

CHAPTER

1

Getting Started with the Output Delivery System

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Welcome to the Output Delivery System

Before SAS 7, most SAS procedures generated output that was designed for a traditional line-printer. This type of output has limitations that prevent you from getting the most value from your results:

- Traditional SAS output is limited to monospace fonts. In a time of desktop document editors and publishing systems, you want more versatility in printed output.
- Some commonly used procedures produce printed output but do not create an output data set. Many times it would be very convenient to produce not only printed output but also an output data set that you could use as input to another SAS procedure or to a DATA step.

ODS is designed to overcome these limitations and make it easier for you to format your output. The SAS Output Delivery System (ODS) gives you greater flexibility in generating, storing, and reproducing SAS procedure and DATA step output along with a wide range of formatting options. ODS provides formatting functionality that is not available when using individual procedures or the DATA step without ODS.

Accessibility Features in ODS

The Output Delivery System conforms to the U.S. Section 508 guidelines for Web-based content. If you have specific questions about the accessibility of SAS products, send them to accessibility@sas.com or call SAS Technical Support.

The following additional accessibility items are available as programming options:

“Event Variables” on page 833

ABBR

specifies an abbreviation for the event variable.

ACRONYM

specifies an acronym for an event variable.

ALT

specifies an alternate description of an event variable.

CAPTION

specifies the caption for a table.

LONGDESC

specifies the long description of an event variable.

SUMMARY

specifies a summary of a table.

Style Template:

STYLES.HIGHCONTRAST

creates the same output as the default output except all of the colors are black on white.

“Header Attributes” on page 628

ABBR= on page 630

specifies an abbreviation for the header.

ACRONYM= on page 630

specifies an acronym for the header.

ALT= on page 630

specifies an alternate description of the header.

GENERIC on page 632

specifies whether multiple columns can use the header.

LONGDESC= on page 632

specifies the long description of the header.

“Table Attributes” on page 642

LONGDESC= on page 648

specifies a long description of a table.

ALT= on page 645

specifies an alternate description of a table.

The following tagsets and ODS statements are 508 compliant:

“ODS PHTML Statement” on page 215

opens, manages, or closes the PHTML destination, which produces simple HTML output that uses twelve style elements and no class attributes.

“ODS HTMLCSS Statement” on page 135

opens, manages, or closes the HTMLCSS destination, which produces HTML output with cascading style sheets.

“ODS HTML Statement” on page 124

opens, manages, or closes the HTML destination, which produces HTML 4.0 output that contains embedded style sheets.

MSOFFICE2K on page 282 tagset

produces HTML code for output generated by ODS for Microsoft Office products.

In SAS 9.1 and later releases, all of the accessibility enhancements have been merged into the ODS HTML tagsets. No additional steps are required.

A Quick Start to Using ODS

The Purpose of These Examples

The following examples are designed to help you to begin using ODS quickly. Use them to learn how to produce output that contains more interesting formatting. Then, to learn more about the depth, breadth, and true power of ODS, see “Introduction to the Output Delivery System” on page 16.

