Installation Instructions and System Manager's Guide for the SAS® System under OpenVMS™ Alpha, Release 6.12 (TS055 and above)

Table of Contents

Getting Started

This document provides instructions for installing Release 6.12 of the SAS System under OpenVMS Alpha. These instructions are designed for system managers and not the general SAS user. For information on how to use the SAS System, refer to the appropriate SAS manuals and Technical Reports.

Terminology

Index File

control file used by the installation procedure to determine what is on the media you received. See the "Important Files" section for other control files used by the SAS System.

Maintenance

replacement files shipped on the installation media that contain software fixes and enhancements to production products. Typically, maintenance files will have a higher TS level than production files. Maintenance files are treated as production software because they have undergone thorough quality assurance testing.

National Language Support (NLS)

National Language Support (NLS) refers to components of the SAS System that have been translated from English to another language.

Post-Processing

some SAS software products require some special processing after the product is installed. You have the option of allowing the installation procedure to start the post-processing for you or you will be required to perform the post-processing manually before you can use any product for which it is required.

Product Updates

software fixes or enhancements shipped on your media that SAS Institute Technical Support deems important. Product updates are shipped along with the SAS Notes and are updated as necessary.

SAS Notes

a set of notes and utilities concerning SAS software issues, including a list of software problems, usage hints, and compatibility notes. SAS Notes are updated regularly and the most current set is included on your media at the time of shipment.

SAS$ROOT

the rooted logical defined to reference the device and root directory on which the SAS System is installed such as `SASdisk:[SASroot.]`. See Appendix I, "SAS Logical Names" for a complete list of SAS logicals.

TS level

a specific number assigned to a release of the SAS System. For example, the TS level for the production Release 6.12 of the SAS System is TS020. You can find this value at the top of the SAS `LOG` window.

Types of Media

The media you receive can be one of five types: FULL, ADDON, USAGE, SUPPL, or SPECL. This section provides a general description of the contents of each media type.

FULL

media that contain the set of all SAS System products for which your site is licensed.

ADDON

media that contain one or more SAS System products to be added to an existing SAS System installation.

USAGE

media that contain updated SAS Notes, product updates, technical support tools, and other miscellaneous files.

SUPPL

media that contain any supplemental SAS products requested by your site. See Appendix B, "Performing SPECL and SUPPL Installs" for more information about installing supplemental products.

SPECL

media that contain any special SAS products requested by your site. See Appendix B, "Performing SPECL and SUPPL Installs" for information about installing special products.

References

Digital Equipment Corporation (1995), "OpenVMS System Management Utilities Reference Manual: A-L" Maynard, Massachusetts: Digital Equipment Corporation, Order No. AA-PV5PC-TK.

Digital Equipment Corporation (1995), "OpenVMS System Management Utilities Reference Manual: M-Z" Maynard, Massachusetts: Digital Equipment Corporation, Order No. AA-PV5QC-TK.

Digital Equipment Corporation (1993), "OpenVMS Developer's Guide to VMSINSTAL." Maynard, Massachusetts: Digital Equipment Corporation, Order No. AA-PWBXA-TE.

Digital Equipment Corporation (1995), "OpenVMS System Manager's Manual: Essentials." Maynard, Massachusetts: Digital Equipment Corporation, Order No. AA-PV5MC-TK.

Digital Equipment Corporation (1995), "OpenVMS System Manager's Manual: Tuning, Monitoring, and Complex Systems." Maynard, Massachusetts: Digital Equipment Corporation, Order No. AA-PV5NC-TK.

Digital Equipment Corporation (1995), "OpenVMS Guide to System Security" Maynard, Massachusetts: Digital Equipment Corporation, Order No. AA-Q2HLB-TE.

Digital Equipment Corporation (1993), "OpenVMS Command Definition, Librarian, and Message Utilities Manual" Maynard, Massachusetts: Digital Equipment Corporation, Order No. AA-PV6DA-TK.

Goldenberg, Ruth E. and Kenah, Lawrence J. "VAX/VMS Internals and Data Structures," Version 5.2, Bedford, MA: Digital Press, 1991, Order No. EY-C171E-DP.

The following SAS Institute publications can assist you with Version 6 of the SAS System:

SAS Companion for the OpenVMS Environment, Version 6, Second Edition

Technical Report P-242, *SAS Software: Changes and Enhancements, Release 6.08*

Technical Report P-251, *Changes and Enhancements to the SAS System for the OpenVMS Environment, Release 6.09*

SAS Technical Report (#55672): *Changes and Enhancements to the SAS System for the OpenVMS Alpha Environment, Release 6.12*

SAS/GRAPH Software: Using Graphics Devices with the VMS System

SAS/GRAPH Software: Reference, Volumes 1 and 2, Version 6, First Edition

SAS Language: Reference, Version 6, First Edition

SAS Consultant's Guide: Supporting the SAS System, Second Edition.

Chapter 1, Pre-Installation Checklist

Before you begin installing the SAS System, make sure you review the following checklist and perform the tasks required. Once you have completed the checklist, continue to Chapter 2, "Installing the SAS System".

- ❑ Review all the items in your product package.
- ❑ Verify you are logged on to the `SYSTEM` account or a comparably privileged account.
- ❑ Verify that your version of OpenVMS is 6.1 or higher.
- ❑ Verify you have enough disk space to install the SAS System. Refer to the *System Requirements* contained in your installation package for disk space requirements.
- ❑ Make sure your terminal is set to a screen size of at least 24x80.
- ❑ Backup the disk on which you are loading the SAS System.
- ❑ Note that hardcopy devices are not supported in this release.

Check Your Version of OpenVMS Alpha

Release 6.12 of SAS System software runs under OpenVMS, Version 6.1 or higher on Alpha systems. If your OpenVMS system is not Version 6.1 or higher, update your OpenVMS system.

Requirements for specific SAS products and OpenVMS-specific product extensions include:

SAS Software Products:

- ❑ SAS/ACCESS Interface to INGRES Software:
  - ❑ OpenVMS, Version 6.1 or higher
  - ❑ INGRES, Version 1.1-04 or higher
  - ❑ INGRES, Version 6.4/05
- ❑ SAS/ACCESS Interface to ORACLE Software:
  - ❑ OpenVMS, Version 6.1 or higher
  - ❑ ORACLE7, Release 7.0.13.1 or higher
- ❑ SAS/ACCESS Interface to Rdb Software:
  - ❑ OpenVMS, Version 6.1 or higher

- Oracle Rdb/VMS, Version 5.1 or higher

- ❑ SAS/ACCESS Interface to SYBASE and SQL Server Software:
  - ❑ OpenVMS, Version 6.1 or higher
  - ❑ SYBASE Open Client, Release 4.6.2 or Open Client, Release 10
- ❑ SAS/CONNECT Software:
  - ❑ DECnet must be installed

  or
  - ❑ DEC TCP/IP Services for OpenVMS, Version 3.0 or above
  - ❑ TGV's MultiNet Software with UCX compatibility
  - ❑ Wollongong's PathWay with UCX compatibility
  - ❑ Process Software's TCPware for OpenVMS with UCX compatibility
  - ❑ any package that provides an interface that is compatible with DEC TCP/IP Services for OpenVMS, Version 3.0 or above

  Note: See Appendix F, "Post-Installation Setup for SAS/CONNECT Software" for more information.
- ❑ SAS/SHARE Software
  - ❑ DECnet must be installed

  or
  - ❑ DEC TCP/IP Services for OpenVMS, Version 3.0 or above
  - ❑ TGV's MultiNet Software with UCX compatibility
  - ❑ Wollongong's PathWay with UCX compatibility
  - ❑ Process Software's TCPware for OpenVMS with UCX compatibility
  - ❑ any package that provides an interface that is compatible with DEC TCP/IP Services for OpenVMS, Version 3.0 or above

  Note: See Appendix G, "Post-Installation Setup for SAS/SHARE Software" for more information.

VMS-Specific Product Extensions:

- ❑ Running the SAS System under DECwindows Motif:
  - ❑ OpenVMS, Version 6.1 or higher
  - ❑ DECwindows Motif 1.1 or higher

Chapter 2, Installing the SAS® System

The following information will assist you in maneuvering within the install windows.

Error Recovery

If any errors occurred during the installation procedure, check the install log for more information. See the following section, "Important Files" for the location of this log.

If help is needed in correcting the error, contact SAS Institute Technical Support as described in the section, "Contacting Technical Support".

Important Files

File Name	Location	Description
INSTALL_SAS612.LOG	SAS$ROOT:[INSTALL]	Contains information logged during installation.
INSTALL_SAS612.HISTORY	SAS$ROOT:[INSTALL]	Lists all products that have been installed including when, where, and the TS level. **Do not delete this file.**
INSTALL_SAS612.INDEX	SAS$ROOT:[INSTALL]	Index list used by the install. **Do not delete this file.**
INSTALL_SETUP.ANS_SAS612	SYS$UPDATE:	Contains all recorded answers to the install and can be used in subsequent installs to eliminate full-screen prompting.

Contacting Technical Support

If you encounter errors or have questions regarding the installation, SAS Institute provides technical support via the World Wide Web, telephone, mail, dial-up computer access, or electronic mail. For technical support via the World Wide Web, use the following URL:

http://www.sas.com/ts/

For technical support by phone, call (919) 677-8008 between the hours of 9 a.m. and 5 p.m., Eastern Time, during SAS Institute business days. If you are a non-U.S./Canadian customer, contact your SAS Installation Representative for the SAS Institute office nearest you. For technical support by mail, address all correspondence to:

SAS Institute, Inc.
Technical Support Division
SAS Campus Drive
Cary, N.C. 27513-2414

Electronic mail access is available through the Electronic Mail Interface to Technical Support (EMITS). This facility allows you to track a technical support problem or add information to a previously reported problem. To obtain more information on EMITS, send electronic mail to `SUPPORT@SAS.COM` with the body of the message containing the command:

```
help
```

Following the Install Process

All windows presented during the SAS System install consist of two parts: a main body of text and a command bar.

The main body of text varies based on the purpose of the window. Some windows contain selectable items for you to choose while others alert you of the progress of the install. The following keys can be used in the main body of the window:

Key	Description
x	select the item at the cursor location
space	deselect the item at the cursor location
highlight character	select the item with the same highlighted character, for example, press `F` to select *Full* install
tab	move the cursor one item to the right
arrow keys	move the cursor one item to the right, left, up, or down
return	executes the selected item, if any, or moves the cursor to the command bar
ctrl-w or r	refreshes the window
h	displays a help dialog if one is available for the item

The command bar is used to maneuver among windows within the install, such as returning to a previous window, continuing to the next window, exiting from the install, or getting help. The following keys can be used in the command bar:

Key	Description
x	select the item at the cursor location
space	deselect the item at the cursor location
pf keys	select the item which is in the same position as the pf key, for example, PF1 selects the first item on the command bar
highlight character	select the item with the same highlighted character, for example, press `C` to select Continue
tab	move the cursor one item to the right
arrow keys	move the cursor one item to the right or left
return	executes the selected item, if any, or moves control to the cursor to find the selectable item in the main body of the window
ctrl-w or r	refreshes the window
ctrl-p	enables you to spawn a subprocess and check system settings (such as disk space, privileges, and so on) when you are running the install

Special Notes about the SAS System Install

- All relevant information gathered during the full-screen portion of the install is written to the install log file for future reference.

- When choosing to install in an existing `SAS$ROOT` location, the install checks what is already installed and what TS level you are at and may reduce your installation selections.

- If the installation media contains any online documentation, you may access it by selecting the `Online Docs` item from the initial installation window.

- The install will check for adequate disk space and minimum system requirements and alert you if either is insufficient.

- The install allows you to use an existing auto-answer file from a previous installation. The auto-answer file contains all information you specified in a previous installation. If re-used, the install requires no prompting from you and performs the same installation as before. If this file exists, you will be asked if you want to use it before the full-screen installation windows appear.

- If you use ctrl-p to spawn a subprocess, you must log off the subprocess to return to the installation procedure. The window from which you spawned is automatically refreshed.

Invoking the Installation Procedure

Complete the following steps to invoke the installation procedure:

1. Allocate your CD-ROM drive using the following command:

   ```
   $ ALLOCATE cdrom_drive
   ```

   where *cdrom_drive* refers to the CD-ROM drive from which you are installing the SAS System.

2. Mount your SAS System CD-ROM on your CD-ROM drive using the following command:

   ```
   $ MOUNT/OVER=ID cdrom_drive
   ```

3. Invoke the installation procedure using the following command:

   ```
   $ @SYS$UPDATE:VMSINSTAL SAS061 cdrom_drive:[SAVE_SETS] options
   ```

   Options are available, but not required, for your use with the VMSINSTAL command line. When specifying the `OPTIONS` parameter, delimit the options with commas only. If you delimit the option with spaces, the option is ignored.

   Available options include:

   - `AWD=disk:[directory]`

     allows you to specify a temporary working directory used by VMSINSTAL other than `SYS$SYSROOT:[SYSUPD.SAS061]`. This option enables you to perform an installation with fewer free blocks on the `VMI$ROOT` device than is otherwise required. If you specify a non-existent directory name, it will be created. It will not be deleted when the installation is complete.

   - `FULL`

     can be used to override the default SAS index list on your media (ADDON, USAGE, and so on). By specifying `FULL`, you can install anything off your fully customized media. This is especially useful if you need to re-install the entire SAS System due to disk or other hardware failures.

   - `IDX=disk:[directory]filename.extension`

     allows you to specify where a SAS index list exists on your system. The installation procedure will read from this index file rather than the one provided on your media. This option is intended for sites that reduce the product selections within their enterprise.

- ❑ SAS_REMOVE=*

  allows you to remove SAS System products that are already installed on your system. Make sure your system is backed up before using this option. See Appendix A, "Removing SAS Products Using the SAS_REMOVE=* Option" for information about removing products from your SAS System installation.

4. VMSINSTAL checks to see if your system meets the minimum requirements for performing an installation. If you receive a warning message here, check the *Guide to Setting Up an OpenVMS System* to determine whether all minimum requirements are met. You may have to exit at this point if they are not.

5. VMSINSTAL tells you if there are any active processes and then asks if you would like to continue anyway. Active processes do not affect the installation procedure. Respond YES and proceed.

6. VMSINSTAL asks if you have backed up the system disk. If your output destination disk is fully backed up, respond YES and proceed.

7. If you are installing from CD-ROM, the installation procedure asks:

   ```
   Are you ready?
   ```

   Mount the CD-ROM, respond YES, and proceed.

   Note: Responding before the media is mounted and online aborts the installation procedure.

8. The installation procedure checks for the existence of an auto-answer file from a previous installation and asks if you want to use it.

   ```
   The installation procedure located an existing install answer file,
   SYS$UPDATE:INSTALL_SETUP.ANS_SAS612...

   Do you want to use the existing install auto-answer file [N]?
   ```

   If you want to perform the same installation as your last install, respond YES and proceed.

   Note: You must install on the same node as before to get the correct auto-answer file.

Performing the Install

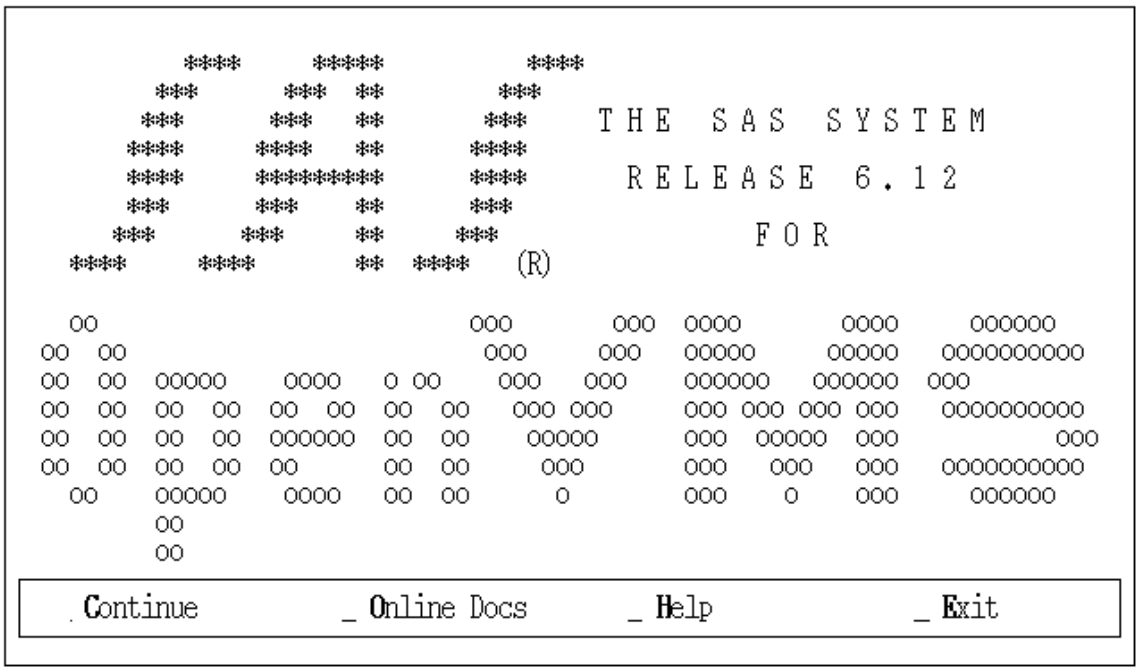
The following table serves as a guide for installation based on the media type you received. The installation procedure will follow the steps listed in the following table based on the media type, the type of install chosen, and the selected target location.

Type of Media	Type of Install	Target Location (SAS$ROOT)	
FULL		New	Existing
	Full	*1,2,3,8,9*	*1,2,3,4,8,9*
	Custom	*1,2,3,5,6,7,9*	*1-7, 9*
ADDON		New	Existing
	Full	*N/A*	*1,2,3,8,9*
	Custom	*N/A*	*1,2,3,5,6,7,9*
USAGE		New	Existing
	Full	*N/A*	*1,2,3,9*
	Custom	*N/A*	*1,2,3,5,6,7,9*
SUPPL		New	Existing
	Full	*N/A*	*1,2,3,4,8,9, Appendix B*
	Custom	*N/A*	*1-7,9, Appendix B*
SPECL		New	Existing
	Full	*1,2,3,8,9, Appendix B*	*N/A*
	Custom	*1,2,3,5,6,7,9, Appendix B*	*N/A*

Each step listed in the table corresponds to a window on the following pages or in an appendix to this document.

For each step, we provide a suggested course of action to help ensure a successful install. It is important to note that there may be cases when the suggested action is not suitable for your installation. If you have questions about what to do for a particular window, refer to the online help or contact SAS Institute Technical Support.

Step 1. Welcome to the SAS System installation.

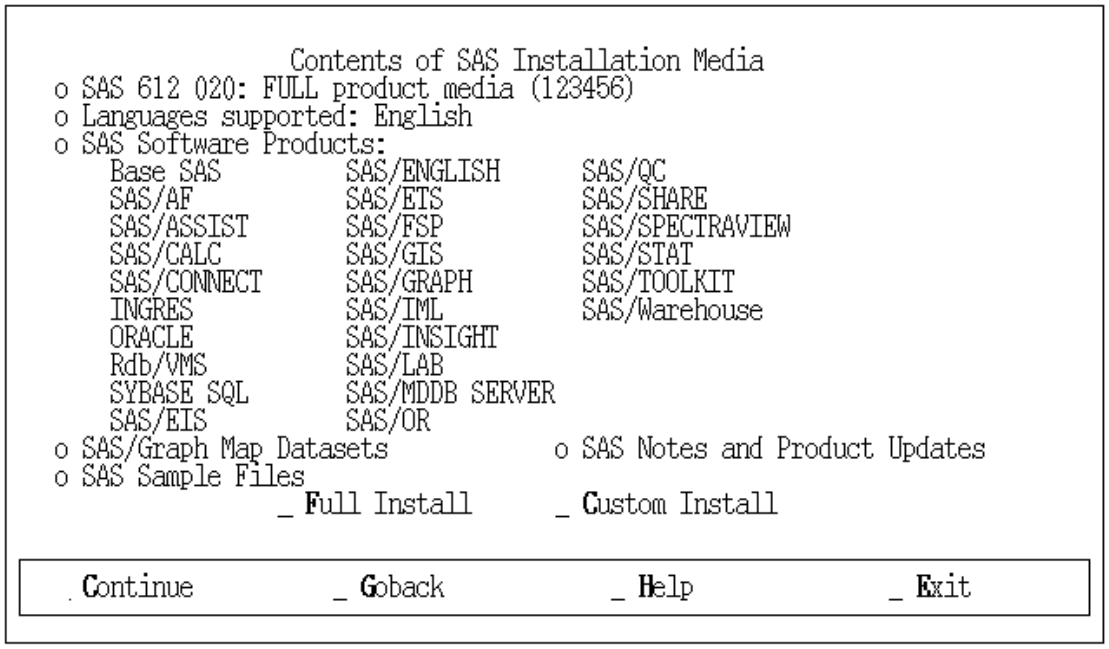


When beginning the installation, the first window displayed is the one shown in Step 1. With this window, you are given the option of viewing and/or printing any of the online documentation provided with your media. This is the only window in which you have the opportunity to do so.

Suggested action: If performing an installation for the first time, select `Help` to become familiar with how to move between the installation windows. Once you are familiar with maneuvering among the windows, select `Continue` to proceed with the install.

Note: For more information on online documentation, see "Online Documentation" in "Other Installation Windows" later in this section.

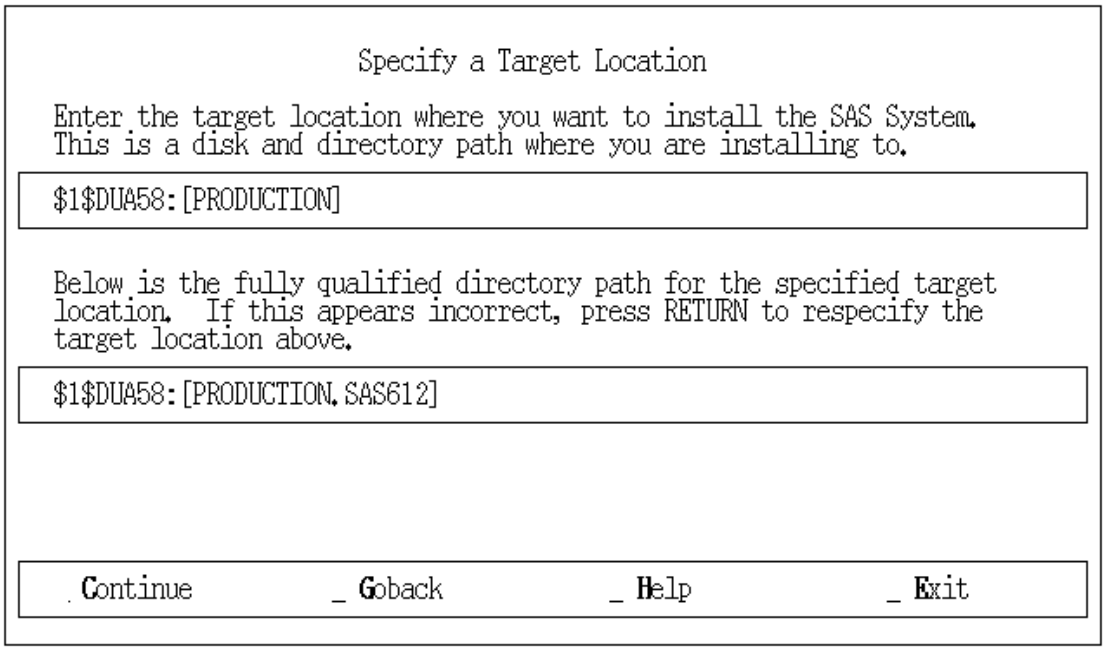
Step 2. View media contents.



After the welcome window, the contents of your media are displayed as shown in the above example window. It is at this point that you select the type of install to perform.

Suggested action: To install the entire contents of your media, select `Full Install` from the main body then select `Continue` to proceed with the install. To selectively install products, select `Custom Install` from the main body then select `Continue` to proceed with the install.

Step 3. Set target location.

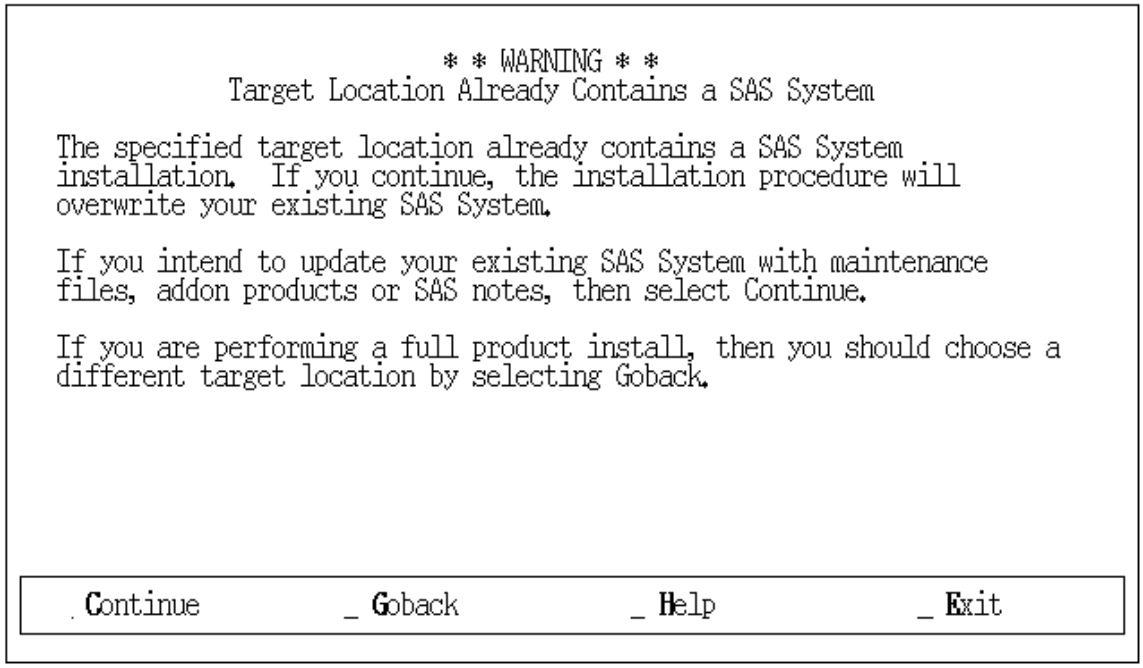


Once the install type has been determined, the next step is to specify the directory in which to install the SAS System. By default, the directory where you invoke the installation is the directory displayed. To change the target location, clear the current value using the backspace key and enter a new value. Then, press `Return` to validate your selection. The install will append `SAS612` to the directory specified if it does not already contain it.

