# Meet your GPIO Pins

Written by Ishita Gupta

This is your MangoPi
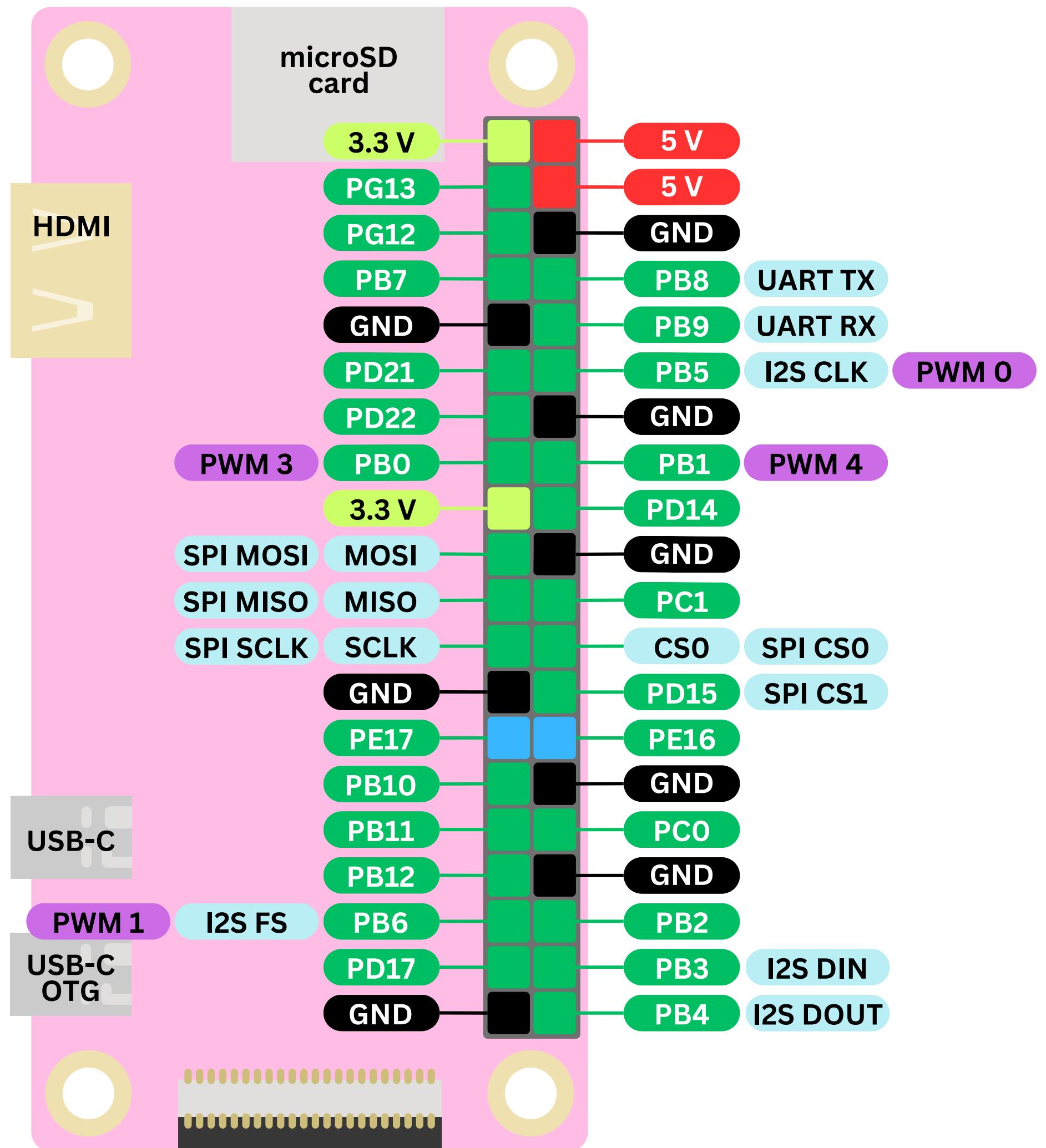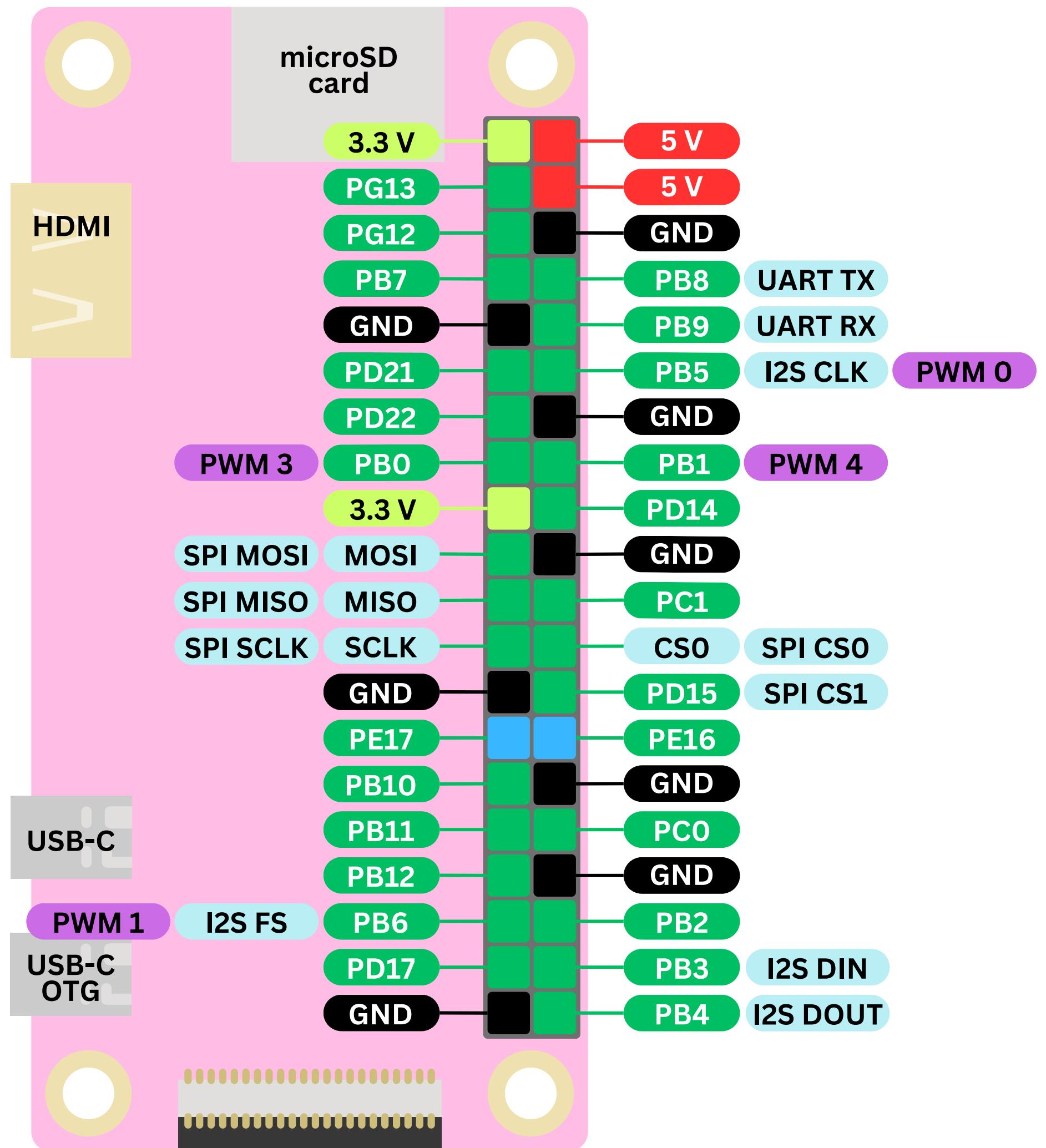
These are the GPIO PINS
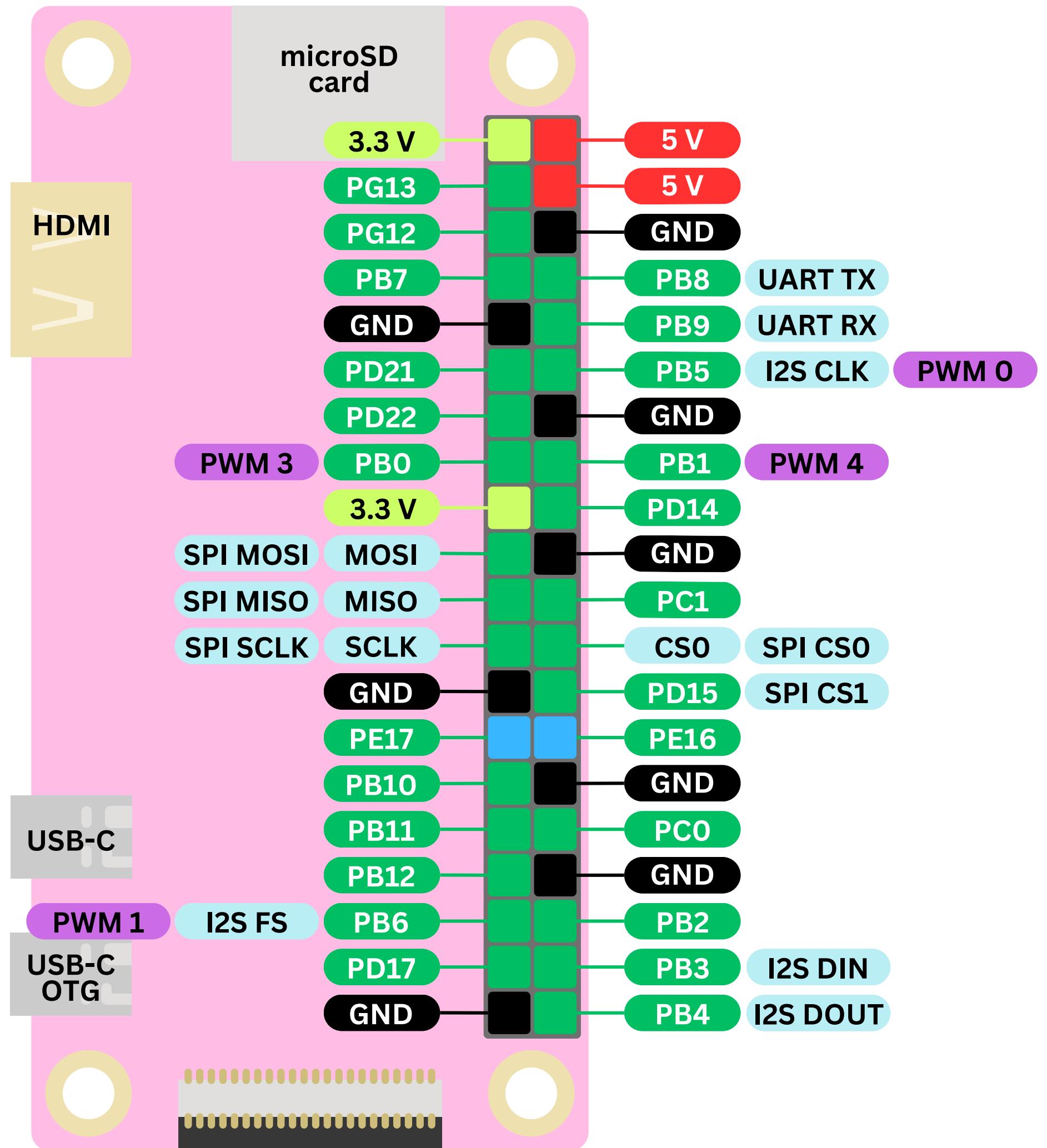
Lets understand how they are laid out

