SCP-3
Electronic Controller

OXIGEN SLOT.IT DIGITAL **Ready 2.4GHz**

wireless software updates

SCP-3 1.0

ACTIVATE THE SCP-3 BEFORE USE

Thank you for your purchase. Before ANY further action, the SCP-3 must be ACTIVATED with the Slot.it APP. Without activation the SCP-3 will not work. What is the activation? Very simply, via Bluetooth, the APP reads the network ID (known as MAC) of the controller, writes permanently the current date in the SCP-3 memory, and saves the following data: your email, the controller MAC, the activation date, the firmware version, and the device name in a cloud database that we can access. The same data is available on the APP.

The activation date is the date used for warranty. Regardless of when you bought the controller, and of availability of the purchase receipt, we consider a two years period from the day you actually start using your device – which is the activation date.

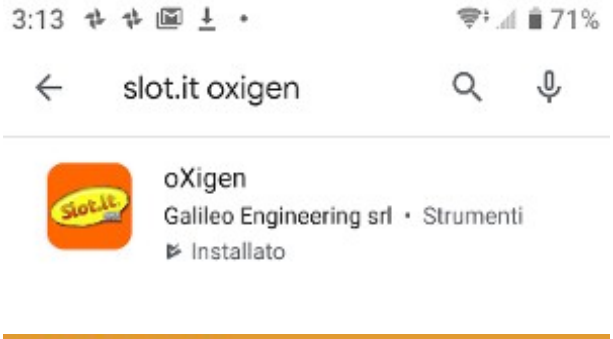
You must give a name to the controller, which is quite useful thing to do if you have more than one.

As we develop the APP further, it will become an indispensable companion to the SCP-3, extending its capabilities, with more advanced features becoming avaible.

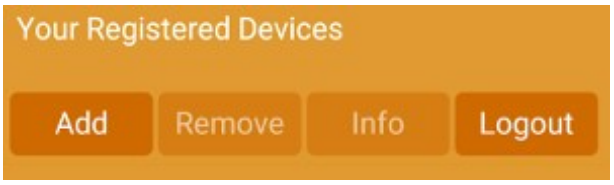
The app is also the tool used to update the firmware of your controller to the latest version, or to switch to a different one – you can easily reprogram the SCP3 from being an oXigen controller to a to a Scalextric ARC AIR/PRO and viceversa.

Note: the APP display has been condensed to fit inside these paper sheets.

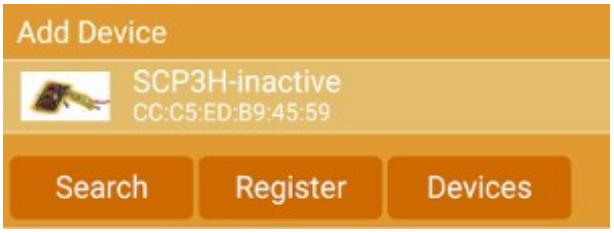
How to activate the SCP-3:



1. Search for oXigen in the APP store. Don't search for Slot.it unless you want get a darn slot machine game. Sownload and install the Slot.it APP on your Android (Android 7.0 or greater) or iOS device. Make sure the geographic location is turned on. This is need by Android Bluetooth function, we don't use such data.
2. Register yourself (email necessary) to access the APP. Enter your email, and touch 'Request Access Code'. The APP sends a confirmation email is sent to your address: copy the code from your inbox, and enter it into the app in the 'Access Code' field. Now press the 'User Login'button that has just appeared
3. Power on the SCP3. Remember, the SCP3 comes with an ON/OFF/Curve selector switch on the back of the controller. Look at the display – the moving message is telling you to "LAUnCH tHE APP And Add tHE SCP3 - PreSS AnY button to StArt"
4. Press any button on the SCP3 (example: the big friendly ~~Panic~~ Brake button) for two seconds, and the display shows 'hn'. 'hn' is the short form for 'handle', that is, the **han**dle part of the SCP3. Now it's time to use the Slot.it APP.



5. So launch the APP (you've done that already if you've followed steps 1. and 2.), login if necessary, then click 'Add'



6. The APP searches for the SCP3 for a while (you will notice a circle in the middle of the screen), then when the SCP3 is detected, it appears on screen. Click on 'Register'

7. You are now ready to use your SCP3

8. Click on 'info' to see your controller's data. Name can be changed with the 'change' button, firmware updated with DFU, and for the immediate future you can ignore the 'buy' button as it is inactive.

The SCP3 at power ON

The SCP3 can be switched OFF with the sliding switch on the back. It's a three position switch which also serves to select the response mode between 'curve' and 'linear'. (Needs photo)

Therefore the controller can be easily switched on and off at will, and can do different things depending on whether it is turned on with or without some buttons pressed.

STANDARD MODE power on: just switch it on without pressing any buttons. If the controller was already activated, then just drive you car. If it wasn't active, and you see a moving message inviting you to launch the APP, please refer to the previous section of this manual (activation).

APP MODE power on: to connect to the APP via Bluetooth, switch on the SCP3 with BOTH ARROWS pressed. On display, a moving message shows

APP - SELECt hAndLE or PA CHIP -

As the SCP3 may have or not a power amplifier unit (PA), you must connect either that, or the handle (main controller) to the APP. Select HANDLE with DOWN ARROW, or POWER AMP MODULE with UP ARROW. Display shows either

hAndLE - or PA CHIP -

You can switch back and forth, until you confirm with the round 'brake' button. The message shows (fixed) either

hn or PA

Now the SCP3, handle or PA module, can be reached with the APP.

