PRIMARE SC15 Prisma MK2 Design Brief User Guide

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P R I M A R E

PRIMARE SC15 Prisma MK2 Design Brief

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- Zen Wireless Microphone: Rechargeable battery powered microphone with Bluetooth and WiFi

Product Usage Instructions

Control Configuration
The SC15 Prisma MK2 can be configured using any of the following methods:

- Front Panel: Use the controls on the front panel of the SC15 Prisma MK2 to configure the settings.
- C25 IR Remote Control: Use the C25 IR remote control to configure the settings.
- Prisma App: Download and install the Prisma app on your mobile device. Connect your mobile device to the SC15 Prisma MK2 via Wi-Fi or Bluetooth and use the app to configure the settings.

Power Supply Section
The SC15 Prisma MK2 features an ultra-low noise switch mode power supply. This power supply allows for rapidly varying demand, providing a much more stable voltage. It also includes ancillary capacitive storage to meet peak transient burst requirements.

Digital to Analog Conversion (DAC) Technology
The SC15 Prisma MK2 utilizes a high-performance ESS ES9028Q2M Sabre Reference DAC. This DAC technology ensures playback of virtually any digital source with absolute accuracy and musicality. The DAC architecture features ESS patented 32-bit HyperStream DAC and Time Domain Jitter Eliminator, delivering a dynamic range (DNR) of up to 129dB and total harmonic distortion plus noise (THD+N) of -120dB. It can handle up to 32-bit 384kHz PCM and DSD 256 data.

Prisma Connectivity and Control Technology
The SC15 Prisma MK2 is equipped with Prisma Connectivity and Control Technology. This technology allows you to connect the SC15 Prisma MK2 to Chromecast speakers and use it within the Roon media management platform.

Room and Manual EQ
The SC15 Prisma MK2 provides both automatic Room EQ and Manual EQ functions. The automatic Room EQ function can be used with any iOS mobile device, while Android devices require the use of the Zen microphone.

Automatic Room EQ
To optimize the room EQ automatically, follow these steps:

1. Launch the Prisma application on your iOS mobile device or Android device connected to the Zen microphone.
2. During the measurement sequence, the speakers will play back pink noise for 60 seconds while you move the iOS device or Zen microphone around the room in large circular motions.
3. The EQ function samples all positions in the room to identify each room mode.
4. Once the measurement sequence is complete, the speaker compensation will be automatically calculated, and a bass filter will be applied to counteract boundary effects caused by the room.
5. The compensation will correct the bass range below 500 Hz, providing a naturally even response within the

room at the listening position.

Manual EQ
After the room has been measured and the system calibrated using the automatic Room EQ, you can manually adjust the speakers' response to meet your personal preferences. Refer to the Prisma application for instructions on how to access and adjust the Manual EQ settings.

Zen Wireless Microphone
The Zen microphone is a rechargeable battery-powered microphone with built-in Bluetooth and WiFi capabilities. It is an ideal calibration tool for collecting room acoustic data when using an Android mobile device. The Zen microphone transfers the collected data via network connection to a supported app. The app processes and calibrates the data and transfers the optimized result through the Prisma application to the SC15 Prisma MK2.

FAQ (Frequently Asked Questions)

1. **Q: Can I configure the SC15 Prisma MK2 using both the front panel and the Prisma app simultaneously?**
   A: No, you can only use one control configuration method at a time. If you are using the Prisma app, the front panel controls will be disabled.
2. **Q: What is the purpose of the Zen microphone?**
   A: The Zen microphone is used to collect room acoustic data for automatic Room EQ when using an Android mobile device. It transfers the collected data to a supported app for processing and calibration.
3. **Q: Can I use the SC15 Prisma MK2 with Chromecast speakers?**
   A: Yes, the SC15 Prisma MK2 supports Chromecast speakers for audio playback.

SC15 Prisma MK2 is a full-featured network player and DAC featuring preamplification functionality, automatic and manual speaker EQ, and WiSA high-resolution wireless speaker connection technology. Employing the Prisma bundle of control and connectivity technology, advanced digital to analog conversion, and, with its three-quarter sized cabinet, the SC15 Prisma MK2 not only continues a Primare tradition of delivering astonishing performance from compact and elegant devices, but also offers even greater possibilities for easy installation into virtually any and every room of the house.

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.
- Class D amplifier technology has many inherent advantages, one of which is the ability to locate the heat sink directly on the circuit board within the amplification module, considerably reducing circuit path length and allowing for the power output devices to be directly connected to the speaker output connection posts.

Pre-amplifier Technology

Input section
Carefully crafted input circuitry utilizes relays for input switching providing better isolation and sound than found in more conventional CMOS (Complementary metal–oxide–semiconductor) switches, and improved 2 x 4 channel balanced mode volume control IC selected for optimal channel balance and low listening level performance.

