Smart Line

SPACE DERBY MANUAL

VERSION 4.0
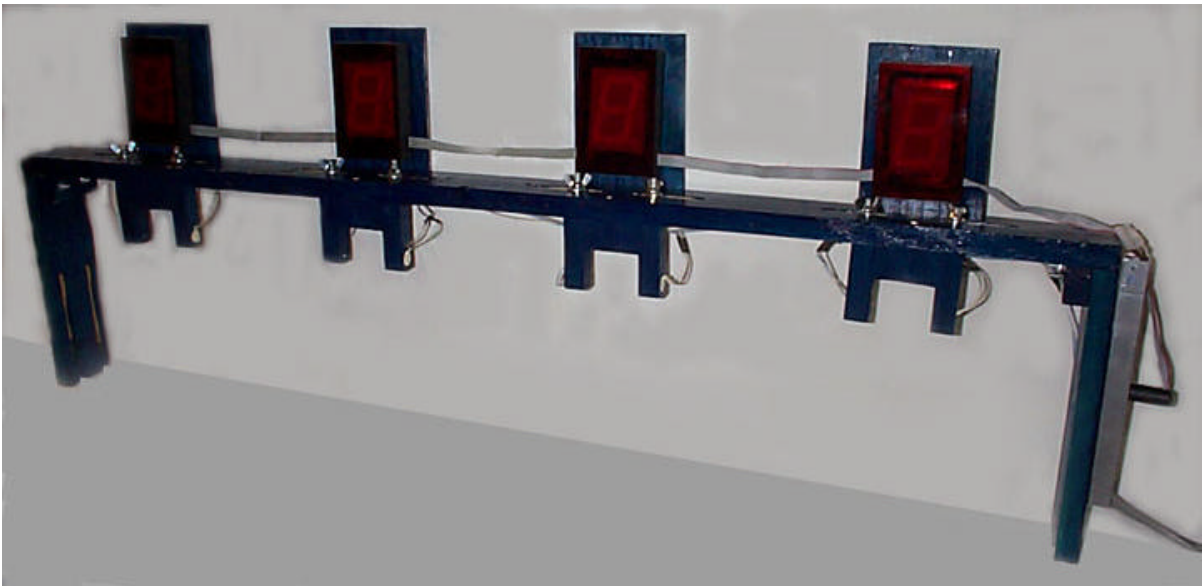
Space Derby Finish Line

A Quick Overview

We thank you for purchasing the eTekGadget SmartLine Space Derby Finish Line Timer System. This manual will assist you with the installation of the SmartLine Timer sensors, displays and computer unit onto a frame that you build from our plans.

Specially Designed Horizontal Sensors

The sensors we supply are a horizontal version of the sensors that we use for the Pinewood Derby. There is one Infrared(IR) source/sensor pair unit for each Space Derby lane. The sensors come pre-assembled and wired together with plugs to connect it to the SmartLine Computer Unit.

Build the Track and Finish Line Mounting Frame

You will need to build the Space Derby track as shown in the Figure 1 Basic Track diagram. Once you have the Space Derby track built, you will need to add the finish line mounting frame that supports for the sensors, displays and computer unit.

Adjust the Finish Line Mounting Frame

The finish line mounting frame supports are designed to be adjustable in height and each sensor can be centered on the fishing line used for the space ship track. The sensor wiring and the support design detailed on the Space Derby Track diagram are made to fit the Space Derby track described in the BSA How to Book. If your Space Derby track is based on a different design you will have to check that it is compatible. The specific areas to check are that the spacing between the lanes does not exceed ten inches.

Add the Start Gate Switch

The start gate switch may be mounted on the starting assembly. The timer is started when the switch is opened.
An easy way to tell if you have the start gate switch wired properly is when the cars or ships are racing down the track the displays will be showing a dash. When the dash is showing, the timer is timing.   The dot on the displays indicates that the timer has reset, but the start gate is still open and needs to be shut.

Install and Run the SmartLine Setup Program

You may use the SmartLine Setup Program (LINESETUP2.EXE) provided on the CD as explained in the "Quickstart instructions".

