



Motor Management System II

System. This piece of history was first seen at the 1/12 scale world championships in Holland. After a successful debut the Corally MMS became available in two forms, the 'eight minute' and the 'five minute'. The only difference between the

favour with Pro Ten and buggy drivers alike, indeed it became THE speed controller to have.

The Opposition

Recently a new breed of American speed controllers have become available and, along with the Nosram TL, the new Tekin and



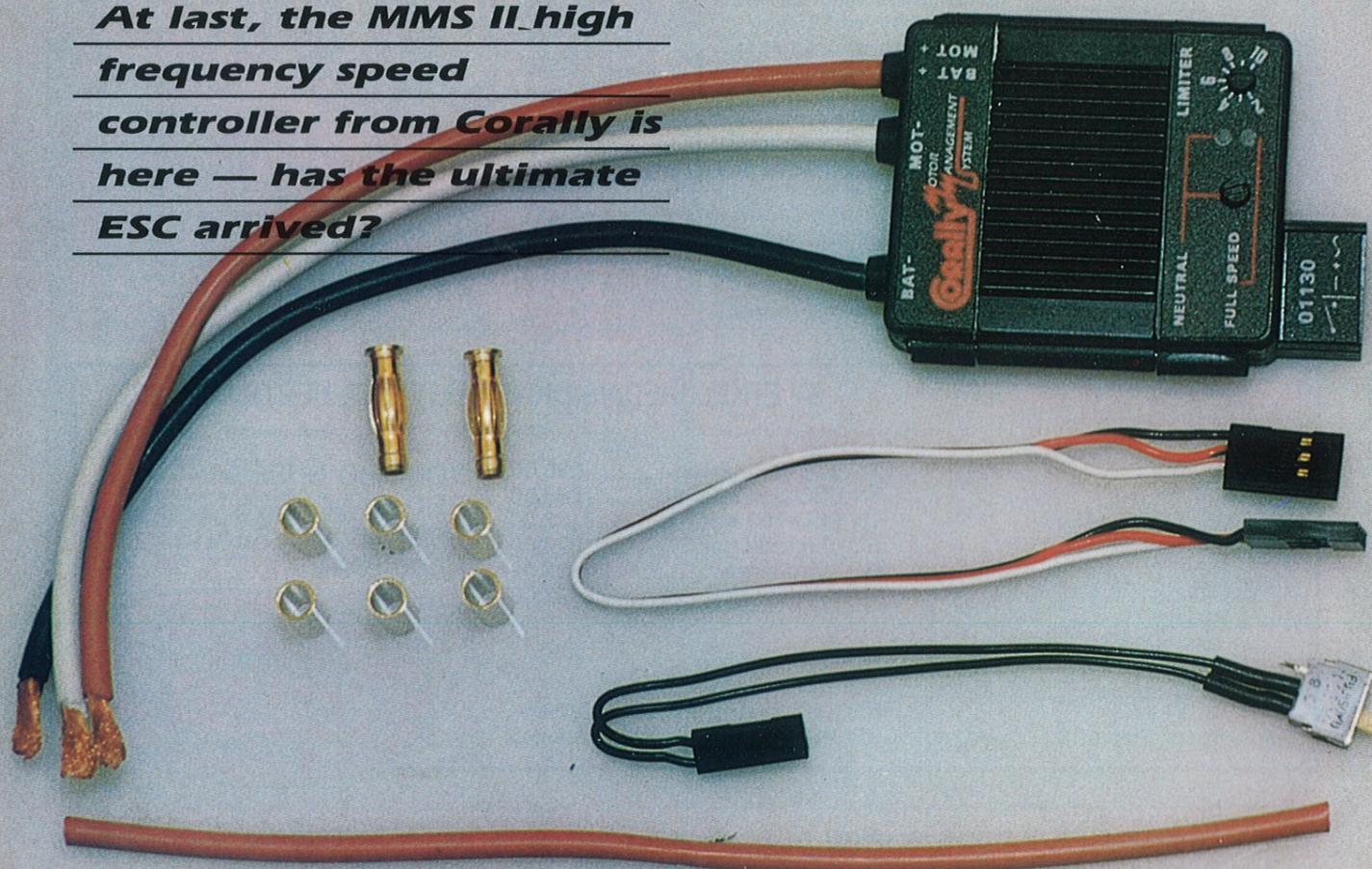
☛ The new Corally MMS II High Frequency ESC.

High frequency electronic speed controllers have become very popular over the past couple of years, because the R/C car enthusiast considers the benefits offered by them are great enough to compensate for the extra cost.

The first high frequency speed controller on the market was the Corally Digital Motor Management

two was that the 'eight minute' version was designed specifically for 1/12 scale racing and consequently had a lower Amp rating. The 'five minute' version found

At last, the MMS II high frequency speed controller from Corally is here — has the ultimate ESC arrived?



