CHAPTER
1

Getting Started

The SAS System Under OS/2

OS/2, an operating environment developed by IBM Corporation, now allows more control over the capabilities of your personal computer. It provides a flexible, easy-to-use working environment for which there are hundreds of software applications. Version 8 of the SAS System under OS/2 is a complete implementation of the SAS System. OS/2 Warp 3.0 (or later) supports Version 8.

Note: Except where noted, the examples and instructions that are provided in this document assume that you are running the SAS System under OS/2 Warp 4.0. For more information about how to use the OS/2 interface, see the documentation for the OS/2 environment that you use. △

Optimum Performance

Version 8 of the SAS System takes advantage of the improved performance of the operating environment. For example, the following operating environment improvements will positively affect your SAS programs:

☐ the 32-bit operating environment enables your SAS programs to execute faster.

☐ the improved fault isolation capabilities ensure that if another application fails, your SAS session is not affected.

☐ the additional resources reduce resource contention, so your SAS programs execute more efficiently.

☐ the redesigned interface in OS/2 makes SAS easier to use.

An Integral Part of Your Desktop Solution

The SAS System is an integrated suite of software for enterprise-wide information delivery that supports data access, data management, data analysis, and data presentation. The SAS System under OS/2 enables you to complete your data and computation-intensive tasks while integrating with the OS/2 applications that are already in place on your desktop and within your enterprise. The SAS System supports information sharing through the most powerful tools and techniques that OS/2 has to offer, including

☐ Dynamic Data Exchange (DDE)

☐ electronic mail system

☐ OS/2 "groupware" applications such as Lotus Notes

☐ pipes and named pipes

☐ the OS/2 clipboard.

Compatible and Maintainable

Version 8 of the SAS System under OS/2 can read and write SAS data sets that were created by earlier releases of SAS. However, in order to bridge the upgrades in SAS System catalog architecture and differences in operating environment structure, you must convert catalogs from earlier formats (such as Release 6.04 under DOS or Release 6.08 under OS/2) to Version 8 format by using the transport procedures CPORT and CIMPORT.

Compatibility with previous releases of the SAS System has been balanced against a desire to take advantage of OS/2 features, specifically the graphical interface. Most

existing SAS commands and windows are implemented, but where appropriate, interactive dialog boxes and various graphical user interface controls are used so that the selection of operations is highly intuitive and interactive.

Starting the SAS System

The following sections describe several ways in which you can invoke the SAS System from the OS/2 environment.

Starting from WarpCenter

To start SAS from the WarpCenter:

1 Click on the **Start Application** button.

2 Select **The SAS System, V8**.

3 Select **The SAS System for OS/2, Version 8**.

Starting from Custom Shadows or Program Items

During installation, the SAS System Setup automatically creates a program item, or shadow, that you can use to start the SAS System. However, you can create multiple SAS program items within a folder to represent several differently configured SAS sessions. Also, if you want SAS to start every time you start OS/2, you can place a program item or shadow in the Startup folder.

For information about creating shadows, see your OS/2 documentation. Display 1.1 on page 7 shows an example of a SAS item that has been accessed from the SAS System folder.

Starting from the Command Prompt in an OS/2 Window

When starting the SAS System using a command line, you might want to specify the SAS configuration file location using the CONFIG system option, even if you use the default name of SASV8.CFG, to ensure that the SAS System uses the configuration file that you want. For more information about how the SAS System searches for the configuration file, see "How the SAS System Finds and Processes Configuration Files" on page 11.

The WORK and SASUSER system options are specified in your default SASV8.CFG file as *!sasfolder*\sasuser and *!sasfolder*\SASWORK, where *!sasfolder* is set to the location of your SAS program files. When these options are set, the WORK and SASUSER data libraries reside in the specified paths regardless of the path from which you invoke SAS.

You can start either an interactive SAS session or a batch SAS job by opening an OS/2 window and typing **SAS** at the command prompt. For example, the following command starts an interactive session, specifies the page size and line size, and indicates the location of the SAS configuration file:

```
C:\SAS\SAS.EXE -LS 80 -PS 60
               -CONFIG C:\SAS\SASV8.CFG
```

The following command starts a batch SAS job in a similar manner:

```
C:\SAS\SAS.EXE -SYSIN C:\SAS\PROGRAMS\PROG1.SAS
               -CONFIG C:\SAS\SASV8.CFG
```

Invoking the SAS System in Interactive Mode Compared with Batch Mode

When running the SAS System under OS/2, you can use an interactive session or you can run batch jobs. An interactive session enables you to interact with the SAS System interface to submit programs and to view the resulting output. SAS batch jobs run without any interaction from you, and you view output later. You can use any of the previously discussed methods to start the SAS System in either mode. By default, invoking the SAS System begins an interactive SAS session. If you have a SAS program that you want to submit as a batch job, specify the SYSIN option with the name of the SAS program file when you invoke the SAS System.

