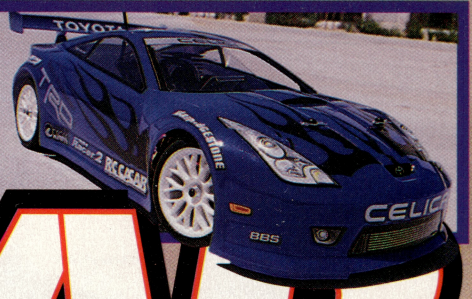
HPI NITRO RS4 RACER 2!

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THE RADIO CONTROL CAR MAGAZINE

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AUGUST 2000

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Why is this car winning so many races? We test Richard Saxton's Thunder Tiger EB-4!



Don't Settle For Anything Less...

Here's The Team Associated RC10GT Lineup For 2000... A GT For every racer, from Novice to Factory Pro!

Team Associated RC10GT's have been the dominant force in nitro truck racing since their introduction in 1993. No other nitro truck even comes close to the GT's winning record, including 3 NORRCA Truck World Cup wins.



All Team Associated RC10GT's feature fully adjustable caster, camber, and toe-in, fully adjustable oil-filled shocks, and our race-proven Stealth differential with 2.60:1 final drive ratio to handle the power of today's nitro engines.

The new, updated RC10GT Team kits feature one-piece racing wheels, Pro-Line F-150 Truck Body, MIP CVD's and a new, heavy-duty one-piece blue-anodized chassis which virtually eliminates chassis flex problems, and increases the GT's wheelbase to the maximum legal length.

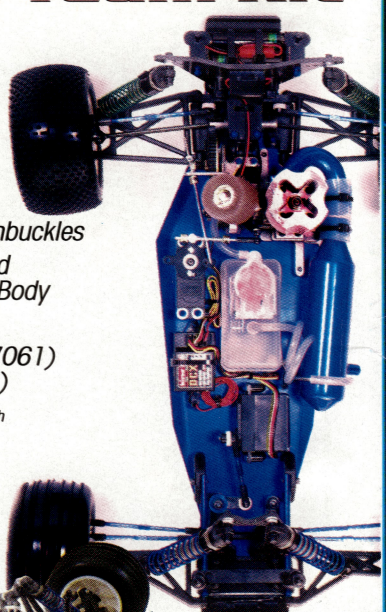
The new RC10GT "Factory Team" kits also include a Factory Blue Tuned pipe and manifold, Factory Blue Titanium turnbuckles, graphite shock towers, blue screws and more... it's the full "factory ride" GT!

The RC10GT is also available in a fully-assembled Ready-To-Run version, kit #7090, complete with .15-size engine and 2-channel radio.

Nobody knows Nitro truck racing better than the Team!

Factory Team Kit

- *New super-rigid Alloy chassis, blue anodized*
- *Factory Blue Tuned pipe and manifold*
- *Sealed ball bearings*
- *Graphite shock towers*
- *Factory Blue Titanium turnbuckles*
- *Pro-Line Racing Tires, and #3078 F150 Ford Truck Body*
- *MIP CVD's*
- *Available in Pull-start (#7061) or Non-pull Start (#7060)*



RC10GT Factory Team Kit #7060 shown with items not included in kit: .12 to .15 size engine, 2-channel radio gear and servos.



•Factory Team GT Kit: #7061 (pull-start) #7060 (non-pull)

FACTORY Team GT

RC10GT

For more information on the RC10GT, visit our website:
www.rc10.com • www.teamassociated.com



Get a REAL Associated RC10GT!

Team Kit

- New super-rigid Alloy chassis, blue anodized
- Tuned pipe and manifold
- Sealed ball bearings
- Composite shock towers
- Hard-anodized, Teflon-coated shocks
- Pro-Line Racing Tires, and #3078 F150 Ford Truck Body
- MIP CVD's
- Available in Pull-start (#7067) or Non-pull Start (#7068)

RC10GT Team Kit #7068 shown with items not included in kit: .12 to .15 size engine, 2-channel radio gear and servos.



•RC10GT Team Kit: #7067 (pull start) #7068 (non-pull)

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- Fully assembled, just add fuel and radio system batteries!
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RC10GT Ready-To-Run

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R/C CAR
THE RADIO CONTROL CAR MAGAZINE
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On the cover: Team Associated's new B3 Worlds Edition readies itself for re-entry. Saxton's Thunder Tiger berm-blasts at Hot Rod Hobbies' track. HPI's new Nitro RS4 Racer 2 hangs out up top. Photos by John Howell. **On this page:** Yet another look at Saxton's ride. Photo by John Howell.

R/C Car Magazine (ISSN 1097-0711, Canada GST 12500#9266RT), August 2000 is published monthly by Daisy/Hi-Torque Publishing Company, Inc., with editorial offices at 25233 Anza Dr., Valencia, CA 91355. Subscriptions $19.98 for 12 issues (one year). Canada and foreign add $9 additional postage for one year, $18 for two years. Copyright ©2000 by Daisy/Hi-Torque Publishing Company, Inc. All rights reserved. Nothing in this magazine may be reprinted in whole or in part, by any means, without the express permission of the publisher. Contributors: Photographic submissions must be 5x7 or 8x10 glossy black and white, or 35mm and larger color slides. Please mark each photo with owner's name and address. Manuscripts should be typewritten. Unsolicited contributions, manuscripts, photographs and illustrations must be accompanied by a stamped, self-addressed envelope. Unless special arrangements are made in advance, all published material becomes the sole property of Daisy/Hi-Torque Publishing Company, Inc. The publisher does not assume responsibility for unsolicited material. Pending periodicals postage paid at Santa Clarita, CA 91380 and at additional mailing offices. POSTMASTER: Send address changes to *R/C Car* Magazine, P.O. Box 958, Valencia, CA 91380-9058. Printed in U.S.A.

by Frank Masi



"Gimme a car."

"I want a gas truck."

"Do you have any speed controls lying around?"

Help me out, please. My co-workers are driving me crazy. Ever since we started this magazine, my fellow Hi-Torque employees have decided that I was the R/C gravy train. I don't mind this much, because I'm happy to do my part to swell our ranks, but enough is enough. It's not the demand for cars and trucks—we have plenty of those to lend out—it's the little things that are bothersome. I never realized before just how much extra stuff is needed to run some of these kits. Batteries, motors, servos, radios and receivers. Necessary but innumerable.

Then of course, there's this: "What do you mean I have to build it?"

"What are you talking about? It's an R/C car kit. The key word here being 'kit'!" is my usual response.

I was surprised to learn how many people could be put off of the R/C hobby by the prospect of a few hours of assembly. But it's true, it's true. Some of my formerly gung-ho co-workers became far less so after their first glimpse of a few hundred tiny parts and the idea of several evenings' worth of construction. Work? I get enough of that at...well...work!

This is why, to me, the advent of the RTR (ready-to-run) vehicle is a prayer answered. Now, when one of my co-workers wants to try his or her hand at R/C, I don't have to do anything except hand over the keys! Everything comes in one box, it's built, and all of the electronic stuff has already been installed. I think that RTRs have and will continue to have a big effect on the overall sales and vitality of this hobby. Bleak expressions turn to joyous ones when a newbie learns that his new R/C vehicle is "plug and play." Long or difficult assembly could very well be the key reason why many people who might be interested in R/C as a hobby become turned off before they even start.

As things seem to be shaping up, the RTR market isn't going to limit itself to servicing only the sport-level of the hobby. Even now, some of the new RTRs are quite up to the task of racing—straight from the box. Associated's RTR GT and HPI's Nitro RS4 RTR come to mind. And as you will see in this month's issue, Kyosho has produced RTR versions of its new Ultima ST trucks—both in gas and electric. I also don't think that it's going to end here; I can see a future in which I'll be able to buy a Team Losi Triple-X or an Associated B3 that has been pre-built to race specs, with a Novak or Tekin speed control and a high-quality radio system already installed. I could buy this car at the hobby shop and race it the same day. Believe me, these manufacturers didn't get to where they are today without the ability to plot trends and meet the needs of the hobby. Look at the success that Traxxas has enjoyed by producing nearly every kit it makes in RTR form. Who knows, the racing industry may soon follow suit. At least I'll be able to get my co-workers off my back with less work! ◆



The future: Kyosho's RTR Ultima Sts—gas and electric. All you do is apply some stickers and install some AA batteries!

R/C CAR
THE RADIO CONTROL CAR MAGAZINE

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THINK PINK!

When the track is hard and hard to get a hold of, think Pink!
Team Losi "Pinks".
Team Losi introduces new "Pink" compound in 10 of their most popular off-road tires.

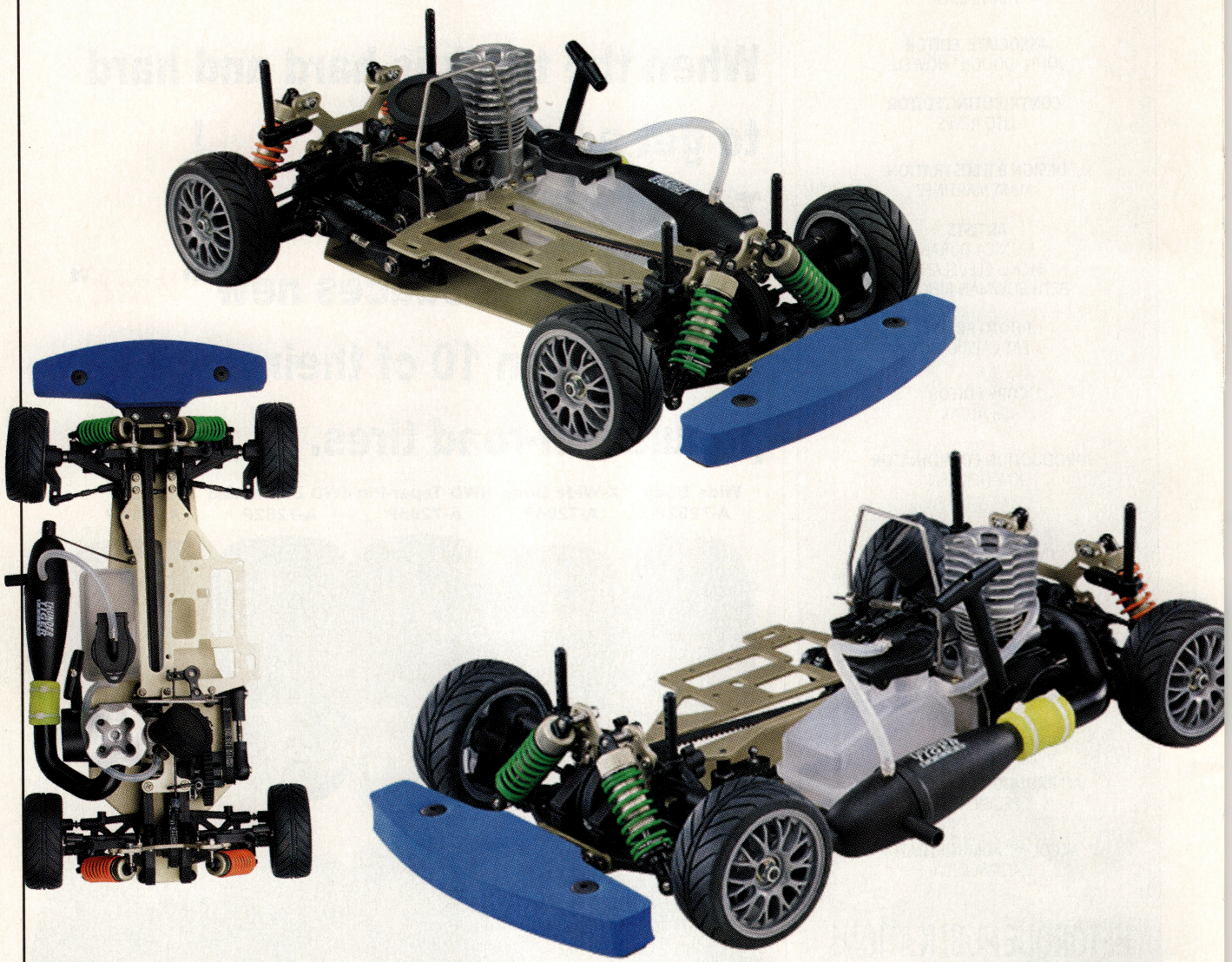
Wide Body A-7202P | X-Wide Body A-7204P | 4WD Taper-Pin A-7285P | 4WD Blockhead A-7282P | BK-Bar A-7371P



A-7369P X-2000 | A-7372P Taper-Pin | A-7505P Trk. Directional | A-7635P Trk. Taper-Pin | A-7641P Trk. T-2000

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Thunder Tiger ready to release TS-4n!

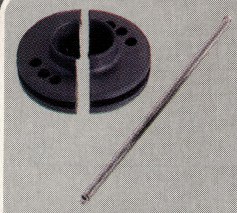
The all-new Thunder Tiger TS-4n is set to be released soon and we received a press package listing the features the car carries. It is going to be an amazing car for the money! We can't wait to get our hands on our test sample! Check out this list of features:

- 90 percent assembled with the choice of three different bodies (Volvo, Alfa, or Mercedes GTP)
- Aluminum top deck, shock bodies, and shock towers
- Strong parts in fiberglass-reinforced Dupont plastic
- Three-belt 4WD system
- Front universal driveshafts
- High-performance GRP rubber tires
- Three-point rear suspension link
- Double-wishbone front suspension
- On-road style front knuckle
- True Ackerman steering system
- Adjustable front caster/front and rear camber
- Adjustable front and rear toe/front rear track width
- Adjustable belt tension cam
- Full ball bearings
- Silicone oil-filled shocks
- Two-hole shock piston (front) three-hole piston (rear)
- Color-coded springs
- Adjustable shock spring tension clips
- Official color sponsor decal sheet
- Pre-cut foam front bumper
- Steel turnbuckles
- Super-low-CG design
- Full array of options available

For more information, contact Thunder Tiger at Ace Hobby Distributors, 116 W 19th St., Higginsville, MO 64037 • (660) 584-7121.

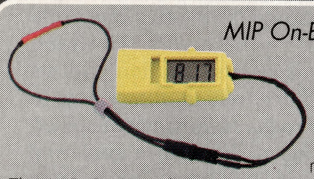
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MIP Clutch Systems for Associated, Losi, HPI, and Kyosho vehicles:

MIP Clutch Systems are specially designed with our custom extension spring and can be run in various settings for precision tuning. They are manufactured of extremely high grade composite material which allows for the smoothest and most consistent transfer of power. MIP Clutch Systems are stock replacements.



MIP On-Board Temp Gauge™:

Knowing the temperature of a gas engine is vitally important to a well running, long living engine. The MIP On-Board Temp Gauge™ probe fastens directly to the gas engine head and delivers accurate temp readings. For use on most model engine applications.

MIP Boost Bottle and Rear Boost Chamber Kits:

MIP Boost Bottle and Rear Boost Chamber kits increase your .12 gas engine's bottom end acceleration while making the power band more consistent than ever before. Fits O.S., HPI, Dynamite, and Thunder Tiger engines.

MIP 360 Stinger Kit for Associated, HPI, Losi, and Traxxas:

The only exhaust system that sounds like a real two stroke pipe. For use with or without pull start engines, the MIP 360 Stinger maintains substantial top end speed while creating the bottom end torque and punch needed for off-road racing. All 360 Stinger kits now come with a shiny coated pipe and black anodized header.



MIP Headsink and Buttsink for O.S. .12 engines:

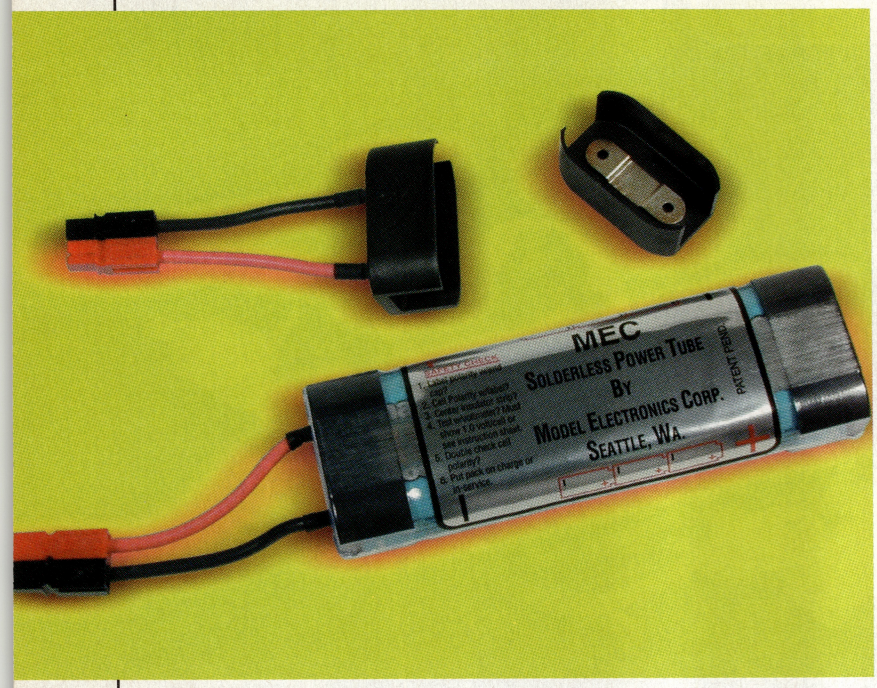
MIP Headsinks were specifically designed for 1/10th scale racing. They come predecked from the factory, and include a top of the line #8 McCoy plug. MIP's ultra light weight aluminum Buttsink can be used to eliminate the pull starter, or just simply to replace the standard engine back plate. Both the Headsink and Buttsink are designed with large spacious cooling fins to dissipate the tremendous heat created from gas engines.

MIP's 21 years of racing experience has lead to the hottest race proven upgrades for 1/10th scale off-road vehicles and touring cars.

©MIP 2000

news flash!

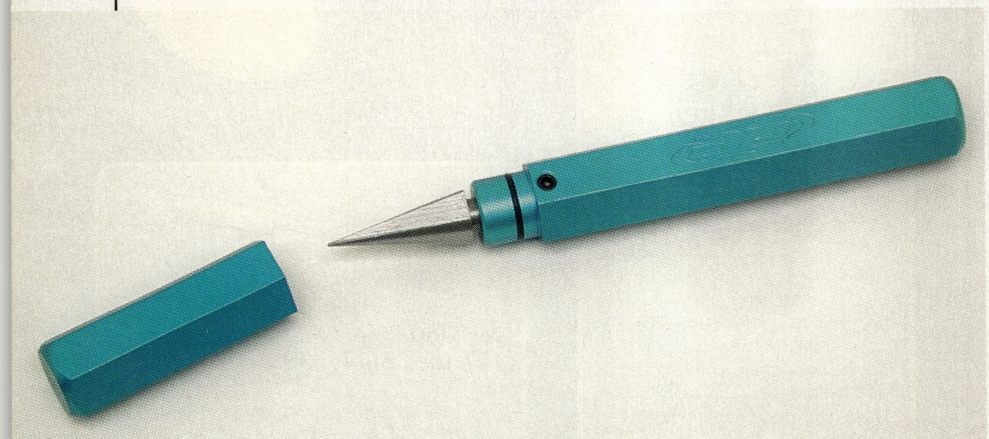
Build a battery without soldering!

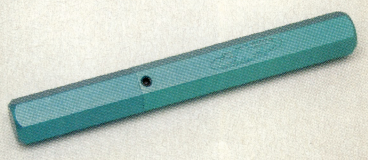


Beginning racers have had two choices when it comes to batteries: they can buy pre-built stick packs, which are in most cases made of unmatched cells, or they can purchased racing-style, matched single cells and a soldering iron. Because soldering batteries correctly takes experience and the right tools, the latter choice is hardly one this magazine can easily recommend for beginners. However, Model Electronics might have the solution with its new Solderless Power Tube, which allows you to build your own battery packs from single matched cells without ever having to heat up a soldering iron. The cells are inserted in the Power Tube much in the same way you install batteries in a flashlight. The Tube holds the cells tightly together so that an adequate connection is made. In its own testing, Model Electronics has found little if any difference in performance between cells that have been soldered together and those held together by the Power Tube. Power Tubes are available for A, Sub-C and full C cells, and come with Power Pole connectors. Model Electronics also sells pre-assembled packs using Panasonic 3000MAh cells.

For more information, contact Model Electronics Corporation, 14550-20th Ave. N.E., Seattle WA 98155 • phone (206) 440-5772; fax (206) 440-5905.

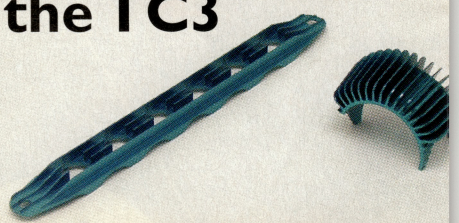
Factory Team Body Reamer





If you're looking to cut out some really clean body-mounting holes in your fresh new Lexan body and you don't want to mess it up, check out his new tapered body reamer from Team Associated. The new Factory Team reamer (part # 1594) is made from aluminum which is then anodized a bright blue to match all of Associated's other Factory Team items. The reamer even comes with its own protective hood to help prevent the cutting edge from getting dull or broken! The body hole reamer retails for only $22.00. For more information, contact Team Associated at, 3585 Cadillac Ave., Costa Mesa, CA 92626 • (714) 850-9342; (714) 850-1744 (fax).

IRS Hops-Up the TC3



IRS' growing line of Team Associated TC3 hop-ups is complemented by these new pieces—an aluminum motor heatsink, and an aluminum battery strap. The aluminum motor heatsink (part # IRS141) is designed to work using the original motor adjustment clamp. The heatsink helps draw heat away from the motor, is anodized in a bright blue finish, and it retails for $30.00.

The new aluminum battery strap (part #IRS142) helps hold the cells securely in place and it also doubles as a battery heatsink! The strap (also anodized in a bright blue finish) retails for $28.00. For more information contact Irrgang Racing Service at 18 Cannon Range Rd., Milmay, NJ 08340 • (609) 476-2371 (phone or fax).

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Designed and extensively tested by engineers and racers	✔	✔	✔	✔	✔
Placement of the highest quality components	✔	✔	✔	✔	✔
Manufactured in-house on automated machinery	✔	✔	✔	✔	✔
Comprehensive, computer-controlled board-level testing	✔	✔	✔	✔	✔
Thorough, full-powered product burn-in	✔	✔	✔	✔	✔

NOVAK® Makers of fine R/C electronic products

100% Excellent!

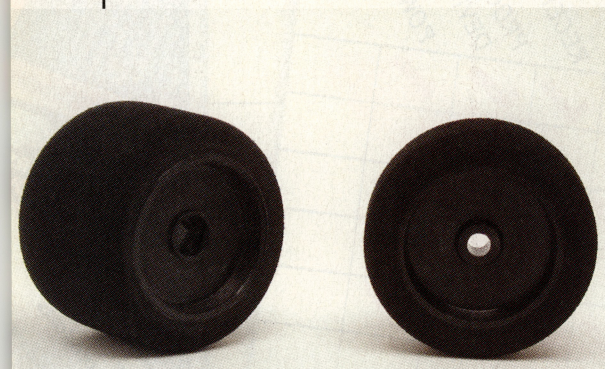
LOOKS LIKE ALL THE TIME WE INVEST DESIGNING, BUILDING, THEN TESTING EVERY SINGLE ONE OF OUR ELECTRONIC PRODUCTS BEFORE OUR CUSTOMERS RECEIVE THEM HAS PAID OFF – NOVAK PRODUCTS HAVE WON 19 WORLD CHAMPIONSHIP TITLES!

NOVAK Racing Electronics

Tested at the Factory Proven at the Track

news flash!

New Foams For Corally 1/12th-Scale Cars

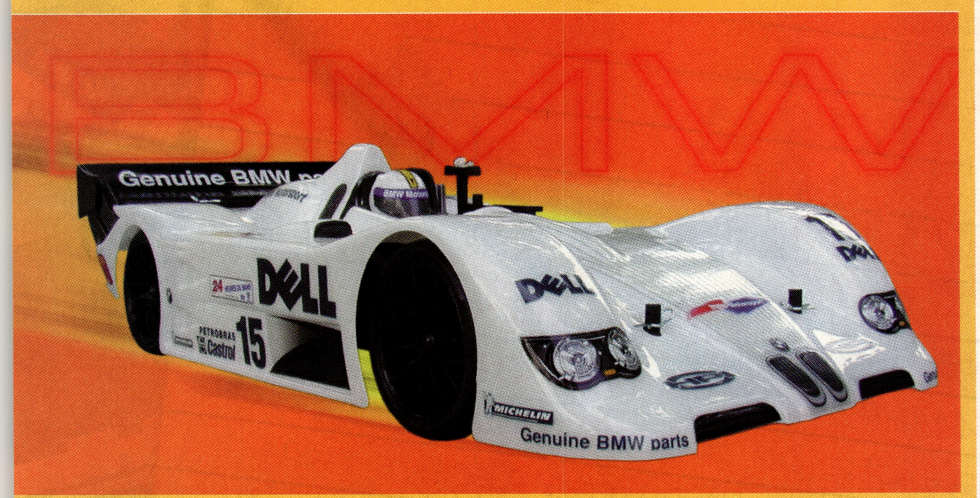


The RRCF Group has released a pairing of TRC natural and exotic compound foam tires mounted on new Corally factory 1/12th-scale wheels (fits all Corally 1/12th cars). All tires are mounted with specially designed contact cement to provide great adhesion, yet allow re-capping when the rubber is worn.

Stock compounds included Purple fronts and Grey and White rears. Fronts sell for $17 and the rears sell for $19. The RRCF Group offers a set price of $35 when you purchase front and rears together. Other compounds are available as special orders of four pairs or more.

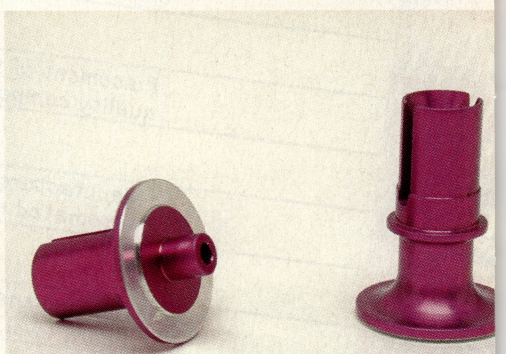
For more info contact the RRCF Group at 1925 State Rd 83, Hartford WI, 53027 • (262) 673-1999.

Own a LeMans winner!

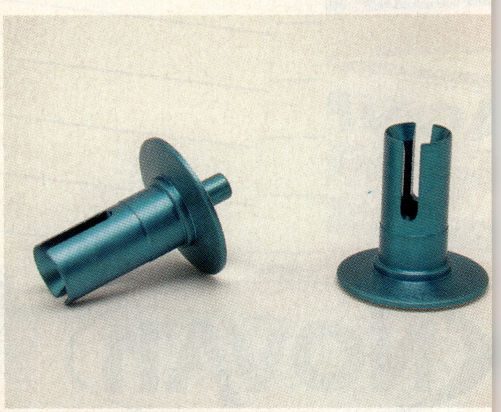


HPI makes good use of its website (*www.hpiracing.com*) to gauge customer response to new products and ideas. After announcing the release of a brand new body for the Super Nitro RS4—a killer-looking BMW V12 LMR—HPI knew it had a winner on its hands as response was very positive. Modeled after the winning car from the gruelling 24 Hours of LeMans, HPI's BMW V12 LMR body is designed to fit the shorter of the two Super Nitro RS4 wheelbases (280 vs. 300mm), and includes a new lowered front shock tower to fit the body's low-profile front end. The BMW body will give all Super Nitro RS4s superb performance thanks to its generous amounts of front and rear downforce, and the body comes with a full set of decals (including official BMW, Dell and Michelin logos) as well as realistic headlights, tail lights, various grills and intakes. Each body comes from the factory with clear overspray film, and scribed lines and dimples for cutting out openings for the engine, handle and fuel tank. For more information on the BMW V12 LMR (part no. 7512, $38), contact HPI Racing, 15321 Barranca Pkwy., Irvine, CA 92618 • phone (949) 753-1099; fax (949) 753-1098.

Robinson Racing New Lightweight Aluminum Outdrives



New from Robinson racing are these Lite Aluminum Outdrives for Team Associated's RC10B3 and T3 as well as for HPI's RS4 Pro and Pro 2. The new Lite Outdrives are 40 percent lighter than stock, are CNC machined from hardened aluminum, and each retails for $22.50. The B3/T3 outdrives (part # 1502) come anodized in bright blue, while the HPI outdrives (part # 1585) come anodized in a vibrant purple finish. For more information, contact Robinson Racing Products at, 4968 Meadow View Dr., Mariposa, CA 95338 • (209) 966-2465; (209) 966-5937 (fax). ◆





"...no other vehicle we've tested, regardless of scale and horsepower... was as capable as the T-MAXX!"
R/C Car magazine

What a dirty, muddy mess. We LOVE it! The battlescars on this hammered T-Maxx tell a story of hours and hours of jaw-dropping action and ear-to-ear grins that only a Traxxas Nitro Truck can deliver. After all the hype, after all the glossy pictures, this is what it's all about.. drivin' hard and having FUN. And nobody does it better than Traxxas. We work hard so you can play harder. Whether it's a Nitro Rustler, Sport, Stampede, or the King of Nitro Monster Trucks, the T-Maxx, you know they're built Traxxas Tough!™ After all, You made them the world's #1 selling nitros. Drive hard, drive fast, drive Traxxas!


Sent in by Steve Hew


Sent in by Glenn Parramore


Sent in by Andrew Logan

"...this (T-MAXX) truck will shape the future of monster trucks."
Xtreme R/C Cars magazine

"(T-MAXX) breaks all the 'rules' of monster truck design, yet out-performs every monster truck that preceded it."
R/C Car Action magazine

"I've been into R/C for 12 years and nothing comes close to the T-MAXX. Thanks for making a great product."
Joe Hill, via e-mail

"You people have re-written the book on customer satisfaction and standing behind your product!"
Jeremy Cox, via e-mail

"The T-MAXX is my first R/C vehicle and it is awesome! It's very fast and seems to be just about unstoppable!"
Aaron Morgan, via e-mail

"We just want to thank you for a truck that really kicks!!"
Mark Apodaca, via e-mail

"Hours and hours of fun!!!!"
Nick, via e-mail

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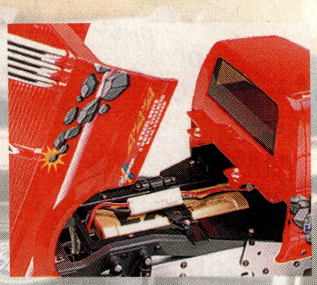
TRAXXAS®
FROM START TO FINISH

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Ph. (972) 613-3300 Fax (972) 613-3599.
Traxxas U. K., P. O. Box 1128 Winterbourne, Bristol, BS36-2SH, England. Ph. 44-117-956-1002 Fax 44-117-956-1121.
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4X4X4 Juggernaut 2 (Ford F-350)
Monster Pick-Up Truck #58256

Realistic
Driving Lights

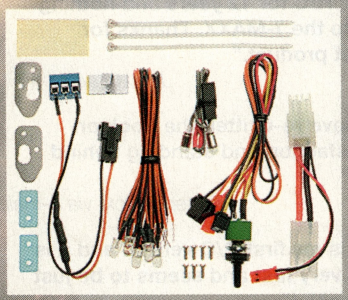
Highly Detailed Hard
Plastic Body



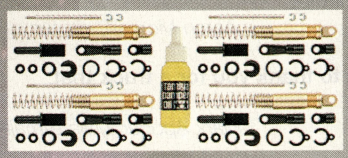
Truck Bed Tilts for Easy
Battery Access (Battery
Pack NOT Included)

Aluminum Bumpers,
Front and Rear

Hop-Up Options:

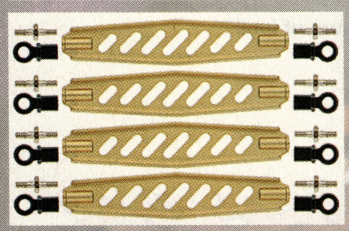


#53370 Lighting Kit
Powers Head Lights
and Driving Lights

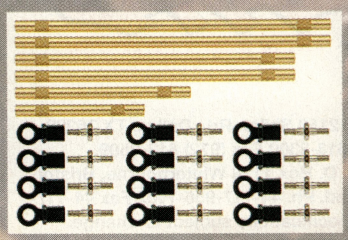


#53369 Aluminum
Oil-Filled Damper Set
(2 Sets Needed)

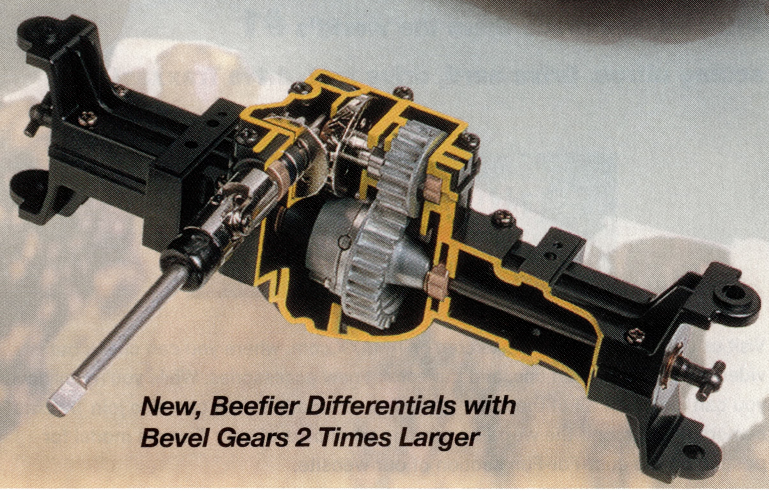
Huge, Semi-Pneumatic
Tires and Chrome Wheels



#53383 Aluminum
Suspension Arm Set
(2 Sets Needed)

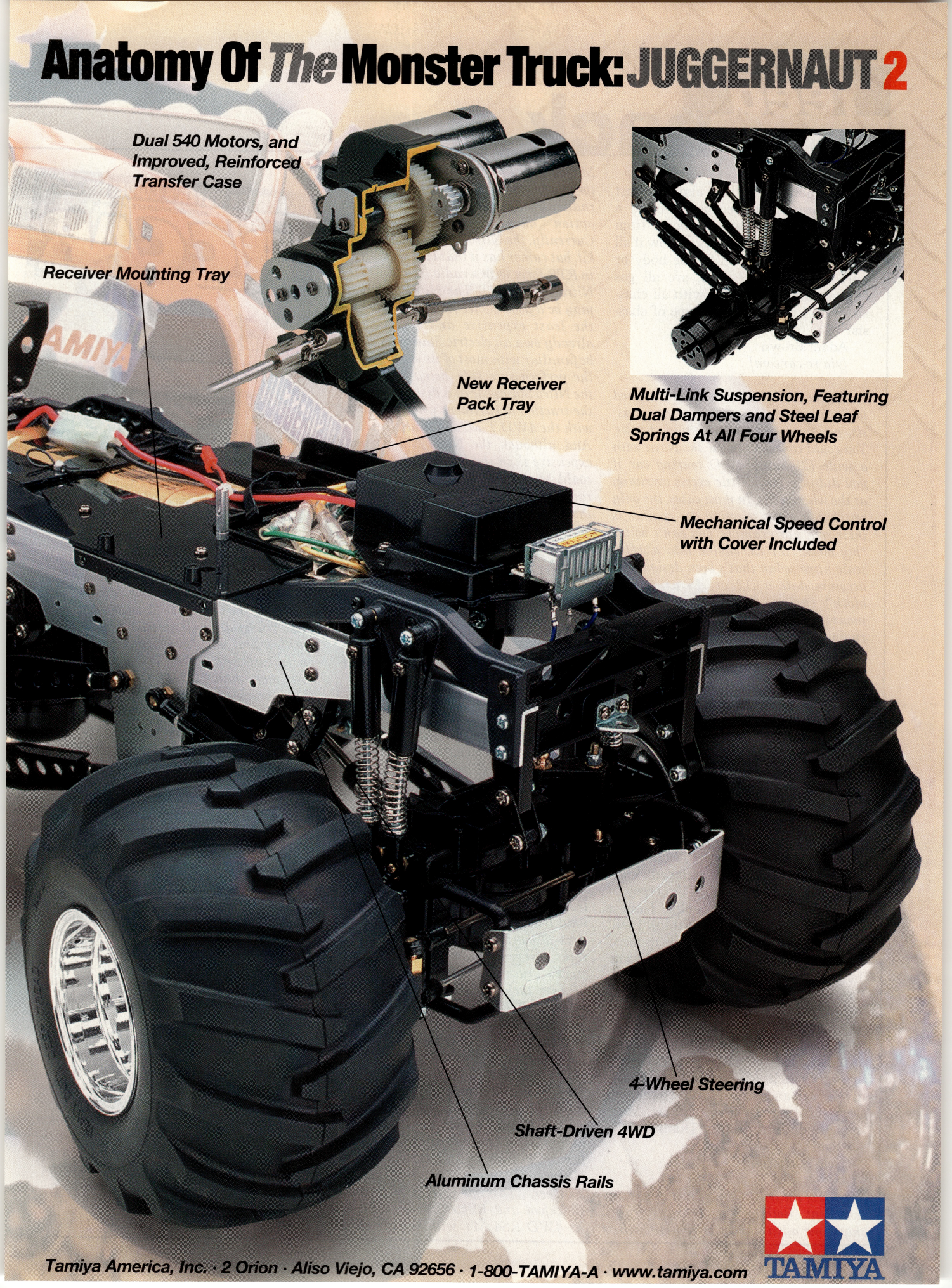


#53385 Aluminum
Steering Rod Set



New, Beefier Differentials with
Bevel Gears 2 Times Larger

Anatomy Of *The* Monster Truck: JUGGERNAUT 2



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feedback

Bossa-Nova!

I am new to R/C cars and I am just getting into them because I found a 1/10 scale '70 Nova SS body from Bolink (BL-2278). I want to know if all 1/10-scale chassis will fit the body or only certain ones? Also, are all gas engines interchangeable with all chassis or do I need a certain type of chassis?

Adam Brown
[via rc-car.com]

Adam, Bolink's Nova SS is designed to fit "narrow" 1/10-scale pan car chassis, e.g., a superspeedway-style chassis. You could conceivably use the Nova with a wide (200mm) 4WD touring car if you didn't mind a little excess overhang at the wheel wells. In most cases, the only restriction when selecting gas engines is their size. For example, you can't bolt a "big block" .21 c.i. engine into a 1/10-scale nitro sedan that's been designed to accommodate a .12 or .15 c.i. "small block" engine. Other than this, the mounting "ears" of most .12 and .15 engines are very similar, and will fit the mounts in most popular on-road and off-road kits. The only other factor that affects engine/chassis compatibility is carburetor type. A chassis designed to use an engine with a barrel-style carb usually won't work with an engine that has a slide carb, and vice-versa. Check your kit's instruction before buying an engine.

Gas Truck quandry

I was wondering if you could help me decide on something. About a year ago I got started in the R/C hobby and I purchased a Traxxas Stampede electric truck, but now I think I'm ready to advance to gas! If this helps, I am a backyard basher, so I don't think I will be getting into racing, because to me it becomes monotonous. But I need some help picking the best choice for me. I cannot decide on whether to purchase a Traxxas Nitro Stampede, the new T-MAXX, or the new HPI Nitro MT. If you could tell me the advantages and disadvantages of each, it would help me very much. Also the price and quality of each and ease of tune. Thank you very much, and I love the mag. More reviews on nitro trucks. Thanks.

Paul
[via rc-car.com]

All of the trucks you've mentioned are excellent. Both of the Traxxas trucks have one advantage over the HPI Nitro MT—they come pre-built from the factory, and the T-MAXX comes with a radio already installed (this is also an option on the Nitro Stampede). Currently, the Nitro MT comes only as a kit, but rumor has it that HPI will offer it in RTR form with a radio (similar to the Nitro RS4 RTR). The Nitro Stampede may be a good choice for you because it's the least expensive and because you already own an electric Stampede, you'll be familiar with most of its workings. On the performance side, being 2WD puts the Nitro Stampede at a disadvantage in the traction department when compared with the 4WD T-MAXX and Nitro MT. And although the Nitro MT is more expensive than the Nitro Stampede, you could save some dough and swap the radio system from your Stampede into the MT. As we stated, all three trucks are good. The Nitro Stampede is the least expensive, the Nitro MT is more money but has 4WD traction, and the T-MAXX is the most expensive but also has the most features, e.g., reverse, a two-speed transmission and the biggest tires with the most suspension travel.

Having his cake and eating it too!

I was wondering what is the cheapest but fastest R/C car or truck? Give me the price. It has to be made for dirt and grass. Let's just say really bumpy terrain.

Thanks,
Josh
[via rc-car.com]

Didn't your mother ever teach you to say please, Josh? Seriously, if you plan to run on dirt and grass, we recommend that you begin your search with an off-road truck. A truck's larger wheels and tires allow it to travel over grass and rocks that could cause a buggy to become stuck. Trucks are also easier to drive because they are more stable over the rough stuff. Electric trucks are generally less expensive than gas trucks, so we'll narrow your search further by sticking with electric. Traxxas offers a pair of RTR (ready-to-run) trucks called the Stampede and Rustler, Associated has its T3 Sport kit, Losi sells a bushing-equipped version of its Double-XT racing truck (as well as the entry-level Junior T truck), Kyosho has its new Ultima ST EP RTR and popular Tracker, Tamiya offers its Super Blackfoot and Blitzer Beetle, HPI sells its 4WD RS4 MT with several bodies,



Yokomo has a new truck (the MR-4MT) and MRC has its MT-10 trucks. All of these trucks are well suited to backyard bashing and vary in pricing depending on features, e.g., a 4WD truck usually costs more than a 2WD truck, etc. All of these trucks can be "souped up" by installing a faster stock motor or even a mild modified. How fast you want to go depends on how much green you are willing to spend!

How tough should a track be?

I'm just getting started in R/C racing. I have a track set up at my mate's place. It's off-road, so do you have any hints for any extras on the track like jumps? Also, do you have good setup tips for my car (a Tamiya Super Hornet). The track is a bit rough. I would also like to know what time I should be charging my battery for? Thanks.

Hayden
[via rc-car.com]

If most of the cars that run at your friend's track are similar to yours (beginner-level off-road), then try to limit the size of the jumps and obstacles you build to ones that can be easily handled by your Super Hornet. Big jumps are cool, but broken parts and frequent crashes aren't! A few easy ramps (not too steep) with flat landings will be very easy to make. If you're feeling ambitious, a small double jump (don't make the ramps more than a few feet apart) will

require a bit more technique to clear. The Super Hornet's setup abilities are limited. If the track is really bumpy, we suggest that you run the lightest damping possible and see if you can install some softer tires. Probably the best mods for your car would be a budget-priced ESC (electronic speed control) and ball-bearings for the tranny. If you are using a timer charger, you should do the following: run the battery in your car until it just begins to slow noticeably (no further, or you'll damage the pack). Allow the discharged pack to cool to room temperature and place it on your charger. Charge in increments of 15 minutes. Begin monitoring the pack's temperature toward the end of the second 15-minute charge. After that, keep a careful eye (and hand) on the pack for any sign of increased temperature. As soon as the pack begins to feel slightly warm, it's done. If all this seems like too much work, we suggest that you invest in a budget-priced peak-detection charger (there are several excellent models that are very reasonably priced).

Optimal 4-wheeler

I've got a mint 1985-1987 Kyosho Optima, all original, box, docs, everything. I want to race it, but I don't think it's fast enough. Currently, it has the original chain drive and a Mabuchi RS540SH motor. I've heard of a belt-drive conversion; where can I get this and other upgrades that will make my Optima competitive should I choose to race it?

Wade Nelson
[via rc-car.com]

Wow! Want to sell it? Seriously, the original Optima was a great car in its day, and it set the standard for design in 4WD buggies for years. Through its Option House division, Kyosho did offer a belt-drive kit to replace the Optima's less efficient ladder-chain; however' this conversion is well out of production. Our suggestion is that you try contacting Great Planes (Kyosho's U.S. distributor) at (217) 398-6300; however, most manufacturers will not stock replacement parts or hop-ups for kits more than ten years old. Another option is to search on-line auctions such as ebay (www.ebay.com). These sites have an enormous number of listings, and you just might get lucky. Also, try placing a classified ad in your local paper. You never know. If we owned your car, we would probably retire it to the display shelf. The market for "vintage" R/C kits is growing (we have heard of original, unopened Tamiya kits going for more than $1500). If you insist on racing your Optima, the best mod would be to upgrade to a faster motor such as a modern competition stock or mild modified (16-turns or higher). ◆

Don't be a spectator! ***R/C Car*** *is your magazine, so get involved. Send your letters, comments and questions to the editors at Feedback, c/o* ***R/C Car*** *magazine, P.O. Box 958, Valencia, CA 91380-9058. You can also email Frank at evaone@pacbell.net and John at doog1@earthlink.net.*



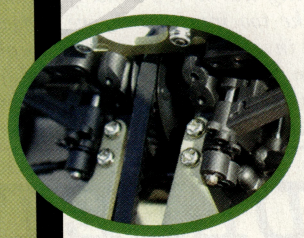
Introducing the TS4N

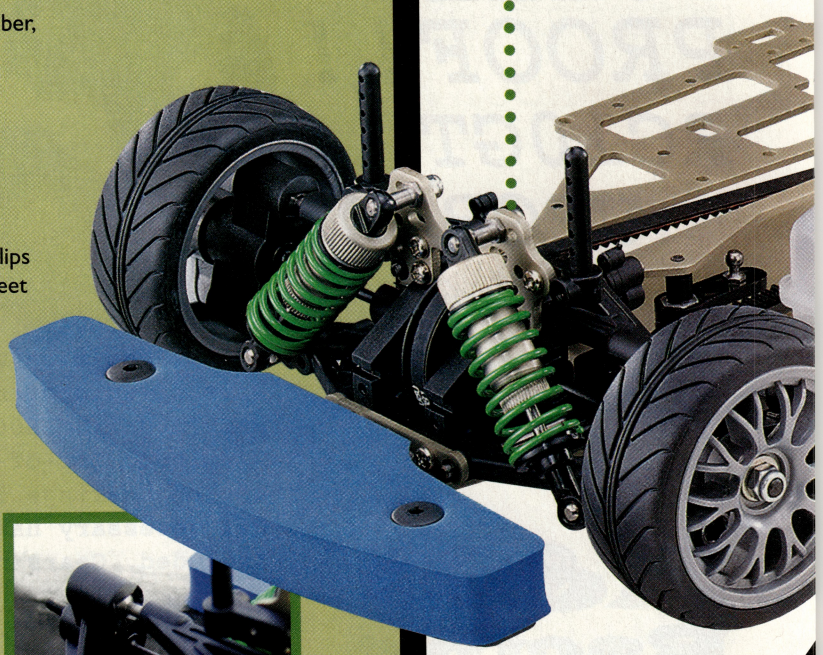
1/10 4wd

Designed by world renowned Franco Sabattini and manufactured at Thunder Tiger's super-modern facility, the TS4N is the first in a series of high performance touring cars. Early in the first year of its existence, the TS4N is already sweeping Europe with first place wins in France and Italy, logging lap times much faster than any of the competition.

The TS4N is a 1/10th scale four wheel drive nitro powered touring car that combines many sophisticated performance-enhancing features that represent a culmination of 30 years of Sabattini's design experience. The car comes in three body styles and is 90% assembled with a powerful, user friendly Thunder Tiger PRO-12BZX with pull start and tuned pipe furnished and installed.

