A Comprehensive Guide to Using TCH Technology OpenLCB Nodes

TCH Technololgy

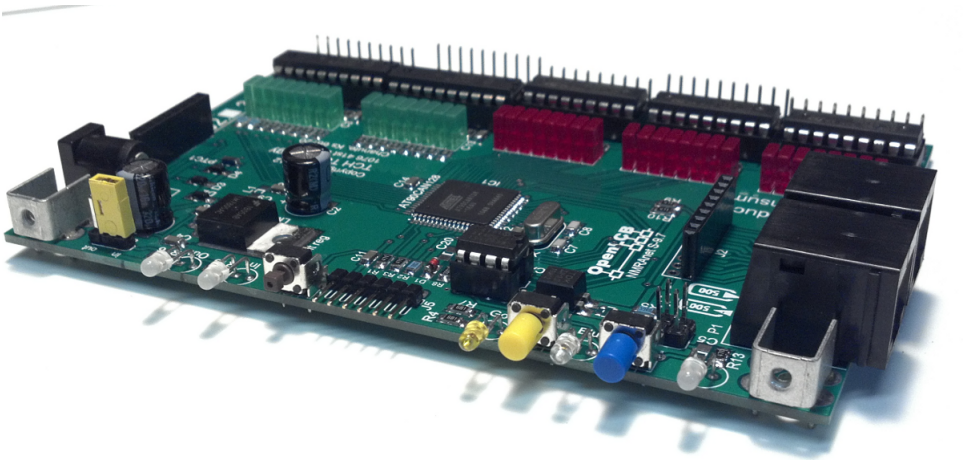
March 24, 2013

Contents

Chapter 1

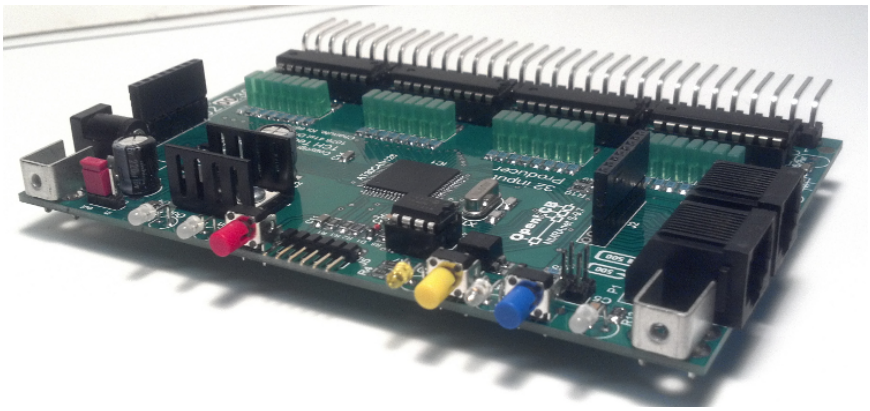
TCH Technology Products for OpenLCB

1.1 OpenLCB 16 Input 24 Output Producer Consumer



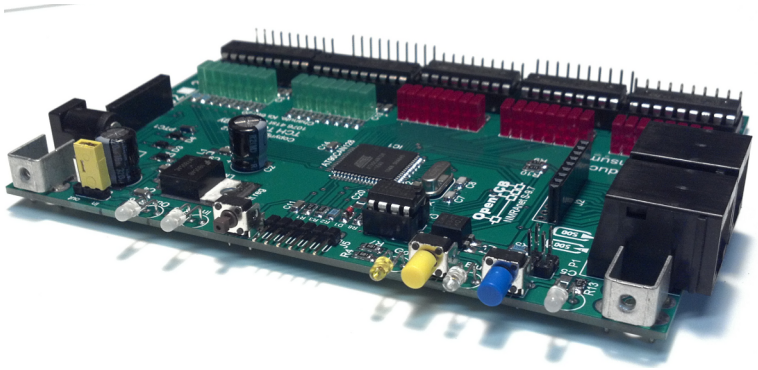
TCH Technology 16 Input 24 Output Producer Consumer provides 16 inputs and 24 outputs to connect to your layout. The outputs can be used to drive LEDs, lights, turnout controls etc. The inputs can have connections for momentary pushbutton switches, slide switches, block detectors, IR sensors, etc.

1.2 OpenLCB 32 Input Producer



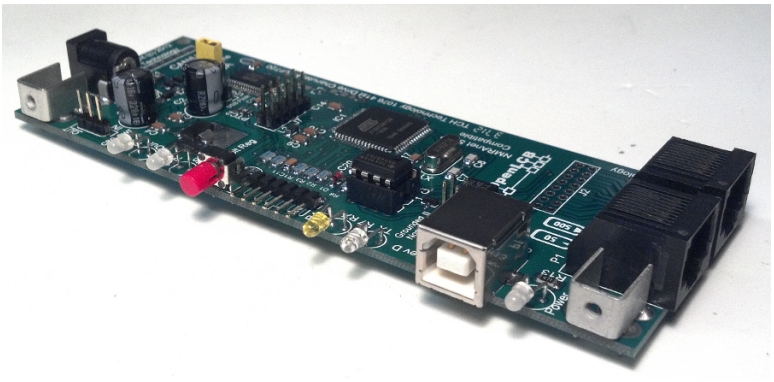
The OpenLCB 32 Input Producer provides 32 individual producer inputs for connecting momentary pushbutton switches, slide switches, block detectors, IR sensors, etc.

1.3 OpenLCB 32 Output Consumer



The OpenLCB Output Consumer provides 32 individual consumer outputs for connectioning LEDs, lights, turnout controls etc.

1.4 CAN/USB Interface Version 3



The CAN/USB Interface is used to connect the OpenLCB bus to a computer.

1.5 CAN/USB Interface Version 5

The CAN/USB Interface version 5 is enclosed in a nice small case.

Chapter 2

Configuring the TCH Technology OpenLCB Node

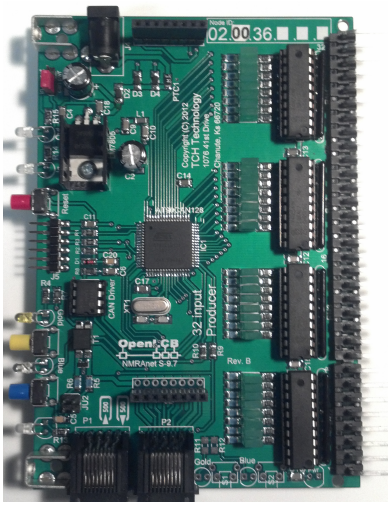


Figure 2.1: TCH Technology 32 Input Producer Node jumpers and connecters.

TCH Technology OpenLCB Nodes have various jumpers that need to be configured before it will work with other OpenLCB boards.

2.1 Powering the OpenLCB Node

TCH Technology OpenLCB Nodes can be powered in one of three ways:

- From an external power supply.
- Via the OpenLCB bus.
- Via a USB six (6) pin connection from a PC.

2.1.1 Power from the external jack

You may power the Nodes using an external power supply that provides a 2.1mm center-positive plug, and between 9 and 15V DC at 500mA or more of current. See Figure 2.2.

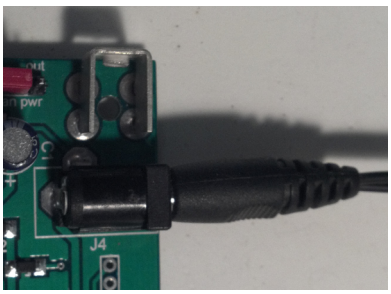


Figure 2.2: Providing power from line in jack.

2.1.2 Power from the six pin serial connection

Powering the Nodes from the six pin serial connector. The six pin serial jack (J5) is provided for uploading new firmware into the node using a USB to serial adapter. See Figure 2.3

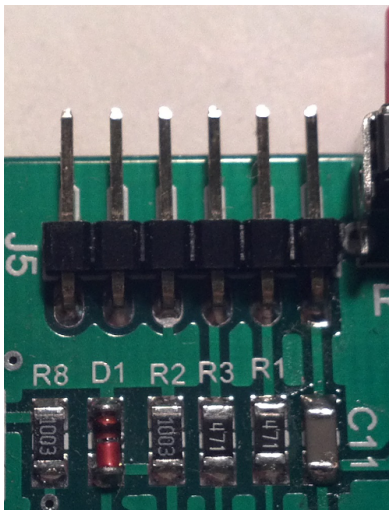


Figure 2.3: Six pin serial connection.

2.2 Power on the OpenLCB bus

Note: Receiving power from the OpenLCB bus requires that at least one other node be configured to provide power to the OpenLCB bus. If the Nodes are configured to use an external power supply, optionally they can be configured to provide power to the OpenLCB bus.

2.2.1 Provide power to the OpenLCB bus

Set the “can power” jumper to “out”’, as per Figure2.4.

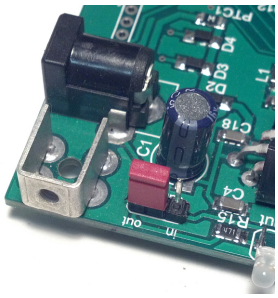


Figure 2.4: CAN POWER jumper set to provide power to the OpenLCB bus

2.2.2 Provide power from the OpenLCB bus

Set the “can power” jumper to “in”, as per Figure 2.5. Note: Remove the “can power” jumper entirely if the 32 Input Producer Node will neither draw power from nor provide power to the OpenLCB bus.

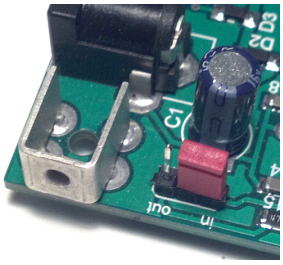


Figure 2.5: CAN POWER jumper set to provide power from the OpenLCB bus.

2.3 Termination of the Bus

You must determine if you need to terminate your bus. If your Node is at the beginning of the CAN bus or at the end of the CAN bus you need to terminate the bus.

2.3.1 No termination

To use no termination, the red shorting jumpers (JU2) shall be in the non-shorting position or removed entirely. See Figure 2.6

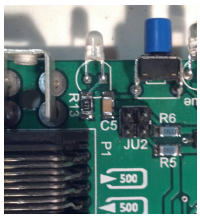


Figure 2.6: No termination.

2.3.2 Resistive termination

Resistive termination uses the shorting jumpers on JU2 set at a right angle with the two surface mount resistors R5 and R6. See Figure 2.7

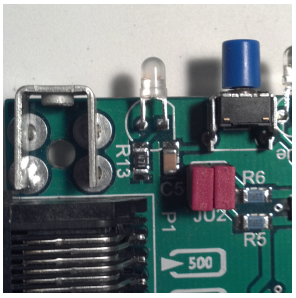


Figure 2.7: Resistive termination.

2.3.3 Grounded termination

Grounded termination uses two shorting jumpers in parallel. Grounded Termination is also called split termination. This is a concept that is growing in popularity. Using split termination will filter unwanted high frequency noise from the bus lines. See Figure 2.8

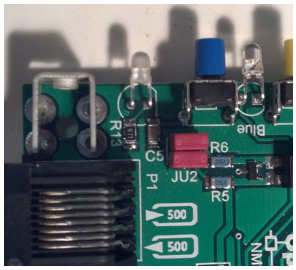


Figure 2.8: Grounded termination.

Chapter 3

Control LED Indicators

3.1 Control LED indications

The TCH Technology OpenLCB nodes have 5 Control LED indicators. These are red, blue, gold, and two green indicators.

3.1.1 Red LED indication

The Red LED indicates the Node is powered up and ready.

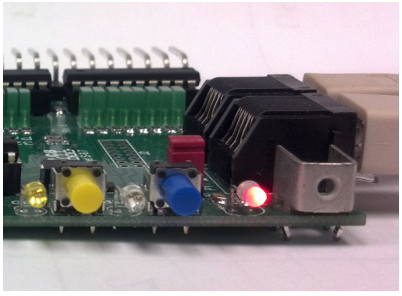


Figure 3.1: Red Power LED.

3.1.2 Blue LED indication

The Blue LED indicates the Node is receiving CAN packets from the CAN bus. It will flash for each set of packets received from the CAN bus. The Blue LED will also indicate the node is in "Teach" mode. It will light when the Blue momentary pushbutton switch is pushed, then extinguish when pushed for a second time. See Figure 3.2

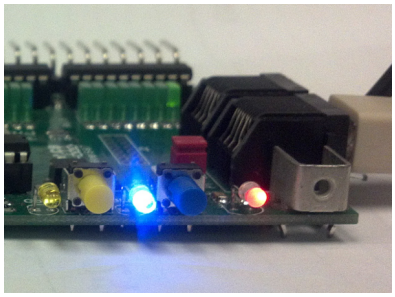


Figure 3.2: Blue Receive LED.

3.1.3 Gold LED indication

The Gold LED indicates the Node is transmitting CAN packets to the CAN bus. Also there is a steady heartbeat flash indicating that the unit is alive and operational. The Gold LED also indications the node is in "Learn" mode. Iit will light when the Gold momentary pushbutton switch is pushed then extinguish when pushed for a second time. See Figure 3.3

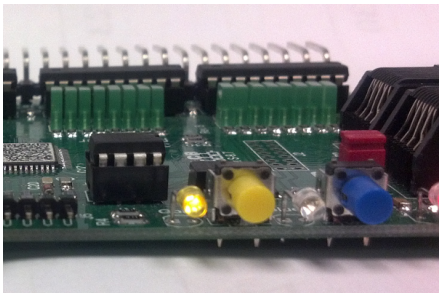


Figure 3.3: Gold Transmit LED.

3.1.4 Single green LED indication

The two green LED indicators will show how the node is being powered. If only a single green LED is on, then the node is being powered by the 2.1mm input jack and can be delivering power to other nodes. This is dependent on how the CAN power jumper is set. See Figure 3.4

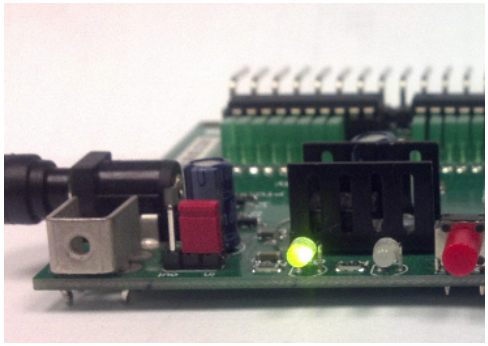


Figure 3.4: Green Power Out LED.

3.1.5 Two green LED indication

If the two green LEDs are on, then the power is being delivered from the CAN bus. See Figure 3.5

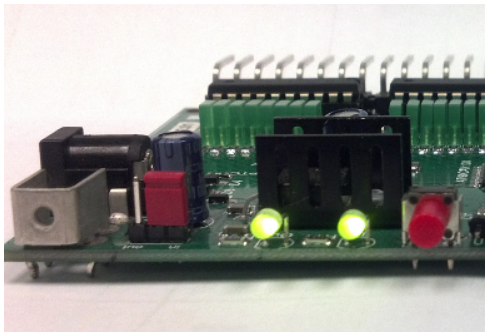


Figure 3.5: Two Green Power LEDs.

3.1.6 No green LED indication

If both green LEDs are extinguished and the red LED is on, then the node it being powered by the six pin serial connector.

3.2 Pushbutton Switches and their functions

TCH Technology nodes have three push button controls located next to the LEDs. These consist of a red, blue, and gold momentary pushbutton switch.

