

Again, it is a happy privilege to extend a warm welcome to all of our old and new friends here this weekend for the 13TH ANNUAL H.O. PROFESSIONAL RACING ASSOCIATION NATIONAL CHAMPIONSHIP RACES. Our greatest satisfaction is your pleasure. We hope you have an enjoyable time at this year's race. Rick Denig

Our sustaining members are those businesses and individuals that each year provide the financial base and support for our many activities, most of which are free to the public. Truly these are the stars of the H.O. 13th Annual National Championship races.

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The 13th Annual H.O. National Championship Races

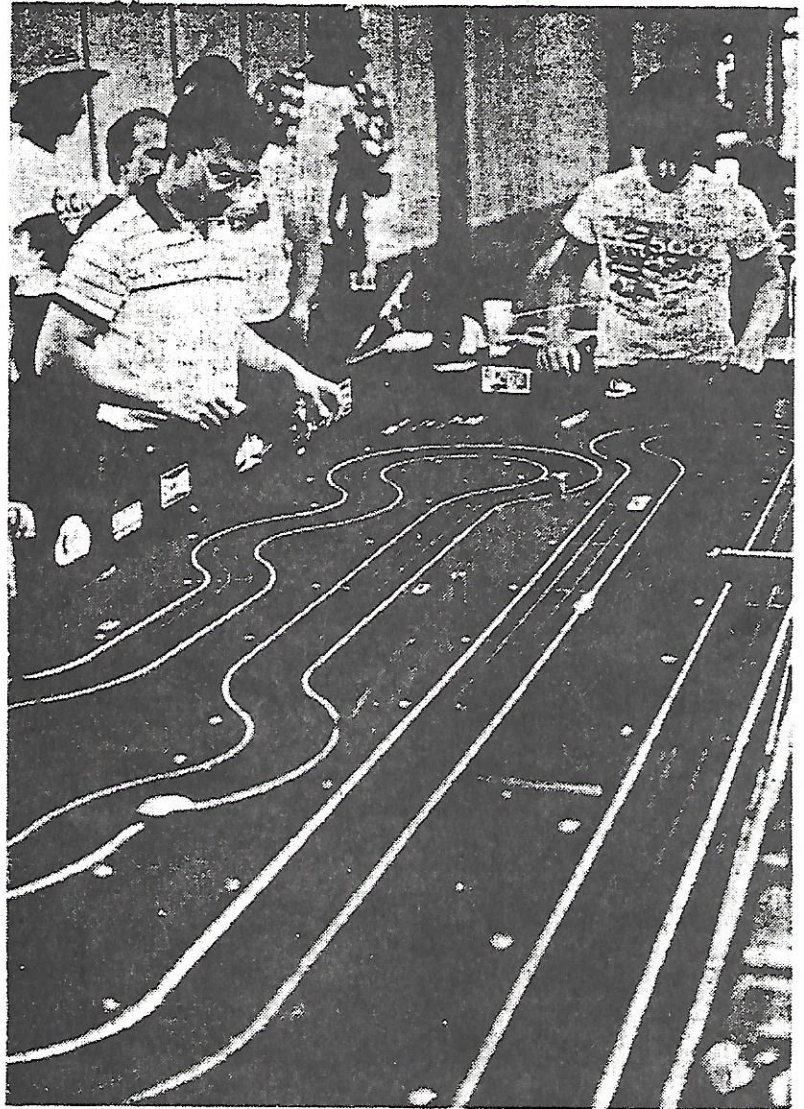
H.O. - THE FIRST WORD IN HOBBIES!!

Welcome to our H.O. model car racing workshop! As an H.O. racer you are part of a group of MILLIONS (yes, millions!) of home racers who enjoy this low cost and fun hobby/sport!

