

Paper 117-27

Using SAS® ODS to Create Adobe PDFs from SAS/GRAPH® Output

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ABSTRACT

Adobe PDF files have become a standard for presenting information across a variety of platforms and are especially useful for downloading reports from websites. This paper examines the use of the SAS® Output Delivery System (ODS) for creating Adobe Portable Document Format (PDF) files from SAS/GRAPH® output. This will include single and multi-page PDF files from single and multiple SAS/GRAPH® procedures as well as including output from other SAS® procedures. This paper will also examine the impact of ODS styles on SAS/GRAPH® output as well as how to label the output for the PDF bookmark feature. This paper utilizes the production version of the SAS® ODS PDF feature provided in SAS V8.2.

INTRODUCTION

As more companies and individuals move online, the demand for reporting information electronically will continue to increase. The need to provide information electronically is confounded by the variety of hardware and software platforms in use. This variability in systems can result in files being reformatted for a particular device or resolution, preventing a standard presentation of the information to the audience. The Adobe Portable Document Format (PDF) provides a method for ensuring standard presentation of information across the different hardware and software used by the end users. This paper discusses the methods for creating Adobe PDF files from SAS/GRAPH® output using the SAS® Output Delivery System (ODS). For this paper, all files and graphs were created on a Windows 2000 Professional system with Adobe Acrobat 4.0 and Adobe Reader 5.0 installed.

PDF FILES, WHAT ARE THEY GOOD FOR?

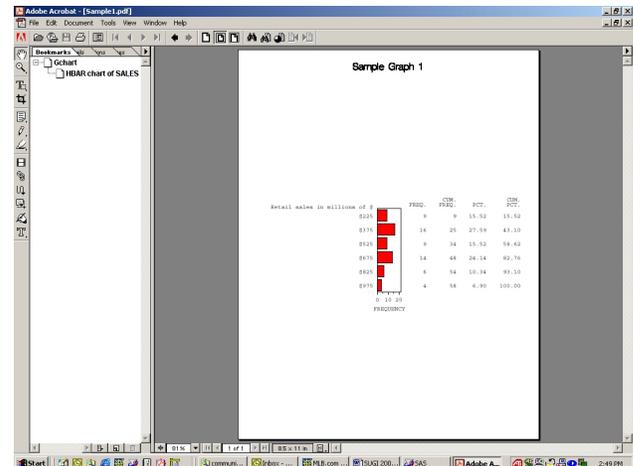
PDF files are used with increasing frequency for on-line forms, documents, manuals and reports. They can be found in many places including the SAS® Online Documentation and IRS Tax forms and publications. The Adobe Portable Document Format provides a platform for ensuring the standard presentation of information across different hardware and software systems. Once created, the PDF file retains all of the fonts, graphics, colors and formatting regardless of the platform. By downloading and installing the free Adobe Acrobat Reader, most anyone can open PDF files. The Adobe Acrobat Reader is available for systems such as Windows, Macintosh, Linux, Solaris, Unix, IBM AIX, OS2, Sun SPARCstation, Palm OS 3.1 or higher and the recently released version for the Pocket PC. The ability to provide individual users with the same file regardless of their system saves time and money and greatly simplifies the publishing process.

A SIMPLE EXAMPLE**SINGLE PAGE PDF FROM A SINGLE SAS/GRAPH® PROCEDURE**

Producing a PDF using ODS is very straightforward. The first statement below opens the ODS PDF destination and sends the output to the file named in the FILE= option. This program will create a single page PDF file containing a single graph. Following the graph statements, the ODS PDF destination is closed preventing further output from being sent to the file.

```
ods pdf file="c:\Sample.pdf";
proc gchart data=sashelp.retail;
  title 'Sample Graph 1';
  hbar sales ;
run;
quit;
ods pdf close;
```

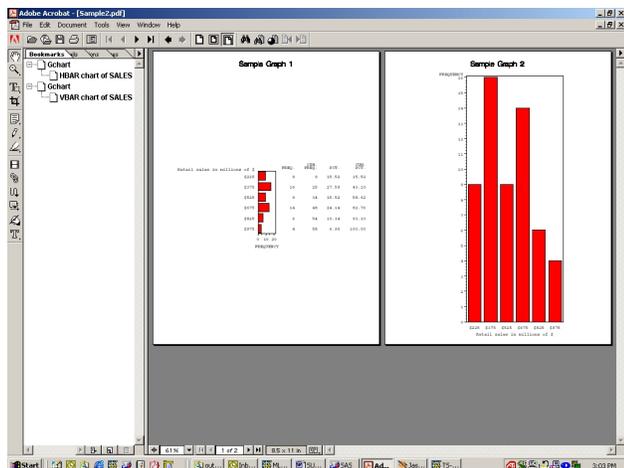
This program results in:

