

CREATION OF CUSTOMIZED SAS/GRAPH DRIVERS FOR POSTSCRIPT PRINTERS

Paul L. Marsh

Dept. of Statistics, N. C. State University

One of the strengths of SAS/Graph is inclusion of an abundant set of device drivers. A wide variety of dot matrix and laser printers, plotters, and cameras can be driven by the software. For some devices, though, it is necessary to modify the Institute-supplied drivers in order to obtain maximum performance. Many PostScript printers on today's market fall into this category since the supplied drivers have limited support for built-in fonts.

It is relatively easy to modify and customize the SAS/Graph device drivers. By doing so, you can ensure maximum hardware performance and premier graphic appearance. This poster provides advice on customizing a PostScript printer driver.

Why Use Hardware Fonts?

Why not? For device drivers that support hardware fonts, it is no more difficult to use hardware fonts than software fonts. Graphic files that contain hardware fonts can be generated more quickly than files that contain software fonts. Finally, hardware fonts often have a better appearance than software fonts, particularly at very small or very large point sizes (see Figure 1).

A hardware font is specified in the same manner as a software font (e.g., by the F= parameter on any TITLE, NOTE, or FOOTNOTE statement). The font parameter value will be HWxxxyyy where xxx is the module name corresponding to the device driver and yyy is the font number. To determine the values of xxx and yyy, execute PROC GDEVICE and locate the desired device driver. The Module parameter value is located on the Details screen. Ignore the letters SASGD at the beginning of the value. The remaining two or three letters is the correct value of xxx. Now go the Chartype screen. Listed on the screen are the hardware fonts, if any, that are supported by the SAS/graph device driver. Substitute the desired font number for yyy. A strength of PostScript fonts is that they are scalable. Thus,

resizing lettering for titles, labels, and other text annotations will be no problem.

Hardware fonts affect the speed of graphic generation in three ways. With software fonts, each letter must be 'drawn' - a time-consuming process to derive the many necessary printer instructions. On the other hand, only a few printer instructions are necessary to direct hardware font lettering. Thus, SAS/Graph can generate the graphic file much more quickly (see Figure 2). In turn, the smaller files can be transmitted to the printer much more quickly. Finally, the printer requires much less time to digest the smaller file and draw the resulting graph. The sum of these three speed enhancements is significant and noticeable even on the fastest machines and networks.

Ensuring that All Hardware Fonts Can Be Used

SAS/Graph Version 6.07 TS203 (SunOS Unix release) currently has approximately thirty PostScript drivers. Some are generic while others are for specific printers such as the QMS 810. For many users, these drivers will be sufficient. However, the generic drivers for black-and-white printers only support thirteen (13) fonts and for color printers only thirty-five (35) fonts. Owners of PostScript printers such as the Texas Instruments microLaser (black-and-white with 35 built-in fonts) or the Seiko Personal ColorPoint (color with 39 built-in fonts) will have to modify generic drivers in order to maximize the performance of their printers. Consult your printer documentation to determine what hardware fonts are supplied.

PROC GDEVICE can be used to list the PostScript drivers available in SAS/Graph. Search the listing carefully. A generic PostScript driver might match your printer very well. For example, the QMS 810 driver closely matches the specifications of a Texas Instruments microLaser printer and thus will satisfy many owners of that printer. If you do determine that you wish to modify one of the drivers in

Font size

Font type software

Font type hardware

smallest

the quick brown fox

the quick brown fox

small

the quick brown fox

the quick brown fox

regular

the quick brown fox

the quick brown fox

large

the quick bro

the quick bro

larger

the quick

the quick

largerr

the qui

the qui

largest

the q

the q

huge

th

th

Figure 1. PostScript hardware fonts tend to look better than their software counterparts, particularly at large or small point sizes

