

Chris's Automobile Recorder

Version 11.0 11/11/90

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Overall Description of C.A.R.

Chris's Automobile Recorder keeps a maintenance and operation log for any type of vehicle or machine and reminds you when Preventative Maintenance and Inspections are due. It is very quick to use, very comprehensive, and has on-line help and a manual. It will help you perform maintenance required for reliable and economical operation. The detailed, printed Log will add value to your vehicle at resale time. And it's free!

C.A.R. supports U.S. users (miles, gallons, MPG) and metric users (kilometers, Liters, L/100km). It supports U.S. (MM/DD/YY) and european (DD/MM/YY) dates. It also will run in a mode designed to support users of special equipment and machines, with hours instead of miles and maintenance scheduled in days vs. months. This manual is written from the perspective of a U.S. vehicle user. The program has separate on-line help files to support U.S., metric, and machine users.

The Vehicle Log

This program maintains a log consisting of `events' such as buying fuel, repairs, inspections, etc. They are listed by date and/or odometer.

Each event is entered on a full screen form automatically customized for your vehicle. The event then becomes a one line entry in the log displayed on the main screen. The log may be moved around in at will, and the full screen of information that was entered for each entry can be easily displayed. Entries may be added, inserted, edited, or deleted.

Inspection & Preventative Maintenance

Inspection and Preventative Maintenance Schedule information for your specific vehicle is entered on easy to use screens.

You can be reminded when something is due on the vehicle. Both a first reminder and a second reminder are provided, along with an overdue warning. The days in advance each reminder will occur can be set, and even work for things scheduled by mileage only.

Preventive Maintenance items and Inspections are all independently tracked, and reminders for each are based on actual due dates and/or milages, which are based on the last time each was done. Each of up to 20 different P.M. items and up to 5 Inspection Groups (up to 7 items each) may have a different milage and/or time interval set up for it.

The program can be called by your AUTOEXEC.BAT file with a "/PM" option, and it will pause and display anything that is due, no pause if nothing due.

The program carefully estimates what the current date's odometer reading is based on the most recent entry and your past driving pattern. The program can be adapted to changes in your pattern, such as a new work location. The starting date for expense calculations can also be changed.

Fuel Consumption

Every time you fill-up with fuel the program will calculate your Miles-Per-Gallon since the last fill-up. Intermediate fuel purchases that were not fill-ups are included in the calculations. The program will also display a last 4 fill-up average MPG and an overall average MPG. Comparing the two can give an indication of any excessive fuel consumption problems. Averages are true averages, i.e.:

100 miles on 5 gallons = 20 MPG plus 210 miles on 7 gallons = 30 MPG

WRONG: Overall average = $(20 + 30) / 2 = 25$

CORRECT: Overall average = $(100 + 210) / (5 + 7) = 25.8$

Printouts

A blank form customized for any Inspection Group or Preventative Maintenance item may be printed on your printer for use by yourself or a repair facility.

The Log may be printed out, in both a compact or full format, color coded if you wish and you have an Epson compatible color printer.

Other Features

The program is very quick to use. Most menus are single keystroke and self-customizing for each vehicle. A full set of defaults as to fuel supplier, fuel type, repair provider, etc. are provided for quick entry. You can add a fuel purchase, backup the files, and exit with 16 keystrokes, no dozens of fancy menus to wade through. Parts of the program that are used on a daily basis, such as adding an entry, have been carefully optimized.

The program will backup your vehicle's data files to a floppy disk when you exit, if you so desire.

On-line, screen-sensitive help is provided with the [F1] key. Almost everything in this manual after this Overall Description section can be displayed at the relevant screen in the program by pushing [F1].

The program makes good use of color monitors, but also identifies and runs well on monochrome monitors. A hard disk is highly recommended, but not required (log display update will be considerably slower on floppy disk systems). About 180K of free memory is required. It will run at a fully acceptable rate on 8088 based systems, but an 80286 system or better is recommended, sort of like the new Sierra games. It uses any floating point processor it might find. An 80286 optimized version and an OS/2 version are available at a nominal charge through C.A.T., see "Further Information" section.

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Metric Usage & Usage With Boats, Planes, Machines, Etc.

C.A.R. can be used with almost any type of maintenance schedule. It even has applications for machine or building maintenance.

In all applications, events can be logged to track them and to track costs. Also, maintenance and inspections that are scheduled by time can be used in all applications.

For applications such as planes, large boats, or machines, a reading of an hour-meter giving total hours of operation can be used, and C.A.R. can be asked to use hours instead of odometer readings. Maintenance and inspections can be scheduled by hours of operation and/or days passed. The program will estimate current hours of operation, and costs per hour will be calculated. If no odometer or hourmeter is available, maintenance can be scheduled by days passed only.