Creating Listing Output

Creating the listing output is simple—just run a DATA step or PROC step as usual. By default, the LISTING destination is on, and the DATA step and Base SAS procedures create listing output through ODS:

```
options source pagesize=60 linesize=80 nodate;

data employee_data;
  input IDNumber $ 1-4 LastName $ 9-19 FirstName $ 20-29
        City $ 30-42 State $ 43-44 /
        Gender $ 1 JobCode $ 9-11 Salary 20-29 @30 Birth date9.
        @43 Hired date9. HomePhone $ 54-65;
  format birth hired date9.;

  datalines;
1919 Adams Gerald Stamford CT
M TA2 34376 15SEP48 07JUN75 203/781-1255
1653 Alexander Susan Bridgeport CT
F ME2 35108 18OCT52 12AUG78 203/675-7715
1400 Apple Troy New York NY
M ME1 29769 08NOV55 19OCT78 212/586-0808
1350 Arthur Barbara New York NY
F FA3 32886 03SEP53 01AUG78 718/383-1549
1401 Avery Jerry Paterson NJ
M TA3 38822 16DEC38 20NOV73 201/732-8787
1499 Barefoot Joseph Princeton NJ
M ME3 43025 29APR42 10JUN68 201/812-5665
1101 Baucom Walter New York NY
M SCP 18723 09JUN50 04OCT78 212/586-8060
1333 Blair Justin Stamford CT
M PT2 88606 02APR49 13FEB69 203/781-1777
1402 Blalock Ralph New York NY
M TA2 32615 20JAN51 05DEC78 718/384-2849
1479 Bostic Marie New York NY
F TA3 38785 25DEC56 08OCT77 718/384-8816
1403 Bowden Earl Bridgeport CT
M ME1 28072 31JAN57 24DEC79 203/675-3434
```

```

1739   Boyce   Jonathan New York   NY
M      PT1     66517   28DEC52   30JAN79   212/587-1247
1658   Bradley  Jeremy   New York   NY
M      SCP     17943   11APR55   03MAR80   212/587-3622
1428   Brady    Christine Stamford  CT
F      PT1     68767   07APR58   19NOV79   203/781-1212
1407   Grant    Daniel   Mt. Vernon NY
M      PT1     68096   26MAR57   21MAR78   914/468-1616
1114   Green    Janice   New York   NY
F      TA2     32928   21SEP57   30JUN75   212/588-1092
;

proc print data=employee_data(obs=12);
  id idnumber;
  title 'Personnel Data';
run;

```

Output 1.1 Listing Output

Personnel Data							1
ID Number	LastName	First Name	City	State	Gender	Job Code	
1919	Adams	Gerald	Stamford	CT	M	TA2	
1653	Alexander	Susan	Bridgeport	CT	F	ME2	
1400	Apple	Troy	New York	NY	M	ME1	
1350	Arthur	Barbara	New York	NY	F	FA3	
1401	Avery	Jerry	Paterson	NJ	M	TA3	
1499	Barefoot	Joseph	Princeton	NJ	M	ME3	
1101	Baucom	Walter	New York	NY	M	SCP	
1333	Blair	Justin	Stamford	CT	M	PT2	
1402	Blalock	Ralph	New York	NY	M	TA2	
1479	Bostic	Marie	New York	NY	F	TA3	
1403	Bowden	Earl	Bridgeport	CT	M	ME1	
1739	Boyce	Jonathan	New York	NY	M	PT1	
ID Number	Salary	Birth	Hired	HomePhone			
1919	34376	15SEP1948	07JUN1975	203/781-1255			
1653	35108	18OCT1952	12AUG1978	203/675-7715			
1400	29769	08NOV1955	19OCT1978	212/586-0808			
1350	32886	03SEP1953	01AUG1978	718/383-1549			
1401	38822	16DEC1938	20NOV1973	201/732-8787			
1499	43025	29APR1942	10JUN1968	201/812-5665			
1101	18723	09JUN1950	04OCT1978	212/586-8060			
1333	88606	02APR1949	13FEB1969	203/781-1777			
1402	32615	20JAN1951	05DEC1978	718/384-2849			
1479	38785	25DEC1956	08OCT1977	718/384-8816			
1403	28072	31JAN1957	24DEC1979	203/675-3434			
1739	66517	28DEC1952	30JAN1979	212/587-1247			

Listing output is the default format; therefore, when you request another format, your programs will create both listing output and output in the requested format. To prevent listing output from being created, use this statement:

```
ods listing close;
```

Creating Output in HTML Format

If you want to display output from a SAS program from the Web, you can use ODS to create output that is formatted in Hypertext Markup Language (HTML). To create HTML output, use the ODS HTML statement:

```
ods html file='external-file-for-HTML-output';
```

If you do not want to generate listing output in addition to the HTML output, then use this statement:

```
ods listing close;
```

