B&G Racing Computers®

OPERATING INSTRUCTIONS 3-10-96 FOR VERSION 44

NOTICE   NOTICE'   NOTICE   NOTICE   NOTICE   NOTICE   NOTICE

OPERATION NOTE:
If the compuler ever stays on afler it has been turned off, or is acting funny, or is making a strange noise, press the CA button that is near the ON/OFF switch or just lum it off. Otherwise call me in case of difficulty.

There are two basic uses for this computer. The first utilizes a group of programs that evaluate the weather, and help the user make fuel system adjustments to correct for weather changes. The second part is a collection of programs that predict or evaluate vehicle performance, and aid in engine design.

The effects of proper fuel mixture on engine performance are as follows:

Horsepower is contained in the fuel being used, The more fuel per second an engine can use, the more power it makes, It is important that the fuel/air ratio be maintained at all times to develop as much power as possible, and profect the engine from damage. In a normally aspirated engine, the amount of fuel that can be run through the engine depends on the quality of the air it will be exposed to. Since the fuel/air ratio must be maintained, bad air limits the amount of fuel an engine can use. When a blower is used, the overdrive can be increased to make up for bad air.

There are two ways to check the air/fuel ratio. The first is plug color and condition. In Drag Boat racing this is dficut   because the boats have to idle around to their tow vehicle. This changes the plug color and condition. One solution would be to have the sanctioning organization provide a practice day for mixture adjustments. The boat drivers could cut their engines at the finish line, then be towed around to their tow vehicles. This would give them an opportunity to check their plugs. Once a reference "Best Run' is determined, this compuler can duplicate that fuel mixture for upcoming race day weather, This mixture can be duplicafed anywhere in the world and throughout the year. To do this, you would need to evaluate the weather by using the Density Altitude program, then select a new mixture by using the Pill, Jet, Nitro, or Fuel Pump and Blower Overdrive program. If the 'Best Run" mixture was off, then the new mixture will be off also—but by the same amount. That way you will always know where you are mixture wise. By using the Orifice % program, adjustments can be made to correct the new mixture when using the Pill or Jet program. The Nitro, and Blower Overdrive programs already are using percentages: therefor, Percentage changes are just a mater of adding or subtracting the amount you want. Blower overdrive uses the form: 45% over is entered as 45, while 10% under is entered as −10. Blowers are not very linear devices. If you need to make greater changes than 5%, then you may want to make a change that is a little richer than what the computer says, ihen recheck the mixture via plug color and condition, exhaust gas temperature, etc., readjust if necessary, then make another change. Remember, changing the blower overdrive from 45% to 50% will lean the mixture by adding more air while leaving the fuel the same. To increase the effective size of you engine, you can up the overdrive on the blower to simulate a larger engine, then make the main bypass pill smaller to keep up with this extra air.
You can use the Combination Change program to solve for a new Main Bypass Pill, but always try a richer pill than what the computer says just to be on the safe side. All blowers are different and any time you make several changes at once or a radical change of any kind, it is always good to sneak up on the new combination.

The other method used to check the air/fuel ratio is lo monitor the engine performance in relation lo weather conditions. This method is more of a double check against the first method. If you looked at a mixture VS horsepower curve, you would notice the rich side of maximum horsepower is more horizontal lhat the lean side--which tapers off more rapidly.

Most engines are set on the rich side so they can run all year round, and travel from a high altitude city lo a sea level city without running to lean. This is why during a race, at night, a car will usually run better as the sir gets cooler. Cooler air means a lower Density

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Altitude, and thicker air.. If the fuel remains the same, the mixture will be getting leaner. As the mixture gets leaner. the engine will develop more power because it is approaching the maximum horsepower point. It is advisable to stay slightly on the rich side for two reasons. The first is: there would only be a minimal loss of power: the second is: engine damage will usually occur if you operate on th lean side. This engine damage can happen if your engine is barely on the lean side, minimal damage can be detected by a white plug color with black speckles on it. These speckles are part of valves, pistons, and combustion chambers. An ideal plug color would be white with no speckles, but that may be cutting it a little close—better stick with a light tan color. Other warning signs would be: a substance oozing out between the center electrode and the porcelain, blistering of the porcelain, or heat coloration of the ground electrode. More exotic fuels like Methanol and Nitro methane are harder to read. I recommend getting with an experienced racer who can show you, in person, how to read plugs exposed to these fuels. If you monitor the Density Altitude, and noticed the performance of your vehicle increased as the Density Altitude increased — your engine is running in a lean condition. If the Density Altitude increases, the air gets thinner. If the fuel stays the same, the mixture gets richer. If the performance increased, that means the engine liked the richer mixture. This means your engine was operating on the lean side, and is now approaching the maximum horsepower point from the lean side. Thinking of it another way would be: if the Density Altitude gets better (lower) as you go into the evening and night, and your vehicle slows down, then your engine is to lean. Once again, this means your engine is operating on the lean side already, and is now going further down on the lean side. Or – if your runs, during a whole evening of racing, remained close to one ET, then you are operating just a tad on the rich side, and are trending to a tad on the lean side. This is nice, but is very unpredictable. Instead if you are running a little more on the rich side, your car's performance would change with the weather, but would be predictable. In either case, it would be advisable to richen your mixture. The Orifice % program wants to see the lorn 100% = breaking even. 95% would mean making a jet 5% smaller for a leaner mixture, or this would make a bypass pill 5% smaller for a richer mixture. 105% would make any orifice larger. It could be a Jet, Pill, or even a Nozzle. To find the area of several Nozzles, use the form: example 800% = 8 X one Nozzle size in thousandths of an inch (.036" would be entered as .036). If you have several different size Nozzles, use this form for each different size, then add them up.

For Bracket racing or Super Class racing, the mixture only needs to be touched up a few times a year as the weather swings from season to season. The mixture will also have to be adjusted if you travel from city to city with different elevations, temperature, and humidity. Staying on the rich side will also keep the vehicle performance tending predictably with the weather changes. NEVER CHANGE THE MIXTURE DURING ELIMINATIONS OR WHILE COLLECTING DATA FOR THE SET-UP PROGRAMS. For Class racers or other forms of racing where the performance of each car is important, the mixture should be changed when the weather dictates a move to the next possible mixture setting. This could be from round to round or from a heat race to the main event. Typically, you don't have to stay on top of it that closely. You should be enough on the rich side to absorb the air getting a little better during the evening. For circle track racing, adjust the mixture of the end of the race.

OPERATION

After opening the box, set the thermometer/hygrometer out in the weather—not in a car or trailer, or above metal that may get hot and produce heat waves (like a trailer tongue, truck bed, or roof of vehicle). The altimeter is very fragile and should be left in the box. The altimeter reacts almost immediately (30 seconds), but the thermometer and hygrometer may take up to 45 minutes or so to settle down. The thermometer and hygrometer must be kept out in the weather, but in the shade. You could use a styrofoam cooler laying on its side with the open end facing away from the sun (put a couple of bricks in it so it won't blow away). Or at least lay it on a 1 ½' square piece of wood and slide it under your trailer – letting the trailer provide the shade, but watch the movement of the sun so it won't peek under.

