

FIRST Robotics: Linear Slide Kit BWC-FIRST-FC001

Version 1.0 2024-10-09

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Part Number: BWC-FIRST-FC001 Season: 2025 Program: FIRST Choice

Description:

The **Linear Slide Kit** from Bishop-Wisecarver® is a flexible kit of parts that can be assembled into a linear slide or a telescopic slide and includes mounting hardware, spacers, and industrial grade vee guide wheels and matching vee guide linear track. 3D print your own wheel plate or wheel mount, available from BWC.com, or design your own solution. Assemble it with simple hand tools like hex wrenches.

Linear slides can be created when the track is mounted to your robot and a wheel plate carriage rolls down the track. Telescopic slides can be created when the wheels are mounted to a fixed location and the linear track moves. For heavier telescopic slide-outs designed as tray, or drawer style, we recommend ordering 2ea kits to support both sides of the slide-out.

Image of Kit:



Each Kit Includes:

KIT	Part Number	Description	Supplier	UoM	Quantity	Notes
BWC-FIRST-FC001	WOX	Linear Guide Wheel, Size 0, Carbon, Sealed	Bishop-Wisecarver®	EA	4	
	TDD-185010	Linear Guide Track, Size 0, Carbon, Double Edge, Hard, 18.5" Long, 10 Holes	Bishop-Wisecarver®	EA	1	
	SHCSM4X16	Socket Head Cap Screw, M4X0.7 X 16mm Long	McMaster: 91290A168	EA	18	Use to mount linear guide track and wheels.
	93441A493	Spacer, 6mm OD X 8mm Long, for M4 Screw Clearance, White Nylon	DigiKey: 952-3460-ND	EA	10	Use to mount linear guide track.
	93441A491	Spacer, 6mm OD X 4mm Long, for M4 Screw Clearance, Aluminum	Mouser: 761-M0533-4-AL	EA	4	Use to mount linear guide wheels.
	NUTLKM4	Lock Nut, M4 X 0.7, Nylon Insert, Zinc-Plated Steel	McMaster: 90576A103	EA	8	Use to mount linear guide wheels.
	2-Wheel_Mount_Thin	3D Printed Wheel Mount, for Fixed Wheels Moving Track (Print Your Own)	Bishop-Wisecarver®	EA	2	Not provided, download files & print your own.
4-Wheel_Mount_Thin	3D Printed Wheel Mount, for Fixed Track Moving Carriage (Print Your Own)	Bishop-Wisecarver®	EA	1	Not provided, download files & print your own.	

Online Resources:

Visit www.bwc.com/FIRST, or scan the QR code link below to access online support resources.

- An overview of Bishop-Wisecarver® participation as a supplier for FIRST FTC
 - Corporate sponsorship of teams
- 3D CAD Models in. stl format ready for your slicing software and 3d printing



- Telescopic designs: Print 2 each of model "2-Wheel_Mount_Thin.stl" and attach to a fixed location. The linear track should move in your assembly.
- Linear Slide designs: Print 1 each of model "4-Wheel_Mount-Thin.stl" and attach either 3 or 4 guide wheels to the moveable wheel plate that can travel along the linear guide track.

