CEC Continuing Education Center

DesignNews

Getting Hands-On With the M5Stack Core Platform

DAY 2: M5Stack Core Hands-On Exploration with Units

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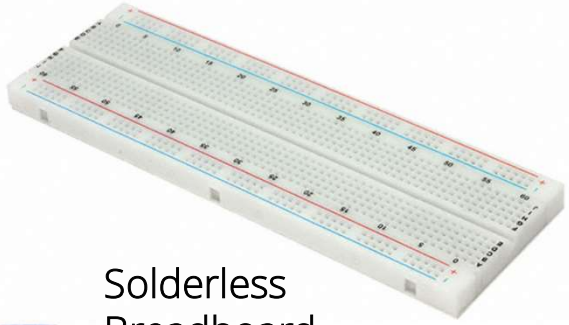
Dr. Don Wilcher

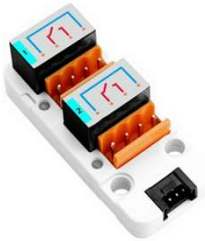
Visit ‘Lecturer Profile’ in your console for more details.

Course Kit and Materials

M5Go IoT Starter Kit V2.6

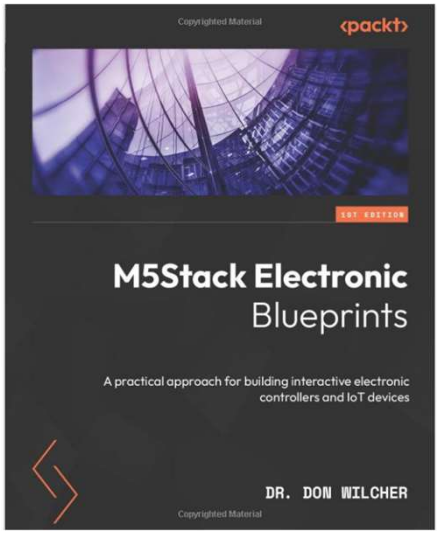


Solderless Breadboard



2 Channel SPST Relay Unit

Adafruit Parts Pal Kit



M5Stack Core UIs

"An important note in designing and developing M5Stack Core UIs is simplicity. Simplicity is the design consideration consisting of using the important UI elements for communicating features and functions of your M5Stack Core device. (Wilcher, 2023, p. 24)."

Agenda:

- M5Stack Units Overview
  a) Examples of M5Stack Units
  b) M5Stack Core Ports
- Mini Lab Activities
  1. Interacting with an RGB LED Unit
  2. Interacting with an IR Remote Unit
  3. Build a Basic Handheld Remote Tester
  4. Interacting with an Angle Sensor Unit
  5. Interacting with a Motion Sensor Unit

M5Stack Unit Overview

- The M5Stack Core is a small electronic input sensor or electrical out device.
  a) Extend the interactive use of the M5Stack Core.
  b) A variety of units to select from to create a multitude of wearable and control applications.
- Units are classified into two categories:
  a) Input – take physical stimuli to create and engage detection devices
  b) Output – provide visual and audio effects to the M5Stack Core creation.

M5Stack Unit Overview. . .

