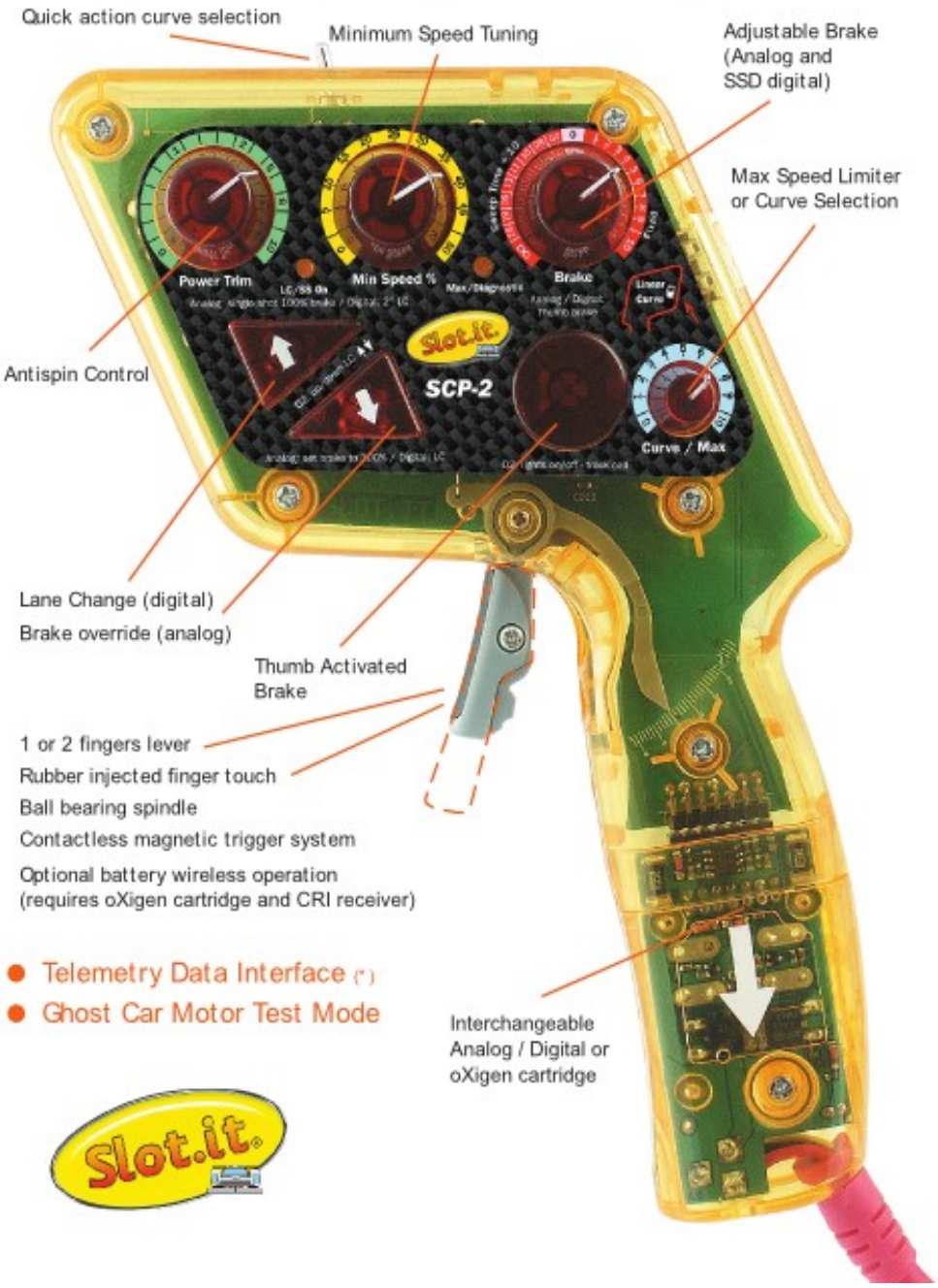
SCP-2


Quick action curve selection
Minimum Speed Tuning
Adjustable Brake (Analog and SSD digital)
Max Speed Limiter or Curve Selection
Antispin Control
Lane Change (digital)
Brake override (analog)
Thumb Activated Brake
1 or 2 fingers lever
Rubber injected finger touch
Ball bearing spindle
Contactless magnetic trigger system
Optional battery wireless operation (requires oXigen cartridge and CRI receiver)
Telemetry Data Interface (*)
Ghost Car Motor Test Mode
Interchangeable Analog / Digital or oXigen cartridge
Power Trim
Min Speed %
Brake
Curve / Max
SCP-2
Slot.it

SCP-2 1.0

Thank you for purchasing this Slot.it controller. Before starting, please make sure you have read the following instructions carefully.

The SCP-2 is contactless, friction free, with linear magnetic trigger position readout (patented), and features an interchangeable cartridge system, to connect to either analog or digital systems. The digital cartridge is universal for all the available commercial brands (Ninco, Carrera, Hornby and Tecnitoys). It is also the standard controller for the Slot.it oXigen digital system.

Warranty: two years. We reserve the right to refuse repair under warranty if safety seal is broken. There's no safety seal in this device, anyway, so it's hard to break it. This device complies with RoHS directive. Do not immerse this controller in water.

No animals have been used for testing this controller, and almost no slot cars flew off the track during the development phase. The name SCP-2 means SeCaPelo-2 (Secapelo=Hairdryer).

Made in Italy.

This 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 - www.slot.it - info@slot.it

Now you know who to blame.