3.2.1 Switch Functions

- The red pushbutton is used to reset the node.
- The gold pushbutton is used to put the node into learn mode.
- The blue pushbutton is used to put the node into teach mode.

3.2.2 Red Pushbutton

Pushing the red button on a TCH Technology Node will reset the node. When pushing the red button, the blue LED will flash briefly and all input or output LEDs will come on steady for 250ms, then extinguish, denoting the node has reset.

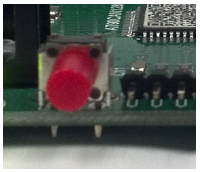


Figure 3.6: The red reset button.

3.2.3 Gold Pushbutton

Pushing the gold button on a TCH Technology Node will put the node into "learn mode". When pushing the gold button, the gold LED will come on and glow steadily indicating the node is in "learn mode".

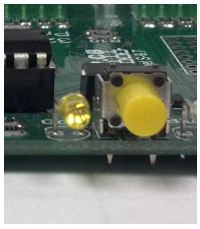


Figure 3.7: Gold "learn mode" button.

3.2.4 Blue Pushbutton

Pushing the blue button on a TCH Technology Node will put the node into "teach mode". When pushing the blue button, the blue LED will come on and glow steadily indicating the node is in "teach mode".

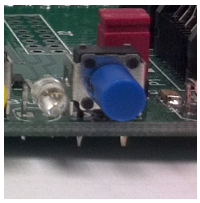


Figure 3.8: Blue "teach mode" button.

3.3 Input/Output LED Indications

The TCH Technology 32 Input Producer and 32 Output Consumer Node has 32 LEDs that are associated with each input/output connector pin located on the node.

3.3.1 Input Producer LEDs

The Input Producer Node has 32 green rectangular LEDs that are associated with each input connector pin located on the node. The LEDs are in 4 groups of 8.

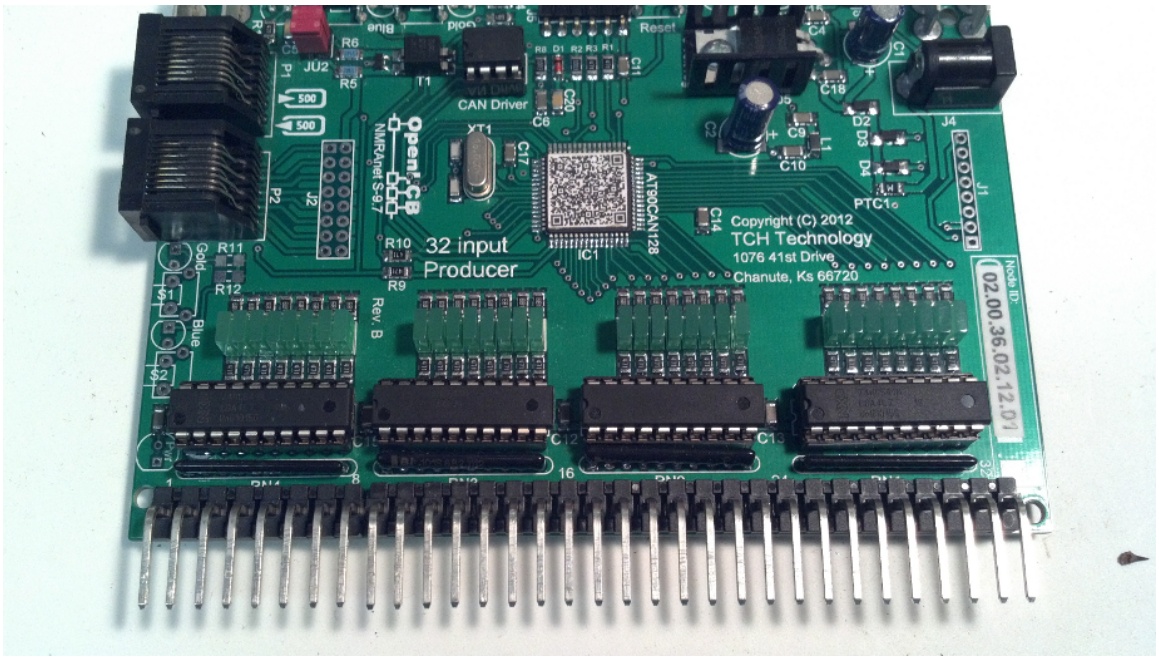


Figure 3.9: Producer input LEDs.

3.3.2 Output Consumer LEDs

The Output Consumer Node has 32 red rectangular LEDs that are associated with each input connector pin located on the node. The LEDs are in 4 groups of 8.

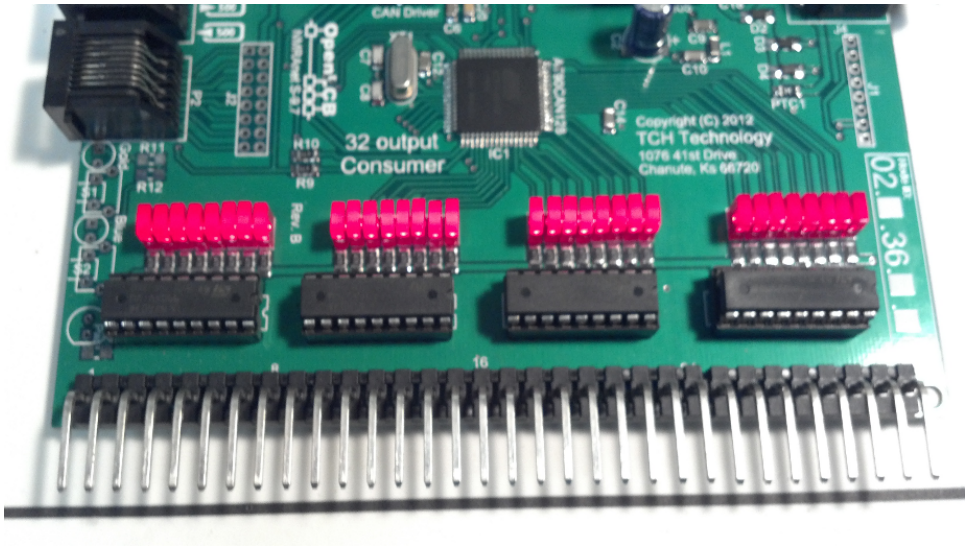


Figure 3.10: Output Consumer LEDs.

3.3.3 16 Input 24 Output node LEDs

The16 Input 24 Output Producer/Consumer node has 16 green rectangular LEDs abd 24 red LEDs that are associated with each input/output connector pin located on the node. The LEDs are in 5 groups of 8.

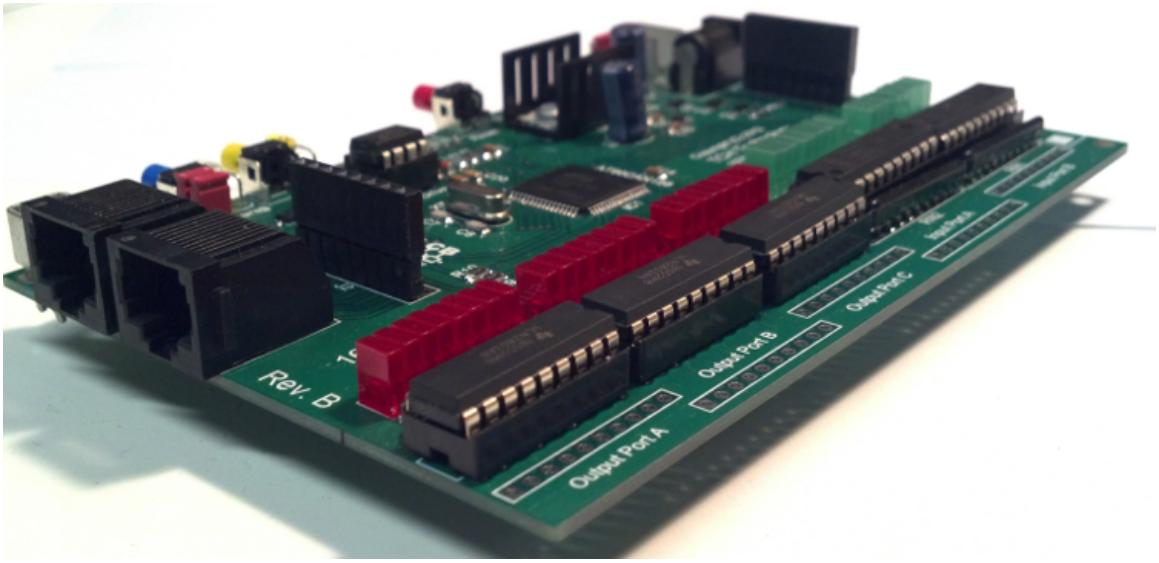


Figure 3.11: Producer/Consumer input/output LEDs.

Chapter 4

16 Input 24 Output OpenLCB Node Hardware Connections

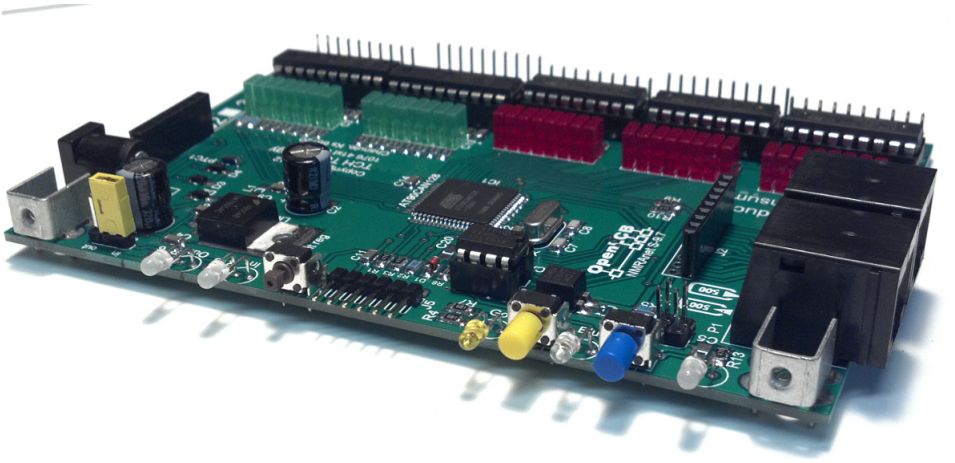


Figure 4.1: The 16 Input 24 Output OpenLCB/NMRAnet Node.

TCH Technology 16 Input 24 Output Producer Consumer provides 16 inputs and 24 outputs to connect to your layout. The output can be used to drive LEDs, lights, turnout controls, etc. The input can have connections for momentary pushbutton switches, slide switches, block detectors, IR sensors, etc.

4.1 Connection Types

4.1.1 Input Connections

Each input and output port has a 10 pin header. These headers include +5 volts dc and a ground connection. Each port has eight(8) input and output pins. See Figure 4.2

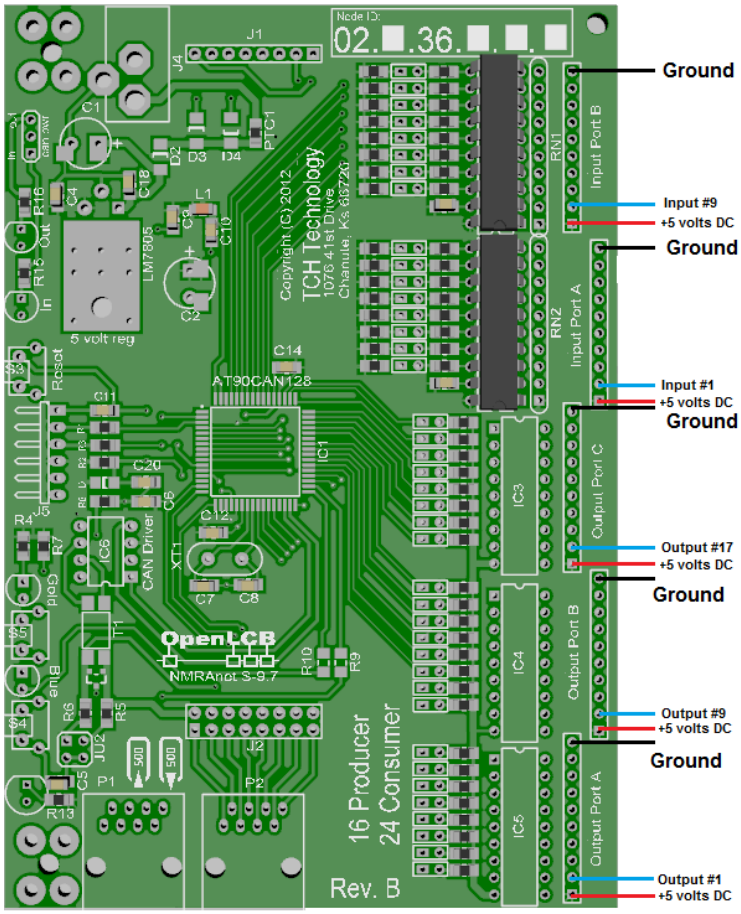


Figure 4.2: Connections to 16 in 24 out Producer/Consumer Node.

4.1.2 Momentary Pushbuttons

All inputs can be controlled by a momentary pushbutton switch by connecting one side of the switch to the input pin and the other to the ground input pin. See Figure 4.3

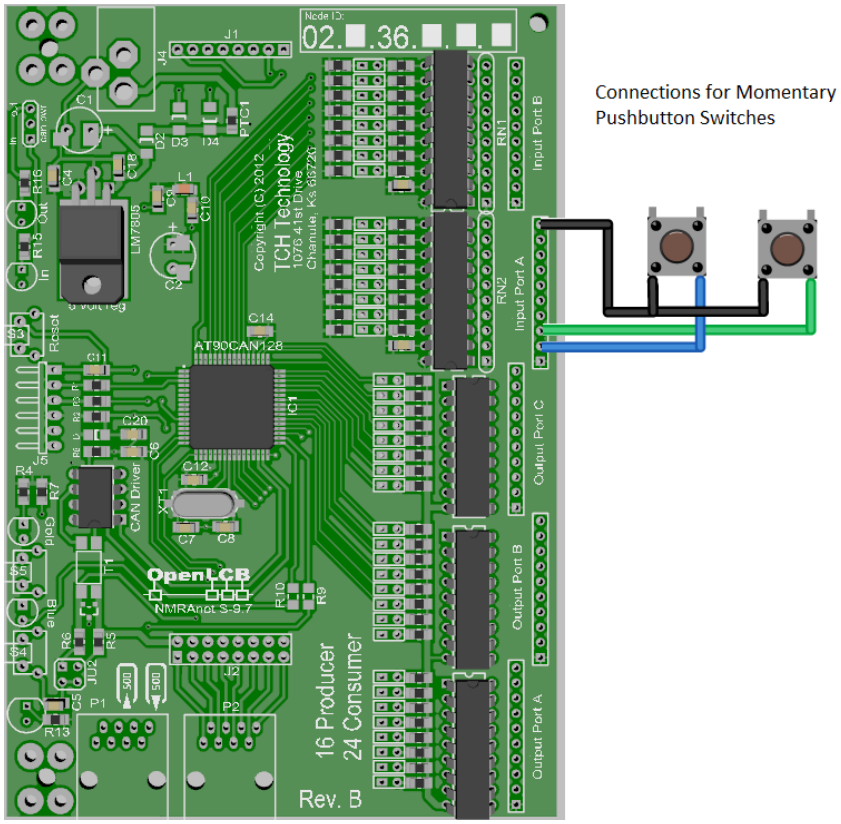


Figure 4.3: Example for connecting momentary pushbutton switches.

