

# Economy Air Track

P4-2710

## SUMMARY:

The Economy Air Track design is based on the principles of an air-cushion. When used with the included air source the glider is able to slide along the air track without the force of friction. Without friction, many different experiments can be completed using the included accessories, timer, photogates, and air source. Some possible experiments include the study of velocity, acceleration, momentum, collisions, and other examples of kinematics. The air track has a working length of 120cm with an alignment margin within 0.10mm over its entire length.

The single foot support at one end and a double support at the other end allows for leveling both lengthwise and sideways.

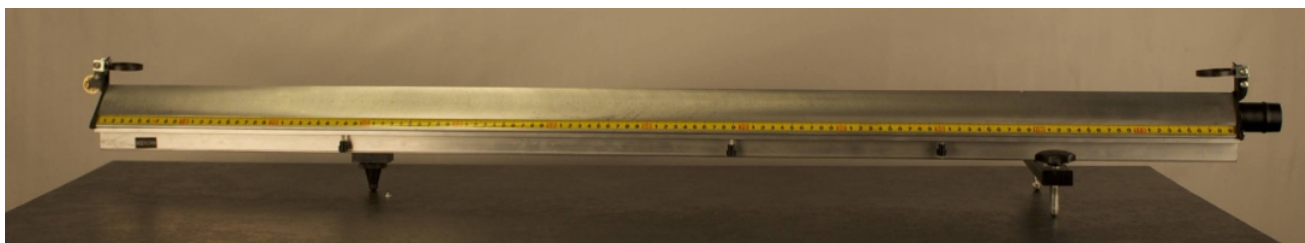
## PACKAGING:

The Economy Air Track is shipped in three boxes: a long rectangular box containing the track, gliders, and accessories. a small rectangular box containing the timer and photogates. and one cubed box containing the air source.

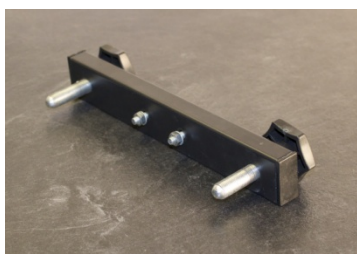
When removing the Styrofoam packing from the track and accessory box, be careful not to drop the accessories, gliders, or the track.

## PARTS:

Air Track (picture shows some accessories pre-installed)



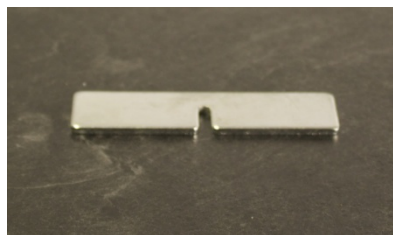
Air Track Double Support



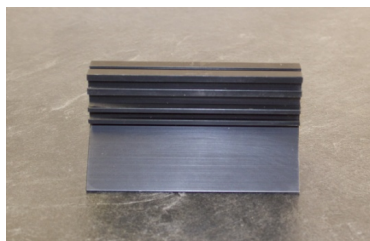
Hexagon Head Screw (Qty 10-10mm and 4-20mm)



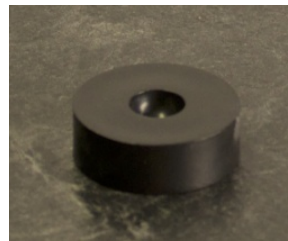
Glider Masses



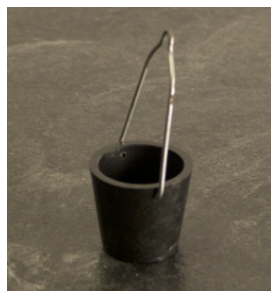
Glider (Qty 2)



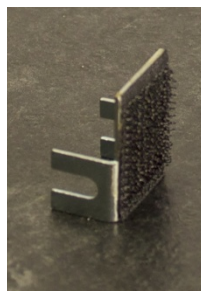
Rise Spacer



Weight Bucket (Qty 1)



Velcro Collision Plate (Qty 2)



