

dCS Scarlatti Upsampler
Digital to Digital Converter

User Manual
Software Release 1.2x
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USING THE *dCS Scarlatti Upsampler* FOR THE FIRST TIME

Congratulations on purchasing your *dCS Scarlatti Upsampler*.

Before using your unit, please read this section and the Step by Step Guide. This will enable you to set the unit up quickly and safely with your hi-fi system.

From time to time, *dCS* will release updated software on CD that you can install yourself using the **CD Update** feature. Please check our web-site occasionally to see if new *Scarlatti* software is available, or consult your dealer.



Software version 1.20 adds new features, including DSD in DoP format. This allows the *Scarlatti Upsampler* to be used in DSD mode with a *Vivaldi DAC* (which has no 1394 interface).

What's in the box?

Check that the box contains the following items:

- *dCS Scarlatti Upsampler*
- Manual and Menu / Setup Guide
- Power cable
- IEEE1394 cable
- USB cable
- BNC cable
- Spare fuses

Notify your dealer as soon as possible if anything is missing or damaged. We suggest that you retain the original packaging for possible future use. If this is not possible, replacement packaging can be ordered from *dCS* or our distributors. Details can be found on our web site at www.dcsLtd.co.uk.

The *Scarlatti Transport* is supplied with a programmed Nevo Q50 remote control. If you do not have a *Scarlatti Transport* in your system, a programmed Nevo Q50 can be ordered direct from *dCS* as an optional extra.

Positioning the unit

Units in the *Scarlatti* range are designed to be mounted on separate shelves of a rack and must NOT be stacked directly on top of each other. Place each unit on a firm, vibration free base, allowing convenient connection to the other parts of your system. To prevent overheating, we recommend that you leave some free space around the unit to allow for ventilation.

Safety Notice



Your *dCS Scarlatti Upsampler* contains no user serviceable parts. **DO NOT** attempt to open the case as there are potentially dangerous voltages present inside. In the event of the unit developing a fault, please contact your dealer in the first instance.

To maintain protection from electric shock, the unit **MUST** be connected to mains earth (ground) via the power cable. Also, unearthed systems do not give the best sonic performance.



This product is lead-free and complies with the RoHS directive.

Before connecting the power cable to the unit for the first time, please check that it has been set to the correct operating voltage for your mains supply. The unit's voltage setting is shown on the serial number label. If this does not match your local supply voltage, **DO NOT** attempt to use the unit. Contact your dealer to have the unit reset. Using the unit with the wrong mains setting for your local supply may result in serious damage to the unit and will invalidate the warranty. Do not attempt to reset the voltage yourself.

We do not recommend the use of mains regenerators. However, if you do wish to use a mains regenerator with variable voltage and frequency, we recommend that you set the voltage to match your local voltage and the frequency to either 50Hz or 60Hz **ONLY**.



Damage caused to your *Scarlatti Upsampler* by misuse of a mains regenerator or by a malfunctioning mains regenerator is not covered by the warranty.



Disposal at end-of-life - the symbol indicates that this product should not be treated as normal household waste. It should be recycled, so please take it to an approved collection facility.

STEP-BY-STEP GUIDE

This section guides you through setting up the unit for basic operation.

Preliminaries

The Menu / Setup Guide sheet details the menu structure, and two basic set-ups excluding the Upsampler.

For digital interfaces, use with cables designed for digital audio:

- for AES/EBU interfaces use 110Ω screened, twisted pair cables fitted with one male XLR connector and one female XLR connector.
- for SDIF, Word Clock or SPDIF BNC interfaces, use 75Ω coax cables fitted with BNC plugs.
- for SPDIF RCA interfaces, use 75Ω coax cables fitted with RCA Phono plugs.
- for TOSLINK optical interfaces, use Toslink fibre-optic cables.
- for IEEE 1394 interfaces, use the IEEE 1394 cable provided with the unit.
- for the USB interface, use a screened cable fitted with one USB type B connector and one USB type A connector.

Connect the power cable supplied to the power inlet on the Upsampler rear panel, plug the other end into a convenient power outlet.



Please do not use an excessively heavy or inflexible power cable as this may damage the power inlet connector.

Press the **Power** button and wait about 30 seconds while the Upsampler configures itself. The display will show in sequence: *dCS*, **Scarlatti Upsampler**, then the status screen.

If the unit is likely to be set in an unfamiliar state, you can reset it as follows:

Press the **Menu** button, press the → button once, then the **Menu** button again to display the **Upsampler Settings** menu. Press the ← button a few times to highlight the **Factory Reset** menu page. Press the **Menu** button and wait a few seconds while the unit resets itself. The display shows:



STEP 1 - Connecting an Input

Use suitable cables to connect your source equipment to the matching digital input connectors on the back panel of the Scarlatti Upsampler. The digital inputs are labelled in green print. The AES, RCA and BNC inputs will accept up to 24-bit PCM data at 32, 44.1, 48, 88.2, 96, 176.4 or 192kS/s or DSD in DoP format. The USB interface is limited to a maximum of 96kS/s and the Toslink input is not guaranteed above 96kS/s. You can connect any interfaces you need or all 6 if you wish.

Use the **INPUT** button on the front panel to select the input you require, the choices are:



AES



RCA1



RCA2

BNC

BNC

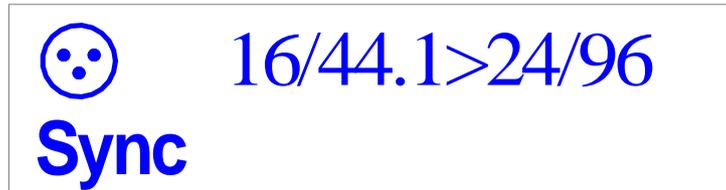
TOS

TosLink



USB

The icon for the selected input will appear at the top left corner of the screen. If the source is generating recognisable PCM, the Upsampler will lock, displaying **Sync** and the input / output sample rates. For example, when connected to an AES source generating 16/44.1 data:



Go to **STEP 2**.

STEP 2 – Setting up the USB source

The USB interface can be connected to a Windows™ 7, Vista (SP2 or later) or XP (SP3 or later) PC, a Mac™ OSX (10.5.4 or later) PC or a sound server, running software to generate PCM data.

If you do not want to use a USB source, **go to STEP 3**.

A word about Music Playing Software

There are countless programs that can play music on Windows™ PC and Apple Mac™ OSX systems. Unfortunately, not all of them present the data completely unprocessed to the USB ports. For example, Windows Media Player re-samples all data to 24 bits, albeit at the original sample rate, whilst iTunes rate converts data as necessary to the output sample rate set in the OSX Audio set-up panel.

With such a proliferation of playing software, and with updates being issued daily, it is impossible for *dCS* to be fully up-to-date with the behaviour and performance of all programs. If you have questions or problems, we would urge you to take them up with your software vendor. What we will say is that different programs operate very differently and it is well worth finding out exactly how your particular program processes the audio.

One particular problem that has been identified concerns the popular iTunes program when running on Windows systems. The default output word length is 16 bits and must be changed to 24 bits for correct operation. To do this, click on **Start > Control Panel > Quicktime**. Click on the **Audio** tab of the Quicktime panel and select **24 bit** in the **Size** field of the **Sound Out** section.

Selecting the *Scarlatti Upsampler* as your Audio Output device

Whichever program you are using to play your music, your computer may not automatically select your *Scarlatti Upsampler* as the preferred playback device. You can correct this as follows :

Windows XP - Once you have connected the *Scarlatti Upsampler* and switched it on, go to **Start > Control Panel > Sounds and Audio devices**. Click on the **Audio** tab and select **dCS Scarlatti** from the drop down list in the **Sound Playback** Default device list.

Windows 7 / Vista - Once you have connected the *Scarlatti Upsampler* and switched it on, go to **Start > Control Panel > Hardware and Sound > Sound** and click on the **Playback** tab of the panel that appears. **dCS Scarlatti** will appear in the list of available devices. For best results, set the **Sample Rate** to be the same as that of the file.