Novak 'speedos' have dominated the market for the last year. The reason for the surge in popularity of these new units is that they offer a driver yet another adjustment that can be made to the performance of their car, torque adjustment.

It appears that at the same time Corally were developing and perfecting the high frequency facility, and cramming it all into a speed controller the size of a credit card, other companies were working on the torque limit feature, ie being able to adjust the amps getting to the motor. The result, the Tekin and Novak high frequency, torque limit speed controllers arrived slightly before the Corally alternative. But now its here, and it has been well worth the wait!

The Second Generation

The most welcome and obvious difference between the MMS II and the original credit card speed controller is the inclusion of a torque limiting facility. This is fast becoming the norm on modern speed controllers and is of major importance if you want to 'pose in the pits'.

The torque adjustment means that you can dial in the exact amount of maximum torque you need to get to the motor to prevent the wheels from spinning. Dialing in less torque won't effect the top speed of the car, only the speed

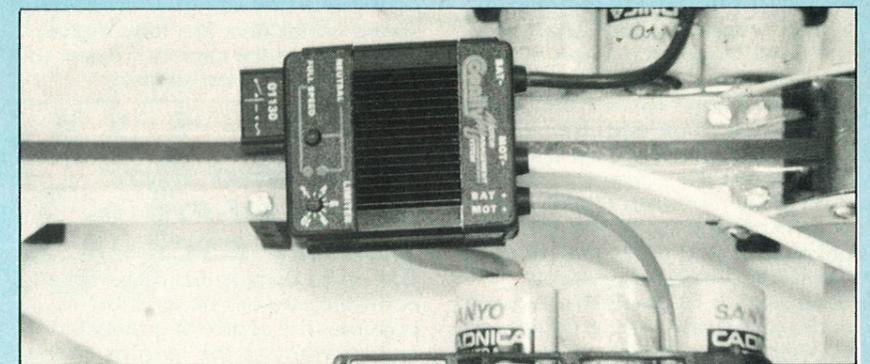
☛ The MMS II will fit into most buggies and Pro Ten cars, it is an excellent ESC for all classes.



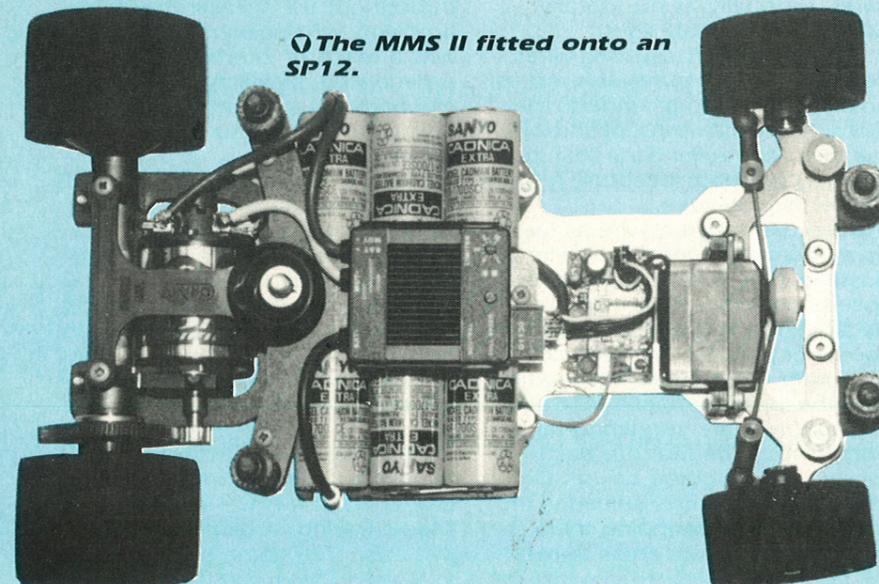
☛ The finned middle section on the MMS II is the all important heatsink to keep the unit as cool as possible. The neutral and torque limit pots can be seen at the bottom of the speed controller.

from a standing start and exiting slow, slippery corners.

This means that the speed controller acts like a 'slipper clutch'. A slipper clutch is a mechanical device though and wastes energy when it is slipping, unlike the speed controller which actually limits the



☛ The MMS II fitted onto an SP12.



power to the motor, so no energy is wasted.

What is not common knowledge is that the original Corally speed controllers all had adjustable torque control, but it was not adjustable by the racer from outside the speed controller. The reason was that the potentiometers (pot's) that are used in the speed controllers are very small and can easily be damaged.

On the new speed controller a small plastic moulding has been fixed onto the pot's so they can be turned from outside the speed controller by the racer to, for example, adjust the amount of torque limit. The plastic insert also functions as a stop for the pot's so they can't be 'overturned' and damaged.

If the actual plastic moulding itself becomes damaged however it can easily be replaced. The way Corally have designed it means that the plastic insert has been sealed with a rubber 'O' ring to prevent water and dust entering the speed controller itself.

