

ML 280 Elite

◆ TECHNICAL REFERENCE GUIDE



OKI

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The most up-to-date drivers and manuals are available from the Oki Europe website:

<http://www.okieurope.com>

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As an Energy Star Program Participant, the manufacturer has determined that this product meets the Energy Star guidelines for energy efficiency.



This product complies with the requirements of the Council Directives 89/336/EEC (EMC) and 73/23/EEC (LVD) as amended where applicable on the approximation of the laws of the member states relating to electromagnetic compatibility and low voltage.

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INTRODUCTION

This ML/Epson/IBM compatible printer is a highly reliable, rugged, high performance desk-top dot matrix printer, designed for strong, feature-rich paper handling, fast throughput, and user friendliness.

FEATURES

...❖ Emulation Compatibility

	IBM	EPSON	ML
Extension	IBM2480	ESC/P2	OKI ML
Upper	IBM Graphics +	Epson LX +	OKI ML
Original	IBM Graphics Printer	Epson LX	OKI ML

...❖ 9-pin single arrangement operator replaceable printhead.

...❖ Direct access control panel.

...❖ Structured direct access menu for easy set up.

...❖ Printhead life: 200M characters (average) in 10 CPI Utility mode at normal 25% duty, 35% page density.

...❖ Bidirectional short-line-seeking printing.

...❖ Print speed:

- 333 CPS HSD (all CPI's)
- 375 CPS SSD (12 CPI Only)
- 250 CPS Utility (all CPI's)
- 62.5 CPS NLQ (all CPI's) *

** This value is available when the "Mechanical Speed" of the technical menu is set to "High".*

...❖ Paper feed:

- Top Friction.
- Rear Pin Platen.
- Bottom path (with optional pull tractor).
- Optional pull tractor.
- Optional Roll Paper Stand.
- Optional Cut-Sheet Feeder.

- ...❖ Paper handling: Semi-Auto-loading for single sheet.
- ...❖ Paper copies: 9 – 11 lb, 4 part.
- ...❖ Re-inking cartridge ribbon.
- ...❖ Standard IEEE1284 parallel interface, USB interface, optional serial interfaces.
- ...❖ Quiet operation at 51 dBA in quiet mode and 58 dBA in normal mode.
- ...❖ 128 kbytes max. receive buffer.
- ...❖ Line feed resolution:
 - 1/6 inch, 1/8 inch, n/72 inch, n/144 n/144 inch, n/216
- ...❖ Agency approvals: DC and 230V model – CE, GS, PSB.
- ...❖ Options: RS232C and RS422 Serial Interfaces, Current loop.
 - Pull tractor (with acoustic cover)
 - Cut-Sheet Feeder (CSF)
 - Roll paper stand
- ...❖ Barcode data printing.
- ...❖ Postnet bar code data printing.

USING THIS GUIDE

This Technical Reference Guide is a supplement to the manuals for the various models of Microline printers. It contains additional information on selecting printer drivers and on the printer commands, as well as interfacing specifications.

ONLINE USAGE

This manual is intended to be read on screen using Adobe Acrobat Reader. Use the navigation and viewing tools provided in Acrobat.

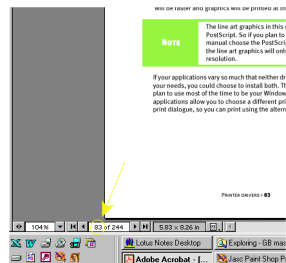
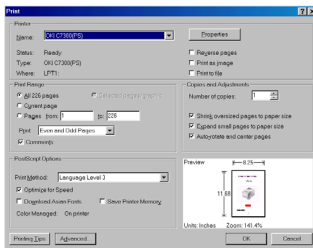
You can access specific information in two ways:

- ❖ In the list of bookmarks down the left hand side of your screen, click on the topic of interest to jump to the required topic. (If the bookmarks are not available, use the Table of Contents).
- ❖ In the list of bookmarks click on Index to jump to the Index. (If the bookmarks are not available, use the Table of Contents). Find the term of interest in the alphabetically arranged index and click on the associated page number to jump to the page containing the subject.

PRINTING PAGES

The whole book, Individual pages, or sections may be printed. The procedure is:

1. From the toolbar, select [File], then [Print] (or press the Ctrl + P keys).
2. Choose which pages you wish to print:
 - (a) **All pages**, for the entire manual.
 - (b) **Current page** for the page at which you are looking.



- (c) **Pages from** and **to** for the range of pages you specify by entering their page numbers.
3. Select the **Properties** for the printer you are using and check/select/set up the parameters such as duplex printing, page size etc.
4. Click on **OK**.

CONVENTIONS USED IN THIS MANUAL

The following conventions are used in the command chapters of this manual:

- ...❖ The emulation(s) to which each command applies is given in parentheses at the end of the heading for the command. The emulations (IBM = IBM Proprinter, E = Epson FX, and ML = Oki Data MICROLINE Standard) are described later in this Guide.

For example:

Proportional Spacing Commands (IBM/E/ML)

- ...❖ Text denoting lines of BASIC programming is set in a sans serif font.

For example:

```
LPRINTCHR$(27);CHR$(4);CHR$(0);CHR$(0);CHR$(0);  
CHR$(34);CHR$(0)
```

NOTE

A note appears like this. A note provides additional information to supplement the main text.

ABBREVIATIONS & ACRONYMS

The following abbreviations and acronyms are used in this manual:

ASCII:	American Standard Codes for Information Interchange
Cpi:	Characters per inch
Cpl:	Characters per line
CSF:	Cut Sheet Feeder
Dec:	Decimal
DLL:	Down Line Loading
Dpi:	Dots per inch
E/I:	Epson/IBM Compatible Model
EPS:	Epson FX Emulation
Hex:	Hexadecimal
HSD:	High Speed Draft
IBM:	IBM Proprinter Emulation
ML:	Oki Data MICROLINE Standard Emulation
NLQ:	Near Letter Quality
ROM:	Read Only Memory
RAM:	Random Access Memory
Std.:	Oki Data MICROLINE Standard Model
TOF:	Top of Form
UTL:	Utility

PRINTER DRIVERS

WORKING WITH COMMERCIAL SOFTWARE

PRINTER DRIVERS

The tables below summarise usable drivers for each printer emulation. They are listed in order of decreasing compatibility. As you go down the list, select one from as high up on the list as possible, based on what is available from among the drivers supplied with your software.

Oki constantly enhances its printer drivers. For details and availability of the latest drivers for your printer please check the Oki Europe Web Site at:

www.okieurope.com

IBM PROPRINTER EMULATION	EPSON EMULATION	OKIDATA ML STANDARD EMULATION
IBM Proprinter III	Epson FX850/1050	Okidata Microline 280 Elite
IBM Proprinter II	Epson FX86/286	Okidata Microline 320/321
IBM Proprinter	Epson FX	Okidata Microline 292/293
IBM Graphics Printer	Epson EX800/1000	Okidata Microline 192/193
		Okidata Microline 182/183
		Okidata Microline 92/93
		Okidata Microline 82A/83A

Because there are some differences in characteristics such as speed or access to various features, you may wish to experiment with different drivers.

