

ADDING CONVENIENCE TO THE SAS® SYSTEM: ONE SITE'S IMPLEMENTATION STRATEGY

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ABSTRACT

When Tandy Information Services became a SAS site, the SAS System was new to most of the 200 plus members of the programming staff and the end user community had very little mainframe experience. The system needed to be implemented in such a way that it was convenient to use and minimized the learning curve associated with MVS/TSO. The system also needed to be standardized to lessen the burden on the support staff.

IDENTIFYING THE PREREQUISITES

The implementation team identified the following prerequisites for a successful implementation:

- Invoking the system should be easy
- SAS related files should be standardized
- File allocations should be simplified
- The interactive and batch environments should be synchronized
- Documentation should be readily available
- Training tailored to the Tandy environment should be available
- Sharing of programs, routines and techniques should be encouraged

The team developed the following strategy to meet these prerequisites:

- Develop a menu system providing easy access to:
 - SAS Display Manager
 - User specific autoexec and configuration files
 - A default printer form designed for the central printers
 - The SAS Notes
 - The SAS Sample Library
- Develop a method to create and automatically allocate a set of SAS related files for each user. Standardize these files in terms of file names and associated file reference names.
- Provide read access through SAS/SHARE® to the Tandy production SAS libraries.
- Provide read access to the Tandy production source code library.
- Modify the JCL proc for SAS incorporating all of the functionality of the interactive environment.

- Produce a user's guide detailing site specific information.
- Design a set of training courses consisting of two SAS basics' courses, one for programmers and one for end users, and a specialty course specific to report writing with the SAS System.
- Conduct weekly SAS workshops.
- Design a SAS users newsletter.

THE HOST ENVIRONMENT

Tandy Information Services is running SAS Version 6.07 on an AMDAHL ® 5995 under MVS/ESA™ Version 4.1. TSO™ Version 2.3 and ISPF™ Version 3.3 serve as the interactive interface. Output is produced on IBM® 3800 printers. A Tektronix® 4693 printer linked to the mainframe through a Tektronix 4510A rasterizer, is also centrally available for color graphic output.

THE SAS MENU SYSTEM

A TSO REXX™ exec called SASA6 controls both the panels comprising the SAS menu system and the pre-allocation of site and user specific files. From this menu a user may begin a SAS Display Manager session or invoke the SAS Support application provided by the SAS Institute. Through the SAS Support application users have access to both the SAS Notes and the SAS Sample Library. Through the SAS Display Manager Parameters window users may update both their configuration options and their autoexec statements prior to beginning a SAS Display Manager session. Editing is accomplished through ISPF under control of the SAS6A REXX exec. The SAS6 option from the Tandy Master Application Menu invokes the SAS Main Menu.

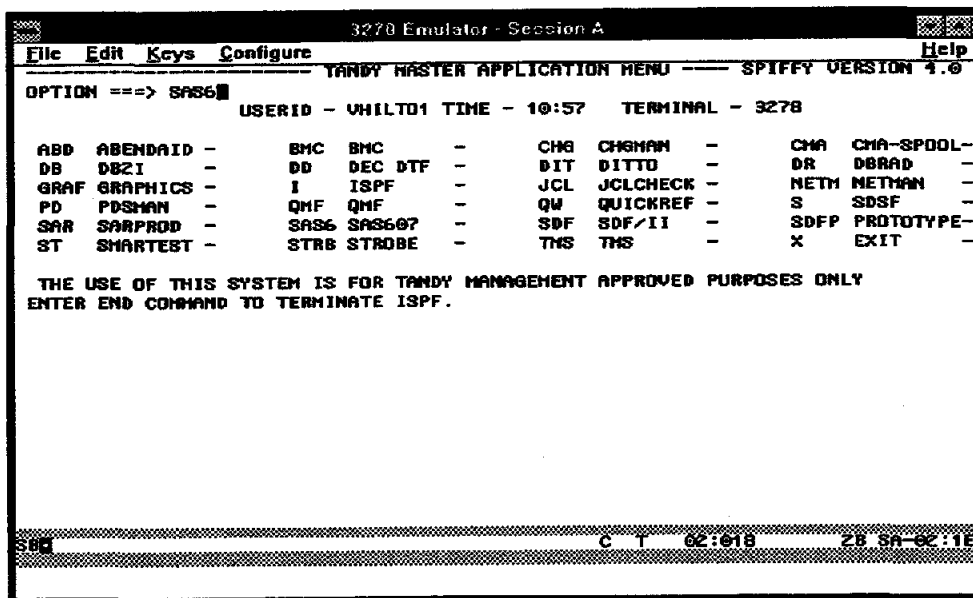


Figure 1: Choosing the SAS6 Option

SAS Display Manager and the SAS Support Application are available from the SAS Main Menu. Help for the SAS Main Menu is available by pressing <PF1>.

