

Using GOPTION Statements For PC/SAS* Graphic Devices

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Making Transparencies on HP ColorPro*

To make transparencies on the HP ColorPro the first step is to set up the communications between your computer and the plotter. The instructions that are listed here assume that you will be connecting your plotter to the COM1 port. There are three things that need to be done before plotting your graphics. First is a DOS command that needs to be executed

```
MODE com1:9600,e,7,1,p
or in the SAS program
x 'MODE com1:9600,e,7,1,p';
```

In order for these commands to work the plotter needs to be setup for 9600 baud, even parity, 7 data bits, 1 stop bit, and to use the com1 port for a serial printer. At the back of the plotter there are seven switches that need to be set:

<u>Baud</u>	<u>paper</u>	<u>parity</u>
B1 0	US 1	S1 1
B2 1		S2 0
B3 0		
B4 1		

The second step is to set the Goptions statement(s). An optional Goption could be **GOPTIONS RESET=all**;. This goption will reset all global options as well

as Title, Footnote, Axis, Legend, Pattern or Symbol statements that have been used earlier. The required Goption statement will send the graphics to the device is:

```
GOPTIONS DEVICE=colorpro
GACCESS='sasgastd>com1:'
SPEED=10;
```

The third and final step is entering the program.

```
X 'MODE com1:9600,e,7,1,p';
```

```
GOPTIONS RESET=all;
GOPTIONS DEV=colorpro
GACCESS='sasgastd>com1:'
SPEED=10;
```

```
TITLE1 C=white F=SWISS
'The Cowboy Hat';
TITLE2 H=2 ANGLE=90 ' ';
```

```
PROC G3D;
PLOT Y * X = Z / CTOP=YELLOW
CTEXT=BLACK;
RUN;
```

The program listed above will send the graphics output straight to the plotter or the graphics output can be written to a file that can later be sent to the plotter. For the latter, the required Goptions needs to be changed to:

```
GOPTIONS DEVICE=colorpro  
GACCESS='sasgastd>dosname.ext'  
speed=10;
```

In this case the graphics file will be called dosname.ext. In order to plot this file the following commands will need to be entered at the DOS prompt:

```
mode com1:9600,e,7,1,p  
copy dosname.ext com1 /b
```

The Title statements were placed before the procedure to reduce memory requirements. Other statements that can be placed before procedures to reduce memory requirements include Footnotes, Axis, Legend, Pattern and Symbol statements.

When running the program that sends the output directly to the plotter the following things will happen:

(1) Program will exit to DOS and state the following:

```
Resident portion of MODE loaded  
COM1: 9600,e,7,1,p  
Press any key to return to SAS.
```

(2) After pressing any key you will return to SAS

(3) A box will show up in the middle of the screen that will say:

Graphics Driver

Please turn on the plotter then press return.

Use the top white key on plotter panel. Place the transparency (or paper) in plotter and lineup the top with the white line on the paper feed tray. Now press the paper feed on the plotter (bottom white key on panel).

(4) Another box will show up that says:

Graphics Driver

**Please mount the following pens: Color1
Color2 Color3 Color4 Color5 Color6
Color7 Color8.**

Press return when finished.

Mount the pens in the same order that is listed in message then press the return key. Special transparency pens can be used however paper pens also work.

(5) Another box:

Graphics Driver

Please change the paper then press return.

Just press the return key because the paper was changed in step (3).

(6) Plotter starts by selecting a pen. When a pen has been selected press the pause button on the plotter (lower left corner) and test the pen on another piece of paper. Place the pen back and press the pause button again.

(7) Another box shows up because we asked for specific colors to draw the graphics (i.e. PLOT Y * X= Z / CTOP=YELLOW CTEXT=BLACK):

Graphics Driver

Please mount the following pens: Color1 Color2 Color3. Press return when finished.

(8) Press the paper feed on the plotter and remove the graph.

This procedure will work for transparencies, plain paper, or plotter paper. One suggestion is to use plain 8.5 X 11 inch paper until the graphics looks good then switch to the more expensive paper. The paper that your printer uses will work if the tractor feed perforations are removed before plotting.

