Lunchbox Amplifier Mechanical drawings and photos

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ABSTRACT

Mechanical drawings of heat-sink and metal parts together with photos of the “Lunchbox” 2x300W amplifier are shown.

The “Lunchbox” amplifier is a unique high power high efficiency low idle current amplifier system including a SMPS based on Texas Instruments power supply controllers.

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Figures

1 Box mechanics

The used box is a ready made box from TEKO in Italy. [1]

A drawing of the box in PDF format is shown here:
http://www.teko.it/multimedia/manuali/pdf/DS2470.pdf

The aluminum side bar is used as heat-sink for the amplifier, for the SMPS this can not be used due to the isolation requirement when using mains (110-230Vac) powered equipment.

The front and rear plates are anodized aluminum plates, we selected the version with black read and silver front.

Figure 1. TEKO Box

TEKO distributers can be found on their home page, see [1] we used ELFA as distributor. [2]

1.1 Front plate drawing

The front plate has holes for the status LED for the amplifier, a audio volume knob and two switched, one for ON/OFF (controls the /RESET signal to the amplifier chip TAS5630) and a switch that select SMPS high power output voltage, 25V, 50V or automatic selection.

Figure 2. Front plate photo

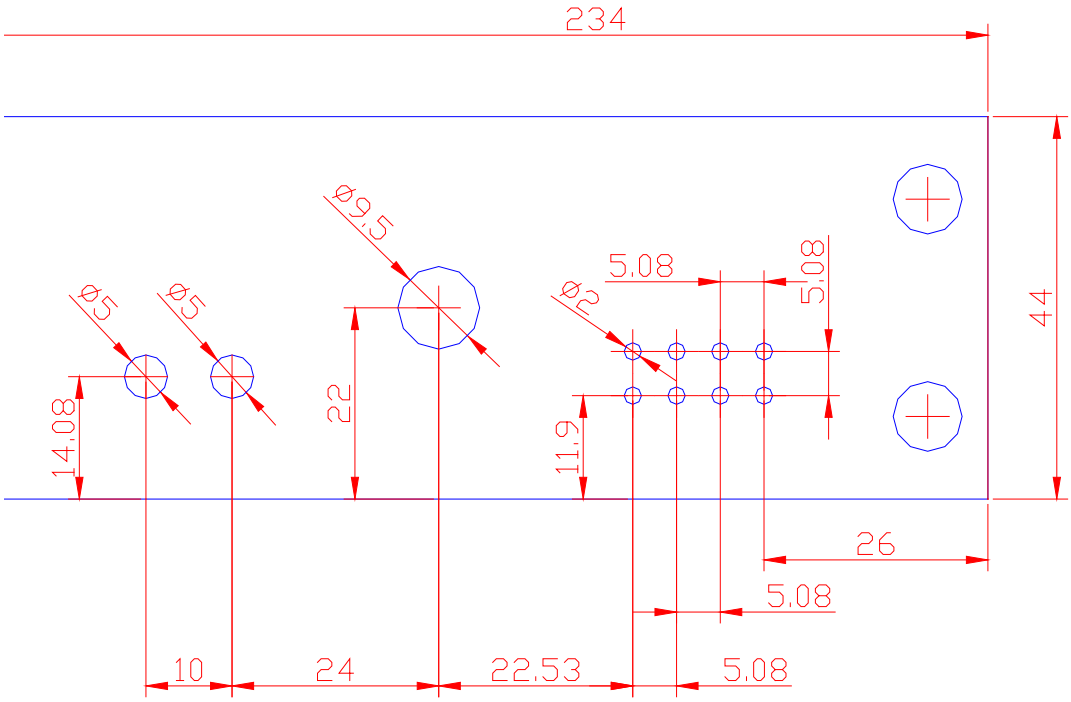

Figure 3. Front plate Zoom dimensioning of holes.

In the appendix the drawing is shown full size.

The Volume knob is placed exactly on the horizontal center line – that fits with 6mm high standoffs for the PCB mounting.

1.2 Rear plate drawing

The rear plate holds the IEC mains plug with integrated switch. Fuse holder is on the SMPS PCB.

Speaker connectors – heavy duty types with banana-plugs and holes for bare wire ends. – positive red, negative black. Note that the TAS5630 amplifier has a balanced output – common mode voltage on the output terminals are half PVDD. The PVDD can switch from 26V to 50V e.i. the common-mode voltage is 13V or 25V.

Audio input is a gold plated dual RCA – color coded – white = Left, red = right.

