

Product File:

Novak Cyclone ESC and Profile Software R/V

(Part 1)

What it has

- Fully programmable, all digital microprocessor based.
- State of the art surface mount components.
- Tyre different user selectable profiles (off road, on road, 1:12th).
- Custom profile (requires software or pit wizard).
- 256 steps for forward and brakes.
- High frequency control (up to 23,400 Hz).
- Quick response (less than 500 micro seconds).
- One touch set up.
- Adjustable minimum brake (0 to 75%)
- Polar drive technology.
- Hyperfet II® transistors.
- Low resistance.
- BEC and radio priority circuitry.
- Digital anti glitch.
- Solder posts for quick installation.
- Massive 12g wires.
- Internal Schottky diode.
- Brake light circuitry and LED kit included.
- Forward only.

If you're racing off road would you take a scale saloon with you, if you are racing on road would you take a monster truck with you? No way of course, neither of the two cars would be suitable for the purpose. So why should we expect one type of electronic speed controller to be ideal in an off road two wheel drive car racing in the wet, or in a 4WD scale saloon on a hot high grip day, you can't can you?

You need some kind of extra control, LRP started this with their "plug in" range of chips, these mainly

were of a torque control nature. Then this was followed by the UK's MRT company, with the VFX we reviewed in 1996, well Novak have gone even further with the Cyclone we've received to review.

Treat from Novak

The instruction book is one of the best in the industry - excellent photography and illustrations (a picture is worth a 1,000 words) and a very detailed description on how to install and set up the speedo, plus all the adjustments required to match the speedo to the current range of radio transmitters.

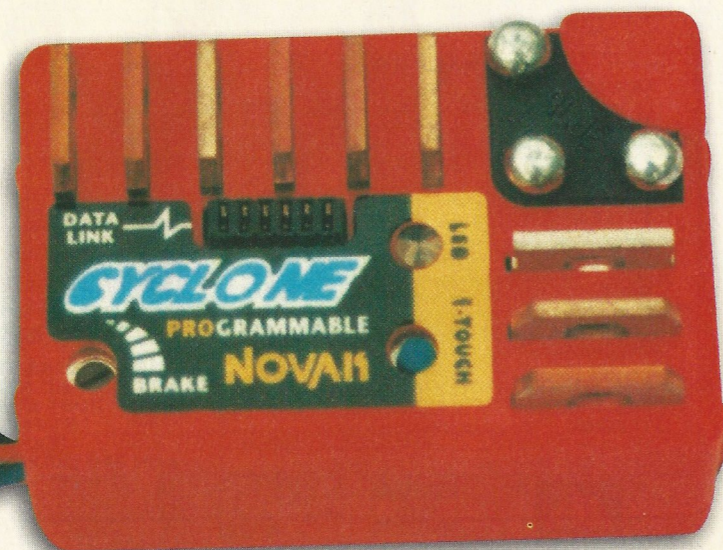
Removing the four screws that hold the bottom in place, revealed a mass of 21st century electronics crammed into a very small space. Several microprocessors could be clearly seen, all on the latest type "surface mount" boards. Six of the very best quality

The wind of change, waiting to blow me away.

Hyperfets® take care of forward motion, three for the brakes. On the top of the controller you have the Data link connection, I was a little disappointed to find that Novak don't supply any protective cover for this, it would be easy to get dirt and water in the connections. Next you have the one-touch set up button and the minimum brake setting pot. Several servo plugs are included in the fitting kit, so all radio gear is covered.

Bench Test

Throughout the test I used a removed servo drive unit, this would reproduce the transmitter signals without the use of a radio. With the driver connected I



get blown away

went through the same set up for a normal transmitter.

With the driver set at neutral the Cyclone was switched on and the one touch button was pressed at the same time, the status light changed to solid red, the 1-touch was released, neutral was now set, immediately the "driver" was taken to full travel, the status light changing to green, then the driver was turned the other way, status flashing green. Returning to neutral returned the status light to solid red. So now the speedo had "learnt" full throttle and full brake.

Cyclone and Datalink, more about the software next month.

Test 1. Resistance

This is a very important test of a racing ESC, the lower the resistance the better it will be able to cope with winds like a 9 or 10 double for instance.

With a 12 amp current flowing, I measured the voltage drop across the ESC and then along the full length of the motor wires.

Voltage drop across the ESC was .01 of a volt giving = .000088 ohms resistance, this was almost undetectable.

Voltage drop across the full length of the motor wires was .02 of a volt giving 0.0017ohm resistance.

These figures suggest the Cyclone is one of the best if not the best. This guarantees the Cyclone can handle any wind of motor with ease.

Test 2. Will it cook?

