

*dCS Debussy DAC*

## **Service Manual**

**August 2011**

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## SAFETY AND CONFIDENTIALITY

### Safety Warnings



**Servicing must be carried out by qualified service personnel only.**



These products contain circuitry that operate at high voltages and/or currents. Removing safety covers can expose personnel to risk of electric shock or other injury.

Take special care when working on the Power Board, as much of the board is at high voltage.



These products contain static-sensitive devices which can be seriously damaged by incorrect handling. Observe standard anti-static precautions at all times.



This product is lead-free to comply with the RoHS directive. If soldering or de-soldering is required, SAC solder (tin / silver / copper) must be used to ensure reliable repairs.

### Disclaimer

Data Conversion Systems Ltd. accept no liability for any kind for loss, accident or injury resulting from service activities.

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## UNIT DESCRIPTION



The *dCS Debussy DAC* is a 2-channel audio USB-DAC primarily intended for use with a computer or sound server. It will also accept PCM data via AES, Dual AES or SPDIF interfaces. The unit is extensively configured by software stored in flash memory. The key features are as follows.

- The unique *dCS Ring DAC™* is a discrete balanced design, which uses no proprietary DAC chips. All data received by the DAC is oversampled to 5 bits at either 2.822 or 3.07MS/s, depending upon whether the data is based on a 44.1 or 48kHz clock.
- USB interface on a B-type connector will accept streamed PCM data from a Windows PC, Apple Mac or sound server. The interface operates in asynchronous mode.
- Industry standard PCM inputs: 2x AES3 or Dual AES on XLR3 connectors, 2x SPDIF on 1x RCA and 1x BNC connectors.
- All PCM interfaces (including USB) will accept up to 24-bit data at 32, 44.1, 48, 88.2 or 96kS/s.
- The Dual AES interface will accept up to 24-bit data at 88.2, 96, 176.4 or 192kS/s.
- Industry standard Word Clock Input. The unit can either Slave to the audio data, Sync to an external master clock on the Word Clock Input or, when the USB interface is selected, act as a grade 2 Master Clock.
- Twin crystal oscillators – one for 44.1kHz-related data, the other for 48kHz-related data. Discrete Phase-Locked-Loop circuitry.
- Separately buffered stereo Balanced output on 2x XLR3 connectors and stereo Unbalanced outputs on 2x RCA connectors. Both can output either 2V or 6V rms full-scale, set by a back panel switch. The Balanced output stages are a discrete class-A design.
- Software may be updated by the user from a suitable CD, played on a standard CD Player or Transport. If the software has become corrupted, the unit may be re-booted from a ROM, fitted to a Programmer Board.
- All-aluminium case.

In April/May 2011, the Debussy's USB interface hardware was upgraded to accept data sampled at 176.4 and 192kS/s. The new hardware requires software issue 2.00 or later to run. The serial number for v1 units starts with **DDC**, the serial number for v2 units starts with **DDP**.



A hardware upgrade is required to convert from DDC to DDP.  
Do not load software issue 2.xx into a DDC unit.

## HARDWARE AND SOFTWARE HISTORY

### Hardware History & Configuration Code

The long version of the *Debussy DAC* serial number appears on the packaging label and is kept electronically at *dCS*. This contains a great deal of information about the build standard of the unit, allowing *dCS* to advise on the suitability of software updates, whether a hardware update is advisable and (sometimes) the cause of a particular problem.

The example below is a *Debussy DAC* with serial number DDC-0S2-7J3-6E1-1A1-012-7201.

A typical serial number	This code group means:
DDC	<b>PRODUCT CODE.</b> SCK = Scarlatti Clock, SDC = Scarlatti DAC, STT = Scarlatti Transport, SUP = Scarlatti Upsampler, PPR = Puccini Player, PUU or PUC = Puccini U-Clock, PCK = Paganini Clock, PDC = Paganini DAC, PTT = Paganini Transport, PUP = Paganini Upsampler, DDC or DDP = Debussy DAC.
0S2	<b>OPTIONS CODE.</b> First character = product options. Second character: S = Silver. Third character = voltage setting: 1 = 100V, 2 = 115/120V, 3 = 200V, 4 = 215/220V, 5 = 230/240V.
7J3	<b>CONTROL BOARD CODE.</b> The build standard of the Control board.
6E1	<b>TOP BOARD CODE.</b> The build standard of the Ring DAC™ Board.
1A1	<b>DISPLAY BOARD CODE.</b> The build standard of the Display / Connector Board set.
012	<b>CASE &amp; BASE CODE.</b> This covers the build standard of the case parts, mains transformer, Power Board, USB Board and anything else.
7201	<b>CONTROL BOARD SERIAL NUMBER.</b> Each Control Board has a unique serial number.

## Software History

### DDP

**The latest software issue should be loaded in all DDP units.**

April 2011 v2.00 – USB interface upgraded to operate in either Audio Class 1 mode (sample rates up to 96kS/s without special drivers) or Audio Class 2 mode (sample rates up to 192kS/s, dCS drivers are required for Windows, no special drivers are required for Mac OSX 10.6).



DDC units are not compatible with software issue 2.0x.

DDP units are not compatible with software issues 1.00 or 1.01.

The hardware may be permanently damaged if the wrong software is loaded.

### DDC

August 2010 v1.01 - Word Clock LED operation corrected, USB code updated for improved compatibility with WASAPI. **This issue should be loaded in all DDC units.**

February 2010 v1.00 – This is the first issue. USB interface operates in Audio Class 1 only at sample rates up to 96kS/s.

## COMMON SET-UP ERRORS

### Symptom: The unit fails to power up

- Check that the rated supply voltage stated on the back panel matches the local supply voltage. Note that if the unit is connected to a 200-240V supply while set to 100-120V at any time, the small transformer on the Power Board WILL be damaged and the unit will not power up until it is replaced.
- Ensure there is power available on the power cable, connect it to the unit. Set the back panel power switch to the **I** position (ON), wait 10 seconds and press the **POWER** button.
- Check that the mains fuse under the mains inlet has not blown. If it has, correct any obvious cause then replace the fuse with the correct type as described in the manual.

### Symptom: The unit fails to respond to the controls

- If the indicator beside the **POWER** button is illuminated, the DAC is in Sleep mode. Press the **POWER** button once to return to normal operation.

### Symptom: The DAC fails to lock to a digital source

- Ensure the source is connected with a proper cable and the appropriate input is selected.
- If there is an Upsampler in the system, make sure it is actually locked to the source.
- If there is a Master Clock in the system, make sure the data rate received by the DAC is an exact multiple of the Clock frequency. See the Clock manual for more information. The **WCik** indicator will flash if the clock frequency is incorrect.

### Symptom: The DAC fails to lock to the USB input

- Make sure the computer is set up correctly and is running a streaming program. Please refer to the latest version of the **dCS Guide to Computer Audio**, which can be downloaded free from [www.dcsLtd.co.uk/page/support](http://www.dcsLtd.co.uk/page/support).
- DDC units or DDP units set to Audio Class 1 will not accept data sampled at 176.4 or 192kS/s from the USB input.
- DDP units set to Audio Class 2 will not lock to Windows XP/Vista/7 PCs unless the **dCS** USB drivers have been installed. Note that DDP units are supplied set to Class 2.

### Symptom: The DAC locks but the audio is low or absent

- Check that the indicator to the left of the **MUTE** button is off. If it is not, make sure the DAC is locked to the source and press the **MUTE** button.
- Ensure the source is sending audio data. Non Audio data can cause an automatic mute.
- Ensure the **Volume** Control is correctly set.
- If you are driving the USB interface from a computer, make sure the operating system and the streaming program are set up correctly – please refer to the **dCS Guide to Computer Audio**. After changing settings on the computer, it may be necessary to re-start for those changes to take effect.

### Symptom: The audio output is monophonic

- If the source is actually Dual AES (not just 2 single AES outputs), check that the DAC is receiving Dual AES. Check that both cables are connected and undamaged.
- If the source outputs Single AES on 2 connectors and both are connected to the DAC, make sure the DAC is also set to Single AES.

### Symptom: The Left and Right channels are swapped.

- Check that the analogue output cables are not reversed.
- If the DAC is receiving Dual AES data, make sure the data cables are not reversed.

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**Symptom: The sound on one channel is low or missing**

- The Output Level setting is controlled by 2 latching relays, one or both can flip over if the unit is bumped hard. To correct this, change the **O/P Level** switch setting to **6V** and then change it to **2V**. Check that both channels are now at the same level.
- Check that the audio output cables are correctly connected and undamaged.
- It is possible to connect the balanced analogue outputs to an unbalanced input, provided that pin 3 on both XLRs is connected to ground (pin 1). Do not leave pin 3 floating, as this will make the outputs noisy and the level unstable.

**Symptom: Crackles, pops or noise occur while playing music**

- The digital audio cable connecting the source to the DAC, may be damaged, intermittent or of the wrong type. Some expensive cables are not well designed for digital audio use. Try another cable.
- If you are playing a disc, it may be dirty – clean it carefully with a radial motion.
- The disc may be “copy protected”. Check that the Compact Disc Digital Audio logo is printed on the disc. If it is not, the disc is not a CD – please complain to the disc manufacturer.
- The source medium may be damaged or contain corrupted data.
- The DAC's audio output level may be high enough to overload a preamplifier or power amplifier. Try setting the **O/P Level** switch to **2V**.
- The source equipment may have a very high level of jitter – servicing is required.
- If you are driving the USB port from a computer, check that the settings agree with the latest version of the **dCS Guide to Computer Audio**, which may be downloaded from [www.dcsLtd.co.uk/page/support](http://www.dcsLtd.co.uk/page/support).
- We suggest that you disable virus or spyware scanners running on your computer, as these can periodically monopolise the computer's resources, causing clicks. A helpful tool that checks for such problems can be downloaded from [http://www.thesycon.de/deu/latency\\_check.shtml](http://www.thesycon.de/deu/latency_check.shtml).
- If you are using the USB input, try connecting it to a different USB port on your computer.
- DDC units loaded with software issue 1.00 should be updated to 1.01 – this improves compatibility with WASAPI and Spotify.