You may also ask C.A.R. to use Metric units and calculate fuel usage in Liters per 100 kilometers instead of miles per gallon.

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Revision History

11/11/90 Version 11.0:

Support for Metric users, European style dates, machinery maintenance mode. Support for non-IBM compatible printers, many other minor enhancements. 5 inspection creation bug fixed, program checks for zero or negative miles traveled. Now generates MPG and ASCII log files. Data files from previous versions will be converted by the program.

5/4/90 Version 10.0:

Enhanced statistics screen, enhanced help, vehicle addition information moved into manual and other information added, new P.M. form for printer, many other enhancements.

3/20/90 Version 9.5:

Version 9.4 put a comma in a comment in line 5 of the .CFG file, which screwed up everything. Version 9.5 has been more thoroughly tested.

3/19/90 Version 9.4:

Fixed bug for vehicles over 100,000 miles, fixed message location on P.M. report screen.

3/12/90 Version 9.3:

Fixed Error 5 bug for newly created vehicle files on color systems.

3/9/90 Version 9.2:

Backup function modified to backup both C.A.R. files (.CAR & .CFG), now requires a directory name as opposed to a file name to be entered when asked, or as Default Menu entry. Program now waits to show backup success/failure. Program now automatically generates 3 log entries when setting up a vehicle, one for when it was built, one for when it was purchased, and one for the start of the log keeping. Only the last two were previously generated. Faster sort method designed, but still keep in mind that this program uses a complex method of determining positions for maximum log readability. Use of the Insert command is recommended for entries that do not belong at the end. Expanded and enhanced help facility. Better sample vehicle files, complete User's Manual now supplied.

3/1/90 Version 9.1:

Fixed bug, help functions now work on single-page monochrome monitors.

2/25/90 Version 9.0:

It has been under test for 18 months with two vehicles on two computer systems. This is its first public release.

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Further Information

Timely bug diagnosis and repair will be provided via Compuserve EMAIL to Dr. Memory c/o C.A.T. at [71001,1370].

Bug reports, comments and suggestions are always welcome! Please drop us a note and tell us of your experience, good, bad, or boring, or your desire not to have one, with this program. The most current release can be obtained on Compuserve, from the Annex BBS at (513)274-0821, or from the address below for a \$6 media and handling fee (includes "typeset" printed manual).

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Compuserve EMAIL [71001,1370]

C.A.R. is written using the Microsoft Complied BASIC 7.0 Professional Development System.

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Unless this software is marked β or Beta Test, you are granted a license to use C.A.R. and freely distribute it as long as no charge other than a physical or telecommunications media charge is made, and the program and files are not modified and are a complete set. Please give copies to all your friends!

C.A.R. is not warranted in any way, and is distributed "as-is" and without charge. The user is responsible for determining its suitability for any application. No liability for damages, direct, indirect, or consequential, is assumed.

Users need not send any money to the above address, but may feel free to do so. If you do, you will receive notification of new releases of this and other C.A.T. programs and a free copy of our swimsuit issue (should we ever publish one).

Important Note for Users of Versions Prior to 9.2

The Backup File entry on the Defaults menu has been changed to Backup Directory. Both C.A.R. files will now be copied to this directory. Example entries for this field:

A:\\

B:\\

C:\\CARBACK\2

If you don't know about this optional entry and did not make one, this does not concern you.

Important Note for Users of Versions Prior to 11.0

Files for vehicles created by versions of C.A.R. prior to Version 11.0 must be converted before use with Versions 11.0 and later. To do this, run the program as you normally would. C.A.R. will notice that the file needs conversion, and will ask you if you wish to do so. If you reply "Y" then the vehicle files will be converted.

C.A.R. will not delete your old vehicle files, they will be renamed to vehicle.OLD and vehicle.SAV. They may be deleted once you are sure the conversion has been successful.

Installing C.A.R.

All of the files supplied with C.A.R. (listed in the READ.ME file) should be placed in a disk directory or on a floppy disk. If you have a hard disk, a directory named "CAR" is recommended. If you know about paths and such, and want to put the CAR.EXE file elsewhere or want to specify a path on front of the vehicle file name, take note that C.A.R. expects its help files to be in the same directory as its vehicle files.

If you want U.S. units (gallons, miles, etc.) for a vehicle with an odometer and U.S. style dates (Month/Day/Year), you are ready to start. If you want Metric units (Liters, km, etc.) or european style dates (Day/Month/Year) or want to use C.A.R. with a machine (hours vs. miles), read further.

