

Interactive Desktop Decoration (IDD) Controller Board: Individual Component Test

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4 Mar 2025

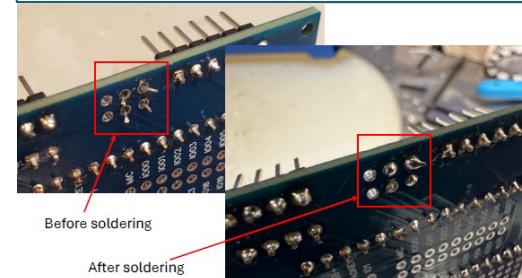
Pre-requisite

- Make sure to properly solder your PCB according to instructions in [https://www.designandmake.org/pages/viewpage.action?pageId=260378918#ControllerBoard\(2025\)-HowtoSolderandCheckConnections](https://www.designandmake.org/pages/viewpage.action?pageId=260378918#ControllerBoard(2025)-HowtoSolderandCheckConnections)

- Especially on the “Check Connections”

Interactive Desktop Decoration (IDD) Controller Board: Soldering and Check Connections

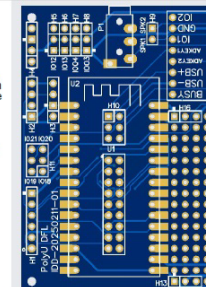
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Check Connections

Headers for ESP32C3

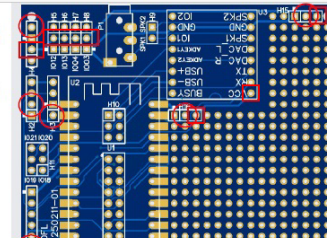
- Perform continuity test using pin header with pad on PCB surface by the side of the female header
- GND
 - All GND should be connected
 - GND should NOT be connected to any other pin
- 5V
 - ALL 5V should be connected
 - 5V should not be connected to any other pin
- 3V3
 - ALL 3.3V should be connected
 - 3.3V should not be connected to any other pin
- Others SHOULD NOT CONNECTED



01 GND	17 GND	01 GND	GND	17 GND	01 GND	GND	17 GND
02 3.3V	18 02	02 IO00	3.3V	18 02	02 IO00	3.3V	18 02
03 IO01	19 03	03 IO01	IO02	19 03	03 IO01	IO02	19 03
04 IO12	20 04	04 IO12	IO03	20 04	04 IO12	IO03	20 04
05 IO18	21 05	05 IO18	IO10	21 05	05 IO18	IO10	21 05
06 IO19	22 06	06 IO19	IO06	22 06	06 IO19	IO06	22 06
07 IO07	23 07	07 GND	IO07	23 07	07 GND	IO07	23 07
08 IO20_RXD	24 08	08 IO20_RXD	FE_11	24 08	08 IO20_RXD	FE_11	24 08
09 IO21_TXD	25 09	09 IO21_TXD	GND	25 09	09 IO21_TXD	GND	25 09
10 IO13	26 10	10 IO13	3.3V	26 10	10 IO13	3.3V	26 10
11 NC	27 11	11 NC	IO05	27 11	11 NC	IO05	27 11
12 RESET	28 12	12 RESET	IO04	28 12	12 RESET	IO04	28 12
13 3.3V	29 13	13 3.3V	IO08	29 13	13 3.3V	IO08	29 13
14 GND	30 14	14 GND	BOOT	30 14	14 GND	BOOT	30 14
15 PWB 5V	31 15	15 PWB 5V	GND	31 15	15 PWB 5V	GND	31 15
16 5V	32 16	16 5V	GND	32 16	16 5V	GND	32 16

