Raspberry Pi Pico plus LoRa Based Gate 'Open' / 'Closed' Project
BASIC PROTOTYPE

Figure 1 : Raspberry Pi Pico Pin Designations Viewed from the Top.

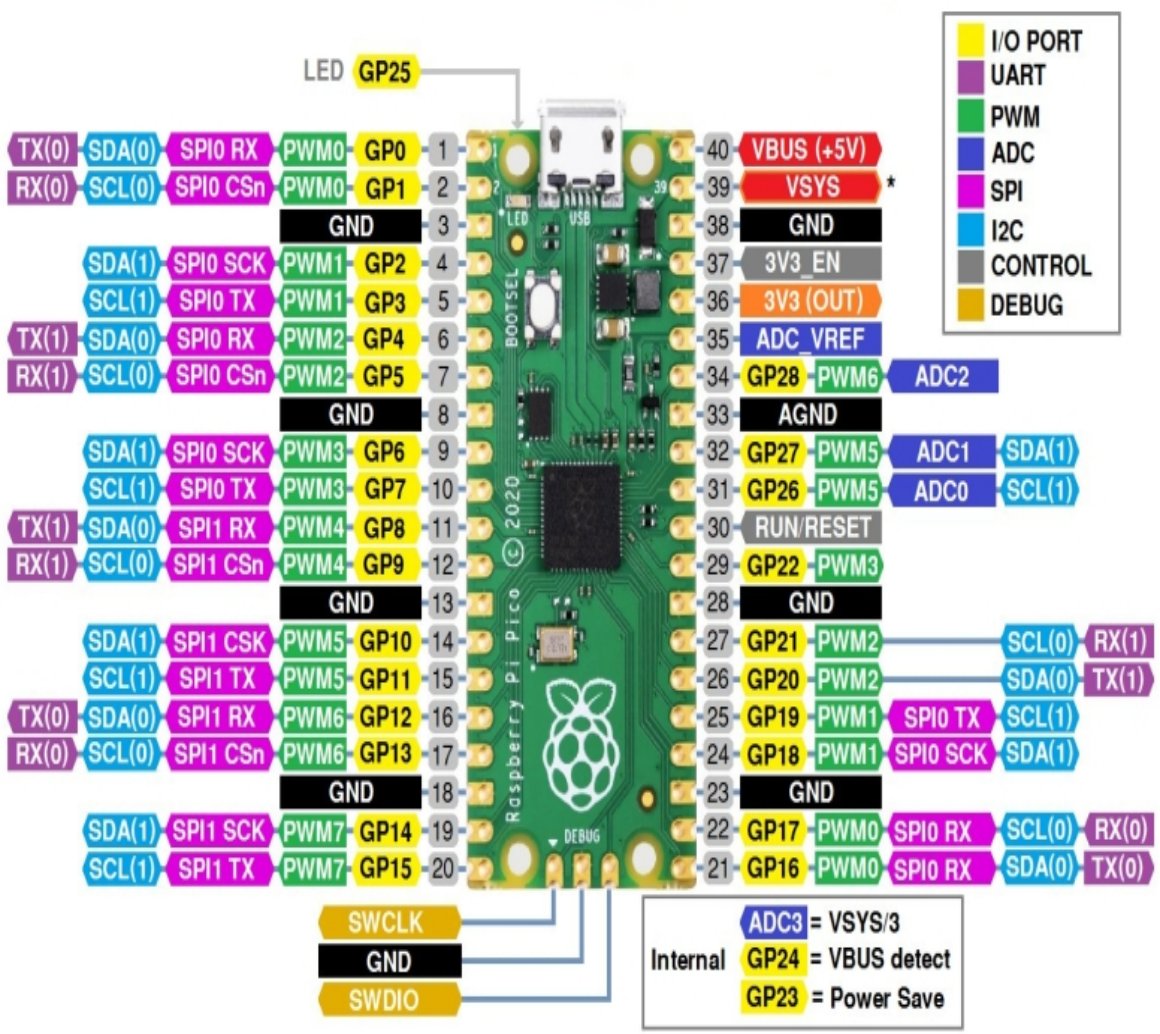


Table 1 : WIRING PLAN - TRANSMITTER

Pico Physical Pin Number	Pico Pin Designation	Bluetooth Module Pin Designation	Hall Effect Sensor Pin Designation
1	TX(0)	RX	
2	RX(0)	TX	
38	GND	GND	
40	VBUS(+5v)	Vin (5V)	
8	GND		GND
36	3V3(OUT)		Vin (3.3V)
9	GP6		S (signal)