- Aluminum top deck, shock body, and shock towers
- Strong, fiberglass reinforced Dupont plastic parts
- Three belt, 4WD drivetrain
- Front universal drive shaft.
- High performance GRP rubber tires
- Three-point rear suspension link
- Double wishbone front suspension
- On-road style front knuckle
- True Ackerman steering system
- Fully adjustable fr caster, fr/rr camber, fr/rr toe-in, and fr/rr track width
- Adjustable belt tension cam
- Full ball bearings throughout
- Silicone oil filled shocks
- Two hole shock piston (front)
- Three hole shock piston (rear)
- Color coded springs
- Adjustable shock spring tension clips
- Official, colorful sponsor decal sheet
- Pre-cut foam bumper
- Steel turnbuckles
- Super low CG design
- Full array of options
- Requires 2-channel radio





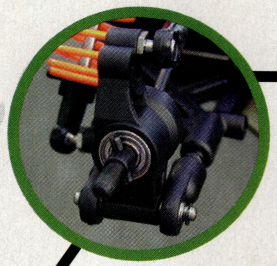
Future releases will include completely ready-to-run versions and electric versions. All cars in this series will share 80% parts compatibility plus upgrade and conversion packages will be available.

As with all of Thunder Tigers cars, the TS4N offers performance that is value priced. Go see your hobby dealer today and get ready to roar with Thunder Tiger!

Interested? For a retailer, visit: http://www.acehobby.com/sources or call (660) 584-7121
Distributed exclusively by Ace Hobby Distributors, Inc. 116 W. 19th ST, Higginsville, MO 64037

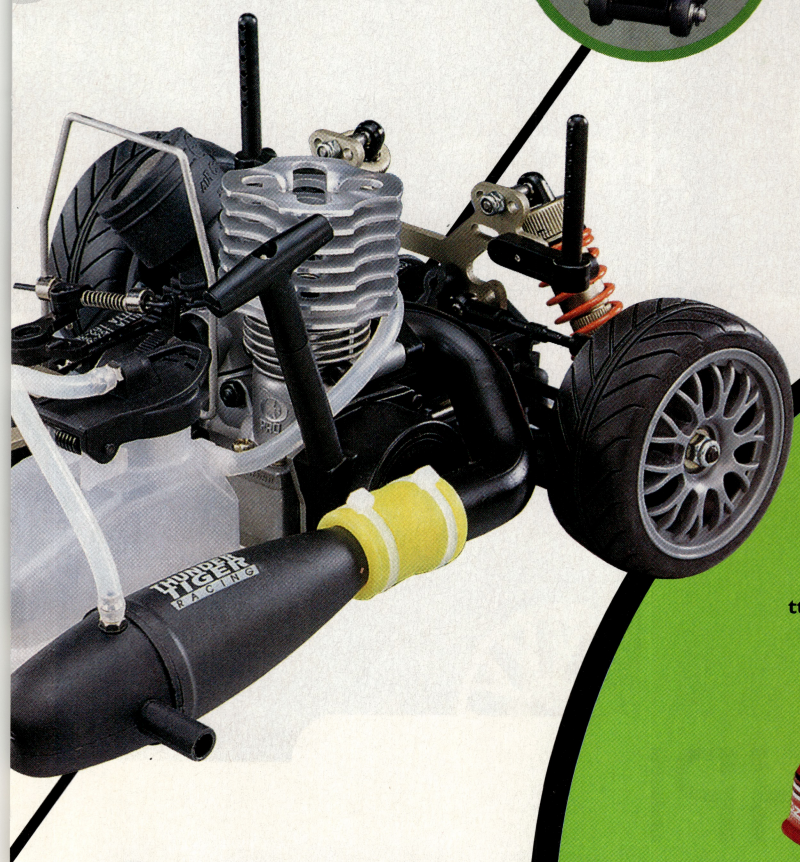
future: TS-4n

nitro sedan



T S 4 N

- 90% assembled.
- PRO-12BZX included.
- Three belt, 4WD drivetrain.
- Fully adjustable suspension
- Front universal drive shaft.
- Aluminum top deck, shock body, and shock towers.
- Official sponsor decal sheet.

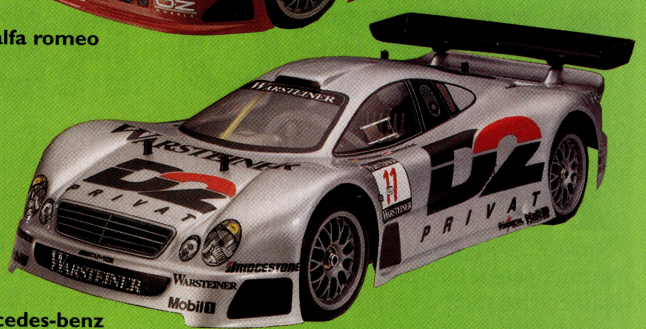




ttr6134-a volvo

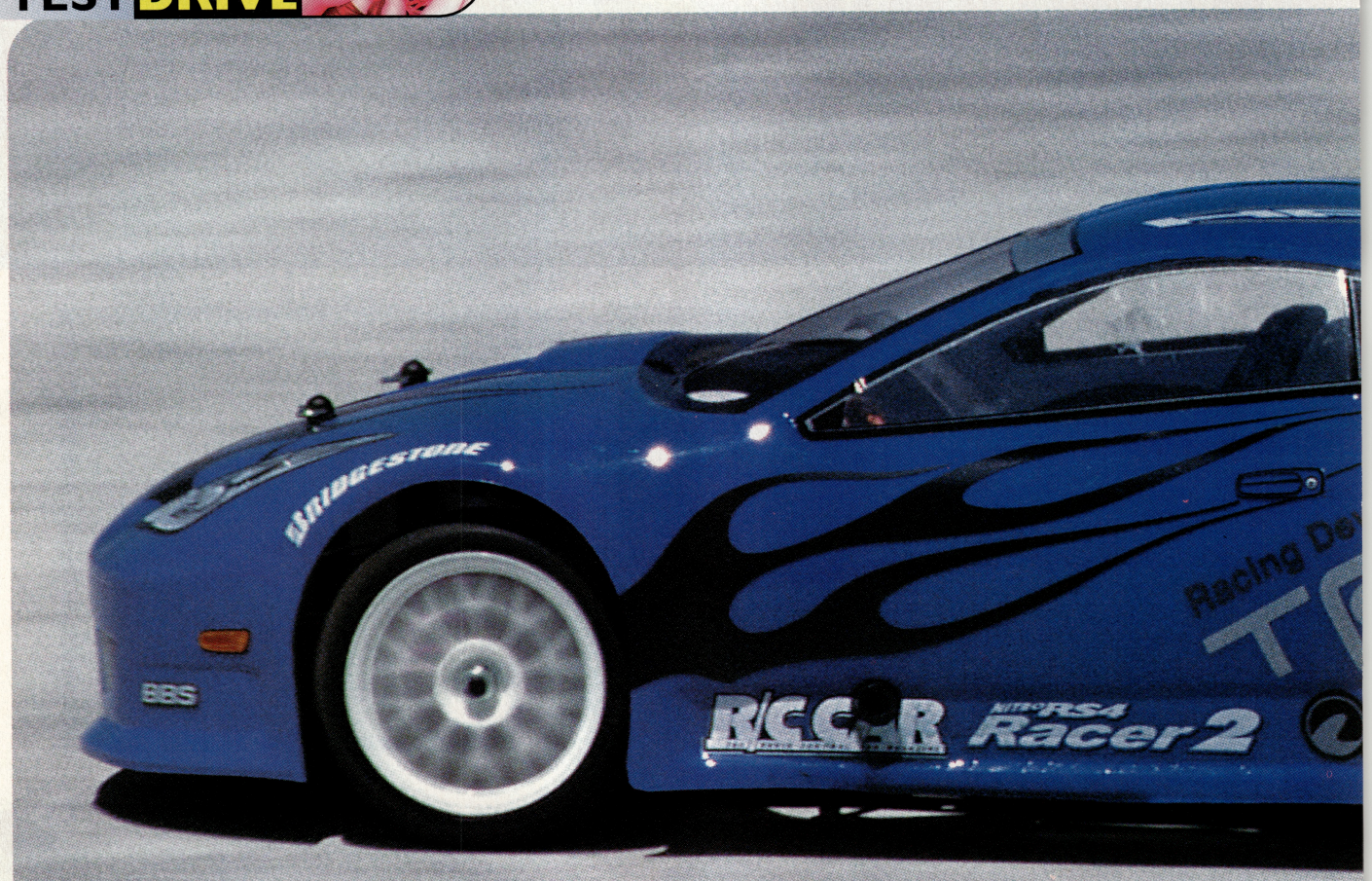


ttr6136-a alfa romeo



ttr6135-a mercedes-benz

Thunder Tiger TEAM
INTERNATIONAL



What you get

- Rolling chassis
- Updated suspension geometry
- Full ball bearings
- Tons of hop-ups come standard

What you need

- Engine
- Body
- Tires
- Paint (suitable for Lexan body)
- Two-channel radio and receiver with two servos
- CA (Cyanoacrylate) "super glue" for tires



HPI NITRO RS4 RACER 2

First things first—the Nitro RS4 Racer 2 can be best described as an "evolutionary" car. As a matter of fact, right in plain view, emblazoned on the front of the stunning-looking box, you'll see the words "second generation racer." With the Nitro RS4 Racer 2, HPI designers have picked and pulled from the best of what we liked so much about the original Nitro RS4 Racer and combined it with the best from their new electric racer, the RS4 Pro 2. The end result is just that—a second generation racer. And a racer it is—the kit comes sans body, engine, exhaust or tires. HPI offers it that way so racers can choose their own preferred setup, or use existing parts.



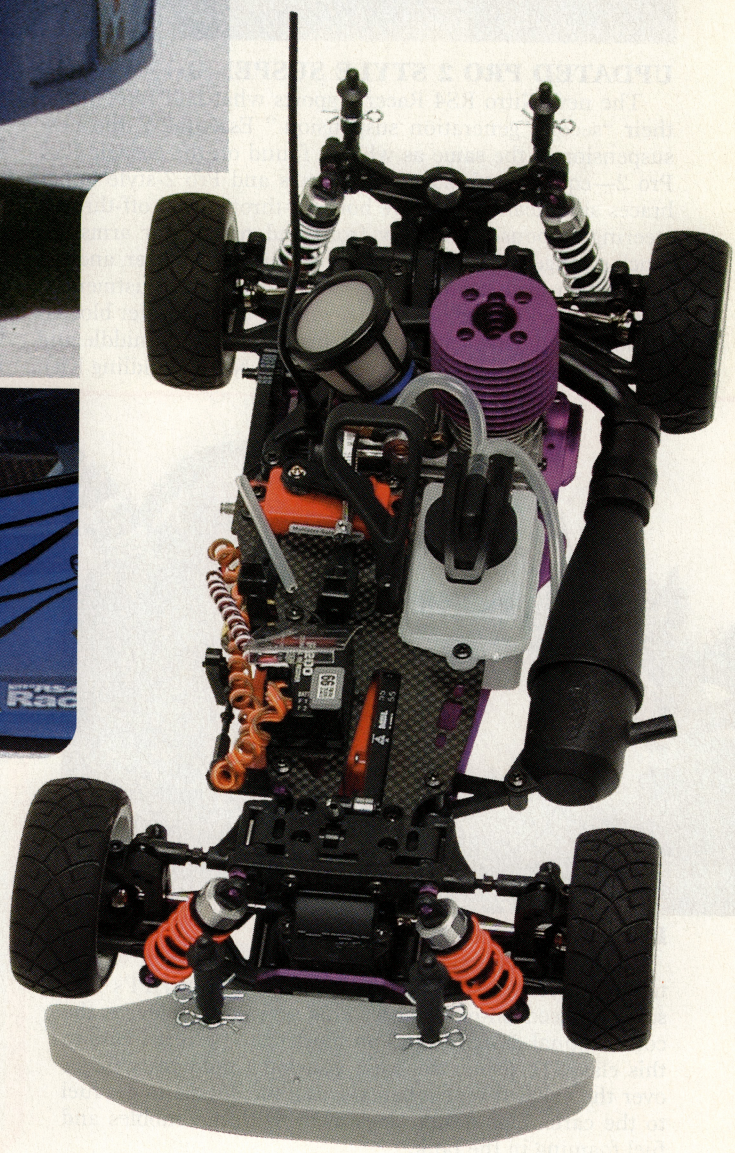




SPECIFICATIONS

Length	360mm/14.2 in.
Width	196mm (f)/200mm (r)
Wheelbase	254mm
Track	168mm (f)/171mm (r)
Weight (RTR)	1330g/2.9lb.
SKILL LEVEL*	2.5
PRICE	
Retail	$439.00
Average hobby shop	$250-270

* Indicates skill needed to satisfactorily complete kit. Level 1 kits are the easiest to complete, Level 4 are the most difficult and shouldn't be attempted by beginners without experienced assistance.



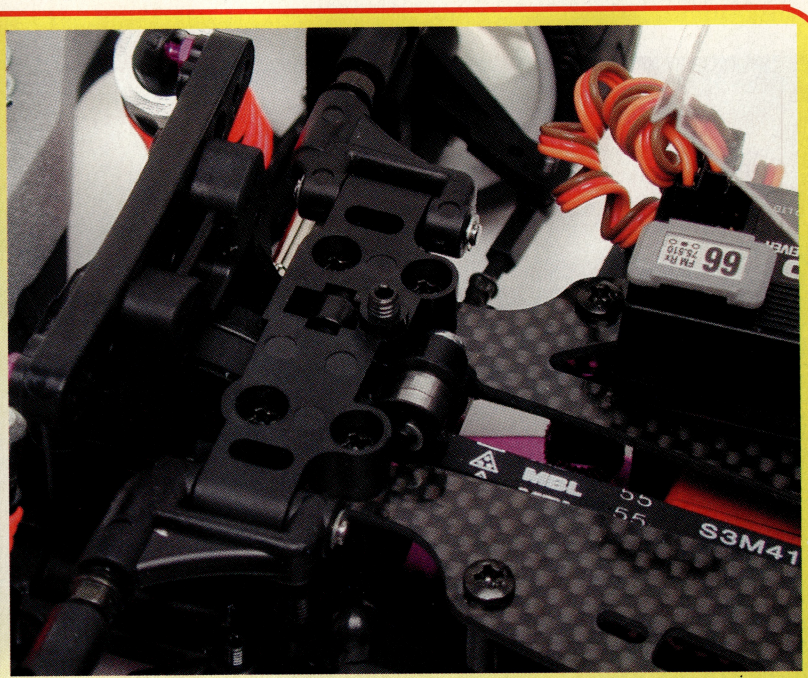
CHASSIS

HPI uses a familiar-looking purple-anodized, 2.5mm-thick, countersunk aluminum chassis on the new kit. The new chassis features special lightening holes to help reduce the car's overall weight. In addition to being a rugged, well-designed backbone, the aluminum chassis also helps dissipate heat away from the engine.

The upper deck is composed of woven graphite, which provides excellent rigidity over plastic yet weighs less. The new graphite upper deck also has been re-designed to place the fuel tank more inboard when compared to the older-style upper deck.

HPI **NITRO RS4 RACER 2**





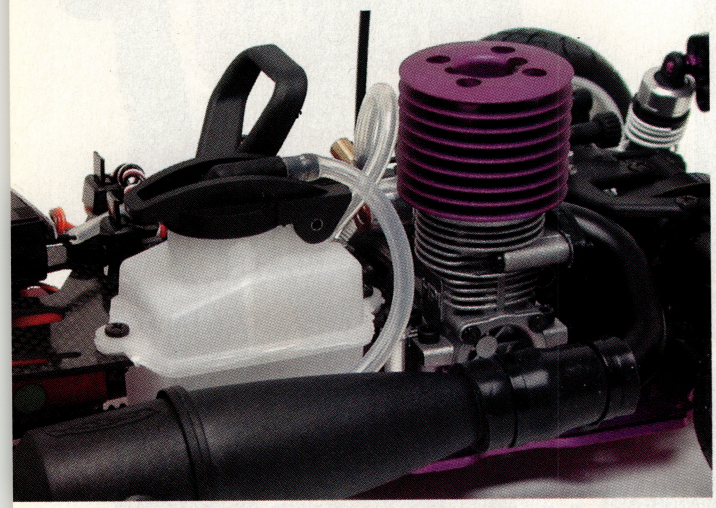
UPDATED PRO 2 STYLE SUSPENSION

The new Nitro RS4 Racer 2 sports what HPI refers to as their "second generation suspension." Essentially, the new suspension is the same as what is found on the electric RS4 Pro 2—equal-length suspension arms and Pro 2-style upper braces significantly improve both on-throttle and off-throttle steering response. The new front and rear upper arms are much stronger than those on the original Nitro Racer, and the front upper arms feature many possible tuning adjustments.

Additional tuning options (8- and 10-degree caster blocks) are now included as standard items, as are front, middle and rear roll center plates (referred to as the Nitro Handling Kit). According to HPI, used in conjunction with the 2.5mm chassis, these new roll center plates allow the Racer 2 to corner flatter and they allow for the use of slightly softer springs to help gain more traction.

The car also features Pro 2-style steering linkage complete with additional Ackerman mounts. Gone is the older-style Z-bend drag link between the steering bellcranks (which happen to be ball-bearing supported)—a new molded plastic piece sits in its place.

Another welcomed feature is the use of adjustable turnbuckles on each end. Quick and easy adjustments can be made to front and rear camber, as well as front toe.



PROCEED-STYLE FUEL TANK

A primerless racing-style fuel tank (no primer, with a top-mounted pressure fitting) is adapted from HPI's 1/8-scale Proceed on-road racer. This new tank replaces the conventional design found on most nitro-powered cars in this class. To prime the carb, you must hold your finger over the exhaust pipe when starting the engine to get fuel to the carb. This design does away with air bubbles and fuel foaming in the tank.

Running Gear

- Multiplex Royal mcV2 steering servo
- Multiplex Royal BB throttle/brake servo
- JR-R1
- Team Orion 5-cell 1000mAh NiMh receiver pack
- HPI Nitro Star Pro 12 RSC



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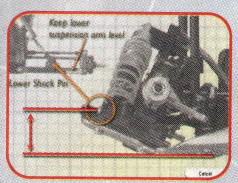
"What RealRace will do is teach you just about everything you need to know about how and why a car handles badly or well."

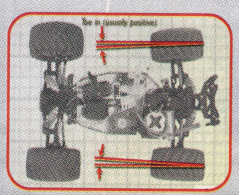
— Peter Vieira, R/C Car Action



REALRACE™

PROFESSIONAL R/C CAR SIMULATOR





"RealRace is most effective as a setup and tuning simulator. It serves as an excellent lab before doing the wrenchwork."

— Lito Reyes, R/C Car Magazine June 2000

Over 120 parameters are available, so you can try almost every tweak imaginable. See how different engine displacements affect fuel consumption, or how changes in motor winds affect amp draw. Adjust clutch slippage and engagement, and set 2-speed shift points. Compare ball diffs to gear diffs, and 2WD to 4WD. Alter the suspension travel, camber, caster, toe-in — even shock oil weight. Swap tires. Re-arrange battery configurations. Vary the body's aerodynamics, and so much more...all with just a simple 'point and click'.



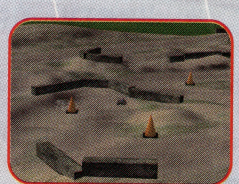


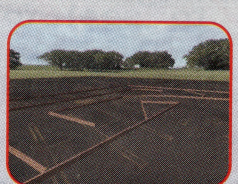
"The best benefit of RealRace is the education and understanding of R/C car technology it promises, and the improved performance you'll see at the track when you apply what you've learned."

— Peter Vieira, R/C Car Action

Thanks to RealPhysics™ technology, every change, no matter how small, will be accurately reflected on-screen, just as it would in real life. So you'll be able to see just what works best for your model and your driving style — and that could be the advantage that puts you in the winner's circle more often.







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Visit the RealRace web site for more information, system requirements, 3D graphic samples, and more!

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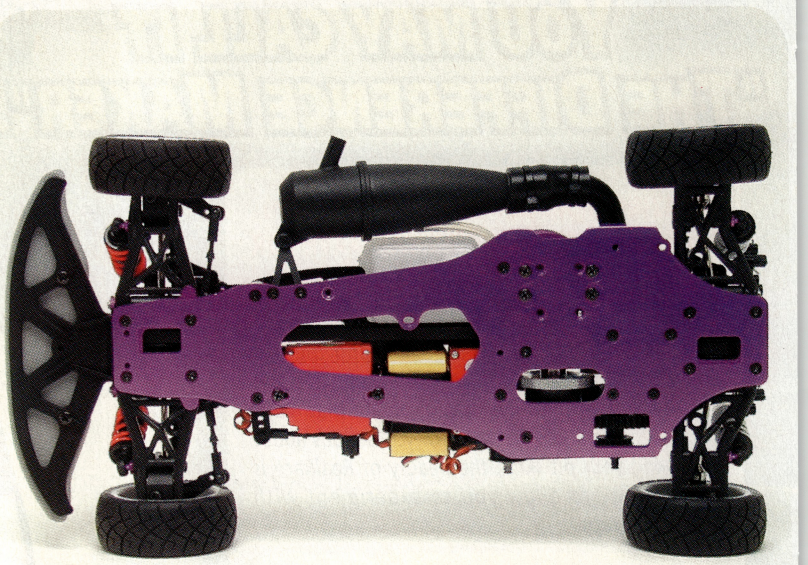
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COUNTLESS MODS

The list of upgrades this car comes with as standard equipment will blow you away—let's start from the front and work our way back!

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- Adjustable body posts.
- White mesh 26mm wheels.
- A new thicker front shock tower.
- Tuned racing springs front and rear (red fronts/white rears).
- Maintenance-free gear diffs (front and rear) can be tuned with heavy grease for serious racing.
- MIP Shiny CVDs (front and rear).
- A new ball-bearing equipped front belt tensioner.
- A complete set of ball bearings.
- Oil-filled composite shock absorbers with stainless steel shafts (HPI has found that there is no difference in performance or durability when compared to their alloy Super Shocks and that the nylon ones are actually lighter and smoother).
- New, heavy-duty Urethane side and rear belts.
- Engine mounts are included
- An adjustable Nitro Racing Clutch.
- A 15-tooth clutchbell. HPI included this instead of a two-speed because they found that most racers are more consistent and faster around the racetrack with a single speed transmission.
- Fade-resistant Fiber Brake Disk.



PARTS COMPATABILITY

Another great feature of the Nitro RS4 Racer 2 is the whole parts compatibility issue. Existing aftermarket items will work with the Racer 2, as will many of HPI's original Racer upgrades. And vice-versa—a great many of the Racer 2 parts fit as direct replacement parts for the original Racer as well!

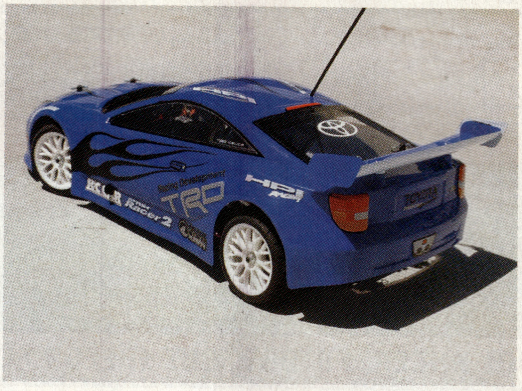
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DRIVING THE RACER 2



Our test of the Racer 2 began with the tedious but necessary break-in process. The HPI Nitro Star Pro 12RSC was very easy to start (although a separate starter box is required for this non pull-start racing engine) and idled through the first tank of fuel without needing any carb adjustments. After driving the car slowly through four tankfuls of fuel at a rich carb setting, we leaned the engine to race-tune and headed for a wide-open parking lot to set the chassis.

Out of the box and built per the instructions, the Racer 2 has plenty of turn-in steering and moderate mid-turn and exit steering. On bumpy or slippery tracks, the car has a tendency to over-steering when entering fast, tight corners. This isn't much of a problem if you feed-in the throttle as soon as the rear wheels begin to slide; grabbing the gas immediately straightens the car out. But if you're not ready, you'll find the Racer 2 facing oncoming traffic! To smooth out the car's overall cornering, we added two-degrees of toe-in to the front wheels. This reduced steering a bit during initial turn-in, and helped the car feel more stable when exiting turns and on the straights. To further improve steering feel, we also reduced the front wheels' camber angle from 2 degrees to 1 degree, while leaving the rear wheels at 1.5 degrees.

Among the Racer 2's best traits are its ability to stay on course—thanks to its slop-free steering and excellent suspension geometry—and its phenomenal balance through the turns. The ratio of front/rear traction is vastly superior to that of the original Nitro RS4. The Racer 2, as well as the Nitro RS4 2 which spawned it, has near-equal front and rear roll-centers, so the car always feels consistent even if the tires aren't getting great traction. This, combined with the abovementioned characteristics, makes the Racer 2 a very easy car to drive—quickly.

THE GOOD

- The car is packed with tons of upgrades usually set aside as "strictly hop-up options."
- Handling is spot-on. We found the spring rate/piston/50wt silicone oil combo to be a great starting point.

THE BAD

- The kit should come with a set of tires, even if this is more of a race-oriented kit. Hardcore racers would probably toss them aside, but most "enthusiast racers" would more than likely appreciate them.

THE VERDICT

This "second generation racer" is HPI's best effort in this class yet! If HPI's proven track record with their Nitro RS4 lineup is any indication of how well the Nitro Racer 2 will do, we don't have any doubt that this car will clearly be leading the way. ◆

SOURCES

HPI Racing, 15321 Barranca Parkway, Irvine, CA 92618; (949) 753-1099 • (949) 753-1098 (fax)

Team Orion, 22601 La Palma, Suite 103, Yorba Linda, CA 92877 • (714) 694-2812; (714) 694-2815 (fax)

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Race Secrets

COOL RACER, FRIDAY, GOT SPEED?

GOT SPEED?

From: COOL RACER (fastguy@gotspeed.com)
To: JOE RACER (joeyr@racenut.com)

YO JOEY,

Bro, at the next club race, get ready to see how it's done. I got the new "SPEED SERIES" body from DEANS. That's right they're finally here!!!

Here's the view I'll be seeing during the race. You'll see it in the pits. Sorry dude, I didn't get a shot of your view, you know THE BACK OF MY TRUCK!

Gotta charge bro – Gotta make room on the shelf for this weekend's trophy.

Later,
Cool Racer



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Trash

racers write

by Richard Saxton

Well, Regan and I took off for Bakersfield Thursday afternoon after work. Regan had been feeling sick, but I called him a wimp and started driving. Well, before we even get to state line, I have to pull over and he is chucking. So the trip began eventfully.

We stopped about every forty five minutes so he could chuck. We showed up at the track, took a look and then went to check into our hotel. Regan charged my gas truck and we were off to the track for some late afternoon practice; the track was cool with a lot of jumps and fast lap times, kind of like an arenacross track. My truck felt good, and we just stayed for about 45 minutes. Friday came around and Steve O'donnell met us to do some motor testing for the 1/8-scale class. I think he showed up around nine and we didn't finish until five. My .12 and .21 were screaming.

Saturday was three rounds of qualifing; in gas truck I felt I was fast but just couldn't put it together for seven minutes—maybe just trying to hard—so I ended up sixth for the day. In 1/8-scale I had a bad run in the round that counted, so I was fourth qualifier. After the race I hooked up with the latest Thunder Tiger driver Jared Tebo and his dad to go over the car and setup. I can't wait to see him drive 1/8-scale; it should be awesome. After they left a bunch of the guys came over, so we walked over to the Chinese resturant for dinner, which always turns into a mess when you have Chad Bradley and Steve Dunn sitting close to each other. Chad gets off on pouring salt into Steve's drink. Then it was off to bed.

Sunday was one round of qualifing and the mains. My first run in gas truck was good until I hit Ron Rosseti at the end of the straightaway. So I ended up sixth qualifier in that class. In 1/8-scale I put in a good seven minutes but was off the pace, so I was fourth qualifier.

When the 1/10 gas main goes off, I go into the second turn and get into a pileup. I can't see my truck so I wood it, but I am looking at the wrong truck—mine is going down the side of the track wide open, oops. So I reenter the track and start going. By this time I notice I am about three quarters of a lap down. I get going and start passing a lot of people. By the twenty-minute mark, I catch up to Brian and pass him for the lead, so that was great. I felt like we were going to have a good race. I come down the straightaway and my truck sounds a little loud. Next lap even louder. So the silicone piece between the header and pipe has a crack in it. I go in for the fuel and they have to richen the truck up because there is no pressure to the tank, and this long pit stop costs me—and my truck doesn't feel the same. It doesn't have the punch like it did.

So I start to drive like a baby, crashing, holding the thing wide open while it is upside down—I have given up. So with about 15 minutes to go, I miss my pit stop, go two turns and run out of gas. This was what really killed me. Before I ran out off gas, I think I was second a few laps down to Dirt. Well, with three minutes to go, Brian broke the front arm on his truck but was still able to get around on three wheels. I was in fourth with three turns to go, and I passed the Woodsrew. So Dirt was first with Kortz second and me third. Congrats to Brian; he drove awesome. I wish I would have kept my cool.

In 1/8-scale I had about the same start and had to make up a lot of ground; I had to run down all the Kyosho guys. I finally got into the lead and was about to put Matt Francis a lap down, and I had to come into the pits. I crashed a couple of times and Matt was on me. He was driving really well. With about three minutes to go, Matt had electrical problems and he was out. Matt was on the gas. I ended up winning by three laps, but it was a tough race with Matt.

Thanks to Racers Haven for putting on the race. It was fun and we had a good time. Then it was time for the drive home and back to work on Monday. ◆



racers write

by Jimmy Babcock

Remember the time I was talking to you about being real busy? Well, nothing has changed! Actually I'm in the middle of a three-week break from racing. I just got done racing eight straight weekends in a row and now have three weeks off before my next race, which will be the Rocket City Challenge in Alabama which Matt Francis, Brian "Club" Dunbar and I will be attending on May 6-7.

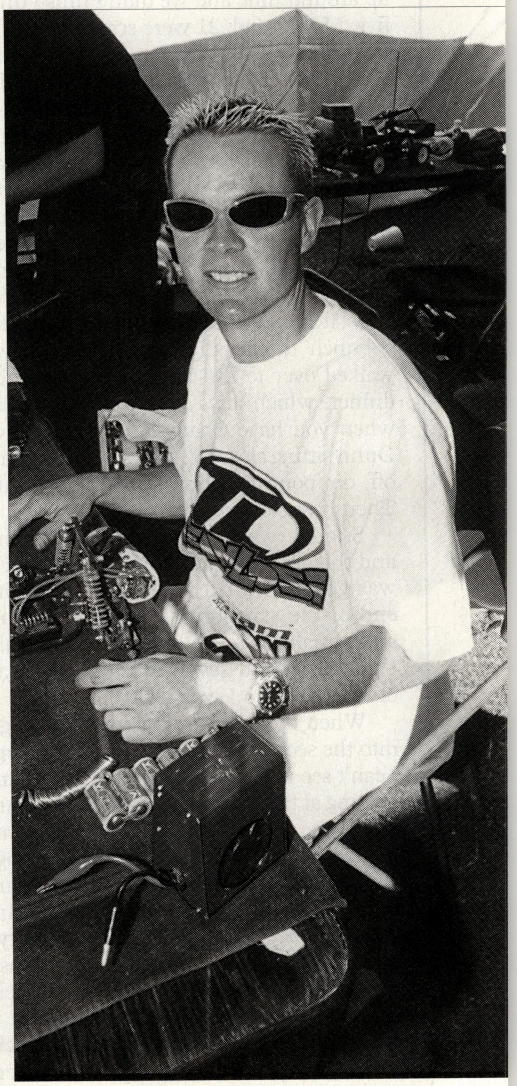
After that race I have one weekend off then it's off to Houston, Texas, for the rapidly growing Houston Invitational on May 20-21. I'm really looking forward to going back to Texas again for the Invitational for several reasons, the first being that it will mark the return of one of my best friends, Scott Renolds, to R/C racing. Scott put racing on hold at the end of last year and has not touched a radio in the past four months. Scott went with me last year and had a great time, so when I told him that I was going back again this year and wanted him to go, he gave me the thumbs up to get his plane ticket. We all missed him, and it will be awesome to have him back racing with us after so long. Also I am looking forward to seeing all my old friends in Texas and just having a great time with great people!

With all that said, let's move on to some race recaps. Since we last talked I have only been to one "big" race, but a lot of club races at the paved oval track. I recently raced the NORRCA Gas Off Road Nationals at Racer's Haven in Bakersfield, California. As you may or may not know, gas racing and I don't agree with one another all the time—to say the least. I always seem to have a problem finishing gas races, and it becomes annoying to me after a while, but I wanted to give it another try, since the race was so close to home and at a great facility.

I asked my mechanic Rich Johnson to prepare my Team Losi NXT for me in preparation for the Nats. Rich has been helping me with gas for a while now and always does a great job getting the equipment ready and in perfect running order for me. Unfortunately, he had to work on Friday and Saturday of the race, and I was forced to handle the track operations alone with some help from the team. Thankfully, my good buddies Matt Francis and Brian Kinwald were there to help out with setup and tuning advice. I arrived in Bakersfield on Thursday night and met up with the team, who were busy in their rooms wrenching for Friday's practice. I made it to the track on Friday morning to find a great track layout with plenty of jumps and obstacles. After mounting some tires I was ready to hit the track for some practice. I had the basic box-stock setup and it worked great, but after talking with Matt I decided to try his NXT setup...well, actually his whole truck, basically. I tore apart his truck and took practically his whole rear end assembly and put it on my truck. You see, Matt and the rest of the team were testing the new Team Losi gas truck and he wasn't using his old truck, so I helped myself to some pieces off of it. After making some changes I hit the track again—and *wow*!—what a difference! After getting my truck as good as I could, I started getting things ready for qualifying on Saturday when I was approached by Racer's Haven owner Greg Cooper and asked to participate in an exhibition race including all the factory drivers in attendance.

This was going to be fun! So all of us gassed up our trucks and hit the track for some door-to-door practice race action. I got the holeshot but things soon went bad, and we all started goofing around and waiting for each other. The crowd was loving it, and it turned out to be a fun idea. Saturday finally came around and I was ready. After the first day of qualifying, I think I was around 12th or 13th and needed to put in a good run on Sunday morning to make the show. I had a pretty decent run and moved to the tenth spot with one heat of gas still remaining. I watched the final heat run and saw Jeremy Kortz put in a run that was a little quicker than mine which bumped me down to 11th. I TQ'ed the B-main, but that in itself was a big accomplishment for me, since it had been about eight months since I had run gas last. Brian Kinwald TQed the A-main and basically checked out during the 45 minute main. With about five minutes remaining, Brian broke the front of his truck, and we all thought it was over with. Fortunately, during the previous 40 minutes he had built up a five-lap lead on second place and was able to limp around and take the win with a broken truck. It was a great display of driving on his part and congrats to him and Team Losi on the national title. It was a great weekend, and I think I actually learned a thing or two about gas trucks and keeping them running. Special thanks to Greg, Kent, Alisa and the rest of the Racer's Haven staff for putting together a great race. Also congratulations to Richard Saxton, who dominated the 1/8-scale class and took the win.

Take care, everyone, and see ya soon. Bring it! ◆



racers write

by Billy Easton

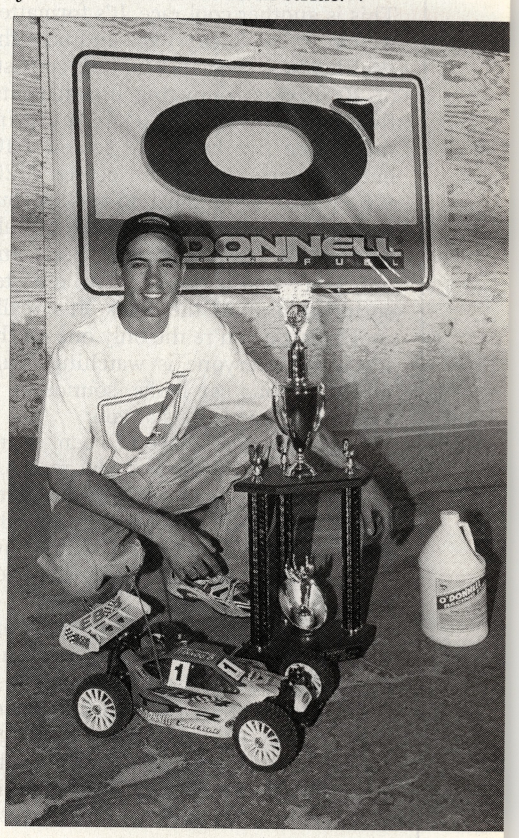
First thing, let me bring you all up to date on some personal information. I'm 22 years of age, I live in Huntington Beach, California, and I have been racing for about nine years. My first car was a Kyosho Ultima Rampage; my second car was an RC10—the best car on the planet!

That's just my opinion, just like everyone has one. I have raced the same brand since I hit the racing scene. I guess you could say that I have been as faithful as any racer could be. I also can't leave out Reedy Modifieds—I consider them the best modified motor company since sliced bread! I better shout out to all my sponsors and say a great deal of thanks, and show some gratitude to all who have helped me to get to where I am today. So a special thanks to Team Associated, Reedy Modifieds, Pro-Line, Airtronics, Thunder Tiger, MIP, O'Donnell, So Cal Raceway (which has weekly racing), LRP, Jaco, Protoform, and that's about it. Sorry if I left you out by accident and you helped me in the last year—my deepest apologies. Well, let's fire up some conversation!

The year 2000 is action-packed with many races. Just about every model of car you can buy or any class of racing you do, there is a race in just about every state. So this year if you are thinking about getting into racing, I would have to say it's a better time than ever. I would say that I have already traveled to and competed at more races than I have last year. So, as far as racing goes, this year has been pretty good for me. I'm sure if you are buying this magazine or are reading this, you can see the results of all the races. I'll see how things go with this chat session and I'll base what I talk about in these columns on what the readers' opinions are. So if you want me to talk about my personal racing and experiences, you must let *R/C Car* magazine know. Otherwise I will hit and miss on all the action that includes myself and everyone else. I guess I could be considered the information superhighway. It's really interesting to talk about R/C car racing; what do you the readers really want to know? That's my job, I guess, to let everyone who purchases this magazine in on the "who's who" and "who did what" information. I'll try and talk about myself as little as possible and keep you posted on the ins and outs of the racing and the month-to-month activity. This is my first run at a page, so I'm not sure what everyone has already talked about. This time I'll keep it simple and bring some information that you might not know to your doorstep.

Lately, I haven't been doing much racing. It would seem that I'm traveling more than I'm at home. I have actually gone to a couple of races that are more promotional than important to win. I had traveled to Hong Kong, China and to Vancouver, Canada. Man, do the people in those places rock! I would have to say that my trip to Hong Kong was awesome—it couldn't have had a better time. I met a lot of Chinese racers—wow, they impress you. They are not only good but better than you would have ever expected. They gave me a run for my money. I somehow managed to squeeze off a victory, but not by much. I guess it shows that you don't have to live in the States or even be a factory racer to be good at this hobby. It really comes down to the competitive spirit. My trip to Canada—wow! What another exciting turn of events. I would have to say, what another great group of people. The hospitality was an A-plus on the scale. The race was held in a gymnasium with carpet rolled out over the wood floor. Boards separated the lanes and the racing once again was tight. Where do all these people get such skills? I was impressed again—the difficulty of trying to beat these guys took all the concentration I had to pull a victory out of the hat. For the most part those two weekend races I attended back to back were probably some of the best racing I have done. So I'd like to give a shout to all the racers that I competed against. You guys did great!

Another race that I attended, not long after those, was the Indoor Carpet Nationals—a race I remember all too well. I had some bad qualifying the first day, only to find out that the heats would be reshuffled to put me in the second-to-last race. For those of you who don't know, this means that you are in with the drivers who are having really bad weekends. Well, for the most part, the third round of qualifying for me was awesome! I put in a run that put me third on the grid in the A-main. Only problem is that it takes more than one good one, it takes two. So I gave it my all in the second one, but I had absolutely no luck. I was on a pace to easily put me in the top three when I came up on a back marker and he decided to hit my car, causing me to flip. Then the car behind hit me hard (just like the A-team van would go through buildings) and it completely smashed in the roof of my body. I don't know how to describe this other than it looked now like a dirt oval body. It had no roof and the sides were now wings. It was unbelievable—my A-main run was shattered. I ran the rest of the race with a busted body still ripping off some good lap times (occasionally!), but for the most part the run was a bust. It shows you even when you are fast on the track, it takes a little bit of luck, no matter how good you are. So I'm going to wrap this up with my last statement. If and when you start racing R/C or anything that's competitive, you will always have good days and bad. But remember you must take them all in stride. ◆



racers write

by Matt Francis

The next few months are going to be very busy. It seems like I rarely get a break from traveling and racing. Well, I'm sitting on one right now (break, that is). It's late April and I have had the last two weeks off and will have the next two off also.

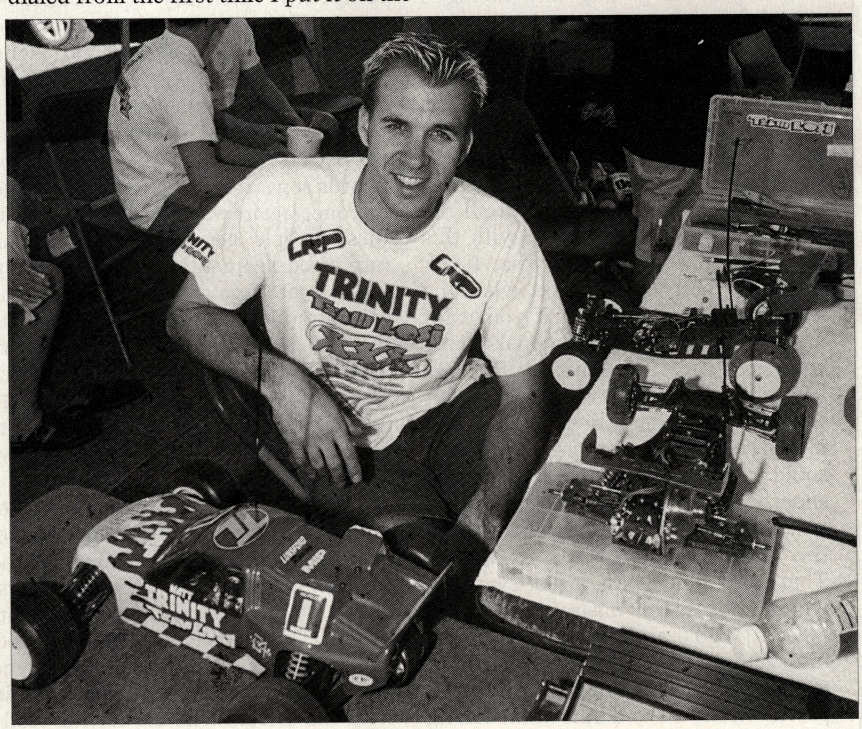
In a couple weeks I go to the Rocket City Challenge in Huntsville, Alabama. This is a race that Jimmy Babcock, Brian Dunbar and myself are all headed down to. The race is being put on by the A-Train fellas down in Alabama. If you're a racer in the South, I am sure you know whom I'm talking about. If not, does the sound *wooooooooo-wooooooooo!* sound familiar? The team consists of, I believe, quite a few guys, but two I mainly know, Lucky and Willie. These guys are great. They invited us to come down to their race, hang out all weekend, and to cut our expenses they even offered to let us stay at their house and drive their car! It's true about Southern hospitality. Of course, I already knew that; my girlfriend Kelli is from Kentucky!

Also coming up is the Houston Invitational at Performance Raceway in—you guessed it—Houston, Texas. This is another cool race. It's formatted similar to the Reedy Race and uses the shuffled heat format. The race consists of 20 drivers competing in ten heats, five each day and two single sprint races. The five heats are scored 1-10, but the sprint races are scored 1-20. Which means you must do well in your sprint races in order to win the overall. The sprint races consist of you—and only you—on the track for two minutes sprinting around the track. It's really cool because you're the only one on the track and everyone is watching. That means if your car looks, sounds or is buck, everyone laughs at you.

Even though I haven't been racing away from home the last few weeks, I have been very busy testing and racing locally or just getting ready for the upcoming races. A project that I have been working on a lot lately has been my workroom. Between all the types of racing, I have accumulated a lot of stuff. Organizing all this becomes difficult, especially because I must contain it in one bedroom of my two-bedroom apartment. I keep changing the way I organize everything, but I think I finally have the solution. I went to an organizing store and bought some plastic stackable drawers. They're great; I can put tires, foam, parts, and everything else in them and keep it all separated. Also, I bought a filing cabinet to keep all my assembled cars stored away. It seems that every time I get home from a race I disassemble all my cars, and then I can't figure out where everything went when it comes time to build stuff for the next race. It's just too much stuff in a too-small area. At my old house I had a much bigger room, plus the use of a garage. I could spread everything out and keep it all organized. I am hoping my new system works.

There has been one race I went to that I haven't told you about, the NORRCA Gas Nationals at Racers Haven Raceway in Bakersfield, California. It was my racing "debut," so to speak, in 1/8-scale. Actually, I tried to race it before at the Silver State in March, but with no success. I drove the "Suby" down Thursday morning to get a couple of days of practice on the track. First up was Gas Truck. It was pretty dialed from the first time I put it on the track. A few tire and minor setup changes and it was ready. So then it was time for 1/8-scale. With all the stuff I learned from my Vegas nightmare, I thought for sure it would be good, and luckily it was! I changed a few minor things but ended up going back to what I showed up with. The car was dialed.

