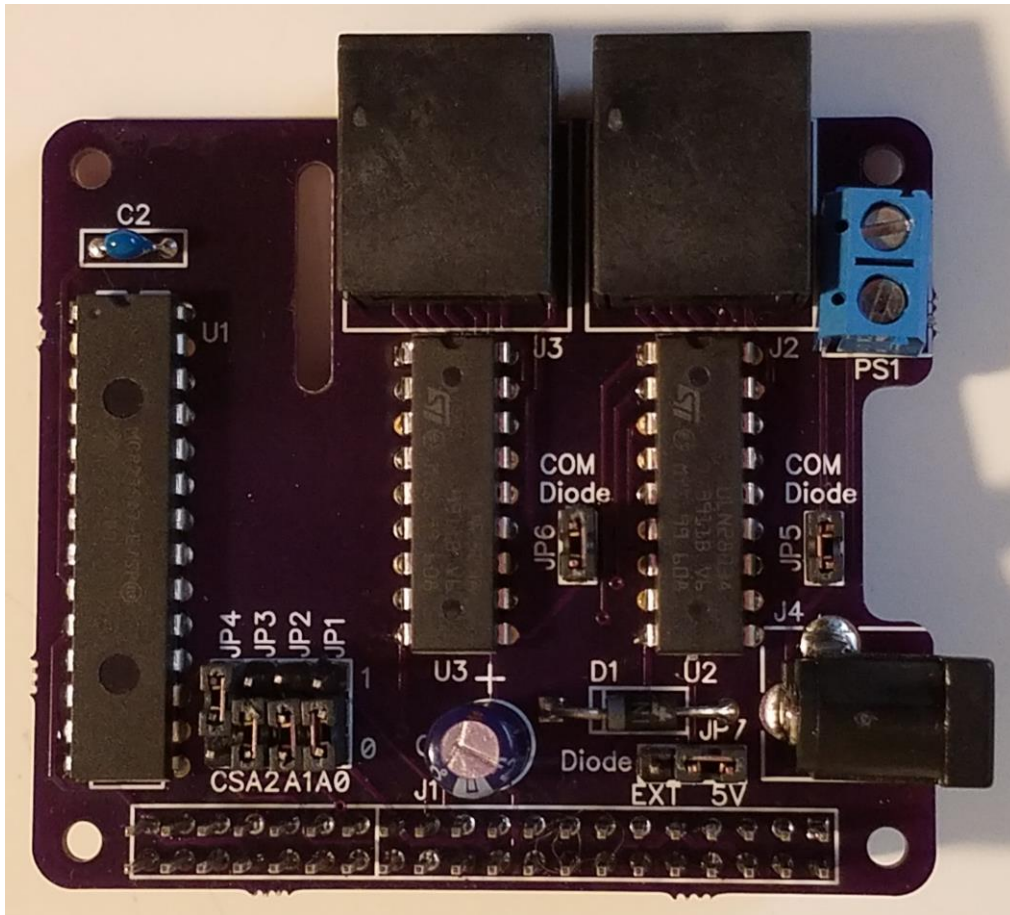


pod bay 3



PiRyte Mini 16 Channel Digital Output Beret Revision 1.0 User Manual

PiRyte Mini 16 Channel Digital Output Beret Installation and User Guide.