C.A.R. can be asked to run in one of three different modes by setting an environmental variable. This is done by putting the line indicated below into your computer's AUTOEXEC.BAT file (or creating an AUTOEXEC.BAT file):

Line in AUTOEXEC.BAT	Usage/Fuel/Oil	Fuel Economy	Help File
SET CARUNITS=METRIC	Kilometers/Liters/Liters	L/100km	CARMET.HLP
SET CARUNITS=HOURS	Hours/Gallons/Quarts	H.P.G.	CARHOUR.HLP
SET CARUNITS=USA	Miles/Gallons/Quarts	M.P.G.	CARUSA.HLP

Add an asterisk to the end of the AUTOEXEC.BAT line shown above, and european style dates (Day/Month/Year) will be used. Example:

```
SET CARUNITS=METRIC*
```

Not putting any line in your AUTOEXEC.BAT file is the same as "CARUNITS=USA".

To save space on your disk you may want to delete unused help files. See which files you won't be using from the above table and delete them. However, when you pass on a copy of C.A.R., be sure to include all the files.

Starting C.A.R.

The simplest way to run C.A.R. is to make the directory with all the C.A.R. files in it the current directory on the current disk (example: C> CD \CAR), and enter "CAR" at the DOS prompt. A menu of up to 32 vehicles will be presented, along with the option to add a new vehicle. Select the vehicle you want by the number or letter preceding it, and the Log Screen for that vehicle will be displayed.

C.A.R. may also be started as just detailed, except enter the vehicle name after "CAR" at the DOS prompt. C.A.R. will go straight to the Log Screen. Examples:

```
CAR Pinto
CAR MX-6
CAR Truck4
```

C.A.R. may also be started regardless of current disk or current directory (such as during boot-up) by supplying paths, both for C.A.R. and the vehicle files. Examples:

```
C:\CAR\CAR C:\CAR\Pinto
C:\CAR\CAR C:\CAR\Jaguar
C:\CAR\CAR A:MX-6
```

Ending the vehicle name with a "\" indicates it is a directory name that C.A.R. will look for vehicle files in, and display a list for selection. Examples:

```
C:\CAR\CAR C:\CAR\
C:\CAR\CAR C:\VEHICLES\
C:\CAR\CAR A:\
```

P.M. Scan Only Mode

If you run C.A.R. and supply a vehicle file name and "/PM", a scan will be made of that vehicle to see if anything is due to be performed. Examples:

```
CAR Pinto /PM          CAR A:Truck12 /PM          C:\CAR C:\CAR\Yugo /PM
```

The last example assumes that both the C.A.R. program files and your vehicle files are located in a directory called "CAR" on your C: disk drive. The last example is also an excellent addition to your AUTOEXEC.BAT file, and will check for maintenance due every time you turn on your computer.

When C.A.R. is run in this fashion, a very quick check of what things reminders are due on will be made. If no reminders or only First reminders should be given, the program will not pause and will end displaying only "No PM Due". If any Second reminders are due, or some things are overdue, a list of only those items will be displayed, a whoop given, and the program will pause for acknowledgement.

MPG or ASCII Log File Generation Mode

If you run C.A.R. and supply a vehicle file name and "/MPG", a scan will be made of that vehicle's log and an ASCII file of fuel usage will be written with a name of vehicle.MPG. If you run C.A.R. and supply a vehicle file name and "/LOG", a scan will be made of that vehicle's log and an ASCII file of all events will be written with a name of vehicle.LOG. These files can be input into spreadsheets, databases, and presentation graphics programs for further analysis and graphing. Both options can be specified together.

Examples:

CAR Pinto /MPG CAR A:Truck12 /LOG C:\CAR C:\CAR\Yugo /MPG

The last example assumes that both the C.A.R. program files and your vehicle files are located in a directory called "CAR" on your C: disk drive.

Log Screen

When you start C.A.R. and select a vehicle, the main or Log Screen will be displayed. It shows one line for each event you have entered into the log. The entries will be shown in different colors on color monitors, and in different intensities on mono monitors to help you differentiate between entry types.

A list of the functions that can be performed appears at the bottom of the screen. The first letter of each function is intensified. Push the letter on the keyboard and the function will be executed.

One log entry will always be "highlighted" or shown in reverse video. This is the entry that will be used for the View, Edit and Delete functions.

To move up and down through the log, use these keys:

(up arrow) » To move the highlight down one entry
(down arrow) » To move the highlight up one entry
Home » To move the highlight to the first entry on the screen
End » To move the highlight to the last entry on the screen
PgUp » To display the previous page of log entries
PgDn » To display the next page of log entries
Ctrl+Home » To move to the very first entry in the log
Ctrl+End » To move to the very last entry in the log

Log Screen Functions

Many functions are available from the Log Screen, and are listed below. Push the first letter of the function name to perform it:

A - Add New Log Entry at End of Log

Press the [A] key to add a new log entry at the end of the log. This is used when you want to add a new entry to the log, something that you just did - something that happened after everything else already in the log.