Example Units

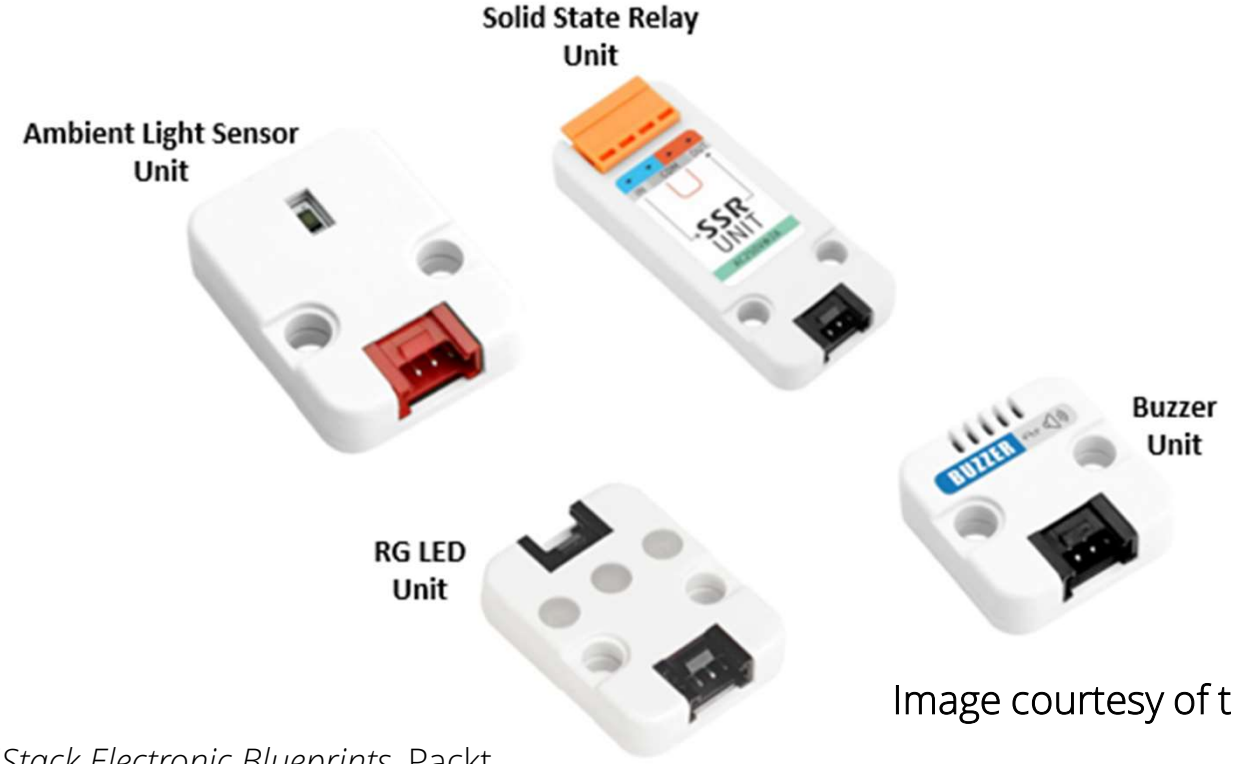


Image courtesy of the author

Wilcher, D. (2023, p. 38). *M5Stack Electronic Blueprints*. Packt.

M5Stack Unit Overview. . .

A Research–Theory Perspective:

The M5Stack Core and supporting Units provide a low entry point into rapid prototyping of small physical computing or Human-Computer Interaction (HCI) devices. Thus, engaging the product development team in research/design activities (Bellucci et al., 2017).

M5Stack Unit Overview. . .

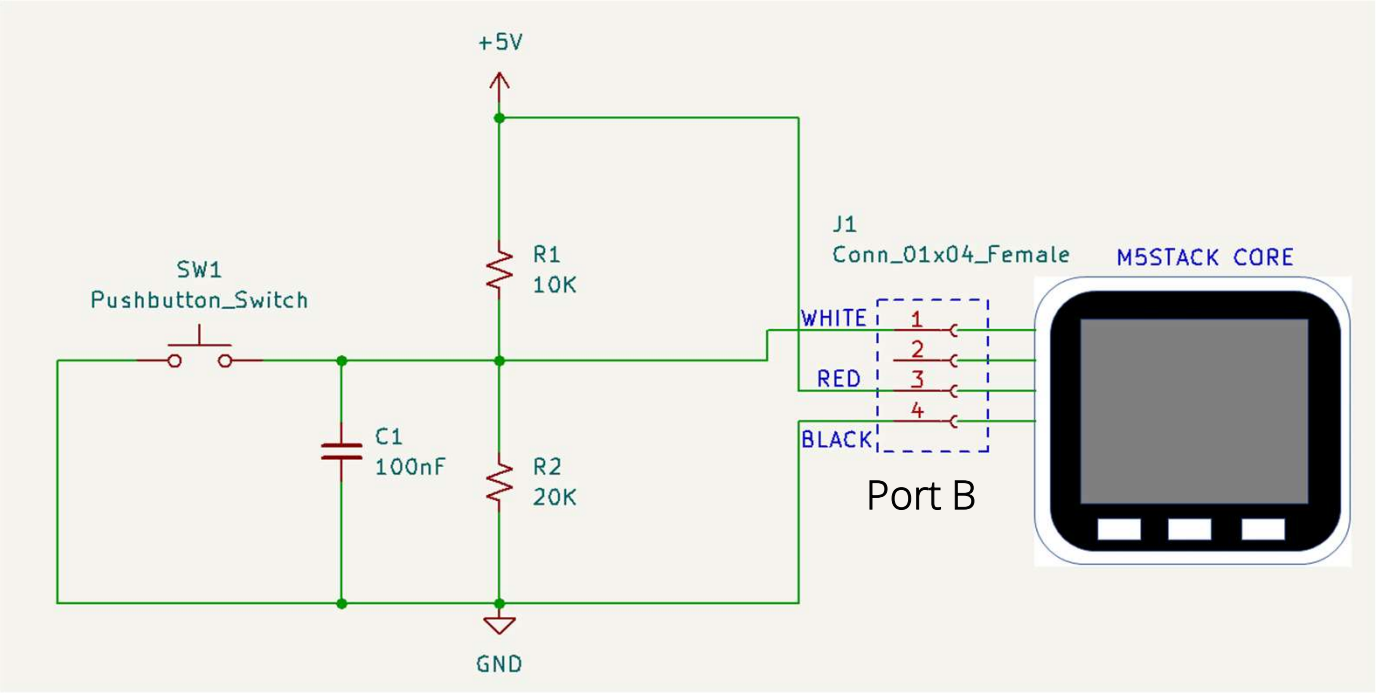
M5Stack Units are attached to the M5Stack Core's ports

M5Stack Core ports

Image courtesy of M5Stack

M5Stack Unit Overview. . .