MicroPython Script for the TRANSMITTER

```
print ("hello from Pico W .... ")

from PiicoDev_SSD1306 import *
from PiicoDev_Unified import sleep_ms # cross-platform compatible
sleep function
from math import sin, cos, pi
from machine import Pin, UART
import utime


lora = UART(0)
lora.init(9600, bits=8, parity=None, stop=1)

display = create_PiicoDev_SSD1306()

display.fill(0)
Hall1 = Pin(3, Pin.IN, Pin.PULL_UP)

myStringA = "Gate Open/Closed"
myStringB = "LoRa Based Sensor"
myStringC = "Starting in 5secs"

# Activate the screen .....
display.text("OLED SSD1306", 0,0, 1)
display.text(myStringA, 0,15, 1)
display.text(myStringB, 0,30, 1)

display.text(myStringC, 0,45, 1)

display.show()

# Start transmitting in 5 seconds ...
sleep_ms(5000)

i = 0
myString1 = " Gate CLOSED..."
myString2 = " Gate OPEN....."

# Clear the display
display.fill(0)

while True:
    if Hall1.value()==1:
        display.fill(0)
        display.text(str(i), 0,15, 1)
        display.text(myString1,0, 30, 1)
        display.show()
        lora.write(str(i))
        lora.write(myString1)

    if Hall1.value()==0:
        display.fill(0)
        display.text(str(i), 0,15, 1)
        display.text(myString2,0, 30, 1)
        display.show()
```

```
        lora.write(str(i))
        lora.write(myString2)

    utime.sleep(10) # Check the gate sensor every 10 seconds
    i = i + 1
```

FIGURE 2 : Dialog as seen in Thonny when the Transmitter Script is Running. All the detail is shown on the OLED Display. Because this script is saved on the Pico as main.py it autostarts as soon as power is turned on. So to view it when connected to Thonny you must press CTRL-Z in the lower screen of Thonny then click on the STOP icon in Thonny. You can then open the script on the Pico in the usual way.

