



i n v e n t

HP

DesignJet Large-Format Printers

Product Comparison Guide

# The Product Comparison Guide for HP Languages on HP Large-Format Printers

Press the **ESC** key to use Acrobat functions  
like **Exit** and **Print**

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Many product updates and fixes do not require manual changes and, conversely, manual corrections may be done without accompanying product changes. Therefore, do not expect a one to one correspondence between product updates and manual revisions.

Edition dates are as follows:

1st edition, November 1991	6th edition, May 1994	11th edition, October 1997
2nd edition, February 1992	7th edition, September 1995	12th edition, March 1998
3rd edition, August 1992	8th edition, May 1996	13th edition, October 1998
4th edition, March 1993	9th edition, September 1996	14th edition, October 1999
5th edition, February 1994	10th edition, March 1997	<b>15th Edition, June 2000</b>

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Notices (continued)

## Notices (continued)

New editions are complete revisions of the manual. Change sheets, which may be issued between editions, contain additional information. The dates on the previous page change only when a new edition is published. Minor corrections that do not affect the function of the product may be made at reprint without a change to the print date.

The seventh edition involved a change in the title from *The Product Comparison Guide for HP-GL/2 and HP RTL Peripherals* to *The Product Comparison Guide for HP Languages on HP Plotters and Large-Format Printers* with a consequent change in its content: information about the use of PJL commands on the HP DesignJet Series was added; information about the HP PaintJet XL and XL300, LaserJet III, and DeskJet 1200C and 1200C/PS devices was removed.

The fourteenth edition dropped the category “plotter” from the title, and did not include HP plotters and printers that are no longer marketed or supported. Information about HP DesignJet printers and plotters and HP 7600 Series plotters that are no longer marketed or supported can be found in earlier editions of this *Product Comparison Guide*.

### Devices Omitted from This Guide

This guide no longer includes information about the following peripherals:

- HP PaintJet XL 300 color printer and the HP PaintWriter XL printer (using the optional HP-GL/2 cartridge)
- HP DeskJet 1200C and 1200 C/PS printers
- HP LaserJet III printer
- HP DraftMaster Series plotters (SX Plus, RX Plus and MX Plus)
- HP DraftPro Plus plotter.
  - HP 7550 Plus plotter
  - HP DesignJet plotter
  - HP DesignJet 200, 220, 230, 250C, 330, 350C, 600, 650C and 750C plotters
  - HP DraftMaster Series plotters (SX, RX and MX)
  - HP 7600 Series plotters (Models 240D/E, 250, 255 and 355).

Information about the HP-GL/2 commands supported by the HP DeskJet and HP LaserJet printers is included in the *PCL 5 Comparison Guide*, part number 5961-0702.

## This Edition

### New in This Edition

- The Hewlett-Packard DesignJet 500, 500PS, 800, 800PS, 5000 and 5000PS large-format printers.

### Included in This Edition

The following HP DesignJet Series printers:

- HP DesignJet ColorPro CAD and GA (collectively referred to in this *Guide* as the 'ColorPro series')
- HP DesignJet 430, 450C, 455CA and 488CA (referred to as '4xx')
- **HP DesignJet 500 and 500PS (referred to as '5xx')**<sup>1</sup>
- HP DesignJet 700, 750C Plus and 755CM (referred to as '7xx')
- **HP DesignJet 800 and 800PS (referred to as '8xx')**
- HP DesignJet 1050C and 1055CM (referred to as '1xxx')
- HP DesignJet 2000CP, 2500CP and 2800CP (referred to as '2xxx')
- HP DesignJet 3000CP, 3500CP and 3800CP (referred to as '3xxx')
- **HP DesignJet 5000 and 5000PS (referred to as '5xxx')**.

Press the **ESC** key to use Acrobat functions like **Exit** and **Print**

- 
1. The HP DesignJet 5xx series printers support HP-GL/2 and HP RTL only if an HP-GL/2 Accessory card (HP part number C7772A) is installed; their support of these HP Languages (HP-GL/2 and HP RTL) is then equivalent to that of the HP DesignJet 8xx series printers.

## Using the Guide

This manual helps you design hardware, firmware, or software for Hewlett-Packard large-format printers that support HP-GL/2 and HP RTL. It shows the differences and similarities between printer models to help you define an HP-GL/2 and HP RTL solution that is compatible across a variety of these peripherals.

In its way, this *Comparison Guide* is a companion to *The HP-GL/2 and HP RTL Reference Guide*, which describes the vector graphics language instructions and HP's Raster Transfer Language (RTL) commands. In this *Comparison Guide*, the instructions and commands are described generically; that is, the explanations do not rely on any one peripheral or type of peripheral. This guide, however does show how specific peripherals and technologies support these languages. It does not tell you how individual instructions and commands work. Care has been taken not to duplicate information unnecessarily; much of the information that was previously duplicated from *The HP-GL/2 and HP RTL Reference Guide* has been deleted.

- [Media](#) has tables of supported media, P1/P2 locations, and maximum plotting or printing area for each peripheral.
- [Features](#) tells more about peripheral features you might want to consider when developing your solution.
- [HP-GL/2](#) shows how HP-GL/2 is supported by the products.
- [Char. Sets](#) lists the characters sets supported by HP-GL/2.
- [HP RTL](#) compares HP RTL among the peripherals that support it.
- [PJL](#) summarizes the Printer Job Language (PJL) commands supported by HP DesignJet devices.

Whenever possible, we have used the printer name with which you may be more familiar, rather than the model number for the specific peripheral. For example, you will find *HP DesignJet 755CM* listed, rather than *HP C3198A* or *C3198B*.

The model numbers are used only when necessary because of differing implementations.

All devices described in this guide are “plotters,” not “printers,” as defined in *The HP-GL/2 and HP RTL Reference Guide*.

*The Product Comparison Guide for HP Languages on HP Large-Format Printers* applies to the current HP-GL/2 and HP RTL peripherals listed in [This Edition](#).

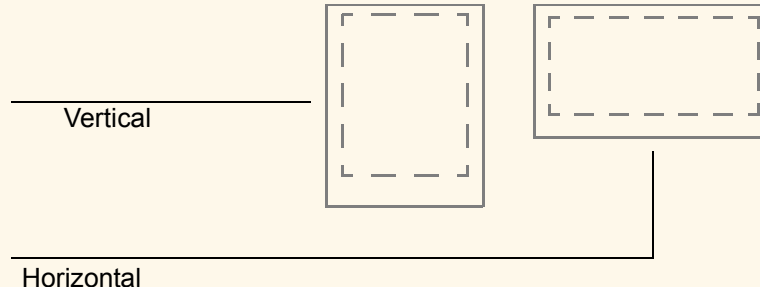
## Media and Printing Area

### Reading the Media Tables

This section lists much of the media supported on each printer. Most devices accept a wide range of sheet media. Some of them also accept roll media.

For each media size specified in the tables, we list the following:

- **default P2 location**—This is specified in plotter units (1 plotter unit = 0.025 mm). This number is based on precise media size in excellent conditions. Your P2 location will vary with the media's actual size and with changes to the media due to humidity. The number given here is most likely within  $\pm 40$  plotter units. The P1 location for all HP-GL/2 peripherals defaults to (0,0) and is not listed in any tables.
- **default maximum plotting or printing area**—This is specified in millimeters and inches for all media listed. Actual size varies with changes in humidity. The size listed is most likely within  $\pm 1$  mm (0.04 in.).



Media and Printing Area (continued)

## Media and Printing Area (continued)

Note that you have a choice with most media sizes as to whether you load it vertically or horizontally into the printer. (Vertical and horizontal are also called portrait and landscape, respectively.) How you load media determines the maximum printing area you have available and the orientation of the coordinate axes. The coordinate system tracks the orientation of the media; the X-axis is always the long side of the media. The examples below show margins as the media is loaded vertically and horizontally into the printer.

HP DesignJet Series Printers handle sheet media from 210 mm to 927 mm (8.3 to 36.5 inches). They also accept standard size roll media. The HP DesignJets 3xxx handle media up to 1371 mm (54 inches) wide (see [Additional areas for HP DesignJet 3xxx printers](#)).

## Margins

Product	Margins	Extended	Normal	Roll media only: Smaller/Expanded (1)
DesignJet 4xx	Leading and trailing edges	—	17 mm, 0.67 in, 680 p.u.	—
	Each side	—	5 mm, 0.20 in, 200 p.u.	—
DesignJet 5xx, DesignJet 8xx	Leading and trailing edges	—	17 mm, 0.67 in, 680 p.u.	—
	Each side	—	5 mm, 0.20 in, 200 p.u.	—
DesignJet 7xx	Leading and trailing edges	—	17 mm, 0.67 in, 680 p.u.	10 mm, 0.39 in, 400 p.u.
	Each side	—	5 mm, 0.20 in, 200 p.u.	5 mm, 0.20 in, 200 p.u.

Margins (continued)



## Margins (continued)

Product	Margins	Extended	Normal	Roll media only: Smaller/Expanded (1)
DesignJet 1xxx	Leading edge	10 mm, 0.39 in, 400 p.u.		—
	Trailing edge	Roll media: 5 mm, 0.20 in, 200 p.u. Sheet media: 15 mm, 0.59 in, 600 p.u.		—
	Each side	15 mm, 0.59 in, 600 p.u.	5 mm, 0.20 in, 200 p.u.	—
DesignJet 2xxx, DesignJet 3xxx	Leading and trailing edges	27 mm, 1.06 in, 1080 p.u. (2)	17 mm, 0.67 in, 680 p.u. (2)	10 mm, 0.39 in, 400 p.u.
	Each side	15 mm, 0.59 in, 600 p.u.	15 mm, 0.59 in, 600 p.u.	15 mm, 0.59 in, 600 p.u.

[Margins \(continued\)](#)

## Margins (continued)

Product	Margins	Extended	Normal
DesignJet 5xxx	Leading edge	Sheet media: 35 mm, 1.4 in, 1400 p.u. Roll media: 15 mm, 0.59 in, 600 p.u.	15 mm, 0.59 in, 600 p.u.
	Trailing edge	Sheet media: 35 mm, 1.4 in, 1400 p.u. Roll media: 17 mm, 0.67 in, 680 p.u.	Sheet media: 17 mm, 0.67 in, 680 p.u. Roll media: 7 mm, 0.29 in, 300 p.u.
	Each side	15 mm, 0.59 in, 600 p.u. 7 mm, 0.29 in, 300 p.u.	7 mm, 0.29 in, 300 p.u.
DesignJet ColorPro CAD, ColorPro GA	Leading edge	—	3 mm, 0.12 in, 120 p.u.
	Trailing edge	—	13 mm, 0.51 in, 520 p.u.
	Each side	—	5 mm, 0.20 in, 200 p.u.

Margins (continued)

## Margins (continued)

### Notes:

All lengths have a tolerance of  $\pm 2$  mm.

p.u. Plotter units.

1. On those HP DesignJet printers with an entry in this column, you can expand the plotting area along the length of the roll media using **Smaller** margins. On other DesignJets, you cannot expand the plotting area; you can only add extra space for cutting.
2. When roll media is used and the printer's cutter is enabled, an additional 2 mm/0.08 in/80 p.u. (29 mm/1.14 in/1160 p.u. with UV inks and vinyl or heavy coated media) is added to the leading edge of the first print or the first print after cutting. This additional area is not at the expense of the printing area, but is added to the total length of media used.

## Long-Axis Plotting

For long-axis plotting on all HP DesignJet printers before the 2xxx series, you can specify a plot length up to 15.2 m (50 ft, which is 609,600 plotter units); the HP DesignJet 2xxx and 3xxx printers support a plot length up to 45.7 m (150 ft, 1 828 800 plotter units); the HP DesignJet 5xx, 8xx, 1xxx and 5xxx printers support a plot length up to 91.4 m (300 ft, 3 657 600 plotter units).

## Media Sizes

The following table lists information for popular sheet media sizes. To calculate the plotting area for a given size of media, subtract the margins from the media size.

Media description	Inches	Millimeters	Plotter units
A	8.50 x 11.00	216 x 279	8 636 x 11 176
B	11.00 x 17.00	279 x 432	11 176 x 17 272
C	17.00 x 22.00	432 x 559	17 272 x 22 352
D	22.00 x 34.00	559 x 864	22 352 x 34 544
E	34.00 x 44.00	864 x 1118	34 544 x 44 704
Architectural C	18.00 x 24.00	457 x 610	18 288 x 24 384
Architectural D	24.00 x 36.00	610 x 914	24 384 x 36 576
Architectural E	36.00 x 48.00	914 x 1219	36 576 x 48 768
Architectural E1	30.00 x 42.00	762 x 1067	30 480 x 42 672
A4	8.27 x 11.69	210 x 297	8 400 x 11 880
A3	11.69 x 16.54	297 x 420	11 880 x 16 800
A2	16.54 x 23.39	420 x 594	16 800 x 23 760
A1	23.39 x 33.07	594 x 840	23 760 x 33 600
A0	33.07 x 46.77	840 x 1188	33 600 x 47 520

[Media Sizes \(continued\)](#)

## Media Sizes (continued)

For example, for an A1-size sheet, loaded vertically (portrait orientation) into an HP DesignJet 450C printer with normal margins:

$$\begin{aligned} \text{length} &= 840 - 17 - 17 &&= 806 \text{ mm,} \\ \text{width} &= 594 - 5 - 5 &&= 584 \text{ mm.} \end{aligned}$$

The P2X (the longer dimension) and P2Y values, in plotter units, for the same sheet are:

$$\begin{aligned} \text{P2X} &= 33\,600 - 680 - 680 = 32\,240, \\ \text{P2Y} &= 23\,760 - 200 - 200 = 23\,360. \end{aligned}$$

For a D-size sheet, loaded horizontally (landscape orientation) into an HP DesignJet 2500CP printer with extended margins:

$$\begin{aligned} \text{length} &= 22.00 - 1.06 - 1.06 = 19.82 \text{ in,} \\ \text{width} &= 34.00 - 0.59 - 0.59 = 32.88 \text{ in.} \end{aligned}$$

The P2X (the longer dimension) and P2Y values, in plotter units, for the same sheet are:

$$\begin{aligned} \text{P2X} &= 34\,544 - 600 - 600 = 33\,344, \\ \text{P2Y} &= 22\,352 - 1080 - 1080 = 20\,192. \end{aligned}$$

## Additional areas for HP DesignJet 3xxx printers

The HP DesignJet 3xxx printers can accept media up to 1371 mm (54 inches) wide:

Extra wide media		P2 Location		Maximum Printing Area (X- and Y-axes)	
Media width	Page Size	P2X,	P2Y	millimeters	inches
42/50/54 in	1m x 1.4m	40 000,	56 000	985 x 1385 mm	38.7 x 55.0 in.
50/54 in	44 in x 62 in	44 800,	62 800	1095 x 1559 mm	43.4 x 61.4 in.
54 in	54 in x 76 in	54 800,	77 200	1356 x 1915 mm	53.4 x 75.4 in.
50/54 in	1.2 m x 1.7 m	48 000,	68 000	1185 x 1685 mm	47.4 x 66.4 in.
54 in	52 in x 73 in	58 200,	74 000	1305 x 1839 mm	51.4 x 72.4 in.

