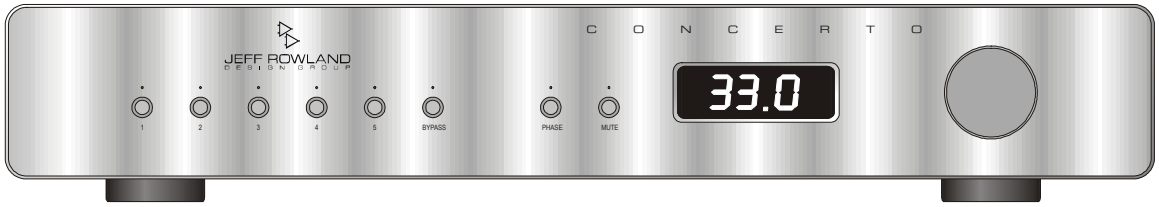
JEFF ROWLAND
DESIGN GROUP



Concerto
Integrated Amplifier Technology

The third generation of integrated amplifier from Jeff Rowland Design Group, the Concerto, is built upon the accumulation of line level and power amplifier knowledge during more than 20 years of amplification design. In the world of high-end audio product design, integrated amplifiers are generally considered the "budget" or entry-level components from most manufacturers. Though the Concerto is the least expensive way to complete the control and amplification portion of an audio or home theater system, it will by no means be a limiting factor in sound quality. The Concerto spares the user excessive heat, burdensome size, and unattractive physical design while at the same time sparing no reasonable expense to provide the best possible sound quality.

The input section of the Concerto is derived from the acclaimed Synergy II*i* preamplifier and utilizes a pair of audio input transformers custom designed with the assistance of Jeff Rowland Design Group using the latest in computer aided drafting techniques (CAD). These transformers enable the input section to accomplish a number of unique goals, including insensitivity to unbalanced source impedances, high common-mode rejection extending to well beyond the audio bandwidth, and the same input impedance and gain regardless of whether the balanced or unbalanced input terminals are used. *(For a more thorough description of transformer based inputs, please see the Jeff Rowland Design Group web-site at: http://www.jeffrowland.com/techtalk.htm)*

Insensitive to unbalanced source impedances, the Concerto has been designed to operate with the widest range of audio source components possible. Making the amplifier immune to the effects of unbalanced source impedances means that in the real world where source components from different manufacturers will vary wildly in their design, the Concerto will be immune to these differences and will pass along the best possible sound quality from any CD player, surround processor, digital component, phono preamp, or analog source.

In the world of audio specs, common mode rejection is the ability of a balanced audio component to reject noise, EMI, RF, and other artifacts. A high common mode rejection ratio improves dynamic range as the music is produced from a quiet, silent background free of hiss, background noise, artifacts, and ground loop hum. Because of the unique abilities of its transformer-based input section, the Concerto realizes superior common-mode rejection, letting the subtlest details, fastest transients, and powerful dynamics present themselves with ease and clarity.

With most amplifier designs, input impedance and gain will vary depending on whether the balanced or unbalanced inputs are used – generally, unbalanced inputs will have half of the output of balanced inputs. With the Concerto Integrated Amplifier, there is no difference between balanced and unbalanced inputs, meaning that there will be no differing characteristic in sound quality and output level depending on which inputs are used – both will provide the same seamless, neutral presentation.

From the input section, the delicate audio signal is then handed to an ingenious input switching and volume control circuit.

The volume control within the control circuit uses the most accurate and sonically neutral system available. A digitally-controlled analog volume control is used to provide exact matching between both channels at every volume setting, as well as allowing the absolute simplest signal path possible. For each volume setting, the audio signal passes unscathed through only a single resistor. This unique system never suffers from the numerous problems found in conventional potentiometer controlled volume controls, including varying impedance and tracking accuracy, and avoids the issues associated with the use of DACs as volume controls, such as the distortions created by their internal polysilicon resistors. Behind the faceplate of the Concerto, the volume knob is attached to a laser cut optical encoder wheel that is read by a light sensitive diode. Based on the information received from this diode, the microprocessor within the unit determines the knob rotation speed and raises or lowers the volume in either large or small increments for the most accurate and transparent volume control possible in the audio world today. The exact number of precise, 0.5 dB steps are then sent to the volume control circuitry on the rear panel to keep the audio signal path as short and distortion free as possible. The volume level is displayed by a soothing, blue seven-segment LED display that is easily read from the listening position. When not in use for more than 5 seconds, the volume control and display circuitry revert to a sleep mode to prevent any audible interference or distortion from corrupting the audio signal.

A pair of unity gain Bypass inputs enables the Concerto to interface seamlessly into any multi-channel or home theater system. Providing direct connection to the main amplifier outputs, the Bypass inputs allow the volume or level control of a multi-channel processor to drive the amplification section of the Concerto and side-step the preamplifier section of the integrated amplifier entirely with the press of a button. The ability of the unit to operate as either an amplifier or integrated amplifier equally well makes it the ideal choice for any music lover looking for a way to also enjoy the best possible film score reproduction.

