6 Cursor Positioning

Introduction

This section describes the cursor positioning commands.

Although the printer does not actually have a cursor, the PCL cursor position refers to the **Current Active Position (CAP)**, like the blinking underline character (cursor) used on most computers. This “cursor” identifies the current position on the page; the pointer, where a printing command begins laying out page data. The cursor can be moved anywhere within the logical page using a combination of horizontal and vertical cursor positioning commands and control codes.

In addition to cursor commands positioning the cursor, the cursor is automatically positioned after certain operations, such as printing characters and graphics. After printing a character, the cursor is positioned to the right, at a distance equal to the width of that character. This is controlled by the character design described under “Character Width” in Chapter 10, and allows printing characters without requiring a cursor position command for each character printed. When printing graphics, the cursor can also be positioned at a new location. These new positions are identified in the graphics sections.

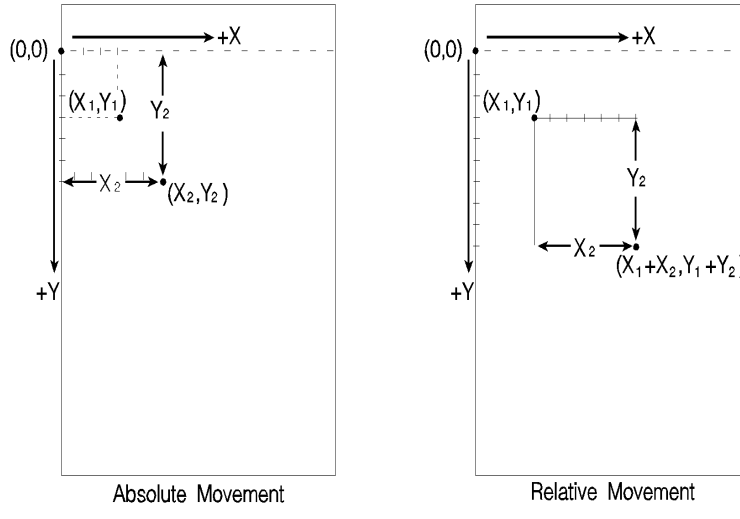
HP-GL/2 vector graphics has its own HP-GL/2 cursor (referred to as the “pen”) that can be positioned within the HP-GL/2 addressable area. For additional information on HP-GL/2 pen positioning refer to Chapter 17, *An Introduction to HP-GL/2 Vector Graphics*.

Absolute vs. Relative Cursor Positioning

Either absolute or relative motion can be specified.

Absolute motion always specifies the distance to move referenced from the top margin at the left bound of the logical page (0,0), *regardless of the current active position* (CAP) (see Figure 6-1). An unsigned value field in a cursor position command indicates absolute cursor movement.

Relative motion specifies the distance to move *referenced from the current active position* (CAP) (see Figure 6-1). A signed (+/-) value field in a cursor position command indicates relative cursor movement.



Horizontal Cursor Value = X_2

Vertical Cursor Value = Y_2

(X_1 Y_1) = initial cursor position before the move

Figure 6-1 Absolute and Relative Cursor Positioning

Cursor Positioning Units

Cursor positioning is done in PCL coordinate system units. The units of the X-axis of the PCL coordinate system may be **PCL Units**, **decipoints**, or **columns**. The units of the Y-axis of the PCL coordinate system may be **PCL Units**, **decipoints**, or rows.

PCL Units

The current unit size used in PCL Unit moves is determined by the value specified in the Unit of Measure command, defining 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 how cursor movement values are rounded, in turn affecting 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 more information, refer to the next section, "*Horizontal Cursor Positioning (Columns) Command*."

If no unit of measure value is specified, the default number of units-per-inch for PCL Unit moves (horizontal and vertical rectangle size, etc.) is one Unit equals 1/300 inch. This is true even when a different resolution (such as 600 dpi) is selected on the printer.

Decipoints

In PCL terminology, a decipoint is 1/720 inch or one-tenth of a PCL point (a PCL point is *exactly* 1/72 inch as opposed to a typographic point which is *approximately* 1/72 inch).

Columns & Rows

The width of a column is defined by the current horizontal motion index (HMI), as described under “Horizontal Motion Index (HMI) Command” in Chapter 5. The distance between rows is defined by the current vertical motion index (VMI), as described under “Vertical Motion Index (VMI) Command” in Chapter 5. HMI is the distance between consecutive characters. VMI is the distance between consecutive lines of text. HMI and VMI are described in more detail in Chapter 5.

HP-GL/2 has its own coordinate system and units. For additional information about the HP-GL/2 coordinate system and units, refer to Chapter 17, *An Introduction to HP-GL/2 Vector Graphics*.

