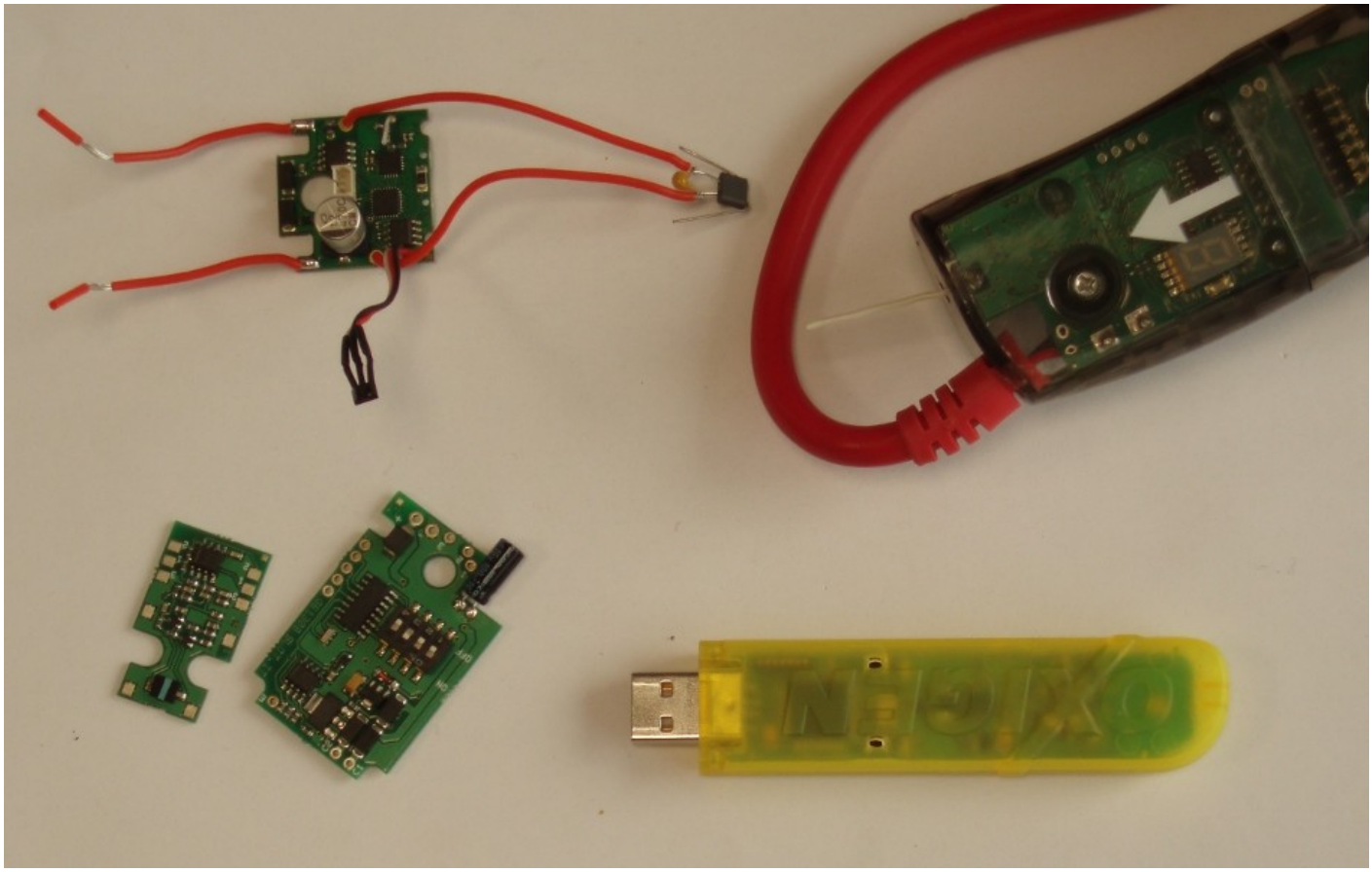
oXigen is the brand name of the racing digital system for slot cars studied and developed by *Slot.it*.
Basically, it is a wireless system which allows digital slot racing with up of 20 cars on the same track.