Mac™ OSX - Once you have connected the *Scarlatti Upsampler* and switched it on, open **Finder**, click on the **Go** tab and select **Utilities**. In the Utilities panel, select **Audio MIDI Setup** and click on the **Audio Devices** in the Audio MIDI setup panel. Select **dCS Scarlatti** from the drop down list in the **System Output**. You can also set **dCS Scarlatti** as the default output from the same panel. For best results, set the **Sample Rate** to be the same as that of the file.

Windows 8 uses a different generic USB driver, this is not compatible with the Upsampler's interface. At the time of writing, Microsoft have not offered a solution to this.

For more detailed advice, please visit www.dcsLtd.co.uk/page/support and download the "*dCS Guide to Computer Audio*".

What is DoP?

DoP is the abbreviation for “DSD over PCM”. The basic idea was devised by dCS in 2011 as a convenient way to transmit DSD data (1 bit data at 2.822MS/s) from a computer to a 24/192 USB DAC. It involves packing the DSD data into the lower 16 bits of a 24/176.4 data stream, using the top 8 bits as a marker to warn the DAC that the data must be treated as DSD rather than PCM. All that is required then is a streaming program that can perform the packaging and a modification to the DAC software to ensure it is decoded correctly.

If a DoP data stream is decoded as PCM by a non-DoP compatible DAC, the result is a low level of noise with the music in the background – this is not a threat to amplifiers or speakers.

dCS offered the idea as an open standard to invite participation by software companies and other equipment manufacturers. We were very pleased by the response - DoP is now an accepted standard. As a result, DoP is supported by a growing number of streaming programs, including the latest versions of:

- Pure Music Player, Audirvana (for Mac OSX) and
- JRiver Media Center, Foobar (for Windows).

It is a common mistake is to assume that DoP involves converting DSD data to PCM – this is not true. DoP maintains the data as DSD but re-packages it for convenience in a 24/176.4 data stream. After decoding, the original DSD data is retrieved bit-perfect – nothing is lost or changed. dCS have been using similar DSD re-packaging schemes in our professional products since 1998 for the same reason – convenience.

DoP is also a convenient way to transfer DSD data from a Transport, Upsampler or USB-Clock to a DoP-capable DAC, either in single-wire or Dual AES format.

Go to STEP 3.

STEP 3 – Connecting an Output

Choose which output interface you want to use and connect it up as described below. You can connect as many outputs as you wish.



The Upsampler will not output sample rates that are lower than the input sample rate.

If you are upsampling to DSD, make sure your DAC can accept DSD data in the format you wish to use.

Single wire PCM

Connect one or more of the PCM outputs (**AES1**, **AES2**, **RCA1**, **RCA2**) to matching inputs on your DAC. Use the **OUTPUT** button on the front panel to set the output sample rate to 32, 44.1, 48, 88.2, 96, 176.4 or 192kS/s or DSD. Use the DAC's **INPUT** button to select that input.

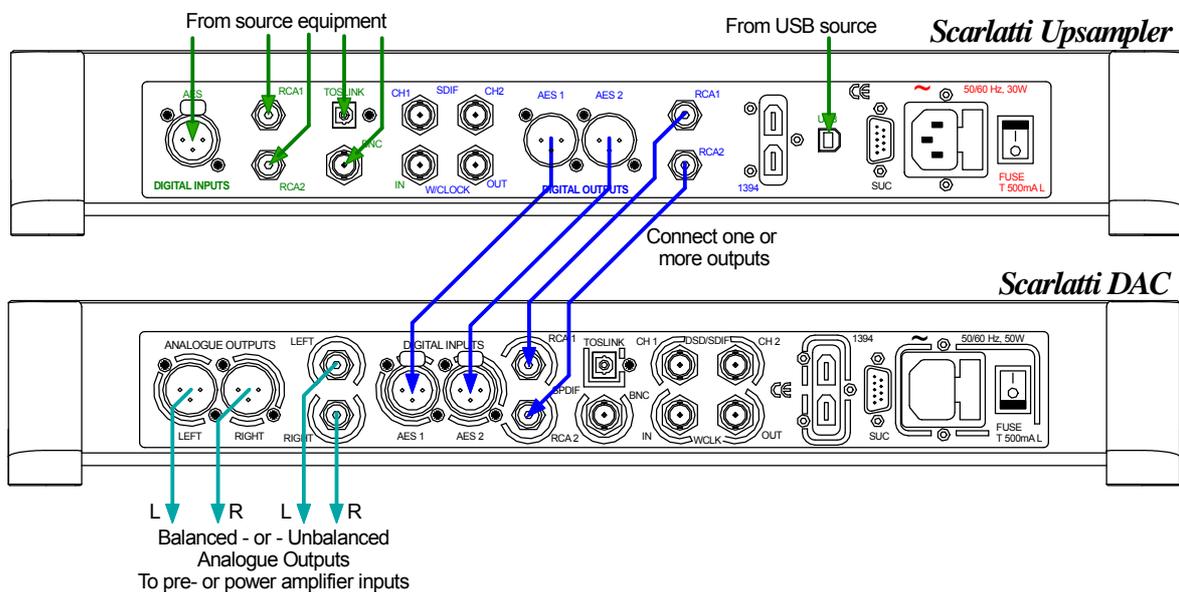


Figure 1 – Connecting the single-wire outputs

Go to **STEP 4**.

SDIF-2 PCM interface

Connect the SDIF **CH1** & **CH2** outputs to the matching inputs on your DAC. If the DAC and the Upsampler are not locked to a master clock, also connect the Upsampler's **W/Clock Out**put to the DAC's Word Clock Input. Use the **OUTPUT** button on the front panel to set the output sample rate to 32, 44.1, 48, 88.2 or 96kS/s. Use the DAC's **INPUT** button to select the SDIF-2 input.

Go to **STEP 4**.

Dual AES

Connect the **AES1** and **AES2** outputs to matching inputs on your DAC. Use the **OUTPUT** button on the front panel to set the output sample rate to 88.2, 96, 176.4 or 192kS/s or DSD. Open the Menu, scroll to the **Upsampler Settings** page and make sure **Dual AES** is set. If it is not, scroll to **Single AES** and press the **MENU** button to change it to **Dual AES**. Use the DAC's **INPUT** button to select the **Dual AES** input. You may need to open the DAC's menu and set it to accept Dual AES.



All dCS DACs are capable of Dual AES operation, but some other manufacturer's DACs may have 2 single AES inputs that are not Dual AES capable. Please check the DAC manual to be sure.

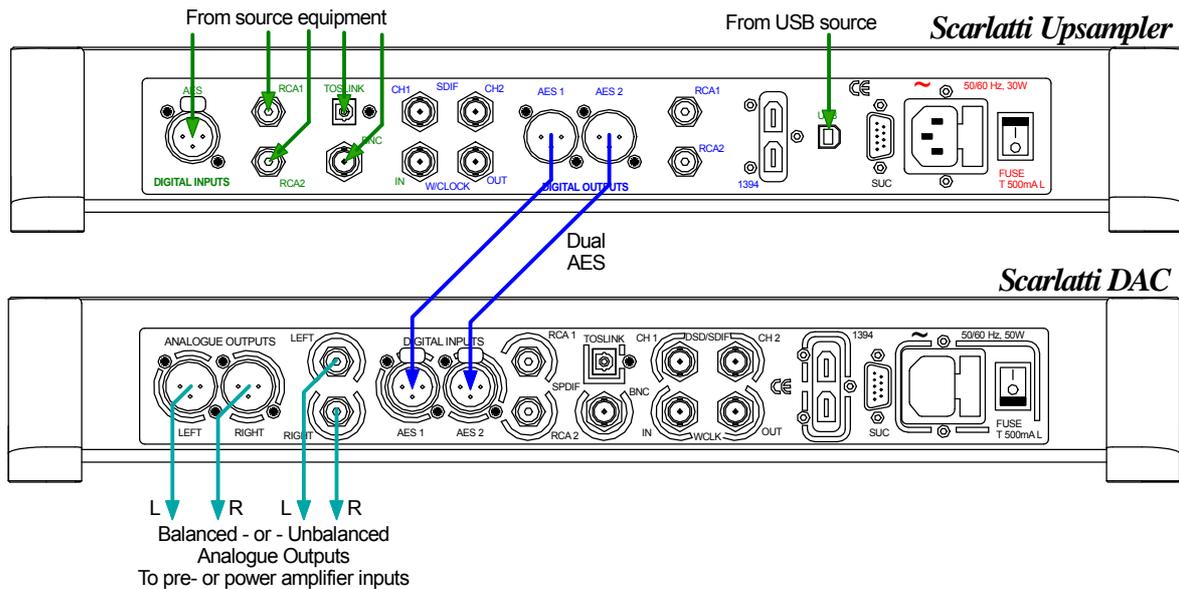


Figure 2 – Connecting the Dual AES output

Go to STEP 4.

