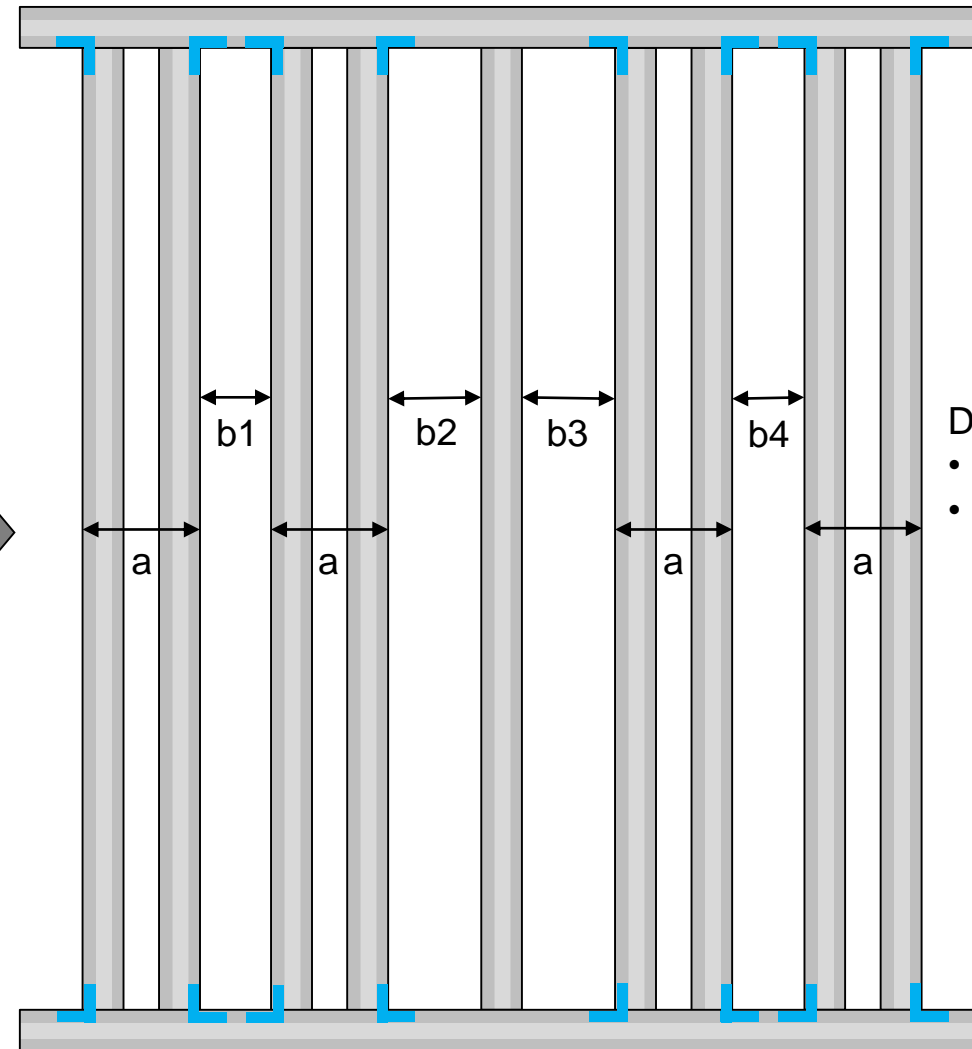
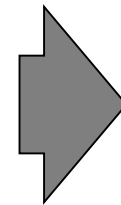
