

Printing with the SAS® System Under OS/2® or Windows -- Its a Snap

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Introduction

Versions 6.08 and 6.10 of the SAS System under both OS/2 and Windows introduced several new features which facilitated the printing process. One especially useful, but complex feature, introduced in SAS 6.08 was the ability to print through a form. The forms sub-system allows one to create customized templates containing printer attributes. Version 6.10 contains additional printing options so that the forms sub-system is no longer necessary.

This paper presents a tutorial for printing under OS/2 and Windows. The tutorial will cover printing alternatives in SAS 6.10, print setup, printing without the forms sub-system, printing through forms, and creating forms. The paper will also note the enhancements that accompany Version 6.10 of the SAS System.

Printing in SAS 6.10

In SAS 6.10, as well as 6.08, the contents of each window is a simple stream of text which does not include printer control codes for print attributes such as page breaks, page orientation, margins, or font characteristics. In SAS 6.08 in order to get the desired print configuration a form was used. A form is simply a template which describes printer attributes.

In SAS 6.10 the forms sub-system still exists, but is being deemphasized. Forms are no longer necessary to control printer attributes such as margins, fonts, or page orientation. Instead, output can be customized by using a series of print dialog boxes. A second enhancement in SAS 6.10 is that the linesize and pagesize

formatting options are automatically adjusted to match printer settings.

To Use or Not to Use Forms

While the forms sub-system is no longer necessary, forms remain a useful printing alternative, especially when using more than one print configuration. The main drawbacks of the forms sub-system are the amount of time the initial setup requires, a new form is needed for each print configuration, and a knowledge of printer control language is necessary. While these are valid criticisms of the forms sub-system, they are offset by the following:

- 1) Normally a user/organization needs only about four different print configurations. Landscape compressed and uncompressed and portrait compressed and uncompressed.
- 2) Only one person in an organization must be knowledgeable in the forms creation process and in printer control language. Once forms are set up, the forms can be copied into a user's SASUSER.PROFILE.
- 3) Once forms are set up, it is quicker to change print configurations by specifying a new form than by going through a series of dialog boxes.
- 4) If forms were setup in SAS 6.08 they still work in SAS 6.10.

Printing from the SAS Application Work Space (AWS)

The SAS AWS has three menu items related to printing, all under the File menu:

- * Print
- * Print Setup
- * Print Utilities

The Print Setup is necessary if print configurations other than the default are needed. By default, the system default printer along with its print configuration is used. Therefore the first consideration when printing is print setup configuration.

Print Setup

You can access the Print Setup dialog box (Figure 1) by selecting 'File' -> 'Print Setup' from the SAS AWS or by choosing the Setup button from the Print dialog box.

Below is summary of the information presented in the Print Setup dialog window.

Printer:

Displays the currently selected printer and its port location. SAS looks for the default printer in the following places in order of precedence: 1) the SYSPRINT system option; 2) the settings in the SASUSER.PROFILE.OS2PRINT(for OS/2) or SASUSER.PROFILE.WNPRINT(for Windows) catalog member ; and 3) the system default printer. A Printer other than the default can be selected by clicking on the arrow portion of the field and then choosing another printer from the listbox. The default printer can also be changed by using the SYSPRINT system option.

Use Forms:

To print through the forms subsystem, select the Use Forms checkbox. The SAS system will print your output using the

current print form. If the current print form contains printer control characters, then the system's printer object must be by-passed. In SAS 6.10, this is accomplished by specifying the SAS system option Sysprint with only the first argument, as in the following statement:

```
options sysprint='lpt1:' ;
```

If Use Forms is selected then all other fields will not be available to you.

NOTE: If you are printing through a form, the desired form must be selected before invoking the Print Dialog box. To specify a form as the current form type FORMNAME form_name on the command line, where form_name is the desired form. Once a form is selected, it becomes the default form for the duration of the current SAS session.