Horizontal Cursor Positioning (Columns) Command

This Horizontal Cursor Positioning command moves the cursor to a new column on the current line.

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

= Number of Columns

Default = NA

Range = 0 - logical page right bound (valid to 4 decimal places)

The width of a column is defined by the current HMI.

Note

The current unit of measure setting affects how HMI values are rounded. 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.

A value field (#) with a plus sign (+) indicates the new position is to the right of and relative to the current cursor position; a minus sign (–) indicates the new position is to the left of and relative to the current cursor position. No sign indicates an absolute distance which is referenced from the left edge of the logical page. The first column within a line is column 0. This sequence ignores margins and can therefore be used to set the current active position (CAP) to any location along the current line.

If a request is made for a location outside the printer's logical page, the CAP is moved to the appropriate logical page limit.

Horizontal Cursor Positioning (Decipoints) Command

This Horizontal Cursor Positioning command moves the cursor to a new position along the horizontal axis.

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

= Number of Decipoints (1/720 inch)

Default = NA

Range = 0 - logical page right bound (rounded to the first decimal place)

A value field (#) with a plus sign (+) indicates the new position is to the right of and relative to the current cursor position; a minus sign (–) indicates the new position is to the left of and relative to the current cursor position. No sign indicates an absolute distance which is referenced from the left edge of the logical page. The left most position is 0 and the right most position is the right bound of the logical page.

If a request is made for a location outside the printer's logical page, the current active position (CAP) is moved to the appropriate logical page limit.

The value field is valid to two decimal places.

Horizontal Cursor Positioning (PCL Units) Command

This Horizontal Cursor Positioning command moves the cursor to a new position along the horizontal axis.

E_C * p # X

\# = Number of PCL Units

Default = NA

Range = 0 - logical page right bound

A value field (#) with a plus sign (+) indicates the new position is to the right of and relative to the current cursor position; a minus sign (–) indicates the new position is to the left of and relative to the current cursor position. No sign indicates an absolute distance which is referenced from the left edge of the logical page. The left most position is 0 and the right most position is the right bound of the logical page.

If a request is made for a location outside the printer's logical page, the current active position (CAP) is moved to the appropriate logical page limit.

Note

The current unit size used in PCL Unit moves is determined by the value specified in the Unit of Measure command. If no other value is specified, the number of units-per-inch for PCL Unit moves is one unit equals 1/300 inch.

Horizontal Cursor Positioning Control Codes

Four control codes can be used to position the cursor horizontally on the current line. These control codes are explained below.

Note The distance which the cursor is moved by the Space (SP), Backspace (BS), and Horizontal Tab (HT) control codes is defined by the current HMI value. The current unit of measure setting affects how HMI values are rounded. 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.

CR - Carriage Return

Moves the current active position (CAP) to the left margin on the current line. (Refer to “Line Termination Command” later in this chapter.)

SP - Space

Moves the current active position (CAP) to the right by one column position. Space may be a printable character or a control code. If a character is defined for the Space code, Space is printable; otherwise, it is a control code. For proportionally spaced fonts, a Space control code moves the cursor by the current HMI value; however, a printable space moves the cursor the width of the character. For fixed pitch fonts, a space, whether control code or printable, moves the cursor according to the HMI value.

BS - Backspace

Moves the current active position (CAP) left a distance equal to the width of the last printed symbol or space. If the active position is already at the left margin, no action is taken. If the cursor is currently beyond the right margin, BS positions the cursor just to the left of the right margin. When using fixed pitch fonts, the Backspace distance is defined by the current print pitch (HMI setting).

When using proportionally-spaced fonts, a single Backspace moves back to center the overstrike character. After printing the overstriking character, the cursor returns to its position prior to the Backspace. Multiple backspaces each move back the distance of the last printed symbol or space. For example, if “world” was printed with a proportional font and then 5 backspaces were performed, the distance moved back would be five times the width of the “d.”

HT - Horizontal Tab

Moves the current active position (CAP) to the next tab stop on the current line. The tab stops are at the left margin and every 8th column between the left margin and the right bound of the logical page. If the new horizontal position crosses the right margin, the new horizontal position is set to the right margin. If the current HMI value is 0, the command is ignored.

Vertical Cursor Positioning (Rows) Command

This Vertical Cursor Positioning command moves the cursor to a new line in the same column position.

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

= Number of Rows

Default = NA

Range = –32767 to 32767 (valid to 4 decimal places)

A value field (#) with a plus sign (+) indicates the new position is downward from and relative to the current cursor position; a minus sign (–) indicates the new position is upward from and relative to the current cursor position. No sign indicates the new position is absolute from the top margin. The top position, defined by the top margin, is 0 and the bottom position is determined by the bottom of the logical page.

