



Yamanote Clock

Hiroyuki Sakuma

Product Description and Creative Ideation

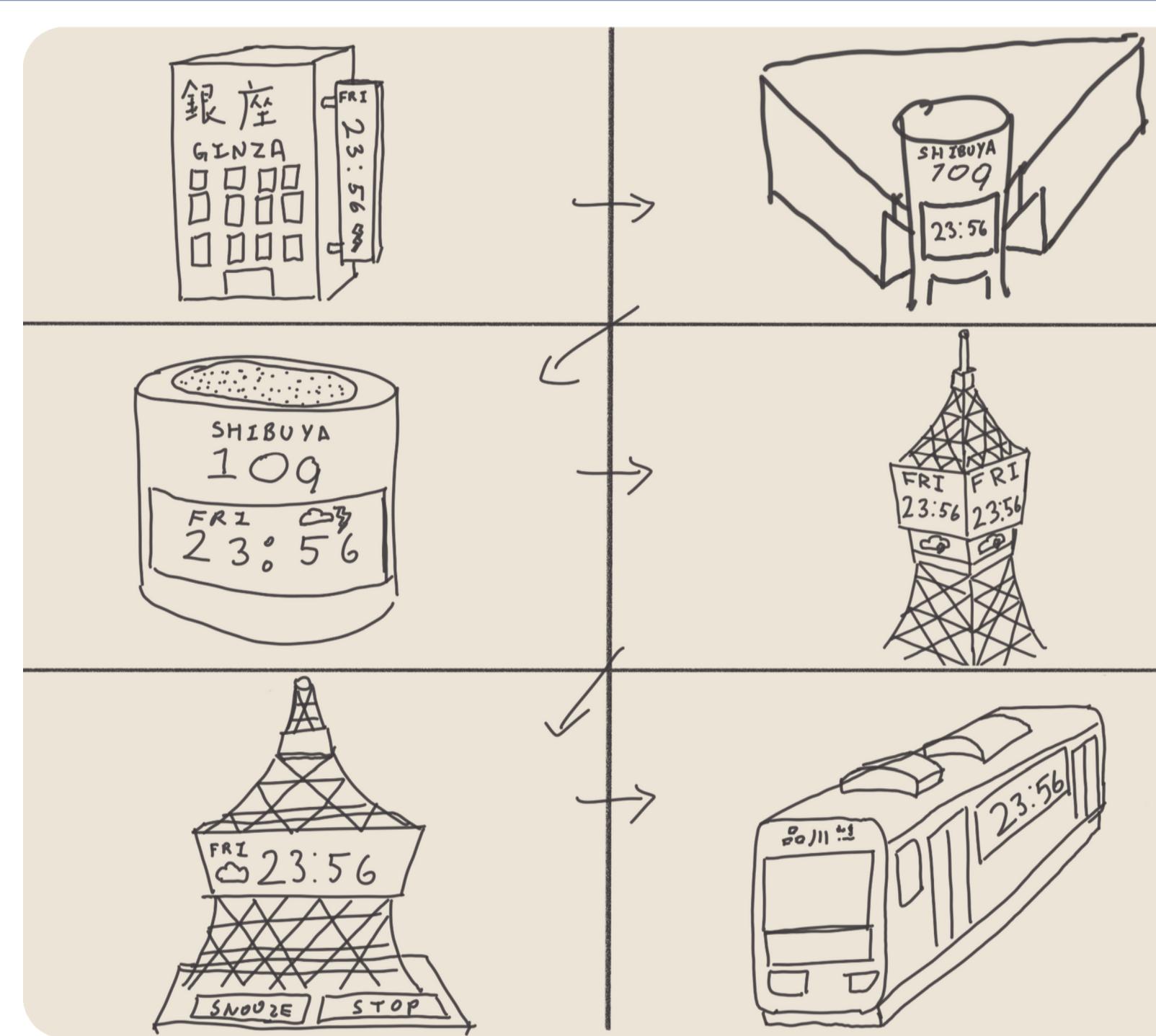
For my individual project, I chose to represent Japanese culture through the Yamanote Line, a staple of daily life and tourism in Tokyo. I modeled the alarm clock after the E231 series train, preserving its iconic green stripes and window shape. I integrated the clock's interface directly into the vehicle's features, specifically by using the rooftop AC vents to function as the snooze and stop buttons and with vents on the undercarriage to mimic jingles of stations along the train line.

