

# PS020

## ODS Step by Step

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### ABSTRACT

The Output Delivery System (ODS) was developed by SAS® to create professional looking output reports, among other reasons. This paper introduces the beginning ODS user to the basic concepts of creating RTF and HTML files using SAS ODS on the MS Window platform. This paper is based on the same set of steps that I used when I was first learning ODS.

Some of the topics discussed are: the options available with the ODS statement including the FILE=, CONTENTS=, FRAME=, NEWFILE=, and STYLE=. The ODS PROCLABEL statement is also discussed. In addition, the paper presents an example of each of the 17 different styles available in SAS® v8.2.

### YOUR FIRST FILE

The basic code for creating either an HTML or RTF file is similar. The first statement starts with ODS, followed by the type of output file you want to create, and then a choice of options. The first option we will review is the FILE= option, which names the output file. The second option we will review is the CLOSE options. This options goes on a second ODS statement and will close the file to further output. At this point you should be able to open and access the file in a separate application. Following is example code that yields an RTF file.

```
ODS RTF FILE="RTF_FILE.rtf";  
Proc Freq data=temp;  
  Tables x1*x2 / list;  
Run;  
Proc Means data=temp maxdec=2;  
  Var x1 x2;  
RUN;  
ODS RTF CLOSE;
```

See the screen print below for the results of the first procedure (opened in MS Word – in print layout view). Note the SAS titles in the MS Word headers are grayed out. We'll discuss this more later.

*The FREQ Procedure*

x1	x2	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	0	2	22.22	2	22.22
1	1	2	22.22	4	44.44
1	2	1	11.11	5	55.56
2	1	2	22.22	7	77.78
2	2	2	22.22	9	100.00

The code between the ODS RTF FILE= statement and the ODS RTF CLOSE statement produces the output that is included in the file. Note the last RUN statement (prior to the ODS RTF CLOSE statement). The RUN statement must occur before the ODS RTF CLOSE statement, so that the output from the last procedure is included in the RTF file.

## HTML FILES

To create an HTML main body file for use on a website, use the BODY= or the FILE= option (both will create the same HTML file). Creating HTML files through ODS enables you to create a table of contents and frame file, in addition to the actual main html body file. A frame file gives the ability to display both the table of contents and the main body page on the same web page. To produce the two additional files, use the CONTENTS= and the FRAME= options. Below is the example code that will create HTML files.

```

ODS HTML FILE="HTML_FILE.html"
CONTENTS="HTML_CONTENTS.html"
FRAME="HTML_FRAME.html";
Proc Freq data=temp;
  Tables x1*x2/list;
Run;
Proc Means data=temp;
  Var x1 x2;
Run;
ODS HTML CLOSE;

```

The opened HTML frame file will look like the screen shot below.

The screenshot shows a web browser window with two frames. The left frame, titled "Table of Contents", contains a list of links: "1. The Freq Procedure" with sub-links for "Table x1 \* x2" and "Cross-Tabular Freq Table", and "2. The Means Procedure" with a sub-link for "Summary statistics". The right frame, titled "The SAS System" and "The FREQ Procedure", displays a "Table of x1 by x2". The table has columns for x1, x2 (0, 1, 2), and Total, and rows for Frequency, Percent, Row Pct, and Col Pct. The data for the first row (Frequency) is: x1=1, x2=0: 2, x2=1: 2, x2=2: 1, Total: 5. The data for the second row (Percent) is: x1=1, x2=0: 22.22, x2=1: 22.22, x2=2: 11.11, Total: 55.56. The data for the third row (Row Pct) is: x1=1, x2=0: 40.00, x2=1: 40.00, x2=2: 20.00, Total: 100.00. The data for the fourth row (Col Pct) is: x1=1, x2=0: 20.00, x2=1: 20.00, x2=2: 10.00, Total: 50.00.

The table of contents contains links to each output object included in the main file. Clicking on the underlined links will bring up the associated analysis on the right side of the page. Note that the labels in the table of contents will be unclear if the same SAS procedure is used multiple times. To modify the labels in the table of contents, use the ODS PROCLABEL statement.

