

Thank you for purchasing a Derby Magic Pinewood Derby Track.

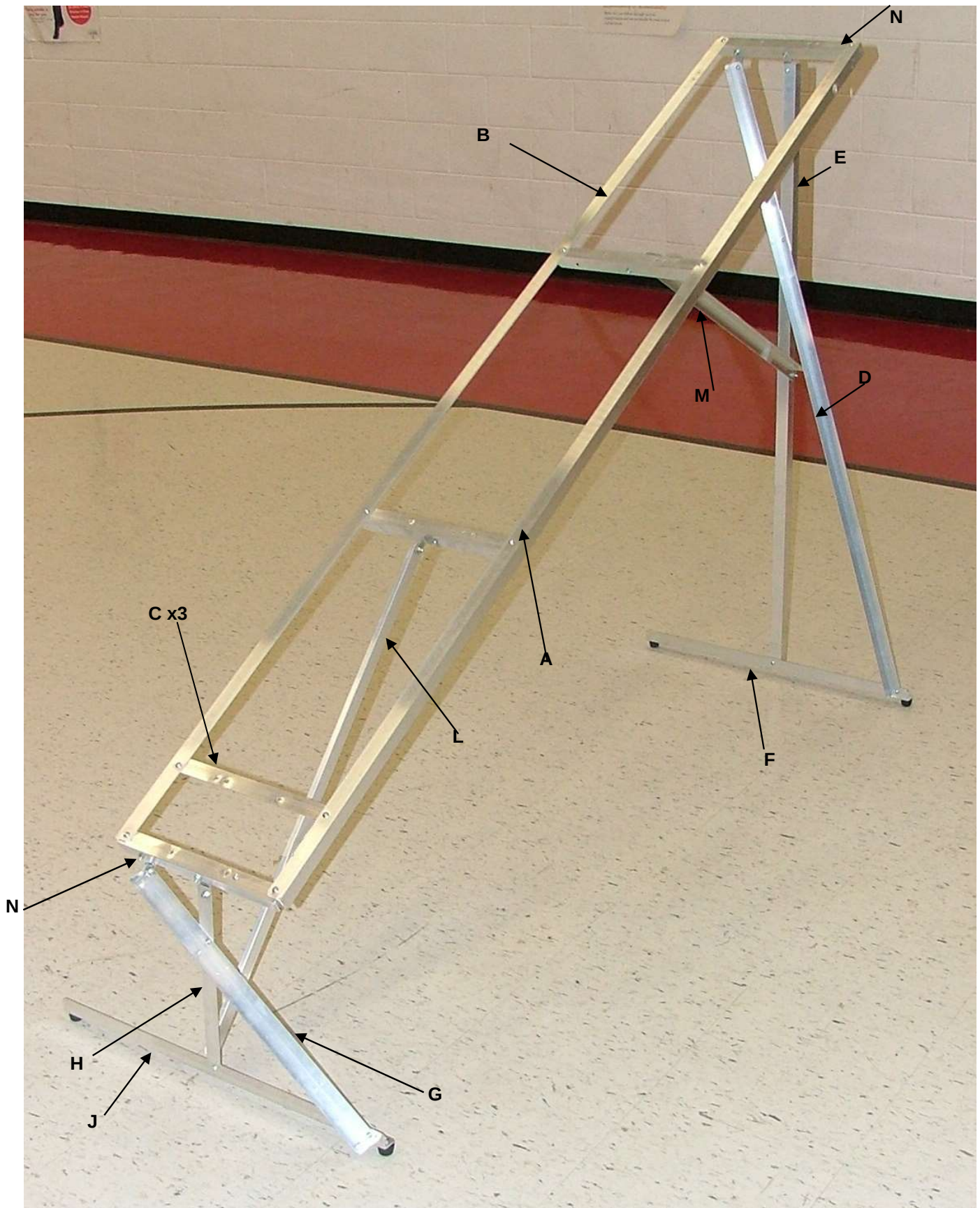
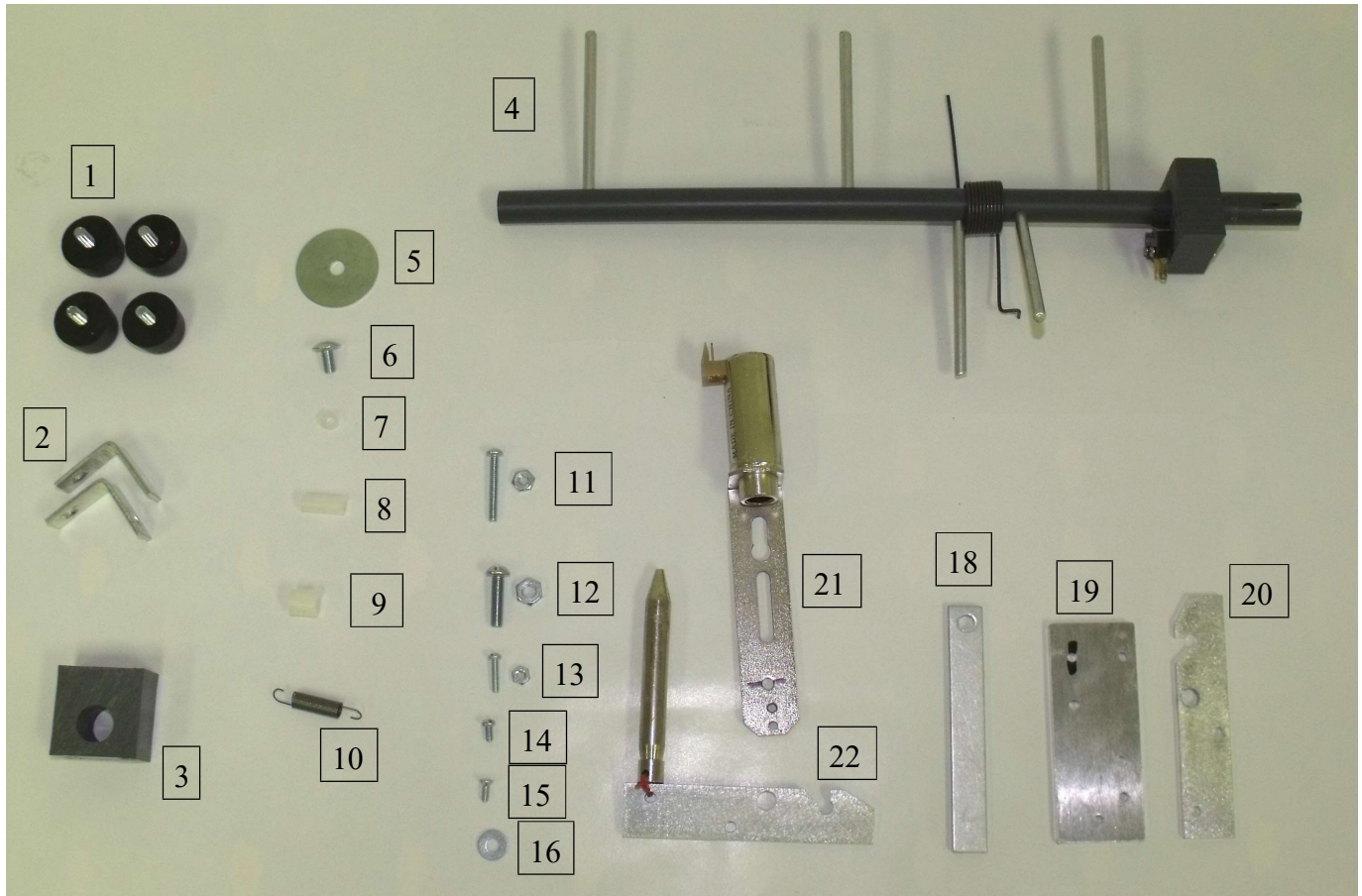