If you must select a driver that is not listed in the table, check it thoroughly for print features such as boldface, underline and changes in pitch.

Boldfaced items printed twice, underlines misplaced, wide spaces left between lines or the printer behaves chaotically (turn off the printer if the latter occurs) are all characteristics of an incompatible driver selection.

SOFTWARE DRIVER SELECTION

Selecting a software printer driver is usually a part of the program installation process. Changing printers may require use of an external routine, or may be possible from within the program through menu selection.

NOTE

Refer to your software documentation for information on installing printer drivers.

EMBEDDED COMMANDS

In some cases, commercial software packages will permit you to create and/or modify the printer driver. Even if a driver specifically designed for the printer is available, this option can provide additional room for customisation.

Typically, the driver modification routine will present a list of operations with some method for entering printer commands, permitting substitution, such as entering the italic command in place of the underline command. It also permits modification of an existing driver to better fit your printer. Driver modification does require a basic familiarity with your printer's command set, so you should study the control codes in the chapters which follow thoroughly before attempting it.

Some programs also permit you to control your printer directly through embedded commands. Usage of these commands in some programs can provide access to a wide range of printer capabilities that are not ordinarily supported, or can be entered as an initialisation string to set the basic format for a document.

EMULATIONS

The printer can be operated with one of three emulations, IBM, Epson or ML (Microline).

DRIVER INSTALLATION

CD1 contains the printer drivers, all of which come with comprehensive help files explaining the operation of the driver functions.

1. Insert the CD into your CD-ROM drive.
-

NOTE

If the CD does not AutoPlay, click Start / Run / Browse. Then browse to your CD-ROM drive, double-click Install.exe and click OK.

2. Select your **Language**.
3. When the Menu Installer window appears, click the **Driver Installation** button.
4. Follow the on-screen instructions.

Please refer to the readme file on this CD for the latest information on printer driver installation.

OR:

1. When the [Add Printer] window appears, click [Next].
 2. Select the directory on the CD where the drivers are located.
X:\Drivers\WinVer\CodePage where *X:* is CD drive letter;
WinVer is the Windows versions, and *CodePage* is the selected option.
 3. After files have finished copying, click [Finish].
 4. Switch your printer ON.
-

NOTE

Installation of the Oki USB driver is only required for Windows 98. You may be asked for your original Windows 98 CD. Please have this available.

INTERFACES

GENERAL

Your printer is equipped with a selection of data interfaces:

Under no circumstances attempt to use both parallel and USB ports simultaneously.

1. **Parallel** – For direct connection to a PC. This port requires a bi-directional (IEEE 1284 compliant) parallel cable.
2. **USB** – For connection to a PC running Windows 98 SE or above (not Windows 95 **upgraded** to Windows 98) or Macintosh.

NOTES

*Windows NT 4.0 does **not** support USB.*

Administrator privileges are necessary for Windows 2000 and Windows XP installations

USB

This port requires a cable conforming to USB version 1.1 or above. A genuine cable displays the Trident symbol on both connectors.



Using an inferior cable can cause printing problems and special cables are needed for longer runs than five metres.

The operation of a printer is not assured if a USB compatible device is connected concurrently with other USB compatible machines.

When connecting multiple printers of the same type, they appear as *****, ***** (2), ***** (3), etc. These numbers depend on the order of connecting or turning on each printer.

Connecting the USB Cable

Due to the number of possible variants of operating systems it is not possible to describe every combination.

Terminology may vary between Windows operating systems and some knowledge is assumed. If you are unsure how to proceed, you should

consult your computer documentation or system manager for details. This example uses Windows 2000 Professional.

1. Ensure the printer and computer are easily accessible and turn both units off. This is not strictly necessary but may prevent any problems being caused by the accidental dislodging of power or other cables.

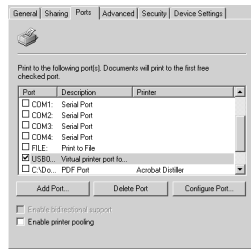
2. Plug the Series A male connector (a) into the computer's USB port or into a suitable USB hub.



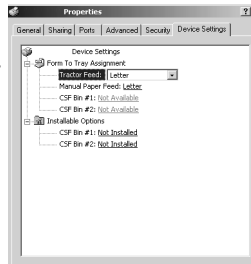
3. Plug the Series B Male connector (b) into the printer's USB port.

4. Switch on both the computer and printer.

5. The printer will be identified immediately by the New Hardware Wizard and install itself in the Printer folder. An additional item, USB Printing Support will also appear in the Device Manager each time the printer is switched **ON** and connected.



6. Check that the default paper size has been correctly set by looking at the settings in the Settings > Printers folder. Under the printer's Properties > General tab, the current paper selection is shown. The printer picks up its initial setting from the Locale settings on the host computer. The paper size can be altered by using the drop down arrow and selecting an alternative size.



7. If the printer had formerly been used as a parallel or serial device and there is no output from the printer once a USB cable has been connected, check to see that the correct port has been selected. This information can also be found in the Properties folder but under the Ports tab. Amend as necessary.

8. If there are printing problems, check to see whether there is a USB connection active in the Control Panel. If there is no USB

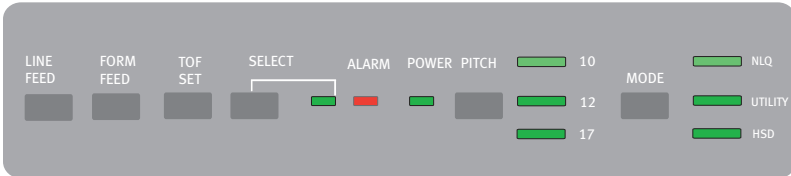
connection shown, you must install the hub.

Alternatively, there may be a problem if the printer is connected via a USB hub. Disconnect the printer cable from the hub and connect it directly to the computer.

OPERATOR CONTROLS

CONTROL SWITCHES AND INDICATORS

OPERATOR PANEL



Functions at “switch on”

FUNCTION	SWITCH					
	LINE FEED	FORM FEED	TOF SET	SELECT	PITCH	MODE
Enters Primary Menu Mode				✓		
Enters Maintenance Menu Mode				✓	✓	
Starts Demo Pattern self-test	✓					
Starts Rolling ASCII self-test	✓			✓		
Starts Hex-dump function		✓		✓		
Runs 17.1 CPI character pitch			✓			
Runs NLQ		✓				
17.1 CPI character pitch + NLQ		✓	✓			
Executes default setting for menu/paper feed. All CPI LEDs flash for 400ms			✓	✓		
Executes default setting for menu. All CPI LEDs flash for 400ms	✓	✓				
Executes default setting for paper feed. All CPI LEDs flash for 400ms					✓	✓