Suggested action: Enter the directory where you want to install the SAS System then select `Continue` to proceed with the install.

Note: If the target location does not currently exist, the installation procedure creates it for you as part of the validation process.

Step 4. Verify target location.

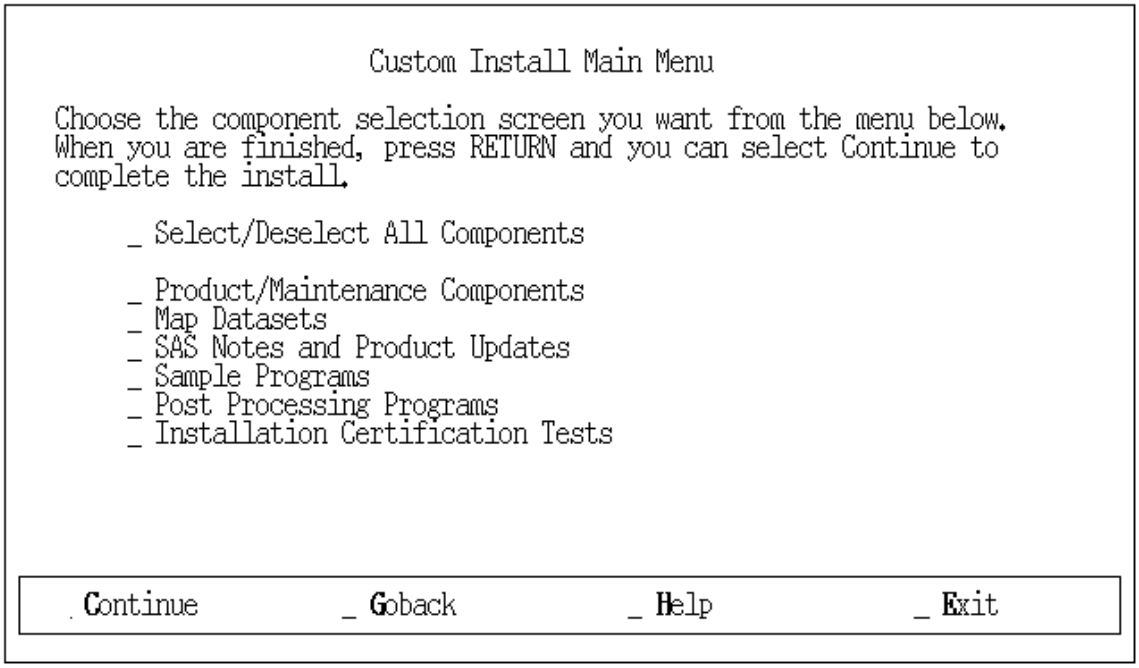


If the target directory specified contains an existing SAS System and you have a full product media, the above window will be displayed.

Suggested action: Verify that the directory you specified is the correct directory. If you want to install over the existing SAS System, select `Continue` to proceed with the install. Otherwise, select `Goback` to return to the Set target location window (Step 3) and enter a new target directory.

Note: By overwriting your existing SAS System installation, you will not be able to restore your previous installation except from system backups.

Step 5. Product main menu.



If you are performing a *Custom* install and you have chosen to install in an existing SAS installation, the above window is displayed. You can then select the components to install on your system. For each component selected, another window is displayed that allows you to further customize what components will be installed (Step 6). If you choose to perform a *Custom* install and you choose to install in a new target location, you will go directly to the custom component selection windows.

Suggested action: Select the components you want to install on your system then select `Continue` to proceed with the install.

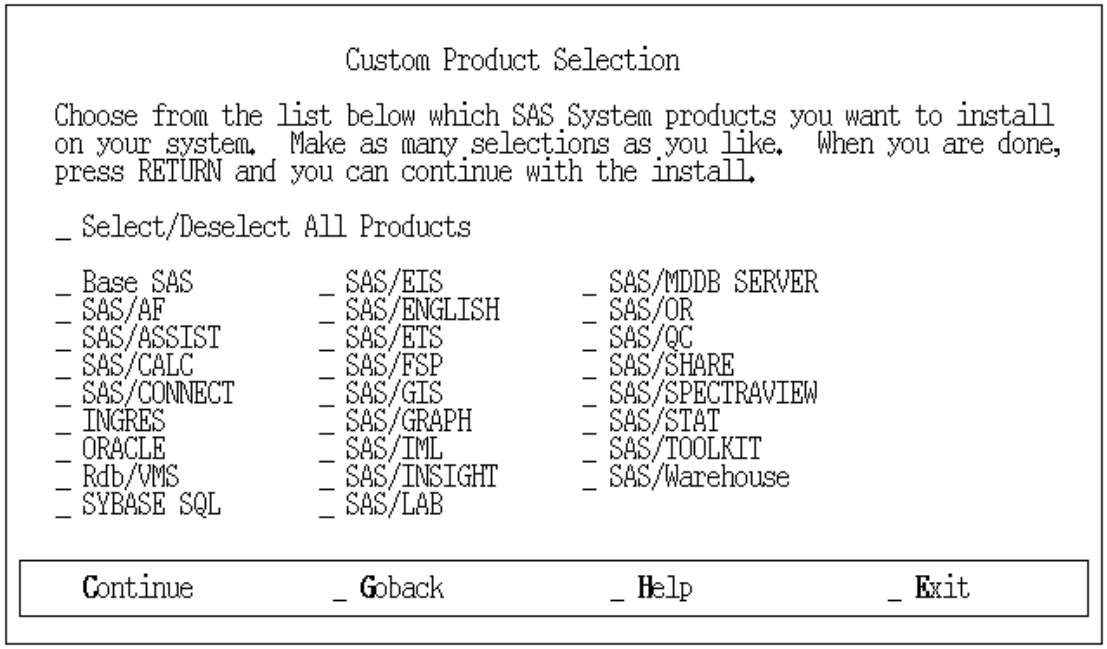
If you decide you would like to install all of the products, select `Goback` to return to the Set target location window (Step 3). From the Set target location window, select `Goback` to return to the View media contents window (Step 2) and select `Full Install`.

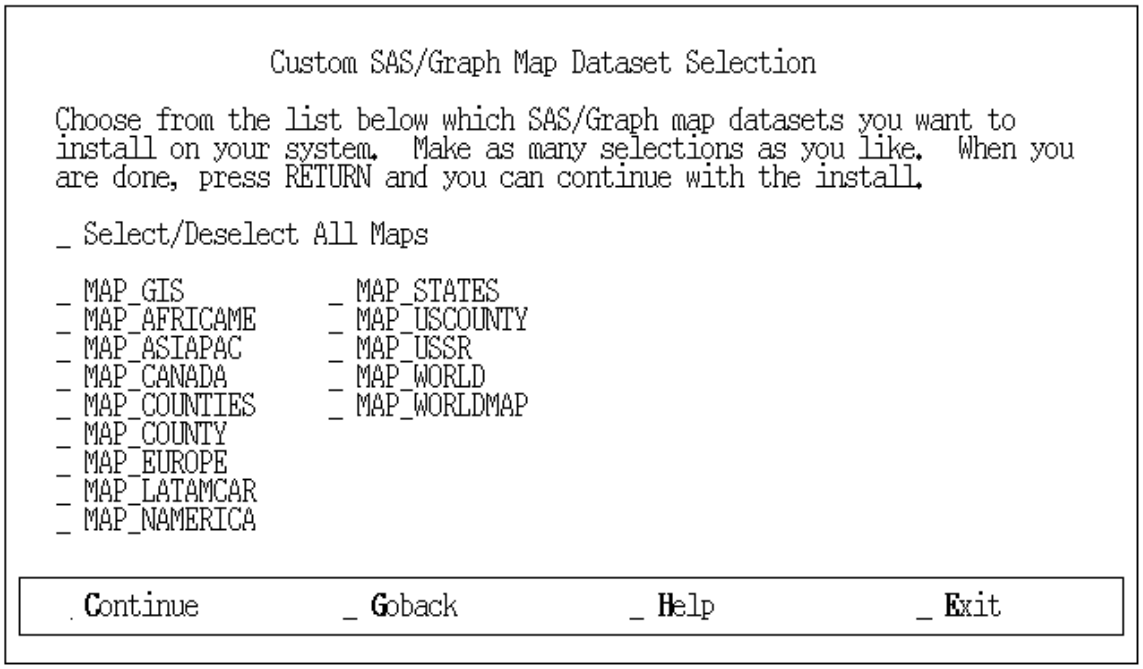
Step 6. Select components.

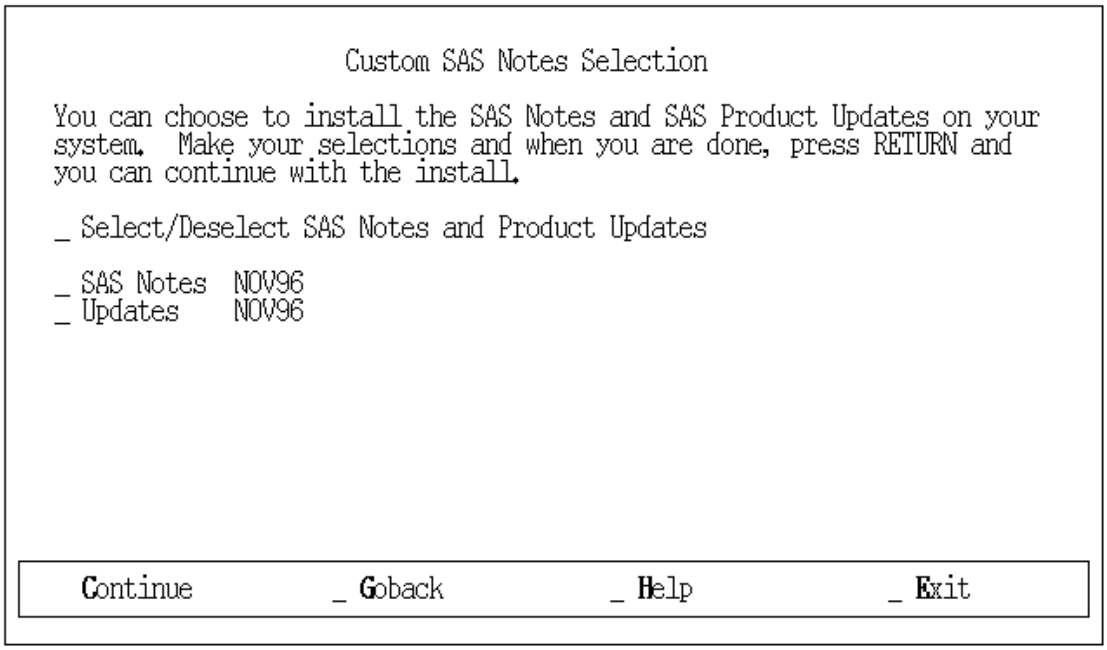
You will see one or more of the following windows based on your selection(s) in Step 5. For each window, you have the choice of selecting all, some, or none of the components.

Suggested action: For each component selection window displayed, select the components needed for your site, then select `Continue` to proceed with the install.

Note: Help information for each component is available by typing `h` next to the component.

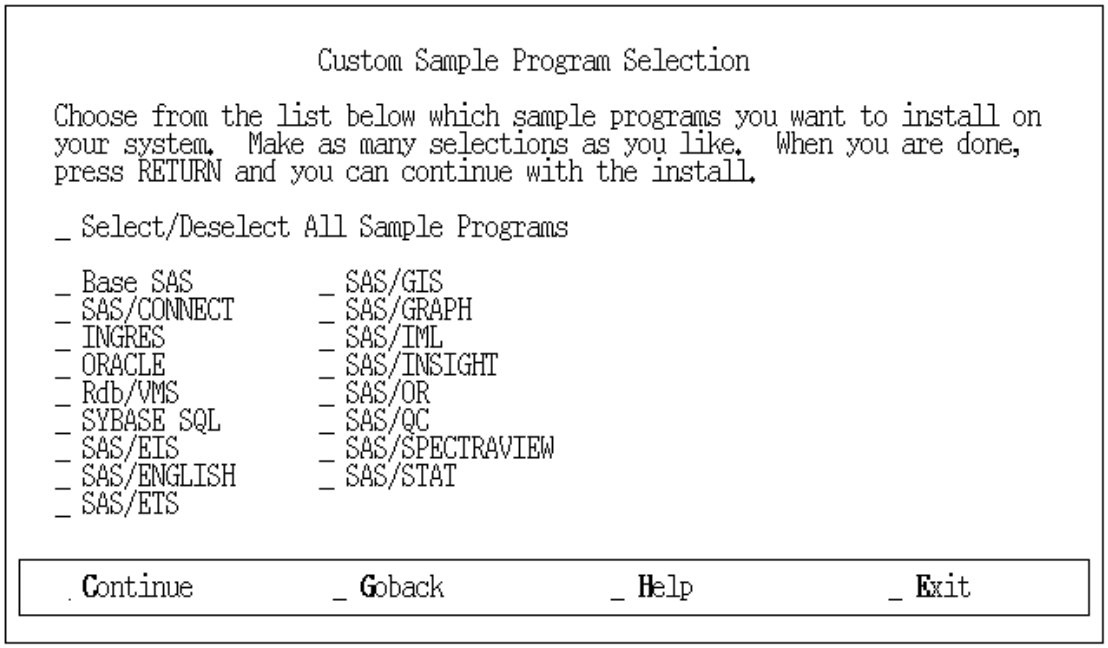


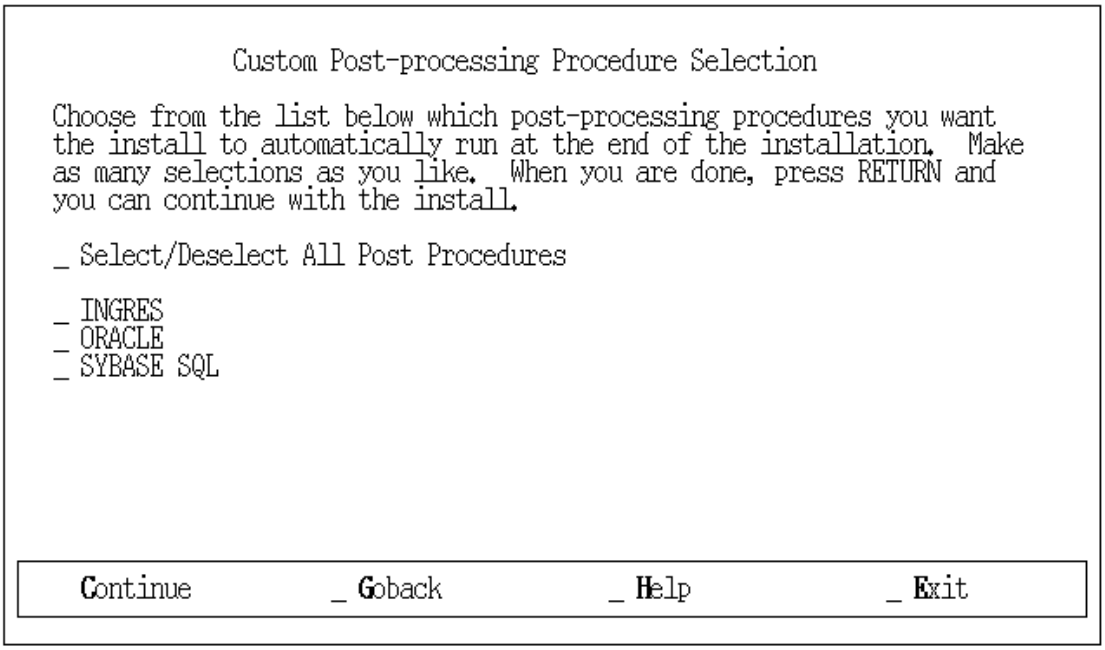


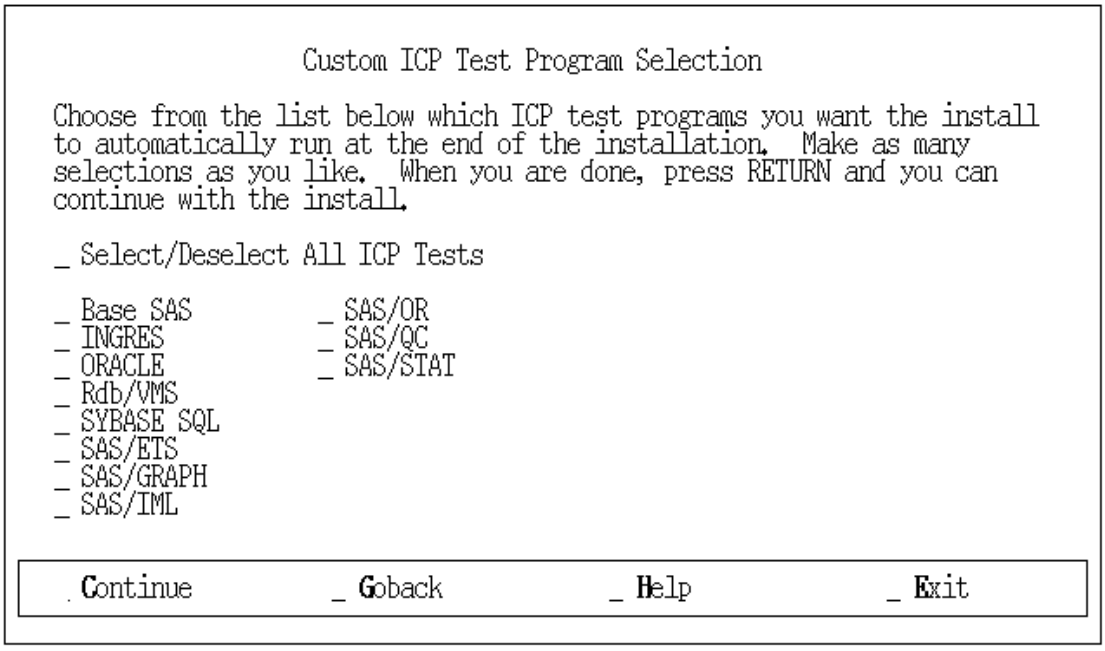


Note: `Updates` are files that are extensions or contain fixes for SAS software products. These files must be loaded in order to update your version of the SAS System to the version supported by SAS Institute Technical Support.

The installation procedure sets the file version limit of the SAS directory tree to a version limit of two. This will preserve the previous version of any files before updates are installed (in case you need to back off an updated file).

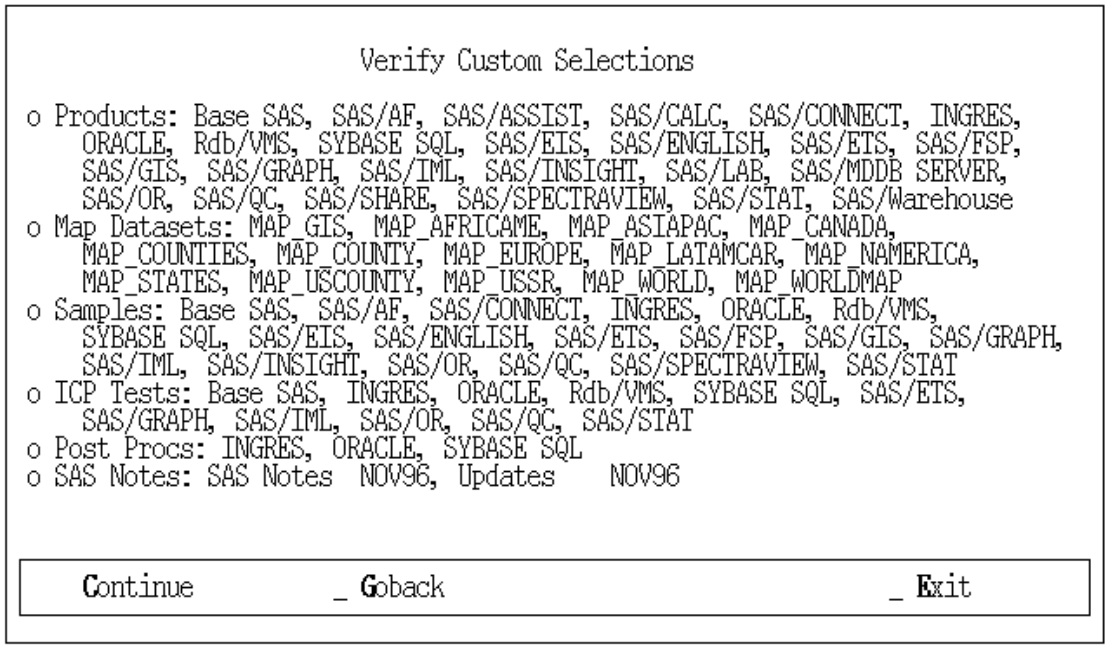

Custom Sample Program Selection
Choose from the list below which sample programs you want to install on your system. Make as many selections as you like. When you are done, press RETURN and you can continue with the install.
_ Select/Deselect All Sample Programs
_ Base SAS
_ SAS/CONNECT
_ INGRES
_ ORACLE
_ Rdb/VMS
_ SYBASE SQL
_ SAS/EIS
_ SAS/ENGLISH
_ SAS/ETS
_ SAS/GIS
_ SAS/GRAPH
_ SAS/IML
_ SAS/INSIGHT
_ SAS/OR
_ SAS/QC
_ SAS/SPECTRAVIEW
_ SAS/STAT
Continue
_ Goback
_ Help
_ Exit


Custom Post-processing Procedure Selection
Choose from the list below which post-processing procedures you want the install to automatically run at the end of the installation. Make as many selections as you like. When you are done, press RETURN and you can continue with the install.
_ Select/Deselect All Post Procedures
_ INGRES
_ ORACLE
_ SYBASE SQL
Continue
_ Goback
_ Help
_ Exit



Note: It is recommended that you select the ICP Tests for the products to be installed on your system to ensure that the installation was successful.

Step 7. Product verification.

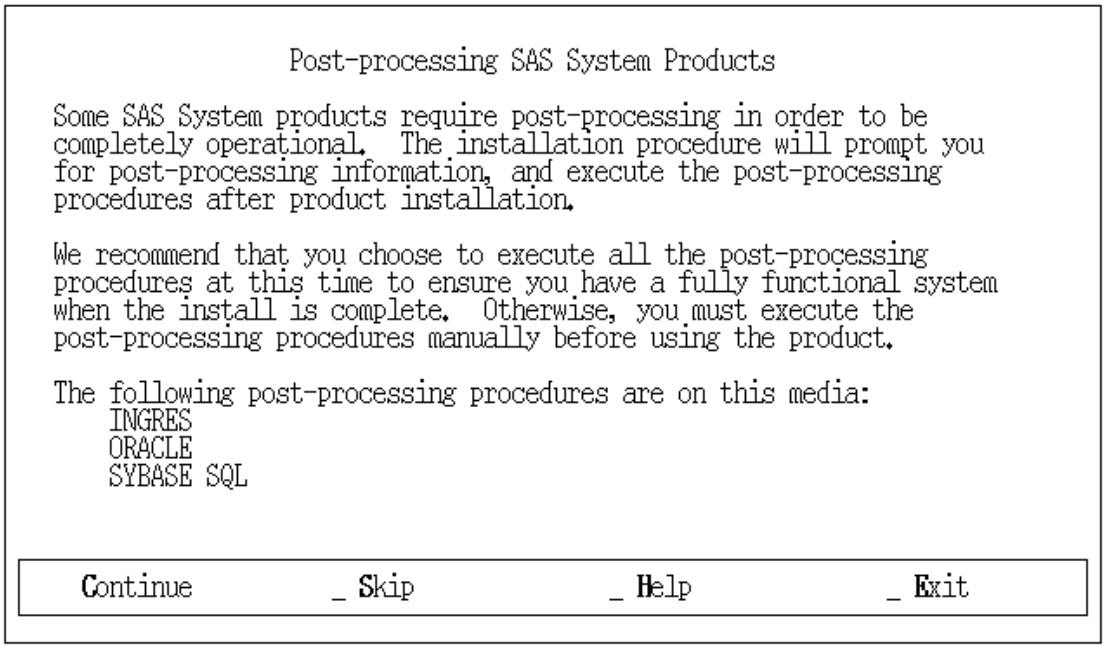


After selecting the components to install, you are presented with your choices to verify that they are correct as shown in the above window.

Suggested action: If the components displayed are correct, select `Continue` to proceed with the install. If the products displayed are not correct, select `Goback` to return to the `Custom Install Main Menu` window or the start of the custom selection windows (Step 5).

Step 8. Post-processing.

If you are performing a *Full* install and your media includes SAS/ACCESS software products, the following window is displayed.