The oXigen system (from now on “O2”) is based on the following devices:

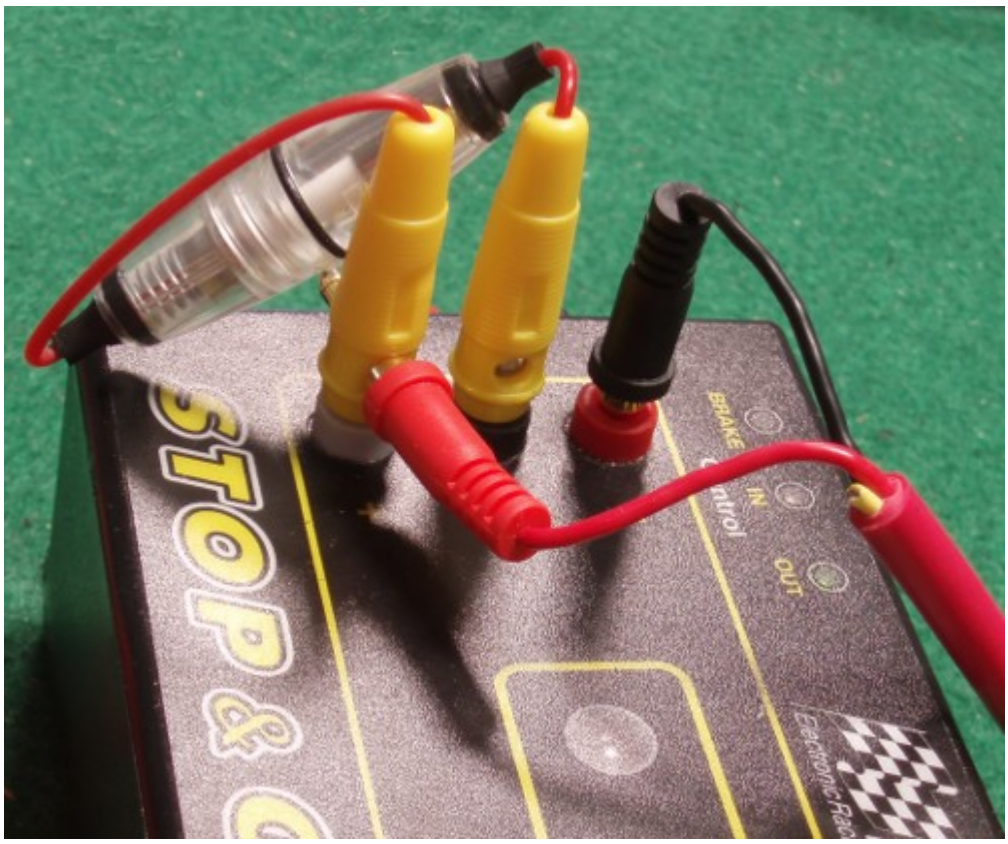
1. oXigen digital cartridge compatible with *Slot.it* SCP controller;
2. oXigen digital chip for the car;
3. oXigen digital chip for lane exchange, suitable for lane exchanger piece of track (simple, X , pit-lane entry) built by *Ninco* and *Carrera*;
4. oXigen digital system dongle.



Track

To run, O2 needs a constant DC power on the rails, pole (+) on the right side of the car facing forward.

Starting from a standard analog slot track, the only necessity is an adapter to bring power to the rail. In general, a simple cable with two bananas, and a fuse (highly recommended - fast switching, 6A)will do the job. This is necessary for all lanes where you want to run O2 cars. That's all there is to do: remove the cable, and you're back to analog traditional racing.. You can run digital on some lanes, and leave the other ones as analog.