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

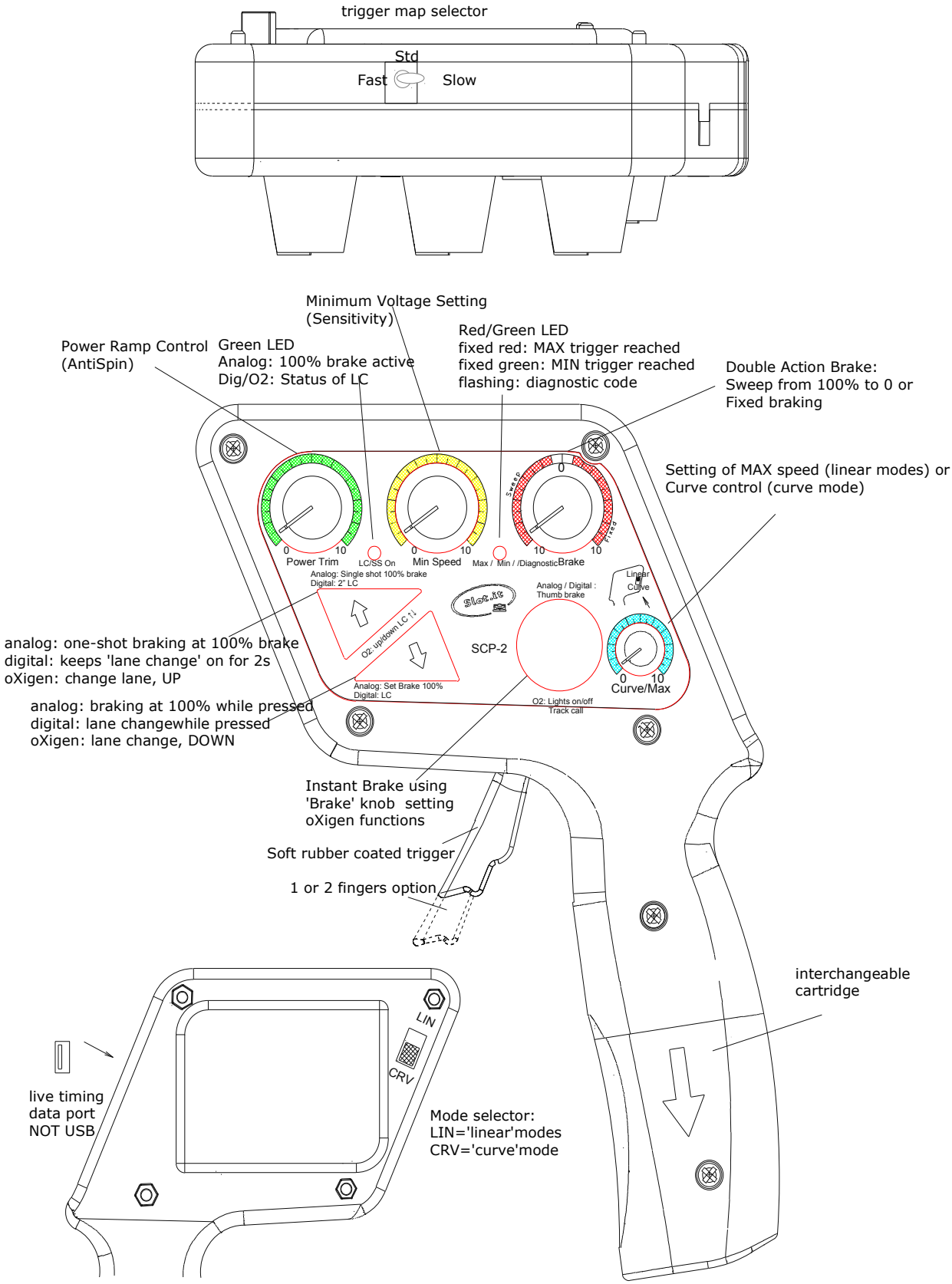
 (I) **La versione completa in italiano e disponibile dal sito Slot.it: www.slot.it**

 (E) **Descargue Ud. por favor el manual completo en Su idioma desde las paginas web Slot.it: www.slot.it**

 (D) **Das komplette Handbuch kann von der Slot.it Website (www.slot.it) heruntergeladen werden.**

 (F) **La version électronique du présent manuel est disponible en ligne sur le site, Slot.it site: www.slot.it, en plusieurs langues (Italien / Espagnol / Allemand / Français).**

Slot.it SCP-2 1.0



NEW IN SCP-2 Choosing the trigger

UK Your new Slot.it SCP-2 controller comes with a trigger option: you can install the 'short' (one finger driving) or the 'long' (two fingers driving). Use the provided screw.

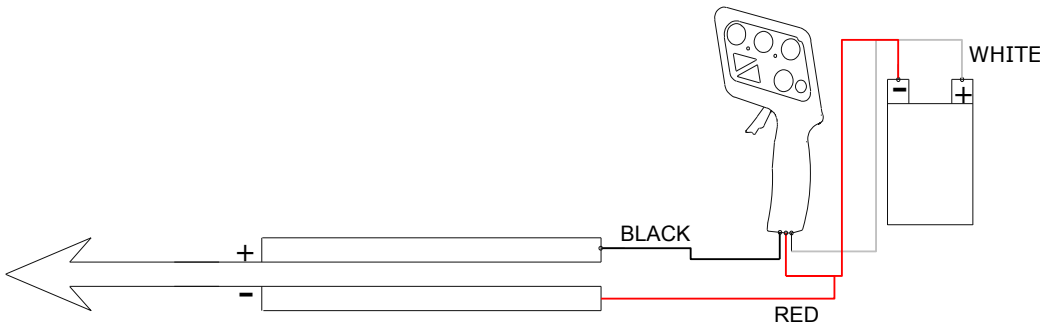
I Il vostro nuovo SCP-2 permette di installare un grilletto corto (per guida a un dito) o lungo (per guida a due dita. Usi la vite allegata ai grilletti.

E Su nuevo mando Slot.it SCP-2 viene con una opción del gatillo: se puede instalar el "corto" (conducción con un dedo) o el "largo" (conducción con dos dedos). Use el tornillo suministrado.

D Ihr neuer Slot.it SCP-2-Handregler kommt mit einer Tasten-Option: Sie können den 'kurzen' Abzugsgriff (zur Betätigung mit einem Finger) oder den 'langen' (für die Geschwindigkeitsregelung mit zwei Fingern) installieren. Verwenden Sie dazu die mitgelieferte Schraube.

F Votre nouveau contrôleur SCP-2 vous est livré avec une “gachette” optionnelle. Vous pouvez choisir d’installer la gachette courte (1 doigt) ou la longue (2 doigts). Utilisez la vis fournie avec le contrôleur.

QUICKSTART for ANALOG SYSTEMS (SCP-2 with analog cartridge)



UK The colour scheme of the SCP-2 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.

(I) I colori del cablaggio del controllore SCP-2 seguono lo standard US (Parma). E' nostra opinione che sia oltremodo insensato usare qualcosa di diverso dal rosso per il positivo e dal nero per la massa, ma dato che ormai questo 'standard' esiste, anche se con molta riluttanza abbiamo deciso di adeguarci.

Quindi: BIANCO per il + (alimentazione), ROSSO per il – (massa), NERO per il motore (pista). Nel caso utilizziate una scatola di connessione DS, i colori dei terminali corrispondono a quelli delle prese sulla predetta scatola.

In ogni modo: inserite il connettore BIANCO o GIALLO nella presa corrispondente al POSITIVO (+) della pista, ed il connettore ROSSO al NEGATIVO (-). Inserite il connettore NERO nella presa MOTORE della pista, e poi andate alla sezione **Quickstart common section** di questo manuale**.**

(E) El esquema de color de los cables SCP-2 sigue la codificación de color estándar de los EE.UU. (igual a los mandos Parma). En nuestra opinión, está realmente estúpido utilizar cualquier cosa diferente del rojo para la batería (+) y cualquier cosa con excepción del negro para la tierra, pero puesto que es una norma Standard establecida desde hace tiempo, decidimos, muy a pesar nuestro, seguir esta nomenclatura.

Definitivamente: El BLANCO es + (alimentación), el ROJO es - (tierra), el NEGRO es motor. Si Ud. tiene una caja de conexión DS, el color emparejará los colores existentes en los conectores femeninos de la caja.

