6400-D Generation II Series Line Matrix Printers

KSSM Programmer's Reference Manual

Form Number S550-0378-00

6400-D Generation II Line Matrix Printers

KSSM 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 Specification Model (KSSM) emulation.

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

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

Software Features

The KSSM 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 are LQ, Near LQ, Normal, Hi-Speed, Super Hi-Speed, and Ultra Hi-Speed.

2 *Configuring With The Operator 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.

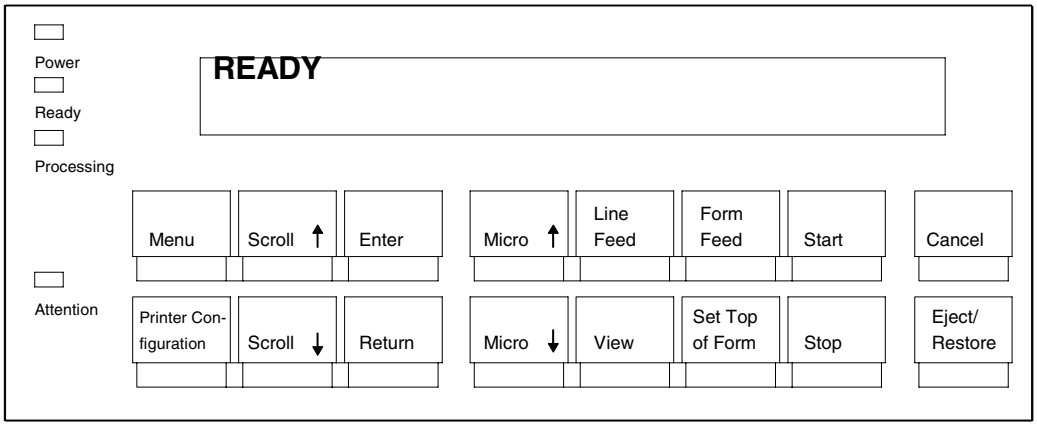
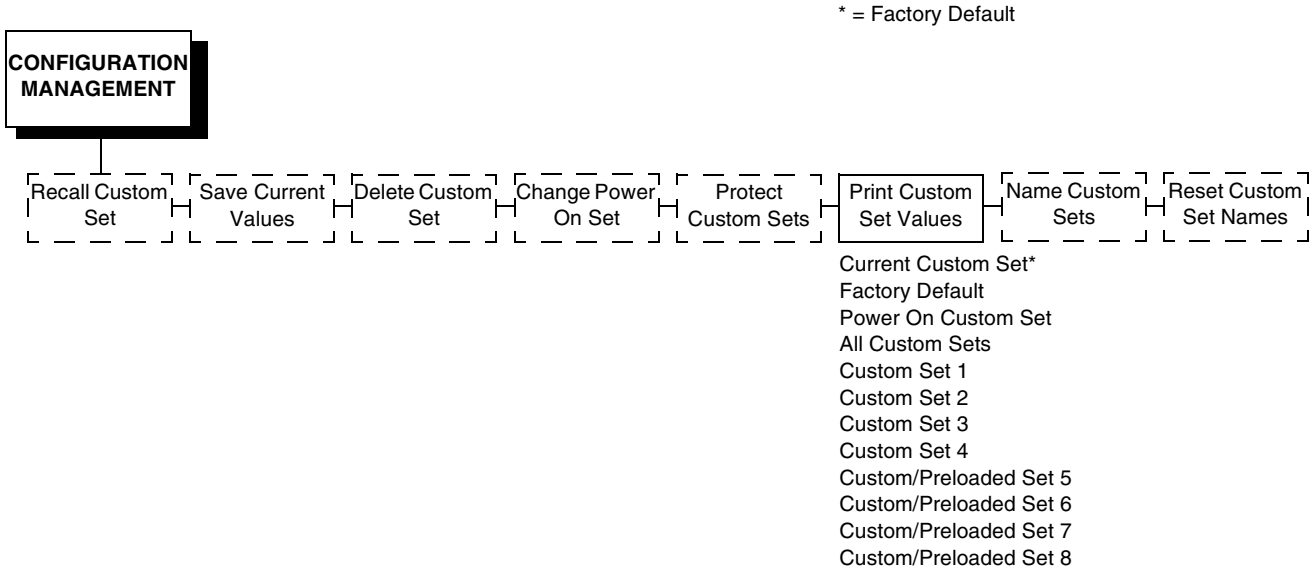


Figure 1. The Operator Panel

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

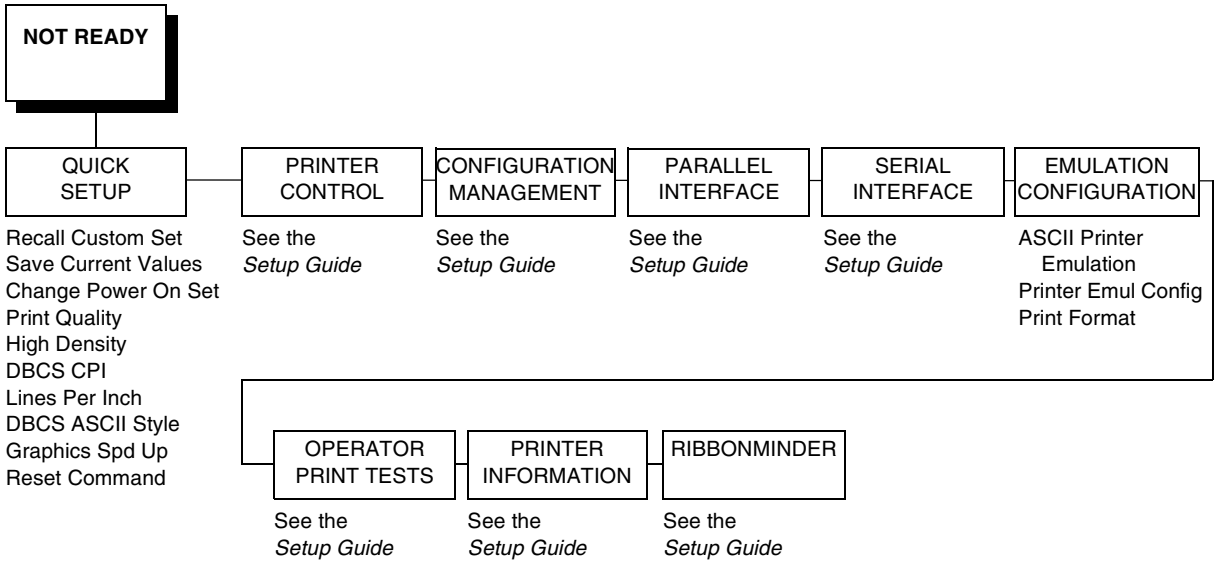


Figure 2. Configuration Menu Overview

Moving Within The Configuration Menu

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

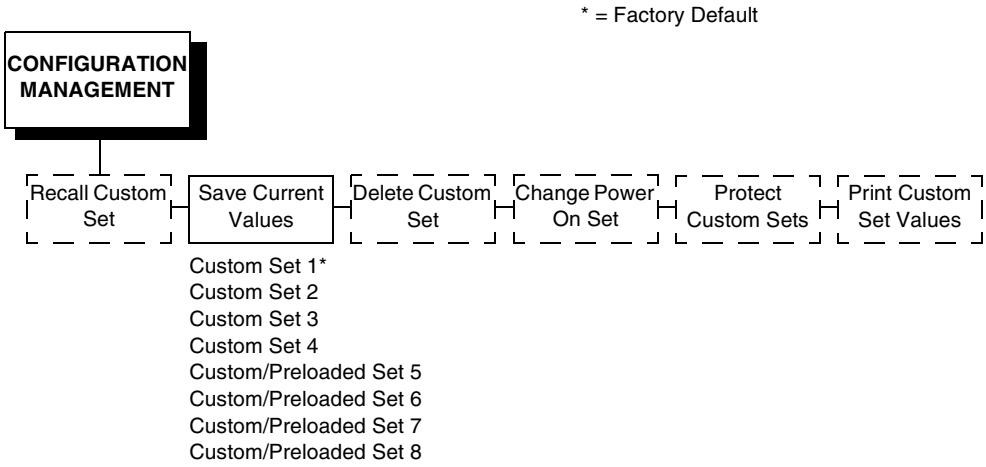
Table 2. Changing Configurations

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	Unlocks the Operator Menu, which allows you to make configuration changes.
6.	Enter	PRINTER CONTROL INTERFACE SELECTION	

Table 2. Changing Configurations (continued)

Step	Key	Result	Notes
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	
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.		

