6400-D Generation II Series Line Matrix Printers

KS Programmer's Reference Manual

Form Number S550-0377-00

6400-D Generation II Line Matrix Printers

KS Programmer's Reference Manual

Note!

Before using this information and the product it supports, read the information in “Notices” on page 75.

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1 *Introduction*

About This Manual

This manual is designed so you can quickly find the information you need to operate your printer with the Korean Standard (KS) emulation.

This book does not explain how to operate the printer. For printer operation, see the *Operator's Guide* and *Setup Guide.*

Warnings And Special Information

Read and comply with all information highlighted under special headings:

WARNING **Conditions that could harm you.**

CAUTION **Conditions that could damage the printer or related equipment.**

IMPORTANT **Information vital to proper operation of the printer.**

NOTE: Information affecting printer operation.

Related Product Information

Refer to the following books for printer operation:

- *Setup Guide.* Provides configuration instructions and descriptions and troubleshooting guidelines.
- *Operator's Guide.* Describes the keys on the control panel and provides quick reference information on daily printer operations such as loading paper and replacing ribbons.

Software Features

The KS emulation software provides the following features:

- Graphics and print quality. You can enable graphics mode and specify a density mode (dots per inch), for either 8-pin or 24-pin images.
- Print Attributes. Characters can be bold, italic, double high, double wide, etc.
- Page Formatting. Commands which allow you to set line spacing, page length, and vertical tabbing.
- Font Typefaces. Also referred to as print modes. The six typefaces include LQ, Near LQ, Normal, Hi-Speed, Super Hi-Speed and Ultra Hi-Speed.

2 *Configuring With The Control Panel*

Introduction

IMPORTANT **Configuration directly affects printer operation. Do not change the configuration of your printer until you are thoroughly familiar with the procedures in this chapter.**

In order to print data, the printer must respond correctly to signals and commands received from the host computer. Configuration is the process of matching the printer's operating characteristics to those of the host computer and to specific tasks, such as printing labels, or printing on different sizes of paper. The characteristics that define the printer's response to signals and commands received from the host computer are called configuration parameters. Examples are line spacing, form length, etc.

You can change the parameters by sending appropriate control codes, or by pressing keys on the operator panel. Control codes offer more versatility, and they override operator panel settings.

This chapter explains how to use the operator panel.

Chapter 3 provides information about control codes.

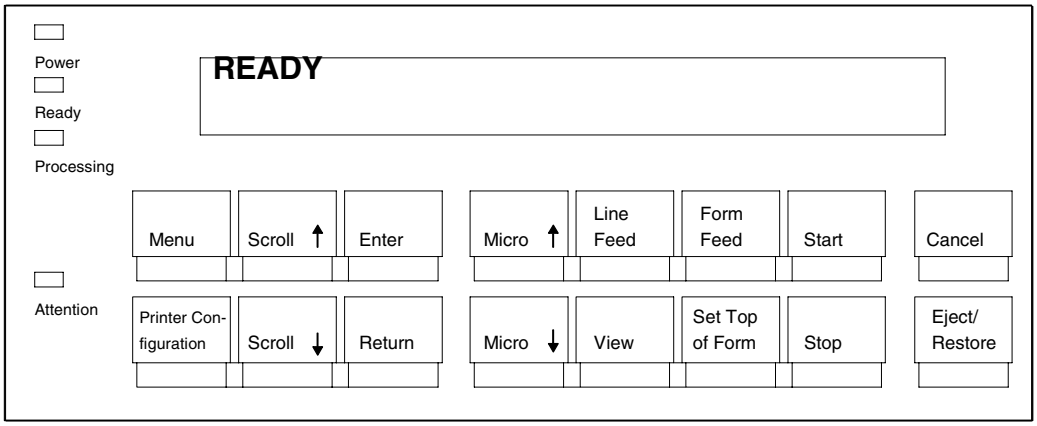
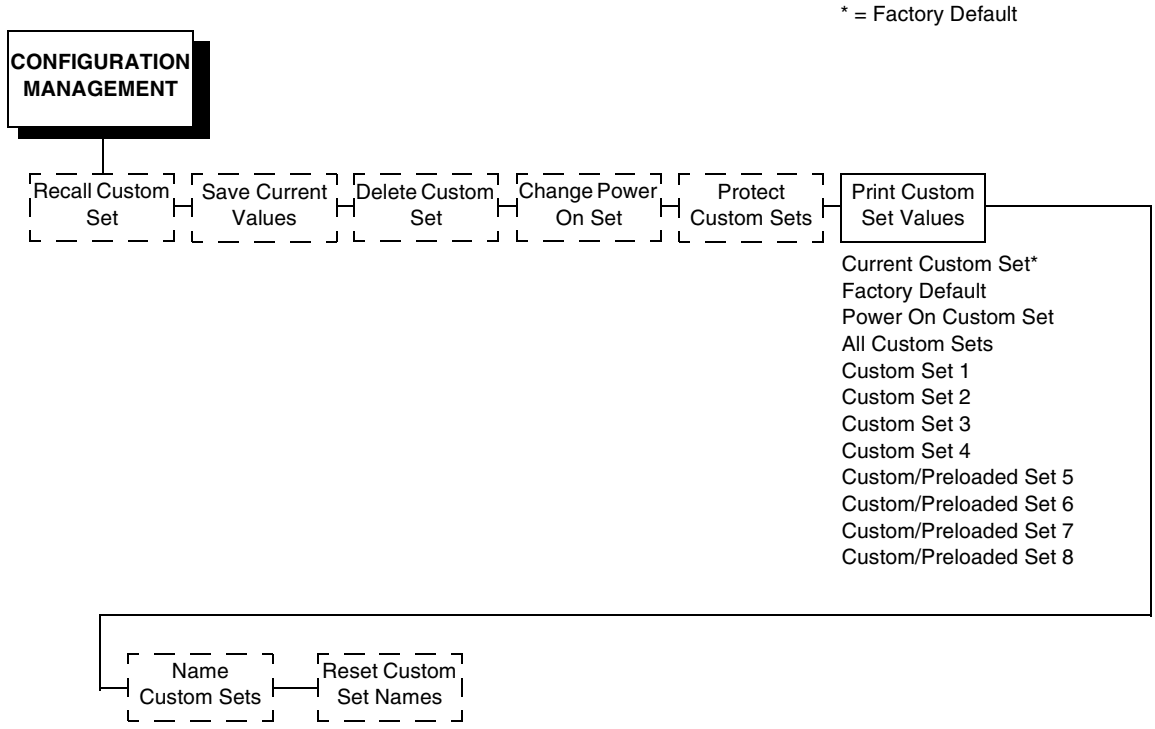


Figure 1. The Operator Panel

Printing The Configuration



It is recommended you print a configuration to determine what is already stored and what needs to be modified.

You can print any or all of the configurations shown above. Configurations 1-8 are the customized configurations.

Before you change any parameters, print the current configuration. Follow the procedure in Table 1.

Table 1. Printing Configurations

Step	Key	Result	Notes
1.	Make sure the printer is on.		
2.	Stop	NOT READY	Places the printer in NOT READY mode.
3.	Scroll ↑ + Scroll ↓	OPERATOR MENU UNLOCKED	Unlocks the Operator Menu.
4.	Menu	OPERATOR MENU QUICK SETUP	
5.	Scroll ↑ UNTIL	OPERATOR MENU CONFIGURATION MANAGEMENT	
6.	Enter	CONFIGURATION MANAGEMENT RECALL CUSTOM SET	
7.	Scroll ↑ UNTIL	CONFIGURATION MANAGEMENT PRINT CUSTOM SET VALUES	
8.	Enter	PRINT CUSTOM SET VALUES CURRENT CUSTOM SET*	
9.	Enter	PRINTING CUSTOM SET	The configuration listing begins printing.
10.	Stop	NOT READY	Returns the printer to NOT READY mode.
11.	Scroll ↑ + Scroll ↓	OPERATOR MENU LOCKED	Locks the operator menu.
12.	Start	READY	Places the printer in READY mode, prepared for normal operation.

NOTE: Another way to print the current configuration is to press the **Stop** key, then the **Printer Configuration** key, and then press **Start**.

The Configuration Menu

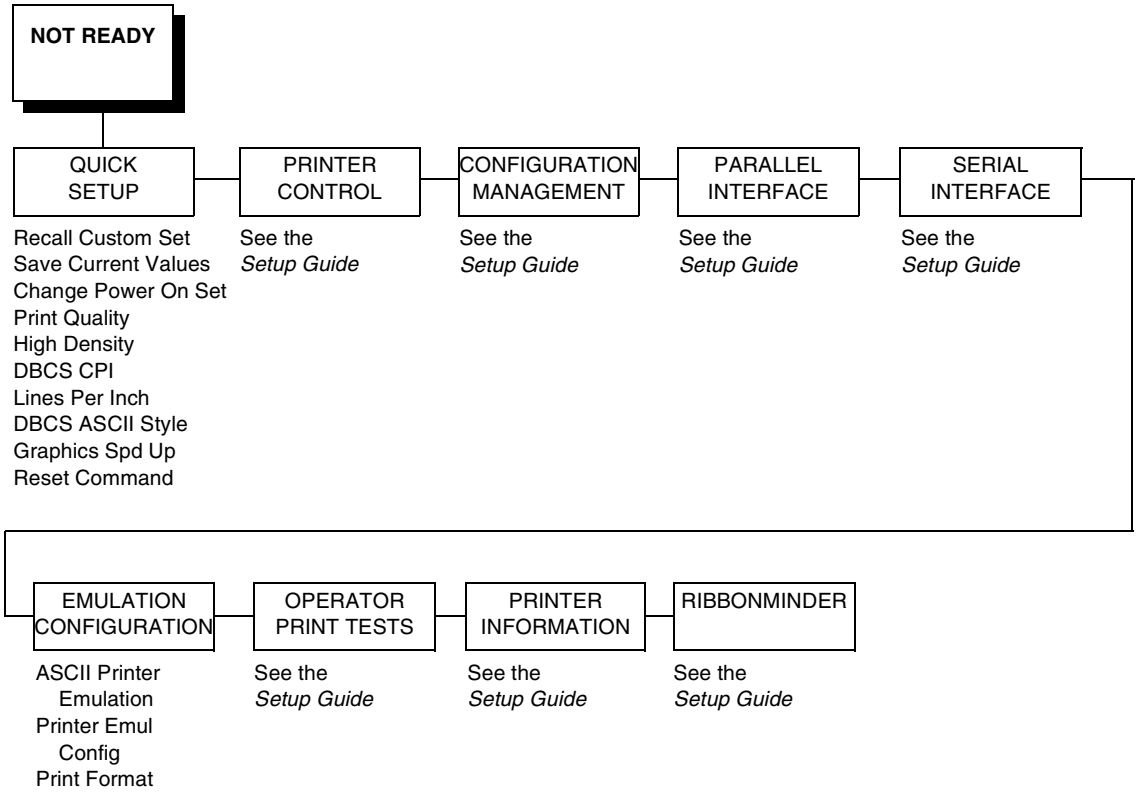


Figure 2. Configuration Menu Overview

Moving Within The Configuration Menu

The example in Table 2 explains how to change the Print Direction value.

