Tables and Views and Forms: Oh My!

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ABSTRACT

New in Release 6.12, the VIEWTABLE window provides a table-like interface for viewing and editing SAS® data files. This is a FRAME entry that displays a data set in a Data Table object. Version 6.11 of the SAS System introduced Data Tables and Data Forms as new data entry classes in the SAS/AF® FRAME product. Major enhancements in Release 6.12 have made VIEWTABLE a very acceptable alternative to PROC FSVIEW for those users with graphics- capable interfaces. Two viewing modes are easily accessed, Table View and Form View. Moving between them is easy, as is customizing the appearance of the columns. The Import Wizard enables creation of SAS tables from dBase, spreadsheets, tab delimited or comma-separated files. The table just created by VTIMPORT will display in the VIEWTABLE window for further processing. VTQUERY will display the result of an interactive SQL interface. SAS data sets can be searched, subsetted, sorted and saved to a new table using VIEWTABLE. This paper will provide insight into this new product and display in online format some useful features.

INTRODUCTION

In the wonderful land of SAS (at least since version 5.18), the ability to display and browse data using the FSVIEW procedure (also known as PROC FSPRINT) in SAS/FSP® software has been available. This paper is intended as a 'how-to' introduction to the new AF VIEWTABLE window in the SAS System for Windows 95 Release 6.12, which provides users with another way to create, view and edit SAS data sets interactively in both a Table View and a Form View. (*Note: SAS/FSP software is required to edit or sort a table, or to use the Form View mode.*) Similarities and differences between the two products will be highlighted. Finally the presentation will include a brief overview of the new SAS System Viewer. This freely distributable application provides a method to view the contents of SAS data sets and catalogs as well as text files without using the SAS System.

The Data

A sample from Maryland Medicaid claims data, containing 17 variables and 2509 observations will be used for the examples. This data set includes information on procedures performed by physicians in a variety of sites: hospitals, clinics, office, etc. A summary of the PROC CONTENTS is shown:

Variable	Type	Len	Label
AGE	Num	4	Age as of March 31
AID1	Num	4	Eligibility Category #1
BGDOS	Num	5	Beginning date of service
COUNTY	Num	4	County
DOSDIS	Num	5	Date of discharge
DX2	Char	5	Secondary diagnosis
MCARE	Char	1	Indicator for Medicare Coverage
PAY	Num	8	Payment
PDX	Char	5	Primary diagnosis
PLACE	Num	4	Place of Service
PROCODE	Char	5	Procedure code
RACE	Num	4	Race
RECID	Char	11	Record Identifier
SERVCD	Num	4	MA service code
SEX	Num	4	Gender
SPEC	Num	4	Provider specialty
TYPE	Char	4	Professional type

Opening the Windows

FSVIEW and VIEWTABLE windows can be opened from the command line, from the Directory window or from menu options.

For example;

fsview sasuser.claims (option)

or **vt sasuser.claims <argument> (option)**.

Check the online help for a list of the invocation arguments which can be used.

PROC FSVIEW can also be invoked by submitting the program statements:

```
PROC FSVIEW DATA=SASUSER.CLAIMS;
RUN;
```

The FSVIEW Table

PROC FSVIEW displays a SAS data set as a table of columns and rows with the variable names as the column labels. Numeric variables are right justified and character variables are left justified. In SAS version 6.11, the FSVIEW window was opened by the menu selection **Globals> Manage> Open table**. In release 6.12 this selection will open the VIEWTABLE window

The VIEWTABLE Data Table

As noted above, in release 6.12, the menu selection **Globals> Manage> Open table** displays the VIEWTABLE window in New mode (the word New appears in parentheses in the title bar). Begin creating a new table or use **File> Open** to select an existing SAS data set as a table of columns and rows in the (AF) VIEWTABLE window. The Data Table can also be displayed by double-clicking a SAS data set in the Libraries window invoked by **Globals> Access> Display libraries**. When the LIBNAME window opens type an **S** (select) beside the library and press **Enter** to open the DIR window. Type an **E** (edit) beside the table to open with ROW level edit access mode and press **Enter**, or type a **B** (browse) beside the table to open it in Browse mode. Double clicking the mouse button on the selection will also open the table.