microSD card

3.3 V		5 V
PG13		5 V
PG12		GND
PB7		PB8 — UART TX
GND		PB9 — UART RX
PD21		PB5 — I2S CLK — PWM 0
PD22		GND
PWM 3 — PB0		PB1 — PWM 4
3.3 V		PD14
SPI MOSI — MOSI		GND
SPI MISO — MISO		PC1
SPI SCLK — SCLK		CS0 — SPI CS0
GND		PD15 — SPI CS1
PE17		PE16
PB10		GND
PB11		PC0
PB12		GND
PWM 1 — I2S FS — PB6		PB2
PD17		PB3 — I2S DIN
GND		PB4 — I2S DOUT

HDMI

USB-C

USB-C OTG
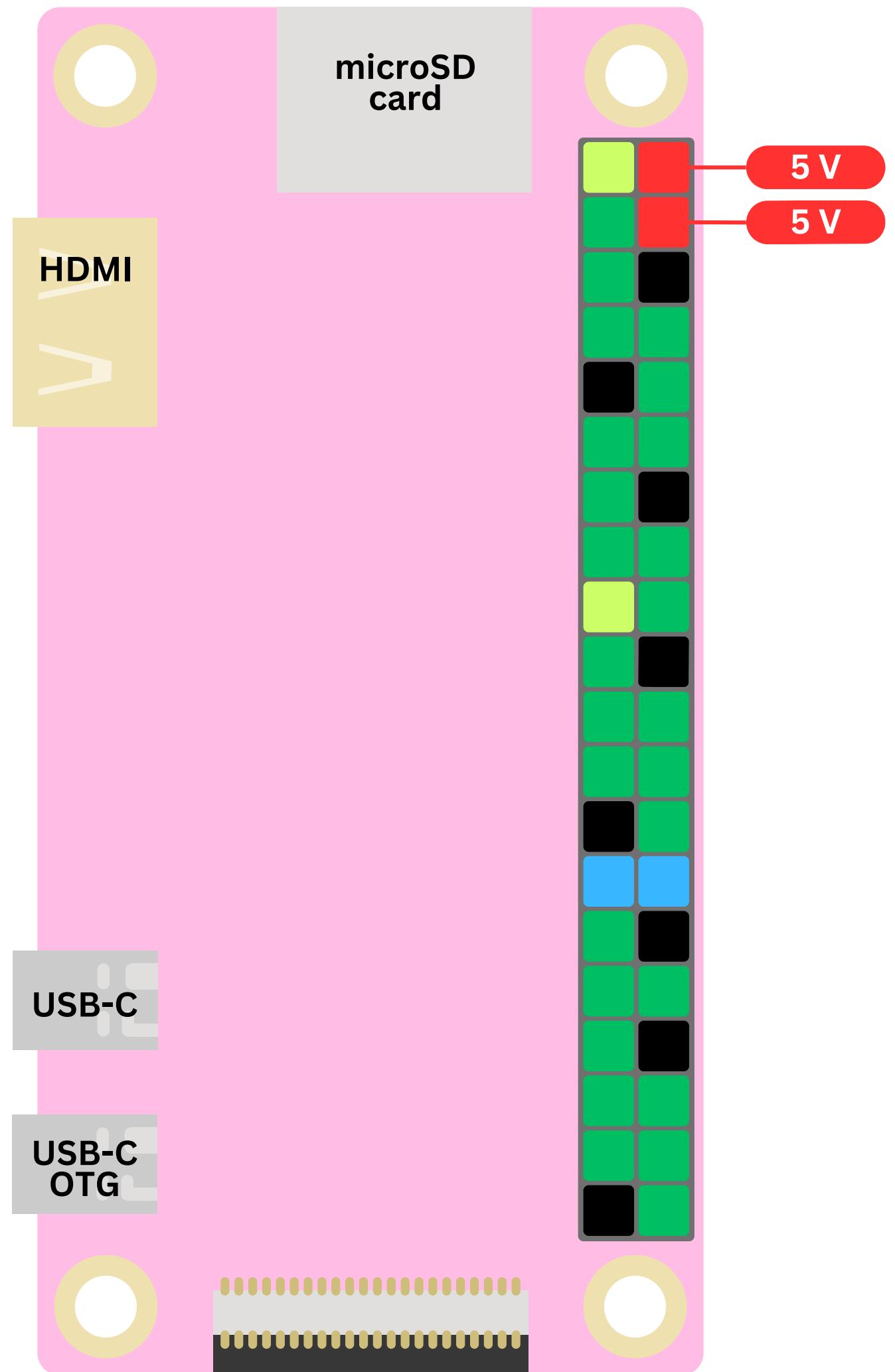
There's a lot going on here...

microSD card

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GND		PB4 — I2S DOUT

HDMI

USB-C

PWM 1

USB-C OTG

Lets break it down!

5 V

5 V
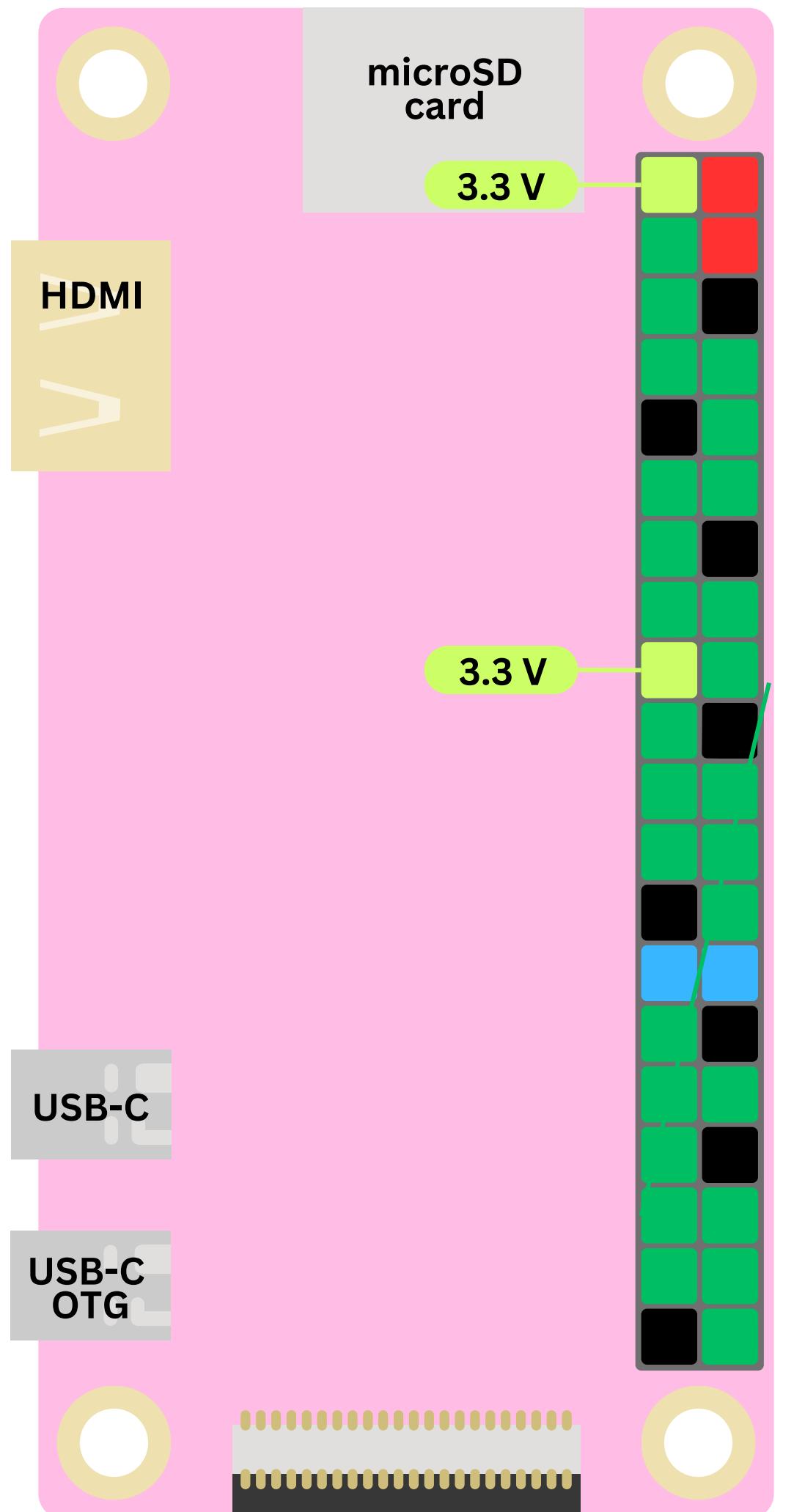
These pins provide 5V
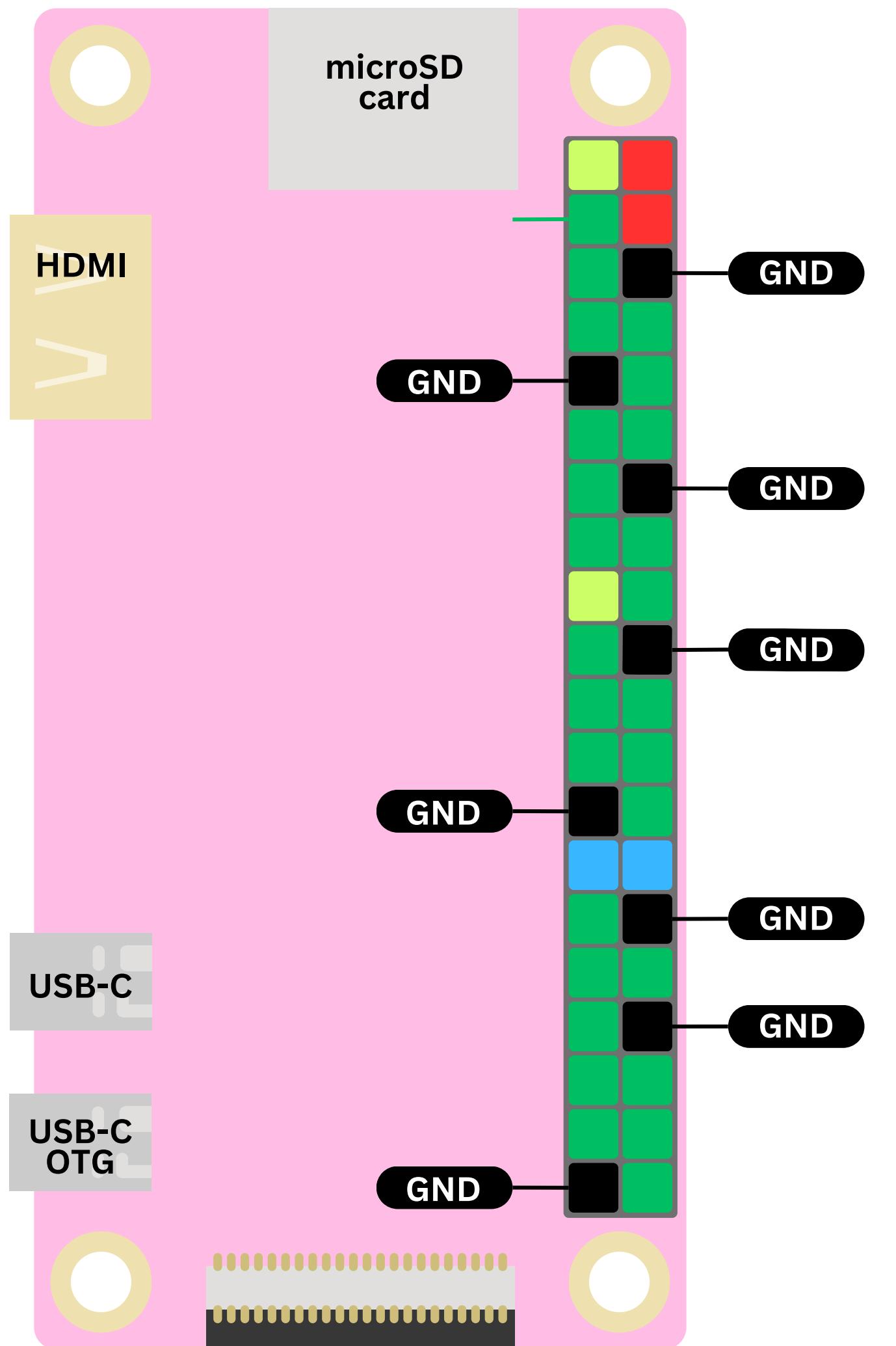
- They are generally used as a stable power supply