Switch Functions

MODE	Print Mode		Hex Dump Mode		Menu Mode		Test Mode	Operator Panel Function			
	Select	Deselect	Select	Deselect	Main (by / itself)	Sub (press PITCH together)		Full	Semi	Limited	
SW											
SELECT	Sets the printer off line.	Sets the printer on line.	Sets the printer off line.	Sets the printer on line.	Prints out a menu item.	Prints out all the menu items.	Exit Test Mode.	Enabled	Enabled	Enabled	
LINE FEED	Performs linefeed. Continuous linefeed is performed if this switch is held down for over 400ms. In CSF mode: If paper hasn't been loaded, paper is fed. Paper is ejected if line-feed makes the page-length exceed the set one. Reverse minute linefeed is executed by simultaneously pressing the TOF SET switch, so TOF position setting is possible.	Continuous linefeed is held down for over 400ms. In CSF mode: If paper hasn't been loaded, paper is fed. Paper is ejected if line-feed makes the page-length exceed the set one. Reverse minute linefeed is executed by simultaneously pressing the TOF SET switch, so TOF position setting is possible.	Performs linefeed. Continuous linefeed is performed if this switch is held down for over 400ms. In CSF mode: If paper hasn't been loaded, paper is fed. Paper is ejected if line-feed makes the page-length exceed the set one. Reverse minute linefeed is executed by simultaneously pressing the TOF SET switch, so TOF position setting is possible.	Continuous linefeed is held down for over 400ms. In CSF mode: If paper hasn't been loaded, paper is fed. Paper is ejected if line-feed makes the page-length exceed the set one. Reverse minute linefeed is executed by simultaneously pressing the TOF SET switch, so TOF position setting is possible.	Goes to the next group title.	Goes back to the previous group title.	-	Enabled	Enabled only when in the Deselect mode.	Enabled only when in the Deselect mode.	
FORM FEED	Paper is fed to the next TOF position. In CSF mode: If paper hasn't been loaded, paper is fed; already loaded, it is ejected. Forward minute linefeed is executed by simultaneously pressing the TOF SET switch, so TOF position setting is possible.	Paper is fed to the next TOF position. In CSF mode: If paper hasn't been loaded, paper is fed; already loaded, it is ejected. Forward minute linefeed is executed by simultaneously pressing the TOF SET switch, so TOF position setting is possible.	Paper is fed to the next TOF position. In CSF mode: If paper hasn't been loaded, paper is fed; already loaded, it is ejected. Forward minute linefeed is executed by simultaneously pressing the TOF SET switch, so TOF position setting is possible.	Paper is fed to the next TOF position. In CSF mode: If paper hasn't been loaded, paper is fed; already loaded, it is ejected. Forward minute linefeed is executed by simultaneously pressing the TOF SET switch, so TOF position setting is possible.	Goes to the next item title.	Goes back to the previous item title.	-	Enabled	Enabled only when in the Deselect mode.	Enabled only when in the Deselect mode.	
TOF SET	-	Executes TOF setting. Makes TOF setting to its default if paper hasn't been loaded.	-	Executes TOF setting. Makes TOF setting to its default if paper hasn't been loaded.	Goes to the next setting value.	Goes back to the previous setting value.	-	Enabled	Enabled	Disabled	
PITCH	Selects a character pitch.	Selects a character pitch. Resets the printer by pressing the TOF SET switch together. *1	-	-	(Switches a function.)	(Switches a function.)	-	Enabled	Enabled only when in the Deselect mode.	Disabled	
MODE	Selects a print quality mode.	Selects a print quality mode.	-	-	Clears a paper end status occurred in the Menu mode and returns to the Menu mode.	Exits Menu Mode.	-	Enabled	Enabled only when in the Deselect mode.	Disabled	

*1 When the "Reset Switch" of the technical menu is set to "Enable".

Indicator light Functions

LED	COLOUR	FUNCTION
POWER	GREEN	Indicates that Power is ON
ALARM	RED	Lit when an alarm condition is present. Also Indicates "Paper out"
SELECT	GREEN	Lit when in SELECT mode.
PRINT MODE:		
HSD	GREEN	See table below
Utility	GREEN	
NLQ	GREEN	
PRINT PITCH		
10 CPI	GREEN	See table below
12 CPI	GREEN	
17 CPI	GREEN	

If the printhead temperature becomes high, the printer will stop printing. It will resume printing automatically when the printhead cools down.

LED: SELECT	ALARM	HSD	UTILITY	NLQ	10	12	17	NOTE
PRINTER STATUS								
SELECT	✓	-	-	-	-	-	-	
DESELECT	-	-	-	-	-	-	-	
HSD	-	✓	-	-	-	-	-	
Utility	-	-	✓	-	-	-	-	
NLQ	-	-	-	✓	-	-	-	
SSD	-	✓	-	-	-	✓	-	*2
10 CPI	-	-	-	-	✓	-	-	
12 CPI	-	-	-	-	-	✓	-	
15 CPI	-	-	-	-	-	-	✓	*1
17 CPI	-	-	-	-	-	-	✓	
20 CPI	-	-	-	-	-	-	-	*3

Key: ✓ = LED **ON**; Blank = LED **OFF**; - = LED maintains current status.

***1** When the 15/20 cpi select switch of the technical menu is set to **Enable**.

***2** When the Draft Mode of the menu is set to **SSD**.

***3** When in the **EPSON** mode, or when the 15/20 cpi select by SW of the technical menu is set to **Enable**.

Alarm/Error Indications

The following table summarises LED indications during alarm states.

1. Alarm LED – Recoverable Error

	LED:	SELECT	ALARM	HSD	UTILITY	NLQ	10	12	17
ALARM									
Paper end			✓	–	–	–	–	–	–
Paper jam			✓	–	–	–	–	–	–
Thermal alarm	–		X	–	–	–	–	–	–
Print suppress	X		–	–	–	–	–	–	–

Key: ✓ = LED ON; Blank = LED OFF; **X** = LED Flashes – = LED maintains current status.

2. Alarm LED – Irrecoverable Error

	LED:	SELECT	ALARM	HSD	UTILITY	NLQ	10	12	17
ALARM									
Printer and internal RAM	X		✓				✓		
PRG. ROM	X		✓					✓	
EEPROM	X		✓			✓	✓	✓	✓
WDT	X		✓			✓			✓
NMI	X		✓	✓					✓
BRK command	X		✓		✓				✓
Printer and internal RAM	X		✓						✓
SPACING	X		✓	✓					
HOMING	X		✓	✓					
Head A/D error	X		✓				✓		✓

Key: ✓ = LED ON; Blank = LED OFF; **X** = LED Flashes.

MENU

Overview

Features selected in the MENU mode become the default features for the printer each time it is powered on. The Menu function allows activation of features without the use of software commands. Software commands will override MENU settings.

1. Key functions

NAME	FUNCTION
LINE FEED	General categorisation of functions/features. Selects next GROUP title. Once the complete list has been selected, cycles back to the first GROUP. When first entering MENU, the first line of the MENU will be printed.
FORM FEED	Direct name of functions/features. Selects next ITEM title. Once the complete list has been selected, cycles back to the first ITEM in the current GROUP. When first entering MENU, the first line of the MENU will be printed.
TOF SET	Value (setting) of the ITEM. Selects next SETTING value. Once the complete list has been selected, cycles back to the beginning of the list. When first entering MENU, the first line of the MENU will be printed.
SELECT	Prints the entire MENU and cycles back to the beginning.