KSSM Emulation

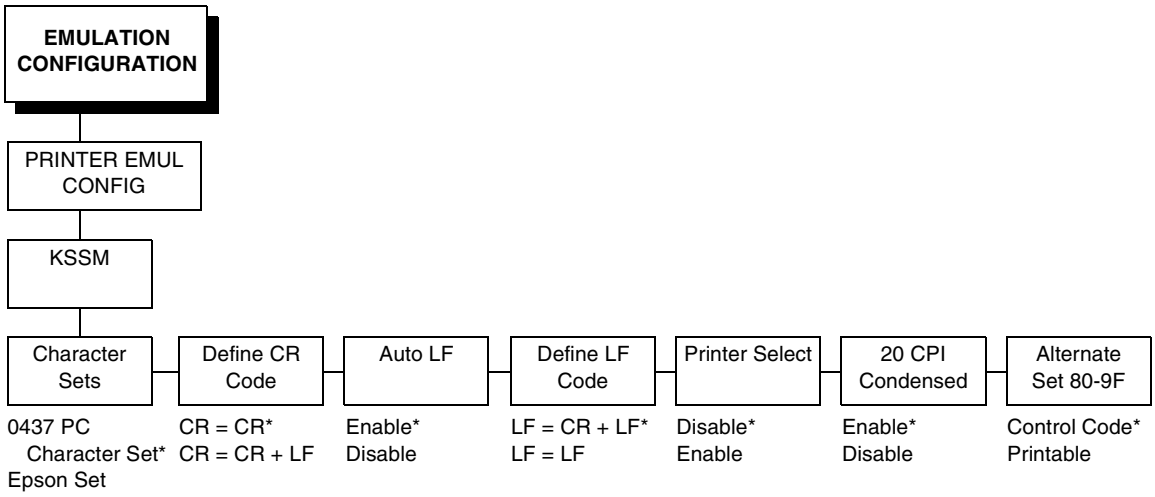


Figure 3. KSSM Emulation Menu

Character Sets

This parameter selects a character set for the KSSM emulation.

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.

20 CPI Condensed

Compressed print characters are narrower than the normal character set. This is helpful for applications for which you need to print the maximum amount of information on a page.

- **Ensable**. Prints about 60 percent of the width of normal characters when compressed print is chosen by the host computer. For example, 12 CPI characters will compress to 20 CPI.
- **Disable**. Does not compress print widths, even if condensed print is chosen by the host.

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.

Print Format Menu

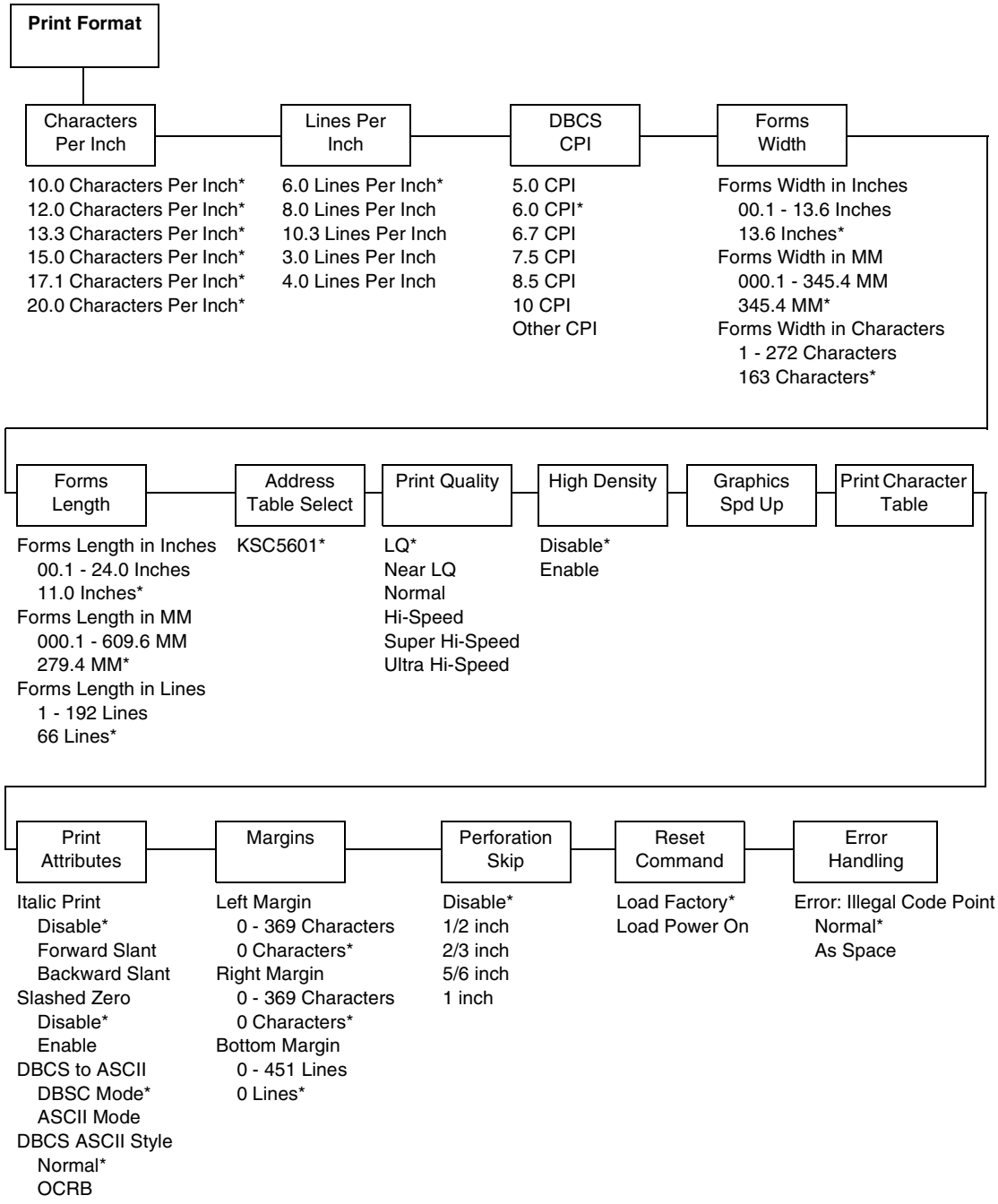


Figure 4. Print Format Menu

Characters Per Inch

Characters Per Inch (CPI) specifies the number of characters that will print per horizontal inch in SBCS mode.

- **10.0 CPI** (the default)
- **12.0 CPI**
- **13.3 CPI**
- **15.0 CPI**
- **17.1 CPI**
- **20.0 CPI**

It is possible to specify a CPI value that causes the page width to exceed the maximum physical page width. In this case, the printer automatically changes the page width to the highest valid value for the new CPI.

NOTE: Receipt of a data stream control code (such as ESC P, ESC M, ESC g, SI, and ESC SI) that specifies a CPI value overrides any value entered via the operator panel.

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 to print High Density LQ.

- **Disable.** The default. LQ print as its usual density.
- **Enable.** Allow 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 to ASCII** determines which mode the printer will perform in.
  - **DBCS Mode** is the default.
  - **ASCII Mode**
- **DBCS ASCII Style** determines the ASCII characters (0x21 to 0x7F) printing style.
  - **Normal** is the default.
  - **OCRB** prints ASCII characters 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 KSSM Emulation

KSSM Emulation

"Emulation" refers to the ability of a printer to execute the commands of other printer control languages.