- They are not programmable

- (You can't turn them on and off with code)

microSD
card

3.3 V

HDMI

3.3 V

USB-C

USB-C
OTG

These pins
provide 3.3 V

- They are also used as a stable power supply

- They are not programmable

They provide a different voltage potential, so are compatible with different things

microSD card

HDMI

GND

GND

GND

GND

GND

GND

GND

GND

USB-C

USB-C OTG
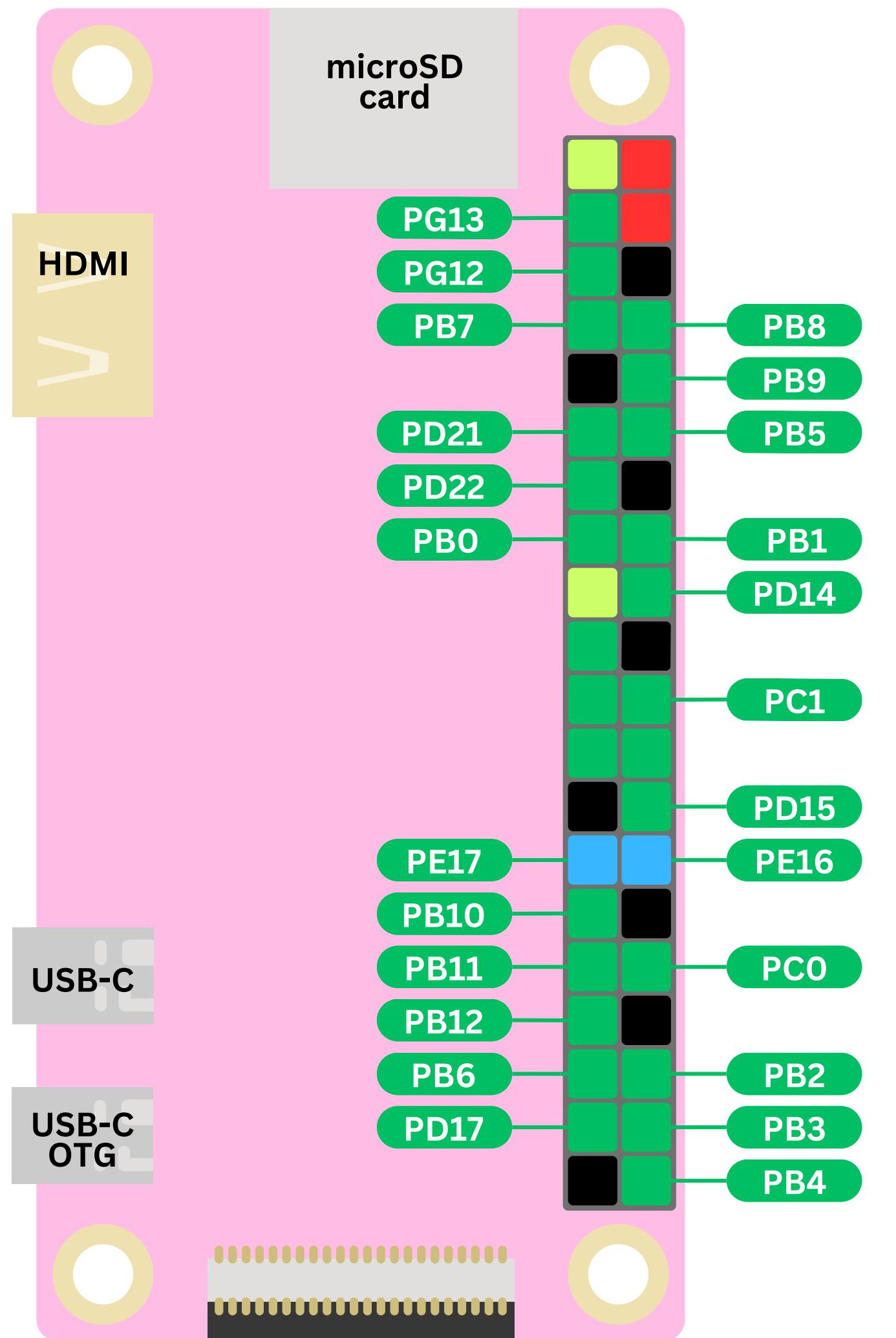
These are ground pins
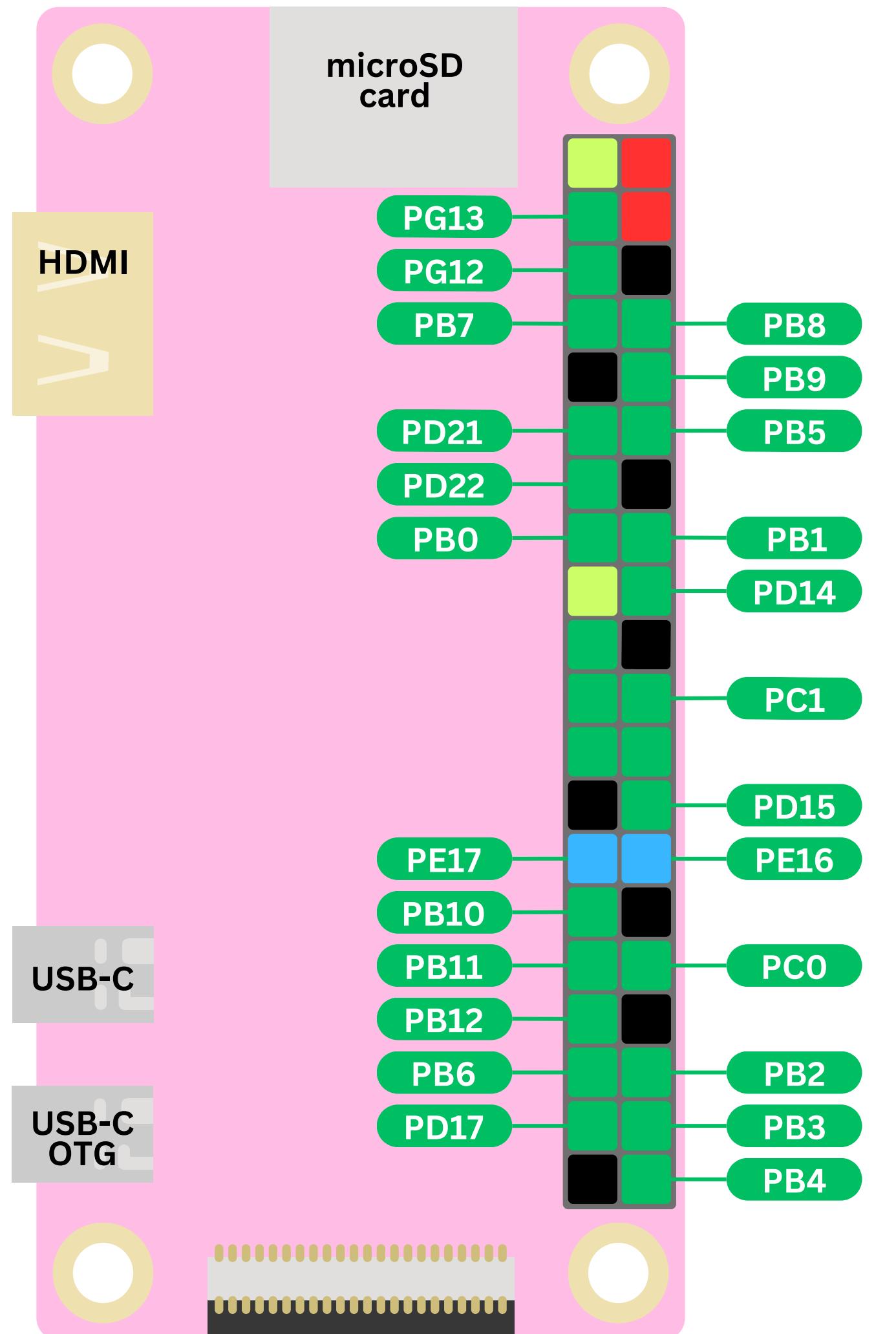
These provide a 0-volt reference voltage.

