

# Lyra

## Maintenance Manual



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## 2. Safety Procedures



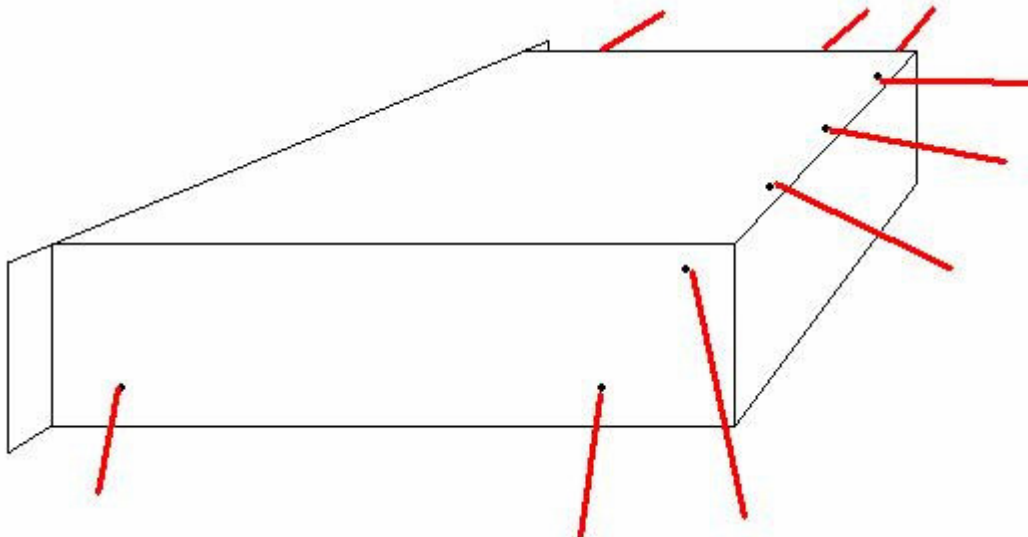
The Lyra may only be serviced in a static safe work area. Failure to do so will void warranty!

## 3. Opening the Lyra

**Before you open the Lyra you have to turn off the power !**

You can open the Lyra cover by removing 9 screws.

Three screws at the left side, three at the right side and three at the top:



## 4. Maintenance inside the Lyra

There are several maintenance issues that you can do without having to dismantle the Lyra.

### 1. System Fan Maintenance

The System Fan needs to be cleaned once a year to ensure that the temperature inside the Lyra does not get too hot. This can be done by opening the Lyra and blowing compressed air from the inside through the Fan. Or you can remove the Fan by removing the two or four (depending on the production date of your Lyra) screws with which the Fan is mounted in the casing.

If the bearings of the Fan wear out the Fan will start to become more and more noisy. When this happens the Fan should be replaced to ensure proper operation.

### 2. Adjusting the Power supply

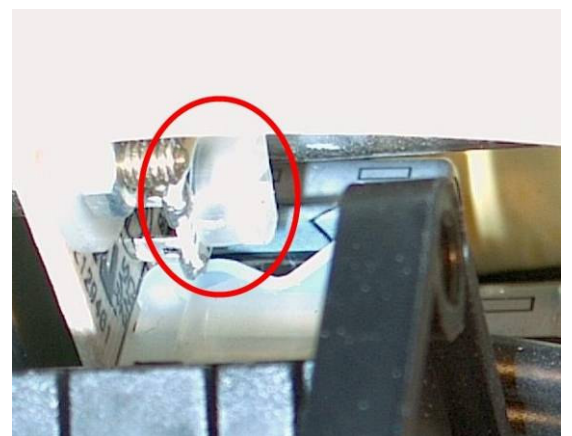
When a CobraNet interface card is added or if a new power supply is fitted it may be necessary to (re)adjust the power supply. You can check the current voltage in the “System Information” page.

