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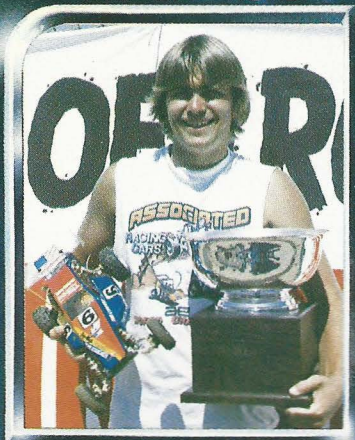


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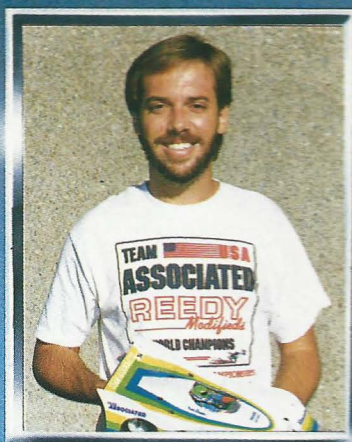
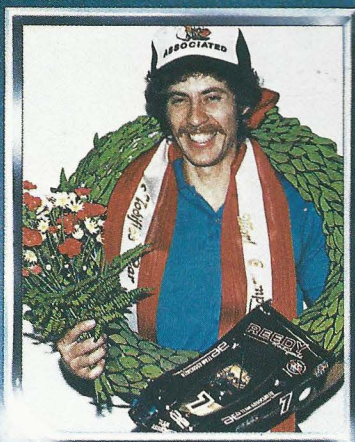


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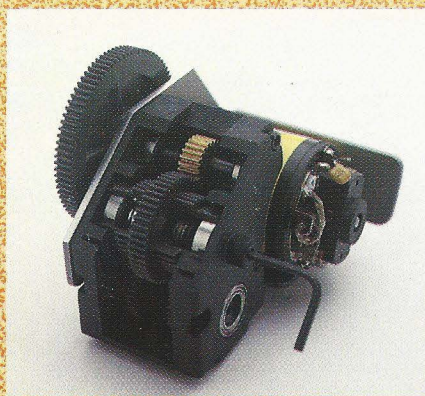


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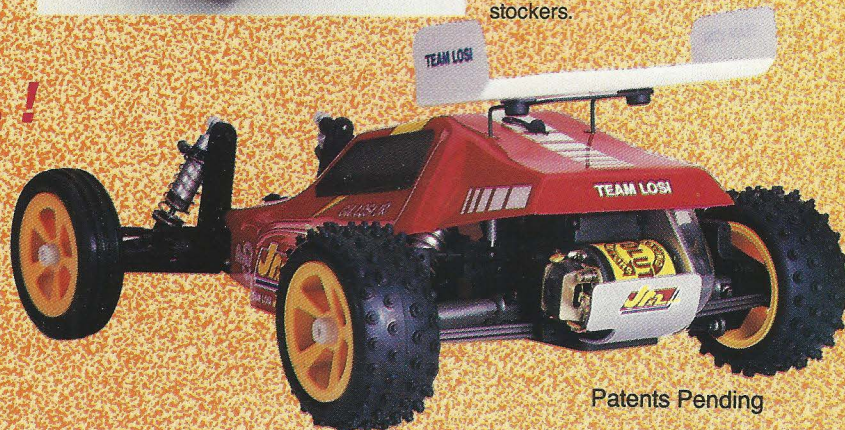


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ABOUT THE COVER

This month's cover features Brandy Dreifers' Quarter Scale Delara Edelbrock Sprint Car. The car uses the Edelbrock quick change rear end. Check out the Region VI quarter scale article on page 42.

Photo by John Thawley.

MAILBOX

HOBBY SHOP DILEMMA

Dear Competition Plus:

We have a fun hobby but its being destroyed by many so called "Hobby Shops". In my hometown, as well as, alot of other towns we have these so called "garage" at-home shops. Some are legitimate but a majority are not. These people will go to a big expense just to fool the distributor into believing they are a "real hobby shop". Now the legitimate hobby dealers not only have to worry about the discount catalog companies cutting into their business but now with the addition of these so called "hobby shops".

Just to let you know what type of expense these people will go to as an example. One individual has gone to several different legal hobby shops and taken photos of their shop, inside and outside. For the outside shot he had the photo touched up with the new name. Granted some people will go to great lengths just to be able to buy from a distributor. Whose to blame?

What can the distributor do? One way is to check by the "quarter" method - Call information. Another is to call several other hobby shops that are listed and ask them about the "new" hobby shop in town. There are other ways to check but these listed are the simplest.

I know its hard to check out these types of hobby shops but it needs to be done. The legal hobby shops have been hurt by these types of people. Its no wonder they don't order items for cars because of these people.

By the way I don't own a hobby shop. If the distributors would like to find out who this individual is in my hometown just give me a call, I'm listed.

Sincerely,

BILL FRADEN

AUSTRIAN INVITATION

Dear Sirs:

Please extend my invitation to a great indoor race being held in Austria. We are looking forward to a lot of American drivers to be in attendance. Haas Racing, Vienna, invites all off-road drivers to the First Indoor Winternational in Hirm, Austria. Our national race last year was a great success and we are looking for a lot more drivers this year. This race is the first International Indoor race in Austria. Date: March 11 & 12, 1989, Saturday, March 11 - Free Practice, Qualifying Heats. Sunday, March 12 - Qualifying Heats, Finals. Class: 1/10th off-road, according to OFMAV rules, no weight limit, SCE cells allowed. Indoor track, carpet and PVC. Unevenness and jumps. Mail entries to: Ferdinand Brindelmayer, Preysinggasse 39/13, A-1150 Vienna Austria. Entry will only be accepted with the entry fee enclosed. Entry Fee: OS 200.--Closing Date: February 25th, 1989.

Many thanks and best wishes

FERDINAND BRINDELMAYER
Tel. 0222/95 48 225

APPLAUSE!

Dear Competition Plus:

Thank you very much for publishing my article on the Midwest. Dirt Oval Championship, it was very much appreciated. We hope that this year's event in August will be just as successful. I also applaud your articles by Cliff Lett and Jeff Palmer's battery series. Articles with some technical background are very helpful, rather than the reviews in other magazines that are all fluff and no substance. Those of us who are serious about racing but not in the actual business find it difficult to get

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good information, please keep heading in the same direction with your publication.

Thanks again for your time and interest. I hope to be in your pages again sometime in 1989!

Sincerely,

JAY BOWMAN

**SC, SCR, SCE,
KR, 1200, 1300, 1700
Which Cells Should I Use?**

Sounds confusing doesn't it? With all the Technology in radio control the past few years with motors, cars, bodies, etc. Sanyo, the industry leader in re-chargeable ni-cads, has kept on pace to provide us with multiple choices of batteries for every application possible for your car use. The problem though is with this many to choose from and no real direction or articles on batteries the Sportsman may have trouble in selecting which cell is the best for his or her application. Hopefully, after this letter you may gain some insight into the different models and it will make your choices a little easier.

All ni-cad batteries usually have positive and negative electrodes consisting of sintered plates wound in a roll and insulated from each other by a separator. The results are the highest possible energy density as well as excellent charge/discharge and thermal characteristics. The cell casing is made of steel. Although cadnica batteries are designed for complete internal consumption of the gas that is built up during overcharging, an automatically re-sealable safety vent comes into place to guard against defects or abuse during misuse of product or severe overcharging! Enough technical background!

The first cell I will deal with is the 1200SC (Trinity No. 5014 \$6.50). This cell has a nominal voltage of 1.2 volts and a minimum capacity of 1200MAH with a typical capacity of 1350MAH. These cells can be

used in really any type of racing. They were the standard for 1/12 scale because of their mix of good voltage and run time. However, with the introduction of the new technology cells the 1200 SC is now primarily used in beginner type "Sportsman" racing where performance is not the real issue!

Another Sport battery is the newly released KR-1200SC cell (Trinity No. 5065 \$7.00). This is a non-sintered cell. It is not as reliable as the 1200SC in terms of being charged at high temperatures, multiple charges, etc. It has a nominal voltage of 1.2V and the minimum capacity is 1300MAH and typical capacity is 1450MAH. The good points of the cells are that they run just slightly longer than the 1200SC. Look for the new KR-1300SC this should be the new sport pack for the industry.

The 1200SCR cell (Trinity No. 5035 \$7.50). These are easily distinguished by their red wrapping and are the fast charge cell. These particular cells put out more voltage than any of the current cells on the market, which means your motor will run faster with SCRs. The drawback using the SCR is most definitely in run time. They run shorter in time than any of the other cells and for this reason many people have trouble running them in modified racing. Most people who use these cells in modified will either run them in 4 minute 1/10 on-road or off-road racing.

Although there is a drawback in running SCRs in modified they are fast becoming the stock class battery. The reason is twofold: more voltage so the stock motors run faster and this SCR cell can stand up to the punishment of constant charging at high temperatures that other cells cannot endure. For example, the Tekin BC-100 hi-amp charger was designed for these cells in mind. Some top experts who run stock will charge their batteries at a 9 amp rate constant. The reason behind this — the

more amperage you use in charging the more voltage the cell will retain!

Most batteries cannot take abuse. The SCR can take almost everything you can dish out! I would strongly recommend the SCR for any stock enthusiast or sportsman driver whose commitment in the hobby will be long term. Naturally the SCRs will be considerably more expensive than the sports packs but I feel the extra price is more than worth it!

Finally we come to Sanyo's newest cell: The KR-1700SCE (Trinity No. 5046 \$9.00). The use of high-density plates and a revolutionary new battery design has enabled Sanyo to achieve up to 40% high capacity (run time) than conventional ni-cad batteries of the same size. The nominal voltage of the cells is once again 1.2V, however, the minimum capacity is 1700MAH and the typical capacity is 2000MAH. Everyone is using 1700s for modified use. The cell's characteristics show slightly lower voltage than the regular 1200s but extended running time. These cells have become the modified cells for R/C car racing.

Although they do provide the racer with more run time they do have some drawbacks. In order to make room for this extra capacity in the cell Sanyo had to reduce the size of the negative plate. Since this plate is much thinner than the SCR cell it is very sensitive to heat and charge rates. If you charge an SCE cell like a SCR with 8-10 amps of charge rate this thin negative plate will sever thus destroying the cell. It is with this in mind that most people charge 1700s between 2.5 to 3.5 amps. They are never charged at higher than 4 amps. SCEs have to be treated with kid gloves. They should be used either by expert drivers or sportsman drivers who have a very good understanding of battery car and charging. I would recommend the Tekin BC870 charger which has just been

(Continued on Page 65)

POWER TRAIN: Batteries Part III

Article and Photos by Jeff Palmer

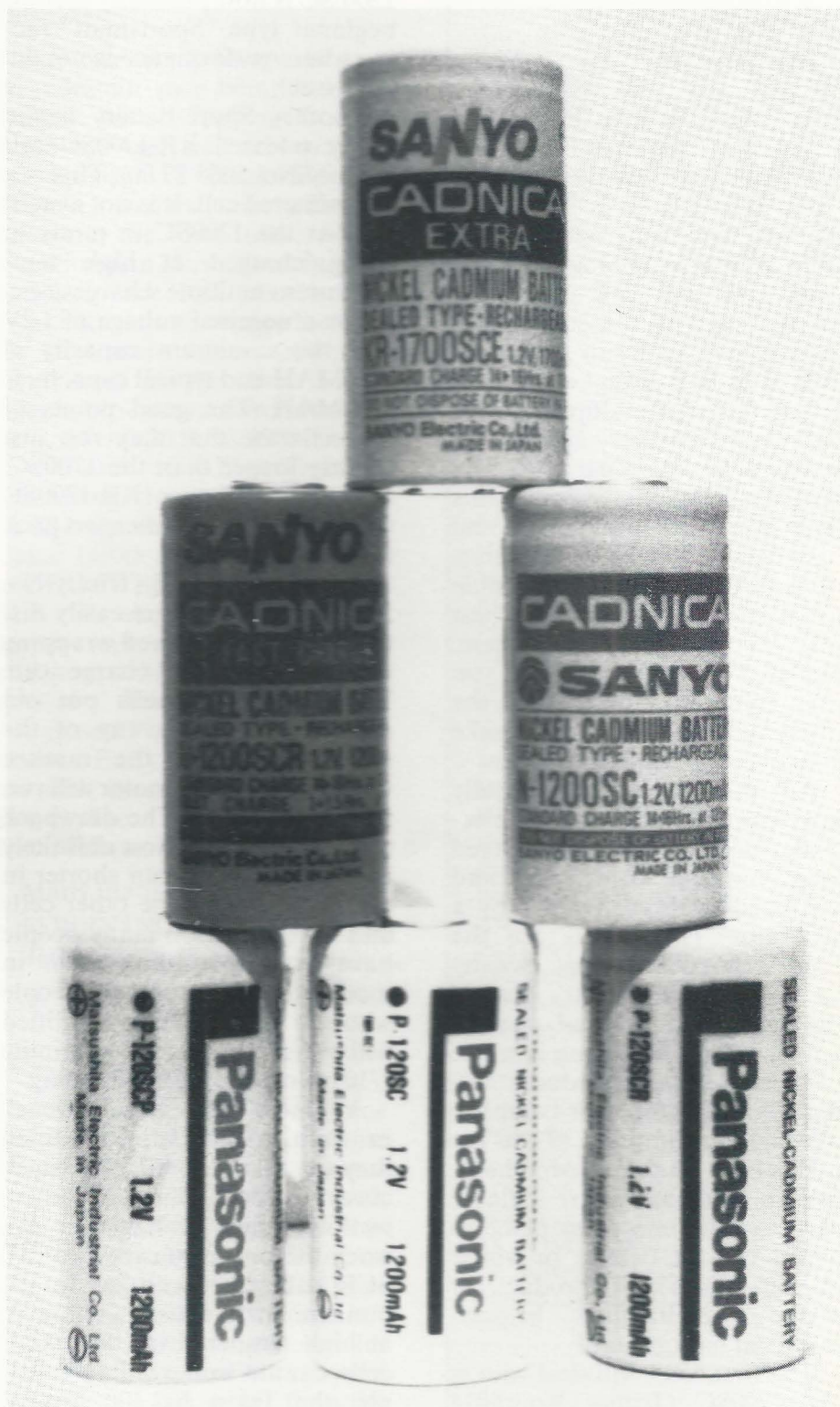
We've finally made it to the action article. Here we'll match cells, construct packs and evaluate batteries. Let's get started.

MATCHING

When a manufacturer assembles a cell, the cell is made to certain tolerances. These tolerances are usually in the 2-5% range. Since the tolerances can be $\pm 2-5\%$, the variance from cell to cell can be 4-10%. Those cell that get +5% are the exceptional cells that everyone hopes to find. The -5% are good cells and perform within the "nominal" range of performance but not at the same capacity level as the +5%. Its these differences which are detected by cell matching. The basic idea of "matched" cells is for the cells to run out of capacity at the same time. Another way of looking at "matched" cells is, they will allow you to go longer but not faster.

To do cell matching we need a device that will allow us to measure each cell's capacity. LAVCO makes such a device called the "CELL-MATE." The CELL-MATE discharges a cell at a rate of 10 amps until the NiCd cell voltage drops to .95 volts. It reports the time it took to discharge the cell in an LCD display. By recording the value reported by the CELL-MATE, we can match cells of similar capacity. Sounds simple, doesn't it? With this device, it is!

Before we get started in cell matching a couple of attachments will prove beneficial. Go to your local Radio Shack and buy two Sub-C battery holders. Attach a plug to one of the battery holders so it will attach to your battery charger. On the second battery holder attach leads that will allow each cell to be discharged individually by CELL-MATE.



Who's on top?

Then execute each of the following steps:

1. Charge the cells.

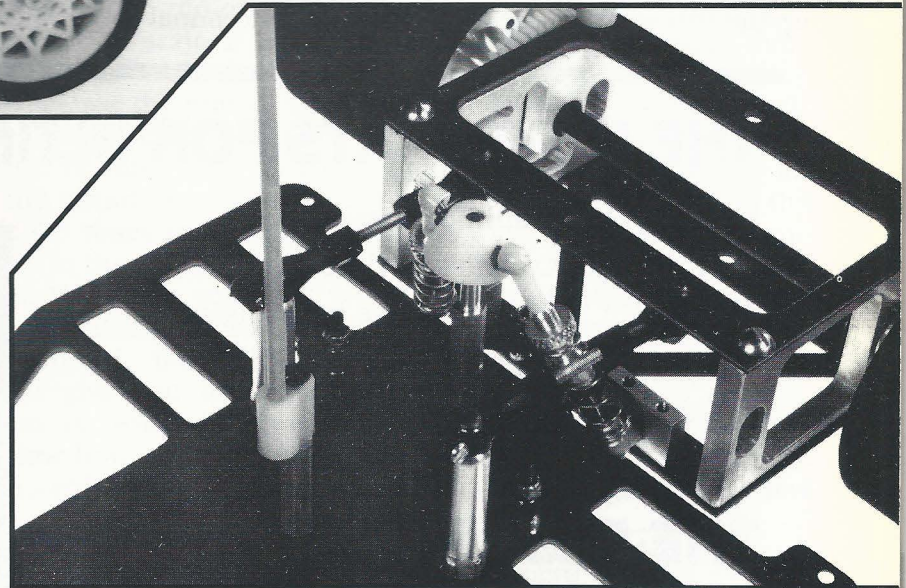
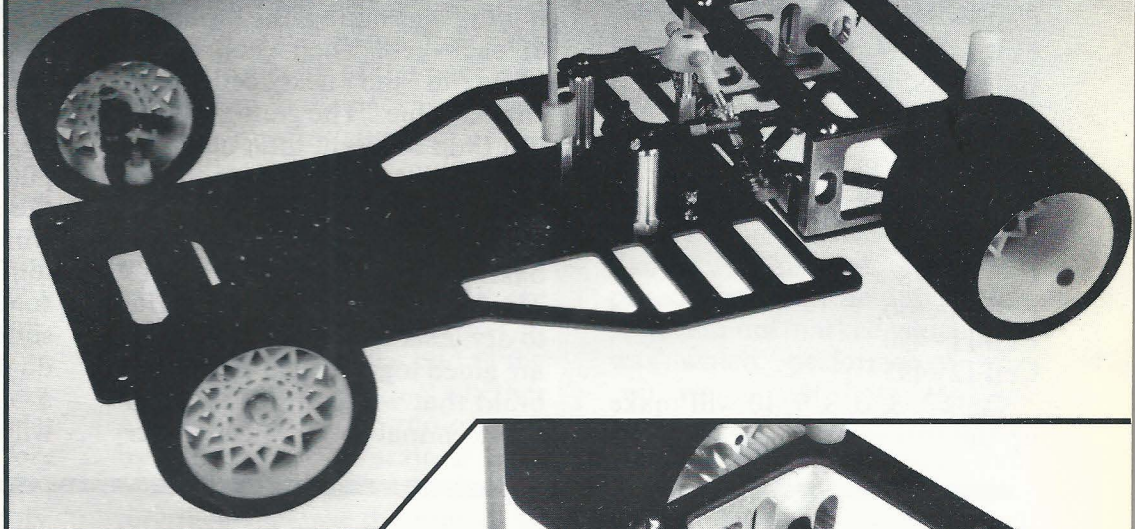
2. Discharge the pack and then each cell individually using the CELL-MATE.

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3. Repeat the time on each cell (I used small labels).

4. Repeat this process 3 times.

The process was repeated 3 times in case a mistake was made during one of the charging or discharging steps. It's not likely the same mistake would be repeated 3 times in a row and this procedure will allow any problems in the cells to identify themselves; i.e. false peaks.

All that's left to do now is to select the cells that will make up a pack. For demonstration purposes, 12 cells were measured with the following readings:

Cell 1 - 486

Cell 2 - 495

Cell 3 - 482

Cell 4 - 489

Cell 5 - 493

Cell 6 - 487

Cell 7 - 501

Cell 8 - 476

Cell 9 - 478

Cell 10 - 480

Cell 11 - 490

Cell 12 - 495

Cells 1, 3, 6, 8, 9, 10 will make up the first pack and cells 2, 4, 5,

7, 11, 12 make up the second pack. Remember the pack will stop delivering power when the weakest cell in the pack is discharged. Pack #1 will be rated at 476 and pack #2 will be rated at 489.

PACK CONSTRUCTION

To begin the assembly process, a decision must be made on the style of pack to be assembled. Basically there are two styles of packs and each style has variations. The easiest style to construct is the side-by-side. In this style, align the cell against a board, alternating the direction of each cell. Then each cell is glued to the next cell using "Super Glue." The gluing process is a little different than normally imagined. At the point where you want to place glue, drop a little baking soda. Then solidify the baking soda with "Super Glue." The baking soda causes the glue to dry instantly. Once all the cells are glued together, cut the battery braid that will connect the positive terminal to the negative ter-

minal of the battery next to it. Place a small amount of solder on the top and bottom of each cell. Then "tin" the ends of each of the battery braids. Now solder the braids to the battery terminals. Add battery leads and heat shrink. EASY!!

To construct stick packs requires a lot more effort. To assist in the assembly process, a jig to hold the batteries is needed. Cut a 6" piece of "V" angle iron and drill holes in the "V" so it could be attached to a piece of wood. For those who don't have this material laying around, Hot Trick makes a "Battery Jig." Deposit a small amount of solder in the center on each terminal of the cell. Place three cells in the jig. If a correct job was done of placing the solder on the cells, the solder on the top of one cell will touch the solder on the bottom of the next cell. Using a soldering gun, heat the two solder pools at the same time. To do this, make a battery sandwich; a battery on the bottom and top with the tip of the soldering gun

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Mike Burnette's 1988 Winter Championship Ultima



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touching both. Using a 300 watt soldering gun, melt the solder deposits, pull the solder gun out of the sandwich and pull the cells together. You'll have to be quick but with practice this technique will become easy. With two sticks of three batteries, glue the two sticks together in reverse battery order; that is, there should be a positive and a negative terminal at each end. If this is to be a six cell or a seven cell pack with a top or side mounted seventh cell, solder a battery braid wire across one set of terminals. If this is to be a flat seven cell pack, solder a battery braid wire to each terminal on one end of the stick pack. Solder the seventh cell to the two braid wires maintaining the positive to negative relationship of batteries in the pack.

To cover the assemblies with heat shrink, cut the heat shrink material 1" longer than the pack. Shrink the two ends prior to shrinking the middle. This technique will allow the heat shrink material to draw up very tight and smooth giving a professional look to the assembly. Now attach the battery leads. The lead wire should be 18 guage or larger. If this is a six cell or seven cell flat pack, attach the battery plug to the leads. To top mount the seventh cell, cut out a small section of heat shrink in the top the size of the NiCd. Glue the cell in place. Run the positive lead from the stick pack to the negative terminal of the seventh cell and solder. Solder a new

positive lead from the seventh cell and connect the two leads to a battery plug. A side mounted seventh cell is assembled in the same manner as the top except you don't have to cut out any heat shrink material.

PACK PERFORMANCE

One of the real difficulties, for today's racers, is to know when a pack is going bad. CELL-MATE has an optional resistor box that will allow the measuring of 4, 6, 7 cell packs. By keeping a log book and recording a pack's original capacity, at a later time the current capacity of the pack can be checked. If the pack is not performing up to standards, disassemble the pack and check each cell. It could be a simple matter of replacing a bad cell. To me, the value of the CELL-MATE is at the races. By checking the amount of power left in the battery pack at the end of the race, we can determine whether or not to increase my pinion gear by a tooth. In 12th scale, if there is over a laps time left in the battery then increase the pinion. In 10th scale oval, if there is over 2 laps worth of time left then increase the pinion. In off-road, if there is 4-5 times the average lap time left in the pack, increase the pinion. Who says you can't go faster on matched cells? The other advantage the CELL-MATE will give you over the competition is, you will know ahead of time how well your batteries are going to perform.