4.1.3 Slide Switches

All inputs can be controlled by a slide switch by connecting one side of the switch to the input pin and the other to the ground input pin. See Figure 4.4

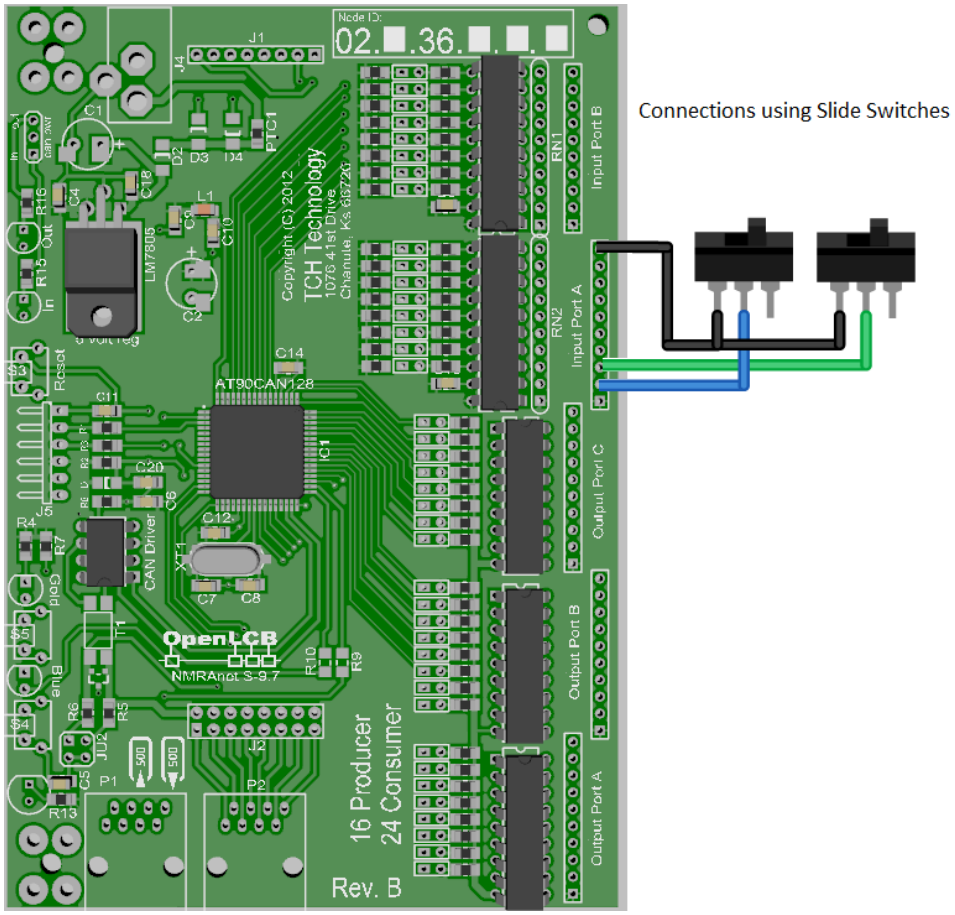


Figure 4.4: Connections to 16 in 24 out Producer/Consumer Node using slide switches.

4.2 Output Connections

- LEDs and Incandesent Bulbs
- Turnout Controls
- Common output schematic

4.2.1 LEDs and Incandescent Bulbs

All outputs can have LEDs or Incandescent bulbs connected to them. Pin 1 of these ports is +5 volts DC and will provide 500ma of current. Pin 10 is ground. see Figure 4.5

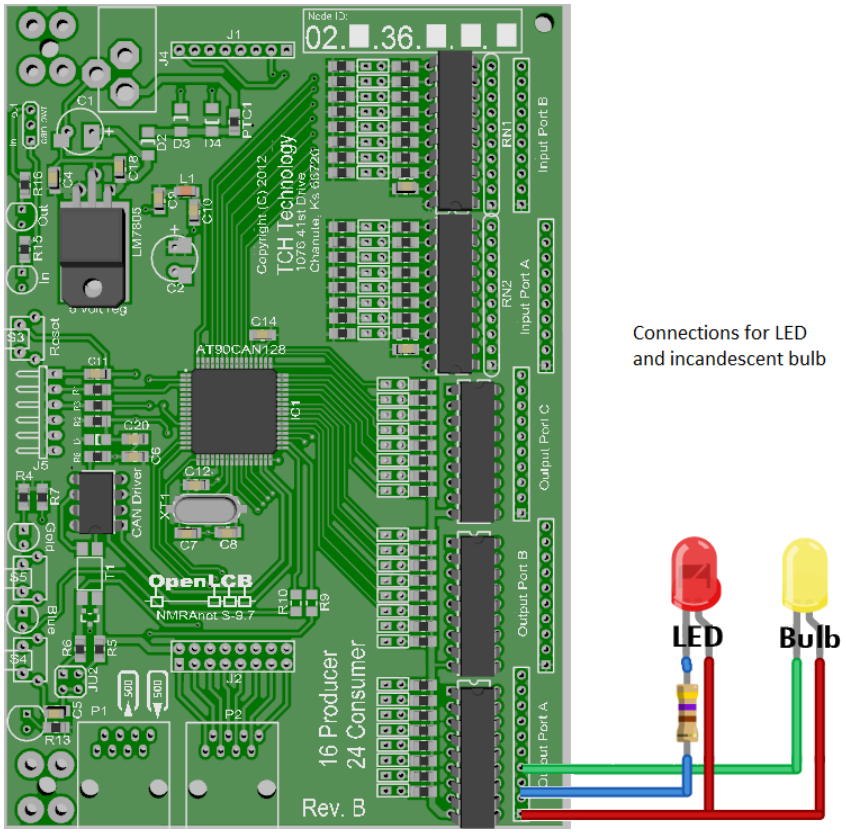


Figure 4.5: Connections to 16 in 24 out Producer/Consumer Node using LED and Incandescent bulbs.

4.2.2 Turnout Controls

Connecting Tortoise Stall Motor turnout control. See Figure 4.6

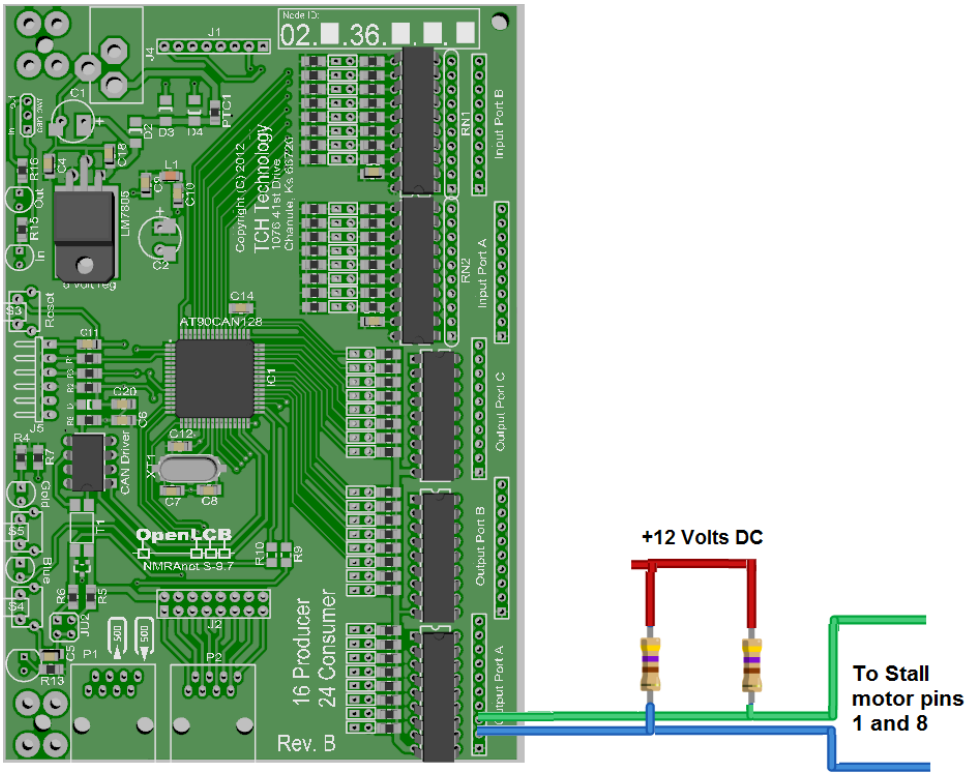


Figure 4.6: Example of connecting a Tortoise Stall Motor Turnout Controller.

4.2.3 Common Output Schematic

Schematic of all outputs. All TCH Technology output nodes have the ULN2803A IC mounted in an easy to remove socket for the outputs. This makes it easy to replace an output if it is accidentally destroyed. See Figure 4.7

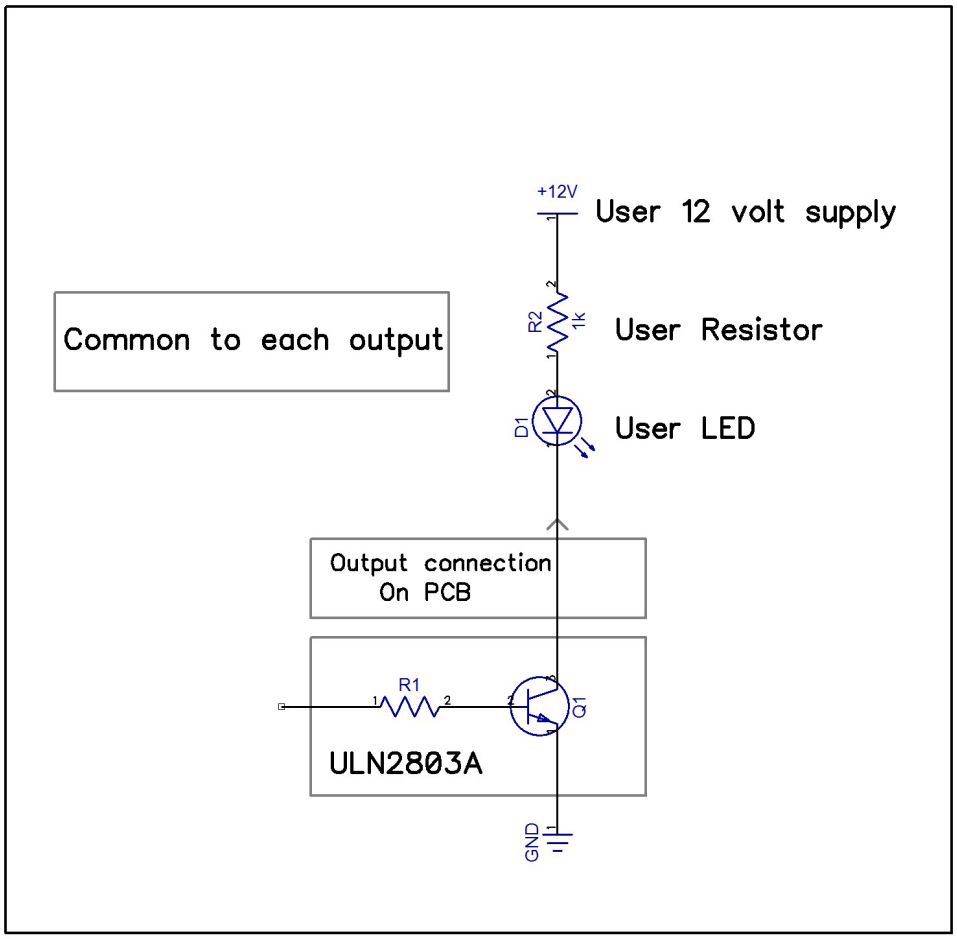
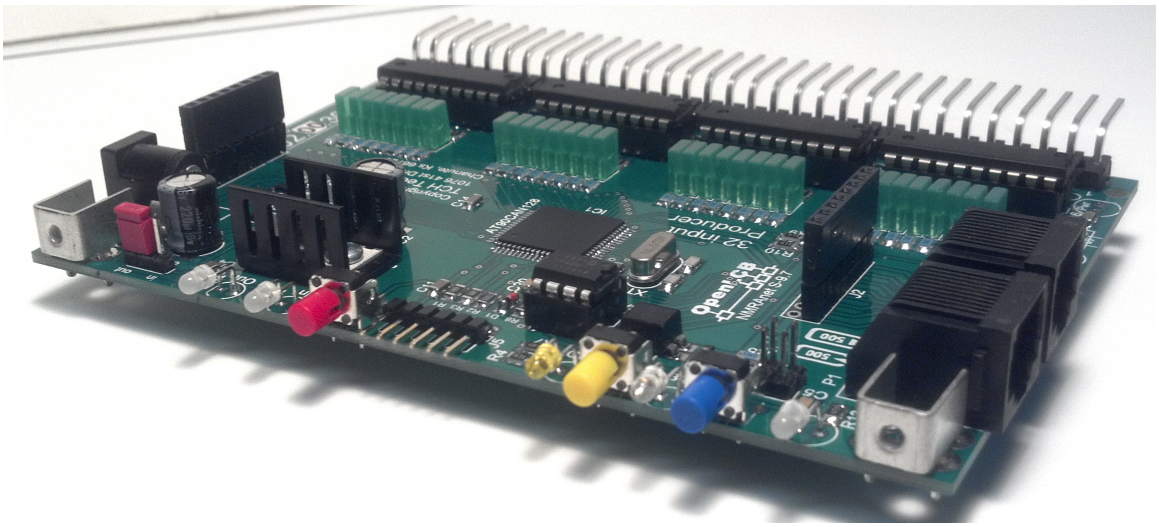


Figure 4.7: Common output schematic

Chapter 5

OpenLCB 32 Output Consumer Node Hardware Connections



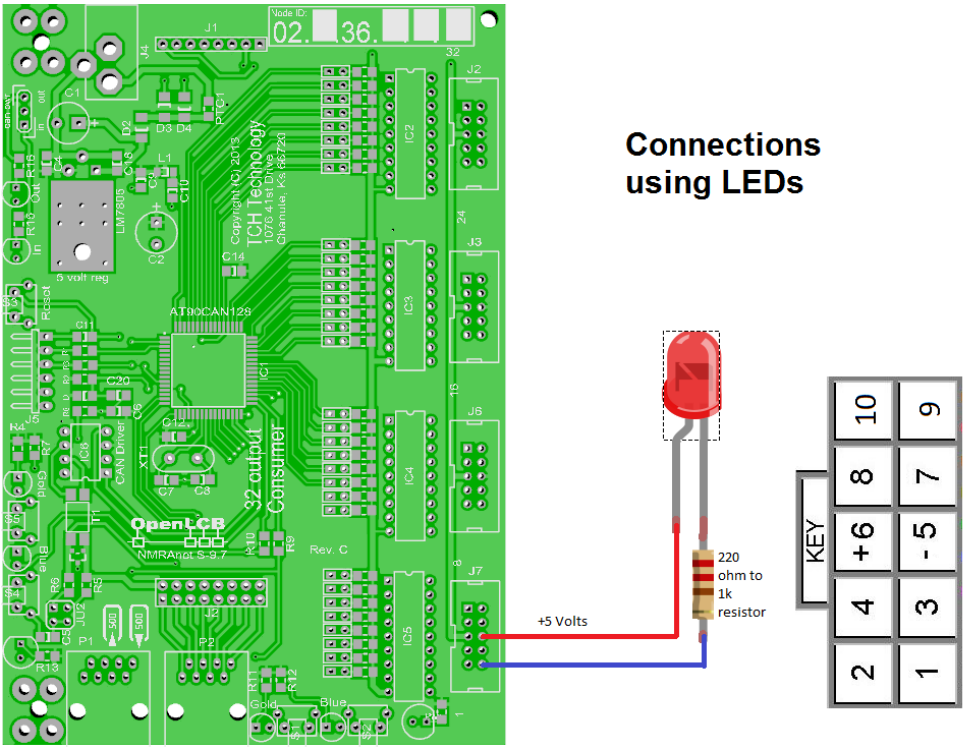
TCH Technology 32 Output Consumer provides 32 outputs to connect to your layout. The output can be used to drive LEDs, lights, turnout controls etc.