DFU MODE power on: DFU means 'direct firmware upgrade'. This is seldom used, as we suggest to use the APP (APP mode) to start DFU. However, it may be useful. To enter DFU mode switch on the SCP3 with BRAKE pressed. On display, a moving message shows

dFU - SELECt hAndLE or PA CHIP -

Again, the SCP3 may have or not a power amplifier unit (PA), you must select either that, or the handle (main controller) for firmware upgrade . Select HANDLE with DOWN ARROW, or POWER AMP MODULE with UP ARROW. Display shows either

hAndLE - or PA CHIP -

You can switch back and forth, until you confirm with the round 'brake' button. The message shows (fixed) either

hn or PA

Now the SCP3, handle or PA module, can be reprogrammed directly. Note that during the firmware update, it is normal to see funny character appear on the display.

BOOTLOADER MODE power on: the bootloader is a special PC program that communicates, via the oXigen dongle, with the SCP3. To enter this mode, switch on the SCP3 with UP ARROW and BRAKE button pressed. A

U

appears on the display. At this point you should be familiar with the usual Bootloader procedures. Note that if you choose to upgrade firmware through the Bootloader, then the Nordic APP (and not the Slot.it APP) should be used to perform the upgrade

BATTERY SELECTION (for 2.4GHz oXigen / ARC SSD wireless systems)

The SCP-3 can be powered by an optional Li-Po battery which may be stored inside the handle, in place of the cartridge. If powered by the battery, the SCP-3 becomes a wireless, untethered device directly compatible with Slot.it oXigen and Scalextric SSD digital systems.

LiPo batteries can be damaged if allowed to discharge below a safety threshold. Our electronics incorporates a circuit which protects the battery against over discharging.

The battery inside the SCP-3 can be charged like the battery of a normal mobile phone through the USB charger plug. The controller cannot be operated via USB battery charger power alone.

Battery specification

Capacity	750/1000 mAh
Voltage	3.7V (1s)
Undervoltage protection	Preferably yes
weight	approx. 20g
Max W*L*H	45*28*10 mm
Balance plug	NA
Plug	JST 2pin

JST Connector Sample

Example: Turnigy nano-tech 750mah 1S

The 2.4 GHz radio section of the SCP-3 can also be used if the controller is powered via the SCP-3 power supply cartridge (SCP301c).

Description

The SCP-3 is a speed controller for slot cars. It reads the trigger position using a contactless, friction free sensor, with linear magnetic trigger position readout. It is directly compatible, via the built-in 2.4 GHz wireless interface, with digital oXigen and Scalextric ARC AIR/PRO systems. Like its predecessor SCP-2, it features an interchangeable cartridge system, to connect to analog systems.

The digital cartridge will be supported at a later stage.

Warranty: two years from the date of activation. Before usage, the SCP-3 must be connected to a Android or iOS phone and 'activated', that is, the date of its first use is written into the controller's memory and in our database. We recommend to keep the receipt anyway, in case the SCP-3 cannot be caontacted via radio anymore.

This device complies with RoHS directive. Do not immerse this controller in water.

Thanks to all our beta testers whose work was essential to help us bring this product to market.

The name SCP comes from the nickname SeCaPelo (Secapelo=Hairdryer) that was given to early Slot.it controllers.

This controller is Made in Italy and is the result of the hard work of Maurizio Ferrari, Maurizio Gibertoni, Cristian Anceschi of

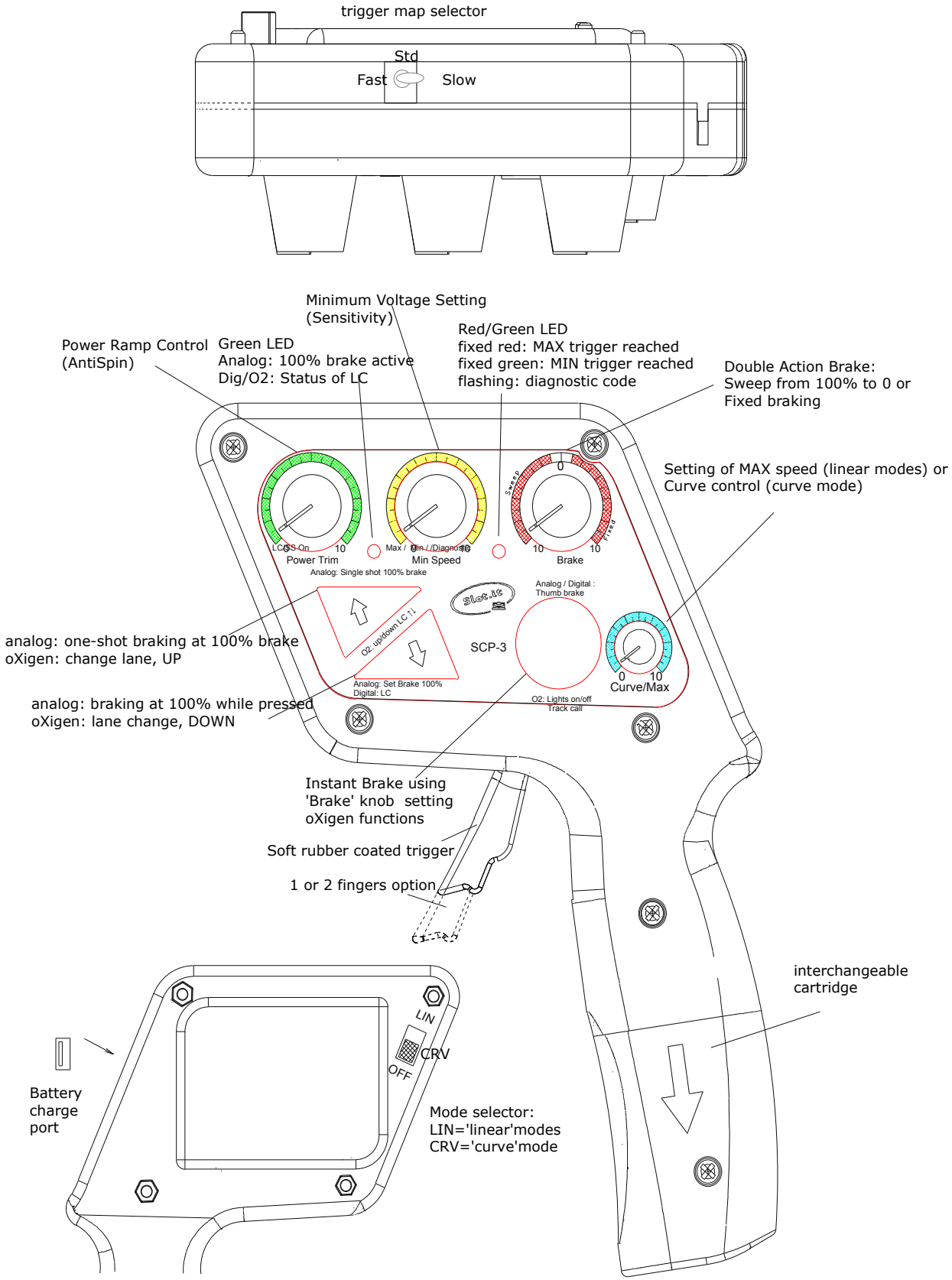
Galileo Engineering srl, Via Cavallotti 16 – 42100 Reggio Emilia, Italy info@slot.it

