

Installing and Maintaining SAS® Release 6.03 under PC DOS

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INTRODUCTION

Release 6.03 of the SAS® System is a major enhancement to SAS software. Among the new features is a new install process that offers three different install methods. In addition, Release 6.03 has many new options and performance features. To maintain the software, the SAS System now implements zaps on the Personal Computer. This paper examines these new features and offers insight to their effective use.

GETTING STARTED: THE INSTALL PROCESS

Release 6.03 of the SAS System is designed to run under PC DOS and MS-DOS® Version 2.0 and later. This is the first SAS release on the PC that is specifically designed to support MS-DOS machines that are not IBM® compatible. For some devices that are not compatible with an IBM PC, screen drivers are provided with Release 6.03.

The first order of business is to install Release 6.03. The user will notice that several new software products are now available: SAS/GRAPH®, SAS/FSP®, and SAS/AF® software. In addition, SAS/STAT™ and SAS/IML® software are still available. The entire package is large due to the number of software products available. If every part of every software product were installed (this is not recommended), it would consume over 22 megabytes of disk space.

The software breakdown is as follows:

- base SAS software - 2.02 megabytes
- SAS/AF - .68 megabytes
- SAS/FSP - .80 megabytes
- SAS/GRAPH - 7.20 megabytes
- SAS/IML - .69 megabytes
- SAS/STAT - 4.09 megabytes

Since the software product is so large, a process is provided that allows the user to install only the modules of a software product he needs. In fact, there are three ways to install using the new process: FAST install, CUSTOM install, and AUTO install.

FAST Install

This process simply installs every piece of every software product on a product-by-product basis. This method is recommended if you install on a network or you have a lot of empty disk space. When FAST is used, it loads the CUSTOM module to the hard disk so that it can be invoked to selectively remove modules of any of the software products. The user can remove modules whenever he wants. This process is the most straightforward and the fastest.

CUSTOM Install

This process allows the user to make decisions about which modules to install as the software product is being installed. The process is recommended for users who are short of disk space and is especially useful with SAS/GRAPH software. The process allows the user to continually monitor free disk space and to query the system for how much space a module requires before

it is installed. Of all the software products, SAS/GRAPH is the one with which most users will want to use CUSTOM install. This is because SAS/GRAPH comes with a large number of device drivers, fonts, and maps. Most users want a small section of these and delete the rest in order to conserve disk space.

This process is the most time consuming of all the install processes and may require that diskettes be loaded out of order or that some diskettes be loaded more than once. When using CUSTOM install, be aware that this is normal.

It is not necessary to install all software products using the same install method. For example, base SAS and SAS/STAT software could be installed using FAST install; then SAS/GRAPH software could be installed using CUSTOM install.

AUTO Install

This process is for users who want to duplicate an installed image from another user. It duplicates exactly the last CUSTOM install from the diskettes. This process is provided for users who have no other way to duplicate an installed image. It is time consuming and may require loading diskettes out of order or loading some diskettes more than once.

If you have one of the third party packages for fast backup and restore of disks, this is probably the preferred method for moving an installed image. If your machines have the same release of the operating system, you can also use BACKUP and RESTORE. The AUTO install process is for users who do not have other means available to move an installed image.

CONFIGURING YOUR IMAGE

Once you have the SAS System installed, you need to configure it to your machine. This is done by editing the CONFIG.SAS file. Users familiar with Release 6.02 will notice that the CONFIG.SAS file is now considerably larger. It has grown from five lines to over sixty. On-line documentation for this file is available in the CONFIG.HLP file, and the user should read this. Several new features of Release 6.03 are controlled from this file.