De todas formas: inserte el cable WHITE/YELLOW (+) en el terminal POSITIVO de su pista, el cable ROJO (-) en el terminal NEGATIVO de su pista y el cable NEGRO en el terminal del MOTOR de su pista, después vaya al capítulo **Quickstart common section** de este manual.

(D) Der Anschlusscode der Kabelfarben entspricht der üblichen Anschlussmethode nach US-Standard (z.B. Parma). Obwohl es eigentlich sinnvoller wäre „rot“ für den Plus- und „schwarz“ für den Minuspol zu verwenden, haben wir uns trotz eigener Bedenken dazu entschlossen, dem international sehr verbreiteten Standard-Anschlusscode zu folgen.

Damit ist WEISS +, ROT - (Masse), und SCHWARZ (Stromzufuhr Motor). Wenn Sie eine DS Anschlussbox haben, sind die Anschlusskabel des Handreglers entsprechend der vorhandenen Farben der Anschlussbuchsen anzuschliessen.

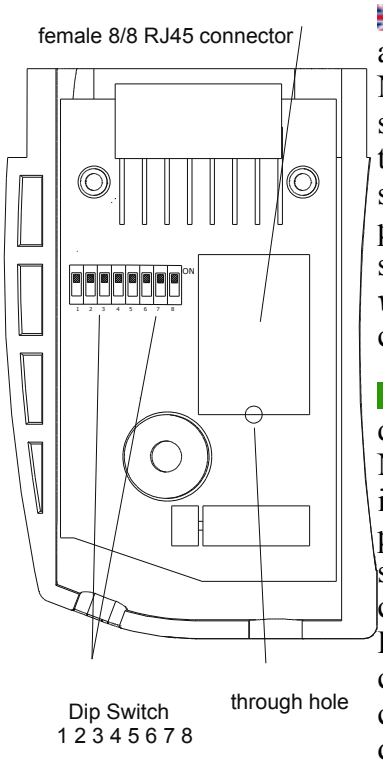
Der Anschluss der Reglers an die Bahn erfolgt nach dem Diagramm wie folgt, d.h. das Kabel WEISS/GELB ist am POSITIVEN (+) Pol, das ROTE am NEGATIVEN (-) Pol und das SCHWARZE (Stromzufuhr Motor) entsprechend an der Bahn anschliessen. Ist der Anschluss erfolgt, gehen Sie bitte zur Info **Quickstart Common Section**.

(F) La couleur des câbles de connexion du contrôleur SCP-1 suit le standard US (Parma). Selon nous, il n’est pas logique d’employer une autre convention de couleur que le rouge pour l’alimentation, le noir pour la terre. Cependant, le standard US faisant référence et ayant imposé son propre choix depuis longtemps, nous nous rallions, à contrecœur, à celui-ci.

Donc, le câble BLANC / JAUNE va au +, le câble ROUGE au – (terre), le câble NOIR à la piste. Si vous avez une boite de connexion DS, le schéma de couleur correspond aux prise femelle de celle-ci. Dans tous les cas, connectez le cable BLANC / JAUNE sur la borne + de votre piste, le cable ROUGE sur la borne – de votre piste et enfin le cable NOIR pour l’alimentation moteur de la piste.Ensuite, reportez vous au chapitre **Démarrage rapide** - partie commune.

Technical Specifications	
Power supply	6 to 24V
Maximum current: home racing cartridge high end cartridge	 5A 40A
Operating temperature	0 to 40°
Weight	270 g

QUICKSTART for DIGITAL SYSTEMS (SCP-2 with digital cartridge)



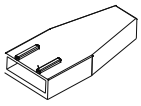
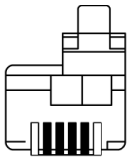
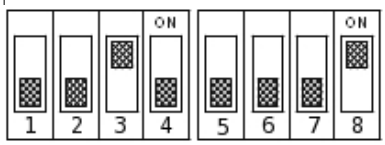
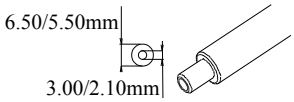
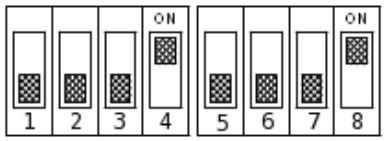
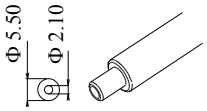
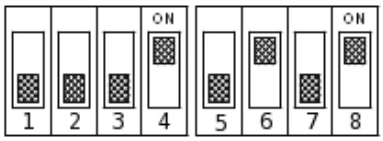
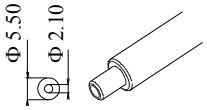
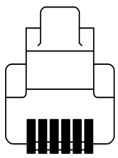
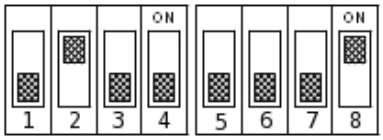
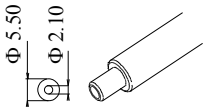
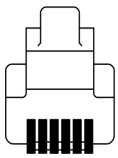
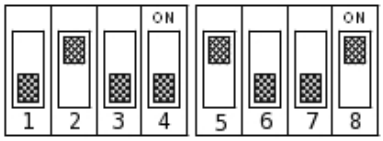
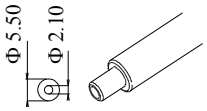
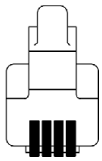
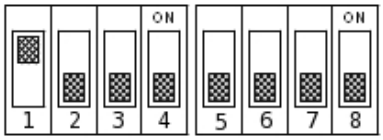
UK The Slot.it SCP-2 controller for digital tracks can be used with all available commercial digital systems for plastic tracks: Carrera, Ninco, Hornby and Tecnitoys. Differently from the controllers supplied by the abovementioned makers, which are sold together with the track, this controller is *active*, that is, it needs its own power supply. For all these systems we provide 'vampire' cables to bring power from the supply line to the controller. Further, each digital system has got its own different cable plug. The SCP-2 (*digital version only*) includes all the necessary cables to interface it to the control box of your digital system, as well.

I Il controllore SCP-2 per piste digitali può essere usato con qualunque sistema commerciale digitale per piste in plastica: Carrera, Ninco, Hornby and Tecnitoys, che sono reciprocamente incompatibili.Al contrario dei controllori allegati alle piste digitali prodotte da questi fabbricanti, lo SCP-2 è *attivo,* ossia, necessita di una sorgente di alimentazione per funzionare. Per tutti i sistemi forniamo cavi 'vampiro' per portare l'alimentazione dal trasformatore allo SCP. Per finire, ogni sistema digitale ha il proprio, differente tipo di cavo di connessione con la centralina. Per questo, nella confezione sono compresi anche tutti questi cavi per collegare lo SCP-2 alla centralina di controllo del sistema digitale (*solo versione SCP-2 digitale*).

