

## **Application Note:**

### **Using The O-48 Output Card with Railroad & Company**

#### **Overview:**

The O-48 Output card provides high-density output for applications which require numerous turnouts, throttles, or signals to be controlled. However, because of the addressing method used by the Railroad and Company software, it can't directly address a device whose output compliment is not a power of 2. For example, it can readily handle cards having 16 outputs, 32 outputs, or 64 outputs (if such a thing existed), but the 48 outputs of the O-48 present a problem to the RR&Co. addressing scheme.

#### **Solution:**

In order to circumvent this issue, Oak Tree Systems added an "IO-48" emulation mode to the O-48 output card. To activate this mode, you simply remove the small jumper located to the left of the addressing switches on the O-48 card. This jumper must **always** be removed when using the card with Railroad and Co.

When the jumper is removed, the following changes take place in operation of the O-48 card:

- The card responds as if it were actually two cards, with an even/odd pair of card addresses. For example, if the address switches are set to 14, the card will actually respond as if it were both card 14 and card 15. Note that if an odd address is set in the switches, the card will still respond to the even/odd pair. For example, if the switches are set to 15, the card will still respond as addresses 14 and 15 (NOT 15 and 16).
- The card will report itself to Railroad and Co. as card type 6, which is the IO-48. Railroad & Co. recognizes this card type and will treat it accordingly. Note that both the even and odd addresses will respond as if they were an IO-48, but with two different addresses.
- All IO-48 commands will be accepted as valid. Any input command will result in zeros being returned as data, since there are no input ports on the O-48. Commands not supported on the O-48 will be acknowledged, but ignored.
- Outputs sent to the even card address will be sent to the first 32 output points in the normal manner, as if it were an IO-48 card with only 32 outputs. Note that Railroad and Co. refers to the outputs in pairs as 1 to 16 .
- Outputs sent to the odd address will be sent to the last 16 output points on the card. Railroad and Co. will refer to these as outputs 1 to 8. Note that any output sent to pairs 9 through 16 will also appear on the same outputs on the card. To avoid confusion and possible malfunction of attached output devices, do not configure anything using the odd address and outputs 9 – 16.

Avoid configuring any input devices on the O-48. Although this will not cause an error, Railroad & Co. will spend unnecessary time polling the O-48 card.

## Using Other Software:

All IO-48 commands used by Railroad and Co. are supported on the O-48 output card. If you are testing the card with the Oak Tree Systems' utility program or your own software, you will notice the following differences:

- The "Long Blink" command is not implemented on the O-48.
- The "Blink" command allows only one blink rate for the entire O-48 card, whereas on the IO-48, each output could have its own blink rate. Changing the blink rate for any output point changes it for all blinking outputs on the card.
- In emulation mode (jumper removed), the card responds with a type of 6 (same as the IO-48), but the version number will be 2.14 on the even address, and 2.15 on the odd address. This allows custom-written software to identify the fact that it is connected to an O-48 board emulating an IO-48, not a real IO-48.
- With the jumper in place, the card responds with a type of 7 (unique to the O-48). Also, all outputs must be addressed only to the actual address set in the switches. The output point number for all commands may range from 0-47 and will be sent to the appropriate output point. The points are numbered from 0 at the lower left of the card to 47 at the lower right.

As with the IO-48, there is no limit on the mix of commands that can be sent to the O-48 output points. It is possible to operate 48 independent devices on the provided outputs. With appropriate interface cards and wiring, you could operate 24 block throttles, 24 searchlight signals, 16 3-light signals, 24 twin-coil switch machines, or 48 slow-motion switch machines.