You can do this by following the procedure below:

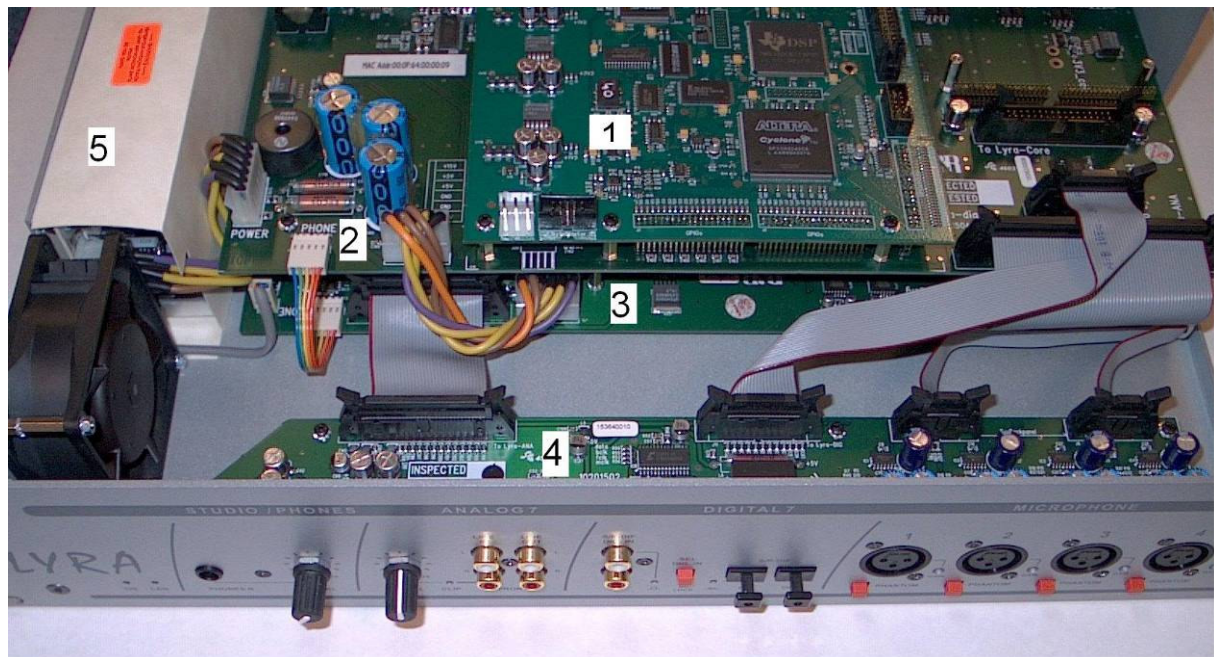
- 1) On the Core PCB there is a Molex connector which you can use for Ground and +5 Volts measurement points.



- 2) Now adjust the power supply so that the so that the +5V on the Core PCB is exactly +5V.



## 5. Identifying the PCB's in a Lyra



### 1. The Core PCB (1)

This PCB is the Core of the Lyra. On this PCB there is a Texas Instruments DSP processor which processes the digitized audio signals (i.e. Leveling, EQ, Dynamics etc...).

Also on this PCB is the digital routing matrix which is located inside the Altera Cyclone FPGA. This IC also contains the Processor (called NIOS) which controls the complete Lyra including the Web server and FTP server.

All the necessary specific voltages (+1V2, +1V5 and the +3V3) are generated locally. How and where they can be measured is explained elsewhere in this manual.

### 2. The Digital in/output PCB (2)

This PCB receives and sends all digital audio data. All inputs have individual Crystal CS8420 sample rate converters and have transformers on the in and outputs.

This PCB also serves as distribution board for all the clock signals as well as distributing the power. All GPIO's are located on this board and the CobraNet interface will be installed on this PCB (when ordered).

The board creates its own +3V3 for the Clock Buffer IC's, and a separate +3V3 for the CobraNet interface card. How and where to measure these voltages is explained elsewhere in this manual.

### 3. The Analogue in/output PCB (3)

This board has the Burr Brown PCM1804 AD converters on board for all your analogue inputs including the Microphone inputs. Also it contains the Burr Brown PCM1793 DA converters for all main (Prog, SUB, CRM etc...) outputs. The Microphone input insert jacks are also located on this board.

This board creates its own +3V3 for the AD and DA converters. How and where to measure these voltages is explained elsewhere in this manual.

#### **4. The Front panel PCB (4)**

This PCB contains Analogue in/output 7 and Digital in/output 7 as well as the Studio headphones and Burr Brown INA163 Microphone input pre amplifiers.

The Samplerate converter (CS8420) for the Digital in/output 7 is located on this board.

The Phantom power (+48V) is generated locally. How and where to measure these voltages is explained elsewhere in this manual.

#### **5. The Power supply (5)**

The Power supply in the Lyra is a switched mode power supply. It delivers 65 Watts of power and generates the following voltages +5V(5 Amp max), +15V(2Amp max), -15V(0,5 Amp max).

The fuse that is located on the Power supply is rated for 4 Ampere 250VAC.

