BD3B - BLOCK OCCUPANCY DETECTOR
CONNECTION AND USAGE INSTRUCTIONS

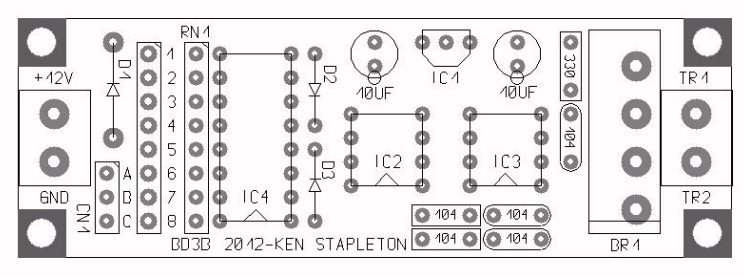

FIGURE 1 - CIRCUIT BOARD LAYOUT

OPTIONS

0.200” pitch screw terminals may be installed at each end of the printed circuit assembly for the power and track/throttle connections. These may be purchased at most Radio Shack stores. PCB connections marked “1” through “8” interface to the signal lamps, LEDs or relays. You can direct wire to these connections or install a 0.100” pitch single inline header to interface with wiring.

CONNECTING AND TESTING

The BD3B requires 12 volts DC power. The power supply should be adequate to deliver ample current for the LEDs, lamps or relays connected to the BD3B. Each output can deliver up to 500ma, but to be safe, de-rate the current demand to 250ma. The power supply connections are made at the “ +12V “ and “ GND “ solder pads.

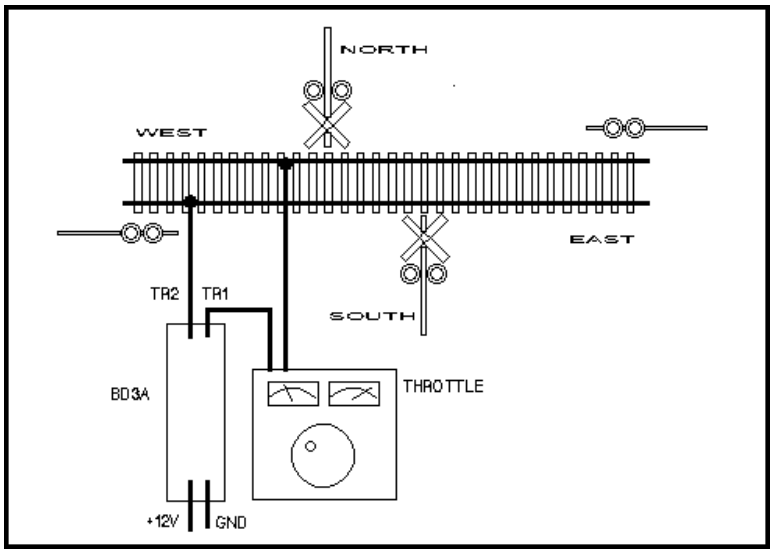

FIGURE 2 - CONNECTIONS

In an existing block, drop one of the feeds to the track from the throttle and re-route this wire to connection “TR2”. Then feed the open throttle connection to “TR1” as shown in FIGURE 2. After connecting signals to the circuit apply 12VDC to the circuit and then run a locomotive through the block as you would normally. The signals will display occupancy by indicating red. If you are using the signals to indicate which direction the locomotive is traveling and the signals work opposite of the direction they should be indicating, simply reverse “TR1” and “TR2”.

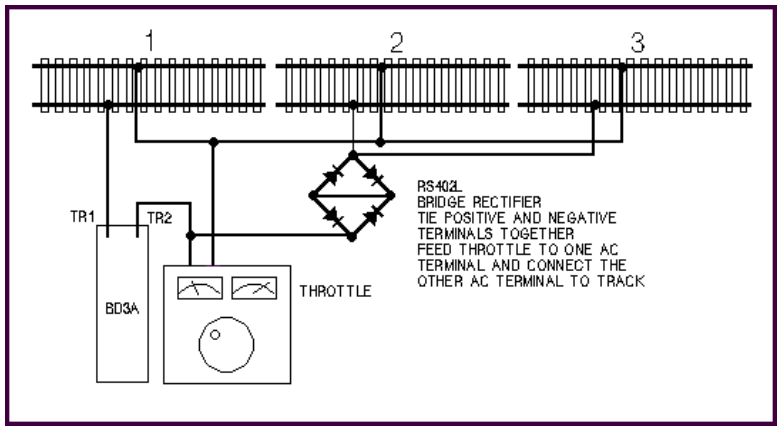

FIGURE 3 - MULTIPLE BLOCKS

If you connect the BD3B to only one block or if you are using only a few BD3B's and still have blocks without BD3B's connected, you should install a bridge rectifier in the feeds to the blocks not equipped with BD3B's as outlined in FIGURE 3. The BD3B senses voltage drop across a bridge rectifier to activate it's control circuitry. The voltage drop is approximately 1.2 to 1.4 volts due to the forward drop across the rectifier. In most cases this will result in a drop in track voltage to the locomotive. Introducing a bridge rectifier into non-monitored blocks prevents sudden speed changes when traversing blocks. It is best to use fully electrically isolated blocks so that no interaction between blocks will affect signaling.