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 KSSM emulation supports the following print modes: LQ, Near LQ, Normal, Hi-Speed, Super Hi-Speed, and Ultra Hi-Speed.
- Various character sets can be used including 0437 PC and Epson**.
- Commands not supported by our printer are:
    - Control paper loading/ejecting (ESC EM *n*)
    - Select user-defined set (ESC % *n*)
    - Define user-defined characters (ESC & NUL *n m*)
    - Copy ROM to RAM (ESC :)
    - Select justification (ESC a)
    - Select typeface (ESC k)
    - Select printing colour (ESC r *n*)
    - Select 17/180-inch line spacing (ESC 1)
    - One line unidirectional printing (ESC <)
    - Absolute position of Hangul and Hanji (FS $ *n*)
    - Multiple byte Hangul character printing (FS M *n1 n2*)
    - Print ASCII characters as in ASCII mode (FS a *n*)
    - Select Hangul completed/combined font (FS t *n*)

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
Characters Per Inch	10.0
DBCS CPI	6.0
Print Quality	LQ
High Density	Disable
Italic Print	Disable
Slashed Zero	Disable
DBCS to ASCII	DBCS Mode
DBCS ASCII Style	Normal
Address Table Select	KSC5601
Graphics Spd Up	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
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
Character Set	0437 PC Character Set
20 CPI Condensed	Enable
Alternate Set 80-9F	Control Code

Escape Sequences

Some KSSM 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

FS Sequences

Another type of control code which consists of more than one character is called an “FS sequence,” because the first character is the ASCII FS character. This control code is used when the printer is printing Double Byte Character Set (DBCS) characters. The FS alerts the printer that a special function command (not printable characters) follows. Most FS commands work only on DBCS characters.

The format for an FS sequence is:

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

For example, to rotate DBCS characters by 90×counter-clockwise, send an FS character immediately followed by the J character:

ASCII: FS J **Hex**: 1C 4A **Dec**: 28 74

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	27 124 125 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 KSSM Emulation With Control Codes

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

FUNCTION	ASCII CODE	PAGE
Control-code Character Printing		
Enable Printing of Upper Control Codes	ESC 6	40
Enable Upper Control Codes	ESC 7	41
Mechanical Control		
Beeper	BEL	38
Printing Graphics		
Select Bit Image	ESC * $m\ n_L\ n_H\ d_1 \ldots d_k$	49
Select 60-dpi Graphics	ESC K $n_L\ n_H\ d_1\ d_2 \ldots d_k$	47
Select 120-dpi Graphics	ESC L $n_L\ n_H\ d_1\ d_2 \ldots d_k$	47
Select 120-dpi Graphics	ESC Y $n_L\ n_H\ d_1\ d_2 \ldots d_k$	48
Select 240-dpi Graphics	ESC Z $n_L\ n_H\ d_1\ d_2 \ldots d_k$	48
Reassign Bit-image Mode	ESC ? *n m*	45
Data and Memory Control		
Cancel Line	CAN	38
Delete Last Character in Buffer	DEL	40
Initialise Printer	ESC @	42
Select Printer	DC1	57
Deselect Printer	DC3	57
Hangul Extension Commands		
Align SBCS Character with DBCS Character	FS U	34
Cancel the Alignment of SBCS Character with DBCS Character	FS V	34
Define User-defined Chinese Character	FS 2 $a_1\ a_2\ d_1\ d_2\ d_3 \ldots d_{72}$	39
Divided Hangul Double Height	FS X *n*	40
Master Select in DBCS Mode	FS ! *n*	44
Pair Two Characters in Vertical Printing	FS D $d_1\ d_2$	45
Select DBCS Print Quality	FS x *n*	53
Select Double-width Printing in DBCS Mode (One Line)	FS SO	55
Cancel Double-width Printing in DBCS Mode (One Line)	FS DC4	55
Select DBCS Mode	FS &	55
Cancel DBCS Mode	FS .	56
Select Hangul Myunjo/Gothic Style	FS k *n*	56
Select DBCS Super/Subscript Printing	FS r *n*	59
Select Vertical Printing	FS J	59
Cancel Vertical Printing (Select Horizontal Printing)	FS K	59
Set DBCS Character Half Width	FS SI	61

Advance Print Position Vertically

ASCII Code ESC J *n*

Hex Code 1B 4A *n*

Dec Code 27 74 *n*

Purpose Advances the vertical print position n/180 inch.

Where:
0 <= *n* <= 255

Comment This command does not affect the horizontal print position.

Advances paper to the top-of-form position on the next page if the ESC J command moves the print position below the bottom-margin position setting.

Align SBCS Character with DBCS Character

ASCII Code FS U

Hex Code 28 85

Dec Code 1C 55

Purpose Aligns two SBCS characters to fit the space normally occupied by a full-width DBCS character that does not have a half-width, subscript, or superscript feature.

Comment A DBCS character with half-width, subscript, or superscript feature is treated as an SBCS character.

The intercharacter space of the next character is set by the FS S command.

In the default mode, the SBCS character aligns with the DBCS character.

Cancel the Alignment of SBCS Character with DBCS Character

ASCII Code FS V

Hex Code 28 86

Dec Code 1C 86

Purpose Cancels the spacing adjustment of SBCS characters to fit the space normally occupied by a full-width DBCS character.

Comment This command cancels the effect of the FS U command.

This command makes the FS T command affect the spacing of the SBCS character.

In the default mode, the SBCS character aligns with the DBCS character.

Backspace

ASCII Code BS

Hex Code 08

Dec Code 8

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

Comment The printer ignores this command if the command would move the print position to the left of the left margin.

In DBCS mode, the command takes effect in double byte character setting.

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
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.

Where:
data = variable length printable data field (PDF); character set is Alphanumeric

The following parameters are optional:

Where:
N = activates the offset

Where:
n = the *x* and *y* coordinate unit system

***n* (ASCII)**	**Selects Value**
0	Use current cpi and lpi values
1	Use ¼ inch value
2	Use ½ centimeter value : 1/(2.54x2)
3	Use 1 mm value : 1/(25.4)
4	Use target barcode dot (refer to the table below)

When *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)

Where:
yyyy = 4-digit upper left corner y (vertical axis)

Where:
X = activates magnification

Where:
mmmm = bar code magnification

The possible magnifications are listed in the table 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
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 180dpi barcodes. If these values are sent for horizontal 120dpi barcodes, they will print as value X1.	

Where:
P = activates printable data field variable

Where:
p = location of PDF ('A' (above), 'B' (below, default), 'N' (none))

(Note: FIM, Postbar, and PDF417 do not support this parameter.)

Where:
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)

Where:
H = activates the height variable

Where:
hh = 2-digit barcode height in 1/10"

Beeper

ASCII Code BEL

Hex Code 07

Dec Code 7

Purpose Sounds the printer's beeper for 1/10 second.

Cancel Line

ASCII Code CAN

Hex Code 18

Dec Code 24

Purpose Clears all printable characters and bit-image graphics on the current line.

Moves the print position to the left-margin position.

Carriage Return

ASCII Code CR

Hex Code 0D

Dec Code 13

Purpose Moves the print position to the left margin position.

Comment The user can define CR = CR or CR = CR + LF from the front panel.

If CR = CR + LF, the CR command is accompanied by a LF command.

Define Pattern for Special Printing Effect

ASCII Code ESC (X n_1 n_2 a_1 a_2 a_3

Hex Code 1B 28 58 n_1 n_2 a_1 a_2 a_3

Dec Code 27 40 88 n_1 n_2 a_1 a_2 a_3

Purpose Defines the pattern to be used in background or to fill up outlined characters.

a_1: 0 – To be filled as background

1 – To be used as fill pattern to fill outlined characters

a_2: 0 – Black on white, normal

1 – White on black

2 – Dotted

a_3: Treat different colours as all black

Where:
$n_1 = 3$

$n_2 = 0$

$a_1 = 0, 1$

$0 <= a_2 <= 2$

$0 <= a_3 <= 6$

Comment This command covers interline spacing for our printer in both DBCS and SBCS modes.

Define User-defined Chinese Character

ASCII Code FS 2 a_1 a_2 d_1 d_2 d_3 …d_{72}

Hex Code 1C 50 a_1 a_2 d_1 d_2 d_3 …d_{72}

Dec Code 28 32 a_1 a_2 d_1 d_2 d_3 …d_{72}

Purpose Sets the parameters for user-defined characters

a_1 a_2 — Character code of the character to be user-defined.

d_1 d_2 d_3 … d_{72} — Data to define the character in which the cell size is 24x24.

Where:

C9A1H < a_1a_2 < C9FEH
FEA1H < a_1a_2 < FEFEH

Comment The user-defined character can be printed by sending a_1a_2 to the printer.

