

dCS Scarlatti Clock
Digital Audio Master Clock

User Manual
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Contents

Using the dCS Scarlatti Clock for the first time	4
What's in the box?	4
Positioning the unit	4
Safety Notice	5
STEP-BY-STEP GUIDE	6
Preliminaries	6
The GOLDEN RULES for using a Master Clock	6
Connecting the system for DSD	7
Connecting the system for Dual AES	8
Using an External Reference	8
Front Panel	9
POWER Button	9
DISPLAY Button	9
DITHER Button	9
Display	10
FREQUENCY Button	10
MENU Button	10
Remote Control Receiver	10
Rear Panel	11
Word Clock Outputs	11
Ref Input	11
1394 Interface	11
SUC Connector	11
Mains inlet	11
The Menu	12
Using the Menu	13
INFORMATION Menu	14
CLOCK SETTINGS Menu	14
DISPLAY SETTINGS Menu	14
Specification	15
Maintenance and Support	16
Service and Maintenance	16
Replacing a Blown Mains Fuse	16
Cleaning the case	16
Limited Warranty	17
If you need more help	18
Software History	18

USING THE *dCS Scarlatti Clock* FOR THE FIRST TIME

Congratulations on purchasing your *dCS Scarlatti Clock*.

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.

What's in the box?

Check that the box contains the following items:

- *dCS Scarlatti Clock*
- Manual and Menu / Setup Guide
- Power cable
- 3x BNC cables
- 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 Philips Pronto remote control. If you do not have a *Scarlatti Transport* in your system, a programmed Pronto 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 Clock* 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 to comply 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 Clock* 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 details the two most common set-ups.

For all of the **Word Clock Outputs** and the **Ref Input**, use 75Ω coax cables fitted with BNC plugs.

Connect the power cable supplied to the power inlet on the Clock 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 Clock configures itself. The display will show in sequence: **Scarlatti** and either **44.1Hz** or **48kHz**.

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 **Clock 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 GOLDEN RULES for using a Master Clock

- **The source equipment MUST be locked to the Master Clock.**
If it is not, you will either have locking difficulties or hear occasional clicks and the advantages of using the Clock will be lost.
Some non-dCS CD transports, DAB radios and other equipment do not have a Word Clock Input and so CANNOT be locked to a Master Clock.
- **The clock frequency MUST match the sample rate(s) used in the system.**
If it does not, the system cannot lock and the DAC may remain muted. Please check the manuals for the equipment used in your system.

When the *Scarlatti Clock* is set to 44.1kHz, it may be used with DSD-based systems, CD systems without an upsampler running at 44.1kHz or CD systems upsampling to 88.2kS/s or 176.4kS/s Dual AES.

When the *Scarlatti Clock* is set to 48kHz, it may be used with a DVD player or DAT recorder fitted with a Word Clock Input running at 48kS/s, or upsampling to 96kS/s Dual AES or 192kS/s Dual AES.

The *Scarlatti* and *Paganini Upsamplers* are exceptions to this rule – we have designed a very flexible clocking arrangement for the *Upsampler* to make it easier to use. It will lock to Word Clock at 32, 44.1, 48, 88.2 or 96kHz, regardless of the input and output sample rates.

To make best use of the *Scarlatti Clock*, all the digital audio units in the chain should be locked to it.

Connecting the system for DSD

Most owners will use the *Scarlatti Clock* to clock a *Scarlatti* stack at 44.1kHz.

- If necessary, use the **FREQUENCY** button to set the Clock to **44.1kHz**.
- Connect one of the Clock outputs to the Word Clock inputs of the transport and the DAC.
- Connect a 1394 cable between the DAC and the transport. Select the DAC's **1394** input.
- The transport will automatically slave to the Clock and display **Sync**.
- Use the DAC's **SYNC** button to set it to **WCLK**.
- Connect the DAC's **Analogue Outputs** to a power amplifier or preamplifier.
- Set the DAC **Volume** control to a suitable level and play a disc.
- Set the Clock's **DITHER** feature on or off as you prefer.