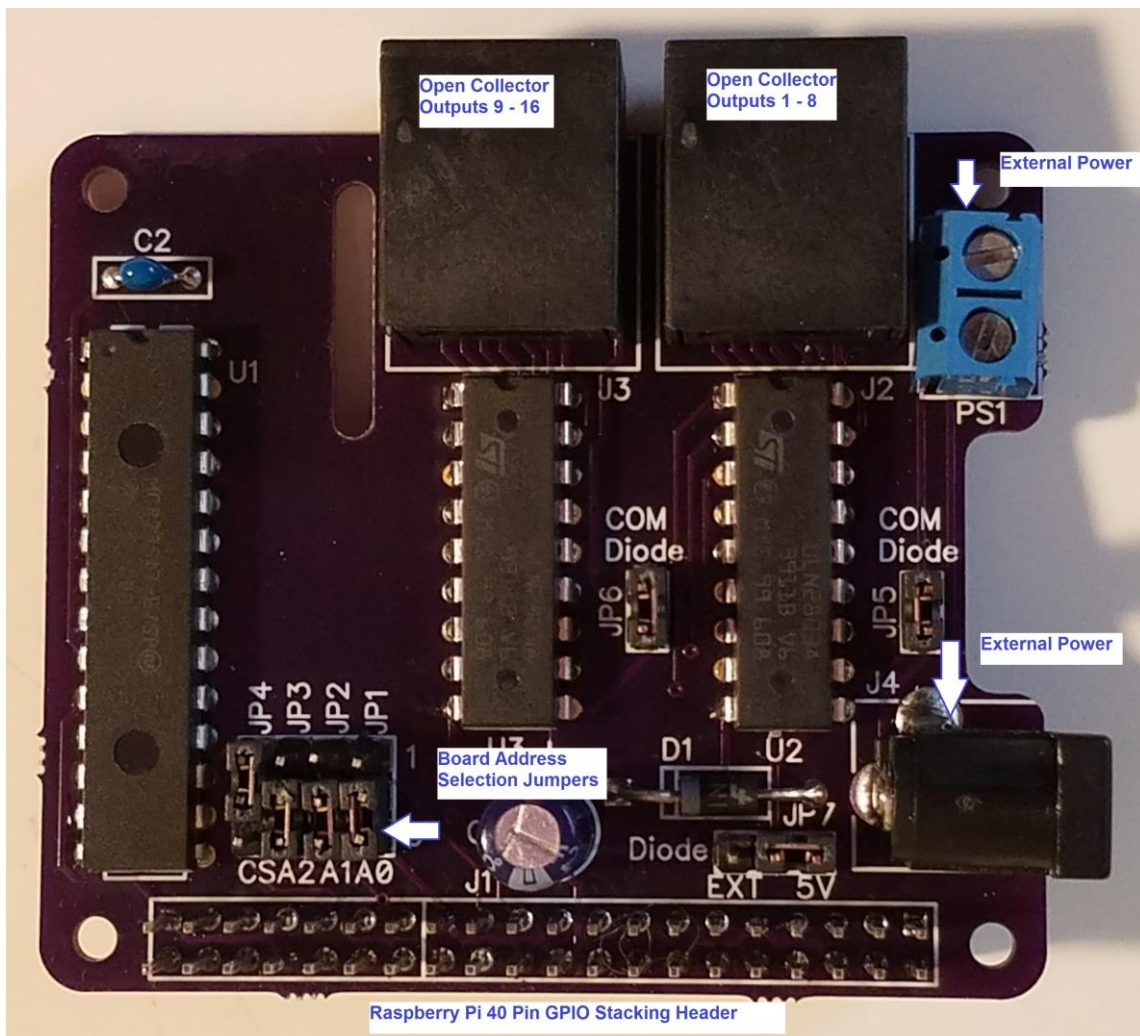
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Overview

Congratulations on your purchase of the PiRyte Mini 16 Channel Digital Output Beret interface board!

Please read this entire manual before using to ensure you receive maximum benefit from this board while protecting your investment in your Raspberry Pi/PiRyte stack.

While reading this document, please refer to the graphic below on the following pages.

