constellation audio

Simply, Light Years Ahead.

TECHNICAL BRIEF:
Constellation Audio products 2012

COMPANY PROFILE

Constellation Audio was founded four years ago based on a simple idea: That creating the world's finest audio products requires both revolutionary design and a love of the great traditions of high-end audio.

The first and most important step in the company's history was to hire not just one or two talented professionals, but an entire team of the audio industry's most respected names. Heading the team as CEO is high-end audio entrepreneur Murali Murugasu. The engineering team includes such revered names as John Curl, Bascom King, Peter Madnick and Demian Martin. Industrial design is by Alex Rasmussen of Neal Feay Company, the firm responsible for the look and feel of many of the high-end audio industry's most distinctive products. All Constellation Audio products are made in Madnick's Newbury Park, California factory.

The company encouraged this "dream team" of engineers and designers to achieve the greatest work of their careers—to use the best possible methods, technologies and materials, regardless of cost or complexity. Constellation Audio products use construction methods other manufacturers would reject because they are too bold or too costly. They use circuit topologies never before imagined, and exotic and expensive parts found on few, if any, competing audio products.

The result is audio products that deliver an entirely new level of performance, far more advanced than what could be achieved by a traditional high-end audio company, and far more musical than what could be achieved by a typical high-tech company.

Even the legendary products of the audio industry are compromised in some way. Constellation Audio's products are not. This is why Constellation Audio can make the bold claim that its products sound better than any audio products ever made, at any price.

REFERENCE SERIES

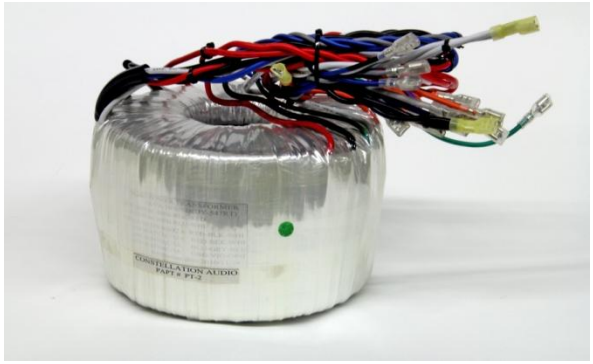
Hercules monoblock amplifier

Hercules monoblock amplifier

The Hercules is one of the most innovative, powerful, and musical amplifiers ever made. In fact, we think it's the best ever made. Despite its extremely high output of 1.1 kilowatts into 8 ohms, it has the same sound quality as a much smaller amplifier. This is because it is built from several 125-watt amplifier modules. The Hercules sounds exactly like the smaller amp, but is eight times as powerful.

Constellation Audio's exclusive balanced drive design allows the Hercules to achieve a perfect balance between the positive and negative halves of an incoming audio signal. Most balanced amplifiers use N-type output transistors for the positive half of the circuit and P-type transistors for the negative half. The difference in the transistors produces an imbalance between the two halves of the signal. Because the Hercules is built with matched amplifier modules using only N-type output transistors, every bit of the musical signal passes through exactly the same circuit components. Thus, it has the musicality of a small, single-ended amplifier, with none of the dynamic limitations.

To maintain perfect balancing, the Hercules must receive a perfectly balanced signal. This is why the amplifier incorporates Constellation Audio's Line Stage Gain Module, the same high-precision circuit used in the Altair preamplifier. If the Altair is used as the preamp for the Hercules, the amplifier's gain module can be bypassed using the Constellation Direct input.



One of the Hercules' dual 1,500-watt toroidal power transformers

The amplifier achieves its high power output in part because of its extremely large power supply, which uses dual custom-wound 1,500-watt toroidal transformers and massive storage capacitors. Large heatsink and a unique side ventilation port design assure proper cooling. Power for low-voltage circuits is fully regulated. Because of the large transformers, heat sinks and machined aluminum chassis, each Hercules amplifier weighs 124.7 kg.

Vital operating information for the Hercules is displayed on a 432- by 230-pixel LCD on the rear panel. The user can view output in watts, operating temperature (C° or F°), input selected, and overload warnings.