Figure 1

Tools Required: Phillips and common screwdriver 3/8" wrench 1/4" wrench 5/16" wrench



- |     |                                    |     |                                       |
|-----|------------------------------------|-----|---------------------------------------|
| 1)  | Foot, 4 pieces                     | 13) | #4-40 x 3/8 & nut, 2 pieces           |
| 2)  | 90° Bracket, 2 pieces              | 14) | #4-40 x 1/4, see qty. below           |
| 3)  | Start Block                        | 15) | Washer, 2 pieces                      |
| 4)  | Start Gate                         | 16) | 4-40 x 5/16 flat head, see qty. below |
| 5)  | Fender washer, see qty. below      | 17) |                                       |
| 6)  | #10-32 x 3/8 screw, see qty. below | 18) | Start Gate Lever                      |
| 7)  | 1/4 OD x 1/8 long spacer           | 19) | Plate                                 |
| 8)  | 1/4 OD x 3/4 long spacer           | 20) | Start gate handle                     |
| 9)  | 3/8 OD x 1/2 long spacer           | 21) | OPTIONAL Solenoid coil                |
| 10) | Start gate handle return spring    | 22) | OPTIONAL Solenoid armature & lever    |
| 11) | #6-32 x 1 screw & nut, 12 pieces   |     |                                       |
| 12) | #10-32 x 3/4 & nut, 1 piece        |     |                                       |

To assemble the support frame, all tracks will have a bag of 34 #10-32 x 3/8 screws and 38 nuts.