M5Stack Unit can be created using off-the-shelf components.



Wilcher, D. (2023, p. 40). *M5Stack Electronic Blueprints*. Packt.

Image courtesy of the author

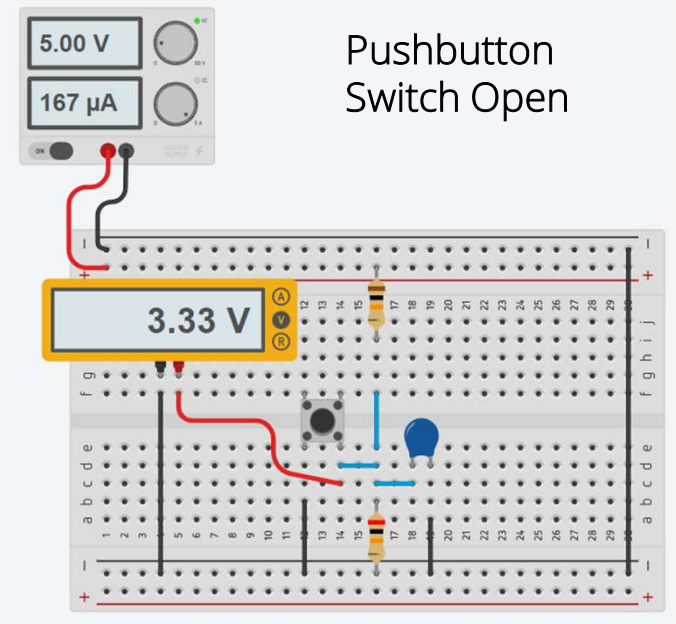
Question 1

As shown in slide 11,what voltage will be applied to Pin 1(White wire) of Port B when SW1 is pressed?

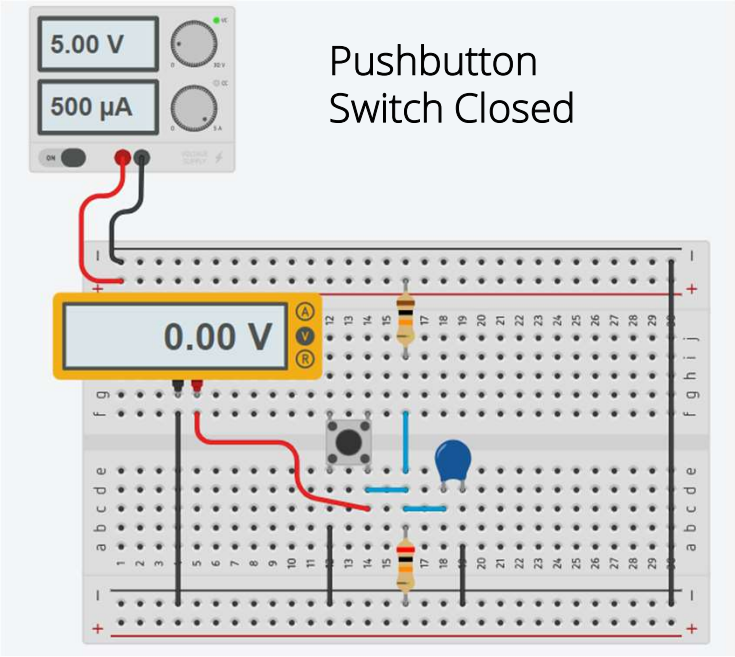
a)3.33V
b)5V
c)0V
d)none of the above

M5Stack Unit Overview. . .