The amplifier output section of the Concerto utilizes two output modules featuring the latest in high-powered switching-output technology. Developed by ICEpower™, these output circuits are used in place of standard output transistors to provide unprecedented audio performance, stability, efficiency, and reliability virtually impossible to achieve with conventional discrete components.

This technology breaks previous performance barriers in both conventional analog and present digital Tripath (Class T), Class D, or Pulse Width Modulation (PWM) systems. It utilizes novel modulation techniques and error correction topologies known as Multivariable Enhanced Cascade Control (MECC) and Controlled Oscillation Modulation (COM). MECC is used for control and error correction of frequency response, distortion, noise, and output impedance, while COM offers a number of distinct advantages, such as better distortion specifications, greater bandwidth, higher efficiency, and a much simpler overall circuit in comparison to previous conversion techniques, such as Class D operation. The overall circuit operates primarily by enabling extremely precise control of all parameters in the output section and, thus, produces exceptional distortion specifications with relatively simple hardware.

The Concerto's output section cannot truly be called Class D, and, in fact, is new and innovative enough to not yet be described by classification at this time. A technical discussion of these technologies is well beyond the scope of this paper, however a thorough discussion of the current technology and history of the development can be obtained from the Audio Engineering Society (AES) archives at http://www.aes.org.

These output modules provide an authoritative 250 watts per channel into 8 ohms and 500 into 4, enabling the Concerto to control the movements of virtually any loudspeaker with an effortlessness never before available in an integrated amplifier. Due to the extremely high efficiency rating of the output modules, the Concerto will never exceed the temperature of the human body, enabling it to remain enclosed and unventilated with no fear of overheating or affect on ambient room temperature. In this way, reliability is dramatically increased while at the same time saving operating cost.

The preamplifier, control, and output modules within the amplifier are securely clamped to a massive, non-resonant, machined aluminum chassis. This chassis has been designed with a specific height, depth, and width in proportion to the front panel, rear panel, and bottom cover of the amplifier so that when all of the various parts of the unit are assembled, the Concerto as a whole does not resonate or vibrate. This prevents any mechanical resonance or vibration under high power conditions from affecting the audio signal. During demanding musical passages, the amplifier is able to play cleanly and smoothly with no chance for ringing or microphonics to interfere with or affect sound quality.

The exterior of the Concerto was artistically designed with rounded corners and no sharp edges. The entire chassis is finely constructed from pieces of solid 6061 plate-stock aircraft aluminum, each cut to a specific depth and thickness determined by Golden Ratio mathematical proportions. The surface of the faceplate and top cover are carefully cut in a unique process that uses a diamond tipped blade. This process was refined over many years to produce an artistic and attractive finish which has been copied a number of times but never equaled. The faceplate is then finished with fine automobile polyurethane clear coat to preserve the clarity of the finish and allow the brilliant radiance of the diamond-cut process to shine. Every edge of the chassis is sealed with overlapping joints to prevent dust from entering and the interior of the chassis and should never need cleaning over the lifetime of the product.

In form and in function, the Concerto separates itself from other products by taking advantage of the benefits of advanced design and meticulous attention to detail. In doing so, it carries on in the fashion of previous integrated amplifiers from Jeff Rowland Design Group that, over the years, have defined and exceeded a level of performance usually reserved for separate components.

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Concerto Integrated Amplifier Specifications

Output Power:	250 watts/channel into 8 ohms, 500 watts/channel into 4 ohms.
Frequency Response:	5 Hz to 70 kHz, -3 dB.
Peak Output Current:	>35 amps.
Dynamic Range:	117 dBA.
Load Impedance Range:	2 ohms to 16 ohms.
THD and Noise, 0.1W-500W/4 ohms:	<0.5%, typically .006% at 1 kHz.
CCIF Intermodulation Distortion, 19/20 kHz:	<.002%.
Output Noise Level:	500 µV (-64 dBu), 20 Hz to 20 kHz, unweighted, 0 dB gain.
Damping Factor at 1 kHz:	1000.
Inputs:	2 x Balanced Input via XLR (pair), 1 x Balanced Unity Gain (Bypass) (pair), 3 x Unbalanced Input via RCA (pair).
Outputs:	2 pair Balanced Line Level, 1 pair binding posts per channel.
Overall Gain Structure:	20 dB from preamplifier section, 27 dB from amplifier section.
Volume Control Range:	99.5 dB.
Input Impedance:	40k ohms, Balanced or Unbalanced.
Power Consumption:	22 watts idle, 1000 watts maximum.
Weight:	26 lbs./12.1 kg.
Dimensions:	17.3" (w) x 13.1" (d) x 3.2" (h)/ 44.0 cm (w) x 33.2 cm (d) x 8 cm (h).