Pressing these keys while the PITCH key is pressed, selects the items in reverse order.

2. Operation

- (a) To enter Menu mode, turn on the power while holding the SELECT switch down.
- (b) When entering Menu mode, press the LINE FEED key, FORM FEED key, or TOF SET key to print the first line of MENU. Press the SELECT key to print the whole MENU.

See Key functions above for description of operation within Menu mode.

- (c) To exit MENU mode, press the PITCH + MODE.
- (d) If conflicting features/functions are set in menu mode, the printer will treat these function/features according to the priority table.

- (e) The TOF position is not affected by MENU mode. (When the page length is changed, reset the TOF.)
- (f) Depressing the FF and LF keys or the SEL and TOF keys simultaneously while powering on the printer will reset the menu back to its factory defaults. (See “Factory Default Settings” on page 311 for further details.)

During the Menu mode, both LEDs of PRINT MODE and PRINT PITCH flash.

Complete Menu listing

*(Factory default settings in **bold italic** text.)*

GROUP	ITEM	SETS
Printer Control	Emulation Mode	IBM Epson ML
Font	Print Mode	Utility NLQ Courier NLQ Gothic NLQ OCR-B DRAFT
	Draft Mode	HSD
	Pitch	SSD 10CPI * 12 CPI 15 CPI 17.1 CPI 20 CPI
	Proportional Spacing	No, Yes
	Style	Normal, Italics
	Size (see note 1.)	Single, Double

GROUP	ITEM	SETS
Symbol Sets	Character Set	Set I Set II Standard, Line Graphics, Block Graphics (ML Mode only)
	Language Set	ASCII , French, German, British, Danish I, Swedish I, Italian, Spanish I, Japanese, Norwegian, Danish II, Spanish II, Latin American, French Canadian, Dutch, TRS 80, Swedish II, Swedish III, Swedish IV, Turkish Swiss I, Swiss II, Publisher
	Zero Character Code Page	Slashed, Unslashed USA , Canada French, Multilingual, Portugal, Norway, Turkey, Greek_437, Greek_869, Greek_928, Greek_437 CYPRUS, Polska Mazovia, Serbo Croatic I, Serbo Croatic II, ECMA-94, Hungarian CWI, Windows Greek, Windows East Europe, Windows Cyrillic, East Europe Latin II - 852, Cyrillic I - 855, Cyrillic II - 866, Kamenicky (MJK), ISO Latin 2, Hebrew NC (862), Hebrew OC, Turkey_857, Latin 5 (Windows Trukey), Windows Hebrew, Ukrainian, Bulgarian, ISO Latin 6 (8859/10), Windows Baltic, Baltic_774, KBL-Lithuanian, Cyrillic Latvian, Roman-8, Icelandic-861, Multilingual 858, ISO 8859-15, Greek_737
	Slashed Letter 0	No , Yes
Vertical Control	Line Spacing	6 LPI , 8 LPI No , Yes
	Skip Over Perforation Page Length	11", 11 2/3", 12" *, 14", 17", 5", 3", 3.5", 4", 5.5", 6", 7", 8", 8.5"

GROUP	ITEM	SETS
Set Up	Graphics	Bi-directional, Uni-directional
	7 or 8 Bits Graphics (see note 4.)	8, 7
	Receive Buffer Size (see note 2.)	1 Line, 32K, 64K , 128K
	Paper Out Override	No , Yes
	Print Registration	Right 0.25, 0.20, 0.15, 0.10, 0.05 mm, 0 0.05, 0.10, 0.15, 0.20, 0.25 mm Left
	7 or 8 Bits Data Word	8, 7
	Operator Panel Function (see note 3.)	Full Operation, Semi Operation , Limited Operation
	Reset Inhibit	No , Yes
	Print Suppress effective	No, Yes
	Auto LF	No , Yes
	Auto CR (see note 5.)	No, Yes
	Print DEL Code (see note 4.)	No, Yes
	SI Select Pitch (10 CPI) (see note 5.)	15 CPI, 17.1 CPI
	SI Select Pitch (12 CPI) (see note 5.)	12 CPI , 20 CPI
	Time Out Print	Valid, Invalid
	Auto Select	No , Yes
	ESC SI Pitch (see note 5.)	17.1 CPI , 20CPI
	Select Language Set (see note 6)	Combined , Code Page Only
	CSF/RPS Select	RPS , CSF
	Impact Mode	Normal , Quiet
Parallel I/F	I-Prime	Invalid, Buffer Print , Buffer Clear
	Pin 18	+ 5V , Open
	Auto Feed XT (see note 6.)	Valid, Invalid
	Bi-Direction	Enable , Disable
CSF	Line Spacing	6 LPI , 8 LPI
	Bottom Margin	Valid. Invalid
	Page Length	11", 11 2/3", 12" , 14", 16.57", 5", 3.5", 4", 5.5", 6", 7", 8", 8.5"

- 1) Selects both double width and double height characters OR single width and single height characters.
- 2) When "1 Line" is selected, the receiving buffer size is set to 2K bytes.
- 3) When "Limited Operation" is selected, after exiting MENU, only the SEL, LF and FF switches are valid. PRINT QUALITY, TOF and PITCH are invalid.
- 4) Displayed only for ML emulation.
- 5) Displayed only for IBM emulation.
- 6) Displayed only for EPSON emulation.

Sample Print Self-test

1. To Start:

Depress and hold the LF switch, while switching the power **ON**.

2. To Stop:

Depress SEL switch.

The printer will finish printing the current line before stopping and returning to its default state.

3. Print header

At the beginning of Self Test, the product description header will be printed as follows:

```
aaaaa  bbb  P      F/W ee.ff    gggggggYR-ii
                        CG jj. kk
```

Where.....

POSITION & CHAR. COUNT	DESCRIPTION	DATA PRINTED	COMMENTS
aaaaa	Model name	ML280Elite	
bbb	Compatibility	MEI	ML/EPSON/IBM compatible
ee.ff	Revision number	00.00-99.99	Firmware revision
gggggggg	Part Number	42434401	YR Number
ii	Part Number	01-99	ROM-FD Number
jj.kk	Revision number	00.00-99.99	CG revision

4. Test pattern

The test pattern is the consecutive printing of all ASCII characters (20H to 7EH) in all print mode combinations with their corresponding pitches.

HSD 10, 12, 17.1 CPI

UTL 10, 12, 17.1 CPI

NLQ 10, 12 CPI

Scalable Font

❖ Number of Characters Printed per Line:

CPI	Narrow
5	40
10	80
12	96
17.1	137

5. Operator panel display

While in the Self Test mode...

- (a) SEL LED = off
- (b) CPI LEDs = change when CPI changes
- (c) Print Quality LEDs = change when Print Quality changes

6. Communication interface

Printer is in the deselect state.

Data cannot be received during self test mode.