**MULTI-PAGE PDF FROM MULTIPLE SAS/GRAPH® PROCEDURES**

Creating multi-page files using ODS PDF is just as easy. As before, the ODS PDF destination is opened with the file option provided. In this example, multiple SAS/GRAPH® procedures are output to separate pages in the PDF file specified. As before, the final statement closes the ODS PDF destination.

```
ods pdf file="c:\Sample.pdf" ;
proc gchart data=sashelp.retail;
  title 'Sample Graph 1';
  hbar sales ;
run;
proc gchart data=sashelp.retail;
  title 'Sample Graph 2';
  vbar sales ;
run;
quit;
ods pdf close;
```

This program results in the following file:

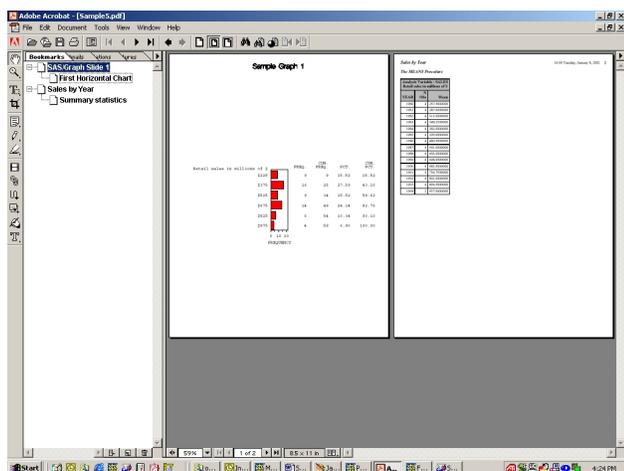


COMBINING SAS/GRAPH® AND OTHER PROCEDURE OUTPUT

As with creating a PDF file with multiple graphs, the SAS/GRAPH® output can be combined with output from other procedures. Once the ODS PDF destination is opened, the output is sent to the named file.

```
ods pdf file="c:\Sample.pdf" ;
proc gchart data=sashelp.retail;
  title 'Sample Graph 1';
  hbar sales
run;
proc means data=sashelp.retail mean;
  var sales;
  class year;
  title 'Sales by Year';
run;
quit;
ods pdf close;
```

The resulting PDF file contains the single SAS/GRAPH® on the first page and the output from the means procedure on the second page.



STYLES AND BOOKMARKS

A valuable feature of ODS is the ability to use styles for formatting output. SAS® provides a library of styles as well as the ability to modify or create new styles. This allows the user to control the appearance and format of the output sent to the ODS destination. Another feature available in Adobe PDF files are

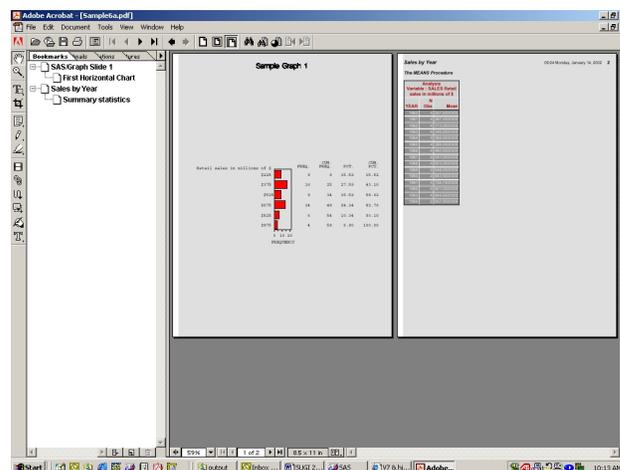
bookmarks. Bookmarks provide a table of contents that label each page and allow the user to select a particular page to view by selecting a particular bookmark.

USING STYLES

Styles allow for greater control and flexibility in the appearance of output for ODS destinations. Either using a style provided or newly defined style, the user can control color, spacing, background and a multitude of other aspects of the output appearance. The styles provided can be modified using proc template. The style option is defined in the ODS PDF statement using STYLE=.

