

Increased Productivity Through The Use Of The SAS® Display Manager System

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Abstract

The SAS Display Manager System provides an interactive, full screen option to SAS System operation, often offering multiple alternatives for accomplishment of the same task. Through the exploration of a selection of Display Manager windows, primary consideration is given to features and commands that will be of greatest benefit for session management and will most expand user productivity. While various SAS products extend the features of Display Manager, attention is limited to a Base SAS implementation. The weight of observation is applicable to all SAS installations, however, limited comments specifically address MVS or Microsoft Windows.

Introduction

Display manager is a windowed environment of named objects and commands. Each window act upon Display Manager commands for the accomplishment of a specific task(s) or function(s).

SAS For Windows 6.08
Display Manager Windows



All but primary windows must be opened for use and can be closed. Once opened, a window remains open for the remainder of the SAS

session unless it is specifically closed. Note that a window may be open while not being visibly displayed. Only one window is active at any time. One method of making a window active, which would include opening the window if needed, is to enter the window's name as a display Manager command. Also, a window can often be opened or made active by its relationship to the active window. Activation is at the discretion of the user for conventional windows. However, Requester windows and Dialog Boxes are system activated. Requestor windows provide notice of system safeguards and require a response. While not directly invokeable, activation of Requestor windows results from user activity. System Dialog Boxes activate as a result of item selection from menus of the PMENU facility. Acting as a system request for information, the user may elect to exit a Dialog Boxes without supplying requested information.

Display Manager offers the advantages of being highly interactive and flexible. The environment can be modified to enhance the productivity of the individual user. Novice and advanced SAS user alike can interact with the SAS system according to their level of expertise. Developers can benefit from using a modular, step by step approach that provides immediate feedback and the opportunity for adjustment. Program code may be submitted, recalled, and edited across multiple screen displays. Display Manager gives the user

considerable control over the management of many critical environmental factors.

Session Initiation

Initiating a Display Manager session is site and system dependent. It might necessitate a command invocation, menu selection, or could be accomplished with a point and click on an icon. Upon invocation, the SAS System searches for an Autoexec file and automatically executes its contents of valid SAS statements. An Autoexec file is specified as a system option and the syntax for file specification are system dependent.

An AUTOEXEC can be a convenient location to specify system, session, and graphic options. Allocations for frequently used libraries and files can also be included.

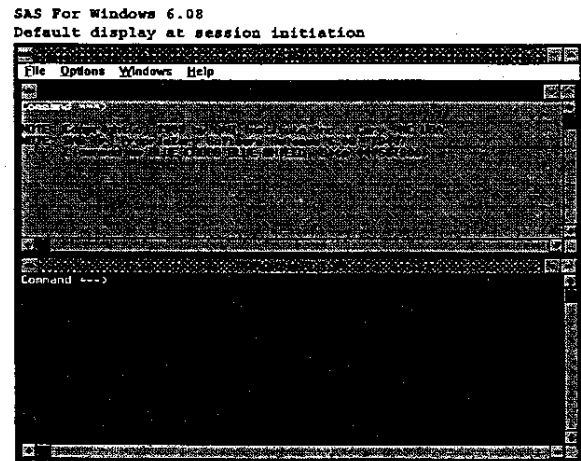
```
.....  
/*** SAS AUTOEXEC FOR VERSION 6.08 ***/  
.....  
/.....  
/*** SET CONNECT OPTIONS ***/  
.....  
OPTIONS SET=VQDLLNAME 'ACS3EHAP'  
          COMAMID=EBLLAPI  
          REMOTE=D  
          PAGESIZE=45  
          LINESIZE=145;  
.....  
/.....  
/*** ALLOCATE CONNECT SCRIPT FILE ***/  
.....  
FILENAME RLINK 'C:\SAS\CONNECT\SASLINK\TSO.SCR';  
.....  
/.....  
/*** SETUP DISPLAY MANAGER ENVIRONMENT ***/  
.....  
DM 'CAPS ON;MUMS ON;OUT;LIST OFF;MGR;ZOOM ON;' LOG;
```

Use of an Autoexec file to individualize Display Manager provides documentation of changes made, makes it an easy matter to return Display Manager to its default setting, and will automatically take effect with the invocation of each session.

Primary Windows

Users of Display Manager are confronted with an extensive number of alternative methods for managing a SAS session and accomplishing tasks within a windowed environment. Upon initiation of a Display Manager session, the windows of the Program Editor, the Output, and the Log are opened. However, display is limited to the Program Editor and Log. The Output window, while open, is not visible. As most windows are movable and sizable object, a single window may fill the display or the display area may be shared by multiple objects.