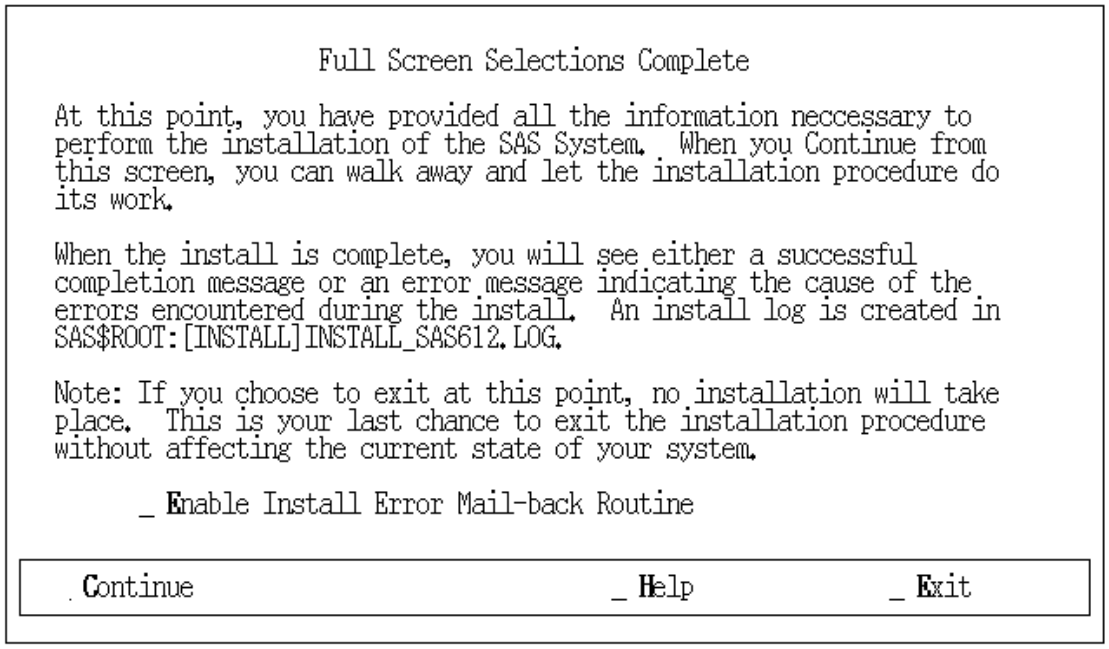


Based on the contents of your media, post-processing procedures may need to be executed in order for certain products to work. The install will prompt you as shown in the above window if any products need post-processing. You then have the option of allowing the install to perform the post-processing after the installation of the SAS System or manually performing the post-processing at a later time.

Suggested action: Select `Continue` to proceed with the installation. You will be prompted to respond to questions needed for completing the post-processing for the products listed. If you do not feel you know the answer to a particular question, you have the option of skipping it. You will then need to perform the post-processing for that product after the install completes.

Note: See Appendix D, "Post-Installation Setup for SAS/ACCESS Software" for information on how to manually run post-processing for SAS/ACCESS software.

Step 9. Successful installation.



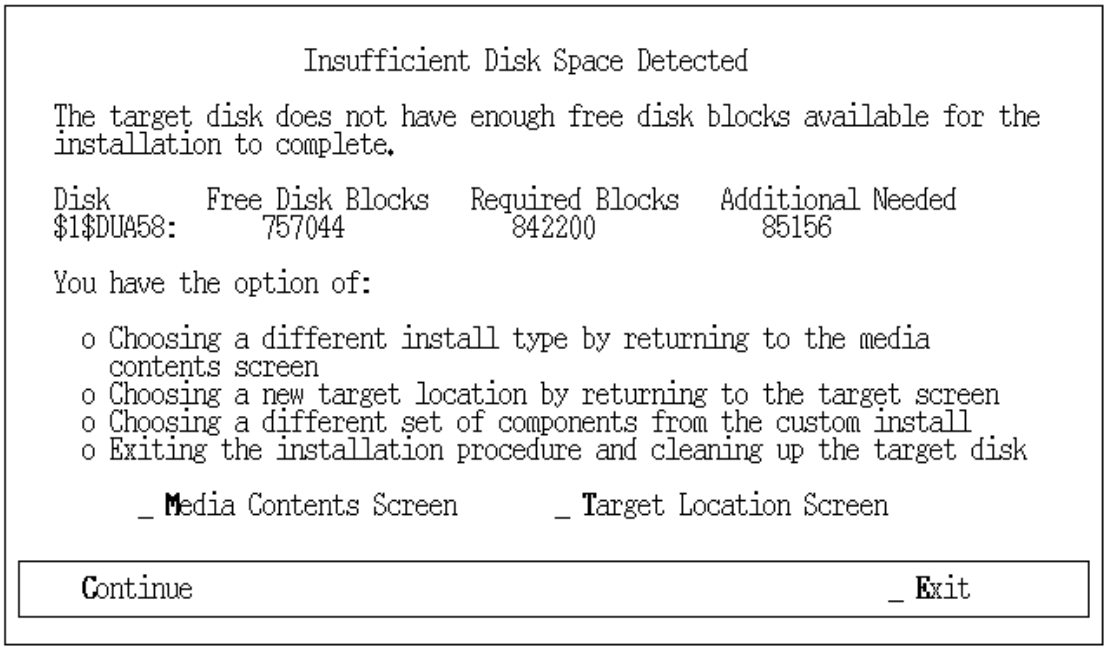
Before beginning the actual installation, the above window is displayed and you are given the opportunity to abort the installation without having any files installed on your system. Should any errors occur during the installation, you have the option of creating a file that contains information that may be electronically mailed to SAS Institute Technical Support to help determine the cause of failure. You can do this by enabling the `Install Error Mail-back Routine`.

Suggested action: Select `Enable Install Error Mail-back Routine` and then select `Continue` to install the SAS System.

Other Installation Windows

The windows contained in this section will appear at some point during the installation if performing an action other than the suggested action or if an error was detected by the install. This section describes why the window would be displayed and how to proceed with the install when encountering one of these windows.

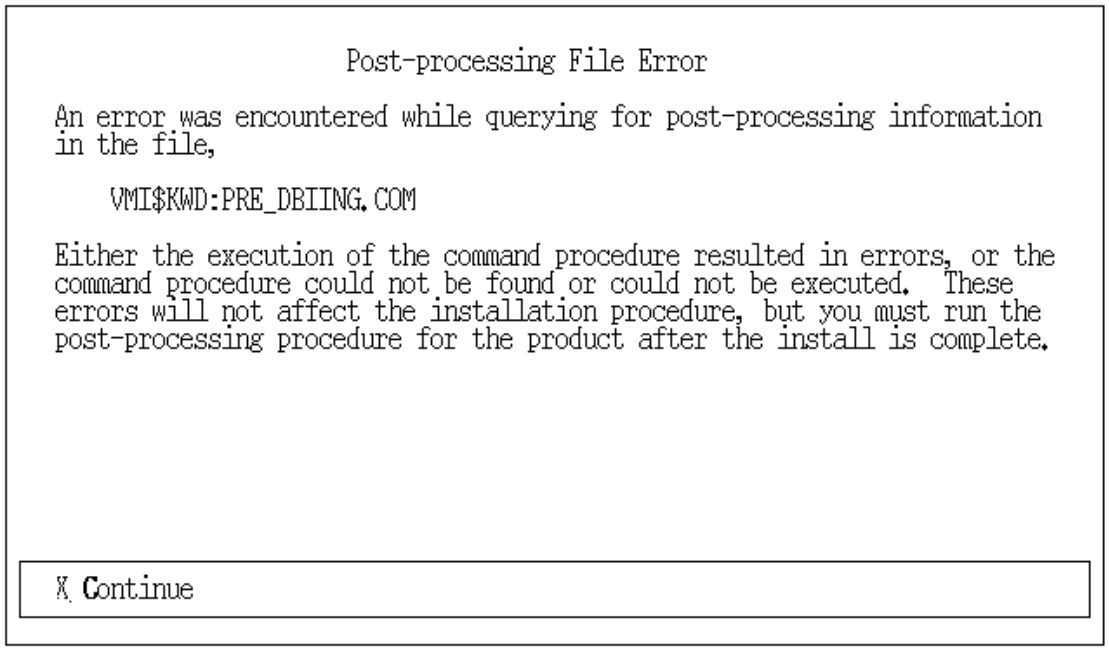
Insufficient Disk Space



After specifying the target location and selecting the components to install, if the target location has an insufficient amount of disk space, the above window is displayed. You have the option of returning to the `Media Contents Screen` (Step 2), or returning to the `Target Location Screen` (Step 3). If you return to the `Media Contents Screen`, you can choose to perform a *Custom* install and select components that do not exceed the amount of free disk space. If you return to the `Target Location Screen`, you can select a different disk on which to install.

Suggested action: If you know another location that has adequate disk space for the install, select `Target Location Screen` in the main body and then select `Continue`. If there is no other location, then either select `Media Contents Screen` in the main body and then select `Continue` to select the *Custom* install type and choose a smaller set of components, or select `Exit` and delete files from the disk.

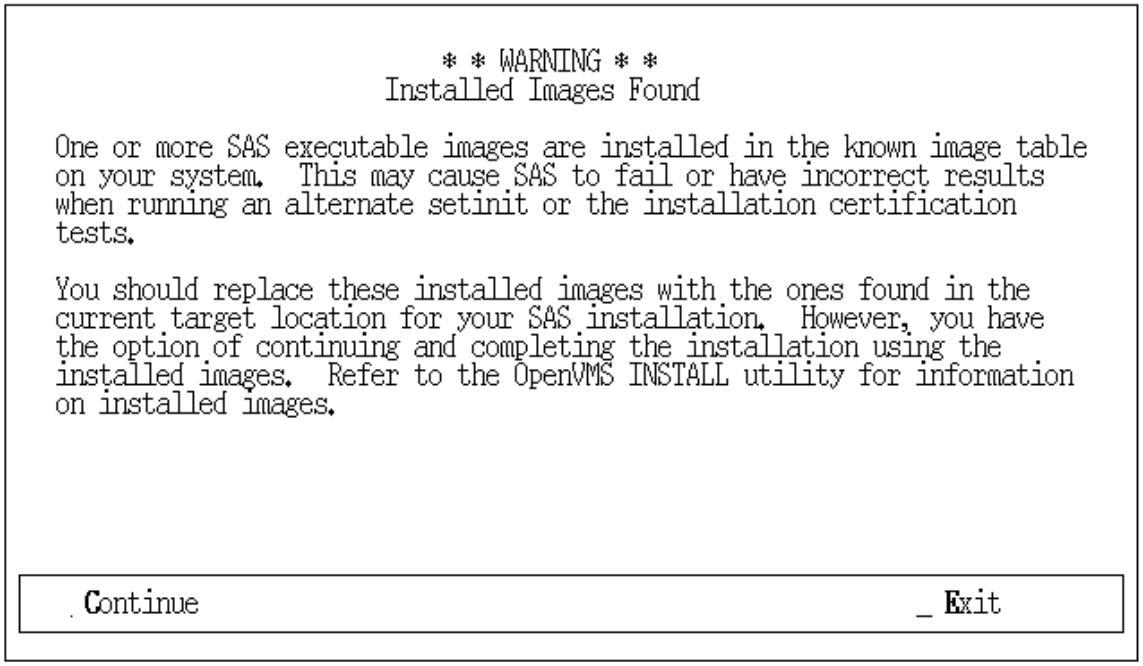
Post-Processing Error



The install alerts you by displaying the above window if an error occurs when prompting you for information about a post-processing procedure. When this occurs, your responses cannot be passed to the post-processing procedure at the end of the install and post-processing does not take place for that product. Refer to `SAS$ROOT:[INSTALL]INSTALL_SAS612.LOG` and `SAS$ROOT:[INSTALL]POST_<product>.LOG` for more information.

Suggested action: Record the product for which the post-processing error occurred, then continue with the install. Once the install has completed, determine the cause of the error and rerun the post-processing for that product.

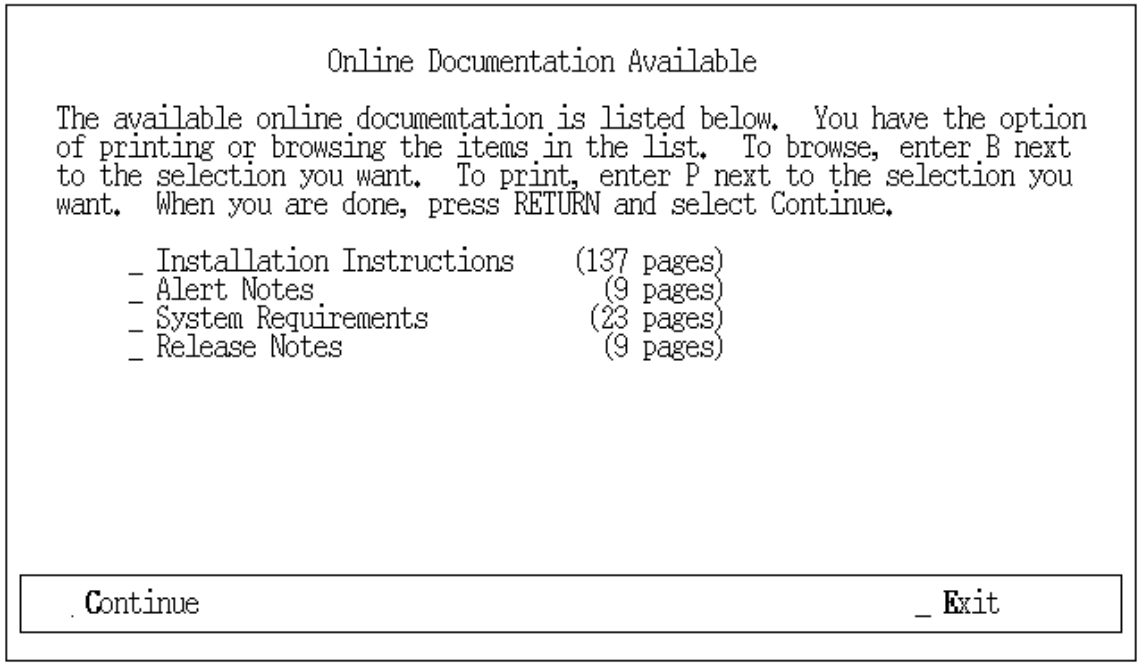
Installed Images



When applying a SETINIT or running an ICP test, the SAS System must be executed. If there are previously installed SAS images on your system, errors may occur while trying to do either task. The install will alert you by displaying the above window.

Suggested action: To ensure that the proper images are executed, Select `Exit` then deinstall the SAS images. After deinstalling these SAS images, rerun the install from the beginning. Note that no files have been installed on your system at this point.

Online Documentation

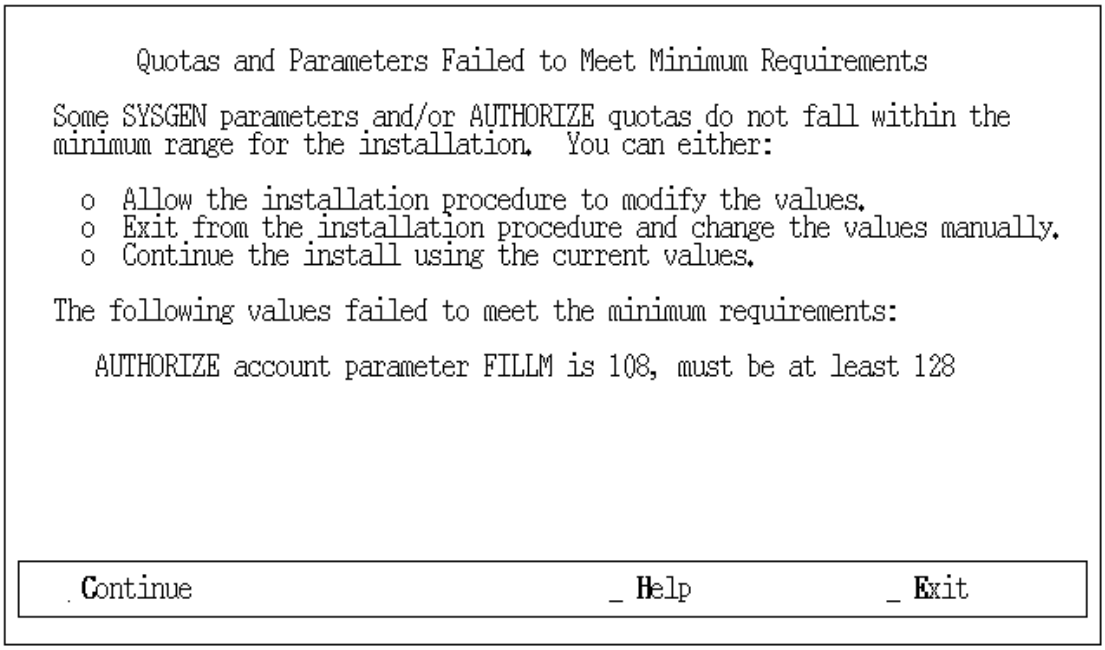


From the welcome window, you have the option of viewing the online documentation. When choosing that option, the above window is displayed. A list of the available online documentation is given along with the approximate number of printed pages each document contains.

You have the option of either browsing or printing a document. To browse, type `B` next to the desired item. When you browse a document, the install checks to see if you have EDIT/TPU installed on your system. If the editor exists, the document is opened in read-only mode using the editor. Note that you must enter `CTRL-Z` to exit EDIT/TPU and return to the above window. Otherwise, it browses the document using the TYPE/PAGE DCL command.

To print a document, type `P` next to the desired item. When you print a document, the install checks for the definition of `SYS$PRINT`. If the logical is defined, then the `PRINT DCL` command is executed with `SYS$PRINT` as the destination. Otherwise, a message is displayed indicating `SYS$PRINT` is not defined and nothing is printed.

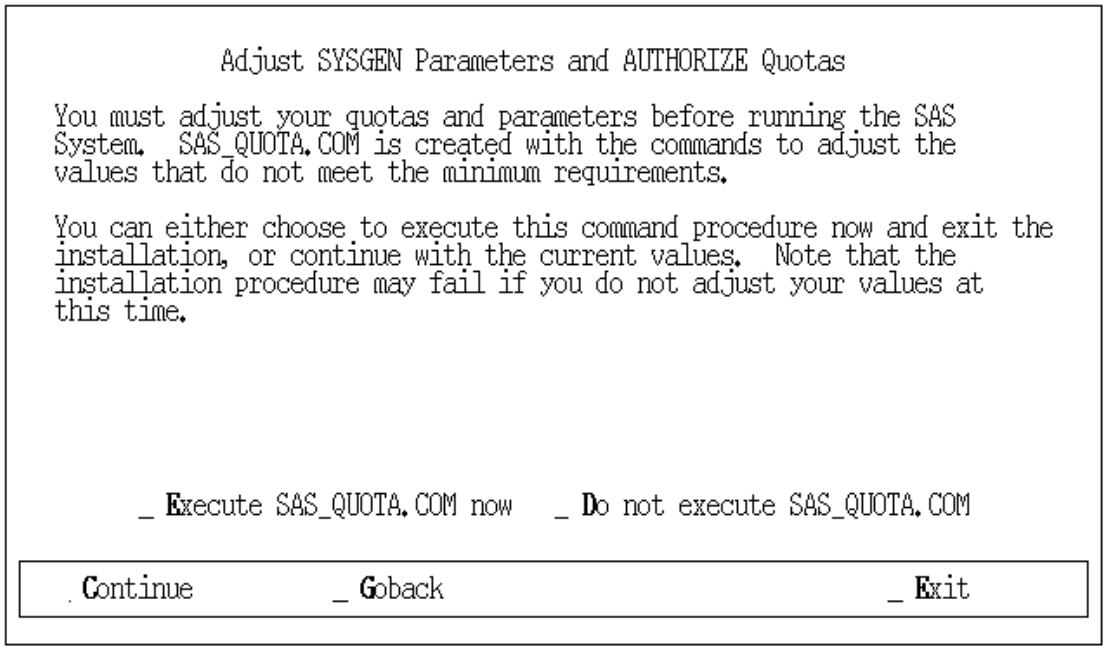
SYSGEN Parameter and AUTHORIZE Quotas



If your SYSGEN parameters or AUTHORIZE quotas do not meet the minimum system requirements needed for the installation, the install will alert you by displaying the above window. Some of the ICP tests may fail if you do not meet the minimum system requirements.

Suggested action: Select Continue if you would like the installation to adjust your parameters to meet the minimum requirements of the install or if you would like to continue the install without modifying your system. If you would like to adjust the parameters manually, select Exit.

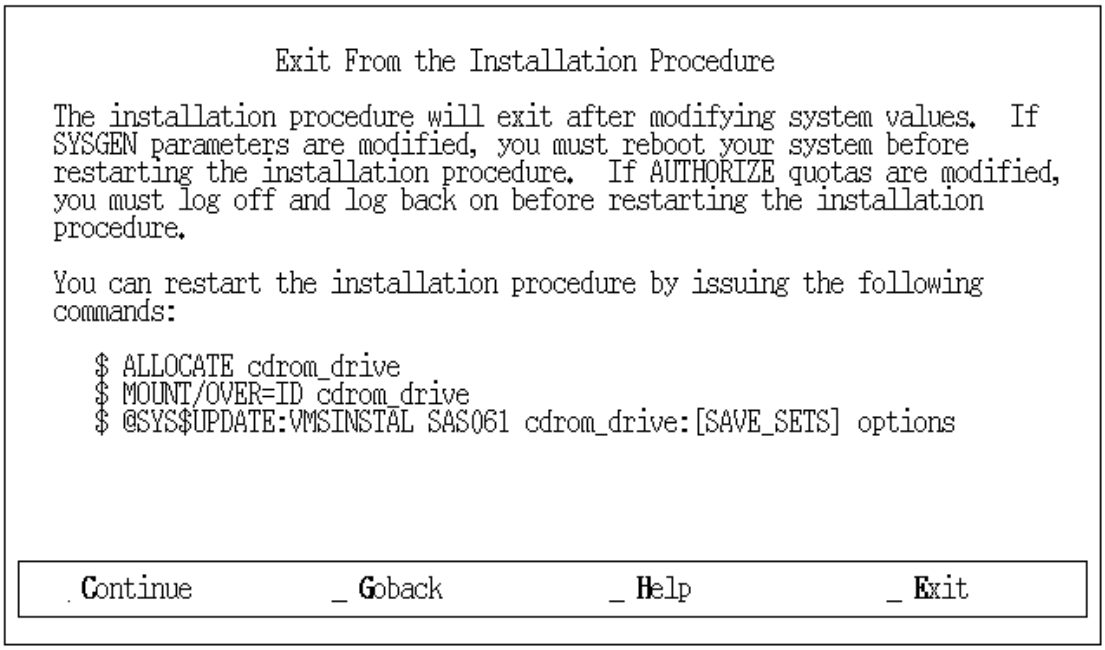
Note: If the install modifies SYSGEN parameters or AUTHORIZE quotas, these values are NOT changed back to their original values upon exiting the install.



The install creates a command file that will update those parameters that do not meet the minimum requirements. This command file can be executed by either the installation or you.

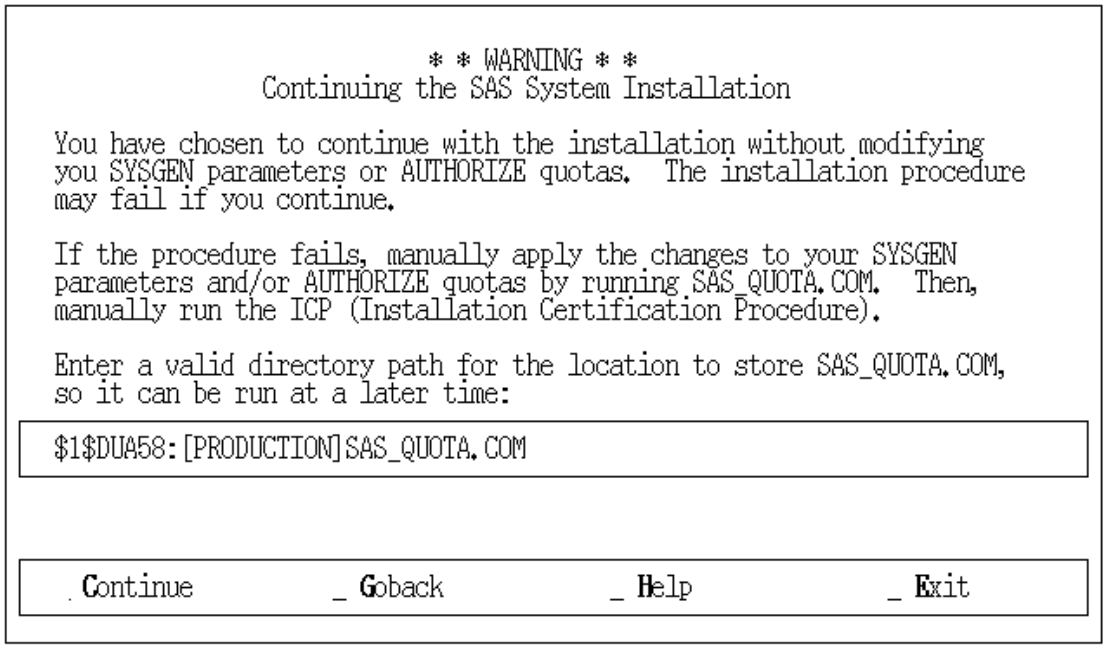
Suggested action: If you would like the install to run the command file, select `Execute SAS_QUOTA.COM now` and then select `Continue`. If you would like to manually run the command file, select `Do not execute SAS_QUOTA.COM` and then select `Exit`.

Note: If you choose not to execute the command file and select `Continue`, you will continue the installation with insufficient parameters. Applying a SETINIT and/or running ICP tests may fail.



If you chose to have the installation procedure adjust the parameters, the above window will be displayed. After adjusting the parameters, the installation will exit and you must restart the installation.

