C H A P T E R

14

Special Considerations for SAS/AF Programmers

Controlling the Appearance and Behavior of the SAS System

The SAS System under Windows provides SAS/AF programmers with extensive control over the appearance and behavior of the main SAS window. You can:

- □ use SAS system options and windowing environment commands to control the appearance of the main SAS window
- □ call external dynamic link libraries (DLLs) using the DATA step or SAS Component Language (SCL) commands
- □ design, save, and load custom toolbar controls
- □ immediately invoke SAS/AF programs when you start the SAS System
- □ distribute the minimum subset of SAS files needed to run a particular SAS/AF application
- □ associate your own logo and icons with your SAS/AF applications
- □ use SCL code to send electronic mail to other users
- □ invoke a web browser to view documents online.

Controlling the Main SAS Window

SAS system options and windowing environment commands make it possible to change the appearance and behavior of the main SAS window so much that end users might not recognize it as the SAS System.

SAS System Options that Control the Main SAS Window

Table 14.1 on page 260 lists the system options that provide control over the main SAS window.

Table 14.1 SAS System Options for the Main SAS Window

Option	Description
AWSCONTROL	Remove system controls such as the title bar, system menu, and minimize and maximize buttons from the main SAS window.
AWSDEF	Specify the location and dimensions of the main SAS window when the SAS System initializes.
AWSMENU	Specify whether to display the main SAS window menu bar.
AWSMENUMERGE	Specify whether to include common options in the main SAS window menu bar (for example, the **Window** and **Options** menus).
AWSTITLE	Specify the text that appears in the title bar of the main SAS window.
ICON	Iconize (minimize) the main SAS window at SAS System initialization.
REGISTER	Specify other Windows programs to be included as options on the AWS **File** menu.
SASCONTROL	Remove system controls and the minimize and maximize buttons from SAS application windows.
SOLUTIONS	Adds or removes the Solutions menu to or from all menus.
SPLASH	Specify whether the logo (splash screen) is displayed when the SAS System starts.
SPLASHLOC	Specify the location of the bitmap that contains the splash screen you want to display when SAS starts.
WEBUI	Specifies whether the web enhancements that select objects by pointing the mouse cursor and using a single mouse-click to invoke the default action are enabled.
WINDOWSMENU	If NOAWSMENUMERGE is specified, this option determines if the Window submenu is included in the main menu.

Windowing Environment Commands that Control the Main SAS Window

Table 14.2 on page 260 lists the windowing environment commands that you can use to control the appearance and behavior of the main SAS window.

Table 14.2 SAS Windowing Environment Commands for the Main SAS Window

Option	Description
AWSMAXIMIZE	Maximizes the main SAS window.
AWSMINIMIZE	Minimizes the main SAS window.
AWSRESTORE	Restores the main SAS window to its previous state.
COLOR	Sets the color for various components of the application windows.

Option	Description
COMMAND	Controls the appearance of the command bar or dialog box.
DLGABOUT	Invokes the About dialog box.
DLGCONVERT	Invokes the Convert dialog box for a selected OLE object.
DLGCDIR	Invokes the Change Folder dialog box.
DLGENDR	Invokes the Exit SAS confirmation dialog box.
DLGFIND	Invokes the Find dialog box.
DLGFONT	Invokes the Fonts Selection dialog box.
DLGLIB	Invokes the Libraries dialog box.
DLGLIBMAINT	Invokes the Modify Library dialog box.
DLGLINKS	Invokes the OLE Links dialog box.
DLGOPEN	Invokes the Open dialog box.
DLGPAGESETUP	Invokes the Page Setup dialog box.
DLGPREF	Invokes the Preferences dialog box.
DLGPRT	Invokes the Print dialog box.
DLGPRTPREVIEW	Invokes the Print Preview window.
DLGPRTSETUP	Invokes the Print Setup dialog box.
DLGREPLACE	Invokes the Replace dialog box.
DLGRUN	Invokes the Run dialog box.
DLGSAVE	Invokes the Save As dialog box.
DLGSMAIL	Invokes the E-mail dialog box.
NEXTWIND	Displays the next open SAS window.
PMENU	Toggles the command lines on or off in the windowing environment.
PREVWIND	Display the previous open SAS window.
RESHOW	Redisplays the SAS windows that are currently open.
TOOLCLOSE	Closes the toolbox or toolbar.
TOOLEDIT	Invokes the Customize... dialog box.
TOOLLARGE	Toggles the size of the toolbar buttons.
TOOLLOAD	Opens the toolbox or toolbar with the specified configuration.
TOOLSWITCH	Toggles whether the toolbar associated with the active window is automatically loaded.
TOOLTIPS	Toggles the ToolTips on or off.
WATTACH	Toggles whether the contents of the active window are attached to e-mail that you send through SAS.
WDOCKVIEW	Enables dockable windows.
WEMAILFMT	Specifies the format (.RTF or .TEXT) of any text window you attach to an e-mail message.
WHIDECURSOR	Suppress display of the cursor.