Altair preamplifier

The Altair offers a truly rare combination of state-of-the-art engineering with the purest possible signal path. The core of the Altair's technology is Constellation Audio's exclusive Line Stage Gain Module, which uses servo circuits to deliver a practically perfect balance between the positive and negative halves of the audio signal, for the most musical and accurate sound possible. The circuit uses the quietest FETs we have ever found, each set hand-selected for performance that is matched as close as technically possible. (These FETs have been discontinued and are no longer available to other manufacturers.)

The Altair's machined aluminum chassis

Each Line Stage Gain Module is isolated from vibration and interference to a degree never before achieved in a preamp. Each of the perfectly matched mono circuit boards is shielded by a machined aluminum shell, then mounted on a heavy platform that places a vibration-absorbing polymer sheet between two sheets of stainless steel. The control circuits are mounted underneath the platform, so they are isolated and shielded from the audio circuitry. The entire platform floats on an elastomeric suspension that absorbs external vibration. Highly flexible, custom-made wires connect the circuits on the platform to the jacks and controls on the chassis. The outer enclosure is machined from a solid aluminum block to a minimum thickness of 8.2mm, sufficient to block all electromagnetic interference.

The Altair's back panel, with three power supply inputs near the bottom

Instead of an imprecise, mechanical volume control potentiometer, the Altair's volume control uses optically controlled resistors that can be adjusted to an accuracy of 0.1 dB. These resistors have no electrical connection with the signals controlling them. Their effect on the audio signal is exactly the same as the effect of a simple resistor, so they do not color the sound as a mechanical potentiometer does. The Altair's optically controlled resistors are so precise that they can achieve maximum potential performance only in a stable temperature environment, which is why Constellation Audio recommends leaving the Altair on all the time or warming up the unit for at least 8 hours if time permits.

Optional Pyxis touchscreen system controller

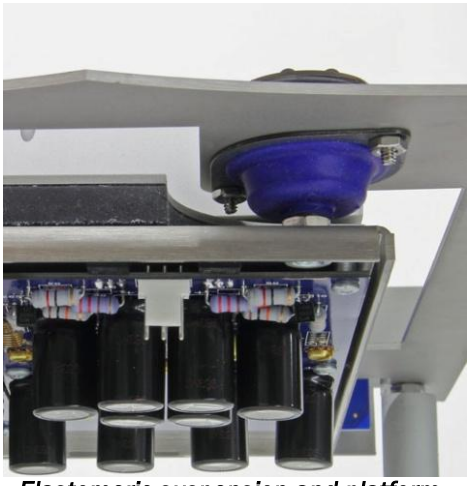
To maintain sonic purity, the Altair uses a completely separate power supply. Inside are three R-core transformers: one for the left channel, one for the right channel, and one for control circuits. Three custom-extruded, high-current PCOCC cables terminated with aerospace-type Hypertronics connectors carry DC from the supply to the preamp. Total weight of the preamp and the power supply is 49.6 kg.

The Altair can be controlled through its 432 x 230-pixel LCD front-panel touchscreen, which accesses such advanced features as input naming, minimum and maximum gain settings for each input, home theater bypass, and volume control resolution. It can also be controlled using the supplied infrared remote control, or through Constellation Audio's Pyxis wireless system controller, which incorporates its own LCD touchscreen.

Orion phono preamplifier

To design the core circuitry of the Orion phono preamplifier, Constellation Audio hired John Curl, the world's most acclaimed designer of phono preamps. Curl's past work includes phono preamps for CTC, Mark Levinson, Parasound, SOTA, and Vendetta Research.

The Orion is the first product in which all of Curl's ideas could be realized. No compromise has been made in its design. As in Constellation Audio's Altair preamp, the world's quietest FETs have been used. These FETs deliver a noise level of 0.4 nanovolts per square Hertz, approximately equal to the noise level of a single 10-ohm resistor. The circuits also use metal-film Vishay resistors, custom polypropylene and Teflon capacitors, and internal cabling made from custom-extruded PCOCC wire drawn from a single copper crystal.


