	oXigen system	Doc.
	Race Management Software	Pag. 1/ 11



Slot.it oXigen timing-RMS installation

To install the Slot.it oXigen timing-RMS software, follow these steps:

1. download the O2_chrono_installer.zip file from Slot.it ftp site;
2. unzip the downloaded file;
3. before starting the installation, make sure that you are logged in as system administrator, or that you have admin privileges anyway;
4. **remove previous version(s) if any**
5. **make sure that the directory named 'SupportFiles' inside documenti/Slotit_O2_chrono/ is removed, if not do it manually**
6. launch the setup.exe program which can be found in the 'volume' directory. This will start the oXigen chrono installation;
7. during installation don't change the default setting and accept all proposed licences. A reboot is necessary after installation;
8. after reboot, an icon should be found on the desktop.

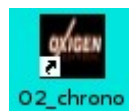



Figure 1:
RMS icon

Dongle driver installation

A driver is a piece of software which connects Windows (the Operating System - OS) to the external hardware (Dongle), and it must be installed before the OS can recognize it. The oXigen chrono installation creates the directory 'Slotit_O2_chrono' inside the 'Documents' directory of your PC. In this directory, you can find the 'drivers' directory where there's our oXigen driver: 'O2Driver.inf'. The final result of the oXigen driver installation is shown in figure 2.

This driver has been tested and works correctly on Windows XP (32-64 bit) or later.

