

KYOSHO'S NEW THREAT: THE TRIUMPH

Radio Control

47380

August 1991

CAR ACTION

THE WORLD'S PREMIER R/C CAR MAGAZINE

POWER

SIDE

ASSOCIATED'S NEW TRUCK

RC10
ST

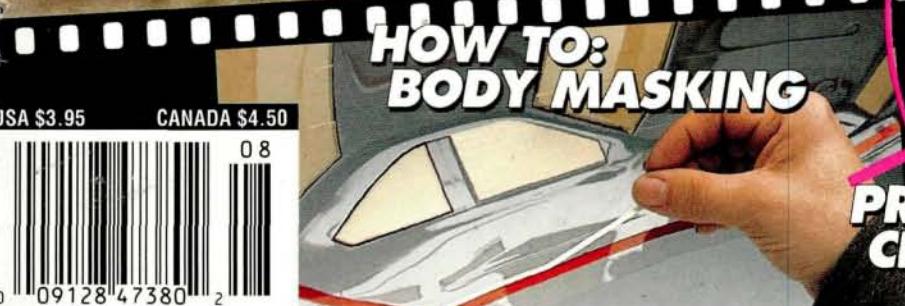


WORLD CHAMPS
PREVIEW

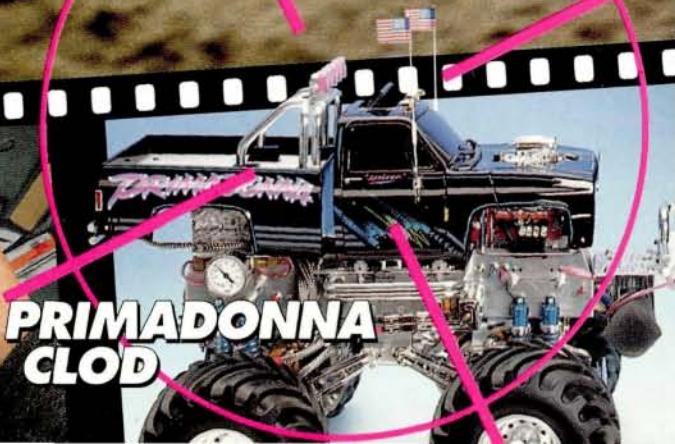
R/C FACTS
FALLACIES &

DON'T
SNOWED

HAMP'S SECRETS REVEALED:
LOOK INTO
MASAMI'S CARS



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HAWK



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Radio Control CAR ACTION

VOLUME 6, NUMBER 8

AUGUST 1991

TRACK REPORTS

32

KYOSHO PENSKE PC-19

by Steve Pond
PC=Pretty Cool!

76

SCHUMACHER RS 4X4

by Alex Strouthopoulos
A racer to rally around

84

TRAXXAS HAWK

by Yamil Sued
Is this a high-flying bird of prey?

96

TAMIYA MANTA RAY

by Fred Murphy
Four-wheel deal

COLUMNS

48

DIRT DIGEST
by Bill O'Brien & Bob Kane
Dirt alert

68

SCOPING OUT
by John Rist
AstroFlight 205

112

TROUBLESHOOTING
by Steve Pond

DEPARTMENTS

6

EDITORIAL
by Steve Pond

8

LETTERS

10

PUBLISHER'S PAGE
by Louis DeFrancesco, Jr.

14

INSIDE SCOOP
by Chris Chianelli

20

READERS' RIDES

28

PIT TIPS
by Jim Newman

184

TRACK DIRECTORY

218

WHAT'S NEW

ON THE COVER: Center: Cliff Lett's Associated RC10 ST (photo by Steve Pond). Upper right: Kyosho's new Triumph. Bottom, from left: Body Masking and Home-Built Primadonna Clod (photos by Yamil Sued).



Associated's RC10 ST, page 52

FEATURES

40

INSIDE MASAMI'S CARS
by Steve Pond • *The master's machines*

52

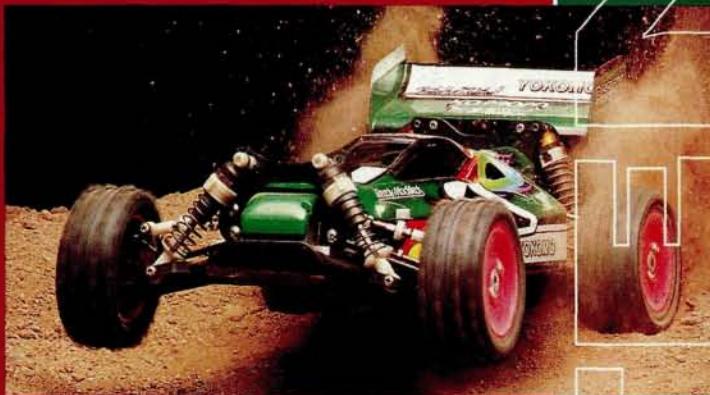
WINTER CHAMPS WINNER
by Steve Pond • *Peek inside Cliff Lett's RC10 ST*

56

SHINWA MOTOR DRESSER FET
by Frank Masi • *Dress for success*

59

R/C FACTS & FALLACIES
by Chris Chianelli • *Don't you believe it!*



Masami's Yokomo '91 Works, page 40

64

HOME-BUILT PROJECT: PRIMADONNA CLOD
by John Huber • *The diva of details*

72

BODY MASKING
by Richard Muise • *Methods of the master*

107

IFMAR WORLD CHAMPS PREVIEW
by John Huber • *Get primed for the showdown in Motown*

109

KYOSHO'S NEW TRIUMPH

129

PRO-LINE/CAR ACTION CACTUS CLASSIC
by Mike Lee • *Duelin' in the desert*

141

HOBBY DYNAMICS HUSTLER
by Gerry Yarish • *Wave warrior*

149

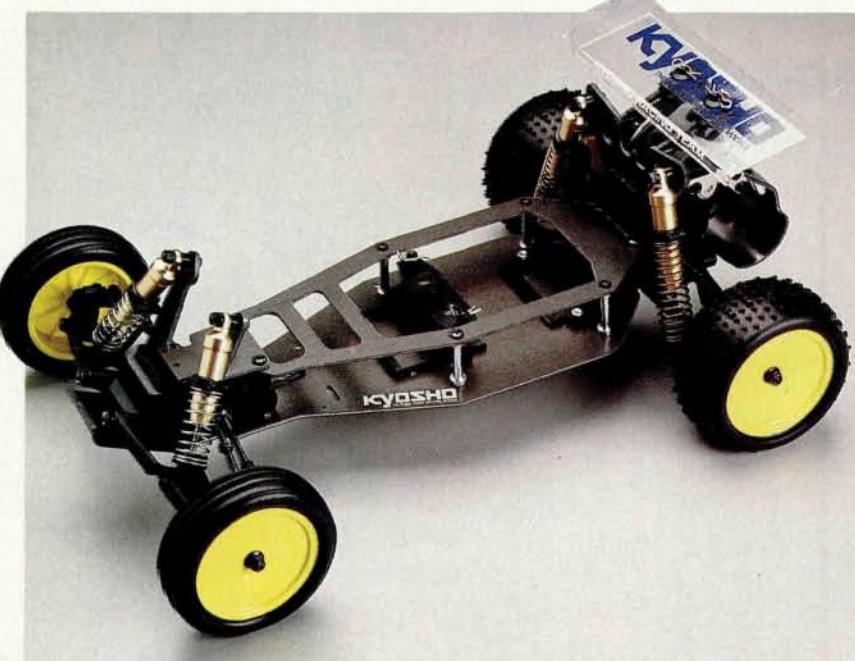
PROJECT BIG BEAR
by Bill O'Brien • *CJ, the dancing Bear*

155

PRO-LINE ULTIMA II CONVERSION
by Bob Gagne • *Convert for dirt!*

EDITORIAL

by STEVE POND



WHY'D IT BREAK?!

The most common complaint we receive is that many R/C cars break easily. The word "easily," however, is relative. To us, an "easily broken part" could be one that breaks in a minor collision or after a decent shot into a wall at the track, or one that fails prematurely under "normal" (another relative term) operating conditions. Some enthusiasts, however, expect their cars or trucks to withstand the abuse of driving off roof-tops, going over 6-foot-high jumps at full speed and hitting walls head-on at more than 45 mph and still come up smelling like roses. To say that the expectations of reckless R/C enthusiasts are unrealistic is an understatement.

Like any other mechanical equipment, R/C cars must be treated with a certain amount of respect. To preserve a full-size auto for as long as possible, you have to change its oil and lube all its joints, and you must care for your R/C vehicle in the same manner. Without careful maintenance and a levelheaded operator, R/C cars are guaranteed a life of breakdowns and below-par performance.

Life is full of compromises. There can't be an up without a down, a good without a bad, a black without a white—well, you get the picture. With R/C cars, you can't have good performance without compromising durability. Bulletproof cars don't go fast, so they must be made of lightweight materials in configurations that provide good strength-to-weight ratios.

Apart from a few poorly manufactured pieces, many of the available R/C products are capable of withstanding some fairly severe punishment. Don't be too critical of the product you're using. Most are designed to be a fair compromise between performance and reliability. You can't have it all, so be happy with something in the middle. Most of all, keep having fun. ■

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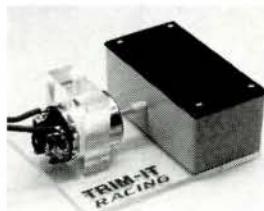
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LETTERS

SHOCK STUMPED

Recently, I bought a Blackfoot, but whenever I run it, its rear shocks get stuck, and they don't come up unless I run it in reverse. Then, when the truck starts moving forward, they go down again. Do you have any solutions?

JOHN ARIEO
Greenbrook, NJ

John, it sounds as if something in your suspension is binding. Remove the shocks, and check that they operate smoothly (putting some lube on the shaft might help). If the shock doesn't show any signs of binding, check that the rear arms move smoothly. If they do, then perhaps the shock-mounting screws are too tight. Stock shocks never work as well as oil-filled units, but if they don't bind, they should be adequate.

JH

SLIPLESS

In the article on slipper clutches (April '91 issue), it said that some slipper clutches are compatible with the popular off-road cars, but there was nothing about using them in off-road trucks. Will any of the clutches mentioned fit my King Cab? If not, are any companies planning to introduce one that will in the near future?

BILL KELLEY
Cape Cod, MA

Bill, slipper clutches are available for some trucks, but they're primarily for trucks that are based on 2WD buggies (i.e., RC10 conversions, JR-XTs, etc.). Unfortunately, none of the clutches mentioned in the article will fit your truck. Slipper clutches are great for any vehicle, but I don't know of any that are available for the King Cab now.

JH

SUPERIOR SERVICE

I'm writing to commend Twister Motors for its supreme service. I bought a Twister lathe, and its belt broke. I wrote to the company about the incident, and guess what? Yup! I received not only a replacement belt, but an extra one, too!—all in

less than three days! Twister deserves the highest accolade for service, and I'd like to thank them.

COSMO MAO
Irvine, CA

Cosmo, I think it's great that Twister helped you so quickly. The belt in my lathe broke soon after I bought it, too. (Actually, it was an O-ring, and they've been known to break!) I found a good selection of belts at an auto-parts store, and they sell for 50¢ each. Just make sure you get an O-ring of the same size.

JH



LETHAL TRACTION

Are you tired of your monster truck not having the traction it needs? Well, I sure was, so I devised this solution: puncture a hole in the tire with a nail, and then pass a bolt with a screw on it through the hole. Don't worry, bolts cost less than \$3, and they'll really improve your truck's traction. After a sore thumb or two, nothin' will be able to stop your truck!

JARED THORNBURGH
APO, NY

Jared, although your idea shows the ingenuity that's so prevalent in our hobby, I strongly recommend that you (or anyone who's even considering modifying tires with sharp metal objects) refrain from this practice. The additional traction afforded by the metal spikes is outweighed by the danger. If anyone accidentally picked up the monster truck while you were running it, they could lose some digits! Besides, if you ever planned to race, I don't know of any club that would let you use these modified tires.

FM

WRITE TO US! We welcome your comments and suggestions. Letters should be addressed to "Letters," Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

WHICH PITCH?

Hey! I have an RC10 with bearings, a Futaba speed controller and a fairly quick motor that I made out of spare parts. The only thing I dislike about my car is that its pinion/spur gear mesh is very loud! I've tried to adjust it, but this hasn't helped. I use stock pinion and spur gears, but I want to use gears of a higher pitch to reduce the noise and provide smoother runs. Which pitch do you suggest? Also, in the B&R Motorworks ad, the motors' brushes were soldered onto their endbells. Is this some sort of high-performance advantage that the rest of us don't know about?!

JEFF KAMKE
New Berlin, WI

Jeff, the noise is probably caused by the fact that you're using 32-pitch gears, and they've worn out. Try a set of 48-pitch gears. (I don't recommend 64-pitch gears for off-road racing, because they're delicate.)

As for the B&R motor ad, there's a big advantage to soldering the brushes onto the endbell. Last year, I noticed that the color of the brushes in my motor was changing after one run, which is an indication of too much heat. Several of the brush springs snapped or were bent because of this heat. I realized that screwing the brushes to the endbell probably didn't create a very good connection, so I soldered them. Wow! What an improvement! Not only did the motor run at a lower temperature, but the brushes and springs lasted much longer. Also, the brush hood is attached to the endbell with the spring post and the same screw that's used for the brushes. When you remove this screw, the brush hood can shift, so you risk altering its alignment. It's important that the brushes are properly aligned with the armature, and soldering the screw ensures that they won't shift.

JH

HARD CELL

I've only been racing for a few months, and I'd like to learn more about batteries. What do the terms "pushed," "SCR," and

"SCE" mean? Also, how are cells rated? What's the best battery for a stock setup? Your mag is great!

RICKY MASTERS
Austin, TX

Flattery will get you everywhere, Ricky. You've asked some very good questions, and I'll answer them in order.

1. The cells in a "pushed" battery pack have been conditioned to produce more "punch."
2. SCR is Sanyo's designation for its fast-charge Ni-Cd battery. The 1200mAh sub-C cells were the first SCRs used in R/C. SCRs had a high discharge rate, however, so they were primarily used for stock-class racing. Recently, 1400mAh SCRs have been released, and they're popularity has grown in the 2WD modified off-road classes.
3. The SCE—Sanyo's 1700mAh battery—has made a huge impact on R/C racing because its increased current capacity allows for much longer run times.
4. Batteries are rated according to their discharge seconds, charging seconds, overall voltage, and recently, their internal resistance.
5. SCRs are the best for stock racing. I suggest that you buy 1400mAh packs, because if you ever decide to go modified, you won't have to buy new batteries. FM



THIS EAGLE EYE NEEDS GLASSES!

I've been reading your magazine for a while, so I've seen the coming and going of the "Eagle Eye of the Month Award." In the article, "How To Make A Winning Concours Interior" (March '91), I noticed something wrong. On page 68, it says that the driver is from a Tamiya car but, when

(Continued on page 24)



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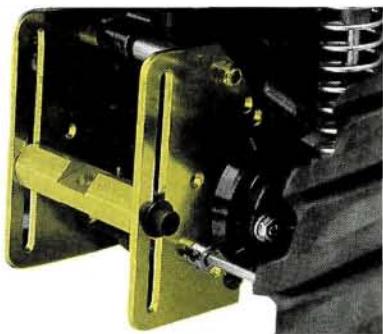
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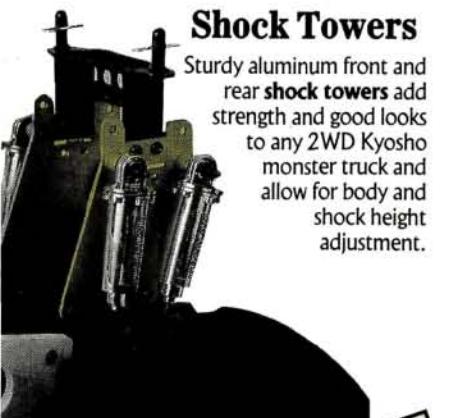
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PUBLISHER'S PAGE

by LOUIS DeFRANCESCO, JR.



NEW TREND?

TO ENSURE our continued growth, much of our marketing effort here at Air Age Publishing is directed toward keeping readers enthusiastic about the hobby. This strategy should be adopted by R/C manufacturers and organizations, too; and this was a key topic of my recent meeting with Alan Green, the senior vice president of the Hobbico group (Tower Hobbies, Great Planes Model Distributors and Kyosho).

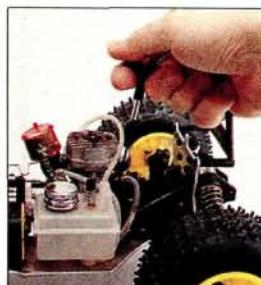
There was a lot of "brainstorming," and we plan to embark on some progressive programs and events that you'll see in the near future. Bringing "new blood" into the R/C fold is imperative; but exciting current R/C enthusiasts is just as important. Bill Jeric (Hobbico's senior product director) demonstrated new products, and the most impressive was the new Outlaw Rampage, which might really turn on active R/Cers. It's a 1/10-scale racing truck powered by a .12ci glow engine. If you aren't familiar with glow-powered R/C vehicles, let me tell you, this truck screamed, and Bill

served up some wild sideways and rooster-tail action.

I thought, "What a great concept for a new class of racing."—and talk about speed and excitement! Many modelers shy away from glow engines because they can be very cantankerous and problematic; and then there's all that cumbersome starting and support equipment. The new glow vehicles are, however, much more user-friendly; they even have pull starters. Also, since this truck is in 1/10 scale, there's already a wealth

of after-market goodies available from its electric brothers (i.e., wheels, tires, bodies, shocks, etc.).

This could very well be the start of something new. The industry is primed for a hot new trend, and I'd like to see more manufacturers getting involved. Global Hobbies is also offering a new glow-powered stadium truck, and Schumacher is about to introduce theirs. Remember: as industry members, it's our responsibility to keep exciting R/C consumers. Hey!—maybe a year from now, we'll be featuring the 1/10-scale glow-powered nationals! ■



GLOW-ENGINE-POWERED, 1/10-SCALE RACING TRUCKS

INSIDE SCOOP

by CHRIS CHIANELLI



As directed by the Ayatollah of Radio Controlla, Commander Crash Chianelli reports back to the faithful followers of the Grand High Exalted with pertinent information! I'm back from my latest espionage excursion with microfilm, spy shots and stolen communiqués that read as follows:

Here, Vladimir Pershin shows our Associate Editor, John-Boy "Walton" Huber, a Soviet 1/8-scale 4WD on-road gas car. The eastern bloc modeling scene has a lot of catching up to do. Most of this car's tooling was done by hand, and it was made of rough nylon. The car features four-wheel independent suspension with oil shocks and torsion springs; a black anodized-aluminum chassis; nylon suspension components; one-way front bearings; a belt drive; a two-speed tranny; steel drive gears; and quick-change rear wheels. We salute our Russian modeling friends for persevering in their country's industrially and economically troubled times. We figured that John-Boy's down-home, hospitable ways would quickly make the Russians feel at ease. Gosh darn, ma. They don't seem no different from us when you get right down to it!



JOHN-BOY GOES GLASNOST

ally and economically troubled times. We

figured that John-Boy's down-home, hospitable ways would quickly make the Russians

feel at ease. Gosh darn, ma. They don't seem no different from us when you get right down to it!



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10027	Battery Bar	(Battery Bars to be used @ the Weightless Environmental Training Facility, NASA/ Johnson Space Center)		

After recent covert operations (including a break-in) at the Dan's RC Stuff facility were carried out in an attempt to expose Dan's high-tech government/business connections and dealings, this stolen document fell into our hands. Names and phone numbers have been deleted to protect the innocent. As you can see, Dan had clandestine meetings, and subsequently, a shipment (or possibly shipments!) of Dan's battery Gold Bars was sent to the NASA/Johnson Space Center for who knows what purpose! The only thing that my people have been able to uncover is that the bars were shipped to a high-security building with the words "Environmental Training Facility" printed on the door in small—but very official—letters. If Dan's bars are good enough for NASA, then they're good enough for us; don't you agree, Scotty?

TEXAS TARMAC

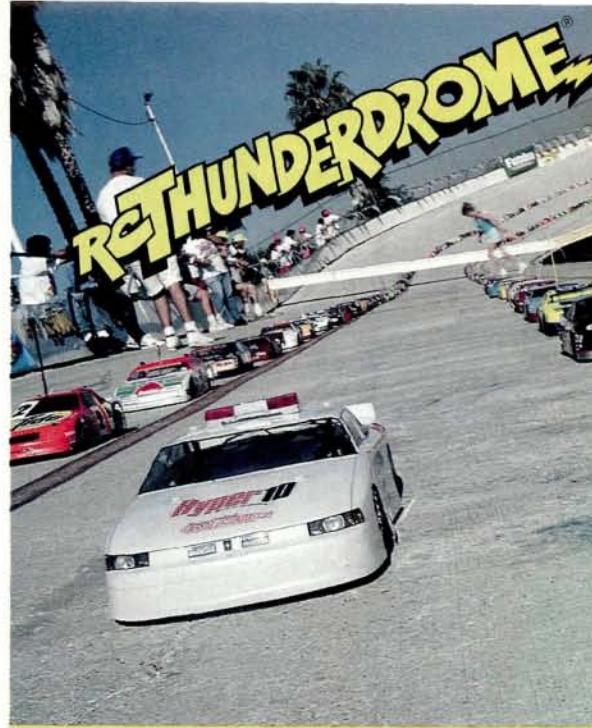
This spy shot was taken at the .32-mile concrete tri-oval test track that's located 3 miles from the Traxxas headquarters in Dallas, TX. You can see what appears to be the 1/10-scale on-road prototype that Traxxas has been working on secretly. Our man in the Deep South (code name: Long-Lenz Leg-Horn) took this telephoto shot right before he was discovered and lassoed by J.R. Jenkins & Son. It's hard to see much because the photo is blurry, but the car looks as if it might be a Lynx-type, rear-pod design with an overhead-shock/bellcrank system; just don't hold me to that. Is Traxxas really developing an on-road threat? The respect for Traxxas in certain racing circles has grown recently, so if they're building one, we look forward to checking it out.



From this photo taken recently at the Great Planes test track in Champaign, IL, it's evident that the 1/10-scale gas scene is gaining popularity. It's also quite obvious that the Kyosho Nitro USA-1 is catching some serious air and is a true American high-flier. Leave it to *Car Action* to bring you the first action shot of this new methanol monster.



GAS CRUNCHER



HIGH-SPEED REPLAY

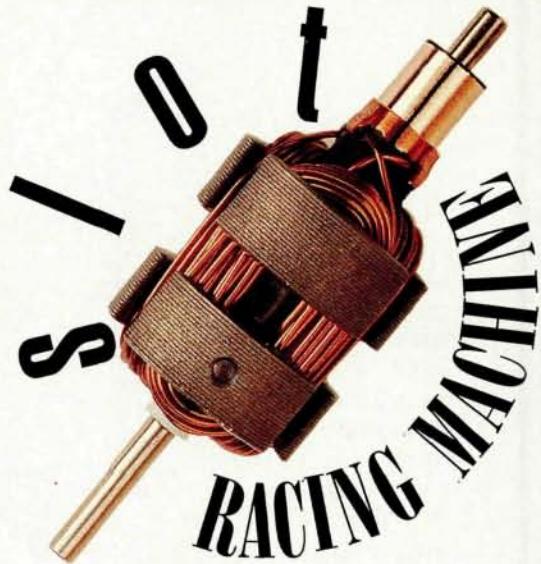
The fastest track in the land—the Velodrome in Encino, CA—will again be the site of the annual Thunderdrome and Radio Control Car Action Super Speedway Shootout. September 13 to 15, 1991, will go down in R/C history as the fastest days of the year. Be there, or be considered...slow!

body builders at work



Known for its fine line of scale bodies, McAllister racing has just made truck racing much "sexier"; look at the curves on this bright-orange Stadium Jeep Cherokee!

McAllister's Iron Man Toyota (white) is also new.



No, I'm not talking about cars that race on slotted tracks. I'm talking about R/C cars that run using Trinity's new ROAR-legal Slot Machine (stock) and Tri Rotor (modified) motors. Trinity took material out of the center of the armature to produce a split or slot. The company says this makes up for the new 24-degree stock motor's reduced rpm (it's lower than old 37-degree stock motor). The

REEDY Modifieds

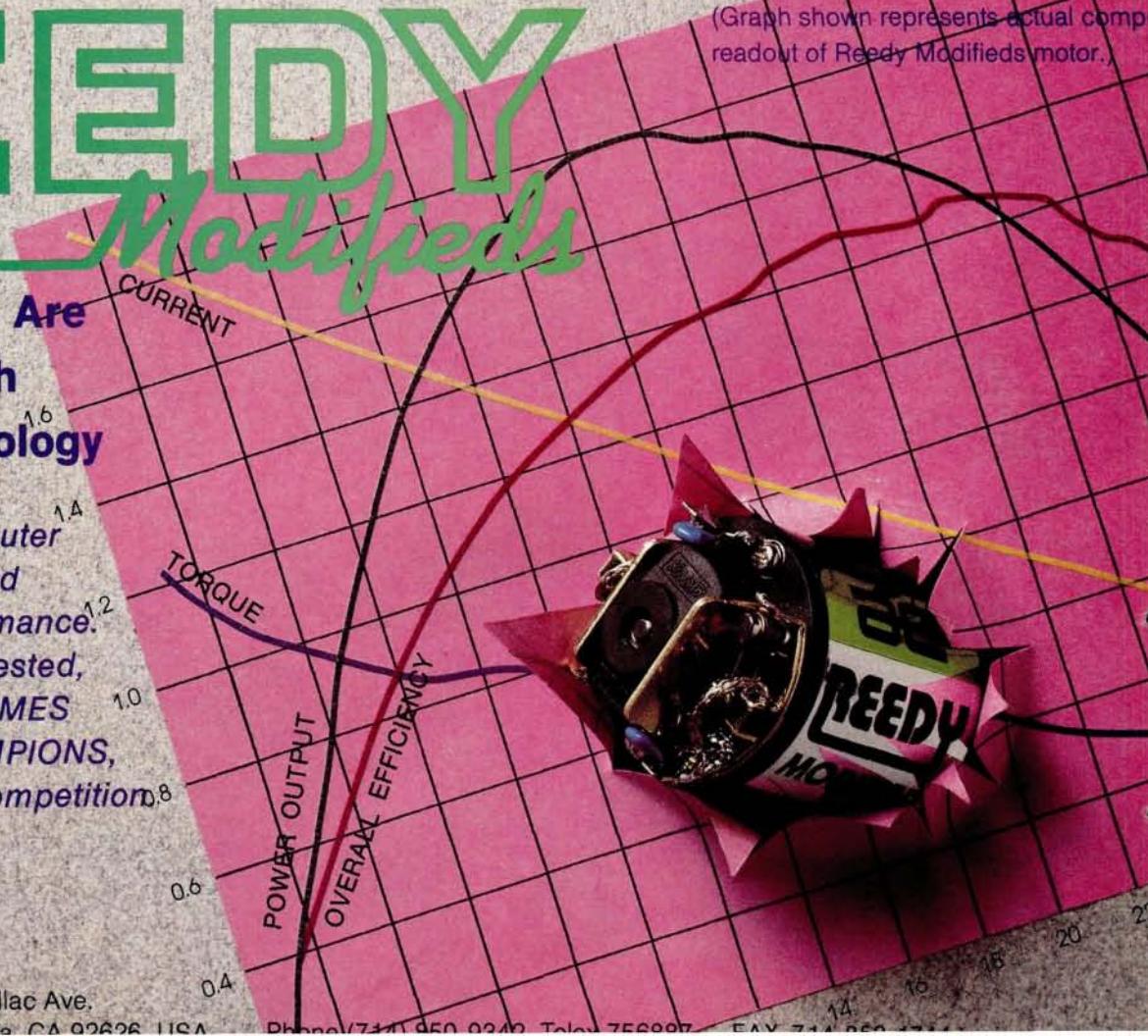
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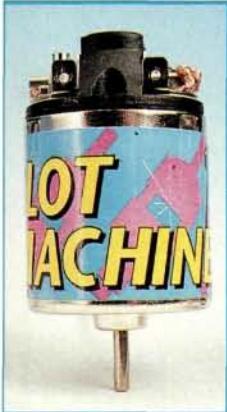
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(Graph shown represents actual computer readout of Reedy Modifieds motor.)



slotted armatures are also cooler because air can now circulate to the inner part of the coil where heat build-up is the greatest. We haven't tested these motors yet, but I can tell you that this design worked in slot-car motors. There's one more thing I can say for sure: this development will stir up the pot...a lot!



My beautiful spy in the Far East has come through yet again! I hope to bring you more info about these Japanese "Mad Tune" cars soon (they're not available in the States yet), but for now, here's all I know. They're—get this!— $1/70$ scale (about HO size)! The single-cell car's Ni-Cd is charged by means of the transmitter. Will somebody please tell me why the Japanese call them Mad Tune cars?! Why not call them Table-Top Racers! Now that's a great name, if I do say so myself.

table-top formula-t?

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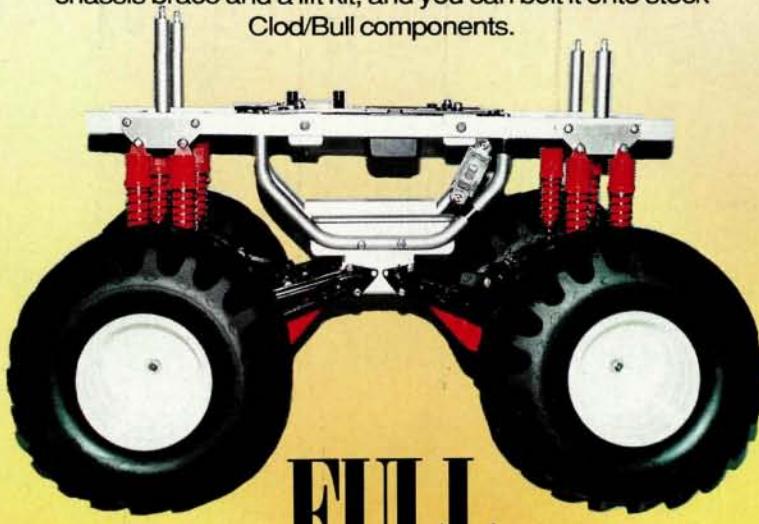
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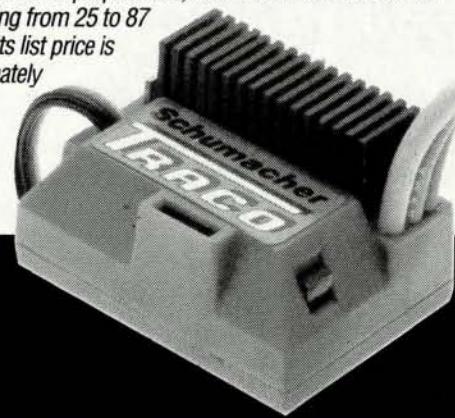
ESP's new, aluminum, monster-crusher Ladder Frame chassis borrows its technology from full-scale crushers. ESP claims that it's "lighter than any other aluminum chassis" and "perfect for racing and truck-pulling." It features a built-in chassis brace and a lift kit, and you can bolt it onto stock Clod/Bull components.



FULL SCALE DESIGN

count traco's control

Schumacher—maker of the fearless feline force—has introduced a high-frequency electronic speed controller called the TRACO (traction-control system). Its ABS (advanced braking system) reduces wheel lock-up when you apply the brakes, and its fail-safe circuitry protects against interference and shuts off the power if you lose the signal. It also has low-voltage detection, which maintains the correct receiver voltage (i.e., the motor drive is reduced whenever the Ni-Cds drop below 4 volts). The controller's push-button programmable functions include acceleration rate and braking-rate options that can be either proportional, or switched between six values ranging from 25 to 87 percent. Its list price is approximately \$220.



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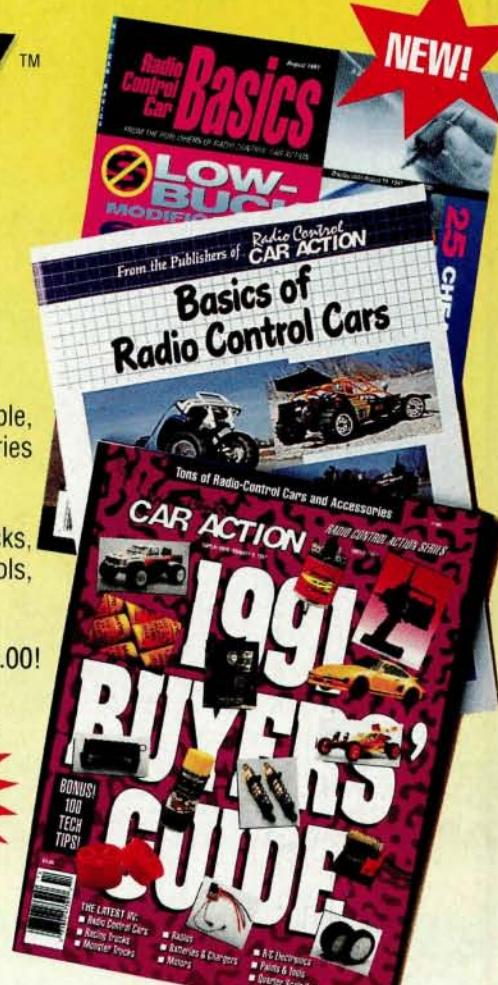
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"Readers' Rides" is our way of recognizing the unique, innovative—and sometimes bizarre!—vehicles that our readers have created. Send us a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, R/C Car Action, 251 Danbury Rd., Wilton, CT 06897. If the Ayatollah chooses your photo, you'll receive a one-year subscription to Car Action, or an extension to your existing subscription. You'll also be eligible for the third annual "Reader's Ride of the Year Contest" in the fall of 1991. Write your address and phone number on your letter and on the back of each photo you send, in case we need to contact you.

winter modifying it until he got this cool truck. The mods include JG front and rear shock mounts, Trinity Power Plus Shocks, Sees Champ 500 wheels, a Sassy Chassis (which David has anodized black) and oh, so much more! Now that it's summer, David is psyched to drive it somewhere other than in his living room!

HOLY TIME-CONSUMPTION, BATMAN!

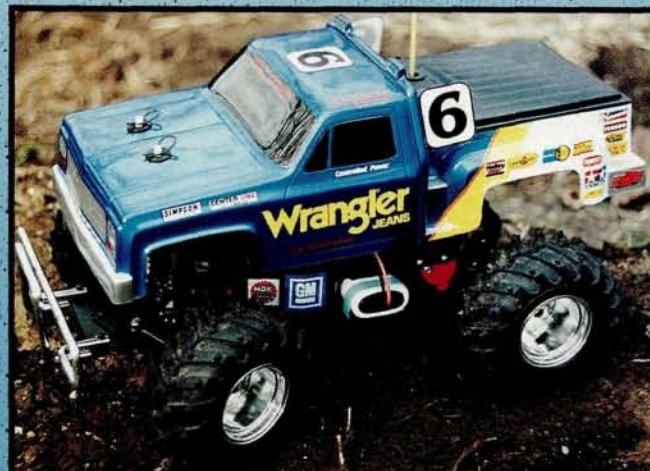


It's rare to see a project on which a reader has spent more than 1,200 hours, but this 98-percent scratch-built Batmobile by Ewald Schuster of Guelph, Ontario, Canada, is just such a project.

What started as a plastic model became a customized 1/8-scale Batmobile. Ewald started with a solid brass chassis and added an O.S. Max 25 FSR with a ducted fan that provides 4 pounds of thrust and keeps the engine cool. The Batmobile's power comes from thrust and a drive shaft that's connected to the spinner on the fan. Its parts are all handmade, and the all-balsa body alone took 850 hours to construct and finish! It's a stupendous job, and Ewald has the right to say his car is one of the best!

CABIN FEVER

It all began with a Monster Beetle kit... David Davis spent the rainy Portland, OR,



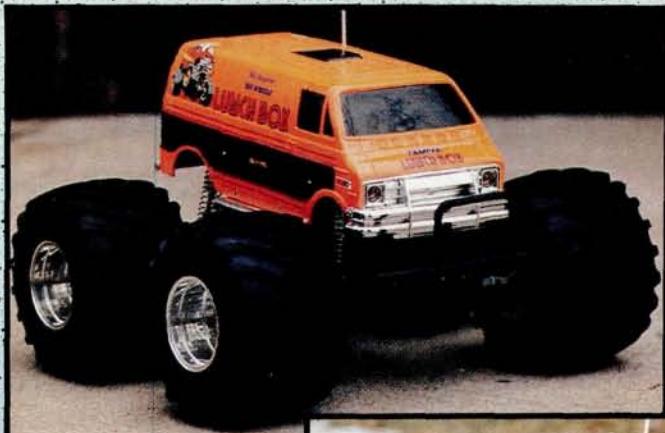
TOUGH LYNX

Garth Warner of Escondido, CA, modified this Lynx II Sport to get the most out of it on short tracks. This revamped machine has a Cheetah Racing Ultimate front end, a Kyosho Gold shock absorber and a TRC left-turn-only chassis. It's powered by a Peak Performance Psycho Stock motor, directed by a Futaba Magnum AM and controlled with a Tekin ESC. Garth decided to rework the Havoline Winston Cup stock-car body—a great body for a great car!



ODD COUPLE

Here's one of Tamiya's smallest trucks (we're talking about a Lunch Box) mounted on a full set of Tamiya's largest tires—yes, we mean *Clod Busters!* Anthony Mulcahy of Barnett, MO, is responsible for this cool combo. To make the big wheels turn with gusto, Anthony added a LeMans 240 ST motor with a Novak T-1X speed controller. Orange and black paint finish the project with a touch of class.



BAD BOY BIGFOOT

Geoffrey Kline Jr. of Trenton, NJ, sent in this photo of his modified Clod Buster. ESP quad shock mounts were added to the stock Clod suspension, and this allowed Geoffrey and his dad to mount eight extra shocks—for a total of 16 shocks! Its mods include a set of Trinity Matched Madness motors and CCP chrome wheels and bumpers. A Futaba Magnum JR radio controls it all.



MINI FUNNY

Taking a cue from full-scale funny trucks, Dave Semanik of Parma, OH, created his own 1/10-scale version. He started with a narrowed GP-10 chassis and added adjustable wheelie bars, a Novak ESC and a Black Magic VooDoo motor. Powering this potent package is a battery pack with 3/4 sub-C cells. The mods on this car enable it to run a 1/10-scale quarter-mile in 2 seconds!



tractor/trailer for 8 months and is still thinking of ways to improve it. The highlights on this beauty are functional jack stands, a working fifth wheel and a geared lifting system for the bed.

THE WHEEL DEAL

Built by Harold Cambra of Wailuku, HI, this multi-wheel Clod tops our list of all-time greats. With more wheels than we've ever seen, this Clod Buster shakes the ground when it moves, and with six 7-cell battery packs powering a trio of Monster Mash motors, Harold can cart anything he wants! He has worked on this It really shows—check out the details! Just some of the highlights on this beauty are functional jack stands, a working fifth wheel and a geared lifting system for the bed.

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LETTERS

(Continued from page 9)

you flip to page 71, the story changes, and it says that driver is from an RC10. Is this a typo or has the Eagle flown the coop and returned to the pages of *Car Action*?

DANIEL WEISMAN
Jasper, IN

Danny, my friend, get some glasses! The caption on page 68 says the driver is from a Tamiya car; you got that much right. But on page 71, it says—and I quote—"Finally, I found an RC10 driver that had the perfect dashboard attached to it. I trimmed the dash away from the driver and put it into my new car." Only the dash was taken from the RC10. JH

BRUTALIZED BIG BRUTE

My Big Brute has Clod Buster tires, a Speedworks Monster Mash motor, ball bearings and a problem with its stock diff! I'm sure that the bevel gear is broken, but I can't buy the gear separately; I have to buy a whole new diff! I'm on a budget, and I can't decide if I should buy a Thorp diff or a stock replacement diff. I don't want to buy the stock one only to have it break again. The Thorp diff won't break, but it's a little too expensive, so I'll only buy it if I have to. I'm unhappy because I couldn't drive my car for 6 months while I waited for a plastic replacement part, and then this happened. Please help!

JASON JUE
South Pasadena, CA

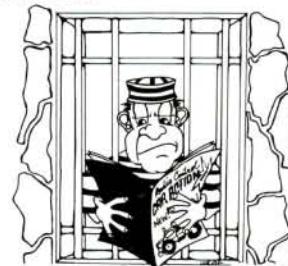
Jason, it sounds like your car is suffering from drive-line failure—an affliction that often occurs when monster-truck tires are used on a car that wasn't designed for them. The big Clod tires and the Monster Mash motor were too much for your Brute's stock tranny to handle. You're right about the situation, though; the stock gears will continue to break. Believe me, you aren't the only R/C'er on a budget, but it's probably cheaper in the long run to buy the Thorp diff. FM

GRAPHITUS!

My Tamiya Vanquish is a fairly decent car. Its manual lists an Avante carbon-graphite chassis set (no. 3853038) as a hop-up option, but I can't find one anywhere! The people at my area hobby shops said the Avante had been discontinued, and the part wasn't available. Say, it's not so! I've only been in the R/C world for about nine months, and I don't know what to do next. Keep the great mags coming.