Delete Last Character in Buffer

ASCII Code DEL

Hex Code 7F

Dec Code 127

Purpose Deletes the last printable character in the print buffer's current line.

Comment This command deletes printable characters only; printer control codes are not affected.

The printer ignores this command if it follows a command that moves the horizontal print position (ESC $, ESC \, or HT).

Divided Hangul Double Height

ASCII Code FS X *n*

Hex Code 28 58 *n*

Dec Code 1C 88 *n*

Purpose Turns on/off divided double height printing of all characters as follows:

n = 0 Turns off divided double height

n = 1 Double height upper part of character

n = 2 Double height lower part of character

n = 3 Double height whole character

Where:
0 <= *n* <= 3

Comment The line spacing of the line with upper part double height (set by FS X 1) will change to 24/180 inch.

The baseline of the line including double-height characters (set by FS X 3) moves down 24/180 inch, and the line spacing also increases 24/180 inch.

The default is Normal (non double-width double-height) printing.

Enable Printing of Upper Control Codes

ASCII Code ESC 6

Hex Code 1B 36

Dec Code 27 54

Purpose Tells the printer to treat codes 128 to 159 as printable characters instead of control codes.

Comment This command affects the front panel setting of “Alternate Set 80-9F.”

This command works in ASCII mode only.

In the default mode, codes 128 to 159 are treated as printable characters.

Enable Upper Control Codes

ASCII Code ESC 7

Hex Code 1B 37

Dec Code 27 55

Purpose Tells the printer to treat codes from 128 to 159 as control codes instead of printable characters.

Comment This command affects the front panel setting of “Alternate Set 80-9F.”

In the default mode, codes 128 to 159 are treated as printable characters.

Form Feed

ASCII Code FF

Hex Code 0C

Dec Code 12

Purpose Advances the vertical print position on continuous paper to the top-margin position of the next page.

Moves the horizontal print position to the left-margin position.

Comment The FF command cancels one-line double-width printing selected with the SO, ESC SO, or FS SO commands.

Graphics Printing: Select Bit Image

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:

m	Specifies the dot density
n_L, n_H	Specifies the total number of columns of graphics data that follow (number of dot columns) = $((n_H \times 256) + n_L)$
$d_1 \ldots d_k$	Bytes of graphics data; *k* is determined by multiplying the total number of columns times the number of bytes required for each column

Where:
0 <= n_L <= 255
0 <= n_H <= 31
m = 48, 49, 50

Comment Dot density:

Parameter *m* in ESC *	Horizontal Density (dpi)	Vertical Density (dpi)	Dots per column	Bytes per column
48	90	90	12	2
49	120	120	16	2
50	90	90	16	2

Initialise Printer

ASCII Code ESC @

Hex Code 1B 40

Dec Code 27 64

Purpose Reloads the power-up configuration if “Reset Command” is Enable. Otherwise, resets to the internal default value.

Line Feed

ASCII Code LF

Hex Code 0A

Dec Code 10

Purpose Advances the vertical print position one line (in the currently set line spacing).

The LF command cancels one-line double-width printing selected with the SO, ESC SO, or FS SO commands.

Comment The user can define LF = LF or LF = CR + LF from the front panel.

If LF = CR + LF, the printer moves the horizontal print position to the left-margin position.

If the LF command moves the print position below the bottom margin on continuous paper, the printer advances to the top-of-form position on the next page.

Master Select

ASCII Code ESC ! *n*

Hex Code 1B 21 *n*

Dec Code 27 33 *n*

Purpose Selects any combination of several font attributes and enhancements by setting or clearing the appropriate bit in the *n* parameter, as shown in the table below:

Where:
0 <= *n* <= 255

Bit	On/Off	Hex	Dec	Function	Equivalent
0	Off	00	0	Select 10 cpi	ESC P
	On	01	1	Select 12 cpi	ESC M
1	Off	00	0	Cancels proportional	ESC p 0
	On	02	1	Selects proportional	ESC p 1
2	Off	00	0	Cancels condensed	DC2
	On	04	1	Selects condensed	SI
3	Off	00	0	Cancels bold	ESC F
	On	08	1	Selects bold	ESC E
4	Off	00	0	Cancels double-strike	ESC H
	On	10	16	Selects double-strike	ESC G
5	Off	00	0	Cancels double-width	ESC W 0
	On	20	32	Selects double-width	ESC W 1
6	Off	00	0	Cancels italics	ESC 5
	On	40	64	Selects italics	ESC 4
7	Off	00	0	Cancel underline	ESC - 0
	On	80	128	Selects underline	ESC - 1

Comment This command cancels any attributes or enhancements that are not selected.

Master Select in DBCS Mode

ASCII Code FS ! *n*

Hex Code 1C 21 *n*

Dec Code 28 33 *n*

Purpose Selects any combination of several font attributes and enhancements by setting or clearing the appropriate bit in the *n* parameter, as shown below:

Bit	On/Off	Hex	Dec	Function	Equivalent
0	Off	00	0	Cancel vertical printing	FS K
	On	01	1	Select Vertical printing	FS J
1	Off	00	0	Cancel half width	FS DC2
	On	02	1	Select half width	FS SI
2	Off	00	0	Cancel double width	ESC W 0
	On	04	1	Select double width	ESC W 1
3	Off	00	0	Cancel double height	FS X 0
	On	08	1	Select double height	FS X 3
4	Off	00	0	Select quarter printing	FS r n
	On	10	16	Cancel quarter printing	FS DC2
5	Off	00	0	Select superscript	FS r 0
	On	20	32	Select subscript	FS r 1
6	Off	00	0		
	On	40	64		
7	Off	00	0	Cancel underline	FS - 0
	On	80	128	Selects underline	FS - 1

Where:
0 <= *n* <= 255

Comment This command cancels any attributes or enhancements that are not selected.

Pair Two Characters in Vertical Printing

ASCII Code FS D d_1 d_2

Hex Code 1C 44 d_1 d_2

Dec Code 28 68 d_1 d_2

Purpose Aligns two rotated characters to fit the space occupied by a normal size rotated character where d_1 is the lower character and d_2 is the upper character. Both d_1 and d_2 can be SBCS characters or DBCS characters. If the character is a DBCS character, it will automatically be half-width.

Comment This command has an effect only in vertical printing mode.

Only two characters are combined at a time.

Reassign Bit-image Mode

ASCII Code ESC ? *n m*

Hex Code 1B 3F *n m*

Dec Code 27 63 *n m*

Purpose Assigns the dot density used during the ESC K, ESC L, ESC Y, or ESC Z commands to the density specified by parameter *m* in the ESC * command.

Where:
n = 75, 76, 89, 90
0 <= *m* <= 40

Comment The default settings are as follows:

ESC K is assigned density 0
ESC L is assigned density 1
ESC Y is assigned density 2
ESC Z is assigned density 3

Select 1/6-inch Line Spacing

ASCII Code ESC 2

Hex Code 1B 32

Dec Code 27 50

Purpose Sets the line spacing to 1/6 inch.

Comment Changing the line spacing does not affect previous settings for vertical tabs or page length.

This command affects the front panel setting of “Lines Per Inch.”

Select 1/8-inch Line Spacing

ASCII Code ESC 0

Hex Code 1B 30

Dec Code 27 48

Purpose Sets the line spacing to 1/8 inch.

Comment Changing the line spacing does not affect previous settings for vertical tabs or page length.

This command affects the front panel setting of “Lines Per Inch.”

Select 10 CPI

ASCII Code ESC P

Hex Code 1B 50

Dec Code 27 80

Purpose Selects 10-cpi character pitch.

Comment If you change the fixed-pitch setting with this command during proportional mode (selected with the ESC p command), the change takes effect when the printer exits proportional mode.

This command affects “Characters Per Inch” on the front panel.

This command takes effect only in SBCS mode.

Select 12 CPI

ASCII Code ESC M

Hex Code 1B 4D

Dec Code 27 77

Purpose Selects 12-cpi character pitch.

Comment If you change the fixed-pitch setting with this command during proportional mode (selected with the ESC p command), the change takes effect when the printer exits proportional mode.

This command affects “Characters Per Inch” on the front panel.

This command takes effect only in SBCS mode.

Select 15 CPI

ASCII Code ESC g

Hex Code 1B 67

Dec Code 27 103

Purpose Selects 15-cpi character pitch.