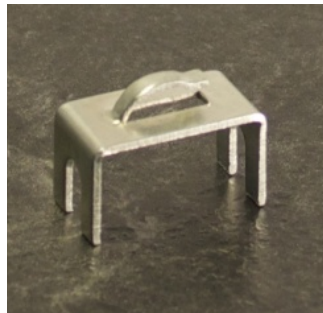
Spring bumper



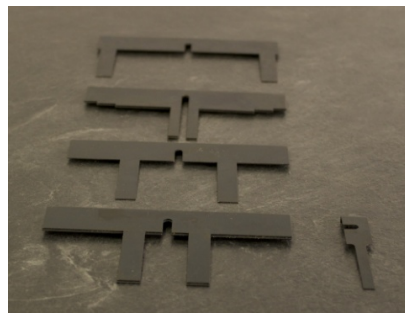
Pulley



Glider Hook



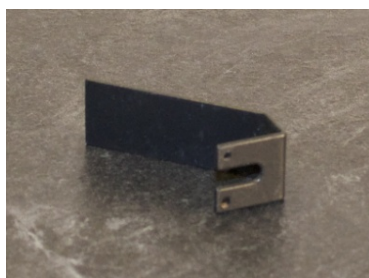
Photogate Flags



Glider Adjustable Starting Point



Photogate Mounting Support



### Not Pictured:

String

Harmonic Spring

Timer and Photogates

Air Supply

## ASSEMBLING AIR TRACK

Once all of the components are unpacked, begin by holding the air track upside down and sliding the double foot hex head bolts into the two channels closest to the air hose connection.

Place the air track on a level surface and use the two screws on the double support to adjust the track until it is as level as possible. A bubble level may also be used to approximately level the track.

Final leveling must be accomplished in the following manner:

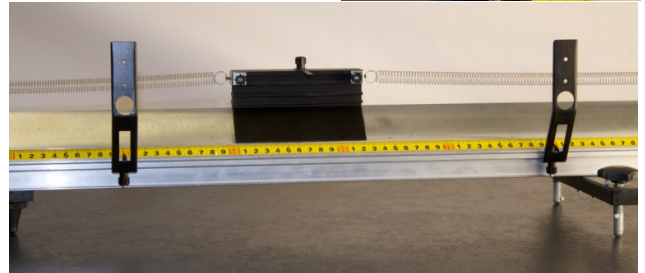
1. Connect the Air Track to the Air Supply and turn the Air Supply on.
2. Place a glider in the middle of the track without any initial velocity.
3. Adjust the leveling screws until the glider remains at its initial position and does not accelerate in either direction.

If using the included photogates, mount a photogate to the track with the pre-installed thumbscrew as desired. The thumbscrews can be moved within the channel in which they are installed. One screw is for the adjustable end stop and two screws are for the photogates.

If the experiment calls for the use of the pulley it is installed by securing the pulley between the two brass screws attached to the end stop farthest from the end of the track where the blower attaches to the track.



If your experiment uses the harmonic springs, they are attached to the top of the glider by using the included glider hooks and attaching the springs from the glider hooks to the hooks on both end stops.





## POSSIBLE EXPERIMENTS:

Based on the requirements of the class, the following experiments can be done:

- 1) Determining the velocity in the uniform rectilinear motion/verifying Newton's First Law.
- 2) Determining the mean velocity and instantaneous velocity in the non-uniform rectilinear motion.
- 3) Determining the acceleration in the uniformly variable rectilinear motion.
- 4) Studying the relations between the distance traveled and time taken in the uniformly variable rectilinear motion.
- 5) Determining the gravitational acceleration.
- 6) Verifying of Newton's Second Law.
- 7) Verifying of Newton's Third Law.
- 8) Verifying of the theorem of kinetic energy.
- 9) Verifying of the theorem of momentum.
- 10) Verifying of the law of conservation of momentum.
- 11) Verifying of the law of conservation of mechanical energy.
- 12) Study on the law of simple harmonic oscillation.
  - 12.1) Determining the coefficient of period stiffness of an oscillator (K).
  - 12.2) Verifying the relation of period of simple harmonic oscillation  $T = 2\pi\sqrt{\frac{m}{k}}$
  - 12.3) Verifying the relation of amplitude with the period in simple harmonic oscillation.

Below are assembled pictures of a few of the possible uses for the Air Track.

