4 PCL Job Control Commands

Introduction

A job typically consists of three parts:

- Commands providing job control.
- Commands providing page control.
- Print data.

Table 4-1 Structure of a Typical Job

E_C%–12345X	UEL Command (exit language)
E_CE	Printer Reset Command.
Preamble	Job Control Commands.
Page 1	Page Control Commands.
	Data
Page 2	Page Control Commands.[1]
	Data.
• • •	• • •
Page n	Page Control Commands.
	Data.
E_CE	Printer Reset Command.
E_C%–12345X	UEL Command (exit language).

1. If a number of consecutive pages within a job have the same format (such as margins, VMI, HMI, etc.), the associated page control commands only need to be sent once for that group of pages.

This chapter describes the commands providing job control. Job control commands are usually grouped together and sent at the beginning of a job. Page control commands and data are associated with each printed page of a job. Job control commands include the following:

- Printer Reset.
- Universal End of Language/Start of PJL.
- Number of Copies.
- Simplex/Duplex Print.
- Left and Top Offset Registration.
- Duplex Page Side Selection.
- Job Separation.
- Output Bin Selection.
- Unit of Measure.

Printer Reset Command

Receipt of the Printer Reset command restores the User Default Environment, deletes temporary fonts, macros, user-defined symbol sets and patterns. It also prints any partial pages of data which may have been received.

Ec E

Notes

Hewlett-Packard strongly recommends the use of both the Ec E command and the **Ec%–12345X** command (Universal Exit Language/Start of PJL — also referred to as the **UEL Command**) at the beginning and end of each job. (The order of these commands is critical. Refer to Table 4-1 for an example.)

The UEL Command (**Ec%–12345X**) has the same effect as the Ec E command, and also enters PJL Mode of operation for printers that support PJL (refer to the next section, ""Universal Exit Language Command" for more information). The Ec E command should be included to ensure backward compatibility (the UEL command is ignored if received by a printer that does not support PJL).

Universal Exit Language Command

The Universal Exit Language (**UEL**) command causes the PCL printer language to shut down and exit. Control is then returned to the Printer Job Language (PJL). Both PCL 5 and HP-GL/2 recognize this command.

Esc % – 1 2 3 4 5 X

Default = N/A

Range = –12345

This command performs the following actions:

- Prints all data received before the Exit Language command.
- Performs a printer reset (same effect as Esc E).
- Shuts down the PCL 5 printer language processor.
- Turns control over to PJL.

Notes

Hewlett-Packard strongly recommends the use of both Esc E (printer reset) and **Esc%–12345X** (UEL command) at the beginning and end of each job. (The order of these commands is critical. Refer to Structure of a Typical JobTable 4-1 for an example.)

The UEL Command (**Esc%–12345X**) has the same effect as the Esc E command, and also enters PJL Mode of operation for printers that support PJL. The Esc E command should be included to ensure backward compatibility (the UEL command is ignored if received by a printer that does not support PJL).

Number of Copies Command

The Number of Copies command designates the number of printed copies of each page.

$^{E}_{C}$ & ℓ # X

= Number of copies (1 to 32767 maximum)

Default = 1 (Configurable from control panel)

Range = 1-32767
(Values 32767 execute as 32767 values 1 are ignored. Maximum number of copies=99 for LaserJet II, IIP, III, IIID, IIIP and earlier LaserJet printers.)

This command can be received anywhere within a page and affects the current page as well as subsequent pages.

Example

To print 3 copies of a page, send:

$^{E}_{C}$&ℓ3X

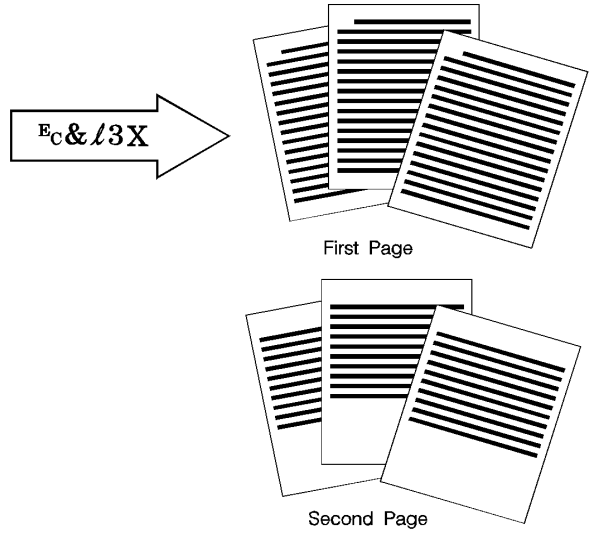

Figure 4-1 Number of Copies

Note

The HP-GL/2 Replot (RP) command is inactive for PCL 5 printers; use the Number of Copies command for multiple HP-GL/2 plots. To be effective, the Number of Copies command must be issued from PCL prior to closing the page on which the plot is defined.

Simplex/Duplex Print Command

This command designates either simplex or duplex printing mode for duplex printers. Simplex mode prints an image on only one side of a sheet (page). Duplex mode prints images on both sides of a sheet.

Esc & l # S

= 0 - Simplex
1 - Duplex, Long-Edge Binding
2 - Duplex, Short-Edge Binding

Default = 0

Range = 0-2 (Other values ignored)

Long-Edge bound duplexed pages are bound along the length of the physical page (see Figure 4-2). Short-edge bound duplexed pages are bound along the width of the physical page (see Figure 4-3).

Selecting long-edge binding usually results in font rotation. This may be a concern if available user memory is critical.

Note If this command is received by a printer which does not contain the duplex feature, it is ignored. Printers which do not contain the duplex feature print in simplex mode (front side of sheet) only.

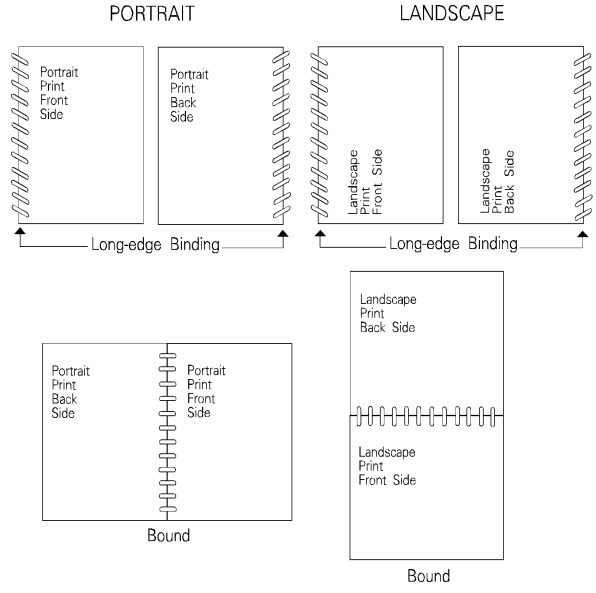

Figure 4-2 Long-Edge Binding Mode

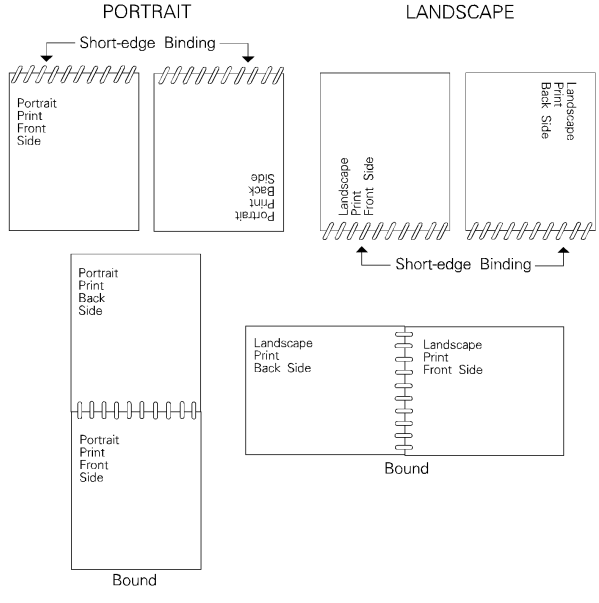

Figure 4-3 Short-Edge Binding Mode

Left Offset Registration Command

The Left (long-edge) Offset Registration command designates the position of the logical page across the width (short side) of the physical page. This command can be used to adjust the text position on the page to allow additional room for the page binding.