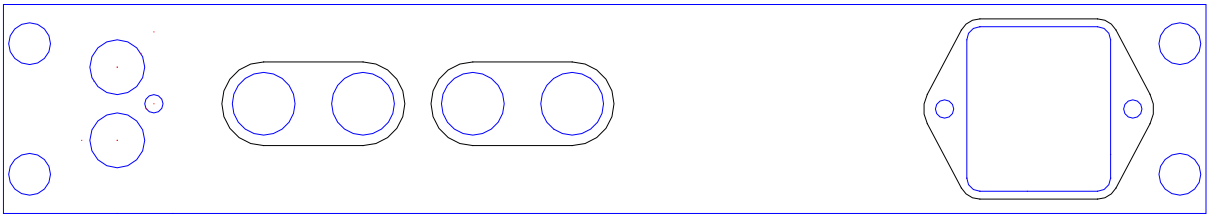

Figure 4. Rear plate

Full scale drawing is shown in the appendix.

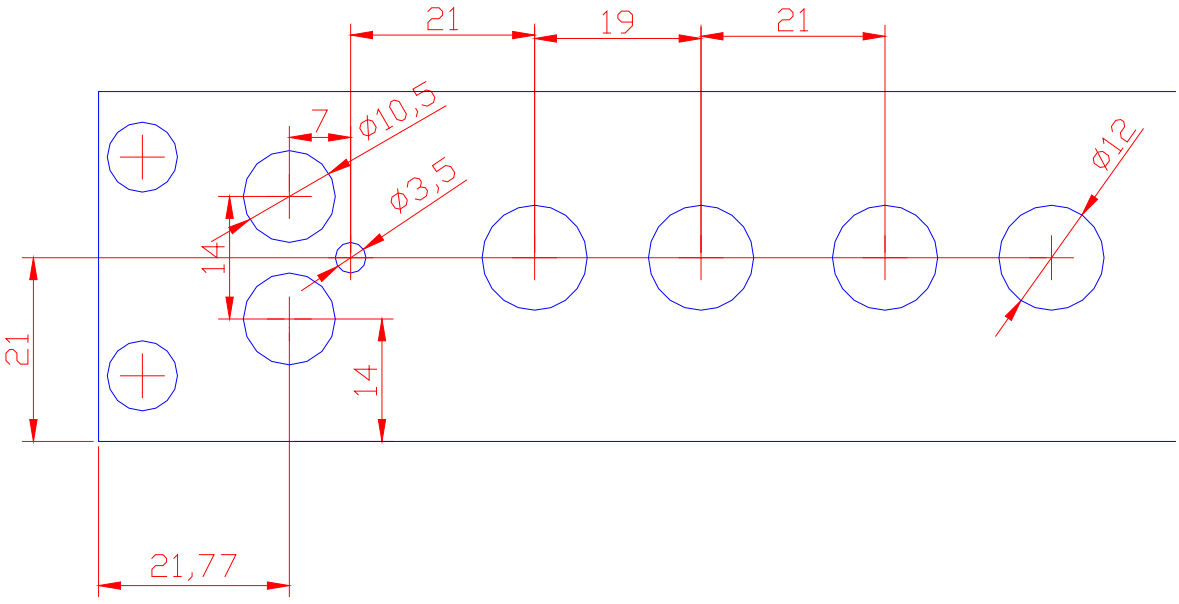

Figure 5. Rear plate dimensions zoomed, RCA and Speaker plugs

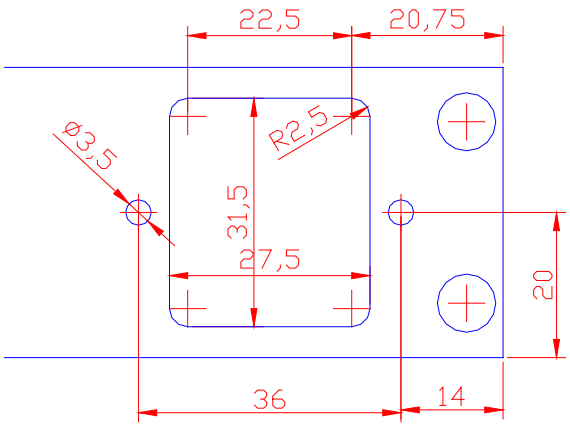

Figure 6. Rear plate, mains plug

1.3 Heat sink drawings

1.3.1 TAS5630 Heat-sink

The box aluminum side panel is used as heat-sink for the amplifier – a solid aluminum bar is used to transfer the dissipation form the TAS5630 to the side panel.

