IOTEST User Guide

Revision v1.5 07/21/2018

Introduction

The IOTEST board is designed to provide I/O devices, which can be operate as inputs or outputs for testing cpNode and IOX ports. Output ports drive LEDs. Input ports read onboard push buttons or external switch closures. The loopback cable bridges the ports, routing an output port to a corresponding input port.

Revision History

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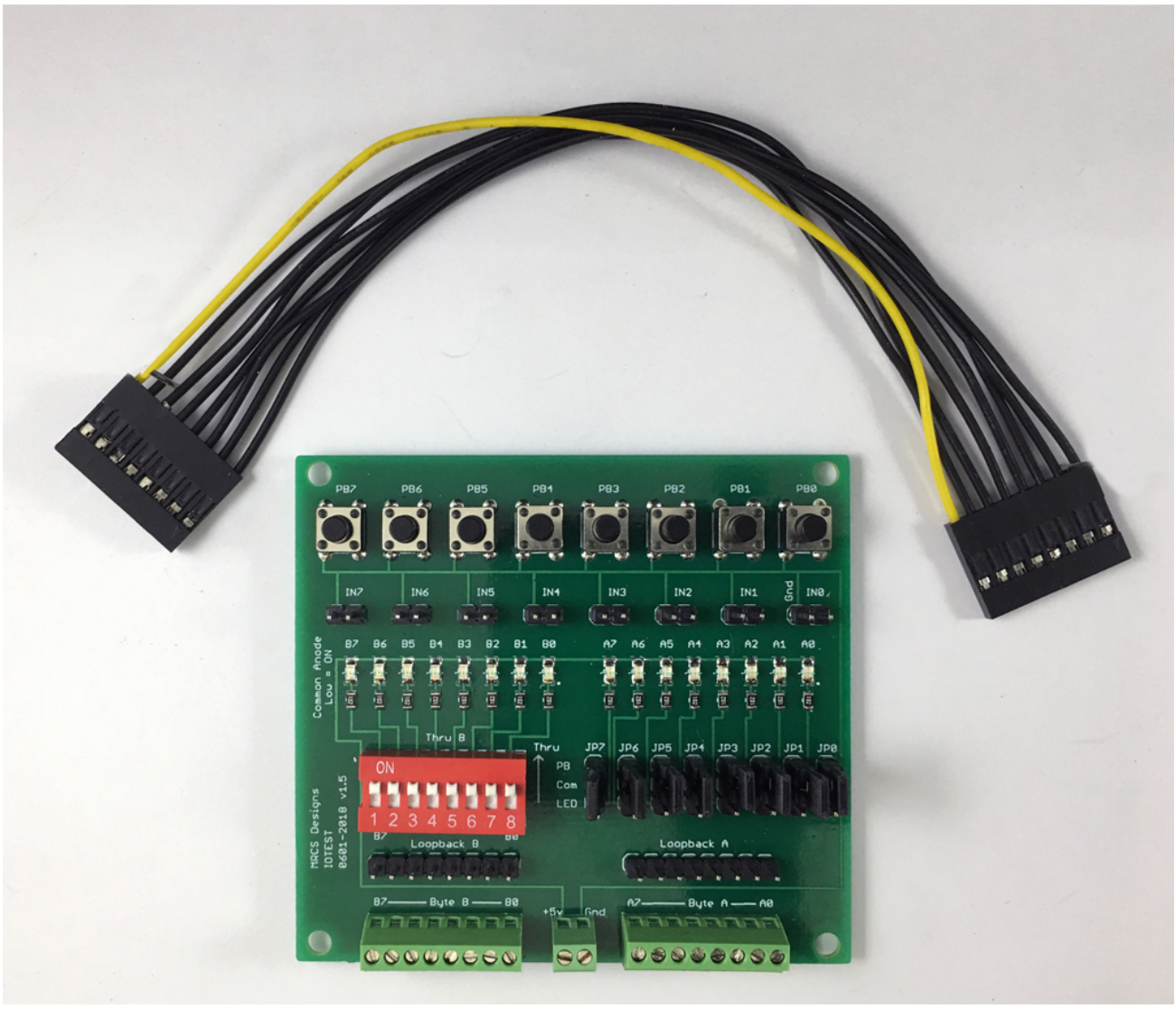
1. TESTER SYSTEM OVERVIEW

The input/output test fixture (IOTEST) is designed to provide byte (8 bit) output and input devices for testing cpNode and IOX boards. Maximum test flexibility is the goal for the IOTEST board.