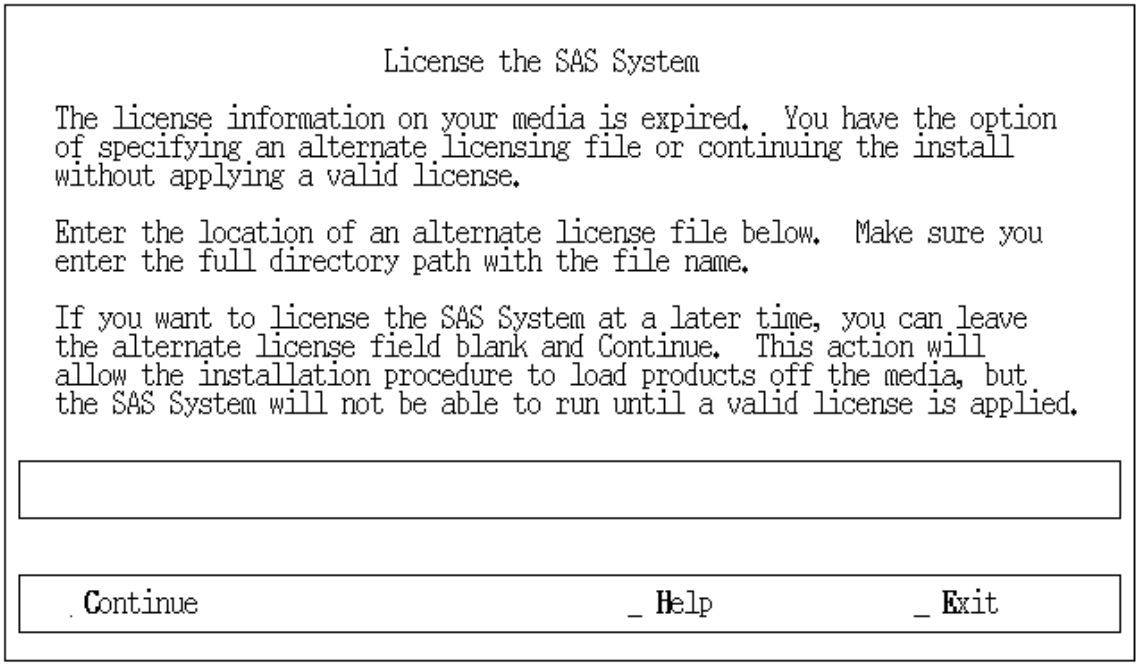
Suggested action: If you would like to have the install adjust the parameters, select `Continue` and then restart the installation. If you decide not to have the install adjust the system parameters, select `Goback` to return to the `Adjust SYSGEN Parameters and AUTHORIZE Quotas` window or select `Exit`.



If you choose not to adjust your system parameters, the install will alert you by displaying the above warning window. The installation procedure will create a command procedure that will adjust your `SYSGEN` parameters and/or `AUTHORIZE` quotas that failed to meet the minimum requirements. You are asked to supply a location to save this file so you can run it at a later time. If you do not want to save the file, blank out the prompt and continue with the install. By choosing to continue, you may encounter errors during the install.

Suggested action: Select `Goback` to return to the `Adjust SYSGEN Parameters and AUTHORIZE Quotas` window or select `Exit` and adjust the parameters and/or quotas manually and then restart the install.

Expired Setinit



The SETINIT contained on your media may be expired. If so, you are given the option of specifying a location of a valid (non-expired) SETINIT to be applied as shown in the above window.

Suggested action: If you have a valid SETINIT, enter the file location and select `Continue`. If you do not, select `Continue` and contact your SAS Installation Representative to obtain a new one and apply the SETINIT after the install has completed. Without a valid SETINIT, the ICP tests will fail to run. See the "Non-Standard Licensing and Running ICP Tests" section in Chapter 3, "Setting Up and Maintaining the SAS System" for more information.

Chapter 3, Setting Up and Maintaining the SAS® System

After the installation procedure has successfully completed, there are several things that need to be done to make access to the SAS System easier for users. There are also several `SYSGEN` parameters and `AUTHORIZE` quotas that can be adjusted for better SAS System performance. This section contains information on the following:

- The SAS System Startup Command File
- The `SAS$LIBRARY` Search List Logical
- The `SAS$IMAGE` Logical Name
- The `SAS$EXTENSION` Logical Name
- Parameters for Installing the SAS Image as a Known Image
- SAS Invocation Via Command Language Definition File
- Deleting a SAS Command Definition from a Command Table
- Defining a Release of the SAS System as a Secondary Version
- Non-Standard Licensing and Running ICP Tests
- The SAS Notes and Utilities
- The Support Application
- Modifying the Support File at Your Site
- Privileged Image Unloading
- OpenVMS Internal Data Structure Dependency
- CLEANUP Command
- Requirements for Running the SAS System under the Display Manager

The SAS System Startup Command File

The installation procedure places a copy of the command file, SAS612.COM, in SAS$ROOT:[TOOLS]. This command file contains the logical name assignments necessary to run Release 6.12 of the SAS System.

```
$!------------------------------------------------------------------------
$! Copyright (c), 1985-1996, SAS Institute Inc., Cary, N.C. 27513, USA
$! All rights reserved.
$!------------------------------------------------------------------------
$! Name:    SAS$ROOT:[TOOLS]SAS612.COM
$! Purpose:  This command file defines the necessary logical name
$!           assignments required to run Release 6.12 of the SAS System.
$!           Logical names are defined in the SYSTEM logical name table.
$!
$!           This command file should be invoked by the system startup
$!           command file if Release 6.12 is the default version on your
$!           system.
$!------------------------------------------------------------------------
$! Concealed logical names:
$ DEFINE/NOLOG/SYSTEM/TRANSLATION=(CONCEALED)  SAS$ROOT  -
      $1$DUA1:[SAS612.]
$
$ DEFINE/NOLOG/SYSTEM/TRANSLATION=(CONCEALED)  SAS$EXTENSION -
      $1$DUA1:[SAS612.USER.]
$ DEFINE/NOLOG/SYSTEM/TRANSLATION=(CONCEALED)  SAS$INSTALL -
      $1$DUA1:[SAS612.INSTALL.]
$ DEFINE/NOLOG/SYSTEM/TRANSLATION=(CONCEALED)  SAS$SAMPLES -
      $1$DUA1:[SAS612.SAMPLES.]
$
$! Logicals that point to executable images:
$ DEFINE/NOLOG/SYSTEM  SAS$LIBRARY
SYS$DISK:[],-
SAS$ROOT:[PROCS],-
SAS$ROOT:[IMAGE],-
SAS$EXTENSION:[LOAD]
$
$ DEFINE/NOLOG/SYSTEM  SAS$IMAGE SAS$ROOT:[IMAGE]SAS612.EXE
$ DEFINE/NOLOG/SYSTEM  SASSHR    SAS$LIBRARY:SASSHR.EXE
$ DEFINE/NOLOG/SYSTEM  SASMSG    SAS$LIBRARY:SASMSG.EXE
$ DEFINE/NOLOG/SYSTEM  SASING    SAS$LIBRARY:SASING.EXE
$ DEFINE/NOLOG/SYSTEM  SASORA    SAS$LIBRARY:SASORA_V7.EXE
$ DEFINE/NOLOG/SYSTEM  SASRDB    SAS$LIBRARY:SASRDB.EXE
$ DEFINE/NOLOG/SYSTEM  SASSYB    SAS$LIBRARY:SASSYB.EXE
$ DEFINE/NOLOG/SYSTEM  SASWXFR   SAS$LIBRARY:SASWXFR.EXE
$ DEFINE/NOLOG/SYSTEM/EXEC  SAS_USS_PRIV
      SAS$ROOT:[IMAGE]SAS_USS_PRIV.EXE
$
$! Logicals that point to other file types:
$ DEFINE/NOLOG/SYSTEM  SASAUTOS  SAS$ROOT:[HELP.AUTO]
$ DEFINE/NOLOG/SYSTEM  SAS$HELP  SAS$ROOT:[HELP]
$ DEFINE/NOLOG/SYSTEM  SASAPPL   SAS$HELP
$ DEFINE/NOLOG/SYSTEM  SAS$CNTMISC     SAS$ROOT:[TOOLS]
$ DEFINE/NOLOG/SYSTEM  SAS$DOC   SAS$ROOT:[DOC]
$ DEFINE/NOLOG/SYSTEM  SAS$FNT   SAS$HELP
$ DEFINE/NOLOG/SYSTEM  SAS$LSEENV      SAS$EXTENSION:[LSEDIT]SAS.ENV
$ DEFINE/NOLOG/SYSTEM  SAS$MAPS  SAS$ROOT:[MAPS]
$ DEFINE/NOLOG/SYSTEM  SAS$MSG   SAS$ROOT:[MESSAGE]
$ DEFINE/NOLOG/SYSTEM  SAS$NEWS  SAS$HELP:NEWS.DOC
$ DEFINE/NOLOG/SYSTEM  SAS$SECTION     SAS$TPUDIR:SASIO.TPU$SECTION
$ DEFINE/NOLOG/SYSTEM  SAS$SITE  1
$ DEFINE/NOLOG/SYSTEM  SAS$SITEINFO    SAS$ROOT:[TOOLS]SITEINFO.TXT
$ DEFINE/NOLOG/SYSTEM  SAS$TPUDIR      SAS$ROOT:[TOOLS]
$ DEFINE/NOLOG/SYSTEM  SAS$USER  SYS$LOGIN
$ DEFINE/NOLOG/SYSTEM  SAS$WORKROOT    SYS$DISK:[]
```

```
$ DEFINE/NOLOG/SYSTEM  SAS$XDEFAULTS   SYS$LOGIN:SAS$XDEFAULTS.DAT
$
$! Logicals for terminal output:
$ DEFINE/NOLOG/SYSTEM  SAS$TERMINAL    SYS$OUTPUT
$ DEFINE/NOLOG/SYSTEM  SAS$GDEVICE     SAS$TERMINAL
$
$! Logicals required by SAS sample programs:
$ DEFINE/NOLOG/SYSTEM IMAGFIL    SAS$SAMPLES:[SASDATA]
$ DEFINE/NOLOG/SYSTEM SAMPSIO    SAS$SAMPLES:[SASDATA]
$ DEFINE/NOLOG/SYSTEM MAPS       SAS$MAPS
$
$!
$! These logicals are intentionally commented out and are only to be used
$! if recommended by SAS Technical Support:
$!
$! Non-default allocation/extent quantities:
$!
$! DEFINE/NOLOG/SYSTEM SAS$ALQ   384
$! DEFINE/NOLOG/SYSTEM SAS$DEQ   129
$!
$! Non-default NLS CCL table assigns: INT = 0, USA = 1:
$!
$! DEFINE/NOLOG/SYSTEM SAS$TRANTAB     0
$! DEFINE/NOLOG/SYSTEM SAS$TRANTAB     1
$!
$
$ EXIT
```

Note: The installed version of the SAS System startup command file includes comments describing the purpose of each logical name definition.

The SAS$LIBRARY Search List Logical

SAS$LIBRARY is a site-specific search list logical that determines search criteria for Release 6.12. The SAS System searches for images to load for execution during a SAS session according to the SAS$LIBRARY search list, whether they are user-created images or images supplied by SAS Institute. SAS$LIBRARY is defined by the following search path:

```
$ DEFINE SAS$LIBRARY      SYS$DISK:[],-
                          SAS$ROOT:[PROCS],-
                          SAS$ROOT:[IMAGE],-
                          SAS$EXTENSION:[LOAD]
```

The SAS System searches initially for the executable image (for example, a function or procedure) in your default directory; then, in the directory referenced by SAS$ROOT:[PROCS] that contains SAS procedures, formats, informats, and functions; then, in SAS$ROOT:[IMAGE] that contains the Base SAS image; and then in SAS$EXTENSION:[LOAD] for user-written images or samples of user images supplied by SAS Institute or customized at your site.

The search string can be modified. For example, if you stored formats, procedures, informats, and site-specific functions in a local directory, you might tailor your SAS$LIBRARY:

```
$ DEFINE SAS$LIBRARY      SYS$DISK:[],-
                          SAS$ROOT:[PROCS],-
                          SAS$ROOT:[IMAGE],-
                          SAS$EXTENSION:[LOAD],-
                          DISK1:[LOCAL_SAS_IMAGES]
```

The SAS$IMAGE Logical Name

SAS$IMAGE is a logical name that is used to activate the main SAS System image. It is defined, by default, as SAS$ROOT:[IMAGE]SAS612.EXE.

The SAS$EXTENSION Logical Name

SAS$EXTENSION is the logical name for SASdisk:[SASroot.USER.], where SASdisk:[SASroot] is the physical location of SAS on your system. The SASdisk:[SASroot.USER.] directory is the root directory for subdirectories containing extensions to the SAS language. These subdirectories contain the source code and samples for formats, functions, informats, drivers, and procedures supplied as examples by SAS Institute. Executable example files are in the SAS$EXTENSION:[LOAD] directory, which is part of the SAS$LIBRARY search path.

The user may search the SAS$EXTENSION subdirectories and read the source code comments for examples of extensions to the language. These examples may serve the user as a model for user-written applications or as extensions to the SAS language.

Parameters for Installing the SAS Image as a Known Image

You have the option of installing the Base SAS image, SAS$ROOT:[IMAGE]SAS612.EXE, as a known image. Doing so may improve performance, but requires that you dedicate more system resources to the SAS System.

Note: If you plan on running multiple versions of the SAS System concurrently, please use caution with installing images in the known image table. The images SABXSPH.EXE and SASDS.EXE are common images between releases of the SAS System. If you have installed these images for one release of the SAS System, you cannot install these images for another release of the SAS System. This is a limitation of the OpenVMS INSTALL utility. SAS Note V6-SYS.SYS-4365 documents this problem.

If you do choose to install the Base SAS image as a known image, the following resources are required:

```
GBLPAGES     +816
GBLSECTIONS    +1
```

To check the parameters and their current usage, use the following commands:

```
$ INSTALL:== $SYS$SYSTEM:INSTALL/COMMAND
$ INSTALL LIST/GLOBAL/SUMMARY

Summary of Local Memory Global Sections

174 Global Sections Used,     21706/14294 Global Pages Used/Unused
```

Run SYSGEN to find out the maximum available global sections:

```
$ SET DEFAULT SYS$SYSTEM
$ RUN SYSGEN

SYSGEN> SHOW GBLSECTIONS

Parameter-name  Current   Default  Minimum  Maximum  Units Dynamic

-----------------------------------------------------------------

GBLSECTIONS     190      128     20     4095      Sections

SYSGEN> EXIT
```

In the example, the number of available GBLSECTIONS is 190 - 174 = 16. The number of free GBLPAGES is 14294. Both values exceed the minimum required, so you could install the SAS image as a known image without modifying the system parameters.

If the values do not meet the minimum requirement, increase the parameter values by adding the following lines to the SYS$SYSTEM:MODPARAMS.DAT file (see the section "Minimum and Recommended SYSGEN Parameters" in Chapter 4, "Optimizing System Performance"):

```
ADD_GBLSECTIONS=1
ADD_GBLPAGES=816
```

To ensure that the Base SAS image is installed as a known image and is available to users each time the system is booted, you should place these commands in the system startup file:

```
$ @SASdisk:[SASroot.TOOLS]SAS612.COM
$ INSTALL :== $SYS$SYSTEM:INSTALL/COMMAND
$ INSTALL ADD SAS$ROOT:[IMAGE]SAS612.EXE/OPEN/SHARED
```

where SASdisk is the disk containing the SAS System and SASroot is the root directory of the SAS System.

The same procedure should be followed for these images:

IMAGE	GLOBAL SECTIONS	GLOBAL PAGES
SAS$LIBRARY:SABXSPH.EXE	1	3280
SAS$LIBRARY:SASDS.EXE	1	48
SAS$LIBRARY:SABMOTIF.EXE	1	2384
SAS$LIBRARY:SASMSG.EXE	1	80

Refer to the section "Privileged Image Unloading" for information on installing the system service SAS_USS_PRIV.EXE, to enable privileged unloading.

SAS Invocation Via Command Language Definition File

In Release 6.12, the SAS System is invoked by a CLD command. The SAS command is defined by the command language definition file SAS$LIBRARY:SAS612.CLD. This file defines the verb SAS to invoke the image, SAS$IMAGE, that is defined in SAS$ROOT:[TOOLS]SAS612.COM.

The SAS command line options are defined as qualifiers in the CLD file. Refer to the *OpenVMS Command Definition, Librarian, and Message Utilities Manual* for more information regarding CLD files. The system DCL command table contains all verb definitions known to the system. It must be modified to make the verb, SAS, available to users. Due to the importance of the system DCL tables to all users, it is wise to verify its location before issuing the commands specified below. There is only one DCLTABLES.EXE that is accessed when users log on; if there are multiple copies of the file in different directories on your system, you must check to see which one is actually installed on your system as a known image. Failure to update and install the correct image can result in users being locked out of your system until you have fixed the problem.

The DCL tables normally reside in SYS$LIBRARY. However, because SYS$LIBRARY is a search string logical, you must use the INSTALL utility to determine where the active DCL tables reside. Note that the image is installed with the parameters OPEN, HDR, SHAR, and LNKBL. These options must be connected with the image to make it available and usable to all users on your system. For example, execute the following commands:

```
$ INSTALL :== $SYS$SYSTEM:INSTALL/COMMAND
$ INSTALL LIST SYS$SPECIFIC:[SYSLIB]DCLTABLES
$ INSTALL LIST SYS$COMMON:[SYSLIB]DCLTABLES
```

The first command above simply provides a convenient abbreviation for accessing the OpenVMS INSTALL utility. Only one of the last two commands generates the desired information. The path displayed for the file is the proper path to that file.

To make the SAS command known to all users, you must issue the following commands if your active DCL tables reference the SYS$COMMON directory:

```
$ SET COMMAND/TABLES=SYS$COMMON:[SYSLIB]DCLTABLES.EXE -
  /OUTPUT=SYS$COMMON:[SYSLIB]DCLTABLES.EXE -
  SAS$ROOT:[IMAGE]SAS612.CLD
$ INSTALL :== $SYS$SYSTEM:INSTALL/COMMAND
$ INSTALL REPLACE SYS$COMMON:[SYSLIB]DCLTABLES.EXE
```

If the SAS System is licensed for a single node and/or you are maintaining node-specific DCL tables, issue the following command on the licensed node:

```
$ SET COMMAND/TABLES=SYS$SPECIFIC:[SYSLIB]DCLTABLES.EXE -
  /OUTPUT=SYS$SPECIFIC:[SYSLIB]DCLTABLES.EXE -
  SAS$ROOT:[IMAGE]SAS612.CLD
$ INSTALL :== $SYS$SYSTEM:INSTALL/COMMAND
$ INSTALL REPLACE SYS$SPECIFIC:[SYSLIB]DCLTABLES.EXE
```

Users then have access to Release 6.12 of the SAS System by executing the command SAS at the DCL prompt ($).

Because OpenVMS requires that command qualifiers be unique through the first four characters, several options use an alias on the command line. If the option is not a command line or configuration-only option, the complete name, as well as its alias, is accepted on the OPTIONS statement when the SAS System is invoked. Refer to *SAS Companion for the OpenVMS Environment, Version 6, Second Edition*; and SAS Technical Report (#55672): *Changes and Enhancements to the SAS System for the OpenVMS Alpha Environment, Release 6.12* for a complete list of options and their appropriate aliases.

Deleting a SAS Command Definition from a Command Table

If you want to remove an old version of the SAS command from the DCL tables, delete the SAS command from the DCL tables, then re-install the DCLTABLES image.

Execute the following commands:

- if the SAS command has been made available to all users and your active DCL tables reference the SYS$COMMON directory.

```
$  SET COMMAND/DELETE=(SAS_COMMAND)-
             /TABLE=SYS$COMMON:[SYSLIB]DCLTABLES.EXE-
             /OUTPUT=SYS$COMMON:[SYSLIB]DCLTABLES.EXE
$  INSTALL :== $SYS$SYSTEM:INSTALL/COMMAND
$  INSTALL REPLACE SYS$COMMON:[SYSLIB]DCLTABLES.EXE
```

  where SAS_COMMAND refers to the SAS command used at your site (for example, SAS or SAS612).

- if the SAS System is licensed for a single node and/or you are maintaining node-specific DCL tables.

```
$  SET COMMAND/DELETE=(SAS_COMMAND)-
             /TABLE=SYS$SPECIFIC:[SYSLIB]DCLTABLES.EXE-
             /OUTPUT=SYS$SPECIFIC:[SYSLIB]DCLTABLES.EXE
$  INSTALL :== $SYS$SYSTEM:INSTALL/COMMAND
$  INSTALL REPLACE SYS$SPECIFIC:[SYSLIB]DCLTABLES.EXE
```

  where SAS_COMMAND refers to the SAS command used at your site (e.g., SAS or SAS612).

Defining a Release of the SAS System as a Secondary Version

It is possible to run more than one version of the SAS System at the same time. A site may choose to do this when running the current release as production and a new release in test mode during transition from one release to another. In order to run two releases of the SAS System concurrently, there are a few steps to follow so that both releases can co-exist on your system. This section describes one way of setting up a release of the SAS System as a secondary or test release without disrupting users of the current production release.

One of the main advantages of the technique described here is that you will be able to run either release of the SAS System from the same session without logging off to reset your environment.

All releases of the SAS System require that a set of logical names and an OpenVMS command verb be defined. In order to avoid logical name and command verb collisions, care must be taken. Assume that the following conditions at your site are true:

- the command verb `SAS` is defined for the current production release
- the current production release logical names are defined as `SYSTEM` mode logical names. When you issue the command `SHOW LOGICAL SAS*`, the list of logical names will include the reference `"(LNM$SYSTEM_TABLE)"`.

For the new release, you define the logical names so that they do not conflict with the production release logical names and define a unique command verb to invoke the new release.

To achieve these results, follow these steps:

- Set up a command file that defines the new release logical names as `USER_MODE` logical names. You may modify the existing command file `SAS$ROOT:[TOOLS]SAS`*`nnn`*`.COM`, where *nnn* refers to the SAS System release level.
- Because `USER_MODE` logical names only exist for the duration of the command file execution, you must invoke the new release of the SAS System in the same command file.
- Define a new command verb for the new release.
- Define a symbol that will be used to invoke the new release.

The following is an abbreviated version of an install-generated command file that has been modified for use with the new release. Note that all references to `DEFINE/NOLOG/SYSTEM` in the install version have been changed to `DEFINE/NOLOG/USER`, and two lines have been added as indicated by *.

```
  $ DEFINE/NOLOG/USER  SASTAPE                NL:
  $ DEFINE/NOLOG/USER/TRANSLATION=(CONCEALED) SAS$ROOT -
         USER$DISK:[SASnnn.]
                 .
                 .
                 .
  $ DEFINE/NOLOG/USER MAPS                    SAS$MAPS
  $! THE NEXT TWO LINES ARE THE NEW ADDITIONS:
* $ DEASSIGN SYS$INPUT
* $ TSTSAS 'P2 'P3 'P4 'P5
  $
  $ EXIT
```

The command `DEASSIGN SYS$INPUT` is required because it returns control to the user from this command file. If it is not issued, the SAS System expects commands from the command file, rather than the user.

Notice that you must invoke the new release with a command verb that differs from the one previously defined for the production release. The actual command verb used is not pertinent because your users will be accessing this command file with a symbol that is different from BOTH command verbs. Because there are many command line options available at SAS invocation, it is recommended that users be provided with multiple parameter placeholders, as in the example, `'P2 'P3 'P4 'P5`. Four parameters should cover most needs, but you can add up to eight parameters.

Next you edit the file `SAS$ROOT:[IMAGE]SASnnn.CLD` to change the command verb. Look for a line that begins with `DEFINE VERB` and change it to `DEFINE VERB TSTSAS`.

Note: An important consideration when changing a command verb is that some versions of OpenVMS require that the first four characters of the verb be uniquely defined. Using two command verbs such as `SAS609` and `SAS612` on your system does not meet these criterions.

Next, you can define the new command verb permanently to your system by following the instructions in the section entitled "SAS Invocation Via Command Language Definition File" or you can define the command verb at login time. The advantage of the first option is that once it is done, you do not have to worry about it. The disadvantage is that it is harder to remove an entry in the system `DCLTABLES` once it is in place. In addition, because the second choice only effects a process memory-resident version of the `DCLTABLES`, these are reconstructed whenever a user logs in, which results in a longer wait at login time.

To define the new command verb temporarily in the process memory-resident `DCLTABLES`, the following command should be added to the `SYS$MANAGER:SYSLOGIN.COM` file for all users or placed in individual user `LOGIN.COM` files. In this example, assume the release of the SAS System to be used in a "test" mode is installed on a disk called `USER$DISK1` in directory `[SOFTWARE]`. You should make the appropriate changes for your site.

```
$ SET COMMAND USER$DISK1:[SOFTWARE.SASnnn.IMAGE]SASnnn.CLD
```

The next steps are to define a symbol that invokes the command file and run the test version of the SAS System. The following example can be defined in the system `SYLOGIN.COM` or in individual user `LOGIN.COM` files. Once again, assume the release of the SAS System to be used in a test mode was installed in `USER$DISK1:[SOFTWARE.SASnnn]`.

```
$ SASnnn :== "@USER$DISK1:[SOFTWARE.SASnnn.TOOLS]SASnnn.COM FILLER"
```

The `@` is a command that takes one qualifier, `/OUTPUT`, and may ignore whatever the user enters as his/her first parameter for the SAS System. Using `FILLER` and beginning with parameter `P2` allows user parameters to be passed to the command file.

You now have a command file that is invoked by a symbol, `SASnnn`, which defines the new release logical names temporarily and invokes the new release of the SAS System using the command verb `TSTSAS`. You may name the symbol and the command verb whatever you like, but they cannot be the same name for both purposes and they cannot be the same as the one used for the production release.

Non-Standard Licensing and Running ICP Tests

This section describes how to certify your SAS System if you do not want to use the information in the SETINIT file supplied on the installation tape. Do **not** use the SETINIT on the tape if:

- ❑ you are a VMScluster or Local Area VMScluster and your machine was added to the contract after the original installation tape was created. The SAS System distribution tape from which you are installing was originally generated for a cluster with a different configuration than currently exists.
- ❑ your SAS license has been renewed. You must apply the new license data to keep your SAS System running.
- ❑ the license information that was supplied on your SAS System distribution tape is incorrect. Call your SAS Contract Administrator to get the correct SETINIT information.

Note: Any change requests for your license parameters (other than those required because of a clerical error) must be submitted in writing on your company's official stationery to your Contract Administrator at SAS Institute. These requests include changing the serial number or CPU model specification when you upgrade your hardware.

