

Scorpius Multi Purpose Decoder

The aim: To supply to market one easy to use, multi purpose, multi protocol product, small in size, hardware/firmware rich product that can perform a multitude of tasks for multiple brands. The enthusiast can upload various products into the decoder. Downloads from the website are included in the initial cost of the product. Imagine if your Scorpius Carrera compatible MPD lane changer could re-purposed as a Scorpius Scalextric Sports Digital compatible car decoder? Or as a Scorpius Lane Change decoder? Or as a wireless light board for WAM users?

The solution: Develop hard/firm/soft/appware that can perform a multiple tasks on multiple platforms. Thus saving development costs and time. Resulting in cheaper more flexible products.

Functionality: Car decoder. Smart Lane Change decoder. Location decoder. Light decoder (analogue WAM users). Dongle (with resistive output for Scalextric C7042/7030 and Carrera 124/132 Digital CU).

Product description: A 26x13mm multi-protocol, hardware rich, multi-function chip. The product can be fitted to any slot car, DPR hatch, track cavity or powerbase input.

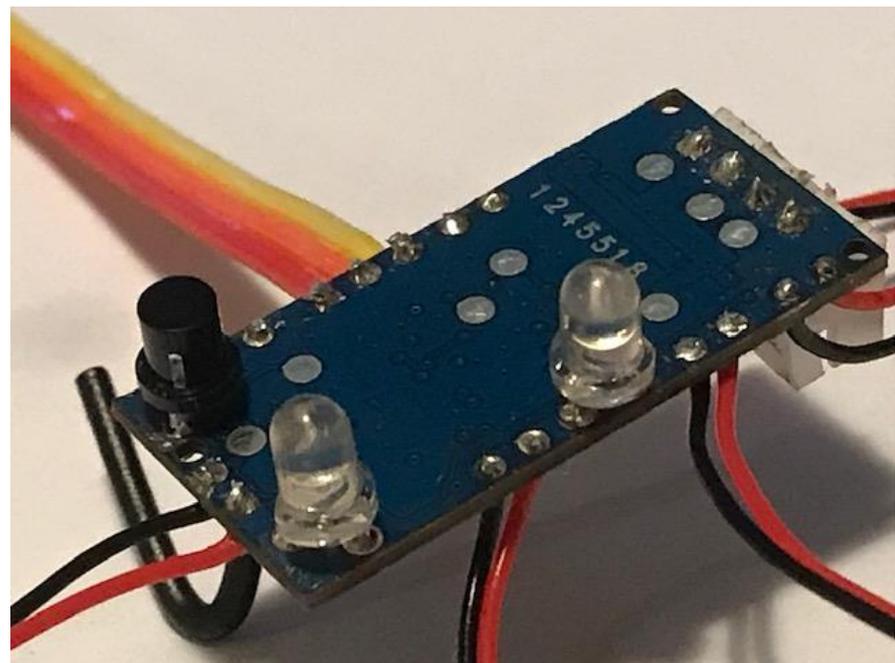
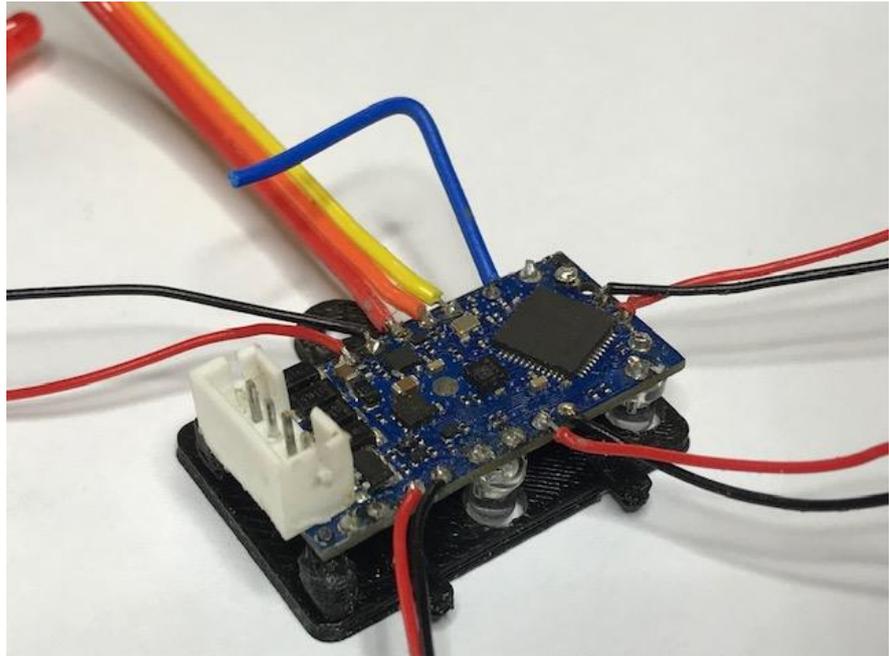
The decoder is designed to fit a DPR hatch using the Scorpius quick release mechanism. It is also designed to fit easily within the cavity of Carrera, Scalextric, Ninco, etc track systems. It can run on 8.5-18V AC or DC using any polarity. It has 3 power drive circuits, LED driver outputs and 1 phototransistor circuit, hall sensor, protection, headlights with high beam, brake lights and proprietary RF and BLE connection.

