

R/C Pattern plan • C/L Stunt plan

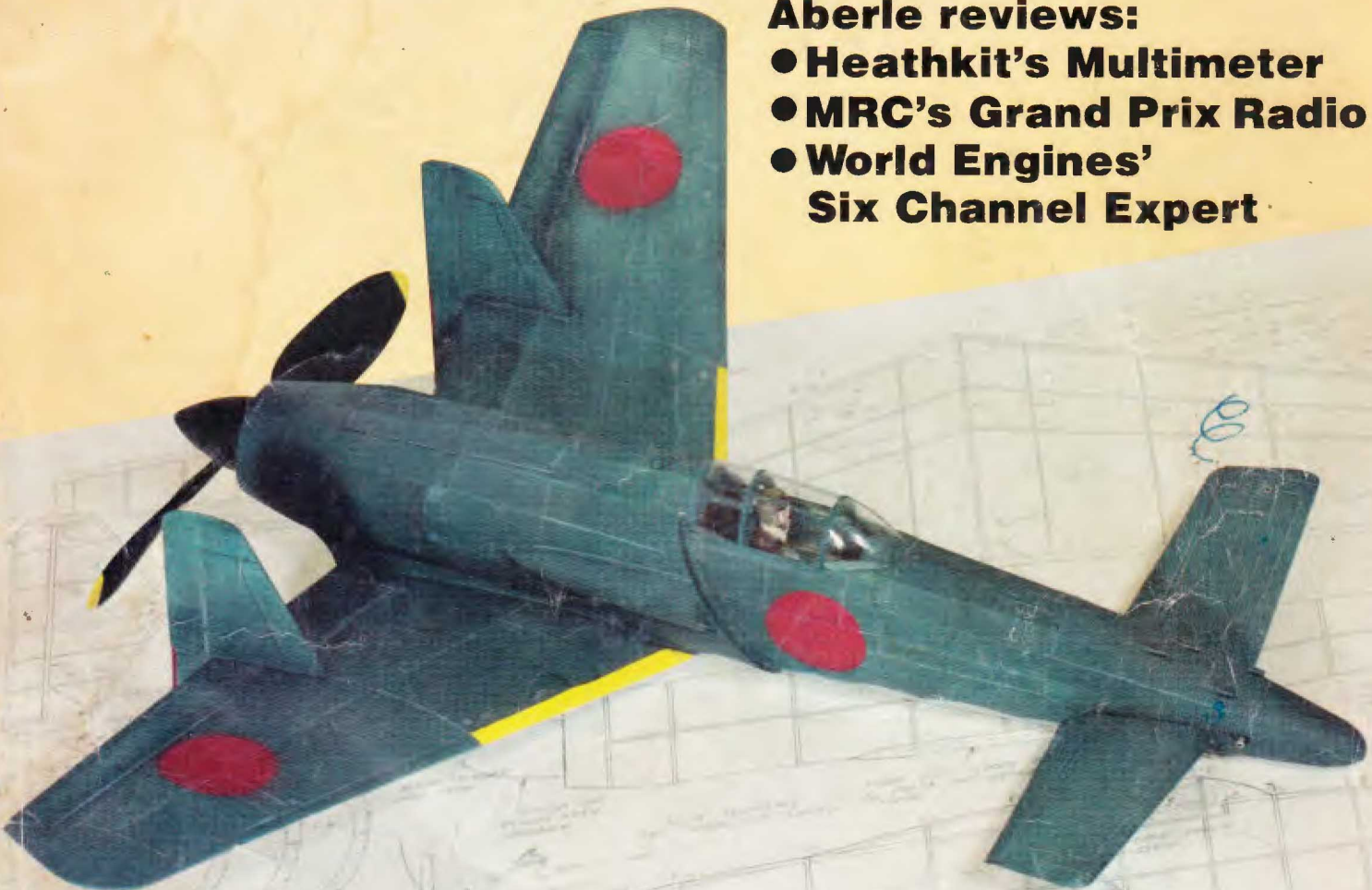
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flying **models**



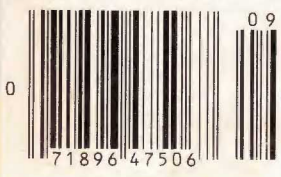
R/C Boats
Racing Cars

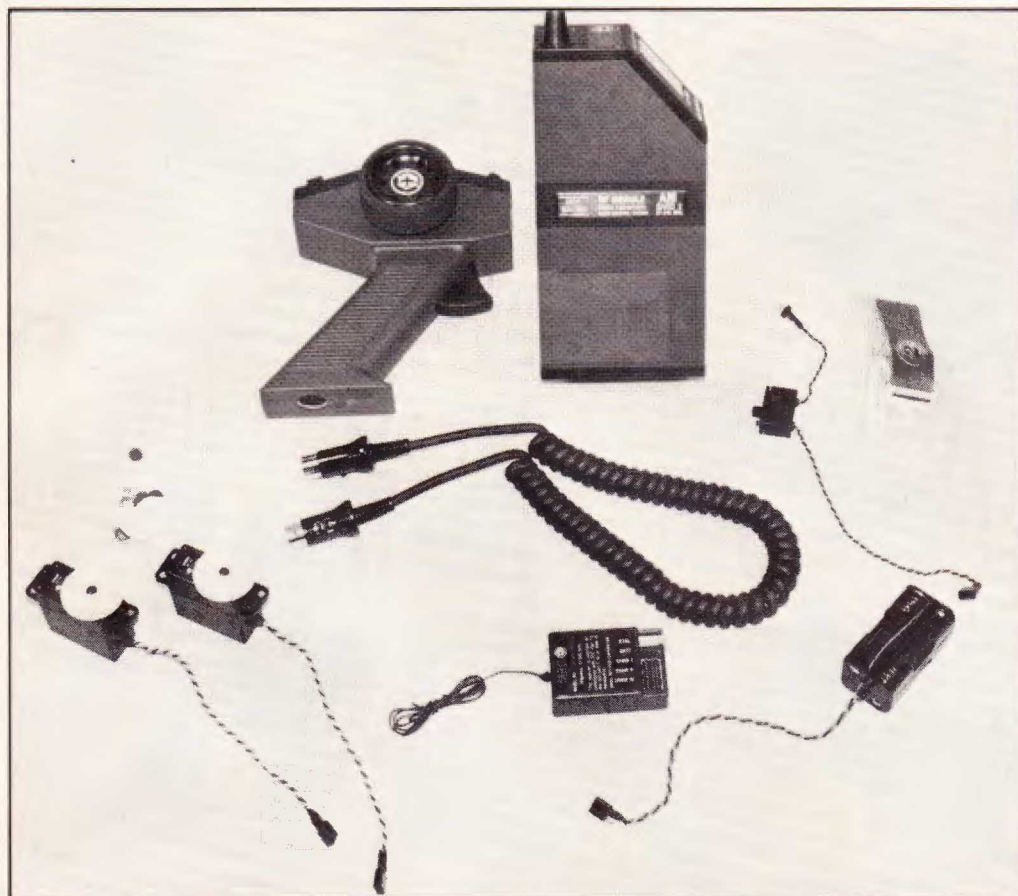
- Aberle reviews:**
- Heathkit's Multimeter
 - MRC's Grand Prix Radio
 - World Engines' Six Channel Expert



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AMA Rubber Scale





PHOTOGRAPHY: BOB ABERLE

An FM Product Review:

MRC's Grand Prix Radio

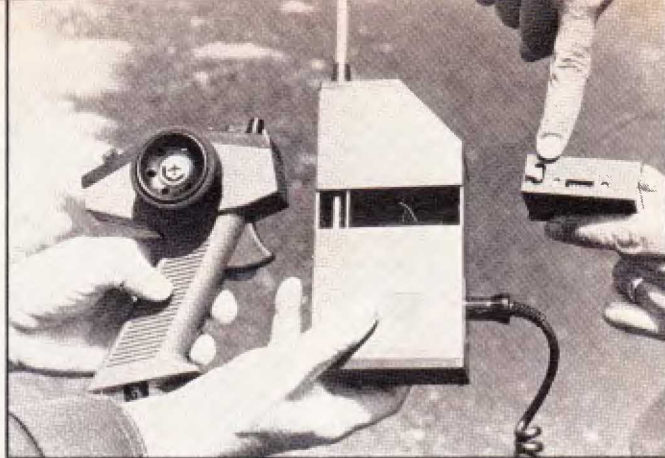
By Bob Aberle

A new concept in radio systems for
the R/C car or boat racer.