1394 interface

Connect the Upsampler's 1394 output to the 1394 interface on a dCS DAC. Use the **OUTPUT** button on the front panel to set the output format to DSD. If the DAC and the Upsampler are not locked to a master clock, also connect the Upsampler's **W/Clock Out** to the DAC's Word Clock Input. Use the DAC's **INPUT** button to select the **1394** input. If necessary, set the DAC to sync to its Word Clock Input. The DAC will lock and display **SUP**.



The Upsampler's 1394 interface is unlikely to work with other manufacturer's 1394 interfaces due to proprietary encryption.



You can connect 1394 cables in a "tree", but do not connect them in a loop as this prevents the system initialising.

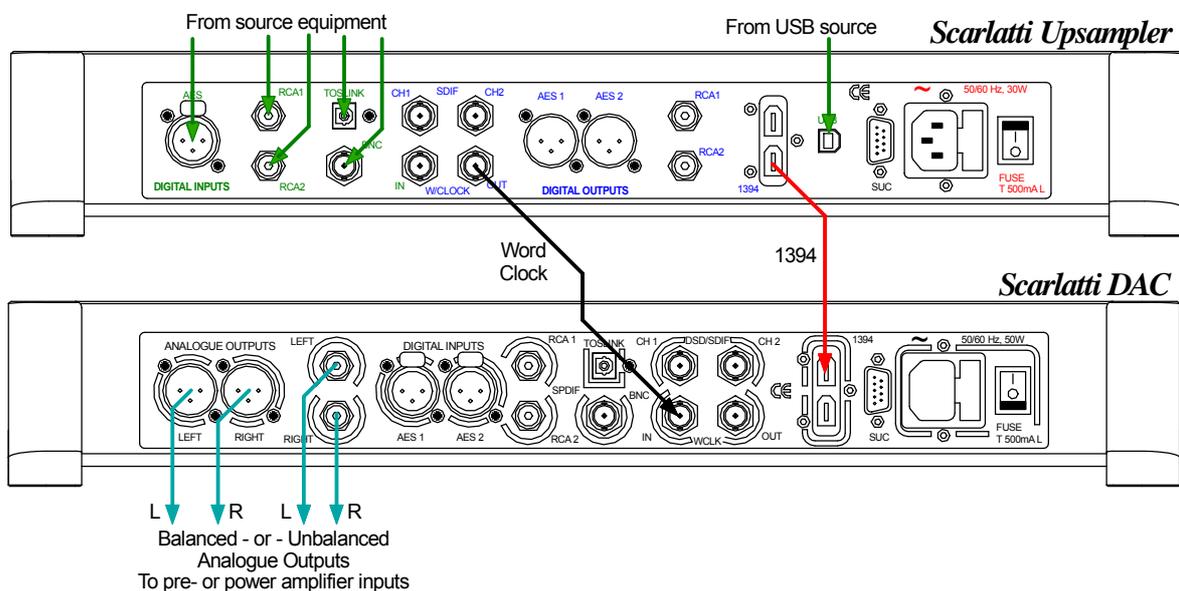


Figure 3 – Connecting the 1394 interface

Go to STEP 4.

Start the source playing and set the DAC's Volume control to a comfortable level.

You should have audio at this point.

STEP 4 - Setting the Sync Source

The system has been set up to lock to the clock generated by the source, (unless you are using the **USB** input) and the **Sync** icon should be displayed. To check this, press the **Menu** button, press the **→** button once, then the **Menu** button again to display the **Upsampler Settings** menu.



Audio If the Upsampler was reset at the start of this procedure, you should see the **Sync Source** – **Audio** icon.

This is the simplest arrangement, but it does not give the best sonic performance due to clock jitter. You can improve the performance by adding a Master Clock to your system.

Using the USB input in Master Mode

Jitter from computer sources is typically very severe and can degrade the audio quality. To avoid this, the Upsampler's USB interface runs in Asynchronous USB mode. The Upsampler does not lock to the source clock, but uses the Upsampler's internal clock instead - this is called Master Mode - and adjusts the source to the same clock frequency. To use this mode:

- Connect the Upsampler's **USB** interface to a suitable source.
- Use the Upsampler's **INPUT** button to select the **USB** interface.



Master Press the **Menu** button, press the **→** button once, press the **Menu** button to display the **Upsampler Settings** menu, press the **→** button to select the **Sync Source** page and then press the **Menu** button as necessary to change the setting to **Master**.

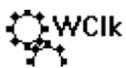
- Set the Upsampler's **OUTPUT** rate as you wish, connect the appropriate outputs to the DAC and use the DAC's **INPUT** button to select that input.

The Upsampler will draw data from the source, but it is not locked to the source, so **Sync** is NOT displayed. You can improve the performance by adding a Master Clock to your system.

Using a Master Clock

If you have a *Scarlatti Clock* (or other dedicated Clock) in your system, lock the source, the Upsampler and the DAC to the Clock for the best performance. To do this:

- Connect the Clock's **Word Clock Outputs** to the **Word Clock Inputs** on the source, Upsampler and DAC.
- Set the Clock **Frequency** to suit the source and DAC. For a CD Transport as source with the Upsampler set to output **24/176.4** or **DSD**, the correct frequency is **44.1kHz**. For a 24/48 source with the Upsampler set to **24/192**, the correct frequency is **48kHz**.
- Select the required input on the Upsampler and DAC. This is important because these units store a different **Sync Source** setting for each input.



WClock To set the Upsampler to lock to the Clock, press the **Menu** button, press the **→** button once, press the **Menu** button to display the **Upsampler Settings** menu, press the **→** button to select the **Sync Source** page and then press the **Menu** button as necessary to change the setting to **WClock**.

- The *Scarlatti Upsampler* will display **Sync**, provided the clock is recognised.



If there is no signal at the **Word Clock In** connector or it is not recognisable, the Upsampler will sync to audio and display this icon to warn you.

- The *Scarlatti Transport* will automatically lock to the Clock and display **Sync**.
- Set the *Scarlatti DAC* to sync to Word Clock by pressing the **SYNC** button as necessary.