The other screw counts depend on options ordered and the number of lanes.

Quantities of #10-32 x 3/8 screws and fender washers for track joints for the standard track

Length\Lanes	2	3	4	5	6	8
32	8	12	16	20	24	32
38	10	15	20	25	30	40
44	12	18	24	30	36	48

Quantities of #4-40 x ¼ round head screws for brake and timer attachment for the standard track

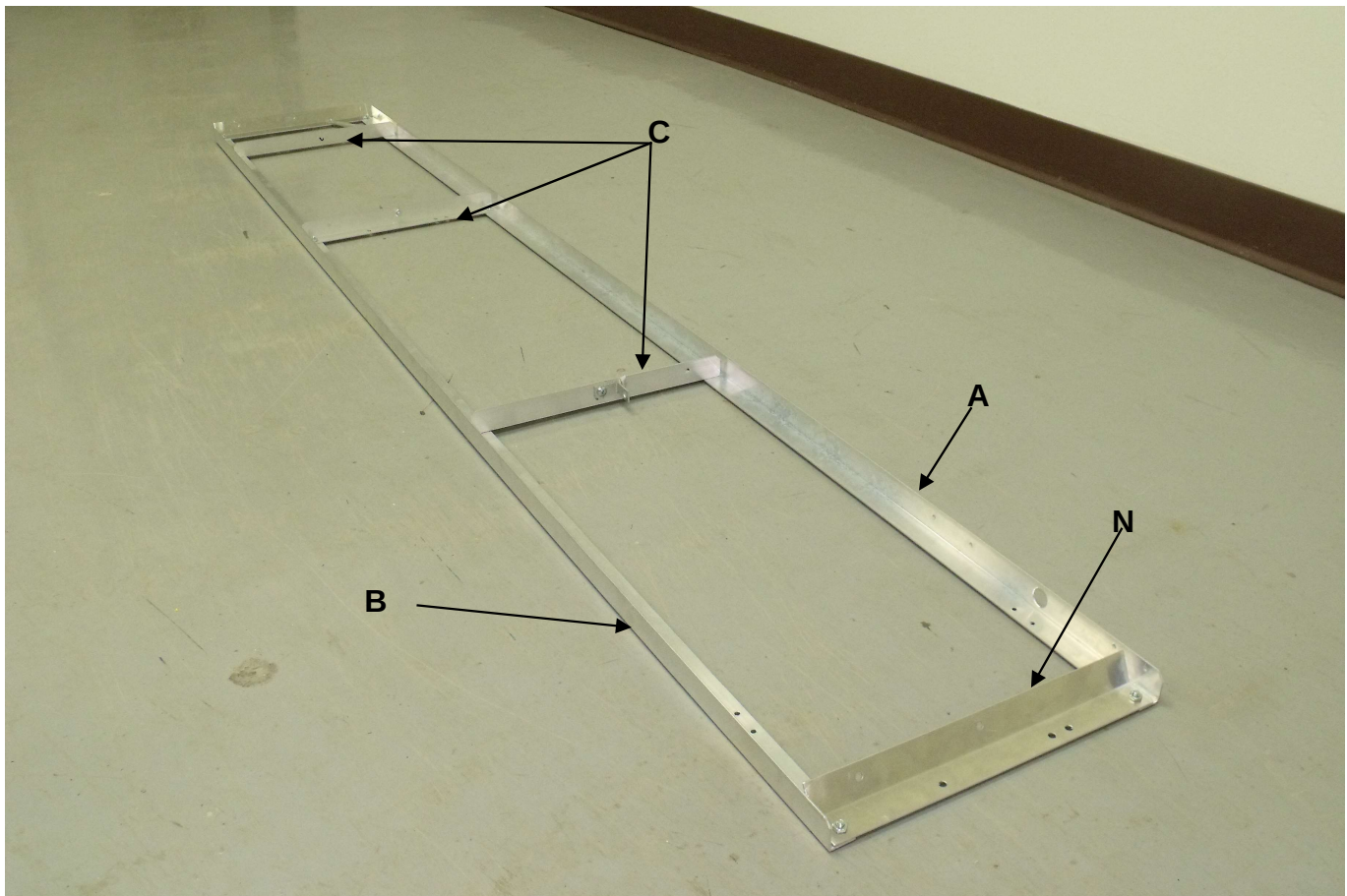
Lanes	2	3	4	5	6	8
	4	6	8	10	12	16

Quantities of #4-40x5/16 flat hd. screws for track joints and brake/timer attachment for the die cast option

Length\Lanes	2	3	4	5	6	8
32	20	30	40	50	60	80
38	24	36	48	60	72	96
44	28	42	56	70	84	112

There are also 4 pieces of the #4-40 x ¼ round head screws included with all tracks for attaching the start blocks to the support frame.