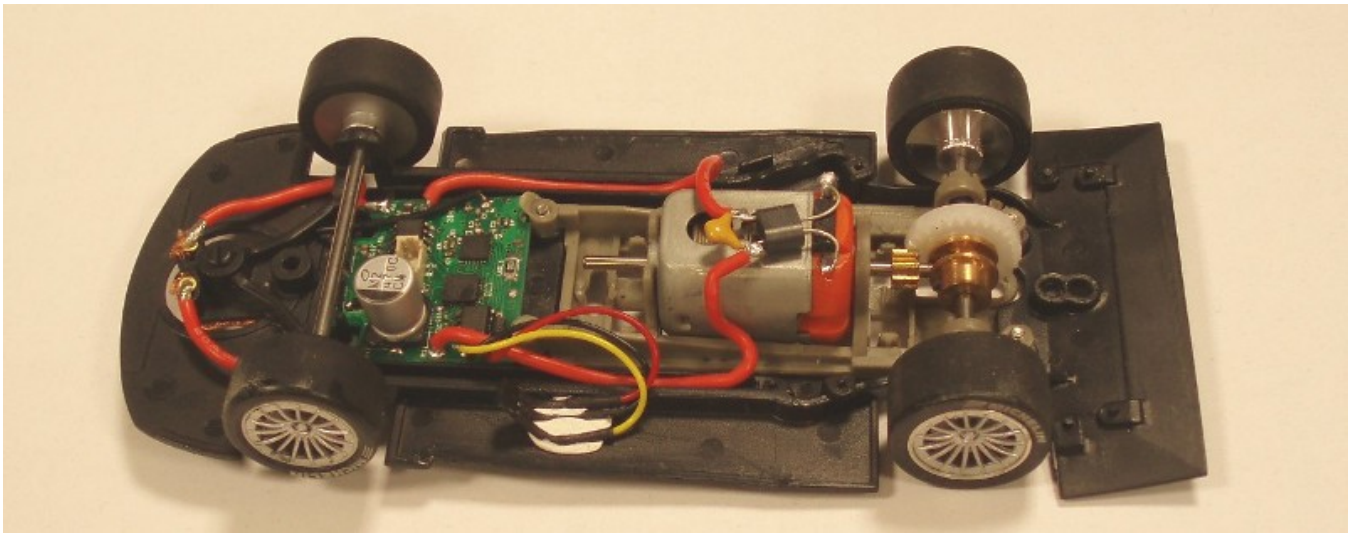


O2 cars can run on tracks powered by Hornby, Ninco, or Carrera digital bases. In case of Hornby base, an additional 'bridge' may have to be installed inside the car, depending on what O2 chip you are using.

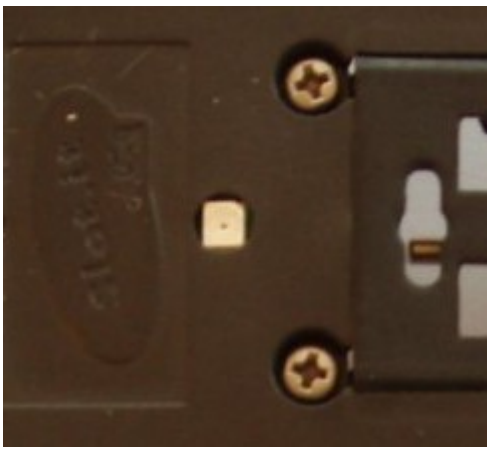
NOTE: power supply polarity on *Carrera* track may be inverted compared to the generally accepted standard, which is (+) on the right, (-) on the left. Considering this, during the installation of the chip on the car, it might be needed to invert the position of the two cables on the pick-up of the O2 cars or install a pick-up diode rectifier built by *Slot.it*.