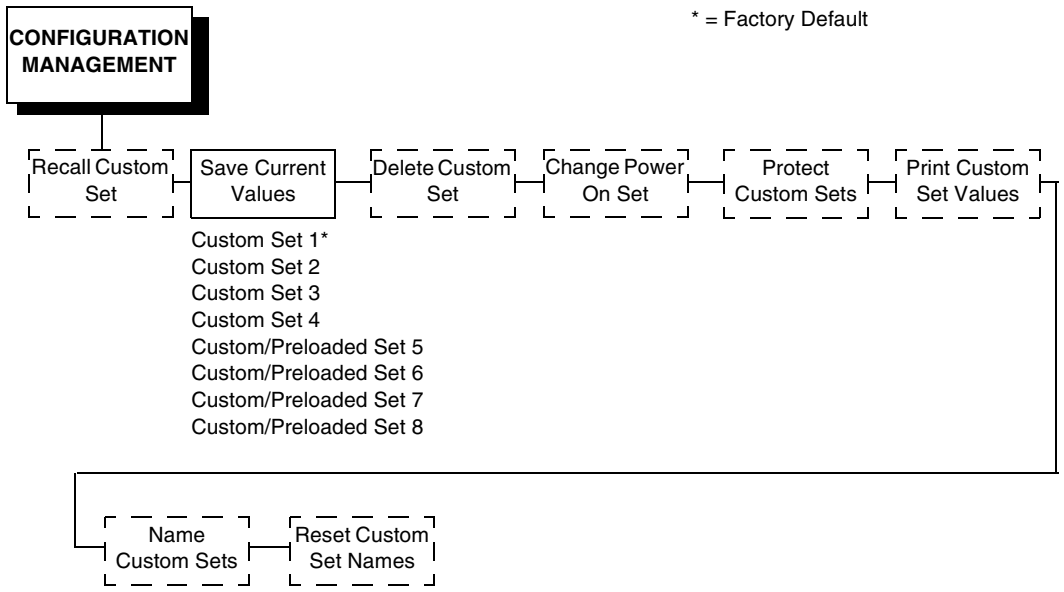
Table 2. Changing Configurations

Step	Key	Result	Notes
1.	Determine which parameters you want to change, and what their new values should be. (In this example, we are changing the value of the PRINT DIRECTION parameter from "Bidirectional" to "Unidirectional.")		
2.	Stop	NOT READY	Places the printer in NOT READY mode.
3.	Scroll ↑ + Scroll ↓	OPERATOR MENU UNLOCKED	Unlocks the Operator Menu, which allows you to make configuration changes.
4.	Menu	OPERATOR MENU QUICK SETUP	
5.	Scroll ↑	OPERATOR MENU PRINTER CONTROL	
6.	Enter	PRINTER CONTROL INTERFACE SELECTION	
7.	Scroll ↑ UNTIL	PRINTER CONTROL PRINT DIRECTION	
8.	Enter	PRINT DIRECTION BIDIRECTIONAL*	
9.	Scroll ↑ UNTIL	PRINT DIRECTION UNIDIRECTIONAL	
10.	Enter	PRINT DIRECTION UNIDIRECTIONAL*	An asterisk (*) appears, indicating this is now the active value.
11.	The configuration you have selected is now the "active" value until you power off the printer.		
To SAVE CHANGES AS A CONFIGURATION that is stored in memory and can later be loaded:			
12.	Menu	OPERATOR MENU PRINTER CONTROL	

Table 2. Changing Configurations (continued)

Step	Key	Result	Notes
13.	Scroll ↑ UNTIL	OPERATOR MENU CONFIGURATION MANAGEMENT	
14.	Go to Table 3, step 6.		
To USE CURRENT CONFIGURATION WITHOUT SAVING:			
15.	Stop	NOT READY	Returns the printer to NOT READY mode.
16.	Scroll ↑ + Scroll ↓	OPERATOR MENU LOCKED	Locks Program mode and the Operator Menu.
17.	Stop	READY	Places the printer in READY mode.
18.	The printer is ready for operation. All parameters are effective as long as the printer is on. When you turn off the printer, the parameters will be erased from memory.		

Saving Your New Configuration



After changing all of the necessary parameters, it is recommended you save them as a configuration that can be stored and loaded later for future use. If you do not save your configuration before you power off the printer, all of your parameter changes will be erased. The Save Current Values option allows you to save up to eight configurations to meet different print job requirements. Configurations 1 through 4 are empty until you save values to them using the Save Current Values option. For example:

Config 1: Selects LQ typeface, 10 cpi, 6 lpi
Config 2: Selects Near LQ typeface, 12 cpi, 8 lpi

Once you have saved a configuration using this option, it will not be lost if you power off the printer. You can load a configuration for a specific print job. You can also modify and resave it. You may want to print your configurations and store them in a safe place, such as inside the printer cabinet.

NOTE: The Protect Custom Sets parameter must be set to disable before you may save a configuration. Once you save a configuration, the Protect Custom Sets parameter automatically returns to enable. Once you change active emulations, any changes to the previously selected emulation will be gone unless they have been saved.

Table 3. Saving Configurations

Step	Key	Result	Notes
1.	If you are already in the configuration menu, go to step 5.		
2.	Stop	NOT READY	Places the printer in NOT READY mode.
3.	Scroll ↑ + Scroll ↓	OPERATOR MENU UNLOCKED	Unlocks the Operator Menu, which allows you to make configuration changes.
4.	Menu	OPERATOR MENU QUICK SETUP	
5.	Scroll ↑ UNTIL	OPERATOR MENU CONFIGURATION MANAGEMENT	
6.	Enter	CONFIGURATION MANAGEMENT RECALL CUSTOM SET	
7.	Scroll ↑ UNTIL	CONFIGURATION MANAGEMENT SAVE CURRENT VALUES	
8.	Enter	SAVE CURRENT VALUES CUSTOM SET 1*	
9.	Scroll ↑ UNTIL	SAVE CURRENT VALUES CUSTOM SET 2	Press until the desired number (1-8) displays.
10.	Enter	SAVING CONFIGURATION	The configuration is now saved in memory. (In this case, config. 2.)
11.	Stop	NOT READY	Returns the printer to NOT READY mode.
12.	Scroll ↑ + Scroll ↓	OPERATOR MENU LOCKED	Locks Program mode and the Operator Menu.
13.	Start	READY	Places the printer in READY mode.
14.	The printer is ready for normal operation. It is recommended you make a printout of your current configuration, as described in Table 1.		

KS Emulation

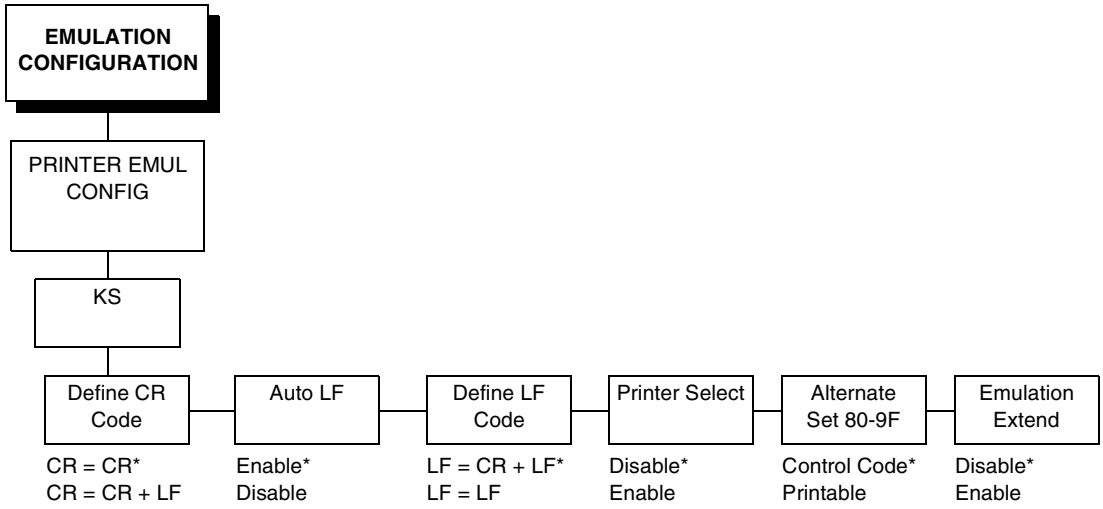


Figure 3. KS Emulation Menu

Define CR Code

The Define CR Code option controls the action of the printer when it receives a Carriage Return code (hex 0D) from the host computer. If this feature is enabled, each time the printer receives a Carriage Return, it inserts an additional Line Feed code (hex 0A) into the data stream. Do not use this feature if the host computer sends Line Feeds to the printer.

- **CR = CR**. Does not insert an extra Line Feed after each Carriage Return.
- **CR = CR + LF**. Inserts an extra Line Feed after each Carriage Return.

Auto LF

This option defines the printer actions when print data is received past the forms width setting.

- **Enable**. Performs an automatic carriage return and line feed when data is received past the forms width.
- **Disable**. Discards any data past the forms width.

Define LF Code

The Define LF Code option controls the action of the printer when it receives a Line Feed code (hex 0A) from the host computer. If this feature is enabled, each time the printer receives a Line Feed, it inserts an additional Carriage Return code (hex 0D) into the data stream. This feature can be used in most installations, but it is required if the host computer does not send Carriage Returns to the printer.

- **LF = CR + LF**. Adds an extra Carriage Return with each Line Feed.
- **LF = LF**. Does not add a Carriage Return with a Line Feed.

Printer Select

- **Disable**. Ignores the ASCII DC1 and DC3 control codes.
- **Enable**. Disables the printer when a DC1 control code is received, and enables the printer when a DC3 control code is received.

Alternate Set 80-9F

- **Control Code**. Interprets data in the range of hex 80 through hex 9F as a control code.
- **Printable**. Prints data in the range of hex 80 through hex 9F.

Emulation Extend

- **Disable**. Does not select the extension command.
- **Enable**. Selects the extension command (ESC 4/ESC 5 to select/cancel Italic Printing and ESC SP to select Intercharacter Spacing.