The following program contains a PROC PRINT step that produces output in HTML, but does not produce the default listing output. You can browse this output with Internet Explorer, Netscape, or any other browser that fully supports HTML 3.2 or later.

```
ods listing close;
ods html file='external-file-for-HTML-output';

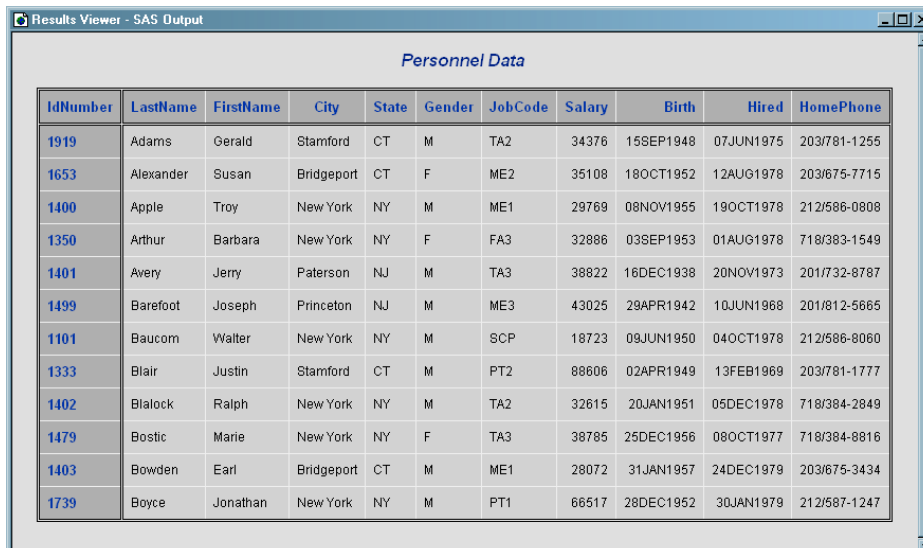
proc print data=employee_data(obs=12);
  id idnumber;
  title 'Personnel Data';
run;

ods html close;
ods listing;
```

Note the two ODS statements that follow the PROC PRINT step. To be able to browse your HTML files in a browser, you must execute the ODS HTML CLOSE statement. It is simply good practice to reset ODS to listing output, which is the default setting.

Display 1.1 HTML 3.2 Output

The following output is formatted in HTML 3.2 output and viewed in an Internet Explorer 5.0 browser.



IdNumber	LastName	FirstName	City	State	Gender	JobCode	Salary	Birth	Hired	HomePhone
4919	Adams	Gerald	Stamford	CT	M	TA2	34376	15SEP1948	07JUN1975	203/781-1255
4653	Alexander	Susan	Bridgeport	CT	F	ME2	35108	18OCT1952	12AUG1978	203/675-7715
1400	Apple	Troy	New York	NY	M	ME1	29769	08NOV1955	19OCT1978	212/586-0808
1350	Arthur	Barbara	New York	NY	F	FA3	32886	03SEP1953	01AUG1978	718/383-1549
1401	Avery	Jerry	Paterson	NJ	M	TA3	38822	16DEC1938	20NOV1973	201/732-8787
1499	Barefoot	Joseph	Princeton	NJ	M	ME3	43025	29APR1942	10JUN1968	201/812-5665
1101	Baucom	Walter	New York	NY	M	SCP	18723	09JUN1950	04OCT1978	212/586-8060
1333	Blair	Justin	Stamford	CT	M	PT2	88606	02APR1949	13FEB1969	203/781-1777
1402	Bialock	Ralph	New York	NY	M	TA2	32615	20JAN1951	05DEC1978	718/384-2849
1479	Bostic	Marie	New York	NY	F	TA3	38785	25DEC1956	08OCT1977	718/384-8816
1403	Bowden	Earl	Bridgeport	CT	M	ME1	28072	31JAN1957	24DEC1979	203/675-3434
1739	Boyce	Jonathan	New York	NY	M	PT1	66517	28DEC1952	30JAN1979	212/587-1247