The -FSDEVICE Option

-FSDEVICE is the option that tells the SAS System what type of screen driver to use:

Machine and Device	Recommended -fsdevice option
IBM AT CGA	-fsdevice SASXDICA
IBM XT CGA	-fsdevice SASXDICX
IBM AT Monochrome	-fsdevice SASXDIMA
IBM XT Monochrome	-fsdevice SASXDIMX
IBM PC 3270 AT	-fsdevice SASXDNCA
IBM PC 3270 XT	-fsdevice SASXDNCX
IBM AT EGA	-fsdevice SASXDIEA
IBM XT EGA	-fsdevice SASXDIEX
IBM PS/2 VGA	-fsdevice SASXDIVA
Wang Color	-fsdevice SASXDWGC

Machine and Device	Recommended -fsdevice option
Wang Monochrome	-fsdevice SASXDWGM
Compaq AT Color	-fsdevice SASXDICA NOWAIT
Compaq with plasma display	-fsdevice SASXDPCA
HP Vectra Color	-fsdevice SASXDVCA
Leading Edge XT	-fsdevice SASXDICX
AT&T Color	-fsdevice SASXDICX
AT&T Monochrome	-fsdevice SASXDICX MODE=BW80 GRAY=BLACK BLACK=WHITE
Non-IBM compatible supporting ANSI.SYS	-fsdevice SASXDASY

The SASDASY driver should be used only if no other fsdevice driver is appropriate and DEVICE=ANSI.SYS must be specified in the CONFIG.SYS file. The performance of this driver is limited.

An IBM compatible machine should be set to the appropriate type of IBM machine.

Note that the screen drivers are customized whenever possible to provide maximum performance and to take advantage of special options. For example, the IBM EGA drivers allow display manager to take advantage of EGA's higher resolution and to operate in forty-three line mode. In addition, the TYPEFAST option can be set, speeding up the cursor on EGA machines.

Selecting the wrong screen driver can have bizarre results. If a user notices static on his screen when it is zooming or changing windows, it is probably due to selecting the wrong -FSDEVICE. Likewise, the wrong setting can cause the machine to display garbage and even to lock up.

If you are not sure how to set this option, simply leave it out and try the DEFAULT option of IBM AT CGA. Modifications can be made after seeing how this option works.

The -EMS Option

One of the major enhancements to Release 6.03 is the ability to use the LIM Expanded Memory Specification. This option must be set at invocation time and should be done in the CONFIG.SAS file. Simply set the option followed by as many 16K pages of memory as you desire to use from your EMS board. For example,

```
-EMS 32
```

invokes 32*16=512 K of EMS. The most common (and recommended) setting for this option is

```
-EMS ALL
```

This setting invokes all free EMS up to 2 megabytes. Setting

```
-EMS or -EMS 0
```

turns EMS off altogether. This is useful for performance testing.

The -FILEBUFFERS Option

-FILEBUFFERS sets up buffering in order to improve I/O with the disks. The standard setting is

```
-FILEBUFFERS 5 512
```

which specifies 5 buffers of 512 bytes each. A great amount of testing has gone into determining the default settings, and it is rare that better performance can be obtained by changing them.

However, if you have some nonstandard I/O device, performance may be enhanced by experimenting with the settings. Just remember that the memory for buffers comes from DOS memory and decreases the amount available to the SAS System.

The -FILECACHE Option

-FILECACHE allows some files to be kept open by the SAS System, thus avoiding DOS open file operations. Again, considerable testing has gone into the selection of the default settings, and it is difficult to improve on their performance.

Do not use -FILECACHE on a directory that contains SAS data sets or SAS catalogs.

The -SASROOT Option

-SASROOT specifies which directory contains the SAS.EXE module and the directory that is parent to all other SAS directories. It may be named anything you want as long as it is referenced here. For example,

```
-SASROOT G:/SAS603
```

may be useful for referencing a network disk.

The -VERBOSE Option

Because the CONFIG.SAS file is so big, with so many options, a way was needed for the user to tell exactly what has been set. If the user is having trouble with settings in the CONFIG.SAS file or if the SAS System is acting strangely, it is recommended that the user invoke the system as follows:

```
SAS -VERBOSE
```

This causes all settings from the CONFIG.SAS file to be displayed while the SAS System is booting.

