17 Plotting, Printing and Publishing Images

This chapter describes how you can use MicroStation Plot capabilities and image print add-ons to plot or print with MicroStation Descartes.

Overview

MicroStation Descartes supports PostScript and HPGL2/RTL devices, as well as all raster devices supported through the MicroStation implementation of the Windows Print Manager.

This section provides information on how to:

*   Publish Image Scenes using Publish To Viewer
*   Publish Projects Using Copy Project
*   Enhance Color Compression and Dithering for 24bit images.
*   Configure your device so that you can plot from within MicroStation.
*   Control contrast and brightness of your plots.
*   Plot Design Element types.
*   Send plots to your device.
*   Produce PostScript plots.
*   Produce RTL plots.
*   Produce Print Manager plots.

In a typical project, a view contains images of the region of interest. The mosaic of images can include an unlimited number of images, each referenced to the vector data contained in the active design file and the reference files attached to it. To produce a hybrid plot for the view, choose Print/Plot from the Image Manager File menu. A hybrid plot is a plot that consists of both raster images and design (vector) elements.

Whether you plot to a color or gray scale postscript device, images from various sources can be assembled together and the

colors for each image are represented correctly on the output. With this flexibility, you can integrate black and white scanned documents, gray scale or color aerial photographs, transparent monochrome bitmap layers, satellite imagery, and design files to produce a full color document on color devices or a gray scale document on gray scale devices.

Image Manager adds plotting of raster images and design raster elements to MicroStation's design vector plotting capabilities. Raster images are plotted together with design vector data through the standard MicroStation File > Print/Plot menu.

MicroStation Descartes utilizes MicroStation resources to plot on any of the following devices:

- PostScript plotters

- HPGL2/RTL plotters

- other MicroStation-supported plotters ("generic" plotters)

- your system printer

MicroStation's plot driver file creates the vector data portion of the plotfile and the MicroStation Descartes driver creates the raster data portions of the plotfile. The result is a composite plotfile that includes information about both the vector data and raster data of your image. Another way of looking at this: MicroStation Descartes merges its raster data into the plotfile generated by MicroStation. MicroStation Descartes plotting begins when you submit your plotfile (a composite plotfile) to your plotter.

Every MicroStation-supported plotting device has a MicroStation plot driver file with file extension PLT which controls the plotting process. Your system's plot file is "printer.plt."

Additionally, MicroStation Descartes provides three suffix files. Each suffix file consists of a set of MicroStation Descartes plot commands suitable for a type of plotter. The suffix files are as follows:

- `dcps.suf` commands for PostScript plotters, DOS/Windows

- `dcrtl.suf` commands for RTL plotters, DOS/Windows

- `dcgen.suf` commands for other MicroStation-supported plotters and for your system printer.

✍ In MicroStation 5.5, the files can be found under *drive:*\ustation\plotdrv.

Each Image Manager usable MicroStation plot driver has the following construction: a MicroStation plot driver file (with PLT extension) followed by the appropriate set of MicroStation

Descartes plot commands in a suffix file (with SUF extension). The resulting file is a concatenated plot driver (with PLT extension) — a MicroStation plot driver file to which a suitable set of MicroStation Descartes plot commands have been added.

Four sample concatenated plot drivers are delivered and are named and described in the following table:

MicroStation Plot Driver	Type of plot driver	Suffix file	Concatenated plot driver
HP650c.plt	RTL	dcrtl.suf	**dcrtl.plt**
pscript.plt	postscript	dcps.suf	**dcps.plt**
pscriptc.plt	postscript color	dcps.suf	**dcpsc.plt**
printer.plt	PC printer	dcgen.suf	**dcgen.plt**

Depending on the default PLT file, a different MicroStation Descartes Plotting dialog box is used.

PLT File	MicroStation Descartes Plotting dialog box
dcps.plt dcpsc.plt	when dcps.plt or dcpsc.plt is chosen as the default driver, selecting Setup menu > Device from the Plot dialog box opens the **Descartes** - **PostScript Image Plotting** dialog box.
dcrtl.plt	when dcrtl.plt is chosen as the default driver, selecting Setup menu > Device from the Plot dialog box opens the **Descartes** - **HPGL2/RTL Image Plotting** dialog box.
dcgen.plt	when dcgen.plt is chosen as the default driver, selecting Setup menu > Device from the Plot dialog box opens the **Descartes** - **Image Plotting** dialog box.