CONFIGURING THE BD3B CIRCUIT

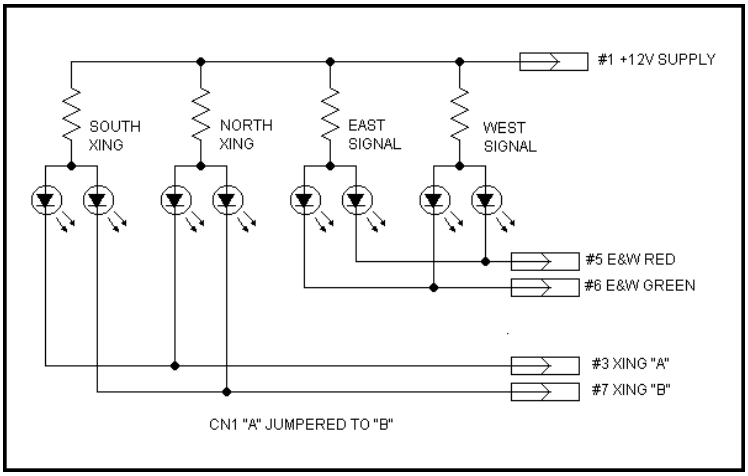

FIGURE 4 - CN1 "A" JUMPERED TO "B"

FIGURE 4 and FIGURE 5 show different ways the BD3B can be used as a "stand alone" block activity detection and signaling circuit. In these two examples, a section of track runs east to west and has a level crossing on the north and south sides of the track as shown in FIGURE 2. Both diagrams show LEDs being used as signals, however, 12 volt incandescent lamps can also be used. The output drivers are robust enough to drive multiple LEDs or lamps and can also be used to power relays. Be sure to limit the current demand on any output to around 250ma. The LED current limiting resistors are shown but no value is assigned. 1KOHM is suggested for 10ma current draw, which will supply ample current for high visibility while ensuring long LED life.

FIGURE 4 shows the circuit configuration and operation with CN1 pin "A" jumpered to "B". This configuration will indicate "occupied" with a red signal at both ends of the block without regard for direction of travel.

Unoccupied blocks would show green signals. Crossing flasher signals operate independent of the block activity signals.

FIGURE 5 shows the circuit configuration and operation with CN1 pin "B" jumpered to pin "C". This configuration would be used for main lines to allow following traffic to have green signals while opposing traffic would get a red. With a bit of "creative" wiring, it is possible to wire in yellow signals, but I'll leave that one up to you! Again, the level crossing signals work independent of the occupancy signals.

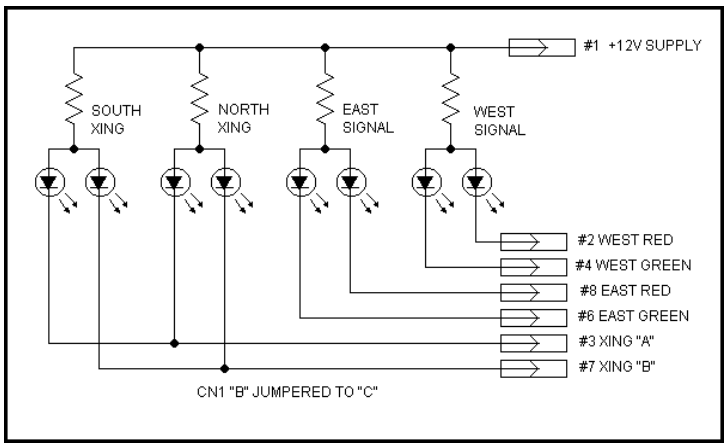

FIGURE 5 - CN1 "B" JUMPERED TO "C"

DO - Use a filtered or, better yet, regulated 12V supply to power the circuit. The supply should be independent of the throttle "accessory" supply.
- Use fully isolated electrical blocks in track connections
- Insert a bridge rectifier for feeding blocks which are not equipped with a BD3B circuit. This will eliminate speed fluctuations when the locomotive(s) enter or exit blocks.
- Use a suitable current limiting resistor for LED type signals. Test signals first before you connect them to this circuit.
- Mount the circuit on an insulated base such as plastic or use insulated standoffs if you plan to mount the circuit board on a metal surface.

DON'T - Avoid using this circuit with "common rail" configurations.
- Never connect the lamp outputs into short circuit loads. This will destroy the Darlington driver IC and may cause wiring damage.
- Never mount the circuit over wood! Heat caused by faulty connections and shorts could be sufficient to start a fire!
- Never work on this circuit with power applied!

http://www3.sympatico.ca/kstapleton3/Index.html

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