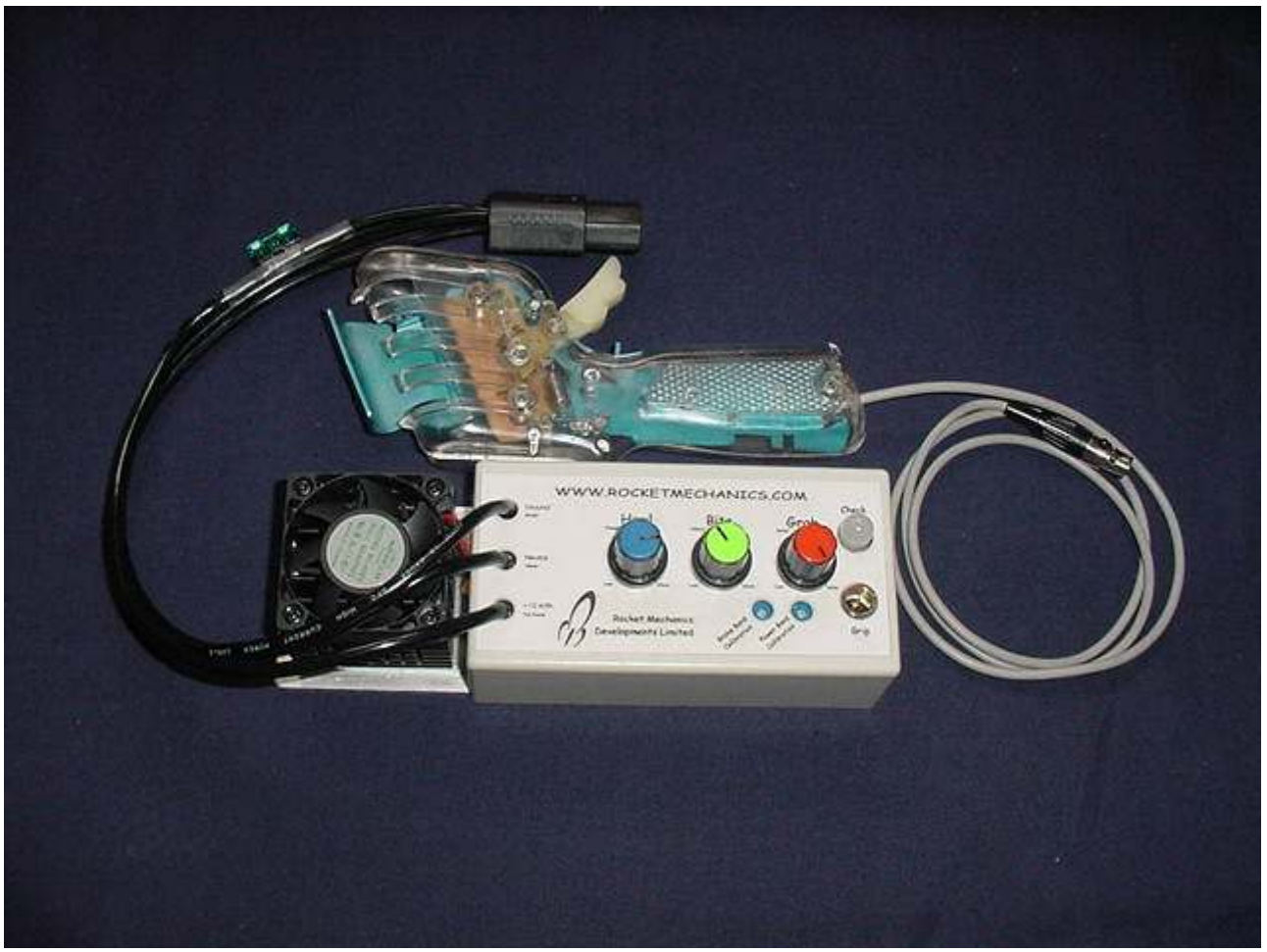
Rocket Mechanics Developments Limited

Slot Car Controller



sales@rocketmechanics.com

www.rocketmechanics.com

About the RMD Controller

The RMD slot car controller is a unit designed for all levels of hobby & competition slot car racing. Take time to read this brochure carefully to ensure that you safely commission your unit into use. If you are unsure of the conversions of the standard wiring suggested, then ask someone at your local club who does know. If you need to, please contact us to check, but local knowledge is the best kind if you are at a club track or raceway.

Our standard controller and conversion kit are suited for installation into a 'Parma Turbo' type trigger grip. (The kit also converts easily into a 'Red Fox' trigger grip with some minor alterations) If desired, it is not difficult for an experienced builder to adapt this kit to a thumb type handle. There are only two components needed on the grip/handle to operate this unit.

These two components are what we consider to be the main feature of our new controller, besides the general high quality & functionality of the unit. Our approach to the design has allowed us to completely eliminate the need for a wiper button & contact board. This unit will not get 'dirty', 'short out' or develop any 'dead spots'.