Rolling ASCII Self-test

1. To **Start**:

Depress and hold the SEL + LF switch, while switching the power **ON**.

2. To **Stop**:

Stop the test by depressing the SEL switch.

3. Print header

```
aaaaa  bbb  P      F/W ee.ff  ggggggYR-ii
                CG jj. kk
```

Where.....

POSITION & CHAR. COUNT	DESCRIPTION	DATA PRINTED	COMMENTS
aaaaa	Model name	ML280Elite	
bbb	Compatibility	MEI	ML/EPSON/IBM compatible
ee.ff	Revision number	00.00-99.99	Firmware revision
gggggggg	Part Number	42434401	YR Number
ii	Part Number	01-99	ROM-FD Number
jj.kk	Revision number	00.00-99.99	CG revision

4. Test pattern

- (a) Printing features/modes = Current Menu value.
- (b) Pattern is the continuous printing of all ASCII characters. (20H to 7EH)
- (c) Number of Characters Printed per Line

CPI	Narrow
10	80
12	96
17.1	137
20	160

5. Operator panel display

While in the Self Test mode...

- (a) SEL LED = off
- (b) CPI LEDs = Current Menu value
- (c) Print Quality LEDs = Current Menu value

6. Communication interface

Printer must not be selected for printing as Data cannot be received in the Rolling ASCII Self-test mode.

Hex-dump

Overview

This mode allows the you to diagnose problems in your program or application by printing the hexadecimal and ASCII equivalent number of the data that was sent to the printer.

Normally, this data is interpreted by the printer to be a command or printable character, however in this mode, all data is just converted to the hex and ASCII equivalent and printed in the “Hex-Dump” format.

Operation

1. To Start:

Depress and hold the SEL and FF switches simultaneously, while switching the power **ON**.

2. To Stop

Switch the power **OFF**, or press the Reset switch.

3. Print pattern

Hex equivalent of received data	ASCII equivalent
---------------------------------	------------------

```
Hex Data Dump
< LF>
XX XX XX XX XX XX XX XX XX XX XX .....
```

All ASCII control codes are printed as a period (.).

4. ASCII equivalent of incoming data

- 00H – 1FH= ASCII “period”
- 20H – 7EH= normal ASCII equivalent
- 7FH = ASCII “period”
- 80H – 9FH= ASCII “period”
- A0H – FEH = normal ASCII equivalent
- FFH = ASCII “period”

5. Details

- (a) Printing features/modes = Utility/10 CPI.
- (b) This function operates with both the serial and parallel communication interfaces.
- (c) When using cut-sheet paper, printing will stop 1 line from the bottom edge of the page. Hex-dump print action is initiated when more than 16 bytes of data is received (one full Hex-dump print line). If less than 16 bytes of data is received, the data will be printed automatically after a “time out” condition is detected (approximately 150 ms).
- (d) HEX dump prints bi-directionally.

Semi Automatic Paper Loading

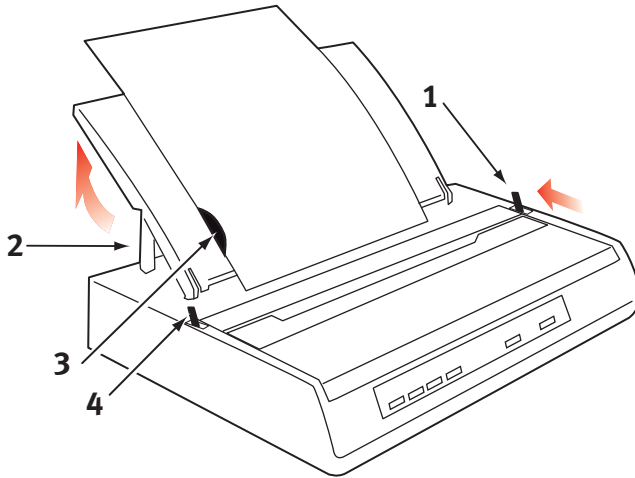
1. Function:

To feed paper to the printing position. Available for cut sheet paper.

2. Operation:

- (a) Place the paper release lever (1) to the rear (closed) position.
- (b) Place the printer OFF LINE. (Press the SEL switch).
- (c) Close the paper bail lever (4). (Place it in its rearward position).

- (d) Raise the paper separator as shown in the figure. Lower the paper separator supports (2) to prevent the paper separator from falling.



- (e) Adjust the cut sheet guide (3) on the paper separator for the paper being used.
- (f) Insert a single sheet along the cut sheet guide until it reaches the pinch roller. Ensure the paper is inside the platen ends. Otherwise the sprocket pins will tear it.
- (g) Open the paper bail lever (4) (place it in its forward position).
- (h) After confirming that the single sheet has been grasped, close the paper bail lever (4). Ensure that the paper bail lever is closed completely, otherwise the paper will jam.
- (i) Press the SEL switch after confirming that the paper is fed up to the first-line printing position. Then place the printer ON LINE.

COMMAND DETAIL

HORIZONTAL CONTROLS

CARRIAGE RETURN EXECUTE

Code: CR

Compatibility: **Epson/IBM/ML**

Function:

Initiate printing action. Print the data in the print buffer by causing a print block change and sets the next printable data's print position to the left margin.

Additional details:

- ...❖ If Auto-LF is activated, a CR will also cause a LF to execute. This action will take place whether there is data in the print buffer or not.
- ...❖ “Double Wide (expanded) - one line only” designated by SO will be reset. (IBM)
- ...❖ “Double Wide (expanded) - one line only” designated by SO and ESC SO will not be reset when “Emulation Compatibility” of the technical menu is set to “Extension”. (EPSON)
- ...❖ “Double Wide (expanded) - one line only” designated by SO and ESC SO will be reset when “Emulation Compatibility” of the technical menu is set to “Upper” or “Original”. (EPSON)

BACKSPACE

Code: BS

Compatibility: **Epson/IBM**

Function:

Print the data in the print buffer and move the printhead one current character width to the left.

Details:

- ...❖ Size (distance) of the BS are as follows:
 - BS + DBL-Width – double width BS
 - BS + char. pitch – BS the amount of the current character pitch
 - BS + Inter-char clearance – BS normal char width + clearance
 - BS + Proportional – Causes the print head to backspace a 10 CPI character width.
- ...❖ If a multipass character (ex. double height characters) is in the print buffer, when BS is executed, the paper is reverse feed back to the original printing position of the multipass character, and the character is printed. (Precise printing is not guaranteed).
- ...❖ Once the current print position has reached the left margin, BS will be ignored. (Epson)
- ...❖ The print head backspaces to the left margin position. (IBM)
- ...❖ BS + right, center, full justification – BS is ignored.

Compatibility: **ML**

Function:

Move the printhead one current matrix cell width (character cell and Inter-character clearance columns) to the left.

Details

- ...❖ If a multipass character (ex. double height characters) is in the print buffer, when BS is executed, the paper is reverse feed back to the original printing position of the multipass character, and the character is printed. (Precise printing position is not guaranteed).

