

P R I M A R E

THE SOUND AND VISION OF SCANDINAVIA

Design Brief – CD15 Prisma Compact Disc and Digital Music Player



CD15 Prisma is an integrated digital music source, combining compact disc and stored or streamed media playback.

Contents

- Design Philosophy
- Drive Technology
- Digital to Analog Conversion Technology
- Prisma Connectivity and Control Technology
- Optional Configurations
- System Building
- Specifications

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 Philips slot load disc drive chosen for use in CD15 Prisma was originally developed for the transportation industry, and as a result is extremely reliable and well isolated from external and internal vibrations, ensuring long life and low 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 a high performance 32-bit stereo AKM DAC AK4490EQ chipset was selected for the I15 Prisma, incorporating AKM’s VELVET SOUND™ technology, and capable of achieving -112dB THD+N with 120dB (stereo) S/N, while supporting up to 768kHz PCM and 256/11.2MHz DSD. The AK4490EQ integrates a newly developed switched capacitor filter “OSR Doubler” that greatly reduces sound degradation from noise shaping, achieving a flat noise floor up to 200kHz. An innovative design technique utilizing a symmetrical layout for the left and right channels prevents signal quality deterioration, and a 32-bit digital operation block provides full 32-bit processing.

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 through the Google Home speaker and Google Assistant is anticipated as that system becomes readily available.

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

System Building

CD15 Prisma + powered loudspeakers

By connecting a pair of powered loudspeakers to the CD35 Prisma and selecting the variable output option allows for the creation of a compact high-performance digital music system for disc, stored, and streamed media.



CD15 Prisma Rear Panel



CD15 Prisma Compact Disc and Digital Music Player Specifications

Compact Disc Player

Mechanism: Philips CDM-M10

D/A converter: AKM AK4490

Analog outputs – selectable fixed or variable: 1 pair RCA, 2.2 Vrms

Output impedance: RCA 370 Ω

Digital outputs:

- 1x RCA
- 1x TOSLINK

Frequency response: 20Hz – 20 kHz $\pm 0.1/-0.65$ dB

Signal to Noise: < 80 dB/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
 - IEE 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: 20Hz – 20kHz +0.1/-0,65dB

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 10W

Dimensions: (wxdxh)

- 350 x 329 x 73 mm with knobs and connectors
- 350 x 329 x 73 mm with knobs and connectors

Weight: 6.6 kg

Color options: Black or Titanium