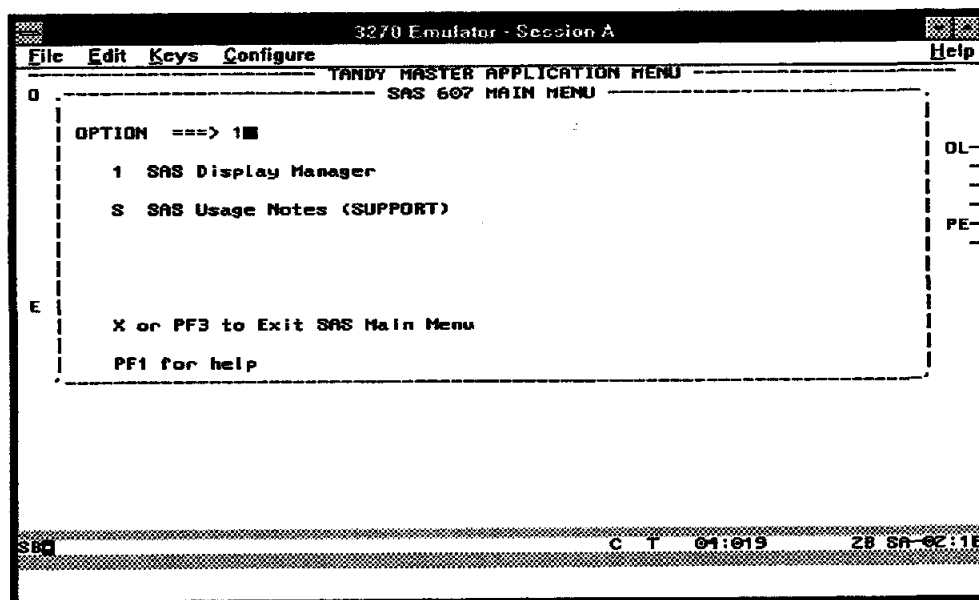


Figure 2: The SAS Main Menu Window

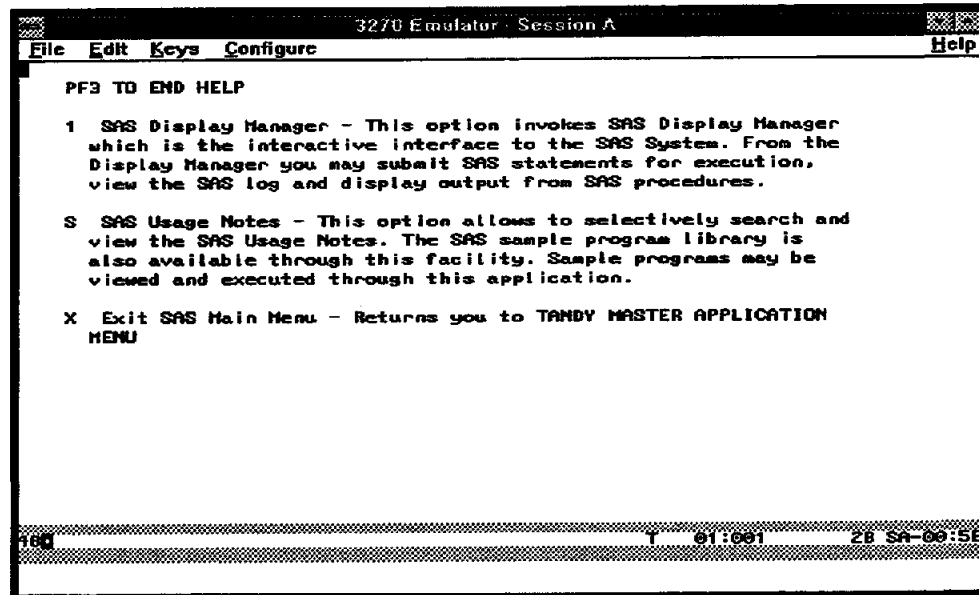


Figure 3: SAS Main Menu Help Panel

When the SAS Display Manager option is chosen from the SAS Main Menu the Select Session Parameters window is displayed. Help is available by pressing <PF1>.