THAT'S A DEFINITE EDGE.

BATTERY COMPARISONS

We recently had the pleasure to compare SANYO batteries to other manufacturers batteries. SANYO out performed most of the competition; PANASONIC was SANYO's closest competition. The Panasonic cells are .5mm taller and bigger in diameter but they weigh .17 ounces less. In the performance category, Panasonic won the out of the box individual cell category, that is, the Panasonic cells right out of the box were closer matched; Panasonic advertises their cells as being matched at the factory. We made up some six and seven cell Panasonic packs and compared those to the Trinity and Parma matched Sanyos. Again, we were surprised. Panasonic held its ground. If we had not marked which pack was which, performance wise, you would not have told the packs apart (see the charts). The only test left is the test of time. How rugged are the packs? Can they endure the torture of off-road? We liked what we saw, and for the money, Panasonic is an excellent buy; Sanyo keep up the good work, you're getting some competition. We're running them in oval and off-road and we haven't been disappointed.

CONCLUSION

In these articles we presented three important points:

1. We should begin to see new

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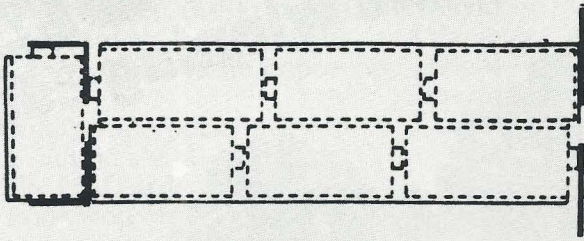


Figure 1a: 7-Cell Inline Pack

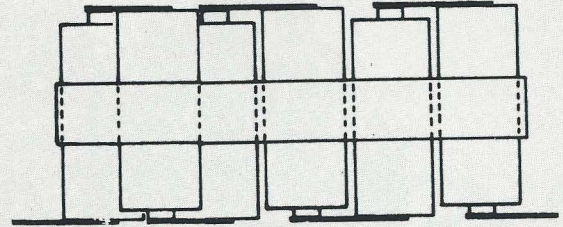


Figure 2a: 6-Cell Hump Pack

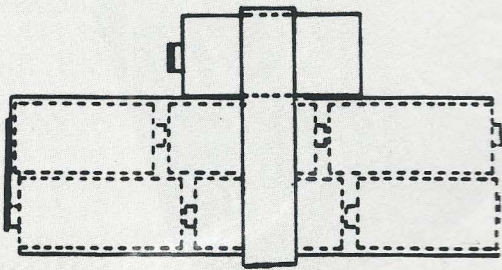


Figure 1b: 7-Cell Side Pack

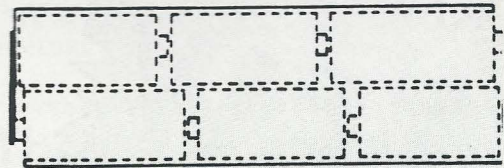


Figure 2b: 6-Cell Inline Pack

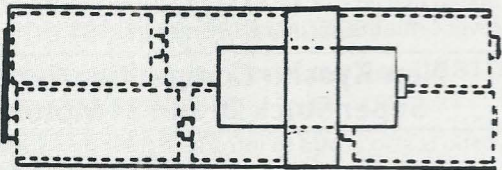


Figure 1c: 7-Cell Hump Pack

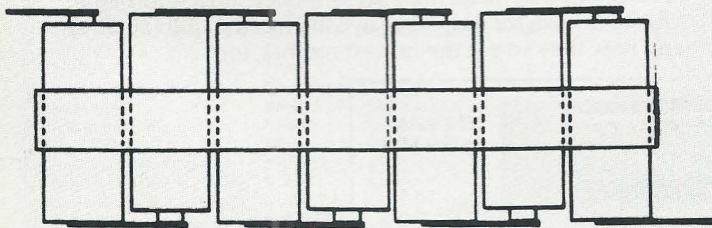


Figure 1d: 7-Cell Side-by-Side Pack

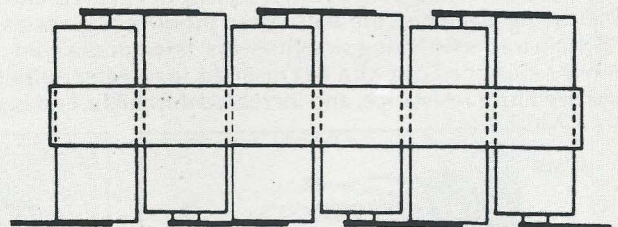


Figure 2c: 6-Cell Side-by-Side Pack

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batteries with 1400 mAh, 1500 mAh, and 1700 mAh ratings with introduction of new ROAR rules. 2. Cell matching is currently a hot issue but knowing the condition of your packs and knowing whether or not to increase your pinion gear size is a more important issue.

3. Heating up the packs prior to the race can be a vital edge to get you in the lead early.

We hope you find this information informative. **GOOD RACING!!**

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Diameter - 22
Height - 42
Internal Resistance - 4.2
Cell-Mate - 440-580
PANASONIC P130SCR:
Weight - 1.7
Diameter - 22.5
Height - 42.5
Internal Resistance - 6
Cell-Mate - 495-520

SCR CHART

Sanyo SCR:
Weight - 1.84

Diameter - 22
Height - 42
Internal Resistance - 4
Cell-Mate - 440-550
Panasonic P12SCR:
Weight - 1.7
Diameter - 22.5
Height - 42.5
Internal Resistance - 5
Cell-Mate - 465-500

SCE CHART

Sanyo SCE:
Weight - 1.87
Diameter - 22
Height - 42
Internal Resistance - 5.5
Cell-Mate - 600-700
Panasonic P170SCS:
Weight - 1.7
Diameter - 22.5
Height - 42.5
Internal Resistance - N/A
Cell-Mate - N/A

*Internal resistance is measured at half charge for Sanyo and at full charge for Panasonic. A fully charged battery will have a LOWER internal resistance than a half charged cell. REMEMBER: The higher the internal

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Motor Basics — 101

By F. Dale Cauthen

Perhaps the least understood component of these electronic wonders that we all love to race is the powerplant. While on the surface, these might seem simple; a spinning armature, composed of conductors powering electromagnets alternately drawn to permanent magnets positioned opposite one another, how much more difficult is it to determine whether this part of the car is performing up to its potential than the radio, the speed control, the differential, or the bearings?

We all have to admit we don't always know exactly how well a given motor is going to perform during that long moment before the race director gives us the word "go". I've seen racers of national ranking pull off the

starting line and run strong around the infield only to find on the first pass, down the long straightaway that the motor they had chosen for the "main" just didn't have the speed to win on that day.

Can we avoid having this happen to us? Well, we can try. We can try by developing as complete an understanding of the motor as possible and by preparing and testing our motors as thoroughly as possible before each race.

I don't pretend to understand everything about motors. You won't learn here how to build your own motors from scratch. What you will learn is how to tell a good motor from a not so good one, and how to keep your motor

performing at its best.

Let's start off with some definitions so we are all speaking the same language:

Armature - the rotating portion of the motor comprised of: the armature shaft, commutator, "stacks," and the winds.

Bottom end (also referred to as low end) - the motor's ability to accelerate from a stopped or very slow speed. Too much "bottom" results in a tendency to excessively spin the tires and causes the car to be "punchy" and difficult to control.

Brushes - the copper and carbon rectangular blocks of conductor material that carry electrical current from the power wires directly to the commutator. The brushes must always be in

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Parma is proud to unveil a new body for the recently released Tamiya Q.D. car (#10300, \$14.00). This 1/14 scale Toyota pickup is produced in clear, and includes body mounts for simple installation. Also shown are Parma's treaded tires (#12016, \$10.00/ pr). These tires are an exact fit for Q.D. rims, and better suited to on-road use.



Parma announces the release of the Pro Panther 12 in a graphite version! (#1855, \$165.00). The Pro Panther 12 features a rockerball/flexplate rear suspension for superior handling. Also included are ready to race tires and complete ball bearings. Begin your winning season with the Pro Panther 12.



Attention monster truck owners! Parma introduces a direct replacement lexan body for the Tamiya Clod Buster (#10270, \$19.00). Molded in clear lexan, with great detail, it also fits other monster trucks with the use of a universal, adjustable body mount kit from Parma (#10450, \$6.50).



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Parma announces the availability of Pro Panther 10 chassis components in graphite! Each is available separately; clockwise, left to right are front crossbar (#18012, \$12.00), Chassis (#18211, \$55.00), Dampener plate (#18014, \$12.00) and Flex plate (#18021, \$10.00). The lightweight and stability of graphite is just the thing to give any race the professional edge. These and other Pro Panther 10 cars and accessories are available now at your local Parma dealer.



Parma's extensive line of decals receives four new additions! Shown left to right are Citgo (#10632, \$3.50), 7-Up (#10635, \$3.50), Endless line (#10638, \$3.50) and Silk cut (#10645, \$3.00). These decals boast three, four and five colors, and are just the thing to add "concourse looks" to any body. Use Parma decals, and finish with a winner!



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good condition or, regardless of the other parts of the motor, there will be less power available than with smooth brushes that have not been overheated or gouged at the commutator end. A new brush is soft and less likely to damage the commutator than a worn and hardened old brush.

Brush hood - rectangular metal tube that the brush rides in. The brush hoods must be clean and smooth. Debris or rough spots in the brush hoods will eventually cause the brushes to hang up in the hood, reducing or eliminating power to the motor.

Brush spring - a length of spring wire with a straight section on each end and coil in the middle that provides pressure against the brush to maintain uninterrupted contact between the motor brush and the commutator. Too much pressure and the friction of the brush pressing

against the commutator causes too much drag, limiting top end. Too little pressure and the spring is unable to overcome "brush bounce" resulting from constantly skipping across the gaps between commutator segments and the motor will perform poorly under hard acceleration as well as having a severely limited top end. That's right. Here comes that phase you hate to hear! If you don't know what you're doing, leave them alone. The engineer who designed your motor knew what he was doing. Trying to outsmart him is often the short path to the end of your motor's useful life.

Can - the outer shell of the motor which houses the two permanent magnets and the output end, or bottom, bearing.

Commutator or "comm" - the polished soft copper conductors and their nonconductive carrier at the top end of the armature

shaft. Each comm segment is connected to the winds of one of the three wound armature "stacks" and conducts electricity from the motor brush to the "winds" creating electromagnets which alternately pull themselves toward the permanent magnets housed in the "can", causing the armature to rotate.

Endbell - the nylon or aluminum "top" of the motor, to which is mounted the brush hoods, top bearing, capacitors and power connections.

Oil shield - a disk of nonconductive material riding on the armature shaft, between the commutator and the endbell, which prevents oil from contacting the commutator and causing a short between the segments of the comm.

Spacer - circles of either metal or nonconductive material which limit movement of the armature within the can. These spacers keep the commutator from moving above or below the motor brushes so far, that either incomplete contact with the brushes results or the protruding contacts on the comm segments collide with the brushes which could, and probably would, break the brush. Some manufacturers have taken of late to using silicone O-rings as spacers in mild modified motors. The jury is still out on the usefulness of these as some motors containing them seem to have less top end than expected and tend to overheat more easily. More on these as we learn more about them.

Top end - maximum speed.

That's enough for now. We'll define more terms as they come up. The hurdle to be cleared in this lesson is getting over the mystery surrounding what makes the motor work and how to keep it working as well as it was designed to. We are NOT going to get into modifying the motor or trying to make it do more than the designer intended. Pushing a motor beyond its intended limits is generally a mistake anyway, so let's get into what you should and

shouldn't do to keep your motor running its best.

First, and perhaps most important, is to keep the motor clean. Don't let dirt stay in the motor, whether its carpet fuzz or sand. Any foreign matter in a motor binds it up and accelerates wear, while degrading performance. Good motor cleaning spray only costs between seven and nine dollars per can and can save you the cost of replacing your motor quite so often, while keeping the motor operating at its best. Primary areas to pay attention to are the motor brushes and their hoods, and the bearings or bushings. Whether running a stock or modified motor, always sparingly lubricate the bushings as soon as the motor is dry from motor spray. Letting your motor run in dry bushings can gall the armature shaft. Running bearings completely dry will eventually destroy the bearing and again gall the shaft. There are a couple of things you should not do con-

cerning motor spray. Don't try to save money on it. Cheap motor spray is often relabeled brake cleaner that can damage the plastic core of the commutator and shorten the life of your motor. Stick to name brands like Trinity and Reedy. And don't run your motor while it is still wet from cleaning. Moisture combined with any remaining grit in the motor will deeply score both the brushes and the commutator, possibly destroying the motor's further usefulness.

Second, replace worn or heat damaged brushes immediately. Brushes are most commonly destroyed by overgearing the motor, producing too much heat, which not only shortens brush life but damages other motor components as well. The second cause of short brush life is dirt passing through the motor and being ground between brushes and comm the way through. If your brushes show a significant change in color, replace them.

They have hardened and lost their lubricant quality and will damage the commutator if used after this point. If the brushes show gouging, check the comm for damage. Parma markets comm cleaning sticks that do a very good job of removing dirt and brush deposits from the comm. If the commutator shows damage, ask one of your club's long time racers or your hobby shop car guru for advice on whether the problem can be corrected outside the machine shop or if its time for the motor to go off for professional attention. Trinity offers a complete normal rebuild for modified motors for only \$20.00, considerably cheaper than replacing the entire motor if you allow it to become extensively damaged before giving it needed attention. Stock motors can be helped by some racer's experience in use of stock motors but must be replaced if neglected to the point of extensive damage. If you aren't sure whether your

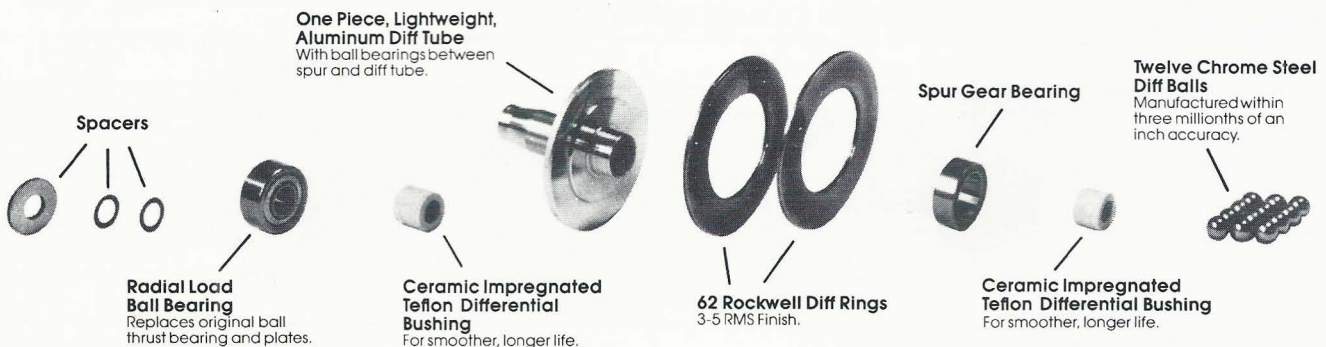
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motor can be rebuilt, contact the manufacturer for further information. Even if you have done irreparable harm to the armature, often the motor can be returned to original performance with magnet "zapping" by the manufacturer and replacment of the armature. Replacement armatures generally run about \$30.00. So, you can see the cost of neglect.

Your motor is different in many ways from an internal combustion engine. But all powerplants are basically pumps of one sort of another, either by intention or coincidence. By coincidence, the electric motor in your car is an air pump. It draws air in through the endbell and pumps it out through the bottom or can end. The faster the motor, the higher the air flow. Unfortunately, the higher the air flow the greater the likelihood that the motor will draw in dirt and the more necessary it becomes that air be allowed to flow freely

through the motor to keep it cool. To balance these two considerations, always run a motor filter, but use the one that filters dirt according to the conditions you run under while providing the greatest air flow achievable without also drawing dirt through the motor. The filter I recommend is the new "Bones Kool Cap" motor sock. These ultra thin filters fit places the old thick foam filters won't while doing a better job of keeping foreign matter out of the motor than earlier filters while allowing the motor to breathe freely. Like any other product which is clearly superior to everything else on the market, there are already imitations in the hobby shops. They use similar materials but the workmanship is inferior and these imitations let as much dirt into the motor as running without a filter does.

Next time we'll get into how to

determine the condition of your motor, and some tips on correcting minor problems. For now, remember these points: 1 - Keep it clean with a good filter and name brand motor spray. 2 - Keep it cool by not overgearing and by letting the motor breathe freely. 3 - Replace bad motor brushes before that \$3 part destroys your \$28 to \$80 motor.

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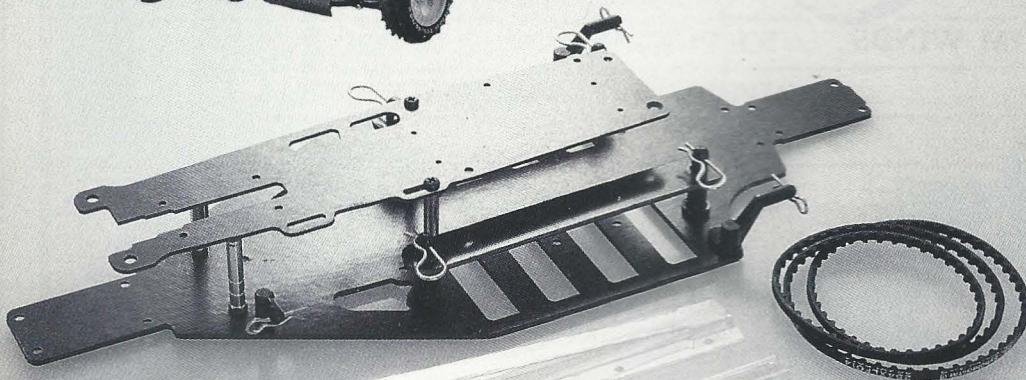
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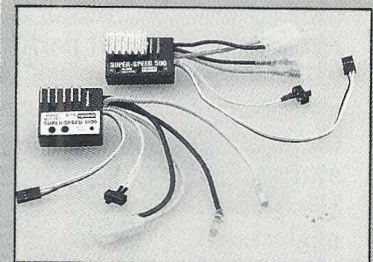
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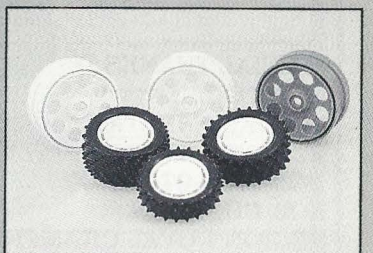
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The WAR!

By John Thawley - Photos By Vince Palazzolo

Team SEMROCC Racing declares "WAR." With the support of the R/C industries largest weapon suppliers, Cam Pro Motors, Reedy Modifieds, Rev-Tech, Trinity, and Twister, drivers from the midwest, northeastern states, and Canada, came to Michigan to take part in the ultimate motor battle. This was to be the first "WAR", a race that SEMROCC has promised to stage annually and build into a showcase showdown for modified off-road racing.

This year's drought has taken its toll on many off-road tracks this year, and SEMROCC's battlefield has been no exception. With that in mind, new dirt was hauled in to prepare the track for the "WAR." In an effort to provide a good surface to lay down some horsepower, the new surface was packed and rolled. Unfortunately the result was the opposite. Although the track is big and wide with long straight-ways and radiused corners, bite was at a premium, and demanded driving skill and creativity in car setup. No problem! As the race flyer stated, "wimps need not apply", and judging by the spirit shown by these drivers' ability to rise to the challenge, there were no wimps present.

Friday was slated as an all day practice session, starting around noon. Many of the out of state drivers took this opportunity to figure out the surface, and start running down some hot laps. In two wheel drive low 19 second laps became the mark, in 4 wheel drive consistent 18's would become a necessity.

Saturday arrived and brought jungle type weather, hot and sticky. The track was groomed and ready after the completion of an early morning practice session. The seven heats of 2 wheel



The WAR - A Main 4WD.

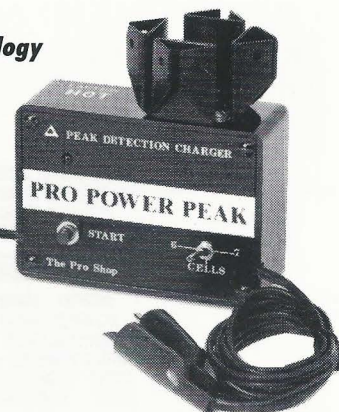
drive were posted along with four heats of 4 wheel drive. Remember this was strictly modified, so drivers did not have the luxury of running the stock class "for prac-

tice" as is often the case. It was evident that already a few strong runners were beginning to create their own mental edge over the rest of the field. Two constant

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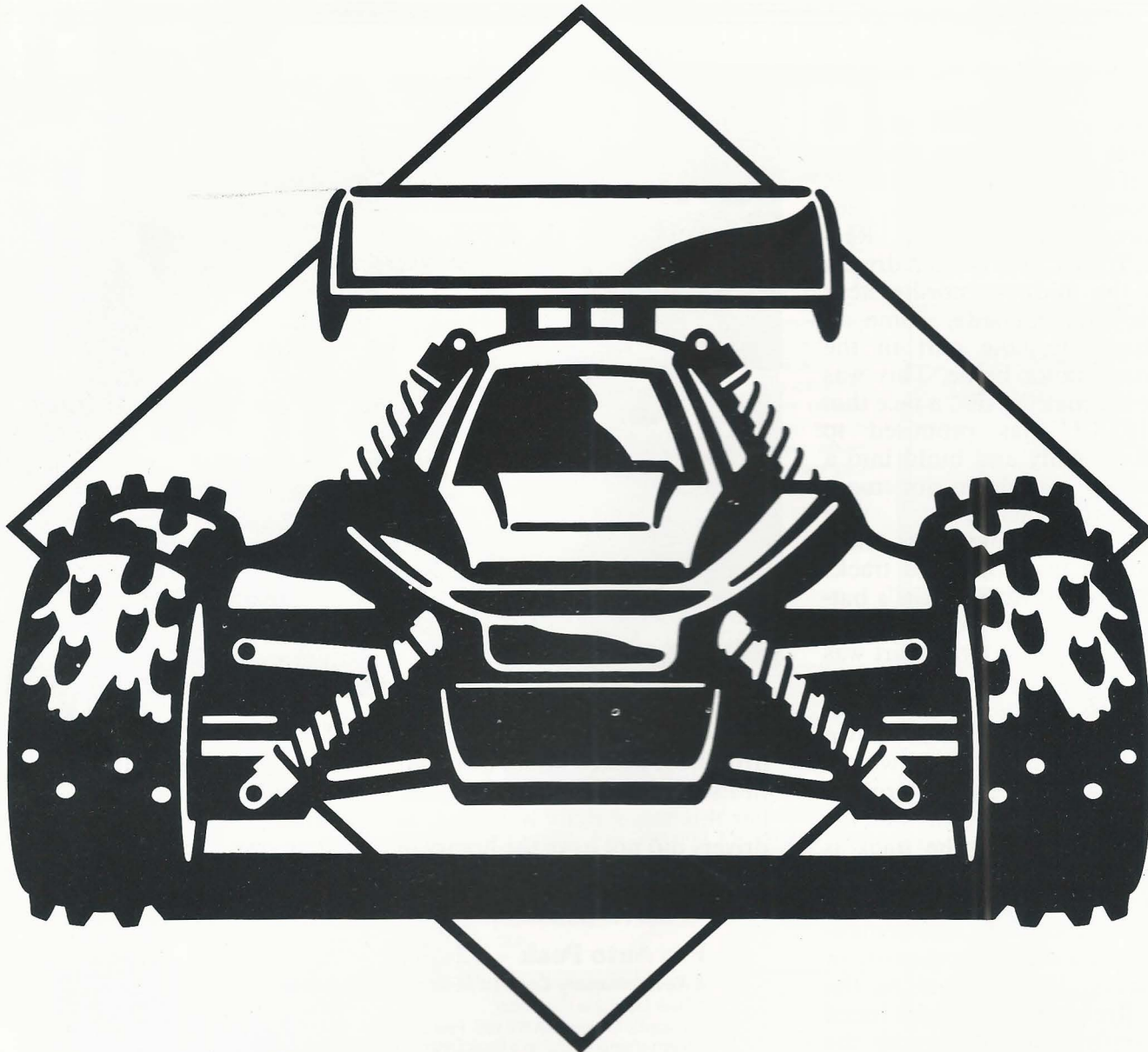
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front runners from the mid-west, Chuck Lonergan and Mike Marshall had quickly established their presence with quick times during practice. Up from Ohio, Jim Dimmerling and '88 2WD Stock Region 3 Champion Dave Pulfer turned some hot laps that sent out the message that they would be around after the smoke clears. In the 4WD camps, Joe Lawrence, the '88 Regional Champion and Reedy modified campaigner was lighting up the track and establishing a definite home court advantage. Curt Demars, another local favorite, declared his CAT to have nine lives. Meanwhile, in a very quiet fashion two "unknowns" were lurking in the field, Brian Fogt from Montreal, Canada, and Travis Moyer from Souderton, PA. These two drivers were quickly establishing themselves as forces to be dealt with both in 2 wheel and 4 wheel drive. Three ingredients would make this one a hot contest. The obvious driver bragging rights, motor manufacturer dominance and regional pride. Believe me, it got hot!