**Symptom: The DAC will not decode Dual AES**

- Make sure the source is actually generating Dual AES data.
- Check for damaged or incorrect AES cables.
- Dual AES is only available if valid AES/EBU data streams are present on both AES1 and AES2 inputs. A corrupted data stream can cause the unit to default to Single AES.

**Symptom: Using a non-dCS Transport, the DAC does not report 44.1**

- Some CD Transports upsample to 48 or 88.2kS/s, the DAC will report the sample rate of the data it receives.



## DISMANTLING PROCEDURE

Bear in mind that you should not have to completely dismantle the unit to carry out the repair!

Tools required:

- Ratchet screwdriver handle.
- Screwdriver bits: Allen key 2, 2.5 & 3mm A/F, 6mm flat blade, No.1 PoziDriv.
- Nut spinners / socket spanners: 5.5mm, 7mm, 12.5mm (1/2"), 14mm (5/16") & 16mm (5/8") A/F.



Do not use ball-ended Allen keys, as these can damage the screw heads.



Remember to observe anti-static precautions when dismantling.

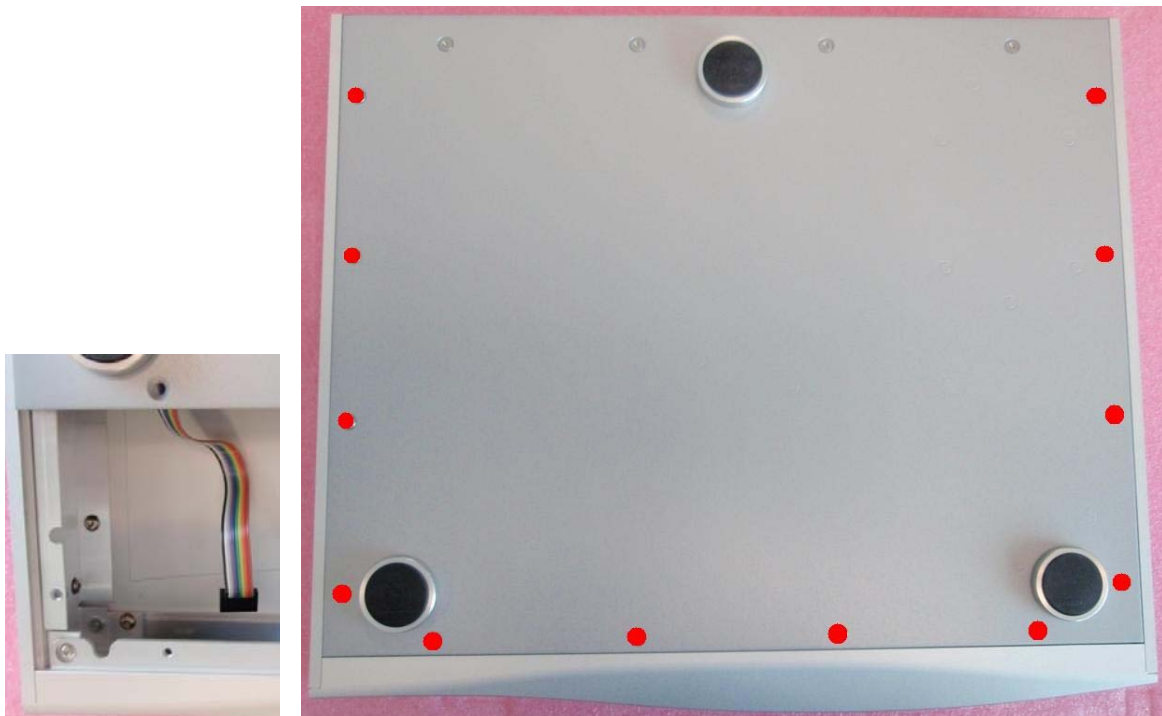
Disconnect all cables from the unit. Rest the unit on a soft anti-static surface to prevent damage to the finish.

### Opening the case

Remove the 4 screws from the back panel, shown in red below.



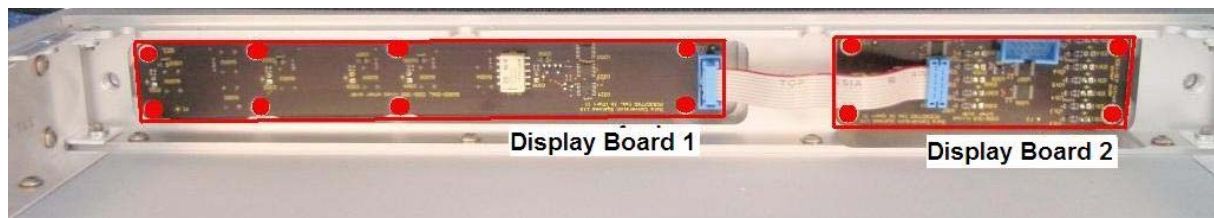
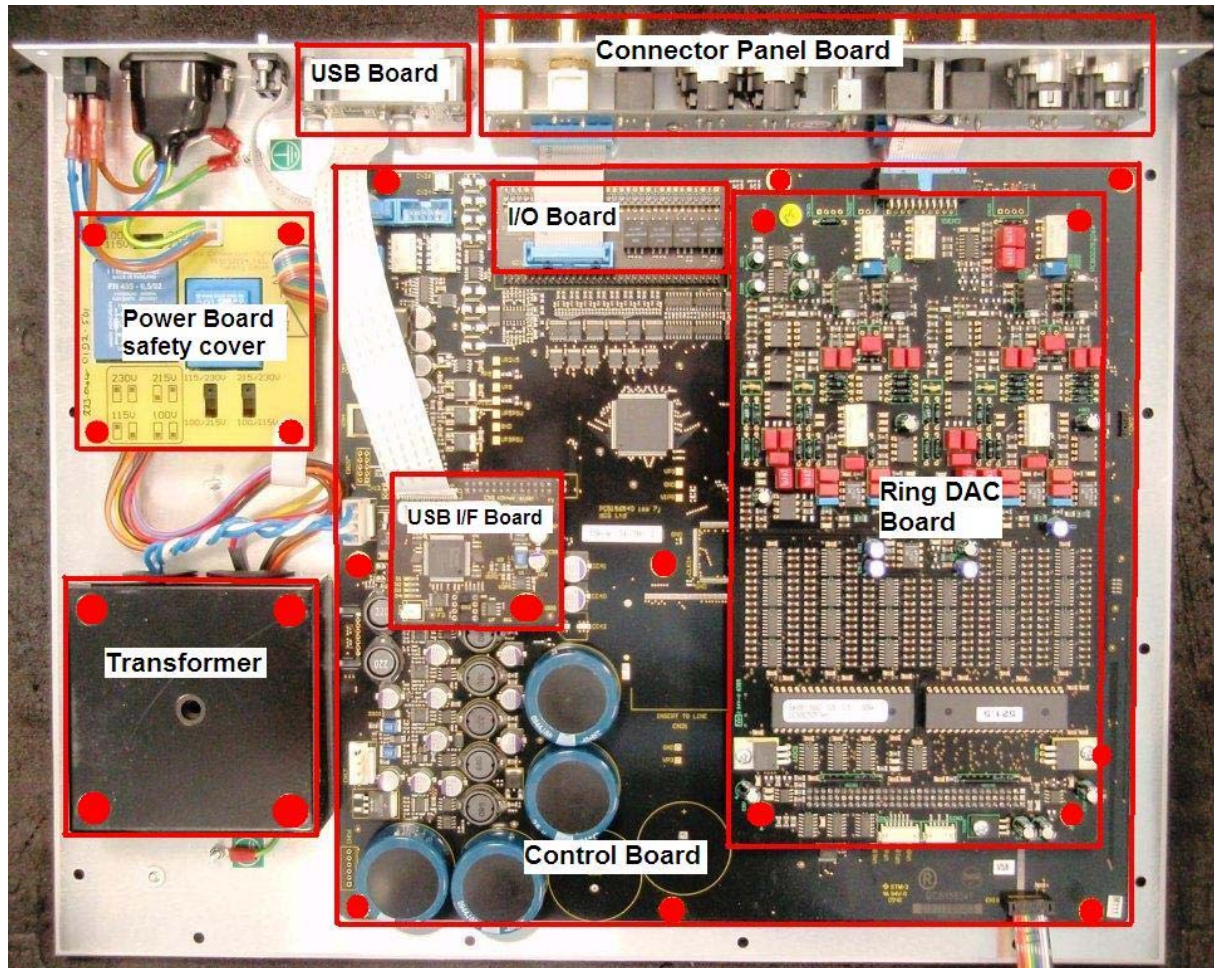
Turn the unit upside-down and remove the 12 screws from the base plate, shown in red below.



Slide the base plate backwards about 50mm and detach the ribbon cable from the front panel board. Lift the base plate assembly out of the case, it is a tight fit.

## Identification of the sub-assemblies

The fixings are indicated by red dots.