E El mando Slot.it SCP-2 para las pistas digitales se puede utilizar con todos los sistemas digitales comerciales para las pistas plásticas fabricadas por: Carrera, Ninco, Hornby y Tecnitoys. En contrario a todos los reguladores fabricados por esos mismos fabricantes, para sus pistas digitales, este regulador es activo, es decir, necesita su propia fuente de alimentación. Como consecuencia, y para todos estos sistemas proporcionamos unos cables especiales llamados "vampiros" para obtener energía de la línea de transformadores al regulador. Además, cada sistema digital tiene su propio conector del cable la base digital; el SCP-2 (*solo version digital*) incluye todos los cables necesarios para conectarlo a la caja de control digital.

D Der Slot.it SCP-2 Regler für digitale Rennbahnen kann in Kombination mit allen bekannten kommerziellen digitalen Steuerungssytemen für Plastikschienen benutzt werden: Carrera, Ninco, Hornby und Tecnitoys. Serienmäßige Geschwindigkeitsregler der zuvor aufgeführten Rennbahn-Marken benötigen keine eigene Energiequelle. Im Gegensatz zu diesen herkömmlichen, markenspezifischen Handreglern verfügt der SCP-2 über eine aktive Funktionsweise und benötigt deswegen eine eigene Stromversorgung. Für die aufgeführten Digitalsysteme gibt es daher spezielle „Anschluss" – Kabelsätze, welche die Energieversorgung des SCP-2 sicherstellen. Hierzu hat jedes digitale System seinen eigenen markenspezifischen Kabelstecker. Der SCP-2 verfügt über alle Kabel die zum Anschluss an das jeweilige Digital-System (Interface) notwendig sind (*nur SCP-2 für Digitalsysteme*).

F Le contrôleur Slot.it SCP-1 peut être utilisé avec tous les systèmes numériques du marché, destinés au piste plastique : Carrera, Ninco, Hornby and Tecnitoys. À la différences des contrôleurs fournis en standard, par les fabricants mentionnés plus avant, le contrôleur SCP-1 est dit « actif », en ce sens qu'il doit être alimenté électriquement. Un seul de ces fabricants de système numérique possède un connecteur d'alimentation, non standard. Quel que soit le fabricant de votre système, nous fournissons des câbles « vampires » permettant d'alimenter le contrôleur SCP-1. D'autre part, chaque système numérique possède sa propre connectique. Le contrôleur SCP-1 (en version numérique seulement) est fourni avec tous les câbles permettant de se relier à l'unité centrale du système numérique.

	Power plug	Control plug		Dip switch
Carrera Pro-X and Digital 132	Custom 	MMJ 6/4		
Hornby SSD 4 car base (15V) 6 car base (12V)	6.5/3.0mm (4 cars base) 5.5/2.1mm (6cars base) round male jack 	jack submin 2.5mm		
Hornby SSD 6 cars C7042	5.5/2.1mm round male jack 	jack submin 2.5mm		
Tecnitoys SDS (Central unit 2500)	5.5/2.1mm round male jack 	RJ11 6/6		
Tecnitoys SDS (Pit box unit 2506)	5.5/2.1mm round male jack 	RJ11 6/6		
Ninco N-Digital	5.5/2.1mm round male jack 	plug 4/4		

UK Locate the Dip Switch on the controller's cartridge and set it to the position corresponding to the system you have (default from factory: SSD), using the table above as reference. Please note that in the above table, 'x' means 'don't care', i.e. for example for Ninco N-Digital, you must set switch number 1 to '1', and all the rest are ignored. Find the appropriate power cable, and connect it between your track's power supply and control box. Connect the male jack to the SCP-2 controller. Choose the control cable for your system, according to the table, and connect it to the SCP-2 (RJ45 end) and to your control box (side according to the table above). Note that to remove the control cable from the controller, you need to insert a pointed object into the small through hole in the plastic case, located underneath the female connector of the control cable, and press the cable's plastic tab upwards. Now go to the **Quickstart common section** chapter.

Ⓘ Trovate i Dip Switch sulla cartuccia e, utilizzando la tabella come riferimento, selezionate la posizione corrispondente al vostro sistema (regolazione di fabbrica: SSD). Notate che nella tabella, 'x' significa 'indifferente', ossia per esempio, per attivare il pulsante in modo Ninco N-Digital, l'interruttore 1 deve essere posizionato su '1', a tutti gli altri sono ignorati. Selezionate il cavo di connessione adatto per l'alimentazione, e inseritelo fra alimentatore e base del sistema. Collegate il maschio del cavo di alimentazione allo SCP. Scegliete, sempre con riferimento alla tabella, il cavo di controllo e collegate lo SCP-2 (lato RJ45) con la centrale base (connettore secondo la tabella). Notate che per rimuovere il cavo di controllo dallo SCP, è necessario inserire un oggetto appuntito nel piccolo foro della plastica della cartuccia digitale, posizionato sotto il ricettacolo femmina del connettore RJ45, e spingere per sganciare il piccolo dente plastico di ritenuta del cavo. Adesso procedete al capitolo **Quickstart common section.**

Ⓔ Localice el interruptor “dip” en el cartucho digital del mando y lo ponga a la posición que corresponde al sistema que tiene (originalmente esta preparado para SSD), con la tabla arriba como referencia. Observar en la tabla anterior: 'x' significa 'no interesa', es decir por ejemplo para Ninco N-Digital, debe fijar el interruptor número 1 a “1”, y no se hace caso a todo el resto de los “dip”. Encuentre el cable de transmisión apropiado, y conéctelo entre la fuente de alimentación de su pista y la caja de control. Conecte también el conector masculino con el regulador SCP. Elija el cable de control para su sistema, según la tabla, y conéctelo con el SCP-2 (extremo RJ45) y con su caja de control (posición según la tabla arriba). Observe que para quitar el cable de control del regulador es necesario insertar un objeto en forma de cuña en el pequeño agujero de la caja plástica del cartucho, situado por debajo del conectador femenino del cable de control, para poder así presionar la lengüeta plástica del cable hacia arriba. Ahora puede ir al capítulo **Quickstart common section.**

Ⓓ Die DIP-Schalter auf dem SCP-2 Modul sind auf die richtige Position für Ihr Digital-System entsprechend der Tabelle einzustellen (Die werkseitige Einstellung ist für die Regelung des SSD Systems ausgelegt). Bitte beachten Sie, dass in der oben genannten Tabelle 'x' keine Rolle spielt, z.B. für N-Digital von Ninco müssen Sie nur den Schalter Nr. 1 auf '1' stellen und allen restlichen DIP-Schalter werden dann ignoriert. Anschließend ist das passende Energieversorgungskabel für den SCP-2 zwischen die Stromversorgung (Transformator) der Rennbahn und dem Digital-Modul anschließen. Dann kann der Stecker an den SCP-2 Regler angeschlossen werden. Wählen Sie nun das Kontrollkabel für Ihr System anhand der Tabelle aus und verbinden Sie damit den SCP-2 (Ende RJ45) mit der Digital-Station (Seite entsprechend der Tabelle oben). Um das Kontrollkabel vom SCP-2 zu entfernen, muss ein spitzer Gegenstand in die kleine durchgehende Bohrung im Plastik geschoben werden (welches sich unter der Buchse des Kontrollkabels befindet), um das Kabel über die Plastiknase nach oben drücken zu können. Ist der Anschluss erfolgt, gehen Sie bitte zur Info **Quickstart Common Section**.