Comment If you change the fixed-pitch setting with this command during proportional mode (selected with the ESC p command), the change takes effect when the printer exits proportional mode.

Characters from 0x80 to 0xFE cannot be printed in this mode.

This command affects “Characters Per Inch” on the front panel.

This command takes effect only in SBCS mode.

Select 60-dpi Graphics

ASCII Code ESC K n_L n_H d_1 d_2 … d_k

Hex Code 1B 4B n_L n_H d_1 d_2 … d_k

Dec Code 27 75 n_L n_H d_1 d_2 … d_k

Purpose Prints bit-image graphics in 8-dot columns, at a density of 60 horizontal by 60 vertical dpi, according to the following parameters:

n_L , n_H Specifies the total number of columns (k) of graphics data.

$k = ((n_H \times 256) + n_L)$

d_1 … d_k Bytes of graphic data

Where:
$0 <= n_L <= 255$
$0 <= n_H <= 31$
$0 <= d <= 255$

Comment The ESC * 0 command is identical to this command.

Select 120-dpi Graphics

ASCII Code ESC L n_L n_H d_1 d_2 … d_k

Hex Code 1B 4C n_L n_H d_1 d_2 … d_k

Dec Code 27 76 n_L n_H d_1 d_2 … d_k

Purpose Prints bit-image graphics in 8-dot columns, at a density of 120 horizontal by 60 vertical dpi, according to the following parameters:

n_L , n_H Specifies the total number of columns (k) of graphics data.

$k = ((n_H \times 256) + n_L)$

d_1 … d_k Bytes of graphic data

Where:
0 <= n_L <= 255
0 <= n_H <= 31
0 <= d <= 255

Comment The ESC * 1 command is identical to this command.

Select 120-dpi Graphics

ASCII Code ESC Y n_L n_H d_1 d_2 … d_k

Hex Code 1B 59 n_L n_H d_1 d_2 … d_k

Dec Code 27 89 n_L n_H d_1 d_2 … d_k

Purpose Prints bit-image graphics in 8-dot columns, at a density of 120 horizontal by 60 vertical dpi, according to the following parameters:

n_L , n_H Specifies the total number of columns (k) of graphics data.

$k = ((n_H \times 256) + n_L)$

d_1 … d_k Bytes of graphic data

Where:
0 <= n_L <= 255
0 <= n_H <= 31
0 <= d <= 255

Comment The ESC * 2 command is identical to this command.

Select 240-dpi Graphics

ASCII Code ESC Z n_L n_H d_1 d_2 … d_k

Hex Code 1B 5A n_L n_H d_1 d_2 … d_k

Dec Code 27 90 n_L n_H d_1 d_2 … d_k

Purpose Prints bit-image graphics in 8-dot columns, at a density of 240 horizontal by 60 vertical dpi, according to the following parameters:

n_L, n_H Specifies the total number of columns (k) of graphics data.

$k = ((n_H \times 256) + n_L)$

d_1 … d_k Bytes of graphic data

Where:
0 <= n_L <= 255
0 <= n_H <= 31
0 <= d <= 255

Comment The ESC * 3 command is identical to this command.

Select an International Character Set

ASCII Code ESC R *n*

Hex Code 1B 52 *n*

Dec Code 27 82 *n*

Purpose Selects the set of characters printed for specific character codes, as listed below:

n = 0	USA
= 1	France
= 2	Germany
= 3	United Kingdom
= 4	Denmark
= 5	Sweden
= 6	Italy
= 7	Spain I
= 8	Japan (English)
= 9	Norway
= 10	Denmark II
= 11	Spain II
= 12	Latin America
= 13	Korean

Where:
0 <= *n* <= 13

Select Bit Image

ASCII Code ESC * *m* n_L n_H d_1 … d_k

Hex Code 1B 2A *m* n_L n_H d_1 … d_k

Dec Code 27 42 *m* n_L n_H d_1 … d_k

Purpose Prints dot-graphics in 8- or 24-dot columns, depending on the following parameters:

m	Specifies the dot density
n_L, n_H	Specifies the total number of columns of graphics data that follows (number of dot columns) = ((n_Hx 256) + n_L)
d_1 … d_k	Bytes of graphics data; *k* is determined by multiplying the total number of columns times the number of bytes required for each column

Dot density is described in the table below:

Parameter *m* in ESC *	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

Where:
$0 <= n_L <= 255$
$0 <= n_H <= 31$
$m = 0, 1, 2, 3, 4, 6, 32, 33, 38, 39\ 40$

Select Bold Font

ASCII Code ESC E

Hex Code 1B 45

Dec Code 27 69

Purpose Sets the weight attribute of the font to Bold.

Comment This command increases the weight of printed lines and characters, resulting in bolder printing.

The default is Normal (non-bold) print.

Cancel Bold Font

ASCII Code ESC F

Hex Code 1B 46

Dec Code 27 70

Purpose Sets the font to Normal (cancels the bold print previously set with the ESC E command).

Comment The default is Normal (non-bold) print.

Select Character Style

ASCII Code ESC q *n*

Hex Code 1B 71 *n*

Dec Code 27 113 *n*

Purpose Turns on/off outline and shadow printing, according to the parameters below:

n = 0 Turns off outline/shadow printing

n = 1 Turns on outline printing

n = 2 Turns on shadow printing

n = 3 Turns on outline and shadow printing

Where:
0 <= *n* <= 3

Comment This command does not affect graphics characters.

Select Character Table

ASCII Code ESC t *n*

Hex Code 1B 74 *n*

Dec Code 27 116 *n*

Purpose Selects the character table to be used for printing among the two character tables described below:

n = 0 or 48	Character table 0	0x80-0x9f Control code, Epson
n = 1 or 49	Character table 1	0437 PC

Where:
0 <= *n* <= 1, 48 <= *n* <= 49

Currently, the setting on the front panel of “Alternate Set 80-9F” determines whether *n* = 1 would be treated as Control Code or Printable Code.

Comment When t = 0 is selected, ESC 6 and ESC 7 do not take effect.

This command affects the front panel setting of “Character Sets.”

Select Condensed Printing

ASCII Code SI

Hex Code 0F

Dec Code 15

Purpose Enters condensed mode, in which character width is reduced as follows:

Selected pitch	Condensed pitch
10 cpi	17.14 cpi
12 cpi	20 cpi
Proportional	½ width

Comment This command is ignored under the following two conditions: 15-cpi printing has been selected with the ESC g command.

This command reduces character width by about 50% when proportional spacing is selected with the ESC p command.

Cancel condensed printing with the DC2 command.

This command only takes effect in SBCS mode.

The default is Non-condensed printing.

Select Condensed Printing

ASCII Code ESC SI

Hex Code 1B 0F

Dec Code 27 15

Purpose Enters condensed mode, in which character width is reduced as follows:

Selected pitch	Condensed pitch
10 cpi	17.14 cpi
12 cpi	20 cpi
Proportional	½ width

Comment This command is ignored under the following two conditions: 15-cpi printing has been selected with the ESC g command.

This command reduces character width by about 50% when proportional spacing is selected with the ESC p command.

Cancel condensed printing with the DC2 command.

If the front panel setting of “20 CPI Condensed” is Disable, 12-cpi printing will ignore the Condense command.

The default is Non-condensed printing.

Cancel Condensed Printing

ASCII Code DC2

Hex Code 12

Dec Code 18

Purpose Cancels condensed printing selected by the SI or ESC SI commands.

Comment The default is Normal (non-condensed) printing.

Select DBCS Print Quality

ASCII Code FS x *n*

Hex Code 1C 78 *n*

Dec Code 28 120 *n*

Purpose Selects different print quality according to the following values:

n = 0 or 48	LQ
n = 1 or 49	Hi-Speed
n = 2 or 50	Near LQ
n = 3 or 51	Super Hi-Speed
n = 4 or 52	Normal
n = 5 or 53	Ultra Hi-Speed

Where:
n = 0, 1, 2, 3, 4, 5, 48, 49, 50, 51, 52, 53

Comment This command affects the front panel selection of “Print Quality.”

This command only works in DBCS mode.

The default mode is LQ.