Now open the computer by sliding the cover to the left. The cover can be turned upside down and slid on the backside of the computer, from the left side. It can then be used right in the carrying case if you want. In the top right corner of the computer you'll find the . "ON/OFF" switch—move it to the right. When the computer comes up it will be in the "Calculator" mode. The "Clear/Clear Last Entry' button is in the top right corner of the computer.

Next press one of the program buttons that are located in the lower left corner. If at anytime you are in the middle of a program, and want to start over because you made a mistake, just press the program button you want, or at least the clear button once to change the current answer or the CA button to get in the calculator mode so you can make some calculations. To get back to a program, just press the appropriate program button. If you did leave the program halfway through, all the entries will still be in memory. They will still be in memory even after the computer has been turned off.

In each program, you will be asked questions. You must answer these questions with values like, Altitude in feet: Temperature in Fahrenheit: % humidity in numbers such as 19 or 45.5 etc. Change % will be in numbers such as 95,105, 1600 etc.; Throttle Stop settings are in inches using decimals such as .350 or .632 or even 1.257; Orifice is used when referring to a Bypass Pill, Nozzle, or Jet. Pills, Nozzles, and Jets are used in thousandths such as .065, .110, ,123 etc. use the appropriate program for Mikuni Hex and Round Jets or Holley Jets; however, some brands have odd sizes and have to be looked up on a chart. I have some charts in the bark of this

rcentages like 15 (indicating 15% over), or –10 (indicating 10% under) etc. Dial-in, and ET is related in seconds like 13.564. Speed in miles per hour; RPM—8200; Gear and Compression is in the form 1.56 or 12.5. Tire dimensions can be entered in either diameter or circumference.

SPECIAL NOTE: Diameter comes up first then the circumference, if you enter a diameter, the circumference, just press enter when asked for diameter, then enter the circumference you want. If you later go through this program again, just remember the figure for diameter will update the circumference so you must enter your circumference again.
Horsepower—856.43, etc.; Head cc—68.2 etc. Other dimensions in compression program are in inches like 4.030, .025, etc. CFM—633.2 etc.; boost in PSI like 28.4. Volumetric Efficiency is a measure of how well an engine can ingest an air/fuel mixture. A typical grocery getter engine may have a volumetric efficiency of 80%, a hot street performer 85%, a bracket car 92%, a sprint car 95%, and a pro stock drag car 102%. This will give you an idea of which value to use unless you know for sure by dyno results. Enter these values in the form 80, 90.5, or 102 etc. After you answer a question, press ENTER. Do this until all questions are answered. When the computer starts giving you answers, press ENTER after each one (some programs have more than one answer). When you hit the end of the program, the screen will go blank. To get to the next program, just press the appropriate program button, or button #8—then answer that question from the key pad on the right to get into the 20 other programs listed under 'Programs' on the lid card – in the box.

DENSITY ALTITUDE DEFINED

The aeronautics industry has described a standard column of air as one that is roughly: At sea level, with a barometric pressure of 29.92" of mercury, 59 degrees Fahrenheit, and loses 1' mercury (barometric pressure) and 3.5 degrees Fahrenheit per 1000'. Therefore, if you are at a track elevation of 1000', you could be seeing an air density similar to that found at 4500' in a standard column of air. This is why they call it Density Altitude.

Pressure Altitude, as asked for in the Density Altitude program, refers to the altitude as read off your altimeter. This is the only program that uses Pressure Altitude. An Altimeter simply measures Barometric Pressure and reads out in feet above sea level rather than inches of mercury. This pressure altitude is in reference to a standard barometric pressure as averaged all around the world, and during all seasons of the year. Some areas around the world will never reach a pressure altitude that is near their true elevation above sea level. Therefore, am altimeter is used to simply weigh the air. When evaluating weather a run is better or not, look at the MPH only. MPH is directly reflecting the HorsePower being made. The horsepower comes from the air that is available. ET is merely a side product-it is just along for the ride, but it is dependent on traction being available. It is imperative that you stay in one lane because of differences that may exist between the MPH clocks.

LEAVE THE STANDARD ALTIMETER SET WHERE IT IS GLUED. KEEP THE AIRCRAFT-TYPE ALTIMETER SET WHERE IT IS. THIS WILL BE INDICATED ON YOUR RECEIPT, OR 29.92" OF MERCURY IF YOU ARE USING ONE OF YOUR OWN,

After going through this program, you will have Density Altitude—the combination of Pressure Altitude, Temperature, and Humidity. Density Altitude is used throughout all other programs. This Density Altitude will come up in the Pill, Jet, Nitro, Overdrive, Dial-in, Throttle Stop, and Timer programs as the New Altitude. If you want to try another Density Altitude value, for experimental purposes in any program, just enter the value you want to try—instead of the one that will come up if you just press ENTER. This will override the value as calculated be the Density Altitude program. This value will come up in any other program that you use until you go through the Density Altitude program once more.
While answering questions, before the ENTER button is pressed, you can press the C-CE button (in the top right hand corner) to clear the wrong answer.

SPEED, RPM, GEAR, AND TIRE

The speed, RPM, Gear, and Tire programs are all related in that they represent a set-up for your car. Any data entered in one program will be carried over to the others. If you want to use the same data in a program that you already put in another—just press 'ENTER'. This holds true for the other group of programs as well. Horsepower, Speed From Horsepower, and ET will update the other as well. There are two other sets of these programs as well. One for Go Karts and Motorcycles, and the other for Boats. The one for boats has a figure for Prop Efficiency. This figure has to be computed before you can progress to the other parts of the boat section. A default value of 88% may work well if you don't have your boat running yet.
VOTE:
Don't forget your rear tires will grow at speed. A 33" tire will be closer to 34.5" at 160 MPH. A 28" tire will be around 28.7' at 120 MPH.

ROD ANGLE RATIO

The compression program mentions something called "Rod Angle Ratio". It is simply the rod length divided by the stroke. This relationship should produce a Rod Angle Ratio of between 1.5 and 2.0. values approaching the 1.5 provide more vacuum at lower RPMs. This is because the piston accelerates away from Top Dead Center quicker than with longer ratios. The spark advance needs to be increased because the piston spends less time near top dead center. Because the rod swings out further with long strokes and short rods, shorter ratios produce greater piston skirt side loading, and more stress on the wrist pins. In circle track racing, where endurance is also a factor, this ratio should be more in the area of 1.6 to 1.7. for longer races where cars run high RPMs continually (like an Indy Car) ratios of 1.7 to 2.0 are better. There is less stress on engine parts, and you can uses less spark advance because the piston dwells near top dead center for a longer part of the cycle, this longer dwell time at top dead center also allows more down-force pressure to develop during combustion. This increased pressure produces more horsepower. The vacuum is reduced because the piston moves away from top dead center slower, but this is not a factor at higher RPMs the bottom line is: The longer the Rod Angle Ratio – the better. One combination that may be bad would be low compression (<10) and a radical cam (>230 @ .050") with a high Rod Angle Ratio (>1.60). In this case a shorter Rod Angle Ratio (closer to 1.55) may make this combination work better—especially at lower RPMs (<3000). I like a Rod Angle Ration around 1.6 the best. Don't go below 1.55.