Note: Unlike other ODS statements, the PROCLABEL statement affects *only* the SAS procedure immediately following it. Therefore, if you wish to keep the same label across different procedures, the ODS PROCLABEL statement will need to be specified before each procedure.

```

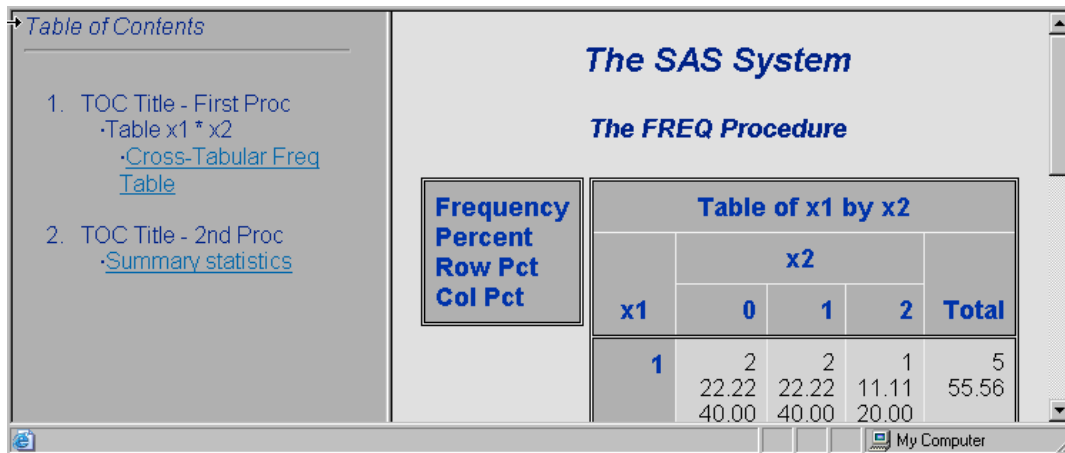
ODS HTML file="HTML_FILE.html"
         contents="HTML_CONTENTS.html"
         frame="HTML_FRAME.html";
ODS PROCLABEL "TOC Title – First Proc";
Proc Freq data=temp;
  Tables x1*x2/list;
Run;

```

## ODS PROCLABEL "TOC Title – Second Proc";

```
Proc Means data=temp;  
  Var x1 x2;  
RUN;  
ODS HTML close;
```

The screen below shows the table of contents with the new labels.



The screenshot shows a SAS ODS HTML output window. On the left is a 'Table of Contents' pane with two entries: '1. TOC Title - First Proc' with sub-items 'Table x1 \* x2' and 'Cross-Tabular Freq Table', and '2. TOC Title - 2nd Proc' with sub-item 'Summary statistics'. The main window displays 'The SAS System' and 'The FREQ Procedure'. Below this is a table titled 'Table of x1 by x2'. To the left of the table is a legend for the columns: 'Frequency', 'Percent', 'Row Pct', and 'Col Pct'. The table has columns for 'x1', 'x2' (with sub-columns 0, 1, 2), and 'Total'. The data row shows values for x1=1: 2 (22.22%), 2 (22.22%), 1 (11.11%), and a total of 5 (55.56%).

x1	x2			Total
	0	1	2	
1	2 22.22 40.00	2 22.22 40.00	1 11.11 20.00	5 55.56

To have the output from each procedure in a separate file without coding a separate ODS statement for each file, use the NEWFILE=PROC option. Use the NEWFILE=PAGE if you wish to have every page of output in a separate file. ODS appends a sequential number after the file name to differentiate between the different output files. For example, the first file created in the example below would be named HTML\_FILE1.html, the second would be HTML\_FILE2.html, etc.

```
ODS HTML  file="HTML_FILE.html"  
          contents="HTML_CONTENTS.html"  
          frame="HTML_FRAME.html"  
          NEWFILE=PROC;  
Proc Freq data=temp;  
  Tables x1*x2/list;  
Run;  
Proc Means data=temp;  
  Var x1 x2;  
RUN;  
ODS HTML close;
```

In the above example, the output from the Proc Freq would be in a file called HTML\_FILE1.html and the output from the Proc Means would be in a file called HTML\_FILE2.html.

## RTF FILES

RTF files are often imported into MS Word documents for viewing and printing. By default, SAS ODS handles titles and footers by placing them in MS Word Headers and Footers (remember the grayed out title in the first example). If you wish to force the titles and footers into the main body of the file, use the BODYTITLE option. This will place the report titles and footers in the main document.

