

Using the AP8406 Efficiency Display

The AP8406 front panel shows amplifier efficiency. It has been found that this makes amplifier tune-up easier. The way to use it is as follows:

When tuning up, set the load and tune controls to the numbers indicated on the Tuneup chart for your amplifier. Apply a few watts of drive, and see that the plate current comes up to several hundred mA. Adjust the tune control for maximum forward power. Switch the multimeter to efficiency and increase drive power, adjusting Tune and Load until the efficiency display is “on scale”. The bar graph display shows efficiencies from 50 percent (on the left edge) to 70 percent (on the right edge). If the amplifier efficiency is below 50%, the left-most LED will be lit. Once the efficiency display begins moving, adjust your drive power and the tune and load to get 1500 watts of output. Then try to find the setting of Tune, Load and drive power from the radio that yields best efficiency at 1500 watts.

Typically the efficiency will be around 53-60%, so around 1/3 of the way from left to right, and this is fine. The further to the right, the better, but it is hard to get it tweaked much above mid-scale (60%). If you play with the drive power a bit, you will see that this does have quite an effect on efficiency.

Note that on SSB, AM or any mode where the signal amplitude varies, the efficiency display will jump around- this is for two reasons. Firstly the amplifier efficiency is changing (remember how it varied when you played with the drive level). Secondly, since the various measurements are not made exactly at the same time, the RF power and plate voltage, current etc. measurements used to compute efficiency might have been made at different envelope levels. The same is true on cw, although to a lesser extent. In cw and ssb, we recommend switching the multimeter back to display plate current.

When running JT65, leave the multimeter in the efficiency position. This is a constant-envelope mode, and you will note that the efficiency might sag a little bit. This may be due to various things, such as the radio drive power changing, or expansion of some tank components, or even antenna or coax heating. Generally this is small, but you can re-tweak the amplifier so that the efficiency is optimum after 30 seconds or so. This would generally only be necessary on the first transmission or two. After that, the amplifier will come up and settle on the optimum efficiency as it warms.