

About The Author **C. ALEXANDER CLABER**

Alex first picked up a bass when studying engineering at university, and his quest for sonic perfection led him to found Barefaced Audio, while also leading The Reluctant, an alt-ska/funk outfit.

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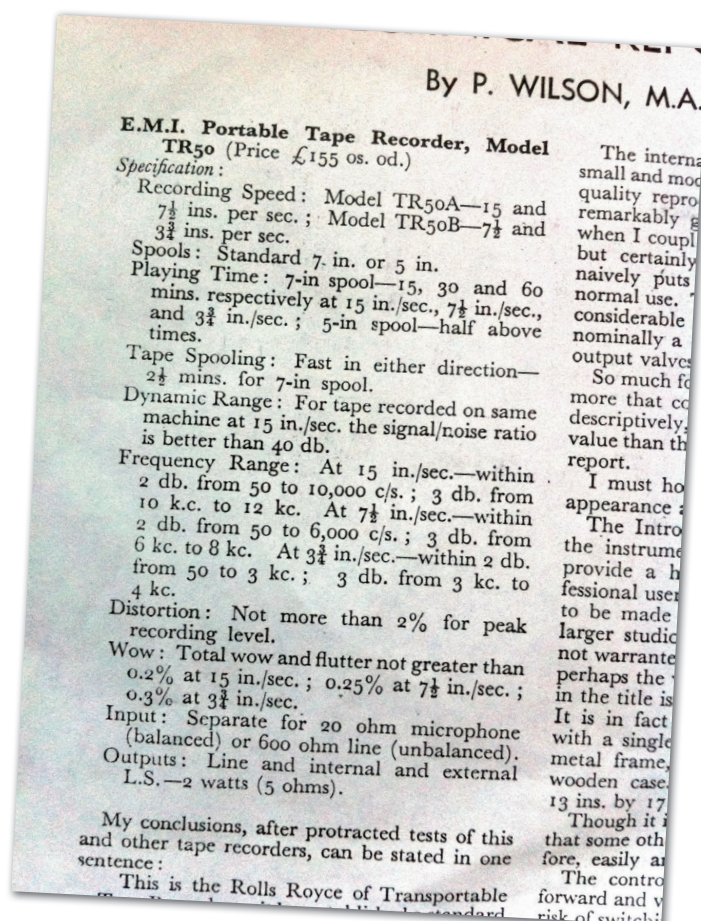
BAREFACED
DESIGNED AND BUILT IN ENGLAND

This column is brought to you in association with Barefaced Ltd who manufacture high-output speaker cabs for the gigging bassist. An archive of previous articles plus a glossary of terms can be found at www.barefacedbass.com

But This Goes to 11...

Welcome to the world of bass rigs.

First things first, I'd like to apologise for the curious publishing cock-up which substituted an expanded cropped version of Figure 4 for the real Figure 1 last month. The correct article is up at the Barefaced website. Hopefully, despite that, you garnered some useful knowledge and have dared turn your 2x10" or even your guitarist's combo on its side – I'd be interested to hear how this worked for your bands, so do email in! This month I'd like to tell you a story... One side of my family is full of engineers and my paternal grandfather is an electrical/electronic engineer and also a musician (saxophone and organ). Shortly after WWII he worked for EMI, who many of you will know as a record company but back then they built everything to do with that industry: loudspeakers, record players etc. The first product that he designed and had released to market was a mono reel-to-reel 'portable' (a mere 59 lb) tape recorder, which was reviewed in *Gramophone* magazine in 1953. Although this was the era of comedy tobacco advertising, when smoking was still claimed to have health benefits, these large engineering companies had a very stringent approach to advertising their audio products, so in between the design engineers and the marketing department there was a 'quality assurance' department. The engineers would test their finished product to see how it performed compared to the design targets and thus create a spec sheet. The quality assurance department would then review the specs with an engineering eye to make sure they weren't promising anything impossible – an excellent idea! What happened with this tape recorder was that it was the first EMI product to use negative feedback in the amplifiers – this allows you to significantly increase frequency response and lower distortion at the cost of some gain, and is used in almost every single amplifier on the market nowadays – and consequently it exhibited specs which the quality assurance



department did not believe were possible, so they downgraded the specs on their literature. By this point my grandfather had a new job, so he didn't notice this until he read the review in *Gramophone* which declared that prospective purchasers should ignore the claimed specs because it performed much better both to their ears and according to their own test equipment.

Sixty years on, how things have changed! We continue to have the same issues with loudness-related specs, because watts are easy to understand (if highly misleading!) while decibels are logarithmic and thus confusing to anyone without a science bent, but in the musical-instrument and home-audio realm the quality assurance department has long been put out to pasture, replaced by a marketing department that appears to take 'creative thinking' to the limit...

So let's look at the standard specs we see for bass amps and cabs.