Because the MMS II has more features (ie more FETs for higher efficiency and lower resistance)

than the original speed controller, it is a slightly thicker, squarer shape. This is far from being detrimental however as it will fit into nearly any buggy, Pro Ten and most 1/12 scale cars.

One particularly nice feature of the MMS II is that it has an 'overload' protection built into it. If the controller becomes too hot because of a short circuit or a fault in the motor, the MMS II will shut off automatically before it becomes too hot. As soon as it cools down again, it will start working!! The Corally uses two separate heat sensors, one near the forward FETs and one near the brake FETs unlike other speed controllers which use just one tempfet.

The heatsinks have been built into the centre of the unit with an



attractive water resistant plastic black case at either side. The neutral and torque adjustment pots are positioned at the bottom of the speed controller, as is the bi-colour LED, which is used for easy setting up of the MMS II.

Facts and Figures about the Corally MMS II

Electronic speed controllers pulse power (current) to the motor in an 'on/off on/off' fashion. Changing the percentage of the 'on' time to the 'off' time alters the speed at which the motor turns. For example at 70% speed (ie with the stick pushed 70% forward on the transmitter) the current pulse is on 70% of the time and off 30% of the time. In normal ESCs this cycle takes place about 60 times per second, but in high frequency speed controllers it happens much faster. In the case of the MMS II it happens at an incredible 5000 times per second, the only speed controller on the market that pulses above 2500 PWM.

One of the characteristics of high frequency ESCs is that they are much easier on motors because the sparking between the commutator and brushes is reduced which increases motor life and efficiency. The reason for the reduced sparking is that the speed controller pulses at a high frequency, therefore there is less time for current to flow through the motor when the brush is actually shorting across two of the three poles on the motor.

Other unique advantages that high frequency speed controllers offer is that they can actually put charge back into the cells when the car is being run. At less than full throttle and braking energy stored in the motor is fed back into the

Presentation of the MMS II is second to none. The speed controller, connectors, switch, receiver lead and wire are all neatly packaged in an attractive plastic storage case.

cells to increase run times by up to 20%.

The last and probably most important advantage of these speed controllers is the smooth throttle response. It is much smoother than normal speed controllers because high frequency speed controllers are fully digital, which makes the car much easier to drive, especially on slippery surfaces.

Hints and Tips about Hi-Frequency ESCs

The wires coming from the speed controller should be as short as possible. The centre of gravity is not as important as the lengths of the wires, especially as the Corally MMS II is extremely light.

If you do need to use long wires, keep the battery wires as short as possible, ie use longer wires to the motor. The thick wire supplied with the speed controller is the best stuff for the job, don't substitute it for thinner, lighter wire.

Keep the antenna wire as far away from the speed controller as possible. Never let it touch the speed controller, especially the negative battery wire as this is a source of possible interference. If necessary have the antenna going over the top of the speed controller.

Capacitors are very important! Three should be fitted to each motor you are going to use. Don't keep soldering and unsoldering the capacitors and swapping them between motors, buy new ones for

each motor! The reasons for this are simple, the best way of damaging capacitors is by overheating them, so obviously if you repeatedly solder them and heat them up they will become damaged and not work properly.

Conclusions

It is difficult to praise the new Corally MMS II highly enough. It is simply a superior piece of modern electronic engineering. The quality, simplicity of use and performance is second to none.

The amount of thought that has gone into producing the MMS II is impressive. Corally have spent a long time in solving the problem of easily swapping the speed controller over from one car to another.

They did this by using a 'plug-in' receiver cable and 'plug-in' switch. The receiver cables are available in 10 and 20cm lengths with either Futaba, KO propo or Sanwa connector plugs on the end.

What this means is that if you have two cars and you want to swap the controller over, say from a 1/12 car with the short receiver cable, you can by simply plugging in the longer receiver cable in from your other car. The switch can be permanently mounted in each car as well, so you just have to unplug the long switch in your buggy and plug in the short switch on your 1/12 car. As with all good ideas Corally have solved the problem very simply, yet it is extremely effective if you have more than one car.

One of the first production units was tested at the recent Dutch international, Dordrecht. It was used for around 20 runs throughout the weekend with no problems whatsoever. Not once was a glitch of interference experienced, probably because we mounted it as recommended in the instructions, make sure you do the same!

There is no doubt that the MMS II is an improvement over the original speed controller. It is more efficient, controllable and durable than the 'credit card'!!

It isn't very often we recommend individual pieces of equipment, an exception will be made here. The Corally MMS II is probably the best electronic speed controller to date, try one.

Available from Intronics, Unit 4, Bay Works, Marine Road, Pevensey Bay, E. Sussex, BN24 6EG or PK Model Racing, Toulonselaan 58, 3312 EV Dordrecht, Holland. ●