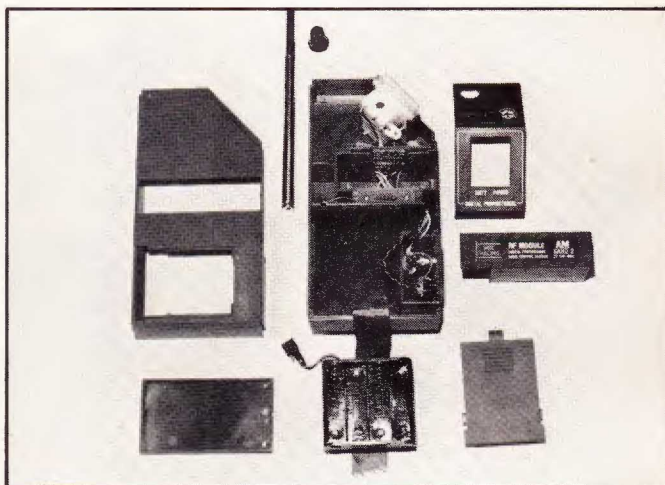
This past February, while attending the WRAM Show at White Plains, New York, I got my first introduction to several new radio systems designed expressly for the R/C car enthusiast, but with possible application towards R/C boating as well. The interest in these areas has grown to the point where manufacturers have finally decided it is time to offer R/C systems to meet their special needs.

One of the first of these systems to reach me for product review purposes was the MRC Grand Prix series three channel unit.

The specific system I received was MRC's Model HJ-105 which lists for \$214.95. It contains the new and separate speed handle control, dry batteries, two waterproof/ball bearing servos and is on 27 MHz. MRC indicated that this particular system would be best suited for 1/8th scale gas cars and also off-track electrics (because of the rugged servos). Also available is the identical system as just described, but on 72 MHz (Model HJ-110) for \$219.95 list. Finally, MRC will offer a Model HJ-115 which is essentially identical to the above, except for the substi-



R-F module removed from transmitter (**above**). Author points to the removable crystals in the module. Assembled transmitter and Speed Handle Control unit (**left**). Transmitter mounts on belt or pocket. Remote transmitter completely disassembled (**below**). Requires 8 A-A penlight batteries.



tution of two VR-62, standard (not waterproof and no ball bearing) servos and available on 27 MHz for a list price of \$194.95. This system, with its smaller and faster servos, is best suited for the 1/12th scale electric powered cars.

Now, let me describe the MRC Grand Prix Model HJ-105 system in detail. The \$214.95 list price buys you the following items: a remote three channel transmitter module; new speed handle control; battery boxes to hold dry, non-rechargeable alkaline type battery cells (both for receiver and transmitter); a three channel receiver; two VR-120 servos; switch harness; frequency flag; assortment of servo output wheels and mounting hardware and an instruction manual (although I didn't receive one with this particular system). The system just described is available on all the 27 MHz R/C channels. You can also obtain the same system on the allowable 72 MHz R/C channels by specifying MRC's Model HJ-110 (which lists for \$5.00 more). Remember, you can only change transmitter frequencies legally on the 27 MHz channels, but not on 72 MHz. In fact on the 72 MHz R/C channels you can only legally operate a "non-aircraft model" on the following frequencies: 72.160, 72.320 and 72.960 MHz.

MRC Grand Prix Transmitter

If you still haven't noticed, the key feature of this new system is the *two part* transmitter. Years ago electric powered slot car racing was extremely popular. These cars followed a slot in the race track (which provided the

electric power and steered the cars as well). You, the modeler, simply operated a hand grip (trigger) for the speed control. Eventually, slot car enthusiasts got into full R/C control where steering came into play as well as speed (throttle) control. Many car modelers still like the trigger speed control and, in fact, in many cases modify their R/C transmitter for that type of throttle control. This new MRC system has been "human engineered" around the needs of the R/C car operators. Both the steering and the throttle controls are contained in a separate "Speed Handle Control". This is connected through a coiled cord type cable to a "Remote Transmitter Module". In actual practice the transmitter module is attached to your belt (towards the rear of your body). You hold the speed handle control in your left hand (your left index fingers operates the throttle control) while the right hand does the steering using a standard wheel type control.

The remote transmitter module measures 7 1/4 inches high x 3 1/2 inches wide x 2 inches thick. It weighs just 17 ounces with a full compliment of eight (8) dry (A-A size) alkaline batteries. These batteries are accessible through a removable trap door located on the lower front portion of the case. These eight cells will cost you approximately \$6.00, so you may want to consider eventually installing rechargeable nickel-cadmium cells. A charging jack is already included in the circuit, permitting direct change over to nickel-cadmium batteries when you are ready. MRC offers the rechargeable batteries

as an option. I measured the transmitter current drain (with alkaline cells) at 125 MA., and with Nickel-cadmium cells at 100 MA. Measured R-F output was 800 MW (8/10th of a watt) with alkaline cells and approximately 600 MW while using nickel-cadmium cells. The reason for this difference is that the alkaline cells have a slightly higher characteristic voltage.

The antenna, mounted on the transmitter module, is an eight section whip which measures only 29 inches when fully extended. It will also fully collapse for storage purposes. On the angled side (top) panel of the transmitter you will find two individual meters. One for monitoring R-F output, the other to check on battery voltage. At the rear of the case is a metal bracket measuring 1 1/4 inches wide x 3 1/2 inches in length which hooks on to your belt and provides a positive attachment for the remote transmitter module without any fear of it falling off.