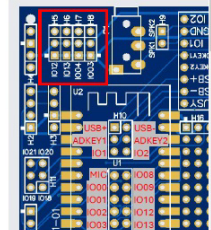
GND, 3V3 and 5V

- GND – marked with a small square
- 5V – red square
- 3V3 – red circle



Headers for Servo Motors

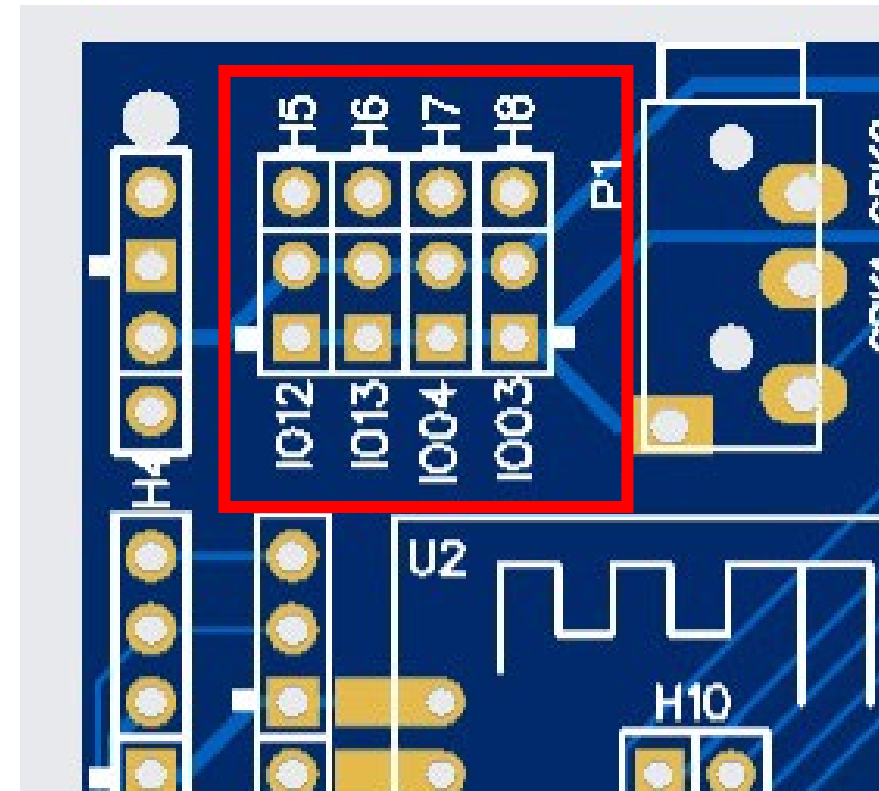
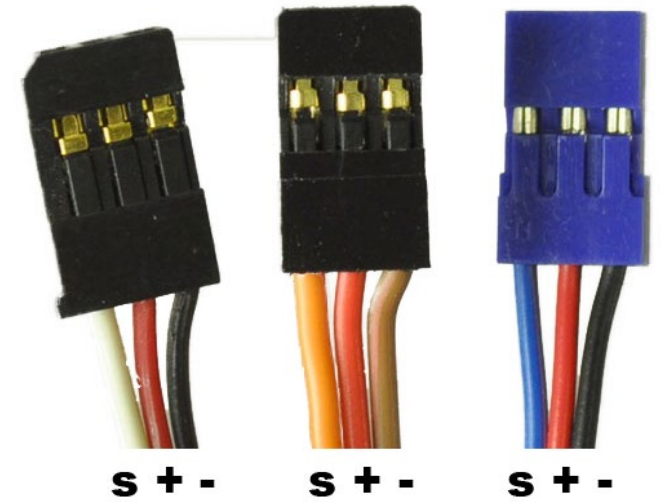
- Solder 1x3 pin header to H5 to H8
- For each 1x3 pin header
 - “Square dot” – GND
 - Middle – 5V
 - The other pin – PWM
- PWM pin should connect to respective pin in U1
 - E.g. IO12



Servo Motor

Servo Motor

- Remove power from ESP32C3
- Plug connectors of servo motors to H5 and H6
- Power on the board
- Use “Servo” function (6)
- Use pin number = 12,13
- Set angle of servo motor from 20 to 160 degrees to see if it works properly
- **DO NOT SET BEYOND THIS RANGE, OR MAY BURN THE SERVO MOTOR**



