www.simaudio.com

Evolution Series
750D Digital-to-Analog Converter / CD Transport

The **MOON 750 D** Digital-to-Analog Converter / CD Transport features the most advanced digital technology; The first true 32-bit fully asynchronous digital audio layback system to reach the marketplace. Intended to fulfill all the demands of the most discerning music connoisseur, the **750 D** is a fully balanced differential dual-mono design featuring our brand new **M-AJiC32** circuitry (an asynchronous jitter elimination system) built around the ESS SABRE^{32} Reference Audio DAC. The conversion process uses 8 DAC's per channel working in 32-bit Hyperstream™. The final result is previously unattainable musical reproduction from digital media, be it a CD, computer, music server, etc.

Revolutionary Technology ... The first 32-bit fully asynchronous digital audio source

Significant Design Features

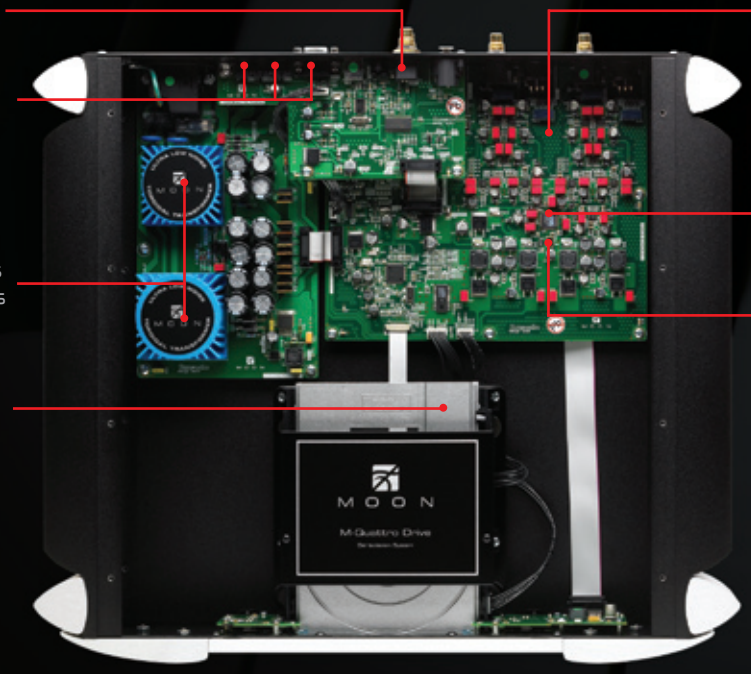
Four (4) digital inputs - AES/EBU, S/PDIF, TosLink and, USB; Two (2) digital outputs – AES/EBU and S/PDIF

IR input for external control, **SimLink**™ controller port allows for 2-way communications between other compatible MOON components and full unsolicited RS-232 for bidirectional feedback and firmware updates.

Separate digital & analog power supplies using 2 independant toroidal transformers

Proprietary CD drive system, using in-house developed hardware & software, mounted on our **M-Quattro** gel-based 4-point floating suspension for vibration damping.

▲ Power supply voltage regulation includes **I²DCf (Independant Inductive DC Filtering)**: There is one inductor dedicated to each integrated circuit type component (DAC, Op-Amp, etc.) in the audio circuit's signal path – 24 stages in all



A very short capacitor-free analog signal path using a DC servo circuit and proprietary 12dB/octave analog filter

The first 32-bit Digital-to-Analog converter using ESS Technology SABRE^{32} Reference DAC / Digital Filter (ES9018S) working in 32-bit Hyperstream™ to achieve unprecedented jitter immunity and low-level linearity via a patented Time Domain Jitter Eliminator

A virtually jitter-free "1 picosecond" digital clocking system

▲ Digital Audio Signal Processing using **M-AJiC32 (MOON Asynchronous Jitter Control in 32-bit mode)**

▲ Four-layer PCB tracings resulting in a much shorter signal path and dramatically improved signal-to-noise ratio

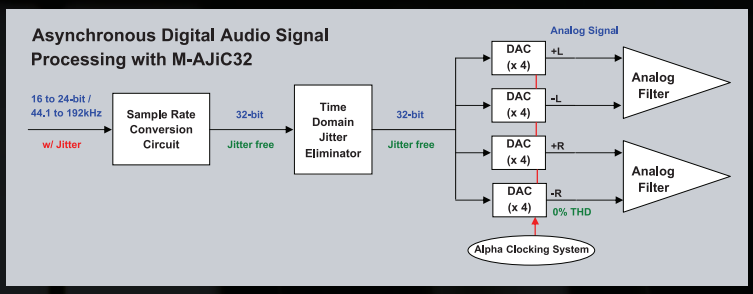
The most realistic and lifelike sound reproduction yet.