Car chip – type 1

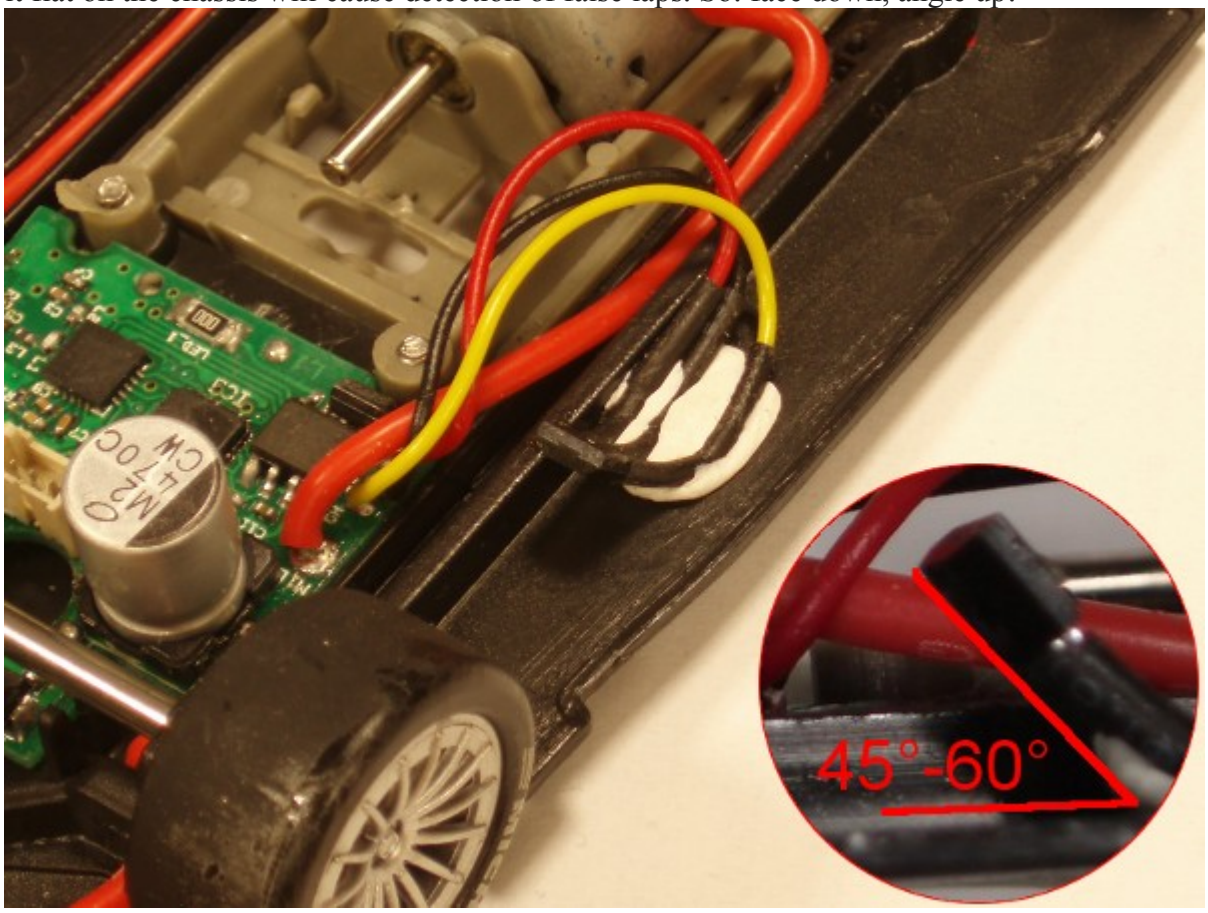
The O2 chip for the car has to be placed as reported in the picture below. Proceed soldering the two rear cables directly to the motor and connecting the two front cables to the pick-up.