Servo Motor

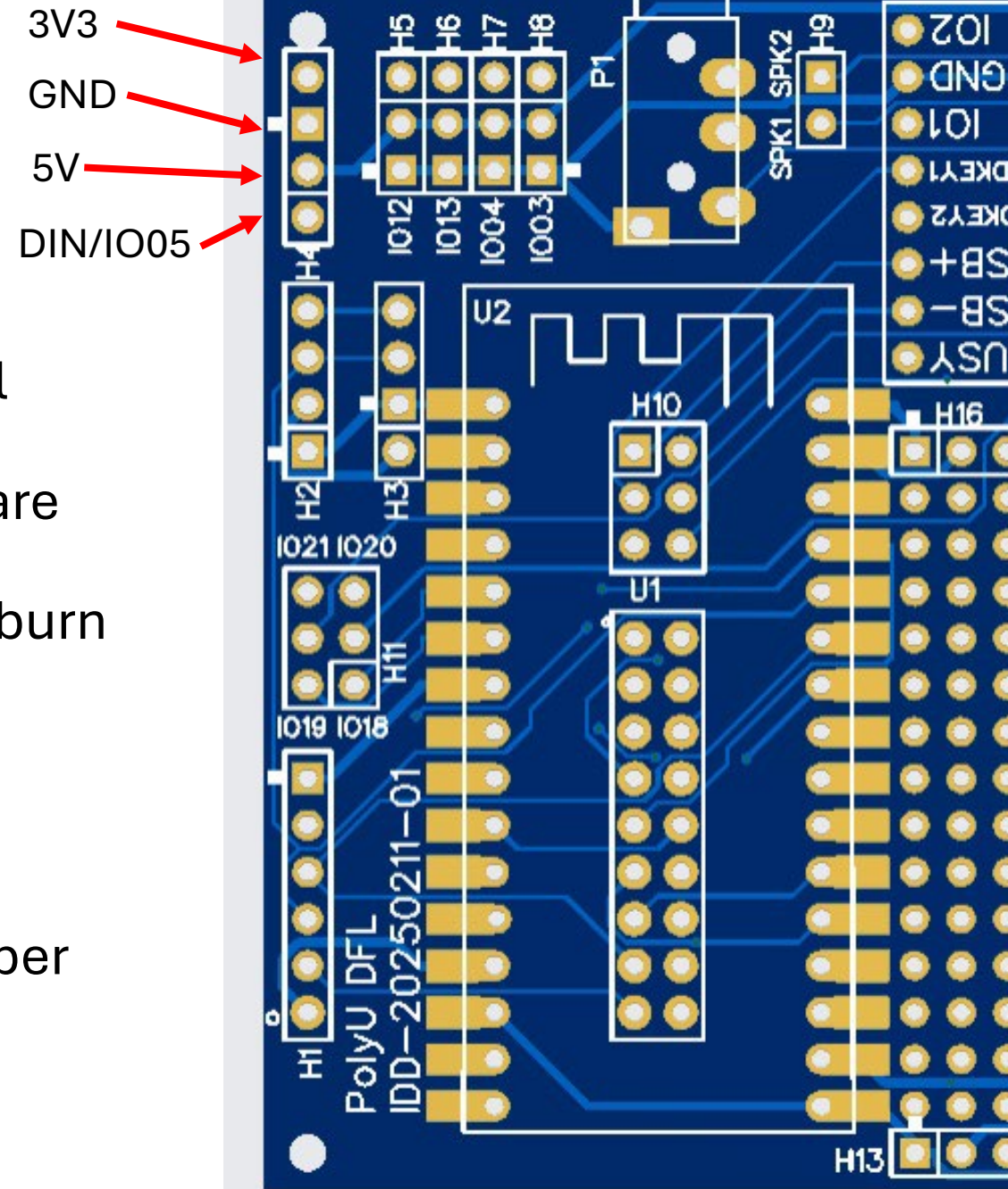
- Remove power from ESP32C3
- Plug connectors of servo motors to H7 and H8