## Removing sub-assemblies

The **Power Board** is protected by a yellow safety cover, fixed by a screw at each corner. The Power Board underneath is fixed by a hex pillar at each corner. Disconnect the cables and lift the board off the 4 studs.

The mains **Transformer** is fixed by a screw in each corner. Disconnect the cables from the Power Board and Control Board, then detach the green/yellow screen wire from the base plate.

Remove the 4 screws securing the **Ring DAC™ Board**. Pull the board off the large DIN connector, then detach the connector from the rear edge of the board.

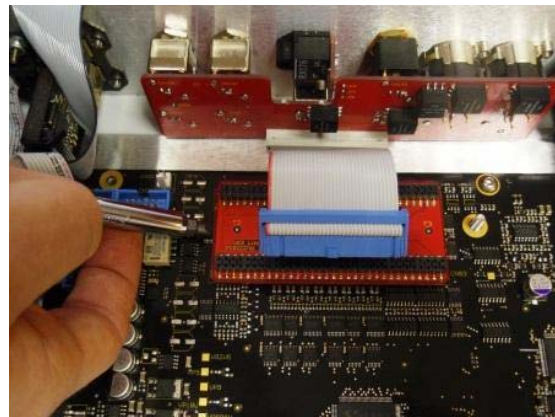
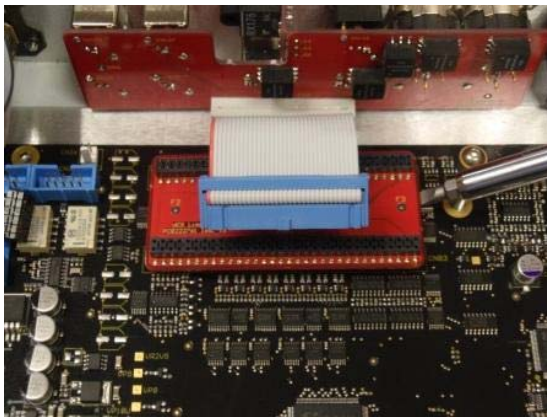
The **USB I/F Board** is secured by one screw and washer. Remove the screw and pull the board off the Control board. The **USB Board** is attached to the back panel by 4 screws.

The **I/O Board** is a **very tight press-fit** onto Control Board header CN82.



**This board is difficult to remove!** Careless use of tools can cause serious (and expensive) damage to the Control Board, for which dCS shall not be liable. If you really need to remove it and you are not confident you can do so safely, refer servicing to dCS.

First disconnect the cable to the Connector Panel Board. Use a 6mm flat-blade screwdriver to lever the right side of the board up a few mm, pivoting on the top of the stud. Carefully lever up the left side of the I/O Board in the same way, protecting the Control board with your fingers. When the I/O board has been loosened, lift it off.



The **Control Board** is secured to the chassis by 9 screws and the pillar that supports the USB I/F Board. Disconnect all cables, remove the fixings and lift the Control Board out of the chassis.

The **Connector Panel Board** is fixed to the back panel by 5 screws, plus the nuts and screws on the connectors themselves.

**Display Board 1** is secured to the back face of the front panel by 8 screws and washers. **Display Board 2** is secured to the front panel by 4 screws and washers. When removing these boards take great care not to disturb the LEDs.

## SUBASSEMBLY DETAILS

Subassemblies which are common to other products are detailed in separate Service Manuals.

### Common Subassemblies

#### Control Board DCS156541 v7



The Control Board carries out all the digital processing and provides regulated DC to the unit. This board is common to most other current *dCS* products, it is configured by software. To date, the 7J version of this board has been used on all *Debussy DACs*.

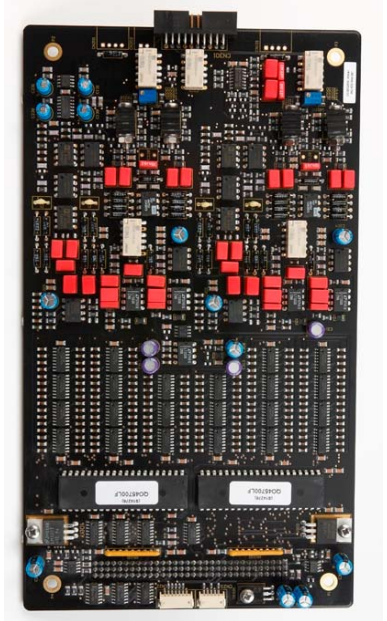
The circuit diagram file is 156540cd7g4.pdf.

The component layout file is 156540cl7g.pdf.

Earlier versions of this board were used on the Classic range.

This board is detailed in the separate **Control Board v7 Service Manual**.

#### Ring DAC™ Board DCS002520



The Ring DAC™ Board takes 2-channel 5-bit data from the Control Board and the Ring DAC™ circuit converts it to analogue. This board is common to all current *dCS* DACs / Players. To date, the 6E version of this board have been used on all *Debussy DACs*. 6E adds 2 connectors to suit the *Puccini Player*.

The circuit diagram file is 002520cd6e1.pdf.

The component layout file is 002520cl6e.pdf.

Earlier versions of this board were used on *Elgar* and *Elgar Plus* DACs.

This board is detailed in the separate **Ring DAC™ Board Service Manual**.

### Power Board DCS152223



This board filters the mains supply and allows the power to be switched on/off safely from the front panel POWER button. The connection of the mains supply to the Mains Transformer primaries is set by 3 slide switches. It is common to most current products. The Power Board is covered by a yellow insulator board for safety. Several earlier versions of this board were used on the Classic range.

The circuit diagram file is 152223cd5b1.pdf (current version).

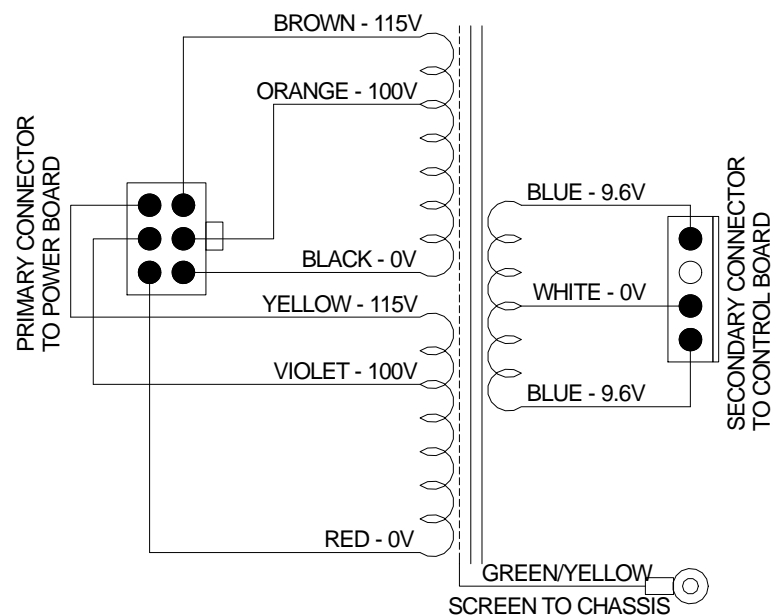
The component layout file is 152223cl5b.pdf (current version).

This board is detailed in the separate **Power Board Service Manual**.

### Mains Transformer DCS002896



This transformer is common to all current products except the *Puccini U-Clock*. The twin primaries allow the transformer to be configured for 100, 115/120, 200, 215/220 or 230/240V.



TYPICAL winding resistances are:

- Black to Orange or Red to Violet: 22 ohms
- Black to Brown or Red to Yellow: 25 ohms
- Blue to White: 0.15 ohms

Note that there is a considerable resistance variation from one transformer to another.

## Unique Subassemblies

### I/O and Display Board DCS307760



This board splits into 5 parts, parts 1, 2, 3 & 5 are common to DDC and DDP.

The circuit diagram file is 307760cd1a1.pdf.

The component layout file is 307760cl1a.pdf.

**Part 1** of the board carries the front panel switches with associated LED indicators. Connector CN15 links to ribbon cable CN16 on the LED board, part 2. Switches SW300-306 are read by shift register U324, which drives serial data line RDATA S via CN15. Power switch SW300 also pulls down the power control line, -POFF. LEDs D301-305 are driven from serial data line FP SDATA S via shift registers U300/U323 and buffered by U302-306. Relay RL301 operates briefly whenever a button is pressed, giving some tactile feedback.

**Part 2** of the board carries the rest of the LEDs and the IR remote receiver U322. LEDs D306-317 are driven from serial data line FP SDATA via shift registers U325-327 and buffered by U307-318. U328 generates a +3V supply. CN14 connects power and the serial control lines to the Control Board CN16.

On **Part 3** of the board, CN108 fits onto the I/O header CN82 on the Control Board. CN107 connects to the ribbon cable from CN106 on the Connector Panel board (part 5). Pulse transformers T1-T4 are part of the 2 AES and 2 SPDIF digital interfaces.

The retention force of CN82 is VERY high. Take great care to avoid damage if it is necessary to detach this board from the Control Board.

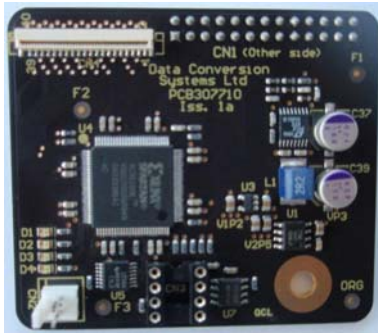




- Initially, all 3 are off.
- D200 on – connected to an active USB port.
- D201 on – cable subsequently disconnected.

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## DDC USB Interface Board DCS307710 v1



This board is used in the DDC only.