Print Format Menu

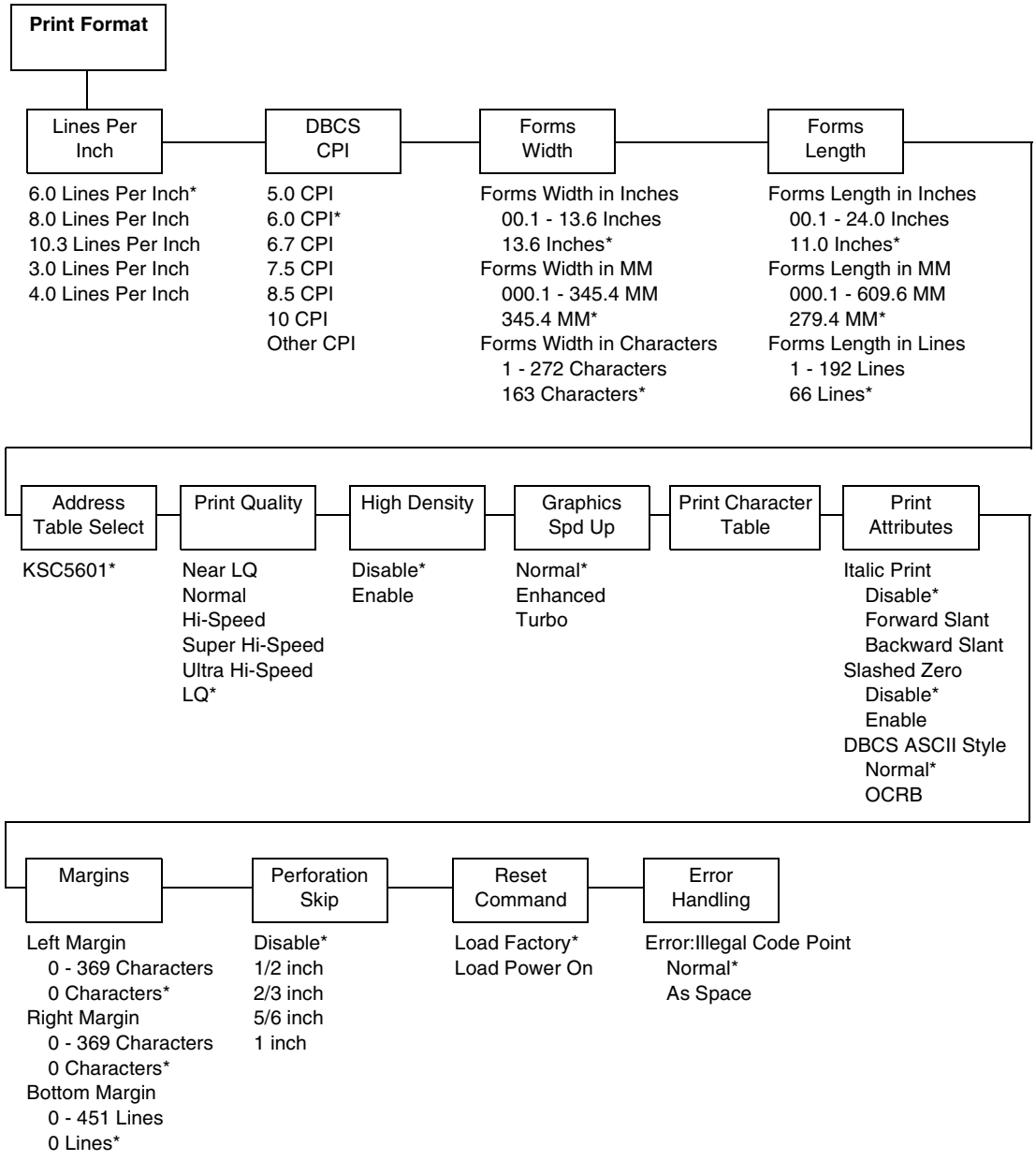


Figure 4. Print Format Menu

Lines Per Inch

Lines Per Inch (LPI) specifies the number of lines that will print per vertical inch.

- **6.0 Lines Per Inch** (the default)
- **8.0 Lines Per Inch**
- **10.3 Lines Per Inch**
- **3.0 Lines Per Inch**
- **4.0 Lines Per Inch**

It is possible to specify an LPI value that causes the page length to exceed the maximum allowed page length. In this case, the printer automatically changes the page length to the highest valid value for the new LPI.

NOTE: Receipt of a data stream control that specifies the LPI value overrides the value entered via the operator panel.

DBCS CPI

DBCS CPI (Characters Per Inch) specifies the number of double-byte characters that will print per horizontal inch.

- **5.0 CPI**
- **6.0 CPI** (the default)
- **6.7 CPI**
- **7.5 CPI**
- **8.5 CPI**
- **10 CPI**
- **Other CPI**

Forms Width

Forms Width specifies the forms width in inches, millimeters, or characters. All three measurements will update the same configuration parameter. The default values for forms width are 13.6 inches, 345.4 mm, and 136 characters.

Descriptions follow for the three ways of specifying the forms width:

- **Forms Width in Inches**: Allows you to input the forms width in inches. Valid values range from 00.1 through 13.6 inches, in increments of 0.1 inch.
- **Forms Width in MM**: Allows you to input the forms width in millimeters. Valid values range from 0.1 through 345.4 mm, in increments of tenths of a millimeter (0.1 mm).

- **Forms Width in Characters**: Allows you to input the forms width in characters. The maximum forms width in characters depends on the current CPI setting; it is equal to the maximum forms width in inches multiplied by the current CPI setting.

  For example, at 10 CPI, the maximum forms width is:

  10 CPI x 13.6 inches = 136 characters

  Only valid forms width values will be accepted. If a width is selected that is larger than the maximum width for the current CPI, then the maximum width will be used. If a larger width value is desired, then the CPI value must be changed first.

Table 4 lists the maximum number of English characters that can be printed for a given DBCS CPI setting.

Table 4.

DBCS CPI Setting	Maximum Forms Width (in Characters)
5.0	136
6.0	163*
6.7	181
7.5	204
8.5	232
10	272
* = Default	

IMPORTANT **If the forms width is set in characters and the CPI is changed, the effective page width is changed to be equal to the forms width in characters divided by the new CPI. For example, if the current forms width is 132 characters and the CPI is changed from 5 CPI to 7.5 CPI, the effective forms width changes from 13.2 inches to 8.8 inches.**

NOTE: This applies only if the forms width is set in characters. If the forms width is set in inches or millimeters (mm), changing the CPI does not affect the effective forms width.

Receipt of a data stream control code which changes the forms width overrides the forms width previously specified via the operator panel.

Forms Length

Forms Length specifies the forms length in inches, millimeters, or lines. All three measurements will update the same configuration parameter. The default values for forms length are 11 inches, 279.4 millimeters, or 66 lines per page.

Descriptions follow for the three ways of specifying the forms length:

NOTE: The actual value displayed for forms length set in inches and mm can be greater than the maximum values listed on the operator panel because the number of lines can exceed actual inches and mm values.

- **Forms Length in Inches**: Allows you to input the forms length in inches. Valid values range from 00.1 through 24 inches, in increments of 0.1 inch.
- **Forms Length in MM**: Allows you to input the forms length in millimeters. Valid values range from 000.1 through 609.6 millimeters, in increments of tenths of a millimeter (0.1 mm).
- **Forms Length in Lines**: Allows you to input the forms length in lines. The maximum forms length in lines depends on the current LPI setting; it is equal to the maximum forms length in inches multiplied by the current LPI setting.

  For example, at 6 CPI, the maximum forms length is:

  6 CPI x 24 inches = 144 characters

Only valid forms length values will be accepted. If you select a length that is larger than the maximum length for the current LPI, the maximum length will be used. If you need a longer page length, you must first change the LPI.

IMPORTANT **If the forms length is set in lines and you change the LPI, the effective page length changes to the forms length in characters divided by the new LPI. For example, if the current forms length is 66 lines and you change the LPI from 6 LPI to 8 LPI, then the effective forms length changes from 11 inches to 8.25 inches.**

NOTE: This only applies if the forms length is set in lines. If the forms length is set in inches or millimeters, changing the LPI does not affect the effective forms length.

Receipt of a data stream control code which changes the forms length overrides the forms length previously specified via the operator panel.

Address Table Select

This option specifies the only address table supported: KSC5601.

Print Quality

This parameter specifies the density (quality) of printing:

- **LQ** (the default)
- **Near LQ**
- **Normal**
- **Hi-Speed**
- **Super Hi-Speed**
- **Ultra Hi-Speed**

NOTE: Receipt of a data stream control sequence that changes the print quality overrides the print quality specified via the operator panel.

High Density

This menu will allow users to print High Density LQ.

- **Disable** (the default). LQ print as its usual density.
- **Enable**. Allows the LQ print quality to print in higher print density. It will not affect when other print quality are selected.

Graphics Spd Up

This menu is used to increase (speed up) graphic printing speed by turning on the Enhanced/Turbo mode.

- **Normal** (the default). The printer prints at the given input graphics resolution.
- **Enhanced**. The printer provides first-level speed up, which means the speed is faster than Normal mode.
- **Turbo**. The printer provides second-level speed up, which means the speed is faster than Enhanced mode.

Print Character Table

This parameter prints a table of the current interface character set.

Print Attributes

The Print Attributes parameter is used to determine character and page formatting.

- **Italic Print**: Prints text in italics, when enabled. Both a forward and backward slanting italic are available.
  - **Disable** is the default.
  - **Forward Slant** uses italic print that slants forward.
  - **Backward Slant** uses italic print that slants backward.
- **Slashed Zero**: Prints zeros with a slash, when enabled, to distinguish zeros from the alphabetic capital “O.”
  - **Disable** is the default.
  - **Enable** prints zeros with a slash.
- **DBCS ASCII Style**: Determines the ASCII characters (0X21 to 0X7F) printing style.
  - **Normal** is the default.
  - **OCRB** allows the numeric characters print in OCRB style.

Margins

The Margins parameter defines where the bottom, left, and right page margins are located.

- **Left Margin**: Defines where print position 1 is located. The left margin is specified as the number of characters from the left edge of the forms. Valid values range from 0 through 369 characters. The default is 0 characters.
- **Right Margin**: Defines where the last print position is located. The right margin is specified as the number of characters from the right edge of the forms. Valid values range from 0 through 369 characters. The default is 0 characters.
- **Bottom Margin**: Defines the location of the last print line on the page. The bottom margin is specified as the number of lines from the bottom of the forms position. Valid values range from 0 through 451 lines. The default is 0 lines.

