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Tubeworks design analysis

The old Real Tube 12AX7A stomp pedal left a little to be desired.



I reviewed a guitar pedal decades ago. I am pretty sure it is this one on YouTube: <https://youtu.be/a88nbHDcpWk>

I can see this pedal also has a 2-wire line cord going into a metal case. To my knowledge, that is illegal, since the box is not double-insulated like a plastic drill motor. Not sure if they still make it, though it looks like the company is still around.

Here is a design analysis I did for a client. It is a guitar effects unit, a so-called "stomp box".

I was not very impressed by the engineering, but this may have been a prototype the client had gotten a hold of.

QUALITY- FAIR

- Flux left on circuit card.
- Unsoldered pads on circuit board.
- Transformer retained by pop rivets.
- Solder wicked into multi-strand wires.
- LEDs unsupported.
- "Fixes" soldered to back of board.

REPAIRABILITY/MANUFACTURABILITY- POOR

- No silkscreen or component designators.
- Hardwired components captivate board to enclosure.
- Components underneath tube socket.
- Close tolerances to enclosure may cause shorts.

DESIGN- FUNCTIONAL BUT EXPENSIVE

- Two op amps used as flip-flop to toggle effects.
- Eight large electrolytic capacitors.
- Metal shaft potentiometers.
- Three different potentiometer values used.
- No surface mounted components utilized.
- No high frequency roll-off, will damage tweeters.

LEGAL- NON-COMPLIANT

- High voltage in unit without earth ground or double insulation.
- No U.L. Listing.
- High and low voltages in close proximity.

RECOMMENDATION:

- Report non-compliance to FTC and Underwriters Laboratories so this product will be recalled from the market.
- Design alternative product which eliminates ground loops in a safe manner and achieves cost reductions by good design and manufacturing practices.