CDS
COMPETITION DATA SYSTEMS

www.competitiondata.com

TRACK MASTER 2000 SOFTWARE

ONLY TRACK MASTER 2000 GIVES YOU:

FLEXIBILITY to analyze data the way YOU choose, using XY plots, Signal vs Signal plots, Map plots, Suspension Animation Displays, Histograms, Bar Graphs, Numeric Displays, Driver Controls Graphics, Text Reports, Map Markers and more!

CONTROL to design screens the way you want, deciding for yourself which plots to put on the screens, how to arrange them, and what data to display in them.

SPEED & POWER that can only be had with true 32 bit software designed exclusively for Windows 95® (and higher). TM 2000 loads and calculates data faster than any competing products - Guaranteed!
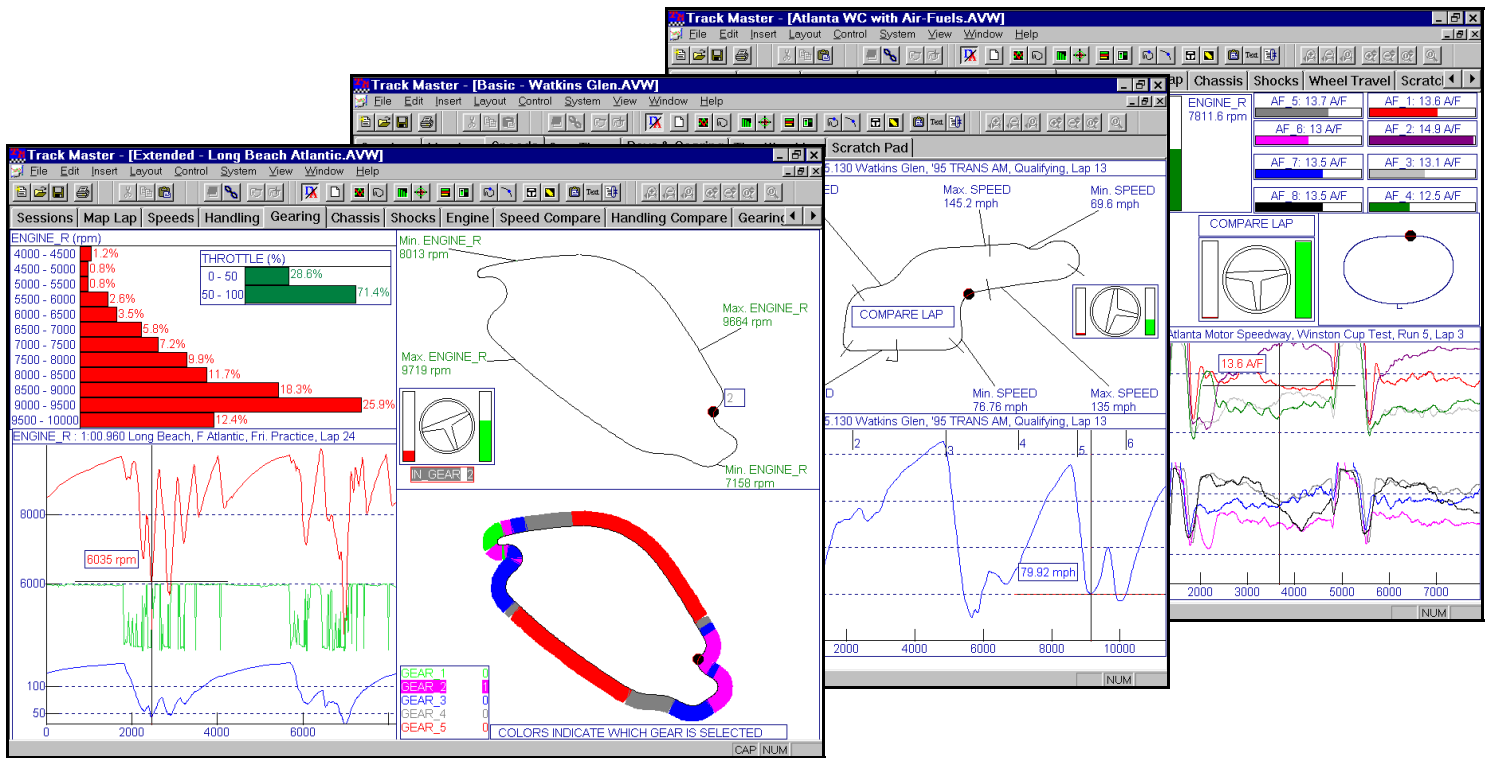

