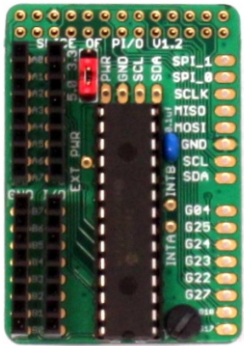# Slice of Pi/O v1.2
Getting started guide   CISECO

The Slice of Pi/O is the most popular way of buffering and protecting the I/O on the Raspberry Pi miniature computer. It provides 16 channels IN or OUT driven direct from the MCP23017 on board chip. The boards can be daisy chained to provide upto 128 ports.

The chip is I2C based so has an address selector on the back of the PCB, an address needs to be selected by soldering the pad jumpers.

1 You will need these tools

1 x Soldering iron
1 x Length of electronics solder wire (not plumbers solder)
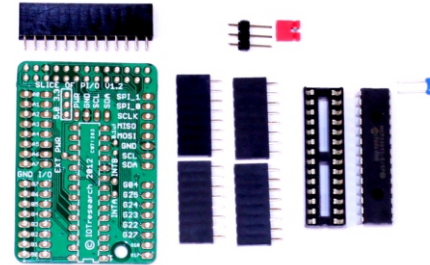1 x Side cutters

Optional but will make the build much easier

1 x Blob of Blutack
1 x Multimeter (preferably with continuity check)

Note: The Blutack is very good at holding parts while soldering. Checking the solder joints for good connections will in our experience save you time overall.

2 First check the contents for 13 items

1 x Printed circuit board (PCB)
1 x 2x13 female 2.54mm pitch connector
4 x 1x8 female 2.54mm pitch connector
1 x 1x3 male 2.54mm pitch connector
1 x Jumper 2.54mm shunt
1 x 28 pin IC socket
1 x 28 pin IC - MCP23017
1 x 0.1uf decoupling capacitor
1 x Nylon bolt
1 x Nylon nut

For help please email: somethingismissing@ciseco.co.uk

3 Deciding what order to fit the parts

We suggest you normally start with the smallest height parts first, leaving the larger parts till later on, this usually leaves most room to manouvere the iron.

Dry fit the parts

What is a really good thing to do on boards where the parts are close to each other is to do a "dry fit" first.
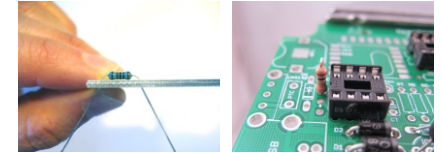
This means pushing parts into place without soldering so you can decide what order is easiest for you. Left handed people almost always decide to do things in a different order to a right handed person for example. The order is ultimately up to you so don't rush in, think about it first.

Not confident in soldering?

Google "soldering guide" or "soldering how to". There's many great articles that people have produced. There's videos on YouTube also. Soldering is simple to learn. Why not ask your local school / college for a little help or what we hope people have near them is a Hackspace or Makerspace (google it) they are brilliant places to join.

4 Solder the parts

Soldering normal electronic parts (some are in this kit)

1. Carefully push the part through the board, hold in place by either Blutack or gently bending the part legs before turning upside down to solder. DO NOT hold with your finger, most parts easily conduct heat, don't burn yourself!

Soldering connectors (some are in this kit)

1. Using the Blutack or your fingers, hold the connector in place and solder just a single pin at one end.

2. Check that the connector is aligned in every direction, if not simply reheat for a second or two and gently move. Avoid excessive heat and always be patient, soldering is a skill anyone can do badly, doing it well is about practice and not rushing things.

3. When you are happy, solder the pin at the opposite end of the connector. Check visually **very carefully** again as the is the last time it will be easy to move position of the part. Complete by soldering the rest of the connector pins.

Soldering surface mount parts (none in this kit)

1. Tin (cover in a coat of solder) a single pad first, put the part on top, perfectly aligned with the other pads. Melt the tinned pad so that the first pin is soldered down. Re melt till the part is aligned then solder the rest of the pads. Tweezers are perfect for holding parts, whilst soldering.

Handy tips for this kit (the Slice of Pi/O)

1. Only install the connectors you actually need for your project you can always add the ones you didn't use later if needed.