CORY MONTGOMERY
Carrollton, GA

Cory, you don't need a graphite chassis to have a good car. If the plastic chassis still works, keep it. If it's broken, then you can upgrade it with fiberglass or graphite chassis. Although the Avante has been discontinued, you should still be able to get parts for it and its relative, the Egress. Call Tamiya directly to see if the parts are still available. JH



CAPTIVE AUDIENCE!

Until two weeks ago, I didn't know how serious people had become about R/C cars, trucks and planes. I'm presently incarcerated in the Orange County Jail in Goshen, NY, and when I asked the man next to me for something to read, he handed me the December '90 issue of *Car Action*. It's superior to anything I've ever read, but I have one complaint. Your magazine is very informative, but there's no information about how to get started, or how to start your own club. Do you have a magazine that could show me how, i.e., what to do; statistics on different motors, cars, etc.? I understand that the Yokomo YZ-10 4WD is a decent car.

My release date is December 27, 1991. Upon release, I'd like to subscribe to *Car*

Action, but right now, I have a money problem and can't possibly afford it. My release is still 8 months away, but if you could find it in your heart to help a new fan, I'd greatly appreciate it.

JOHN CHANDLER
Goshen, NY

John, I guess it's true that Car Action is everywhere. I'm pleased to inform you that Car Action also publishes special-interest books and quarterly special editions. Check out the Basics of R/C Cars, and our brand-new special issue, R/C Car Basics. Also, we're working on an article about how to start your own club, and it should be printed soon. The Car Action 1991 Buyers' Guide is a valuable information source for anyone interested in learning about the newest R/C products. Yes, the Yokomo is a good car, but it has a relatively sophisticated design, so it isn't an entry-level car.

FM

FRED J. GOES BASIC!

I'm just starting out in R/C, and I like off-road cars. What's a good car for beginners, and which motors would work well with it?

FREDERICK J. FLOYD
Orrum, NC

Welcome to R/C, Fred! I'm glad you chose the best magazine right off the bat. I like off-road cars, too, and I recommend any of the Tamiya entry-level cars, e.g., the Madcap or the Saint Dragon. Kyosho also offers some very high-quality kits (i.e., the Raider and the Ultima II to name a few) for novice off-rollers. It's good that companies like Tamiya and Kyosho haven't forgotten entry-level enthusiasts; after all, we were all beginners once (well, maybe not Masami!).

The Mabuchi 540 motor is standard in most of the cars I've mentioned, and it's more than enough with which to start. You didn't mention a radio system. When I first started in this hobby, the only affordable radios were the stick-type. Now, there

(Continued on page 26)

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National Speed Records

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Low E.T. Top Fuel Rail 1.981 Sec. Mike Ogle, Astro Top Fuel I Motor

Track Record Oct. 28, 1990

Low E.T. Unlimited Rail 1.820 Sec. Roger Rose, Astro Top Fuel II Motor

IEDA Nationals Winners

1st Place....Pro CompEric WiemsAstro Top Fuel I Motor
2nd Place....Pro CompRoger RoseAstro Top Fuel I Motor
1st PlaceTop Alcohol Rail.....Brian Reeter....Astro Top Fuel I Motor
1st PlaceTop Fuel Funny Car...Eric WiemsAstro Top Fuel I Motor
2nd Place ...Top Fuel Funny Car...Calvin Grant ...Astro Top Fuel I Motor
1st Place....Top Fuel DragsterMike OgleAstro Top Fuel I Motor
2nd Place....Top Fuel DragsterMike RussoAstro Top Fuel I Motor
2nd Place....Unlimited DragsterRoger RoseAstro Top Fuel II Motor

NR/CTPA World Championships Champaign, IL. Sept. 30, 1990

1st Place..... 2WD Modified.....A. JanickiAstro Pullmaster I Motor
2nd Place ... 2WD ModifiedDutch EsgroAstro Pullmaster I Motor
3rd Place 2WD Modified.....David Hester ...Astro Pullmaster I Motor
1st Place2WD Open IKyle Haynes....Astro Pullmaster I Motor
3rd Place2WD Open IMarcia Arman Astro Pullmaster I Motor
1st Place2WD Open II.....Jim Bee.....Astro Pullmaster II Motor
2nd Place....2WD Open IIScott Weigel....Astro Pullmaster III Motor
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LETTERS

(Continued from page 25)

are inexpensive wheel-type transmitters, too. (Most drivers find wheel radios easier to use.) Do yourself a favor—decide which type of radio is best for you before you buy one.

FM

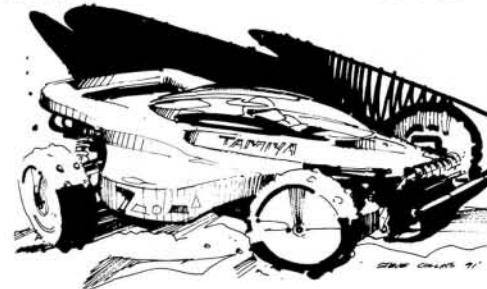
WILD BILL AND SPEEDY SPEAK OUT!!

My wife and I are R/C fans and racers, and we've found *R/C Car Action* very helpful and informative. I'm disabled and race an RC10. In the March and April issues, you showed how handicapped people can be involved R/C. I'd like to see more of this, and I hope you keep up the good work.

WILLIAM "WILD BILL" STEVENS
NANCY "SPEEDY" STEVENS
Baker City, Oregon

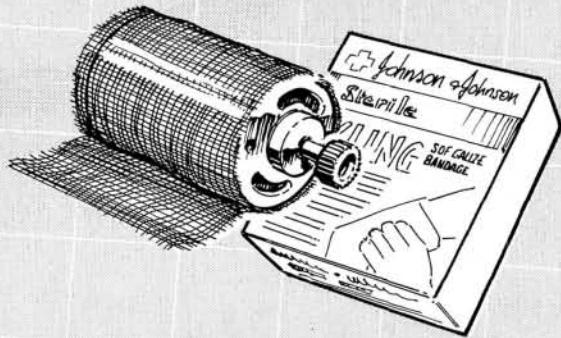
Thank's for writing to us, Wild Bill and Speedy. I'm glad that you find our magazine informative. One of the great aspects of R/C racing is that people of all ages and backgrounds can enjoy it! Most tracks don't have provisions for the handicapped unless one of their club members is disabled. Although there aren't any ROAR rules regarding handicapped facilities, it strongly recommends that its affiliated clubs make their drivers' stands accessible to the handicapped. Recently, my local off-road track built a separate drivers' stand with a ramp for one of its racers who's restricted to a wheelchair. If you're a handicapped racer and are frustrated by the lack of proper accommodations at your track, talk to the president of the club or the track owner. If you don't get satisfactory results, it's time to find another track.

FM ■



PIT TIPS

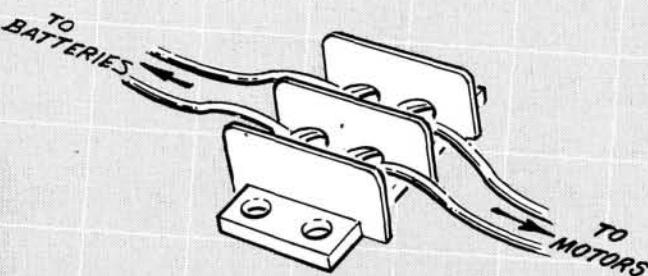
by JIM NEWMAN



INEXPENSIVE FILTERS

For less than \$2, you can make 18 sticky air filters that will attract motor-killing dirt. Wrap Johnson & Johnson self-sticking gauze bandage around your motor twice, cut it, then press it into place. It will stay secure until it's time to replace it.

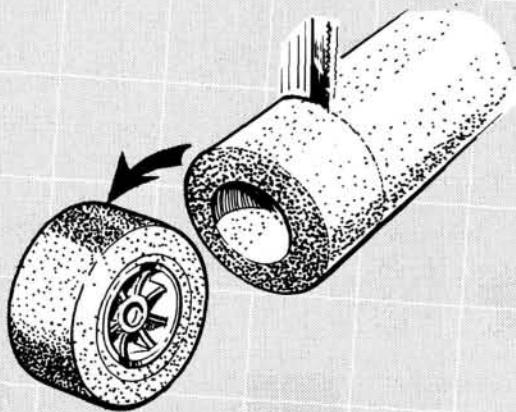
Todd Fanciullo, Lake Zurich, IL



CLOD BUSTER MOTOR TERMINALS

This Radio Shack barrier strip (no. 274-656) mounted conveniently between the chassis and the steering servo makes it easy to disconnect the motor wires before removing the motor for service. It's also said to be a lot less expensive than connectors.

Rusty Carver, Jacksonville, FL



LOW-BUDGET CARPET TIRES

Slice a piece of 1 $\frac{5}{8}$ -inch-i.d. foam insulation tube as shown, then slip your new tires onto your rims. You can sand off the foam's outer "skin" on a grinding wheel, or use a wheel-truing jig, which would be more accurate. (See how to make one in February 1990 "Pit Tips.")

Wayne Beebe, Twin Falls, ID



SPRAY BOOTH

With one large cardboard box and a wire hook, you can make a simple spray booth. To keep the dust down, dampen the inside of the box before you spray. Cut out the area marked by the dotted line, tape an air-conditioner filter into the space, then stand an old window fan close behind the filter (sucking, not blowing!), you'll trap all the overspray inside the box and not on the piano!

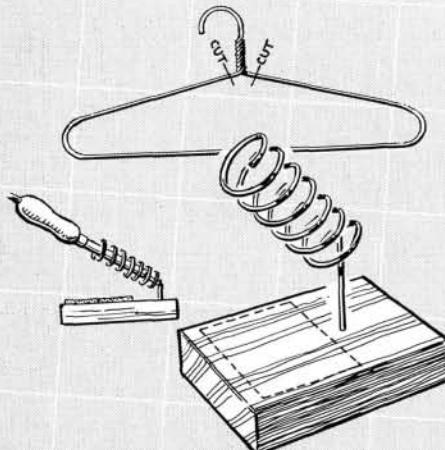
Micah Crapser, Windsor, NY



NO FLAT TRANSMITTER BATTERIES

Have you ever accidentally switched on your transmitter en route to the track? Why not flip the batteries over so that there's no chance of making a contact even when it's switched on? When you're ready to run, turn the batteries the right side up.

Klaus Burkhardt, Corona, CA

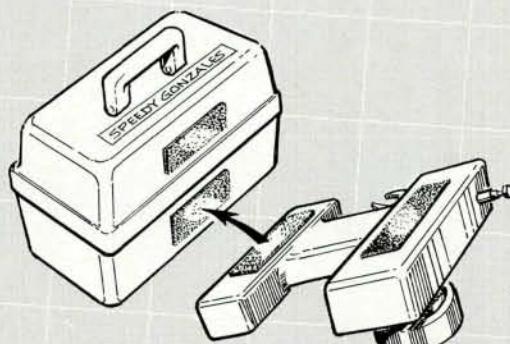


SOLDERING-IRON REST

The humble coat hanger, yet again!—this time, for this handy soldering-iron rest. Coil the wire around a large dowel, cut it to the correct length, then use CA to glue one end into a wooden base. Glue a foam sponge in the area shown by the dotted line. Kept moist, the sponge is ideal for wiping the iron's tip.

Steven Dong, Staten Island, NY

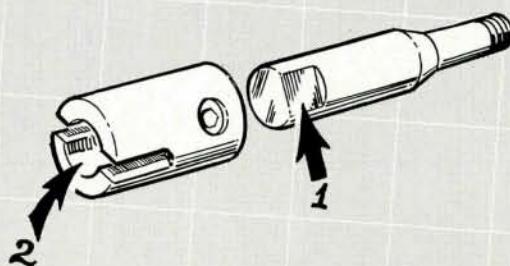
PIT TIPS



TRANSMITTER TRANSPORTATION

Apply two large Velcro® patches to the sides of your toolbox, and apply the matching patches to the back of your transmitter. Now you won't need three hands to get to the track with your car, toolbox and transmitter.

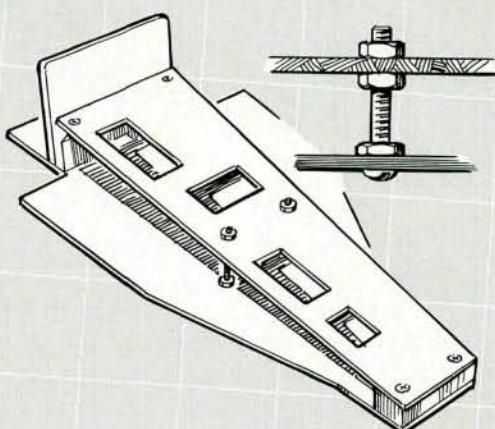
Richard O'Neil, Cheektowaga, NY



BLACKFOOT AXLES FOR THE RAIDER

Cut the stock cup off the Blackfoot axles, grind flats (1) on them, then slip on the Ultima differential cups and tighten the setscrews. Ultima dogbones will fit the cups nicely—bore them out very slightly (2).

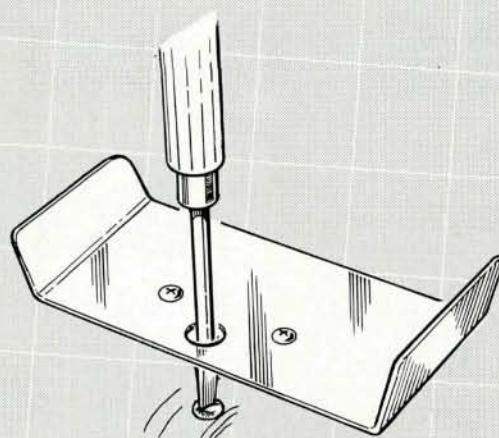
Michael Brocco, Saugerties, NY



ULTIMA CHASSIS UPDATE

The Ultima's original aluminum chassis tended to bend easily, and this damaged the radio plate. The new Ultima Kelron chassis (no. KYOC4523) cost only a few dollars more. Use two long bolts and the corresponding nuts to make center standoffs (as shown). Your car has been updated for less than \$20!

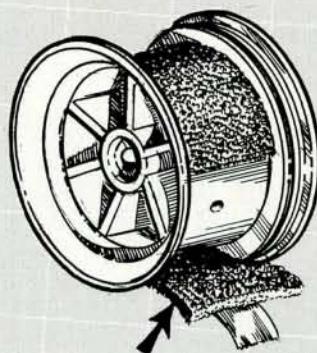
David Dodson, Wichita, KS



ASSAULT SCREW ACCESS

The gearbox cover can only be removed after the wing has been removed, because one of the gearbox cover screws is directly underneath the wing. To make this job easier, just drill a hole in the wing (about the same size as the screw). This will allow you to reach the screw with a screwdriver without removing the wing.

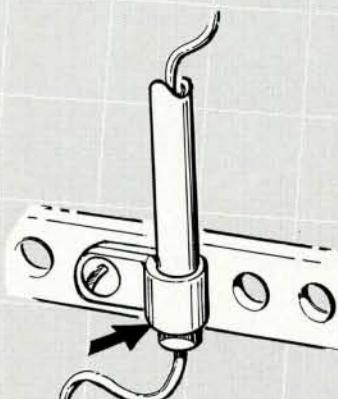
Mike Cover, Amherst, Nova Scotia, Canada



DIRT FILTER FOR TIRES

Most wheels have a breather hole through which grit and dust can enter and unbalance the wheel. Attach a strip of used, foam, clothes-dryer sheet to the wheels with tape or a rubber band. Don't use a new one—it's clogged with softener. This filter keeps out the filth.

Jim Zaborowski, Corona, CA



BLACKFOOT ANTENNA MOUNT

With this simple arrangement, you won't have to slip the antenna wire into and out of its tube each time you remove the body. The inexpensive nylon "P" clip (arrowed) is available at your hardware store. Just bolt it to the rear body-mount cross-beam.

Charles Cheng, Justin, CA



★ ★ ★ ★ ★
KYOSHO* IS WELL-known for its off-road racing machines. As one of the top three manufacturers in the racing arena, it's responsible for the Ultima (which grabbed the World Championship title in 1987), the very successful

Optima series 4WD cars and, most recently, the Lazer 4WD. One of Kyosho's latest efforts, however, strays from its racing lineage into what are called "Scale Series" cars.

With their emphasis on appearance rather than on all-out performance, Scale Series cars are designed for the large group of R/C enthusiasts who don't participate in serious competition. Based on the car Rick Mears campaigned in the 1990 Cart Indy car race series, the Penske PC-19 is the latest in Kyosho's line of scale cars.

PHOTOS BY JOHN HUBER



by STEVE POND

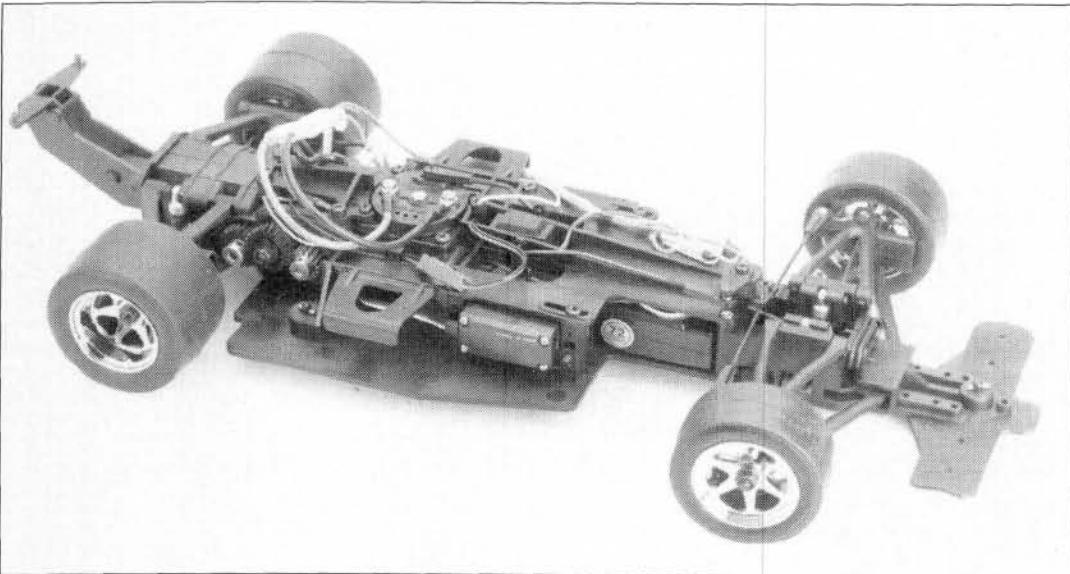
TRACK REPORT

american flyer

kyosho
**penske
PC-19**



PC-19



PC=PENSKE'S CAR

The PC-19 is designed around Kyosho's Scale Car chassis, which lends itself very well to Indy/Formula 1 applications. The 4W, independent, double-wishbone suspension has inboard coil-over shocks with cantilever actuating rods—identical to the design of the full-size car. Other PC-19 design features include a double-deck plastic resin chassis, one-piece chrome wheels, realistic rubber racing slicks, a breakaway front end, a three-step forward/one-step reverse mechanical speed controller, a Mega Outlaw stock motor and a bevel-gear differential. The 1/10-scale Penske PC-19 body included with the kit is about as good as it gets when it comes to scale realism.

The kit includes all the parts you'll need to build a complete rolling chassis, but you'll have to pick up some additional components to guide and power the car.

The chassis is designed to fit most popular 2-channel radios, but if you're new to R/C, it may be a good idea to avoid guesswork and use the

Kyosho Pulsar system, the installation of which is fully detailed in the instructions. Other systems can be installed easily. In addition to the radio control, a 6-cell stick pack and an appropriate Ni-Cd charger will be required. The battery pack should include the male Tamiya-style connector that's commonly used on Kyosho cars.

PC=PRACTICAL CONSTRUCTION

The PC-19's assembly begins with the friction-type shock absorbers for each corner. Rather than using oil for damping, the shocks use a "friction sponge." The shocks in the front seem to do the job rather well but, during testing, the rear of the car showed a tendency to "squat," so add some heavy silicone lube to the rear damper. The heavy silicone lube slows shock compression and prevents the chassis from hitting the ground during acceleration. Once you've assembled the shocks, attach them to the front suspension components.

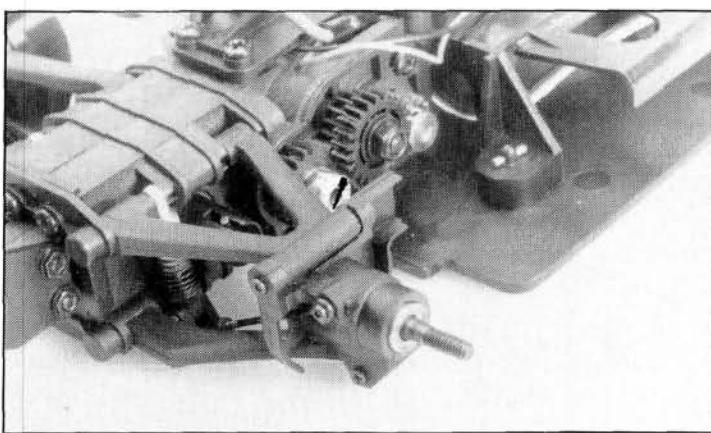
The front suspension is

unique because the bulkheads pivot at the rear and are held together in the front with a pair of rubber O-rings. The O-rings allow the suspension to pivot backwards so it won't break if there's a hard collision. When the front suspension has been completed, attach it to the chassis plate, and then move on to the rear differential and

vehicles. The kit comes with a complete set of plastic bushings, but if you're performance-minded (like me), you may prefer to install the comparatively frictionless ball bearings. By holding tighter tolerances than the bushings, ball bearings will also prevent wear of other components. Attach the rear suspension components to the assembled differential, and attach the entire unit to the chassis plate.

When you assemble the front and rear suspension, pay close attention to the length of the tension rods. Their length determines the ride height of the car, and if they're of even slightly different lengths, the car will handle badly. A good eye and a metric ruler can get you the proper results.

The installation of the Kyosho Pulsar radio system is next, and could only be easier if it dropped in. Attach the tires and the wheels, and you've completed the assembly of the chassis.



Ball bearings replace the stock bushings for increased reliability and smoothness. Scoops for cooling the braking system add to the realism of this model.

suspension.

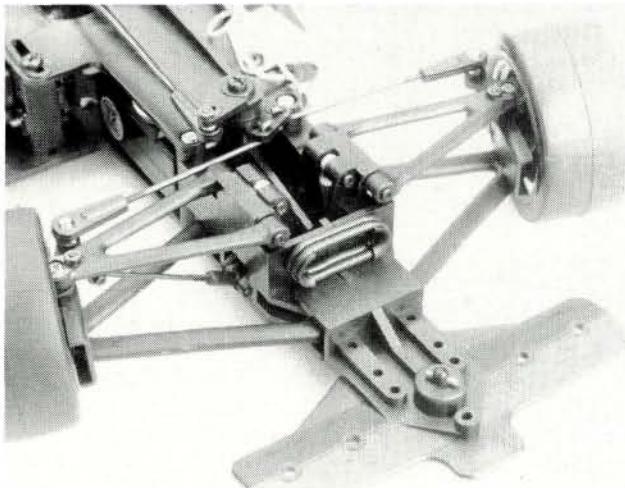
The gear-type rear differential operates smoothly. It takes less time to assemble and is easier to maintain than the ball-type differentials usually found in all-out racing

PC=PACTRA COAT

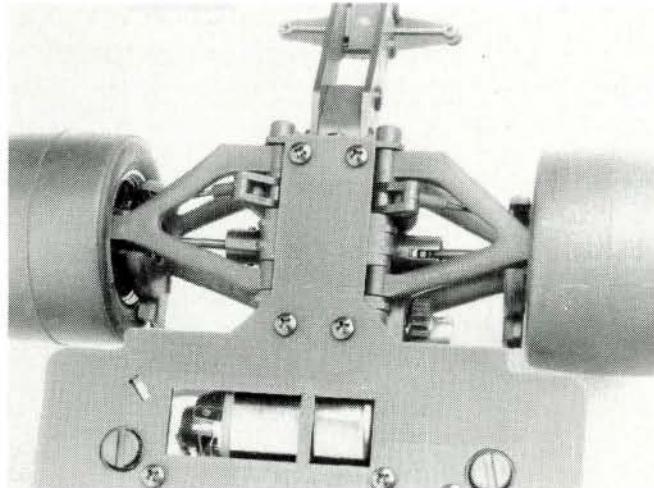
The scale body included in the kit is more complicated than average, but it's designed in a way that makes it easy to achieve fine details. The bright yellow paint seen



PC-19



To avoid serious damage in a collision, the front suspension assemblies can pivot backward to absorb the impact. Two O-rings snap them forward again.



The PC-19's suspension system is remarkably similar to that of a full-size race car. Notice the actuating rods that are connected to the shocks.

S P E C I F I C A T I O N S

Type Penske PC-19 Replica
Scale 1/10
Sug. Retail Price \$219.95

DIMENSIONS:
Overall Length 16.25 inches
Width 7.5 inches
Height 3.5 inches
Wheelbase 10 inches
Front Track 6.5 inches
Rear Track 5.75 inches

WEIGHT:
Gross (with battery) ... 44 ounces

BODY:
Type Indy
Material Polycarbonate

CHASSIS:
Type Upper and lower plate
Material Plastic

DRIVE TRAIN:
Primary Pinion/spur
Transmission Gear
Differential Bevel gear
Bushings Plastic

SUSPENSION:
Front: Type Upper and lower wishbones
Damping Pushrod-actuated inboard damper/spring units
Rear: Type Upper and lower wishbones
Damping Upper-track control rod; pushrod-actuated inboard damper/spring units

WHEELS:

Front: Type One-piece plastic
Dimensions (DxW) 1.375x.75 inches
Rear: Type One-piece plastic
Dimensions (DxW) 1.375x1.25 inches

TIRES:

Front/Rear Semi-pneumatic rubber

ELECTRICS:

Motor Mega Outlaw Stock
Battery 6-cell stick*
Speed Controller Three-step mechanical

OPTIONS AS TESTED:

Futaba Magnum Jr. 2-channel radio, 6-cell stick pack, Kyosho ball-bearing set.

COMMENTS:

The PC-19 is Kyosho's most realistic car to date: the suspension and bodywork are identical to those on the full-size PC-19. Though not designed for all-out competition, it has enough speed to satisfy scale enthusiasts. Getting all the radio and drive hardware under its Indy body is quite a task, but the result is a very sharp-looking car. To make installing the electronics easier and to improve the car's performance, an electronic speed controller can be installed.

* not included

on the full-size PC-19 racing machine can be closely duplicated with Pactra's* Daytona Yellow spray paint. You'll only need masking around the windshield.

Detailing this car is far easier than detailing older scale kits. Most of the car's details are authentic decals, which are easy to apply. To position the decals properly and easily, I wet them in soapy water and slid them around until they were perfectly positioned. When the decals are in place, use a burnishing tool to squeegee water out from under them. The adhesive will hold the decal in place, but let the body sit for a while until the water has completely evaporated.

Attach the finished body to the chassis with quarter-turn fasteners. This setup has two benefits: it gives you much better access to the batteries, and there are no body clips to lose or to detract from the body's scale lines.

PC=PROTO-CRUISE

Instead of testing the car at a racetrack, the PC-19's first run took place at a parking lot. First, though, I

zeroed-out the trims for the throttle and steering to ensure that the car would come back in one piece. It's necessary to check that the speed controller functions in all three forward speeds and reverse (this is easier to do with the motor disconnected). Heading full speed into a curb isn't the time to find out the car won't go into reverse!

The Kyosho Outlaw stock motor provides most of the PC-19's acceleration. Though the car is designed for scale appearance, there's no lack of get-up-and-go (yes, it burns rubber—for you smoking-tire fanatics!).

PC=POSSIBLE CATCHES

Owing to the soft rear suspension, the rear of the chassis plate smacked the ground when the car accelerated from a stop. (That's why I suggested the use of a heavy silicone lube in the rear damper.) This isn't ideal, but unless you race, it doesn't compromise the car's control. The addition of the heavy

(Continued on page 102)

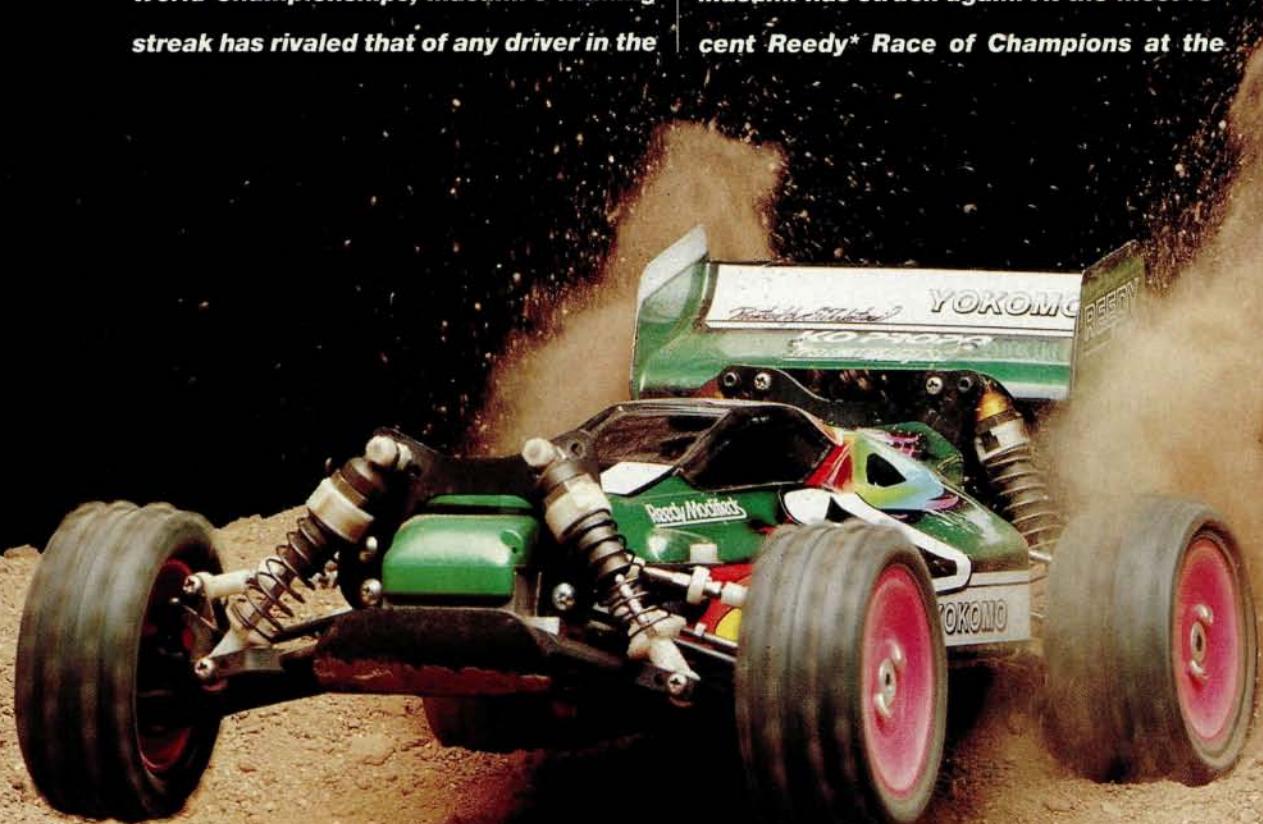
MASAMI'S

by STEVE POND

TO SAY THAT Masami Hirosaka has been "on a roll" would be a drastic understatement. Since the '87 IFMAR World Championships, Masami's winning streak has rivaled that of any driver in the

history of R/C car racing.

In the November '90 issue, we featured the Yokomo* car that he used to win the 4WD Class at the '89 IFMAR World Championships in Sydney, Australia. Masami has struck again! At the most recent Reedy* Race of Champions at the



~~THE MASTER'S MACHINES~~

CARS

RCH Raceway in Costa Mesa, CA, he repeated his '89 World Champs performance and won the 4WD and 2WD classes by a substantial margin.

Although opinions vary about the correct ways to set up cars for different track conditions, top-level racers are the best

sources of information on how to do it.

They spend a lot of time learning about what makes their cars tick, and this makes them highly qualified. Here's a detailed look at how Masami set-up both of his cars for the hard-packed surface at the RCH Raceway.



Masami's YOKOMO '91 WORKS

WHAT "WORKS"!?

To race for the win, Masami drove a Yokomo 4WD car and a Team Associated* 2WD car (he's sponsored by both companies). Instead of the 4WD



The front suspension on Masami's car has improved geometry. Notice the new A-arms, steering blocks and special braces that were needed to control flex in the front hub carriers.

Super Dogfighter that he usually drives, however, he raced a prototype that will eventually be produced as the Yokomo '91 Works machine. It's based on the Super Dogfighter, but it incorporates many of the modifications that were made to Masami's Super Dogfighter for the World Champs.

The car's original front, center and rear bulkheads were kept, and only one modification was made to the rear bulkhead. A ma-

chine screw runs through its end and rests against the center bulkhead. The holes in the chassis for the rear-bulkhead mounting screws are "slotted" so that the bulkhead can slide back and forth. This setup makes it possible to adjust the rear belt tension.

The chassis plate was rede-

dramatically changed the caster angle during acceleration and braking.) The

brace and supporting links are only being used until a stronger material is found for the hub carriers.

The drive train on Masami's prototype consists of a double one-way-bearing spur-gear



It isn't known if the Yokomo's '91 Works Machines will have nylon belt pulleys or aluminum pulleys like those used in Masami's car, but nylon would be the logical choice.

comparable to the optional fine-pitch belts that are available for the Super Dogfighter. This car also has universal-joint drive shafts that extend from the ball differentials at either end of the car.

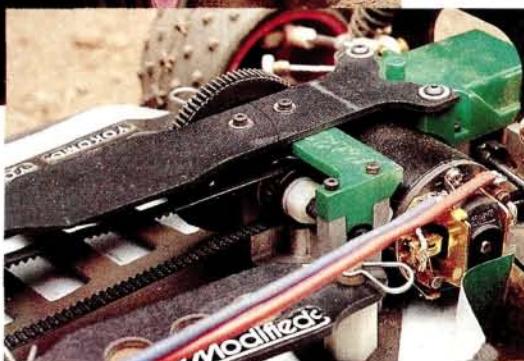
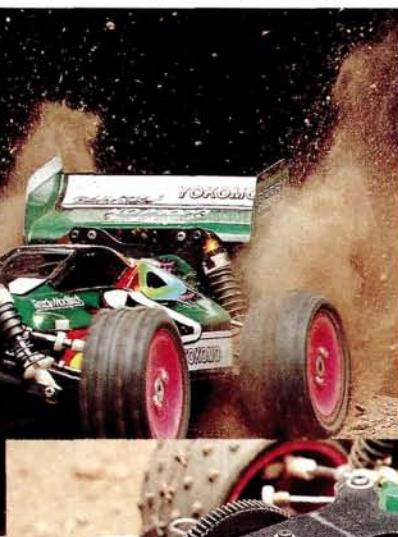
SUCCESSFUL SUSPENSION

For improved stability, the prototype's suspension arms are longer than those on the stock Super Dogfighter, and there's more "toe-in" on the rear arms. They appear to be molded of black, fiber-glass-impregnated nylon, and they look bulky. With

this new design, the kingpins' pivot points and the drive shaft's universal joint are closer to the centers of the front tires, and this reduces the amount of tire scrub. (It's rumored, however, that the arms are being redesigned to make them lighter and

signed so that the batteries could be mounted toward the center of the car and, to increase the chassis' overall strength, an upper support plate was attached to the tops of the bulkheads. On the front end, there's also an unusual support bracket that's attached to the top of each steering bellcrank. It supports two linkage rods that are

connected to the front suspension's upper links. Apparently, this was an effort to compensate for the prototype's weak plastic-composite front hub carrier. (The carrier was too flexible, and this



With a new fine-pitched belt-drive system, a graphite upper chassis stiffener and better battery placement, Masami's Yokomo was the "class of the field" at the Reedy Race of Champions.

adapter with an 86-tooth spur gear. The adapter rides on the shaft that drives the front and rear differentials. Like the Super Dogfighter, the pulley that drives the front belt has a slipper assembly. All of the pulleys, including those in the differentials, are made of aluminum, but they might be prototypes for production nylon pulleys. The belts that drive the differentials are

stronger.)

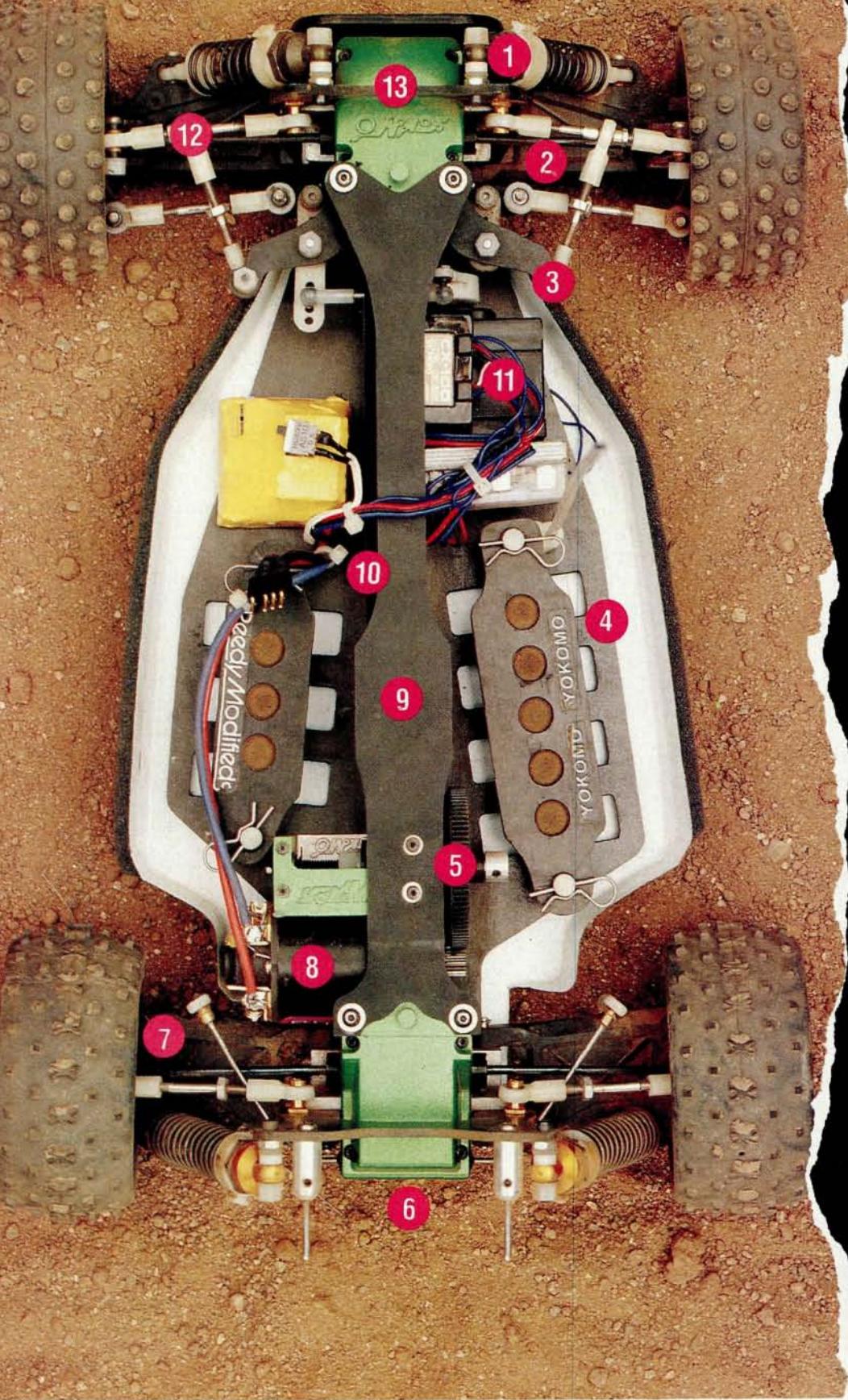
Attached to the front ends of the suspension arms are new injection-molded steering blocks that replace the Dogfighter's fragile magnesium blocks. The rear hub carriers are attached to the suspension arms, and they're also injection-molded. For consistent damping, the upright



With the rear wheel removed, you can see the new hub carriers, the A-arms and the rear-belt tension-adjustment screw.

(Continued on page 46)

YOKOMO



1. Associated's hard-anodized shocks (.71-inch up front and 1.02-inch in the rear)
2. Longer front A-arms move the steering's pivot points closer to the centers of the tires to minimize tire scrub
3. Special linkage designed to strengthen the front caster blocks
4. Yokomo '91 Works chassis
5. Yokomo spur-gear adapter with dual one-way bearings
6. Rear-belt tension-adjustment screw
7. Longer rear A-arms provide more toe-in for better acceleration and stability out of the turns
8. Reedy Mr. H 12-turn triple-wind motor
9. Graphite upper chassis stiffener replaces the graphite backbone used on previous Yokomo cars
10. Fine-pitch belt drive coupled with machined-aluminum pulleys almost eliminates friction in the drive train
11. KO FET-boosted servo for the ultimate in speed and torque
12. RCPS titanium tie-rods
13. Custom-made fiber glass shock towers are used on the front and the rear

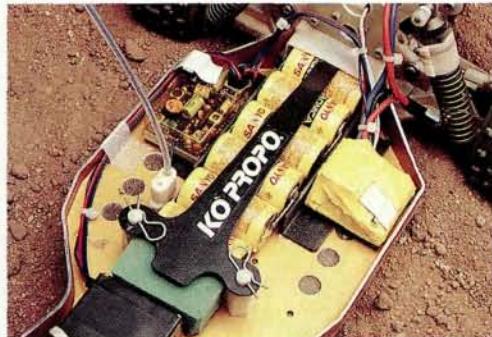
Masami's ASSOCIATED RC10

2WD TENSION

For the 2WD race, Masami used the new aluminum-tub version of the Associated RC10 Team Car. Many team drivers prefer this chassis because aluminum

weight "tape" to prevent the track surface from gouging the aluminum and slowing down the car.

