Advanced servicing of a BBC Micro Power Supply

WARNING: ***You proceed at your own risk when attempting to repair or refurbish the power supply. It is up to you to make sure you are working safely with mains electricity. If possible, use an isolation transformer for connecting the power supply on test. No liability can be assumed for any damage or injury caused. If in any doubt, please return the entire Power Supply to us at RetroClinic for refurbishment or exchange.***

NOTE: If the power supply was working when removed, then it is safe to disassemble it now. If it was not working when switched on, leave it at least 2 hours before attempting dismantling, to allow for high voltages potentially resident in the capacitors to discharge. Please refer to the appropritate section for your PSU.

It is assumed that you have disconnected the unit from the mains supply, and from the PCB.

The following sequence is for an ASTEC and BSR type PSU, which is the most common variant found. There also exists however some other variants, which are similar in function and design, but components may be located in different positions, or the casing may be a different design. This kit is ONLY suitable for the type shown in the photos. Do not attempt to fit it to any other variant, as the part numbers may be in the wrong locations.

Undo the 3 securing screws underneath the case, and withdraw the power supply up and forwards, pulling the mains cable through the aperture at the back of the case.

The power supply unit is half housed in a metal surround, and the PCB will need to be removed from this in order to service it. Referring to Figure 1, take the following steps:

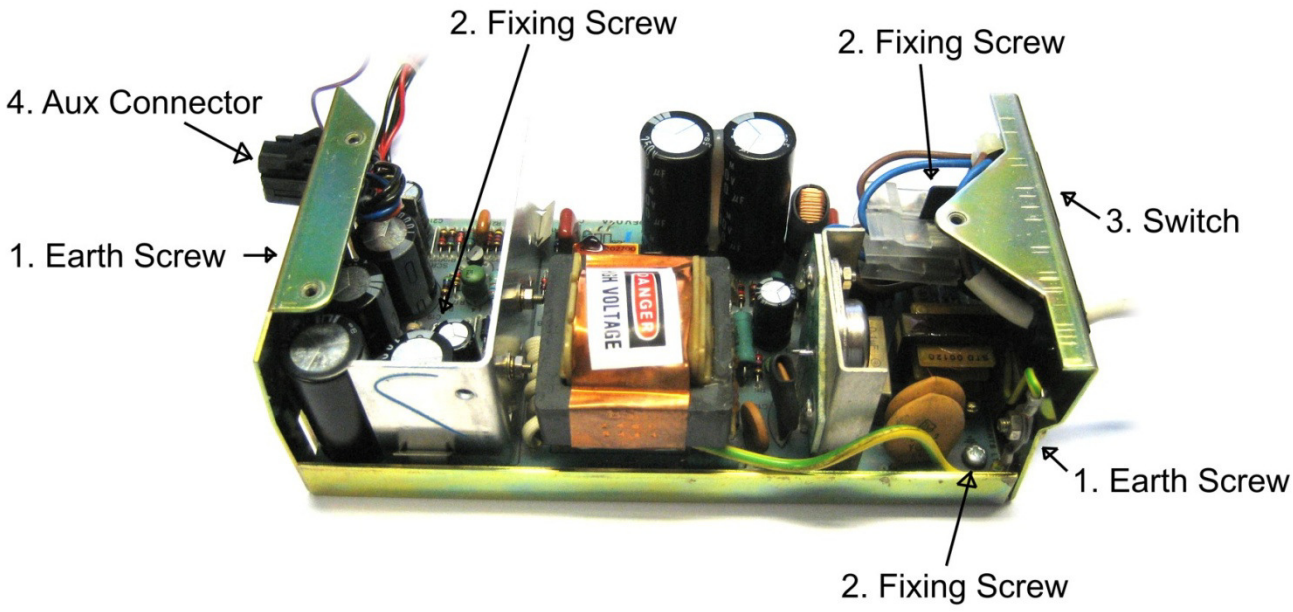

Figure 1 – Power supply in half case

1. Remove the two earth tab bonding nuts and screws, taking care not to lose the star washers.
2. Remove the 3 fixing screws that hold the main PCB to the metal case.

3. Remove the power switch. There will probably be a cable tie holding 2 wires to one of the tags. Carefully cut this tie. Bend the retaining tabs of the switch down with a screwdriver to help ease it out. Make a note of where the mains connectors fit onto the switch, then disconnect the 4 power connectors and remove the switch completely.
4. Press the AUX power connector out by bending the tabs on the outside towards the connector housing.

There may be a cable tie securing the low voltage output wires to the half case, in which case carefully cut this. The main PCB can then be slid out, being careful with the area around the AUX connector, as the wires can be tight.