Solderless Breadboard
M5Stack Pushbutton Switch Circuit Analysis



Pushbutton Switch Open



Pushbutton Switch Closed

Images courtesy of the author

Mini Lab Activities:
Interacting with an RGB LED Unit

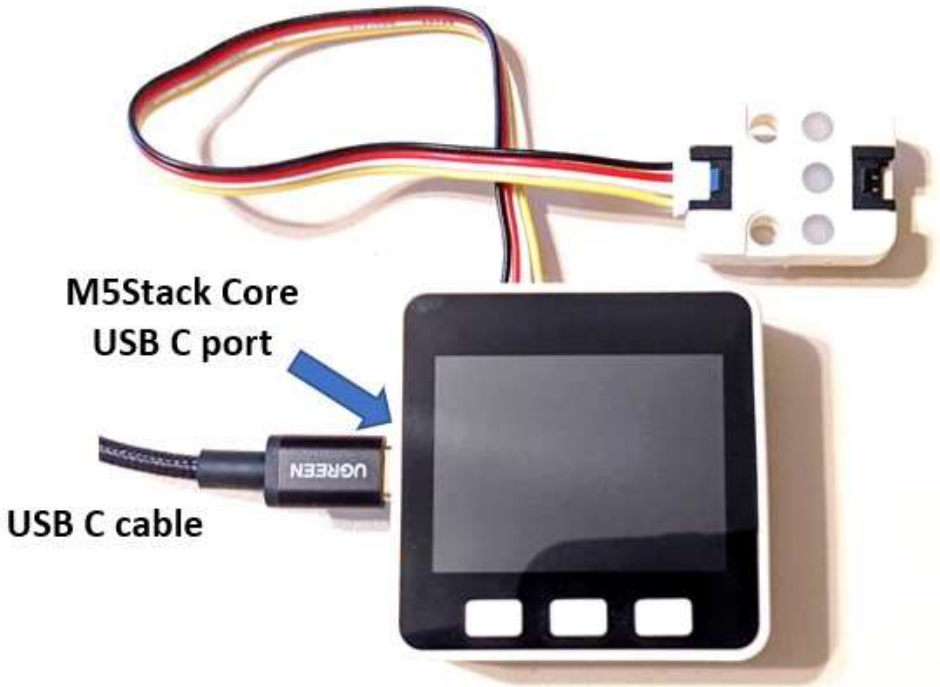
- The RGB LED unit has three individual LED emitters.
    a) Red
    b) Green
    c) Blue
- Each LED can be controlled individually or simultaneously using code.
- The RGB LED unit's intensity can be controlled with code.

Image courtesy of M5Stack

Wilcher, D. (2023, p. 40). *M5Stack Electronic Blueprints*. Packt.

Mini Lab Activities:
Interacting with an RGB LED Unit. . .

Attaching RGB Unit
to a M5Stack Core



Images courtesy of the author

Wilcher, D. (2023, p. 44). *M5Stack Electronic Blueprints*. Packt.

Mini Lab Activities:
Interacting with an RGB LED Unit. . .

RGB LED unit Blockly Code

Image courtesy of the author

Wilcher, D. (2023, p. 45). *M5Stack Electronic Blueprints*. Packt.

Mini Lab Activities:
Interacting with an RGB LED Unit. . .

Building the M5Stack Core UI

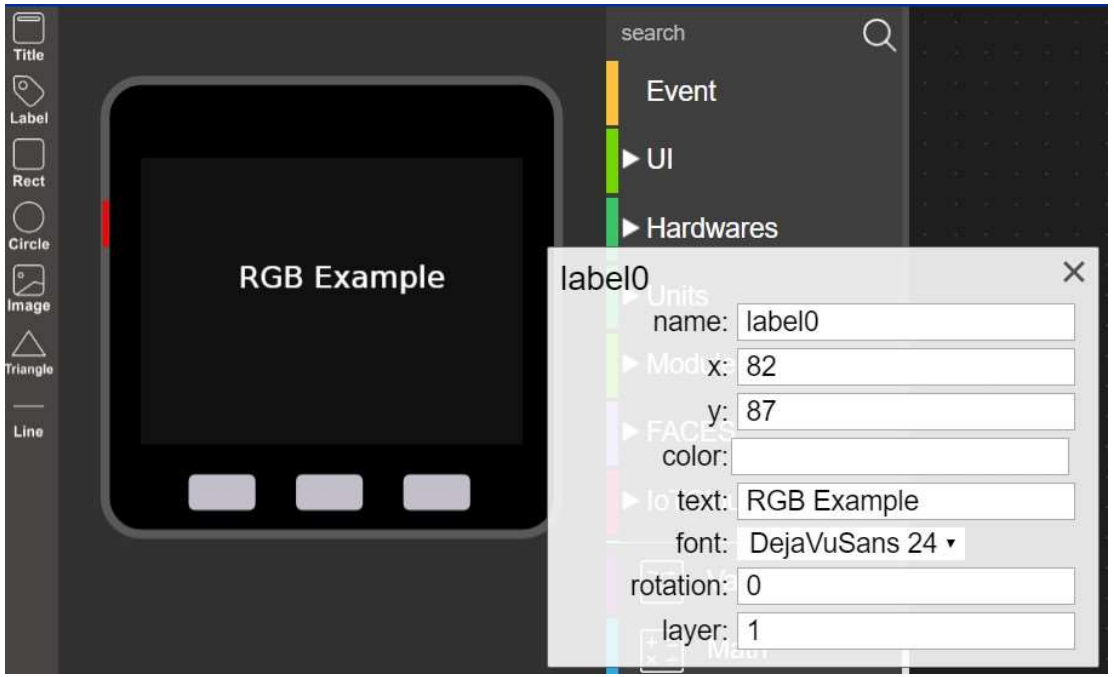


Image courtesy of the author

Wilcher, D. (2023, p. 46). *M5Stack Electronic Blueprints*. Packt.

Question 2

What label0 UI attribute establishes the text appearance shown in slide 17?

a)name
b)color
c)text
d)font

Mini Lab Activities:
Interacting with an RGB LED Unit. . .