Perforation Skip

Perforation Skip allows or prevents printing on page perforation. When enabled, it sets up a skip-over margin of 1/2 inch, 2/3 inch, 5/6 inch, or 1 inch. For example, a skip-over margin of 1 inch allows a 1-inch margin at the bottom of the page perforation.

The default is Disable.

Reset Command

Reset Command specifies the configuration that will be used by the printer after the reset command is issued.

- **Load Factory**: Will load the factory default configuration for printer use. This is the default selection.
- **Load Power On**: Will load the selected power on configuration for printer use.

Error:Illegal Code Point

This command determines the way illegal DBCS characters are processed.

- **Normal**: Will ignore illegal DBCS characters. This is the default selection.
- **As Space**: Will insert two space characters (0X20, 0X20) when the data stream contains error DBCS coding.

3 *LinePrinter Plus KS Emulation*

KS Emulation

"Emulation" refers to the ability of a printer to execute the commands of other printer control languages. In KS emulation mode, your printer prints files coded for Epson LQ series printers, particularly the KS.

Exceptions And Differences

Because of mechanical differences between your printer (a line matrix printer) and moving printhead serial matrix printers, some features are approximated or not supported.

- The KS emulation supports the following fonts: LQ, Near LQ, Normal, Hi-Speed, Super Hi-Speed, and Ultra Hi-Speed.
- 8-pin/24-pin bit-image graphics are supported, including all plotter and CRT densities.

Default Values And States

Your printer stores a set of typical operating states and conditions in the flash memory. The first time you power up the printer, the factory settings in Table 5 are automatically invoked.

Table 5. Factory Settings

Characteristic	Default Setting
Lines Per Inch	6.0
DBCS CPI	6.0
Print Quality	LQ
High Density	Disable
Graphics Spd Up	Disable
Italic Print	Disable
Slashed Zero	Disable
DBCS ASCII Style	Normal
Left Margin	0 columns
Right Margin	0 columns
Bottom Margin	0 lines
Perforation Skip	Disable
Form Length	11.0 inches 279.4 millimeters 66 lines
Form Width	13.6 inches 345.4 millimeters 163 characters
Address Table Select	KSC5601
Reset Command	Load Factory
Error:Illegal Code Point	Normal
Define CR Code	CR = CR
Auto LF	Enable
Define LF Code	LF = CR + LF
Printer Select	Disable
Alternate Set 80-9F	Control Code

Table 5. Factory Settings

Characteristic	Default Setting
Emulation Extend	Disable

Escape Sequences

Some KS control codes consisting of more than one character are called escape sequences because the first character in the sequence is the ASCII ESCape character. ESC alerts the printer that a special function command—not printable characters—follows.

The format for an escape sequence is:

ESC (parameter 1)(parameter 2)...(parameter *n*)

For example, to select emphasized (offset) print, send the ESC character immediately followed by the E character (do not add a space character):

ASCII: ESC E **Hex**: 1B 45 **Dec**: 27 69

Super-Set Commands

The unique control code sequence for both SSCC and ASSC commands are defined in the table below:

Control Code	ASCII Value	Hex Value	Dec Value
SSCC	ESC | } ;	1B 7C 7D 3B	27 127 125 59
ASSC	ESC | } ; q	1B 7C 7D 3B 71	27 124 125 59 113

Set And Reset Codes

Set and reset are other ways of saying turn on and turn off; select and deselect; or enable and disable.

Some printer features are set and reset with an escape sequence and the numbers 1 or 0. In those cases, you can represent 1 and 0 as hexadecimal codes 01 and 00, or as the ASCII codes for the numerals 1 and 0 (hexadecimal 31 and 30).

Configuring The KS Emulation With Control Codes

The remainder of this chapter describes the KS printer control language codes that may be sent from a host computer attached to the printer in order to invoke and configure numerous KS emulation functions.

Format For Control Code Descriptions

The following information is listed for each code (where applicable and possible) in this chapter:

ASCII Mnemonic. The ASCII name for the control code.

Hex Code. The hexadecimal equivalent of the code. (For octal equivalents, refer to Appendix A.)

Dec Code. The decimal equivalent of the code.

Purpose. The function(s) of the control code.

Comment. A description of exceptions or limitations to normal use.

Example. A sample is provided for some control codes to illustrate how the code is used.

Control Code Index

The following index lists the control codes by function, ASCII mnemonic, and page number. Some control code functions can also be selected at the control panel.

Absolute Horizontal Print Position

ASCII Code ESC t *n1 n2 n3*

Hex Code 1B 74 *n1 n2 n3*

Dec Code *27* 116 *n1 n2 n3*

Purpose Moves the stimulated print head to an Absolute Horizontal Print position using the following formulas:

horizontal position = (*n1* x 100) + (*n2* x 10) + *n3*

Where:

n1 = 0 (hex 30) through 1 (hex 31)
n2 = 0 (hex 30) through 9 (hex 39)
n3 = 0 (hex 30) through 0 (hex 39)
horizontal position = 1 through 136

Comment The unit settinf for this command is based on the present size of the ASCII character. Only a condensed print (SI) or CPI (ESC q) command will change the character size.

When moving to an Absolute Horizontal Print position using ESC t, then underline, shadow, and reverse do not print. When the One and a Half Times mode (ESC s) is on, the Absolute Horizontal Print position will not activate until One and a Half Times mode is turned off.

If the distance goes beyond the right margin, the sequence is ignored.

Auto Wrap Mode

ASCII Code ESC d *n*

Hex Code 1B 64 *n*

Dec Code *27* 100 *n*

Purpose When data is printed beyond the right margin in Auto Wrap mode, an LF is inserted automatically. The next character is then printed on the next line from the left margin, and all one line commands selected with SO and ESC y are reset.

Where:

n = SOH (hex 01) or 1 (hex 31) turns on Auto Wrap mode
n = NUL (hex 00) or 0 (hex 30) turns off Auto Wrap mode

Comment Auto Wrap mode is on by default. When Auto Wrap mode is off, any data which occurs beyond the right margin is cut off.

Backspace

ASCII Code BS

Hex 08

Dec 8

Purpose Moves the print position to the left a distance equal to an ASCII character in the current pitch, plus any additional intercharacter space.

Discussion The code is ignored if the logical print head is positioned at the first character column.

Example If you were to print five “T” characters followed by two BS commands and two “=” characters, the output would look like the sample below:

TTT==

Barcode Printing

ASCII Code

SSCC c *t*; *d data d* [; N *n* ; *xxxx* ; *yyyy*] [; X *mmmm*] [; P *p*] [; C] [; H *hh*]

Hex Code

SSCC 63 *t*; *d data d* [; 4E *n* ; *xxxx* ; *yyyy*] [; 58 *mmmm*] [; 50 *p*] [; 43] [; 48 *hh*]

Dec Code

SSCC 99 *t*; *d data d* [; 78 *n* ; *xxxx* ; *yyyy*] [; 88 *mmmm*] [; 80 *p*] [; 67] [; 72 *hh*]

where *t* = type of Barcode

T (ASCII)	t (hex)	Selects Barcode
B	42	Codabar
C	43	Code 39
9	39	Code 93
D	44	Code 128
8	38	EAN-8
1	31	EAN-13
F	46	FIM

T (ASCII)	t (hex)	Selects Barcode
G	47	German I-2/5
I	49	Interleaved 2/5
M	4D	MSI
4	34	PDF 417
O	4F	PostBar
P	50	POSTNET
R	52	Royal Mail
T	54	Telepen
V	56	UCC/EAN-128
A	41	UPC-A
E	45	UPC-E
S	53	UPC-Shipping
U	55	UPS 11

where *d* = barcode delimiter, which can be any character not used in the barcode data field.
data = variable length printable data field (PDF); character set is alphanumeric.

The following optional parameters are allowed after the PDF:

where N activates the offset
n = the *x* and *y* coordinate unit system

n **(ASCII)**	**Selects Value**
0	Use current cpi and lpi values
1	Use 1/4 inch value
2	Use 1/2 centimeter value : 1/(2.54x2)
3	Use 1 mm value : 1/(25.4)
4	Use target barcode dot (refer to the table below)

where *n* = 4:

Front Panel Typeface	X Offset Unit (Inch)	Y Offset Unit (Inch)
LQ	1/180	1/180
Near LQ	1/120	1/120
Normal	1/180	1/144
Hi-Speed	1/180	1/120
Super Hi-Speed	1/180	1/90
Ultra Hi-Speed	1/180	1/90

where *xxxx* = 4-digit upper left corner *x* (horizontal axis)
yyyy = 4-digit upper left corner *y* (vertical axis)
X activates magnification
mmmm = barcode magnification

The possible magnifications are listed below:

Barcode Type	Magnification
Code 39	X4 X3 X2 X1 X1.5 X1A X1B *X1C *X1D *X1E
	X4 X3 X2 X2A X1 X1A X1B
Interleaved 2/5	X4 X3 X2 X2A X1 X1A X1B
German I-2/5	X4 X3 X2 X2A X1 X1A X1B
UPC Shipping	X4 X3 X2 X1 X1.5 X1A X1B *X1C *X1D *X1E
Telepen	X4 X3 X2 X1
	X4 X3 X2 X1 X1.5
MSI	X4 X3 X2 X1 X1.5
Code 128	X4 X3 X2 X1 X1.5
UCC/EAN-128	X4 X3 X2 X1 X1.5
Code 93	X2 X1
UPS 11	X2 X1
UPC-A	X2 X1
UPC-E	X2 X1
EAN 8	X4 X3 X2 X1
EAN 13	X1

Barcode Type	Magnification
Codabar	X1 X1A
Postnet	X1 X1A
Royal Mail	X1
Postbar	X3 X2 X1
FIM	
PDF417	
*Note: the X1C, X1D, and X1E values can only be printed for horizontal 180 dpi barcodes. If these values are sent for horizontal 120 dpi barcodes, it will print as value X1.	

where P activates the printable data field variable

p = the location of PDF. “A” - Above, “B” - Below (default), and “N” - None. Note: FIM, Postbar, and PDF417 do not support this parameter.

C = calculate and plot check digit (if available as an option). The default is no check digit, if the check digit is allowed to be optional.

H = activates the height variable

hh = 2-digit barcode height in 1/10.”

NOTE: This is not the KS Emulation command. This is an additional command for the D-Series printers only.

Bell

ASCII Code BEL

Hex 07

Dec 7

Purpose Sounds the printer’s bell for 1/10 second.

