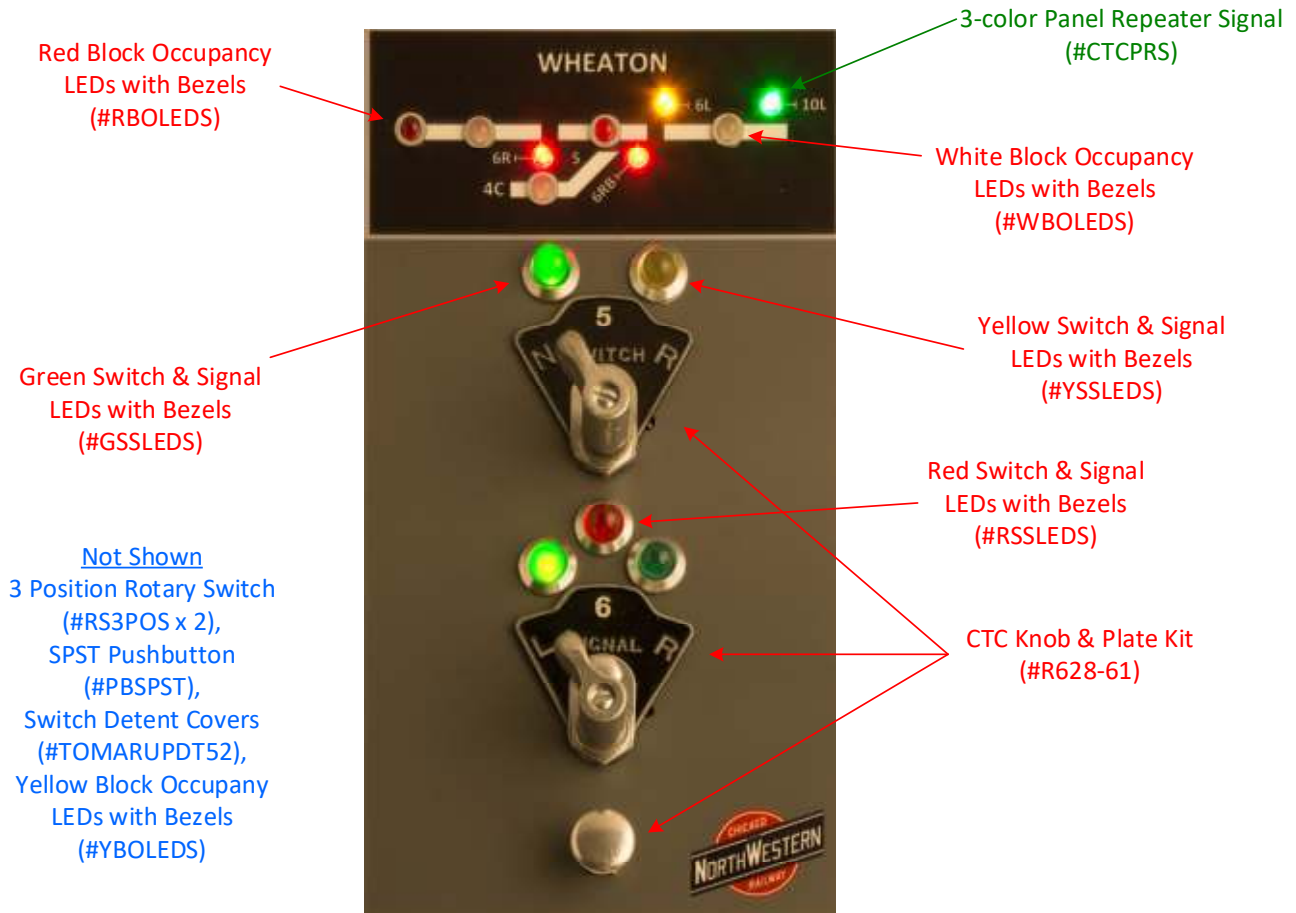


Getting started

Thank you for purchasing a *Logic Rail Technologies* product! Please read all instructions prior to installation.

The purpose of a panel repeater signal is to show trackside signal aspects in a location that is more visible to operators or the dispatcher. Below is a picture of example usage on a CTC panel managed by a dispatcher. Other CTC panel items we carry are also designated.