Design Heuristic Cards:

- Simplify
- Contextualize

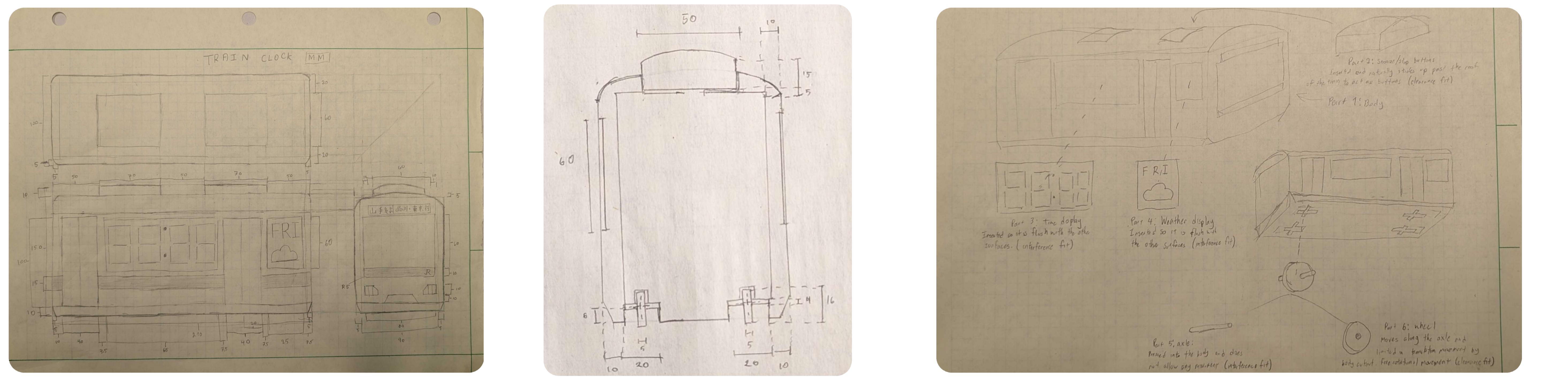
My design is unique in that it simplifies the complex machinery of a train into a sleek, functional alarm clock without losing the vehicle's original aesthetic identity. Additionally, the design also works to recontextualize similar model trains to function in a new product as an alarm clock.