BATTERIES

When the batteries finally wear out, the computer will not lose its program. When that happens, just get two (2) CR 2032 batteries at Radio Shack and put them in. if you have any questions call me.
To replace them, slide the cover off the computer, and lay the computer face down on a towel. The bottom cover comes off with two screws and is hooked on the other edge by a couple of hooks, keep the computer flat because there are two springs that may fall out if the computer is tilted. You then have to slide a small cover over the batteries. Memorize which battery is up and which one is down. There are instructions on the inside of that cover. Then just reverse the process to put it back together.

DENSITY ALTITUDE

Let's try the Density Altitude program. If you were starting with the computer off, Turn it on, press the Alt button 1. You are now in the Density Altitude program. The first question is 'Press Alt?". For this example, let's pretend we read the altimeter and it said 1300'; type in 1300, then press ENTER. This is the only time you will use the altimeter reading. It is just an ingredient like temperature and humidity that gives you Density Altitude which means everything as a composite air quality value. The next question is 'Temp in F?". this means temperature in Fahrenheit: type in 75, then press ENTER. The last question is "Rel Hum?" this is asking for the % relative humidity; type in 24, then press ENTER. The Density Altitude is 2823.14'. Density Altitude is the figure you use throughout the rest of the computer when it asks for Last Altitude, or Best Altitude, or New Altitude. This figure will be available to all the other programs that for a New Altitude. After the Density Altitude is given, pressing ENTER will give you a Density Factor—just for reference, the Air Density figure isn't used in any of the other programs. Some of us that have been in racing for a while may be used to those air density gauges. The Air Density figure is just given as a little tie-in for those who know what to do with it. Beware however, that this figure is an absolute, mathematical figure—not a mechanical reading. It also takes Humidity into consideration as well, so it may be different from the reading you are used to. Pressing the ENTER button once more will cause the computer to give another answer. In getting used to this new computer it may be a good idea to press ENTER after an answer is given to see if there is another answer available in the program. In this case a True Barometric Pressure, Vapor Pressure, and finally a Dyno correction figure is given. Now the screen will go blank. For Drag Racing, Dyno Correction works hand in hand with the Horsepower program. If you have an engine that made 300 horsepower, and the run was done at 2000', then you know it will make more a sea level. This Dyno Correction can be multiplied times the horsepower to find out how fast your car will run at sea level by using the Speed and ET programs (in that order).

ALWAYS LEAVE AN ADJUSTABLE, DELUXE ALTIMETER SET AT 29.92" OF MERCURY, OR WHATEVER WAS WRITTEN ON YOUR RECEIPT. THE STANDARD MODEL IS GLUED IN PLACE, AND THE SUPER DELUXE IS ALWAYS 29.92 BECAUSE THE BAROMETRIC PRESSURE SCALE IS ADJUSTABLE, AND I HAVE SET IT EXACTLY ON 29.92.

ORIFICE

Some programs require data to be calculated prior to running the program. Before using the Pill program. Total Nozzle Area will need to be calculated. This can be done by using the Orifice% program. It will ask "Current Orifice?".

Press .035 to indicate a .035" nozzle, then ENTER. The answer is .00096. Press the enter button once more, you will be asked "% Change?" If you are using 8 .035" nozzles, type in 800, then ENTER. 800%= 8 X .00096. The Total Nozzle Area will be .00769; write this down so you can enter it later in the Pill program. This only has to be figured once unless you change your nozzles, or some of then to change the fuel distribution. I didn't make this automatic because you may have all 8 nozzles the same size or you may be running an alcohol Funny Car that may have 4 different sizes among 16 nozzles. In the case of the Alcohol engine, you will have to use the Orifice% program to figure the area of each nozzle size you are using, then multiply that area (as you did before) by how many of that size you have in your engine. When you get done with all the different sizes, add all those total areas up (for each size) to get the Total Nozzle Area.

COMBINATION CHANGE

The first question is the reference main bypass pill, then questions are asked in pairs. These questions ask original then new something or other. You can change several things at the same time if you are using pure methol and aren't adding any Nitro, enter 0 for both the original fuel and the new fuel. It is wanting you to enter the percentage of Nitro—like 95 or 95%. Hilbom sells a good book on fuel injection that I recommend getting. In that book, they say you can increase the nirto percentage by 20% without a nozzle change. For amounts greater than that, they recommend going up one nozzle size for every 20% increase in Nitro if you don't have a blower, enter 0 for the blower boost and overdrive. The answer at the end of this program, is a new main pill. The next step is to use this new main pill in the Pill program as a substitute for the 'Best Pill" that you originally had. This new 'Best Pill' will compensate for the change or changes you made to your fuel injection system. Pressing the ENTER button once more will give you a New Boost value if a blower was used, substitute this new value in the Pill Program as well. Just to be on the safe side after you go through the Pill program, you may want to use a pill that is several sizes smaller than the size recommended for the first pass, then sneak up in size for the next few rounds until you are at the new pill recommendation or at a point where the plugs look good. Don't forget, ALWAYS use Thousandths of an inch. Use the form .070" is entered as .070. for a first run after the system change you may want to go 10 thousandths of an inch smaller than the computer recommends, then 5 for the next run, and finally right on the recommended pill size. These sizes are in reference to the answer the Pill program gives after you go through it each time to correct for Density Altitude Changes. You may have to read this paragraph a couple of time to get it.

PILL

Let's try the Pill program. Go ahead and enter the information (Data) as I tell you the figures. According to your log records, the best combination you ever had was on a day with a density altitude of 0 feet (sea level) using a ,070 pill, with no blower boost (0), and 8 .035" nozzles. We found that 8 .035' nozzles produce a Total Nozzle Area of ,00769". we will just need to press ENTER when asked for the New Altitude and the 2823.14" will transfer automatically (if you have been playing with the "a" program, just manually enter 2823.14) the new pill will be a ,080, then you should go to the next one smaller—like a ,075. it is a good idea to have every other size if you can—especially for class racing. For Bracket and Super Class racing, all-out performance isn't necessary. For those classes it is a good idea to be on the rich side anyway. Press ENTER once more to get out of the program.

The .-book from Hilbom also asks for a .015" decrease in Main pill size for every 10% increase in nitro percentage. The math doesn't indicate that; however, when going up in nitro percentage you may want to try that if it recommends a smaller size than what this program calls for, then ease up to what this program says just to be on the safe side. When going down in nitro percentage you would not want to increase the Main pill size by the amount Hilbom suggest for fear of leaning the mixture. You may want to use the figure this program says, then slowly increase to the size Hilbom suggest to see if that is better. If you have a High Speed bypass as well, these Main bypass and Nozzle changes will effect its operating point because of system pressure changes. You need to get an air leak down tester and flow bench to make a chart for your system for all these changes you may make, or use a MSD rpm activates switch that at the RPM point that you want your High Speed to open at. This switch can activate a NOS fuel solenoid that leads to your High Speed bypass. All of this may be a little unclear—call me if you have questions.