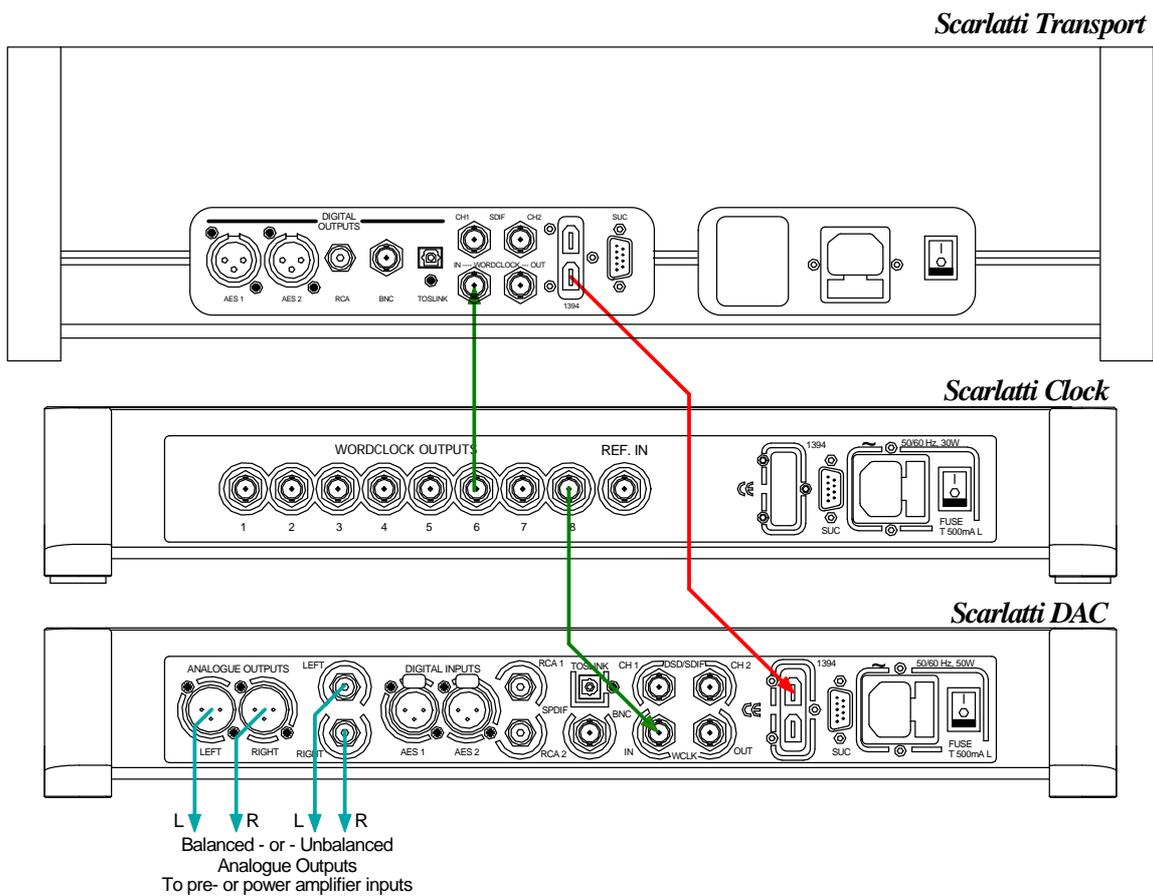


Figure 1 – Using the *Scarlatti* Transport, DAC and Clock together

Connecting the system for Dual AES

Owners with an Upsampler may prefer to use it to run the DAC at 176.4kS/s.

- If necessary, use the **FREQUENCY** button to set the Clock to **44.1kHz**.
- Connect one of the Clock outputs to the Word Clock inputs of the transport, the Upsampler and the DAC.
- Connect an AES cable between the transport's AES output and the Upsampler's AES input, select that input.
- Set the Upsampler to **176.4kS/s**.
- Connect the Upsampler's **AES1 & 2** outputs to the DAC's **AES1 & 2** inputs and select the DAC's **Dual AES** input. (It may be necessary to turn Dual AES mode on in the menu.)
- The transport will automatically slave to the Clock and display **Sync**.
- Set the Upsampler to sync to the external word clock.
- Use the DAC's **SYNC** button to set it to **WClock**.
- Connect the DAC's **Analogue Outputs** to a power amplifier or preamplifier.
- Set the DAC **Volume** control to a suitable level and play a disc.
- Set the Clock's **DITHER** feature on or off as you prefer.