Executing the Application

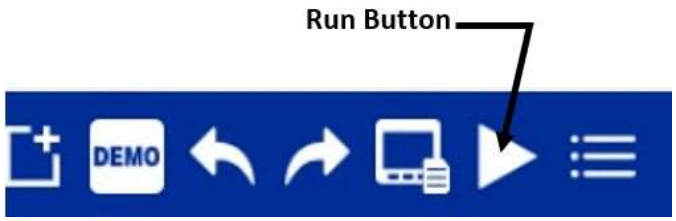


Image courtesy of the author

Wilcher, D. (2023, p. 46). *M5Stack Electronic Blueprints*. Packt.

Mini Lab Activities:
Interacting with an IR Remote Unit

- The IR Remote unit is an electronic photodetector sensor
  - a) Capable of detecting infrared signals
  - b) IR Remote unit has an emitter and receiver pair
  - c) Blue
- The IR Remote Unit uses an IRM-3638 three-pin IC.
- The IRM-3638 IC is responsible for:
  - a) detecting and decoding
  - b) demodulating IR signal data

Image courtesy of M5Stack

Wilcher, D. (2023, p. 46). *M5Stack Electronic Blueprints*. Packt.

Mini Lab Activities:
Interacting with an IR Remote Unit. . .

Image courtesy of M5Stack

IRM-3638 IC

Image courtesy of Everlight Electronics

Wilcher, D. (2023, p. 49). *M5Stack Electronic Blueprints*. Packt.

Question 3

Which IC is responsible for detecting and decoding IR signals for the IR Remote Unit?

a)IRM-3633
b)IRM-3637
c)IRM-3638
d)none of the above

Mini Lab Activities:
Interacting with an IR Remote Unit. . .

Attaching an IR Remote Unit to an M5Stack Core

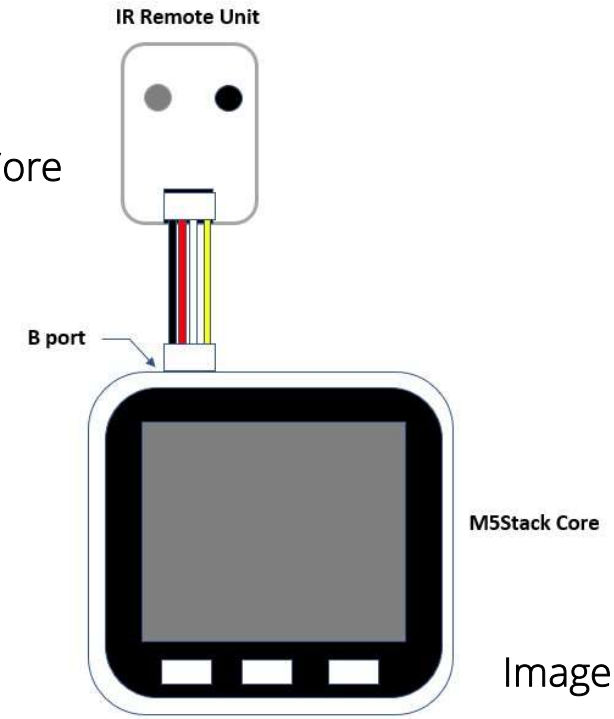
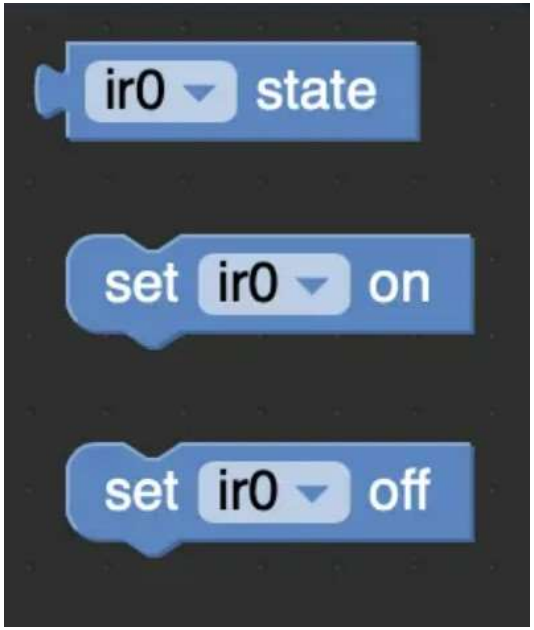