	<i>oXigen system</i>	Doc.
	Race Management Software	Pag. 2/ 11

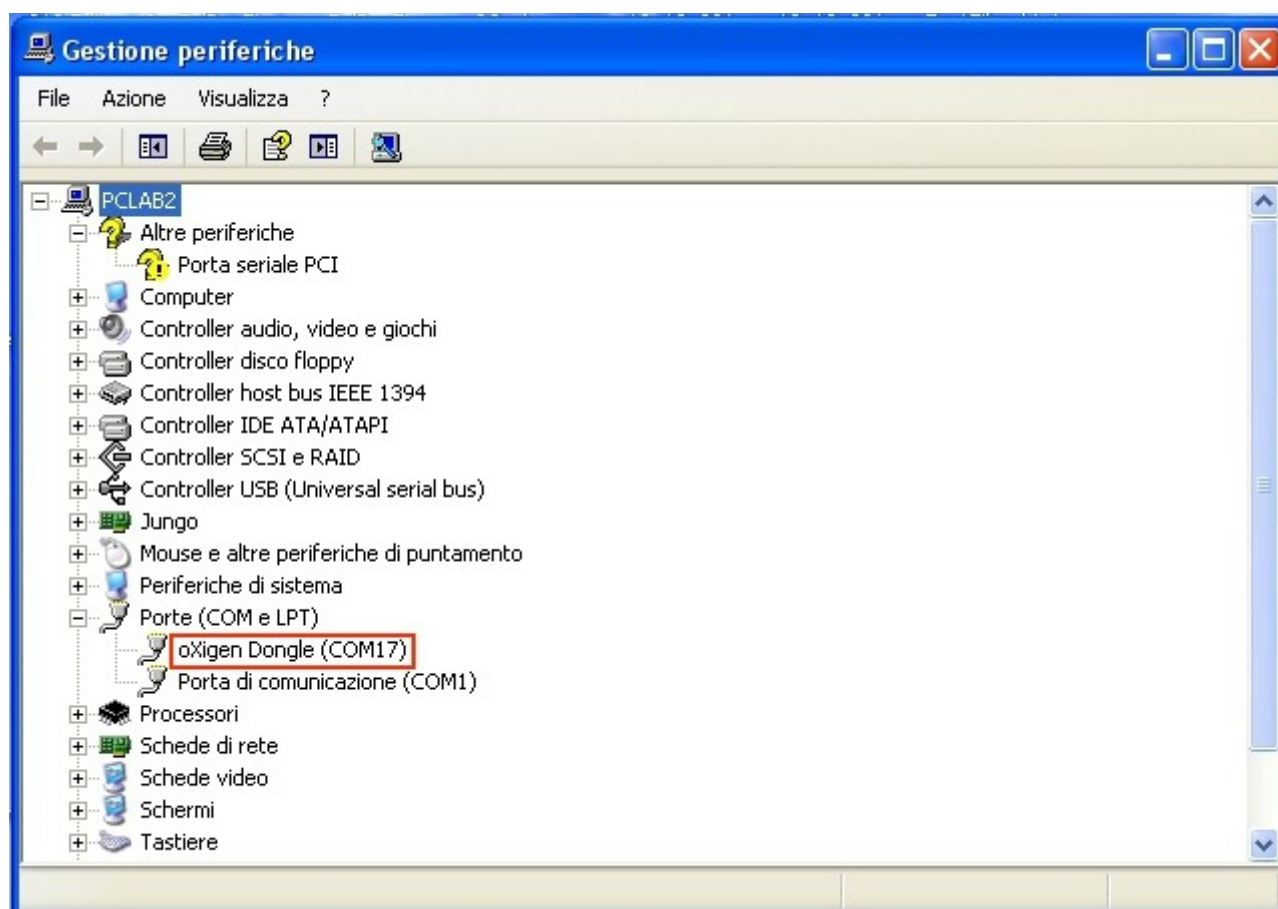


Figure 2: Final result of the oXigen Dongle installation

Slot.it oXigen chrono description (updated to 0.0.32)

The oXigen RMS can manage up to 20 cars (40 in near future) and it appears as shown in figure 3. It consists of two pages: **Main** and **Fuel**, as found in the two tabs right on the top left corner of the screen (underlined in red).

The following picture shows the **Main** page:

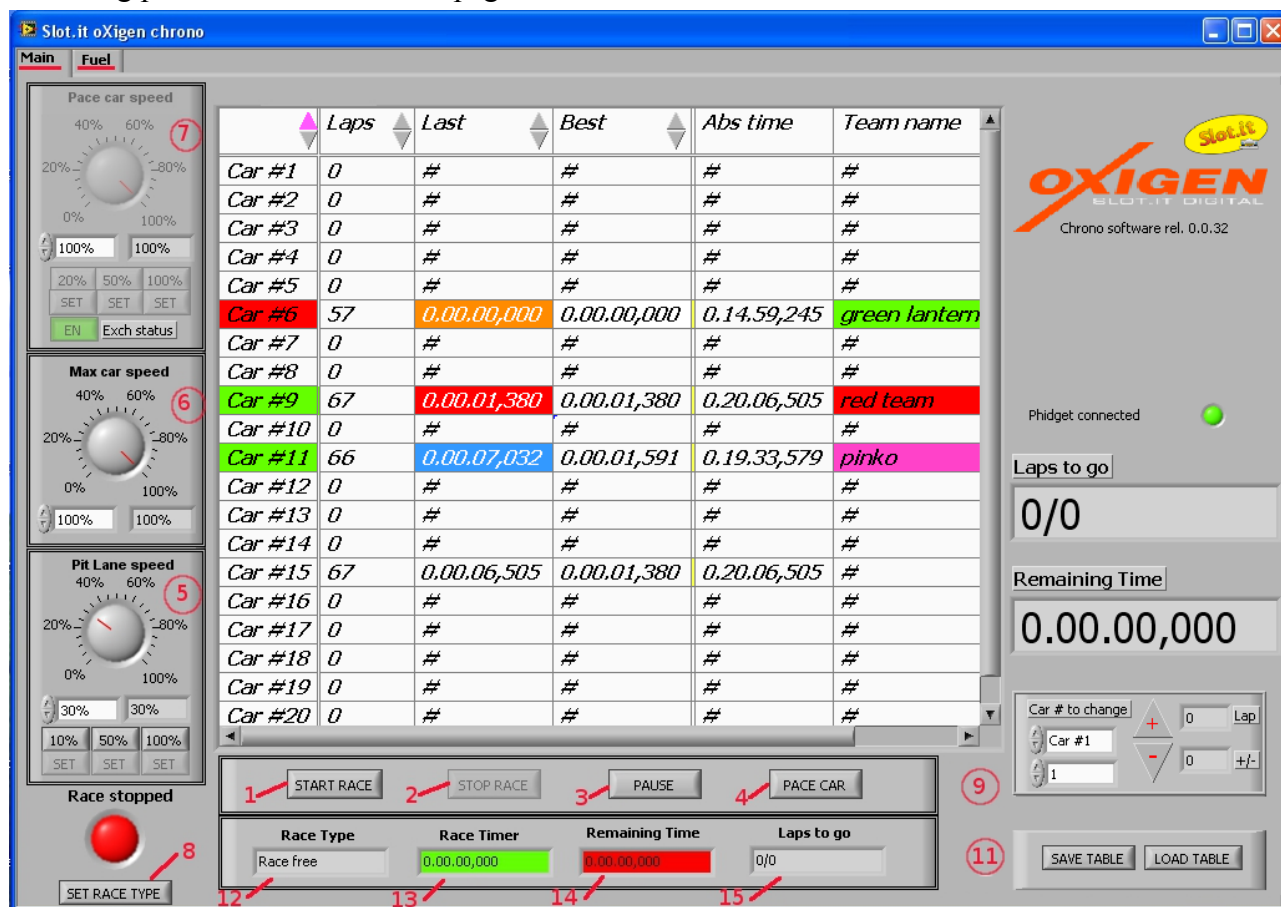



Figure 3: O2 chrono main page.

Quick Start a race

1. 'set race type': enter the number of laps, or time duration of the race
2. optional:
 1. set the max car speed
 2. set the pace car speed
 3. set the pitlane speed
3. press 'start race'

How it works

The race can either be running, paused, in 'paced' mode, or stopped, and the coloured dot in the bottom left of

	<p style="text-align: center;">oXigen system</p>	<p>Doc.</p>
	<p style="text-align: center;">Race Management Software</p>	<p>Pag. 4/ 11</p>

the screen changes colour accordingly

Each mode has its own features and controls.

Running: this is the normal operation. Top speed is controlled from the 'Max Car Speed' knob.

Pause: cars are paused on track.

Pace: cars run at speed defined by the 'Pace car speed' knob (it makes sense to set this to a value smaller than 'Run' speed)

Stop: this button is only enabled if the race is in 'Pause' mode. This is to avoid unintentionally aborting a good race.

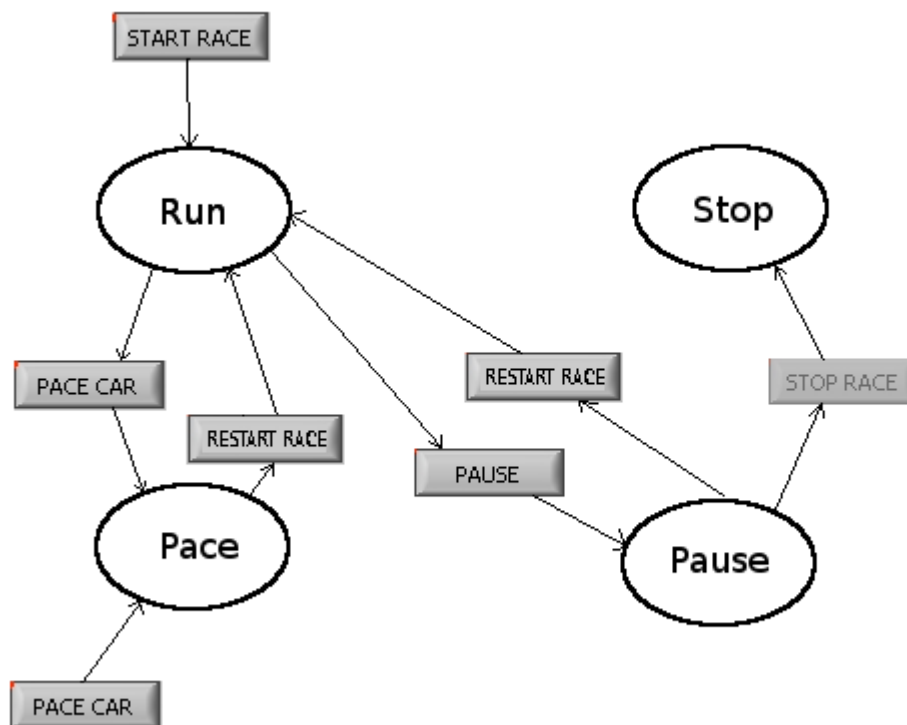



Figure 4:

	<p style="text-align: center;">oXigen system</p>	<p>Doc.</p>
	<p style="text-align: center;">Race Management Software</p>	<p>Pag. 5/ 11</p>

Main page

With reference to the indexes on figure on previous page:

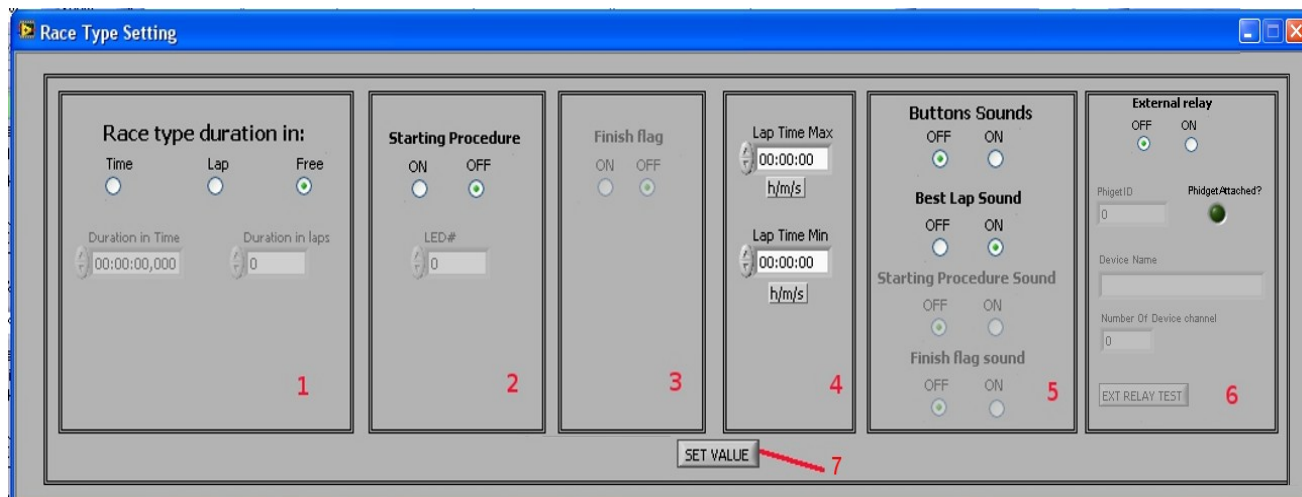
Four square buttons define the current mode of the race (Running, Paused, Paced, or Stopped):

1. **START RACE**: race timer starts and cars can run with the maximum speed limited to the value set with knob 7 (max car speed);
2. **STOP RACE**: this button is only enabled when the race is in pause mode and it completely stops the race. In this situation, the user can decide to save or discard the race data;
3. **PAUSE**: the race is paused: race timer stops and cars cannot move;
4. **PACE CAR**: the race timer runs and the cars can run with the maximum speed limited to the value set with knob 8 (pace car speed);. In this race mode, the race director can also disable the lane changing to prevent the drivers from changing lane. Please note that the race can start also start directly in pace car mode;

Three knobs define the maximum speeds allowed for different conditions:

5. pit lane speed: max speed during pit lane;
6. max car speed: max speed during normal race;
7. pace car speed: max speed during pace car mode;


The 'set race type' button:



Figur 5: set race type

8. set race type: the user can set the duration and other race features of the race: with reference to the previous figure:

1. Race type duration (field 1):
 1. time: the race is limited in time and it is stopped when the race timer reaches the value selected in the “duration in time” field;
 2. lap: the race is limited in lap number and it is stopped as soon as a car completes an amount of laps equal to the value inserted in the “duration in lap” field; the total number of laps cannot be changed while the race is running: race must be stopped to change the number of laps.