- **ARRANGE** displays and graphs to create screens or "pages" the way YOU want. Number of pages limited only by available memory

- **NAME** your pages using labels you prefer such as "GEARS", "CHASSIS", "SHOCK ANALYSIS" etc.

- **HOT LINK** displays and graphs together so when you change to a different lap, move the cursor, or zoom a graph *ALL LINKED ITEMS AUTOMATICALLY UPDATE*

- **DESIGN** map reports using CUSTOM MAP MARKERS (including segment times) for easy visual analysis

- **CREATE** groups of pages (called "views") and save them for future re-use allowing fast and methodical analysis

- **ANALYZE** your data any way you want with preprogrammed AND user programmable math channels

- **ADD NOTES** to any display or graph using the text control

- **PRINT IN COLOR** using any WIN 95 Compatible printer

- **TRUE 32 BIT PERFORMANCE** takes full advantage of the WIN 98 user interface including long file names, toolbars, context sensitive menus, help, and click & drag zoom & pan

CDS TRACK MASTER 2000
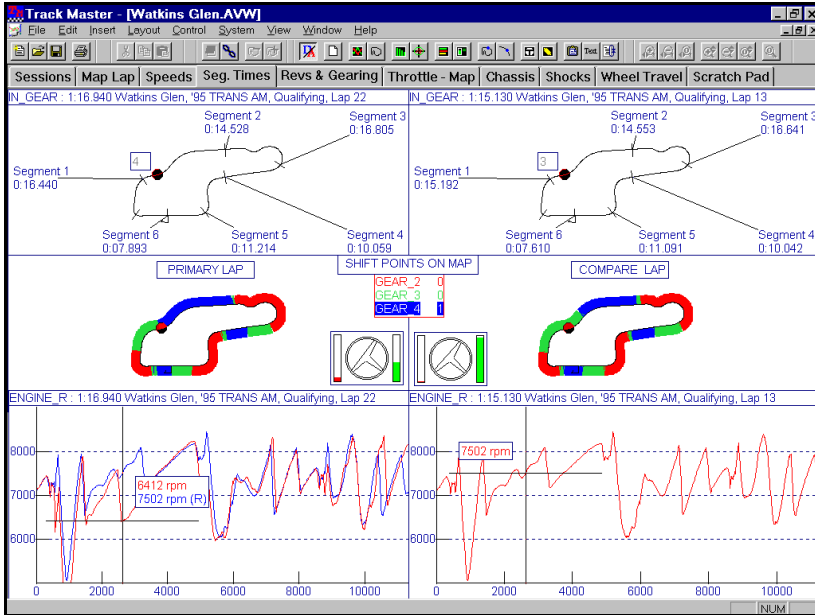
- **SIDE BY SIDE COMPARISONS** are simple to do. Here are segment times, shift points, RPM's and Driver Controls for 2 laps. The left hand column of plots shows data from a "decent" lap, while the right hand column shows data from the best qualifying lap. Only *TM 2000* gives you the power and flexibility to organize data this way.

- **THE "FLYING BOX"** attached to the cursor in the 2 upper map plots shows which gear the car is in. Notice that on the "decent lap" the car is in 4th while on the "best" lap, it is in 3rd. The **SEGMENT TIMES** markers in the 2 upper maps are automatically positioned at the same exact track position for both laps, making the need for multiple beacons obsolete.

- **THE MAPS IN THE CENTER** of the screen show the exact shift points for each lap, as well as which gear is being used at every point on the track, making gearing analysis as easy as it can be.

