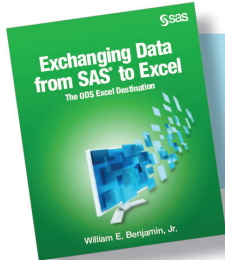


Exchanging Data from SAS[®] to Excel

The ODS Excel Destination



William E. Benjamin, Jr.



From *Exchanging Data From SAS to Excel*.
Full book available for purchase [here](#).

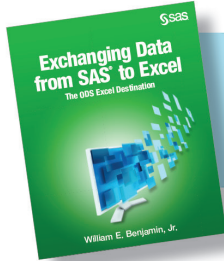
Contents

About This Book.....	vii
About The Author.....	xi
Chapter 1: Introduction	1
Introduction	1
What is the SAS ODS EXCEL Destination?.....	1
Why I like Backward Compatibility	2
Why the ODS Excel Destination Is an Output-Only Feature of SAS.....	3
Layout of This Book	3
General Chapter Layout.....	3
Chapter 2: ODS Tagset versus Destination.....	5
View of Microsoft Excel Changes from the Outside	5
Data Sources Used as Examples	6
The EXCELXP Tagset	7
The ODS EXCEL Destination	7
Features of the ODS EXCEL Destination.....	7
Simple Syntax	7
ID=	8
Actions.....	8
Optional Arguments (Options).....	8
Suboptions of the OPTIONS Statement	9
General Chapter Descriptions	10
Chapter 3: ODS Excel Destination Actions	11
Introduction	11
ODS Excel Destination Actions	11
A Simple ODS Excel Example and the CLOSE Action	12
A Simple ODS Excel Output Step	12
Finding ODS Object Names Using the ODS TRACE Statement.....	15
Using the ODS TRACE Statement to Show PROC UNIVARIATE Objects	15
ODS EXCLUDE Statement	19
ODS SELECT Statement.....	20
ODS SHOW Statement	21
Conclusion.....	22

Chapter 4: Setting Excel Document Property Values	23
Introduction	23
Options to Modify the Excel Document Properties Sheet	23
Default Excel Property Sheets	24
Modify Excel Property Sheets with the ODS EXCEL Destination	25
Excel Property Sheet Date/Time Fields without the SASDATE Option	27
Excel Property Sheet Date/Time Fields with the SASDATE Option	27
Conclusion	29
Chapter 5: Options That Affect the Workbook	31
Introduction	31
ODS Excel Destination Actions	31
The FILE= Option	33
The ID= Option	34
The BLANK_SHEET= Option	37
The CONTENTS= Option	38
The INDEX= Option	39
The MSG_LEVEL= Option	40
The TAB_COLOR= Option	41
The ZOOM= Option	43
Conclusion	44
Chapter 6: Arguments that Affect Output Features	45
Introduction	45
Arguments That Affect Worksheet-Level Output Features	46
Using the ODS Document Object Model (DOM) with the ODS EXCEL Statement	46
The ODS ANCHOR= Option	51
The BOX_SIZING= Option	53
Using Cascading Style Sheets with the CSSSTYLE= Option	54
Simple Color Changes Using a CSS File	54
Sending Graphs to Excel and Modifying the Output Using a CSS File	56
Adding a Background Image Using CSS	59
The IMAGE_DPI= Option	61
The STYLE= Option	63
The ODS EXCEL STYLE= Option	63
The ODS EXCEL STYLE= Overrides	65
The TEXT= Option	66
Conclusion	67
Chapter 7: Options That Affect Worksheet Features	69