In first round qualifying, from the 4WD D qualifier, Travis Moyer sent out an early warning, 13, 255.69. Quick? Yes, but will it hold? Fogt in the C qualifier takes a shot but comes up 2½ seconds short of Moyer. Out of the B qualifier comes the surprise of this year's 1/12 scale Nationals, Ralph Duncan, who lays down a 13 lap run in 253.48. Two seconds quicker than Moyer's early pace. Next up the A qualifier. Pulfer cracks off a 13, 251.74, Demars comes up second in 13, 252.83 with Jerry Cyrul hot on his tail at 13, 253.83. The heat is on!

In the first round of 2WD drive, again, it's Moyer jumping out to an early edge. Who is this guy? 12, 255.66 out of the E qualifier. It's gonna be a long weekend. In the C qualifier local, Troy L'Esperance pulls off a 12, but its not enough to top Moyer. In the B qualifier two more 12 lap runs, Ron Kwentus and Jim



The WAR - 2WD A Main.

Baugh, still a heartbeat short of Moyer's time. Then in the A qualifier, Mike Marshall, driving for Peak Performance, laid down a shot that was heard over the entire pit area. 12, 244.24. 11 seconds faster than Moyer's run. In real estate terms, that's about 2/3 of a lap. Mike Eckstein, also Peak Performance, picks up the second spot with a 12, 251.53.

Round two in the 4WD class seemed to be somewhat uneventful, with the exception of some shuffling amongst the ranks. Wrong!!! When the dust had settled from the A qualifier, Curt Demars had replaced Pulfer's TQ time with a 13, 245.99 with Joe Lawrence drafting him to a 13, 246.46. OH YEAH!

Two wheel drive took to the track for round two. Everyone wondering how Mike Marshall had dominated the round by 2/3 of a lap with six (6) cells. Back up, did you say six (6) cells? Yeah! Read it and weep. And weep they did! With very little commotion, Chuck Lonergan was the only driver to edge his way into the top ten in round 2.

The day wound down with the running of round 3. Most drivers wanted to get that quick run in NOW! With only one more round of qualifying to be run on

Sunday morning, no one wanted to have that much pressure on them for the last round. Pressure. Did someone mention pressure? Could it be . . . SATAN? Travis Moyer decided to establish the definition of pressure. The man climbs the drivers' stand and proceeds to lay down the only 14

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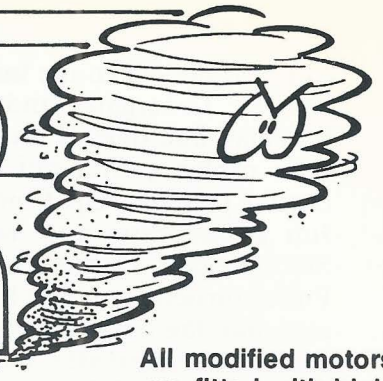
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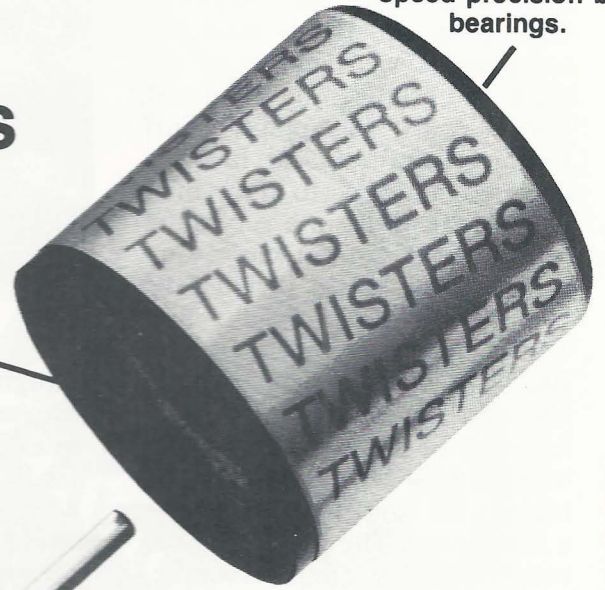
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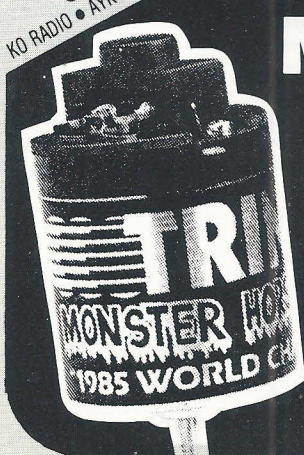
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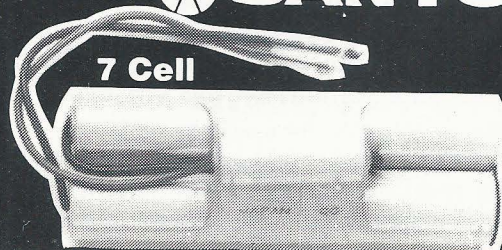


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lap run of the weekend. Just when everybody thought they were having fun. And so with three rounds completed, the 4WD drivers had a night of sleeping with the wrenches to look forward to.

In two wheel drive a little more shuffling took place, with Fogt and Dimmerling moving into the top two slots respectively. The day would end for the 2WD challengers, with only the hopes of knocking down Fogt's 12, 242.74 in round 4 on Sunday.

As the morning haze lifted on Sunday, we were finally able to figure out where that whirring sound was coming from. On the driver's stand stood, Lonergan, Pulfer, Marshall, Demars, and a host of other fast guys, showing the rest of us why they are fast guys. Practice, practice, practice. When asked, Lonergan admitted he had already put 5 packs through the car. (#%@*#!) It was obvious, these guys came to race! Round four promised to be challenging for some, disappointing for others. The do or die situation brought out the best in many. In the B qualifier, your truly, had a perfect run going until an unfortunate tangle with a backmarker left the car on its lid while waiting to be rescued by a helpful marshall. The run ended 1 second short of the A main. Joe Lawrence saw similar fate in the A qualifier, as he tangled with the dying car of Dave Pulfer. This reduced Joe's time to a 13, 251.16. That run put Joe into the number two spot,

missing 14 laps and a shot at the TQ by a heart beat.

In 2WD, it was obvious that Brian Fogt had pretty much pressed the envelope in round three. Thirteen laps was not going to happen. Travis Moyer edged his way into the A main, with a few other folks bumping each other around between the B and the C mains. But most drivers agreed the track had given up as much as it was gonna give. Preparation for battle in the mains was the next order of business.

In the 4WD A main, Travis Moyer to the advantage of his pole starting position, grabbed the hole shot, and came by the timer in first position. Demars grabbed second, with Lawrence's Reedy powered Yokomo in third. On lap three, Demars showed the nose of his Cat to the timers first, Moyer came by second. Lawrence meanwhile had come across trouble by way of Brian Fogt and Darryl Bingner. Also in the hunt was Jerry Cyrul, showing some pretty stout lap times. Demars managed to maintain about a 3 second lead over Moyer midway through the race, but as the clock ran down, Moyer got consistent. Little by little, he crept up to the back of Demars Shumacher car, as Demars worked his way through traffic, Moyer began to haunt him. As the two cars made the last turn onto the straightway, time was called. The crowd went crazy as Demars drag raced Moyer to the finish line edging him out by 65/100 of a second. Demars with his QT (Race Prep) powered Schumacher Cat, had won the "WAR."

The 2WD main proved to be a battle royal. The first corner with Brian Fogt leading the pack looked like the "Battle on Pork Chop Hill." This was probably the worst start of any race I have ever witnessed. At least 8 of the ten cars were piled up in the first turn. Before the marshall could separate the wreckage, one car emerged from the pack, followed

by a second moments later. The crowd waited anxiously to see who had survived the whole mess. Three cars came toward the timer's table, down the front straightway, staggered in one second intervals. It would be Lonergan across first, with Mike Marshall and Mike Eckstein in hot pursuit. Travis Moyer followed running fourth. To give you an idea of the pile up, Lonergan's first lap time was 25.88, compared to the first 4WD lap of Travis Moyer at 20.83. Meanwhile further back in the pack, Dimmerling was moving up through traffic. Eckstein and Moyer, not wanting to yield any ground to each other, got caught by Dimmerling first, then Mike Boedrukker. As Moyer began to pull away from Eckstein, Dave Pulfer to advantage and also slipped by. This left Eckstein in seventh, Pulfer in sixth, Moyer 5th, and Boedrukker in 4th. Lonergan continued his trek to lead the way. Marshall just couldn't seem to get a break. Mike showed his usual consistent driving style and awesome six cell speed, but he just couldn't buy back the 3 second edge that Lonergan had established in the early going. In third place Dimmerling's charged appeared to be too little too late as he finished 4 seconds behind Mike Marshall. Through patience and a smooth persistent style of driving, Chuck Lonergan had piloted his Reedy powered RC10 to victory at the "WAR."

2WD A MAIN

- 1st - Chuck Lonergan
- 2nd - Mike Marshall
- 3rd - Jim Dimmerling
- 4th - Mike Boedrukker
- 5th - Travis Moyer
- 6th - David Pulfer
- 7th - Mike Eckstein
- 8th - Brian Fogt TQ
- 9th - Chuck Summers
- 10th - Glen Ellis

B MAIN

- 1st - Paul Brower
- 2nd - Jim Baugh
- 3rd - Bob Joysey

C MAIN

- 1st - Mike Wartell
- 2nd - Rick Rottach
- 3rd - Vince Palazzolo

4WD A MAIN

- 1st - Curt Demars
- 2nd - Travis Moyer TQ

- 3rd - Brian Fogt
- 4th - Darryl Bingner
- 5th - Jerry Cyrul
- 6th - Ralph Duncan
- 7th - Joe Lawrence
- 8th - David Pulfer
- 9th - Tom Cyrul
- 10th - Mike Boedrukker

B MAIN

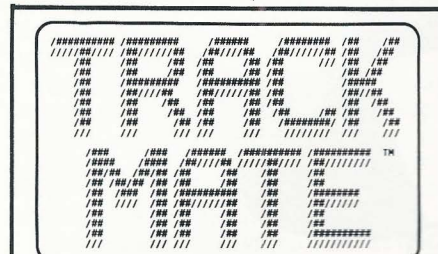
- 1st - Barry Rosenberger
- 2nd - Chuck Lonergan
- 3rd - David Fenech

C MAIN

- 1st - Scott Moody
- 2nd - Chris Miksovsky
- 3rd - Gary Clark

Congratulations to all the winners, and many thanks to our sponsors. Also thanks to Bud's Racing Products, Competition Plus, Stage III, Advantage Batteries, and McAllister Racing for the donations. I would personally like to thank Kevin Betz, Rick Rottach, Donna Engler, and all the other many enthusiastic SEMROCC members that helped out with this event. I wish I could mention you all. I am sure you know who you are, thanks a whole lot, we couldn't do it with out you!

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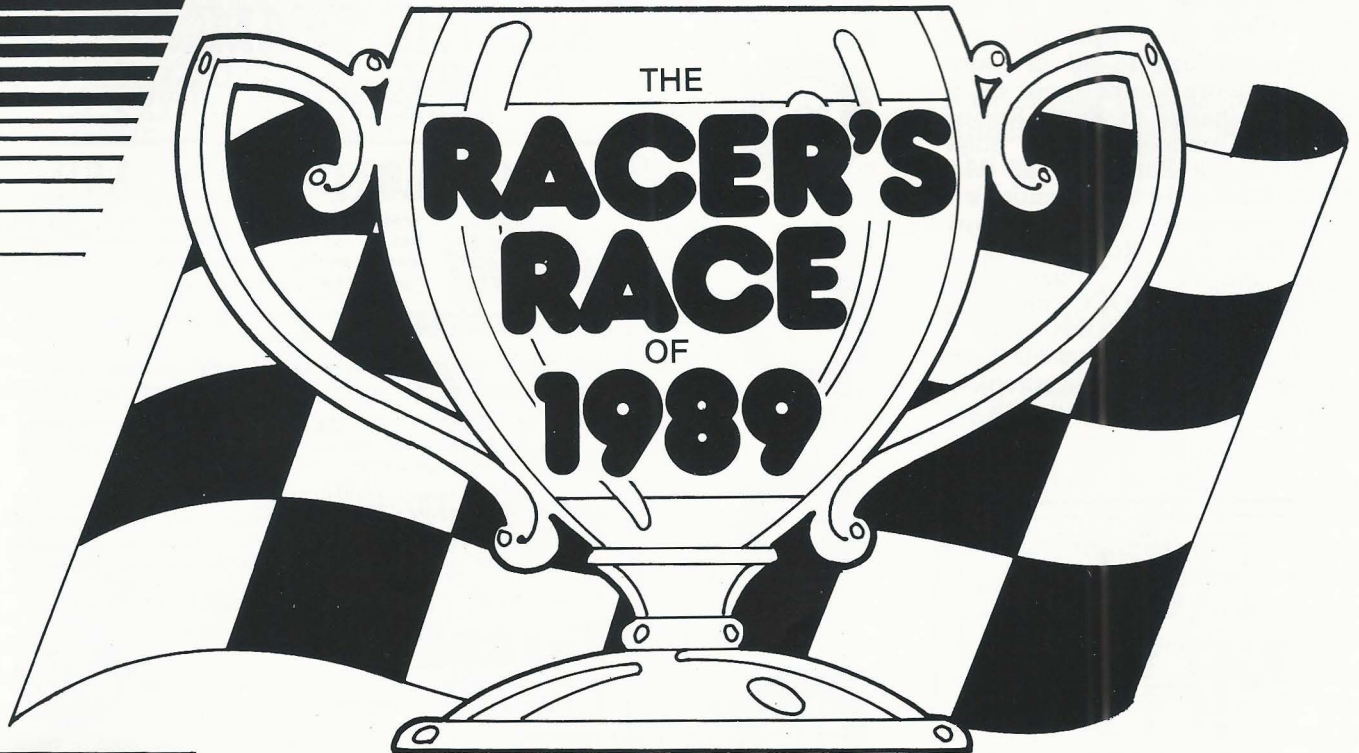


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MRC/Tamiya's Run-For-Fun Draws Thousands Of Spectators

By MRC Staff

Thousands of onlookers filled the race area at New Jersey's Woodbridge Shopping Center for a recent competition that was part of MRC/Tamiya's highly successful Run-For-Fun Nationals qualifier.

As R/C modelers countrywide are doing, the entrants were competing for the winner's trophies (all racers received T-shirts) as well as the right to move on to the regionals. . . and ultimately the nationals, where \$100,000 in prizes will be awarded to winners, including two full size Pontiac Firebirds.

There's Still Time To Sign Up

Race rules are such that it doesn't matter whether you've raced before. 35% of the entrants have never competed. If you're in that category, come to the track and ask for the "On-Site Public Relations Director." He's there to bring all participants up to speed in a hurry.

Anyone with a stock Tamiya buggy can enter. No souped-up buggies. No experience necessary. There is a speed competition in 4WD and 2WD. And, a monster truck "carry the egg race" category.

The country is divided into seven regions. The local events are run by local hobby shops. Local winners move up to the regionals. Regional winners go to the Nationals.

To enter the MRC/Tamiya Run-For-Fun Races, see your hobby dealer for an entry form.



Some of the happy winners showing their trophies at the Run-For-Fun.

A total of 15 shops participated in one way or another. All distributed entry blanks and hung point-of-purchase announcements in their store. Some donated their time or their employees time to help run the race. These volunteers did everything from helping with the computer cataloging of winners, to acting as race marshalls, lap counters, tech service people, and more.

Coordinated on a nationwide basis by MRC, Run-For-Fun was conceived as a program that would give those who were not competitive

racers an opportunity to enjoy the fun of competition. . . win some prizes and enjoy the comradie of others with the same bent. And that's what's happening. As opposed to the heavily competitive, strictly race-oriented atmosphere that exists at many other races, Run-For-Fun brings its own unique form of excitement and invites much broader participation in the sport.

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U. S Indoor Championships

By Mike Reedy



The Modified winners from Left to Right: 1st Place Shawn Ireland, 2nd Place Christian Keil, and 3rd Place Chris Doseck.

When November rolls around each year it is time to dust off the four cell battery packs and head to Cleveland for the U. S. Indoor Championships. Most west coast racers never see a 4 cell pack but the lucky ones who get to make the annual trek to Cleveland know that 4 cell does not mean slow or dull. Through the years this race has provided some of the best competition possible in 1/12 scale racing. The top drivers from all over the U.S.A. seem to grab this chance to get together at a hotel and go at it for three or four days of hard competition. Cleveland has never lacked a little drama and excitement, for

instance last year's battery controversy. This year, though, the attention was centered around the excellent racing taking part on the track, as it should be.

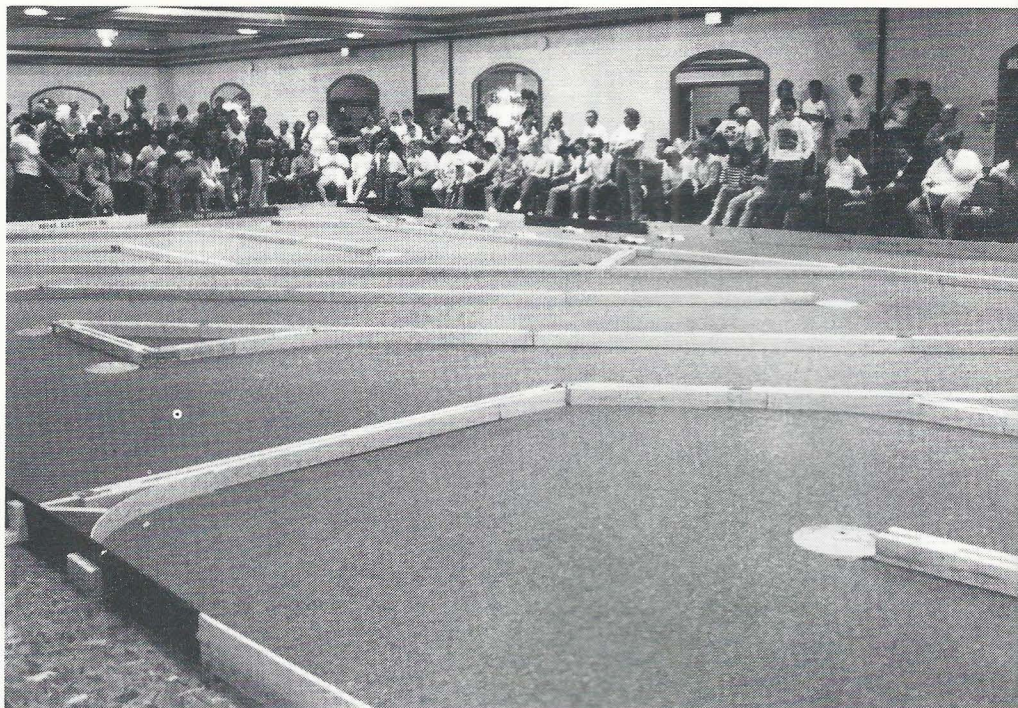
The only common topic of conversation around the pits, other than the race, was the musical chairs game being played by some of the team drivers. Team changes debuted at Cleveland included Chris Doseck returning to Trinity, Terry Rott moving over to CAM, Mark Blacketter joining the ranks at Associated/Reedy along with Carl Christy, and the grand daddy of changes with Joel Johnson leaving Trinity after an

association dating back years. As it turned out the musical chairs game was not over when the race started, as young Mike Seubert changed teams halfway through ending up with Trinity.

With all the off track action settled it was now time to get down to what we were there for racing and more racing.

Before going any further I have to apologize for not being able to give a blow by blow account on qualifying or the Sportsman Class. Not knowing I would be writing this article I did not observe or record in detail. I will give the highlights the best I can so please bear with me, and my

appreciation to the drivers in the Sportsman class as they put in a great effort and provided an excellent exhibition on R/C car competition. Qualifying times ended bringing Bob Light and Chris Doseck close to the top, both recording very fast times early in qualifying with immaculate clean runs. They held on to the top positions with Christian Keil, Kent Clausen, and Shawn Ireland all knocking on the door. In the final round Ireland and Keil put on a classic duel right down to the last two turns. Keil ended up on top and Top Qualifier two years in a row. Bob Light's time held up for a second position on the grid while Shawn Ireland ended up in the third slot. These cars were separated by one of the narrowest margins I have seen. Kent Clausen came through with fourth position with Doseck in fifth. Sixth went to crowd favorite, Tyree Phillips,



An overall view of the track at the hotel. An excellent and challenging track layout.

while newcomer Mike Seubert ended up seventh followed by east coast driver Mike Ebert. These two Mike's have come on

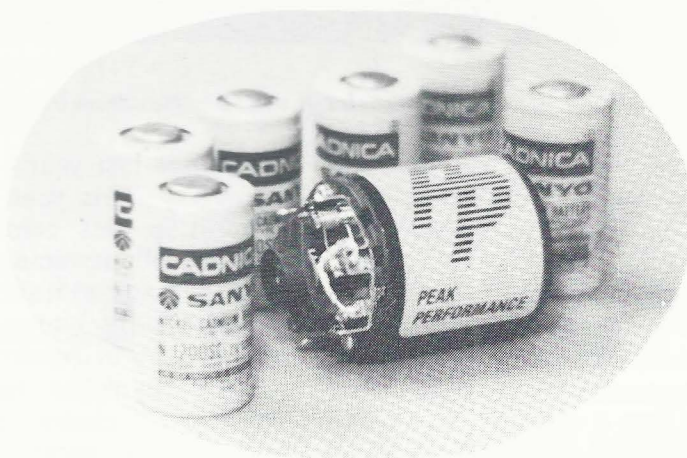
strong this year and both should be drivers to watch for in years to come. It's great to see new drivers showing up in the "A" Mains at

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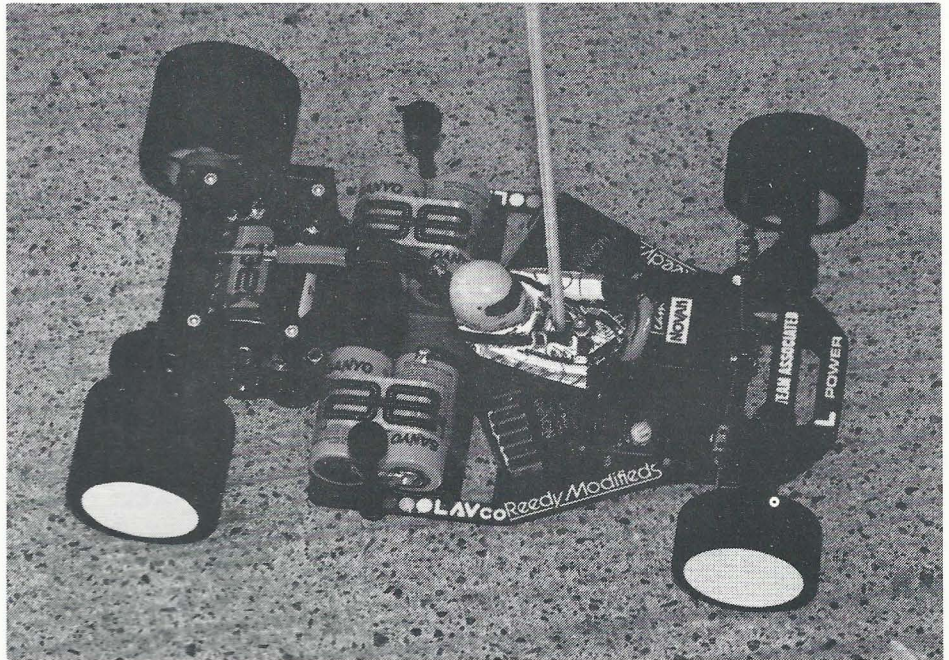
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national ranked events. Rounding out the A Main was Kevin Mercadante and Andy Dobson.