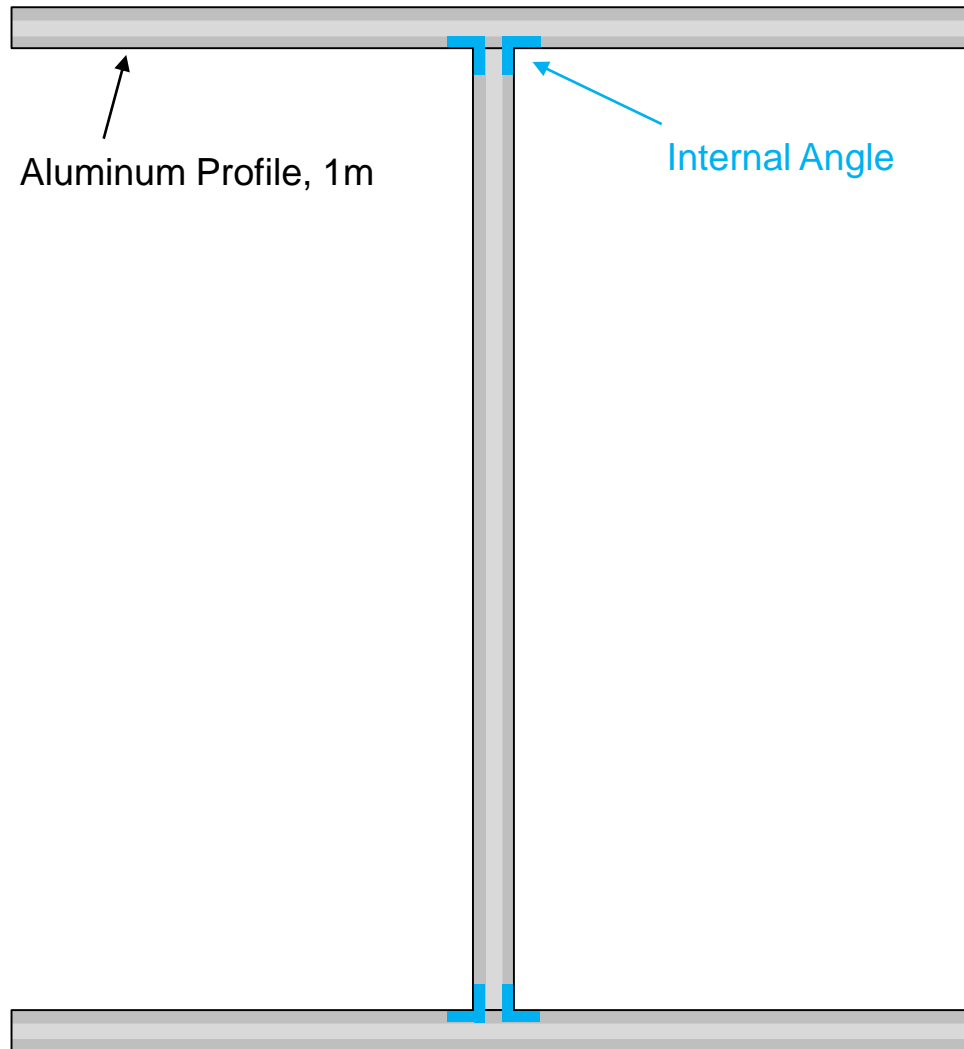