Enhance 24bit Color Compression and Dithering

MicroStation Descartes Version 7 now includes enhance color compression and dithering algorithm to produce photo quality plots.

Copy Project

Copy Project is an efficient way for creating backups of all files contained in a project and also to publish project files. For more information, see "Copy Project" on page 3-9.

Publish To Viewer

Used to create a self-embedded viewer file called a "Publication." The Publication contains a program and one or several images and design file elements. When executed, a viewer application is loaded and allows any WIN-TEL based client to browse through these images and mosaics created within MicroStation Descartes.

Publish to Viewer creates this publication file from a specified MicroStation view. Design file elements can also be included.

Publish to Viewer dialog box

Upon selecting the Publish To Viewer menu item, the Publish To Viewer dialog box opens and several parameters are accessible.
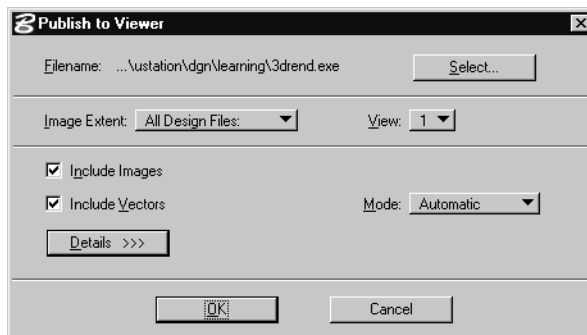
Select button

Used to change the name and location of the publication. By default, the name of the publication is composed of the name of

the design file along with the ".exe" extension. The location (path) of the publication file is identical to the location of the design file.

Example:

Design file: \DGN\MYDGN.DGN

New Image File: \DGN\MYDGN.EXE

To change the path and/or the file name, click the Select button.

View

Used to specify which MicroStation view, displaying images, to use for including images into the publication file.

✍ Include Images MUST be turned ON.

Image Extent

When creating a publication file and including images and/or design file elements, you may require that only part of the images and/or design file elements be use. In order to determine the extent, the following options are available and will define the extent into which to include images and/or design file elements. Any images and/or design file elements exceeding this extent is/ are cropped.
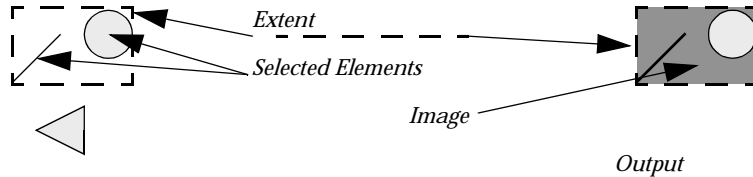
• All Design Files

  Used to specify the extent of use for all opened design files. This includes the Active design file as well as any attached referenced design file.
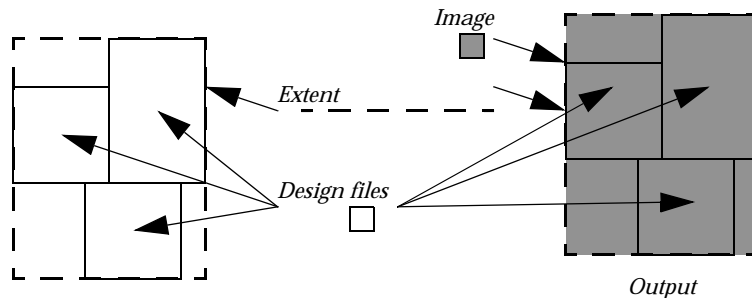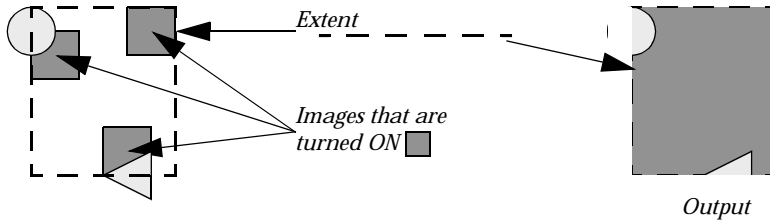
- Selected Element(s)

