



How to build your robot

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 **14** and **25** 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

11 x **E19**-STS3215

3 x **E18**-STS3095

1 x **E13**-SPL-82

1 x **E14**-Power_Supply-cable

1 x **E17**-Waveshare_servo_driver

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

Step 0

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

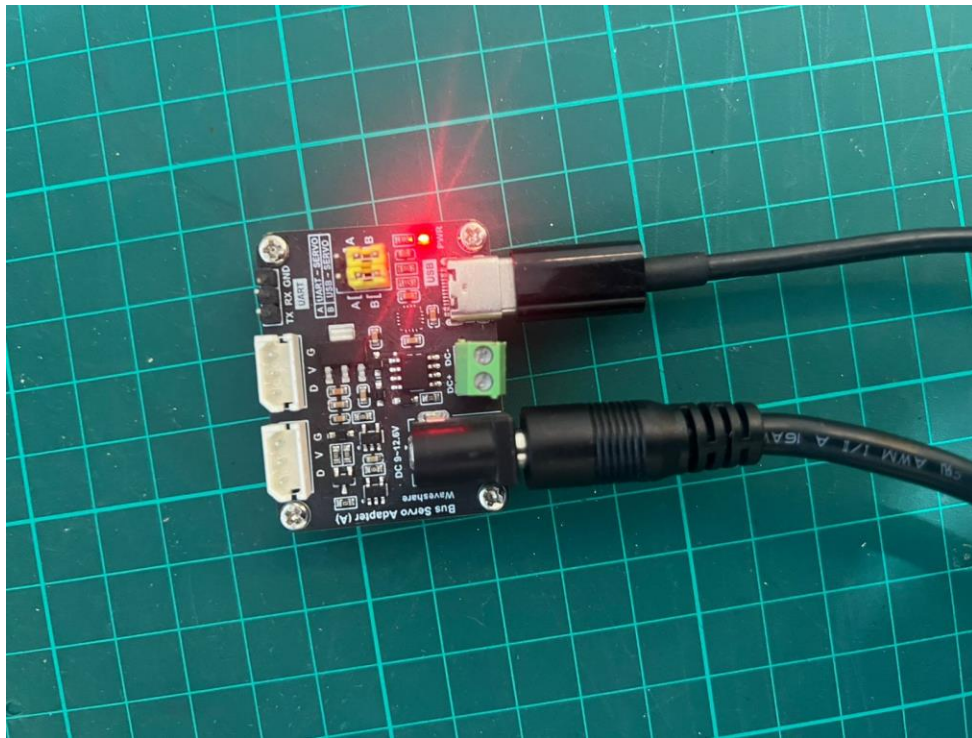


Step 1

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



1

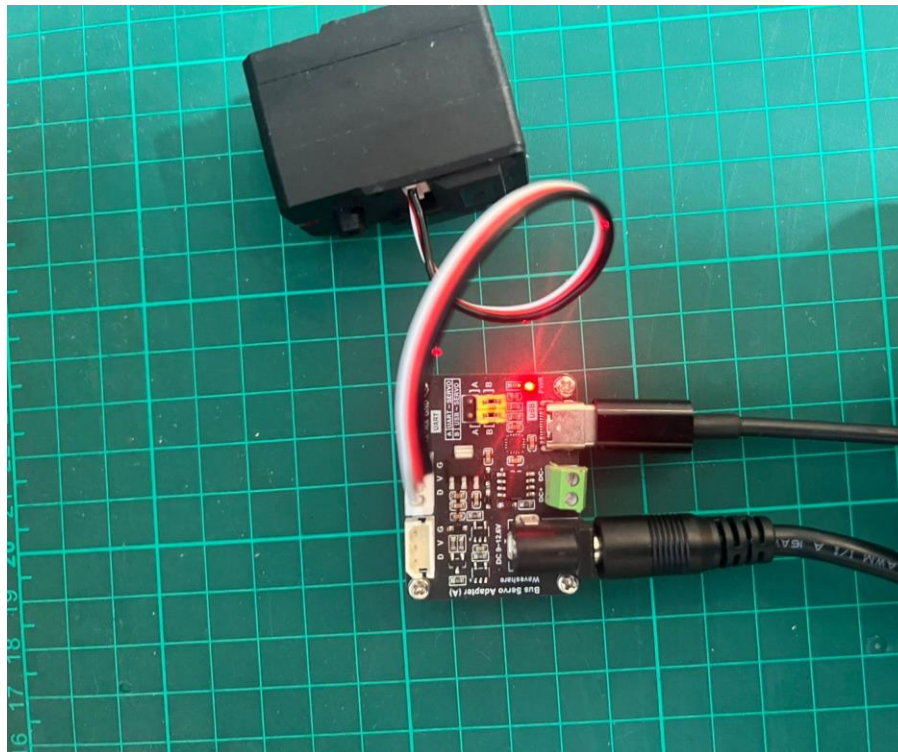


Step 2

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




1



Step 3

Download the software package from this [link](#) and open the FD_1_9_8_1.exe file

FD_1_9_8_1.exe

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 SCServo Debug V1.9.8.1

Com Settings

Com: COM3

BaudR: 1000000

DParity: 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 SCServo Debug V1.9.8.1

Com Settings

Com: COM3

BaudR: 1000000

DParity: NONE

TimeOut: 25

Close

Servo List

Search

Select ID: 1

ID: ST3215

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

Servo List: Select ID: 1

Address	Memory	Value	Area	R/W
0	Firmware 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

Normal

ID: 1

Save

FT SC servo Debug V1.9.8.1

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

Servo List: Select ID: 1

Address	Memory	Value	Area	R/W
0	Firmware 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			rw
9	Min Position			rw
11	Max Position			rw
13	Max Temperature			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