They are essential for completing the electrical circuit and ensuring the proper functioning of the components.

The ground pins provide a return path for the current. This completes the electrical circuit when connected to other components.

microSD card

HDMI

PG13
PG12
PB7 — PB8
— PB9
PD21 — PB5
PD22
PB0 — PB1
— PD14
— PC1
— PD15
PE17 — PE16
PB10
PB11 — PC0
PB12
PB6 — PB2
PD17 — PB3
— PB4

USB-C

USB-C OTG

These are GPIO pins

General
Purpose
Input
Output

These **programmable** pins connect your pi to external devices and circuits! They allow it to communicate and interact with the physical world.

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You can configure them to be input or output pins!

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You can configure them to be input or output pins!

If you configure them as output, you can connect them to things like **LEDs and Motors**

If you configure them as input, you can connect them to **sensors**
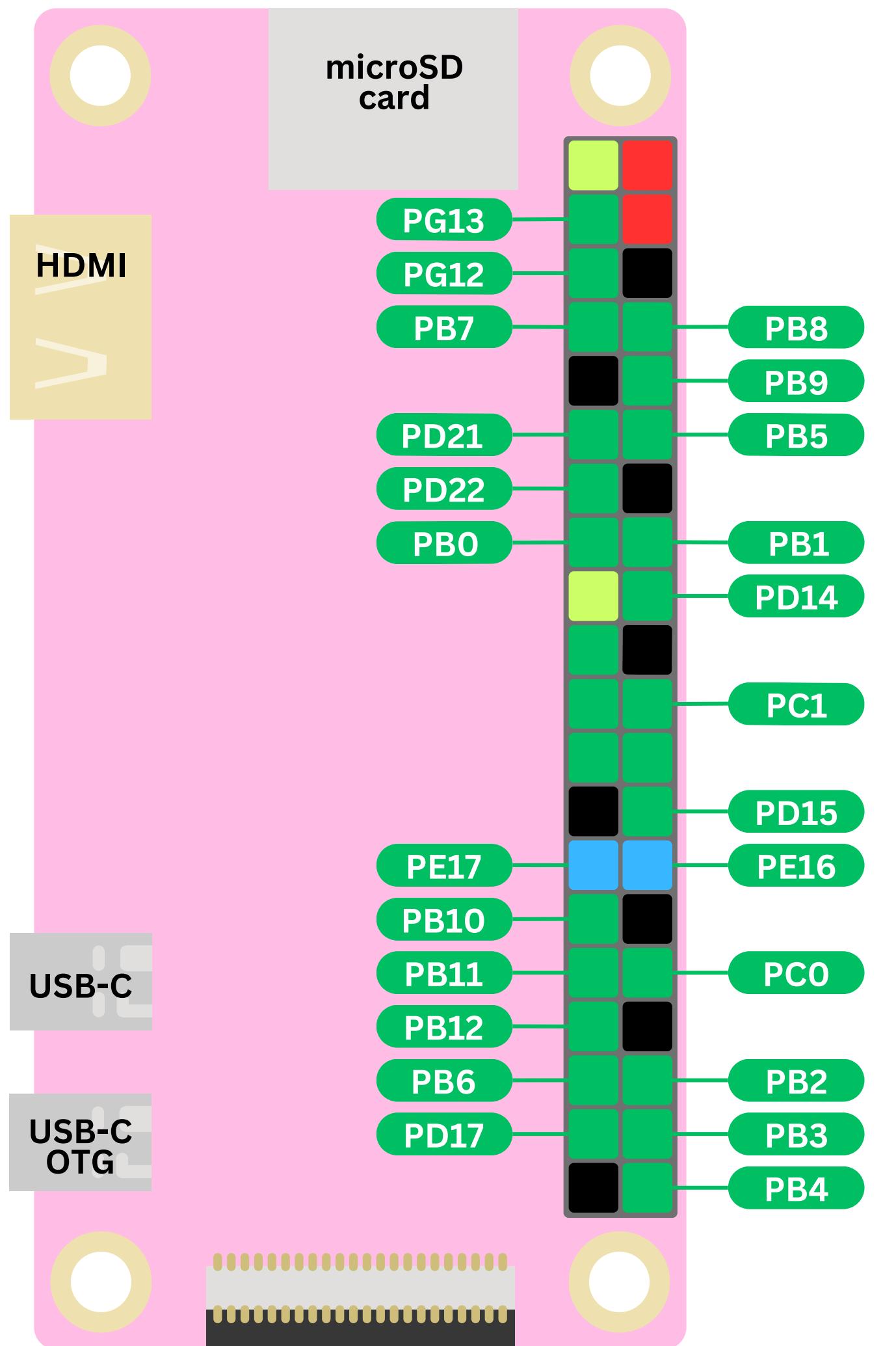
These **programmable** pins connect your pi to external devices and circuits! They allow it to communicate and interact with the physical world.

You can configure them to be input or output pins!
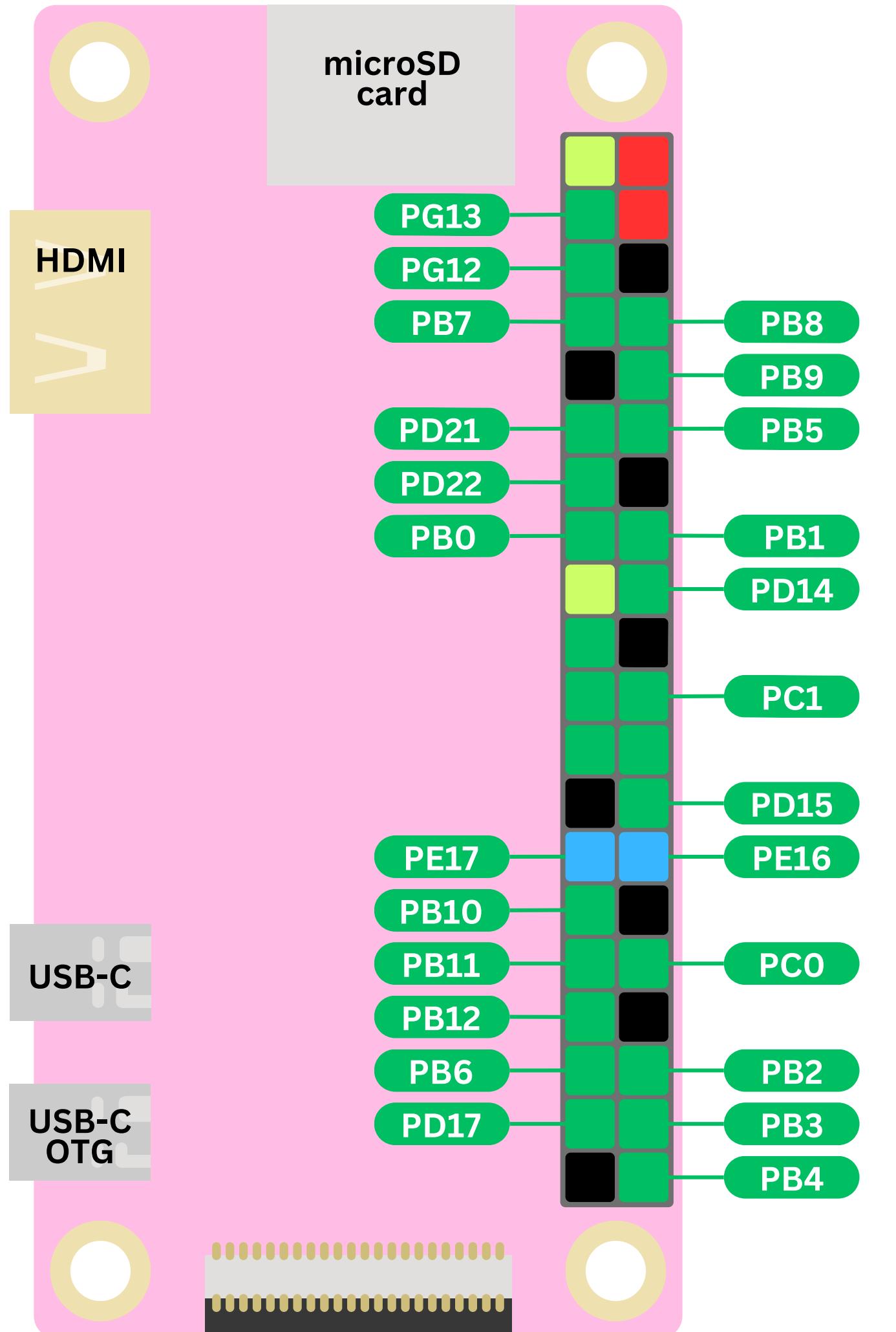
If you configure them as output, you can connect them to things like LEDs and Motors