Material List

	Quantity	Part	Assembly Step
1	11	Aluminum Profile 20x20 Groove 6 B-Type, 1m	1
2	16	Internal 90° Angle/Bracket Groove 6 B-Type M5	
3	32	Screw M5x5	
4	16	Pan & Tilt Kit, cf. Paper	2
5	16	Long “C” Bracket (51mm(L) X 24mm(W) X 57mm(H))	
6	16	3D-Printed Module (Base, Plug and Plate)	
7	64	M3x5.7 3D-Printing Threaded Insert	
8	64	Screw M3x7	
9	16	3D-Printed Reflecting Surface	
10	16	Screw M5x8, with washer	
11	16	M5x9.5 3D-Printing Threaded Insert	
12	1	SBC (Raspberry Pi Pico W)	3
13	2	16-Channel Pulse-Width Modulation Controller (PCA9685)	
14	1	Designed PCB	
15	64	Screw M3x7	4
16	64	M3 Slot Nuts Groove 6	
17	32	Servomotor Extension Cable JR Male to Female, 1m	5
18	1	5V Power Supply	

1. Assembly Instruction – Frame



- Dimensions:
- $a = 7\text{cm}$
 - $b1, b2, b3$ and $b4$ can be Chosen Freely

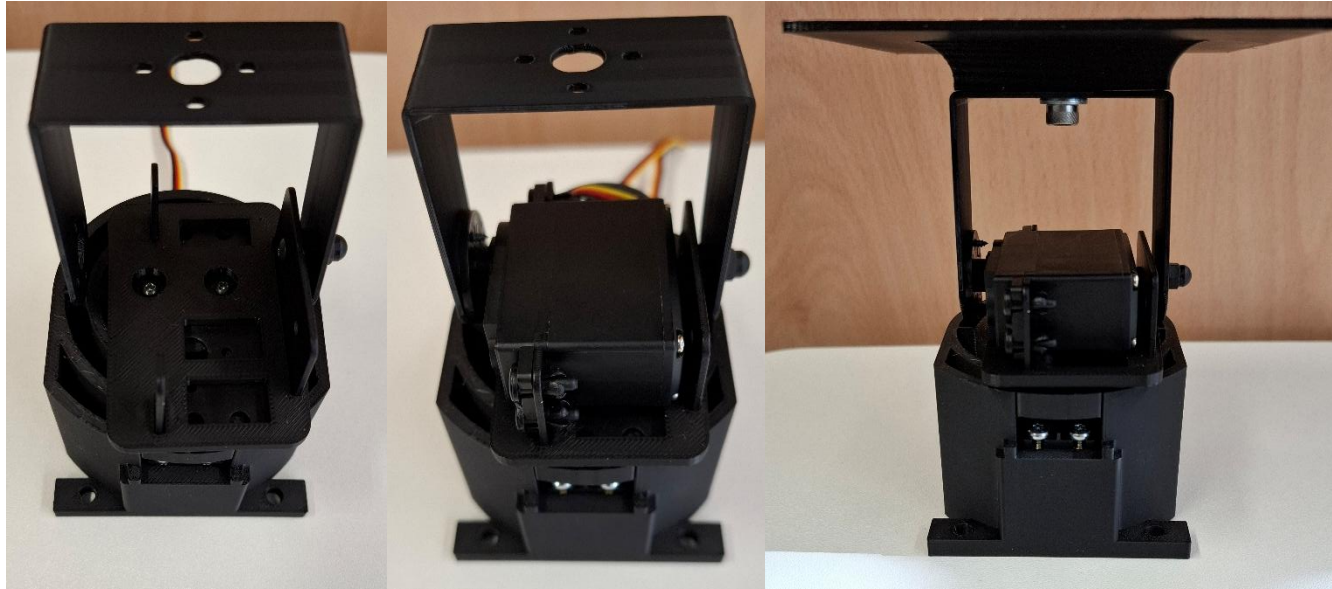
2. Assembly Instruction – Module (1)

1. Assemble 16 Modules, Each Consisting of Three 3D-Printed Components (Base, Plug, Plate) Along With the Pan & Tilt Kit)
2. Assemble in the Following Order:



1. Start With the 3D-Printed Module Base with 4 M3x5.7 Threaded Inserts
2. Place First Servomotor in Module Base and Fixate it With 4 M3x7 Screws
3. Press the 3D-Printed Module Plug Into the Gap Until it Fits Cleanly With the Edges
4. Fixate the Multi-Purpose Servo Bracket From the Pan & Tilt Kit on the Servomotor
4. Place the 3D-Printed Module Plate on the Bracket

2. Assembly Instruction – Module (2)



5. Mount Long “C” Bracket Instead of Short “C” Bracket From the Pan & Tilt Kit

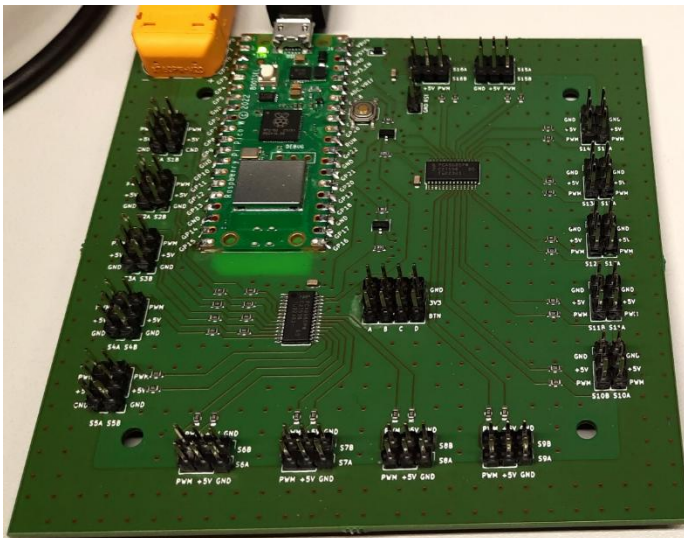
6. Mount Second Servomotor as Specified by the Pan & Tilt Kit

7. Prepare the 3D-Printed Reflecting Surface With a M5x9.5 Threaded Insert. Mount the Reflecting Surface on the “C” Bracket with One M5x8 Screw With Washer.