Using an External Reference

If you have a GPS receiver or an atomic clock with a 10MHz output, you can lock the *Scarlatti Clock* to it. These sources are even more accurate than the *Scarlatti Clock*, but note that low jitter and stability are more important than absolute accuracy.

- Connect your system for DSD or Dual AES as you prefer.
- Use another BNC cable to connect the 10MHz output from the external reference to the *Scarlatti Clock*'s **Ref In** connector.
- Open the Clock's menu and set the **Coupling** menu page to **Bipolar**. The Clock should lock to the external reference and display **Sync**.
- Set the DAC **Volume** control to a suitable level and play a disc.

FRONT PANEL

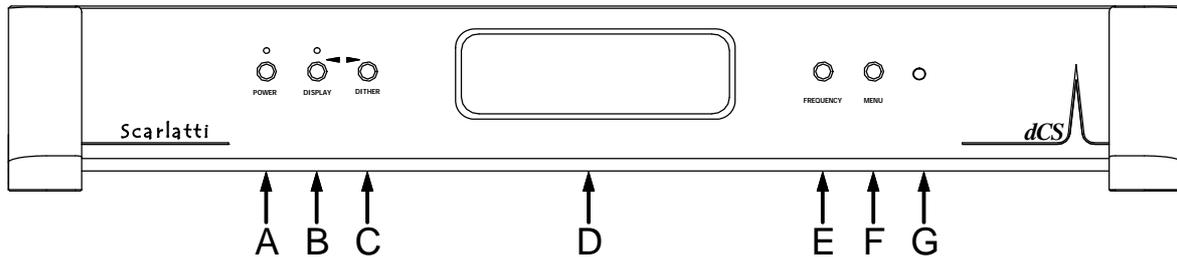


Figure 2 – Front panel

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.

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

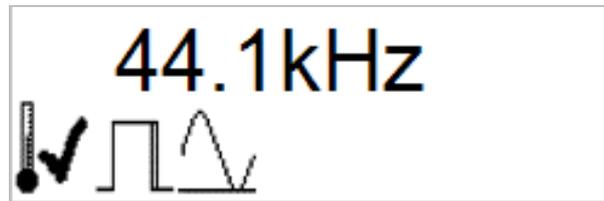
DITHER Button

Press the **DITHER** button (C) to turn the Dither feature on and off. This dithers the clock edges in a controlled way to exercise the phase-locked-loops in the source and DAC. Try it and decide for yourself whether you prefer Dither on or off.

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

Display

In normal use, the clock frequency is shown at the top of the display (D), for example:



The icons at the bottom show the current settings or operating conditions. From the left, these are:

- Temperature stabilised, if the icon is displayed.
- **Dither** on, if this icon is displayed.
- **Coupling** menu setting (**TTL** is shown, the alternative is **Bipolar**).
- If the unit is locked to an external reference, **SYNC** is displayed instead. If an external reference is connected but the unit cannot lock to it, **SYNC** is displayed greyed out.

Details of the menu displays are shown in the Menu section on page **12**.

FREQUENCY Button

Use the **FREQUENCY** button (E) to set the clock frequency to either **44.1kHz** or **48kHz**. The usual setting is **44.1kHz**.

MENU Button

Press the **MENU** button (F) to open the menu, select menu pages and change settings. See the Menu section on page **12** for information on using the menu features.

Remote Control Receiver

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

REAR PANEL

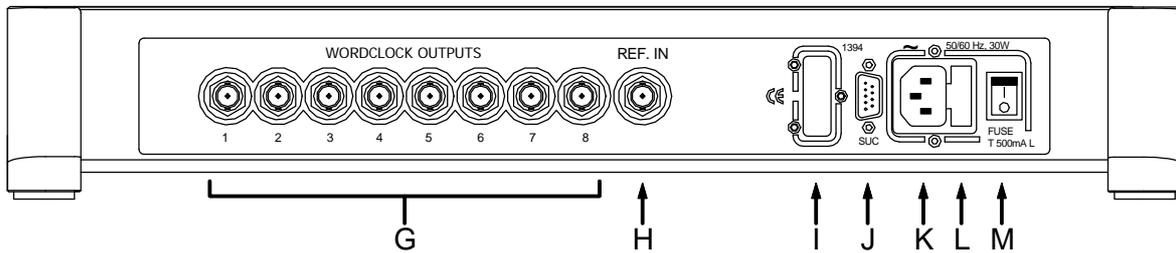


Figure 3 – Rear panel

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

Word Clock Outputs

The unit has eight identical **Word Clock Outputs** (G), all of which carry standard word clock at either 44.1kHz or 48kHz.