Now lets talk about the speed handle control which I like to refer to as simple the control head. A 2 inch diameter, rubber lined, wheel is provided for the main steering control. On the top of the control head is a power switch (rotary type) with an L.E.D. indicator to let you know when the power is on. This is the only switch that will allow the transmitter to be turned on. So you can only operate the transmitter with the control head plugged in. In the middle of the control head is a steering channel trim lever. With this control you can fine tune your neutral steering position. The amount of trim authority

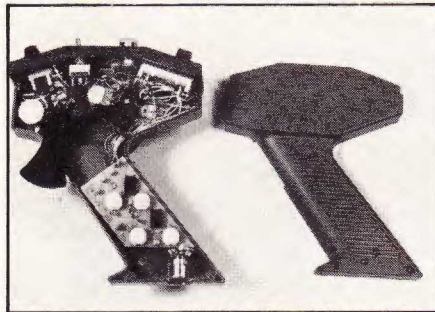
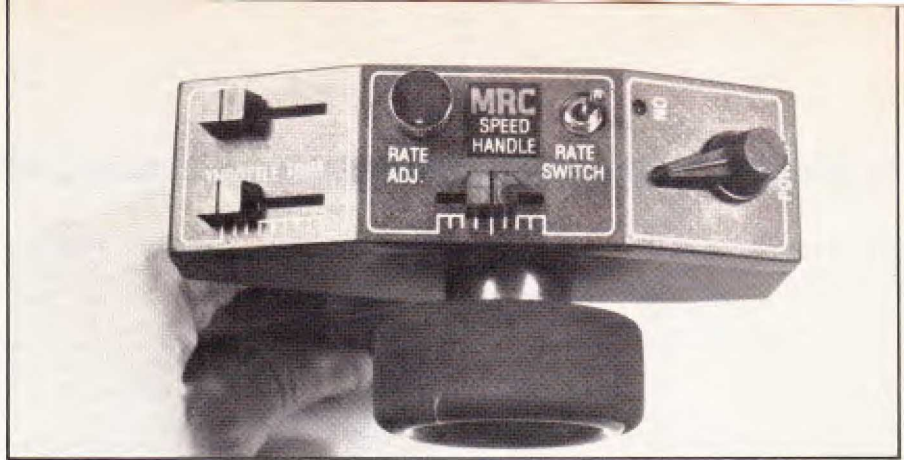
was measured at ± 10 degrees (20 degrees total travel). There is also a dual rate switch and a rate adjust control located in the center portion of the control head. The dual rate switch is not marked "high" or "low" rate. When positioned to the right you get full steering control which amounts to a servo rotation of ± 40 degrees (80 degrees total travel). When the dual rate switch is moved to the left position, you will be able to use a "Rate Adj." pot control to reduce the steering servo travel all the way down to only ± 6 degrees (total of 12 degrees travel). In actual practice I can see the R/C car operator leaving the dual rate switch on (to the left) all the time and simply using the "Rate Adj." as a span control to set up the steering for the particular track conditions. Switch it or adjust it, the choice is there for you to make. On the left side of the control head is a third channel level. It is proportional (but without a separate trim) and will provide a total servo travel of 80 degrees. This extra channel would be better for the R/C boat enthusiast since most car operators require only two channel type control. If you use the third channel function on the transmitter you must purchase an extra servo since only two are supplied with the basic system. "Throttle Trim" is the last control on top of the control head. The actual throttle channel is operated by a spring return trigger on the hand grip. Unfortunately, the trigger can't be moved past it's normal stopped position for the purpose of applying brakes. You would, therefore, have to use the throttle trim lever to do this which means that you would have to momentarily have to take your right hand off the steering wheel control. Possibly someone will come up with a simple modification to cope with this minor problem. The main steering wheel control moves only 35 degrees off center in either direction (70 degrees total movement from full left to full right).

Now for the big surprise! If you remove two small screws from the hand grip portion of the control head you will find a series of extra controls. I must admit that I missed these features while observing this radio at both the WRAM's and Toledo shows. Inside the handle you will find a servo reversing switch for both the steering and throttle channels. Likewise you will find separate end point servo travel adjustment pots for both the steering and throttle control functions. That means you can set up the servo for more right than left control or for more servo excursion on either end of the throttle control function.

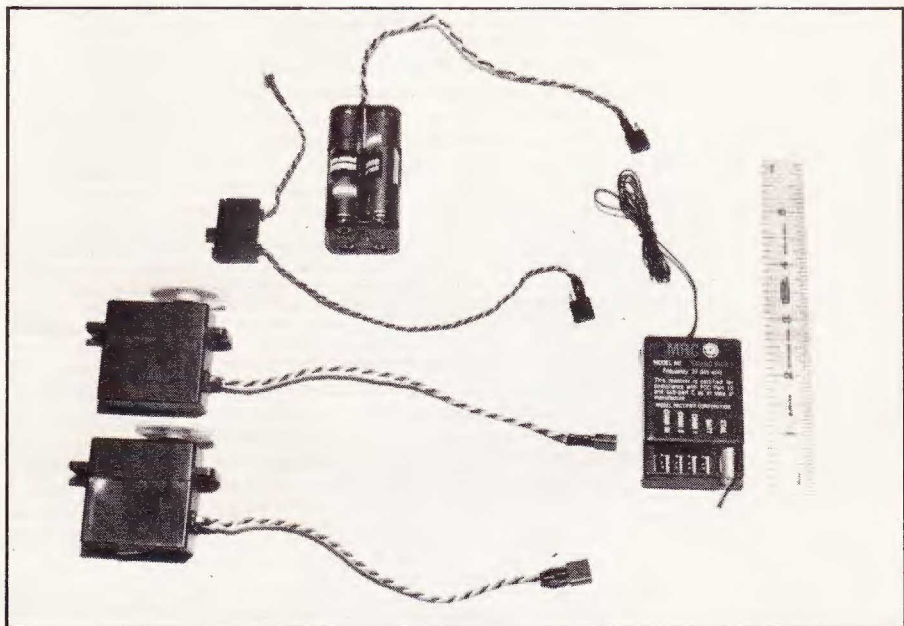
Car Pack Description

The new MRC Grand Prix three channel receiver measures $2\frac{5}{16}$ inches long x $1\frac{1}{16}$ inches wide x $\frac{3}{4}$ inch thick and weighs just 1.3 ounces. Crystals can be easily plugged into one end of the receiver case for quick frequency changing. All connectors plug directly into the case. The connectors are Mitsumi type with gold plated pins. They can be soldered by the modeler quite easily which is a real plus if maintenance is ever required.

Servos supplied with this system are the new MRC VR-120's. They measure $1\frac{5}{8}$



Bob Aberle shows how the MRC Grand Prix radio is used in actual operation (above). Top view of Speed Handle Control unit (top). Major controls visible. Inside Speed Handle Control unit (above left). Quite an assortment of electronic parts here. Additional controls found by removing one side of handle grip (left). Steering and throttle channels have reversing switches. Each of these two channels also have individual throw controls. All in all, a very versatile radio. Loaded with features.



Road pack for the Grand Prix radio. Receiver is at right, with battery pack at top center. Servos at left are standard with this radio. Smaller servos are available with other models.

inches long x 1 1/8 inches high x 3/4 inch thick (less output wheel and mounting flanges). Each servo comes with both a 1 inch and a 1 1/4 inch diameter output wheel (with no pre-drilled holes in either case). Output shaft has a spline gear which permits easy neutral position adjustments. The VR-120's have a waterproof "O" ring seal around the case halves along with a ball bearing supported output shaft. Individual servo weight is 2.0 ounces including the 6 1/2 inch long cable.

A battery box is provided for the car park (equipment that goes in the car) which measures 1 1/4 inch square x 2 1/4 inches long and weighs 3.8 ounces when holding four alkaline type cells. You can substitute rechargeable nickel-cadmium cells or you may even wish to tap off the main power supply if you are running an electric powered race car (or boat). A simple switch harness is provided (without a charging jack) which weighs 0.2 ounces. Total weight of the car pack (re-

ceiver, two servos, dry battery pack and switch harness) is 9.3 ounces. Without the battery pack it is just 5.5 ounces.

Current wise the receiver idle drain is 21 MA. With two servos added the total idle drain is approximately 35 MA. With one servo in continuous motion I measured 300 MA and with two servos in continuous motion I measured a total, average current drain of 500 MA. These readings were taken with alkaline battery cells which have a slightly higher voltage level than nickel-cadmium batteries. I think this is a good indication that the alkaline cells won't last too long while powering the receiver and servos. The nickel-cadmium rechargeable cells or the direct power tap off the R/C car battery seems the better approach.

