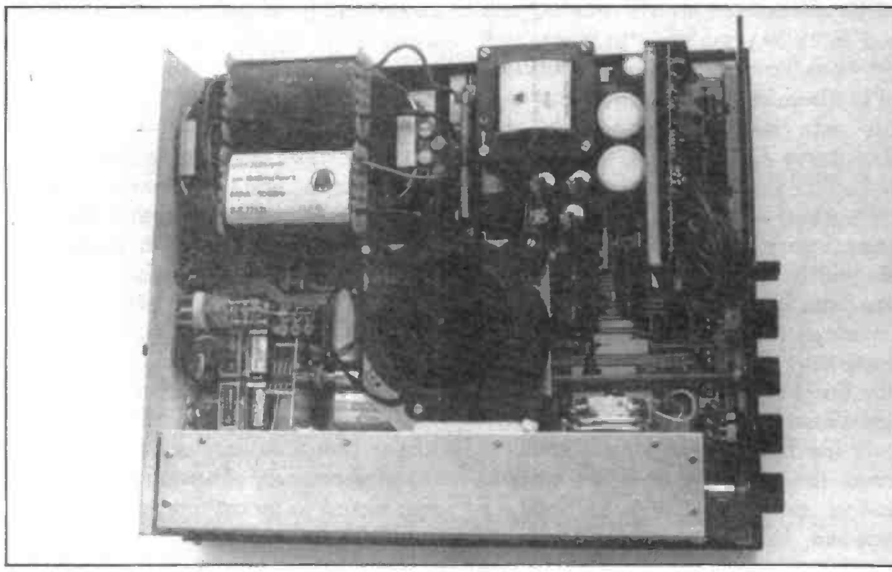
Laboratory tests

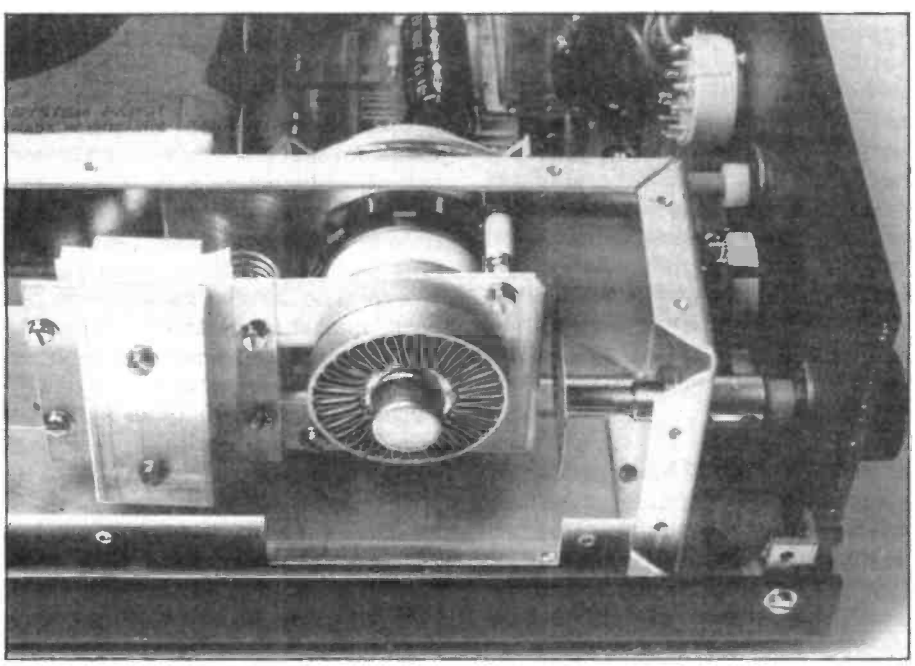


It is most important to develop very clean signals when testing valve linears, as they are so much cleaner normally than transistor ones, and you want to make sure that any distortion noted is from within the product being tested, rather than from the source. We first checked the Dressler with a single tone input of 100mW, with the Dressler input switch on the high gain position. The output was peaked up for maximum gain and the accompanying table shows the output powers reached. Checks were made at various levels up to 500W maximum, the output powers being noted both on the PEP meter and on the Racal. The 4CX350A valve current was noted under all conditions, as were grid 1 and grid 2 readings.

We checked the input VSWR on both the high and low gain positions, and this was none too good, generally being between 2:1 and 2.5:1.

Half power bandwidth will be seen to be approximately 1.7MHz wide for 3dB reduction of power, so re-tuning is recommended for QSYs of more than 300kHz or so. We tuned up for 350W output at 145MHz and adjusted the tuning and loading controls for maximum power and minimum harmonic distortion. We were unable to reduce the second harmonic of 290MHz to below −42dB, 3rd harmonic being −52dB. This is already pointing to insufficient loading, incidentally (but see later). The only time that we saw any grid 2 current was at the 500W level which produced 1mA screen current, and we would have thought that slightly more screen grid current would have flowed here if loading had been optimum, but we could not make any improvement by altering the capacitors own length. I was impressed with the fairly small HT voltage drop of only 100V, ie 5%, at 0.4A drain.

Standing currents were (as I would have expected) set for optimum results for the valve fitted. It is worth mentioning here that no grid current is permissable in the 4CX350A, which is a valve designed primarily for linear SSB service. We checked on this linearity, having carefully loaded the valve as best we could at a high output level and found it to be remarkably linear down to extremely low levels, for apart from the slight compression at the high end, linearity was within the errors of our test equipment. This is part of the reason why signal quality reports were so favourable, as compared with similar ones received recently when I was checking some transistor linears.



Anode mounting assembly

We also checked the amplifier on FM and found, as expected, the efficiency to be better, but gain was lower, and of course the valve was very non-linear, apparently working in class B.

Intermodulation tests

For the intermodulation tests we chose to run two tones 100kHz apart through the system. We regularly checked the intermod. of the drive source by switching the linear to stand-by and checking our analyser, and the worst source IM figures are shown in the table as taken at a 1W PEP drive level. Needless to say, source IM was always very substantially below the Dressler IM. An examination of all the 2-tone tests show the Dressler to be really excellent at all levels up to 190W, very good at 340W, and tolerable at 500W PEP, although we noted that the high order IM products failed to go down fast enough with increasing order at this very high power level. Even at the 340W level they should have been reducing faster. We are, therefore, convinced that the output secondary loop is not as good as it could be and results would have been even better with a more satisfactory loading. I have no doubt that amateurs who know what they are doing will be able to re-adjust or modify this loop to get better linearity, the Eimac valve specifications suggesting that the