## Product Features

These tables show some of the product features of which you may want to take advantage.

- [Internal Disk](#)
- [Interfaces](#)
- [Memory \(including swath memory\)](#)
- [PostScript](#)
- [Monochrome Output](#)
- [7586 HP-GL Emulation](#)
- [Mid-print Refilling with HP DesignJet 2xxx and 3xxx Printers](#)



## Internal Disk

Peripheral	Internal Disk Size
HP DesignJet 8xx printers	6.0 Gigabytes
HP DesignJet 1055CM printers	2.0 Gigabytes
HP DesignJet 2500CP, 2800CP, 3500CP and 3800CP printers	4.3 Gigabytes
HP DesignJet 5000 and 5000PS printers	5 Gigabytes (42-inch model) 20 Gigabytes (60-inch model)

## PostScript

Peripheral	PostScript Supported
HP DesignJet 700, 750C Plus and 1050C printers	Yes, optional
HP DesignJet 500PS <sup>a</sup> , 755CM, 800PS, 1055CM, 2500CP, 2800CP, 3500CP, 3800CP, 5000PS and ColorPro GA <sup>a</sup> printers	Yes

a. Supported using a software RIP.

## Interfaces

Peripheral	Interfaces Supported
HP DesignJet 430 and 450C	RS-232-C, IEEE-1284-compatible parallel with ECP mode built-in
HP DesignJet 455CA and 7xx	RS-232-C, IEEE-1284-compatible parallel, Network connection built-in
HP DesignJet 5xx and 8xx	IEEE-1284-compatible parallel, Network connection built-in, USB
HP DesignJet 1xxx and 5xxx	IEEE-1284-compatible parallel, Network connection built-in
HP DesignJet 2xxx and 3xxx	IEEE-1284-compatible parallel, Network connection built-in
HP DesignJet ColorPro CAD	IEEE-1284-compatible parallel, Network connection built-in
HP DesignJet ColorProGA	IEEE-1284-compatible parallel, Network connection built-in

## Memory (including swath memory)

Peripheral	Memory
HP DesignJet 4xx printers	4 Megabytes (can be expanded to 36 MB)
HP DesignJet 5xx printers	16 Megabytes (can be expanded to 96 MB or 160 MB)
HP DesignJet 700 printers	7 Megabytes (can be expanded to 71 MB)
HP DesignJet 750C Plus plotters	11 Megabytes (can be expanded to 75 MB)
HP DesignJet 755CM printers	71 Megabytes
HP DesignJet 800 printers	96 Megabytes (can be expanded to 160 MB)
HP DesignJet 800PS printers	160 Megabytes
HP DesignJet 1050C printers	16 Megabytes (can be expanded to 128 MB)
HP DesignJet 1055CM printers	32 Megabytes (can be expanded to 128 MB)
HP DesignJet 2000CP printers	12 Megabytes (can be expanded to 72 MB)
HP DesignJet 2500CP and 2800CP printers	24 Megabytes (can be expanded to 72 MB)
HP DesignJet 3000CP printers	16 Megabytes (can be expanded to 72 MB)
HP DesignJet 3500CP and 3800CP printers	40 Megabytes (can be expanded to 72 MB)
HP DesignJet 5000 and 5000PS printers	128 Megabytes (60-inch 5000PS model has 192 Megabytes)
HP DesignJet ColorPro CAD and GA	4 Megabytes (can be expanded to 76 MB)

## Monochrome Output

Your output is plotted or printed in color or monochrome according to the settings from the setup sheet (or front panel) or the @PJL SET RENDERMODE command. Normally the PJL setting wins if there is any conflict. However, if you specify through the front panel or the setup sheet that the pen settings are to be taken from tables or the builtin Palettes, not from software, the PJL setting is ignored. Also, the command @PJL SET PALETTE\_SOURCE=DEVICE forces the front panel settings to be used for both palette and color/monochrome setting.

If the @PJL SET RESOLUTION command is used with the HP DesignJet 700, 750C Plus or 755CM printer, the value **600** forces grayscale output, irrespective of any color specifications.

PJL commands used with these devices are summarized in [PJL Comparison for HP DesignJets](#).

## 7586 HP-GL Emulation

The HP DesignJet 5xx, 8xx, 2xxx, 3xxx and 5xxx printers do not support HP-GL emulation.

## Mid-print Refilling with HP DesignJet 2xxx and 3xxx Printers

You can specify explicitly (Image quality → Printhead service → Refill now from the printer's front panel) that the printer's pens are to be refilled now. Pens are also refilled automatically at the end of each print if the ink level has fallen below a threshold of about 75% of the pen's capacity. However, if the pens are not refilled and the ink requirements of the next print are large, it may be necessary for the printer to refill the pens while it is printing.

### Estimated printable areas before refilling

Estimated printable areas at 100% ink density before refilling becomes essential	Imaging ink	UV ink
Ink level not checked, and printheads not topped up before starting printing	8.5 sq ft or 0.8 sq m.	8 sq ft or 0.75 sq m.
Printheads topped up before starting printing	12 sq ft or 1.1 sq m.	9.2 sq ft or 0.85 sq m.

If the pens need to be refilled during printing, there are a number of options available to you:

There are two  durations  of refill, **normal** and **quick**.

- A *quick* refill normally takes about 50 seconds, and charges the pens with 5 cc of ink.
- A *normal* refill takes about 150 seconds, and charges the pens with 17 cc of ink.

There are two  types  of refill, **sharp** and **interleaved**.

- A *sharp* refill is done only between swaths. All passes for the current swath are completed before refilling takes place.
- An *interleaved* refill can be done between two passes of the same swath. After the refill, the next pass of the current swath is made.

[Mid-print Refilling \(continued\)](#)

## Mid-print Refilling (continued)

The refill warming level can also be specified, by selecting an appropriate **media type** (see the table below). The value affects the lightness of banding that may be seen with some media after a mid-print refill. In general, the higher the level, the darker the banding. A value of **0** specifies that no pen warming will be done.

The threshold for triggering automatic refilling can also be specified.

- A threshold of **100%** means that refilling takes place when the pen reaches its minimum level of ink (there is no usable ink remaining).
- *Lower* threshold values cause the printer to analyze the density of the colors of the next swaths. If the density is increasing, the refill is done immediately. If the density is decreasing, the refill is delayed until it starts increasing again or the minimum ink level is reached. Mid-print refill banding is less noticeable in the lighter areas of a print. It is also less noticeable in yellow areas than in black ones.

A threshold of **80%** means that the printer may start refilling when the ink level has dropped by 80% of the charge level. If the charge level was 15.5 cc, the threshold is reached when 12.4 cc of usable ink remains in the pen.

## Mid-print Refilling (continued)

The default parameters for mid-print refilling are shown in the following table. Note that they depend on the type of ink system, the media type and the print quality. These abbreviations are used in the table:

- A: Normal, interleaved
- B: Normal, sharp
- C: Quick, interleaved.

### Default refill types for various media, and print qualities—Imaging Inks

Media type	Fast	Normal	Best	Threshold (%)
High gloss photo	B	B	B	80
Semi gloss photo	B	B	B	80
Coated paper	A	B	B	80
Heavy coated paper	A	A	B	80
Imaging film backlit	A	A	A	80
Opaque vinyl	C	C	C	100
Custom A	B	B	B	80
Custom B	A	A	A	80
Custom C	A	A	A	80
Custom D	B	B	B	80

Mid-print Refilling (continued)

## Mid-print Refilling (continued)

### Default refill types for various media and print qualities—UV Inks

Media type	Fast	Normal	Best	Threshold (%)
UV heavy coated paper	A	A	A	75
UV opaque vinyl	B	B	B	100
UV custom A	B	B	B	80
UV custom B	A	A	A	75
UV custom C	A	A	A	80
UV custom D	B	B	B	75

If the default values of the mid-print refill parameters are not appropriate for the image quality you need, you can override them through the printer's front panel. Under Device setup → Refill type select Refill A, Refill B or Refill C, where A, B and C are as in the table above, as appropriate.

If you are using KCMY prints with no negative motion, you can also set the refill parameters for a job using these PJL commands:

```
@PJL SET REFILLTYPE=INTERLEAVED|SHARP
@PJL SET REFILLDURATION=QUICK|NORMAL
@PJL SET REFILLTHRESHOLD=integer between 5 and 100.
```



# HP-GL/2

## Power-On Defaults

On application of power, each HP-GL/2 peripheral performs an initialization cycle to set certain conditions to predefined values. These default values can differ from device to device, and some functions are not implemented on all devices. The values are the same as those of the DF (Default Values) instruction, defined in *The HP-GL/2 and HP RTL Reference Guide*.

## HP-GL/2 Overview

In the tables that make up this section, the following notations indicate the status of an instruction or extension for a device.

- Indicates the peripheral's support of the instruction or group of instructions.
- × Indicates that the instruction or group is not supported.
- NOP** Indicates that the peripheral ignores the instruction, but does not generate an error. (The Transparency Mode [TR] instruction is the exception to this rule; an error is generated when it occurs on a device that NOPs it.)

The following table shows the different component groups of HP-GL/2 and the devices on which they are supported.

### HP-GL/2 language groups and devices

Kernel <sup>a</sup>	Extensions <sup>a</sup>					
	Technical Graphics	Palette	Dual Context	Digitizing <sup>b</sup>	Advanced Drawing	Advanced Text
•	• <sup>c</sup>	•	•	×	•	•

- a. The HP DesignJet 5xx printers support HP-GL/2 only if an HP-GL/2 Accessory card (part number C7772A) is installed.
- b. Note that the output instructions require a bidirectional interface such as RS-232-C.
- c. The HP DesignJet ColorPro printers support only the BP, MC, PS and QL instructions; see below for details.

## HP-GL/2 Instructions

Parameter fields must be specified in the format defined by each instruction. Refer to *The HP-GL/2 and HP RTL Reference Guide* for more information and examples. The table below shows which devices support which HP-GL/2 instructions.

- Means that all HP DesignJet printers listed in [Included in This Edition](#) (with the exception of the model 500 with no HP-GL/2 Accessory card) support the instruction fully, as defined in *The HP-GL/2 and HP RTL Reference Guide*, subject to any limits or restrictions shown in the notes.
- × Means that the instruction is not supported or is NOP'd (see above).

## HP-GL/2 Instructions supported by HP DesignJet printers

- [Configuration and Status Group](#)
- [Vector Group](#)
- [Polygon Group](#)
- [Line and Fill Attributes Group](#)
- [Character Group](#)
- [Technical Graphics Extension](#)
- [Palette Extension](#)
- [Dual-Context Extension](#)
- [Digitizing Extension](#)
- [Advanced Drawing Extension](#)
- [Advanced Text Extension](#)

## Configuration and Status Group

CO Supported fully. The HP DesignJet ColorPro series printers do not support this command.

DF, IN, IP, IR, PG, RO Supported fully.

IW, SC Supported fully. X-coordinate, Y-coordinate, and radius ranges are:

- integer and real:  $-2^{23}$  to  $2^{23}-1$
- clamped integer and real:  $-2^{15}$  to  $2^{15}-1$ ; this range also applies to the number of fractional binary bits in the PE instruction, and to internally held coordinates.

“Current units” means *integer* if scaling is off, *real* if scaling is on.

RP Supported fully. To ensure that a program using the RP (Replot) instruction works identically on all devices, begin each plot with a BP instruction followed by an IN instruction.

There is no limit to the number of replots, provided that no new plot is loaded that deletes the old one. Note that if a device enters “superflow” mode, this effectively deletes the old plot thereby preventing any replotting.

If an RP (Replot) instruction is received after a PG (Advance Full Page) instruction and with no intervening BP (Begin Plot), both the previous and the new pictures are plotted again.

The RP (Replot) instruction cannot be used when the data contains an HP RTL Simple Color command with a parameter value of -4 (**ESC**\*r-4U).

## Vector Group

AA, AR, AT, CI, PA, PD, PE, PR, PU, RT

Supported fully. X-coordinate, Y-coordinate, and radius ranges are:

- integer and real:  $-2^{23}$  to  $2^{23}-1$
- clamped integer and real:  $-2^{15}$  to  $2^{15}-1$ ; this range also applies to the number of fractional binary bits in the PE instruction, and to internally held coordinates.

“Current units” means *integer* if scaling is off, *real* if scaling is on.

Default chord angle is  $5^\circ$ .

## Polygon Group

EA, ER Supported fully. X-coordinate, Y-coordinate, and radius ranges are:

- integer and real:  $-2^{23}$  to  $2^{23}-1$
- clamped integer and real:  $-2^{15}$  to  $2^{15}-1$ ; this range also applies to the number of fractional binary bits in the PE instruction, and to internally held coordinates.