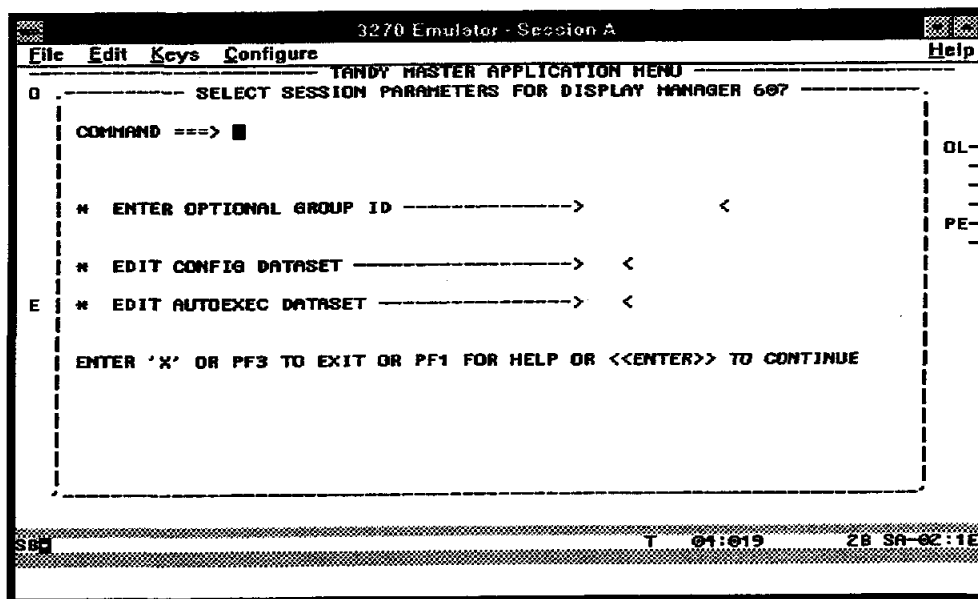


Figure 4: The SAS Display Manager Parameters Window

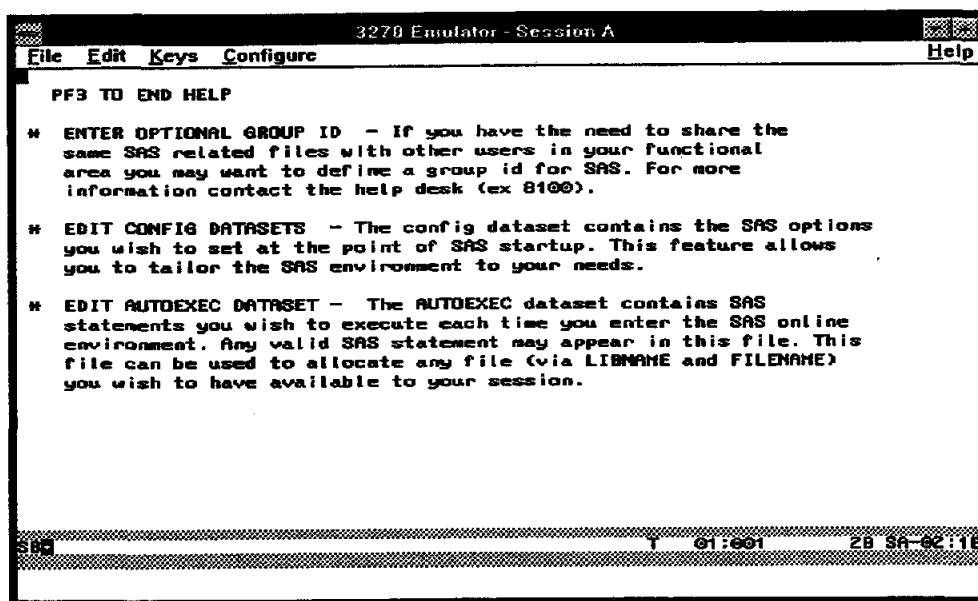


Figure 5: The SAS Display Manager Parameters Help Panel

Optionally, users may request a group id. This id consists of a name, eight characters or less, defined to CA-TOP SECRET[®]. Each member of the group is granted authority to the name. When the id is used, a common set of SAS related files, each with the group id as the first node of the file name, is allocated with share access. Using this feature groups of users may share common developmental libraries. If no group id is provided on the Select Session Parameters screen the user's user id is substituted by default. To provide each user with his own profile, the individual's SASUSER library is allocated by default when a group id is used.