A window may be open without being displayed. Invoking a window will open it if it is closed or makes it active if it is open. The commands of NEXT and PREVWIND may be used to sequence through the open windows making each active in its turn. Toggle the ZOOM command to cause a window to share or fill the display area. Most windows may be closed with an END command.



A fourth window, the Output Manager, completes Display

Manager's primary window set. These core windows are tightly coupled to accomplish the base functions of code editing and execution, output management, and the recording of session activities.

Principally for the editing and submitting of program code, the Program Editor is also useful for displaying files. The SUBMIT command submits all SAS statements from the Program Editor. Text Editor Commands are available to Program Editor for the manipulation of text that can span multiple screen displays. Open by default, the Program Editor cannot be closed.

The Log is a temporary journal of a SAS session. Included are notes, warnings, error messages, and statistics that are relevant to the outcomes of DATA and PROC steps. Additionally, the outputs of some SAS procedures are displayed in the SAS log. Available for the SAS session, on most systems the Log can be cleared but cannot be closed.

Outputs produced by a DATA step or most SAS procedures are normally directed to the open output window(s). Both the Output and the Output Manager may be open at the same time, or either may be closed at any time.

According to the SAS[®] Language, Reference Version 6 First Edition, it is required that one output window or the other be open during a session. It is also documented that, assuming both are not open, closing one output window will act as a toggle to open the other. However, SAS 6.08 for MVS and Windows will allow both output windows to be closed at the same

time. When neither OUTPUT is open, outputs route into the closed windows and are displayed upon an OUTPUT window being reopened.

System initialization opens the Output window for the collection of an appended listing of the session's output. However, with each newly created output, default parameters will cause processing to suspend following the generation of a single output page. The user must act upon the page of display before the system will continue to produce output or accept additional DATA or PROC steps for execution. Taking an action within Output, such as clearing the window, will globally impact appended output.

Expanding the functional scope of the Output window, actions taken within the Output Manager are applied to specific instances of output. The Output Manager is a session directory where each output is presented in the order that it is created. The name of the step that generated the output, a beginning page number and page count, a textural description, and an indicator if the output has been modified are displayed. Beyond the functions of browse, file, and print, Output Manager allows for description modification and for the editing of the output itself.

By defaulting to Output at system initiation, Display Manager takes on the role of protecting the user from excessive resource use. Suspension of processing and forced action are the costs for this 'protect me from myself' philosophy. A preferred alternative is to close Output and open Output Manager at system invocation. Options of the Output window are available that

will also allow for full output generation, however, directory functions of the Output Manager have considerable advantages over an appended listing of outputs. With Output closed, each output will be generated in full without the suspension of processing. The user takes the responsibility to control output generation through the use of data selection criteria and Data Set options.

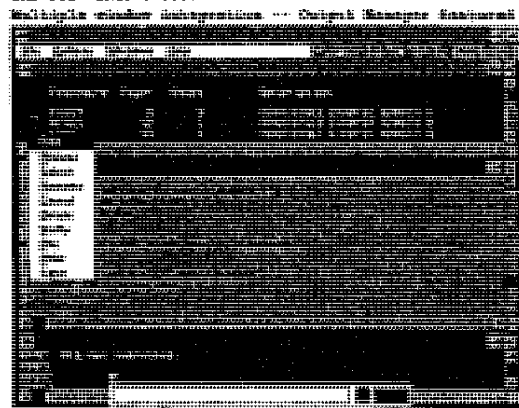
Commands to open output windows:

OUT or OUTPUT or LIST ON
MGR or MANAGER

Commands of close output windows:

LIST OFF
MGR OFF or MANAGER OFF

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Use of the OUT command will open the Output window if closed or make the window active if open. However, if both output windows are open at the same time, the OUT command will act a toggle between Output and Output Manager.

Display Manager Commands

Applying a basic set of commands against the primary windows allows for fundamental Display Manager use. Multiple methods of submitting commands for execution are offered. While the command line, PMENU facility, and function keys are available in all environments, different sites

and host systems will use different defaults. Users may toggle between the command line and the PMENU facility. In addition to the methods mentioned, SAS for Windows uses popup menus as the preferred command style. SAS for Windows also offers the command line for experienced SAS users and a menu bar (PMENU facility) as a navigational aid to novice users of SAS.

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Global Commands



SAS For Windows 6.08
Global Commands -- Continued



Command Line

A command line will accept one or more Display Manager commands in text form. Like multiple SAS language statements, multiple Display Manager commands must individually end in a semicolon. Exclusive use of the command line would require the user to have extensive SAS knowledge.

PMENU Facility

The PMENU facility consists of an action bar and pull down menus for point and click command execution. Depending upon the host system's level of point and click support, the PMENU facility can be tedious and frustrating. Under MVS, my PMENU experience is negatively colored by a poor point and click configuration that may be site specific. While novice SAS users may benefit from PMENU use, increase productivity by utilizing an alternate method of command execution.

