SAS/ASSIST™ Software: Bringing the Power of the SAS® System to the User
Kathy Roggenkamp, Gail Kramer, Tammy Gagliano, and Brenda Erickson
SAS Institute Inc., Cary, NC

ABSTRACT
SAS/ASSIST™ software provides a menu-driven gateway to the powerful features available in the SAS® System. The special-purpose windows and selection lists make it easy to generate a report or produce a graph. With SAS/ASSIST, you can perform tasks in the areas of data management, data analysis, and data presentation.
SAS/ASSIST software is a comprehensive application written using the SAS System as a toolbox. Because your own applications can be hooked into SAS/ASSIST, it can serve as a platform for all SAS applications in use at your organization. SAS/ASSIST software is provided free with base SAS software.

INTRODUCTION
SAS/ASSIST software is a menu-driven interface to many features of the SAS System. It is a task-oriented system that includes components for data management, graphics production, report writing, data analysis, and various decision support tasks. It also includes tools for management of programs and output produced through your work with SAS/ASSIST. While this may not sound very unusual for the PC environment, with Version 6 of the SAS System the ease of use of personal computers is brought to other computing environments via SAS/ASSIST.

The basic tools used in development of SAS/ASSIST software have been SAS/AF© software and base SAS software, but also of use have been SAS/GRAPH software, SAS/STAT™ software, SAS/FSP™ software, and all the other components of Version 6 of the SAS System. SAS/ASSIST software is provided free with base SAS software and will run at a site with just that component of the SAS System. However, its utility is enhanced greatly with each additional product that is licensed.

In this paper, the following topics are discussed:
• the tasks that can be performed with SAS/ASSIST software
• the SAS/ASSIST interface
• why SAS Institute developed SAS/ASSIST software
• how you can use SAS/ASSIST software in your workplace
• SAS/ASSIST software as a SAS application.

Most parts of the discussion refer to both Release 6.03 and Release 6.06 of SAS/ASSIST software. Differences between the releases are pointed out as necessary.

THE COMPONENTS OF SAS/ASSIST: 6.03
Main menu:

SAS/ASSIST: Primary Menu

The online tutorial helps new SAS/ASSIST users to become productive quickly. It not only describes how to use SAS/ASSIST, but how to use the SAS System in general.

Also, sample SAS data sets are provided to give new users something to experiment with, in case "real" data sets are not immediately accessible.

Data management menu:

SAS/ASSIST: Data Management

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Report writing menu:

SAS/ASSIST: Reports

The online tutorial helps new SAS/ASSIST users to become productive quickly. It not only describes how to use SAS/ASSIST, but how to use the SAS System in general.

Also, sample SAS data sets are provided to give new users something to experiment with, in case "real" data sets are not immediately accessible.

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Graphics menu:

SAS/ASSIST: High Resolution Graphics

High Resolution Graphics

HELP DATA BASIS FILE

PLE Plt SLIDES GORACK

Tab to an option and press ENTER to select.

Both high resolution and line printer graphics can be produced. Text slides are not available in line printer mode.

Statistics menu:

SAS/ASSIST: Statistical Analysis

HELP DATA SUMMARY CL

CORRELATE REGRESS ANOVA GORACK

Tab to an option and press ENTER to select.

The DESKTOP selection from the primary menu provides access to:
- a personal phone directory
- a letter writing facility
- a desktop financial workshop for savings and loan calculations
- system utilities
- a calculator
- a notepad
- the SAS Display Manager System.

The PROGRAMS selection provides access to programs that you have saved during your work with SAS/ASSIST software.

Even if you are an experienced SAS/ASSIST user, the APPLICATIONS selection may not have appeared on any version of the software that you have seen. It appears on newer versions of SAS/ASSIST, depending on the add-on products your site has licensed and the operating system you are running. This section provides a home for applications to be sent out by the Institute with products such as SAS/CR® software and SAS/OSE® software. It also provides an easy way for you to add any applications developed at your site to SAS/ASSIST.

The SETUP option enables you to enter or change information such as your default printer and graphics device.

The PROCEDURES option provides entry to the SAS Procedure Menu System.

THE COMPONENTS OF SAS/ASSIST: 8.06

Note: The menus shown below are subject to change.

Main menu:

SAS/ASSIST

HELP TUTORIAL DATA INDEX MESSAGES GRAPHICS

ANALYSIS PLANNING APPLICATIONS

PROGRAMS SETUP INDEX EXIT

Place cursor on your selection and press the enter key.

