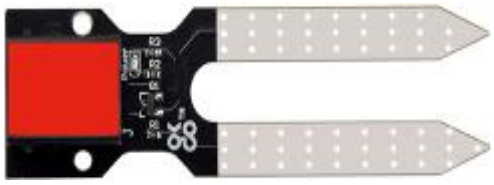
Soil Moisture Sensor (000x0000 Article Number) (TS2136)

DESIGN THE WORLD

Product Details

This is the TelePort soil moisture sensor which can measure the soil moisture. When it is inserted in the soil and the current passes though the soil, the sensor will read the current changes and convert the resistance value into the water content. The higher the resistance value, the higher the soil conductivity. Additionally, the metal on the surface can extend its life expectancy.



Features and Benefits

- Compatible with RJ11 6P6C OKdo TelePort Control boards and expansion shields.
- Two conductive tines are inserted in to the soil providing an analog representation of the moisture content within the soil.

Technical Specifications

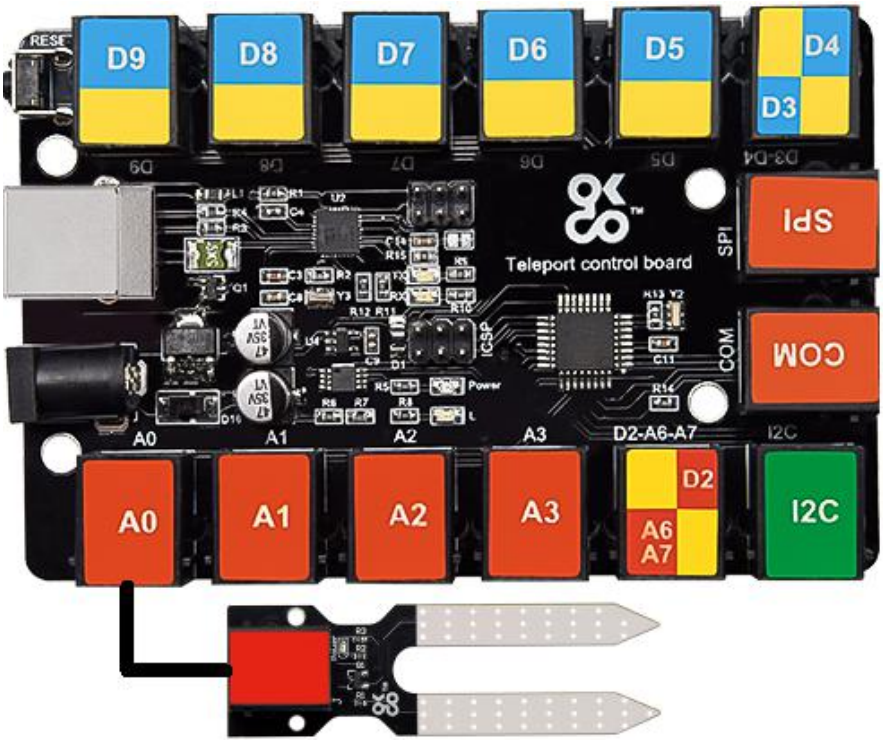
Sensor type	Analog input
Working voltage	3.3V-5V
Working Current	≤ 20mA
Output Voltage	0-2.3V
Dimensions	66mm*20mm*18mm
Weight	4.8g

Applications

- Botanical Gardening
- Moisture Sensing
- Consistency Measurement

This module is compatible with the TS2180-Raspberry Pi shield, the TS2179-Micro:bit shield and the TS2178-TelePort main board.

➢ **Arduino Application**



This module is compatible with the TS2178 TelePort control board.