Note again that the table can be opened in Edit mode only if SAS/FSP is licensed.

The first noticeable difference is the 'spreadsheet' grid appearance and the larger choice of tool bar icons. By double-clicking on a column heading, a Column Attributes window appears in which fonts, colors, and other variable attributes can be manipulated. Column labels can be added and displayed (in contrast to the

FSVIEW window), and column width can be adjusted by dragging.

VIEWTABLE provides the ability to switch easily between the two viewing modes, Table View, and Form View (this action is not available in the FSVIEW window). In Form View, if there are more variables (columns) than will fit on one screen, the Data Form will appear with dog-ears.

Help

The online documentation for the VIEWTABLE window is very comprehensive. To access the extended help system for VIEWTABLE, which provides detailed procedures, explanations of all menu items, and complete command syntax and descriptions, use any of these options:

- Select **Help > Online documentation > Base SAS Documentation > VIEWTABLE** window from the SAS pull-down menus.
- Select **Help | Extended help** from the VIEWTABLE pull-down menus.
- Use the **VTHELP** command from the VIEWTABLE command line.
- Select the **Help** button on the VIEWTABLE toolbar.

- To access help information for a dialog box in VIEWTABLE, select the **Help** button on the dialog box.

- To access help in a VIEWTABLE dialog box, type **HELPMODE** in the VIEWTABLE command line. Press **Enter**. Move the cursor over the dialog box, and now it will be shaped like a question mark (**?**). Click on the field, option, or list box for which help is needed..

Pull Down Menu in the ViewTable Window

File	Edit	Data	View	Customize
New	Add Row	Where	Form View	DATAFORM Entry....
Open...	Copy Row	Where Clear	Table View	Model SCL...
Import	Commit New Row	Hide/Unhide	Column Names	
Query	Delete Row	Sort	FormView Options>	
Save	Cancel Row Edits	Hold	TableView Options>	
Save As...	Find...	Column Attributes		
Export	Repeat Find	Table Attributes		
Like	Edit Mode			
Include...	Browse Mode			
Print...	Row Level Edit Access			
Print Setup	Table Level Edit Access			
Print Preview				
Cancel				
End				
Send...				
Exit...				

A Look Around the Screen

A good way to get acquainted with the new VIEWTABLE application is to browse through the Pull-Down and Pop-Up Menus that have been provided, and to check out various handy Tool Bar icons.

Pull-Down Menus

In the VIEWTABLE menu bar the options shown in the table above are available.

Pop-Up Menus

Throughout VIEWTABLE, there are helpful pop-up menus available by clicking the right mouse button:

Table View Pop-Up	
Column Specific	**Row/Cell**
Colors...	Clear Active Cell
Fonts...	Clear Selections
Sort	Print Setup...
Hide	Print...
Hold	Print Preview...
Column Description	Add Row
Column Attributes...	Copy Row
	Commit New Row
	Delete Row
	Cancel Row Edits
	Where
	Where Clear
	Edit Mode

Form View Pop-Up	
Column Specific	**Row/Cell**
Colors...	First Row
Fonts...	Previous Row
Sort	Next row
Hide	Last Row
Column Description	First Page
Column Attributes...	Previous Page
	Add Row
	Copy Row
	Commit New Row
	Delete Row
	Cancel Row Edits
	Where
	Where Clear

Toolbar Options

A toolbar or toolbox can be activated, which gives access to buttons that perform an action in VIEWTABLE when selected. Each button is an icon that depicts its action. A descriptive label appears when the cursor is placed over the button. See Preferences in the Options pull down menu.