At power up, FPGA U4 loads its configuration from flash memory U7. The Control Board micro uploads the USB firmware into the FPGA. The FPGA then powers up the USB Board, which configures itself via I2C from the FPGA.

The inter-board communications tells the Control Board which master clock to send, and the audio sent down is always synchronous to this clock.

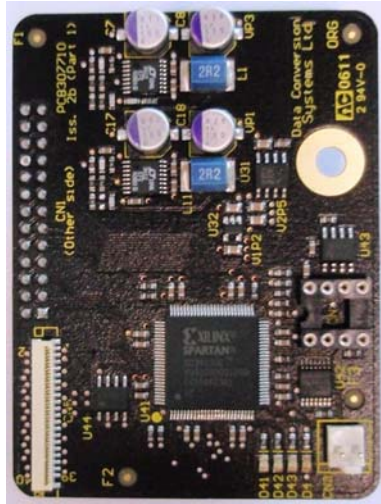
CN1 mounts the board onto CN22 on the Control Board. CN4 connects to CN200 on the USB Board via a flat flex cable (FFC), carrying serial communications, clocks, power and ground. Ensure the FFC is fitted the right way around, with the metal contacts towards U4. U2, U1 & U3 generate +3.3V, +2.5V and +1.2V DC rails respectively. Software is stored in flash memory U7, which is programmed during production via socket CN3, selected by jumper CN2. LEDs D1-D4 are active during programming of the interface board. In normal use, all 4 LEDs are on.

The circuit diagram file is 307710cd1a1.pdf.

The component layout file is 307710cl1a.pdf.



## DDP USB Interface Board DCS307710 v2



This board is used in the **DDP** version only, it splits into 2 parts.

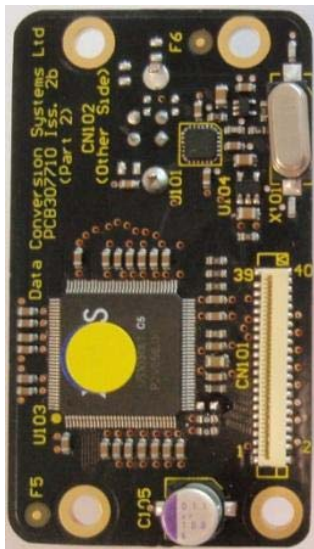
The circuit diagram file is 307710cd2b3.pdf.

The component layout file is 307710cl2b.pdf.

**Part 1** of the board is the USB I/F Board, it carries an FPGA, flash memory and power regulators. At power up, FPGA U41 loads its configuration from flash memory U43. The FPGA then releases the USB PHY Board from reset, which configures itself via the FPGA from flash memory U44.

The inter-board communications tells the Control Board which master clock to send, and the audio data sent down is always synchronous to this clock.

CN1 mounts the board onto CN22 on the Control Board. CN4 connects to CN101 on the USB PHY Board via a flat flex cable (FFC), carrying serial communications, clocks, power and ground. Ensure the FFC is fitted the right way around, with the metal contacts towards U44. U1, U11, U31 & U32 generate +3.3V, +1V, +2.5V and +1.2V DC rails respectively. Software is stored in flash memory U7, which is programmed during production via socket CN4, selected by jumper CN3. LEDs D41-D44 are active during programming of the interface board. In normal use, all 4 LEDs are on.



**Part 2** of the board carries the XMOS chip, USB interface chip and USB connector, it fits onto 4 pillars on the back panel. CN102 accepts PCM data streamed from a computer or sound server. The interface is driven by USB chip U101 and XMOS chip U103, which are clocked by a 13MHz crystal oscillator, X101. FFC connector CN101 connects to CN5 on Part 1, it connects power, control and data lines. U104 regulates the +3.3V rail down to +1.8V. Ensure the FFC is fitted the right way around, with the metal contacts towards U103.

**DO NOT MIX THE ORIGINAL DDC USB BOARDS WITH THE NEWER DDP BOARDS – THEY ARE NOT COMPATIBLE.**

## FAULT-FINDING

### Known Faults and Solutions

**Make sure the latest software is loaded.**

**Symptom: The DAC works but one or more LEDs flash or flicker randomly**

- This can be caused by an LED terminal short-circuiting to the front panel. Units shipped from August 2010 onwards have insulated terminals. Detach the relevant board from the front panel, taking great care not to disturb the LED orientation. If the terminals are not insulated, cut 2 pieces of sleeving to the right length, slit them along their length and slip them over the LED terminals. Carefully re-fit the board to the panel and test. DO NOT de-solder the LEDs, as you will find it is very difficult to re-align them correctly.

**Symptom: The DAC fails to power up**

- If disconnecting the Display Boards allows the unit to power up, the fault is likely to be an LED terminal shorting to the front panel. Fix as described above.

### Fault Finding Guide

**Symptom: The mains fuse blows**

This can be caused by a brief mains voltage surge. Check that the voltage setting is correct, then fit a new fuse of the correct type (20x5mm T0.5A L). If the new fuse does not blow, soak for 24 hours to verify the fix.

If the new fuse blows, the most likely causes are:

- Incorrect voltage setting. See the Power Board Service Manual for details.
- A damaged surge arrestor on the Power Board. See the Power Board Service Manual.
- The mains transformer has short-circuited turns. This is VERY RARE, so please do not make assumptions! Test the transformer against the circuit diagram on page 13, checking for short-circuits. Note that the secondary windings (Blue and White wires) have a very low resistance.

To date, we have never seen a fault in the rest of the unit that causes the mains fuse to blow.

**Symptom: The unit fails to power up**

- Is AC reaching the Power Board? If not, check the mains wiring and mains fuse.
- Is the full mains AC voltage passing through the Power Board to the mains transformers? If not, make sure the Power Board is turned on and find the point at which the circuit is broken.
- Is low voltage AC reaching Control Board at connector CN17? With nominal mains voltage, the AC voltage (referred to the chassis) at pins 1 & 4 (blue wires) should be 10V rms and at pin 2 (white wire) should be 0V. If the voltage is substantially different, check the transformers for signs of overheating.
- To check the Control Board Power Supply circuitry, measure the DC voltages between GND (or the chassis) and the various square test point pads around the board. Typical measurements are:

Name	DC Voltage
VR2V5	+2.500V
VP5	+5.0V
VP9	+8.5V
VP18U	+17.9V

Name	DC Voltage
VP5PSU	+5.0V
VP3PSU	+3.4V
VP3	+3.3V
V1P8	+1.8V

Name	DC Voltage
VN18U	-18.1V *
VP6U	+6.8V
VN8X	-5.9V

\* Note that VN18U remains disabled until the Control Board has booted up.

- If any of these measurements are different by more than 5%, this indicates a fault in the power supply or that the power supply is being overloaded by the circuitry it is supplying. Power down, disconnect the Ring DAC Board, then check to see if this has corrected the voltages.
- If power is reaching the Control Board, check the behaviour of the red diagnostic LED, located near the front right corner of the Control Board. When power is applied, the LED should flash once and then flash twice a few seconds later. It should remain off for about 20 seconds while the board boots up, then turn on. If this does not happen but there is some LED activity, the microcontroller is not running. Try reloading the software from ROM, as described on page **28**.
  - Detach the DAC Analogue Board from the Control Board and move it out of the way. At the rear right corner of the Control Board, you will see 2 metal-cased crystal oscillators X01 and X02. There is provision for 4 crystals on the board, a red LED behind each turns on when the crystal is powered. At power up, the LED behind X02 should turn on and stay on. During boot-up, the LEDs behind the other 3 crystal positions should flash together on 2 occasions. Check that a 22.6MHz clock appears at U626 pins 3 & 4. If not, X02 or U613 may be faulty.
  - If the Control Board microcontroller is running, CN12 may be connected to a PC running Hyperterminal to extract diagnostic information from the Control Board. Please see the **Control Board v7 Service Manual** for more information.

**Symptom: The unit fails to lock at some sample rates**

- Check that the clocking arrangements are consistent with the data rate. For example, the DAC cannot lock to a clock at 44.1kHz while receiving data at 48, 96 or 192kS/s, because the two rates are not exact multiples.
- Select the required input and ensure there is no connection to WClk In. If the unit locks correctly to incoming data at 44.1, 88.2 or 176.4kS/s but not to incoming data at 32, 48, 96 or 192kS/s, this suggests a fault near crystal X01.
- Select the required input and ensure there is no connection to WClk In. If the unit locks correctly to incoming data at 32, 48, 96 or 192kS/s, but not to incoming data at 44.1, 88.2 or 176.4kS/s, this suggests a fault near crystal X02.

