

RackInjector Installation Manuals

PowerInjector Plus Sync Injection Board Appendix

Appendix Revision 9/11/2017

Introduction

This appendix documents the specific settings and configurations of the PowerInjector Plus Sync Injection Board for the PacketFlux RackInjector system. This manual supplements but does not replace the manuals for the RackInjector system. The RackInjector manuals provide the basis for understanding the information in this Appendix. Much of the information in this appendix is referenced in the RackInjector manuals.

Instead of writing out the entire name of the board each time we need to refer to it, we will instead refer to this board using its SKU: RI-PIPS.

System Requirements

The RI-PIPS board will only work in a RackInjector Chassis with a Control Board installed. At least one of the power sources on the RackInjector must be positive. The RI-PIPS board needs a small amount of power to operate. It will pull this power from the power source with the highest voltage.

If the sync pulse functionality is needed, then a working GPS receiver needs to be attached to the GPS In port on the RackInjector Control Board.

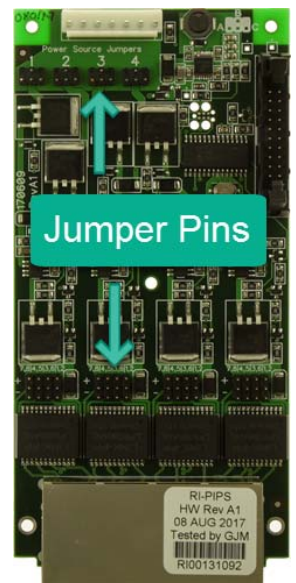
Hardware Configuration

The RackInjector Hardware Installation Manual provides information on how to configure the RackInjector system. This section supplements the information in that manual.

Individual Port Jumper Configuration

Each port has two sets of pins which require jumpers. The top set determines which voltage source that port should be powered from. The bottom set determines the pin polarity of each pair in the Ethernet cable for a given port.

Each port's jumpers correspond to the port's position on the board. The leftmost pair of CAT5 jacks correspond to port 1, and the leftmost set of jumpers are for port 1. The rightmost pair of CAT5 jacks correspond to port 4, and the rightmost set of jumpers are for port 4. The middle two sets are for ports 2 and 3, arranged sequentially between ports 1 and 4.



Selecting the Power Source

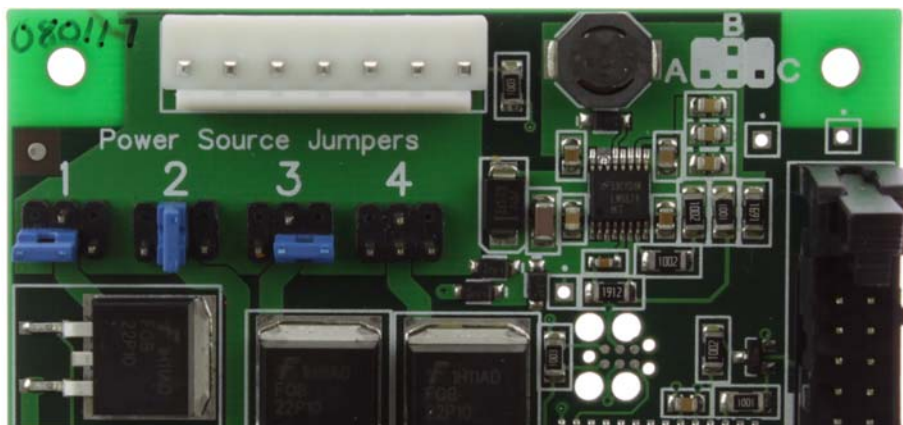
The RackInjector system has 3 power inputs. Each port on the RI-PIPS board can be set to pull power from any one of the three inputs. The power input needs to have sufficient power for the PoE powered device, and also needs to be of the correct voltage for that device.

NOTE: *The RI-PIPS board does not support negative (-48VDC) power sources.*

The RI-PIPS board does not transform the voltage received, so to provide the correct voltage to a particular powered device, you will need to both connect a power supply matching the voltage needed to a specific input on the control board, and also select the correct power source on the RI-PIPS board.

