Raspbian GNU/Linux 10 (2020-02-13-raspbian-buster-lite)

- ssh
- wpa_supplicant.conf

192.168.1.251

- (1) Raspberry Pi Zero W (https://www.adafruit.com/product/3400)
- (1) SFE Qwiic Hat (https://www.adafruit.com/product/4688)
- (4) STEMMA QT / Qwiic JST SH 4-pin Cable (https://www.adafruit.com/product/4210)
- (1) Adafruit AS7341 10-Channel Light / Color Sensor (https://www.adafruit.com/product/4698)
- (1) Adafruit BH1750 Light Sensor - STEMMA QT / Qwiic (https://www.adafruit.com/product/4681)
- (1) Adafruit TSL2591 High Dynamic Range Digital Light Sensor (https://www.adafruit.com/product/1980)
- (1) Adafruit LTR390 UV Light Sensor - STEMMA QT / Qwiic https://www.adafruit.com/product/4831

passwd
sudo raspi-config

- Network, Hostname (light-mkII-01)
- Interfacing Options (enable I2C and SPI)
- Advanced Options, Expand Filesystem

nano -K update.sh

```
apt update
apt upgrade -y
apt dist-upgrade -y
apt autoclean -y
apt autoremove -y
```

sudo chmod +x *.sh
sudo ./update.sh

sudo apt install i2c-tools -y
sudo i2cdetect -y 1

```
     0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00:          -- -- -- -- -- -- -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
20: -- -- -- 23 -- -- -- -- -- 29 -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- 39 -- -- -- -- -- --
40: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
50: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
60: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- --
```

sudo apt install -y python3 git python3-pip -y
sudo pip3 install --upgrade setuptools
pip3 install RPI.GPIO
pip3 install adafruit-blinka
nano -K blinkatest.py

```
import board
import digitalio
```

```
        import busio

        print("Hello blinka!")

        # Try to great a Digital input
        pin = digitalio.DigitalInOut(board.D4)
        print("Digital IO ok!")

        # Try to create an I2C device
        i2c = busio.I2C(board.SCL, board.SDA)
        print("I2C ok!")

        # Try to create an SPI device
        spi = busio.SPI(board.SCLK, board.MOSI, board.MISO)
        print("SPI ok!")

        print("done!")
python3 blinkatest.py
        Hello blinka!
        Digital IO ok!
        I2C ok!
        SPI ok!
        done!

pip3 install adafruit-circuitpython-as7341
pip3 install --upgrade adafruit-circuitpython-as7341
nano -K  as7341_simpletest.py
        # SPDX-FileCopyrightText: 2020 Bryan Siepert, written for Adafruit Industries
        # SPDX-License-Identifier: MIT
        from time import sleep
        import board
        import busio
        from adafruit_as7341 import AS7341

        i2c = busio.I2C(board.SCL, board.SDA)
        sensor = AS7341(i2c)


        def bar_graph(read_value):
            scaled = int(read_value / 1000)
            return "[%5d] " % read_value + (scaled * "*")


        while True:

            print("F1 - 415nm/Violet  %s" % bar_graph(sensor.channel_415nm))
            print("F2 - 445nm//Indigo %s" % bar_graph(sensor.channel_445nm))
            print("F3 - 480nm//Blue   %s" % bar_graph(sensor.channel_480nm))
```

```
        print("F4 - 515nm//Cyan   %s" % bar_graph(sensor.channel_515nm))
        print("F5 - 555nm/Green   %s" % bar_graph(sensor.channel_555nm))
        print("F6 - 590nm/Yellow  %s" % bar_graph(sensor.channel_590nm))
        print("F7 - 630nm/Orange  %s" % bar_graph(sensor.channel_630nm))
        print("F8 - 680nm/Red     %s" % bar_graph(sensor.channel_680nm))
        print("\n---------------------------------------------")
        sleep(1)
```

pip3 install adafruit-circuitpython-bh1750
nano -K bh1750_simpletest.py

```
        # SPDX-FileCopyrightText: 2020 Bryan Siepert, written for Adafruit Industries

        # SPDX-License-Identifier: Unlicense
        import time
        import board
        import adafruit_bh1750

        i2c = board.I2C()

        sensor = adafruit_bh1750.BH1750(i2c)

        while True:
            print("%.2f Lux" % sensor.lux)
            time.sleep(1)
```

pip3 install adafruit-circuitpython-tsl2591
nano -K tsl2591_simpletest.py

```
        # Simple demo of the TSL2591 sensor.  Will print the detected light value
        # every second.
        import time

        import board
        import busio

        import adafruit_tsl2591

        # Initialize the I2C bus.
        i2c = busio.I2C(board.SCL, board.SDA)

        # Initialize the sensor.
        sensor = adafruit_tsl2591.TSL2591(i2c)

        # You can optionally change the gain and integration time:
        # sensor.gain = adafruit_tsl2591.GAIN_LOW (1x gain)
        # sensor.gain = adafruit_tsl2591.GAIN_MED (25x gain, the default)
        # sensor.gain = adafruit_tsl2591.GAIN_HIGH (428x gain)
        # sensor.gain = adafruit_tsl2591.GAIN_MAX (9876x gain)
        # sensor.integration_time = adafruit_tsl2591.INTEGRATIONTIME_100MS (100ms, default)
```

```python
# sensor.integration_time = adafruit_tsl2591.INTEGRATIONTIME_200MS (200ms)
# sensor.integration_time = adafruit_tsl2591.INTEGRATIONTIME_300MS (300ms)
# sensor.integration_time = adafruit_tsl2591.INTEGRATIONTIME_400MS (400ms)
# sensor.integration_time = adafruit_tsl2591.INTEGRATIONTIME_500MS (500ms)
# sensor.integration_time = adafruit_tsl2591.INTEGRATIONTIME_600MS (600ms)

# Read the total lux, IR, and visible light levels and print it every second.
while True:
    # Read and calculate the light level in lux.
    lux = sensor.lux
    print("Total light: {0}lux".format(lux))
    # You can also read the raw infrared and visible light levels.
    # These are unsigned, the higher the number the more light of that type.
    # There are no units like lux.
    # Infrared levels range from 0-65535 (16-bit)
    infrared = sensor.infrared
    print("Infrared light: {0}".format(infrared))
    # Visible-only levels range from 0-2147483647 (32-bit)
    visible = sensor.visible
    print("Visible light: {0}".format(visible))
    # Full spectrum (visible + IR) also range from 0-2147483647 (32-bit)
    full_spectrum = sensor.full_spectrum
    print("Full spectrum (IR + visible) light: {0}".format(full_spectrum))
    time.sleep(1.0)
```