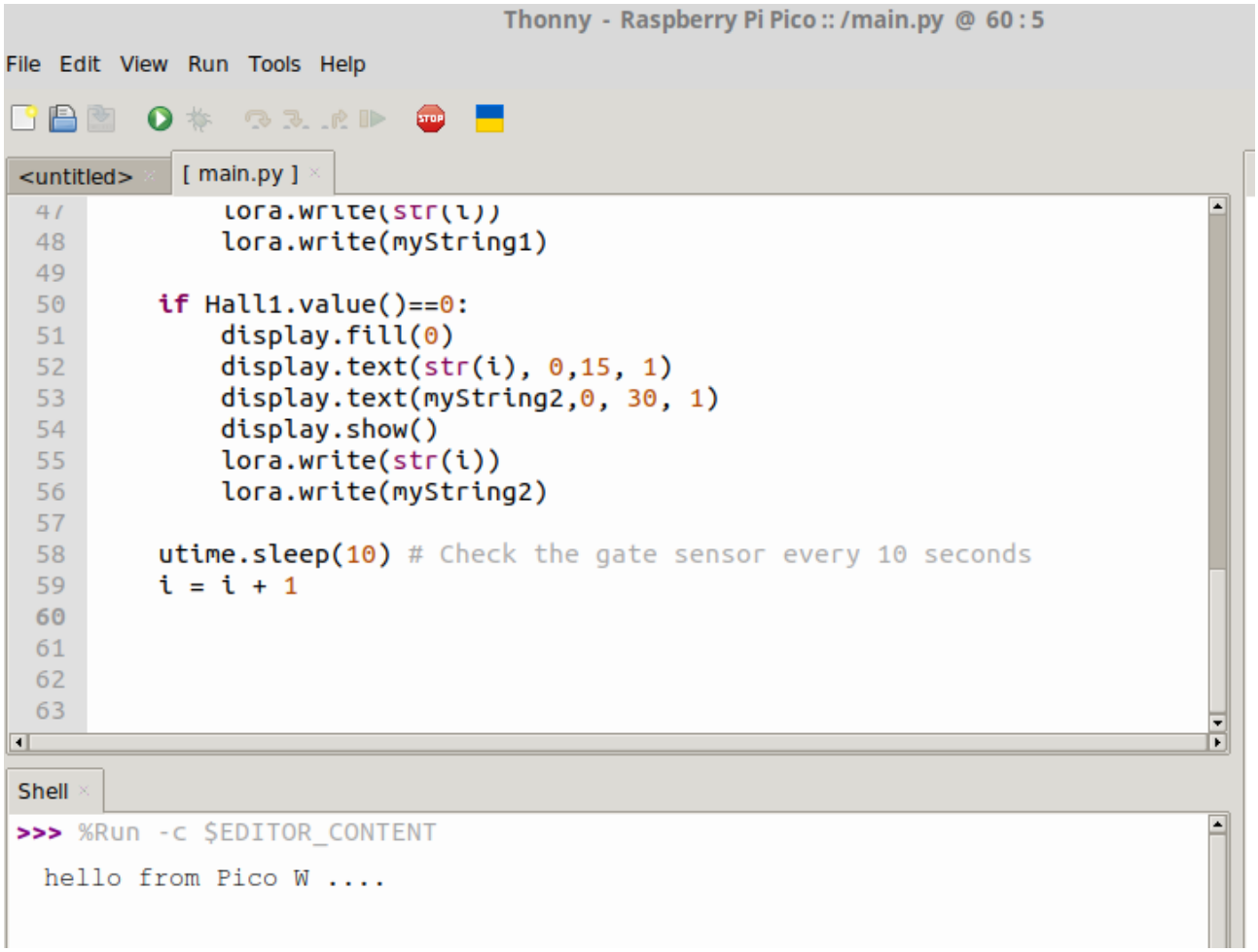


Table 2 : WIRING PLAN - RECEIVER

Pico Physical Pin Number	Pico Pin Designation	LoRa Module Pin Designation	
1	TX(0)	RX0	
2	RX(0)	TX0	
38	GND	GND	
40	VBUS(+5v)	VCC	
9	GP6	AUX	
		M0	Connect these two pins to each other
		M1	