Note: There is a known bug in SAS v8.2 when using the BODYTITLE= option. In order for the document to format correctly, you MUST make sure that either the SAS date or the SAS page number are turned on. These two options are on by default so unless you turn them off there should be no problem. Below is an example of code with this option.

```

ODS RTF FILE="RTF_FILE.rtf" BODYTITLE;
  Proc Freq data=temp;
    Tables x1*x2/list;
  Run;
ODS RTF CLOSE;

```

Below is example output with the titles in the body, not the header. Note that the titles are no longer grayed out as in the first example.

<i>The SAS System</i>					
<i>The FREQ Procedure</i>					
x1	x2	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1	0	2	22.22	2	22.22
1	1	2	22.22	4	44.44
1	2	1	11.11	5	55.56
2	1	2	22.22	7	77.78
2	2	2	22.22	9	100.00

It is also possible to specify the page orientation by using the **OPTIONS** statement with the option **ORIENTATION=** set to either **PORTRAIT** or **LANDSCAPE**. The default is portrait. Note that the orientation must be either portrait or landscape for all pages in any single ODS file (using SAS v8.2). See example code below.

```

OPTIONS ORIENTATION=LANDSCAPE;
ODS RTF file="RTF_FILE.rtf" bodytitle;
  Proc Freq data=temp;
    Tables x1*x2/list;
  Run;
ODS RTF CLOSE;

```

A final note on RTF files: Importing an ODS RTF file into Excel is not always successful. The HTML format is recommended in order to avoid errors.

## STYLE DEFINITIONS

ODS allows you to use different styles to create tables. There are 17 different style definitions available in SAS v8.2, although these definitions may be customized or you can create your own style. However, the current paper will review only the ready-to-use styles. To find out the names of the styles that are available, use the **PROC TEMPLATE** procedure. The code to produce the list of styles is below.

```

PROC TEMPLATE;
  LIST STYLES;
RUN;

```

The list of styles provided by SAS v8.2 is:

- BarrettsBlue
- Beige
- Brick
- Brown
- D3d
- Default
- Minimal
- NoFontDefault
- Printer
- RTF
- SASWeb
- StatDoc
- Theme
- FancyPrinter
- SansPrinter
- SASDocPrinter
- SerifPrinter

To specify a style to use, use the STYLE= option for both the ODS HTML and RTF statements. If a style is not specified, then STYLE=DEFAULT is assumed. An example of each style is included in Appendix A. Each style uses different colors, fonts and font sizes. Below is example code for specifying a style.

```
ODS RTF file="style.rtf" STYLE=BROWN ;  
  Proc Freq data=temp;  
    Tables x1*x2/list;  
  Run;  
ODS RTF close;
```

See Appendix A for examples of the different styles using Proc Tabulate.

## CONCLUSION AND REFERENCES

The options described here provide a basic overview of the capability of ODS. Please refer to the SAS ODS manuals, papers by other authors, and the online SAS help documents to learn more about ODS.

I also highly recommend the manual "The Output Delivery System: The Basics" written by Lauren E. Haworth. This manual has many excellent learning lessons and has provided the inspiration for this paper.

## AUTHOR CONTACT

Your comments and questions are valued and welcome. Contact the author at:

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## APPENDIX A

### Report Counts by Region Using Style BarrettsBlue

Region	Fiscal Year						Total
	2000-01			2001-02			
	# of Requests	# Released		# of Requests	# Released		
		Yes	No		Yes	No	
MSRO	56	49	7	55	33	22	111
MWRO	32	24	8	20	5	15	52
NERO	17	14	3	13	4	9	30
SRO	68	45	23	45	25	20	113
SWRO	53	36	17	16	4	12	69
WRO	61	42	19	22	1	21	83
<b>Total</b>	287	210	77	171	72	99	458

### *Report Counts by Region Using Style Beige*

Region	Fiscal Year						Total
	2000-01			2001-02			
	# of Requests	# Released		# of Requests	# Released		
		Yes	No		Yes	No	
MSRO	56	49	7	55	33	22	111
MWRO	32	24	8	20	5	15	52
NERO	17	14	3	13	4	9	30
SRO	68	45	23	45	25	20	113
SWRO	53	36	17	16	4	12	69
WRO	61	42	19	22	1	21	83
<b>Total</b>	287	210	77	171	72	99	458