If you want to add an entry to the log that belongs somewhere in the middle and not on the end, press [I] for the Insert function instead. You can use the Add function and Sort the log, but this may be time consuming.

A customized entry form will be displayed to be filled out. When done, push the [F10] key to save the new event. If you do not want the new event and wish to discard the entry, push the [Esc] key instead.

When you add a Fuel Entry, the fuel usage will be recorded and an MPG calculated if it was a fill-up.

When you add an Inspection or P.M. entry, next due dates & mileages will be updated.

If the New Odometer Adder entry of the Defaults Menu is nonzero, the entry will be added to the odometer reading you entered (with a low beep).

I - Insert New Log Entry

Press the [I] key to insert a new entry in the log just before the highlighted entry. This is used when you want to add an "old" entry to the log, something that happened a while back and belongs somewhere in the middle or beginning of the log. Move the highlight to where the entry you are adding belongs and push [I].

If you want to add a brand new entry to the log, one that belongs at the end, use the Add function instead.

A customized entry form will be displayed, and it should be filled out. When done, push the [F10] key to save the new event. If you do not want the new event, and wish to discard the entry, push the [Esc] key instead.

When you insert a Fuel, Inspection or P.M. entry, next due dates & mileages or MPG's may become incorrect. The Sort function should be used to correct any possible problems. A reminder will be given by the program.

If the New Odometer Adder entry of the Defaults Menu is nonzero, the entry will be added to the odometer reading you entered (with a low beep).

V or <—| - View a Log Entry

Press the [V] or [<—|] (Enter) key to display the details of the entry currently highlighted in the log.

The entry can only be viewed and cannot be changed in any way.

E - Edit a Log Entry

Press the [E] key to edit the entry currently highlighted in the log. The entry will be displayed on the original entry form and can be changed at will.

When done, push the [F10] key to save the changed entry. If you do not want the changes you have made, and wish the entry back as it was, push the [Esc] key instead.

When you edit a Fuel, Inspection or P.M. entry, next due dates & mileages or MPG's may become incorrect. The Sort function should be used to correct any possible problems. A reminder will be given by the program.

To view an entry without danger of changing it use the View function.

D - Delete Log Entry

To delete a log entry and permanently remove it from the log, move the highlight to the entry and push the [D] key. The entry will be flashed and you will be asked if you want to delete it. When asked if you are sure, press the [Y] key and press Enter and the entry will be discarded.

When you delete a Fuel, Inspection or P.M. entry, next due dates & mileages or MPG's may become incorrect. The Sort function should be used to correct any possible problems. A reminder will be given by the program.

S - Sort Log and Recalculate

Press the [S] key to start the Sort Function. It will execute in three phases or parts:

Sort: The entries in the log will be sorted using dates if supplied; if not, by odometers if supplied; if not, by estimated dates. If an entry exists with an impossible combination of date & odometer, the program might not ever stop sorting. Press [Esc] to stop the sort without harm at any time. The sort might take some time, be patient or push [Esc] to check progress.

P.M. Scan & M.P.G. Recalculation: The entries are scanned to determine when P.M. and Inspections are next due. The Miles-Per-Gallon for each fuel fill-up entry will be recalculated. A percentage of completion will be displayed.

Statistics Screen: Operational statistics for the vehicle will be displayed based on the scans just made. They are detailed later in this manual.

P - Preventative Maintenance and Inspections Next Due Report

Press the [P] key to display a list of the date and/or mileage when each Preventative Maintenance item or Inspection is next due. The list will show all items, with those soon due or overdue highlighted and color coded.

This display will be described in greater detail later in this manual.

L - List Log on Printer

Press the [L] key to print a copy of the log on printer LPT1.

Two formats will be offered. The Compact format is similar to the log screen display, with one line per log entry. The Full format is similar to the screen produced by the View function for each entry.

Options of Color or Black & White will be given. If you have an Epson compatible color printer and you wish the log to be color coded, select Color. This can add considerable time to printing the Compact listing.

F - Print Inspection or P.M. Form on Printer

Press the [F] key to print a copy of a blank form for an Inspection or Preventative Maintenance item log on printer LPT1. The form will remind you of exactly what to do, or can be given to an Automotive Service Center to indicate what you want done. Blanks are provided for needed information, and the information can be easily transferred from the form to the C.A.R. program.

A list of forms will be displayed when you push [F]. Select the form you want to print a copy of by pushing the number in front of it.

One of the form selections will be "Preventative Maintenance." If you select this, a list of all of the P.M. Items for your vehicle will be presented. Select all of the P.M. items you wish to appear on the form by pushing the number or letter in front of each of them. An asterisk in front of an item indicates that it is selected. Push the number or letter again to un-select an item.