We hope to show you how to have more fun with your hobby, by showing you how to build, maintain, & drive your H.O. cars better. We will also have a brief competitive event to show you how we conduct a race and to introduce you to competitive racing. Only one of you will win that race, but you will be winners by just competing, because in a sport as competitive as H.O. racing, the only losers are the people who lack the courage to even try to win. The important thing is to give it your best shot and to learn from each race & if you lost, prepare harder for the next race and try again; if you should win, congratulations, but don't let it go to your head! You will lose more times than you'll win in our hobby/sport, but that's part of the fun of H.O. racing!!

Our goal in this workshop is to provide you with the information that will help you enjoy your hobby more, and also to introduce you to H.O. racing as a sport. We hope you will join us in the future in organized events.

Note: We would like to take this opportunity to thank "The Jackson Citizen Patriot" "M.A.R.A.", and "H.O.P.R.A." for granting us permission to reprint photographs and information from previous NATS.



(Photos by Tom Nelson)

Amateur racers run their cars through the time trials on Saturday in preparation for the Sunday finals. The National Championships featured both Amateur and Professional class racers.



H.O. - THE FIRST WORD IN HOBBIES!!

I. DRIVER:

- A. the weakest link in the chain
 - 1. learn discipline and control so you can "tune out" distractions during your race
 - 2. learn to accept the challenge of balancing driving skill with mechanical knowledge
- B. least expensive link to improve
 - 1. establish a testing program to measure your progress.
 - a. laps per minute
 - b. feet per second
- C. practice practice practice
 - 1. practice to improve
 - a. learn braking points
 - b. learn where to accelerate
 - c. learn to drive ahead of your car to avoid collisions
- D. compete
 - 1. THE best way to improve your skills
 - 2. realize that you aren't going to win every time out, but prepare as if you will

II. TRACKS:

- A. without a consistent quality race facility, it is difficult to gauge your progress
- B. it is NOT necessary to own a track to be involved
 - 1. race with a group or a club
 - 2. help a friend with their track
- C. size of the track is less important than the quality of the track
 - 1. several National Races have been held on tracks as small as 4' X 12'
 - 2. many club races are held on tracks 4' X 8' and even 2' X 8'
- D. some track suggestions:
 - 1. permanently mounted
 - a. protects track from breaking
 - b. protects track from "rug fuzzies" and "hair bearings"
 - c. makes it easier to race when you want to

2. enough power for consistency
 - a. eliminates surges when another car falls off
3. jumper wires
 - a. please don't attempt this without help
4. all track joints level or "step downs"
 - a. will protect cars from sudden stops

(SEE DIAGRAM #2)
5. reliable lap counters
6. master switch to turn all lanes on together for fair starts
7. timing device
8. color coded lanes
9. sponge or other soft crash barriers
10. alligator clip controller hookups
11. unobstructed driver visibility
12. keep it clean with WD-40 on a rag

III. CARS:

- A. Tyco Magnum 440 X-2
- B. lightweight Lexan body
 1. mounted with velcro or 1/16th aluminum tubes and cut off straight pins
- C. proper tires
 1. compound
 - a. silicone
 - b. sponge(easier to adjust height)
 2. height
 - a. low enough to improve handling
 - b. high enough to prevent overheating.
 3. keep clean with sticky side of a roll of tape
- D. motor brushes and springs
 1. stock or high performance
- E. gearing
 1. experiment with different ratios

(SEE DIAGRAM #3)
- F. develop a maintenance schedule
- G. use a pre-race checklist:
 1. body mounted properly.
 2. pickup shoes clean and not overly worn (clean with eraser)
 3. pickup shoes travel freely up and down
 4. motor brushes and springs clean and fresh enough to last through the whole race