  Used to specify the extent of use for selected elements. This includes the Active design file as well as any attached referenced design file.
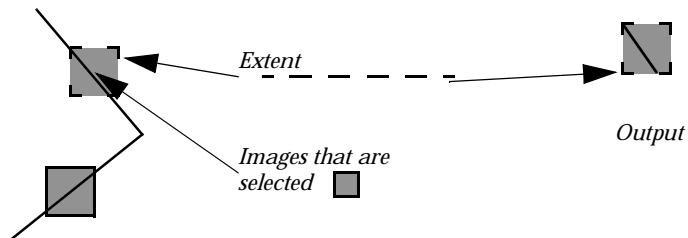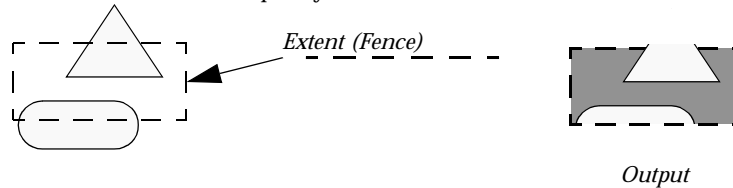
  Extent

  Selected Elements

  Image

  Output

- All Images

  Used to specify the extent of use for all displayed images.

  Extent

  Images that are turned ON

  Output

- Selected Image(s)

  Used to specify the extent of use for selected images.

  Extent

  Output

  Images that are selected

- Fence

  Used to specify the extent of use for the active fence.

  Extent (Fence)

  Output

- View Extent

  Used to specify the extent of use for the target view.

Extent (View)

Output
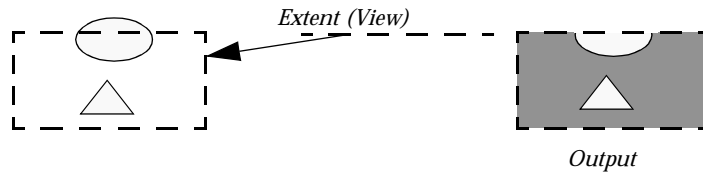
Include Images

Used to specify if images should be included or not. When turned ON, all images comprised in the specified Image Extent is/are included in the publication file. When OFF, only the vectors are processed into raster.

Extent (Fence)

Image

Output
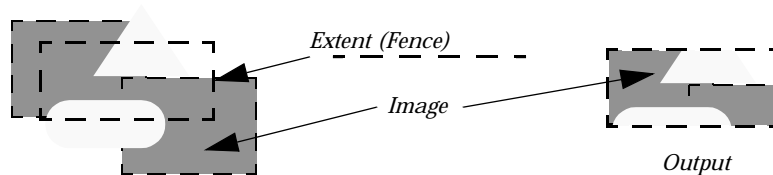
Include Images and/or Include Vectors MUST be turned ON for the OK button to be enabled.

Include Vectors

Used to specify if design file elements should be included or not. When turned ON, all design file elements comprised in the specified Extent is/are included in the publication file.

Mode

Used to specify the method used to calculate stamping scale. The stamp scale determines the scale factor applied to that each Line Weight and Line Style.

- Automatic

  The Stamp Scale is automatically determined by computing optimum values using the imagery pixel size and the average deviation between weights.

- User Defined

  In this mode, required values, for the Stamp Scale and Pixel Size, are read from the "[UserPreference]" section of the "DCARTES.INI" file. Four(4) variables can be defined in this

section, "PublishPixelSizeX," "PublishPixelSizeY," "PublishStampScale" and "PublishRasterScale". Values assigned to these variables must be expressed in meter (m), except for PublishRasterScale which must be expressed in DPI.

When these variables are not defined in the "DCARTES.INI," default values are assigned as follows:

PublishPixelSizeX = 1
the value is expressed in meter.

PublishPixelSizeY = 1
the value is expressed in meter.