- ❖ If no “printable” data (including space) has been previously received by the printer, the BS is ignored.
- ❖ If there is character data on a line formed by 12 vertical dots, such as Line Graphics, and a BS command is executed, the printer performs a line feed to the printing position of the next data block and prints.
- ❖ The left margin is the limit to the positioning of the printhead when multiple BS commands are executed. Any subsequent BS commands, processed after this limit is reached, are ignored.
- ❖ Regardless of any CPI change in the middle of the print line, the distance that the printhead moves backward is the same as the width of the matrix cell (which includes Inter-character clearance columns) of the CPI that was active previous to the processing of the BS command.
- ❖ Backspace does not initiate printing action (block change); it is executed when character data or a “initiate printing action” command is received.

BS + DBL-Width – double width BS

BS + Inter-char clearance – BS normal char width + clearance

BS + Proportional – Current CPI character width without proportional.

DELETE

Code: DEL

Compatibility: **Epson**

Function:

Delete the last printable character data in the print buffer.

Details:

- ❖ If the data which is to be deleted is a SP code, (20) H or (32) D, one SP code is deleted by this command.

- ❖ If the data which is to be deleted is in bit image graphics, this command is ignored.
- ❖ H-TABs are not deleted.

PRINT DIRECTION

Code: ESC U n

Compatibility: **Epson/IBM**

Function:

Select between left-to-right (unidirectional) printing which achieves improved interline print registration, or bi-directional printing which achieves faster throughput.

Range:

	UNI-DIRECTIONAL	BI-DIRECTIONAL
Epson	01H, 31H, 81H, or B1H	00H, 30H, 80H, or B0H
IBM	Odd numbers	Even numbers

Out of Range:

This command will be ignored if n equals any other values except for the values mentioned above.

Details:

- ❖ Short-Line-Seeking is performed in both unidirectional and bidirectional print modes.
- ❖ When the first thermal threshold of the printhead is sensed, the printer automatically enters unidirectional printing mode.

Unidirectional print – one line only

Code: ESC <

Compatibility: **Epson**

Function:

For one print line only. Choose left-to-right (Unidirectional) printing for improved interline print registration.

Details:

Subsequent lines will be printed bi-directionally, according to short line logic seeking priorities.

Uni-directional

Code: ESC.

Compatibility: **ML**

Function:

Print while moving the carriage from left to right only. Used to improve dot alignment between print lines.

Details:

... Uni-directional short line seeking is performed.

Bi-directional


Code: ESC =

Compatibility: **ML**

Function

Cancel Uni-directional print and returns to Bi-directional print for quicker throughput.

Details:

... Bi-directional printing is the power-up default and the normal mode of printing.

PRINT POSITION

Execute print position from the left margin

Code: ESC \$ n1 n2

Compatibility: **Epson**

Function:

Initiate printing action by starting to print at the position specified from the left margin.

Range:

n1 is a decimal number value 0 . 255.

n2 is a decimal number value 0 . 255.

Out of range:

Any position specified beyond the right margin is ignored.

Details:

- ...❖ Dot position = $(n1 + n2*256)/60$ to the right of the left margin.
- ...❖ The position specified as $n1 = n2 = 0$ is the left margin.
- ...❖ Physical Upper Limit
 $(n1 + n2*256)/60$ " 8.0 (inches)
- ...❖ Logical Upper Limit
Absolute position equal to or less than the right margin
- ...❖ No underlines are made in the print line area skipped by the positioning.

Define print position from Home Position

Code: ESC % B n1 n2 n3 n4

Compatibility: **IBM/ML**

Function:

Set the next printing position, by dot columns, relative to the home position.

- ...❖ n1 is a decimal number value 48 . 57 (ASCII 0 . 9)
- ...❖ n2 is a decimal number value 48 . 57 (ASCII 0 . 9)
- ...❖ n3 is a decimal number value 48 . 57 (ASCII 0 . 9)
- ...❖ n4 is a decimal number value 48 . 57 (ASCII 0 . 9)
- ...❖ 0000 is equal to or less than $n2 n3 n4$ and is equal to or less than the right margin.

Right margin in units of dot/columns

CPI

10 961

12 1153

15	1441
17.1	1646
20	1921

Details:

❖ n1 . n4 is a 4 digit ASCII number; leading zeros must be input even if the number is less than 1000.

Example: 250 ;æ 0250

❖ This command will be ignored if print position set by this command exceeds the right margin or left margin.

❖ No underlines are made in the print line area skipped by the positioning.

Define right relative position

Code: ESC% E n1n2n3n4

Compatibility: **ML**

Function:

Move the next print position by a number of dot columns (specified by n1n2n3n4) to the right from the current print position.

Variable range:

	ASCII	Decimal	Hexadecimal
n1	0 – 9	48 – 57	30H – 39H
n2	0 – 9	48 – 57	30H – 39H
n3	0 – 9	48 – 57	30H – 39H
n4	0 – 9	48 – 57	30H – 39H

Out of range:

❖ If the code for n1n2n3n4 is other than the above, this command is ignored.

Logical limitation:

- ❖ The printer ignores this command if the command attempts to set a print position exceeding the right margin.

Details:

- ❖ The number $n_1n_2n_3n_4$ is a 4-digit decimal number. Since all digits must be defined, any number that does not use all digits must be “padded” with leading zeros.

EXAMPLE: 25 = 0025

- ❖ If $n_1n_2n_3n_4 = 0000$ is specified, this command is ignored and the printer maintains the current print position.
- ❖ No underlines are printed in the print line areas skipped by this command.

Define left relative position

Code: ESC % F $n_1n_2n_3n_4$

Compatibility: **ML**

Function:

Move the next print position by a number of dot columns (specified by $n_1n_2n_3n_4$) to the left from the current print position.

Variable range:

	ASCII	Decimal	Hexadecimal
n_1	0 – 9	48 – 57	30H – 39H
n_2	0 – 9	48 – 57	30H – 39H
n_3	0 – 9	48 – 57	30H – 39H
n_4	0 – 9	48 – 57	30H – 39H

Out of range:

- ❖ If the code for $n_1n_2n_3n_4$ is other than the above, this command is ignored.

Logical limitation:

The printer ignores this command if the command attempts to set a print position exceeding the left margin.

Details:

...✦ Number $n_1n_2n_3n_4$ is a 4-digit decimal number. Since all digits must be defined, any number that does not use all digits must be padded with leading zeros.

EXAMPLE: 25 = 0025

...✦ If $n_1n_2n_3n_4 = 0000$ is specified, this command is ignored and the printer maintains the current print position.

...✦ No underlines are printed in the print line areas skipped by this command.

...✦ When the printer receives a valid $n_1n_2n_3n_4$ number, it prints out the data stored in the printer buffer.

Define indexed position – by dot column

Code: ESC \ $n_1 n_2$

Compatibility: **Epson**

Function:

Set the next printing position, by dot columns, indexed from current print position.

Range:

...✦ n_1 and n_2 specify a signed 16 bit binary number of dot columns to move. The lower byte is n_1 , and the upper byte is n_2 .