Qualifying went well with both cars. I qualified third in both classes. The mains were a little different, though. In Gas Truck, BK smoked us all; I think he won by four laps over the field! I broke at the 20-minute mark, but couldn't keep up anyway. In buggy I got a bad start and ended up getting lapped early in the race. I got my lap back and started my charge back up through the field. There were five of us battling for the lead, Jeremy Kortz, Chad Bradley, Greg Degani, Richard Saxton and myself. We had a mean battle going on for the major part of the race. Towards the end, I put on a charge to catch Saxton, and with two minutes to go we were nose to tail. We had to get around a few cars, and unfortunately I tangled with one of them, which gave Richard the win. It also loosened a wire on my receiver, and I didn't run the last minute. This allowed Jeremy and Greg to go by for position, and I finished fourth. Congrats to Richard for a deserving win and to BK in Gas Truck for total domination! Till next time...MF ◆



THUNDER DESIGNS

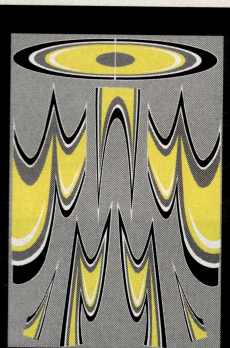
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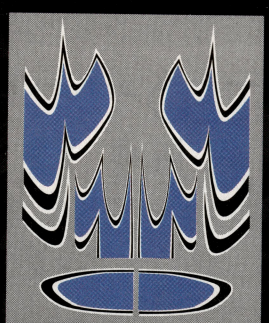
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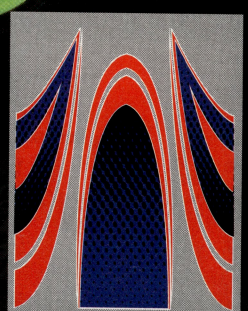
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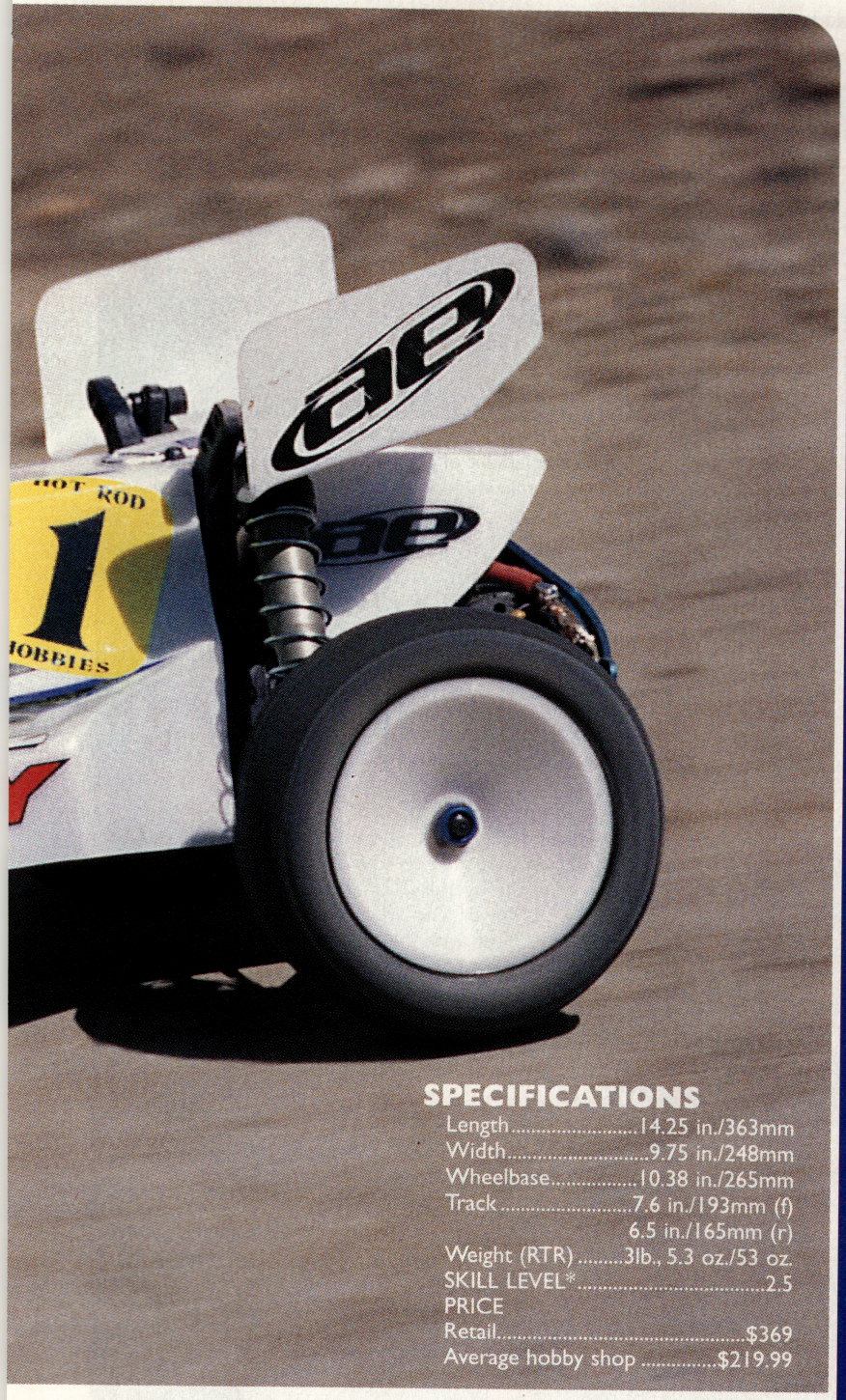
What makes a world champion?



TEAM ASSOCIATED FACTORY TEAM B3

By Frank Masi

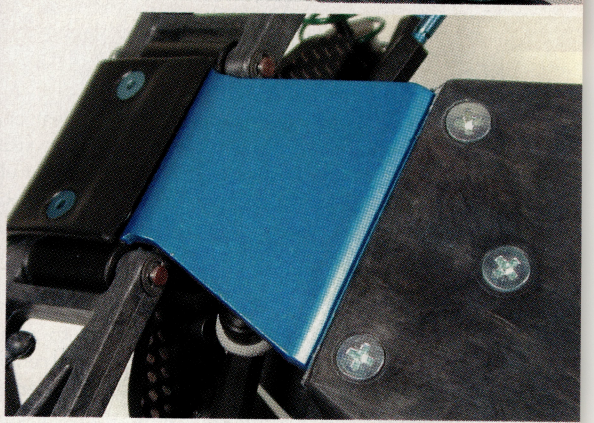
Team Associated isn't well known for flooding the hobby shop shelves each year with new kits. In most cases, Associated kits have some of the longest life-cycles in the industry. For example, the current B3 off-road buggy is actually five years old. Sure, it began life as the B2 in '95, but the transition to B3 was made of small changes and updates, which makes it essentially the same platform as the original B2. That's Associated's style; to spend a lot of time developing its kits up front rather than scrapping them in favor of new designs after just a few years. Each Associated kit receives numerous upgrades, or "running changes," during its life span, and the B3 is no exception. The latest incarnation of Associated's top-of-the-line racing buggy is the Factory Team B3, which contains not only a shopping cart-load of Factory Team aftermarket goodies, but a revised suspension geometry that was used by Masami Hirosaka to win the '99 IFMAR world championship. We got our hands on an early production kit, and here's how it fared under racing conditions.

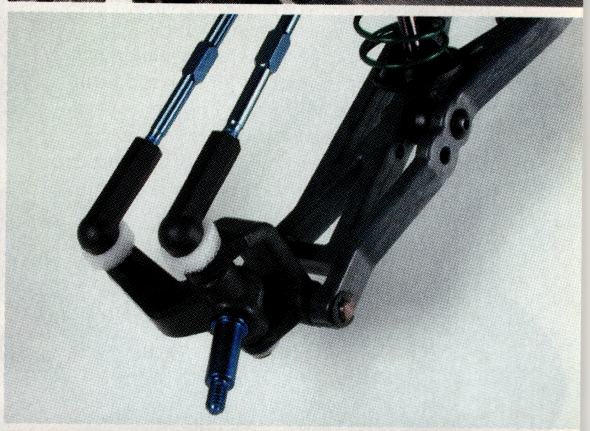


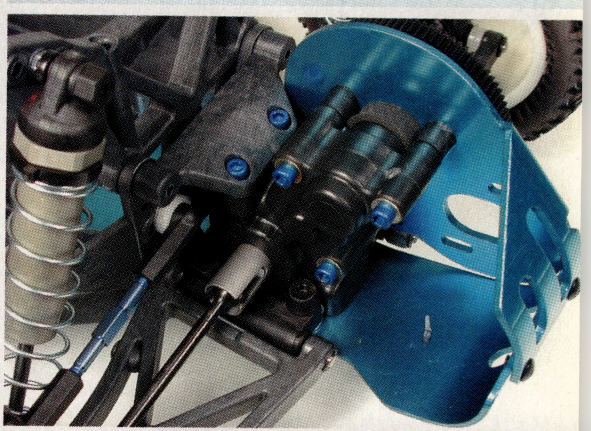
SPECIFICATIONS

Length	14.25 in./363mm
Width	9.75 in./248mm
Wheelbase	10.38 in./265mm
Track	7.6 in./193mm (f) 6.5 in./165mm (r)
Weight (RTR)	3lb., 5.3 oz./53 oz.
SKILL LEVEL*	2.5
PRICE	
Retail	$369
Average hobby shop	$219.99



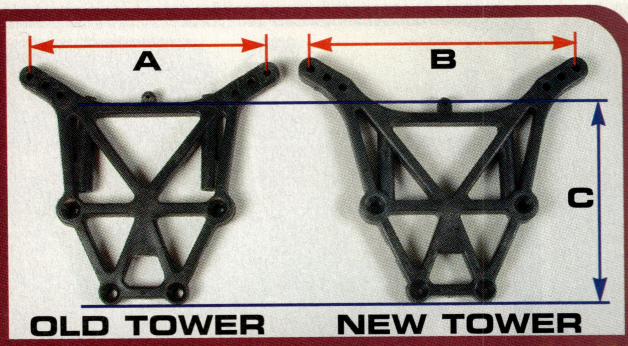




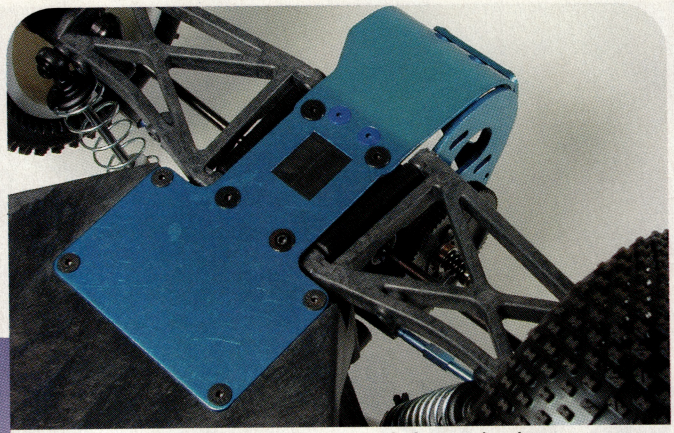


Right (from top to bottom): The Factory Team B3 comes with a ton of option parts. A laminated graphite shock tower; blue aluminum front and rear chassis plates; titanium turnbuckles and blue aluminum axles; a blue motor plate and lightweight, blue aluminum screws.

TEAM ASSOCIATED **FACTORY TEAM B3**



The single most important change made to the Factory Team B3 is its rear shock tower. Comparing dimension A with B shows a wider spacing between the tops of the shocks, while dimension C demonstrates how much lower the new tower is compared with the old one. These changes improve the B3's mid-turn and exit steering and increase suspension down-travel.



The Factory Team B3 includes a ton of aftermarket hop-up parts, including a full complement of graphite-composite parts and a bevy of blue-anodized aluminum goodies such as this rear chassis plate.

FACTORY FEATURES

■ Factory Blue aluminum kickup plate, rear chassis plate and motor-mount plate. These parts replace the stock B3's black-anodized parts to give the Factory Team kit that ultra-trick look.

■ Factory Blue titanium turnbuckles. Not only are these high-tech turnbuckles stronger than the stock steel pieces they replace, they are also lighter and have been anodized in blue to match the rest of the Factory Team pieces.

■ Unobtainium shock shafts. Associated's specially coated shock shafts have been precisely ground to a mirror finish to provide the smoothest shocks possible with reductions in friction and stiction. The result? Better damping and fewer rebuilds.

■ Factory Blue aluminum axles.

■ Ball-bearings for steering idler-arm. These replace the stock kit's plastic bushings to provide smoother, slop-free operation of the steering bellcranks.

■ Graphite-composite chassis and suspension. Every single molded-composite chassis and suspension piece has been replaced with Factory Team's lighter and stiffer graphite composite. This makes the entire B3 platform more rigid, and saves quite a bit of weight over stock—this is especially important for stock-class racing. If your Factory Team B3 is too light for sanctioned racing, you now have the luxury of adding weight where it can be used, such as in the front bulkhead to increase on-power steering. And because the suspension pieces also benefit from the graphite treatment, the Factory Team B3's handling is more consistent on bumpy tracks.

■ Pro-Line Deja Vu Tu body and wing. Cliff Lett, Associated's chief designer, tells us that the B3's new rear shock tower was designed with this new low-profile body in mind. The Deja Vu Tu sits nearly a quarter of an inch lower than the old body, and when combined with the new tower and low-profile molded wing, the overall CG (center of gravity) of the B3 is lower. The wing itself is designed to rest flush with the roof of the body, and the rear body-mount post actually passes up through a hole in the wing, where it is topped-off with a body-clip that prevents the wing from shifting positions during a crash.

■ Factory Blue aluminum screw kit. Replaces many of the B3's steel 4-40 hardware with lightweight blue aluminum.

■ Revised rear suspension geometry. This is the Factory Team B3's biggest change. According to Cliff Lett of Team Associated, there





The new Deja Vu Tu body features this ultra-low profile wing that sits flush with the roof and is secured by the rear body-clip. Molded channels add strength to the wing.

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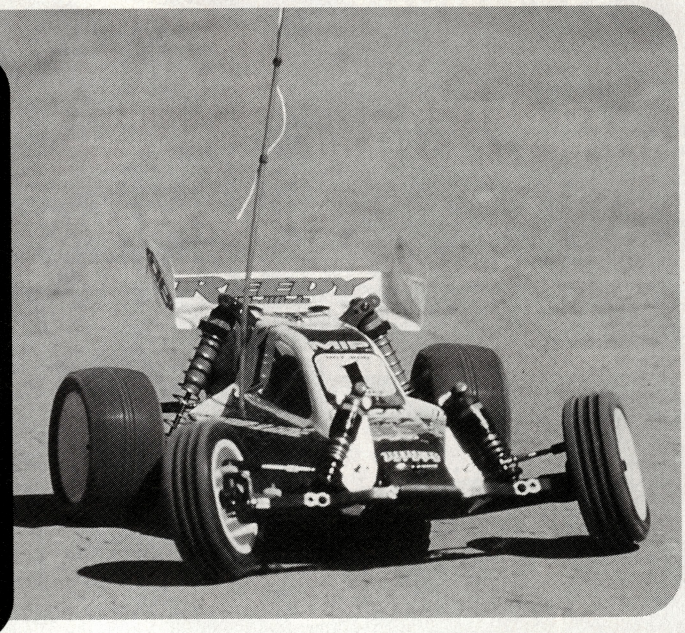
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TEAM ASSOCIATED **FACTORY TEAM B3**



FACTORY FEATURES (cont.)
are several reasons for the new shock tower. When the original B2 buggy had been revised to the B3, one of the changes made was the addition of new, longer rear suspension arms. Under most circumstances, a revised rear shock tower would also have been part of the package, but since time was short with the approach of the '97 IFMAR Worlds, and the existing B2 shock tower seemed to work fine, no new tower was produced. According to Cliff, the old B2 tower didn't provide enough suspension down-travel for really rough conditions. The new tower, which will come standard on the Team and Factory Team kits (and will fit the B3 Sport kit as well), adds down-travel while still retaining the proper amount of up-travel. The new tower also moves the top shock-mounting positions out a bit further to provide what Cliff refers to as "the 'right' geometry for this car." The result of this "correct" geometry is more steering during the middle and exit of the turns, and with more down-travel, the rear of the car doesn't compress as much on jump faces, which lets the car jump higher and farther at any given speed. The extra travel also helps the car soak up harsh bumps and rough landings with greater composure. ◆

RACE JOURNAL

Race 1: Saturday, April 30, 2:00 p.m.

First round: Totally dry blue-groove track. Arrived at 2 pm on the dot, so I had no time to practice! While still getting used to the track and the car, I turned a 20.8 second lap time. The fastest guy is turning consistent 20-second laps. The car feels very balanced with the the regular Pro-Line M3 ribs up front mounted on standard-width wheels. I used LP Holeshots in the rear mounted on standard-width wheels. I haven't yet broken out the kit's wide wheels, partly because I haven't glued 'em up yet!

Second round: I mounted the B3 kit's wide front wheels with M3 ribs up front and kept the same rear tires. It took a few laps to get used to the front tires, as the car kept wanting to turn around the front end. Once I became used to the feel, it was okay. You just steered as much as you needed—as with a 1/12-scale car—and no more. Turned a 20.4 second lap time and qualified in third position behind local fast guys Robert Drew and Doug "E. Fresh" Scripture.

Main event: Got a really good start. Just drove right inside of the first two cars on the sweeper. The B3 feels so good there. Tons of traction and steering. The car holds the tightest lines and doesn't push at all when you feed in power. I got passed on the jump section and fell back a bit after a few bobbles. Finished third overall and turned consistent laps in the 20 and 21-second range. The leaders were turning 20s and a few slow 19s. I'm happy with my performance; having not raced in a month and driving a new car doesn't make for a winning combination, but the B3 felt like an old friend after a few laps. I'll be back.

Race 2: Tuesday, May 2, 7:00p.m.

First round: Full eight-car heat in Expert Stock buggy class. Hot Rod Hobbies is now watering the track, so lap times are a little slower. I ran an old set of Pro-Line M3 Holeshots and ribs mounted on standard-width wheels. Bad start (crashed a couple of times), but briefly made it to the lead in the IFMAR-style qualifying that we use. Another crash in a bad spot kept me in fourth. The car felt really good and neutral, with a hint of understeer on faster turns. Very easy to drive. My driving was much more consistent this day, but as the track was a bit slower, my best lap times were in the low 21-second range. The TQ driver, although failing to register any 19-second laps, turned consistent high 20s and low 21s. I wasn't far off the pace, I just needed to make fewer mistakes.

Second round: Going from daylight (first round) to nighttime (second) is a difficult transition. The car felt good as before, but the cooler, damper track was a bit more slippery. Still, the B3 found enough grip out of the turns, which makes it easier to drive aggressively. Left the tires from round one, which still felt solid. The jump faces are getting torn-up, so they aren't as predictable and more technique is needed. The attitude of the B3 is easy to control during flight, however it does tend to get kicked sideways on a few of the rougher jumps. Despite this, the car soaks up the landings and keeps going. Again, landing on the gas helps the car settle in and remain stable. Just squeezed into third place behind NORRCA national champ Scott Renolds.

Main event: Another excellent start from the fourth spot on the grid. The B3 has lightning-quick acceleration and excellent forward bite. You can almost lock-up the slipper and still not get much wheelspin. Changed tires before the main—big mistake! I mounted a set of Pro-Line M3 ribs on wide wheels up front, and Pro-Line M3 Holeshots on wide wheels in back. The car had too much steering and was less stable coming out of the turns.

RACE SETTINGS

FRONT SUSPENSION

Shocks: No. 2 pistons, 30wt oil, green springs, 1/2-inch pre-load spacers. Middle hole in tower, inner hole in arm

Camber-rod position: outside hole in tower, one spacer under ball-stud

Front wheels: 1 degree of toe-in, 2 degrees of negative camber

REAR SUSPENSION

Shocks: No. 1 pistons, 25 wt. oil, silver springs, 1/4-inch pre-load spacers. Middle hole in tower, outer hole in arm

Camber-rod position: Inner hole on tower, inner hole in hub

Rear wheels: 1.5 degrees of anti-squat (washer under rear of arm mount), 3 degrees of toe-in per wheel. 2 degrees of neg. camber

- **Battery:** middle position
- **Gearing:** 22/81 (24-degree stock motor)

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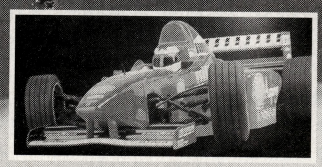
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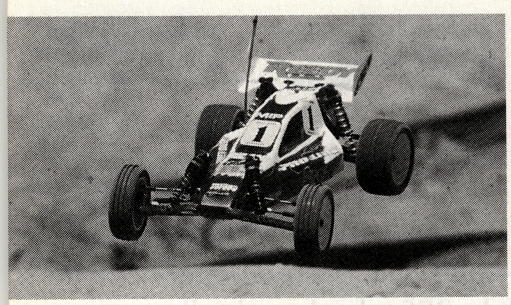


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TEAM ASSOCIATED **FACTORY TEAM B3**



I haven't yet driven the B3 on conditions where I favor the wider front wheels. I much prefer the standard-width wheels as they seem less sensitive and don't make the car feel twitchy. I almost always prefer a small amount of understeer. If I continue to run this tire setup, I will move the battery all the way to the back to place more weight over the rear wheels. The wide rear wheels provide good bite both in the corners and on the straights, but because they stretch the tire and make its sidewall more angular, the car doesn't go through the bumps and ruts as well as it had with a standard, more rounded tire. At one point, I was running a solid second place, but a couple of mistakes on a difficult rhythm section kept me out of contention. I finished fourth overall. Not too shabby, but I know that I can run up front with the Factory Team B3 if I can just settle down and develop better timing. ◆

REPORT CARD

Steering: Awesome. Feels fantastic for my driving style. Excellent turn-in with heaps of mid-turn and exit grip. A bit of oversteer when entering fast turns. Accelerates exceptionally hard out of the turns, even through bumps. Carries excellent speed through the turns without squaring them.

Jumping: My experiences with the Factory Team B3 tells me that it is a good jumper. Many of the jumps on our test track are large doubles, triples and quads, and the jump faces have kickers on them, so you have to hit them on the gas or you'll endo. The B3 leaves the jumps pretty straight, although it feels like it gets sideways a bit easier than does its arch-rival, the Losi Triple-X (bear in mind that this is also due to differences in setups and in driving technique). Landing is the B3's best trait on jumps, although it's always better, and safer, to land on the gas, as this locks up the rear suspension a bit and helps prevent the car from bottoming out. The B3's increased rear-suspension down-travel also helps. The front end of the B3 does tend to dig in more easily if you land a bit nose down (more than usual). Otherwise, it's pretty stable and plants itself well on landing.

Acceleration: Stellar, to say the least. The B3's Stealth diff and low 2.4:1 ratio deliver neck-snapping punch without excessive wheelspin or hooking when coming out of turns. For stock-class racing, the Factory Team's reduced weight (thanks to its graphite-composite parts) gives it an advantage. The gearbox is silky smooth and efficient, helping to keep the battery strong all way to the five-minute mark (in stock class) and more. The geometry of the B3's rear suspension provides excellent straight-line acceleration, even on bumpy tracks. This is a holeshot machine if you've got fast reflexes.

Durability: Excellent. Let me tell you, I crashed this thing hard the first few times out, and nothing broke. This is the same track that sidelined my Kyosho Ultima ST with broken rear-arm mounts and shock tower. I cased a set of twelve-foot quads several times, came up short on a large table-top, and drove straight into a track barrier at speed (glitch...), and not one broken part. Funny, the last B3 we tested (way back in April '98) suffered from numerous broken steering blocks. Cliff Lett of Associated tells me that the B3's steering blocks have been subtly refined to improve durability. Whatever they did, it worked! Cliff also told me that Associated has softened the servo-saver's spring-rate by nearly half (this change affects both the B3, T3 and GT) to reduce failure in the steering system and prevent broken servo gears. ●

BUILDING TIPS

• **Bag A: Step 1**—You'll find it extremely difficult to insert the kingpin ball-ends through the block carriers and steering blocks. You don't want to ream the parts to make this easier, as a tight fit is essential to minimize play. Gently tap the kingpins using a small hammer or a screwdriver handle (be careful not to mar the ball-end). If the steering blocks don't move freely, give them a couple of gentle taps from the bottom.

• **Bag A: Step 2**—Use blue Loctite on the 7260 4-40 nuts that secure the ball-ends to the front shock tower.

• **Bag B: Step 2**—Don't forget that your Factory Team B3 comes with ball-bearings to replace the 9155 plastic bushings that support the right steering bellcrank.

• **Bag B: Step 4**—Before you install the top plate, de-burr the portion that surrounds the servo-saver adjustment nut. Flashing on this part can bind the steering.

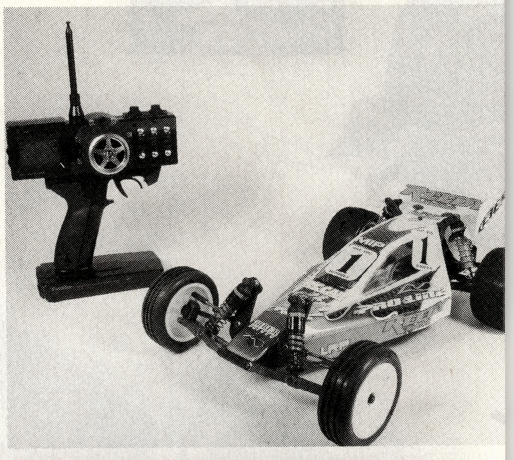
• **Bag D**—Before you build the differential, clean the diff outdrive hubs, the large drive rings, the thrust washers, the diff thrust balls and the carbide diff balls with solvent to remove any oils.

• **Bag D: Step 7**—Why is it so hard to install the 6572 roll-pin into the 6571 driveshaft/gear? Do your best to get it started, then muscle it in with a pair of pliers. It's never coming out again!

• **Bag D: Step 10**—Before you install the slipper-clutch spring, compress it all the way with a pair of pliers. This will "set" the spring and make it hold its tension better. Also, use a dab of blue Loctite on the two 4-40 x 3/16-inch button-head screws that secure the spur gear.

• **Bag F: Step 5**—The instructions tell you to use one 1/4-inch shock pre-load spacer for each front shock. To achieve proper ride height, use the 1/4, and two 1/8-inch spacers for a total of 1/2-inches.

• **Bag H: Step 5**—In order to properly install the new wing, you'll have to trim about a quarter of an inch from the ends of the wing wire to allow the wing to sit low enough so that the body-clip can be installed. Also, you'll need to ditch the 4-40 x5/16-inch setscrews for the wing mounts and use shorter setscrews (such as those used in pinon gears) to get the right amount of clearance. ●



SOURCES

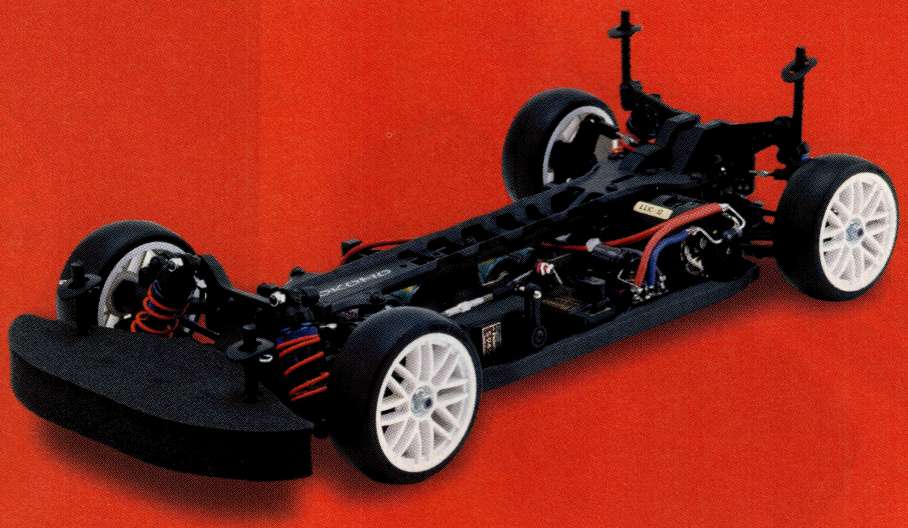
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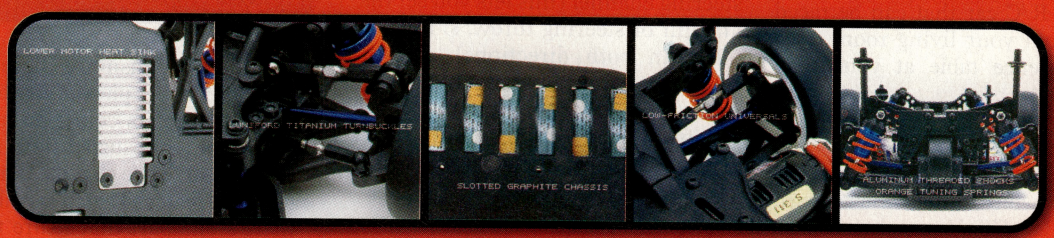
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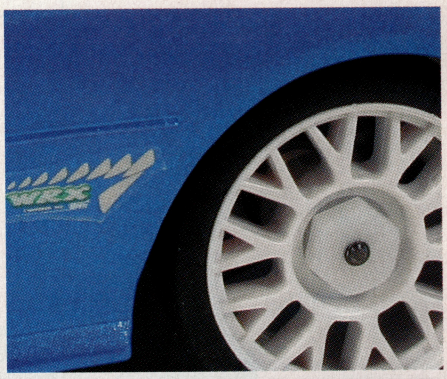
Congratulations to new Yokomo team driver Chris Tosolini for winning the PRO Modified Class at the 2000 Novak Midwest Touring Car Championship!

Also, congratulations to the 'Fabulous One' - Barry Baker for winning the 2000 Millenium RC Touring Car Race in Hong Kong.

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KYOSHO
MINI-Z RACER

Kyosho is a company filled with creative minds, and with management that gives its engineers the freedom to try new things. We hobbyists are the beneficiaries of this innovation. The latest development from our friends in Atsugi, Japan, is the Mini-Z Racer, a five-inch-long, fully proportional R/C car that can be raced anywhere from your living room floor to the conference table at your next board meeting!

All in one box

There are actually six Mini-Zs available; you can buy either the Subaru Impreza WRX STi-V or the Nissan Skyline GT-R R34 V-Spec, and each is available in a choice of three colors. The Mini-Z comes very well packaged in a cardboard "briefcase," and everything you need to run the car (minus batteries) is supplied. The Mini-Z chassis comes fully assembled with Kyosho's Perfex radio system installed. The core of the system is Kyosho's RA-1 micro receiver with high-frequency FET speed control. This tiny unit serves as both the receiver and ESC all in one package. Kyosho's clever Perfex MS-1 micro steering unit is also provided. This device is like a tiny rack-and-pinion steering system and connects right to the car's steering spindles.

Also in the box is Kyosho's brand-new Perfex 27mHz two-channel pistol-grip transmitter, which has trim knobs and reversing switches for both the steering and throttle channels, a dual-rate dial for the steering channel (this lets you set the amount of steering throw, simultaneously in both directions) and three LEDs that indicate remaining battery power. The Perfex system also has removable transmitter and receiver crystals, so as many as twelve Mini-Zs can be raced at one time!

Miniaturized marvel

The Mini-Z chassis is so simple that you almost forget how much technology has gone into its design. Basically, the chassis is a molded-plastic box that holds four AAA-sized batteries (two on either side) and the Perfex radio gear. Up front, the Mini-Z has coil-sprung suspension to allow independent movement the left- and right-side wheels. Kyosho offers a range of optional springs to help tune the front suspension to your liking.

The rear end of the car is "hung" out back by a thin plastic plate that flexes to provide suspension. There is also a second plastic piece that touches the thin plate in its center to act as a fulcrum for the suspension action. We would like to see this plate made from a tougher material such as fiberglass—if there's one part that's sure to break on the Mini-Z, this is it. Power from the included 130-size electric motor is sent to the rear wheels through a one-piece straight axle. Kyosho provides a tiny bevel-gear differential to help the car get through the corners with less drag. It's amazing how small they can make these things!

A very tunable tabletop racer

The Mini-Z is not merely a novelty item. In fact, Kyosho has engineered the car to be quite adjustable. First, a range of four pinion gears is provided with the Mini-Z, which will allow you to tailor

Palm-sized performer!

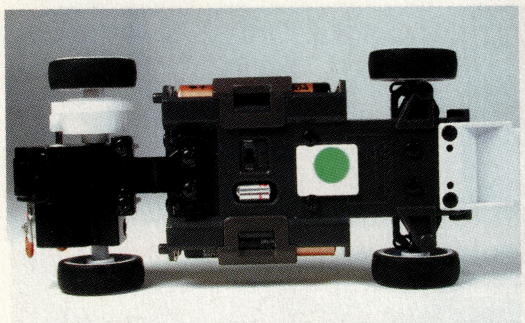


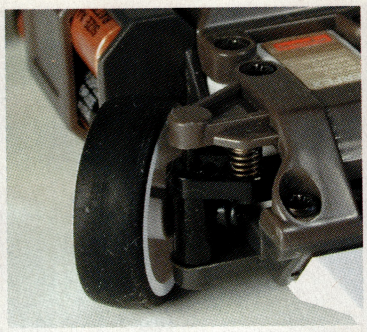
Kyosho Mini-Z Racer

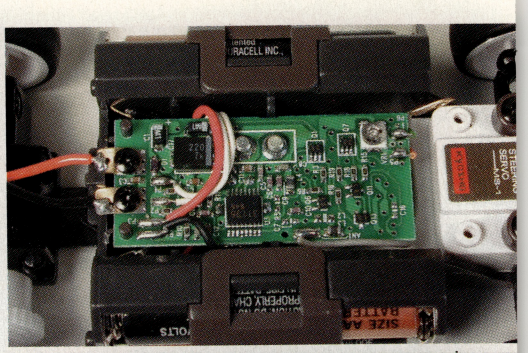
Length	5.1 in./130mm
Width	2.6 in./65mm
Wheelbase	3.7 in./94mm (Skyline); 3.5 in./90mm (Impreza)
Min. turning radius	7.9 in./200mm
PRICE	
Retail	$199.99
Average hobby shop	$159.99

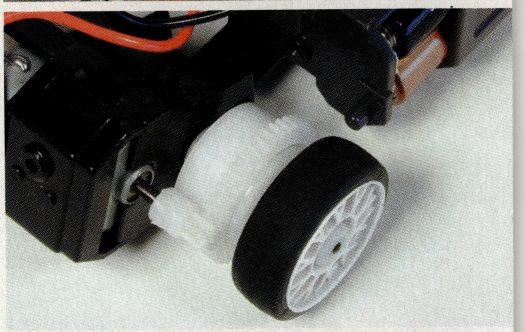


KYOSHO **MINI-Z RACER**









(Top left): Beneath the chassis you can see the Mini-Z's on/off switch and its removeable receiver crystal. With up to 12 available frequencies, you can hold your own Mini-Z Grand Prix (provided that all your friends have them).

(Top center): The Mini-Z's front suspension uses tiny coil springs to support the car's weight and to provide damping action. Kyosho offers a range of optional springs so that you can tune your car's handling.

(Top right): Simple, but complicated: in a first glance at the Mini-Z's chassis, there doesn't appear to be much to look at. Further inspection reveals a sophisticated electronic control system and functional front and rear suspensions.

(Bottom right):World's smallest: to assist in cornering, the Mini-Z has this near-microscopic differential that allows the inside rear tire to rotate independently of the outside when the car takes a corner.

Optional Hop-Up Parts

- XSPEED Mini-Z motor
- Ball Diff Set
- Rear Shock Set
- Racing Slick Tires
  (Soft)
  (Medium)
- Front Shock Spring Set

the car's overall gear ratio to your liking. A larger pinion will provide higher top speed, while a smaller gear will improve acceleration. The pinions are plastic and are pressed onto the motor's shaft. Kyosho supplies a tool that makes gear removal very easy. To install the new pinion, simply press it on to the motor shaft until it is flush. The motor is held in place by shims, so when you change the gear ratio, you must also change shims. This makes setting gear mesh virtually idiot-proof.

You can also change the position of the Mini-Z's motor. This is intended to allow the chassis to fit a variety of bodies, but we found that having the motor in the lower position gave us more rear traction, while raising the motor provided more steering. The Mini-Z's wheelbase is also adjustable from between 86, 90 and 94mm to fit a variety of bodies.

Race 'em and display 'em!

Both the Impreza and Skyline bodies are absolute works of art, rivaling any scale model we've seen. The shells are molded from hard styrene plastic and are painted on the outside rather than from the inside as are Lexan bodies. Our test car, a Subaru Impreza, came with a stunning blue paint job. All we had to do to finish the detailing was to install the plastic window piece (which is tinted), add stickers and install the clear headlight and taillight lenses (which are placed over the "light" decals for a realistic effect). After this, we added a few more details using a black detail pen. With the Mini-Z sitting on your display shelf, your friends will ask you when you became interested in scale modeling!



Mini-Z on the loose and in the house!

We tested the Mini-Z on a variety of surfaces, including carpet (short pile), hardwood and concrete. Kyosho even supplies three red-plastic pylons and three little corner dots so you can lay out your own course! On carpet, the Mini-Z is totally hooked-up, as if it were on rails. Just make sure that the carpet you run on isn't shag, or you will get all sorts of fibers stuck in the car's wheels and suspension.

Driving on wood flooring is like driving on ice! The Mini-Z can be slid around wildly in controlled drifts. If you want the ultimate driving challenge, race your friends on wood!

Concrete seemed like the best surface for the Mini-Zs, as it provides plenty of traction with little drag (even the shortest carpet causes quite a bit of drag). And the concrete doesn't have to be mirror-smooth, either. The Mini-Z's suspension is actually pretty compliant. We raced ours around a concrete pool-deck (kids, don't try this at home unless you want to get into R/C submarines) and had no problem going over the concrete's expansion joints. Patio furniture, however, is another story!

The only shortcomings we found in the handling department were that the back end chatters a lot when you put the car into reverse (Kyosho's optional rear shock should help this), and that the steering trim seems to wander all over the place. The Mini-Z just won't hold a straight line no matter what you do. Otherwise, the car is just plain awesome. The speed control is fantastic, and provides superb throttle control in both forward and reverse. The car felt very balanced, too. Cornering is very consistent in both directions. We tested our Mini-Z using standard alkaline dry cell batteries, and we got nearly an hour of run time! Kyosho offers a set of four AAA NiMH batteries and a slow charger for the Mini-Z, which will save you money in the long run over buying alkaline cells. ◆

SOURCES

Kyosho, distributed by Great Planes Model Distributors, 2904 Research Rd., Champaign, IL 61826-9021 • phone (217) 398-6300; fax (217) 398-0008

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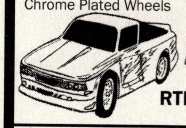
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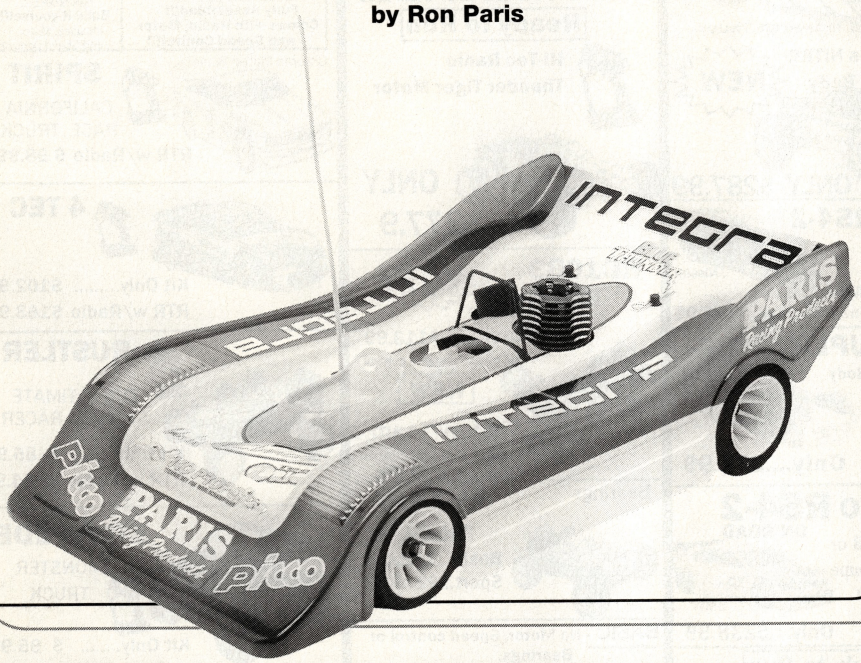
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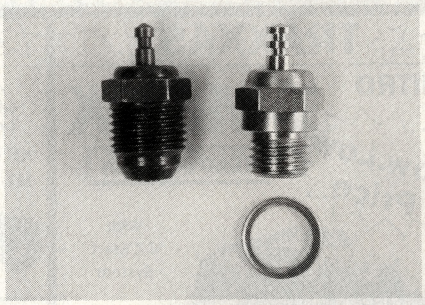
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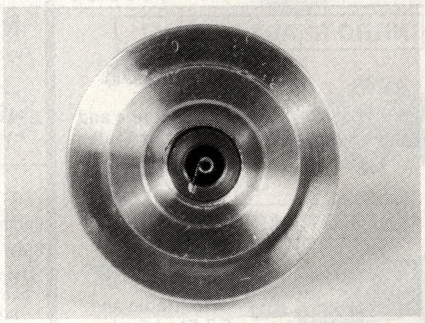
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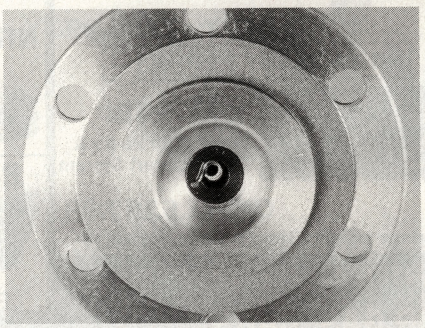
by Ron Paris





A Turbo plug (left) uses its tapered bottom to seal against the head button, while a standard plug (right) relies on a copper washer.





Standard glow plugs (top), don't seal the combustion chamber as well as do Turbo plugs (bottom). A better seal improves combustion, but Turbo plugs aren't recommended for off-road use.

Hello, gang! It's been a while since I have had time to write, but now I'm back! Over the past few months I have seen a dramatic increase in the number of times I have been asked certain questions, so I thought that this would be the best way to address these key issues to the largest audience possible. Remember that these are my opinions. Some people may disagree, but my answers are based on over 20 years of experience with model car engines.

The most frequently asked questions

"Which engine should I buy?"
"How much horsepower and rpm does a engine have?"
"What is the maximum rpm?"

There are no simple answers to these questions. As I have written before, there is no industry standard for testing horsepower or rpm. You simply cannot compare specs of different brand engines. (I also have written that in my opinion, some of the advertised ratings are way overestimated or exaggerated). Something to keep in mind is that in most cases the rpm listed in a manufacturer's specs is not the maximum rpm the engine will turn, but is in fact the rpm at which the listed horsepower was calculated. In other words, if two similar engines are compared, say a Super Wombat-brand .12 is rated at 1.0 hp at 32,000 rpm, and a PowerMatic brand .12 is also rated at 1.0 hp but at 34,000 rpm. This does not mean the Wombat won't turn 34,000 rpm, it just means that it produces 1.0 hp at a lower rpm! Normally, the fact that one engine creates the same power at a lower RPM means it probably has more torque and may accelerate the car faster.

Can I use an on-road engine in my off-road car?

Fact: Unlike the larger and more radical .21 engines, most of the .12 and .15 "small-block" engines do not have different timing for on-road and off-road applications. Basically, these engines will work equally well in a 1/10-scale nitro sedan or a 1/10-scale off-road truck.

The reason this question is asked so frequently is obvious if you look at most engine manufacturers' websites that list engine specs for both their on-road and off-road .21 engines. I want to stay neutral here, so I will compare the specs from two popular engines—one off-road and one on-road—from a common brand (I won't mention the brand because it really isn't important).

- No-name brand buggy engine: 2.0 hp at 28,000 rpm
- No-name brand on-road engine: 2.33 hp at 32,500 rpm

These are both .21 c.i. car engines. Which one would you pick for your new 1/8-scale off-road buggy? The 2.33 hp at 32,500 rpm on-road engine, right? *"Gong!"* Bad choice! Why, you ask? Well here we go; the problem is that the on-road engine is more than likely designed to use a Turbo-style plug (in this case it is). Turbo plugs do make more power, but at a price (everything comes at a price). We'll get into the Turbo plug issue a little later. Next problem: all that rpm in the on-road engine sounds good, but there is one big drawback—torque, or should I say the lack of torque where off-road buggies need it most! Torque is what does the work, and where the engine creates its most torque—in other words, its usable power band—can be more important than how much maximum torque an engine has. You could have a $500 on-road engine that makes 3.5 hp at 45,000 rpm, but this may do you no good at all if its peak torque is developed at too high an rpm. While you are waiting for your car to get up to its maximum speed entering the back straightaway, the kid standing next to you could drive past your car with a $125 sport buggy engine! That sport engine may only make 1.6 horsepower at 27,000 rpm, but it may develop its peak torque at 23,000 rpm. Your high-dollar "killer" on-road engine may not hit its peak torque until 32,000 rpm!

So how do they use these engines in on-road cars? There are several factors:

1) In on-road racing, conditions are more stable and you can effectively use Turbo plugs.

2) On-road cars are considerably lighter and easier to accelerate.

3) The rotating mass in the drive train of an on-road car is considerably lighter and easier to accelerate.

4) Most on-road cars utilize multiple-speed transmissions which allow a very low first gear to multiply torque.

5) A higher percentage of nitro is normally used in the fuel. (Higher nitro can be used in buggies, but tuning becomes VERY critical and engine damage is common.)

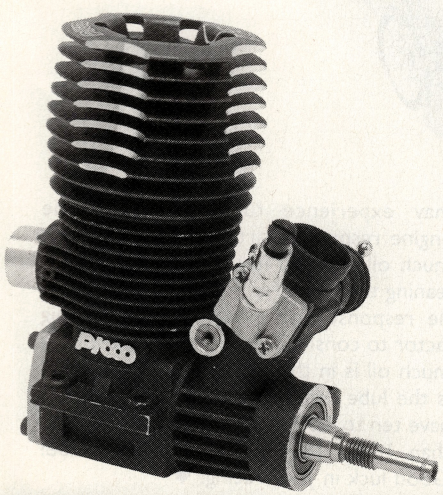
6) More clutch-slip can be used in on-road, and the clutch systems are more sophisticated in most modern cars. Unfortunately, these clutches do not function well or last long in dirty off-road conditions.



This 1/8-scale car is lighter and easier to accelerate than a 1/8-scale off-road buggy.

So what does this all mean?

It is important to research your future investment carefully. Try and realize there are no tricks to going faster, and yes I'm going to say it again, *more is not always better!* It cost a lot of money to develop and manufacture the many different engine configurations, and as you get to the higher-level engines, everything starts becoming more critical. There are exceptions, and some sport- and mid-level on-road engines will work well in off-road cars, but when you get to the super high-performance engines, things become a bit more complicated. This is because the manufacturers have optimized these engines for certain types of racing or conditions. As an example, some manufacturers produce several engines just for off-road racing. Why is that? One reason is that this allows them to offer engines in different price ranges, but this also means they can offer engines that are optimal for different conditions. The best advice I can give is to contact the manufacturer or importer directly and ask their advice. It shocks many people when they call me and I don't recommend the "top-of-the-line" or most expensive "killer" engine! Many times a milder engine may not only be more affordable, but also actually perform better for your particular application.

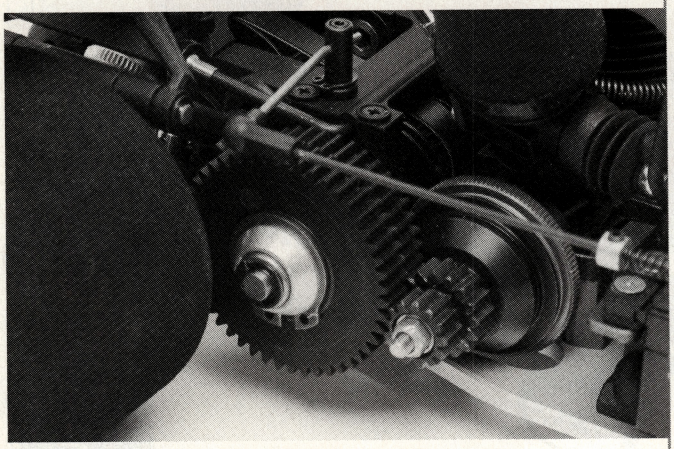


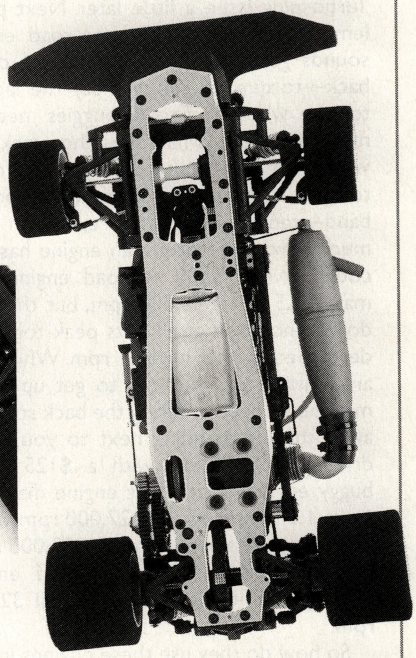
Why shouldn't I use Turbo plugs in my off-road buggy?

