# Valve ISIS

CD player

## THE STORY BEHIND THE VALVE ISIS

Rega's now legendary head electronics engineer Terry Bateman spent 10 years researching the concept of a CD player using valves in the output amplifier. When it came to the inspiration for this project Terry drew on the enormous experience he gained while working with musical instrument valve amplification, which dates back to the middle part of the 1970's. Terry's concept was based on the need to have a playback chain, which is in harmony with the instruments and equipment being used. Valves have been widely used in musical instrument and recording amplification from the 1950's to the present day, therefore it made great sense to develop a valve based CD player to match that of the signal chain found in such applications. This approach kept the circuit straightforward, this is mainly because musical instrument amplification is not excessively hindered by some of the folklore surrounding certain aspects of valve audio design. He took the approach of combining the technical and sonic attributes of valves in a differential instrumentation amplifier circuit driven from differential output DAC with a passive LC filter. Careful choice of valves and the use of moderate levels of feedback keep the distortion at reasonable levels thus keeping the colouration to a minimum. The valve Isis became fully realised when he combined the valve project with the Wolfson high performance differential output WM8741 DAC along with the digital playback circuitry of its solid state stable mate.

## DESIGN

The valve Isis shares the same digital and USB sections as found in the solid state version however the analogue stage is valve based with passive filtering. This stage uses two military specification triple mica 5814A (ECC82/12AU7) triodes being driven by the revolutionary Wolfson WM8741 ultra high performance digital to analogue converter. The output buffer and transformer driver stage uses two ECC88 (6DJ8/6922) triodes. This, like its solid-state stable mate, is of an un-orthodox design. The design goal with this player was to keep away from the normal design approach of "lets run it through a valve to make it sound warm", but take advantage of industrial valve circuits to make an articulate and competent valve based CD player. Careful choice has been made for every component in the digital and the analogue signal path to ensure the integrity of the signal. Careful design of the PCB's ensures isolation of not just the digital and analogue sections, but also the motor, display and user interface processor. All sonically critical electrolytic capacitors have been by-passed with polypropylene or polyester film capacitors. In addition to this, large value electrolytic capacitors have also been by-passed with audio grade electrolytic capacitors. Power supply impedances in the digital to analogue converter are kept very low by the use of solid polymer capacitors. All power supplies utilise custom Rega K-Power smoothing capacitors, and fast diodes have been used throughout in power supply rectification. The Isis uses enhanced and optimised control code for the control of the CD processor and user display; this will speed up the initialisation process by means of a tighter control interface between the user micro and CD processor.

## TECHNOLOGY

The differential output of the digital to analogue converter drives a valve differential (operational) amplifier, with a very modest amount of feedback to stabilise the operating conditions. The 5814A based differential amplifier, with a solid-state current generator in its tail, takes full advantage of the differential output from the digital to analogue converter. This is followed by a passive Butterworth second order LC filter. Finally, this signal is buffered using a low anode resistance ECC88 to drive the output and balancing transformer. In design it was felt that unnecessarily high levels of THD would unduly overwhelm the qualities of the digital stage of the Isis. The overall THD is typically 0.06% being prominently even order, where the 2nd harmonic predominates. This will give the sonic dynamics of the valves without dominating the sonic qualities of the digital section. After many hours of tube rolling we found the 5814A differential amplifier position was best on the grounds of micro-phonics, reliable operation and sonic qualities. Both the HT & LT power supplies are fully regulated and use the same power supply parts as used in the solid state Isis. Like the solid-state analogue stage valve Isis has it's own dedicated 50VA mains transformer, ensuring galvanic isolation between the digital and analogue sections of the player. The Isis has an isolated balanced output, and in keeping with the spirit of the valve circuit topology we have opted to use a transformer in this position. This balancing transformer is made to the same exacting standards to that found in the IOS MC amplifier.

## Technical Specifications

**Laser** Semiconductor laser
**Wavelength** 780nm
**Digital sampling frequency** 44.1kHz
**Power Consumption** 46w
**Phono Unbalanced** 2.4V source impedance 600Ω
**XLR Balanced** 2.4V source impedances 600Ω
**Co-Axial SPDIF** 0.5V source impedance 75Ω
**Toslink** Toslink compatible output
**USB** 16bit 44.1/48KHz
**THD+Noise** < 0.06%
**Frequency Response** 30Hz - 20KHz +/-0.5dB
**Dimensions cm H x W x D** 43.4 x 35 x 11.2
**Weight** 18kg

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## Rega Valve Isis

**UK SSP – £6998.00**

## Package Price Valve ISIS+OSIRIS

**UK SSP – £11.998.00**