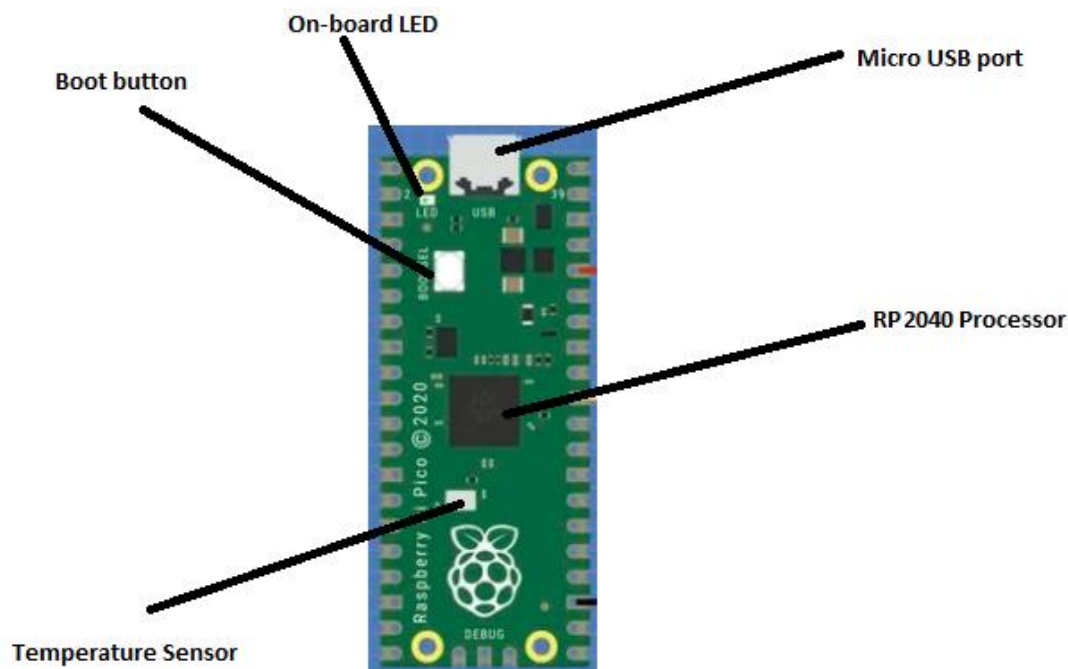


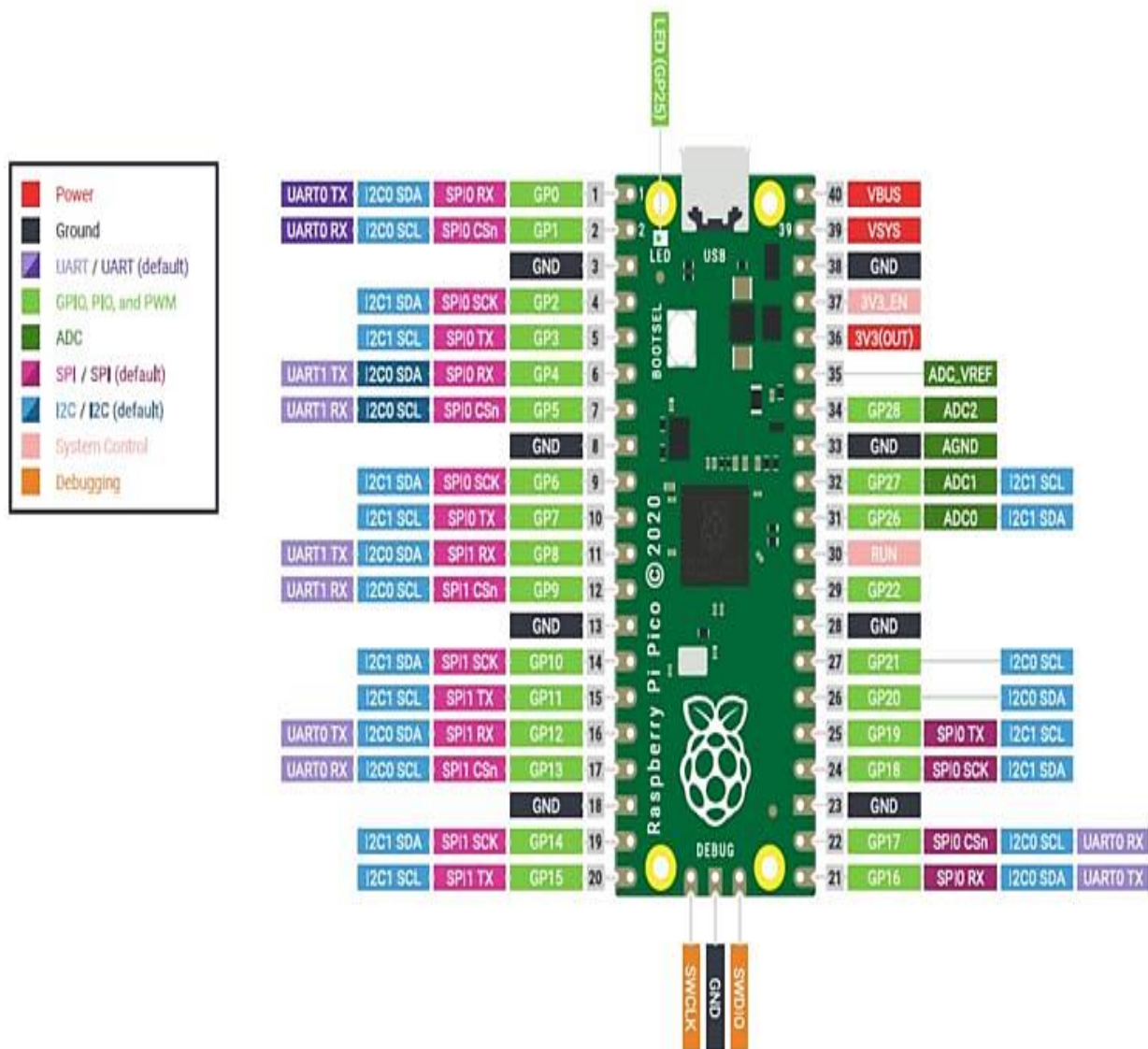
RASPBERRY PI PICO

The Raspberry Pi Pico is a low-cost, high-performance microcontroller board with flexible digital interfaces. It is built using RP2040, a microcontroller chip designed by Raspberry Pi in the UK. Key features of the Raspberry Pi Pico include a dual-core Arm Cortex M0+ processor, 264kB of SRAM, on-board flash memory, and 26 multi-function GPIO pins. It also has support for USB 1.1 with device and host support, and 8 Programmable I/O (PIO) state machines for custom peripheral support.

Some of the major parts of the Raspberry Pi Pico include:

- The **RP2040 microcontroller chip**, which is the heart of the board and provides processing power and flexible I/O options.
- The **26 multi-function GPIO pins**, which can be used for a wide range of digital and analog inputs and outputs.
- The **USB 1.1 controller**, which provides support for connecting the board to a computer or other USB devices.
- The **8 Programmable I/O (PIO) state machines**, which allow for custom peripheral support and can be programmed to handle a wide range of tasks.





Ground Pins (GND)

There are several ground connections on the board, eight of them plus an additional one on the 3-pin Debug connector. These pins are easy to spot, they are evenly spaced and are square as opposed to rounded like the other connections. One of the ground connections, on pin 33, is also designated the Analog Ground.

Power Pins

The Pico is a 3.3-volt logic device, however, it can be powered with a range of power supplies thanks to a built-in voltage converter and regulator.

All of the power-related pins are grouped in one section on the board, close to the microUSB connector.