“Current units” means *integer* if scaling is off, *real* if scaling is on.

EP, PM Supported fully.

EW, WG Supported fully. X-coordinate, Y-coordinate, and radius ranges are:

- integer and real:  $-2^{23}$  to  $2^{23}-1$
- clamped integer and real:  $-2^{15}$  to  $2^{15}-1$ ; this range also applies to the number of fractional binary bits in the PE instruction, and to internally held coordinates.

“Current units” means *integer* if scaling is off, *real* if scaling is on.

Default chord angle is  $5^\circ$ .

FP Supported fully. [see [Note](#)]

RA, RR Supported fully. [see [Note](#)]

X-coordinate, Y-coordinate, and radius ranges are:

- integer and real:  $-2^{23}$  to  $2^{23}-1$
- clamped integer and real:  $-2^{15}$  to  $2^{15}-1$ ; this range also applies to the number of fractional binary bits in the PE instruction, and to internally held coordinates.

“Current units” means *integer* if scaling is off, *real* if scaling is on.

## Line and Fill Attributes Group

AC Supported fully. [see [Note](#)]

X-coordinate, Y-coordinate, and radius ranges are:

- integer and real:  $-2^{23}$  to  $2^{23}-1$
- clamped integer and real:  $-2^{15}$  to  $2^{15}-1$ ; this range also applies to the number of fractional binary bits in the PE instruction, and to internally held coordinates.

“Current units” means *integer* if scaling is off, *real* if scaling is on.

When applying a pattern imported from HP RTL, the plotter uses the current Anchor Corner position rather than the HP RTL Pattern Reference Point.

FT Supported fully. [see [Note](#)]

HP DesignJets 4xx, 7xx, 1xxx, 2xxx and 3xxx also support fill types 21 and 22 when patterns are exported from HP RTL to HP-GL/2.

LA Supported fully. Lines with a width of 35 mm or less always have butt caps and no join, regardless of the current attribute setting.

LT, SM, SP, UL Supported fully.

PW Supported fully. [see [Note](#)] 256 pens are supported.

Line-width mapping. The [Line-width mapping for HP DesignJet plotters and printers](#) table shows the correspondence between the line width, as set using the PW instruction, and the pixels at various device resolutions.

RF Supported fully. [see [Note](#)]

256 pens are supported.

The range of the index number is 1 to 16.

WU Supported fully. [see [Note](#)]

### Line-width mapping for HP DesignJet plotters and printers

HP-GL/2 pen width (mm)	All devices: pixels at 300 dpi	Other devices <sup>a</sup> : pixels at 600 dpi (addressable, black)	750C Plus, 755CM (B): pixels at 600 dpi (addressable, color)	700, 750C Plus, 755CM: pixels at 600 dpi (real, black)	1xxx, 2xxx, 3xxx: pixels at 600 dpi (real, color)	1xxx: pixels at 1200 dpi (addressable, black)	5xx, 8xx: pixels at 1200 dpi (real, black and color)
0.10	1	1	1	1	1	1	3
0.14	1	1	1	2	2	3	5
0.18	2	3	2	3	3	5	7
0.22	2	3	3	4	4	7	9
0.26	3	5	4	5	5	9	11
0.31	3	5	5	6	6	11	13
0.35	4	7	6	7	7	13	15
0.39	4	7	7	8	8	15	17
0.43	5	9	8	9	9	17	19
0.48	5	9	9	10	10	19	21
0.52	6	11	10	11	11	21	23
and so on	...	...	...	...	...	...	...

a. Devices, except those listed in other columns, that support this resolution.



## Character Group

AD, SD Supported fully. [see [Note](#)]

The default standard and alternate fonts are both Roman-8 (character set 0).

CF Supported fully. [see [Note](#)]

256 pens are supported.

HP RTL patterns are supported using fill modes 2 and 3, which apply the current fill type from the FT command, when patterns are exported from HP RTL to HP-GL/2.

The HP DesignJet series plotters and printers support CF for stick fonts, but only to apply solid, shaded, or raster fills, not edging or hatching.

CP, DI, DR, DT, DV, ES, LB, LO, SA, SL, SS, TD Supported fully.

SI, SR Supported fully. [see [Note](#)]

## Technical Graphics Extension

BP Supported fully. There is an additional kind/value pair supported by the HP DesignJet 1xxx printers: BP5,2. This setting forces the X-axis to be in the direction in which the paper advances, and the Y-axis to be along the carriage axis.

The HP DesignJet ColorPro series printers only support *kind* values 1 and 3; 5 is permitted but ignored.

CT, DL, OE, OH, OL, OS Supported fully.

EC Supported fully. On the HP DesignJet 3xxx printers, this command is disabled if the take-up reel is enabled through the front panel. Additionally, if the front-panel CUTTER option is set to OFF, the command has no effect. If CUTTER is set ON, the command controls whether cutting is enabled.

FR Supported fully. On the HP DesignJet 1xxx printers, the FR command has an optional parameter that specifies the size of the next frame (band). The syntax is FR[size of band].

MC Supported fully. The HP DesignJet ColorPro series printers only support a limited range of logical operations.

MG, MT, NR, ST, VS NOP

OP Supported fully. X-coordinate, Y-coordinate, and radius ranges are:

- integer and real:  $-2^{23}$  to  $2^{23}-1$
- clamped integer and real:  $-2^{15}$  to  $2^{15}-1$ ; this range also applies to the number of fractional binary bits in the PE instruction, and to internally held coordinates.

“Current units” means *integer* if scaling is off, *real* if scaling is on.

[More...](#)

## Technical Graphics Extension (continued)

PS Supported fully. X-coordinate, Y-coordinate, and radius ranges are:

- integer and real:  $-2^{23}$  to  $2^{23}-1$
- clamped integer and real:  $-2^{15}$  to  $2^{15}-1$ ; this range also applies to the number of fractional binary bits in the PE instruction, and to internally held coordinates.

“Current units” means *integer* if scaling is off, *real* if scaling is on.

The HP DesignJet 3xxx support A0 prints in landscape orientation.

QL Supported fully. The HP DesignJet ColorPro series printers support these ranges: 0—33 = Econofast; 34—67 = Normal; 68—100 = Best; no value = Normal.

## Palette Extension

CR, PC Supported fully.

NP Supported fully. 256 pens are supported.

The default value is 2 for monochrome devices or for color devices where GRAYSCALE or MONOCHROME is set from the front panel, using the setup sheet, or through PJL; otherwise the default is 8.

SV Supported fully. [see [Note](#)]

HP DesignJets 4xx, 7xx, 1xxx, 2xxx and 3xxx also support fill types 21 and 22 when patterns are exported from HP RTL to HP-GL/2.

TR Supported fully. The HP DesignJet 4xx, 7xx, 1xxx, 2xxx and 3xxx have an equivalent RTL command (Source Transparency Mode, `ESC*v#N`) which must be used to set this function in HP RTL.

## Dual-Context Extension

FI, FN, SB, **esc%#A**, ESCE Supported fully.

## Digitizing Extension

DC, DP, OD Not supported.

## Advanced Drawing Extension

BR, BZ Supported fully. X-coordinate, Y-coordinate, and radius ranges are:

- integer and real:  $-2^{23}$  to  $2^{23}-1$
- clamped integer and real:  $-2^{15}$  to  $2^{15}-1$ ; this range also applies to the number of fractional binary bits in the PE instruction, and to internally held coordinates.

“Current units” means *integer* if scaling is off, *real* if scaling is on.

MC, PP Supported fully.

## Advanced Text Extension

LM Supported fully. The HP DesignJet ColorPro series printers do not support mode 2 (Kanji fonts).

SB Supported fully.

## Note

For the HP DesignJet 7xx, 1xxx, 2xxx and 3xxx printing at 600 dots per inch, the line width increments at 600 dpi. At this resolution, these devices have a finer granularity for defining the line widths of vectors and stick fonts (see [Line-width mapping for HP DesignJet plotters and printers](#)). The benefit is most noticeable on the thinnest lines. Related instructions are:

- AC (Anchor Corner), defines pattern reference point.
- AD (Alternate Font Definition), where the line width in stick fonts depends on the stroke weight, pitch, and height.
- CF (Character Fill Mode), character filling uses the selected pattern.
- FP (Fill Polygon), fills a polygon with the selected pattern.
- FT (Fill Type), when selecting a user-defined pattern.
- PW (Pen Width), defining the line width of the vectors or stick fonts when the stroke weight is 9999.
- RA (Fill Rectangle Absolute), fills a rectangle with the selected pattern.
- RF (Raster Fill Definition), where additional width and height values of 128 allow the use of patterns at a resolution of 600 dots per inch.
- RR (Fill Rectangle Relative), fills a rectangle with the selected pattern.
- SD (Standard Font Definition), where the line width in stick fonts depends on the stroke weight, pitch, and height.

[More...](#)

## Note (continued)

- SI (Absolute Character Size). Scaling stick fonts modifies also their line width, when the stroke weight is not 9999.
- SR (Relative Character Size). Defines the line width for stick fonts as a percentage of the distance between P1 and P2. Related commands that modify the distance between P1 and P2 are: IP, IR, PS, IN and BP.
- SV (Screened Vectors) in the Palette extension, fills vectors, arcs, and other entities with the selected pattern.
- WG (Fill Wedge), fill a wedge with the selected pattern.
- WU (Pen Width Unit Selection). When relative mode is used, the pen width is a percentage of the distance between P1 and P2. Related commands that modify the distance between P1 and P2 are IP, IR, PS, IN, and BP.

For these devices, if the @PJL SET RESOLUTION command specifies 600 dpi, halftoning is at 600 dpi with higher quality than at 300 dpi.

## Character Sets

Refer to the [Char. Sets](#) tab for information about the character sets implemented in current HP-GL/2 peripherals. The following lists the typefaces appropriate for pen plotters. The *kind* value corresponds to the *kind* parameter in the AD and SD instructions.

### *Kind* value in the AD and SD instructions

Attribute	Kind	Value	Description
Typeface	7	48	fixed vector (default)
		49	drafting
		50	fixed arc



## HP-GL/2 Labels

The following table lists the font types supported by various HP-GL/2 devices.

### Font types

Bitmap	Outline	Stick		
		Vector	Arc	Drafting
×	×	•	•	•

## Character Set Values

A full list of character set values is given in *The HP-GL/2 and HP RTL Reference Guide*. The character sets supported through the current HP-GL/2 peripherals are:

### Character set values

0	4	5	6	9	11	14	19	21	36	37	38	39
•	•	•	•	•	•	•	•	•	•	•	•	•
43	83	85	115	147	267	277	531	563	595			
×	•	•	•	•	a	•	•	•	•			

a. Available on HP DesignJets except the ColorPro series.

A peripheral may support other character sets than those listed here. The character sets listed above reflect those that can be used within such a peripheral's HP-GL/2 mode.

For Japanese users of the HP DesignJet Series, the device is shipped with the capability to produce Kanji characters.

## HP-GL/2 Character Sets

## HP-GL/2 Character Sets

- [Character sets 0 and 277 Roman-8 \(default\) \(symbol set ID: 8U\)](#)
- [Character set 4 Danish/Norwegian version 1 \(symbol set ID: 0D, ISO 60\)](#)
- [Character set 5 Roman Extensions \(symbol set ID: 0E\)](#)
- [Character set 6 French version 1 \(symbol set ID: 0F, ISO 25\)](#)
- [Character set 9 Italian \(symbol set ID: 0I, ISO 15\)](#)
- [Character set 11 JIS ASCII \(symbol set ID: 0K, ISO 14\)](#)
- [Character set 14 ECMA-94 Latin 1 \(8-bit version\) \(symbol set ID: 0N, ISO 8859/1\)](#)
- [Character set 19 Swedish for names \(symbol set ID: 0S, ISO 11\)](#)
- [Character set 21 ANSI US ASCII \(symbol set ID: 0U, ISO 6\)](#)
- [Character set 36 Norwegian version 2 \(symbol set ID: 1D, ISO 61\)](#)
- [Character set 37 United Kingdom \(symbol set ID: 1E, ISO 4\)](#)
- [Character set 38 French version 2 \(symbol set ID: 1F, ISO 69\)](#)
- [Character set 39 German \(symbol set ID: 1G, ISO 21\)](#)
- [Character set 43 Katakana \(symbol set ID: 1K, ISO 13\)](#)
- [Character set 83 Spanish \(symbol set ID: 2S, ISO 17\)](#)
- [Character set 85 International Reference version \(symbol set ID: 2U, ISO 2\)](#)
- [Character set 115 Swedish \(symbol set ID: 3S, ISO 10\)](#)
- [Character set 147 Portuguese \(symbol set ID: 4S, ISO 16\)](#)
- [Character set 267 Kana-8 \(symbol set ID: 8K\)](#)
- [Character set 563 HP-GL Drafting \(symbol set ID: 17S\)](#)
- [Character set 595 HP-GL special symbols \(symbol set ID: 18S\)](#)

## HP-GL/2 Character Sets

**Character sets 0 and 277 Roman-8 (default)** (symbol set ID: 8U)

This set consists of the ANSI US ASCII set and the Roman Extensions set combined. The most significant bit, value 128, is set to 1 for the Roman Extensions part.