Comments on Operation

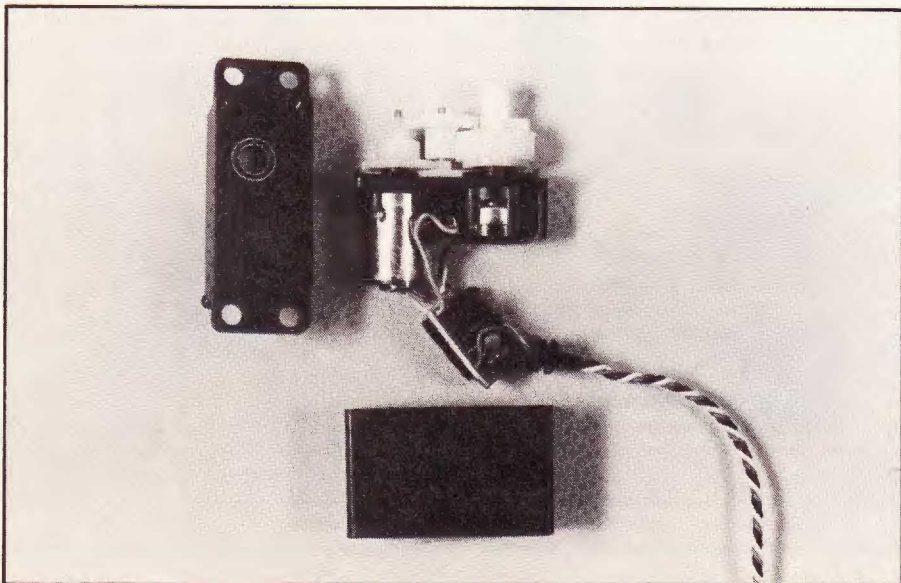
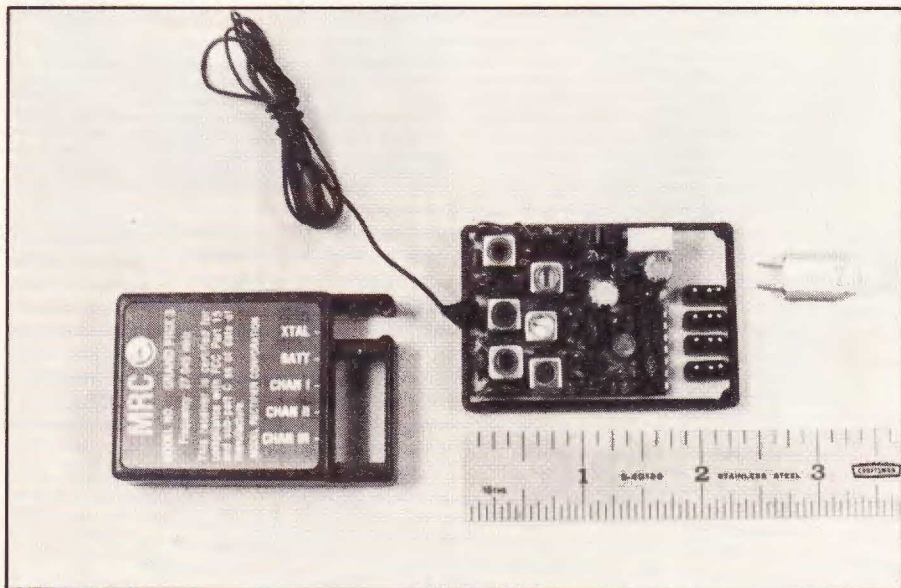
Since this is the first real departure from standard R/C control of cars (or boats for

that matter), I predict that it will take a little getting use to. The experienced competitor may very well stay with what he has for the moment. In the future I see the "Speed Handle Control" concept will catch on and possibly replace the standard two stick R/C transmitter. For my initial testing standpoint I found it quite easy to find a comfortable location for the transmitter module on my belt. Something towards your right, rear, is about optimum. In that location you can still see the transmitter's meters and yet not have the whip antenna get in your way. One of the things missing that I think would be helpful is a hook on the speed handle that would let you hang the handle on the transmitter module when not in use. Otherwise you need an extra hand to constantly hold on to the handle. A microphone attachment connector from a CB set would work out fine for this application. When you are ready to operate the car or boat all you have to do is reach around and disconnect the speed handle from the transmitter module.

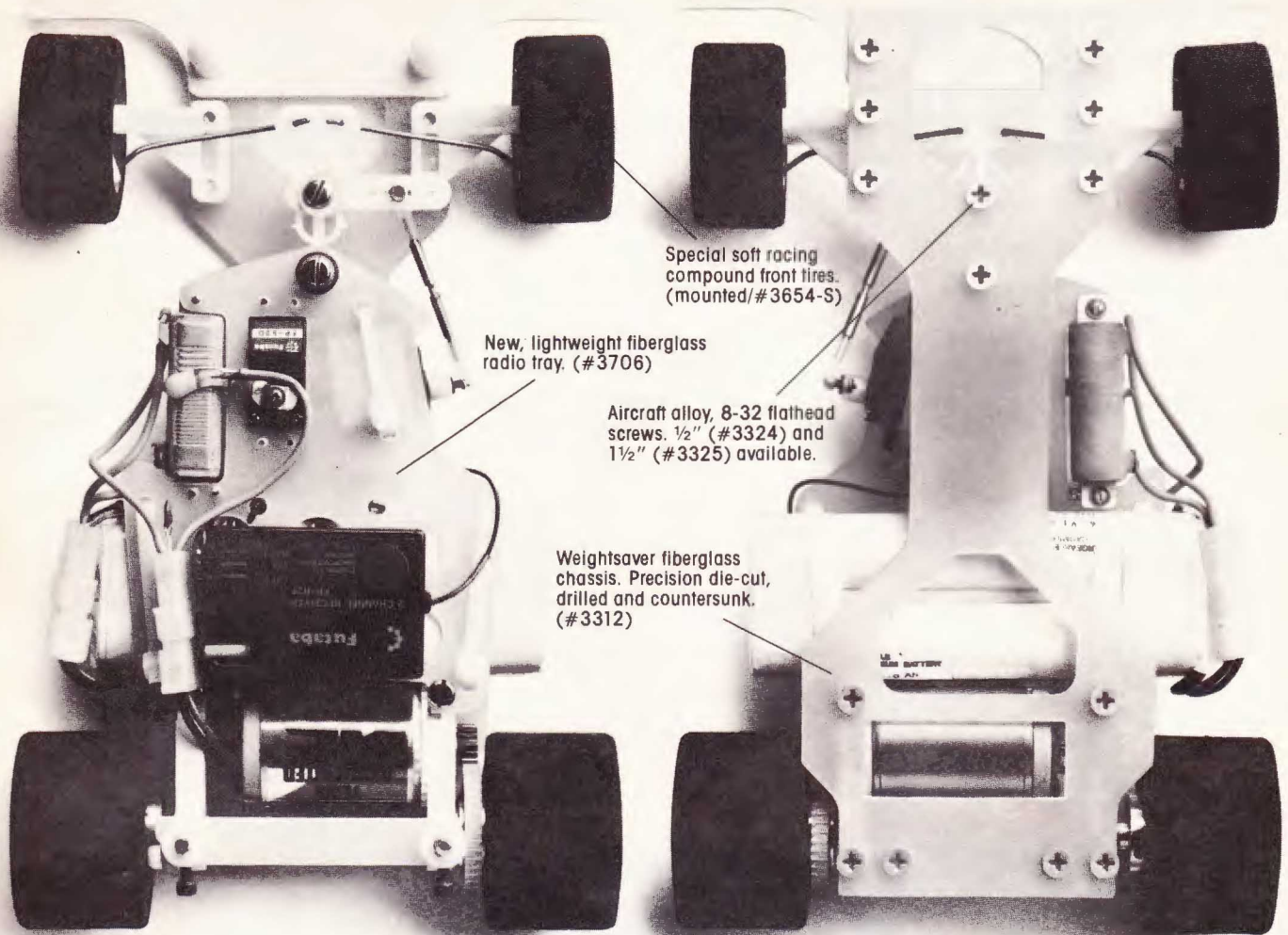
The servos applied with this system were both fast (around 0.4 seconds for full rotation) and responsive. Centering accuracy under no load conditions was under 1 degree when returning from full travel. I did notice some shift in the neutral steering position when switching on the dual rate function (when a lot of steering trim was being used). If you keep your dual rate switch on all the time as I suggested before and use the "Rate Adj" pot as a span control, then you wouldn't be bothered by this neutral shift. About the only thing I feel that still needs resolution is the application of brakes after the throttle control is released (idle or stopped position).