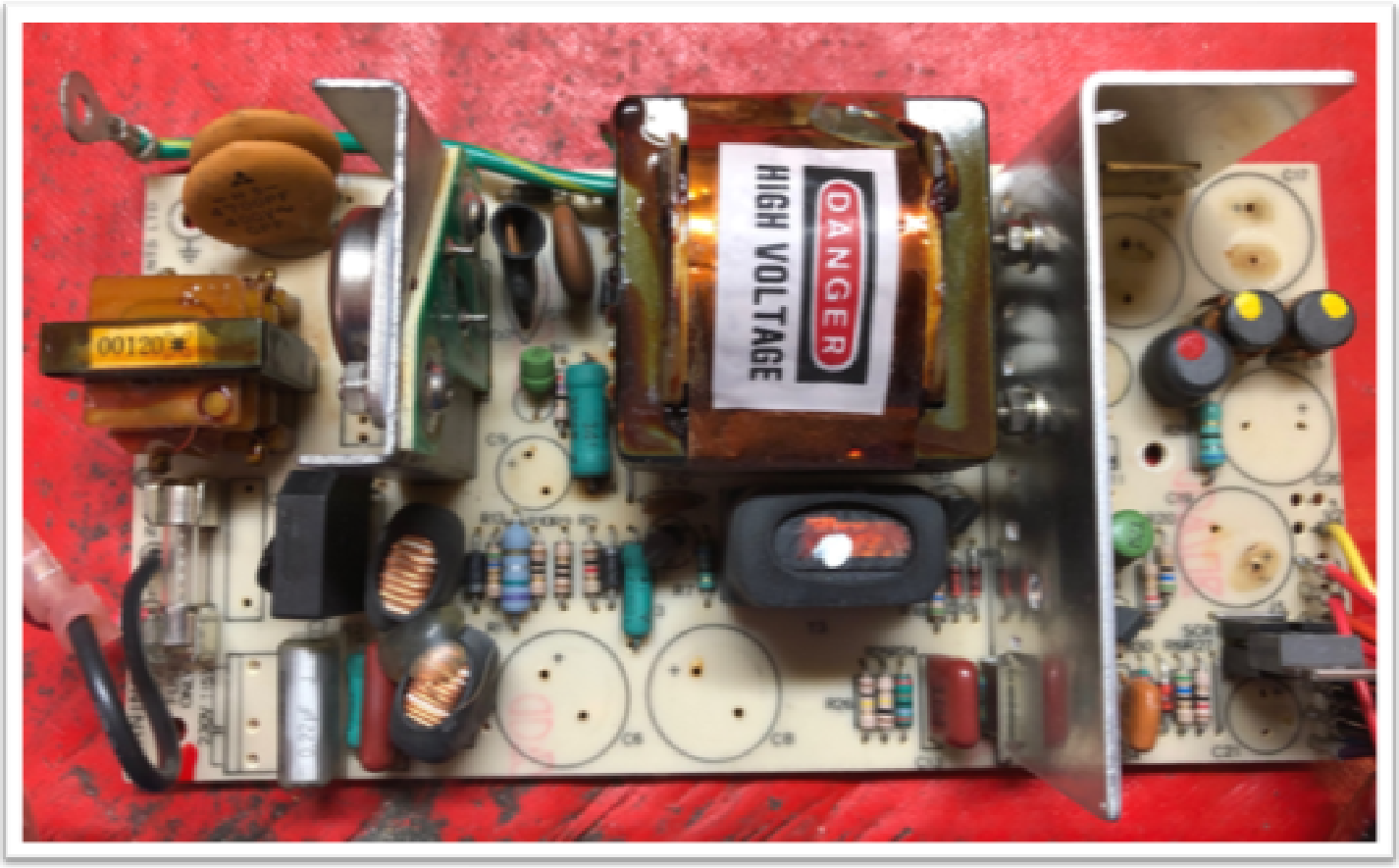

Figure 2 – PCB with capacitors removed, ready for replacement

Remove the following capacitors, so the board looks as it does in Figure 2:

- C1, C2 – X2 supression caps
- C9 – Startup cap
- C6, C8 – Mains smoothing caps
- C16, C17, C18, C19, C20 and C21 – Low voltage smoothing caps

Don't bother making a note of their values, we'll make sure you fit the right ones in the right places in the next step.

Make sure the solder pads are clean, try to remove any flux residue with IPA or dedicated flux remover if you have it.

Figure 3 – Mains Capacitors location

Now we can start refitting the capacitors in the right locations. Replace the following:

- Location C1 with the 10n X2
- Location C2 with the 100n X2

These X2 capacitors are not polarised, so it doesn't matter what way round you fit them. However, all the others are. The circuit board is marked with one side of the capacitors location with a "+" sign. This is the positive pin, and is the longer of the two leads on the capacitor. The shorter is the negative, which should fit in the other side, away from the "+". The negative on an electrolytic capacitor is also makred with a stripe, with minus signs along it.

NOTE: ***Fitting electrolytic capacitors the wrong way round WILL cause them to quickly overheat and burst open when powered up, shooting smoke out into the room, so make extra sure you're fitting them the right way round, and refer to the photos at each stage to double check your work.***

Now replace the next set:

- Location C9 with the red Wurth "Red Expert" 220uF 25v electrolytic
- Locations C6 and C8 with the black 100uF 250v electrolytics.

The last two, C6 and C8 are **VERY IMPORTANT** that you fit the correct ones, triple check that you've used the large 100uF 250v ones, and not one of the other low voltage type.

Figure 4 – Output Capacitors location

Next we fit the output capacitors as follows. These are all blue Panasonic brand.

- Location C18 and C21 with the 220uF 35v type. The astute amongst you may notice that the originals of these were 100uF. That's fine, we're using higher values here to add extra smoothing to the -5v line.
- Location C16, C19 and C20 with 1000uF 25v.
- Location C17 with 2200uF 16v.

Again, check with Figure 4 above that you've fitted them the correct way round, and that the negative polarising strip is in the right place.

You're all done for the capacitor replacement. Before you reassemble, check and if necessary reflow the solder joints around the two transformers and the 4 pin input choke, as these can often dry out. Inspect your work again, to be sure you haven't left any new component wires uncut, or accidentally shorted something.

Reassembly of the power supply is a reverse of the procedure used to dismantle it. Be sure to check you've wired up the mains switch correctly, and haven't snagged any of the mains cables. Refit 2 new cable ties, one for the 2 mains wires on the switch – this keeps them away from the hot heatsink, and the other to retain the low voltage output wires. Also check you've refitted the earth tags correctly.

If at any point you are unsure of what to do, DON'T GUESS! The power supply contains mains voltages and can kill if handled incorrectly, or cause an electrical fire if the componets are replaced incorrectly. Please contact us and we can complete the refubishment for you if you're unsure of anything or if the PSU is still not functioning correctly.

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