

## Ballantine 323 Voltmeter - Battery Substitution

Some of these HF voltmeters can be operated using an internal battery or from the AC line. Not all of these voltmeters have an internal battery. My voltmeter has an internal battery. The way the instrument appears to work is that the internal power supply actually charges the battery



and the instrument runs off the battery. The battery is unusual as it is a 12 volt battery with a 6 volt tap. A replacement battery is not readily available. When the battery failed in the voltmeter I have, I initially decided I would build a power supply using a couple of 3 terminal regulators (6 and 12 volts) and install them in place of the battery when I got around to it. Well I never got around to it. When I wanted to use the voltmeter again I wanted a quick fix. What I did was a little crude but it seems to work. Initially I got a 10 Watt 100 Ohm resistor with a slider so as to take the 6 Volts required from the slider. I used a lower value 100 Ohm resistor initially to provide improved regulation. I finally settled for a 200 Ohm resistor with a slider. The idea was to supply a regulated 13.8 Volts DC from an external source to the top of the resistor and use the resistor tap to supply the required 6 Volts DC. The low side of the resistor was connected to the voltmeter's electrical ground not the chassis ground. BTW, the external 13.8 power supply I planned to use is homebrew and does not have the negative side connected to

the power supply chassis. I installed a polarity protection diode in series with the positive side of the external power supply. Something like a 1N4001 will do. The 12 Volt DC required by the voltmeter is taken from the top of the resistor on the cathode side of the protection diode.

I removed the AC line cord and used the hole where the line cord went for the DC power cord I used.

For the 6 Volt adjust on the resistor tap, I initially adjusted the slider for about half way and applied 13.8 Volts from the external power supply. I then adjusted the slider tap for 6.3 Volts on the slider tap. The voltmeter doesn't appear to draw much current from the 6 Volts and not much adjustment was required. The total current draw by the voltmeter including the 200 Ohm voltage divider resistor is about 85 MA.

I did not do any extensive testing on the voltmeter. The accuracy still seems good when compared with my Wavetek RF signal generator and my HP 652A test oscillator. It wasn't tested in a high ac/rf noise environment.

I don't know if the voltmeter would work satisfactorily using a wall wart. Regulation might be an issue. The voltmeter seems to compensate well with varying voltages but takes a little time to recover and may show jitter in the readout.

Do to the age of the voltmeter there might be a number of these out there that have the same problem and are not used. This might be a simple solution or better solutions may be available elsewhere.

This is not a very elegant fix but for now it seems to work. It's not as convenient to use as before but I tend not to uses it much anyway.

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