Improving SAS System Support (Version 6) at a Large Site: Introduction

At the Federal Reserve Board, SAS is one of the most frequently-used computing tools. Approximately 250 people per week use SAS for such diverse tasks as production applications that process and generate reports on large macro and micro-economic databases, research-oriented statistical and econometric work, and generation of hard-copy color graphics.

SAS support at the Federal Reserve Board is provided by the SAS Consulting Group in the Division of Information Resources Management (IRM). Two full-time and one part-time consultant provide support that includes answering approximately 900 user questions per year, developing end-user utilities, writing documentation, and working with systems programming staff to coordinate the testing and cutover of new releases of SAS software.

The following methods were used to improve SAS system support at the Federal Reserve Board. We believe that these methods can be utilized at other sites.

I. Develop a "SAS Utilities" Menu System using SAS/AF® and SAS Screen Control Language (SCL). This allows users to easily accomplish the following tasks: allocate existing data sets, allocate new SAS data libraries, invoke any SAS window, customize function keys, change printer destination, read about conversion to Version 6.07, initialize SAS/ASSIST® graphics printer configuration, and display a list of SAS Version 6 documentation. Information entered by users on the menus is retained from session to session.

II. Develop a Function Key Customization Application.

III. Publish a SAS Tips column in the Federal Reserve Board's monthly data processing newsletter.

IV. Obtain SASware Ballot® recommendations from key users, and distribute the recommendations to the SAS user community.


VII. Specialize SAS Consulting Responsibility by Product.

VIII. Determine the appropriate level of consulting services.

This paper focuses on steps I - IV. Steps V - VIII are described in the paper, "Improving SAS System Support at a Large Site," by Bruce Gilsen and Bert Shankman, which was published in the SAS Users Group International Proceedings of the Fourteenth Annual Conference, 1989.

I. Develop a SAS Utilities Menu System

SASZ, the Federal Reserve Board SAS Utilities menu system, provides centralized access to Federal Reserve Board SAS utilities. It was written using SAS/AF and SAS Screen Control Language (SCL) on the MVS/TSO operating system. The utilities include the following:

- **ALLOCOLD** allocates existing data sets. These data sets can be SAS data libraries or any other data sets. The data set names, refs (librefs for SAS data libraries or filerefs for other data sets), dispositions, and type (SAS for SAS data library or FLAT for any other data set) are retained from session to session in a SAS data set in a user's SASUSER catalog, and are displayed when ALLOCOLD is invoked. Users modify the information as necessary (add, delete or change the list of data sets, refs, dispositions, and types), and then select the data sets to allocate by pressing enter or clicking their mouse.

- **ALLOCNEW** allocates new SAS data libraries. Users enter the necessary information on the ALLOCNEW menu. Only the libref and SAS data library name are required.

- **WINDOWS** displays an index of all SAS windows, and allows users to invoke one of the windows. Windows common to different operating systems (e.g., FOOTNOTES, LIBNAME, OUTPUT) are displayed at the top of the menu, and host-specific windows (e.g., FNAME, MEMLIST, and DSINFO in MVS/TSO) are displayed at the bottom of the menu.

- **PFKEYS** allows users to customize their function keys. They can select a function key set from a list of general-purpose function key sets, or restore a function key set that they previously stored in their SASUSER.PROFILE catalog. They can also
save their current function key set in SASUSER.PROFILE so that it can be restored later. PFKEYS is described in the section, "Develop a function key customization application."

- PRTDEST allows users to change the destination of printed output without having to construct their own print forms. The printer destination can be changed temporarily (for the current session only) or permanently. To execute a temporary printer change, the SCL program builds and executes a SAS Formname command. To execute a permanent printer change, the SCL program copies the appropriate form into the user’s SASUSER.PROFILE catalog with a name of DEFAULT.FORM. PRTDEST utilizes a public catalog of pre-defined forms maintained by the Board’s SAS Consulting Group.

- CONVERT displays updated information about the conversion to MVS SAS Version 6.07 at the Federal Reserve Board. The text is included from a TSO data set into the PREVIEW window, and the PREVIEW window is zoomed and displayed. When users finish viewing the information, the PREVIEW window is cleared.

- ASSISTGR initializes users’ SAS/ASSIST graphics printer configuration. Users select a graphics printer from the menu, and the SCL program copies the prefix and suffix files for that printer into the catalog entries PSCOLOR.SOURCE (prefix file) and PSCOLOR.OUTPUT (suffix file) in their SASUSER.PROFILE catalog. ASSISTGR utilizes a public catalog of pre-defined prefix and suffix catalog entries maintained by the Board’s SAS Consulting Group.

- SASDOCS displays a list of available SAS Version 6 documentation. The text is included from a TSO data set into the PREVIEW window, and the PREVIEW window is zoomed and displayed. When users finish viewing the information, the PREVIEW window is cleared.