- Power on the board
- Use “Servo” function (6)
- Use pin number =4,3
- Set angle of servo motor from 20 to 160 degrees to see if it works properly
- **DO NOT SET BEYOND THIS RANGE, OR MAY BURN THE SERVO MOTOR**

Neo Pixel (WS2812)

Neo Pixel (WS2812)

- Remove power from ESP32C3
- Connect DIN, 5V and GND of your Neo Pixel strip to H4
- Check carefully to make sure connections are correct before powering on the ESP32C3
- DO NOT REVERSE 5V and GND, or else will burn your whole Neo Pixel strip
- Power on the board
- Use “Neo Pixel” function (6)
- Enter the pin number “5” and then the number of pixels you have on your Neo Pixel strip

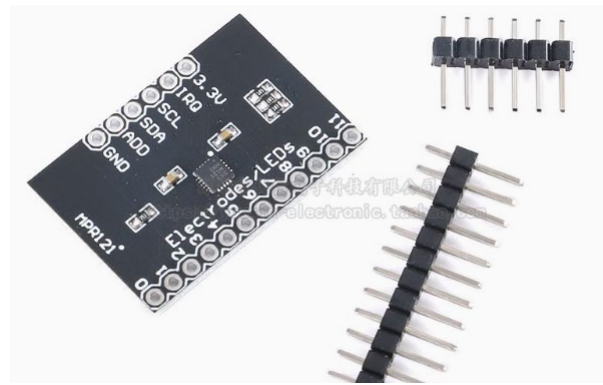


Neo Pixel (WS2812)

- Use the “setRGB” sub-function to set color of one or more pixels to check your connections are correct as follows:
 - RGB value – each component from 0 to 255
 - Index
 - from 0 to number of pixels – 1 (e.g. if you have 10 pixels, value of index goes from 0 to 9)
 - Index = 0 corresponds to the one closest to the GPIO pin
 - Set the 1st pixel to one color and the last pixel to another color
 - Set all pixels to one color
- Use the “setHSV” sub-function to set color of one or more pixels to check your connections are correct as follows:
 - HSV – Hue, Saturation and Value
 - <https://learn.leighcotnoir.com/artspeak/elements-color/hue-value-saturation/>
 - Hue – 0 to 359
 - Saturation – 0 to 100
 - Value – 0 to 100
 - Set the 1st pixel to one color and the last pixel to another color
 - Set all pixels to one color

