Pico Radio

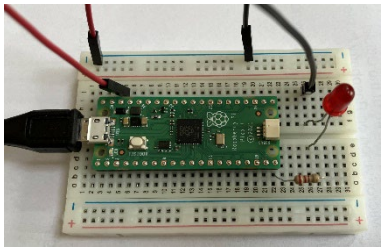
The Raspberry Pi Pico 2 is a very cheap powerful microcontroller. It is a clever versatile device, and it can help you to learn about electronics, coding and radio communications. It can be programmed in blocks like Scratch, in Python and even in the Arduino programming language.

Time
About 30 minutes

Kit List
One Raspberry Pi Pico 1 or 2
A computer
A breadboard, an LED, a current-limiting resistor and connecting wires, available from Bitsbox, https://www.bitsboxuk.com/

Instructions
There is a choice of block coding for the Pico, all free. Picobricks (https://picobricks.com/collections/raspberry-pi-robotics-kits) offers different levels of coding depending on your ability. MicroPython is the preferred choice for the Pico. Later we will see how we can also use Arduino code.

Set up the circuit to light an LED, as shown in the image. The current-limiting resistor is connected to pin 20.



The other end of the resistor is connected to the positive lead of the LED, while the negative lead goes to the ground of the Pico. The coding is explained on page 48 of the Official Raspberry Pi Pico Guide 'Getting started with MicroPython on Raspberry Pi Pico' (https://hackspace.raspberrypi.com/books/micropython-pico).

Download Thonny, the Python IDE for beginners. (https://thonny.org/)
Enter this code:

```
import machine
import utime
led_onboard = machine.Pin(25, machine.Pin.OUT)
while True:
        led_onboard.value(1)
        utime.sleep(5)
        led_onboard.value(0)
        utime.sleep(5)
```

Upload the program to the Pico and the LED will blink

FM receiver. It can also be used to demonstrate amplitude modulation and pulse width modulation. Full details are provided in 'Make: Radio' by Fredrick Jansson.
In order to use Arduino code, the Arduino board library has to include the Pico. The Pico can measure frequencies up to about 60 MHz with the result displayed on an LCD screen. It counts the number of pulses in one second.
Milly M7MIY is showing her frequency counter, displaying 1000001 Hz, which the Pico has generated.

With the addition of an FM receiver module, the Pico can be converted to an FM receiver. Also, the Pico can demonstrate amplitude modulation by generating frequencies up to 10 MHz. Not only can it generate a carrier wave, but it can modulate it too.