If you configure them as input, you can connect them to sensors
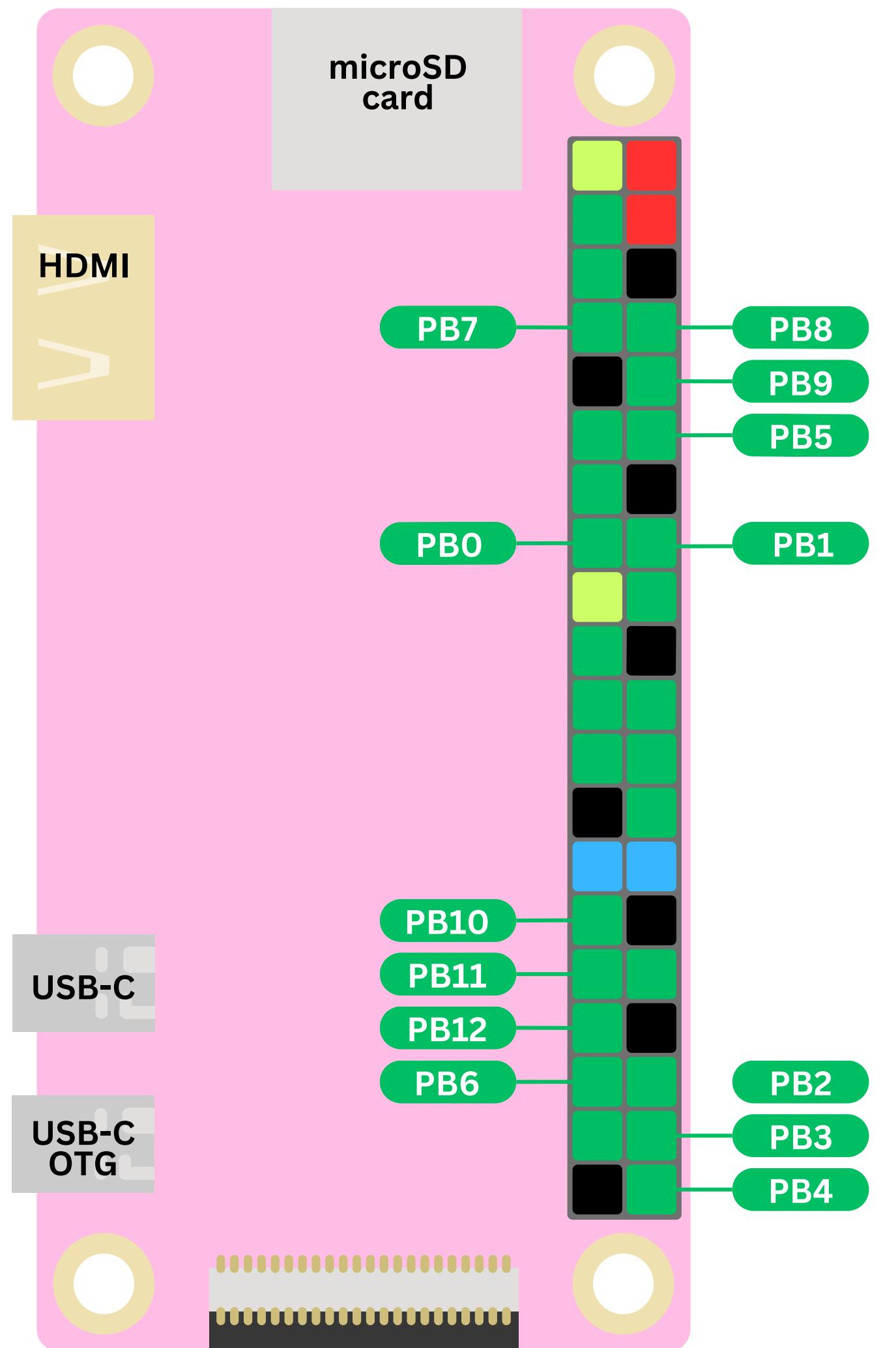
Using a programming language like C you can control these GPIO pins. This can allow you to create a wide range of projects, from simple LED blinkers to complex robotics and automation systems!
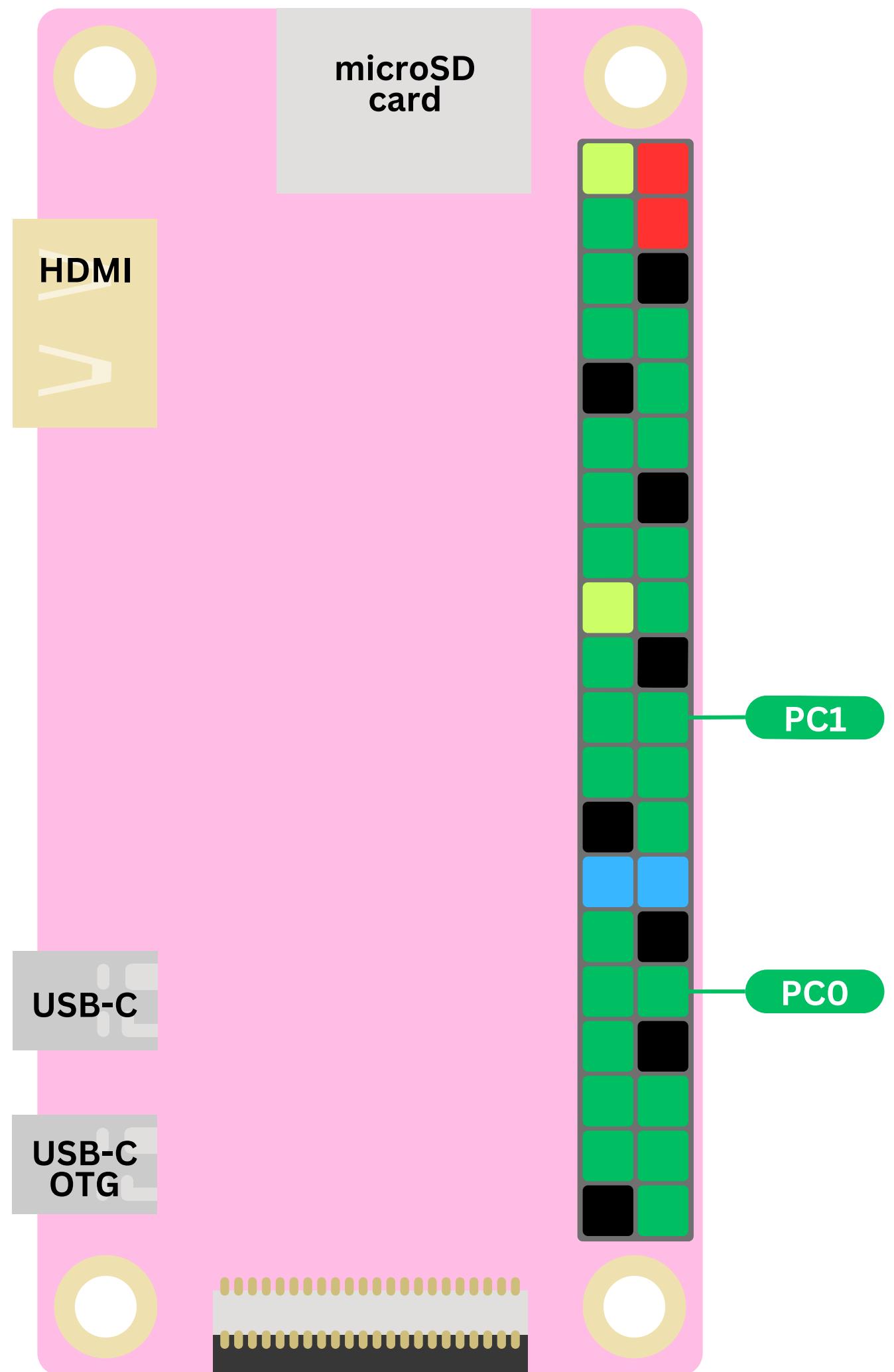
Each Pin has a unique ID, consisting of a letter and a number
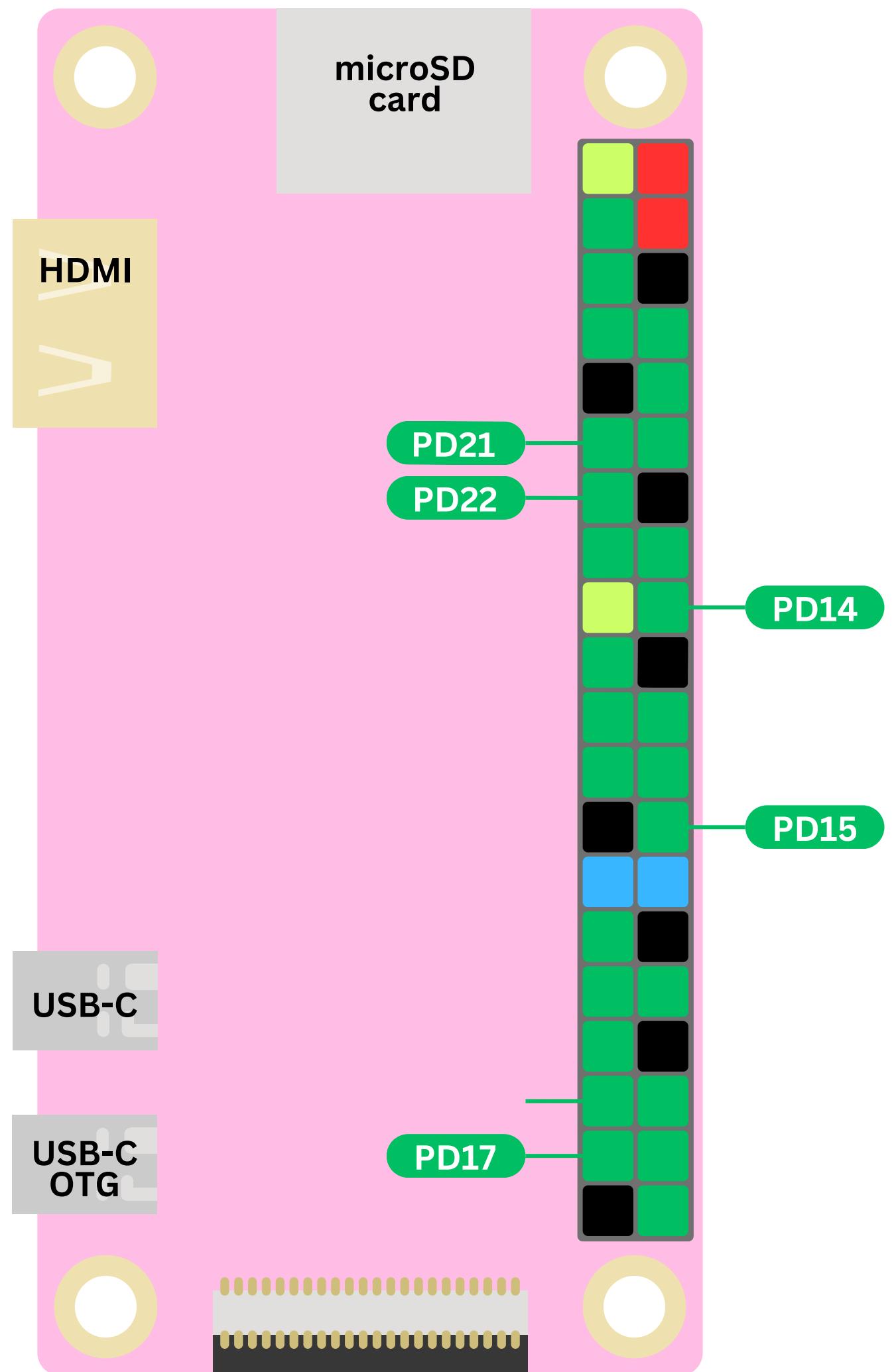
This unique ID allows users to easily identify and work with individual pins