- **THE CURSORS IN ALL THE PLOTS** are "*Linked*" to each other, so that as you move any one, they all update.

- **ALL THE NOTES ON THESE SCREENS** were created using the *Text Tool* built into *TM 2000*, which makes it a snap to add notes to graphs.
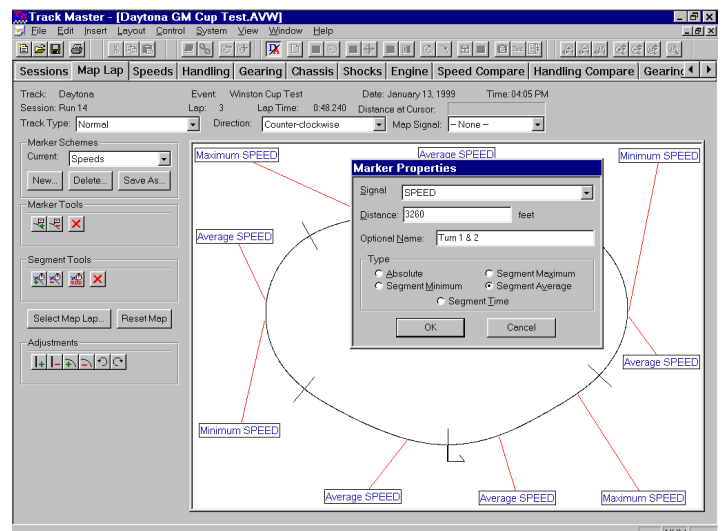
- **SWITCHING FROM SCREEN TO SCREEN** by clicking on the Page Tab is nearly instantaneous. Each custom screen can be given a meaningful name, reducing confusion.

- **HISTOGRAMS** aid in analyzing complex data such as Shock Speeds. Here are histograms of the 4 shock speeds, along with distance plots of the shock speeds, the Driver Controls, Track Map, and 3-D Chassis Animation, all in one nicely organized page.

- **BY ZOOM LINKING** the histograms to the X-Y plot, they analyze and display only the portion of the lap you are zoomed in on. This powerful feature allows you to quickly zero in on the portions of the data important to YOU.

- **3-D CHASSIS ANIMATION** can be rotated both horizontally and vertically (even as it is animating!) The fixed plane (green) shows the chassis at static ride height while the red plane shows the relative movement from static. These chassis planes can be shown as wire frames (as they are in this example) or as solid planes (as shown on the next page).
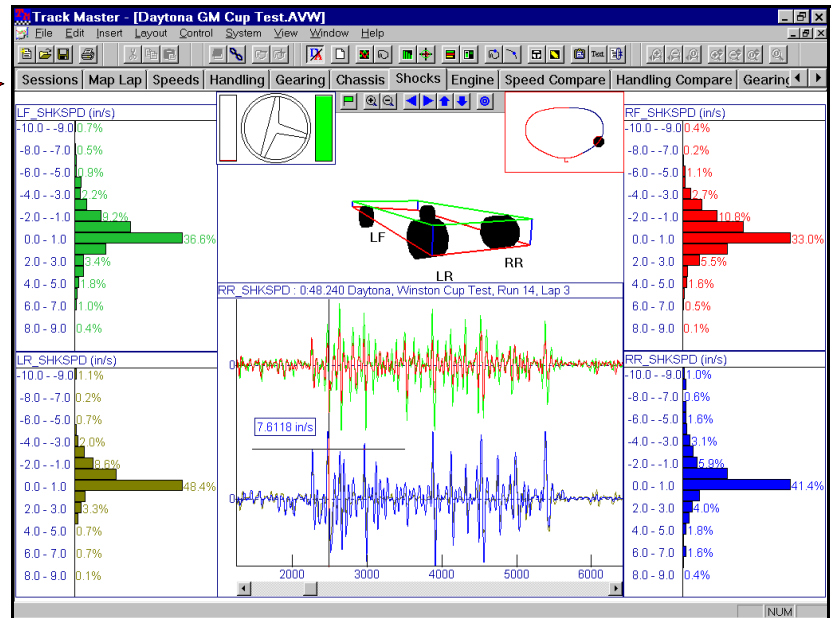
STATE OF THE ART Context Sensitive Menus (Speed Menus) are used throughout the program, and are accessed by simply "Right Clicking" on any object.