The support frame is easiest to put together in three sections. The sections are the front and back leg, and the center section. The three sections will then be put together to form the complete assembly.



The center portion of the frame is shown in Figure 3. This is a view looking from the starting end of the frame, but it is upside down.

Lay out the 'A' and 'B' parts as shown. Two of the 'C' parts have the angle opening to the rear and the third one that is about 5 inches from the far end has the angle opening forward. Assemble all of the screws for these parts, but only finger tight. After the center section is assembled except for the brackets, tighten all screws with a screwdriver and wrench.

The 90° brackets should be installed on the center two 'C' parts as shown in figures 4 and 5. Figure 4 is the part nearest to the start end and Figure 5 is away from the start end.



Figure 4



Figure 5

### Leg Assembly

The 'G', 'H', and 'J' parts make up the front leg as shown in figure 6.

The 'D', 'E', and 'F' parts make up the rear leg. They form a triangle as shown in figure 7.

The rubber feet are attached using #10-32 nuts.



Figure 6



Figure 7

After the three sections are completed, assemble them as shown in Figure 1 using the 'M' and 'L' braces.

### Start Gate Assembly

Attach the plate to the side of the 'A' part using the #4-40 x 3/8" screws and nuts. Tighten the screws.

Install the 1/4 x 3/4 nylon spacer to the plate using a #6-32 x 1 screw and nut.

The start gate handle needs to be pre-assembled. The 1/4" diameter x 1/8" nylon spacer goes into the 1/4" hole in the handle. The washer and #6-32 x 1 screw then go through the spacer. Finally, the 3/8" diameter spacer goes on the #6-32 x 1 screw.



Figure 9



Figure 8

The handle sub-assembly should now be attached to the plate using a #6-32 nut. The extension spring should then be connected from the hole at the rear of the 'A' part to the handle. The completed assembly can be seen in Figure 10.

Place the start gate through the large hole in part 'A'.

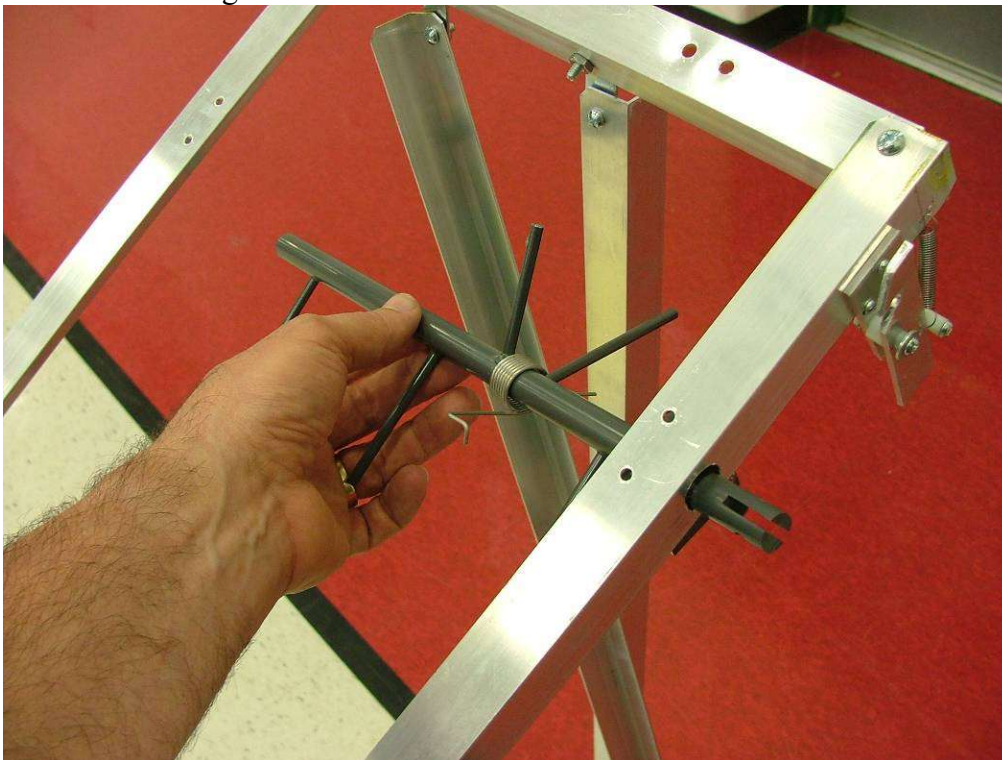


Figure 10

Place the start block on the far end of the start gate rod. Using two #4-40 x 1/4" screws, attach the start block to the frame.