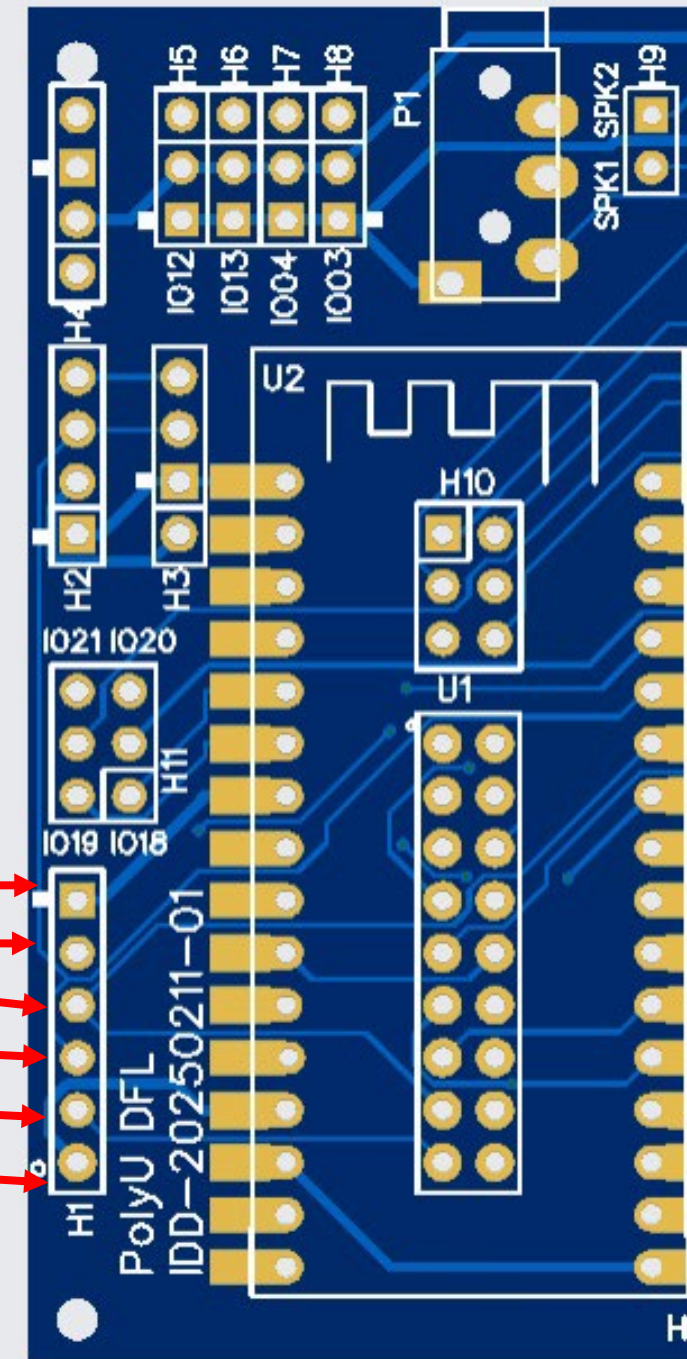
MPR121

MPR121



- Solder connectors to MPR121
- Remove power from ESP32C3
- Connect the six pins on MPR121 to H1
- Check carefully to make sure the connection is correct, especially on 3.3V and GND
 - DON'T REVERSE THEM

GND
ADD
SDA
SCL
IRQ
3.3V



MPR121

- Power on the board
- Use “MPR121” function (2)
- Touch at least two terminals on the MPR121 on the side labeled with “Electrode/LEDs”, and observe messages on the Serial Monitor

```
Enter your choice:
You entered: 2

Running testcase_mpr121...
I2CMasterControl is initialized successfully
MPR121Control::init is called
MPR121Control is initialized successfully

Touch and Release MPR121 to see the result. Enter 'x' to leave MPR121 testing.
touched i=0 at time=140502
touched i=1 at time=140502
touched i=2 at time=140502
touched i=3 at time=140502
touched i=4 at time=140502
touched i=5 at time=140502
...

```

MPR121

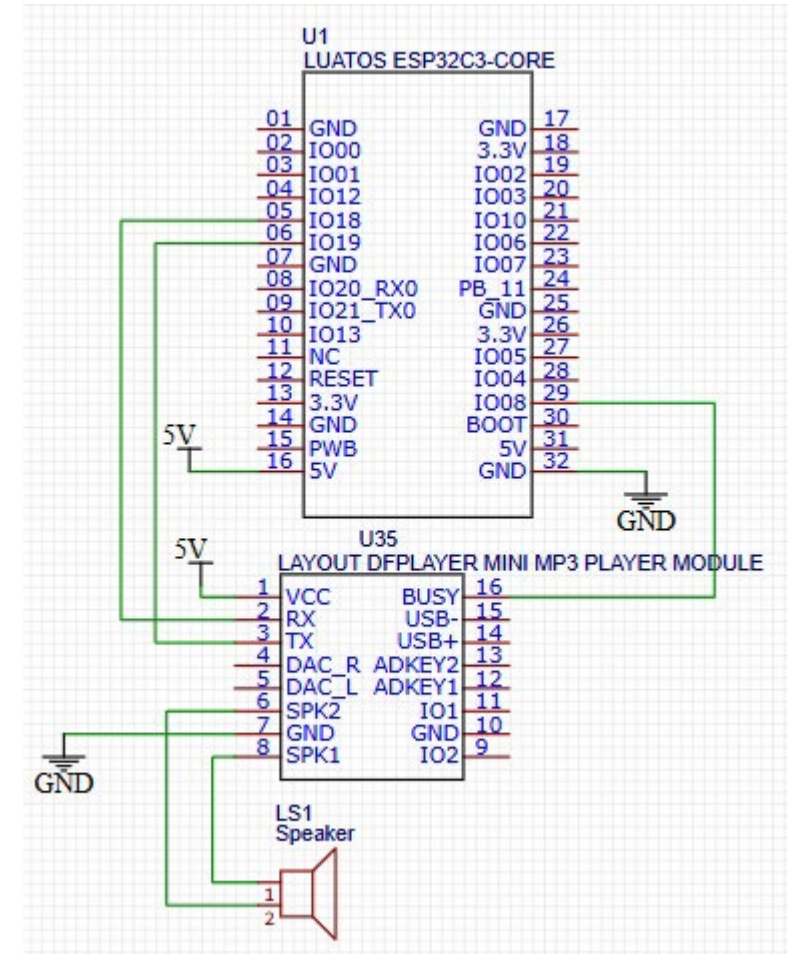
- The value of “i” corresponds to the terminal you “touched” or “released”

```
touched i=5 at time=863592  
released i=5 at time=863721  
touched i=4 at time=865060  
released i=4 at time=865162
```