Dec		32	48	64	80	96	112
	Hex	2	3	4	5	6	7
0	0		0	@	P	'	p
1	1	!	1	A	Q	a	q
2	2	"	2	B	R	b	r
3	3	#	3	C	S	c	s
4	4	\$	4	D	T	d	t
5	5	%	5	E	U	e	u
...	...	(and so on, as <a href="#">set 21, US ASCII</a> )					
Dec		32	48	64	80	96	112
	Hex	2	3	4	5	6	7
0	0		-	â	À	Á	Ɔ
1	1	À	Ý	ê	î	Ã	Ɔ
2	2	Â	ý	ô	Ø	ã	·
3	3	È	°	û	Æ	Ð	μ
4	4	Ê	Ç	á	à	ö	¶
5	5	Ë	ç	é	í	í	¾
...	...	(and so on, as <a href="#">set 5, Roman Extensions</a> )					

## HP-GL/2 Character Sets

Character set 4 Danish/Norwegian version 1 (symbol set ID: 0D, ISO 60)

Dec		32	48	64	80	96	112
	Hex	2	3	4	5	6	7
0	0		0	@	P	'	p
1	1	!	1	A	Q	a	q
2	2	"	2	B	R	b	r
3	3	#	3	C	S	c	s
4	4	\$	4	D	T	d	t
5	5	%	5	E	U	e	u
6	6	&	6	F	V	f	v
7	7	'	7	G	W	g	w
8	8	(	8	H	X	h	x
9	9	)	9	I	Y	i	y
10	A	*	:	J	Z	j	z
11	B	+	;	K	Æ	k	æ
12	C	,	<	L	Ø	l	ø
13	D	-	=	M	Å	m	å
14	E	.	>	N	^	n	~
15	F	/	?	O	_	o	

## HP-GL/2 Character Sets

## Character set 5 Roman Extensions (symbol set ID: 0E)

Dec	Hex	32	48	64	80	96	112
0	0		-	â	À	Á	ƒ
1	1	À	Ý	è	î	Ã	þ
2	2	Â	ý	ô	Ø	ã	·
3	3	È	°	û	Æ	Ð	μ
4	4	Ê	Ç	á	à	ð	¶
5	5	Ë	ç	é	í	í	¾
6	6	Î	Ñ	ó	ø	ì	—
7	7	Ï	ñ	ú	æ	Ó	¼
8	8	‘	ı	à	Ä	Ò	½
9	9	#	ı	è	ì	Õ	a
10	A	^	α	ò	Ö	õ	°
11	B	“	£	ù	Ü	Š	«
12	C	~	¥	ä	É	š	□
13	D	Ù	§	ë	ï	Ú	»
14	E	Û	f	ö	ß	ÿ	±
15	F	£	¢	ü	Õ	ÿ	

## HP-GL/2 Character Sets

## Character set 6 French version 1 (symbol set ID: 0F, ISO 25)

Dec	Hex	32	48	64	80	96	112
0	0		0	à	P	'	p
1	1	!	1	A	Q	a	q
2	2	“	2	B	R	b	r
3	3	£	3	C	S	c	s
4	4	\$	4	D	T	d	t
5	5	%	5	E	U	e	u
6	6	&	6	F	V	f	v
7	7	'	7	G	W	g	w
8	8	(	8	H	X	h	x
9	9	)	9	I	Y	i	y
10	A	*	:	J	Z	j	z
11	B	+	;	K	°	k	é
12	C	,	<	L	ç	l	ù
13	D	-	=	M	§	m	è
14	E	.	>	N	^	n	¨
15	F	/	?	O	_	o	

## HP-GL/2 Character Sets

Character set 9 Italian (symbol set ID: 01, ISO 15)

Dec		32	48	64	80	96	112
	Hex	2	3	4	5	6	7
0	0		0	§	P	ù	p
1	1	!	1	A	Q	a	q
2	2	“	2	B	R	b	r
3	3	£	3	C	S	c	s
4	4	\$	4	D	T	d	t
5	5	%	5	E	U	e	u
6	6	&	6	F	V	f	v
7	7	‘	7	G	W	g	w
8	8	(	8	H	X	h	x
9	9	)	9	I	Y	i	y
10	A	*	:	J	Z	j	z
11	B	+	;	K	°	k	à
12	C	,	<	L	ç	l	ò
13	D	-	=	M	é	m	è
14	E	.	>	N	^	n	ì
15	F	/	?	O	_	o	



## HP-GL/2 Character Sets

Character set 11 JIS ASCII (symbol set ID: 0K, ISO 14)

Dec		32	48	64	80	96	112
	Hex	2	3	4	5	6	7
0	0		0	@	P	'	p
1	1	!	1	A	Q	a	q
2	2	"	2	B	R	b	r
3	3	#	3	C	S	c	s
4	4	\$	4	D	T	d	t
5	5	%	5	E	U	e	u
6	6	&	6	F	V	f	v
7	7	'	7	G	W	g	w
8	8	(	8	H	X	h	x
9	9	)	9	I	Y	i	y
10	A	*	:	J	Z	j	z
11	B	+	;	K	[	k	{
12	C	,	<	L	¥	l	
13	D	-	=	M	]	m	}
14	E	.	>	N	^	n	~
15	F	/	?	O	_	o	

## HP-GL/2 Character Sets

Character set 14 ECMA-94 Latin 1 (8-bit version) (symbol set ID: 0N, ISO 8859/1)

Dec	Hex	32	48	64	80	96	112
0	0		0	@	P	'	p
1	1	!	1	A	Q	a	q
2	2	"	2	B	R	b	r
3	3	#	3	C	S	c	s
4	4	\$	4	D	T	d	t
5	5	%	5	E	U	e	u
6	6	&	6	F	V	f	v
7	7	'	7	G	W	g	w
8	8	(	8	H	X	h	x
9	9	)	9	I	Y	i	y
10	A	*	:	J	Z	j	z
11	B	+	;	K	[	k	{
12	C	,	<	L	\	l	
13	D	-	=	M	]	m	}
14	E	.	>	N	^	n	~
15	F	/	?	O	_	o	

## HP-GL/2 Character Sets

Character set 19 Swedish for names (symbol set ID: 0S, ISO 11)

Dec		32	48	64	80	96	112
	Hex	2	3	4	5	6	7
0	0		0	É	P	é	p
1	1	!	1	A	Q	a	q
2	2	“	2	B	R	b	r
3	3	#	3	C	S	c	s
4	4	α	4	D	T	d	t
5	5	%	5	E	U	e	u
6	6	&	6	F	V	f	v
7	7	‘	7	G	W	g	w
8	8	(	8	H	X	h	x
9	9	)	9	I	Y	i	y
10	A	*	:	J	Z	j	z
11	B	+	;	K	Ä	k	ä
12	C	,	<	L	Ö	l	ö
13	D	-	=	M	Å	m	å
14	E	.	>	N	Ü	n	ü
15	F	/	?	O	_	o	

## HP-GL/2 Character Sets

Character set 21 ANSI US ASCII (symbol set ID: 0U, ISO 6)

Dec		32	48	64	80	96	112
	Hex	2	3	4	5	6	7
0	0		0	@	P	'	p
1	1	!	1	A	Q	a	q
2	2	"	2	B	R	b	r
3	3	#	3	C	S	c	s
4	4	\$	4	D	T	d	t
5	5	%	5	E	U	e	u
6	6	&	6	F	V	f	v
7	7	'	7	G	W	g	w
8	8	(	8	H	X	h	x
9	9	)	9	I	Y	i	y
10	A	*	:	J	Z	j	z
11	B	+	;	K	[	k	{
12	C	,	<	L	\	l	
13	D	-	=	M	]	m	}
14	E	.	>	N	^	n	~
15	F	/	?	O	_	o	

## HP-GL/2 Character Sets

## Character set 36 Norwegian version 2 (symbol set ID: 1D, ISO 61)

Dec		32	48	64	80	96	112
	Hex	2	3	4	5	6	7
0	0		0	@	P	'	p
1	1	!	1	A	Q	a	q
2	2	"	2	B	R	b	r
3	3	§	3	C	S	c	s
4	4	\$	4	D	T	d	t
5	5	%	5	E	U	e	u
6	6	&	6	F	V	f	v
7	7	'	7	G	W	g	w
8	8	(	8	H	X	h	x
9	9	)	9	I	Y	i	y
10	A	*	:	J	Z	j	z
11	B	+	;	K	Æ	k	æ
12	C	,	<	L	Ø	l	ø
13	D	-	=	M	Å	m	å
14	E	.	>	N	^	n	~
15	F	/	?	O	_	o	

## HP-GL/2 Character Sets

## Character set 37 United Kingdom (symbol set ID: 1E, ISO 4)

Dec		32	48	64	80	96	112
	Hex	2	3	4	5	6	7
0	0		0	@	P	'	p
1	1	!	1	A	Q	a	q
2	2	"	2	B	R	b	r
3	3	£	3	C	S	c	s
4	4	\$	4	D	T	d	t
5	5	%	5	E	U	e	u
6	6	&	6	F	V	f	v
7	7	'	7	G	W	g	w
8	8	(	8	H	X	h	x
9	9	)	9	I	Y	i	y
10	A	*	:	J	Z	j	z
11	B	+	;	K	[	k	{
12	C	,	<	L	\	l	
13	D	-	=	M	]	m	}
14	E	.	>	N	^	n	~
15	F	/	?	O	_	o	

## HP-GL/2 Character Sets

Character set 38 French version 2 (symbol set ID: 1F, ISO 69)

Dec		32	48	64	80	96	112
	Hex	2	3	4	5	6	7
0	0		0	à	P	μ	p
1	1	!	1	A	Q	a	q
2	2	“	2	B	R	b	r
3	3	£	3	C	S	c	s
4	4	\$	4	D	T	d	t
5	5	%	5	E	U	e	u
6	6	&	6	F	V	f	v
7	7	‘	7	G	W	g	w
8	8	(	8	H	X	h	x
9	9	)	9	I	Y	i	y
10	A	*	:	J	Z	j	z
11	B	+	;	K	°	k	é
12	C	,	<	L	ç	l	ù
13	D	-	=	M	§	m	è
14	E	.	>	N	^	n	¨
15	F	/	?	O	_	o	

## HP-GL/2 Character Sets

## Character set 39 German (symbol set ID: 1G, ISO 21)

Dec		32	48	64	80	96	112
	Hex	2	3	4	5	6	7
0	0		0	§	P	'	p
1	1	!	1	A	Q	a	q
2	2	"	2	B	R	b	r
3	3	#	3	C	S	c	s
4	4	\$	4	D	T	d	t
5	5	%	5	E	U	e	u
6	6	&	6	F	V	f	v
7	7	'	7	G	W	g	w
8	8	(	8	H	X	h	x
9	9	)	9	I	Y	i	y
10	A	*	:	J	Z	j	z
11	B	+	;	K	Ä	k	ä
12	C	,	<	L	Ö	l	ö
13	D	-	=	M	Ü	m	ü
14	E	.	>	N	^	n	ß
15	F	/	?	O	_	o	



## HP-GL/2 Character Sets

## Character set 43 Katakana (symbol set ID: 1K, ISO 13)

Dec		32	48	64	80	96	112
	Hex	2	3	4	5	6	7
0	0		-	夕	ミ		
1	1	。	ア	チ	ム		
2	2	「	イ	ツ	メ		
3	3	」	ウ	テ	モ		
4	4	、	エ	ト	ヤ		
5	5	・	オ	ナ	、		
6	6	ヲ	カ	ニ	ヨ		
7	7	ア	キ	ヌ	ラ		
8	8	イ	ク	ネ	リ		
9	9	ウ	ケ	ノ	ル		
10	A	エ	コ	ハ	レ		
11	B	オ	サ	ヒ	ロ		
12	C	ヤ	シ	フ	ワ		
13	D	ユ	ス	ハ	ン		
14	E	ヨ	セ	ホ	、		
15	F	ツ	ソ	マ	、		

## HP-GL/2 Character Sets

## Character set 83 Spanish (symbol set ID: 2S, ISO 17)

Dec		32	48	64	80	96	112
	Hex	2	3	4	5	6	7
0	0		0	§	P	‘	p
1	1	!	1	A	Q	a	q
2	2	“	2	B	R	b	r
3	3	£	3	C	S	c	s
4	4	\$	4	D	T	d	t
5	5	%	5	E	U	e	u
6	6	&	6	F	V	f	v
7	7	‘	7	G	W	g	w
8	8	(	8	H	X	h	x
9	9	)	9	I	Y	i	y
10	A	*	:	J	Z	j	z
11	B	+	;	K	ı	k	°
12	C	,	<	L	Ñ	l	ñ
13	D	-	=	M	¿	m	ç
14	E	.	>	N	^	n	~
15	F	/	?	O	_	o	

## HP-GL/2 Character Sets

Character set 85 International Reference version (symbol set ID: 2U, ISO 2)

Dec		32	48	64	80	96	112
	Hex	2	3	4	5	6	7
0	0		0	@	P	'	p
1	1	!	1	A	Q	a	q
2	2	"	2	B	R	b	r
3	3	#	3	C	S	c	s
4	4	¤	4	D	T	d	t
5	5	%	5	E	U	e	u
6	6	&	6	F	V	f	v
7	7	'	7	G	W	g	w
8	8	(	8	H	X	h	x
9	9	)	9	I	Y	i	y
10	A	*	:	J	Z	j	z
11	B	+	;	K	[	k	{
12	C	,	<	L	\	l	
13	D	-	=	M	]	m	}
14	E	.	>	N	^	n	~
15	F	/	?	O	_	o	

## HP-GL/2 Character Sets

## Character set 115 Swedish (symbol set ID: 3S, ISO 10)

Dec	Hex	32	48	64	80	96	112
0	0		0	@	P	'	p
1	1	!	1	A	Q	a	q
2	2	"	2	B	R	b	r
3	3	#	3	C	S	c	s
4	4	¤	4	D	T	d	t
5	5	%	5	E	U	e	u
6	6	&	6	F	V	f	v
7	7	'	7	G	W	g	w
8	8	(	8	H	X	h	x
9	9	)	9	I	Y	i	y
10	A	*	:	J	Z	j	z
11	B	+	;	K	Ä	k	ä
12	C	,	<	L	Ö	l	ö
13	D	-	=	M	Å	m	å
14	E	.	>	N	^	n	—
15	F	/	?	O	_	o	

## HP-GL/2 Character Sets

## Character set 147 Portuguese (symbol set ID: 4S, ISO 16)

Dec		32	48	64	80	96	112
	Hex	2	3	4	5	6	7
0	0		0	§	P	'	p
1	1	!	1	A	Q	a	q
2	2	“	2	B	R	b	r
3	3	#	3	C	S	c	s
4	4	\$	4	D	T	d	t
5	5	%	5	E	U	e	u
6	6	&	6	F	V	f	v
7	7	'	7	G	W	g	w
8	8	(	8	H	X	h	x
9	9	)	9	I	Y	i	y
10	A	*	:	J	Z	j	z
11	B	+	;	K	Ã	k	ã
12	C	,	<	L	Ç	l	ç
13	D	-	=	M	Õ	m	õ
14	E	.	>	N	^	n	°
15	F	/	?	O	_	o	

## HP-GL/2 Character Sets

**Character set 267 Kana-8** (symbol set ID: 8K)

Kana-8 is a combination of

- The JIS ASCII set 11 [see [Character set 11 JIS ASCII \(symbol set ID: 0K, ISO 14\)](#)], and
- Set 43, Katakana [shown in [Character set 43 Katakana \(symbol set ID: 1K, ISO 13\)](#)]

The Katakana part has the most significant bit, value 128, set to 1.