Bit Image Select

ASCII Code ESC * *m n1 n2 d1 ... dk*

Hex 1B 2A *m n1 n2 d1 ... dk*

Dec 27 42 *m n1 n2 d1 ... dk*

Purpose Prints dot-graphics in 8- or 24-dot columns, depending on the defined parameters.

Where:
m = the dot density (see Table 6).
n1 n2 = total number of columns of graphics data to follow:
number of dot columns = (*n2* x 256) + *n1*
n1 ranges from 0 through 255; *n2* ranges from 0 through 31.
d1 ... dk = bytes of graphics data; *k* is determined by multiplying the total number of columns times the number of bytes required for each column.

Table 6. Dot Density

m	Horizontal Density (dpi)	Vertical Density (dpi)	Dots per Column	Bytes per Column
0	60	60	8	1
1	120	60	8	1
2	120	60	8	1
3	240	60	8	1
4	80	60	8	1
6	90	60	8	1
32	60	180	24	3
33	120	180	24	3
38	90	180	24	3
39	180	180	24	3
40	360	180	24	3

Bold Print

ASCII Code ESC E ESC F

Hex Code 1B 45 1B 46

Dec Code 27 69 27 70

Purpose ESC E sets the weight attribute of the font to **bold**.
ESC F sets the weight attribute of the font to normal (cancels the bold weight previously set by ESC E).

Comments The ESC E command increases the weight of printed lines and characters, resulting in bolder printing.

Cancel Italic Font

ASCII Code ESC 5

Hex Code IB 35

Dec Code 27 53

Purpose Sets the style attribute of the font to normal (the default). (Cancels the italic style previously selected with the ESC 4 command.)

Comment This command changes the Italic Print front panel setting.

NOTE: This is not the KS Emulation command. This is an additional command for the D-Series printer only.

Cancel Line

ASCII Code CAN

Hex Code 18

Dec Code 24

Purpose Clears all printable characters and bit-image graphics on the current line and moves the print position to the left margin.

Carriage Return

ASCII Code CR

Hex Code 0D

Dec Code 13

Purpose Returns the simulated print head to the left margin.

Comment The CR code may or may not cause printing or paper motion, depending on the configuration as set from the control panel. If CR=CR is set, the characters following the CR are printed over the previous characters on the line. If CR=CR+LF is set, the paper is moved one line at the current line spacing. This automatic LF will also cancel all single line print attributes.

Condensed Print (Set/Reset)

ASCII Code SI DC2

Hex Code 0F 12

Dec Code 15 18

Purpose Condenses print pitch to Hangul 10 CPI/English 20 CPI. DC2 cancels this command.

Comment Control code SI affects all subsequent characters. After receiving code SI, all characters are printed condensed until the printer is reset by DC2, a printer reset, or a new print mode control code.

One and a Half Times mode and Superscript/Subscript mode are ignored in Condensed mode. Conversely, condensed mode commands are ignored if One and a Half Times or Superscript/ Subscript mode is turned on.

Example The program below shows condensed character printing and reset.

```
Control code
SI selects
condensed character printing.
Control code DC2
resets condensed character printing.
```

Double Height Upper/Lower Part Of Character

ASCII Code ESC i *n*

Hex Code 1B 69 *n*

Dec Code 27 105 *n*

Purpose Turns the double height upper/lower character feature on or off.

Where:
n = SOH (hex 01) or 1 (hex 31) prints the upper part of character with double height
n = STX (hex 02) or 2 (hex 32) prints the lower part of character with double height
n = NUL (hex 00) or 0 (hex 30) reset; print as normal character

Comment The ESC i *n* command vertically enlarges the upper or lower part of a character. When printing the upper part in this mode, the minimal line spacing is 24/180 inches. This prevents overlapping after an LF. When printing the lower part and executing an LF command, the paper moves by:
(set value) x 2 - 24/180 inches. If the calculated value is less than or equal to 0, the adjustment of line spacing is ignored. To set line spacing, the line spacing command must precede the ESC i *n* command.

The underline cannot be printed with the upper part of a character. This command is not cleared by LF or CR commands.

See Figure 5 for an illustration of this command.

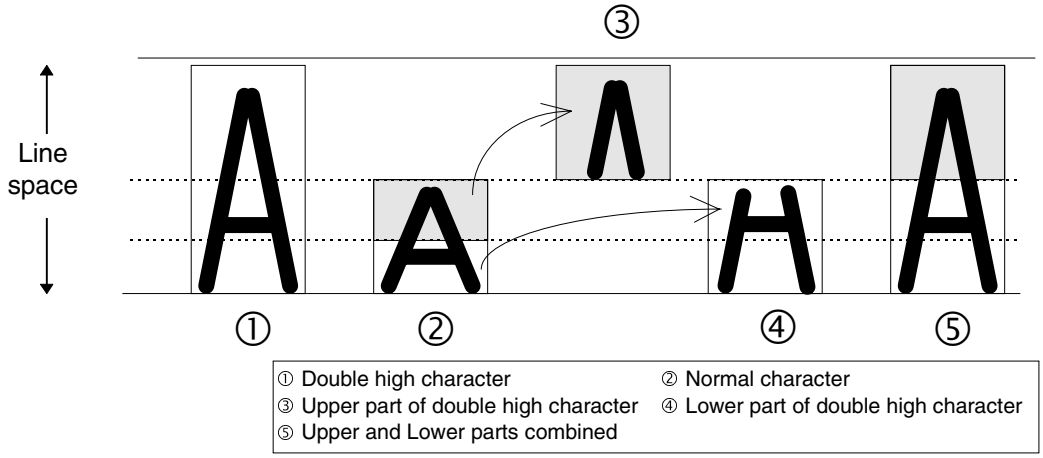


Figure 5. Double Height Upper/Lower Part Of Character Example

Double High Print

ASCII Code ESC y *n*

Hex Code 1B 79 *n*

Dec Code 27 121 *n*

Purpose Turns double high print on and off.

Where:
n = SOH (hex 01) or 1 (hex 31) turns double high print on
n = NUL (hex 00) or 0 (hex 30) turns double high print off

Comment When ESC y is received, all characters are printed twice as high until reset. This command is cancelled when the printer receives the following commands: LF, FF, VT, CR, or ESC J.

This command is ignored when One and a Half Times mode is turned on, and the One and a Half Times command cancels this feature.

Double Strike

ASCII Code ESC G ESC H

Hex Code 1B 47 1B 48

Dec Code 27 71 27 72

Purpose ESC G turns on double strike printing.
ESC H turns off double strike printing.

Comment ESC G makes text bolder by printing each dot twice, the second dot offset to the right of the first by a distance equal to 1/2 the width of a dot.

Example The following program illustrates double strike character printing.

```
Control code ESC G
selects bold character printing,
for example: AaBbCcDdEeFfGgHhIiJjKkLlMmNnOoPp.
Control code ESC H
cancels bold character printing.
```

Double Wide Print

ASCII Code ESC W *n*

Hex Code 1B 57 *n*

Dec Code 27 87 *n*

Purpose Turns double wide print on and off.

Where:
n = SOH (hex 01) or 1 (hex 31) turns double wide print on
n = NUL (hex 00) or 0 (hex 30) turns double wide print off

Comment When ESC W is received, all characters are printed twice as wide until reset.

This command is ignored when One and a Half Times mode is turned on, and the One and a Half Times command cancels this feature.

Example The following program illustrates double wide character printing.

```
Control code
ESC W 1 selects
expanded character printing.
Control code
ESC W 0 resets
expanded character printing.
```

Double Wide Print (One Line)

ASCII Code SO DC4

Hex Code 0E 14

Dec Code 14 20

Purpose Selects double wide print for one line only.
DC4 cancels this command.

Comment This control code is a line-by-line print attribute; when SO is received, the characters on the current line print twice as wide and then reset automatically.

This control code is cancelled by one of the following codes: LF, FF, VT, DC4, ESC W 0, CR, or ESC J. If Auto Wrap is active, once the data reaches the end of the line double wide print is cancelled.

SO does not work in One and a Half Times mode, and it will recover when One and a Half Times mode is cancelled. In Compressed mode, the width of the printed character will print double the size of the compressed character.

Example The following program illustrates double wide print for one line only.

```
Control code
SO selects
expanded character printing
for one line only.
```

Form Feed

ASCII Code FF

Hex Code 0C

Dec Code 12

Purpose Prints the data in the buffer, if any, then moves the paper to the top of the next form.

Comment The simulated print head moves to the left margin. This code cancels one-line double-width printing selected with the SO or ESC SO commands.

Form Length By Lines

ASCII Code ESC C *n*

Hex Code 1B 43 *n*

Dec Code 27 67 *n*

Purpose Sets the form length by lines.

Where:
n = 1 through 127 (hex 01 through hex 7F) to specify the number of lines per form at the current line spacing.

Comment The current line becomes the first line of the form. Setting the form length cancels the bottom margin setting.

Changing the line spacing does not affect the current page length setting, but does change the total number of lines. If the line spacing is changed, using only LF commands may not reach the exact position of the top-of-form.

This command overrides the front panel setting for Forms Length In Lines.

Graphic Printing

ASCII Code SSCC * m nL nH d1 ... dk

Hex Code SSCC 2A m nL nH d1 ...dk

Dec Code SSCC 42 m nL nH d1 ... dk

Purpose Prints dot graphics in 12-or 16-dot columns, depending on the following parameters:

Where:

0 < = nL < =255; 0 < = nH < = 31

m = 30, 31, 32

nL nH specifies the total number of columns of graphics data that follow (number of dot columns) = (nH x 256 + nL) d1...dk bytes of graphics data; k is determined by multiplying the total number of columns times the number of bytes required for each column.

Parameter *m* in ESC*	Horizontal Density (dpi)	Vertical Density (dpi)	Dots per Column	Bytes per Column
30	90	90	12	2
31	120	120	16	2
32	90	90	16	2

NOTE: This is not the KS Emulation command. This is an additional command for the D-Series printer only.

Graphics Select (60 dpi)

ASCII ESC K *n1 n2 d1 ... dk*

Hex 1B 4B *n1 n2 d1 ... dk*

Dec 27 75 *n1 n2 d1 ... dk*

Purpose Prints bit-image graphics in 8-dot columns, at a density of 60 horizontal by 60 vertical dpi, depending on the defined parameters.

Where:
n1 n2 = total number of columns of graphics data to follow:
number of columns = (*n2* x 256) + *n1*
n1 ranges from 0 through 255; *n2* ranges from 0 through 3.
d1 ... dk = bytes of graphics data; range from 0 through 255.

Comment This command is identical to the ESC * 0 command (see page 40).