The IOTEST board consists of the following sections:

- 8 onboard push buttons with parallel pins for external inputs.
- 16 LEDs, Common Anode (sinking), wired as two groups of eight.
- 8 jumper blocks to assign Byte A data port to either onboard push buttons or external inputs (input) or LEDs (output).
- Loopback connectors (with supplied cable) to connect Port A to Port B with isolation from LEDs
- Input (ground) return for buttons/sensor inputs.
- External 5vdc connection to LEDs



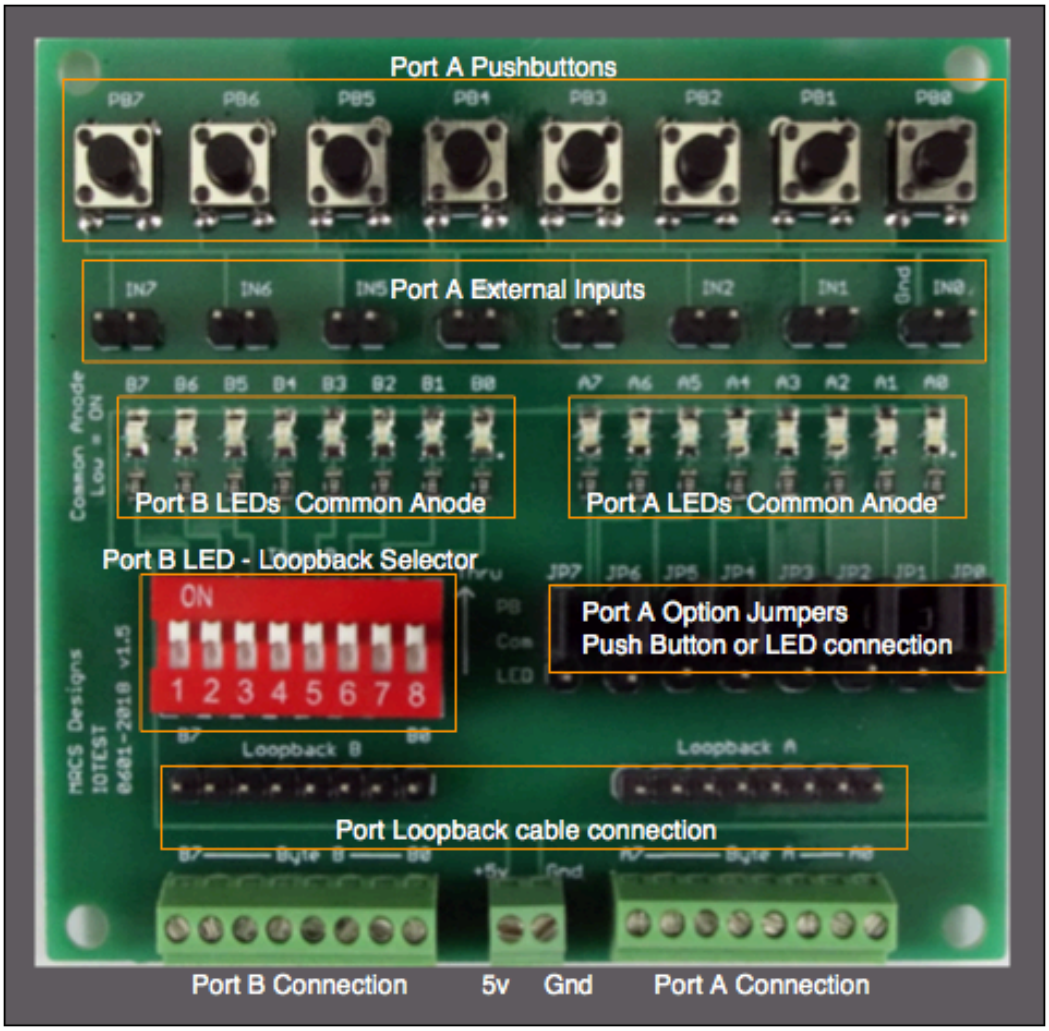


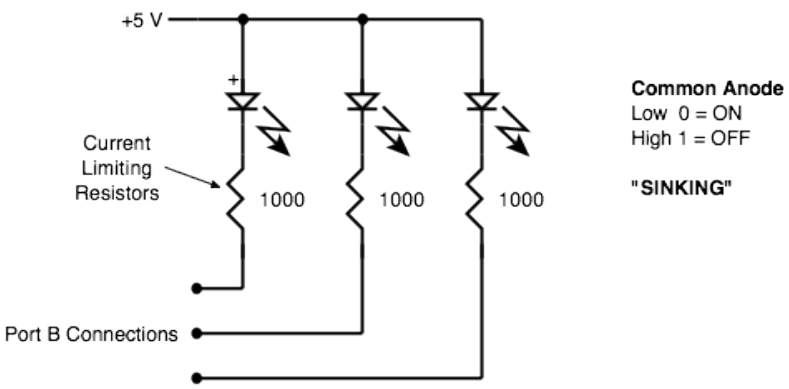
Figure 1 IOTEST

2. 5V AND GND CONNECTIONS

The 5v and Gnd connections complete the circuits for the push buttons and LEDs for the I/O port connections.