Thumbnail Sketches and Perspective View

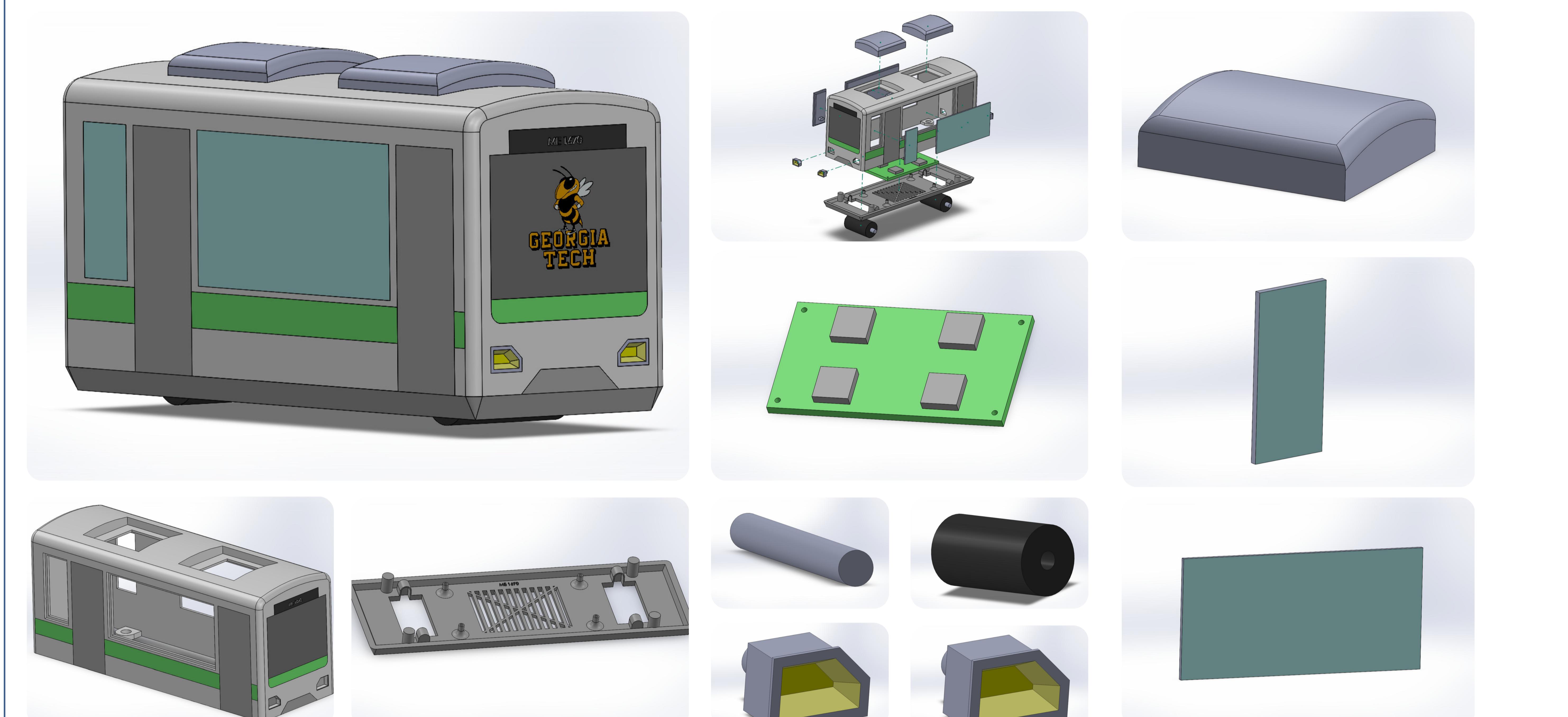


Tokyo is recognized for its high-rise buildings and shopping. The design concept began with a building in Ginza, then shifted to Shibuya 109 which is known for its more modern fashion. Then came the consideration for the Tokyo Tower, focusing on sightseeing. Ultimately, the final design was on the Yamanote Line train, which connects all of Tokyo, and thus all my previous designs.