5.1 Types of Connections

- LEDs and Lights
- Turnout Controls

5.1.1 LEDs and Lights

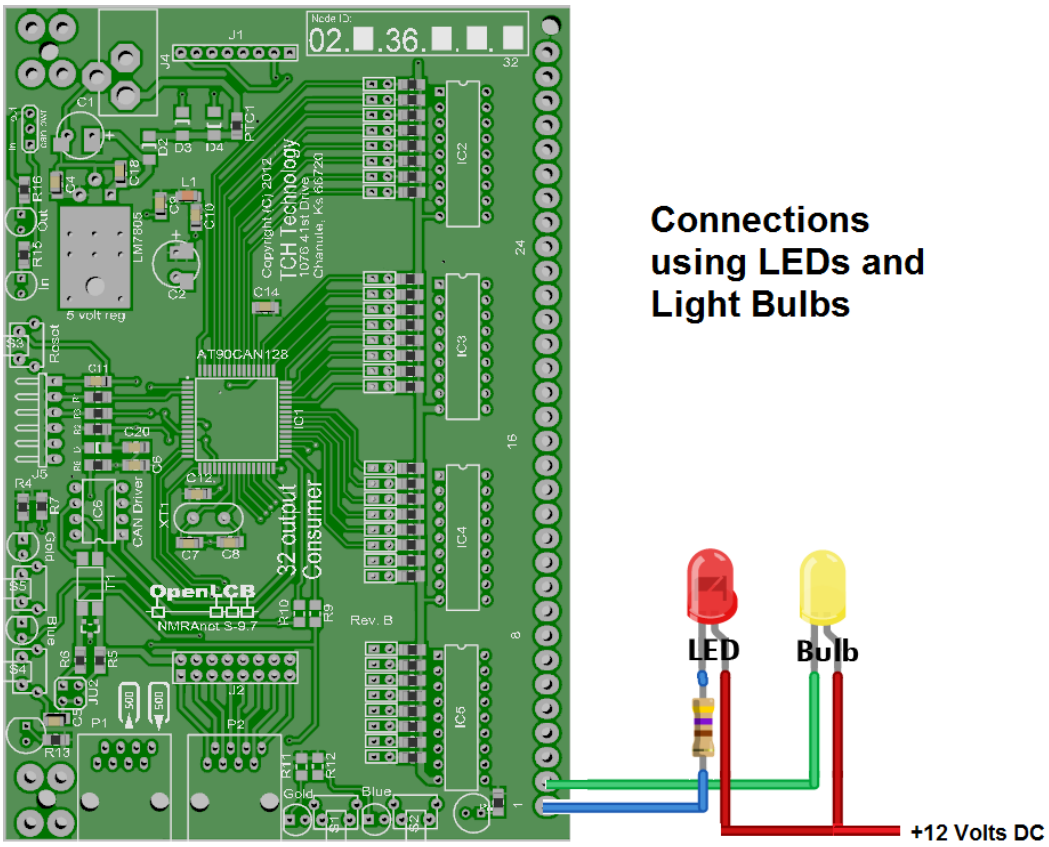
Output connections for the Consumer Version C.



Connections for Consumer board with 10 pin IDC connector. Note: Always use a 220 ohm to 1k ohm resistor in series with the LED.

Connector pin location
pin 1 = output 1
pin 2 = output 2
pin 3 = output 3
pin 4 = output 4
pin 5 = ground
pin 6 = +5 volts DC
pin 7 = output 5
pin 8 = output 6
pin 9 = output 7
pin 10 = output 8

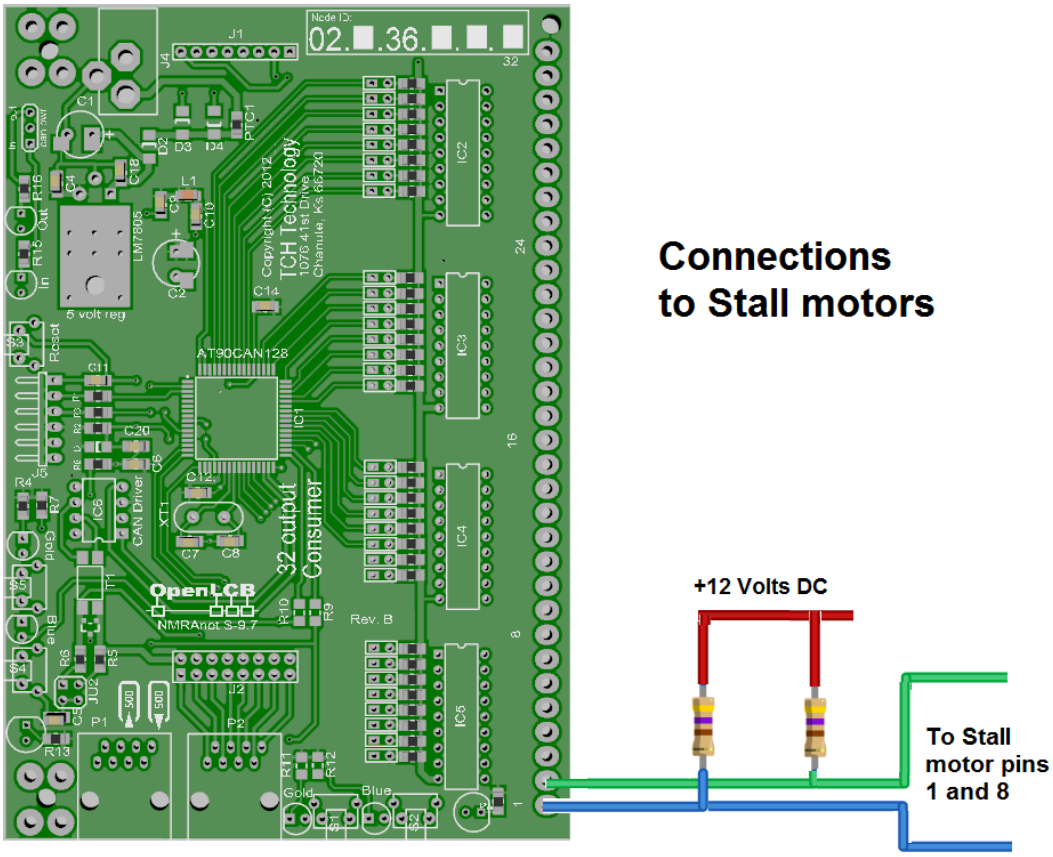
Consumer Version B with Molex .156 inch connectors.



Connections for Consumer board with using the .156 inch right angle molex header and housing connector. Note: Always use a 220 ohm to 1k ohm resistor in series with the LED.

5.1.2 Turnout Controls

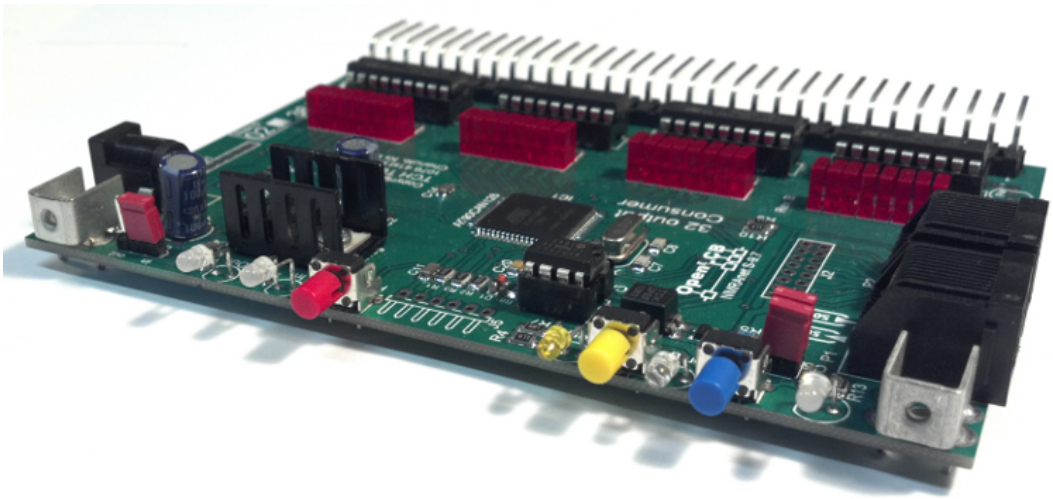
Consumer Version B with Stall motor connects.



Connections for Consumer board with using two resistors. Note: Using a 220 ohm resistor will move the motor faster. Using a 1k ohm or higher will reduce the speed. Please refer to the output schematic in Figure 4.7 when make connections to the nodes.

Chapter 6

OpenLCB 32 Input Producer Node Hardware Connections



6.1 Types of Connections

- Momentary Pushbutton Switches

- SPST slide switches

6.1.1 Momentary Pushbutton Switches

Inputs should be wired to short to ground. An open circuit on an input is read as "off", and shorting the input to ground is read as "on". (It is safe to apply 5V to the inputs, although 32 Input Producer cannot distinguish between an open circuit and +5V on an input line).
Normally-open pushbuttons should be wired as per Figure 6.1, with one leg to the desired input, and the other to ground. In this configuration, a depressed button will be read as "on".

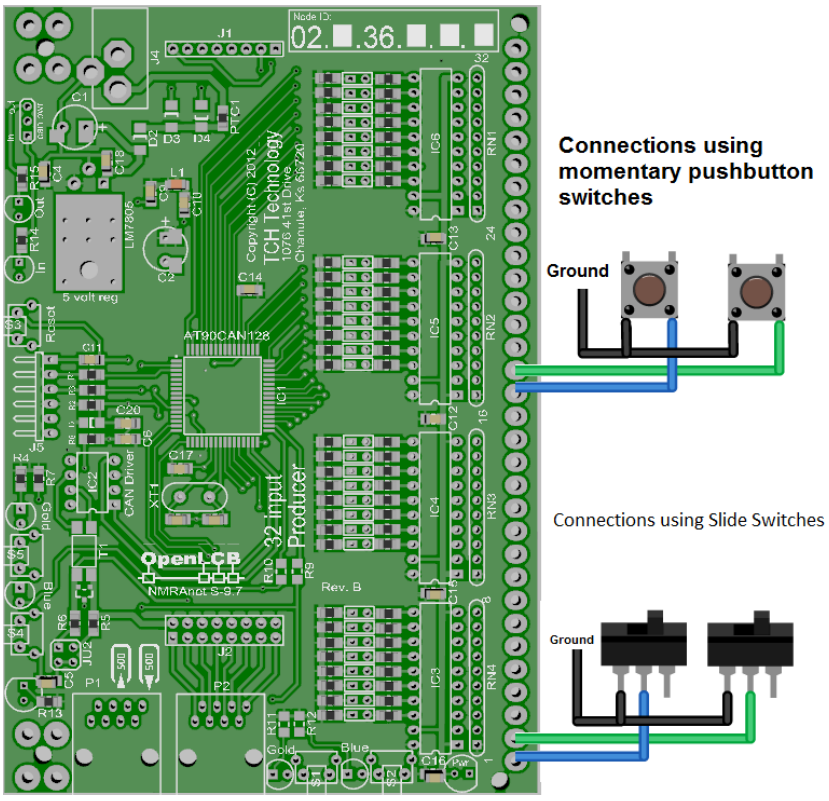


Figure 6.1: Switch connections to the 32 Input Producer.

6.1.2 SPST Slide Switches

SPST slide switches should be wired as per Figure 6.2, with the center pin wired to the desired input, one pin wired to ground, and the other left unconnected. In this configuration, moving the toggle towards the wired pin is read as “on”, and towards the other as “off”.

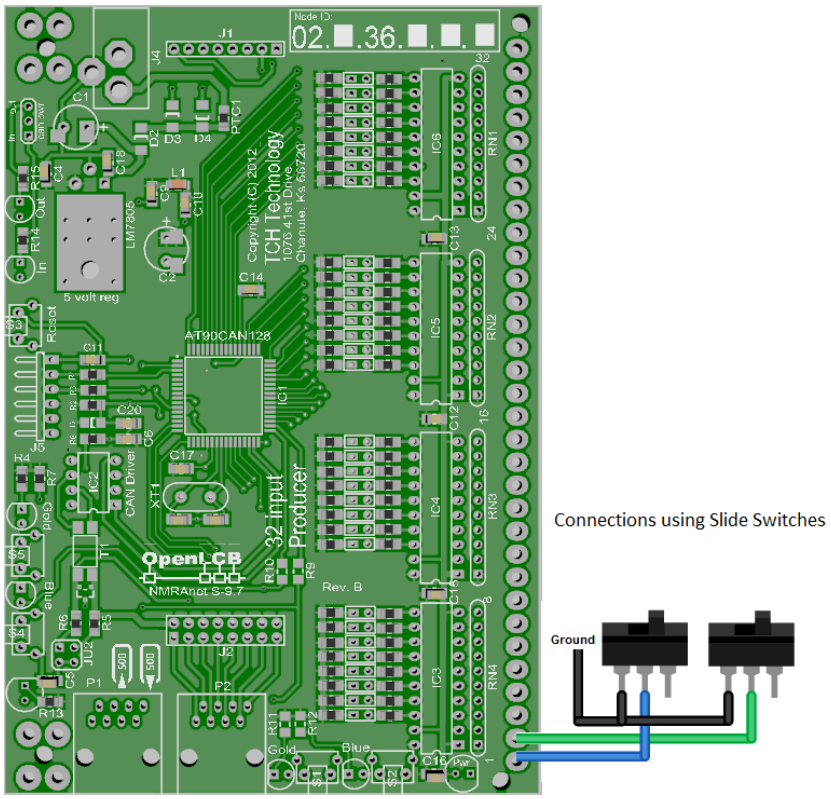
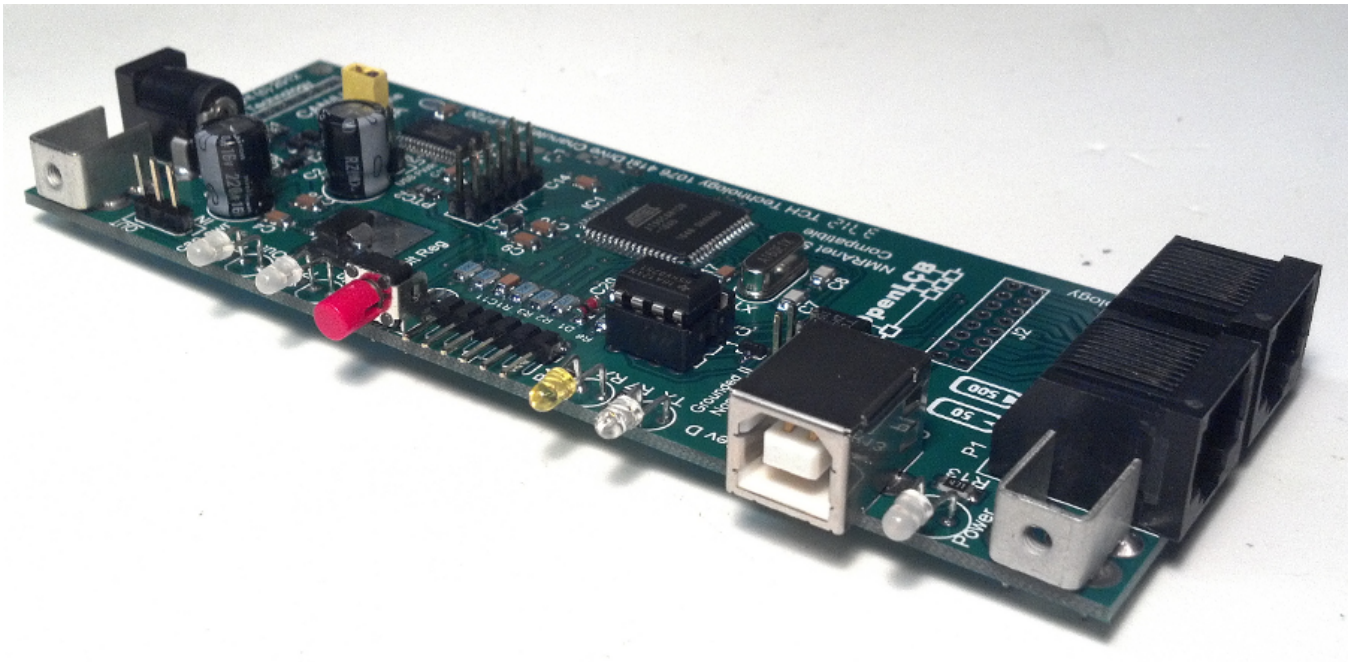