## APPENDIX A (Continued)

*Report Counts by Region  
Using Style Brick*

Region	Fiscal Year						Total
	2000-01			2001-02			
	# of Requests	# Released		# of Requests	# Released		
		Yes	No		Yes	No	
<b>MSRO</b>	56	49	7	55	33	22	111
<b>MWRO</b>	32	24	8	20	5	15	52
<b>NERO</b>	17	14	3	13	4	9	30
<b>SRO</b>	68	45	23	45	25	20	113
<b>SWRO</b>	53	36	17	16	4	12	69
<b>WRO</b>	61	42	19	22	1	21	83
<b>Total</b>	287	210	77	171	72	99	458

*Report Counts by Region  
Using Style Brown*

Region	Fiscal Year						Total
	2000-01			2001-02			
	# of Requests	# Released		# of Requests	# Released		
		Yes	No		Yes	No	
<b>MSRO</b>	56	49	7	55	33	22	111
<b>MWRO</b>	32	24	8	20	5	15	52
<b>NERO</b>	17	14	3	13	4	9	30
<b>SRO</b>	68	45	23	45	25	20	113
<b>SWRO</b>	53	36	17	16	4	12	69
<b>WRO</b>	61	42	19	22	1	21	83
<b>Total</b>	287	210	77	171	72	99	458

## APPENDIX A (Continued)

*Report Counts by Region  
Using Style D3D*

Region	Fiscal Year						Total
	2000-01			2001-02			
	# of Requests	# Released		# of Requests	# Released		
		Yes	No		Yes	No	
MSRO	56	49	7	55	33	22	111
MWRO	32	24	8	20	5	15	52
NERO	17	14	3	13	4	9	30
SRO	68	45	23	45	25	20	113
SWRO	53	36	17	16	4	12	69
WRO	61	42	19	22	1	21	83
<b>Total</b>	287	210	77	171	72	99	458

*Report Counts by Region  
Using Style Default*

Region	Fiscal Year						Total
	2000-01			2001-02			
	# of Requests	# Released		# of Requests	# Released		
		Yes	No		Yes	No	
MSRO	56	49	7	55	33	22	111
MWRO	32	24	8	20	5	15	52
NERO	17	14	3	13	4	9	30
SRO	68	45	23	45	25	20	113
SWRO	53	36	17	16	4	12	69
WRO	61	42	19	22	1	21	83
<b>Total</b>	287	210	77	171	72	99	458

## APPENDIX A (Continued)

Report Counts by Region  
Using Style Minimal

Region	Fiscal Year						Total
	2000-01			2001-02			
	# of Requests	# Released		# of Requests	# Released		
		Yes	No		Yes	No	
MSRO	56	49	7	55	33	22	111
MWRO	32	24	8	20	5	15	52
NERO	17	14	3	13	4	9	30
SRO	68	45	23	45	25	20	113
SWRO	53	36	17	16	4	12	69
WRO	61	42	19	22	1	21	83
<b>Total</b>	<b>287</b>	<b>210</b>	<b>77</b>	<b>171</b>	<b>72</b>	<b>99</b>	<b>458</b>

*Report Counts by Region  
Using Style NoFontDefault*

Region	Fiscal Year						Total
	2000-01			2001-02			
	# of Requests	# Released		# of Requests	# Released		
		Yes	No		Yes	No	
<b>MSRO</b>	56	49	7	55	33	22	111
<b>MWRO</b>	32	24	8	20	5	15	52
<b>NERO</b>	17	14	3	13	4	9	30
<b>SRO</b>	68	45	23	45	25	20	113
<b>SWRO</b>	53	36	17	16	4	12	69
<b>WRO</b>	61	42	19	22	1	21	83
<b>Total</b>	<b>287</b>	<b>210</b>	<b>77</b>	<b>171</b>	<b>72</b>	<b>99</b>	<b>458</b>

## APPENDIX A (Continued)

*Report Counts by Region  
Using Style Printer*

Region	Fiscal Year						Total
	2000-01			2001-02			
	# of Requests	# Released		# of Requests	# Released		
		Yes	No		Yes	No	
MSRO	56	49	7	55	33	22	111
MWRO	32	24	8	20	5	15	52
NERO	17	14	3	13	4	9	30
SRO	68	45	23	45	25	20	113
SWRO	53	36	17	16	4	12	69
WRO	61	42	19	22	1	21	83
<b>Total</b>	287	210	77	171	72	99	458