MicroPython Script for the RECEIVER

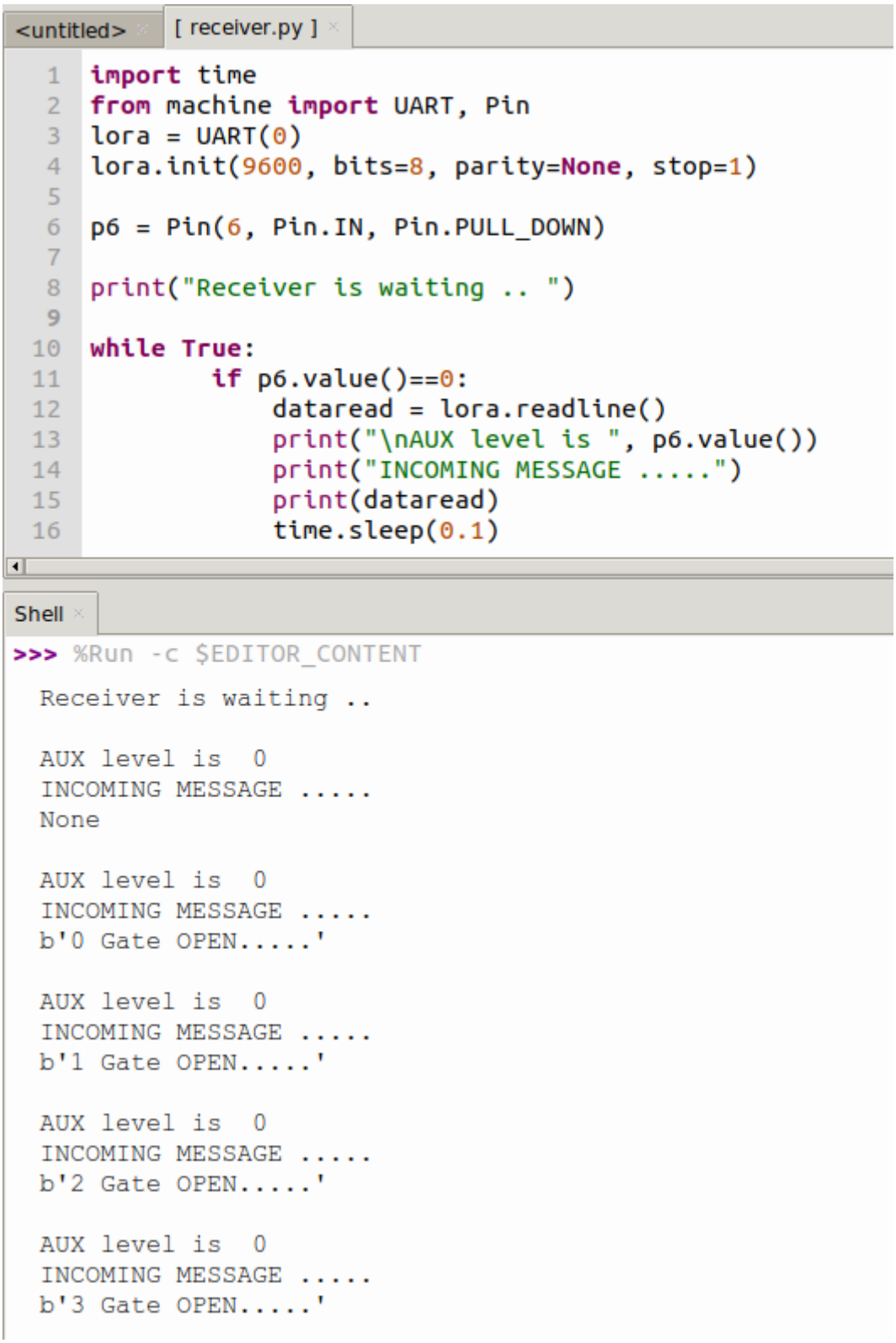
```
import time
from machine import UART, Pin
lora = UART(0)
lora.init(9600, bits=8, parity=None, stop=1)

p6 = Pin(6, Pin.IN, Pin.PULL_DOWN)

print("Receiver is waiting .. ")

while True:
        if p6.value()==0:
            dataread = lora.readline()
            print("\nAUX level is ", p6.value())
            print("INCOMING MESSAGE .....")
            print(dataread)
            time.sleep(0.1)
```

FIGURE 3 : Dialog as seen in Thonny when the Receiver Script is Running and the Transmitter is Turned On.



Both the Transmitter and Receiver include a small OLED display to make it easier to check that the modules are running and not stalled for some reason. These are 'plug

and play' modules when used with the corresponding PiicoDev LiPo Expansion Board for Raspberry Pi Pico.

FIGURE 4 : Pi Pico Inserted into PiicoDev Expansion Board with PiicoDev OLED connected via proprietary cable.