The fuse that is located in the AC inlet is rated for 3.15 Amps 250VAC.

## 6. Measuring the Voltages inside the Lyra

To measure the voltages in the Lyra you will need a volt meter. Connect the – (black) of the meter to the chassis for ground.

### 1. The Core PCB Voltages

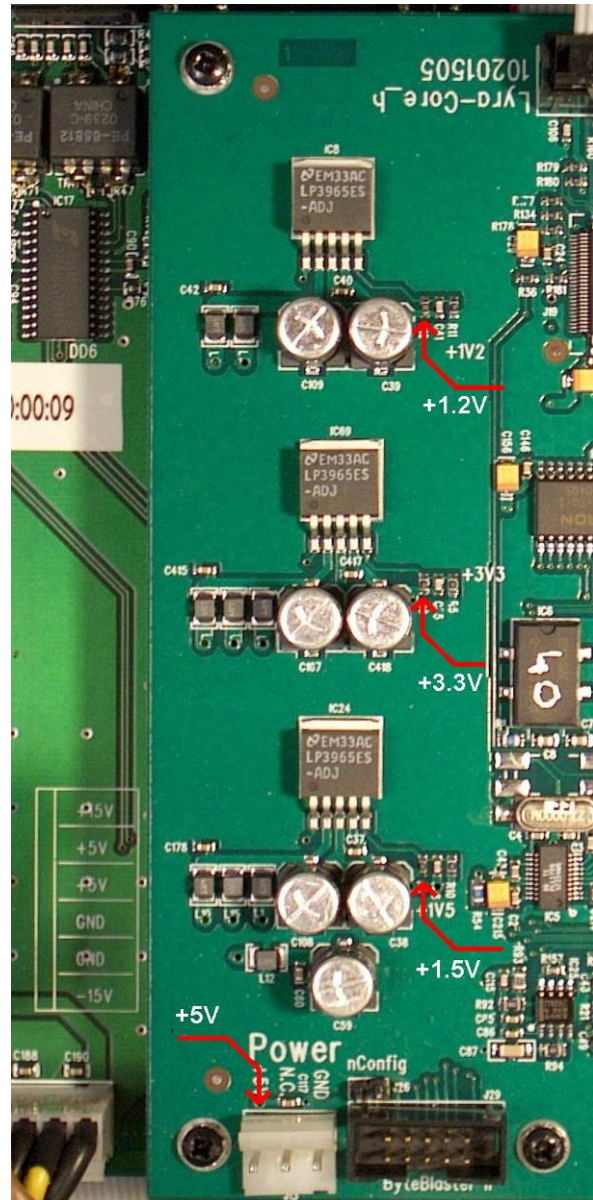
There are 4 voltages present on the Core PCB.

**+5V:** All other voltages are derived from this voltage. Also the onboard PLL uses this voltage.

**+3.3V:** Used by the FPGA, DSP, memory etc...

**+1.5V:** Used only by the FPGA.

**+1.2V:** Used only by the DSP.



### 2. The Digital in/output PCB voltages

## 7. Disassembling the Lyra

To disassemble the Lyra you need the following tools:

- A Philips type screwdriver
- A 1/4" spanner for the sub-d connector screws. A 5.5 mm spanner will also work.
- A 14mm spanner for the BNC nuts.
- An 11mm spanner for the pot meter nuts.
- An Allen wrench for the front panel retaining screws.
- A multi-meter for measuring the voltages.

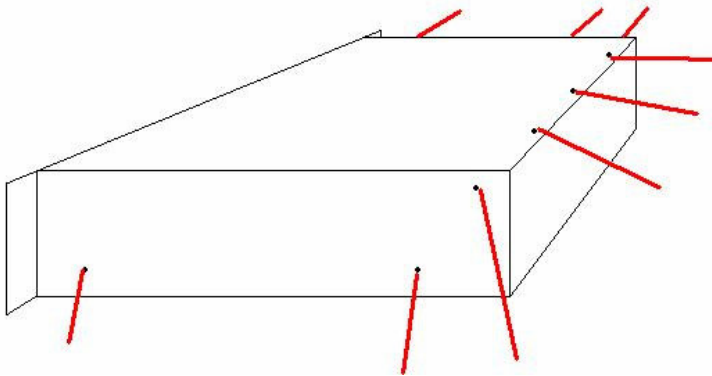
As stated on page 3 of the manual please take precautions for static discharges. Either by wearing a wristband connected to a good earth point or a heel band if you have a special floor which dissipates static electricity.