The Brands: In alphabetical order: Carrera 132/124 Digital, Scalextric Sport digital, Scorpius Wireless, Technitoys SCX.

Added functionality: Some functions like lane changing may have additional features added over proprietary functionality, example upgraded brakes, lights, ULTIMA, a combination of AC (anti collision function) and PEARL (programmable electronically activated race line) and location.

Versions: There is only one version of the MPD. However the default firmware is Car Decoder, which encompasses the brands mentioned.

The products are listed by brand compatibility.



Scorpius Multi-Protocol Multi Purpose wireless decoder

1. Scorpius MPD Carrera car decoder.

This will have 2 modes where the Scorpius Carrera compatible dongle comes into play.

The first mode is strictly native and operates on DC and track packets.

Install and use decoder as you would any Carrera decoder. Standard Carrera controllers, lane changers and CU are used.

The second mode is wireless only. Standard Carrera controllers, lane changers and CU are used. Track packets are ignored and the MPD installed in the car gives priority to wireless command.

Installation: Install and use decoder as you would any Carrera decoder. Scorpius controllers, Scorpius Carrera compatible dongle, Carrera lane changers and Carrera CU are used.

How does it work?: The CU and cars MPD both receive the same signal simultaneously from the Scorpius controller and access CU functions. The MPD can decide to take notice of track packet commands if required, such as coding ID.

In simple terms the dongle is to trigger lane changers and the controller, in conjunction with the MPD car decoder gives upgraded throttle and brake resolution, light control, traction control, tacho, min speed, max speed, speed limiter, throttle profiling, simulations and reconfiguring.

Advantages: Throttle steps AND brake steps are now increased to 256. Speed limiting, Min Speed, Max Speed, car lights, brake and throttle settings are all accessible on the Scorpius controller. The driver experience is enhanced accordingly.

Decoder size reduced from OEM 631 sq.mm to 338. A reduction in size of 47%.

As a default the car now also has Carrera and Scorpius hardware embedded ready to use on those systems without any reconfiguration.

Installation Carrera cars: Power in/out and lights front/rear are JST plug compatible between MPD and Carrera cars. Just plug in.

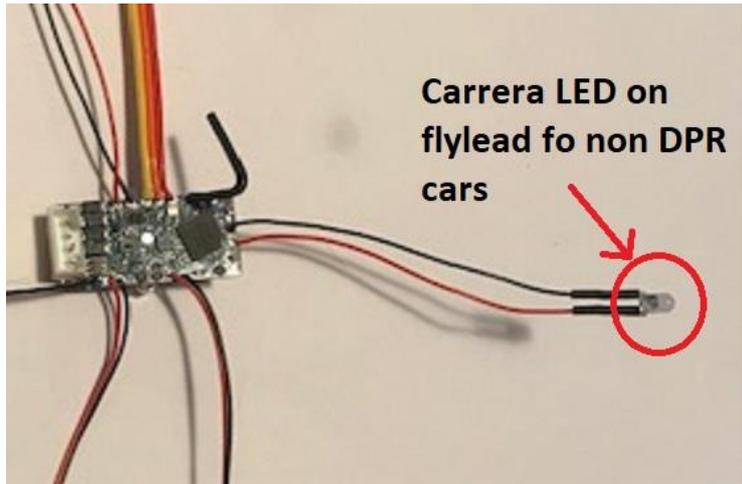
A 3mm IR LED is supplied and fitted on a 70mm fly lead for track comms using thin 28AWG cable for easy and unobtrusive install 12mm offset to the left as per OEM.

Installation non DPR compatible cars: The Scorpius MPD can be installed on the chassis when not chipping a DPR compatible car and solder wires as per normal.