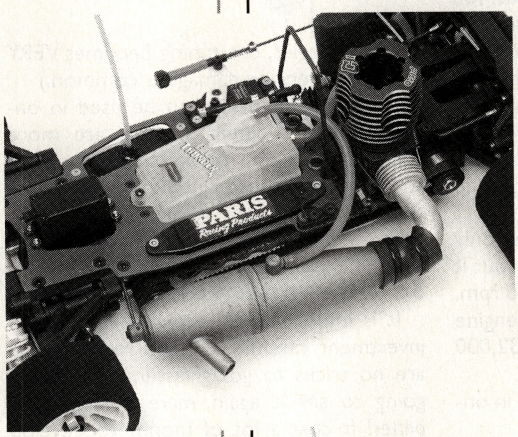
Turbo plugs and off-road do not go well together! If you have the tuning ability, you can squeeze out a few hundred more rpm by using a Turbo plug, but they are very sensitive to weather and track conditions, and to use them effectively you must constantly re-tune the engine. To give you an example of what you're in for should you decide to throw caution to the wind and use Turbo plugs off-road, check this out. There are two types of Turbo plug: long "hot" body and short "cold" body. And each of these come in four temperature ranges (5,6,7 and 8)—this totals eight different plugs! The optimum operating range of these plugs is very narrow (this is why there are so many), and to get the most out of them, you have to constantly fine-tune. Not to say there are not racers who could handle this task, but the problem is that the conditions and surface can change so quickly in off-road racing it would impractical to keep up. In fact, off-road conditions can easily change enough during the race that you would be dialed out! Another major

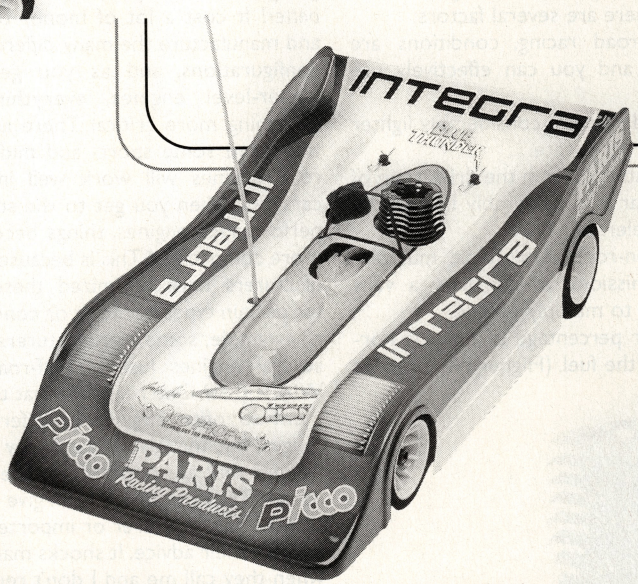


NITRO KNOW-HOW









drawback is that Turbo plugs do not like vibration, and with the jumps, rough terrain and state of tire imbalance in off-road cars, it is very unlikely you will have satisfactory results. The final factor is cost; Turbo plugs don't last nearly as long as standard plugs—even under ideal conditions—and they are approximately twice as expensive ($7-8 each) as standard glow-plugs.

How much oil should fuel have?

This could be an article in itself [*Editor's note: And might be, if we can persuade Ron to write it!*]. Let me first say that you can ask this question of ten people and get ten different answers! I want to point out that this is only my opinion, it is based on the over 20 years experience I have had with model engines and the literally thousands of engines and consumers I deal with on a yearly basis. I respect others' opinions, but do not feel compelled to debate the fuel issue. I also want to point out that my recommendation is specifically for *true* ABC (Aluminum piston, Brass sleeve with Chrome plating) *ball bearing* engines. It should be noted that there are some engines being manufactured with ABN construction (the "N" meaning nickel plating on the sleeve instead of hard chrome), and the manufacturers of these engines recommend a very high percentage of oil. I'm not in a position to dispute the manufacturer, and in no way is this suggesting anything negative regarding these engines. I just do not feel comfortable recommending something outside the manufacturer's suggestion. On a personal note I have run many of these engines with the same oil content fuel as I use in all my ABC engines and have had excellent results! I'm not going to get into brands because I want to keep this neutral. I will say that you should stick with a major brand of fuel that is produced in a modern manufacturing facility (stay away from the small home-brews). Also, use fuel that is intended for car engines. If a particular shop recommends a major brand of fuel, you will probably be okay.

Okay Ron, but how much oil should be in my fuel?

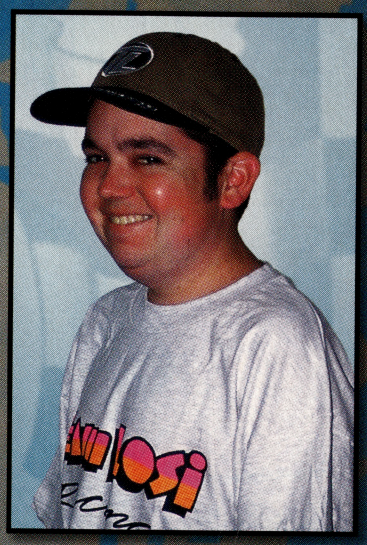
In my opinion, between ten and 14 percent of your fuel should be oil. I have used as little as eight-percent in my personal team engines, as long as the oil package is made mostly of natural castor oil. But I feel that between ten and 12 percent is an excellent choice. If you start exceeding 14 percent, I think you will notice a substantial loss of power and in some cases you may experience tuning difficulty. The engine response starts suffering with too much oil and you may find yourself overleaning the engine to try and regain throttle response and performance. One big factor to consider is that it is not just how much oil is in the fuel, but also how good is the lube package! I would much rather have ten to 12 percent of high quality lube than 16 to 18 percent of inferior lube! Good luck in your racing! ◆

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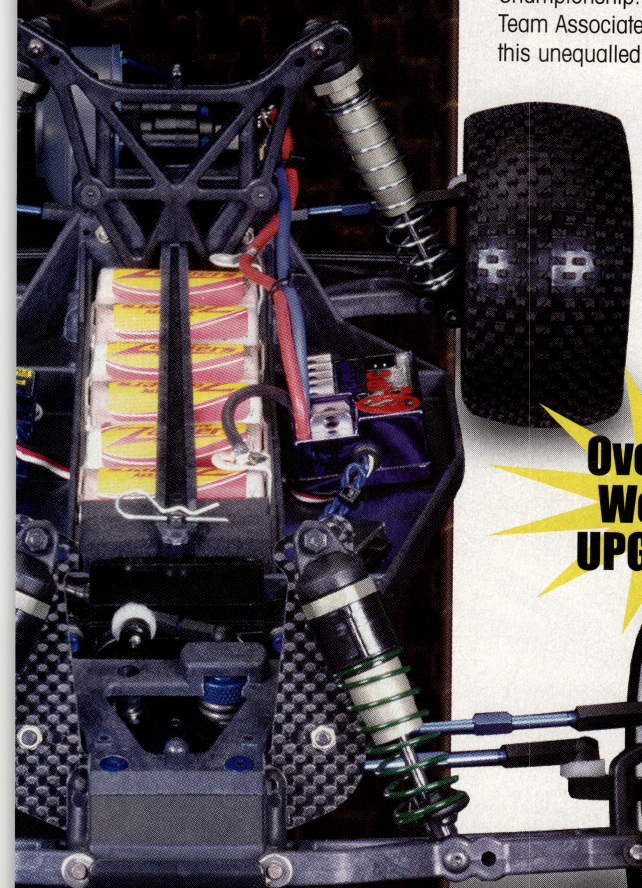
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www.teamassociated.com

ad#1070

AFTERMARKET GUIDE TO FACTORY TEAM TC3 ACCESSORIES



25 go-fast goodies from Associated's hot-rod division!

There's no denying that Team Associated's line of off-road cars and trucks, its on-road cars and its all-new TC3 sedan are among the most popular with racers. But did you know that Associated has developed its own aftermarket hop-up division, called Factory Team? This month, we decided to shine our spotlight on Factory Team's extensive catalogue of accessories for Associated's TC3 touring sedan. Which parts are must-haves and which merely enhance appearance? Read on to find out!

CHASSIS UPGRADES

Graphite Chassis

Replaces the stock kit's molded composite tub. The graphite chassis is both stronger (stiffer) and lighter than the stock piece, so installing it to your TC3 will not only save weight, but your car won't flex as much.

Part no.: 3849; 3880 (graphite chassis brace set)

Price: $39

R/C Car Rating: Surprisingly, not every driver chooses the graphite chassis. Because it is stiffer, the graphite chassis does a better job at isolating the action of the suspension. This means that the car will generally handle more consistently, but it may feel a bit *too* responsive for some drivers on some tracks. Overall, you can't beat the weight savings over the regular chassis, and if your car comes in under legal weight, at least with the graphite chassis you can choose where to place additional weight to further balance or change the handling.

Graphite battery hold-down strap

This little item replaces the stock kit's molded-composite hold-down strap. Because it's molded from a trick graphite-composite, this strap saves weight and will do a better job at stiffening the chassis and holding the cells in place.

Part no.: 3854

Price: $10

R/C Car Rating: You really need to be weight-conscious—we're talking Jenny Craig here—to view this as a must-have item. However, the fact that it's stiffer than stock means that it will do a better job of keeping the battery in place, especially toward the middle of the pack.

SUSPENSION UPGRADES

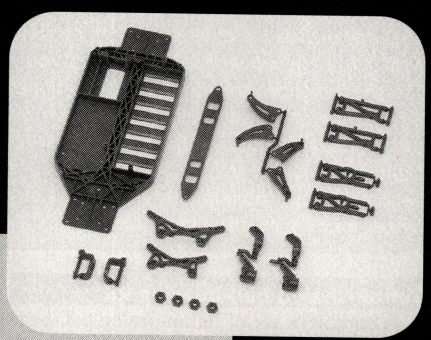
TC3 Graphite Suspension Parts

Team Associated offers graphite replacements for nearly every molded part of the TC3 that are both stiffer and lighter than stock. Each piece can be purchased separately, or you can save yourself a few bucks and buy the entire graphite component set.

Part nos. and prices:

- Full graphite component set (includes chassis, braces and battery hold-down strap)—3961; $75
- Front A-arms—3861; $11
- Rear A-arms—3891; $11
- Front 0-degree block carriers—3869; $8
- Steering blocks and rear hub carriers—3877; $12
- Front shock tower—3882; $10
- Rear shock tower—3896; $11

R/C Car Rating: Just as adding the graphite chassis will stiffen the TC3 and reduce its weight, installing suspension components made from the same graphite composite will reduce overall weight and minimize flexing. More important is that the reduced weight of the graphite suspension pieces also cuts down on the unsprung weight of the suspension, reducing the force needed for the shock absorbers to keep the tires in contact with the ground.



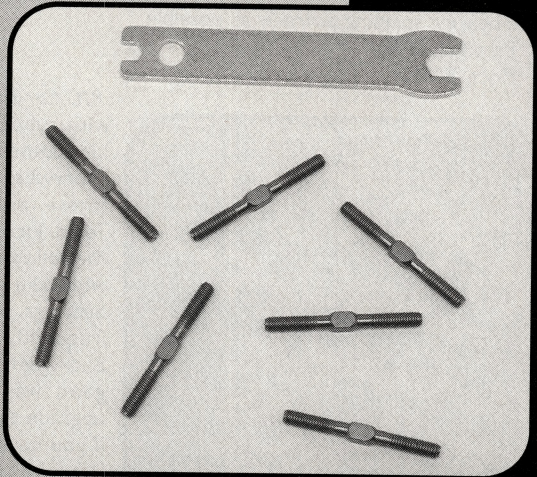
Factory Blue TC3 titanium turnbuckle set

Standard equipment on the TC3 Team kit, these trick-looking titanium turnbuckles are a great upgrade for owners of the TC3 Racer kit, which comes with less expensive and heavier steel turnbuckles. Team Associated sells the turnbuckles as an entire set (enough to replace each camber rod and steering rod) or in pairs.

Part no.: 1356 (full set); 1414 (pr. 1.125 in.)

Price: $30; $9

R/C Car Rating: Titanium is lighter and less likely to bend than steel, so that's good. The Factory Team turnbuckles are blue-anodized, and that's really good! If you own a TC3 Racer kit, consider these at the top of your hop-up wish list.



Factory Blue Aluminum VCS Macro shock bodies

These are the same blue-anodized aluminum shock bodies found on the TC3 Team kit, and can be purchased as direct replacements for the molded-composite shock bodies that come in the less expensive Racer kit.

Part no.: 3936

Price: $14 per pair

R/C Car Rating: Honestly, the molded shock bodies on the Racer kit work extremely well. If, however, you find that your molded bodies have become worn or damaged, then upgrading to these aluminum bodies makes more sense. But don't throw out the molded bodies until they are worn or you have money burning a hole in your pocket.



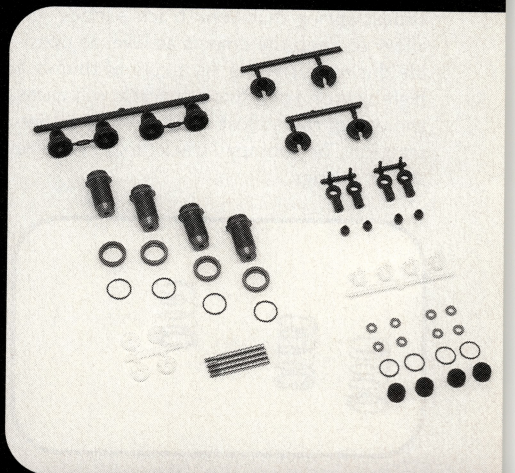
Factory Blue threaded aluminum shock set

This is a complete set of four VCS shocks with the optional threaded aluminum bodies included. Each set includes the shock body, shock shafts, an assortment of pistons, clips and rod-ends—enough to build four complete shocks.

Part no.: 3962

Price: $60

R/C Car Rating: Why would a TC3 owner need to buy a whole new set of shocks? He wouldn't. If you want the threaded bodies, Associated sells them separately. This complete shock set is for owners of other brands of touring cars who want to fit their rides with these excellent VCS dampers.



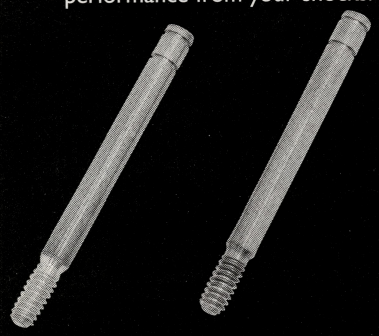
Unobtainium shock shafts

Direct replacements for the stock steel shafts. A special titanium-nitride coating improves durability and adds a trick-looking blue-gray finish.

Part no.: 3964

Price: $11 per pair

R/C Car Rating: These finely ground and specially coated shock shafts are among the best we've ever tested. The Unobtainium shafts last far longer than the stock chrome-plated steel shafts found in the TC3 kit, plus they allow the shocks to operate with less friction and stiction. Well worth the investment if you want the best performance from your shocks.



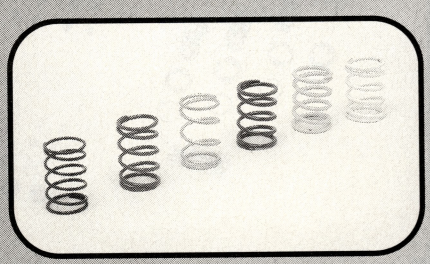
Factory Team tuning springs

Team Associated offers a full selection of shock springs to allow you to tune your TC3's suspension to track conditions. Each pair of springs has been meticulously matched by length and by rate to ensure equal performance from both sides of the suspension. The springs are rated in stiffness by PSI, which is the amount of weight in pounds it takes to compress the spring one inch. A spring with a higher weight is stiffer than a lower-weight spring.

Part nos.: Green springs (12 lb.)—3941; Blue springs (17 lb.)—3943; Red springs (22 lb.)—3945; Copper springs (25 lb.)—3946; Purple springs (30 lb.)—3952; Yellow springs (35 lb.)—3953; White springs (40 lb.)—3954

Price: $5 per pair

R/C Car Rating: To tune your TC3, you need springs. Generally, try to use the stiffest spring that your track surface will allow to keep the chassis as level as possible during cornering. As a rule of thumb, a high-bite or very smooth track will allow the use of the stiffest springs, while a low-traction or bumpy track may require softer springs.



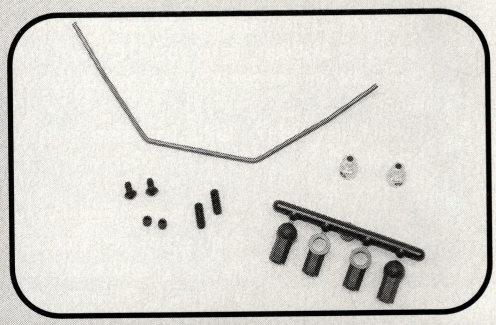
Front or rear anti-roll bar kit

An anti-roll bar, or sway-bar, uses torsion to tie the left and right sides of the suspension together to limit the degree of chassis roll during cornering. Usually, the less the chassis rolls or leans during cornering, the higher its speed will be. The Factory Team anti-roll bar kit for the TC3 is universal, meaning that it can easily be fitted to either end of the chassis.

Part no.: 3960

Price: $8

R/C Car Rating: Anti-roll bars are a great tuning aid to any sedan. Installing one up front tends to smooth out the car's steering and make it less twitchy. Team Associated drivers have had success with this setup when driving on high-traction carpeted surfaces. Installing a rear anti-roll bar tends to increase steering. Every TC3 owner should have at least one anti-roll bar kit in his toolbox.



DRIVE TRAIN UPGRADES

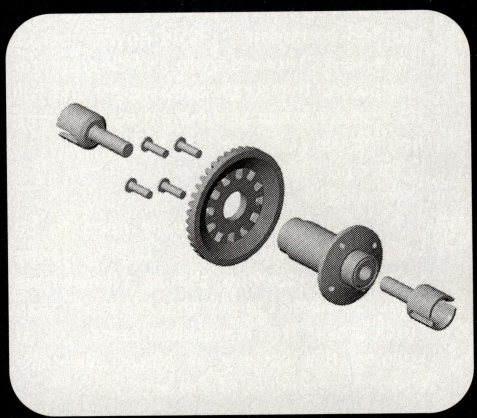
Factory Blue front one-way assembly

This device replaces the TC3's front differential assembly and allows the front wheels to spin freely in a forward direction. The unit houses a series of one-way bearings that provide drive to the front wheels equally during acceleration, but let each front wheel rotate independently off-power. The main benefit of a one-way unit is that it provides steering that's more aggressive, which can translate into higher cornering speeds. The downside is that, with the one-way unit installed, the TC3's brakes only work on the rear wheels.

Part no.: 3938; replacement ring-gear—3939, replacement outdrives—3966; replacement one-way hub w/bearings—3967

Price: $60

R/C Car Rating: According to Team Associated, you should use this new front one-way device "whenever you can get away with it." In other words, as long as you've got the traction, the one-way should help the car to carry more speed through the turns. Usually, this setup works best on higher-bite surfaces. As soon as the car becomes too loose, you will likely have better luck by re-installing the ball diff.

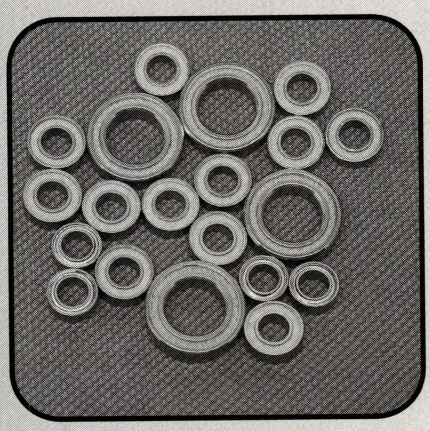


Teflon-sealed ball-bearing kit

A complete set of Teflon-sealed ball-bearings for all TC3 kits. Teflon seals provide excellent protection from dust and dirt, yet maintain a very low amount of friction to keep the bearing spinning as freely as possible.

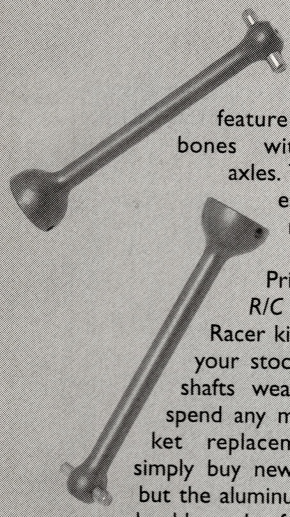
Part no.: 3970

Price: $120



R/C Car Rating: The TC3 Racer kit comes with rubber-sealed bearings, and the Team kit comes with Teflon-sealed bearings everywhere except on the diff outdrives (these are rubber-sealed bearings). So, Team kit owners only need to purchase the Teflon outdrive bearings. Racer owners who take good care of their rubber-sealed bearings by cleaning and re-lubing them frequently will get plenty of life from them. But when it's time to upgrade, this is a good way to go—it's just an expensive upgrade that most racers won't notice. But if you never clean your bearings, these will last the longest without any attention whatsoever!

Factory Blue aluminum CVD driveshafts



These are the same blue-aluminum MIP CVD driveshafts that come in the TC3 Team kit. CVDs feature lightweight dog-bones with hardened-steel axles. They are also very easy and cheap to rebuild.

Part no.: 3888

Price: $22 per pair

R/C Car Rating: TC3 Racer kit owners, wait until your stock composite driveshafts wear out before you spend any money on aftermarket replacements. You could simply buy new composite shafts, but the aluminum CVDs are more durable and, of course, they look totally trick!

Graphite wheel-hex drives

The same hex-drives as stock, but these are molded of lighter and stronger graphite composite so they reduce the amount of rotating weight in the car's drive train.

Part no.: 3949

Price: $5

R/C Car Rating: For overall performance, these graphite hex drives are the way to go. They're cheap at just five bucks for a set of four, and they're the lightest pieces you can get. Will you notice better acceleration? Probably not, but rest assured that it's there.

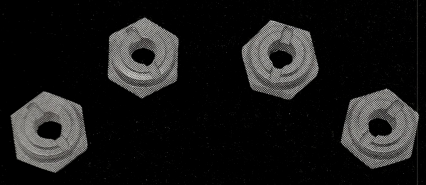
Factory blue aluminum hex drives

Replaces the stock kit's molded-composite hex drives with blue-anodized aluminum pieces.

Part no.: 3972

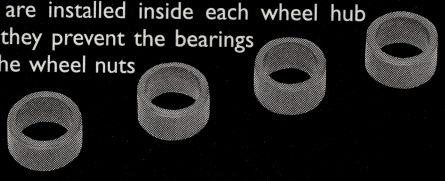
Price: $15

R/C Car Rating: Fifteen dollars is a lot to spend on a part that is chiefly a cosmetic upgrade. And considering that you can't even see the hubs once the wheels are installed, you'd really have to be in love with the color blue to justify the cost. On the plus side, these blue hubs will look really cool when your car is in the pits with its wheels removed!



Factory blue aluminum axle spacers

These tiny aluminum collars are installed inside each wheel hub between the axle bearings, and they prevent the bearings from binding in the event that the wheel nuts are over-tightened.



Part no.: 3965

Price: $4

R/C Car Rating: At a buck a wheel, you have no excuse not to buy a set of these spacers. With these babies installed, you can safely tighten the wheel nut all the way down without fear of binding up the wheel or causing damage to your expensive bearings.

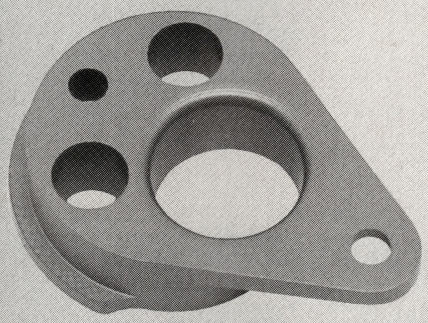
Factory Blue machined aluminum motor-adjustment cam

Replaces the black cast-aluminum piece with a high-quality, blue-anodized cam machined from solid aluminum stock.

Part no.: 3932

Price: $25

R/C Car Rating: Better heat-dissipation with a great-looking blue-anodized finish. Remember: cool is better!



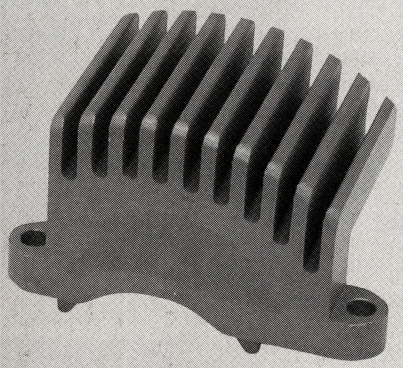
Factory Blue machined aluminum motor-adjustment clamp

Features a larger heat-sink than the stock cast-aluminum clamp for better cooling. Machined from solid aluminum and blue-anodized.

Part no.: 3933

Price: $35

R/C Car Rating: Sure, it's a little pricey at $35, but anything that can keep your motor running even a little cooler is worth the dough. Plus, the blue-anodizing looks way better than the black stock clamp, which blends in with the black composite chassis too well.



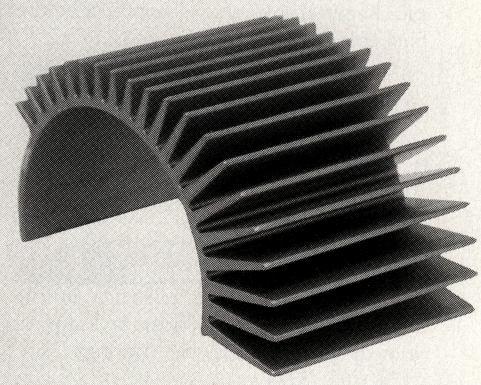
Factory Blue aluminum clip-on motor heat-sink

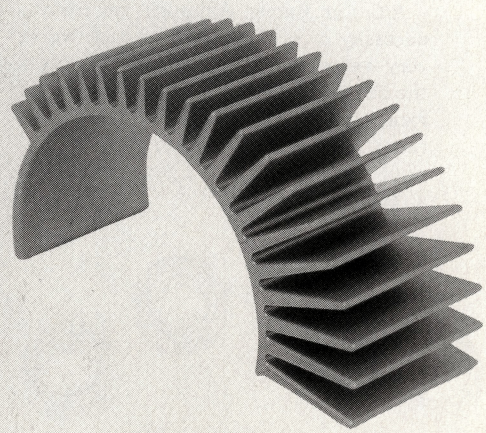
Designed to provide the most contact area with the motor when it's installed in the TC3 chassis, these clip-on heat-sinks provide that extra degree of cooling needed for hot summer race days or for when you run that extra tall gearing. Machined from quality aluminum and blue-anodized. The short heat-sink works with the Factory Team aluminum motor clamp, and the longer heat-sink fits the stock TC3 clamp.

Part no.: 3927 (short, use with 3933); 3928 (long, use with 3931 stock motor clamp)

Prices: $11 (3927); $13 (3928)

R/C Car Rating: Cool motors mean more power, and anything that can help reduce motor temperature is a worthwhile investment. These clip-on heat-sinks work very well and add to the appearance of your chassis. Worth the money!





MISCELLANEOUS UPGRADES

Factory Blue 4-40 aluminum locknuts

Blue-anodized aluminum nuts with nylon inserts to prevent them from loosening. Will also replace the standard nuts on the Racer kit.

Part no.: 6937

Price: $3 (set of six)

R/C Car Rating: These are the same blue 4-40 locknuts that are used to secure the tops of the shocks on the Team kit, except that you get enough extra nuts in this package to also use them to secure the camber-rods' ball-studs to the shock towers.



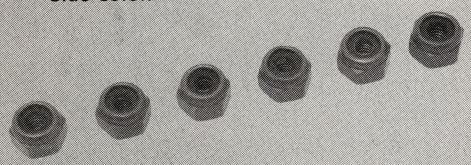
Factory Blue 8-32 aluminum locknuts

Same as above except these are larger 8-32 nut used to secure the wheels to the axles.

Part no.: 6943

Price: $4

R/C Car Rating: All TC3 owners should stock an extra set of wheel nuts just to be safe. Racer kit owners will appreciated the blue color.



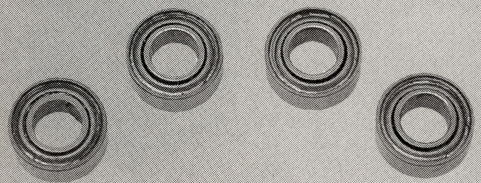
Steering rack ball bearings

Replace the bronze bushings in the steering rack of your Racer or Team kit with these high-quality ball bearings.

Part no.: 3971

Price: $12

R/C Car Rating: Although far from a necessity (the TC3's steering rack works very well with the stock bronze bushings), the bearings do reduce play in the steering rack, and they'll prolong the life of the rack's plastic parts through reduced friction. Not essential, but a good hop-up for a reasonable price.



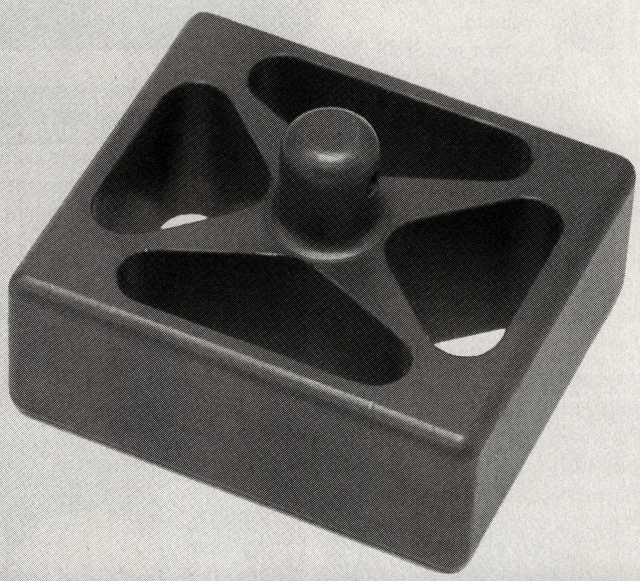
Factory Blue fake transponder

Intended to duplicate the size and weight of an AMB automatic scoring system transponder. Use the fake transponder during practice and when setting the balance of your TC3. Machined from blue-anodized aluminum.

Part no.: 3968

Price: $15

R/C Car Rating: If you regularly race at a track that uses AMB lap counting transponders, then it might be worth the $15 bucks to ensure that your car's weight and balance will be the same during practice as it is come race time.



Factory Blue TC3 screw kit

Replace the heavy steel screws in your TC3's chassis with these lightweight, great-looking blue-anodized aluminum screws and bolts. Set includes an assortment of 4-40 flathead and cap-screws in various lengths.

Part no.: 3935

Price: $13

R/C Car Rating: Aluminum screws are great, but you must use them with care. It's a good idea to cut the threads using a 4-40 tap or a 4-40 steel screw before you install any aluminum screw into a self-tapping screw hole (such as those used on the TC3's molded chassis). And we're not entirely comfortable using aluminum screws in high-stress areas such as transmission mounts and suspension pieces. Use your best judgment, but if you break-off an aluminum screw, don't blame us! ◆



SOURCES

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Announcing the new Dynamite® Vision Peak™ AC/DC Charger. One look and you'll know how powerful you really are.

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Same great charger as the Mega 1, but with meter and discharge circuit to keep your batteries in tip-top shape.



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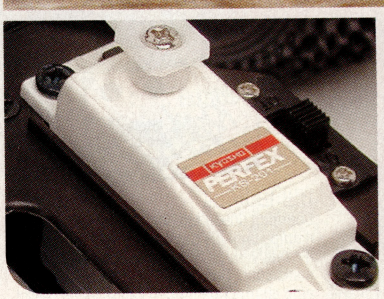
KYOSHO
ULTIMA ST EP/GP RACING SPORTS

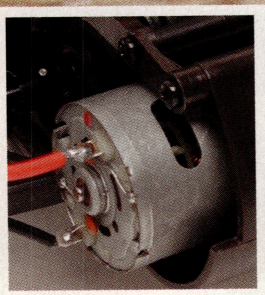
By Shannon Hudson



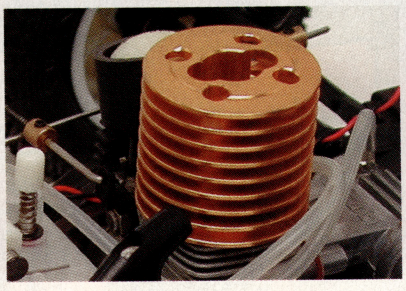
You knew it had to happen. Let's face it, the RTR (ready to run) thing is huge and Kyosho is not going to be left out. With companies like Traxxas and new-to-the-RTR-market Team Associated making some seriously good products, how do we know which ones are best? Well, first you have to figure out what kind of truck you want? Electric or nitro? Electric is easy—charge up a battery, plug it in, and go! With nitro you get that realistic engine sound, more power, and longer run times! With nitro engines becoming more user-friendly these days, nitro trucks seem to be the most popular choice. But with the advent of new, longer-lasting NiMh batteries, electric vehicles are still a very solid choice! Decisions, decisions—hmmm, I think I'll take both! Thanks to Kyosho, I could bash around a set of their newest RTR trucks in electric and nitro trim in my backyard to see if these new sport-level trucks have what it takes to compete in the ever-growing world of RTR.















Kyosho Ultima ST EP & GP Racing Sports

Length.....(EP) 16.4 in./417mm; (GP) 16.8 in./427mm
Max. width.....12.5 in./317mm
Wheelbase.....(EP) 11.2 in./285mm; (GP) 11.3 in./287mm
Front track.....10.4 in./263mm
Rear track.....10.2 in./260mm
Weight (RTR).....(EP) 4.1 lb.; (GP) 4.2 lb.
SKILL LEVEL.....1
PRICE
Retail: $229.29 (EP)/$379.99 (GP)
Average hobby shop $164.99 (EP)/$279.99 (GP)



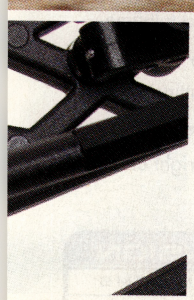
What you get

- Complete ready to run chassis including Kyosho Perfex pistol grip radio.
- Very user-friendly GX.15 engine installed (GP)
- Fast and fun 20-turn electric motor (EP)
- Pre-painted body

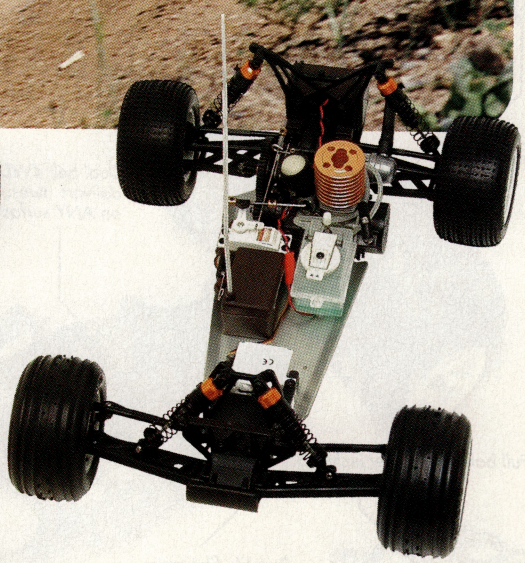
What you need

- Glow starter and quality fuel suitable for nitro car engines
- AA batteries









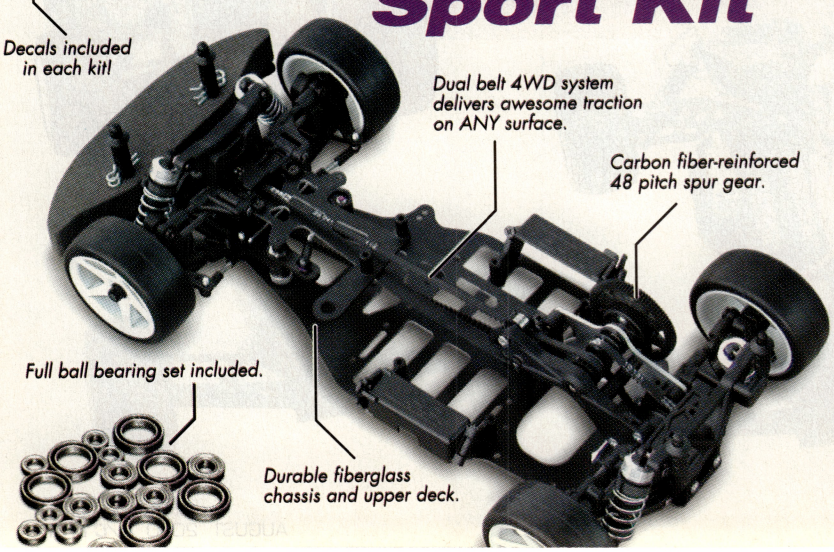
RS4 SPORT 2

#263 DODGE Stratus



Second Generation Sport Kit

Decals included in each kit!



Dual belt 4WD system delivers awesome traction on ANY surface.

Carbon fiber-reinforced 48 pitch spur gear.

Full ball bearing set included.

Durable fiberglass chassis and upper deck.

The RS4 Sport 2 features our race-proven "equal length" suspension geometry and shares many of the same parts with our high level Pro 2 car. Affordable performance, tons of hop-up potential, great looks... the Sport 2 is a the perfect way to get into R/C Touring Cars! A long list of standard features include a full set of precision ball bearings, 26mm Racing Slick Belted tires, and full-time four wheel drive for awesome traction on any paved surface. Choose the popular Stratus or the cutting-edge Netz/Castrol Altezza body. Need some variety? HPI offers a huge variety of body styles that bolt right on the RS4 Sport 2 for a completely new look.

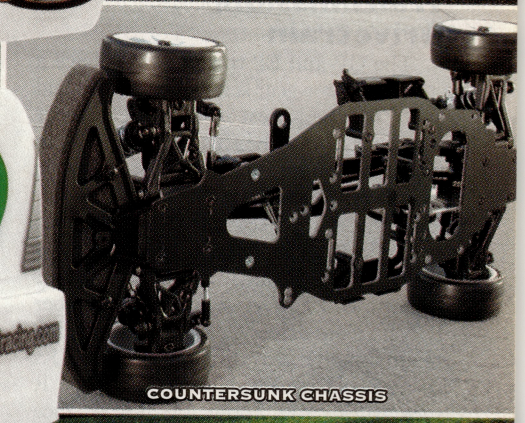
PRO 2 TYPE SUSPENSION

- EQUAL LENGTH SUSPENSION ARMS
- ADJUSTABLE CASTER AND CAMBER
- REINFORCED FOR MORE STRENGTH



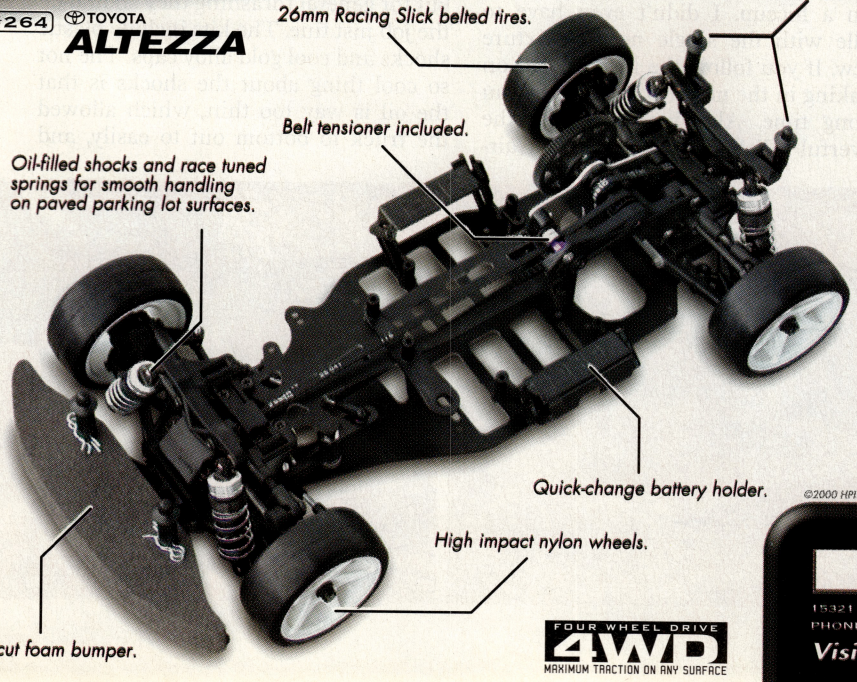


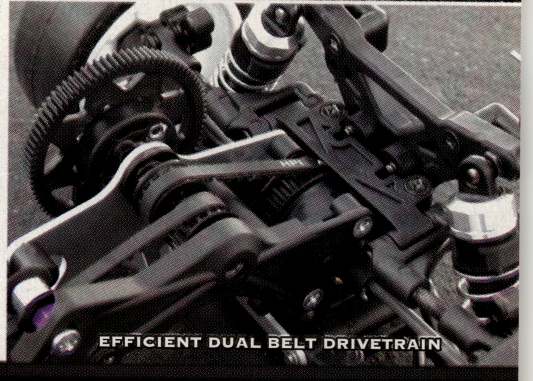






#264 TOYOTA **ALTEZZA**





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KYOSHO **ULTIMA ST EP/GP RACING SPORTS**

Chassis

Both the EP & GP Sports are nearly identical in every way except the chassis. The GP uses a 2.5mm-thick Duralumin plate that has raised sides to minimize chassis flex, while the EP Sports uses a plastic tub type chassis with an aluminum rear plate that the gearbox and rear suspension bolt to. Both setups have a fair amount of flex, which should aid handling on bumpy surfaces. Both trucks share the same shock absorbing nosepiece that holds the front suspension together. No doubt you will appreciate the pliable front bumpers on these trucks when you do the inevitable full speed "slam" into a curb or big rock.



Running gear

- Blue Thunder 20-percent fuel
- Dynamite glow starter
- Trinity 3000mAh NiMh Battery

Transmission/ Drivetrain

The GP and EP transmissions have a standard three-gear set up. The GPs is laid down for the lowest possible CG (center of gravity) while the EPs trans is stood up to accommodate the 20-turn electric motor. Both transmissions have gear differentials, which seem to be bulletproof, although if you plan on racing you may want to upgrade to Kyosho's super smooth ball diff. I seem to remember Kyosho team driver Greg Degani wanting me to take the gear diffs out of my RTRs so he could try them in his GP Type R race truck. You know 1/8th-scale race buggies use gear differentials filled with heavy silicone, and they work awesome! Maybe gear diffs are the hot race setup?

The GP has a slipper clutch which helps reduce wheel spin and unnecessary drivetrain wear. Where's the slipper on the electric truck? A plastic disc brake does the stopping on the GP, while the EP relies on a rather cheesy rotary speed control, which goes into reverse when you push the trigger back. Rotary and wiper speed controls should go away like disco and all companies should provide ESC's (electronic speed control) for their RTR kits.

Power is transferred to the wheels via steel dog bones. Thank you, Kyosho, for supplying bearings instead of bushings in the transmissions. Maybe someday it will be illegal to supply bushings in R/C kits and companies will be forced to provide complete ball bearing sets. Only in a perfect world…

Kyosho GX.15 engine & 20-turn electric motor

Most of my driving experience was with the GP and I have to say without a doubt this is the most user-friendly nitro engine I have ever encountered. It started on the second pull and idled through a whole tank of gas without even a hiccup. I didn't even have to fiddle with the single needle mixture screw. If you follow the instructions on breaking in the motor it should last you a long time. Also included with the powerful GX.15 engine is a quiet airplane-style muffler (which should help keep your neighbors happy) and a rubber tube exiting out the back.

The EP truck comes with a 20-turn electric motor, and if it's anything like the Traxxas 20-turn stinger motor, it should have plenty of power to keep a smile on your face.

Suspension

The Ultima ST Sports suspension consists of long-travel arms molded from a stiff composite material. The shock towers and front bulkhead are made of a softer material to resist breaking, and I am proud to say that not a single part broke during my back yard excursion. The shock towers do seem to be a little to flexible for racing purposes, but for general thrashing they should do the job just fine. The kits include plastic shocks and cool gold alloy caps. The not so cool thing about the shocks is that the oil is way too thin, which allowed the truck to bottom out to easily, and







they leaked like a cheap diaper. If you really want the best performance out of the shocks, empty out the Wesson oil and grab your self some quality silicone oil—either Associated or Losi 30wt will work wonders. I believe the shocks leaked because they weren't bled correctly from the factory, so bleeding the air out of them will probably help against leakage.

There are no E-clips holding the hinge pins in the suspension arms, so they won't be flying out anytime soon. The front spindles and rear hub carriers seem to be made of quality material and should be plenty strong. The rear arm mounts are the weak points in the suspension—mine didn't brake during testing but I know Frank had problems with the race truck's. It might be a good idea to buy an extra set of rear arm mounts so a broken one doesn't ruin your day. I heard from the Woodscrew (aka Greg Degani) that some aluminum mounts will be available shortly, so you may want to hold out for those.

Fixed camber & steering links

Both Ultima Sports Trucks come standard with fixed-position plastic camber links as well as fixed steering links. This doesn't allow for much in the way of adjustment, i.e. camber and toe in/out. There have been so many times when I was at the track watching beginners try to drive their race-oriented cars around the track, with their camber and toe adjustments way off—they were all over the place! So, the fixed links aren't necessarily a bad thing—they provide a little bit of toe-in which makes the truck stable at high speeds and about 1.5 degrees of camber which allows for consistent cornering. You could always replace the fixed links at a later time if you decide to start racing.

Tires, Wheels & Body

The included tires hooked up really well on the loose dirt in my front yard. The rear tires' tread pattern is very similar to Losi's dash pin. The fronts are a standard rib pattern that did an admirable job in the steering department. I wouldn't hesitate to race at my local track with these tires. I think they would work quite well. The included white disc wheels are good looking and seem to be very strong. The tires are only spot glued to the rims so you should take the time to go out to your local hobby store and pick up some quality tire glue. You'll want to glue the tires completely; they'll hold up a lot better.

I forgot to mention earlier that even though the transmission had bearings, the hub carriers and front wheels have bushings. You know how I feel about bushings! It is also a good idea to poke some extra holes in the rims so that air doesn't get trapped in the tires. The GP body came painted in black while the EP's body was done in blue. The only thing you need to do to the body is cut it out and place the decals on—watch out when installing these decals; you can't peel them off and re-stick them, so you have to get them right the first time! The bodies are pre-drilled for the mounts and antenna. This is a nice feature—thanks, Kyosho. If you're familiar with the race-edition trucks, you'll notice that the sport versions of the bodies differ slightly. ◆

PERFORMANCE

I had a lot of fun driving the nitro truck. It was easy to start and it ran flawlessly. I am even considering installing bearings in the front wheels and hub carriers then taking it out to Hot Rod Hobbies and racing it, fixed camber links, airplane-style muffler and all! The steering and overall feel of the truck is very good, and best of all nothing broke.

The electric truck handled well, and was surprisingly quick for an entry-level truck. It jumps well (see below!), and handles rough terrain with ease. I was very happy with the performance on both vehicles!