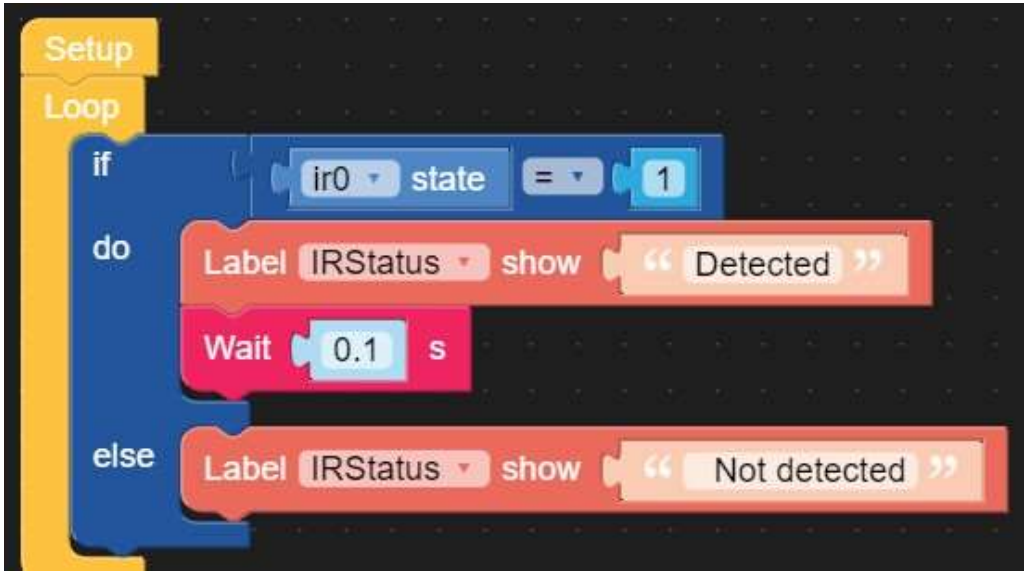
Image courtesy of the author

Wilcher, D. (2023, p. 49). *M5Stack Electronic Blueprints*. Packt.

Mini Lab Activities:
Interacting with an IR Remote Unit. . .

UIFlow IR Remote Blockly Code Blocks





IR Signal detection Blockly Code

Wilcher, D. (2023, pp. 50-51). *M5Stack Electronic Blueprints*. Packt.

Question 4

What message will be displayed on the M5Stack Core's UI with the conditional block "*if ir0 state = 0*" in slide 24?

a)Detected
b)Not Detected

Mini Lab Activities:
Interacting with an IR Remote Unit. . .

Building the M5Stack Core UI: IR Receiver

Image courtesy of the author

Wilcher, D. (2023, p. 51). *M5Stack Electronic Blueprints*. Packt.

Mini Lab Activities:
Interacting with an IR Remote Unit. . .

Build a Basic Handheld Remote Tester

IR receiver:
Not Detected

IR receiver:
Detected

Images courtesy of the author

Wilcher, D. (2023, p. 52). *M5Stack Electronic Blueprints*. Packt.

Mini Lab Activities:
Interacting with an Angle Sensor Unit

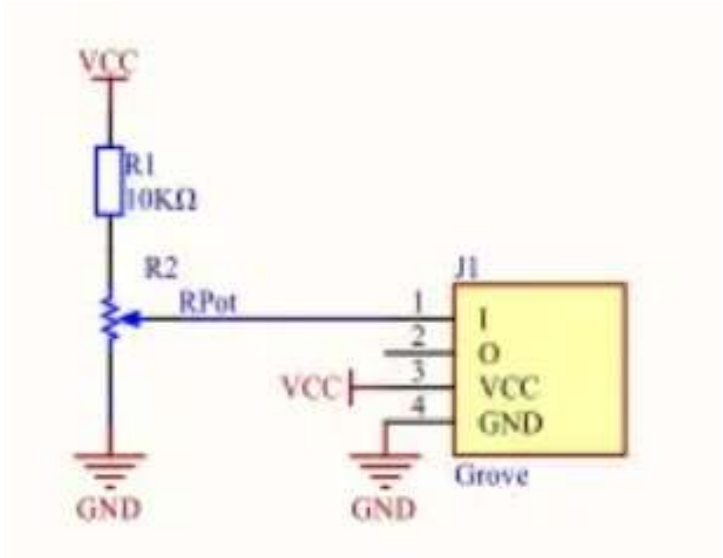
- The angle sensor unit uses a basic 10 Kiloohm potentiometer for rotary adjustment of providing control signals.
- The primary function is to provide voltage division of an attached voltage supply source to an electrical circuit.

Image courtesy of Wikipedia

Wilcher, D. (2023, p. 53). *M5Stack Electronic Blueprints*. Packt.

Mini Lab Activities:
Interacting with an Angle Sensor Unit. . .

The potentiometer is the primary component of the Angle Sensor Unit.