Figure 6.2: Switch connections to the 32 Input Producer.

Chapter 7

The CAN/USB Interface



The TCH Technology CAN/USB interface is used for connecting a computer to an OpenLCB CAN network. The CAN/USB interface is a plug and play device. Configuring is by selection of various jumpers.

7.1 Configuring the CAN/USB Interface

The CAN/USB interface has various jumpers that need to be configured before it will work with your computer and other OpenLCB boards.

7.1.1 Powering the CAN/USB Interface

The TCH Technology CAN/USB can be powered in one of three ways: From an external power supply, via the OpenLCB bus, or via a USB connection from a PC.

7.1.2 Power from the external jack

You may power the CAN/USB using an external power supply that provides a 2.1mm center-positive plug, and between 9 and 12V DC at 500mA or more of current.

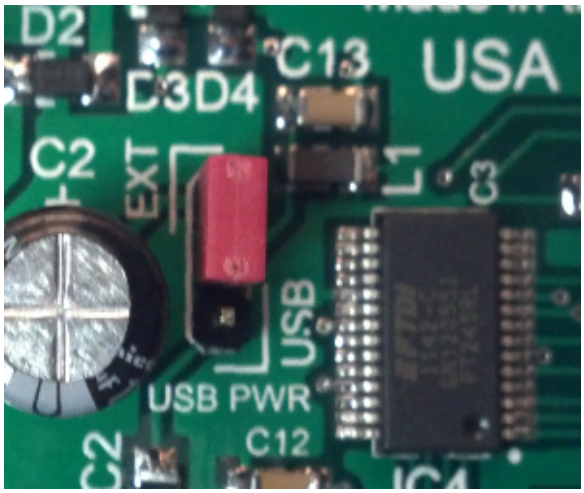


Figure 7.1: Jumper set to provide power from line in jack.

7.1.3 Power from the USB

Powering the CAN/USB interface from the USB connector. With this option set, it will not provide power to the CAN bus.

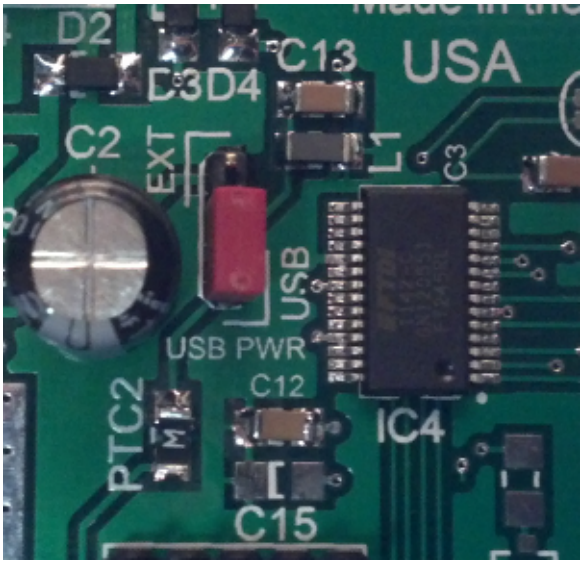


Figure 7.2: Jumper set to provide power from PC USB.

7.2 Power on the OpenLCB bus

Note that receiving power from the OpenLCB bus requires that at least one other node be configured to provide power to the OpenLCB bus. CAN/USB configured to use an external power supply can optionally be configured to provide power to the OpenLCB bus. Note: Remove the “can power” jumper entirely if the CAN/USB will neither draw power from nor provide power to the OpenLCB bus.

7.2.1 Provide power to the OpenLCB bus

Set the “can power” jumper to “out”, as per Figure 7.3.

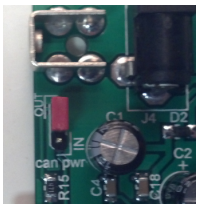
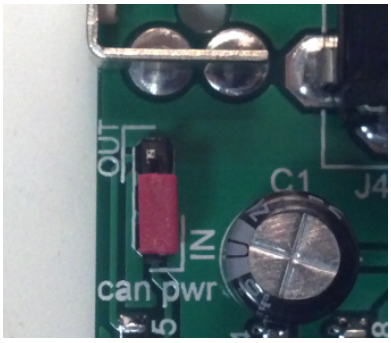


Figure 7.3: CAN POWER jumper set to provide power to the OpenLCB bus.

7.2.2 Provide Power from the OpenLCB bus



Set the “can power” jumper to “in”, as per Figure 7.4.

Figure 7.4: CAN POWER jumper set to provide power from the OpenLCB bus.

7.3 Termination of the Bus

You must determine if you need to teminate your bus. If your CAN/USB Interface is at the beginning of the CAN bus or at the end of the CAN bus you need to terminate the bus.

7.3.1 No termination

To use no termination, the shorting jumers shall be in the non-shorting position. See Figure7.5.

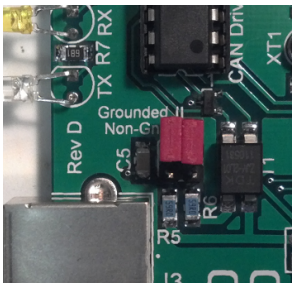


Figure 7.5: No termination.

7.3.2 Non-grounded termination

Non-grounded or standard termination uses two shorting jumpers. See Figure 7.6

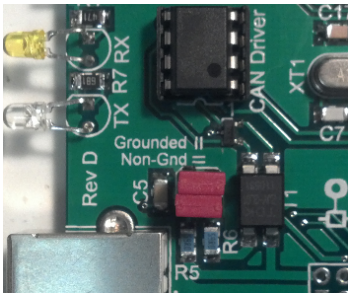


Figure 7.6: Non-grounded termination.

7.3.3 Grounded termination.

Grounded termination uses two shorting jumpers as shown in Figure 7.7 Grounded

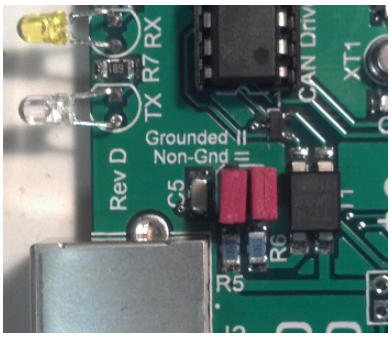


Figure 7.7: Grounded termination.

Termination is also called split termination. This is a concept that is growing in popularity. Using split termination will filter unwanted high frequency noise from the bus lines.
See these references.

http://ww1.microchip.com/downloads/en/appnotes/00228a.pdf
http://www.ti.com/lit/an/slla270/slla270.pdf

Chapter 8

Blue/Gold Programming

8.1 Teach/Learn

In order to completely configure an OpenLCB/NMRAnet System, you will need at least one OpenLCB/NMRAnet compatible Producer node and one OpenLCB Consumer node. This may also be done with one 16 input 24 output Producer/Consumer node.

A connection is made between a Producer and a Consumer by sharing an Event ID, from a teacher to a learner. The TCH Technology Producer and Consumer boards have a blue button that is used to select an individual Producer/Consumer on the board, and a gold button which determines whether it is a Learner or Teacher, and which sends the Learn Event Message to establish the connection between the two.

The specific steps to configure a connection from a Teacher-Producer on one node to a Learner-Consumer on another are:

1. On the consumer node, press the blue button repeatedly to select a specific Consumer and its response. The Consumer node has 32 red LEDs that are associated with each of the specific outputs. Its LED will flash one long-blink to show it will be activated when it receives the learned-event, and will flash one short-blink to show it will be deactivated on receipt. Now press the Gold button. That Consumer is now selected to be the Learner. 2. On the producer node, press the gold button once. This puts the node into Teach mode. The Producer node has 32 green LEDs that are associated with each of the specific inputs. Push the blue button enough times to select a specific Producer node that you want to be the teacher. Its LED will flash with a long-blink to indicate it will teach an activation-event, and a short-blink to indicate it will teach a deactivation-event. Now press the gold button to complete its

selection as the Teacher. This also sends the Learn Event message with the selected Event ID of this producer. You will see the blue light on the Consumer node flash briefly, confirming that the message has been sent. The previously selected Learner will now respond to this Event ID.
The user will need to repeat the process again to set up the inactivate event.

8.2 Notes

Each Producer/Consumer starts with two unique default Event IDs configured, one associated with activation, and one with deactivation. Because they are unique, it ensures that the created connection doesn't interfere with others.

The teaching process is actually much more general than suggested above. You can teach in the opposite direction, i.e. teaching from a Consumer to a Producer so any Consumer/Producer can be the Teacher. In addition, you can teach multiple Producers/Consumers at the same time by selecting them all, before sending the Learning-event. You can also add a new Consumer/Producer to the existing connection by teaching it from any Producer/Consumer that is already part of that connection.

Chapter 9

JMRI Programming

JMRI is available for download at http://jmri.org. JMRI Main Screen

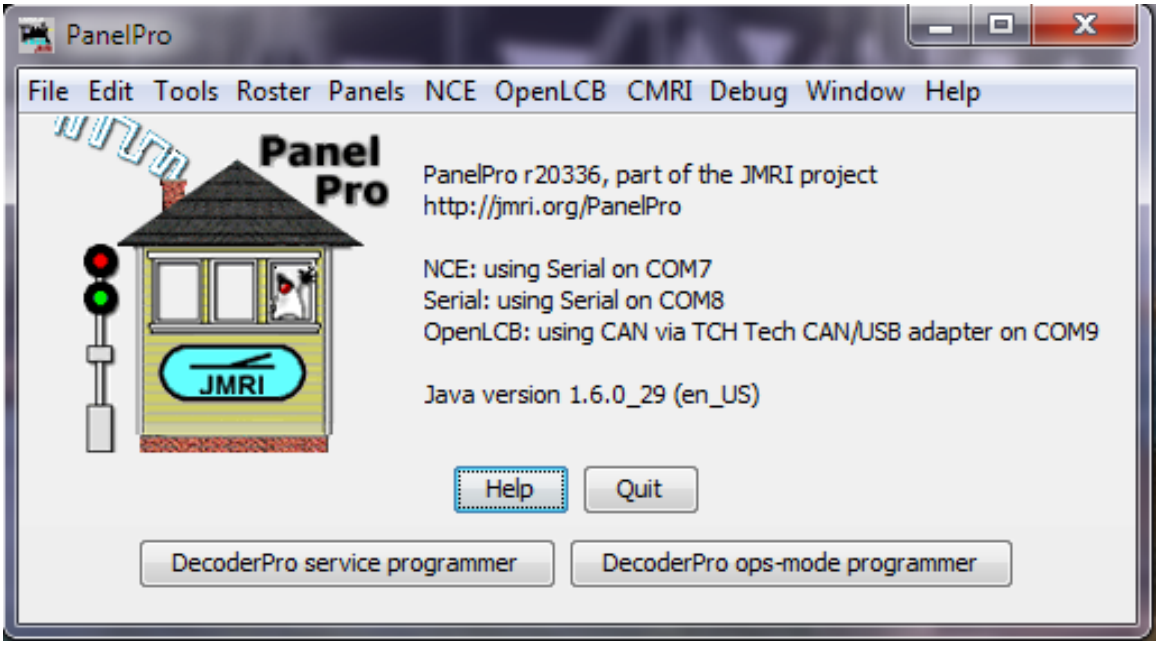


Figure 9.1: JMRI Panel Pro.

9.1 JMRI Preferences

9.1.1 Connections

JMRI Preferences Screen. Select OpenLCB for your connection.

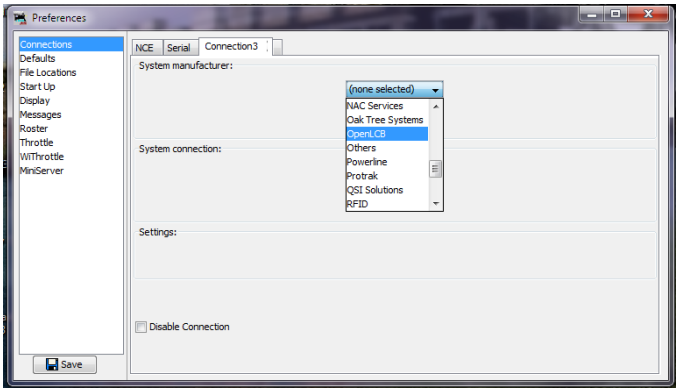


Figure 9.2: JMRI Preferences.

9.1.2 TCH Tech Adapter

Select the "CAN via TCH Tech CAN/USB adapter"

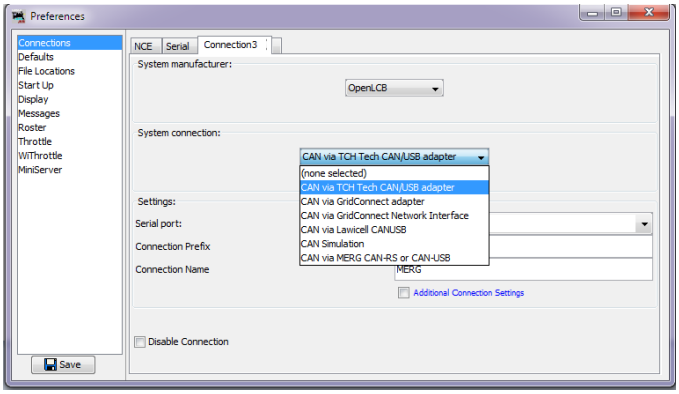


Figure 9.3: JMRI TCH Tech CAN/USB Adapter.