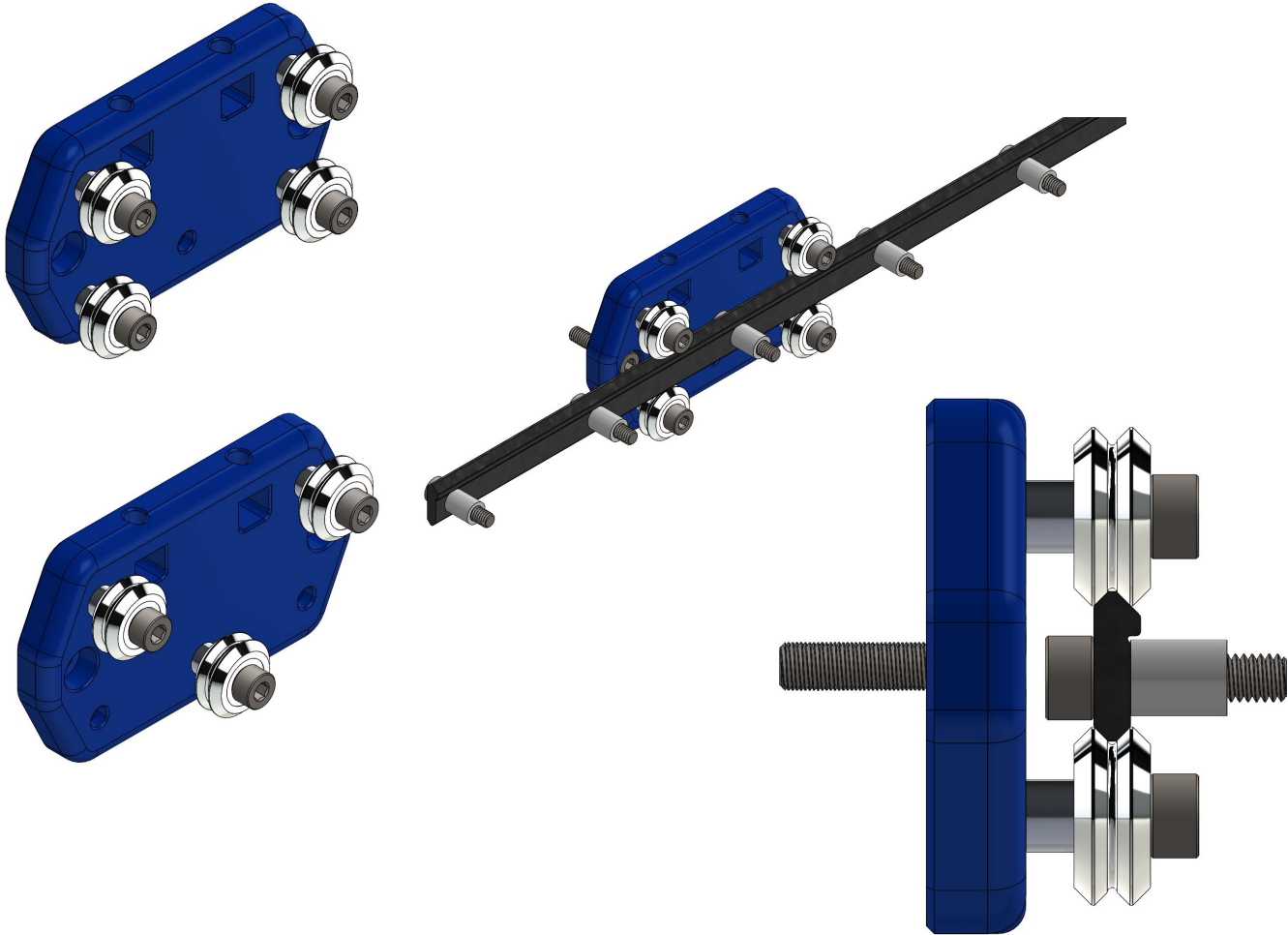
Example Assemblies:

Note: All blue parts are not supplied but can be 3d printed from available CAD files.

Telescopic Assembly: 2-Wheel_Mount_Thin



Linear Slide Assembly: 4-Wheel_Mount_Thin
Possible to mount either 3 or 4 guide wheels