Make sure the LED looks through the chassis hole:



On the left side of the chip, the lap and finish line detector, a unipolar 'Hall' sensor, is attached to three wires colored in yellow, black and red.. This sensor is responsible of sensing the magnetic field of the finish line and pit lane (that has been placed under the track) and must be fixed to the chassis of the car so that front face of the sensor, the bevelled one, is facing down. The sensor has to be angled upwards at least of 45°, angle α in picture above. This is very important: laying the sensor with the bevelled side up won't work, and placing it flat on the chassis will cause detection of false laps. So: face down, angle up!



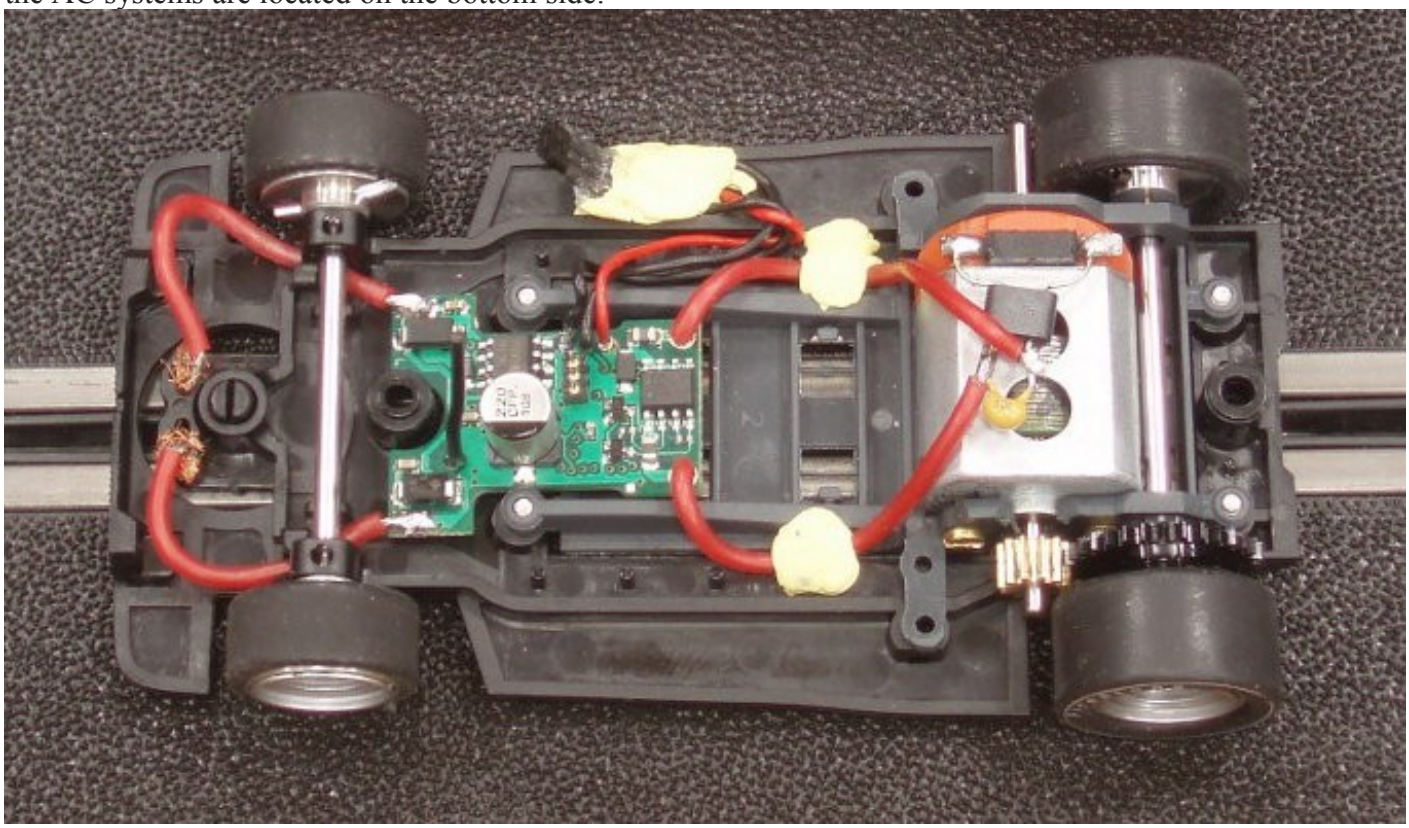
Should you experience flase lap detection when changing lane, the reason is the sensitivity of the Hall sensor, which can detect the magnetic field of the coil during lane changing. Bend the sensor more, or add some spacers underneath until the problem goes away.