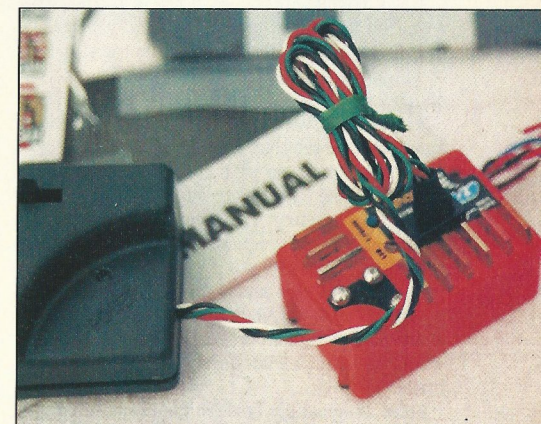
I loaded the Cyclone with a 25 amp load from a resistor bank, then jammed the throttle wide for 15 minutes. This would be equivalent to dumping four or five packs through the speedo with now cooling off time. During this time I checked the "on resistance" to see if the load did increase it. At the end of test the FETs were still stone cold, and the resistance had not changed at all. This you would expect from such a low loss controller.

Test 3. Overload

In this test I checked to see if the speedo could cope if a gear jammed or a motor "cooked". We all know when or if please god, this happened we would lift off straight away. But I really wanted to give this baby a workout. I don't recommend you try this test yourself as RRC bears no responsibility for your blown speedo. With a 30 amp load I shorted the motor wires out. The power capacitor blew straight away, but after about a minute the FETs were barely hot, no mean feat. Again this suggests the Cyclone could handle anything you wished to throw at it, sign of true quality.

All the tests proved that the Cyclone is ideal for any class of electric model racer. The low resistance will put all your nicad power where it should be, at the wheels.

Lots of bits: power capacitor, Schottky diode.



The data link plugs into the top of the speedo's case, surprisingly no form of protection for the connect is supplied when the link is not connected.

the shrink tube, as with any graphite chassis car it will conduct electricity and give you a short.

Although the Cyclone has an internal Schottky diode, Novak do supply and recommend the use of an external one. This will protect the speedo when braking heavily, and make it run even cooler. The Schottky was mounted in the motor wires at the motor point. Remember the silver band should always be on the positive motor wire.

Installation

As the Cyclone suggests it can be "tuned" to suit any application, it was installed in both my Yokomo YR4 Scale Saloon and my Losi XXT, both these vehicles would give the Cyclone a real workout.

With the three "mounting" posts I was able to make up two totally different harnesses. With the YR4, the only place to mount the speedo was forward of the battery trays, this left the wires quite long, this would test the "on resistance". In the Losi the speedo was mounted on the rear shock tower, this left the motor wires quite short, so max. power would be felt.

Do take care with the installation of the power capacitor, this protects the speedo from damage if you have severe voltage spikes, say at a start of a race with a fully charged nicad pack. Or if you have a lot of "noise", say from a motor with poor brushes that you are using when you're braking heavily. With the space available in the YR4 I had to mount it in the wires, as close to the speedo as I could, do use

Ready to Roll

After going through the transmitter set up with my JRX756, it was off too the test track with both Losi and Yok.

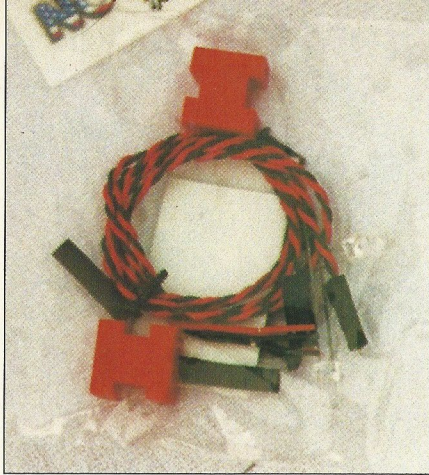
Yok First

To be able to go on road then off, I used Brandon and Bedworth for the test.

With a very hot motor fitted on a very high gearing the Yokomo was ready for the test. The Cyclone has three dedicated profiles burnt into the "chip". Profile (1) is recommended for off road, profile (2) for on road, (3) for 1:12th. Now there is no reason why you can't use any of them that suit you and on the day conditions.

Four basic parameters are changed in each profile, dead band, minimum drive, brake frequency, drive frequency.

Dead Band: This is the space or time you have at transmitter neutral between minimum drive and brakes. With a small dead band or 0,



A brake light kit is supplied for all you poser's out there!

on stick movement will send power to the motor be it drive or brake, so if you have loads of grip you can really make the motor punchy, or pile on the brakes. So a wide band would be good in low grip or if you have a very light car.

Minimum Drive: This allows you to set the amount of power that is applied on initial throttle opening, so with the dead band you can adjust the "punch" to suit the day.

Brake Frequency: This operates the power of the brakes. A low frequency will give sharp brakes for very little stick movement. A higher frequency will give much softer brakes. So with a 4WD off road car you can have a low PWM for sharp almost sudden brakes, but a Pro Ten car would use a high PWM for very soft, gentle brakes.