Ref Input

The **Ref In** connector (H) allows the unit to be locked to an accurate external reference, such as an atomic clock or a GPS clock. With the **Coupling** menu page set to **TTL**, the unit will lock to an external word clock at 32, 44.1, 48, 88.2 or 96kHz. With the **Coupling** menu page set to **Bipolar**, the unit will lock to a 10MHz reference.

As the *Scarlatti* Clock is a grade 1 master clock, there is nothing to be gained by locking it to a less stable or less accurate reference!

1394 Interface

There is provision for fitting an IEEE 1394 interface (I), which may be added at a later date. As a Master Clock does not generate or accept digital data, this will be used for control purposes only.

SUC Connector

The SUC connector (J) 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 (K), protected by a fuse (L) and isolated by a 2-pole power switch (M).

THE MENU

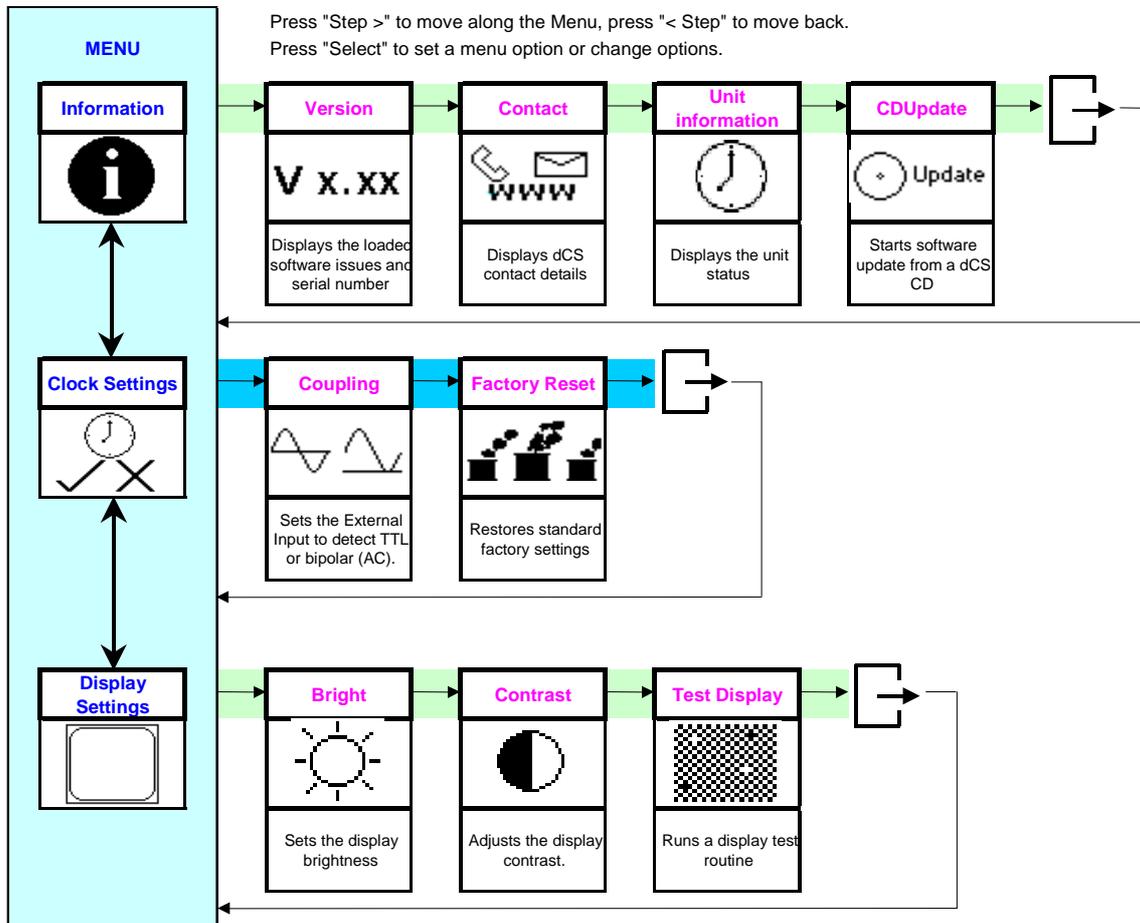


Figure 4 – The menu sequence

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.