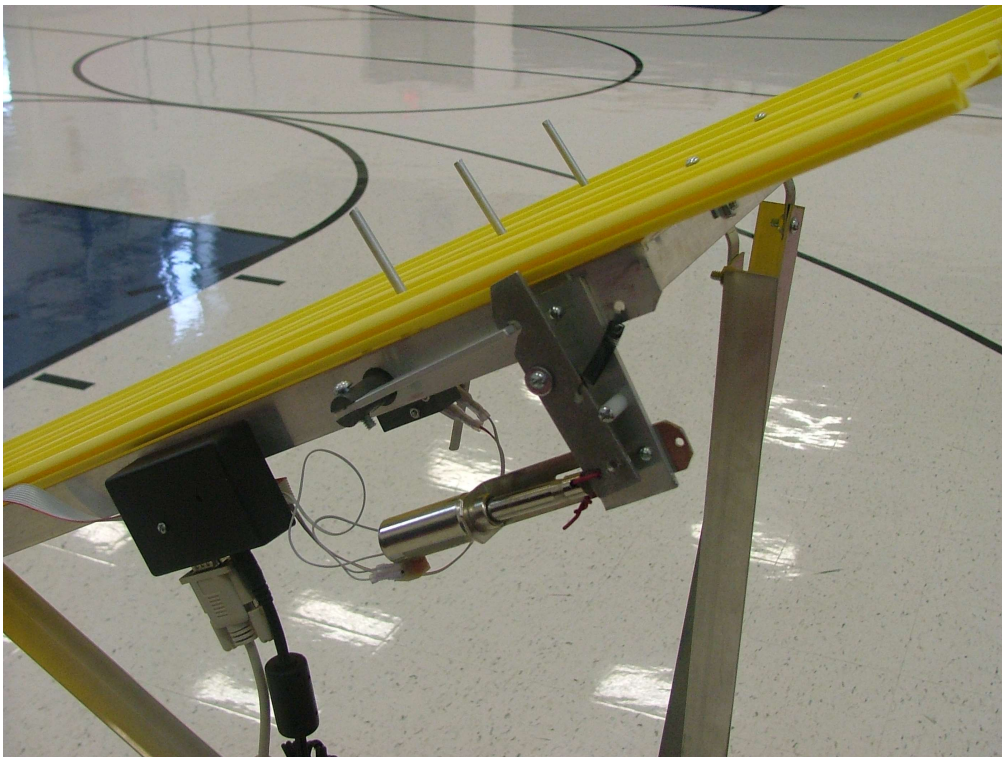


Figure 11

Attach the near end start block using two #40-40 x 1/4" screws.

Slide the start gate lever into the slot on the end of the start gate rod. Connect them using the washer, #10-32 x 3/4" screw, and nut.

The lever should be released from the handle and the start gate rotated so that the car stop pins are not vertical during attachment of the track to the support frame.



If you purchased the electronic timer, mount the control box to the support frame using (2) #4-40 x 1/4" screws.

The optional solenoid starter should be attached to the starter bracket using (2) #4-40 x 1/2" screws and nuts.

Figure 12

## Track Assembly

For 8 Lane tracks, see the attached page for the track pre-assembly.

Each section of track that joins to another section is marked on the bottom with a letter. The start gate section is marked with 'A' on one end. The second section has an 'A' on one end and a 'B' on the other [see Figure 13]. Lay all of the track sections out in order at the approximate location that you want your track. An example of this is shown in Figure 14.

Figure 13 shows the labels on the bottom of the track sections. Also shown are the assembly nuts which are pressed into the connector plates for easy assembly.



Figure 13.