Elastomeric suspension and platform construction

Each of the fully balanced, dual-mono circuit boards is enclosed in a shield made from machined aluminum, in order to protect the delicate audio signals from interference. These circuit boards are mounted on a platform composed of a vibration-absorbing polymer layer sandwiched between thick sheets of stainless steel. The control circuits are on the other side of the platform, so they are completely shielded from the audio circuits. The platform is mounted on an elastomeric suspension that prevents vibration from reaching the sensitive

circuitry. This entire assembly is then installed in a chassis milled from a solid billet of aluminum, with a wall thickness of 8.2mm to block all electromagnetic interference.

To further ensure that the precision audio circuits are totally isolated from interference, Constellation Audio builds the power supply into a separate chassis. Separate R-core power transformers are used for the left channel, the right channel, and the control circuitry, so the demands of one channel cannot interrupt or affect the DC power going to the other channel. Three custom-made, high-current cables tipped with aerospace-type Hypertronics connectors carry the power from the supply to the phono preamp chassis. The weight of the entire Orion, with preamp and power supply, is a substantial 42.8 kg.

Orion power supply back panel, showing three separate DC outputs

The Orion allows vinyl record enthusiasts complete flexibility to fine-tune the performance of their playback system. Load capacitance is adjustable from 200 to 400 pF, while load impedance is adjustable from 3Ω to 100 KΩ. RIAA, Columbia, and Decca EQ curves can be selected. Each of the three inputs has its own settings memory.

All of these functions may be adjusted through the Orion's own front-panel 432 x 230-pixel LCD touchscreen or using the included infrared remote control.

Sirius digital-to-analog converter

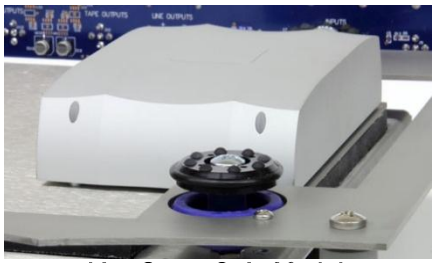
The Sirius is an advanced digital-to-analog converter (DAC) capable of getting the best sound from high-resolution digital music files as well as from traditional sources such as CD players. No matter where the music comes from, the Sirius will reproduce it with the best possible fidelity.

Sirius digital-to-analog converter rear panel

The fully balanced, dual-mono digital-to-analog converter in the Sirius is the most advanced and musical ever designed. While many high-end digital-to-analog converters have one or two DAC chips per channel, the Sirius features eight DAC chips per channel. For each channel, the DAC chips are split into two groups, one for the positive half of the audio signal, the other for the negative half. The four DAC chips in each group receive slightly different signals, subtly filtered in bandwidth and phase so that when the signals are recombined, the inherent noises and distortions of the DAC chips are cancelled. The result is the quietest, most detailed, most lifelike digital audio heard to date.

The listener can select from four digital filters—minimum-phase, phase-perfect, Bessel and Butterworth—depending on which suits their taste.

From the DACs, the signal travels to two Line Stage Gain Modules, fixed-gain output versions of the same circuitry used in Constellation Audio's Altair preamp. To ensure precise, delicate and musical sound, these modules are built with hand-selected FETs and servo circuits to maintain a perfect balance between the positive and negative halves of the signal.



Line Stage Gain Module

The Sirius features the most carefully designed chassis and interior components of any digital audio product available today. The Line Stage Gain Modules are enclosed in cast-aluminum cases to shield the analog circuits from outside interference. The cast-aluminum cases are mounted on a platform, which is built from a sandwich of two stainless steel sheets with a vibration-absorbing polymer sheet inside. The platform shields the analog audio circuitry from the control and digital circuits mounted under the platform. The entire platform floats on an elastomeric suspension so the circuitry is not affected by external vibration. The surrounding enclosure is milled from a solid piece of aluminum, with a minimum wall thickness of 8.2mm to shield against all electromagnetic interference.

The separate power supply contains three R-core transformers, one each for left channel, right channel, and digital/control circuits. The power supply connects to the DAC with three specially designed high-current cables tipped with aerospace-style Hypertronics connectors.