These activities can be performed by selecting toolbar buttons:

Button	Action
New	Creates a new table
Open	Opens an existing table
Save	Saves changes to the open table
Print	Specify printing options and print the open table
Print Preview	Previews the print output for the open table
Add Row	Adds a new row
Copy Row	Copies the current row
Commit New Row	Saves current row changes
Cancel Row Edits	Cancels current row edits
Delete Row	Deletes the selected row. In New mode, multiple rows can be selected for deletion.
Sort Ascending	Sorts the table in ascending order according to the values in the selected, or highlighted, column(s)
Sort Descending	Sorts the table in descending order according to the values in the selected, or highlighted, column(s)
Table View	Changes the display to Table View mode
Form View	Changes the display to Form View mode (if SAS/FSP software licensed)
Column Attributes	Displays column attributes for the selected column(s)
Table Attributes	Displays table attributes for the open table
Edit	Sets the table to Edit mode (if SAS/FSP software licensed)
Browse	Sets the table to Browse mode
Help	Activates online help

Scrolling in Table View

To navigate through the table, use the scroll bars at the right and bottom of the table, or the TOP, BOTTOM, FORWARD, and BACKWARD commands.

Selecting Columns in Table View

To select a single column in Table View, click on the column label. To select multiple columns, click anywhere on a column and drag the mouse across the columns to be selected. The columns are highlighted as the mouse moves over them. Alternatively, click on a single column, called the anchor, then move the cursor to another column in the table (either to the right or left of the anchor column) press Shift, and click the mouse. All the columns are highlighted. To select multiple non-contiguous columns, move the cursor to each column heading to be selected, press **CTRL**, then click the mouse. To select all columns in the data table, click on the upper left box in the corner of the table. To deselect all highlighted columns, select Clear Selection from the pop-up menu, which is accessed while the cursor is over one of the currently highlighted columns, or select a cell that is not in one of the currently highlighted columns.

Ordering Columns

Ordering columns does not permanently affect the order of the columns or data in the table. It only affects the view seen in the VIEWTABLE window. To display columns in a particular order select **Data> Hide/Unhide**. When the Hide/Unhide dialog box appears, select one column from the Displayed list box using the mouse, and use the arrow buttons under the Displayed list box to move the column up or down in the list box. By default, columns are listed in the order they appear, left to right, in the table. When a column is moved up in the list box, it will appear farther to the left in the table.
Alternatives: Within Table View, highlight the contiguous column(s) to be moved; then use the mouse button to drag and drop the column(s) onto the column that will precede the moved columns.

Resizing Rows and Columns

The height of all rows, as well as the width of each individual column can be adjusted in Table View. To resize the height of all rows position the cursor over the horizontal edge of any row label.

To resize the width of any column: position the cursor along the right hand edge of any column heading. When the cursor changes appearance, click and drag the cursor right or left to increase or decrease the width of the column. The column resizes to the width chosen when the cursor is released.

Holding Columns for Scrolling

To hold certain columns in place during horizontal scrolling through a table in Table View select **Data> Hold**. A held column in a data table is similar to an ID column in the FSVIEW window. To deselect a column, select another column or click the **Release** button.

Alternatives: Hold and release columns using the **Hold | Release** options on the pop-up menu or the HOLD and RELEASE commands.

Searching the Data

Select **Edit> Find** to search the data in the open table. The Where expression dialog box opens, where the search criteria can be entered. In Form View, if the value is found, the row where the value is found is displayed. In Table View, the row where the value is found becomes the top row in the display. In either view, if the value is not found, the last row of the table is displayed, along with a message that the end of the table was reached without a match. To repeat the search, select **Edit> Repeat Find**. If the pointer is on the last row of the table, the search begins at the beginning of the table. For example, if a search begun halfway through the table reaches the bottom of the table without finding a match, use **Repeat Find** to continue the search from the top of the table.

