



## How to build your robot

[www.pib.rocks/build](http://www.pib.rocks/build)

assembly instructions for:

## Motor Calibration

pib#4 advanced



PRINT

BUILD

DEVELOP

YOUR OWN ROBOT

## Important note

In order to use the motors for pib's movement it is important to **calibrate** them before building them into pib.

Pib has two different motors build in, in total **26** if 2 arms.  
They can be calibrated in the same way.

For this tutorial you will need the shown parts from the table.  
Additionally, we suggest to first build **pib's head** and install the **software to the Raspberry Pi** as you will need to use this for the calibration.

You can find the tutorials here:

<https://pib.rocks/build/how-to-build-pibs-head/>

<https://pib.rocks/build/how-to-install-raspberry-pi/>

### Non-printable parts

20 x **E27**-STS3215

6 x **E18**-STS3095

1 x **E13**-SPL-82

1 x **E14**-Power\_Supply

1 x **E17**-Waveshare\_servo\_driver – servo adapter

10 cm (red-black) **power cable**

## Step 0

Make sure **all motors** in are calibrated according to this tutorial

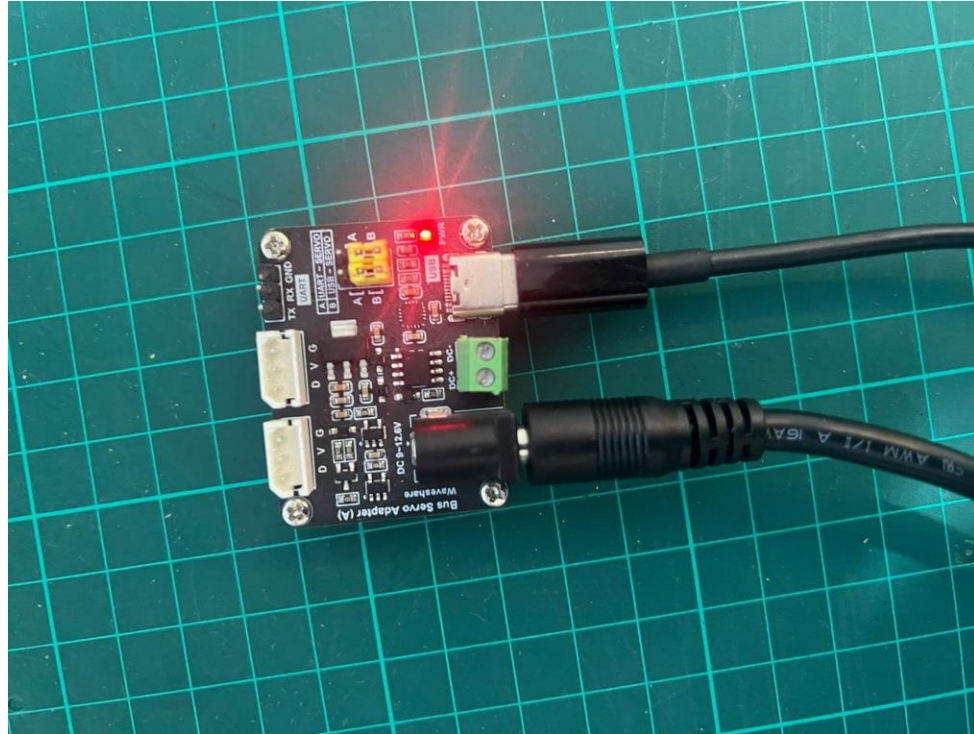


## Step 1

Connect output jack of **E14 power supply** into **E17** and a type C cable

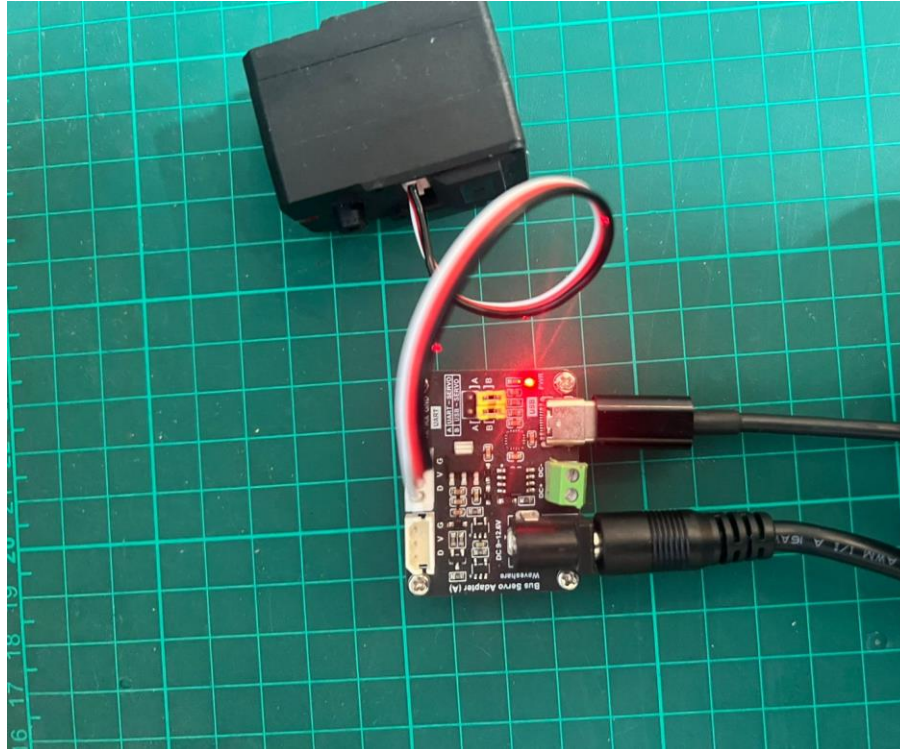


1



## Step 2

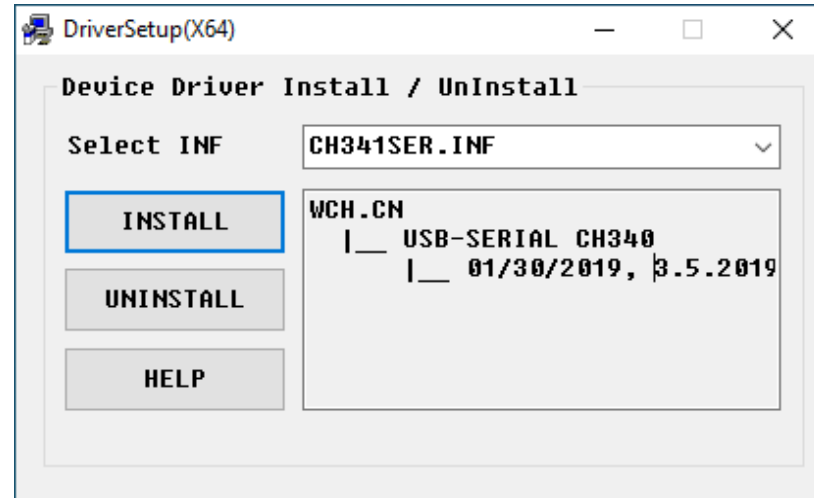
Connect the motors one by one to **E17** using their cable to change the ID and calibrate it



## Step 3a



Download the software package from this [link](#) and setup serial driver by clicking on the CH34x\_install\_Windows\_v3\_4.exe file and proceed with setup wizzard

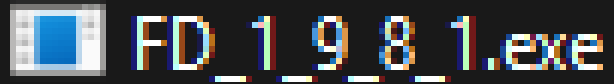


## Step 3b

Open the FD\_1\_9\_8\_1.exe file



1

A screenshot of a file explorer window showing a file named "FD\_1\_9\_8\_1.exe" with a blue icon.

## Step 4

Click on com and select the open one, choose baud rate 1000000, click search and open. Finally select the shown motor and click set to the middle position 2047

