

# Pilot Lamp Change-out Modification

This modification has **not** been approved by Ten-Tec and is done at the owner's risk. I will not be responsible for any damage resulting from this modification

As can be seen on my webpages my HF station is primarily rack mounted and consists of a:

- Ten-Tec Omni V.9
- Ten-Tec Model 253 Automatic Antenna Coupler
- Ten-Tec Hercules II

Recently I decided that I was tired of pulling the rack apart simply to replace an incandescent pilot light. As luck would have it the bulbs and/or lamp configuration were different on all three rigs! A summary of the lamp configuration is given below:

Rig	Lamp type	Voltage (DC)	Number of Lamps
Omni V.9	755 / 47	6.3	2
253 Auto Tuner	755 / 47	6.3	1
Hercules II	756	14.0	2

I remembered an article in QST *Solid-State Those Pilot Lamps* (September 2003) by Phil Salas AD5X and decided to give it a try. Using the QST article as a guide, I set about replacing the pilot lamps in all three pieces of Ten-Tec gear. Phil uses the bayonet socket from an old lamp to hold the current limiting resistor and LED (the shell of the socket is grounded).

Unlike the pilot lamps in the article, I found it was best to orient the white ultra-brite LEDs at almost 90 degrees (right-angle) to the bayonet socket. Under normal operating conditions these LEDs require 4 volts at 20 mA.

Using the calculations in the AD5X article suggest that a dropping resistor of 500 ohms would drive the LEDs to 20 mA in the Hercules and a resistor of 115 ohms would do the same for the Omni V.9 and 253 tuner.

- The Hercules operates at 14 volts DC lamps would require a drop in voltage of 10 volts at 20 mA to safely operate the LEDs.

$$(14V - 4V)/0.020A = 500 \text{ ohms}$$

- The Omni V.9 and 253 tuner would require a drop of 2.3 volts

$$(6.3V - 4V)/0.020A = 115 \text{ ohms}$$

I found that the LEDs run at this intensity were too bright for my liking (your mileage may vary) and reduced the current flow to approximately 50% or 10 mA.

- Omni V.9 and 253 tuner = 220 ohm in series with the LED
- Hercules = 1,000 ohm in series

In addition, the 253 tuner required 2 dropping resistors in parallel (220 ohms each) and a pair of LEDs in a single socket to provide adequate back lighting for the S-meter.



Final adjustment involved aiming the LEDs and reinstalling the gear back in the rack. The LEDs produce a *cooler* light with a somewhat blue tinge rather than the warm orange colour of the incandescent lamps.



I've been very happy with the results and hopefully I won't be changing lamps for a long time!

73,  
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