

Equipment Review

PV-35R and PV-85R 2 m Power Amplifiers

Reviewed by Chas Gnaccarani VK3BRZ*

Introduction

As most users of 2-metre hand-held or portable rigs know, there are times when their comparatively low power of two to three watts just won't cut the mustard. Like when you're operating from the car, for example, and your signal into a repeater is scratchy. Or perhaps you find that your packet hook-up just isn't reliable with such low power. What you wouldn't give for a little more muscle!

This pair of 2-metre "brick" power amplifiers from Dick Smith Electronics is specifically targeted at such situations. First introduced in the 1996/97 catalogue, the PV-35R 30 watt amplifier

replaces a similar unit from the previous catalogue, whilst the PV-85R 80 watt amplifier is an entirely new offering. Priced at \$129.95 and \$199 respectively (the PV-85R is on special at \$169 at present), they are an absolute steal. You couldn't even buy the parts to build them for that money.

Description

Both amplifiers include an integral GaAsFET receive pre-amplifier which can be switched in as required, and are specified for 3 W nominal drive power (0.5 to 5 W according to the instruction sheets). They are intended for 13.8 V DC operation, the current requirements

being specified as 6 A for the 30 watt unit and a hefty 20 A for the 80 watt unit.

Both amplifiers are 125 mm wide and 45 mm high, the 30 watt unit being 147 mm long, and the 80 watt unit 208 mm long, including all protrusions. Simple LED front-panel metering is provided on both units for relative RF output and, quaintly, DC supply voltage.

Whilst both amplifiers are labelled on the front panel as "linear amplifiers", thus implying they are suitable for both FM and SSB, the catalogue descriptions make it plain that they are intended solely for FM operation. This is backed up by the instruction sheets as well as the label on the packaging box. Be warned: as they come, these amplifiers are **not suitable for SSB operation!**

This is for two reasons. Firstly, and more importantly, the transistors are operated in Class-C, that is without bias current. Secondly, the transmit/receive switching is actuated by the driving RF signal. Whilst this is fine for FM, there is no provision for selecting a delayed-release for SSB use.

This is a great pity. No doubt there will



be some FM operators who will want to add that extra grunt to their signal, but my experience is that it is the SSB users who are generally more serious about their station capability, and who would have purchased these amplifiers had they been suitable. For the sake of a couple of dollars' worth of components, an entire market sector is lost, especially in the case of the 80 W unit.

A glance at its circuit board revealed that it was designed as a proper linear amplifier, but the important biasing components have been left out, and part of the circuit board has been deliberately punched out, seemingly to prevent subsequent modification! Beats me!

The amplifiers are fitted with the usual SO-239 RF sockets, and you have to supply the appropriate patch-lead to go between your rig and the amplifier's input socket. You also need a 13.8 V power supply capable of delivering the current required by either amplifier if you intend using one in the shack.

How the Bricks Stack Up

Not owning a 2 m hand-held transceiver, I chose to test these amplifiers with my Yaesu FT-290R Mk1 multi-mode rig. It produces 3 W output, just as required. I suspect that many other owners of this model rig, and its successor, would be very interested in these amplifiers, but heed the warning about SSB.

Whilst the output power tests were pretty straightforward to perform, as was the pre-amp gain measurement, substantiating the manufacturer's claim of a 1.8 dB noise figure was not, as I do not have access to a noise figure meter. Instead, I elected to measure the 12 dB SINAD sensitivity of the transceiver with, and without, the pre-amp activated. As it happens, this will probably be more meaningful to FM operators.

Tests were carried out at both ends of the two metre band, and there were no significant differences in the results. The results are summarised below. The figures in brackets relate to the PV-85R, while those without brackets relate to the PV-35R.

Drive Power	Output Power	DC Supply Current
0.5 W	18 W (65 W)	4.3 A (14.5 A)
3 W	33 W (90 W)	5.5 A (17.5 A)

Pre-amp Gain 11 dB (10.2 dB)
Pre-amp Sensitivity 0.14 μ V (0.14 μ V)
 for 12 dB SINAD*

(*FT-290R sensitivity without pre-amp was 0.22 μ V for 12 dB SINAD)

Comments

Both units met their published specifications, apart from the pre-amplifier gain, which was within a dB or so of the claimed 12 dB. Frankly, this is of no concern, as the improvement in sensitivity provided by the pre-amp was very noticeable, and it is the sensitivity, rather than the outright gain, which counts. In fact, it is better to utilise the minimum gain in order to minimise front-end overload problems.

It is worth elaborating on the sensitivity of the pre-amp. My FT-290R's sensitivity is pretty average as far as 2 m rigs go. Most 2 m hand-helds would be noticeably more sensitive. If you look at the test results, you will see that the 12 dB SINAD figure came down from 0.22 μ V to 0.14 μ V, which represents an improvement of almost 4 dB. To put this in perspective, the same improvement in signal-to-noise ratio would require more than double the power at the transmitter, or replacing a $\lambda/4$ wave whip with an extended Ringo or similar antenna. Not bad, for just a push of a button!

However, the pre-amp requires rather circumspect use in RF-hostile environments, as the additional gain might send most hand-held radios into front-end overload, especially from 148 MHz pagers. The instruction sheet warns of this possibility and, in all probability, the majority of modern hand-helds already have adequate sensitivity.

One other matter worth mentioning is the heat-sinking of the amplifiers. I didn't undertake specific tests for this, merely noting the temperature rise by touch during testing and in a few QSOs. The 30 watt unit never became more than just very warm, whereas the 80 watt unit eventually became so hot that you would not want to hold it for more than a few seconds. While its heat-sink is considerably larger than its lower-powered cousin, it should be noted that, at full output, it has to dissipate almost 160 watts of heat, compared to just 50 watts for the smaller unit. Adequate

ventilation is mandatory, especially in mobile installations. Short overs might help too!

Do You Need One?

My perception is that many owners of hand-held radios probably also own a mobile FM rig of perhaps 25 or 50 watts output. They use their hand-helds for the purpose they were intended – handy, pocket-sized, battery-operated portable rigs. If that describes your situation, you probably don't need one of these amplifiers (but at the price, you might want one anyway!).

However, if your hand-held rig has to do service in the shack and the car as well, then the extra punch delivered by these amplifiers will give you a commanding signal. And there's something wicked about picking up a pocket-sized rig, and crunching out 80 watts!

Thanks to Dick Smith Electronics for supplying the amplifiers for the review.

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