[Compare the Roman-8 set described in [Character sets 0 and 277 Roman-8 \(default\) \(symbol set ID: 8U\)](#).]

## HP-GL/2 Character Sets

## Character set 563 HP-GL Drafting (symbol set ID: 17S)

Dec		32	48	64	80	96	112
	Hex	2	3	4	5	6	7
0	0		0	@	P	'	p
1	1	!	1	A	Q	a	q
2	2	"	2	B	R	b	r
3	3	¢	3	C	S	c	s
4	4	\$	4	D	T	d	t
5	5	%	5	E	U	e	u
6	6	&	6	F	V	f	v
7	7	'	7	G	W	g	w
8	8	(	8	H	X	h	x
9	9	)	9	I	Y	i	y
10	A	*	:	J	Z	j	z
11	B	+	;	K	[	k	μ
12	C	,	<	L	∅	l	°
13	D	-	=	M	]	m	∞
14	E	.	>	N	⊥	n	~
15	F	/	?	O	_	o	

## HP-GL/2 Character Sets

Character set 595 HP-GL special symbols (symbol set ID: 18S)

Dec	Hex	32	48	64	80	96	112
0	0		0	@	-	'	±
1	1	!	1	□		∩	∓
2	2	"	2	○	R	∪	→
3	3	#	3	△	S	∩	↑
4	4	\$	4	+	T	∪	←
5	5	%	5	×	U	-	↓
6	6	&	6	◇	V	≡	∫
7	7	'	7	⊥	W	≡	÷
8	8	(	8	⊗	X	≈	✱
9	9	)	9	Σ	Y	≈	∇
10	A	*	:	Υ	Z	≤	°
11	B	+	;	⊗	[	≥	{
12	C	,	<	✱	\	≠	
13	D	-	=	⊗	]	Δ	}
14	E	.	>		^	Π	~
15	F	/	?	☆	_	Σ	



# HP RTL Comparison

## HP RTL Overview

The following peripherals support HP RTL:

- HP DesignJet Series plotters and printers, except the 5xx models. The HP DesignJet 5xx printers support HP RTL only if an HP-GL/2 Accessory card (part number C7772A) is installed.

Commands that are not supported by a particular device are parsed and ignored without any error indication; the device scans for the next escape character (ESC).

See:

- [General Considerations for Drivers](#)
- [HP RTL Commands](#)
- [Context Switching](#)
- [Defining an Image](#)
- [Defining Colors](#)
- [Defining Patterns](#)
- [Interactions between Picture Elements](#)
- [Transmitting Data](#)
- [Summary of the Commands Supported on HP DesignJet Plotters and Printers](#)

## General Considerations for Drivers

### Use of CAP Movement Commands

When the resolution is set to 600 dpi, all CAP movements that are specified in pixels are at that resolution.

### Merging Vector and Raster Data

Merging HP-GL/2 and HP RTL data is **not supported** for KCMY data using the Simple Color (`ESC*r#U`) command with a parameter of -4, or using the Configure Raster Data (`ESC*g#W`) command.

The HP DesignJet printers (except the ColorPro series) use an improved algorithm for solving memory overflow problems. Consider using the HP-GL/2 Frame Advance (FR) command in conjunction with this new algorithm, to divide large plots into suitable bands, and send them in order to the device.

### When Overflow Occurs

**“Superflow” mode** applies to all HP DesignJet printers, except the ColorPro series.

When the printer runs out of resources, both memory and hard disk, it enters “superflow” mode. Consequently, in order to keep working, the printer flushes any data from its resources and prints what has been already processed without waiting for the end of the job. Once the resources are free, it continues processing the rest of the job.

Note that if you send the information in order, the fact that the printer enters “superflow” mode does not imply that the final output is necessarily wrong. You will know when the printer goes into this mode, since the front panel display will show an “Out of memory” message warning.

[More...](#)

## General Considerations for Drivers (continued)

### Selecting the Resolution

Consider supporting 300 dpi resolution, or 600 dpi for the HP DesignJet 7xx, 1xxx, 2xxx and 3xxx printers.

You can control the resolution of images through the @PJL SET RESOLUTION command. This allows the selection of high-resolution plotting or printing on devices, like the HP DesignJet 7xx, 1xxx, 2xxx and 3xxx printers, that support 600 dots per inch for monochrome or color output.

If the @PJL SET RESOLUTION command specifies 600 dots per inch, these devices have a finer granularity for defining raster images. To take full advantage of this mode, the data must be transferred at 600 dpi, using the ESC\*t600R command.

For the HP DesignJet 7xx, if:

- no explicit resolution is set through PJL, and
- monochrome is set from the control-panel or from PJL, and
- the quality level is set to Best from the control-panel or using a “QL100” instruction in HP-GL/2,

then:

- vectors and polygons are rendered at 600 dpi, and
- raster fills, halftones and HP RTL images are rendered at 300 dpi.

For the HP DesignJet 2xxx and 3xxx, if no explicit resolution is set through PJL, and the quality level is set to Best from the control-panel or using a “QL100” instruction in HP-GL/2, then vectors and polygons are rendered at 600 dpi, and raster fills, halftones and HP RTL images are rendered at 300 dpi.

[More...](#)

## General Considerations for Drivers (continued)

### “Pure” HP RTL

On the HP DesignJet 5xx (with the HP-GL/2 Accessory Card, part number C7772A), 8xx and 5xxx Series printers you can send “pure” HP RTL language to the printer. Select the @PJL ENTER LANGUAGE=HP RTL and write all the code in RTL.

### Configure Raster Data Command

This command allows you to send more than one dot for each pixel. This is what is commonly known as "multi-level technology" which is the base of the HP Photo RET Technology.

This command is only supported by the HP DesignJet 5xx (with the HP-GL/2 Accessory Card, part number C7772A), 8xx and 5xxx Series printers.

### Sending Contone data

With Contone data any resolution is valid. This applies to the HP DesignJet 5xx, 8xx and 5xxx Series (the first products that support the Configure Raster Data command). This means that the printer's behavior will be the same regardless of the printer you are using. The printer is responsible for scaling the image to achieve the final desired output.

## HP RTL Commands

- [Context Switching](#)
- [Defining an Image](#)
- [Defining Colors](#)
- [Defining Patterns](#)
- [Interactions between Picture Elements](#)
- [Transmitting Data](#)
- [Summary of the Commands Supported on HP DesignJet Plotters and Printers](#)

## Context Switching

<code>esc&amp;b#W</code>	AppleTalk Configuration
<code>esc%#B</code>	Enter HP-GL/2 Mode
<code>esc%#A</code>	Enter RTL Mode/Enter PCL Mode
<code>esc%#X</code>	Universal Exit Language/Start of PJL
<code>escE</code>	Reset

HP DesignJet Series printers do not allow the transferring of palettes between HP-GL/2 and HP RTL.

## Defining an Image

<b>ESC*t#v V</b>	Destination Raster Height
<b>ESC*t#h H</b>	Destination Raster Width
<b>ESC&amp;a#h H</b>	Move CAP Horizontal (decipoints)
<b>ESC*p#x X</b>	Move CAP Horizontal (HP RTL native resolution units)
<b>ESC*p#y Y</b>	Move CAP Vertical (HP RTL native resolution units)
<b>ESC&amp;a#n N</b>	Negative Motion
<b>ESC*b#l L</b>	Raster Line Path
<b>ESC*t#r R</b>	Set Graphics Resolution
<b>ESC*r#t T</b>	Source Raster Height
<b>ESC*r#s S</b>	Source Raster Width
<b>ESC*b#y Y</b>	Y Offset

[More...](#)

## Defining an Image (continued)

### HP DesignJet 4xx, 7xx, 1xxx, 2xxx and 3xxx printers

When scaling down, the device uses a sampling technique to determine whether the scaled-down pixel will be set; the size of the sample is determined by the scale factor. Scaled-down rendering uses the Destination Raster Width and Destination Raster Height commands (see also the Start Raster Graphics command). The result of scaling down, when the original size is not a multiple of the scaled size, is not defined and such scaling should be avoided.

Sending a Negative Motion command with a value of 1 causes the printer to enter on-the-fly plotting mode. The current raster image is plotted as it is received. If a command requesting negative motion is received while in this mode, the command is ignored, and the remaining data for the plot is discarded. For a discussion of On-the-Fly plotting, see *The HP-GL/2 and HP RTL Reference Guide*.

When in raster mode and the Current Active Position (CAP) is moved with a Y Offset command, or when raster graphics mode ends, an incomplete row is zero-filled and rendered, and the row pointer is incremented.

Outside raster mode, the Move CAP Horizontal (decipoints) (**ESC**&a#H) and Y Offset (**ESC**\*b#Y) commands are not supported.

The Move CAP Horizontal (RTL Native Resolution Units) (**ESC**\*p#X) and Move CAP Vertical (RTL Native Resolution Units) (**ESC**\*p#Y) are recommended for use with HP DesignJet printers. The Move CAP Horizontal (decipoints) (**ESC**&a#H) command is to be made obsolete.

The parameter range for the Move CAP Horizontal (**ESC**\*p#X), Move CAP Vertical (**ESC**\*p#Y) and Y Offset (**ESC**\*b#Y) commands is -32 767 to +32 767 for all HP DesignJets that support these commands, except the HP DesignJets 1xxx and 3xxx, which allow a broader range, -8 338 607 to +8 338 607. Similarly, the supported Source and Destination Raster Widths and Heights are 0 to 65 535 pixels, except on the HP DesignJets 1xxx and 3xxx where the ranges are 0 to 16 777 215.

These devices do not support reverse media movement. A negative Y Offset command is allowed as long as the device memory is not full (see the explanation of on-the-fly plotting in *The HP-GL/2 and HP RTL Reference Guide*).

[More...](#)



## Defining an Image (continued)

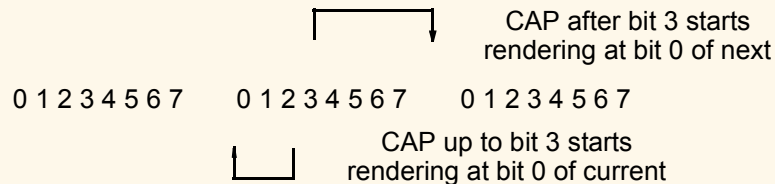
The HP RTL native device resolution is 300 dots per inch (dpi) by default; in GRAYSCALE mode, the HP DesignJet 7xx, 1xxx, 2xxx and 3xxx support 600 dpi (specified through the @PJL SET RESOLUTION command); in COLOR mode, the HP DesignJet 1xxx, 2xxx and 3xxx also support 600 dpi (through the @PJL SET RESOLUTION command). Continuous resolutions are not supported.

No draft resolutions are supported on these HP DesignJet printers.

### Move CAP Horizontal (decipoints): `ESC&a#h|H`

This command is to be made obsolete; use the Move CAP Horizontal (RTL native units) command, `ESC*p#x|X`, instead.

Rendering after one or more Move CAP Horizontal commands always begins on a byte boundary. (One byte corresponds to eight dots of the printer's physical resolution. Bytes are counted from the left edge of the printer.) The effective rendering position is rounded to determine which byte to start rendering on. If the series of Move CAP Horizontal commands places the CAP in bit positions 0, 1, 2, or 3 of the pixel data, rendering starts at bit 0. If the series of commands places the CAP in bit positions 4, 5, 6, or 7, rendering begins at bit 0 of the next byte. Note that the CAP itself is not changed; this rounding operation only affects the place where the device starts rendering.



Note: The physical distance covered by a byte depends on each device's physical resolution. For instance, at 300 dpi, there are  $300/8 = 37.5$  bytes per inch, so each byte is  $1/37.5 = .027$  inches wide.

[More...](#)

## Defining an Image (continued)

Y Offset: `ESC*b#y|Y`

This command is to be made obsolete *outside* raster mode; instead use the Move CAP Vertical (RTL native units) command, `ESC*p#y|Y`. The Y Offset command is still supported in raster mode, to skip rows by filling them with zeros.

### HP DesignJet ColorPro Series printers

The Negative Motion command is ignored by these printers. The Raster Line Path command is not supported. The Move CAP commands do not support negative coordinates; such movements are clipped to zero.

For these printers, there is no interaction between the PJL SET RESOLUTION command and the resolution units used to position the CAP in HP RTL. The Move CAP commands by default use a resolution of 300 dpi; this can be changed using the PCL command `ESC&#D`. Similarly, the resolution of raster data can be changed with the Set Graphics Resolution, `ESC*t#R` command.