2. Don't forget to select the address selection (on the reverse page).

5 Locations of the parts

Solder the 2 row x 13 way header as shown (facing down)

The IC socket, capacitor and 3 pin male header (with jumper) should be soldered where shown below. The MCP chip needs it's legs gently bent inwards to fit into the socket. The Jumper selects either 5v or 3.3v operation. The direction of the small semicircular notch in the chip (and socket) are maked with a notch on the actual PCB legend (do not reverse the chip).

notch
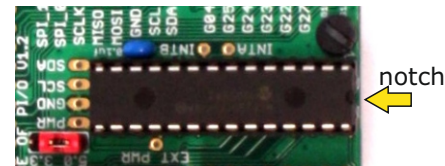
The single row 8 way 2.54mm sockets face upwards

The address selector is on the reverse of the board and detailed over the page in the schematic.
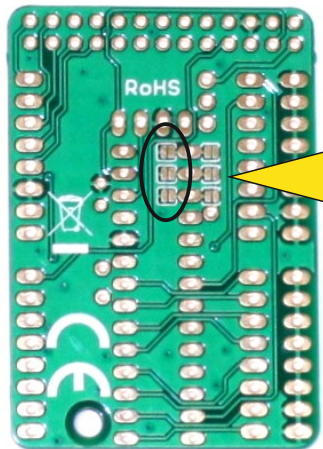
6 Check everything

Even if you are confident in soldering, please still check your work. Almost all the problems we see (where boards do not function correctly) are down to a poor/dry joint somewhere.

With a multimeter make sure you have good connections between the various pins. On the back of this page is the schematic layout so you can see what is connected where.

Testing & Building your projects

Build and test as you go in small stages, take your time and always check twice before soldering, this extra small amount of effort is always worthwhile. Rushing is the best recipe for getting things wrong, backwards or poorly soldered.

MCPPWR

IC1

9	VDD	GPA0	21
18	RESET	GPA1	22
		GPA2	23
		GPA3	24
20	INTA	GPA4	25
19	INTB	GPA5	26
		GPA6	27
		GPA7	28
12	SCL	GPB0	1
13	SDA	GPB1	2
		GPB2	3
15	A0	GPB3	4
16	A1	GPB4	5
17	A2	GPB5	6
		GPB6	7
10	VSS	GPB7	8

MCP23017SP

INTA
INTB

SCL
SDA

A0
A1
A2

GND

C1

GND

JP5

JP11

JP6

JP10

GND

Address Selection Jumpers

JP9
JP8
JP7
JP12
JP13
JP14

A0
A1
A2

GND

MCPPWR

I2C Expansion

JP4
SDA 1
SCL 2
GND 3
MCPPWR 4

Volatage Selection

JP3
3V3
5V0
JUMPER-3PTH
MCPPWR

SU1

3U3	1	2	5U0
SDA	3	4	
SCL	5	6	GND
GP7	7	8	TXD
	9	10	RXD
GP0	11	12	GP1
GP2	13	14	
GP3	15	16	GP4
	17	18	GP5
MOSI	19	20	
MISO	21	22	GP6
SCLK	23	24	SPI_0
	25	26	SPI_1

JP1
8 SPI_1
7 SPI_0
6 SCLK
5 MISO
4 MOSI
3 GND
2 SCL
1 SDA

JP2
8 GP7
7 GP6
6 GP5
5 GP4
4 GP3
3 GP2
2 GP1
1 GP0

RoHS

The 6 solder pads are used to select the address of the MCP23017

To select the default address of 0x20 simply melt a blob of solder between each of the 3 pairs of the left hand solder pads to join them.

The left hand pads connect to GND and the right to PWR, detailed information on addressing can be found on the Microchip website

http://ww1.microchip.com/downloads/en/DeviceDoc/21952b.pdf

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8 **The finish is just the start**

Now your kit is built here comes the interesting part. What are you going to do with it? Our forum is a great place to discuss your ideas with others. We love to hear what people are up to and have built.

Feel free to drop in and say hello. Our forum is not just about our products it's also intended for any discussion and sharing about the use of computers with microcontrollers, electronics and wireless.

www.openmicros.org
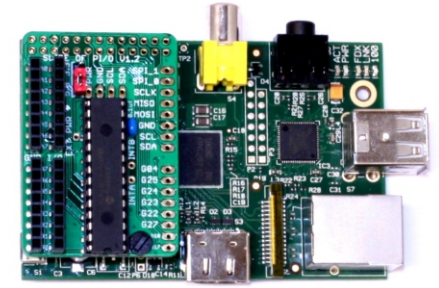
what your board will look when installed

CE RoHS Compliant 2002/95/EC