

Maglev Track II

User Guide



Materials Included

- Rolls of mounting tape
- 2 connector pins
- 4 strip magnets
- 2 track sections

Items Needed (not included)

- Rubbing alcohol
- Soft cloths
- Utility knife
- Maglev vehicle (such as the Levitator or Maglev E Vehicle)*
- Books or blocks (optional for gravity track)
- Maglev E Track Power Supply (37797) (for powered track)
- Duct tape
- Safety glasses for anyone near track while it is in operation
- Tape measure
- Stopwatch (optional)

*The instructions for a powered track are for Pitsco maglev cars only.

Safety

General:

- Always wear safety glasses when operating the Maglev Track II.
- When using a maglev vehicle with a propeller, be careful to keep all body parts away from the vehicle when turning on the power supply.

For the powered Maglev Track II:

- The Maglev Track II should only be operated by a teacher or an authorized adult.
- Only use the Maglev E Track Power Supply (37797), which is a low-power and short-protected power supply, to power the track.
- Only use the track in a dry environment and do not let anyone have liquids near the track. When connected to a power supply, the track is an exposed conductor, so this is an important safety rule.
- Do not place the track on a metal surface (it will short out).
- Do not place a metal object so it touches both sides of the track (it will short out).
- Do not touch the track while it is in operation.

What is Magnetic Levitation?

Magnetic levitation, referred to as maglev, is the use of magnetic fields to levitate vehicles on a track to reduce friction. The track has magnets positioned to repel the magnets on the vehicle, and the track keeps the vehicle from flying loose. Adding an electrical power source can propel these vehicles, which include European speed trains, to great speeds.

Track Assembly

1. Lay out the four strip magnets separately – they will be stuck together (Figure 1). Wipe them down with rubbing alcohol and a piece of soft cloth to remove any dust that might have collected during shipping (Figure 2). Measure the strip magnets and use a hobby or utility knife to cut them to 48" (Figure 3).

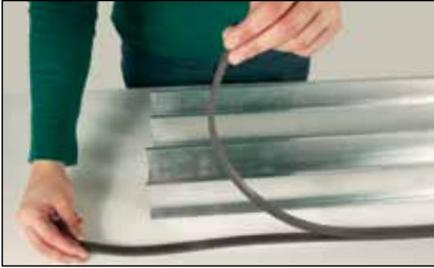


Figure 1



Figure 2

2. Make sure the strips' magnetic poles are pointed in the same direction. Do this by stacking the strip magnets on top of each other so they stick together. This shows that they are attracted to each other and that their magnetic poles are pointed in the same direction.



Figure 3

3. Lay out the two track sections. Dust them off with a dry cloth, especially the area between the raised track center and the track walls (Figure 4).



Figure 4

4. Starting on one end of a track section, unroll the mounting tape as close to the inside rails as possible so the sticky side of the tape is against the track (Figure 5). You might need to use two pieces that equal 48" if a roll of tape runs out. Do not place the tape against the outside walls of the track.

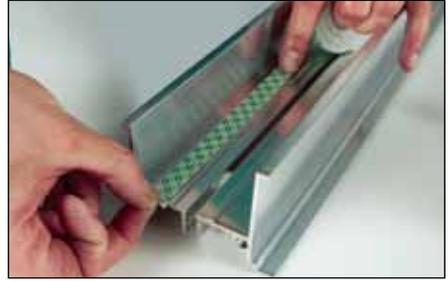


Figure 5

5. Repeat Step 4 on both sides of the inside rail for both sections of track (Figure 6).

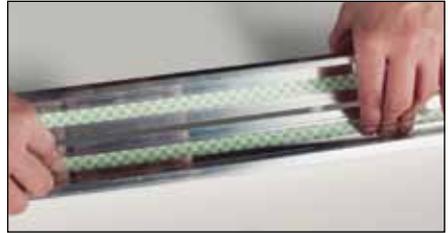


Figure 6

6. Remove the backing from the mounting tape (Figure 7). Take one strip of magnet and place it on top of the mounting tape (Figure 8). Press it down to secure it to the tape.