MAP BASED REPORT DESIGNER

- **CREATE** map based reports using the improved map markers facility which enables you to position markers wherever you would like them to appear in the report.

- **MAP MARKERS** appear on Map Plots positioned exactly as you arranged them on the design page.

- **NOTE** that a Custom Marker can display the Minimum, Maximum, Average, or Absolute Value of any Signal (including Math Signals).
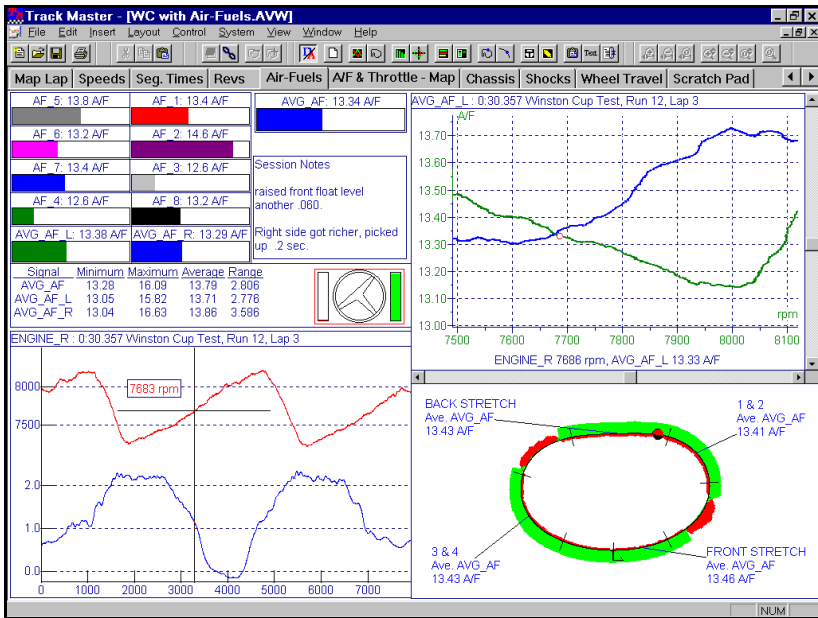
- **INTUITIVE PAGE LAYOUTS** enable you to view many channels of data on one screen. On this page we have air/fuel ratio for all 8 cylinders of a Winston Cup motor shown in bar graphs on the left. The bar graphs are arranged as if you were viewing the engine "from above". Obviously, this is particular data is arranged for a Ford engine. The average air/fuel Ratio for the left and right side cylinders are also shown in bar graphs as well as the average for the whole motor. (These averages are formulated using the Math facility in *TM*)

- **THE MAP PLOT IN THE LOWER RIGHT** shows throttle position and fore/aft G superimposed on a map of the track. This type of plot (unique to TM 2000) is a quick, easy to understand picture of where the driver can pick up the throttle and where he must back off. Also shown on this map plot are markers of average air/fuel ratio for the 4 main sections of the track. Map markers can be easily set up for any variable in TM.

- **THE XY PLOT** in the upper right shows average air/fuel for the right side cylinders in blue, with the left side in green. The graphs are plotted against Engine RPM, and show how drastically the air/fuel ratios change as the engine pulls through its RPM range. These plots illustrate how easy it is to boil down "data" into the easy to see "answers" that we really need.

- **THE CHASSIS ANIMATION** display shows a 3-D representation of the "Chassis Plane". This screen shows the reference plane (green) and moving plane (red) as solids. (the example on the opposite page uses the "wireframe" option. As you move the cursor around the map of the track or across a x-y plot, the chassis and all the bar graphs update or "animate" Moving the cursor can be done manually point by point, or can be run automatically at 3 selectable speeds. This screen also demonstrates that you can easily have more than 1 chassis animation showing several views of 1 set of data, or even view several data sets side by side.