The SASZ utilities can be invoked in the following ways:

- Our macro autocall library contains a set of macros whose names correspond to the name of each utility. To invoke a utility, type the name of the corresponding macro in the program editor window (%sasz, %allocold, %allocnew, etc.), and press the Submit key.

- Select a utility on the SASZ main menu.

- Set a function key to one of the following commands and press the function key, or type one of the following commands on the command line of any window and press Enter:
  
  af c = sconsult.menus1.sasz.program
  af c = sconsult.menus1.allocold.program
  af c = sconsult.menus1.allocnew.program

  Note: In the %FRBKEYS macro, which contains the recommended Federal Reserve Board function key settings, F1 is set to the following command:

  af c = sconsult.menus1.sasz.program

  See the section, "Develop a Function Key Customization Application", for more information.

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<table>
<thead>
<tr>
<th>Procedure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALLOCOLD</td>
<td>Allocate existing data sets (SAS data libraries or other)</td>
</tr>
<tr>
<td>ALLOCNEW</td>
<td>Allocate a new SAS data library</td>
</tr>
<tr>
<td>WINDOWS</td>
<td>Invoke a SAS window</td>
</tr>
<tr>
<td>PFKEYS</td>
<td>Customize function keys</td>
</tr>
<tr>
<td>PRTDEST</td>
<td>Change the destination of printed output</td>
</tr>
<tr>
<td>CONVERT</td>
<td>Display information about Version 6.07 Conversion</td>
</tr>
<tr>
<td>ASSISTGR</td>
<td>Set up SAS/ASSIST graphics output</td>
</tr>
<tr>
<td>SASDOCS</td>
<td>Display SAS Version 6 documentation</td>
</tr>
</tbody>
</table>

- Exit without invoking any procedure

Press PFkey or type: SUBMIT to execute, HELP, or CANCEL

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Figure 1 - SASZ Primary Menu

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### Figure 2 - ALLOCOLD Menu

<table>
<thead>
<tr>
<th>Allocate? Data set name (fully qualified, no quotes)</th>
<th>Ref Disp Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>mlbfg00.sastest2.data</td>
<td>test222 shr sas</td>
</tr>
<tr>
<td>mlbfg00.sastest3.data</td>
<td>test333 shr sas</td>
</tr>
<tr>
<td>mlbfg00.notsasio.data</td>
<td>abclll old flat</td>
</tr>
</tbody>
</table>

**Instructions:**
1. If necessary, enter Data set names, Refs (librefs for SAS data sets, filerefs for other data sets), Dispositions (OLD or SHR, default=OLD), and Type (SAS for SAS data sets or FLAT for other data sets, default=SAS).
2. Select (click your mouse or press enter) the data sets to allocate.
3. Press PFkey or type: SUBMIT to execute, HELP, or CANCEL

### Figure 3 - ALLOCNEW Menu

**ALLOCNEW - Allocate a new SAS Data Library**

<table>
<thead>
<tr>
<th>SAS data library (fully qualified, no quotes, e.g. logonid.dsname.data)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Libref</td>
</tr>
<tr>
<td>Engine (V606, TAPE, VS, VSSEQ, XPORT, default=V606)</td>
</tr>
<tr>
<td>Unit TSO (TSO, DATAnn, WORK, TEMP, default=TSO)</td>
</tr>
<tr>
<td>Type of space TRK (TRK or CYL, default=TRK)</td>
</tr>
<tr>
<td>Primary allocation Secondary allocation</td>
</tr>
</tbody>
</table>

- Exit without allocating a SAS data library
- Press PFkey or type: SUBMIT to execute, HELP, or CANCEL
WINDOWS - Select the Window to invoke

- AF
- APPOINTMENT
- CALCULATOR
- CATALOG
- DIR
- FILENAME
- FOOTNOTES
- FORM
- HELP
- KEYS
- LIBNAME
- LOG
- NOTEPAD
- OPTIONS
- OUTPUT
- OUTPUT MANAGER
- PROGRAM EDITOR
- SETINIT
- SITEINFO
- TITLES
- VAR

The following Windows are host-specific (MVS/TSO only):

- DSINFO DDname or 'data.set.name':
- FNAME Optional DDname argument:
- MEMLIST DDname or 'data.set.name':

Exit without invoking any window

Press PFkey or type: SUBMIT to execute, HELP, or CANCEL

Figure 4 - WINDOWS Menu

PFKEYS - Assigning a new set of Function Keys

Macro name       Purpose
- FRBKEYS        Set function keys to Federal Reserve Board settings
- SAS5KEYS       Set function keys to Version 5 SAS default settings
- SAS6KEYS       Set function keys to Version 6.06 SAS default settings

- Restore a previously-saved (see below) function key set from your SASUSER.PROFILE catalog (Enter ? to display the list of choices)

***To save your current function key set (in your SASUSER.PROFILE ***catalog) so that it can be restored later, enter a name

Exit without taking any action

Press PFkey or type: SUBMIT to execute, HELP, or CANCEL

Figure 5 - PFKEYS Menu
PRTDEST - Change the destination of printed output

Permanent or temporary change (T = temporary (for current SAS session only), P = permanent)

Choose one of the following printers:

- U3000 3820 printer in data center
- U3001 3820 printer in M3315
- U3002 3820 printer in B8000
- U3003 3820 printer in B1126

Exit without selecting a printer

Note: If you have not used this menu before, please press the help PFkey to read about the timing and duration of printer destination changes.