Submitting a Batch SAS Job

When you run SAS in batch mode, SAS displays a status window for the SAS job that you submit. This window tells you the name of the SAS job that is running and where your log and procedure output files are written. This window remains open until the SAS job is complete.

You can run windowing procedures, such as those associated with SAS/GRAPH, SAS/INSIGHT, and SAS/ACCESS software, in a batch SAS job. When the SAS System reaches a point in your program where interaction is required, it opens the main SAS window.

If you do not want to see the status window while your batch SAS job is running, invoke the SAS System with the ICON system option so that the status window becomes an icon when your job is running. You can also minimize the status window by selecting $\boxed{\text{Icon}}$ when the status window appears. The icon shows the busy cursor (usually an hourglass) while the SAS job is running and the cursor disappears when the job is complete. You can cancel a batch job by either pressing CTRL BREAK or by clicking on $\boxed{\text{Cancel}}$ in the status window.

There are several ways to submit a batch SAS job:

□ Specify the SYSIN system option in the SAS command (issued from the OS/2 window command prompt) to specify the SAS program to submit.

□ Click the right mouse button on a file that has a .SAS, .SS2, .SS7, or .SASV7BPGM file extension and select **Submit**.

Setting the Current Folder

The SAS System uses a current folder as the default location to read and write SAS files when you do not explicitly specify a path. (In Version 7 of the SAS System, the working folder also contained the system profile catalog. In Version 8 the system profiles are kept separated from the working files.)

Under OS/2, the following rules are used to determine the working folder for the SAS System:

1 If a working folder is specified in the OS/2 Properties Program page for the program item or shadow, the SAS System uses that path as the working folder.

2 If you do not use the program item or shadow to start SAS (using the command line instead), and if OS/2 successfully loads the SAS.EXE file from the path that was specified in the SAS command, that path is the working folder. In other words, the working folder is the path that you specify as part of the SAS command, regardless of where OS/2 actually finds SAS.EXE. If you do not specify a path as part of the SAS command, then the working folder is the path from which you issued the command.

Note: If OS/2 cannot find the SAS.EXE file in the specified folder, the folder specified in the SAS command still becomes the working folder, and OS/2 searches for the SAS.EXE file by using the OS/2 PATH environment variable. △

For example, if you specify the following command, C:\SAS is the working folder, regardless of whether the SAS.EXE file is actually in that folder:

```
C:\SAS\SAS.EXE –CONFIG C:\SAS\SASV8.CFG
```

You can change the SAS working folder from within your SAS session. For more information, see "Changing the SAS Current Folder" on page 42.

Note: Do not confuse the SAS working folder with the SASWORK data library. See "WORK Data Library" on page 16. △

Sample SAS Session

This section illustrates how to invoke the SAS System from **Start Application**, submit a sample SAS program, examine the program output, and end the SAS session. Display 1.1 on page 7 shows a possible configuration of the SAS program item in the Start Application menu. Double-click on **The SAS System for OS/2, Version 8** to start the SAS System.

Display 1.1   Starting the SAS System

Display 1.2 on page 8 shows the Program Editor and Log windows as well as a sample SAS program that is ready to be submitted. This program creates a SAS data set called ORANGES, which contains the results of a taste test that was conducted on four varieties of oranges. Then the program sorts the data set by the total test score and prints the data set.

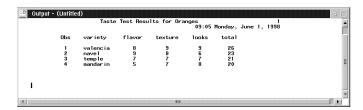**Display 1.2**   Submitting the Sample SAS Program

Here is the SAS code that appears in the Program Editor window:

```
data oranges;
    input variety $ flavor texture looks;
    total=flavor+texture+looks;
    cards;
navel 9 8 6
temple 7 7 7
valencia 8 9 9
mandarin 5 7 8
;
proc sort data=oranges;
    by descending total;
run;
proc print data=oranges;
    title 'Taste Test Results for Oranges';
run;
```

Once you submit the program, the output appears in the Output window, as shown in Display 1.3 on page 8.

Display 1.3   Looking at the Program Output

The items in the menu bar at the top of the main SAS window change depending on the active window within the SAS session. In addition, you can access window-specific pop-up menus that offer the same menu choices. To access the pop-up menus, click the right mouse button in the window for which you want to see menus. Display 1.4 on page 9 shows a series of menus in the Program Editor window. This series was

generated by first clicking the right mouse button in the Program Editor window, then by selecting **File** and **View**.

Display 1.4 Pop-up Menus in the Program Editor Window

When you are ready to end your SAS session, click on the title bar Close button (the small square icon in the upper-right corner of the main SAS window) and click on ⎹OK⎸ when the dialog box verifies your request.