Basic Track Plan From BSA How-To-Book

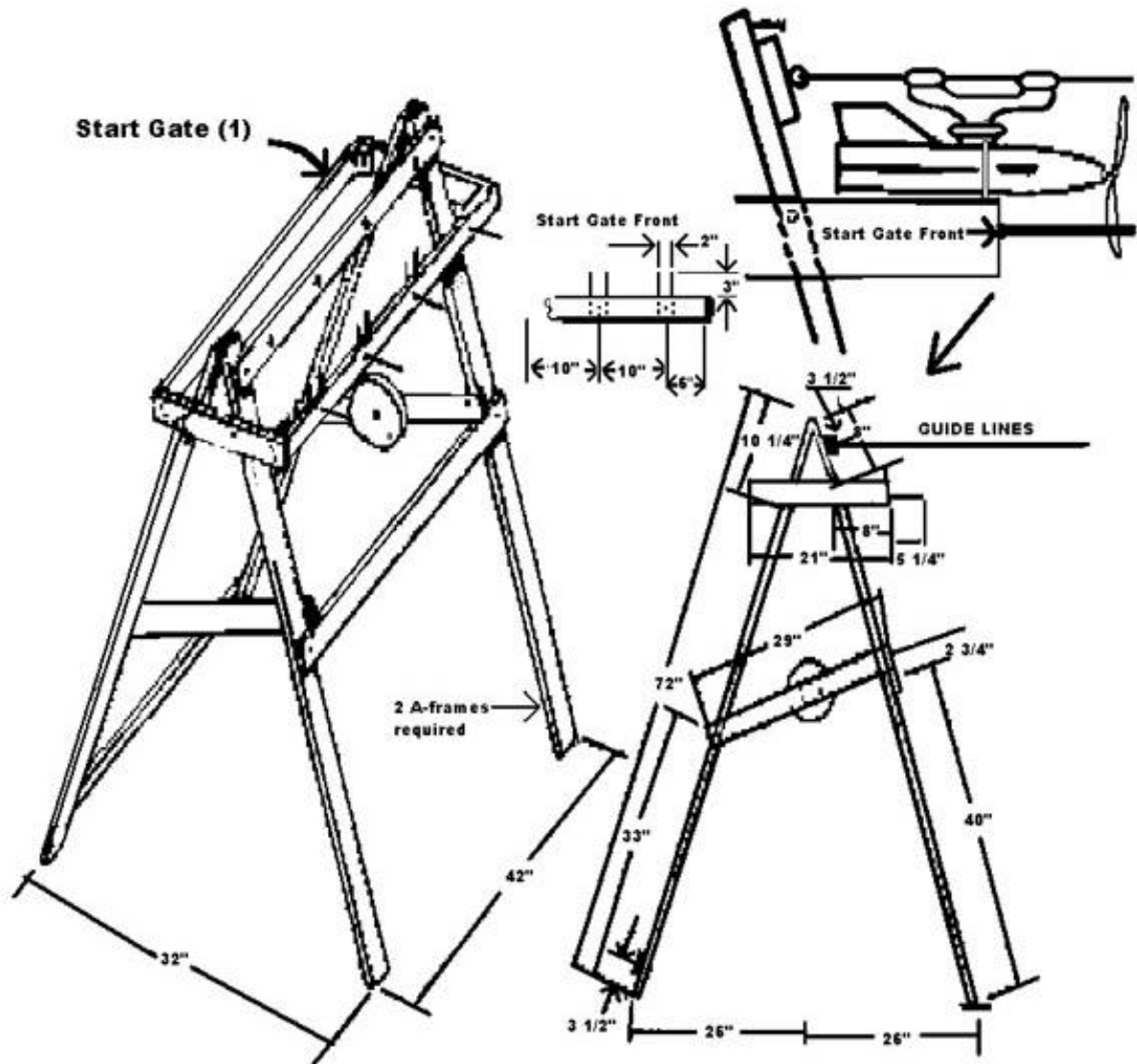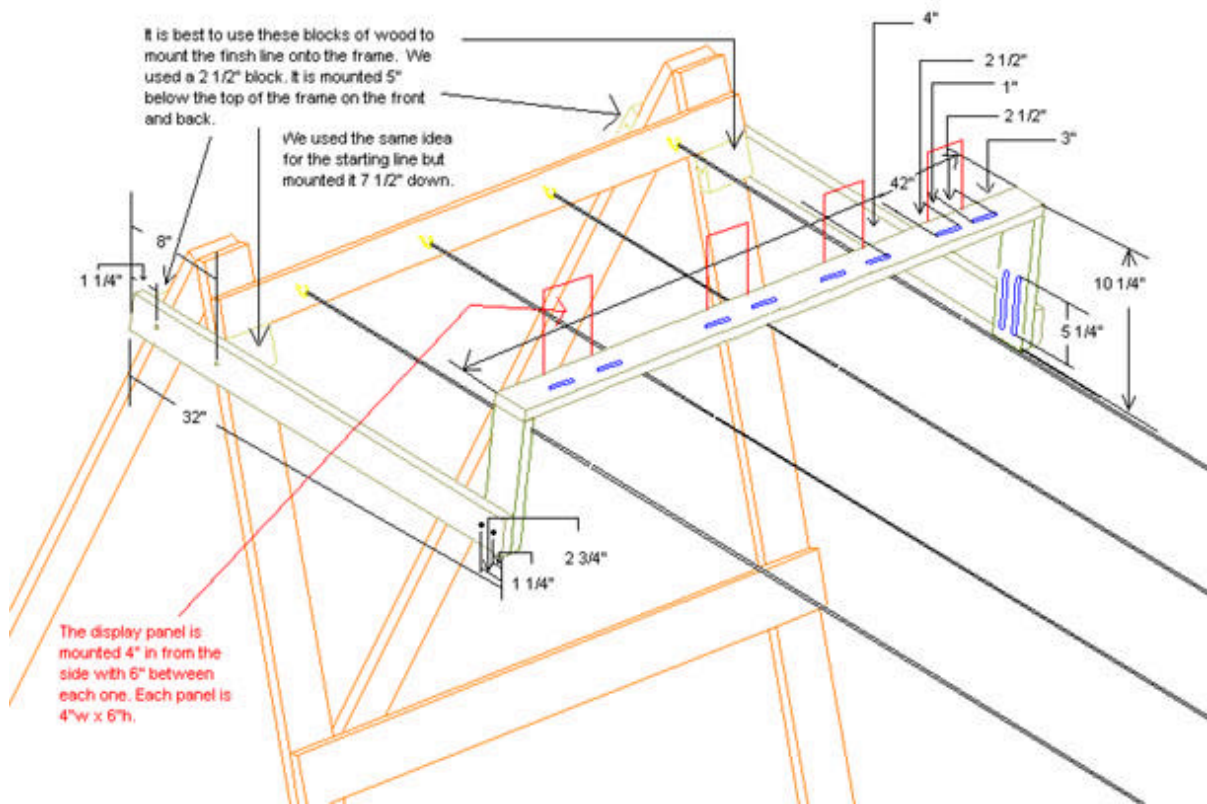The BSA How To Book shows the dimensions of a basic track. A good choice of wood for construction is 1"x3".