PublishStampScale = 1
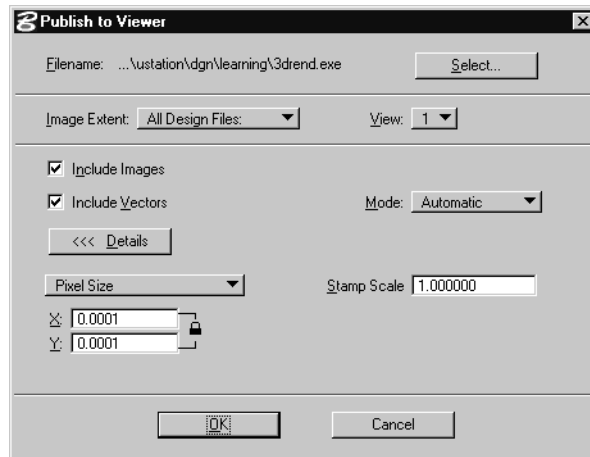the value is expressed as a factor.

PublishRasterScale = 300
the value is expressed in Dots Per Inch.

- Vector Settings

  In this mode, the values are read directly from the Stamp Settings dialog box.

Details >>> and <<< Details button

Used to expand the dialog box to provide access to more settings.

Pixel Size/Scale Factor

Used to specify the resolution of the new image. The resolution ca be expressed in Pixel Size or in Scale and DPI. For more information, see "Image Location Editor dialog box" on page 5-27

Stamp Scale

Used to display and edit the Stamp Scale that will be used. This field may not be editable depending on the selected *Mode*.

Using Publish To Viewer

Use the following procedure to create a publication file containing embedded vectors with or without background images.

➤ **To create a publication file**

1. To include just a subset of the design file elements, create a selection set of the elements prior to selecting Publish To Viewer.

2. From the File menu, select Publish To Viewer.

   The Publish to Viewer dialog box opens.

Publish to Viewer dialog box
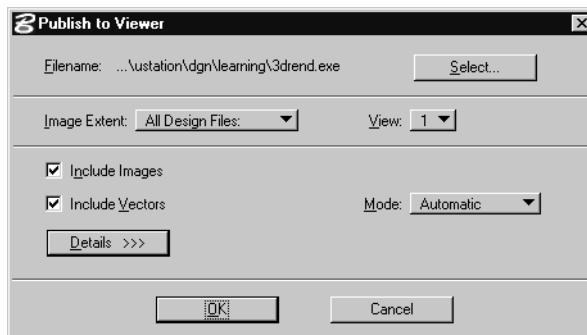
3. Set the parameters as required and as described below:

File Name: Your choice

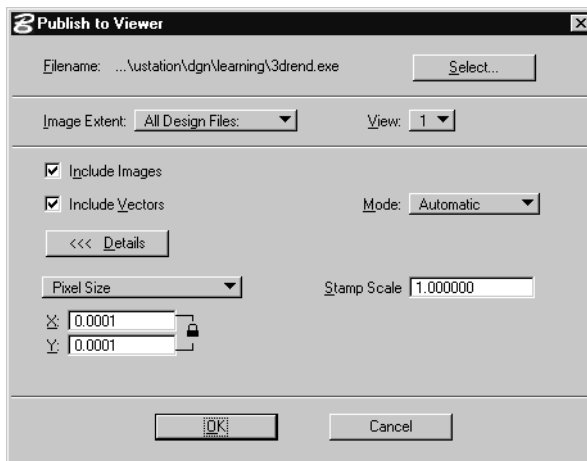*Image Extent:* Use the extent that corresponds to your data

Include Images: ON, if you wish to include images.

Include Vectors: ON, if you wish to include the design file elements.

Mode: Automatic

Details >>>: In automatic mode, these settings are not editable.

Publish to Viewer dialog box with Details section opened

At least one Include option, Images or Vectors, MUST be turned ON to enable the OK button.

4. Click OK.

The new publication file can be executed by double-clicking on the file name. Once loaded, you can browse through the images, pan, zoom-in, zoom-out, fit to view, etc.

✍ For more information on using the viewer, consult the on-line documentation.