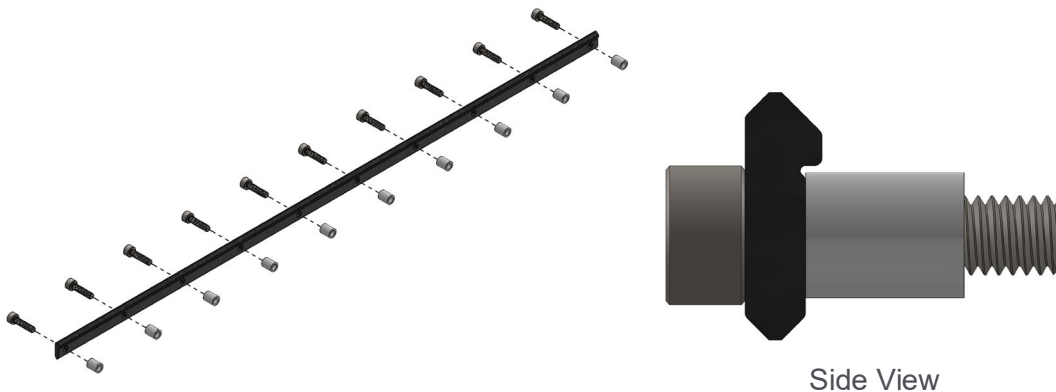


Tools Needed:

1. Drill bit, 4mm diameter or imperial # 21 (0.129")
 - a. Drill press (recommended), or cordless drill
2. Hex wrench
3. Sharp knife

Instructions:

1. Download and 3d print the following parts with the following recommended slicer settings:
 - a. Parts List:
 - i. 2ea of 2-Wheel_Mount_Thin
 - ii. 1ea of 4-Wheel_Mount_Thin
 - b. Slicer Settings:
 - i. Nozzle Diameter: 4mm
 - ii. Layer Height: 3mm
 - iii. # of Top/Bottom Layers: 5
 - iv. # of Walls: 5
 - v. Material: PLA, or PETG for higher strength
2. Clean and finish the 3d print parts with a sharp knife to remove blemishes.
3. Drill all holes in the 3d printed parts with a 4mm drill bit in a drill press, or a cordless drill, to ensure the holes are round and the correct diameter for the cap screws to pass thru with very little clearance. Remove the least amount of material possible and keep the drill bit perpendicular to the holes. Increase the drill size if necessary.
4. Mount the linear guide track using the hex wrench and 10ea of the white plastic spacers and 10ea of the M4 socket head cap screws. You'll need to attach the track to M4 threaded holes on your robot structure. These holes are spaced at 2.000" apart.

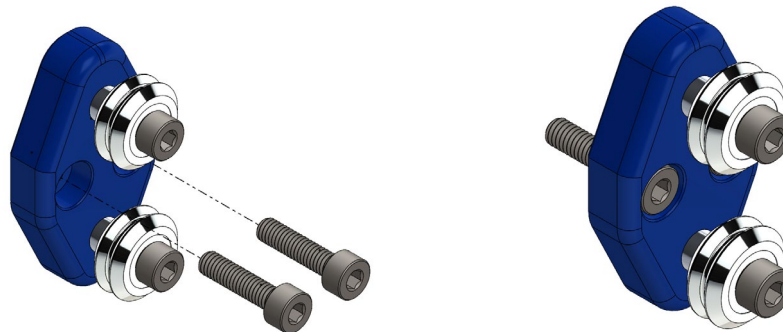


5. Option A: Telescopic

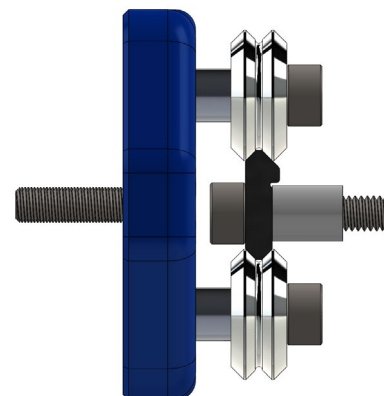
- a. Assemble the linear guide wheels onto the 2-Wheel_Mount_Thin.
Important! Insert the lock nuts into the hex feature with the Nylon locking ring pointing toward the linear guide wheels as shown in the image below. Use the aluminum spacers, guide wheels, lock nuts, and M4 screws to complete the assembly. Assemble 2ea.



- b. Attach the assembly to a fixed location on your robot frame using 2ea cap screws per assembly. These holes are spaced at $\frac{1}{2}$ " or 0.500" apart.