Once you have determined which power source will be attached to each power input on the control board, you then need to use a jumper to select the correct power source for each port. Near the rear of the board are four sets of pins which are labeled “Power Source Jumpers”, one for each port. Each pin set has three positions to place a standard jumper (provided) – one horizontally on the left two pins, one vertically on the middle two pins, and one horizontally on the right two pins. The illustration shows the three possible positions, and one port with no jumper attached.

Note: *Because of the position of the signaling ribbon cable in the RackInjector, you may find it easier to remove the ribbon cable before changing these jumpers. Please see the Hardware Installation Manual for this procedure.*



To select a particular power source, set the jumper as appropriate for the power source you are selecting for that port. The left position selects Power source A, the center position selects power source B, and the right position selects power source C. With no jumper in place the port will not be powered.

There is a drawing of the jumpers in the upper right hand side of the board to help you remember if you are configuring a board without the help of this manual.

Configuring the Injection Scheme

Near the front of the board there are four more sets of pins. Adding jumpers sets the PoE scheme for each port. Each port can be configured to any PoE scheme where both wires in a given pair are assigned to the same polarity.

Each block has four columns of 3 pins. Each column sets the voltage polarity for one pair in the CAT5 cable. For example, the first pin sets the voltage polarity for the pair which is attached to pins 7 and 8

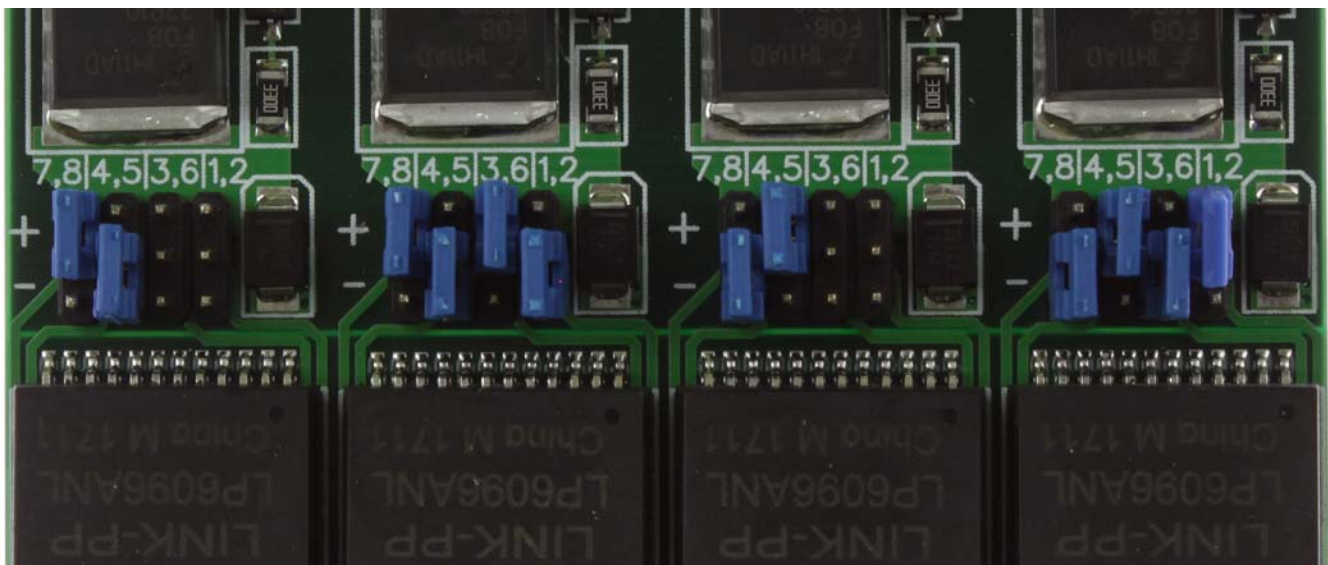
on the CAT5 cable (normally brown). Both pins will be connected to the same polarity. The remaining columns are for pins 4&5, pins 3&6, and pins 1&2.