The entries on this list will be marked using color or intensity to show how soon they are due. They will be marked in the same way as described for the P.M. Report Screen.

M - Miscellaneous Functions Menu

Press the [M] key to enter the Miscellaneous Functions Menu.

This menu of miscellaneous functions will be described in greater detail later in this manual.

=====

H - Help Screen

Press the [H] or [F1] key to display help for the Log Display.

Q or Ctrl + Q - Quit Program

Press the [Q] key or [Ctrl] + [Q] keys to terminate the C.A.R. program and return to the operating system.

Pressing the [Q] key will immediately exit the program.

Pressing the [Ctrl] + [Q] keys will cause C.A.R. to copy the C.A.R. files for the current vehicle to another disk directory. If the Backup Directory entry on the Defaults Menu is not blank, that directory will be used. If it is blank, a directory name will be asked for.

Adding or Inserting an Entry in the Log

When either the Add or Insert function is selected you will be presented with a menu listing all the different types of entries that make up the log. This list is customized for the vehicle selected. Select the type of entry from the list by pushing the letter or number listed before it.

If you select "PREVENTATIVE MAINTENANCE", you will be asked to select a specific Preventative Maintenance item from a second list.

A blank form that is customized for the type of entry you have selected will be displayed. When filling out the form you may move from blank to blank by using these keys:

(down arrow)	or	Tab	or	Enter	to move to the next blank
(up arrow)	or	Shift+Tab			to move to the previous blank

To edit the entry in a blank use these keys:

<- (left arrow)	to move the cursor to the left
<- (right-arrow)	to move the cursor to the right
<- (backspace)	to delete the character left of the cursor
Del	to delete the character at the cursor
Ins	to switch between Insert and Overwrite modes

In Insert mode, characters you type will be inserted where the cursor is. In Overwrite mode, characters you type will replace what is already there.

When everything is correct, push [F10] to store the entry in the log.

If you don't want to put this entry in the log, or you don't want the changes you have made editing an entry, push [Esc].

Most items are optional and may be left blank, except:

- An entry must have at least a date or an odometer reading.
- Certain items must have an odometer reading, such as a P.M. item that is scheduled by milage.
- Certain items must have a date, such as a P.M. item that is scheduled by months.
- Odometer reading and gallons of fuel must be supplied for fuel fill-ups so that an M.P.G. calculation can be performed. If you don't have this information, enter [N] for fill-up.
- Dates must be entered in MM/DD/YY format, examples: 12/25/88 2/4/85
- Do not put commas (,) in any numbers entered, and do not put a dollar sign (\$) in front of dollar amounts.

Editing an Entry

Press the [E] key to edit the entry currently highlighted in the log. The entry will be displayed on the original entry form and can be changed at will using the keys described in the previous section. The restrictions listed there also apply when editing.

When done, push the [F10] key to save the changed entry. If you do not want the changes you have made, and wish the entry back as it was, push the [Esc] key instead.

When you edit a Fuel, Inspection or P.M. entry, next due dates & mileages or MPG's may become incorrect. The Sort function should be used to correct any possible problems. A reminder will be given by the program.

To view an entry without danger of changing it use the View function.

Misc. Functions Menu

From this menu you may select one of several different miscellaneous functions of this program:

Change Current Mileage Estimate Starting Point

The current odometer reading for your vehicle is estimated based on today's date. This program looks back and averages how many miles you drove each day since a certain date, and then calculates what today's odometer reading is likely to be.

This function sets the date and mileage used as the starting point for the calculation of the estimated current mileage for each day. You will want to use this if a change in your driving habits significantly changes the rate at which you accumulate miles on your vehicle. For example, you may change jobs and drive much further each day. Just set the odometer reading and date of when your usage habits changed.

This will not effect other statistics, such as cost per mile.

Change Expense Calculation Starting Point

This function sets the date and mileage used as the starting point for the calculation of the overall fuel economy and costs per mile. The totals of all the expenses and fuel amounts you report after the date selected are divided by the number of miles you have driven since the mileage specified to get cost per mile and overall MPG.

When this program was set up for your vehicle, it set this date and mileage to the date and mileage when you purchased the vehicle.

You may want to change the date and mileage if you do not have complete cost or maintenance records from the date when you purchased the vehicle. Just set the odometer reading and date of when your records start.

Set Default Values

If you wish, you can have certain items pre-entered for you on new log entry forms, things that are often the same time after time. This is called a default. For example, if you always buy the same type of fuel, you could have this type already entered on the fuel entry form. You are not forced to use it, however, and can always change it to what you want.

If you put a [Y] next to Use Today's Date, the current date will appear as the date entry on new log entry forms.

If you make an entry for Backup Directory then both C.A.R. files for the current vehicle will be copied to that directory when the program is exited using the [Ctrl] + [Q] keys.