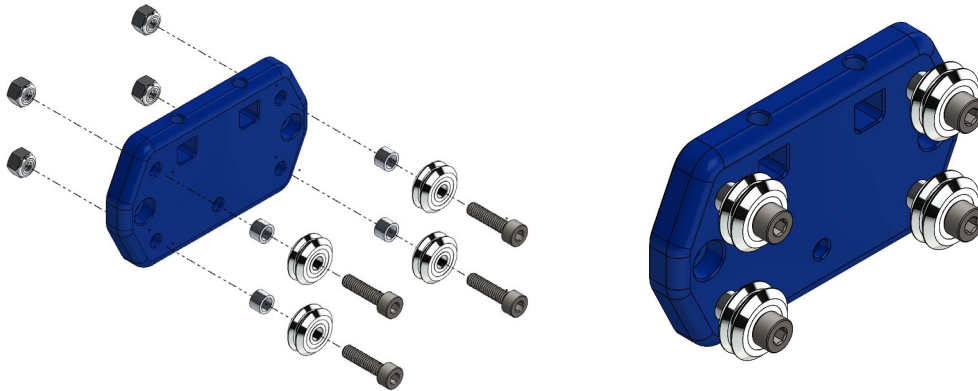
- c. Attach the second assembly at a distance from the first assembly to create support for telescopic motion. The wider the distance the better for the load capacity, but that reduces the travel. Experiment for best results.



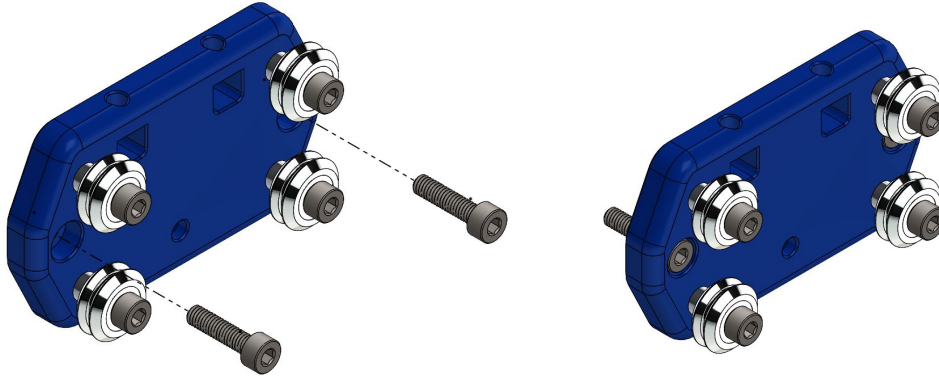
Side View

6. Option B: Linear Slide

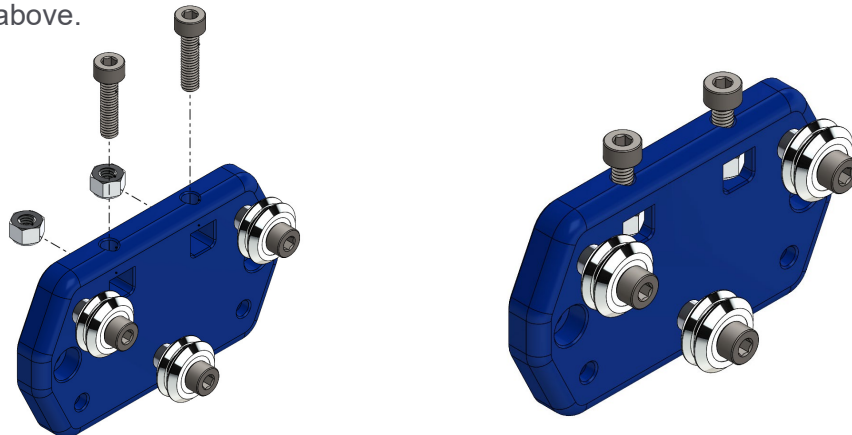
- a. Assemble the linear guide wheels onto the 4-Wheel_Mount_Thin.
Important! Insert the lock nuts into the hex feature with the Nylon locking ring pointing toward the linear guide wheels as shown in the image below. Use the aluminum spacers, guide wheels, lock nuts, and M4 screws to complete the assembly.



