

K2 RIT-SPLIT LED Indicator Mod
dated 18 October 2003
Circuit Design by: Wayne Burdick, N6KR
Implementation by: Tom Hammond, NØSS

Show & Tell Pictorial Supplement to the
K2 RIT-SPLIT LED Mod Documentation
15 November 2003
by: Willie Hew, KH6NO/W7

- The K2 RIT-SPLIT LED Indicator Mod starts with NØSS's *.pdf file dated 18 October 2003 and available for download at Tom's site.
- Visit NØSS: <http://home.earthlink.net/~n0ss/download.html>
- Hopefully this Supplement will help address additional questions and is to be USED IN CONJUNCTION WITH NØSS's *.pdf file.
- Your project will fail, if you attempt to only use Supplement to build the LED Indicator Mod...You have been warned!
- K2 Firmware version MUST BE: 2.03d or more recent
K2 IOC Firmware version MUST BE: 1.07 or more recent

A. "Tests Performed to Select a Suitable LED":

Two Fluke meters set up to measure voltage and current, of following LEDs that were installed on K2 SPLIT LED mod PC board.

Capacitor = 100 uF at 10 volts
Resistor = 910 ohms, ¼ watt

Radio Shack 276-026
3mm, Low Intensity, T-1 Size, RED
3 volt, 15 mA, 2.5 mcd
LCD Day: 4.30 vdc
2.15 mA draw
LCD Nite: 2.80 vdc
0.55 mA draw

Conclusion: Above LED is NOT SUITABLE for this project due to its (Low Intensity) output.

B4300H7LC - YELLOW (LC at end of part number = LOW CURRENT)
5mm, 2mA
LCD Day: 4.12 vdc
2.15 mA draw
LCD Nite: 2.801 vdc
0.60 mA draw

Conclusion: Above LED is NOT SUITABLE for this project due to low intensity, yellow color and 5mm physical dimensions.

Used as a REFERENCE to see how much current this 2 mA (Low Current) LED would draw. The mA current draw between this LED and the others tested were very close.

B4303F1 - RED by Linrose Electronics, Inc.
3mm
LCD Day: 4.30 vdc
2.35 mA draw
LCD Nite: 2.799 vdc
0.80 mA draw

Conclusion: Above LED is SUITABLE for this project.
"Slow Blinking/Flicker" can be seen on this LED when K2 is set to LCD Nite.

B4307T1 - RED "Micro Mini" by Linrose Electronics See Figure 5
LCD Day: 4.30 vdc
2.30 mA draw
LCD Nite: 2.799 vdc
0.76 mA draw

Conclusion: I used the above LED for my K2 SPLIT LED mod.

- "Slow Blinking/Flicker" is NOT NOTICEABLE to naked eye when K2 is set to LCD Nite. "Blinking/Flicker" is visible when magnified.
- Your local Fry's Electronics Store might stock this LED.

B. "PC board availability and/or self fabrication":

- Order PC board directly from NØSS OR:
- Use Radio Shack PC board Number: 276-150 \$1.69
Prepare section that contains the required soldering pads.
(See Figure 1)

Remove FOIL from area marked "xxxxx"

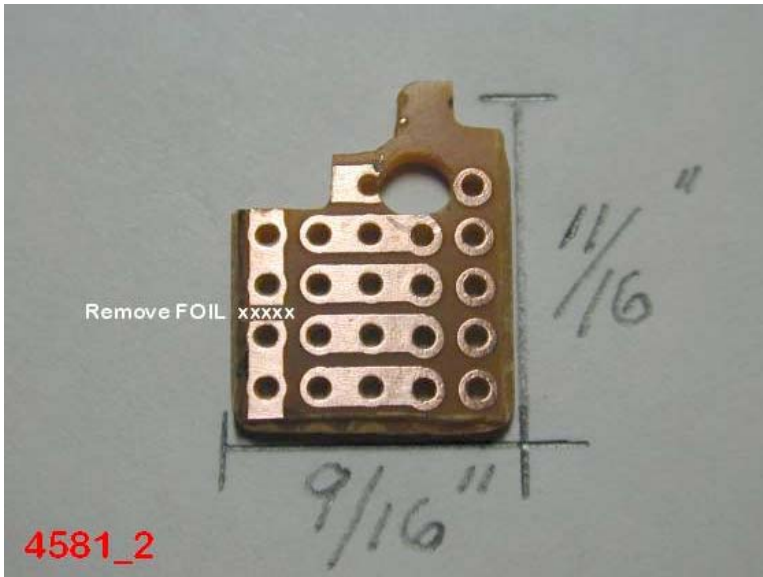


Figure 1

Figure 2 shows why PC board is shaped as such.