The Good

- From out of the box to driving in about a half hour
- High-quality powerful engine in GP version, fast 20-turn motor in EP
- Competent race-proven chassis design in a sports package

The Bad

- Oil in shocks way to thin
- Shocks a little on the leaky side
- Bushings in wheels and hub carriers
- Universal joint drive shafts instead of dog bones would be nice

The Verdict

The RTR world is getting bigger everyday, and more companies are making them. These two Kyosho trucks are definitely worth considering when you get ready to purchase your first or next R/C car. They have both proven to be strong, fast and, most of all, fun. There are a few things I think you should consider doing before you start driving. First is changing the oil in the shocks to a thicker silicone oil; 30wt Losi or Associated would be a good starting point. Gluing the tires completely with quality tire glue. Poking one or two extra holes in the rims so they don't get air trapped in them. If you take care of these minor things, enjoyment of either of these trucks will be that much greater. ●

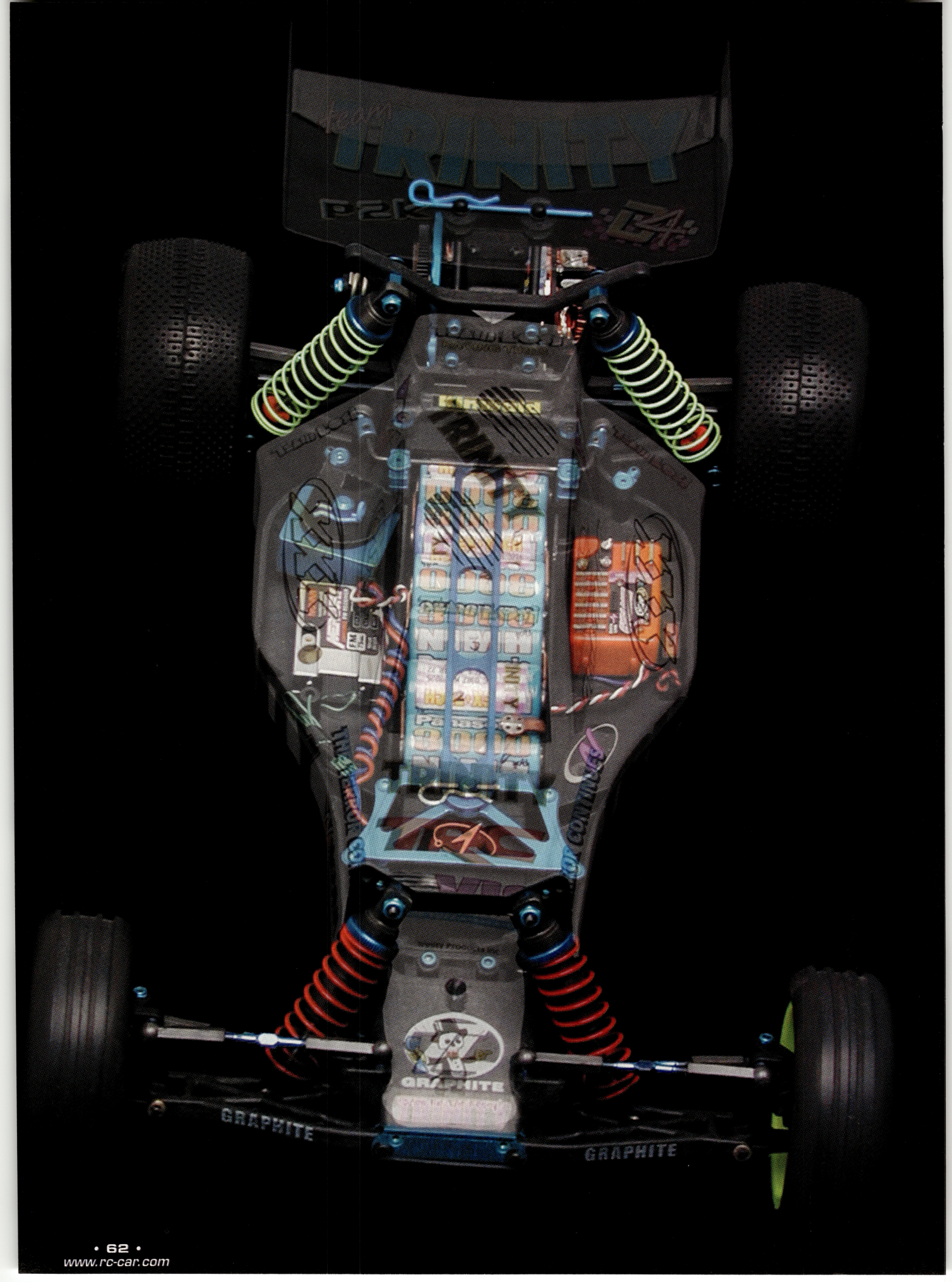
SOURCE

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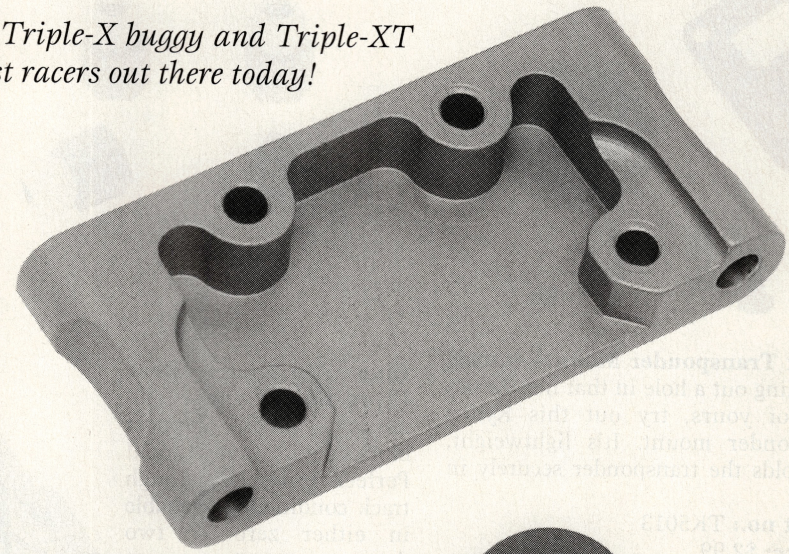
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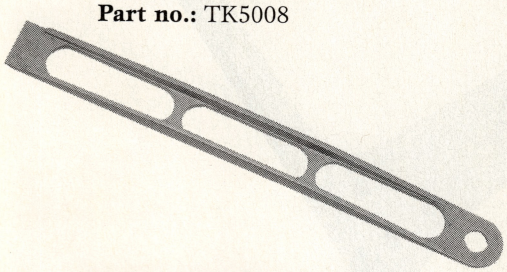
A look at Trinity's Aluminum goods for the Triple-X & Triple-XT!

Undoubtedly, Team Losi's Triple-X buggy and Triple-XT truck are two of the hottest racers out there today!

Trinity has supported Team Losi since day one, so it came as no surprise that the Team Kinwald division of Trinity Products announced plans they were going to produce some hot hop-ups for both vehicles. In case you've missed them (and we don't know how you could have!), we've assembled the entire line in an effort to show you all the cool stuff available for each vehicle.



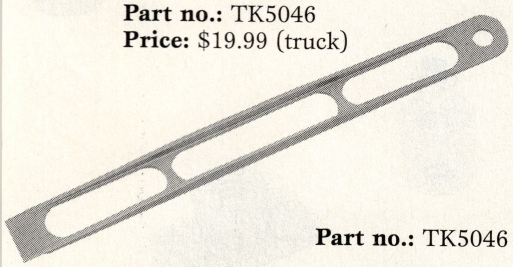
Part no.: TK5008



Blue Aluminum Battery Strap—this lightweight aluminum battery strap not only looks cool, it also functions as a big battery heatsink! Keeping your cells cooler is one of the best ways to help prolong their life. In our book, this is definitely one of the top Team Kinwald mods available for both the buggy and truck.

Part no.: TK5008
Price: $19.99 (buggy)

Part no.: TK5046
Price: $19.99 (truck)



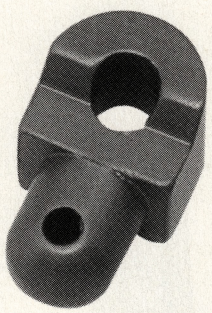
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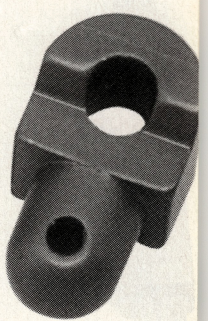
Blue Aluminum Upper Servo Brace—the upper servo brace is a great complement to the Aluminum Battery Strap. In addition, it is connected to the strap which effectively becomes part of the battery "heatsink package."

Part no.: TK5010
Price: $29.99

Blue Aluminum Front Bulkhead—looking to improve steering? Try adding an aluminum front bulkhead. This bulkhead holds the front suspension arm hingepins solidly in place, not allowing any flex at all. This helps both the truck and buggy steer more precisely.

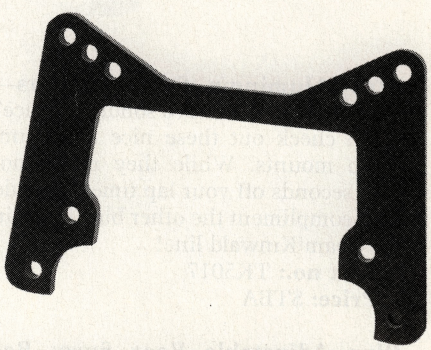
Part no.: TK5009
Price: $29.99

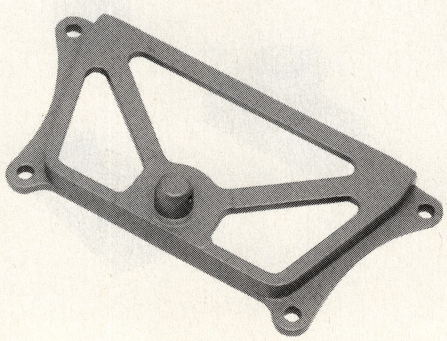




Blue Aluminum Rear Body Mounts—considered more of an aesthetic item, these aluminum rear body mounts for the buggy help round out the Team Kinwald package. In the functionality department, the aluminum has the advantage of not breaking off in a crash, and should last much longer than standard plastic pieces.

Part no.: TK5011
Price: $17.99 (pair)



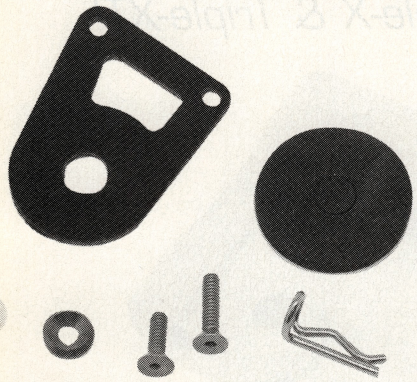


Blue Flake Graphite Front Shock Tower—everyone knows that graphite is super-strong and lightweight. This blue flake tower not only looks good, it's thick and durable.

Part no.: TK5012
Price: $15.99

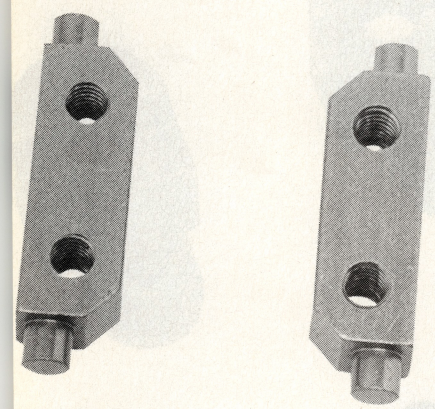
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Kydex Transponder Mount—instead of drilling out a hole in that nice Lexan body of yours, try out this Kydex transponder mount. It's lightweight, and holds the transponder securely in place.

Part no.: TK5013
Price: $2.99

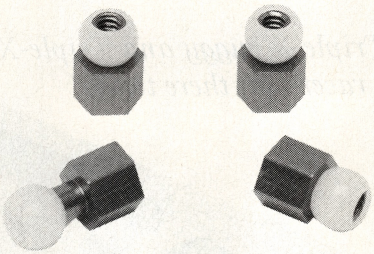


Blue Aluminum Servo Mounts—need to hold your servo solidly in place? Then check out these nice aluminum servo mounts. While they might not take seconds off your lap times, they do help compliment the other blue items in the Team Kinwald line!

Part no.: TK5017
Price: $TBA

Blue Adjustable Rear Sway Bar Mounts—if you run on a high-bite track, you need to run a rear sway bar! If that's the condition, then you should check out these adjustable alloy rear sway bar mounts.

Part no.: TK5019
Price: $14.99



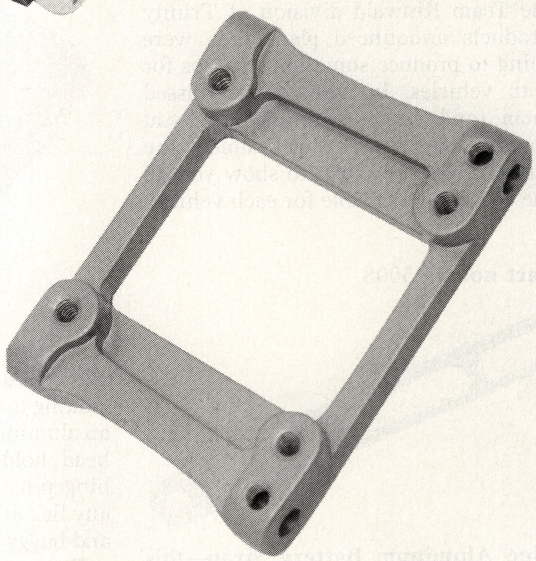
Blue Aluminum Shock Bushings—when your stock plastic bushings start to get sloppy, check out these trick aluminum shock bushings. They don't flex or deflect at all which allows the shock to stay put and do its job as effectively as possible!

Part no.: TK5014
Price: $7.99 (4)

Blue Aluminum Rear Pivot Blocks—these aluminum pivot support blocks will not break! Perfect for really rough track conditions! Available in either zero or two degrees.

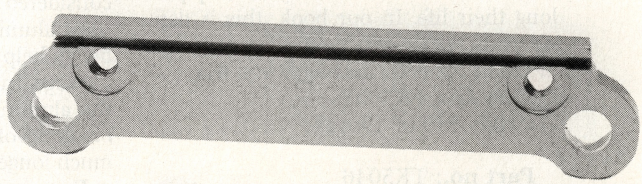
Part no.: TK5015
Price: $29.99 (0-degree)

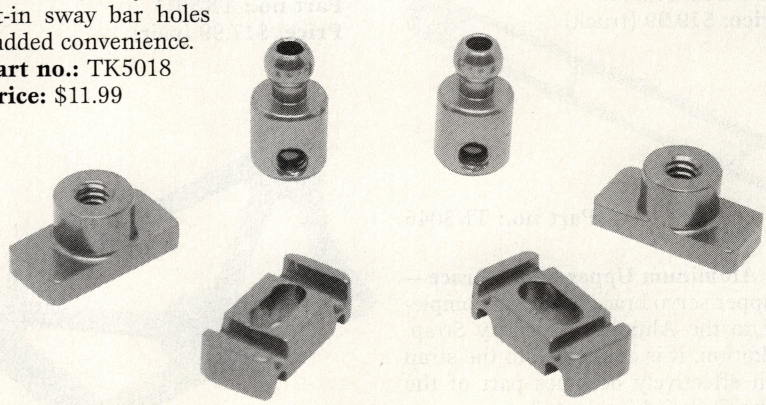
Part no.: TK5016
Price: $29.99 (2-degree)



Blue Front Brace With Sway Bar Mounts—when combined with the aluminum front bulkhead, this aluminum front brace really helps keep the front suspension arm hinge pins in place! In addition, they have built-in sway bar holes for added convenience.

Part no.: TK5018
Price: $11.99

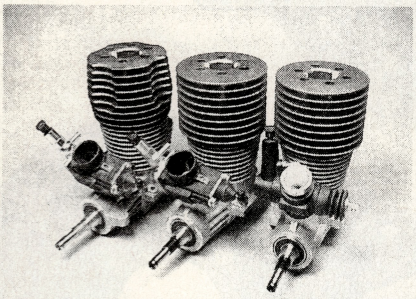




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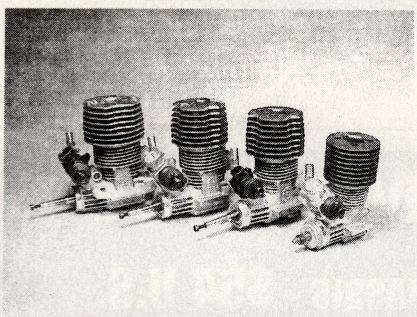
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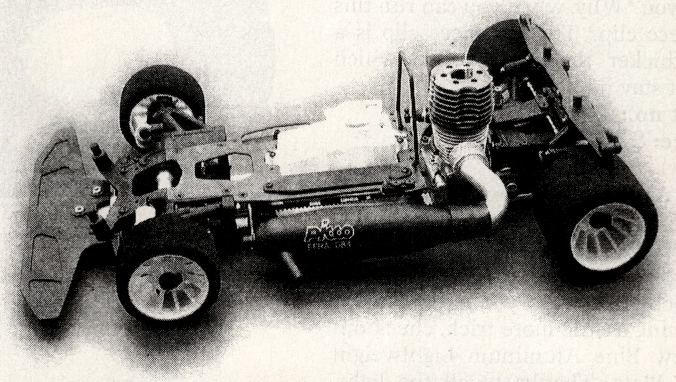
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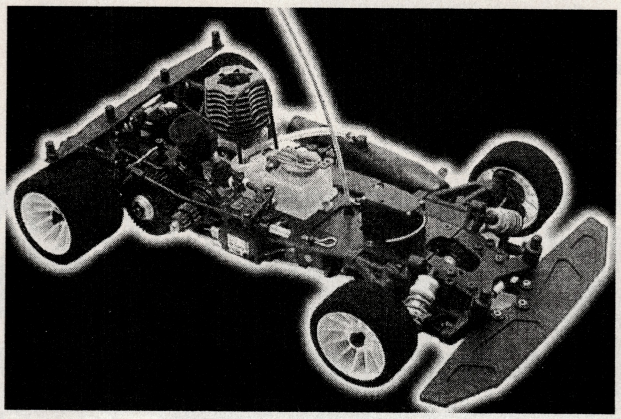
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PARIS-POWER



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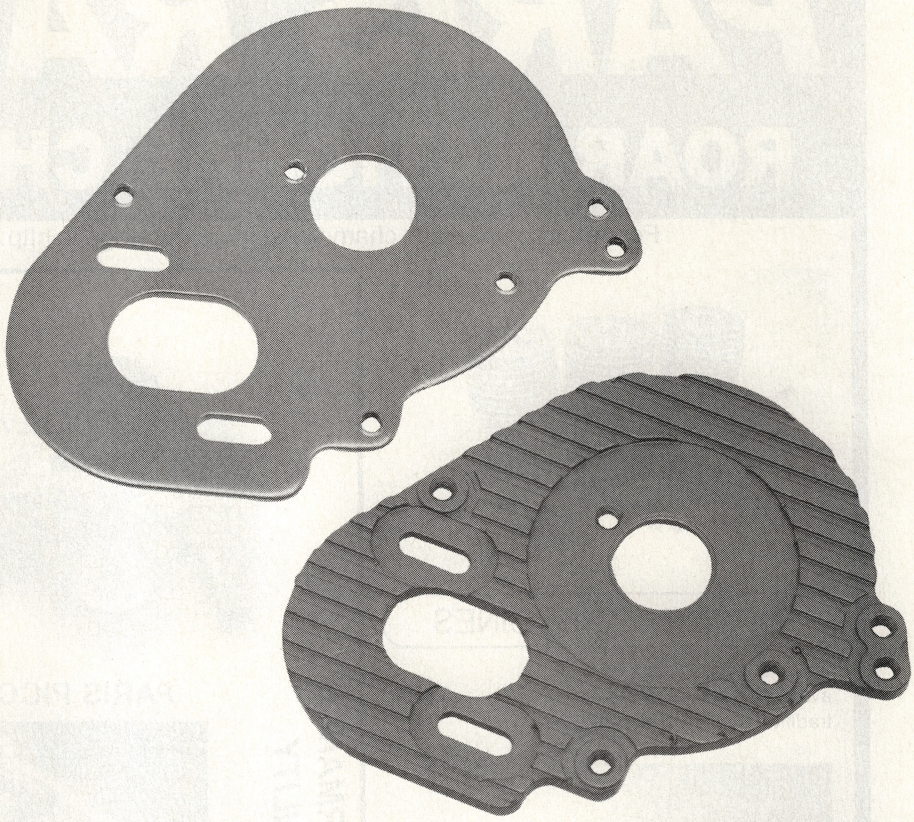


One Piece Rear Wing Clip—still running two body clips on your rear wing, aren't you? Why, when you can run this one-piece clip? The one-piece clip is a little thicker than stock clips which helps it stay put a little better.
Part no.: TK5020
Price: $TBA

Blue Aluminum Standard Motor Plate—dress up your car with this sweet-looking blue-anodized aluminum motor plate. It is essentially the same as the stock piece. Or, if you're looking for something a little more trick, check out the new Blue Aluminum Lightweight Motor Plate. Thanks to all the lightweight milled-out sections, it provides more surface cooling area for the motor.
Part no.: TK5022
Price: $10.99 (standard)

Part no.: TK5023
Price: $25.99 (lightweight)

Part no.: TK5022



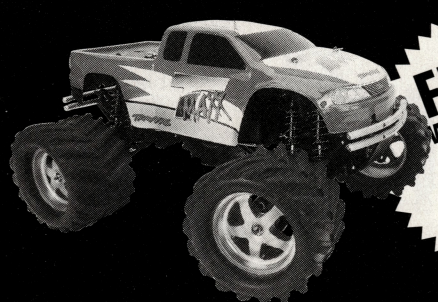
Part no.: TK5023

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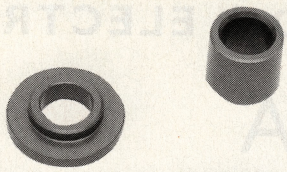


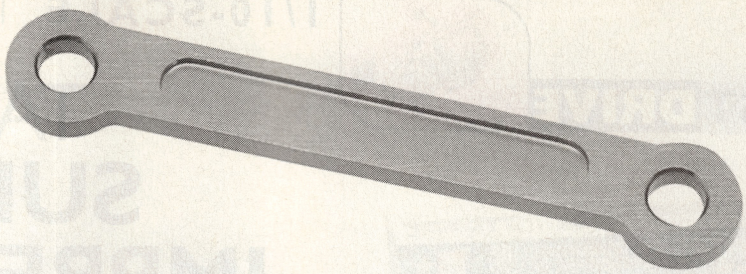
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Blue Aluminum Bearing Spacers—don't wanna bind up those bearings, do you? Didn't think so. These aluminum bearing spacers help eliminate any wheel bearing binding situations.

Part no.: TK5025
Price: $9.99 (4 pcs.)



Blue Aluminum Rear Arm Brace—keep your rear suspension arms from flexing in and out with this aluminum rear arm brace. It can also help keep the stock plastic pivot support in one piece in the event of a bad crash!

Part no.: TK5026
Price: $8.99

Blue Aluminum Screw Kit—replace the stock steel screws with these lightweight pieces. Bonus—it gives your car that "factory" look!

Part no.: TK5024
Price: $18.99 ◆

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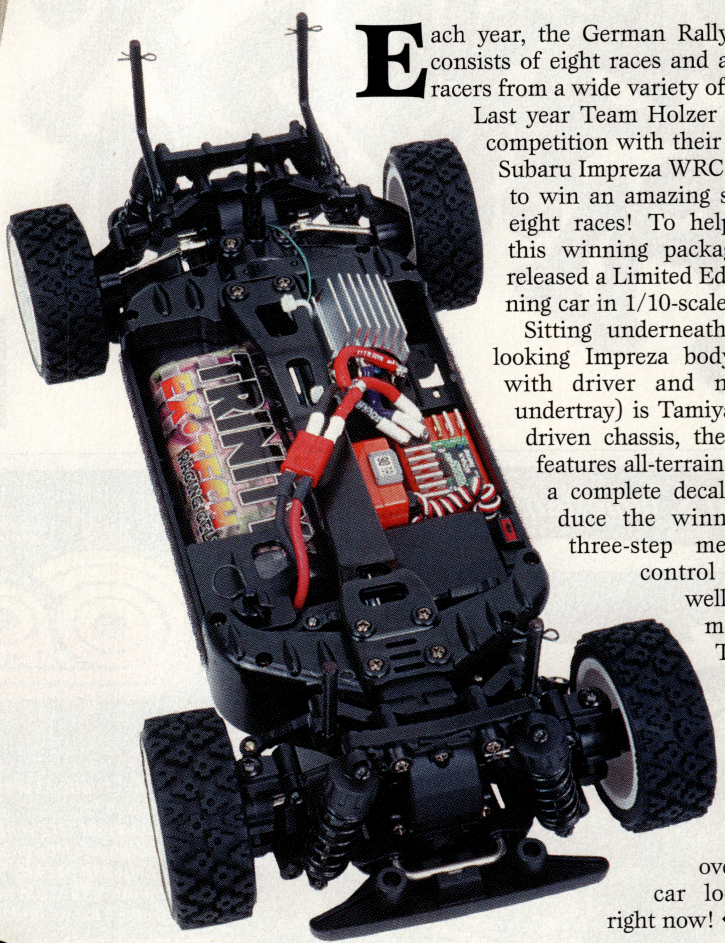
TAMIYA SUBARU IMPREZA TB01

A Quick Look at this Limited Edition German Rally Car









Each year, the German Rally Championship consists of eight races and attracts cars and racers from a wide variety of different teams. Last year Team Holzer blasted past the competition with their highly modified Subaru Impreza WRC as they went on to win an amazing seven out of the eight races! To help commemorate this winning package, Tamiya has released a Limited Edition of the winning car in 1/10-scale trim.

Sitting underneath this stunning-looking Impreza body set (complete with driver and navigator figure undertray) is Tamiya's newest shaft-driven chassis, the TB01. The kit features all-terrain rally-block tires, a complete decal sheet to reproduce the winning car, and a three-step mechanical speed control is included as well. For more information on the TB01 chassis platform, you can check out our in-depth review in R/C Car May 2000. Otherwise, you can drool over how cool this car looks right here, right now! ◆

TB01 SPECIFICATIONS

Length	17.3 in./442mm
Max. width	7.3 in./185mm
Wheelbase	10.1 in./257mm
Front track	6.1 in./157mm
Rear track	6.1 in./157mm
Weight (RTR)	3 lb. 14 oz./1770g

Limited Edition Tamiya Subaru Impreza German Rally TB-01/ Part #58259—$234.00 (retail price)

Manufacturer: Tamiya America, Inc., 2 Orion, Aliso Viejo, CA 92656-4200 • phone (800) TAMIYA-A; fax (949) 362-2250

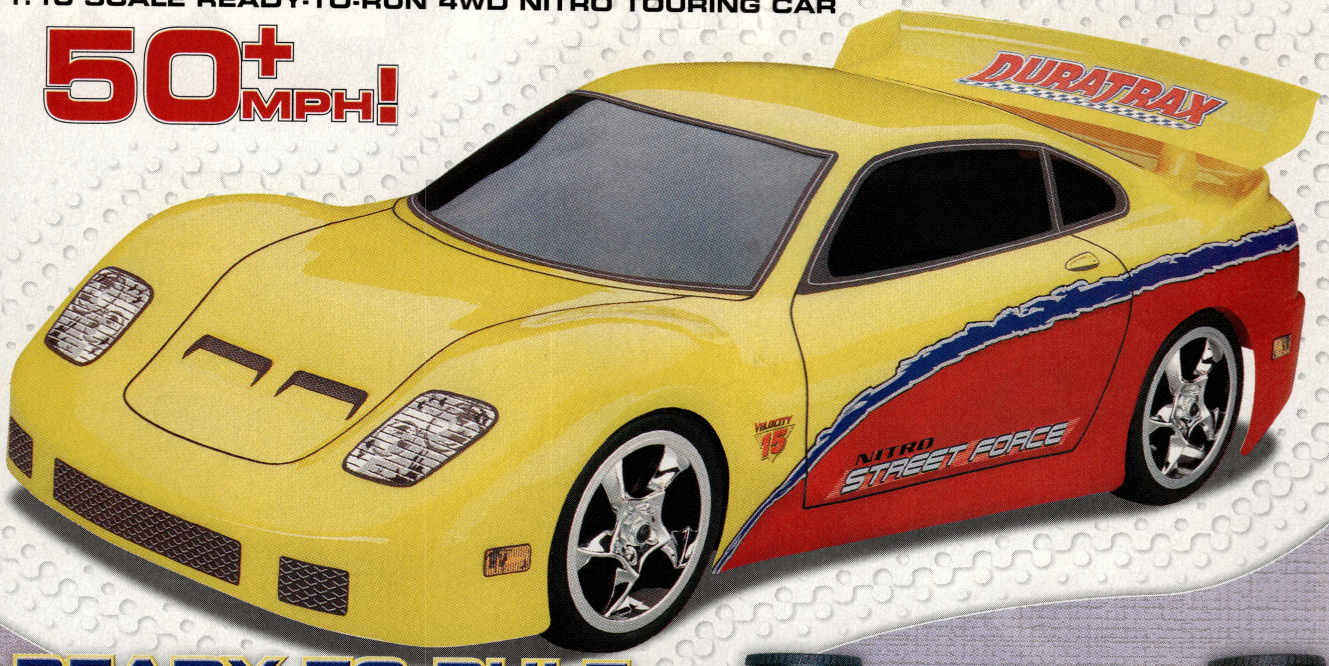


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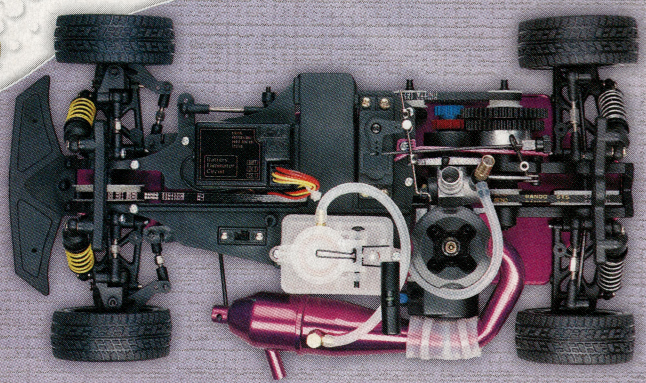
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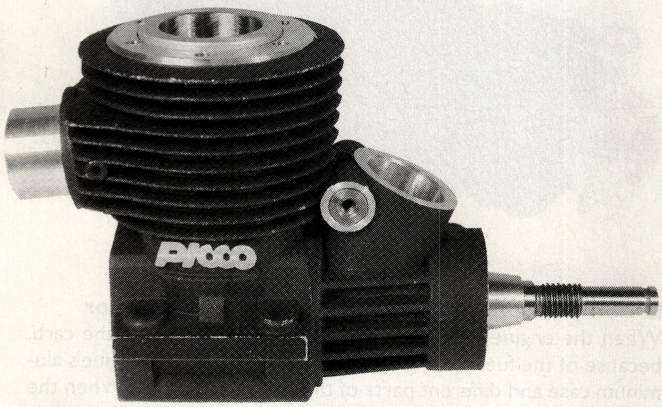
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FIRST LOOK!
Picco

PICCO G1 ENGINES

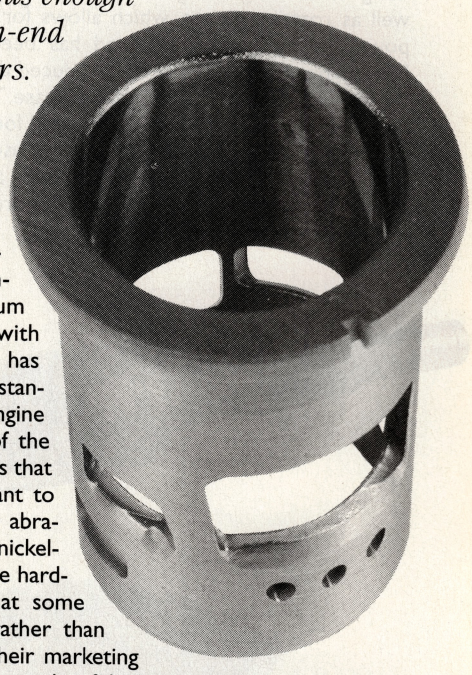
Picco engines are among the elite in the highly competitive world of gas racing. Paris Racing is the exclusive U.S. importer and service agent for the new Picco G1 engine series (and all Picco engines except the new Trinity/Picco 12-RC), and was generous enough to give R/C Car *an exclusive first look at this incredible lineup of high-end racing engines for 1/8-scale on-road and off-road cars. The G1 Series replaces Picco's JS engines.*

G1 ENGINE COMMON FEATURES



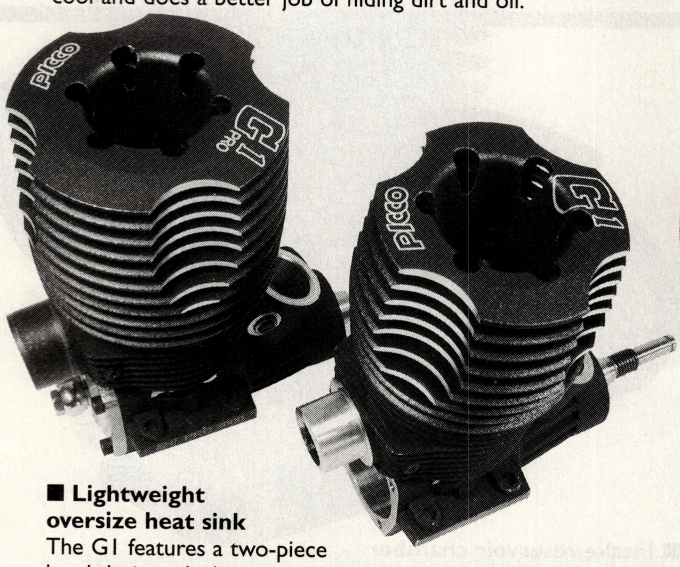
■ Precision-cast black crankcase

Some engine manufacturers claim that black engine cases absorb heat, but this isn't the entire truth. The fact is that the color black absorbs certain rays of solar radiation, i.e., sunlight. So unless your black engine is left out in the sun, there is really no reason that it should become hotter than an engine with a standard silver case. In reality, the chief advantage of a black engine case is that it looks cool and does a better job of hiding dirt and oil.



■ Hard-chromed cylinder sleeve

Every new Picco G1 features true ABC construction (aluminum piston, brass sleeve with chrome plating). This has become the industry standard for European engine builders. The benefits of the sleeve's chrome plating is that it is much more resistant to wear and damage from abrasion than a standard nickel-plated sleeve or even the hard-nickel-plated sleeves that some "ABC" engines have (rather than chrome, despite what their marketing departments say). As a result of having a hard chrome-plated sleeve, the break-in time must be increased to allow a sufficient period of break-in between the piston and sleeve, but the end result is an engine that will maintain its high output-level longer.



■ Lightweight oversize heat sink

The G1 features a two-piece head design which consists of a combustion head, or button, and a finned aluminum heatsink. This design permits the engine builder to construct the head button from an alloy that's better suited for mating with the cylinder sleeve. The separate heatsink that tops off the engine can then be made from the best heat-conducting alloy to provide the coolest operating temperature. Remember, a cool engine can make more power and last longer.

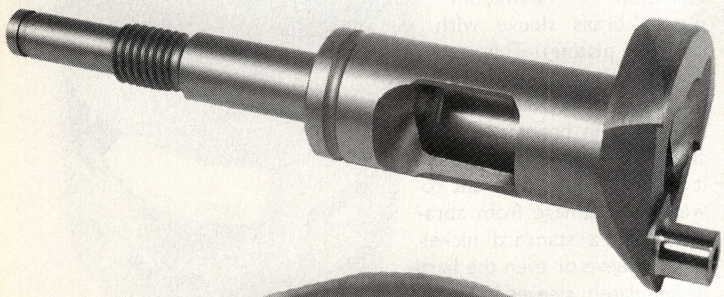


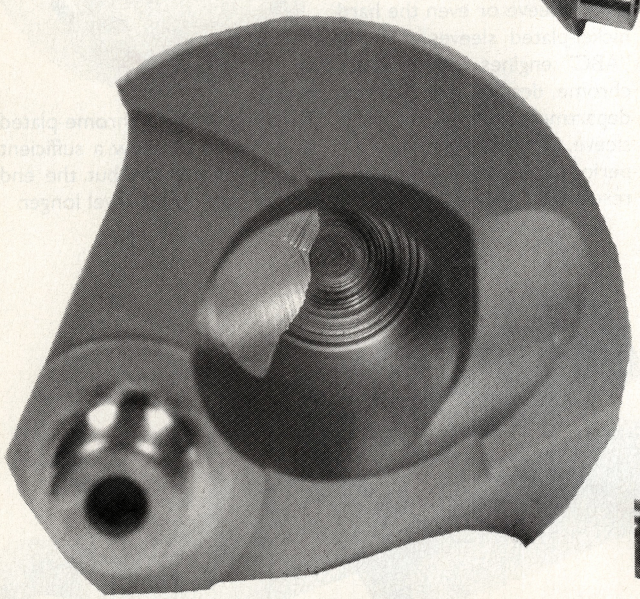
■ Lightweight profile cast piston with high silicone percentage

Picco's designers created the G1's piston to provide the best balance of weight, friction and strength. The G1's profile-cast piston features a higher amount of silicone content to substantially reduce the friction between it and the cylinder sleeve, yet the balance of material still provides the optimum coefficient of expansion to ensure the best combustion seal possible. A greater amount of slippery silicone translates into higher rpm and more power. And because the piston is specially cast to be as lightweight as possible, its reciprocating mass is greatly reduced to increase the engine's ability to accelerate quickly.

PICCO G1 ENGINES

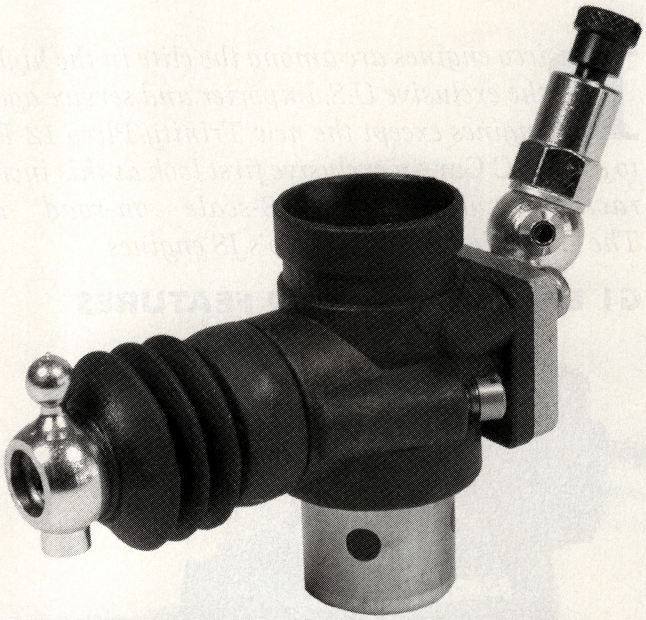
■ Lightweight, double-bushing, aerodynamic conrod
The G1 engines use the state-of-the-art in connecting-rod design. Machined from solid bar-stock of an aerospace alloy (the composition of which Picco wishes to keep to itself), the G1 conrod is designed to be lightweight to reduce both reciprocating weight as well as rotating weight, which allows for higher rpm and more power. In addition, the conrod has been aerodynamically and hydrodynamically optimized for reduced drag as it whips through the fuel/air mixture inside the crankcase. This also improves rpm and efficiency. Each conrod is inspected for flaws using X-rays and ultrasound testing—the same process used with high-end aerospace components—to ensure durability and strength. Both ends of the rod also have high-quality phosphorous bronze bushings for long wear and less friction.



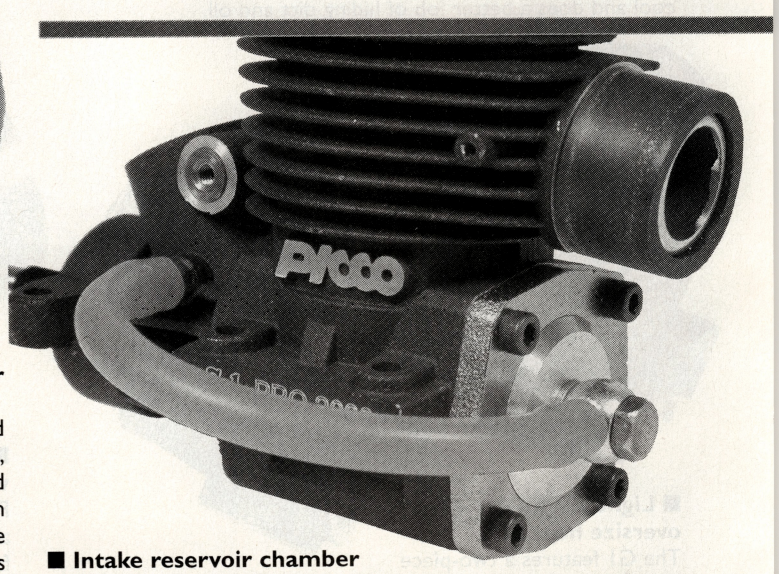


■ 13mm crankshaft with special aspiration and longer stroke
The G1 crankshaft is unique in that its bore is slightly elliptical and has been placed off-center to produce a "slinging" effect as it spins, which causes less fuel to be collected on the inside of the bore and more to be forced into the crankcase for combustion. This design improves flow from the carb to the crankshaft and to the crankcase and allows the G1 to run more efficiently. All G1 cranks feature a hard-chromed crank pin for improved wear and less friction. The new longer stroke improves engine torque and efficiency.

■ Nickel-plated rear cover
A nickel-plated rear engine cover reduces friction between itself and the connecting-rod to provide higher rpm and reduced wear. It also features cast-in transfer-port bypass reliefs.



■ Composite Easy Tune traditional slide carburetor
When the engine's running, one of the coolest parts is the carb, because of the fuel passing through it. The rest of the engine's aluminum case and different parts of the engine are hotter. When the motor is shut off, the heat then equalizes over the entire engine. An aluminum carb will abosrb that heat and can cause the fuel to boil and evaporate as it enters the carb, causing vapor lock. But heat will not transfer to a composite carb. This keeps the incoming fuel and air charge cooler and denser, which equals more horsepower. Composite carbs are common in off-road, where they are more critical because of higher temperatures.



■ Intake reservoir chamber
The G1 Pro-BV buggy engine features a special reservoir/boost chamber integrated into its rear cover. What this chamber does is increase the volume between the carb's slide and the rotor of the crankshaft. This larger volume essentially reduces the "pulse" that occurs when the rotor opens and draws the fuel/air mixture inside. The result is a "calming" effect and smoother throttle response. Improved fuel economy is also a benefit.

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PICCO G1 ENGINES

G1 PRO FEATURES

■ Super balanced Crankshaft, 13mm w/special aspiration and longer stroke
Similar to the design found on the standard G1 but with a teardrop relief to enhance aspiration, the crankshafts of both G1 Pro engines have been further balanced to improve the engine's harmonic balance throughout the useful rpm range.

■ Conical seat (Turbo) head insert
The G1 Pro On-Road engine features a Turbo-plug head insert that allows the use of larger Turbo plugs. The benefits of using these type of plugs are that they seal the combustion chamber more positively so there's no leakage or "dead area" during combustion. Turbo plugs also have better physical contact with the combustion area for improved heat dissipation. The Pro On-Road engine is the only G1 to make use of Turbo plugs; all of the other engines—the G1 Off-Road, On-Road and G1 Pro Off-Road—use standard head inserts and standard glow-plugs with washers. For more information on Turbo plugs, including why they aren't recommended for off-road use, see Ron Paris' article in this issue.

■ Hard-chromed wrist-pin
The G1 Pro engines are the only ones available that have hard-chrome wrist pins for reduced wear and less friction during operation.

■ Nickel-chromed rear cover
The rear engine covers of both G1 Pro engines feature a nickel-chrome finish to further reduce friction between the conrod and the back of the cover. ◆

SOURCES
Picco, distributed by Paris Racing Products, 4254 Independence St., Chino, CA 91710 • phone (909) 465-1189; fax (909) 465-0089

	P21 G1 On-Road	P21 G1 Off-Road	P21 G1 Pro On-Road	P21 G1 Pro Off-Road
Carb	9mm composite slide	7mm composite slide	9mm composite slide	7mm composite slide
Capacity	3.49cc	3.49cc	3.49cc	3.49cc
Porting	6 + 1	6 + 1	5 + 2 + 1	6 + 2 + 1
Stroke	16.80mm	16.80mm	16.80mm	16.80mm
Bore	16.26mm	16.26mm	16.26mm	16.26mm

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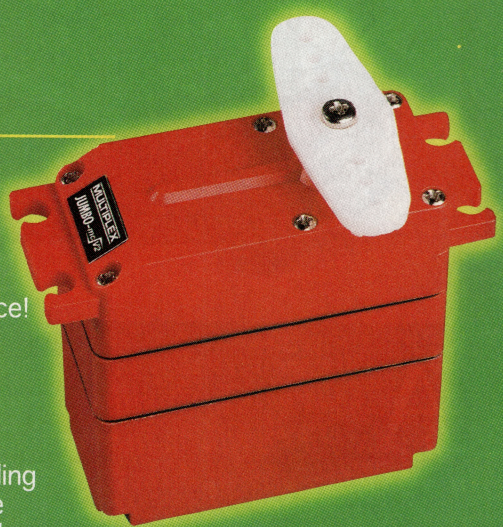
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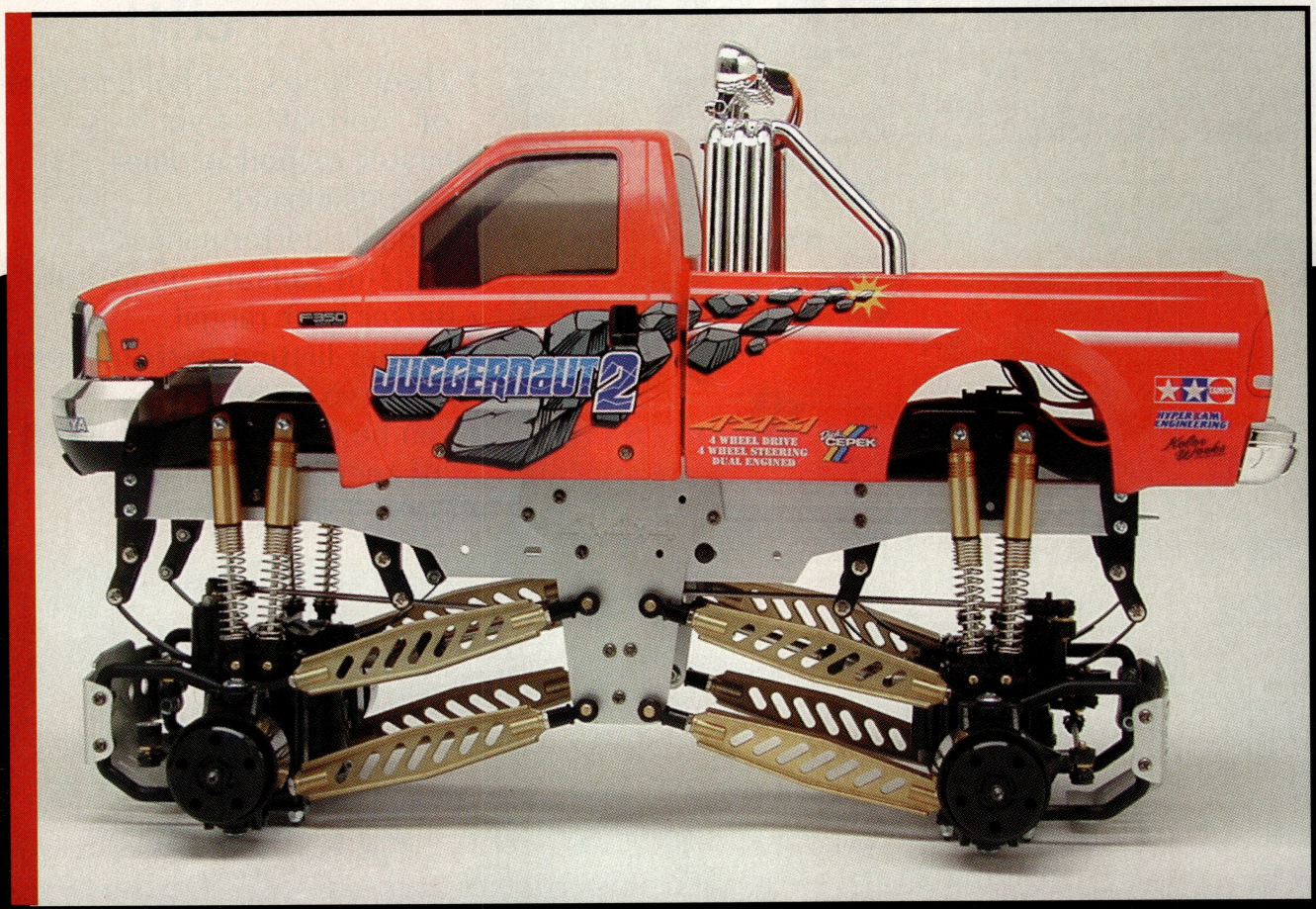
	Profi 3BB*	Micro Speed	Micro mc/V2	Profi Speed	Profi mc/V2	Power	Jumbo
Speed	0.16	0.06	0.15	0.09	0.12	0.19	0.20
Torque (in./oz.)	60	42	56	62	75	135	297
Holding Power (in./oz.)	180	165	126	186	225	405	891
Price	$60.11	$99.95	$99.95	$99.95	$99.95	$135.50	$159.95

* Profi 3BB is NOT digital or programmable
All mc/V2 servos listed have two ball bearings and metal gears
Power mc/V2 and Jumbo mc/V2 can be run on six cells.