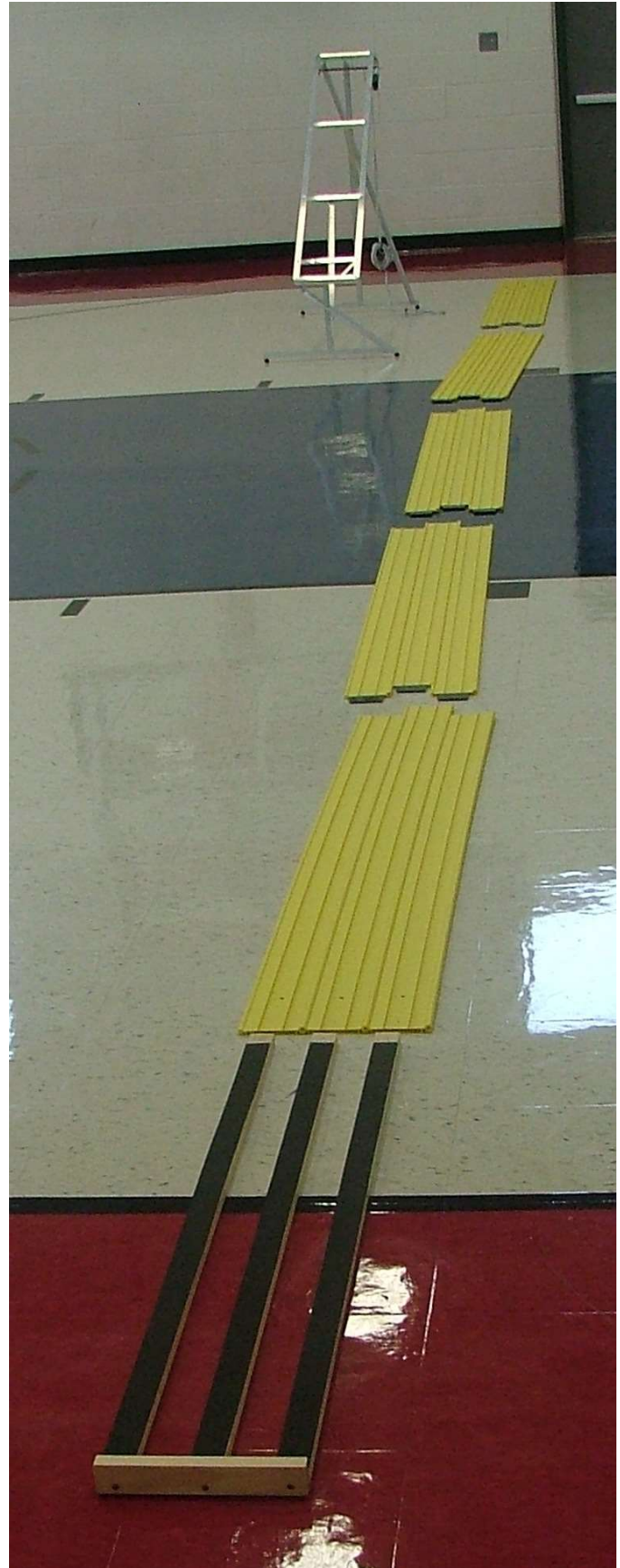


Figure 14.

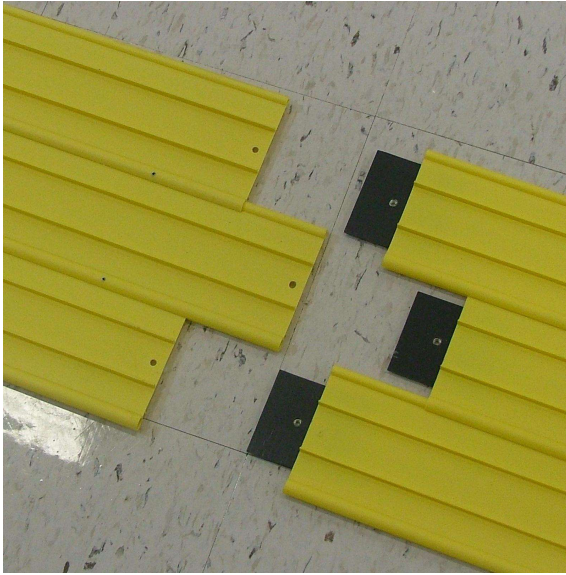


Figure 16



Figure 17

Slide the track sections together as shown in Figures 16 and 17. Use the #10-32 x 3/8" screws and fender washers to secure the track sections to each other. With the die cast option, use 2 #4-40 x 5/16" flat head screws per lane joint.

You are now ready to place the track on the stand. Raise the start gate end of the track and slide the stand under the track. Place the #6-32 x 1" screws in the holes on the track and through the holes on the stand. Secure the track to the stand using the #6-32 nuts as shown in Figure 18.

Position the torsion spring as shown in figure 19 when placing the track on the support frame. After the #6 screws are in place, clip the spring to the pin on the starting gate as shown in figure 18.

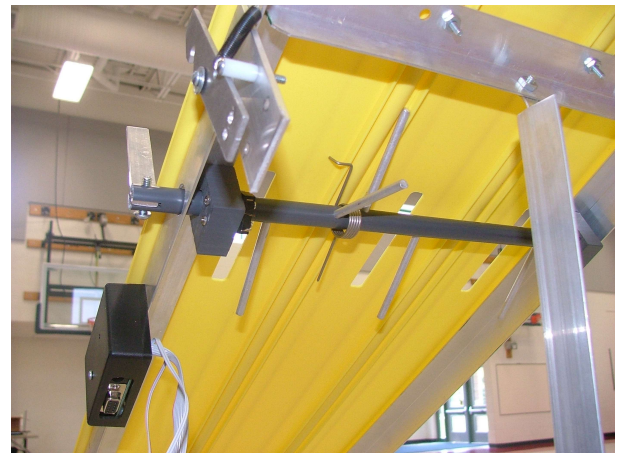


Figure 18

Slide the brake under the finish line end of the track. Attach each brake to the track using a #4-40 x 1/4 screw. With the die cast option, use the #4-40 x 5/16" flat head screws.