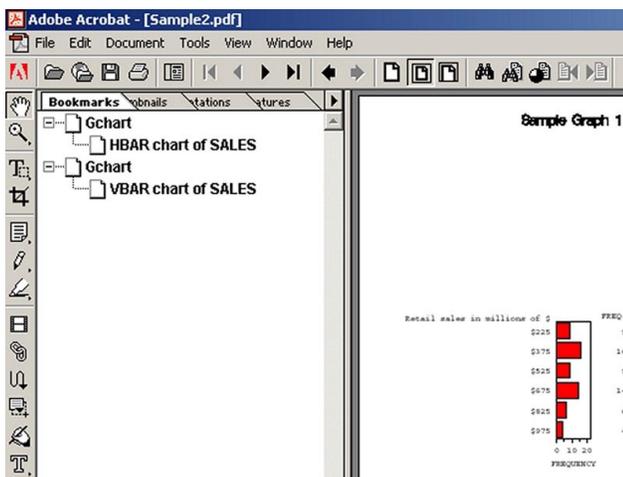
```
ods pdf file="c:\Sample.pdf"
style=styles.brick;
proc gchart data=sashelp.retail;
  title 'Sample Graph 1';
  hbar sales
run;
proc means data=sashelp.retail mean;
  var sales;
  class year;
  title 'Sales by Year';
run;
quit;
ods pdf close;
```

The BRICK style produces a PDF file with a gray background and red lettering in the column headers.



USING BOOKMARKS

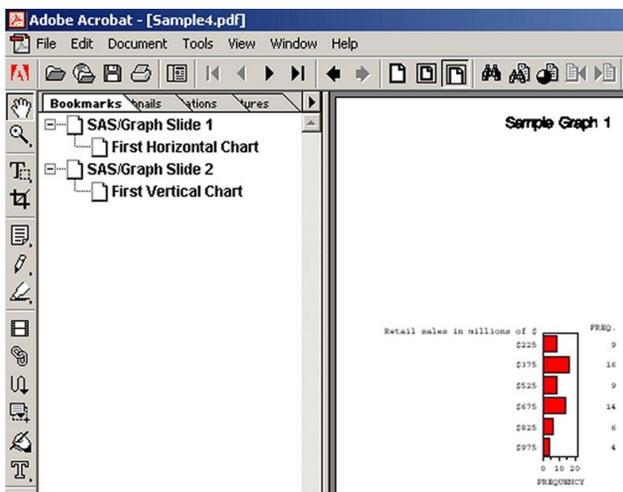
By default, SAS automatically produces bookmarks for the PDF file using internal procedure labels. In the file below, both SAS/GRAPH® procedures are labelled as GCHART and the specific type of chart is labelled as well, HBAR and VBAR. The bookmarks appear on the left side of the window and appear in the order of the pages in the file.



Using the ODS Proclabel option allows user control over the main label for the bookmark. In the program below, the first SAS/GRAPH® procedure is labelled as SAS/Graph Slide 1'. Another ODS proclabel statement modifies the label for the second SAS/GRAPH® procedure. In order to change the secondary label for each graph, the description option is used within each SAS/GRAPH® procedure.

```
ods pdf file="c:\Sample.pdf" ;
ods proclabel='SAS/Graph Slide 1';
proc gchart data=sashelp.retail;
title 'Sample Graph 1';
hbar sales /description='First Horizontal
Chart';
run;
ods proclabel='SAS/Graph Slide 2';
proc gchart data=sashelp.retail;
title 'Sample Graph 2';
vbar sales /description='First Vertical
Chart';
run;
quit;
ods pdf close;
```

Using these options to change the bookmarks results in:

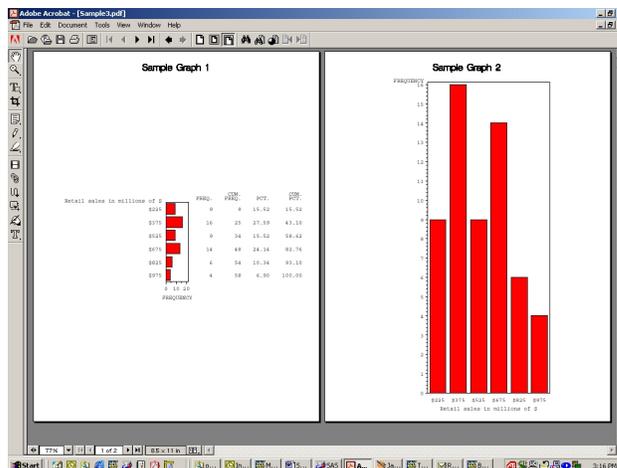


TURNING OFF BOOKMARKS

By default, ODS PDF produces bookmarks. If the user does not want bookmarks to appear, they may be turned off using the NOTOC option in the ODS PDF statement.

```
ods pdf file="c:\Sample.pdf" NOTOC;
proc gchart data=sashelp.retail;
title 'Sample Graph 1';
hbar sales ;
run;
proc gchart data=sashelp.retail;
title 'Sample Graph 2';
vbar sales ;
run;
quit;
ods pdf close;
```

Unlike the previous files produced, the result of the above program does not display the bookmarks on the left side of the window.



