

Even if the ADJ pin is accidentally disconnected, the protection circuitry stays operational. It is a very useful and reliable IC, and I have deployed thousands of them.

As with other variable-voltage regulators, the low voltage maintained between the Out and ADJ pins needs to be amplified by a considerable ratio to get the desired output voltage, and so the reference voltage tolerances are also amplified. In this case the amplification factor is as high as 37 times, and so a preset is used to adjust the output voltage to exactly +48 V. The filter capacitor C3 is essential for the same reason – without it the ripple is amplified along with the reference voltage.

The unregulated supply can be derived from a completely separate transformer secondary as in Figure 20.10, or alternatively by means of a voltage-doubler. The latter is usually more economic, but obviously this depends on the cost of an extra transformer winding versus the cost of the extra capacitor in the doubler.

The arrangement of a voltage-doubler phantom supply is shown in Figure 20.11. Note that the familiar voltage-doubler circuit C13, C2, D5, D6 is actually working as a voltage-tripler,