For input ports, the system logic ground would be connected to the Gnd pin. The I/O Port A connections would go to the logic input of the control system port. Pressing one of the push buttons or triggering an internal input will cause the Port A bit to go low.

For output ports to display the state of a logic output on an LED, the system logic power (5v) would be connected to the 5v pin. The I/O Port B connections would be connected to the logic output of the control system port. Setting the logic output to low, will light the LED. This is common anode (sinking) mode.



3. DATA PORT CONNECTIONS (BYTE A, BYTE B)

Byte A data ports connect through the male jumper pins to the onboard push buttons by inserting a jumper block from PB to Com. The push button input presents an Active Low to the input port when pressed.

An input, like a toggle switch closure to ground or Open Collector output, can be connected to INn external input pin header.

Byte A data ports can be connected directly to LEDs A0 to A7 by inserting a jumper block from COM to LED pins. The LEDs are wired as current sinking (Common Anode) through limiting resistors.

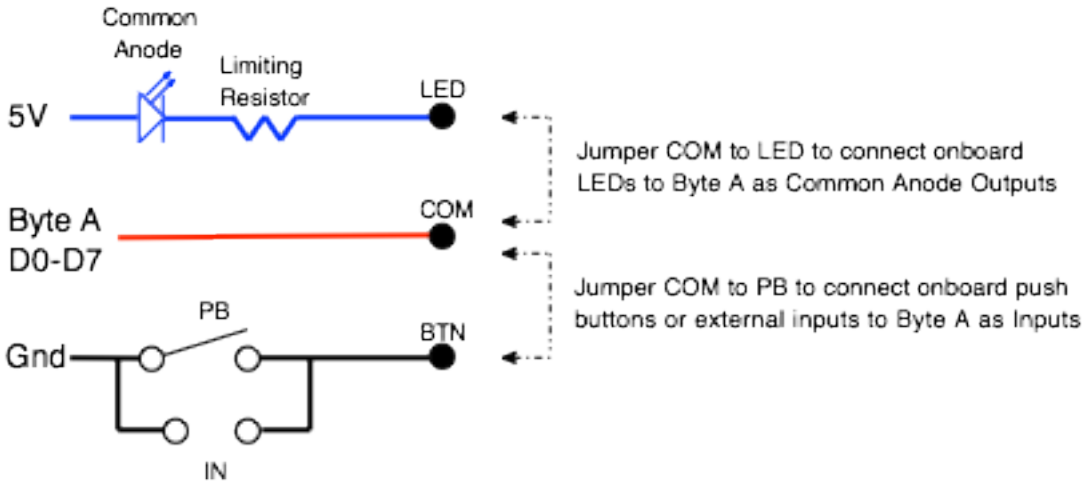


Figure 2 Port A LED - Button Jumpers

Byte B data ports are connected directly to LEDs B0 to B7 through the DIP switches when the switches are set to ON. The LEDs are wired as current sinking (Common Anode) through limiting resistors.

4. DATA PORT LOOPBACK CONNECTIONS

Byte A and Byte B ports can be wired for an input to output loopback function by setting the DIP switches to the position opposite the ON position. This isolates the Byte B pins from the B Byte LEDs. Insert the loopback cable between Loopback A and Loopback B pins. The yellow wire in the loopback cable is pin 1 (D0).

5. TEST SOFTWARE SUPPORT

The Java Model Railroad Interface (JMRI) software has C/MRI diagnostic test functions, which can be used with the IOTEST board.

6. CONNECTOR PINS, HEADERS, AND CABLES

The pins on the board are all 0.100" (2.54mm) spaced. Parts are available from various sources. In China, the connector headers and pins are referred to a DuPont connectors.

Pololu Electronics and Robotics (http://www.pololu.com/) is an on shore supplier with a wide selection of parts. Here are the cable/connector components used in many of the MRCS board products.

Crimp Connector Housings
https://www.pololu.com/category/19/connectors
https://www.pololu.com/category/70/crimp-connector-housings

Crimp Pins
Female - https://www.pololu.com/product/1930
Male - https://www.pololu.com/product/1931

Male Header Pins (Breakaway)
https://www.pololu.com/category/134/0.1-2.54-mm-male-headers

Pre-Crimped Wire
https://www.pololu.com/category/71/wires-with-pre-crimped-terminals

Crimp Tool
https://www.pololu.com/product/1929
https://www.moddiy.com/products/Professional-Molex-Crimping-Tool.html