...✦ Range n_1 and $n_2 = 0 . 255$

Logical limitation:

...✦ Value defined beyond the left or right margins are ignored.

Details:

...✦ The new print position is indexed from the current printing position and may be either to the left or the right of the current position.

- ...❖ Positive values move the print position to the right, negative values move it to the left.
- ...❖ Dot position = $n1 + n2 * 256$
- ...❖ Values are shown as follows:
Narrow – FCH, 40H equal to or less than n2, n1 equal to or less than 03H, COH
- ...❖ Underlined printing is enabled only when the print head moves to the right.
- ...❖ A position defined to the left of the current position initiates printing action by causing a block change.
- ...❖ The amount of print position cannot be deleted by the DEL command.

Define relative dot position

Code: ESC | n1 n2

Compatibility: **IBM**

Function:

Move the current logical horizontal print position by n/120 inch from the current print position.

Range:

- ...❖ The number n1 is the low byte and n2 is the high byte in the dot position setting code.
- ...❖ The number n1n2 is a decimal number between 0 and 255 (if n1 = n2 = 0 is specified, the printer maintains the current position).
- ...❖ Limit
FC40H equal to or less than n1 + n2 equal to or less than 256
03C0H

Out of range:

- ...❖ The printer ignores this command if the command attempts to set a print position exceeding the left/right margin.

Details:

- ✦ Scores can be added only when the print head moves to the right from the current print position.
- ✦ When the print head moves to the left from the current print position, the printer prints out the data stored in the printer buffer.

Set print position

Code: ESC DLE @ n A1 A2 P1P2P3P4

Compatibility: **Epson/IBM/ML**

Function:

Set the next horizontal print position. The data received after the printer receives this command is printed from the new print position.

Range:

- ✦ The number n is used to specify the number of bytes of the parameters which follow n.
0 equal to or less than n equal to or less than 255
- ✦ The number A1 is used to specify the type of print position.
0 equal to or less than A1 equal to or less than 255
Specify an even number for A1 to specify a print position relative to the left margin. Specify an odd number for A1 to specify a relative print position from the current print position.
- ✦ The number A2 is used to specify the direction of movement of the relative print position.
0 equal to or less than A2 equal to or less than 255
Specify an even number for A2 to specify movement toward the right margin (forward). Specify an odd number for A2 to specify movement toward the left margin (reverse). The number P1P2P3P4 is used to specify the print position.
- ✦ 0 equal to or less than P1P2P3P4 equal to or less than 255 (a number between 0 and 9 specified for the lower 4 bits is valid. The printer ignores the upper 4 bits). The number P1P2P3P4

should be specified with a 4-digit decimal number where: P1 = thousands digit, P2 = hundreds digit, P3 = tens digit, and P4 = units digit.

Out of range:

- ❖ The printer ignores this command if the command attempts to set a print position exceeding the left/right margin.

Details:

- ❖ When the print head moves toward the left margin (reverse) from the current print position, the printer prints out the data stored in the printer buffer. Scores can be added when print head movement toward the right margin (forward) from the current print position is specified while the score mode is set.

Define stops – by characters

Code: ESC D x1, x2, x3 ... xk NUL

Compatibility: **Epson/IBM**

Function:

Set, by character columns, up to a maximum of 32 tab (Epson) or 28 tab (IBM) positions.

Range:

k = 1 – 32 (Epson)

= 1 – 28 (IBM)

x = 1 – 265 (Epson)

= 1 – 255 (IBM)

	Epson	IBM
CPI	Narrow	Narrow
10	79	80
12	95	96
15	119	120
17.1	137	138
20	159	160

Out of range:

- ❖ If $k > 32$ (Epson) or $k > 28$ (IBM) the following value of x will be ignored.
- ❖ Maximum x value in each CPI, values larger than maximum are ignored.

Details:

- ❖ Tabs are set at every 8 characters after: powering up the printer, receiving an I PRIME (INIT) signal or executing an ESC @ (Epson), ESC R (IBM), ESC } NUL and ESC { n .
- ❖ The entire command string is terminated with a NUL [CHR\$(0)] or a number less than the last tab setting specified. (Epson)
- ❖ The tab settings n_1, n_2, n_3, n_k must be entered in ascending order.
- ❖ Tabs are a relative position. However, if the left margin is changed, HT position is changed according to the left margin. (IBM)
- ❖ Tabs are not reset to default if Left margin is changed. (EPSON)
- ❖ If $n = 0$, clear all tabs set.
- ❖ If there is not a nul at the 33rd (Epson)
- ❖ This command is disregarded while $n_{k-1} \hat{=} n_k$ or the printer encounters a null character. A maximum of 32 tab stops can be set. If there is no null character at the 29th value of n , this command is disregarded until the printer encounters a null character. Tab positions set up to the 28th n value are enabled. (IBM)

Example:

If ESC D $n_1 n_2 n_4 n_3$ NUL:

$n_1 < n_2 < n_3 < n_4$ – valid $n_1 . n_4$.

$n_1 < n_2 = n_3 < n_4$ – valid $n_1 . n_2$ (Epson)

Horizontal tab execute

Code: HT

Compatibility: **Epson/IBM**

Function:

Advance from the current print position to the next Horizontal Tab position.

Details:

- ❖ Tab positions are based on the character pitch in force at the time the horizontal tab is set (IBM).
- ❖ Tab position is relative. If the character pitch is changed, including double width, the tabs will remain in the same relative locations. (Epson)
- ❖ On power up the default tabs are set at columns 9, 17, 25, 33 ... and every eight spaces after that.
- ❖ HT will become invalid when it exceeds right margin setting. If an HT is executed past the right margin, it will cause the next character to be printed immediately after the last. All subsequent HT's will correspond to the beginning of the TAB setting sequence.
- ❖ No underline will appear in the "skipped" area.

Define stops – default values

Code: ESC R

Compatibility: **IBM**

Function:

- ❖ Set horizontal tabs at every 8th position starting at column 9 and clears all vertical tabs.

Define stops – by characters

Code: ESC, HT X1 Y1 Z1, ... , Xm Ym Zm CR

Compatibility: **ML**

Function:

Clear all previously defined H-tabs and defines up to 16 new horizontal tab stop positions from the left-most physical print position in, units of character columns.

Range:

⌘ Variables

	ASCII	Decimal	Hexadecimal
X1	0 . 9	48 . 57	30 . 39
Y1	0 . 9	48 . 57	30 . 39
Z1	0 . 9	48 . 57	30 . 39

m (number of tabs) = 0.16

⌘ Argument “X1Y1Z1”

10 cpi	12 cpi	17.1 cpi	20 cpi
80	96	137	160

Out of range:

⌘ The command will be ignored.

Logical limitations:

XmYmZm represents a 3 digit number where each consecutive XmYmZm number must be greater than the previous one. If this is not true, Xm Ym Zm is ignored.

X1 Y1 Z1 < X2 Y2 Z2 < ... < Xmax Ymax Zmax

Details:

⌘ Maximum of 16 HT stops maybe defined.

