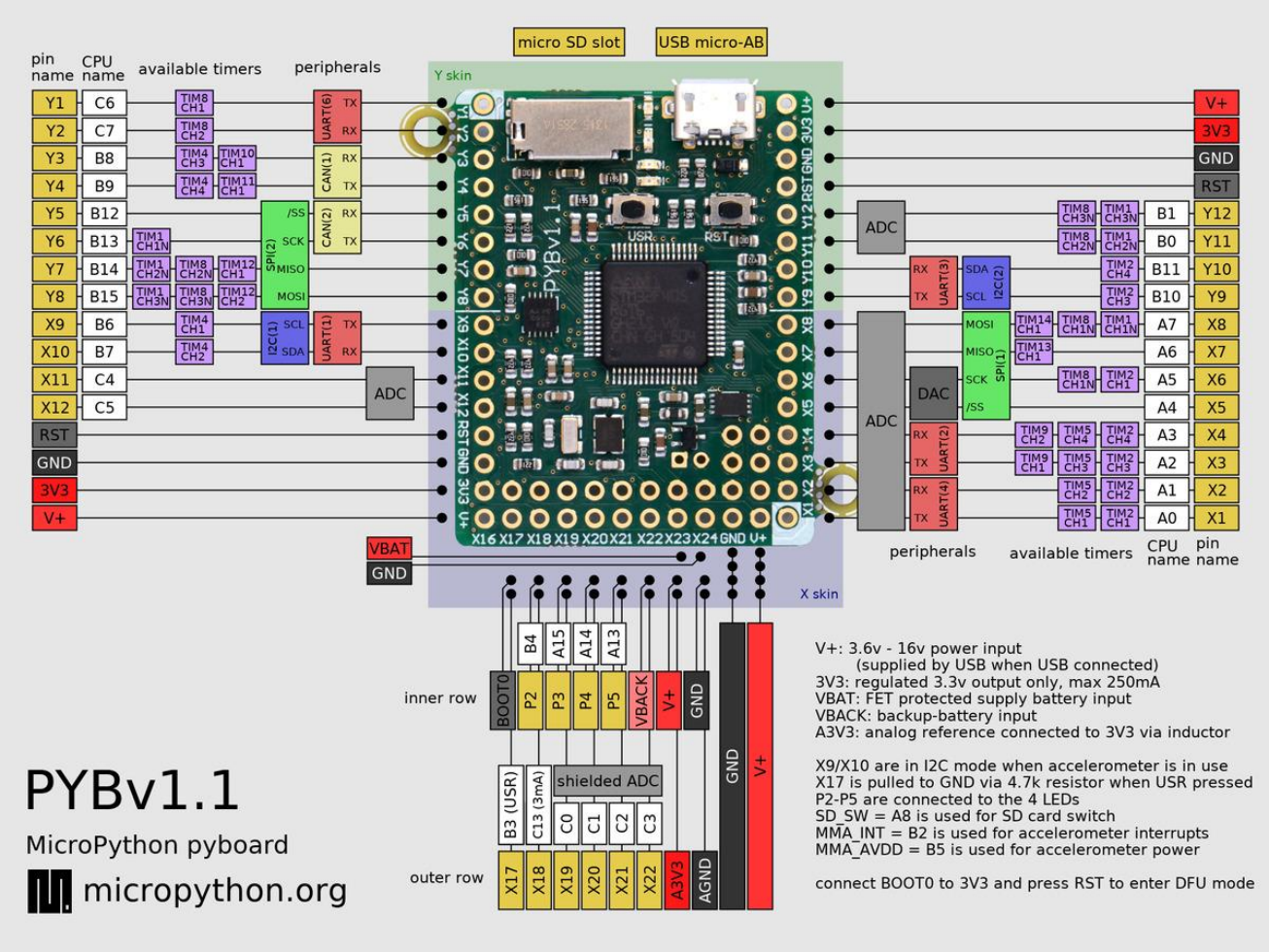
Quick reference for the pyboard

The below pinout is for PYBv1.1. You can also view pinouts for other versions of the pyboard: PYBv1.0 or PYBLITEv1.0-AC or PYBLITEv1.0.