B Main Modified was a good crowd warmer for the A Main, with drivers like Neisinger, Bartos, Hechler, Blacketter, etc. Running it promised to be a top notch racer, and it was, Tony Neisinger who grabbed the hole shot and early lead followed by Joe Lawrence, Dave Hechler and Bud Bartos. At 2:30 into the race Tony's car lost its power with Hechler catching at a fast pace. Driving a tight line Neisinger held off Hechler's charge for a few laps, but with his top end power, Hechler made a clean inside move at the end of the straightaway for the lead. From that point on Dave Hechler pulled away and never looked back as he went on to win. With less than a minute to go Bud Bartos made his bid and goes by both Lawrence and Neisinger for second. On the last lap Bud starts to dump but holds off Neisinger



The winning combination car of Associated/Reedy that took Shawn Ireland to his first major win!

for second place honors.

A Main time and there was not an empty spot around the track. Christian Keil got the early lead followed by Kent Clausen and Tyree Phillips. About four laps

into the race Clausen gets by Keil for the lead. Tyree Phillips also gets by with Keil dropping back in the field. Meanwhile, Shawn Ireland was moving up on the leaders and as Clausen and

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The Sportsman Class winners all smiles, congratulating each other on their excellent racing skills! Left to Right: Wayne Penfold, Schumacher, third; Dwight Smith, Associated, first; George Smith, TRC, third.



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(Graph shown represents actual computer readout of Reedy Modifieds motor.)

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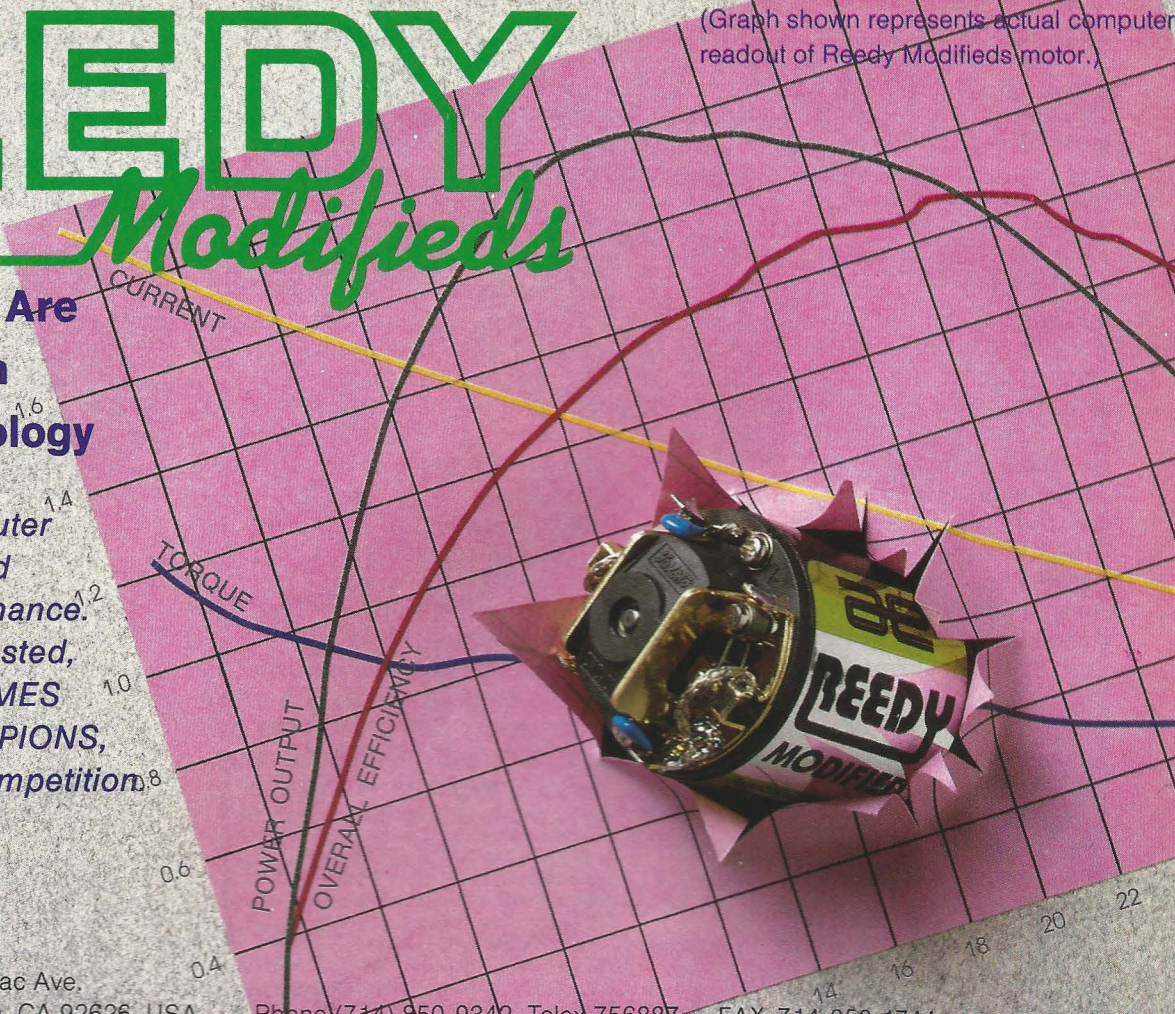
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Phillips played bumper cars in the infield, Ireland went by for the lead. Young Mike Seubert was working his way through traffic and had moved into second and when Ireland picked up a board, Seubert went by for the lead at the four minute mark. Seubert stretched his lead taking advantage of the battle going on behind him. The question now was "Could his batteries last at the pace he was going?" A good race was developing between Ireland and Doseck for second. Doseck makes it by with a little patty cake move in the infield only to pick up a board a few turns later letting both Ireland and Phillips through for second and third. Shawn starts to pull away from Tyree and with Seubert's batteries taking a massive dump with one minute to go, Shawn, with plenty of power left, went by for the lead. Meanwhile Tyree's batteries also decided to say goodbye and Christian Keil putting on a hard charge passed Phillips for a second place finish. Shawn

Ireland driving a fast consistent pace brings home the win and his first major championship.

In closing I would like to say Cleveland once again provided some of the top racing available and the drivers should all be congratulated. Also to be thanked should be the organizers who put in a lot of work every year and this year everything was excellent. One last congratulations to Shawn Ireland, I've known Shawn for many years and he has always been one who has worked hard at his R/C car racing and has always been a Sportsman. A well deserved and well earned win.

A footnote and thanks as Shawn Ireland donated his winning Reedy Modified and batteries to a drawing after the race.

MODIFIED MAINS

A MAIN

- 1st - Shawn Ireland/Assoc./Reedy
- 2nd - Christian Keil/Assoc./Reedy
- 3rd - Chris Doseck/TRC/Trinity
- 4th - Mike Ebert/Assoc./Reedy
- 5th - Kent Clausen/Assoc./Reedy
- 6th - Mike Seubert/TQ Racer/Trinity
- 7th - Kevin Mercadante/Assoc./Reedy
- 8th - Tyree Phillips/Corally/Revolution
- 9th - Andy Dobson/Parma/Parma

10th - Bob Light/TRC/Trinity

B MAIN

- 1st - Dave Hechler
- 2nd - Bud Bartos
- 3rd - Tony Neisinger

C MAIN

- 1st - Bob Schoenau
- 2nd - Paul Martin
- 3rd - Louis LeBlanc

D MAIN

- 1st - Tom Lamb, Jr.
- 2nd - Rusty Husband
- 3rd - Dave Pulfer

E MAIN

- 1st - Tom Adams
- 2nd - Chuck Lonergan
- 3rd - Mike Lufaso

F MAIN

- 1st - Glenn Tonagai
- 2nd - Steven Verona
- 3rd - Dennis Vendedahl

G MAIN

- 1st - Chad Coppock
- 2nd - Wayne Gerber, Sr.
- 3rd - Mike Stewart

H MAIN

- 1st - Mitch Witteman
- 2nd - Paul Morack
- 3rd - Gary Lanzer

I MAIN

- 1st - Mike McBride, Jr.
- 2nd - Robert S. Kuss, Jr.
- 3rd - Dave Biller

J MAIN

- 1st - Jim Pierson
- 2nd - Tom Joysey
- 3rd - Sam Williams

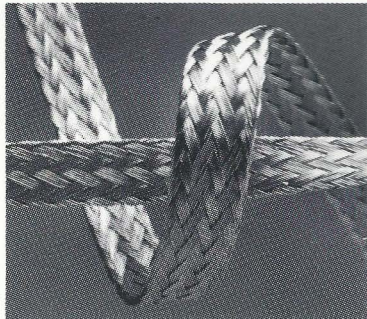
K MAIN

- 1st - John Whyte
- 2nd - Mike Davis
- 3rd - Ronald Aricchi

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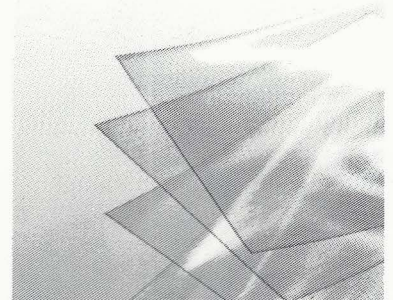
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- 2nd - George Martin/TRC
- 3rd - Wayne Penfold/Schumacher
- 4th - Dave Webb/Associated
- 5th - Jason McWethy
- 6th - Frank Calandra
- 7th - Glenn Orant
- 8th - Bill Schoenau/TRC
- 9th - Jim Keserich/Parma
- 10th - Mike Pulfer/TQ

SPORTSMAN B MAIN

- 1st - Keith Hamilton
- 2nd - Ray Cifani
- 3rd - Dean Smith
- 4th - David Chester
- 5th - Jay Killingsworth
- 6th - Craig Romero
- 7th - Chuck Mackin
- 8th - John G. Pens
- 9th - Scott Smith
- 10th - Dave MacLennan

SPORTSMAN C MAIN

- 1st - Peter Klebert
- 2nd - Gary W. Sager
- 3rd - Mike Walpole
- 4th - Mark Frechette
- 5th - John Incantalupo
- 6th - Mike Overbay
- 7th - Tony Carrubba
- 8th - Doug Orton
- 9th - Tim L. Smith
- 10th - Joe Hutton

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Region 6 Quarter Scale Dirt Championships

By Paul Nadeau/Photos by Jerry Blake

Have you ever been to a local small dirt track to watch the local heroes do battle in their shiny yet dented race cars? Do you remember the smell of the hot dog stands mixed with the smell of burning rubber and exotic racing fuels? Then, looking back, you can remember the almost party-like atmosphere of the night racing with the lights shining brightly and the noise sometimes deafening. This is what Quarter scale racing under the lights is like.

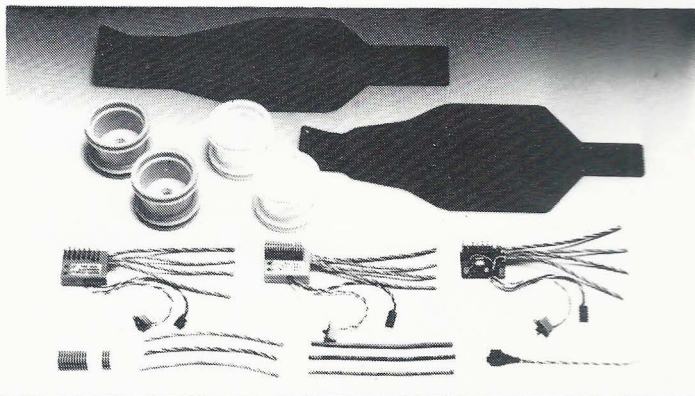
On Dec. 3, 1988, OUTLAW R/C Hobbies staged such a race. The fans were lined up around the track dodging dirt clods as the cars roared into the corners at close to 50mph. The hot dog stand was packed and the smell



Mike White was a double winner at the Regionals.

of racing fuel was definitely in the air. The drivers were hyped

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up and the track was dialed in and ready for some of the best quarter scale racing to be seen anywhere on the planet.

The show began about 2:00 p.m. with time trials. These single car runs would determine each driver's starting position in the qualifying heats. These heats are where the action really gets heavy as a good finish puts a driver in the "A" Main and not-so-good finish puts you in the lower mains. If you could win a lower main there was still the option of bumping-up into the next main and hopefully bump all the way into the "A" Main with the big boys.

The time trials proved that the guys that were fast at last summer's Nationals at Outlaw Motor Speedway were still fast. The only difference being that the track was wet like a dirt track should be instead of dry and swept which is a way to run asphalt and call it dirt. Two classes were run at the Regionals.



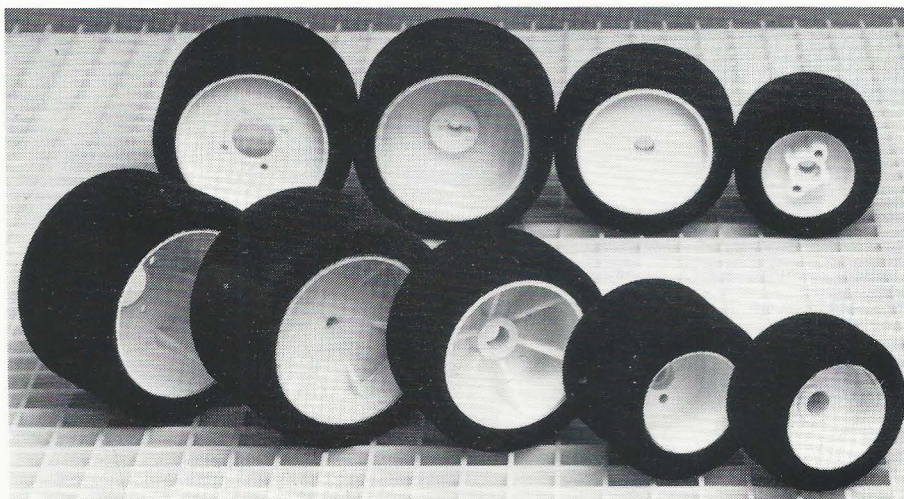
James (No. 4) and Bartel (No. 2) really going at it!

They were Super Modified and Stock Cars. The latter class underwent some changes since the Nationals. Being that real dirt is different than asphalt the body rules were modified to give the dirt Stockers a more racy look which also improved the handling to the point that the cars were quite competitive. Actually all it amounted to was the addition of larger rear spoilers and the "OK" to cut the rear of the bodies out similar to full size

Open Comp cars. With these changes the Stockers ran almost as fast as the Modifieds. When time trials began the Stockers were out first with track owner Rick James running a 10.1 lap time. The next closest was Steve Bartel and Mike White both at 10.3 seconds. In SuperMod Mike White would take the fast time with a 9.4 followed by Gary Kyes at a 9.6 and Ray Zabriskie in at 9.7 seconds. With the field of 18 SuperMods being only 2 seconds

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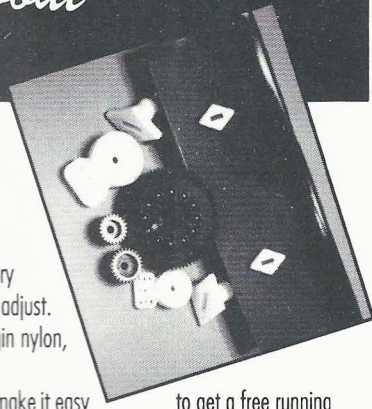
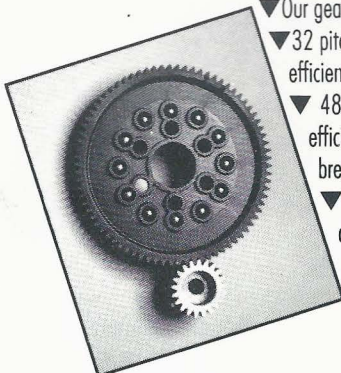
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apart from the fast man to the slow man the stage was set for some excellent wheel to wheel racing.

The heats showed some of the different driving techniques the drivers needed to race and pass with up to 6 cars on the track at once. While Kyes and Zabriskie used the low line in the turns White and James did more "dirt tracking" as they would drive in real deep into the corners getting their cars sideways. The best example of this was Mike White driving his Stocker. He could get completely sideways and still save it. Needless to say, White won all of his heats as did Kyes. James and Bartel split a pair of wins in their Stocker heat and J.D. South outran Zabriskie in both rounds of Heat 3 Supermod. Good runs in the heats were also put in by Bobby White and Duane Smith in Heat 1, Dean Brown, Jim Wright and Joe Rogers in Heat 2 and Tony Porinni and John Sultzbaugh in Heat 3. The Stockers were split

into 2 heats with James in #1 and White in #2. James and Bartel battled as Jeffrey Schmidt broke and in Heat 2 Gus Gustafson gave chase to White both rounds of Heat 2.

Probably the most spectacular Main event to the crash and burn fans was the "C" Main SuperMod. Ralph Gould took the win but not before dodging ill-handling Sam Conatser and a tumbling Jerry Bell. Conatser was black flagged eventually and Bell clobbered the backstraight wall which sent the car about 6 feet in the air. When it finally came to rest it took 3 people to carry off the wreckage and debris. Meanwhile Bill Daniel was giving Gould a run for his money all the way to the end.

With "C" Main winner Gould electing not to bump-up to the "B" and Porinni not showing for the race there would be less traffic and less action, or so we thought. The "B" started with Rick James out front and pulling away. Dean Brown broke early

which left John Sultzbaugh and Jim Wright to battle for second. These two stayed close, swapping positions back and forth until leader James had the demons strike again. Now being the owner of the track would make you think he has an advantage here wouldn't it. Not on your life. James was one of the best drivers at this race and did have a good car capable of winning just as he always has. But, how do you fight a jinx at your own track? Sure, in the heats he got bumped around a bit and had some bad breaks which put him in the "B" instead of the "A", but that's racing. Now, to the running away with the "B" in order to bump to the "A" and hopefully win that race only to have a tire unmount itself from a wheel is just plain bad luck! I don't think I've ever seen that happen on a quarter scale car. Well, so much for winning this race. He did put another tire on and ran ridiculously fast lap times to make up 3 of his 7 lost laps in the final 20 laps of the race but the race belonged to Sultzbaugh as he stayed clean to beat Wright and bump to the "A".

The next race up was the "A" Stock Car where James would get another chance at winning. When the flag dropped Mike White and James were out and gone from the rest of the field. Jerry Bell tried destroying his Stocker with minimum success and Gustafson broke. That left Bartel in third as the battle for first raged on. Eventually White broke free from James to take the win with James second.

With one region 6 championship under his belt, Mike White rolled out his SuperMod to try for two in a row. As the "A" Main SuperMod field came onto the track you could pretty much size up the race going in. Gary Kyes and Mike White would be the chargers for the lead as Zabriskie, Smith and the rest would play wait and see. At the start Kyes did get set up through and was a real handful to drive. In

fact he spun a few times and got lapped. Now Zabriskie was moving up to do battle with White for second with Smith not far behind. Things stayed about the same until the 2/3 mark when Kyes came together with another car and broke a front suspension arm. This put Zabiskie first and White second until ten laps from the end when White dove inside of Zabriskie for the lead and the win. Zabriskie finished a close second and Smith was third. Bobby White drove home fourth with Joe Rogers fifth. Both Sultzbaugh and South broke and finished eight and seventh respectively.

So the first ever quarter scale Region 6 Championships will go into the history books with a double winner. Congratulations to Mike White and to all the racers for another excellent show.

As with any racing, full size or scale racing, the aftermath of a big race is the same, as the drivers laugh and giggle about

how they took out so and so and why they didn't win and so forth. It's good to see such a high level of competition without the high tempers sometimes seen in full size racing. While there is some agony of defeat these guys can still laugh about it after the race and will actually stand next to each other for a group picture. Next time your craving for a good race go see a quarter scale dirt race. Hang out in the pits especially. That's where the real stories are. Listening to the drivers and seeing what's underneath those brightly painted bodies really gets you into the whole mood of the event. There's nothing quite like it.