Introduction	70
ODS Excel Destination Suboptions.....	70
The EMBEDDED_FOOTNOTES= Suboption.....	72
Embedded Footnotes Turned Off	72
Embedded Footnotes Turned On	73
Embedded Footnotes='ON' with Multiple Outputs on a Worksheet.....	74
The EMBED_FOOTNOTES_ONCE= Suboption	76
EMBED_FOOTNOTES_ONCE with Only One Output Table	76
EMBED_FOOTNOTES_ONCE with More Than One Output Table.....	77
The EMBEDDED_TITLES= Suboption.....	79
EMBEDDED_TITLES='OFF'	79
EMBEDDED_TITLES='ON'	80
The EMBED_TITLES_ONCE= Suboption	83
EMBED_TITLES_ONCE and Only One Output Worksheet	83
EMBED_TITLES_ONCE with Multiple Outputs on a Worksheet	84
The FITTOPAGE= Suboption.....	86
The GRIDLINES= Suboption	89
The PAGES_FITHEIGHT= Suboption.....	92
The PAGES_FITWIDTH= Suboption	93
The SHEET_INTERVAL= Suboption	94
SHEET_INTERVAL='BYGROUP' Example	95
SHEET_INTERVAL='PAGE' Example	96
SHEET_INTERVAL='PROC' Example.....	98
SHEET_INTERVAL='NONE' Example.....	99
SHEET_INTERVAL='TABLE' Example	100
The SHEET_LABEL= Suboption.....	102
The SHEET_NAME= Suboption	104
The SUPPRESS_BYLINES= Suboption	105
Conclusion.....	107
Chapter 8: Options That Affect Print Features	109
Introduction	109
ODS Excel Destination Actions	110
The BLACKANDWHITE= Option	112
The CENTER_HORIZONTAL= Option.....	113
The CENTER_VERTICAL= Option.....	116
The DRAFTQUALITY= Option	119
The ORIENTATION= Option	120
The PAGE_ORDER_ACROSS= Option	121
The PRINT_AREA= Option	123

The PRINT_FOOTER= Option	125
The PRINT_FOOTER_MARGIN= Option.....	128
The PRINT_HEADER= Option	130
The PRINT_HEADER_MARGIN= Option.....	132
The ROWBREAKS_COUNT= Option.....	137
The ROWBREAKS_INTERVAL= Option.....	138
The ROWCOLHEADINGS= Option.....	141
The SCALE= Option	143
When Using Excel 2013, If You Enter:	143
The TITLE_FOOTNOTE_NOBREAK= Option	147
The TITLE_FOOTNOTE_WIDTH= Option	150
Conclusion	154
Chapter 9: Column, Row, and Cell Features	155
Introduction	155
ODS Excel Destination Column, Row, and Cell Options.....	155
The ABSOLUTE_COLUMN_WIDTH= Suboption.....	158
The AUTOFILTER= Suboption	160
The COLUMN_REPEAT= Suboption.....	162
The FROZEN_HEADERS= Suboption.....	168
The HIDDEN_COLUMNS= Suboption	170
The ABSOLUTE_ROW_HEIGHT= Suboption	171
The FROZEN_ROWHEADERS= Suboption	172
The HIDDEN_ROWS= Suboption	174
The ROW_HEIGHTS= Suboption	175
The ROW_REPEAT= Suboption	177
The FORMULAS= Suboption.....	182
The START_AT= Suboption.....	184
Conclusion	185
Index.....	187



From *Exchanging Data From SAS to Excel*.
Full book available for purchase [here](#).

Chapter 1: Introduction

What is the SAS ODS EXCEL Destination?	1
Why I like Backward Compatibility	2
Why the ODS Excel Destination Is an Output-Only Feature of SAS	3
Layout of This Book	3
General Chapter Layout.....	3

Introduction

Since I began writing code in 1973 to make computers do what I wanted them to do, instead of what they wanted to do, I have always worked as an application programmer. That means that I used someone's software to build a tool to do something. When I upgrade my software the tools I have already written still need to work, because not every computer is upgraded at the same time and new features need to be available to everyone.