The -PATH Option

-PATH specifies the search order and search paths that the SAS System uses when looking for an executable module. The following entries are included in the default CONFIG.SAS file. Note that there is a directory for CORE and BASE as well as each add on software product.

```
-PATH ISASROOT/SASEXE/CORE
```

```
-PATH ISASROOT/SASEXE/BASE
```

```
-PATH ISASROOT/SASEXE/STAT
```

```
-PATH ISASROOT/SASEXE/IML
```

```
-PATH ISASROOT/SASEXE/AF
```

```
-PATH ISASROOT/SASEXE/FSP
```

```
-PATH ISASROOT/SASEXE/GRAPH
```

When the SAS System looks for an executable module, it starts with the first directory listed and searches it. If the module is not found, it searches the next directory, and so on until the module is found or the list is exhausted. You can insert another directory anywhere in the -PATH statements, and it will be searched in the appropriate order. The -PATH need not start with !SASROOT.

The -NEWS Option

-NEWS specifies the name of a text file that contains a message that is displayed in the LOG window after the SAS copyright

notice. This is especially useful in local area network environments.

INSTALLATION ON LOCAL AREA NETWORKS

The Technical Support Department at SAS Institute runs the SAS System on a Novell network. We are pleased with the performance and adaptability of the SAS System in a network environment. To install the SAS System on a network, the following are recommended:

1. Use the FAST Install and install the entire software product. On most networks someone will want almost everything the SAS System has to offer.
2. The network supervisor should edit a CONFIG.SAS file so that the SAS System can run on all workstations on the net; then allow each user to customize it for his own workstation. Set -FSDEVICE to IBM AT CGA (the default). Set !SASROOT to point to the appropriate drive and directory, set -NEWS to a file accessible to the SAS Software Consultant, and leave the other options set at their default values. This copy of CONFIG.SAS should be left in the !SASROOT directory.
3. The user should create a directory on his local workstation disk (this may be a virtual disk on the server) from which he can execute the SAS System. Into this directory, he should copy CONFIG.SAS, CONFIG.HLP, and SAS.EXE. It is not required to have SAS.EXE in this directory, but it takes very little space and makes things much simpler.
4. As the user and the network supervisor become more familiar with the SAS System on the network, they can tune the system if they desire by copying certain modules to the workstation's local disk and setting the first -PATH option to that directory. This causes traffic to be taken off the network. The !SASROOT/SASEXE/CORE/SASMD*.EXE modules are good candidates for this, as is any procedure that is used extensively at that workstation.

SUPPORTING THE INSTALLED SOFTWARE

Usage Notes

Usage Notes are a collection of facts about the SAS System. They include helpful hints about using the system, how the system works with different hardware, and most importantly, descriptions of all bugs in the system of which the Technical Support Department is aware.

The Institute strives to be as open as possible with users, and it is the Technical Support Department's position not to withhold information about bugs. We realize that all software has bugs, and we constantly make an effort to keep you advised of all known bugs.

New for Release 6.03 is the inclusion of zaps to fix bugs whenever possible. Zaps, also known as patches or fixes, are referenced by the Usage Notes. It is imperative that an effective SAS System user install and become familiar with the Usage Notes.

When a user encounters a problem with the SAS System, the first step is to consult the Usage Notes. This is the quickest and easiest way to answer questions about the system. The SAS Software Consultant is consulted only if the user cannot find the answer in the Usage Notes.

Note that while the Usage Notes are included with the SAS System, updates can also be ordered. Orders can be made quarterly by writing to the Distribution Department at SAS Institute Inc. The Usage Notes data base included with Release 6.03 of the SAS System contains Release 6.03 notes only, and the update diskettes contain Release 6.02 notes as well. There are a great number of usage notes that apply to both Release 6.02 and Release 6.03 of the SAS System.