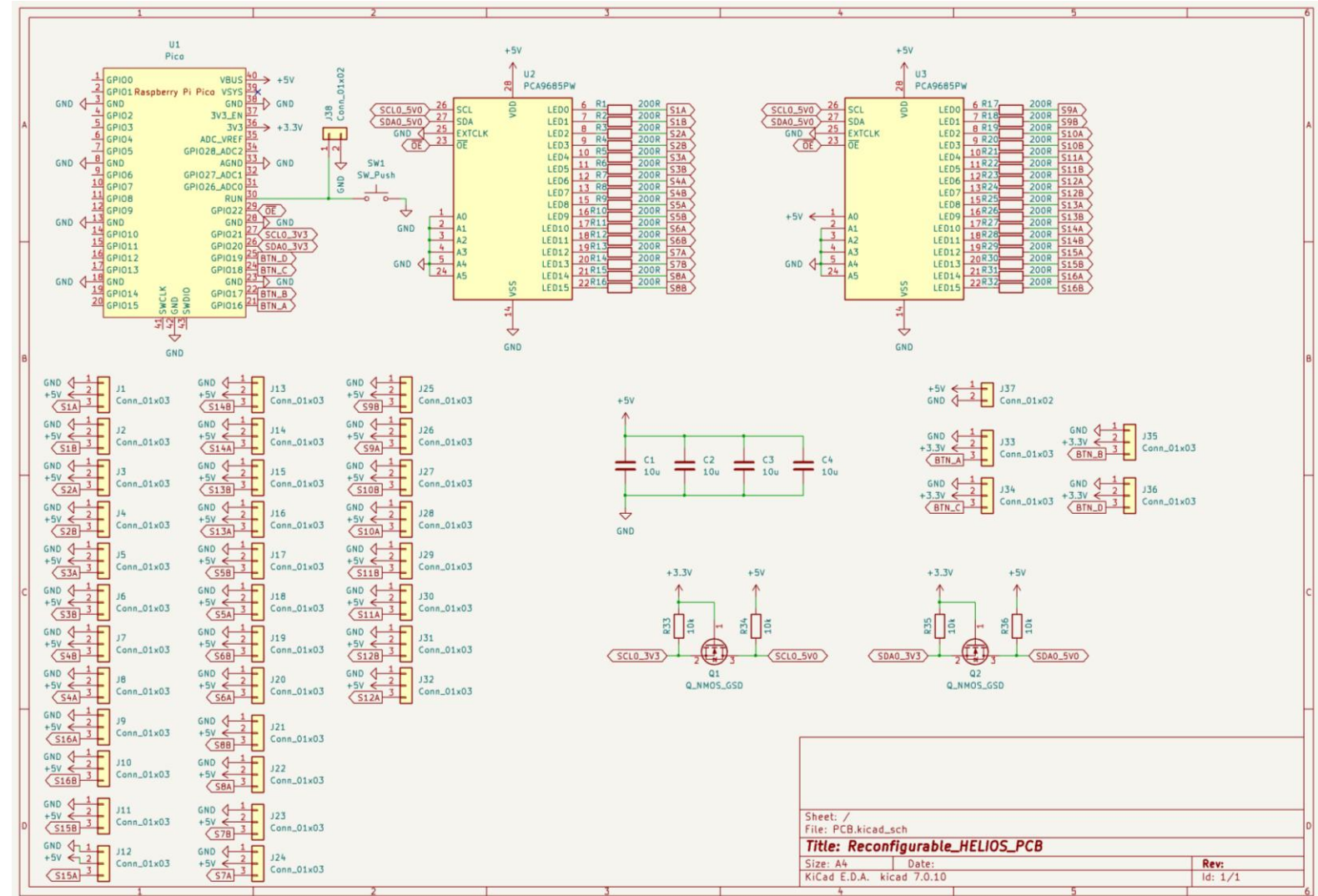
3. On the 3D-Printed Reflecting Surface Self-Adhesive Copper Tape can be Applied or, for Example, a Conductive Coating can be Spray-Painted, to Achieve Desired Reflection Characteristics