You should have a collection of pills or jets that were purchased at the same time, and from the same company. This is because they will be sized in relation to each other during that production run. Don't trade or loan, pills or jets—they must remain a set. Try to have every other one in the range you expect to be operation in. you can use this computer's Density Altitude and Pill programs to figure this out. Remember, Pill numbers are not always the same as their size in thousandths of an inch. While using this computer; Pills, Jets, and Nozzles are always referred to in there actual decimal size like: .070", .0855" or .115", unless they are Holley or Mikuni Jets I have special programs for those.

For Class racers, the recommended way to use this computer is to keep a log of your runs. When the next run is about to come up, use the Density Altitude program to compute the new Density Altitude. Then go to the appropriate program to get a recommendation for a mixture change to see if the change in needed. This will put your mixture at exactly the same ratio as it was during your reference "Best Run". If the mixture used for your 'Best Run" was actually a little off, then use the Orifice % Program to zero in on the correct mixture ration. The Nitro, Fuel Pump and Blower Overdrive is already figured in percentages, just change that percentage to go in the direction you want to go. If you are on the lean side you may want to make a drastic change like 15%-- to the rich side for safety. If you think you may be to rich, then a 2% change to the lean side may be needed for each upcoming run till the mixture is right. For Sportsman racer, you will only need to touch-up your mixture a couple times a year – unless you travel to tracks of different elevations. The best thing to do in this case is to estimate the best air you think you will be exposed to during the entire weekend, and run that through the appropriate mixture program. Don't ever change mixture during a weekend unless you think you are to lean! Try to anticipate it in advance.

Here is an example of using a fuel injected engine: the Pill program just recommended a change to an .080" main pill. Your engine was running on the rich side, now go to the Orifice % program. It will ask for the orifice – press .080 then ENTER. It will calculate the area of a pill with a .080" diameter hole. Press ENTER once more—it will ask % change ? if you want to bypass 5% more fuel to lean the mixture, press 105 ENTER to represent 105% of the size being used now. The new pill's area will come up – .00527". Now go to the Orifice Diameter program. It will ask for this new Orifice Area: enter .0057 and hit ENTER. The new pill should be a .0819 or 82 – close enough. Make your next run than check your plugs again. You can repeat this step as many times as needed to sneak up on your setup. Eventually you will amve at a perfect mixture. When you do, use the associated Density Altitude and Pill for you Best figures. The ideal mixture should be far enough on the rich side that you will not have to touch it up that much; unless you move from one city to another with an elevation difference, or when the seasons (and temperatures) change. When first using this computer it may be wise to make mixture adjustments that are on the rich side of the computer recommendations, then trust it more and more as you use it. It would also be wise to transition from a system you may be using now to this one gradually – sneaking up on your combination from the rich side. It's always a good idea to play it safe.
CHECK YOUR PLUGS AND EXHAUST GAS TEMPERATURE !

BLOWER

There are several programs that deal with mixture. They all recommend changes in relation to changes in the weather. One is slightly different however, and that one is the Blower Overdrive program. The Pill, Jet, and Fuel Pump programs all make fuel changes in relation to Density Altitude. The Blower program leaves the fuel system alone, and makes up for weather changes by adjusting the Blower Boost via the Blower Overdrive. This method will also have a side benefit of keeping the ET the same. 'our engine will effectively not see a weather change. There are a couple of drawbacks; one is that as the Density Altitude gets higher hinner air), the blower will loose its ability to provide boost. This can happen with a Density Altitude change of as little as 2000' ensity altitude with a large engine. The best way to change the fuel system for Density Altitude changes even higher than this is to use ie Blower Overdrive program to change from a low Density Altitude like 500' to let's say 2000'; then use 2000' as a starting point (with ie new overdrive and associated boost figured out by the Combination Change program) for use in the Pill program to go to your urrent Density Altitude of let's say 3500'. Another problem is that the blower will eventually be overdriven to its RPM limit. ltimately, this program and the combination change program requires that the blower be appropriately sized in relation to the size of e engine. Also these programs were written for a normal roots style blower—not a high helix or compressor type. Another thing that akes a program dealing with a blower a little flaky is that the heat generated by a blower, produces a high Density Altitude right there the intake manifold. It is for these reasons that I recommend using one of the other programs to effect a mixture change.

SPEED, RPM, GEAR AND TIRE PROGRAMS

me give a couple more examples of how to use this computer. Ultimately the best way to learn how to use this computer is to just n it up and play with it. If you have an engine that should be running 6800 RPM but is spinning at 7200, what gear would you need et rid of the extra 400 RPM? Let's say you have a Sprint Car with a 5.34 overall rear gear, and a 104" right tire (the size isn't that ortant, its just used to get from one program to the other). By using the Speed program, you will find the tire speed to be 132.79. go to the Gear program to find your ideal gear for 6800 RPM to be as close to 5.04 as possible. The reason we went to the speed ram first is because the program we ultimately need to use (the Gear Program) asks speed. In this case the wheel speed is about ph greater than the vehicle speed. I was considering a Winged Sprint Car at Manzanita Speedway in Phoenix, Ariz. One note is each time tire dimension is asked. The diameter will be asked first, then the circumference. The circumference will be calculated the diameter. If you know the circumference just press ENTER for diameter, then enter the circumference. The circumference will ride what ever would have been calculated from the diameter, so it doesn't matter what figure you have in for diameter. If you know iameter, go ahead and enter it, then press ENTER when the circumference is asked.

The circumference is calculated from the diameter. The diameter will roll up a new circumference next time the program is run, so if you are using circumference for your tire dimension, remember that you have to enter the circumference each time—not just press ENTER.

DIAL-IN/THROTTLE-STOP/TIMER SET-UP

Ok let's try the Dial-in program. Some of the programs in this compuler are set up for ¼ mile, automotive drag racing, these programs are the Horsepower, Speed and ET programs lhat are related together on the menu card in lhe lid of your compuler case. These count on a Drag Racing vehicle being set up to top out in high gear through the traps, and have enough tire as not to lose traction on the launch. However, the Dial-in, Throttle Stop / Timer programs also works on 1/8th mile tracks and with Drag Boats. The Dial-in, Throttle Stop / Timer program is custom calibrated to your vehicle's performance via the Set-up programs. The Set-up programs will figure how many feet it fakes to make the ET change by a hundredth, or you can directly a figure of your own that will ovemde the one the computer came up with. For Super Class racing you also have to tell the computer how much Throttle Stop movement it takes to make the ET change by a hundredth or what your Timer Ratio is. You can also enter a figure of your own as before. This is convenient when the computer is used for more than one car. This Set-up programs only have to be used once lo come up with numbers for the Dial-in, Throttle Stop / Timer programs to use – unless you change your engine combination. Once these figures are visible on the screen, it is electronically transferred to the Dial-in, Throttle Stop ▌ Timer programs. To get started you should keep track of your runs in a log book. For Bracket racing, you need to select a good run from the hottest part of the day (High Density Altitude), and you need to also select a good run from the cooler part of the day (low Density altitude). These runs should have relatively low Ets, good 60' times, and correspondingly high speeds in relation to the other runs around them. Preferably these runs should be done in the same lane. It is best to use a ledger type notebook because they provide wide pages that will hold several column headings across the top. Each racer must decide what facts are important to his operation – a sample sheet has been included. You can make several copies, then put them in a three ring notebook. After you use the Density Altitude and Dial-in programs a little, you will be able to recognize good runs easily.