Ⓕ Veuillez localiser le banc de micros switch, sur la cartouche numérique de votre contrôleur SCP-1, et positionnez les en fonction du système que vous possédez (réglage par défaut : SSD Hornby), en faisant référence au tableau ci-avant. A noter, que dans la colonne « Position des swicths », les exemples de configuration de switch où figure un ‘ x’, signifie que la position de celui-ci n’a pas d’importance : exemple, si vous avez un système numérique Ninco N-Digital, vous devez positionner le premier swicth à 1, les autres ne seront pas pris en considération. Trouvez le câble approprié à votre système numérique et connectez le entre l’alimentation électrique et l’unité centrale. Connectez la prise jack mâle à votre contrôleur SCP-1. Choisissez le câble adapté à votre système numérique et reliez la prise RJ-45 à votre unité centrale en faisant référence au tableau précédent. Afin d’enlever le précédent câble de votre SCP-1, vous devrez insérer un objet pointu dans l’orifice du cache plastique situé en-dessous du connecteur femelle RJ45 et pressez en tirant vers le haut le petit onglet en plastique de la prise RJ-45 mâle, avant de retirer le câble. Maintenant, allez au chapitre **Quickstart Common Section**.

QUICKSTART for oXigen SYSTEMS (SCP-2 with oXigen cartridge)

UK . The oXigen Slot.it wireless digital system uses a specific cartridge on the SCP2. Please refer to the 'oXigen base manual', downloadable from the oXigen area of the Slot.it web site, for further information.

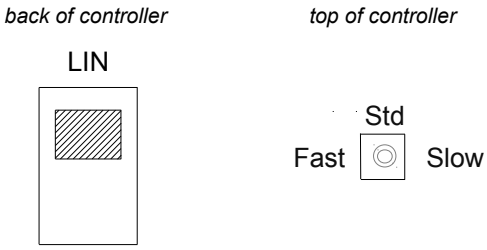
I . Il sistema digitale wireless oXigen Slot.it utilizza il pulsante SCP2 con una specifica cartuccia radio oXigen. Fate riferimento al 'manuale base oXigen, scaricabile dalla sezione oXigen delle pagine web Slot.it per le istruzioni di funzionamento del sistema.

E . El sistema digital wireless oXigen Slot.it utiliza el mando SCP2 con un cartucho específico radio oXigen. Consulte el manual base oXigen, descargable desde la sección oXigen de las paginas web Slot.it para las instrucciones del funcionamiento del sistema.

D . Das Betriebssystem Slot.it „oXigen wireless digital“ zur drahtlosen digitalen Rennbahnsteuerung verwendet ein spezielles Anschluß-Steckmodul beim SCP-2 Handregler. Bitte beachten Sie die "OXIGEN Basic Manual“ Anleitung zum Herunterladen im Bereich „oXigen“ auf der Slot.it Website für weitere Informationen.

F Le système oXigen Slot.it sans fil utilise une cartouche spécifique sur le SCP2. S'il vous plaît se référer au 'oXigen manuel de base', téléchargeable à partir de la zone oXigen du site web Slot.it, pour plus d'informations.

QUICKSTART common section



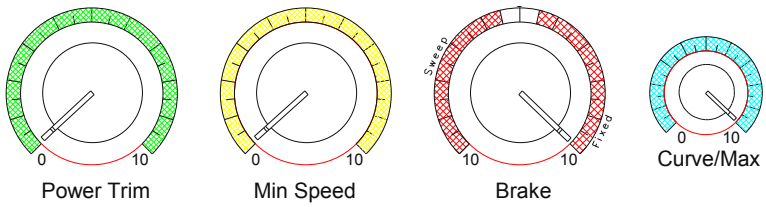
UK Move the slider on the back of the controller to the LIN position, and the top switch on STD.

I Posizionare l'interruttore sul retro del controllore sulla posizione LIN, e l'interruttore sulla parte superiore su STD

E Mover el interruptor en la parte posterior del regulador a la posición LIN, y el interruptor en la parte arriba a la posición STD.

D Den Schalter auf der Rückseite des SCP-2 auf die „LIN“ Position und der Schalter auf irgendeine Position STD schieben.

F Positionner l’interrupteur figurant au dos du contrôleur SCP-1 sur la position LIN et le switchs sur '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. In particular, advanced users should read the chapter named '*Reprogramming the SCP-2*')

(I) Ruotare le manopole Power Trim e Min Speed completamente in senso antiorario. Ruotare la manopola Brake e Curve/Max completamente in senso orario.

Premere il grilletto: la macchina dovrebbe partire. Regolare la manopola 'Min Speed' fino ad ottenere la giusta velocità minima del modello, che dipenderà dalla pista, dal motore, dalla tensione e dallo stile di guida. Regolare poi la manopola Curve/Max per adattare la curva alla risposta desiderata. *Per favore, leggete ora il resto del manuale. Please. In particolare, gli utenti esperti si assicurino di leggere il capitolo* 'Riprogrammare lo SCP-2'.

(E) Dar vuelta a los pomos 'Power Trim' y 'Min Speed' totalmente a la izquierda y dar vuelta a los pomos 'Brake' y 'Curve/Max' totalmente a la derecha.

Presionar el gatillo y para mover el coche. Ajustar el pomo 'Min Speed' para conseguir una buena velocidad de arranque, que depende de la pista, coche, estilo de pilotaje y voltaje. Entonces, ajustar el pomo 'Curve/Max' para obtener la curva de respuesta preferida. Disfrute, y después, lea el resto de este manual. *Por favor, lea Ud. ahora el manual completo. Por favor. En particular, los clientes expertos lean el capítulo* 'Reprogramar el SCP-2')

(D) Die 'Power Trim' und 'Min Speed' Drehknöpfe vollständig nach links drehen. Die 'Brake' und 'Curve/Max' Drehknöpfe vollständig nach rechts drehen.

Die Regeltaste betätigen und das Auto sollte nun fahren. Anschliessend kann der 'Min Speed' Drehknopf justiert werden um eine gutes Ansprechverhalten zu erzielen, welches jeweils abhängig von der Bahn, dem Auto und der Betriebsspannung ist. Dann den 'Curve/Max' Drehknopf justieren, um ein optimal - auf die Bahn und Fahrzeug individuell – abgestimmtes Regel-/Fahrverhalten erzielen zu können. *Jetzt, bitte, lesen Sie den Rest dieses Handbuchs. Bitte. Insbesondere sollten fortgeschrittene Anwender lesen Sie das Kapitel mit dem Namen* 'Reprogramming the SCP-2')

(F) Tournez les boutons «Power Trim» et «Min Speed» complétement à gauche (dans le sens inverse des aiguilles d'une montre). Tournez les boutons «Brake» et «Curve/Max» complétement à droite (dans le sens des aiguilles d'une montre).

