

# The Incompatibility Race

Becky and Fred have had a tiff and the culprit is a small matter of conversion. Marriage counsellor **BOB KATZ** steps into the breach.

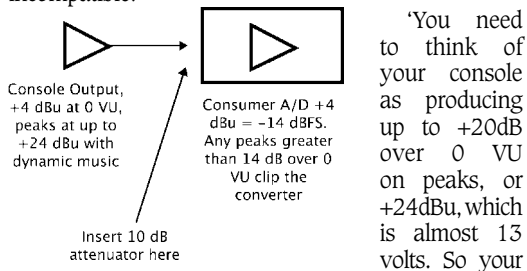
**B**ECKY CAME TO ME the other day sighing, 'Fred and I just had our first fight, all over a measly A-D and D-A convertor.'

'I don't know if I can handle your fight, Becky,' I replied, 'but convertors are right up my alley. Tell me about it.'

'Well, I wanted to go to Hawaii for our honeymoon, and I knew we could afford it if we saved \$6000 by buying a cheaper 16-channel convertor,' she said, drying a tear. 'That's what started it, cos Fred wanted to buy the more expensive one. But at my insistence, we bought this mid-level convertor and hooked it up to the classy analogue console that you fixed up for us. But the A-D convertor overloads all over the place when we're tracking, and the D-A reads way too low on the meters on playback.'

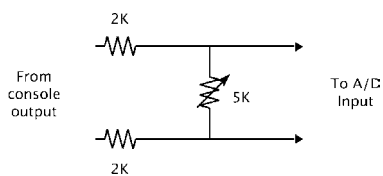
Uh oh, this newlywed fight is really my fault, I thought. Fred's following my advice to accept nothing less than the very best audio. But what do I know about love? I've got to figure a way out of this mess.

'Let's draw a picture,' I told Becky. 'On the tracking side, it's natural that your professional console will overload your semi-pro A-D. The two are incompatible.'



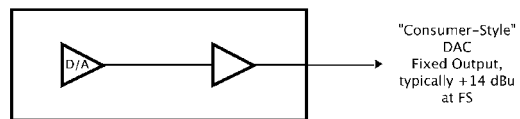
'You need to think of your console as producing up to +20dB over 0 VU on peaks, or +24dBu, which is almost 13 volts. So your

A-D has to be able to take up to 13 volts on peaks. You can fix this by building an adjustable attenuator inside the A-D on each channel, though it will void the warranty. Here is the schematic for a balanced attenuator you can build with two fixed resistors and a variable resistor, with an attenuation from about 5dB to infinity.



'That's not too expensive — though it would have been much nicer

if the convertor manufacturer provided adjustable input gain. But on the D-AC side we have a conundrum.



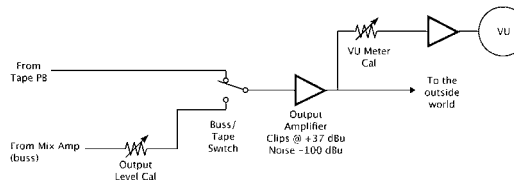
'Notice it has a fixed output level of +14dBu (3.9 volts) at 0dBFS (full scale peak). Despite having balanced connectors it's really a consumer D-AC because its output level is 10dB too low. Your convertors were designed to interface with an all-digital console, which doesn't care about analogue levels, or a consumer-level analogue console. You



can't fix this with an attenuator, you need 10dB more amplification. And even if we could change its internal gain, it's doubtful that it can produce +24dBu without clipping. It needs a better internal amplifier and power supply; that's a lot of money and would cost you your honeymoon. I don't know what to do!

'Power supply,' said Becky. 'Our console has a mountainous power supply, can't you use that?'

'That won't work because if we goose the voltage inside your convertors it will blow the cheap chips.' I scratched my head... 'Wait a minute!' I exclaimed. 'Becky, you've just given me an idea. We'll take the mountain down to Mohammed. This is your console's internal block diagram...'



'Unlike your new convertor, the manufacturers of your console have built in plenty of headroom, and excellent signal-to-noise ratio. We can use its calibration trimpots to reduce its signal level. Take a signal generator and audio voltmeter, recalibrate your console's output and meters to produce -6dBu at 0VU and, presto, it will match your newly-acquired convertors. And you won't have to build a thing! Now there's one difference between pro and consumer-grade equipment; pro equipment doesn't cut corners. The moral of the story, always buy a convertor with adjustable I-O trims and lots of headroom.'

'But there's no such thing as a free lunch. This is a workaround, not a total solution. Recalibrating your console creates an incompatible monster that won't easily interface with other professional-level gear. But you've got lots of spare inputs and outputs and you can leave those calibrated at the +4dBu standard. With care, you and Fred can beat this episode of The Incompatibility Race.'

Later that week, I drove the newlyweds to the airport, smiling all the way. I'd saved a marriage and an audio studio all in one day. ■

## Information

Resolution recommends Bob Katz's book *Mastering Audio — The Art and the Science* as an essential source of information for every pro audio enthusiast who cares about sound. You can buy it on line at [www.digido.com](http://www.digido.com)