Alternative: Search the data using the FIND command. The syntax used for the FIND command is the same as used when building a where clause and must be enclosed in quotes.

> For example: **find 'procode= "93545" '**

will find the next occurrence of where the column procode is "93545" indicating a coronary angiography procedure. If no value is passed in with the FIND command, the Where dialog box opens, in which a FIND string can be specified.

Subsetting Data

Data can be subset in two ways:

- By viewing only certain columns
- By viewing only certain rows after applying a WHERE expression.

To view only certain columns, see Hiding and Displaying Columns.

To view only certain rows, select **Data> Where** to open the Where expression dialog box. Specify criteria to display a subset of data that meets those specific

conditions. If a where clause has already been applied using the Where expression dialog box, and more criteria need to be added to the existing clause, reopen the Where expression dialog box. The last WHERE clause will be displayed in the dialog box, to allow continued selection of items and further subset the data by adding an **AND** or an **OR**. Alternatively, subset the data and clear the subset using the **Where** and **Where Clear** options on the pop-up menu. To clear a subset of rows: open the Where expression dialog box then select the Reset button and click OK. All rows in the table are displayed.

Hiding and Displaying Columns

Hiding or displaying columns does not affect the columns or data stored in the table itself, but merely affects what is displayed in the VIEWTABLE window, as well as what is saved if the Save As feature is used. To hide or display one or more columns in a table: Select **Data> Hide/Unhide** to reveal the Hide/Unhide dialog box.

To hide a single column: double-click on the column in the Displayed list box that is to be hidden, or select the column from the Displayed list box, and click the left single-arrow button between the two list boxes. The column now appears in the Hidden list box.

To hide multiple columns: drag the mouse over the contiguous columns in the Displayed list. Click the left single-arrow button between the two list boxes. The columns selected now appear in the Hidden list box. To hide all columns, click the left double-arrow button between the two list boxes. All columns now appear in the Hidden list box. To unhide, or display, certain columns in a table move the columns as described above to the Displayed list box. Click the right double-arrow button between the two list boxes to display all columns. Click **OK**. All columns in the table are displayed. Alternatives: Hide/unhide one or more columns using the Hide option on the pop-up menu or the HIDE or COLUMNS commands.

Displaying Column Labels or Column Names

To display columns with labels or names in either Table View mode or Form View mode, select **View> Column Names** or **Column Labels**. (The default is Column Labels.) If no labels are available and Column Labels is specified, then column names are displayed instead. Alternatively, display column names or labels using the COLNAMES | COLLABELS command.

Viewing and Changing Column Attributes

The attributes of a column can be viewed, and certain attributes can also be changed. While viewing an existing table, the label, the format/informat, the foreground and/or background color of a column or its label, the font of a column and/or its label can be changed. These changes are reflected immediately in the display when the Apply button is selected. To "undo" changes requires resetting them. To view and change column attributes for one or more columns: select the column(s). Select **Data> Column Attributes** (or request a pop-up while the cursor is over a highlighted column). The Column Attributes dialog box appears. If a single column is selected, the dialog box displays the attributes of the currently selected column. If multiple columns have been selected, the dialog box displays the attributes of the column selected last. Only those tab pages and fields that are appropriate for multiple columns are available. Make whatever changes are desired on the General, Color, or Fonts tab pages, and then select the **Apply** button. Any changes made to the attributes of a particular column will be immediately displayed in VIEWTABLE.

If the color or font attributes set for a particular column, are to be applied to other columns:

- Open the Column Attributes dialog box
- Select the columns to change, then select the "model" column.
- Select Apply from the dialog box.

Viewing Table Attributes

To view the table's attributes, select **Data> Table Attributes**. The Table Attributes dialog box opens, providing a status for the open table. It displays *read-only* table attributes for existing tables, which cannot be altered. The Table Attributes dialog box contains two tab pages: General and Advanced. In Table View, or double-click on upper left cell in the table to open the Table Attributes dialog box (not available in New mode).