Utilisez l'accélerateur de votre SCP-1 pour faire démarrer votre voiture sur la piste. En jouant sur le bouton «Min Speed», vous pourrez choisir la vitesse minimale de votre véhicule. Cela doit être fait en fonction du tracé de votre circuit, de la voiture, de votre façon de piloter et du voltage d'alimentation électrique. Ensuite utilisez le bouton «Curve/Max» pour adapter la courbe de réponse de la poignée à votre souhait. *Alors s'il vous plaît, lisez le reste de ce manuel. S'il vous plaît. En particulier, les utilisateurs experts devraient lire le chapitre nommé* "Reprogrammation de la SCP-2 ')

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

(I) La versione completa in italiano e disponibile dal sito Slot.it: www.slot.it

(E) Descargue Ud. por favor el manual completo en Su idioma desde las paginas web Slot.it: www.slot.it

(D) Das komplette Handbuch kann von der Slot.it Website (www.slot.it) heruntergeladen werden.

(F) La version électronique du présent manuel est disponible en ligne sur le site, Slot.it site: www.slot.it, en plusieurs langues (Italien / Espagnol / Allemand / Français).

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-2 works

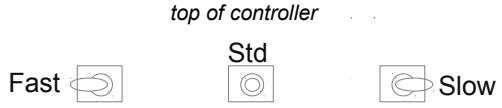
UK The Slot.it SCP-2 is a sophisticated, microcontroller based, speed controller for slot cars. It has a PWM output for both power and brake, plus a lot of other features.

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'

NEW IN SCP-2 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

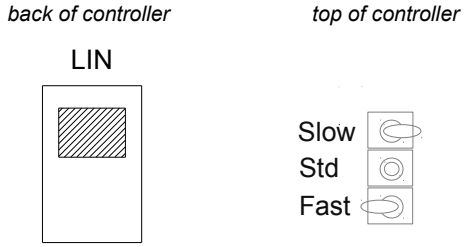
1. **LINEAR with step (mode 1):** the relationship between the trigger and the voltage output is a straight line. The controller, when the trigger is fully pressed, will always provide 100% power. Due to its innovative and in our opinion clever, strategy, this mode has a lot of flexibility and can help in the most difficult situations.
2. **LINEAR with max speed limiter (mode 2, "kid's mode"):** the relationship between the trigger and the voltage output is a straight line, but when the trigger is fully pressed, optionally, the voltage can be reduced down to a selectable minimum of 35% of the available voltage. This is extremely useful, for example, for children.
3. **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:
4. **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.

Mode 1 – LINEAR with step

(UK) Entering Mode 1

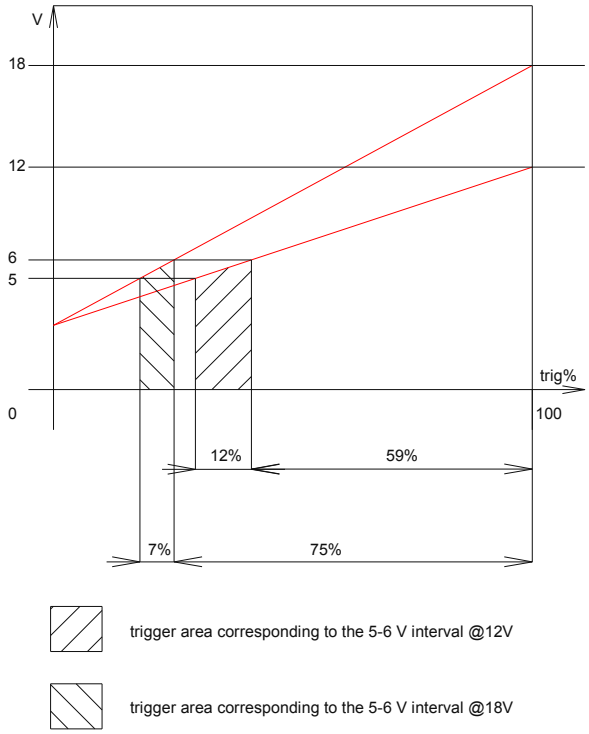
Mode 1 is selected by putting the switch on the back of the controller to the 'LIN' (top) position, and the switch on the top side, to any position except the '00' one:



(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.

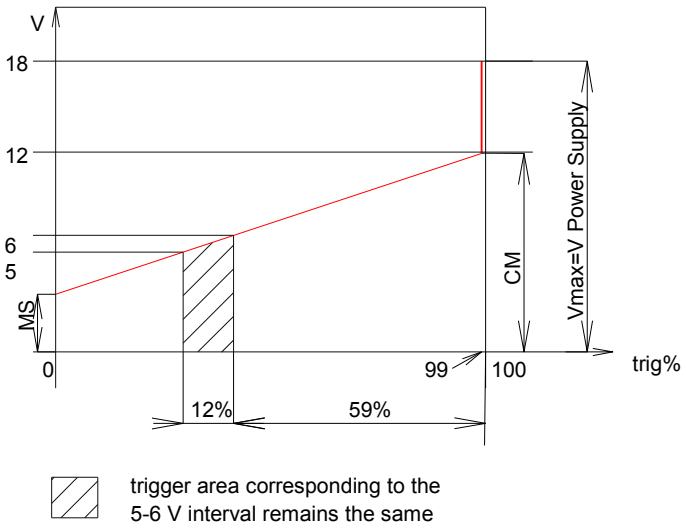
Come think about it, a basic truth applies: more or less, *the speed of a given car in a given turn is largely independent of the motor power*, that is, provided your motor is powerful enough, and most motors are powerful enough to de-slot a car in a turn, the speed in a turn depends on many factors 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

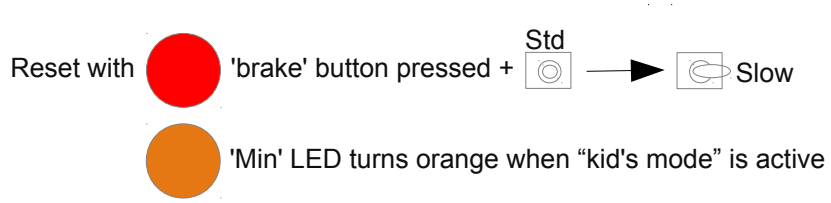
It is an easy to tune, very effective strategy.

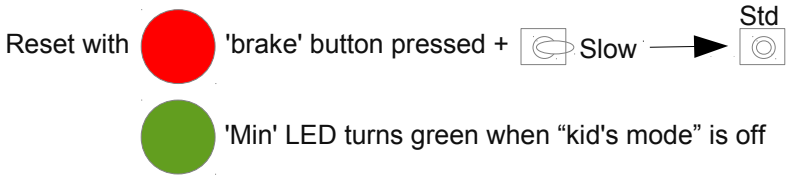
Mode 2 – LINEAR with max speed limiter - explained

(UK) Entering Mode 2 ("kid's mode")

Mode 2 is designed to give a way to reduce the top speed of the car, which is especially useful for beginners or young kids.