I might also mention that MRC is also offering an alternate "Twin Grip Handle" for those who wish to have a separate control head, but don't necessarily want a speed handle control. The twin grip unit would be ideal for both R/C boats and aircraft operators. Space limitations unfortunately will not permit a review of that option at this time.

My review system was a prototype and therefore did not come with an instruction manual so I can't comment on that. The regular MRC one year limited warranty applies to the new Grand Prix system as well. If you still have questions or would like a detailed brochure I suggest you write to the folks at MRC. Their address is: Model Rectifier Corp., 2500 Woodbridge Ave., Edison, New Jersey 08818.



Inside the MRC Grand Prix three channel receiver (above left). Note that crystal is removable on this 27 MHz receiver. This compact unit weighs in at 1.3 ounces. Inside the MRC VR-120 servos (left). Output shaft has ball bearing support. For boaters, the servo is sealed with a water-tight "O" ring. This servo, designed for 1/8 scale gas cars, is fast and accurate. Smaller servos for 1/12 scale also available. The Grand Prix radio also comes with a dual stick transmitter for use by those who prefer sticks to steering wheels. Take your pick and go racing.



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Starting Line

By Jack Russell

Indoor championships

Yes, all you laid back California racers, there is an indoor R/C championship. Parma International decided it was time to give the indoor crowd a major race to decide a national champion, so the U.S. Indoor Championships were born. All the "Orphan Annie" indoor racers can thank Parma president Ken MacDowell for being their "Daddy Warbucks". The race took place on April 25 and 26, at Brookpark National Guard Armory, in Cleveland, Ohio. Sixty seven racers registered for the championships and 64 actually took part. The field included racers from Michigan, Illinois, Indiana, Texas, New York, New Jersey, Ohio and, for that international flair, Canada.

When the dust settled Sunday, it was Ralph Burch, Jr. who came away as the first ever U.S. Indoor Champion. The young Texan won the "A" main by a lap and a half over Todd Little of Illinois. Terje Haugen, of Indianapolis, was third, followed by Steve

Koepp, Bruce Shaffstall and Tom Miller, all of Ohio. The "B" main was won by Buddy Bartos and John Huron took the top spot in the "C" main. For Ralph Burch, Jr. this was his second big indoor win of 1981. He's really established himself as one of the best drivers in the country, and he's done it at the ripe old age of 13. (That's okay. One of these days Ralphie, and Mike Lavacot and Kent Clausen will start taking girls a little more seriously and leave some room for us older guys with bad reflexes to win a couple of trophies.)

Congratulations to the winners and all the other participants in the first U.S. Indoor Championships. The N.O.R.C.A.R. club did a fantastic job of running the race, and as an indication of how well things went, there were no disagreements between racers and officials at any time during the entire week-end of racing. Not bad, when you consider there were 64 racers on hand.

Credit should also go to Parma, American

Modeler and Hobby Hut hobby shops for their sponsorship of this event. Ken MacDowell, of Parma, tells me they hope to make this race an annual event.

U.S. Gran Prix East?

There will be a U.S. Gran Prix East in 1981. The 1/1 scale guys may not have their act together, but the 1/12 electric racers can count on a big Formula One bash in October, courtesy of FLYING MODELS.

Mark October 4th as a red letter day on your calendar. That's the date of the FLYING MODELS Gran Prix East. As if you couldn't guess, F1 bodies will be used and the cars will be run under ROAR Modified class rules. ROAR membership and an FCC license will be required for registration!

We'll have more details about the FM GP East in the September issue. In the interim, get your F1 cars ready. The race will be held in northern New Jersey at a venue convenient for racers in the northeastern part of the U.S., as well as racers in the eastern portions of the midwest. Stay tuned for further details.


Curvaceous bodies

How are you at picking out svelte bodies? No, not the kind displayed by the Dallas Cowboys cheerleaders, but the kind that goes on your red hot racer. Are all the curves in the right place? (Not the blonde, your race car, remember?)

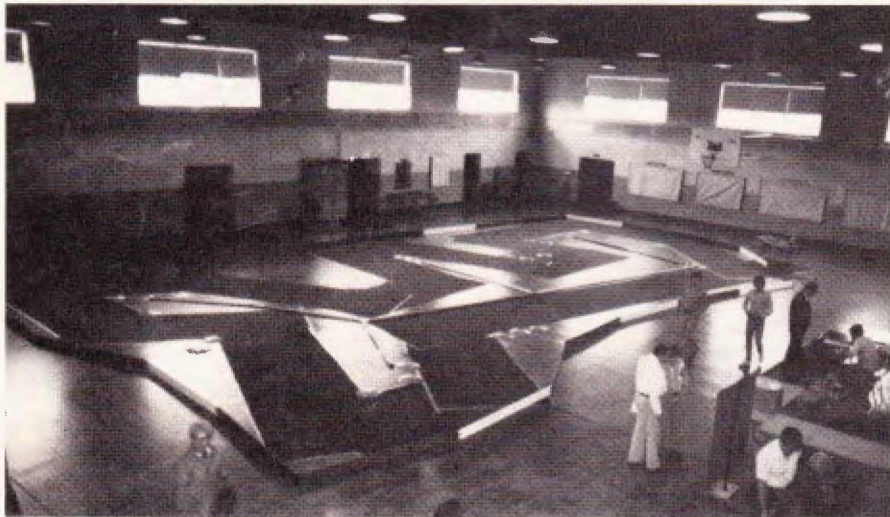
Just like members of the opposite sex, curves in the right place can be great. Curves in the wrong place can be a drag. You wouldn't want your latest missile (or the blonde) to have any excess drag, now, would you?

Bolink Industries is trying to clear all this up. I don't know how much research they've done on blondes, but Bob Rule tells me they have been wind tunnel testing a number of 1/12 scale bodies, both their own and other manufacturers. The figures they have come up with show total drag of each body tested, as well as pressure (or in some cases, lift) on the front and rear wheels. I have seen some of the results, and they are interesting.