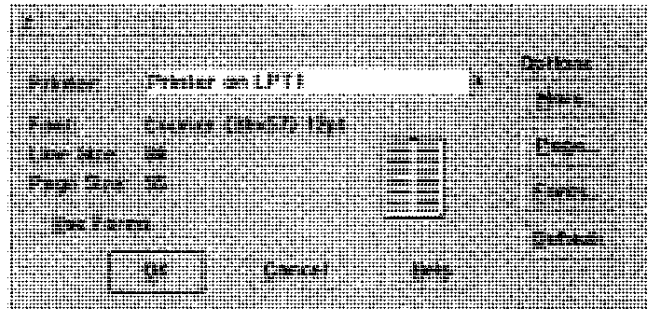


Figure 1. Printer Setup Dialog Box

Font:

The Font field displays the current font. To change the font choose the Fonts button (see below).

Line Size and Page Size:

Displays the calculated line size and page size for the current printer and font settings. You cannot directly reset the values in this box. They are adjusted by changing the font, font size, margins, or page orientation.

More:

By clicking on the More button,

a printer specific dialog box will be displayed. The contents of this dialog is based on the printer selected. Printer attributes that can be set in this dialog box include orientation, number of copies, resolution, dual-sided printing, and performance options.

Page:

The Page button can be selected to set top, bottom, left, and right margins.

Fonts:

You can click on Fonts to display a list of available fonts. You can choose a font, font style(i.e. bold), font emphasis, and font size.

Once you have completed setting the printer options, click on OK to save your configuration and close the Printer Setup dialog box.

The Printing Process

Once printer setup is complete, the printing process is similar for both of the printing methods described above.

From the DMS window that you would like to print, use the popup menu to select 'File' -> 'Print'. This will bring up the Print dialog box(Figure 2). This box can also be displayed by making the desired DMS window active and selecting the AWS menu items 'File' -> 'Print' or by clicking on the printer icon.

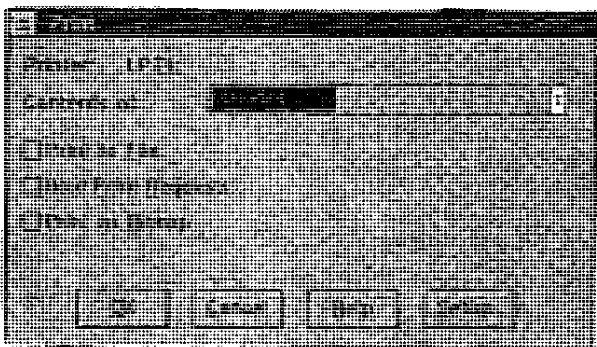


Figure 2. Print Dialog Box

Below is a summary of the options in the Print dialog box.

Printer:

Displays the currently selected printer and port (as shown in Figure 2). If you are by-passing print manager, only the port will be displayed. Click on the Setup button to select another printer or to change the print settings. This will display the Printer Setup Dialog box described above.

Contents of:

Displays the name of the window that you want to print. You can click on the arrow part of the field to choose between the currently selected window and the clipboard.

Print to File:

You can route your printed output to a file, by selecting the Print to File checkbox and specifying a filename. By saving the contents of a window in the Print dialog box, you can ensure that the file will contain all the desired printer control information. When the contents of a window is saved using 'File' -> 'Save as', the file will not be formatted with regard to page size or page ejects.

Print as Bitmap:

You can print your output as a bitmap instead of text, by selecting the Print as Bitmap checkbox.

Hold Print Requests:

Add the print request to a queue. You can hold several print requests and release them all at once by selecting 'File' -> 'Print Utilities' -> 'Release print queue'.

Force Bitmap to Fill Page:

Scales the bitmap as needed to fill the entire page. The Print dialog window only displays this checkbox when you select Print as Bitmap.

Once you have completed setting the print options click on OK to print the file and close the Print dialog box.