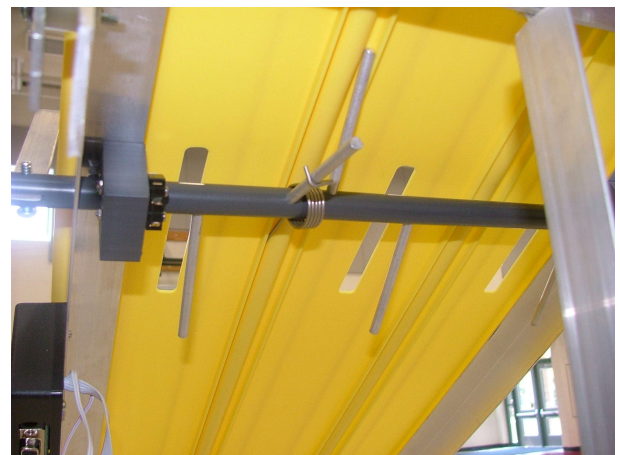


Figure 19

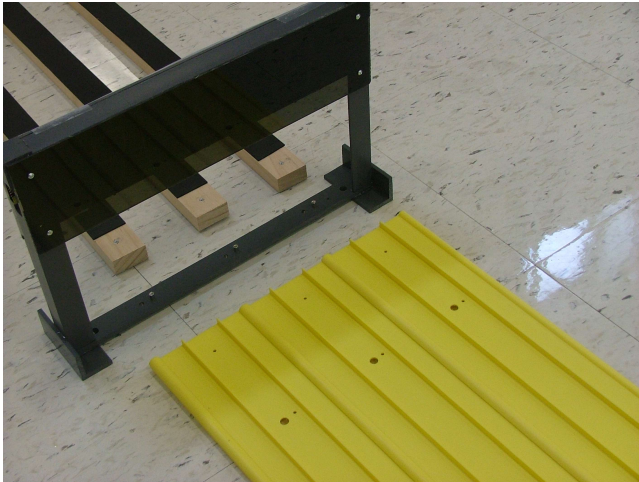


Figure 20

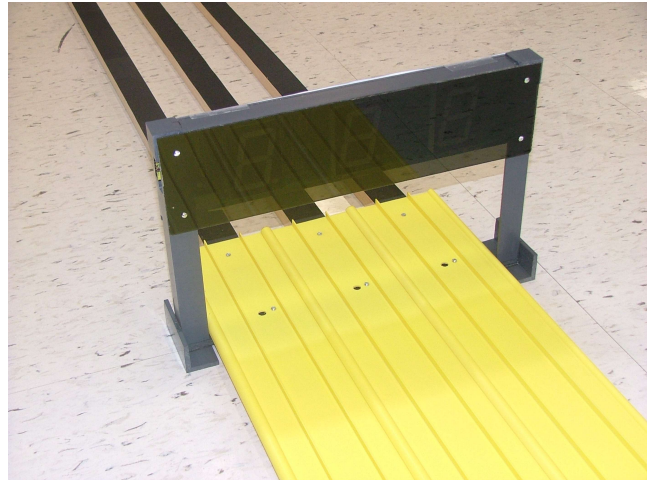


Figure 21

The electronic timer should be installed with the plexiglass side facing the start end of the track. Lift the track and slide the timer under the track. Use one #4-40 x 1/4" screw on each lane to secure the timer to the track. The same screws are used to attach the brake assembly to the track. If you purchased the die-cast option, use the #4-40 x 5/16" flat head screws.

Congratulations, your track is now ready for use!



Figure 1.  
When the Timer is first powered up, the display shows the lane numbers from left to right. The message shown in Figure 5 is also sent to the serial link at this time.

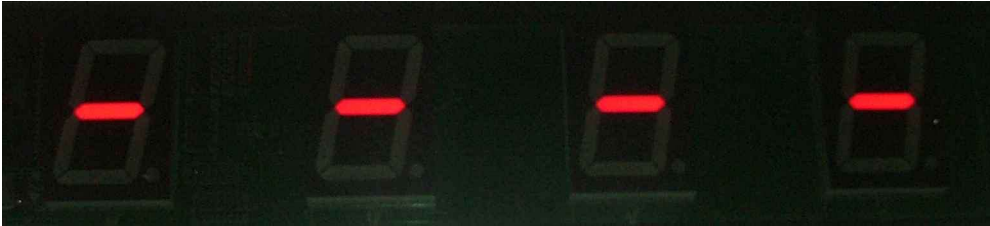


Figure 2.  
After the Start Gate is closed, if the red reset button on the control box is pressed, the display will show a dash in the center of each LED.