Set Program Options

If you wish, you can set program options, which means to change the way in which this program operates:

1st Reminder Entry: You may set how many days-in-advance reminders are to be given for a P.M. item. An entry of "0" days will disable a reminder. The 1st reminder causes an item to appear in bold white on the P.M. report. No beep or warning message will be given, and CAR called for just a P.M. check will not list it or display it. A suggested number of days is 14. You will not be given a 1st reminder for things due less than every 60 days.

2nd Reminder Entry: The 2nd Reminder causes an item to appear in bold yellow on the P.M. report. A beep and warning message will be given, and CAR called for just a P.M. check will list it and pause. A suggested number is 7 days.

New Odometer Adder Entry: This entry, if not blank or zero, is added to the odometer value entered on all NEW entries. Odometer entries on edited entries are left unchanged. This has two uses. One, if your odometer is replaced with a new one reading zero, just enter the mileage at which it was replaced. Two, if your odometer turned over at 100,000, enter 100000 and then just enter the actual odometer reading when making entries.

Mono Monitor Entry: If [Y] is entered, the program will think you have an MDA monitor no matter what. An entry of [N] will force C.A.R. to think you have a color monitor (CGA, EGA, or VGA). A blank entry will tell C.A.R. to determine what kind of monitor you have.

Don't Use Blue Entry: If [Y] is entered, the program will not use blue for headings and other uses. This is useful for those users whose monitors do not produce readable blue text.

Print Line Drawing Characters: If [Y] is entered, the program will use the so-called "line drawing" characters when printing logs and forms. This requires a 100% IBM compatible printer (or setting your printer to IBM compatible mode). If your printer prints funny looking italic characters instead of lines, set this option to [N].

Statistics

At the end of the Sort function of the Log Screen, a screen of statistics for the vehicle will be displayed:

Statistics Starting Date & Odometer: This is the date and odometer from when you bought the vehicle, or what you entered for the Expense Calculation Starting point on the Misc. Functions menu.

Miles Traveled: This is (Today's estimated odometer) minus the (Statistics Starting Odometer).

Years: The number of years since the Statistics Starting Date.

Miles Per Year Average: (Miles Traveled) / (Years)

Miles Per Day Average: (Miles Per Year) / 365

Gallons of Fuel Used: Total of all fuel purchases since Statistics Starting Odometer.

Overall MPG Average: (Gallons of Fuel Used) divided by (Odometer at Last Fuel Purchase - Starting Statistics Odometer). Today's estimated odometer is not used since you have yet to buy the fuel used since the last purchase. The last purchase odometer will be estimated if not supplied.

Last 3 Fillup Average: This is (the total of all fuel purchase gallons from 3 fuel fill-ups ago until the last fill-up) divided by (the total miles between the odometer 4 fill-ups ago and the last fill-up). This gives a better indication of your vehicle's current economy than the MPG calculated for each purchase because it is less affected by "filling up" your tank to random levels. If you don't tend to fill your tank when purchasing fuel, this may not have any valid meaning.

Total Fuel Cost: Total of all fuel purchase costs since the Statistics Starting Odometer.

Fuel Cents/Mile: (Total Fuel Cost) / (Miles Traveled)

Quarts of Oil Used: Total of all oil top-offs since Statistics Starting odometer. This is a measure of oil consumption, and does not include oil changes.

Miles per Quart Overall: Miles Traveled / Quarts of Oil Used

MPQ Last 90 Days: (Quarts of Oil Used in the last 90 Days) / (Mi. Per Day * 90), after Statistics Starting Date.

Oil Consumption Total Cost: Total cost of all oil top-offs since Statistics Starting Date and Cents Per Mile.

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Other Cost Totals: The total cost of each of these entry types and the Cents Per Mile average for each.

Total Operating Cost: Total of all Costs since Statistics Starting Odometer.

Total Cents Per Mile: (Total Operating Cost) / (Miles Traveled)
Other displayed CPM's are rounded to 1/10 cent and may not add up to this total.

The cost figures do not include the cost of the vehicle or its depreciation in value.

How are MPG's Calculated?

When you purchase fuel for your vehicle but do not fill-up the tank, there is really no information on MPG than can be calculated. C.A.R. keeps a total of the amount of fuel purchased between fill-ups and adds them to the fuel amount for the next fill-up when calculating.

When you fill-up your tank, you are replacing the fuel you just used to drive the miles since the last fill-up. As you drive around after the fill-up and use the fuel just purchased, you do not have any way of telling what the MPG is for these new miles. When you fill-up again, you will then see how much fuel was consumed for the miles you drove.

