

M-Magic Controller

Features

1. Easy to Use, Low Maintenance, "**Wiperless**" Design
2. Adjustable Coast & Brake with Overcurrent Protection
3. Dual Polarity Design with Power On Polarity Correct LED
4. Adjustable Sensitivity (*Works with T-Jets, G-Jets as well as heavily modified "Magnet" cars*)
5. Self Contained (*All components are located in the handle assembly*)
6. 20 Amp Rated Power Transistor (*40A Peak*) with 3 in² Heat Sink and Fuse Protection
7. Full Power Choke Softens the Transition from Transistor Control to Full Power Bypass
8. Lightweight (330 g / 0.75 Lbs)
9. Can be used with either two or three wire driver's stations
10. Available in Right and Left hand versions

Hookup

The M-Magic controller is **dual polarity**. For proper operation you must first determine the track's polarity. To do this, first place the brake/coast switch in the center (off) position or in the lower (brake) position, then place the car on the track and hookup **only** the **black** wire to the **black** (or track) terminal. Then touch the **white** wire to the **white** (power) terminal. If the slot car takes off at speed without engaging the controller trigger remove the white wire and flip the **polarity switch** to the opposite position. Touch the **white** wire to the white or power terminal again. The **Polarity Correct LED** should light up and the car should not move without the trigger engaged. If this is the case the car should now work normally. The **Polarity Correct LED** will only light up if the power is on, the car is on the track, the car is in good working order AND the polarity switch is in the correct position. Hook up the **white wire** and have fun! Note that if the **polarity switch** is in wrong position with the **red** wire hooked up damage may occur.

The **Polarity Correct LED** will be on when the controller is released, a car is on the track, the car is in good working condition AND the polarity switch is in the correct position. The **polarity correct LED** does not need a car on the track if the **red wire** is hooked up, the brake / off / coast switch is in the down position (Brakes) AND the polarity switch is in the correct position.

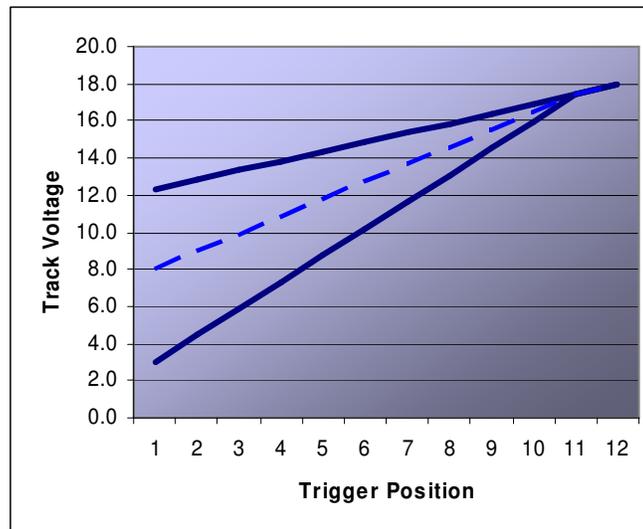
The **Polarity Correct LED** will be at maximum brightness when the car is stopped and will be off when the trigger is pulled back to full power. If the **red wire** is disconnected or the brake / off / coast switch is in the center position (Off) the car must be on the track and in good working condition for the LED to light. For example if the pickups are dirty and the car will not move or moves sluggishly the LED might not illuminate or flicker as the car stutters or stalls.

The **Polarity Correct LED** will also allow you to check the car's electrical system (armature, motor brush system & pickups) and the track rails by taking a slow lap or two at a set trigger position. If the LED is steady then the track and car electrical systems are A-OK. If the LED flickers you know there is a motor brush, pickup or rail problem at that spot on the track.

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Trigger Response (a.k.a. Sensitivity)

The controller sensitivity adjustment is controlled using the rear dial. The sensitivity dial changes the ramp rate of the controller. In the photo the sensitivity dial is set to maximum. T-jets cars tend to require less sensitivity compared to a magnet car with a rewind motor which tends to require more sensitivity. The operating range and output of the M-Magic on 18VDC with the sensitivity dial in the minimum and maximum positions is shown by the solid lines in the following figure. Placing the sensitivity dial in an intermediate position will result in straight line (linear) performance between the two lines as shown by the dashed line. The M-Magic will also work at 12VDC.



Coast & Brake

The coast and brake adjustment is controlled using the front dial AND the coast/brake switch. The dial in the photo is set to maximum brake/coast. Place the switch in the **down** position for brakes and in the **up** position for coast. Place the switch in the center (off) position or remove the red wire if neither brake nor coast is desired.

In normal brake operation the coast/brake overcurrent device will protect the brake and coast circuit. In the coast mode the coast pot and coast limit resistor are designed for a normal RO or unlimited car duty cycle. To prevent damage to the car's armature and controller it is recommended that you remove the car from the track when it is stopped and the coast is turned on and do not "warm up" the car by turning laps unattended with coast on. The following is taken directly from the Mabuchi website: "DO NOT leave motor shaft locked (*stopped*) while power is applied, as even a short-time lock-up may cause excess heat build up resulting in damage to the motor."