9.1.3 JMRI comport

Select the "COM Port"

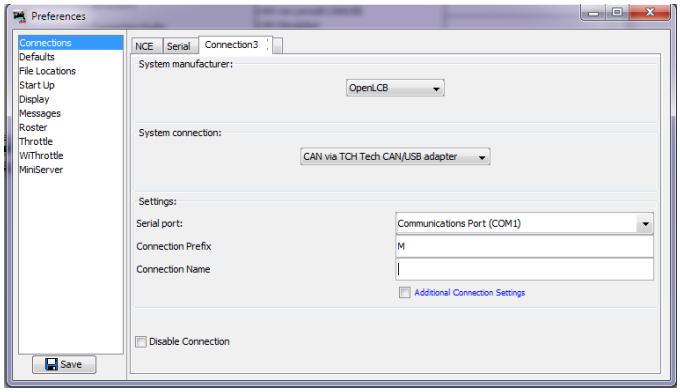


Figure 9.4: JMRI comport.

9.1.4 JMRI baud rate

Type in your "Connection Name" usually "OpenLCB". Additional Connects are for baud rate and are not used.

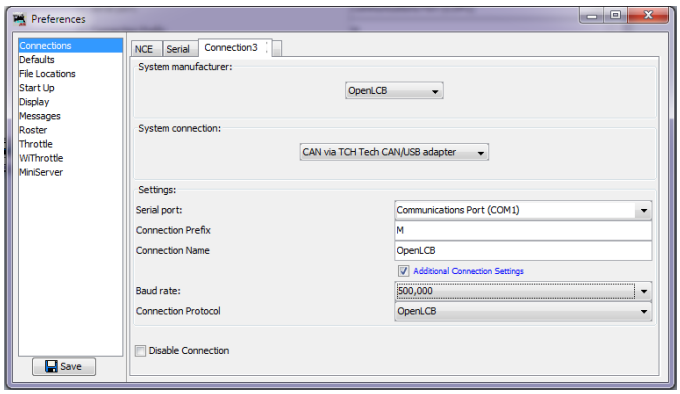


Figure 9.5: JMRI baud rate selection can be disregarded as the baud rate is automatic.

9.1.5 JMRI complete

Click save, and if asked, click OK to restart. Your connection to JMRI should now be complete.

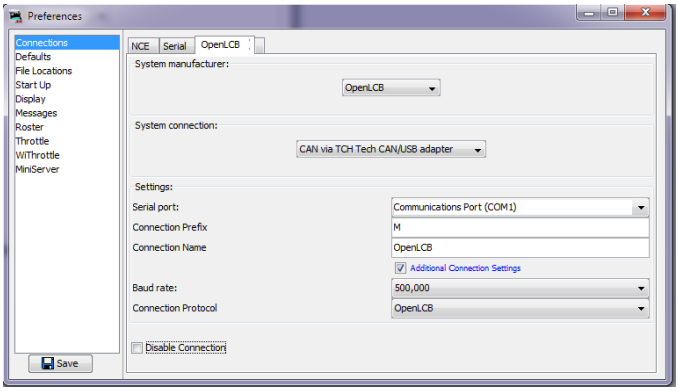


Figure 9.6: JMRI Completion.

9.2 Configuring an OpenCLB/NMRAnet Node

After you have started JMRI and have set up the connection from JMRI to the OpenLCB interface, click the Menu "OpenLCB", a drop down box will appear. See Figure 9.7

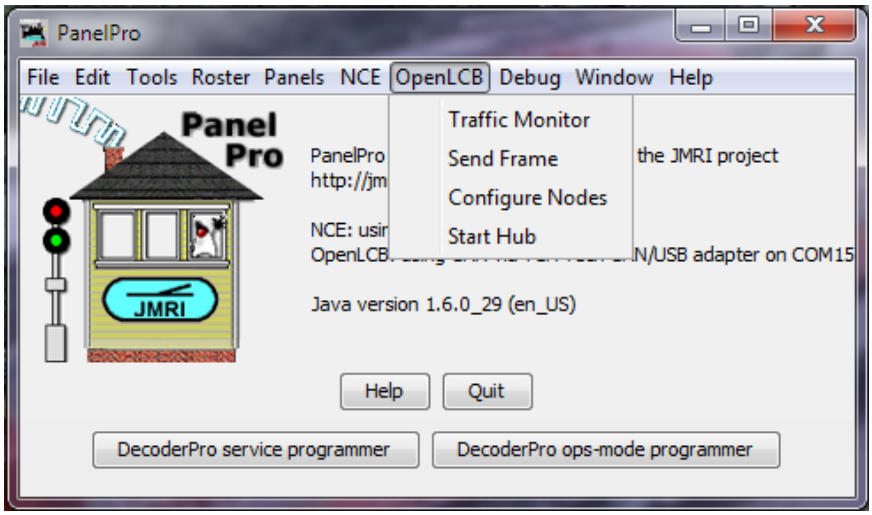


Figure 9.7: JMRI Menu.

9.2.1 Traffic Monitor Screen

Clicking on the menu "Traffic Monitor" will bring up the Traffic Monitor Screen. This screen is a convenient way of monitoring the input and output of the OpenLCB/NMRAnet bus. All traffic on the bus is monitored with this screen.

The "M" designates the"computer node" is sending traffic. The "R" designates a "node" on the bus is sending traffic. SeeFigure 9.8

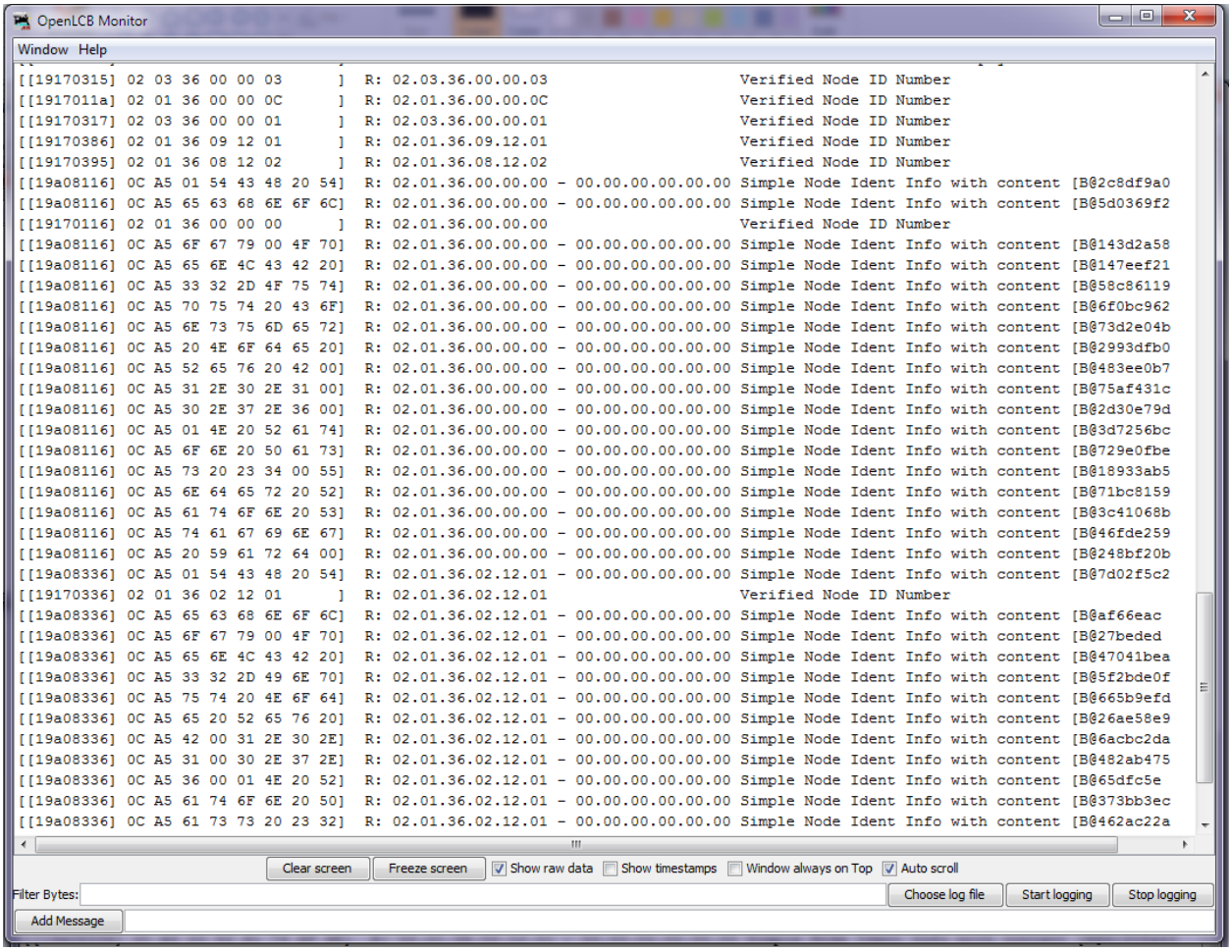


Figure 9.8: JMRI OpenLCB Traffic Monitor.

9.2.2 OpenLCB Network Screen

Clicking on the "Configure nodes" in the JMRI menu will bring up the OpenLCB Network Screen. The OpenLCB Network Screen shows all nodes connected on the OpenLCB/NMRAnet bus. It shows the node ID of the nodes connected. Clicking on the "+" will drill down a layer to reveal more options and information. See Figure 9.9

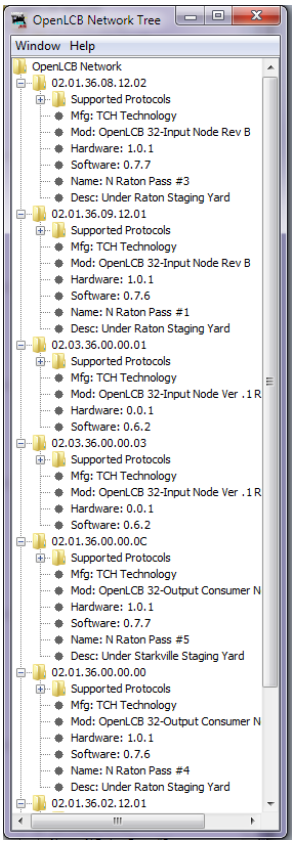


Figure 9.9: JMRI OpenLCB Network Screen.

9.2.3 CDI Screen

To get to the CDI screen, click on"+" next to Supported Protocols. Find the CDI in the list of Supported Protocols and click on it. This will bring up the CDI Screen. The CDI Screen (Configuration Description Information) gives all the information contained in the node. See Figure 9.10

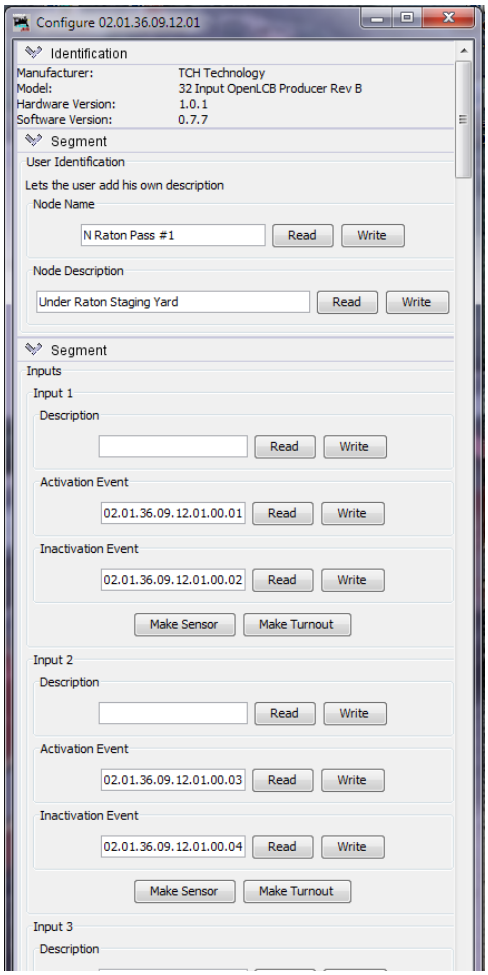


Figure 9.10: JMRI CDI Screen.

9.2.4 Node Manufacturer information

The node manufacturer information screen (in the CDI screen) provides the information of who the manufacturer is, the hardware version and software version. See Figure 9.11

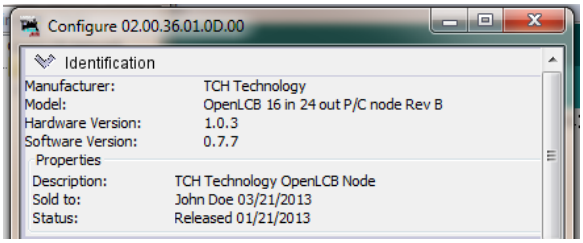


Figure 9.11: JMRI CDI Manufacturer Screen.

9.2.5 Node User information

User information provides two input boxes to input user information about the node. This information is provided by the user. Using the "Read" button to access the information and "Write" buttons to insert the information. See Figure 9.12

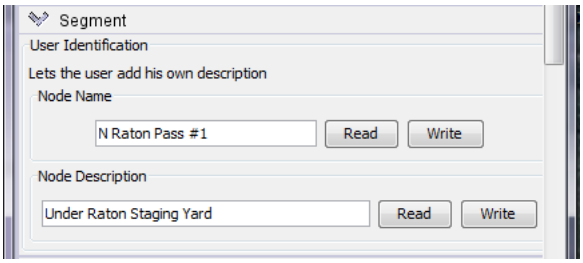


Figure 9.12: JMRI CDI User Input Screen.