NEW IN SCP-2 Being a 'special' mode, it is accessed through a protected procedure, as follows: reset (power on) the controller with the round button pressed and move the switch to 'slow' from 'std' while keeping the brake pressed. To terminate Mode 2, follow the same procedure but with an opposite transition of the switch. Mode two is indicated by an orange light (instead of green in the 'Min' LED.





Step by step instructions:

To **enter mode 2** (kid's mode):

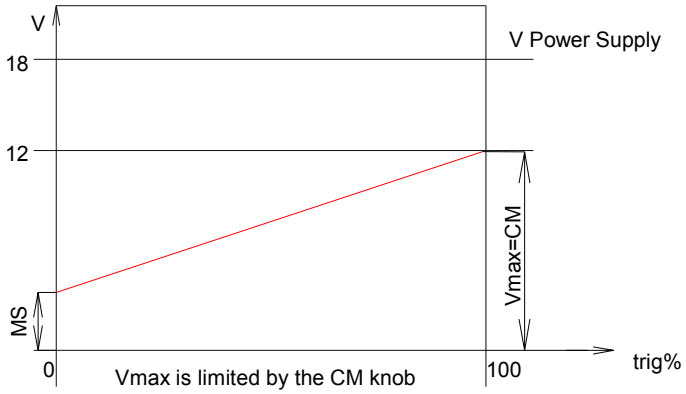
- switch off the controller
- move the switch to the 'std' position
- slide the switch on the back of the controller to the 'LIN' (top) position
- press and *keep pressed* the 'round' brake button
- power on the controller (keeping the round brake button pressed)
- move the switch to 'slow' from the 'std' position
- release the round button

To **exit mode 2** (kid's mode), the procedure is the same but the switch must :

- switch off the controller
- move the switch to the 'slow' position
- slide the switch on the back of the controller to the 'LIN' (top) position
- press and *keep pressed* the 'round' brake button
- power on the controller (keeping the round brake button pressed)
- move the switch to 'std' from the 'slow' position
- release the round button

(UK) Using Mode 2

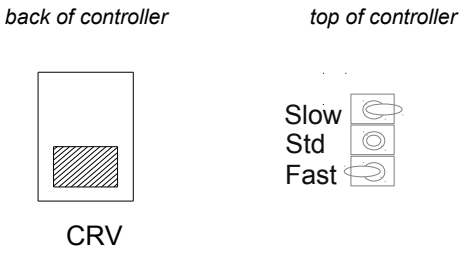
Mode 2 does everything mode 1 does, but with a very important difference: the maximum voltage is always limited to the value set by the CM knob. This is extremely useful when, for whatever reason, top speed should be reduced, like for example when your children are playing with vintage slot cars...


V
V Power Supply
18
12
Vmax=CM
MS
0
Vmax is limited by the CM knob
100
trig%

Mode 3 – CURVE - explained

(UK) Entering Mode 3

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



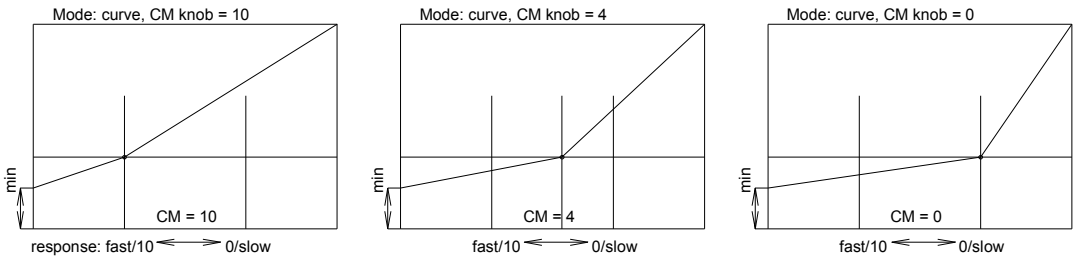
(UK) Using Mode 3

The 'Curve' mode is very flexible. By appropriate adjustment of the Curve/Max CM knob, together with the position of the dip switches (DS), the response curve can be custom tailored.

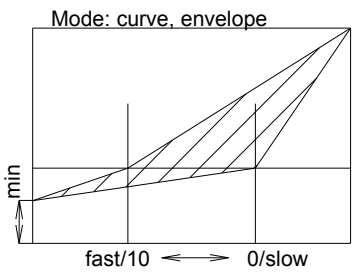
To understand how it works, consider that the curve of the trigger position/Voltage relationship is built by three points:

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.



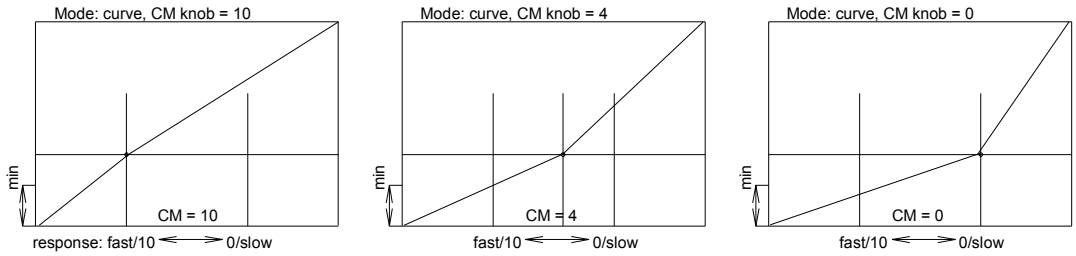
Example of curves with given MS and DS, CM change



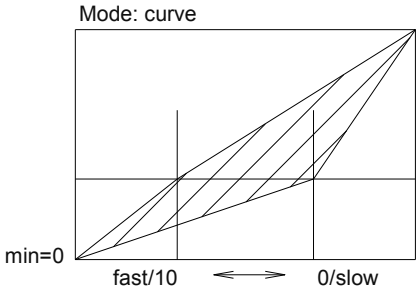
Envelope of curves with given MS and DS, CM change

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?

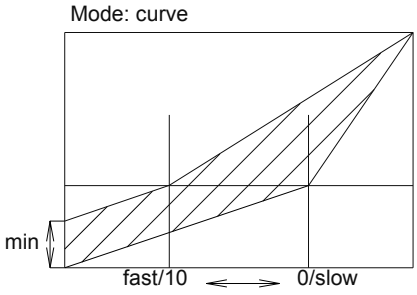


Example of curves with MS=0, given DS, CM change



Envelope of curves with MS=0, given DS, 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



Envelope of curves with given DS, MS and CM change

knobs:**NEW IN SCP-2** 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.

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.