Besides, the Hall sensor is a current sensor, so keep it away from the power wires leading from track to chip, and from chip to motor.

The antenna of the chip, the piece of wire located on the right-bottom side, has to be kept vertical, within the realms of possible. It is not recommended to lay the antenna down on the chip or close to the motor. It will work, but it's not good practice.

Car chip – type 2

The car chip type 2 differs from the type 1 in size, and in its ability to run on either AC (e.g: SSD power base), or DC (e.g.: analog tracks), in this latter case without the loss of a diode drop (0.5V) which is typical of dual mode (AC and DC) chips. To do so, we have split the pads that must be used to connect the wires coming from the pickup: the pads for the DC systems are on top of the chip, whereas the ones to be used for the AC systems are located on the bottom side.



To recap:

1 - if the power on the rails is DC, or comes from Carrera or Ninco digital power bases, you can use either the DC pads (top), where the + is on the right side, or the bottom AC pads, whose polarity can be either one. In this latter case, the car will be able to run in both directions, but it will be slightly slower than if it was powered from the DC pacd

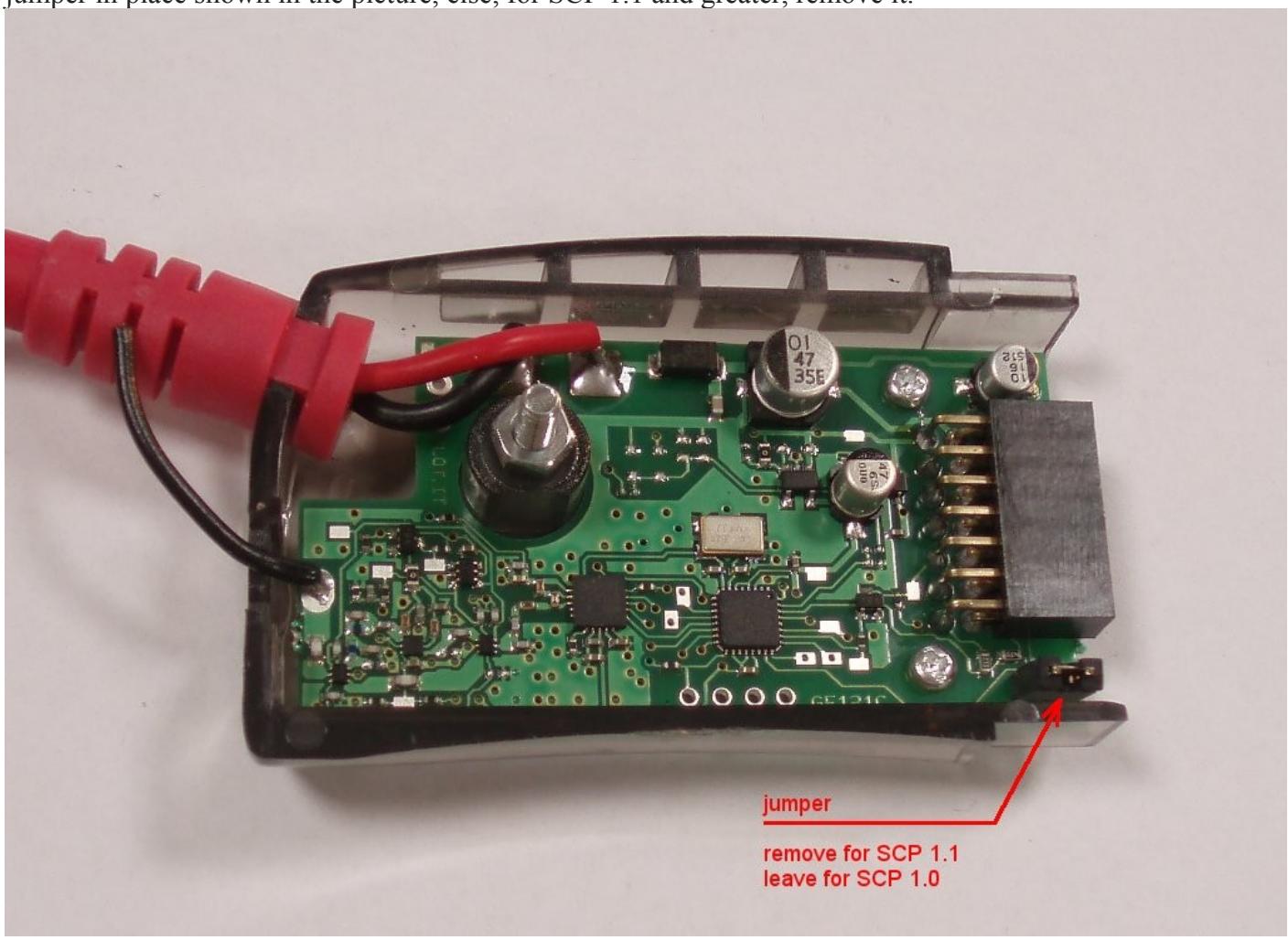
2 – if the rails are powered from an Hornby power base or a derivative, the AC pads must be used.