Let's try a Dial-in scenario first. To start with, a history has to be built up at least during a race – not time trials only, or preferably during a Test n Tune Friday night so you can get several all-out passes, and preferably out of one lane.
IT IS BEST IF THE SAMPLE GROUP OF RUNS ENCOMPASS THE SAME **RANGE** OF DENSIW ALTITUDES THAT WILL BE ENCOUNTERED DURING AN UPCOMING RACE,
The bigger the spread from a High Density Altitude to a Lower Density Altitude—the better. Go to the Air Set-up program.
Then look at your log to find a good reference high Density Altitude run. Let's use 3500' and 9.920 seconds. Now for a good reference low Density Altitude run let's use 3100' and 9.890 seconds. Pressing the ENTER button after the low ET is entered will bring the question 'Feet per Hundredth?', **At** this time you can enter your own figure (for another vehicle or your same vehicle running with a Timer as a Super Gas car0, by pressing ENTER – but we don't want to do that; we want to let the computer figure it for us by pressing ENTER. This figure will automatically be transferred to the Dial-in, Throttle Stop / Timer programs. If you did make an entry of your own, just remember the Feet per Hundredth figure will be updated by whatever data is currently in the Air Set-up program the next time you go through it. So if you want to use a special figure, you must enter it each time you go through the Set-up program in order to ovemde the figure that would have been calculated from the data you have in the program already. If it is needed for experimentation, the following figures can be used; 12 or 13 second cars 100' = a hundredth in ET; Super Street 118'; Super Gas 137'; Super Comp 165'; and Super Eliminator 185'. If you run Alcohol, multiply these figured by 2.2 if you run 1/8th mile, multiply by 1.57.

DIAL-IN

Let's pretend it is the next race day. For example lets say it is once again in the afternoon when we made three time trials, and the second one was the best. That run was done at a Density Altitude of 3000' and produced an ET of 9.880.For this demonstration we will be entering it now the first question is 'Last Altitude?", type 3000 then ENTER. The next question asks 'Last ET?" so type 9.880 then Press ENTER. Then we would turn the computer off and wait till we are being called up to run. After being called up, the first thing you do is; run the Density Altitude program. If you don't have a quick acting temperature and humidity gauge, you must anticipate what the conditions are going to be like when we will be going down the track. For figures let's use a Pressure Altitude of 1300' as read off the Altimeter, Temperature of 75, and Humidity of 24%. Go ahead and enter these figures now. This will give a Density Altitude of 2823.14'. Now go to the Dial-in program. The Dial-in program will already be loaded up. All we would have to do is step through it by hitting ENTER. The next question "ET Adjust?" will be answered with 0 most of the time. It will be used to enter a change in conditions like a head wind that will make your ET get larger by .050 seconds by enten'ng .05, or the sun going behind a cloud may make your ET get smaller by .1015 seconds and be entered as -.015 – we will use 0 for now. The last question asks for "New Altitude ?",just press ENTER to transfer the figure from the Density Altitude program'that you just ran. The ET Dial-in for next round should be 9.8667. You might want to try a 9.86. If your car were exposed to the same weather all day, you may find it has an ET range of .010 or .020 seconds, so Dial accordingly.

For your last Altitude and associaled ET, you should select the best run from time trials, and then put those figures in the Dial-in program. You can use the same Last Run lor several rounds if you have lo. Or later in the race if you get a by-run or any other full out pass, you may want to compare it against the one you chose from time trials to see if it is as good or better. In a tie situation, I always prefer to use the last round as that makes the Density Altitude change less—for grealer accuracy.

In a furthereffort to boost accuracy it is important that a racing vehicle be exposed to fresh air rather than under the hood air. That way the engine will receive the full benefit of a weather change without Ihe unpredictable warming effect of the hot air around the engine. is also good lo control other variables that may effect performance as well. Some of these are: Engine Temperature, Idle speed or Launch RPM, Tire pressure, etc. The Dial-in program works with Drag boats also, but don't lorget—Ihere are more variables on the water.

The Dial-in program can also be used to verify if a combination change had a positive or negative effect. To do this just use the Dial-in program as you normally would, but make your change between your last run and pour next run that the Dial-in program is trying to predict. Let's say this was a spark advance change. If your run is better than the Dial-in program predicted—then the change worked. Without the aid of a computer, when making changes, it is hard to tell if the weather helped or if it was the result of your combination change. You can also use the Horse Power program and then correct it to sea level by multiplying it by the Dyno Correction figure from the Density altitude program.

SUPER CLASS RACING

Program 1 in the new computer has to be set up as above so the computer will know how the air effects the ET. The only difference is that you want your ET control devices. (throttle stop and timer) set so you are drifting across your index as the weather changes during your test session. For example, at a night time Test N Tune session, on the first pass, you would want to shoot for a couple hundredths on the slow side of your index and if you get something at or 5 hundredth on the slow side, just leave your ET control devices at the same setting. The air will then drift you quicker as the night progresses. When the air stabilizes, then you can do the test described below because you will not be able to leam anything more from the air changing as it has come to a stop. For bracket racing , you can set your ET control devices back to the same position they were at for the test above, and use button 3 for ET prediction without changing numbers in the Air Set Up Program. It you want to Bracket race wide open, then you would need to do some testing as above, but with no Throttle Stop action. This will yield a different Feet Per Hundredth figure. To change back and forth from Throttle Stop racing to Wide open racing, you only have to change the Feet Per Hundredth figure in the Air Set-Up program.

SUPER CLASS RACING WITH THROTTLE STOPS AND TIMERS

An under the carburetor type Throttle Stop must have both primary and secondary plates to be effective. When Dedenbear Throttle Stops are used by themselves, they should only be used in the .400" to .550" range, and when used by themselves (without a timer) they should have a 2:1 linkage set-up between the Secondaries and the Primaries. This helps counteract the wacky geometry that exists outside this range. If yours goes beyond that during any time of the year or at any track you go to, you should do whatever is necessary to your engine or car to get it in that range. That way you can use it all year round and wherever you go. Things to change are engine timing, carb size, weight, shift points, or even disconnect the secondaries in your carburetor.

Using a Timer to drive the Throttle Stop is a better idea for three reasons. First it is better from a strategy standpoint so you can chase your opponent down or at least run side-by-side. Secondly, if the track is slippery, you will be applying less power during the part of the race you will be most apt to loose traction. And finally, it is functionally a more accurate device. If your engine is on the edge of not being powerful enough for the class, then you should go to a Timer for sure. Using a Timer will allow you to leave the Throttle Stop dimension the same all the time so where it is set will no longer be as much a factor. You should try to keep it above .225" so you won't loose traction when it tums back off, and below .425" so it will definitely have an effect. When you have a Timer driving a Throttle Stop, the linkage should be 1:1. This will be better from a fuel distribution standpoint. If you have a Cable Type Throttle Stop, and if a 1:1 linkage kit is available for your carburetor.