5. motor brush tubes clean (clean with a pipe cleaner)
6. properly oiled
 - a. ends of armature
 - b. axles
 - c. gears
 - d. DO NOT OVER OIL !!!!
(SEE DIAGRAM #4)
7. check axles for hair or fuzzies
8. chassis checked for damage
9. guide pin checked for excessive wear
10. tires proper size and rounded
(SEE DIAGRAM #5)
11. tires cleaned with tape
12. proper gear selection for this track
13. gears meshing smoothly
14. controller wires hooked up properly
15. rear axle in the right way
 - a. car will run backwards if reversed. On a Tyco the gear always goes on the side with the pointed magnet
16. spare parts and controller nearby
17. is your head screwed on right?
 - a. relax
 - b. drive like you practiced
 - c. drive your own race, don't let the other driver get to you

IV. CONTROLLERS:

- A. match ohms to track and car
 1. more ohms, more control, less response
 2. less ohms, more speed, more response, less control
- B. alligator clip hookups
 1. most common meathod used
 2. allows other people to use their own controllers instead of yours
- C. recommended: Parma 25 ohm

V. TOOLS:

- A. minimum requirements:
 1. oiler
 2. small screwdriver
 3. needlenose pliers
 4. cardboard nail file(to trim tires)

5. tweezers
6. masking tape
7. magic marker(to test tire heights)
8. pen or pencil with eraser
9. test track with hole to view bottom of car
(SEE DIAGRAM #6)

B. optional tools

1. micrometer(to check tire sizes)
2. ohmeter(to check your armatures, tracks, etc.)
3. magnet tester (homemade to check relative strength of
your magnets so you can race your best set)

VI. TESTING:

- A. some "pro" racers have test tracks with all available radius
and one good size straight to see how the car works
- B. keep records of how you had your car set up for each track you
race on and how well that set up worked.
- C. test your components:
 1. check your tire heights by marking your chassis with a magic
marker. Run a few laps to see if the marker is wearing off
evenly and enough
 2. check your armature's ohm readings. Look for the one that
registers the lowest to be the fastest (usually)
 3. check motor brush tension. More tension may improve speed,
but may cause overheating and loss of coast
 4. check pickup spring tension. Too much tension will cause
your car to deslot easily, too little tension will cause
poor electrical connection
 5. check for proper pickup shoe wear. Bend shoes to make
maximum contact with the track rails
 6. check chassis for grooving. Use magic marker to see if
chassis is wearing evenly.
- D. try to improve your lap times while you are testing to get twice
as much from each test session

VII. TROUBLE SHOOTING:

- A. experience is the best teacher
- B. car won't run? Check:
 1. no power to track
 2. controller not hooked up or broken
 - a. try another controller or your car on another lane

3. are your pickup shoes on properly and clean?
4. are your motor brushes in your car?
5. do you have a pair of magnets in your car?
 - a. if you have two of the same polarity magnets in the car,
it will just sit there and hum until it burns out.
6. are your axles bound up?
 - a. tires pressed too far
 - b. gears set too tight
 - c. "hair bearings" or other foreign matter binding axles
7. are your axles popped in?
8. is the track clean enough to run on?
- C. car runs, but not well? Check:
 1. pickup shoes clean?
 2. is car oiled?
 3. is car over oiled?
 4. are axles free wheeling?
 5. are motor brushes and springs in good shape?
 6. is a motor brush broken?
 7. are your tires too low?
 8. are your tires clean?
 9. is your driver doing his part?

VIII: RACING FORMATS:

- A. there are as many race formats as there are different groups racing
 1. H.O.P.R.A. 2 and 4 bracket systems
 2. M.A.R.A. style round robin
 3. crash and burn
 4. running set number of laps
 5. running against the clock
- B. most important point: **fairness to all entrants**

IX: ATTITUDES:

- A. this is a hobby/sport. you will never get rich doing it
- B. this is supposed to be fun. If it is not for you, let us know why
and we will do our best to change it!
- C. if H.O. racing is not a pleasurable pastime for you and you intend
to make everyone else miserable, I know where you can find some
people who can get you started in radio control, or train, or.....

Diagram #1

HOW FAST IS FAST?

