three contact female plug mating with three pins on the printed board. It was here that the problem originated, even minor movements of the cable causing the audio to vary. On this basis the serviceman had thoroughly cleaned the pins and bent them slightly to increase pressure on the plug contacts.

"All went well for about four months, then the same symptoms showed up again. This time I decided to tackle the job myself, and to dismantle the plug fully. This was easy, as the contacts can be withdrawn by depressing a small tongue through holes in the moulding.

"A long hard look under a glass showed that the central co-ax conductor was connected to the contact by crimping the sides of the metal over the wire. Apparently corrosion had set in, causing a high resistance joint between the wire and the contact.

"A swift touch with a soldering iron, taking care not to overheat the contact, and so draw the temper, and all was well again. There has been no sign of a recurrence so far. It is worth noting that the other two contacts had soldered joints, though whether from the production line, or a later visit to a serviceman, I cannot tell."

Mr B.S. then goes on to question the wisdom of crimped joints, pointing out that a minor design error of this kind can ruin the reputation of an otherwise good set. Finally, he implies that I will probably classify this as just another story about a dry joint.

On the contrary, B.S., I found it a most interesting story, particularly as it is such a close parallel to the one I told in the July issue. And I couldn't agree more with your comments about crimped joints and similar minor design points in general.

Something which some designers fail to appreciate is that failure of the most insignificant component in the set can be just as frustrating for the customer as a far more complex failure. As far as they are concerned the set has failed, they have missed their favourite program, and had to pay a service fee. To try to explain that it is ". . . only a little fault" will achieve little, if anything, it will probably only aggravate the annoyance.

And from another Queensland reader a quite different story, but one which highlights the idea that a serviceman should be prepared to broaden his outlook and tackle other than the conventional radio and TV devices.

The contributor is a professional serviceman, Mr F.S. of Townsville, and this is his story:

How's this for a number of faults on the one piece of equipment?

It all started out quite innocently (so, I believe, did the Martins and the Coys!) when I receive a call from a dealer in amusement machines.

These games consist of a TV monitor supplied with video generated by a "game board", which can hold as many as 120 TTL ICs. Power supplies, coin mechanisms, and operator controls complete the deal.

The game in question was entitled "Bazooka". Apparently, when working, a procession of tanks, trucks, transporters, and motor bikes proceeds across the screen and the operator attempts to annihilate these vehicles with a bazooka-like device mounted on the machine.

To add spice to the game, an ambulance and/or stretcher bearer also dash unpredictably across the screen, and shooting them results in the score being degraded.

This visual extravaganza is accompanied by tank, explosion, motor bike, shot, and ambulance noises.

On switch-on the machine displayed nothing. On firing the bazooka a line of dots ascended the screen to the accompanyment of a sound which can only be described as electronic flatulence! And, to make matters worse, the monitor displayed severe hum bars.

It appeared that the owner of the machine had purchased the games board and fitted it into another chassis. In so doing he had had to purchase and fit an additional power transformer.

Well, one has to start somewhere, so I pulled out the games board, which consisted of a mother board and three plug-in boards. The reason I started there is that I have found that printed board edge connectors can be highly unreliable.

While the board was out I remounted some large electrolytic capacitors, as they appeared to have been installed in a hurry and left hanging in space. While doing this I also noticed that one IC appeared to have something like "gravy" over it.

As these machines are patronised by particularly enterprising young customers, who are wont to include it in their staple diet of pies and pop, I wasn't particularly surprised. Using methylated spirit and a toothbrush I cleaned away the goo, only to discover a blob of solder between the IC and the board, where it could easily have been shorting out several pins.

A few moment's work with a spike removed the solder and an inspection with a jeweller's loupe failed to reveal anything else suspicious. I imagined that putting back the boards, plugging in, and making a few quick checks would serve to see me on my way.

No such luck! Granted, the assorted tanks, bikes, ambulances etc reappeared, but the only improvement in the sound was that, whenever the bazooka was fired and scored a hit, an explosion occurred. The hum bars were also still very evident.

I decided to tackle the sound problem next, rather than the hum bars, mainly because I did not relish the idea of removing the monitor — it was practically "un-removable", and definitely not repairable in situ. This was a wise decision, as it transpired.

Fortunately the owner had some documents which showed that there were two sound channels; one apparently providing the tank and explosion effects, the other the ambulance, motor bike, and bazooka shot effects.

Both channels used LM380 amplifiers, each driving a speaker. As it was the easiest thing to do, I swapped the two LM380s and this swapped the sound. I now had motorcycle, ambulance, and shot sounds.

The obvious cure was a new LM380, but I had only the 14-pin LM380s, instead of the 8-pin version used in this equipment. Fortunately, a wire-wrap socket and a little judicious pin bending solved that problem, and I had sound on both channels.

Why had the LM380 failed? I was inclined to put it down to old age or bad luck, until I idly moved one of the speaker leads — and promptly lost one channel. Fortunately, the LM380 survived and removing a plug and socket connection cured that one. It is incredible that so many problems can be traced to plugs and sockets.

That left only the hum bars. The most likely culprit was the power supply, which was a rather interesting installation. The board was designed to accept 9V AC each side of a centre tap, and 15V AC each side of the same centre tap, from a suitably designed, common centre tap transformer. Each pair of inputs worked into a conventional full-wave rectifier.

This machine used two transformers. One was a fairly robust, but rather ancient model, 9V centre tapped, and the other a more modern type with two independent 15V windings which had been series connected.

Just for the hell of it I pulled out the double-beam CRO and discovered that the series connection had been made out of phase. As a result the intended full-wave rectification was not occurring. Instead, each diode was functioning as a half-wave rectifier, in phase with its mate, or two half-wave rectifiers in parallel. No wonder the power supply had ripple in it.

Correcting this mistake reduced the hum hum bars significantly, but they were still very much in evidence. Then I noticed that the monitor had two earth wires; one the braid on the video input connection, the other a recently run wire back to the main earth point at the mains input. Disconnecting this wire cured the fault — no more hum bars. (I might add that this last effort called for a fair amount of deduction.)

I put the thing back together, checked the coin mechanism, and had the machine tested by an expert (the boss's nine year old son). As far as I know it is back in service — and I hope it stays that way!