So, now you know who to blame.

Please also check out our Slot.it, Policar and Galileo Engineering sites!

(UK) Electronic versions of the manual in Italian/Castellano/German can be downloaded from the Slot.it site www.slot.it.

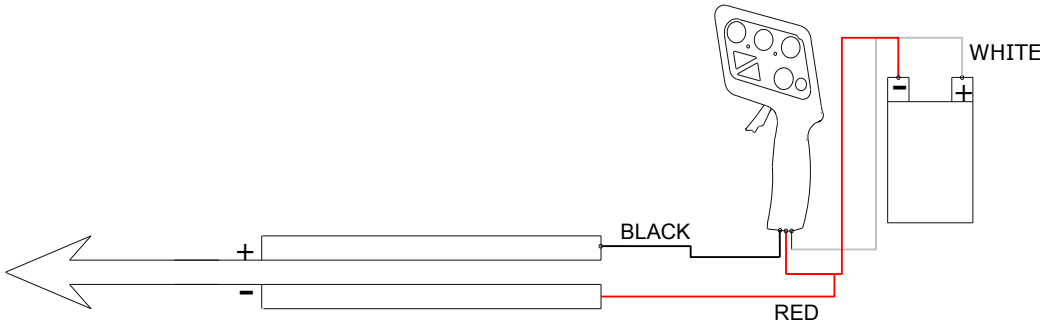
Slot.it SCP-3 1.0



BEFORE YOU START — Choose a trigger

(UK) Install the trigger that matches your driving style: short (for one finger) or 'long' (for two fingers). Use the provided screw.

QUICKSTART for ANALOG SYSTEMS (SCP-3 with analog cartridge)



(UK) The colour scheme of the SCP-3 cables follows the standard US (Parma) colour coding. In our opinion, it does not make sense to use anything other than red for battery power and anything other than black for ground, however since the long time standard established convention is different, we decided, reluctantly, to follow it.

So: WHITE is +, RED is – (ground), BLACK is motor (track). If you have a DS connection box, colour will match the existing colours on the female plugs of the box.

Anyway: plug the WHITE/YELLOW cable into the POSITIVE (+) terminal of your track; plug the RED cable into the NEGATIVE (-) terminal of your track; plug the BLACK terminal to the motor connector of your track, then go to the **Quickstart common section** chapter.

Technical Specifications	
Power supply	7 to 24V
Maximum current: home racing cartridge high end cartridge	 5A 40A
Operating temperature	0 to 40°
Weight	270 g

As a radio device, it operates on the 2.4GHz band either as a BLE (Bluetooth Low Energy) device, to interface with, for example, a mobile phone, or on the proprietary oXigen or Scalextric SSD ARC AIR/PRO networks and protocols.

QUICKSTART for oXigen and Scalextric ARC AIR/PRO SYSTEMS

(UK) . The SCP-3 is directly compatible with oXigen Slot.it wireless digital system. You should not use the old oXigen cartridge (for SCP-1 and SCP-2) with it. An extra Power Amplifier Module is available if you need to cover extra distance.

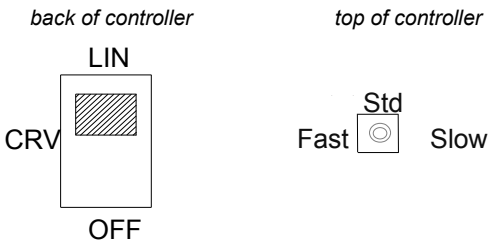
It can also be used as a Scalextric ARC AIR/PRO controller.

Refer to the oXigen manual for instructions about how to use the SCP-3 in an oXigen or ARC AIR/ PRO system.

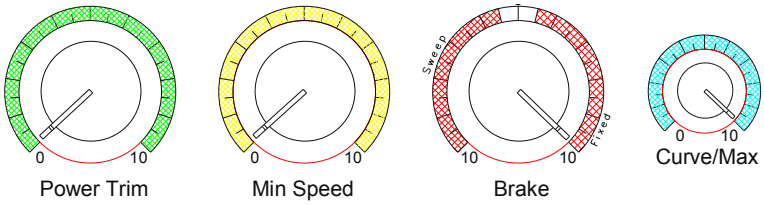
NOTE for DIGITAL SYSTEMS (SCP-3 with digital cartridge)

(UK) Currently, the Slot.it SCP-c controller does NOT support the universal digital cartridge. We need to write appropriate firmware. It will happen though.