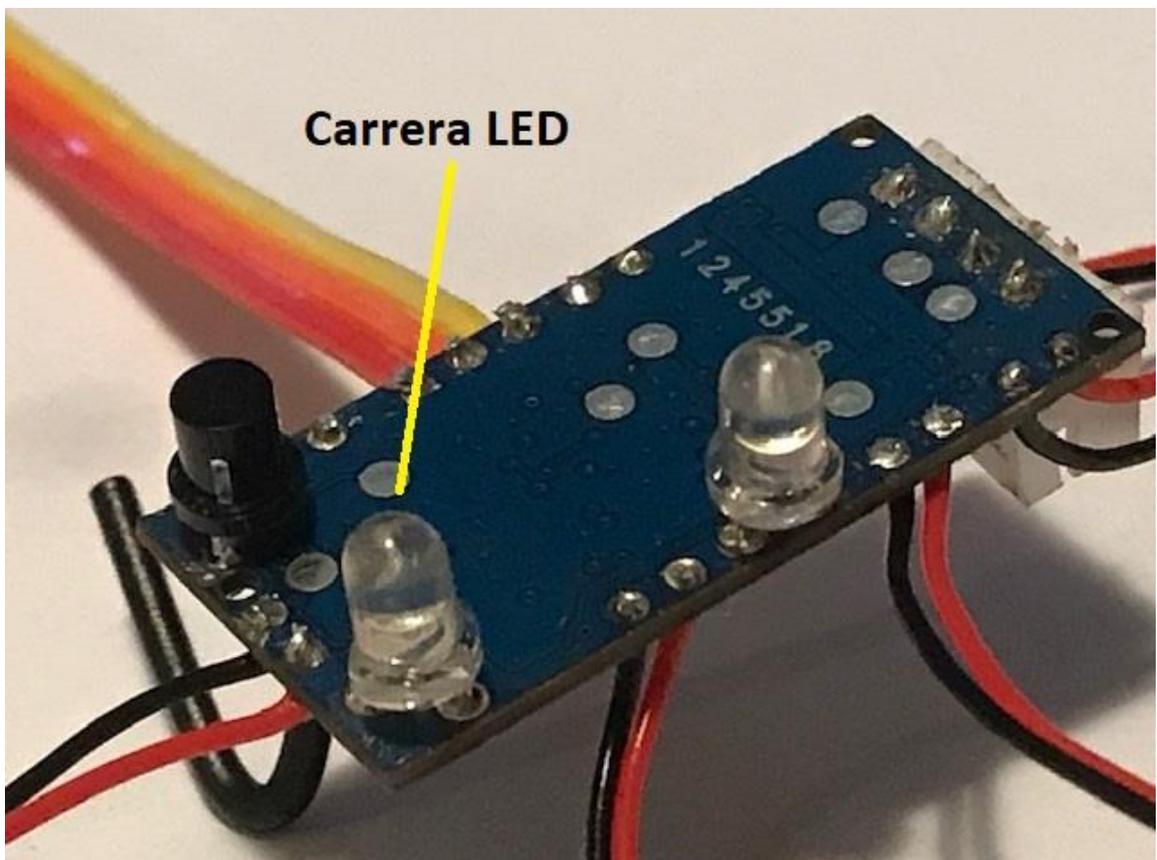
A 3mm IR LED is supplied and fitted on a 70mm fly lead for track comms using thin 28AWG cable for easy and unobtrusive install 12mm offset to the left as per OEM.

Installation DPR compatible cars: The Scorpius MPD can be installed straight into any DPR compatible car (Scalextric and Pioneer cars) using the Scorpius quick release DPR hatch which has been designed and printed. A Scalextric Sport Digital compatible JST plug is embedded on the MPD for universal power in. The LED is mounted 12mm left of centre as per OEM.

Flexible LED installation: Choose either the DPR (Digital Plug Ready) or traditional installs by using the LED supplied on a 70mm flylead (28AWG).



Picture showing Scorpium Carrera compatible decoder mounted in a Scorpium DPR hatch.



2.Scorpius MPD Carrera Lane Brain

The Scorpius MPD replaces the Carrera OEM lane change chip. Download the product off the Scorpius website then upload into your Scorpius MPD unit. The MPD is now in Carrera lane changer mode. Anti collision is available but liven flipper function is not applicable to Carrera digital.

Installation: The phototransistor hardware is embedded into the track as per Carrera sensors. A unique ID may be given to each MPD. This is for use in race management software for various tasks requiring track location of cars.

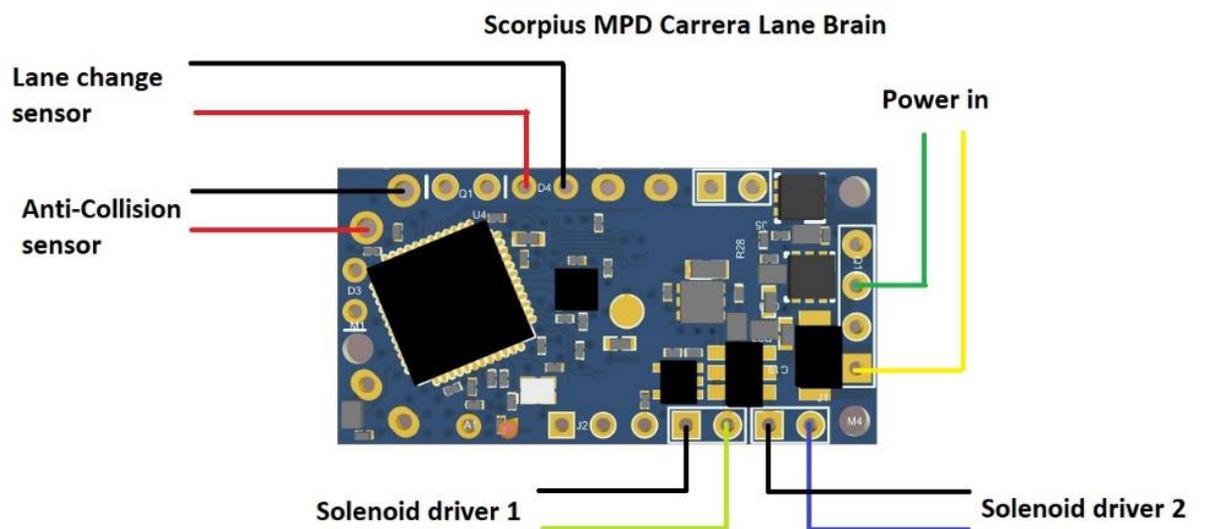
Power is vamped off the track rails in any polarity.