In each column there are three options for the jumpers: no jumper installed, jumper connecting the middle and top pin, and jumper connecting the middle and bottom pin.

With no jumper installed, no power is connected to this pair. In most power schemes, you will find that there will be two columns with no jumpers installed, however for higher-powered schemes, all 4 will be needed.

With a jumper installed across the middle and top pin, that pair will be connected to the Vin terminal for the selected power source. With a jumper installed across the middle and bottom pin, that pair will be connected to the Rtn terminal for the selected power source.

You will need to determine the correct scheme for your powered device.



The picture above shows the jumper settings for some common PoE injection schemes that we have encountered.

Port 1 is configured for traditional Cambium PtMP radios such as the 100, 450 and 450i series.

Port 2 is configured for a high powered Cambium PtMP radio such as the 450i (optional) and 450m (required).

Port 3 is configured for traditional Ubiquiti or Mikrotik radios

Port 4 is configured for high powered Ubiquiti radios such as the airFiber product line.

NOTE: Cambium 320 and 430 radios are not directly supported as the PoE scheme required by these radios needs a pin arrangement which is not gigabit compatible. However, these can be supported through a special cable. Please contact us for details if you need to power one of these radios.

Connecting Devices to the RI-PIPS Board

There are 4 sets of RJ45 jacks on the front of the board, arranged in 4 columns of 2 jacks. Each column corresponds to one port. In each column, the top jack connects to the powered device (radio, etc), and the bottom jack connects to your Ethernet switch or similar. Use standard CAT5 cable to make the connections, respecting the length limitation of Ethernet.

Firmware Operation

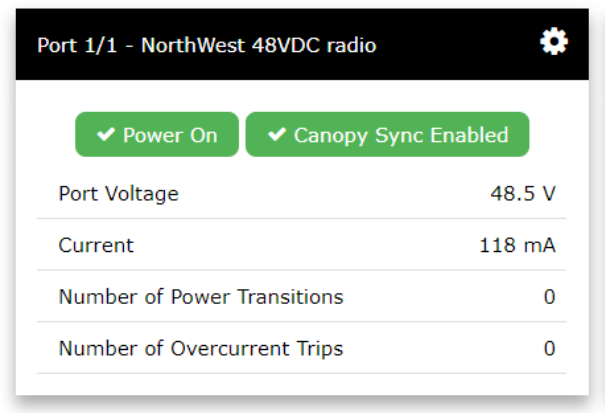
The RackInjector Firmware Operation Manual provides information on how to operate the web interface on the RackInjector system. This section supplements the information in that manual.

Slots and Ports Page

On the Slots and Ports page, the interface has a section for each injection board. This portion of this appendix describes the operation of this portion of the interface for the RI-PIPS board.

Each port has a separate section of the web interface. At the top of this section is a header which contains the Port Number and description of the powered device.

The Port number is listed in the form slot/port. So Port 1/1 is found in slot 1, port 1.



Port 1/1 - NorthWest 48VDC radio	
Power On	Canopy Sync Enabled
Port Voltage	48.5 V
Current	118 mA
Number of Power Transitions	0
Number of Overcurrent Trips	0

Immediately following the port number is a user settable description of that port. It can be changed by clicking on the gear icon to the right. This description is stored in the memory in the control board, so that even if a RI-PIPS board is replaced, the description will remain.

Below the header are two buttons. One provides the power status and one provides the status of Canopy sync on this interface. The color and icon of each button changes depending on the status. We will cover the functionality of these buttons in a few paragraphs.

Below the buttons are various statistics about the port:

Port Voltage. This shows the power being provided to the port by the selection jumper. Even if the port is off, the voltage will still display, however it will have a strike-through over it. It is important to understand that this voltage is read before the power switching circuitry so that you can determine the configured voltage for a port even if it is off.