A Typical 4-box Scarlatti System

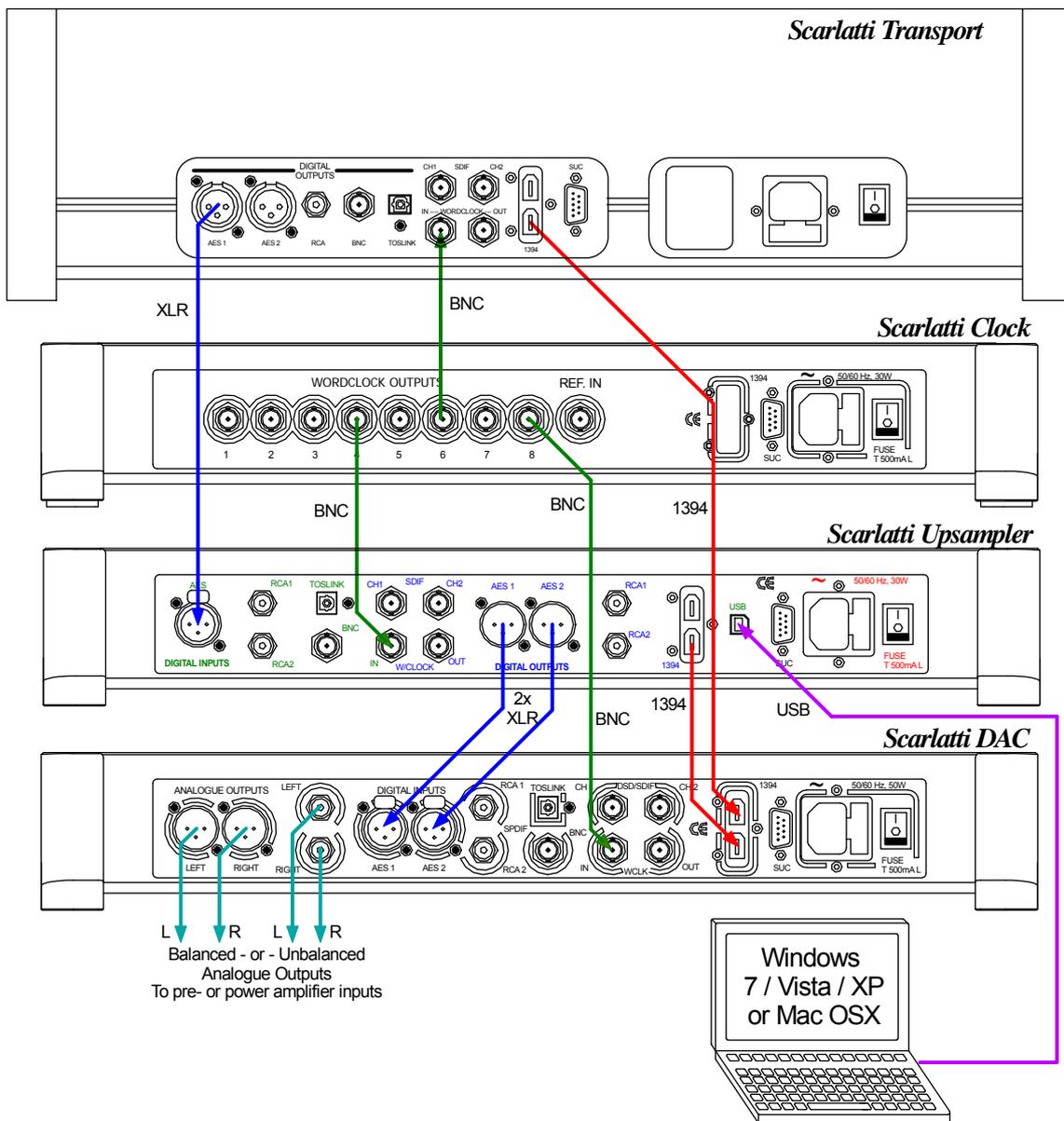


Figure 4 – An example of a full *Scarlatti* system plus a laptop

- The system is synchronised by a Clock running at **44.1kHz**
- The Upsampler takes data from the Transport or the laptop, it will probably be set to upsample to **24/176.4** or **DSD**.
- The DAC takes DSD data from the Transport via **1394**, or PCM data from the Transport / laptop through the Upsampler via **1394** (DSD) or **Dual AES** (24/176.4).
- Remember to select the DAC input first before using the **Sync** button to select **WCIK**.

Scarlatti Upsampler v1.20 can drive the Vivaldi DAC with DoP in either single-wire or Dual AES formats.

Scarlatti DAC v1.30 will also accept DoP in either single-wire or Dual AES formats.

Using the Scarlatti Upsampler and DAC

If your system consists of a *Scarlatti Upsampler* and *DAC* but you do not have a *Clock*, you can use the DAC as the Master Clock as described below.

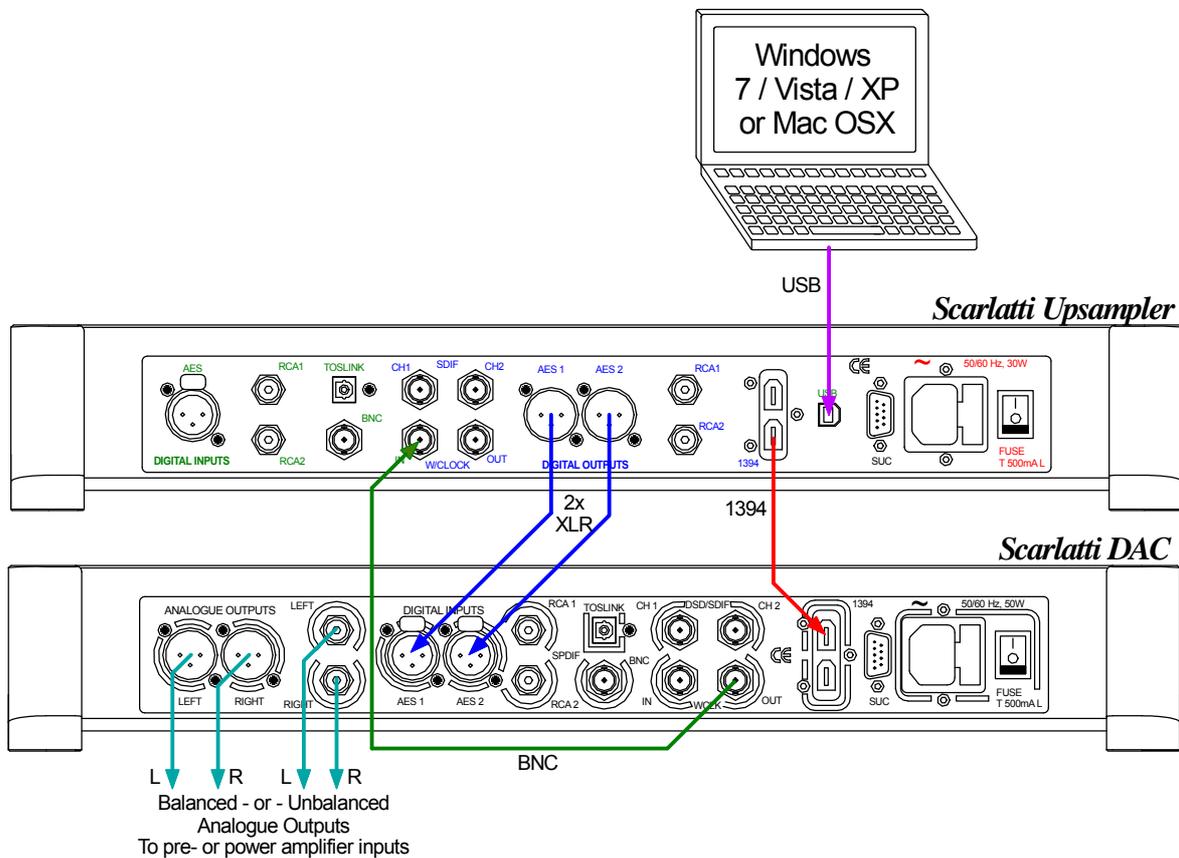


Figure 5 – Using a *Scarlatti Upsampler* and DAC with a laptop

- The system is synchronised by the DAC running in Master Mode at **44.1kHz**. Remember to select the DAC input first before using the DAC's **Sync** button to select **Master**. The DAC will not operate in Master mode when receiving 48, 96 or 192kS/s data.
- The Upsampler takes data from the laptop, it will probably be set to upsample to **24/176.4** or **DSD**. Set the **Upsampler Settings / Sync Source** menu page to **WCik**.
- The DAC takes data from the Upsampler via **1394** (DSD) or **Dual AES** (24/176.4), it is your choice.

For further improvement, add a *Scarlatti Clock* to the system.

The next step is crucial – sit back and enjoy the music.

Using a Vivaldi DAC with a Scarlatti stack

Scarlatti Upsampler v1.20 and Transport v1.11 feature Dual AES DSD outputs, which allows the stack to be used with Vivaldi DAC.



Figure 6 – Using a *Vivaldi* DAC with a *Scarlatti* stack

- Connect up the system as shown above.
- Set the Transport's **Settings > Vivaldi Mode** menu page to **On**.
- Set the Clock **Frequency** to **44.1kHz**.
- Select the Upsampler's **RCA1** input, set the Upsampler's **Settings > Sync Mode** menu page to **WCLK**, set the Upsampler's **Output** to **DSD**.
- Select the DAC's **AES1+2** input, set the DAC's **Settings > Sync Mode** menu page to **W** (auto), set BOTH of the DAC's **Settings > Dual AES** menu pages to **Auto**.
- Select the DAC's **AES3+4** input, set the DAC's **Settings > Sync Mode** menu page to **W** (auto).