To achieve consistency between these printers and other HP DesignJet printers, the following sequences can be used:

For 600 dpi printing and positioning:

```
ESC%-12345X@PJL SET RESOLUTION=600
@PJL ENTER LANGUAGE=HPGL2
... HP-GL/2 instructions ...
ESC%#AESC*t600RESC&#u600D
... HP RTL commands ...
```

For 300 dpi printing and positioning:

```
ESC%-12345X@PJL SET RESOLUTION=300
@PJL ENTER LANGUAGE=HPGL2
... HP-GL/2 instructions ...
ESC%#AESC*t300RESC&#u300D
... HP RTL commands ...
```

## Defining Colors

<code>ESC*v#i I</code>	Assign Color Index
<code>ESC*v#W[data]</code>	Configure Image Data
<code>ESC*v#S</code>	Set Foreground Color
<code>ESC*p#P</code>	Push/Pop Palette
<code>ESC*t# J</code>	Render Algorithm
<code>ESC*v#c C</code>	Set Blue Parameter
<code>ESC*v#b B</code>	Set Green Parameter
<code>ESC*v#a A</code>	Set Red Parameter
<code>ESC*r#U</code>	Simple Color

### HP DesignJet 4xx, 7xx, 1xxx, 2xxx and 3xxx printers

These HP DesignJet Series printers can process color raster data and plot it as a gray scale raster image.

[More...](#)

## Defining Colors (continued)

Configure Image Data: `ESC*v#W[data]`

- The Configure Image Data command is supported by these HP DesignJet printers. You can optimize the file size of a monochrome image sent to an HP DesignJet series printer by transferring the raster information using the index-by-plane mode with one bit/pixel. Images sent in a direct-by-plane and direct-by-pixel (modes 2 and 3 of the Configure Image Data command) require color information, and this will not work *if only one plane of data is sent*. Pixel encoding modes 0 to 3 are supported; plane-by-plane encoding (mode 4) is not supported.
- The maximum number of bits per index is 8, and the maximum number of bits per primary is 8.
- The Configure Image Data command is not supported by the HP DesignJet and the HP DesignJet 600. All Configure Image Data defaults apply; normal encoding (mode 0) is supported.

Set Foreground Color: `ESC*v#S`

- The Set Foreground Color command sets the foreground color to the specified index of the current palette (#, default 0). Along with the Source Transparency Mode (`ESC*v#n|N`) and Merge Control (MC) in HP-GL/2, this command is used in conjunction with the Logical Operation command (`ESC*|#O`). The default foreground color is black, regardless of palette settings.

[More...](#)

## Defining Colors (continued)

Render Algorithm: `ESC*t#J`

- Selects the algorithm to be used for rendering page marking entities on a given page. It allows the selection of a halftone algorithm and allows the switching of halftone algorithms within a plot. The selected algorithm also applies to HP-GL/2.
- Range of the parameter - 0, 3, 5, 7, 8, 11, 12, 13, 14.  
All these values are supported by the HP DesignJet 4xx, 7xx and 1xxx printers; values 0, 5, 13 and 14 are supported by the HP DesignJet 2xxx and 3xxx printers. The command is ignored for other values of the parameter.

Simple Color: `ESC*r#U`

- This command is supported by these HP DesignJet printers. The following parameter values are allowed:
  - 4 Four planes, device KCMY palette
  - 3 Three planes, device CMY palette.
- The HP-GL/2 RP (Replot) instruction cannot be used when the data contains a Simple Color command with a parameter value of -4 (`ESC*r-4U`).

**HP DesignJet ColorPro Series** printers

The Simple Color command is not supported.

## Defining Patterns

<code>ESC*v#t T</code>	Current Pattern
<code>ESC*c#W[data]</code>	Download Pattern
<code>ESC*c#q Q</code>	Pattern Control
<code>ESC*c#g G</code>	Pattern ID
<code>ESC*p#r R</code>	Pattern Reference Point

### HP DesignJet 4xx, 7xx, 1xxx, 2xxx and 3xxx printers

Download Pattern: `ESC*c#W [pattern data]`

- The HP DesignJet 4xx printers only support 300 dots per inch. The 7xx printers also support 600 dpi in GRAY-SCALE mode. The 1xxx, 2xxx and 3xxx printers support 600 dpi in any mode.
- The HP DesignJet 4xx printers do not support format 20 or 21 (see next).
- The HP DesignJet 7xx, 1xxx, 2xxx and 3xxx printers also support format 21. This is similar to format 20, except that the pixel encoding byte can take the value 1 or 8 (with the same meaning as in format 1).
  - Height in pixels and width in pixels fields: The HP DesignJet 4xx printers support only 8, 16, 32, and 64 pixels. The HP DesignJet 7xx printers support these values and 128 pixels in GRAY-SCALE (600 dpi) mode. The 1xxx, 2xxx and 3xxx printers support these values and 128 pixels in any (600 dpi) mode.

[More...](#)

## Defining Patterns (continued)

Pattern Control: `ESC*c#q/Q`

- These HP DesignJet printers do not support permanent patterns.

Pattern Reference Point: `ESC*p#r/R`

- These HP DesignJet printers do not support pattern or print direction rotation; therefore there is no difference between the values 0 and 1.

### HP DesignJet ColorPro Series printers

The Download Pattern command supports format 22, with 24-bit RGB patterns with dimensions ranging from 8 to 128 pixels.

## Interactions between Picture Elements

<code>ESC*I#O</code>	Logical Operation (The group character in the command is a lowercase letter L, and the termination parameter character is an uppercase letter O.)
<code>ESC*v#o O</code>	Pattern Transparency Mode (The termination parameter character is a letter O, upper- or lowercase.)
<code>ESC*v#n N</code>	Source Transparency Mode

### HP DesignJet 4xx, 7xx, 1xxx, 2xxx and 3xxx printers

When a raster image is rendered on top of previous images, the plotted image will depend on the settings of the MC and Source Transparency Mode commands. HP-GL/2 and HP RTL transparency settings are handled independently of each other.

- If MC is off (MC0) and Source Transparency Mode is set to 1, the last rendered image overlaps previous images.
- If Merge Control and Source Transparency Mode are set to any other combination, the resulting interaction between the images will depend on the particular settings of these commands.
- The Logical Operation command (`ESC*I#O`) is supported, with the same function as the MC instruction.

Source Transparency Mode: `ESC*v#N`

- This command is supported by these devices. Other devices in the DesignJet series use the HP-GL/2 TR instruction.



## Transmitting Data

<code>ESC*b#m M</code>	Compression Method
<code>ESC*rC</code>	End Raster Graphics
<code>ESC*r#a A</code>	Start Raster Graphics
<code>ESC*b#V[data]</code>	Transfer Raster Data by Plane
<code>ESC*b#W[data]</code>	Transfer Raster Data by Row/Block

The following restrictions and considerations apply to the merging of data.

### HP DesignJet 7xx, 1xxx, 2xxx and 3xxx printers

When a raster image is rendered on top of previous images, the plotted image will depend on the settings of the MC and Source Transparency Mode commands. HP-GL/2 and HP RTL transparency settings are handled independently of each other.

If MC is off (MC0) and Source Transparency Mode is set to 1, the last rendered image overlaps previous images.

If Merge Control and Source Transparency Mode are set to any other combination, the resulting interaction between the images will depend on the particular settings of these commands.

The Logical Operation command (`ESC*!#O`) is supported, with the same function as the MC instruction.

The merging of data is controlled by the HP-GL/2 MC (merge control) and TR (transparency mode) instructions and the HP RTL Logical Operation (`ESC*!#O`) command.

[More...](#)

## Transmitting Data (continued)

### HP DesignJet 4xx printers

The merging of data is controlled by the HP-GL/2 MC (merge control) and TR (transparency mode) instructions and the HP RTL Logical Operation (**ESC\*I#O**) command.

### HP DesignJet 1xxx printers

There is an additional compression method available, compressed replacement delta row encoding (also supported by some PCL devices) that integrates a delta compression and a run-length encoding compression. It performs a run-length encoding on the differences of the delta compression. The instruction is **ESC\*b9M**. It is particularly suitable for 8-bit per pixel images, not 24-bit, and can give better performance than other algorithms for halftoned raster data that contains a lot of white space.

## Summary of the Commands Supported on HP DesignJet Plotters and Printers

The following table shows which plotters and printers support which RTL commands. There may be restrictions on the range of parameters supported or on the use of the command; see the detailed descriptions above for more information.

Command name	Escape sequence	DesignJet 4xx, 5xx <sup>1</sup> , 8xx	DesignJet 7xx, 1xxx, 2xxx, 3xxx, 5xxx	DesignJet ColorPro CAD, ColorPro GA
AppleTalk Configuration	ESC&b#W[data]	•	•	•
Assign Color Index	ESC*v#i	•	•	•
Compression Method	ESC*b#m M	•	•	•
Configure Image Data	ESC*v#W[data]	•	•	•
Configure Raster Data	ESC*g#W[data]	• <sup>2</sup>	• <sup>2</sup>	x
Current Pattern	ESC*v#t T	•	•	•
Destination Raster Height	ESC*#v V	•	•	•
Destination Raster Width	ESC*#h H	•	•	•
Download Pattern	ESC*c#W[data]	•	•	•
End Raster Graphics	ESC*rC	•	•	•
Enter HP-GL/2 Mode	ESC%#B	•	•	•
Enter RTL Mode	ESC%#A	•	•	•

## General Considerations for Drivers

## HP RTL Commands

Summary of the Commands Supported on  
HP DesignJet Plotters and Printers

Command name	Escape sequence	DesignJet 4xx, 5xx <sup>1</sup> , 8xx	DesignJet 7xx, 1xxx, 2xxx, 3xxx, 5xxx	DesignJet ColorPro CAD, ColorPro GA
Foreground Color	ESC*v#s S	•	•	•
Logical Operation	ESC* #O	•	•	•
Move CAP Horiz. (decipits)	ESC&a#h H	x	x	x
Move CAP Horiz. (dots/in.)	ESC*p#x X	•	•	•
Move CAP Vert. (dots/inch)	ESC*p#y Y	•	•	•
Negative Motion	ESC&a#n N	•	•	(•)
Pattern Control	ESC*c#q Q	•	•	•
Pattern ID	ESC*c#g G	•	•	•
Pattern Reference Point	ESC*p#r R	•	•	•
Pattern Transparency	ESC*v#o O	•	•	•
Push/Pop Palette	ESC*p#P	•	•	•
Raster Line Path	ESC*b# L	•	•	x
Render Algorithm	ESC*t#J	•	•	•
Reset	ESCE	•	•	•
Set Blue Parameter	ESC*v#c C	•	•	•
Set Graphics Resolution	ESC*t#r R	•	•	•
Set Green Parameter	ESC*v#b B	•	•	•

## General Considerations for Drivers

## HP RTL Commands

Summary of the Commands Supported on  
HP DesignJet Plotters and Printers

Command name	Escape sequence	DesignJet 4xx, 5xx <sup>1</sup> , 8xx	DesignJet 7xx, 1xxx, 2xxx, 3xxx, 5xxx	DesignJet ColorPro CAD, ColorPro GA
Set Red Parameter	ESC*v#a A	•	•	•
Simple Color	ESC*r#U	• <sup>3</sup>	• <sup>3</sup>	x
Source Raster Height	ESC*r# T	•	•	•
Source Raster Width	ESC*r#s S	•	•	•
Source Transparency	ESC*v#n N	•	•	•
Start Raster Graphics	ESC*r#a A	•	•	•
Transfer Raster by Plane	ESC*b#V[data]	•	•	•
Transfer Raster, Row/Block	ESC*b#W[data]	•	•	•
UEL/Start PJL	ESC%-12345X	•	•	•
Y Offset	ESC*b#y Y	•	•	•

1. The HP DesignJet 5xx printers can print HP RTL data only if an HP-GL/2 Accessory card (part number C7772A) is installed.
2. The Configure Raster Data command is not supported by the HP DesignJet 4xx, 7xx, 1xxx, 2xxx, 3xxx or ColorPro printers.
3. The Simple Color command is not supported by the HP DesignJet 5xx, 8xx, 5xxx or ColorPro printers.

# PJL Comparison for HP DesignJets

## PJL Commands

Some of the commands of the Printer Job Language (PJL) are supported by HP DesignJet plotters and printers, as indicated by a bullet (•) in the tables on the next pages. Commands that are not listed are not supported on any HP DesignJet printer. See the *Printer Job Language Technical Reference Manual* for details of the full syntax of PJL. PJL commands or variables in the @PJL SET command that are not supported by a device are ignored with no error indication.

### Example

```
ESC%-12345X@PJL JOB NAME = "..." CR LF
@PJL COMMENT HP DESIGNJET 750C PLUS CR LF
@PJL COMMENT ... PLOTTER USING HP-GL/2, CR LF
@PJL COMMENT ... MONOCHROME, 600dpi CR LF
@PJL SET RESOLUTION = 600 CR LF
@PJL SET RENDERMODE = GRAYSCALE CR LF
@PJL SET MIRROR = OFF CR LF
@PJL SET MARGINS = NORMAL CR LF
@PJL SET PALETTESOURCE = SOFTWARE CR LF
@PJL SET PAPERLENGTH = 5958 CR LF
@PJL SET PAPERWIDTH = 8423 CR LF
@PJL SET ORIENTATION = PORTRAIT CR LF
  @PJL SET PRINTAREA = FULLSIZE CR LF
  @PJL SET RET = ON CR LF
  @PJL ENTER LANGUAGE = HPGL2 CR LF
    ... (HP-GL/2 instructions) ...
```

```
ESC%-12345X@PJL EOJ NAME = "..." CR LF
```

(The symbols **ESC**, **CR** and **LF** denote the escape, carriage-return and line-feed control characters, respectively.)