Producing Output in Multiple Formats at the Same Time

A simple way to produce output in multiple formats at one time is to produce the default listing output and then request an additional format, such as HTML, PDF, RTF, or PostScript.

```
ods html file='HTML-file-pathname.html';
ods pdf file='PDF-file-pathname.pdf';
ods rtf file='RTF-file-pathname.rtf';
ods ps file='PS-file-pathname.ps';

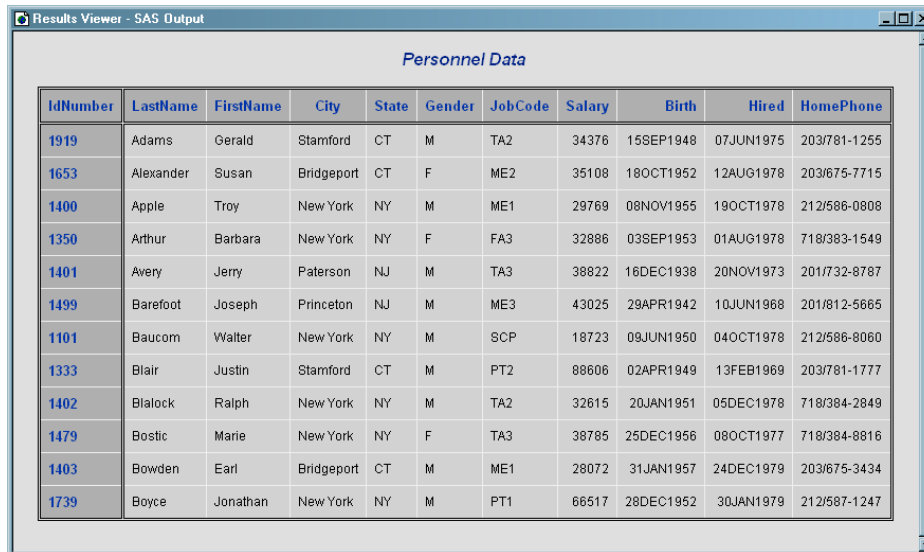
proc print data=employee_data(obs=12);
  id idnumber;
  title 'Personnel Data';
run;

ods _all_ close;
ods listing;
```

Note the two ODS statements that follow the PROC statement. The first one closes all files so that you can use them (for example, you could browse the HTML file or send the PDF file to a printer). The final statement opens the LISTING destination so that ODS returns to producing listing output for subsequent DATA or PROC steps in the current session.

Display 1.2 HTML 3.2 Output

The following output is formatted in HTML 3.2 output and viewed in an Internet Explorer 5.0 browser.



IdNumber	LastName	FirstName	City	State	Gender	JobCode	Salary	Birth	Hired	HomePhone
1919	Adams	Gerald	Stamford	CT	M	TA2	34376	15SEP1948	07JUN1975	203/781-1255
1653	Alexander	Susan	Bridgeport	CT	F	ME2	35108	18OCT1952	12AUG1978	203/675-7715
1400	Apple	Troy	New York	NY	M	ME1	29769	08NOV1955	19OCT1978	212/586-0808
1350	Arthur	Barbara	New York	NY	F	FA3	32886	03SEP1953	01AUG1978	718/383-1549
1401	Avery	Jerry	Paterson	NJ	M	TA3	38822	16DEC1938	20NOV1973	201/732-8787
1499	Barefoot	Joseph	Princeton	NJ	M	ME3	43025	29APR1942	10JUN1968	201/812-5665
1101	Baucom	Walter	New York	NY	M	SCP	18723	09JUN1950	04OCT1978	212/586-8060
1333	Blair	Justin	Stamford	CT	M	PT2	88606	02APR1949	13FEB1969	203/781-1777
1402	Blalock	Ralph	New York	NY	M	TA2	32615	20JAN1951	05DEC1978	718/384-2849
1479	Bostic	Marie	New York	NY	F	TA3	38785	25DEC1956	08OCT1977	718/384-8816
1403	Bowden	Earl	Bridgeport	CT	M	ME1	28072	31JAN1957	24DEC1979	203/675-3434
1739	Boyce	Jonathan	New York	NY	M	PT1	66517	28DEC1952	30JAN1979	212/587-1247

Display 1.3 PDF Output

The following output is formatted in PDF and viewed with Adobe Acrobat Reader.