Note: If you have disabled the **Confirm Exit of SAS** option in the Preferences dialog box, your SAS session ends without asking if you are sure that you want to end the session. For more information about how to customize your SAS session, see "Setting Session Preferences" on page 43. △

Files Used by the SAS System

The SAS System uses many files while it is running; however, some of these files are especially important from a user's perspective. These files include the

- □ SAS configuration files (SASV8.CFG by default)
- □ SAS autoexec file (AUTOEXEC.SAS by default)
- □ user profile catalog (Profile.sas7bcat)
- □ WORK data library (SASWORK folder)
- □ SAS Registry files.

SAS Configuration Files

The SAS configuration file enables you to specify SAS system options that are used to establish your SAS session. These options indicate, among other things, the location of your SAS System Help, message files, and the paths to SAS executable files. The SAS configuration file is particularly important because it specifies the folders that are searched for the various components of SAS products. You must have at least one configuration file in order for the SAS System to initialize regardless of whether you are running SAS in either interactive or batch mode. You can have multiple configuration files that are all processed while your SAS session begins. For a list of

system-dependent options that you can use in your SAS configuration file, see "Summary of SAS System Options under OS/2" on page 316 and the section on SAS system options in *SAS Language Reference: Dictionary*.

A default SAS configuration file named SASV8.CFG is created during the installation process and is stored in the !SASROOT folder. (The !SASROOT folder is the folder in which you install the SAS System. For more information about the !SASROOT folder, see "SAS Default Folder Structure" on page 17.)

Specifying SAS System Options in the SAS Configuration File

You can specify any SAS system option in the SAS command when you start the SAS System. However, it is generally more convenient to place frequently used system options in your SAS configuration file rather than repeatedly specifying the same options at invocation. The syntax for specifying system options in the SAS configuration file is discussed in "Syntax for System Options in the SAS Invocation or SAS Configuration File" on page 314.

You can edit the default SASV8.CFG file to add to or change the system option settings, or you can create your own SAS configuration file. "Naming Conventions for the SAS Configuration File" on page 10 discusses how to modify your SAS configuration file.

Your SAS configuration file is divided into two sections. The first section specifies system options that are not updated by the SAS System Setup program. The second section is used by the SAS System Setup program to update information about where SAS software is installed. The sections are divided by the following text string:

```
/* DO NOT EDIT BELOW THIS LINE - INSTALL */
/* application edits below this line     */
```

The SAS System Setup deletes all data below this text string but does not affect the options that are specified above it. The Setup application appends the following system options that are below this text string: DMSEXP, DOCLOC, HELPLOC, MAPS, MSG, PATH, SASHELP, SASAUTO, SASUSER, WORK, and SET. (The SET option defines the following SAS environment variables: SASAUTOS, SASCFG, SASFOLDER, SASROOT, INSTALL, SAMPSIO, SAMPSRC, and SASEXT0).

CAUTION:
Use the SAS text editor to edit your configuration file. The text editor that you choose to edit the SAS configuration file is important to preserve some of the special character formatting in the file. The recommended method is to edit SASV8.CFG using a SAS text editor (such as the Program Editor window) and save it using the Save As dialog box. If you do not use a SAS text editor, be sure to use another ASCII text editor (such as the OS/2 Enhanced Editor). Do not use a non-ASCII editor. Using such an editor can insert carriage control characters into your SASV8.CFG file or corrupt the characters that are there. △

Naming Conventions for the SAS Configuration File

When you install the SAS System under OS/2, a SASV8.CFG file is created in the !SASROOT folder.

You can specify your own file to act as the SAS configuration file and override the default file, SASV8.CFG. When you use a file that is named something other than SASV8.CFG as your SAS configuration file, you must tell the SAS System where to find the configuration file. For example, the **Target** field of the SAS System properties notebook might contain

```
C:\SAS\SAS.EXE -CONFIG C:\SAS\MYCONFIG.SAS
```

If the SAS System cannot find the SAS configuration file, an error message is displayed, and the SAS System does not initialize.

CAUTION:

You must add several required system options if you create your SAS configuration file. If you use your own configuration file instead of the default SASV8.CFG file, you must add several required options. For example, you must either use the SET option to define the environment variable, !SASROOT, or define SASROOT as an OS/2 environment variable. Therefore, if you do not want to use the default SASV8.CFG file, you should copy the SASV8.CFG file and modify the copy instead of creating your own file. △

How the SAS System Finds and Processes Configuration Files

When you invoke the SAS System, SAS automatically searches several locations for configuration options that can affect your SAS session. SAS looks in the following areas and processes them in this order:

SAS_SYS_CONFIG operating environment variable
This environment variable, if defined, must resolve to a valid SAS configuration file.
Use the SAS_USER_CONFIG user environment variable to specify a user-specific configuration file.

files specified by CONFIG system options
On the SAS invocation command, you can specify one or more CONFIG options with the names of the configuration files that you want to use. You must include a separate CONFIG option for each file that you want to specify.