All Timers use two numbers. The first number is the time at which the Throttle Stop comes on. It is best if you have it come in as close t the start line as possible (0.05 or maybe 0.70 seconds, but no more than afler your worst case 60' times). The second Timer is either a Duration Timer for how long the Throttle Stop is on, or is a Shut-off Timer lor when the Throttle Stop is going to shut off. It doesn't matter which one you use. It's just a number for the computer to crunch. Always use the second timer number so you won't contaminate your 60' times, and don't let the second timer get further down track than 3.3 seconds. It may approach this range in the middle of winter. Times longer than that make ET control very inaccurate. It is a good idea to shift while the Throttle Stop is on. To do this at the same position all year round, you must-shift in the 1.6 second range to be below the summer time 1.8 second 2nd timer time. A 5500 stall speed on your torque converter is good so you can shift around the 5800 to 6200 RPM range - whatever is necessary. Sometimes you can't squeeze a shift before you go back to full throttle without getting the shift event and the going back to full throttle event to close together. In that case, you will have to shift at a high RPM to get separation between those to events. Or better yet , use a Dedenbear Shift Timer. An ideal set-up would be to shift at around 1.70 secs. And have a worst case, summer time, second timer

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time of 2.3 seconds. Always sneak up on the shift time so as not to over rev the engine. Start at 1.3 secs. Don't forget that if you run wide open for a bracket race, test in advance for the shift point, because you are now going to rev up quicker. You don't want t have to or to little throttle stop action, for a Super Street car, shoot for around 1.65 to 1.75 60' times. Super Gas should be around 1.44 to 1.52 Super Comp works well at 1.34 to 1.39 . and Super Eliminator 1.30 to 1.34.

PROGRAM 2

To tell the computer what effect the Throttle Slop or Timer has on the ET, you must load up program 2 in the new computer. It will then ask 1 or 2 so you can tell the computer you are adjusting a Throttle Stop or Timer respectively — then hit ENTER. What you need to do here is to make two runs back to back where the air is almost the same – within 20' or 25' at the most. That way the change in ET will be a result of the Throttle Stop or Timer change only - not the air. The air will stay almost the same in the heat of the day between 2:00pm and 4:00pm or late at night after 9:30pm or so. You must make a change in your Throttle Stop dimension of .025' or a Timer change of .30 seconds. Because the air must remain relatively the same, you will probably only get to do one pair dun'ng each test session. It would be a good idea to do this test on a few different test sessions so you can find an average and put that average in your computer at the 'Thousandths or Timer per Hundredth?" prompt. It you can rent a track or are at a test session where there aren't to many cars, you may try to run two runs at one setting and two more at the other. That way you can pick the best of each pair to avoid getting a bid run. F is always good to make this arbitrary Throttle Stop or Timer change in the direction of your index so you will be collecting statistics around your index for accuracy. For example, if you are on the quick side of your index - then elongate your Timer setting by .15 seconds. Don't forget to correct the ET's based on 60' differences. They should be the same 60' times because the Density Altitude is the same. After a day of racing is done, you may want to write the work BEST beside your best run so you can use it to pick up where you left of last time for Super Class racing. That way you won't have to look over all the runs next time to find a good reference as a starting point.

Some examples of a Super Gas car running a Throttle Stop would be: Quick TS or Timer? .500; Quick ET ? 9.880; Slow TS or Timer ? .475; Slow ET ? 9.930 (you can measure from any reference point - this example used the distance between the jam nut and the back of the head of the adjuster).

An example set of numbers for use with a Timer would be; Quick Timer 2.85; Quick ET 9.850, Slow Timer 3.15; Slow ET 9.950. There is an up side and down side to a Timer. The up side is they are easy to adjust. The down side is you don't have any override unless you use the new 3 or 4 stage timer.

DIFFERENT DENSITY ALTITUDE RANGE OR DIFFERENT INDEX

After a day's worth of racing in a new Density Altitude range or at a different Index, you may find a new pair of runs to use in the Air, or Throttle Stop I Timer Set-up program that will generate a new figure for Feet per Hundredth or Timer Ratio for use with the new index (the figures may be the same, even though the runs are different). if the figures are the same, then you don't' have to worry about a different set of numbers because the ending figures are the only thing that is important. You can use your old figures for racing at new Density altitude or Index till you generate new ones, after that day's worth of racing is down. You should start a master sheet for the front of your log book that has figures listed for all circumstances - Bracket Racing, 9.90 Index, 10.01 index, and for different Density Altitude ranges. You may find that the same figures work quite well all year round and at different Indexes. The one thing that will change for sure is the Feet per Hundredth for 1/8th and 1/4th mile races.

SPECIAL NOTE;
PLEASE USE DECIMALS IN THE CORRECT PLACE. THIS IS THE MOST OFTEN FOUND MISTAKE! ET'S ARE IN THE FORM 9.935 THROTTLE STOPS DIMENSIONS ARE IN THE FORM .437 TIMER SETTINGS ARE IN THE FORM 2.36 GEAR RATIOS ARE IN THE FORM 4.56 AND GASKET THICKNESS AND DECK CLEARANCES ARE IN THE FORM .038.

ESTIMATING AN INCOMPLETED RUN for the Bracket Racer

During eliminations you may have to lift while nearing the finish line to avoid breaking-out. By doing this, you will not have a ¼ mile time to base your next run prediction on. If the track your on gives 1000' times as well as your ¼ mile ET, you can derive a ¼ mile ET by using the following method: it works best on a ¼ mile track with 1000' lights. By the time you get to the 1000' point, your ET is pretty much carved in stone. Don't try to use this method on 1/8th mile tracks with 330' clocks or ¼ mile tracks with only 660' clocks because there is to much room for error. It doesn't work that well for Super Class racing either, unless the timer amounts on both runs are the same. The first step is to clear the memory in the calculator mode by hitting the r-cm button twice. Then find a good run, done earlier, to use as a reference run. It should have a good 60' time and high MPH. Take the ¼ mile ET and divide it by the 1000' ET, this will generate a factor of about 1.198 for the average car. Press the M+ button to put this number in memory for future use. You only need to do this once. ¨

On the in completed run find the 1000' ET and multiply it by this factor. In the calculator mode, type in the 1000' ET (corrected for excessive 60' time if needed). Then hit the X button, then R-CM once, then =. For example: 7.435 X R-CM =. You should get 8.907

JET CHANGE FOR NITRO

This program is used when you are using a Jet by size in thousandths, and are burning Nitro. This is mostly used by Harley and Radio Control racers. Use the form .230 or .035.

POWER VALVE RESTRICTION

You have to look up the size of a Jet in the Holley book and use it in decimal form for this program. Lets use .105 for this example. Next you enter the size of the Power Valve Restriction like .065 .The answer .123 has to be looked up in the Holley book to see what the closest Jet number would be to that size. If it is in the middle, go up in size. This is what size Jet you would have to use if you block off the power Valve, next you can find out what new Jet to go to if you want to change the size of the Power Valve Restriction. Let's reduce it to .045. The answer is .115. See which Holley Jet is closest to that size. If there are more than one, try the large one.