## PJL commands supported by HP DesignJet 4xx and 7xx printers

PJL command	HP DesignJet model						
	430	450C	455CA	488CA	700	750C Plus	755CM
COMMENT	•	•	•	•	•	•	•
ECHO	•	•	•	•	•	•	•
ENTER LANGUAGE=HPGL	•	•	•	•	•	•	•
HPGL2	•	•	•	•	•	•	•
POSTSCRIPT	X	X	X	X	• <sup>(1)</sup>	• <sup>(1)</sup>	•
EOJ [NAME="..."]	•	•	•	•	•	•	•
INFO <sup>(2)</sup> CONFIG ID STATUS USTATUS	•	•	•	•	•	•	•
JOB [NAME="..."]	•	•	•	•	•	•	•
RESET	•	•	•	•	•	•	•
SET MARGINS <sup>(3)</sup> =NORMAL SMALLER	X	X	X	X	•	•	•
MIRROR <sup>(3)</sup> =OFF ON	•	•	•	•	•	•	•
ORIENTATION <sup>(3)</sup> = LANDSCAPE PORTRAIT	•	•	•	•	•	•	•
PALETTE SOURCE= DEVICE SOFTWARE	•	•	•	•	•	•	•

## PJL commands supported by HP DesignJet 4xx and 7xx printers

PJL command	HP DesignJet model						
	430	450C	455CA	488CA	700	750C Plus	755CM
PAPERLENGTH=value in decipoints <sup>(4)</sup>	•	•	•	•	•	•	•
PAPERWIDTH=value in decipoints <sup>(4)</sup>	•	•	•	•	•	•	•
PRINTAREA <sup>(3)</sup> = <u>FULLSIZE</u>   <u>INKEDAREA</u>	•	•	•	•	•	•	• <sup>(5)</sup>
RENDERMODE <sup>(3)</sup> = <u>COLOR</u>   <u>GRAYSCALE</u>	X	•	•	•	X	•	•
RESOLUTION=300	•	•	•	•	•	•	•
RET <sup>(3)</sup> = <u>OFF</u>   <u>ON</u>	•	•	•	•	X	X	X
RET <sup>(3)</sup> = <u>AUTO</u>   <u>OFF</u>   <u>ON</u>	X	X	X	X	X	•	• <sup>(5)</sup>
<b>ESC</b> %-12345X (universal exit language)	•	•	•	•	•	•	•
USTATUS DEVICE=value TIMED=value	•	•	•	•	•	•	•
USTATUSOFF <sup>(2)</sup>	•	•	•	•	•	•	•



## PJL commands supported by HP DesignJet 5xx and 8xx printers

PJL command	HP DesignJet model			
	500	500PS	800	800PS
COMMENT	•	•	•	•
ECHO	•	•	•	•
ENTER LANGUAGE=HPGL2	• <sup>(9)</sup>	•	•	•
POSTSCRIPT	• <sup>(1)</sup>	•	• <sup>(1)</sup>	•
CALSRASTER	•	•	•	•
HPOM	•	•	•	•
EOJ [NAME="..."]	•	•	•	•
INFO <sup>(2)</sup> CONFIG ID STATUS USTATUS	•	•	•	•
JOB [NAME="..."]	•	•	•	•
RESET	•	•	•	•
SETTOPMARGIN=0 to 43200	•	•	•	•
BOTTOMMARGIN=0 to 43200	•	•	•	•
RIGHTMARGIN=0 to 43200	•	•	•	•
LEFTMARGIN=0 to 43200	•	•	•	•
USERNAME=string [20 characters]	•	•	•	•
HOSTNAME=string [20 characters]	•	•	•	•

## PJL commands supported by HP DesignJet 5xx and 8xx printers

PJL command	HP DesignJet model			
	500	500PS	800	800PS
SET COLORSPACE=DEVICERGB SRGB	•	•	•	•
RENDERINTENT= <u>PERCEPTUAL</u>  COLORIMETRIC	•	•	•	•
NESTMODE= OFF INORDER OPTIMAL	•	•	•	•
NESTSCOPE=ACROSSJOBS INJOB	•	•	•	•
IMAGELOCATION= <u>DISK</u>  RAM	•	•	•	•
MIRROR <sup>(3)</sup> = <u>OFF</u>  ON	•	•	•	•
ORIENTATION <sup>(3)</sup> = LANDSCAPE  <u>PORTRAIT</u>	•	•	•	•
PALETTESOURCE= <u>DEVICE</u>  SOFTWARE	•	•	•	•
PAPERLENGTH=value in decipoints <sup>(4)</sup>	•	•	•	•
PAPERWIDTH=value in decipoints <sup>(4)</sup>	•	•	•	•
PRINTAREA <sup>(3)</sup> = <u>FULLSIZE</u>  INKEDAREA	•	•	•	•

## PJL commands supported by HP DesignJet 5xx and 8xx printers

PJL command	HP DesignJet model			
	500	500PS	800	800PS
SET RENDERMODE <sup>(3)</sup> = <u>COLOR</u>  GRAYSCALE	x	•	•	•
RESOLUTION= <u>300</u>  600 1200	•	•	•	•
RET <sup>(3)</sup> =OFF  <u>ON</u>	•	•	•	•
<b>ESC</b> %-12345X (universal exit language)	•	•	•	•
USTATUS DEVICE=value	•	•	•	•
TIMED=value	•	•	•	•
USTATUSOFF <sup>(2)</sup>	•	•	•	•

## PJL commands supported by HP DesignJet 1xxx, 2xxx and 3xxx printers

PJL command	HP DesignJet model					
	1050C	1055CM	2000CP	2500CP 2800CP	3000CP	3500CP 3800CP
COMMENT	•	•	•	•	•	•
ECHO	•	•	•	•	•	•
ENTER LANGUAGE=						
HPGL	•	•	X	X	X	X
HPGL2	•	•	•	•	•	•
POSTSCRIPT	• <sup>(1)</sup>	•	X	•	X	•
EOJ [NAME="..."]	•	•	•	•	•	•
INFO <sup>(2)</sup> CONFIG ID STATUS USTATUS	•	•	•	•	•	•
JOB [NAME="..."]	•	•	•	•	•	•
RESET	•	•	•	•	•	•
SET COMPRESSRASTERSTORAGE= <u>ON</u>  OFF	•	•	X	X	X	X
IMAGELOCATION= <u>DISK</u>  RAM	•	•	X	X	X	X
MARGINS <sup>(3)</sup> = EXTENDED  <u>NORMAL</u>	•	•	X	X	X	X

## PJL commands supported by HP DesignJet 1xxx, 2xxx and 3xxx printers

PJL command	HP DesignJet model					
	1050C	1055CM	2000CP	2500CP 2800CP	3000CP	3500CP 3800CP
SET MARGINS <sup>(3)</sup> = <u>EXTENDED</u>   NORMAL  <u>SMALLER</u>	•	•	•	•	•	•
MEDIASOURCE= MANUALFEED ROLL1	•	•	X	X	X	X
MIRROR <sup>(3)</sup> = <u>OFF</u>  ON	•	•	•	•	•	•
ORIENTATION <sup>(3)</sup> = LANDSCAPE  <u>PORTRAIT</u>	•	•	•	•	•	•
PAGELENGTHACCURACY= EXACT OPTIMIZED CONSTANT	•	•	•	•	•	•
PALETTESEQUENCE= <u>DEVICE</u>  SOFTWARE	•	•	•	•	•	•
PAPERLENGTH= value in decipoints <sup>(4)</sup>	•	•	•	•	•	•
PAPERWIDTH=value in deci- points <sup>(4)</sup>	•	•	•	•	•	•
PRINTAREA <sup>(3)</sup> = <u>FULLSIZE</u>  INKEDAREA	•	•	•	•	•	•

PJL  
CommandsWith 4xx and  
7xxWith 5xx and  
8xxWith 1xxx,  
2xxx and 3xxx

With 5xxx

With ColorPro

Device  
Dependencies

## PJL commands supported by HP DesignJet 1xxx, 2xxx and 3xxx printers

PJL command	HP DesignJet model					
	1050C	1055CM	2000CP	2500CP 2800CP	3000CP	3500CP 3800CP
REFILLDURATION= NORMAL QUICK	X	X	X	X	•	•
REFILLTHRESHOLD= value from 5 to 100	X	X	X	X	•	•
REFILLTYPE= INTERLEAVED SHARP	X	X	X	X	•	•
RENDERMODE <sup>(3)</sup> = COLOR GRAYSCALE	•	•	•	•	•	•
RESOLUTION= <u>300</u>  600	•	•	•	•	•	•
RET <sup>(3)</sup> =AUTO OFF ON	• <sup>(7)</sup>	• <sup>(7)</sup>	X	X	X	X
<b>ESC</b> %-12345X (universal exit language)	•	•	•	•	•	•
USTATUS DEVICE=value TIMED=value	• •	• •	• •	• •	• •	• •
USTATUSOFF <sup>(2)</sup>	•	•	•	•	•	•

### PJL commands supported by HP DesignJet 5xxx printers

PJL command	HP DesignJet model	
	5000	5000PS
COMMENT	•	•
ECHO	•	•
ENTER LANGUAGE= HPGL2 POSTSCRIPT HPOM	• x •	• • •
EOJ [NAME="..."]	•	•
INFO <sup>(2)</sup> CONFIG ID STATUS USTATUS	•	•
JOB [NAME="..."]	•	•
RESET	•	•
SETTOPMARGIN=0 to 43200 BOTTOMMARGIN=0 to 43200 RIGHTMARGIN=0 to 43200 LEFTMARGIN=0 to 43200	• • • •	• • • •
USERNAME=string [20 characters] HOSTNAME=string [20 characters]	• •	• •
COLORSPACE=DEVICERGB SRGB	•	•

## PJL commands supported by HP DesignJet 5xxx printers

PJL command	HP DesignJet model	
	5000	5000PS
SET IMAGELOCATION= <u>DISK</u>  RAM	•	•
MARGINS <sup>(3)</sup> = <u>EXTENDED</u>   <u>NORMAL</u>	•	•
MAXDETAIL= <u>OFF</u>  ON	•	•
MIRROR <sup>(3)</sup> = <u>OFF</u>  ON	•	•
NESTMODE=OFF INORDER	•	•
ORIENTATION <sup>(3)</sup> = LANDSCAPE  <u>PORTRAIT</u>	•	•
PAGELengthACCURACY=CONSTANT  MAXIMUM OPTIMIZED	•	•
PALETTEsource= <u>DEVICE</u>  SOFTWARE	•	•
PAPERLENGTH= value in decipoints <sup>(4)</sup>	•	•
PAPERWIDTH=value in decipoints <sup>(4)</sup>	•	•
PRINTAREA <sup>(3)</sup> = <u>FULLSIZE</u>  INKEDAREA	•	•



### PJL commands supported by HP DesignJet 5xxx printers

PJL command	HP DesignJet model	
	5000	5000PS
RENDERMODE <sup>(3)</sup> = <u>COLOR</u>  GRAYSCALE	•	•
RENDERINTENT= <u>PERCEPTUAL</u>  COLORIMETRIC	•	•
RESOLUTION= <u>300</u>  600	•	•
<b>ESC</b> %-12345X (universal exit language)	•	•
USTATUS DEVICE=value TIMED=value	• •	• •
USTATUSOFF <sup>(2)</sup>	•	•

### PJL commands supported by HP DesignJet ColorPro printers

	HP DesignJet model
PJL command	ColorPro CAD and GA <sup>(8)</sup>
AUTOSELECT= <u>ON</u>  OFF	•
COPIES=1 to 99	•
ENTER LANGUAGE=HPGL2	•
INTRAY1= <u>UNLOCKED</u>  LOCKED	•
INTRAY2= <u>UNLOCKED</u>  LOCKED	•
JOB [NAME="..."]	•
PAGEPROTECT	•
PARALLEL= <u>FAST</u>  STANDARD	•
POWERSAVE= <u>ON</u>  OFF	•
POWERSAVETIME=15 30 60 120 160	•
SET MEDIASOURCE= <u>TRAY1</u>  TRAY3	•
ORIENTATION <sup>(3)</sup> = <u>LANDSCAPE</u>   <u>PORTRAIT</u>	•
RENDERMODE <sup>(3)</sup> = <u>COLOR</u>  GRAYSCALE	•
RESOLUTION= <u>300</u>  600	•
<b>ESC</b> %-12345X (universal exit language)	•
TIMEOUT=5 to 300 (default 15)	•

## Notes:

1. The POSTSCRIPT option is only accepted when the PostScript feature is installed.
2. The @PJL INFO and @PJL USTATUSOFF commands are to be made obsolete; do not use them in new applications.
3. If this option in the table is not specified in a @PJL SET command, the default is to use the setting from the front panel of the device; the default value shown underlined in the table is the front-panel default. (Exception: the front-panel default for PRINTAREA on non-supported devices is INKEDAREA.)  
@PJL SET RET corresponds to the SHARP LINES front-panel option.
4. A decipoint is 1/720 inch.
5. @PJL SET PRINTAREA=FULLSIZE|INKEDAREA and @PJL SET RET=ON|OFF|AUTO are supported by the model C3198B only.
6. See [Mid-print Refilling with HP DesignJet 2xxx and 3xxx Printers](#). These commands are ignored for non-KCMY data. The values are reset at the end of each print, when a print is cancelled, or after a @PJL RESET or UEL command.
7. The RET=ON (or AUTO) setting is only used to print at 1200 dpi grayscale vector prints parsed at 600 dpi (using the commands @PJL SET RENDERMODE=GRAYSCALE and @PJL SET RESOLUTION=600).
8. There are several values that can be specified using different environments; in the HP DesignJet ColorPro series printers, the priority order for the interaction of commands and instructions is:
  - (1) HP-GL/2 instructions and HP RTL commands
  - (2) HP PJL commands
  - (3) The printer's control panel.
9. The HP-GL/2 and HP RTL languages are supported only when an HP-GL/2 Accessory card is installed.

## Device Dependencies

The following sections describe which commands are supported by specific HP DesignJet printers and plotters.

### **@PJL SET COMPRESSRASTERSTORAGE=ON, OFF [CR] LF**

This command is supported only on HP DesignJet 1000 series printers.

### **@PJL SET IMAGELOCATION=DISK, RAM [CR] LF**

This command is supported only on HP DesignJet 1000 series printers.