Amplifier power = 500 W RMS

If that amplifier power is quoted at 0.01% THD and it's sustainable for a long period, then this will be a loud 500 W amp. However, if that amplifier power is quoted at 5% THD, and it can only manage it for very short bursts, it will be a quieter 500 W amp. In fact, an amp that's rated at 500 W according to the more stringent specs could potentially claim to be 1000 W according to the more flattering specs. Even worse, sometimes the RMS is left off too and then the spec is even further from reality.

Don't obsess about amplifier power when comparing between different makes, as without more detail you don't know how they're rating their power. Twice the power might seem a huge increase but in reality it may be quieter!

Cab power = 1000 W RMS

Unless stated otherwise, this will always be a thermal rating. This test merely tells you how much power it takes to overheat the

voice coils of the loudspeakers in the cab. It doesn't tell you how much power the cab can handle while still sounding good – that figure is likely to be far lower. Of course, you will then get people claiming that they've put 1000 W through their cab and that it sounds good because they use a 1000 W amp and turn it up high ... Two problems with that: firstly, unless the amp is spec'd stringently (like a PA power amp), that 1000 W will not be 1000 W. And more importantly, how high you turn the volume knob does not tell you how much power the amp is putting out – that depends on the loudness of the signal going in (which depends on how hard you pluck!) and the gain through the system. And don't forget that notes are only full power when you first pluck them – they then get quieter, and there's even silence (and thus zero power) in between notes. Frequency response: 40 Hz – 20 kHz

This spec allows everyone to play fast and loose – without a specified roll-off (-3 dB, -6 dB, -10 dB). It tells you very little about how high or low a speaker goes. It tells you nothing about the response in between those limits. It also tells you nothing about how a speaker performs off axis (which is where you'll be standing most of the time). Criminally, certain manufacturers include the roll-off specs while claiming upper and lower limits that are completely impossible according to the laws of physics within this universe! If these claims were true, then touring PA companies would be throwing out their hideously expensive massive line-array systems and replacing them with a small pile of bass cabs. Sensitivity: 104 dB
This figure tells you that 1 W of power will get you 104 dB SPL at 1 m from the speaker. What it doesn't tell you is what frequency this is at. It would make sense to reference this sensitivity to the frequency response specs, so if a cab claims to be 104 dB sensitivity, -10 dB @ 40 Hz and 20 kHz, then we know that the sensitivity at 40 Hz and 20 kHz is 94 dB. But these 'creative' marketing people often have a better solution – pick the loudest point in the speaker's response curve for the sensitivity spec, then go for something more like the average loudness to determine the frequency roll-off ... brilliant!

Wow: Total wow and flutter not greater than 0.2% at 15 in./sec.; 0.25% at 7½ in./sec.; 0.3% at 3¼ in./sec.

Input: Separate for 20 ohm microphone (balanced) or 600 ohm line (unbalanced). Outputs: Line and internal and external L.S.—2 watts (5 ohms).

My conclusions, after protracted tests of this and other tape recorders, can be stated in one sentence:

This is the Rolls Royce of Transportable Tape Recorders: it has established a standard from which all others must be judged.

I state this without hesitation and without apprehension. It may be that some technically minded person, on reading the specification quoted above, will say: "Oh, but I have seen more attractive specifications than that". So have I! But not a better performance, and that, after all, is what matters.

My tests show that the specification is easily achieved in performance; indeed it is a very modest understatement.

The installation was made in my home by one of the E.M.I. service engineers, though I had previously read through the very detailed "Instruction Manual" and had followed out the instructions for unpacking before the engineer arrived. I found them all quite clear and sensible. This Manual reminds me of those that the Americans used to publish for service equipment during the war; I know of none to compare with it in British practice, either for thoroughness or clarity.

The engineer and I then went through the installation tests together. They took only a few minutes. Everything was well within the limits

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So here's a marketing department's set of specs for a premium 2x10" and what they're likely to really be if they'd gone through a QA department:

Marketing department:

Power = 500 W

Sensitivity = 102 dB

Frequency response = 40 Hz – 16 kHz

Quality assurance department:

Power handling = 500 W thermally limited, 200 W excursion-limited

Sensitivity = 98 dB, frequency response: -3 dB @ 60 Hz, -6 dB @ 50 Hz, -10 dB @ 41 Hz and 16 kHz (based on low-frequency sensitivity)

Or: Sensitivity = 100 dB, frequency response: -3 dB @ 87 Hz, -6 dB @ 60 Hz, -10 dB @ 46 Hz and 14 kHz (based on broadband sensitivity)

Some of this may seem like splitting hairs – but bear in mind that a 3 dB difference is the same as doubling or halving your power. And knowing how many people think a 1000 W amp must be insanely loud compared to a 500 W amp, shouldn't you care about those missing decibels?

Note that this is about loudness and bottom – it isn't really about tone. But if you're not loud enough to be heard, then the best tone in the world is wasted. So in future, read between the lines when looking at specs, and if they don't stack up then don't be afraid to ask why!

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