Number of feet per lap _____
 Number of Laps per minute x _____
 Number of feet over full lap + _____
 + = Feet per minute + = _____
 (to find feet per second[F.P.S.],
 divide this number by 60)
 Feet per minute from above _____
 Times 60 minutes x _____
 = Feet per hour = _____
 ÷ By 5280 (1 mile) ÷ _____
 = Actual M.P.H. = _____
 x 1/64th scale x 64 _____
 = Scale M.P.H. _____

Diagram #1

FT. PER SECOND	ACTUAL M.P.H.	SCALE M.P.H.
10	6.8181	436.3636
11	7.5000	480.0000
12	8.1818	523.6363
13	8.8636	567.2727
14	9.5454	610.9090
15	10.2272	654.5454
16	10.9090	698.1817
17	11.5909	741.8181
18	12.2727	785.4545
19	12.9545	829.0908
20	13.6363	872.7272
21	14.3181	916.3635
22	15.0000	960.0000
23	15.6818	1003.6363
24	16.3636	1047.2727
25	17.0454	1090.9090
26	17.7272	1134.5454
27	18.4090	1178.1817
28	19.0909	1221.8181
29	19.7727	1265.4545
30	20.4545	1309.0908

Diagram #2

DIRECTION OF TRAVEL



TRACK TRACK TRACK

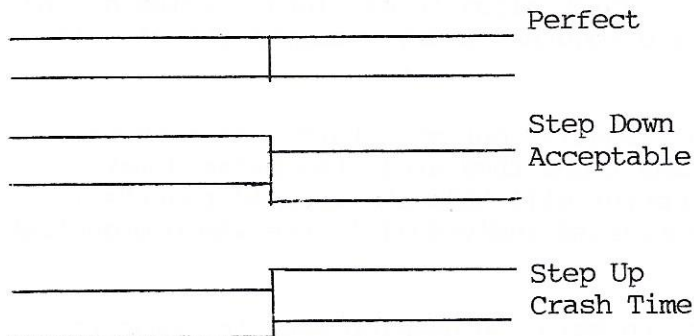


Diagram #3

Victory Lane Gear Ratio Chart

6-15...2.5:1	7-15...2.14:1	8-15...1.87½:1	9-15...1.666:1
6-19...3.16:1	7-19...2.71:1	8-19...2.37½:1	9-19...2.111:1
6-20...3.33:1	7-20...2.86:1	8-20...2.500:1	9-20...2.222:1
6-22...3.66:1	7-22...3.14:1	8-22...2.750:1	9-22...2.444:1
6-25...4.16:1	7-25...3.57:1	8-25...3.12½:1	9-25...2.777:1
6-26...4.33:1	7-26...3.71:1	8-26...3.250:1	9-26...2.888:1

Diagram #4

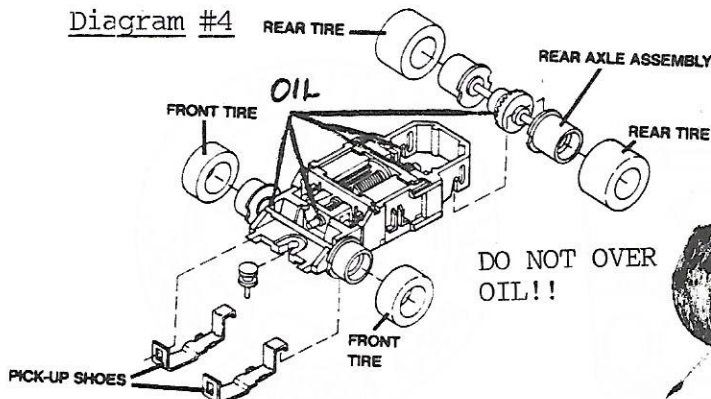
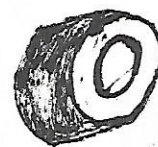
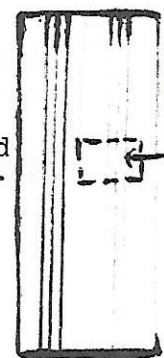