While Base SAS and other features of SAS software make SAS an important and useful software suite, many people are not programmers or analysts and do not write computer programs. These people have learned to use and understand how Microsoft Excel can benefit them. They are quite often managers, directors, and vice presidents, and they want to use the data in a comfortable format. Since the release of Microsoft Excel 2007 and the Open XML format, the upgrades made to Excel and computer hardware in general have caused many updates and changes to the way SAS processes Microsoft Excel workbooks and worksheets.

The first adaptations came in the form of learning to read and write the new Excel formats. These changes upgraded PROC EXPORT, PROC IMPORT, the SAS LIBNAME statement, and the new SAS PC Files Server. The introduction of the SAS PC Files Server bridged the 32 to 64-bit barrier in application software, operating system software, and computer hardware. The release of the SAS ODS EXCELXP tagset occurred before the introduction of Excel 2007. The EXCELXP tagset writes output text files in the Extensible Markup Language (XML) format. Both Excel 2003 and 2007 can read these files. The new EXCEL 2007 (and later) workbooks are stored in the open XML format. Between the release of the EXCELXP tagset and December 2014, over 100 modifications in several releases occurred.

In late December 2014, I found out about a new SAS ODS feature, the ODS EXCEL destination. After nearly eight years of research and preparation my first book was days away from being finalized for publication. I realized I had the software required to create an example and lobbied hard to get something into my first book. This second book replaces the page and a half that introduced the ODS EXCEL destination in the first book.

What is the SAS ODS EXCEL Destination?

The SAS Output Delivery System has two major features that deal with outputting data files that Microsoft Excel can read. The general classifications are ODS tagsets and ODS destinations. Each

2 *Exchanging Data From SAS® to Excel: The ODS Excel Destination*

of these has many features. Tagsets are created by PROC TEMPLATE code that any SAS programmer can modify, while the ODS destinations are fixed executable modules that the user cannot modify. While the ODS EXCEL destination is a new part of Base SAS, many of the features of the ODS EXCELXP tagset are available to the new ODS EXCEL destination. See Chapter 2, “ODS Tagset versus Destination” for more information.

Why I like Backward Compatibility

Backward compatibility is a challenge that nearly every software producer faces. It does not matter if you develop software suites, operating systems, or reports for your boss. The only thing you can guarantee about the software, data, or reports that you need to produce is that they will change. SAS is one of the software producers that do a good job of maintaining backward compatibility. Sometimes I recode legacy features to accept the same inputs as before but I also accept new options and output new information. This allows the legacy code to run seamlessly but give new features to existing routines. At other times the SAS documentation is updated to say that an option is retained for backward compatibility, but is not used by the software.

I like backward capability because it enables me to write new code inside a current feature of a tool I have written. This leaves the existing functions intact and lets me write new features. Thus, allowing me to have one upgraded program without losing features.

Why I Cannot Use Backward Compatibility for This Book

The change from the binary formatted *.xls file structure to the open XML file format was a big file format change that was introduced with Microsoft Office 2007. The new output *.xlsx file format, which included “zip” files of XML code, also changed the access method for all new Excel workbook files. Any SAS user that needed to read or write an Excel worksheet needed to consider the Excel workbook format changes. Everyone who had used or programmed applications using the old formats suddenly had to redo every application that used the old formats.

SAS debuted the Output Delivery System (ODS) with Version 7 of Base SAS. SAS Versions 8 and 9 expanded upon and introduced methods that would allow data transfers between SAS and Microsoft Excel. The transfer methods called destinations (like CSV or HTML) or tagsets (like CSV, HTML, MSOFFICE2K, or EXCELXP) allowed SAS code to create files that Microsoft Excel could read. After the release of Microsoft Office 2007, SAS wrote many versions of several ODS tools to address the changes to the Microsoft Office products. The ODS tagsets related to files Microsoft Excel could read were all created as text files that Excel could read, but did not directly write to the new Excel file open XML format.

A tagset is a module of SAS template code that PROC TEMPLATE compiles and stores in the SASHELP library with each installed version of SAS. Every user with access to the SASHELP library can use these tagsets. A SAS user can apply changes to a tagset (or create one of their own) and compile this to a user library. This is usually accessible to only one computer, but the user tagsets are sharable.