SASV8.CFG in the current folder
SAS looks for a file that is named SASV8.CFG in the current folder *only if* you do not specify a CONFIG option on the SAS invocation.

SASV8.CFG in the folder where SAS.EXE resides
SAS looks for a file that is named SASV8.CFG in the folder that contains the SAS.EXE executable *only if* you do not specify a CONFIG option on the SAS invocation *and* if there is no SASV8.CFG file in the current folder.

SAS_USER_CONFIG operating environment variable
This environment variable, if defined, must resolve to a valid SAS configuration file.
Use the SAS_SYS_CONFIG environment variable to specify an environment-wide configuration file.

SAS_OPTIONS operating environment variable
This environment variable, if defined, contains a string of option specifications for any other system options that you want to process each time that you invoke the SAS System.

SAS invocation command line
You can specify additional system options in the command that you use to invoke the SAS System; these options always override option values that are set within any of the configuration files.

You can also specify additional CONFIG options within any of these configuration files. When the SAS System encounters a CONFIG option, SAS immediately processes the options in that named file and then returns to process the remainder of the current file. SAS system options that are encountered later in the processing always override those options that are specified earlier. For example, if you specify ICON in the file specified

by the SAS_SYS_CONFIG environment variable, and then NOICON in the file specified by the SAS_USER_CONFIG environment variable, the NOICON option is used. Since the options that you specify in the SAS invocation command are always processed last, those option values will always override the option values that were specified in configuration files. Figure 1.1 on page 13 illustrates the flow of SAS System configuration file processing.
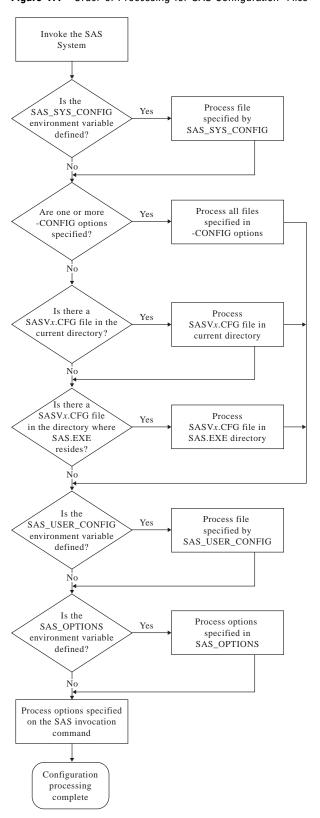
Figure 1.1 Order of Processing for SAS Configuration Files

SAS Autoexec File

The SAS *autoexec file* contains SAS statements that are executed immediately after the SAS System initializes and before any user input is accepted. These SAS statements can be used to run SAS programs automatically, set up certain variables for use during your SAS session, or set system options. Unlike the SAS configuration file, a SAS autoexec file is not required in order to run the SAS System, but if you do have a SAS autoexec file, the default name is AUTOEXEC.SAS. The SAS System uses the following search order to find the AUTOEXEC.SAS file:

1 Search the current folder.
2 Search the paths that are specified by the OS/2 PATH command.
3 Search the root folder of the current drive.
4 Search the folder that contains the SAS.EXE file.

If the SAS autoexec file is not present and if you did not specify the -AUTOEXEC option in the command line or within any of your configuration files, then the SAS System assumes that there is no AUTOEXEC file to process.

You can choose a name for your SAS autoexec file, but if you choose a name other than AUTOEXEC.SAS, you must use the AUTOEXEC system option to tell the SAS System where to find the SAS autoexec file. For example, you can specify the following option in the **Parameters** field of the SAS System for OS/2, Version 8–Properties page:

```
-AUTOEXEC C:\MySASFiles\INIT.SAS
```

If the specified SAS autoexec file is not found, an error message is displayed, and the SAS System terminates.

The SAS autoexec file is a convenient way to execute a standard set of SAS program statements each time you invoke the SAS System. You may want to include OPTIONS, LIBNAME, or FILENAME statements, or any other SAS statements and options that you want the system to execute each time you invoke a SAS session. For example, if you want to specify a script file for SAS/CONNECT software, you can place the following statement in the AUTOEXEC.SAS file:

```
filename rlink 'c:\sas\connect\saslink\vms.scr';
```

Or you can use the OPTIONS statement to set the page size and line size for your SAS output and use several FILENAME statements to set up filerefs for commonly accessed network drives, as in the following example:

```
options linesize=80 pagesize=60;
filename saledata 'f:\qtr1';
filename custdata 'l:\newcust';
filename invoice 'o:\billing';
```