Figure 1 Basic Track

eTekGadget/SmartLine Finish Line Design©2003

       The SmartLine finish line mount is designed to fit the Space Derby frame from the BSA How To Book. The original space derby frame is shown in brown. The plans for the SmartLine finish line mount are shown in green, red and blue.

       The photo sensors and their associated wiring will be located on the SmartLine finish line mount that you build.

       It is best to use the blocks of wood to mount the finish line frame onto the original frame for additional support.

It is best to use these blocks of wood to mount the finish line onto the frame. We used a 2 1/2" block. It is mounted 5" below the top of the frame on the front and back.

We used the same idea for the starting line but mounted it 7 1/2" down.

4"
2 1/2"
1"
2 1/2"
3"
42"
10 1/4"
5 1/4"
8"
1 1/4"
32"
2 3/4"
1 1/4"

The display panel is mounted 4" in from the side with 6" between each one. Each panel is 4"w x 6"h.

©2003

4

The Space Derby Finish Line supports are designed to be adjustable in height and each sensor can be centered on the fishing line used for the space ship track. The sensor wiring and the support design are shown here.
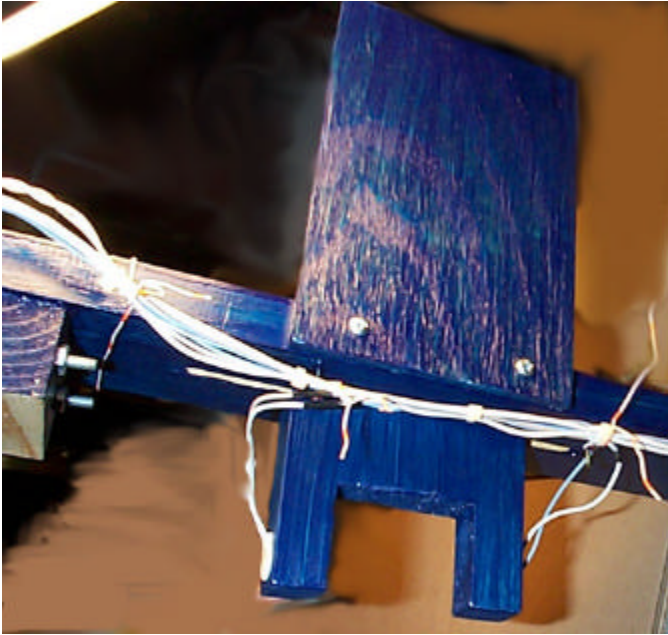

Use nails as guides for the wires on the back underside of the frame.

Adjust the sensors over the wire and tighten the wing nuts when it is positioned correctly.

Install the Space Derby Timer on the SmartLine finish line mount. When looking at the finish line from the starting line, the SmartLine Finish Line Timer will be mounted on the right side. Use the mounting bracket and Velcro strip to attach it to your frame.

