

Arduino Uno and Race Coordinator

This document describes the pin assignments for the Arduino Uno used from Race Coordinator, and a suggested sensor setup for the Arduino board. These pin assignments should be the same on any of the Arduino boards but the interface has only been tested on the Arduino Uno. The Arduino Uno has sufficient pins to fully support a 4 lane circuit.

In addition to an Arduino Uno board and a version of Race Coordinator which supports the Arduino interface, you must also upload the Race Coordinator lapCounter.ino sketch to the Arduino board. The process to install the Arduino environment, required drivers and upload instructions are detailed on the Arduino getting started page at <http://arduino.cc/en/Guide/HomePage>. If you follow these instructions on the Arduino site simply open the lapCounter.ino sketch instead of blink sketch suggested in the tutorial.

Pin Assignments

<i>Pin</i>	<i>Use</i>	<i>Wiring</i>
4-7	Lane sensors for lane 1-4	Pins 4-7 are the inputs from the track sensors, to record laps from each lane.
8-11	Track lane relays lane 1-4	If a relay board is connected then these pins will enable Race Coordinator to control power to each lane.
12	Track call button	Connect a push to make switch to pin 12 if a track call is required.
A0-A5	Starting lights	If starting lights are required then LED's should be connected to these pins via a suitable resistor. The supply voltage is 5v so for a typical LED a 150ohm resistor would be needed.

Obviously for a 1, 2 or 3 lane track you would simply use the correct number of pins and leave the rest unconnected.

The diagram below shows how a typical 2 lane lap counter can be connected to the Arduino Uno. The example shows the use of 2 Photo Transistors mounted in the track for recording the laps. In addition to the circuit you will also need a light source above the sensors to ensure sufficient light to correctly detect cars. This can be a simple desk lamp or a light bridge, low power LED's may be powered from the Arduino's 5v output, but you must check the current requirements first.

The appendix at the end gives some alternative sensor setups that people have successfully used.

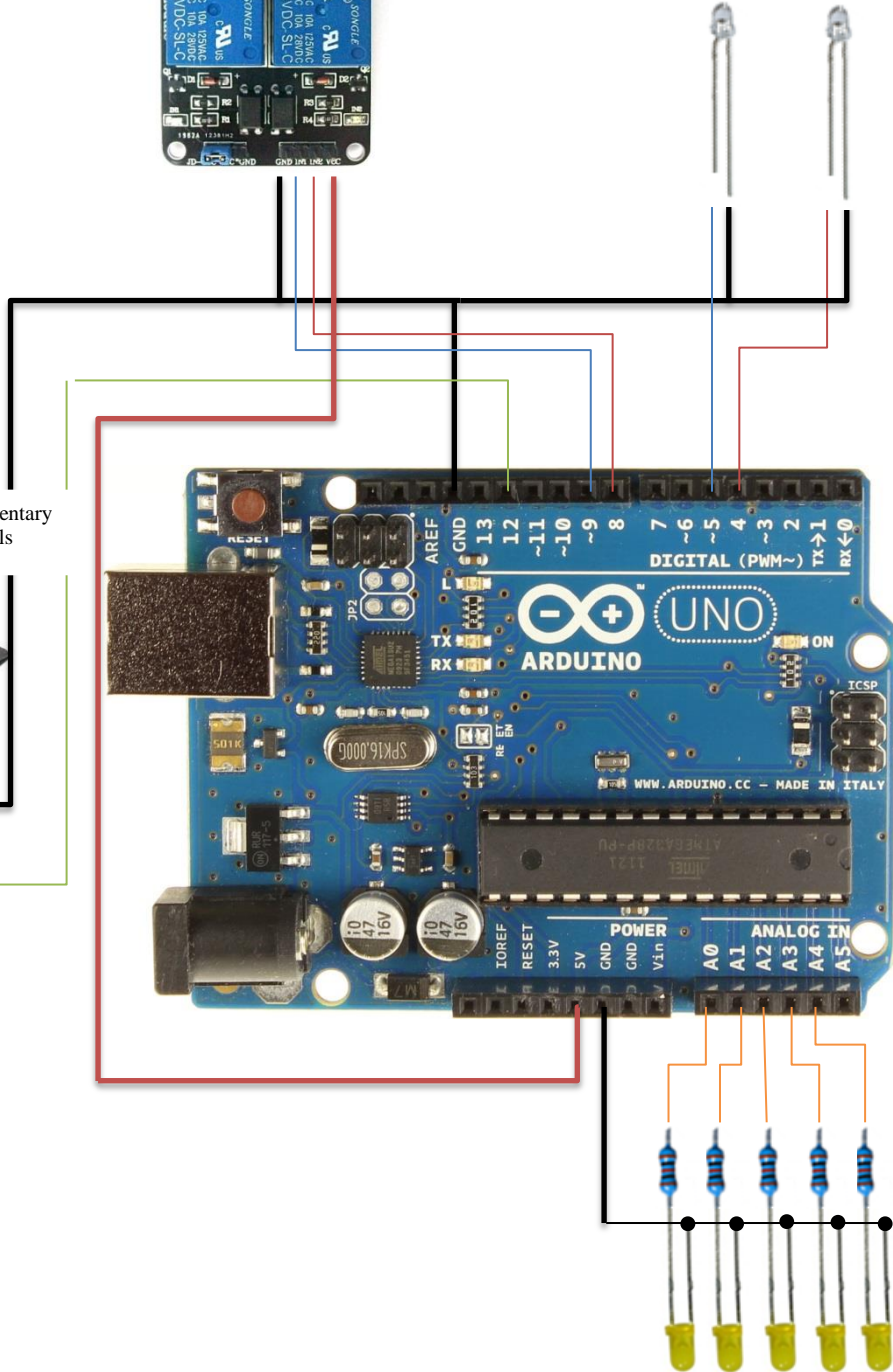
Track power relay module
HL-52S example shown



