



ON THE BENCH MR (CAN'T) FIXIT.

The life of a tech can be a frustrating business, especially when a part is made of 'unobtainium'.

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▶ This issue I thought I'd bring you over to my side of the bench, so you can see what it's like. Don't touch anything now, it's dangerous back here.

Like most pro audio service technicians, I've been doodling away with electronics since I was a young lad. It started out with my best friend Nigel and his '20 Electronic Projects' experimenter's kit he got for Christmas one year. We spent that first summer building one-octave organs, crystal set radios and intercoms. The experience lit a fire that hasn't gone out in the 40 years since, even though there have been times when it was reduced to a barely maintained smoulder.

While Nigel went on to become an electrician, I headed to university to study science. There I picked up every electronics option I could find and spent whole weekends exploring the university library, reading every book and journal there was on audio electronics. Unlike most other pro audio techs, I've had minimal formal training. However, like *many* other techs, most of my knowledge comes from self education and hands-on experience. The sheer quantity of information that a tech must retain in his head in order to perform in this service area is vast and ever increasing. Memorising formula – you know, Ohms Law and the like – is just the beginning. Integrated circuit pin-outs, standard resistor values, logic functions, connector wiring schemes, tube types and operating parameters, common circuit functions... it goes on and on.

DOING YOUR HEAD IN

To be efficient at repairing equipment a lot of this information needs to be in your head, or, if not, at your finger tips. The knowledge is generally hard won. For me, reading the information out of a book only embeds this knowledge so far, unlike watching smoke pour out of a piece of equipment, which tends to lock the information in permanently! One consequence of all this accumulation of information is that most techs end up becoming equipment designers. In fact, it's probably fair to say that most designers of audio equipment began their careers as service technicians. Whether these designs ever end up for sale in your local music store is another matter, and has less to do with the designer and more to do with the marketing department. Technicians do not make good marketing people! Marketing people do not make good designers!

The pro audio service technician is something of a dying breed. I recall just over 10 years ago working in a mid-sized radio station as part of a team of seven techs. The same station today has just two. In the recording area there are few service techs left who will do on-site work in studios, and have the skills and experience to deal with equipment from tape recorders to digital outboard to large-format consoles.

On the other hand, the dedicated service workshops are, by and large, as busy as they've ever been. Yet all this workshop activity doesn't mean that earning a living from repairing pro audio is getting any easier, in many ways it's getting more difficult.

Of course, a number of workshops are also authorised repairers for product distributors, but unfortunately, being 'authorised' often simply means the repairer is the meat in the sandwich between the client and the distributor (I think the cut of meat is 'scape-goat from memory'). In a warranty situation the repairer is actually working for the distributor, not the equipment owner, and yet this person is often the only point of contact for customers seeking real answers about their faulty equipment. In a sense, some distributors use their authorised repairers to cover for the fact that they actually provide very little backup, but are reluctant to shoulder the burden of explaining to customers the reality that a cheap product usually comes with cheap support. Also keep in mind that if you've purchased a unit overseas then the Australian distributor has *no* obligation to provide warranty cover, leaving the repairer even further out on the limb trying to access parts and technical support.

ANYONE GOT THAT SCHEMATIC?

Today, a good point of comparison is the availability of schematics and technical information. This situation has changed dramatically over the years, and not for the better. I recall the days of Tascam audio products – arguably pro or semi-pro audio tape recorders and consoles. When you purchased a Tascam unit, you got a thick manual. Not only did the front of the manual cover installation and operation, as you flicked through the pages you would find a technical analysis of every electronic sub section of the unit. This would be followed by schematic diagrams, circuit board layouts and mechanical assembly and part identification – everything a service tech would need to locate the fault in a unit, identify the part number required to repair it to the distributor, and realign the unit should it be required. And, this was all in the provided operator's manual!

There are many products today for which you can't locate the schematics diagrams for love nor money. There are two reasons for this. In some cases the equipment manufacturer isn't really the manufacturer at all, and has outsourced not only the construction of the equipment but also the details of its actual design. The other situation is

where manufacturers fear for their intellectual property – the equipment designs – and don't want anyone to see the schematic diagrams and have them exploited. In a sense, they do have a right to be concerned about this as a circuit design cannot be copyrighted or protected. (The name and appearance of a piece of equipment and the actual layout of the circuit board can be, but not the actual circuit design.) It's this quirk that allows a whole swag of manufacturers to clone some of the classic audio designs and issue them with different knobs and a variation of the original name... you know the ones!