An ingenious battery-holding system replaced the stock battery cup. Two Yokomo battery-strap stand-offs were mounted to the chassis plate on both sides of the battery pack.



Here you can see Masami's unique battery brace. He also replaced the receiver case with a lighter Lexan case and the speed controller case with a shrink-wrap covering.

absorbs the hard bumps better than the very rigid graphite. This was especially helpful to Masami at the RCH Raceway.

To reduce weight, the chassis' sides were machined and parts of the kick-up plate and the rear motor plate were removed. In addition, the holes in the bottom of the chassis (originally used to mount battery trays from side to side) were enlarged. The chassis plate's bottom was covered with a clear, light-

The cells were held in place by a custom-made graphite battery brace that ran the length of the pack. This holds the saddle-style packs in place better than the stock battery holder.

SECOND SUSPENSION

The stock suspension

arms were used at both ends of the chassis, but the stock adjustable upper links and steering links were replaced with lighter, more durable RCPS titanium turnbuckle rods. The front suspension's upper linkage was attached in the usual



Changing the rear upper camber rod's position gave the car a more radical camber change throughout its suspension travel and made it more stable on hard-packed surfaces. A Reedy Mr. A's 14-turn triple-wind motor provides massive Masami motion!

place, but the rear upper links were attached to the top, inside hole on the bulkhead. In this location, the rod is

shorter than the lower suspension arm, and this increases the camber angles when the suspension is compressed. The car's rear traction is slightly reduced, but when the



The standard 15-degree caster blocks were replaced with 25-degree blocks to enable the car to turn more aggressively. Yokomo heavy-duty tie-rod ends were used in favor of the stock ends.

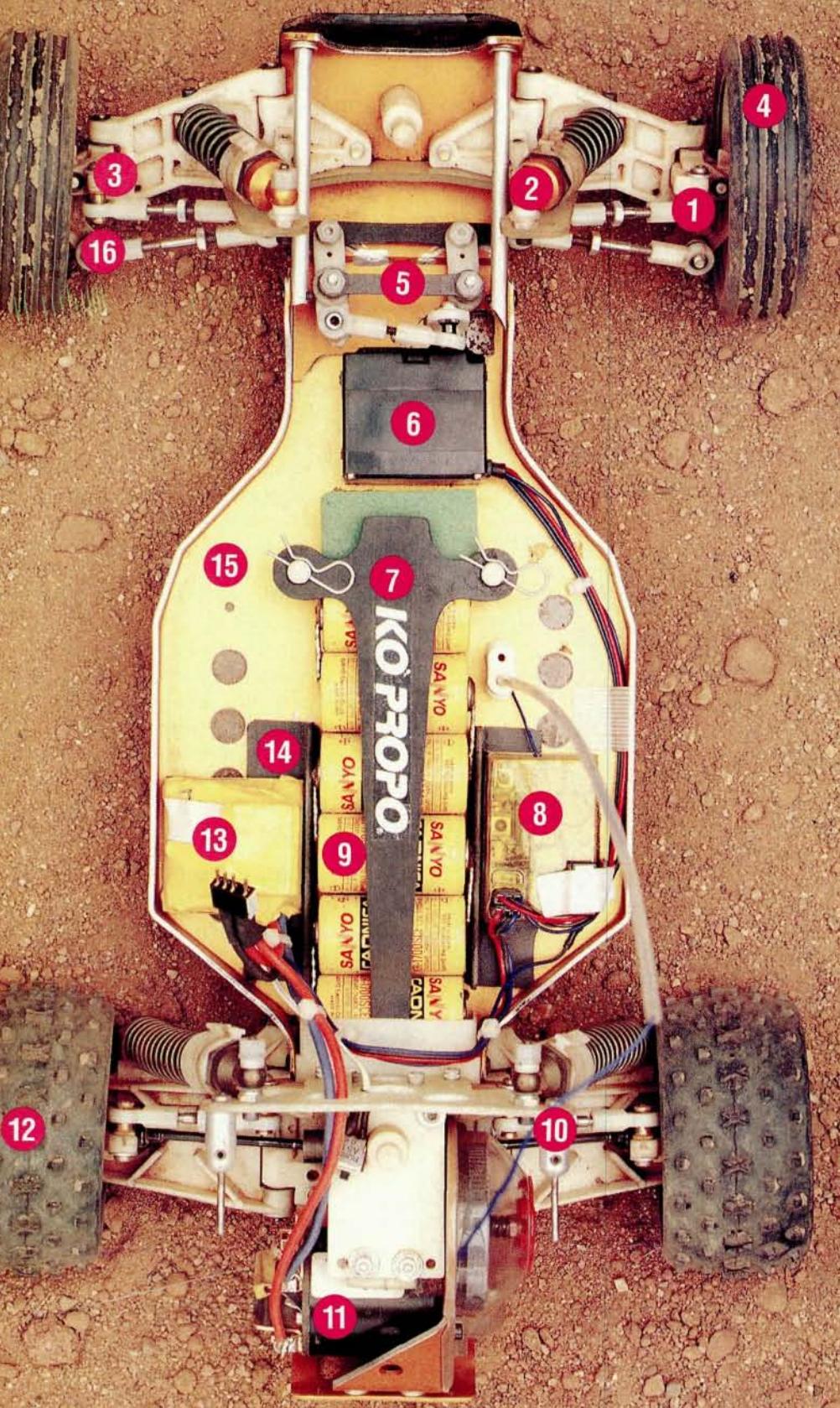
arms have 25-degree caster blocks (instead of the standard 15-degree blocks) that allow the car to turn more aggressively and exit the turns at higher speeds.

Associated front and rear wheels and Losi tires keep the car stuck to the ground. A pair of four-rib rubber tires handle the steering up front, while a pair of cut X-patterns put the power to the ground in the rear. Like the 4WD car, the X-pattern tires were padded to add support to the tread surface. For damping, Masami's Team Car has the older Associated aluminum shocks, and they've been hard-anodized for a smooth performance. Each shock uses Associated soft green springs and Yokomo 30WT pure silicone oil.

The RC10's electronics package is similar to that used on Masami's 4WD car (i.e., KO radio system, light Lexan receiver case and the shrink-wrapped CX-III speed controller). The KO prototype servo isn't externally boosted, but if you look at the servo leads closely, you can see an extra wire entering the case. This is probably some type of booster.

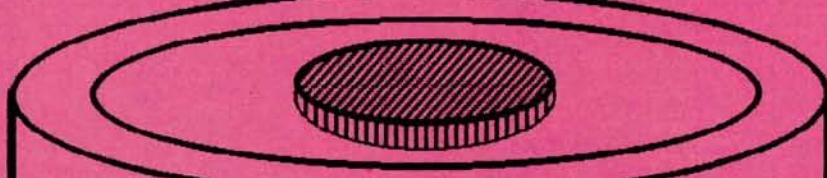
Although SCE batteries are pictured, Masami used (Continued on page 47)

RC 10



1. Yokomo heavy-duty tie-rod ends replace the stock ball cups
2. Associated's hard-anodized shocks (.71 inch up front and 1.32 inch in the rear)
3. 25-degree caster blocks
4. Losi HT ribbed front tires
5. Yokomo steering linkage with a custom-made graphite rack and brace
6. Prototype KO servo with internal booster for quick response
7. Custom-made graphite battery brace
8. Lexan receiver cover replaces the heavier stock cover
9. Although SCE batteries are pictured, Masami used Reedy 1400 matched SCRs
10. Yokomo wing mounts
11. Reedy Mr. A's 14-turn triple-wind motor
12. Losi X-pattern (cut-down) rear tires
13. Shrink-wrap replaces the KO speed controller's casing
14. Graphite angle stock to stiffen chassis and help secure battery
15. Specially trimmed aluminum chassis
16. RCPS titanium tie-rods are used throughout to add strength and reduce weight

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YOKOMO '91 WORKS

(Continued from page 42)

portion of each carrier limits flex. Masami used custom-made RCPS* titanium adjustable turnbuckle links on each corner of the suspension. He also used Yokomo's largest rod ends to provide as much strength as possible.

Associated hard-anodized shocks provide the damping on each corner of the Works car, and they're fitted with Associated's very soft green springs. (They're the older shock bodies with seals that are installed through the bottom. At the time, the new shocks weren't available in the proper length.) Masami also used Yokomo 25WT pure silicone damper oil in the front and rear. This grade was custom-blended using Yokomo's 200 and 300 grades. (By mixing them half-and-half, you can create a 25WT viscosity.)

The shocks are attached to the chassis using new shocks towers that are designed to prevent the bulkheads from being damaged during a crash. Both towers are made of fiberglass instead of graphite, so they're more flexible and less likely to break.

TERRIFIC TIRES

For the hard-packed slippery conditions at the RCH Raceway, Masami mounted a set of Losi* tires on Yokomo factory wheels. The front tires are four-row rears mounted on Yokomo wheels that were trimmed to the inside bead to reduce their width. The rears are cut X-pattern tires that are mounted on standard 2.1-inch wheels. Both the front and rear tires are filled with a lightweight packing material, which makes the tread area more rigid but still allows sidewall flex.

ELECTRONICS, ETC.

Masami used his favorite radio—a KO* two-stick type. To reduce weight, he replaced the standard receiver case with a Lexan case, and he used KO's FET-boosted servo to improve the steering

response. Completing the electronics package is what looks like a KO CX-III speed controller that was removed from its original casing and covered with shrink-wrap (once again, to reduce weight). Reedy's matched SCE cells and Mr H's 12-turn triple-wind Ultra series modified motor powered the Works to the win. Topping it all off was a new, sleek shell.

ASSOCIATED RC10

(Continued from page 44)

Reedy Matched SCRs to power a Reedy Mr. A 14-turn triple-wind modified motor. The motor was mounted to a stock Stealth transmission that has an 81-tooth spur gear. He used an 18-tooth pinion, and this resulted in a 4.5:1 primary ratio and a 10.125:1 overall ratio.

Finally, Masami's car had an Associated Viper body and wing, and it was painted with his trademark colors. The wing was mounted to the rear of the shock tower with Yokomo wing mounts and buttons.

With Masami's track record, this probably won't be the last time we congratulate him on his win at the Reedy International Race of Champions. We're grateful to Yokomo and Team Associated for helping us obtain the cars for this article. Masami had to go without them for several weeks, and we also thank him for being such a trooper!

*Here are the addresses of the companies mentioned in this article:
Yokomo; distributed by Associated Electrics, 3585 Cadillac Ave., Costa Mesa, CA 92626.

Reedy Co.; distributed by Associated Electrics.

Team Associated, see above.

RCPS, 18312 Gifford St., Fountain Valley, CA 92708.

Team Losi, 13848 Magnolia Ave., Chino, CA 91710.

KO Propo; distributed by Global Hobby Distributors, 10725 Ellis Ave., Fountain Valley, CA 92728.

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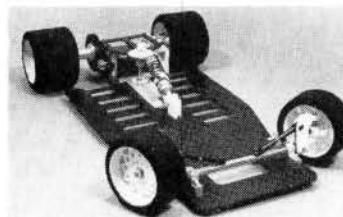
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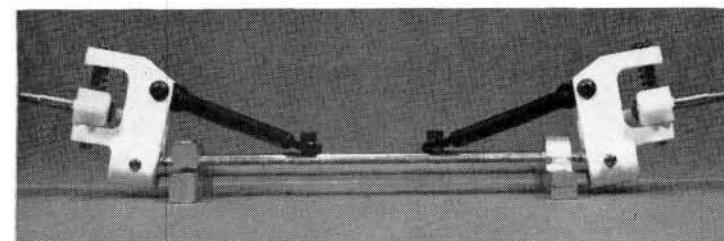
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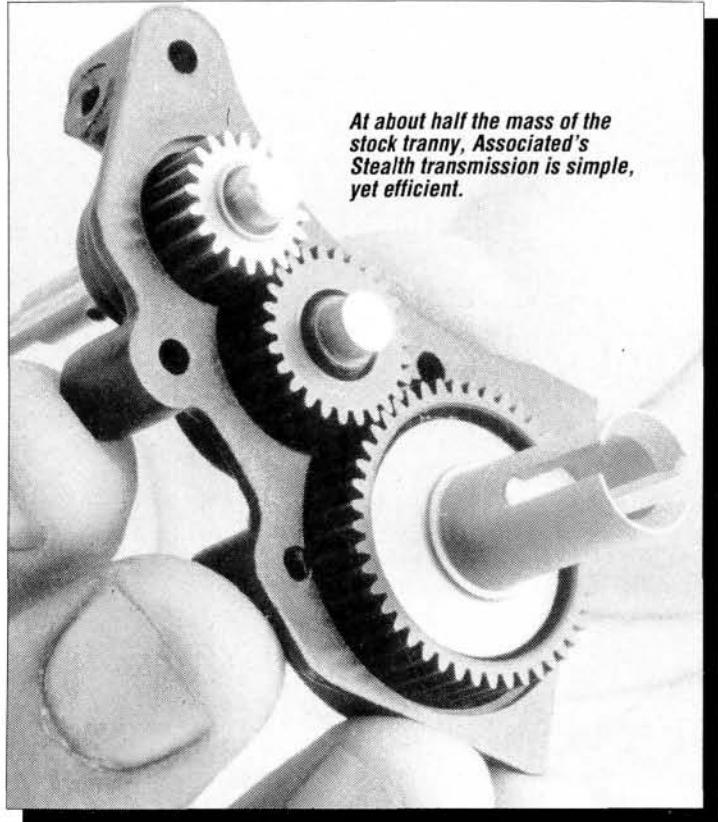
by BILL O'BRIEN & BOB KANE

Bad Brain Bonanza

HOLY FANDANGO, Batman! It has been an incredibly busy month, but I've managed to get some things done here in the Bad Brain Laboratory of Doom and Pepsi-Cola. For those who were about to ask—no, I haven't assembled my YZ-10 yet (I'm only a year or so behind schedule). But I finally had the chance to look at some of the parts and product plugs that I've been stockpiling.

ASSOCIATED STEALTH

I bought an Associated* Stealth transmission, and all I can say is, "Wow"! This smooth operator only takes an hour to assemble, and it has about half the mass of the stock RC10 tranny. Overall, its manual is excellent, but some of the instructions were confusing. Right after the part about joining the two diff halves, I had questions like, "Do I grease the gears or not?" Luckily, this mental lapse occurred after I had finished the diff-gear assemblies (even assembling the thrust



At about half the mass of the stock tranny, Associated's Stealth transmission is simple, yet efficient.

most of you probably don't remember her.) If you buy these shocks, pick up the necessary hardware.

LOSI JUNIOR

I spent a weekend (actually, it only took me 5 hours) assembling my Losi* Junior (the car, not the person). Tamiya had better look out! The manual for this Losi car might not be as slick those in-

bearing was painless), so I figured out the remaining steps without dropping a bead of sweat.

The best news is that, after adding speed goodies to my stalwart RC10 for three years, I have enough spare parts (chassis included!) to build another stock version—right down to the dogbones. I admit that I'm missing some ball links, but this concept is still incredible. If I assemble the spare parts and then start modifying that stock version, I'll have yet another RC10...and so on!

ASSOCIATED HARD-ANODIZED SHOCKS

These shocks are easy to assemble, and the "tool" that comes with them makes installing the seals a snap. The piston operation is super-smooth, and these shocks are light, which is boon for your dieting buggy. The ones that I bought, however, didn't come with springs, spring caps, or spring clamps. (Spring Buyington wasn't included either, but

included in Tamiya kits (which are written in 86 languages and have all those "pointing heads"), but it has scale pictures of the parts. In addition, when you finish with "Bag A," you've used all the parts that were in it (except for a spare C-clip). You can actually complete an entire sub-assembly without having to hunt for parts. What a novelty!

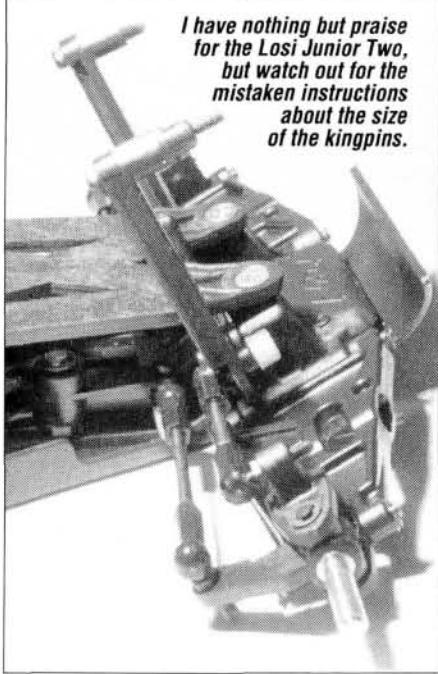
Be wary of the kingpin assembly, though. My manual showed pins of the wrong size. I knew they were the wrong ones, but I blindly followed the manual when I got to that step, and I spent 20 minutes detaching them and installing the correct ones. (That's also when I used the spare C-clip.)

PARMA

Parma* consistently introduces innovative products and high-quality buggy and truck bodies. So, there I was at Bruckner Hobbies, and what did my wondering eyes behold? A brand-new, one-piece

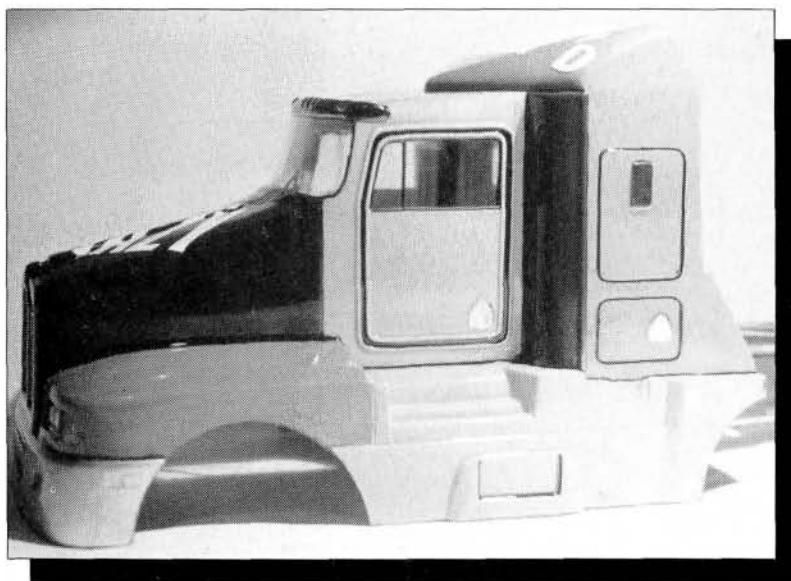
(Continued on page 50)

I have nothing but praise for the Losi Junior Two, but watch out for the mistaken instructions about the size of the kingpins.



DIRT DIGEST

(Continued from page 48)



Parma's new Kenworth truck body is perfect for the Bullhead or the Clod Buster.

Parma Kenworth body that's fairly thick. No, it's *not* a replacement for your favorite car stereo!; it's an honest-to-goodness front end (cab) of a semi—and what detail! Granted, McAllister introduced its semi-truck body first, but joining its body halves is a painstaking operation (especially if you don't cut along the scribed lines accurately).

Persian rug makers deliberately flaw their rugs, because they believe that only Allah can create perfect things. Likewise, no matter how skilled and detailed a body is, there's usually some minor stuff that will drive you nuts. The upper sides of my Kenworth's sleeper are thinner than the rest of its body, and one of the Lexan vent windows has a small run. Like the rugs, however, the body's overall quality obscures the flaws.

Although the Kenworth would be great on a Bullhead, or even on a Clod conversion, it will fit almost any buggy chassis. (I'm using mine on a "gaseraed" Kyosho RS-200).

PRO-LINE AT IT AGAIN

I have so many tires in my work room that it could qualify as a rubber room. So what did I do when I saw Pro-Line's* new Clod-size tires? Yup; I added them to the pile.

These odd tires (you'll see them in action in a future article on my Project USA-1) look as if someone started to develop a truck-pulling tire and then changed his mind. They have the hori-

zontal bars that you'd see on a pulling tire, but the bar's centers have been carved out, so the tires almost look like all-terrain tires. My initial trials indicate that they work well, and they might reduce the amount you spend on monster-truck tires; you won't have to buy separate tires and wheels for street and strip running anymore!

LETTERS

I've asked you to write to me, and you have—thanks. Please keep the letters coming—it makes it easier to write this column. I have an idea for a letter-writing campaign.

I watch a lot of television, especially ESPN. (This is one of the reasons my brain went bad.) Lately, I've seen celebrity skeet shooting, cheerleading competitions and a travelogue on the American



Their unique treads make Pro-Line's new Clod-Buster-size tires suitable for truck pulling and off-road running.

quarter horse. Yawn! Now, there's nothing wrong with shooting skeet (as long as it's in season); quarter horses are beautiful animals; and a covey of screaming girls forming the letter "O" is great comic relief. But why doesn't ESPN cover some of the R/C nationals? It wouldn't have to be a whole Saturday Night Thunder segment—just a short program, once a month. Many of these races are more exciting than watching a clay plate escape from the sights of a celeb who's armed with a shotgun. And the tracks are small enough to need only two cameras.

Obviously, ESPN has overlooked the commercial possibilities of selling advertising time to the myriad R/C manufacturers such as Kyosho, Tamiya, Losi and Associated! This is where your letters come in. Money buys things (as you're well aware), and if ESPN thinks it can make a buck by running sponsored programs, here's a chance that it will. The more letters you write, the better the chance of this happening becomes. So finish reading this month's *Car Action*, and then write!

NEXT MONTH

My crystal ball is still being repaired, so it's hard to decipher what the future will bring (everything looks cracked—a familiar sight). Luckily, this hasn't stopped me in the past, so it's unlikely that you'll find a blank space where this column should be. I might even write about something "Septemberish." No matter what, I'll be here: same dirt time; same dirt channel.

*Here are the addresses of the companies mentioned in this article:

Associated Electrics Inc., 3585 Cadillac Ave., Costa Mesa, CA 92626.

Team Losi, 13848 Magnolia Ave., Chino, CA 91710.

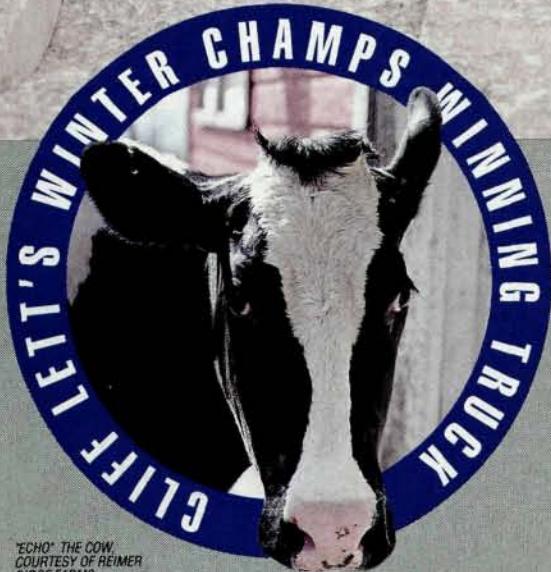
Parma International Inc., 13927 Progress Pky., N. Royalton, OH 44133.

Pro-Line USA, P.O. Box 456, Beaumont, CA 92223.

WINTER CHAMPS

Winner

**ASSOCIATED'S
NEW RACING TRUCK**



"ECHO" THE COW,
COURTESY OF REIMER
RIDGE FARMS

by STEVE POND

PHOTOS BY YAMIL SLEID

THE POPULARITY of R/C monster truck racing has been growing for the last couple of years. It started with a hobby grade kit and a few enthusiastic racers; it has developed into a tremendous sport. All of the major, competitive off-road race car manufacturers have hopped aboard the bandwagon and introduced their own racing trucks. The only holdout has been Team Associated*.

Associated has been a leader in off-road racing technology for years, but it isn't known to take the first step in new trends. It takes this company a little longer to introduce its vehicles into a popular class of racing, but Associated's research has consistently provided consumers with some of the best racing-class vehicles money can buy. Where racing trucks are concerned, Team Associated's cautious yet calculated approach has again been worth the wait. Associated's prototype racing truck, the RC10 ST, has arrived.

At this year's Florida Winter Champs, a trio of Team Associated drivers debuted the prototypes in the Modified Truck Class. The drivers ran the trucks

with guarded optimism. Though they had a tough job getting through the qualifying rounds, two of the trucks managed to make the big feature. When push came to shove, the RC10 ST put the power down and came away with the 1st and 2nd positions!

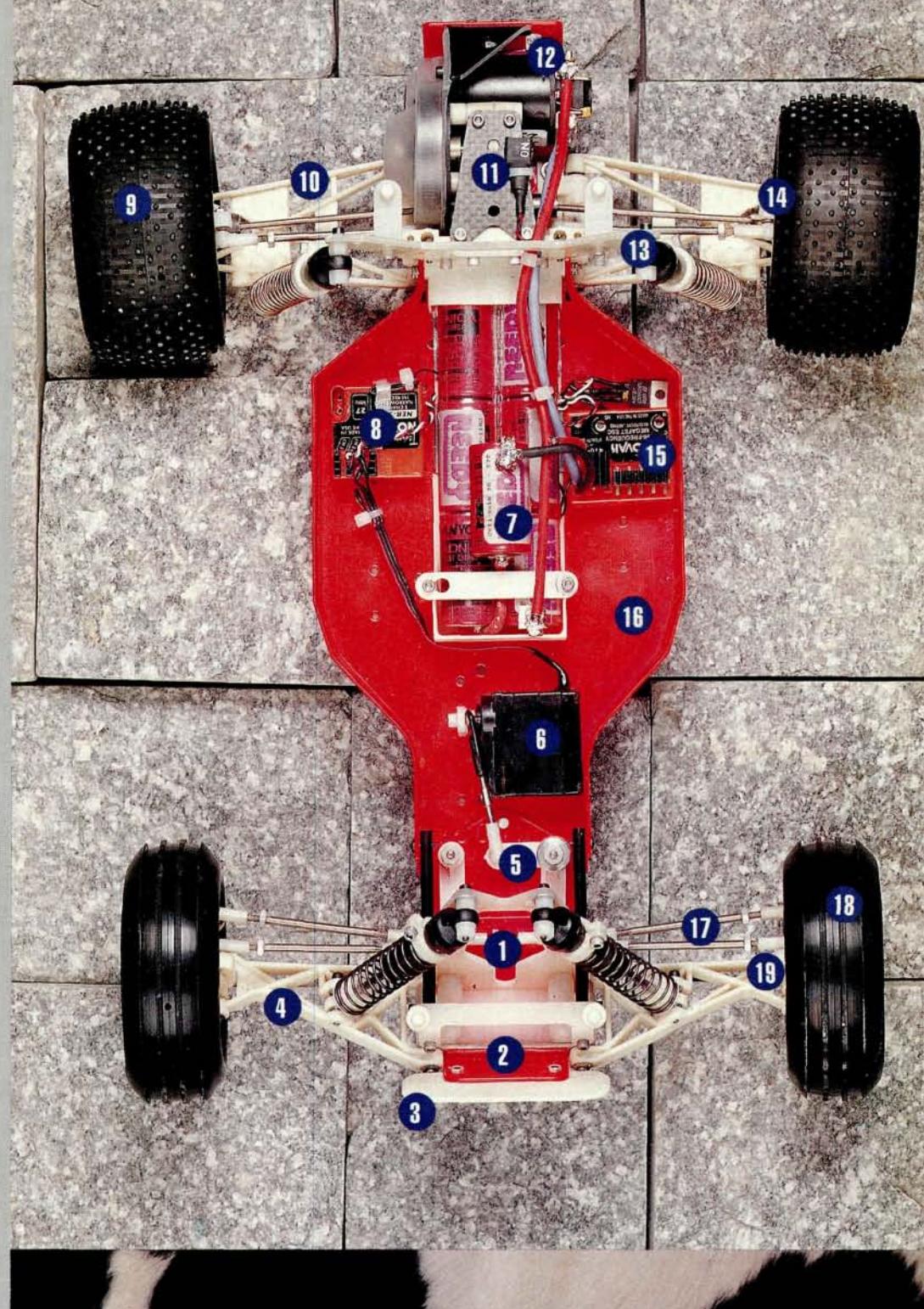
Though the outcome of one race is hardly enough evidence with which to determine the overall worthiness of a particular design, the RC10 ST's performance in the hands of Cliff Lett was enough to mark it as a potential leader in R/C truck racing.

LETT'S GO!

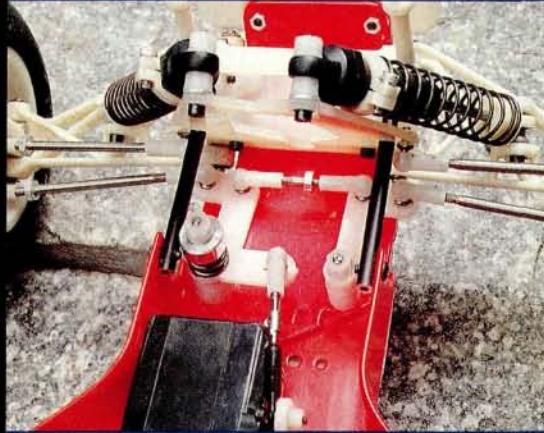
The design of the winning RC10 ST is based on the timeless RC10 off-road racing car. At a glance, the RC10 ST looks like the car, but Associated reps caution that this vague resemblance is where the similarity ends. This was designed as a racing truck, not as a conversion for the car.

The RC10 ST has an aluminum tub chassis similar to the car's. A durable powder coating gives the chassis that vivid fluorescent color. Though the production versions of the truck will reportedly include a black-anodized version of the chassis, the powder-coated versions may be available as options. The RC10 ST's front kick-up plate, which is noticeably slimmer than that on the car, is designed to facilitate the use of longer suspension arms. The bottom of Lett's chassis was protected with a thick, adhesive-backed Teflon sheet that's available through Litespeed*.

The RC10 ST's suspension has been designed to withstand the rigors of truck racing. The suspension arms are noticeably bulkier than those used on the car, but they're molded in a way that provides tremendous strength and weighs less. The front arms are attached to the chassis by means of a new,



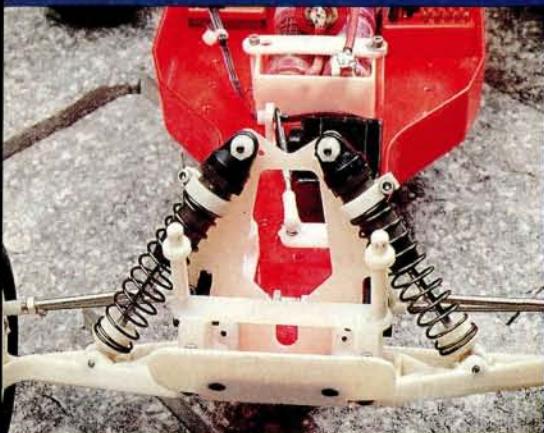
1. New front shock tower with short rear Team shocks
2. Narrow front kick-up plate
3. Nylon mini-bumper
4. Extra-long front A-arms
5. Beefier steering bellcranks with built-in servo saver
6. Airtronics ERG-XS servo
7. 7-cell Reedy matched 1400 SCRs
8. Novak NER-3FM receiver
9. Pro-Line mini-spike truck tires
10. Super-long rear A-arms with corresponding universal joints
11. Stealth transmission with optional graphite brace
12. Reedy Mr. A 14-turn triple
13. Long rear Team shocks with a new tower made specifically for the ST
14. New rear hub-carriers with more toe-in
15. Novak 410 M1c speed controller
16. Standard RC10 aluminum tub with fluorescent coating
17. RCPS Titanium Ti-rods
18. Pro-Line narrow ribbed front tires
19. 15-degree caster blocks from the standard RC10



A beefed-up steering bellcrank with a built-in servo-saver was designed to withstand the rigors of truck racing.



Although the RC10 ST chassis is standard RC10 fare, the shock towers, A-arms and hub carriers are all new for the ST.



Long, hard-anodized Team shocks are fitted up front. Special body mounts, a new mini-bumper and a taller, strengthened, front shock tower are standard equipment.



The RC10 ST features longer front A-arms and a narrow, one-piece bulkhead (shades of the World Champ Stealth car!). Cliff used 15 degree caster blocks.

narrow bulkhead design, and the rear arms are attached with the standard Associated mounts.

Supporting the wheels in the front are 15-degree caster blocks and standard steering blocks. The rear features a new hub carrier design that's similar to the one used on the car, but with 3 degrees of toe-in built in. There are plans to offer three pairs of caster blocks with different degrees of toe-in, so that the truck can be tuned to a variety of track conditions. The advantage of altering the toe-in at the caster block (versus at the suspension-arm mounts on the chassis) is that it makes no appreciable difference to the wheelbase.

Each suspension arm features adjustable upper links to allow for changes in camber. The links used by Lett on the RC10 ST are from RCPS*. These titanium turnbuckle links, which are also used for steering, allow for easy adjustment and are substantially lighter and stronger than steel.

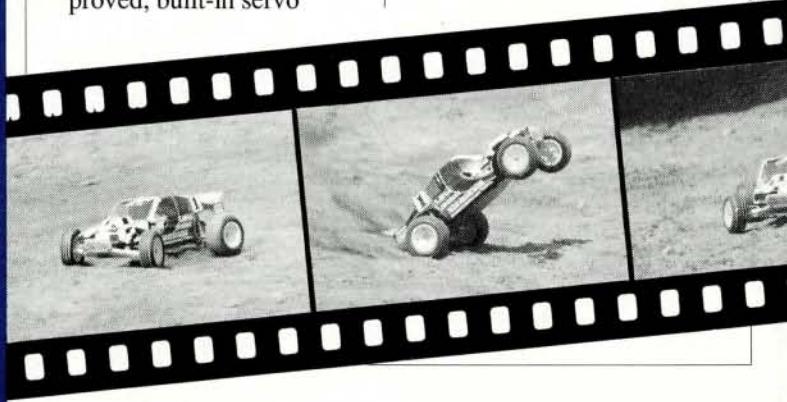
TURNING TRICKS

Lett's RC10 ST has bellcrank steering. Owing to the truck's larger, heavier tires, the truck's bellcranks are much stronger than those found on the car, and they have an improved, built-in servo

saver. The servo saver has adjustable tension that allows the user to tailor it to the steering servo used.

The wheels used on Lett's truck were designed specifically for the RC10 ST. Both the front and the rear wheels are of the three-piece variety that locks the tire on the rims without glue. The tires used on the RC10 ST at the Winter Champs were developed by Pro-Line. The four-row front tires are ribbed to improve the truck's traction on hard-packed surfaces. The rear tires have a pin-spoke tread made out of a soft rubber compound.

A noticeable difference between Lett's RC10 ST and other racing trucks is the narrowness of its front tires, which were designed to improve turning ability. At one time, there were no rules concerning truck-tire widths, and Associated discovered that, in certain applications, the narrow tire worked better. Later, Associated and a group of other manufacturers decided, along with ROAR officials, that it would be in everyone's best interests if the tires regarded as legal for ROAR-sanctioned events were limited to the wider versions. This was done to allay the fears of racers that they would have to buy narrower tires.



COW a BUNGA



PHOTO BY WALTER SIDAS

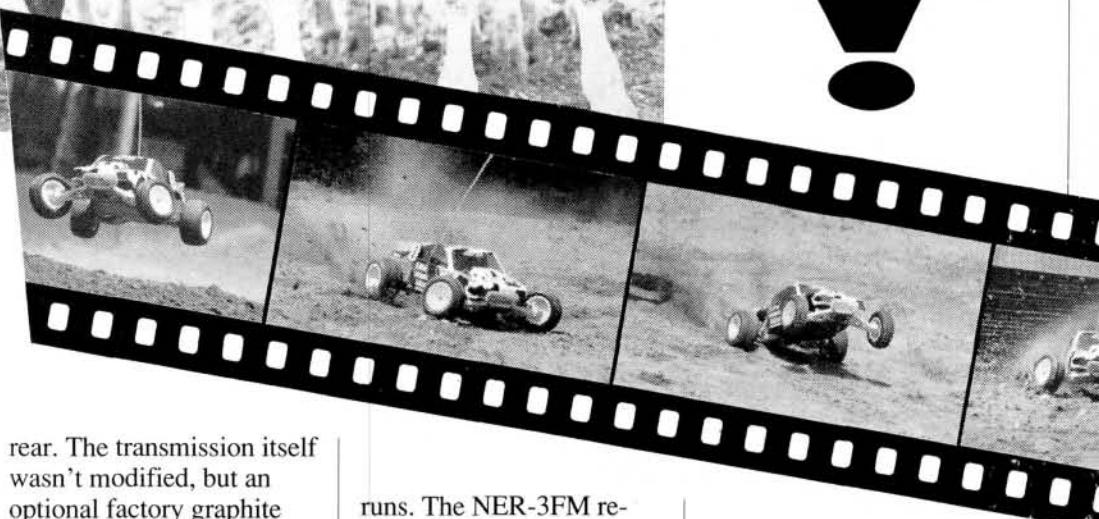


and wheels to remain competitive. The RC10 ST will include both versions of the front tires for racers to use in non-ROAR events.

SHOCK TREATMENT

Associated's new Team shocks, which have a hard-anodized body for less operating friction and improved durability, provide the damping for the RC10 ST. The new shocks have seals that are loaded from the inside, not from the outside as with older shocks. This allows quick assembly and more suspension travel for the size of the shock. Associated pure silicone oil (30WT) was used in both the front and the rear.

The new Associated Stealth transmission is attached to the truck's



rear. The transmission itself wasn't modified, but an optional factory graphite brace was used to fasten it to the rear bulkhead.

THE GUTS OF GLORY

Lett's truck is powered by a 14-turn, triple-wind Reedy* Modifieds Mr. A Ultra Series motor. The A-Main gear ratio consists of an 87-tooth spur gear with a 16-tooth pinion, for an overall ratio of 12.23:1. The juice is provided by 7-cell Reedy matched 1400 SCR pack.

Other electronics in Lett's RC10 ST include a Novak* 410-M1c speed controller and NER-3FM receiver, and an Airtronics* CS-2P radio with an ERG-XS steering servo. The M1c is one of Novak's new line of high-frequency speed controllers. It's designed to make the best use of your battery power by "recharging" as the truck

runs. The NER-3FM receiver is also new to the Novak line, and it's the first after-market receiver for use with FM radio systems.

The Airtronics ERG-XS steering servo has ultra-high speed and exceptional torque—of its size, it's the fastest, most powerful servo available. The FET, which is attached to the chassis just behind the speed controller, was apparently required to use this new servo. Cliff explained that the demands of the ERG-XS were more than the circuitry in the speed controller was capable of delivering. The use of the FET was part of a test Novak conducted in an attempt to update the speed controllers to handle the demands of this servo and others with higher current requirements.

MOOVE ON

Topping off the winning RC10 ST is the Associated Toyota stadium-truck body that will be included in the production kits. The regalia on the nose of Lett's truck is part of "Team Moo"—one of the current fads sweeping through California. It seems that everyone's got "moo" on the brain, including Cliff (moooooovin' that is).

Congratulations to Cliff and Team Associated for their win with the RC10 ST.

*Here are the addresses of the companies mentioned in this article:

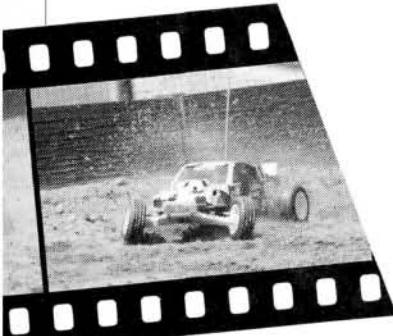
Team Associated, Associated Electronics, 3585 Cadillac Ave., Costa Mesa, CA 92626.

Litespeed, P.O. Box 4765, Spokane, WA 99202.

RCPS, 18312 Gifford St., Fountain Valley, CA 92708.

Novak Electronics Inc., 128-C E. Dyer Rd., Santa Ana, CA 92707.

Airtronics Inc., 11 Autry, Irvine, CA 92718.



SHINWA MOTOR DRESSER FET

by FRANK MASI

I LOVE TOYS! I love to play with them; and I especially love to buy them. Unfortunately, toys can sometimes be a little more costly than my budget allows. Of course, I get them anyway, but I feel guilty later—even more so when I realize that I didn't really need them to begin with.

The new Motor Dresser FET from Shinwa* is just such an item. Don't get me wrong; the Motor Dresser delivers what it promises—a visual indication of motor timing; variable motor speed with a dual-range tachometer; and a measurement of no-load motor current—but besides the tach and the ammeter, the rest of its features don't tell you a heck of a lot. If you're in the market for a device that will give you an idea of the kind of shape your motors are in, then you could do a lot worse than to pick up the new Motor Dresser!