Notes on Printing Through Print Manager

1. If you print through a form that contains printer control characters you must by-pass print manager. Print manager will interpret them as text to be printed.
2. When using this method, SAS output can be managed as any other output under OS/2 or Windows. You can hold jobs, delete queued jobs, change the priority or jobs, and monitor the queue.
3. A print job can be held by selecting Hold Print Requests from the Print dialog box as described above. A job can also be held by changing the status to 'Hold' on the OS/2 or Windows printer object. This causes all jobs to be held until the status on the printer object is changed to 'Release'.

Creating Forms in OS/2 or Windows

Customized Forms can be created using the FORM window. The FORM window consists of six screens that allow you to create a catalog entry for a specified printer and host system. Information on linesize, pagesize, orientation, font type and size, printer margins, and printer control language can be specified.

You can create or edit a form by selecting 'File' -> 'Print Utilities' -> 'Open a Form' from the popup menu of any window. This will invoke the Open a Form window. You can also create or edit a form by typing FSFORM *formname* on the command line of any window (where *formname* is the name of the form that you would like to create or edit).

In the Form window, specifying a libname or catalog name is optional. By Default, the form is stored in SASUSER.PROFILE. If you choose to specify a catalog name that is associated with a permanent library, the form will be saved in that library. In the form name field, enter the name of a form to be edited or the name of a new form to create. You can click on the DEFAULT button to make this form the default form. Click on the OK button to begin editing the form.

Printer Selection Frame -- When creating a new form, the Printer Selection frame is the first frame to appear. This window only appears when creating a new form. Move your cursor to the printer that best matches the one you are using and press ENTER. Your selection will take effect and the Text Body and Margin Information frame is displayed (Figure 3). It should be noted that once you have made your printer selection, you cannot return to this frame.

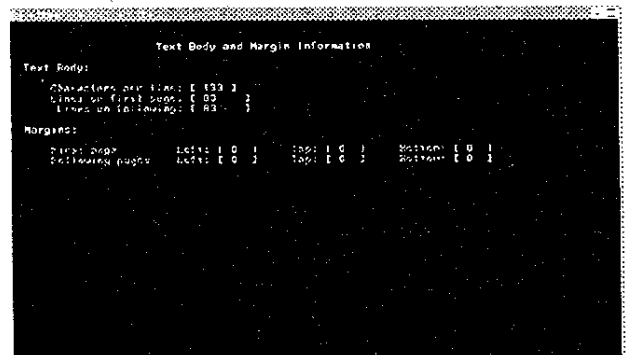


Figure 3. Text Body and Margin Information Frame

Text Body and Margin Information-- When editing an existing form, the Text Body and Margin Information frame is the first frame to appear. In this frame you can specify page formats by editing the following fields. You can obtain information on the acceptable values for any of the fields in this frame by typing '?' in the field and pressing enter.

Characters per line:
specifies the number of characters to print across the pages. Characters per line should be determined by the horizontal printing area of your paper and font size.

Lines on first page:
specifies the number of lines to print on the first page.

Lines on following:
specifies the number of lines to print on pages that follow the first page.

The number of lines on the first page and the pages that follow should be based on the vertical area of your paper and font size. You may have to experiment with this field.

NOTE: The number of lines per page and characters per line should be exactly the same as specified in the SAS options Pagesize and Linesize. You can enter the value -99 in the characters per line and lines per page fields. This indicates that the values for the SAS options LINESIZE and PAGESIZE should be used. Also, the number of lines per page in the form should be the same as the number of lines per page the printer is set up for (this could be set in the printer control language panel described below).

First page/Following Page margin:
specify the top, bottom, and left margins for the first page and all additional pages. The number of characters per line determines the right margin. BY default the top, bottom, and left margins have been set to zero. If a number other than zero is specified, that number is added to the default margin position of the printer.

Carriage Control Information --
To get to frame #3, the Carriage Control Information frame (Figure 4), select 'Locals' -> 'Next Screen' from the popup menu. In

this frame you can specify whether you want carriage control information included with the output and where you want page breaks.