Output section

- Analog Out – selectable fixed or variable
- WiSA wireless loudspeaker connection technology
- Audio Quality – WiSA transmits 24bits at 48kHz/96kHz, that’s twice the quality of CD audio.
- Nearly Zero Latency – less than 1/10th the latency of Bluetooth audio devices.
- Immediate Synchronization – even with a 7.1 configuration, synchronization is certified less than 1/1,000,000 of a second.
- Multiple pairs of speakers can be connected wirelessly, such as a pair of main speakers and a subwoofer or pair of subwoofers.

Control Section

- The latest generation OLED display technology used in the SC15 Prisma MK2 was originally developed for the

automobile industry to ensure long life in even the most hostile environments, and improved readability due to greater consistency of color value and brightness level.
- Auto sense input circuitry automatically selects any input source as it is activated.
- C25 IR remote control with completely new, proprietary control codes for faster response and reduced interference.
- RS-232 connection, in addition to being used for component quality control testing of each and every product, allows for the use of whole home system control technologies such as Control 4.
- 12V triggers for coordinated system turn on and turn off.

Control Configuration
Either from the front panel, C25 IR remote control or Prisma app, the SC15 Prisma MK2 can be configured to best suit system needs, including:

- **Input settings**
    - Status – enable or disable the input to make it visible or not, so only those you use are visible for easier input selection
    - Alias – edit the alias, or rename, each input to give it a specific name, for easier identification
    - Auto-sense – enable auto-sense to determine which inputs will be automatically selected when a signal is detected
    - Volume – choose between variable or fixed volume, allowing any input to pass through the preamp stage to connect directly to the amplifier for use of within a home theater system configuration.
      Or fixed gain setting allows for any input to be use in a theater or surround sound pass through configuration
    - Input Gain – adjusting the input gain so that all inputs to be at the same relative volume level, and as result the ability to raise or lower overall gain for preferred output volume setting
- **Audio Settings**
    - Balance – to adjust the output balance between the left and right speaker
    - Startup volume – sets the volume level at a predetermined level upon turn on from standby or at the level when last switched off.
    - Maximum volume – sets the maximum volume
    - Mute volume – sets the output level when muted, from 0 to any preferred setting
    - Digital output – to select between 48kHz and 96kHz settings for the digital output from analog inputs, as some devices in your system might not be compatible with the default 96kHz output.
    - Analog Out
- selectable fixed or variable
- subwoofer output with crossover control when using wired subwoofer with WiSA wireless main speaker connection
- General
    - Show inputs – choose between showing all enabled inputs or only those with signal
    - Front panel – to lock the front panel to disable all front panel controls
    - Auto dim – select the amount of time at which the front panel display will dim
    - LED brightness – set the level of display brightness for three specified dim levels
    - Standby settings
- Standby mode – select

- “normal” standby, which allows any activated input device set to “wake up” enable to wake up the Prisma integrated amp or preamplifier from standby
- or “Eco” in order for the device to consume less than 0.5W in standby mode, disabling auto wake-up
- Auto-standby – sets the amount of time without user interface action or signal from last selected source before the device automatically goes into standby
- Wake up – enables auto-sense to wake up the device from standby upon detecting an input signal source
- Factory reset – allows for the device to be returned to factory default settings

Power Supply Section

An ultra-low noise switch mode power supply allows for rapidly varying demand, providing much more stable voltage, with ancillary capacitive storage to meet peak transient burst requirements.

Digital to Analog Conversion (DAC) Technology
To allow for playback of virtually any digital source with absolute accuracy and musicality a high-performance ESS ES9028Q2M Sabre Reference DAC is utilized, using the critically acclaimed ESS patented 32-bit HyperStream DAC architecture and Time Domain Jitter Eliminator, delivering a DNR of up to 129dB and THD+N of -120dB, while handling up to 32-bit 384kHz PCM and DSD 256 data.

Prisma Connectivity and Control Technology
Prisma provides connectivity and control for playback of stored and streamed media, wired or wireless, all managed from any mobile device through a dedicated system control app. In addition, the Prisma platform allows for streaming from virtually every music streaming services with Bluetooth®, AirPlay, Chromecast built-in, Roon and Spotify Connect functionality.

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

Switching of all inputs, analog and digital, stored or streamed

- **NAS 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
  - 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
  - Multi-room multi-zone control between other Prisma enabled devices

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

    - Prisma – provides direct access to high resolution streaming services
    - Radio – a convenient way to easily play favorite radio stations
    - Qobuz and TIDAL, both MQA Master and MAX HiRes FLAC, gapless playback with resolution up to 24/192 kHz.
- 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. Additionally, AirPlay offers multi-room/multi-zone capability with AirPlay speakers and within the Roon media management platform.
- Roon – is a sophisticated digital music management software, transforming the experience of browsing music. Artist photos, credits, bios, reviews, lyrics, tour dates, and composers are located automatically, then interconnected by links to build a surf-able, searchable digital magazine about your collection. And Roon finds all the same links between your personal files and the millions of tracks available on TIDAL and Qobuz. In addition, Roon is a multi-room, multi-user networked audio platform built to the exacting standards of audiophiles, while offering features like bit-perfect playback, DSD and PCM up-sampling, EQ functionality, and signal path display.
- 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 a remarkable 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 SC15 Prisma MK2 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 MAX (up to 24/48 kHz) 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.
- Additionally, Chromecast offers multi-room/multi-zone capability with Chromecast speakers and within the Roon media management platform.

