

Yamaha amplifier and Bose guitar effects unit restoration

D. D., of Petrie, Qld is a serial repairer and recently managed to easily fix two different Yamaha amps and a guitar effects unit, two of which had already been relegated to the tip! That's a pretty good effort and here is how he did it...

The local tip has a recycling section where you can drop off your unwanted gear to sell to people who can use it, but their policy recently changed, and they no longer allow mains-powered equipment to be sold in this manner. But as I was recycling some bits and pieces, I happened across a Yamaha RX-V457 7.1-channel surround receiver.

A tip worker saw me looking at it, so I asked him if I could have it. He said no (with a wink), but if he doesn't see me take it, then he can't do anything about it. He then walked away.

So I became the proud new owner of an amplifier. I got the unit home, plugged it in, and nothing happened. So, Google to the rescue. There is a common fault with this amplifier, a capacitor on the inlet power circuit board goes bad. I tested capacitor C4 and found it much lower than its rating of 22nF, 630V.

I replaced it with a new one from Jaycar and the amplifier now sounds fantastic, although I did have to buy

a remote control, which was the most expensive part of the repair!

Here's another story of a tip rescue. My brother-in-law's brother works at his local tip and picks up bits and pieces all the time. Lately, he happened across a Boss ME-50 guitar multiple effects unit. These are pretty cool and have pretty much everything a guitar player could want, with some 22 effects.

The unit had no (or very low) output signals. Disassembling it took a while due to the 20 odd potentiometers holding it together. I found a very nice looking PCB populated with SMDs. A quick internet search revealed the service manual and a circuit diagram.

I applied a sinewave signal to the aux input using my smartphone. I could see the signal going into the circuit but nothing coming out. While looking at the diagram, I noticed there are muting transistors on the outputs of all the channels, so I lifted one of the legs of all of these SMD transistors, but there was still no output.

Next, I tried removing each op amp one by one to see if one was causing the problem. As luck would have it, the very first op amp I lifted (IC6, NJM4556) solved the problem. It appeared to have a short circuit across its inputs, which was shunting the input signal to ground for all the op amps. As soon as I replaced that IC, the whole thing worked.

My third repair was of a Yamaha RX-V2067 7.2-channel surround sound amplifier that was given to me. It would turn on but then switch itself off after a second or so. I initially thought great another easy fix with a faulty capacitor on the power board, but it was not to be.

So I downloaded the service manual and put the unit into service/no protection mode. The unit prompted me with an error code, "PS2_PRT 168H". A perusal of the manual showed that this error code is related to the voltage rails labelled, $\pm 12V$, $\pm 12RY$, $+5A$, $+44V$ and $+5DK$.

The schematic showed the regulators for three of these rails were on the PCB labelled "video 2", which is right at the bottom of the unit, so after removing four PCBs and many screws and unplugging many connectors, I got to those board. I set it up on the bench with my bench supply and measured all the voltages. They were all in spec. I then re-assembled the unit and pow-

ered it on, testing all the other rails; they were all in spec too.

I scratched my head and had another look at the schematics. The PS2_PRT line is a sum of all the above voltages via a resistor voltage divider network, resulting in a voltage going into the A/D converter which should be around 1.6V but I measured 2.2V.

I removed the PCB labelled "video 2" again and started checking the resistors related to this voltage divider network. I found one which measured 70k Ω , but it should have been 47k Ω . These are all small 0603-sized SMD resistors.

On removal of the suspect resistor, I tried to measure it again and found it open circuit briefly, before it flew off somewhere, yet to be found.

I didn't have any 0603-sized 47k Ω resistors in my home stockpile, but I had a couple of 0.25W axial versions which, with a bit of lead manipulation, I soldered to the pads. After re-assembly, the PS2_PRT line now reads 1.5V and the unit no longer goes into protection mode.

Unfortunately, it only worked for a couple of days before all sound disappeared. I put the unit into service mode again and found that I could get sound out of the speakers using the service modes A2: analog direct test and the A7: manual test. So I knew the amplifiers were still working.

I then used my phone as a signal generator and fed signals into all the channels one by one. They all worked on pure direct and A2 test mode. So all inputs and outputs were working. But there was a fault when the DSP function was switched on.

I started to follow the signal and found that nothing was coming out of IC811, a PCM1803 analog-to-digital converter (on the Function 3 PCB). Replacing the chip permanently fixed it.