The screenshot shows a PDF viewer window with the following content:

Personnel Data

IdNumber	LastName	FirstName	City	State	Gender	JobCode	Salary
1919	Adams	Gerald	Stamford	CT	M	TA2	34376
1653	Alexander	Susan	Bridgeport	CT	F	ME2	35108
1400	Apple	Troy	New York	NY	M	ME1	29769
1350	Arthur	Barbara	New York	NY	F	FA3	32886
1401	Avery	Jerry	Paterson	NJ	M	TA3	38822
1499	Barefoot	Joseph	Princeton	NJ	M	ME3	43025
1101	Baucom	Walter	New York	NY	M	SCP	18723
1333	Blair	Justin	Stamford	CT	M	PT2	88606
1402	Blalock	Ralph	New York	NY	M	TA2	32615
1479	Bostic	Marie	New York	NY	F	TA3	38785
1403	Bowden	Earl	Bridgeport	CT	M	ME1	28072
1739	Boyce	Jonathan	New York	NY	M	PT1	66517

IdNumber	Birth	Hired	HomePhone
1919	15SEP1948	07JUN1975	203-781-1255
1653	18OCT1952	12AUG1978	203-675-7715
1400	08NOV1955	19OCT1978	212-586-0808
1350	03SEP1953	01AUG1978	718-383-1549
1401	16DEC1938	20NOV1973	201-732-8787
1499	29APR1942	10JUN1968	201-812-5665
1101	09JUN1950	04OCT1978	212-586-8060
1333	02APR1949	13FEB1969	203-781-1777
1402	20JAN1951	05DEC1978	718-384-2849
1479	25DEC1956	08OCT1977	718-384-8816
1403	31JAN1957	24DEC1979	203-675-3434
1739	28DEC1952	30JAN1979	212-587-1247

Display 1.4 RTF Output

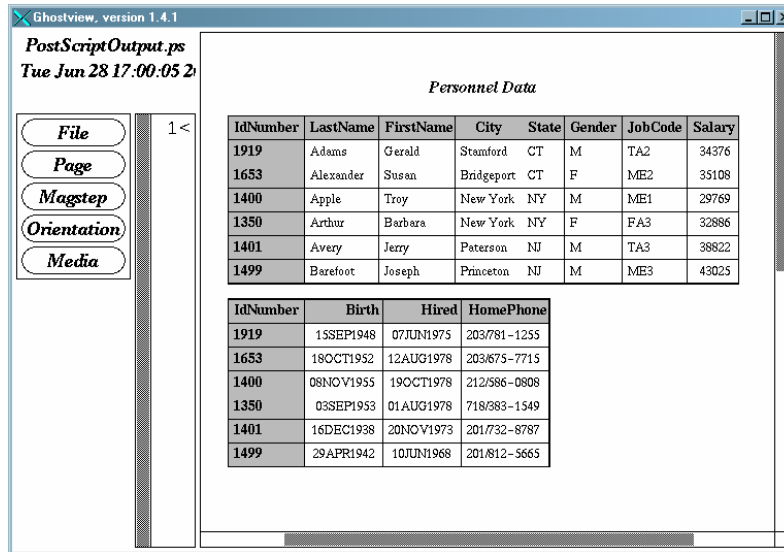
The following RTF output is viewed with Microsoft Word 2000.