3. Assembly Instruction – SBC and PCB Circuit Diagram

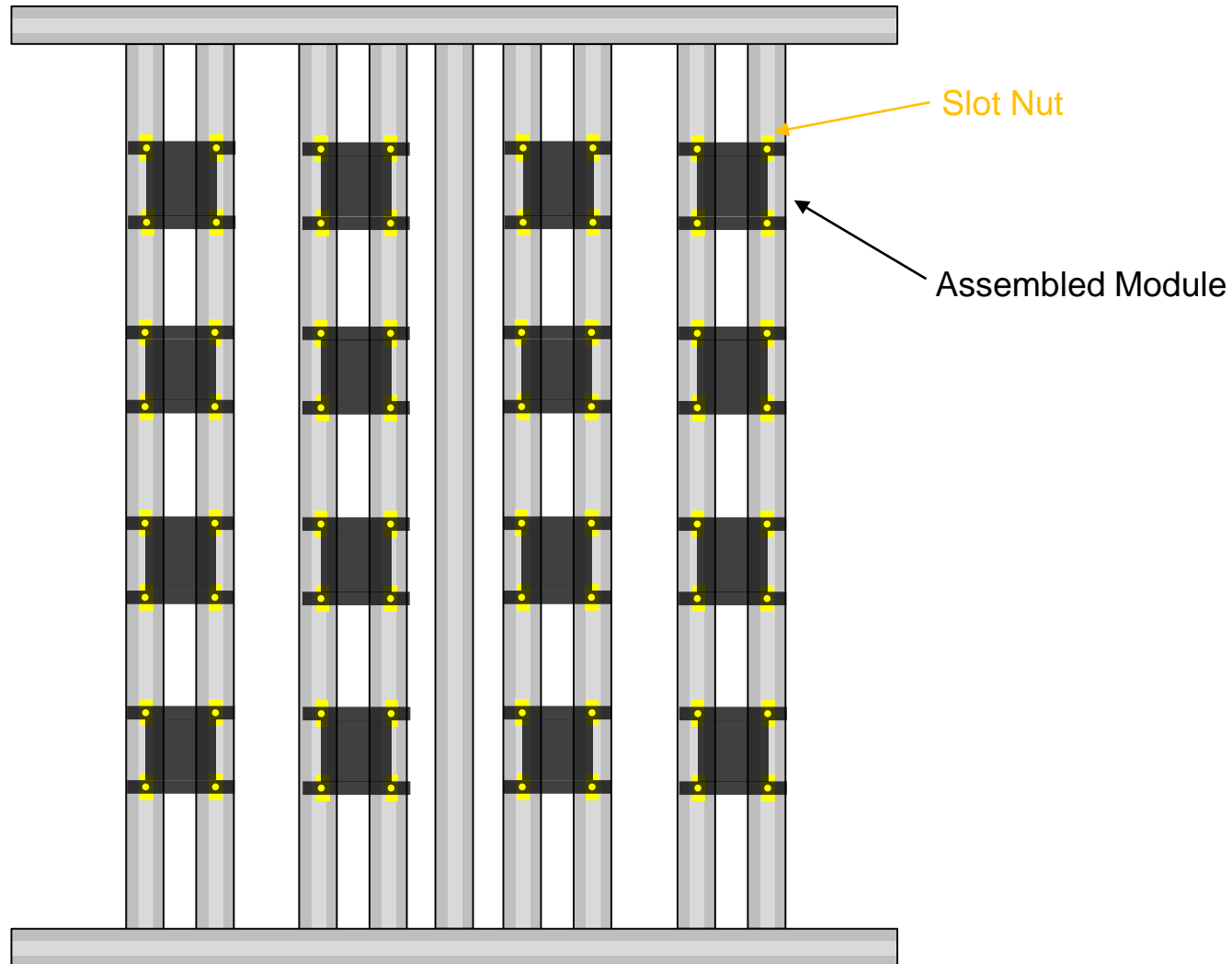
1. To Control the 32 Servomotor a SBC and Two 16-channel Pulse-Width Modulation Controllers are Used.
2. The Circuit Diagram of The Used PCB can be Seen on the Right.
3. The PCB is Used for Connecting the Above Mentioned Components as Well as for the Connectors for the Connection to the Servomotors