This controller is not an analogue device; it is controlled digitally by a software program.

Our controller does not use ordinary bipolar power transistors. Unlike typical transistor controllers, there is no danger of damage if a car is run slowly, as often happens when learning the sport. In fact, settings can be made to limit the top speed, dramatically, to enable an easier learning process with no concern for the safety of the controller. The cooling fan is thermally controlled & will usually only operate for Grp12/15 class motors or higher.

We are not in the business of building grips or handles, but custom orders may be referred to local builders & suppliers. What we are providing is a powerful upgrade that will allow you to advance beyond transistorised controllers.

The following pages give explanations of the controls & a basic routine to follow when first using the RMD slot car controller.

The Controls on the Front Panel

Ground - connect to suit your tracks' standard 'brake' connection, usually done via 'Earth' pin of plug (New Zealand & UK) or 'Red' clip (Parma & USA).

Neutral - connect to suit your tracks' standard 'wiper' connection, usually done via 'Neutral' pin of plug (New Zealand & UK) or 'Black' clip (Parma & USA).

+12 volts - connect to suit your tracks standard 'power' connection, usually done via 'Phase' pin of plug (New Zealand & UK) or 'White' clip (Parma & USA).

Howl - use this control to reduce full power available by rotating anti-clockwise. This is not a choke, it only sets a hard limit to the maximum rpm of the motor. The characteristics of the acceleration are unchanged.
(Full Power is when fully clockwise)

Bite - use this control to adjust the initial rpm at the start of the physical stroke of the controller. It is the same effect that you may know as 'Sensitivity' or 'Attack'. (Low is anti-clockwise, high is clockwise) A 'Lo/Hi' range switch is provided. This changes the lower two thirds of the 'Bite'.

Grab - use this control to reduce the brake effect available by rotating anti-clockwise. (Full Brake is full clockwise)

Check - this is a three colour display that visually confirms the settings you choose to operate the controller with. Red = brake, Green = acceleration & Blue = full power. The display is active even without a load; ie a car on the track.

Grip - plug the controller handle or grip in here with the latching connector. Always press the black release button whilst pulling the plug from the socket.

Power Band Calibration - this trim pot sets the gain to the sensor circuit, making compensation for the distance between the magnet and sensor. If absolutely necessary, this setting may be carefully adjusted to reduce the 'depth' of the full power band.

Brake Band Calibration - this trim pot allows the 'depth' of the brake band to be adjusted, both to calibrate for the position of the sensor in your grip/handle & to allow for the physical position & length of the band to be set.

Preparing to use the Controller

On the next page are photos that will help with the following steps

Step One - remove all components from inside your 'Parma Turbo' type trigger grip. Keep only the following components;

- the plastic casings & securing screws
- the aluminium chassis
- the nylon trigger arm & brass contact plate with its mounting screw and nut.
- the tension spring (returns trigger arm to brake position)

Step Two - epoxy magnet to brass contact plate; it is vital that the marked 'S' is exposed so that it faces the sensor device when complete.

Step Three - shorten the screw to 11mm (7/16 inch) then mount brass contact plate with magnetic device in its original position.

Step Four - allow 60-65mm cable length (approx. 2 ½ inches) from the circuit board & use existing tag to lightly crimp the cable to the aluminium chassis so that it will lay between the chassis and the left casing. Crimp a little more if needed after 'Step Six' is completed so that you may still make adjustments to this length.

Step Five - position the circuit board between the aluminium frame and the nylon trigger assembly. It is easier to do this with the trigger depressed fully.

Step Six - replace the aluminium chassis into the left hand plastic casing of the grip; notice that it locates over the two screw hole lugs of the moulding. Lay the cable & circuit board from the rear edge of the chassis and also locate using these lugs.

The sensor device should be positioned at the front edge of the grip. Epoxy the edges of the circuit board to the chassis. Use only enough to hold the board in place. Wait for epoxy to cure.

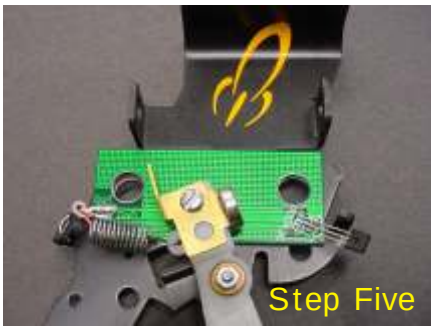
Step Seven - carefully bend the sensor into position.

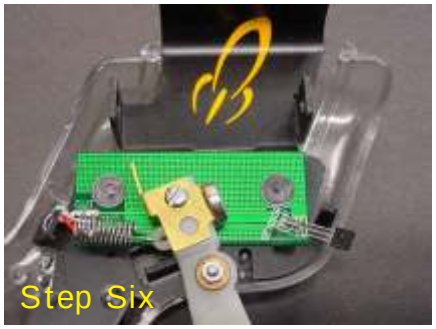
'It is important that the sensor is approximately parallel to and opposite the centre of the magnet with 1-2mm between them.