Data management menu:

SAS/ASSIST

ACTIVE EDIT/PROBE CREATE MERGE/JOIN

SORT TRANSFORM DATABASE ACCESS UTILITIES INDEX GORACK HELP

Place cursor on your selection and press the enter key.

Enhancements to the data management section in Release 5.06 include the ability to:
- merge or concatenate data sets
- produce subsets
- create, derive, transform, or recode variables
- define formats
- access data from DB2®, SCL/DS®, ORACLE®, and RDB data bases (on appropriate operating systems)
- transpose data sets
- convert data libraries from one format to another
- perform functions such as those provided by the CONTENTS, COPY, and DATASETS procedures.
Report writing menu:
The UTILITIES selection will provide the ability to produce calendars, banners, and customized forms.

Graphics menu:
Both high resolution and line printer graphics can be produced. Additions to the high resolution graphics section in Release 6.06 include:
- the ability to produce maps (U.S., Canadian, and European) at a number of different scales
- more possibilities for customizing a graph
- the ability to replay graphs in their original form or use a template.

Data analysis menu:
The DESCRIPTIVE selection will allow you to:
- produce summary statistics
- compute correlation coefficients
- find confidence intervals
- analyze frequency tables.
The REGRESSION selection will allow you to perform:
- linear regression
- logistic regression
- regression with correction for autocorrelation.
The ANOVA selection will allow you to:
- perform analysis of variance
- perform t tests
- compute a variety of nonparametric statistics.
The MULTIVARIATE selection will allow you to find principal components and compute canonical correlations.
The CATEGORICAL selection will allow you to perform categorical modeling as well as analyze frequency tables.
The QUALITY CNTL selection will provide tools for the design and analysis of experiments and the production of a wide variety of quality control charts.
The FORECASTING selection will provide univariate forecasting, seasonal adjustment, and regression with correction for autocorrelation.
The UTILITIES selection will allow you to compute ranks and standardize data.

The following is a summary of the functions provided by the remaining items on the SAS/ASSIST primary menu in Release 6.06:
The PLANNING TOOLS selection from the main menu will provide tools for:
- project management
- forecasting (as described above)
- the design of experiments.
The APPLICATIONS selection will give you access to
• the sample library, stored in catalog format
• a personal phone directory
• a financial workshop
• a letter writing facility
• an application maintenance facility that you can use to add your own applications to SAS/ASSIST software.

Note that many of the Release 6.03 DESKTOP functions are included under APPLICATIONS in Release 6.06.

The RESULT/PROGRAM selection from the main menu will enable you to work with programs and output that you have saved from SAS/ASSIST.

The SETUP selection is similar to its Release 6.03 counterpart, but it provides more types of control. For example, it allows you to specify the set of colors used to display menus. More importantly, this section taken care of all the aspects of SAS/ASSIST software that might mystify a fairly naive computer user. Thus, this selection will be important to system administrators, who can use it to set up default catalogs, printer and plotter specifications, libraries, and so forth.

The INDEX selection will provide an alphabetical list of all important functions provided by SAS/ASSIST software. If you do not know where to look for your task among the menus, the index will provide you with a direction.

THE SAS/ASSIST INTERFACE

The primary goal of SAS/ASSIST software is to provide the power of the SAS System without requiring use of SAS syntax. The interface has been designed with this goal in mind.

Important aspects of the Release 6.06 SAS/ASSIST interface include
• user control via selection of keywords
• use of selection lists, leading to very little need for the typing of information
• consistent use of colors
• use of standard legends to provide explicit instructions for secondary windows
• context-specific help
• control of the number of choices to be made through the use of layering
• use of action bars for selection of general functions such as output customizing and saving results and programs
• automatic retention of important information (such as the last selected data set and graphics device) from one task to the next
• BY group processing and WHERE statement processing in all appropriate tasks
• the ability to save, modify, and reexecute programs generated by SAS/ASSIST selections
• the saving of these programs (as well as SAS/ASSIST output) to a catalog rather than to operating system-specific files

Most but not all of these interface features appear in Release 6.03 of SAS/ASSIST software.

WHY SAS/ASSIST EXISTS

As you know, the SAS System is a powerful programming language that facilitates data management, data presentation, and data analysis. Over the years, the Institute has continually added to the ways in which you can access the SAS System. You can use the SAS System in batch mode, in interactive or line mode, with the Display Manager System, and now with SAS/ASSIST. These various modes are available to suit different tasks, different computing environments, and different user preferences.