The back panel features a complete array of digital input and output connections to meet all the needs of today's ever-widening technologies.

Eventually, an optional outboard power supply will be made available to further enhance the already astonishing performance of the **750 D**.

Simaudio Ltd. has been designing and manufacturing innovative, leading-edge audio and video products since 1980. **MOON** products have been globally recognized for their world-class performance, garnering numerous accolades for this outstanding achievement. Our products are engineered and built in Canada, utilizing advanced, efficient, "green" assembly techniques with strict quality control. Furthermore, our manufacturing processes are part of our philosophy, whereas the high quality and long-life of MOON products are the best way to preserve our environment, avoiding premature obsolesence. MOON products meet or exceed all international requirements for safety, performance and durability. At Simaudio, great music matters. However, great music for a lifetime matters most.

Building on the **MOON Asynchronous Jitter Control (M-AJiC)** circuit released in the MOON CD3.3 disc player, we have developed an even more advanced version of this jitter reduction system called **M-AJiC32**. Operating in 32-bit mode and initially launched in the revolutionary MOON **750 D DAC/** Transport, this circuit virually eliminates jitter, reducing it to an unprecedented 1 pico second:



M-AJiC32 is based on ESS Technologies SABRE[32] ES9018S circuit with 32-bit Hyperstream™. The only point where clocking occurs - using our own Alpha Clocking System - is at the very end of the digital audio stream during the final phase of Digital-to-Analog conversion. This, along with both the Sample Rate Conversion circuit and the "Time Domain Jitter Eliminator" reduce jitter to 1 pico second.

There are numerous benefits to asynchronous circuits:

- Completely independant of jitter from all previous stages
- Higher processing speed
- Better tolerance to voltage fluctuations -
- Improved immunity to noise
- The circuit's speed adapts to conditions of the input signal
- Less source electromagnetic interference (EMI); Synchronous circuits generate a great deal of EMI in the frequency band of their clocking frequency and its related harmonics; Asynchronous circuits generate EMI patterns that are much more evenly spread across the entire frequency spectrum resulting in lower distortion.

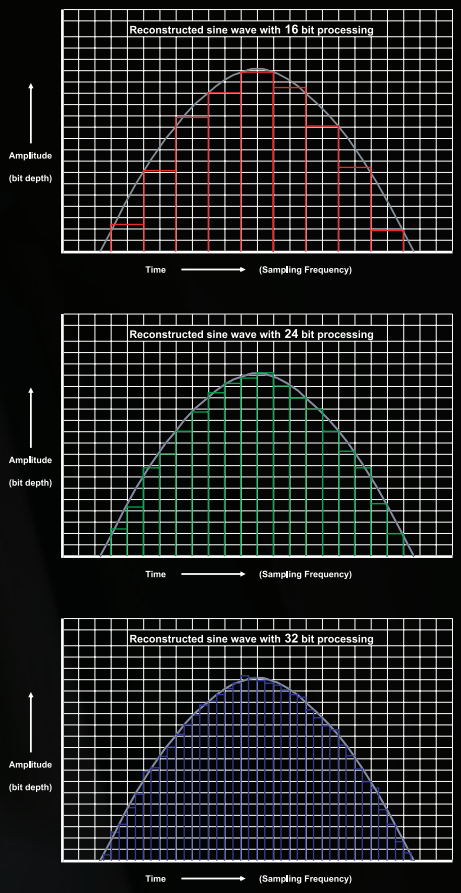
Another significant feature is a total of 16 Digital-to-Analog converters (DAC's) in the **M-AJiC32** circuit; The left and right channels each use 8 DAC's in a differential topology. For each channel, the outputs of 4 DAC's are summed to create the positive signal and the outputs of the other 4 DAC's are summed to create the inverted signal. Since a DAC's output is in current, the output of 4 DAC's can easily be summed together to yield much better results when compared to using 1 DAC per channel.

The reason for this is because there are unique imperfections for each individual DAC. However, they become diluted within the current of the other DACs. As well, there are imperfections common to all the DACs in a circuit. These common imperfections are completely cancelled out because of the differential topology used in the **M-AJiC32** circuit; Ultmately, since all these imperfections are eliminated, better measurements are produced in terms of lower noise and lower distortion which translates into far superior sonic performance

When digital meets analog... you will have to suspend disbelief that you're actually listening to a digital music source.

Technical information

The digital-to-analog conversion process uses bits of digital information to produce an analog waveform, represented as a sine wave (in this example only a part of a sine wave is shown) to produce a music signal. When more digital information is made available, the result is a more accurate and detailed music signal. A higher bit-depth (or a higher resolution) yields smaller, finer and more accurate steps in the reconstruction of this sine wave (grey) as seen in the animated figure below. A 32-bit (blue) data stream contains significantly more information than a 24-bit (green) or 16-bit (red) data stream.



