I35 Modular Stereo Integrated Amplifier Platform Design Brief

I35 stereo integrated amplifier platform features dual XLR inputs to a fully balanced preamplifier circuitry feeding a powerful amplifier stage and modular construction allowing for sophisticated DAC and Prisma network modules to be added at any time to create an integrated digital and analog music system control center and amplifier capable of providing exemplary performance whether the source is analog or digital, stored or streamed, wired or wireless.

To allow for playback of virtually any digital source with absolute accuracy and musicality, the PRE35 Prisma's advanced DM36 DAC stage recreates high-resolution sound that is as close as possible to the original source.

The addition of SM35 Prisma network player module provides multi-room/multi-zone connectivity and control for playback of stored and streamed media, wired or wireless, all managed from a mobile device through a dedicated system control app. Additionally, virtually any music streaming service can be cast for playback using Chromecast, Bluetooth®, AirPlay, Roon Ready, and Spotify Connect.

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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.
   - 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.

Amplifier Technology

<u>Input section</u>
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.

<u>Control</u>

- Improved 2 x 4 channel balanced mode volume control IC selected for optimal channel balance and low listening level performance.
- The latest generation OLED display technology used in the I35 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 or C25 IR remote control, the I35 Prisma can be configured to best suit system needs:

- 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.
- 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:
        - 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

Amplifier Section

The amplifier section utilizes the new proprietary UFPD 2 power technology, providing immediate and sustained high power output with very low distortion, instantaneous rise time and absolutely linear amplification across the entire bandwidth resulting in a naturally fast, clean and agile sound over an ultra-wide frequency range and with exceptional headroom.

In UFPD 2 a new error amplifier circuit has been developed that does not affect the gain versus frequency curve and thereby the bandwidth does not have to be limited. This gives very low phase shift in the audio band and a larger closed loop bandwidth. Using a custom made output coil in the 2nd order filter error amplifier with the same loop gain results in feedback control across the entire audio band. It has been optimized to keep the loop gain constant in the audio band, which means it is actually lower at low frequencies than with UFPD but much higher at high frequencies. The result is even more linear amplification, with lower noise with UFPD 2, providing absolute "black" backgrounds from which music has a more holographic, three-dimensional, life-like character and richness.

Power Supply Section

Given the speed with which the UFPD 2 amplifier module is able to deliver power to the speaker a switch mode power supply was the only choice in that it allows for rapidly varying demand, providing much more stable voltage, with ancillary capacitive storage to meet peak transient burst requirements.

This newly developed Active Power-Factor Correction (APFC) converter is as much as 5% more efficient than past supplies, and comprises dual PFC converters 180 degrees out of phase from each other. AFPC is used to avoid input current harmonics, thereby minimizing interference with other devices being powered from the same source. This reduces the total current ripple and improves EMC (Electromotive Compatibility), while current ripple at the output of the PFC converter is also reduced, which decreases stress within the circuit for prolonged life. Additionally, the supply operates in what is called "transition mode", minimizing switching losses and improving overall efficiency in delivering power to the UFPD 2 amplification module.

Digital to Analog Conversion (DAC) Technology

In order to allow for playback of virtually any digital source with absolute accuracy and musicality, the I35 Prisma's refined DAC stage recreates high-resolution sound that is as close as possible to the original source.

The DM36 DAC stage is a completely new and thoroughly designed digital to analog converter, utilizing an ESS ES9068A chipset that incorporates the critically acclaimed ESS patented HyperStream®II architecture, QUAD DAC™ technology, Time Domain Jitter Eliminator, and advanced SABRE HIFI® technology, thereby significantly improving overall performance over its predecessor DM35, providing a sound that is more richly detailed and lifelike, with more precise three dimensionality within a larger soundstage.

Additionally, the DM36 provides full MQA processing capabilities with both Prisma and Primare CD sources.

This means that, with the associated Prisma application update, embedding both Qobuz and Tidal, the Prisma models listed above with the DM36 module will allow for the final MQA unfold to 384 kHz when playing Tidal Master files. Noting that for all other Prisma models, including those using the DM35 DAC module, the update will allow for the first full MQA unfold to resolution up to 96 kHz, Qobuz resolution up to 192 kHz, and gapless playback for both platforms.