Before You Apply the SETINIT

Do the following before attempting to apply a new SETINIT to your system:

- ❑ Make sure that you have `WRITE` access to `SAS$ROOT:[HELP]CORE.SASEB$CATALOG` and `SAS$ROOT:[TOOLS]SETINIT.SAS`.
- ❑ Make a backup copy of `SAS$ROOT:[HELP]CORE.SASEB$CATALOG`.
- ❑ Copy `SAS$ROOT:[TOOLS]SETINIT.SAS` to `SAS$ROOT:[TOOLS]ORIGINAL_SETINIT.SAS`.
- ❑ Make the required changes to `SAS$ROOT:[TOOLS]SETINIT.SAS` by using a standard OpenVMS editing tool.
- ❑ Type the information that is included in your `SETINIT.SAS` file **exactly** as it appears.

Steps to Apply the SETINIT

To apply the SETINIT information, complete the following steps:

- Set the default to the SAS$ROOT:[TOOLS] directory. Make sure that the following steps have already been executed:

  1. Set up the SAS logical names by executing the SAS System startup file, SAS$ROOT:[TOOLS]SAS612.COM.

  2. Set up the SAS verb by doing either:

     - $ SET COMMAND SAS$ROOT:[IMAGE]SAS612.CLD

     - Following the instructions on updating the system DCL command tables as documented in the section "SAS Invocation Via Command Language Definition File".

- Specify the following from an OpenVMS system prompt:

```
$ SAS/SETINIT SETINIT.SAS
```

- Check the SETINIT.LOG for the following messages that indicate that your SETINIT was applied successfully:

```
NOTE:  Siteinfo data have been updated
NOTE:  No update of secondary setinit since either the password was
omitted      or zero, or the SEC statement was omitted.
```

Troubleshooting SETINIT Problems

The following is a list of common error messages and solutions that can occur when attempting to update your SETINIT information.

ERROR:

```
ERROR:  INCORRECT INFORMATION WAS ENTERED FOR THE PASSWORD
xxxxxxxxx.
```

SOLUTION:

Check for typographical errors. The SETINIT information in the SETINIT.SAS file must be entered exactly as it appears on the paper SETINIT. If any text of the SETINIT does not match, the above error occurs.

ERROR:

```
ERROR: THE SAS SYSTEM IS EXECUTING ON A PROCESSOR (CPU) WHOSE MODEL
       NAME, MODEL NUMBER, AND SERIAL NUMBER ARE NOT INCLUDED IN THE
       SETINIT DATA USED TO INITIALIZE THE SAS SYSTEM LIBRARY IN
       USE.  THIS IS PERMITTED IF THIS PROCESSOR IS A DESIGNATED
       BACKUP PROCESSOR FOR A LICENSED CPU.  FOR THIS SITE, THE SAS
       SYSTEM IS LICENSED FOR THE FOLLOWING CPU SERIAL NUMBERS:

             MODEL AXP xxxx-xxxx SERIAL NUMBER zzzzz
```

SOLUTION:

Verify that the SAS System is executing on the processor indicated in the `SETINIT.SAS` file. When the SETINIT is run on a processor that is not included in the SETINIT information, the above error is issued. If your model name, model number, or serial number has been updated, contact your SAS Customer Service Representative for an updated SETINIT.

ERROR:

```
ERROR: THE SITE VALIDATION DATA CANNOT BE UPDATED.  THIS IS MOST
       LIKELY DUE TO THE FACT THAT THE SASHELP CATALOG IS NOT
       AVAILABLE IN WRITE MODE, AND/OR THAT THE SETINIT OPTION HAS
       NOT BEEN SPECIFIED WHEN USING THE SAS COMMAND.

ERROR: DIFFICULTY READING THE SITE VALIDATION DATA.
```

SOLUTION:

Verify that you have `WRITE` access to the `CORE.SASEB$CATALOG` file in `SAS$ROOT:[HELP]`. Make sure that the option `/SETINIT` is included when running the SETINIT. If either of these conditions is not met, the above error is issued.

Steps to Run ICP Tests

After the SETINIT has been updated, you have the option of running the ICP tests. By running the ICP tests, you will ensure that the SAS System installed on your system is running correctly.

To run the ICP tests, you have two options:

- Rerun the installation procedure and choose `Custom Install` from the main body. `Select All ICP Tests` as documented in the `Custom ICP Test Program Selection` window.

- Run the ICP tests via `SAS$ROOT:[INSTALL]RUN_ICPTESTS.COM`. Before invoking the `RUN_ICPTESTS` command procedure, make sure that the following steps have already been executed.

1. Set up the SAS logical names by executing the SAS System startup file, SAS$ROOT:[TOOLS]SAS612.COM.

2. Set up the SAS verb using either of the following methods:

   - $ SET COMMAND SAS$ROOT:[IMAGE]SAS612.CLD
   - following the instructions on updating the system DCL command tables as documented in the section "SAS Invocation Via Command Language Definition File".
   - RUN_ICPTESTS.COM runs all ICP tests found in SAS$INSTALL:[ICP] and notifies you of the results.

If an ICP test fails, check the differences file.

SAS$INSTALL:[ICP]TEST<product>.L*_DIF for differences between the result file,
SAS$INSTALL:[ICP]TEST<product>.LOG **and/or**
SAS$INSTALL:[ICP]TEST<product>.LIS and the benchmark file,
SAS$INSTALL:[ICP]TEST<product>.BLG **and/or**
SAS$INSTALL:[ICP]TEST<product>.BLS.

If you need further assistance in ascertaining the problem, contact the SAS Institute Technical Support Division.

Once you have finished installing the SAS System at your site, applying the license, and running the ICP tests, proceed to Chapter 3, "Setting Up and Maintaining the SAS System" for information on how to configure the SAS System at your site.

The SAS Notes and Utilities

The SAS Notes files are located in SAS$ROOT:[USAGE] and include:

- a Release 6.12 format SAS Notes data set containing the list of the current SAS software problems for Release 6.12, usage hints, and information about compatibility issues.
- modified windows for browsing those data sets with PROC FSBROWSE.
- SAS programs for processing the SAS Notes data sets.
- the Support Application for displaying the SAS Notes and Sample Library programs.

Once these files are installed, you may want to run one or both of the SAS programs, SELECT.SAS and PRINT.SAS.

Using the SAS Programs

The SELECT.SAS file creates a subset of the SAS Notes based on your selection criteria specified in the PARMS.SAS file.

The PRINT.SAS file prints out the SAS Notes. Change parameters in the PARMS.SAS file to customize the output from the PRINT program.

The FIXREPT.SAS file produces a report showing which outstanding problems in the SAS Notes have been fixed by maintenance. Change parameters in the PARMS.SAS file when using this program.

The PARMS.SAS file contains the parameters used by the SELECT.SAS, PRINT.SAS, and FIXREPT.SAS programs. Each parameter is preceded by a comment block that explains the parameter and describes the valid values.

The READPRM.SAS file reads and verifies values in the PARMS.SAS file. Do not modify this program.

Accessing the SAS Notes

SAS Notes can be browsed online using either the SUPPORT facility or the FSBROWSE procedure in SAS/FSP software. For more information on the SUPPORT facility, a windowing application for accessing the SAS Notes and Sample Library, see the section "The Support Application". Those sites that license SAS/FSP software may want to access the SAS Notes interactively with PROC FSBROWSE. To do this, use the following SAS statements for the SAS Notes:

```
LIBNAME LIBRARY 'SAS$ROOT:[USAGE]';
LIBNAME USAGE 'SAS$ROOT:[USAGE]';
PROC FSBROWSE DATA=USAGE.USAGE SCREEN=USAGE.SCREEN
RUN;
```

Note: The libref LIBRARY on the first LIBNAME statement must be issued to access application-specific formats.

The default search arguments are MODULEN, PROD, and KEYS. If you want to search other fields, first issue a STRING command. For more information on the FSBROWSE procedure, refer to *SAS/FSP Software: Usage and Reference, Version 6, First Edition*.

The Support Application

The Support Application is a menu-based SAS/AF application for accessing the SAS Notes and the Sample Library, which run under Base SAS software. The primary menu of the Support Application contains the following options:

```
[_] SAS NOTES
[_] SAMPLE LIBRARY
[_] MAINTENANCE
[_] OPTIONS
```

The primary menu also gives you two choices for leaving the application, `EXIT` and `GOBACK`. Select `EXIT` to close the Support Application and exit the SAS System. Select `GOBACK` to close the Support Application, but not exit the SAS System.

An autoexec file, `SUPPORT.SAS`, with the SAS statements for invoking the Support Application, is included under `SAS$ROOT:[USAGE]`. A DCL system file, `SUPPORT.COM`, is also included. You may need to move this file to the appropriate location on your system for global access by users at your site. You may need to make some modifications to the file for the Support Application to execute properly, because a default name is supplied for the command used to invoke the SAS System and the default autoexec file name is `SUPPORT.SAS`. This file includes references to the SAS data library containing the SAS Notes data set and the catalog containing the entries for the Support Application, and to the library containing the formats for the SAS Notes data sets (these two libraries may be the same).

To start the Support Application from outside a SAS session, execute the `SUPPORT.COM` program file.

To start the Support Application from inside a SAS session, include the `SUPPORT.SAS` file into your `Display Manager Editor` window and submit.

Refer to *SAS Consultant's Guide*: *Supporting the SAS System, Second Edition* for more information on the SUPPORT application.

SAS Notes

To view or print the SAS Notes, select `SAS NOTES` from the primary menu of the Support Application. The SAS Notes menu is displayed with the following options:

`[_] FSBROWSE`

> allows you to browse the SAS Notes using `PROC FSBROWSE` if you have SAS/FSP software licensed. The default search arguments are `MODULEN`, `PROD`, and `KEYS`. If you want to search other fields, first issue a `STRING` command. For more information on the `FSBROWSE` procedure, refer to *SAS/FSP Software: Usage and Reference.*

[_] VIEW (AF)

allows you to view the SAS Notes using windows available in Base SAS software. If you choose this method, you are prompted to enter keywords by which to subset the SAS Notes. A list of SAS Notes titles is displayed based on the keywords entered. You can select a note from this list to display by clicking on the title.

To help locate relevant SAS Notes, you can enter up to two individual keywords, one PRODUCT name, and/or one MODULEN field key. You can also enter a ? in either of the last two fields to display appropriate selection lists. The three filtering pushbuttons can also be used to refine your search.

When you have defined your search criteria, press the RUN SEARCH pushbutton to display a scrollable list of SAS Notes titles. You can view a SAS Note by clicking on its title or MODULEN field.

[_] PRINT

allows you to print a subset of the SAS Notes. You can create the subset by MODULEN or PRODUCT. Select OUTPUT to view or clear the Output window or send its contents to a printer.

Sample Library

The Support Application also allows you to access the programs from the SAS Sample Library. The SAS Sample Library is a diverse collection of SAS programs that illustrate the specific applications of SAS software and demonstrate different approaches to programming problems. Also included in the Sample Library are many of the examples that appear in SAS documentation.

To access the SAS Sample Library from the Support Application, select SAMPLE LIBRARY from the primary menu, then select the SAS product in which you are interested to get the Sample Library main menu. From this menu, you can choose any of the following options:

[_] INDEX

creates an index of the sample programs. The index is saved in a catalog in your SASUSER library as an entry called INDEX with a type of OUTPUT. The INDEX.OUTPUT entry can be viewed or printed through the SAVED and OUTPUT options on the Sample Library main menu or outside the application. Note that once the Sample Program index has been created, you do not need to generate it again, since it will be stored permanently in your SASUSER library.

[_] PROGRAMS

allows you to browse, edit, run, or print individual sample programs. Programs are selected by a keyword value. To select programs by keyword, push the SELECT KEYWORD button. A keyword list will be shown from which to select. Choose one and a program selection list is displayed. Choice of a program pops up an action window with the choices of browse, edit, run, or print. You can save an edited program in your SASUSER.PROFILE catalog. See the SAVED option for more information about saved programs.

[_] SAVED

allows you to access catalog entries of types SOURCE and OUTPUT that have been saved in your SASUSER.PROFILE catalog. You can choose to edit, browse, print, delete, file, or rename SOURCE or OUTPUT type members or you can execute SOURCE members.

[_] OUTPUT

allows you to manipulate information directed to the Output window. To print the contents of the Output window, select PRINT. To clear the contents of the Output window, select CLEAR. To view the contents of the Output window, select VIEW.

Maintenance

If maintenance is supported for a release, the maintenance releases are identified by unique TS level numbers. The Maintenance menu displays the different TS levels found in the installed SAS Notes and allows TS level subsetting of the SAS Notes.

To help locate relevant SAS Notes, you can enter up to two individual keywords, one PRODUCT name, or one MODULEN field key. You can also enter a ? in either of the last two fields to display the appropriate selection lists. The three filtering pushbuttons can also be used to refine your search.

When you have defined your search criteria, press the RUN SEARCH pushbutton to display a scrollable list of SAS Notes titles. You can view a SAS Note by clicking on either its title or MODULEN field.

Options

The Options menu allows you to set and save certain useful SUPPORT options. To change the color scheme of the block menus, select MENU COLORS. To set printing parameters, select PRINT PARMS. To set a particular folder for the Sample Library, select SAMPLE DIRNAME. To save these options you have set in your SASUSER.PROFILE catalog, select SAVE OPTIONS.

Troubleshooting

If errors are encountered during execution of the application, the following message is displayed:

```
WARNING: Program Halted.  See MSG or LOG for messages.
```

To view the errors, type `LOG` on the command line to access the `LOG` window. (If it is necessary to call SAS Institute Technical Support, please have this information available.) The application can be resumed by typing `AF` on the command line of the `LOG` window.

Modifying the Support File at Your Site

An autoexec file is included that provides the SAS statements necessary to invoke the Support Application. An appropriate system file is also included. You may need to move this file to the appropriate location on your system for global access by users at your site. You may need to make some modifications to the file for the Support Application to execute properly. Default names are supplied for the following:

- ❑ the command used to invoke the SAS System at your site
- ❑ the name of the autoexec file that includes the SAS statements necessary to invoke the application. The autoexec file includes references to the SAS data library containing the SAS Notes database and the catalog containing the entries for the Support Application, and to the library containing the formats for the SAS Notes databases (these two libraries may be the same).

These names may need modifications based on your naming conventions at installation time.

Privileged Image Unloading

The SAS System includes a "user-written" system service that must be installed as a protected image on an OpenVMS, Version 6.1 and higher system. The privileged unloading feature is dependent upon access to internal routines and data structures in the user's process control region. If the following apply to your installation, you should use privileged unloading:

- ❑ you frequently run out of memory with your SAS jobs.
- ❑ your large production jobs involve many procedures.

Alternatively, if your large production jobs involve a few procedures that are used over and over again, privileged unloading should not be used.

The `UNLOAD` option allows a site to control the use of the SAS system service. This option is documented in *SAS Companion for the OpenVMS Environment, Version 6, Second Edition*, and SAS Technical Report (#55672): *Changes and Enhancements to the SAS System for the*

OpenVMS Alpha Environment, Release 6.12. To enable privileged image unloading in Release 6.12, the system service `SAS_USS_PRIV.EXE` must be installed as a protected and shared image and a logical name for the image must be supplied to all SAS users. It must be manually installed.

All source for the SAS system service and command procedures for relinking, installing, and testing the system service are found in SAS$ROOT:[TOOLS].

SAS$ROOT:[TOOLS]PRIV_UNLOADER.COM links the SAS system service, while SAS$ROOT:[TOOLS]INSTALL_UNLOADER.COM installs the system service with the use of the logical name SAS_USS_PRIV. The system service is linked under OpenVMS, Version 6.1. In a later release, it may be necessary to relink the system service in the following manner:

```
$ @SAS$ROOT:[TOOLS]PRIV_UNLOADER.COM
$ SET PROCESS/PRIVILEGE=CMKRNL
$ @SAS$ROOT:[TOOLS]INSTALL_UNLOADER.COM
```

SAS Institute recommends that you install this image by using the command:

```
$ @SAS$ROOT:[TOOLS]INSTALL_UNLOADER.COM
```

in the OpenVMS system startup file, SYS$MANAGER:SYSTARTUP_VMS.COM.

OpenVMS Internal Data Structure Dependency

In Release 6.12 of the SAS System under OpenVMS Alpha, a SAS image called CTL$GL_IMGLSTPTR resolves the SAS System references to the OpenVMS image list pointer. This image may need to be relinked when OpenVMS is upgraded. An OpenVMS upgrade could change the location of the image list pointer, necessitating a relink. Some upgrades will not require a relink. If you receive the following error messages, then a relink is necessary; otherwise no further work is needed.

```
%SAS-F-LOADERR, error while loading image SASIMPTR
-SYSTEM-W-SYSVERDIF, system version mismatch; please relink
```

The following steps relink the necessary SAS image. To protect SAS directories, perform the relink in a temporary directory.

```
$ @SAS$ROOT:[TOOLS]RELINK_SASIMPTR.COM
```

If the relink process was successful, invoke and test the SAS System from your temporary directory. Save a copy of SAS$ROOT:[PROCS]SASIMPTR.EXE and replace it with the newly linked copy located in your temporary directory.

If the relink process was not successful, contact SAS Technical Support for further assistance.

CLEANUP Command

To access the cleanup tool, SAS$ROOT:[PROCS]CLEANUP.EXE, choose a verb to assign to the cleanup function. In this example, the verb is CLEANUP. Create a DCL foreign symbol that points to the utility image. No SET COMMAND operation is required.

```
$ CLEANUP == "$SAS$ROOT:[PROCS]CLEANUP.EXE"
```

This lets you issue commands to cleanup directories.

```
$ CLEANUP              ! Cleans current directory of work files
$ CLEANUP [.TEMP]      ! Cleans work files from [.TEMP]
$ CLEANUP [...]        ! Cleans work files from entire tree
```

The command accepts the following qualifiers:

```
/LOG            (default is /LOG)
/NOLOG
```

This causes the command to issue a message showing each file as it is deleted and to show the total number of directories deleted. If omitted, the command runs silently unless an error is encountered trying to delete one or more files.

Example:

```
$ CLEANUP [SMITH...]/NOLOG
```

```
/CONFIRM        (default is /CONFIRM)
/NOCONFIRM
```

This causes the CLEANUP command to prompt you for each directory to be deleted. The default is Y for "yes" if you press Return. If you do not wish to be prompted or the command is being run in a batch job where no prompting can be done, then use the /NOCONFIRM qualifier.

Example:

```
$ CLEANUP [.SCRATCH]/NOCONFIRM
```

```
/V5             (default is /V5)
/NOV5
```

controls the cleanup of Version 5 SAS work directories (for example, those of the form Z%%%%%%%). The default is to clean up Version 5 work directories. If you do not want to clean up Version 5 work directories, use the /NOV5 qualifier.

Example:

```
$ CLEANUP/NOV5 [.SCRATCH]
```

```
/V6             (default is /V6)
/NOV6
```

controls the cleanup of Version 6 SAS work directories (for example, those of the form SAS$WORK%%%%%%%%). The default is to clean up Version 6 work directories. If you do not want to clean up Version 6 work directories, use the /NOV6 qualifier.

Example:

```
$ CLEANUP/NOV6 [.SCRATCH]
```

Requirements for Running the SAS System under the Display Manager

In Release 6.12 of the SAS System under OpenVMS, TMPMBX privilege is required by any user wanting to run the SAS System under Display Manager. The TMPMBX privilege is also needed to run all full-screen products. To determine if a particular user has TMPMBX privilege, run the following commands to check the user's current AUTHORIZE quotas:

```
$ SET DEFAULT SYS$SYSTEM
$ SET PROC/PRIV=(SYSPRV)! Ensure access to SYSUAF.DAT file
$ RUN AUTHORIZE

UAF> SHOW user

---- "user" attributes and quotas displayed ----
```

If TMPMBX does not appear in the list of Default Privileges, use the following commands (while still in AUTHORIZE) to add TMPMBX privilege to the "user" account:

```
UAF> MODIFY/DEFPRIVILEGES=(TMPMBX) user
UAF> SHOW user

---- "user" attributes and quotas displayed ----
UAF> EXIT
```

TMPMBX privilege will be available the next time "user" logs in.

Note: NETMBX should also be added if you plan to do any type of DECnet or network access.

Chapter 4, Optimizing System Performance

System Performance and Configuration

The SAS System is a heavy user of system resources. This includes physical and virtual memory and the I/O subsystem. Typical SAS sessions execute many distinct images and process large amounts of data. This requires ample physical memory and address space and also requires heavy use of the I/O subsystem for spooling and SAS data set operations.

The next two sections will detail several areas in which you can make system changes to provide better performance or to ensure that larger SAS jobs will be able to successfully execute. Primarily, control over system resources is accomplished by means of altering `SYSGEN` (system generation) parameters that control resources affecting all users, and `AUTHORIZE` quotas that are established on a per user (or per process) basis.

A simple overview of what you need to accomplish includes:

- providing sufficient virtual address space to support the types of jobs you need to run,
- providing sufficient physical memory to prevent excessive page faulting, and
- reducing I/O activity by optimizing placement of files.

The first two items will be controlled with `SYSGEN` parameters and `AUTHORIZE` quotas. In order to provide an optimal I/O environment for the SAS System, it is important to spread your disk accesses across different disks. It is a good idea to have the SAS System images on a separate disk from the SAS System data. If you can spread your applications and data across more disk drives, there will be less contention at the drive level.

Other system resource optimizations can be realized by making sure that applications make proper use of the `UNLOAD` option. This option provides control over when the SAS System frees resources to the operating system. This is primarily because of the dynamic image loading technique employed by the SAS System. Dynamic loading allows a module to be called that was not originally linked to the calling image. This enables an image to transfer control to another image without losing image context. Dynamic unloading refers to the disassociation of a called module from the calling image. Dynamic loading and unloading together allow a reduction in resources and modularization of the SAS System. Resources are reduced because resources are only allocated when they are going to be used. Modularization aids in development and maintenance of the software, while minimization of resources enhances operating system efficiency.

OpenVMS does not provide for a supported method of completely unloading a dynamically loaded image before image rundown. The SAS System in Release 6.12 provides a mechanism to support complete image rundown. This method is called privileged unloading because it requires privileged code to modify a data structure in the process control region (process `P1` space).

Images that are used by multiple users should be installed with the option `/SHARED` to reduce the amount of image loading overhead needed to activate the image. Use of the OpenVMS INSTALL utility to make an image available in this fashion is documented in the OpenVMS operating system documentation. For more information on which images to install, refer to the `LOADLIST` option documented in SAS Technical Report (#55672): *Changes and Enhancements to the SAS System for the OpenVMS Alpha Environment, Release 6.12*.

Classifying SAS Job Size

Even though the size and type of SAS jobs vary from site to site, you can use the following set of guidelines to determine settings for `SYSGEN` parameters and `AUTHORIZE` quotas for small, medium, and large SAS jobs.

The amount of address space consumed and how much memory your job needs are the most important things to consider when quantifying small, medium, and large SAS jobs. Address space is required for both code and data space. Therefore, if you have a lot of observations, you are going to need more data space and your job will be considered larger. More important, however, are the number of procedures and the types of applications you run. Executing a large number of procedures over a small data set also produces a large job. For example, running SAS/ASSIST software is considered to be a medium to large job, regardless of the amount of data, because the product is large.

Other factors to consider include having image unloading enabled, and where you set buffer sizes. For more information on setting buffer sizes, refer to *SAS Companion for the OpenVMS Environment, Version 6, Second Edition*.

Large jobs can include:

- a lot of data,
- a lot of code running over a little data,
- a little data run over a lot of procedures without unloading, and
- running large applications such as SAS/ASSIST software.

Small jobs can include:

- a few thousand observations being run by a couple of procedures, and
- data entry jobs.

The following are estimates for quantifying small, medium, and large jobs by observation size:

- SMALL under 5,000 observations
- MEDIUM under 50,000 observations
- LARGE over 50,000 observations.

If you are familiar with your data, the type of application you are running, the number of procedures your job uses, buffer size settings, and checking if unloading of images has been enabled, you will be able to better gauge the size of your SAS jobs. Once this type of information has been determined, it will be easier to set the recommended SYSGEN parameters and AUTHORIZE quotas to the appropriate values.

Minimum and Recommended SYSGEN Parameters

For the most part, modifying SYSGEN parameters will not actually have any impact on SAS System performance. Where this is not the case, it is explicitly noted. SYSGEN parameters will, instead, determine the size of the jobs that may be run. SYSGEN parameters impose a limit on the amount of particular resources that a process can use. When a process has exhausted the resource allotted by the operating system, the SAS System has to either attempt to free up resources of a like nature that are not in use, or, in the event that the SAS System cannot free up sufficient resource, your SAS session will abort. Making proper use of the UNLOAD option and the image unloading system service will insure that the SAS System frees up whatever resources it can.

Three SAS jobs were used to assist in deriving the following parameters. The job used to determine the minimum values consisted of a DATA step with 100 observations, each with two numeric variables and one 10-byte character variable, one invocation of PROC PRINT, PROC SORT, and an FSEDIT session.

```
/* This will be a small job used to evaluate the minimal configuration */
/* requirements for running SAS. */

data a; do i=1 to 100; name="Text Field"; x=i*50; output; end; run;
proc print; run;
proc sort; by descending x; run;
proc fsedit; run;
      endsas;
```

There were two jobs used to determine the recommended values. One job consisted of a single invocation of every SAS procedure with multiple invocations of procedures like PRINT and SORT. The other was a resource-intensive job that ran over a large amount of data. The job created a 50,000 observation data set with 20 numeric variables and 14 character variables most of length 8. Several procedures were run over the data, including CONTENTS, PRINT, MEANS, SORT (SAS System and OpenVMS), SQL, GPLOT, GLM, REG, and COMPARE. Full-screen procedures included FSVIEW, FSEDIT, CALC, ASSIST, and the EIS tutorial run in the Motif window environment.

Any parameters not mentioned are assumed to be set at their default values. Unless specifically mentioned, the parameters in these examples assume no privileged unloading of images.

PROCSECTCNT Parameter (Sections)

Minimum-128, Recommended-300

PROCSECTCNT controls the amount of process header memory used in the loading and running of images. Each image loaded uses one or more process sections. If you run out of process sections, you receive the following OpenVMS system message:

```
%SYSTEM-F-SECTTBLFUL, section table (process/global) is full
```

For PROCSECTCNT, the size of a SAS program is determined by the number of procedures, formats, informats, and functions used by the program.