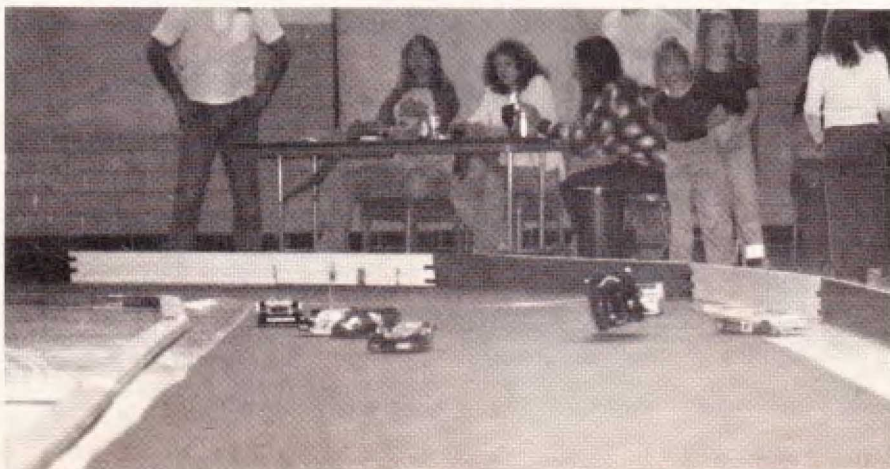
The real question is: how much practical use do these figures have under real running/racing conditions? Anyone who has done any work with model airplanes knows that full scale aviation formulas do not always apply to models because of the vast difference in the Reynolds numbers under discussion. The same holds true with 1/12 scale cars.

When all the information is available from Bolink, FLYING MODELS will present the findings. Although you may be skeptical about the real value of the wind tunnel tests, I think you will be surprised at the negative effect an old, beat up, body has (at least theoretically) on the handling of a 1/12 scale racer. Stay tuned for the results. 

PHOTOGRAPHY: DENNIS CALKINS



Bird's eye view of track at Brookpark National Guard Armory (above), site of U.S. Indoor Championship. Track surface of indoor-outdoor carpet. Some of the racing action (below). NORCAR club hosted event.





An FM Product Review:

Delta's Pocket Rocket

By Dean Hughey

The smallest R/C racer to date turns every living room into a speedway.

Have you ever been snowed in for an entire winter and the only place flat enough and dry enough to run a car is just a little too small? Not everyone has this problem, but for those of us who do, it can sure drive you crazy waiting for the spring thaw. Delta Manufacturing has been working on this problem for some time and has come up with one solution and a great one at that. It's called the Pocket Rocket. It's a 1/18 scale car packed with performance and is specially suited for confined area racing.

At a quick glance, one might think this car is just another toy, but on closer inspection

you will find a full-fledged race car. Don't let the size fool you, this tiny car is as potent as a baby rattle snake.

The basic components are much like that of its 1/12 scale sister. The chassis and radio plate are 1/32 fiberglass. The front suspension consists of a one piece aluminum cross member with nylon steering blocks. The steering blocks are connected to a special servo arm by ball joint tie rods. This set-up makes for a very precise steering system. The rear end is fairly standard with one exception, the rear motor pod is a one piece aluminum extrusion. This not only makes the rear end as solid as a rock, it also acts as a

heat sink to disipate motor heat. All in all, a very straight forward chassis layout.

The electrical system consists of a 6 cell 250 mah battery pack and a very efficient electronic speed controller. The speed controller has a dual mode feature that is really nice. Mode 1 has forward and reverse with electronic brakes while mode 2 is forward only with dynamic brakes. Mode 2 gives you a little better acceleration, but you give up the capability of being your own track marshall by not having reverse.

The car is very well engineered and goes together in a very short time. This is mostly do to the excellent fit of all of the parts. The kit is quite complete, only the radio gear is needed. This also saves time in assembly because there is no need to run to the hobby store for more parts.

The body comes unpainted and is highly detailed, all the way down to a molded in driver. The first bodies released for the Pocket Rocket are the Kroll Can-Am and Porsche 935 GT. Soon to be released will be a Corvette, Spyder Can-Am, Schkee and for those dirt track oval fans, Delta will have two bodies in the near future which should be of interest. One is a modified Pinto and the other is a Sprint car body. Both are by Roy Moody.

Although there is no official racing circuit for the Pocket Rockets yet, there are a few tracks springing up that are specially built for them. One such track is inside a restaurant in Canada. It just so happens, the owner of this establishment is none other than Formula 1 driving ace, Gilles Villeneuve. Gilles has a small fleet of Pocket Rockets running now and is so pleased with the performance and the response towards the cars, that he intends to expand his fleet. In fact, he is planning on a chain of these restaurants with Pocket Rocket track inside. Definitely a different experience in dinning out.

I feel the Pocket Rockets are going to give more people the opportunity to get involved in car racing due to the fact that these cars can be raced in almost any garage or medium sized basement. Available space to run has always been a big problem. With the Pocket Rocket, space will no longer be such a big factor. So if you need a car that will give you great performance in a confined area or you are just looking for a new experience in R/C car racing, I highly recommend you try one of Delta's new Pocket Rockets.

PHOTOGRAPHY: DEAN HUGHEY



Delta's Pocket Rocket is 1/18 scale, which is slightly smaller than established 1/12 scale electric cars (above). The Pocket Rocket comes as a kit (left). All the parts are there and the end result is a real racer. A fun car.

R/C Auto clinic

By Jack Russell

Have you sent your car to the R/C racing fat farm? It's all the rage these days, you know. It seems like everybody who goes fast or wants to is trying to shave grams, or good ole' American ounces, off their cars. The process can become an obsession if you're not careful.

The latest rage here on the east coast is the graphite chassis pan and drilled out, hogged out parts mounted there on. This craze began right around the time the March issue of *FLYING MODELS* hit the news stands. March FM had a photo of Mike Lavacot's experimental, graphite chassis Associated car. Since Associated's trend setting carries the weight of Orson Welles and his twin brother, Slim, graphite chassis pans sold out in most hobby shops within a couple of weeks.

Shortly after the graphite buying spree, I was in Toledo for the Weak Signals show and caught up with Associated's Roger Curtis. Roger and I talked about many things, including graphite chassis. Surprisingly, Roger told me that Team Associated had gone back to fiberglass chassis! Why? It seems that graphite chassis worked well on certain tracks, but became a real handful on others. Since the Associated team runs on a number of differing tracks surfaces, they feel it is better to have a single chassis which will work on all surfaces, rather than have a graphite chassis car for certain tracks and a fiberglass pan car for the others. It makes sense.

In addition, Roger told me that Associated has a new fiberglass chassis, ready for delivery, which places the flex point of the pan in a slightly different position. Also, Associated's team racers have been running a Kydex chassis stiffener down the center of the fiberglass pan. Quite a departure from the light, stiff, twisty graphite chassis which became the overnight rage in Yankee land.

I got into the lightweight discussion recently with Don McKay of JoMac. In case you haven't been paying attention, the JoMac Lightning 2000 has been cleaning up, at least indoors, over the past winter. JoMac has been experimenting with making their car lighter, and the results are pretty much the same as those obtained by Associated. Graphite is nice, but . . . it has drawbacks. Don told me something which took me by surprise. Graphite will stress, and break-down quicker than a quality fiberglass chassis. In the wings at JoMac is a Lexan chassis for the Lightning 2000. This chassis, with the lightweight front bumper for the 2000 brings the car close to ROAR minimum car weight. From what Don tells me about

the Lexan chassis, it is doing very well under the stresses of actual racing. That directly contradicts some popular notions about Lexan, which have that material being very pliable and susceptible to taking a set (becoming permanently bent) warp very easily.