This chip also provides extra pads to use an external lane changer LED on wires. There is no need to remove the standard LED, which is mounted directly on the board.

Apart from the differences above, everything said for the type 1 chip applies.

Controller and car link – check and programming

First of all: make sure to set the jumper on the oXigen cartridge properly: if you have an SCP 1.0, leave the jumper in place shown in the picture, else, for SCP 1.1 and greater, remove it.



You can check now if the chipped car is already linked to the controller: power the track (make sure power is on the rail), verify that controller is on, and put the chipped car on the track: if the cartridge red LED blinks very fast, it means the car is already linked to the controller and you can start playing.

1. To check the current ID of the controller, press the round button: the display on the cartridge shows the current track, and the current channel of the car (cycling in this order :'t' ('track'), number of track, c ('channel'), number of channel. The dot on the low right side of the number, if lit, is the decimal light - that is: ' 9 ' means nine; ' 9. ' (nine with dot) means nineteeen. Number twenty is displayed as '||.'

2. To program a new channel, do as follows:
    1. remove car from track

2. channel is programmed through the controller knobs. Proceed as follows:
    1. The yellow (MIN) knob selects the track number: 0 -10= track 1, 10-20 track 2 and so on. Leave it at zero.
    2. The green (Antispin) knob selects the tens: set it between 0-10 for cars 1-9, 10-20 for cars 11 to 19, 20 and above for car 20
    3. The blue (Curve) knob sets the units: 0 to 9 (minimum is 1)
3. now check the values that you have set pressing the 'down arrow' together with the circular button: the display will show the settings. You can adjust them on the fly and as long as you keep pressing the down arrow and the round button, any changes are shown in real time.
4. keeping the down arrow and the round button pressed, pull the trigger fully and place the car to link with on the (powered) track. The display LED will 'circle' for a while (usually it's a very short time) and then will flash, confirming the correct programming. If the LED keeps circling, remove the car from the track, and repeat this step. When programming is finished, the display LED will show a number (the channel just programmed). Reset car (remove from track and put back on track). The link between car and controller is shown by the fast blinking of the LED on the cartridge.