Sorting Data

VIEWTABLE uses the sorting program supported by SAS for each particular operating system. It sorts the actual data in the table, not just the display. **Note:** *The data in the table can be sorted only if SAS/FSP has been licensed* . To sort the data, VIEWTABLE must be able to gain Table Level edit access. VIEWTABLE will try to gain this access temporarily in order to perform the sort, regardless of how the current open mode or access level options are set. If access fails, a message will display indicating that the table cannot be sorted in place due to Table Level edit access (or MEMBER lock) being unavailable. If VIEWTABLE cannot obtain Table Level edit access,

the table can still be sorted by requesting that the results be stored in a new table.

To sort the rows by one or more columns: select **Data> Sort** to display the Sort dialog box, and order the rows of the table according to specific criteria for the columns, for example, ascending or descending. Select the column(s) on which to sort from the Available list box. Click the right single arrow located between the two list boxes. The column(s) now appears in the Selected list box. To place the columns in the desired sorting order, select a column and move it up or down in the Selected list box using the up or down arrow buttons located below the list box. To indicate whether the column(s) are to be sorted in ascending or descending order, select a column in the Select list box, then select Ascending or Descending from the Selected Column Sort Order region. Ascending is the default.

To save the sorted output to another file, select the **Save As** tab from the Sort dialog box. Select the down arrow beside the Path field to see a list of currently allocated librefs which can be selected. However, if a directory has not been assigned a libref, select the right arrow beside the Path field. The Select Directory dialog box appears to allow identification of the path. A libref will automatically be assigned, making any SAS data sets or views in that directory accessible immediately. Type the name of the new table in the Table field on the Save As tab page. Click **OK**. VIEWTABLE saves the sorted output to the new table and opens this new table in the display.

Printing

Printing is only available from Table View mode viewing either an existing table or creating a new one. Set up and manage the list of printers by selecting **File> Print Setup** or by selecting the Setup button on the Print dialog box. In either case, the Print Setup dialog box appears where printers can be set up and managed. To preview the printout before printing, select **File> Print Preview**. The Print Preview dialog box appears, where output can be viewed, two pages at once, and the size of the preview output changed. The Print dialog box can also be opened by selecting the Print button.

To print an open table: select **File> Print** to open the Print dialog box appears, specify the printer, as well as various printing options such as the printing area and order. Click OK.

IMPORT/EXPORT FACILITY WIZARD

The Import Wizard is an interactive application that creates SAS data sets from external file formats such as dBase, spreadsheet, tab delimited, or comma-separated files. When importing the external source from within VIEWTABLE the table will display in the VIEWTABLE. To import data from an external file source select **File> Import**. Follow the steps for creating a SAS table from an external file. Make the selections, name the external file and click the **Next>** button. Supply a name for the incoming data in the MEMBER entry box and click the **Finish** button.

The Export Wizard can be used to export SAS tables to other external file formats, such as dBase, spread-sheet, tab delimited, or comma-separated files. To export data to an external file format Select **File> Export** to open the Export Wizard. The table being viewing in VIEWTABLE has automatically been initialized as the SAS source data. Or change the source to a different table. Otherwise, continue stepping through each window to create the export file. Choose from the following: DBF, EXCEL5, EXCEL4, WK1, WK3, WK4, DLM, CSV, or TAB export file formats. Alternatively, define a special file format using the External File Interface (EFI) facility.

As an example: To transfer selected information from a dBase file into a table for a Microsoft Word report using the Import/Export Wizard.

- Import a dBase file, subset it in VIEWTABLE, and save the subsetted data set with a new name.
- Export the new file as a *comma delimited* file.
- In a Microsoft Word select Insert> File... and choose the comma delimited file just exported.
- Select all of the inserted text and choose Convert Text to Table... in the Table menu.
- Et Voila! That's French for we're back in Kansas.