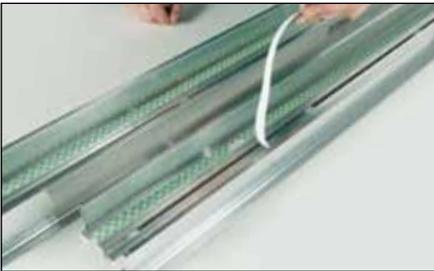


Figure 7



Figure 8

7. Remove the tape backing and place the other three magnets on the tape. Be sure to keep the magnets' polarities in the same direction.

8. At this time, the Maglev Track II is ready. Either use the track sections side-by-side for two short tracks or slide the

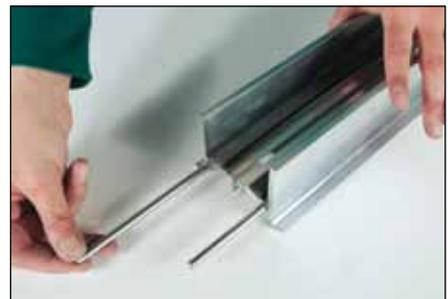


Figure 9a

sections together with the steel connector pins to form one long track (Figures 9a and b).



Figure 9b

Using as a Gravity Track

1. To use gravity to propel maglev vehicles down the track, elevate one end a bit (Figure 10). Place the vehicle onto the end that is elevated, let go, and watch it glide down the track (Figure 11).



Figure 10



Figure 11

2. If you wish, you can place a piece of duct tape across the finish end of the track to keep the vehicles from gliding off the track (Figure 12).

Try experimenting with elevation height. Using a stopwatch, time how long the vehicles take to travel the length of the track at each elevation.

You can also use this track setup on a level surface for vehicles that are self-propelled, such as the Warp Drive Levitator (28459).



Figure 12

Using as a Powered Track

Note: With the equipment provided, you can only power one track with one power supply, so either use one four-foot section or connect the two track sections together with the connector pins.

1. Set the power supply on a solid surface near one end of the track. Insert the ends of the two leads that come with the power supply into its jacks (Figure 13).

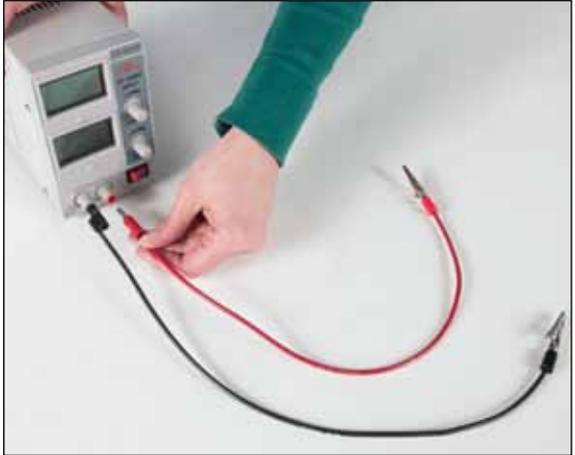


Figure 13

2. Place the alligator clip ends of the leads onto the Maglev Track II so that one is on either side of the track (Figure 14). It doesn't matter how high or low on the sides they are attached.



Figure 14

3. Turn both the Voltage and Current knobs counterclockwise as far as they will go (Figure 15).

4. Turn on the power supply (Figure 16).



Figure 15



Figure 16

5. Slowly turn the Voltage knob to 6 – **do not** go higher than 6 (Figure 17). Turn off the power supply (Figure 18).



Figure 17

6. Place a piece of duct tape across both ends of the track to keep the vehicles from gliding off the track (Figure 19). On the lead end, place the tape above the leads.



Figure 18



Figure 19



Figure 20

7. Set a maglev vehicle on the track in front of the duct tape – be sure it is facing to move in the direction of the tape (Figure 20).

8. Turn on the power supply (Figure 21). Determine which direction the current runs on the track. If the vehicle is propelled toward the power supply connections on the track, reverse the polarities of the power supply going to the track. To do this:



Figure 21



Figure 22

- Turn off the power supply (Figure 22).
- Switch the places of the two alligator clips on the sides of the track (Figure 23).
- Turn on the power supply (Figure 24).



Figure 23



Figure 24

Make sure the vehicle moves away from the connections (Figure 25).

- Turn off the power supply (Figure 22).
9. Adjust the Current to be as close to 1 as possible, but do not go higher than 1 (Figure 26). Turn off the power supply (Figure 22).