Your vehicle probably had a full tank of fuel when you purchased it, and it will not have an empty tank when you sell it (hopefully!). It is best to think of your fuel tank as a "bank" from which you borrow fuel as you drive, and then replace when you fill-up. C.A.R. assumes that the fuel tank was full on the day you purchased it. It is not necessary to record this fill-up - if you do, enter "0.0" for the number of gallons, as you did not "use" this fuel, either the previous owner did (used purchase) or you are setting up the "bank" (new purchase).

When calculating overall MPG averages, it is important to use the odometer reading at the last fill-up, not the current odometer. Let's see what happens if we use the current odometer to check our MPG between fill-ups:

	Odometer	Total Miles Driven	Total Gallons Purchased	Overall MPG
Fill-up at purchase	1000	0	0	-----
Fill-up of 10 gallons	1200	200	10.0	20.0
Check of MPG	1300	300	10.0	30.0
Check of MPG	1400	400	10.0	40.0
Fill-up of 15 gallons	1500	500	25.0	20.0

The simplest way to put all of this; you can calculate your MPG right after a fill-up, and then not till you fill-up again.

When asked to calculate the overall average MPG, C.A.R. calculates the total miles driven using the odometer from your last fuel purchase. It would be more correct to use the odometer reading of the last fill-up, not purchase, and ignore all fuel purchases since the last fill-up. However, if a user rarely filled-up his/her tank, the overall MPG up till the last fill-up of 9 months ago would not be very helpful. Since this is an overall average, little harm is done in using the last purchase. Those who always fill-up are not affected, and those who do not will get the best estimate available.

If the last fuel purchase was not a fill-up, and an odometer was not entered, C.A.R. will estimate what the odometer reading was based on the date entered.

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P.M. Report Screen

This screen shows a list of all of the Preventative Maintenance items and Inspections that are scheduled for your vehicle, along with how often they are due and when they are next due.

If you have a color display the items will be colored based on when they are next due, and based on how many days in advance you have asked C.A.R. to remind you. This is normally 14 days in advance for 1st Reminder, 7 days in advance for 2nd Reminder. See Program Options menu on Misc. Functions menu to set them to different values. 1st Reminders will be bright white, 2nd Reminders yellow, and Overdue will be red. A first reminder is not given for things done once a month. Monochrome displays will show soon due and overdue entries as intensified.

If an item is scheduled only by mileage, estimated future odometer readings will be used to see if a reminder is due.

The next due date and/or mileage is based on the last time something was performed. If it never has been, it is based on when the vehicle was built.

Adding New Vehicles

New Vehicle Addition

A new vehicle can be added to C.A.R. by not specifying a vehicle name when starting C.A.R., and selecting "Add new vehicle" off of the Vehicle Selection Menu. This selection will set up the files used by the C.A.R. program to monitor a vehicle. In order to use it you will need to know the following information for the vehicle:

Vehicle' VIN Number (look on dashboard thru windshield on driver's side)

Date of Purchase

Odometer at Time of Purchase

Current Odometer Reading

Date Vehicle was Built or First Sold when New (you may estimate)

Vehicle's Inspection and Preventative Maintenance Schedule
(explained in detail in the following sections)

The information should be accurate, but you may estimate if you must. The information supplied by to you by C.A.R. will be only as good as the information you supply to it.

What are Inspection and Preventative Maintenance Items?

An Inspection item is something that is checked every so-many miles, or every so-many days. It involves looking at something to determine if repair, replacement, replenishment, or adjustment is needed. Unless some problem is found, no material or work is needed. Examples might be:

- Check Oil Level
- Check Engine Coolant Level
- Check Brake Wear
- Check Windshield Wiper Blade Conditions
- Check Tire Pressures

A Preventative Maintenance item is something that is replaced or serviced every so-many miles or every so-many days. The replacement or service is performed regardless of condition. Materials may or not be needed. Examples might be:

- Align Front End
- Rotate Tires
- Change Oil & Filter
- Clean Drain Holes

Inspection and Preventative Maintenance Schedule

You will need to find or develop a list of all the Inspections and Preventative Maintenance procedures that you want to perform for you vehicle. A good source of this is your vehicle's Owner Handbook. Other sources:

Contact a dealer of your vehicle's make to get a replacement handbook.

Buy a maintenance book at an auto store for your make & model.

Ask your dealer for an Inspection and Preventative Maintenance schedule.

Make up a list (details follow) of those items THAT YOU REALLY INTEND TO DO. Putting "measure tire tread depth every 30 days" on the list will not measure anything, it will just cause the C.A.R. program to bug you until you do it or lie about it.

Copy file "PMSCHED.TXT" to a printer to produce a blank form that can be used to gather the needed information.

Inspection Groups and Preventative Maintenance Items

Inspections should be organized in Groups of those performed at the same time. Examples might be all those items inspected every 15,000 miles or 12 months, those inspected every Spring, etc. A title should be picked for each group such as "15,000 Mile Inspection" or "Monthly Inspection". Something that is performed every 15,000 miles need only be on the "every 15,000" list and not repeated on the 30,000 mile or 60,000 mile lists.