In the final analysis, the jury is still out on graphite. If it works on your track, and you do not race elsewhere, then it may be a good material for you to use. If you do your racing at a number of tracks, with different surfaces, graphite may not suit all conditions. Fiberglass will work on most tracks, but may not be optimum on some surfaces. Lexan is still in the experimental stages. It, too, may become a popular chassis material. You pay your money and takes your chances.

Don't just follow the leader. If you think you have a chassis material that will work, give it a try. You just might come up with the special hot track that will become the next big rage!

The chassis material is only part of the lightweight story. In order to reduce weight, many folks have been drilling, filing, and generally cutting away all unnecessary material on such assemblies as the "A" arms, front blocks, rear blocks and radio trays. Another favorite for a visit to the fat farm is the set of wheels on your car.

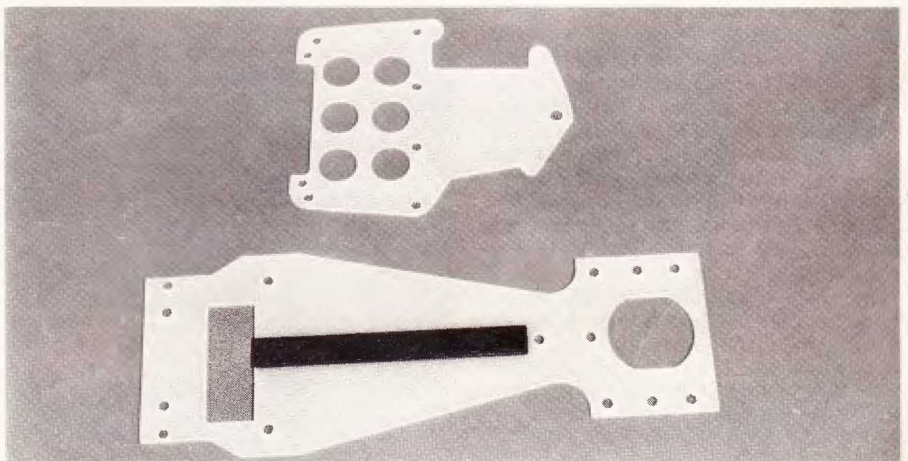
Starting with the front end assemblies, remember just one thing. In most cases lighter

also means weaker when it comes to drilling or filing. If you run without a front bumper to protect the wheels and tires, lightening such parts as the front blocks could be disastrous. There is a tradeoff between ultimate light weight and ruggedness.

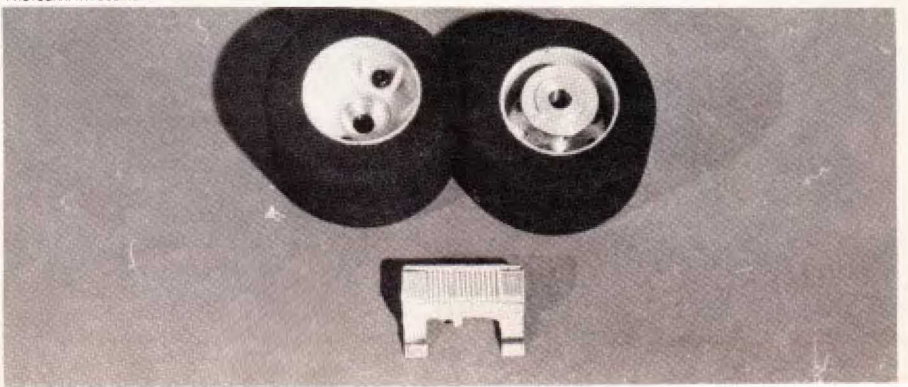
Moving back to the radio tray, there are a number of things being done to remove weight. For those who drive stock Associated cars, there is the lightweight, fiberglass radio tray. Lightweight fanatics will not be satisfied with this though. Bob Emott, proprietor of B.I.R. Hobbies in Union, NJ, has come up with the ultimate lightweight shaker tray. He doesn't use one! Bob has devised a way of mounting a mini-sized speed control resistor on a Bantam Midget servo, and it totally does away with the need for a shaker plate. Bob tells me he will be marketing these little gems, too.

Finally, we arrive at the back of the car. A lot of people have been grinding the rear blocks to remove excess weight. Again, don't overdo it. You can weaken the back blocks with too much filing and cutting. A simple way to save weight in the rear portion of the car is to use a graphite axle. As for the wheels, both front and back wheels can have every other spoke cut out, if you're that much of a fanatic.

Personally, I'm working on helium filled sub-C nicads to help make my car lighter. After all, it works for the Goodyear blimp! ☺



PHOTOGRAPHY: BOB HUNT



Associate's new "wedge" chassis and lightweight radio tray (above right). This fiberglass chassis and Kydex dampener is an alternative to graphite. Parma's lightweight resistor and wheel/hub assembly for cars on a diet (below right).

Pit report



MODEL RECTIFIER CORPORATION, 2500 Woodbridge Avenue, Edison, NJ 08817, announces the ultimate in off road racers . . . the Land Jump 4WD. This four wheel drive vehicle is designed to be used with a .19 to .21 sized engine, with MRC recommending either an Enya 19X or 21X. The four wheel drive is accomplished by using chain drive with a torque clutch on the front sprocket to even out the power between the front wheels. The chain tension is adjustable. A disc brake and centrifugal clutch are standard, as is a radio box for protection of your R/C system. A special muffler and fuel tank come with the kit to retain scale appearance and give good use. The trailing arm suspension system with oil shock absorbers soak up the bumps, while the chassis and roll cage gives great handling in the rough stuff. For further information write to the above address.



BOLINK INDUSTRIES, 420 Hosea Road, Lawrenceville, GA 30245, has come up with a new, non-toxic, water soluble paint for R/C car bodies, and it's called "Mr. Concours". This paint comes in two ounce, wide mouth jars. It has been formulated to be used on Bolink Tuffak bodies and any other type lexan car body. "Mr. Concours" paint comes in 7 colors, and can be brushed or sprayed. Water is all that is required for clean-up of either brushes or spray guns. This new Bolink paint is used and recommended by Frank Pupello, winner of the 1981 Winternational Concours award. For more information write to the above address.

DELTA MANUFACTURING, 27 Racecar Court, Lorimor, IA 50149, is producing a conversion kit to turn any resistive type quick



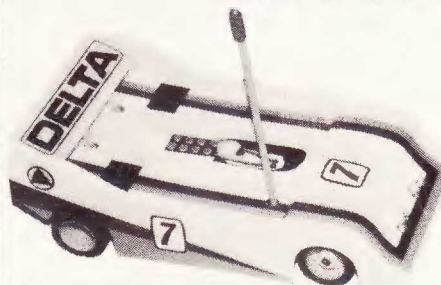
charger into a constant current charger. The model ACK-800 includes all parts necessary to make the conversion, even solder. Com-

plete instructions are included with the kit to aid in assembly. Price is \$15. For more information write to the above address.



Announcing

The Delta Pocket Rocket A NEW RACING CLASS 1/18th SCALE



not a toy -
a precision quality
competition designed
R/C Racing Car
several body styles available
dealers & dist. inquiries invited
see your local dealer
manufacturers of 1/8, 1/12
& 1/18 race cars & accessories

Delta Manufacturing, Inc.