9.2.6 Outputs

This screen provides information on the event ID's for the activation/ inactivation of the output. There are boxes which provide the activation/ inactivation with a read button and a write button to program in the activation/inactivation event ID's. See Figure 9.13

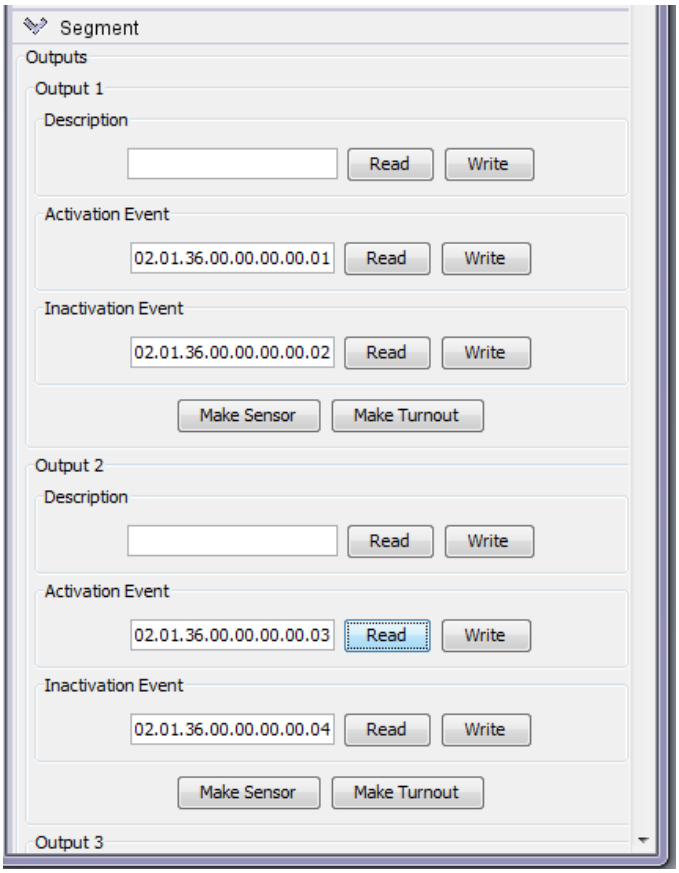


Figure 9.13: JMRI CDI Output Screen

9.2.7 Inputs

This screen provides information on the event ID's for the activation/ inactivation of the inputs. There are boxes which provide the activation/ inactivation with a read button and a write button to program in the activation/inactivation event IDs. See Figure 9.14

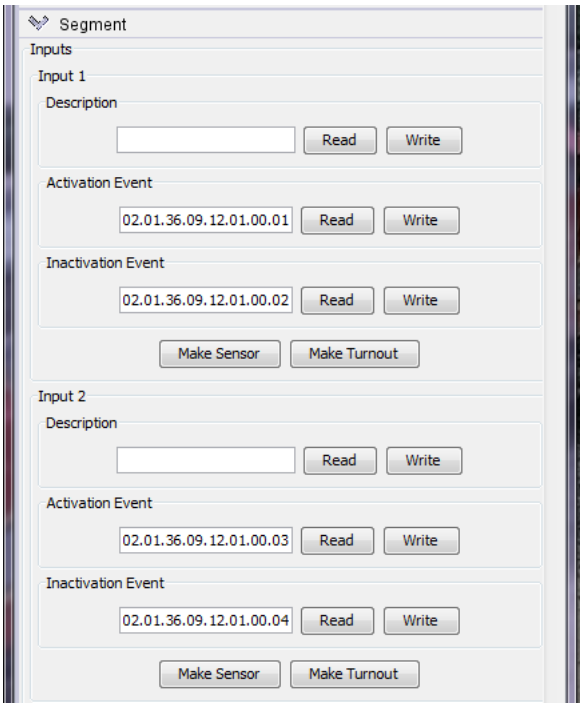


Figure 9.14: JMRI CDI Input Screen.

The "Make Sensor" and the "Make Turnout" tell JMRI to use events for it's own I/O.

9.2.8 Node Reset

The node reset screen gives options to reset the node back to original manufacturers defaults, or to new event IDs and clears all user names and information. See Figure 9.15

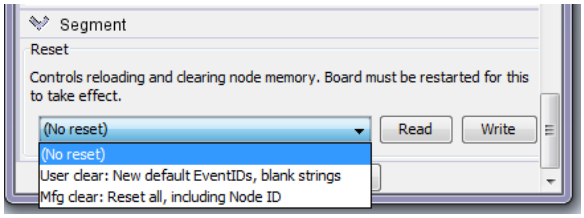


Figure 9.15: JMRI CDI Reset Screen.

Chapter 10

JMRI as an OpenLCB/NMRAnet Configuration Tool

This chapter will go into detail to show how JMRI can be used to configure nodes on the OpenLCB/NMRAnet bus.

10.1 List of supplies needed to use the Configuration Tool

- Computer with JMRI installed
- TCH Technology CAN/USB interface
- One OpenLCB/NMRAnet node
- Power supply
- Ethernet cable
- USB cable

10.2 Step by step process

1. Open the latest JMRI program available.
2. Set up the connection to OpenLCB.
3. Open OpenLCB Traffic Monitor.
4. Open OpenLCB Configure nodes.

10.2.1 Supported Protocols

This section is about the Supported Protocols in an OpenLCB node. When bringing up the OpenLCB Network Tree click on the "+" next to the folder named "Supported Protocols". This will reveal the "Protocol Identification Protocol" or "PIP". This identifies all of the protocols supported by the node. See Figure 10.1

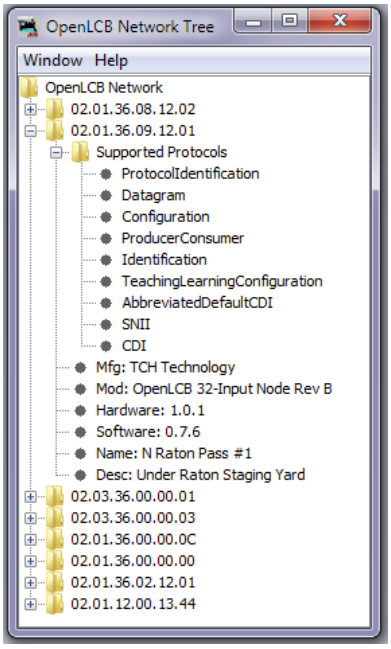


Figure 10.1: PIP Screen.

The node selected has nine types of protocols supported.
- Protocol Identification
- Datagram
- Configuration
- Producer/Consumer
- Indentification
- Teching/Learning Configuration
- Abbreviated Default CDI
- SNII
- CDI

10.2.2 Retrieve the CDI from the node

All OpenLCB/NMRAnet nodes sold by TCH Technology have an XML file embedded in the control processor. The XML file has all the information about the node, the protocols it supports and what functions can be performed. To configure the node, the user has to download the XML file. This file is called the "Configuration Description Information" or CDI. To retrieve the CDI from the node, open up the "OpenLCB Network Tree" by clicking on "Config Node" in the main menu. Drill down the tree by clicking on the node you wish to configure, and then "Supported Protocols". There will be a list of supported protocols, click on "CDI". See Figure 10.2

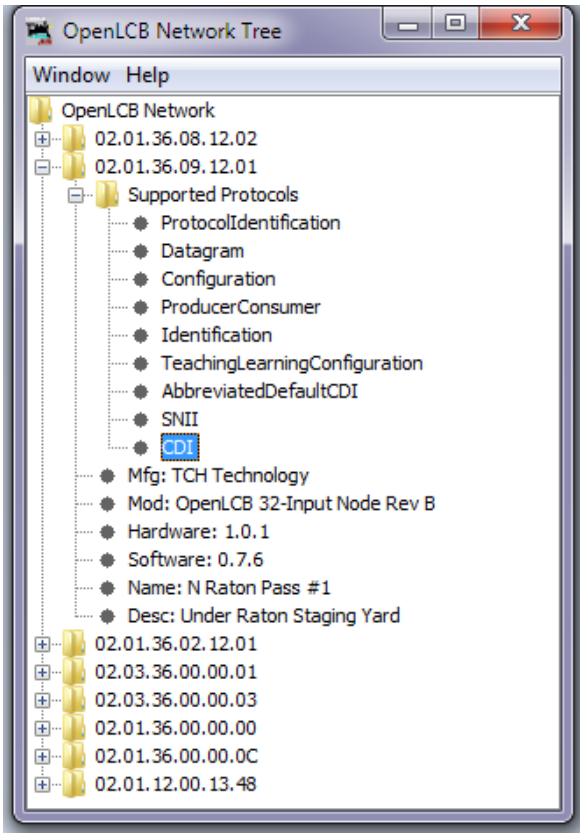


Figure 10.2: Retrieving CDI.

If you have your OpenLCB Traffic Monitor open you will see a considerable amount of traffic for a few seconds. This it the XML file downloading. After that is complete, a new screen will appear. See Figure 10.3

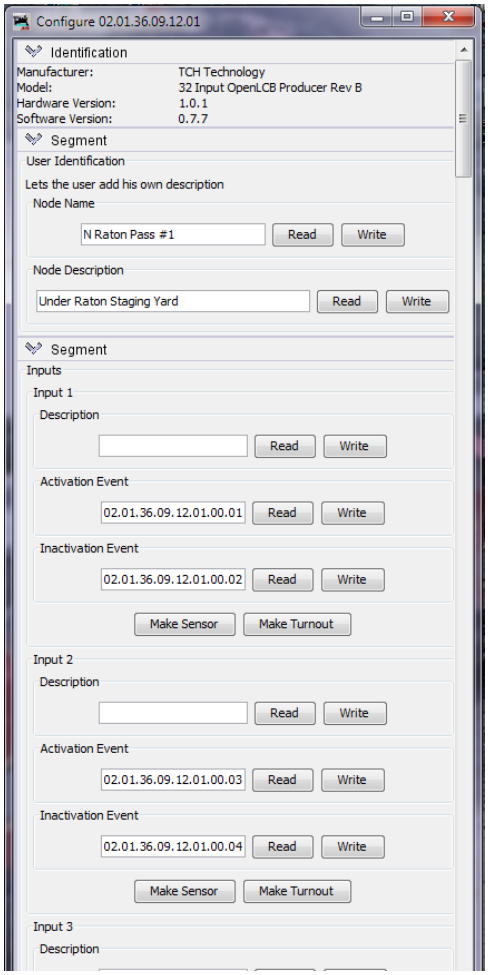


Figure 10.3: Configuration Description Information Screen.

10.2.3 User Information

Start out by moving down to the "User Information" segment. There are two boxes the user can input their own information. The input supports UTF-8 so any language is accepted. After the user types in what is desired, click on the "Write" button, and

the information will be written into the eeprom memory of the node. See example in Figure 10.4

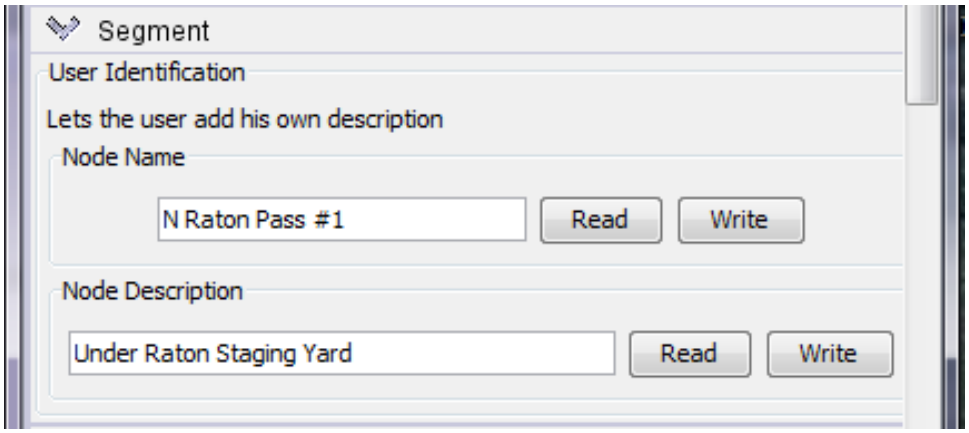


Figure 10.4: User Information Input Screen.

After the "Write" button is clicked, the user can verify what has been entered by clicking on the "Read" button. The input supports 20 characters for the Node Name and 30 characters for the Node Description, so if too many are put in, it will be truncated and will show when read back.

10.2.4 Output Segment

Next we can move on to put the description in for the Output. Again UTF-8 is supported. Type in what is to be desired, click on the "Write" button and the information will again be written in to eeprom memory. See Figure 10.5

Moving down the Output Segment, we have the Activation Event. This is the event which causes the output to activate. When the CDI is first read, then boxes will come up with all zeros. To see the default Activation Event you must click on the "Read" button. The event ID will be displayed in the box.

Now we have the Inactivation Event. This is the event the output responds to turn off the output. Click on the "Read" button to reveal the event ID.

The last two buttons in the Output Segment, are the "Make Sensor" and the "Make Turnout". This makes a very convenient way to produce a turnout in the Turnout

Table of JMRI. To make a turnout for an OpenLCB Consumer node, click on the "Make Turnout" button. Opening the Turnout Table in JMRI will reveal a turnout. If a Description has been written, it will be listed with the turnout. This is a nice feature.

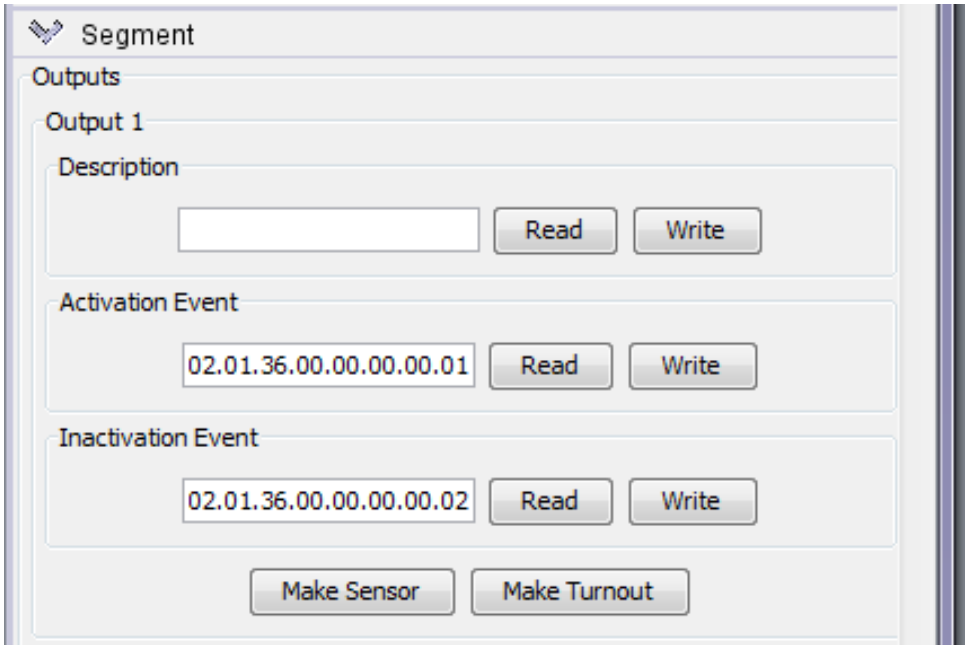


Figure 10.5: Output Segment Screen.

10.2.5 Input Segment

The Input Seqment is the same as the Output Segment. The same process is used. Click on the "Read" button to reveal the activate and inactivate event IDs. Then produce a sensor by clicking on the "Make Sensor" button. See Figure 10.6

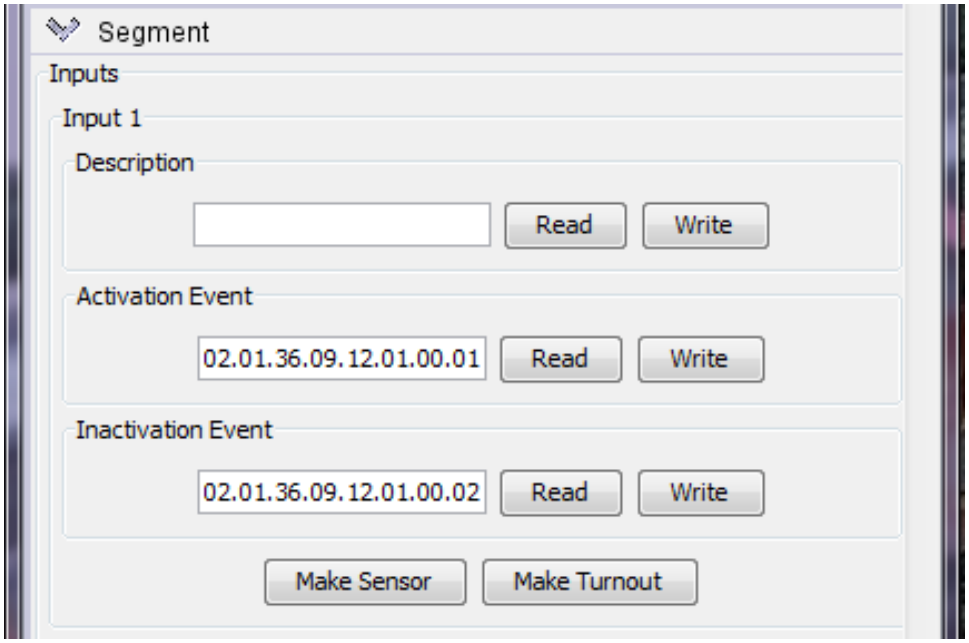


Figure 10.6: Input Segment Screen.