Current. This is a relatively inaccurate indication of the current being consumed by the port. This current readout is a side effect of the way we have implemented overcurrent protection on the RI-PIPS

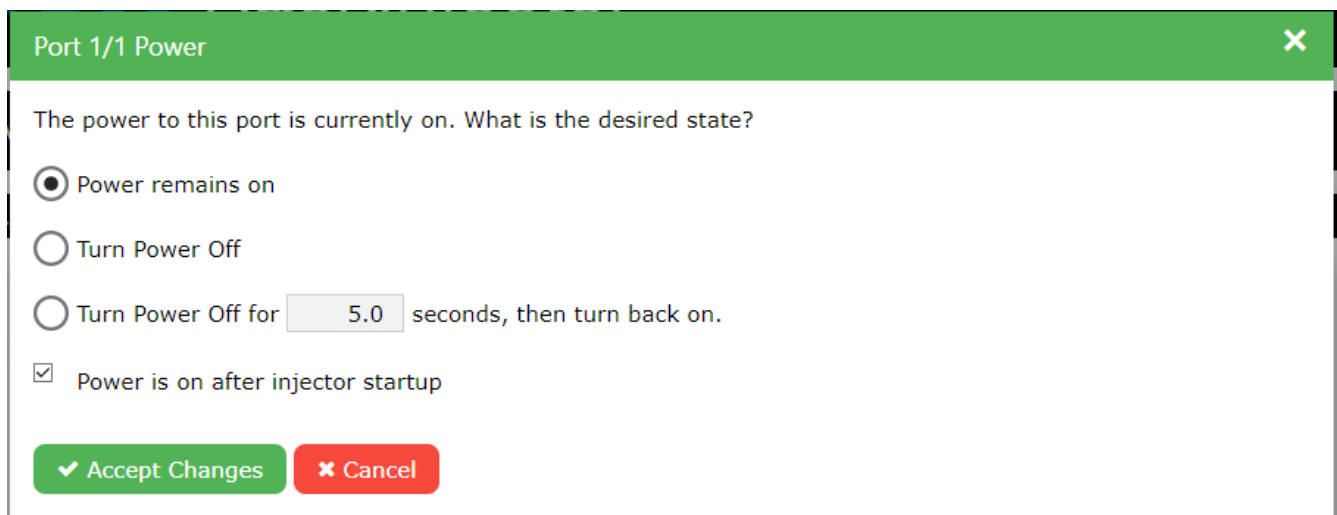
board. It has been designed to handle lots of abuse, including high current short circuit conditions and similar. As a result, the accuracy at the lower currents which are typically found in normal operations is marginal. We find that this reading is close enough to provide a rough idea of how much power a powered device is taking, but should not be utilized in the same way that a high accuracy current reading would be.

Number of Power Transitions. This is a count of how many times this port has turned from on to off, and from off to on. Thus, turning a port off and then back on will result in this counter increasing by two.

Number of Overcurrent Trips. This counts how many times this port has been in the ‘tripped’ state which means that an overcurrent condition has been detected.

Changing Port Power State

To change the power state of a port, simply click on the power button for the port. The dialog box below will pop up.



Port 1/1 Power

The power to this port is currently on. What is the desired state?

Power remains on

Turn Power Off

Turn Power Off for seconds, then turn back on.

Power is on after injector startup

This window should be self-explanatory. The options will change based on the current state of the port (for instance, if a port is in the ‘tripped’ state due to an overcurrent condition, it will give you options to reset the overcurrent and turn the power back on).

Two specific portions of this dialog box need clarification.

The first is the option which says ‘turn power off for ___ seconds, then turn back on’. When this is selected, the power for the selected port will turn off, then a certain number of seconds later, it will turn back on. During the time period where the cycle is in effect, an additional row “Power Cycle Time Remaining” will be added to the port status screen to indicate that a cycle is in effect.

The second portion is the checkbox labeled ‘Power is on after injector startup’. By checking this box, you are indicating that after a power cycle or RI-PIPS board reboot that this port should be powered on. If you would prefer that a port be powered off after initial power on or after a reboot, then you

should uncheck this box. The setting for this checkbox is stored in the RI-PIPS board to ensure that power will be restored correctly even if the control board fails.

Changing Sync Pulse State

Changing the sync pulse state is very similar to changing the power state. That is: click on the appropriate button, and follow the prompts on the dialog screen.



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