Personnel Data

IdNumber	LastName	FirstName	City	State	Gender	JobCode	Salary	Birth	Hired	HomePhone
1919	Adams	Gerald	Stamford	CT	M	TA2	34376	15SEP1948	07JUN1975	203-781-1255
1653	Alexander	Susan	Bridgeport	CT	F	ME2	35108	18OCT1952	12AUG1978	203-675-7715
1400	Apple	Troy	New York	NY	M	ME1	29769	08NOV1955	19OCT1978	212-586-0808
1350	Arthur	Barbara	New York	NY	F	FA3	32886	03SEP1953	01AUG1978	718-383-1549
1401	Avery	Jerry	Paterson	NJ	M	TA3	38822	16DEC1938	20NOV1973	201-732-8787
1499	Barefoot	Joseph	Princeton	NJ	M	ME3	43025	29APR1942	10JUN1968	201-812-5665
1101	Baucom	Walter	New York	NY	M	SCP	18723	09JUN1950	04OCT1978	212-586-8060
1333	Blair	Justin	Stamford	CT	M	PT2	88606	02APR1949	13FEB1969	203-781-1777
1402	Blalock	Ralph	New York	NY	M	TA2	32615	20JAN1951	05DEC1978	718-384-2849
1479	Bostic	Marie	New York	NY	F	TA3	38785	25DEC1956	08OCT1977	718-384-8816
1403	Bowden	Earl	Bridgeport	CT	M	ME1	28072	31JAN1957	24DEC1979	203-675-3434
1739	Boyce	Jonathan	New York	NY	M	PT1	66517	28DEC1952	30JAN1979	212-587-1247

Display 1.5 PostScript Output

The following PostScript output is viewed with Ghostview.

**Output 1.2** Listing Output

This output is traditional SAS listing output.

Personnel Data											5
ID	First	Job			Birth	Hired	HomePhone				
Number	LastName	Name	City	State	Gender	Code	Salary	Birth	Hired	HomePhone	
1919	Adams	Gerald	Stamford	CT	M	TA2	34376	15SEP1948	07JUN1975	203/781-1255	
1653	Alexander	Susan	Bridgeport	CT	F	ME2	35108	18OCT1952	12AUG1978	203/675-7715	
1400	Apple	Troy	New York	NY	M	ME1	29769	08NOV1955	19OCT1978	212/586-0808	
1350	Arthur	Barbara	New York	NY	F	FA3	32886	03SEP1953	01AUG1978	718/383-1549	
1401	Avery	Jerry	Paterson	NJ	M	TA3	38822	16DEC1938	20NOV1973	201/732-8787	
1499	Barefoot	Joseph	Princeton	NJ	M	ME3	43025	29APR1942	10JUN1968	201/812-5665	
1101	Baucom	Walter	New York	NY	M	SCP	18723	09JUN1950	04OCT1978	212/586-8060	
1333	Blair	Justin	Stamford	CT	M	PT2	88606	02APR1949	13FEB1969	203/781-1777	
1402	Bialock	Ralph	New York	NY	M	TA2	32615	20JAN1951	05DEC1978	718/384-2849	
1479	Bostic	Marie	New York	NY	F	TA3	38785	25DEC1956	08OCT1977	718/384-8816	
1403	Bowden	Earl	Bridgeport	CT	M	ME1	28072	31JAN1957	24DEC1979	203/675-3434	
1739	Boyce	Jonathan	New York	NY	M	PT1	66517	28DEC1952	30JAN1979	212/587-1247	

Where to Go from Here

- *Examples of ODS output:* To see the types of output that you can create with ODS, see “Gallery of ODS Samples” on page 16.
- *Essential concepts in ODS:* For concepts that will help you to understand and to use ODS to your best advantage, see “Introduction to the Output Delivery System” on page 16.
- *Creating more complex HTML pages:* With ODS, you can create HTML pages that include a frame and a table of contents. For more information, see “ODS HTML

Statement” on page 124 and Appendix 2, “ODS and the HTML Destination,” on page 891. You can see many examples of HTML output in the *Base SAS Procedures Guide* online documentation.

- *ODS statements:* For reference information on the ODS statements, see Chapter 5, “Dictionary of ODS Language Statements,” on page 67. These statements control the many features of the Output Delivery System.
- *Using ODS with the DATA step:* With the addition of ODS-related options to the FILE and PUT statements, you can use ODS to produce enhanced DATA step reports. See Chapter 3, “Output Delivery System and the DATA Step,” on page 39.
- *Creating your own templates:* For even more control over formatting, you can create your own templates for formatting output. See Chapter 7, “TEMPLATE Procedure: Overview,” on page 395.