Note that if the controller is switched off, and the car is taken off track, inside the pit lane, the pit lane status is lost, hence the 'end of pit lane' magnet will be detected not as a pit lane magnet, but as a finish line magnet, hence, one lap will be added to the lap counting. To avoid this, if both car and controller are switched off during pit lane, reposition the car after the pit lane exit magnet.
It is better to keep controllers at a distance of 30cm from each other.

Other functions

Lights: switching the lights on/off: the car chip is compatible with the lights kit SP16. To turn lights on/off, release the trigger and press the circular 'brake' button.

Battery level: if a 'b' appears in the cartridge display, it's time to change battery.

Lap and pit-lane detecting

To mark the finishing lane and the pit-lane on the track, it's necessary to use a few magnets. The magnets have to be glued under the track, on the left side of each lanes, facing the engine, with the south pole up. Refer to the figure 1. About the magnets position on the track, the suggested configuration is the one reported in the figure 2. The magnets F1, F2 and F3 work as finishing line. P1 and P2 are the start and the end point of the pit-lane area. The distance between F3 and P1 should be between 5 to 10 cm. Anyway, the car enters in pit-lane if it reads two magnets within 320ms.

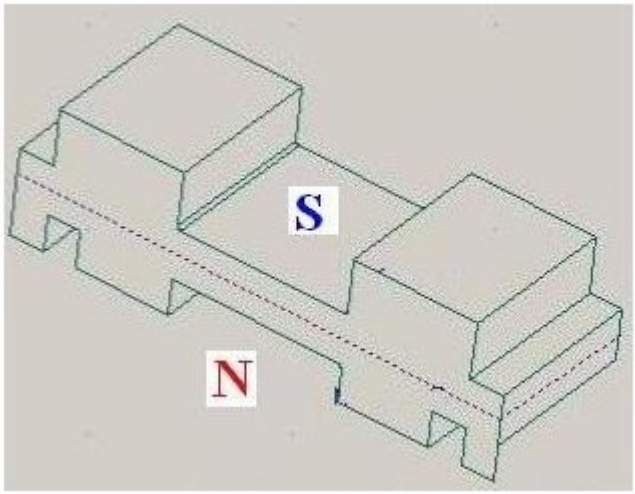
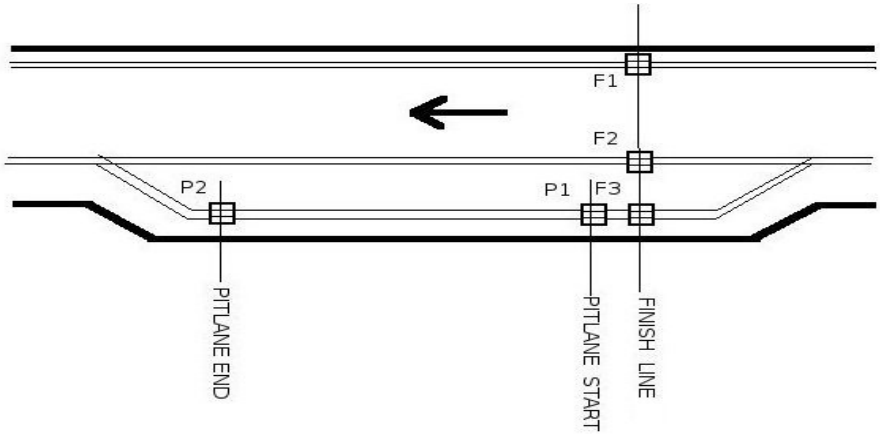


Figure 1:

Figure 2: placement of magnets



During pit-lane, the car adjusts its maximum speed to 'pit lane speed' as set by the appropriate RMS knob. As of car software release 2.01, the car coasts to the selected pit lane speed . This means that the speed reduction is not immediate as the car does not apply any direct braking, hence the effect may not be noticeable for short pit lanes.

Lane exchange

Refer to “oXigen_Lane_Exchange_Manual.pdf” file for detailed instructions.

Dongle

Refer to “oXigen_Chrono_Manual.pdf” file for detailed instructions.