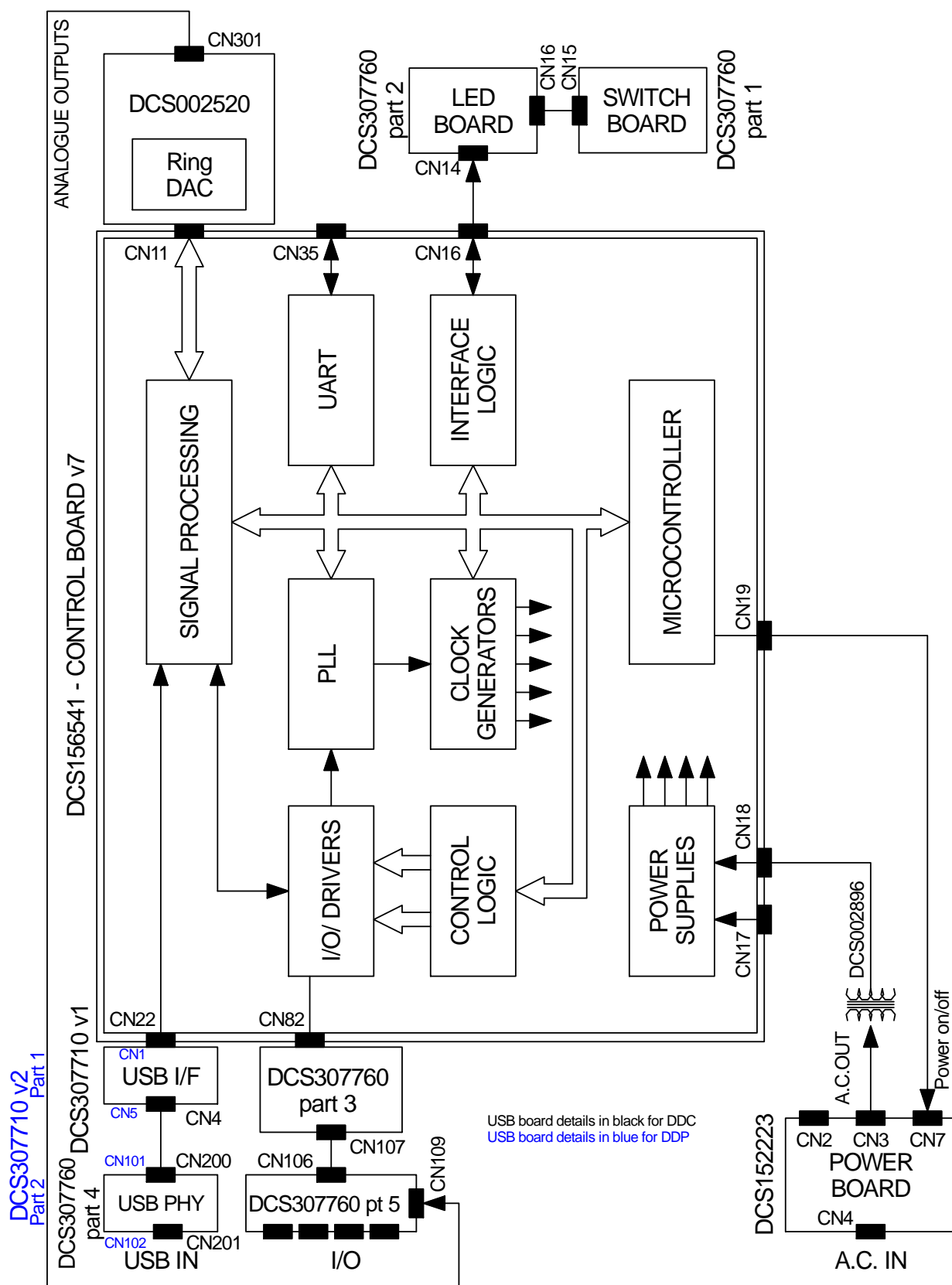
**Further tests**

In most cases, the above information will be sufficient to get an unresponsive unit up and running, or indicate a serious fault on the Control Board – which is normally dealt with at *dCS*.

For faults which affect the analogue outputs, please refer to the **Ring DAC™ Board Service Manual**, as this is the most likely location of the fault.

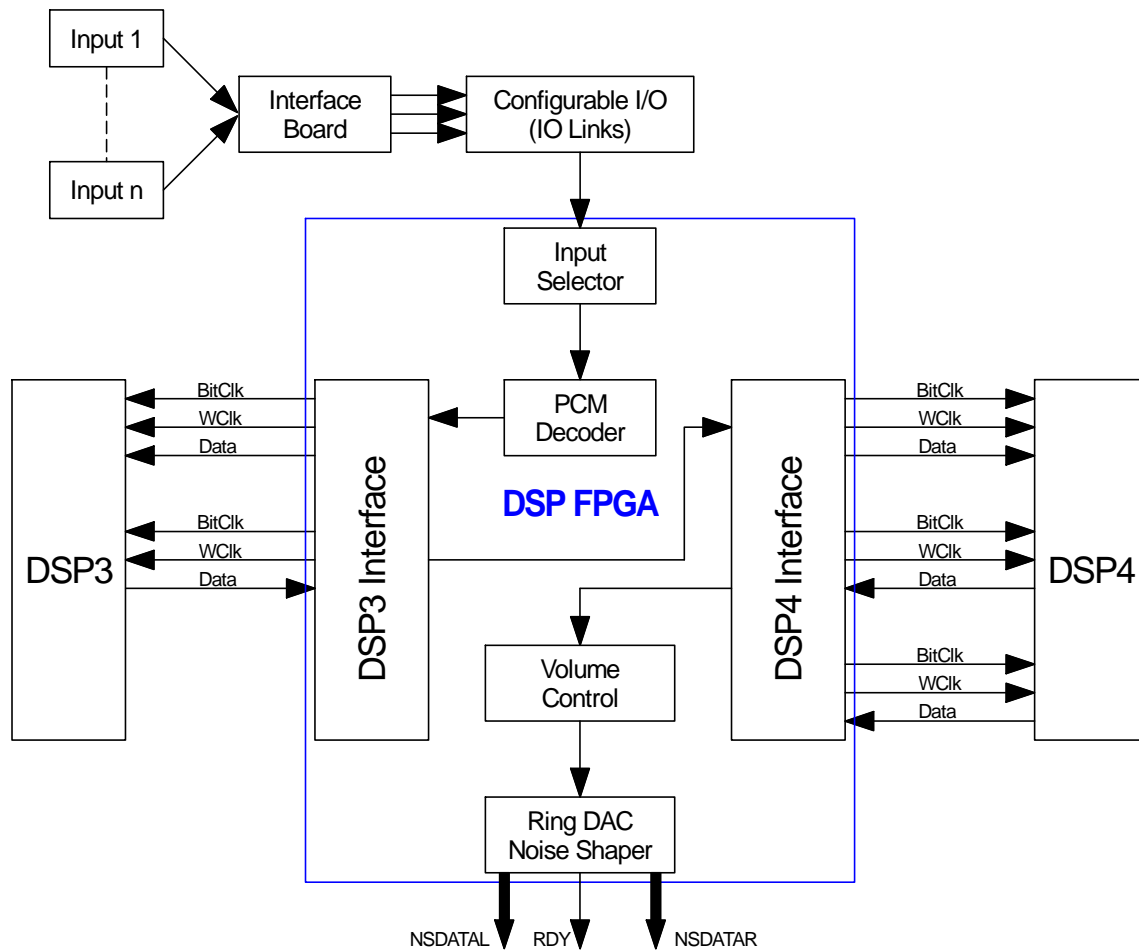
Note that an intermittent ribbon cable connection to the Control Board is a fairly common cause of Display Board problems.