Descartes Plotting dialog boxes

The Descartes - Image Plotting dialog box is used when using dcgen.plt - concatenation of printer.plt and dcgen.suf.
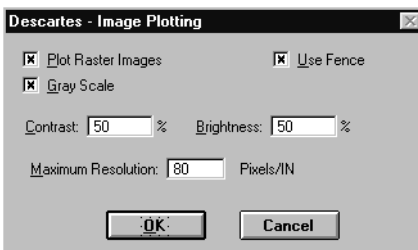
The Descartes - PostScript Image Plotting dialog box is used when using dcps.plt or dcpsc.plt - concatenation of pscript.plt/ pscriptc.plt and dcps.suf.
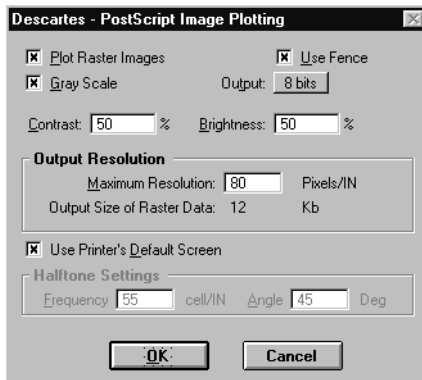
The Descartes - HPGL2/RTL Image Plotting dialog box is used when using dcrtl.plt - concatenation of hp650c.plt and dcrtl.suf.
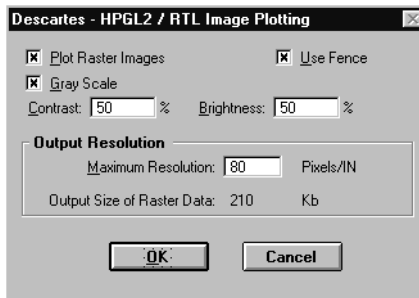
Plot Raster Images

Turn off Plot Raster Images to disable the plotting of Raster images (the default is on).

☞ This parameter is saved with a project.

Gray Scale

- RTL — Use Gray Scale to plot images in gray scale RTL format even if they are color images. Otherwise, images are plotted in color (the default is off). When plotting to a black and white RTL device, you should turn on the Gray Scale check button even for color images, as it saves time and minimizes the disk space required to plot. If you wish to print color images and if your RTL device supports color, turn off Gray Scale.

- PostScript — If Gray Scale is on, images are plotted with a half-toning technique that renders shades of gray. Turn it off to plot images in color PostScript format (the default is off).

☞ Keep in mind that:

- When plotting to a black and white PostScript device, you should leave on the Gray Scale check button even for color images. This way, you save time and minimize the disk space required to plot the image.

- Color mosaics of multiple images can be printed correctly even though they are not rendered correctly on the display in some circumstances. This situation exists because each image in a view is plotted to a color PostScript device using its own color table, like with a 24 bit display. (If you have an 8 bit display and one image is active, all images display through its color table.)

- The on/off status of the Gray Scale option does not affect the design files. Therefore, you can print color design elements in a color PostScript format even if the Gray Scale check button is on.

☞ This parameter is saved with a project.

Use Fence

Used to indicate whether the raster images should be clipped to the fence when plotting the view. The Use Fence option is only available when a fence is present (the default is off).

☞ This parameter is saved with a project.

Output

Select 8 or 24 bit output. Some PostScript printers are not capable of handling more than one 8 bit color table for generating a printout. This means that several images with different colors would print using the same color table. When this happens, select 24 bit. Each image is then printed using its own color table rendering the desired output.

Contrast and Brightness Settings

You can also set the contrast and the brightness of images in your plots. The contrast and the brightness values set by those fields apply to all images when plotting, but do not affect the display of images in the views.

Output Resolution

It is recommended that you select the maximum possible number of pixels per inch on output. Use lower resolutions to obtain a quick draft output and higher resolutions to obtain high quality output.

To ensure maximum quality for your plot, set this value to the same resolution as your device. However, with devices that use half-toning, the maximum resolution that you can achieve is the net resolution after half-toning. Since a value set higher than necessary does not usually provide added resolution, determine this value if you wish to minimize the size of your plot file.

To find the lowest possible plot file size, first determine the net resolution of your device. This value should be less than the resolution of the printer. The Image Manager default value is 80, since it is the typical net resolution for 300 dpi printers that plot in gray scale with half-toning. Then, optimize your plot file size by determining whether your plot requires the full available resolution.

Formula to use

(Image Width/Pixel Size) / Width of Plot = Optimal Resolution.

For example, if the image width is 1000 meters (measure if necessary), the pixel size is 1 meter, and the width of the plot is 5 inches, then:

(1000/1) / 5 = 200 dpi

✐ Use the Image Location Editor dialog box to find the pixel size and the image dimensions (see "Image Location Editor dialog box" on page 5-27).