If you do not have these facility's to countermeasure static discharges then it is not recommended that you disassemble the Lyra.

Failure to observe ESD regulations will void warranty!

### 1. Step 1 (Opening the Lyra)

If not already opened remove the 9 screws.



### 2. Step 2 (Removing the CobraNet card and Core PCB)

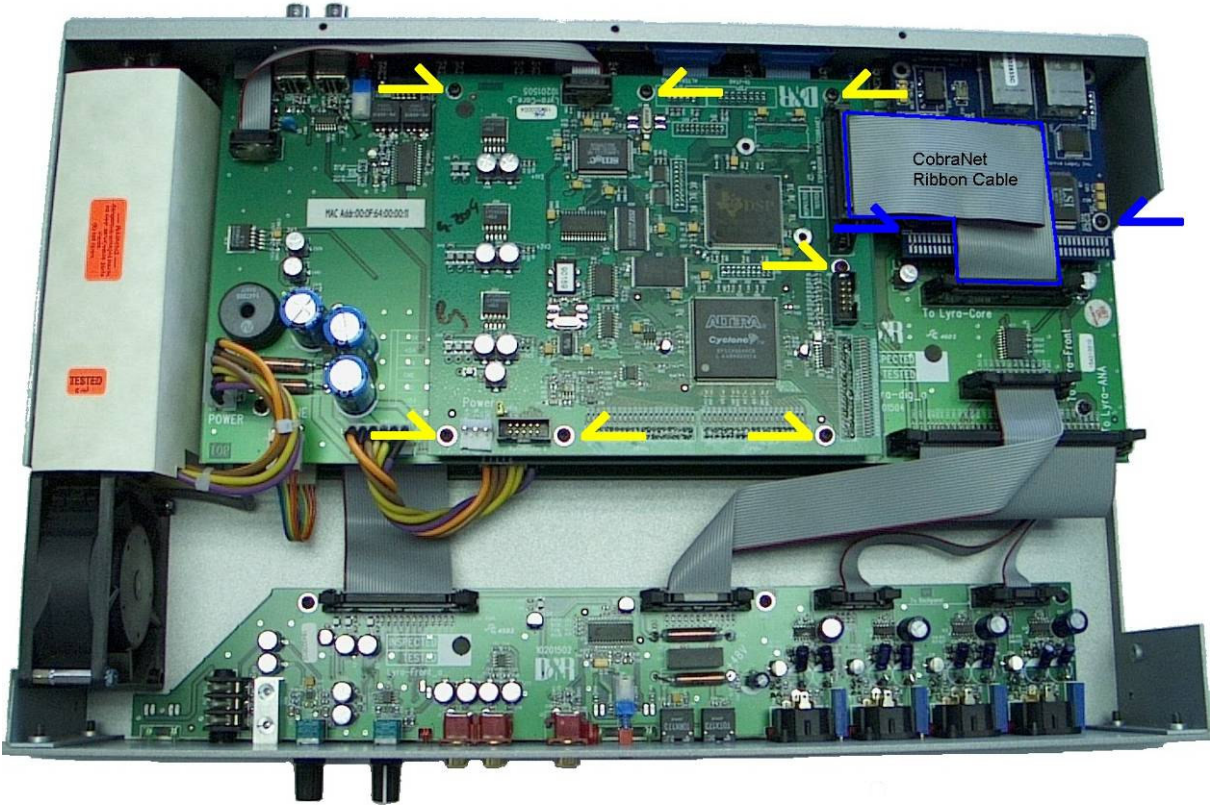
To remove the CobraNet card just remove the ribbon cable connector and the two screws that hold the CobraNet card in place.

To remove the Core PCB remove the 7 screws that hold the Core PCB in place.

There will be some glue on the 10P header to keep it in place during shipping.