## BLOCK DIAGRAM

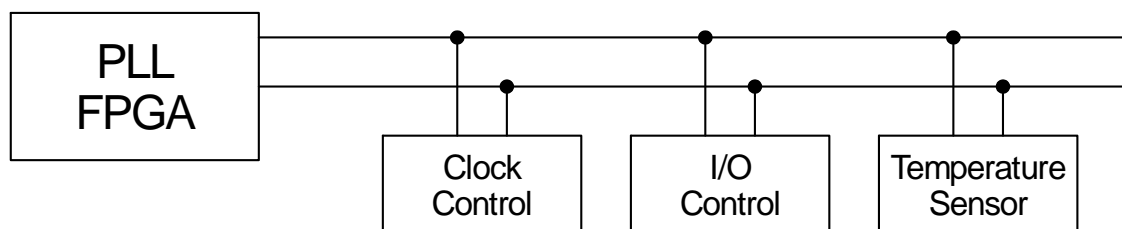


## SIGNAL PROCESSING PATH

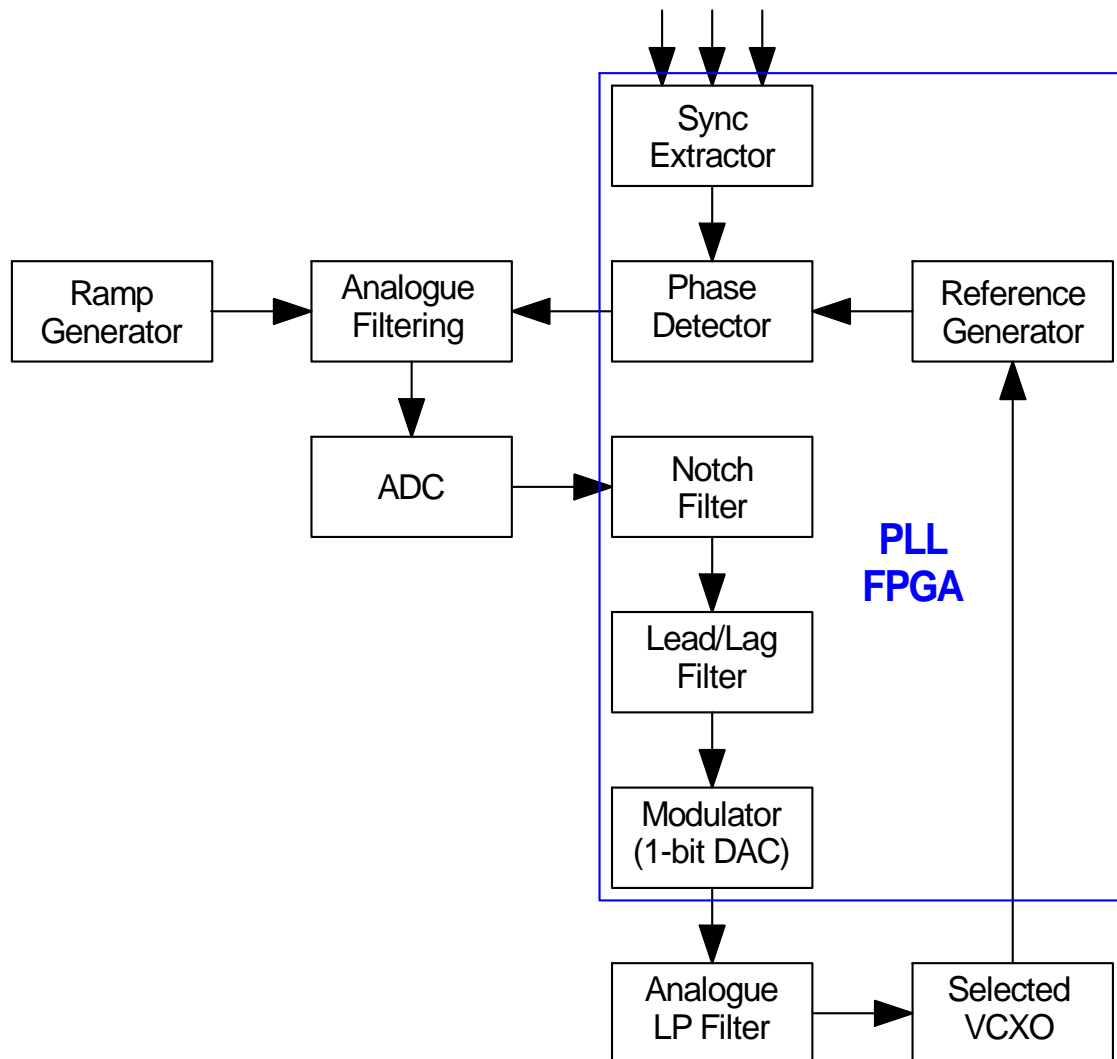
## PCM Audio Path



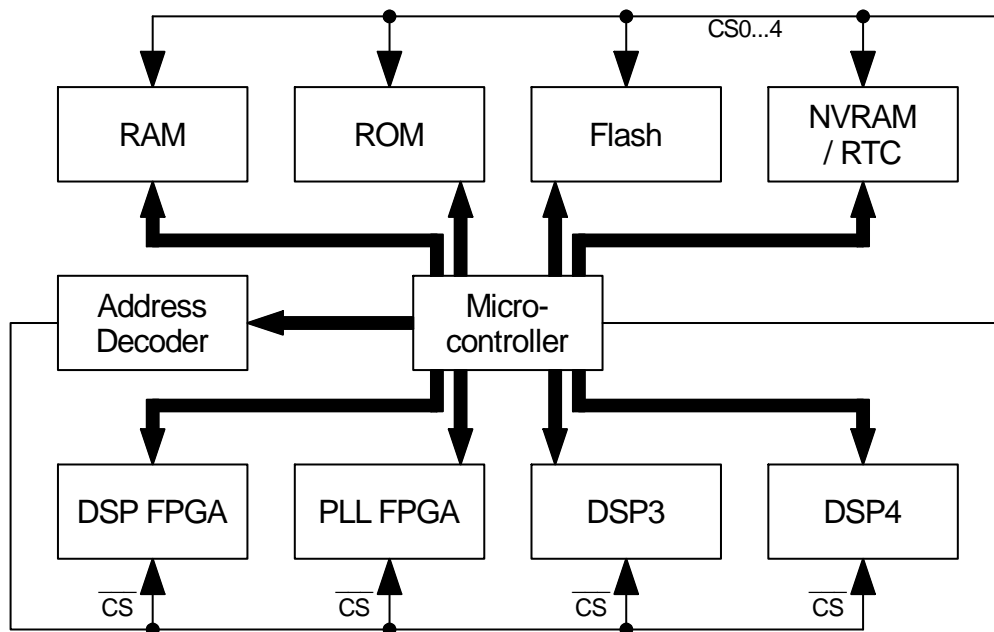
## I<sup>2</sup>C Bus



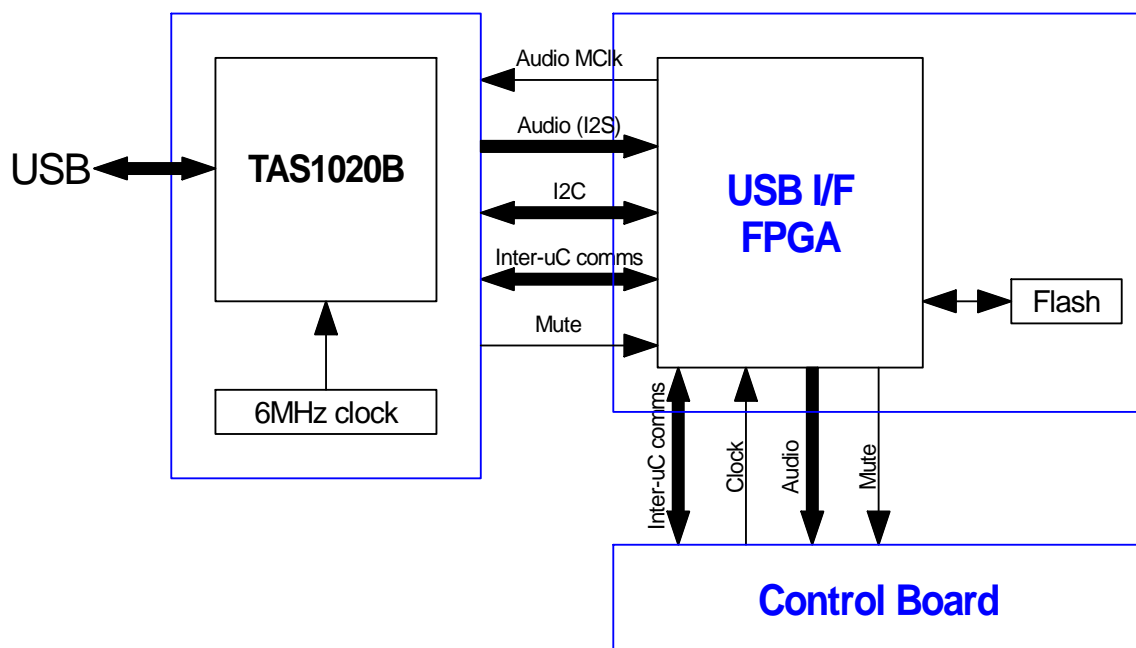
## PLL



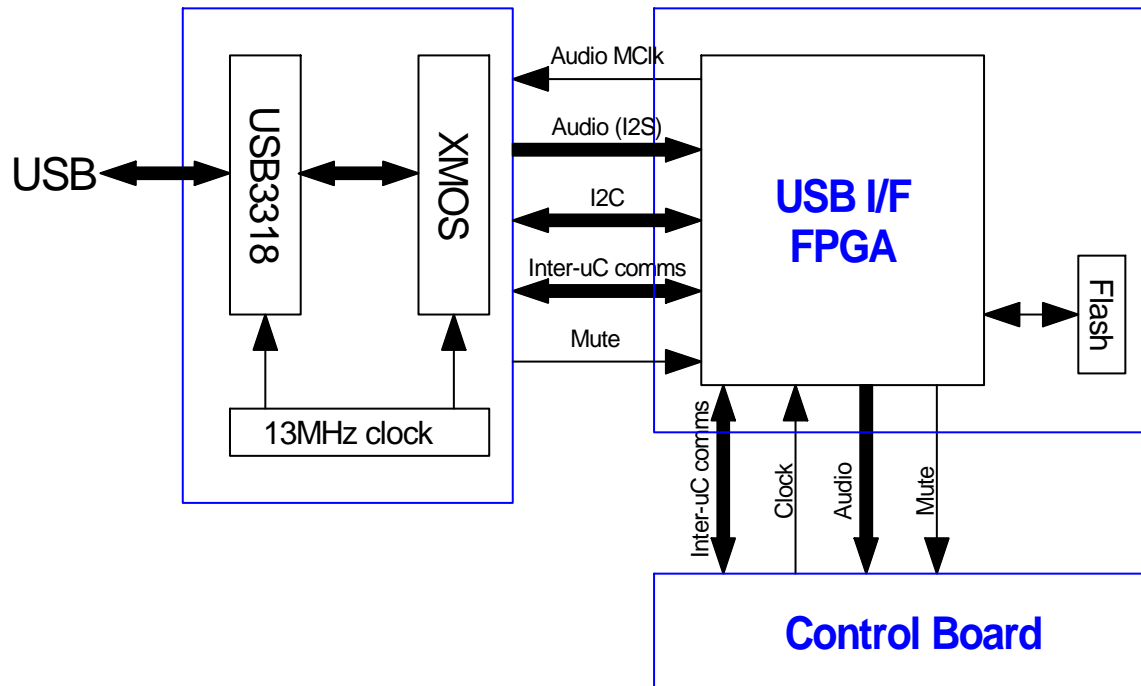
## UA & UD



## USB Interface - DDC



## USB Interface - DDP



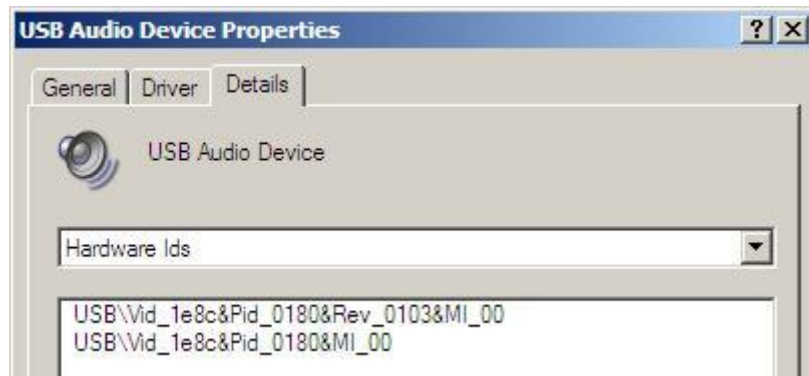


## SOFTWARE

### Which Software Issue is loaded?

The *Debussy* DAC does not have a display, but if the USB port is connected to a computer, you can find the software issue in the USB device descriptor for firmware version. To do this:

**Windows XP™:** Go to **Start > Control Panel > System > Hardware > Device Manager > Sound, Video and Game Controllers**. Double click on **USB Audio Device**, select the **Details** tab and choose **Hardware Ids** from the drop-down box. The first line of text that appears will include the software issue prefixed by **Rev\_**. For example, **Rev\_0103** in the picture below indicates the software issue is 1.03.