Creating Graphics on the HP LaserJet Series II*

The Hewlett-Packard LaserJet Series II driver can produce an 8 by 10-inch graph at 300 dots per inch. There are two ways to send the graphics to the laser printer. One way is to send the graphics directly to the printer attached to one of the ports (lpt2 -in this example). The goption statement that I use is:

```
GOPTIONS DEVICE=hpljs2
GACCESS='sasgastd>lpt2:'
GSFMODE=replace
PROMPTCHARS='0000010000000000'x
HANDSHAKE=none GSFLen=4096;
```

The second way is to send the graphics to a DOS file and then transfer that file to a computer that is attached to a laser printer. The only parameter of the goption statement that needs to be changed is GACCESS. The parameter could be

GACCESS='sasgastd>a:filename.ext'.

The file can then be copied to the laser printer with this command:

COPY filename.ext lpt1: /b

where filename.ext is any valid DOS filename.

Different device drivers can be used to generate graphics. Some of the other drivers are:

<u>drivers</u>	<u>dpi</u>	<u>plot size</u>	<u>minimum memory</u>
hplj0	75	8X10	512
hplj5p2	150	8X10	512
hpljs2	300	8X10	1024
hplj5p3	300	4X5	512

The GSFMODE parameter affects how records are written. The default is PORT for directing output to a serial or parallel port. If you specify GSFMODE=replace, output is performed as if records are being written to a graphics stream file, and replaces any output already placed in the file.

The **PROMPTCHARS** value is 8 bytes specified as 16 hexadecimal digits. The third byte (fifth and sixth hex characters) when set to 01 causes the driver not to split device commands across records. In many cases, file transfer or spooling software can add extra characters between records. These extra characters can sometimes be interpreted as graphics commands by the device and cause stray lines or other unpredictable behavior. This will minimize inter-record characters but will cause the file to be larger.

The **HANDSHAKE** parameter specifies the type of flow control (handshaking) used to regulate the flow of data to a hardcopy device. Specifying **NONE** tells SAS/GRAPH software to send data without providing flow control. I use **NONE** because sending graphics to the laser printer over a network does not require flow control. By not specifying the **HANDSHAKE** parameter the default value for that device driver will be used. In most cases this will work.

The **GSFLEN** parameter specifies the length of the records written by the driver to a graphics stream file or to a port. The value 4096 seems to work the best.

Creating Slides using PC SAS/GRAPH

There is an easy way to create slides using PC SAS/GRAPH and the Matrix* PCR Recorder. The **GOPTIONS** statement that I have been using is:

```
GOPTIONS DEVICE=PCR4XL  
GACCESS='sasgastd>filename.hex'  
GSFMODE=replace GSFLEN=4096  
HPOS=80 VPOS=43;
```

(Note the DOS filename has the extension .hex which is required by the Matrix PCR recorder)

The **DEVICE** statement can also have the following drivers:

<u>Drivers</u>	<u>Resolution</u>
PCR2X	2K by 2K
PCR2SL	2K by 2K
PCR4X	4K by 4K
PCR4XL	4K by 4K
PCR2XXL	2K by 2K
PCR4XXL	4K by 4K

The **HPOS** and **VPOS** statements are used to specify the number of rows (Horizontal positions) and the number of columns (Vertical positions) in your graphics display area. The larger the size of your **HPOS** and **VPOS** the smaller the size of each character cell. For example, specifying **HPOS=80** and **VPOS=30** divides your display area into a grid with 80 columns and 30 rows. If you change the **VPOS=** value to 60, the graphics area is now divided into 60 rows, and the vertical dimension of each of the cells is now smaller. Some of the values that will make your slides look like the graphs on your screen are:

<u>CGA Graphic Adapters</u>	<u>HPOS</u>	<u>VPOS</u>
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CGA,CGA0,CGAH0	64	25
CGA1,CGAH1	64	25
CGAM	80	25

<u>EGA Graphic Adapters</u>	<u>HPOS</u>	<u>VPOS</u>
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EGA,EGAC	80	25
EGACX	64	25
EGAS,EGAL,EGAM	80	43

<u>VGA Graphic Adapters</u>	<u>HPOS</u>	<u>VPOS</u>
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VGA,VGA16	80	43
VGA2	80	43
VGA256	80	43

The bold EGA Graphic Adapter was the DEVICE= value for the monitor where the graphics were first created. In order to have the slides look like the monitor the statements HPOS=80 and VPOS=43 needed to be added to the GOPTIONS statement. The other statements that needed to be added so that the graphics could be stored on floppy were GACCESS=, GSFMODE=, and GSFLN. The DEVICE= needed to be changed to one of the device drivers for the Matrix PCR Recorder.

The material for this paper was drawn from discussions in SAS/GRAPH Hardware Interfaces for Personal Computers Version 6, ch. 4,5.

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