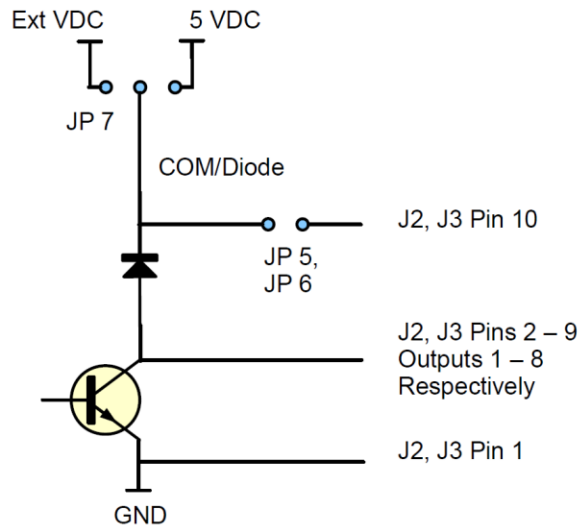


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Digital Outputs

The PiRyte Mini 16 Channel Digital Input Beret has the ability to control 16 open collector outputs. You have the option of using either the Raspberry Pi provided 5 VDC, an external supply, typically 12 VDC or no connection. If the device you are controlling is providing its own power supply, then you will need to remove JP 7 entirely. Also, if the device provides its own clamping diodes, or they are not required, then you may remove JP 5 and/or JP 6.



Each of the two jacks accepts RJ50/RJ45 type 10 conductor cables (10p10c). You can then break out the cable wires however you need to at the other end either by plugging the cable into an RJ50 type break-out board like the one below, or by separating it into individual wires at the termination points.

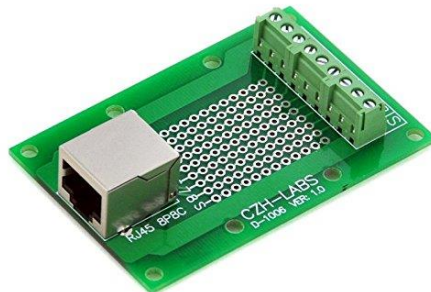


Figure 1: Readily available 10p10c RJ45/RJ50 breakout board

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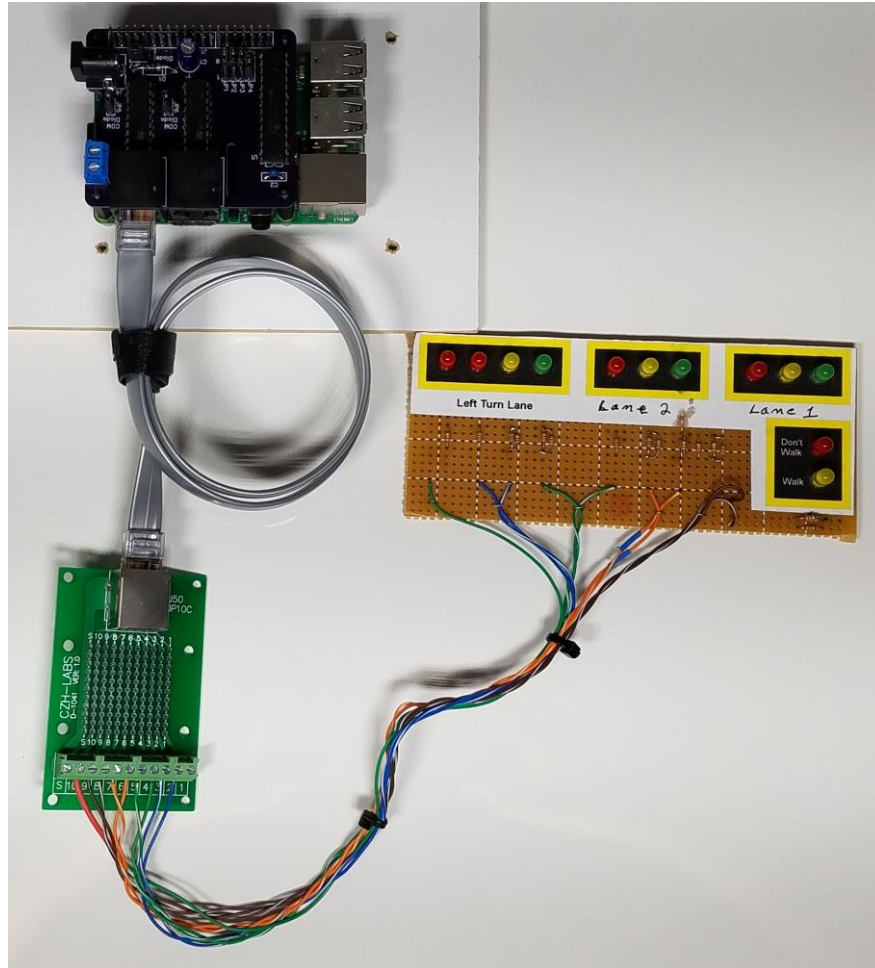


Figure 2: Output lines cabled to a breakout board

Please refer to the section titled “Output Mappings” for more information on breaking out individual conductors.