To get maximum performance from an electric motor, it's critical that you maintain it properly, clean it with a good motor spray between runs, change the brushes when they become worn or discolored, and keep the bearings or bushings clean and

properly lubricated. But what if you do all this and still get dusted by a driver with comparable skills and the same motor as you? Then perhaps you need to learn how to tune your motor for better performance on specific tracks and traction situations. I know what you're thinking: "That's all fine and dandy, but I don't have the slightest idea how an electric motor works, let alone the know-how to make one run better." Enter the Shinwa Motor Dresser (isn't that a Bruce Lee movie?), which is the latest offering in Shinwa's line of electric racing equipment.

GETTIN' DRESSED!

The Motor Dresser is a fairly compact (approximately 12x4x3 inches) unit that's designed to give you an idea of how well your motor performs and the changes you can make.

Brushes, springs and timing all affect a motor's characteristics. The Motor Dresser is not, I repeat, *not* a dynamometer. A true dyno measures torque and rpm under load, and the Shinwa uses a no-load method



Shinwa's
new Motor Dresser
FET features dual-range
tachometer, fully proportional FET speed
control, dual-scale ammeter and break-in timer.

to determine rpm and amp draw ratings.

The Motor Dresser FET will perform the same three main functions as its predecessor; it has a tachometer that reads in the standard revolutions

per minute (rpm), a DC current ammeter that shows the amp draw of the test motor as it relates to the speed at which it's being run, and a motor-timing meter (Shinwa calls it a "timing-point meter") to help you determine the right end-bell position for optimum efficiency. What separates this FET model from the previous Motor Dresser is its Mosfet motor-voltage control, which allows greater accuracy and smoother speed settings for testing and break-in, and the new Shinwa has a variable timer that automatically shuts off the unit.

To operate the Motor Dresser, you must first make your own lead wires and connectors—one for the power input and another for the motor-output terminal (two lead wires with alligator clips on their ends are more than sufficient for this). Although making my own leads was hardly a traumatic experience, I think that the least Shinwa could have done was include some wire for this purpose.

The instructions recommend that, to test and break-in your motor, you use a battery with the same voltage as the one you'll eventually run it with, so use any spare 6- to 20-cell pack.

Once you've determined which battery is best for you, charge it as you would if you were going to run it in your car, and then hook it up to the power-input connectors, being sure to note the correct polarity. Now take the motor

100-
COOL
TUNING
TOOL

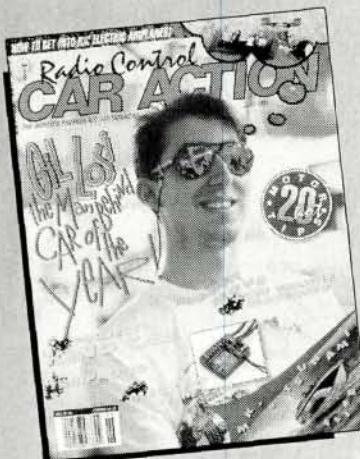
GET PUBLISHED!

R/C WRITERS WANTED...

We know that many of you have ideas that are worth sharing, and here's your chance! *Radio Control Car Action* is looking for contributors with an in-depth knowledge of the R/C hobby and the ability to take good photographs (we can help you with the writing).

Interested? It's easy! Just send your ideas, articles and photos to:

Li Agen
Managing Editor
Radio Control Car Action
251 Danbury Road
Wilton, CT 06897
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you wish to test and attach the Shinwa's magnetic pickup to the shaft on which you'd put a pinion gear, and put the motor—shaft down—into the Dresser's "Christmas tree," stand-like motor holder. The pickup magnet is what allows the Motor Dresser's tachometer to determine rpm.

To protect your motor from being damaged, the instructions tell you to set the speed control to zero before you turn on the unit; if you don't, the start-up amp draw may damage both the Motor Dresser and your expensive motor.

PRIMARY FUNCTIONS

Of the Motor Dresser's three primary functions, I usually find myself consulting its tachometer first.

- **The tachometer** uses a dual scale that allows you to select either a low (0 to 20,000rpm) range, or a high (0 to 50,000rpm) range. The lower range is useful when you're performing slower-rpm operations such as break-in and timing-point adjustment; and the higher setting gives an overall rpm rating for you speed-freaks.

I found the tachometer very useful when selecting brush and spring combinations (especially for stock motors), but always remember that the tach should be used with the unit's ammeter, because the relationship between rpm and amp draw will determine a motor's power curve. Trust me on this one; I tuned a stock motor to have a low amp draw and high rpm to see how it would work in my off-road car, and boy, what a dog this motor was out of the corners! So take my advice, and use the ammeter with the tachometer.

- **The ammeter.** It's important to note that most motors, stock and modified, should be drawing around 2 to 3.5 amps at most. If a motor tests out at more than 3.5 amps, it should be adjusted to a lower rating. Any motor that pulls 4 amps or more on a no-load ammeter should be checked for shorts and other damage. The instruc-

(Continued on page 116)

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ILLUSTRATION BY JIM NEWMAN

RADIO
CONTROL

facts AND FALLACIES

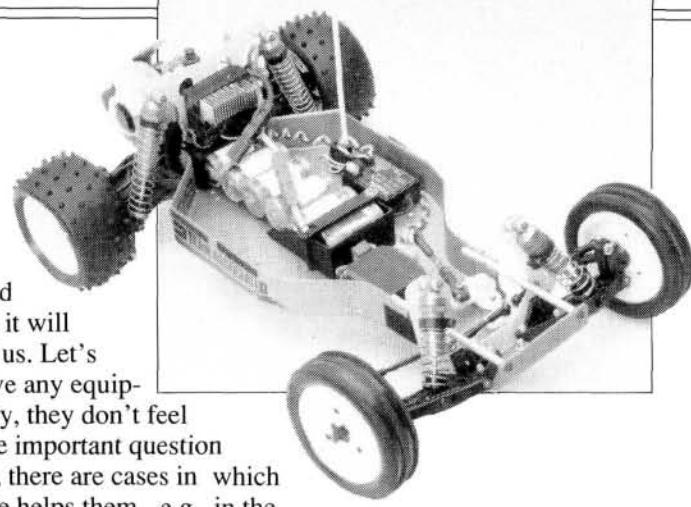
by CHRIS CHIANELLI

IF YOU COULD SEE all the letters I receive, you'd understand the need for this article. Far too many of you are wringing your hands, trying to decide which high-price item you "must" have next to make it to the winners' circle. Result number 1: you're rushing to relieve yourselves of hard-earned cash, only to find out the purchases don't instantly cut your lap times by 20 minutes. Result number 2: you're mad as hell! It's result number 2 we're trying to avoid. If you own an oil field, then please, indulge yourself in fruitless shopping sprees to your heart's content. If you're one of the unlucky few who doesn't, read on.

facts & FALLACIES

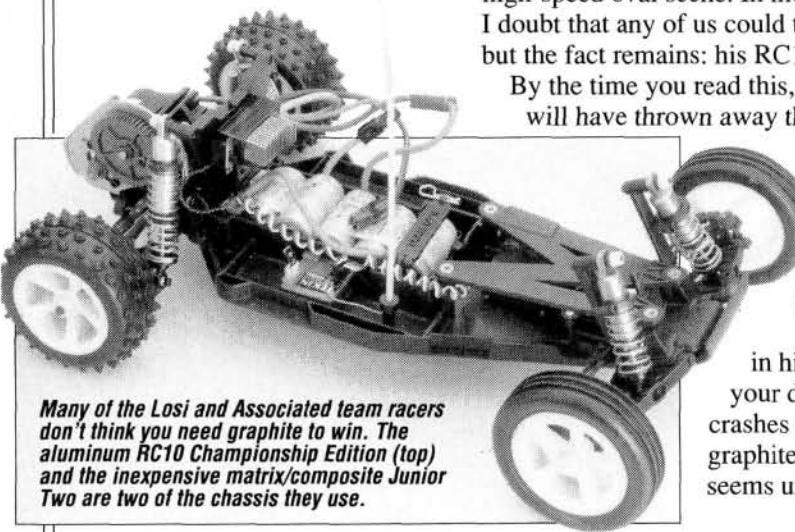
DON'T BE GREEDY FOR GRAPHITE

If aluminum is good enough for Team Associated's Cliff Lett and "Master" Masami, I think it will do just fine for the rest of us. Let's face it: these guys can have any equipment they want. Obviously, they don't feel they *need* graphite, but the important question is, "Do you need it?" Yes, there are cases in which racers really think graphite helps them, e.g., in the high-speed oval scene. In most off-road situations, however, I doubt that any of us could tell the difference. Maybe Masami could, but the fact remains: his RC10 is aluminum!



By the time you read this, most (if not all) of the Team Losi racers will have thrown away their JR-X2 graphite chassis and be running the Junior Two chassis! The reason? Its high-pressure-molded, plastic-composite frame is incredibly light, rigid and, above all, much cheaper than graphite. Someone is watching over us racers!

It's true that graphite won't bend or break in high-speed crashes, but if you're honing your driving skills, you've learned to keep these crashes to a minimum, right? I'm not putting down graphite—just its cost, which, more than ever, seems unjustified.



Many of the Losi and Associated team racers don't think you need graphite to win. The aluminum RC10 Championship Edition (top) and the inexpensive matrix/composite Junior Two are two of the chassis they use.

MATCHED SMATCCHED!

Next fallacy: "To be competitive, I absolutely have to have matched cells." WRONG! High-speed oval racing has become a battery/motor money game, but in off-road, they aren't nearly as important, especially with the advent of high-frequency speed controllers and their recharging capabilities. With the heavy use of throttle-off

and brakes in off-road, the charging circuitry in this new breed of controller can really increase run times. I'm sure a lot of you are saying, "Yeah, sure, the new breed of electronic speed controllers are *expensive*. Thanks for nothin'." Electronics is the next subject, and speed controllers are a good place to start!

PTI 6-CELL SANYO PACK



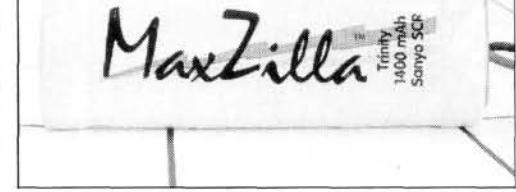
TAMIYA EX RACING PACK

A good racing pack with unmatched cells will get the job done in off-road.

PARMA SANYO 6- TO 8-CELL PACKS



TRINITY MAXZILLA 6-CELL PACK





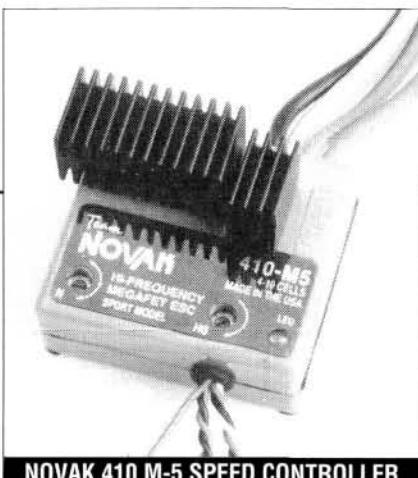
THE SPENDING SCAM

If it costs more, it has to be better, right? I'm not so sure. Of this I am sure: just because it costs more doesn't mean you need it. Here's proof: Team Novak has just introduced a new controller—the 410-M5. It not only has recharging circuitry, but it's also a high-frequency, 4- to 10-cell unit that uses Megafet transistors. Here's the best part—it lists for \$119!

This represents a phenomenon that has occurred throughout the 1980s—prices of electronic products go down after the manufacturers have recouped their R&D money. Considering Novak's reputation for quality, I doubt that this affordable unit will turn out to be a dog; in fact, I'd bet on the opposite.

The "It's-more-expensive-means-I-need-it" load of garbage also applies to radios. Manufacturers are increasingly making their own components (e.g., integrated-circuit chips). This greatly reduces their costs, and the savings are then passed on to you. This doesn't make the radio "cheap"; it just makes it less expensive. I've had great results with inexpensive radios.

Will a super-equipped "bells-and-whistles" radio make you a better driver? Things like end-point adjustment definitely make it easier to set-up a car, but I don't think that an expensive radio will make you the track star—maybe a pit star, but not a "hot trigger." So, sorry, you can't buy talent; you can only fine-tune it with practice. Life is tough, young patriots.



NOVAK 410 M-5 SPEED CONTROLLER

FUTABA MAGNUM SPORT



AIRTRONICS SR-2P



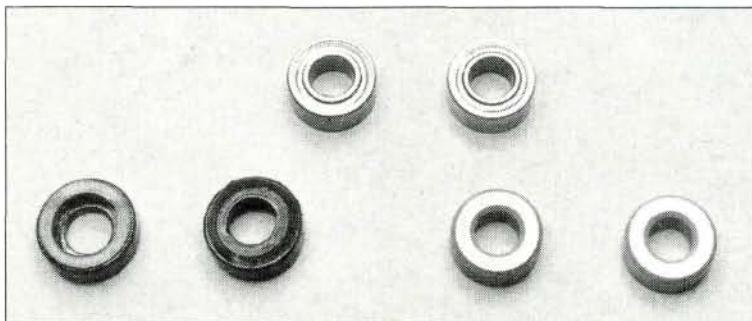
These low-priced, but good-quality radios from KO, Futaba and Airtronics might not have all the "bells and whistles," but it's practice that wins races.

Companies are working hard to reduce the price of competition-worthy equipment. Novak's high-frequency 410-M5 with recharging is a perfect example; it lists for \$119!

facts & FALLACIES

WHY BAG THE BUSHINGS?!

I know a lot of you sit home watching TV on race day. Why? "I can't race till I save money for a set of ball bearings. You can't win without them, man; you just



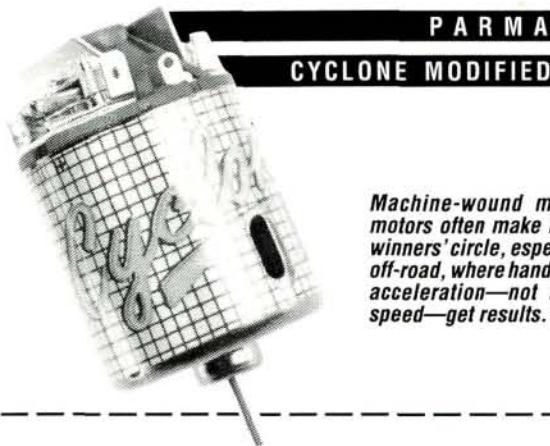
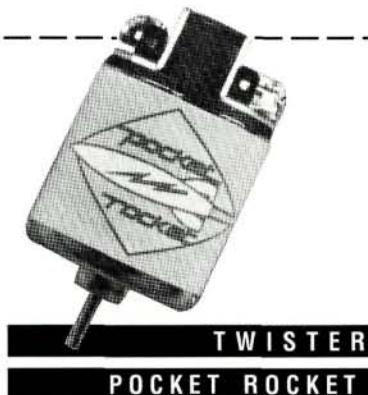
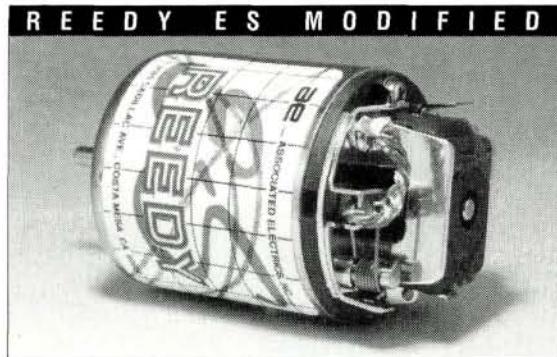
Although ball bearings (top) are the way to go, bronze bushings (bottom right) work well, especially on wheels. Forget plastic bushings (bottom left); they're a waste of time.

can't." FALSE! OK, ball bearings do make a difference, but more to run time than to top speed. I doubt that the difference in top-end speed would be noticeable or make a consistent difference to lap times. Bronze bushings that have been broken-in last a long time and run freely if properly lubricated and maintained. (Forget about *plastic* bushings altogether.)

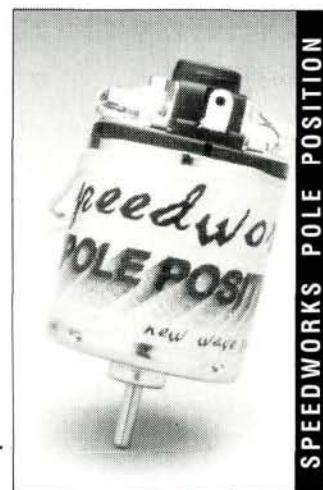
When you first build a car, put ball bearings into the transmission. (If you can't swing it, that's OK; bronze bushings will do nicely.) If you can afford ball bearings for the tranny but not for the wheels, bronze bushings will suffice, and they're easy to replace when you're ready.

THE \$80 MODIFIED

Many races have been won with machine-wound modified motors—especially in off-road. Unlike the high-bank oval game, in which nearly flat-out speed conditions are the norm, off-road racing takes the motor through a much greater rpm range. Acceleration is the most important factor, not top-end speed. In this case, a cheaper, machine-wound modified will quite often rise to the occasion. Simply put; the \$80 hand-wind is *not* a must. If someone tries to tell you it is, don't you believe it!



Machine-wound modified motors often make it to the winners' circle, especially in off-road, where handling and acceleration—not top-end speed—get results.



WISE UP!

OK, now I want different letters from you people. Instead of all the whining "I can't," "I want," "I need" letters, I want some, "How I did with good, affordable, sensible equipment and lots

of practice" letters. I'll print them in *Radio Control Car Action* to prove it to the doubters out there.

On the other hand, if you want to be a pit star, go ahead, spend your money; I

really don't care. Maybe the transmitter with the most switches, lights and buzzers will help you get girls. Nah—truly great women love an underdog winner. ■

HOME-BUILT PROJECT

YOU'VE SEEN a lot of Tamiya* Clod Busters in these pages, but never one like this! In the April '90 issue of *Car Action*, Bill "Bad Brain" O'Brien showed us his

Maximum Clod, and we knew the world would

Full-tilt fever

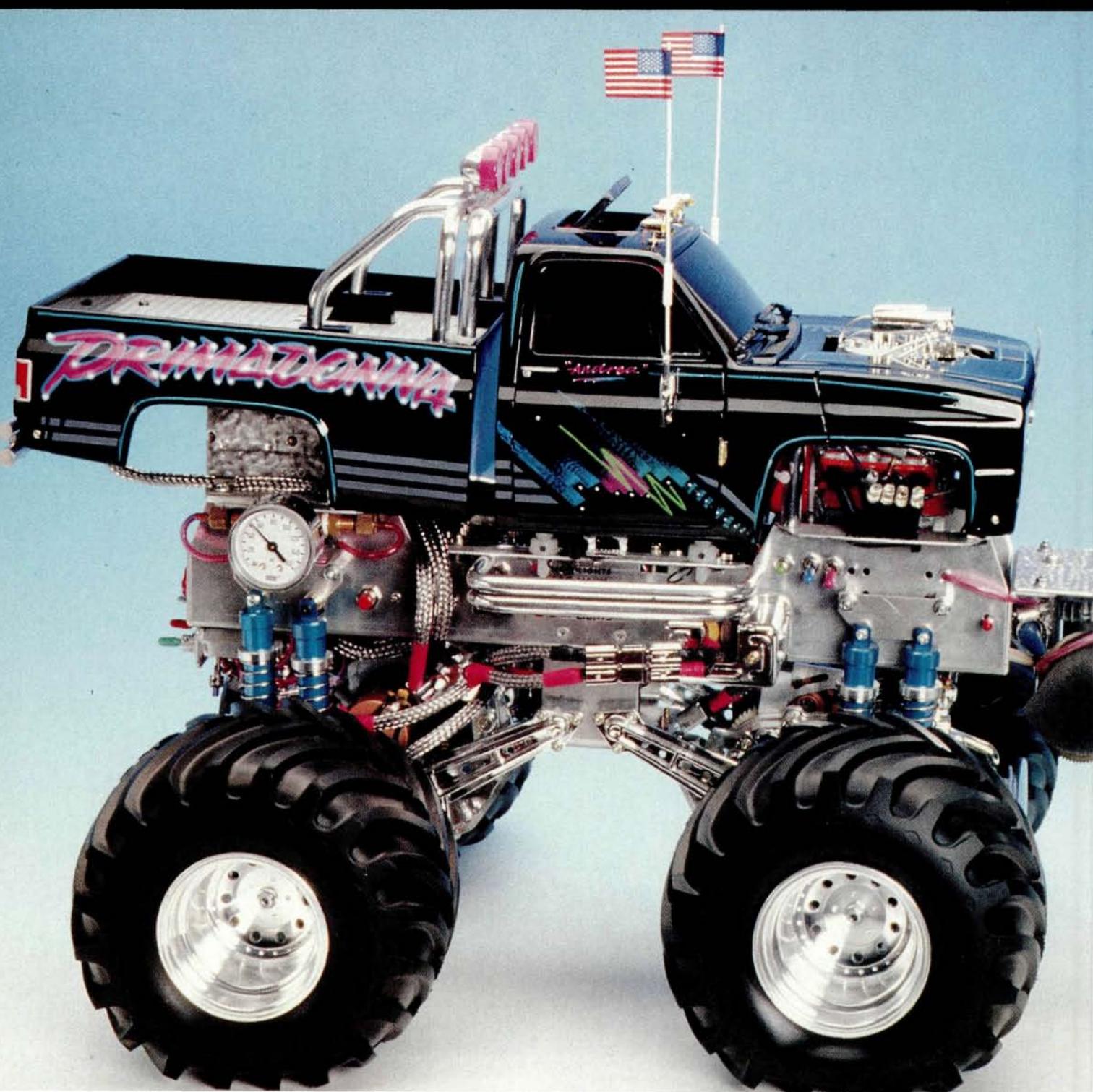
never be the same. It seems that a "Brain" infection has spread:

Steve Levine of Flushing, NY, has gone beyond the Maximum Clod and created the Primadonna Clod. This is a Clod like no other. It has so many features, I hardly know where to begin.

Let's start with the chassis.

THE CHASSIS

The original plastic chassis was replaced with ESP's* aluminum Clodzilla chassis. APM's*

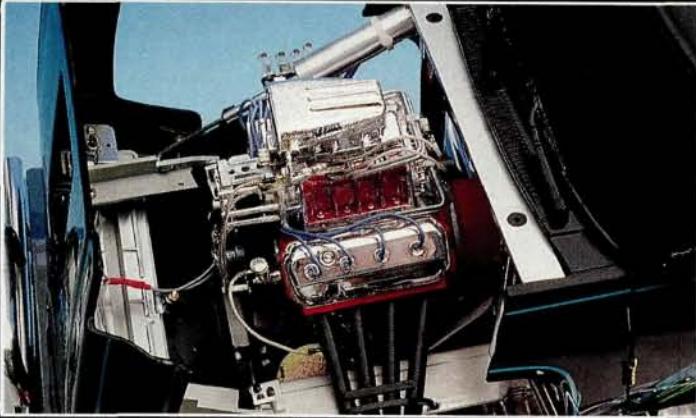


Primadonna

CLOD

by JOHN HUBER

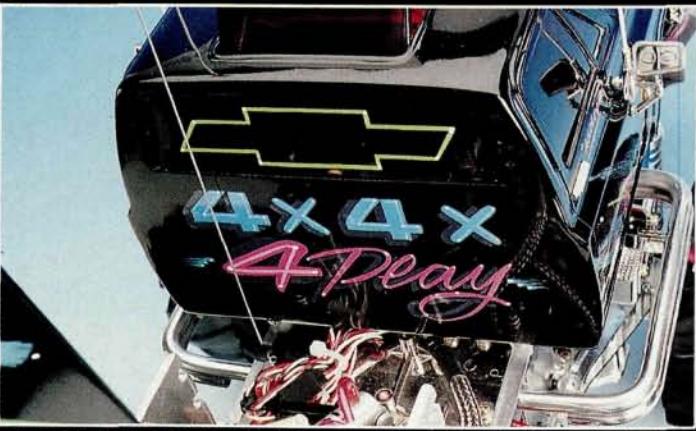
tubular bumper is bolted to the front of the chassis; it has been moved forward 2 inches to allow the front hood to tilt forward. Basically, all the stock plas-



Parma's Hemi engine, complete with ignition wires and braided pressure hose, rests under the hood. APM's hood tilt kit was modified to use an air cylinder instead of a servo.



The sunroof on the Primadonna Clod was cut out and hinged to allow it to open. The lights are fully functional.



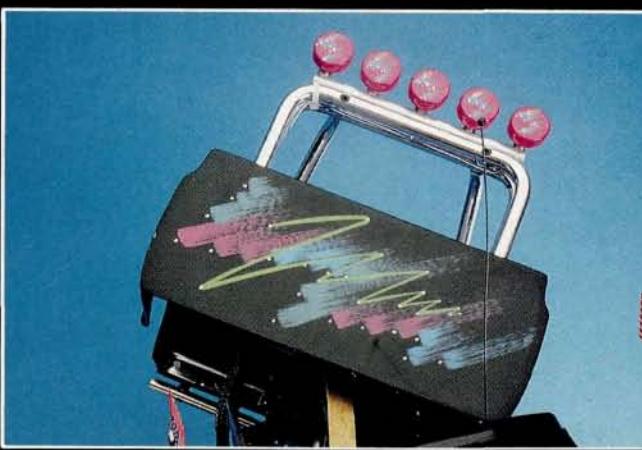
John Riccio's paint job must be seen to be believed. The entire body was hand-painted, with very little use of an airbrush.



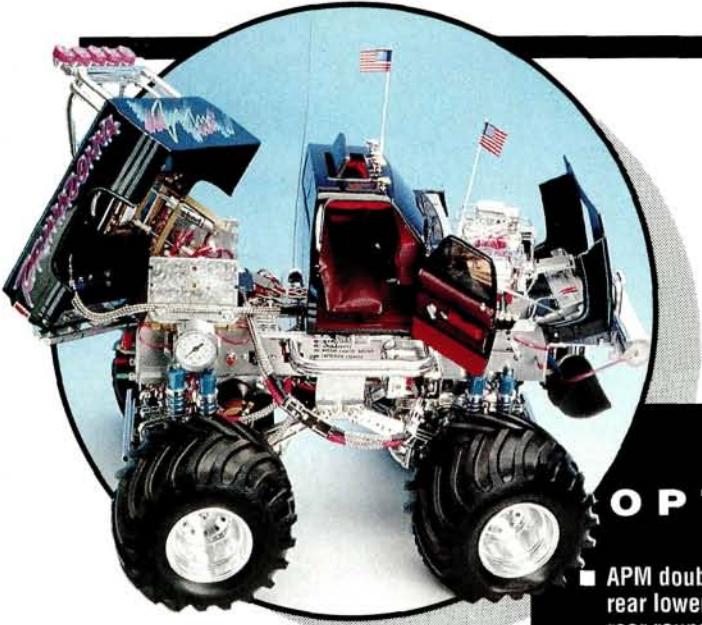
Just look at the detail inside the cab. The dashboard was originally from a Tamiya Bruiser, but all the other details were handmade.



Steve made his own bug shield and tinted headlight covers out of scrap plastic. As you can see from the yellow ribbon on the front bumper, Steve

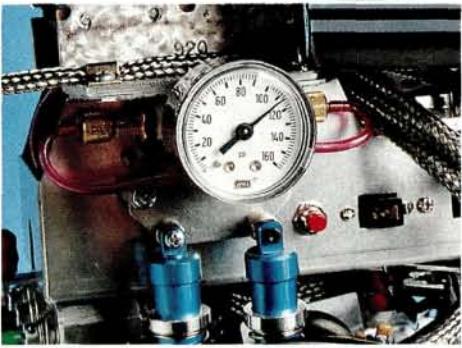


The custom paint job wasn't cheap, but the results speak for themselves.



OPTIONS

- APM double roll bar; front and rear lower skid bars; front and rear round bumpers; roll bar lights; diamond-plate bed liner; hood tilt kit
- AstroFlight twin cobalt truck-pulling motors
- Chrome-Tech USA chrome Sermos and Tamiya connectors
- Custom Chrome parts complete Clod package
- ESP shock extensions; suspension stabilizers; Clodzilla aluminum chassis
- Futaba Magnum Senior, MC111B ESC, 2 FP131s servos
- Kyosho windshield wipers, side-view mirrors
- Litespeed twin-motor heat sinks
- Max Customs custom paint
- Parma 426 Hemi; oil-filled shocks
- RAM VW engine sound
- Robart air retracts
- Sees aluminum rims
- Stormer Racing twin 4:1 gear-reduction units
- Misc.: emergency tire pump; 2-inch front-bumper nose extension; 1-inch body extension; two automotive automatic-reset thermal circuit breakers; interior; opening sunroof



This pressure gauge reads the pounds-per-square-inch in the air-storage tank. Steve usually stops at 120psi, but it can hold more.



By flipping the switches mounted on the rear of the chassis, the rear bed can be tilted right, left, upward and downward. Steve custom-made the brackets and hinges after looking at a full-size truck with a similar setup.



Blinking red LEDs were wired into the exhaust headers. They flash in the same sequence as those on a real Hemi engine, and go well with RAM's VW engine sound board.

tic parts have been replaced with a complete Custom Chrome* plastic parts kit. The gearboxes are protected by APM's front and rear lower

skids and ESP's suspension stabilizers.

A set of eight Parma* oil-filled shocks mounted on ESP shock

motors are bolted to Stormer Racing* 4:1 gear-reduction units for awesome pulling power. Each motor is protected by an auto-reset thermal circuit breaker. (They're used in the power systems of electric car seats and are rated for 35 amps.) All the wires are covered with braided pressure hose for the utmost realism. And have you ever seen chrome Tamiya or Sermos* connectors before? Steve couldn't find them either, so he sent some connectors out to Chrome-Tech USA* in Wisconsin and had



To power the pneumatic system, a small on-board compressor pumps air into the tank on the bumper. A 540 motor, powered by 12 volts, cranks the compressor up to operating pressure.

extensions provide the damping for this mon ster.

POWER

The moti vational force behind the Primadonna is a pair of AstroFlight* cobalt truck-pulling motors with Litespeed* heat sinks. These

them chromed!

Steve chose the Futaba* Magnum Senior radio system. Two Futaba FP 131s servos are used for steering, but they're not used in the usual way. As in full-size monster trucks, the Primadonna's rear wheels aren't controlled by the steering wheel, but rather by a switch that flips the wheels to the left or right. A switch on the transmitter sets the wheels left, right, or

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straight, while the front wheels are controlled in the usual way. This is a very interesting idea, because 4WS is often too sensitive and makes the truck difficult to control. With Steve's method, the rear wheels are turned only when necessary.

To control the power to the motors, Steve chose a Futaba MC111B. This is the MC112's stronger brother, and it has adjustable reverse delay. It handles the power well, but Steve doesn't use this truck for competition—pulling competition that is.

000-LA-LA

Steve entered his truck in the 1991 WRAM Show and the Toledo show, and he cleaned up both times: at WRAMS, the Primadonna was awarded "Best of Show", and in Ohio it won both "Best Finish" and 1st Place among cars. After you see what else he's done, you'll know why. He started with a couple of old Clod bodies. With a little cutting here and a little cutting there, he removed the sunroof, doors, hood and rear bed. He attached small hinges to the doors and sunroof, and if the doors were to open, it made sense to make an entire interior. Steve cut and glued the dash from a Bruiser until it fit his truck properly, and then he added gauges and a stereo. He made his own seats (complete with seat belts), padded doors with armrests, window levers and even door locks! An interior lighting system makes all these details visible. To mount the interior, he had to raise the body by 1 inch. This also made it possible to mount a floorboard with a shift stick and plush carpeting.

When all the cutting and fitting had been done, it was time to put a few coats of paint on the body. After giving it his best shot, Steve decided to have a professional tackle the job. He

gave the prepared body to Max Customs* of Hicksville, NY. Painter John Riccio spent many hours turning the dull plastic body into a colorful masterpiece. All the lettering and "dry brush" marks were hand-painted and protected by a super-glossy, clear coat. Such custom paint work doesn't come cheap, but I'm sure you'll agree that the results are stupendous.

Steve added APM's double roll bar, light bar and diamond-plate bed liner, and windshield wipers and side-view mirrors from a Kyosho* kit. To complete the "show" look, he mounted stock tires on a set of Sees* aluminum rims.

BODY IN MOTION

Here's the really interesting part: the pneumatics. Steve studied a full-size truck that had a hydraulic rear bed. By using Robart* air cylinders and valves, he can manipulate his truck's bed into almost any position. Valves on the rear of the chassis control the bed's tilting action in three directions: straight back, to the left and to the right. Steve had to make the brackets and mechanisms from scratch, using brass stock.

Using the APM tilt kit's mounting brackets, a pneumatic cylinder tilts the front hood forward. A Parma Hemi engine looms under the hood with only the blower protruding from an opening. It's incredibly realistic. When the hood is tilted forward, all the spark-plug wires, hoses and details are visible—there's even a chrome firewall! On the end of each header pipe is a small red LED (light emitting diode). When turned on, they flash on and off in the same firing order as those on a real Hemi. This, along with the RAM* VW sound unit, makes the Primadonna look and sound very realistic.

(Continued on page 124)

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Scoping Out

by JOHN RIST

AstroFlight 205



R/C CAR MODELERS owe a lot to R/C airplane modelers. It was the need for a light, reliable aircraft control system that prompted the design of the great, reliable radio systems we now take for granted. It was therefore no surprise to me when a company with its roots in the model aircraft world came up with a heavy-duty, pulling-truck speed controller.

The aircraft requirements that led to this design were the need for reliability, lightness, high voltage and high current. The result?—the AstroFlight 205 speed controller. It seems to have been designed with trucks and cars in mind, because it has a massive braking system. It actually uses four FETs for braking instead of the usual one or two. You need the massive brake when you're trying to stop a 2hp Cobalt 60 with a 12-inch folding prop turning 13,000rpm—in less than $\frac{2}{10}$ second! Of course, truck pullers will find this brake handy, too. Its aircraft heritage becomes obvious when you read the instruction sheet, which describes the "built-in, soft-acceleration circuit" and explains that this soft acceleration might save your airplane from a deadly snap roll on takeoff. (Later, we also learn that this soft start will also save your gearbox and axles when you attempt a heavy pull.)

In the *R/C Action Series* special, *Monster & Racing Trucks*, there's a "Scoping Out" article in which I compare several high-voltage speed controllers that are commonly used in the truck-pulling world. The AstroFlight 205 did

extremely well in my brutal lab tests, so this month, "Scoping Out" contains the results for all those who might have missed the special issue.

When I test a controller, I always take a look inside. The AstroFlight 205 controller has these features:

- brakes
- nine FETs: five for forward and four for braking
- Tamiya-style battery and motor connectors
- ability to handle 50 volts (40 cells)
- high-frequency motor control
- built-in heat sink

The AstroFlight 205 has very short leads and anti-glitching signal filtering (features that will be familiar to R/C airplane enthusiasts), but no BEC. It's housed in a narrow, fairly long box that's suitable for an airplane fuselage. This might sound grim, but a second look at these features reveals that the folks at AstroFlight are on the ball.

WIRE WORRY

Its short motor leads are perhaps its biggest handicap. You often need more than 6 inches of wire to reach the motor in a monster truck, but in an all-out, Open II-class pulling machine with several motors, you'll have wire splices anyway. For maximum efficiency, these splices should be as close to the speed controller as possible.

The controller is long and skinny with battery leads coming out of one end and motor leads coming out of the other. Point one end toward the batteries and

the other end toward the motor, and you have a layout that needs the shortest possible wires.

The anti-glitch filtering is very useful. Fliers lose aircraft as a result of glitching, and truck pullers could lose a contest if a controller glitches and lets the sled bog down. Truckers might not think as much about reliability as fliers do, but if you ain't got it, you don't win.

Not having a BEC isn't such a bad deal. Most glitching results from the arcing of the motor brushes, and the AstroFlight 205 is a high-speed switching controller that generates noise of its

● THE SCOPING OUT LAB ●

John Rist's lab consists of:

- an oscilloscope
- a digital voltmeter
- a resistor load bank
- a 6V 30-amp electricity supply
- a Pit Stop Radio servo/speed controller tester.

The oscilloscope is used to monitor the controller's output and to guarantee that it's fully on.

The digital voltmeter takes all the voltage-drop readings and verifies the reading on the current meter.

The resistor load bank consists of 40, 12-ohm, 5-watt power resistors, which can be switched on and off one at a time to vary the load between .6 amps and 20 amps, but the standard 12 amps are usually used.

In series with the resistors is a 25-amp Simpson current meter and a 1-percent .01-ohm resistor. By measuring the voltage drop across this resistor, the current-meter's reading can be double-checked. Of course, the lab power supply provides the test current.

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own. By not having a direct connection between the receiver and the controller, this noise has one less path along which to travel and destroy your run. Besides, when you run 28 cells, some of the high-voltage controllers with BEC require you to disconnect the BEC and run an external receiver battery.

With a 7-cell pack, I determined full throttle on the AstroFlight 205 by listening for maximum motor speed and measuring maximum voltage across the motor leads with a voltmeter. (The results of both methods proved to be right on the button when I checked them with an oscilloscope.)

At a glance, the AstroFlight 205 looks like a dynamite truck-pulling speed controller, but its instruction sheet leaves much to be desired. It contains a lot of information on the controller's features, but few installation instructions. If you're a newcomer to the R/C hobby, ask an experienced modeler for help before you tackle its installation.

LAB TESTS

The tests for this controller were designed to see whether it could stand up to the rigors of high-voltage truck-pulling. There were three stages: voltage-loss readings; my "let-it-cook" test and a 28-cell "dead-short" test.

The tests were conducted in the "Scoping Out" lab, but I added a few "torture" items, e.g., a 12V car battery for the voltage-drop test and the let-it-cook test. I also dedicated four 7-cell packs to my tests—with the intention of sacrificing them! I wanted to see whether the controller could stand 28 cells pumping at 100 amps.

Getting 100 amps out of a Ni-Cd battery just about requires a dead-short, and to provide this short, I used approximately 20 feet of monster wire. I used Sermos Powerpole connectors to tie the mess together. As far as I know, the Sermos connector is the only one that's up to 100 amps. I measured the current

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with a 100W .01 1-percent resistor wired in series with the monster wire.

VOLTAGE-DROP TEST

In keeping with the high power-handling capability of this monster controller, I measured the voltage loss across it at 20 amps instead of the 12 amps I usually use for my tests. I used a digital voltmeter to take an input voltage reading and an output voltage reading. The difference between the two shows the voltage drop across the controller.

If you know the voltage drop at a

fixed 20A current, you can calculate the controller's resistance, i.e., voltage drop across the controller divided by 20 amps equals resistance. I take this measurement twice: first, along the full length of the battery and motor wires, including the connectors. This gives a voltage-drop reading for the controller as it comes out of the box.

I take a second reading at the 2-inch point along the battery and motor wires. This reading gives me figure with which I can compare a controller with the others

(Continued on page 70)

SCOPING OUT

(Continued from page 69)

I've tested. The connector-to-connector voltage-drop test revealed a drop of .29 volt at 20 amps—a resistance of .0145 ohm. At the 2-inch point, the voltage drop was .15 volt—a resistance of .0075 ohm—not bad, considering that the controller has only five FETs.

A look inside the controller revealed how AstroFlight has managed this magic. The current doesn't run through the pc board but is carried by heavy braid. As I've often pointed out, the quality of the solder joints, the length of the wires and the type of connectors used have as much effect on a rig's performance as the quality of its speed controller's FETs.

LET-IT-COOK TEST

With the car battery attached (and a 15-amp battery charger running full-bore), I readjusted the resistor load bank to consume 40 amps. My first attempt to "let it cook" soon had my load bank smoking—a lot! I discovered that, at higher voltages, I had to direct the blast from a 20-inch window fan across the load bank. But I also had to ensure that none of this cooling air reached the ESC being tested. After all, when a truck is pulling, its speed is almost zero, and there's very little air cooling.

I let the test run for 15 minutes and then checked to see whether the 205 was hot. It was hot enough to burn your fingers, but it never missed a beat. Given its measured resistance, I expected it to get warm—perhaps even hot—but, once again, owing to its sound design, the 205 hung in there.

PULLING TEST

For my final test, I connected the AstroFlight 205 to the 28-cell pack to see whether it could hack Open II Class truck-pulling current levels. A few words of caution: it's dangerous to try to obtain true 100A currents. I say this because I literally wrecked the battery packs; I had a smoky fire! The high current literally melted all the shrink-wrap off the cells. Some of the cell-to-cell straps shorted out across the now-exposed edges of the cells.

During the tests, I ruined five cells: four shorted and one opened. If you plan to abuse your Ni-Cds in the range of 100 amps, you must do two things:

- Use heavy braided wire between each

ASTROFLIGHT 205

DIMENSIONS:

Height	.65 inch
Width	1.62 inches
Length	2.62 inches
Weight with wires	2.1 ounces

TUNING:

Access to controls	Excellent
Ease of adjustment	Fair

PRICE:

Sug. retail price	\$179.95
Warranty	90 days

ELECTRICAL:

(Manufacturer's Specs)	
Max voltage	50 volts
Min voltage	7.2 volts

Max current	700 amps
Continuous current	100 amps
Resistance	Not stated

TEST PARAMETERS:

Voltage	12 volts
Current	20 amps

TEST RESULTS

Voltage drop to end of wire	.29 volt
Voltage drop at 2-inch point	.15 volt

Calculated resistance:

Resistance to end of wire	.014 ohm
Resistance at 2-inch point	.0075 ohm

Voltage Drop / Current = Resistance
0.29 volt / 20 amps = .014 ohm
.15 volt / 20 amps = .0075 ohm

COMMENTS:

Although I probably wouldn't have bought an AstroFlight 205 on its looks alone, the more I learned about it, the better it looked! It has no BEC, but it checked out as one tough contender. It's a true 28-cell (rated at 50 volts), 100A controller.

cell. The extra metal will help to dissipate the heat by drawing it away from the cells, and the braid's low resistance helps performance.