The new SAS ODS EXCEL destination (not a tagset) is unique in that it creates a file in the Open XML Format, regardless of the filename requested. Providing an output filename with an extension of “*.xls” does not create a binary formatted Excel file that Excel 2003 can read. However, when using the “*.xls” extension as an output Excel workbook name Excel will send an error message and might (depending on the Excel version) enable you to open the created file if you continue.

There is no history for this feature to be backward compatible with. However, some features of the ODS EXCEL destination are similar to features of the SAS ODS tagset EXCELXP. While I did not provide details for every feature of the EXCELXP tagset in my previous book, I did list most of the features that are available. Most of the features that were added with EXCELXP are available with the ODS Excel destination.

Why the ODS Excel Destination Is an Output-Only Feature of SAS

By definition, the SAS ODS (Output Delivery System) features are “OUTPUT” only. Once the file is defined with the ODS FILE statement, created with SAS code, and closed with the ODS <destination> CLOSE statement it is available for use by other programs or SAS features. If the SAS/ACCESS for PC Files software is installed, then you can use the LIBNAME statement to open a new Excel Workbook.

Layout of This Book

The intent of this book is to describe in detail the options of the ODS EXCEL destination. I will be grouping the arguments and options into what I consider common usage elements. I have been an applications programmer for over 40 years and am using my experience to establish what I consider logical units. You should be able to use the index to look up the options alphabetically. I hope my grouping is satisfactory for other needs. While the EXCELXP tagset and the ODS EXCEL Destination are separate and unique features of SAS, many of the options of each tool provide similar output to an output Excel workbook. The following chapters will describe the arguments and options while providing as many examples as space permits. The goal is to show something for everything. The lists below show my general grouping categories. I will describe each of these arguments and options later.

ODS Destination EXCEL Arguments

- File identification
- Excel file properties
- Output features

ODS Destination EXCEL Option Groups

- Workbook
- Worksheet
- Print
- Column
- Row
- Cell level

General Chapter Layout

Chapters 3 and beyond will each introduce and explain some features of the ODS EXCEL destination by providing a description of the feature followed by the SAS code and Excel output. To conserve space each example might contain one or more features. As noted before, the groupings of the features are my own and might not be the same as anyone else might describe them.

About This Book

What Does This Book Cover?

I wrote this book to help SAS users of all skill levels learn to use the new SAS ODS EXCEL Destination software. My years of programming experience have helped me decode the mysteries of vendor-supplied system documentation. I wanted to convert that information into practical examples of how to apply the options to every day programming applications. Microsoft Excel is one of the most widely used software tools available to computer users. While many computer programmers are also Excel software users, there are far more Excel users than programmers that use Excel. Of course, this book is for SAS users who move data to Excel workbooks. The intent of this book is to enable SAS users to format the Excel Workbook output in a way that eliminates manual changes after the workbook is created.

This book explains how to use all of the options in the ODS EXCEL destination available in SAS 9.4 (TS1M3). I have broken up the options and suboptions into groups that I feel work on similar parts of the Excel output workbooks. My grouping is different from any other grouping that is provided by SAS Institute or anyone else.

This book uses only the Microsoft Windows operating system version of Base SAS to execute the examples. However, since the ODS Excel destination is a supported part of Base SAS, the code and examples will work on other operating systems (IBM Mainframes, UNIX, Linux, and perhaps others.) In addition, with the proper library assignments this will work on other SAS Products, like SAS Enterprise Guide, SAS Studio, and SAS University Edition.

Is This Book for You?

Whatever your skill level, I hope you will find examples that will teach you something. In every class I teach or paper I present, I always ask whether anyone learned anything. I want you to be able to find a place on your desk for this book, use it as you progress through the skills presented, and gain expertise to easily move your data.

What Are the Prerequisites for This Book?