Diagram #5

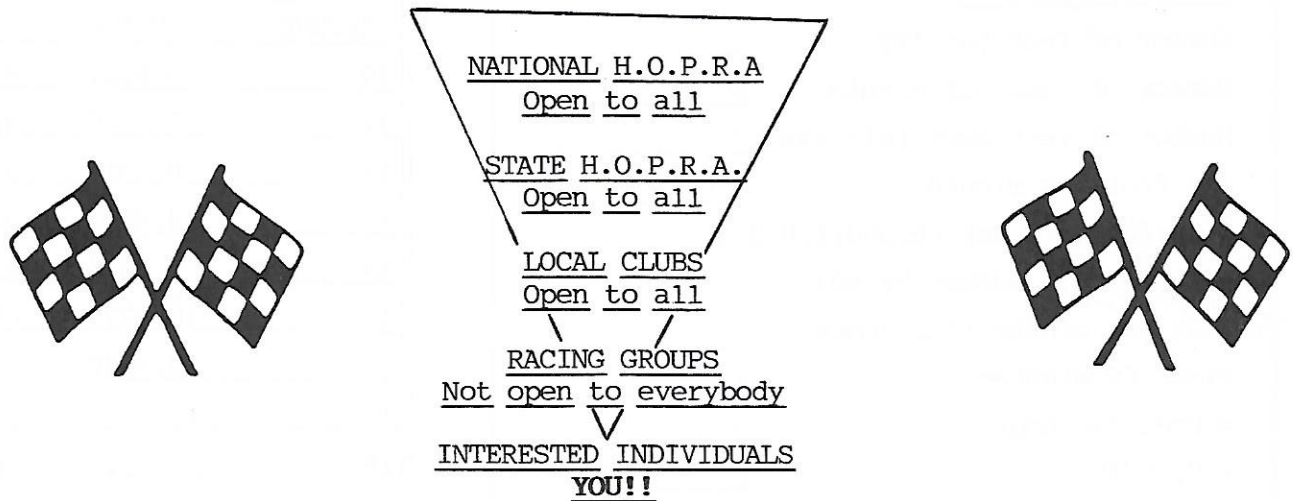


Use nail file
to lower tires and
round off corners.
Tires should have
a rounded edge.

Diagram #6



Cut Out



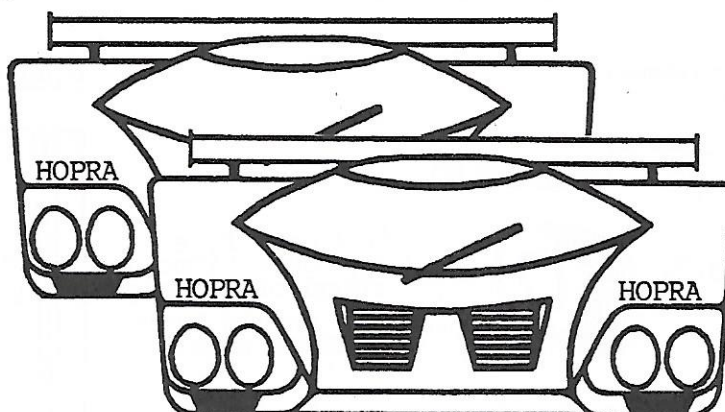
H.O. racing is bigger and more well organized than most people realize, but the structure shown above truly reflects the realities of our organization. At the top of the organized racing is the National H.O.P.R.A., a group of dedicated longtime racers and knowledgeable new comers who put on a National race annually and who determine rule book guidelines with input from all across America. The next step are the state organizations which allow local clubs, racing groups, and interested individuals a forum to race together under a common set of rules (usually the national rules).

