

First word

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124g of pot, \$600 + GST?

It was a typical Melbourne day – cold and raining one minute, hot and sunny the next. But the problem with this particular ‘Melbourne’ day was it was happening in Sydney. So I decided to stay indoors and sit it out. And then it struck me – this was the ideal time to try the pot I had stashed away at the back of my bookshelf. After all, I’d been saving it for a rainy day.

I reached into the package and gently rolled the contents onto the palm of my hand, watching it glisten in a brief flash of sunlight and inhaling the characteristic ‘new’ smell. “Time to fire it up”, I thought, and proceeded to unwind the nut from the mounting shaft...

Wait a minute! Nut? Mounting shaft? The pot I’m talking about is a contraction of the word ‘potentiometer’, the electronic component found beneath the knobs on your audio equipment. Potentiometers are used for faders, EQ, auxiliary sends, and anything else that offers continuously variable adjustment between two extremes. What kind of pot did you think I was talking about? Marijuana? Get real!

Like most mind-altering substances, marijuana affects your hearing, usually making things sound much better than they actually are. Any engineer who uses that kind of pot for mixing is obviously an idiot.

Now, back to our potentiometer. The unit in the palm of my hand was made by Penny & Giles, part no. RF15/D/2, 10k ohms, dual audio taper. It’s a precision piece of hand-made electronic art, all stainless steel and blue plastic with gold-plated contacts. This is one type of pot that really does make things sound better. So why had I been saving it for a rainy day?

Some time ago I was doing a series of sound quality demonstrations at the Sydney branch of the JMC Academy. I was playing 24-bit/96k recordings from a Sony DVP-S715 DVD player into my ATC SCM20A active monitors. Ideally, I would’ve plugged the output of the DVD player directly into the ATCs, but I needed volume control. I tried all kinds of things, from low cost little ‘utility’ mixers to ultra-expensive preamplifiers. But no matter what I used in this very simple signal path, its inherent noises and distortions added their own characteristic flavour to the sound. So, in desperation, I went to the very essence of volume control – a single potentiometer in the signal path. No active electronics to generate noise and distortion, no power supply to generate hum, and heaps of headroom! I went to Dick Smith and bought a 10k ohm dual logarithmic pot – a good choice for making a passive stereo volume control – along with a small diecast box, four RCA sockets and a huge knob. The whole shebang cost about \$30. I raced home and put it together.

It was certainly very clean and quiet, but, in comparison to the active circuits I had tried previously, it seemed ever so slightly dull. Nonetheless, I used it for my demonstrations.

Not long after, I discussed the dullness with Rick Dowel of Control Devices, the Australian distributor for Penny & Giles. “Greg,” he said in his characteristically knowing tone, “I have just the thing for you”. After rummaging through his drawers for a moment, he tossed the RF15/D/2 across the desk and into my hand. It was surprisingly heavy. “This pot is ideal for the passive situation you’re describing – very low stray capacitance, and therefore much better high frequency performance.” I twisted the shaft between my thumb and forefinger, and sensed the precision engineering within. “Bet it’s real cheap,” I said mockingly. “\$600 plus tax”, he replied sternly. “Can I hang onto it for a rainy day?” I asked. “It’s raining today...” he interjected. “But I’m kinda busy today,” I said, pocketing the pot and making a beeline for the door. “I want it back real soon!” Rick yelled as the elevator closed behind me...

Needless to say, the RF15/D/2 was a major improvement over the standard \$4.50 pot I’d been using. The dullness was gone, but that wasn’t all. The overall sound was more fluid and smooth. The RF15/D/2’s conductive plastic element made the carbon element in the \$4.50 pot sound granular and harsh – just like carbon, I suppose.

But there’s more. One of the most impressive aspects of the RF15/D/2 is its excellent linearity between left and right channels – as you adjust the volume, the centre image stays dead centre. It’s a very ‘pure’ experience. According to Rick, the left and right sides are hand-matched to exacting tolerances – one of the reasons for the pot’s high price. (Cheaper pots don’t have such excellent linearity, and so the centre image actually moves slightly left and right as you make volume adjustments.)

After using the RF15/D/2 for a while, I realised I never turned it beyond the 11 o’clock position. Considering the price, I figured I was only using a fraction of what I was paying for! So, I put a 10k ohm carbon resistor in series with each input. This dropped the overall level by 50% (-6dB), and allowed me to use more of the pot’s rotation for the same monitoring level. It also raised the pot’s overall input resistance to 20k ohms, which gave me a bit more ‘air’ from the DVD player (important when playing 24-bit 96k recordings). But, traces of the granular and harsh sound of carbon were back! So, I put together a small collection of 10k ohm resistors of different compositions, and conducted a semi-formal AB test with two keen-eared sound engineering students (Jay and Geon) to decide which ones were best. Believe it or not, we settled on conductive plastic resistors from the French manufacturer Vishay. These puppies cost about \$15 each. In comparison, the carbon resistors I started with cost less than 10 cents each!

When it comes to high quality audio, you have to spend a lot more money to get a little more sound. Every single component in the signal path – every resistor and capacitor, every transistor and chip, every tube and transformer – has a characteristic sound. Collectively, they all contribute to the sound of a particular product.

You could build a passive volume control like the one described above for about \$30 using standard ‘off-the-shelf’ carbon resistors and a potentiometer. Or, you could build the same thing using the Penny & Giles RF15/D/2 and the Vishay resistors, and pay about 30 times more! Theoretically, they’re identical, but in practice the more expensive unit sounds and feels a lot better. It’s the kind of pot you should be getting high on...

Next time you’re comparing two similar products at radically different price points, consider this story.