QUICKSTART common section



UK Move the slider on the back of the controller to the LIN position, and the top switch on STD.



UK Turn the 'Power Trim' and 'Min Speed' knobs completely counterclockwise. Turn the 'Brake 'and 'Curve/Max' knobs completely clockwise.

Press the trigger and the car should start. Adjust the 'Min Speed' knob to get a good starting speed; this will depend on the track, car, driving style and voltage. Then, adjust the Curve/Max knob to suit the whole curve to the desired response. Have fun. Then *please*, read the rest of this manual. Please. It is important, otherwise we wouldn't have written it. In particular, advanced users should read the chapter named '*Reprogramming the SCP-2*')

UK **Complete electronic versions of the manual may be downloaded from the Slot.it site www.slot.it**

NOW READ THE COMPLETE MANUAL!
ORA LEGGERE IL MANUALE COMPLETO!
LEA Ud. AHORA EL MANUAL COMPLETO!
DAS KOMPLETTE HANDBUCH JETZT LESEN!
MAINTENANT, LISEZ LE MANUEL!

Understanding how the SCP-3 works

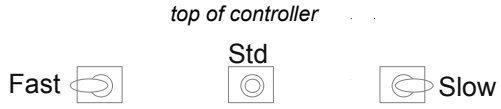
(UK) The Slot.it SCP-3 is a sophisticated, microcontroller based, speed controller for slot cars. It has a PWM output for both power and brake, plus a lot of other features.

Without entering too much into detail, PWM (Pulse Width Modulation) is one of the possible ways to control the output voltage of an electronic system. A PWM system basically 'chops' the output voltage in a series of on-off periods, whose on-off ratio corresponds to the desired voltage according to the formula V=on-off ratio * track voltage. In other words, if you have a track voltage of 12V, and an on-off ratio of 1/4, you are feeding your car 1/4*12 = 3V, and so on.

The ratio is chosen by the microcontroller, according to the trigger position and to the desired *'response curve'*.

The switch: 'Fast', 'Standardd', 'Slow'

With the advent of the SCP2 we have redesigned the underlying mapping system, to make it easier to use, and more effective: both 'linear' and 'curve' modes can now be used in three fashions: 'fast', 'standard', 'slow', these terms referring not to the overall speed of the car, but to the speed of the car at a given trigger position. In other words, the trigger readouts are 'remapped' on an *aggressive* (fast), *standard* (std) or *soft* (slow) trigger readout.



three available positions of the 'trigger' switch:

Fast: more aggressive trigger mapping
Std: normal trigger mapping
Slow: soft trigger mapping

Available modes

1. **LINEAR with step (mode 1):** the relationship between the trigger and the voltage output is a straight line. The controller, when the trigger is fully pressed, will always provide 100% power. Due to its innovative and in our opinion clever, strategy, this mode has a lot of flexibility and can help in the most difficult situations.
2. **CURVE mode (mode 3):** the relationship between the trigger and the voltage output is not a straight line, but can be made convex or concave more or less at will.

   There is also a further useful mode:
3. **GHOST mode (mode 4):** a self-run mode with adjustable speed, useful for running a ghost car on the circuit (or more, if more digital cars are programmed with the same ID), or running in a motor.

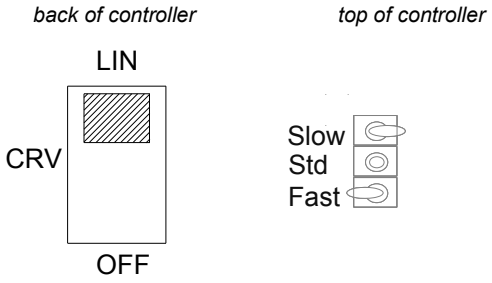
So where did the 'kid's mode go?

We removed it - it will be available from the accompanying APP, with which users may limit the maximum speed to a desired level.

Mode 1 – LINEAR with step

(UK) Entering Mode 1

Mode 1 is selected by putting the switch on the back of the controller to the 'LIN' (top) position, and

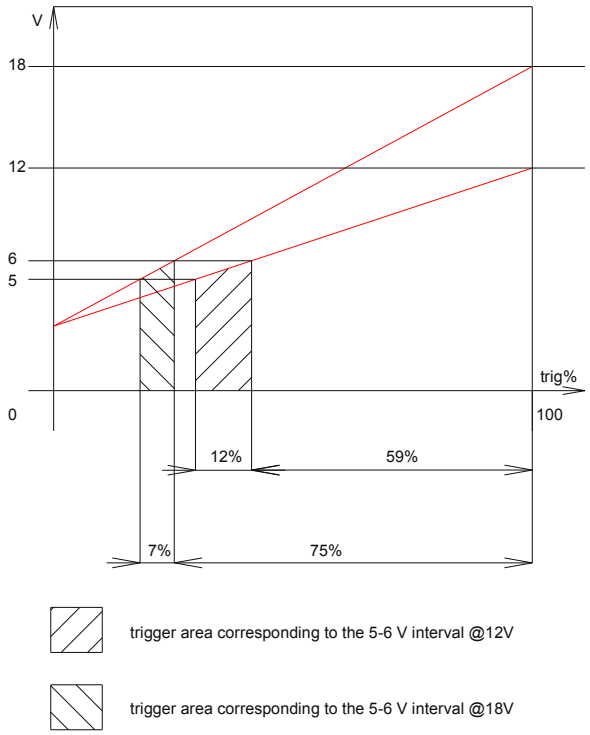


the switch on the top side, to any position:

(UK) Using Mode 1

In the development process of the SCP controllers software, at a certain point we started to investigate why a given car, very easy to drive below a given voltage, was very 'rough' and unpredictable with increasing voltage levels. It was not a matter of excessive speed, the problem lied in the broken link between the finger and the car: somehow, a well-behaved system became increasingly wild and uncontrollable. Every slot car racer knows that more voltage doesn't always make a faster lap time, but we needed a physical, logical explanation to this well-known fact.