The advantage of using this 32-bit process to reconstruct a 16-bit digital signal (i.e. Redbook CD) is simple; This process interpolates the digital information more accurately by calculating the finer steps with 32-bit resolution that were lost during the analog-to-digital 16-bit mastering process. The result is, after the D-to-A conversion, a more realistic waveform that is incredibly analog sounding; Each musical note's harmonic decay is restored more accurately than with a 16-bit or 24-bit process, creating a uniquely life-like sound that was previously inaccessible from digital audio. In the past, the poor restoration of harmonic decay was a major contributor in what gave digital audio that cold, uninvolving and analytical feeling.

As a general rule, increased processing power is directly proportional to resolution: For each additional bit of resolution,the number of available levels will double, as shown in the following table:

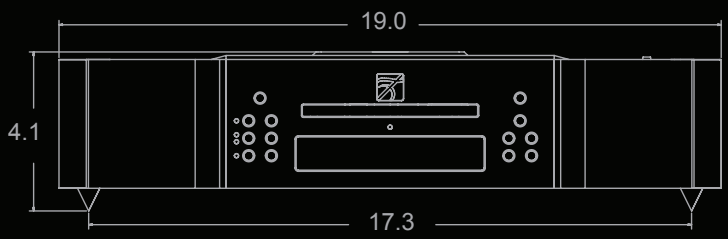
Bit Depth	16	24	32
Steps	65,536	16,777,216	4,294,967,206

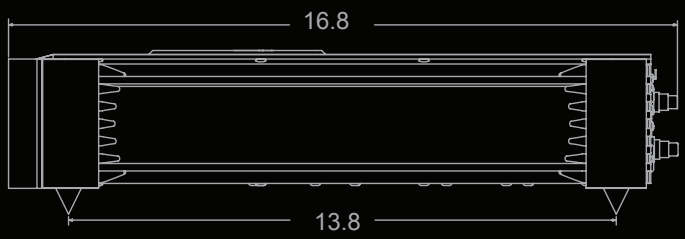
To summarize, the higher the resolution of the data, the smaller the steps will be. This results in more detail as each individual step covers a smaller section of the waveform. More detail in the digital domain leads to a much more accurate analog signal at the end of the conversion process. Another major benefit of this 32-bit process is smaller data truncation errors. These errors result from the extensive mathematical calculations performed during upsampling & sampling rate conversion, prior to the D-to-A process. These truncation errors - shown in the above figure, occur when the data sample rises outside (or above) the grey curve - will be signifcantly smaller as bit-depth increases due to finer and more accurate calculations. As well, because of the sheer processing power that's readily available at 32-bits, the errors will not impede the circuit's ability to accurately recreate the music waveform.

MOON 750 D Specifications

Configuration	Fully balanced, dual-mono
Transport Mechanism	Proprietary Design
Digital Filter / Digital-to-Analog Converters	ESS ES9018S Sabre32 32-bit Hyperstream™
Frequency Response (audible)	20Hz - 20kHz +0/-0.1dB (internal CD transport)
Frequency Response (full range)	2Hz - 100kHz +0/-3dB (external digital source)
THD @1kHz, 0dBFS (A-weighted)	< 0.0003%
Intermodulation Distortion	< 0.0002%
Dynamic Range	> 120dB
Signal-to-noise Ratio	> 120dB @ full output
Slew Rate	50V/µs
Channel Separation	> 116dB
Low Level Linearity	< ±0.25dB at -90dBFS
Intrinsic Jitter	1 picosecond RMS
Analog Outputs – Balanced	1 pair XLR
Max. Analog Output @ 0dBFS - XLR	2.0 Volts
Analog Output Impedance - XLR	100Ω
Analog Outputs – Single Ended	1 pair RCA
Analog Output Impedance - RCA	100Ω
Max. Analog Output @ 0dBFS - RCA	2.0 Volts
Digital Inputs (4)	AES/EBU (XLR), S/PDIF (RCA), TosLink, USB Type-B
Digital Outputs (2)	S/PDIF (RCA), AES/EBU (XLR)
Digital Input/ Output Impedance - S/PDIF	75Ω (0.5 Volts p-p)
Digital Input/ Output Impedance - AES/EBU	110Ω (3.7 Volts p-p)
Remote Control	All Aluminum Full-Function
Display Type	8 character dot matrix LED
Power Consumption @ idle	25 Watts
AC Power Requirements	120V / 60Hz or 240V / 50Hz
Shipping Weight	35 lbs / 16 Kgs
Dimensions (W x H x D, inches)	19.0 x 4.1 x 16.8

Specifications subject to change without notice





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