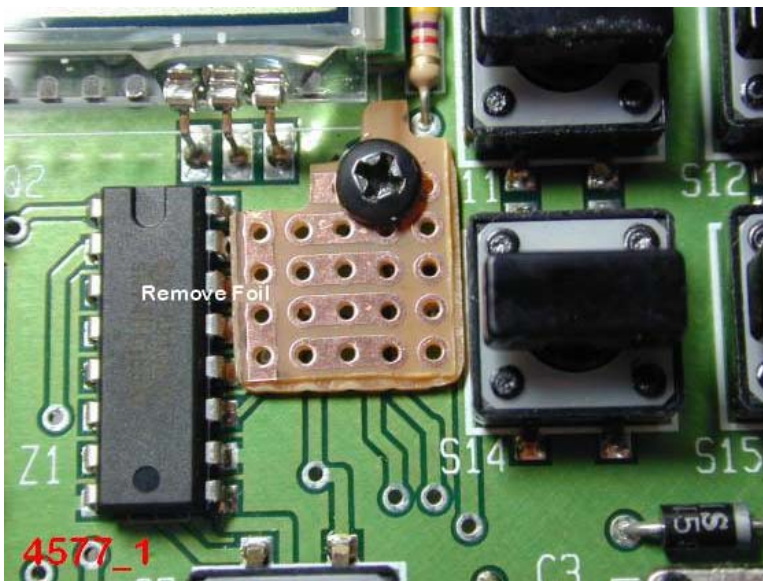


Figure 2

C. "METHOD #1 of 2 for Drilling K2 front panel - See Figure 3":

Items required:

- 3/16" X 3/16" grid graph paper
- Rubber cement to apply to graph paper
- Center punch
- 1/16" drill bit (NEW and sharp)

- Apply rubber cement to graph paper that has been cut to size. CAREFULLY LINE UP graph paper (lines) with CENTERS of RATE/LOCK and RIT/PF1 button cutouts on front panel.
- Where 2 RED CENTER lines intersect on graph paper, center punch it.
- With 1/16" drill bit, CAREFULLY drill out your K2 front panel.



Figure 3

Figure 4 shows drilled hole with perfect alignment.

Use Black Sharpie permanent marker to touch-up any bright aluminum showing following the drilling of 1/16" hole.



Figure 4

• METHOD #2 of 2 for Drilling K2 front panel -- courtesy NØSS:

1. 100% printing of page 2 . (re: Tom's -- *.pdf document dated 18 October 2003 showing K2 front panel at BOTTOM of page).
2. Your printer setting may have to be changed, for 100% printing of the *.pdf image file.

I un-checked a box that said: "Shrink oversized pages to paper size" – before I attempted to print. (Only then, did I get a 100% image file printout.)

3. IF you are SATISFIED with 100% printout and actual K2 front panel dimensions – you may use bottom K2 front panel printout as your drill template.

D: "Components, Views and Hardware Mounting":

Figure 5 shows the size of LED I used for my split mod.



Figure 5

B4307T1 - RED "Micro Mini" by Linrose Electronics, Inc.

- Figure 5 shows there is a 1/16" nipple that sticks out from the square portion of LED.
- This nipple fits perfectly into the 1/16" hole that I drilled into my front panel.
- The nipple end DOES NOT SIT FLUSH with the front panel and is recessed a bit.
- The slightly recessed LED lights up the drilled hole VERY WELL and can be seen from many different viewing angles
- I "DID NOT THIN" my front panel for fear of shorting out the LED leads that exit from the sides of its package.

Figure 6 shows TOP VIEW of component layout.

NEGATIVE lead of 100 uF 10 volt capacitor is shown soldered to several pads on right side of PC board. NEGATIVE lead makes a left turn under the 4-40 screw head, is soldered to empty pads and looped around the screw shaft -- to complete the GROUND connection.

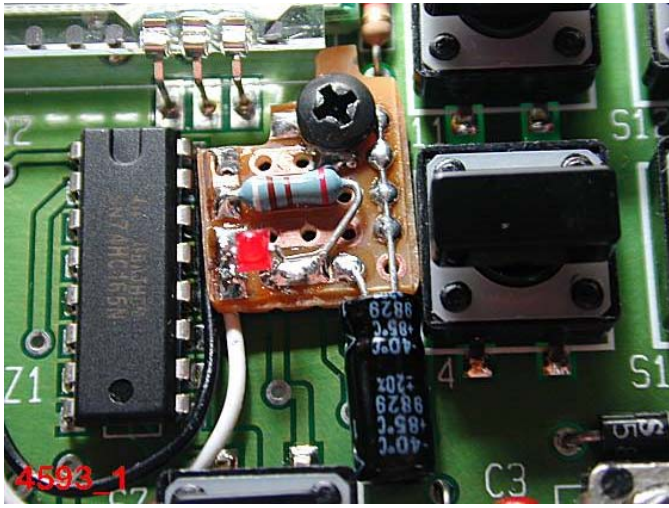


Figure 6

Figure 7 shows SIDE VIEW of component layout:

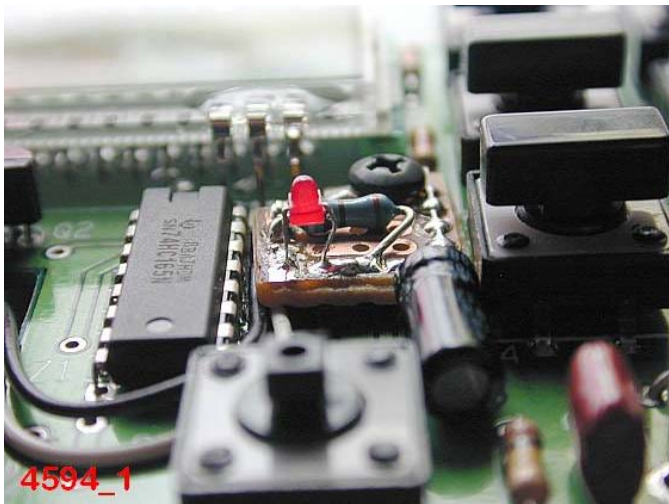


Figure 7

Mounting sequence of PC board mod -- starting from TOP to BOTTOM:

1. 4-40 screw 3/8" long
2. PC LED board mod
3. 4-40 split ring lock washer
4. K2 main Front Panel circuit board
5. 4-40 split ring lock washer
6. 4-40 aluminum standoff

In STEP 3 -- NØSS suggested using a split ring lock washer to space the PC board mod away from the K2 main FP circuit board. Spacer would help prevent shorts between the 2 boards.

Figure 8 shows completed K2 RIT-SPLIT LED Indicator Mod with RED LED ON, indicating RIT and XIT are ACTIVE.



Figure 8

Was it worth the effort? YES...

Many Thanks to Wayne Burdick, N6KR and Tom Hammond, NØSS for all their pioneering efforts. Special Thanks to NØSS for his time and editing skills contributed towards this Supplement.

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E: "ADDITIONAL NOTES":

LED lead length measurements:

The following procedure ASSUMES, your LED has NOT BEEN soldered to PC board.

BE VERY AWARE of surrounding plastic parts and **KEYCAPS** when soldering components to MOUNTED PC mod board. Your soldering iron will "heat adjust" (melt) **KEYCAPS**, if any contact is made!

1. Solder 2 bare wires to LED pads and stick them through drilled hole in front panel.
2. Assemble Aluminum Front Panel and Front Panel circuit board with flat head machine screw and main tuning dial hardware.
3. Clip these 2 wires flush with front panel.
4. Separate front panel from FP circuit board.
5. Measurement from TOP of bare wires to BOTTOM of PC board mod – will give you the approximate LED lead lengths. Trim your LED leads using the above as a guide.

NØSS has advised to "cut those leads long" and trim them back very carefully.

6. Remove the 2 bare wires from LED pads and clean out the holes.
7. It is time to install your LED.

Please double check NØSS's documentation for LED installation.

KH6NO/W7 LED installation procedure:

1. Soldered only ONE "CUT" LED lead to pad.
2. Checked LED alignment with assembled Front Panel.
3. Bend / Adjust the LED lead as required.
4. When satisfied, solder the SECOND LED lead in place.
5. Builders are REMINDED to CLIP excess lead length from the back side of the board once the LED is soldered into place.

F: "RED LED illumination near bottom edge of LCD":

I tried using the 3mm B4303F1 - RED LED to see if I could cast a red glow near the A/B annunciators and not have to drill my front panel.

For some reason (probably close Elecraft tolerances) very little of the LED light reached the front of the LCD. On LCD Nite - only a bare glow of red could be seen and I had to look for it. With LCD Day and in a darkened room, I could see only a SLIGHT RED GLOW.

5mm Wide-Angle RED LED - EXPERIMENT

Radio Shack 276-309

1.7 volt, 20 mA, 800 mcd

LCD Day: 4.30 vdc

2.35 mA draw

LCD Nite: 2.798 vdc

0.75 mA draw

The above 5mm led was the brightest of all tested when using the same PC mod board.

The 5mm led size placed restrictions on where it could be mounted. Led was mounted on LEFT side of IC chip U2, on bottom edge of LCD in a jury-rigged manner.

LCD Day inside my apartment - red glow cast on LCD was OK.
LCD Day in bright sunlight - red glow completely washed out and nothing seen.

LCD Nite inside my apartment - operator had to LOOK FOR red glow, as it competed with LCD back light
LCD Nite in bright sunlight - red glow completely washed out and nothing seen.

NØSS has suggested an LED driver circuit will be needed, to drive the above LED to its fullest potential and not be limited to 2 or 3 mA.

Happy K2 Trails to YOU,

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