Option 'S' from the SAS Main Menu invokes the SAS Support Application provided by the SAS Institute. This SAS/AF[®] application provides easy access to the SAS Notes and the SAS Sample Library. For more information on the SAS Support Application refer to SAS Technical Report U-116.

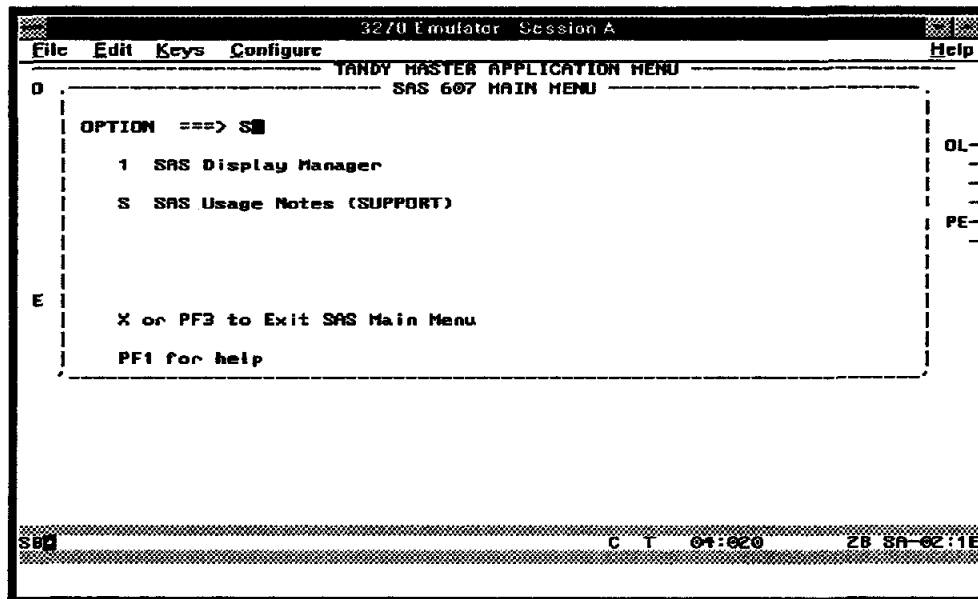


Figure 6: Invoking the SAS Support Application

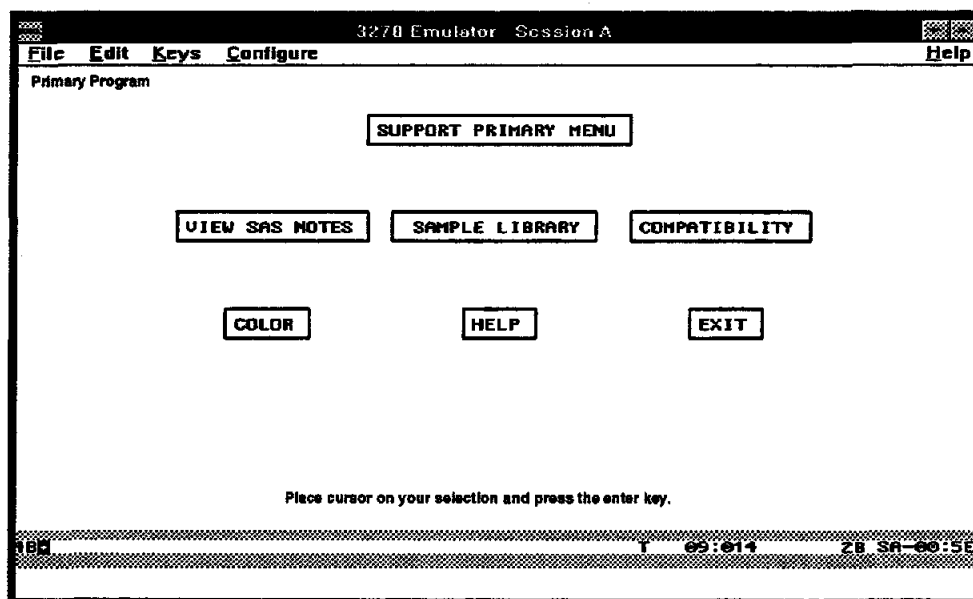


Figure 7: The SAS Support Primary Screen

THE FILES

Standardized User Files

When a SAS Display Manager session is requested a series of user specific files is allocated under standardized file reference names in concatenation sequence with the Tandy production files. Partitioned data sets for storage of SAS program code, SAS macro source code and SAS format source code are provided in this group.

The Tandy Information Services Technical Services group maintains a model file for each of the files listed in **Figure 8**. When a user makes a menu selection from the SAS Main Menu for the first time, the files listed in **Figure 8** are created on their assigned volume using the LIKE option on the TSO ALLOC statement. Each subsequent time an interactive SAS session is started these files are allocated to the session by default.

FILEREF: AUTO1 DSN: OWNER ¹ .SAS.AUTO DISP=SHR ORG: PS(1,0,TRKS) PURPOSE: Storage of user specific commands and statements for execution at initialization.
FILEREF: CONFIG1 DSN: OWNER.SAS.CONFIG DISP=SHR ORG: PS(1,0,TRKS) PURPOSE: Storage of user specific SAS system options. Concatenated with product file.
FILEREF: FORMATS DSN: OWNER.SAS.FORMATS DISP=SHR ORG: PO(1,1,CYL) PURPOSE: Storage of PROC FORMAT source code.
FILEREF: SASAUTOS DSN: OWNER.SAS.MACAUTOS DISP=SHR ORG: PO(1,1,CYL) PURPOSE: Storage of macro source code. This PDS is the user's auto-call library. Concatenated with the Tandy and product libraries.