Function Keys

Individual or multiple Display Manager commands may be assigned to function keys. Also, DATA Step, SAS Procedure and macro statements may be submitted by entry of a single function key. Function key assignment offers significant ease of command or system execution.

The Display Manager provides for function key assignment through the KEYS window, the KEYDEF command or the %KEYDEF statement. Permanent assignment may be made through the KEYS window while assignments by command are limited to the duration of the SAS session or until changed.

Text Editor

Most persons who are familiar with MVS text editors should be comfortable with the full-screen editing facility of the SAS Text Editor. Text Editor may be used in several windows of the Display Manager and some windows of non-Base SAS products. However, Text Editor is of greatest benefit in the Program Manager to manipulate and modify program code. In addition to the editing and movement of text, the Text Editor includes spell checking and undo.

Text Editor

Command Line Commands

A selection of Text Editor commands may be issued from the command line. These command line commands may also be assigned to function keys.

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Command Line Commands

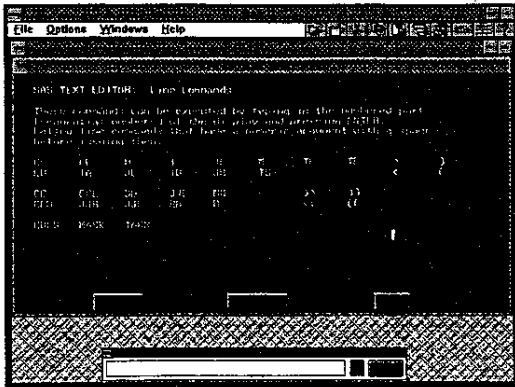


Text Editor Line Commands

Issue of the command NUMS will act as a toggle for line numbering in the Program Editor window. While numbered lines is the default for MVS, line numbers must be activated for SAS for Windows.

Blocks of code that span multiple text displays may be manipulated with line commands. Most commonly, line commands are issued from within the line numbered display. However, by preceding a line command with a colon, the command may be issued from the command line. After entering on the command line, position the cursor in the line that is to be effected and issued the command.

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Text Editor -- Line Commands



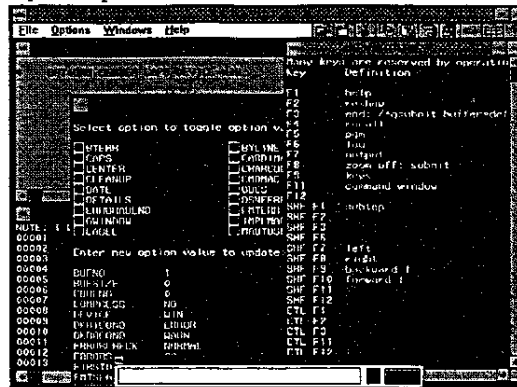
While behaving somewhat differently on different host systems, the UNDO command will restore text that has been changed by use of a Text Editor command. Issuing UNDO multiple times will cause text to be restored from the most recent edit command and continuing backward through the session.

Session Management

Flexible management of a SAS session is a major productivity advantage of Display Manager. The Keys and Options windows have the potential to effect Display Manager globally. SAS Library management may be accomplished by acting upon interrelated windows. Multiple leveled help windows encompass the range of the SAS system.

Assignment made through the KEYS window will change the Display Manager environment for the current session and will carry over to future sessions.

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Keys and Options



An Integrated Productivity Suite

Tightly coupled set of windows provides for interactive access to SAS libraries. While basic library management may be accomplished, the Display Manager user can benefit solely from having access to library contents without the need to run a SAS procedure.

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Library Management



Help

Help windows address the SAS session, language, and procedures. These windows are an excellent on-line resource to supplement traditional SAS documentation.

SAS For Windows 6.08
Help for the INCLUDE Global Command



productivity through improved session management.

Host Systems Commands From a SAS Session

Exit to the host system without ending the Display Manager session by use of the X command. Returning to the SAS session is host specific. As an option to exiting and returning to the SAS session, host system commands may be executed within a SAS Data Step by use of the System CALL routine.

Conclusions

Five chapters of SAS Language Reference Version 6 First Edition detail Display Manager. In addition, three chapters of SAS Language and Procedures Usage Version 6 First Edition are devoted to Display Manager usage. As previously noted, Display Manager provides extensive on-line Help windows.

SAS Display Manager System offers such a range of alternatives that some features are likely to be familiar to all but the most novice computer user. Adapt to mixed methods for issuing command for execution. Explore beyond the primary window set to uncover increased functionality in the system. Expanding into new commands and execution techniques for the navigation of windows will result in increased

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