The Schumacher NMS is yet another release during the recent avalanche of new products from Britain's most successful model car manufacturer. This time it's not a new car, but a high-tech microprocessor controlled system to enable the serious racer to achieve the best from his/her nicads.

It monitors the performance of up to nine nicad packs during their life. The system provides the racer with the information required to utilise all the power available from every nicad pack in every run. Oh and it charges, discharges and cycles your nicads as well!

Nicads?

For over a decade now nickel cadmium (nicad) rechargeable batteries have been used to power model racing cars. Over that period much has been learned about their behaviour in the hostile environment of model car racing. As the sub 'C' nicads we use are designed to be charged and discharged at milliamps rather than amps their behaviour is somewhat different and so it has become a specialist area.

To cut a long story short many charging methods have been tried many times with exaggerated performance claims, but constant current charging has remained the favourite to provide best performance and overall life of the nicads.

There are basically three ways to tell when a nicad pack is charged to its optimum, pressure, temperature and voltage. Pressure can't be measured practically, which leaves temperature and

⬖ *Thermal probe.*

voltage as indicators to terminate the charging sequence.

When nicads are charged they will reach an optimum voltage and then go into overcharge, when the pack voltage drops again. Identifying this voltage 'peak' and ending the charge is the secret of a good charger. Overcharging of nicads causes a pressure build up within each cell which causes a temperature increase. Again a good charger will detect this charge and terminate the charge cycle automatically. The rule is, if you value your nicads use an automatic charger with one of these features. Unfortunately both these methods have their own disadvantages.

Thermal detection requires a probe to be in contact with the nicads during charging. Forgetting the probe causes big problems, like popping, squeaking, bubbling and very hot nicads!! Be warned, 501's and battery acid don't mix!

Fluctuations in the power supply when peak charging can cause the charger to terminate the charge cycle prematurely. This means that after you return from the bar just before your final it is possible to find that your nicads are uncharged.

It has also been established that

discharging after races removes the 'memory' of the nicads which is built up by semi discharging. This ensures that all the capacity of the nicads is available when required. Periodic smooth discharging or cycling of nicad packs can improve or maintain their performance and enhance the overall life of the nicads.

It is also clear that the only real way to establish the performance and capacity of a nicad pack is by monitoring the discharge of that nicad pack. Indications of gear ratios and motor required can be given by the capacity remaining after a race.

As can be seen by the impressive list of specifications below the Schumacher NMS has all these features and the ability to store information of up to nine nicad packs. This information means that results can be compared to known figures and not theoretical yardsticks, as used in other systems.
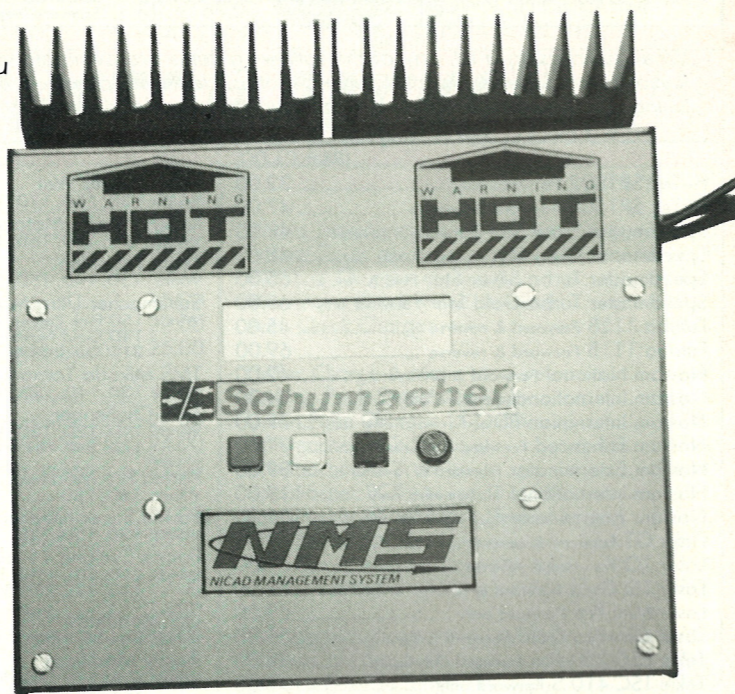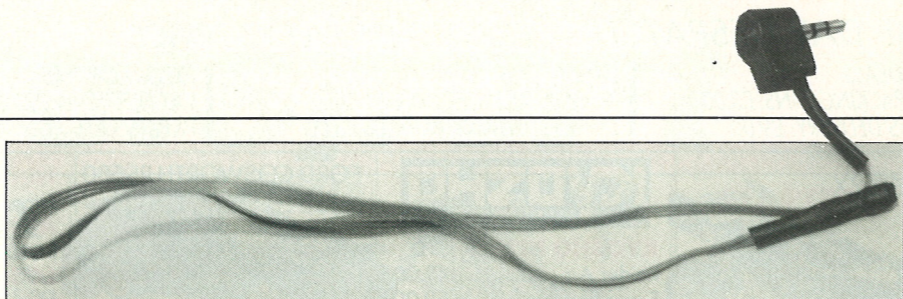
Jason Dearden looks at the NMS.