FT SC Servo Debug V1.9.8.1

Com Settings

Com: COM3

BaudR: 1000000

DPalty: NONE

TimeOut: 25

Open

Servo List

Search

Servo Control

Write (selected) | Sync Write | Reg Write | Torque Enable

Acc: 0 | Goal: 2047 | Action

Speed: 0 | Time: 0 | Set

Servo Feedback

Voltage: 0.0 V | Torque: 0

Current: 0 | Speed: 0

Temperature: 0 | Position: 0

Moving: 0 | Goal: 0

State: Timeout

Auto debug

Start: 0 | Delay(Sweep): 2500 | Sweep

End: 1023 | Setp: Delay 4 | 20 | Setp

Data analysis

time(s): 30 | Export

file: rows | record.txt | 0 | Empty

FT SC Servo Debug V1.9.8.1

Com Settings

Com: COM3

BaudR: 1000000

DPalty: NONE

TimeOut: 25

Close

Servo List

Search

Select ID:1

ID: 1 | Modle: STS3215

Servo Control

Write (selected) | Sync Write | Reg Write | Torque Enable

Acc: 0 | Goal: 2047 | Action

Speed: 0 | Time: 0 | Set

Servo Feedback

Voltage: 7.6 V | Torque: 0

Current: 0 | Speed: 0

Temperature: 28 | Position: 439

Moving: 0 | Goal: 439

State: Normal

Auto debug

Start: 0 | Delay(Sweep): 2500 | Sweep

End: 4095 | Setp: Delay 4 | 20 | Setp

Data analysis

time(s): 30 | Export

file: rows | record.txt | 0 | Empty

## Step 5



Click on programming, then change the ID of the motor according to the table in the next slide and click save

FT SC Servo Debug V1.9.8.1

Com Settings: Com: COM3, BaudR: 1000000, DPaity: NONE, TimeOut: 25

Buttons: Save, Load, Online, Recovery

Address	Memory	Value	Area	R/W
0	Firmare Main Version	3	EPROM	r
1	Firmware Secondary V...	9	EPROM	r
3	Servo Main Version	9	EPROM	r
4	Servo Sub Version	3	EPROM	d
5	ID	1	EPROM	rw
6	Baud Rate	0	EPROM	rw
7	Reserved	0	EPROM	rw
8	Status Return Level	1	EPROM	rw
9	Min Position Limit	0	EPROM	rw
11	Max Position Limit	4095	EPROM	rw
13	Max Temperature limit	70	EPROM	rw
14	Max Input Voltage	140	EPROM	rw
15	Min Input Voltage	40	EPROM	rw
16	Max Torque Limit	1000	EPROM	rw
18	Setting Byte	12	EPROM	rw
19	Protection Switch	44	EPROM	rw
20	LED Alarm Condition	47	EPROM	rw
21	Position P Gain	32	EPROM	rw
22	Position D Gain	32	EPROM	rw
23	Position I Gain	0	EPROM	rw
24	Punch	16	EPROM	rw
25	MAX I	0	EPROM	rw
26	CW Dead Band	1	EPROM	rw
27	CCW Dead Band	1	EPROM	rw
28	Overload Current	310	EPROM	rw
30	Angular Resolution	1	EPROM	rw

Servo List: Select ID: 1, ID: 1, Modle: STS3215

Normal

ID: 1 [Save]

FT SC Servo Debug V1.9.8.1

Com Settings: Com: COM3, BaudR: 1000000, DPaity: NONE, TimeOut: 25

Buttons: Save, Load, Online, Recovery

Address	Memory	Value	Area	R/W
0	Firmare Main Version	3	EPROM	r
1	Firmware Secondary V...	9	EPROM	r
3	Servo Main Version	9	EPROM	r
4	Servo Sub Version	3	EPROM	d
5	ID	17	EPROM	rw
6	Baud Rate	0	EPROM	rw
7	Reserved			rw
8	Status Return Level			rw
9	Min Position Limit			rw
11	Max Position Limit			rw
13	Max Temperature limit			rw
14	Max Input Voltage			rw
15	Min Input Voltage			rw
16	Max Torque Limit			rw
18	Setting Byte	12	EPROM	rw
19	Protection Switch	44	EPROM	rw
20	LED Alarm Condition	47	EPROM	rw
21	Position P Gain	32	EPROM	rw
22	Position D Gain	32	EPROM	rw
23	Position I Gain	0	EPROM	rw
24	Punch	16	EPROM	rw
25	MAX I	0	EPROM	rw
26	CW Dead Band	1	EPROM	rw
27	CCW Dead Band	1	EPROM	rw
28	Overload Current	310	EPROM	rw
30	Angular Resolution	1	EPROM	rw

