Ultimate-Preamplifier

by

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DC/AC COUPLING AND OFFSET VOLTAGE ISSUES
INTRODUCTION

Some Ultimate Preamp units may have been shipped with the DC offset jumpers in place which bypasses the coupling capacitors on the Unbalanced and Balanced output boards. For the Unbalanced outputs this should not present a problem to a proceeding power amp as the offset should be no more than +/- 5-20mV. However, if any of the channels of the Buffered-Balanced board have their coupling capacitors bypassed, a common mode voltage of around 1.6 Volts will be present on both pins 2 and 3 of respective XLR jack. This may cause problems with a power amp connected to the Preamp which is not designed to handle high common mode voltages on its balanced input.

Although the common mode voltage on the DC coupled output is relatively high, the actual differential voltage measured between pins 1 and 2 on the XLR jack should be no more than +/- 20 mV and should not present a problem to any subsequent amplifier which is AC coupled or has a well-designed balanced input stage which should mitigate this offset. However, if you are having troubles with your power amp going into protection mode or producing a loud thump when the preamp is switched on or off then it is recommended to AC couple the outputs of the preamp to the proceeding amplifier. This is facilitated using a set of jumper pins on the output boards of the Preamp.

BYPASSING THE OUTPUT COUPLING CAPACITORS

Both the Unbalanced and Buffered-Balanced output boards have series output capacitors to filter out any DC offset on the output of the DAC converter stages. If it is desired to have a flat response down to DC then these capacitors can be bypassed but there maybe a residual DC offset which may affect the operation of the proceeding power amp that it is connected to - if the power amp is DC coupled or does not have a properly designed balanced input stage which can null out any common mode DC offset voltages.

As can be see in the following DC measurement the DC offset between balanced output pins 2-3 on the Channel-1 XLR connector with the DC coupling jumpers in place is of the order of 23 mV.
However, the following two DC measurements show that the common mode voltage measured between pins 1 & 2 and pins 2 & 3 is of the order of 1.6 Volts which is nearly a hundred times as much as the differential offset voltage.
If the DC offset voltages are a problem to the proceeding amplifier then the DC coupling bypass jumpers should be removed.

**INSTALLING OR REMOVING THE DC COUPLING JUMPERS**

With the unit switched off and unplugged you should remove the top 8 screws using a 2 mm hex driver.

At the back of the unit is located the Unbalanced and Balanced output boards. As shown below the jumpers for the Unbalanced board are fairly easy to access without physically removing the board. If you need to bypass the coupling capacitors then you need to place jumpers or shunts over the exposed pins for each channel. Likewise, for AC coupling you should remove the jumpers. As each channel has its own individual jumper you can customize each channel depending on the amplifier it is connected to.
For the Balanced output board, the procedure is a little bit trickier as the jumpers are buried in a location underneath the Unbalanced board so the best way to access it is by removing the Unbalanced board first. To remove the Unbalanced board, first remove all of the IDC connectors connected to both the Unbalanced and Balanced boards as in the following image.
Next you will have to gently remove the 8 retaining nuts and washers on the RCA jacks using a 16 mm extended socket.
Then slide out the board towards the front of the unit without removing the earth straps. Each channel has a pair of jumpers which represent the hot and cold connections of the balanced output so you need to either install or remove both jumpers at a time. Do this for each channel that you want to configure.
Once you have done this the reassembly process is the reverse of the assembly process. Note that the retaining nuts on the RCA jacks should be hand tightened with the socket without using a bar.

Power up the unit and measure the offset at the output. If the unit is AC coupled (ie jumpers removed) you should see there is no longer any DC offset at the output of the XLR connector.
DC/AC coupling and OFFSET VOLTAGE ISSUES

Pins 1 and 2 DC measurement.

Pins 1 and 3 DC measurement.