Mating the PiRyte Beret Board to the Raspberry Pi

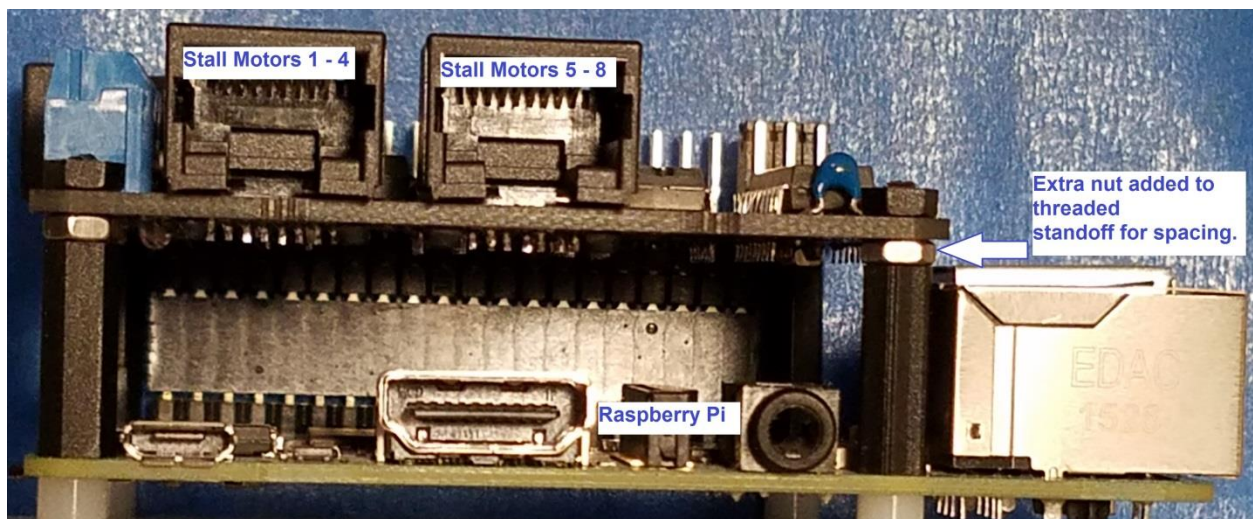
Your Mini Digital Output Beret conforms to the Raspberry Pi HAT specification with the exception that it does not have the configuration EEPROM. Additionally, the stacking headers and RJ45 jacks require that the spacing between boards to be a bit more than what is specified. Thus, it becomes a Beret and not a HAT.

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Initially, the stacking connector J1 will fit into mating connectors very tightly so care must be taken to not damage boards or bend connector pins by using too much force if you wish to separate the boards later on. Therefore, it is recommended to use a rocking approach for both stacking and separating boards. For example, when stacking, gently seat the top board on top of the bottom board ensuring that J1 is properly aligned. Pick one end of the board and gently apply pressure. Release pressure, then move down along the connector and apply pressure again and so on back and forth until the two boards are properly seated. Use the same principals when separating the boards; do a little bit at a time working back and forth along the connectors.

It is recommended to use the threaded standoffs that come with the board to ensure a tight mechanical fit. If this board is the first to be stacked on top of the Raspberry Pi, then use the extra nuts as spacers shown in the image below. This will ensure proper spacing between the Raspberry Pi and the Mini Digital Input Beret. You do not need the extra spacing for additional boards mounted on top of the first board.