microSD card

HDMI

PB7
PB8
PB9
PB5

PB0
PB1

PB10
PB11
PB12
PB6
PB2
PB3
PB4

USB-C

USB-C OTG

PB group

microSD card

HDMI

USB-C

USB-C OTG

PC1

PC0

PC group

microSD card

HDMI

PD21
PD22

PD14

PD15

PD17

USB-C

USB-C OTG

PD group

microSD card

HDMI

USB-C

USB-C OTG

PE17

PE16
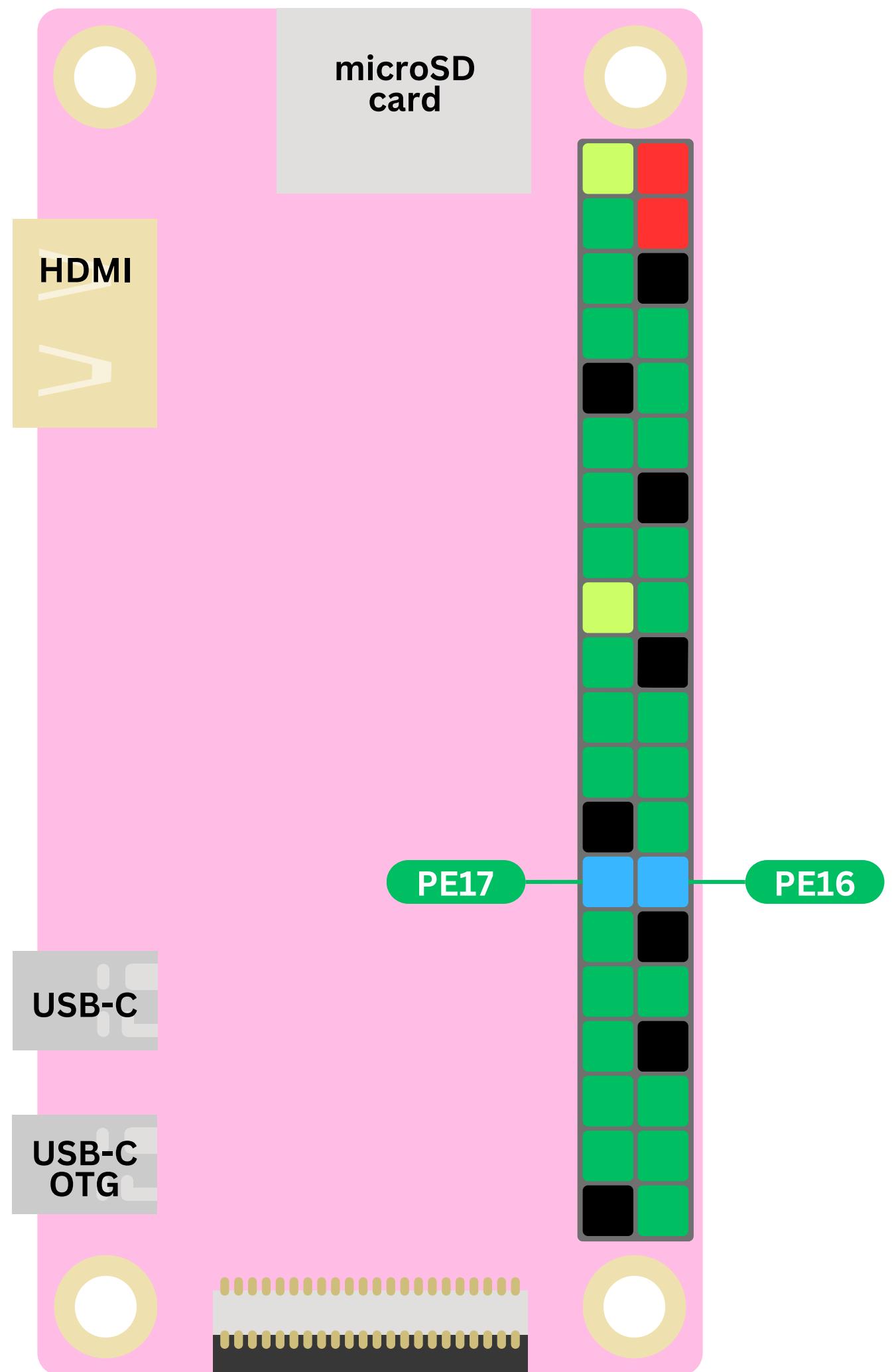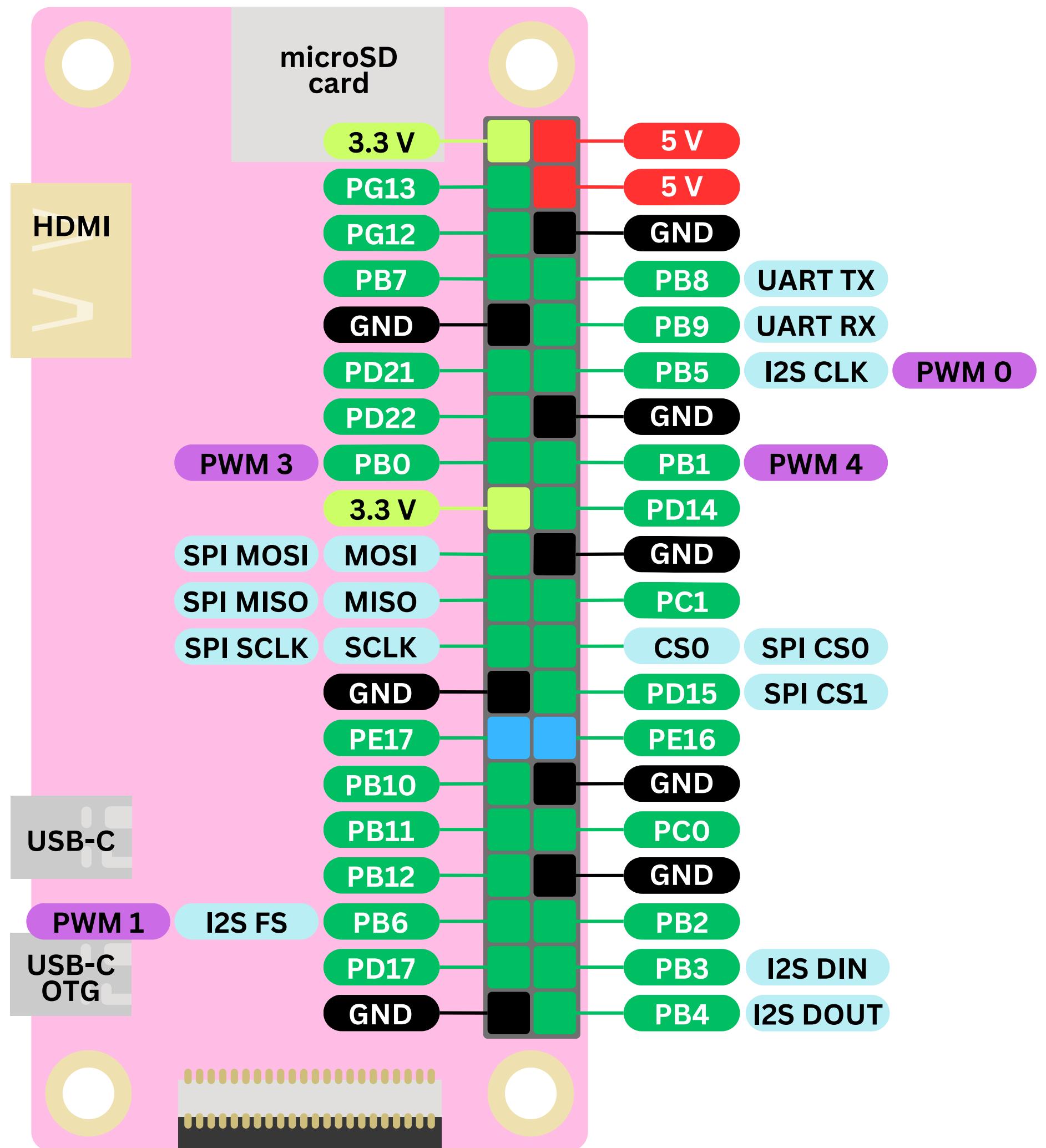
PE group
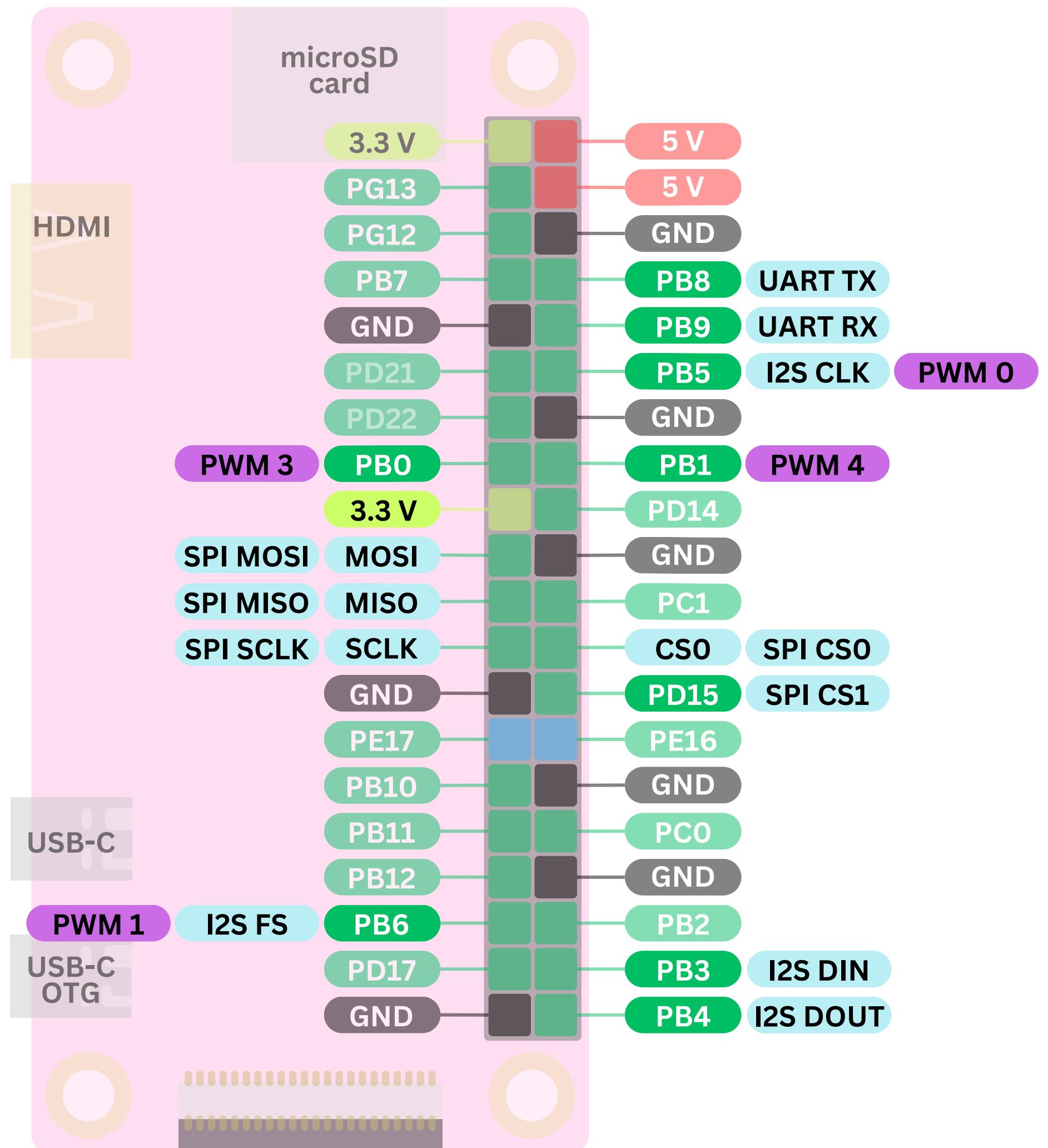
We can connect a peripheral (eg LED, motor, sensor) to a pin that we choose.