Press PFkey or type: SUBMIT to execute, HELP, or CANCEL

Figure 6 - PRTDEST Menu

ASSISTGR - SAS/ASSIST graphics output setup

Choose one of the following printers:

- R38 LZR black and white graphics printer in graphics center
- R52 Colorocs color graphics printer in graphics center

Exit without selecting a printer

Note: When a printer selection is made, it remains in effect until it is changed (it continues to be in effect in future SAS sessions).

Press PFkey or type: SUBMIT to execute, HELP, or CANCEL

Figure 7 - ASSISTGR Menu
II. Develop a Function Key Customization Application

In SAS Version 6.06 in MVS/TSO and VM/CMS, 24 function keys are defined. These keys are assigned default values by SAS Institute. We discussed the default function key configuration with the Federal Reserve Board SAS user community, and determined that users could use SAS more effectively if they could easily customize their function key assignments. The following factors were taken into consideration when we formulated our approach to customization:

- An initial function key configuration for new users that differed from the configuration described in SAS Institute's documentation might cause confusion. Therefore, we decided not to change the default function key set for our site, but to instead develop tools that would enable users to easily change their keys.
- In MVS and CMS, almost no use of the Text cut-and-paste commands was expected. By default, these commands are assigned to the function keys F1 - F6, which were therefore primary candidates for modification.
- Some users worked with keyboards that offered only 12 function keys, and preferred the default Version 5 function key set, in which F1 - F12 had the same values as F13 - F24.
- Users required the capability to restore the default Version 6.06 function key set provided by SAS Institute.
- Users required the capability to save the current function key set, and restore a previously-stored function key set.

The PFKEYS application was developed. On the PFKEYS menu, the following options are available:

- Save the current function key set so that it can be restored later. (Note: It is saved as a catalog entry in the user's SASUSER.PROFILE catalog.)
- Redefine the function key set by restoring a previously-stored function key set.
- Redefine the function key set by selecting from a list of general-purpose function key sets that is stored in a public library available to all SAS users.

To implement general-purpose function key sets, two approaches were considered:

- Use SAS/AF to create a group of catalog entries in a public SAS data library. Each entry contains one set of general-purpose function key assignments. Write an application that allows users to select one of the function key sets (for example, Version 6.06 defaults), and copies the appropriate catalog entry into the user's SASUSER.PROFILE catalog.
- Write a group of SAS macros that use "DM" commands to assign function key settings, and store them in our autocall library. Each macro would contain one set of general-purpose function key assignments. To change their function key settings, users would submit the appropriate macro.

The second method, SAS macros, was selected, because it does not require knowledge of SAS/AF, enabling end-users as well as consultants to create and maintain macros that contain function key sets.

Our autocall library contains the following general-purpose function key macros.

- **%SAS6KEYS** Set function keys to SAS Institute's Version 6.06 default settings.
  - F1 mark
  - F2 smark
  - F3 unmark
  - F4 cut
  - F5 paste
  - F6 store
  - F7 prevwind
  - F8 next
  - F9 pmenu
  - F10 command
  - F11 keys
  - F12 undo
  - F13 help
  - F14 zoom
  - F15 zoom off;submit
  - F16 pgm;recall
  - F17 rfind
  - F18 rchange
  - F19 backward
  - F20 forward
  - F21 output
  - F22 left
  - F23 right
  - F24 home

- **%SAS5KEYS** Set function keys to SAS Institute's Version 5 default settings.
  - F1 help
  - F2 zoom
  - F3 zoom off;submit
  - F4 pgm;recall
  - F5 rfind
  - F6 rchange
  - F7 backward
  - F8 forward
  - F9 output
  - F10 left
  - F11 right
  - F12 home

- **%FRBKEYS** Set function keys to settings recommended by the Federal Reserve Board (FRB) SAS Consulting Group. F1 - F7 are changed from SAS Institute's Version 6.06 defaults, and are described below. F8 - F24 are set to SAS Institute's Version 6.06 default settings. Macro FRBKEYS is listed in figure 8.
  - F1 af c=sasconsult menus1.sasz.program
  - F2 libname
  - F3 ~x/
  - F4 prevcmd
  - F5 i
  - F6 ts
  - F7 manager
  - F8 next
  - F9 pmenu
  - F10 command
  - F11 keys
  - F12 undo
  - F13 help
  - F14 zoom
  - F15 zoom off;submit
  - F16 pgm;recall
  - F17 rfind
  - F18 rchange
  - F19 backward
  - F20 forward
  - F21 output
  - F22 left
  - F23 right
  - F24 home