Parameter saving

Parameters saved successfully

ID: 17

Save

Step 5

Table of motor IDs

Bricklet 1

Motor name	Serial ID
thumb_right_opposition	10
thumb_right_stretch	11
index_right_stretch	12
middle_right_stretch	13
ring_right_stretch	14
pinky_right_stretch	15
wrist_right	16
lower_arm_right_rotation	17
elbow_right	18
upper_arm_right_rotation	19

Bricklet 2

Motor pin	Motor name	Serial ID
0	shoulder_horizontal_right	20
1	shoulder_vertical_right	21
2	Free replacement for burned pins	22
3	Free replacement for burned pins	23
4	turn_head_motor	24
5	tilt_forward_motor	25
6	Free replacement for burned pins	26
7	Free replacement for burned pins	27
8	shoulder_horizontal_left	0
9	shoulder_vertical_left	0



Bricklet 3

Motor pin	Motor name	Serial ID
0	thumb_left_opposition	30
1	thumb_left_stretch	31
2	index_left_stretch	32
3	middle_left_stretch	33
4	ring_left_stretch	34
5	pinky_left_stretch	35
6	wrist_left	36
7	lower_arm_left_rotation	37
8	elbow_left	38
9	upper_arm_left_rotation	39

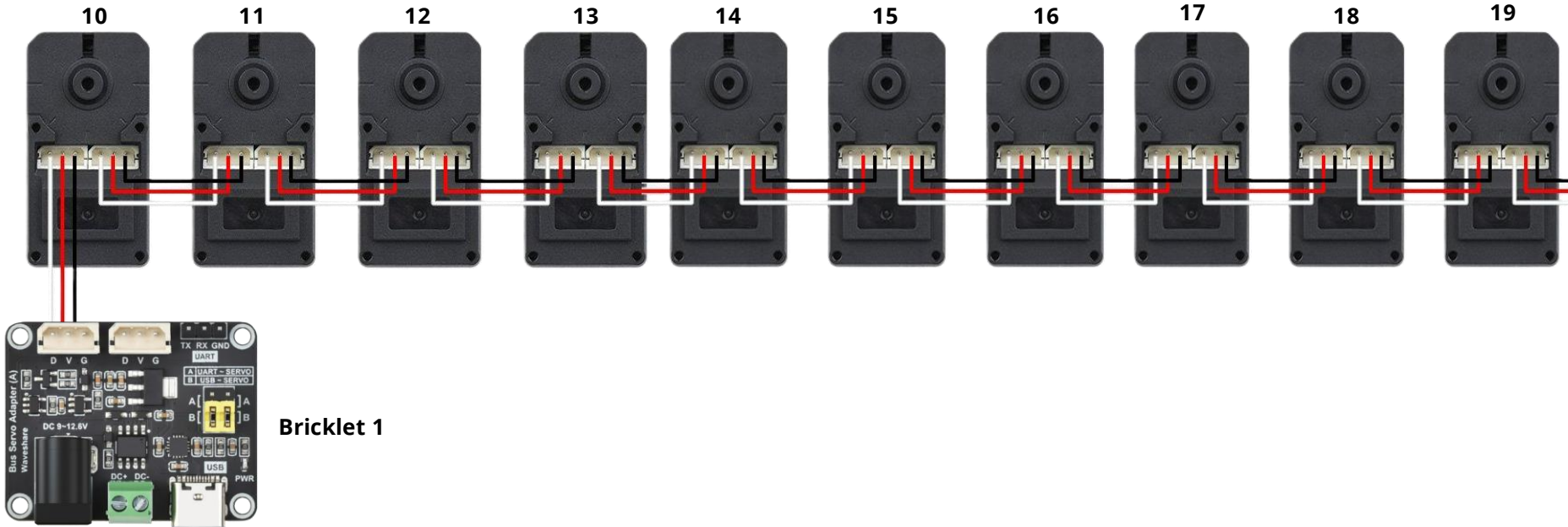
Bricklet 4 (only serial)

Motor pin	Motor name	Serial ID
0	shoulder_horizontal_left	28
0	shoulder_vertical_left	29

Note



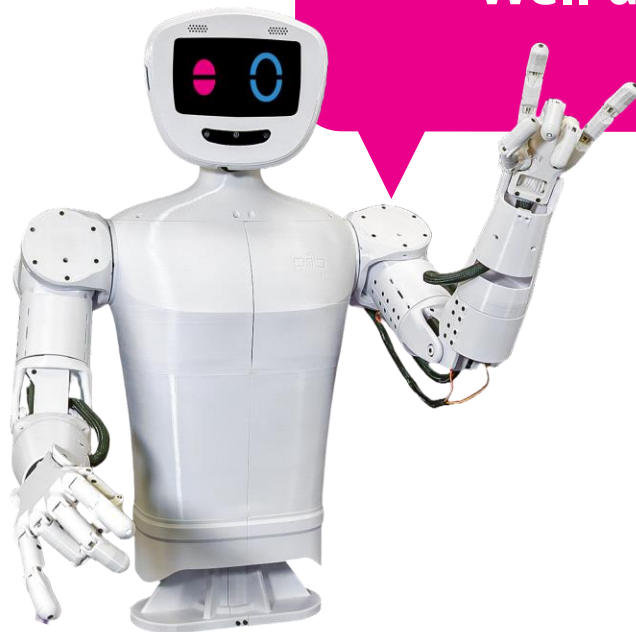
Serial servos are connected with a method called Daisy chain. Every servo has 2 ports, use one to connect from one motor to another and the second one to connect to the designated bricklet. Meaning that only motors from the same bricklet should be daisy chained and one wire goes from the motor you started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



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.



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