The Transport's **EasyPlay** system cannot automatically set the DAC's input to suit the disc type because this feature relies on 1394 bus connections.

- To play an SACD in native format, select the DAC's **AES1+2** input.
- To play a CD upsampled to DSD by the Upsampler, select the DAC's **AES3+4** input.

A Vivaldi Transport may be connected to this system in place of the Scarlatti Transport.

FRONT PANEL

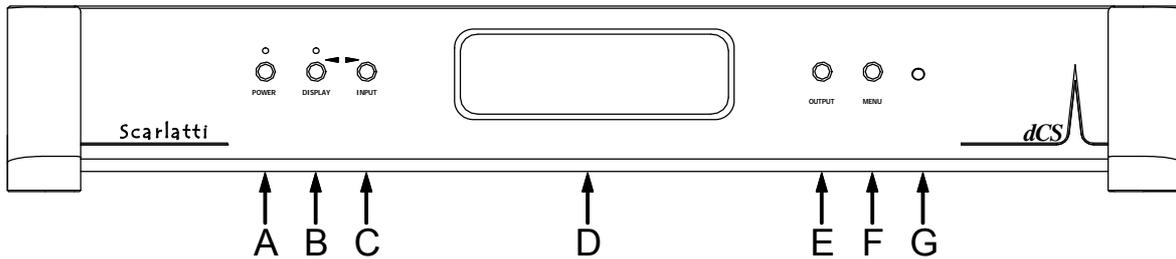


Figure 7 – Front panel

POWER Button

To switch on, ensure the rear panel switch is set to **I** and press the **POWER** button (A) on the front panel once. Note that the unit cannot be turned on from the remote control.

To set the unit to sleep mode, press the **POWER** button once. The main display will turn off, the clock outputs will mute and the LED over the button will light. Press again to return to normal operation.

To switch off, hold down the **POWER** button for about 5 seconds until **Power Down** appears on the display, then release it.

When the menu is open, press the **POWER** button to close the menu.

DISPLAY Button

Press the **DISPLAY** button (B) to turn the main display off and on. When the display is off, the LED over the button will light to warn you that the unit is running. If you find the LED is intrusive, you can turn it off by opening the **Display** menu and selecting **LEDs OFF**.

When the menu is open, the **DISPLAY** button changes to the ← button, used to page backwards through the menu.

INPUT Button

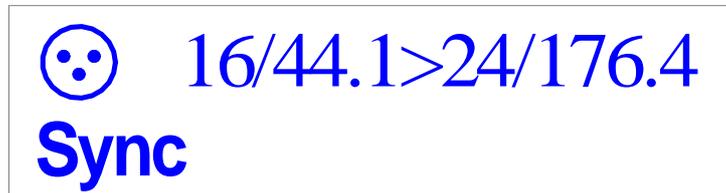
Press the **INPUT** button (C) to change the selected input, the icon in the top left corner of the display will change. The source sample rate is automatically detected. The input sequence is:



When the menu is open, the **INPUT** button changes to the → button, used to page forwards through the menu.

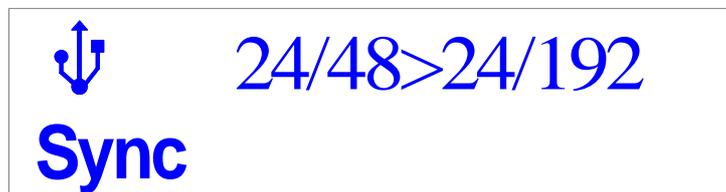
Display

In normal use, an icon representing the selected input appears at the top left corner of the display (D). To the right of this, the input and output sample rates appear.



Sync will appear at the bottom left corner if the unit is locked to a source or clock and is not in Master mode. The Clone icon will also appear if the unit is in clone mode.

Two other display examples are shown below:



Details of the menu displays are shown in the Menu section on page **21**.

OUTPUT Button

Use the **OUTPUT** button (E) to change the output sample rate, the new rate appears on the right side of the display. The output sample rate sequence is:

..., 32kS/s, 44.1kS/s, 48kS/s, 88.2kS/s, 96kS/s, 176.4kS/s, 192kS/s, DSD, 32kS/s,



The *Scarlatti Upsampler* does not feature down-sampling combinations. Output sample rates that are lower than the input sample rate cannot be selected.

MENU Button

Press the **MENU** button (F) to open the menu, select menu pages and change settings. See the Menu section on page **21** for information on using the menu features.

Remote Control Receiver

Aim the remote control handset towards the receiver (G) for best sensitivity.

REAR PANEL

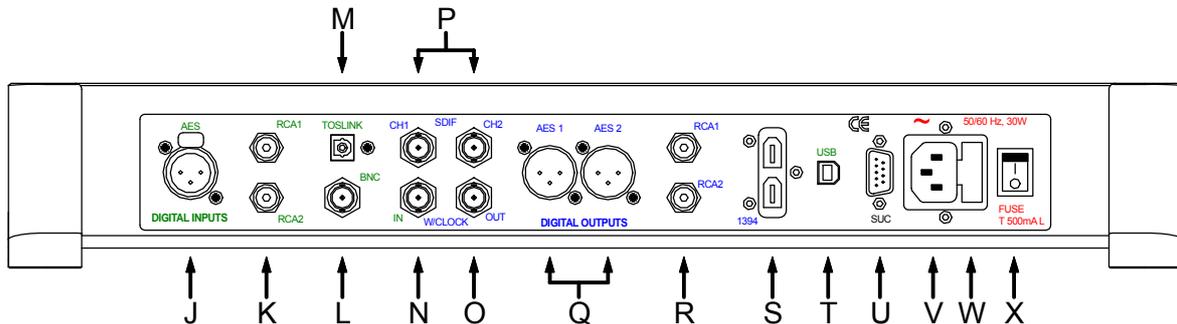


Figure 8 – Rear panel

Digital Inputs

The standard PCM inputs are **AES** on a 3-way female XLR connector (J), SPDIF inputs **RCA1** and **RCA2** on RCA phono connectors (K) and an SPDIF input on a **BNC** connector (L). They will accept up to 24-bit PCM data at 32, 44.1, 48, 88.2, 96, 176.4 or 192kS/s or DSD in DoP format.

An optical SPDIF on a **TosLink** connector (M) accepts up to 24-bit PCM data at 32, 44.1, 48, 88.2 or 96kS/s.

The **USB** interface on a 'B' type connector (T) will accept music data streamed from a Windows™ PC, MAC™ or sound server equipped with a USB 2.0 interface. The interface operates in USB Audio Class1, it will accept up to 24-bit PCM data at 32, 44.1, 48, 88.2 or 96kS/s.



We have tested this interface with several common formats running on Windows 7, Windows Vista, Windows XP and MAC OSX 10.5 / 10.6 but we cannot accept responsibility for correct operation with all source devices, operating systems or software. At the time of writing, the Windows 8 generic USB driver is not compatible.

Digital Outputs

All of the outputs consistent with the selected output mode are active at the same time.

All the single-wire PCM digital outputs generate 24-bit PCM data at 32, 44.1, 48, 88.2, 96, 176.4 or 192kS/s or DSD in DoP format.



The *Scarlatti Upsampler* does not have facilities to reduce the word length of PCM data to less than 24 bits. It will not give good results with older DACs or other equipment that cannot process 24-bit data. ALL *dCS* equipment will accept 24-bit PCM data.

The **AES1** and **AES2** outputs (Q) can be used individually at all output rates or as a Dual AES pair at 88.2, 96, 176.4 or 192kS/s or DSD in DoP format.



The AES outputs will carry single AES data unless the **Dual AES** menu page is set to **Dual AES**.

2 SPDIF outputs are provided, **RCA1** and **RCA2**, on RCA phono connectors (R). These outputs carry SPDIF data at all output rates, even if Dual AES mode is set.



If DSD data is received, the output rate is automatically set to DSD. The data passes through to the AES and RCA outputs, in addition to the 1394 interface.