PROGRAMS 21, 22, 24, AND 29

Program 21 allows you to measure fuel delivery system volume by any combination of Quantity or Time.

Program 22 tells you how much pressure it lakes to offset the pressure due to the effects of acceleration. You need to add to this amount about 15 lbs. So you can regulate it down to 7.5 or so.

Program 24 also gives a recommended Fuel Line Inside Diameter.

Program 29 is used by Harley racers who use S&S carburetors on Nitro, or Radio Controlled Sprint Cars or Stock Cars running on Nitro.

I want to say at this time I think it is always advisable to transition from one system to another very carefully especially ones dealing with fuel mixtures, or ones that can also effect your wallet like Dial-in or Throttle Stop selections when used in a race for money. At first you may want to use your old system and use this one for testing. If you have no other system, use this one but stay on the rich side for your fuel mixture. Also, stay on the quick side for your dial-ins so you won't breakout. Then progressively start trusting it more as you use it. I assume no liability for anything that may go wrong because of using this computer. There are a lot of factors in any racing combination that have an effect on the way a vehicle will respond to a weather change. Remember, this is just a tool to help you make up your mind on Mixture and Dial-in/Throttle Stop settings.

SCRUTINIZING RUNS

To get real accurate, you need to do what I call equalizing the ET's based on 60' time differences. There are only 2 reasons why ET change. 1 – from Horse Power changes, and 2 – from Traction changes. If the change was from Horse Power, the ET will progressively change throughout the run. ET changes from Traction will be the same all the way down the rack. To separate this you need to find the run that had the best 60' time and reference it for the rest of the runs. As the weather goes up or down by 100', I figure the 60' time should of changed by .001 seconds on gas. The 60' times will need about 200' for a change of .001 seconds on Alcohol. So if you are comparing two runs on gas, where the one you are comparing to the reference run has 200' worse air, then you add .002 to the reference run's 60' time that is what is should have been. I usually write the 60' time that is should have been above the real 60' time, and put it in parenthesis. Then subtract the difference. This ET difference needs to be subtracted from the finish line ET so you are looking at real ET's without the influence of run to run 60' time variances. Write the corrected finish line ET above the real ET and Put it parenthesis. If the 60' times look reasonable in relation to each other, just leave them the way they were. Next we should look for any runs that were done at near the same Density Altitude and pick the one with the lowest ET. That means the one with the quickest ET made the most out of the available air. So scratch out the bad run.

Likewise if you have two runs that produced close ET's, but there was a couple hundred feet difference in Density Altitude the one that was down at the higher Density Altitude is the better run because the one with the better air should of speeded up but it did not. So scratch out the bad run. The rough rule of thumb for Gas is that you should pick up a hundredth with every 100' to 190' of better air. . The faster the car, the more air it takes to make the ET change by .010 seconds. Alcohol usually takes 225' to 400' for the ET to change by a hundredth. It takes a greater change of air for the faster cars like a Super Comp car as opposed to a 12 second Bracket car.

ODD BALL SLOW RUNS

ET can be slow because of only 2 reasons Horse Power or Traction. When evaluating why a run is bad, look at the MPH only. MPH is directly reflecting the HorsePower being made. The Horse Power comes from the air that is available. ET is merely a side product – it is just along for the ride, but it is dependent on traction being available. It is imperative that you stay in one lane because of differences

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that exist between the MPH clocks. Let's say a run was slow by .02 or .03 seconds. If the MPH is slower by only .06 or .09 than there was a loss of traction. If the Mph was slower by .25, .50, or more, then there was a loss of power. Or it could be a little of both. Now let's learn a little about fuel mixture and its effect on performance. The drawing below represents a fuel mixture curve for horsepower, as you can see, to the left of the maximum horsepower point (rich condition) the curve is closer to horizontal: on the right side, the horsepower drops off rapidly. The right side is an excessively lean condition. Not only will horsepower be lost more rapidly, but engine damage will likely occur when on the lean side.

<div align="center">

Maximum horsepower point

Rich side

Lean side

</div>

This engine damage can happen if your engine is barely on the lean side. If you are already operating on the lean side, and the air gets better, your vehicle will slow down. Your engine will make less power because you will be operating further down on the lean side of the curve. If this occurs, immediately go up **4** jet sizes all the way around, or go down .005" to .006" on your main by-pass to get back on the rich side for safety. A computer will only work properly if you are on the rich side,

NEVER CHANGE YOUR MIXTURE WHILE YOU ARE GATHERING INFORMATION FOR YOU COMPUTER OR DURING TIME TRIALS AND ELIMINATIONS UNLESS YOU ARE TO LEAN AND NEED TO SAVE YOUR ENGINE, IF YOU DO, THEN DISREGARD ANY RUNS DONE PRIOR TO THE JET CHANGE.

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BRACKET RACING

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Let's say you went out for Friday night test – n – tune Bracket race. You ran 4 time trials, made it through 3 rounds of eliminations in the gamblers race, and got 2 test-n-tune runs in between the last couple of rounds. The next day you need to sort from among the 9 runs, then you will be able to use your computer next time you go racing.

Our goal here is to find two quality runs with good 60' times, that had at least 300' of Density Altitude spread between them, and that trended in the proper direction – ET wise. If your 60' times are in a range of a couple hundredths or more, then you need to work on traction before you go any further. A more typical case would be where they are all within a hundredth and maybe one of two were slower because of something unusual. This indicates loss of traction due to a marginal track or someone dragged to much water or oil to the start line. I always recommend using the largest set of tires that are reasonable for your car. Let the other guy worry when the track is slippery. In this case, run #1 is a typical first run that doesn't go right and therefore not worthy of consideration. Any 60' time that is a couple of hundredths slow probably was slipping after the 60' mark as well. So scratch run #1. To get real accurate, you need to do what I call equalizing the ET's based on 60' time differences.