CAUTION:
> **Use a SAS text editor to create your SAS autoexec file.** The text editor that you choose to create the SAS autoexec file is important. The recommended method is to create it by using a SAS text editor (such as the Program Editor window) and save it using the Save As dialog box. If you do not use a SAS text editor, be sure to use another ASCII text editor (such as the OS/2 Enhanced Editor). Do not use a non-ASCII editor. Using such an editor can insert special carriage control characters into your SAS autoexec file that the SAS System cannot interpret when it tries to execute the statements in the file. △

Other system options, in addition to the AUTOEXEC option, provide ways to send the SAS System information as it is starting up. Here are the options and the order in which they are processed:

1 CONFIG (at SAS System invocation only)

2 AUTOEXEC

3 INITCMD

4 INITSTMT

5 SYSIN.

For more information about the CONFIG, AUTOEXEC, and SYSIN options, see "SAS System Options under OS/2" on page 313. For more information about the INITSTMT and INITCMD options, see *SAS Language Reference: Dictionary*.

Suppressing the SAS Autoexec File

If you have an AUTOEXEC.SAS file in your current folder but do not want the SAS System to use it, specify the NOAUTOEXEC option in the SAS command, as in the following example:

```
C:\SAS\SAS.EXE -NOAUTOEXEC
```

Profile Catalog

Each time you invoke SAS, the SAS System checks the SASUSER data library for your user profile catalog (named SASUSER.PROFILE), which defines the start-up profile for your SAS session, including key definitions, display configurations, and so on. If you invoke the SAS System without accessing an existing profile catalog, SAS creates one with the default key definitions and window configuration.

Use the SASUSER system option to specify a location for the profile catalog other than the default (which is a folder named SASUSER). This option is useful if you want to customize your SAS sessions when sharing a machine with other users or if users are accessing the SAS System from a network.

The SASUSER option takes the following form:

-SASUSER *folder*

If *folder* does not exist, the SAS System attempts to create it. For example, if you specify the following option, a profile catalog is created in a folder named MYUSER that resides in the root folder of drive C:

```
-sasuser c:\myuser
```

Note: The default configuration file for the SAS System specifies the SASUSER system option as follows:

```
-sasuser !sasfolder\sasuser\
```

where *!sasfolder* is set to the same location as the SAS System program files. △

The profile catalog is not re-created if it already exists. Any customizations (such as key definitions or color modifications) that are defined during subsequent sessions are stored in your profile catalog in the specified folder.

When you delete your profile catalog, you lose the key definitions, window configurations, and option settings that you might have defined, as well as any other entries that you saved to your profile catalog. In addition, any text that you stored in NOTEPAD windows is erased. For this reason, it is a good idea to make a copy of your profile catalog after making significant modifications to your SAS session settings.

For more information about the SASUSER option, see "SASUSER" on page 370.

WORK Data Library

The SAS System requires some temporary disk space during a SAS session. This temporary disk space is called the *WORK data library*. By default, the SAS System stores SAS files with one-level names in the WORK data library, and these files are deleted when you end your SAS session. You can change the data library in which SAS files with one-level names are stored. For more information, see "Using the USER Libref" on page 70.

The WORK system option controls the location of the WORK data library. You can specify the WORK option one time in your SAS configuration file or each time that you invoke the SAS System. Usually, you use the WORK option that is specified in the default SASV8.CFG file.

The default configuration file for the SAS System specifies the WORK system option as follows:

```
-work !sasfolder\saswork\
```

where *!sasfolder* is set to the same location as the SAS program files.

Because you can run multiple SAS sessions at one time, the SAS System creates temporary folders under the folder that you specify with the WORK option. These temporary folders are created in the unique form #TD*nnnnn*, where TD means temporary folder and *nnnnn* is the process ID for each SAS session. These folders enable multiple SAS sessions to be invoked by using the same configuration file, and they prevent the WORK folder from being shared. The SAS System creates any temporary files that are required within each temporary folder. As with all temporary files that are created in the WORK data library during a SAS session, these temporary folders are deleted when you end the SAS session. If the SAS session ends abnormally, these temporary files are not deleted.

If you do not want the SAS System to create a temporary folder under the specified WORK folder, but would rather use the actual folder that is specified in the WORK option, specify the USE suboption in the WORK option. For example, you can specify the following in the **Parameters** field of the SAS System Properties page:

```
-work saswork use
```

This creates a folder called SASWORK beneath the current folder, and all temporary SAS files are stored in this folder.

For more information about using the WORK data library and overriding the default location, see "Using the WORK Data Library" on page 69.

If the SAS System terminates abnormally, determine if the WORK library was deleted. If it was not, remove it by using OS/2 commands. Do not attempt to delete the WORK folder while the SAS System is running.