Test Code

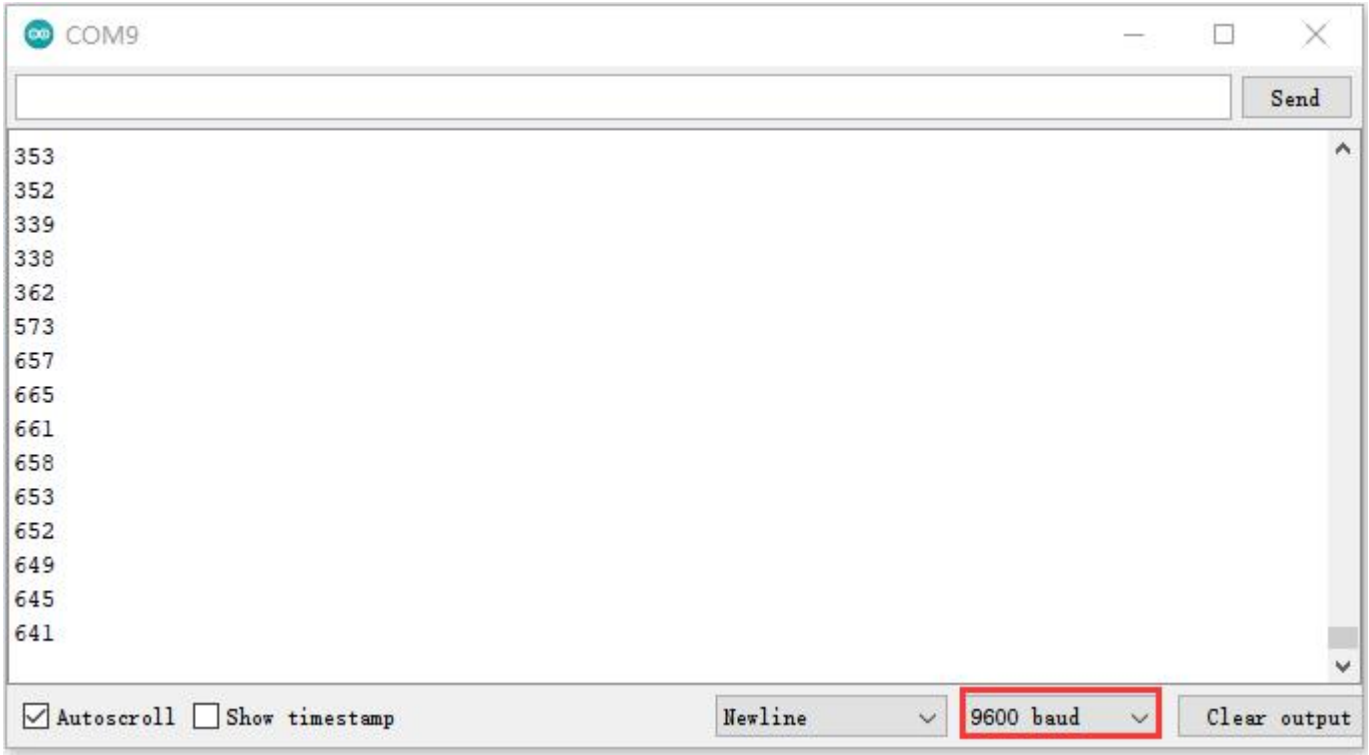
```
int analogPin = A0; //connect soil moisture sensor to analog interface A0
int val = 0; //define the initial value of variable ‘val’ as 0
void setup()
{
Serial.begin(9600); //set baud rate at 9600
}
void loop()
{
val = analogRead(analogPin); //read and assign analog value to variable ’val’
Serial.println(val); //print variable ‘val’ by Serial.print
delay(100);
}
```

Test Result

Wire up, upload test code, power it up, open serial monitor and set baud rate to 9600. Then it will read the soil moisture value.

Insert its probe into soil, the higher the soil moisture, the larger the value.

As shown below;

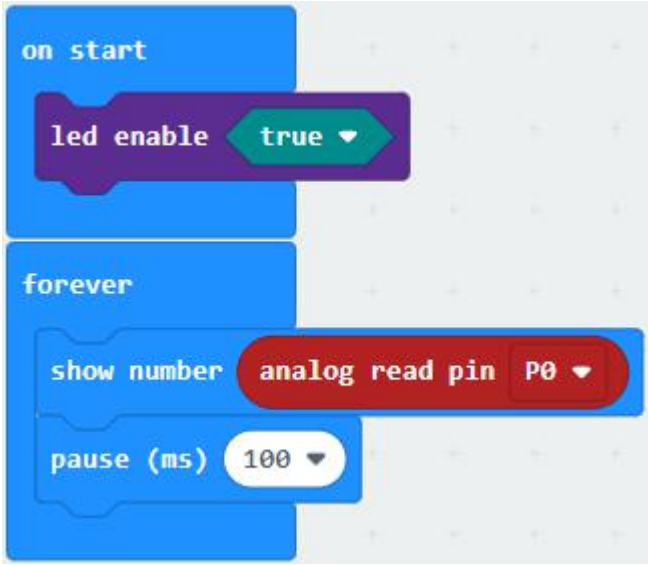


If you want to know more details about Arduino and the TelePort control board, you can refer to TS2178.

- **Micro:bit Application**

It is compatible with the Micro:bit board and the TS2179 Micro:bit expansion board.