- **THE PRIME BENEFIT** of the Chassis Animation is that it lets you watch actual action of your chassis on the track, rather than trying to visualize it yourself while looking at graphs. Of course you can also look at the graphs in *TM 2000* if you like. The small graph in the lower right of this screen might not seem useful until you realize that any graph, no matter how small, can be instantly zoomed to full screen with 1 keystroke.

- **BAR GRAPHS** displaying all the common chassis parameters have been added to this screen. This illustrates that in TM 2000 you can "layer" displays on top of each other to create screens as you want them to appear rather than being constrained by someone else's idea of how to show the data.
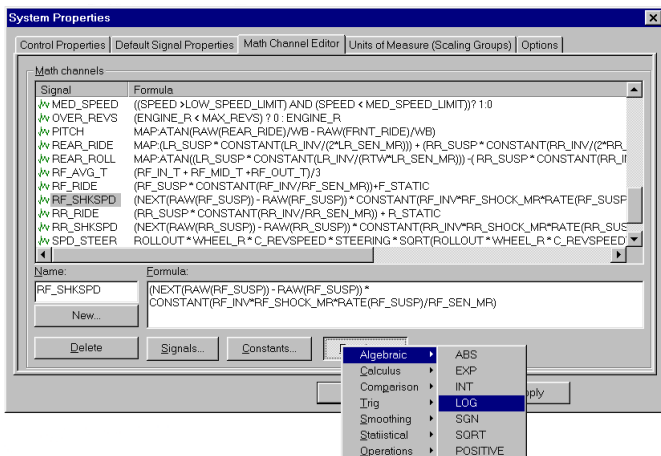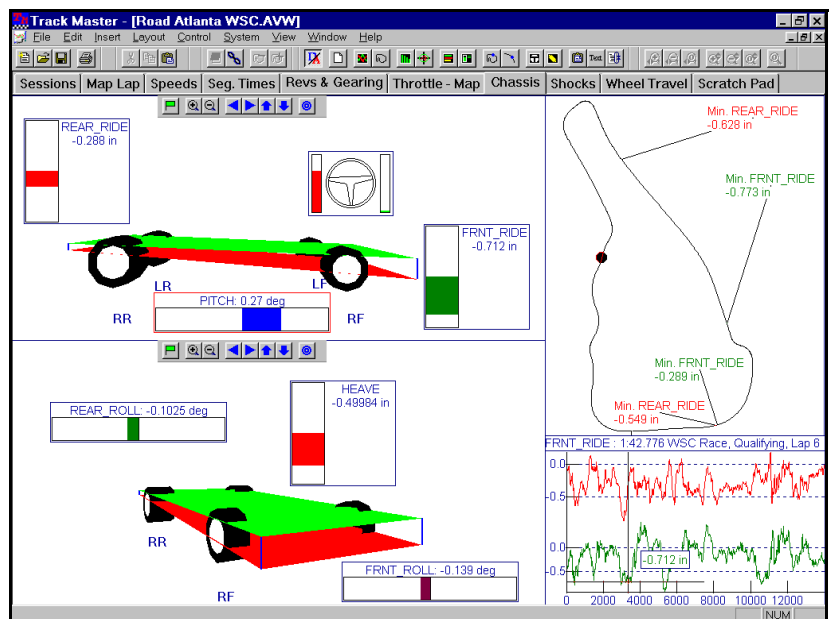
THE MATH CHANNEL FACILITY IN TM 2000 is the most advanced available with many unique and powerful features. Performance is so good that when you plot a signal, you can't tell if it is a raw recorded signal or a math signal nested many layers down in the math channels!

