

Introduction to PC SAS

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INTRODUCTION

This is a tutorial for the SAS* beginner or novice on how to use PC SAS. It will not cover how to program in SAS. The aim is to demonstrate the functions and capabilities of PC SAS. It will show the reader how to establish the system and configuration options, and how to easily move about within PC SAS.

The areas addressed are: (1) PC hardware requirements; (2) internal SAS file structures; (3) how to invoke SAS; and (4) the Display Manager System (DMS).

PC HARDWARE REQUIREMENTS

There are three software and hardware concerns for running PC SAS. They are DOS software version, memory availability, and disk. PC SAS requires PC DOS 2.0 or above. Your PC must have at least 640K of memory installed. When you load PC SAS you need 128K of memory of the 640K available for SAS. To determine how much memory is available use the DOS command CHKDSK. This command will provide a memory status report. To run PC SAS in the DMS mode (refer to the section on Display Manager System for more information) you need 332K of free memory. The amount of disk space required is dependent on the components installed. Some of the more common components are:

Base SAS*	6.6 MB
SAS/STAT*	6.3 MB
SAS/GRAPH*	4.7 MB
SAS/FSP*	.8 MB
SAS/AF*	.7 MB
SAS/IML*	.7 MB

SAS FILE STRUCTURES

This section defines important subdirectories and files created and used for SAS. This portion is to familiarize you with some of its internal structures.

There are nine subdirectories created by SAS.

SASEXEC	Executable SAS software files
SASHELP	SAS help files
SASINST	Installation process software
SASLINK	Micro-to-host link software
SASMSG	SAS message files
SASUSER	SAS user profile catalog
SASWORK	Temporary SAS files used during execution
SASTEST	Test information

SASMACRO

Macros developed for SAS programs

I recommend you create two additional directories. They are SAS program and SAS data directories. The SAS program directory would store your SAS programs and the SAS data directory would store your data files. These directories should be defined outside of the sasroot directory, c:\SAS. This way, you can control your data and it is not inadvertently changed by the processing of the SAS software.

The three SAS files to be aware of are the CONFIG.SAS, PROFILE.SCT, and AUTOEXEC.SAS. The CONFIG.SAS and AUTOEXEC.SAS work similar to your DOS files of CONFIG.SYS and AUTOEXEC.BAT. These two files are usually stored in the sasroot directory. The PROFILE.SCT file resides in the SASUSER subdirectory. The functions of each file are defined below.

CONFIG.SAS

Settings for the SAS configuration options.

PROFILE.SCT

Settings for the SAS system options. These control the appearance of the SAS output, SAS file processing, etc.

AUTOEXEC.SAS

The SAS statements which will execute automatically during initialization or start-up.

The type of configuration options established in the CONFIG.SAS file are selections that interact with the SAS system and your PC's environment. The options take effect only when starting the SAS system. They can not change during a SAS session. Some examples of options are: (1) defining the names and structures of where the SAS software resides on your PC; (2) specifying the SAS mode of execution; (3) stating the amount of expanded memory allowed for the SAS System to use; (4) declaring the number of buffers the SAS System can access and the size of each buffer. Refer to Attachment A for an example of a CONFIG.SAS file.

Within the PROFILE.SCT file you include SAS system options. These options include defining function key settings, window attributes, notepad entries, specific options such as CENTER, DATE, DEVICE, FIRSTOBS, etc. This file resides in the SASUSER directory. I strongly recommend you define the SASUSER directory within your CONFIG.SAS file (refer to Attachment A). If this directory is not defined to SAS, it will create a subdirectory SASUSER in your current directory. Your current directory is where you started SAS from. It may or may not be your sasroot directory. This is dependant on your DOS PATH statement in the AUTOEXEC.BAT file. Thus subdirectories of SASUSER may be established in multiple directories in your system.

The PROFILE.SCT file can be updated in two ways either interactively through DMS mode or directly with some edit facility using the POPTIONS statement. In an interactive mode, ensure the PROFILE system option is on. If the Profile is on, the next session reflects

established in the AUTOEXEC.SAS file. Refer to Attachment B for an example of the AUTOEXEC.SAS file.

The AUTOEXEC.SAS file contains global SAS options or executable SAS statements. During start-up of the SAS System, these statements get run.

There are two additional DOS files you should be familiar with. They are CONFIG.SYS and AUTOEXEC.BAT. The CONFIG.SYS file contains DOS configuration parameters. For SAS performance, set the file=50, and buffers=17. The AUTOEXEC.BAT file has DOS commands that are executed when your PC is started. It is here that the PATH command is established. If you define the sasroot directory in your PATH statement, you can start SAS from any directory. Refer to Attachment C for an example of the CONFIG.SYS and AUTOEXEC.BAT files.