Track packet data is picked up by the MPD and lane changing functions carry on as per normal.

Applications:

New timber tracks.

Upgrading existing lane changers



3. Scorpius MPD Carrera CU dongle.

The MPD is configured to Carrera Throttle Dongle mode. A separately sold enclosure with connecting cable and battery holder Will be available separately. The unit can plug into ports 1-4 on the CU and 5-6 on the extension unit.

How's it work? : The assembled unit replicates the output of the OEM wired controller and reproduces resistance values required to perform throttle and lane change functions.

Up to 6 dongles can be used per Carrera CU.

What's it consist of?: Casing, Multi Purpose Decoder, 9V battery holder, connection lead and plug.

Power: Runs on 9V battery power. Batteries will last 3 months minimum average use.



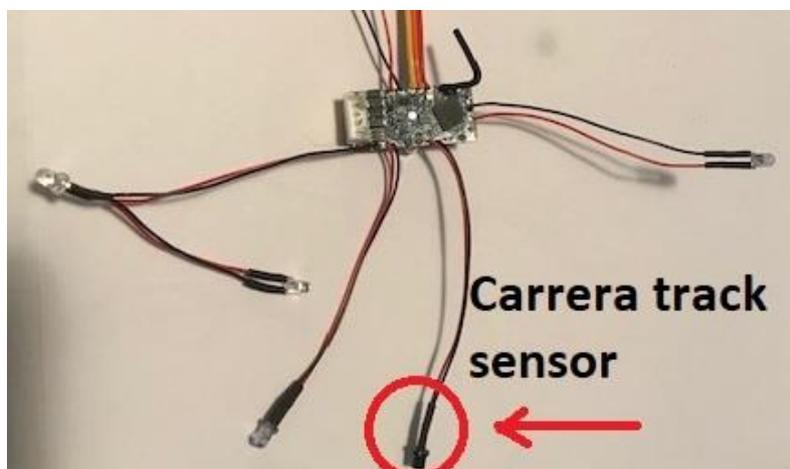
Picture showing Scorpius Carrera compatible wireless throttle dongle with Carrera connector for use with Carrera CU and Scorpius controllers.

4. Scorpius MPD Carrera Locator Pro

The MPD is configured to Carrera locator decoder.

Track location telemetry. MPDs can be assigned to be any number of track location sensors. Examples. Lap counting, pit lane detection, entering and leaving, pit bay detection, entering and leaving, safety car detection entering and leaving, pace car detection entering and leaving. With **RCD now supporting Carrera Digital**, Scorpius functions can be ported over, like the Lane Brain set up page which could be renamed as MPD set up page. Lots of possibilities here for Carrera enthusiasts.

This relies on third party software developers to supply support. RCD will be implementing this once released.



5.Scorpius MPD Scalextric Sport Digital Lane Brain

The Scorpius MPD replaces the Scalextric OEM lane change chip. Download the product off the Scorpius website then upload into your Scorpius MPD unit. The MPD is now in Scalextric Sport Digital compatible lane changer mode.

Functionality: Anti-collision, liven flipper function, PEARL (Programmable Electronically activated Race Line) and wireless track telemetry will all be standard.

How does PEARL work? A register of each drivers lane change preferences are stored in the SMART decoder. Each time a car is detected its ID is looked up in a registry and its preference applied, ie change lanes or do not change lane command is activated. Anti-collision is applied by default but can be deactivated for the purists. Flipper polarity is activated according to the cars requirements.

Ultima: When employing best line, liven flipper and anti-collision all in one we refer to it as the ULTIMA mode. Best suited to best line tracks changers.

Track location telemetry: MPDs can be assigned to be any number of track location sensors. Examples. Lap counting, pit lane detection, entering and leaving, pit bay detection, entering and leaving, safety car detection entering and leaving, pace car detection entering and leaving.

Race software compatibility: Compatible to SSDC and RCD (By Race Coordinator) race software.

How's it work?: OEM track packets are received by the Scorpius MPD and responds to OEM commands in an identical fashion as per native.

Installation: The phototransistor hardware is embedded into the track as per Scalextric sensors. A unique ID may be given to each MPD. This is for use in race management software for various tasks requiring track location of cars. Fix MPD to underside of track using Blu Tack for easy placement and removal.