*Report Counts by Region  
Using Style RTF*

Region	Fiscal Year						Total
	2000-01			2001-02			
	# of Requests	# Released		# of Requests	# Released		
		Yes	No		Yes	No	
MSRO	56	49	7	55	33	22	111
MWRO	32	24	8	20	5	15	52
NERO	17	14	3	13	4	9	30
SRO	68	45	23	45	25	20	113
SWRO	53	36	17	16	4	12	69
WRO	61	42	19	22	1	21	83
<b>Total</b>	287	210	77	171	72	99	458

## APPENDIX A (Continued)

### Report Counts by Region Using Style SASWeb

Region	Fiscal Year						Total
	2000-01			2001-02			
	# of Requests	# Released		# of Requests	# Released		
		Yes	No		Yes	No	
MSRO	56	49	7	55	33	22	111
MWRO	32	24	8	20	5	15	52
NERO	17	14	3	13	4	9	30
SRO	68	45	23	45	25	20	113
SWRO	53	36	17	16	4	12	69
WRO	61	42	19	22	1	21	83
<b>Total</b>	287	210	77	171	72	99	458

### *Report Counts by Region Using Style StatDoc*

Region	Fiscal Year						Total
	2000-01			2001-02			
	# of Requests	# Released		# of Requests	# Released		
		Yes	No		Yes	No	
MSRO	56	49	7	55	33	22	111
MWRO	32	24	8	20	5	15	52
NERO	17	14	3	13	4	9	30
SRO	68	45	23	45	25	20	113
SWRO	53	36	17	16	4	12	69
WRO	61	42	19	22	1	21	83
<b>Total</b>	287	210	77	171	72	99	458

## APPENDIX A (Continued)

*Report Counts by Region  
Using Style Theme*

Region	Fiscal Year						Total
	2000-01			2001-02			
	# of Requests	# Released		# of Requests	# Released		
		Yes	No		Yes	No	
MSRO	56	49	7	55	33	22	111
MWRO	32	24	8	20	5	15	52
NERO	17	14	3	13	4	9	30
SRO	68	45	23	45	25	20	113
SWRO	53	36	17	16	4	12	69
WRO	61	42	19	22	1	21	83
<b>Total</b>	287	210	77	171	72	99	458

*Report Counts by Region  
Using Style FancyPrinter*

Region	Fiscal Year						Total
	2000-01			2001-02			
	# of Requests	# Released		# of Requests	# Released		
		Yes	No		Yes	No	
MSRO	56	49	7	55	33	22	111
MWRO	32	24	8	20	5	15	52
NERO	17	14	3	13	4	9	30
SRO	68	45	23	45	25	20	113
SWRO	53	36	17	16	4	12	69
WRO	61	42	19	22	1	21	83
<b>Total</b>	287	210	77	171	72	99	458

## APPENDIX A (Continued)

### Report Counts by Region Using Style SansPrinter

Region	Fiscal Year						Total
	2000-01			2001-02			
	# of Requests	# Released		# of Requests	# Released		
		Yes	No		Yes	No	
MSRO	56	49	7	55	33	22	111
MWRO	32	24	8	20	5	15	52
NERO	17	14	3	13	4	9	30
SRO	68	45	23	45	25	20	113
SWRO	53	36	17	16	4	12	69
WRO	61	42	19	22	1	21	83
<b>Total</b>	287	210	77	171	72	99	458

### Report Counts by Region Using Style SASDocPrinter

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Region	Fiscal Year						
	2000-01			2001-02			Total
	# of Requests	# Released		# of Requests	# Released		
		Yes	No		Yes	No	
MSRO	56	49	7	55	33	22	
MWRO	32	24	8	20	5	15	52
NERO	17	14	3	13	4	9	30
SRO	68	45	23	45	25	20	113
SWRO	53	36	17	16	4	12	69
WRO	61	42	19	22	1	21	83
<b>Total</b>	287	210	77	171	72	99	458

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## APPENDIX A (Continued)

*Report Counts by Region  
Using Style SerifPrinter*

Region	Fiscal Year						Total
	2000-01			2001-02			
	# of Requests	# Released		# of Requests	# Released		
		Yes	No		Yes	No	
MSRO	56	49	7	55	33	22	111
MWRO	32	24	8	20	5	15	52
NERO	17	14	3	13	4	9	30
SRO	68	45	23	45	25	20	113
SWRO	53	36	17	16	4	12	69
WRO	61	42	19	22	1	21	83
<b>Total</b>	287	210	77	171	72	99	458