Multi-views, Section Views and Assembly Drawings

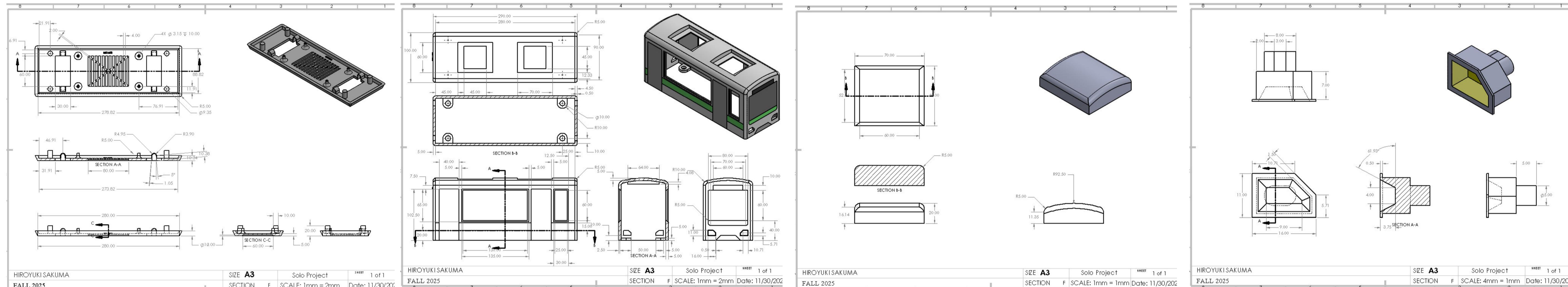


Rendered Part and Assembly Views





Part Working Drawings



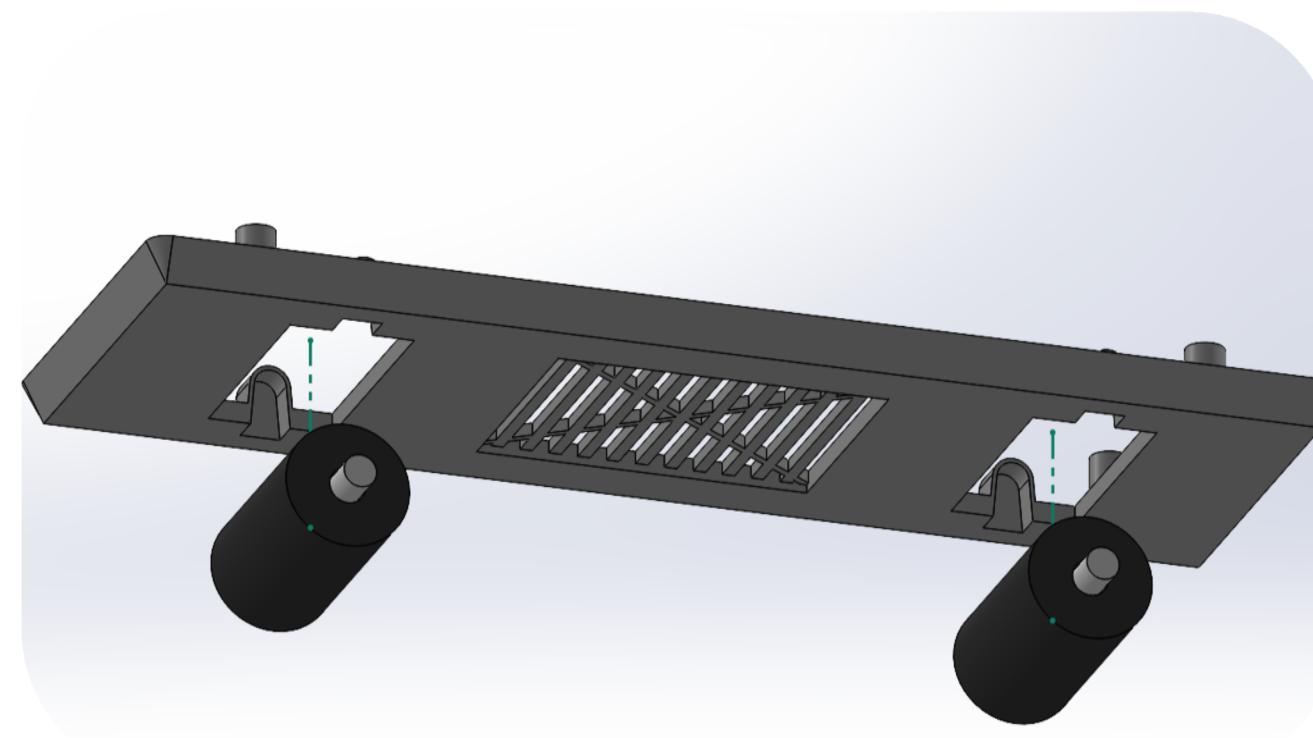
Dimensional Tolerance and GDT Tables

Parts in the Assembly	Fit Type	Dimensional Tolerance Limits	Dimensional Tolerance Limits	MMC/LMC (mm)
Part 2 (Buttons) & Part 1 (Body)	Clearance	Hole (Body) 5.00±0.05	Shaft (Button) 4.90±0.03	Clearance 0.02 MMC 0.18 LMC
Part 3 (Time Display) & Part 1 (Body)	Interference	Recess (Body) 40.00±0.05	Display 40.10±0.03	Interference 0.18 MMC 0.02 LMC
Part 4 (Weather Display) & Part 1 (Body)	Interference	Recess (Body) 20.00±0.05	Display 20.10±0.03	Interference 0.18 MMC 0.02 LMC
Part 5 (Axe) & Part 1 (Body)	Interference	Hole (Body) 4.00±0.02	Shaft (Axe) 4.05±0.02	Interference 0.09 MMC 0.01 LMC
Part 6 (Wheel) & Part 5 (Axe)	Clearance	Hole (Wheel) 4.15±0.03	Shaft (Axe) 4.05±0.02	Clearance 0.05 MMC 0.15 LMC
Part 7 (Base) & Part 1 (Body)	Interference	Hole (Body) 10±0.05	Cylinder (Base) 10.10±0.03	Interference 0.18 MMC 0.02 LMC
Part 8+9 (Lights) & Part 1 (Body)	Interference	Recess (Body) 40.00±0.05	Lights 40.10±0.03	Interference 0.18 MMC 0.02 LMC
Part 7 (Base) & Part 10 (Computer)	Interference	Hole (Body) 3.15±0.05	Hole (Computer) 3.30±0.03	Clearance 0.23 MMC 0.07 LMC