This package includes the following items:

- PCB-mounted 3-color (green, yellow/amber, red) common anode (positive) LED with 4-pin connector
- Mating 4-wire, color-coded wiring harness with ~6" leads
- Clear Fresnel lens
- Current-limiting resistors
- 3/8" diameter heat shrink tubing

LED Technical Specifications

The CTC Panel Repeater Signal 3-color LED has the following technical specifications:

Parameter	Green	Yellow	Red
Wavelength	515nm	590nm	645nm
Brightness (Luminous Intensity) – minimum (typical) @ 20mA	200 (400) mcd	120 (180) mcd	55 (80) mcd
Applied DC Voltage – typical (maximum)	3.3 (4.1) V	2 (2.5) V	1.95 (2.5) V
MINIMUM current limiting resistor @ 5V supply voltage	100 Ω, 1/4W	150 Ω, 1/4W	150 Ω, 1/4W
MINIMUM current limiting resistor @ 12V supply voltage	470 Ω, 1/4W	510 Ω, 1/4W	510 Ω, 1/4W
RECOMMENDED current limiting resistor @ 5V power source	2.2K Ω, 1/4W	150 Ω, 1/4W	150 Ω, 1/4W
RECOMMENDED current limiting resistor @ 12V power source	10K Ω, 1/4W	510 Ω, 1/4W	510 Ω, 1/4W

NOTE: the MINIMUM current limiting resistor values will insure that you do not exceed the LED's limits. However, the green element is VERY bright compared to the yellow and red ones. As such we have provided some RECOMMENDED values and have included those resistors for you. We chose these values in order to try to equalize the relative brightness between the three colors. However, feel free to use any value equal to or greater than the MINIMUM values specified!

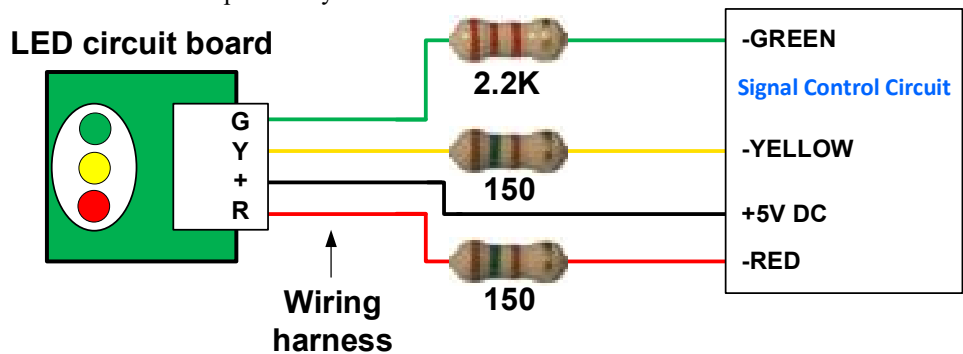
Resistor value	Resistor band colors
150 Ω	Brown-Green-Brown-Gold
510 Ω	Green-Brown-Brown-Gold
2.2K Ω	Red-Red-Red-Gold
10K Ω	Brown-Black-Orange-Gold

Mounting

The clear Fresnel lens has an outside diameter of 0.19" and will fit into a 0.171" mounting hole. It can be installed in a panel with maximum thickness of 0.125". Once you have determined the location of the repeater signal carefully drill the mounting hole with a 11/64" diameter bit compatible with the material of your panel. After cleaning up any debris carefully push the lens into the panel from the front of your panel. Do not use any adhesive at this time!

Wiring for the LED

Choose the appropriate set of resistors depending upon the DC voltage you'll be using to control the signal. Following the example diagram below connect the resistors in series with the stripped ends of the wiring harness. Note: the connections to the wiring harness can be extended to any length using just about any size wire; we recommend using color coded wires or good labeling! In this wiring example we assume the signaling circuit will provide 5V DC to the common wire and so we use the RECOMMENDED resistors described previously.



Installing the LED

Once you have made the appropriate connections to the wiring harness you can plug the harness into the mating connector on the LED circuit board. At this point you can also install the included black heat shrink tubing over the LED circuit board (slide it away from the circuit board for now). The connector is "keyed" so that there is only one way to properly attach the harness. Carefully insert the LED end of the circuit board into the notches in the rear of the Fresnel lens (see photo at right, panel not shown). Center the LED in the lens and test the LED illumination using your signal circuit. Once you are satisfied with the appearance you can secure the Fresnel lens from the rear as well as the LED circuit board in the back of the lens using a non-permanent adhesive. We recommend canopy glue or any similar glue which dries clear. Later slide the black tubing so that it sits up against the back of the panel to minimize light leakage; carefully shrink it using a heat gun or a high wattage hair dryer.



Warranty

This product is warranted to be free from defects in materials or workmanship for a period of one year from the date of purchase. **Logic Rail Technologies** reserves the right to repair or replace a defective product. The product must be returned to **Logic Rail Technologies** in satisfactory condition. This warranty covers all defects incurred during normal use of this product. This warranty is void under the following conditions:

- 1) If damage to the product results from mishandling or abuse.
- 2) If the product has been altered in any way.
- 3) If the current or voltage limitations of the product have been exceeded.

Requests for warranty service must include a dated proof of purchase, a written description of the problem, and return shipping and handling (\$6.00 inside U.S./\$10.00 outside U.S. - U.S. funds only). Except as written above, no other warranty or guarantee, either expressed or implied by any other person, firm or corporation, applies to this product.

Technical Support

We hope the preceding instructions are sufficient for answering any questions you might have about the installation of this product. However, technical support is available should you need it. You can reach us via phone, email or mail.