Overcurrent Protection

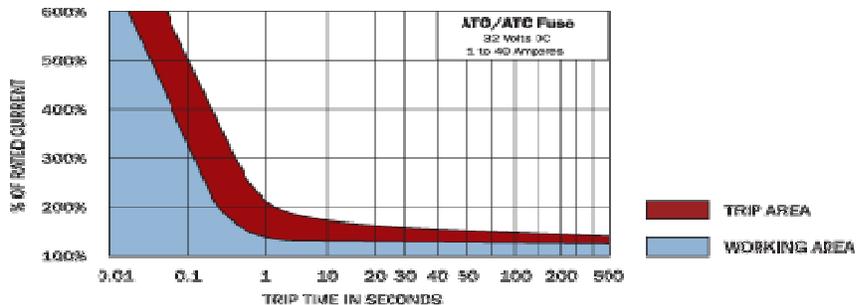
The controller's transistor is fused. The trigger potentiometer and the coast/brake circuit are protected by separate automatically resetting thermal devices. The thermal devices will not open during normal operation with any properly operating HO car but will open in the event of an overload condition or short circuit. They will automatically reset once the overload situation is corrected.

The five amp fast acting fuse will protect the transistor from an overload condition. Unfortunately, as the transistor is a sensitive, ultra fast acting device the transistor's fuse may not protect the transistor from a dead short.

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The coast/brake overcurrent device will protect the circuit when the controller is hooked up correctly. The coast/brake protective device will open should coast/brake circuit current exceeds one amp. However, if the coast pot is turned down and the coast current is less than the trip point the protective device will not open. In the case of a continuous one amp load at 20VDC the coast limit resistor and coast/brake pot will each dissipate 10 watts of heat. The coast pot and coast limit resistor will safely tolerate this current for a few minutes however long term damage to the car or controller may occur if the situation is not corrected.

The transistor fuse is located in the black hookup wire. This fuse is a **FAST ACTING** automotive blade type and is readily available. Do not replace the fuse with a larger fuse. Also do not replace the fuse with circuit breaker type fuse replacements as the breakers are slow acting, thermal, devices and will not provide adequate protection.



TO PREVENT CONTROLLER DAMAGE OR FAILURE USE ONLY THE RECOMMENDED FUSE

Maintenance

No maintenance is normally required. It is suggested that the trigger potentiometer bushing and the trigger/microswitch contact point be lubricated with a minute amount of high quality oil such as Thomas H'Oyl every three months.

Disclaimer

Since the use to which the M-Magic controller may be put and the manner of storing, handling and operation are beyond control, no guarantee, expressed or implied, is made to the fitness of use stability or performance of the materials supplied.

I have strived to make the best two or three wire controller possible in its price range. While M-Magic controller is based on various proven controller designs it is a unique design that is based on decades of personal HO racing experience. The full power choke, for example, is a variation of the one that was on the controller I used to win the HOPRA National Modified and R.O. titles followed by the HOPRA Winternats title back in 1987. This feature is not available on any other HO controller at any price. Please contact me via e-mail at SDM2831@Hotmail.com with any feedback, comments, questions or problems. I have been using an early version of the M-Magic since 2004 without problem. With proper care the M-Magic controller should provide many years of use.

The design is continually reviewed to see if it can be improved. I encourage feedback from every M-Magic owner. It's the only way I know of to improve the product. As a result of feedback received several changes have been made and every change has further improved the controller.