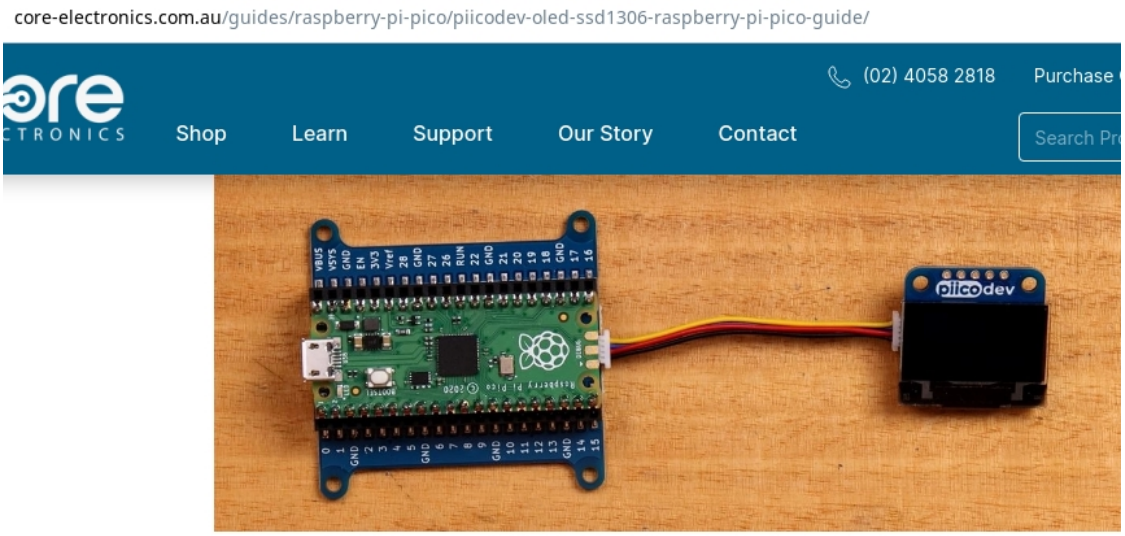
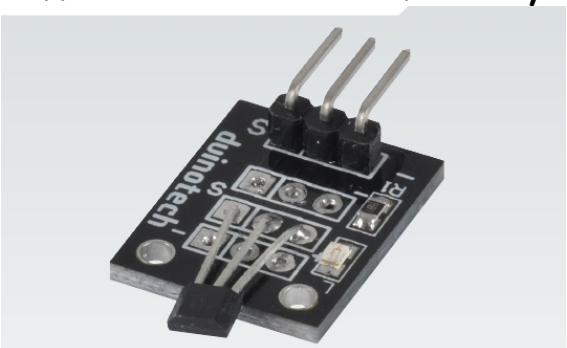


FIGURE 5 Hall Effect Sensor available from Jaycar Electronics.



Specifications	
	Hall Effect Sensor Module
Activation threshold	30 Gauss
Deactivation threshold	10 Gauss
Operating Voltage	4.5VDC - 48VDC
Output Type	Schmitt Trigger(Digital) Active Low
Dimensions	20(L) x 15(W) x 3(H)

Specifications		
Module	Duinotech	Function
-	GND	Ground
Middle	5V	Power
S	D13	Output Signal

Table 3 : LoRa Gate Monitor – Shopping List

ITEM	Supplier	Cat. No.	Count
Pi Pico with headers	Core Electronics	CE07589	**2**
PiicoDev OLED Display Module (128x64) SSD1306	Core Electronics	CE07911	**2**
PiicoDev LiPo Expansion Board for Raspberry Pi Pico	Core Electronics	CE07693	**2**
PiicoDev Cable 50mm	Core Electronics	CE07772	**2**
Unclad Punched Laminate	Jaycar	HP9562	**2**
Hook Up Cable Pack	Jaycar	WH3025	**1**
USB Leads (A plug Micro B plug) (same as usual Android phone charger and data cables)	Jaycar	WC7723	**2**
Battery Bank 4 x AA with USB socket and switch	Jaycar	PH9283	**2**
Three core cable for Hall Effect sensor long enough to suit installation on gate.	Jaycar	WB1590	
0.1 inch 6 pin PCB plug right angle entry	Jaycar	HM3426	**3**
Weatherproof box for transmitter. (top clear enough to see screen)			**1**
Box for receiver (top clear enough to see screen).			**1**
LoRa Module : LoRa 433MHz LLCC68 470MHz Wireless Module 22dBm Long Range 5km EBYTE E220-400T22D SMA-K UART RSSI Transmitter Receiver SEMTECH https://www.aliexpress.com/item/1005002091320352.html	CDEBYTE IoT Module Store, AliExpress	See under ITEM	**2**
LoRa Aerial : Omnidirectional Antenna 433MHz 3.0dBi Gain 50 Ohm SMA-J COJXU TX433-JKS-20 High-Quality wireless communication antenna https://www.aliexpress.com/item/1005001530239330.html	CDEBYTE IoT Module Store, AliExpress	See under ITEM	**2**
Strong magnet			**1**
Alkaline ‘AA’ batteries			**8**

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FIGURE 6 : Completed Transmitter
FIGURE 7 : Completed Receiver