The **SDIF** interface outputs SDIF-2 PCM data for output rates up to 96kS/s, even if Dual AES mode is set. The interface consists of two data inputs labelled **CH1** and **CH2** (P). The interface is disabled if the output is set to 176.4 or 192kS/s or DSD. We recommend connecting the **W/Clock Output** as part of the SDIF interface, this is required with *dCS* equipment.

The IEEE **1394** interface (S) outputs encrypted DSD data. 1394 interfaces are great for carrying lots of digital data - but are very poor at transmitting a stable clock, so a separate Word Clock connection is required. The two 1394 ports are identical – they can be used as data outputs or as a pass-through. Note that the 1394 bus must not be connected in a loop as this will prevent the system initialising.

Word Clock Input / Output

The **W/Clock In** connector (N) will accept standard word clock from the source equipment or a master clock at 32, 44.1, 48, 88.2, 96, 176.4 or 192kHz. Unlike the DAC, the clock frequency does not need to be an exact multiple of the input sample rate provided the two rates are locked together. Set the **Upsampler Settings > Sync Source** menu page to **WClk** when locking to an external word clock. Note that the source (e.g. the CD Transport) **MUST** be locked to the same clock, otherwise the **SYSTEM** will not be locked and periodic clicks will be heard on the outputs.

The **W/Clock Out** connector (O) carries word clock at a frequency that depends on the **Output** sample rate and the setting of the **Dual AES Output** menu page, as shown in the table below.

Output sample rate	32	44.1	48	88.2	96	176.4	192	DSD
W/Clock Out frequency - Single AES setting	32	44.1	48	88.2	96	176.4	192	44.1
W/Clock Out frequency - Dual AES setting	32	44.1	48	44.1	48	88.2	96	44.1

Word clock is used for synchronisation only, it does not carry digital data.

SUC Connector

The SUC connector (U) is an RS232 interface, primarily used to remotely control the unit during automated testing. Please contact *dCS* for advice on using this interface with a household automation system. Note that we recommend using infra-red remote control instead.

Mains inlet

Power is connected via a standard IEC320 connector (V), protected by a fuse (W) and isolated by a 2-pole power switch (X).

THE MENU

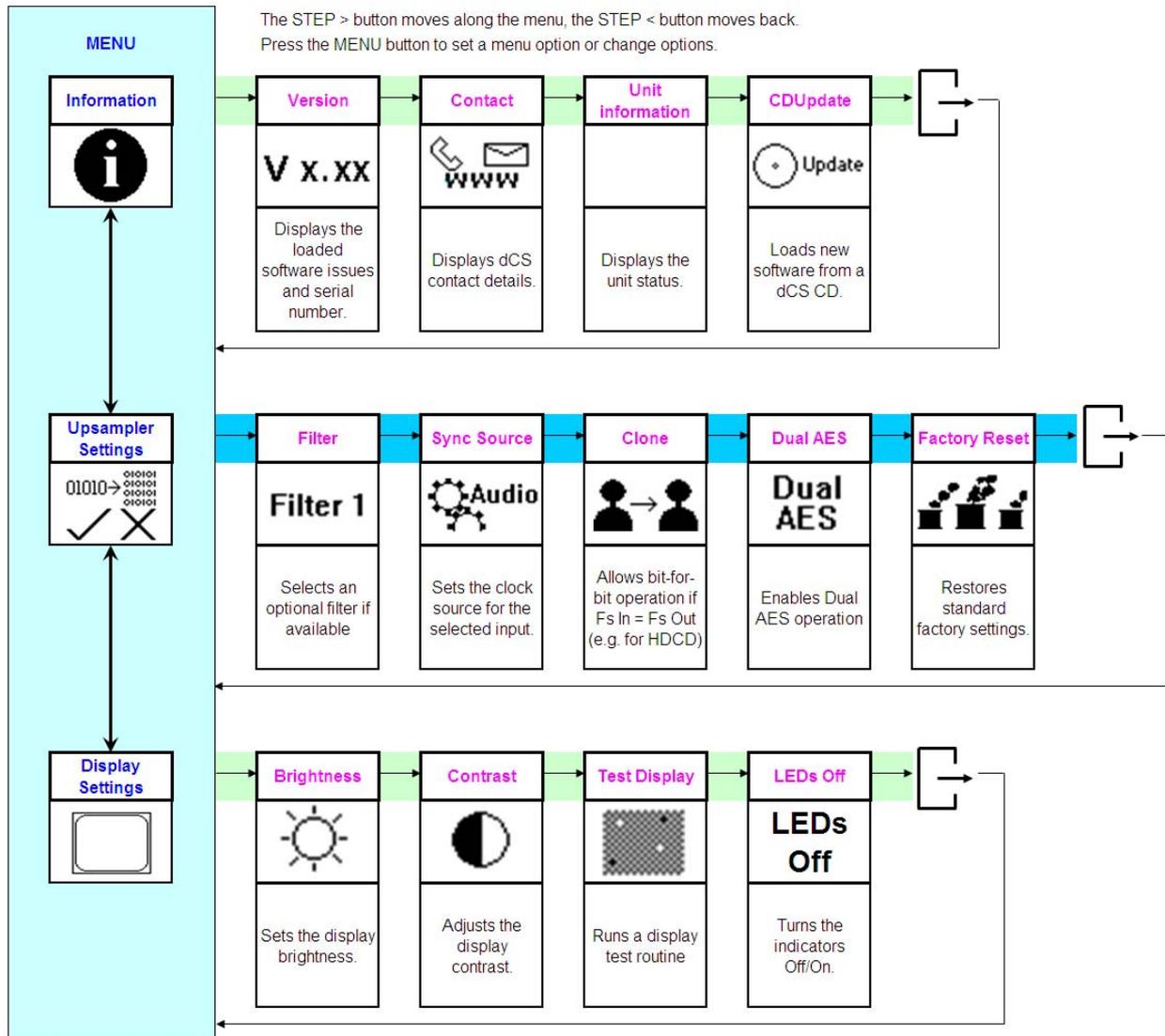


Figure 9 – The menu sequence

Using the Menu

The menu gives the user access to a range of additional features. It also allows new features and performance enhancements to be added at a later date by software upgrades.

The menu is controlled by four buttons.

- Press the **MENU** button to open the menu or select a setting.
- Press the **→** button to page forward through the menu.
- Press the **←** button pages backward through the menu.
- Press the **POWER** button to close the menu or just wait 5 seconds.

Alternatively, use the remote control to access the menu.

Use the Menu Guide sheet to help you find the right menu.

Each unit in the range has either three or four top-level menu pages:



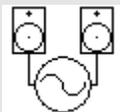
The **INFORMATION** menu displays software issues, serial number, contact details and unit set-up details.



Each model has a different **SETTINGS** menu, which allows you to set some features that are not directly accessible from the front panel.



The **DISPLAY SETTINGS** menu is used to adjust and test the display.



The **SIGNAL GENERATOR** menu (on the Transport and DAC only) contains test and set-up routines.

Use the **→** button to move the highlight to the menu you want, then press the **MENU** button to select it. The next menu level down is displayed. Use the **→** button to move the highlight to the menu page you want, then press the **MENU** button to display the information or change the setting.

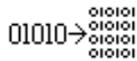
Select the exit icon  to go back to the previous menu level.

INFORMATION Menu

V X.XX The **Version** page displays the software versions loaded in the unit and the full serial number. Please have this information ready if you contact your dealer for any reason.



The **Contact** page displays *dCS* web-site URL and email address. If you have any difficulty, please contact your dealer for help first.



The **Upsampler Information** page reports the status of the unit:

- Audio Input: AES / RCA1 / RCA2 / BNC / TosLink / USB
- Sync Source: Audio / WClk / Master
- Clone Mode: Off / On / Locked
- Input Sample rate:
- Output Sample rate:
- Word clock rate:
- Temperature°C

Use the ← → buttons to scroll down the list and the **MENU** button to exit.



The **CD Update** feature allows you to load new software into your system from either a *Scarlatti* Transport or any STANDARD CD player / transport or from a PC. Note that some non-Red-Book CD transports change the digital data and cannot be used to load new software. Please follow the instructions supplied with the update CD carefully.