• Use a high-temperature sleeving on the cells. Plumbers' Teflon sealing tape or cardboard sleeves might work, too. All the shrink-wrap on my cells was destroyed by a true 100 amps.

With the AstroFlight 205 connected to 28 cells, I jerked the throttle wide open. Smoke poured out of the batteries as they became dangerously hot. The initial current jumped to 108 amps, and after 30 seconds, it measured 65 amps. After 1 minute, the current had dropped to 51 amps and the AstroFlight 205 was still working normally; in fact, it wasn't that hot. The rapid decrease in current was caused by the death of the batteries and not by any malfunction in the AstroFlight 205.

TRUCK TEST

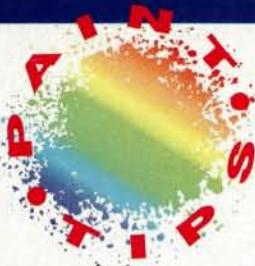
We don't have any truck-pulling where I live, so I wasn't able to test this controller in a pulling truck. When my friends at R/C hobbies wanted to run a Tamiya Clod Buster in the Christmas parade, however, I suggested that the AstroFlight

205 would be up to the task.

The truck was fitted with Sanyo 4000mAh batteries to provide a run time that would be long enough to last for the whole parade. All went well, and the truck covered the entire route without a hitch. I've also tried the AstroFlight 205 in my Kyosho Sideways, and I found that it works very smoothly because of its high-frequency motor control. It also has very strong brakes.

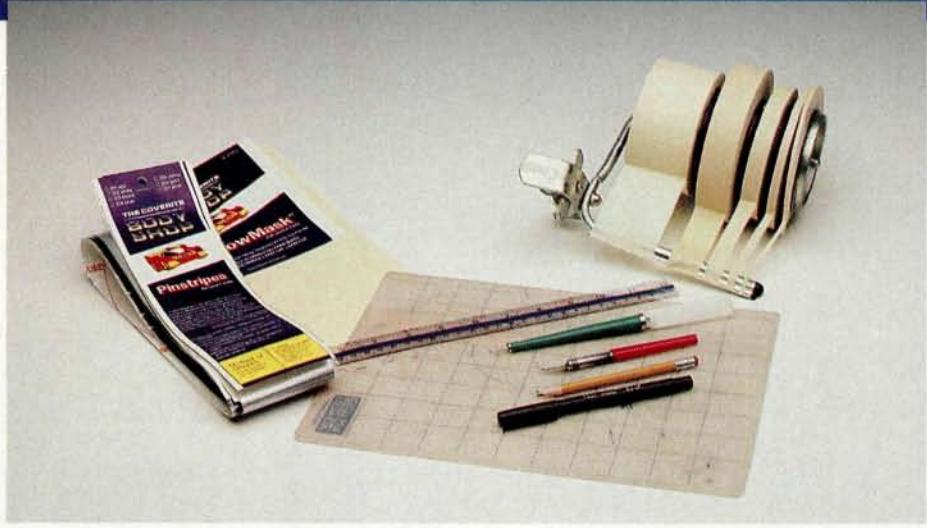
The AstroFlight 205 probably isn't the best choice for an average 1/10-scale car or buggy because it doesn't have BEC. If you plan to run more than the usual 6- or 7-cell battery packs, though, this controller is one tough contender. It's a true 28-cell (rated at 50 volts), 100A controller. Let the competition beware! If a truck-pulling competitor walks in with this controller under his truck's hood, he has come to let the smoke roll—battery smoke, that is—because the AstroFlight 205 will still be around at the end of a 1-minute, true 100A run.

*Here's the address of the company featured in this article:
AstroFlight Inc., 13311 Beach Ave., Marina Del Rey, CA 90292. ■

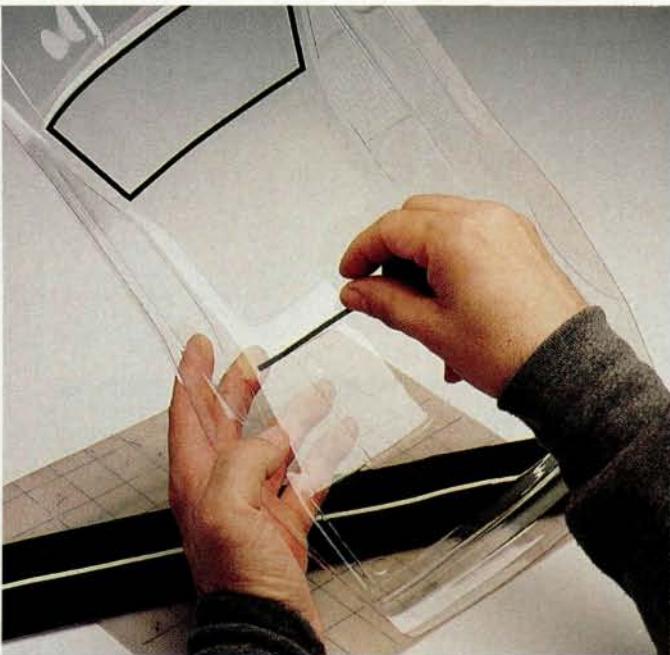


BODY MASKING

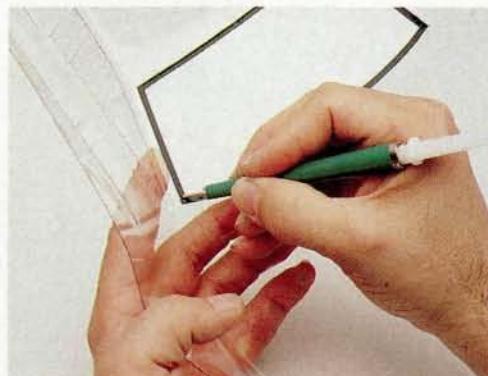
by RICHARD MUISE



In this, the second article in a four-part series on basic, start-to-finish painting, I'll cover the ins and outs of body masking. I used an Associated* T-Bird body and a Viper body as examples of how to paint cars for the popular off-road and concrete-oval racing classes. The Viper's paint scheme is a generic stars-and-stripes job, while the T-Bird is painted like the '91 Bill Elliot Winston Cup car. (At least it was when I started this project; the full-size car's paint scheme is different now.) Here's how to "smooth out" the most difficult part of painting your R/C car.



1 You can apply thin black pinstriping tape around the windows to simulate foam molding.



2 To prevent paint from seeping under the tape, rub the edges and the overlaps with a burnishing tool to seal them.

Always mask the windows first unless you plan to highlight a window with chrome window trim or black weather stripping. If so, then apply it first. (See the T-Bird photo). Mask windows and details (i.e., grill openings, headlights, tail lights, etc.) with pieces of Dahm's* or Coverite* window masking that are slightly larger than the areas you want to cover. Keep the masking as flat and as smooth as possible. Using the side of a sharp pencil point, gently rub the masking over the ridge that outlines the window or detail. This will leave an image on the masking's surface.

Remove the masking from the body, and put it on something that it won't stick to permanently, e.g., a carrier sheet/backing paper, plastic, or a sheet of Lexan. At Motion Graphics*, we use self-healing cutting mats. They're available at hobby shops or art-supply stores. You can also use Plexiglas or a piece of glass, but cutting on these surfaces will dull the hobby-knife blade quickly.

Cut the masking to the proper shape, and then gently re-apply it in the appropriate place on the body's interior. Be sure to rub down or burnish the edges after you apply each piece.

WHAT YOU'LL NEED

Window mask
Pinstriping tape
Flexible ruler
Burnishing tool
Suitable cutting surface
3M masking tape (1/4-,
1/2-, 1- and 2-inch)
Hobby knife
Pencil
Tack rag
Fine-point permanent marker

3 Use a short, sharp pencil to mark the masking tape on the body's interior.



4 Gently rub the pencil back and forth over the tape on the window to highlight its raised border.



Never cut the masking after you've applied it to the body, because this will score the body and eventually cause cracking. On many of the small details (e.g., the grill openings on the T-Bird), you can use pinstriping of the proper width.

INVINCIBLE VIPER

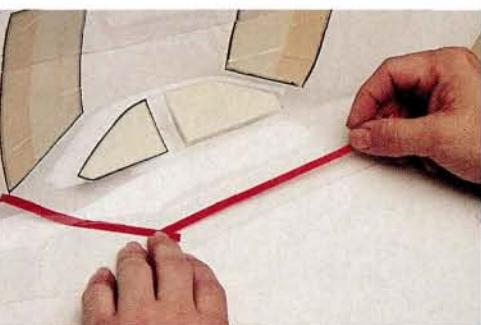
On the Associated Viper (no. 6121), I drew the design for the graphics on the body's exterior using a flexible ruler and a fine-

point marker. You'll be able to remove these lines after you've masked the body. When you lay out a design, study the body's shape and determine where the color separations will look good and be easy to mask.

After I had laid out the design, I applied the silver pinstriping tape to separate the colors. With this "break" between different colors, I don't have to worry about the paints bleeding together. You can leave the

8

Before you applying pinstriping tape, draw guide lines on the body with a marker to help you position the tape properly.

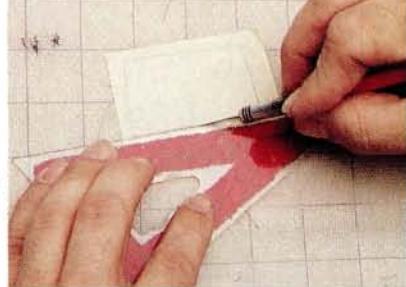


9 Lay the tape on the body, then cut off any excess tape. Be careful not to score the Lexan when you trim the tape.

10

This white pinstriping that runs along the top of the red line separates areas that will be painted different colors and prevents the paint from bleeding.

5 Remove the tape from the body, put it on a "non-stick" surface and cut along the pencil lines.



6 Re-apply the masking tape.

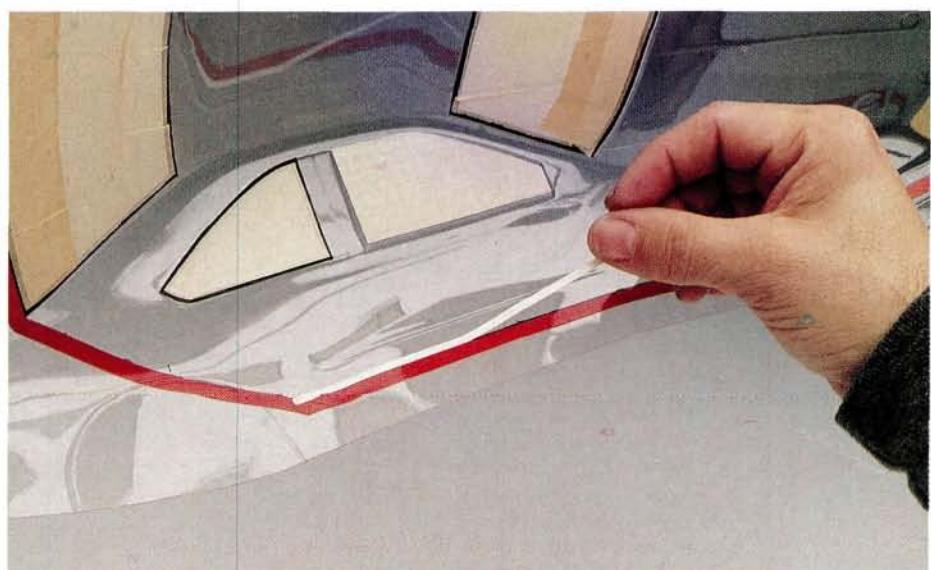


7 Rub down all the edges with a burnishing tool. Use the same method to mask the side window and the headlights.

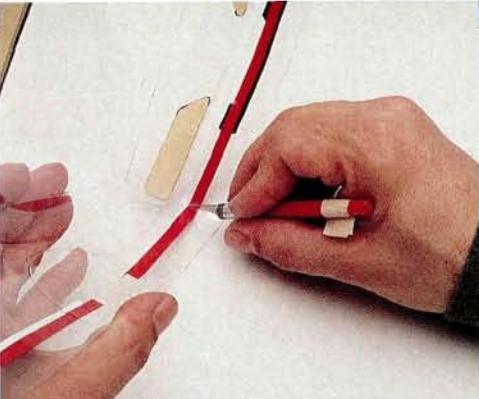


pinstriping on the body or remove it later and paint these areas. Try not to stretch the tape too much when you apply, because it tends to return to its original shape. Overlap the ends of the pinstriping, and trim them with a hobby knife (be careful not to apply too much pressure). Straight lines are the easiest to apply, so try to limit the number of curves in your design.

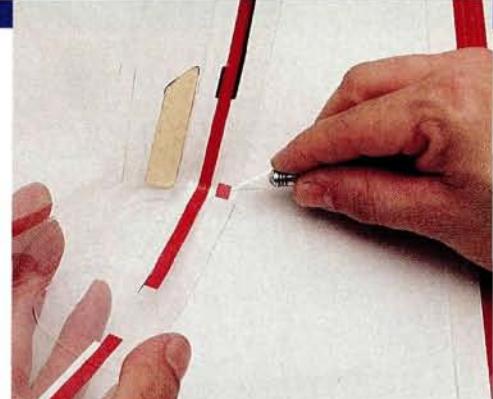
Using high-quality pinstriping will make this step much easier. Coverite Body Shop pinstriping is my favorite. One sheet has enough pinstriping to do several bodies, and the stripes come in five different sizes. There are, however, other



BODY MASKING

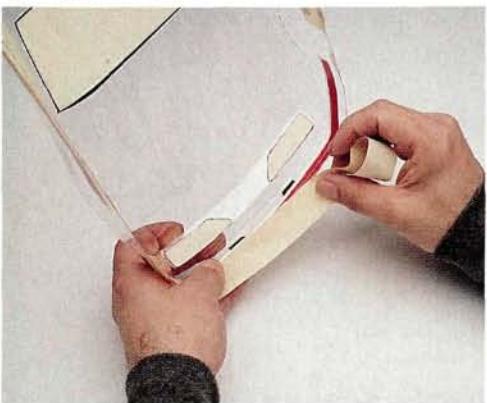


11 For curves, you might have to slice the pinstriping so that it lays flat.



12 Apply a small piece of tape over the cut to seal it.

13 Wide masking tape is used to cover the body's lowerskirt. This area will be painted later.



14 When you've finished masking, wash the lines off the body's exterior with a mixture of nail-polish remover and rubbing alcohol.

brands that work well; just remember that the thinner and more flexible the material is, the better.

After you've applied the pinstriping, mask off the area at the rear of the roof with masking tape of different sizes. Next, apply 1/2-inch masking tape "stripes" across the hood and roof. Use a burnisher, a pen cap, or the back of your fingernail to smooth the edges of the pinstriping and the tape so that the paint won't be able to sneak under them. Now, mask off the rest of the hood and the roof. At this point, I applied the white stars (available from Coverite), and I prepared to paint the area that wasn't masked blue.

Before you start to paint, remove the black marker lines with a solution of three parts nail-polish remover and one part rubbing alcohol. Don't let this solution touch anything that's been painted or varnished (i.e., your mom's dining-room table), because it will remove the finish. Also, don't get any of it on the inside of the body, it will cause streaks and loosen the tape.

T-BIRD TRANSFORMATION

For the Bill Elliot T-Bird replica, I referred to a number of photos from full-scale racing magazines to determine where to put the car's stripes. The windows on most NASCAR racers are lined with black foam so that the glass has an airtight seal. To simulate this foam, I applied black pinstriping around all the windows except for the one on the drivers' side, which doesn't have glass in it on the full-size car. Then, I followed the procedure that I outlined earlier to mask the windows and the headlights.

When I had determined where the accent stripes should go, I drew guide lines on the body using a permanent marker and a ruler. These lines made it much easier to apply masking tape to the body's interior. Next, I applied red pinstriping of the proper width to make the red boot stripe. I put a white stripe just above the red one to separate it from the area that's painted blue. I kept the red and white stripes on the finished body as accent stripes. You can remove them and paint these areas later, but keeping

(Continued on page 146)



15

The bodies are completely masked and ready for the first coats of paint. Check all the edges of the tape before you begin.



T R A C K R E P O R T

SHUMACHER

4x4 RS⁴



by ALEX STROUTHOPOULOS

MOST PEOPLE in the U.S. are unaware of rally-cross racing, but it's very popular in Europe. It's a cross between full-blown rally racing and Mickey Thompson stadium racing. High-horsepower 4WD sedans (called "saloons" in Europe) and coupes battle it out on a short, enclosed rallycourse/racetrack.

Owing to the immense popularity of these races on the other side of the Atlantic, Schumacher* of England has introduced an R/C version of the most popular rally-cross car: the Ford Sierra Cosworth RS 4x4, called simply the "RS 4x4". Based on the European champion 4WD Pro Cat, the RS 4x4 is a potent package. Consider its mid-mounted motor, "quick-adjust" front and rear ball diffs, four-wheel independent suspension, full set of rubber-sealed ball bearings, Kevlar drive belts and some of the most original engineering in R/C, and you have a car that's begging to hit the racetrack with all wheels spinning.

PHOTOS BY JOHN HUBER

union jack attack

THE KIT

The car's large body took up most of the box's space, and all the parts were neatly bagged and labeled. I completed the construction in about 5 hours. Although not for rank amateurs, it wasn't difficult to assemble this kit.

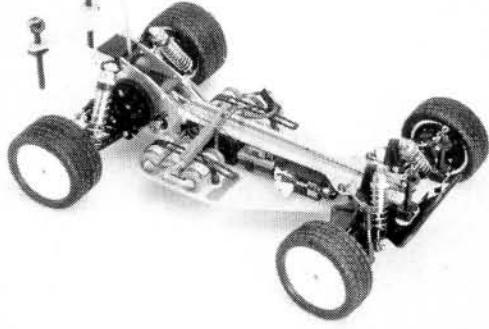


ASSEMBLY

Assembly starts with the rear gearbox. It seems strange to call it that, because in this case there *are* no gears—only belts! A layshaft transfers power to the rear diff through two short Kevlar belts. This layshaft exits the gearcase and is driven by the motor in the standard spur-and-pinion fashion. The front and the rear diffs are ball-type units that include the new Schumacher hex diff rings. (Earlier Cat models had sandpaper glued to the diff rings to prevent slippage, but this didn't work very well.) A long belt that runs between the front and rear diffs transfers power to the front end. An innovation that works: the diff pulleys in this kit are barrel-shaped, so there are no guides needed to keep the belts from sliding off the pulleys. This way, there's no power loss caused by the friction of the belts rubbing against the guides. The drive train is simple, so maintenance should be easy.

Instead of using dogbones or universals to transfer the power from the diffs to the wheels, the car uses slider-style drive shafts similar to those found on Losi and Traxxas cars. (Contrary to popular belief, Schumacher, not Losi, was the first to use sliding-style drive shafts.) The sliders are connected to a splined rear axle that rides in the hub carrier.





RS 4x4

Type Rallycross
 Scale 1/10
 Price \$449.95

DIMENSIONS:

Overall Length 18.5 inches
 Width 9.75 inches
 Wheelbase 10.875 inches
 Front Track 8.5 inches
 Rear Track 8.0 inches

WEIGHT:

Gross (w/bat.) 3 pounds, 14.11 ounces

BODY:

Type Ford Sierra Cosworth 4x4
 Material Polycarbonate

CHASSIS:

Type Pan with upper brace
 Material Fiberglass

DRIVE TRAIN:

Primary Spur/pinion
 Transmission Belt
 Differentials (f/r) Ball
 Bearings/Bushings Sealed ball bearings

SUSPENSION:

Front: Type Dual A-arm
 Damping Oil-filled, coil-over shocks
Rear: Type Single A-arm with upper
 control link
 Damping Oil-filled, coil-over shocks

WHEELS:

Front: Type One-piece nylon
 Dimensions (DxW) 1.9x1.25 inches
Rear: Type One-piece nylon
 Dimensions (DxW) 1.9x1.5 inches

TIRES:

Front/Rear Treaded blue compound

ELECTRICS:

Motor 540/05*
 Battery 6- or 7-cell saddle pack*
 Speed Controller Not included

The hub carrier has a disk molded onto it that helps prevent the accumulation of dirt inside the wheel. (This would slow your car.)

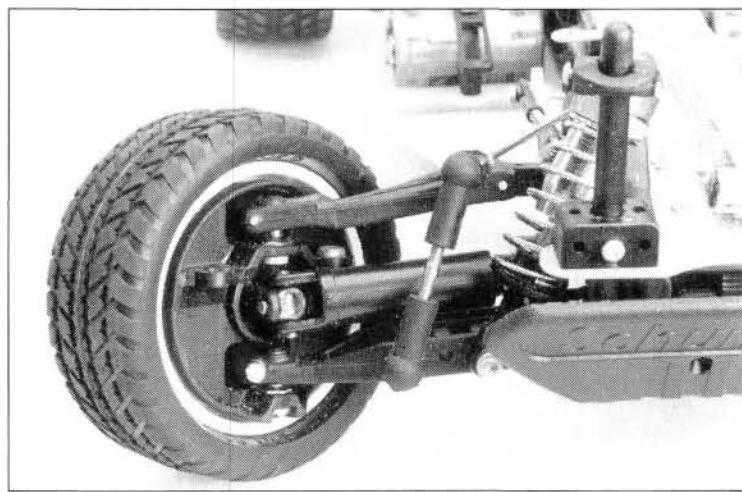
The front diff is similar to its rear counterpart, but only one belt rides on it instead of three. Again, the pulley is barrel-shaped, but I think there should be guides on the front, because the front belt is considerably longer and there's a greater chance of it sliding off the pulley.

Put the assembled diff into the housing and screw the housing to the chassis. When I did this, I noticed that the diff moved side to side about 1/8 inch in the housing. This didn't seem right, but there was no mention of spacers anywhere in the manual. (I later found out that this was an oversight in the instructions.) I thought that the play might be inten-

tional, so I left the spacing alone.

Mount the front A-arms to the upright bulkhead/shock tower and connect this to the diff housing. The entire upright assembly can pivot backward (or "crashback") to absorb some of the shock of a crash. O-rings on the front of the uprights provide enough tension to keep the uprights in place while the engine is running.

As the suspension is compressed, the camber increases. The only disadvantage is that camber isn't adjustable. A rather beefy rollbar on the rear helps handling (unlike many others, this one makes a difference). I did have one small problem with this: the ball ends have to be soldered to the rollbar and for the life of me, I just couldn't heat the bar enough to melt the solder! I heated the bar for about 15 minutes with no effect; eventually, I managed it, but it was a real job. I



The front hub carrier has a disk molded into it so that no dirt can enter the wheels and slow your car. Notice the extra beefiness of the A-arms.

OPTIONS AS TESTED:

Tekin 411P ESC; KO Propo EX-5 radio and PS-701 steering servo; Novak NER-2S mini-receiver; Trinity Torkzilla motor and Pushed SCRs; Kimbrough small servo-saver; JG threaded rod and ball ends.

COMMENTS:

Although its assembly might leave beginners frustrated, the car's performance is worth the effort. Out of the box, the car can be raced on- or off-road. This car is based on the highly successful Pro Cat, and with the right body and a new set of tires, it can be converted into one. Schumacher's new nickel-plated shocks and hex diff rings are great improvements over the original Pro Cat design.

* not included

later found a product called, "Solder-It" from Kool-It*. This solder paste can fuse parts with only the heat from a match. It's incredibly convenient compared with the conventional silver solder required for this type of job.

SHOCKING SHOCKS

Anyone who's ever raced a Schumacher car knows that the weakest parts of the suspension are the stock shocks. Under serious racing conditions, they quickly wear out. To improve on the old design, Schumacher has nickel-plated the shock bodies to increase durability. I built the shocks and filled them with 20WT Team Losi* shock oil, and they didn't leak a drop!

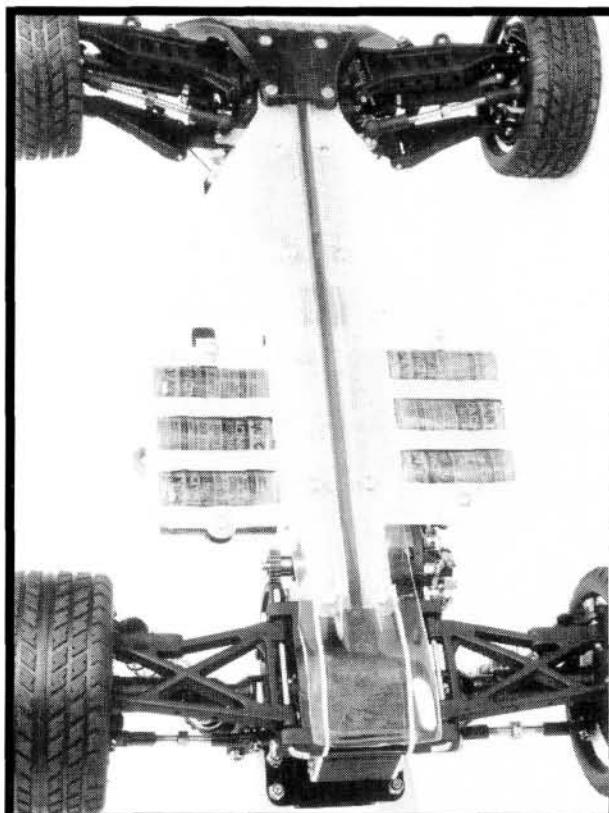
Next, connect the front and rear hardware to the fiberglass chassis

with the chassis stiffener, also made of fiberglass. Make sure that you bevel the edges of the battery slots on the chassis so that you don't cut the shrink-wrap on the cells when you strap them in.

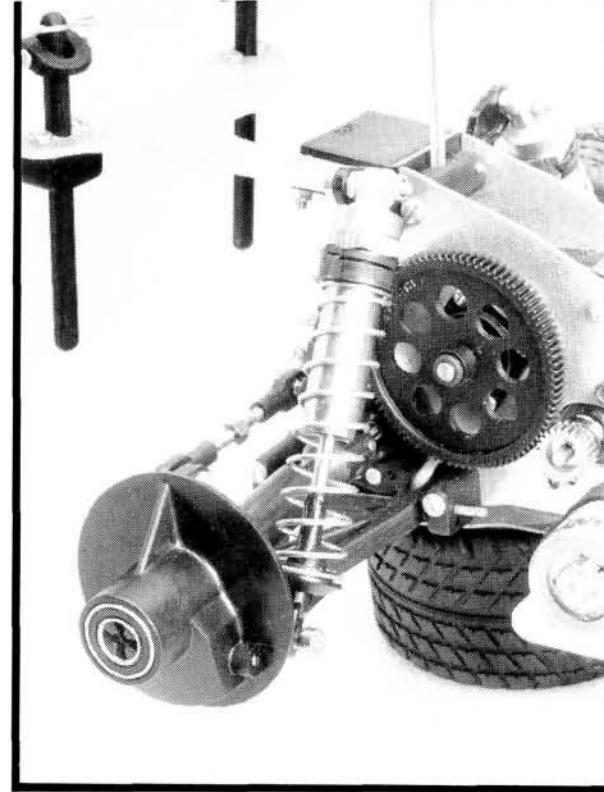
This car's main drive belt rides under the chassis, so you have plenty of room in which to mount your radio gear. I mounted a Tekin* 411P electronic speed-controller, a Novak* NER-2S mini-receiver and a KO Propo* PS-701 servo under the upper chassis brace. I chose to use the Trinity* Torkzilla 13-turn single motor that I used in my other 4WD car for part of last year—it's a killer! After I had installed the equipment, I mounted the supplied pinion (nice touch!) and was ready to go...almost.

Next, I painted the body, which is fairly thick and should last through many beatings. I covered the body with three coats of liquid masking, and then I proceeded to cut and paint. The result wasn't bad, if I do say so myself. Mounting the body was the last step, and when I had done that, I peaked a battery and was *really* ready to go.

"...this is one of the most versatile cars I've ever seen...by changing the tires and the body, you can have an off-road Pro Cat—but one with new, improved shocks and diffs!"



The belt rides under the chassis, so a lower belt cover is used to stop the belt from hitting the ground when suspension is compressed.



Mated splines hold the rear wheels on the axle. The ball bearings are of a very high quality. To simplify cleaning, the black rubber seals can be removed.

PERFORMANCE

The first thing that I noticed as I ran the car down my street was how real it looked! Despite the oversteer (probably the result of a lack of rear traction), running this car was a real blast! After a day here at *Car Action*, John Huber and I took the RS 4x4 out for few more test runs. The deserted street in front of the office was the perfect site to "wind this baby out." The car's speed was phenomenal!

We quickly learned that going full speed into a slightly sandy area, hitting the brakes and then punching the throttle could produce multiple 360s and great laughs. With the rather soft suspension setup, the car leaned a lot on hard corners, but it never lifted its inside tires.

Unfortunately, there's no racing class for the RS 4x4 under the rules of current racing organizations. For the on-road classes, independent rear suspension isn't allowed, so the car can't qualify for those sanctioned events. There are a number of local carpet and concrete tracks, however, that run off-road classes, for which the RS would be suited.

Against its own kind, this is one of the most versatile cars I've ever seen. As a bonus, by changing the tires and the body, you can have an off-road Pro Cat—but one with new, improved shocks and diffs! I'm impressed with the quality of the parts, and everything that was *supposed* to be in the box was there. If you break something, all the Pro Cat parts fit the RS 4x4; if your hobby shop doesn't carry them, Schumacher does. If Siskel and Ebert reviewed R/C cars, I think they'd give this one an enthusiastic "thumbs up!"

*Here are the addresses of the companies mentioned in this article:

Schumacher, 6302 Benjamin Rd., Suite 404, Tampa, FL 33634.

Kool-It; Unival, 498E Nepperhan Ave., Yonkers, NY 10701

Team Losi, 13848 Magnolia Ave., Chino, CA 91710.

Tekin Electronics, 970 Calle Negocio, San Clemente, CA 92672.

Novak Electronics, Inc., 128-C E. Dyer Rd., Santa Ana, CA 92707.

KO Propo distributed by Global Hobby Distributors, 10725 Ellis Ave., Fountain Valley, CA 92728.

Trinity, 1901 E. Linden Ave. #8, Linden, NJ 07036.

TRAXXAS Hawk

THERE'S A NEW bird of prey soaring in the R/C skies. The Traxxas* Hawk is an entry-level racing truck that's based on the Traxxas Radiator's fiber-reinforced ABS tub chassis. Its wheels are of brushed chrome over nylon; its tires are low-profile spikes; and its tranny has a planetary diff with 48-pitch, metal internal gears. (For durability, all the other gears are 32 pitch.) To reduce



by YAMIL SUEÑO





PHOTOS BY YAMIL SUED

stress on the drive train and increase gearbox reliability with extremely hot motors, a ball diff kit is also available. (Unlike a gear diff, a ball diff allows slippage.)

The Hawk kit comes with a stock 540 Mabuchi motor, a Lexan truck body and a three-step

ground assault

forward/reverse mechanical speed controller that's identical to the one used in the Traxxas Cat. Oilite bushings are also standard, but a ball-bearing kit is available.



Type Racing truck
 Scale 1/10
 Sug. Retail Price \$180

DIMENSIONS:

Overall Length 16.5 inches
 Width 7 inches
 Wheelbase 11 inches
 Front Track 10 inches
 Rear Track 10.25 inches

WEIGHT:

Gross (w/bat.) 4 pounds,
 4 ounces

BODY:

Type Pickup
 Material Lexan

CHASSIS:

Type Tub
 Material Nylon

DRIVE TRAIN:

Primary Gear
 Transmission Gear
 Differential Gear
 Bearings/Bushings Oilit bushings

T R A X X A S

Hawk

SUSPENSION:

Type (f/r) Single A-arm
 with upper control link
 Damping (f/r) Oil-filled,
 coil-over shock

WHEELS:

Type (f/r) One-piece nylon
 Dimensions (DxW) (f/r) 2.2x2
 inches

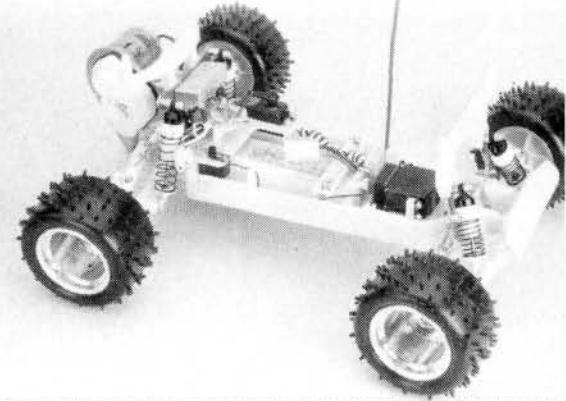
TIRES:

Front and rear Pin spikes

ELECTRICS:

Motor 540 Mabuchi
 Battery 6-cell stick pack*
 Speed Controller Three-step
 mechanical

*not included



OPTIONS AS TESTED:

Futaba 2PBKA Magnum Junior transmitter and S-148 servos; Tekin mini-receiver; ball bearings; Trinity SCE stick pack.

COMMENTS:

The Hawk offers most of the reliable features of the more expensive Eagle at a low price. It's a wise investment for entry-level racers because it performs well out of the box and can be upgraded as their skills improve and their budgets allow.



Except for the chassis and the servo-saver, all the Hawk's parts can be dyed. The gearbox and shock parts should only be cold-dyed, however (heat distorts these parts); the chassis can be painted with polycarbonate paint. The Hawk is available in two versions—completely assembled (including radio gear), or as a kit.

CONSTRUCTION

I was apprehensive about building my first R/C vehicle, but I was pleasantly surprised by both the kit and the instruction manual, which is very well-illustrated and easy to follow. All the parts are separated into well-marked bags, and there are plenty of spare screws, nuts and washers.

Most of the construction went smoothly. You begin by building the tranny and installing the rear suspension arms. My only trouble was with the shocks: without C-ring pliers, it took me forever to install the C-rings on the bottoms!

Later, the shocks were binding. I thought that I might have bent the shaft, but I had over-tightened the shock

collars. This compressed the shock body, which, in turn, caused the piston to bind. The problem was easy to correct, and otherwise, the shocks worked perfectly.

After you've built the shocks, install the rear ones, build and adjust the front end, and then install the front shocks. Next, install the body mounts in both the front and the rear ends.

At this point, the instruction manual tells you to cut off the tail end of the chassis, but if you want to upgrade the Hawk with the Pro Tranny, you shouldn't do any cutting until you get the tranny kit. The next step is to mount the tranny, the front end and the front bumper onto the chassis. The servo, radio system and speed controller are installed next, and finally, you install the tires on the finished chassis.

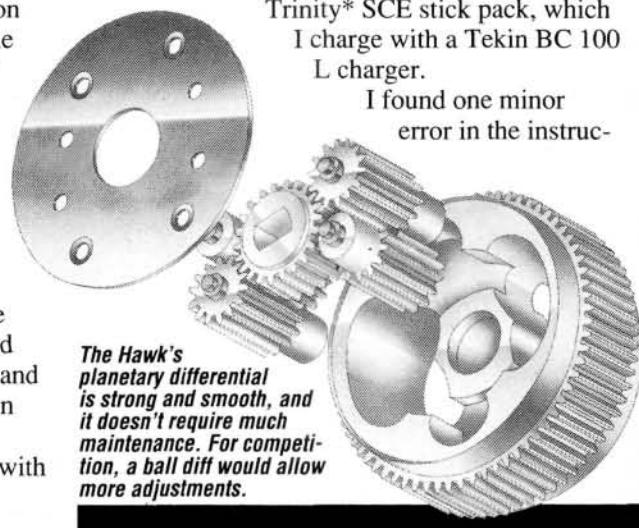
The turnbuckles included with the Hawk kit have a nifty feature. Each has a little adjustment nut that's cone-

shaped on the side with the reverse thread. This makes it very easy to adjust the turnbuckles properly once they've been installed in the truck.

I chose a Futaba* 2PBKA Magnum Junior transmitter, but I use a Tekin* mini-receiver to save space and minimize weight. To control the steering and speed controller, I use Futaba S-148 servos. I also use a

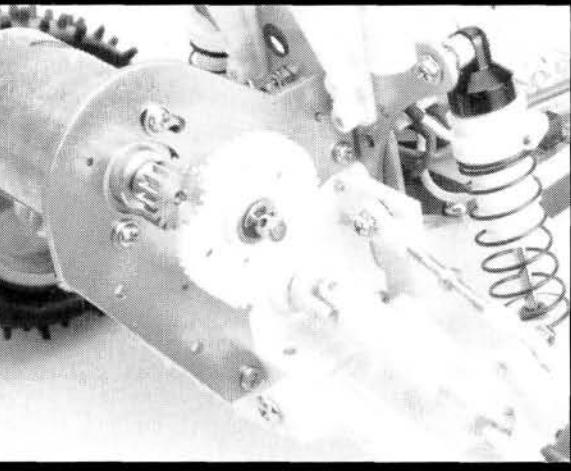
Trinity* SCE stick pack, which I charge with a Tekin BC 100 L charger.

I found one minor error in the instruc-

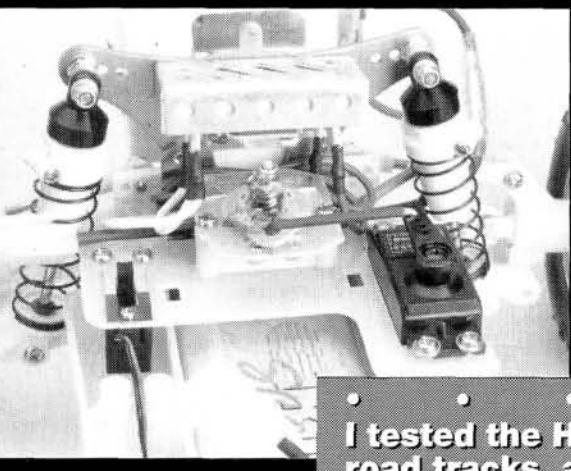


The Hawk's planetary differential is strong and smooth, and it doesn't require much maintenance. For competition, a ball diff would allow more adjustments.

Hawk



For increased durability, the Hawk's external gears are 32 pitch. The internal gears are 48 pitch, and they run much more smoothly.

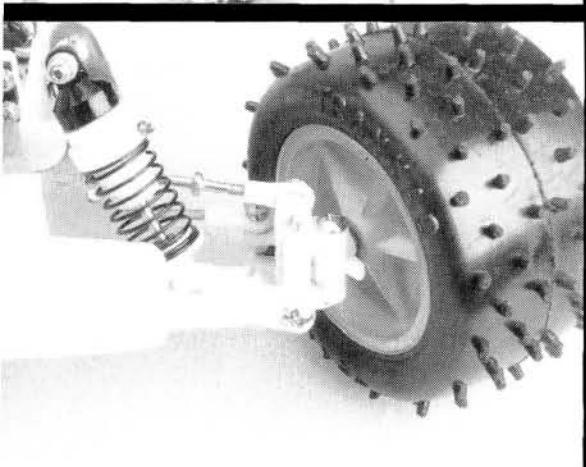


The standard three-speed controller worked properly, but when it was dirty, "dead spots" developed. A quick stroke with a wire brush brought it back up to snuff.

I tested the Hawk on indoor and outdoor off-road tracks, as well as on an open dirt road, and it handled like a pro on all three surfaces.



Without a bellcrank system, some bump-steer is noticeable, but it doesn't hamper the Hawk's performance. Tekin's mini-receiver fits nicely behind the steering servo.



The Hawk's front arms are shorter than those on the Blue Eagle, but because the rims are offset, the width of their front tracks is very similar.

tion manual. Step B-3 tells you to install and adjust the motor, but later (in Step H-11), you have to remove it to install the speed-controller resistors. Then you have to install and adjust the motor all over again! The people at Traxxas are aware of this problem, and they told me that it would be corrected in an updated version of the manual.

For convenience, I recommend that you attach the speed-controller resistors to the shock tower *before* installing the shock tower on the tranny, i.e., in Step C-14, rather than in Step H-11.

BODY BEAUTY

The kit includes a pickup-truck body that resembles the Toyota Extra Cab, as well as chrome and fluorescent decals. Like most beginners, I was somewhat intimidated by the task of painting the body, so I turned it over to Richard Muise of Motion Graphics*. He turned the Hawk into a masterpiece.

TRACTION ACTION

I tested the Hawk on indoor and outdoor off-road tracks, as well as on an open dirt road, and it handled like a pro on all three surfaces. It's easy to drive and maneuver. The low-profile spiked tires had great traction on my local track, but you should experiment until you find the appropriate tires for yours. From backyards to race-

tracks, this truck has them all covered.

The manual warns you to "avoid the big air," but my Hawk got some great air time and loved every

minute of it. The bottom line?—the Hawk is built to take it and take it big time.

SUGGESTED UPGRADES

Once you've mastered your Hawk, you'll never outgrow it. There are several upgrades that will make it meaner and better. First, you can install the Pro (Blue Eagle) Tranny kit (part no. 1920); then you can add aluminum shocks, long rear suspension arms (which actually reduce stress on the rear axles), the graphite rear shock tower and an electronic speed controller, e.g., the brand-new Traxxas 3009.