Note

Since the top margin can be changed using a printer command, the physical location of the point (0,0) may change. This affects the cursor position on the page.

If a request is made for a location outside the printer's logical page, the current active position (CAP) is moved to the appropriate logical page limit.

Vertical Cursor Positioning (Decipoints) Command

This Vertical Cursor Positioning command moves the cursor to a new position along the vertical axis.

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

= Number of Decipoints (1/720 inch)

Default = NA

Range = –32767 to 32767 (rounded to the first decimal place)

A value field (#) with a plus sign (+) indicates the new position is downward from and relative to the current cursor position; a minus sign (–) indicates the new position is upward from and relative to the current cursor position. No sign indicates an absolute distance from the top margin. The top position, defined by the top margin, is 0 and the bottom position is determined by the bottom of the logical page.

Note

Since the top margin can be changed using a printer command, the physical location of the point (0,0) may change. This affects the cursor position on the page.

If a request is made for a location outside the printer's logical page, the current active position (CAP) is moved to the appropriate logical page limit.

Vertical Cursor Positioning (PCL Units) Command

This Vertical Cursor Positioning command moves the cursor to a new position along the vertical axis.

$^{E}_{C}$ * p # Y

= Number of PCL Units

Default = NA

Range = –32767 to 32767

A value field (#) with a plus sign (+) indicates the new position is downward from and relative to the current cursor position; a minus sign (–) indicates the new position is upward from and relative to the current cursor position. No sign indicates an absolute distance from the top margin. The top position, defined by the top margin, is 0 and the bottom position is determined by the bottom of the logical page.

Note Since the top margin can be changed using a printer command, the physical location of the point (0,0) may change. This affects the cursor position on the page.

If a request is made for a location outside the printer's logical page, the current active position (CAP) is moved to the appropriate logical page limit.

Note The current unit size used in PCL Unit moves is determined by the value specified in the Unit of Measure command. If no other value is specified, the number of units-per-inch for PCL unit moves is one unit equals 1/300 inch.

Half-Line Feed Command

The Half-Line Feed command moves the cursor to the same character position one half-line down. The distance moved for a Half-Line Feed is one-half of the current line spacing (defined by the last VMI or line spacing setting).

$^{E}_{C}$ =

Vertical Cursor Positioning Control Codes

Two control codes can be used to position the cursor vertically. These control codes are explained below.

LF - Line Feed

Advances the current active position (CAP) to the same horizontal position on the next line. The distance to the next line is defined by the current line spacing (defined by the last VMI or line spacing setting). (Refer to “Line Termination Command” later in this chapter.)

FF - Form Feed

Advances the current active position (CAP) to the same horizontal position at the top of the text area on the next page. (Refer to “Line Termination Command” later in this chapter.)

Line Termination Command

The Line Termination command controls the way the printer interprets CR, LF, and FF control characters. All CR, LF and FF control characters received after the Line Termination Command are interpreted as shown below.

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

= 0- CR=CR; LF=LF; FF=FF
1 - CR=CR-LF; LF=LF; FF=FF
2 - CR=CR; LF=CR-LF; FF=CR-FF
3 - CR=CR-LF; LF=CR-LF; FF=CR-FF

Default = 0

Range = 0-3

For example, if a value field of 1 is sent, the printer interprets each Carriage Return (CR) received as a **Carriage Return (CR) and Line Feed (LF)** control code. A Line Feed or Form Feed would be sent as is.

If a value of 3 is sent, the printer interprets each Carriage Return (CR) received as a **Carriage Return (CR) and Line Feed (LF)**; it interprets each Line Feed (LF) received as a **Carriage Return (CR) and Line Feed (LF)**; and it interprets each Form Feed (FF) received as a **Carriage Return (CR) and Form Feed (FF)**.

Push/Pop Cursor Position Command

The Push/Pop Cursor Position command allows the current cursor position to be stored and recalled.

E_C & f # S

= 0 - Push (Store cursor position)
1 - Pop (Recall a cursor position)

Default = 0

Range = 0, 1 (Values outside range are ignored)

A value field of 0 pushes the cursor position onto the stack, leaving the current position unaffected. A value field of 1 pops the position from the stack, restoring it as the current cursor position.

Note The last item pushed is the first item popped.

Twenty positions may be pushed. If you try to save more than 20 positions, the command is ignored. If you try to restore more positions than were pushed, the command is ignored. A printer reset restores the current active position stack to the top (all saved positions are discarded).

The positions stored in the stack are not changed with an orientation change. Therefore, the positions are relative to the top left corner of the current orientation. Also, a position pushed in one orientation and popped in another can result in a position that is outside the logical page. If the position popped is outside the current logical page, the position is moved to the appropriate logical page limit.