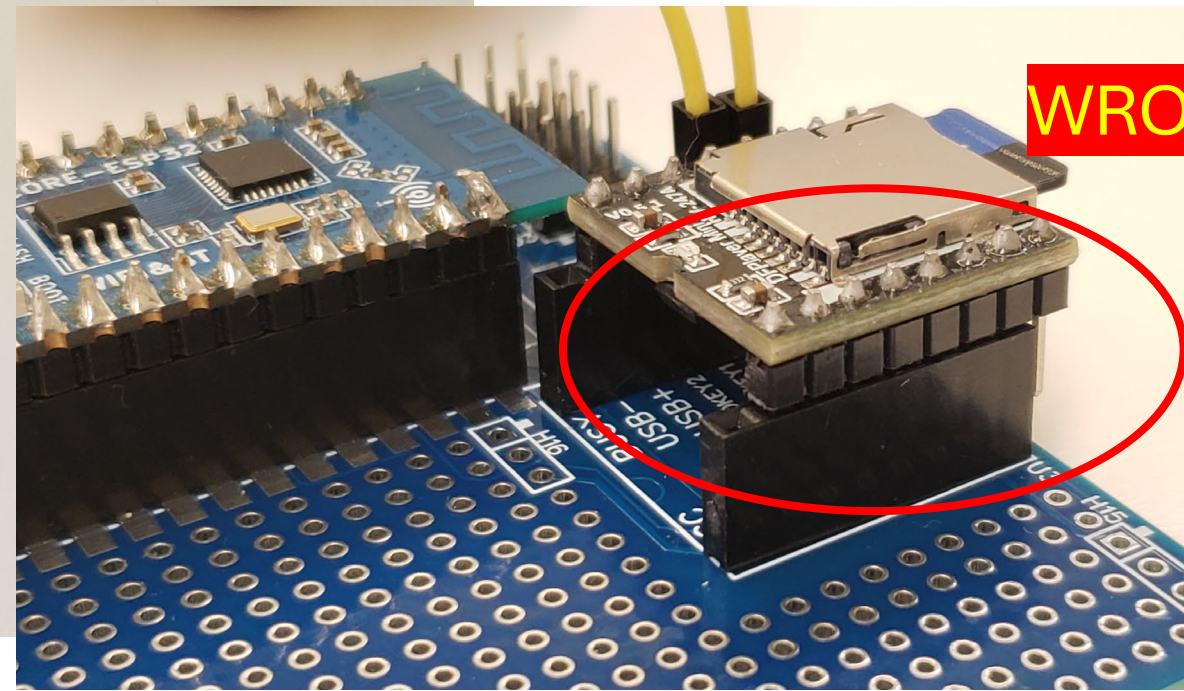
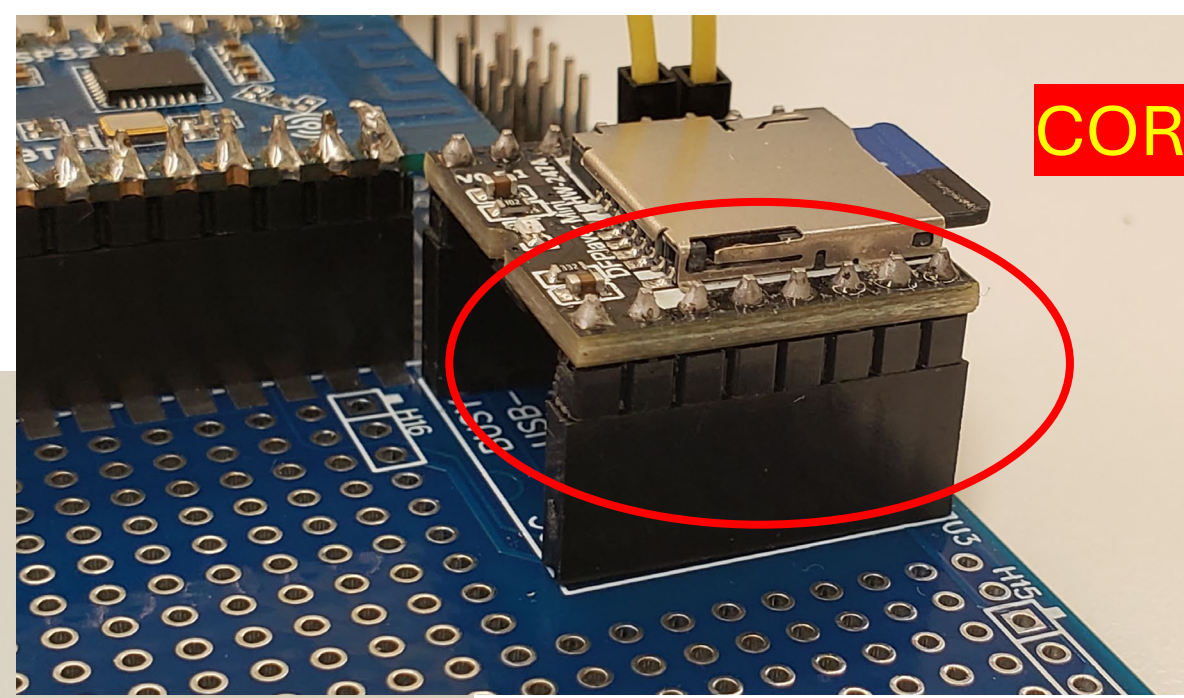