To do this you need to find the run that had the bet 60' time and reference it for the rest of the runs. As the weather goes up or down by 100', I figure the 60' time should of changed by .001 seconds. So if you are comparing two runs, where the one you are comparing to the reference run has 200' worse air, then you add .002 to the reference run's 60' time – that is that it should have been. I usually write the 60' time that it should have been below the real 60' time then subtract the difference. This difference needs to be subtracted from the finish line ET so your are looking at the real ET's without the influence of run to run 60' time variances. Like run #2, 1.255 – 1.254 = .001 seconds, 60' time difference. If a 60' time is already lower, and the ideal 60' time is higher, then add the difference to the finish line ET. It doesn't matter what the reference 60' time is. Run #2's 8.520 -.001=8.519. This new 8.519 would be what you would of ran had Your 60' time been in the usual range. You may want to write this corrected ET beside it for future comparison. You can also correct the other runs as well except for run #9 of course – the reference run. It's a good idea to put a * by the 60' time you are using as a reference. During a test session or a bracket race, if the runs keep getting quicker as the air gets better, you may want to take the run with the best air (Lowest Density Altitude) and put it in what ever mixture program you are using as your reference run. Then when you go to Your next race, anticipate the best air you will encounter, then adjust your mixture before you even run your first time trial. Also we need to get rid of any runs where you slowed up to avoid breaking out. The MPH and ET indicate this of run 6. Next we should look for any runs that are done at near the same Density Altitude and pick the one with the lowest ET. That means the one with the quickest ET made the most out of the available air, the comparison 3 and 4 would indicate that run number 4 was the better run. Lets eliminate run number 3. Also you would want to keep run #9 instead of #8, not only was the ET a hair quicker, but the MPH was faster and the 60' time on run #8 had to be corrected to much to be absolutely accurate. Likewise if you have two runs that produced close ET's the one that was done at the higher Density Altitude would be the better one because the one with the better air should of speeded up but it didn't, runs number 2 and 4 are a good example where number 2 ran almost the same ET as 4, but with worse air, the rough rule of thumb for Gas is that you should pick up a hundredth with every 100' to 190' of better air, Alcohol usually take 225' to 425' for the ET to change by a hundredth. And the 60' times will need about 200' for a change of .001 seconds on Alcohol. It takes a greater change of
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air for the faster cars like a Super Comp car as opposed to a 12 second Bracket car. We didn'l pick up as much as we should of with run number 4. So we will therefore eliminate run number 4. This leaves run number 2,5,7, and 9 as good runs. They all have good 60' times. Trend quicker as the air got better and they look right in relation to each other (having roughly the same spacing of Density Altitude and ET). We would use runs number 2 and 9 because they have the greatest Density Altitude spread (this large air sample will make the statistics most accurate).If the 60' limes look reasonable in relation lo each other, just leave them the way lhey were. Or you run several pairs through Program 1 in the new computer to see if any of the pairings make the Feet per Hundredth go way out of line. Since run 5 is near runs 7 and 9 (Density Altitude wise), you may want to pair up 2 & 7, 2 & 9, and have a look at 2 & 5 and 5 & 9 to see if they look reasonable (when you don't have a large Density altitude spread, the Feet per Hundredth can get real flaky). If you have run all of these pairs you will have noticed that by using run 5 in both of the last two pairings, the Feet per Hundredth went to extremes, where as the first two pairings were in the middle. In this case because run 5 was paired with a higher and lower figure the average will be the same as 2 & 9. If you do this averaging thing, take each of these Feet per Hundredth figures, add them up and divide by however many of the pairs you use to get the average feet per hundredth. You can put this average directly in the computer at the 'Feet per Hundredth?' prompt. It would be better to just scratch run #5.Then the next time you go Bracket racing, you just pick one of your time trial runs as the best one, and use it for your reference run (Last Altitude and Last ET for the L program or button 3 depending on which computer you are using). Keep in mind all cars have a certain range that they operate in. if the air stayed the same all day, and so did track conditions, you figure you would hit the same ET on each round. In real life, all cars have an operating range. A good car may vary by 1.5 hundredths, while a car that doesn't hook up and/or run as well may vary 4 or 5 hundredths. You will get a feel for this after you start keeping records. After scrutinizing the runs, your reference run will probably be near the center of your operating range. Therefore, you may want to Dial quicker by ½ your range. If you have a range of 1 1/2 hundredths, you may want to Dial quicker by ,007 seconds.

ONE MORE NOTE, THEN THIS IS THE END – IPROMISE!
Always place your Temperature and Humidity gauge out in the weather and in the shade. Don't ever take it up with you in the staging lanes because there are people running their engines. This will be picked up as excessive heat and humidity. When they call you up for your next round, try to anticipate what the weather will be like while you are actually making your run. Take a bike and send someone to your gauges in case the weather is starting to get away from you. Keep the computer with you in the staging lanes. The altimeter will stay steady enough if you get delayed in the staging lanes a little longer than you anticipated. Or use radios, and let the person in the pits run the computer.
I want you to get all your money's worth out of my computer. To do that, you must fully understand how to use it. So if you have any questions, please call. Copyright 1989 Bruce Huggard

RELATIVE NOZZLE SIZES

Kinsler	Hilbom	Crower	Enderie
E-165	4	,016"	,016
F-200	5	,017"	.017
G-240	6	.020"	.020
H-280	7	.0215"	.0215
J-320	8	.0225"	.0225
K-385	9	.024"	.024
L-410	10	.025"	.025
N-510	12	.028"	.028
P-560	14	,029"	.029
Q-620	16	,032"	,032
R-710	18	.033"	.033
T-792	20	.035"	.035
U-845	22	.0355"	,0355" - ,036"
V-900	24	,035" - .037"	.036" - .037"
X-1040	27	.039"	.038" - .039"

The 3 digit number in the Kinsler Line indicates for example, K-385 means k> drill size = ,024"; 385 > 38.5 lbs of fuel per hour at 30 lbs psi on the average.

B & G RACING COMPUTERS (602) 274-2537

Large	47	.055	70	.070	81	.078
Hilborn	56	,059	73	,073	94	.089
Nozzles	61	.063	75	.076	104	.093

B&G Racing Computers®

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BUTTONS

1 Dens Alt
2 TS/Tmr
3 Dial-in
4 Compression
5 Holley Jets
6 Pill
7 Nitro %
8 Menu

•

Some Programs May Not Appear In All Versions.

• 1/4 MILE Performance Related

B&G Racing Computers

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Phoenix, AZ 85016
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PROGRAMS

1   Air Set-up
2   TS/T Set-up
3   Total Nozzle Area
4   Orifice Diameter
5   Comb Change
6   Parallel Orifices
7   Pulley OD %
8   Blower OD %
9   Mikuni Hex
10 Mikuni Round
11 Jets by Size MM or Thousandths
12 Conv Slippage % ⎫
13 Speed   ⎬ For CABS
14 RPM   ⎪
15 Gear   ⎪
16 Tire   ⎭
17 Horse Pwr *
18 Speed *
19 ET *
20 CFM
21 Fuel Volume by Time or Quantity
22 Fuel tine Reverse PSI
23 Power Valve Restriction
24 Fuel Flow/Hose ID
25 Balance

26 Compression Dist.
27 Rod Length
28 Deck Height
29 Jet Change for Nitro -
30 Speed ⎫
31 RPM   ⎬ For Harleys, Motorcycles, and Go-Karts
32 Gear   ⎪
33 Tire   ⎭
34 Horse Pwr from Toque
35 Toque from Horse Pwr
36 Poured Dome Vol & Comp
37 Main By-Pass Starting Point
38 Winning Clearance
39 Main By-Pass /Fuel Flow
40 Fuel Volume
41 Main/HiSpd Balance
42 Prop Slippage ⎫
43 Speed   ⎬ For Boats
44 RPM   ⎪
45 Overdrive   ⎪
46 Prop Pitch   ⎭
47 C°– F°
48 F°– C°
49 Valve Springs
50 Cam Specs
51 Cam Timing
52 Splits
53 Cylinder/Hose Volume
98 1 or 6 Car Set-Up
99 Alt or Baro Set-Up