Power is vamped off the track rails in any polarity.

Solenoid driver wires are attached.

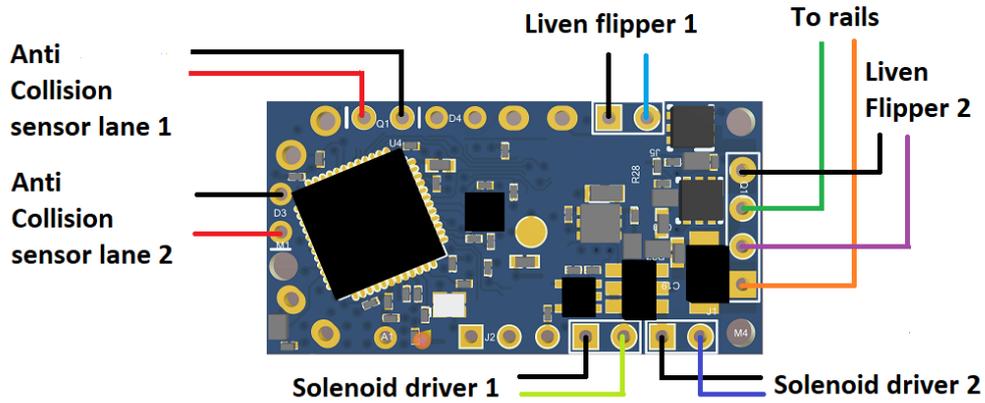
The additional sensor is embedded in the adjacent lane to allow the anti-collision function.

Liven entry and exit flipper drivers wires are attached to existing flippers..

Configure solenoid drive time, delay, anti-collision, flipper polarity for both entry and exit flippers via PC and eventually app.

Locator Pro compatible: Enjoy all the benefits of Locator Pro along with normal lane changing functions.

Scorpius MPD Scalextric Lane Brain



6. Scalextric Sport Digital car decoder.

The Scorpius MPD is used in place anywhere the Scalextric Sport Digital car chip is normally used. Download the product off the Scorpius website then upload into your Scorpius MPD unit. The MPD is now in Scalextric Sport Digital compatible mode.

Functionality: Responds to normal OEM commands via rail track packets ie. Throttle, brake and ID change commands.

Additional features: Include wireless upgrades and access to the accelerometer for ghost and smart car future functions like front and rear end collision detection, damage simulation assessment if car deslots.

Hardware: nRF 52832 wafer processor, 8.5A drive mosfets and Schottky diodes,

Simulations: To minimise throttle response lag due to processing of throttle data by PC or app simulations are planned on the MPD itself, therefore maintaining the important direct throttle to car communications protocol.

Simulations will include tyre selection, fuel simulation, brake wear and damage. Data will be sent to RCD for display in real time.

Upgrades: Upgrades will be via PC or app.

Bluetooth Connection: To allow car to talk to app using the BLE protocol simply tap on car 5 times in succession whilst car is stationary. To convert back Scalextric Sport Digital mode simply press the trigger.

Installation Scalextric DPR compatible cars: The Scorpius MPD can be installed straight into the DPR compatible car (Scalextric and Pioneer cars) using the Scorpius quick release DPR hatch which has been designed and printed. A Scalextric Sport Digital compatible JST plug is embedded on the MPD for universal power in/out applications, in this case power in from braids and power out to motor. The LED is embedded in the middle of hatch as per OEM and no actual installation of the LED is required. As a default the car now also has Carrera and Scorpius hardware embedded ready to use on those systems without any reconfiguration.

Installation non DPR compatible cars, any brand: The Scorpius MPD can also be installed on the chassis when not using the DPR as you would any other car chipping exercise. Solder wires as per normal. We recommend using a JST pre wire lead, decoder end plugs in, braid and motor ends to be soldered.

For track comms a 3mm IR LED is supplied and fitted on a 70mm fly lead using thin 28AWG cable for easy install.



Picture showing Scorpius app firmware and reconfigure page for all products.

7. Scorpius MPD Scalextric Sport Digital Locator Pro.

The Scorpius MPD is added to any position on track where car ID and location are required. Download the product off the Scorpius website then upload into your Scorpius MPD unit. The MPD is now in Scalextric Sport Digital lane changer mode.

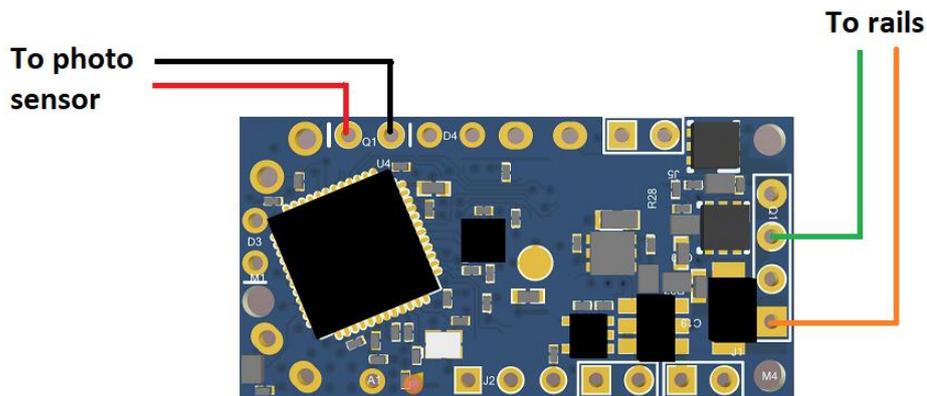
Function: To report wirelessly to existing and future race management software systems of cars ID and sector for multiple tasks such as lap counting, pit functions and more.