In this example, the maximum quality output can be achieved with a resolution set at 200 dpi. Any higher value creates a larger plot file, but does not increase quality. If the net (true) resolution of your device is lower than 200 dpi, then any value higher than the true resolution also creates a larger plot file, but does not increase quality. Unfortunately, in this last case, if your device does not contain the true resolution necessary to achieve the maximum possible resolution inherent in your image, then your plot quality cannot be maximized.

✍ This parameter is saved with a project.

After the Maximum Resolution is set, this field displays the amount of raster data that will be created. The total size of the PostScript file also includes the vector data.

Use Printer's Default Screen

Used to override the standard screen settings of your PostScript device (the default is on).

✍ The default screen settings of your printer are usually optimal for your particular device. Turn off the Use Printer's Default Screen only if you have experienced a problem with the quality of your plot (such as dark images).

✍ This parameter is saved with a project.

Frequency

Used to set the frequency of the screen on the half-toning printer, in cells per inch. The Frequency sets the interval between the centers of the halftone dots without regard to the dot size. The higher you set the frequency, the smoother is the apparent changes in tone. However, if you set the frequency too high for your printer, you will lose image contrast and the result will be darker than expected.

The default value for Frequency is 55 which should provide a near-optimum result on a 300 dpi printer. For a lower resolution printer, use a lower Frequency value (around 30 to 50 cells per inch). For a higher resolution printer, use a higher value (80 cells per inch or more).

✍ This parameter is saved with a project.

Angle

Used to set the angle of the half-toning screen of your printer (the default is 45 degrees). The Angle value determines the number of

degrees by which the halftone screen rotates in relation to the device coordinate system.

✍ This parameter is saved with a project.

OK
Accepts the values in the dialog box and closes it.

Cancel
Closes the dialog box without changing the parameters.

Plotting under MicroStation 5.5.x for Windows

➤ **To plot**

1. From the Image Manager File menu, select Print/Plot.

2. From the Plot dialog box, select Setup > Driver.

3. Select a concatenated plot driver suitable for your plotter or your system printer.

4. Select Setup > Device to open a dialog box to alter the parameters controlling the plotting process.

The dialog box which opens depends on the concatenated plot driver you selected, as follows:

Type of concatenated plot driver	Dialog Box
PostScript	Descartes - PostScript Image Plotting
RTL	Descartes - HPGL2/RTL Image Plotting
Generic plotter	Descartes - Image Plotting
PC	Descartes - Image Plotting

When you are satisfied with the plotting control settings, in the Plot settings box, select File > Plot.

If you are plotting to a plotter, this opens the Save Plot As dialog box, a standard MicroStation file selection dialog box used to select the plotfile name. After selecting a plotfile name, a progress status displays while a plotfile is generated. To plot, copy the plotfile to your plotter. Specifically, if appropriate, copy the plotfile to your computer's plotter port.

➤ **To send your plot files**

1. Open a MS-DOS window.

2. Change the directory to where the plot file is located.

3. Use COPY /B *filename printer_port.*

Plotting begins when the plotter receives the plotfile (containing the image according to the selected parameters).

Otherwise, if you are plotting to your system's printer, plotting (of the image according to the selected parameters) begins immediately after selecting File > Plot. (That is, the Save Plot As dialog box does not open and a plotfile is not generated.) A progress window displays while the file is plotted.

Plotting under MicroStation 5.5.xx for DOS

Except for direct printing which is not supported, procedure is the same as "Plotting under MicroStation 5.5.x for Windows" on page 17-15. Since the Print Manager implementation is not possible under a DOS environment, dcgen.plt (printer.plt) cannot be used. Files are created on disk and later submitted to the printer port using the DOS command, COPY /B *filename printer_port.*

Additional Information About Configuration Plot Files

Before you try to plot with MicroStation Descartes, make sure that the appropriate statements are present in the plot configuration file (see suffix file on page 15-2). If the appropriate statement(s) are not added to your configuration file when you try to plot, the Device option from the Setup menu will be disabled.

Plotting Design 87 and 88 Elements

Key-ins can be used to enable or disable the plotting of Design raster elements 87 and 88 when using the Plot feature.