If you want to verify the location of the current WORK folder, it is displayed in the current folder area of the status line. You can also verify the location of the WORK folder by double-clicking on the Libraries icon, and select and click the right mouse button on the WORK folder. Select **Properties** from the pop-up menu and then click on the list box down arrow to see the folder name.

SAS Registry Files

The SAS Registry files are used to store information about the SAS session applications. The registry entries can be customized by using the SAS Registry Editor or by importing the registry files. To invoke the SAS Registry Editor, select the **Solutions** pull-down menu and then select **Accessories** and **Registry Editor**.

CAUTION:

For Experienced Users Only. Registry customization is generally performed by more advanced users who have experience and knowledge of the SAS System and their operating environment. △

SAS Default Folder Structure

The SAS System Setup program creates a number of subfolders during the installation process. Understanding the organization of the SAS folders can help you to use the SAS System more efficiently. The SAS System can be installed on a single drive or across multiple drives. It is not recommended that a single product of the SAS System be split over multiple drives.

The root folder of the SAS System is the folder in which you install the SAS System. Within SAS, this folder has the logical name !SASROOT. In many installations, the real physical name of this folder is SAS, but this is not required. (The examples in this document assume that the !SASROOT folder is called SAS.)

One important subfolder of the !SASROOT folder is the CORE subfolder. The CORE subfolder in turn contains many subfolders, three of which are described here:

!SASROOT\CORE\HELP
  contains the SAS System Help information in HTML help format.

!SASROOT\CORE\RESOURCE
  contains SAS resouces such as fonts and images.

!SASROOT\CORE\SASINST
  contains the installation process software.

For each SAS product that is installed, the following subfolders might be created (but not all products contain all of these folders):

!SASROOT*product*\SASEXE
  contains the SAS executable files.

!SASROOT*product*\SASHELP
  contains many specialized catalogs and files.

!SASROOT*product*\SASMACRO
  contains SAS autocall macro files.

!SASROOT*product*\SASMSG
  contains the SAS message files.

!SASROOT*product*\SAMPLE
  contains the Sample Library programs.

!SASROOT*product*\SASTEST
  contains Test Stream programs.

!SASROOT*product*\SASMISC
  contains miscellaneous external files that are shipped with the product.

Some products, such as SAS/CONNECT software, also have other subfolders associated with them. For details about each product's structure, see the specific product documentation.

For more information about how the SAS folders are configured at your site, contact your SAS Support Consultant.

Submitting SAS Code

The SAS System under OS/2 provides several methods for you to submit your SAS programs for processing. SAS supports a variety of work strategies, whether you run SAS interactively or in batch, and in conjunction with other OS/2 programs or alone.

Submitting Code from the Program Editor

You issue the SUBMIT command to submit SAS code that you have typed into the Program Editor. SAS provides several ways to issue the SUBMIT command:

☐ Press F8 when the Program Editor is active.

☐ Click on the Submit toolbar button.

☐ Type **submit** in the command bar.

☐ From the menu, select

| Run | ▶ | Submit |

Submitting Code from the SAS Text Editor

SAS enables you to submit SAS code that you have typed into the SAS text editor (NOTEPAD). To invoke the SAS text editor select the **Tools** menu and then select **Text Editor**. SAS provides several ways to submit the code in the text editor:

☐ Click on the Submit toolbar button.

☐ Type **submit** in the command bar.

☐ From the menu, select

| Run | ▶ | Submit |

Submitting Code from the Clipboard

You can submit SAS code that you copied from another OS/2 application (such as an editor or word processor) or from SAS System Help. When you copy text from another OS/2 application, that text is stored in the OS/2 clipboard.

From the **Run** menu in the Program Editor window, select **Submit clipboard**. The code is submitted from the clipboard directly to the SAS System (without appearing in the Program Editor), and notes and results are sent to the SAS Log and Output windows, respectively. You can still issue the RECALL command (or press F4) to recall the submitted program into the Program Editor.

You can also use the GSUBMIT command to submit SAS code that is stored in the clipboard. For more information, see "GSUBMIT" on page 211.

Submitting Code by Dragging and Dropping

You can drag SAS programs from other OS/2 applications onto an open SAS session and submit them. You can also drag files that contain SAS code and drop them on an open SAS session to submit them.

Dragging Text from Other Windows

If you drag text from another OS/2 application or from a SAS window to the Program Editor, that text is moved or copied to the window by default. It is not submitted until you press F8 or issue the SUBMIT command.

Dragging Files in an Interactive Session

Using the My Favorite Folders window, you can access files that exist outside the SAS windowing environment. Files that contain SAS code can be dragged and dropped into your interactive SAS session for execution. The My Favorite Folders window can be accessed from the **View** menu.

If you drag a file that contains SAS code and drop it on the Program Editor window, that code is included in the window (but not submitted). If you drop the file on the Log or Output window or on a minimized SAS session, the code is automatically submitted.