**SUPERMODIFIED
A MODIFIED**

- 1st - Mike White
- 2nd - Ray Zabriskie
- 3rd - Duane Smith
- 4th - Bobby White
- 5th - Joe Rogers
- 6th - Gary Kyes
- 7th - J.D. South
- 8th - John Sultzbaugh

B MAIN

- 1st - Jim Wright

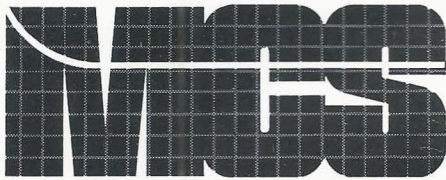
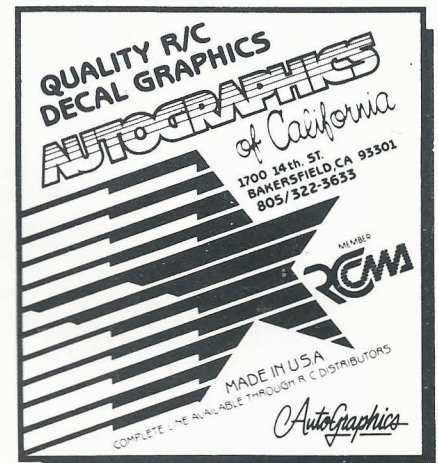
- 2nd - Rick James
- 3rd - Dean Brown
- 4th - Tony Porinni

C MAIN

- 1st - Ralph Gould
- 2nd - Bill Daniel
- 3rd - Jerry Bell
- 4th - Sam Conatser
- 5th - Sig Ward

**STOCK CAR
A MAIN**

- 1st - Mike White
- 2nd - Rick James
- 3rd - Steve Bartel
- 4th - Gus Gustafson
- 5th - Jerry Bell
- 6th - John Glauser/DNS
- 7th - Jeff Schmidt/DNS
- 8th - Jeffrey Schmidt/DNS



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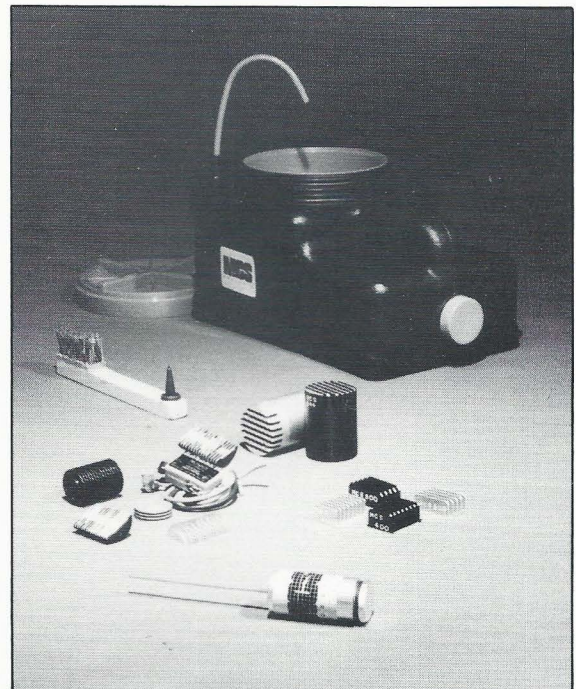
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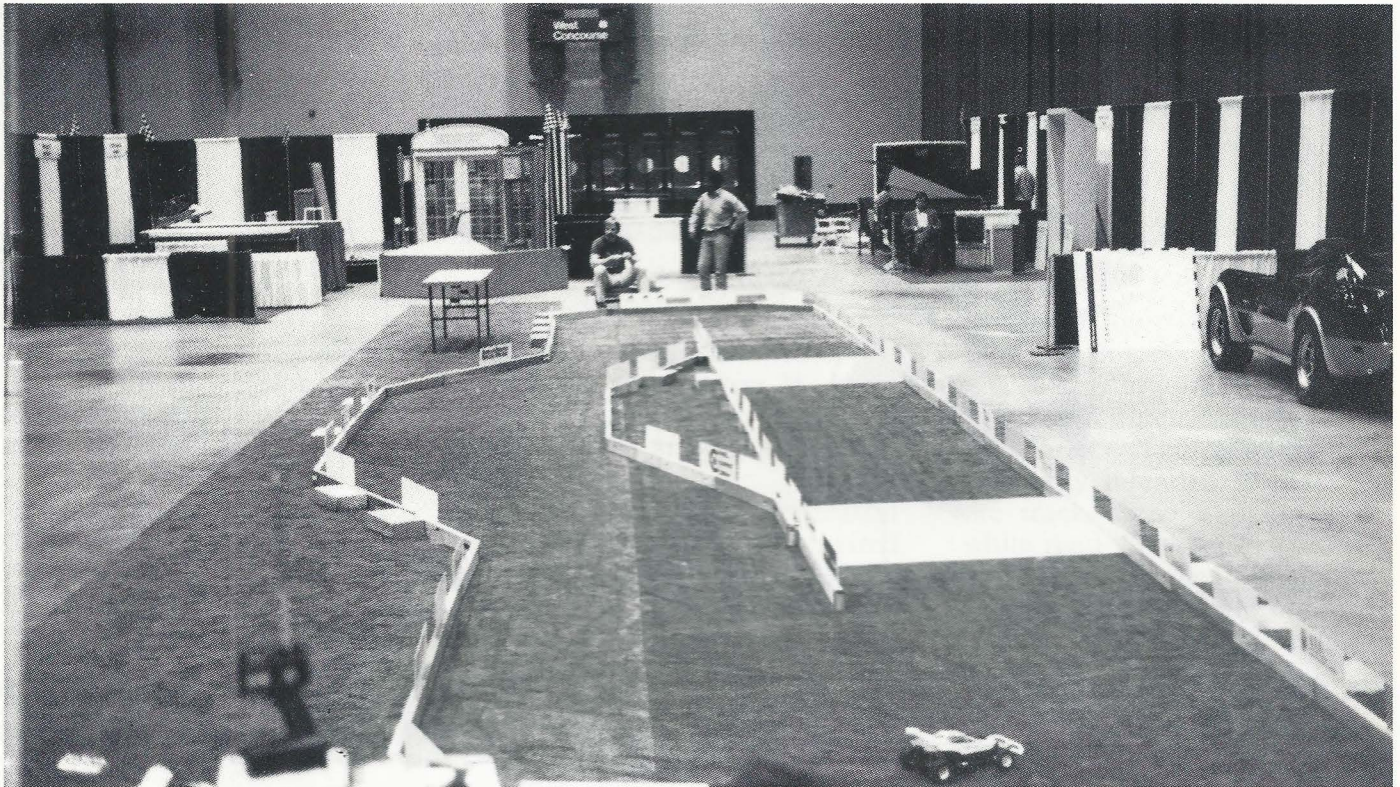
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MSA Grand Prix

By Erich Hiedemann, AIA & Leonore S. Litwin



A view of the track from the pits. Two ramps on the long straight got things airborne. Car in the foreground has just crossed the lap line. The 1978 Indy Pace Car off to the right is owned by Jim Perkins. This car was the actual backup pace car used at Indy and, contrary to popular demand, was not first prize.

As we gathered at the Lansing Center on October 19-21, 1988 for the 73rd Annual Convention of the Michigan Society of Architects (MSA), my thoughts were not of seminars or workshops, but of R/C racing and maintaining 20 Hornet chassis in good running order. Sound odd? Perhaps, but last December when the convention Chairman and the MSA's Executive Director visited the Center to make preliminary arrangements for the use of their facilities, a walk on the exhibit floor was in order. Fortunately, the floor was empty, offering 50,000 square feet of space for over one hundred exhibitors and their displays; but then, empty, it looked like a great place to run R/C cars. As time passed, the idea stuck, and I was recruited to design and produce an event which would "bring out the kid" in a group of adults who are

usually preoccupied with a more serious side of life, and which would, incidentally, entice conference attendees to visit the exhibits.

So we wouldn't steal the show, we curtailed our enthusiasm and settled on a quasi - IROC format, racing 10 equally prepared chassis in 5 or 6 car heats with the only variable being driver skill, or lack thereof. Keep in mind that the people attending this convention had probably never seen an R/C car, let alone driven one.

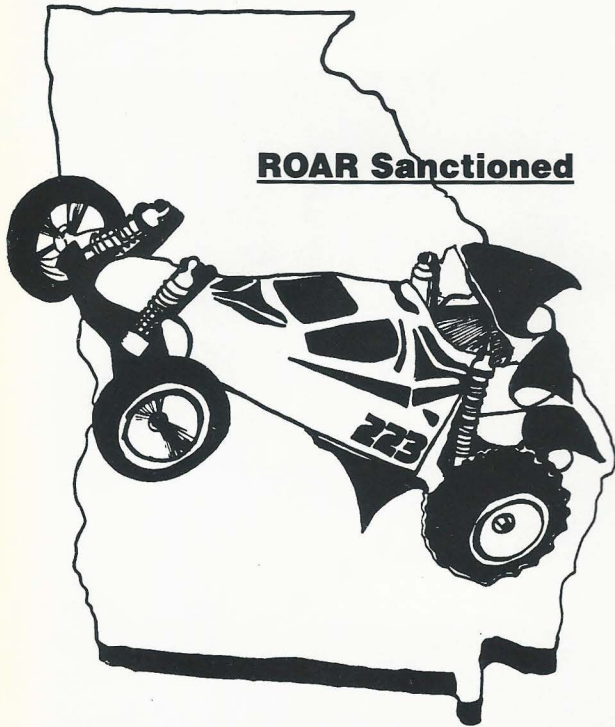
A quick trip to the hobby shop to discuss a healthy discount for bulk ordering confirmed the financial viability of the project. The Hornet was chosen based on two criteria: established quality of the brand name and cost. We left the store with 10 Hornets, 10 radios, 30 Ni-Cads and 5 chargers — it was Christmas in

May! Four weeks of lunch hours and spare time after work later, and we were testing and tuning chassis. We also came across what became the Official Truck of the MSA Convention - a big, bright red Clod Buster. This truck was as much a pleasure to build as it is to drive, and inevitably became the focus of attention whenever we took it to promote the event.

Then a simple track was devised - a long oval with a chicane on one side. Drivers stood at one end, so that all but one turn would be right reading. The track surface was an inexpensive carpet provided by the exhibit installer. Edges were defined by 2 x 4's cut to 3' lengths (for future flexibility), braced by a piece of bent sheetmetal, and velcroed together at each end. Remember, we're talking novice drivers and lots of crashing. The

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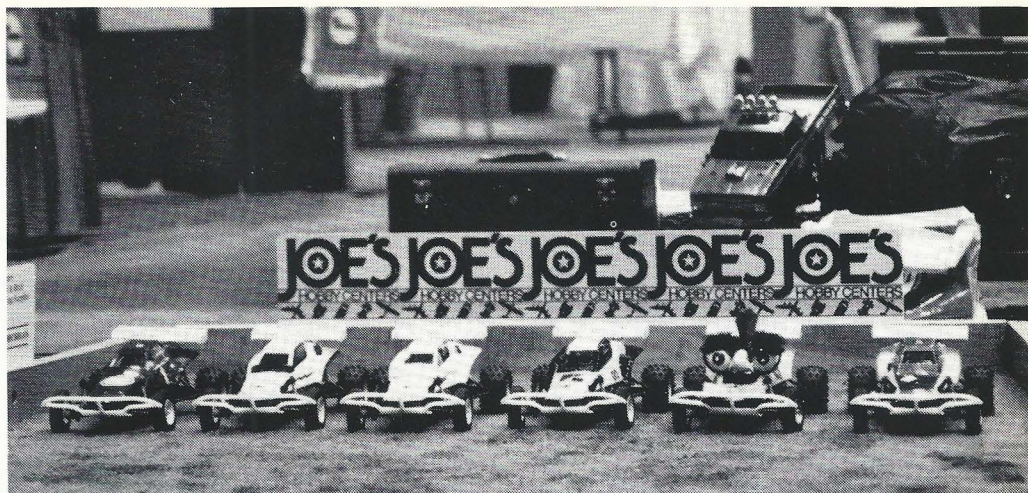
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* April 28th: Practice, 29th Qualifying, 30th Qualifying and Mains

cars can't take all the abuse, so we designed the track to "give a little." Then we staged a few practice heats in our office to test the mechanics of the event - when the dust cleared, all 10 Hornet bumpers were replaced with Pro-Lines. We also stocked up on replacement gear sets for the differential and steering servo, since two sets of each were required to repair the practice damage.

While all this research and development was going on, we were also selling car bodies to architectural firms and exhibitors throughout the state to engage their participation and help defray costs. We cut our car bodies, pre-assembled the "driver" and mailed them to the participants for painting and decals. We kept the wings, painted them white, and numbered them sequentially so our lap counters would have a consistent feature to key on. (I didn't want 14 cars numbered "1"!)

As the finished car bodies started coming back from the



The first heat is ready to go! The Groucho glasses didn't survive the first lap.

participants, it was evident that quality ran the gamut from very elegant to very bizarre. We knew we were going to have an interesting and entertaining event!

With the dress rehearsal behind us and 10 repaired chassis, 30 charged batteries, and 40 or so car bodies in hand, we packed up our crate and headed to Lansing. The first day there, we unpacked and set up the

track. The more vulnerable areas were reinforced with concrete blocks and all joints between the 2 x 4's were spanned with billboards. These billboards, originally intended to dress up the track, were made of .030" white rigid vinyl cut to 7" x 21". Artwork was applied with double-sided tape, and each billboard was set into a 1/2" deep slot cut the length of the 2 x 4 and held tight with shims cut from scrap vinyl.

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By spanning the joint, we were able to strengthen it and keep it flexible at the same time. The track held up beautifully - giving, but not breaking, and I am convinced this flexibility prevented serious damage to the Hornets.

Racing began at noon the next day, with elimination heats between the MSA and its nine chapters. Dubbed the "Chapter Challenge," all our expectations and anxieties were confirmed - the novice drivers had their hands full coping with the speed and steering responsiveness of these 1/10 scale cars. Naturally, the spectators lining the track showed little mercy with their shouts of encouragement and laughter. Two quarter-finals and a semi-final advanced two entrants to the Grand Prix, to be held later that evening. Damage control reported one broken servo saver, one servo gear set with broken teeth, and what was thought to be a blown rear end proved to be a loose lug nut. An

hour later, all was well and we were ready for the evening's event.

The "Office Clash" would pit over 20 architectural firms and exhibitors against each other in 4 semi-final heats of five or six cars, depending on driver availability. Each heat was timed at four minutes, with the top 2 or 3 lap counts advancing to the Grand Prix. Our official starter and timer kept all drivers apprised of the remaining time via a small public address system. While one heat was running, the pit crew quickly changed car bodies and installed a fresh Ni-Cd. Filament tape secured the battery covers, which would otherwise have been dislodged by the relentless pounding to which the chassis were subjected. Two-way radio communication between the pit crew and the drivers' table ensured each racer the proper transmitter. By the time the semi-final heats were completed, only six chassis

were operable, two more servo savers were broken, and two chassis were cracked where the rear axle stays mount to the chassis. With no protection for the back of the car, the differential had to absorb all the impact. Stress cracks formed between the two screw holes and would then extend to the edge of the chassis. These cracks (both sides) caused the locating shaft to pop out on impact and the differential to drop from the chassis and drag behind the car, held only by the shocks and engine wires. Two cable ties cinched together and tightened around the axle stays kept these chassis available as back-ups.

Twelve entrants qualified for the Grand Prix, so we decided to have two 6-car heats, with the top three lap counts overall receiving the three prizes. With 30 seconds left in the first heat, one car coasted to a stop for no apparent reason (and as of this writing, the problem is still not diagnosed). A

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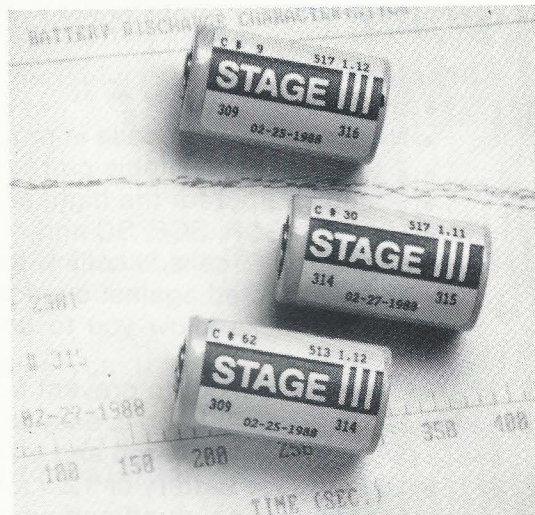
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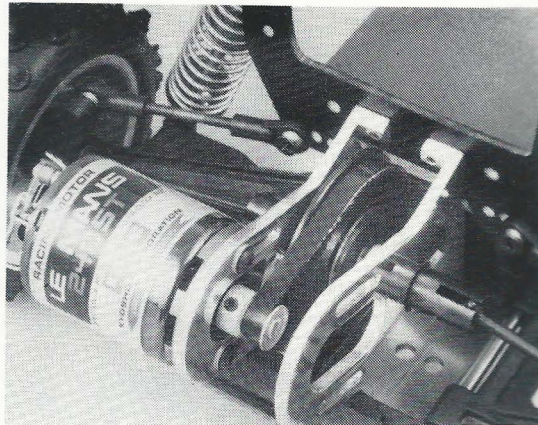
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having fun, and acting like kids again.

If I can indulge for a moment, I would like to thank our official starter and timer, Jim Perkins; and the Pit Crew, Jim Braathen, George Ontko and Wayne Bills. George Ontko and Paul S. Bednarski for their photos. Without their solid support and tireless efforts, none of this would have been possible.

All in all, it went very well, and my guess is that we turned more than a few people on to the hobby - they're already talking about next year! Maybe we can do truck pulls, or 1/4 scale dragsters, or ...

CP

Editor's Note: I have decided to place this article because of its unusual content. Perhaps other professionals or conventions could include such a program. The idea is great! Congratulations on your efforts! Anxious to see what you may try next year.

cable tie chassis was pressed into service, and they were off! It was the observation of those of us marshalling the course that these final two heats were driven much more capably than the first six - these drivers actually had some control over their cars! Lap counts throughout the day increased from an initial average of 5.4 to a final average of 11.8. First Place was secured with 19 laps, Second and Third with 18 and 16, respectively. The lowest lap count was 3, and it is my guess that the four minutes used to produce those laps seemed like an eternity to the driver.

First Place took home a complete car and radio, with a battery charger and two spare Ni-Cds. Second and Third Place each received a Hornet Jr. mounted on a fabricated trophy base so that it could be run. Everyone who participated in the event received an official "MSA Racer" button and everyone else, I think, took home memories of people laughing,



Cell-Mate/Charge Mate: The Next Generation

Article and Photos by Jeff Palmer

LAVCO is one of the premiere names in the cell matching arena. Mike Lavacot and Kent Clausen have built their reputation on knowing how to get the most from batteries. Fortunately for us, they have incorporated some of this knowledge into two of their products, the Cell-Mate and the Charge-Mate.

The Cell-Mate

LAVCO recently introduced its third generation Cell-Mate. The major change over the previous instruments, is in the electronics; it was made more electronically indestructible - reversing the battery polarity won't destroy the unit. Another change is in the units ability to dissipate heat, by means of the new brushed aluminum case. Along with these improvements, LAVCO introduced a companion for the Cell-Mate, the Charge-Mate.

The Cell-Mate was first introduced about three years ago. It debuted as a product that could be used to test and match individual cells and it quickly set the standard by which all other similar products would be compared. The Cell-Mate discharges a single cell at a 10 amp rate until the voltage level for that cell drops to .95 volts. It reports the time it took to discharge the cell on its "Liquid Crystal Display (LCD)", in seconds. By using this time to group the cell with other cells of similar times, a matched pack can be constructed.

Although the Cell-Mate was basically designed to match individual cells, it has added value in two indirectly related areas. The first area is: "Know when a pack is going bad" and secondly, "Know how much energy is left in a pack at the end of a race." To accomplish these extended functions, LAVCO



Cell-Mate, Charge-Mate and Adapter Box - The Complete System.

introduced an optional "Adaptor Box" for the Cell-Mate. The "Adaptor Box" allows the Cell-Mate to discharge 4, 6, or 7 cell packs at the 10 amp discharge rate. By using this combination and recording the amount of time required to discharge a pack when the pack was new, it's possible to track the condition of the pack. Once a month, charge the pack and discharge it using the Cell-Mate. Record the information on a log sheet for that pack each time this cycle is done and compare the current results with past results. This simple procedure will allow you to monitor the condition of a pack. A slight modification to this suggested approach is to record and plot a "discharge curve" for the pack. A discharge curve is simply the plotting of voltage by time. Since the Cell-Mate is going to provide the time reading, attach a digital voltmeter to the input leads of the Cell-Mate and record the voltage reading every 5-10 seconds. Plot this information on a graph and keep it for future reference. Next month, when it's time to check the pack, attach the voltmeter in the same manner and compare the readings. If

there are variations in voltage, review the method used to charge the pack and begin checking the pack for cell deterioration. The point is, discharge curves are a valuable tool for determining the condition of your packs and cells.

At the track, the Cell-Mate helps determine the optimum gear ratio for your car. If the pack didn't dump, use the Cell-Mate to determine the amount of energy left in the pack. The amount left could allow you to alter the pinion/spur ratio for faster lap times. For example:

- 1) In 12th scale, if there is over one lap of time left in the battery then increase the pinion.
- 2) In 10th scale oval, if there is over 2 laps worth of time left then increase the pinion.
- 3) In 10th scale off-road, if there is 4-5 times the average lap time left in the pack, increase the pinion.

Remember the Cell-Mate won't give your batteries more energy, however, it will help you to better adjust to the current driving demands, and help you keep up your speed longer. THAT'S A DEFINITE EDGE.

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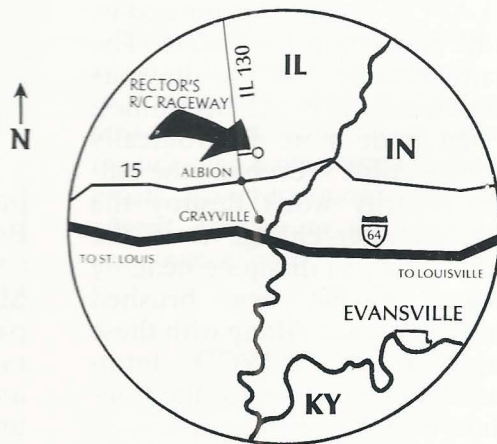
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Racing 10:00



WHEN: Saturday, April 15 Off-Road
Sunday, April 16 Oval

AWARDS: Trophies for 1st-3rd place winners

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4WD Modified
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Take IL State Highway 130, 5 miles north of Albion to Edwards County Road marked 13.86, turn east and go 1 mile, south side of road.

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Home 618-446-3282

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Classes:

Off-Road
(Saturday, April 15)

2WD Stock 2WD Modified

4WD Stock 4WD Modified

Jr. 2WD Stock

Oval
(Sunday, April 16)

2WD Stock 2WD Modified

4WD Stock 4WD Modified

Jr. 2WD Stock

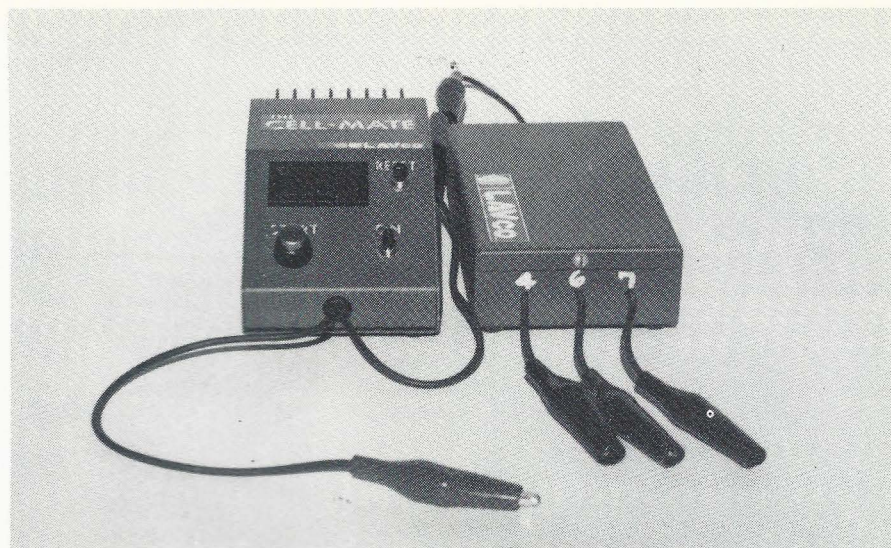
Entries are limited, so mail in your entry today!

The Charge-Mate

The Charge-Mate plugs directly into the new Cell-Mate and will charge a cell at a preset 4 amps. The Charge-Mate uses a temperature sensing probe to determine when the cell has reached its peak charge and shuts off - 45° Celsius. LAVCO, by using the temperature probe, has corrected the one problem which has cursed all of us who have attempted to match new cells, that of false peaks. Many times new cells will show false peaks, shutting off the traditional peak detection charger early, rendering invalid or incorrect discharge information. As the Charge-Mate charges the cell, an LCD display reports the amount of time, in seconds, it took for the cell to reach full charge. When the Charge-Mate shuts off, it triggers the Cell-Mate to discharge the cell. This duo will handle the charging/discharging cycle of a cell for matching purposes, giving greater consistency for more accurate matching of cells.