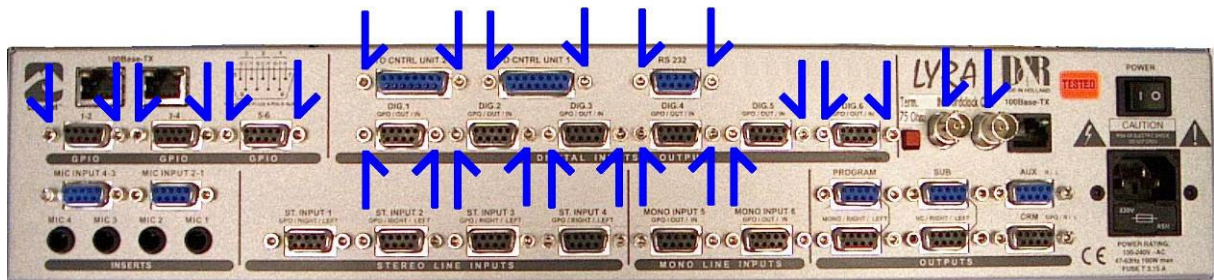
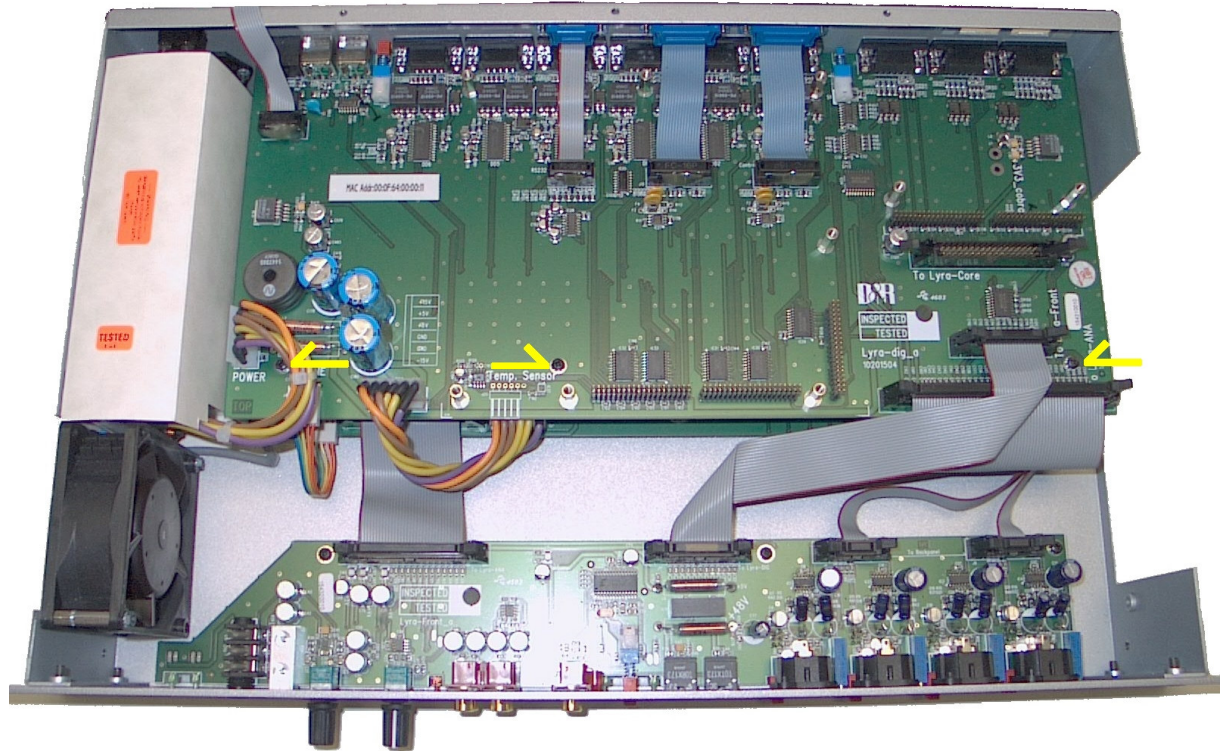
You will need to cut through the glue in order to release the connector. However if you only have to do a visual inspection or simple maintenance then you can leave the Core PCB connected in place behind the Lyra.