Figure 4. Carriage Control Information Frame

The generate Carriage Control Information field allows you to specify whether you want to include information about page breaks. If you want to include information about page breaks, place your cursor on the YES field and press ENTER. To remove carriage control characters, position the cursor on the NO field and press ENTER. If you chose the NO option, the Signal Page Skip parameters are ignored.

If carriage control characters are being generated, you can specify where you want page breaks and other carriage control information. Page skips can be generated in any or all of the following places:

Printer initialization:
before any printer control characters are sent to the printer to initialize the printer.

First Text Page:
before the first page of text is printed. This field must be selected for any form that contains printer control codes.

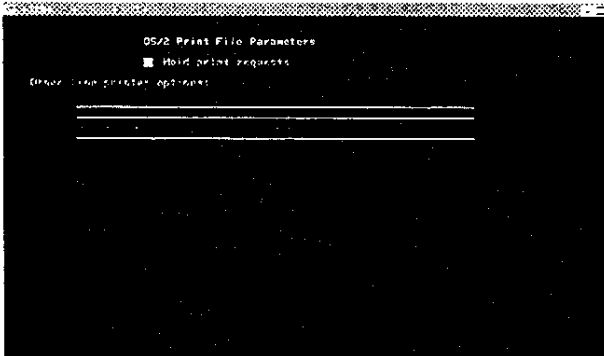
Following Printer Control Statements:
before any printer control language is sent for following pages of text.

Following Text Pages:
 before the following text pages
 are printed.

To select a field, position the
 cursor on any of the fields and
 press ENTER. An asterisk(*) should
 appear to the left of the field.
 To deselect a field place your
 cursor on the field again and
 press ENTER. The asterisk should
 disappear.

**Print File Parameters -- Select
 'Locals' -> 'Next Screen'** to get
 the next frame, the Print
 File Parameters frame(Figure 5).
 This frame enables you to specify
 print file information based on
 the host system and printer
 selected.

The Hold print request checkbox
 can be used to hold a print
 information. You can receive
 information on the acceptable
 values of any of the other fields
 by typing a question mark(?) in
 the field and pressing ENTER.

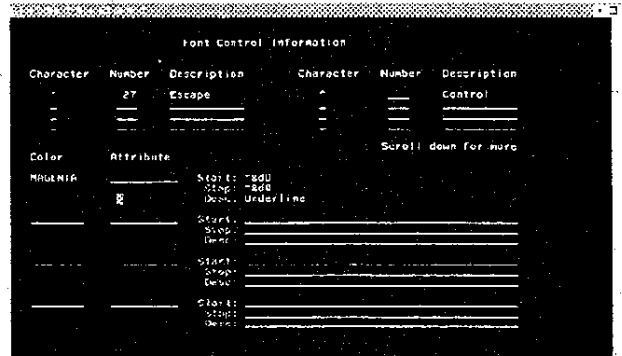


**Figure 5. Print File Parameters
 Frame**

Font Control Information -- You
 can display the Font Control
 Information frame(Figure 6) by
 selecting 'Locals' -> 'Next
 Screen'. The attributes defined in
 this frame are based on the
 printer you selected in the
 Printer Selection window. There
 are two parts to this frame. The
 control character definition
 fields(top part) has spaces for
 you to define up to eight special
 characters that are used to
 represent printer control

characters. These characters are
 used both in the bottom portion of
 the frame to define text
 attributes and in the next frame
 to define printing modes. You can
 make changes to any of the fields
 in this frame by positioning your
 cursor on the field you want to
 edit, then typing in the field.
 You can receive information on the
 acceptable values for any field in
 this frame by typing a question
 mark (?) in the field and pressing
 ENTER.

Printer control characters are
 characters (typically non-
 printing) that signal to the
 printer that the text following
 the control character is a printer
 command. In these fields, you can
 choose a printing character to use
 in your form definition that SAS
 will translate into the special
 printer control character. By
 default, SAS uses the tilde(~) to
 represent the ESC keys and the
 caret(^) to represent the CTL key.
 If your printer uses other
 characters as control characters,
 they can be defined in this
 section. For each control
 character that you define, specify
 the special character, its decimal
 representation, and a description.