Dragging and dropping the file C:\MYPROG.SAS onto a window (other than the Program Editor) of an open SAS session is the same as issuing this command:

```
gsubmit "%include 'c:\myprog.sas'";
```

You can submit more than one file at once by selecting a group of files that contain SAS programs and then dragging and dropping them on the open SAS session. The order in which the programs are run when they are submitted as a group is determined by OS/2. Therefore, if order is important, you should drag and drop each program file separately.

Note: If the SAS System is busy when you drop a SAS program icon, the dropped file is ignored. The only indication that the dropped file was ignored is a warning beep. △

Dragging Files to Start a Batch Session

If you drag a file that contains SAS code and drop it on a SAS program icon, SAS starts in batch mode and submits the code for processing.

Submitting Code Stored in Registered SAS File Types

During installation, the SAS Setup program registers certain file types with OS/2 to start specified actions when you double-click on those types of objects. For example, files with a file extension of .SS7 or .SAS are registered as SAS programs. These registered file types are displayed in OS/2 with a special icon, as shown here:

When you double-click on a file with this extension (or with this icon) the SAS System is invoked and the contents of the file are included (using the INCLUDE command) in the Program Editor window. The SAS code that is contained in the file is not processed until you submit it (for example, by pressing F8 or by clicking on the **Submit** tool). If you already have a SAS session running, double-clicking on a file begins a second SAS session; it does not use the already-existing session.

Interrupting Your SAS Session

You can click on the Break toolbar button (the circled exclamation point (!)) or press CTRL+BREAK to interrupt processing in your SAS session. Depending on what tasks the SAS System is performing at the time of the interrupt, you can cancel submitted statements or cancel an upload or download request. SAS prompts you with various choices (such as to continue the interrupt or to cancel it) in a dialog box.

Note: Depending upon what tasks are in progress when you interrupt your session, the SAS System may require several seconds to stop processing. △

The SAS System supports the common OS/2 method of issuing interrupts: from the Window List window, click the right mouse button on **SAS** and select **Close**. Note that the task might not stop until SAS has completed processing.

Issuing OS/2 Commands from within SAS

You can execute OS/2 commands from your SAS session either asynchronously or synchronously. When you run a command as an asynchronous task, the command executes independently of all other tasks that are currently running. To run a command asynchronously, you must use the SYSTASK statement. For more information about running asynchronous commands using the SYSTASK statement, see "SYSTASK" on page 304.

When you execute one or more OS/2 commands synchronously, then you must wait for those commands to finish executing before you can continue working in your SAS session. You can use the CALL SYSTEM routine, X statement, and X command to execute OS/2 commands synchronously. The CALL SYSTEM routine can be executed with a DATA step and the X statement can be used outside DATA steps. You can enter the X command on any SAS command line.

You can submit the X statement to exit your SAS session temporarily and gain access to the OS/2 command processor. The X statement takes the form

X <'*command*'>;

The optional *command* argument is used either to issue an operating environment command or to invoke an OS/2 application such as the OS/2 System Editor. This discussion concentrates on using the X statement to issue operating environment commands; note, however, that the X statement can also be used to invoke OS/2 applications.

Note: The X statement is similar to the X command. The major difference between the two is that the X statement is submitted like any SAS statement; however, the X command is issued as a windowing environment command. This section uses the X statement in examples, but the information applies to the X command as well. △

If you want to issue only one operating environment command, include the command as an argument in the X statement. When you submit the X statement, the command is issued, and you cannot issue any additional commands.

If you want to issue several operating environment commands, submit the X statement without an argument. A command prompt appears where you can enter an unlimited number of operating environment commands. Remember, however, that the commands that you issue from the command prompt do not affect the SAS process. For example, if you change from the SAS working folder to MYDATA at the command prompt, the SAS System still uses the SAS folder as its working folder. Also, any environment variables that you define are not available to the SAS System. If you

submit an X statement or command without a *command* argument, type EXIT to return to your SAS session.

Other methods of temporarily exiting your SAS session include

□ using the command bar or box to issue the X command

□ selecting **OS/2 Window** from the WarpCenter command prompts.

Executing Operating Environment Commands Conditionally

If you want to issue operating environment commands conditionally, use the CALL SYSTEM routine, as in the following example:

```
options noxwait;
data _null_;
   input flag $ name $8.;
   if upcase(flag)='Y' then
      do;
         command='md c:\'||name;
         call system(command);
      end;
   cards;
Y mydir
Y junk2
N mydir2
Y xyz
;
```

This example uses the value of the variable FLAG to conditionally create folders. After the DATA step runs, three folders have been created: C:\MYDIR, C:\JUNK2, and C:\XYZ. The folder C:\MYDIR2 is not created because the value of FLAG for that observation is not **Y**.