However, this lack of technical information doesn't help when the unit's in need of repair, sometimes turning what should be a quick and painless signal tracing and fault location exercise into hours of reverse engineering. To fix something, you generally have to know how it's supposed to work in the first place.

PART FARCE, PART PRISON SENTENCE

The next issue you come to is replacing the part. Sure there are lots of common parts inside all pro audio equipment, and repairers dedicate a good portion of their workshops to holding a stock of resistors, capacitors, common ICs, connectors and a whole host of garden variety parts. However, there are also lots of unique parts in products that can only be sourced from the manufacturer. And, of course, without schematics and parts lists, this process becomes complicated and time consuming. Often techs spend a good part of the day hanging off the phone or bashing out emails trying to nail down the details, price and availability of a required part. Conversations go something like this:

"I've got a Z-Space Inter-Compressor Model Three here and I need the third IC from the left that's on the sub-board near the front panel. It has a number on it that doesn't show up in any data book ever published by humankind... do you have one in stock and what's the trade price?"

Most distributors then reply: "I'll get back to you."

Maybe they will, maybe they won't. Possibly they'll just hope you'll eventually go away and the client will go out and buy the newly released Model Four.

This might sound a bit harsh, but this is by no means an unusual situation. Here's another example from one of Sydney's largest pro audio repairers:

"Over the last few years we would average 400 jobs in the workshop at any one time. Of that 400, usually around 200 were waiting on parts. Even at one phone call per week from each punter asking, 'where the f##k is my XYZ?' and one phone call from us asking the supplier 'where the f##k is part no. 123', you're already up to 400 phone calls per week! Worse still, of the 400 items in for repair at any given time, maybe 75 are 'shelf gobblers' – equipment that, no matter how urgent the job originally seemed, now languishes on the shelves for maybe a year or two."

A quick survey of service workshops indicates that these are pretty typical statistics. Around 50% of jobs are waiting on parts and this waiting period can easily be up to three months. Certainly this time frame is, in part, due to Australia's isolation, compounded by distributors' lack of desire to hold large inventories of spare parts. Parts are usually only brought in with shipments of product, so spare part supply times are a matter of pot luck. If you have a unit booked in with a workshop, hounding them to source the required replacement part is a waste of everyone's time. Believe me, the workshop wants your unit fixed and out the door even more than you do! For the repairer, equipment waiting on parts takes up valuable space, and until completed, invoiced and paid for, represents no income.

MONKEYS WITH GLUE GUNS

Increasingly pro audio equipment is becoming harder to service. Just getting some units apart is like solving an engineering puzzle deliberately concocted to drive the average technician insane. Modern construction techniques have dramatically reduced the final manufacturing cost on many products. The use of hot glue, moulded plastic and hidden clips ensure lots of products snap together like Lego in the factory, but often this leaves the technician wondering how it's supposed to come apart for repair – if indeed it *can* come apart.

I'm not necessarily talking about cheap, obviously disposable gear here either. There's certainly one

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very popular home/pro studio product that sells by the truckload for a reasonable portion of most people's monthly wage, which requires the knobs to be removed to open it up. Fair enough, that's not uncommon. However, in this case the knobs are *glued on!* Sure, you can get them off, but it takes a lot more time and effort than the owner is usually willing to pay for. Worse, the risk of scratching or marking the unit when dealing with these glued-on knobs just generates a whole lot of otherwise unnecessary anguish. Whoever it was that decided gluing the knobs on was a good idea has obviously never spent a single day in a service workshop. And here's the killer, this unit invariably breaks because it uses a small and relatively fragile USB socket, and jacking in and out of a USB socket, day in and day out, will almost certainly lead to it breaking one day. If someone had proposed a connector looking like a USB socket as a vital equipment interconnect in 1960, they'd have been laughed out of the room.