To use the Cell-Mate/Charge-Mate combination, strap or tape the temperature probe to the cell being charged. Next turn on both units and press "reset" on both units. Now, press start and watch them perform their respective tasks. **IT'S THAT SIMPLE.** Don't attempt to charge a pack or use the optional "Resistor Box" with the Cell-Mate/Charge-Mate combination. Literally, nothing will happen - the pack will not be charged or discharged.

A word of caution: Make sure the probe is securely fastened to the cell, otherwise, the Charge-Mate will not shut-off and you can damage or ruin the cell being cycled. In my early attempts at using the units, I used a small piece of tape, which came loose when the temperature of the cell became warm and allowed the probe to lose contact with the surface of the cell. The cell vented! I now wrap electrical tape completely around the cell, fir-



At the track, these two units will help you dial in your car.

mly securing the probe to the surface. I repeat: **MAKE SURE TO FASTEN THE PROBE SECURELY TO THE SURFACE OF THE CELL.**

Cell Matching with the Cell-Mate/Charge-Mate

Up to now we've discussed the function of the Cell-Mate and Charge-Mate, let's put them to work and see what happens. As you know, when a manufacturer assembles a cell, the cell is made to certain tolerances. These tolerances are usually in the 2-5% range. Since the tolerances can be -2-5%, the variance from cell to cell can be 4-10%. Those cells that get +5% are the exceptional cells that everyone hopes to find. The -5% are good cells and perform within the "nominal" range of performance but not at the same capacity level as the +5%. Its these differences which are detected by cell matching. The basic idea of "matched" cells is for all of the cells to run out of capacity at the same time. Another way of looking at "matched" cells is, they will allow you to go longer but not faster.

Normally to match cells the following steps would be executed:

- 1) Charge the cells.
- 2) Discharge the cell using the CELL-MATE.
- 3) Record the time on each cell (I used small labels).

The process should be repeated 3 times to uncover any mistakes

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We are tooling up to have RCC5.V5 on the market very soon.

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For information write or call: Merl Hayes, HobbyTown, 2506 N. 76th Street, Lincoln, NE 68507, (402) 467-4784.

or inconsistencies that might have occurred during the charging or discharging steps; i.e. false peaks. The Cell-Mate/Charge-Mate combination have eliminated the problems traditionally associated with "cell matching."

With the Cell-Mate/Charge-Mate unit simply:

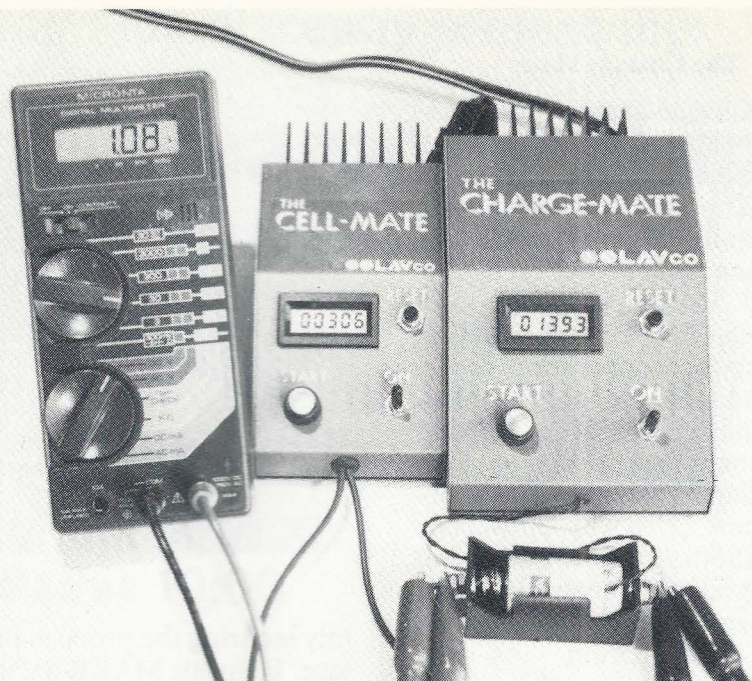
- 1) Press Start.
- 2) Record the time on each cell.

For demonstration purposes, 2 matched packs of Reedy SCE's were measured with the following readings (6 cells each):

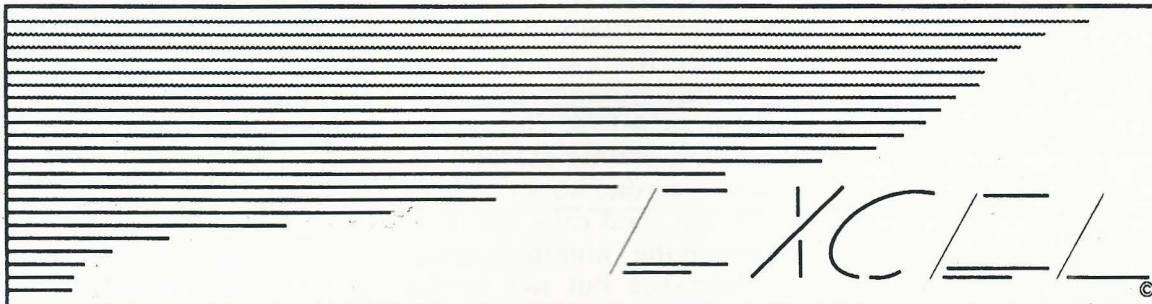
- 1 - 706
- 2 - 696

- 3 - 679
- 4 - 684
- 5 - 693
- 6 - 687
- 7 - 699
- 8 - 698
- 9 - 692
- 10 - 680
- 11 - 677
- 12 - 682

It's not difficult to plot a discharge curve. Use this setup and log your pack's voltage reading.



The first 6 cells were bought in one matched pack and the last 6 cells were bought in a second matched pack. If the packs had been assembled in the units they were bought in, the first pack would have had a capacity of 679 and the second pack's capacity would have been 677. Note: These figures use the accepted



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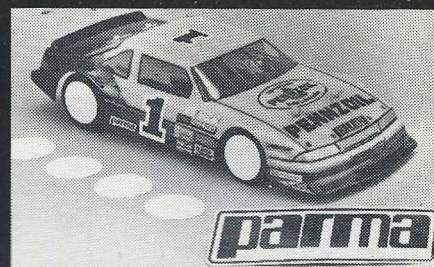
25 YEARS OF WINNING SERVICE TO THE HOBBY INDUSTRY



Drag racing fans will appreciate Parma's new 1/12 scale Plymouth Arrow funny car body (#1965, \$15.00). Available in clear, this body is a beautifully scaled replica of Don Prudhomme's World Champion drag racer, now owned by Parma International. This body has a longer wheelbase than standard 1/12 scale road cars, and will fit most 1/12 scale funny car chassis available at this time. Ask your Parma dealer which of our body mount kits you need to mount your new body!



Parma's new 1/10 scale Penske PC-17 body (#10278, \$19.00), is bound to put a sparkle in the eye of Indy car fans! Accurately reproduced in clear lexan and including the rear wing, Rick Mears' '88 Indy 500 winner will make any 1/10 scale on-road car look like a million!



Parma's newest 1/12 scale body is the '88 Pontiac NASCAR (#1960, \$11.00). Molded in clear lexan with superb detail, this body is sure to be a big hit with oval racing fans! Also shown, are new adhesive wheel discs available in both 1/12 (#5500, 16/\$3.60) and 1/10 scale (#17005, 16/\$3.50). Supplied in white with an excellent adhesive, they can be painted to match your car's paint scheme!



Parma is proud to announce the introduction of their newest fast electric boat kit, the Follansbee Hydro. Available in three kit versions; basic (#20013, \$79.50), deluxe (#20014, \$129.50) and supreme (#20015, \$189.50). This 1/10 scale beauty features a revolutionary lexan construction for strength, durability and flexibility in painting design. Create your own waves with Parma boat kits.

parma NEW PRODUCTS

No. I



Parma's newest 1/10 direct replacement body is for the Tamiya Grasshopper II, (#10283, \$13.00). Available in clear, it replaces the styrene version included with the kit. Enjoy the easy painting and impact resistant qualities of lexan with this and many other bodies now available from your local Parma dealer.



New tires from Parma! Shown above left are Parma's new pin-spiked monster truck tires (#12042, \$18.00/pr.). Designed for superior car crushing traction. They fit Blackfoot/Monster beetle-type rims above, right are new Yokomo replacement tires (#12038 soft, \$12.00/pr.) and (#12039 hard, \$12.00/pr.). Make your choice based on track surfaces and conditions. Either type is bound to give you biting competitive action. They fit 2"-2 1/8" rims, and are available now at your local Parma dealer.



New accessories from Parma include above left, 64 pitch spur gears, available in 98 tooth (#17310, \$4.00), 102 tooth (#17311, \$4.00), 106 tooth (#17312, \$4.00), and 110 tooth (#17313, \$4.00) counts. Also shown are Parma's precision machine steel 64 pitch pinions (#6020-A thru #6020-C, \$4.50). Convenient storage of all small parts can be had with Parma's small parts container (#463, \$1.25). On the right are Parma's new narrow front tires for the Schumacher Cat (#12035, \$8.25). These tires fit Schumacher and similar sized front rims. All are now available at your local Parma dealer.



Parma adds six more decals to the already extensive collection! From left to right are . . . Sunoco (#10652, \$3.50), Campbells Soup (#10650, \$3.50), Wiseco (#10649, \$3.50), Texaco (#10651, \$3.50), Zorex (#10648, \$3.50) and Purlator (#10647, \$3.00). These high quality Parma decals add the finishing touches to any car. When it comes time to detail your next concourse winner, insist on the winning finish that Parma decals give you!



Parma is pleased to announce the release of their 1/10 scale '89 NASCAR Thunderbird body (#10276, \$19.00). Available in clear, it captures the detail and realism that Parma's bodies are famous for. This body fits most 1/10 cars with the use of a Parma tall body mount kit (#10453, \$6.50). Have you driven a Ford lately? If not, visit your local Parma dealer for a "test drive."

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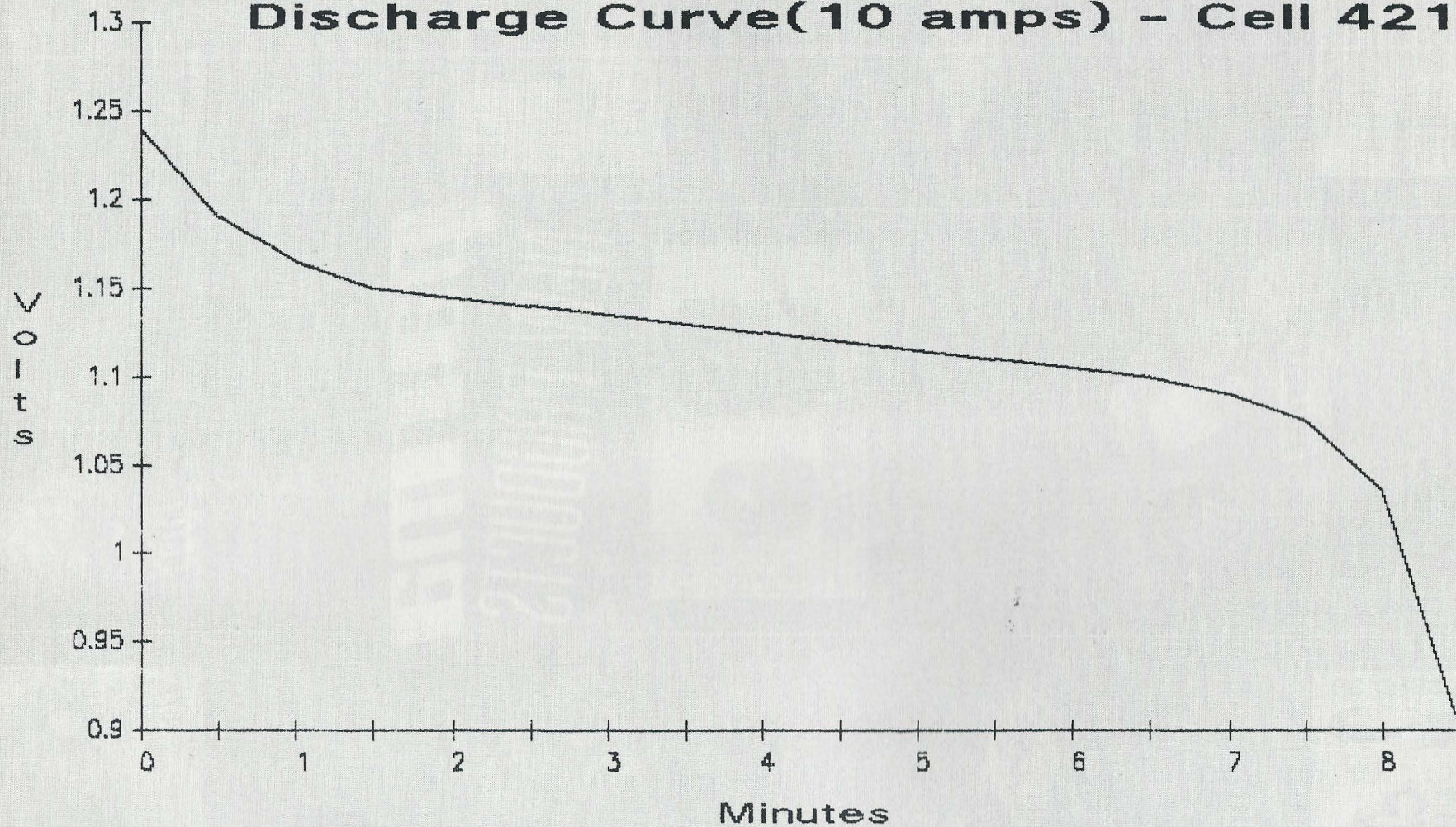
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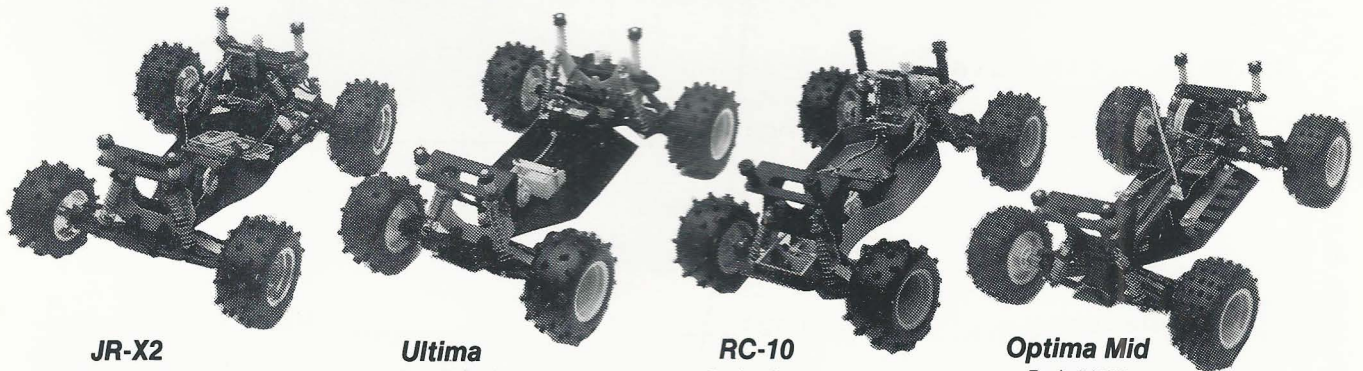
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standard - "a pack's capacity is only as good as the capacity of the weakest cell in the pack." As can be seen, by picking the best cells from each group, a pack of greater capacity can be built. Cells 1, 2, 5, 7, 8, 9 would make up a higher capacity pack with a capacity of 692 - 13 seconds more capacity. Cells 3, 4, 6, 10, 12, 12 make up the second pack with a capacity of 677. The first pack's 13 seconds increase over its original pack capacity might be the extra lap or two you need to win the "A" main.

Final note: For those who own first generation Cell-Mate, black units with low battery LED, can't be upgraded. The second generation Cell-Mates, black units without the low battery LED, can be upgraded to use the Charge-Mate, contact LAVCO for further information and price quotes - (714) 632-7262.

Associated Electrics
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Costa Mesa, CA 92626
LAVCO
3150 E. La Palma, Unit B
Anaheim, CA 92806
Sanyo Energy Co.
200 Riser Rd.
Little Ferry, N.J. 07643

CP

(Continued From Page 7)

updated especially for the 1700 SCEs. It has an adjustable charge rate of 1 to 4.5 amps.

The other thing about the new 1700 SCEs is that they should only be used one charge per day. Again as stated they cannot be used as much as other cells. Trinity's testing has also shown the match on these cells to drift more so than SC and SCR cells. This is inherent in the construction of the cell. What this means basically is that you could have a perfectly matched SCE pack and after a few runs the match is gone. Your cells have to be re-matched. For this procedure I would recommend the LAVCO Cell-Mate. The retail price is \$180.00 and the units are distributed by Trinity, RPS, and Horizon.

In closing I would like to leave you with a few tips which will help you in the care and feeding of any battery you purchase:

1. All re-chargeable ni-cad batteries

retain a memory. If you discharge your pack in an off-road car several times at 4 minutes it will start dumping at this time in any other application. The only way to erase this memory is by discharging the battery overnight and let them sit in an un-used state for several days.

2. Try to use your battery pack only once per day. If you race five times per day it makes much more sense to buy five packs and run them once a day and then place dropping resistors on them to rejuvenate them for the next race, than to completely ruin a pack per week by constantly charging them. If you take care of your five packs you can keep them for a long, long time!

3. Never overcharge your batteries! This method is only used by the experts who want the most out of a particular pack for that one day and are more than content with throwing the pack away after the race as long as they acquire their results (more voltage). This does not make much sense on a local level!

4. Store your batteries in a dry place

at low temperatures (refrigerator). It is estimated that storing your batteries in high temperatures could cause a loss in performance equal to 1% per month.

5. When assembling your batteries into a pack be as clean and precise as possible. Never use acid flux for soldering. We recommend Trinity No. 5004 liquid rosin flux \$2.49, which does not corrode but also allows the solder to flow. Use a hot iron that works (like an Ungar) so you don't have to leave the iron tip on the cell too long. Use braid instead of wire to connect cells. Despite what you've heard, the braid carries more amperage and is a much neater application. Finally use a wire that is not so much the thickest but has a lot of strands of copper wire. Well that's all for now!

Sincerely,

ERNIE PROVETTI, President
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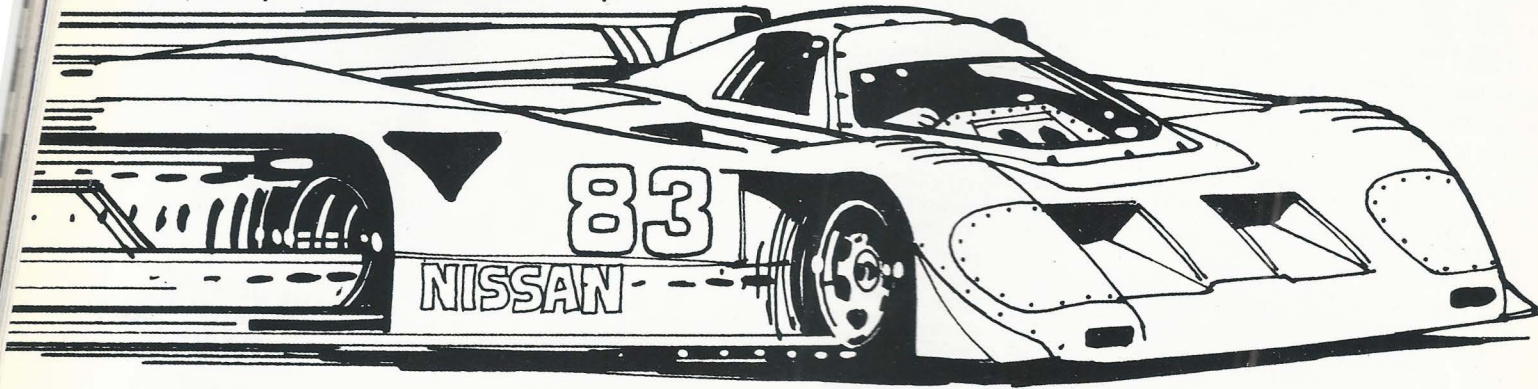
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Wednesday

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1/12 Road Racing Series

Stock • 4 cell • Stock motor

Modified • 4 cell • Modified motor

All heats 8 minutes

ROAR Membership required

Sign in closes 6:30 p.m.

Entry fee:

SEMROCC Members\$6.00

Non-Members\$8.00

Friday

JJ'S R/C SPEEDSHOP Presents

"Oval Madness"

1/10 Stock • Gear Box cars 6 cell • Stock motor

1/10 Superstock • Solid Axle cars 6 cell • Stock motor

1/10 Unlimited • Solid Axle cars 6 cell • Modified motor

1/12 Unlimited • 4 or 6 cell • Open motor

All heats 4 minutes

Sign in closes 7:00 p.m.

Entry fee.....\$ 7.50

Saturday

JJ'S R/C SPEEDSHOP Presents

"Stadium" Off-Road Racing

1/10 Stock • 6 cell • Stock motor

1/10 Modified • 6 or 7 cell • Modified motor

All heats 4 minutes

Sign in closes 4:00 p.m.

Entry fee\$ 7.50

Sunday

TEAM **SEMROCC** RACING Presents

Championship Road Racing

1/12 Stock • 4 cell • Stock motor

1/12 Modified • 4 cell • Modified motor

1/10 Stock • 6 cell • Stock motor

1/10 Unlimited • Solid Axle cars • 6 cell • Modified motor

All classes require full bodies

All 1/10 Scale heats 4 minutes

All 1/12 Scale heats 8 minutes

ROAR membership required

Sign in closes 10:00 a.m.

Entry fee:

SEMROCC Members\$ 7.00

Non-Members\$9.00

CLASSES ARE SUBJECT TO CHANGE BASED ON PARTICIPATION

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for more information call **JJ'S R/C SPEEDSHOP** (313) 977-0420

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1655 E. Mission Blvd., Pomona, CA 91766, (714) 623-1506. Every second Sunday.

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1/4 & 1/8 scale. Outside Racing Every Saturday - April through October. 1220 Shappert Drive, Machesney Park, IL 61111, (815) 282-1311.

— 1/10 Scale —

G & S Off-Road Raceway

Every Sunday - San Carlos & Meridian Avenue, San Jose, CA.

KANSAS R/C RACING CLUB

Every 2nd Sun. - Junction City - 1 p.m. Every 4th Sun. - Enterprise - 1 p.m.

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Panthorn Park, Burrirt St., Southington, Conn. Every Saturday May 1st to Nov. 1st. Off-Road, Oval, Baja, Truck Pulling. Call (203) 628-9345 Ben Carr, 272-9326 Pete Church, 237-6976 Bob Lavoie, 879-2316 Steve Magnani.

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Route 163 Bozrah, CT
Racing Every Sunday - May 1 to Oct. 30. For more information call: R/C Hobbies, (203) 886-9441, ask for Mike or Bob.

R & R HOBBY

We have 1/10 scale dirt tracks both inside and outside, also 1/12 tracks both inside, also 1/12 tracks both inside and outside. R & R Hobby - 1414 N. 24th St., Quincy, IL 62301, (217) 228-1133.

HAL'S HOBBY SHOP

Every Saturday from 9:30 a.m. to 4 p.m. Practice: Track open all week. Hal's Hobby Shop, 4886-A Hercules, El Paso, TX 79904, (915) 755-1914.

RIVER CITY R/C OFF-ROAD

Racing is every Saturday, sign-ups 3 p.m., racing starts at 3:30 p.m. (512) 656-5724 evenings.

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Every Sunday at 1:00 p.m. Track location at Hagerstown Fairgrounds, Hagerstown, Maryland. Call King's R/C Cars, 219 E. Washington St., Hagerstown, MD 21740, (303) 739-0080.