UPSAMPLER SETTINGS Menu

Filter 1 The optional **Filters** give different trade-offs between impulse response and aliasing.

Filter 2 For most conversions, only **Filter 1** is available - a classic sharp filter. The amplitude is reduced by 0.1dB to match the other filters.

Filter 3

Filter 4

Filter 5 The best filter setting is a personal choice and may be related to the type of music.

Filter 6

The Upsampler remembers the last filter set for each sample rate conversion.

The table below shows how many filter choices are available for each combination.

		OUTPUT RATE							
		32k	44.1k	48k	88.2k	96k	176.4k	192k	DSD
INPUT RATE	32k	1	1	1	1	1	1	1	1
	44.1k		2	2	5	2	5	2	6
	48k			1	1	4	1	4	1
	88.2k				1	1	1	1	4
	96k					1	1	1	1
	176.4k						1	1	1
	192k							1	1
	DSD								1

For conversions with 2 filters (currently all of these have a 44.1k input rate):

Filter 1 is a classic sharp filter. The 44.1k→44.1k conversion has no filtering, the level is reduced by 0.1dB.

Filter 2 is a very steep, long asymmetrical (or apodising) filter which starts rolling off at 20kHz (19kHz for the 44.1k→44.1k conversion). This filter has no energy left in the output to exercise the DAC's filter, so there is no pre-ringing from the source and the DAC. This will improve the response of the DAC's reconstruction filter by removing some high frequency components that typically cause images in half-band filter DACs.

For conversions with 4 filters:

Filter 1 has the sharpest cut-off, and so has the poorest impulse response (transient performance) but the best alias rejection (removal of out-of-band frequencies). **Filters 2, 3** and **4** have progressively gentler cut-off, with less alias rejection.

For conversions with 5 filters (currently all of these have a 44.1k input rate):

Filters 1 – 4 are the same as for conversions with 4 filters.

Filter 5 is an asymmetrical (or apodizing) design with non-linear phase and no pre-ringing.

For the 44.1k→DSD conversion which has 6 filters:

Filters 1 – 4 are the same as for conversions with 4 filters.

Filter 5 is an asymmetrical (or apodizing) design with non-linear phase and no pre-ringing.

Filter 6 is a new long filter which has linear phase and pre-ringing.



The **Filter** setting cannot be changed if an input / output rate combination with only 1 filter choice is selected, or if the Upsampler is not locked to a source.

“I don't have time to listen to all these filters! Which ones do you suggest?”

Filters are definitely a personal choice, but we suggest the following:

44.1kS/s > 44.1, 48, 96 & 192kS/s - Filter 2 (asymmetrical)

44.1kS/s > 88.2 or 176.4kS/s or DSD – Filter 5 (asymmetrical)

48kS/s > 96 or 192kS/s – Filters 2 or 3

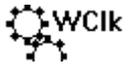
88.2kS/s > DSD – Filters 2 or 3





The **Sync Source** menu determines the clock source for the Upsampler.

Set to **Audio**, the unit extracts the clock from the selected digital input and locks to it. **Sync** appears on the front panel, greyed-out during locking. When locking is complete, the **Sync** indication firms up. The Upsampler's PLL will reduce the clock jitter, but this mode does not give the best jitter performance. Sync to **Audio** is not available when the **USB** input is selected.



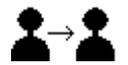
Set to **WCIK**, the Upsampler locks to an external Word Clock connected to the **W/Cik In** connector and locks to it. **Sync** appears on the front panel, greyed-out during locking. When locking is complete, the **Sync** indication firms up. This setting gives best results when using a Master Clock to sync the whole system.



If the **USB** input is selected but a Master Clock is not available, the Upsampler must be set to **Master** mode. In this mode, the Upsampler's internal clock controls the system timing, so **Sync** does not appear on the display.



The **Sync Source** setting is stored separately for each input. Select the required input before changing the **Sync Source** setting.



With the **Clone Mode** page set to **Clone On** and the output sample rate set to be equal to the input sample rate, PCM data passes through the Upsampler unchanged (bit-perfect).



The Clone icon appears on the display to indicate the output is bit-perfect.

If the input and output sample rates change so that they no longer match, the unit will stop cloning and the clone icon will disappear.

This mode is useful when passing HDCD data through unchanged to a (non- *dCS*) HDCD converter, or for CD Updating a *dCS* DAC via the Upsampler.



Set to **Clone Lock**, the output rate automatically changes to match any change in the input rate, locking the unit in clone mode.



The Clone Lock icon appears on the display.



Set to **Clone Off**, the unit upsamples as directed by the control setting and so the data is changed. This is the usual setting.



Filters are disabled in Clone mode, as filtering prevents bit-perfect operation.

**Dual
AES**

The **Dual AES** menu page sets the output mode when the output sample rate is 88.2, 96, 176.4 or 192kS/s or DSD. When set to **Dual AES**, a stereo pair of data is split between the **AES1** and **AES2** outputs, they MUST be used together as a pair. Each wire runs at half the sample rate (44.1, 48, 88.2 or 96kS/s respectively). The left channel data appears on the **AES1** output (split between the 2 tracks), the right channel data appears on the **AES2** output (split between the 2 tracks).

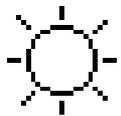
**Single
AES**

When set to **Single AES**, both **AES1** and **AES2** outputs carry the same single AES data at the output sample rate. Using these together in **Single AES** mode is NOT the same as a Dual AES pair.



The **Factory Reset** menu page resets the unit to standard settings. These are:

- **Sync** to **Audio**, except
- **USB** sync to **WCiK**
- **Input** to **AES**
- **Dual AES** mode to **Single**
- Filters to **Filter 1**
- **Output** sample rate to 96kS/s
- **Clone mode** to **Clone-Off**.
- **Display** to **On**.
- **Brightness** to 80%.
- **Contrast** to 60%
- **LEDs** to **On**.

DISPLAY SETTINGS Menu

Set the display **Brightness** to a comfortable level. Use the **← →** buttons to change the setting and the **MENU** button to accept the new setting.



Set the display **Contrast** to a comfortable level. Use the **← →** buttons to change the setting and the **MENU** button to accept the new setting.



Runs a **Display Test** routine, which flashes all the indicators and the main display.

**LEDs
Off**

This page is usually set to **LEDs On**. Set it to **LEDs Off** to turn off the indicators if you find them distracting.

SPECIFICATION

Digital inputs	USB interface on a B-type connector, will accept up to 24 bit PCM at 32, 44.1, 48, 88.2 or 96kS/s. Operates in asynchronous mode.
	AES3 on a 3-pin female XLR connector, will accept up to 24 bit PCM at 32, 44.1, 48, 88.2, 96, 176.4 & 192kS/s or DSD in DoP format.
	3x SPDIF on 2x RCA Phono and 1x BNC connectors. Each will accept up to 24 bit PCM at 32, 44.1, 48, 88.2, 96, 176.4 & 192kS/s or DSD in DoP format.
	Optical SPDIF on TosLink connector, will accept up to 24 bit PCM at 32, 44.1, 48, 88.2 or 96kS/s. Operation is not guaranteed at 176.4 or 192kS/s.
Digital outputs	IEEE 1394 interface on 2x 6-way connectors. In DSD mode, the interface outputs <i>dCS</i> -encrypted DSD (1 bit data at 2.822MS/s).
	2x AES3 on 3-pin female XLR connectors. Each outputs 24 bit PCM at 32, 44.1, 48, 88.2, 96, 176.4 or 192kS/s or DSD in DoP format, OR as a Dual AES pair at 88.2, 96, 176.4 or 192kS/s or DSD in DoP format.
	2x SPDIF on RCA Phono connectors. Each outputs 24 bit PCM at 32, 44.1, 48, 88.2, 96, 176.4 or 192kS/s or DSD in DoP format.
	1x SDIF-2 interface on 2x BNC connectors, outputs 24 bit PCM at 32, 44.1, 48, 88.2 or 96kS/s.
Clocking	Word Clock Input on 1x BNC connector, accepts standard word clock at 32, 44.1, 48, 88.2, 96, 176.4 or 192kHz. Sensitive to TTL levels.
	Word Clock Output on 1x BNC connector, outputs standard word clock at a frequency equal to the (single wire) output data rate, or 44.1kHz when set to output DSD.
Upsampling rates	Data from any input may be converted to 24 bit PCM at 32, 44.1, 48, 88.2, 96, 176.4 or 192kS/s or DSD (1 bit data at 2.822MS/s). The output sample rate must be equal to or greater than the input sample rate.
Spurious responses	Better than -100dB0, 20Hz-20kHz.
Optional filters	A choice of filters is available for 10 popular conversions, see page 24 for details.
Size and weight	465mm (18.3") long x 405mm (16.0") deep x 75mm (3.0") high, excluding cable connectors. Allow space for air flow around the unit.
	10.1kg (22.2lbs).
Power requirements	Internally set to either 100, 115/120, 220 or 230/240V AC, 49 – 62Hz.
	Power consumption: 12.7 W typical, 15 W maximum.