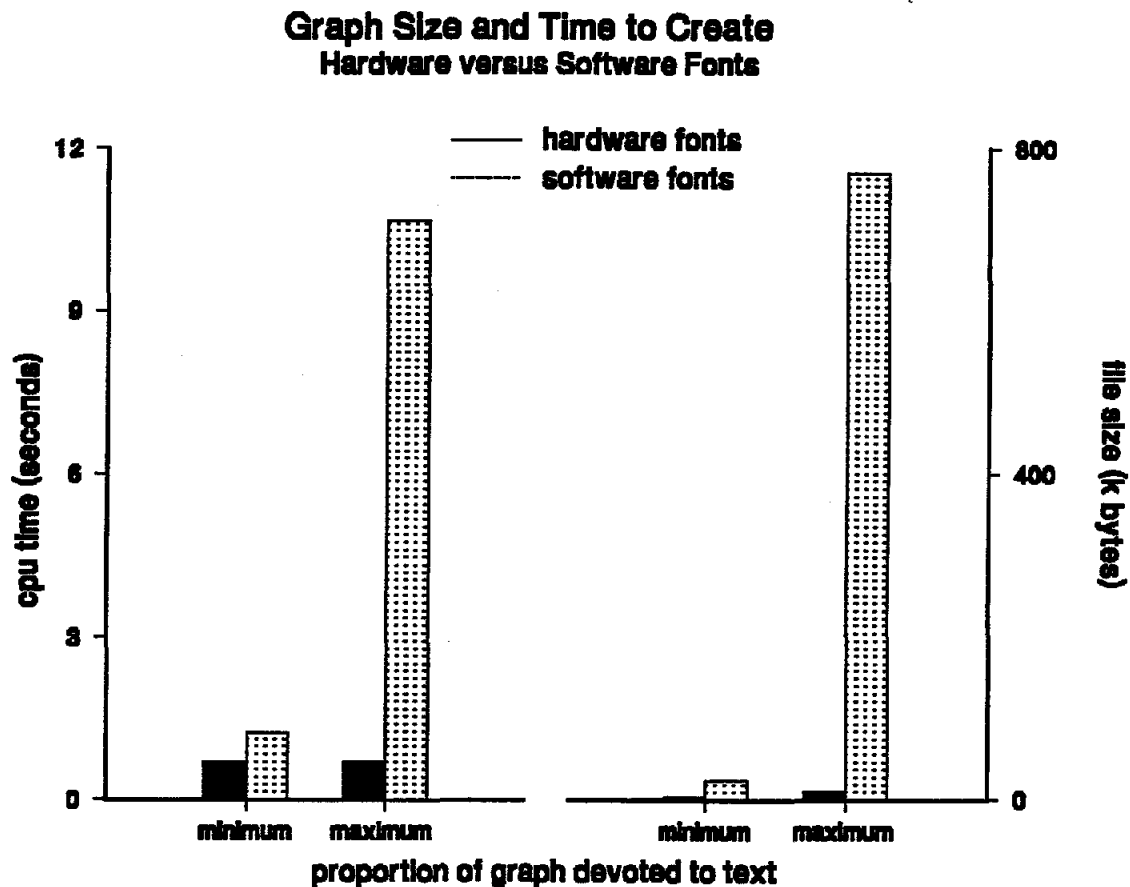


Figure 2. Use of PostScript hardware fonts reduces both the size of the resulting graphics file and the time needed to produce the file. The reduced file size also results in faster transmission of the graphic to the printer and quicker reproduction of the graphic by the printer.

SAS/Graph, use the following code to begin PROC GDEVICE¹:

```
PROC GDEVICE C=SASHELP.DEVICES;
```

Scan the device driver listings and choose the device driver that most closely matches the specifications of your printer. The Detail (in particular, the Hsize, Vsize, Horigin, Vorigin, Xpixels, Ypixels, and Gaccess parameters) and Chartype screens contain most of the information that must be checked for compatibility. One additional comment: due to the fact that PostScript is really a command language, the best compatibility can usually be obtained for black-and-white printers by modifying a black-and-white device driver. Similarly, a color printer device driver should be

selected if preparing a driver for a color printer. After determining the best driver, execute the following command (either with pull-down menus or from the command line):

```
COPY sas-driver-name new-driver-name
```

This action will add the entry *new-driver-name* to the device driver catalog. Select the new driver from the devices listing. The Detail screen will be presented. Modify any parameters that do not match the specifications for your printer. Make note of the Module parameter value. The last two or three letters of that value will allow you to access the hardware fonts with SAS/Graph (see above).

The next major checking point is the Chartype screen. Note which fonts are supported. If additional fonts must be added, care must be taken since exact spellings and case

¹The instructions presented here are for SAS interactive mode. Similar command language equivalents are available if batch mode is preferred.

sensitivity are necessary in order for the printer to understand the font names. Consulting other PostScript device driver Chartype screens may provide the correct form for additional fonts.