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Every Friday - Oval 1/10 Dirt
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94509. Every Wed. & Fri. 6:30 p.m., Every Sat. & Sun. 10:30 a.m. Call Jack Hanson (415) 754-5700.

F/X CITY RACEWAY

Every Saturday 1 p.m. The Frame Gallery, 13340 F. Franklyn Farm Road, Herndon, VA 22071. For info call Eric Zelman, (703) 471-4499.

RIVER CITY RACEWAY

On Quincy Road, Wichita Falls, Texas. Every 2nd & 4th Sundays at noon. Call (817) 691-1478.

WALT'S HOBBY & CRAFT

4300 West Genesee Street, Syracuse, NY 13219. (315) 468-6544. 1/10 Off-Road racing on unique indoor clay track. Mon. eves (sprints). Racing 7 p.m. - Sat. Afternoons racing at 1 p.m. Computerized scoring. Daily practice.

HITT'S HOBBY AND RACEWAY

Tuesdays: Oval Asa, Full Bodies
Thursdays: Off-Road - Stock
Saturdays: Off-Road - Novice
Sundays: Off-Road - Modified
Oval and Off-Road; 853 Wren Rd., Goodlettsville, TN 37072. For info call Ben or Kent (615) 859-3465.

CARCLUB - COCHRANTON AREA

The Carclub races Fridays starting at 6 p.m., Saturdays starting 9 a.m. Sundays starting at noon. Large indoor carpet - dirt outdoor. Call for info Harry Turner, 120 W. Adams St., Cochranton, PA 16314. (814) 425-7788.

QUEEN CITY R/C RACEWAY

1/12, 1/8 and 1/10 scale cars. Every Friday - 7 p.m. - Open Class Every at -2 p.m. Stock & Open. Every Sun. - 2 p.m. Drag Racing 5050 S. Federal Blvd., Englewood, CO 80110, (303) 730-1391.

PDQ RACEWAYS & HOBBIES

1/8, 1/10, 1/12 Scales
Call times and details. 429 Bankhead Highway, Mableton, GA 30059, (404) 941-2626.

NEW ENGLAND'S

PINE BANKS R/C RACEWAY

We are located in Melrose, Mass. For info contact: B & B R/C Accessories at (617) 324-4465 or Brian Branon at (617) 322-9554.

GROUND ZERO RACEWAY

Sunday: Noon to 6 p.m. 1/10 Off-Road & 1/12 carpet races at 2 p.m. Sign up Noon to 1:30 Tuesday - 1/12 carpet races at 7:30. Friday - 1/10 Dirt Oval races at 7:30. Saturday - Informal Junior Races (16 & under). Speciality clinics. 208th and West Dodge Rd., Omaha NE (402) 289-4184.

SROKA'S INDOOR R/C

Racing every Sunday - Oval racing every 4th Sunday. 5216B Arboga Rd., Marysville, CA 95901. Call Michael or Vickie Sroka (916) 742-6148 or (916) 741-3051.

FLINT R/C CAR CLUB

Flint, MI. Summer: Every other Sun. from May to Sept., Fall & Winter 1/12 4 cell on carpet. For info: Ralph Herndon (313) 658-5390 or Tom Hoos (313) 658-1043.

MILE-HI R/C SPEEDWAYS

Thurs. & Sat. Off-Road, Fri. Carpet, Sunday 2 p.m. 178 S. Kalamath, Denver, CO 80221, (303) 722-6766.

AMERICAN HOBBIES

Thursday Night Oval Racing
Sunday Off-Road & Oval
For info call (201) 446-2010.

C.A.R. CLUB

Racing at Tamarack Raceways. Contact Harry Turner, 120 W. Admans St., Cochran, PA 16314, (814) 524-7788. Racing every Sunday.

ARROW HOBBIES

Wed. Nights - 1/10; Every other Fri. night 1/8 Sprint Cars only; Sat. nights 1/10 dirt oval. 2710 So. 1-35 West, Burleson, TX (817) 295-2821.

BLASTERS OFF-ROAD CLUB

Every Sun. at noon-weather permitting. ROAR. 42 Riel Dr., St. Albert, Alberta, Canada. Call Fred at (403) 457-9333. In winter on carpet.

BUCKLEY SPEEDWAY

37 Douglas Street, Hartford, CT. Every Sunday April 1st to Nov. 31st Black Top Oval. For more information call "Ziggy" or Deb-

bie Kwasnicki (203) 246-4778.

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1756 First Street, Livermore, CA 94550 AC power, paved parking, computer scoring, trophy races, trophy dashes, gift certificates. Coming soon night racing & oval races. For info (415) 443-5828 M-F 10-6 p.m.

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110 Anderson Ave., Behind Village Gate (274 N. Goodman St.)

7:00 p.m. - Monday Pro Night
7:00 p.m. - Tuesday Boy Scout Nite
7:00 p.m. - Wednesday Teen Night
7:00 p.m. - Thursday Indoor Clay
7:00 p.m. - Friday Roar Meetings
7:00 p.m. - Sat. & Sun. Family Days

HOBBY HUT

2665 Park Marina Dr., Redding, CA 96001, (916) 241-3737. 1/10 Off-Road Racing. Norcal Mini Off-Roaders. Ask for Kevin Paschke.

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Every Thursday Oval & Off-Road

Every Fri. Indoor Carpet Oval

R.C. BUGGYWORLD & RACEWAY

7511 Hamilton Ave. - RT. 127, MT. Healthy, OH 45231, 522-0809. Wednesday night off-road and oval on alternating weeks. Also carpet races on Monday nights 40 x 80 banked oval.

OUTLAW MOTOR SPEEDWAY

7920 Webster, Highland, CA
Every 2nd Sunday - 1/10 dirt oval. All classes. Call (714) 370-0607.

LITTLES HOBBIES

Monday Nite - 1/10 Trucks
Tuesday Nite - 1/10 Sprint Cars
Wed.-Fri. - Open Practice Available

Sat. - 11 a.m. 2WD 6 yrs. to 16 yrs.
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ter. 111 Main St., Rt. 66, Hebron, CT 06248, (203) 228-4942.

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FAST LANE R/C

On Road Asphalt Track. 21616 Golden Triangle, Saugus, CA. Call (805) 255-2404.

RPM R/C RACEWAY

1112 S. 16th, Elwood, IN 46254. Indoor off-road racing every Sunday at 12:00 noon. For info call (317) 552-7758.

REC. R/C RACEWAY

1/10 scale clay oval track. Racing Sat. - Oval 10-2.30 - Racing at 3:00 p.m. - Sunday - Off-Road 10-2:30 Racing at 3 p.m. Call Erin Clancy (914) 868-7715. Route 82 to Standfordville, NY 12581.

MADISON AREA RADIO CONTROL CAR ASSOCIATION, INC.

Factory Outlet Mall, Madison, Wisconsin. 1/10 and 1/12 scale carpet racing. Practice Sat. Afternoon Racing 6 p.m. Sat. & 7 p.m. Tues. George Jerdee (608) 873-7286.

THE RANCH PIT SHOP

1655 E. Mission Blvd., Pomona, CA 91766 (714) 623-1506. Every Wednesday night at 6 p.m. Alternating Oval and Off-Road.

COMPETITION HOBBY

Off-Road racing indoors on dirt. Every Wednesday night 6:30 - Sunday 12 noon, Juniors (12 and under) & Novice Saturday 12 noon. 8169 S. State St., Midvale, UT 84047, (801) 562-9452.

CONNECTICUT AUTO RACING TEAM

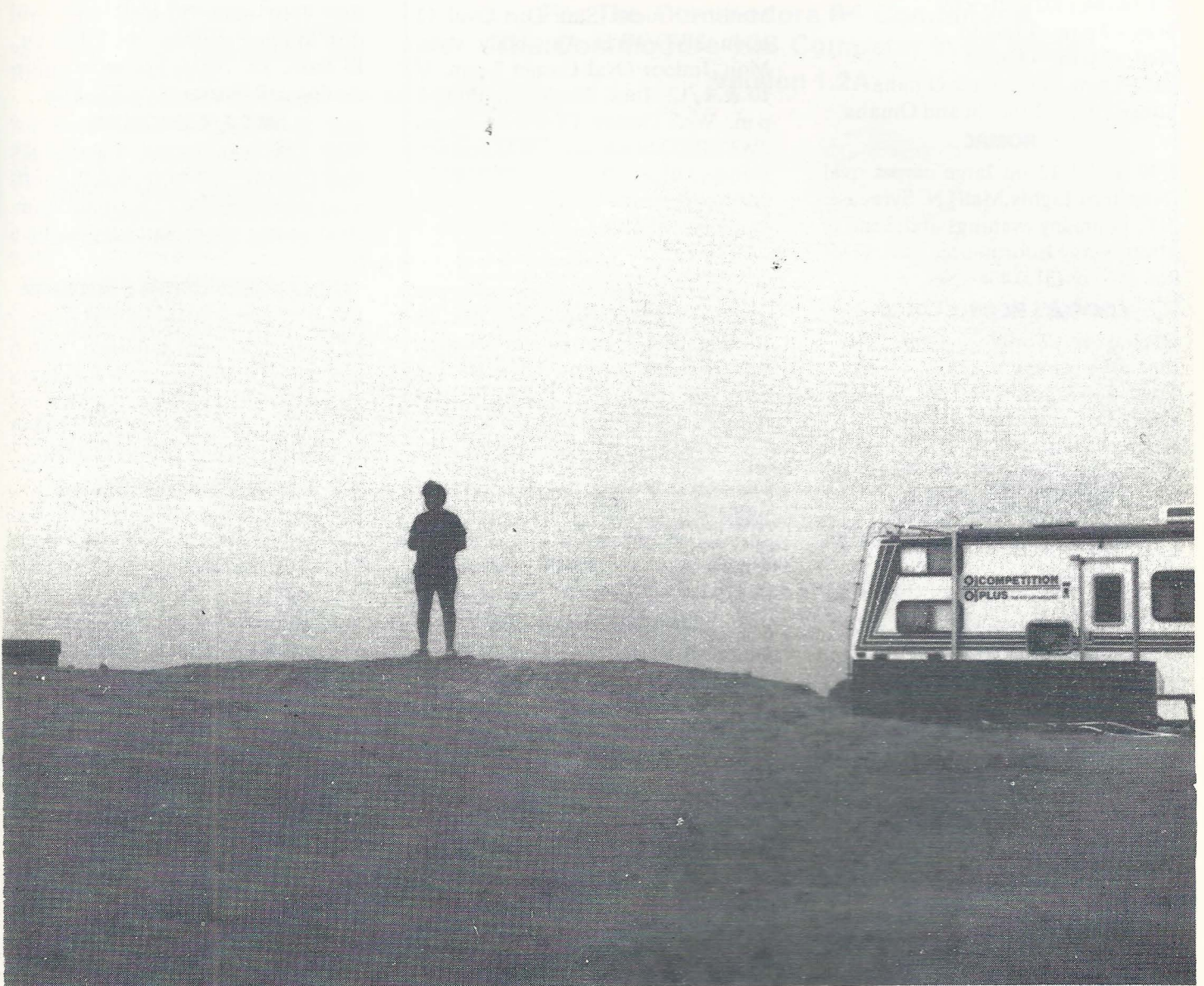
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68516 (402) 483-7427. The Omaha track is located at Rockbrook Village at 11011 Elm Street, Omaha, NE 68144, (402) 391-5669.

Tues. - 7 p.m. - Lincoln

Wed. - 7 p.m. - Omaha

Sat. - 1 p.m. - Lincoln & Omaha

Sun. - 1 p.m. - Lincoln and Omaha

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1/10 and 1/12 on large carpet oval (Northern Lights Mall) N. Syracuse, NY. Thursday evenings and Sunday afternoons. Information call (315) 468-1463 or (315) 468-6544.

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Open Wed. and Fri. 6 p.m.

Open Sat. & Sun. 12 noon

Oval and Off-Road

Contact Norris, Rt. 4 Box 122B, Chatham, VA 24531, (804) 724-4182.

VICTORIA HOBBY SHOP

Every Saturday - 2 p.m. - Off-Road;

Every Sunday - 2 p.m. - Ovals.

5211 John Stockbauer, Victoria, TX 77904, (512) 575-3270.

M.H.O.R. R/C RACEWAY

155540 E. Batavia Dr., Aurora, CO 80011, (East on 17th Ave. at Chambers Rd.). Indoor 1/10 Off-Road Racing on Wed. & Sat. Practice/Track Time Tues., Thur., Fri., Sun. Complete Hobby Shop, pit area has AC & DC power, a nice clean handicap accessible racing facility. For info call Jess Brockman, (303) 343-0151 after 3 p.m. MST. Closed Monday.

HOBBYTOWN RACEWAY

4915 W. Elm, McHenry, IL 60050, (815) 344-1777.

Hobbytown Raceway, 219 W. Cedar Lake Rd., Round Lake, IL 60073. Indoor - Dirt 80' straightaways, (312) 546-0707. Oval Racing every Friday 7 p.m.; Off-Road Sunday 10 a.m.

BNS COMPETITION HOBBIES

Route 7, Box 380, Anderson, SC 29624, (803) 224-8591, Contact Bob Sanford. Racing and Open Practice Wed. 6:30 p.m., Every Saturday 1:00 p.m. 1/10 Dirt Oval.

DESERT HOBBIES & RACEWAY

Off-Road racing 1st & 3rd Sundays. Sign in 10-11:15 a.m. Every Friday nite 7:30 p.m. 25 minutes from San Bernardino. 17210 Main St., Hes-

peria, CA 92345, (619) 94858.

TAIT'S HOBBY SHOP

Sat. Off-Road 12 noon, 2WD/4WD Monster Trucks. Sun. Dirt Oval 12 noon 2WD/4WD Any body style. Mon. Indoor Oval Carpet 7 p.m. 1/10 & 1/12. Tues. Truck/Car Pulls 7 p.m.. Wed. Outlaw Dirt Oval 7 p.m. 2WD/4WD Stock cars/2WD Sprints. Friday. Off-Road 7 p.m. 2WD/4WD Off-Road cars. 3270 Bay Rd., Saginaw, MI 48603, (517) 799-3900.

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Dirt Oval Racing every Thursday night 6 p.m. Fully stocked hobby shop, computer scoring, lights, bleachers, concessions. Menomonee Falls, WI (414) 255-2040.

WAGONHILL HOBBIES

Indoor 1/10 & 1/12 on-road racing every Friday night. Outdoor Off-Road every Saturday Night. 225 S. Board St, Grove City, PA, (412) 458-4711.

HOBBY CENTERS DIRT-DROME

Indoor Dirt Oval: Tues. 2WD Stock/Modified, Sprint Car Bodies Only. 4WD Mod. Oval full bodies 7:30 p.m. Thurs. Open Practice 6-10 p.m. Sat. 6 Big Classes 7:30 p.m. 2WD Stock A, 2WD Stock B, Box Stock Trucks, Modified Trucks, 2WD Modified, 4WD Modified. Sun. Open Practice 1-5 p.m. Call Brent Wilson (502) 683-7611. 715 E. 4th Street, Owensboro, KY 42301.

DIXIE R/C HOBBY SHOP

Every weekend Sat. & Sun. The races will alternate between oval and motocross starting May 14 with oval and May 15 with motocross. Dixie R/C Hobby Shop, P. O. Box 135, Ramseur, NC 27316, after 6 p.m. (919) 824-2770.

BREMEN RACEWAY

Clay Oval Track 60 x 100 ft. Under roof, lighted Friday nights 7 p.m. May thru Sept. Call for information (219) 546-3807. Bremen Hobbies, 308

N. Bowen, Bremen, IN 46506.

WEST TEXAS R/C RACEWAY

3477 Lee Blvd. - Racing every Sunday. 1/10 scale off-road and oval dirt. Mailing address: 301 Edith Dr., El Paso, TX 79915. For more information call Hector (915) 772-1382.

JIM'S R/C SPECIALTIES

3107 S.W. Van Buren, Topeka, KS 66611 (913) 273-4070. Racing off-road every Sunday 12 noon to 5 p.m. Oval racing every Saturday night 6 p.m.

EAGLE HOBBY CENTER & RACEWAY

Every Saturday night at 7:30 p.m. 1/12 4 cell stock and modified. 1/10 6 cell stock on-road, call for body style. Eagle Hobby Center & Raceway, 3601 Shepherd, Balch Springs, TX 75180, (214) 557-5290.

SUMMIT SPEEDWAY

Summer Schedule: 1/10 Indoor Oval Outdoor Tri-Oval - Fridays 7 p.m.; Tuesdays off-road 6:30 p.m.; Saturday nights and Sundays. Call for more information (219) 489-RACE.

ACTION SPEEDWAY

Indian River's Facility

1/10 scale half mile clay oval & off-road. Two story covered drivers' stand, large pit area close to track, ample parking, classes for young and old, beginner's to expert's, and truck pulls. Coming soon - 1/10 scale super speedway and road course, night racing, full electric, and concessions. For further information call Trace or Chip Button (407) 231-9410 or Doug Upton (407) 569-8793.

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Every Wednesday - 7 p.m. and Saturday 6 p.m. Classes: 2WD Stock and Modified, 4WD Stock and Modified and Monster Trucks. For more information call (312) 898-5649. 725 Hill Avenue, Aurora, IL 60505.

ABC R/C

Clay track racing every Saturday 1 p.m. Truck pulls every Tuesday 6:30 p.m. Complete R/C headquarters, 1441B E. Main Street, Waukesha, WI 53186, (414) 542-1245.

TC'S R/C'S

Inside and outside race track and RC shop. 1537 Freeport Road, Natrona Heights, PA 15065, call 226-8802.

BROCKTON INTERNATIONAL SPEEDWAY

Monday night 1/10 & 1/12 oval racing 5:30 to 7:30 Practice. Races start 7:30 p.m. 1217 Main st, Brockton, MA. For more information call Ruben (508) 588-9355.

SONOMA COUNTY RACEWAY

806 Brookwood Avenue, P. O. Box 9565, Santa Rosa, CA 95405 -1/10 Dirt Oval, 1/10 Off-Road, 1/10 & 1/12 Asphalt. Mark White (707) 571-7565, Schedule info (707) 571-8044, Competition Products (707) 571-8048.

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5612 S. 108th St. Hales Corners, WI. 1/10 scale indoor dirt track. High speed semi-oval and true off-road courses. Practice Tues, Thurs., and Fri. 6 - 9 p.m. Racing Wednesday nights at 6 p.m., Sat. & Sun. at 1 p.m. For more information call (414) 425-4060.

THE SQUARE ROUNDHOUSE SPEEDWAY

Saturdays - 3 Events per month - Off-Road, Monster Truck Pulls and Oval Race. Oval dirt track and Off-road track. 1468 Lander Avenue, Turlock, CA 95380, (209) 668-4454, Ask for Harold Lindquist.

COASTAL BEND SANDBLASTERS R/C CAR CLUB

Races first thru 3rd Sundays, 2 p.m. start. Bill Witt Park, Yorktown Road, Corpus Christi, TX, Call Pete Broadway (512) 992-4448.

— 1/12 Scale — OUTLAW RACING

Every Friday nite Stock only 6:45 p.m. Every 1st Sunday - 1/12 Stock & Modified. 1/10 on-road Stock & Modified, 1/24 Tamtechs. Call Paul Nadeau, (714) 370-0607

GLASS CITY RADIO CONTROL

Racing 1/10 & 1/12. For more info contact: Clayton White (1/12) (419) 882-2518 or Mike Marshall ((1/10) (313) 241-5321.

S.T.A.R.C.

Every Wed. Night - S.T.A.R.C. Club Series. Rockton, Ontario, Canada. Call Sam Burke (519) 621-5424.

TEAM RACE R/C CAR CLUB

Friday: 6:30 p.m. indoor track, 505 Spring Ridge Rd., Clinton, MS, (601) 924-0722.

NORTHERN MINI-RACERS

4 Cell indoor regular schedule 1st & 3rd Saturday. located at 1715 S. Broadway, Minot, ND Call Roger Lee, Pres. (701) 838-0654, or 839-5294.

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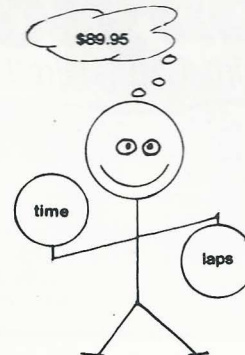
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Southern Ontario Radio Control Race Car Club in Toronto, Ontario, Canada. Racing Alternating Sunday evenings from October to April. 6 p.m. to 10 p.m. For more information call Scott Reynolds at 298-4941 or Gary Joi at 421-9061.

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COMMUNITY R/C SPEEDWAY

Middletown Park, Middletown, Maryland. 100' x 50' dirt oval, 14'

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May 27 - Metro Raceway, Bakersfield, Stock & Modified.
July 8 & 9 - Radio Controlled Hobbies, Costa Mesa, Saturday Stock, Sunday Modified.

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June 3 - Racer's Haven, Bakersfield, Stock, Mod. & Sprint
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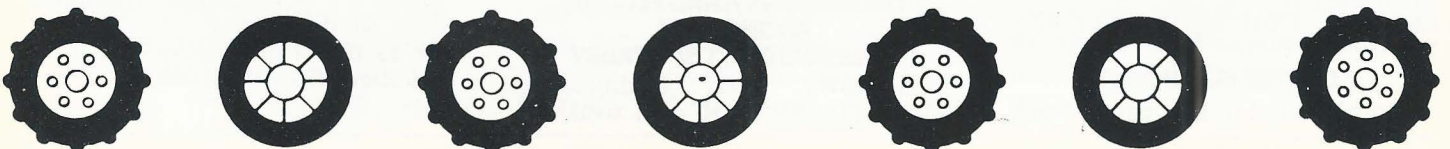
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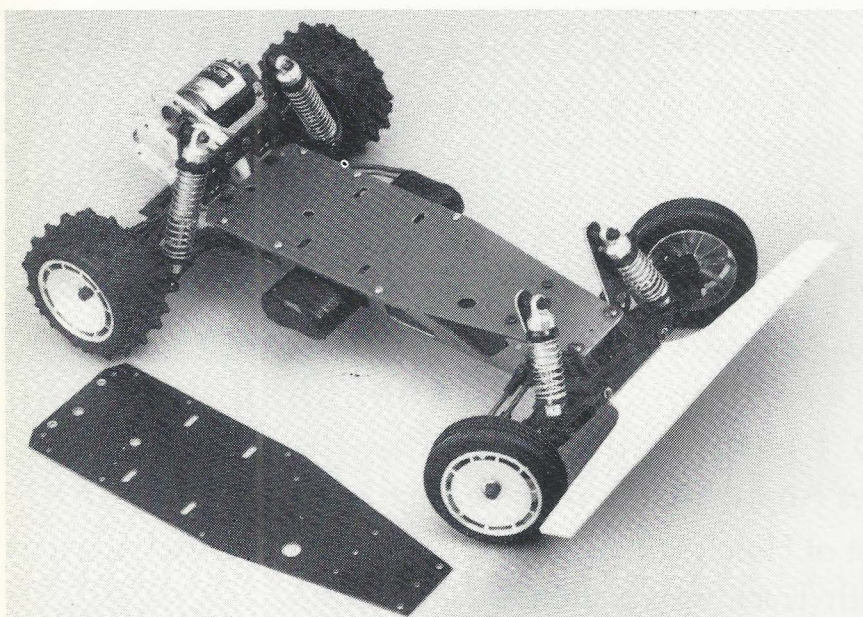
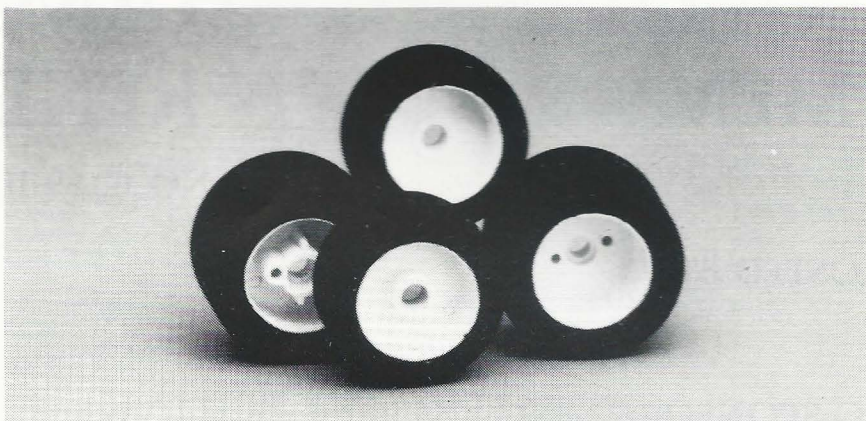
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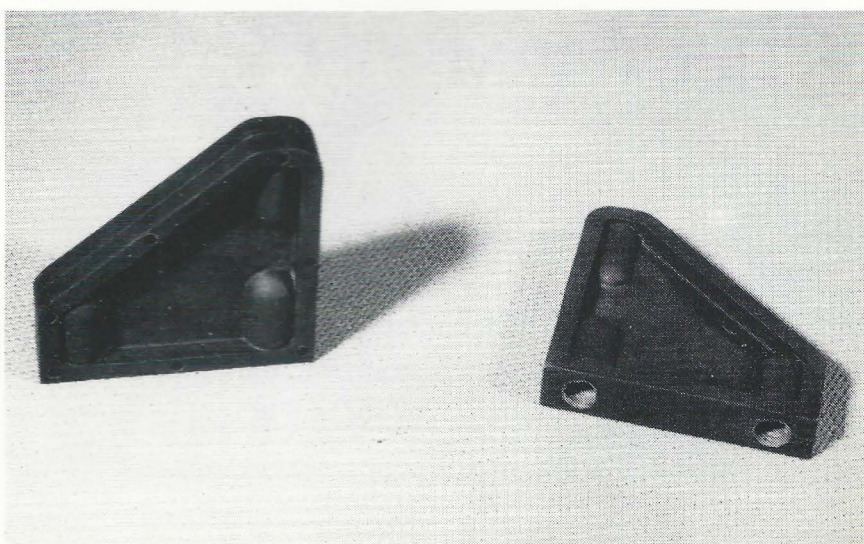
NEW PRODUCTS

Available in February, 1989 will be a firm compound for T.M.'s 12th scale tires, along with the standard soft and medium compounds. The firm compound will also be available in replaceable donuts. T.M. R/C Racing Components, 39330 Donahue, Mt. Clemens, MI 48044, (313) 949-3506.