Test Code



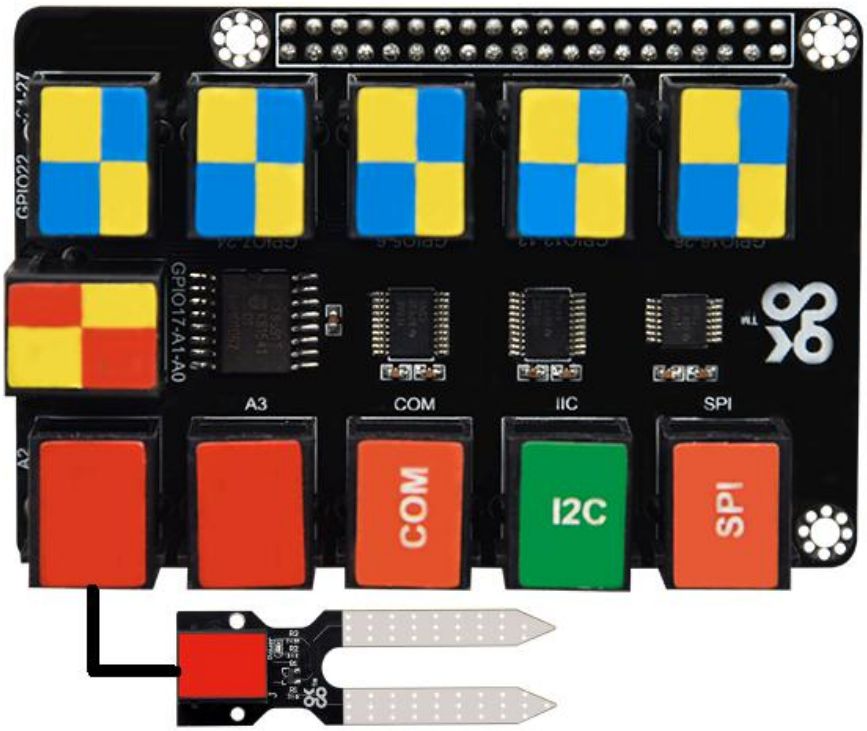
.....①Run the "on start" block to boot the program
.....②Open the LED matrix of the Micro:bit
.....③The program is run circularly under the command of "forever" block
.....④Micro:bit shows the moisture values detected by the soil moisture sensor
.....⑤delay in 100ms

Test Result

Wire up, insert the Micro:bit V2.0 into the shield, turn DIP switch to 3V3, upload test code and power it up. Then Micro:bit will show the detected analog moisture values.

If you want to know more details about the Micro:bit board and Micro:bit shield, you can refer to TS2179.

➢ **Raspberry Pi Application**



This module is compatible with the Raspberry Pi board and the TS2180 Raspberry Pi shield.

PCF8591 A/D Conversion：

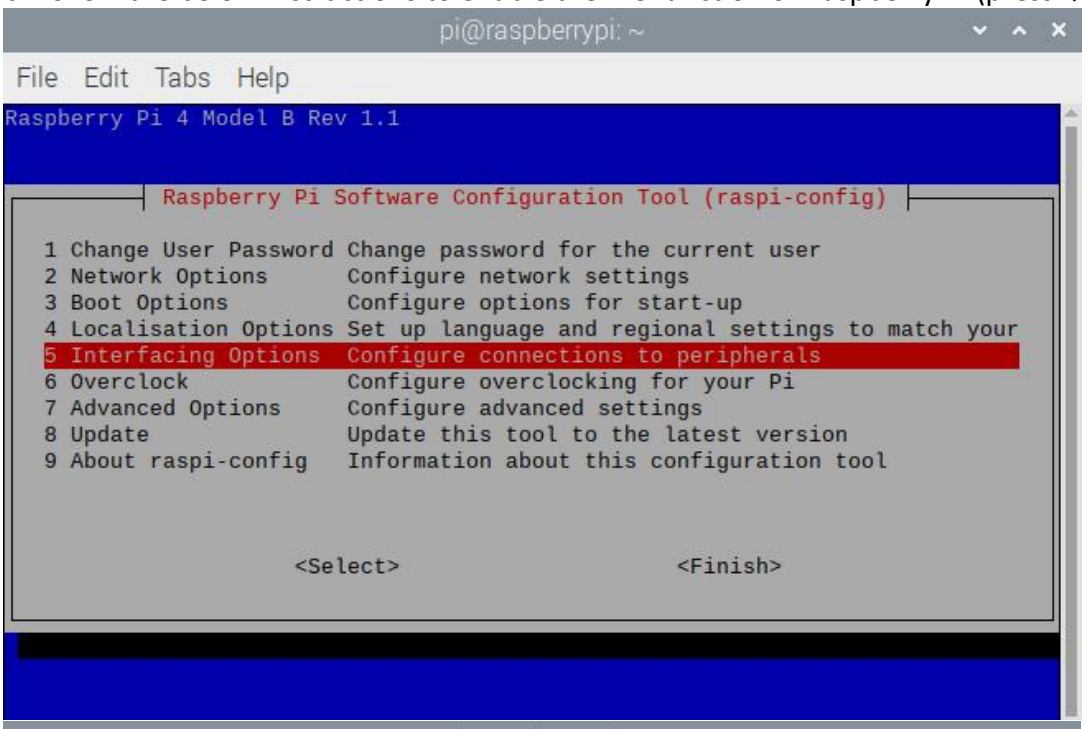
The Raspberry Pi itself does not have AD/DA function; therefore an expansion board with this function is required when connected to external analog sensors. And here we use a PCF8591 A/D converter with I2C communication.