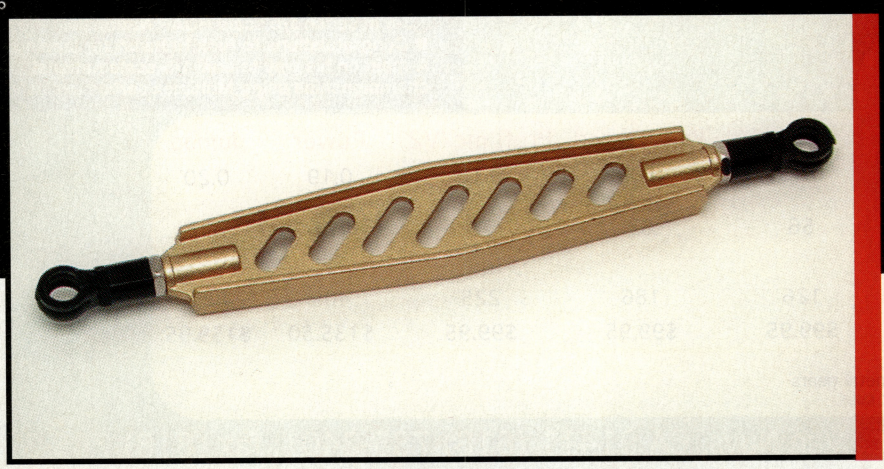
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TAMIYA JUGGERNAUT

It's time to beef-up and brighten-up your monster!



After we reviewed the Tamiya Juggernaut 2 last issue, we received a care package from the good folks at Tamiya America that contained a few hop-ups for the beast. Unfortunately, we didn't get them in time to include them in the article, so we thought it would be a good idea to give you a peek at them in this issue! According to Tamiya, more items may be on the way, but for now these mods will have to tide us over.

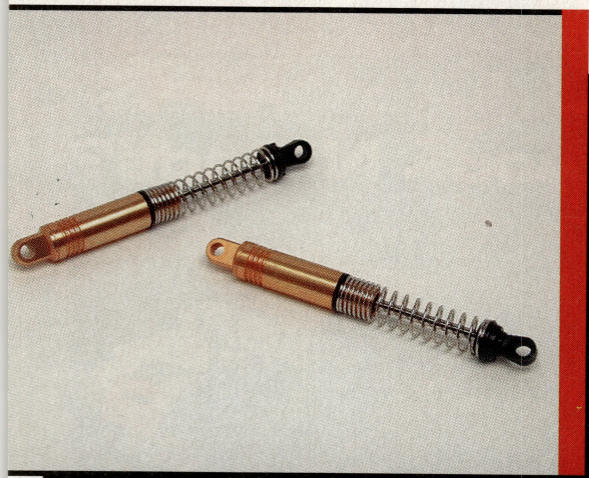


The gold-anodized Aluminum Suspension Arms are extremely lightweight (surprisingly so), yet seem capable of tackling tough terrain without tweaking. We also like the slanted cutouts—it gives each piece a distinctive look.

Parts List

- Aluminum Suspension Arms Set (2 pair) #53383—$44.00
- Aluminum Damper Set (2 pair) #53369—$47.00
- R/C Light Bulb Set #53370—$46.00

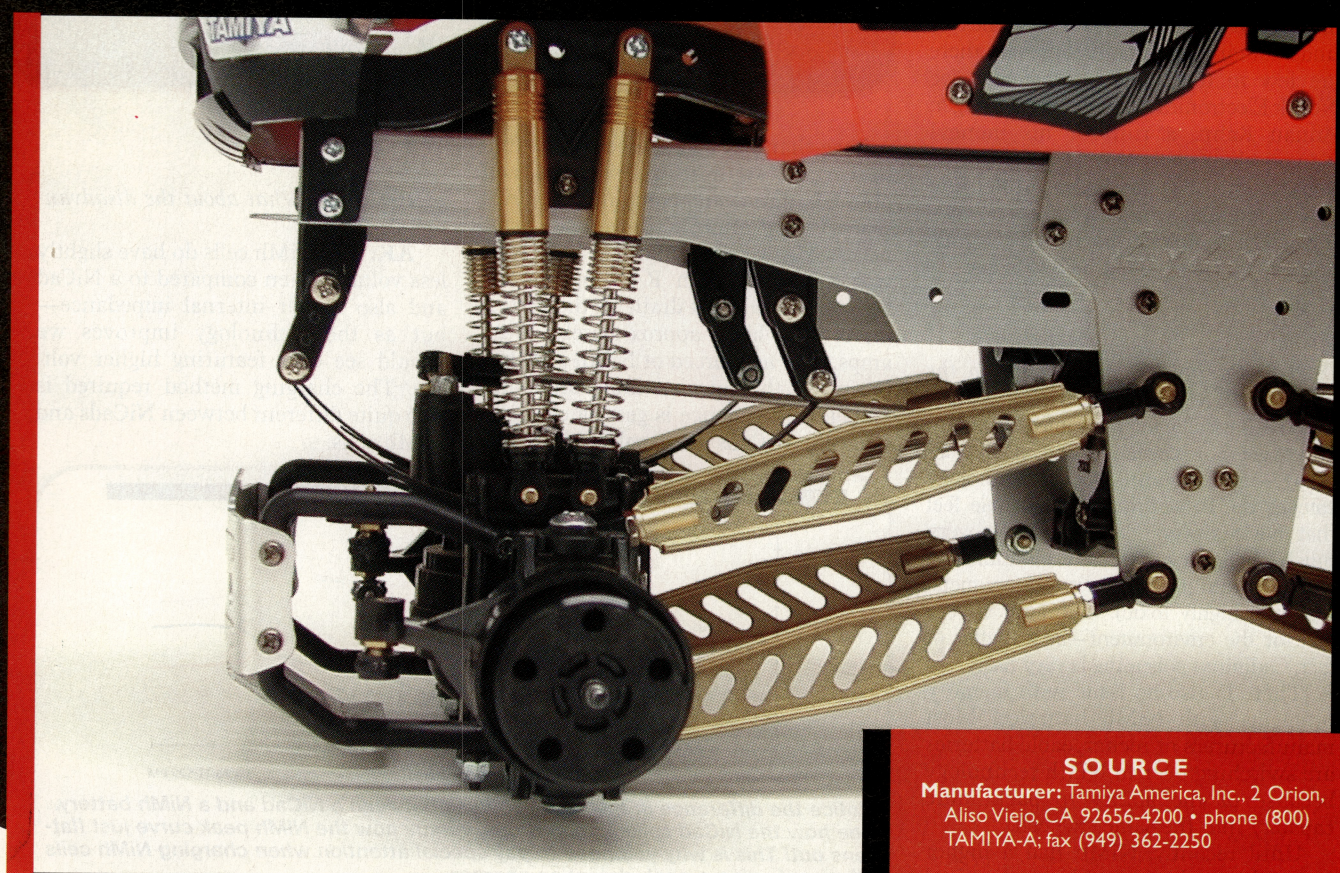
ALLOY MODS



The stock spring-loaded dampers don't do much to help out in the suspension department—the leaf springs are too stiff to even let the shocks work properly. With that in mind, it has to be said that the gold-anodized Aluminum Damper Set is more a cosmetic item (even though they are oil-filled) than a performance enhancer. Still, it you plan on bolting on a set of the gold-anodized Aluminum Suspension Arms, the gold damper set would be a nice compliment to the arms.

If you plan on driving your Juggernaut 2 at night (uh...we hope that's not what you're really planning), then the R/C Light Bulb Set is for you! The set comes complete with headlights, front and rear fog lamps, roll-bar lights, and rear brake lights. We were mightily impressed with the results. The lighting system is fairly intricate—but it really adds to the scale-looks of the truck in a big way!





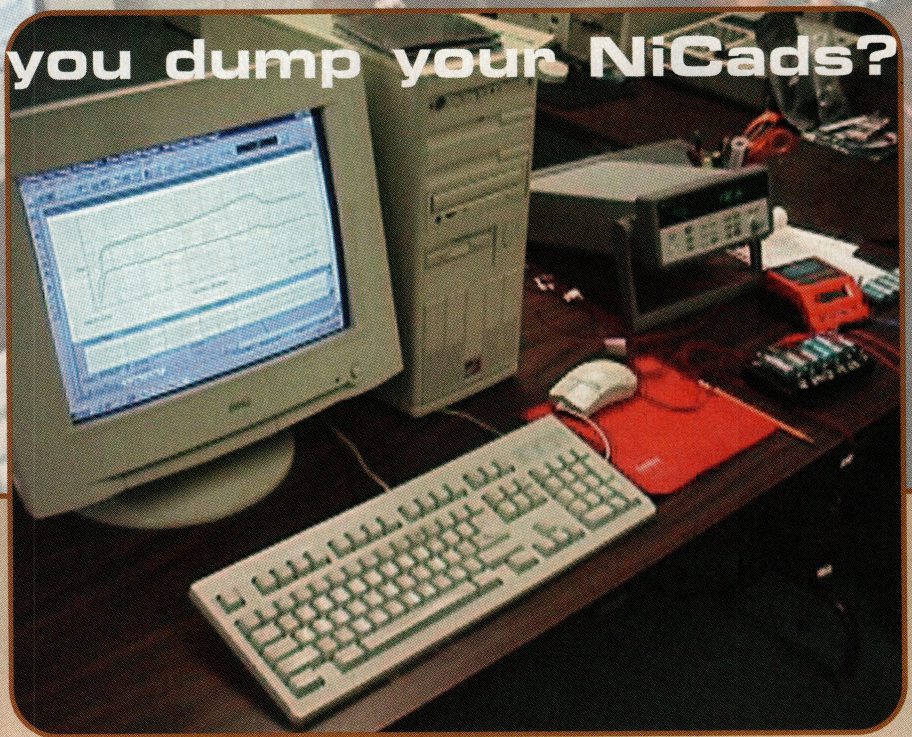
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Manufacturer: Tamiya America, Inc., 2 Orion, Aliso Viejo, CA 92656-4200 • phone (800) TAMIYA-A; fax (949) 362-2250

10 QUESTIONS ABOUT NiMh BATTERIES

So, should you dump your NiCads?

With the introduction of the Panasonic and newer Sanyo 3000mAh NiMh batteries, there has been some confusion in the R/C community as to just where the new batteries and the new technology is leading us. Are NiMh packs the future?



Are NiCad batteries dead? For months now, we've had people come to us asking us all sorts of questions about NiMh technology, so we compiled a list of the top ten questions we've run across and turned to an industry expert. When it comes to understanding battery technology, there are few in the industry who can give Novak Electronics' Engineering Manager, Adnan Kahn, a run for his money! Adnan, along with Novak's engineering department, designed the Millenium charger and has worked very closely testing NiMh samples from both Panasonic and Sanyo. Here's what he had to say.

1

R/C Car: *What advantages do the 3000 NiMh cells have over NiCads?*

AK: Basically, for the same size you're able to get more capacity using NiMh technology—at least until NiCad technology catches up. In addition, most people feel that NiCads won't be around for very much longer because of the Cadmium recycling program (Cadmium is a heavy-metal which is highly toxic). Cadmium is very bad for the environment—as a matter of fact, Cadmium poisoning is very nasty!

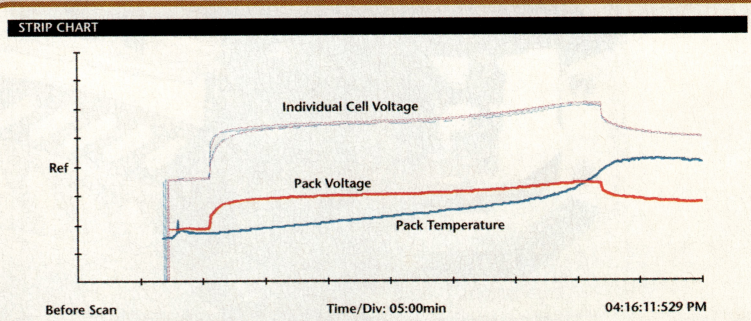
There is also no issue with memory problems with NiMh batteries. Most manufacturers of rechargeable batteries are switching over to NiMh technology because of the ability to pack more capacity into the same size cell.

Until recently, NiMh had a higher internal impedance and lower terminal voltage than NiCads. While that is fine in certain applications such as cell phone batteries and computer batteries where high internal impedance isn't necessarily a priority but capacity is, it was a hindrance in R/C applications because the current drain on the batteries is very high; approximately 15-25 amps. The new breed of NiMh cells has improved the internal impedance and voltage performance is getting closer to what the NiCads are capable of.

2

R/C Car: *What about the disadvantages?*

AK: The NiMh cells do have slightly less voltage when compared to a NiCad and also higher internal impedance—but as the technology improves we should see cells featuring higher voltage. The charging method required is also quite different between NiCads and NiMh cells.



Notice the difference in the "peak" curves between a NiCad and a NiMh battery. See how the NiCad spikes, then drops, versus how the NiMh peak curve just flattens out! This is why you need to pay special attention when charging NiMh cells when not using a peak-detection charger.

3

R/C Car: *So how should I charge my 3000's—do I need a special charger?*

AK: We recommend that you charge your NiMh between three and five amps. The reason for the lower amp rate is due to the fact that you can damage NiMh cells by charging them at higher currents which can overheat them and heat can drastically reduce the overall life of the cell.

Conversely, a NiCad battery can withstand much higher temperature changes during charging. The delta peak method (the most popular form of charging today) has to be drastically modified or a different method altogether needs to be used to charge NiMh. As a NiCad pack is peak charged, the charger monitors the voltage, detects its peak voltage then shuts off the charging once the voltage curve begins to drop. All NiCads begin to drop in voltage as soon as it peaks. A NiMh voltage curve, on the other hand, "flattens out" once its hit the peak and it doesn't drop in voltage. Because of this characteristic, a typical delta peak charger won't detect when the NiMh pack has peaked, and will continue to charge the pack, damaging it along the way. As technology improves there will be other methods to charge NiMh packs and specific chargers will be made to charge them. If you happen to have an older style charger and you want to charge a NiMh pack, you have to carefully monitor the pack temperature as you charge it. Don't let it get over 110-degrees! And remember, when a NiMh pack peaks, it will build up heat quickly if you continue charging.

4

R/C Car: *After I'm done running them, can I recharge them and use them again?*

AK: We've found that the NiMh cells are pretty rugged. During our bench testing sessions, we've found that they can be run two to three times, no problem. Even in racing applications where the cells may be of a higher grade, we don't think that there will be much of a difference if you run them more than once or twice a day. However, let the packs cool down in between runs or after discharging, though. Don't let the heat build up too much!



5

R/C Car: *Should I use a bulb discharger on them after I run them?*

AK: Absolutely not! It can ruin a NiMh pack—a bulb discharger will bring the cells down to too low a voltage. NiMh cells seem to be a lot more delicate than NiCads in this sense. Never put resistors on them overnight as well—this also could reverse the polarity of the cells. Because NiMh cells don't have a memory issue, these procedures are unnecessary.

However, if you use a NiMh pack and run only a partial charge that leaves you with left over capacity, and want to charge them again, first let them cool, then discharge the pack. Novak's tests have found that this gives the pack more runtime than if you just recharged the partially charged pack

If you have a discharger unit where you can set the cutoff voltage, don't let the cells go under 1v per cell (6 volts total for a six cell pack) when discharging.

6

R/C Car: *I've heard that people are "motoring down" when racing with 3000 cells. Will this put any additional strain on the batteries?*

AK: I've heard that people are going as far down now as 7-turns. Eventually, the current drain this motor provides could damage the cell. When you go wide open with a low turn motor like that, it's almost like a dead-short situation which leads to cell degradation.

Energy conversion in a R/C electric motor is accomplished by the means of the magnetic field provided by the permanent magnets and the reaction of magnetic field generated by the electric current in the armature (Megnetomotive force). Under normal operating conditions, there is balance between these two forces, but a small amount of temporary demagnetization occur in the permanent magnents. In most cases this armature demagnetization, which is called armature reaction, has only a reversible effect; i.e., when the current in the armature goes to zero the magnets return to full-strength. A very low turn motor allows the current in the armature winding to exceed that level (this level is dependent of the magnets in the can). Once this threshold is exceeded, a permanent demagnetization of the motor magnet occurs. When this demagnetization starts, the magnetic field intensity, developed by the armature reaction, is great enough to overcome the magnetic domains of the magnet structure. This process can become runaway as the motor temperature rises due to the reduction of magnetic field of the PM at elevated temperature and loss of efficiency which causes further heating. If the motor temperature is allowed to elevate, uncontrolled permanent damage to the motor and battery will occur.

Since all the work in an electric motor is done by Megnetomotive force, which is the force generated by current flowing through armature winding, the unit of magneto motive force is mmf. Thus a coil with 10 turns and 15 amps of current or 5 turns and 30 amps would produce the same amount of mmf 20-turn. The highest possible motor efficiency should be the goal to get the best run time. As the motor current goes up so does the voltage losses in the brush assembly, wire loss and speed control. All these increasing losses can be controlled by keeping the current requirement of the motor within reason and that can be easily accomplished by using motors with higher turns. I recommend that you should play around with gear ratios and stick with a higher turn motor instead.

10 QUESTIONS ABOUT NiMh BATTERIES

7

R/C Car: *Are there any specific steps I need to take to care for my 3000s?*

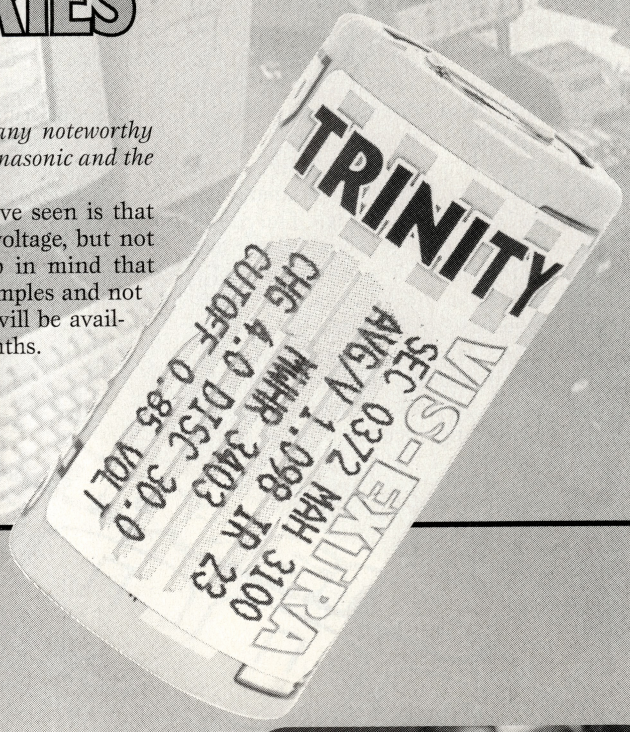
AK: Well, first and foremost, it's best to store them partially charged versus discharged. Other than that, take the same care of your packs that you would with a NiCad pack. For instance, never leave your pack soldered in a car—if you accidentally leave the switch on or something happens, the car could take off on you! Don't store them in your toolbox—believe it or not, we've had instances where people have left charged packs in their toolboxes with metal tools sliding around!

Keep them cool, don't overcharge them, and don't try and re-peak them after they're ready to go. If you take good care of your batteries, they should last a long time.

8

R/C Car: *Are there any noteworthy differences between the Panasonic and the new Sanyo 3000 cells?*

AK: So far what we've seen is that the Sanyo's have more voltage, but not as much run-time. Keep in mind that these are engineering samples and not production cells which will be available in the next few months.



What Does the Dirtinator Think of NiMh Batteries?

● We asked top Team Trinity driver Brian Kinwald how he feels about racing with the new 3000 NiMh cells.

R/C Car: *Tell us, Brian, in what classes do you use the new 3000's?*

Brian: Pretty much every class right now—although they seem to work best for on-road and touring car. In the beginning, everyone was using them in their 4WD buggies, but slowly we started using them in every class.

R/C Car: *Have you found the slight decrease in voltage to be a significant problem?*

Brian: For some reason, the packs I've been using over and over seem to have more power than my 2000s! I don't know why, but it seems that the more you run them the better they get.

R/C Car: *Do you notice any change in driving style or tactics when using these cells?*

Brian: Not really, I charge my batteries at 7amps so they have a lot of punch! I found that you want to stay consistent with your charging method as it doesn't seem to hurt your cells. When I first started using the NiMh batteries, I was charging my packs at three amps like everyone recommended, then I moved up to four, and eventually up to seven. Seven amps seems to be working the best so far—they feel much stronger charged at this amp rate.

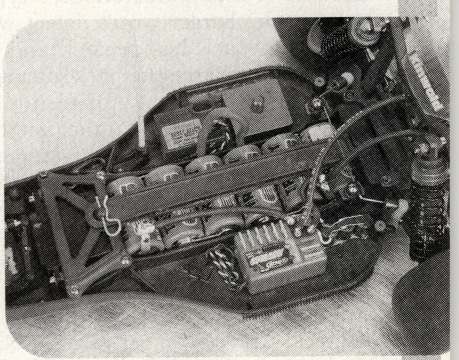
R/C Car: *What about motoring down? Have you been running hotter motors?*

Brian: No, I found through testing that you can't really run a faster motor just because you have more runtime—it seems to be slower to me.

R/C Car: *Any recommendations on caring for them?*

Brian: Be careful when you discharge them! Don't discharge them past 5.4 volts (total pack voltage), and don't use resistors on them. I run the same motor and same gearing that I use with my 2000s. ●





9

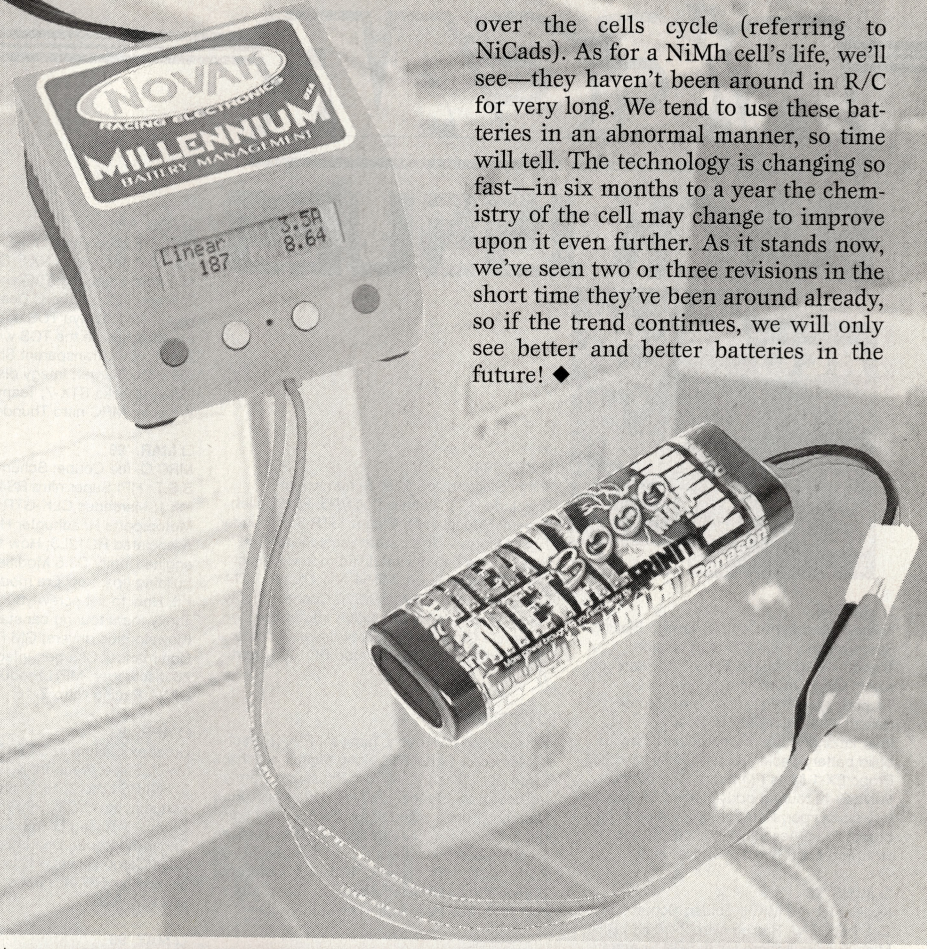
R/C Car: *Realistically, how much more capacity can be expected out of a sub-c size cell?*

AK: We used to think that 1500mAh was the upper end back in the day and now we're at 3000! All I can say is that there is a lot of research going on in Japan and in the U.S. to develop NiMh batteries for full-size electric cars. I wouldn't be surprised to see some of that technology trickle down and see 4000, or 5000 mAh capacity cells in the next few years—the sky's the limit. I believe that 3000 is an interim step!

10

R/C Car: *What kind of life expectancy does a NiMh cell have versus a NiCad?*

AK: It should inherently have a higher cycle life because of the non-memory issue. It also has a lower self-discharge than a NiCad (older NiCads can discharge themselves over a period of time by several percent per day). What that causes is a reduction in life over the cells cycle (referring to NiCads). As for a NiMh cell's life, we'll see—they haven't been around in R/C for very long. We tend to use these batteries in an abnormal manner, so time will tell. The technology is changing so fast—in six months to a year the chemistry of the cell may change to improve upon it even further. As it stands now, we've seen two or three revisions in the short time they've been around already, so if the trend continues, we will only see better and better batteries in the future! ◆

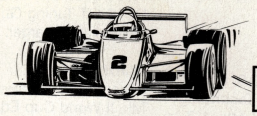


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R/C CAR BACK ISSUES



❑ **MAY '98**
Kyosho Nitro Mini-Cooper; Tamiya Blazing Star; Yokomo YR-4 MS USA version; Traxxas 4-Tec; Mugen Prime 12; Team Losi XX-4 Racing Truck; Innoventive Technologies CVEC tuned pipe; Motor Saver filters; PC/RC EFR; Reedy International Race of Champions; how to build battery packs; Kyosho Rally cars; KO Propo EX-1 Mars FM radio; PROTOForm Volvo S-40 touring body; Tekin DIS-350 battery discharger; Racers Edge diff building board; Team Associated RC10T3 (Part 1); HPI Nitro Mini (Part 1); Tamiya M02l.

❑ **JUNE '98**
Kyosho GP-10 MK. II Spider; Schumacher Cat '98; OFNA Racing Nitro Z-10 HPI RS4 Mini; Kyosho Inferno DX II; SRP Spectre; Bennett vs. ESP Clods; '98 Team Losi Winterchamps; Airtronics anti-lock brake booster; Cross Racing JOMO Nissan Skyline GT; GM Racing Super Glue; Tekin G-10 PRO ESC; Hitec Lynx FM Radio; Schumacher '98 Spec S.S.T. 2000 (part 1); Team Associated RC10B3 (part 2); Team Losi Double-X Kinwald Edition (part 2).

❑ **JULY '98**
MRC Nitro Thunder King; Traxxas Nitro Sport; Kyosho ATV Quad rider; OFNA Pirate 10 SE Porsche; Kyosho Formula 10; Team Losi XX-T 'CR' Graphite; Team Losi XX-4 (part 2); Tamiya M02L (part 3); Futaba 3PJ FM/PCM radio system; Roland Digital Group Sitka; Schumacher gauge set; Dirt Bagz Battery Caddy; Robinson Racing bearing cleaner; GM Racing V-12 ESC.

❑ **AUG. '98**
HPI Nitro RS4 Racer; Tenth Technology StreetWise Stadium Truck; Thunder Tiger Twister; Yokomo MX-4; Team Associated Nitro Dual Sport; Team Associated Nitro Dual Sport; inside the Silver State Nitro Challenge Winners; Setting your suspension; 12 ways to go faster!; inside the Pro-Line Cactus Classic; Factory Works Motor Centering Kit for Losi vehicles; MIP Thorpe Wrenches; Futaba Magnum Sport and Magnum Junior Radios; Progressive Suspension EDC Shocks; Schumacher CAT '98; Team Associated RC10T3.

❑ **SEP. '98**
Trinity Switchblade 12sj; Schumacher Fireblade USA; Tamiya Golf VR5; FSR Bullet; Kyosho SuperTen McClaren; GTR F1; Thunder Tiger Mirage V-Spec; which scale is for you?; how to care for your modified motor; project Dirt Oval Nitro Sport; MIP 4-N-1 Clutch; RPM Tire Gluing JIG; Hitec CG-330 Charger; Trinity Touring Car Tire Tamer; OFNA starter box; Dynamite Glow Tuning Screwdriver; Team Losi XX4 (part 1); Team Associated RC10GT (part 1).

❑ **OCT. '98**
Kawada SV-10 Alcyon; Tamiya's PIAA Porsche & Mercedes CLK GTR; Schumacher Nitro .21 Xtreme; Kyosho Nitro Blizzard; Tamiya Volkswagon Beetle; ROAR Off-Road Fuel Nationals; understanding swaybars; 10 beginner problems; OFNA car stand; Performance Hobby Jack Stand with Lite Switch; Novak Atom ESC; JR Racing XR2 AM Computer Radio; Trinity Monster Stock Jr. Stock Motor; HPI RS4 Pro; Team Losi Kindwald Edition

❑ **NOV. '98**
HPI RS4 Rally; MRC Nitro Thunder King; HPI Mini Pro; Team Associated L3; Tamiya Ferrari F310B F1; Tech Racing Voggerd GT; Kibrough/BSR Oval Shootout; Mark Pavidis' new Mugen MBX-4; building a track; turn marshalling rules; Tamiya Championship Series; RPM Ride-Height gauge; Dynamite Ultra-Start starter box; Tekin Pro Motor Dyno; Traxxas Nitro Sport.

❑ **DEC. '98**
Kyosho TF-3 Type-R; Tamiya M0-3 Cooper; Kawada SV-10 Alcyon; Tenth Technology Streetwise Mercedes; Tamiya TGX-Mk. 1 TS; painting Lexan bodies; roll center; Novak Pit Wizard; 12 uses for fuel tubing; '98 ROAR mod Nats; Driving the ROAR off-road winning cars; JR-Propo R1 Radio; Schumacher CCD charger/discharger; Kyosho MP-5; Schumacher Fireblade USA.

❑ **JAN. '99**
Traxxas Nitro 4-tec; Kyosho QRC-SV Mooneyes Street Van; Thunder Tiger TA02 Nitro Conversion; OFNA Nitro Z-10 Pro; Tamiya TA03R Mobil 1 NSX; Team Kinwald Pro Shock bushings; RPM Bearing Blaster; Tamiya tire gluing jig; Racers Edge shock piston drill set; IFMAR OnTrack World Championships; Dynamite's New 12 S and 12 SPD Engines; ROAR On-Road Fuel Nationals; off-road tire tuning; HPI Viper Cup; First Annual Labor Day Shootout

❑ **FEB. '99**
FSR V12 Nitro Bullet; MRC SP3; Kyosho Fiat 500; Team Losi NXT; Tamiya SVT F-150 Ford Lightning; R/C and Safety; Chicago Hobby Show; Dead Short Your Batteries?; Tamiya TCS national; Trinity's Paradox; Inside the TCS winning cars; Tamiya CVA Transparent Shocks; Hitec CG-335 Charger; Integy discharge tray; Roland Sticka STX-7; Team Losi Street Weapon; MRC nitro Thunder King.

❑ **MAR. '99**
MRC Q-Tee Coupe; Schumacher Nitro S.S.T.; HPI Super nitro RS4; Tamiya TG-10 Mk.1; Mercedes CLK-GTR; Savage Motorsports Headhunter HS-350; Team Associated RC12L3; How to break in your engine; Trinity D3.5 Modified motor; pro building tips; new Era models Clod Buster Kit; How to set screw your suspension; Trinity foam touring car stand; Team Kinwald blue drivers; GM Racing Commander Charger; Integy Indi Reactor 20 discharger; MPH Products Packrack; OFNA Racing Nitro Z-10.

❑ **APR. '99**
Duratrax maximum ST RTR; Team Losi I.W.C. Street Weapon; Kyosho Inferno MP-6; HPI RS4 pro 2; HPI Nitro RS4 RTR; Schumacher S.S.T. '99 Pro; Team Losi Double-X Tuning Guide; Super-Size Nitro Sedan Shootout; Deans Speed Jig; Dirt Bags Cargo Hauler; Multiplex programmable servos; HG Inc. Transparent Shocks; HPI RS4 Rally.

❑ **MAY '99**
Tamiya Toyota GT-One; Kyosho Landmax Volvo S-40; Team Associated RC10L3 Touring; Tamiya Baja Champ; Golden Horizon Colt 10- Formula 1; Integy parts cleaner; Team Losi NXT; '99 International Reedy Race of Champions; Team Associated Dual Sport Conversion; Motor Saver Filters; Inside the Reedy Race Winning Cars; Jamara 1/2-scale Go-Kart; RC10-GT Tuning Guide; Novak's new Millennium Charger.

❑ **JUNE '99**
Yokomo MR-4 Rally; Kyosho GP Spider Mk. II World Cup Edition; Tamiya M4 Sherman Tank; Tamiya TAO3R TRF; SVM Columbia Mk5 1/5th Scale; Novak Fusion; Robinson Racing RC10GT Spur Gear; Integy 16x2 Chargers; JR Racing XR3 FM Radio; FSR Nitro Bullet; '99 Team Losi Florida Winter Champs; Tamiya Juggernaut; Inside Winter Champs winning Cars.

❑ **JULY '99**
Hobby Tech HT1; BoLink/Racetech G-Force; Mugen Seiki MBX-4; Yokomo YR4-M2 pro; Tamiya Wild Dagger; Traxxas Nitro Wash; Pro-Line/Jaco pre-mounted sedan tires; FMA Direct Typhoon ESC; Golden Horizon Turbo Head; FMA Warlock FM Receiver; Hi-Tec Lynx FM 3D; Silver State Nitro Challenge; How to update your HPI Nitro RS4; '99 Florida Gas Winternats; Tamiya TG-10.

❑ **AUG. '99**
Tamiya Juggernaut; Kyosho Ford F-150 Desert Racer; Kyosho 4-Stroke SuperTen; Tamiya McLaren F1; PC Controller Shootout; '99 Reedy truck Race of Champions; .12 Engine Guide; Inside the Trinity/team Losi Merger; HPI Super Nitro RS4; Tamiya Porsche GT-One; Duratrax maximum ST; Take-Off Setup Board.

❑ **SEPT. '99**
CEN SP1; Kyosho QRC Ford Escort Rally; Yokomo MR-4TC; Kyosho TF-3 Type R '99; Rally Car Shootout; Inside Team Associated's TC3 touring car; FM racing receiver guide; How to make a pseudo sedan; International Reedy Race Touring Car Championship; FSR Bullet; Duratrax Piranha; Progressive Suspension piggy back reservoirs.

❑ **OCT. '00**
Tamiya TG10-Mk. 1 Pro; Compagnucci Beetle; Technago 1/5 Scale; Traxxas nitro 4-tec pro; ROAR Modified Off-Road nats; How to install Deans connectors; Touring car buyer's guide; HPI Challenge; Tamiya's TRF-414X; Kyosho MP-6.

❑ **NOV. '99**
Tamiya 1/8 Mini Cooper; Neo Maximum Nitro pro; Team Losi Triple-X; How a two-speed tranny works; '99 IFMAR Off-Road World Championships; Hitec HS-925MG & HS-945MG Servos; Inside the IFMAR Winning Cars; Tamiya Monster Truck Alloy Shock Set; TamiyaMo3 Mini Cooper; Hobby Tech HT1.

❑ **DEC. '99**
HPI Nitro RS4 2; Kyosho Snake Bite; Serpent Impulse Streetspec; Tamiya M-O4L; HPI RS4MT Baja Bug; Golden Horizon Neo Type-M; Kawada SV-10 GT; '99 ROAR On-Road Nats; Racer of the Century; HPI Nitro RS4 Buyers' Guide; ROAR On-Road National Winning Cars; CEN Two-Speed; MIP tweak Station; Team Losi NXT; Academy SP3,

❑ **JAN. '00**
Schumacher Fireblade EVO; Tamiya Wild Willy 2; Academy STR-4; Kyosho MP-6 DX; Thunder Tiger Real Ten RTR; Horizon Pro-Trax Stampede; Picco/Omega .21 Engine; Team Orion Chrome Modified motor; Traxxas T-Maxx; NORRCA Off-Road nats; How to clean bearings; Tamiya nationals; Pro-line Endless Summer; Budget battery discharger guide; Penguin Yokomo MR4-TC Chassis Set.

❑ **FEB. '00**
Schumacher SST AXIS Pro; Tamiya Tao3R-S TRF; Team Associated TC3; Thunder Tiger EB-4; New for 2000; *R/C CAR* interviews Mike Reedy; Volvo Challenge II; Trinity Real Time 2 battery discharger tray; Sierra Radio Control Racers PC Game.

❑ **MAR. '00**
Kyosho TF-4 type R; Tamiya Toyota Celica; Team Losi XX-4 Worlds Edition; Duratrax Axis; HPI World Challenge; How to make a pass; Hot Rod hobbies & *R/C CAR* Shootout; What's the deal with 4WD?; Inside foam inserts; Team Losi Triple-XT; Hitec Spectra Module.

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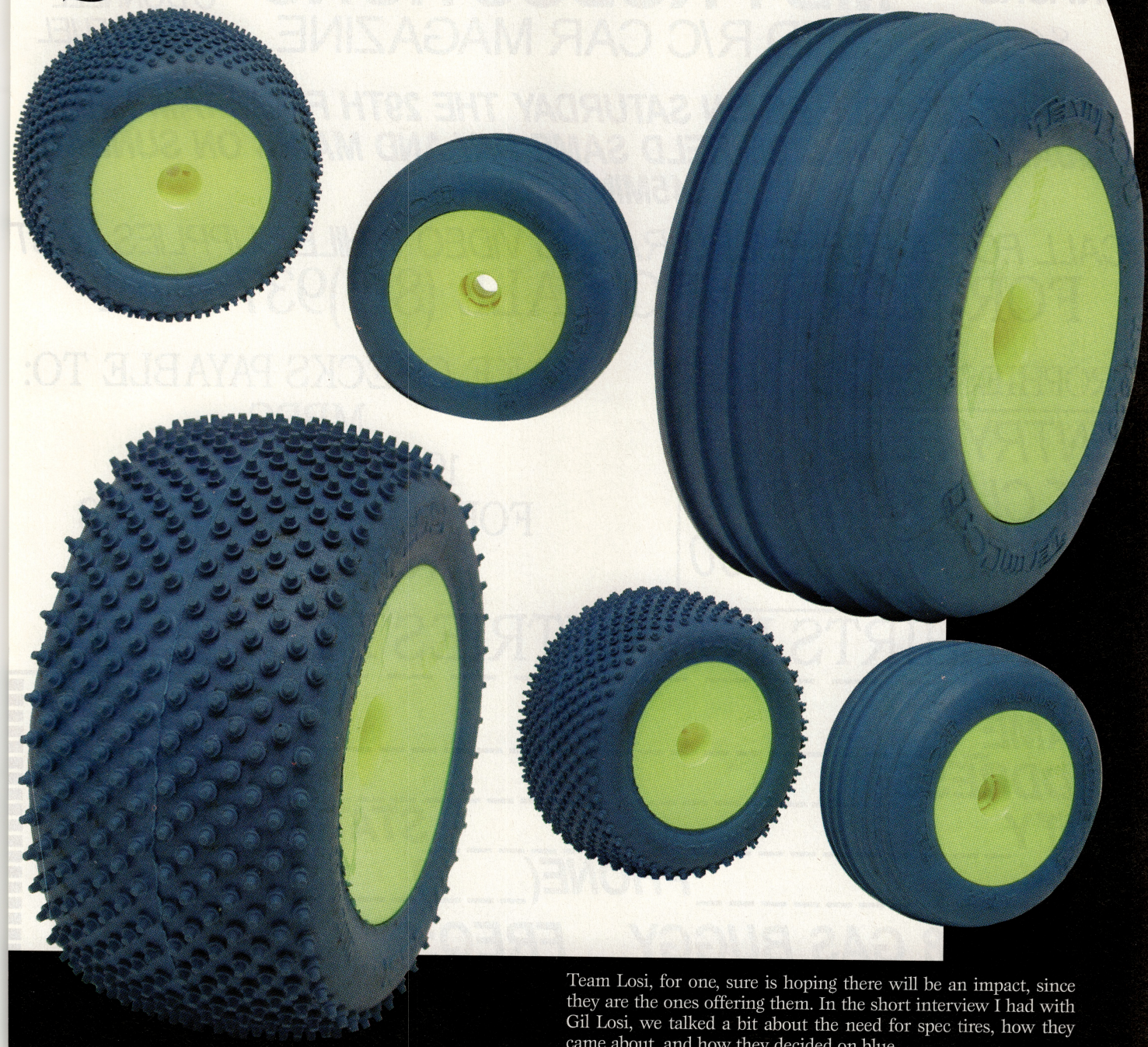
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CORNER THE EXPERTS

Inside Team Losi's new Cost-Controlled Off-Road Spec Tire Program

By Lito Reyes

Soon, you are going to see on the shelves of your local hobby shop a new product that may have a huge impact on racing at the club level—off-road spec tires.



Team Losi, for one, sure is hoping there will be an impact, since they are the ones offering them. In the short interview I had with Gil Losi, we talked a bit about the need for spec tires, how they came about, and how they decided on blue.

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CORNER THE EXPERTS

R/C Car: *What inspired Losi to formulate a spec tire for off-road?*

GL: Basically, people were asking for a way to regulate costs so we thought up a way to simplify the tire issue. New people coming into the hobby shouldn't have to deal with so many variables; compounds, tread pattern, shapes, etc.

R/C Car: *Have the powers that be at the national racing organizations taken notice of what you're trying to do?*

GL: Not too much. We're hoping that it will be picked up at the club level. That's where it really counts.

R/C Car: *Are spec tires for buggies on the way?*

GL: Yes, they sure are.

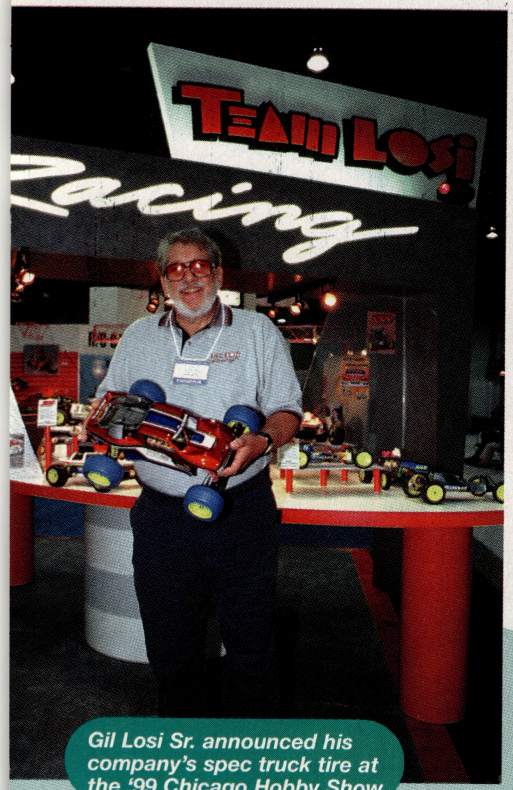
R/C Car: *Now, a little bit about the tires themselves. How does the compound fit into your existing line?*

GL: We wanted to produce a broad-base tire. We went with directional fronts and studded rears that work well on everything from a blue groove to a soft track. For the buggy we decided on super-wide fronts and, again, studs in the rear. They really are good general tires for most conditions.

we eventually went to a hybrid compound to get the wear and the strength properties back.

R/C Car: *What about the cost?*

GL: Our spec tires cost the same as our current compounds. But they last longer. The compound we use actually costs more than our other compounds, but we felt they needed to be the same price as our race tires. Our goal was to make a universal compound that works at least decently on just about any surface and lasts.



Gil Losi Sr. announced his company's spec truck tire at the '99 Chicago Hobby Show.



R/C Car: *Suppose an off-road spec class is adopted by local clubs. What other rules would you like to see in a spec off-road class?*

GL: That's a hard one. We really want to keep it simple. It depends on the track and their needs. The track directors should be familiar with the people that race there and tailor the program for them.

R/C Car: *How about motors and batteries?*

GL: I think that's a good idea. It makes it even easier for the novice or for those who don't want to spend lots of money. But I have seen the issue of spec motors and batteries cause lots of arguments.

R/C Car: *What if your spec tires turn out to be the hot ticket on some tracks? Are we going to see the fast guys using them as well?*

GL: Definitely not at a ROAR event, since they require tires to be black. I can see it now: guys with cans of black spray paint in the parking lot hoping to get their tires "legal"! I'm not sure about NORRCA, though. If we find that the compound works exceptionally well at a number of places, then we would consider duplicating the compound but with the carbon black put back in.

R/C Car: *Does the carbon black affect the compound at all?*

GL: Carbon black is one of the main components of rubber compounds. When we removed it, it affected the tires drastically in a negative way. We found that when you take out the black, durability goes out the door with it. It was a challenge to find the right formula, but

R/C Car: *And what about inserts?*

GL: Our standard firm inserts will be included. We realize that there are numerous insert compounds also, and short of banning inserts from the tires altogether, a club can't really tech them. But we're providing a starting point and taking a huge variable out the equation by making a spec tire. That's what we felt was most important.