Esc & ℓ # U

= The number of decipoints (1/720 inch)

Default = 0

Range = –32767 to 32767

The value (#) is a signed number valid to 2 decimal places. The units are decipoints. Positive values cause the logical page, regardless of orientation, to move right along the width of the physical page, except on the back side (duplex print) of sheets printed in long-edge binding duplex mode, where positive values cause it to move left (refer to Figure 4-4 and Figure 4-5).

Negative values cause the logical page, regardless of orientation, to move left along the width of the physical page, except on the back side of sheets printed in long-edge binding duplex mode, where negative values cause it to move right (refer to Figure 4-4 and Figure 4-5).

Notes

The +/– value is absolute with respect to the default position of the logical page along the width of the physical page. It is not relative to the present location.

The registration commands may cause data loss by moving the logical page outside the printable area.

This command has the same effect regardless of orientation.

This command can be used in both simplex and duplex modes.

Top Offset Registration Command

The Top (short-edge) Offset Registration command designates the position of the logical page along the length (long side) of the physical page.

Esc & ℓ # Z

= The number of decipoints (1/720 inch)

Default = 0

Range = –32767 to 32767

The value (#) is a signed number valid to 2 decimal places. The units are decipoints. Positive values cause the logical page, regardless of orientation, to move down along the length of the physical page, except on the backside of sheets printed in short-edge binding duplex mode, where positive values cause it to move up (refer to Figure 4-4 and Figure 4-5).

Negative values cause the logical page, regardless of orientation, to move up, along the length of the physical page, except on the backside of sheets printed in short-edge binding duplex mode, where negative values cause it to move down (refer to Figure 4-4 and Figure 4-5).

Notes

The +/– value is absolute with respect to the default position of the logical page along the length of the physical page. It is not relative to the current location of the logical page.

The registration command may cause data loss by moving the logical page outside the printable area.

This command has the same effect regardless of orientation.

This command can be used in both simplex and duplex modes.