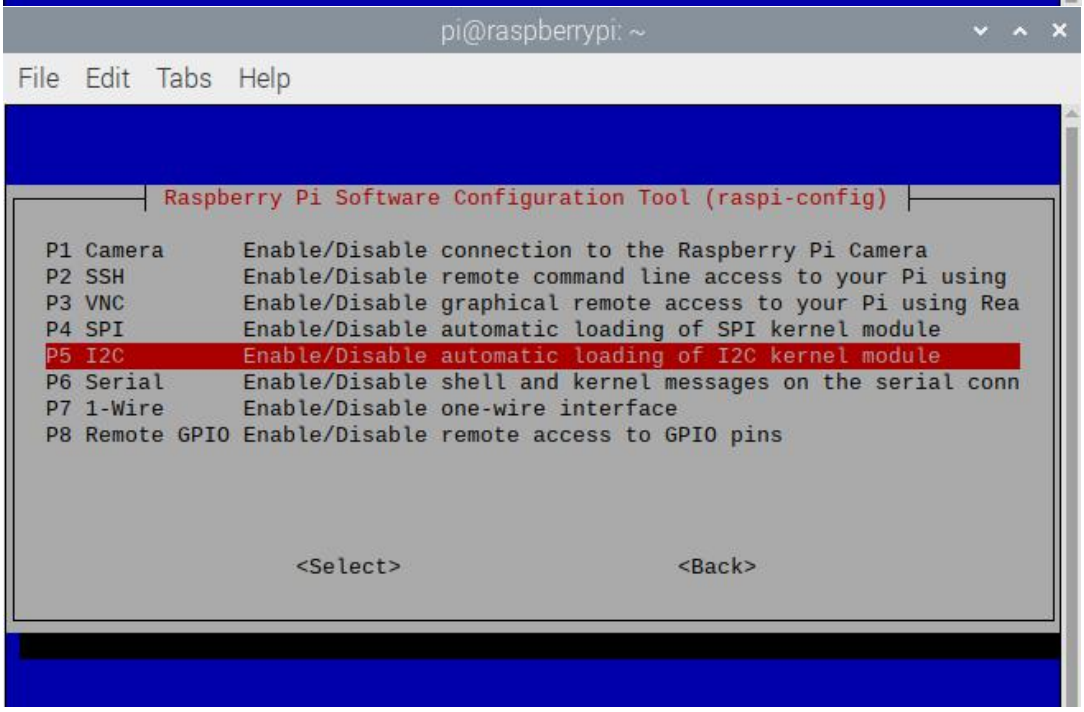
Enable the I2C communication function of the Raspberry Pi as follows:

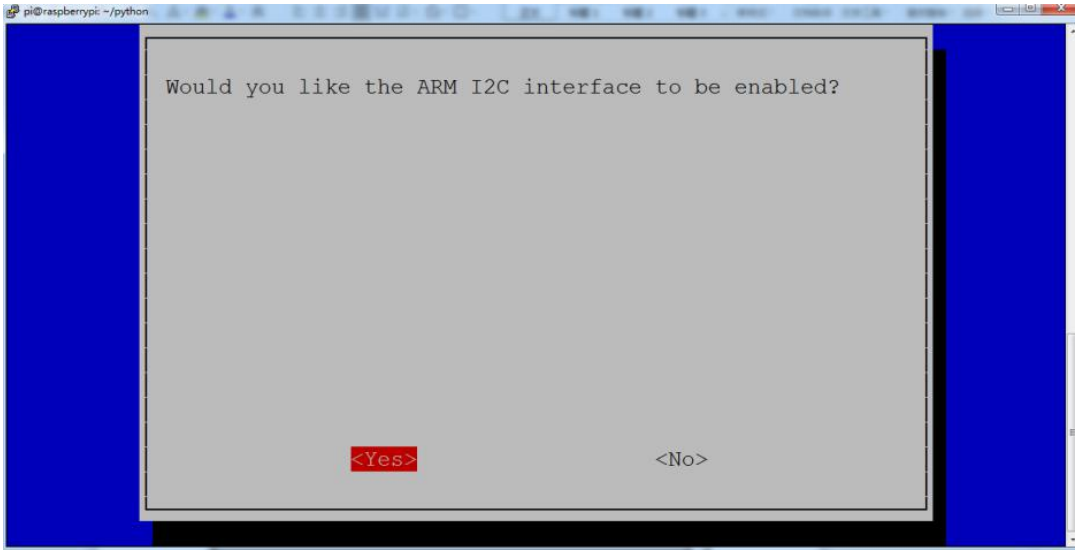
a. Raspberry Pi does not enable the I2C function by default. Enter sudo raspi-config in the terminal to enter the Raspberry Pi configuration interface.

```
pi@raspberrypi:~/python $ sudo raspi-config
```

b. Follow the below instructions to enable the I2C function of Raspberry Pi:(press ←,↑,↓,→ then“Enter”)