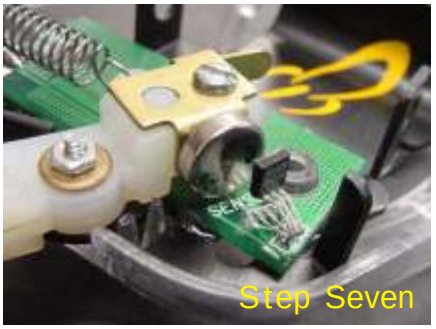
Step Eight - replace the right hand casing & screw together. Check for free movement of the trigger arm throughout its motion.

Preparing to use the Controller

Assembly Photos







Checking Calibration

Note that for the following steps there is no need for a car to be on the track!

Step One - adjust the main controls of the controller to the following settings;

Howl - fully clockwise (this is the Full Power setting)
Bite - fully anti-clockwise (this is the least Sensitivity or Attack setting)
Grab - fully clockwise (this is the Full Brake setting)
Brake Band Calibration - adjust to the bottom of range (anti-clockwise)
Power Band Calibration - adjust to the top of range (fully clockwise)

Step Two - check track power is on, then plug the controller into the track. Most likely, the blue light (full power) will be on which is a very good reason not to have a car on the lane.....!

Step Three - with the trigger released to brake position, slowly advance the Brake Band Calibration trim clockwise until you achieve the depth or braking position you want. The blue light should extinguish & run down through the green until the red light comes on.

Step Four - check by moving the trigger through its motion that the red (brake) extinguishes and is followed by green (attack) increasing brightness until the blue (full power) comes on at full depression.

Unless absolutely necessary to adjust it, leave the power trim at max. It is actually a gain to the sensor circuit & by operating this as high as possible you will have the greatest control over the brake adjustment.

Later on, when you are using the controller, reducing the ‘full power’ effect by rotating the ‘Howl’ control anti-clockwise will not cause the intensity of the lit blue ‘Check’ light to reduce in proportion with your chosen setting. It simply always shows you that the controller is ‘seeing’ the ‘full power’ position thus confirming acceptable calibration of the magnetic device & the sensor device. The red & green phase of the check light will be proportional to your settings of the ‘Grab’ & ‘Bite’ controls.

It is now time to test the controller with a car on the track!

Make further adjustments as you need; in particular spend time with the two calibration trim pots. They are not designed to be adjusted 'on the fly' but they are simple enough that you may adjust them to try out other combinations of grip & control box for the sake of comparison.

Cautions - as with all electrical devices, there are some basic cautions that need to be observed with the RMD slot car controller. It is a digitally controlled device.

Please take care to avoid these things;

1 - do not allow a metal object to short the tapes or braid of your lane for an extended amount of time; ie anything longer than a normal chassis short or similar. The unit is protected by an external automotive type fuse that is soldered into the +12volts supply. This may blow in order to protect the circuitry within the unit. Normally, replace it with the same type as you find installed from manufacture.

2 - keep the unit dry. If you suspect that it has taken on any significant moisture, don't plug it in! Open the casing by removing the bottom panel & allow to dry.

3 - do not expose the unit to extreme conditions (other than good racing!) such as temperatures and magnetic fields. Regarding magnetic fields; nothing in normal use will cause problems to the controller.

4 - have a great time racing & never blow a transistor again!

All the best from Rocket Mechanics Developments Limited!

Some Technical Specifications

Nominal Voltage - +12 volts (+15 volts max. Continuous). The circuit is designed to switch between the supply & the device; ie slot car.

Fuses - the +12 volts fuse is an automotive type & is rated at 15amps. If you encounter regular fuse blowing & the cause is not obvious such as; the chassis of the car causing tapes or braids to short circuit or a faulty armature, for example, then try a larger value fuse. Never exceed 30amps.

In the ground wire use 5amps unless also the above problems occur, maximum 15amps. The ground wire being fused will not add resistance to the RMD controller with regard the supply to the track & slot car.

The fuses are soldered into the +12 volts supply to the controller & the ground (brake) wire. It is important to insulate these connections if a fuse is replaced.

FETs - the standard circuitry of the RMD slot car controller employs three devices, two for the power & one for the brake function. They are of very low 'on' resistance; under 0.010 ohms (each) for the power FET & under 0.005 ohms for the brake FET. Nominal values from the manufacturers of the FETs are actually 0.008 ohms & 0.004 ohms respectively. There are two FETs installed on the power circuit so the total 'on' resistance for this function is under 0.005 ohms or under 0.004 ohms as specified by the manufacturer of the FETs.

'When dealing with small measurements like these, even connections to your track can cause greater resistance than the FETs we use. Likewise the cable length and diameter. If you measure the resistance at the track you will get a higher figure, as would any controller.'

If replacement FETs are required, they must be installed by a qualified & experienced electronics technician. RMD Limited will not cover costs including damage caused by unqualified service or repair attempts. Return the unit to your supplier if in any doubt as to service procedure should the unit malfunction.