### 3. Step 3 (Removing the Digital in/output PCB)

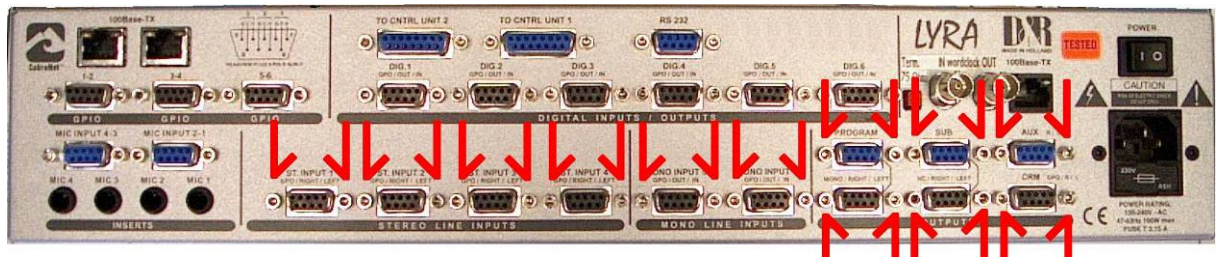
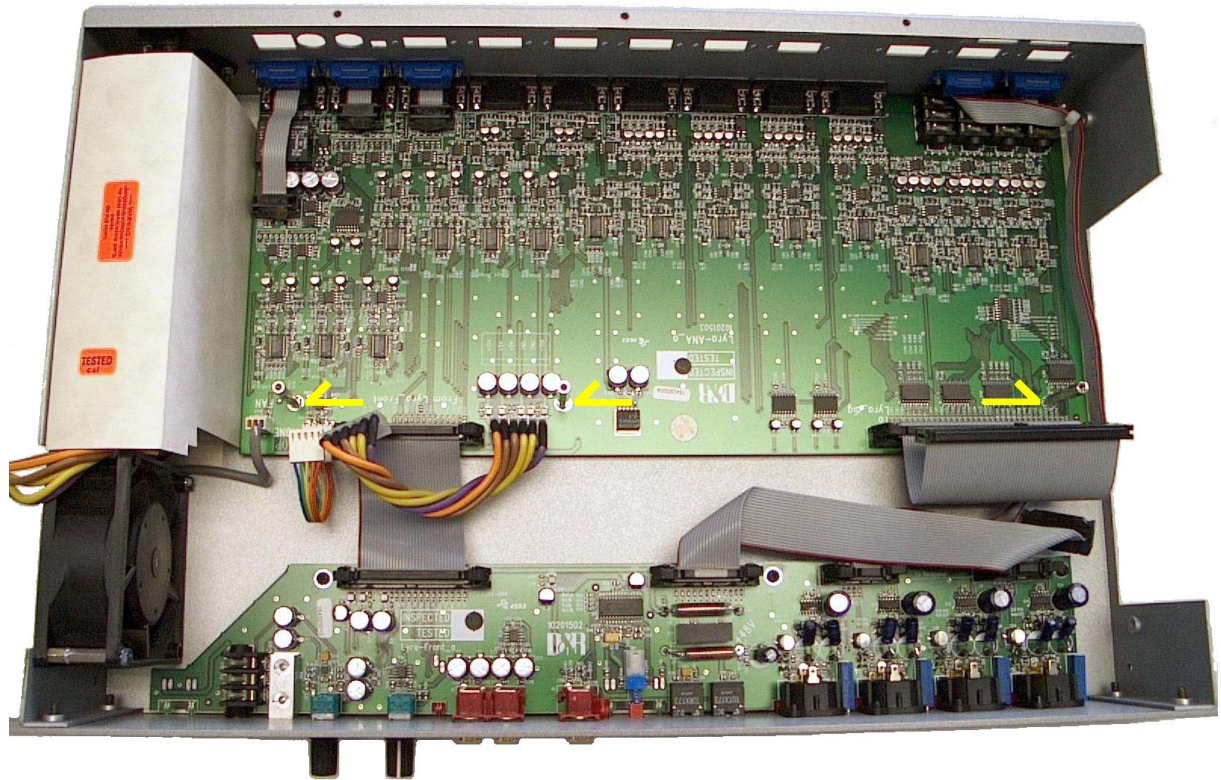
To remove the Digital in/output you need to remove three screws. On later models the Power connection is soldered to the Molex connectors to ensure proper connection. You will then need to place the PCB to the side. Revision B PCB's have PCB terminal blocks.



For the BNC nuts you will need a 14mm spanner. For the other nuts you will need either a 1/4" spanner or a 5mm spanner.