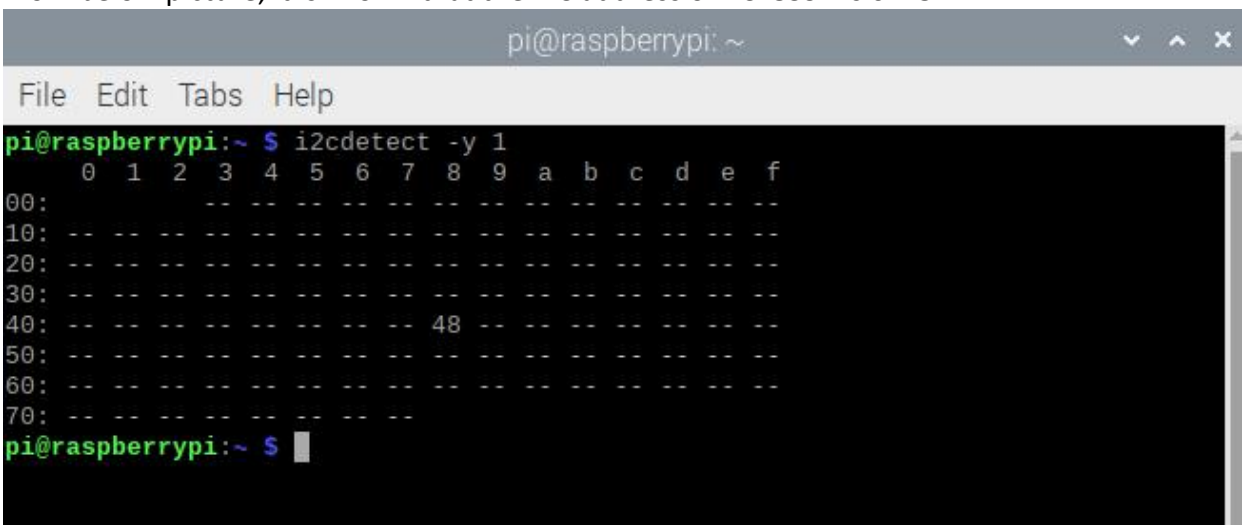






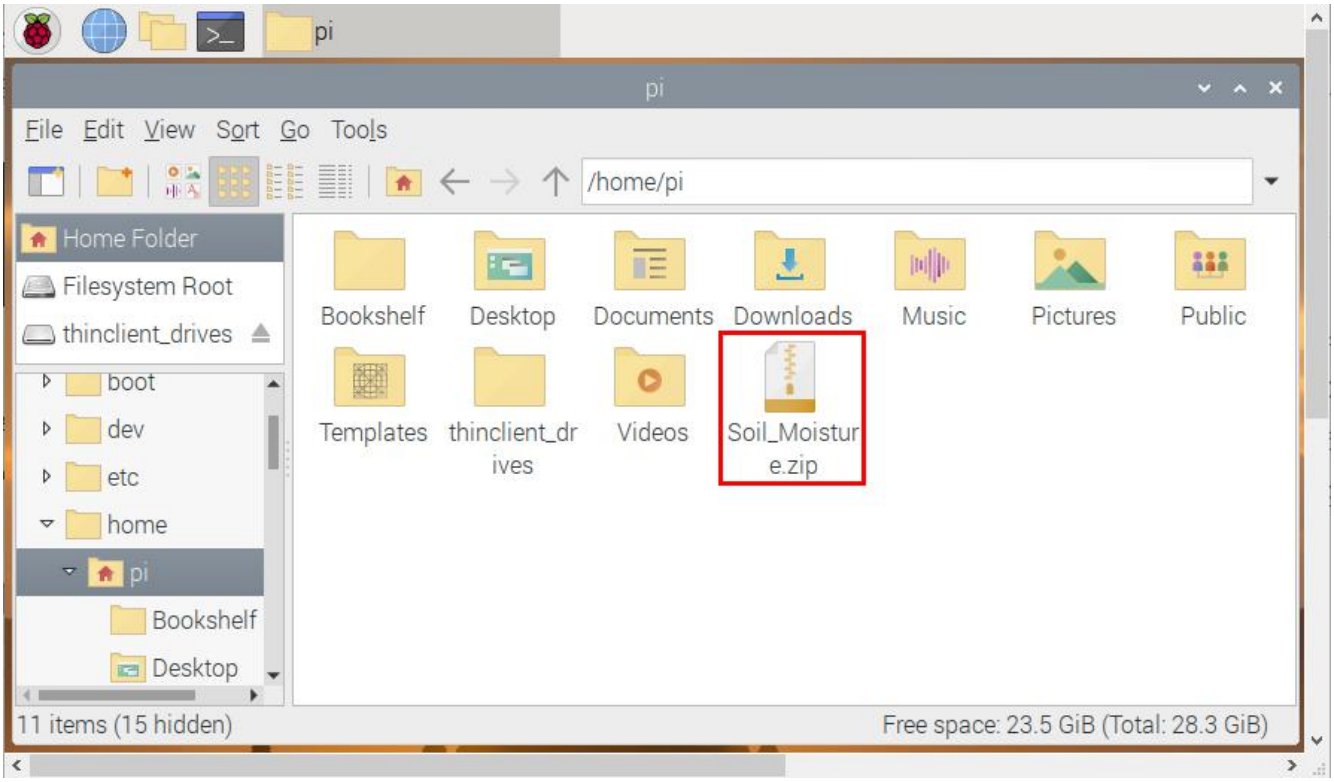
Check the address of the I2C module (PCF8591) connected to the Raspberry Pi, enter the command i2cdetect -y 1, and then press **Enter**.