Designed and Fully Equipped PCB

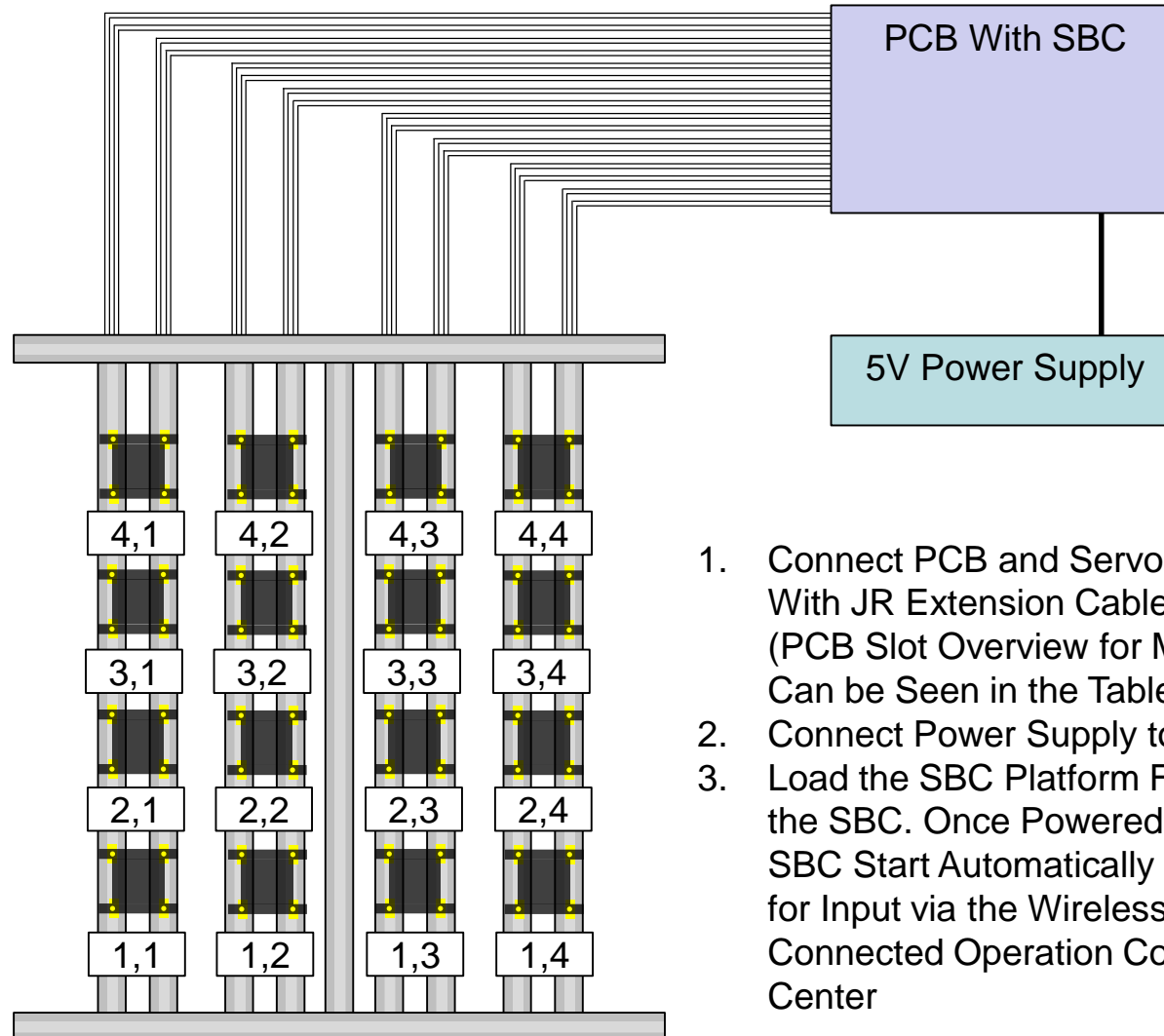


4. Assembly Instruction – Mount Modules on Frame



1. Mount Assembled Modules on Frame Using 4 M3 Slot Nuts and M3x7 Screws for Each Module

5. Assembly Instruction – Connection Overview



1. Connect PCB and Servomotors With JR Extension Cables (PCB Slot Overview for Modules Can be Seen in the Table)
2. Connect Power Supply to PCB
3. Load the SBC Platform Files Onto the SBC. Once Powered On, the SBC Start Automatically and Wait for Input via the Wirelessly Connected Operation Control Center

PCB Slot Overview

Module	Servomotor	PCB Slot	Module	Servomotor	PCB Slot
1,1	Bottom	S1A	3,1	Bottom	S9A
1,1	Top	S1B	3,1	Top	S9B
1,2	Bottom	S2A	3,2	Bottom	S10A
1,2	Top	S2B	3,2	Top	S10B
1,3	Bottom	S3A	3,3	Bottom	S11A
1,3	Top	S3B	3,3	Top	S11B
1,4	Bottom	S4A	3,4	Bottom	S12A
1,4	Top	S4B	3,4	Top	S12B
2,1	Bottom	S5A	4,1	Bottom	S13A
2,1	Top	S5B	4,1	Top	S13B
2,2	Bottom	S6A	4,2	Bottom	S14A
2,2	Top	S6B	4,2	Top	S14B
2,3	Bottom	S7A	4,3	Bottom	S15A
2,3	Top	S7B	4,3	Top	S15B
2,4	Bottom	S8A	4,4	Bottom	S16A
2,4	Top	S8B	4,4	Top	S16B