Figure 25

Now you are set up to run maglev vehicles on the track.



Figure 26

Be careful not to bump the Voltage and Current knobs or you will not be using a consistent setting for all vehicles, which is important for testing and determining which vehicle design had the best time. **NOTE:** If you wish to test vehicles at a lower voltage than 6, you may do so. Just set the Voltage to the desired setting **under 6** and turn off the power.



Figure 27a

10. With the power off (Figure 27a), place a vehicle on the track near the connection end and facing toward the finish end (Figure 27b).

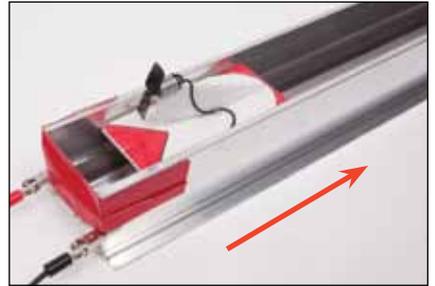


Figure 27b

11. Turn on the power and the vehicle will glide down the track (Figure 28). Continue to test vehicles by turning off the supply, placing the car, turning on the supply, watching/recording the vehicle's results, turning off the supply, and removing the vehicle.

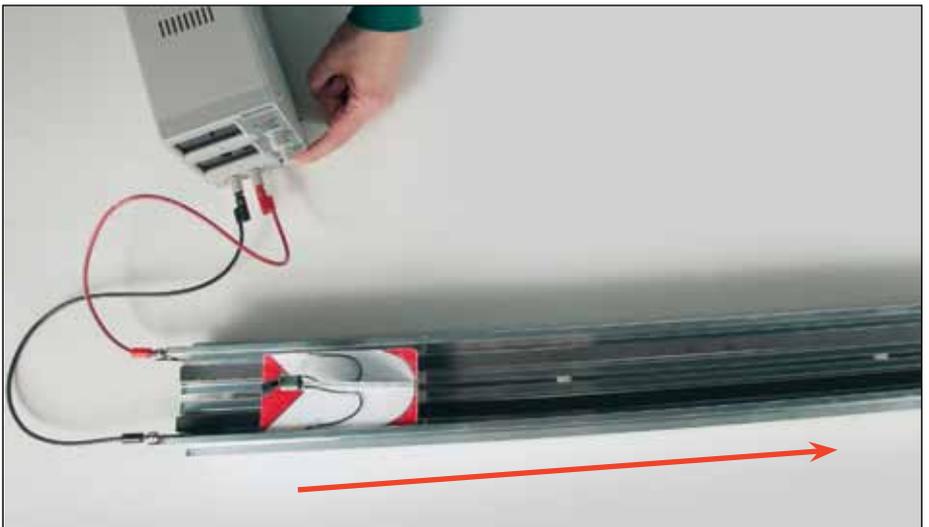


Figure 28

Adding Additional Sections to the Maglev Track II

Note: This information is for making your track longer than 8' by purchasing additional 4' Track Sections for Maglev Track II (37790).

For each additional section you order, you should receive:

- 1 track section
- 2 strip magnets
- 2 connector pins
- Rolls of mounting tape

Apply the same steps from the Track Assembly section of this guide (pages 3-5) to this additional Track Section.

CAUTION: Be sure to have the strip magnets' polarities facing the same direction as your Maglev Track II. If they face in the opposite direction, the track will not run correctly.

Add this section and any other additional sections by simply sliding the sections together with the steel connector pins to form one long track (Figures 29a and b).



Figure 29a



Figure 29b

Use the longer track either as a gravity track or a powered track and follow the directions from the appropriate sections in this guide:

Gravity track – page 5

Powered track – pages 6-9

Using the Maglev Track II with the Original Maglev Track

Can you use your old Maglev Track with the current Maglev Track II to make a 16-foot track?

For gravity experiments, yes you can. Using two connector pegs, you can connect the two tracks, elevate one end, and run gravity tests or races with maglev vehicles. Or use it on a level surface for self-propelled vehicles such as the Warp Drive Levitator.

For powered (or electrified) experiments using the Maglev E Track Power Supply, you **cannot connect** the two different tracks. Because the new track is constructed with two sides joined with insulators between them and the original track is made as a solid piece, putting them together **with the power supply could short out the system.**

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