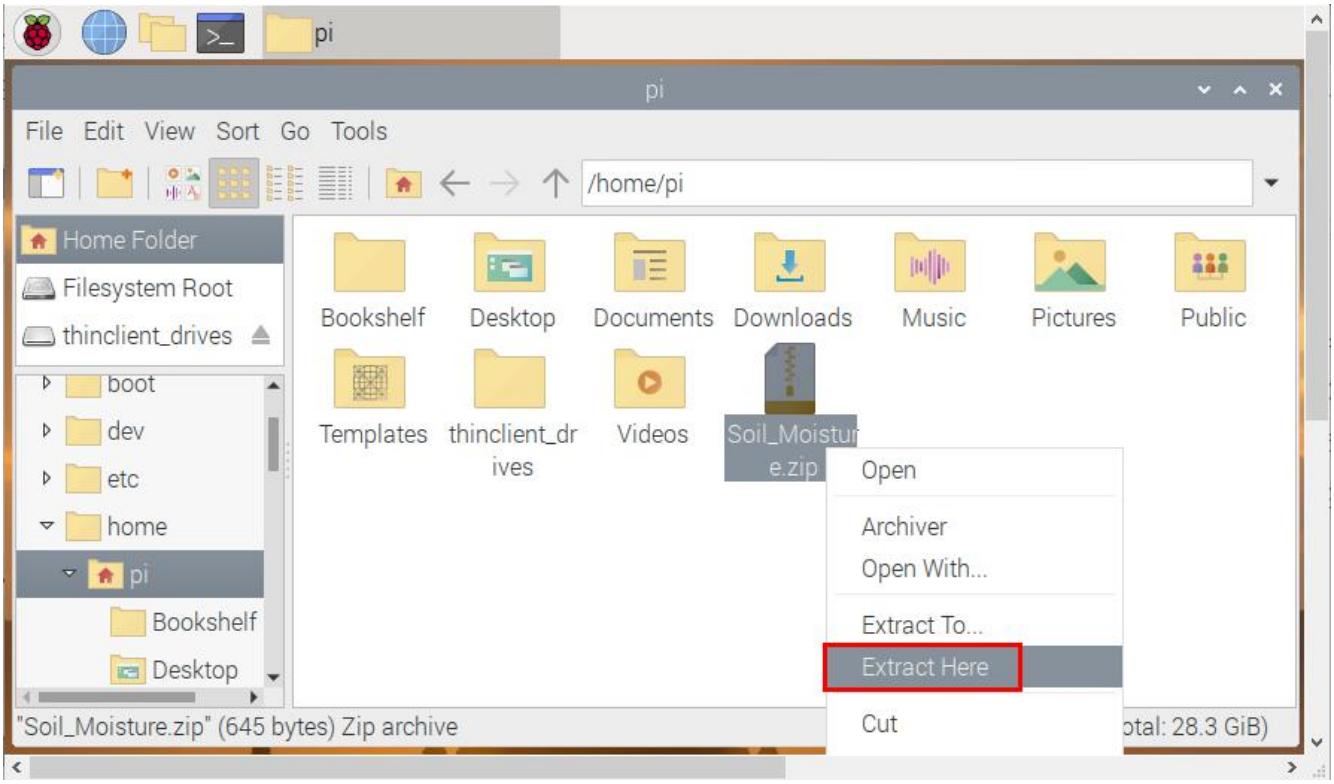
From below picture, it is known that the I2C address of PCF8591 is 0x48 .