Below is a quick reference for the pyboard. If it is your first time working with this board please consider reading the following sections first:

- General information about the pyboard
- MicroPython tutorial for the pyboard

General board control

See `pyb`.

```
import pyb

pyb.repl_uart(pyb.UART(1, 9600)) # duplicate REPL on UART(1)
pyb.wfi() # pause CPU, waiting for interrupt
pyb.freq() # get CPU and bus frequencies
pyb.freq(60000000) # set CPU freq to 60MHz
pyb.stop() # stop CPU, waiting for external interrupt
```

Delay and timing

Use the `time` module:

```
import time

time.sleep(1)           # sleep for 1 second
time.sleep_ms(500)      # sleep for 500 milliseconds
time.sleep_us(10)       # sleep for 10 microseconds
start = time.ticks_ms() # get value of millisecond counter
delta = time.ticks_diff(time.ticks_ms(), start) # compute time difference
```

Internal LEDs

See pyb.LED.

```
from pyb import LED

led = LED(1) # 1=red, 2=green, 3=yellow, 4=blue
led.toggle()
led.on()
led.off()

# LEDs 3 and 4 support PWM intensity (0-255)
LED(4).intensity()    # get intensity
LED(4).intensity(128) # set intensity to half
```

Internal switch

See pyb.Switch.

```
from pyb import Switch

sw = Switch()
sw.value() # returns True or False
sw.callback(lambda: pyb.LED(1).toggle())
```

Pins and GPIO

See pyb.Pin.

```
from pyb import Pin

p_out = Pin('X1', Pin.OUT_PP)
p_out.high()
p_out.low()

p_in = Pin('X2', Pin.IN, Pin.PULL_UP)
p_in.value() # get value, 0 or 1
```

Servo control

See pyb.Servo.

```
from pyb import Servo

s1 = Servo(1) # servo on position 1 (X1, VIN, GND)
s1.angle(45) # move to 45 degrees
s1.angle(-60, 1500) # move to -60 degrees in 1500ms
s1.speed(50) # for continuous rotation servos
```

External interrupts

See pyb.ExtInt.

```
from pyb import Pin, ExtInt

callback = lambda e: print("intr")
ext = ExtInt(Pin('Y1'), ExtInt.IRQ_RISING, Pin.PULL_NONE, callback)
```

Timers

See pyb.Timer.

```
from pyb import Timer

tim = Timer(1, freq=1000)
tim.counter() # get counter value
tim.freq(0.5) # 0.5 Hz
tim.callback(lambda t: pyb.LED(1).toggle())
```

RTC (real time clock)

See pyb.RTC

```
from pyb import RTC

rtc = RTC()
rtc.datetime((2017, 8, 23, 1, 12, 48, 0, 0)) # set a specific date and time
rtc.datetime() # get date and time
```

PWM (pulse width modulation)

See pyb.Pin and pyb.Timer.

```
from pyb import Pin, Timer

p = Pin('X1') # X1 has TIM2, CH1
tim = Timer(2, freq=1000)
ch = tim.channel(1, Timer.PWM, pin=p)
ch.pulse_width_percent(50)
```

ADC (analog to digital conversion)

See pyb.Pin and pyb.ADC.

```
from pyb import Pin, ADC

adc = ADC(Pin('X19'))
adc.read() # read value, 0-4095
```

DAC (digital to analog conversion)

See pyb.Pin and pyb.DAC.

```
from pyb import Pin, DAC

dac = DAC(Pin('X5'))
dac.write(120) # output between 0 and 255
```

UART (serial bus)

See pyb.UART.

```
from pyb import UART

uart = UART(1, 9600)
uart.write('hello')
uart.read(5) # read up to 5 bytes
```

SPI bus

See pyb.SPI.

```
from pyb import SPI

spi = SPI(1, SPI.MASTER, baudrate=200000, polarity=1, phase=0)
spi.send('hello')
spi.recv(5) # receive 5 bytes on the bus
spi.send_recv('hello') # send and receive 5 bytes
```

I2C bus

Hardware I2C is available on the X and Y halves of the pyboard via `I2C('X')` and `I2C('Y')`. Alternatively pass in the integer identifier of the peripheral, eg `I2C(1)`. Software I2C is also available by explicitly specifying the `scl` and `sda` pins instead of the bus name. For more details see machine.I2C.

```
from machine import I2C

i2c = I2C('X', freq=400000)                 # create hardware I2c object
i2c = I2C(scl='X1', sda='X2', freq=100000)  # create software I2C object

i2c.scan()                          # returns list of slave addresses
i2c.writeto(0x42, 'hello')          # write 5 bytes to slave with address 0x42
i2c.readfrom(0x42, 5)               # read 5 bytes from slave

i2c.readfrom_mem(0x42, 0x10, 2)     # read 2 bytes from slave 0x42, slave memory 0x10
i2c.writeto_mem(0x42, 0x10, 'xy')   # write 2 bytes to slave 0x42, slave memory 0x10
```

Note: for legacy I2C support see pyb.I2C.

CAN bus (controller area network)

See pyb.CAN.

```
from pyb import CAN

can = CAN(1, CAN.LOOPBACK)
can.setfilter(0, CAN.LIST16, 0, (123, 124, 125, 126))
can.send('message!', 123)   # send a message with id 123
can.recv(0)                 # receive message on FIFO 0
```

Internal accelerometer

See pyb.Accel.

```
from pyb import Accel

accel = Accel()
print(accel.x(), accel.y(), accel.z(), accel.tilt())
```