- *ALGEBRAIC FUNCTIONS*
- *TRIGONOMETRIC FUNCTIONS*
- *LOG AND EXP FUNCTIONS*
- *STATISTICAL FUNCTIONS*
- *CALCULUS FUNCTIONS*
- *COMPARISON FUNCTIONS*
- *SMOOTHING OPERATORS*
- *LOGICAL OPERATORS*
- *IF-THEN-ELSE CONSTRUCTS*

- *SYSTEM WIDE CONSTANTS*
- *SESSION SPECIFIC CONSTANTS*
- *NO LIMIT AS TO NUMBER OF FORMULAS OR LEVELS OF RECURSION*
- *COMPLETE CONTROL HOW DATA IS MODIFIED PRIOR TO INSERTION INTO A MATH SIGNAL*
- *CONTROL OF SAMPLE RATE AT WHICH A MATH SIGNAL IS RESOLVED*

- **TM 2000 IS PERFECT FOR DRAG RACING.** In this screen we have all 8 EGTs (Exhaust Gas Temperatures) shown both in bar graph form AND as XY Plots. Notice that the EGTs are fairly well balanced with the biggest difference being between and Cylinder #1 and #3. The low temperatures indicate that this data is from an acohol powered car.

- **CLUTCH SLIP** is automatically calculated for you, and is displayed as a green trace on the XY Plot in the lower right and shown in the green bar graph in the center. CLUTCH SLIP can be displayed in terms of either "percent" or RPM, your choice.

- **THE RPM HISTOGRAM** (in the lower left of the screen) shows that the engine spent a lot more time in the 7000 to 7800 RPM range compared to the 7800 to 8600 RPM range. This a because the driver shifted 1st-2nd early (at about 8060) instead of stretching it all the way to 8600 RPM.

- **WITH THIS SCREEN** and perhaps 1 more to display fuel system data, the typical drag racer can analyze all his data from a run in a few minutes, and be back tuning his car for the next pass rather than struggling with a less flexible software program.

Track Master - [Alcohol Funny Car.AVW]

File Edit Insert Layout Control System View Window Help

Passes | EGT & Clutch | Clutch Slip | RPM & Fuel System | Min & Max Reports

EGT1: 780.7 F	EGT2: 823.5 F
EGT3: 870.3 F	EGT4: 865.1 F
EGT5: 843.7 F	EGT6: 878.2 F
EGT7: 842.5 F	EGT8: 825.4 F

ENGINE_R: 8064 rpm

CLUTCH_SLIP: 4.8 %

EGT1 : 0:05.940 Rockingham, Spring Race, First Qualifier, Pass

780.7 F

8064 rpm

ENGINE_R (rpm)
8000 - 6200	0.0%
6200 - 6400	1.2%
6400 - 6600	2.4%
6600 - 6800	1.9%
6800 - 7000	1.5%
7000 - 7200	12.0%
7200 - 7400	17.1%
7400 - 7600	15.0%
7600 - 7800	15.2%
7800 - 8000	9.1%
8000 - 8200	9.5%
8200 - 8400	9.1%
8400 - 8600	6.1%
8600 - 8800	0.0%
8800 - 9000	0.0%

Track Master - [Atlanta WC.AVW]

File Edit Insert Layout Control System View Window Help

Sessions | Map Lap | Speeds | Seg. Times | Revs | Throttle - Map | Chassis | Shocks | Wheel Travel | Summary Reports

0:30.318 Atlanta Motor Speedway, Winston Cup Test, Run 12, Lap 4

Lap	Lap Time	Segment 1	Segment 2	Segment 3	Segment 5	Segment 6
1	0:39.019	0:15.592	0:04.765	0:06.160	0:09.484	0:03.018
2	0:30.436	0:07.768	0:04.204	0:05.826	0:09.544	0:03.094
3	0:30.357	0:07.812	0:04.179	0:05.797	0:09.517	0:03.051
4	0:30.318	0:07.788	0:04.180	0:05.796	0:09.503	0:03.051
5	0:30.357	0:07.797	0:04.194	0:05.812	0:09.504	0:03.051
6	0:30.516	0:07.802	0:04.248	0:05.844	0:09.561	0:03.061
7	0:48.000	0:07.941	0:04.551	0:06.630	0:13.727	0:15.152
Theoretical	0:30.298	0:07.768	0:04.179	0:05.796		
Rolling	0:30.318	0:07.788	0:04.180	0:05.796		