For more information on the Import/Export Wizard, open the wizard through VIEWTABLE and then access its online help.
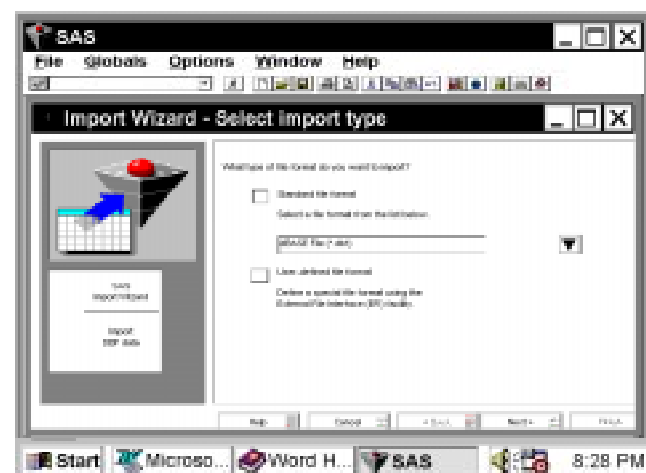
SAS System viewer *(for Windows 95 only)*

This handy, **free** accessory is invoked from the Windows Explorer by double-clicking or by clicking the right mouse button on a SAS data set (.sd2) or SAS catalog (.sc2) file icon.

Download the latest version of the SAS System Viewer (sview612.zip) from SAS Institute's World Wide Web site (http://www.sas.com) or by anonymous FTP in the download section of the Technical Support FTP site (ftp.sas.com) on the internet: log on as **anonymous** then enter **your email address** as the password. When connected enter:

cd/techsup/download/misc/additional/sasviewer/production

   get sview612.zip

To disconnect, enter **quit**.

Use the SAS System Viewer to view SAS data sets and SAS catalogs that have been created using the SAS System Release 6.04 or later. Also view SAS files created by versions of the SAS System that run on other platforms, and view and edit SAS programs, text files, LST files, LOG files, and RTF files. Columns and rows in grid displays can be resized by grabbing and dragging the separator between the headers, or just by double-clicking the name or label. Print, sort and subset any SAS file in the viewer, and copy the entire table, or column, row and block selections to the clipboard. Sort the view of a SAS file by selecting a cell in a column and then selecting a sort option from the View menu.

Subset the data (using a WHERE clause) displayed by the viewer by selecting Where from the View menu (or pressing Ctrl-W). Last but not least, text anywhere in a SAS file can be found using regular expressions by selecting Find from the Edit menu (or pressing Ctrl-F).

CONCLUSION

The VIEWTABLE application and the FSVIEW procedure each offer many useful features to simplify data entry, query, editing, validation, display, and retrieval.

So as to complete the metaphor of the title: the clever wizards at SAS Institute have given us what we wanted, an AF application to let us see our data, although we actually had the ability all along without really knowing it.

REFERENCES

A great place to learn more about the DataTable and DataForm interactive environments is in the CD-ROM entitled **Solutions@Work**[TM]*: Data Forms and Data Tables* (cat # SP55753 $24.95)

Additional guidance may be found in the following excellent materials.

I.   Carpenter, Ann E., and Leone Lynn P. (1996), "Introducing a GUI Approach to Data Entry Using Data Table and Data Form Objects in SAS/AF FRAME Software" *Observations* First Quarter 1996, 6-14.

II. Gagliano, Tammy L., Kumar, Deva and Brideson, Patti (1996), "Objects, Objects and More Objects..." *Proceedings of the Ninth Annual North East SAS Users Group Conference,* 9, 469-476.

III. Wilkins, Scott. (1997), "Data Table and Data Form Enhancements in Release 6.12" *Observations* First Quarter 1997, 28-35.

IV. SAS Institute Inc (1996), SAS System for Windows, Release 6.12 Online Documentation, "VIEWTABLE Extended Help"

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