Installation: The phototransistor hardware is embedded into the track as per Scalextric sensors. A unique ID may be given to each MPD. This is for use in race management software for various tasks requiring track location of cars.

Power is 'vamped' off the track rails in any polarity.

Applications: Pit lane entry, pit lane exit, pit bay entry, pit bay exit, safety car entry, safety car exit, start/finish line for lap counting.

Scorpius Scalextric Sport Digital compatible Locator Pro



8. Scorpis MPD Scalextric Sport Digital powerbase dongle C7042

The MPD is configured to Scalextric Sport Digital Throttle Dongle mode. A separately sold enclosure with connecting cable and battery holder Will be available separately. The unit can plug into ports 1-6 on the powerbase.

How's it work? The assembled unit replicates the output of the OEM wired controller and reproduces resistance values required to perform throttle, brake and lane change.

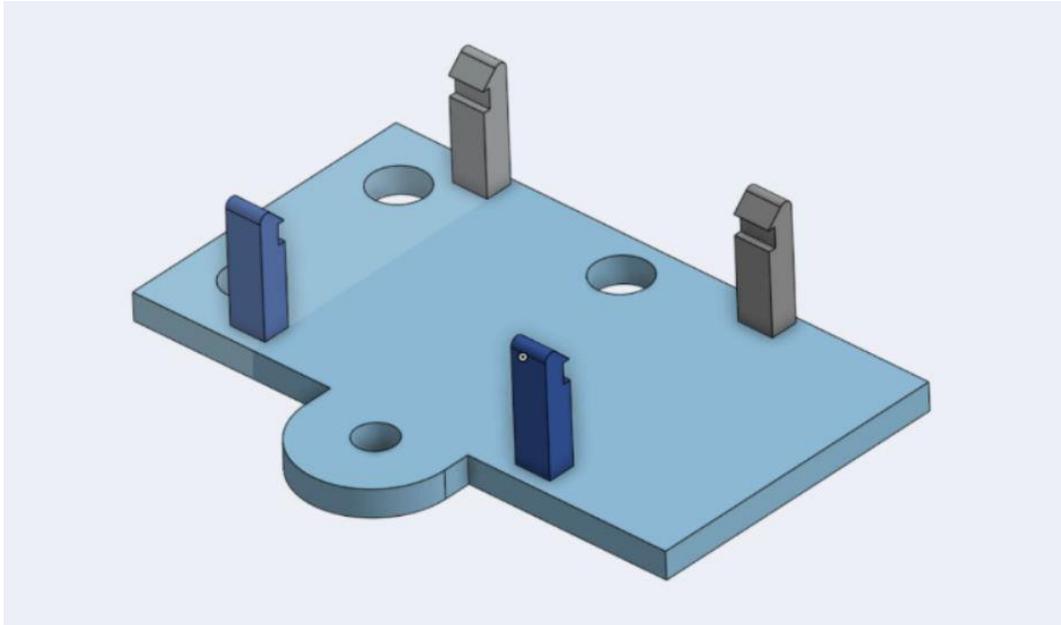


Picture showing Scorpis MPD Scalextric Sport Digital C7042/C7030 powerbase dongle.

9.Scorpius MPD Car Decoder.

The Scorpius MPD default firmware is Scorpius, SSD, Carrera and SCX advance car decoder platforms. Simply install and run. No configuration required.

- 1.Size 338 sq mm.
- 2.SSD DPR hatch and plug compatible. Convert your Scalextric car in 60 seconds no soldering.
- 3.SSD native compatible. Use SSD powerbase, controllers and lane changers.
4. Carrera native compatible. Use Carrera CU, controllers and lane changers.
5. SCX Advance. Track compatible if using Scorpius controller. Trigger lane changes and lap counting.
6. Multi-protocol means true multiprotocol. No configuring using app or other methods. When in Car Decoder mode the decoder is putting out Carrera, Scalextric and SCX LED codes simultaneously in their car LEDs while at the same time receiving track data via the photo transistor sensors on board. While doing all these functions simultaneously it is also proposed to carry out simulations while sending 100 telemetry messages a second.
6. Accelerometer. Used for what we hope will be the ultimate ghost car. Also used to detect rear end bumps and crash severity for RMS damage algorithm.
7. Switchable between nRF shockburst and BLE (Bluetooth) Place car on rails. Tap car 3 times on roof. Car converts to BLE for firmware upgrades, reconfiguring and app driver control (Without dongle). Tap again to convert back to nRF (Scorpius protocols).
8. Hall sensor. Used for tacho. Test on bench or in car.
9. Back EMF detection. Used for traction control, current sensing, motor analysis.
- 10.Headlights and tail lights controlled from controller.
- 11.Analogue compatible using Scorpius WAM.
12. App connection.
13. Heat sensor. If car chip starts to cook the car chip is switched off. Yet to be tested.
14. Improved car telemetry. G force readings, back EMF etc.
15. Ability to send telemetry and lap counting information to Scorpius RMS while in SSD or Carrera native mode.
16. Robust 25A drive mosfets
17. 6.1A brake mosfet
18. On board simulations eg, fuel, tyres and damage.