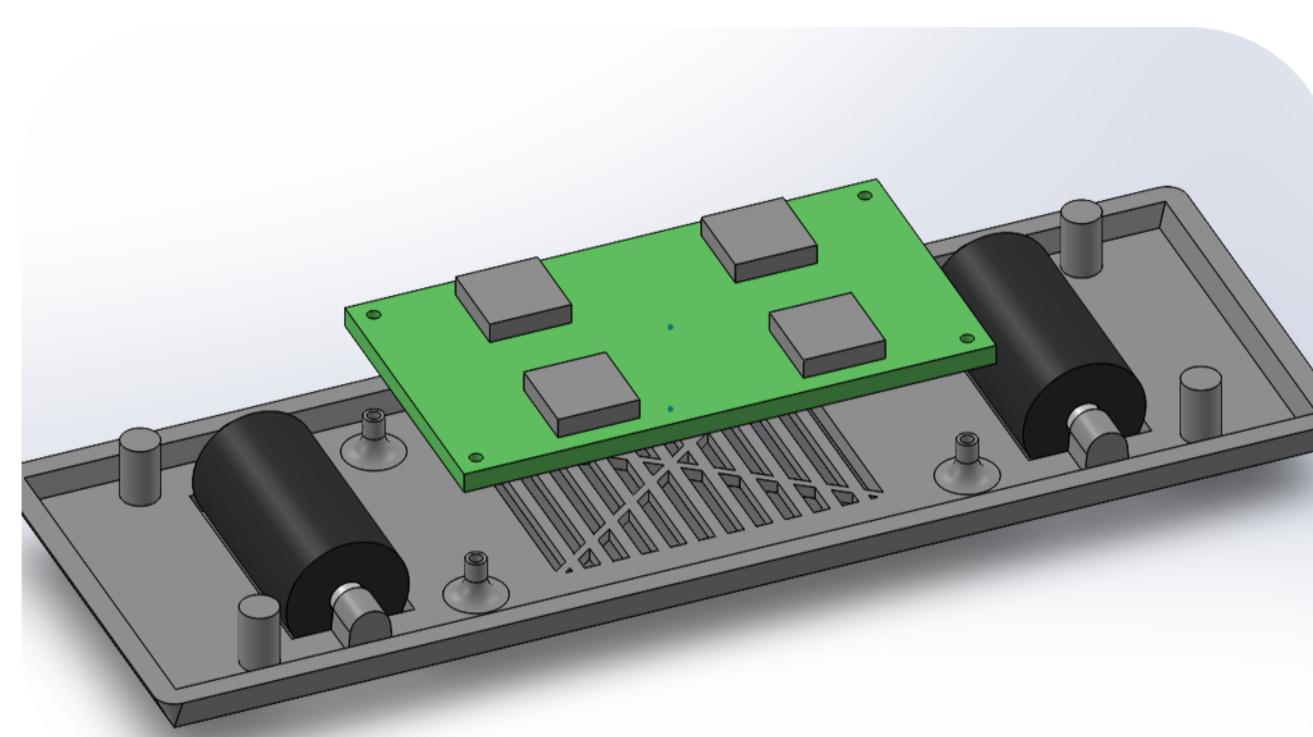
Part Name	Modeling Approach	Manufacturing Process	GDT Parameter to Control	Tolerance With Symbol
Part 1 (Body)	Extrude, Fillet, Chamfer	Injection Molding	Symmetry	0.20 mm
Part 2 (Buttons)	Extrude, Extrude-cut, Fillet	3D Printing	Parallelism	0.10 mm
Part 3 (Time Display)	Extrude	Photolithography	Flatness	0.05 mm
Part 4 (Weather Display)	Extrude	Photolithography	Flatness	0.05 mm
Part 5 (Axe)	Revolve, Extrude	Injection Molding	Cylindricity	0.05 mm
Part 6 (Wheel)	Revolve, Extrude	Injection Molding	Cylindricity	0.10 mm
Part 7 (Base)	Extrude, Fillet, Chamfer	Injection Molding	Symmetry	0.20 mm
Part 8 (Left Light)	Extrude, Cut-loft	Photolithography	Flatness	0.05 mm
Part 9 (Right Light)	Extrude, Cut-loft	Photolithography	Flatness	0.05 mm
Part 10 (Computer)	Extrude	Soldering	Symmetry	0.10 mm