These specifications are subject to change without notice.

MAINTENANCE AND SUPPORT

Service and Maintenance

dCS audio products are designed not to need regular maintenance, and contain no user serviceable parts apart from the mains fuse. If your unit is damaged in any way, please contact your dealer.

Replacing a Blown Mains Fuse

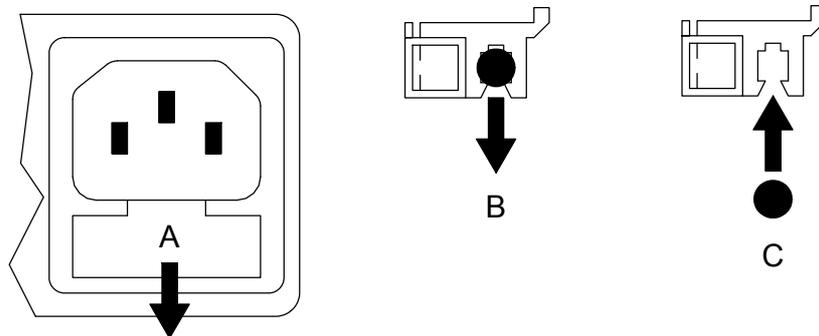
There is a mains fuse below the power inlet, accessible from the outside of the unit. If the fuse blows, it may be changed by the user. The current consumption of the unit is very low, so it only blows if power surges occur, or there is a fault in the unit. Usually power surges cause no other damage, but if the fuse blows repeatedly on replacement, some other damage will have been done and the unit must be returned to dCS for repair.

Fuse type: 20 x 5mm T 0.5 amp L fuse



If the fuse should fail, it is essential that it is replaced with one of the same type and rating. Failure to do so could result in damage to the unit, risk of fire or electric shock and will invalidate the guarantee.

Referring to the diagram below, remove the power cable, use a small flat bladed screwdriver to pry up the tab on the fuse carrier (A) and pull it out. Push the blown fuse out of the clip in the carrier (B) and dispose of it. Fit a new fuse in the clip (C) and push the carrier back into the unit so that it clicks home. Spare fuses are provided with the unit.



Cleaning the case

The front and back panels of your dCS equipment are machined from very high grade aluminium. Great care has been taken to create the finish of the aluminium throughout the engineering process from the raw solid material to the finished piece.

To remove loose dust or finger marks from the case, we recommend that you use a clean, dry, lint-free cloth.

To restore the finish on the front and back panels, we recommend applying small quantities of a lanolin based cleaner, using a clean, dry, lint-free cloth and then wiping off. Do not allow lanolin to collect around the buttons.

Small amounts of glass cleaner containing ammonia may be used to clean other surfaces, but avoid spraying onto the connector contacts.

Limited Warranty

General

dCS warrants this product against defects in materials and workmanship for a period of 3 years from the date the unit was originally shipped from dCS. During the warranty period, dCS will repair or, at our absolute discretion, replace a faulty product. Warranty repairs must only be carried out by dCS or our authorised service agents. Please contact your dealer if your unit requires service.

Your dealer should have completed on your behalf an **Owner Registration** form at the time of sale and returned it to dCS. On receipt of the Owner Registration form, dCS will add your contact details to our customer database. dCS will use this information for warranty purposes only, we will not contact you directly for reasons relating to sales and marketing.

This warranty applies to the original owner.

Warranty Exclusions

The Warranty does not cover wear and tear.

The Warranty on this product will be void if:

- the product is misused in any way.
- any unauthorised modifications or repairs are carried out.
- the product is not used in accordance with the Operating Conditions stated in this manual.
- the product is serviced or repaired other than by dCS or our authorised service agents.
- the product is operated without a mains earth (or ground) connection.
- the unit is returned inadequately packed.

dCS reserve the right to apply a service charge if a product returned for warranty repair is found to be operating correctly, or if a product is returned without a returns number being issued.

This warranty covers parts and labour only, it does not cover shipping charges or tax/duty.

Our dealers or distributors are NOT authorised to extend the terms of this warranty, dCS cannot accept responsibility for any attempt to do so.

Products re-sold by dCS on a “used” basis may be subject to reduced warranty terms.

Obtaining Service

Should you encounter a problem, contact your authorised dCS dealer for advice, quoting the model, the full serial number, software version number, and giving a detailed description of the fault. Your dealer will advise you fully on actions that need to be taken. When returning a unit, the original packaging should be used to avoid transit damage. Replacement packaging sets may be purchased from dCS.

During the Warranty period, there will normally be no charge for parts or labour.

Operating Conditions

- The supply voltage must remain within +/-10% of the A.C. voltage specified on the back panel.
- The supply frequency must be in the range 49Hz to 62Hz.
- Ambient temperature range: 0°C (32°F) to 40°C (104°F), non-condensing.
- Do not install the unit near heat sources such as radiators, air ducts, power amplifiers or direct strong sunlight.
- If in doubt, the easy test is – the unit is happy to work anywhere a human is.

If you need more help

In the first instance, you should contact your dealer. If they cannot resolve the issue, contact your national distributor.



dCS, our dealers and distributors cannot accept responsibility for I.T. support issues. In such cases, please ask the computer or software vendor for advice.

Manufactured by:

Data Conversion Systems Ltd.
Unit 1, Buckingham Business Park,
Anderson Road,
Swavesey,
Cambridgeshire. CB24 4AE
UK

www.dcsltd.co.uk

This user manual may be downloaded free of charge from our web-site. A bound copy of this manual may be ordered from dCS.

Software History

dCS products make extensive use of software configurable chips – FPGAs and DSPs. This gives us the ability to update our products to add extra features, update digital interface standards or make performance improvements by loading new software. Occasionally, a hardware update may be necessary also to increase the “capacity” of the electronics, add extra connectors or extra front panel controls.

Please note that not all software updates make an earth-shattering change. You should have a clear idea of what you expect to gain before updating to the latest issue. We recommend that you keep your software up to date. Check the dCS web-site for the latest software updates.

This manual is for *Scarlatti Upsampler* software version 1.2x.

Issue 1.00 - The first issue, with 1394/USB code 4.00.

Issue 1.01 – Corrects a tendency to remain muted when receiving 96k on the USB input.

88.2k > 192k filter improved.

1394/USB issue updated to 4.01.

Issue 1.02 – 96k USB bug fixed.

Issue 1.10 – Filter choices are now available for 10 conversions, including asymmetrical filters for all conversions from 44.1kS/s.

USB code updated to improve compatibility with Windows Vista/7 WASAPI mode and Spotify. This updates the 1394 code version to v4.05.

Clone Lock mode added.

LEDs Off feature added.

Adds support for the Output rate IR command from the Premium Remote handset.

Word Clock Output frequency corrected to 88.2 / 96kHz when output rate is 176.4 / 192kS/s.

Issue 1.11 – Corrects intermittent glitching when converting 32/48/96kS/s data to DSD while locked to a 44.1 or 88.2kHz word clock.

Issue 1.20 - Adds single wire 176.4 & 192kS/s & DoP operation to AES, RCA & BNC inputs & outputs.

Adds Dual AES DoP output mode.

Word Clock in/out supports 176.4 & 192kHz.