Figure 3.  
When the Start Gate is opened, the dash moves to the bottom of the LED display indicating that the race is on.



Figure 4.  
When each car passes the finish line, its finish position is displayed on the LED.

As each car passes the finish line and the finish place is displayed on the screen, the lane number and race time is sent to the computer through the serial link. Figure 6 shows the results for the race that is displayed in Figure 4. As can be seen, the finish order is lane 2, 3, 1, 4 and the times are displayed in that order.

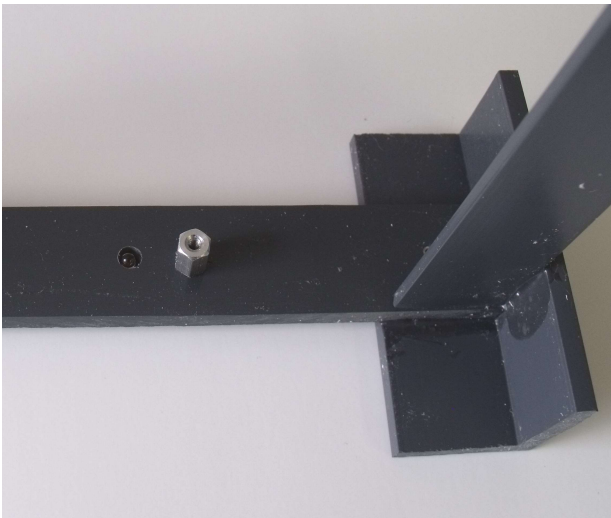
To run another race, the start gate is placed in the up [closed] position. It is optional as to whether the reset button is used to clear the LED display as in Figure 2. If the display is not cleared, when the start gate is opened to start the next race, the display will automatically show the race running as in Figure 3 and the correct times will be recorded.

## **Troubleshooting**

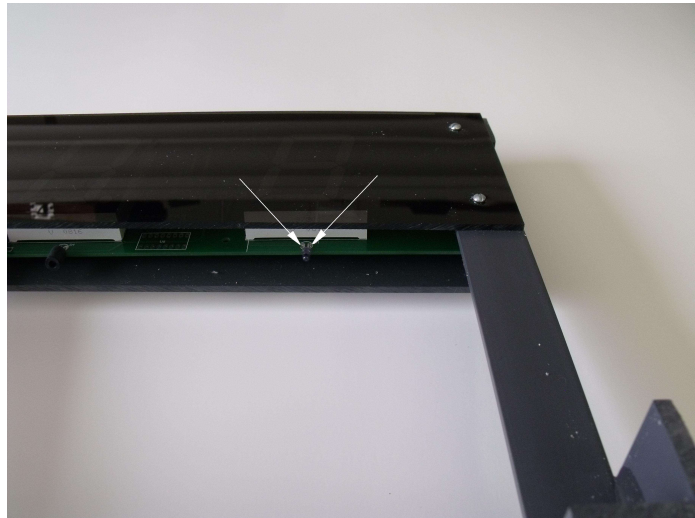
**Erratic Operation** If the timer functions erratically, unplug the power cord from the control box. Then ensure that the start gate is in the down position. Then power the timer up. The timer must always be powered up with the start gate in the down position.

**One Lane always shows '1'** If one of the lanes shows a first place finish as soon as the race starts or displays an 'E' when the start gate is in the up position, then the lane sensors are either blocked or not aligned. The sensors need to be aligned. The Infrared LED's are on the bottom portion of the timer and the phototransistor sensors are on the top.

You can use the Derby Magic Race Manager's Sensor Test page to align the sensors or you can use a Voltmeter. When the sensors are aligned and not blocked, the voltage on the phototransistor should be less than 0.10 volts.



Location of IR LED



Location to check voltage

Usually the IR LED on the bottom needs to be pointed toward the phototransistor, but both may need to be adjusted.

**Race will not start** If the timer powers up, but the LED's do not change state when a race starts, the micro switch on the start gate is not closing. The switch lever must be depressed when the start gate is in the up position. If the steel pin is not closing the switch, bend the end of lever on the switch toward the pin until the switch is closed when the start gate is up.

**Timer will not communicate with the computer** Ensure that the driver for the USB converter is installed. Check 'Start | Control Panel | Device Manager | Ports' on your computer.