Everything comes together

If exceptional music making is the first hallmark of the Naim DAC, the second is versatility.

Versatility comes thanks to S/PDIF inputs that can accommodate either optical or coaxial formats and USB inputs that can accommodate memory sticks and iPod and iPhone models. It arises also from the numerous Naim system upgrades that the DAC makes possible. Simultaneously with its introduction, the CDX2 and CD5 XS CD players have gained S/PDIF outputs and can now benefit significantly from use with the DAC.

With the addition of a DAC, existing preamplifiers can be incorporated into digital audio systems.

The Naim DAC can be controlled by a Naim preamplifier remote control, seamlessly integrating analogue and digital inputs across the two units. The DAC becomes an extension of the preamplifier. And when a USB stick, iPod or iPhone is docked, the DAC front panel input buttons transform to operate as playback controls.

Connect to DAC

iPod
Connect an iPod (generation 5 models and above) to play its stored music or music streamed from your network via UPnP over Wi-Fi.

iPhone
Connect an iPhone to play its stored music or music streamed from your network via UPnP over Wi-Fi.

Mac
Connect a Mac digital output to play its stored music or music streamed from your network via UPnP over Wi-Fi.

PC
Connect a PC external sound card digital output to play stored or network music.

DVD player
Connect a DVD player digital output for stereo playback of DVD-A discs.

Games console
Connect a games console digital audio output to play games audio.

Hard Disk player
Connect a hard disk player or music server to play stored or network music.

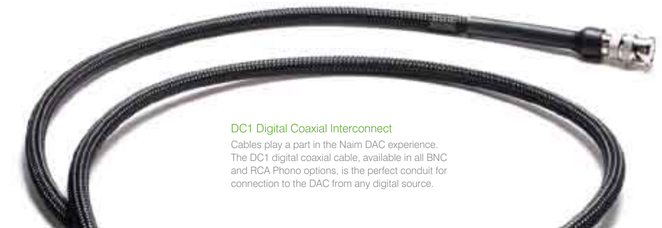
CD player
Connect a CD player digital output to play CDs.

USB stick
Connect a USB memory stick to play stored standard or high resolution music.

Streaming device
Connect a music streaming device to play multi-room streamed music.

Satellite TV receiver
Connect a set-top-box satellite TV receiver digital output to play satellite TV audio.

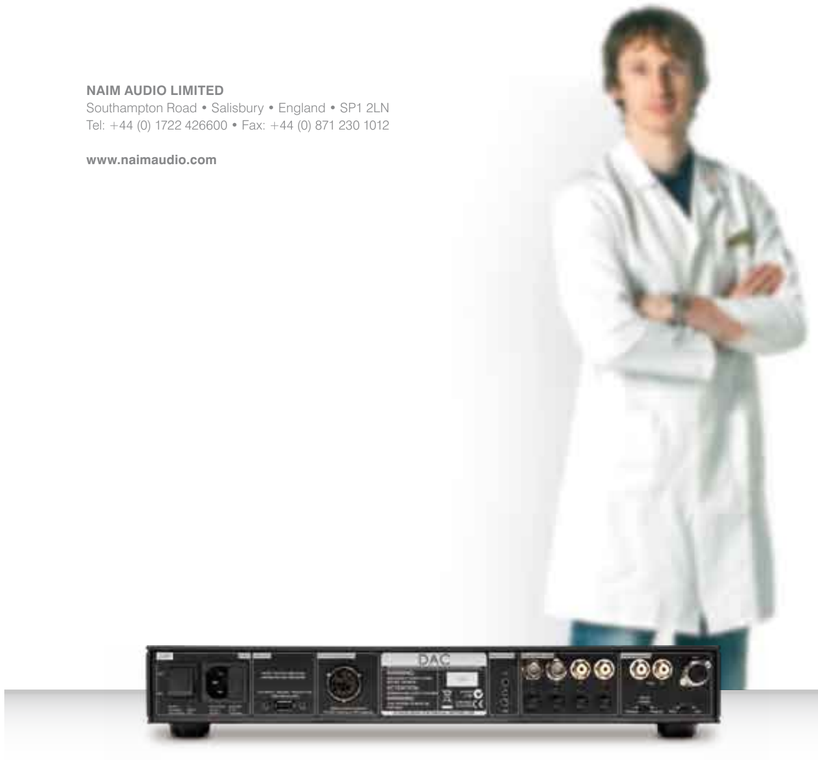
TV
Connect a TV digital output to play TV audio.



DC1 Digital Coaxial Interconnect
Cables play a part in the Naim DAC experience. The DC1 digital coaxial cable, available in all BNC and RCA Phono options, is the perfect conduit for connection to the DAC from any digital source.