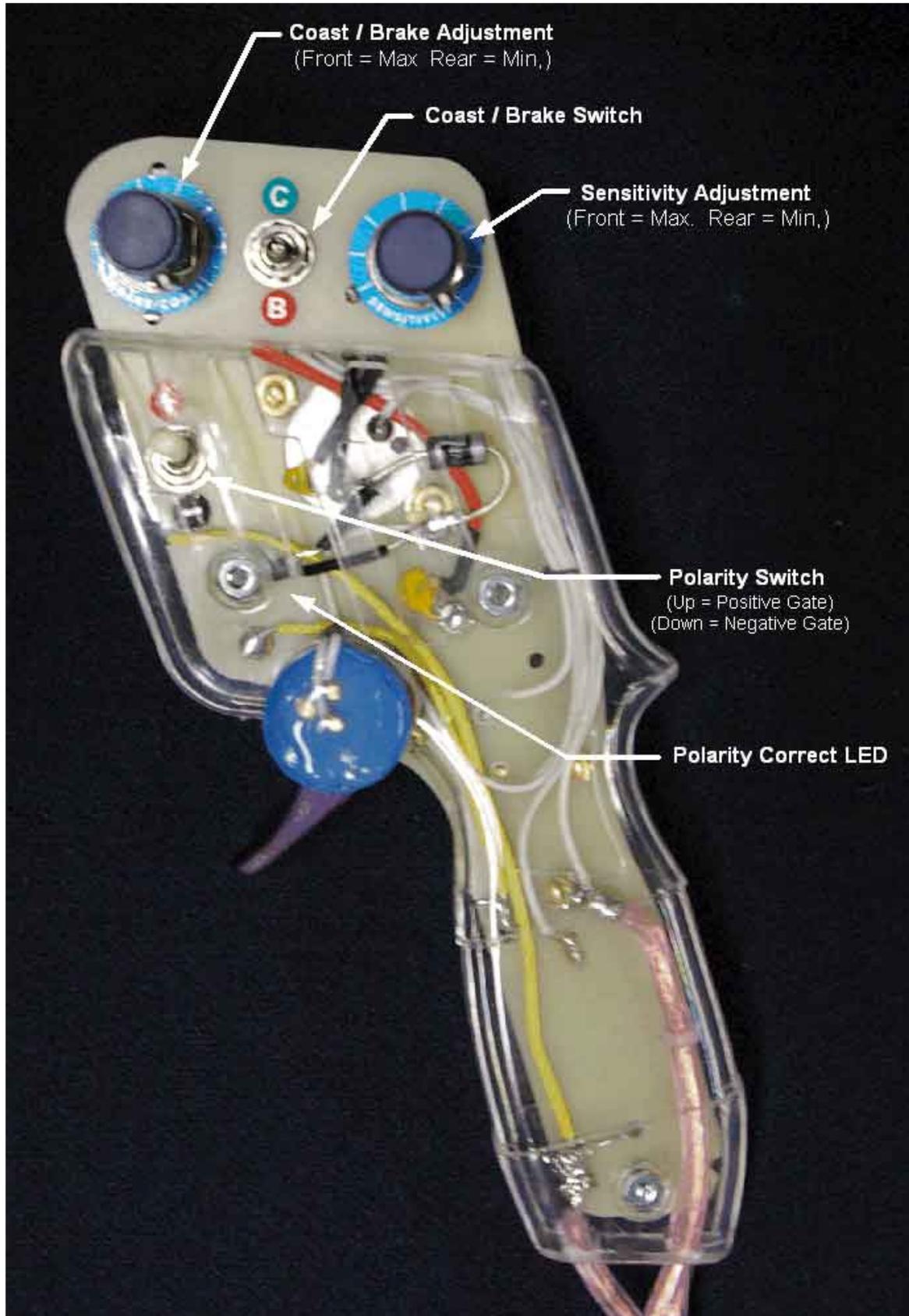
Regards,

Steve "Maddman" Medanic

February 2007

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Adjustments, Switches and the Polarity Correct LED



M-Magic Controller

Independent Test Report

Test Report

The M-Magic controller felt very nice in the hand. I love the fact that the heat sink is inside. It felt very nice. It does not look intimidating. All the solder joints look like very nice work. (I have seen some that are not!) The inline fuses are well positioned and out of the way. Also they are not "dangly". So, the weight, looks and feel of the unit are well suited for me. I saw the Polarity Selector switch. On later units you might include a + or - on the board to indicate what position is positive or negative. You may also want to label the other controls. The instructions are very complete. The trigger pull is a little lighter than my other units. This is something that I can adjust to.

I found the unit very driver friendly with enough adjustment to deal with any of the cars I have. I believe that what I call "linear" sensitivity has been achieved with this unit. My references to linear are trying to state that the trigger when moved slightly the car responds in a similar fashion. I have used some controllers that need to be driven at the top end or bottom end regardless of the sensitivity level used. With your unit I seemed to be able to drive the car instead of the track driving me. I could use the whole trigger range instead of just tapping on the trigger. I was still driving 100% and that is different than trying to only use 1/2 of the trigger range.

Even though many claim that their "Brand X" controller can be used for anything I have not felt comfortable with them for the classes I drive. The unit for me needs to be able to handle T-jets, G-Jets and Superstock. I believe that it is easier to dial in than the others I own. The controller doesn't have any surprises. I couldn't feel any jumps while I was putting in laps. Though I haven't been on the track for a while I sensed rather than could measure (lap times), a difference in the performance of some VERY familiar cars.

Changes as a Result of the Test and Comments

Personally, I have found that a new controller (especially a new electronic controller) can take time to learn. To get such an encouraging report right out of the box was not expected and the results of the test were a pleasant surprise. It should be noted that a light spring was purposely installed as the intent of the test was to verify operability and a light spring was better for this test than a heavy spring. Spring tension is easily changed by the owner and no changes are planned except to put a slightly stiffer spring in the testers personal M-Magic controller when it is delivered. No changes to the power and/or brake/coast circuits were required as a result of the testing. As recommended, printed labels (as opposed to either marker or paint) have been added to identify the controls. Other testers have echoed favorable comments similar to the ones listed above. The controller has been called the best of its kind, smooth and effortless.

As indicated previously I review the design constantly and encourage feedback from every M-Magic owner. It's the only way I know of to improve the product. As a result of feedback received several changes have been made and every change has further improved the controller.

To summarize the controller is linear, responsive, "driver friendly", easy to use and works equally well with T-Jets, Fray Style T-Jets, G-Jets (at 12VDC & 18VDC), Stock, Superstock, Modified and R.O. cars with a wide range of adjustability.

Enjoy,

Steve "Maddman" Medanic

October 1, 2006