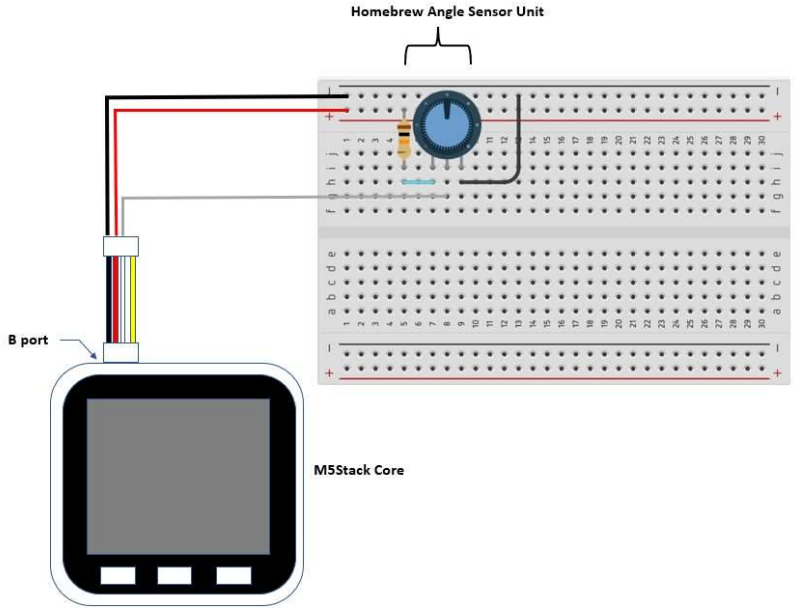


Images courtesy of M5Stack

Wilcher, D. (2023, p. 53). *M5Stack Electronic Blueprints*. Packt.

Mini Lab Activities:
Interacting with an Angle Sensor Unit. . .

Build an Experimental Angle Sensor



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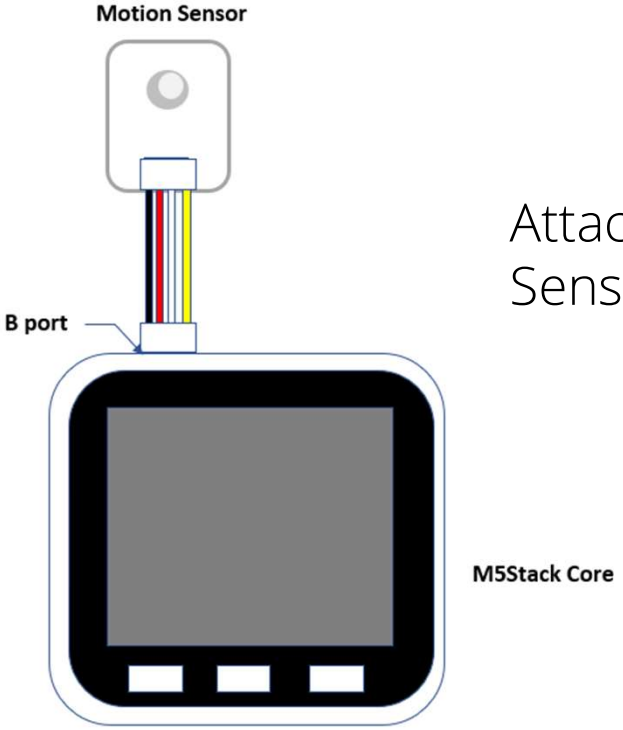
Mini Lab Activities:
Interacting with an Angle Sensor Unit. . .



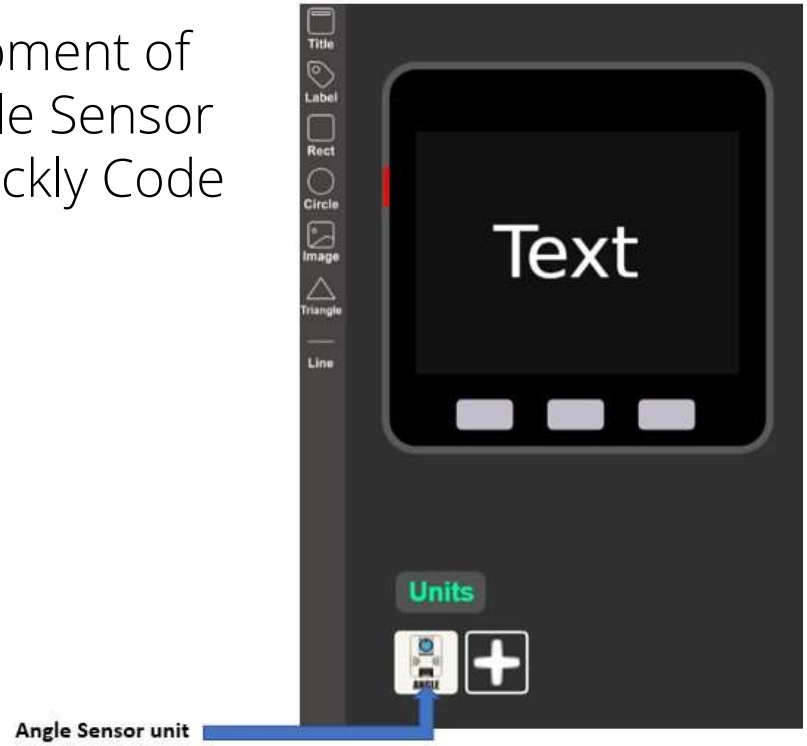
Attachment of the Angle Sensor to the M5Stack Core

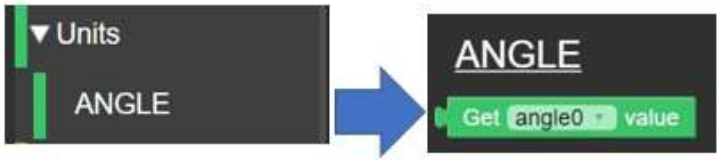
Image courtesy of the author

Wilcher, D. (2023, p. 57). *M5Stack Electronic Blueprints*. Packt.

