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...retro-fit output transformers on a DP224/6

There are four stages involved in the fitting of output balancing transformers:

- Removal of the main PCB from the unit
- Removal of all the components for the electronic balancing output stages
- Fitting of the output transformers
- Refitting of the main board back into the chassis.

Removal of the main PCB

MAKE SURE THE UNIT IS DISCONNECTED FROM THE MAINS SUPPLY BEFORE BEGINNING THIS PROCEDURE –THERE ARE VOLTAGES PRESENT INSIDE THIS UNIT WELL IN EXCESS OF THE INCOMING MAINS VOLTAGE!

Remove the 7 screws holding the top cover of the unit in place and lift off.
On the rear panel of the unit, remove the pairs of screws associated with each XLR socket.

Now, inside the unit, unplug the connector associated with the RS232 port on the rear panel. Remove the two bolts holding the card in place and set the assembly to one side.

BEFORE REMOVING THE SCREWS HOLDING THE MAIN PCB IN PLACE, BRIEFLY EARTH YOURSELF TO A LARGE METAL OBJECT (SUCH AS A FILING CABINET) – THERE ARE STATIC SENSITIVE DEVICES ON THIS BOARD!

Now remove the screws holding the main board in place – there are 9 in total (including one beneath where the RS232 card is positioned with a earth wire attached[1])

[1]Some older units may not have an earth wire attached to this screw

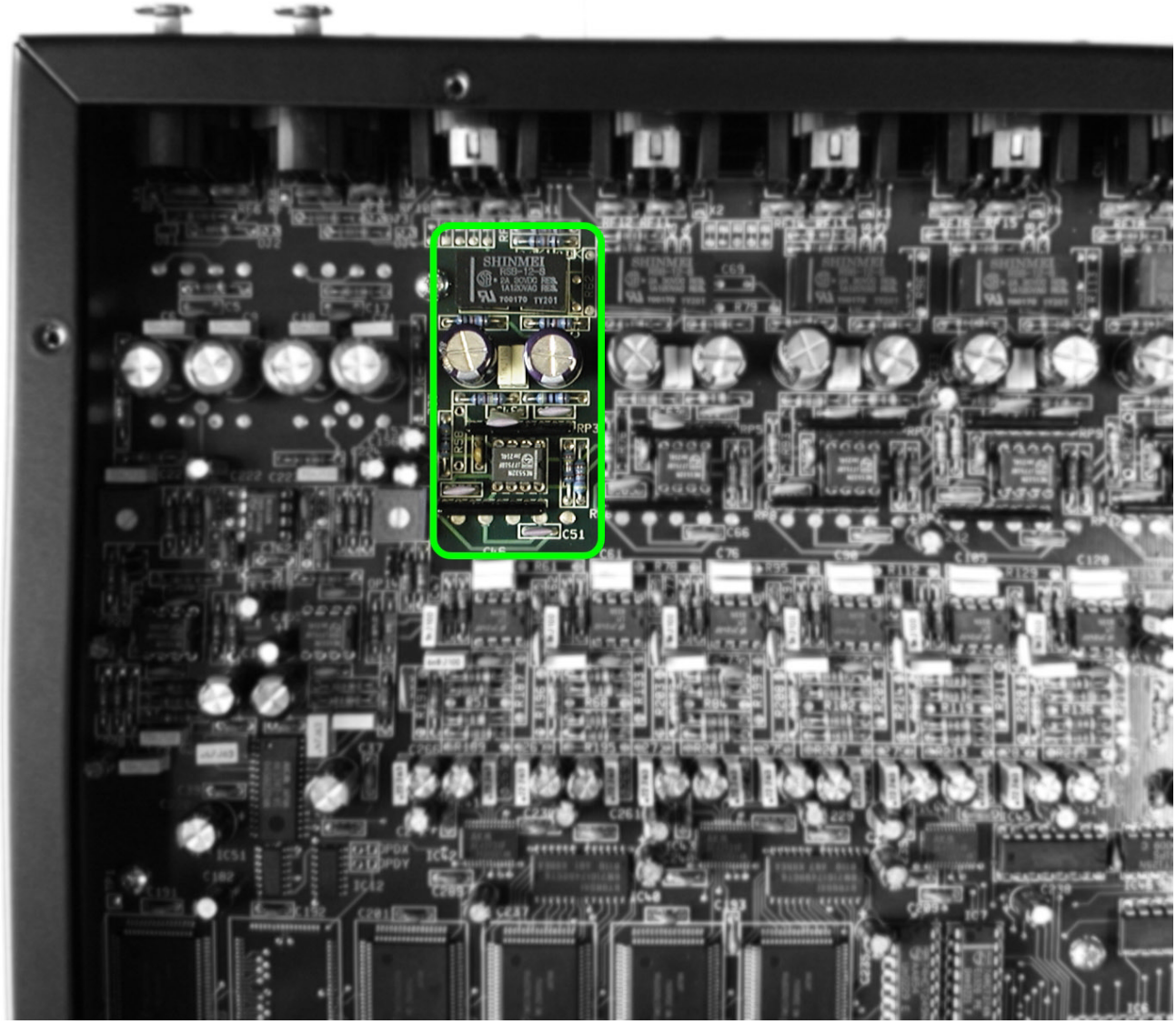
Unclip the connectors along the front of the main board that connect it to the front panel – there are three – two for the switches/LEDs and one for the display.