Then we can configure that specific pin using code to tell it to do what we want it to do.
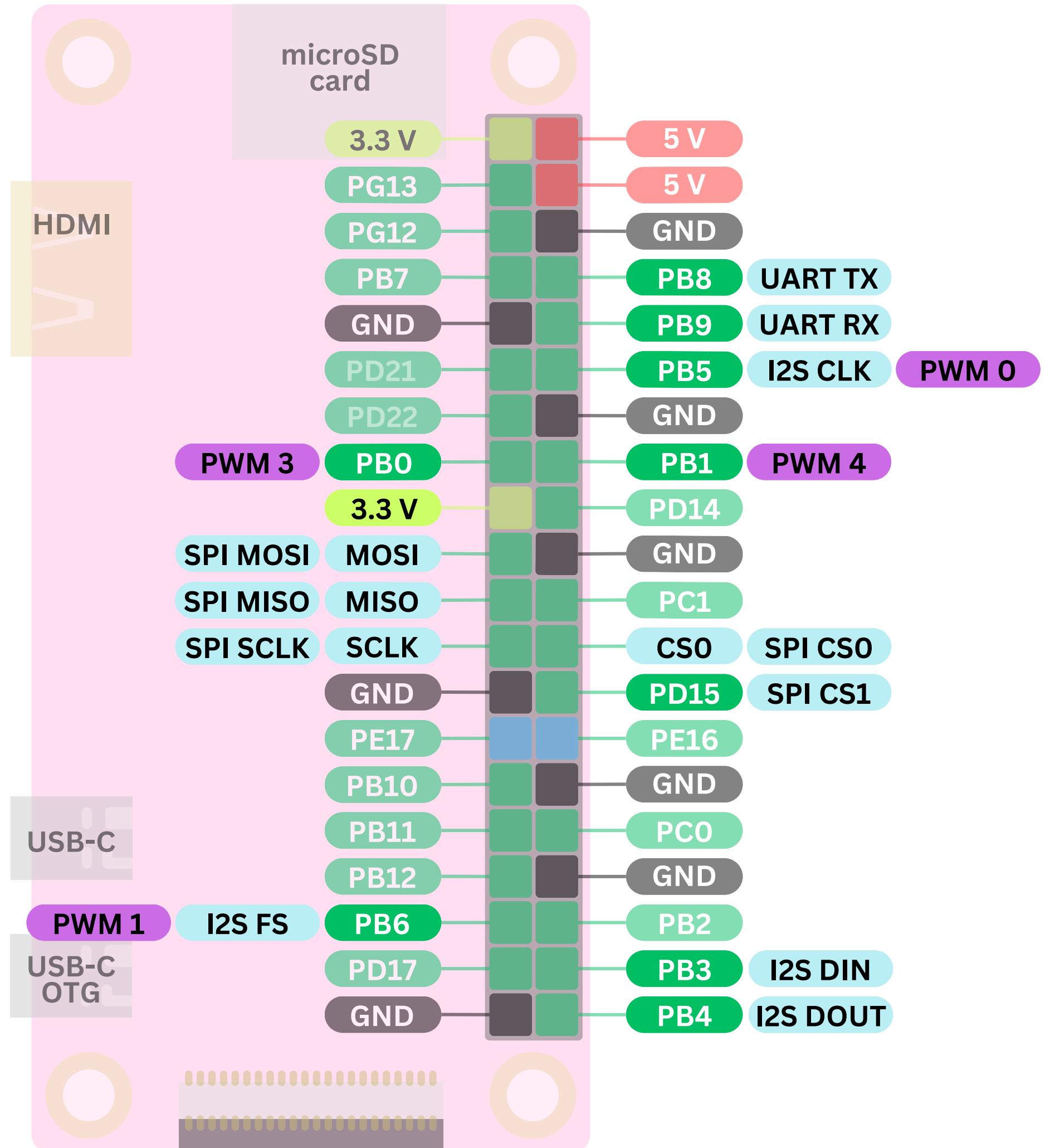
You will learn how to do this in the next guide!
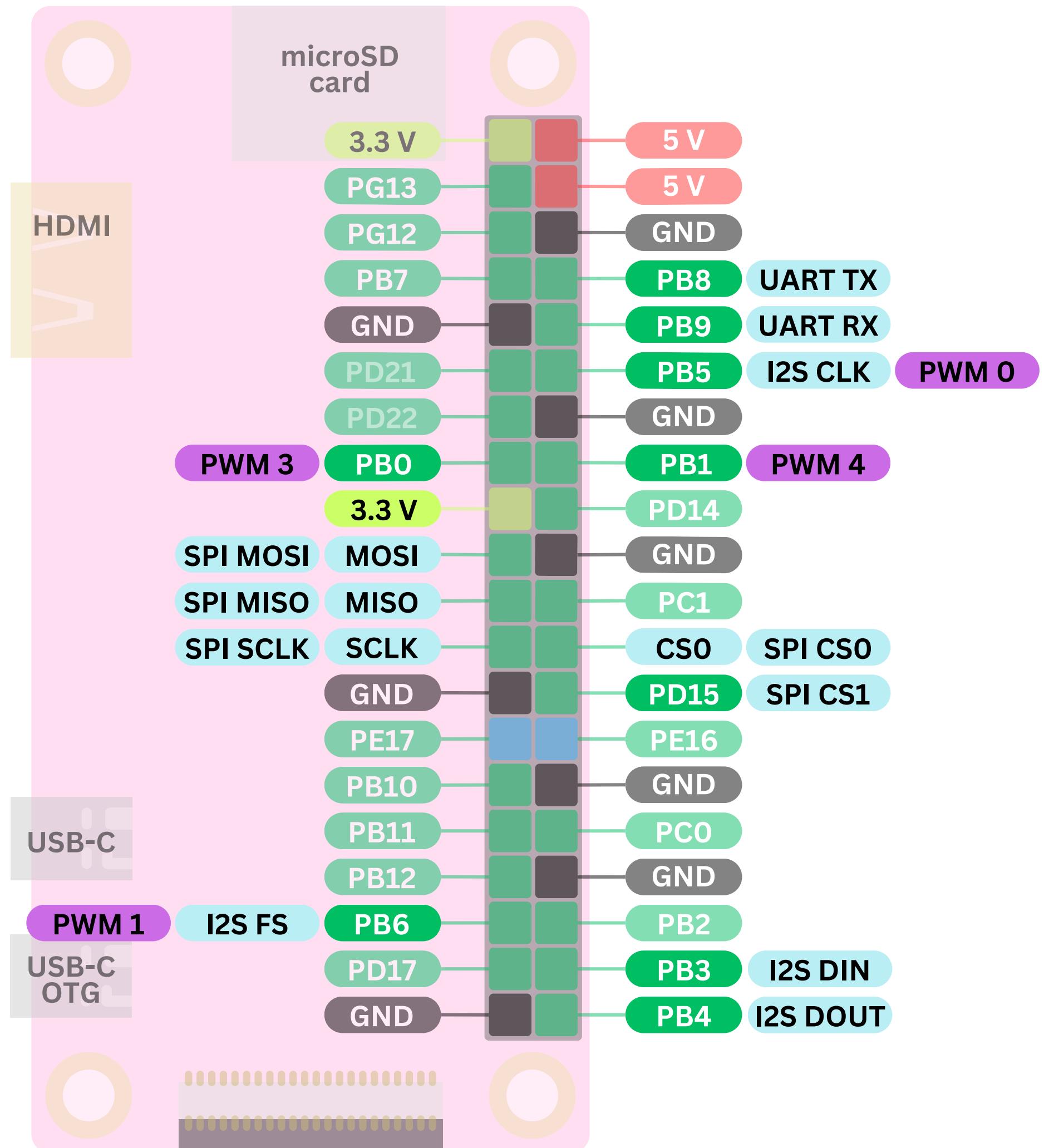
Here are all the pins again