#### 4. Step 4 (Removing the Analog in/output PCB)

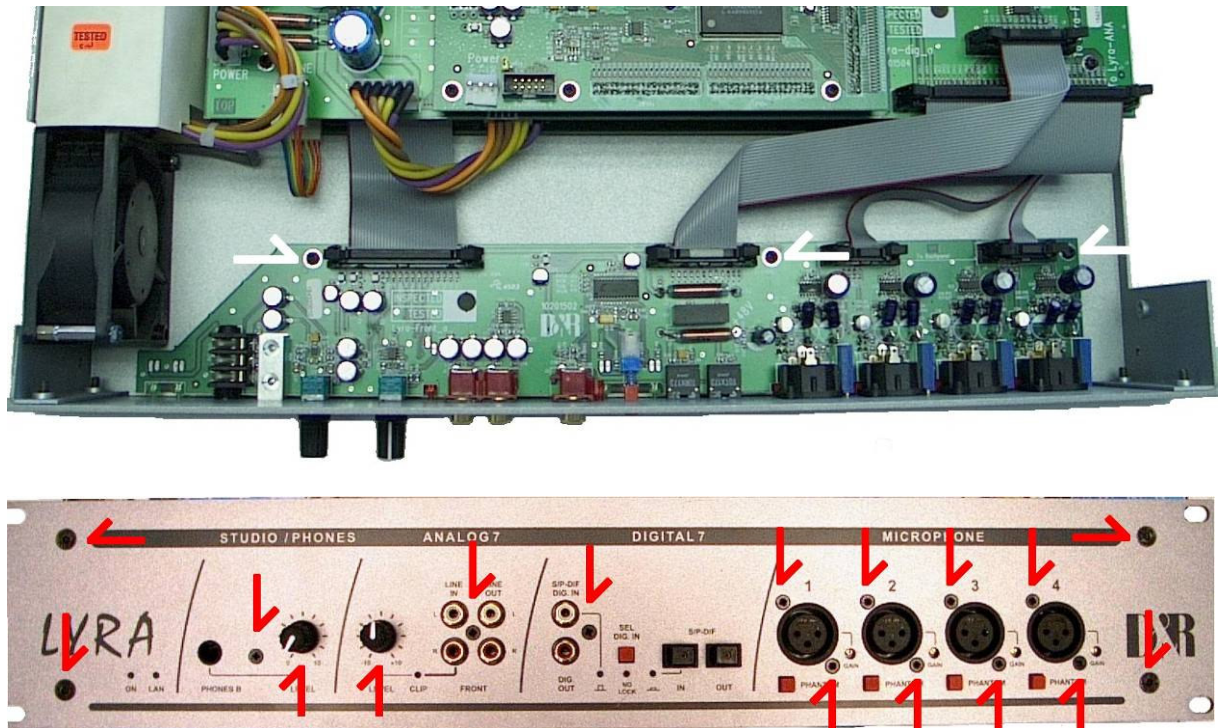
To remove the Analogue in/output PCB you need to remove the



For the nuts you will need either a 1/4" spanner or a 5mm spanner.

## 5. Step 5 (Removing the Front panel PCB)

To remove the front panel PCB you need to remove three screws on the inside and several on the outside.



For the screws you will need a pozi drive screwdriver. To remove the pot meter nuts you will need a 11mm spanner.

Also you will need a Allen wrench when you want to remove the front panel.

When putting the PCB back in the front panel please take care that you do not over tighten the screws as they are in a danger that the plastic wears out.

## 8. Product improvements hardware

### From 9 September 2004:

#### **L1 and L2 on Lyra DIG PCB changed from 4.7 $\mu$ H into a wire bridge.**

This to stop oscillation of the 3.3V power rail when a CobraNet option is installed.

Lyra DIG PCB revision B this is fixed with a SMD 00hm resistor.

### From 7 October 2004:

#### **Power connection from PSU to Lyra DIG PCB is soldered permanently.**

We noticed that due to the current that is drawn on the +5V power rail the contacts of the Molex connector started to get more and more resistive. This results in a voltage drop over the connector, which leads to an unstable Lyra.

Lyra DIG PCB revision B the Molex connectors are replaced by PCB terminal blocks.

### From 6 June 2005:

#### **Remove R28 on Core PCB.**

When a CobraNet CM-2 Module is installed the audio from the CobraNet Module contains clicks. This was due to the fact that the CM-2 module drive current for the Frame clock line is not enough.

Note: This does NOT apply to CobraNet CM-1 modules although you will not notice anything.

### From 1 July 2005:

#### **Change R93 on Core PCB to 6.8 kOhm.**

We noticed that the Power Good only comes active is the +5V rail is above +4.8V. This makes the Lyra vulnerable to power drops in the mains supply. When this modification is preformed the threshold voltage will be +4.5V.

### **From 9 December 2005:**

**Change C5, C6, C11, C12, C19, C20, C25, C26 on Front panel PCB to 10 $\mu$ F with a 100.0 Ohms 1% resistor**

Switching the Phantom power while the Lyra is switched on can damage the Microphone inputs. This modification makes the Microphone inputs stronger without concessions to the sonic integrity of the input.