10.2.6 Reset Segment

The Reset Segment is used to Reset the node to original manufacture settings. Also, it can reset the node to clear out the User Identification name, description and all input/output descriptions. It will, at the same time set an all new block of event IDs. This is a powerful tool and there is a caveat to this. If a node has been in service for a time and has been set up to operate in a specific way with other nodes depend on the node is to be reset, those depend nodes will be affected. BE VERY CAREFUL. Think about the act before it is performed. See Figure 10.7

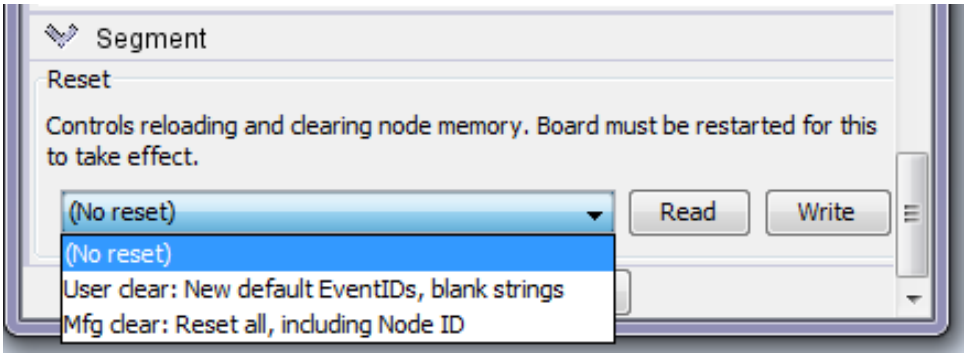


Figure 10.7: Reset Segment Screen.

To Reset, use the drop-down box and highlight the one to perform. Then click on the "Write" button. Once the "Write" button is clicked the act is performed. In order for it to take effect the board has to be restarted either by powering the node down, or pushing the reset button. A third way is to send a reset datagram to the node.

10.2.7 Programing the Event IDs

All TCH Technology OpenLCB node have default event IDs programed at the factory. The process will show how to change the event IDs at the users discretion. The user will start of with selecting a Producer node in the OpenLCB Network Tree and retrieving the Configuration Screen. Next, the user will retrieve the Configuration Screen of an OpenLCB Consumer. These two can be set up side by side. This will make the next step easier. See Figure 10.8

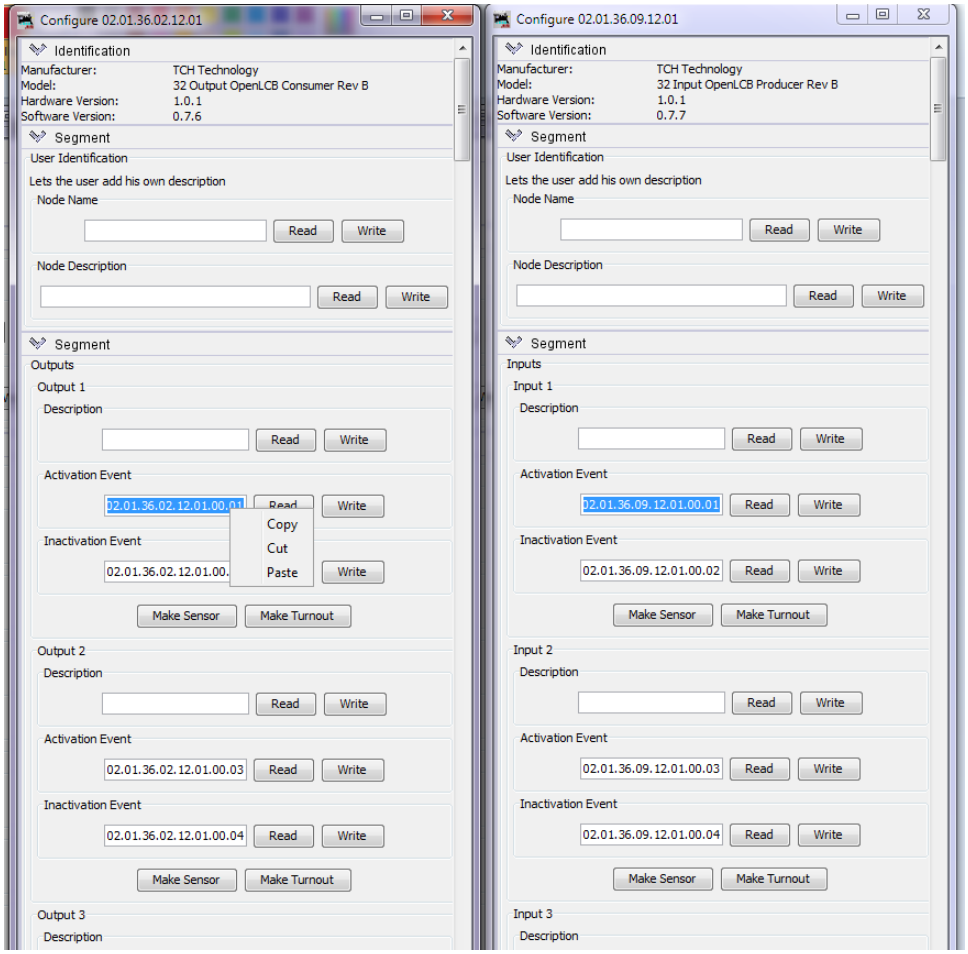


Figure 10.8: Configuration Screen for the Producer and Consumer side by side.

In this step the user has decided to use an input switch on the 32 Input Producer to trigger the output of a 32 Output Consumer. The user will select the "Activation Event Box" , in the 32 Output Consumer node using the cursor to select the complete Event ID as shown in Figure 10.8. Copy the selection. Then move to the 32 Input Producer node and again select the complete Event ID, then Paste that into the "Activation Event Box". Then click the "Write" button. The user can verify that the change was made by clicking the "Read" button. See Figure 10.9

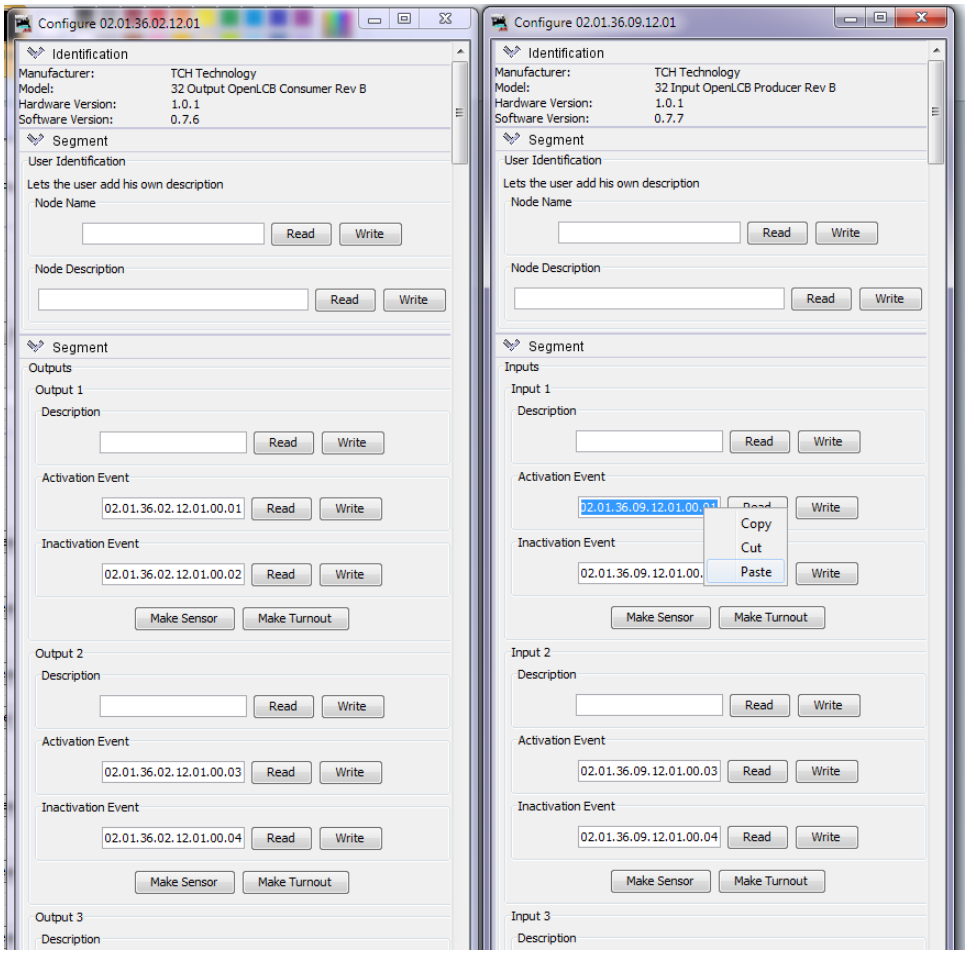


Figure 10.9: Configuration Screen Paste.

To complete this step the user must reset the node using the red reset button, or by sending the reset datagram via JMRI. The user then can continue to change the events at their discretion.
If the user does not like the way it has been set up or choose to start over. This is when the user may choose to use the factory reset in the previous chapter. See Figure 10.7

Chapter 11

Stacking nodes

Unique to all TCH Technology OpenLCB/NMRAnet nodes is the ability to stack nodes. The nodes have the option to add female connections on the top of the node and male connections on the bottom of the node. See Figure 11.1 TCH Technology is working on front panels that will match the front panels that are available for the CAN/USB interface. See Figure 11.2

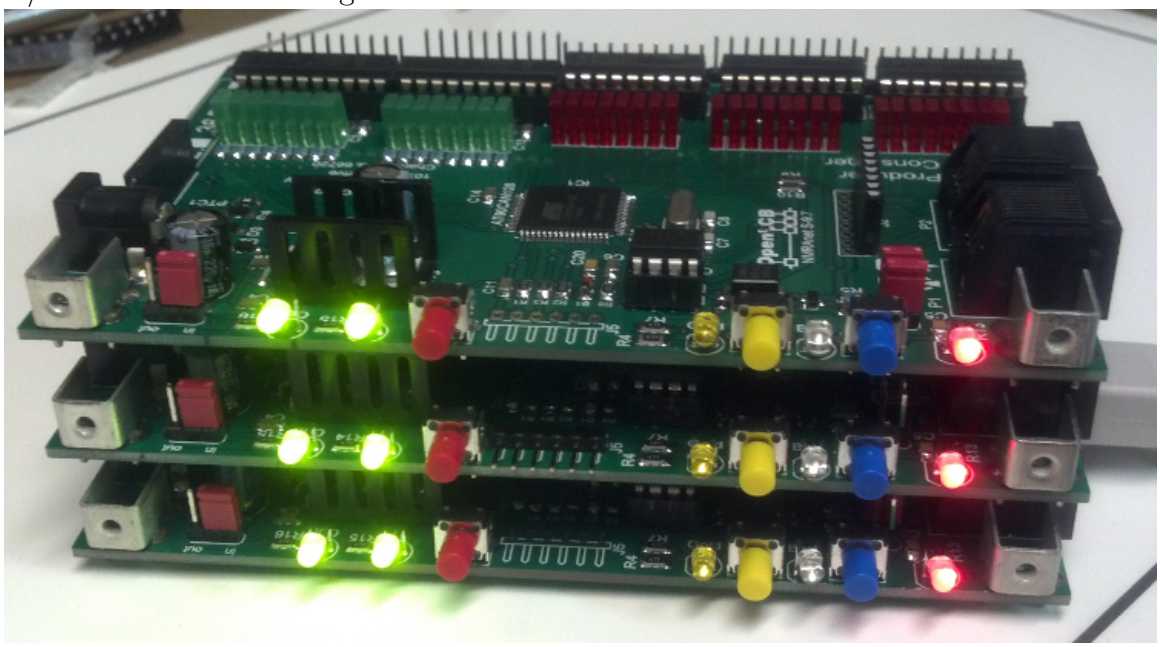


Figure 11.1: Stack of TCH Technology nodes.

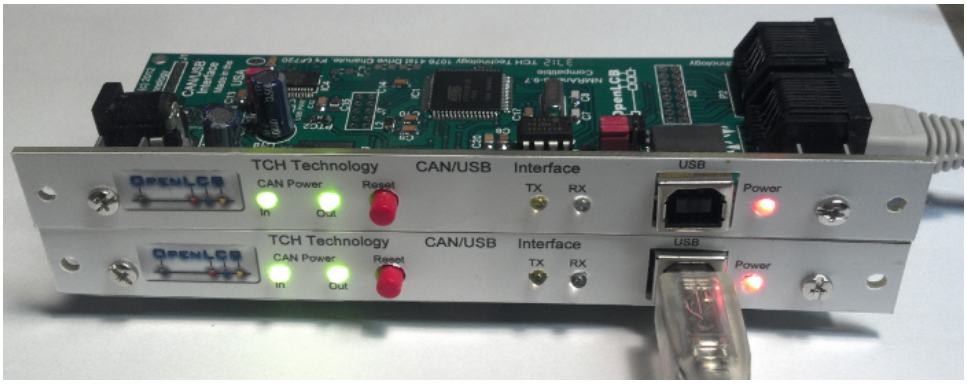


Figure 11.2: Stack of CAN/USB interfaces.

The advantage to stacking the nodes:

- Compact several I/Os
- Reduces CAN network cabling between nodes
- Reduces power cabling between nodes
- Helps in determining termination needs

See the TCH Technology web site to purchase the connectors that provide this option. http://www.tchtechnology.com/

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Limited Warranty

TCH Technology guarantees that every OpenLCB/NMRAnet product is free from physical defects in material and workmanship for a period of 1 year. TCH Technology does not give refunds for the return of any item that is fully functional. Within the first year, full repair or replacement will be made to the original purchaser of any item that has failed due to manufacturer defect. Should the item no longer be produced and the item is not repairable, a similar item will be substituted if a similar item is produced. The customer will pay shipping to and from the TCH Technology Warranty Center. The customer is to provide the original receipt. TCH Technology will return the items via First Class USPS.

After the first year a fair and reasonable service charge will be placed on each failed item returned for repair. Should the item no longer be produced and the item is not repairable a similar item will be substituted at TCH Technology's discretion and if a similar item is produced. The customer pays shipping to and from the TCH Technology Warranty Center.

This warranty is not valid if the customer has intentionally misused, mis-wired, or performed any unauthorized alterations to the product. In this case a service charge will be applied for all repairs and replacements. To protect the warranty please contact TCH Technology for authorization prior to altering any product.

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Release Version 0.0.3