Preventative Maintenance Items are normally not combined into groups. Some, such as oil change and oil filter change, can be combined into one item with no problem as there is little chance one will be changed without the other. But even if you determine that both the fuel filter and air filter should be changed at the same time, say at 15,000 miles, don't combine them into a single item. If only one is replaced due to a failure, C.A.R. will not be able to track them separately. The same warning applies to combining tire rotation with tire balancing, etc.

You may have up to 5 Inspection Groups and up to 21 Preventative Maintenance Items.

Scheduling

The time intervals between inspections should be specified in months. If you want something to occur every Spring, set an interval of twelve months. If you want something to occur every Spring and Fall, set an interval of six months.

You might want to schedule some things, such as oil changes, more often than your vehicle manufacturer specifies.

You can always do things more often than they are scheduled, so set up the maximum interval that should be allowed.

Editing or Changing Configuration Information

When all of the Preventative Maintenance and Inspection scheduling information has been gathered for your vehicle by this program, it will write it out to a file called {vehicle}.CFG, where {vehicle} is the vehicle name you specified.

If you wish to make changes to this information, you can edit the .CFG file using any text editor or word processor. Just be sure not to completely delete any lines, read the comment lines carefully as a guide, and save the result as an ASCII file.

Another option is to set up the vehicle again under a different name, and then substitute the .CFG file generated for your current one.

Vehicle History

You need to know or estimate when each Inspection or P.M. item was last performed. If you have no idea, the program will assume it has never been done since the vehicle was built. If this makes it now due or overdue, then it is now due or overdue, get it done! If you don't want to do it, why are you putting it on the list? If you plan to do it in 2 months, and it is due every 6 months, say it was done 4 months ago (6 minus 2).

You will need to know the date for those things that are performed every so-many days. You will need to know the odometer reading for those things performed every so-many miles. If you don't know one, you might estimate it from the other.

This information will not be asked during this new vehicle addition, but will be needed the first time you use C.A.R. with the new vehicle. You will need to add predated log entries to record when each item was last performed, so that the program will know when they are next due.

The fuel usage should start off with the tank full.

IMPORTANT - To start things out: Fill up the fuel tank and enter a fuel purchase fill-up of 0 gallons and the date and mileage. The tank will be full when calculating MPG's after fill-ups, and full when you sell the car, so this first tank doesn't count. Hopefully you got a full tank when you bought it! Stated differently, MPG's are based on fuel consumed, not fuel purchased.

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Example Schedule

The following illustrates an ambitious example schedule for a 1989 Ford Probe GT:

INSPECTIONS

MONTHLY INSPECTION (every month)

- Inspect Clutch, Brake & ABS Fluid Levels
- Inspect Power Steering Fluid Level
- Inspect Coolant Level
- Inspect Tire Pressures (32 F/26 R)
- Inspect Tire Wear
- Inspect Oil Level
- Inspect Battery & Lighting System

SPRING/FALL INSPECTION (every 12 months)

- Inspect Wheel Lug Nuts
- Inspect Pressure in Spare Tire
- Inspect Headlamp Alignment
- Inspect Coolant Condition
- Inspect Air Conditioning System Operation

7,500 MI INSPECTION (every 7,500 miles)

- Inspect Engine Belts & Hoses
- Inspect Wiper Blades & Washer

15,000 MI INSPECTION (every 15,000 miles)

- Inspect Brake Lines and Connections
- Inspect Front Disc Brakes
- Inspect Plug Wires, Rotor & Cap

30,000 MI INSPECTION (every 30,000 miles)

- Inspect Rear Disc Brakes
- Inspect Steering Operation & Gear Linkage
- Inspect Front Suspension Ball Joints
- Inspect Driveshaft Dust Boots
- Inspect Exhaust System Heat Shields
- Inspect Fuel Lines
- Inspect Manual Transmission Fluid Level

Example Schedule Contd.

PREVENTATIVE MAINTENANCE

Item Name	Every Miles	Every Months
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Oil & Filter Change	5,000	6
Rotate Tires	15,000	
Balance Tires	15,000	
Tighten Bolts & Nuts B & C	15,000	
Sparkplugs Change	15,000	
Wheel Alignment	15,000	12
Wiper Blades		18
Coolant Change	18,000	12
Fuel Filter Change	30,000	
Air Filter Change	24,000	
Replace Belts & Tension	30,000	
Replace Timing Belt	60,000	
Lubricate All Hinges and Locks		6
Silicone on Weatherstrips		6
Clean Drain Holes & Undercarr.		3
Clean Battery Connections		6
Wax Car		3