### **From 1 January 2006:**

**Change L6 on the Front panel PCB from 470 $\mu$ H to 100 $\mu$ H.**

This modification makes the +5V, that the DC-DC (NMT0572) converter uses to make +48V, higher. This gives a higher output at the DC-DC converter (+48V in stead of 40V or less).

### **From 17 March 2006:**

**Change R297 and R298 from 10KOhms to 100KOhms and Replace C222 and C223 from 10uF/16V into a wire bridge on the Analog in/output PCB.**

This modification will improve the stereo separation over the entire frequency range. This only applies to the Program output.

## **9. Software (NIOS) revision history.**

### **V1.0.0.0: 16 Feb 2004.**

- Initial release

### **V1.0.0.1: 19 Feb 2004.**

- Fixed free interrupt that caused NIOS to restart.

### **V1.0.0.2: 14 May 2004.**

- EQ now default On.
- Added chip card functionality for 8 fader control surface.
- Web server now correctly accepts <Head> and <Put> command.

### **V1.0.0.3: 18 May 2004.**

- Peak Led now works. The peak led will go on when the level reaches 17dBFS (3dB below Fullscale).
- Fixed bug regarding encoder 5 (in an 8 Fader control surface). Pushing the encoder button resulted in a chip card security level change

### **V1.0.0.4: 8 June 2004.**

- The FPGA now displays a version string in the “System Information” page of the Web server.

### **V1.0.0.5: 24 Nov 2005.**

- Added SNMP community names in the “CobraNet Settings” page.
- Added compatibility for CobraNet CM-2 module, this requires FPGA version 1.2.
- Added Sub pre switch in “Global Settings”.
- Lyra now also checks MfgID and ProdID.
- Snapshot format changed. Previously saved snapshots do not work anymore..

### **V1.0.0.6: 1 March 2005.**

- Fixed error in FTP transfer which resulted in 0 Byte files size when trying to save Snapshot.
- Added FTP command CDUP
- Changed FTP reply of Anonymous login to 230 instead of 200.

### **V1.0.0.7: 3 May 2005.**

- When Idle level is given full access (all boxes ticked in “Security Settings” pages you will Not see a log in screen.
- Updated the CobraNet CM-2 module web page.
- CobraNet Remotes now work between a CM-1 and CM-2 modules.
- Due to reorganisation of the flash it is now possible to see COPIER.BIN when using an FTP program.
- Added Update&Reboot button in “Network Settings”.
- An IP address with a “0” in it is now valid.
- New channel “mono” modes added, Mono (Left+Right), Mono from Left channel only, Mono from Right channel only.
- Clear Log button added on Connection Log page.

- Fixed slowdown when CobraNet CM-2 module installed.
- SetIPAddress function corrected for CobraNet CM-1 module.
- SNMP read/write communities are read and saved correctly. For this to work correctly you will need CM-1 firmware V2.9.12 and higher and for CM-2 firmware 2.10.6 and higher (See “CobraNet Settings” page on the Lyra web page).
- Fixed problem with Remote Buss when FaderOn and On was set.
- The CUE button in the CRM source select section now works as CUE Reset.
- Meters on the control surface now show the correct level (meter data was truncated not rounded).
- Meters on the control surface now receive and update after booting. This to show the level, even when a constant signal is applied i.e. sine wave with constant amplitude.

**V1.0.0.8: 18 May 2005.**

- Mic gain is now correctly set when recalling a snapshot.

**V1.0.0.9: 20 March 2006.**

- Fixed problem with remotes and CobraNet CM-2 module.

**V1.0.0.10: 11 May 2006.**

- Microphone gain is now saved in Snapshot.

**V1.0.0.11: 18 May 2006.**

- Added “Fader top is Unity gain” in Global Settings page.
- Snapshot format changed. Previously saved snapshots do not work anymore.

## **10. FPGA firmware revision history.**

**V0.0: 16 Feb 2004.**

- Initial release.

**V1.0: 8 June 2004.**

- FCLK, BCLK and MCLK drive currents increased to 24 mA to increase system stability.



**V1.1: 18 June 2004.**

- FCLK\_CobraNet is inverted after the PLL to remove sample timing difference between channel 1/2,3/4 and 5/6,7/8.

**V1.2: 15 Oct 2004.**

- CobraNet audio data 4x2 channels instead of 4x4 channels.

**V1.3: 2 June 2006.**

- Fixed problem with digital output 4 always following digital output 3.