The USB input on the Sirius accepts FLAC, AIFF and WAV files from a computer, so you can easily play your stored music files. AES/EBU, coax SPDIF and Toslink digital inputs connect to CD players and other traditional digital source devices.

All features of the Sirius can be controlled through the unit's front-panel 432 x 230-pixel LCD touchscreen or by using the included infrared remote control.

PERFORMANCE SERIES

Centaur Mono and Centaur amplifiers

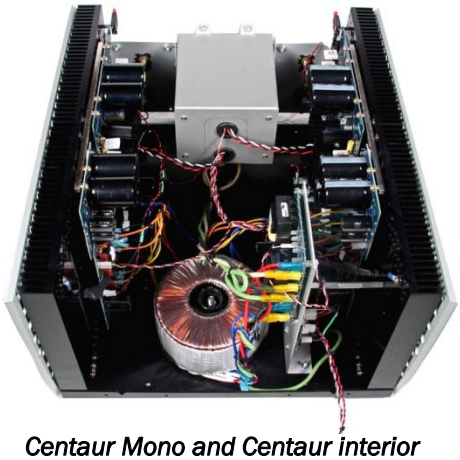
Like Constellation Audio's Reference series Hercules amplifier, the Centaur Mono monoblock and Centaur stereo amplifiers are designed to deliver the power of a large solid-state design with all the delicacy and detail of the finest single-ended triode tube amplifiers.

Centaur Mono and Centaur amplifier

A small, highly musical 125-watt amplifier module

forms the basis of the Centaur Mono and Centaur. This design gives these amplifiers all of the delicacy and musicality for which small, single-ended tube amplifiers are known. But these amplifiers are far more capable than any tube amp. To reach the Centaur Mono's 500 watts into 8 ohms, and the Centaur's 250 watts per channel into 8 ohms, we simply added more modules. Thus, the amplifiers deliver extremely high power but sound exactly the same as that original smaller amplifier module.

Both the Centaur Mono and the Centaur use Constellation Audio's balanced drive design, a unique, fully complementary circuit topology that achieves an essentially perfect balance between the positive and negative halves of an audio signal. Instead of using P-type output transistors in one half of the amplifier and N-type output transistors in the other half, the single-ended module in the Centaur Mono and Centaur use only N-type output transistors. Thus, an ideal balance—and the best possible fidelity—is achieved.



Centaur Mono and Centaur interior

In order to ensure that all signals going into the Centaur Mono and Centaur are perfectly balanced, both amplifiers use the same Line Stage Gain Module found in the Performance series Virgo preamp. This line stage uses hand-selected FETs and servo circuit to make sure that the positive and negative halves of the signal are perfectly balanced. Customers who own a Virgo or Altair preamps, which already put out a perfectly balanced signal, may use the Constellation Direct interface to bypass the Centaur's gain module.

Both amplifiers use a large toroidal transformer and massive storage capacitors so that the amplification circuits have an ample supply of clean DC power. The Centaur's power transformer includes separate windings for left and right channels, to assure that high demand in one channel does not affect the other channel's output. All power supplies for line-level circuits are fully regulated.

Virgo preamplifier

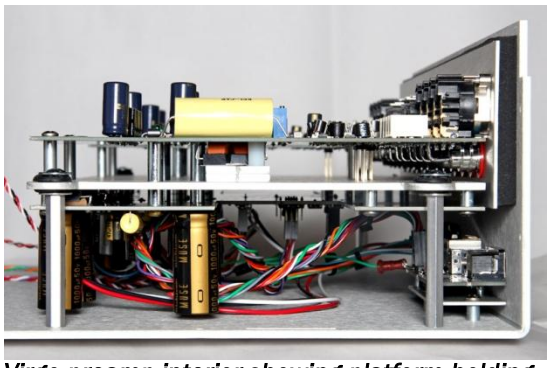
The Virgo preamplifier's design borrows heavily from Constellation Audio's state-of-the-art Reference series preamp, the Altair. In fact, the fundamental circuit design is the same. The difference is that the Virgo is constructed in a way that allows its price to be more affordable.