⬛ **Schumacher**

Nicad Management System

Specifications

CHARGING THERMAL. (Selected by connection of temperature probe). Charge current 2.5 amps to 8 amps. Cut off temperature 25°C to 60°C.
Both charger current and cut off temperature are user adjustable. By multiples of 0.1 amp and 1°C.

CHARGING PEAK. Charge current 2.5 amps to 8 amps. Charge current user adjustable by multiples of 0.1 amps.

BOOST CHARGE. Is used to boost the nicad pack immediately before you race. If thermal charging is selected and the pack temp. is above that of pre-set cut off then peak voltage boost charge is undertaken.

CHARGE DETAILS Type of charging (peak or thermal).
— Nicad pack being charged.
— Supply voltage.
— Nicad pack voltage.
— Charge current.
— Charge time/duration.
— Nicad pack temperature (thermal) when charge is completed.
— Charge accepted in mAh.
— No. of charges accepted by the nicad pack.

OVERCHARGE PROTECTION — Only 2.5 amps is supplied in case probe not in place.
— Successive voltage drop will terminate charge.

DISCHARGE — Nicad pack being discharged.
— Nicad pack voltage.
— Discharge current (10A).
— Discharge time/duration.

DISCHARGE COMPLETED (Discharge ends when voltage reaches 6.0 volts).
— Discharge capacity in mAh hours.
— Average pack voltage during discharge.
— Total discharge time/duration.
— Percentage of best ever discharge of that nicad pack.

TOTAL DISCHARGE (Undertaken after std. discharge).
— Nicad pack being discharged.
— Nicad pack voltage.
— Discharge current >4v = 5A. <4V = 2A.

CYCLING — Starts with total discharge.
— Will charge and discharge nicad pack up to nine times automatically.
— Has cool-down period built in after dicharge cycle.
— Highest discharge capacity is stored.
— All charge and discharge features are identical to those above.
— Will add number of cycles to total charges for that nicad pack.

**ALARM FEATURES** Audible alarm, with written warnings to describe fault.
— Input outside required range.
— Nicad pack not connected (charge disappears).
— Nicad pack disconnected during operation.
— Thermal sensor faulty/not connected.
— Overcharged.

INPUT REQUIRED 10.5v-18 volts DC. Input must be well smoothed if using mains power supply. Continuous current rating must be equal to that of charge current. 12 volt car battery is ideal.

DATA STORAGE — Data is stored indefinitely in each of the following cases.
— When any charge, discharge or cycle specifications are adjusted.
— Nicad pack details are stored at the end of charging sequence.
— Nicad pack details are stored after discharge sequence if amps rating is the highest for that nicad pack.