Come think about it, a basic truth applies: more or less, *the speed of a given car in a given turn is largely independent of the motor power*, that is, provided your motor is powerful enough, and most motors are powerful enough to de-slot a car in a turn, the speed in a turn depends on many factors but not the power of the motor, or the track voltage. So, what happens when you increase the voltage, and why does it make things so much more difficult?

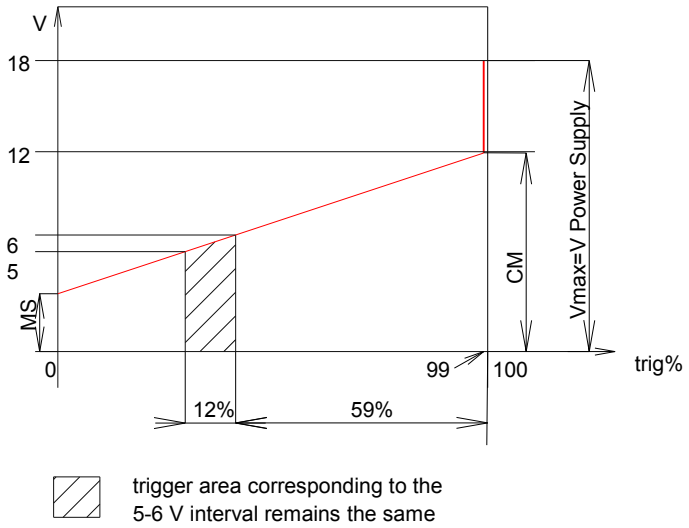


(UK) Let's suppose in a given turn the car can be driven optimally in a voltage range between, say, 5 and 6 Volt. In the given example (which is an example only), at 12V this range falls across a 12% band, which, in turn, is located approximately 30% from 0. But look at what happens at 18V: the same 5-6 Volt band is now spread across a 7% band, which is also much closer to the 0 position

than before!

So, ideally one would want, in this case, to have a controller, which responded as if the power was 12V in the turns, and 18V in straight lines.

From this observation, the 'linear with step' mode was created to keep the power band under control, without sacrificing top speed.



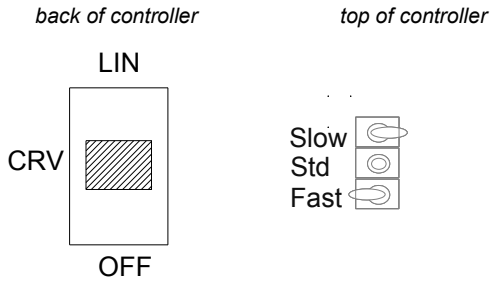
UK It all works like this: the Min Speed (MS) knob and the Curve/Max (CM) knob set respectively the desired attack voltage, that is, the minimum voltage applied to the motor, and the voltage which is applied when the trigger is at 99% of its run, that is, just before the physical maximum of the trigger's run. When the trigger is pulled 100%, full power (be it 12, 18 or any voltage) is applied. By doing so, it is possible to maintain a fixed, ideal power band for turning, irrespective of track conditions, and to take advantage of the full power on the straights. The transition between the CM value, and the full (100%) Vmax, is actuated according to the setting of the Power Trim knob: the more Power Trim is requested, the slower the transition between CM and VMax

It is an easy to tune, very effective strategy.

Mode 3 – CURVE

UK Entering Mode 3

Select mode 3 by putting the switch on the back of the controller to the 'CRV' (bottom) position.



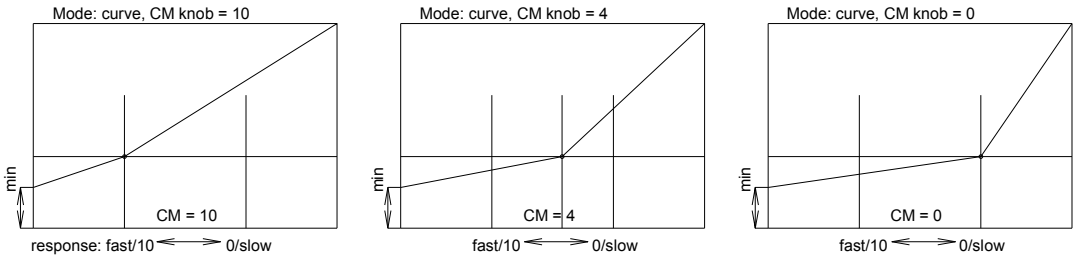
UK Using Mode 3

The 'Curve' mode is very flexible. By appropriate adjustment of the Curve/Max CM knob, the response curve can be custom tailored.

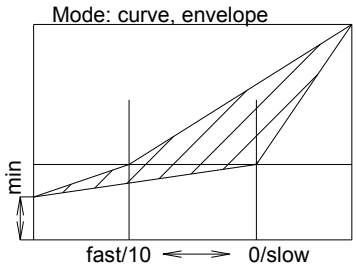
To understand how it works, consider that the curve of the trigger position/Voltage relationship is built by three points:

1. Min, which is the attack speed set by the MS knob, and varies according to the relative setting.
2. The middle point, which is on the intersection of two lines:: one, a horizontal line on the vertical 'voltage' axis, placed at 50% of the axis length, and the other, a vertical line on the horizontal trigger axis, whose position depends on the Curve/Max knob position. The intersection of these two lines sets the middle point.
3. The Max Voltage, which in this case is always 100%, that is, in the 'curve' mode it is not possible to decrease the maximum power.