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Macro %FRBKEYS.

```sas
%macro frbkeys ;
 /***********************************************************************/
 /* Macro FRBKEYS. Set F1 - F7 to settings provided */
 /* by the FRB SAS Consulting Group, F8 - F24 to */
 /* Version 6.06 defaults provided by SAS Institute. */
 /* Note that: */
 /* (1) Set a maximum of 6 keys at a time due to */
 /* 200 character limit on DM commands. */
 /* (2) To set a function key to more than one command, */
 /* surround DM command with double quotes. Otherwise, */
 /* surround DM command with single or double quotes */
 /* (e.g. f15 and f16 set to 2 commands each below). */
 /***********************************************************************/
dm "keydef f1 af c=sconsult.menusl.sasz.program ;"
 dm "keydef f2 libname ;
 keydef f3 '~ /x ;"
 dm "keydef f4 prevcmd; keydef f5 :i; keydef f6 :ts ;"
 dm 'keydef f7 manager; keydef f8 next; keydef f9 pmenu ;
 keydef f10 command; keydef f11 keys; keydef f12 undo ; ;
 dm "keydef f13 help ; keydef f14 zoom ;
 keydef f15 'zoom off;submit'; keydef f16 'pgm;recall';
 keydef f17 rfind; keydef f18 rchange ;"
 dm 'keydef f19 backward; keydef f20 forward ;
 keydef f21 output; keydef f22 left; keydef f23 right ;
 keydef f24 home ;
 /* Go to KEYS window, save the function key settings. */
 dm keys 'save ' ;
 /* 'End' out of KEYS window, go to PGM EDITOR window. */
 dm keys 'end' pgm ;
%mend frbkeys ;
```

Figure 8 - Macro %FRBKEYS
Explanation of F1 - F7 key settings in macro

%FRBKEYS.

F1. af c = sconsult.menus1.sasz.program
Display SASZ, the Federal Reserve Board SAS utilities primary menu, which provides centralized access to Federal Reserve Board SAS utilities such as allocation of new and existing SAS data libraries, function key customization, and invocation of SAS windows.

F2. libname
Display the libname window. The dir and vars windows can be invoked from the libname window.

F3. ~/*
Insert a comment line in the program editor window on the line where the cursor is currently located.

F4. prevcmd
Retrieve previously entered command-line commands to the command line of the current window. F4 is paired with F16, which retrieves program editor commands.

F5. ;
Insert a new line in the program editor window on the line following the cursor's current location.

F6. :ts
Split a line in the program editor window at the cursor's current column.

F7. manager
Display the output manager window.

Invoking the PFKEYS Application.
The PFKEYS application can be invoked in the following ways:

- Select PFKEYS on the SASZ main menu (see the section, "Develop A SAS Utilities Menu System," for more information).

- Set a function key to the following command and press the function key, or type the following command on the command line of any window and press Enter:
  af c = sconsult.menus1.pfkeys.program

- Type %PFKEYS in the program editor window and press the Submit key to execute a macro called %PFKEYS in our macro autocall library.

- Bypass the PFKEYS menu by typing one of the following macro names in the program editor window and pressing the Submit key:

%FRBKEYS
%SASSKEYS
%SASSKEYS

Our macro autocall library contains a set of macros whose names correspond to the name of each general-purpose function key set.

III. Publish a SAS Tips Column

A monthly SAS Tips column is published in The Information Exchange, the Federal Reserve Board's monthly data processing newsletter. The column was started in March 1990.

The objectives of the SAS Tips column include the following:

- Answer questions from SAS users at the Federal Reserve Board.
- Offer tips on problem resolution.
- Highlight new SAS features.
- Describe existing SAS features that are underutilized.

Some recent tips include the following:

- Saving the contents of display manager windows to a file.
- Recalling commands to the display manager command line.
- Testing for empty SAS data sets.
- PROC SORT collating sequences in different operating systems.
- When concatenating two character variables, prevent truncation by using the TRIM function to remove trailing blanks.

Some problems (and some solutions) are specific to certain operating systems or versions of the SAS system. The SAS Tips column takes this into account as follows:

- The scope of each tip (which operating systems and versions of SAS the tip applies to) is specified.

- Where applicable, solutions are given for alternative operating systems and versions of SAS.

An index of all tips is published annually in The Information Exchange, so that users can easily reference older columns that may now be of interest to them.

Figure 9 shows a recent SAS Tips column.