CTLPAGES and CTLIMGLIM Parameters (Pagelets)

CTLPAGES and CTLIMGLIM specify the number of pagelets in the process dynamic memory pool. OpenVMS uses the process pool to store image control structures, process logical names, and other data structures. CTLPAGES determines the size of the pool and CTLIMGLIM limits the amount of the pool that can be used for the image control structures. If you run out of space for image control structures, you receive the following OpenVMS system message:

```
%SYSTEM-F-INSFMEM, insufficient dynamic memory
```

You should then raise CTLPAGES and CTLIMGLIM by equal amounts. If you run out of space for logical names, first try increasing the AUTHORIZE quota, JTQUOTA. If that does not work, raise CTLPAGES.

For CTLPAGES and CTLIMGLIM, the size of the SAS program is determined by the number of steps, procedures, formats, informats, functions, and device drivers used by the program. The following values for CTLPAGES and CTLIMGLIM are recommended, based on the size of your SAS job.

- CTLPAGES=100 CTLIMGLIM=35 for small to large jobs.

Note: Always maintain or increase the difference of 15 between CTLPAGES and CTLIMGLIM.

- CTLPAGES=100 CTLIMGLIM=60 is sufficient for the largest possible SAS program.

VIRTUALPAGECNT Parameter (Pagelets)

Minimum-102,400, Recommended-153,600

VIRTUALPAGECNT specifies the maximum amount of virtual memory any process on the system can use. Every 128 virtual pagelets adds four bytes of memory to the system page table. If you raise the value for VIRTUALPAGECNT, you may also need to raise the AUTHORIZE quota PGFLQUOTA to allow processes to take advantage of the extra virtual memory. You may also need to increase the size of the system page and swap files. If you run out of virtual memory, you receive the following OpenVMS system message:

```
%SYSTEM-F-INSVIRMEM, Insufficient virtual memory
```

For VIRTUALPAGECNT, the size of a SAS program depends on the amount of memory required by the different program steps. The value for VIRTUALPAGECNT can be higher than the suggested high value for exceptional memory needs.

Note: On OpenVMS, Version 7.0 and higher, this parameter no longer has any useful meaning. Leave it set to the SYSGEN default value.

CHANNELCNT Parameter (Channels)

Minimum-256*, Recommended-300

Note: *Certain applications may require this to be higher.

CHANNELCNT controls the number of I/O channels a process is able to have open at once. This value should be at least 50 larger than the largest value of the process quota FILLM (see the section "Minimum and Recommended Authorize Quotas" later in this chapter). If you run out of channels, you receive the following system message:

```
%SYSTEM-F-NOIOCHAN, no I/O channel available
```

For CHANNELCNT, the size of a SAS program depends on the number of files opened, the number of steps, procedures, formats, informats, functions, and device drivers used, and the number of full-screen operations used by the program.

GBLSECTIONS and GBLPAGES Parameters

GBLSECTIONS and GBLPAGES are used to make images known as shareable. The values given specify the number of unused sections and pages that must be available to make SAS612.EXE and SAS_USS_PRIV.EXE known images. If you currently have this many sections and pagelets free, you do not need to increase the value of GBLSECTIONS or GBLPAGES.

The following list shows how many sections and pages must be free for the files SAS612.EXE and SAS_USS_PRIV.EXE.

- GBLSECTIONS
  - 1 free section for SAS612.EXE
  - 1 free section for SAS_USS_PRIV.EXE
  - 1 free section for SASDS.EXE
  - 1 free section for SABXSPH.EXE
- GBLPAGES
  - 816 free pagelets for SAS612.EXE
  - 48 free pagelets for SAS_USS_PRIV.EXE
  - 48 free pagelets for SASDS.EXE
  - 3280 free pagelets for SABXSPH.EXE

WSMAX Parameter

This parameter limits the maximum amount of physical memory that any one process can allocate. In order to minimize page faulting, you need to be sure that a process can allocate as much memory as possible without impacting other processes. Individual physical memory (working set) parameters are discussed in the next section. However, WSMAX sets an upper limit to the amount of memory that any one process can allocate, regardless of the individual process parameters.

Note: You should set WSMAX based on the maximum concurrent users and the system memory size. It is suggested that this value be no less than 16384.

Minimum and Recommended AUTHORIZE Quotas

This section describes minimum and recommended values for AUTHORIZE quotas. The parameters are configured to ensure that ample resources are available. Refer to *OpenVMS System Management Utilities Reference Manual: A-L* for more detailed information.

This is a portion of a listing of a typical user account. Note that some values are for administrative or accounting purposes and have little or no effect on the performance of the SAS System.

```
Maxjobs:         0        Fillm:    255      Bytlm:   99840
Maxacctjobs:     0        Shrfillm:   0      Pbytlm:      0
Maxdetach:       0        BIOlm:    200      JTquota:  3072
Prclm:           2        DIOlm:    200      WSdef:     500
Prio:            4        ASTlm:    400      WSquo:    4000
Queprio:         0        TQElm:     10      WSextent: 6000
CPU:        (none)        Enqlm:     40      Pgflquo:150000
```

Following is a list of several AUTHORIZE quotas that should result in a good level of system performance for the user.

FILLM (Files)

Minimum-128, Recommended-255

The maximum number of files a process can have open simultaneously is controlled by the FILLM quota. This should always be as large as possible, because, depending on the complexity of the job, the SAS System may open a very large number of files. Files are opened for input, output, and format; utility files are opened for various products; and dynamically loaded modules are opened. This quota should be set to at least 75 with the unloading option enabled. Without the unloading option, it should be set to the maximum. Setting this value to the maximum does not consume any system resources unless the added files are being referenced. It permits the user to open a large number of files and consumes resources only when a particular file is open.

Note: The SYSGEN parameter, CHANNELCNT, also limits the number of open files. See the previous section on "Minimum and Recommended SYSGEN Parameters".

BYTLM (Bytes)

Minimum-65,536, Recommended-99,840

The amount of system memory that can be consumed by a process for I/O-related overhead is controlled by the BYTLM quota. The file system (RMS) consumes this quota for some data structures associated with open files. We recommend that you set this value reasonably high. If necessary, you may have to increase the SYSGEN parameter NPAGEDYN to accommodate extra-paged system memory.

JTQUOTA (Bytes)

Minimum-1,024, Recommended-3,072

The JTQUOTA quota affects the size of the job-wide logical name table. The number of SYSTEM, PROCESS, GROUP, and JOB level logical names that you define on your system affects this quota.

PGFLQUOTA (Pages)

Minimum-100,000, Recommended-150,000

This quota, in conjunction with the SYSGEN parameter VIRTUALPAGECNT, controls virtual memory allocation. This value can be several thousand pages less than VIRTUALPAGECNT because it only affects modified pages. The value of PGFLQUOTA on OpenVMS Alpha, Version 7.0 and higher may need to be bigger than 150,000 because the virtual address space is no longer limited by VIRTUALPAGECNT. Be sure there is adequate space in your page file(s) to contain PGFLQUOTA pages for all active processes. A site may consider creating alternate page files on a separate disk from the system disk for better paging performance.

Optimizing Performance in a Local Area VMScluster Environment (LAVC)

Most of the guidelines that have been presented are equally applicable to executing the SAS System on a local area VMScluster satellite node. There are, however, additional considerations for optimizing performance in this environment.

The most important additional aspect is to make as much of the disk access as possible take place on the local node. Always have a local disk set up for page and swap files. One of the primary bottlenecks in a LAVC environment is the time required to move large amounts of code and data across the Ethernet. In general, Ethernet access is slower than local disk access. Therefore, to maximize performance, you should minimize the amount of Ethernet activity.

This can be done in two ways. You can ensure that your data files and application source files are resident on the local node disk drives whenever possible. In addition, you can maximize your use of the `LOADLIST` option, which indicates the SAS System images that are executed most frequently during the course of a particular application. Copying and accessing these files from the local node disk drive prevents you from having to access them across the Ethernet. If the executables are not located in the current directory of the local disk, the `SAS$LIBRARY` logical must be modified to include the new location.

There are additional performance considerations when DECclusters are used to share data sets between OpenVMS VAX and Alpha. Performance for I/O-intensive operations may be lower when accessing data sets created by an Alpha system from a VAX, and vice versa. See *SAS Companion for the OpenVMS Environment, Version 6, Second Edition* for more information.

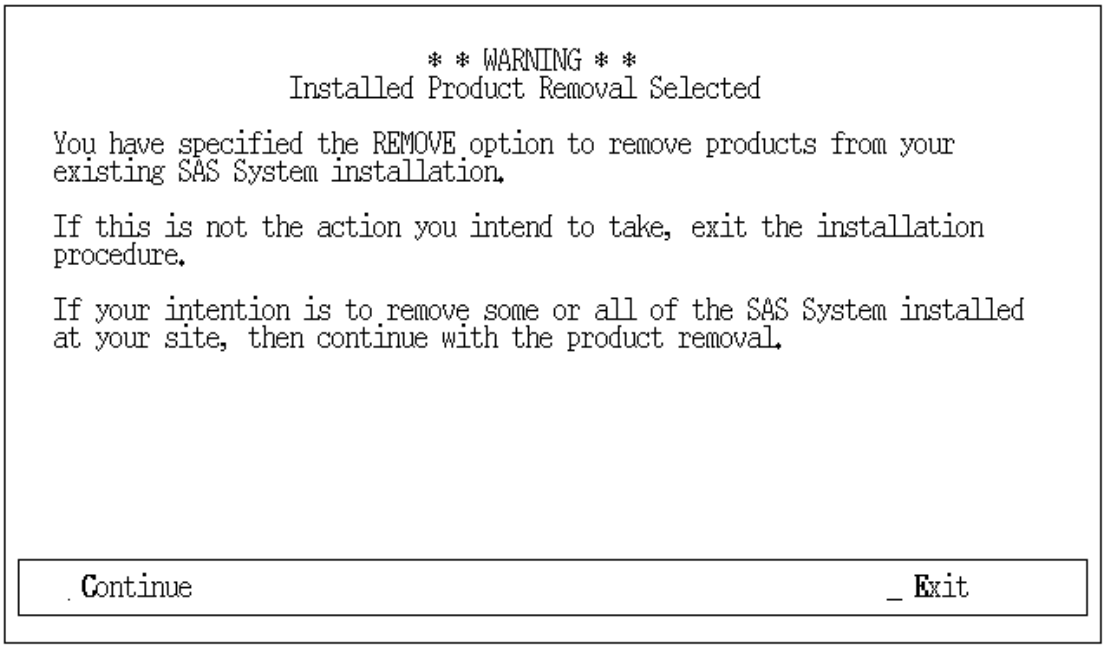
Appendix A, Removing SAS Products Using the SAS_REMOVE=* Option

The installation procedure provides a method for removing SAS products installed on your system, the SAS_REMOVE=* option. This option allows you to remove specific components of your installation or the entire SAS System. Specify the SAS_REMOVE=* option on the VMSINSTAL command line as follows:

```
$ @SYS$UPDATE:VMSINSTAL SAS061 cdrom:[SAVE_SETS] OPTIONS
SAS_REMOVE=*
```

Some of the installation windows you will see are common to product installation as documented in Chapter 2 of this document, "Installing the SAS System".

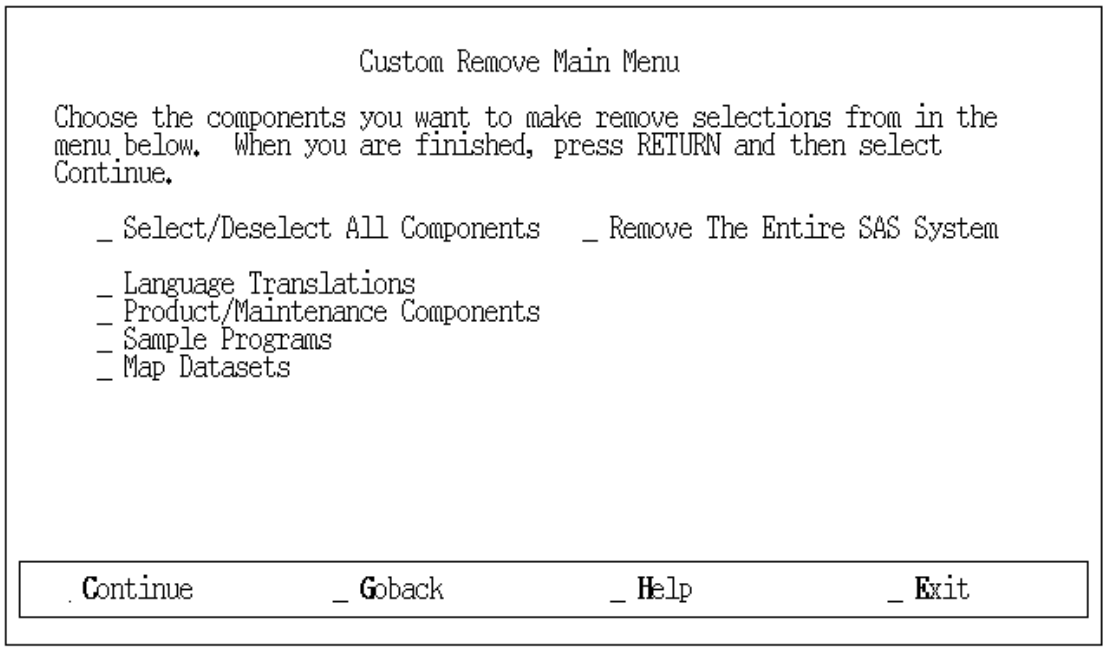
After the initial installation window (as described in Step 1 in the section "Performing the Install" in Chapter 2 of this document), a warning window is displayed to inform you that you have chosen the SAS_REMOVE=* option.



Next, the Specify a Target Location window (as described in Step 3 in the section "Performing the Install" in Chapter 2 of this document) is displayed. Enter the location of the SAS System installation from which you want to remove products. You are not able to continue if you choose a directory location that does not contain an existing SAS System.

When you have chosen the correct target location, the `Custom Remove Main Menu` is displayed. From this menu, you can choose which components you want to remove. You can select to remove the entire SAS System or various components.

Note: The only way to remove Base SAS software is to select `Remove the Entire SAS System`.



Choosing any item other than `Remove The Entire SAS System` takes you through the `Custom Product Selection` windows (as described in Step 6 in the section "Performing the Install" in Chapter 2 of this document). When you have chosen which components of the SAS System you want to remove from your installation, you are asked to verify your selections (as described in Step 7 in the section "Performing the Install" in Chapter 2 of this document) before anything is removed from your system. If you are not satisfied with your selections, you can choose to return to the `Custom Remove Main Menu` by selecting `Goback` or you can exit the installation procedure by selecting `Exit`.

When components are removed from your existing SAS installation, the installation procedure updates the install history file and marks the appropriate components as having been removed.

Appendix B, Performing SPECL and SUPPL Installs

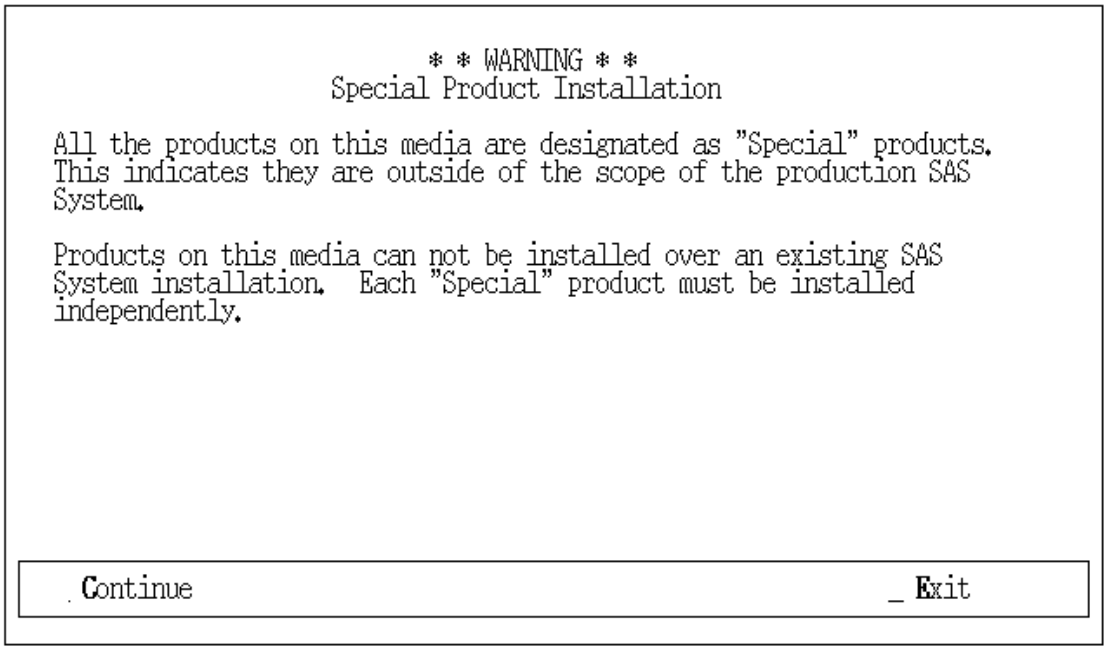
Performing a SPECL Install

The installation procedure supports SPECL installs in addition to the usual installation of SAS System products. SPECL media consists of one SPECL product on media created by SAS Institute. SPECL products are not required to be installed in an existing SAS System.

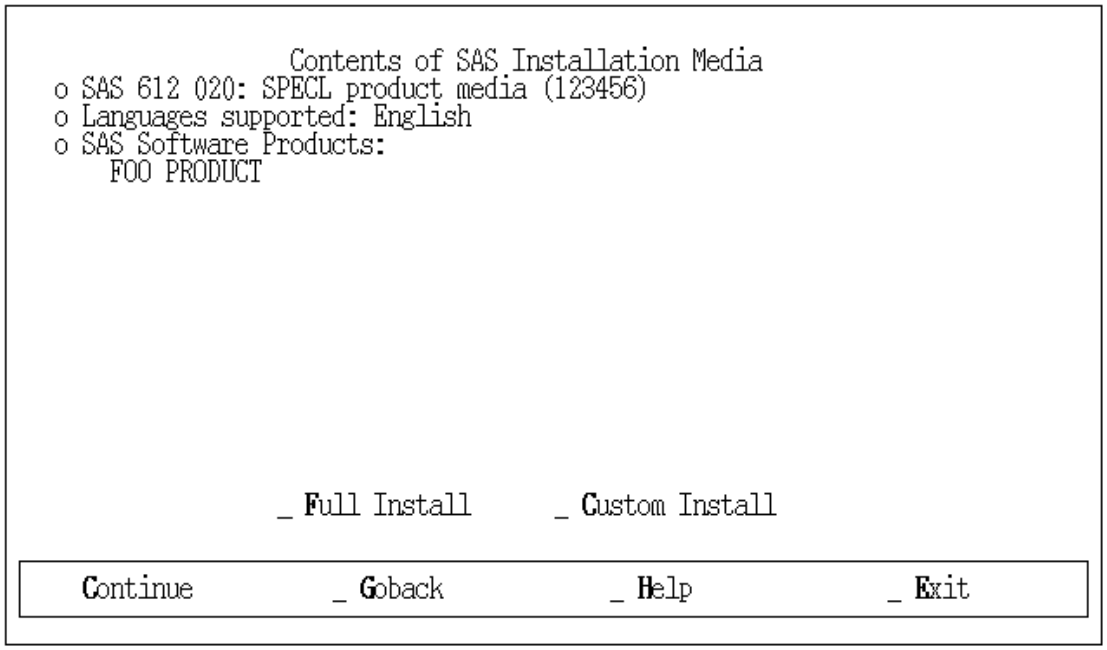
To install SPECL products, invoke the installation procedure with the following command:

```
$ @SYS$UPDATE:VMSINSTAL SAS061 cdrom:[SAVE_SETS] options
```

The install detects that the media contains SPECL products and knows what install steps to run. After the install begins and the initial splash screen is displayed, the following window appears:



Suggested Action: Select `Continue` and proceed with the install. You can verify your product selection as shown in the following example:



Suggested Action: Select `Full Install` and `Continue` and proceed with the install. You are then prompted for the target destination where you want to install the product on your system. After exiting from the full-screen portion of the install, the SPECL product is installed and you exit the installation procedure.

Performing a SUPPL Install

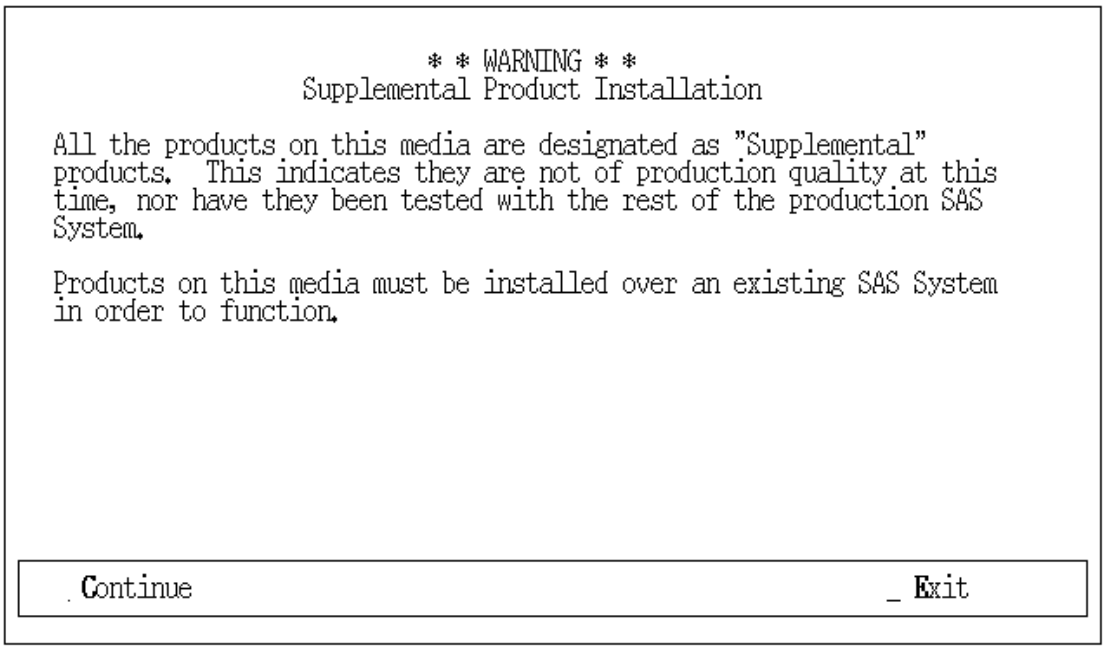
SUPPL media contains updates to existing SAS System products or new non-production SAS System products. These products must be installed into an existing SAS System.

Note: SUPPL products have not been through the Institute's formal quality assurance cycle; therefore, install them at your own risk.

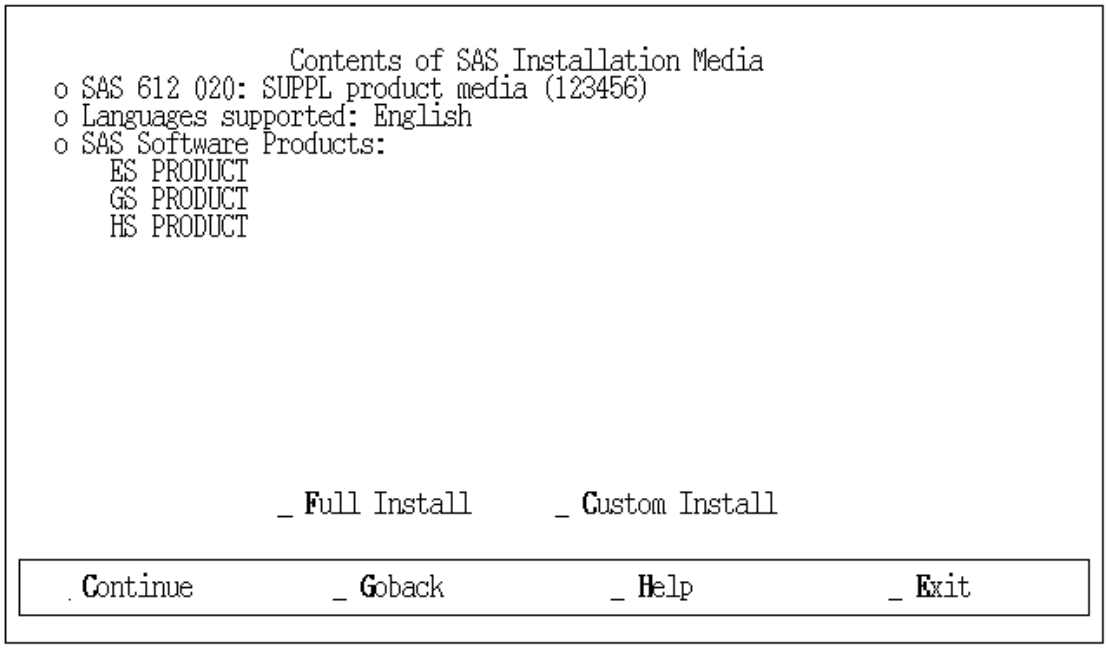
To install files from SUPPL media, issue the following command:

```
$ @SYS$UPDATE:VMSINSTAL SAS061 cd_rom:[SAVE_SETS] options
```

The install detects that there are SUPPL products on the media and knows what install steps to run. After invoking the install and passing the initial splash screen, the following window is displayed:



Suggested Action: Select `Continue` and proceed with the install. You can verify your selection of supplemental products in the following window:



Suggested Action: Select `Full Install` and `Continue` and proceed with the install. The install will then prompt you for a target destination for the SAS System. Be sure to enter the location of the SAS System that already exists on your system.

Proceed with the installation as described in Chapter 2, "Installing the SAS System".