While SAS/ASSIST software is an adjunct or appendage of display manager—it is invoked from display manager and uses display manager windows—for many tasks it can be seen as an alternative way of accessing the power of the SAS System. Ensuring that SAS/ASSIST software has the ease of use and the functionality to be a reasonable choice for SAS System users with many different needs is one of our goals in its development.

Why does SAS/ASSIST have an audience? The widespread availability of personal computers and the increasing quantities of information available for organizational decision making have meant that more and more people are using computers. These computer users are not usually programmers and not always even people with computers as the main focus of their jobs; they are simply people with tasks to do that are best done by computer. For example, an epidemiologist might want to know the relationship between sudden death rates and such factors as water hardness, per capita income, and population per physician, without first having to know the syntax of the CORR and REG procedures. Since the SAS System can do so much, we offer SAS/ASSIST software as a way to use SAS without writing code.

The increasing speed and power of computing machinery have also made products like SAS/ASSIST software an attractive alternative. New hardware features mean that highly interactive, menu-driven software can run at reasonable speeds. Such software has become the preference and even the norm for many computer users, as organizations realize that machines are relatively inexpensive compared to people. SAS/ASSIST software is the Institute's offering to users who enjoy working in a menu-driven environment.

PROVIDING POWER AND EASE OF USE

Given the power of the SAS System, it would be a waste to provide a user-friendly interface while leaving most of the power behind. Thus, a major goal of our Release 6.06 SAS/ASSIST development efforts has been to increase the functionality of the product while maintaining and enhancing the usable interface established with Release 6.03 of SAS/ASSIST software.

The list below summarizes some of the features we have implemented in an attempt to accommodate the dual needs of both power and ease of use.
• Our main menus (or "block screens") are task oriented.
• Each block screen includes an index, in case you are not sure
which selection encompasses your task.

- Items are accessible from more than one location.
- Less important items are generally grouped under UTILITIES buttons found on many menus.
- A consistent user interface is provided across all areas of SAS/ASSIST software.
- In some cases, guidance is provided for the sequence of your choices. After you supply initial information, your remaining choices are limited to only those that are appropriate.
- To help prevent user errors, selection lists are offered rather than blanks to be filled in.
- Selection lists generally give both the SAS keyword and a description for each item. Help on each item is also available.
- In cases where the "point and shoot" methodology will suffice, choices are limited to only those that are appropriate. After you supply initial information, your remaining choices are limited to only those that are appropriate.
- To help prevent user errors, selection lists are offered rather than blanks to be filled in.
- Selection lists generally give both the SAS keyword and a description for each item. Help on each item is also available.

HOW SAS/ASSIST SOFTWARE CAN BE USED

At SAS Institute, we envision SAS/ASSIST software being used in the following ways:

- SAS/ASSIST can be used to introduce people to the SAS System. If the SAS System is not used widely in your organization, SAS/ASSIST software can be a tool for showing current non-users its wide variety of capabilities.
- Once someone wants or needs to learn about the SAS System, SAS/ASSIST software can be a training tool. It not only shows a person what can be done, but the program constructed as you make selections can be viewed at any time. That is, you can see the connection between what you have requested and what SAS/ASSIST has put together to carry out the request. Furthermore, the constructed program can be saved and later modified and executed again. Starting with an existing program and only adding a few additional details may provide a gentle introduction to SAS manuals for many people.
- For many Version 5 users, SAS/ASSIST software can serve as a good introduction to Version 6. Seeing pop-up windows may surprise many people, but when they look at their generated programs, they will not see many differences from Version 5 code that would accomplish the same thing.
- For some of you, SAS/ASSIST software may be all of the SAS System that is needed. SAS/ASSIST includes tools for producing reports and graphs and performing many kinds of analyses, and it has a growing versatility for data management.
- In organizations that develop in-house SAS applications, SAS/ASSIST can serve as a home for those applications. Since SAS/ASSIST software is at heart simply a large SAS application, some of you may take the time to figuratively tear it apart and see how it works. Even if you do not have the time or desire to do this, you can take advantage of the fact that SAS/ASSIST can serve as a repository for any SAS applications that need to be widely available in your organization. If you do so, using the SAS/ASSIST Developer's Toolkit that will be provided with Release 6.06, you can save yourself much application development time. By using SAS/ASSIST software you can take advantage of all the facilities for data set selection, graphics device specification, catalog management, and so forth, that we have already provided.