You can also replace the ABS tub with the graphite chassis used in the Eagle and then install long aluminum shocks, a graphite front shock tower, offset wheels and long front suspension arms. When you've finished upgrading your Hawk, it will look just like its big brother—the Eagle.

This is definitely the truck to start with and grow with. Face it, you'll want to keep this Hawk in your R/C rookery for a good long time!

*Here are the addresses of the companies mentioned in this article:
Traxxas Corp., 12150 Shiloh Rd., #120, Dallas, TX 75228.
Futaba Corp. of America, 4 Studebaker, Irvine, CA 92718.
Tekin Electronics, Inc., 970 Calle Negocio, San Clemente, CA 92672.
Trinity, 1901 E. Linden Ave. #8, Linden, NJ 07036.
Motion Graphics, 2645 Robert Arthur Rd., Westminster, MD 21157.

TRACK REPORT

PHOTOS BY JOHN HUBER



TAMIYA

TAMIYA'S* Manta Ray is a 1/10-scale, ready-to-assemble, full-time, 4WD off-road racer. It's easy to build, and beginners will be pleased with its performance. Many of its features are the standards that have made Tamiya products industry mainstays.

The Manta Ray's tub chassis is made of high-impact, injection-

MANTA

molded, ABS resin with a specially designed honeycomb pattern molded into the base of the tub to increase

strength. The suspension features a four-wheel, independent, double-wishbone design with upper and

lower arms, which were designed to be light, but strong. Large-volume, oil-filled, coil-over shocks are also



FOUR WHEEL RAY DEAL

RAY



by FRED MURPHY

used.

The drive system consists of an easy-to-assemble, low-maintenance shaft drive. The

main drive shaft is connected to the front and rear gearboxes, which house bevel-gear-type differentials. This de-

sign is one that Tamiya has used successfully over the years. Each gearbox

has an access hatch to allow quick gear changes or any maintenance that may be needed.

SPECIFICATIONS

Type 4WD off-road buggy
Scale 1/10
Price \$180

DIMENSIONS:

Overall Length 16.36 inches
Width 10 inches
Wheelbase 11 inches
Front Track 8 inches
Rear Track 8.15 inches

WEIGHT:

Gross (w/bat.) 62 ounces

BODY:

Type Single-seat off-road
Material Polycarbonate

CHASSIS:

Type Honeycomb tub
Material ABS resin

DRIVE TRAIN:

Primary Pinion/spur
Transmission Gear
Differentials Bevel gear
Bearings/Bushings Plastic/
bronze bushings

SUSPENSION:

Type (f/r) Double wishbone
Damping (f/r) Oil-filled,
coil-over shocks

WHEELS:

Type (f/r) One-piece plastic
Dimensions (DxW) (f/r) 2.1x1.5
inches

TIRES:

Front/Rear Low-profile spike

ELECTRICS:

Motor 540/05
Battery 6-cell stick pack*
Speed Controller 3-step
forward/reverse

OPTIONS AS TESTED:

MRC Top Gun pistol-grip radio system; Tamiya 6-cell 7.2V racing pack.

COMMENTS:

The Manta Ray shows great advances for Tamiya in suspension geometry, but the standard oil-filled shocks could stand some beefing-up. Replacing the plastic bearings with sealed ball bearings is a must for maximum performance. A hotter motor and better gearing will let the Manta Ray really run out front.

* not included

MANTA RAY

"The speed controller is Tamiya's dependable, three-step forward-and-reverse mechanical unit..."



THE KIT

The kit includes a basic 540-type, sealed-endbell motor and a 21-tooth pinion gear, which will provide a good starting ratio. Many people will want to upgrade their motors, or at least change the gear ratios, so Tamiya has included an adjustable motor mount. You can use 16- to 21-tooth pinion gears with ratios that range from 8.59:1 to 11.27:1. This

should cover most of the track conditions when you use a hotter motor setup.

The speed controller is Tamiya's dependable, three-step forward-and-reverse mechanical unit that's been around for years. The kit includes a set of low-profile, spiked tires mounted on one-piece, dish-type wheels; and there's a sleek,

vacu-formed polycarbonate body and rear wing that are ready to paint.

The steering arms are heavier than the usual ones, and they have a 5mm ball end instead of the smaller 3mm ball end. The plastic bushings will wear out with extended use. For optimum performance, buy a set of four 5x8mm and four 5x11mm ball bearings.

The well-illustrated,

23-page, 45-step manual has a troubleshooting and maintenance section. It also provides detailed instructions on how to install the 2-channel radio (not included in the kit).



The standard Tamiya three-step speed controller delivers the power to the motor—it's not too fancy, but it's reliable.

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MANTA RAY

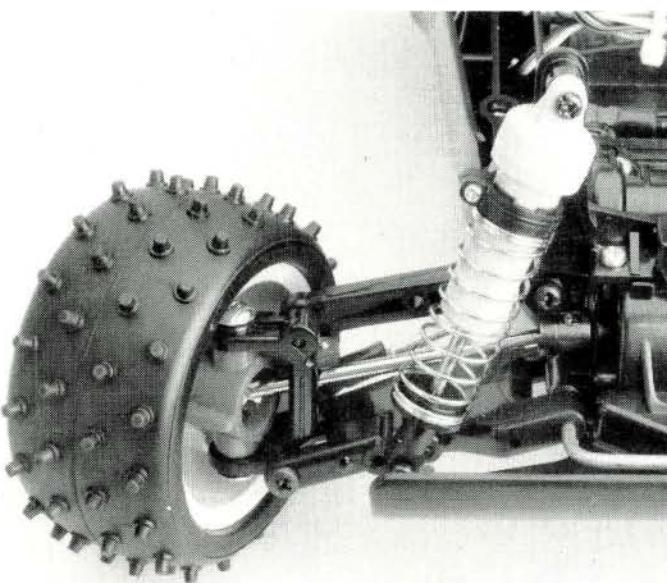
PERFORMANCE

The Manta Ray ran smoothly through the turns and over the jumps. The suspension functioned smoothly, but it should be upgraded for racing. The Manta's weight distribution is interesting: about 60 percent of the overall weight is in the rear, and the rest is

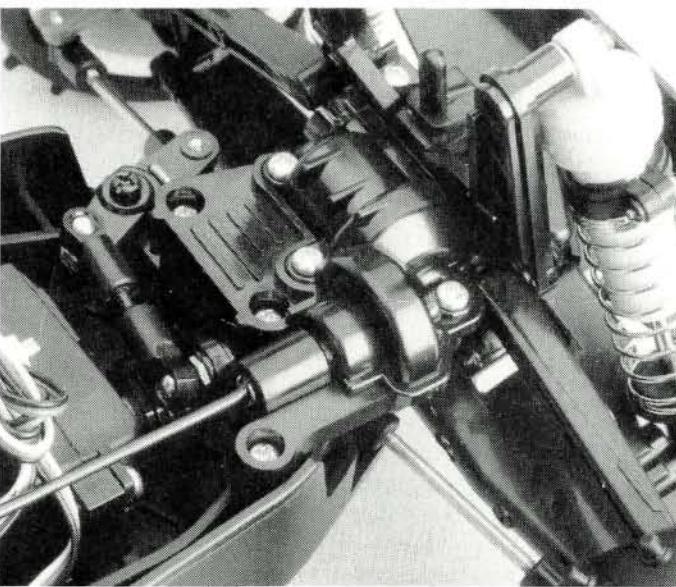
in the front. This makes handling jumps easier, which is uncharacteristic of most 4WD cars. The 540 motor performed as expected—flawlessly—but with the 21-tooth pinion, top-end speed was fine, although the Manta Ray had a hard time pulling out of the turns with any authority. A smaller pinion gear

would help the car accelerate out of turns, but for those who'd like to see a drastic improvement in performance, a motor change may be in order.

The Manta Ray is easy to assemble, and the instructions are well-written. This rugged vehicle is perfect for the entry-level modeller. Once again, Tamiya has proven that it's the beginner's best friend.



Tamiya's yellow, oil-filled shocks provide consistent damping on all four corners. Extra-long dogbones deliver power to the front wheels.



Like many other 4WD Tamiya cars, the Manta Ray is shaft-driven. A nicely designed rack-type steering system virtually eliminates bump steer.

*Here's the address of the company featured in this article:
MRC/Tamiya,
200 Carter Dr.,
Edison, NJ
08818.
■

KYOSHO PENSKE

(Continued from page 36)

silicone lube in the rear shocks improved the ride, but because the shocks have no seals, the lube must be replenished regularly.

The car's soft suspension also affects its turning ability. Under power, the PC-

19 has a tendency to push. The lack of steering under power, however, reduces steering sensitivity, and this makes the car more controllable (good for the inexperienced drivers). When you want the car to turn more tightly, simply let go of the throttle and the weight will be transferred to the front end.

This car's chassis is very close to the ground, and that makes it tough to clear small rocks and other debris. Take a broom along with you if you plan to run this car in an area that hasn't been well-maintained.

PC=PRETTY COOL!

After running through a few packs, I analyzed the chassis further to see if there was anything I could do to improve the car's performance. I couldn't change the shocks, as they aren't adjustable. I did, however, find a way to get a substantial jump in speed. The pinion gear included in the kit rides on a reduction/counter gear. In its stock configuration, the pinion rides on the larger part of the two-step gear, and the smaller part drives the transmission. This results in a gear reduction and reduced speed overall. If you take the pinion gear off and turn it around, it rides on the same part of the counter gear as the transmission does. This produces the same effect as the installation of a larger pinion, at no extra cost. The down side to this is that it reduces run time by about 1 minute.

Overall, the PC-19 was a blast. As an

(Continued on page 116)

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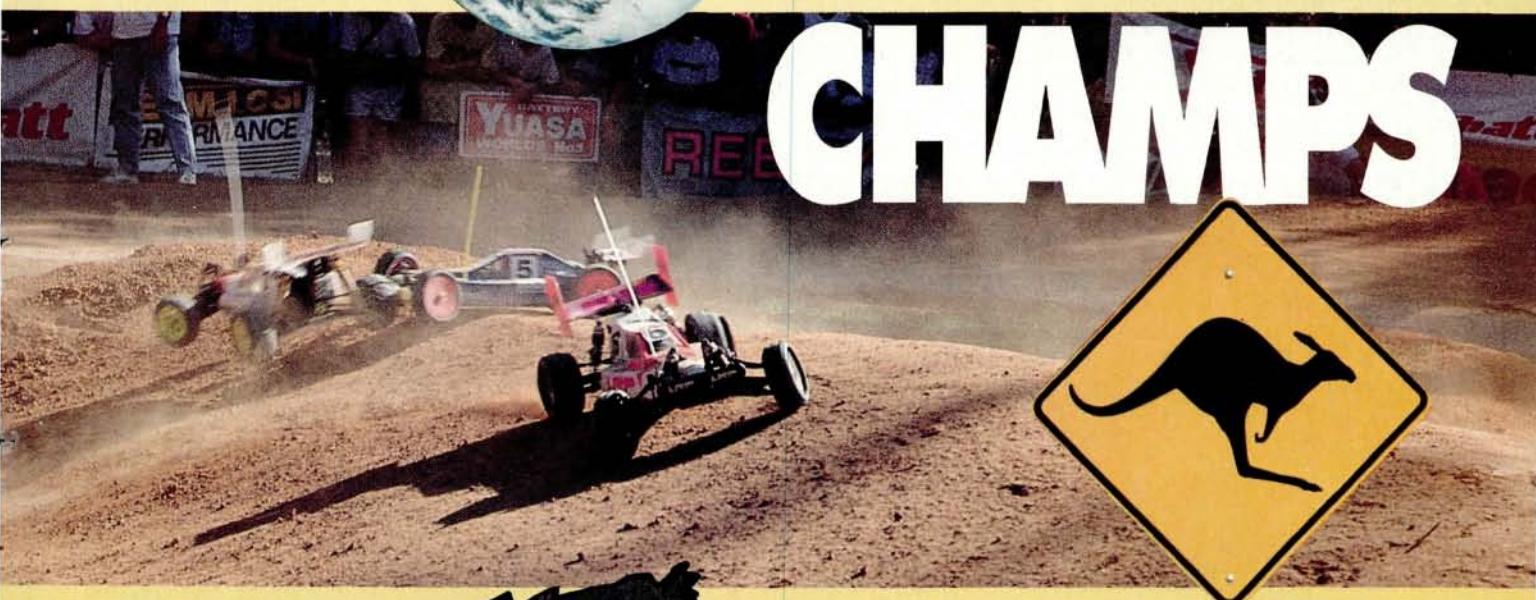
MASAMI SWEPT UP IN '89... WILL HE REPEAT IN '91?

by JOHN HUBER

If you've ever wanted to attend the IFMAR Off-Road World Championships, but knew that spending thousands of dollars to travel to some far-away place like Australia or England just to watch a race was out of the question, then hold on to your

IFMAR

WORLD CHAMPS



hat: the Worlds is coming to the United States—Detroit, MI, specifically—this year! Held biennially, and boasting the attendance of 140 drivers from 20 countries, the IFMAR Worlds is the premier R/C racing event. The last time the Worlds was held in this country, it was the event's premiere in 1985 at the Ranch Pit Shop in Del Mar, CA. At this rate, the next time the U.S. hosts the Worlds (after '91) it could be 1997!

**NEXT
120 km**

'91 Showdown in Motown

WORLDS

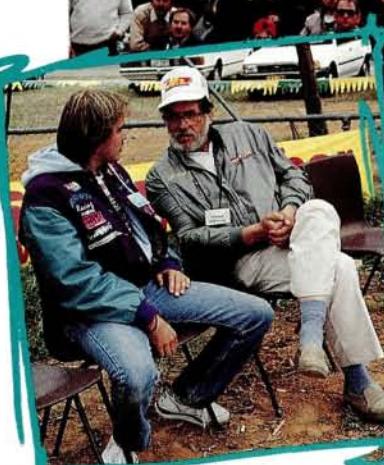


Photo left: Associated's 2WD 2nd-place finisher, Jay Halsey, will race for Team Losi in future. I wonder what was said back in '89?

THE TRACK

The 170x70-foot track has a clay base covered with 4 inches of sand for drainage; the racing surface is 8 inches of sifted and processed topsoil. Grass grows around the track, which is fully equipped with electrical lines and water. The width of the lanes varies between 8 and 14 feet, and the track's elevation changes as much as 7 feet—a very enjoyable drive. To give the drivers an unobstructed view, the 32x8-foot drivers' stand is 10 feet away from and 8 feet above the track. Covered pit space will be located trackside. To make it easier for the racers to get their radios, the radio-impound area will be in the pit area. Tables and AC will, of course, be provided.

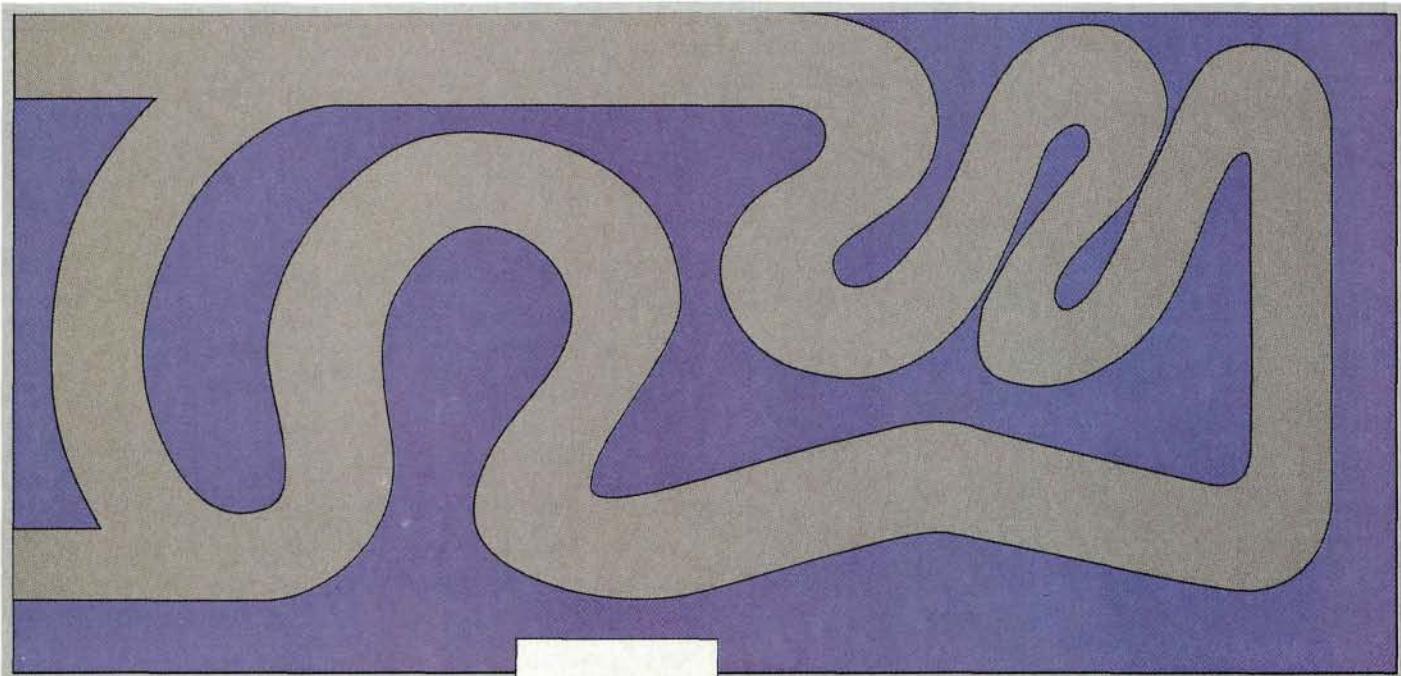
So what is there to look forward to this year? Well, if the '91 Worlds is anything like the last one, there should be a lot.

This is the place for factory teams to bring out all the prototype cars and parts to see how they'll hold up in world-class competition. The last Worlds was full of

(Continued on page 111)



'91 W O R L D C H A M P S T R A C K L A Y O U T



KYOSHO'S NEW CONTENDER— TRIUMPH!

by FRANK MASI

If there's one task in the world that could drive any R/C car manufacturer bonkers, it would be designing a 2WD off-road race car that could loosen the stranglehold that Team Associated and Team Losi have put on this class. Kyosho has done an admirable job, even winning the 2WD class at the 1987 World Championships with Joel Johnson at the helm of one of its new Ultimas. Every time it releases a new car, Kyosho seems to set the industry on its ear, as it did with its Lazer ZX. With the 1991 Worlds fast approaching, Kyosho has unveiled its all-new factory-works 2WD car, the Triumph.

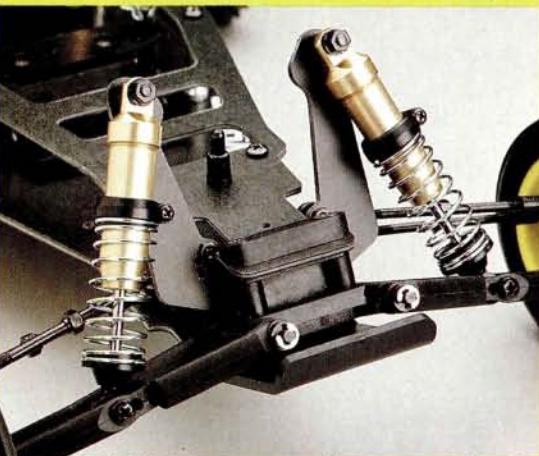
The Triumph is a completely new design—no Ultima parts here! One of the

sion uses twin 4mm belts instead of the gears found in the Ultima. Attached to one end of these belts is a slipper clutch that's similar to the A&L Power-clutch, except that the unit must be disassembled to remove the spur gear. This may be changed so that slipper settings can be retained when the spur is taken off.

The pleasant surprise here is that Kyosho has included a standard 48-pitch, 100-tooth spur gear, not a metric 48-pitch!

Though

STOP THE PRESSES!



The front bulkhead was narrowed to accommodate the extra-long A-arms. Rake is adjustable between 20 and 30 degrees. The new front shocks are 3 1/2 inches long.

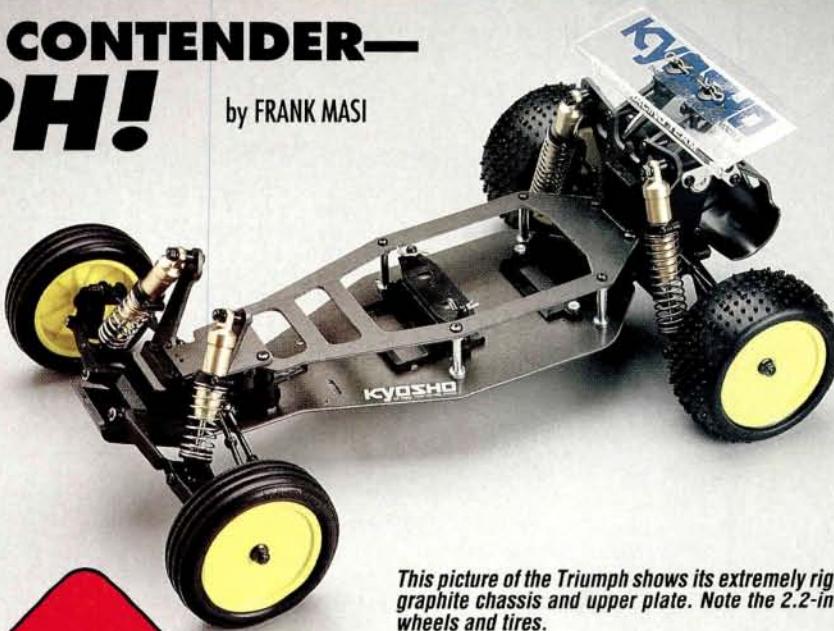
Ultima's problems was its transmission, and—boy!—has Kyosho taken care of it. With an output ratio of 2.21:1 (to compare: Associated's Stealth is 2.25:1 and Losi's LRM is 2.18:1), the Triumph's transmis-

most parts of the standard Kyosho ball diff remain unchanged, engineers felt the ball pressure plates could be improved. The plates now incorporate separate, hardened drive rings. All Kyosho

ball diffs may soon receive this treatment. The transmission sits so low in the car that the diff pulley is actually partially below the chassis plate.

Want to talk about easy maintenance? The entire tranny can be removed by taking out just five screws! The Triumph has an extremely rigid double-plate chassis. Just to show that Kyosho is aiming for the gold with this baby, *all* the major chassis parts—including shock towers—are made of graphite.

Perhaps the most significant difference between the Triumph and previous Kyosho cars is its front-end design. Its features



This picture of the Triumph shows its extremely rigid graphite chassis and upper plate. Note the 2.2-inch wheels and tires.

include: 20- to 30-degree adjustable rake; new 3.5-inch front shocks with machined pistons that will be available separately (to upgrade Kyosho's Gold shocks); a super-narrow front bulkhead with extra-long front A-arms; and in-line steering blocks. On the rear-

nitely adjustable. Rounding out the Triumph's list of features are: a set of four 2.2-inch rims and tires (this car is designed for IFMAR competition); a bellcrank steering system similar to that found on the Lazer; and a quick-release battery-hold-down system.

With the Triumph, Kyosho has proven that



The Triumph has a completely new transmission that uses a belt drive and a slipper clutch. A growing number of Japanese racers use standard 48-pitch spur gears (instead of metric 48-pitch), so Kyosho included one with the Triumph.

end of the Triumph, there's a unique toe-in adjustment that's similar to the one used on the Ultima Pro XL. By attaching the rear hub carriers to the A-arms with tie-rod ends, toe-in/out becomes infi-

nitely adjustable. If the U.S. production version is anything like the prototype shown here, Team Associated and Team Losi's lives just got harder!

WORLD CHAMPS

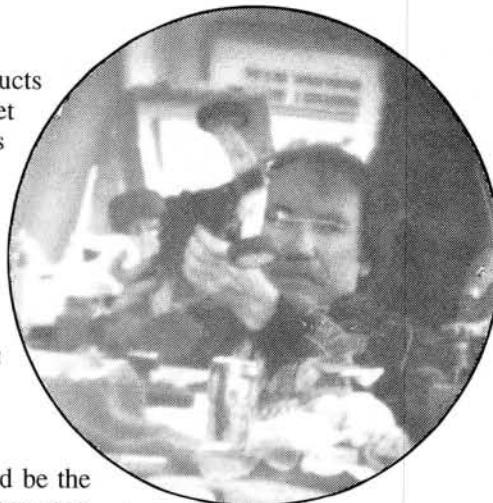
(Continued from page 108)

new and controversial products like Associated's top-secret "Stealth" car and Yokomo's coveted 2.2-inch tires and rims. So much secrecy shrouded the Stealth that no one was permitted to photograph it without its body. Even two years later, no one outside Associated has ever had a close look at it.

2WD

The 2WD Open Class should be the fiercest competition yet, at any race, anywhere. At the 1989 Worlds in Australia, Eustace Moore said, "If one of these guys thought he could win by slitting his opponent's throat, he would!" I'm sure the competition will be just as tough this year; after all, everyone wants to be the world champion. Each of the major manufacturers has been working its research and development teams overtime in an attempt to put its car on top.

The Losi JR-X2 has gone through some changes over the past two years



Two years after the '89 Worlds, Associated's "Stealth" car is still under wraps. Expect to see more of it this year.

what worked to the Stealth's benefit there may not work here.

4WD

At the 1987 Worlds, in Romsey, England, Kyosho placed five of its then-prototype Optima Mids in the 4WD A-Main; Yokomo placed only one car. In

At the 1989 Worlds in Australia, Eustace Moore said, "If one of these guys thought he could win by slitting his opponent's throat, he would!"

and could be a serious contender in the 2WD Class. Jay Halsey, who finished 2nd in 1989 (driving for Team Associated) will be driving for Team Losi this year. Rumor has it that Losi may have a prototype 4WD car at this contest—keep your eyes open!

After losing the '89 2WD title to Associated, Kyosho is coming on strong with its new car, the Triumph. For the past two years, Kyosho has been designing this threat and, until now, it has been top secret. It has some impressive, innovative designs (see sidebar).

Team Associated will be tough to beat, as always, especially with current 2WD and 4WD World Champion Masami Hirosaka driving for them. It isn't known whether they'll bring the Stealth or the standard Team car. The track conditions in Detroit will be different from those in Australia, and

1989, things changed: there were five Yokomos and one Kyosho. The track conditions strongly affected these performances, so it will be interesting to see what happens this year.

Schumacher, with its Pro Cats and Cougars that are so well suited to high-bit surfaces, will also be tough competition in Detroit. An interesting new "face" in this year's Worlds will be Tomy. (Yes, that's right, the toy company.) It recently developed a highly sophisticated belt-drive 4WD car called the "Intruder," and it could definitely be a contender.

This event will be covered extensively by *Car Action*'s Steve Pond, yours truly and maybe more. If you enjoyed *Car Action*'s coverage of the '89 Worlds as much as I did, just wait till this issue hits the stands. Steve and I will see who can shoot the most film at a single event! ■



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TROUBLESHOOTING

by STEVE POND

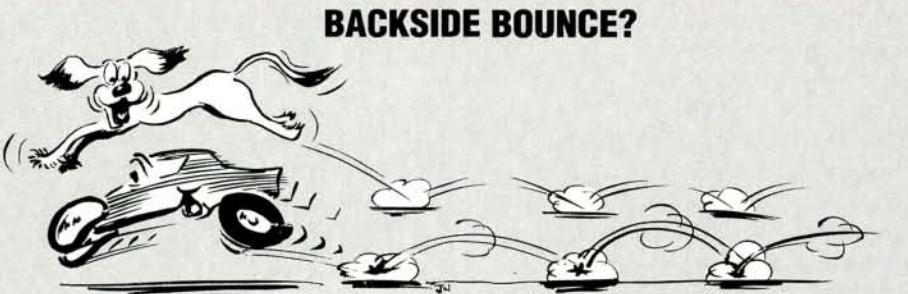
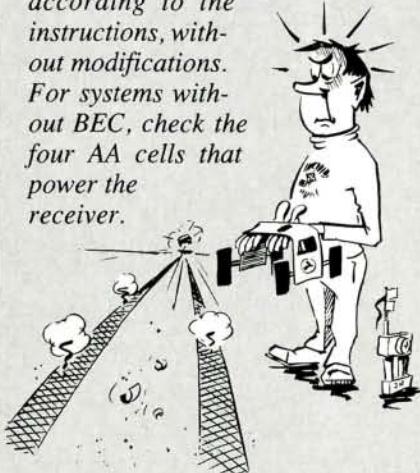
Illustrations by JIM NEWMAN

GROUND GRASSHOPPER

Recently, another car ran over my modified Grasshopper (I was able to fix it). This happened because, whenever I give my car full power and let go of the throttle, it gets stuck on full speed and goes crazy. Then, when it stops, it won't move. *I need help!!!* (I use a Team Associated RC10 stock motor and a Magnum Sport radio.)

Matthew Bourland
Fort Worth, TX

You have to adjust the mechanical wiper speed controller that's used on many Tamiya cars precisely to prevent them from running away. The Magnum Sport radio doesn't have any throttle-trim or end-point adjustments, so the servo travels as far as it can every time. To compensate for not being able to adjust the radio, you'll have to adjust the linkage. When the wiper goes too far past the full-throttle point, it's likely to bind and become stuck in the full-throttle position. To limit the wiper's travel, move the servo end of the linkage rod inward, closer to the servo. If your radio has a BEC system, be sure that it's installed according to the instructions, without modifications. For systems without BEC, check the four AA cells that power the receiver.



BACKSIDE BOUNCE?

The rear shocks (red) on my Turbo Scorpion bounce as if there's no oil in them. They worked well when they were new, but now they don't. I've checked the oil level, and it's fine. I've tried putting new oil in them, but this hasn't solved the problem. Also, the shocks are slightly scratched on the inside.

Nathan B. Colorado

The shocks on the original Cox Turbo

Scorpions shocks were well known for losing their oil, but since you insist that there's plenty of oil in them, the problem must lie elsewhere. When you use a shock for a long time, its cylinder bore and its piston become worn. This creates a larger gap through which the shock oil must pass, and the shock's damping ability deteriorates. There must be extensive wear for this to happen,

though.

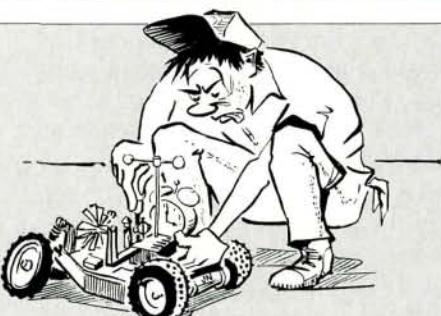
The only other possible cause is that when you replaced the shock oil, you used an oil with a lighter weight. Oil is graded by viscosity—the thicker it is, the higher the viscosity number. If the kit came with 30WT oil and you replaced it with 5WT oil, then the car will bounce all over the place. Try refilling the shocks with heavier oil; this should eliminate bouncing.

A CLOD MOD?

I've talked to many hobby dealers and racers about putting my Novak T-4 speed controller into a Clod Buster. Some say I can use this controller in a stock Clod; some say it's OK to use it in a modified Clod; and others say don't use it at all. Who's right?

Carl Bloom
Hermantown, MN

According to Novak Electronics, the T-4 should work well in the Clod Buster. Be sure to use the proper capacitors on both motors, and use the heat sinks that come with the controller. The controller's most

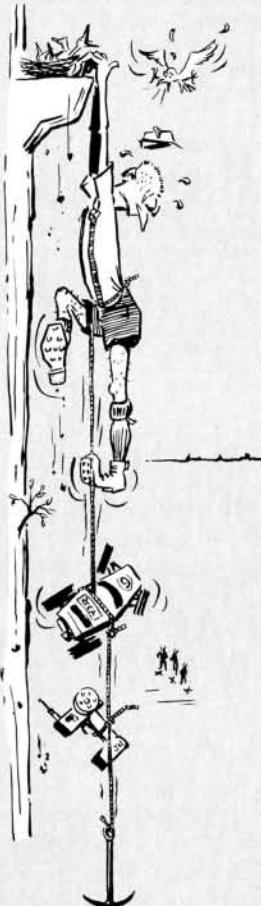


vulnerable component is its 50A brake FET. It's the same as those used in the 410 MXc and M1c units. As long your packs have ratings that are within the controller's acceptable voltage specifications, you shouldn't have any problems.

If you have a technical problem that your hobby shop or racing friends can't resolve, give us a shout at Radio Control Car Action, and we'll see if we can chase down an answer for you. Questions should be of a technical nature and should be addressed to Troubleshooting, c/o Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897.

REACHING THE PEAK

I have a problem with the batteries that I use in my Clod Buster. I climb hills at a local quarry just for fun. I've connected a Sassy Chassis, a Tekin 700 speed controller and Trinity Matched Madness motors using 13-gauge wire and Sermos Power Pole connectors. I have two Trinity matched 1700 SCE packs that I assembled with Dan's Gold Bars, and three other packs that consist of bulk, unmatched cells. The matched packs are "false-peaking." One of them is only 8 seconds behind my number-one pack when I discharge it with a 12-bulb discharger, so I don't think the problem is caused by a dead cell. I use a Tekin BC210 Reflex charger and Cobra Super Battery Bugs. I let my packs trickle-charge for half an hour, and then I fast-charge them. To prevent voltage spikes, I use a 12V deep-cycle marine battery as a power source. I "Super Bugged" the problem pack down to .5 volt by reversing the Bug for a week. Then I trickle-charged it for 16 hours at 1700mAh. I peak-charged the pack according to Tekin's instructions, and it didn't false-peak. Then I dumped the pack with a 12-bulb discharger that I built from an article in *Car Action*. I brought it down to 6 volts and let it sit for a week on a Super Bug at 1.5 volts. When I recharged it, however, it false-peaked again! I have to hit the 4-minute timer six or seven times and monitor the pack with a digital voltmeter to charge it. It's very frustrating. There isn't an R/C hobby shop



within a 200-mile radius, so you're my only link with the R/C world. I hope you can help.

Jim Huntley
Cranbrook, BC,
Canada

Without question there's a bad cell in your pack. Although its discharge time is only 8 seconds less than your other packs, a partially deteriorated cell will "vent" slightly and cause the false-peaking you've described. You'll be able to use the pack for a while, but every time you charge it, the safety vent in the bad cell will release a little gas. This causes a momentary voltage drop that the peak charger interprets as a peaked pack.

When you trickle-charged the pack, you alleviated the false-peaking problem. With 16

hours of trickle at the rate you mentioned, the pack was probably completely charged, so when you attached it to the fast charger, you just topped it off. Find the bad cell by checking each cell with a digital voltmeter. The bad cell will have substantially lower voltage than the rest. Simply replace it, and the pack should work well.

As for your charging technique, I think you're overdoing it. Abandon the complicated trickle, quick-charge, dump, cycle method. Just charge your packs, run them until they're out of juice, let them sit for a day or two (SCEs only), and then use them again. You should only use the bulb discharger when you can't use a pack's entire charge. Every now and then, you can use a simple 5-ohm or 10-ohm resistor to completely erase any residual charge.

COMING NEXT MONTH!

THUNDER DROME



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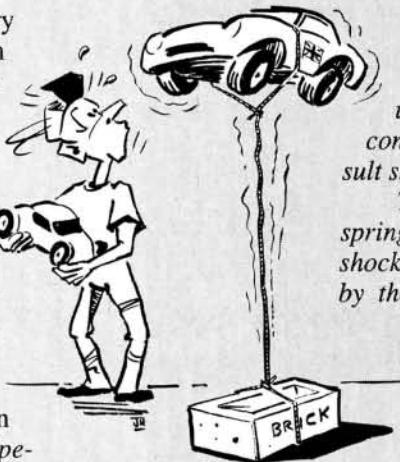
TROUBLESHOOTING

BRITISH LIGHTWEIGHT

Recently, I decided to try on-road racing (I've been racing a monster truck at a local track, but I've always enjoyed watching the lightning-fast on-road cars), and I bought a well-designed, lightweight car—a PB Racing (it's an English company) Sizzler. How tight should the ball diff be? I read the article on this in your *Stock Car Special*, but I prefer the roadcourse scene to the Superspeedway. Do the same diff-setup rules apply to road-racing and stock cars? Also, how tight should the spring tension on the rear shock be?

*Micheal Lopez
New York, NY*

Regardless of the application, you should tighten the diff until there's little or no slip under full acceleration when starting from a dead stop. The correct



tension will vary according to the type of motor you use and the track conditions, but the result should be the same.

The amount of spring tension on the rear shock is also determined by the track conditions.

When you're sure that you're using the correct oil/spring combination, you can increase or decrease the spring's tension to fine-tune the suspension. If you increase the tension, you'll improve the steering response, but you'll have to sacrifice a little rear traction. Reducing the tension produces the opposite effect. This adjustment also depends on what kind of tires you use, the chassis tweak, the weight distribution, etc. After you've sorted out these variables, adjusting the spring will be a piece of cake.

STICKY SITUATION

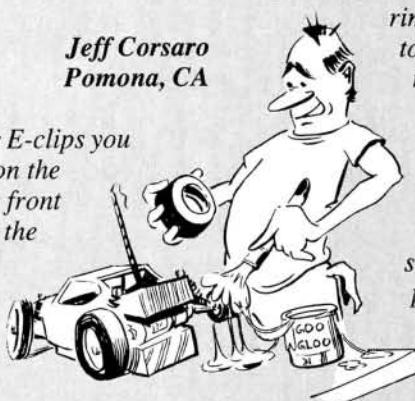
My RC10's E-clips pop off the front pivot pins. Ever since I installed Andy's front A-arms, the pins have worked their way out. The people at my hobby shop told me to use titanium pins, but they haven't made a difference. Also, I use Pro-Line 2-inch rear tires on my car, and they fall off the wheels when I drive in dirt. I've tried different tires (e.g., Pro-Line, Team Losi, Duratrax). The people at my hobby shop suggested that I glue the tires onto the wheels, but I don't want to replace the wheels when the tires wear out.

*Jeff Corsaro
Pomona, CA*

I'll assume that the E-clips you refer to are those on the rear of the inner front pivot pin. (They're the closest to the ground and the most likely to be knocked loose.) When you use

Andy's A-arms, the beveled edge on the arm where the clip is attached to the pin increases the chances of losing these clips. The E-clips' edges are exposed, so it's more likely that they'll be caught on something and come loose. To prevent this, put shims (e.g., washers) on the pivot pin before you install the E-clip. This will keep the E-clip on the rear of the pin and snug against the arm, so it's less likely to be caught on something.

If you use one-piece rims, the only solution is to glue the tires to the rims. When the tires wear out, loosen them by boiling them for a few hours; then it should be easy to remove them. Also, Associated offers three-piece wheels that lock the tires to the rims without the use of glue.



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KYOSHO PENSKE

(Continued from page 102)

Indy car enthusiast, I was extremely happy with the sleek body's scale details. No, it's not a race car, but the PC-19 does offer better-than-average performance for its class, and its looks are second-to-none!

*Here are the addresses of the companies mentioned in this article:

Kyosho, distributed by Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820.
Pactra Inc., 620 Buckbee St., Rockford, IL 61104.

MOTOR DRESSER

(Continued from page 57)

tions for the Motor Dresser are very specific on this point: running a motor that draws in excess of 4 amps for extended periods can damage the Shinwa as well as the motor.

• The timing-point meter has four scales: one for stock, or 8-minute motors; one for high-speed, or 6-minute motors; another for high torque, or 4-minute motors; and one for modifieds. All four scales may be set by means of the timing-adjustment knob located below the meter itself.

If the tachometer and the ammeter are the highlights of the Motor Dresser, then the timing-point meter is the disappointment. Like the one in the previous Shinwa, its value remains a mystery to me. Theoretically, this feature is supposed to find a motor's optimum timing point (or zero degrees) and let you advance from this setting. The best use I could make of it was to use it to give a starting point from which to advance or retard timing—by rotating the end bell—when I was running a motor in the Motor Dresser.

Because of the perplexing nature of the timing-point meter, I decided to conduct a mini-survey of Shinwa owners in my area, and of the dozen or so I spoke with, not one had been able to figure out exactly what it was supposed to do! I'm not alone!

The break-in timer belongs exclusively to the new Motor Dresser FET. Consisting of an illuminated on/off switch and adjustment pot (which can be set anywhere between 30 minutes to an hour), the timer will automatically cut off the power to the test motor. Unfortunately, if you plan to run your motors for 30 to 60 minutes to break them in, then

(Continued on page 124)



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MOTOR DRESSER

(Continued from page 116)

plan to have your commutator cut afterwards, as most motor manufacturers recommend short break-in periods—around 5 minutes (with a shot of motor spray every minute or so while it's running) at 3 or 4 volts. The purpose of this is to allow the removal of surface irregularities on the brush, between it and the commutator. Actual break-in occurs when the motor is run in the car under load after just a few minutes. Running without load won't accomplish this.

GETTIN' CHARGED!

Just to show you that the Shinwa engineers are always thinking of ways to improve their products, the Motor Dresser can actually be used as a battery charger and discharger.

To charge batteries on the Shinwa, you must first replace the battery you were using to test your motors with a 12V power source (a car battery or a regulated power supply). Next, in place of the motor, hook-up the battery you want to charge; set the FET motor speed control so that the built-in ammeter reads 1.5, and charge away. (Remember to use the

break-in timer or an auxiliary timer.)

