FAQs

Printing a Bitmap Image Using Visual Pro/5

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Prelude to Printing:

There are a number of commands and dimensions that must be known prior to printing a bitmap image. If the final image will be hard copy printed there are additional dimensions also required. The dimensions needed are:

- Screen Width
- Screen Height
- Screen Resolution (x and y if they are different)

These measurements are usually given in Pixels, and will need to be converted to thousandths of an inch in order to be sure the image will print correctly to the printer. If the image will be forced to fit on a full page at the printer, no matter the original dimensions, the proportions will have to be adjusted accordingly by the user. Visual PRO/5 will print the image in any manner, but it does not automatically perform the calculations. To determine the monitor resolution consider the following code:

```
0010 DIM S$:TMPL(1,IND=0)
0020 LET S$=FIN(1)
0030 PRINT FATTR(S$),'LF'
0040 PRINT  S.SCREEN_WIDTH, S.SCREEN_HEIGHT, S.SCREEN_HRES, S.SCREEN_VRES
```

The FATTR() function provides the programmer with a list of the variables including type that are used with the FIN() function. The programmer can then just print the variables needed in Line 0040. (NOTE: The TMPL() function is new to PRO/5 and is useful for device or file information).

The following dimensions are required to print the image to the printer:

- Width of Printable Area
- Height of Printable Area
- Resolution Used to Print.

It would be simple to assume that if you want to print a picture on an 8 1/2" x 11" paper these are the dimensions. This is not true of most printers, because of *unprintable zones* around the entire sheet of paper, usually spanning from 1/4" to 1/2" Make sure the actual dimensions are retrieved prior to attempting to print! The following code retrieves the dimensions, including xpage offset and ypage offset, then translates into thousandths of an inch.

```
0010 DIM CTRL13$:"width:u(4),height:u(4),hres:u(4),vres:u(4),xoff:u(4),yoff:u(0:4)"
0020 LET CTRL13$=CTRL(1,0,13)
0030 LET W=CTRL13.WIDTH*1000
0040 LET H=CTRL13.HEIGHT*1000
0050 LET H=CTRL13.HEIGHT-XOFF-XOFF
0060 LET W=CTRL13.WIDTH-YOFF-YOFF
0070 LET W=INT(W*1000/CTRL13.HRES)
0080 LET H=INT(H*1000/CTRL13.VRES)
0090 PRINT H,W
```

CTRL() 13 returns information about the printer device but only works correctly if a GUI window has been previously defined. CTRL() 14 also returns printer information with a GUI window open, but it will vary depending upon the state of the user's current printer setup. (NOTE: The CTRL() function is new to Visual PRO/5 and is useful for determining the status of items on a GUI device).

Printing:

Now that you have the monitor dimensions and the printer dimensions, you can write the actual code to draw a picture and then print a hard copy if desired.

```
010 OPEN (1)"X0"
020 PRINT (1)'WINDOW'(50,50,300,200,"",$01$)
030 PRINT (1)'TRACK'(0)
040 PRINT (1)'DRAWUNITS'(1)
050 PRINT (1)'WORLD'(0,0,8000,10540)
060 PRINT (1)'VIRTUAL'(0,0,8000,10540)
070 PRINT (1)'IMAGE'(0,0,8000,10450,"c:\windows\bitmaps\tetons1.bmp",1)
080 PRINT (1)'PSETUP'
090 PRINT (1)'PWINDOW'
100 END
```

In order to understand how this can be done using only 10 lines of code, the mnemonics need to be explained.

1. **0020: Defining a GUI window**- While this seems straightforward it needs to be noted that the definition includes a parameter to make the window resizable and can also be made invisible. This is important because you do not have to have the bitmap image on your monitor in order to print it.

2. **0030: TRACK**- This is a Boolean value that defaults to tracking being ON (1). When on, tracking will reset the drawing surface in such a manner that unless your window and image are drawn to the correct sizes, the image will not be proportional. For example, draw a window with the coordinates (0,0,100,500) and put an image into it using the same x1,y1,x2,y2 parameters. The image will be squished into a box 100 pixels wide by 500 pixels tall, made to fit. Also, when resized to fill the monitor, (therefore it will appear that you can get a full page image) the image will only print the screen size. Tracking turned OFF (0) will allow the user to view the image in one size and perspective, but allow it to print in another.

3. **0040: DRAWUNITS**- This sets this value to thousandths of an inch thereby allowing the user to print to a printer using dimensions that are understandable by taking the width and height values returned by CTRL() 13 and multiplying by 1000, to get the true printable area on a printer.

4. **0050: WORLD**- The image is the world. If you define a window to be 300hx200w Visual PRO/5 will grab the upper left-hand portion of the image, only taking the height of 300 and width of 200 pixels. If tracking is ON (default), once you resize the window using the mouse, the WORLD is not going to change. No additional part of the picture will be grabbed. The already grabbed image will grow to fill the window. If tracking is OFF, the window can be resized, but the image doesn't change size. So define the WORLD to be a little larger than the image. The result will be that a portion of the image will show up in the window but can be viewed in its entirety by resizing the window. If you define your WORLD to be larger than the image, but the VIRTUAL is smaller than actual size, you will get a very small image (but it will be the complete image) inside a window the defined size. Resizing the window will not change the size of the image.

5. **0060: VIRTUAL**- The easiest way to understand this is to think of it as a ratio. By default, WORLD and VIRTUAL are the same as WINDOW and do not have to be set to anything. But in the above example (with tracking OFF) when you resize the window, VIRTUAL is equal to the WINDOW size, while WORLD stays the same. With Tracking ON, VIRTUAL and WORLD remain at a 1:1 ratio setting.

6. **0070: IMAGE**- The coordinates can be defined by the parameters the user desires to achieve different effects. If coordinates of 0,0,0,0 are used the image will appear in any size window but the portion showing will only be the portion of the image that fits within that window without being skewed or resized in any manner. When the window is resized the rest of the image will appear. With tracking on, the image will still resize and can even be made proportional. If x2, and y2 are set to be the same as x1,y1 the image will default to be printed "actual size", depending on what you have set the other parameters at.

7. **0080: PSETUP**- This brings up a dialog box that allows you to decide on items such as Portrait mode, Landscape mode, the printer resolution, the specific printer, and the like.