Servo List: Select ID: 1, ID: 17, Modle: STS3215

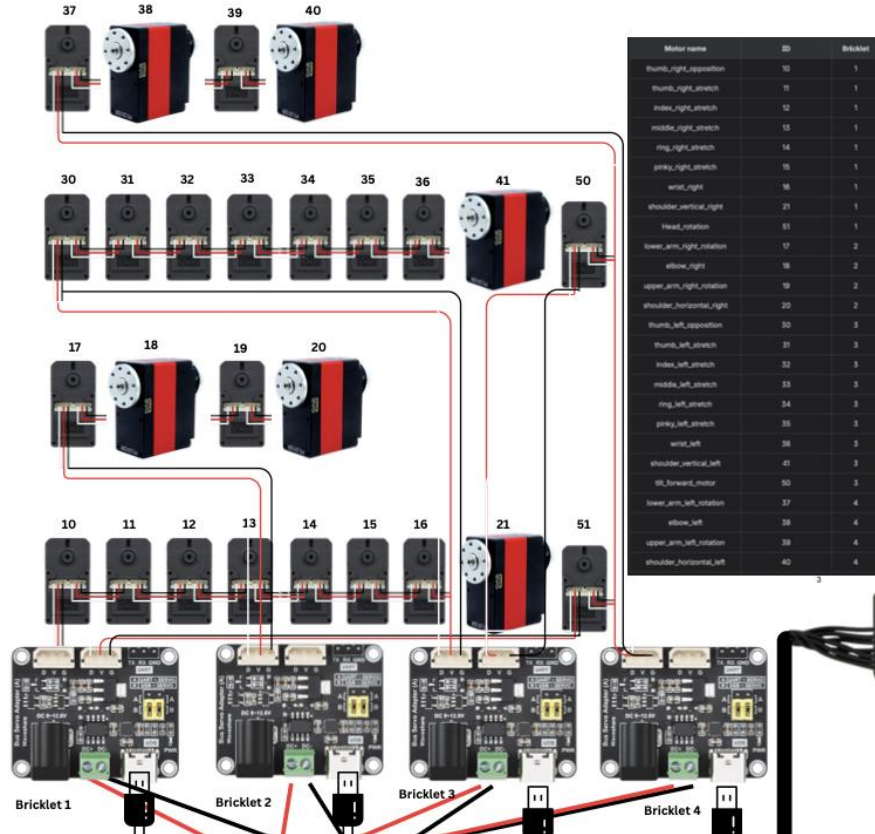
Parameter saving dialog: Parameters saved successfully [OK]

Normal

ID: 17 [Save]