**Windows Vista™ / Windows 7™:** Go to **Start > Control Panel > System > Device Manager > Sound, Video and Game Controllers**. Double-click on **dCS Debussy**, go to **Details** and select **Hardware Ids** in the **Property** box. The software issue will appear among the text in the **Values** box, prefixed by **REV\_**. For example **REV\_0100** indicates software issue 1.00.

**Mac™ OSX:** Open **Finder. Menu Bar > Go > Utilities > System Profiler**. Now go to **Hardware > USB > USB Bus > dCS Debussy**. The revision will be the software issue.

## Software Update Procedure

The Software Update feature allows you to load new software into your system.



If you try to update a DDC unit with DDP software issue 2.00 or later, the update will fail because the hardware is not compatible.

- You can unzip the update file and stream it via the USB interface from a computer set to give bit-perfect 16-bit output. – or –
- You can play an update CD on 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.



When an update is issued, follow the instructions provided with the disc or file. The procedure below is given for reference only.

If the selected input is NOT receiving CD format data (16 bits at 44.1kS/s), CD Updating is not possible and the update will not start. Use the front panel controls during an update as the remote control may not operate.



If you start an update unintentionally or when the system is not correctly set up, switch off the unit at the back panel switch, wait 10 seconds, then switch on again.

Please read these instructions through fully at least once before attempting the update.

### Update Procedure

- Mute your power amplifier.
- **From a Transport or Player:** Load the *dCS Debussy* Update CD into the Transport, making sure it is in **STOP** mode. The disc must **not** be playing. Connect the Transport's AES or RCA output to the matching input of the DAC and use the **Input** button to select that input. If necessary, disconnect the W/Clock cable. The DAC should lock, the LEDs for **44.1** and the selected input should be illuminated.
- **From a Computer:** Make sure the file is unzipped (the file size should be around 350MB). Connect the computer's USB interface to the DAC's USB interface and use the **Input** button to select it. If necessary, disconnect the W/Clock cable. Open the streaming program and play a short section of the file, then pause the program and scroll back to the start of the file. The DAC should lock, the LEDs for **44.1** and **USB** should be illuminated.
- Hold down the DAC's **Power** button for a few seconds then release to completely power down.
- Hold down the **Mute** and **Input** buttons and briefly press the **Power** button. When the **44.1** and the selected input LEDs flash, release the **Mute** and **Input** buttons.
- Wait a few seconds until both the **44.1** and the selected input LEDs are illuminated.
- When the input selection LEDs start cycling in sequence, press the Computer or Transport's **PLAY** button. The sample rate LEDs will start to cycle in sequence.
- The update is now in progress, the upload phase takes about 33 minutes. The sample rate LEDs count off downloading of each section and the input LEDs count off overall progress.
- When the upload is complete, the DAC will re-boot itself. **DO NOT SWITCH OFF** for the next 2 minutes while the DAC copies the new software into active memory.
- When the DAC returns to its normal state with the **44.1** and selected input LEDs illuminated, it is ready for use.

### Problems?

- If the display does not change for more than 5 minutes or there is a power failure, switch off the unit at the rear panel switch, wait 10 seconds, then switch on and start the update again.
- If the disc skips or you accidentally advance the track, the display will freeze. Switch off the unit at the rear panel switch, wait 10 seconds, then switch on and start the update again.

If the update fails to load, all the LEDs on the front panel will flash. The most likely cause is that the update CD is faulty or the file is damaged. There is no cause to worry as the original software is backed up inside the unit.

- **File:** Download the file from [www.dcsLtd.co.uk/page/support](http://www.dcsLtd.co.uk/page/support), unzip it, check the update file size is around 350MB and run the procedure again. Make sure that you play the update file, not the Update Note pdf file!
- **CD:** Check for dirt or damage. If the disc appears to be dirty, wipe it gently from the centre outwards with a dry soft cloth. If the disc is damaged, contact your local *dCS* distributor or *dCS* for a replacement. If it appears to be OK, run the procedure again.



If the *Debussy DAC* starts up correctly but has a problem of some kind, do not repeatedly Software Update as this cannot solve the problem.

### If You Need More Help

In the first instance please contact the *dCS* distributor for your country. Contact details may be found on the *dCS* web site - [www.dcsLtd.co.uk](http://www.dcsLtd.co.uk). Please provide the serial number of your unit, the software version currently installed and the version of software on the Update CD or file you are trying to install.

## Re-loading Software from ROM

Normally, software can be updated from CD without opening the case, provided the unit boots up and runs correctly.

Occasionally, the software stored in the flash memory becomes corrupt, usually as a result of a power failure or user error while Software Updating. There is also some evidence that nearby electrical storms can do this. If the software has become corrupt, it is necessary to reload the unit from a ROM. To do this, you will need a DCS156554 programmer board and a *dCS* ROM which is loaded with the *Debussy DAC* software labelled either “DDC” for DDC unit or “DDP” for a DDP unit. Load the boot version from ROM and then Software Update to the current version.

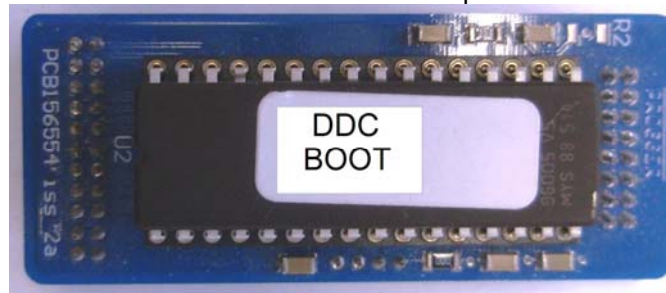


DDC units are not compatible with the software in DDP ROMs.

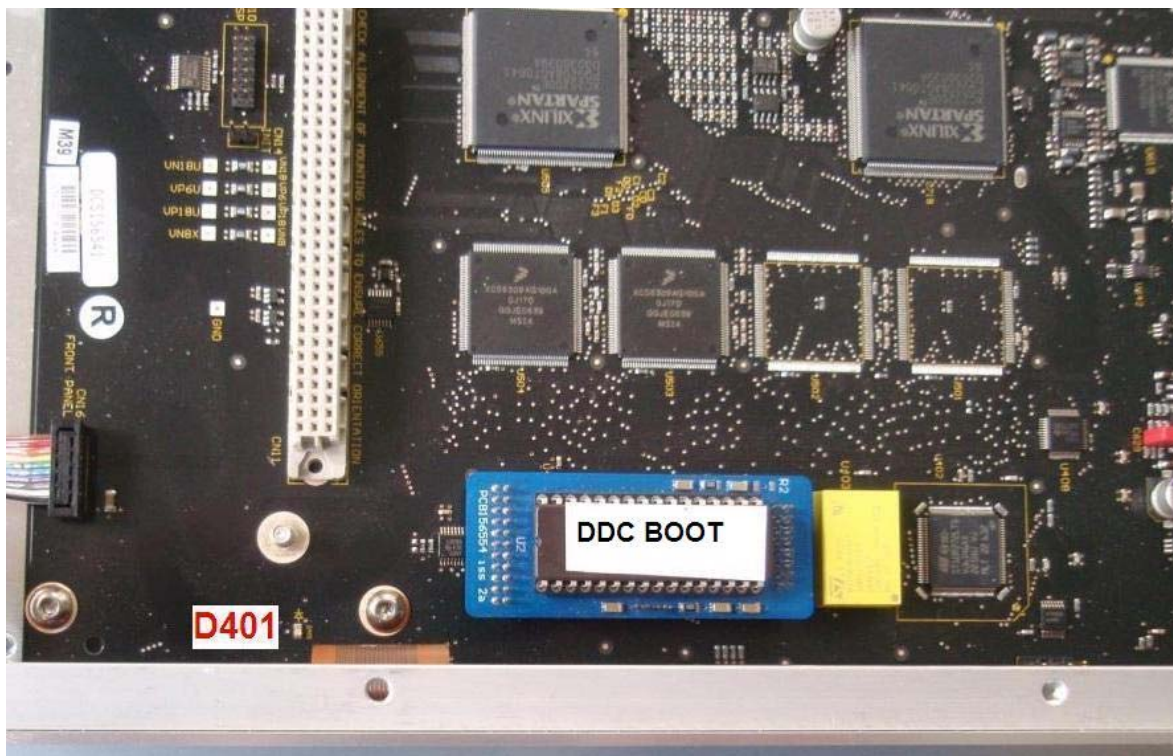
DDP units are not compatible with the software in DDC ROMs.