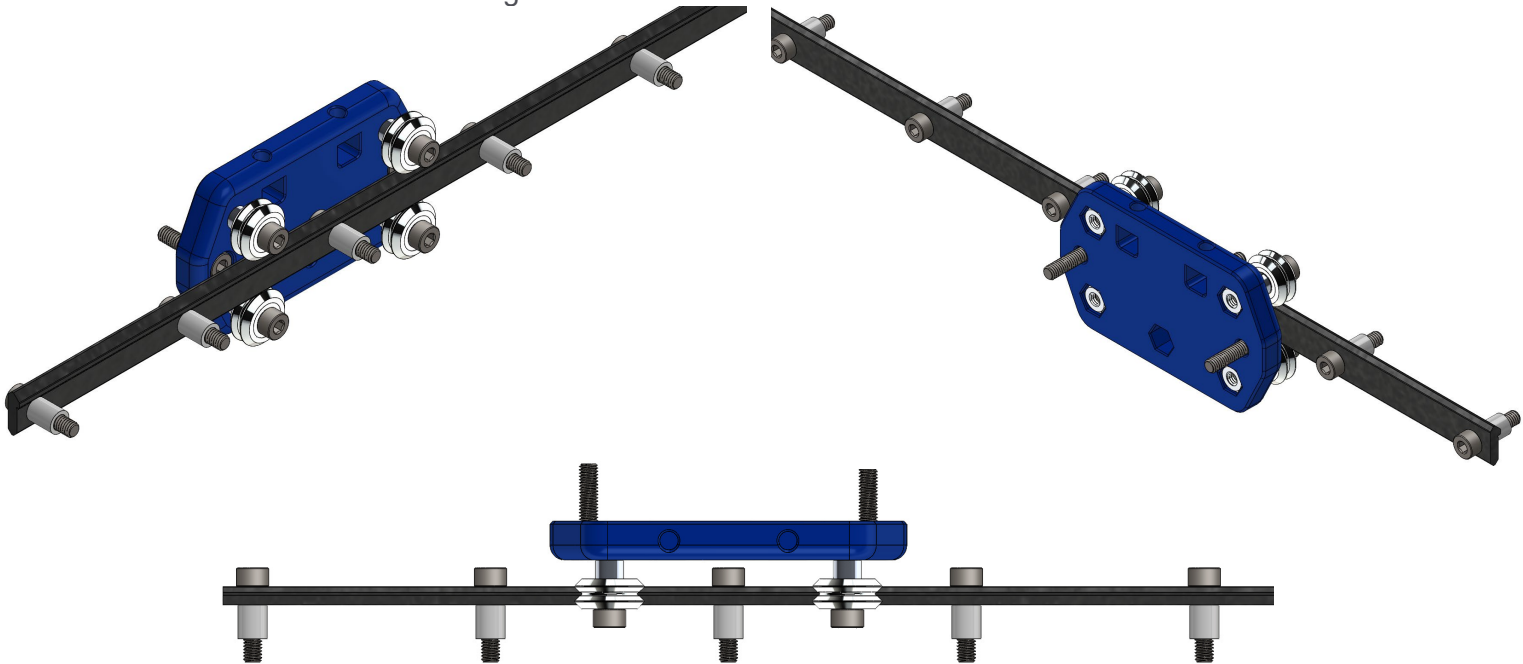
- b. The first option for attaching objects to the wheel plate carriage uses 2ea cap screws through the counterbored holes into your object. These holes are spaced at 2.350" apart.



- c. The second option for attaching objects to the wheel plate carriage uses 2ea locknuts inserted sideways into the square holes and 2ea cap screws from above.



d. Additional Images:



7. Lubrication is important. Vee guide wheel based linear slides work best, and last the longest, when they are clean and well lubricated. We recommend a light oil or grease. It doesn't need a lot, but never run it dry if possible.
8. Last Thing: Share your creations and comments with Bishop-Wisecarver® so we can celebrate and improve for the future. Have fun out there!

Revision Log			
Version	Date	Employee	Description
1.0	10/09/2024	Brian Burke	Initial Draft