Finally, to discharge a battery with the Motor Dresser, hook your pack up as if you were going to test a motor, but instead of a motor, connect a 0.1-ohm 10W resistor. While the battery is discharging, use a voltmeter to monitor the voltage to prevent cell reversal.

So there you have it. I found some of the new Shinwa Motor Dresser FET's features quite useful, but others fell short of my expectations. The bottom line is that only you can decide whether its benefits are worth the investment.

*Here's the address of the company featured in this article:

Shinwa; distributed by Pacific Trading Co., P.O. Box 3593, Mission Viejo, CA 92690. ■

PRIMADONNA CLOD

(Continued from page 67)

AIR TIME

A pneumatic system depends on air pressure to function. Steve could have simply mounted an air-storage tank on the truck,

(Continued on page 134)

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WHILE MOST OF the nation was still digging out from under the winter snow and dealing with the cold, R/C off-road racing was alive and hot in the sunny Southwest. The scene was Tempe, AZ (a suburb of Phoenix); the event was the Pro-Line/Car Action 5th Annual Cactus Classic Off-Road Race, which was held on March 15 to 17.

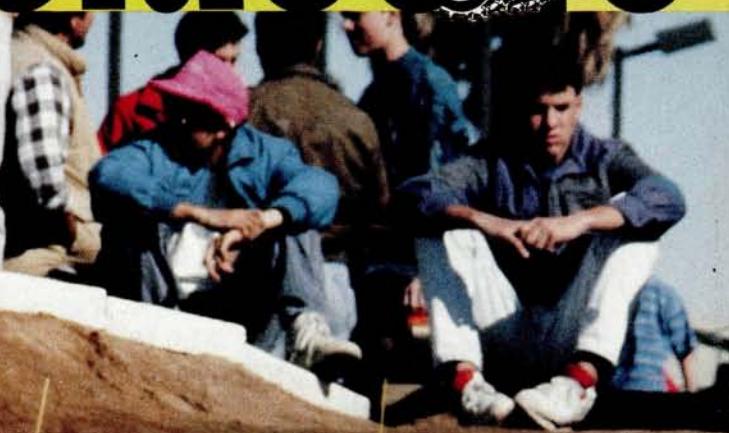
Pro-line AND car action

by MIKE LEE

cactus

classic

desert duel!





Cactus Classic

Hosted by the Scale Racing Sports (SRS) Raceway, this race is one of the hottest off-road events in the Southwest. It not only draws crowds of drivers from Arizona, but it also attracts the heavyweights from California, Texas, New Mexico and Nevada.

THE TRACK

The SRS Raceway track is truly unusual. (The only other track of this type that I've seen is at Hobby Haven in Livermore, CA, which was the site of the 1990 ROAR National Championship Race.) In addition to the rough-and-tumble jumps and the twisting turns of a regular off-road track, the elevation of this course varies.

There's a huge stadium jump on the straight in front of the drivers' stand. On the back side of this jump there's a lower jump that your car can easily clear if it has sufficient speed. A mere 15 feet down the track,

there's a set of large doubles that end in a downhill slope into turn 1.

The first turn is a 150-degree, left-hand, downhill dogleg. This is immediately followed by turn 2, which is right-hand dogleg that runs uphill to turn 3. There, you hit a 180-degree hairpin, head downhill and over a light jump (hit the brakes!), and run into turn 4, which is a right-hand dogleg at ground level. Next, you head down a short straight with two jumps that are just far enough apart to cause your car's front bumper to scrape the deck. When you've cleared these, it's uphill to turn 5, which takes you onto a fast sweeper at the far end of the track to a rocket ride straight downhill. Turn 6 is right before the main straight. It's a deceiving, hairy, banked hairpin that has a little inside "hook."

Next, it's back uphill onto another long straight, in the middle of which is a mild

2WD STOCK



STOCK TRUCK



4WD STOCK



2WD MODIFIED



4WD MODIFIED



2WD MODIFIED TRUCK



Fin.	Qual.	Name	Laps	Time
1	1	Matt Francis	12	4:22.68
2	4	Robert Gillespie	11	4:04.00
3	10	Todd Bullis	11	4:05.46
4	6	Darryl Reich	11	4:05.85
5	8	Brent White	11	4:08.93
6	3	Quincy Hughes	11	4:09.42
7	5	Chris Walrod	11	4:13.43
8	9	Bill Siler	11	4:17.91
9	2	Rick Wood	11	4:20.24
10	7	Jammer	11	4:21.89

Fin.	Qual.	Name	Laps	Time
1	1	Todd Bullis	11	4:10.08
2	5	Billy Bradford	11	4:14.81
3	7	Jade Kurtchi	11	4:15.97
4	8	Ryan Hicks	11	4:16.55
5	4	Cliff Montgomery	11	4:18.24
6	3	Chuck Erickson	11	4:23.61
7	10	Dale Roberts	10	4:03.36
8	2	David Wilson	10	4:05.28
9	6	Mark Styles	10	4:06.44
10	9	Coy Berry	10	4:10.92

Fin.	Qual.	Name	Laps	Time
1	1	Bill Christiansen	12	4:13.28
2	3	Jason Christensen	12	4:14.64
3	2	Ryan Hicks	12	4:17.66
4	5	Jim Freeman	12	4:20.90
5	4	Troy Messina	11	4:02.02
6	7	Dale Bates	11	4:05.25
7	8	Tomas Gloria	11	4:08.42
8	10	Doug Handel	10	4:00.44
9	9	Giti Gowland	5	1:52.39
10	6	Mark Shaw	2	0:44.73

Fin.	Qual.	Name	Laps	Time
1	1	Brian Kinwald	12	4:04.48
2	2	Scott Anfinson	12	4:13.05
3	7	Matt Francis	12	4:15.10
4	6	Steve Chamberlain	12	4:15.56
5	3	Cliff Lett	12	4:17.14
6	5	Rick Hohwart	12	4:19.65
7	4	Rick Vehlow	12	4:22.66
8	8	Derek Furutani	12	4:23.83
9	10	J.D. Beckwith	12	4:25.60
10	9	Kris Moore	11	4:00.20

Fin.	Qual.	Name	Laps	Time
1	2	Brian Kinwald	13	4:12.61
2	4	J.D. Beckwith	13	4:15.86
3	1	Mark Francis	13	4:17.16
4	3	Rick Hohwart	13	4:18.75
5	7	Jonathan Morgan	12	4:00.83
6	6	Rick Vehlow	12	4:02.56
7	10	Lance Connolly	12	4:14.49
8	8	Kris Moore	12	4:14.92
9	5	Bill Siler	12	4:21.27
10	9	Mike Dolan	2	0:37.38

Fin.	Qual.	Name	Laps	Time
1	3	Bryan Peterson	12	4:12.66
2	1	Mark Pavidis	12	4:15.44
3	2	Cliff Lett	12	4:16.19
4	6	Cliff Montgomery	12	4:33.00
5	4	Butch Kloeber	11	4:03.12
6	5	Mark Vyne	11	4:04.32
7	9	Derek Furutani	11	4:05.46
8	8	Randy Shewey	11	4:15.04
9	7	Eustace Moore	11	4:16.95
10	10	Al Bridges	10	4:00.32

"...Team Associated was there to win."

table-top. Although this jump is broad, it doesn't go clear across the track. There's one open lane that you can take to dodge the jump, and it puts you on the wide end of the seventh turn. Turn 7 is a fairly fast 180-degree sweeper. Taking the wide line slingshots you down the last straight, which has at least three slight elevation drops. There's a small lip on the entrance of turn 8, and this causes your car to drop into a small dip. If you hit it hard, you'll slide away. Hit it with just a touch of power, however, and you'll move on to the main straight and back to the awesome jumps. This track is fun and intense.

QUALIFYING

Most of the drivers loved this track, and the challenge of the different elevations only added to the thrills. The traction was decent, and the tires of the day were mini pin-spikes with ribbed fronts.

Practice runs were held on Friday, and it was also supposed to be the first day of qualifying. This was spoiled, however, by a vicious rain storm that hit during the thick of practice. The next morning, the scene was one of despair. The storm had left up to 12 inches of water in the low areas of the track. Not to be defeated, the SRS crew labored hard to prepare the track by 10 a.m. on Saturday. It was an incredible feat, and I congratulate them. The opening qualifiers began at 10:30 a.m.

During the Monster Truck qualifying, it became apparent that Team Associated was there to win. The team's qualifying times proved that their new RC10 truck was handling the track well. Mark Pavidis, Cliff Lett and Butch Kloeber all placed their factory-works trucks into the A-Main, and Derek Furutani placed a similar vehicle in the A-Main, too. The Associated trucks'



Cactus Classic

mods included narrow, front, ribbed tires; very long A-arms; and long shocks all around. All of them were equipped with Stealth transmissions.

In the 4WD Classes, it was a classic battle between YZ-10s and Lazers. Although there were a few other cars in the group, these were the dominant cars. In the 2WD Classes, the clear-cut leaders were the RC10s with Stealth trannies. The tires of choice seemed to be mini pin-spikes on the driving wheels and ribbed tires up front. (In 4WD, mini pin-spikes were used on all four corners.)

There was an incredible number of participants: 295 cars were entered in the race, and over 150 more had to be turned away! How would you like to see *that* many entries at your track? Obvi-

ously, the guys at the SRS Raceway know how to run a race. Unfortunately, because of the rain on Friday, there was time for only three rounds of qualifying before the Mains. But the drivers were ready for the fight.

In the 2WD Stock Class, Matt Francis held the TQ position with Rick Wood only 2 seconds behind, and Quincy Hughes just a second behind him. The 2WD Modified Class saw Brian Kinwald in the lead by 3 seconds over local driver Scott Anfinson. He was followed by Lett, who was only .31 second behind.

Bill Christiansen held the TQ by a full lap over Ryan Hicks and Jason Christensen in the 4WD Stock Class. The 4WD Modified group was led by Mark Francis, followed by Kinwald and Rick Hohwart. They were separated by less than 3 seconds. The Truck Class for stockers had Todd Bullis leading David Wilson by only $\frac{1}{4}$ second, while Chuck Erickson was 2 seconds down in the 3rd spot. In the Modified Truck Class, Pavidis put a works Associated truck up front, while teammate Lett finished in 2nd. Privateer Bryan Peterson was less than $\frac{1}{10}$ second behind him.

The final qualifier was held on Sunday morning. Then, the track was groomed and marked with chalk to prepare it for the Mains, which started at 2 p.m. The weather was perfect, with sunny skies and "T-shirt" temperatures.

THE MAIN EVENTS 2WD STOCK

At the start of this race, Matt Francis took the holeshot with Chris Walrod in tow, making Francis sweat. Robert Gillespie was within striking range while the

leaders battled, and he actually captured 2nd when they hit a corner and stalled. At the halfway mark, Walrod stole the lead for a while, but he lost it later when he bungled a jump. This allowed Bullis to jump into

3rd with Darryl Reich hot on his trail. Matt Francis took the win with Gillespie in 2nd and Bullis in 3rd.

By the way, all of the Stock Class drivers were "tech checked" using Com-

(Continued on page 146)

license and registration, please!



In stock-class racing, everyone uses motors of equal power; the challenge is in the head-to-head driving. Some people, however, would rather cheat using a modified armature than pit their driving skills against those of someone else—bad scene!

Competition Electronics' StockCop (used at the Cactus Classic) will soon end the cheating. It electronically checks the voltage that passes through a running motor, and displays the value on a digital voltmeter. The amount of power that passes through a motor depends on the motor's windings and wires. The StockCop can check that the motors are the same. The result? The stock cars at the Cactus Classic had the same amount of power. The only difference that I noticed was in the drivers' skills, and that's the name of the game!

For more information about the StockCop, look for a complete test in an upcoming issue of *Car Action*.

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PRIMADONNA CLOD

(Continued from page 124)

but that would have needed frequent pumping. Instead, he dismantled a 12V roadside air pump and mounted it on the front. The pump is powered by a standard 540 motor and is capable of pumping over 120psi! A 12V battery jack is mounted to the side of the chassis, and the compressor fills the air tank in approximately 30 seconds.

I thank Steve Levine for letting us get a good look at the Primadonna Clod. It's not every day we see a vehicle like this one. I hope this "Brain" infection doesn't

affect too many more of you, but I think it's contagious!

*Here are the addresses of the companies mentioned in this article:

Tamiya, 200 Carter Dr., Edison, NJ 08817.
ESP Mfg., 20 Crystal Lake Plaza, Crystal Lake, IL 60014.
APM Custom Hobby Inc., P.O. Box 357, Dumont, NJ 07628.
Custom Chrome, 36175 Plymouth Rd., Livonia, MI 48150.
Parma International Inc., 13927 Progress Pky., North Royalton, OH 44133.
AstroFlight Inc., 13311 Beach Ave., Marina Del Ray, CA 90292.
Litespeed, P.O. Box 4765, Spokane, WA 99202.
Stormer Racing, P.O. Box 126, 23 High Speed Rd., Glasgow, MT 59230.
Sermos R/C Snap Connectors, Cedar Corner Stn.,

P.O. Box 16787, Stamford, CT 06905.
Chrome-Tech USA, 2914 Rockwood Dr., Madison, WI 53713.

Futaba Corp. of America, 4 Studebaker, Irvine, CA 92718.

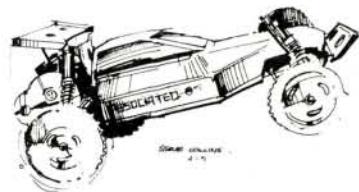
Max Customs, 88 Kraemer St., Hicksville, NY 11801.

Kyosho; distributed by Great Planes Model Distributors, P.O. Box 4021 Champaign, IL 61824.

Sees Precision Machine Works, 1414 W 134th St., Unit 2, Gardena, CA 90249.

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by
GERRY
YARRISH

D
D

BOATS WITH large, gas-guzzling, 2-stroke engines are now very popular, and during the last few years, the variety from which to choose has continued to grow. Called "weedeaters," these large boats are easy to start and have excellent gas mileage (at least 30 minutes run time on a full tank), and their size and power are more

than enough for blasting through the waves.

Their only drawback—until now—has been price. Most weedeater boats cost more than \$800, and some have price tags nearer to \$1,500; a special few approach \$3,000! But bear in mind that these well-engineered boats have been thoroughly tested, and their top-

quality gelcoat-and-fiberglass hulls are often painted at the factory—good value! You only have to open the shipping crate, pour in the gas, flip on the radio and go.

Distributed by Hobby Dynamics*, the Hustler isn't in the same league as the high-price monsters. It was designed for more average budgets, but it's still a monster boat; there's just a little assembling left for you to do before it can hit the water. At half the price of the other weedeaters, it's a good deal.

HOBBY DYNAMICS *Hustler*



Small
Craft
Warning



PHOTOS BY YAMIL SUED

HUSTLER

Type	Weedeater (modified deep-vee)
Length	48 inches
Beam	13 inches
Weight	12 pounds
Hull Material	Molded plastic
Power Supplied	McCulloch 22cc, 2-stroke, air-cooled engine (installed)
Radio Channels Required	2 (throttle and rudder)
Suggested Retail Price	\$499.95

Features: The Hustler comes with the McCulloch engine installed and all the running hardware you need. An easy-to-assemble, wooden boat stand is also supplied. The white, vacu-formed hull is just about indestructible. The radio box is a freezer-food-type plastic container.

Comments: At half the price of other weedeaters, the Hustler is well-balanced and powerful in straightaways, but its performance in turns could be improved by adding a turn fin. Because the hull is vacu-formed over a positive, male, mold, the strakes have rounded edges. This makes the Hustler feel "skiddy" in turns. The model doesn't spin out, and sport-weedeater fans will like its power and ease of operation.

THE KIT

The kit contains a white, plastic, modified deep-vee hull with a McCulloch 22cc engine already installed, a plastic radio box, a bag of running hardware and a wooden boat stand. I assembled the boat in about 3 hours. The hardware went together exactly as described in the instructions, and the parts fit easily.

Any problems?—yes; one. In my pre-production review model, the engine wasn't mounted at the correct angle. It was mounted so that the output shaft and the stuffing box weren't perfectly aligned. The difference between them was only about $\frac{3}{16}$ inch, but this was too much to expect the flexible drive cable to compensate for. It took me about 20 minutes to remove the rear motor-mount bolts, reposition the engine, drill new mounting holes and reinstall the bolts. I called Hobby Dynamics, and they confirmed that there were alignment problems with the first few models produced, but also said this is no longer the case. On the new Hustlers, the flex shafts and engines are supposed to be aligned at the factory.

ASSEMBLY

Before you do anything else, you must spend 30 seconds on assem-

bling the wooden boat stand, which holds the hull securely while you work on it and attach the other assemblies.

Next, assemble the strut-drive components—just a shaft, a pin and a locking collar. Slide the strut drive into the strut blade, and then attach the assembly to the driveable ferrule. Slide the prop onto the strut-drive assembly, key the prop to the drive pin, and hold the prop in place on the shaft with another locking collar. To ensure everything stays put, apply thread-locking compound to all the set-screws.

Attach this assembly and the rudder to the strut bracket, which you then attach to the hull with four 8-32 bolts. (The holes have already been drilled for you, so there's no problem deciding where the bolts go.) Secure the bolts with blind nuts that come in the hardware package. What wasn't included?—only the thread-locking compound.

RADIO BOX

The plastic radio box (it looks like a typical Tupperware®-type freezer box) is sealed tightly with a lid, so your electrical stuff will stay dry when the box doesn't. The box fits perfectly between the factory-installed, plywood, motor-mounting rails in the far-aft section of the



The deck is open, so engine cooling isn't a problem. Everything is readily accessible.

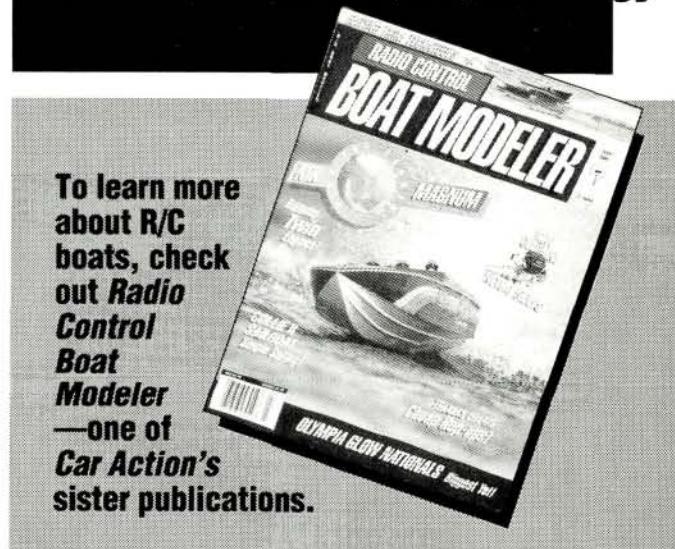
McCULLOCH WEEDEATER ENGINE

Displacement	21.2cc
BHP	.85hp at 8500rpm
Spark plug	Champion RDJ8J
Gas/oil ratio	40:1
Ignition	electronic
Carburetor	diaphragm primer type
Fuel-tank capacity	14.6 fluid ounces
Run time	approx. 40 minutes on a full tank

Features:

- Chromed-bore cylinder
- Machined piston with cast-iron ring
- Forged-steel connecting rod
- Die-cast aluminum fan housing
- Automatic, centrifugal, ball-bearing-mounted clutch
- Capacitor-discharge, solid-state ignition
- Recoil pull-start with plastic housing
- Manual choke
- Standard expansion muffler with plastic guard

To learn more about R/C boats, check out *Radio Control Boat Modeler*—one of Car Action's sister publications.



Hustler

hull. When you've drilled the holes for the throttle and rudder pushrods, slide the box into place behind the fuel tank and hold it there with rubber bands, which also ensure that the lid stays put.

Screw the servos onto the two wooden servo-mounting rails, and slip the entire assembly into the radio box. Glue doesn't adhere well to this type of plastic, so the two servo rails are secured with self-tapping screws. (These go through the box and into the ends of the rails.)

Use double-sided tape to hold the radio gear on the sides of the radio box, and then install the on/off switch through the lid (use the supplied Du-Bro Kwik-Switch mount). So far, this radio box has kept my radio safe and dry, and there's no sign of "freezer burn" on my servos!

THE ENGINE

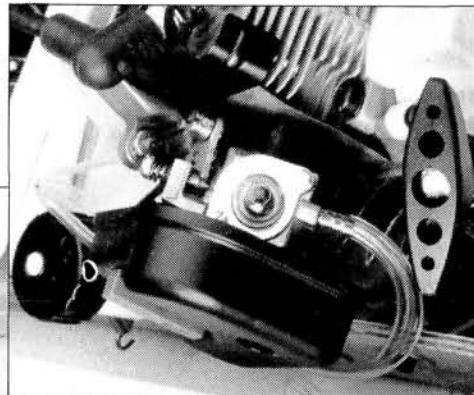
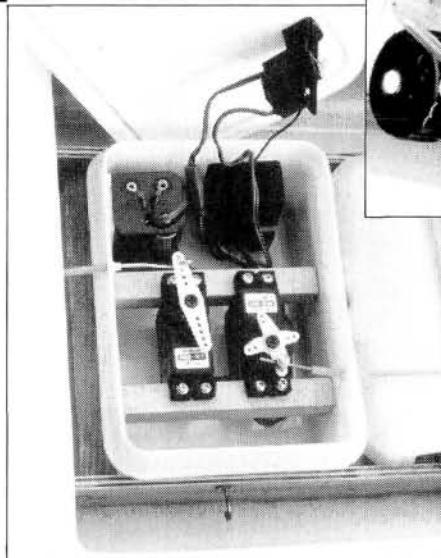
To complete the installation of the McCulloch 22cc, 2-stroke, gas engine, you only have to connect the gas lines and the throttle cable—a straightforward procedure that takes only seconds to complete. The fuel tank fits right behind the engine and is held in place with rubber bands.

I installed the tank before installing the throttle cable because I didn't want the cable to get in the way while I was trying to position the tank between the plywood mounting rails. With the tank and cable installed, you only have to hook the throttle cable to the servo with the hardware that's supplied for the job. Make sure that the radio box's lid doesn't bind the servo or the cable when it's attached to the box.

NO-HASSLE HUSTLER

When all the parts are in the hull, route the throttle and rudder cables to the radio box, mark their positions, and drill the box to accept the outer guide tubes. There's already a hole in the transom for the rudder control, but it's bigger than it has to be. I didn't seal the space around the outer guide tube because I wanted a route through which the

A close-up of the manual primer bulb. Two or three squeezes draw fuel into the carburetor for easy engine starting.



The radio box à la Tupperware®! The wooden servo rails are secured with wood screws at each end.

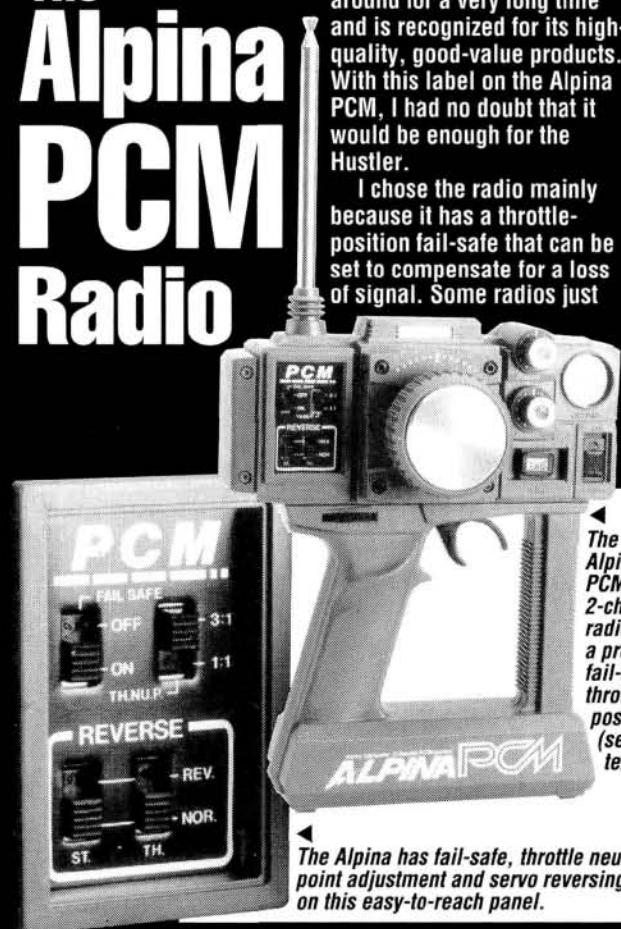
bilge water that accumulates during runs could be poured out. It isn't logical to seal this 1/8-inch space when the deck is open to water.

Before you're ready for action, you have to dress up the

Hustler with the supplied Mylar decals. They come in a large sheet, but it takes only a few minutes to trim them to size and press them into place. Be sure to clean the hull before you apply the decals so that you

(Continued on page 174)

The Alpina PCM Radio



The Alpina has fail-safe, throttle neutral-point adjustment and servo reversing, all on this easy-to-reach panel.

JR Propo* needs no introduction; it has been around for a very long time and is recognized for its high-quality, good-value products. With this label on the Alpina PCM, I had no doubt that it would be enough for the Hustler.

I chose the radio mainly because it has a throttle-position fail-safe that can be set to compensate for a loss of signal. Some radios just

"freeze" when the signal is lost, and if they're set at straight rudder and full throttle, you don't have a good situation.

You can program the Alpina in two ways to preset your throttle position to cope with loss of signal. I chose to have the throttle fully retarded in the event that the signal is lost. By pulling the trigger and switching on the fail-safe, you can set it to position the throttle anywhere you want. When the receiver is switched on, the data is stored and you're ready to go.

The throttle-neutral point can also be adjusted with a switch and can be set for a "centered 1:1 range" (50-percent forward, 50-percent reverse servo travel), or a "centered 3:1 range" (66-percent forward, 33-percent reverse travel). For the Hustler, I had to use the 3:1 range because I didn't need reverse, and the 66-percent forward servo travel gave full throttle response. All the other well-placed features on the transmitter are standard affairs.

The receiver has BEC (battery eliminator circuitry) and ABC&W (automatic blocking circuit with window). It's said that this virtually eliminates all interference by using a narrow window that won't fit a distorted or "off" frequency signal. If the receiver is sent a poor signal, it "cleans it up" and amplifies it repeatedly until it's sent completely through the window. The single-conversion receiver is AMA Gold Label-approved, and the ABC&W system is patented by JR.

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BODY MASKING

(Continued from page 74)

the tape in place makes the paint job cleaner. I used computer-cut vinyl graphics, but if you decide to paint on your graphics, this is the time to apply the masking for them.

Most bodies have bends and compound curves around which you have to stretch the pinstriping tape. Taping the insides of corners seems to be difficult for most painters, because the tape tends to lift off the body. To prevent this, gently slice the tape in these areas with a hobby knife. This will relieve the stretching that's needed to get the tape into the corner. Pressing the tape down firmly will create a small gap in the sliced area. Apply a smaller piece of the tape over the slice so that paint won't get under the tape and cause unsightly blemishes.

I masked off the areas that I'd later paint white before I applied the car's main color—royal blue. Wide masking tape sufficiently covered the skirting on the car's nose and sides, but the large area in the rear needed more than that. You can apply additional pieces of tape, but this is more work than is necessary. Attach masking tape to the edge of a piece of paper that's slightly larger than the area you want to cover. Apply the taped edge along the accent stripe, pull the paper over the body's edges, and tape it in place.

Next month, I'll discuss how to paint both bodies using spray paint and airbrushes.

*Here are the addresses of the companies mentioned in this article:

Associated Electrics Inc., 3585 Cadillac Ave., Costa Mesa, CA 92626.
Dahm's, P.O. Box 360, Cotati, CA 94931.
Coverite, 420 Babylon Rd., Horsham, PA 19044.
Motion Graphics, 2645 Robert Arthur Rd., Westminster, MD 21157.

CACTUS CLASSIC

(Continued from page 132)

petition Electronics' new "StockCop" motor checker (see the sidebar). This device positively identifies stock motors by measuring their internal resistance. It's a clever idea—one you can't fool with.

STOCK TRUCKS

This event was a slug fest! In the first corner, seven of the 10 trucks were piled high. Bullis managed to come out ahead with a huge lead in the opening lap. Hicks was in 2nd and Billy Bradford brought up the rear, in 3rd. Within the first

(Continued on page 158)

by BILL O'BRIEN

MOSTLY OVER looked—and definitely undervalued by most R/Cers—Marui's* 1/12-scale Big Bear has a lot more to offer than you might think.

Years and years ago, when I was young and didn't know much better, in the heartland of New Jersey, I found a store that was selling Marui's CJ-7 for a paltry \$49 as a close-out special. I bought it, assembled it and had more fun with that bouncy, under-suspended Jeep than with any other vehicle I owned (the only possible exception being my Blackfoot). Eventually, the pounding I gave it broke enough pieces to warrant a final bounce to the trash bin, but I saved the body—it had great detail and, thanks to the solid, high, roll bar, it hadn't been really destroyed.

(Continued on page 151)



PROUD BIG BEAR

PHOTOS BY JOHN HUBER



(Continued from page 149)

A bunch of years went by, during which Marui products sort of disappeared for a while and then reappeared—sold by Phoenix Models. I occasionally looked at the Big Bear, but because it's $\frac{1}{12}$ scale, I really wasn't interested until I saw one up close. Someone had forgotten to tell me that the Big Bear and the CJ-7 use the same chassis. The CJ-7 was $\frac{1}{10}$ scale essentially because of its small (buggy-size) tires, and Jeeps fit that scale well.

So, if the CJ-7 body was $\frac{1}{10}$ scale, and the chassis could fit either scale, by putting $\frac{1}{10}$ -scale tires on the Big Bear, I'd be able to turn the Big Bear into a CJ-7 monster truck...sort of!

BODY WORKS

Made of hard, injected, ABS plastic, the CJ-7 body is incredibly detailed—inlaid hinges, grills and wipers. A driver, a six-point roll bar, a fire extinguisher, a gas can and a spare tire are standard accessories, but it needs a little work to make into a monster truck—but it's *easy* work.

To clear the large tires (Clod Buster size), I enlarged and rounded the wheel wells. To do this, I

had to remove the body's nice front and rear fender wells. That's was no great loss at the rear, but the front wells have a molded-in sidelight, and it was a shame to sacrifice it. (Oh well...cut we must!)

Likewise, I trimmed $\frac{1}{4}$ inch off the fenders in the areas behind each front wheel well, but that's all there was to it! The Big Bear and CJ-7 body mounts are identical, so everything else stayed the same.

CHASSIS SURGERY

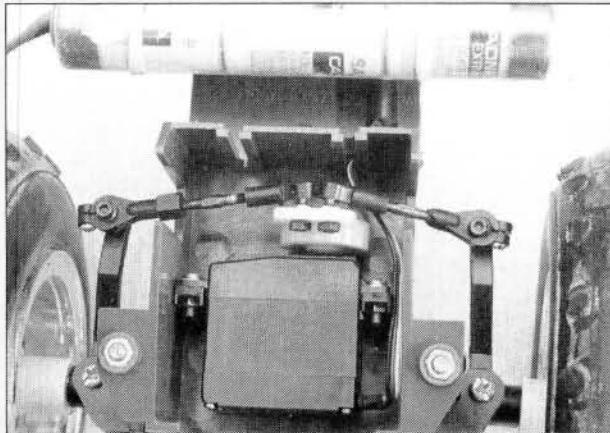
The chassis offered more of a challenge. To make the Clod tires fit correctly, I had to remove most of the forward section of the battery compartment, and that's an important part of the chassis. Its box shape increases front-to-rear rigidity, so when you take out that forward section, you actually weaken the chassis, and that isn't a good thing to do.

To make up for this, I epoxied some $\frac{1}{8}$ -inch-square brass-tube stock into the grooves at the bottom of the chassis. Don't use CA; it's too brittle. Get some 5- or

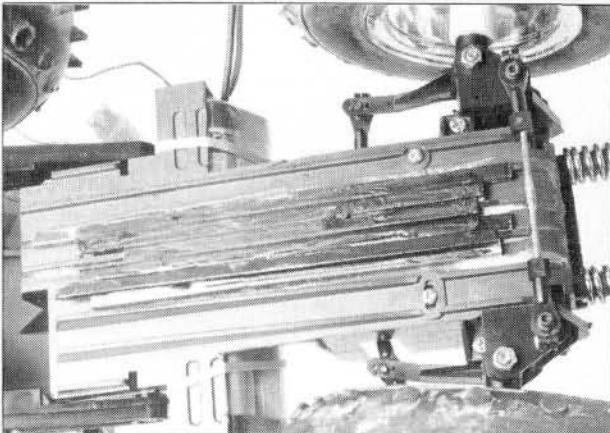
(Continued on page 152)



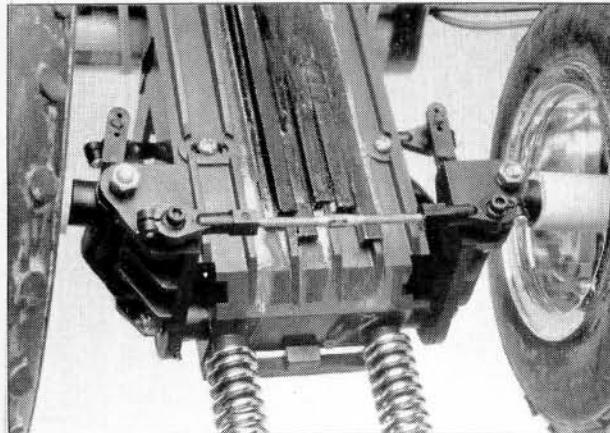
I transformed a mild-mannered $\frac{1}{12}$ -scale Marui Big Bear into a $\frac{1}{10}$ -scale monster CJ-5 Jeep by adding Clod rims and tires. All didn't go well and some minor modifications were necessary (see text).



To handle the extra load of the oversize rims and tires, a servo with at least 42 ounces of torque was needed. I also devised a center-point-type steering system for Project Big Bear.



To make the Clod tires clear the tub chassis, I removed the molded-in battery box. The box was important for chassis strength, so I had to epoxy $\frac{1}{8}$ -inch-square brass stock to its underside.



The Clod Buster rims and tires are a lot bigger and heavier than the stock Big Bear ones, so I made a spindle brace of Du-Bro rods and ends to keep things in order.

PHOTOS BY YAMIL SUED

BIG BEAR

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BIG BEAR

(Continued from page 151)

10-minute epoxy, but read the label before you buy it. Some epoxies (mostly the instant ones) don't do too well if you get them wet, and the bottom of a monster truck will definitely get wet.

DIFFERENTIAL OF OPINION

The stock Big Bear diff is quite good (I used its CJ-7 counterpart in a dragster, and it didn't break), but the giant tires subject it to new loads, so protecting it is more than a safety precaution; it's a necessity. For the Big Bear, there's only one way to go—MIP's* ball differential kit. There are only two gears in the package, and they're metal, so they can't break (all right, anything *can* break, but they don't break easily).

SO-O TIRED

Now the hard part—choosing the wheels and tires. For wheels, I turned to Bru-Line*; its Super System Wheels include a Clod wheel and a hub intended for the Big Bear. The sad part is that while the wheels are chromed, the hubs are white. Oh well...can't have everything.

The tires were easy to find. I wanted "big," and I wanted "menacing," and the only ones that fit that description are CRP's* monster Clod Buster spikes. Of course, they weren't *meant* for a Big Bear (or a CJ-7, for that matter), so I had to trim them a bit. I cut the two inside rows of spikes off the front tires, and the innermost row off the rears. Then, everything fit, and nothing rubs where it shouldn't.

SPRING ARRIVES!

The weakest part of CJ-7 and Big Bear kits is the suspension. For all practical purposes, they have none—just some really loose springs. The CJ-7 was designed to do wheelies, and for that, the suspension works well—but that's *all* it works well for. Unfortunately, there's really nothing you can do about it. With the weight of large tires up front, it won't be reaching for the sky, but the tires will have to do most of the work usually done by the suspension.

This doesn't mean that you can't

help the suspension along a little, (especially at the rear)—so it doesn't bottom-out. You just have to add a spacer to the 1/2-inch spring to compress it enough to make wheelies an impossibility.

Up front, you have to do something else entirely. With the large tires mounted, the front wheels will splay out when the truck runs, because the suspension geometry wasn't designed to carry that much load. To counteract that, you need to beef up the steering assembly.

The top of the steering assembly is strengthened with new linkage. Thread Du-Bro* adjustable 4-40 ball links onto

PROJECT BIG BEAR PARTS LIST

- Marui CJ-7 body
- MIP Big Bear diff kit
- Bru-Line Clod Buster wheels and hubs
- CRP Clod Buster spiked tires
- Kimbrough servo-saver
- DuBro 4-40 adjustable turnbuckles and rod ends
- Futaba MC-112B ESC
- Futaba S148 servo
- KO Propo EX-5 transmitter

the ends of Du-Bro 4-40 rods. They act as steering rods between the servo and the spindles. To improve steering-linkage geometry, install 1/4-inch spacers between the ball links and the spindles. When linked, Du-Bro rod ends give the closest thing to center-point steering on a monster truck that you'll ever find. Tie the whole thing together with a large Kimbrough* or CRP servo saver, and mount it on a servo with at least 42 ounce/inches of torque. That's half the battle.

The bottom of the front-suspension assembly is strengthened with a custom-made tie-rod. Mount an adjustable 4-40 rod with adjustable 4-40 ball links across the bottom of the car by drilling a hole in each of the spindles; then adjust this rod to minimize play between the spindles.

Together, these two additions will stop a lot of the wheel splaying, but it won't eliminate it—nothing will, but the truck will be controllable, and that's what you're looking for.

MONSTER MOTIVATION

Because I'm basically a mild-mannered

(Continued on page 179)

PRO-LINE

TURBO

ULTIMA II

CONVERSION

by BOB GAGNE

WHAT DO YOU get when you combine a Kyosho* Turbo Ultima II with a Pro-Line* monster-truck conversion kit? The answer is, a bodacious track burner! With the tremendous growth of the monster truck/racing truck segment of the R/C hobby, everyone seems to be getting into the buggy-to-truck conversion business. Now Pro-Line, one of the most respected names in tires and wheels, has decided to jump in and offer a well designed, rugged truck conversion kit at a very reasonable price (\$79.95).

Before I discuss this conversion kit, I think that a warning is necessary. Few, if any, conversion kits are as economical as an out-of-the-box truck kit.

Consider the conversion that I'm reviewing: the Ultima II Turbo kit costs \$279.95, and the Pro-Line conversion kit costs \$79.95. This totals \$359.90 compared with \$229.95 for the Outlaw Ultima Racing Truck kit.



Inset:
Kyosho's
Turbo Ultima
II "before."
Left: the
completed
truck with
sharp-looking
directional
spoke wheels
and the Ford
stadium-racer
pick-up body.

Convert for DIRT

PHOTOS BY BOB GAGNE

"Cornering was just the way I like it: sure and predictable with a little push."

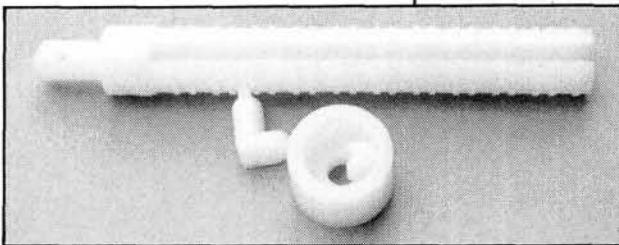
On the other hand, conversion kits enable you to turn a car that's collecting dust on your shelf into something that will get you truckin'. Many of the Pro-Line parts are better than those found in some truck kits! (e.g., extremely well-detailed five-blade directional wheels, "Speed-Paw" competition tires, a versatile body mounting system). The Pro-Line conversion of the

Ultima II Turbo gives you a good, basic, very competitive racing truck for use on a tame-to-moderate track—and you don't have to modify the suspension.

THE KIT

The Pro-Line kit gives you a lot for the money,

including: a polycarbonate, Ford stadium-racer pickup body; heavy-duty body mounts; unique body posts; high quality wheels and tires; front spindles; front-wheel bushings (too bad they don't include bearings!), black polycarbonate for side dams; a killer fluorescent orange



■ Above: first, replace the stock front axle with the conversion kit's extended axle. The kingpin fits into the new axle very tightly. ■ Left: use the marks on the heavy-duty body posts as cutting guides. Then, screw the post and base together through the mounting bracket.

decal sheet; and line-drawing instructions. The only things not included that would really make a difference are long front shocks and long front shock towers. These parts would probably push the kit's cost to over \$100, which might be too expensive for many prospective truckers.

ASSEMBLY

The Pro-Line conversion starts with the Kyosho Ultima II Turbo that I

reviewed in the June, 1991 *RC Car Action*. Except for a Tekin* 411P electronic speed controller and a Parma* 18-turn Cyclone II, it's stock. I thought it was the ideal choice for a conversion because it would be similar to the Kyosho Outlaw truck when it was completed. It also has some interesting built-in refinements, such as a ball diff, ball bearings and gold shocks.