27 Race Car Court, Lorimor, IA 50149
tel. 515/763-2220

New LEISURE DIGITAL Auto Charger



\$99.95



New digital charger designed for the serious modeler who wants to obtain top performance from NiCd batteries. Features a large (1/2" high) LCD readout, which stands out even in strong sunlight. Digital meter is designed to read both current and voltage to better than 1% accuracy. Unit also contains a variable rate charger which allows selection of a constant current charge rate up to 4 amps. Permits charging any size NiCd from 250 ma up to 1.2 AH. Built-in equalizer circuit tops off battery overnight for top performance at that big race. As with all LEISURE chargers, this digital unit is manufactured with original, quality electronic components, and is warranted for 60 days from date of purchase.

See your local dealer, or order direct.

LEISURE ELECTRONICS, 11 Deerspring, Irvine, CA 92714
Phone (714) 552-4540

DELTA MANUFACTURING, 27 Racecar Court, Lorimer, IA 50149, has a complete line of tires for 1/12 scale cars. Delta grades each individual rubber donut for hardness to ensure consistent rubber density in each range of tires. Delta produces both front and rear tires, with the rears available in two different diameters. For more information write to the above address.



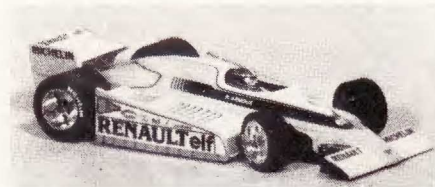
TEAM TRINITY

TRINITY PRODUCTS, P.O. Box 86, Brooklyn, NY 11228. For those racers who would like to modify their motor with a different wind, but are afraid to tackle rewinding, Trinity Products has an entire series of hand wound armatures for Igarashi motors. All Trinity armatures are hand wound with the best wire available. All contact points are welded and the armature is epoxied in a vacuum chamber. The commutator is diamond trued and the armature dynamically balanced to the lowest tolerances available. Winds available include number 22, 22½, double 25, and 25/26 double wire. For more information write to the above address.

TRINITY PRODUCTS, P.O. Box 86, Brooklyn, NY 11228. Double sided tape is used in a number of applications in R/C race cars, and Trinity is now marketing its own tape, model RC#11 Super-Stik Servo Tape. This foam tape measures ½"x1/16", and comes on a 62" roll. The tape can be used for mount-



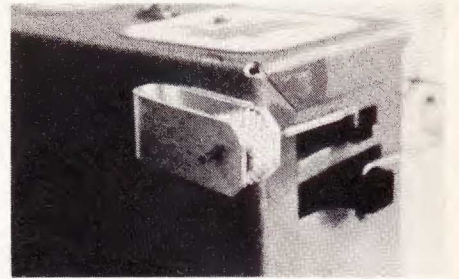
ing receivers and servos, and it features a very high tack adhesive to keep things in place during the rigors of racing. For more information write to the above address.



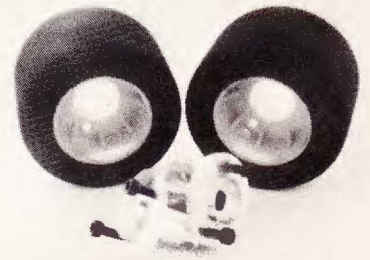
MODEL RACING PRODUCTS, 12706 N.E. 124th Street, Kirkland, WA 98033, has released the Renault RS23 Formula One body. The RS23 is the latest in F1 technology and its superior aerodynamics and design yields a superior handling 1/12 body. The RS23 has plenty of room for chassis and batteries. It is available either clear or painted, #933 or #933P. For more information write to the above address.

MODEL RACING PRODUCTS, 12706 N.E. 124th Street, Kirkland, WA 98033, has engineered a wiper arm and button specifically

for use in 1/12 scale electric cars. The model 534 wiper arm features a special phosphorous-bronze contact that cuts wiper resistance and increases power. The wiper arm is designed to fit all electric car applications. For more information write to the above address.



PARMA INTERNATIONAL, 13927 Progress Parkway, North Royalton, OH 44133. To allow the racer to get an infinite brake setting from his Futaba steering wheel radio, Parma has introduced a new brake adjuster. This unit uses a threaded rod and wheel to fine tune the trim tab on the popular Futaba radio. Use of the brake adjuster eliminates the detent clicks on the trim tab and allows fine adjustment of brakes for varying track conditions. For more information write to above address.



PARMA INTERNATIONAL INC., 13927 Progress Parkway, North Royalton, OH 44133, makes it easier to change tires and wheels on an Associated Differential with the introduction of their new Tiger rear wheels and hubs. The Tiger wheels allow the racer to change wheels without removing the lock-nut which holds the differential together and keeps it adjusted. For more information write to the above address.



PARMA INTERNATIONAL, 13927 Progress Parkway, North Royalton, OH 44133, announces the latest addition to its line of 1/12 scale bodies, a Go-Kart. This body, complete with molded in driver, is made of lexan. The Go-Kart will fit any 1/12 chassis currently on the market. For more information write to the above address.

WANTED!

RACERS WHO DARE



TO BE DIFFERENT

The **CHALLENGER** is now available in Mid-engine and European Rear Engine styles. Both styles are available for ROAR legal production racing or complete with a hot modified hand-selected motor & a BoLINK/Schumacher differential ready for serious racing right out of the box.

- Working Wind Tunnel for testing bodies
- Hot New Open-Sports Body - C.A.C.-1 (pictured above, #BL-2087)
- (MR. CONCOURS) Paint - 7 exciting colors - Water Soluable, Brushed on or sprayed

NEW
from
BoLINK

420 Hosea Rd., Lawrenceville, GA 30245
Send \$1.00 (refundable) for complete catalog.



MRC'S GRAND PRIX WILL LEAVE EVERYONE ELSE EATING YOUR DUST OR FLOUNDERING IN YOUR WAKE

Races are won in the corners:

Competitive car and boat racers know how important it is to have precise control through the turns or around the buoys... they'll tell you how tough it is to win if you can't put that model right where you want it... lap after lap after lap.



The racer's radio: MRC's Grand Prix radios are designed to give you that control. They're designed specifically for cars and boats, whether you race them to win or run them for fun. Check out these special features: **LIGHT-WEIGHT.** The transmitter and battery hang on your belt—all you have in your hands is the lightweight control unit. That makes a big difference in enduro races. **BUILT-IN SERVO REVERSING.** Makes throttle and steering installation a breeze—no more mickey-mouse linkages or special servos needed. **ADJUSTABLE DUAL-RATE STEERING.** With the flick of a switch you go from sensitive steering down those high-speed straights to full-throw response for quick action in the turns. **THIRD CHANNEL.** Use it for onboard fuel mixture control, boat trim tabs, or any other third-function use. **PLUG-IN CRYSTALS*:** Change frequencies on the spot so you can race all day without interference. **RUGGED SERVOS.** Dual ball-bearings on the output shaft for smooth action, water resistant construction for protection.



Get into the future, now: Don't use a radio intended for airplanes. Get with the radios designed from the start for car and boat racing. The MRC Twin Stick or Speed Handle GRAND PRIX series. The radios you must have to be competitive.

**Per FCC requirements, plug-in crystals available only on 27 MHz.*

Twin Grip
Easily held two-stick control features trimmable adjustable-neutral throttle stick on left, steering stick on right. Third channel and dual-rate controls and switches are on top.



Transmitter

Hangs on your belt with antenna out of the way. Transmitter features battery voltage meter, RF output meter, plug-in RF module with plug-in crystal* for quick frequency change.



Speed Handle

Human-engineered pistol grip puts everything in perfect position—steering on the wheel, throttle on the trigger, third channel and throttle trim under your thumb, dual-rate controls on top.



Model Rectifier Corporation

2500 Woodbridge Ave., P.O. Box 710 Edison, New Jersey 08818