Appendix C, Post-Installation Setup for National Language Support (NLS)

Performing a Quick Install

If you choose to perform a quick install, note the following:

- ❑ all NLS products on your customer media are installed by default.
- ❑ any corresponding English products that are not already installed on your system are installed by default.
- ❑ post-processing for all installed NLS products is automatically executed.

Note: In the event that you encounter any post-processing errors during the install, see the section of this appendix called "Post-Installation Setup" for more information on how to run the post-processing procedures manually.

Performing a *Custom* Install

If you choose to perform a *Custom* install, you can select a new or existing target location. If you choose a new target location, then all of the English products will be loaded along with any NLS components you select. If you choose an existing target location, then you are prompted to select any English products that are not already installed.

Complete the following steps to install NLS products using the *Custom* install:

1. Select `Custom Install` from the `Contents of SAS Installation Media` window.

2. Specify an existing SAS System installation area for the target destination in the `Specify a Target Location` window.

3. From the `Custom Product Selection` window, select the products that you want to install.

4. From the `Custom Language Selection` window, choose the NLS language(s) that you want installed onto your system in addition to English.

5. From the `Custom Post-processing Procedure Selection` window, ensure that the NLS post-processing selection is selected. If not, select it.

After you have made all of your selections, verify them in the `Verify Custom Selections` window. After exiting this window, the install checks your installed SAS System and only loads the necessary components / products that are not already installed on your system.

Removing NLS Products Using the *Custom* Install

Complete the following steps to remove NLS products using the *Custom* install:

1. When invoking the install, specify the `SAS_REMOVE=*` option as shown in the following example:

```
$ @SYS$UPDATE:VMSINSTAL SAS061 cdrom_drive:[SAVE_SETS] OPTIONS SAS_REMOVE=*
```

2. Select `Continue` from the welcome window.

3. Select `Continue` from the `Installed Product Removal Selected` window.

4. Specify an existing SAS System installation area for the target destination in the `Specify a Target Location` window.

5. From the `Custom Remove Main Menu`, you have the option of removing:

   - Select / Deselect All Components

     -Language Translations
     -Product / Maintenance Components

For removal of languages other than English, select both `Language Translations` and `Product/Maintenance Components`. From the `Custom Language Selection` window, select the language translation(s) that you want to remove from your system.

- ❑ the entire SAS System tree

  If you select this option, the entire SAS System, including any language translations, will be removed from your system.

6. From the `Custom Product Selection` window, select the NLS components that you want to remove from your installed SAS System area. If you do not know all of the associated products for that translation, select all components / products.

After you have made all of your selections, verify them in the `Verify Custom Selections` window. After exiting this window, the install checks your installed SAS System and only removes the selected NLS components from your installed SAS System area.

Post-Installation Setup

If you installed any National Language Support (NLS) save sets for production or maintenance and executed post-processing in the installation procedure, there are some post-installation setup tasks you need to perform to make NLS for a language available on your system. If you did not execute post-processing for NLS during the installation procedure, see the section "Running the Post-Processing Procedure for Languages Manually" later in this appendix.

The following assumptions are made in these instructions. Make sure these apply to your system before proceeding.

- ❑ The logical names for the default English version of the SAS System are defined on your system as either `PROCESS` or `SYSTEM` level logicals.

- ❑ The `SAS` command verb is available to all users either installed in `DCLTABLES` or via an earlier execution of the following command:

  ```
  $ SET COMMAND SAS$ROOT:[IMAGE]SAS612.CLD
  ```

Supporting NLS for One Language

During post-processing, the installation procedure creates the following command:

```
SAS$ROOT:[<language>.TOOLS]<language>_SAS612.COM
```

This command procedure defines all `USER` level search path logical names required to run NLS for a language on top of the default English version of the SAS System. To make NLS for a language available on your system, set up a global symbol in your system login file, `SYS$MANAGER:SYLOGIN.COM`, that calls the NLS command procedure.

Note: By default, SAS is the command verb specified in the NLS command procedure. If you invoke the SAS System with a different command verb, edit the NLS command procedure and change the command verb to the one used on your system.

For example, add the following command to your system startup file to support Spanish NLS:

```
$ SPANISH_SAS612 == "@SAS$ROOT:[SPANISH.TOOLS]SPANISH_SAS612.COM FILLER"
```

The Spanish NLS version of the SAS System can now be accessed by specifying SPANISH_SAS612 at the $ prompt.

Supporting NLS for Multiple Languages

To support NLS for more than one language, follow the steps in the previous section "Supporting NLS for One Language", but create separate global symbols for each language supported on your system.

For example, set up the following global symbols and add them to your system login file to support both French and German NLS:

```
$ FRENCH_SAS612 == "@SAS$ROOT:[FRENCH.TOOLS]FRENCH_SAS612.COM
FILLER"

$ GERMAN_SAS612 == "@SAS$ROOT:[GERMAN.TOOLS]GERMAN_SAS612.COM
FILLER"
```

The French NLS version of the SAS System can now be accessed by specifying FRENCH_SAS612 at the $ prompt. You can access the German NLS version of the SAS System by specifying GERMAN_SAS612 at the $ prompt.

Running the Post-Processing Procedure for Languages Manually

If you did not run the post-processing procedure for NLS support from the installation procedure or if errors occurred during post-processing, you can run the post-processing procedure manually to create the NLS command procedure that defines the necessary USER level logical names for a particular language.

Execute the following steps to create the NLS command procedure:

- ❑ Make sure that the SAS$ROOT logical name is already defined on your system before running the post-processing procedure.

- ❑ Invoke the post-processing procedure to create the NLS command procedure that defines the necessary search path logical names required for NLS for a particular language.

For example, specify the following to create the command procedure for Spanish NLS:

```
$ @SAS$ROOT:[TOOLS]POST_BASE_ES.COM "SPANISH"
```

where SPANISH is a P1 parameter used by the post-processing procedure. As a result, the NLS command procedure creates the following command procedure:

```
SAS$ROOT:[SPANISH.TOOLS]SPANISH_SAS612.COM
```

This command procedure defines the necessary `USER` level search path logical names required to run the Spanish NLS version of the SAS System.

After this file is created, set up the global symbols necessary for NLS support on your system as described in the previous sections of this appendix.

Appendix D, Post-Installation Setup for SAS/ACCESS® Software

SAS/ACCESS Interface to ORACLE Software

In order to use SAS/ACCESS Interface to ORACLE software, you must link the interface with your version of the ORACLE RDBMS. If you did not complete the linking during the installation procedure or if you must relink SAS/ACCESS Interface to ORACLE software, you need to run the installation post-processing file SAS$ROOT:[INSTALL]POST_DBIORL.COM. This installation post-processing command file links SAS/ACCESS Interface to ORACLE software with your current ORACLE configuration. You might need to relink the interface if you installed additional ORACLE products or additional ORACLE SQL*Net device drivers, or if you install a new version of the ORACLE RDBMS.

The command procedure links SAS/ACCESS Interface to ORACLE software with the ORACLE libraries and your site-specific ORACLE two-task drivers. From the `Netconfig Configuration Options` menu of your ORACLE installation, you need to verify that you selected the Version 1, Mailbox Driver and the Version 2, Mailbox Adapter, as well as the other drivers at your ORACLE installation. The ORACLE RDBMS server must be linked as a shared image (using the default value of `S`). See *ORACLE7 for Alpha AXP OpenVMS Installation Guide* for more information about installing the ORACLE RDBMS and the ORACLE two-task architecture.

You must execute the command file, `SAS$ROOT:[TOOLS]SAS612.COM`, that defines SAS logical names before executing the post-processing files.

SAS/ACCESS Interface to ORACLE7 Software

In order to use SAS/ACCESS Interface to ORACLE software with an ORACLE7 server, you must create the `SASORA_V7.EXE` image. Before you begin, you must execute the `ORA_UTIL:ORAUSER.COM` file associated with your ORACLE7 installation. In addition, the `ORA_ROOT` logical must point to your root level ORACLE7 directory.

To link the `SASORA_V7` image, invoke the following post-processing command procedure:

```
$ @SAS$ROOT:[INSTALL]POST_DBIORL.COM V7
```

where `V7` is a parameter that is passed to the command procedure indicating that you want to link to an ORACLE7 database.

SAS/ACCESS Interface to SYBASE Software

To use SAS/ACCESS Interface to SYBASE software, you must link the interface with your version of Sybase Open Client. If you did not complete the linking during the installation procedure or if you must relink SAS/ACCESS Interface to SYBASE software, you need to run the installation post-processing file `SAS$ROOT:[INSTALL]POST_DBISYB.COM`. The installation post-processing command file links SAS/ACCESS Interface to SYBASE software to your current Sybase configuration. You may have to relink Sybase applications when you install a new version of Sybase Open Client.

In order to link SAS/ACCESS Interface to SYBASE software, the Sybase logical names must be defined. Specifically, the logical names `SYBDB_OPTIONS` (Sybase, Release 4.x), or `SYB_DB_OPTIONS` (Sybase System 10) must be defined to point to the Sybase linker options file. For example:

```
SYBASE_SYSTEM:[SYBASE.LIB]SYB_DB.OPT
```

Additionally, `SYB_DBSHR` (for both Release 4.x and System 10) must be defined to point to the Sybase shareable image, as shown in the following example:

```
SYBASE_SYSTEM:[SYBASE.LIB]SYB_DBSHR.EXE
```

Additionally, you must be sure that the Sybase shareable image, `SYBASE_SYSTEM:[SYBASE.LIB]SYB_DBSHR.EXE` reflects your current version of the Sybase Open Client installation. For Sybase Release 4.x, this image should have been built when you installed Sybase. However, if you did not complete the Sybase installation or you are unsure about the status of this shareable image, you can rebuild it **before** invoking the SAS/ACCESS Interface to SYBASE installation post-processing file by executing the following:

```
$ @SYBASE_SYSTEM:[SYBASE.INSTALL]MAKE_SYBDBSHR.COM
```

To link SAS/ACCESS Interface to SYBASE software, execute the installation post-processing file:

```
$ @SAS$ROOT:[INSTALL]POST_DBISYB.COM
```

You will be prompted for the release of Sybase Open Client you are using. For example, `460` for Sybase Open Client Release 4.60, `10` for any Sybase System 10 Open Client, and so on.

For more information on the Sybase logical names and on the Sybase installation procedure, refer to the *Sybase Installation Guide for AXP/VMS*.

You must execute the command file that defines SAS logical names before running the installation post-processing command file by issuing the following command:

```
$ @SAS$ROOT:[TOOLS]SAS612.COM
```

SAS/ACCESS Interface to INGRES Software

In order to use SAS/ACCESS Interface to INGRES software, you must link the interface with your version of the INGRES RDBMS. If you did not complete the linking during the installation procedure or if you must relink SAS/ACCESS Interface to INGRES software, run the installation post-processing file `SAS$ROOT:[INSTALL]POST_DBIING.COM`. You might also need to relink if you install a new version of the INGRES RDBMS.

In order to link SAS/ACCESS Interface to INGRES software, you must have defined the INGRES logical names. Specifically, the logical name `II_SYSTEM` should be defined to the disk containing your INGRES installation.

You should execute the command file that defines SAS logical names before running the installation post-processing command file. Execute the following:

```
$ @SAS$ROOT:[TOOLS]SAS612.COM
```

To link SAS/ACCESS Interface to INGRES software, execute the installation post-processing file:

```
$ @SAS$ROOT:[INSTALL]POST_DBIING.COM 11
```

Appendix E, Post-Installation Setup for SAS/ASSIST® Software

An AUTOEXEC file that can be used to invoke SAS/ASSIST software has been provided with your customer tape. This AUTOEXEC file automatically brings up the "Primary Menu" for SAS/ASSIST software upon invocation of Release 6.12 of the SAS System.

The AUTOEXEC file is located in:

```
SAS$ROOT:[TOOLS]ASSIST_AUTO.SAS
```

To make this AUTOEXEC file available to your users, set up the following VMS symbol:

```
$ SASASSIST :== SAS/AUTOEXEC=SAS$ROOT:[TOOLS]ASSIST_AUTO.SAS
```

When the OpenVMS symbol is in place, users will only have to type SASASSIST at the DCL prompt ($) to access SAS/ASSIST software.

Note: We recommend that you include this symbol definition in your system login command file, SYS$MANAGER:SYLOGIN.COM, so the symbol will be available for all users upon logging into the system.

This appendix describes how to add an optional master profile and optional group profile(s) to SAS/ASSIST software. A master profile can be used to override the default settings as sent by SAS Institute. This allows you to provide a customized setup for SAS/ASSIST software. With the master profile, you can control the profile options of all SAS/ASSIST users from one central place. For information on the profile options, see Chapter 8, "Setting Up and Customizing Master, Group, and User Profiles" in *SAS/ASSIST Software: Changes and Enhancements, Version 6*.

Adding a Master Profile

A master profile can be used to override the default settings as sent by SAS Institute. This allows you to provide a customized setup for SAS/ASSIST software. With the master profile, you can control the profile options of all SAS/ASSIST users from one central place. For information on the profile options, see Chapter 8, "Setting Up and Customizing Master, Group, and User Profiles," in *SAS/ASSIST Software: Changes and Enhancements, Version 6.*

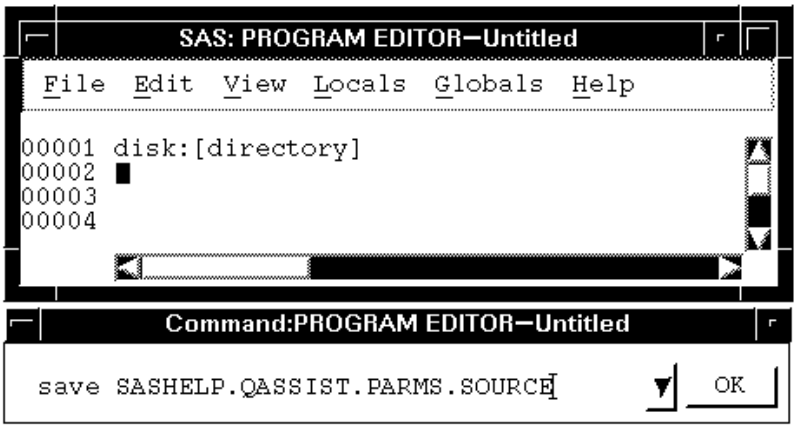
Complete the following steps to add a master profile to SAS/ASSIST software:

1. Specify the location of the master profile by creating a new directory that will contain the master profile as shown in the following example:

```
$ create/dir disk:[directory]
```

   All users with write access to this directory will automatically also have write access to the master profile in SAS/ASSIST software. Select a name that conforms to the naming conventions at your installation. All users must have read access to this library.

   - ❑ Invoke Release 6.12 of the SAS System.
   - ❑ On line 1 of the `PROGRAM EDITOR`, type the physical pathname to be used as the SAS library to store the master profile. Execute the `save` command in the command box to save the pathname in `SASHELP.QASSIST.PARMS.SOURCE` as shown in the following example:



   The location of the master profile is now known by SAS/ASSIST software.

2. Create the master profile.

   The first time SAS/ASSIST software is started, a master profile is created if the `SASHELP.QASSIST.PARMS.SOURCE` contains the name of an existing library and the person who starts SAS/ASSIST software has write access to this library.

3. Customize the master profile by starting SAS/ASSIST and selecting `SETUP ... Master/group...`

   If you have write access to the SAS library containing the master profile, you can specify default values for your installation. These values will be used by new users as they start SAS/ASSIST software.

   Note: If you restrict values by typing `R` in `Status`, users will not be allowed to change the values you define.

   SAS/ASSIST software contains a command bar and a saving facility. Depending on the style you want to run, you must specify the following options in the master profile:

```
Run old style:

Save selections on end:   No
Menu Style:               Old

Run new style:

Save selections on end:   Yes
Menu Style:               New
```

   For more information, see Chapter 8 in *SAS/ASSIST Software: Changes and Enhancements.*

4. Create Group profiles.

   From the master profile, it is possible to create group profiles if you want to divide the users into several groups with different profiles. The master profile controls group and user profiles, whereas the group profiles only control the user profiles. You may want to set up group profiles as part of your post-installation tasks or do it at a later time.

   Select `Create Group Profile` from the `Locals` menu. Specify a name, description, and location for the group profile. Edit the profile option values as desired. To add users to a group profile, select `Update User Group` from the `Locals` menu to enter the userids interactively. You can also use a SAS program to update the group. To specify the name of the variable that contains the userid to be used in SAS/ASSIST software, open the master profile, change the type to `System Administration`, and enter the variable name for the `userid` option. By default, the userid is found in the macro variable `&SYSJOBID`. This value is set in the option userid in the master profile (option type `System Administration`). Change the value if your site uses another variable to keep the userid. If the value name starts with `&`, it is a macro variable; otherwise it is an environment variable, which is defined before starting the SAS System.

Appendix F, Post-Installation Setup for SAS/CONNECT® Software

Overview

The first section in this appendix, "Storing and Locating SAS/CONNECT Script Files", describes the use of the sample script files shipped with the product. The remaining sections in this appendix list supported software for access methods available on OpenVMS and outline configuration procedures for those access methods that require additional configuration.

The access methods supported for OpenVMS are DECNET, TELNET, and TCP/IP and are described in the order listed. Refer to the section for the access method(s) that you will be using at your site for requirement information. Remote capability for the ASYNC access method supported in previous releases is available in this release as well. There is no change in the requirements for this access method and, therefore, there will be no discussion of it in this appendix. Refer to *SAS/CONNECT Software: Usage and Reference, Version 6, Second Edition*, for complete details on the access methods supported by other systems.

Storing and Locating SAS/CONNECT Script Files

Several sample script files are shipped with SAS/CONNECT software. SAS/CONNECT software uses these script files to establish a connection to a remote SAS session.

There is a new configuration option, `SASSCRIPT`, that points to the location of the SAS/CONNECT script files. The `SASSCRIPT` option is used by SAS/ASSIST software and could be used by user-written SCL applications.

The logical name, `SAS$CNTMISC`, contains the location of the script files. This value should be assigned to `SASSCRIPT` during the customization process for `CONFIG.SAS`. You can accomplish this by adding the following line to the `CONFIG.SAS` file:

```
/SASSCRIPT=SAS$CNTMISC
```

The value of the `SASSCRIPT` option can be a logical name or one or more concatenated directory names. The `SAS$CNTMISC` logical name points to `SAS$ROOT:[TOOLS]` by default, but the system administrator may override this if desired. Therefore, by default, the sample script files are stored in `SAS$ROOT:[TOOLS]`. Putting the following line in `CONFIG.SAS` produces the same result as the previous example:

```
/SASSCRIPT=SAS$ROOT:[TOOLS]
```

If you would like to move the script files to another location, you must edit the SAS System startup file, `SAS$ROOT:[TOOLS]SAS612.COM`, and change the location where you want the logical name, `SAS$CNTMISC`, to point.

For example, if you want to create a search path for the sample script files so that it searches a work area first, then the default area, you can change the define command for SAS$CNTMISC in the SAS System startup file to:

```
$ DEFINE/SYSTEM/NOLOG SAS$CNTMISC
     DISK:[SCRIPT_FILES],-
     SAS$ROOT:[TOOLS]
```

where DISK:[SCRIPT_FILES] is your work area and SAS$ROOT:[TOOLS] points to the area where the original sample script files are stored. The following line would be put in the CONFIG.SAS file:

```
/SASSCRIPT=SAS$CNTMISC
```

System Configuration for the DECnet Access Method

(required to use DECnet)

SAS/CONNECT software provides a DECnet access method for use with OpenVMS. Any user that will use the DECnet access method must have TMPMBX and NETMBX privileges that should be standard user privileges. Proxy access to OpenVMS nodes is supported.

DECnet has the ability to automatically create its remote partner. In DECnet terms, this process is called connecting to an object. When using SAS/CONNECT software, the local SAS session requests DECnet to connect the SAS$CONN object. This causes DECnet on the specified remote host to create a process on the remote host using proxy access or the user name and password supplied as the access control information. DECnet then finds and executes the command file associated with the object name, SAS$CONN. This command file contains DCL commands, one of which invokes the remote SAS session. A default SAS$CONN.COM file is provided for you in the SAS$ROOT:[TOOLS] directory.

For OpenVMS, you may do one of two things to cause DECnet to associate a command file with the SAS$CONN object name. One way is to have a command file whose name is SAS$CONN.COM in the directory that is the user's default login directory.

A sample command file (SAS$CONN.COM) for OpenVMS follows:

```
$ SET DEF disk:[user.directory]
$ SAS/DMR/COMAMID=DECNET
```

The first line sets the default directory to the directory in which you want to run the SAS System and the second line invokes the remote SAS session with the options necessary for SAS/CONNECT software.

The other way that you can have DECnet associate a command file with the SAS$CONN object name is to use the Network Control Program (NCP) to tell DECnet where the command file is. To define the SAS$CONN object, the system administrator will need SYSPRV and OPER privileges.

System Configuration for the TELNET and TCP Access Method

(required to use TELNET or TCP/IP)

Using the TELNET or TCP access method, a user on OpenVMS can connect to any supported platform that is on the TCP/IP network, is running a SAS System release that has the corresponding access method support, and has SAS/CONNECT software licensed. With the TCP access method, one of the supported TCP/IP products must be installed on any node, local or remote, that you want to use with SAS/CONNECT software. For the TELNET access method, a supported TCP/IP package must be installed on the local node. The remote node does not have to run a supported TCP/IP product, but must run some TCP/IP product to make the node accessible via telnet.

The following TCP/IP products are supported for Release 6.12:

- ❑ DEC TCP/IP Services for OpenVMS, Version 3.0 or above
- ❑ TGV's MultiNet Software with UCX compatibility
- ❑ Wollongong's PathWay with UCX compatibility
- ❑ Process Software's TCPware for OpenVMS with UCX compatibility
- ❑ The TCP access method should run with any package that is compatible with DEC TCP/IP Services for OpenVMS, Version 3.0 or above.

Appendix G, Post-Installation Setup for SAS/SHARE® Software

In order to use SAS/SHARE software, you must complete system configuration for the access method(s) to be used for communication between servers and users.

Selecting Communications Access Method(s) to Use

(required)

Complete the following steps:

1. Determine access method to use.

   An OpenVMS SAS/SHARE server and user can communicate using two different network-based access methods. Most OpenVMS sites will choose to use the DECnet access method. You may also choose to use the TCP/IP access method.

   If you use the DECnet access method, the process in which the server runs must have the `SYSNAM` privilege. This access method enables you to allow the network to start a server if a user attempts to connect to it when it is not running.

   In order to use the TCP/IP access method, one of the following TCP/IP products must be installed on any node on which a server or user process runs:

   - ❑ DEC TCP/IP Services for OpenVMS, Version 3.0 or above
   - ❑ TGV's MultiNet Software with UCX compatibility
   - ❑ Wollongong's PathWay with UCX compatibility
   - ❑ Process Software's TCPware for OpenVMS with UCX compatibility
   - ❑ any package that provides an interface that is compatible with DEC TCP/IP Services for OpenVMS, Version 3.0 or above

2. Set SAS system option to specify selected access method.

   The SAS system option `COMAMID=` specifies which access method SAS/SHARE software should use for communication. Specify `COMAMID=DECNET` to use the DECnet access method and `COMAMID=TCP` to use the TCP/IP access method.

   Your site's default value for this option should be specified in a SAS System configuration file by the SAS/SHARE Software Consultant. If you choose to use both access methods at your site, specify the one that will be used more often via the `COMAMID=` option. A user who needs to use the other access method can override the default by specifying the `COMAMID=` option in his own configuration file or in an `OPTIONS` statement in his SAS program.

Note that the COMAMID= option is also used by SAS/CONNECT software. A user may use different access methods for communicating with a SAS/SHARE server and with a SAS/CONNECT remote session and would have to specify different values for the COMAMID= option prior to establishing each connection. You should take into account the access method used by SAS/CONNECT software at your site when choosing your default value for the COMAMID= option.

The SAS System options COMAMID= and COMAUX1= cannot both be specified on the SAS command line due to limitations of the DCL command line parser. The first option list is ignored. In order to set up multiple communication access methods for your SAS session, specify one or both options in an OPTIONS statement before referencing the SAS server.

For example:

- SAS/COMAMID=TCP/COMAUX1=DECNET

  Only the DECnet access method will be started.

- SAS/COMAUX1=DECNET/COMAMID=TCP

  Only the TCP access method will be started.

- options comamid=tcp comaux1=decnet;

  Both access methods will be started.

System Configuration for the DECnet Access Method

Complete the following steps:

1. Establish necessary privileges (**required**).

   Each server or user process must have TMPMBX and NETMBX privileges - these should be standard user privileges. Additionally, each server process must have the SYSNAM privilege.

2. Enable automatic server starting by the network (optional).

   Rather than creating a server as part of your system startup, you may choose to allow the network to start a server the first time a user attempts to connect to it. To do so, associate the command file used to start a server with the server name. Instructions for creating this file are in the SAS/SHARE host documentation for OpenVMS. When the first user tries to connect to the server, the network executes that command file.

There are two ways to associate the command file with the server name:

- Create the command file in the default login directory of the users that will connect to the server. The file must be named *<serverid>*.COM, where *<serverid>* is the server name. When a user with this command file in his default login directory attempts to connect to <nodeid>.<serverid> and DECnet determines that no server named <serverid> is running on the node named <nodeid>, DECnet will execute <serverid>.COM on <nodeid>, creating the process on that node as the user connecting to the server with the privileges of that user.

or

- Use the Network Control Program (NCP) to define the server as an object and associate its command file with it. The command for doing this is the following:

```
NCP> DEFINE OBJECT <serverid> FILE <path> NUMBER 0
```

  where *<path>* is the path name of the command file. You can assign any command file name, because the name you assign is included in *<path>*. For simplicity, we recommend that the command file have the same name as the server.

  The NCP command must be issued on the node where the server will run. This command only needs to be issued once.

  When a user attempts to connect to <nodeid>.<serverid> and DECnet determines that no server named <serverid> is running on the node named <nodeid>, DECnet will execute the specified command file on <nodeid>.