Virgo preamplifier

Like the Altair, the Virgo is based on Constellation audio's Line Stage Gain

Module, a fully balanced preamplifier circuit that achieves essentially perfect balance between the positive and negative halves of the audio signal. Through the Constellation Direct connection, a special output terminated in an XLR jack, the Virgo can drive Constellation Audio amplifiers directly, bypassing their input stage for superior sound quality. And also like the Altair, the Virgo uses extremely accurate, optically controlled resistors for ultra-precise volume control. Because these resistors are so precise, they require a stable temperature environment to achieve maximum accuracy, so Constellation advises leaving the Virgo on all the time or warming it up for at least 8 hours if time permits.

The circuitry inside the Virgo is built on a thick aluminum platform that floats on an elastomeric suspension so it is isolated from outside vibration. The audio circuitry sits atop the platform, and the control circuit is mounted beneath it. The metal platform isolates the two halves from each other to block interference between them.



Virgo preamp interior showing platform holding audio circuitry above, control circuit underneath.

The chassis of the Virgo is machined from solid aluminum to a minimum thickness of 8.2mm, thick enough to block all common forms of electromagnetic interference. A 432 x 230-pixel screen on the front provides detailed information about operating status and adjustments.

A separate power supply enclosure contains two separate power circuits. One is a linear supply with an R-core transformer, which provides power to the analog circuits. The other supply provides power for the control circuitry. High-current Hypertronics cables, originally developed for the aerospace industry, carry DC power from the supply to the preamp section. Because the power supplies are in a separate enclosure, any magnetic fields or interference they generate cannot affect the audio circuits in the preamp.

A machined aluminum remote control with backlit buttons provides full access to all of the Virgo's functions.

Perseus phono preamplifier

Constellation Audio was very pleased with the quality of the Performance series Orion phono preamp—a joint effort by analog circuit wizard John Curl, engineering and manufacturing expert Peter Madnick, and industrial designer Alex Rasmussen. This is why the company decided not to change the circuit design when it created the more

Perseus phono preamplifier

more affordable Perseus phono preamp. The Perseus uses the same preamp circuits as the Orion, built into a chassis that is simpler and less expensive to manufacture.

As in the Orion, the core of the Perseus is Constellation Audio's Line Stage Gain Module, a fully balanced preamplifier circuit that achieves essentially perfect balance between the positive and negative halves of the audio signal. Hand-selected FETs assure extremely low noise and maximum sound quality.

Signals coming from a phono cartridge are extremely low in level and susceptible to vibrations from outside the preamp. This is why Constellation Audio took such care to isolate the circuits in the Perseus from outside vibration. The circuit board is built on a thick aluminum platform, and the platform is mounted to the chassis using an elastomeric suspension that absorbs vibration. The thick metal platform also shields the delicate audio circuits from the control circuitry mounted underneath.

Elastomeric isolation supporting the Perseus circuit board platform

The enclosure surrounding the circuit board assembly is made from solid aluminum, machined to a minimum wall thickness of 8.2mm-enough to block even the strong 50/60 Hz electromagnetic interference from household electrical circuits.

The separate power supply enclosure provides an R-core transformer for analog circuits and an independent supply for control circuitry. The quality of the power supply and the separate enclosure assure noise and interference are at an absolute minimum. High-current cables tipped with aerospace-type Hypertronics connectors carry power from the supply to the phono preamp.

Front-panel controls on the Perseus allow adjustment of source impedance and load capacitance to achieve maximum performance from any cartridge. Impedance is continuously adjustable from 0 to 500 ohms for moving-coil cartridges. For moving-magnet cartridges, the Perseus provides four impedance selections from 33 to 100 kilohms as well as five load capacitance options from 200 to 400 picofarads.

Cygnus DAC and Cygnus media player

The Cygnus is designed to get the best possible sound from all of the digital files and sources an audiophile is likely to use. No matter if the Cygnus is playing a high-resolution downloaded file, a copy of a tape or vinyl record, or a standard CD, it will deliver truly outstanding sound quality.