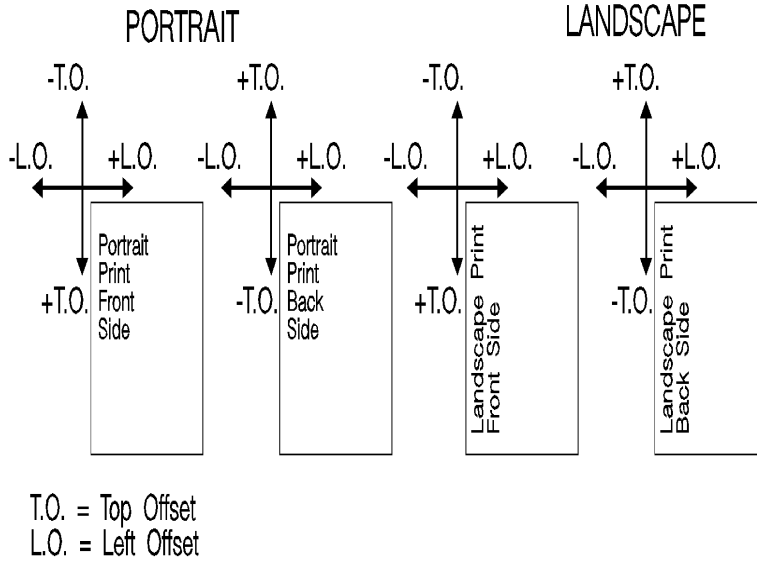

Figure 4-4 Short-Edge Binding Mode Offsets

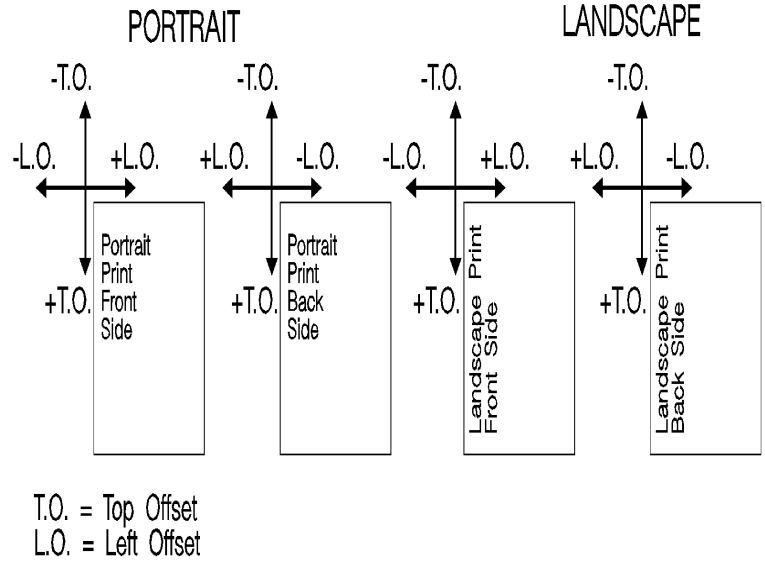

Figure 4-5 Long-Edge Binding Mode Offsets

Duplex Page Side Selection Command

The Duplex Page Side Selection command causes a Form Feed and designates which side of the sheet to print.

The ability to skip a page while duplexing may be required at certain locations in a document. For example, a chapter typically begins on the front side of a page.

$^{E}_{C}$&a#G

= 0 - Select next side
1 - Select front side
2 - Select back side

Default = 0

Range = 0-2 (All other values ignored)

If this command is received by a printer which does not have duplex or if duplexing is not enabled, these commands just eject the current page (sheet), positioning the cursor at the default position on the next page.

Example

To print on the front side of a page, regardless of the current side, send the following:

$^{E}_{C}$&a1G

In this example, if the printer is currently formatting a front side, it will stop formatting, eject that page (sheet, skipping the back side), and begin printing on the next front page.

Job Separation Command

Job separation provides a means of identifying one print job from others in the printer's output tray. It usually does this by physically offsetting one print job from the next.

The Job Separation command toggles the printer's separation mechanism. This command must be sent between each job to enable the separation mechanism.

$^{E}_{C}$ & ℓ 1 T

HP recommends that the Job Separation command be included at the end of each job, just before the Printer Reset command. HP also recommends that this command be included in the programs even though printers with job separation are not currently being used. This ensures that if a printer with job separation is eventually added, job separation will be performed.

If this command is received by a printer which does not have job separation, the command is ignored.

Note

It is possible to perform job offset in printers which do not have a mechanical offset mechanism but have dual paper trays. In dual bin printers, job offset can be performed by placing colored paper in the second tray and using Paper Source command to select the tray to feed a blank sheet of colored paper at the end of a job. This method should only be used in special cases where the end user can control its use, for example, the program should only be available for a dual bin printer which can always contain colored paper in one tray.

Output Bin Selection Command

The **Output Bin Selection** command selects either of the two output paper bins (upper or lower [rear]) for paper output.

$^{E}_{C}$ & ℓ # G

= 1 - Upper Output Bin
2 - Lower (Rear) Output Bin

Default = Upper Output Bin

Range = 1, 2

Note

If this command is received by a printer which does not contain the dual output bin feature, it is ignored.

Unit of Measure Command

The Unit of Measure command establishes the unit of measure for **PCL Unit** cursor movements.

$^{E}_{C}$ & u # D

=Number of units-per-inch

Default = 300

Range = 96, 100, 120, 144, 150, 160, 180, 200, 225, 240, 288, 300, 360, 400, 450, 480, 600, 720, 800, 900, 1200, 1440, 1800, 2400, 3600, 7200.

The value field defines the number of units-per-inch used in the following commands:

- Vertical Cursor Position (PCL Units).
- Horizontal Cursor Position (PCL Units).
- Vertical Rectangle Size (PCL Units).
- Horizontal Rectangle Size (PCL Units).