Other screens that may need modification include the GPROLOG, GEPILOG, GSTART, and GEND. Fortunately, changes needed on these screens are minor and easy to perform. While this whole process may seem intimidating, performing the above steps carefully will produce a driver that can maximize the performance of your printer.

References

SAS Institute Inc. "Producing Hard-Copy Graphics Under Unix", SAS Communications, Third Quarter, 1992. SAS Institute, Inc. Cary, NC. pp. 33-36.

* sample PROC GDevice code that could be used to produce a
* customized PostScript SAS/Graph driver;

* suggestion - always store personal device drivers outside of
* the SASHELP.DEVICES catalog <- this catalog holds the drivers
* provided w/ SAS/Graph. if you place your customized drivers
* into the SASHELP.DEVICES catalog, you might have to recreate
* the drivers whenever SAS is updated.;
libname gdevice0 "";

* if running PROC GDEVICE in batch mode, invoke the NO FULL
* SCREEN (nofs) option;
proc gdevice c=gdevice0.devices nofs;
* copy best fitting driver;
copy psl from=sashelp.devices newname=srscpsl;
* sample modifications - check Vol1, SAS/Graph manual or the
* PROC GDEVICE documentation for additional parameters that
* might need modification;

```
modify srscpsl
  charrec = (1, 100, 75, '/Courier'           , 'Y')
  charrec = (2, 100, 75, '/Courier-Oblique'    , 'Y')
  charrec = (3, 100, 75, '/Courier-Bold'       , 'Y')
  charrec = (4, 100, 75, '/Courier-BoldOblique', 'Y')
  charrec = (5, 100, 75, '/Times-Roman'       , 'Y')
  charrec = (6, 100, 75, '/Times-Italic'      , 'Y')
  charrec = (7, 100, 75, '/Times-Bold'        , 'Y')
  charrec = (8, 100, 75, '/Times-BoldItalic'  , 'Y')
  charrec = (9, 100, 75, '/Helvetica'         , 'Y')
  charrec = (10, 100, 75, '/Helvetica-Oblique' , 'Y')
  charrec = (11, 100, 75, '/Helvetica-Bold'   , 'Y')
  charrec = (12, 100, 75, '/Helvetica-BoldOblique', 'Y')
  charrec = (13, 100, 75, '/Symbol'           , 'Y')
  charrec = (14, 100, 75, '/AvantGarde-Book'   , 'Y')
  charrec = (15, 100, 75, '/AvantGarde-Demi'   , 'Y')
  charrec = (16, 100, 75, '/AvantGarde-BookOblique', 'Y')
  charrec = (17, 100, 75, '/AvantGarde-DemiOblique', 'Y')
  charrec = (18, 100, 75, '/Palatino-Roman'    , 'Y')
  charrec = (19, 100, 75, '/Palatino-Bold'     , 'Y')
  charrec = (20, 100, 75, '/Palatino-Italic'   , 'Y')
  charrec = (21, 100, 75, '/Palatino-BoldItalic', 'Y')
  charrec = (22, 100, 75, '/NewCenturySchlbk-Roman', 'Y')
  charrec = (23, 100, 75, '/NewCenturySchlbk-Bold', 'Y')
  charrec = (24, 100, 75, '/NewCenturySchlbk-Italic', 'Y')
  charrec = (25, 100, 75, '/NewCenturySchlbk-BoldItalic', 'Y')
  charrec = (26, 100, 75, '/Helvetica-Narrow' , 'Y')
  charrec = (27, 100, 75, '/Helvetica-Narrow-Bold', 'Y')
  charrec = (28, 100, 75, '/Helvetica-Narrow-Oblique', 'Y')
  charrec = (29, 100, 75, '/Helvetica-Narrow-BoldOblique', 'Y')
  charrec = (30, 100, 75, '/ZapfChancery-MediumItalic', 'Y')
  charrec = (31, 100, 75, '/ZapfDingbats'     , 'Y')
  charrec = (32, 100, 75, '/Bookman-Light'     , 'Y')
  charrec = (33, 100, 75, '/Bookman-Demi'      , 'Y')
  charrec = (34, 100, 75, '/Bookman-LightItalic', 'Y')
  charrec = (35, 100, 75, '/Bookman-DemiItalic', 'Y')
des='SRCIS PostScript driver - hardware fonts'
Xpixels=2550 Ypixels=3300 Hsize=7.5 in Vsize=10 in
rotate=portrait;
run;
```