VBUS – This is the power from the microUSB bus, 5-volts. If the Pico is not being powered by the microUSB connector then there will be no output here.

VSYS – This is the input voltage, which can range from 2 to 5-volts. The on-board voltage converter will change it to 3.3-volts for the Pico.

3V3 – This is a 3.3-volt output, from the Pico’s internal regulator. It can be used to power additional components, providing you keep the load under 300ma.

GPIO Pins

There are 26 exposed GPIO connections on the Raspberry Pi Pico board.

They are laid out pretty-well in order, with a “gap” between GPIO 22 and GPIO 26 (those “missing” pins are used internally). Pretty well all these pins have multiple functions, and you can configure up to 16 of them for PWM.

There are two I2C busses, two UARTs, and two SPI busses, these can be configured to use a wide variety of GPIO pins.

ANALOG PINS

The Pico has three Analog-to-Digital Converters, plus a fourth one used internally for an on-board temperature sensor.

The ADC’s have a 12-bit resolution.

You can also provide an external precision voltage-reference on the ADC_VREF pin. One of the grounds, the ADC_GND on pin 33 is used as a ground point for that reference.

RP2040 MICROCONTROLLER

The Raspberry Pi Pico is based around the Foundation’s new chip, the RP2040 microcontroller.

It has some impressive specifications:

- Dual-core 32-bit ARM Cortex-M0+
- Runs at 48MHz, but can be overclocked to 133MHz
- 30 GPIO pins (26 exposed)
- Can support USB Host or Device mode
- 8 Programmable I/O (PIO) state machines

The RP2040 is capable of supporting up to 16MB of off-chip Flash memory, although in the Pico there is only 4MB.