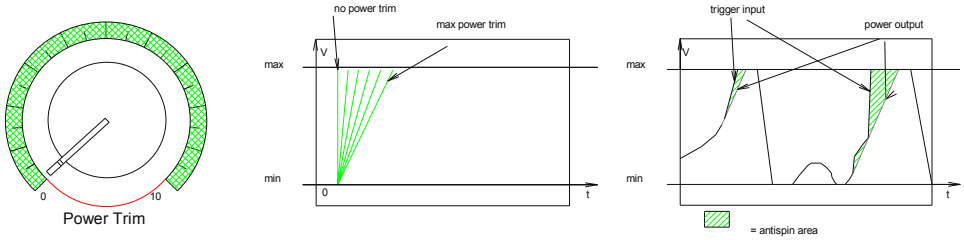
Exit mode by quickly pulling the trigger to full power and releasing it.

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-2's controls

UK The SCP-2 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.

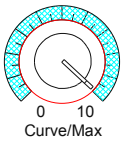


The PT knob sets the maximum accepted 'slope' for a power increase: if the power increase ratio is above this slope, the 'power trim' slope is applied instead. In other words: if the trigger is pulled sharply, the power increase ratio is very high: in this case, the power trim strategy releases the power 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.

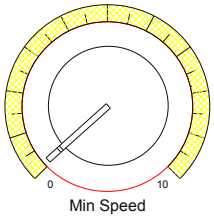


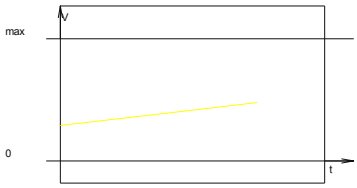
“linear”, and “linear with speed limit” modes: if you have *not* read the explanation on these two modes, then now it's probably time to read the relevant chapter. If you have, then this knob sets the maximum speed in both cases.

“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.

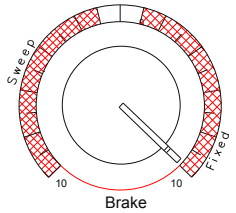
UK **Min Speed (MS)**: this knob sets the starting speed of the car, i.e. the minimum voltage which is applied to the track, when the trigger is pulled just enough to leave the 'braking' area. Also known as sensitivity, in terms of a traditional resistor based controller, it is similar to changing the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

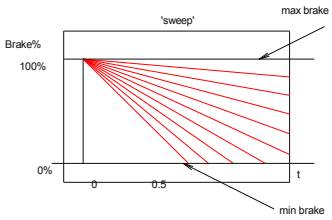


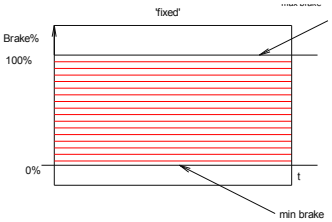


UK ***MS for digital systems***: there is no difference between the analog and digital controller as far as the MS is concerned.

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.

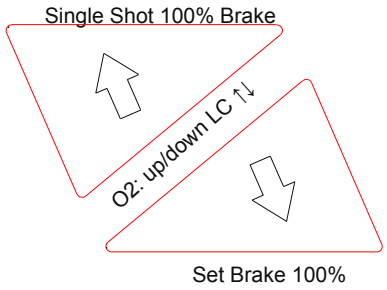
The 'fixed' mode, clockwise, is the 'standard' mode of most, if not all, other controllers with adjustable braking: depending on the dial position, you get a stronger or weaker braking according to the knob setting.

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

oXigen: works as analog.
Hornby SSD: braking can in fact be adjusted with the BK knob as you would on an analog system. Only, the possible settings are 100%, 80%, 60%, 40%, and 20%.
Ninco N-Digital: either brake 100%, or no brake.
Tecnitoys SDS: no braking is provided by Tecnitoys on their system, so there's no braking available with the SCP-2, either.
Carrera: always 100% brake when available from the track.

Hand brake (analog and digital mode):Brake overrides (analog mode):

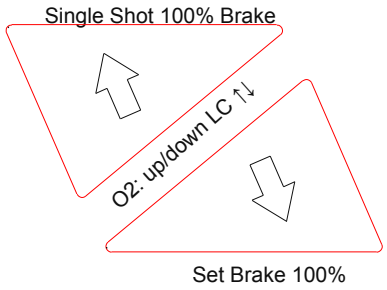
UK There are two ways to change the brake setting on the fly, and temporarily, without altering the base setting selected by the BK knob:



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 (digital mode):

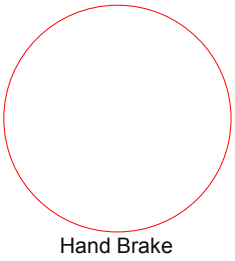
UK There are two ways to change lane:



1. the 'UP' arrow button is a 'Latched Lane Change' command: what it means is that once pressed, for 2 seconds it keeps the Lane Change command active, like if the driver was keeping the Lane Change command pressed himself. The advantage of this is that, once pressed, the driver can concentrate on driving, and the SCP-2 will take car of lane changing, for the next two seconds. A further pressing of the 'UP' arrow when the strategy is active will switch it off.
2. the 'DOWN' arrow button, while pressed, activates the Lane Change mechanism.

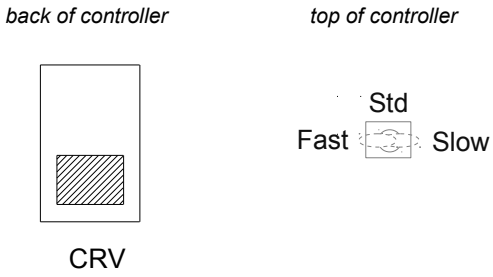
If used with an oXigen digital cartridge, the arrow direction is used to change lane according to the Selective Lane Changing protocol. In other words, arrows correspond to left or right changing. Refer to oXigen manuals for further explanations.

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.

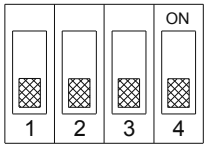


CRV/LIN selector and Switch (top of controller):

UK The CRV/LIN 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-2.



DIP Switches (digital cartridge only):



UK The DIP Switches located on the controller's digital cartridge are used for selection between the different digital systems. Please refer to the Quickstart for Digital chapter for a thorough explanation

Live Timing (Telemetry) interface:

UK ***The USB-like data port on the side of the controller is NOT a USB PORT. Do NOT connect it to your PC or data key.*** It does not harm the SCP-2 or the PC, but is completely useless to do so.

The SCP-2 provides a data port for telemetry transmission to PC. However, to do so, an optional interface box (which will be piggyback mounted on the controller itself) must be used.

Telemetry system handles all driving data (throttle, brake, knobs, etc), shows them graphically in real time on PC screen, and stores it for future retrieval. It's a very handy system to compare car setup, driver's skills, or simply to keep track of your races.

Lap time and sector times are recorded in telemetry as well.

This topic is fully covered in the manuals of the interface box and software.

How does the SCP-2 protect itself

UK As the SCP-2 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".

a word about the trigger readout and reprogramming the controller curves

UK The SCP-2 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-2 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 controller (November 2010) adds 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 and now SCP-2. 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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