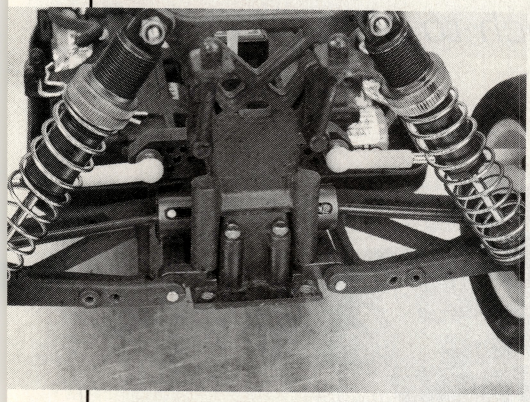
R/C Car: *And finally, why blue?*

GL: We just thought it was one of the better-looking colors. They ended up being darker than the prototypes we had at the shows and some races. It is easy to tech and see from the driver's stand. We're hoping it doesn't clash with most people's paint jobs. Lots of guys we've seen are using blue parts on their cars also. Oh, and the buggy tires will be blue, too. ◆


TEAM LOSI
RACING TIRES
When Performance Counts!
A-7703
"LP" Slicks
A-7701
STD Slicks
A-7368
Big Shot
A-7367
IFMAR-Pin
A-7710
Treaded
A-7375
Sprint
A-7378
Step-Pin
A-7711
intermediate
A-7364
IFMAR-Stud
A-7635
Taper-Pin
A-7370
BK-Bar
A-7372
Taper-Pin
A-7369
X-2000
A-7285
Taper-Pin
A-7636
Step-Pin
Team Losi
Tire Glue
A-7880
A-7284
Sprint
15 Years of World Class Performance
A-7282
Blockhead
A-7638
IFMAR-Pin
1999-2000 IFMAR
World Champion
A-7281
IFMAR-Pin
A-7690
T-90 Street
A-7505
Directional
1999-2000 R.O.A.R.
National Champion
(6 classes)
A-7283
IFMAR-Stud
A-7507
8-Rib
A-7202
Wide Body
A-7204
X-Wide Body
A-7641
T-2000
A-7639
IFMAR-Stud
A-7633
Reptile
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tech tips

Send your questions to: Tech tips, P.O. Box 958, Valencia, CA 91380-9058 or visit us on-line at www.rc-car.com



LEFT IS RIGHT, RIGHT IS LEFT...WHAT?

In the May issue article on Brian Kinwald's Reedy Race-winning Losi XX4, it says that Brian installed his rear arms backward. As the stock XX4 setup is for the arm marked "R" to be on the left and the "L" arm on the right, does this mean the "R" arm is on the right? If not, what? And what effect does this have?

Thanks.

Colin Herbert

[via rc-car.com]

The original XX4 came with 3-1/2 degrees of toe-in per rear wheel—all of which was provided by the rear hub carriers. The pivot support and rear arms had zero degrees of toe-in. The rear arms themselves don't provide any toe-in, but the reason that they are installed "backward," i.e., the arm marked "L" actually goes on the right side of the car on the original XX4, is that the arms were designed asymmetrical. In other words, the "sweep" of the suspension arms is different depending on which side of the car they are installed. This is done to keep the car's wheelbase the same whether you are running a "CR" style setup in which all of the toe-in is provided by the rear pivot-support, or a standard setup in which the toe-in is provided by the rear hub carriers.

When the toe-in is provided by the rear pivot support, the arms are pointed toward the front of the car at an angle of three degrees. If the arms were symmetrical, i.e., both the same, then the car's wheelbase would be shortened substantially. But by flipping the arms as Brian did (and as in the new Worlds Edition XX4 kit), the arms' sweep keeps the wheelbase the same as it had been with the standard setup.

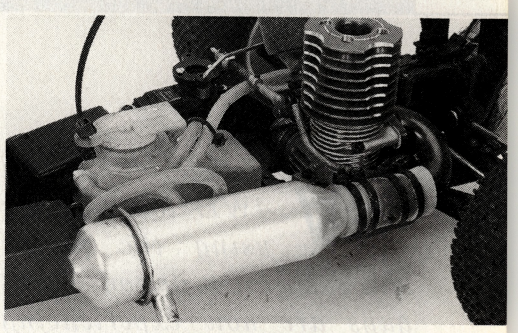
YOU PUSH AND YOU PUSH...

I'd like to know how I can get more forward bite on my Team Losi Triple-X. I have tons of traction but I cannot get the car to quit pushing in the corners. The track I race on is very dry with a lot of fluff.

Slammin' Sammy

[via rc-car.com]

Sammy, what you are looking for isn't actually forward bite, but more steering. Forward bite is a term usually used to describe the traction of the rear wheels under straight-line acceleration. Try moving the battery pack as far forward as possible. This will take a little weight from over the rear wheels and place it over the fronts. Weight equals traction, so the front end should get more bite and the rear a little less. Because your track has fluffy dirt, try using front tires made from a less sticky rubber. If you are using Losi tires, try their Silver or Gold compound. If you use Pro-Line tires, try M2 compound. The firmer rubber will allow the tire to get better penetration and more bite on looser dirt. Finally, try using brakes—usually, slowing the car, even a little, will allow the suspension geometry to do its thing and you'll gain steering. If you are uncomfortable with using brakes, dial-in a bit of "coast-brake" using your transmitter's throttle trim adjustment (coast brake is when a slight amount of brake is applied when the throttle is in its neutral position).



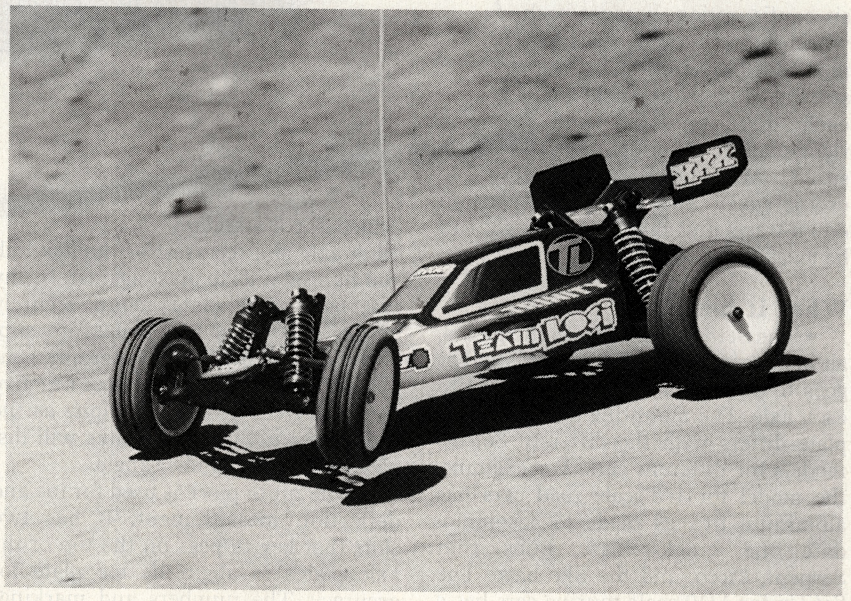
SLIDING GAS TRUCK!

I was wondering if there was an easy way to install a slide carb in a Team Associated RC10GT gas truck. If so, how?

Mike

[via rc-car.com]

It would be virtually impossible to convert the Team Associated RC10GT from a barrel-style carb to a slide carb. The chief reasons behind this are that there is no way to rotate a slide carb so that its slide can point toward the throttle servo (the truck's spur gear is in the way), and the position of the fuel tank prohibits the installation of any type of relay linkage that would permit the carb's slide to be pulled in and out (such linkage would also be fairly complicated). Your best bet is to stick with a barrel-type carb. Well-respected engine guru Ron Paris has stated that in a .12 or .15 size engine, the difference in performance and response between a barrel and slide carb is negligible. In other words, it's not worth the hassle! ◆



Product Test

Hudy Set-up Tool

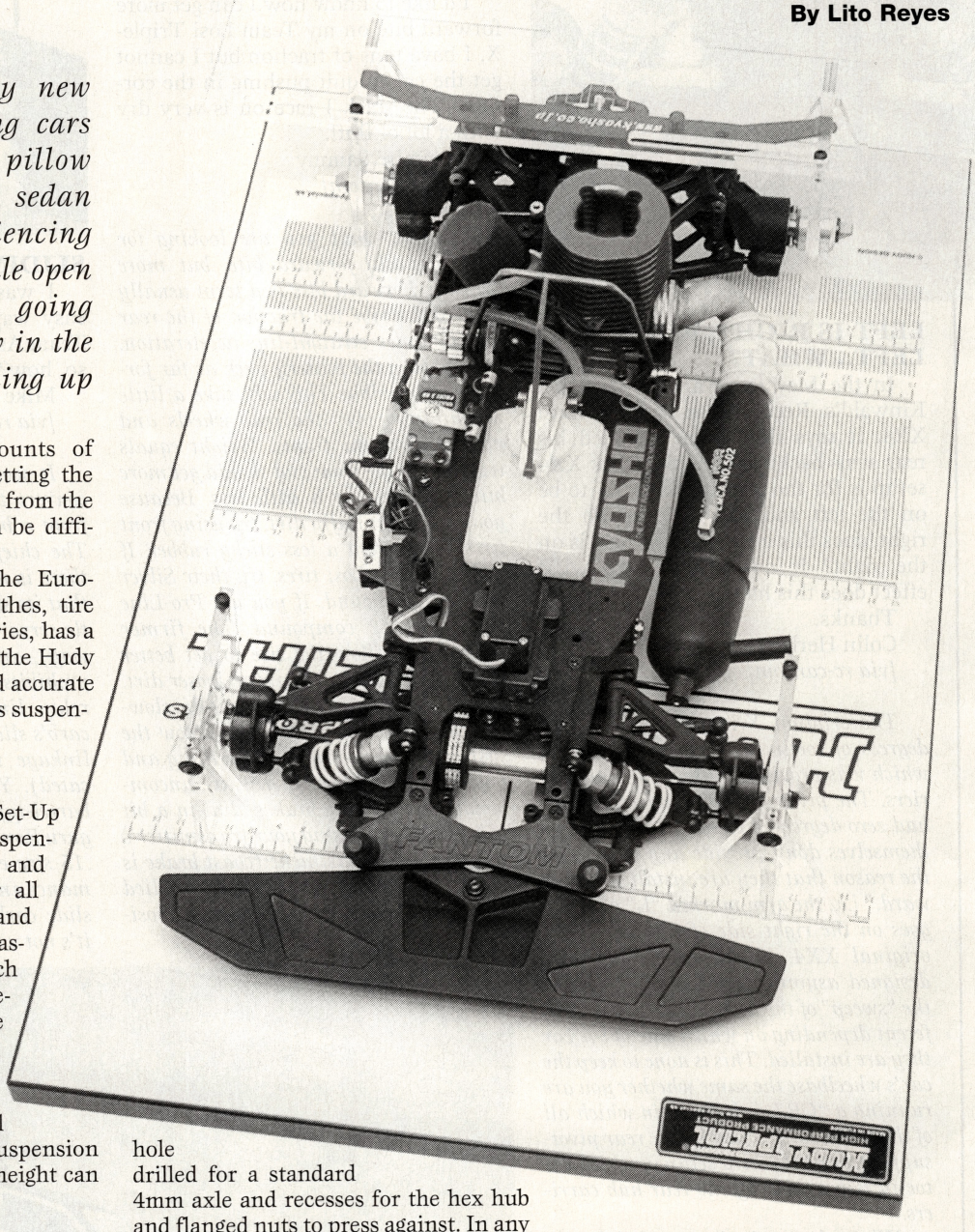
The scientific approach to chassis tuning!

By Lito Reyes

With so many new 4WD touring cars using the pillow ball suspension design, sedan guys are now experiencing what 1/10- and 1/8-scale open drivers have been going through for years. How in the world do I set this thing up accurately?

With nearly unlimited amounts of adjustment available, even getting the rear wheels an equal distance from the center line of the chassis can be difficult.

Hudy Special Products, the European maker of fine tools, lathes, tire truers and other R/C accessories, has a line of products simply called the Hudy Set-Up that facilitates easy and accurate adjustments for your R/C car's suspension.



What it does

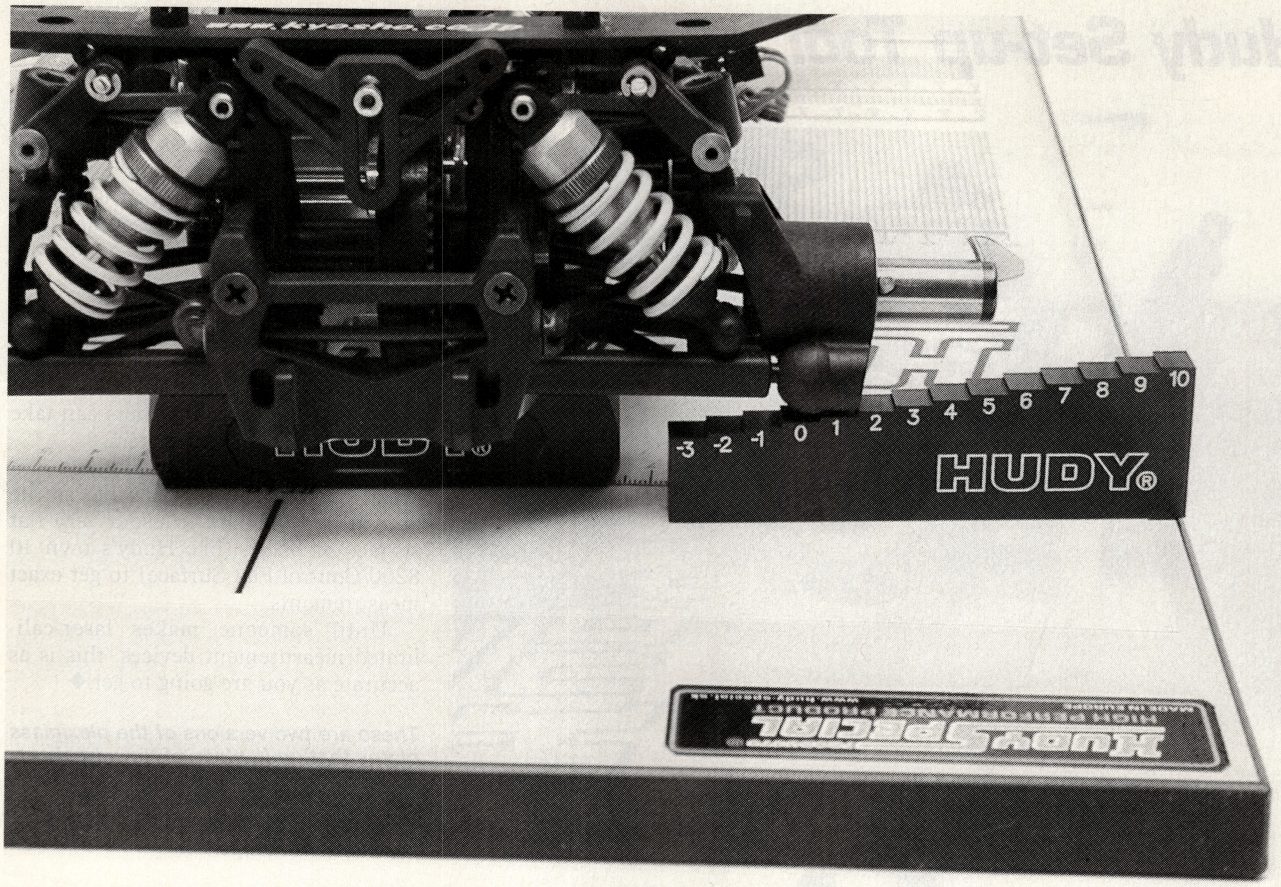
• Hudy claims that the Set-Up will make setting accurate suspension adjustments quick and simple. Toe and camber for all four wheels can be viewed and set without disturbing the chassis configuration, because each wheel has its own measurement device. Additionally, the steering deflection angle for each direction (left and right) can be precisely measured. With the optional droop gauge and blocks, suspension down-travel and chassis ride height can be measured as well.

What it has

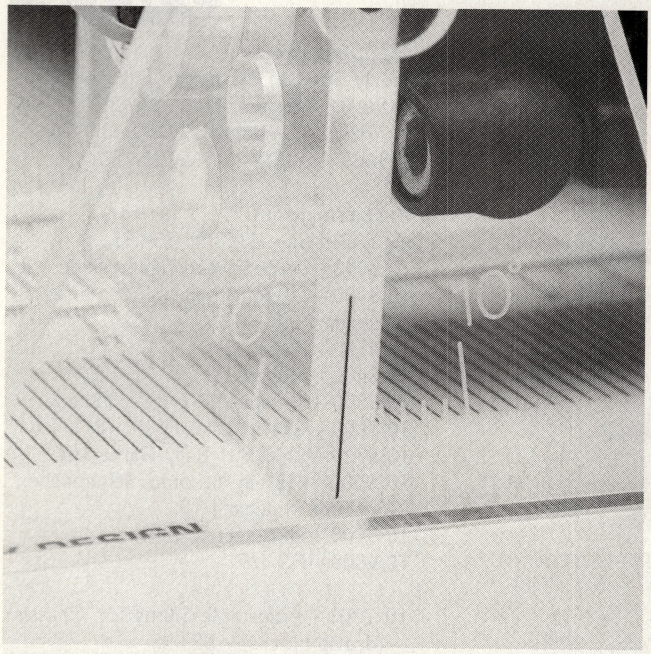
• The Set-Up consists of nine pieces, all made of clear Plexiglas. A plate that goes in place of a wheel is mounted to each axle. The mounting method of the plate differs with the different Set-Up models for different cars. For example, the model for 1/8-scale road cars has aluminum fittings made to accommodate the quick-release hubs that Serpent, Picco, and the like have. The Set-Up for 1/10-scale touring cars has a hole drilled for a standard 4mm axle and recesses for the hex hub and flanged nuts to press against. In any case, each of the plates mount securely to the axle. The axle plates are supported on ball bearings by measurement plates marked from ten degrees negative to ten degrees positive. As long as the axles are true, the axle plates will display the precise camber angle.

• The ninth piece is used for toe and deflection measurement. It has two slots that key to pegs on the top of the axle plates to align the toe plate for accuracy. The numbers and markings on this piece glow purple because it is made of a special clear neon Plexiglas.

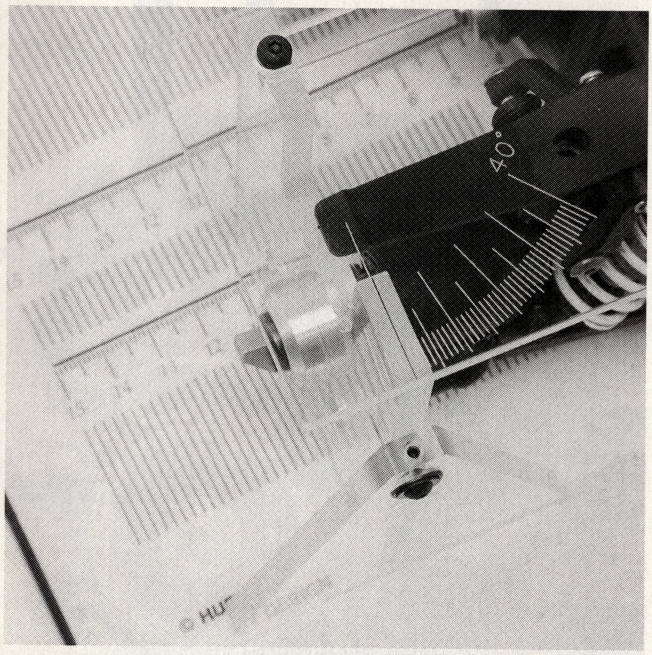
• The droop blocks and gauge are made of machined aluminum and hard anodized with a black finish. The purpose of the blocks is to raise the chassis an equal amount front and rear so that the downward extension of each arm can be measured to help eliminate chassis tweak. Measurements from minus 3mm to 10mm can be taken.



The droop block (centered underneath the rear of the car) and droop gauge help measure suspension down-travel.



Camber can be measured in one-degree increments up to 10 degrees.



With the gauge set up you can accurately measure front or rear toe.

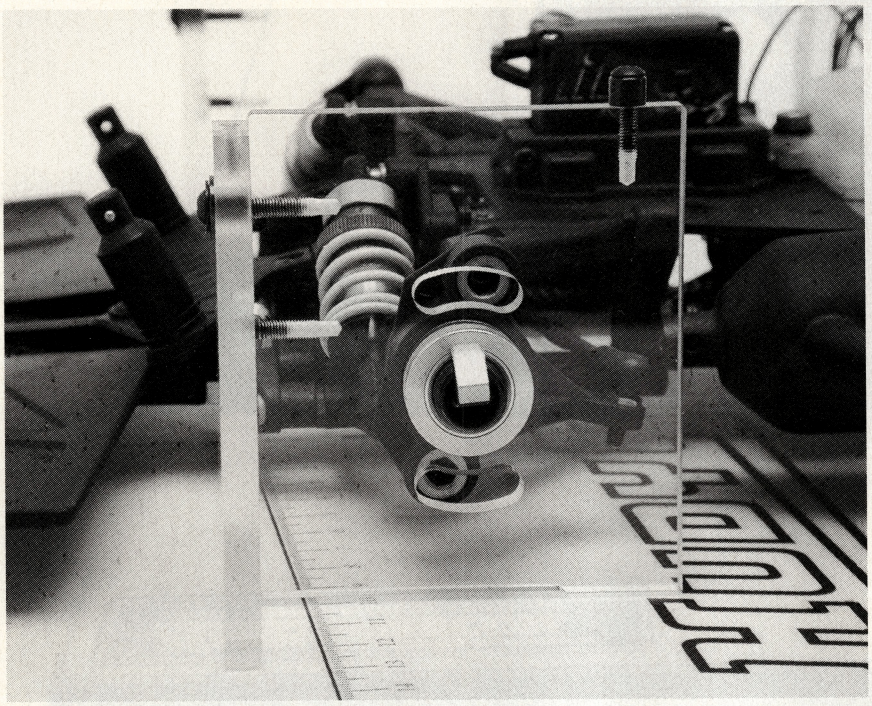
What we don't like

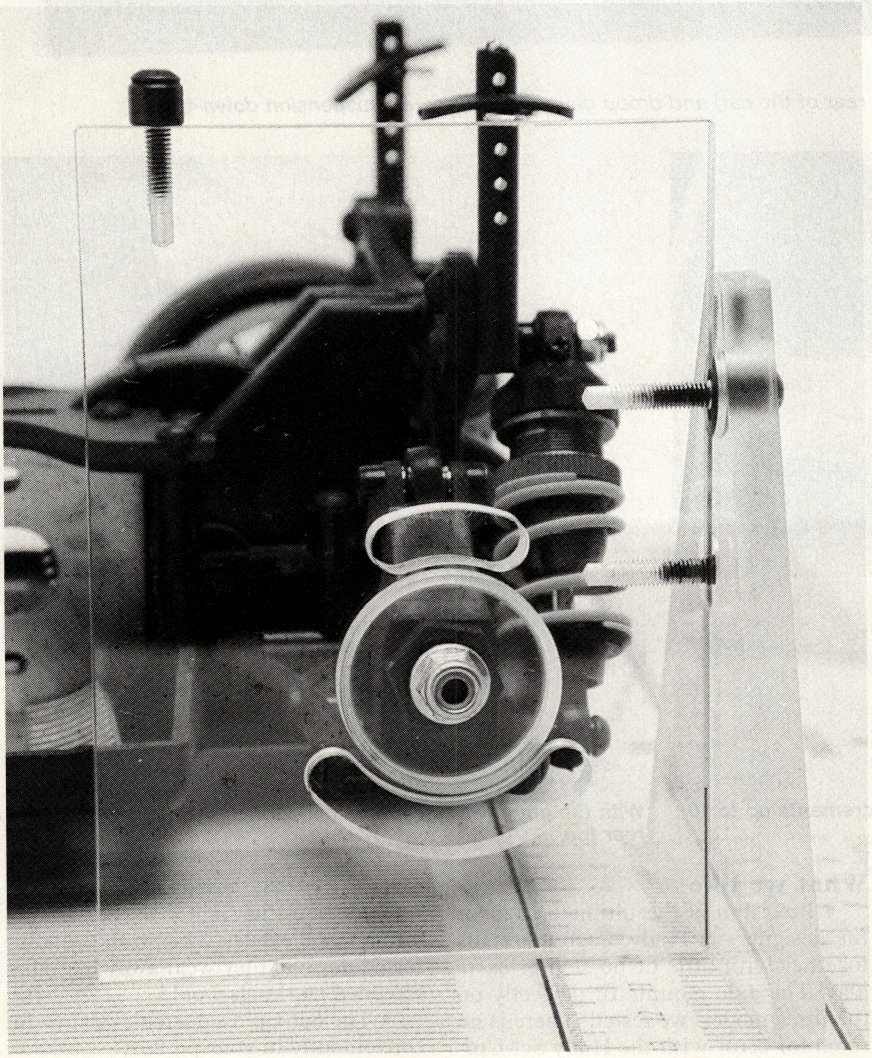
- The acrylic used to make the Set-Up is susceptible to damage by motor spray and glow fuel.
- The language used in the instructions is cryptic.
- This stuff is expensive!

What we like

- Precision is the ultimate goal for the designers at Hudy. Each piece fits together with little or no slop or extra play. The axle mounts fit perfectly on the three models we tested. There is no room for error with the Hudy Set-Up.
- All of the markings are clearly scribed into the material, be it aluminum or Plexiglas. They won't get distorted nor will they wear away like silk-screened markings would.
- The Set-Up disassembles flat to fit conveniently in your pit box.

Hudy Set-up Tool





What we really think

We've seen every measurement tool on the market, and nothing else compares to the Hudy Set-Up. It is a high-quality tool, made of the best materials available. Yes, it is a little bit on the expensive side, but nothing will give you more accurate results than this. Nitro on-road racers have known about the Set-Up for a while, and now that models are available for lots of different cars (on- and off-road), others can take advantage of this great system.

The blocks and droop gauge are also great, but not as indispensable as the Set-Up. Just be sure to use a very flat surface or board (like Hudy's own 10 8200 Control Flat Surface) to get exact measurements.

Until someone makes laser-calibrated measurement devices, this is as accurate as you are going to get.◆

These are two versions of the plexiglass plates that go in place of the wheels—one outfitted to accept quick-release hubs (i.e. Serpent style cars), and another that accepts standard touring car 4mm axle stubs.

info

Manufacturer
Hudy Special Products, Distributed in the U.S. by Serpent USA, 2830 NW 79th Ave., Miami, FL 33122; (305) 639-9665 • (305) 639-9658 (fax)

Part Numbers:
Hudy Set-Up—$113.95-134.95
10 8000—Serpent Vector, Neo, Slide 1/8
10 8100—Serpent Impact, Picco Integra, Mugen, Neo 1/10
10 8300—Picco 1/8
10 8400—Mugen 1/8
10 8500—Kyosho MP-6 1/8 off road
10 8600—Crono, Laro, Flash 1/8
10 8700—BMT 981 Rally Game 1/8
10 9000—Corally, Yokomo, Schumacher, Serpent Impulse 1/10
10 9100—HPI Electric 1/10
10 9500—FG 1/5

10 7701—Adjustable Shims for Chassis (droop blocks)—$23.95
10 7711—Adjustable Shim for Suspension (droop gauge)—$15.95

Recommended for: Accurately measuring suspension geometry
• Hudy Set-Up— ⊛⊛⊛⊛⊛
• Hudy Droop Gauge and Blocks— ⊛⊛⊛◐●

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INSIDE RICHAR

Racing King Richard's Ride!

Richard Saxton is one of the premiere nitro off-road racers in the United States. Look at the results at most of the big gas races around the country and it's not uncommon to see he's grabbed the TQ position, the overall winners spot, or has placed in the top ten in the A-main!



D SAXTON'S THUNDER TIGER EB4

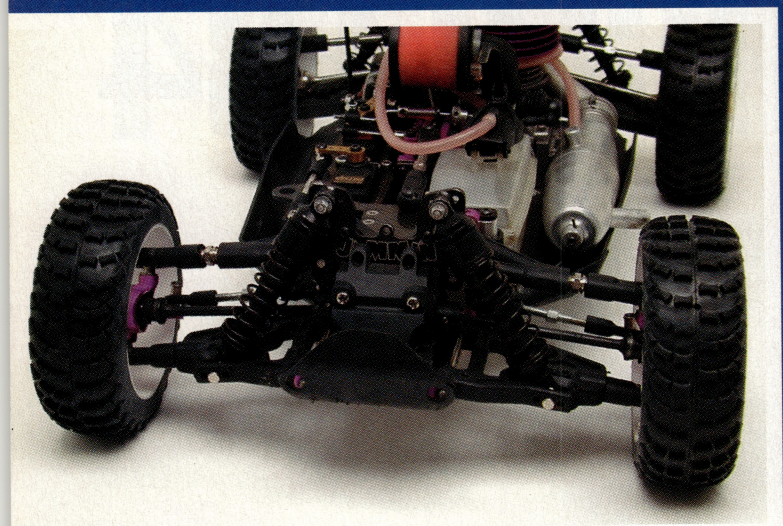
But great driving skills alone won't get you to the winner's circle—you have to have the right car to get you there. For him, that car is the Thunder Tiger EB4.

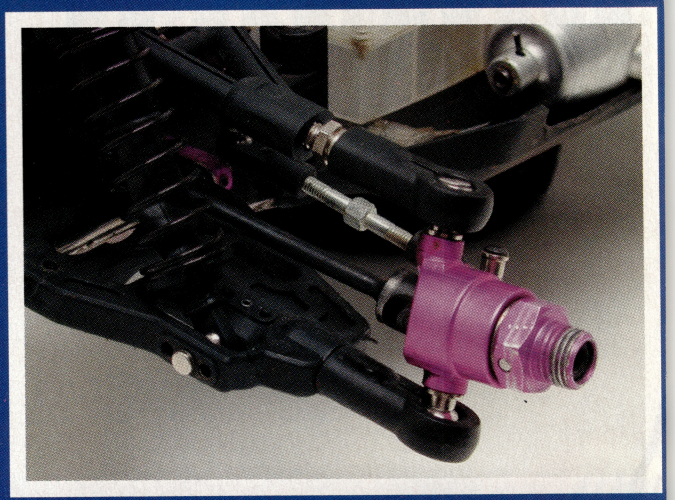
Over the past year or so Richard has been busy helping Thunder Tiger develop and refine their EB4 1/8-scale buggy, and with his input it has become a car to reckon with. Richard recently told us that a new Limited Edition EB4, based on all the mods he's done to his car, is in the works. When pressed for details, we were told that the Limited Edition car should be released in the near future and it will include quite a few really trick alloy hop-ups for roughly $100 more! In the meantime, let's take a look at the car that provided the inspiration.

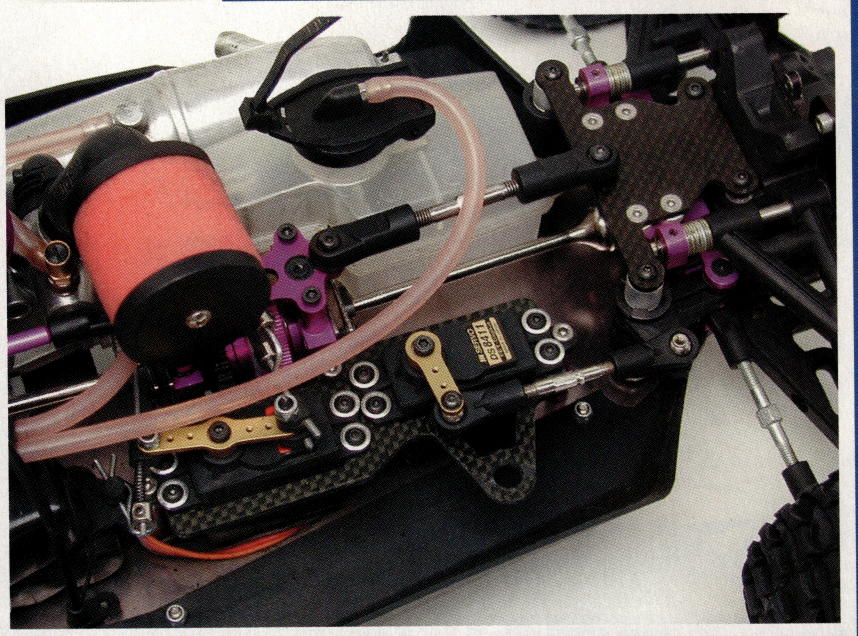


We put in a few race laps with Richard's EB4 at our local track, Hot Rod Hobbies. We were blown-away at how fast it is—the car barks! Thanks again to Richard for allowing us to thrash around his Tiger!

INSIDE RICHARD SAXTON'S THUNDER TIGER EB4







Front End

- Front differential—Nuova Faor
- Nuova Faor Front Suspension Plate (the piece that holds suspension arm hinge pins in place)
- Nuova Faor Front Lower Arm Plate (rear)
- Jammin' Products aluminum front shock tower
- Shocks:

  Body—MIP long aluminum MP-6 shock bodies

  Piston—MIP pistons

  Oil—35wt Associated oil

  Spring—Thunder Tiger Blue

  Mounting—Top middle hole in tower, middle hole on arm
- Bottom of tranny case/chassis is sealed with gasket seal.
- Front universals stock (the front universals give the car more steering)
- Nuova Faor Steering Knuckles provide more steering.
- Stock steering bellcranks
- Nuova Faor Hubs
- Jammin' Products servo saver top plate (from the steering post to the front of the diff housing)
- Jammin' Products carbon fiber radio tray
- Nuova Faor aluminum Upper Arm Mount
- Camber front: –1°
- Toe: –1° toe out
- No sway bar

Richard's Front End Notes:

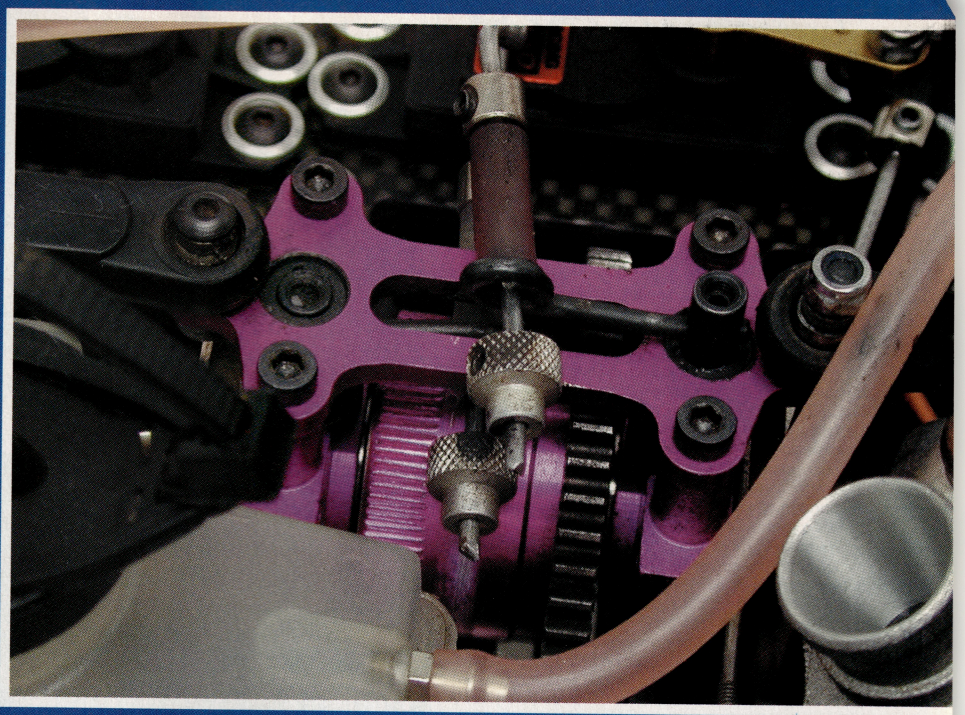
- It's very critical that when pressing the steel front knuckle ball onto the steering spindle (through the plastic) that you look at the plastic ends of the steering spindle. There should be a big side and a small side (of the hole). You want to make sure that you press the ball through the big side! If you don't, the setup won't move freely and the front end will bind.

Carefully follow the instructions in your owner's manual for pressing the ball in! In addition, the countersunk screw and shoulder that come with the kit limits the suspension travel—replace those with a socket head screw and get rid of the shoulder for additional clearance.

- Make sure you grease the car's steering post and servo saver post before you race it, for the best results.
- When you pop the ball cups on the steering assembly, squeeze them with a set of pliers to free them up a bit.
- To make life easier, I run the steering servo saver arm towards the outside of the car—it's easier to get to. This will be a running change made to the kit pretty soon, though.

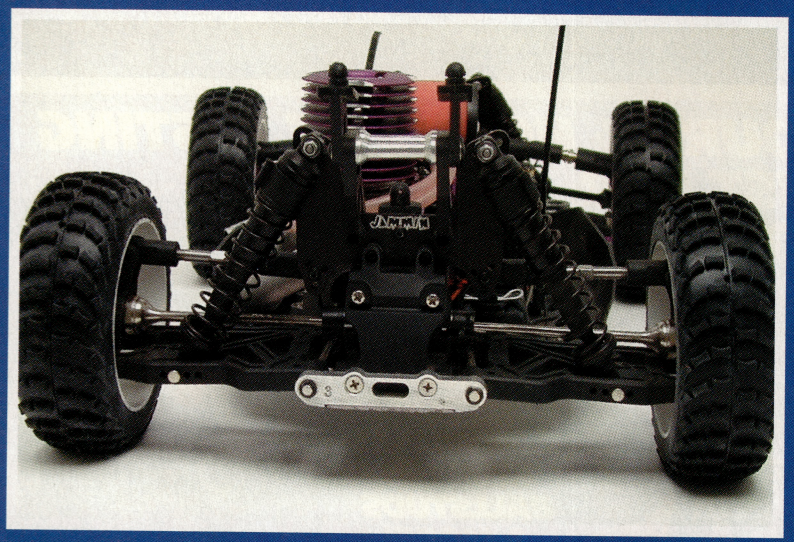
Center:

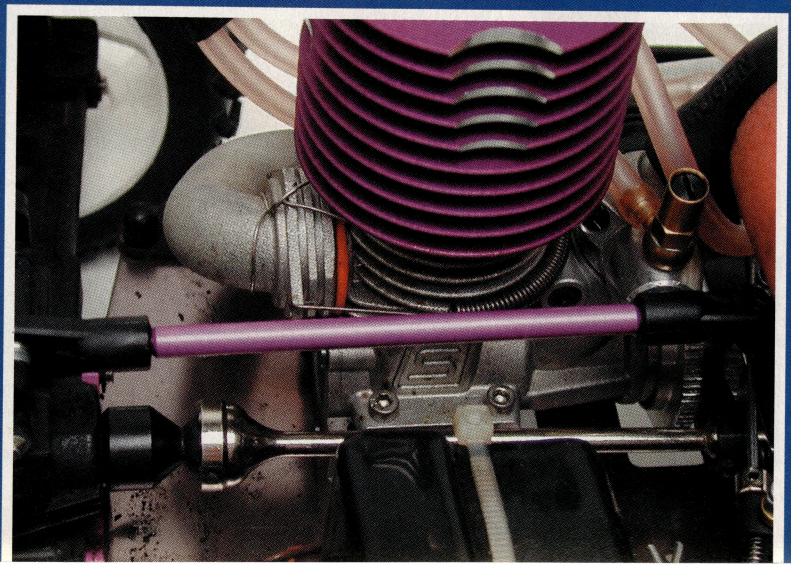
- Nuova Faor Torsen Center diff
- Nuova Faor split center diff housing
- MIP CVDs for the center driveline
- Nuova Faor top plate w/two ears which allows you to run two tie rods to the center of the car to stiffen the chassis.
- Fioroni disc brake pads



Richard's Center Notes:

- The way you run your throttle linkage is very important. I run my linkage so the carb is reversed and I run a extra long rod for this, so I can attach the chassis stiffener to the top plate without any clearance issues.
- I set up the brakes so they will be pushing instead of pulling—this takes away a lot of the slop and the brakes will engage quicker and harder. I run about 40 percent front brake and 60 percent rear. In addition, I also use fuel tubing instead of springs on the brakes. Also the calipers have to be Dremeled out where the screws go so they are free floating and don't bind when you hit the brakes.
- I eliminated the stock receiver box and moved the receiver pack more inboard towards the car's centerline.





Rear End

- The rear diff is stock and is packed with thick Bergonzoni grease, and no O-rings are used.
- MIP CVDs
- Shocks:
  Body—MIP long aluminum MP-6 shock bodies
  Piston—MIP pistons
  Oil—35wt Associated oil
  Spring—Thunder Tiger White
  Mounting—Top middle hole in tower, third hole out (from left to right) on arm.
- Jammin' Products custom-made taller shock tower with taller set of shock mounting holes to accommodate the longer MIP shock bodies
- Rear hubs spaced all the way forward
- Camber link middle hole on hub
- Wing run in middle hole
- Nuova Faor Chassis Stiffener from tranny case to center diff
- Gasket seal between diff case and chassis
- Rear camber: -2° with Thunder Tiger 3° aluminum toe-in block
- No sway bar

TEAM LOSI TECH-TALK

Slide, Swing, or CVD

Many racers ask which form of rear drive is best; Sliders, Swing shafts, or CVD. Well each one works differently. Each one impacts the handling differently. What we need to determine then is which one is best suited for you particular needs. Before we get into the specifics lets remember that the differential is the same in all of these drive systems. In particular, this means that you build and adjust the differential so that there is no slippage. All differential and slipper adjustment is done as described in the owner's manual.

Sliders were first used by Team Losi for the JRX-2. At the time most tracks were rough and covered with loose dirt. Tires, motors, and batteries were good but not near today's standards. So the slider allows the suspension to move very freely and keep the tires on the rough surface. They also allow the weight to transfer freely across the chassis to increase side bite and catch slides. These conditions are very uncommon today but the characteristic of freeing up the suspension is still valuable. When running sliders it is not uncommon to need a rear sway bar to help control the chassis roll. You will probably need to run a little heavier spring and a bit more pack in the shocks. Pack is obtained by decreasing the size of the hole in the piston and running a lighter weight fluid. This does not effect the normal dampening of the car but sudden harsh bumps will cause the shocks to become stiff and not move as quickly.

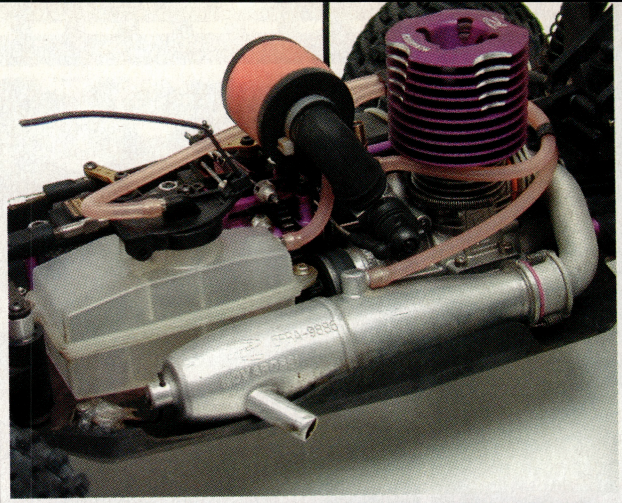
Swingshafts are undoubtedly the most versatile form of rear drive. The pin type drive used on both the swing shaft and the CVD tend to lock up under power as they are put under load. This does a number of things that are mostly controllable and therefore advantageous for off-road as well as on-road racing. Off power, the suspension is free to move to whatever limits you have built into the suspension. The car is free to roll, turn, or whatever. However, under power things change. The pressure of the outdrives trying to turn the pin drive dogbone of the swingshaft (or CVD) makes the drive shaft and axle try to become straight in line with the outdrive creating a dynamic tension. This tendency to seek and stay straight takes some of the freeness away from the rear suspension. Although obviously not as good in extreme rough conditions this actually helps in several other ways. By not allowing the chassis to roll over as the weight transfers, the car will corner better at higher speeds. This also helps hold up the rear of the car under acceleration which greatly helps the chassis "square up" exiting turns and driving off of jumps. To a lesser degree this can also help with landings. Typically this will help your high speed steering as well. In some respects this does what a sway bar does for sliders but only under power. Off power you will find that steering is decreased compared to the sliders. Bumps present a unique problem in that the pin drive is obviously not going to be as free as the slider due to the tendency to bind the rear suspension. The up side of this is that you will usually run a softer spring and dampening in the rear due to the "help" the pin drive is giving in holding up the rear of the car under power.

CVD's are very similar to the swingshaft. The pin drive is virtually identical to the swingshaft but the axle end actually has a bit more tension under power. This just magnifies the tendencies described for the swingshaft and creates a greater difference between on and off power handling. As the axle end wears it becomes more like the regular swingshaft. The increased difference in on and off power handling can at times be a slight advantage.

Another item that should not be overlooked is the wear on the outdrives when using a swingshaft or CVD. As the outdrives wear the tension will increase and at times actually create unwanted movement in the driveshaft/dogbone. The pin drive will wear a depression into the outdrive and as described above, the pin will seek this spot without control. The cure is to replace or swap (sides) the outdrives so there is an unworn face driving the pin. This isn't necessary with the sliders but you should clean them on a regular basis and over time they to will wear and need replacing.

So now you're an expert. Which rear drive system do you use? Potentially either the sliders or the CVD's can help you find a fraction of a second or make the car easier to drive under the right conditions with the right set-up. In general you will probably find that the swingshafts are the easiest to use for the varying conditions most dirt tracks offer. At a recent major race there were eight Team Losi vehicles in the A-Main. Of these one had sliders, two used CVD's and five used stock swingshafts.....Go figure. The bottom line is now you have something to try and have fun with. One last word of wisdom, If you find you have gotten lost in your quest for that extra tenth of a second get out the owner's manual or your previous set-up sheet and you will be surprised how well the car works.

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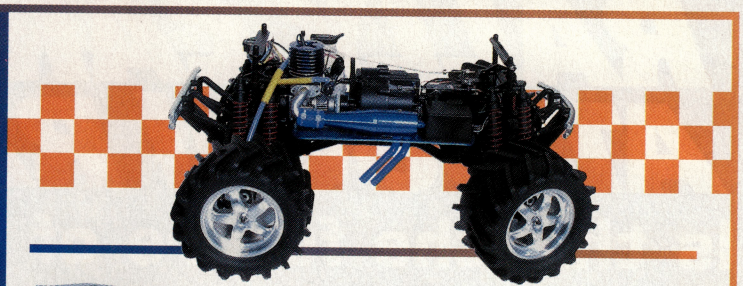
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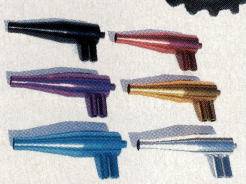
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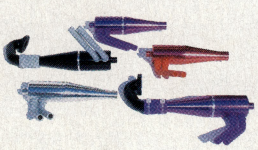


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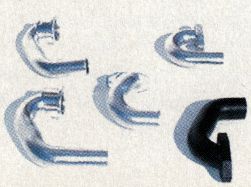


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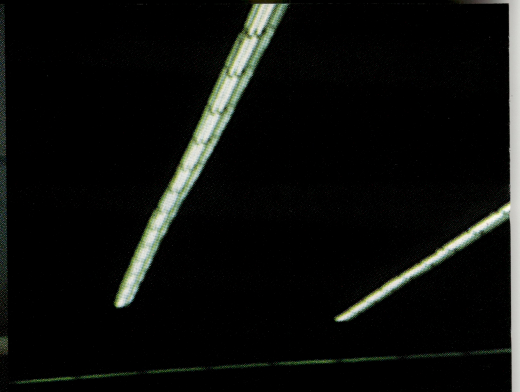


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Rally racers unite! While the turnout for the rally event at SoCal may not have exceeded the number of racers at regular off-road races, the crowd of enthusiasts present was a good indicator that this class of racing may have some potential.







RALLY CAR RACING AT SoCal RACEWAY

Is this the future of off-road racing?