INVOKING SAS

SAS can run in three modes of execution, interactive Display Manager System, interactive line, and batch. Each mode is described along with the differences between them.

The interactive mode is a full screen facility using windows. Display Manager System (DMS) is another name for the it. This is the most common method for running SAS. By default, there are three windows that will appear in this mode. The windows are:

- The program editor used for editing and executing SAS program statements.
- The log display which shows the SAS log from the execution of SAS statements.
- The output display which displays the output from the execution of SAS statements.

EXAMPLE (Display Manager System mode):

```
-OUTPUT-----
-Command ==>
-
-LOG -----
-Command ==>
-
-PROGRAM EDITOR-----
-Command ==>
00001
.....
```

More detail is given about the windows in the Display Manager System section.

Another, is the interactive line mode. In this mode SAS statements are entered one line at a time. The commands are executed when a run statement is encountered. The log and output information precede the run statement. This mode consumes 100K less of memory but does not have the full interactive capabilities as DMS.

EXAMPLE (Interactive Line mode):

NOTE: Copyright(c) 1985, 86,87 SAS Institute Inc., Cary,
NC NOTE: SAS (r) Proprietary Software Release 6.04
Licensed to

NOTE: Autoexec processing completed.

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The last is batch or noninteractive mode. In this mode, SAS programs are stored in DOS files. The log and output files are written to DOS files. This mode also consumes 100K less of memory than DMS.

To start any of these modes of SAS you enter SAS at the DOS command line along with any SAS options. An example for each mode is:

```
Interactive DMS      c:>sas -dms
Interactive line     c:>sas -nodms
Batch                c:>sas c:\saspgm\phone.pgm
```

To end a SAS session you type either BYE or ENDSAS at the command line.

DISPLAY MANAGER SYSTEM

Saving & Retrieving SAS Programs

Within the program editor window you code SAS programs. To save a program type FILE 'file name' on the command line. An example is:

```
Command====> FILE 'c:\pgm\phone.asc'
```

The file name is composed of the drive, directory, and file name for the particular program. To retrieve this program into your SAS session, use the command INCLUDE 'file name'. Again this is entered on the command line.

Data Manipulation

There are two types of data in the SAS System. They are SAS files, and non-SAS files (external files). To retrieve and save these files different commands are used. The LIBNAME command is for saving and retrieving SAS files. Use the FILENAME command for non-SAS files. Enter each statement on the command line of the program editor window. The format for each command is:

```
LIBNAME libref 'SAS LIBRARY'
FILENAME fileref 'EXT FILE'
```

Both the libref and the fileref are names you define. The libref and the fileref declares the SAS reference name to where the file resides on your disk. The SAS LIBRARY is the drive and directory where the SAS file resides. The EXT FILE is the drive, directory, and file name where the non-SAS file resides. Examples for each are:

Saving SAS files:

```
00001 LIBNAME saslib 'c:\sasdata';
00002 Data saslib.phone;
```

Retrieving SAS files:

```
00001 LIBNAME saslib 'c:\sasdata';
00002 Data work1;
00003 Set saslib.phone;
```

Saving non-SAS files:

```
00001 FILENAME extdata 'c:\phone.asc';
00002 Libname saslib 'c:\sasdata';
00003 Data work1;
00004 set saslib.phone;
00005 file extdata;
00006 put @1 name $10. @15 phone $8.;
```

Retrieving non-SAS files:

```
00001 FILENAME extdata 'c:\phone.asc';
00002 Data work1;
00003 infile extdata;
00004 input @1 name $10. @15 phone $8.;
```

Global Commands

Global commands are executed from any command line or with a function key (function keys are discussed in the Window section). There are seven classifications of global commands. They are:

Window call commands

activates a specific window such as the program, log, or output window.

Window management commands

allows efficient use of the windows. More information is provided on this category.

Window position commands

alters the appearance of the windows. It allows you to change the size and position of the windows.

Scrolling commands

allows you to move in the window with ease. The commands are similar to TSO ISPF scrolling functions. TSO ISPF is an IBM mainframe product.

Color commands

allows you to change the color and highlights of lines within the window.

Micro-to-host commands

submits SAS programs on remote computers.

Cut and paste commands

allows you to copy, move, and delete text within windows, and to other windows.

For basis PC SAS use, two types of global commands are of interest. They are the window management, and the cut and paste commands. The commands used in the window management area are:

BYE or ENDSAS

ends a SAS session.

CLOCK

turns the clock on or off.

END

removes a window from the screen.

NEXT

activates the next window.

PREVCHD

recalls the last command entered. You can repeat this command to continually access the previous command. It stores up to 128 characters.

X

exits SAS to DOS. Use the EXIT command to return to SAS.

ZOOM

enlarges the current window to the full screen size.