In our CD players and transports, MQA CD playback is supported with CD15 Prisma DD15, CD35 Prisma, and DD35 when using Toslink optical or RCA coaxial digital out connection to the DM36.

MQA indication in the DAC only versions of I25, I35 or PRE35 with DM36 the OLED display will show:

- MQA – reflecting MQA
- MQA. – reflecting MQA STUDIO

In the Prisma versions of I25, I35 and PRE35 the OLED will show as above as well as in the lower left of the Prisma app main page as below:

- MQA GREEN DOT – reflecting MQA

- MQA BLUE DOT – reflecting MQA STUDIO

'MQA Studio' (blue light) gives confirmation directly from mastering engineers, producers, or artists to their listeners authenticating that the sound you are hearing is exactly as played in the studio when the music was completed and, by implication, that this is also the definitive version of the recording at that point in time.

'MQA' (green light) indicates that although the stream is a genuine MQA file, provenance may be uncertain or that it is not yet the final release.

Note: the DM35 DAC module is now discontinued and no longer available either separately or as part of a DAC or Prisma model.

Prisma Connectivity and Control Technology

Prisma provides multi-room/multi-zone 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 to Bluetooth®, AirPlay, and Spotify Connect, Prisma features Chromecast built-in, a unique streaming portal allowing effortless direct connection to hundreds of streaming applications for the best possible performance and user experience.

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

- Switching of all inputs, analog and digital, stored or streamed
- Volume control and input sensitivity adjustment
- Customization of input options, including renaming
- Multi-room multi-zone control between other Prisma enabled devices
- Playlist and queue functionality from connected LAN storage devices
- Wake up on cast signal

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 Ethernet connection for wired network system connection
    - Wireless/WLAN - dual band wireless technology (WLAN IEEE 802.11 a/b/g/n and 802.11ac compliant)
- Streaming
    - 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.
    - 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.
    - Roon Ready - functionality allows for the use of Roon's sophisticated digital music management software. Roon transforms the experience of browsing music. In addition to music browsing, Roon is a multi-room, multi-user networked audio platform built, to the exacting standards of audiophiles. It offers features like bit-perfect playback, DSD and PCM up-sampling, 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 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.

I35 Modular Stereo Integrated Amplifier Platform Specifications

Amplification

Amplifier module: Primare UFPD 2

Power supply: Primare APFC

Output Power: 2x 150W at 8Ω; 2x 300W at 4Ω

Analogue Inputs:
- 2 pair XLR (L & R)
- 3 pair RCA (L & R)

Input Impedance: RCA 15kΩ; XLR 30kΩ

Line Output: 1 pair RCA (L & R)

Pre Out: 1 pair RCA (L & R)

Output Impedance: Line and Pre 100Ω

Frequency Response: 20Hz – 20kHz -0.2dB

THD + N: < 0.01%, 20Hz – 20kHz, 10W at 8Ω

Signal to Noise: >100 dB

Gain:
- Pre Out: RCA in 16.5dB; XLR in 10.5dB
- Speaker Out: RCA in 42.5dB; XLR in 36.5dB

Digital to Analog Conversion

Chip set: ESS ES9068A

Inputs:

- 4 x TOSLINK (optical) up to192kHz/24 bit
- 2 x RCA up to 192kHz/24 bit
- 1 x USB-B up to 384kHz/32 bit; DSD 256/11.2MHz

Digital Output: 1 x RCA

- Analog input = 96kHz output
- Digital input = pass through, if up-sampling is disabled

Frequency response:

- 44.1kHz +0,1 / -0,4 dB 20Hz - 20kHz
- 48/96/192kHz +0,1/ -0,2 dB 20Hz-20kHz

Prisma

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

Inputs:

- USB-A: up to 192 kHz/24 bit; DSD 256/11.2MHz
- Airplay®
- Bluetooth®
- Chromecast built-in®
- Roon Ready®
- 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:

- 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

General

Control

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

Power Consumption:

- Standby: <0.5W ECO Mode; <3.5W Wake Up Mode
- Operate: <42W

Dimensions (wxdxh):

- 430 x 420 x106 mm with knobs and connectors
- 430 x 382 x106 mm without knobs and connectors

Weight: 11 kg

Color Options: Black and Titanium

Note: features and specifications are preliminary and subject to change.