Select Double-strike Printing

ASCII Code ESC G

Hex Code 1B 47

Dec Code 27 71

Purpose Prints each dot twice, with the second slightly below and right to the first, creating a bolder character.

Comment The default is Normal (non double-strike) style.

Cancel Double-strike Printing

ASCII Code ESC H

Hex Code 1B 48

Dec Code 27 72

Purpose Cancels double-strike printing selected with the ESC G command.

Comment The default is Normal (non double-strike) style.

Select Double-width Printing (One Line)

ASCII Code SO

Hex Code 0E

Dec Code 14

Purpose Doubles the width of all characters, spaces, and intercharacter spacing (set with the ESC SP command) on the same line as the command.

Comment This command is cancelled when the printer receives the following commands: LF, FF, VT, DC4, ESC W 0, and CR.

This command works under both ASCII and DBCS modes.

The default is Normal (non double-width) printing.

Cancel Double-width Printing (One Line)

ASCII Code ESC SO

Hex Code 1B 0E

Dec Code 27 14

Purpose Cancels the double-width printing of all characters, spaces, and intercharacter spacing (set with the SO command).

Comment This command works under both ASCII and DBCS modes.

Cancel Double-width Printing (One Line)

ASCII Code DC4

Hex Code 14

Dec Code 20

Purpose Cancels double-width printing selected by the SO or ESC SO commands.

Comment This command does not cancel double-width printing selected with the ESC W command.

The default is Normal (non double-width) printing.

Select Double-width Printing in DBCS Mode (One Line)

ASCII Code FS SO

Hex Code 1C 0E

Dec Code 28 14

Purpose Doubles the width of all characters, spaces, and intercharacter spacing (set with the FS S or FS T commands) on the same line as the command.

Comment This command is cancelled when the printer receives the following commands: LF, FF, VT, DC4, FS W 0, and CR.

This command can be cancelled by FS W 0 and FS !

This command works under ASCII mode, and it works the same as the SO or ESC SO commands.

The default is Normal (non double-width) printing.

Cancel Double-width Printing in DBCS Mode (One Line)

ASCII Code FS DC4

Hex Code 28 14

Dec Code 1C 20

Purpose Cancels double-width printing selected by the FS SO command.

Comment This command does not cancel double-width printing selected by the FS W command.

The default is Normal (non double-width) printing.

Select DBCS Mode

ASCII Code FS &

Hex Code 1C 26

Dec Code 28 38

Purpose Sets the printer in DBCS mode.

Comment In DBCS mode, all the data received by the printer with the MSB set will be paired with the next character to be a DBCS (double byte character system) character. Otherwise, the character will be treated individually as SBCS (single byte character system) character and printed accordingly.

The DBCS mode should be set before processing Hangul characters.

This command affects the front panel setting of “DBCS to ASCII.”

The default is DBCS mode.

Cancel DBCS Mode

ASCII Code FS .

Hex Code 1C 2E

Dec Code 28 46

Purpose Cancels DBCS mode. The printer is set back to ASCII mode.

Comment A few ESC commands only work in ASCII mode.

This command affects the front panel setting of “DBCS to ASCII.”

The default is DBCS mode.

Select Hangul Myunjo/Gothic Style

ASCII Code FS k *n*

Hex Code 1C 6B *n*

Dec Code 28 107 *n*

Purpose Selects Myunjo/Gothic style according to the following values:

n = 0 or 2 Set Myunjo style
n = 1 or 3 Set Gothic style

Where:
0 <= *n* <= 3

Comment The default is Myunjo style.

Select Italic Font

ASCII Code ESC 4

Hex Code 1B 34

Dec Code 27 52

Purpose Sets the style attribute of the font to Italics.

Comment This command selects italic printing even if the italic character table is not selected.

This command affects “Italic Print” on the front panel.

The default is Normal (non-italic) style.

Cancel Italic Font

ASCII Code ESC 5

Hex Code 1B 35

Dec Code 27 53

Purpose Sets the font style to Normal (cancels the italic style previously selected with the ESC 4 command).

Comment This command affects “Italic Print” on the front panel.

The default is Normal (non-italic) style.

Select Print Quality

ASCII Code ESC x *n*

Hex Code 1B 78 *n*

Dec Code 27 120 *n*

Purpose Selects the print quality according to the following values:

n = 0 or 48	Hi-Speed
n = 1 or 49	LQ
n = 2 or 50	Near LQ
n = 3 or 51	Super Hi-Speed
n = 4 or 52	Normal
n = 5 or 53	Ultra Hi-Speed

Where:
n = 0, 1, 2, 3, 4, 5, 48, 49, 50, 51, 52, 53

Comment This command affects the front panel setting of “Print Quality.”

Select Printer

ASCII Code DC1

Hex Code 11

Dec Code 17

Purpose Selects the printer after it has been deselected with the DC3 command.

Comment The printer ignores this command if the user has set the printer offline by pressing the online button.

Deselect Printer

ASCII Code DC3

Hex Code 13

Dec Code 19

Purpose Deselects the printer.

Comment The printer cannot be reselected by pressing the online button.

Select Superscript/Subscript Printing

ASCII Code ESC S *n*

Hex Code 1B 53 *n*

Dec Code 27 83 *n*

Purpose Prints characters that follow at about 2/3 their normal height; the printing location depends on the value of *n* as follows:

n = 1 or 49 Lower part of the character space
n = 0 or 48 Upper part of the character space

Where:
n = 0, 1, 48, 49

Comment This command does not affect graphics characters.

The width of super/subscript characters when using proportional spacing is the same as that of normal characters.

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

Use the ESC T command to cancel super/subscript printing.

This command only takes effect in SBCS mode.

The default is Normal (non-super/subscript) printing.

Cancel Superscript/Subscript Printing

ASCII Code ESC T

Hex Code 1B 54

Dec Code 27 84

Purpose Cancels super/subscript printing selected by the ESC S command.

Comment The default is Normal (non-super/subscript) printing.

Select DBCS Super/Subscript Printing

ASCII Code FS r *n*

Hex Code 28 72 *n*

Dec Code 1C 114 *n*

Purpose Prints characters that follow at about ½ their normal width and ½ their normal height; the printing location depends on the value of *n* as follows:

n = 1 or 49	Lower part of the character space
n = 0 or 48	Upper part of the character space

Where:
n = 0, 1, 48, 49

Comment Use the FS DC2 command to cancel super/subscript printing.

This command resets DBCS half-width printing set by the FS SI command.

The default is Normal (non-super/subscript).

Select Vertical Printing

ASCII Code FS J

Hex Code 28 4A

Dec Code 1C 74

Purpose The character is printed in the same position with 90 degrees rotation in a counter-clockwise direction under Hangul mode.

Comment Use the FS K command to cancel vertical printing.

This command does not take effect on single-byte characters.

The default is Normal (horizontal).

Cancel Vertical Printing (Select Horizontal Printing)

ASCII Code FS K

Hex Code 28 4B

Dec Code 1C 75

Purpose Prints all characters horizontally.

Comment This command cancels vertical printing set with the FS J command.

This is the default setting at power-up.

The default is Normal (horizontal).

Set *n*/60-inch Line Spacing

ASCII Code ESC A *n*

Hex Code 1B 41 *n*

Dec Code 27 65 *n*

Purpose Sets the line spacing to *n*/60 inch.

Where:
0 < *n* <= 85

Comment Changing the line spacing does not affect previous settings for vertical tabs or page length.

Does not support 0 lpi. When *n* = 0, the printer prints according to the previous LPI.

This command affects the front panel setting of “Lines Per Inch.”

Set *n*/180-inch Line Spacing

ASCII Code ESC 3 *n*

Hex Code 1B 33 *n*

Dec Code 27 51 *n*

Purpose Sets the line spacing to *n*/180 inch.

Where:
0 < *n* <= 255

Comment Changing the line spacing does not affect previous settings for vertical tabs or page length.

Does not support 0 lpi. When *n* = 0, the printer prints according to the previous lpi.

This command affects the front panel setting of “Lines Per Inch.”

Set Absolute Horizontal Print Position

ASCII Code ESC $ *n1 n2*

Hex Code 1B 24 *n1 n2*

Dec Code 27 36 *n1 n2*

Purpose Moves the horizontal print position to the position specified by the following formula:

Horizontal position = *n1* + (*n2* * 256) + left margin.