This book is designed for you to use without the need for prerequisites. If you can open the SAS program and copy data using your mouse, then you can get started. I do not attempt to teach you how to write SAS programs or build an Excel spreadsheet, but I present methods to move data between the two data storage tools.

What Should You Know about the Examples?

This book includes software examples for you to follow to gain hands-on experience with SAS.

Software Used to Develop the Book's Content

SAS 9.4 (TS1M3) was used to create all the examples in this book. I used Microsoft Excel 2013 while writing this book. I also know that the files generated are compatible with Microsoft Excel 2016. I expect them to be compatible with Microsoft Excel 2007 and Excel 2010. The output files are always in the new Excel file format (*.xlsx).

Example Code and Data

The example code shown in this book was executed using the Base SAS Display Manager on a Microsoft Windows 10 Operating System. I expect it to execute in any other Base SAS environment. Most of the examples use a subset of the SASHELP.SHOES data set that I called ASIA_ONLY, because the name implies that it includes only the data from the region “ASIA” of the SASHELP.SHOES data set. Some examples use the whole SASHELP.SHOES data set, and a few others are identified when they are used.

You can access the example code and data for this book by linking to its author page at <https://support.sas.com/authors>. Each chapter has a segment of code that is not shown in the book (except for Chapter 2), which creates a path and sets some other values. The code name has a general format of “SAS Code 3.0 Create ASIA_ONLY file in Chapter 03 Path.sas,” You will need to modify these modules to execute the code.

SAS University Edition

If you are using SAS University Edition to access data and run your programs, then please check the SAS University Edition page to ensure that the software contains the product or products that you need to run the code. The link is www.sas.com/universityedition.

Because the SAS University Edition run-time environment differs slightly from other SAS products, I found that special code was needed that might not be needed in SAS Studio. I recommend using SAS University Edition because it is a great way for new SAS users to learn how to use SAS software without spending a lot of money. Please see the following paper I wrote, available at the following URL: <https://pharmasug.org/proceedings/2017/AD/PharmaSUG-2017-AD12.pdf>. This paper was presented at PharmaSUG 2017 and is titled “Using the ODS EXCEL Destination with SAS® University Edition to Send Graphs to Excel.”

Output and Graphics

All output and graphs were generated by using Base SAS or SAS/GRAPH. The code can be found in the book or on my SAS Author page, located at the following URL: <https://support.sas.com/authors>.

We Want to Hear from You

SAS Press books are written *by* SAS Users *for* SAS Users. We welcome your participation in their development and your feedback on SAS Press books that you are using. Please visit sas.com/books to do the following:

- Sign up to review a book
- Recommend a topic

- Request information about how to become a SAS Press author
- Provide feedback on a book

Do you have questions about a SAS Press book that you are reading? Contact the author through saspress@sas.com or https://support.sas.com/author_feedback.

SAS has many resources to help you find answers and expand your knowledge. If you need additional help, see our list of resources located at the following URL: sas.com/books.

About The Author



William E. Benjamin, Jr., owns Owl Computer Consultancy, LLC, and works as a consultant, trainer, and author. William has been a SAS user for over 30 years and a consultant since 2007. He received an MBA from Western International University and a BS in computer science from Arizona State University. He has written and presented papers for SAS Global Forum, as well as many regional and local SAS users groups.

Learn more about this author by visiting his author page at <http://support.sas.com/benjamin>. There you can download free book excerpts, access example code and data, read the latest reviews, get updates, and more.

Ready to take your SAS[®] and JMP[®] skills up a notch?



Be among the first to know about new books,
special events, and exclusive discounts.

support.sas.com/newbooks

Share your expertise. Write a book with SAS.

support.sas.com/publish



sas.com/books
for additional books and resources.

sas

THE POWER TO KNOW[®]

SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc. in the USA and other countries. ® indicates USA registration.
Other brand and product names are trademarks of their respective companies. © 2017 SAS Institute Inc. All rights reserved. M1588358 US.0217