Graphics Select (120 dpi)

ASCII ESC L *n1 n2 d1 ... dk*

Hex 1B 4C *n1 n2 d1 ... dk*

Dec 27 76 *n1 n2 d1 ... dk*

Purpose Prints bit-image graphics in 8-dot columns, at a density of 120 horizontal by 60 vertical dpi, depending on the defined parameters.

Where:
n1 n2 = total number of columns of graphics data to follow:
number of columns = (*n2* x 256) + *n1*
n1 ranges from 0 through 255; *n2* ranges from 0 through 6.
d1 ... dk = bytes of graphics data; range from 0 through 255.

Comment This command is identical to the ESC * 1 command (see page 40).

Graphics Select (180 dpi)

ASCII ESC n *n1 n2 d1 ... dk*

Hex 1B 6E *n1 n2 d1 ... dk*

Dec 27 110 *n1 n2 d1 ... dk*

Purpose Prints bit-image graphics in 24-dot columns, at a density of 180 horizontal by 180 vertical dpi, depending on the defined parameters.

Where:
n1 n2 = total number of columns of graphics data to follow:
number of columns = ((*n2* x 256) + *n1*) x 3
n1 ranges from 0 through 255; *n2* ranges from 0 through 9.
d1 ... dk = bytes of graphics data; range from 0 through 255.

Comment This command is identical to the ESC * 39 command (see page 40).

Hangul/English CPI Select

ASCII Code ESC q *n*

Hex Code 1B 71 *n*

Dec Code 27 113 *n*

Purpose Sets character pitch to one of the values listed in Table 7.

Table 7. Hangul/English CPI Select

n (Hex)	CPI
0 or 30	Hangul 5 CPI English 10 CPI
1 or 31	Hangul 6 CPI English 12 CPI (the default)
2 or 32	Hangul 10 CPI English 10 CPI
3 or 33	Hangul 6.7 CPI English 13.3 CPI
4 or 34	Hangul 7.5 CPI English 15 CPI
5 or 35	Hangul 8.5 CPI English 17 CPI

Comment This function has no effect on One and a Half Times mode and condensed mode.

Hangul/English Mode Select

ASCII Code ESC h *n*

Hex Code 1B 68 *n*

Dec Code 27 104 *n*

Purpose Switches between Hangul/English mode and English-only mode.

Where:
n = SOH (hex 01) or 1 (hex 31) selects Hangul/English mode
n = NUL (hex 00) or 0 (hex 30) selects English-only mode

Comment In Hangul/English mode, only ASCII characters in the range below hex 80 are addressed. Anything above this range are Hangul characters following the Korean standard code table (KSC 5601).

In English-only mode, the characters in the range above hex 80 are extended characters, and can be recognized as either control codes or printable characters with the ESC 7 and ESC 6 commands, respectively (see page 58).

Hangul Myunjo/Gothic Character Select

ASCII Code ESC m *n*

Hex Code 1B 6D *n*

Dec Code 27 109 *n*

Purpose Selects the typeface of all characters following the command.

Where:
n = SOH (hex 01) or 1 (hex 31) selects Gothic style
n = NUL (hex 00) or 0 (hex 30) selects Myunjo style

Comment The Hangul characters in the Hangul code table can be selected as Myunjo or Gothic. The remainder of the code table (e.g. special and Chinese characters) remains the same. The default is Myunjo typeface.

Home Print Head

ASCII Code ESC <

Hex Code 1B 3C

Dec Code 27 60

Purpose The print head moves to the extreme left position, so the next line prints left to right.

Horizontal Tab Execute

ASCII Code HT

Hex Code 09

Dec Code 09

Purpose Moves the simulated print head to the next horizontal tab stop set by the ESC D command.

Comment The unit setting for this command is based on the present size of the ASCII character. Only a condensed print (SI) or CPI (ESC q) command will change the character size.

If double wide or Superscript/Subscript mode is active, the Absolute Horizontal Print position is kept the same.

The printer ignores this command if no tab is set to the right of the current position or if the next tab is to the right of the right margin. Character scoring (underline, overscore, and strikethrough) is not printed between the current print position and the next tab when this command is sent.

Horizontal Tab Set/Release

ASCII Code ESC D *n1 ... nk* NUL

Hex Code 1B 44 *n1 ... nk* 00

Dec Code 27 68 *n1 ... nk* 0

Purpose Sets up to 28 horizontal tab positions in the current character pitch, measured from the left margin position.

Where:
n = 1 through 255 (hex 01 through hex FF)
k = 1 through 28 (hex 01 through hex 1C)

n1 through *n28* specify the character column of the tab positions. NUL is the sequence terminator. ESC D NUL clears all tabs.

Comment The values of *n* must be listed in ascending order or they are ignored. Tabs greater than 28 are ignored. The printer does not move the print position to any tabs beyond the right-margin position. However, all tab settings are stored in the printer's memory; if you move the right margin, you can access previously ignored tabs.

After tabs are set, HT moves the simulated print head to the next tab stop. Sending ESC @ initializes the printer and resets the tabs to every eighth character column (which is the default).

Changing the character pitch does not affect current tab settings. The tab settings move to match any movement in the left margin.

Example The following example illustrates how to set horizontal tabs.

```
Control code
ESC D CHR$(4);CHR$(10);CHR$(0)
sets tab stops at columns 4 and 10.
Control code HT
accesses the tab stops as follows:
    column 4
           column 10
```

Initialize Printer

ASCII Code ESC@

Hex Code 1B 40

Dec Code 27 64

Purpose Resets all print-related parameters to the power-up configuration values.

Comment Restores the power-up configuration. The print buffer is cleared of printable data on the line preceding the command. Current position is set as top-of-form.

All settings, such as font, international language selection, etc. are reset to the power-up default values. Character-by-character and line-by-line attributes are canceled. All channels of the vertical format unit are cleared. This command resets the horizontal tabs to every eigth character column. Interface parameters and printer protocol selection are not affected.

NOTE: This is not the KS Emulation command. This is an additional command for the D-Series printer only.

Line Feed

ASCII Code LF

Hex Code 0A

Dec Code 10

Purpose Prints the data in the buffer (if any) and advances the vertical character position a distance of one line at the current line spacing.

Comment If configured for LF equals newline (LF=CR+LF) from the printer's front panel, the simulated print head is moved to the left margin. Otherwise, it is not moved from its current position.

This code cancels single line print attributes selected with the SO, ESC w, or ESC y commands.

If the LF command moves the print position below the bottom margin on continuous paper, the paper advances to the Top-Of-Form position on the next page.

Line Feed *n*/180 Inch

ASCII Code ESC J *n*

Hex Code 1B 4A *n*

Dec Code 27 74 *n*

Purpose Immediately advances the paper *n*/180 inch.

Where:
n = 0 through 255 (hex 00 through hex FF)

Comment *n* = 0 is ignored. This command produces an immediate line feed but does not affect line spacing or produce a carriage return. Any one-line-only print attributes in effect are canceled.

Small values of *n* can result in overlapping lines. Overlapping lines can also occur if print attributes such as double high, superscript, or subscript characters are used on the same line.

If One and a Half Times mode (ESC s) is on, any value of *n* specified between 1 and 24 advances the paper 24/180 inch. Any value of *n* specified between 25 and 255 advances the paper *n*/180 inch.

Example The following example illustrates *n*/180-inch line spacing.

```
Control code ESC J 132



performs a 132/180 inch
line feed function for one line only.
```

Line Spacing 1/*n* Inch

ASCII Code ESC c *n*

Hex Code 1B 63 *n*

Dec Code 27 99 *n*

Purpose Specifies the line spacing at 1/*n*-inch increments.

Where:
n = 3 through 6, 8 or 60 (hex 03 through 06, 08, 3C)

Comment When this control sequence is received, all subsequent line feeds are 1/*n*-inch until a new line spacing is selected or the printer is reset. This setting overrides line spacing set at the control panel.

Line Spacing 1/6 Inch (6 lpi)

ASCII Code ESC 2

Hex Code 1B 32

Dec Code 27 50

Purpose If this command is following an ESC A *n* command, line spacing is set at *n*/60 inch. Otherwise, line spacing is set at 1/6 inch (6 lpi) for subsequent line feeds.

Comment The 2 is ASCII character 2, not hex 2. This control code overrides line spacing set at the control panel.

Example The following example illustrates 1/6-inch line spacing.

```
Control code ESC 2 sets
line spacing at
6 lpi for all subsequent lines
until reset or another spacing is selected.
```

Line Spacing 1/8 Inch (8 lpi)

ASCII Code ESC 0

Hex Code 1B 30

Dec Code 27 48

Purpose Sets the line spacing to 1/8 inch (8 lpi) for subsequent line feeds.

Comment The 0 is ASCII character 0, not hex 0. When ESC 0 is received, all lines are printed at 8 lpi until a new line spacing is selected or the printer is reset. This control code overrides line spacing set at the control panel.

Example The following example illustrates 1/8-inch line spacing.

```
Control code ESC 0 sets
line spacing at
1/8 (8 lpi) inch for all subsequent lines
until reset or another spacing is selected.
```

Line Spacing 1/10 Inch (10.3 lpi)

ASCII Code ESC 1

Hex Code 1B 31

Dec Code 27 49

Purpose Sets the line spacing to 1/10 inch (10.3 lpi) for subsequent line feeds. This control code overrides line spacing set at the control panel.

Comment The 1 is ASCII character 1, not hex 1. When ESC 1 is received, all lines are printed at 10.3 lpi until a new line spacing is selected or the printer is reset.

Line Spacing *n*/60 Inch

ASCII Code ESC A *n*

Hex Code 1B 41 *n*

Dec Code 27 65 *n*

Purpose Sets a line spacing of *n*/60 inch for subsequent line feeds. This command takes effect only when followed by an ESC 2 command.

Where:
n = 1 through 85 (hex 01 through hex 55) (all other values are ignored)

Comment When this control sequence is received, all subsequent line feeds are *n*/60-inch until a new line spacing is selected or the printer is reset. This setting overrides line spacing set at the control panel.

Small values of *n* can result in overlapping lines. Overlapping lines can also occur if print attributes such as Elongated (Double High), Superscript, or Subscript characters are used on the same line. If lines overlap, printing speed is reduced.

Example The following example illustrates *n*/60-inch line spacing.

```
Control code ESC A 20 sets
line spacing at 20/60 inch

increments for all subsequent lines

until reset or another spacing is selected.
```

Line Spacing *n*/120 Inch

ASCII Code ESC u *n*

Hex Code 1B 75 *n*

Dec Code 27 117 *n*

Purpose Specifies the line spacing at *n*/120-inch increments.