FILEREF: SASCODE DSN: OWNER.SAS.SASCODE DISP=SHR ORG: PO(1,1,CYL) PURPOSE: Storage of SAS programs.
FILEREF: SASUSER DSN: OWNER.SAS607.SASUSER ² DISP=OLD ORG: PS(1,1,CYL) PURPOSE: Permanent storage of the PROFILE catalog.

Figure 8: Standardized User Files

¹ The term 'OWNER' can refer to the user's USERID or his GROUPID if a group id is provided on the Select Session Parameters for Display Manager screen.

² To provide each user with his own profile, the individual's SASUSER library is allocated by default when a group id is used.

Shared Files

In addition to the user files listed in **Figure 8** the following collection of files and SAS data libraries is allocated with read access to each user when a SAS Display Manager session is begun.

LIBNAME: ACCDESC
DSN: SYS2.SAS.SASLIB.ACCDESC
PURPOSE: Storage location for Tandy production SAS/ACCESS access descriptors.

FILEREF: ADMDEFS
DSN: GDDM.ADMDEFS.SAS
PURPOSE: GDDM™ defaults for graphics output.

LIBNAME: AF
DSN: SYS2.SAS.SASLIB.AF
PURPOSE: Storage location for Tandy production SAS/AF applications.

LIBNAME: FONTO
DSN: SYS2.SAS.SASLIB.FONTS
PURPOSE: Storage location for Tandy production SAS/GRAPH fonts.

LIBNAME: FORMS
DSN: SYS2.SAS.SASLIB.FORMS
PURPOSE: Storage location for Tandy production printer forms.

LIBNAME: GDEVICE0
DSN: SYS2.SAS.SASLIB.GDEVICES
PURPOSE: Storage location for Tandy production SAS/GRAPH device drivers.

LIBNAME: LIBRARY
DSN: SYS2.SAS.SASLIB.LIBRARY
PURPOSE: Storage location for Tandy production formats (compiled).

LIBNAME: MAPS
DSN: SAS.V6R0M7.MAPS
PURPOSE: SAS map library.

FILEREF: SHRCODE
DSN: SHRCODE.SAS
PURPOSE: This PDS serves as a common area to share programs.

LIBNAME: TEMPLATE
DSN: SYS2.SAS.SASLIB.TEMPLATE
PURPOSE: Storage of Tandy production SAS/GRAPH templates.