To turn on this feature:

Key-in: IMGMANAGER PLOT8788 SETON

When the toggle is set to on, MicroStation Descartes plots 87 and 88 elements with the same options used to print raster files (clipping to the fence extent, converting to gray scale, and so forth).

To turn off this feature:

Key-in: IMGMANAGER PLOT8788 SETOFF

When the toggle is set to off, MicroStation Descartes ignores 87 and 88 elements.

Inverting two-color images

Key-ins can be used to enable or disable the color inversion of two-color images for printing (for example, reversing black and white with B&W images).

To turn on this feature:

Key-in: IMGMANAGER PLOTINVERTBW SETON

To turn off this feature:

Key-in: IMGMANAGER PLOTINVERTBW SETOFF

RTL Plotting - Exceeding Installed Memory on Plotter

Whenever you are not using the Print Manager to plot files, you may find that once spooled into the plotter's memory, the raster portion of the plot does not entirely fit. When this happens, several options are available:

• Add more memory to the plotter.

• Reduce the size of the plot file by reducing the resolution or paper size.

- Use the Plot On The Fly Feature.

The Plot On The Fly feature is activated by inserting a special keyword into your plt file. When this keyword is found, MicroStation Descartes generates the plot file in such way that when the plotter's memory is full, it:

- Stops input of data.

- Starts the drawing.

- Starts input and plotting of data one band at a time until it reaches the end of the file.

This method is slower but allows you to plot large raster files on a plotter with minimal memory installed.

The only condition to use this feature is for the design file to entirely fit into the plotter's memory. Conventional ways require the raster data be spooled first and then the vector data (design file). When using Plot On The Fly, the vector data is spooled first. This method ensures that no matter how large the raster portion, it will never outrun the plotter's memory.

Using Plot On The Fly always produces translucent vectors. Vector information will be transparent and some colors, like yellow, may not show properly when an aerial photograph is beneath the vector data.

➤ **To modify the PLT file for Plot On The Fly**

1. Using a text editor, open the plt file you will use to generate the plot file.

2. Find the following line:
   RTL_PLOT_ON_THE_FLY=0
   Edit it and replace "0" with "1". The line becomes:
   RTL_PLOT_ON_THE_FLY=1

3. Save and exit.

➤ **To send the plot file to the plotter**

1. Open a MS-DOS window.

2. Change the directory to where the plot file is located.

3. Type the following command:

```
mode lpt1 retry=p
```

This instructs the copy command not to send a time-out
message to the host computer during the drawing process,
especially when the plotter stops responding to empty its
memory by starting the drawing.

4. Send your file to the plotter by typing:

```
copy /b filename printer_port
```

The prompt returns when the copy command finishes
copying the plot file to the printer port.

This can take several minutes to several hours depending on the
amount of raster data remaining to be plotted when the Plot On
The Fly mode begins. Your computer will be tied up for the
duration of the process. Remember, the remaining raster data is
spooled one band at a time.

Printing/Plotting Quick Reference

Paths in bold represent the easiest and simplest way to plot.

Platforms	MicroStation Version	Printer/Plotter Model	Language	Procedure
		HP650C	RTL	Use DCTRL.PLT. Execute the plot. Exit to DOS and use COPY /B.
DOS	5.5		PostScript	For Black & White use DCPS.PLT or color use DCPSC.PLT. Execute the plot. Exit to DOS and use COPY /B.
		Other	Native	Choose the PLT file for your printer/plotter. Use DCGEN.SUF to update your plt. Execute the plot. Exit to DOS and use COPY /B.
			PostScript	For Black & White use DCPS.PLT or color use DCPSC.PLT. Execute the plot. Exit to DOS and use COPY /B.
			RTL	Use DCRTL.PLT. Execute the plot. Exit to DOS and use COPY /B.
		Unsupported by Print Manager	PostScript	For Black & White use DCPS.PLT or color use DCPSC.PLT. Execute the plot. Exit to DOS and use COPY /B.
Windows	5.5		Native	Choose the PLT file for your printer/plotter. Use DCGEN.SUF to update your plt. Execute the plot. Exit to DOS and use COPY /B.
		Any supported printer attached to Print Manager	Any	Use DCGEN.PLT and the Print Manager printer you wish to use. Execute the plot.