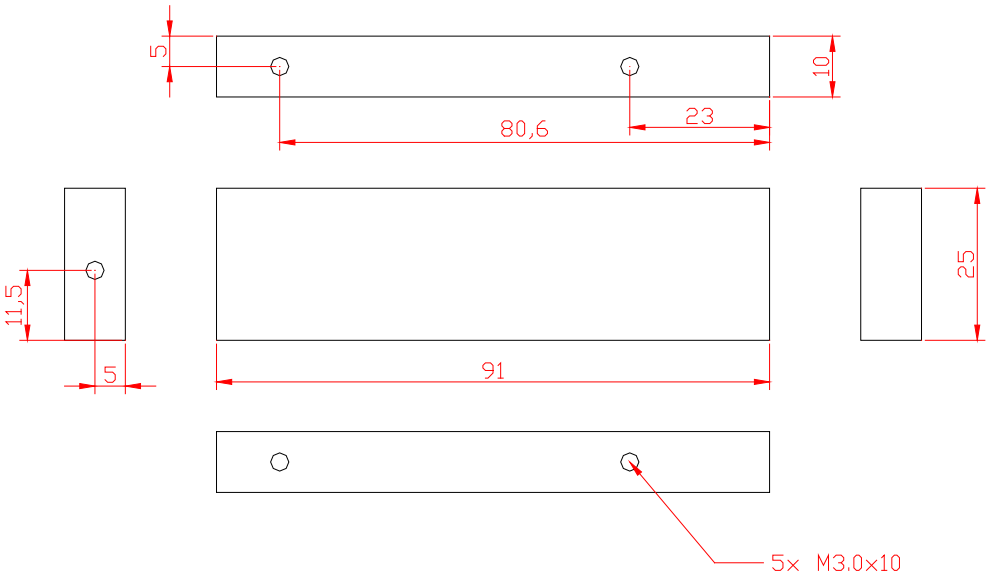

Figure 7. TAS5630 Heat-sink/Bar

1.3.2 SMPS FET Heat-sink

The heat sink is based on a readymade extrusion, type MQ75-1 from Aavid Thermaloy available from Farnell no.: 232970 or KS29.2 from Austerlitz electronic available from ELFA no.: 75-624-81

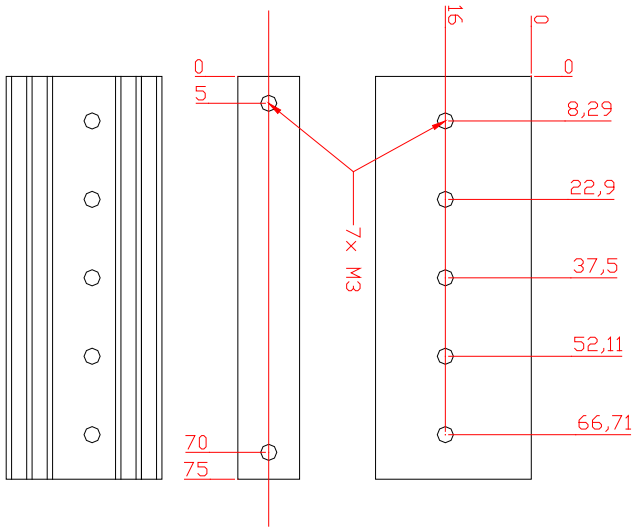

Figure 8. FET Heat-sink

1.3.3 SMPS Diode Heat-sink

The diode heat sink is based on the same readymade extrusion, but here 50mm-long, type MQ50-1 from Aavid Thermaloy available from Farnell no.: 232968 or KS29.2-50E from Austerlitz electronic available from ELFA no.: 75-623-41

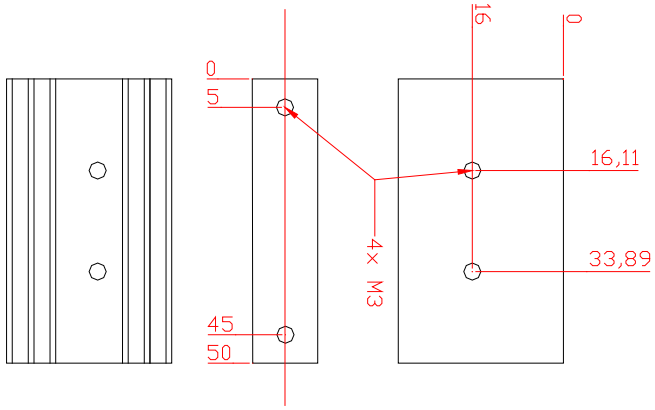

Figure 9. Diode Heat-sink

1.4 Bottom plate

1.5 Integration

The mains powered SMPS should have 6mm isolation to any metal parts that's connected to chassis – that's not possible with the TEKO box due to the 40mm internal height.

For this box we therefore use 3mm standoff, and place insulation material between the PCB and box. The insulation material, for example polyester film should be able to withstand 4kVac.

On the lid of the box we have used 2 layers of polyester tape. Make sure that there is a 3mm overlap on the second tape layer to ensure the 6mm creapage distance

If the insulation material is not available – we must strongly recommend using a box with a building height that allows 6-8mm minimum air gap to the SMPS on top and bottom

References / Liks

1. www.teko.it
2. www.elfa.se
3. www.farnell.com
4. http://focus.ti.com/lit/ds/symlink/tas5630.pdf
5.

Appendix A. Front and rear plate drawing