The commands for the cut and paste features are:

CUT

deletes it from the text. It is stored in a buffer, for access later.

MARK

marks text for use later in another command. It is used with CHANGE, CUT, FIND, or STORE.

PASTE

copies stored text from the buffer. The CUT or STORE command placed the text into the buffer.

PCLEAR

clears the text in the buffer.

PLIST

lists the names of the text in the buffer.

SHARK

similar to the MARK command except it allows you to mark text from all areas of the screen and move it to other windows.

STORE

similar to the CUT command except it leaves the original text in place.

UNMARK

undoes the MARK command.

The SAS text editor is very similar to TSO ISPF functions.

Windows

There are many windows within PC SAS. To access a window, either type the window name on the command line or set up a function key definition. This next section will go through each window.

The three basic windows are the program editor, log, and output windows. These windows were described above. The program editor has some unique commands as described below.

SUBMIT

executes SAS programs.

SUBTOP

executes only the first line in program window.

RSUBMIT

executes a SAS program to a remote computer.

RECALL

recalls your statements to the program editor. This command can be used repeatedly to bring back the next set of statements used.

The HELP function has two types of panels. The first is a menu driven facility defining the SAS products and SAS procedures. The second is specific help documentation for each window and SAS statement.

The KEYS window displays the 92 different function key settings. You can also alter the key definition and use the save command to permanently store the SASUSER.PROFILE catalog. Text statements can be coded as a function key by placing a tilde (~) as the

first character. You can save as many files containing different function key definitions as you want. Use the SAVE command in the form of: SAVE filename.

The LIBNAME, CATALOG, DIR, and VAR window displays all the SAS libraries, catalogs, directories (SAS files), and file variables assigned to that session. These windows are interactive. Thus if you select a library in the LIBNAME window it will bring you to the DIR window. The DIR window shows the SAS files in that data library. If you then select a SAS file, it will display the VAR window showing the contents of that file. You can also select a SAS catalog to display a CATALOG window showing its entries.

The FILENAME window lists current external (non-SAS) files assigned to the SAS session.

The FOOTNOTES and TITLES window specify up to 10 footnotes and titles for use in your SAS program. This is a good place to store frequently used titles.

The MENU window lists applications shipped with the SAS system and provides a facility to generate SAS code. It is a useful window for the beginner. It has fill-in-the-blank options that the user must provide. By placing a "?" in the blank a list of valid options will be displayed. From these options SAS code is generated. You can then submit or cancel the job. Once the job is submitted, SAS will return you to the main DMS screen. The output and log will display the results of the job. You can then use the RECALL command in the program edit window to retrieve the SAS generated code.

The NOTEPAD window provides a full screen editor for free form text editing. It is great for storing information about a particular program, hints on how to run the program, interfaces needed, etc. Similar to the function key window, you can save many different notepads by using the SAVE command. If you do not specify a file name it will default to SCRATCH.PAD in the SASUSER.PROFILE catalog.

The OPTIONS window lists the current settings of all SAS system options. From this window you can alter the system options. Use the SAVE or END command to save the changes permanently or just for that session.

The SETINIT window displays or alters site license information. Again use the SAVE command to save the changes.

SUMMARY

This paper highlights the basic requirements and structures of PC SAS, and features of the Display Manager System. Its intent is for the beginning PC SAS user. There are many additional commands, tricks, and hints but these will come with experience.

REFERENCES

SAS Institute Inc. SAS Language Guide for Personal Computers, Release 6.03 Edition. Cary, NC: SAS Institute Inc.

TRADEMARK NOTICE

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ATTACHMENTS

ATTACHMENT A (CONFIG.SAS)

```
/* PC SAS 6.04 root path as specified during
installation */
-SET SASROOT C:\SAS
```

```
/* Full-Screen device-driver as specified during
installation */
-FSDEVICE SASXDICA NOWAIT
```

```
/* Directory definitions */
-sashelp !sasroot\sashelp
-sasuser !sasroot\sasuser
-work !sasroot\saswork
-msg !sasroot\sasmsg
-dms /* Display Manager System */
-filebuffer 5 512 /* To improve performance */
-ems all /* Use all available EMS */
```

ATTACHMENT B (AUTOEXEC.SAS)

```
/* This is THE AUTOEXEC.SAS file */

filename rlink !sasroot\saslink\tso.scr';
libname saslib 'c:\sasdata';
filename extdata 'c:\phone.asc';
options remote=irma profile;
```

ATTACHMENT C (CONFIG.SYS & AUTOEXEC.BAT)

CONFIG.SYS

```
files=50
BUFFERS = 17
device=c:\dos\ansi.sys
```

AUTOEXEC.BAT

```
echo off
prompt $p$g
path c:\;\dos\;\sas\
```