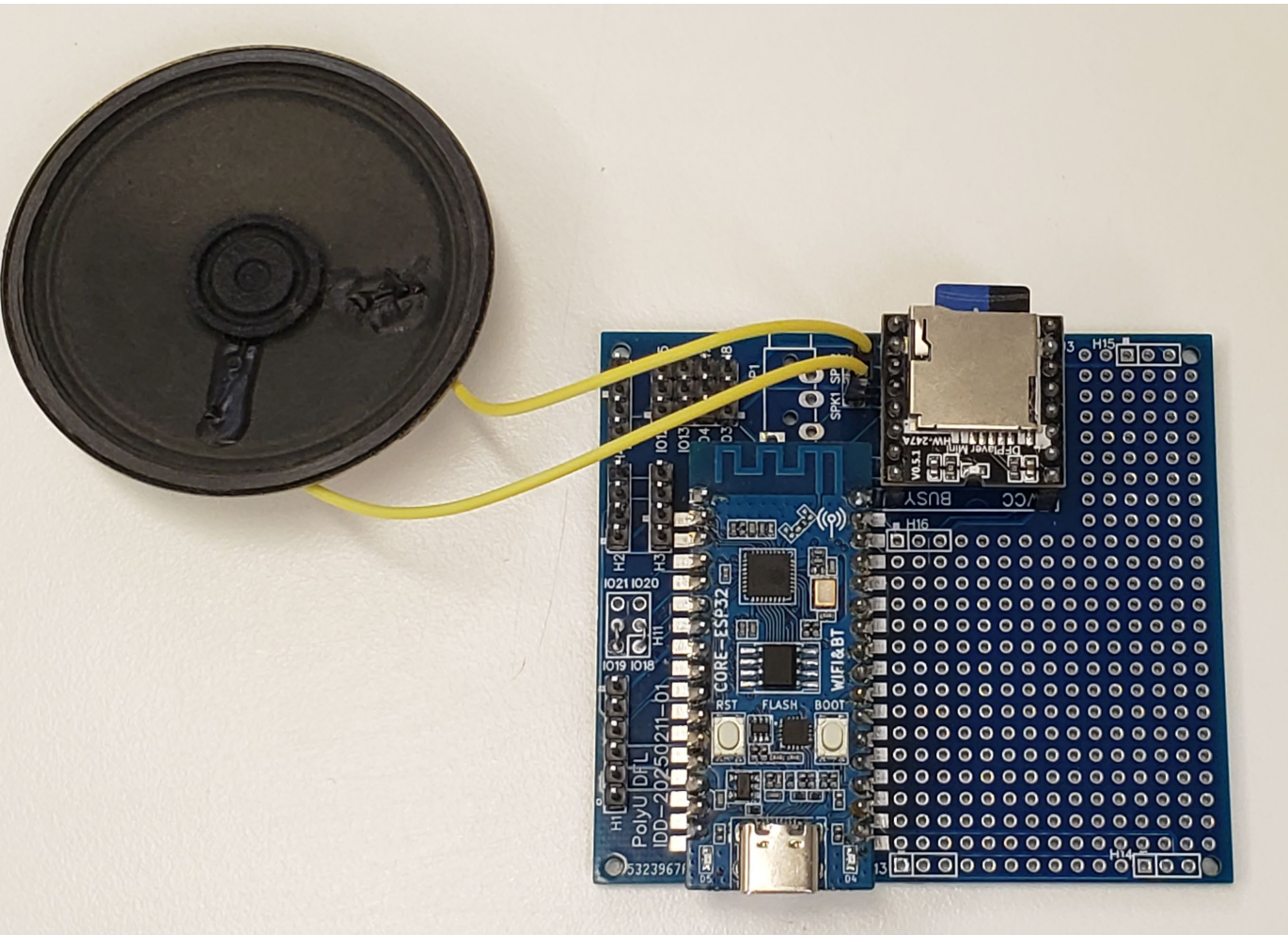
DFPlayer Mini