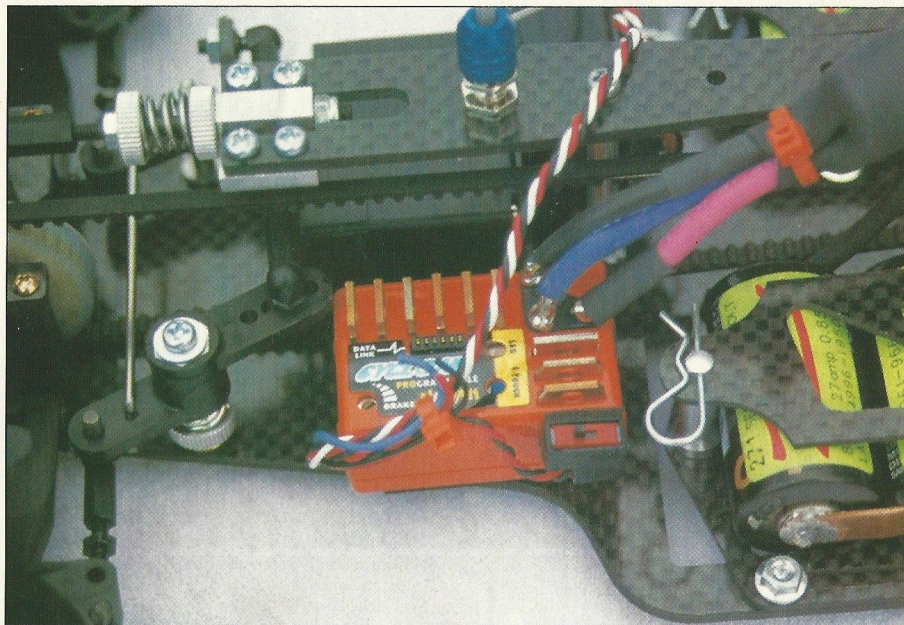
Drive Frequency: This works as the brakes, as the Cyclone has no torque limit, the drive PWM give the punch or not as required. With a low PWM the motor will develop more power at low throttle positions, the reverse for a high PWM.

So as you can see the Cyclone is very tuneable, but I'm getting ahead of myself.

As you can see from the profile, table No 1 has quite a wide dead band, so it will not be very sensitive at neutral, but the 6.25% min drive will apply a lot of initial punch and the 5.86khz drive will really make the car accelerate at the bottom end. Profile 2 will react quicker from neutral due to the narrower dead band, but will require more stick movement at the bottom end, making it smooth, but then the power will come with a rush. Profile 3 will react even quicker at neutral and will have loads of bottom end punch for use on mega grip, then the drive to full throttle will be very smooth for better duration. All three will have the same braking power but the "feel" will depend on the dead band width.

Back to the Yok

Running profile 2, the car was very smooth out of the corners, then really rushed up the straights. The brakes "felt very" progressive and powerful. On profile 3 the Yok really reacted and was really good on initial acceleration. But it took some while to reach top speed, but did run for an extra minute. So I was able to gear up two teeth, this gave me real speed. But you did not need to have grip to use it. On profile 1, the car was very smooth at neutral, but got on the power really well, then the drive PWM



The Cyclone fitted to the author's Yokomo YR4, the power capacitor is mounted in the motor wires. Note the shrink, to protect from "shorts".

Right: Note the Schottky diode fitted to motor leads, this is a must.

really punched it. I think this would have worked well if the grip had been lower.

Just as a point at the RRC meeting at Bedworth I raced on profile 3, the straight line speed being ballistic.

Truck Time

Swapping the motor (10 x 2) from the Yok to the Losi only took a matter of minutes, as did the speedo. Brandon's track is mostly Astro turf®, with a lot of sand in it, making it quite slippery.

On profile 1 the dead band width made it just sensitive enough to suit the grip, bottom end was just good enough to make the rear drift out on leaving the corner, the drive PWM giving good acceleration and top speed.

Profile 2 really made the truck bite, then almost docile out of the bend, on to the power, this could work if you had a lot of very slow corners.

Profile 3 was just too much fun, the rapid bottom end pushing the tail out on every corner, but it had no top speed, but loads of duration, again it might be possible to gear up and use the top speed, but you would need a large track with a lot of grip.

In Standard Spec

As you can see even in standard spec the Cyclone gives the driver a great deal of performance for his or her money. Novak do have an almost enviable reputation for quality and performance.

Next month I will explain how with the aid of Novak's software you can make the Cyclone even better suited to your track and car.

The Novak Cyclone and all the Novak range is distributed in the UK by Mirage R.C.P. **RRCI**



Novak Cyclone

DIMENSIONS

Height	0.79"
Width	1.10"
Length	1.73"
Weight	40.8gms

TUNING

Access to controls	excellent
Ease of adjustment	excellent

SPEC

Max Voltage	10 cells (12v)
Min Voltage	4 cells (4.8v)
Max Current	420 amps
On Resistance	0.000088ohms
Braking Current	140 amps
PWM Drive	up to 23,400
FrequencyBEC	6.00 volts/3 amps
Transistor Type	Hyperfet II®
Adjustment	one touch
Wire Size	12 gauge

Comments:

The Cyclone is about as good as it gets, it has World class resistance levels. Has profiles to suit nearly all applications. Super strong brakes. One touch set up. It's heading for the winners circle.