

## LED light for Portable Operation by Phil Salas – AD5X

I like to operate HF portable as often as I can- from operating in a park or campground with my IC-703, to operating from a condo when on vacation with my IC-706MKIIG. My favorite times to operate tend to be later on at night, or early in the morning – especially when I'm with my family. As a 99% CW operator, the use of headphones solves the “noise” problem when my family or others may be asleep. However, a small light is also necessary for portable operations at night – and you'd like this light to draw very little current if you're operating from battery power. You also want the light to not be a distraction to others.

My solution was to build a variable intensity LED light source powered from the IC-703/706 transceiver antenna tuner connector socket. Obviously you can provide voltage from any available transceiver accessory socket or directly from your power supply. I chose to use ultra-bright white LEDs since the price on these have dropped significantly in recent years. White LEDs have a forward voltage drop of 3.6-4 volts, so three of these in series are perfect for powering from a 13.8 volt DC source. Since the LEDs are in series, you only need 20ma total for the three LEDs as opposed to 20ma each if the LEDs were connected in parallel. The circuit I used is shown in Figure 1, and the parts list is shown in Table 1. Except for the 4-pin Molex connector that interfaces to the IC-703/706, all parts were purchased from All Electronics ([www.allelectronics.com](http://www.allelectronics.com)).

I placed a 150 ohm resistor in series with the LED string to ensure that I wouldn't exceed the 20 milliamp current rating of the LEDs. I determined this resistor value as follows:

$$R = E/I = (13.8-3 \times 3.6)/0.02 = 150 \text{ ohms}$$

When I connected up the single 150 ohm resistor with the three series ultra-bright white LEDs, I was surprised to see just how bright the light output was. Because of this, I added the 5K ohm potentiometer in series so I could adjust the brightness. I also added a small switch for turning off power to the LED light. Feel free to substitute other values for the potentiometer (down to about 1K) and other types of switch. And ultra-bright red LEDs also work very well. Keep in mind that red LEDs have a lower forward voltage drop (approximately 2-volts), so you should put more red LEDs in series and/or increase the value of the fixed series resistor.

Everything was built into the plastic box called out in the parts list. I mounted the LEDs in the bottom of the box using hot glue after drilling clearance holes for them. The 1K pot and switch are mounted on the cover of the box. I glued a magnet to the back of the box, which permits me to attach the light box wherever I want to on the steel cover of my IC-703/706. Photo A shows the internal wiring view of the LED light, Photo B shows the LEDs mounted in the box, Photo C shows the labeled side of the unit, and Photo D shows the light box “stuck” to the top of my transceiver. Since LED's have a very narrow viewing angle, the light box does a great job of illuminating the area just in front of your transceiver, while little light is given off that may disturb others.

Table 1: Parts List

QTY	Description	Part Number	Price
1	Plastic Box	1551-HBK	\$1.95
1	Magnet	MAG-97	\$2.75
1	Mini- switch	SSW-37	4/\$1.00
1	5K pot	APT-5K	\$1.00
1	Knob	KNB-127	\$0.50
1	150 ohm res.	150	10/\$0.50
3	Wht LED	LED-121	\$0.65 ea.
1	4-pin plug	RS 274-224	\$1.00

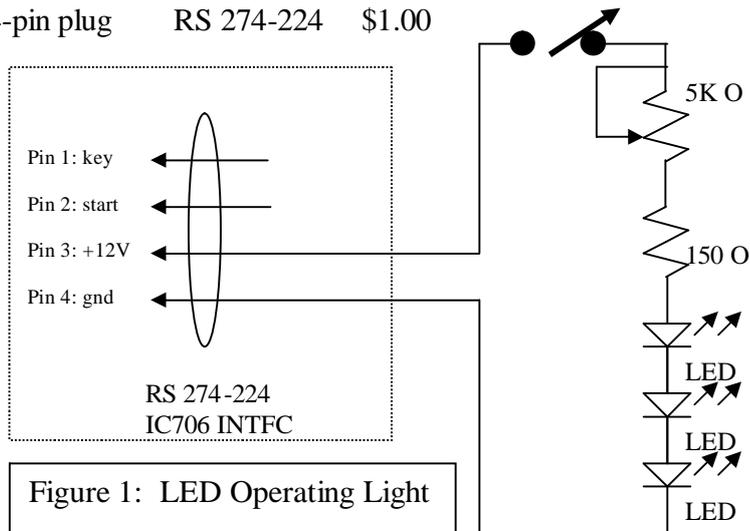


Photo A: Inside Wiring



Photo B: LED Mounting



Photo C: Labeled Top Side



Photo D: Unit "stuck" to IC-706MKIIG