Think of this inverted pyramid when you visualize our structure. When things are a little unstable at the top (and many times they are), the pyramid may sway a little, but the strength of the center will hold the pyramid together. However, if we loose the bottom (the interested individuals), the whole organizational structure will topple!

That's why we are holding this workshop, to help you develop your interest in H.O. racing. We invite you to join us in organized racing to increase your enjoyment of our hobby/sport.

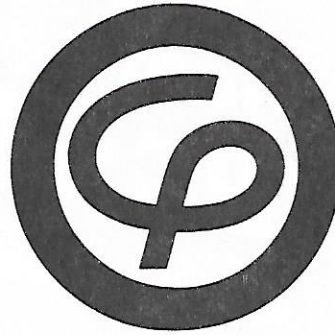
Thanks for your attendance! We welcome any questions or comments and we would like to ask you to do us (and yourself) a favor, the next time you do this, or any other activity, bring a friend along. It will more than double your fun.

See you at the races!!





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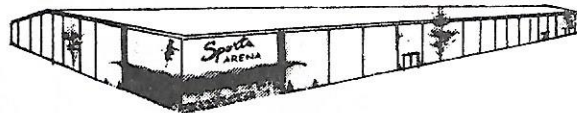
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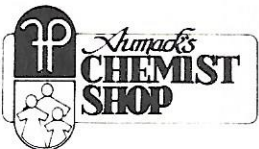
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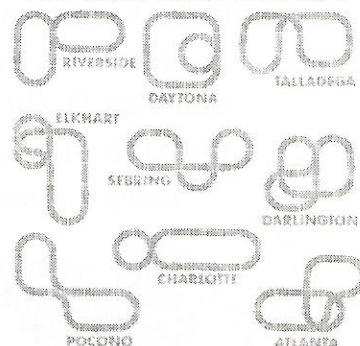
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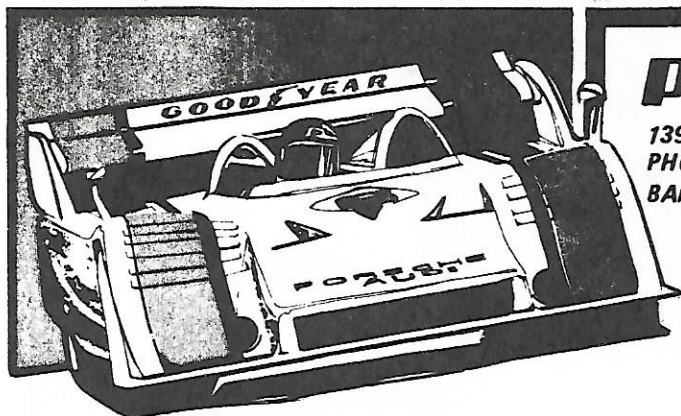


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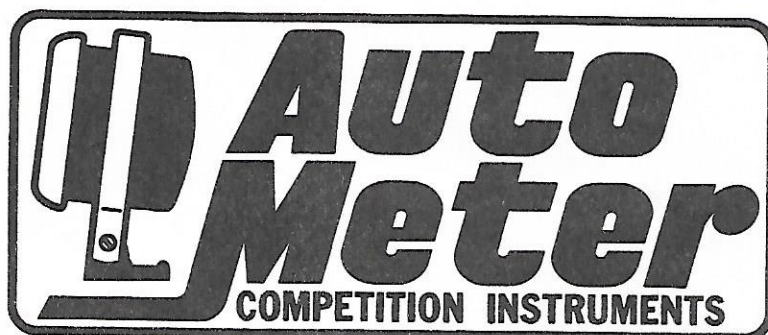
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- To think only of the best, to work only for the best and to expect only the best.
- To be just as enthusiastic about the success of others as you are about your own.
- To forget the mistakes of the past and press on to the greater achievements of the future.
- To wear a cheerful countenance at all times and give every living creature you meet a smile.
- To give so much time to the improvement of yourself that you have no time to criticize others.
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