J-Car Ultima Chassis Plate. This chassis plate is designed to solve three problems with stock or other plates. First is strength, J-Car's solid plate makes the front end of your Ultima much stronger to prevent the typical chassis bending. Also J-Car's chassis plate won't break. Second is that now you have a solid area to servo tape the speed control and receiver to. Third is to locate the battery tie straps inboard to prevent them from breaking in an accident. The chassis plates comes in black, blue, and red. \$19.95. J-CAR, 52 Perkins Avenue, Norwich, CT 06360, (203) 887-6476.

Attention: Predator Lynx Racer - In an on-going effort to improve and refine the Predator Lynx, CompositeCraft has developed the new front link mounts made of tough, injection molded, glass filled nylon. They are stiffer and stronger than the old aluminum posts utilizing two bolts instead of one to securely mount them to the chassis. Part No. 50051 - Retail \$8.95. CompositeCraft Inc., 2400 Sand Lake Road, Orlando, FL 32809.



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SANCTION NO. 02-89-10

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Phone for Information

CO-SPONSORED BY: TRC and BOLINK

ENTRY FEE: Stock Class - \$40.00 per entry/Modified - \$30.00 per entry
Entry deadline - May 19th

SCHEDULE: Thursday - May 25th - Open Practice
Friday - May 26th - 2 Round of Qualifiers
Saturday - May 27th - 2 Round of Qualifiers
Sunday - May 28th - Concourse, Mains
Monday - May 29th - Rain Date

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RACE FEE: Non-Refundable

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New molded spike rubber tire for the popular Clod Buster. Part No. 9825. Packaged by pairs. Have an OD of 6 1/4"!! Twinn-K, P. O. Box 31228, Indianapolis, IN 46231, (317) 839-6579.

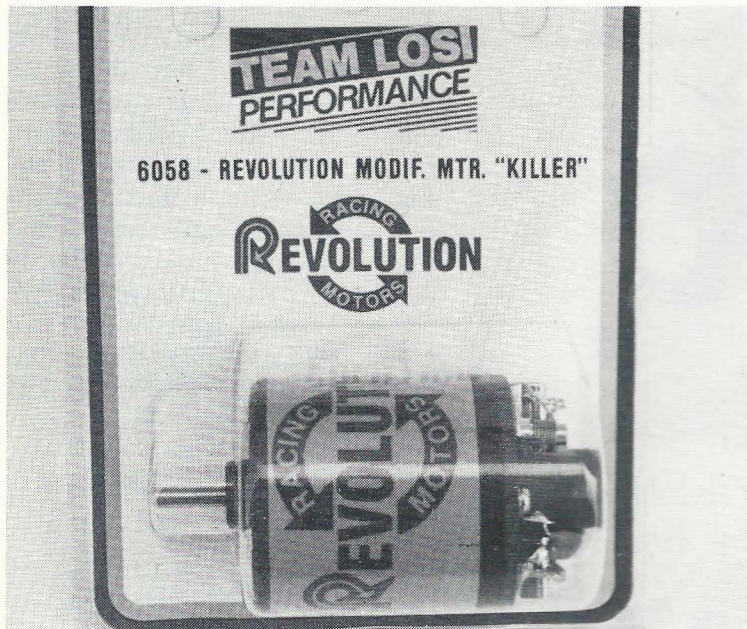
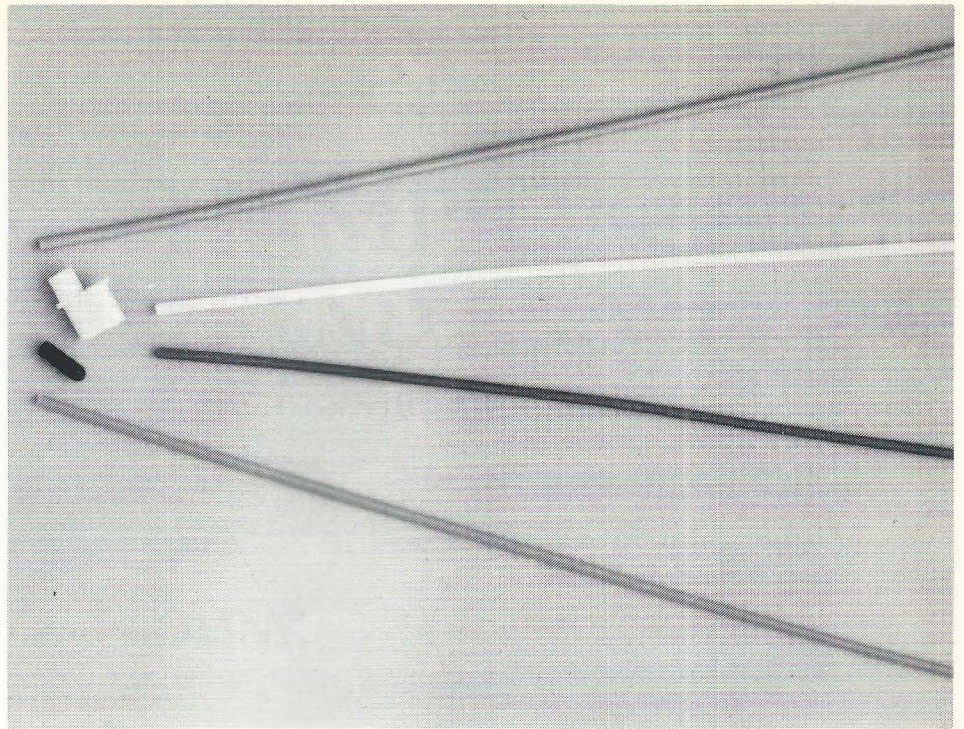


The Super Sabre Q.D. (Quick Drive) comes with a radio system installed in the chassis and a pistol grip transmitter that permits full proportional left and right turns. The chassis is a marvel of engineering. Pin spike tires at all four corners provide great steering and maximum traction. Finally, the high strength resin plastic body is decorated and styled only as a MRC/Tamiya off-road buggy can be. Try out a Super Sabre Q.D. No. 46002. MRC, 200 Carter Dr., Edison, NJ 08817, (201) 248-0400.

New from Parma is the direct replacement body and undertray for the Yokomo C-4 1/10 Off-Road car (No. 10282, \$29.50). Available in clear lexan, a wing, mounts, and wing wire are included to give Yokomo owners a completely new look. Look for it at your local Parma Dealer. Parma International, Inc., 13927 Progress Parkway, North Royalton, OH 44133.

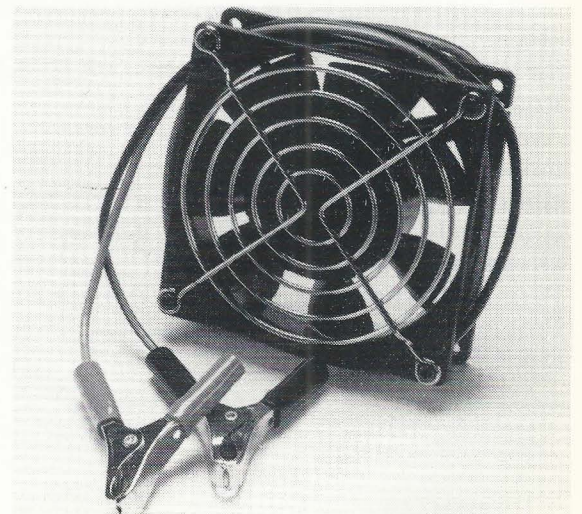


They're hot, they're wild, they're Nimrods! These new fluorescent whip antennas are flexible and have great memory. Set yourself apart from the crowd, run a Nimrod! Each package includes four different fluorescent colored rods with one base and tip. Suggest retail \$ 4.95. Part No. NR090. For a catalog send \$2.00 to: Paragon Racing Products, Dept CP2, 8802 Knollwood Dr., Eden Prairie, MN 55347.



Revolution "Killer" Modified Motor Part No. 6058. Team Losi and Revolution Racing Motors have released a known Killer! "Killer" is the designation given to the ultra hot 14 turn motor that has been caught, red handed, simply murdering the competition. The No. 6058 "Killer" motor has proven to be as radical as you go without sacrificing life or reliability. This is also an excellent motor for use with 6 cell power as it offers an unbelievable power band. Put the competition "To Rest" with the Killer, available at performance hobby shops. Team Losi Inc., 1655 E. Mission Blvd., Pomona, CA 91766, (714) 623-1506.

12V Electric Fan. The fan connects to any DC source for cooling. Heat sinks on battery chargers and dischargers. Prevents overheating of equipment. Part No. 5007, Retail Price \$39.99. Custom Racing Products, 3250 El Camino Real, No. B3, Atascadero, CA 93422, (805) 466-6945.



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CORALLY[®]

SUPERIOR PERFORMANCE THROUGH HIGH-TECH ENGINEERING

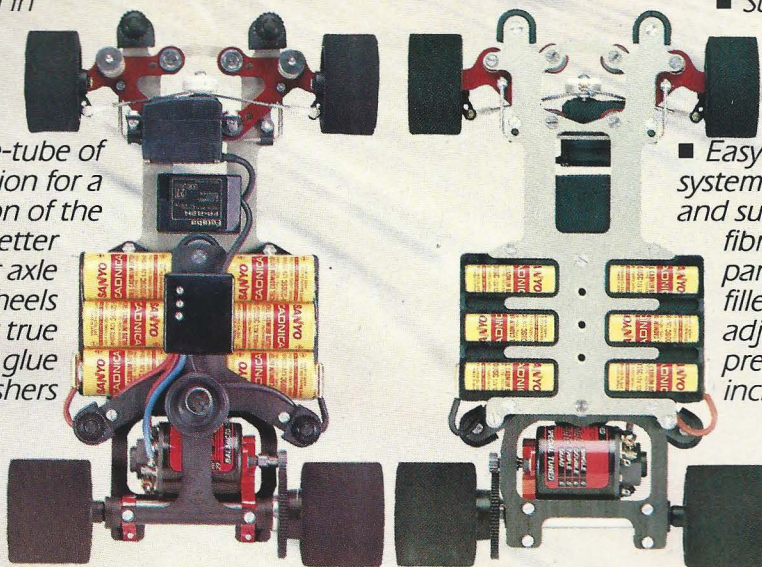


- Oil-filled, dust-free shock absorbers front and rear
- Front and rear ride height adjustment
- Anti Roll Bar for higher cornering speeds
- Roll Over Mast
- Saddle pack batteries for the lowest possible centre of gravity
- Batteries mounted in quick-change trays
- Machined CORAL powerpod for maximum rigidity and heat dissipation
- Axle-tube of oval cross-section for a rigid construction of the powerpod and better alignment of the rear axle ball bearings
- Rear wheels with double support for true running
- No need to glue the differential steel washers

as they are kept in place with 'O'rings, which prevent slip and make the washers self-aligning

- Steering servo mounted on CORAL servo posts
- Quick change wheels secured with rubber 'O'rings

- Suspension arms and T-bar mounted with play free pin joints for smooth suspension action
- T-bar stiffness easy to adjust
- Easy and precise tweak system
- CORAL chassis and suspension arms
- Carbon fibre filled T-bar
- All moulded parts made of carbon fibre filled nylon
- Height adjustable body posts
- All 14 precision ball bearings included.



Note: CORAL is a new space age alloy, it combines high tensile strength with low weight and does not split or tear like fibre filled chassis parts.

CORALLY RACING TEAM[®]

CORALLY SPlI 1/12 ELECTRIC COMPETITION RC CAR

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Toulonselaan 58, 3312 EV Dordrecht Holland, phone 078-132324, fax 078-134595

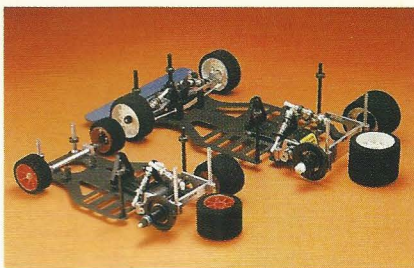
Ralph Burch Jr., world class driver and 1988 McCoy champion, was our choice to put Hyperdrive to the test.

"The Hyperdrive belt drive system will do more for the performance of 1/10th, 1/12th, and off road racing than belt drive has already done for 1/8th scale," said Ralph.

Racers everywhere are discovering the advantages of Hyperdrive. At its first introduction to the racing world, 2 of 3 stock, and 5 of 9 modified class winners won with Hyperdrive equipped cars at the 1988 10th scale Nats!

The combination of tough anodized

aluminum motor drive, durable Kevlar belt, and Teflon impregnated Delrin diff pulley is new, and it's a killer!



DELTA SPYDER and VILLAIN will feature Hyperdrive on some models soon.

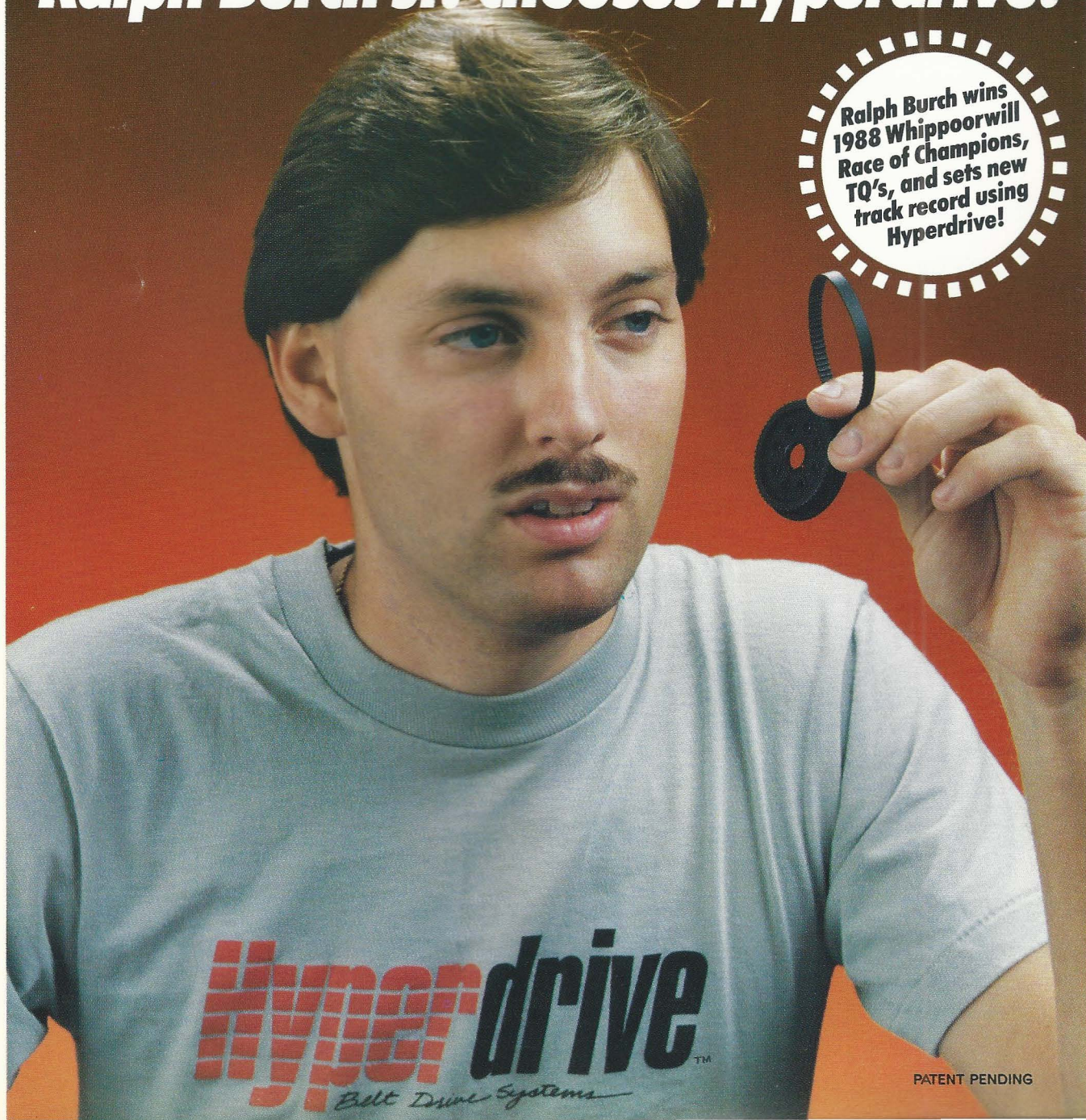
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Add **Hyperballs**, the highest grade bearings on the market, with **Hyperrings**, our chrome-hardened diff rings, and you have the ultimate, near frictionless, bulletproof drive system.

Contact us today for our new catalog and ordering information, or order direct using your VISA or MASTERCARD.

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Ralph Burch Jr. chooses Hyperdrive!



Ralph Burch wins
1988 Whippoorwill
Race of Champions,
TQ's, and sets new
track record using
Hyperdrive!

Hyperdrive
Belt Drive Systems™

PATENT PENDING

IT'S LOADED.

You're looking at the most potent pistolgrip radio you can buy. When it comes to features and performance, it's loaded. But only the competition needs to be worried.

PCM 1024.

Futaba's Magnum PCM fires out its commands in high speed, high resolution 1024 Pulse Code Modulation.

Virtually stepless PCM 1024 is a Futaba exclusive, and for response and resistance to interference nothing even comes close.

And Futaba's pioneering efforts in PCM have also resulted in a remarkably compact 3 channel receiver.



The 3 Channel PCM/BEC receiver weighs just 0.73 oz. and measures 1.75" x 1.125" x 0.625."

ALL THE RIGHT MOVES.

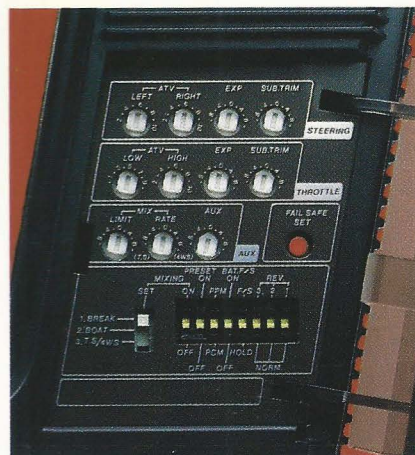
On the track, Magnum PCM one-touch, electronic trim and adjustable dual rate give you precise control over changing conditions.

Steering wheel throw, spring tension and throttle limit can also be easily changed on the transmitter.



Another important feature is Direct Servo Control (DSC), which lets you check and adjust settings without turning the transmitter on.

The Magnum PCM control panel. Customize your system for every application.



A PIT CREW IN THE PALM OF YOUR HAND.

The control panel of the Magnum PCM gives you access to every option imaginable.

ATV, exponential and sub-trim let you fine tune steering and throttle servo action to suit your driving style, car or track.

Third channel, mixing, fail safe, PCM/PPM (FM) and servo reverse controls are also provided.

THE FUTURE IS NOW.

Developed and competition-tested for all types of RC racing, the Magnum PCM can handle anything on wheels.

From high-powered 1:8 gas cars to high jumping 1:10 offroad racers, Futaba's reliable, surface-mounted electronics can take it. A complete selection of servos and MOS/FET speed controls is available.

We've even included twin-servo steering control, four wheel steer (4WS) differential and torque-steer compensation mixing.

Magnum PCM is truly the system for the serious racer. Everyone else is just firing blanks.

MAGNUM Futaba®

Futaba Corporation of America
555 West Victoria Street, Compton, CA 90220

Midnight PUMPKIN

The 1953 Ford Pick-up that combines 50's style with the latest technology from Tamiya.

Tamiya takes you back to the 50's with an awesome combination of classic beauty and brute strength. The full size pick-up was called the "Pumpkin" for its round contoured body style, bulging hood and fenders. Tamiya's 1/12 kit is a beauty, guaranteed to turn heads for miles around. The classic body sits high atop monster tires ready to eat up the turf.

THE BEAUTY OF THE FORD F100

From the chrome-plated bumper in the front to the chrome-plated bumper bringing up the rear, this truck was designed to be hot and nasty! Look at its chrome grille...the blue flames racing across the fenders...the chrome flood lights high atop the roll bar.

It's a blast from the past!



But making it beautiful is never enough at Tamiya. They also made it tough. So the body features injection-molded plastic for detailing and super resiliency.

THE TOUGHNESS OF TAMIYA

We made the F100 tough, inside and out. Inside, we started with an engineering resin plastic chassis/frame. Then we installed a sealed gear box, which incorporates precision differential gearing for better cornering. A powerful 540 motor. And three-step speed controller.

THE APPEAL OF ITS ENGINEERING

Outside, the first thing you'll notice are the 5" high tires that'll clear all but the biggest obstacles. To keep it down to earth and under control, we also installed independent swing arms in the front and a rigid swing axle suspension in the rear, and smoothed it with heavy-duty coil shock dampers for smooth sailing over the toughest terrains.

The result? A customized pickup with classic 50's good looks and powerful 80's technology that'll take you where you want to go. The Midnight Pumpkin from MRC/Tamiya. It's a blast from the past built for R/C's future.



Model Rectifier Corporation
2500 Woodbridge Avenue, Edison, NJ 08817