LIBNAME: TISMAPS
DSN: SASTIS.SAS.SASLIB.MAPS
PURPOSE: Custom map library.

LIBNAME: VIEWDESC
DSN: SYS2.SAS.SASLIB.VIEWDESC
PURPOSE: Storage location for Tandy production SAS/ACCESS view descriptors.

Figure 9: Shared Files

Tandy Information Services employs a change control package to maintain all production files. The change control package requires update access to all Tandy production libraries. To satisfy the needs of the change control package and provide read access to users, SAS/SHARE is used to allocate the Tandy production SAS libraries. A SAS macro, %PRODFLS, is executed using the INITSTMT option to allocate the production SAS libraries as part of the initialization process. The Tandy production SAS program and format source code libraries are not explicitly allocated to each user, but are available to users with read access.

Site Defaults

The following configuration options are written to the user's configuration data set when it is created:

Configuration Options:

OPTION	FUNCTION
PFKEY=ALTERNATE	This option sets PF1-PF12 to the Version 5.18 settings.
FORMS=HARDCOPY	This option sets the name of the default printer form. This form is created at initial logon.
FSDEVICE=PCX3179	This option sets the terminal device driver for the PC emulator.

Figure 10: Default Configuration Options

AUTOEXEC Statements:

The first time the user chooses the SAS6 option from the Tandy Master Application Menu, the system creates their autoexec data set along with the other files listed in **Figure 8**. The PROC CATALOG step below is written to the data set at that time. When the user starts SAS Display Manager for the first time the printer form is copied from the model library to their SASUSER.PROFILE catalog.

```
%TSO ALLOC FI(COPYFR) DA('SASTIS.SAS.SASLIB.EXAMPLE') SHR REUS;
PROC CATALOG C=COPYFR.PRINTER
  ENTRYTYPE=FORM;
  COPY OUT=SASUSER.PROFILE;
  SELECT HARDCOPY;
RUN;
QUIT;
LIBNAME COPYFR CLEAR;
%TSO FREE FI(COPYFR);
```

Figure 11: Source Code For Creation of HARDCOPY.FORM

THE BATCH ENVIRONMENT

The JCL proc for SAS has been modified to incorporate all of the functionality available to the interactive user. This one to one relationship between the interactive and batch environment provides users with greater flexibility to develop applications interactively. No program changes are required to execute a program in batch. The JCL proc also simplifies the JCL statements required to submit batch SAS jobs. Site specific features include:

- Optional group id processing
- Concatenation of SAS macro libraries
- Multiple copies of output on request
- Ability to re-route job output through the %HARDCOPY macro
- Ability to route graphics output to the system and/or color graphics printer
- Font control for the system printers

Site Defaults

PARAMETER	DESCRIPTION
OPTIONS='INITSTMT="%PRODFLS"'	Allocates the Tandy production SAS libraries through SAS/SHARE.
WORK='10,2'	Space allocation for WORK library in cylinders.
CORE=4M	Memory allocation.
GROUP=SYS2	Default GROUPID. Points to Tandy production files.
DB2ID=DBP1	Specifies the DB2™ subsystem id. Points to the production subsystem.

Figure 12: Default Parameters for the SAS JCL Proc

The %PRODFLS macro is responsible for allocating all of the Tandy production SAS libraries through SAS/SHARE. The macro invocation is passed as the value of the INITSTMT= option and is executed at initialization time. The DB2ID parameter allows users to identify the desired DB2 subsystem.

Optional Group Id Processing

Group id processing is also available in batch mode. By default the group id for all batch jobs is 'SYS2'. This group id corresponds to the first node of all Tandy production SAS files. If a user chooses he or she may override this default by passing either their user id or their group id on the GROUP= parameter.