Velcro strip
between frame
and timer

Support bracket
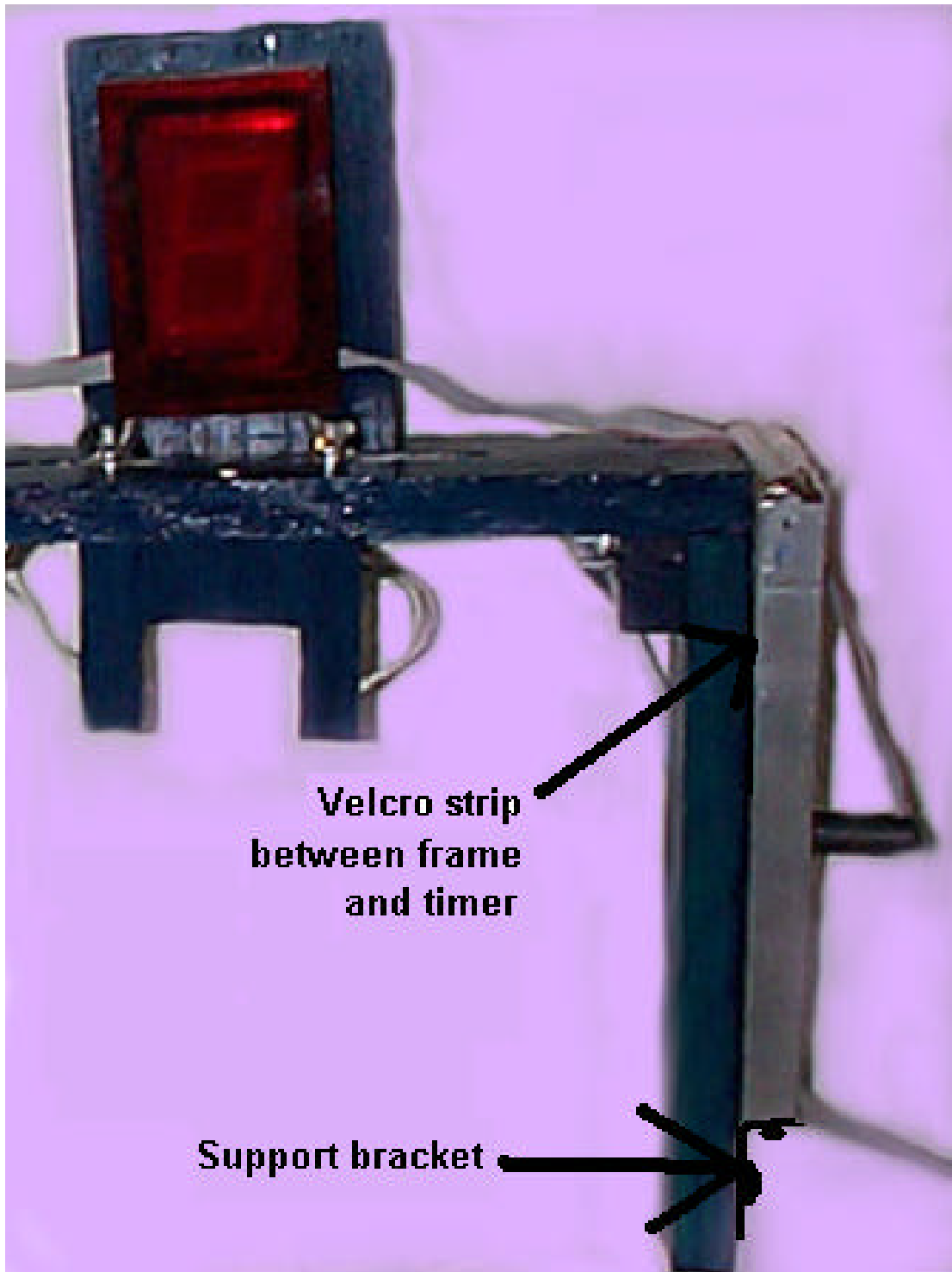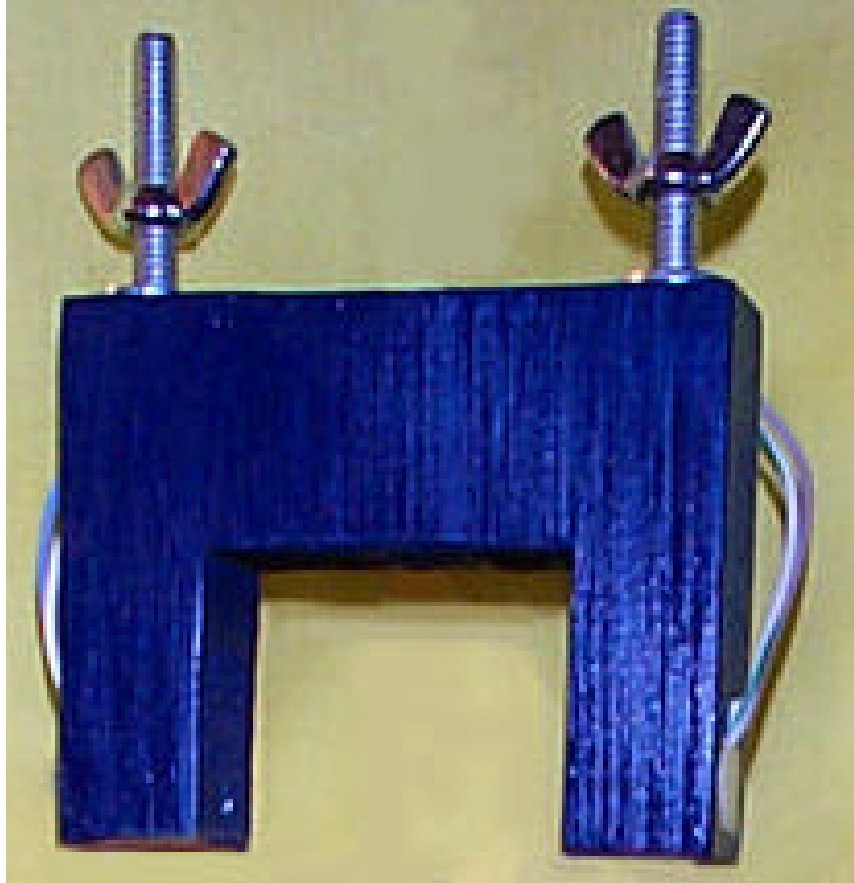
©2003