Installing Usage Notes A directory called !SASROOT/SASINST is created when the SAS System is installed. This directory contains the necessary modules to run the SASLOAD procedure. Simply set the default directory to

```
!SASROOT/SASINST
```

and enter:

```
SASLOAD -USAGENOTES <ret>
```

The SASLOAD procedure creates two new directories:

```
!SASROOT/SASUSAGE and !SASROOT/ZAPS
```

The SASUSAGE directory contains the Usage Notes data base and a number of programs to manipulate it:

```
PRINT.SAS
```

```
SELECT.SAS
```

```
FSP.SAS
```

```
SETUP.SAS
```

```
KEYS.SAS
```

```
VIEW.SAS
```

A description of each follows:

PRINT.SAS produces, in the display manager OUTPUT window, a facsimile of the Usage Notes that can be sent to a printer. The program allows you to print the notes in any combination of version and software product you desire, or the entire data base can be printed. You should run this program first and print off any usage notes that you do not want to keep on-line. For example, if you are a site representative, you can print a copy of Release 6.02 Usage Notes and keep Release 6.03 Usage Notes on-line.

SELECT.SAS subsets the Usage Notes so you do not have to waste disk space storing notes for a software product or version you do not have. When it runs, the program creates a SAS data set named USER.SSD. This data set contains only what you requested in the SELECT program. You can delete the USAGE.SSD data base, which contains all Usage Notes. This program must be run before any of the programs used to view the notes can be run.

FSP.SAS invokes the FSBROWSE procedure to view the Usage Notes in full-screen mode. A screen is included in SCREEN.SCT. To use this program, you must license SAS/FSP software and you must run SELECT.SAS.

VIEW.SAS browses the Usage Notes. It is a DATA step application and is stored in compiled form in the file USAGE.SSP. The source code for this program is in VIEW.SRC. To use this program, you must run SELECT.SAS, SETUP.SAS, and KEYS.SAS.

SETUP.SAS sets up an index file that VIEW.SAS uses to access the Usage Notes.

KEYS.SAS copies the KEYS.SCT catalog member to your PROFILE.SCT catalog so that the custom key definitions are available to the VIEW.SAS program.

In addition to the programs, there are a number of other files in the SASUSAGE directory:

READ.ME
USAGE.SSD
KEYS.SCT
SCREEN.SCT
VIEW.SRC
VIEW.SSP

A description of each follows:

READ.ME is an on-line documentation file that explains how to use these programs.

USAGE.SSD is the Usage Notes data base as it is shipped. It must be converted to USER.SSD by the SELECT.SAS program before it can be used.

KEYS.SCT is a catalog holding key definitions for use with the VIEW.SAS program.

SCREEN.SCT is a catalog holding a screen for use with the FSP.SAS program.

VIEW.SRC is the source code for the VIEW.SAS program.

VIEW.SSP is the compiled code for the VIEW.SAS program.

The ZAPS directory contains the following files:

SASZAP.HLP
TESTZAP.EXE
Z6030001.ZAP

A description of each follows:

SASZAP.HLP is an on-line documentation program for the SASZAP utility.

TESTZAP.EXE is a program that prints a simple message on the screen. It is used to test the SASZAP program.

Z6030001.ZAP is a sample zap. It is used to zap TESTZAP.EXE and test the SASZAP utility.

There is also a file for every zap that has been added to the data base before your software was shipped. The Usage Notes data base and ZAPS directory are updated at the Institute monthly, and the updated versions are shipped with the SAS System.

Configuring the Usage Notes Once the Usage Notes are installed, the user decides if he wants hardcopies. If he does, they are generated with the PRINT.SAS program.

The next order of business is to run the SELECT.SAS program. This program subsets the Usage Notes according to what soft-

ware products and releases you want to save. Even if you want to save the entire data base, you must run SELECT.SAS. The program creates the USER.SSD data base, and this is the one that the rest of the programs access. After SELECT.SAS runs and USER.SSD is created, USAGE.SSD should be deleted in order to conserve disk space.