Mini Lab Activities:
Interacting with an Angle Sensor Unit. . .

Development of the Angle Sensor Unit Blockly Code





Images courtesy of the author

Wilcher, D. (2023, p. 58). *M5Stack Electronic Blueprints*. Packt.

Mini Lab Activities:
Interacting with an Angle Sensor Unit. . .

Development of the Angle Sensor Unit UI

Image courtesy of the author

Wilcher, D. (2023, p. 59). *M5Stack Electronic Blueprints*. Packt.

Mini Lab Activities:
Interacting with an Angle Sensor Unit. . .

ADC minimum and maximum values displayed on TFT LCD

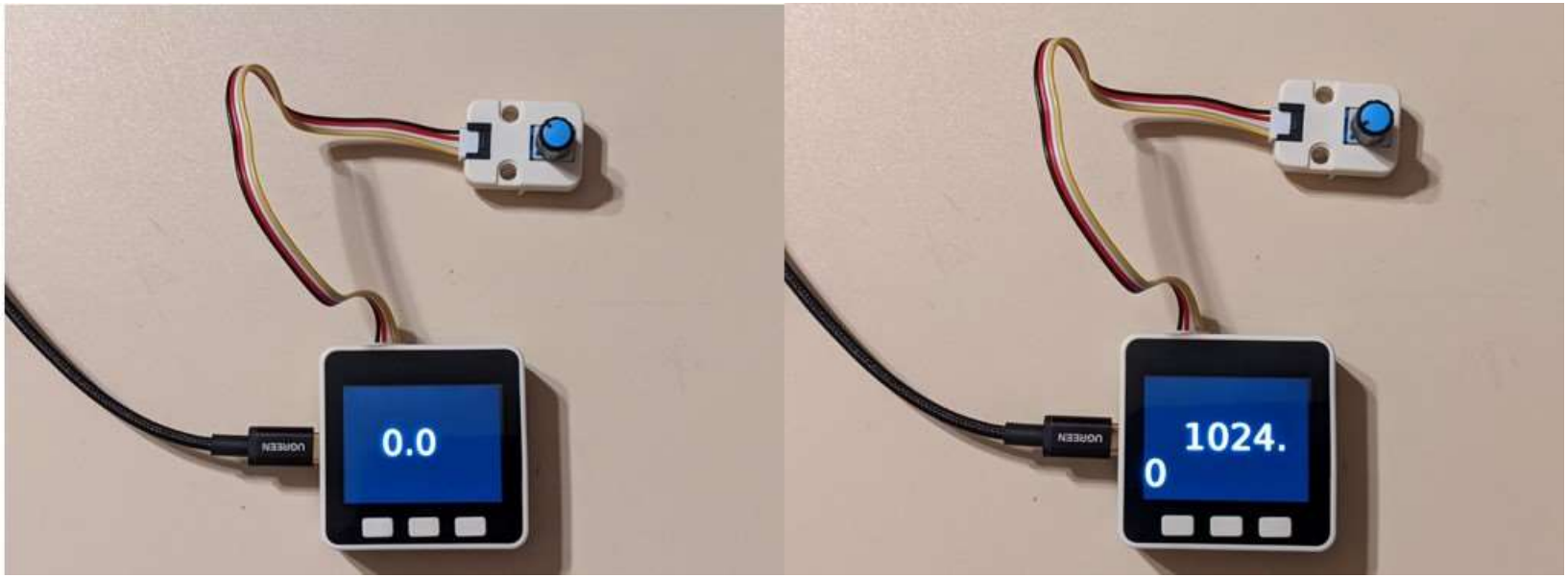


Image courtesy of the author

Wilcher, D. (2023, p. 59). *M5Stack Electronic Blueprints*. Packt.

Question 5

As shown on slide 32, what blockly code block captures the analog signal from the Angle Sensor Unit?

a)Get *sensor* value
b)Get anglesensor value
c)Get *angle0* value
d)none of the above

Thank you for attending

Please consider the resources below:

Bellucci, A., Aedo, I., & Diaz, P. (2017). ECCE toolkit: Prototyping ping sensor-based interaction. *Sensors, 17(3), 438.* https://doi.org/10.3390/s17030438

Wilcher, D. (2023). M5Stack electronic blueprints. Packt.

. M5Stack Electronic Blueprints Code:

https://github.com/PacktPublishing/M5Stack-Electronic-Blueprints

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