Install the Sensors and Displays

The sensors are installed into the slots at the top of the finish line frame over each lane's line. You must have slots in the finish line frame so that you can center the sensors over the wire. The height adjustment is important so that the wire and carrier tab will go through the sensors at the correct height.

1. Apply the final tension to the fishing line before adjusting the sensors.
2. Mount a spaceship on each carrier and slide the carriers down to the finish line area.
3. Center each sensor over the wire and tighten the wing nuts on the top of the sensors.
4. Adjust the height with the carrier under the sensor so that the tab does not hit the top of the sensor but positioned so that it will trigger the sensors.

The displays are supplied with Velcro strips. You simply peel the adhesive off the back of the Velcro that is already on the back of the display and attach it to the display mount that you have built into your track.
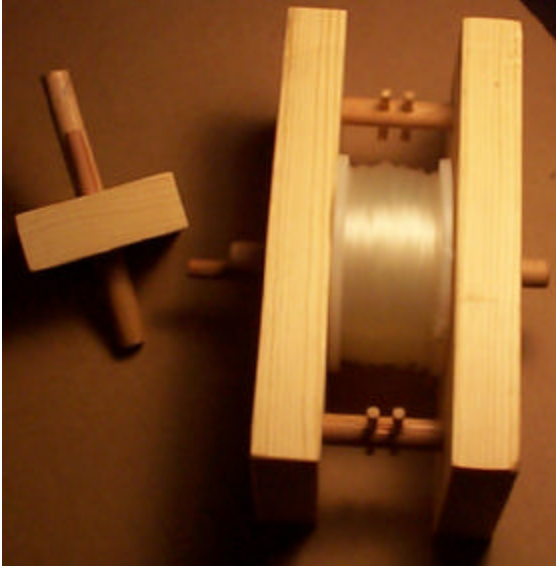
Wire holder/storage device operation and function

The storage device is used to hold the line and a weight so that the line stays tight during the race. Tie a heavy object, such as a water bottle onto the wire holder so that the line stays tight. This is an important function of this device.
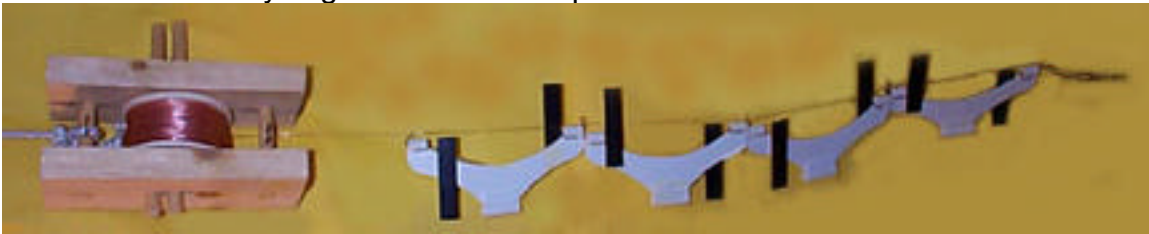
Wire winding device operation and function
The winder is handy for quickly winding up the line at the end of the race. Remove the weight on the wire holder. Take the wire spool out of the holder and put it onto the winder. Insert the winder into your drill and away you go.