The next task is to decide how you would like to access the Usage Notes. If you have licensed SAS/FSP software, you can use the FSP.SAS program. Users who use SAS/FSP to access the Usage Notes on a mainframe or minicomputer find that this works the same.

Users who do not license SAS/FSP software need to use the VIEW.SAS program. Before the program can be used, the user must run the KEYS.SAS program that copies a set of key definitions to his USER.SCT catalog. Then it is necessary to run the SETUP.SAS program that builds an index file. This file is used by the VIEW.SAS program to access the Usage Notes quickly.

If you have SAS/FSP software but are unsure of how you would like to access the Usage Notes, you should try both programs and use the one you prefer.

Using the Usage Notes Both of these programs access the Usage Notes by means of keywords. Using keywords to code a Usage Note is an imprecise exercise, but the Technical Support Department follows several guidelines:

- If an error message is involved, several words from it should be keyed.
- If a device is involved, the device should be keyed by all common names.
- If a procedure is involved, it should be keyed.
- If a condition or concept is involved, it should be keyed.

There are two kinds of screens in the data base:

1. Usage Notes contain information about the SAS System in general.
2. Outstanding problems document bugs and provide workarounds or reference zaps whenever possible. It is through the outstanding problem entries in the Usage Notes data base that the user finds zaps.

The outstanding problem window displays a variable labeled ZAP that has the value YES if a zap exists for the problem. The variable ZAPS AVAILABLE holds a number that allows you to locate the zap. If the ZAPS AVAILABLE value was Z6030055, then the zap would be located in the !SASROOT/ZAPS directory in the file named Z6030055.ZAP.

Once the zap number is located, applying it is a simple matter. The SASZAP.EXE module is located in the !SASROOT directory, so zap application is done from there. There is a sample zap included with Release 6.03. It zaps a module found in the !SASROOT/ZAPS directory named TESTZAP.EXE. To run TESTZAP.EXE, simply change to the !SASROOT/ZAPS directory and enter:

```
TESTZAP <ret>
```

You receive the following message:

```
The zap is not currently applied
```

To apply the zap, go to the !SASROOT directory and enter:

```
SASZAP -APPLY ZAPS/Z6030001.ZAP <ret>
```

The SASZAP module applies the zap and reports to you if the application was successful. SASZAP verifies the module, so it is impossible to apply the zap to the wrong module or to apply the zap wrong. To verify that the zap was applied, go to the !SASROOT/ZAPS directory and enter:

```
TESTZAP <ret>
```

You should receive the following message:

The zap is currently applied

SASZAP keeps a zap log appended to every module it zaps. To see the log for TESTZAP.EXE, go to the !SASROOT directory and enter:

```
SASZAP -NAME ZAPS/TESTZAP.EXE -REPORT <ret>
```

The following message is displayed:

```
THE FOLLOWING ZAPS ARE APPLIED TO THE FILE  
  </ZAPS/TESTZAP.EXE>
```

```
Z6030001.ZAP
```

If more zaps were applied, they would be listed. To remove the zap, go to the !SASROOT directory and enter:

```
SASZAP -REMOVE ZAPS/Z6030001.ZAP <ret>
```

SASZAP reports if the zap was successfully removed. To verify that it was, go to the !SASROOT/ZAPS directory and enter:

```
TESTZAP <ret>
```

The following message is displayed:

The zap is not currently applied

When Release 6.03 was shipped there were no production zaps, but as the software remains in the field, there undoubtedly will be. These are included, along with an updated Usage Notes data base, if you license an add-on software product, or if you request an update of the Usage Notes diskettes.

The zap facility in Release 6.03 improves the Institute's ability, as well as the SAS Software Consultant's and the user's, to fix the inevitable problems that come up with software. The combination of zaps and on-line Usage Notes provide the basis for local support of any number of PCs.

As the process evolves, we will have better tools to assist the local support organization. Our goal is to make local support easier and more effective.

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