Where:
n = 1 through 255 (hex 01 through hex FF)

Comment When this control sequence is received, all subsequent line feeds are *n*/120-inch until a new line spacing is selected or the printer is reset. This setting overrides line spacing set at the control panel.

Small values of *n* can result in overlapping lines. Overlapping lines can also occur if print attributes such as Elongated (Double High), Superscript, or Subscript characters are used on the same line. If lines overlap, printing speed is reduced.

Line Spacing *n*/180 Inch

ASCII Code ESC 3 *n*

Hex Code 1B 33 *n*

Dec Code 27 51 *n*

Purpose Specifies the line spacing at *n*/180-inch increments.

Where:
n = 1 through 255 (hex 01 through hex FF)

Comment The 3 is an ASCII character 3, not hex 3. All line feeds following receipt of this code are at *n*/180 inch line spacing until a new line spacing is selected or the printer is reset. Line spacing set by this control code overrides line spacing setting set at the control panel.

If the vertical distance to move is other than a multiple of *n*/180 inch, the remainder is added to the next paper motion command.

Use caution when combining this control code with other print attributes such as Elongated (Double High), Superscript, or Subscript, because overlapping lines can occur. Print speed is reduced if lines overlap.

Example The following example illustrates *n*/180-inch line spacing.

```
Control code ESC 3 50 sets
line spacing at 50/180 inch

increments for all subsequent lines

until reset or another spacing is selected.
```

Make Hex 80-9F Control Codes

ASCII Code ESC 7

Hex Code 1B 37

Dec Code 27 55

Purpose Makes codes hex 80-9F control codes.

Comment This command affects the front panel setting for the Alternate Set 80-9F menu option.

This command takes effect in English-only mode (see page 50).

Make Hex 80-9F Printable

ASCII Code ESC 6

Hex Code 1B 36

Dec Code 27 54

Purpose Makes codes hex 80-9F printable characters.

Comment The 6 is an ASCII character 6, not hex 6. This command affects the front panel setting for the Alternate Set 80-9F menu option.

This command takes effect in English-only mode (see page 50).

One And A Half Times Mode

ASCII Code ESC s *n*

Hex Code 1B 73 *n*

Dec Code 27 115 *n*

Purpose All characters are printed at one and a half times their normal size, as measured from the current baseline and based on the default CPI.

Where:
n = SOH (hex 01) or 1 (hex 31) turns One and a Half Times mode on
n = NUL (hex 00) or 0 (hex 30) turns One and a Half Times mode off

Comment One and a half times characters can have underline, emphasis, shadow background, and reverse printing attributes.

Condensed and Superscript/Subscript commands are ignored if One and a Half Times mode is on. Conversely, One and a Half Times mode commands are ignored if Condensed mode or Superscript/Subscript mode is on.

Double width and double height commands do not work when One and a Half Times mode is on, but the commands are recovered when the One and a Half Times mode is cleared.

HT and ESC t commands are ignored in One and a Half Times mode.

This command is ignored in bit image mode.

The line with the One and a Half Times character has double the line spacing as a normal line.

Print Quality

ASCII Code ESC x *n*

Hex Code 1B 78 *n*

Dec Code 27 120 *n*

Purpose Selects print quality.

Where:
n = hex 00 or hex 30 selects LQ print
n = hex 01 or hex 31 selects Hi-Speed print quality
n = hex 02 or hex 32 selects Near LQ print quality
n = hex 03 or hex 33 selects Super Hi-Speed print quality
n = hex 04 or hex 34 selects Normal print quality
n = hex 05 or hex 35 selects Ultra Hi-Speed print quality

Comment This command overrides control panel print quality selections.

Printer Deselect

ASCII Code DC3

Hex Code 13

Dec Code 19

Purpose Places printer in the deselected state.

Comment The configuration parameter Printer Select must be set to Enable.

When the printer receives this command, it ignores data until a DC1 (Printer Select) command is received.

NOTE: This is not the KS Emulation command. This is an additional command for the D-Series printer only.

Printer Select

ASCII Code DC1

Hex Code 11

Dec Code 17

Purpose Places printer in the selected state.

Comment The configuration parameter Printer Select must be set to Enable.

This control code allows the printer to receive and print data from the host if it was deselected by DC3. If the printer was not deselected by DC3, this code is ignored.

NOTE: This is not the KS Emulation command. This is an additional command for the D-Series printer only.

Reverse Mode

ASCII Code ESC r *n*

Hex Code 1B 72 *n*

Dec Code 27 114 *n*

Purpose Turns Reverse Printing on or off.

Where:
n = hex 01 or hex 31 turns Reverse Printing on
n = hex 00 or hex 30 turns Reverse Printing off

Select Italic Font

ASCII Code ESC 4

Hex Code IB 34

Dec Code 27 52

Purpose Sets the style attribute of the font to italic. The default is normal (non-italic) style.

Comment This command selects italic printing even if the italic character table is not selected. This command changes the Italic Print front panel setting.

NOTE: This is not the KS Emulation command. This is an additional command for the D-Series printer only.

Set Intercharacter Spacing Of DBCS Character

ASCII Code ESC SP *n*

Hex Code 1B 20 *n*

Dec Code 27 32 *n*

Purpose Sets intercharacter spacing to the right of the DBCS character. The left of the DBCS character spacing is set to 0.

Where:

0 < = n < = 127
Default n = 6

Comment The dot size is 1/180 inch. The current CPI will be set according to full-width character.

The intercharacter spacing of SBCS character is half of *n*.

This command affects DBCS CPI on the front panel.

This command only takes effect when Emulation Extend (a front panel option) is set to Enable.

NOTE: This is not the KS Emulation command. This is an additional command for the D-Series printer only.

Set/Reset Vertical Writing

ASCII Code ESC j n

Hex Code 1B 6A n

Dec Code 27 106 n

Purpose Sets/resets vertical writing.

Where:

n = 0: Resets vertical writing
n = 1: Sets vertical writing

Comment Alphanumeric and table characters cannot be written vertically.

NOTE: This is not the KS Emulation command. This is an additional command for the D-Series printer only.

Shadow Mode

ASCII Code ESC z *n*

Hex Code 1B 7A *n*

Dec Code 27 122 *n*

Purpose Turns Shadow mode on or off. When Shadow mode is on, all characters are printed with background.

Where:
n = hex 01 or hex 31 turns shadow mode on
n = hex 00 or hex 30 turns shadow mode off

Superscript And Subscript Printing

ASCII Code ESC S *n*
ESC T

Hex Code 1B 53 *n*
1B 54

Dec Code 27 83 *n*
27 84

Purpose ESC S *n* selects superscript or subscript printing.
ESC T cancels superscript or subscript printing set by ESC S *n*.

Where:
n = NUL (hex 00) or 0 (hex 30) to enable superscript printing
n = SOH (hex 01) or 1 (hex 31) to enable subscript printing

Comment Superscript prints quarter-sized characters with a baseline higher than the normal characters. Subscript prints quarter-sized characters with a baseline lower than the normal characters. ASCII characters become half height when the command is active. When the control code is received, all characters are superscript or subscript until reset by ESC T or printer reset.

The characters printed in Superscript or Subscript mode change to 15 CPI for both ASCII and DBCS characters.

You can print both superscript and subscript characters in the same character column by using the Backspace (BS) control code, but these characters will not print when double high printing is in effect.

This command does not affect graphics characters. The command is ignored in condensed mode and One and a Half Times mode. Conversely, Condensed and One and a Half Times mode commands are ignored when Superscript or Subscript is on.

The underline strikes through the descenders on subscript characters during Underline mode.

Table Character Masking

ASCII Code ESC w *n*

Hex Code 1B 77 *n*

Dec Code 27 119 *n*

Purpose Masks the bitmap of table characters over *n* pins, and only prints from 1 to *n* pins.

Where:
n = 0 through 24 (hex 00 through hex 18)
n = 48 through 72 (hex 30 through hex 48)

Comment This function is cancelled by the following commands: CR, LF, VT, FF, and ESC J, or if *n* = 0, 24, 48 or 72.

This command works for both Hangul and ASCII table characters. Hangul table characters range from A6A1 through A6E4. ASCII table characters include hex 01 through hex 06; hex 10; hex 15 through hex 17; and hex 19.

Table Characters, Extending

ASCII Code ESC v *n*

Hex Code 1B 76 *n*

Dec Code 27 118 *n*

Purpose Enables or disables the extension of the table characters following the command.

Where:
n = SOH (hex 01) or 1 (hex 31) enables the extension of table characters
n = NUL (hex 00) or 0 (hex 30) disables the extension of table characters

Comment This command works for both Hangul and ASCII table characters. Hangul table characters range from A6A1 through A6E4. ASCII table characters include hex 01 through hex 06; hex 10; hex 15 through hex 17; and hex 19.

When the table extension is enabled, the table characters in the previous line are extended to link to the next line. The maximum line spacing of the extension is 1 LPI. The table character is automatically extended horizontally.

Turn On/Off OCRB Selection

ASCII Code	ASSC	0	z	*n*
Hex Code	ASSC	30	7A	*n*
Dec Code	ASSC	48	122	*n*

Purpose: Prints ASCII characters with OCR B styling.

Where:
n = 0 or 48: Normal printing (default)
n = 1 or 49: OCR B printing

Comment: This command only functions in DBCS mode. This command affects the DBCS ASCII Style front panel setting.

NOTE: This is not the KS Emulation command. This is an additional command for the D-Series printer only.

Underline

ASCII Code ESC – *n*

Hex Code 1B 2D *n*

Dec Code 27 45 *n*

Purpose Turns automatic underlining on and off.

Where:
n = NUL (hex 00) or 0 (hex 30) to turn off underlining
n = SOH (hex 01) or 1 (hex 31) to turn on underlining

Comment Spaces are underlined, but graphics and grey scale characters are not. The underline is not printed across the distance that the horizontal print position is moved with the ESC t or HT commands.

Example The following program illustrates underlining.

```
Control code ESC -1
enables automatic underlining.
Control code ESC -0
disables automatic underlining.
```

Unidirectional Mode

ASCII Code ESC U *n*

Hex Code 1B 55 *n*

Dec Code 27 85 *n*

Purpose Turns unidirectional printing on and off.

Where:
n = NUL (hex 00) or 0 (hex 30) bidirectional printing
n = SOH (hex 01) or 1 (hex 31) unidirectional printing

Comment Unidirectional printing provides better alignment of vertical lines. Bidirectional printing is faster but has lower print quality.

Vertical Tab

ASCII Code VT

Hex Code 0B

Dec Code 11

Purpose Moves the vertical print position to the next vertical tab set below the current print position, and moves the horizontal print position to the left-margin position. The printer advances to the top-margin position of the following page if the next tab is below the bottom-margin position or if no tab is set below the current position.