Be careful when you come to the end of the line though

or this could happen:

Install the Start Gate Switch

1. **WIRING INSTRUCTIONS:** The supplied sensor switch has three terminals marked C(Common), NC(Normally Closed) and NO(Normally Open). The preferred method is to have the switch pressed before the race and un-pressed when the race starts. This method requires the use of the C and NC contacts. **The timer is shipped with the green wire on C and the white wire on NC.**
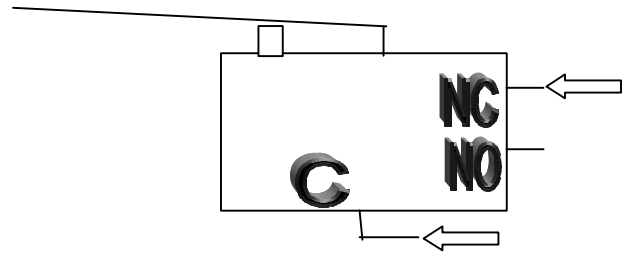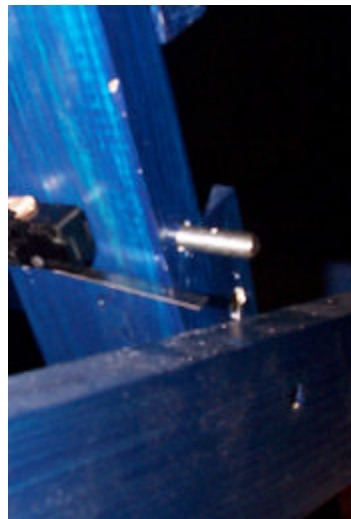

   If you want the switch to be un-pressed before the race and pressed when the race starts, then the push-on terminal needs to be on the NO contact as indicated below.
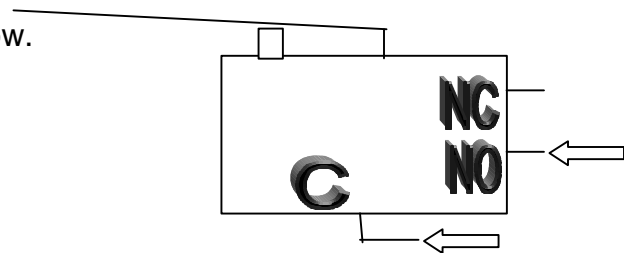
The start gate switch is mounted as shown here:
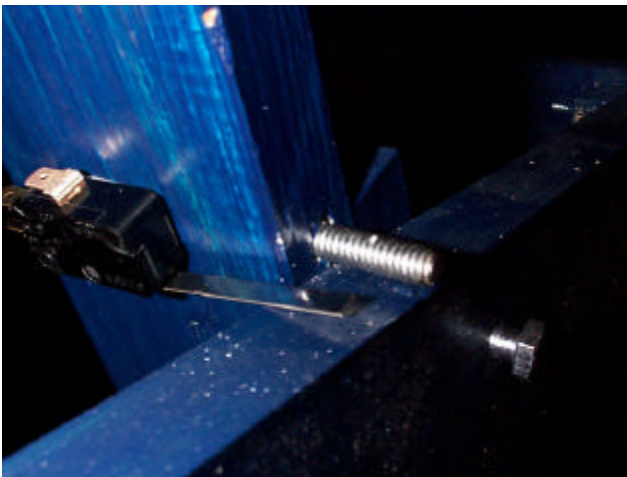
Outside view 1- Closed Position

Outside view 2- Open Position

Connections

SmartLine system consists of:
- 1- SmartLine Timer system unit.
- 2- 1 – 8 displays.
- 3- AC power adapter.
- 4- Serial cable attached to SmartLine Timer.
- 5- Reset/Start gate switch included on 35' - 55' cable

Follow these easy steps to complete the installation:

1. Plug the **Display** connector into the socket on the leg of the timer as indicated on the chart below. This socket is keyed so that it can only be inserted in one direction. A RED paint mark helps to align them correctly. Note: The displays are attached with Velcro pads. This allows the displays to be moved to another finish line frame without having to buy another set of displays.

2. Plug the **Start /Reset** button cable into the leg of the timer.

3. Plug the **9-pin Serial Com** cable into the SmartLine Finish Line and a serial (COM) port on your PC. You may also use a USB to Serial cable if needed.

4. Plug the **Power** cable into the socket of the SmartLine Finish Line Timer.

5. Using the AC adapter, plug the SmartLine Finish Line Timer into a source of power.