Where:
0 <= *n1* <= 127

0 <= *n2* <= 255

The unit setting for this command is 1/60 inch.

Comment The printer ignores this command if the specified position is to the right of the right margin.

Set Bottom Margin

ASCII Code ESC N *n*

Hex Code 1B 4E *n*

Dec Code 27 78 *n*

Purpose Sets the bottom margin on continuous paper to *n* lines (in the current line spacing) from the top-of-form position on the next page.

Where:
1 <= *n* <= 127

0 < *n* *(current line spacing) < page length

Comment This was formerly called the “Set skip-over-perforation” command.

This command affects the front panel setting of “Bottom Margin.”

The default depends on the power-up configuration.

Cancel Bottom Margin

ASCII Code ESC O

Hex Code 1B 4F

Dec Code 27 79

Purpose Cancels the bottom margin settings.

Comment This was formerly called the “Cancel skip-over-perforation” command.
This command affects the front panel setting of “Bottom Margin.”

Set DBCS Character Half Width

ASCII Code FS SI

Hex Code 28 0F

Dec Code 1C 15

Purpose Prints DBCS characters that follow at about half their normal width, and SBCS characters maintain their normal width.

Comment Use the FS DC2 command to cancel half-width DBCS character printing.

This command resets subscript/ superscript printing set by the FS r command.

The default is Normal (non half-width) printing.

Cancel DBCS Character Half Width and Super/Subscript Printing

ASCII Code FS DC2

Hex Code 28 12

Dec Code 1C 18

Purpose This command cancels the FS SI (half-width DBCS character) and FS r (set super/subscript printing) commands.

Comment The default is Normal (non half-width and non-super/subscript) printing.

Set Horizontal Tabs

ASCII Code ESC D n_1 n_2 … n_k NUL

Hex Code 1B 44 n_1 n_2 … n_k 00

Dec Code 27 68 n_1 n_2 … n_k 00

Purpose Sets horizontal tab positions (in the current character pitch) at the columns specified by n_1 to n_k as measured from the left-margin position.

The values for *n* must be in ascending order; a value of *n* less than the previous *n* ends tab setting (like the NUL code).

Where:
0 <= *k* <= 32
1 <= *n* <= 255
$n_k > n_{k-1}$

Comment Changing the character pitch does not affect current tab settings.

Send an ESC D NUL command to cancel all tab settings.

The tab settings move to match any movement in the left margin.

A maximum of 32 horizontal tabs can be set.

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.

The printer calculates tab positions based on 10 cpi if proportional spacing is selected with the ESC p command.

The default is every eight characters.

Set Intercharacter Space

ASCII Code ESC SP *n*

Hex Code 1B 20 *n*

Dec Code 27 32 *n*

Purpose Increases the space between characters; the unit is according to the current density.

Where:
0 <= *n* <= 127

Comment The extra space set with this command doubles during double-width mode.

Set Intercharacter Spacing of DBCS Character (Hangul Extension)

ASCII Code FS S n_1 n_2

Hex Code 28 53 n_1 n_2

Dec Code 1C 83 n_1 n_2

Purpose Sets intercharacter space to the left and right of the DBCS character.

n_1 Specifies the space to the left of the printed character.
n_2 Specifies the space to the right of the printed character.

The dot size of n_1 and n_2 is 1/180 inch.

Where:
$0 < n_1 < 127$
$0 < n_2 < 127$

Comment A DBCS character with a half-width feature set by the FS SI command is treated as an SBCS character.

This command also affects an SBCS character if the character is aligned with DBCS by the FS U command.

If the SBCS character is aligned with the DBCS character, the intercharacter space of the SBCS character is half of n_1 and n_2.

This command affects the front panel setting of “DBCS CPI.”

The default is $n_1 = 0$, $n_2 = 3$.

Set Intercharacter Spacing of SBCS Character (Hangul Extension)

ASCII Code FS T n_1 n_2

Hex Code 28 54 n_1 n_2

Dec Code 1C 84 n_1 n_2

Purpose Sets intercharacter space to the left and right of the SBCS character.

n_1 Specifies the space to the left of the printed character in 1/180 of an inch.

n_2 Specifies the space to the right of the printed character in 1/180 of an inch.

The units of n_1 and n_2 are 1/180 inch.

Where:
$0 < n_1 < 127$
$0 < n_2 < 127$

Comment A DBCS character with a half-width feature set by the FS SI command is treated as an SBCS character.

This command only affects SBCS characters when the FS V command is set.

The default is $n_1 = 0$, $n_2 = 2$.

Set Left Margin

ASCII Code ESC l *n*

Hex Code 1B 6C *n*

Dec Code 27 108 *n*

Purpose Sets the left margin to *n* columns in the current character pitch, as measured from the left-most printable column.

Where:
1 <= *n* <= 255

0 < left margin < right margin

Comment In DBCS mode, the character pitch is according to the width of the DBCS character.

This command affects the front panel setting of “Left Margin.”

The default depends on the power-up configuration.

Set Page Length in Inches

ASCII Code ESC C NUL *n*

Hex Code 1B 43 00 *n*

Dec Code 27 67 0 *n*

Purpose Sets the page length to *n* inches.

This command sets the page length in 1-inch increments only.

Sets the page length before paper is loaded or when the print position is at the top-of-form position. Otherwise, the current print position becomes the top-of-form position.

Where:
1 <= *n* <= 22

Comment Setting the page length cancels the bottom margin setting.

This command affects the front panel setting of “Forms Length In Inches.”

Set Page Length in Lines

ASCII Code ESC C *n*

Hex Code 1B 43 *n*

Dec Code 27 67 *n*

Purpose Sets the page length to *n* lines in the current line spacing.

Sets the page length before paper is loaded or when the print position is at the top-of-form position. Otherwise the current print position becomes the top-of-form position.

Where:
1<= *n* <= 127
0 < *n* *(current line spacing) <= 22 inches

Comment Setting the page length cancels the bottom margin setting.

Changing the line spacing does not affect the current page-length setting.

This command affects front panel setting of “Forms Length In Lines.”

Set Relative Horizontal Print Position

ASCII Code ESC \ *n1 n2*

Hex Code 1B 5C *n1 n2*

Dec Code 27 92 *n1 n2*

Purpose Moves the horizontal print position left or right from the current position.

For right movement: horizontal position = *n2* * 256 + *n1*.

For left movement: horizontal position = 65536 - (*n2**256 + *n1*).

Where:
0 <= *n1* <= 127

0 <= *n2* <= 255

Comment The printer ignores this command if the command would move the print position outside the printing area.

The default defined unit for this command is according to the current density: 1/120 inch for Near LQ and 1/180 inch for LQ, Normal, Hi-Speed, Super Hi-Speed, and Ultra Hi-Speed.

Set Right Margin

ASCII Code ESC Q *n*

Hex Code 1B 51 *n*

Dec Code 27 81 *n*

Purpose Sets the right margin to *n* columns in the current character pitch, as measured from the left-most printable column.

Where:
1 <= *n* <= 255
left margin < (current pitch) * *n* < printable area width

Comment In DBCS mode, the right margin will be set according to the width of the DBCS character.

This command affects the front panel setting of “Right Margin.”

The default depends on the power-up configuration.

Set Vertical Tab Channels

ASCII Code ESC / *m*

Hex Code 1B 2F *m*

Dec Code 27 47 *m*

Purpose The value for *m* specifies the number of the tab sets being changed; these sets of tabs are called vertical formatting unit (VFU) channels.

Where:
0 <= *m* <= 7

Comment You must use this command to select a tab set (VFU channel) other than set 0; the VT (tab vertically) command then uses the settings for the selected channel.

You can select from eight sets of tabs (VFU channels).

Set Vertical Tabs

ASCII Code ESC B n_1 n_2 … n_k NUL

Hex Code 1B 42 n_1 n_2 … n_k 00

Dec Code 27 66 n_1 n_2 … n_k 0

Purpose Sets vertical tab positions (in the current line spacing) at the lines specified by n_1 to n_k, as measured from the top-margin position.

The values for *n* must be in ascending order; a value of *n* less than the previous *n* ends tab setting (just like the NUL code).

Where:
0 <= *k* <= 16
1 <= *n* <= 255
$n_k > n_{k-1}$

Comment Changing the line spacing does not affect previous tab settings.