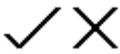
Alternatively, use the remote control to access the menu.

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:



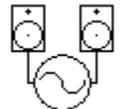
The **INFORMATION** menu gives software issues, serial number, contact details and unit set-up details.



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, email address, telephone and fax numbers. If you have any difficulty, please contact your dealer for help first.



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

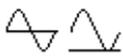
Output frequency ...kHz	Temperature stable / unstable
Coupling TTL / Bipolar	Master / Slave mode
Dither on / off	Input frequency ...kHz / ...MHz / unlocked
Temperature ...°C	

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 or transport. Note that some non-Red-Book CD transports change the digital data and cannot be used to download new software. Please follow the instructions supplied with the update CD carefully.

CLOCK SETTINGS Menu



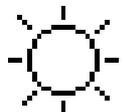
The **Coupling** menu page sets the **External Input** to accept either an AC coupled **Bipolar** reference (generated by a GPS receiver, for example) or a Word Clock at **TTL** levels.

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



Output Frequency to 44.1kHz.	Display to On.
Dither to Off.	Brightness to maximum.
Coupling to TTL .	Contrast to 60%

DISPLAY SETTINGS Menu



Set the display **Brightness** to a comfortable level.



Set the display **Contrast** to a comfortable level.



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

SPECIFICATION

Clock type	Class 1 Master Clock with dual VCXO, temperature compensated.
Clock Frequencies	44.1kHz or 48kHz.
Clock Accuracy	Better than +/- 1ppm when shipped (guaranteed for 12 months from shipping), typically +/-0.1ppm when shipped and stabilised.
Word Clock Outputs	8 independently buffered outputs on 75Ω BNC connectors, all carry the same clock frequency.
Reference Input	External Reference Input on 1x 75Ω BNC connector. Accepts word clock (with the Coupling menu page set to TTL) or AC coupled signals (with the Coupling menu page set to Bipolar) at 32kHz, 44.1kHz, 48kHz, 88.2kHz, 96kHz, 1MHz, 5MHz or 10MHz. Lock range is +/-300ppm.
Start-up time	Typically 1 minute to rated accuracy.
Size and weight	465mm (18.3") long x 405mm (16.0") deep x 75mm (3.0") high. Allow extra depth for cable connectors. Allow space for air flow around the unit. 9.8kg (21.6lbs).
Power requirements	Internally set to either 100, 115/120, 220 or 230/240V AC, 49 – 62Hz. Power consumption: 8W typical, 12W 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

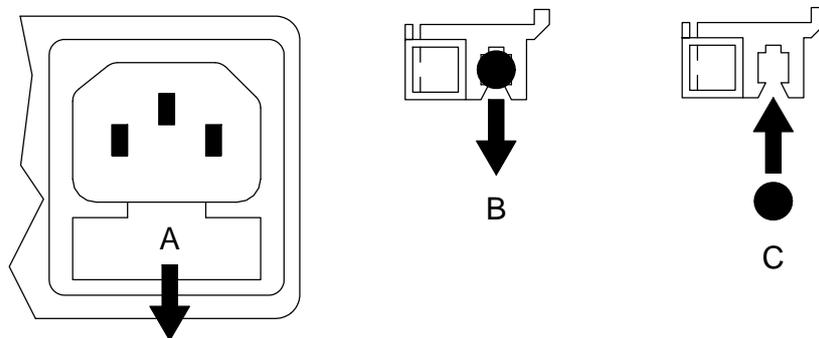
There is a mains fuse below the power inlet, accessible from the outside of the unit. If the fuse blows, it may be changed by the user. The current consumption of the unit is very low, so it only blows if power surges occur, or there is a fault in the unit. Usually power surges cause no other damage, 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 T0.5 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.

Manufactured by:

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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 Clock* software version 1.0x.

Issue 1.00 - The first issue.