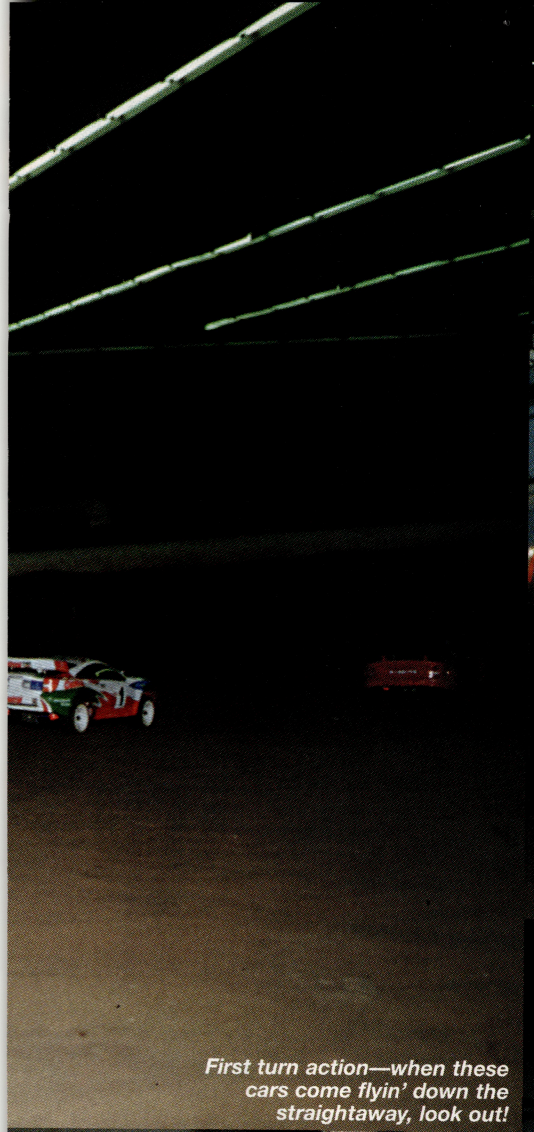
By Lito Reyes

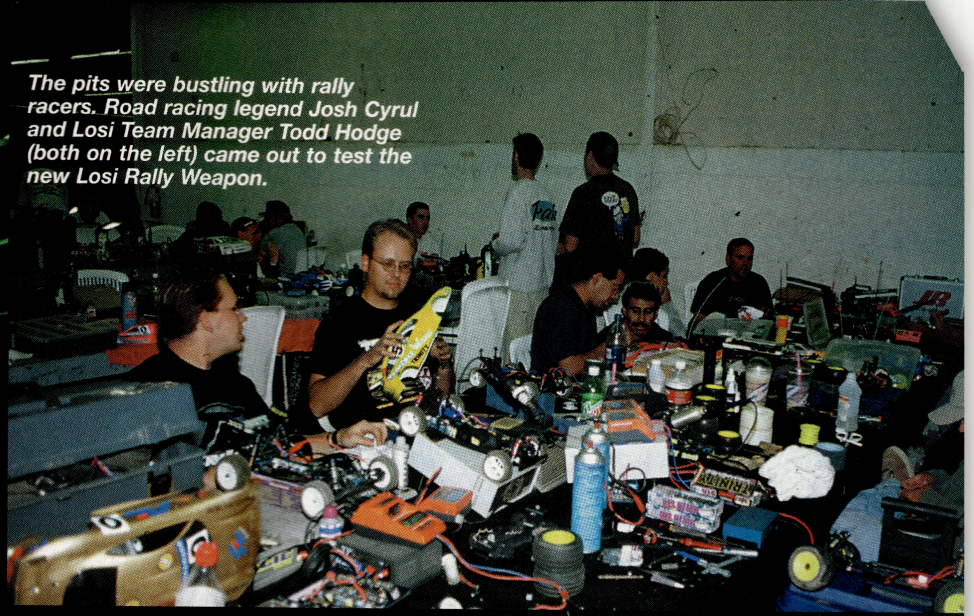
You'd think it was a Nats or something equally intense by the caliber of names that showed up at SoCal Raceway in Huntington Beach, California, one balmy Friday evening. Representatives from Losi, Yokomo, and HPI all accepted the invitation from HPI's Frank McKinney for an impromptu evening of rally racing.

From Yokomo came the infamous Barry Baker, Shin Adachi, and Robert Ito running their popular MR-4 Rally cars. Losi sent over team manager Richard Trujillo, Todd Hodge, Ron Rosetti, and Josh Cyrul to introduce everyone to their new Rally Weapon. Frank McKinney, of course, dragged along the HPI crew, including Thad Gardner and Ito. And Associated Electrics driver Tony Phalen couldn't stay away from the fun with his modified TC3 (for the evening dubbed TC3 "Type R"...for Rally, that is), nor could new Traxxas employee George Gonzalez.

You should have heard the buzz around the track when the rally cars started practicing. "Hey, I want one!" or "those things sure take a beating" and even a "we did that last weekend in my full-size Corolla!" were some of the phrases heard from spectators surrounding the track. Once the races got underway, spectators were shoulder to shoulder, at times two deep around most of the track. Though there were a few casualties (a couple of broken arms and uprights), the MR-4s, RS-4s and Rally Weapons navigated the jumps and bumps of the grueling off-road track with aplomb.

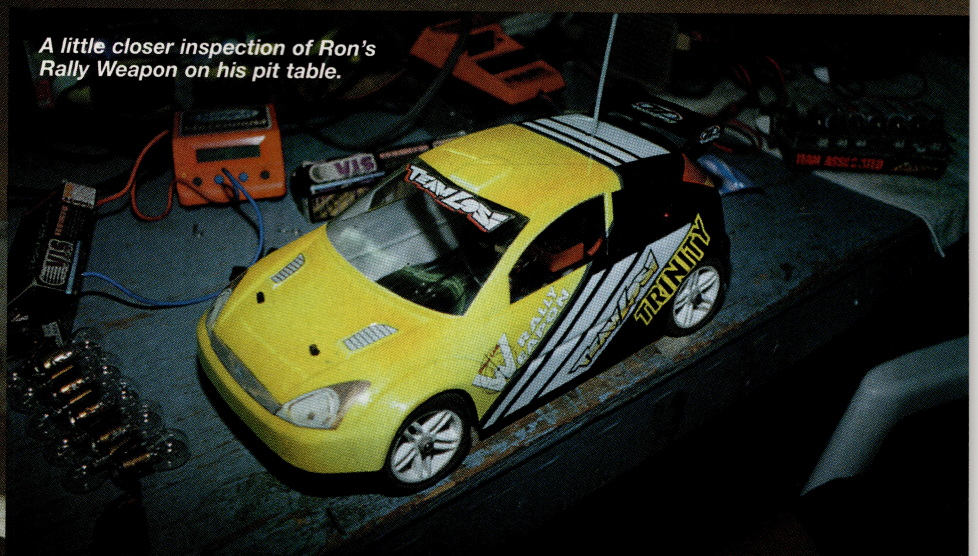
The main purpose of the evening was to generate some excitement and exposure for the rally class, and now that Losi's Rally Weapon is coming out, that shouldn't be a problem anymore. Kudos to Frank McKinney for organizing this exhibition and special thanks to Jim and Lana at SoCal for letting the rally crowd take over the place for a while. ◆





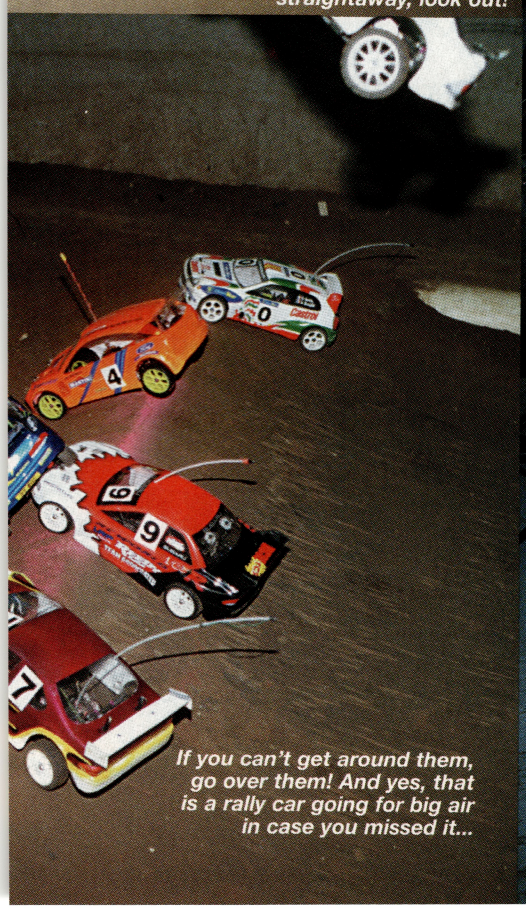
The pits were bustling with rally racers. Road racing legend Josh Cyrul and Losi Team Manager Todd Hodge (both on the left) came out to test the new Losi Rally Weapon.

Ron Rossetti airs out his new Losi Rally Weapon.



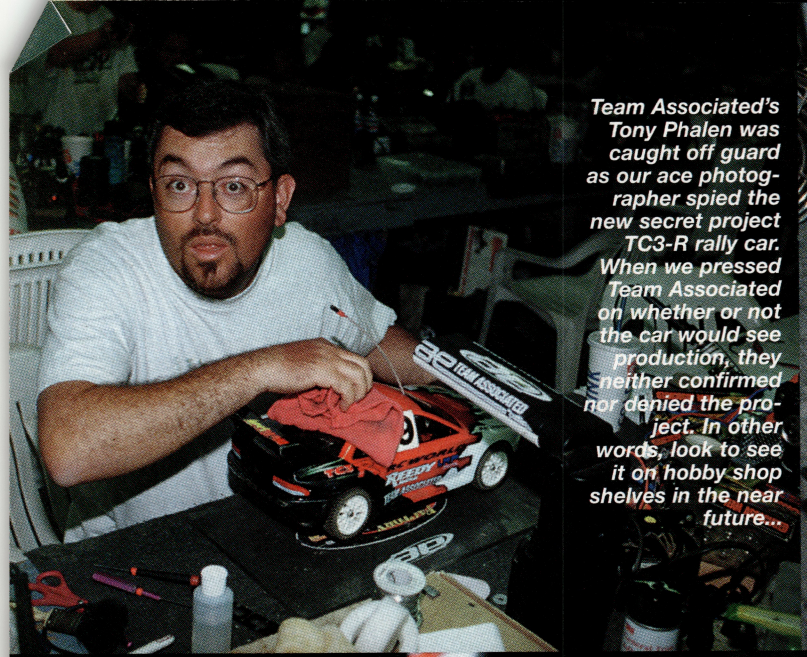
A little closer inspection of Ron's Rally Weapon on his pit table.

First turn action—when these cars come flyin' down the straightaway, look out!



If you can't get around them, go over them! And yes, that is a rally car going for big air in case you missed it...

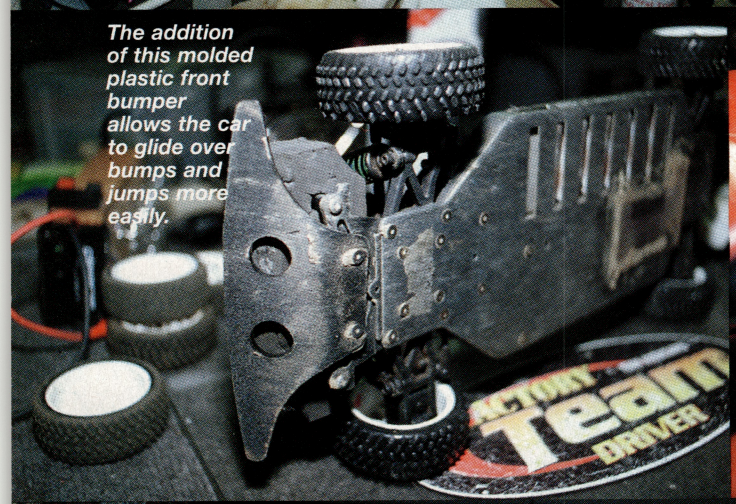




Team Associated's Tony Phalen was caught off guard as our ace photographer spied the new secret project TC3-R rally car. When we pressed Team Associated on whether or not the car would see production, they neither confirmed nor denied the project. In other words, look to see it on hobby shop shelves in the near future...



Tony's car is a relatively standard TC3 modified to withstand the rigors off off-road driving. Tony topped off his car with a Subaru Impreza body.



The addition of this molded plastic front bumper allows the car to glide over bumps and jumps more easily.



So is this the name designation we'll be seeing?—makes perfect sense to us!

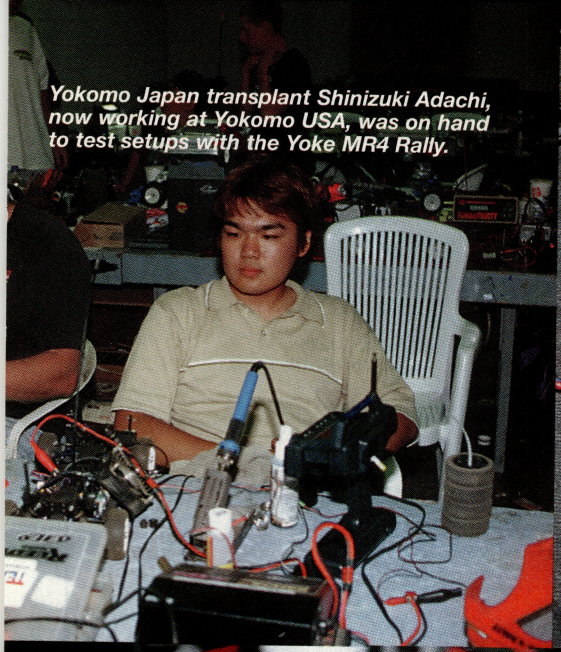


SoCal Raceway owners Jim and Lana broke from the norm on a Friday night and generously shut down the track for an impromptu evening of rally racing!

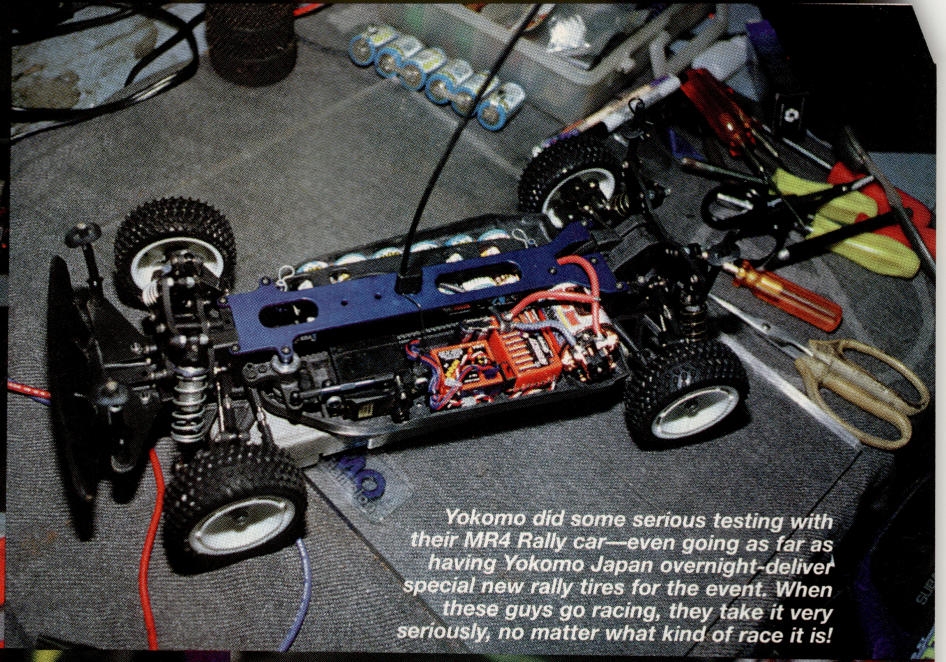


Hey, lemme help you a little over the jump...

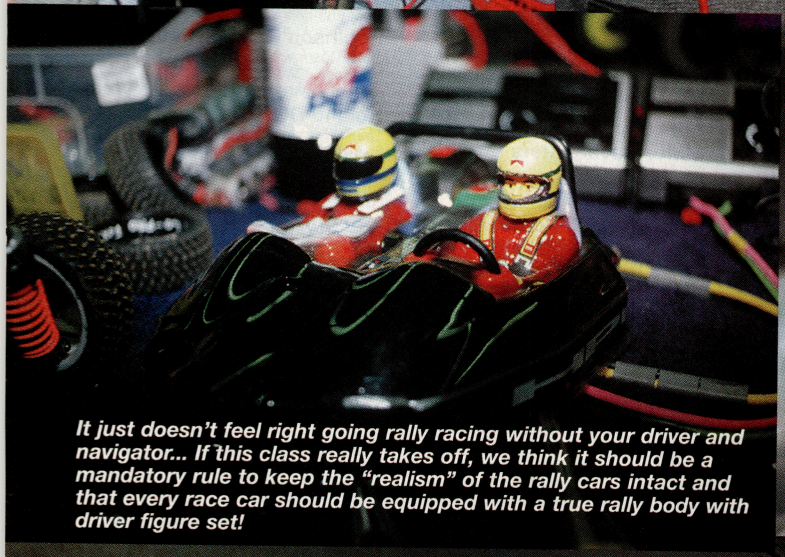
RALLY CAR RACING



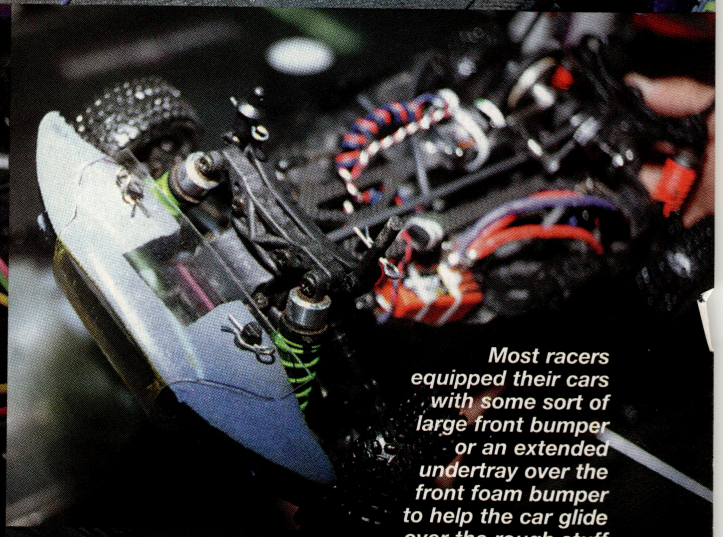
Yokomo Japan transplant Shinizuki Adachi, now working at Yokomo USA, was on hand to test setups with the Yoke MR4 Rally.



Yokomo did some serious testing with their MR4 Rally car—even going as far as having Yokomo Japan overnight-deliver special new rally tires for the event. When these guys go racing, they take it very seriously, no matter what kind of race it is!

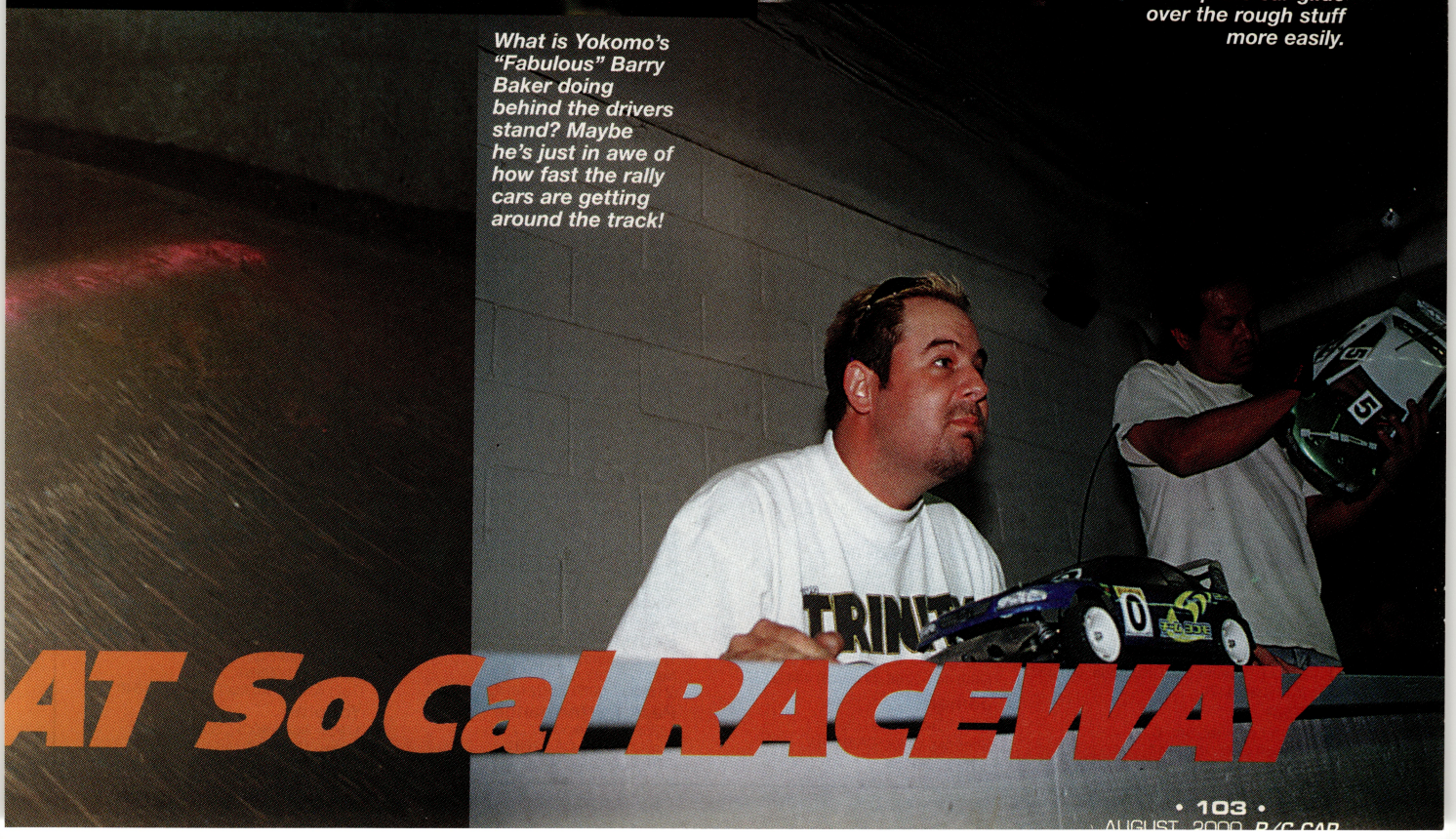


It just doesn't feel right going rally racing without your driver and navigator... If this class really takes off, we think it should be a mandatory rule to keep the "realism" of the rally cars intact and that every race car should be equipped with a true rally body with driver figure set!



Most racers equipped their cars with some sort of large front bumper or an extended undertray over the front foam bumper to help the car glide over the rough stuff more easily.

What is Yokomo's "Fabulous" Barry Baker doing behind the drivers stand? Maybe he's just in awe of how fast the rally cars are getting around the track!



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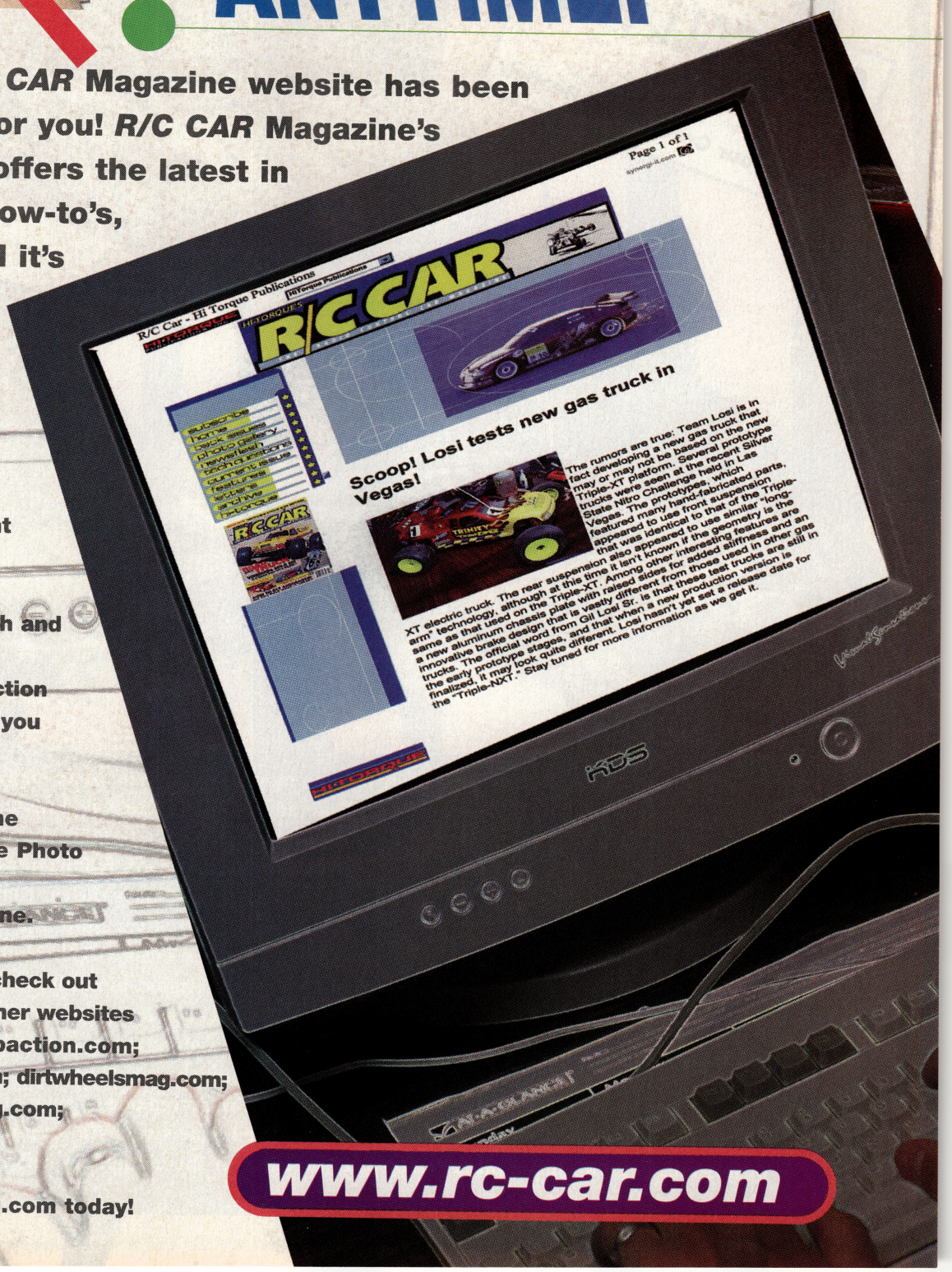
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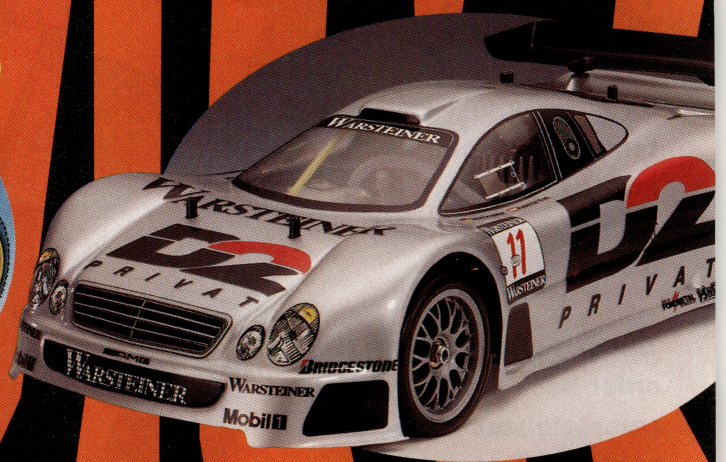
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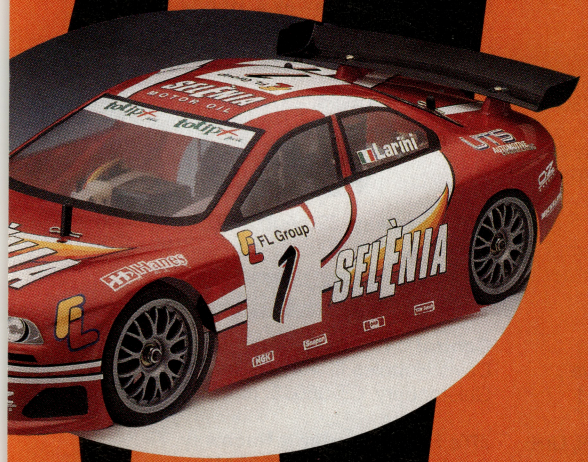
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Ozark's R/C Raceway, PO Box 460, Willard, MO 65781, (417) 742-4376, (417) 742-7223

Real Blue Vue Speedway, 12019 E. 47th St., Kansas City, MO 64133, (816) 358-0238

Real R/C Raceway, 24204 State Rte. 58, Pleasant Hill, MO 64080

NEBRASKA

Goodyear Speedway, 4021 North 56th, Lincoln, NE 68510, (402) 464- 5172

OTWG Carpet Raceway, 55129 849th Rd., Norfolk NE 68701, (402) 644-7922

RC Motorsport Off-Road Raceway, 5600 Mass Rd., Omaha, NE 68164, (402) 593-6133

NEVADA

Danwsey's Indoor R/C Hobbies, 741 N. Nellis Las Vegas, NV 89110, (702) 453-RACE

NEW MEXICO

Charlie's Hobby Shop, 225 E. Idaho, Ste. # 11Las Cruces, NM 88005, (505) 541-1097

NEW YORK

Rampage R/C, 782 Rt. 9G, Hyde Park, NY 11204

RHODE ISLAND

Tri-State R/C Raceway, 205 Hallene Rd., Warwick, RI 02886, Lenny Sosa (401) 738-4908

SOUTH CAROLINA

Carolina R/C Speedway, 4148 Calhoun Memorial Hwy., Easley, SX 29640; Craig Prahl, (864) 295-1209; *ww.carolinarc.com*

Myrtle Beach R/C Park, 5976 Grace Lane, Myrtle Beach, SC 29577 Brad Smith, (843) 234-0096

The Grove Racing Center, 939 S. Anderson Rd., Rockhill, SC 29730, Mike Durham or Don Faris, (803) 327-4121

Hobbies and More, 1570 S. Main str., Darlington, SC 29532; Jerry Pollard (803) 393-0355

J&M R/C Hobbies, 5341 Dorchester Rd., Evanston Plaza, N. Charleston, SC 29418; Mike Smith (843) 552-9449

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Midway Hobby and Raceway, 707 Sulphur Springs Rd., Greenville, SC 29611; Allen A. Dodson, (864) 246-6335

ORA Atomic Racing, 373 Boyd Pond Rd., Aiken, SC 29803; Bill Felak, (706) 855-0846 or (803) 642-0314

SOUTH DAKOTA

Boomerans Raceway, 105 N. Main, Hartford, SD 57033; Ed Smithback (605) 528-7345

TENNESSEE

Hobby Town USA, 2000 Mallory Ln., Franklin, TN 37067; Bobby Mills, (615) 771-7441

MSA R/C Racing, Rt. 12 Box 489 F, Crossville, TN 38555; D.R. Findley (931) 456-0027

W.O.W. Raceway, 59 Luray Rd., Beech Bluff, TN 38313; Kelly Bean, (901) 427-7874; *windix60@pipeline.com*

XS Speed, 5237 Hwy. 126, Blountville, TN 37617, (423) 323-1513

TEXAS

215 Speedway, 1814 County Rd. 215, Abilene, TX 79602; Clyde Gardner (915) 673-2351

Big Mike's R/C Raceway, 1405 W. Cotton St. Longview, TX 75604; (903) 297-7814

Comanche Trail RC Park, City Park, Big Spring, TX 79720; Allen Nichols (915) 263-4241

Discount Hobbies, 1722A West Anderson Loop, Austin, TX 78757; Tony Bermudex, (512) 458-2324

Drycreek Raceway, 5903 Co. Rd. 2297, Quinlan, TX 75474; Micky Alphin (903) 883-4060

Hal's Hobby Raceway, 1440 Bessember, El Paso, TX 79936; Carlos (915) 591-2213

Hobbycraft Speedway, 819 N. Main St., Corsicana, TX 75110; Keith Hoffman (903) 872-6761

HobbyTown USA, 999 E. Basse Rd., Suite 177, San Antonio, TX 78209; Joe Sena, or Clark Baisdon, (210) 829-8697

Indy R/C World, 2020 Saturn Rd., Garland, TX 75041, (972) 271-4844

Issac's Race Track, 18177 Gulf Frwy., Webster, TX 77598; Issac Ben-Ezra, (281) 488-8697

MBRC Off-Road Raceway, 204 D & E Valley Ln., Kennedale, TX 76133 (817) 292-5055

Performance Raceway, 1106C Witte Rd., Houston, TX 77055; Jorge Tabush or Terry Schmid, (713) 464-4458

VIRGINIA

Hobby Hangers Speedway, 14014D Sullyfield Cir., Chantilly, VA 20151; Kwang or Billy, (703) 631-8820

Olde Towne Hobby Shoppe, 9105 Center St., Manassas, VA 22110; Arnie Levine, (703) 369-1197

Shamroc Raceway, 106 Cheviot Pl., Stephens City, VA 22655; Scott Janow, (540) 869-3551

Star/Car Raceway, Debbie's R/C World, 200 Commerce Parkway, Virginia Beach, VA 23454, (757) 340-6681

The Toteyard, 6494 Toteyard Dr., Dayton, VA 22821 (540) 828-3476 *toteyard.com.home*

WASHINGTON

Alfie's, 108 South K St., Aberdeen, WA 98520; (360) 533-6638

A-Main Raceway, 14011 NE 3rd Ct., Vancouver, WA 98685; Monty Coleman, (360) 571-8404

Burien Toyota R/C, 15025 1st Ave. South, Seattle, WA 98148 Ray Meek, (800) 654-6456

Cedardale Raceway, 16733 Cedardale Rd., Mount Vernon, WA 98273; Joe Madonia, (360) 659-0072; *getchell@halcyon.com*

Four Season R/C Racing, 2941 Sleater Kinney Rd. NE Olympia, WA 98506; Gary Brown (360) 491-2430

Rain City Raceway, 3616 South Rd., Suite A3, Mukelteo, WA 98275, Debbie Cartwright (425) 438-2454 *raincityraceway.com*

Spokane Indoor Raceway, 6422 E. 2nd Ave., Spokane, WA 99212; Dave Mapston (509) 534-RACE

Tacoma R/C Raceway, 6305 6th Ave., Tacoma, WA 98406; Scott Brown (253) 565-1935

Ultimate R/C Raceway, 907 Cole St. #3, Enumclaw, WA 98022; Dan Dougherty, (509) 375-4995

West Coast Hobby & Raceway, 2239 Stevens Dr., Richland, WA 99352; Rick, (509) 375-4995

WEST VIRGINIA

Burr-Fab Raceway, 90 Davis St., West Union, WV 26456; Mark Travis, (304) 873-2487

Fulton's R/C Raceway, 2646 Chapline St., Wheeling, WV 26003; James Fulton (304) 233-5355

Left Turn Hobbies, 100 Saco Ln. Glen White, WV 25849; Stretch (304) 255-3930
Race Zone, Hopewell Rd., Rt. 8 Box 343A, Fairmont, WV 26554; Joe Clutter , (304) 368-1000

WVRCA R/C Club, 142 West Main, Bridgeport, WV 26330; D.W. Weed

WISCONSIN

ABC R/C Inc & Raceway, 244 W. Main St., Waukesha, WI 53186; Dick Mathiesen, (414) 542-1245

Gary's Hobby Center, 3701 Durand Ave., Racine, WI 53403; Bill Phalen, (414) 542-1245

Heart of the Valley R/C Club, 1330 Midway Rd., Menasha, WI 54952; Bill Morgan, (920) 954-1695

Hobbytown USA, 2061 South Koeller, Oshkosh, WI 54901 (920) 426-1840

Hobbytown USA-Revolution, Memorial Mall, 3347 Kohler Memorial Dr., #D2, Sheboygan, WI 53081; Kenny, (920) 452-0801

JJ's Dirt Heaven Hobby and Raceway, 6028 County Rd K, New Frankview, WI 54229; *dirtheaven@msn.com* Aaron Dufey (920) 866-9096

Mid-West Tri-Clone, 3745 Shuster, West Bend, WI 53095; Tom Holz, (414) 334-0429

Pro-Star Racing, 726 Pine St., Green Bay, WI 54301; Chuck, (920) 469-5566

RJ's/R.C., 4920 Hwy. 70W, Eagle River, WI 54521; Randy Stys, (715) 479-2541

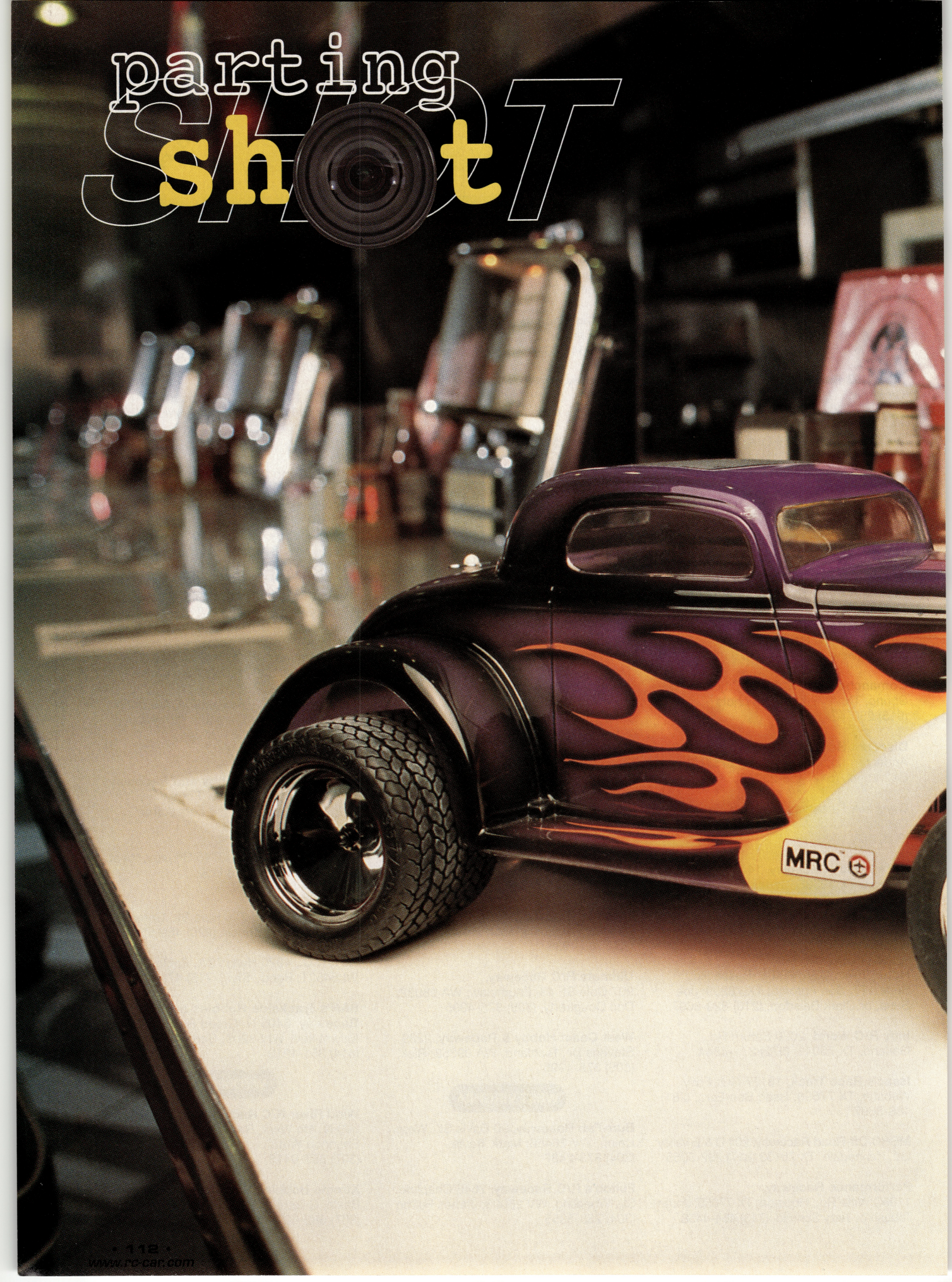
S&N's Trackside Hobbies and Raceway, 6405 N. Green Bay Ave., Milwaukee, WI 53209; Scott Ernst, (414) 351-1910

WYOMING

Wind River R/C Racing Association, 309 N. 4th West, Riverton, WY 8250; Shannon Watts, (307) 857-0418

Xtreme Hobbies Raceway, 2724 Powder Basin, Gillette, WY 82718; Frieg Balls, (307) 682-6077

THUNDER TIGER RACE PLACES


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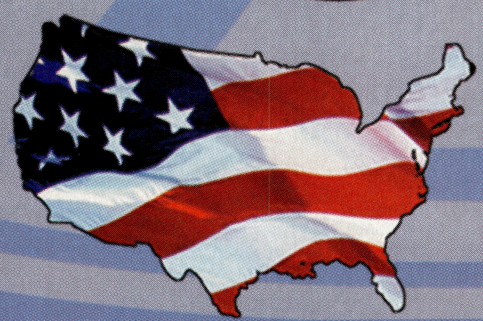
GOING BACK IN TIME

As we were sifting through our old color slides here in the office, we stumbled upon this photo that appeared in our March '99 issue. It happens to be Doogie's favorite photo of all the ones he's shot since we started this magazine, and when he saw it he looked back at the article and simply stated, "sure was a shame we had to run other photos and type over that shot...you can't even tell it's in a 50's diner, really...". So, we decided the pic deserved another go-around.

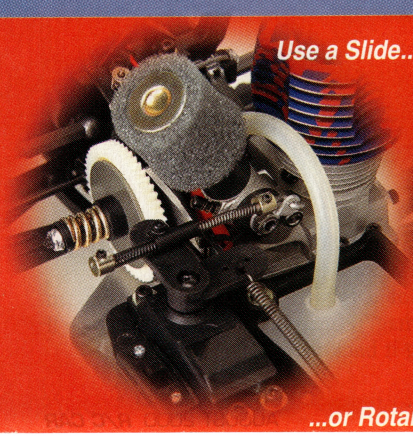
Got a favorite photo you've seen in the mag? Let us know and maybe we'll bring it back for another look too!◆

XXX TECH GOES

XXX NT



MADE IN USA



Use a Slide...

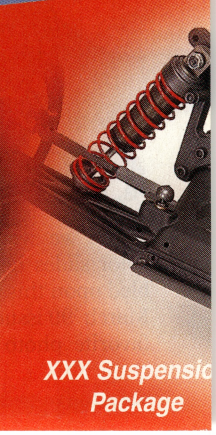
...or Rotary Carb



Quick-fill Fuel Tank



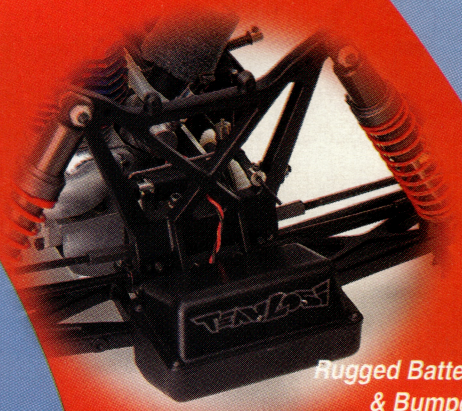
Molded Receiver Box



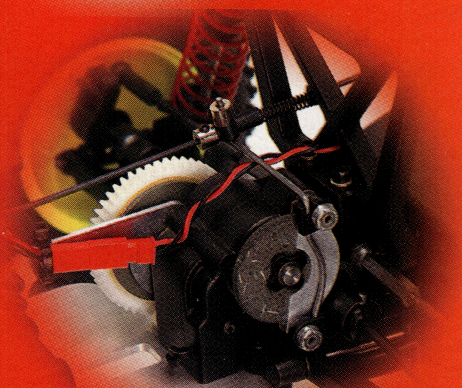
XXX Suspensio Package

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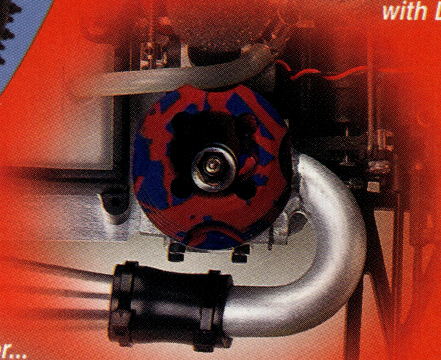




Rugged Battery Box & Bumper

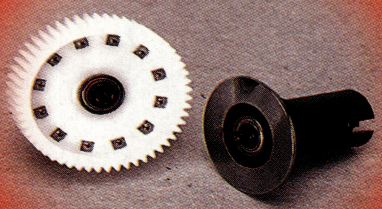


New Super Low Profile 4.11:1 Transmission with Disc Brake

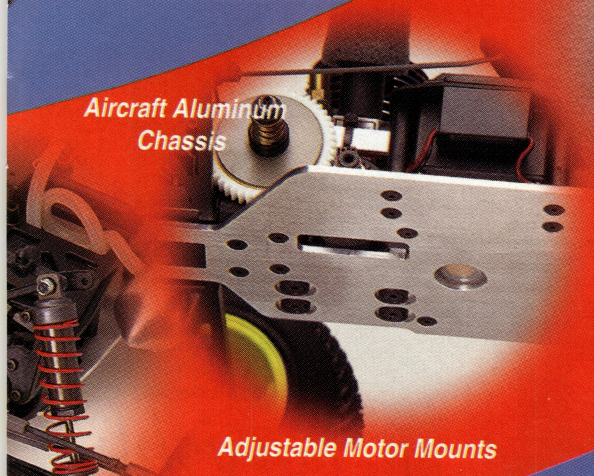


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Trinity Off-Road Shoot Out
2wd, Matt Francis
Truck, Adam Drake
4wd, Brian Kinwald

US Indoor Championships
1/12th, David Spashett
Touring, Josh Cyrul

Reedy Race Of Champions
Brian Kinwald

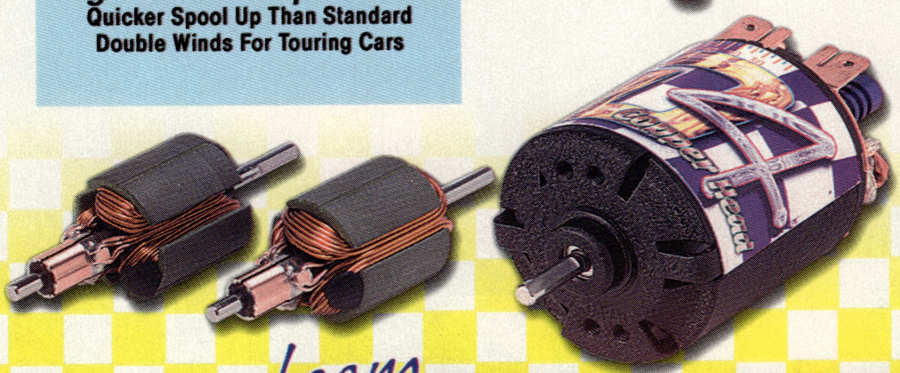
Florida Winter Champs
Truck, Matt Francis

Trinity On-Road Challenge
Touring, Josh Cyrul

Cactus Classic
2wd, Matt Francis
Truck, Brian Kinwald
4wd, Brian Kinwald

ROAR Carpet Nationals
1/12th, Josh Cyrul
1/10th, Josh Cyrul
Touring, Josh Cyrul

1/12th Euro Champs
David Spashett





Josh Cyrul and Barry Baker celebrate their 1-2 finish in Modified Touring at the ROAR On-Road Nationals

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