NO PARTS & NO IDEA

Some time back I had a stereo compressor in for repair. The compressor featured four little VU meters – cool! Unfortunately, the lamps that lit the meters had all blown so I was asked to replace them. This job took over two hours of labour, spread over two weeks just to remove the ordinary incandescent lamps that everyone knows have a limited lifespan.

The job required the following: removal of all knobs, removing a small tub of screws, desoldering of numerous small parts, melting and pulling out several large gloops of hot glue, disassembly of the delicate VU housing and unsoldering of the lamp from inside the VU housing. Once this was done it was then time to get on the phone to the distributor and enquire about replacement lamps. His response? “I'll have to get back to you.”

‘Here we go’ I thought. A week and a few phone calls later, the distributor confirmed that not only were *no* replacement lamps available from the manufacturer, but the manufacturer couldn't even say what the specifications of the lamps were to enable me to source a generic replacement! So, from that point I was forced to spend quite some time experimenting with differently rated lamps to obtain a suitably cheerful glow in the meter. Upon deciding on a suitable one, I reversed the huge disassembly

job and put the unit back together. Given that the whole job required such extensive work, I then spent 15 minutes ensuring that everything still worked. Of course, to cap this situation off, I then needed to spend time clearly explaining to the owner why the repair bill was so large just for “changing the light bulbs.”

This is just poor design on the manufacturer's part. Sure the meter cost a couple of dollars less because the lamp was built in, and a trained monkey could assemble the unit with their industrial hot glue gun. But designed to be serviced or have parts that are certain to eventually fail replaced? Forget it.

Then there's the well known manufacturer who has a funky little flash recorder on the market. Unfortunately, this company doesn't supply the plug-pack that you need to operate it without batteries; you have to buy your own. But if you accidentally get an AC type instead of DC, or a DC type with a reversed polarity – which is a pretty easy mistake to make – the unit will immediately self destruct, potentially writing the unit off or at least creating a hefty repair bill because the particular unit has no power protection. Any service tech could show the manufacturer how they could make the plug-pack power supply issue bulletproof, and the cost would probably amount to no more than maybe 30 cents. So why don't they do this? This is just dumb design.

FAULTY MEMORY

Of course, repair difficulties aren't just to be found in newer equipment. Service and repair of so-called vintage equipment opens up an entirely new can of worms. Most manufacturers have much shorter memories than the people who use their equipment. Technical support, schematics and spare parts can not only become obsolete and unavailable through the original manufacturer, it can seem like no-one working for the manufacturer today even knows of the model you're enquiring about. There are some fundamental tools of trade in use in studios around the world today – names such as Neve, Lexicon, Eventide and Amek – for which there is zero support from the manufacturer. They have moved on, and I guess are hoping you have too! Complex digital processors contain often hundreds of ICs, and whilst some are available from the corner electronics shop for 50 cents, there will be a few in

there that are simply unobtainable.

Taking on these sorts of repair jobs is a plunge into the unknown for the service tech. You can get lucky and nail the fault quickly and pull a replacement part out of the spares drawer in the corner, or you could spend two days working to narrow down the faulty part, only to discover in the end that the part is made of ‘unobtainium’. How do you charge for that? “Here's your unit back. I know exactly what's wrong with it but unfortunately the part can't be obtained. The unit will never work again. That'll be \$500 thanks.”

Then there are the parts that simply wear out. Candidates like switches and pots are quite often unique to a particular product. Generic parts simply won't work or don't fit, and with the original manufacturer no longer holding stock, you're left to surf the internet looking for someone who had the foresight 15 years ago to buy up all the remaining stock on the planet. If they now want \$100 for a pot, then I guess that is what they're worth. In servicing vintage equipment your tech starts to become your agent at large, scouring the planet for the required parts to keep equipment alive. The resources, contacts and time to do this is surely worth something, but it's damn hard to itemise on an invoice.

CHRISTMAS CHEER

This Christmas, when researching what latest doohickie to get your girl/boyfriend, parents, band mates to buy you, ask around: “Who is the service agent for this item? Do the manufacturers support the service agents with technical information? Does the distributor hold spare parts and are they reasonably priced?”

If you're looking into something from the past, go ask your local audio service guy what they think, can they get parts and at what cost. Oh, and while you're there, say “thanks, for helping keep my shit together, and... Merry Christmas.” ■

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