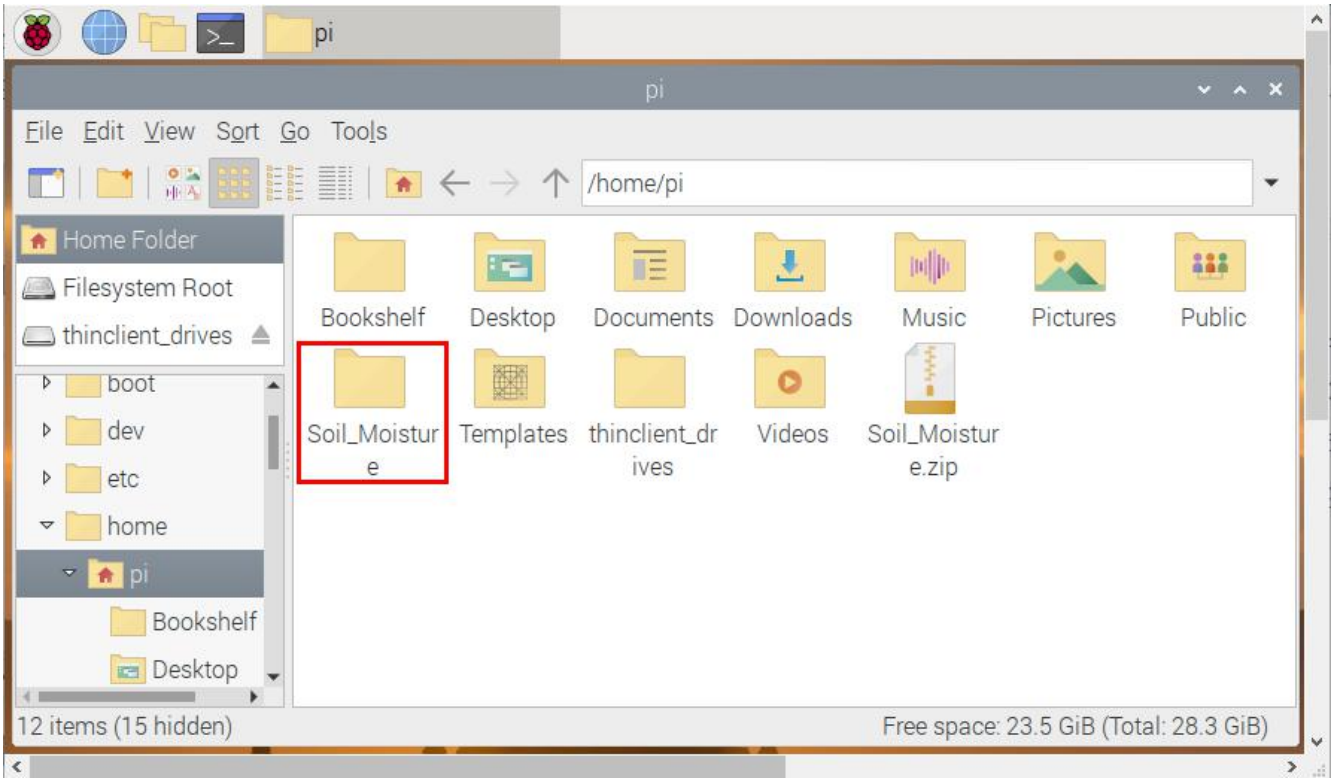


Copy the test code to Raspberry Pi system to run it

(1) Save the test code in the **pi** folder of Raspberry Pi system. Then place the Soil_Moisture.zip file we provide in the **pi** folder, right-click and click **Extract Here.** As shown below:


pi
pi
File Edit View Sort Go Tools
/home/pi
Home Folder
Filesystem Root
thinclient_drives
boot
dev
etc
home
pi
Bookshelf
Desktop
Bookshelf
Desktop
Documents
Downloads
Music
Pictures
Public
Templates
thinclient_drives
Videos
Soil_Moisture.zip
11 items (15 hidden)
Free space: 23.5 GiB (Total: 28.3 GiB)


pi
pi
File Edit View Sort Go Tools
/home/pi
Home Folder
Filesystem Root
thinclient_drives
boot
dev
etc
home
pi
Bookshelf
Desktop
Bookshelf
Desktop
Documents
Downloads
Music
Pictures
Public
Templates
thinclient_drives
Videos
Soil_Moisture.zip
Open
Archiver
Open With...
Extract To...
Extract Here
Cut
"Soil_Moisture.zip" (645 bytes) Zip archive



(2) Compile and run test code:

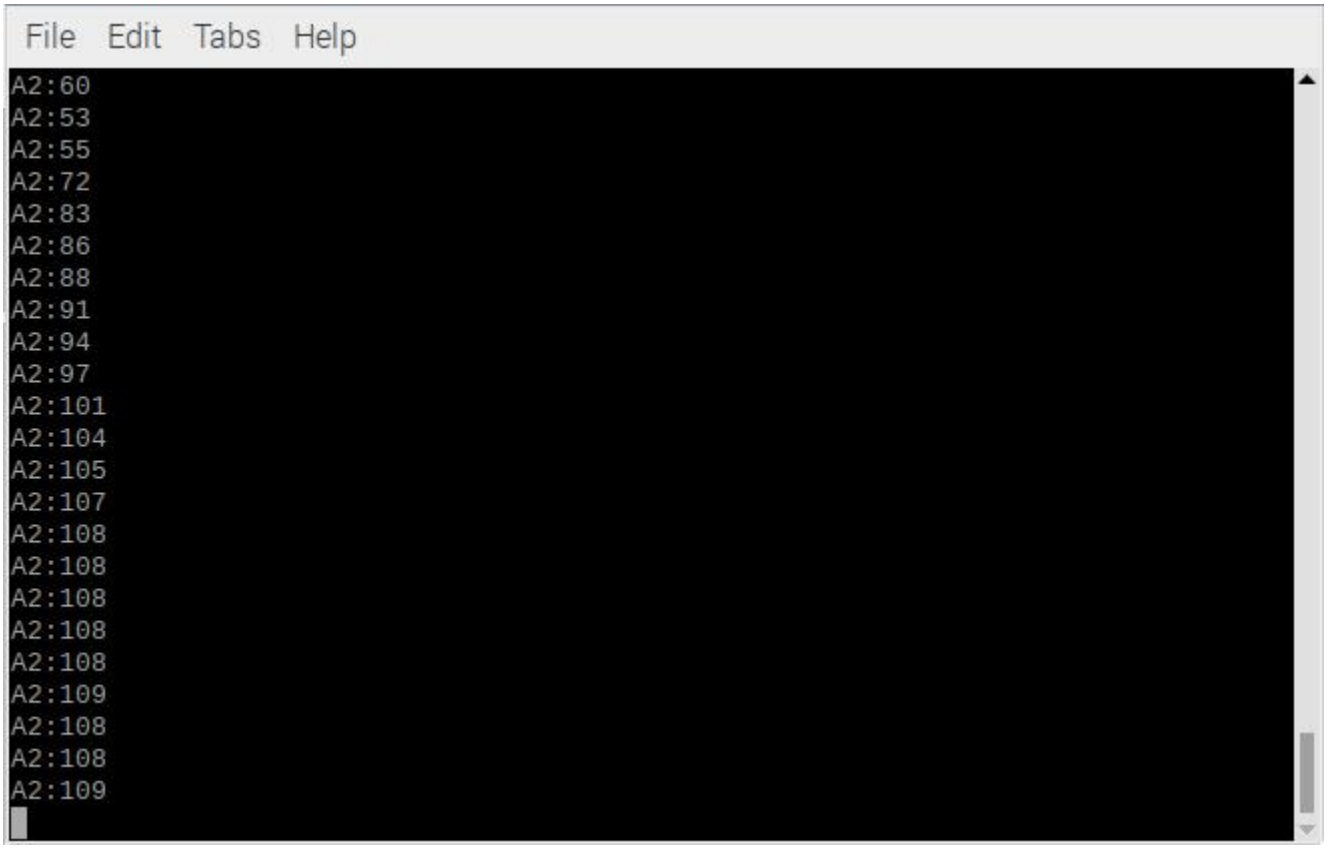
Input the following code and press"Enter"

```
cd /home/pi/Soil_Moisture
gcc Soil_Moisture.c -o Soil_Moisture -lwiringPi
sudo ./Soil_Moisture
```

(3) Test Result:

Insert the shield into the Raspberry Pi board. After programming finishes, then the terminal will show the detected soil moisture signals.

Note: press Ctrl + C to exit code running



Test Code

File name: Soil_Moisture.c

```
#include <wiringPi.h>
#include <pcf8591.h>   //pcf8591 library
#include <stdio.h>

#define Address 0x48   //iic address
#define BASE 64   //DAC write address
#define A0 BASE+0  //A0 analogRead  address
#define A1 BASE+1  //A1 analogRead  address
#define A2 BASE+2
#define A3 BASE+3


int main(void)
{
    unsigned char value;
    wiringPiSetup();
    pcf8591Setup(BASE,Address);  //Initialize the pcf8591

    while(1)
    {
      value=analogRead(A2);    //Read the analog value of pin A2
      printf("A2:%d\n",value); //The terminal prints the simulated value
      delay(100);
```

```
    }
}
```

If you want to know how to utilize Raspberry Pi and the Raspberry Pi shield, you can refer to TS2180.

END