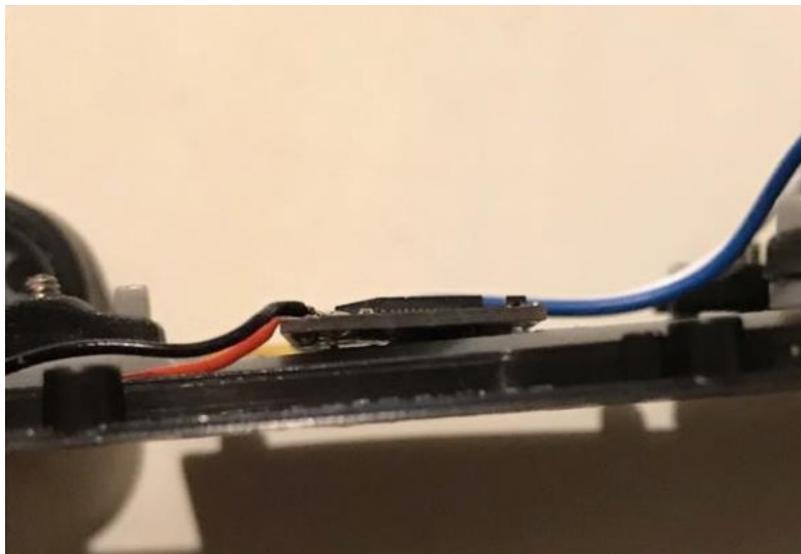
Revolutionary quick release DPR plug design by Scorpius Wireless.



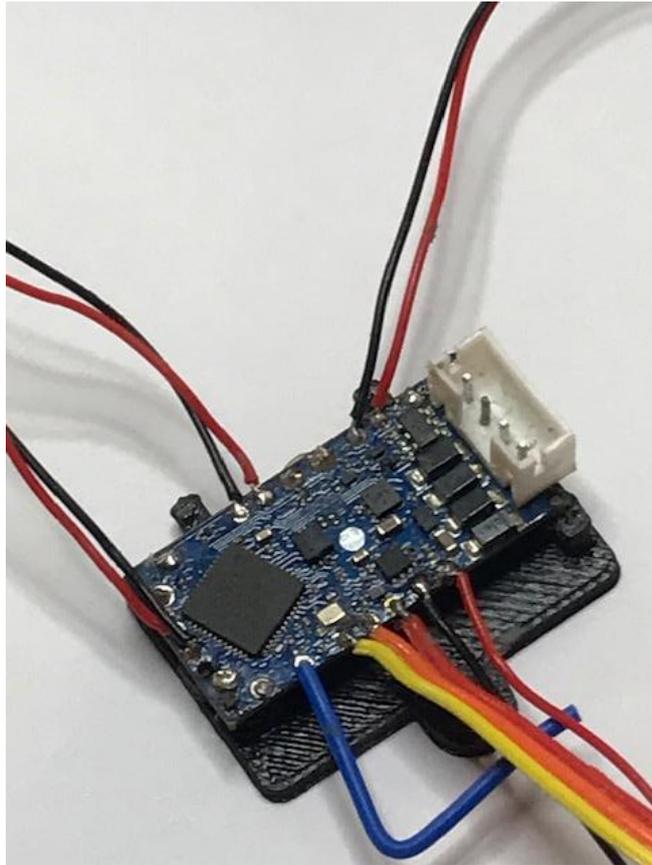
Picture showing Scorpius MPD in car decoder mode installed in a Thunderslot Lola.



Picture showing Scorpius MPD in car decoder mode installed in a Thunderslot Lola.