The X command is a global SAS statement; therefore, it is important to realize that you cannot conditionally issue the X command. For example, if you submit the following code, the X statement is issued:

```
data _null_;
   answer='n';
   if upcase(answer)='y' then
      do;
         x 'md c:\extra';
      end;
run;
```

In this case, the folder C:\EXTRA is created regardless of whether the value of ANSWER is equal to **n** or **y**.

For more information about the CALL SYSTEM routine, see "CALL SYSTEM" on page 248 and the section on functions and CALL routines in *SAS Language Reference: Dictionary*.

XWAIT System Option

The XWAIT system option controls whether you have to type EXIT to return to your SAS session after an X statement or command has finished executing a DOS command. (The XWAIT system option is not used if an X statement is issued without a *command* argument or if the X statement invokes an OS/2 application such as the EPM editor.) This option and its negative form operate in the following ways:

XWAIT   specifies that you must type EXIT to return to your SAS session. This is the default behavior.

NOXWAIT   specifies that the command processor automatically return to the SAS session after the specified command is issued; you do not have to type EXIT.

If you issue an X statement or command without a *command* argument, you must type EXIT to return to your SAS session, even if NOXWAIT is in effect.

When a window that was created by an X statement is active, reactivating the SAS System without exiting from the command processor causes the SAS System to issue the following message:

```
The X command is active. Enter EXIT at
the prompt in the X command window to
reactivate this SAS session.
```

If you receive this message, type the EXIT command from the command prompt to close the window and return to your SAS session.

XSYNC System Option

The XSYNC option specifies whether the operating environment command that you submit runs synchronously or asynchronously with your SAS session. This option and its negative form operate in the following ways:

XSYNC   causes the operating environment command to run synchronously with your SAS session. That is, control is not returned to the SAS System until the command has completed. You cannot return to your SAS session until the command prompt session that was spawned by the X command or statement is closed. This is the default behavior.

NOXSYNC   indicates that the operating environment command should run asynchronously with your SAS session. That is, control is returned immediately to the SAS System, and the command continues executing without interfering with your SAS session. With NOXSYNC in effect, you can invoke an X command or statement and return to your SAS session without closing the window that was spawned by the X command or statement.

Specifying NOXSYNC can be useful if you are starting applications such as the EPM editor from your SAS session. For example, suppose you submit the following X statement:

```
x epm;
```

If XSYNC is in effect, you cannot return to your SAS session until you close EPM. But if NOXSYNC is in effect, you can switch back and forth between your SAS session and the NOTEPAD. The NOXSYNC option breaks any ties between your SAS session and the other application. You can even end your SAS session. The other application stays open until you close it.

Comparison of the XWAIT and XSYNC Options

The XWAIT and XSYNC options have very different effects. An easy way to remember the differences is the following:

XWAIT   means the command prompt session waits for you to type EXIT before you can return to your SAS session.
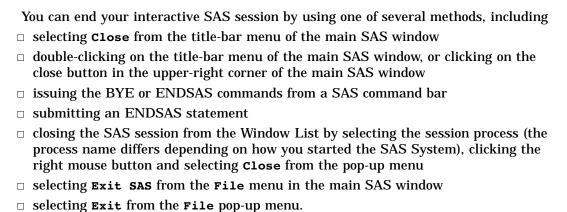
XSYNC   means the SAS System waits for you to finish with the other
                          application before you can return to your SAS session.

The various option combinations are summarized in Table 1.1 on page 23.

Table 1.1   Combining the XWAIT and XSYNC System Options

Options in Effect	Result
XWAIT XSYNC	The command prompt window waits for you to type EXIT before closing, and the SAS System waits for the application to finish.
XWAIT NOXSYNC	The command prompt window waits for you to type EXIT before closing, and the SAS System does not wait for the application to finish.
NOXWAIT XSYNC	The command prompt window closes automatically when the application finishes, and the SAS System waits for the application to finish.
NOXWAIT NOXSYNC	The command prompt window closes automatically when the application finishes, and the SAS System does not wait for the application to finish.

Ending Your Interactive SAS Session

You can end your interactive SAS session by using one of several methods, including

- □ selecting **Close** from the title-bar menu of the main SAS window
- □ double-clicking on the title-bar menu of the main SAS window, or clicking on the close button in the upper-right corner of the main SAS window
- □ issuing the BYE or ENDSAS commands from a SAS command bar
- □ submitting an ENDSAS statement
- □ closing the SAS session from the Window List by selecting the session process (the process name differs depending on how you started the SAS System), clicking the right mouse button and selecting **Close** from the pop-up menu
- □ selecting **Exit SAS** from the **File** menu in the main SAS window
- □ selecting **Exit** from the **File** pop-up menu.

SAS° Companion for the OS/2° Environment, Version 8

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