LCD TWO LINE DISPLAY — Fully adjustable contrast via potentiometer on front panel.
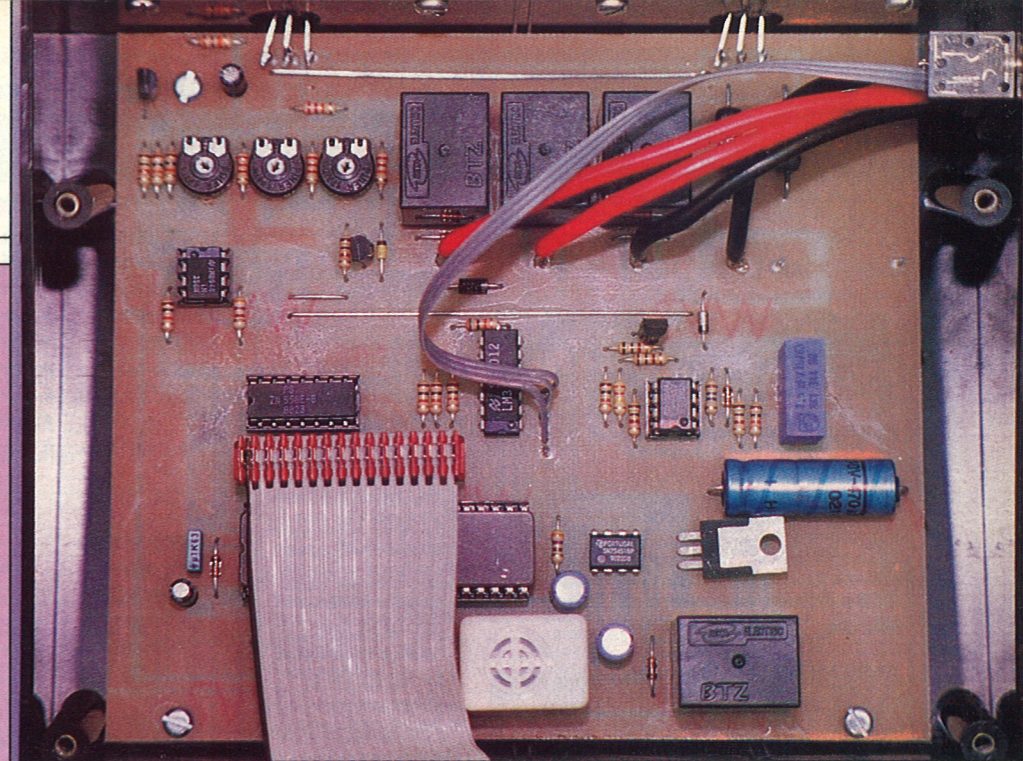
⬖ *Build quality is superb.*
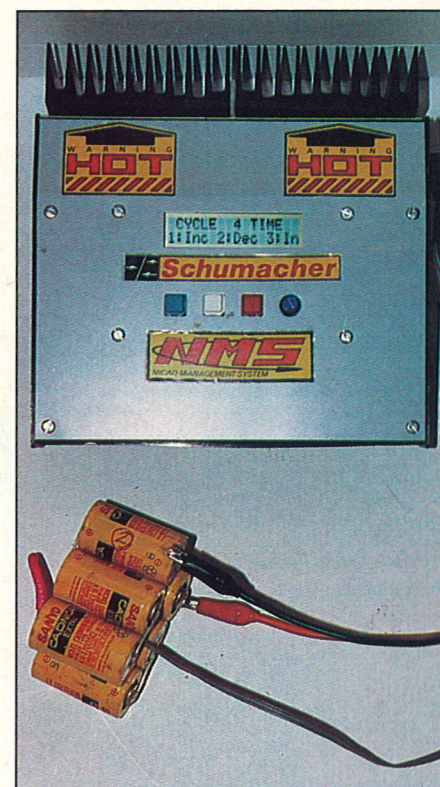
⬖ *Cycle mode being initialised.*

The Competition

The competition for the NMS is the Victor Products HI-IQ system which retails at closer to £300 and the Competition Electronics turbo charger at £165. The HI-IQ has more features but none significant and the turbo charger can't compete on specification with the NMS, it can only peak charge and cycle once. Neither have the data storage system and charge/discharge details must be input each time.

SCHUMACHER NMS
Initialising...

🕐 *The NMS lets you know it's o.k. when you turn it on.*

SCHUMACHER NMS
1:Ch 2:Dis 3:Cyc

🕐 *Options screen.*

THERM.   2·5A
1:Inc 2:Dec 3:In

🕐 *Setting current in thermal mode.*

THERM. 25°C
1:Inc 2:Dec 3:In

🕐 *Setting maximum temperature.*

THERM. 25°C 2·5A
1:Cont. 3:Adjust

🕐 *If everything is o.k. press 1, if not press 3.*

P4 PCHARGE 13·8V
10·4V 4·0A 27:52

🕐 *Peak charging mode.*

P1 0·00AHr 0ch
1:Inc 2:Dec 3:In

🕐 *Just before the charge begins.*

P2 TCHARGE 15°C
8·9V 4·0A 12:49

🕐 *Pack 2 being thermal charged. Temperature, voltage, amps and time on charge can be seen on this screen.*