	<i>oXigen system</i>	Doc.
	Race Management Software	Pag. 6/ 11

3. free: free practice time, no time or lap limit.
2. Starting procedure (field 2): red/green traffic light signals enable/disable. In the “LED #” field, the user can select how many traffic lights to use (5 at most);
3. Finish flag (field 3): chequered flag enable/disable. It comes on screen at the end of the race;
4. Lap time range (field 4): if the lap time is inside the range inserted, its background colour is white otherwise is red;
5. Sounds effects (field 4):
 1. *buttons sounds*: if ON, the RMS plays a sound when the user click on the start, stop, pause and pace buttons;
 2. *best lap sound*: if ON, the RMS plays a sound each time a driver improves his own lap time;
 3. *starting procedure sound*: if ON, the RMS plays a beep sound each red semaphore light is turned on;
 4. *finish flag sound*: if ON, the RMS plays a horn sound at the race finish flag.
6. External relay: if you have a phidget board attached, enable it from here. It is used for driving external lights.
7. set value: confirm the selected features of the race and close the window.

More tabs and switches control other features:

9. adjustment of total car lap number. This enables adding/subtracting laps to a given car. To do this the user must select the car number and the lap number to add or subtract, then click on the arrow buttons to complete the operation. In the Lap field is shown the current car lap number and in the '+/-' field the correction value;
10. this field shows the oXigen RMS software release and the software release for the dongle;
11. save and restore current race data (warning: a 'restore' will add the contents of the selected data table to the number of laps currently stored in memory, as received from the controllers. To restore a state, make sure the race is just started - i.e. all cars to '0' laps)

To exit from pause or pace car mode click on START/RESTART button.

The **white table** of 'Main' page shown the current race status for each car, by column:

1. Lap: how many laps the corresponding car has completed;
2. Last: last recorded lap time;
3. Best: best lap. Clear this value clicking on the cell and then clicking somewhere else on the table;
4. Abs Time: elapsed time between the start of the race, and the instant of the last recorded lap;
5. Team name: name of the team owning the corresponding car. To insert the name, click on the cell and write the team name in the 'car new name' field, then click 'set'. Colour background for each team can also be set.



Figure 6:

The table can be sorted in different order:

1. by car ordinal number;
2. by lap number (ascending/descending);
3. by last lap times value (ascending/descending);
4. by best lap times value (ascending/descending);

During the race, oXigen RMS creates a backup of the main page table to allow the user to restart the race from the latest known status after a crash: it is an unlikely event which may be caused by simultaneous black-out of controllers and dongle. To recover, please follow these steps:

1. re-launch the oXigen RMS application;
2. DO NOT press 'Start': put the race in PAUSE mode;
3. load the file 'Lastrace.txt' located in the following path:
 'Documents\Slotit_O2_chrono\RaceRankingBackup\';
4. click on 'RESTART' button.

For each car, the background colour has a special meaning:

red: car is in pit lane

green: car is on track


white: car is not on the track

There is a special meaning attached to the 'last' time cell, too:

white: everything OK

red: last lap time was lower than the minimum acceptable lap time

orange (with '0.00.00' time): controller reset during last lap, possible extra lap (if happened during pit lane)

	<i>oXigen system</i>	Doc.
	Race Management Software	Pag. 8/ 11

blue: last lap time was higher than the maximum acceptable lap time.

What to do if you see these colours?

red: possibly, the Hall sensor is too low on the track, and extra laps are triggered during lane changers - or the Hall sensor is near to the power wires of the motor or of the chip. So, either bend up the sensor, or route your cables away from the Hall sensor. The last 'red' time is saved in the 'best' column, as a reminder, and you must clear it by hand.

orange (with '0.00.00' time): the controller was reset (powered off, or some other reason) during last lap. In general, the system copes with this issue by itself, except for one case: if you reset the controller during pit lane, AND you lift the car off track, then after reset the controller and the car will not be in 'pit lane' state - which means that as soon as they cross the magnet at the end of the finish line, rather than just going back to normal mode (exit from pit lane), the system will add one lap. This is possibly going to be removed in a future software release, which will handle this situation as well. For now, the last 'orange' 0.00.00 time is saved in the 'best' column, as a reminder, and you must clear it by hand.

blue: this is generally just an indicator of a slow lap. However, it may also point to a malfunctioning Hall sensor which cannot detect the magnets properly.