In the following example, given a certain MS knob position, by turning the CM knob the curve varies as shown below.



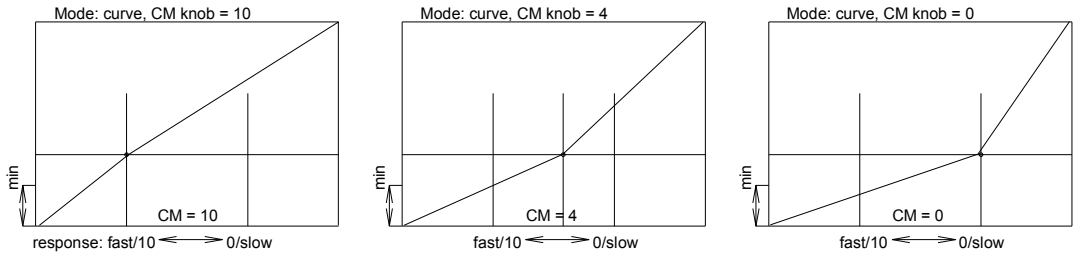
Example of curves with given MS, CM change



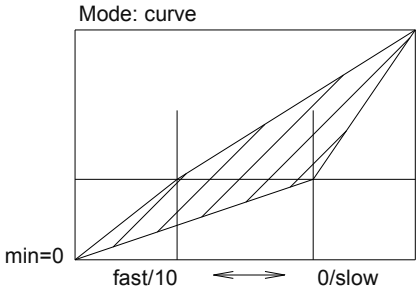
Envelope of curves with given MS, CM change

Obviously, the curve can vary continuously between the one represented with CM=10 and the one with CM=0. The middle curve, with CM=4 is an example of an intermediate situation. The envelope of possible curves, with the above said fixed MS, is explained by the picture right above.

What happens now to our curves, if we change the position of the minimum speed (MS) knob?

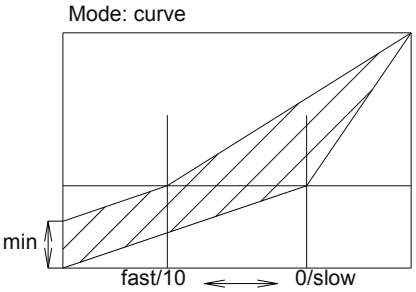


Example of curves with MS=0, CM change



Envelope of curves with MS=0, CM change

At this point, it is easy to visualize the complete envelope of a sample situation, i.e. the complete set of curves that can be obtained with fixed dip switch position, and adjusting CM and MS knobs:



Envelope of curves when MS and CM vary

All this said, in Mode 3, as in the other modes, the trigger mapping can be set to an aggressive, standard or soft response using the additional switch, located on the top of the controller.

Mode 4 – GHOST - explained

(UK) Entering Mode 4

Activate the GHOST (auto run) mode by executing the following actions in sequence:

1. turn the Curve/Max knob completely counterclockwise to 0
2. put the CRV/LIN switch on LIN
3. press HAND BRAKE
4. keep HAND BRAKE pressed and press both arrow buttons (LC and Latched LC)
5. pull the trigger to full power
6. completely release the trigger
7. release all the buttons – the LEDs start flashing indicating GHOST mode
8. set speed with CM knob

(UK) Using Mode 4

Speed can be adjusted with the Curve/Max knob. The Hand Brake button, as well as the Lane Change buttons (digital mode), work.

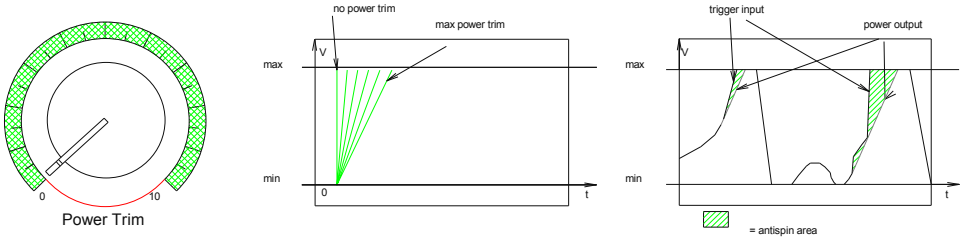
Exit mode by quickly pulling the trigger to full power and releasing it.

Note that the mode can be entered also skipping step 1. above. The risk in this case is that the speed is adjusted by said knob, so if you leave it to a high setting, as soon as you release the Hand Brake button in step 7, the car will start at warp speed and crash. So, please play safe and turn the CM knob to low before entering mode 4

SCP-3's controls

UK The SCP-3 has four main knobs, three push buttons, a sliding switch and a lever switch.

UK **Power Trim (PT)**: also known as 'antispin', this knob controls how the power trim strategy delivers the power to the car.

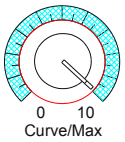


The PT knob sets the maximum accepted 'slope' for a power increase: if the power increase ratio is above this slope, the 'power trim' slope is applied instead. In other words: if the trigger is pulled sharply, the power increase ratio is very high: in this case, the power trim strategy releases the power to the car through a more gentle slope. In reality, a 'real' antispin should monitor the wheel speed and detect wheelspin before cutting back the power. This is not what this controller does, which is, instead, a 'smoothing out' of the trigger action.