It should now be possible to lift the board out of the unit, taking care to manoeuvre it up at the back due to the XLR latches – these latches (on the two inputs and one of the RS485 sockets can be removed but it is an awkward job, and not strictly necessary).

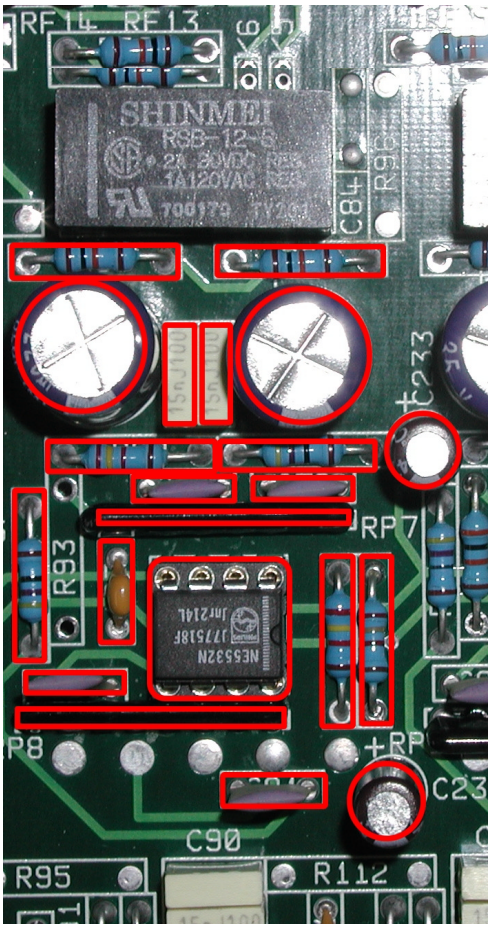
Removal of all components associated with electronic balancing outputs

Due to space restrictions within the unit, it is necessary to actually remove the circuitry associated with the electronic balanced outputs to make room for the transformer option.

Look at the photograph below – it shows the section of circuitry associated with ***one*** of the 6 outputs. Note that this circuitry is replicated 5 more times and so the procedure detailed here must be repeated for each channel.



The picture below shows a close-up of this circuitry, and all components highlighted in RED must be removed. Hint – the majority of the components can be cut off the top of the board with a pair of side-cutters, but it is best to desolder the IC socket. Note that the transformer will be sitting over these old component locations and as such can potentially short against them so the removed components MUST be cropped very close to the board. If in doubt, desolder them.