But wait! What are these?

|			
	3.3 V	5 V	
	PG13	5 V	
	PG12	GND	
	PB7	PB8	UART TX
	GND	PB9	UART RX
	PD21	PB5	I2S CLK / PWM 0
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	GND	PD15	SPI CS1
	PE17	PE16	
	PB10	GND	
	PB11	PC0	
	PB12	GND	
PWM 1 / I2S FS	PB6	PB2	
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	GND	PB4	I2S DOUT

microSD card

HDMI

USB-C

USB-C OTG
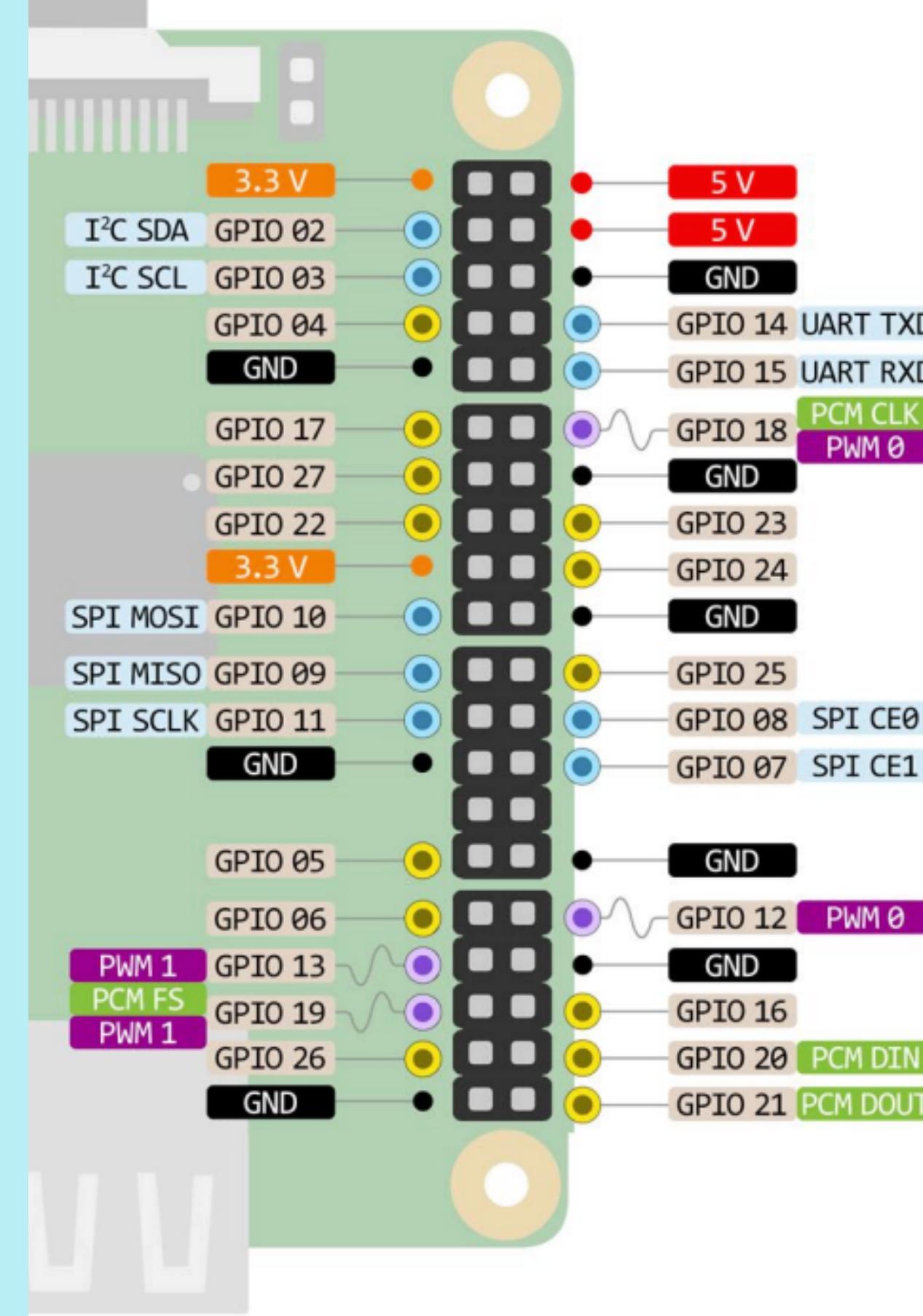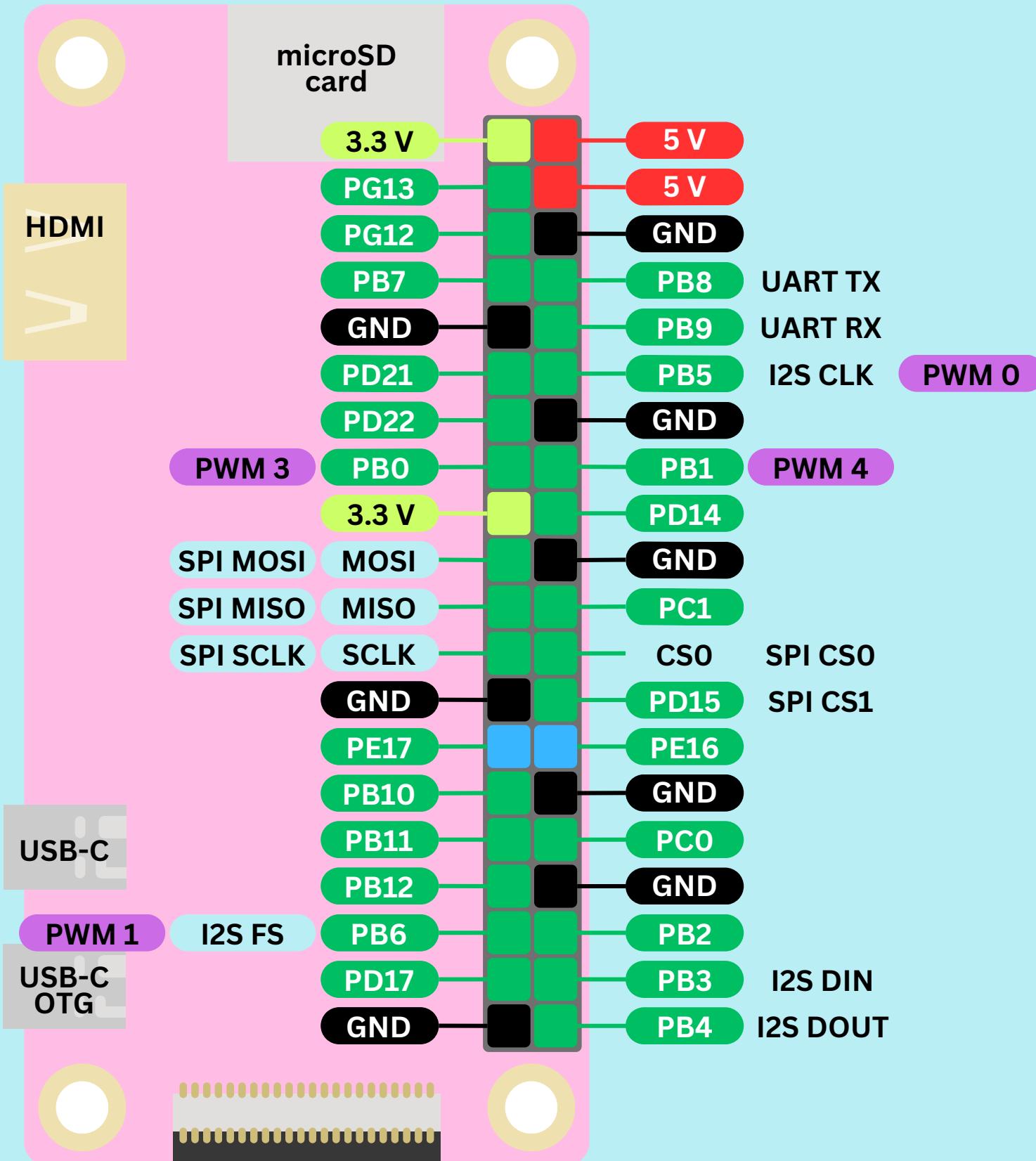
These are some special functions that only some *special* pins get

The board designer gets to choose how the pins are laid out.

Take a look at these two boards!

Left board

microSD card

HDMI

USB-C

USB-C OTG

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PB11	PC0
PB12	GND
PWM 1 — I2S FS — PB6	PB2
PD17	PB3 — I2S DIN
GND	PB4 — I2S DOUT

Right board

3.3 V	5 V
I²C SDA — GPIO 02	5 V
I²C SCL — GPIO 03	GND
GPIO 04	GPIO 14 — UART TXD
GND	GPIO 15 — UART RXD
GPIO 17	GPIO 18 — PCM CLK — PWM 0
GPIO 27	GND
GPIO 22	GPIO 23
3.3 V	GPIO 24
SPI MOSI — GPIO 10	GND
SPI MISO — GPIO 09	GPIO 25
SPI SCLK — GPIO 11	GPIO 08 — SPI CE0
GND	GPIO 07 — SPI CE1
GPIO 05	GND
GPIO 06	GPIO 12 — PWM 0
PWM 1 — PCM FS — PWM 1 — GPIO 13	GND
PCM FS — PWM 1 — GPIO 19	GPIO 16
GPIO 26	GPIO 20 — PCM DIN
GND	GPIO 21 — PCM DOUT

Notice they are quite similar, but also different!

Now that you know what the pins are, try using wires to connect to them! We will learn to program them in the next guide :)