DFPlayer Mini (MP3 Player)

- DFPlayer Mini MP3 Player For Arduino
- https://www.dfrobot.com/product-1121.html?srsltid=AfmBOor2IHMZ-OhNU62ZiWna5NC29e8cm412A8jlsYI0o8hzXLn2w_kM
- https://wiki.dfrobot.com/DFPlayer_Mini_SKU_DFR0299
- For playback MP3 audio stored on an SD card
- Require
 - A speaker with less than 3W output power
 - A micro SD card for storing MP3 audio files



- Remove power from ESP32C3
- Plug DFPlayer Mini into the female headers in the orientation as shown
- Connect speakers to H9



DFPlayer Mini (MP3 Player)

- Store one or more MP3 audio files to the micro SD card
- Insert micro SD card to DFPlayer Mini
- Power on the board
- Use “MP3(DFPlayer mini)” function (16)
- Enter “19,18,8”
- “index”
 - 1 for first file in the micro SD card
 - 2 for second file, and so on
- Does not care its actual name, just based on the order in the directory

```
Enter your choice:
You entered: 16
Enter the "pin number of RX", "pin number of TX" and "pin number of speaker":
You entered: 19,18,8

Running testcase_dfPlayer...
DFPlayer Mini online.

Menu:
Enter the "index" of the MP3 file to be played OR enter "x" to stop
```