**Figure 6. Font Control Information
 Frame**

The lower part of the font control
 information frame allows you
 to associate a color and/or
 attribute(e.g., highlight,
 underline) with a control code
 used by your printer for printing
 in special mode (e.g., italic,
 bold). In figure 6, the color

magenta is associated with the text attribute underline. For Example if you wanted to underline a title, select 'View' -> 'Colors' -> 'Title' from the popup menu of the output window. Then click on the button to the left of MAGENTA and click on OKAY. When the contents of the Output window is printed, titles will be underlined.

SAS supplies some default text attribute definitions with the correct start and stop sequences for each special printing mode supported by the printer that you have selected. To specify additional text attributes, enter the color and/or attribute. The Start field is the printer control sequence required by you printer to turn the printing mode on. The Stop field is the printer control sequence required by your printer to turn the printing mode off. The Description field can be used to document the printing mode you are specifying.

Print Control Language -- Select 'Locals' -> 'Next Screen' to get to the final frame, the Print Control Language Frame(Figure 7). Here you can enter control sequences that are sent to the printer. You can send control language sequences before text is sent, in between pages of text, and after all text is sent. This frame is especially useful for formatting the contents of a window without having to manually adjust your printer settings or SAS Setup and Font options.

The Printer Control Language frame is a text editor frame and all text editor commands can be used in it.

The Printer Control language frame can be used to set the page orientation, the font type, the font size, the number of characters per line, or other print characteristics. Your printer manual describes the control languages sequences that

you need to specify. Your printer manual should also describe the order which the control codes should be sent to the printer. Your printer will not respond correctly if all items are not ordered correctly.

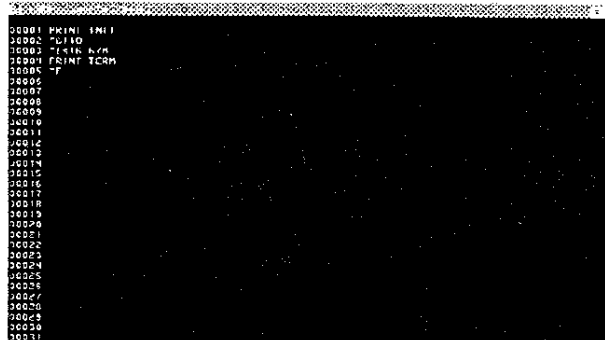


Figure 7. Print Control Language Frame

To tell the printer when to use a control language sequence the following labels should be used. Each Label should be placed a line by itself before the sequence it sends.

PRINT INIT
sends control language sequences that follow before sending any text to the print file.

PAGE n
sends control language sequences that follow it to the print file before the specified pages(n). Where n is used to represent the page number. The control sequences will continue to be sent before each following page until another page label is reached. The control sequences can be stopped by specifying a Page label with no control sequences.

PAGE LAST
sends control language sequences that follow it to the print file after all text is sent for an individual item.

PAGE TERM
sends control language sequences that follow it to the print file after all text is sent for all items. This section is used to

reset the printer back to its default mode.

Figure 7 displays a sample Printer Control Language frame for a Hewlett-Packard LaserJet IIP . Line 1 specifies that the printer control codes that follow are to be sent to the printer before any text is sent. Line 2 contains the printer control sequence for landscape page orientation. Line 3 specifies the sequence for 16.67 cpi pitch. Line 4 indicates that the control sequence to follow is to be sent to the print file after all text is sent. Line 5 has the printer control code needed to reset the printer back to its default mode. Select 'File' -> 'End' to save the form. If a SAS library and Catalog was not specified, the form will be saved as SASUSER.PROFILE.formname.FORM. Where *formname* is the name for the form that you have chosen.

Conclusion

Version 6.10 of the SAS System contains several new features which provide an alternative to printing through the forms subsystem. Although SAS is deemphasizing the forms subsystem, it is the opinion of the authors that printing through forms is an effective and useful alternative.

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