## Step 5

### Table of motor IDs



## Step 5

### Table of motor IDs

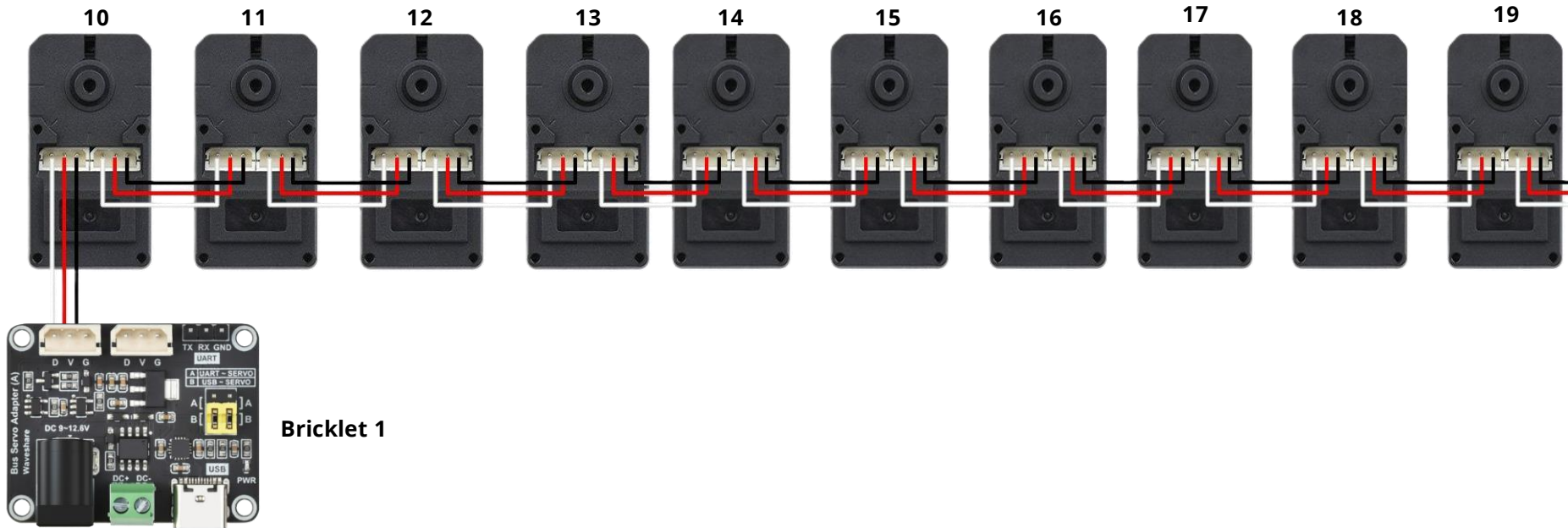
Motor name	ID	Bricklet
thumb_right_opposition	10	1
thumb_right_stretch	11	1
index_right_stretch	12	1
middle_right_stretch	13	1
ring_right_stretch	14	1
pinky_right_stretch	15	1
wrist_right	16	1
shoulder_vertical_right	21	1
Head_rotation	51	1
lower_arm_right_rotation	17	2
elbow_right	18	2
upper_arm_right_rotation	19	2
shoulder_horizontal_right	20	2
thumb_left_opposition	30	3
thumb_left_stretch	31	3
index_left_stretch	32	3
middle_left_stretch	33	3
ring_left_stretch	34	3
pinky_left_stretch	35	3
wrist_left	36	3
shoulder_vertical_left	41	3
tilt_forward_motor	50	3
lower_arm_left_rotation	37	4
elbow_left	38	4
upper_arm_left_rotation	39	4
shoulder_horizontal_left	40	4

Note



**This can only happen after calibration.** Serial servos are connected with a method called Daisy chain. Every servo has 2 ports, use one to connect from one motor to another and the second one to connect to the designated bricklet. Meaning that only motors from the same bricklet should be daisy chained and one wire goes from the motor you started daisy chaining from to the designated bricklet.

Below is an example



Note



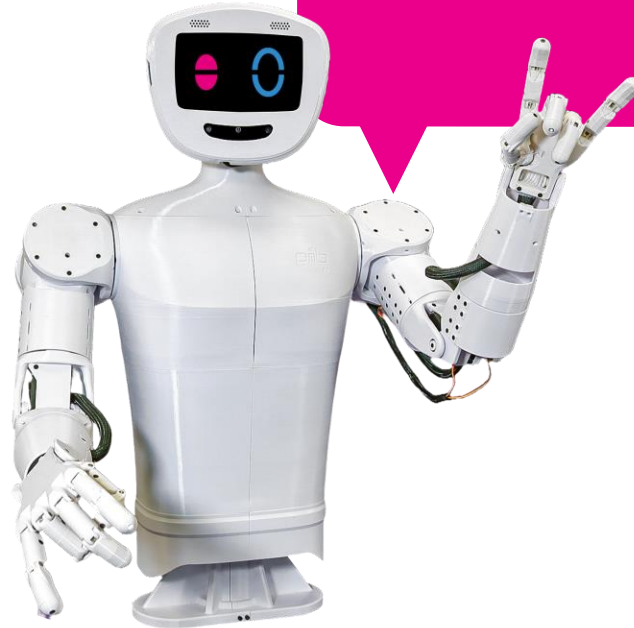
For all the next steps you have 3 options of wires to use with the servo motors, all of them work well but the middle one is the best due to better fitting and different lengths which eliminate the need of extension cables



## Congratulations

Remove the calibrated motors, connect the remaining motors and repeat the steps, until you have calibrated **all motors**

Once finished, you can disassemble most parts as you will need the T-Connector, bricklet cable, motors and so on in the other tutorials.



## Do you need support?

Or do you need our pib.Box with all non-printable parts?

Or maybe you have some new ideas and improvements?

Please contact us.



**team@pib.rocks**  
Send us an email.



**discord.com/invite/GRdpyeDu7P**  
Join us on Discord.



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