BEHIND THE WINDOWS

SAS/ASSIST software is a very large SAS application. As sophisticated SAS users, you may be interested in hearing something about how this application is put together.

The Programming Language:

Our primary tool has been SAS/AF software, with its powerful screen control language (SCL) and BUILD procedure. The BUILD procedure, in turn, includes a versatile edit facility. SAS/ASSIST development needs have actually driven SAS/AF development, leading to extensive enhancements to SCL, the BUILD procedure, and the CBT facility.

The SASPARM Data Set:

The SASPARM data set is one of SAS/ASSIST software's basic building blocks. Every user has his or her own such data set to serve as SAS/ASSIST's memory for that user. The SASPARM data set contains such information as the last data set used, the last graphics device specified, BY and WHERE processing information, and the names of catalogs where programs and output are to be stored. The very first time you invoke SAS/ASSIST software, this data set is created and added to the SASUSER data library. The data set is referenced and updated at various points during your interaction with SAS/ASSIST software, and information remains in the data set from one SAS/ASSIST session to the next.

The Primary Program:

SAS/ASSIST software's primary program performs several important tasks. It displays the initial block or menu screen and all subsequent block screens, opens the SASPARM data set to retrieve current user-specific information, and passes control to the section you request.
The basic structure of SAS/ASSIST software is shown below:

```
SASPARM data set

| PRIMARY PROGRAM |

| DATA | REPORTS | GRAPHICS | STATISTICS | APPLICATIONS |

| section programs |
```

One important aspect of this figure concerns the location of the section programs. While SAS Institute does distribute a catalog containing programs and CBT specifically for SAS/ASSIST software, most of the section programs reside in product-specific catalogs—catalogs accompanying SAS/STAT software, SAS/GRAPH software, and so forth. You receive only the base and assist catalogs with the base product. If you select “forecasting” from a SAS/ASSIST menu when your site has not licensed SAS/ETS® software, you receive a message that the task is not available because the required software is missing.

**Standards:**

The menus or block screens provided by the primary program give SAS/ASSIST software its organization, but its coherence as a product is provided by the consistent interface that you will find in SAS/ASSIST's constituent parts. Whether you are producing a pie chart, computing correlations, or creating a data set, you will find yourself working with a window that looks and acts in a predictable way. Once you have performed one or two SAS/ASSIST tasks, you will have mastered the interface.

To produce this consistency, we have set many design standards for SAS/ASSIST software. We carefully selected the colors used for specific purposes throughout the product. We selected standard instructions to appear in legends, and we restricted the number of different action bars and pull-down menus you have to contend with. We made many decisions about how particular types of windows should behave—whether selected items should be reverse videoed or highlighted, whether the cursor should remain on a keyword after a selection or jump to the next logical item, and so forth. We hope that we have arrived at an optimal design for most users.

**Common Tools:**

While design standards are set because of how they make windows look and act, they also have consequences for the programs behind the windows. As our SAS/ASSIST design standards have evolved, we have also converged on some standard coding methods. As aspects of our coding have solidified, we have created tools to facilitate use of those coding methods in future programs. Our two primary tools have been macros and common, or sublib, programs.

**Macros:**

The macros that we use serve a variety of purposes, including the following:

- substituting for code
- maintaining design standards
- serving as surrogate SCL functions

When you receive SAS/ASSIST software, you also will receive the library of macros that have been used in the development of the product. Thus, if you decide to add your own applications to SAS/ASSIST, you will also be able to use the macros.

**Sublib Programs:**

We have also developed a library of programs that can be called on to perform tasks that need to be done frequently in SAS/ASSIST software. For example, a program called DATSEL is always called upon when you need to select a data set. We also have sublib programs that provide variable selection lists, WHERE clause construction, output data set name specification, consistent error messages, and so forth. As you use various parts of SAS/ASSIST software, you will notice that some of the same windows keep reappearing as we attempt to keep catalogs small, spend development time coding unique rather than general tasks, and provide the most predictable interface we can.

Again, should you decide to add applications to SAS/ASSIST software at your site, these sublib programs will be available for your use. They will be documented in the SAS/ASSIST Developer's Toolkit distributed with Release 6.06.

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