Concatenation of Macro Libraries

When the GROUP= parameter is specified, SAS macro libraries are concatenated in the following order:

GROUPID.SAS.MACAUTOS	==>	Group library
SYS2.SAS.MACAUTOS	==>	Tandy production library
SAS6.V6R0M7.AUTOLIB	==>	SAS System library

A fourth library may be added to this concatenation by providing a DD statement with the reserved name SASAUTOS:

```
//SAS          EXEC SASV6.GROUP=ABCD
//SASAUTOS DD DSN=JDOE1.SAS.MACAUTOS,DISP=SHR
```

When a SASAUTOS DD statement is provided in conjunction with the GROUP= parameter the following concatenation is produced:

JDOE1.SAS.MACAUTOS	==> Personal library
ABCD.SAS.MACAUTOS	==> Group library
SYS2.SAS.MACAUTOS	==> Tandy production library
SAS6.V6ROM7.AUTOLIB	==> SAS System library

Printing

In addition to the standard print DDnames included in the JCL proc supplied by the SAS Institute, several print DDnames have been added to the Tandy proc to accommodate multiple copy requests and special font needs:

PRINT DDNAME	COPIES	DEFAULT FONT	FORMDEF
SASLOG	1	GT12	Default (Gray bar flashing)
SASLIST	1	GT12	Default (Gray bar flashing)
SASPRINT	1	GT12	Default (Gray bar flashing)
ALTLOG	1	GT12	Default (Gray bar flashing)
ALTPRINT	1	GT12	Default (Gray bar flashing)
IBM3800	1	IBM 3800 Graphics	None
GSASFILE	1	Color Graphics	None
FT11F001-FT24F001	1	GT12	None
FT25F001	1	GT15	None
FT31F001-FT34F001	1	GT12	None
FT35F001	1	GT15	None

Figure 13: Supported Print DDnames

The Tandy Information Services Technical Services group maintains three Tandy production SAS macros that enable users to route output among the supported print DDnames names. The Tandy production macro %HARDCOPY(NBR,FLASH) may be used to route output to any of the FTXXF001 DDnames listed above. Users may use an optional JCL parameter, OFTXX=font name, to control what font is used when the output is printed. The %PRINTER macro sets the GOPTIONS required for the IBM3800 printers to produce graphical output through GDDM. The %COLORPRT(CLRFORM) macro provides the same functionality for routing output to the central color printer.

USER SUPPORT

The Tandy Information Services training department plays a key role in the continued success of the SAS System by providing telephone support, in-house training, a user's guide detailing site specific information and weekly SAS workshops. The department also acts as a source of SAS Institute publications and provides an on-line newsletter for SAS users.

The Tandy Information Services training department currently offers two SAS basics' classes and a specialty course specific to report writing with the SAS System. All courses are taught using SAS Display Manager. Students are screened for the basics course based on their past computer experience. Staff programmers and those end users with previous programming experience are placed in the 'SAS Basics for Programmers' course. This three day course centers on the SAS base product. It provides basic instruction on the SAS Data Step and an introduction to the SAS procedure step.

Those end users with little or no previous computer experience are placed in the 'SAS Basics for End Users' course. This five day course assumes no previous computer knowledge. After an orientation to SAS Display Manager students are introduced to basic programming principles and then exposed to the SAS Data Step and selected base product procedures. Developed as a follow up to the basic courses, the 'Effective Reporting with the SAS System' course introduces users to the many procedures available in the base product to analyze, summarize and present data.

Future course development includes plans for a SAS/GRAPH and SAS/AF course. In addition to the courses listed above the training department also provides a weekly SAS workshop. Every Friday morning three hours are set aside for users to ask questions, debug programs, and receive product information from the training department staff.

The training department is also responsible for the compilation and distribution of the 'SAS Policies and Procedures Manual'. This document details site specific information not found in the SAS documentation set. It also provides users with a who-where-when guide for SAS related questions. In addition to the printed documentation described above, the training department also provides an on-line quarterly newsletter for its users. The newsletter is stored in a partitioned data set to which all users have access. A typical issue consists of SAS related events, product highlights, the current training schedule and a section devoted to tips, tricks and techniques.

CONCLUSION

This strategy has resulted in convenience for our users and much more. By providing a standardized interface to the SAS System, Tandy Information Services has greatly reduced the amount of on-going support required by both experienced and novice users. By simplifying access to the system and providing an easy method to allocate files and set system options, the menu system has shortened the SAS learning curve for Tandy users. Synchronizing the interactive and batch environments has encouraged the use of SAS Display Manager for prototyping applications. Adding popular features to the JCL proc has minimized the amount of user supplied JCL required to execute SAS in batch mode. Training and documentation tailored to the Tandy environment has given users a common frame of reference that facilitates their transition to the SAS System. Lastly, providing read access to the Tandy production libraries and files has encouraged sharing of routines and techniques, and lessened duplicated effort.

ACKNOWLEDGMENTS

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