AVG_AF	Time	Minimum	Maximum	Average	Range
1	0:39.019	10.13	15.9	12.48	5.774
2	0:30.436	11.81	16.34	13.67	4.53
3	0:30.357	13.28	16.09	13.78	2.806
4	0:30.318	12.87	16.58	13.76	3.719
5	0:30.357	13.33	16.38	13.82	3.049
6	0:30.516	12.23	15.72	13.67	3.496
7	0:48.000	12.1	17.97	16.47	5.877

ENGINE_R	Time	Minimum	Maximum	Average	Range
1	0:39.019	3387	8659	7083	5272
2	0:30.436	7215	8415	7717	1201
3	0:30.357	7157	8271	7714	1115
4	0:30.318	7209	8299	7714	1090
5	0:30.357	7158	8316	7710	1158
6	0:30.516	7030	8381	7674	1351
7	0:48.000	4488	8242	5366	3754

Signal	Minimum	Maximum	Average
AVG_AF	11.81 (2)	16.58 (4)	13.74
AVG_AF_L	11.84 (2)	16.68 (4)	13.71
AVG_AF_R	11.64 (2)	16.63 (4)	13.77
BITE	46.6 (6)	50.4 (5)	49.1
ENGINE_R	7030 (6)	8415 (2)	7706
FRNT_LASER	4.817 (3)	7.431 (3)	6.253
FRNT_RIDE	-1.6 (6)	0.479 (3)	-0.477
FRNT_ROLL	-0.1284 (2)	0.9316 (5)	0.6227
LATERAL_G	-0.2155 (2)	2.337 (2)	1.35
SPEED	162.6 (6)	189.7 (2)	177

ReportControl Properties

Report Control Properties | Report Control Colors

Report
- ○ Lap times
- ○ Segment Times
- ○ Session Summary
- ● Signal Summary (All Laps)
- ○ Signal Summary (Single Lap)
- ○ Marker Report   Revs

Lap Time Filter
Map lap time: 0:30.507
15 % of map lap = 0:04.576
Ignore laps less then: 0:25.931
Ignore laps greater then: 0:35.083

☑ Always on top
☐ Full screen
☐ Show Infobar

OK | Cancel | Apply | Help

- **THE REPORT GENERATOR in TM 2000** is extremely flexible and powerful. The *SEGMENT TIMES REPORT* shows segment times for every lap in the session. At the bottom of the report the *FASTEST ROLLING LAP* and *FASTEST THEORETICAL LAP* are displayed, along with their segment times.

- **THE AVERAGE AIR/FUEL and the ENGINE RPM** reports in the lower left are examples of "All Laps" type reports, where the min, max, average, and range for each lap is reported. In the upper right is an example of a "Session Summary" where only 1 line is devoted to each chosen signal, and the parentheses after each item indicate which lap the min or max occurred on.

- **THE PROPERTIES BOX** for reports includes a user-controllable "Lap Time Filter" so that you have control of which laps are considered in reports. This makes it easy to exclude slow or "in" laps, spins, etc.

OTHER FEATURES & OPTIONS

- **NEW** "Dyno mode" for using TM on engine and chassis dynos. See the separate dyno brochure for details.

- **NEW** "Command View" option for graphic viewing of live data from Commander II. See the separate brochure for details.

- Integrated record keeping with session notebook

- "Resume from last save" mode

- Design / Analyze mode switch

- Automatic update after data download by Command-Link

- Automatic Track Map regeneration when changing to a different track

- Display and analyze data from MRA-LTS Simulation Software.

- Import Data from Pi V6

- ASCII Export of any data including math signals

PC Requirements & Recommendations

- IBM Compatible with Windows 98SE, 2000, NT, ME, and XP
- SVGA graphics required, 1024x768 (XGA) graphics recommended
- 32 MB or more RAM
- Pentium 3 or higher recommended.
- 40 MB Available Hard Disk Space, CD ROM Drive for installation.
- PCMCIA slot for memory card option

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www.competitiondata.com

Competition Data Systems, Inc. Williamsville, NY
Voice: (716) 631-2880   Fax (716) 631-9930