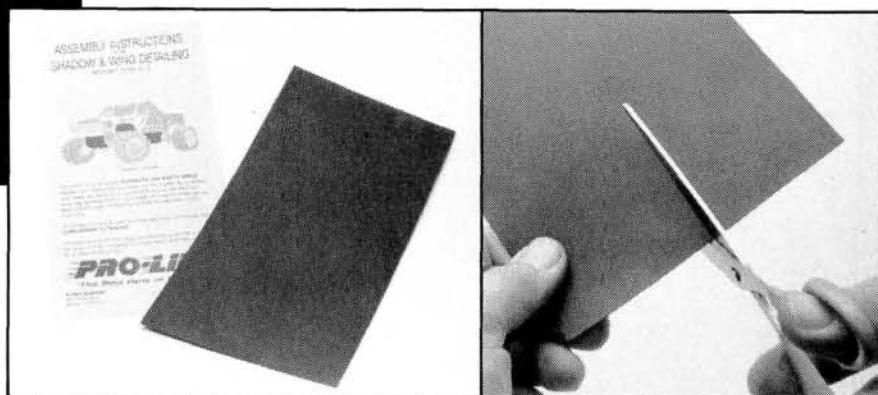
When the Ultima's body has been stripped off, the metamorphosis

begins. The kit's instructions are good, but they might be a little sketchy for first-time builders. First, you replace the front spindle. Simply remove the steering blocks from the uprights, pull out the old spindle and press in the new, extended spindle. Next, assemble the body posts and mount them onto the support bracket. They're about 1/2-inch thick, rugged and well-made, and they have molded-in saw guides that make it easier to cut them evenly. These

OPTIONS USED

- Pro-Line truck conversion
- Trinity underdrive 48-pitch gear set
- Tekin 411P ESC
- Sanyo 6-cell SCR battery
- Futaba Magnum AM radio system
- Tamiya wheel bearings (ball bearings)
- Litespeed nylon dye
- Parma Cyclone modified 18-turn motor
- Pactra metalflake paint

■ Right: a package of useful black polycarbonate sheets is included in the kit. I used them to make side dams that keep out dirt and mud, and fill the gap between the body and the chassis. ■ Far right: to make the side dams, cut a pattern from thin cardboard (index cards work well), transfer the pattern to the polycarbonate and cut the material with scissors.

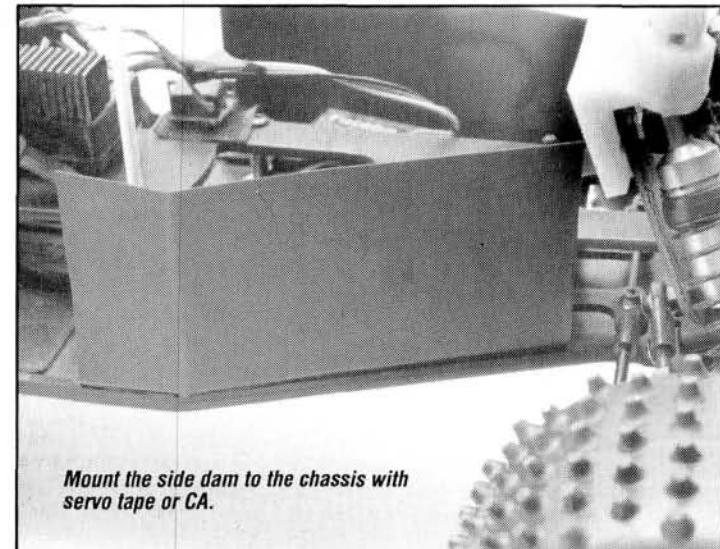


posts will probably never break, but they aren't perfect. Because of the way they fit on the brackets, the shortest they can be is about $\frac{3}{4}$ inch. I like to keep the body as low as possible, but that's as low as this system will allow.

Attach the mounting-bracket assembly to the shock towers with the long shock-mounting screws. Remove the stock screws, put washers on the new screws, and slip them through the mounting bracket and the shock towers. Install the shock-mounting spacers and replace the retaining nuts. Now the hard part is over, and you've almost finished! Mount the tires on the rims, and install the bushings in the front hubs. I bought and in-

stalled a set of Tamiya* ball bearings—they make a big difference in the truck's performance. Install the hub nuts, and check that the wheels turn freely. I hate white wheels, so I dyed mine blue with LiteSpeed* nylon dye to match the paint.

So far, the conversion has taken about half an hour. If you're a perfectionist, the rest of the work will be more time consuming. To protect your electronic compounds from dirt and moisture, you can make side dams out of the black polycarbonate sheets included in the kit. Few other kits include anything like it to help you preserve your electronics, and it's easy to work with—all you need are scissors and a straightedge. I



Mount the side dam to the chassis with servo tape or CA.

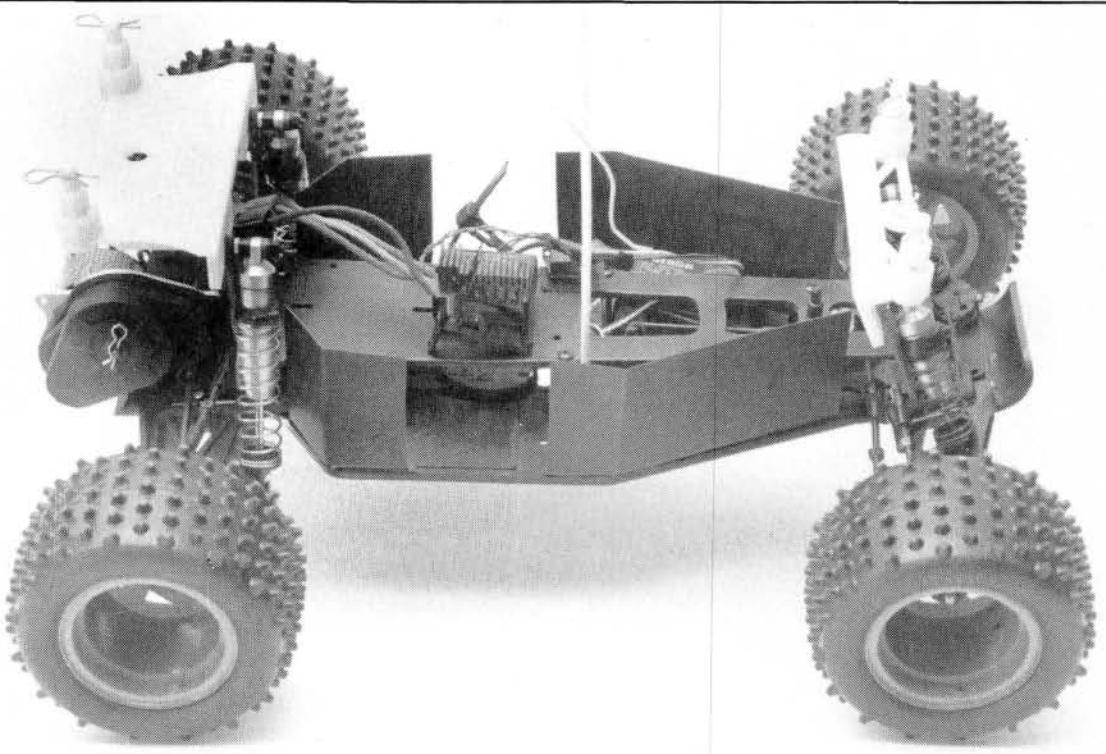
made a template out of thin cardboard and I used it as a pattern on the black polycarbonate. You can mount the side dams to the chassis with servo tape or with CA if you're brave. I cut out a section in the middle of each side of the dams for easier access to the battery.

Finally, you can fit and finish the body.

Generally, I trim the body at the trim line and fit it before I paint it. This way, I can see where the body posts come into contact with the body. I used Pactra* metalflake and candy colors in the red-white-and-blue combination for which I'm well known. It just plain sparkles!

(Continued on page 182)

**"Conversion
kits enable you
to turn a car
that's collecting
dust on the
shelf into some-
thing that will
get you
truckin'."**



Here's the completed chassis with the side dams installed. Notice the cut-out middle section for easier access to the battery.

CACTUS CLASSIC

(Continued from page 146)

minute, Jade Kurtchi made his way from the back of the pack to 4th place, and then, while Hicks and Bradford battled, he made a bid for 3rd. With just over a minute left, Bullis was gone, and Kurtchi and Bradford fought for 3rd. With 25 seconds left, Kurtchi and Bradford closed within striking distance of 2nd-place Hicks, and then all three of them tangled. Bradford shot to 2nd, while Kurtchi and Hicks duked it out in the last lap. Kurtchi got the best of the fight and finished in 3rd.

2WD MODIFIED

At the start of this race, Kinwald held the lead, with Lett in 2nd and Matt Francis in 3rd. Lett played his pressure game, but Kinwald held up well. Then, Lett missed the tabletop and "endo'd" his car. That put him back with the pack, while Kinwald left the scene. Rick Vehlow, Hohwart and Francis were on Lett's tail, and they put the pressure on him. Lett nailed the triple and then a track marshall, which put him way down while the pack drifted away. With a minute left, the pack

was a mess, and there were five cars vying for 2nd place. Kinwald was so far gone that he was forgotten. At this point, Francis was in 2nd, and Anfinson was in 3rd. Francis clipped a corner, letting Anfinson by, and this sealed up the race. J.D. Beckwith made a late charge, but it wasn't enough. He plowed his car on the final lap and sank to 9th place. At the finish, Kinwald was in the winners' circle by almost a full lap, Anfinson was in 2nd and Matt Francis in 3rd.

4WD STOCK CLASS

The start of this race was clean, with Bill Christiansen in the lead followed by Hicks, Troy Messina and Jim Freeman. They formed a little train that lasted for most of the race, but Jason Christensen spoiled it. As the race continued, the cars spread out almost perfectly, and no one hit any major traffic. Hicks fell into 3rd about 3 minutes down. Bill was out front doing his thing—nothing but clean driving! He finished in 1st place, with Jason Christensen in 2nd and Hicks in 3rd.

MODIFIED TRUCKS

This was the most exciting race of the day. Although there was still plenty of

daylight, the track lights started to come on. Pavidis got a nice start from the pole, with Peterson in 2nd and Lett in 3rd. As I mentioned earlier, Lett likes to play a pressure game. It goes like this: he knows he has the power, but he stays on the tail of the guy in front of him until that guy gets nervous and takes himself out. This time, Lett's game backfired! He tried to go around the table-top jump, but he missed, and his truck rolled. He retained 3rd and eventually caught up with Peterson. Cliff Montgomery held 4th over Furutani and Kloeber, and all of them were in a tight little bunch. Meanwhile, Pavidis was out front, just tooling along. At the halfway mark, Lett was up on Peterson again. They began a "see-saw" battle, but this time, neither one played any games. Down the main straight, Lett had the inside edge, but Peterson had a lot of punch, and he took back 2nd. Through the back straights, Lett had the speed. He regained 2nd, and began running as fast as he could. Peterson wouldn't be denied, however.

The final laps were down to the wire. Pavidis was out front and almost gone. Lett opened up on Peterson, but they

(Continued on page 174)

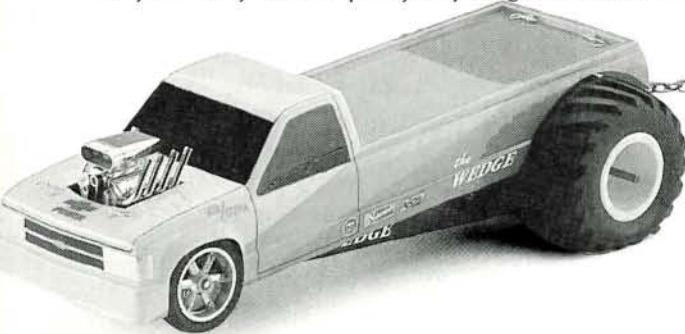
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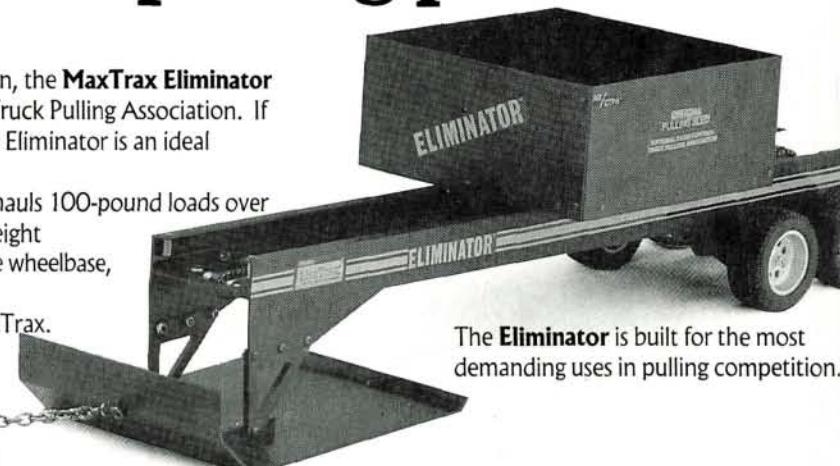


Body and chrome detail engine not included in Wedge kit.

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CACTUS CLASSIC

(Continued from page 158)

headed into traffic. This was costly for the leaders. Then Pavidis made his only mistake of the day. He was heading for the final turn, and it looked as if the win would be his. He looked backward to see if his teammate Lett was in the clear for 2nd place, and he lost sight of his truck. By the time he found it again, it had overshot the final turn and spun out. Then Lett and Peterson were on him, with another truck just ahead. At the stadium jump, Pavidis stalled. Lett took the lead in midair, only to find the slower truck in front of him. There was nowhere for Lett to go, and he tangled with the slower truck. From out of nowhere, Peterson shot forward and seized the win. The crowd went absolutely wild, as Lett crossed the finish line in 2nd and Pavidis in 3rd. This was quite a topper for Peterson, because he was also celebrating his birthday at the race.

4WD MODIFIED

At the drop of the start, Mark Francis had the lead with Kinwald in 2nd and Beckwith in 3rd. This group left the rest of the pack behind. At the 1-minute mark,

Francis hit a corner, and Kinwald took the lead. Beckwith made a really good run at Francis, cutting most of the corners tightly and cleanly. Although he hit some a little too closely, he had lots of ponies and made up the time very quickly. Beckwith made a great midair pass over the jumps, but to no avail. He planted his car in the wrong place, and Francis drove right through him. With only half a lap remaining, Francis must have angered the gods of Sanyo, because his battery went south. Beckwith never even blinked as he shot past Francis and took 2nd behind Kinwald. Mark Francis barely held off Hohwart as he crawled to the line in 3rd.

Thanks to SRS Raceway, Pro-Line and *Car Action*, the Cactus Classic was, indeed, a great race. It was even rumored that it was a qualifier for the World Championship team, but this proved untrue. From the fierce competition, however, you never would have known that it was anything but a bloody shot for a team slot. Sunny Tempe, AZ, has warm weather and *hot* off-road racing. You should be there next year! ■

HUSTLER

(Continued from page 144)

don't trap dirt or fingerprint smudges under the decals' clear edges. Dirt and smudges are very unsightly and will detract from an otherwise nice-looking model. (I cleaned my boat with window cleaner.)

IN A HURRY TO "HUSTLE"

The first run with any new model always stirs a few butterflies in my stomach; on this day, the Hustler had them doing double-time! At the water's edge, I installed new radio batteries and filled the fuel tank with a fresh batch of 40:1 gas/oil fuel. (I always use freshly mixed fuels.) I tugged the McCulloch's starter cord sharply. Three pulls, and the engine barked, sputtered, and then settled into a nice, comfortable idle. Weedeater boats have a centrifugal clutch, and the prop doesn't turn until you advance the throttle. This is a nice feature, because it's safer: you don't have to be concerned about losing a finger while you handle and launch the model.

When the engine had warmed up a tad, I slowly applied the throttle while moni-

(Continued on page 179)

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Radio Control Car Action Plans, 251 Danbury Rd., Wilton, CT 06897.

HUSTLER

(Continued from page 174)

toring the engine's response. The engine is air-cooled, so I didn't hurry to put the boat in the water. I put the Hustler in the water and pushed it out to clear the mud and rocks.

The Hustler's prop cavitated for a moment, but after running approximately 20 feet, the hull got up on step and accelerated nicely. The water was calm, and the model ran rather "flat." The boat felt balanced, but when I applied left rudder, it seemed to skid in turns. I attribute this to the hull's shape—a modified vee—and its rather smooth strakes. The Hustler didn't spin out; it just seemed "soft" when it edged around corners. (The hull seems to have been vacu-formed over a mold, and this has produced the strakes' smoothed-over shape.)

The Hustler doesn't come with turn fins or trim tabs, and adding them would be the first logical step toward improving its performance in turns. As is, it's a fine, powerful sport model. Needing little trim, it runs straight and hard right off the workbench.

The Hustler doesn't pretend to compete with models that cost two or three

times as much. Given its reasonable price and the little assembly required to put it together, I rate the Hustler as good value, and its performance can satisfy sport mariners. I like my Tupperware® boat!

*Here's the address of the company featured in this article:

**Hobby Dynamics Distributors, P.O. Box 3726,
Champaign, IL 61826.**

JR Propo; distributed by Hobby Dynamics. ■

BIG BEAR

(Continued from page 152)

sort of "Bad Brain," I really didn't get outrageous in the motor department; in fact, I chose the Big Bear's stock 540SH motor. It has enough torque to move the beast, and it's free—and that meets all my requirements!

I matched this tame motor with a Futaba* MC-112B speed controller, which I've had for nearly three years. It has never "burned up" on me; it works whenever I want it to; and I didn't have to buy it—once again, a product that meets all my major criteria.

I came across a 2-channel 27MHz Futaba receiver in my spares box and already had a KO Propo* EX-5 radio

(another three-year-old veteran). I had to buy a pair of crystals so that they could talk to each other, but \$12 wasn't such a bad investment. For some reason, 27MHz crystals are cheaper around here than 75MHz crystals. (I'm not complaining; just making an observation.)

MOVIN' 'N' A-GROOVIN'

I didn't know it when I put the "High Voltage" decal on the front of the Jeep, but there's a full-size monster Jeep called "High Voltage." Unfortunately, it's yellow, and my Jeep is black, but they have similar rides.

If you take a short-wheelbase truck (or Jeep, as the case may be) and stick some giant rubber on it, the result is a wild and bouncy ride. Rough terrain soon proved this to me, and a few nights later, I watched the TNT monster truck show on ESPN. Seeing the full-size model bouncing, I felt a lot better about my Jeep's scale performance. And make no bones about it, it's a *wild* ride. (It's also more fun than a basket full of atheists at a spiritualist convention!)

The best thing about it is uniqueness. It isn't a Clod Buster, or a Big Bear, or a

(Continued on page 182)

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BIG BEAR

(Continued from page 179)

Blackfoot; and it isn't a racing truck. It's my very own CJ—the Big Bear Clod. No one else has one and, unless you *all* build one of your own, there won't be a bazillion of them around. And that makes it the fastest, biggest, bestest 1/10-scale monster Jeep that there is!—and there's nothing at all wrong with that.

*Here are the addresses of the companies mentioned in this article:

Marui; distributed by Imex Model Co., 53 Trade Zone Ct., Ronkonkoma, NY 11779.

MIP, 838 Edna Place, Covina, CA 91723.

CRP, P.O. Box 2530, Atascadero, CA 93423.

Du-Bro Products, 480 Bonner Rd., Wauconda, IL 60084.

Kimbrough Products, 1420 East St. Andrews Place/Unit F, Santa Ana, CA 92705.

Futaba Corp. of America, 4 Studebaker, Irvine, CA 92718.

KO Propo; distributed by Global Hobby Distributors, 10725 Ellis Ave., Fountain Valley, CA 92728. ■

January in New England, there was just enough warm weather for me to find a thawed spot where I could take some pictures. The racing action, however, was all inside. Its first run confirmed my suspicion that the Ultima conversion would be a very forgiving truck. I drove like a turkey, but the truck easily recovered from every blunder I made. Cornering was just the way I like it: sure and predictable with a little push. The truck didn't have much power out of the turns, though, and it didn't make it to 4 minutes. The culprit was the transmission gearing. After gearing down as low as I could, I decided that the transmission's drive ratio was just too high for the monster tires. I installed a Trinity* Ultima under-drive cluster-gear assembly, and it brought the ratio down so that I had plenty of gear-selection latitude with the Parma 18-turn motor. Sometimes, when you install this assembly, you have to modify the motor plate where the spur-gear spindle passes through it to create the proper clearance. This time, I found that it fit perfectly and didn't need any modifications.

Back on the track, the Ultima exploded out of the turns as if it were fired from a cannon. It also achieved a 4-minute run

time with about 30 seconds to spare. Although I raced this truck on an indoor track, I think that when the weather breaks and the dirt tracks open, it will be admired and feared by the local competition. I'd better make room on the trophy shelf right away—running this truck in serious competition will make things crowded in a *big* hurry!

*Here are the addresses of the companies mentioned in this article:

Kyosho; Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61824.

Pro-Line USA, P.O. Box 456, Beaumont, CA 92223.

Tekin Electronics, 970 Calle Negocio, San Clemente, CA 92672.

Parma International Inc., 13927 Progress Pky., North Royalton, OH 44133.

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LiteSpeed, P.O. Box 4765, Spokane, WA 99202.

Pactra Inc., 620 Buckbee St., Rockford, IL 61104.

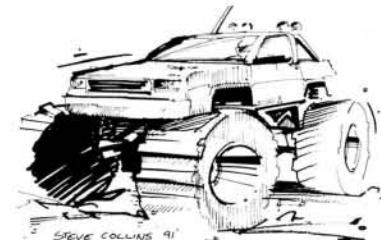
Trinity, 1901 E. Linden Ave., Linden, NJ 07036. ■

ULTIMA II

(Continued from page 157)

PERFORMANCE

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Steve Collins 91

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TRACK DIRECTORY

In keeping with our constant efforts to help foster the growth of the radio-control car hobby, we print this track directory intermittently to inform modelers where they can race and exchange ideas. If you'd like your track listed, send the track's name, address and phone number to R/C Car Action Track Directory, 251 Danbury Road, Wilton, CT 06897. We'll list as many clubs as space allows.

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(Continued on page 188)

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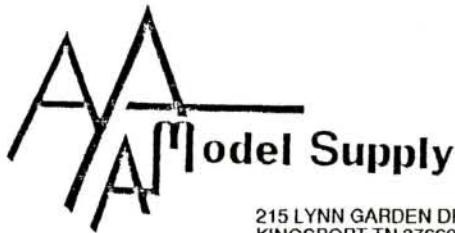
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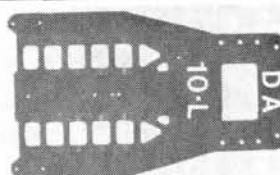
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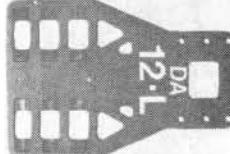


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(Continued from page 192)

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Mike Morse (305) 748-5416

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N.W. 15th Ave., Fort Lauderdale, 33313
(305) 472-1032

(Continued on page 204)

TRACK DIRECTORY

(Continued from page 194)

MIAMI AUTO R/C CAR ASSOCIATION
129 Ave. and S.W. 6th St., Miami, 33184
Richard or Nilda Carreras at
America Hobby Center (305) 554-5505

LET'S RACE AMERICA RENTAL SPEEDWAY
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Trackside (407) 277-9586
Campground (407) 277-5075

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Eddie Attaway (912) 362-4536

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Savannah, 31406
(912) 355-6033

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(Continued on page 212)

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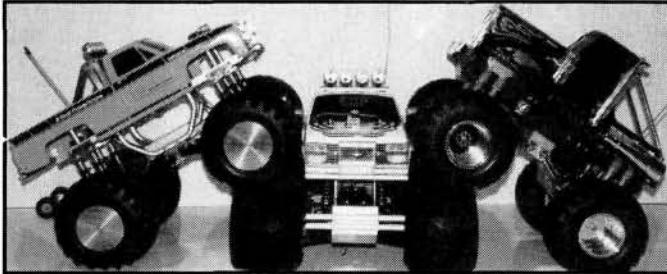
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Rear Twin-Tube Bumper	\$16.95	Stainless Bearing Kit	\$59.95
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(Continued from page 204)

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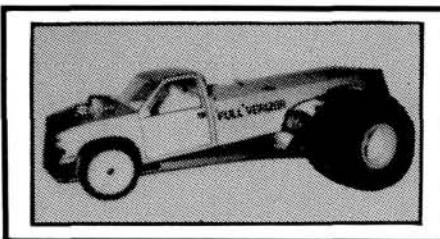
(Continued on page 222)

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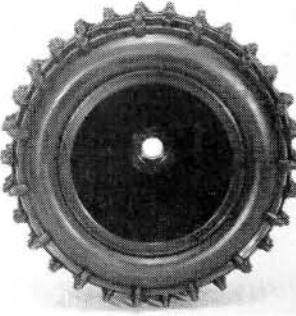


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Exclusive distributor of “Pull”verizer. Kit does not include linkages, radio, antenna, body, or mounts.

WHAT'S NEW



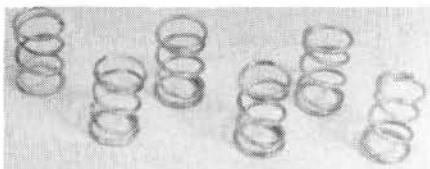
PRO-LINE Jet Wheels

Pro-Line USA introduced its direct-fit "Jet" racing truck wheels for the RC10 and the JR-XT at the 1991 Chicago Show. These 2.2-inch jet-black wheels will always look new, and they have a cone-dish design that keeps the dirt out. They contain a high-grade, light-weight, black nylon compound for high-impact resiliency and fracture resistance in races and heavy-use conditions.

Part nos. 2568 (front, RC10); 2569 (rear, RC10); 2570 (front, JR-X2/XT); 2571 (rear, JR-X2/XT).

Price: \$7.95/pair

For more information, contact Pro-Line, P.O. Box 849, 40490 RCR 186, West Acres Professional Bldg., Steamboat Springs, CO 80477.



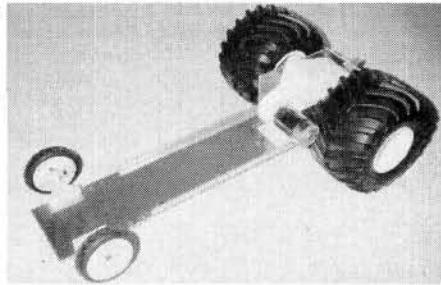
BOLINK Pro Springs

Bolink's new front suspension Pro Springs are here! They're available individually or as a set in four different tensions: blue is light, green is medium, red is heavy and purple is extra-heavy.

Part nos. 5131-B (blue); 5131-G (green); 5131-R (red); 5131-P (purple).

Price: \$2 each; \$7 (four pairs).

For more information, contact Bolink R/C Cars Inc., 420 Hosea Rd., Lawrenceville, GA 30245.



DARANCI DESIGN The Pull Verizer

Daranci Design introduces the Pull Verizer 1/10-scale truck. Its Mabuchi RS550 motor has a brass, 10-tooth, 32-pitch pinion gear and is mounted to a heavy-duty sealed gearbox that has a 90:1 output ratio. The gearbox and gears are of heavy-duty nylon. The Pull Verizer's solid-aluminum gearbox adapter is designed to fit tightly onto the gearbox hub, and it will accept a 3/8-inch-diameter rear axle. It's drilled and tapped with a 6/32-inch thread for a mounting screw (to secure it to the gearbox) and for a 10/24x5/8 setscrew (to secure it to the axle). Also included is a 3/8x8 1/2-inch steel axle that's drilled and tapped to accept 8/32x1/2 cap screws, which secure the rear wheels to the hubs. The 4x20-inch chassis is of .90-thick (approximately 1/16-inch) aluminum, and on each side, it has six, countersunk front mounting holes for adjusting the wheelbase.

For more information, contact Daranci Design Inc., P.O. Box 410, Bohemia, NY 11716.



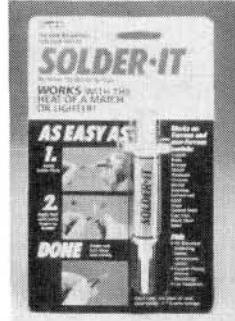
TOTAL RACING CONNECTION Titanium Axle

Total Racing Connection's durable titanium axle replaces the stock Lynx II or Pro 10 axles.

Part no. 5661T

Price: \$27.95

For more information, contact Total Racing Connection Inc., P.O. Box 1058, 2211 Charter St., Albemarle, NC 28001.

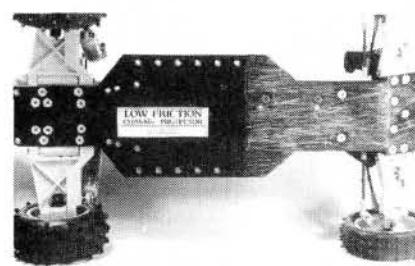


UNIVAL Solder It

Unival's Solder It silver-bearing solder paste comes in an easy-to-use 7gm syringe, and it can be activated with the heat from a lighter or a match. Designed to solder all ferrous and non-ferrous metals, Solder It is ideal for making electrical connections, joining copper pipes and repairing car radiators. It's five times stronger than ordinary solder and has a tensile strength that ranges from 10,000 to 25,000psi. Solder It is electrically conductive, and it resists stress and vibration.

Part no. SP7.

For more information, contact Unival Corp., 498E Nepperhan Ave., Yonkers, NY 10701.

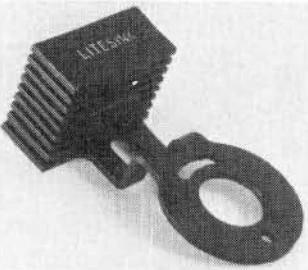


LITESPEED Tuff-Stuff Chassis Protector

Litespeed's Tuff-Stuff Chassis Protector adhesive sheets prevent the drag and wear that's caused when the chassis bottoms-out against the track. They also reduce drag at high-speeds. The 8x14-inch sheets are .010 inch thick.

Part no. 0175

Price: \$6.95.



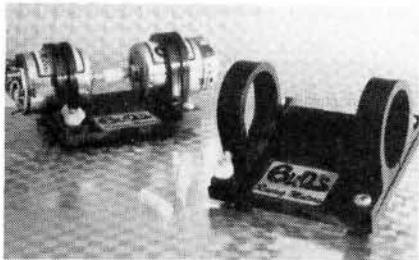
Yokomo YZ-10 Litesink

Litespeed introduces its improved Litesink motor heat sink for Yokomo C-4/YZ-10 cars. Designed for use with an upper-chassis stiffener plate, this lightweight black model has over 17 square inches of heat-exchange surface area. Litesink substantially reduces a motor's temperature, and this provides 20 to 40 percent longer run times.

Part no. 1035

Price: \$24.95

For more information, contact Litespeed Inc. R/C Performance Products, P.O. Box 4765, Spokane, WA 99202.



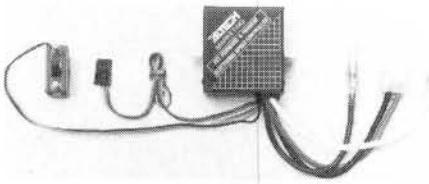
BUD'S RACING PRODUCTS Pre-Run Break-In Jig

Break-in your racing motor, without applying power to it, with Bud's Pre-Run Break-In Jig. Just install an old motor in the jig permanently and then couple it to your racing motor. Run the old motor in reverse; this will spin your racing motor in the right direction and gently break-in the brushes without causing arcing.

Part no. 7141

Price: \$10.95.

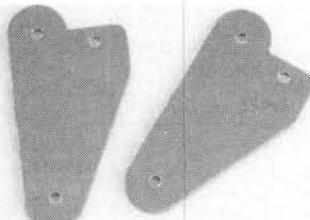
For more information, contact Bud's Racing Products, 1575 Lowell St., Elyria, OH 44035.



ALTECH PK170 ESC

Altech Marketing's new PK170 proportional forward-and-reverse electronic speed controller is rugged and powerful. To satisfy the demands of many stock and mildly modified motors, it delivers 120A continuous current (320A peak) in forward and 60A continuous (160A peak) in reverse. It has BEC, which eliminates the need for a receiver battery and a speed-controller servo, and it uses a Tamiya-style battery connector and 6V to 8.4V Ni-Cd battery packs. Only two adjustments are necessary to set it up for use with MRC or Futaba radio systems, so beginners will find it easy to use. Its aluminum case has metal mounting lugs that serve as heat sinks for the Mosfet output circuit.

For more information, contact Altech Marketing, P.O. Box 391, Edison, NJ 08818.



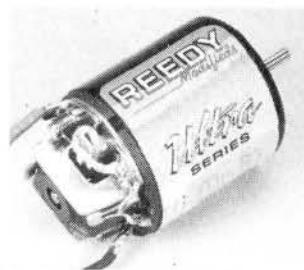
TOTAL RACING CONNECTION Graphite Nerf Wings

These new Graphite Nerf Wings enable you to protect your car's rear tires and axle with an offset hub. The package includes a pair of nerf wings and all the hardware that's necessary to install them on a Lynx II.

Part no. 5206

Price: \$6.95

For more information, contact Total Racing Connection Inc., P.O. Box 1058, 2211 Charter St., Albemarle, NC 28001.



ASSOCIATED ELECTRICS New Mr. Series Modified Motors

Reedy has added new motors to its Mr. Series of modifieds, and each one includes an on-road conversion kit. The versatile kit has extra on-road springs and brushes so you can run off-road and on-road. For a broader power-band and increased efficiency, all the motors use the heat-resistant Ultra Torque Magnets, which excel under heavy loads and provide consistent power. The motors are available in a variety of double, triple and quad winds and from 11 to 19 turns for on-road and off-road applications.

Part nos. 508 (Mr. A's 14-turn triple); 509 (Mr. L's 14-turn double); 510 (Mr. T's 11-turn triple); 511 (Mr. N's 19-turn double); 512 (Mr. M's 13-turn double).

Price: \$80

For more information, contact Associated Electrics Inc., 3585 Cadillac Ave., Costa Mesa, CA 92626.

Descriptions of new products appearing on these pages were derived from press releases supplied by the manufacturers and/or their advertising agencies. The information given here does not constitute endorsement by **Radio Control Car Action**, nor guarantee product performance or safety. When writing to the manufacturer about any product described here, be sure to mention that you read about it in **Radio Control Car Action**.

WHAT'S NEW



PARMA Losi Chassis Dust Cover

Parma's Losi Chassis Dust Cover protects the electronics on your JR-XT or JR-X2 from dirt and grime. Made of durable .030 Lexan, the cover is clear, so it's easy to look inside. You can also paint it to match your car's body!

Part no. 10417

Price: \$7



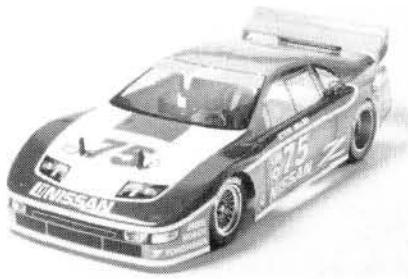
Mylar Decals

With Parma's three new 6x8-inch Mylar decals for 1/10-scale cars you can win in style! Finish your Pontiacs with the Heinz Ketchup or Country Time sponsor sheets and your NASCAR "stockers" with the Winston fender decal. Just cut along the dotted lines, and cover the entire fender with all the decals at once!

Part nos. 10684 (Heinz); 10687 (Winston fender); 10689 (Country Time).

Price: \$4

For more information, contact Parma International, 13927-PR Progress Pky., N. Royalton, OH 44133.



MRC Nissan 300ZX IMSA GTO Racer

MRC/Tamiya's 1/10-scale Nissan 300ZX IMSA GTO Racer will astound you. Its chassis is made of a new, engineering plastic, and its FRP T-plate provides stiffness where it's needed, but it flexes to give optimum handling. You can control the Nissan's new Sport Tuned 540 motor with its three-step forward-and-reverse mechanical speed controller or an optional electronic speed controller. It has a spring front suspension and an oil-filled, coil-over shock damper in the rear. The rear-axle brace is mounted on an FRP T-bar plate that flexes with the track's surface, and you can adjust the shock-damper plate for track conditions, too. The new transmission is a ball differential, so you can adjust the amount of "slip" that occurs. Ball bearings are used on the rear axle, and oil-less metal bushings are used on the front axles. The Nissan's polycarbonate body is detailed and aerodynamic, but the car's new three-point adjustable wheelbase can also accommodate other Tamiya on-road bodies (optional).

For more information, contact MRC, 200 Carter Dr., P.O. Box 267, Edison, NJ 08818.



DAHM'S RACING BODIES 1991 Chevrolet Lumina-NASCAR

Dahm's new super-aerodynamic 1991 Chevrolet Lumina NASCAR racing body (shown here on Associated's RC10L) fits 1/10-scale on-road cars. This lightweight .030 GE Lexan body has an authentic, bolt-on, adjustable rear spoiler (including mounting bolts), screened vents, hood pins, trunk pins, windshield clips, rear-window straps and 3-D intake vents on the side windows.

Part no. D133

Price: \$19.98

For more information, contact Dahm's Racing Bodies, P.O. Box 360, Cotati, CA 94931.



MIP Shock Kit

MIP's shock kit for 1/10-scale Losi buggies has hard-coated shocks that are smooth and durable! They have less friction, and there's no leakage between the cartridge and the shock body!

Part no. LS-20

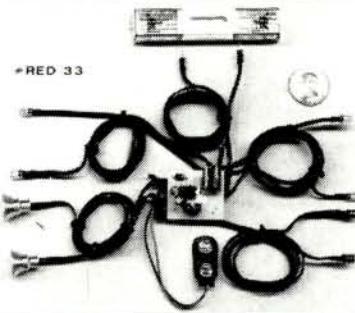
Price: \$26.95/pair

For more information, contact MIP, 838 Edna Pl., Covina, CA 91723.

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(Continued from page 212)

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(Continued on page 226)

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ADVERTISER INDEX

AAA Model Supply	192	Hobby Products International	63,188	R/C Car Basics	175
A&L Manufacturing	82	Hobby Shack	180-181	R/C Graphix	100
Ace Hardware	152	Hobby Warehouse	136	R/C International	154
Air & Wheels	152	Hyperdrive	34	RCK	176
Airtronics	4	Imex Model Co. Inc.	145,211	R/C Racer	39
A.J.'s R/C	222	Island Hobbies	212	R/C Thunderdrome	90-92
America's Hobby Center	183	JG Manufacturing	11	REM Racing	194
Andy's R/C Products	103	JPS Custom Wheels	146	Retailer Ad	114
Associated Electrics	16,58,104-105,140,C3	King RC Cells	111	Robinson Racing Products	71
AstroFlight	26	Kyosho	62,81,115,142,188	Saiko Racing Products	69
Autographics of California	69	Litespeed	125	Sanyo Energy Corp.	110
B&B Software	100	Mail Order Form	195	Sassy Chassis	102
B&R MotorWorks	121	Max-Cell	194	Schumacher Inc.	134,200
B&T Racing Team	116	Model Rectifier Corporation	C4	SCI Corporation	22
Badger Air-Brush Co.	8	MRP	78,147,213	Sheldon's Hobbies	196-199
Ballistic Batteries	57	Novak Electronics	86	SoCal Surfwear	83
Boca Bearing Co.	116	Omni Models	126	Southside Hobbys	120
Bolink R/C Cars Inc.	133	O.S. Engines	89	Stealth Electronics	25
Bruckner Hobbies	225	Paragon Racing Products	25	Stormer Hobbies	186-187
Bud's Racing Products	182	Parma International	29,159,193	TD Enterprises	188
Bullet Racing	188	Performance Hobby	192	Team Losi	12-13,98,148,177
California Cheap Skates	9	Power-Graphix	26	Team Smooth	226
Central Model Marketing	223	Powerline Cells	46	Tecnacraft	23
Cheetah Racing	47	Pro Car Racing	67	Tekin Electronics, Inc.	38
Competition Electronics, Inc.	106	ProLine U.S.A.	37	The Finest R/C	206-209
Cox Hobbies	127	Quality Chroming Co.	116	Thorp Manufacturing Inc.	81
DA Graphite	194	R&L Hobbies	152	T.M. R/C Racing Components	47
Dahn's Racing Bodies	24	Raborn Racing Originals	179	Tower Hobbies	9,67,160-173
Dan's RC Stuff	102	Race America	46	Track Directory Coupon	184
Dolomite Custom Graphics	124	RAM	222	Traxxas Corporation	95,205
Endurance Racing Products	49	R.C.C.A. 401 R/C Tech Tips	139	TRC	138
ERI	134	R.C.C.A. Action Series Subscription	51	Trim-It Racing	8
ESP Manufacturing	212	R.C.C.A. Back Issues	190-191	Trinity Products	3,7,19,75,118-119,150
Futaba Corp.	128	R.C.C.A. Beginner Pak	18	Twinn-K	27
GLD Racecars	116	R.C.C.A. Books	202-203	Twister Motors	101
Global Hobby Distributors	135	R.C.C.A. Charger	174	Ultra ⁵	189
Great Northern Hobbies	214,217	R.C.C.A. Chronometers	210	Victor Engineering	153
Great Planes Distributors	93-94	R.C.C.A. Monster & Racing Trucks	178	Walt's Hobby	26
Hobbico	10,127,158,201	R.C.C.A. Off-Road Pak & Truck Pak	117	WOW Racing Products	111
Hobby Centro	146	R.C.C.A. Product Line	122-123	Writers Wanted	57
Hobby Dynamics Distributors	17	R.C.C.A. Trak-Pak	124		
Hobby Heaven	221	R.C.C.A. Watches	204		