The **fuel** page of oXigen chrono is shown in figure 7.



Figure 7: oxygen chrono fuel page.

This page shows the following information for each controller and car:

1. CTRL number field: it shows the car/controller number owner of the information shown in the following field;
2. ctrl feedback LED: it shows if the controller is powered on or off:
 - green light on/off: the controller is powered on/off;
3. car feedback LED: it shows if the car is on the track:
 - green light on/off: the car is on/off track;
4. ctrl sw release field: software release of the controller;
5. car sw release field: software release of the car;
6. fuel field: average trigger position for the last 0.5";
7. Pit Lane field: it shows if the car is in pit lane:
 - red light on/off: car in/out of pit lane;

In addition, this page allows the user to send two types of commands: global commands and commands for a specific controller.

Global commands



	<p style="text-align: center;">oXigen system</p>	<p>Doc.</p>
	<p style="text-align: center;">Race Management Software</p>	<p>Pag. 10/ 11</p>



Figure 8: Global commands.

- **SCP Power Tx**: change the transmission power of all SCP controllers. Max value 0 dBm, min value -18dBm; in general, there should be no need to decrease the transmitted power, so leave it at 0dBm
- **Dongle power Tx**: change the transmission power of the dongle. Max value 0 dBm, min value -18dBm; in general, there should be no need to decrease the transmitted power, so leave it at 0dBm
- **Global ghost ON/OFF**: if ON, all the cars on the track run with the same minimum speed as defined by the 'Min Speed' control, and all lane exchange commands are set according to the arrow button selection.
The 'Global Ghost' feature is very useful to herd all cars back to pit lane after racing: set a low minimum speed and force lane changing in the right direction, and grab the cars while in pit lane.

	<p style="text-align: center;">oXigen system</p>	<p>Doc.</p>
	<p style="text-align: center;">Race Management Software</p>	<p>Pag. 11/ 11</p>

Commands for each controller/car

These controls have higher priority than the driver's throttle or button input: in other words, if min speed is set to anything other than zero, the car will not stop even if the driver fully releases the throttle. Same for the arrow buttons. The ON/OFF button activates the override - that is, if the control is OFF, the driver retains full control - else, if ON, the computer takes the helm. When the AUTO button is green, the commands are automatically reset to default - that is, control is returned to the driver - upon entering the pit lane.

All this is useful, for example, to force pit lane drive through: set a minimum speed, press the appropriate button, and turn ON the control: the selected car will keep running and changing lane until it gets to the pit lane, where the driver will regain full control. Another example is a Safety car which can be driven between minimum and maximum speeds, then forced into pit lane when race resumes.

A detailed description of each command follows:

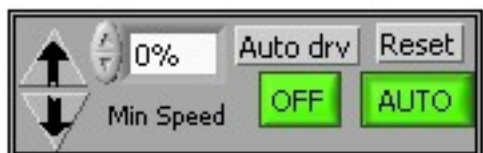


Figure 9: Min Speed command

Min speed command ON/OFF

- 'Auto drv' ON/OFF: if ON, the car runs with the speed value inserted into 'Min speed' field and changes lane according to the arrow button pressed;
- 'Reset' AUTO/MAN:
 - AUTO: automatic reset of values when car enters in pit-lane;
 - MAN: no automatic reset



Figure 10: Max speed command:

Max Speed command ON/OFF: if ON, the car max speed is the value inserted into the indicator.



Figure 11: Max brake command.

Max Brake command ON/OFF: if ON, the car max brake value is the one inserted in the indicator.

Additionally, the Max Speed and Max brake settings may be used by third party RMS (e.g. PCLapCounter) to simulate different behaviour of the car depending on fuel load