NAIM AUDIO LIMITED
Southampton Road • Salisbury • England • SP1 2LN
Tel: +44 (0) 1722 426600 • Fax: +44 (0) 871 230 1012

www.naimaudio.com



Specification

AUDIO OUTPUTS
Audio Outputs: 2 (RCA and DIN, selectable)
Line Output Fixed: 2.2V RMS
Frequency Response: 10Hz to 20kHz +0.1dB/-0.5dB
THD: <0.002%

INPUTS
Digital Inputs: 8 (2 coaxial BNC, 2 coaxial phono, 4 optical TOSLINK)
USB: front and rear panel - the front overrides the rear

CONTROL
IR Input: front and rear panel
IR Output: rear panel socket

FORMATS
Audio files supported: USB = WAV (LPCM up to 32bit / 768kHz)

SAMPLE RATE
USB: 32kHz to 768kHz, 24bit
S/PDIF: 32kHz to 192kHz, 24 bit
iPod, iPhone: 48kHz max

POWER
Supply Voltage: 100V, 115V, 230V AC; 50/60Hz
Power Consumption: <30VA (max inc iPod charging)

PHYSICAL
Dimensions (mm): 70 x 432 x 301 (HxWxD)
Weight: 5.6kg
Colour: black
Finish: anodised fascia, painted cover

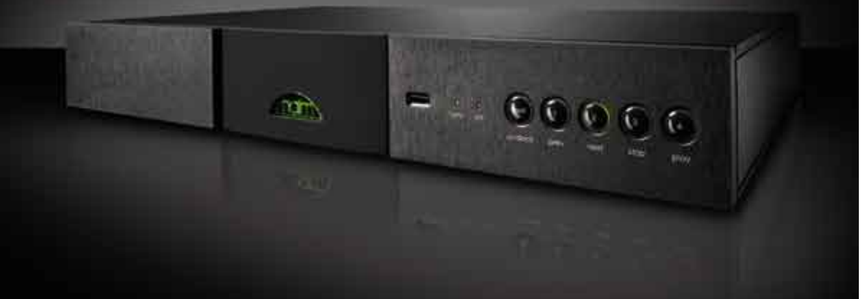
Made for iPod
Works with iPhone

"Made for iPod" means that an electronic accessory has been designed to connect specifically to iPod and has been certified by the developer to meet Apple performance standards. "Works with iPhone" means that an electronic accessory has been designed to connect specifically to iPhone and has been certified by the developer to meet Apple performance standards. Apple is not responsible for the operation of this device or its compliance with safety and regulatory standards. iPod is a trademark of Apple Inc., registered in the U.S. and other countries. iPhone is a trademark of Apple Inc.

DAC: digital to analogue conversion by Naim

naim
world class sound...

Naim digital to analogue - for the converted



The nature of music delivery is changing fast. CD has been joined by downloads, portable music players are part of the landscape, computers are routinely connected to hi-fi systems, and USB memory sticks are used to store high resolution music files. So the Naim DAC, our first stand-alone digital to analogue converter, arrives at an exciting time in the narrative of high quality music in the home. And listening to the DAC builds the excitement yet more.

The Naim DAC marks a technical milestone comparable to our first CD player, the CDS. The CDS demonstrated that CD replay and lifelike music reproduction were not mutually exclusive. Now, the Naim DAC demonstrates that the jitter and noise that bedevil traditional external digital to analogue converters can be overcome and a new route to the real enjoyment of music opened.

The Naim DAC provides eight S/PDIF inputs, two USB inputs, and is capable of handling audio data sampled at up to 768kHz and with up to 24bit resolution. It not only brings all the digital inputs together into the analogue domain, but does so with a level of performance that can compete with the finest from any Naim CD player to provide unrivalled musical fulfillment

Listening to the Naim DAC is a revelation. Music, whether its source be an iPod, a CD or a high resolution data file, is presented afresh, with more definition, more insight, more warmth, and simply more of those hard-to-define clues of rhythm, melody and emotion that distinguish the real thing from pale imitation. The Naim DAC is an advance that brings real music in the home closer to reality than ever before.