Room and Manual EQ

SC15 Prisma MK2 provides both automatic Room and Manual EQ function using a program built-in to the Prisma application. The EQ function can be used with any iOS mobile device, while Android devices require the use of the Zen microphone described below. Room EQ automatic optimization method is easy to use. During the measurement sequence, the speakers will play back pink noise for 60 seconds while the iOS device or Zen mic is moved around the room in large circular motions. The EQ function samples all positions in the room to identify each room mode. When the measurement sequence is complete, the speaker compensation will be automatically calculated, and a bass filter will be applied to the system to counteract boundary effects, compensating for the interference caused by the room. Since the room impacts the lower frequencies the most, the compensation will correct the bass range below 500 Hz. However, full frequency data is captured during the measurement process

so that the low-frequency output is aligned with the high-frequency output, providing naturally even response within the room at the listening position.
Once the room has been measured and the system calibrated using the automatic Room EQ, it is possible to manually adjust the speakers' response to meet personal preferences.

Zen Wireless Microphone
The Zen mic is a rechargeable battery powered microphone with built-in Bluetooth (setup process) and WiFi 2.4Ghz, making it an ideal calibration tool for collecting room acoustic data when using an Android mobile device. The Zen transfers the collected data via network connection to a supported app. The app processes and calibrates the data and based on that calculation, the optimized result is transferred through the Prisma application to the SC15 Prisma MK2.

System Building

SC15 Prisma MK2 + Pre-amplifiers and Integrated Amplifiers
Selecting fixed output configures SC15 to act as a complete stored and streamed digital music source and digital to analog converter for virtually any high-performance audio system.

SC15 Prisma MK2 + Powered Speakers
Selecting variable output allows the SC15 Prisma MK2 to be the centerpiece of a compact digital audio system by simply connecting a pair of powered loudspeakers.

SC15 Prisma MK2 + WiSA Loudspeakers
Connecting SC15 Prisma MK2 with a pair of WiSA enabled wireless speakers can easily create an elegant and compact digital audio system.

SC15 Prisma MK2 + DD15
Adding a DD15 CD transport will allow for CD disc playback with any SC15 Prisma MK2 based audio system.

SC15 Prisma MK2 Specifications

Amplification

- Analog Inputs: 2 pair RCA (L & R)
- Input Impedance: RCA 12 kΩ
- Analog Out: 1 pair RCA (L & R)
  - selectable fixed or variable
  - subwoofer output when used with WiSA connected loudspeakers
- Output Impedance: 150Ω
- Gain: Pre out 16.5 dB
- Frequency Response:
- Analog: 20Hz – 20kHz -0,3dB
- Digital:
  - 44.1kHz 20Hz – 20kHz +0,1/-0,2dB
  - 96kHz 20Hz – 20kHz +0,1 /-0,2dB
  - 192kHz 20Hz – 20kHz +0,1/- 0.2dB
- THD + N: < 0.005%, 20Hz – 20kHz
- Signal to Noise:
  - >110 dB digital
  - >100 dB analog
- DAC
  - Chip set: ESS ES9028Q2M
- Digital Inputs
  - 3 x Optical/TOSLINK 192 kHz
  - 1x 3.55mm mini-plug: 192 kHz
  - 1 x SPDIF/RCA: 192 kHz
  - 1 x USB-B: up to 384 kHz/24 bit; DSD 256
- Digital Output: 1 x RCA
- Analog input = 96 kHz out
- Digital input = pass through
- Prisma
  - Audio formats: WAV, LPCM, AIFF, FLAC, ALAC, MP3, MP4 (AAC), WMA, OGG, DSD

    - WLAN: IEE 802.11 a/b/g/n/ac compliant; 2.4/5gHz; b, g, n mode
- Wired Inputs:
    - USB-A: 192 kHz/24 bit; DSD 64/128′
    - 1 x LAN: 192 kHz/24 bit; DSD 64/128
    - WLAN: 192 kHz/24 bit; DSD 64/128
- Wireless Inputs:
    - Airplay®
    - Bluetooth®
    - Chromecast built-in®
    - Spotify Connect®
    - WiSA wireless loudspeaker connection technology
- General

  Control
    - C25 system remote control
    - RS232 – Control 4
    - IR in/out
    - Trigger out
- Power Consumption:
- Standby:
    - ECO mode <0.5W
    - Normal mode <5W
- Operate: <15W
- Dimensions (wxdxh):
    - 350 x 320 x 73 mm with knobs and connectors
    - 350 x 310 x 73 mm without knobs and connectors
- Weight: 6 kg
- Color Options: Black and Titanium

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Documents / Resources

	PRIMARE SC15 Prisma MK2 Design Brief [pdf] User Guide SC15 Prisma MK2 Design Brief, SC15, Prisma MK2 Design Brief, MK2 Design Brief, Brief

References

- Primare – The Sound and Vision of Scandinavia
- User Manual