DIS. 6·8Va 10:27
P2 1·74AHr 100%

P2 DISCHARGING
7·1V 10·0A 01:19

🕐 *Discharging a battery pack.*

Using the NMS

As can be seen in the pictures the NMS uses simple menus to guide the user around the features of the system. The instructions are comprehensive and I can work it so it's definitely idiot proof!
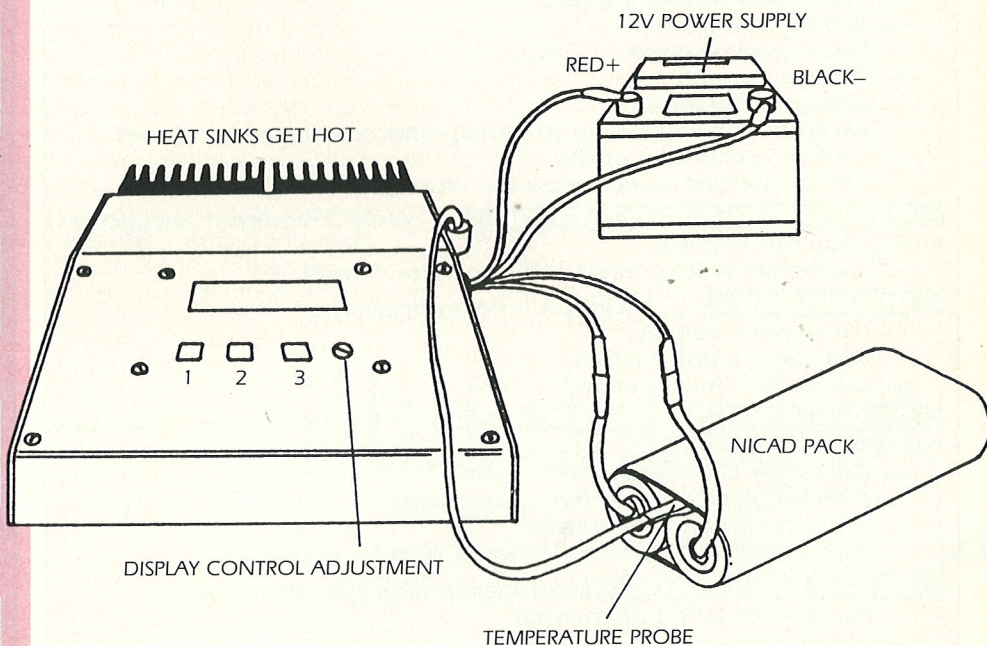
Quick Reference Star Rating

Appearance	★★★★★	—Not inspiring
Durability	★★★★★★★	—Time will tell
Performance	★★★★★★★★★	—Data storage, superb
Handling	★★★★★★★★	—Hot in places!
Value	★★★★★★★	—Only for serious racers
Back-up	★★★★★★★★★★	—21 day turn around
Build Quality	★★★★	—Case lets unit down
	★★★★★★★★★★	—Circuitry
Re-sale Value	★★★★★★★	—Only limited demand though

Market

Competition	—100%
Beginner	—Maybe loadsa' money gadget freak
Street Racer	—Negative
Off-road	—A must for monitoring life of cell
On-road	—A must for accurate gear ratio predictions

Additional Parts Required

12 volt supply — auto battery.
Suitable connectors.
Driver ability.

12V POWER SUPPLY
RED+   BLACK−
HEAT SINKS GET HOT
NICAD PACK
DISPLAY CONTROL ADJUSTMENT
TEMPERATURE PROBE

→/← Schumacher NMS

Conclusion

Schumacher have topped the field again. The data storage feature knocks the socks off the competition and makes the system a great deal more practical and accurate. At £199.95 the NMS can't be considered cheap but this price is reasonable considering the competition, and the total price of individual units required to achieve the same, ie. charger £80, capacity meter £80. The only detail which I don't like is the cheap looking stickers and front panel, which reduces 'pose power'. Although, we will buy the NMS for its abilities not its looks. ●