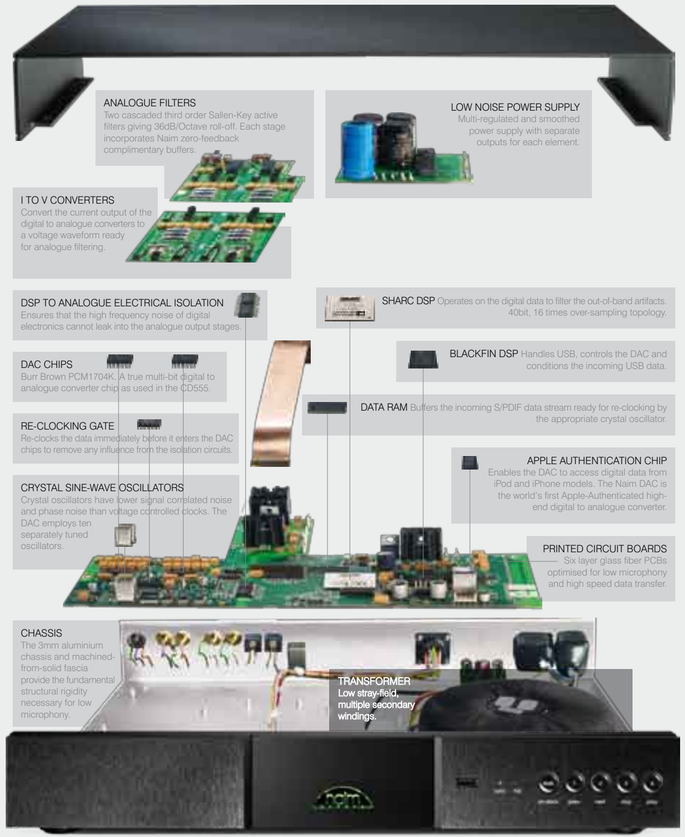
Upgrade Path

Upgrades are a fundamental element of the Naim philosophy. As well as providing a significant performance upgrade for the CDX2 and CD5 XS CD players, and HDX hard disk player, the Naim DAC can itself be upgraded by the addition of an XPS or 555 PS external power supply.

The essential ingredients

Each element of the Naim DAC has a vital role to play in its musical virtuosity, but it is not just the specifics of each that is important, it is their organisation also. The influence of signal path, the microphony of circuit boards, the impact of track layout, the noise contribution of components, the noise sensitivity of others - each one is vital, and each one influences every other.

The DAC signal path is fundamentally simple. The SHARC DSP, operating as a filter, receives the data, then over-samples and low-pass filters the data and feeds this to its peripheral memory. Also operating as a buffer; the memory outputs data clocked by the oscillator. The DAC chips turn digital into analogue current, and the I to V converters turn current into voltage. The analogue low-pass filter removes high frequency artifacts, and buffers the signal for a preamplifier.



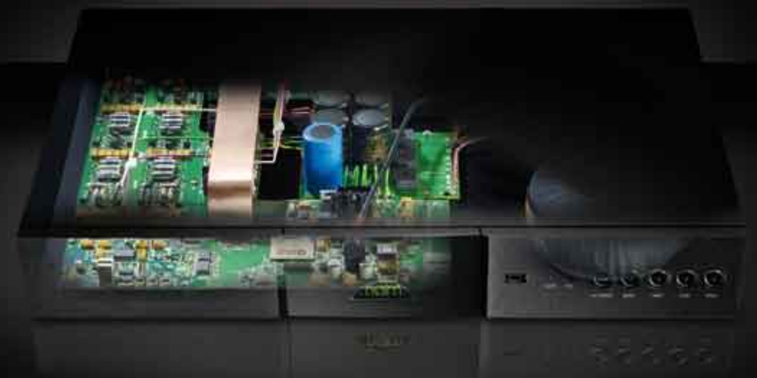
Designing an external digital to analogue converter capable of offering the exceptional musical performance obligatory for a Naim product brings numerous technical challenges. In particular, the S/PDIF interface protocol for digital interconnection has significant jitter and noise problems. Original solutions to these problems had to be conceived and developed.

The Naim DAC has more in common with Naim CD players than with conventional external digital to analogue converters. It overcomes the jitter issues of S/PDIF by reading the data into a "rotating" data RAM buffer independently of its timing signal and reading it out again clocked by one of ten extremely low noise, fixed frequency crystal sine-wave oscillators. In terms of system topology, the DAC's rotating memory is analogous to a rotating CD feeding raw data to be re-clocked. The rate at which the memory fills and empties is controlled by the DAC automatically selecting the oscillator that matches the average incoming clock frequency. The data entering the downstream digital filtering and DAC chips is then completely isolated from the incoming S/PDIF jitter.

Along with being a source of jitter, S/PDIF is a potential source of RF noise. The Naim DAC suppresses S/PDIF noise through electrical isolation of its DSP front end from the digital to analogue converter and analogue circuits. Each element is also run from separate power supplies

The Naim DAC's digital filtering is handled by a powerful SHARC DSP chip running unique Naim authored code to create an ultra high precision 40bit floating point filter. The filter over-samples by 16 times on 44.1kHz data and provides stop-band attenuation of 180dB on all data. Following the digital filter are the two mono Burr-Brown digital to analogue converter chips, as used in the CD555 CD player. Finally the Naim DAC features a very high performance, low noise, and low distortion fully discrete analogue output stage.

Ground breaking technology and digital audio engineering however are purely academic. Listening to the Naim DAC is something else entirely. Startling in its clarity, arresting in its detail, beguiling in its warmth and inspiring in its rhythm, the Naim DAC seduces from the first note.



Technology under the hood

naim
world class sound...