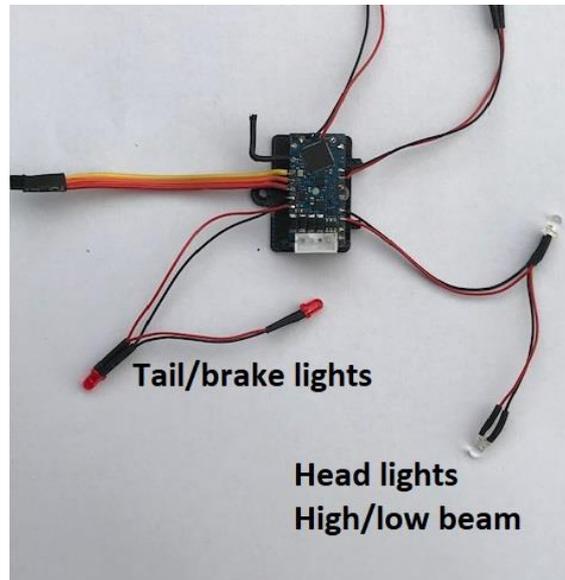
Picture showing the flattest car decoder design to date, just 1.7mm thick if need be.



Installation of this unit into your Scalextric DPR ready car gives you full compatibility on 4 systems without pushing a button, ie no configuring required.

10. Scorpius wireless light board to use with Scorpius Wireless Analogue Module and Scorpius controller

Scorpius MPD lights are standard equipment and have configurable settings, ie brightness, exhaust flame simulator or safety car lights. For use with any configuration where the Scorpius controller is operating. Use the auxiliary button on the controller to select lights on/off and high beam on/off/flash.



Picture showing Scorpius MPD lights

11. Scorpius MPD Mini Wireless Analogue Module

The Scorpius MPD in Mini Wireless Analogue mode is a little brother to its 50A equivalent, the WAM.

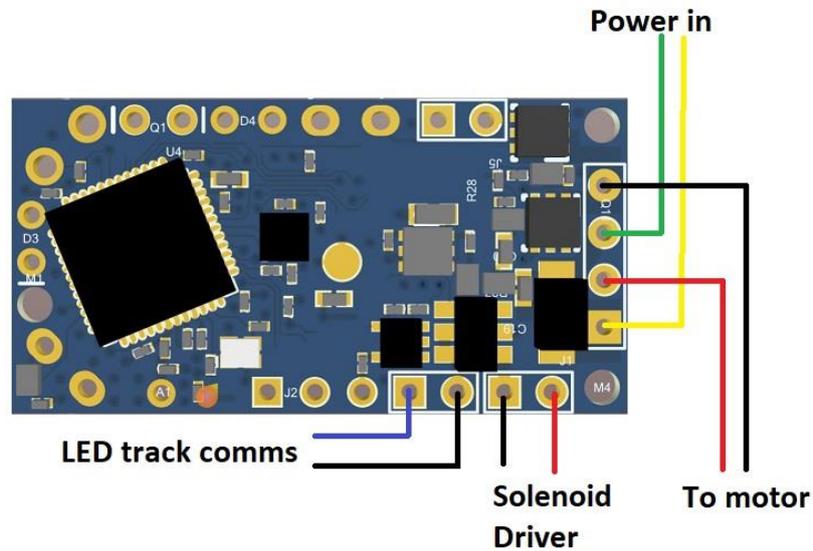


Picture showing 25A MPD WAM or Wireless Analogue Module

12. Technitoys SCX Advance car decoder.

The Scorpius MPD, used in conjunction with the Scorpius Wireless controller allows the user to run on the new SCX Advance system. By duplicating the cars LED ID code for each ID 1-9. Use of the Scorpius RMS is possible by simply installing a Scorpius MPD Locator Pro.

Scorpius MPD SCX-A Car Decoder

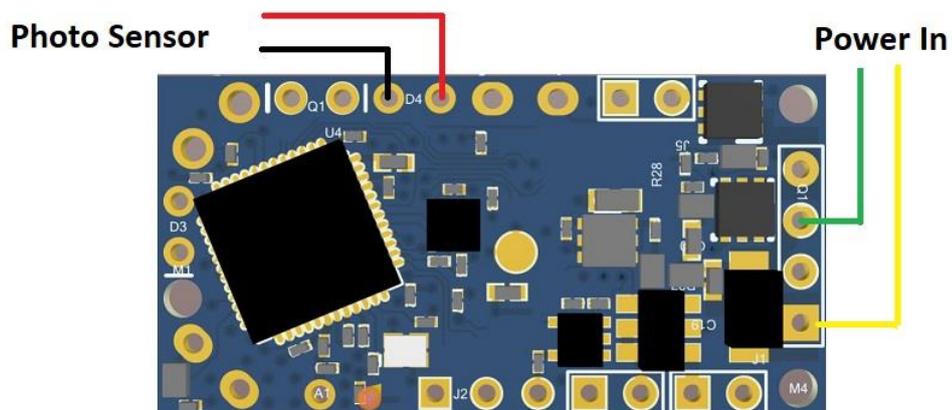


Picture showing SCX advance car decoder.

13. Technitoys SCX Advance car compatible lap

Scorpius MPD Locator Pro for SCX Advance gives users an opportunity to include pit functions and lap timing, opening up the way for 3rd party RMS' to be used.

Scorpius MPD SCX A Locator Pro/Lapcounter



Picture showing Scorpius MPD in Locator Pro mode