Lap counter sensors
860nm – 1100nm
SFH310 Photo Transistors shown.



Push to make momentary
switch for track calls



Optional LED Start lights
The resistors should be correctly sized for a 5v supply, typically
these would be around 150ohms.

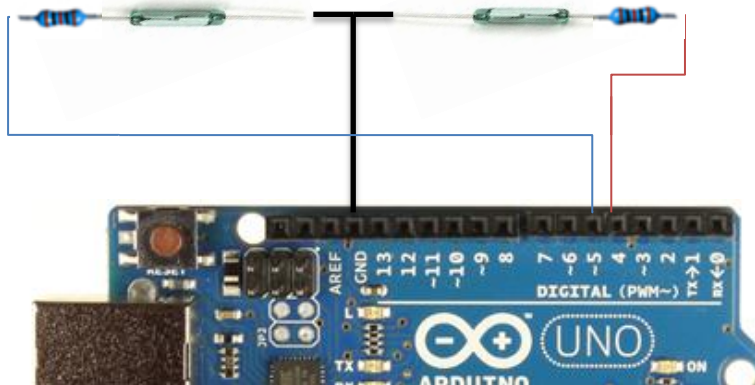
Appendix – Alternative sensors

Following on from the diagram above other sensor configurations have been successfully used with the Race Coordinator Arduino interface. All this information has been provided by the slot community so may require modifying or tuning for different slot cars.

Reed switches

Reed switches can be used for cars that have fairly powerful magnets, the magnet will cause a reed switch placed under the track to activate and send a lap count signal.

Reed switches **32-N58-05**
Connected via 10KOhm resistor to
stop false triggering due to noise.



Dead Strip

If a section of track is isolated from the rest of the powered track then this can be used to detect laps. It's important that steps are taken to ensure that no more than 5v can ever reach the Arduino input. The diagram below shows how the dead strips are connected, the dead strip for each lane must go via the circuit shown.



TBD



Slotted Sensors

Slotted sensors or photo-interrupters such as the Kingbright KTIR0611S photo interrupter can be placed under the slot so that the guide of the car breaks the beam. These sensors use infrared light which some coloured guides i.e. the red MSC guides and the white NSR guides are transparent to. Painting the guide black should solve this issue.

A resistor of the correct size must be used on the emitter side of sensor to reduce the voltage down from the 5V that is supplied. This can easily be calculated by looking at the forward voltage of the emitter on the sensor and using one of the many online resistor calculator pages.