I/O Extender Address and I/O Extender Channel Selects (JP1, JP2, JP3, JP4)

This PiRyte Mini Beret uses an MCP23S17 I/O Extender communicating with the Raspberry Pi over an SPI buss. You have the ability to stack a total of sixteen 16 Channel Digital Output Berets using a combination of addressing and channel selects. Eight Output Berets go on channel 0 and another eight go on channel 1 to control a total of 256 outputs. JP1, JP2, and JP3 determine the address of the I/O extender while JP4 determines the channel select. Please refer to the accompanying tables for proper addressing.

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JP 4	Raspberry Pi Chip Select	Breezy4Pi Channel
CE 1 	CE 0	Channel 0
CE 1 	CE 1	Channel 1

PiRyte Mini SPI Chip Select Modes

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	JP 3 A0	JP 2 A1	JP 1 A0	Hex Address	Breezy4Pi Address
3.3 VDC				0X40	Address 0
GND					
3.3 VDC				0X42	Address 1
GND					
3.3 VDC				0X44	Address 2
GND					
3.3 VDC				0X46	Address 3
GND					
3.3 VDC				0X48	Address 4
GND					
3.3 VDC				0X4A	Address 5
GND					
3.3 VDC				0X4C	Address 6
GND					
3.3 VDC				0X4E	Address 7
GND					

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Output Mappings

J2 Inputs 1 - 8	Pin	MCP23S17
GND	Pin 1	
Input 1	Pin 2	GPA0
Input 2	Pin 3	GPA1
Input 3	Pin 4	GPA2
Input 4	Pin 5	GPA3
Input 5	Pin 6	GPA4
Input 6	Pin 7	GPA5
Input 7	Pin 8	GPA6
Input 8	Pin 9	GPA7
Common/Diode	Pin 10	

J3 Inputs 9 - 16	Pin	MCP23S17
GND	Pin 1	
Input 1	Pin 2	GPB0
Input 2	Pin 3	GPB1
Input 3	Pin 4	GPB2
Input 4	Pin 5	GPB3
Input 5	Pin 6	GPB4
Input 6	Pin 7	GPB5
Input 7	Pin 8	GPB6
Input 8	Pin 9	GPB7
Common/Diode	Pin 10	

The above tables are provided to aid in properly configuring software to control the MCP23S17 I/O extender on the PiRyte Mini Digital Output Beret.

If you're controlling the PiRyte Mini Digital Output Beret with the Breezy4Pi application a board template will be available on the Breezy4Pi.com website.

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Assembling the PiRyte Mini Digital Output Beret from a kit

We assume that if you are assembling the Mini Digital Output Beret from a kit that you are experienced in assembling and soldering circuit boards and their components.

The following order of assembly is recommended:

1. Solder in J1. Make sure that it is “upside down” i.e. with the female portion of the socket under the board so that it can mate with other PiRyte boards and the Raspberry Pi. For best results, make sure the socket is snug against the board and perpendicular to the board.
2. Solder C1, C2, and D1 .
3. Solder U1, U2, and U3. It is recommended that solder only a few pins per part then move on to another part. This allows parts to cool down and not over heat which can lead to damage of the I.C. If you choose to use I.C. sockets, then you won't have this issue.
4. Solder JPs 1 – 7.
5. Solder J2 and J3.
6. Solder J4 and PS1