System Configuration for the TCP/IP Access Method

The following TCP/IP products are supported for Release 6.12:

- DEC TCP/IP Services for OpenVMS, Version 3.0 or above
- TGV's MultiNet Software with UCX compatibility
- Wollongong's PathWay with UCX compatibility
- Process Software Corp.'s TCPware for OpenVMS with UCX compatibility
- any package that provides an interface that is compatible with DEC TCP/IP Services for OpenVMS, Version 3.0 or above

To configure your installation for the TCP/IP access method, specify server names and port assignments. The server names and port assignments for the TCP/IP access method are defined in a services file. A server name must be 1 to 8 characters in length. The first character must be a letter or underscore. The remaining seven characters can include letters, digits, underscores, the dollar sign ($), or the at sign (@). To define server names and port assignments for your TCP/IP product, refer to the documentation for your TCP/IP software.

Appendix H, Post-Installation Setup for the SQL Query Window

To successfully use the sample table named EMPLOYEE listed in the SQL Query Window online documentation (and in the *SAS Guide to the SQL Query Window, Usage and Reference, Version 6, First Edition*), you must execute a program called RUNSAMPL.

1. To run the program, you must first submit a LIBNAME statement in the PROGRAM EDITOR window to assign the SAMPLE libref to the sample library as shown in the following example:

   ```
   libname sample 'SAS$ROOT:[samples.base]';
   ```

   where SASROOT is the subdirectory in which the SAS System is installed. Check with your SAS system administrator for the location of the SAS System.

2. Include the RUNSAMPL program in the PROGRAM EDITOR window by entering the following statement at a command line:

   ```
   include 'SAS$ROOT:[samples.base]runsampl.sas';
   ```

3. Submit the program.

Appendix I, SAS® Logical Names

Many logical names are created by the SAS System. Some are extremely important to the system, while others are used only for special processing. The following is a list of these logical names and a brief description of what they do.

SAS$ROOT	Root directory for the SAS System. Subdirectories beneath this directory contain all the pieces of the SAS System.
SAS$EXTENSION	Root directory for user-written extensions.
SAS$INSTALL	Root directory for installation procedure files.
SAS$SAMPLES	Root directory for sample programs.
SAS$LIBRARY	Search path for executable images.
SAS$IMAGE	Base SAS image.
SASSHR	Image used for linking shareable images. This image provides a bridge for access between SAS images.
SASMSG	Image used to invoke SAS messages.
SASING	Allows use of SAS/ACCESS Interface to INGRES image.
SASORA	Allows use of SAS/ACCESS Interface to ORACLE image. Refer to Appendix D, "Post-Installation Setup for SAS/ACCESS Software" for more information about this logical name.
SASRDB	Allows use of SAS/ACCESS Interface to Rdb image.
SASSYB	Allows use of SAS/ACCESS Interface to Sybase image.
SASWXFR	Allows use of the WIN/TCP shareable image.
SAS_USS_PRIV	Privileged unloader image. This is a user-written system service used by the UNLOAD option.

SASAUTOS	AUTOCALL library. If a SAS MACRO is used, but not defined in the current SAS System session, the SASAUTOS directory is searched for a SAS program by the same name to resolve the MACRO expansion.
SAS$HELP	Location for SAS System help and maintenance catalogs.
SASAPPL	Location of indexed SAS data sets used by SAS/ASSIST software.
SAS$CNTMISC	Location of the script files used by SAS/CONNECT software.
SAS$FNT	Location for SAS/GRAPH fonts catalog.
SAS$LSEENV	Location of the SAS environment file when using VAXLSE with the SAS System.
SAS$MAPS	Location for SAS/GRAPH map data sets.
SAS$NEWS	The SAS$NEWS logical name provides the SAS system administrator a way of broadcasting information to all SAS users when they start up the SAS System. The contents of a file defined by this logical name are displayed as a header when the SAS System starts up. The appropriate place to define this logical is in the SAS612.COM file, which defines all other logicals used by the SAS System. Not defining SAS$NEWS has no effect on processing.
SAS$DOC	Location of online documentation.
SAS$MSG	Location for SAS System message files.
SAS$SECTION	Default location for TPU section file.
SAS$SITE	Customer site number.
SAS$SITEINFO	Site-specific information file. See Appendix K, "The SITEINFO FILE" for additional information.
SAS$TPUDIR	Default location for TPU editor interface.
SAS$USER	Default location for user profile.
SAS$WORKROOT	Default location for SAS work library.

SAS$XDEFAULTS	Default location for X resource files.

These logicals are used for terminal output:

SAS$TERMINAL	Default terminal output.
SAS$GDEVICE	Default graphics terminal.

These logicals are used by the sample programs:

IMAGFIL	Location of sample *.GIF files for SAS/IMAGE software.
SAMPSIO	Location of sample program data sets and catalogs.
MAPS	Location of SAS/GRAPH map data sets.

For more information on SAS system-wide and user-specified logical names, refer to *SAS Companion for the OpenVMS Environment, Version 6, Second Edition.*

Appendix J, Customizing Site Forms

As the SAS Support Consultant for your site, you have the ability to customize the forms displayed for your operating system. The printer selection list can be customized to display only those printers available for your site. To find out more about customizing the printer selection list, issue the following command from the Display Manager:

```
af c=sashelp.base.pdevice.cbt
```

The VMS Print File Parameters program can be customized for your site if you have SAS/AF software installed. To find out more about customizing the OpenVMS Print File Parameters program, issue the following command from the Display Manager:

```
af c=sashelp.base.formscph.cbt
```

If you have SAS/AF software, you can print these CBTs. To do this, issue the following program statements:

```
proc build c=sashelp.base batch;
print display select=pdevice.cbt;
run;
proc build c=sashelp.base batch;
print display select=formscph.cbt;
run;
```

or

```
proc build c=sashelp.base batch;
print display select=(pdevice.cbt formscph.cbt);
run;
```

To route the output to a file rather than a printer, issue these commands:

```
proc build c=sashelp.base batch;
print display select=(pdevice.cbt formscph.cbt)
 prtfile='file name'; run;
```

Appendix K, The SITEINFO File

The SITEINFO file provides site-specific information in a form that is modifiable by the local SAS site. You can access this file in full-screen mode by typing SITEINFO at the Display Manager command prompt.

The SITEINFO file is defined either by using the SITEINFO command line option (or configuration file.) as follows:

```
$ SAS/SITEINFO=SAS$ROOT:[TOOLS]SITEINFO.TXT
```

or by using the SAS$SITEINFO logical name. If the logical name is defined, the associated file is used. The logical is defined in the SAS startup command file. By default, the definition points to a template found in the file:

```
SAS$ROOT:[TOOLS]SITEINFO.TXT
```

The SAS Installation Representative should modify the contents of the file to include site-specific information. A copy of the template on which these changes should be made is shown in the following example:

```
* SAS Licensed Installation Information:

       Site Number:
         Site Name:

Please provide the above information with all documentation sent to
SAS Institute when reporting a suspected problem.

* Installation Name and Address:

             Name:
          Address:

         Telephone:

* SAS Installation Representative (this is the person to whom SAS
Institute directs all communication about products installed at this
site):

             Name:
         Telephone:

* Installation Consulting Group:

             Name:
         Telephone:
```

Request for help with SAS programming problems should be directed to your installation's consulting group.

* Requests for information concerning SAS courses or other educational services should be directed to the following individual and/or group:

Name:
Telephone:

* Following is a list of SAS Institute software products installed at this site:

Institute Program Product	Name	Model Group	CPU Serial
Use this column to list SAS software installed at your site; include version numbers:	Use this column to list Model Name:	Use this column to list CPU Group:	Use this column to list serial numbers:

Appendix L, Creating Translate Tables with PROC TRANTAB

If you want to provide your own collating sequences or change a collating sequence provided for you, use the TRANTAB procedure to create or modify translate tables. For complete details on the TRANTAB procedure, refer to SAS Technical Report P-197, *The TRANTAB Procedure, Release 6.06.*

When you create or modify a translate table, the new table is stored in your SASUSER.PROFILE catalog. This new table will override any translate tables by the same name stored in the SASHELP.HOST catalog.

Note: System managers can modify the SASHELP.HOST catalog by copying newly created tables from the SASUSER.PROFILE catalog to the SASHELP.HOST catalog. Then all users can access the new or modified translate table.

If you are using Display Manager and want to see the names of the collating sequences stored in the SASHELP.HOST catalog, issue the following command from any window:

```
catalog sashelp.host
```

If you are not using Display Manager, issue the following statements to generate a list of the contents of the SASHELP.HOST catalog:

```
proc catalog catalog=sashelp.host;
contents;
run;
```

The collating sequences are catalog entries of type TRANTAB.

If you want to see the contents of a particular translate table, use the following statements:

```
proc trantab table=table-name;
list;
run;
```

The contents of collating sequences are displayed in the SAS LOG window.

Appendix M, Instructions for Graphics Devices on OpenVMS

Getting Help on Graphics Devices and Drivers

If you are using the SAS System interactively, you can also obtain details on using graphics devices by entering `HELP` on the command line of the `PROGRAM EDITOR` or `LOG` window under SAS Display Manager. When the main `HELP` menu is displayed, select `GRAPHICS` then select `GRAPHICS DEVICES AND DRIVERS` from the `GRAPHICS HELP` menu. These `HELP` windows contain information on configuring specific devices and the `GOPTIONS` required to send output to them.

Setting Up and Modifying Device Catalogs

After installing SAS/GRAPH software, you may need to create or modify device catalog entries in order to customize device driver output to your site's needs. This section gives a brief explanation of device catalogs and explains how to handle catalog entries that may need to be modified. For complete details on managing device catalogs, refer to Chapter 25, "The GDEVICE Procedure," in the *SAS/GRAPH Software: Reference, Version 6 Edition;* pages 36 through 52 in SAS Technical Report P-215, *SAS/GRAPH Software: Changes and Enhancements, Release 6.07* and *SAS/GRAPH Software: Using Devices in the VMS Environment* (referred to as the OpenVMS Hardware Guide).

How Device Catalogs Are Used

In Version 6 SAS/GRAPH software, the name of a graphics device driver that you specify using the `DEVICE=` or `TARGET=` options corresponds to an entry in a device catalog. Device catalog entries contain default characteristics (such as graph size, picture orientation, and default colors) used by the driver. You can change the characteristics used by a driver by modifying its entry in the device catalog or by specifying `GOPTIONS` that override settings in the catalog entry. Some options can only be set in the driver entry. For more information, refer to Chapter 5, "Graphics Options and Device Parameters Dictionary" in the *SAS/GRAPH Software Reference, Version 6 Edition.*

For example, if you specify `DEVICE=HP7550`, the SAS/GRAPH procedure attempts to find an entry named `HP7550` in available device catalogs. The parameters found in the entry (such as the default graph size, graph orientation, or output destination) are used to generate the graph. If you want to change the way the driver produces output, use the `GDEVICE` procedure to modify parameters in the catalog entry, or override the parameters with a `GOPTIONS` statement.

If you want to change defaults for a single session or job, use a GOPTIONS statement. If you want to permanently change the default parameters used by a driver, create a new device entry or modify an existing one. When the installation procedure installs the SAS/GRAPH product, an Institute-supplied device catalog, SASHELP.DEVICES is made available. This catalog contains over 300 entries, covering each graphics device and model that SAS/GRAPH software supports. Individual users or groups can create their own device catalogs. Device catalogs that you create have logical names GDEVICE0.DEVICES through GDEVICE9.DEVICES. When a driver name is specified in a SAS program, the SAS System looks for the corresponding entry in GDEVICE0.DEVICES, GDEVICE1.DEVICES, etc. If it does not find the entry in any of the user catalogs (or the catalogs do not exist), it searches the Institute-supplied catalog, SASHELP.DEVICES.

Note: Use a LIBNAME statement to associate GDEVICE0 with the directory in which you are creating your device catalog.

How and When to Modify Catalog Entries

If you need to make changes to a device entry, consider whether the changes affect an individual user or multiple users at a site. If the change affects only one user, that user should create a device catalog (GDEVICE0.DEVICES), copy the device entry from SASHELP.DEVICES, and make the changes to the entry in GDEVICE0.DEVICES. Note that GDEVICE0.DEVICES is an individual user catalog and is usually a unique catalog for each user. If the modification affects a large number of users (or if the SAS System is being run on a single-user workstation), the SAS Installation Representative or SAS Support Consultant can make modifications to an entry in SASHELP.DEVICES.

Examples

The following examples illustrate how to use device catalog parameters to spool output directly to a hard copy device. The examples first illustrate GOPTIONS and FILENAME or host statements that can be used to produce output. Then it is shown how equivalent parameters can be specified in device entries, eliminating the need for the statements in the end users' programs.

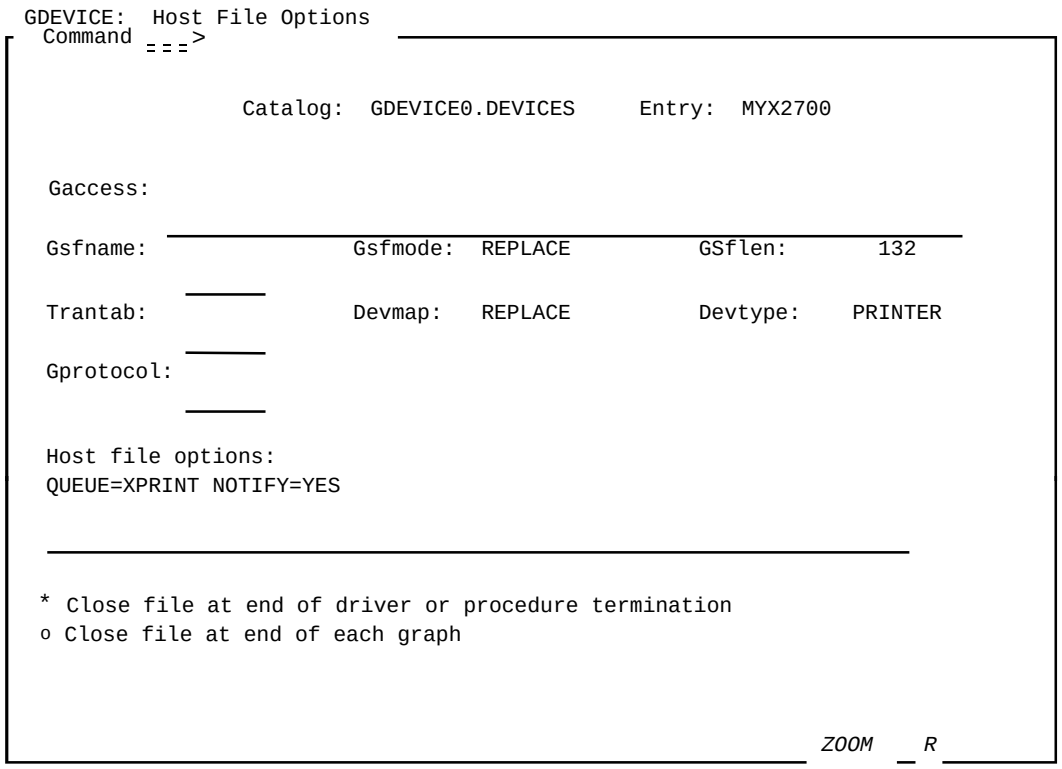
Spooling Directly to a Printer Queue

Suppose you want to use the X2700 driver and send the output directly to a Xerox 2700 printer attached to an OpenVMS host. If the queue name for the printer is XPRINT, use the following GOPTIONS and FILENAME statements to send graphics output to the Xerox 2700 printer:

```
/* define fileref and queue attributes for output */
filename gsasfile printer queue=xprint notify=yes;

/* specify device driver, fileref for GSF,  */
/* mode, and record length                  */
goptions dev=x2700 gaccess=gsasfile gsfmode=replace gsflen=132;
```

Note: You can also accomplish this task with the GSFNAME= option.

You can achieve the same results by creating your own driver with the GDEVICE procedure and specifying host file options. The following display shows the Host File Options window for the modified device entry MYX2700. You can enter these values using GDEVICE windows or with line-mode GDEVICE statements.



The information on the Host File Options window causes SAS/GRAPH software to send the output to the queue specified on the Host file options field using parameters specified on that line. The file is released when the SAS/GRAPH procedure terminates.

Note: Because a temporary spool file is being dynamically created, you do not need to specify GACCESS=GSASFILE.

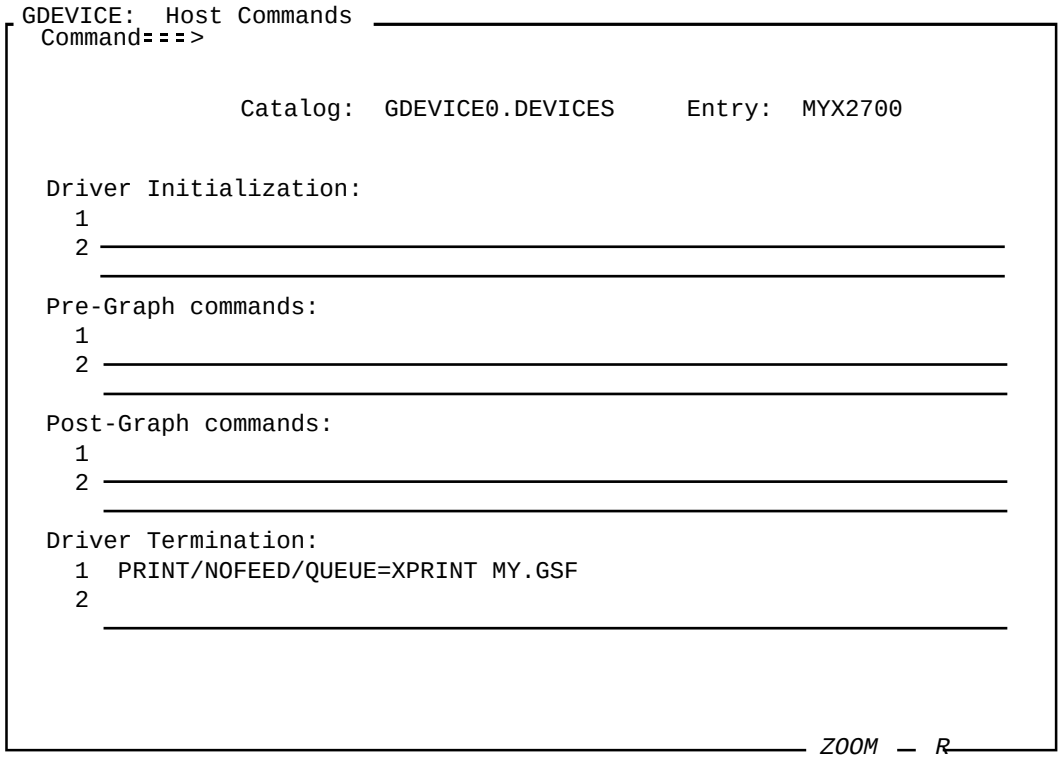
Creating a Graphics Stream File and Sending it to an OpenVMS Printer Queue

Suppose in the previous example you want to create a graphics stream file and use the OpenVMS PRINT/QUEUE command to send the file to your printer. If the queue name for the printer is XPRINT, you can use the following program, which uses GOPTIONS and FILENAME statements to create the graphics stream file, and send the graphics output to the printer queue using the OpenVMS PRINT/QUEUE command.

```
/* define fileref for graphics stream file */
filename gsasfile 'my.gsf';

/* specify device driver, fileref for GSF,  */
/* mode, and record length                  */
goptions dev=x2700 gaccess=gsasfile gsfmode=replace gsflen=132;

/* send SAS/GRAPH procedure output to the graphics stream file */
proc gslide;
    title 'Example of creating a graphics stream file';
run;
quit;
filename gsasfile clear;   /* to clear file reference */

/* to release the graphics stream file to the printer */
x print/nofeed/queue=xprint my.gsf;
```

You can achieve the same results by creating your own driver with the GDEVICE procedure and specifying the host file options and host commands. The next two displays show the Host File Options window and the Host Commands window, respectively, for the modified device entry MYX2700. You can enter these values using GDEVICE windows or with line-mode GDEVICE statements.

```
GDEVICE:  Host File Options
 Command___>

               Catalog:  GDEVICE0.DEVICES     Entry:  MYX2700

 Gaccess:  sasgastd>my.gsf

 Gsfname:                Gsfmode:  REPLACE          GSflen:     132

 Trantab:                Devmap:   REPLACE          Devtype:    DISK

 Gprotocol:

 Host file options:

 ____________________________________________________________________
 ____________________________________________________________________

* Close file at end of driver or procedure termination
o Close file at end of each graph

                                                          ZOOM  _ R
```



The information in the `Host File Options` window causes the driver to send the output to the file `MY.GSF`, and the information in the `Driver Termination` field of the `Host Commands` window executes the `PRINT/QUEUE` command when the procedure terminates.

Use the following guidelines when creating or modifying device entries:

- Only the SAS Installation Representative or SAS Support Consultant should add or modify entries in `SASHELP.DEVICES`. End users should not have update access to `SASHELP.DEVICES`, with the exception of users working on individual workstations. If individual users need to make modifications on a multi-user system, they should create their own `GDEVICE0.DEVICES` catalog.

- If a catalog entry needs to be modified, create a new entry (with a different name) and modify the new entry. Renaming modified entries ensures that the original entries supplied in the `SASHELP.DEVICES` catalog use default settings.

- If a parameter needs to be changed only for a single session, use a `GOPTIONS` statement to override equivalent parameters in a device catalog.

SAS/GRAPH Linkable Driver

If you have a device that uses vendor-supplied plotting subroutines and does not already have a SAS/GRAPH driver, you can create a driver using our Linkable driver routines. Devices that may require a Linkable driver include many Versatec models, Xerox 9700 series printers, and older CalComp or Zeta models. For instructions on creating drivers for these devices (or if you have created a Linkable driver for a previous release of SAS/GRAPH software), contact SAS Institute Technical Support.

Appendix N, Adding SAS® HELP to an OpenVMS Help Library

In order for users to get online help when invoking Release 6.12 of the SAS System under OpenVMS, the system manager may want to produce an OpenVMS help library containing information on the SAS System. The file SAS$ROOT:[TOOLS]SAS.HLP, which contains text in the correct format for creating an OpenVMS help library, is included on the installation media. You can choose to create a separate library for SAS HELP or you can insert this information into an existing help library at your site. Note that this OpenVMS help information does not replace or supersede the help available during a SAS session.

Creating a New OpenVMS Help Library

To create a new OpenVMS help library that contains only the SAS System help information, you need to use the OpenVMS library facility to create the library, as shown in the following example:

```
$ LIBRARY/HELP/CREATE=(BLOCKS:140,MODULES:1) -
  SAS$ROOT:[TOOLS]SAS.HLB -
  SAS$ROOT:[TOOLS]SAS.HLP
```

You must also define a HLP$LIBRARY logical name to point to this help library. For example, to define this help library for all users, you should insert the following line into your system startup file, SYS$MANAGER:SYSTARTUP_VMS.COM:

```
$ DEFINE/SYSTEM HLP$LIBRARY SAS$ROOT:[TOOLS]SAS.HLB
```

If you already have a HLP$LIBRARY logical name defined for some other help library, you may use HLP$LIBRARY_1, HLP$LIBRARY_2, and so on. Refer to the *OpenVMS Command Definition, Librarian, and Message Utilities Manual* for further information.

Adding to an Existing OpenVMS Help Library

To add the SAS System help information to an existing help library, you need to use the OpenVMS library facility to insert the SAS help information into the existing library:

```
$ LIBRARY/HELP/INSERT existing_library_name SAS$ROOT:[TOOLS]SAS.HLP
```

where *existing_library_name* refers to an existing help library on your system.

You should already have defined a corresponding HLP$LIBRARY logical name for your help library.

Appendix O, The Directory Structure of SAS/TOOLKIT® Software

SAS/TOOLKIT software has the following directory structure:

Root Directory for SAS/TOOLKIT Software:

```
SAS$ROOT:[TOOLKIT]
```

Required Files and Global Examples:

```
SAS$ROOT:[TOOLKIT.GLOBAL.GRM]
                       .OBJ]
                       .TEST]
```

C Component and Samples:

```
SAS$ROOT:[TOOLKIT.C.CNTL]
                  .LOAD]
                  .MACLIB]
                  .OBJ]
                  .SRC]
```

FORTRAN Component and Samples:

```
SAS$ROOT:[TOOLKIT.FTN.CNTL]
                    .LOAD]
                    .MACLIB]
                    .OBJ]
                    .SRC]
```

Appendix P, Accessing SAS® Samples

Sample programs for SAS products are provided on the installation tape. A SAS Installation Representative may choose not to load the sample program onto the system during the initial install. If they are needed later, they can be installed with the installation procedure. There are several logicals provided to access the data used in sample programs. Two of the logicals that are used as librefs in the sample SAS programs are:

`SAMPSIO`	This logical is used to access SAS data sets and catalogs needed for the samples.
`MAPS`	Location of SAS/GRAPH map data sets.

For more information concerning the SAS samples, refer to *SAS Consultant's Guide: Supporting the SAS System, Second Edition*.

Government Notice

If you are a government site or a government contractor, a file that contains important information specific to your site is unloaded during the product-loading phase of the installation procedure. The file is located in:

```
SAS$ROOT:[TOOLS]GOVERNMENT.NOTICE
```

Note: It is important that you read and make other users at your site aware of this file by using one of the three options listed.

1. To add the government notice information to an existing OpenVMS help library (see Appendix N, "Adding SAS Help to an OpenVMS Help Library"), follow the first two steps listed under option 1. Then add the `HELP` member to the existing help library by executing the following command:

   ```
   $ LIBRARY/HELP/INSERT existing_library_name -
      GOVERNMENT.NOTICE
   ```

   where *`existing_library_name`* is an existing help library on your system.

2. To add the government notice information to `SAS$ROOT:[HELP]NEWS.DOC`, execute the following commands:

   ```
   $ SET DEFAULT SAS$ROOT:[HELP]
   $ CONVERT/APPEND SAS$ROOT:[TOOLS]GOVERNMENT.NOTICE -
      SAS$HELP:NEWS.DOC
   ```