Assembly Instructions

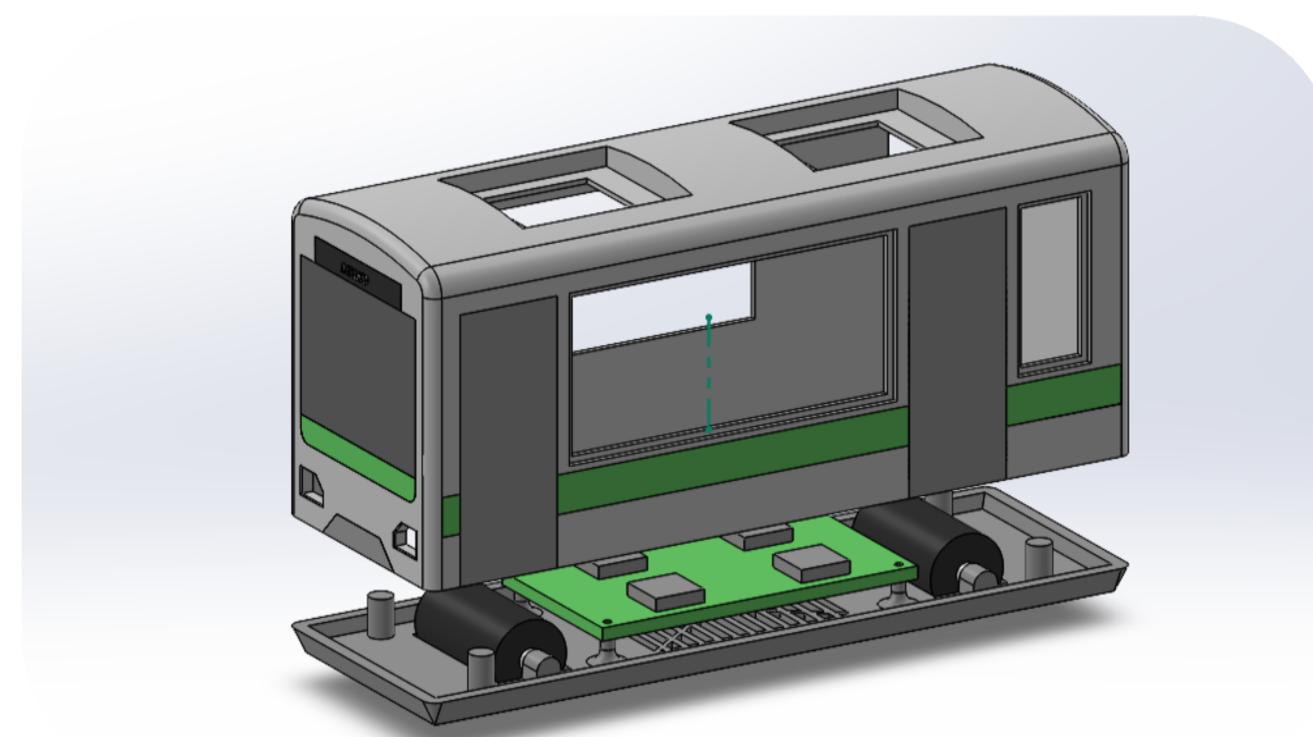
Step 1



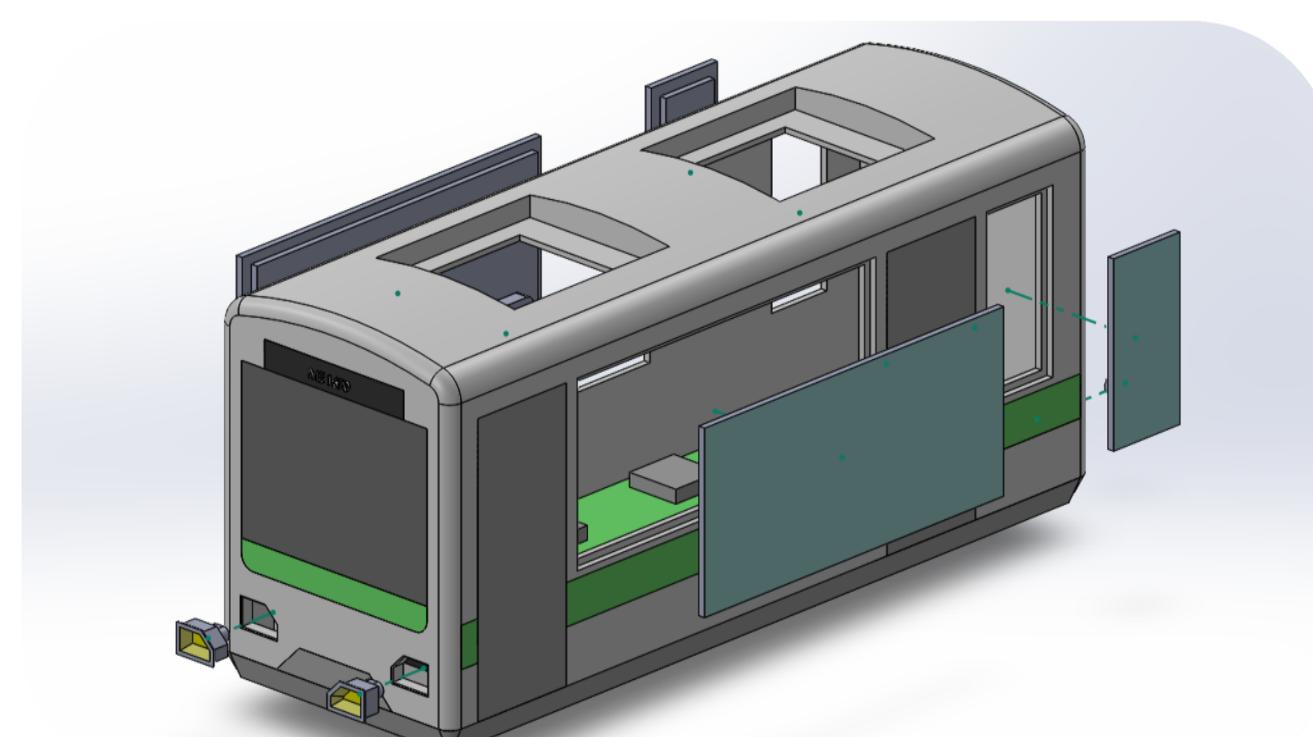
Step 2



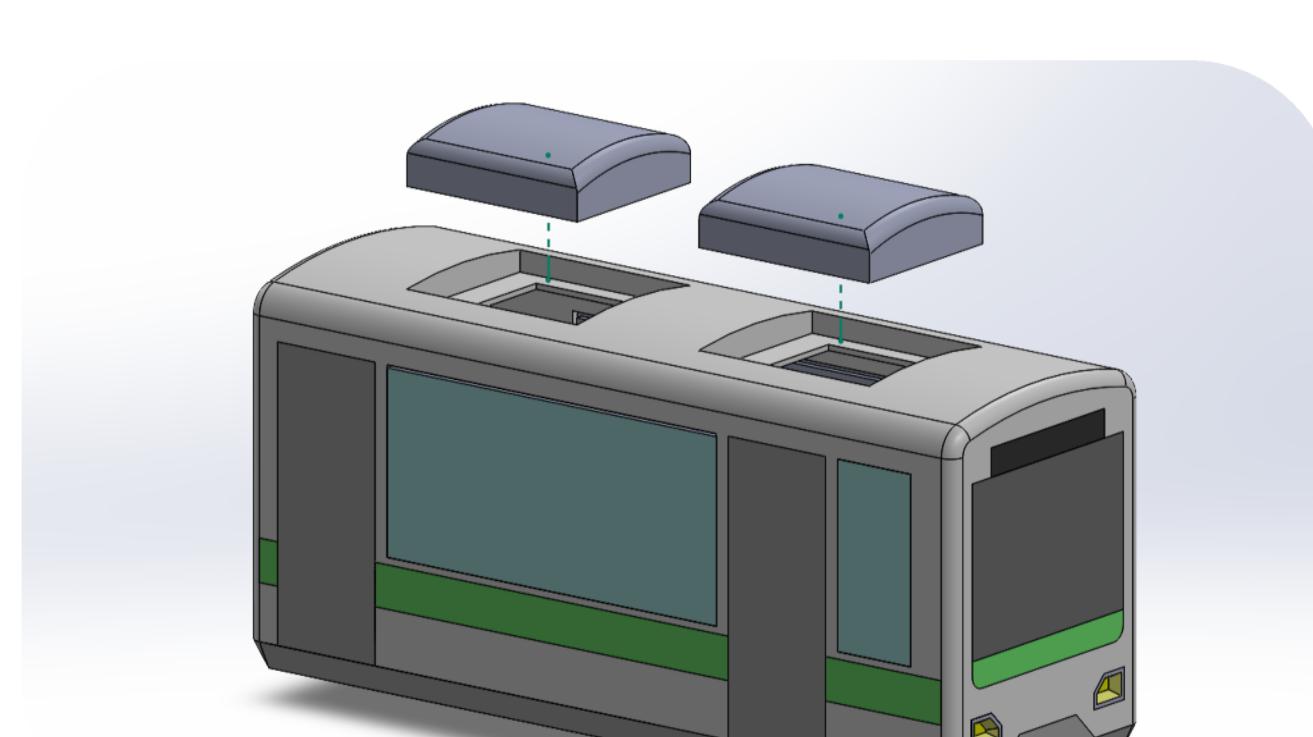
Step 3



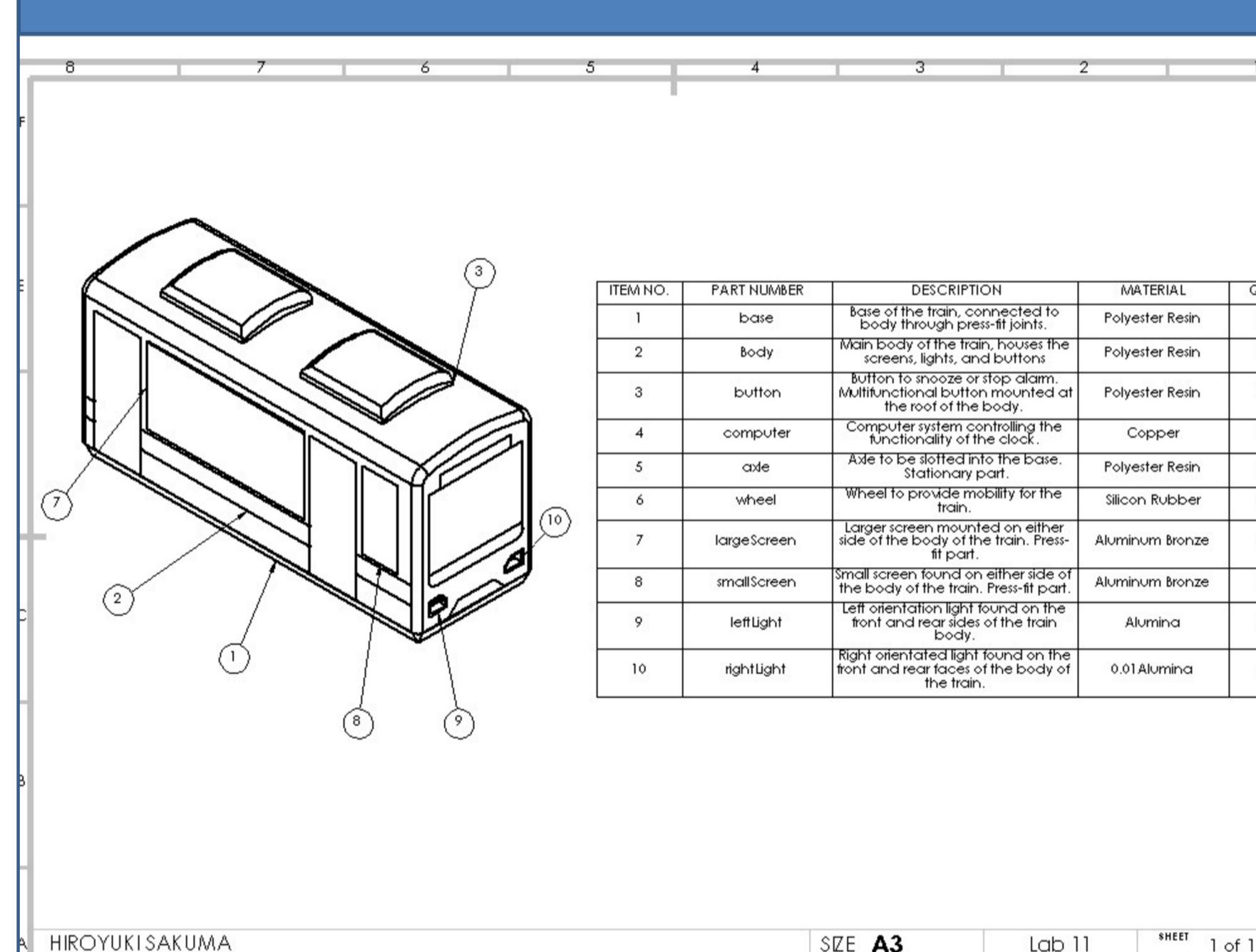
Step 4



Step 5 (Final)



Exploded view with BOM Parts List



ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY
1	base	base of the train, connected to the body of the train	Polyester Resin	1
2	body	main body of the train, houses the computer system and displays	Polyester Resin	1
3	button	button to increase or stop display	Polyester Resin	2
4	computer	Computer system controlling the functionality of the train	Copper	1
5	case	case to be soldered to the base	Polyester Resin	2
6	wheel	Wheel to provide mobility for the base	Silicon Rubber	2
7	largeScreen	Large screen mounted on either side of the body of the train	Aluminum Bronze	2
8	smallScreen	Small screen found on the side of the body of the train. Present on the front and rear sides of the train	Aluminum Bronze	2
9	leftlight	Left side light found on the front and rear sides of the body of the train	Alumina	2
10	rightlight	Right side light found on the front and rear sides of the body of the train	0.01 Alumina	2

HIROYUKI SAKUMA SIZE A3 SECTION F SCALE: 1" = 9" Date: 10/30/2025

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