**The hardware may be damaged if the wrong software is loaded.  
*dCS* will not accept responsibility for such damage.**

- Power the unit up and then pull out the power cable.
- Open the case, disconnect the Display Board ribbon cable and remove the top cover.
- Remove the 4 screws securing the DAC Analogue Board and pull it off the Control Board.
- Fit the correct ROM to the socket in the programmer board, ensuring that the notched end is beside the “U2” label. A DDC ROM is shown in this example.



- Fit the programmer board onto the 3 headers near the edge of the Control Board, as shown below, making sure all pins fit into the sockets on the underside of the programmer board.



- Connect the power cable.

The Control Board will power up, red LED D401 will flash once and LEDs elsewhere on the board will turn on.

The loading process takes several minutes, please be patient. When it is complete, the red LED D401 will start flashing steadily.



If D401 is still off after more than 10 minutes, the software has failed to load for some reason. Pull out the power cable, make quite sure the programmer board and ROM are correctly seated and repeat the process.

- Disconnect the power cable.
- Remove the programmer board and ROM, put them somewhere safe in anti-static packaging.
- Reassemble the unit, remembering to connect the Display Board cable.
- Update the software from CD (or a file) as described on page **26**.
- Check the software issue, as described on page **25**.
- Check that the unit is operating correctly.



## UPGRADING DDC TO DDP

Existing DDC units can be upgraded to DDP to extend the USB capability to 24/192. The upgrade involves replacing 2 small boards and loading issue 2 software, it can be carried out by dCS distributors. A kit is available from dCS for a modest charge, please quote order code **KT DDC-DDP** and state the serial number of the unit to be upgraded.

Each kit contains:

- USB I/F Board (tested)
- USB PHY Board (tested)
- FFC cable
- A DDP serial number label for that unit
- dCS USB Audio Class 2 Driver disc

You will also need:

- DDP BOOT ROM
- DDP v2.00 (or later) update disc with instructions
- dCS v7 Programmer Board (most distributors should have one of these already)
- 3mm A/F Allen key

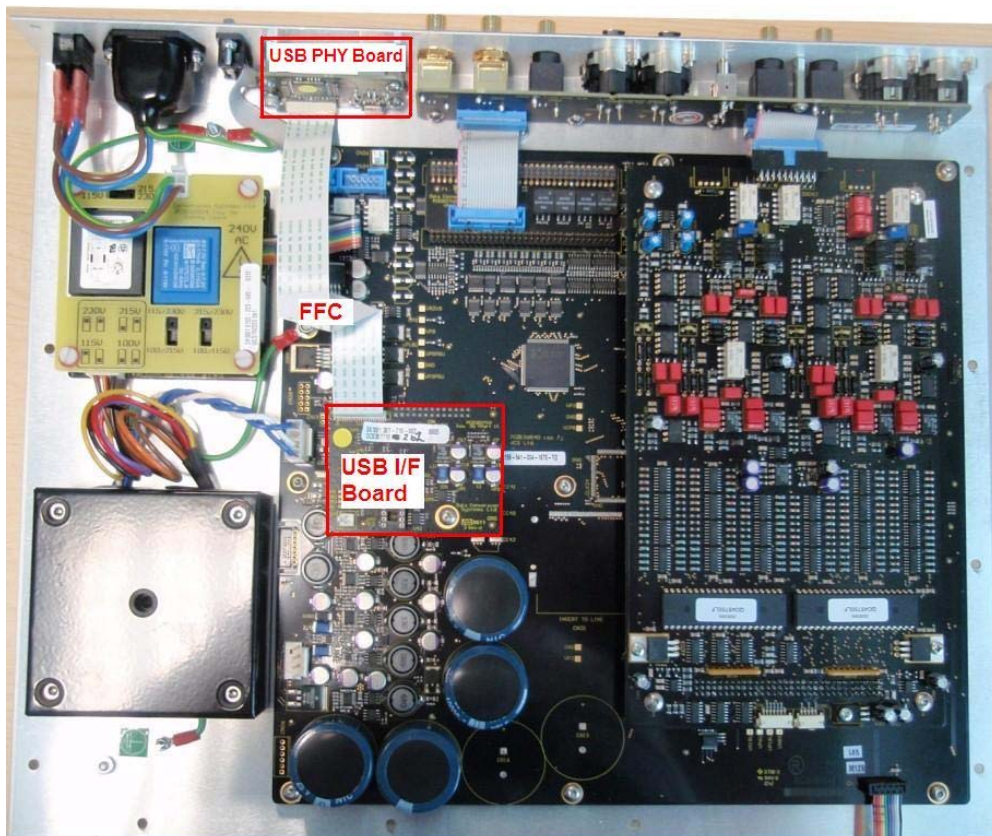


Electronic products contain static-sensitive devices which can be seriously damaged by incorrect handling. Observe standard anti-static precautions at all times.

### Upgrade Procedure

Power up, then pull out the power cable. Disconnect all cables and open the case (see page 9).

Remove the USB PHY Board from the back panel, the USB I/F Board from the top of the Control Board and the Flat Flex Cable (FFC) that connects them. Dispose of the old parts at a recycling centre. Remove the Ring DAC Board.



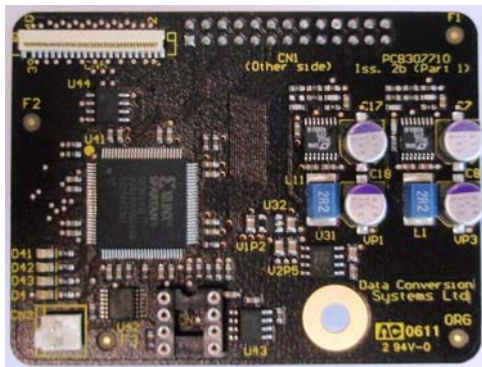


The upgrade kit has been assembled to match a particular unit. We need to keep records of which DDC units have been upgraded, so please make sure the DDP serial number label in the kit matches the unit (e.g. DDC7890 becomes DDP7890).

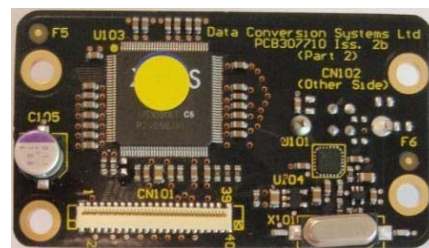
Please do not mix up the boards from 2 or more kits, as we log the board serial numbers against each unit.

Fit the DDP ROM to the Programmer Board, fit the Programmer Board to the Control Board and load the new software into the DAC as described on page 28. Switch off at the back panel switch, remove the Programmer Board and ROM, put them somewhere safe for later use.

Fit the new USB I/F Board (DCS307710 issue 2 part 1) and USB PHY Board (DCS307710 issue 2 part 2) along with the new FFC.

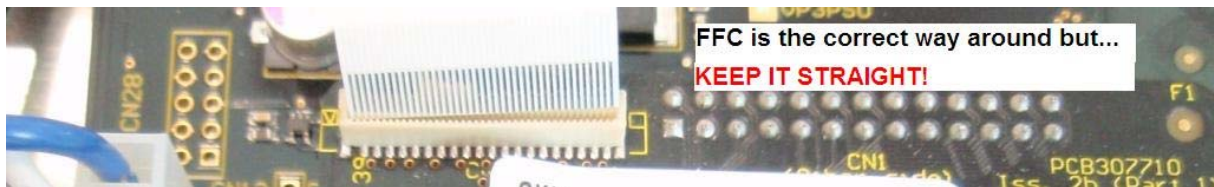


USB I/F Board issue 2



USB PHY Board issue 2

Make sure that the FFC is the right way around with the metal contacts towards U44/U103. To avoid damaging the FFC, push it STRAIGHT into the connector, not at an angle.



Re-fit the Ring DAC Board. Close the unit, remembering to re-connect the cable to the front panel.

Use a CD Transport or Player to CD Update the DAC to V2.00 (or later), as described on page 26.

Prise the plastic serial number from the back panel, taking care not to damage the panel overlay. If necessary, remove any blobs of glue or pieces of paper from the metal underneath. Remove the backing paper from the new DDP serial number label (the number must match the original DDC serial number!), locate it on the panel and press it down firmly.



Updating the serial number is important. Failure to do so **WILL** cause confusion and mistakes when supporting or updating the DAC so **PLEASE TAKE THIS SERIOUSLY!**

Switch off completely (not just to Sleep mode). Hold down the **INPUT** and **VOL+** buttons while powering up. Keep the buttons pressed until all the front panel LEDs flash continually, then release them. Wait until the LEDs stop flashing (about 50 seconds) – the DAC is now in Class 2 mode.

The USB interface will now operate at up to 192kS/s.

When connected to a Mac running OSX 10.6 or later, no special drivers are needed. Early versions of OSX (e.g. 10.5) do not support USB Audio Class 2 mode.



Before the DAC can be used with a Windows XP/Vista/7 PC, the *dCS* drivers must be loaded onto the PC from the driver disc provided. Follow the instructions provided with the disc.

Make sure that the drivers disc (with instructions) is given to the customer along with the upgraded Debussy DAC.

**If you want to set the unit to USB Audio Class 1 mode (96kS/s maximum):**

Switch off completely (not just to Sleep mode). Hold down the **INPUT** and **VOL-** buttons while powering up. Keep the buttons pressed until all the front panel LEDs flash continually, then release them. Wait until the LEDs stop flashing (about 15 seconds) – the DAC is now in Class 1 mode.

You can select Class 2 again at any time by repeating this process but holding down the **INPUT** and **VOL+** buttons instead.