The VT command functions the same as a CR command if all tabs have been cancelled by the ESC B NUL command. Additionally, the VT command functions the same as an LF command if no tabs have been set since the printer was turned on or was reset with the ESC @ command.

This command cancels double-width printing set with the SO or ESC SO command.

Vertical Tab, Set/Clear

ASCII Code ESC B *n1 n2 n3...nk* NUL

Hex Code 1B 42 *n1 n2 n3...nk* 00

Dec Code 27 66 *n1 n2 n3...nk* 0

Purpose Sets up to 16 vertical tab positions.

Where:
n = 1 through 255 (hex 01 through hex FF)
k = 1 through 16 (hex 01 through hex 10)
n1 through *nk* specify the line number for the vertical tab(s), up to a maximum of 16 tab positions. NUL must end the sequence.

To clear the tab settings, send ESC B NUL (1B 42 00).

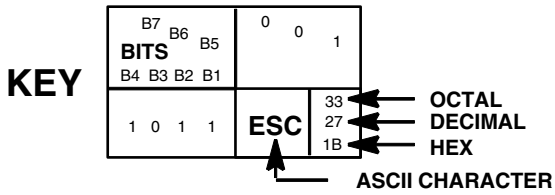
Comment The values of *n* range from 1 through 255 and must be in ascending order. The distance of each tab stop from TOF is the current line spacing times the number of lines given in *n*. If the value of *n* exceeds the form length, commands to move to that tab position are ignored.

If values of *n* are not in ascending order, the sequence up to and including the out-of-sequence number is ignored, and the rest of the load is processed. Skip over perforation is ignored.

This command always sets channel 0. You can clear channel 0 by sending ESC B NUL.

NOTE: This is not the KS Emulation command. This is an additional command for the 6400-D Series printer only.

A *Standard ASCII Character Set*



B7 B6 B5 / BITS B4 B3 B2 B1	ROW	COLUMN 0 (0 0 0)		1 (0 0 1)		2 (0 1 0)		3 (0 1 1)		4 (1 0 0)		5 (1 0 1)		6 (1 1 0)		7 (1 1 1)	
0 0 0 0	0	NUL	0 0 0	DLE	20 16 10	SP	40 32 20	0	60 48 30	@	100 64 40	P	120 80 50	`	140 96 60	p	160 112 70
0 0 0 1	1	SOH	1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
0 0 1 0	2	STX	2 2 2	DC2	22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
0 0 1 1	3	ETX	3 3 3	DC3 (XOFF)	23 19 13	#	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
0 1 0 0	4	EOT	4 4 4	DC4	24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
0 1 0 1	5	ENQ	5 5 5	NAK	25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
0 1 1 0	6	ACK	6 6 6	SYN	26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
0 1 1 1	7	BEL	7 7 7	ETB	27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
1 0 0 0	8	BS	10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
1 0 0 1	9	HT	11 9 9	EM	31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
1 0 1 0	10	LF	12 10 0 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
1 0 1 1	11	VT	13 11 0 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	[	133 91 5B	k	153 107 6B	{	173 123 7B
1 1 0 0	12	FF	14 12 0 C	FS	34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	\	134 92 5C	l	154 108 6C	|	174 124 7C
1 1 0 1	13	CR	15 13 0 D	GS	35 29 1D	-	55 45 2D	=	75 61 3D	M	115 77 4D	]	135 93 5D	m	155 109 6D	}	175 125 7D
1 1 1 0	14	SO	16 14 0 E	RS	36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	^	136 94 5E	n	156 110 6E	~	176 126 7E
1 1 1 1	15	SI	17 15 0 F	US	37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	_	137 95 5F	o	157 111 6F	DEL	177 127 7F

Appendix A

B KS Character Sets

Hangul/English Mode

The character sets on the following pages are supported by the ESC h *n* command. See “Hangul/English Mode Select” on page 50.

Hangul/English mode (ESC h 1)
ASCII character set (hex 00 through hex 7F)

Decimal Value	Hex Value	0	16	32	48	64	80	96	112
		0	1	2	3	4	5	6	7
0	0	NUL	▬	BLANK (SPACE)	0	@	P	`	p
1	1	▛	▝	!	1	A	Q	a	q
2	2	▛	DC2	"	2	B	R	b	r
3	3	▙	▝	#	3	C	S	c	s
4	4	▙	DC4	$	4	D	T	d	t
5	5	▌	▟	%	5	E	U	e	u
6	6	▬	▜	&	6	F	V	f	v
7	7	BEL	▬	'	7	G	W	g	w
8	8	▝	CAN	(	8	H	X	h	x
9	9	HT	▝	)	9	I	Y	i	y
10	A	LF	▝	*	:	J	Z	j	z
11	B	VT	ESC	+	;	K	[	k	{
12	C	FF	▝	,	<	L	₩	l	|
13	D	CR	▝	-	=	M	]	m	}
14	E	SO	▝	.	>	N	^	n	~
15	F	SI	▝	/	?	O	_	o	▝

English mode (ESC h 0 + ESC 7)
ASCII character set 1 (hex 00 through hex 7F)

Decimal Value → / Hex Value ↓	0	16	32	48	64	80	96	112
	0	1	2	3	4	5	6	7
0	0	NUL		BLANK (SPACE)	0	@	P	`	p
1	1			!	1	A	Q	a	q
2	2		DC2	"	2	B	R	b	r
3	3			#	3	C	S	c	s
4	4		DC4	$	4	D	T	d	t
5	5			%	5	E	U	e	u
6	6			&	6	F	V	f	v
7	7	BEL		'	7	G	W	g	w
8	8		CAN	(	8	H	X	h	x
9	9	HT		)	9	I	Y	i	y
10	A	LF		*	:	J	Z	j	z
11	B	VT	ESC	+	;	K	[	k	{
12	C	FF		,	<	L	\	l	|
13	D	CR		—	=	M	]	m	}
14	E	SO		.	>	N	^	n	~
15	F	SI		/	?	O	_	o	

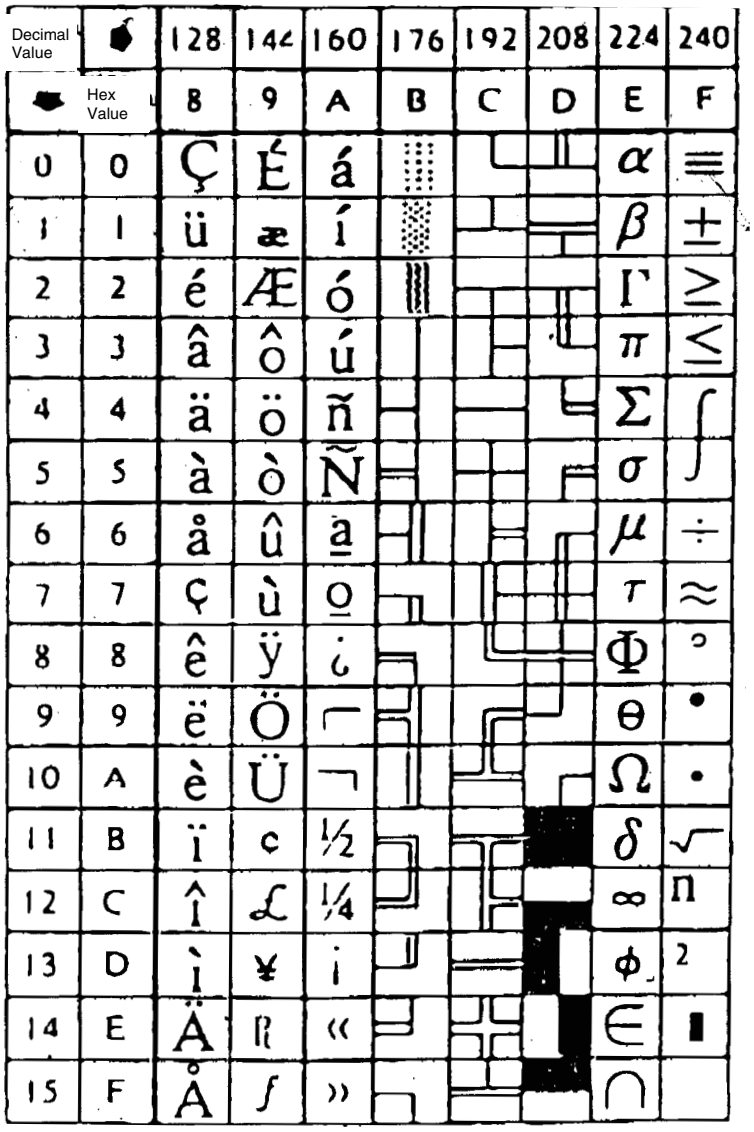
English mode (ESC h 0 + ESC 7)
ASCII character set 1 (hex 80 through hex FF)

Decimal Value	Hex Value	128	144	160	176	192	208	224	240
		8	9	A	B	C	D	E	F
0	0	NUL		á				α	≡
1	1			í				β	±
2	2		DC2	ó				Γ	≥
3	3			ú				π	≤
4	4		DC4	ñ				Σ	⌠
5	5			Ñ				σ	⌡
6	6			a				μ	÷
7	7	BEL		o				τ	≈
8	8		CAN	¿				Φ	°
9	9	HT		⌐				Θ	•
10	A	LF		¬				Ω	·
11	B	VT	ESC	½				δ	√
12	C	FF		¼				∞	n
13	D	CR		¡				φ	2
14	E	SO		«				∈	■
15	F	SI		»				∩	

English mode (ESC h 0 + ESC 6)
ASCII character set 2 (hex 00 through hex 7F)

Decimal Value	Hex Value	0	16	32	48	64	80	96	112
		0	1	2	3	4	5	6	7
0	0	NUL		SPACE	0	@	P	'	p
1	1			!	1	A	Q	a	q
2	2		DC2	"	2	B	R	b	r
3	3	♥		#	3	C	S	c	s
4	4	◆	DC4	$	4	D	T	d	t
5	5	♣	§	%	5	E	U	e	u
6	6	♠		&	6	F	V	f	v
7	7	BEL		'	7	G	W	g	w
8	8		CAN	(	8	H	X	h	x
9	9	HT		)	9	I	Y	i	y
10	A	LF		*	:	J	Z	j	z
11	B	VT	ESC	+	;	K	[	k	{
12	C	FF		,	<	L	\	l	|
13	D	CR		—	=	M	]	m	}
14	E	SO		.	>	N	^	n	~
15	F	SI		/	?	O	_	o	

English mode (ESC h 0 + ESC 6)
ASCII character set 2 (hex 80 through hex FF)



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