### **@PJL SET MARGINS=NORMAL, SMALLER, EXTENDED [CR] LF**

This command is not supported in the HP DesignJet 200, 300, 400 or 600 Series. In products previous to the HP DesignJet 700 series, the default is NORMAL. In the HP DesignJet 1000, 2000 and 3000 series there is a new value, EXTENDED, which is the default for these devices.

### **@PJL SET MEDIASOURCE=MANUALFEED, ROLL1 [CR] LF**

This command is only supported on the HP DesignJet 1000 series.

### **@PJL SET PAGELENGTHACCURACY=EXACT, OPTIMIZED, CONSTANT, MAXIMUM [CR] LF**

Command available only for HP DesignJet 2000 and 3000 series since firmware version A.04.05.

The inexactness does not appear on all prints. The default behavior of the device is to adapt the roll movement to produce the highest print quality, so for certain plots and under certain circumstances you may get differences. This is easy to correct using the control panel or this PJL command.

[More...](#)

## Device Dependencies (continued)

### @PJL SET PALETTE**SOURCE=DEVICE**, SOFTWARE [CR] LF

For the HP DesignJet 250C, 350C, 700, 750C and 750C Plus plotters and the 450C, 455CA, 488CA, 755CM, 1050C, 1055CM, 2000CP, 2500CP, 3000CP and 3500CP printers, if you specify through the control panel or the setup sheet that the pen settings are to be taken from tables or the built-in palettes and not from software, the PJL setting is ignored.

For the HP DesignJet 350C, 700, 750C and 750C Plus plotters and the 450C, 455CA, 488CA, 755CM, 1050C, 1055C, 2000CP, 2500CP, 3000CP and 3500CP printers, the command @PJL SET PALETTE**SOURCE=DEVICE** forces the control panel settings to be used for both palette and color/monochrome setting.

### @PJL SET PAPER**LENGTH=5953 to 2592000** [CR] LF

### @PJL SET PAPER**WIDTH=5953 to 2592000** [CR] LF

Devices before the HP DesignJet 2000 series were only able to print up to 50 feet and had a maximum value of 432 000 decipoints. The HP DesignJet 2000 series is able to print up to 150 feet, so the maximum value for these devices is 1296000 (150 feet \* 12 inch/feet \* 720 decipoints/inch = 1296000 decipoints). The HP DesignJet 1000 series is able to print up to 300 feet.

The corresponding items on the control panel are as measured by the device using the media currently loaded.

[More...](#)

## Device Dependencies (continued)

### @PJM SET PRINTAREA=FULLSIZE, INKEDAREA [CR] LF

The control panel default on HP DesignJet 750C and 755CM is INKEDAREA. For the other HP DesignJet models the default is FULLSIZE.

Special uses for each HP DesignJet model:

- HP DesignJet 700 and 750C Plus: If no plot size is defined in the file (that is, there is no HP-GL/2 PS instruction or @PJM SET PAPERLENGTH or PAPERWIDTH command present), the device places the print according to the control panel setting at that time.
- HP DesignJet 750C and 755CM: The @PJM SET PRINTAREA=FULLSIZE command is ignored. Sending the @PJM SET PAPERLENGTH and PAPERWIDTH command overrides the control panel, providing the same effect.
- HP DesignJet 700, 750C Plus, 2000 and 3000 series: @PJM SET PAPERLENGTH and PAPERWIDTH do not override the Inked Area control panel setting unless it is set to SOFTWARE. Use @PJM SET PRINTAREA to override it.
- HP DesignJet 1000 series: If PRINTAREA is set to INKEDAREA, it overrides the value of the @PJM SET PAPERLENGTH and PAPERWIDTH commands.

Note: If the driver sends @PJM SET PAPERLENGTH or PAPERWIDTH commands or an HP-GL/2 PS instruction, but does not send any information regarding FULLSIZE and the control panel setting is Inked Area, only the inked area is printed and cut.

[More...](#)

## Device Dependencies (continued)

### @PJL SET REFILLDURATION=NORMAL, QUICK [CR] LF

This command is available only for HP DesignJet 2000 and 3000 series. It applies to any HP DesignJet 3000 series printer or for an HP DesignJet 2000 series printer with a firmware revision equal to or higher than A.04.05.

### @PJL SET REFILLTHRESHOLD=5 to 100 [CR] LF

This command is available only for HP DesignJet 2000 and 3000 series. It applies to any HP DesignJet 3000 series printer or for an HP DesignJet 2000 series printer with a firmware revision equal to or higher than A.04.05.

### @PJL SET REFILLTYPE=INTERLEAVED, SHARP [CR] LF

This command is available only for HP DesignJet 2000 and 3000 series. It applies to any HP DesignJet 3000 series printer or for an HP DesignJet 2000 series printer with a firmware revision equal to or higher than A.04.05.

[More...](#)

## Device Dependencies (continued)

### @PJL SET RESOLUTION=300, 600 [CR] LF

The corresponding item on the control panel is Best, Normal, Fast or the equivalent for the device.

- If the @PJL SET RESOLUTION command is used with the HP DesignJet 700, 750C and 750C Plus plotters or the 755CM printer, the value 600 forces grayscale output, irrespective of any color specifications. These devices only offer 600 dpi in monochrome.
- If the @PJL SET RESOLUTION command is used with the HP DesignJet 1000, 2000 and 3000 series printers, the value 600 will print the file in color or monochrome depending on what is specified in the file. For example:

```
@PJL SET RENDERMODE=COLOR [CR]LF
```

```
@PJL SET RESOLUTION=600 [CR]LF
```

- If you want to print on HP DesignJet 1000series printers using 1200 dpi addressable in monochrome, you must use the following command sequences:

```
@PJL SET RENDERMODE=GRAYSCALE [CR]LF
```

```
@PJL SET RESOLUTION=600 [CR]LF
```

```
@PJL SET RET=ON [CR]LF
```

- 1200 dpi COLOR mode is not possible in any of the models.
- See also [Resolutions Supported by HP DesignJet Plotters and Printers](#) and [@PJL SET RET=ON, OFF, AUTO \[CR\] LF](#).

[More...](#)



## Device Dependencies (continued)

### Resolutions Supported by HP DesignJet Plotters and Printers

- HP DesignJet 200 plotter: Monochrome 300 dpi only. Only supports pattern dither.
- HP DesignJet 220 plotter: 300 dpi black pens only, but able to print at 600 dpi addressable for vector graphics. Raster and halftones are always at 300 dpi. Only supports pattern dither.
- HP DesignJet 230 and HP DesignJet 250C plotters: HP DesignJet 250C has black and color 300 dpi pens. HP DesignJet 230 has only a black 300 dpi pen. Both able to print addressable 600 dpi in monochrome for vector graphics. Raster and halftone are always at 300 dpi. Color prints are always at 300 dpi. Both support scatter, cluster and pattern dither.
- HP DesignJet 330 and HP DesignJet 350C plotters: HP DesignJet 350C has black and color 300 dpi pens. HP DesignJet 330 has only a 300 dpi black pen. Both able to print 600 dpi addressable in monochrome for vector graphics. Raster and halftone are always at 300 dpi. Color prints are always at 300 dpi. Both support scatter, cluster and pattern dither. In order to disable 600 dpi addressable for non-CAD applications a new PJL command was added: RET with the options ON (the default) and OFF.
- HP DesignJet 430 printer: 600 addressable monochrome dpi.
- HP DesignJet 450C, HP DesignJet 455CA and HP DesignJet 488CA printers: 600 addressable dpi in monochrome, 300 real dpi color.
- HP DesignJet 600 plotter: 300 dpi black pens only, but they can print vector graphics at 600 dpi addressable. Raster and halftones are always 300 dpi. They only support pattern dither.
  - HP DesignJet 650C plotter: 300 dpi black and color pens. They can print 600 dpi addressable in monochrome for vector graphics. Raster and halftone are always 300 dpi. Initial versions only supported pattern dither, scatter dither having been introduced later on.

[More...](#)

## Device Dependencies (continued)

### Resolutions Supported by HP DesignJet Plotters and Printers (continued)

- HP DesignJet 700 and 750C Plus printers: True 600 dpi monochrome printing and 600 addressable dpi color printing for vector graphics. Raster and halftones are always 300 dpi. HP DesignJet 700 is a monochrome device and the monochrome entries only apply. The value 600 forces grayscale output, irrespective of any color specification.  
High quality halftones are always used. The PJL RET setting has a new AUTO value (which is the default), and there is a control panel option, Sharpen Lines, that matches the values of the RET setting, to overcome print quality problems of images from AutoCAD and third party drivers.
- HP DesignJet 750C plotter and HP DesignJet 755CM printer: Both have a 600-dpi black pen that allows true 600 dpi monochrome printing, and 300 dpi color pens. Color is always at 300 dpi and monochrome at either 300 or 600 dpi. The value 600 forces grayscale output, irrespective of any color specification. True 600 dpi printing for all objects (vector, raster and halftone) is only possible through special drivers that select 600 dpi from PJL.

[More...](#)

## Device Dependencies (continued)

### Resolutions Supported by HP DesignJet Plotters and Printers (continued)

- HP DesignJet 1000 series printers: Can print in monochrome at 1200 dpi addressable and monochrome or color prints at 600 dpi. True 600 dpi in color and monochrome, set by using the PJL command: `@PJL SET RESOLUTION = 600`. Also, 1200 addressable dpi in monochrome vector files, set by using the following PJL commands:

```
@PJL SET RENDERMODE = GRAYSCALE CR LF
```

```
@PJL SET RESOLUTION = 600 CR LF
```

```
@PJL SET RET = ON CR LF
```

In the HP DesignJet 1000 series, to take advantage of true 600 dpi, halftones can be at 600-dpi either for raster or for vectors, even when the native resolution (the resolution at which patterns, bitmap fonts and raster data [if not otherwise specified] are sent to the printer) is 300 dpi. Native resolutions in the HP DesignJet 1000 series are 600 and 300 dpi (300 dpi by default) and can be changed only by using `@PJL SET RESOLUTION = value`.

- HP DesignJet 2000 and 3000 series printers: True 600 dpi in color and monochrome in Best print mode, set by using the command `@PJL SET RESOLUTION = 600`. Fast and Normal print quality is 300 dpi in color and monochrome.

## @PJL SET RET=ON, OFF, AUTO [CR] LF

ON: 600 dpi addressable for the HP DesignJet 330 and 350C plotters; 1200 addressable dpi for the HP DesignJet 1000 series.

OFF: Only 300dpi is supported—this is the default for the HP DesignJet 1000 series printers.

AUTO: 600 dpi addressable in color vector plots—this is the default for the HP DesignJet 330 and 350C plotters; for the HP DesignJet 1000 series printers the ON and AUTO settings perform the same function (AUTO is kept for compatibility).

This command was introduced with the HP DesignJet 330 and 350C plotters to enable addressable dpi for non-CAD applications.

On HP DesignJet 1000 series printers, the RET setting is used for printing at 1200 addressable dpi. It applies only to grayscale vector prints that are parsed at 600 dpi device resolution, that is, prints that use the @PJL SET RENDERMODE = GRAYSCALE and @PJL SET RESOLUTION = 600 commands. ON or AUTO settings are ignored if the print to be printed at 1200 addressable dpi has any raster images or flow-mode prints (object banding prints or prints too large to fit in memory or disk). There is no setting equivalent to the RET value in the control panel.

The command is not supported in the HP DesignJet 2000 or 3000 series. The new control panel option Sharpen Lines now provides the function of this command.

## PJL Commands Supported on HP RTL Devices

Here is a summary of the PJL commands used by devices that support HP RTL. Note that not all devices recognize all PJL commands or all operands of PJL commands. All these commands are preceded by @PJL and followed by a carriage return/line feed pair, as shown in the example that follows the summary. White space (tabs or blanks) around equals-signs is optional, as is trailing white space following the command, before carriage return (CR) and linefeed (LF). See the *Printer Job Language Technical Reference Manual* for full details, and *The Product Comparison Guide for HP Languages on HP Plotters and Large-Format Printers* for information relating to specific devices.

@PJL COMMENT

@PJL ECHO

@PJL ENTER LANGUAGE = HPGL  
HPGL2  
POSTSCRIPT

@PJL EOJ [NAME = "..."]

@PJL JOB [NAME = "..."]

@PJL RESET

@PJL SET MARGINS = NORMAL|SMALLER  
MIRROR = ON|OFF  
ORIENTATION = PORTRAIT|LANDSCAPE  
PALETTE SOURCE = DEVICE|SOFTWARE  
PAPERLENGTH = value in decipoints (1/720-inch)  
PAPERWIDTH = value in decipoints (1/720-inch)  
RENDERMODE = COLOR|GRAYSCALE  
RESOLUTION = 300|600  
RET = ON|OFF

esc%-12345X (universal exit language)

## Example Showing the Structure of a PJL Job

```

ESC%-12345X@PJL JOB NAME = "... " CR LF
@PJL COMMENT HP DESIGNJET 750C PLOTTER USING CR LF
@PJL COMMENT ... HP-GL/2, MONOCHROME, 600dpi CR LF
@PJL SET RESOLUTION = 600 CR LF
@PJL SET RENDERMODE = GRAYSCALE CR LF
@PJL SET MIRROR = OFF CR LF
@PJL SET MARGINS = NORMAL CR LF
@PJL SET PALETTE SOURCE = SOFTWARE CR LF
@PJL SET PAPERLENGTH = 8423 CR LF
@PJL SET PAPERWIDTH = 5958 CR LF
@PJL SET ORIENTATION = PORTRAIT CR LF
@PJL SET RET = ON CR LF
@PJL ENTER LANGUAGE = HPGL2 CR LF
... (HP-GL/2 instructions and HP RTL commands) ...
ESC%-12345X@PJL EOJ NAME = "... " CR LF

```

Note that the @PJL SET command overrides the control-panel settings, allowing drivers to define their own requirements without interference from the control panel.