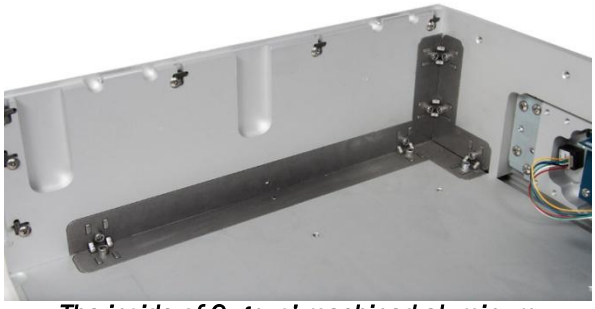
Cygnus digital-to-analog converter

Like the Reference series Sirius digital-to-analog converter, the Cygnus is a fully balanced, dual- mono design. The main difference between the two is that the Cygnus is built into a simpler chassis that is more affordable to make. Two different Cygnus products are available, the Cygnus digital-to-analog converter and the Cygnus media player.

Inside the Cygnus are four 32-bit/192-kilohertz DAC chips. For each of the two channels, one DAC chip reproduces the positive half of the audio signal while the other reproduces the negative half. The signal coming from the DAC chips is amplified by two fixed-gain versions of Constellation Audio's Line Stage Gain Module, the same perfectly balanced, servo-driven circuit found in the company's elite Reference series products. The balanced DAC arrangement and the Line Stage Gain Module assure that the signal is perfectly balanced, with the positive half of the signal at exactly the same level as the negative half of the signal. The result is an incredibly realistic and captivating musical experience.

Thus, the signal starts out perfectly balanced. The listener can select from four digital filters—minimum-phase, phase-perfect, Bessel and Butterworth—depending on which best suits their taste.

From the DACs, the signal travels to two Line Stage Gain Modules, fixed-gain output versions of the same circuitry used in Constellation Audio's Altair preamp. To ensure precise, delicate and musical sound, these modules are built with hand-selected FETs and servo circuits to maintain a perfect balance between the positive and negative halves of the signal.



The inside of Cygnus' machined aluminum enclosure

High-quality chassis and interior components assure that the Cygnus' audio circuits achieve maximum performance. Analog audio circuits are mounted on a thick aluminum platform, with the digital and control circuits mounted underneath. This arrangement assures that the analog audio circuits are shielded from the digital and control circuits to prevent interference. The metal platform is mounted to the chassis with elastomeric isolators so that outside vibration does not get through and Interfere with the circuits' operation. The outside enclosure is milled from solid aluminum, with a minimum wall thickness of 8.2mm to shield against all electromagnetic interference.

To prevent high-voltage energy and electromagnetic waves from the power supply from interfering with audio signals, the supply is in a completely separate enclosure. Inside the supply are an R-core transformer for analog audio circuits, and a conventional transformer for digital and control circuits. The power supply connects to the DAC using high-current, cables tipped with aerospace-style Hypertronics connectors.

Both the Cygnus DAC and the Cygnus media player accept all commonly used digital interfaces, including USB, AES/EBU, coax SPDIF and Toslink optical. The difference between the two is the configuration of the USB input. In the Cygnus DAC, the USB input is placed on the back of the main chassis, and it plays FLAC, AIFF and WAV files streamed from a computer.

The Cygnus media player does not allow streaming USB, but instead is used with USB hard drives and thumb drives. Browsing and metadata (album/artist/song/genre) readout is available on iPhones and iPads through a special app. In the media player, the USB input is moved to the power supply chassis, where the internal computer that accesses the digital files resides. The computer is kept in the power supply to prevent the radio-frequency signals generated by the computer's circuitry from interfering with the analog signals in the main chassis. A dual-link DVI connector provides the digital interface between the main chassis and the power supply.

The media player's USB input also employs a unique synchronous connection, in which the highly accurate clock signal from the DAC is fed to the media player inside the power supply. The computer's clock is entirely isolated from the circuit, so files are read out using the DAC's clock. This maintains perfectly accurate timing of the digital signals for maximum musicality and accuracy.

FOR MORE INFORMATION

For more in-depth information about Constellation Audio and its products, including full technical specifications, press releases, and additional photos, please visit the Constellation audio website or contact info@constellationaudio.com.

www.constellationaudio.com