ISSUES WITH USING ODS PDF DESTINATIONS

ODS PDF provides a valuable tool for easy creation of PDF files from SAS® output. The use of bookmarks and styles allow for greater control of the appearance and format of the output when writing to ODS PDF. Unfortunately, in addition to the features provided, there are a couple of issues that users need to be aware of when creating PDF files using ODS PDF.

ERROR MESSAGE UPON OPENING THE FILE

The first time a PDF file created with ODS PDF is opened using Adobe Reader 4.0 or higher, an error message will be displayed. The message reads, "File is damaged but is being repaired" and displays only when the file is opened for the first time on PC platforms. If the user is on a very fast machine, the error may appear so quickly that it goes undetected. According to SAS® Note SN-005481, an extra line feed is written to the file resulting in the error. This issue is fixed in Version 9.

FILE SIZE

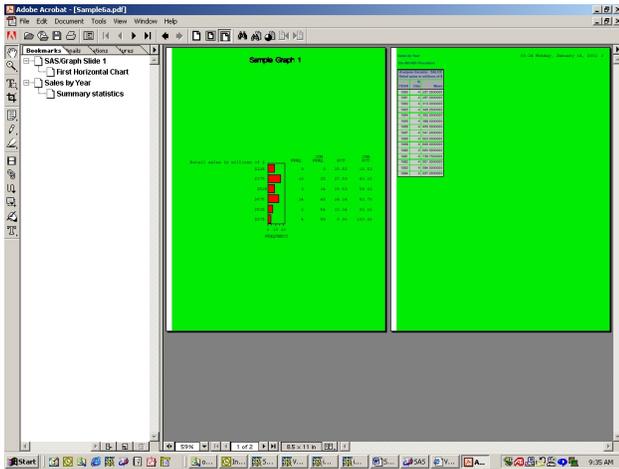
One of the advantages of using PDF files is their compressed format. By default, PDF files created using Adobe Acrobat or Adobe Distiller are compressed internally negating the need for archiving or zipping prior to downloading or emailing. Unfortunately, PDF files created using the ODS PDF destination are not compressed. If the user is creating files with multiple pages, the resulting file size can be problematic for downloading the files from the web or in email distribution systems. This issue is documented and addressed in SAS® Note SN-003733.

USING SOME STYLES IN ODS PDF STATEMENTS

As shown earlier, styles are a valuable method for formatting the appearance of output for ODS destinations. The earlier example showed the appearance of the Brick style in the multi-page file from different procedures. There are a couple of styles in the style library that do not perform as anticipated. When used with ODS PDF, the minimal style will add a green background to the output. This issue is addressed in SAS® Note SN-005510. This note references only the minimal style but during testing for this

paper, the same behavior was exhibited by the STATDOC style as shown below.

```
ods pdf file="c:\Sample.pdf"
style=styles.statdoc;
```



CHANGING STYLES

Another situation to avoid when using styles is not to change styles after the initial style has been defined in the first ODS PDF statement. In the sample program below, the style is changed after the SAS/GRAPH® procedure is run using a second ODS PDF statement without the FILE= option. By default, the DEFAULT style is applied in the initial ODS PDF statement.

```
ods pdf file="c:\Sample.pdf" ;
proc gchart data=sashelp.retail;
title 'Sample Graph 1';
hbar sales
run;
ods pdf style=styles.minimal;
proc means data=sashelp.retail mean;
var sales;
class year;
title 'Sales by Year';
run;
quit;
ods pdf close;
```

Attempting to change the style in this manner results in Read Access Violation (RAV) requiring the user to close the current SAS session and open a new session. This issue is fixed in Version 9, allowing different styles to be used in the same PDF file.

CONCLUSION

In spite of the limitations listed above, ODS PDF still provides a very helpful and direct method for creating PDF files from SAS/GRAPH® and other procedures. The features provided in the styles and bookmarks allow for greater control over the appearance of the output being written to the PDF files. Once a few of the limitations are dealt with in Version 9, the ODS PDF destination will be even more useful.

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