Actually, this idea is rooted in what was legal in the F1 rules in the 90s: real closed loop antispin being banned, this was as close as one could legally get.

UK ***PT for digital systems***: there is no difference between the analog and digital controller as far as the PT is concerned.

UK **Curve/Max (CM)**: the core of SCP-2's inner working. Depending on the chosen working mode , “linear”, “linear with speed limit”, “curve”, it has two completely different functions.

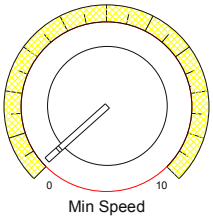


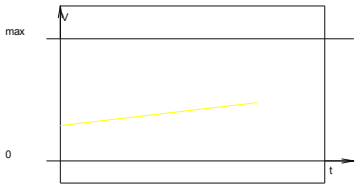
“linear”, and “linear with speed limit” modes: if you have *not* read the explanation on these two modes, then now it's probably time to read the relevant chapter. If you have, then this knob sets the maximum speed in both cases.

“curve”: if you have *not* read the explanation on this mode, again you should do so now, or proceed at your own risk.... If you have, this knob, in this case, moves the working point on the 'X' axis and sets the third point through which the curve is set, the other two points being the minimum selected by the MS knob, and the 100% fixed maximum.

UK ***CM for digital systems***: there is no difference between the analog and digital controller as far as the CM is concerned.

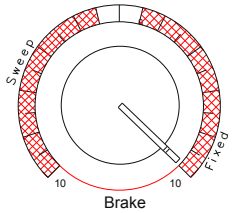
UK **Min Speed (MS)**: this knob sets the starting speed of the car, i.e. the minimum voltage which is applied to the track, when the trigger is pulled just enough to leave the 'braking' area. Also known as sensitivity, in terms of a traditional resistor based controller, it is similar to changing the resistor's value, to get a faster or slower start point.

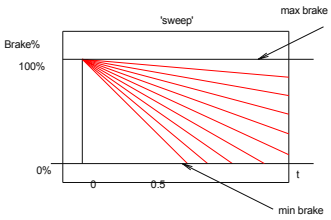


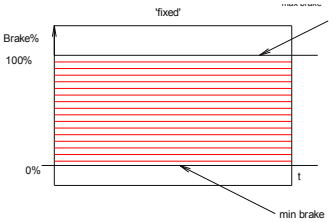


UK ***MS for digital systems***: there is no difference between the analog and digital controller as far as the MS is concerned.

UK **Braking (BK)**: braking occurs when the trigger is completely released. The braking knob selects between two different braking strategies: 'sweep' and 'fixed'. The braking dial is split in two halves: one, under the label 'sweep', puts the braking system in 'sweep' mode, the other half, under the label 'fixed', does the same but for the 'fixed', standard, mode. As this tautology is not probably the best possible explanation, please look at the picture and read on.







If you have ever been fortunate enough to look at some telemetry data from a real racing car, you might have noticed that the deceleration peaks at the beginning of the braking (in a modern F1 car, deceleration can reach 5g), then decreases as the driver eases the pressure on the pedal, as he tries to match the car's speed to the desired entry speed for the next turn. This is what the 'sweep' braking strategy tries to accomplish: a strong initial braking followed by a gradual easing of the braking itself. In other words: the sweep always begins with 100% braking, then, gradually reduces it to 0 (zero), as time passes. When turned counterclockwise in the 'sweep' area, the knob position controls the sweep time, i.e. how long does it take to bring the braking from 100% to 0. Note that, when fully turned counterclockwise, the braking is fixed at 100%, or, if you like to put it this way, the time it takes to bring the braking to 0 is infinite. Apart from this position, the longest available sweep is 1.7s, and the shortest is 0.5s.

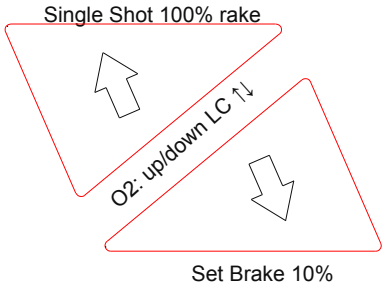
The 'fixed' mode, clockwise, is the 'standard' mode of most, if not all, other controllers with adjustable braking: depending on the dial position, you get a stronger or weaker braking according to the knob setting.

UK ***BK for digital systems***:

oXigen, ARC PRO: works as analog.

Brake overrides (analog mode):

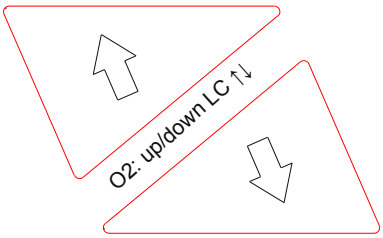
(UK) NOTE: EARLY FIRMWARE MAY NOT HAVE THIS FEATURE YET. There are two ways to change the brake setting on the fly, and temporarily, without altering the base setting selected by the BK knob:



1. the 'UP' arrow button performs a 'single shot' brake override: the next braking action will always occur at 100% braking, regardless of the current BK settings. This can be useful in several situations: for example, in a circuit where 100% braking would not be the best choice, except for a single narrow turn. While active, that is, when the button has been pressed but braking did not take place yet, the green light stays ON. A further pressing of the 'UP' arrow when the strategy is active will switch it off.
2. the 'DOWN' arrow button, while pressed, overrides any braking knob settings, forcing braking at 100%, as long as it is pressed.

Lane change (oXigen):

(UK) oXigen, when used with appropriate hardware, has a ìSelective Lance Change' feature allowing users to swith or not depending on the direction of the lane changer (left or right): therefore, depending on the programming of the lane change mechanism, pressing either arrow has differnt results. In other words, arrows correspond to left or right changing. Press both buttons together to activate the lance change mechanism regardless of directions.