The tab settings move to match any subsequent movement in the top-margin position.

Send an ESC B NUL command to cancel all tab settings.

A maximum of 16 vertical tabs can be set.

The printer stores all tab settings, even if outside the printing area; if you increase the page length to include previously set tabs, you can move to those positions with the VT (tab vertically) command.

Sending the ESC B command clears any previous tab settings.

Set Vertical Tabs in VFU Channels

ASCII Code ESC b *m* n_1 … n_k NUL

Hex Code 1B 62 *m* n_1 … n_k 00

Dec Code 27 98 *m* n_1 … n_k 0

Purpose Sets vertical tab positions at the lines specified by n_1 to n_k (in the current line spacing) in tab set *m*, as measured from the top-of-form position.

The value for *m* specifies the number of the tab sets being changed; these sets of tabs are called vertical formatting unit (VFU) channels.

The values for *n* must be in ascending order; a value of *n* less than the previous *n* ends tab setting (just like the NUL code).

Where:
0 <= *m* <= 7
1 <= *n* <= 255
$n_k > n_{k-1}$
1 <= *k* <= 16

Comment Up to eight sets of tabs can be set.

Send the ESC / command to select a VFU channel other than channel 0; the VT (tab vertically) command then uses the settings for the selected channel.

Changing the line spacing does not affect previous settings for vertical tabs.

Sending the ESC b command clears any previous tab settings in that tab set.

Send an ESC b *m* NUL command to cancel all tab settings in the tab set *m*.

A maximum of 16 vertical tabs can be set in each VFU channel.

The printer stores all tab settings, even if outside the printing area; if you increase the page length to include previously set tabs, you can move to those positions with the VT (tab vertically) command.

Tab Horizontally

ASCII Code HT

Hex Code 09

Dec Code 09

Purpose Moves the horizontal print position to the next tab to the right of the current print position.

Comment 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 strike through) is not printed between the current print position and the next tab when this command is sent.

In DBCS mode, the command takes effect in double byte character setting.

Tab Vertically

ASCII Code VT

Hex Code 0B

Dec Code 11

Purpose Moves the vertical print position to the next vertical below the current print position.

Moves the horizontal print position to the left-margin position.

Comment 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 (moves the horizontal print position to the left-margin position) if all tabs have been cancelled with the ESC B NUL command.

The VT command functions the same as an LF command (advances one line in the current line spacing and moves the horizontal print position to the left-margin position) if no tabs have been set since the printer was turned on or was reset with the ESC@ command.

The VT command functions the same as an FF command (advances to the top-margin position on the next page) if some tabs have been set, but no tab is set between the current print position and the bottom-margin position.

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

Turn Auto-wrap Around On/Off

ASCII Code ESC d *n*

Hex Code 1B 64 *n*

Dec Code 27 100 *n*

Purpose Turns Auto-wrap Around on/off according to the following values:

n = 0 Turn off Auto-wrap Around. The characters beyond right margin will be cut.

n = 1 Turn on Auto-wrap Around. The characters beyond right margin will be printed on the next line.

Where:
n = 0, 1

Turn Double-height Printing On/Off

ASCII Code ESC w *n*

Hex Code 1B 77 *n*

Dec Code 27 119 *n*

Purpose Turns on/off double-height printing of all characters, as measured from the current baseline:

n = 1 or 49 Turns on double-height

n = 0 or 48 Turns off double-height

Where:
n = 0, 1, 48, 49

Comment No change for line spacing.

This command only takes effect in SBCS mode.

The default is Normal (non double-height) printing.

Turn Double-width, Double-height Printing On/Off

ASCII Code FS W *n*

Hex Code 28 57 *n*

Dec Code 1C 87 *n*

Purpose Turns on/off double-width, double height printing of all characters, spaces, and intercharacter spacing (set with the FS S or FS T commands) on the same line as this command, as follows:

n = 0 or 48 Turns off double-width double-height
n = 1 or 49 Turns on double-width double-height

Where:
n = 0, 1, 48, 49

Comment The baseline of the line including double-width, double-height characters moves down 24/180 inch, and the line spacing also increases 24/180 inch.

The default is Normal (non double-width double-height) printing.

Turn Double-width Printing On/Off

ASCII Code ESC W *n*

Hex Code 1B 57 *n*

Dec Code 27 87 *n*

Purpose Turns on/off double-width printing of all characters, spaces, and intercharacter spacing (set with the ESC SP command) following this command as follows:

n = 1 or 49 Turns on double-width
n = 0 or 48 Turns off double-width

Comment This command works under both ASCII and DBCS modes.

The default is Normal (non double-width) printing.

Turn Extending Table Character On/Off

ASCII Code FS v *n*

Hex Code 1C 76 *n*

Dec Code 28 118 *n*

Purpose Turns on/off extending table characters, as follows:

n = 0 or 48 Cancels extending table characters

n = 1 or 49 Selects extending table characters

Where:
n = 0, 1, 48, 49

Comment This command extends the table characters so they touch in both horizontal and vertical directions.

The limitation of extension is ½ inch.

Our printer could extend the table characters in the range of A6A1H to A6E4H in the Hangul Complete font.

The default is Table Character not extended.

Turn On/Off OCRB selection

ASCII Code ASSC 0 z *n*

Hex Code ASSC 30 7A *n*

Dec Code ASSC 48 122 *n*

Purpose Turns on/off OCRB selection as follows:

n = 0 or 48 Turns off OCRB selection

n = 1 or 49 Turns on OCRB selection

Where:
n = 0, 1, 48, 49

Comment When OCRB selection is turned on, the OCRB character can be printed out.

This command affects the front panel setting of “DBCS ASCII Style.”

This command works only in DBCS mode.

The default is *n* = 0.

Turn Proportional Mode On/Off

ASCII Code ESC p *n*

Hex Code 1B 70 *n*

Dec Code 27 112 *n*

Purpose Selects either proportional or fixed character spacing according to the following values:

n = 0 or 48 Returns to current fixed character pitch.

n = 1 or 49 Selects proportional spacing.

Comment Changes made to the fixed-pitch setting with the ESC P, ESC M, or ESC g commands during proportional mode take effect when the printer exits proportional mode.

Characters from 0x80 to 0xFE cannot be printed in this mode

This command only affects the character printing in ASCII mode.

Turn Underline On/Off

ASCII Code ESC - *n*

Hex Code 1B 2D *n*

Dec Code 27 45 *n*

Purpose Turns on/off printing of a line below all characters and spaces following the command:

n = 0 or 48 Turns underline off
n = 1 or 49 Turns underline on

Where:
n = 0, 1, 48, 49

Comment The underline does not print across the horizontal space with the following commands: ESC $, ESC \ (when the print position is moved to the left), and HT.

Graphics characters are not underlined.

This command does not change line spacing.

The default is Normal (non-underlined) style.

Turn Underline On/Off (Hangul Extension)

ASCII Code FS - *n*

Hex Code 1C 2D *n*

Dec Code 28 45 *n*

Purpose Turns on/off printing of a line below all characters and spaces following the command:

n = 0 or 48 Turns underline off

n = 1 or 49 Prints one dot underline

n = 2 or 50 Prints two dot underline

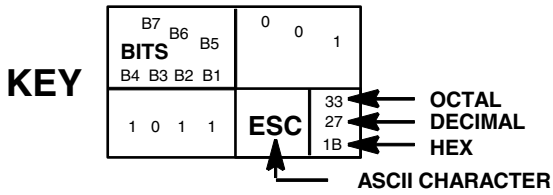
Where:
n = 0, 1, 48, 49

Comment If the character is in vertical printing mode, the line prints over the character and becomes overscored.

Underline and overscore each increase 4/180 inch line spacing.

The default is Normal (non-underlined) style.

A *Standard ASCII Character Set*



BITS B7 B6 B5 / 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 Notices

Energy Star

The Environmental Protection Agency ENERGY STAR® Computers program is a partnership effort with manufacturers of data processing equipment to promote the introduction of energy-efficient personal computers, monitors, printers, fax machines, and copiers to help reduce air pollution and global warming caused by electricity generation.

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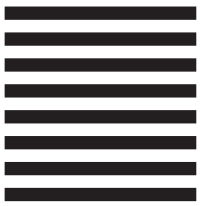

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