Option	Description
WHSBAR	Toggles the horizontal scroll bars on or off.
WINSERT	Toggles the insert mode on or off.
WMENUPOP	Enables or disables the pop-up menus in the SAS application windows.
WMRU	Specifies how many filenames to retain in the list under the File menu.
WNEWTITLE	Clears the contents of the active window and removes its title.
WPOPUP	Causes the pop-up menu for the active window to appear.
WSCREENTIPS	Toggles the ScreenTips on or off.
WSTATUSLN	Toggles the status line on or off, and controls the area proportions.
WUNDO	Undoes the previous editing action.
WVSBAR	Toggles the vertical scroll bars on or off.
WWINDOWBAR	Displays the window bar at the bottom of the main SAS window.
ZOOM	Maximizes the active SAS application window.

Accessing External DLLs from the SAS System

You can access routines that reside in external dynamic link libraries (DLLs) by using the SAS MODULE family of functions within a DATA step or SCL. This lets you access DLLs that you create or purchase; you can even access operating system DLLs.

To access an external DLL, you must know:

□ the name of the DLL
□ the function name or ordinal
□ a description of the function's arguments
□ a description of the return code.

CAUTION:
Only experienced programmers should access external DLLs. When you access an external DLL, you are passing control of your computer from the SAS System to the DLL function. If done improperly, or if the DLL function is unreliable, you might lose data or have to reset your computer (or both). △

The general steps for accessing an external DLL routine are:

1 Create a text file that describes the DLL routine you want to access, including the arguments it expects and the values it returns (if any). This attribute file must be in a special format.

2 Use the FILENAME statement to assign the SASCBTBL fileref to the attribute file you created.

3 In a DATA step or SCL code, use MODULE, MODULEN, or MODULEC to invoke the DLL routine. The specific function you use depends on the type of expected return value (none, numeric, or character). (You can also use MODULEI, MODULEIN, or MODULEIC within a PROC IML step.)

Note: The MODULE routines can be a flexible and powerful tool, especially when used with the SASCBTL file, SAS formats and informats, and other SAS routines. As

such, you should be extremely careful when invoking external routines; if done improperly, you might lose data or have to reset your computer. △

For complete information about accessing DLLs from within SAS, see Chapter 13, "Accessing External DLLs from the SAS System," on page 239.

Designing, Saving, and Loading Custom Toolbar Controls

You can provide the users of your SAS/AF application with easy-to-use tools by creating a custom toolbar configuration. You can assign these tools to represent any windowing environment command. For complete information about creating and saving custom toolbars, see "Customizing the Toolbar" on page 71.

If you distribute your SAS/AF application to other machines, be sure to include the catalog entry that contains your custom tool configuration.

By default, tool switching is enabled, which allows the use of a custom toolbar in your SAS/AF application. Tool switching can be disabled by issuing the TOOLSWITCH OFF command.

Invoking SAS/AF Applications Automatically

The SAS System provides a system option, INITCMD, that lets you invoke SAS/AF programs automatically. When you use this option, the SAS System does not create the PROGRAM EDITOR, LOG, or OUTPUT windows but instead runs the SAS/AF applications and windowing environment commands that you specify.

The general syntax of the INITCMD option is:

-INITCMD "*af-command*" <*DM-command-1…DM-command-n*>

where *af-command* is a command to start an AF application, and *DM-command-1* through *DM-command-n* are any windowing environment commands.

For example, the following option specification starts a SAS/AF application and loads a custom tool bar:

```
-initcmd "AF c=mylib.myapp.myfirst.frame;
   toolload bar mylib.myapp.profile.toolbox"
```

For more information about the INITCMD system option, see *SAS Language Reference: Dictionary*.

Creating a Scaled-Down Version of the SAS System for Distribution

Version 8 of the SAS System for Windows provides a file resource tracking facility that allows you to keep track of which files the SAS System uses during a particular SAS session. This information can be valuable for several reasons:

☐ You can create and distribute a subset of the SAS System to licensed users at your site who run a particular SAS application. These users might not need all of the SAS System resources that are installed by default.

☐ You can create scaled-down versions of the SAS System for use on portable or notebook computers for which disk space is scarce.