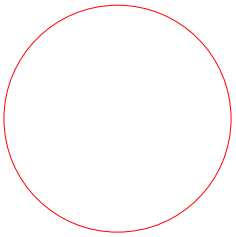


Lane change (Scalextric ARC AIR/PRO):

(UK) Pressing either arrow activates the lance changing mechanism, as Scalextric's ARC doesn't support the selective lance changing protocol.

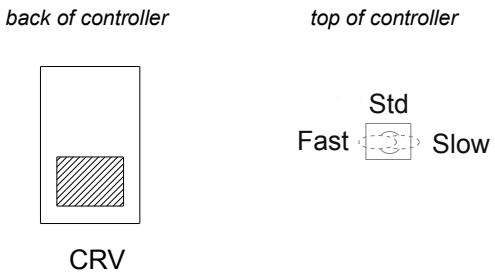
Hand brake (analog and digital mode):

UK The round push button marked 'Hand Brake' is an instant brake, thumb activated. While pressed, power is cut and braking performed according to the BK knob setting.



LIN/CRV/OFF selector and Switch (top of controller):

UK The LIN/CRV/OFF selector and the Switches are located respectively on the back and on the top of the controller. Together, they are used to select the working modes of the SCP-3, and to turn it OFF, of course.



Live Timing (Telemetry) interface:

UK ***THE SCP-3 IS NOT COMPATIBLE WITH THE LIVE TIMING SYSTEM***

How does the SCP-3 protect itself

UK As the SCP-3 can operate in a very harsh environment, it has several ways of protecting itself against short circuits and polarity inversions. ***The following applies to analog systems with 'home racing' cartridge only***. The high end cartridge is protected differently, by fuse and by higher MOSFET current rating (80 A in ideal conditions).

UK ***Protection against short circuit between rails:***

This is the most common situation in normal use. A screwdriver on the track, a screw across the slot, a copper filament crossing the braids are normal events that any controller should handle gracefully. The power MOSFETS used in the SCP-2 are well dimensioned, but this alone is not enough to guarantee a happy and healthy life to your controller. So, the Slot.it SCP-2 continuously monitors the current drain from the track and cuts power if the current is higher than 6A. The situation is checked every few tenths of a millisecond, and if the short circuit goes away, power is restored. The 'diagnostic' LED flashes with one flash every two seconds while this condition is detected.

This obviously means that with the 'standard' analog cartridge, motors with a very large current drain cannot be used. This excludes the motors commonly used for 'metal slot racing' but includes all motors commonly used in plastic cars. An 'unlimited' cartridge, is planned, for higher current requirements.

In the table below, this protection is referred as SC.

UK ***Protection against short circuit to Ground:***

This is quite unlikely during normal use, but can be caused by a mismatch between Motor and Ground cables.

The 'diagnostic' LED flashes with two flashes every two seconds, while this condition is detected.

In the table below, this protection is referred as SC.

UK ***Protections against polarity errors:***

The SCP-2 has three cables: Motor (Black), Ground (Red), Power (White).

Two devices protect the SCP-2 against polarity inversion, which happens if the cables are mismatched. This should not happen often, but it *can* happen, so the SCP-2 is shielded by

1. Fast Fuse, 3.15A, replaceable. In the table below, this protection is referred as FF
2. Resettable Fuse (Automatic). In the table below, this protection is referred as RF

Track connectors	SCP-2 connectors					
Motor	Motor	Motor	Ground	Ground	Power	Power
Ground	Ground	Power	Power	Motor	Ground	Motor
Power	Power	Ground	Motor	Power	Motor	Ground
Effect →	OK	FF	RF	FF or SC	RF or SC	FF or SC

UK ***What to do:***

If the diagnostic LED flashes once every two seconds, unplug the controller, search and remove the offending item that is shorting the rails. Check that your motor is not draining too much current.

If the diagnostic LED flashes twice every two seconds, unplug the controller, and check your connections.

If you believe there might have been a condition like the ones above, check the Fast Fuse and in case, replace it. The automatic Resettable Fuse resets automatically in approximately 2".

an IMPORTANT word about the trigger readout and reprogramming the controller curves

UK The SCP-3 reads the trigger position from two magnets housed in the trigger itself. The magnetic field is read by a Hall sensor, whose linear output is fed to the microcontroller (the CPU). What makes it interesting for the user though, is that, being there no end of run switches or mechanical contacts, there is no friction between the trigger and the cursor as in a traditional controller, which means no wearout, no dust, no change in characteristics.

The SCP-3 comprises a sophisticated software which can detect the end-of-run positions and self calibrate during normal operation. It comes precalibrated from factory so that it works as expected as soon as it is powered up.

Version 1.1. of the SCP-1 controller (November 2010) added an important new feature: it is now possible to reprogram the factory-set base relationship, which links the physical position of the magnet (trigger position, in degrees) to the logical point on the mapping. In other words: underneath all the curves that you have read so far, lays a base mapping through which the controller knows that a certain readout of the magnetic field corresponds to a certain position of the trigger. It is this 'base' relationship which makes it possible, for the software, to create all the curves of the SC 1.1, then SCP-2, and now SCP-3. A small change of the 'base' map, which normally is hidden from the user, can radically change the behaviour of the controller. The base mapping is set during production, but a rewrite of the mapping must be performed every time the trigger magnet is replaced.

For the user, then, it is now possible to alter the *base* setting, as if you were using completely different magnets. Please refer to the 'Reprogramming the SCP' document, or to the single-language manual for an explanation of the procedure, all of which are downloadable from the Slot.it web site

if everything else fails...

press the large, friendly orange button:

...and contact us at this address in the following page

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