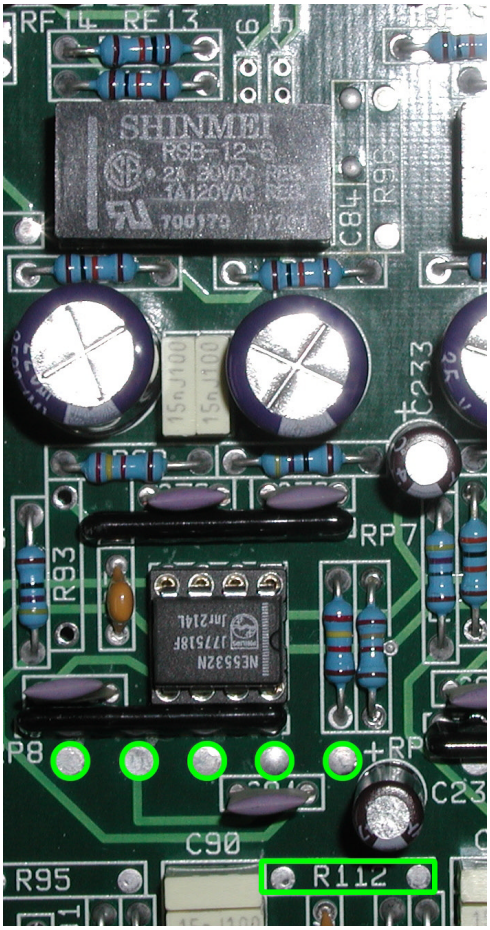


Note that the channel shown here is NOT channel 1 for a reason – there are two extra components near this channel that have to be removed to fit the transformers – they are the two smaller electrolytic capacitors circled on the right on the picture – C232 and C233 (47uF, 25v).

For each channel you should remove (working from the back of the unit forward):
The two 10k resistors between the relay and the large electrolytic caps;
The aforementioned caps and two small polyester caps between them;
The two resistors in front of the caps (2k4/47R);
The two ceramic caps in front of the resistors (220pF – purple top);
The resistor pack in front of these caps (RP7etc.);
The two resistors to the left and right of the IC (2k4/47R) – there may be two additional resistors next to these (in the pic the right hand one is fitted, R93 is not) – these need to go as well.

The ceramic cap (220p) and the 47nF (yellow) one to the left of the IC;
The resistor pack below the IC (RP8 etc.) and finally…
The ceramic cap (220p) below that again.

Fitting of the output transformers



Once the big electrolytic caps have been removed (not removed on this pic) the other set of holes for the transformer will be visible. The first set is circled below in green. These holes will need to be cleared of solder.

Prior to fitting the transformer, stick a piece of double sided foam tape to the underside of it. The tape provided will just fit snugly down between the two rows of pins. Remove the waxed paper cover before positioning the transformer and press it HARD into the board. This tape not only helps hold the transformer in place, it insulates the metallic underside from the component remnants left on the PCB.

It will probably be necessary to push the transformer through the board as the pins are soldered in place, as they do not protrude very far.

Note the resistor position marked in green below the transformer holes – a wire link must be fitted in this position for every channel – the corresponding numbers are R61, R78, R95, R112, R129, R146, for outputs 1 to 6 respectively.

Refitting of the main board back into the chassis

Before completely refitting the main board, it is wise to attach just the necessary leads and check that the unit is still functioning correctly.

To this end, just…

Reposition the board in the chassis, carefully guiding the XLR latches through the holes (two inputs and one RS485)

Plug in the three front panel connectors

Attach one screw to anchor the board in place (the one beneath the RS232 card is recommended, along with its earth wire)

Now, switch the unit on and verify that it is working correctly. It is best to do this by opening up all the crossover filters on all channels to 20Hz – 20k and bypassing all EQ. Feed a full range signal through the unit (or 1kHz @ 0dB if you have access to a signal generator) and listen to / measure the outputs. If any channel appears to be lower level than expected, the most likely problem will be a poor solder joint. If there is NO signal, then the wire link has probably been accidentally omitted for the faulty channel.