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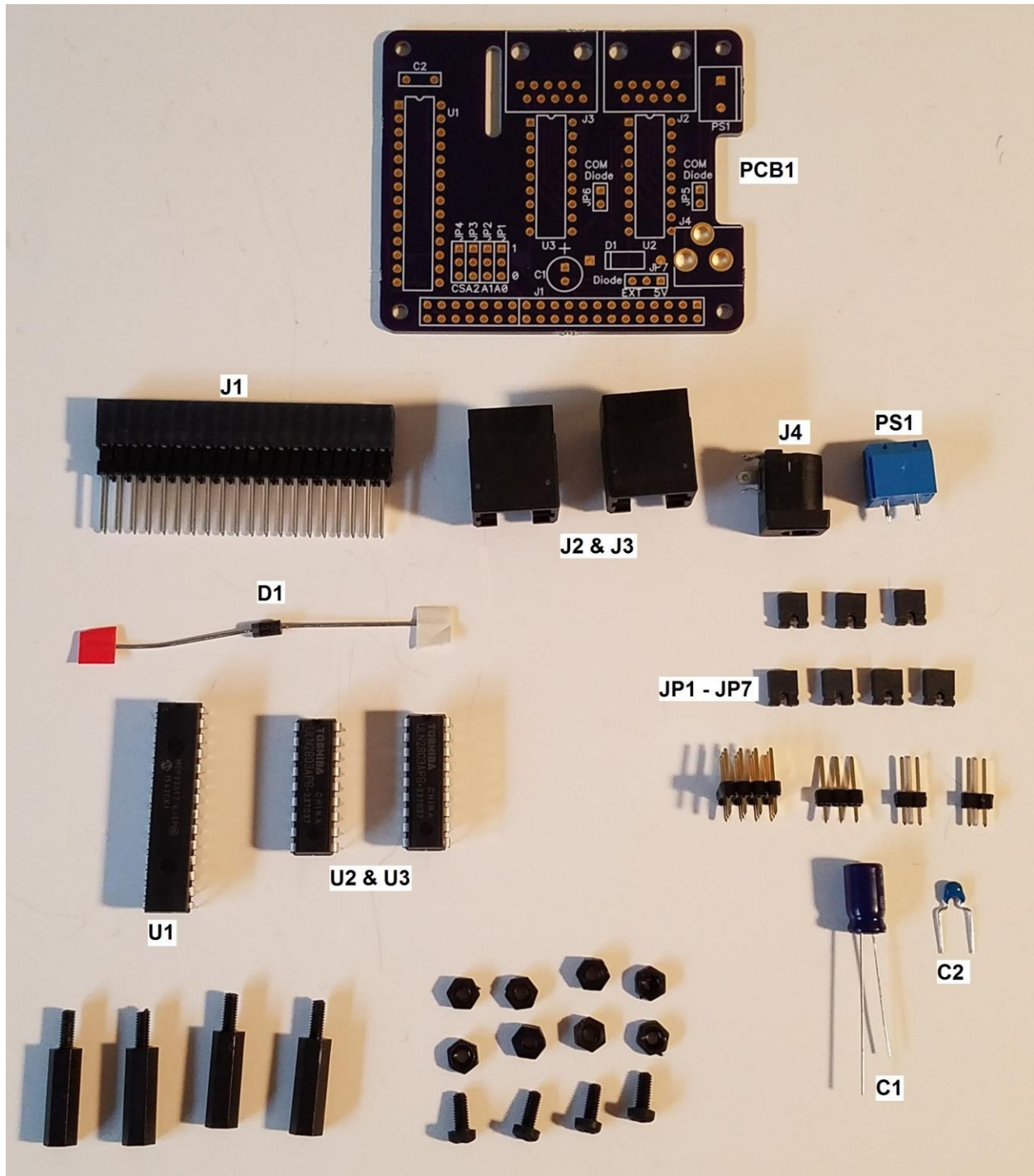


Figure 3: Parts Reference

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Warranty

Fully assembled PiRyte interface boards from the factory are warranted against manufacturing defects for a period of one year from date of purchase. As the circumstances under which this product is installed cannot be controlled, failure of this product due to installation problems will not be warranted. Such issues include but are not limited to: applying over voltages to digital inputs, not using clamping diodes on open collector outputs or trying to drive more current than the driver is capable, and improperly changing the shunts on power jumpers causing the interface board, the Raspberry Pi, or both to fail.

Unassembled kits are warranted for the parts only as home assembly cannot be controlled. However, if you do find yourself with a non-working board and have exhausted all attempts to fix the issue, then the board may be exchanged for a new kit at a discounted price.

Product that has failed for non-warranted reasons may be exchanged for new or equivalent functionality at a discounted price. Please email us using the "Contact Us" page at www.podbay3.com for more details.