In addition, the current unit of measure setting affects the HMI setting, which in turn determines how cursor movement values are rounded. This affects the result of the following commands:

- Horizontal Cursor Position (Columns).
- Horizontal Tab (HT control code).
- Space (SP control code).
- Backspace (BS control code).
- Bitmap Character Delta X (“Delta X (SI),” Chapter 11).

For example, if the unit of measure is set to 96 (one PCL Unit = 1/96 inch), then the HMI is rounded to the nearest 1/96 inch. If the unit of measure is set to 300 (one PCL Unit = 1/300 inch), the HMI is rounded to the nearest 1/300 inch.

Note

HMI is set either as a result of font selection or through the use of the HMI command. The rounding behavior just described only applies when the HMI is at its default setting (derived from the currently selected font). If the HMI Command was used to override the HMI setting, the rounding behavior described above does not apply. (See “Horizontal Motion Index (HMI) Command” in Chapter 5 for more information.)

The current unit of measure setting affects all PCL Unit moves, horizontal and vertical rectangle size, bitmap and scalable font metrics (how the cursor moves after printing a character). The Unit of Measure command does not affect the interpretation of binary raster data (bitmap fonts, raster graphics or patterns).

Once the units of measure is changed, it stays in effect until another is selected or the printer is reset. A control panel or **Ec E** reset returns the current unit of measure setting back to the device default setting (300).

The units value is part of the modified print environment. As such, it is saved and restored whenever a macro is called or an overlay invoked, and defaulted when establishing the overlay environment in preparation for an overlay.

Note

Values out of range are mapped to the supported value with the minimum relative error. For example, a unit selection of 4801 would be mapped to 7200, since the relative error (0.3332) is less than the relative error when mapped to 3600 (0.3336):

$$\frac{|14801 - 7200|}{7200} = 0.3332 < \frac{|4801 - 3600|}{3600} = 0.3336$$

{|4801-7200| over 7200}=0.3332 < {| 4801-3600|over 3600}=0.3336

Figure 4-6 compares a 4-unit vertical and horizontal cursor move with a unit of measure setting of 100 versus 200 units-per-inch. Note that the cursor move distance is halved when the Units per inch is doubled.

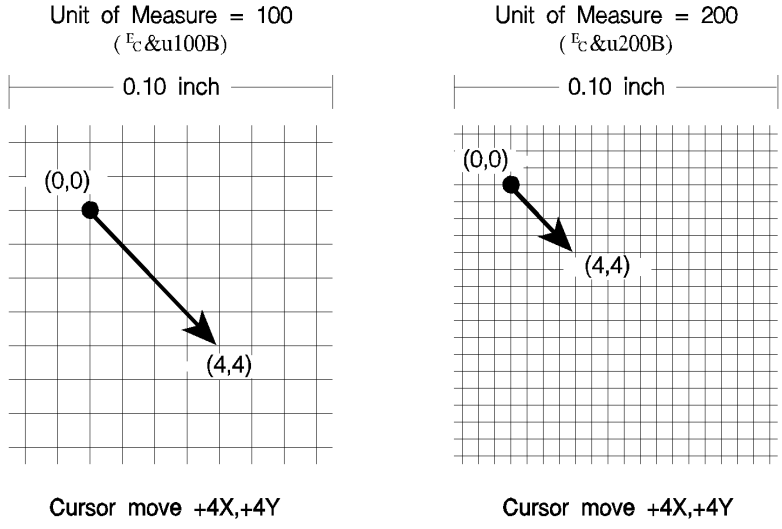

Figure 4-6 Cursor Moves at Different Unit of Measure Settings

The printer's physical **dot size** has **no direct bearing** on the size of **PCL Units** used in cursor movements. In addition, PCL Units are **not affected by the current control panel or PJL resolution setting.**

Note

If no other unit of measure value has been specified, then the default is one Unit equals 1/300 inch. In this case, a cursor movement of 450 Units moves the cursor 1.5 inches, whether printed at 300 or 600 dpi print resolution.