☐ You can customize the global installation of the SAS System at your site to optimize use of disk space on individual machines.

To generate a list of files that the SAS System opens and closes during a particular session:

1 Specify the RTRACE and RTRACELOC system options when starting the SAS System. You can specify these options in the command line defined in the SAS program item in Windows, in the SAS configuration file, or as part of a SAS command that you specify. (For more information about specifying options when starting the SAS System, see "Syntax for System Options in the SAS Invocation or SAS Configuration File" on page 396.)

The syntax of the options is:

```
-rtrace all -rtraceloc c:\sas\filename.ext
```

where *filename.ext* is the name of the file to which the SAS System will write the list of opened files.

2 During the SAS session, perform the actions that a user who will be working with the subset of SAS files will perform. For example, if a user will use a particular SAS/AF application, run that application during this session.

> **CAUTION:**
> **If you do not include all of the necessary files in your scaled-down version of the SAS System, you might get unexpected results from your SAS application.** To ensure that all of the necessary file resources are recorded, you must traverse *every* path in your SAS session that an end user of the scaled-down version could traverse. (If you are running a SAS/AF application, exercise every possible path, including error conditions.) Otherwise, you might fail to include a necessary file in your run-time version of the SAS System. If you do not include all of the necessary files in your scaled-down version of the SAS System, you might get unexpected results from your SAS application. △

3 When you are finished with the SAS session, exit the SAS System. Be sure to remove the RTRACE and RTRACELOC option specifications from wherever you put them (for example, the SAS program item or SAS configuration file).

This procedure leaves you with a list of the files (located in *filename.ext*) that the SAS System opened and closed during your SAS session.

You can use the COPYSAS autocall macro to create a batch program to copy this subset of files. This makes the task of distribution automated and simple.

To use the COPYSAS macro to create a copy script for a scaled-down version of the SAS System, submit a statement of the form

%COPYSAS (*copydir,rtracelog, cpcmd, scriptloc, mkcmd*)

where:

copydir	is the destination SAS root directory for the scaled-down version. You can specify *copydir* as a local directory (for example, `c:\mysas`) or as a network path (for example `\\server\share\pubsas`).
rtracelog	is the log file created using the RTRACE and RTRACELOC system options.
cpcmd	is the DOS copy command, with options, that you want to use in the copy script. The default is `copy /v`.
scriptloc	is the location of the resulting batch file containing the copy commands. The default is COPYSAS.BAT in your SASUSER subdirectory.
mkcmd	is the DOS make directory command, with options, that you want to use in the copy script. The default is `mkdir`.

For complete information about the COPYSAS macro, see "COPYSAS Autocall Macro" on page 487.

Associating Your Own Logo and Icons with Your SAS/AF Application

You can substitute your own logo screen and icons in place of those provided by the SAS System.

Note: These procedures involve creating resources for and building your own dynamic link libraries (DLLs). For more information on creating DLLs, see the Microsoft Win32 Software Development Kit. △

To display your own logo when the SAS System starts:

1 Create the logo you want to display and save it either as a Windows bitmap (which has a BMP file extension), or compile it as resource and build it into a DLL.

2 When you invoke SAS, specify the SPLASHLOCATION option with the full pathname of the file that contains your bitmap. If the bitmap is in a DLL, be sure to specify the resource number as well. The default resource number is 1. For more information, see "SPLASHLOC" on page 464.

Your logo will display when you start the SAS System.

To use your own icons with your SAS/AF application:

1 Use the USERICON system option when you start the SAS System to specify the resource file that contains the icons you want to include. You must use the Windows software development tool to compile the resource file. For more information about the USERICON option, see "USERICON" on page 473.

2 Use SAS/AF software to create a FRAME entry.

3 On the FRAME entry, select **Make** from the popup menu. (Alternatively, you can create a region and then select **Fill** from the popup menu.)

4 Select **Icon** from the selection list.

5 From the Icon Attributes display, select the **Current Icon** button.

6 Select the **User-defined** radio button to display the icons in your resource file.

7 From the Select an Icon display, choose the icon you want to use. If there are more icons than will fit in the window, use the scrollbars to see the rest of the icons.

Incorporating Electronic Mail into Your SAS/AF Application

You can associate SCL code with buttons and fields in a FRAME entry to create your own interface to electronic mail. The SAS System provides methods to interface with VIM- and MAPI-compatible electronic mail programs.

Using SCL code, you can specify who should receive mail (TO and CC), the subject of the mail, the body of the message, and any files you want to attach to the message. "Sending Electronic Mail from within the SAS System" on page 161 describes the e-mail functions that the SAS System facilitates and contains examples of DATA step and SCL code.