⌘ Horizontal tab settings can be cleared by:

ESC HT CR (defining no tabs)

ESC HT 000 CR (defining no tabs)

ESC HT 001 CR (defining no tabs)

NOTE:

Tab position "0" and tab position "1" both represent the first column position on the print line.

- ...❖ X1 Y1 Z1 is a 3-digit ASCII numeric. A 2-digit or 1-digit X1Y1Z1 number can be specified, however, by separating it from the subsequent parameters with a comma.
- ...❖ On Power-Up and reset conditions, such as l-Prime, the default tabs are set at character columns 9, 17, 25, 33 ... and every eight character columns after that.
- ...❖ Horizontal Tab positions are relative to the character pitch. While in 10 cpi, an Htab of 10 characters will represent a physical distance of 1 (10/10th) inch. This same 10 character H-tab in 12 cpi will represent a physical distance of 11/12th of an inch.
- ...❖ Refer to the Illustration attachments for further details.
- ...❖ This command is available when j°Emulation Compatibilityj± of the technical menu is set to "Extension".

Define stops – by dot column

Code: ESC ETX X1 Y1 Z1 W1, ... , Xm Ym Zm Wm CR

Compatibility: **ML**

Function:

Clear all previously defined H-tabs and define up to 16 new horizontal tab stop positions from the left-most physical print position in units of dot columns.

Range:

❖ Variables

	ASCII	Decimal	Hexadecimal
X1	0 – 9	48 – 57	30 – 39
Y1	0 – 9	48 – 57	30 – 39
Z1	0 – 9	48 – 57	30 – 39
W1	0 – 9	48 – 57	30 – 39

m (number of tabs) = 0.16

❖ Argument “x1y1z1w1”

10 cpi	12 cpi	17.1 cpi	20 cpi
960	1152	1644	1920

Out of range:

The command will be ignored.

Logical limitations:

XmYmZmWm represents a 4 digit number where each consecutive XmYmZmWm number must be greater than the previous one. If this is not true, Xm Ym Zm is ignored.

Details:

- ❖ Maximum of 16 HT stops may be defined.
- ❖ Each tab must be defined in ascending order.
- ❖ Horizontal tab setting can be cleared by:
 - . ESC ETX CR (defining no tabs)
 - . ESC ETX 0000 CR (defining no tabs)
 - . ESC EtX 0001 CR (defining no tabs)

NOTE

Tab position “0” and tab position “1” both represented the first column position on the print line.

- ...❖ X1 Y1 Z1 W1 is a 4 digit ASCII numeric.
- ...❖ X1Y1Z1W1 should be a 4-digit ASCII number. An X1Y1Z1W1 number of 3-digits or less can be specified, however, by separating it from the subsequent parameters with a comma.
- ...❖ On Power-Up and reset conditions, such as I-Prime, the default tabs are set at columns 97, 193, 289 ... and every 96 dot columns after that.
- ...❖ Horizontal Tab positions are relative to the character pitch. While in 10 cpi, a Htab of 120 columns will represent a physical distance of 1 inch. This same 120 columns H-tab in 12 cpi will represent a physical distance of 120/144th of an inch.
- ...❖ H-TABS by dot column are valid when combined with Bit Image Graphics and Proportional Width Characters.

Horizontal tab execute

Code: HT

Compatibility: **ML**

Function:

Advance from the current print position to the next Horizontal Tab position.

Logical limitations:

- ...❖ An HT cannot be executed beyond the right margin.

Details:

- ...❖ HT execution will cause an advance to the next tab stop position defined by the “H-TAB by characters” or “H-TAB by columns” definition commands, which ever HT command was most recently defined.
- ...❖ When the character pitch is changed, the tab position will be recalculated based on the new pitch.

- ⋯✦ HT will become invalid when it exceeds the right margin setting. If an HT is attempted past the right margin, it will cause the next character to be printed immediately after the last. All subsequent HT's will correspond to the beginning of the TAB setting sequence.
- ⋯✦ If the Underline print feature is “ON”, the area of the page that the HT skips over will not be underlined.

Margins – define left margin

Code: ESC n

Compatibility: **Epson**

Function:

Set left margin is at (n) characters from the left-most physical print position.

Range:

- ⋯✦ Range n = 0 . 255

NAME	PITCH	NARROW
PICA/PROPORTIONAL	10	1 – 79
ELITE	12	1 – 94
	15	1 – 118
COMPRESSED	17.1	1 – 135
COMPRESSED ELITE	20	1 – 157

Out of range:

- ⋯✦ If n exceeds the right margin, the left margin command will be ignored.

Details:

- ⋯✦ Left margin positions are based on the character pitch which is in force at the time the left margin is set. Left Margin's position is absolute. If the character pitch is changed, the margin will NOT move to accommodate the change.
- ⋯✦ While in proportional mode, the print column width of the margin will be set in pica character size.

- ...❖ The left margin will remain at value set unless reset by some software code or the printer is turned off.
- ...❖ Input of the ESC/ code with a valid left margin parameter causes the horizontal TAB positions previously set to be cleared, and the subsequent horizontal TAB will default to every 8 character positions starting with the new left margin as position 0.
- ...❖ There must be a difference of at least 25 characters between the left margin and the right margin values for 10 CPI when “Emulation Compatibility” of the technical menu is set to “Extension” or “Upper”.
- ...❖ There must be a difference of at least 2 characters between the left margin and the right margin values for 10 CPI when “Emulation Compatibility” of the technical menu is set to “Original”.

Margins – define right margin

Code: ESC Q n

Compatibility: **Epson**

Function:

Set right margin is at (n) characters from the left-most physical print position.

Range:

- ...❖ Range n = 1 -255

NAME	PITCH	NARROW
PICA	10	2 – 80
ELITE	12	3 – 96
	15	3 – 120
COMPRESSED	17.1	4 – 138
COMPRESSED ELITE	20	4 – 160

Out of range:

- ...❖ The number “n” must be within the ranges given above, otherwise it will be ignored.

- ...❖ If $n = 0$, or is less than or equal to the left margin this command is ignored.

Details:

- ...❖ Right margin positions are based on the character pitch which is in force at the time the right margin is set.
- ...❖ Right margin's position is absolute. If the character pitch is changed, the margin will NOT move to accommodate the change.
- ...❖ While in proportional mode, the print column width of the margin will be set in pica character size.
- ...❖ Setting Right margin clears the print buffer.
- ...❖ There must be a difference of at least 25 characters between the left margin and the right margin values for 10 CPI when "Emulation Compatibility" of the technical menu is set to "Extension" or "Upper".
- ...❖ There must be a difference of at least 2 characters between the left margin and the right margin values for 10 CPI when "Emulation Compatibility" of the technical menu is set to "Original".
- ...❖ If you attempt to print a character beyond the right margin the character will be printed on the next line after a line feed and carriage return are executed.

Margins – define left & right margin

Code: ESC X n1 n2

Compatibility: **IBM**

Function:

Set the Left Margin to (n1) characters and Right Margin to (n2) characters from the left-most physical print position.

Range:

- The ranges for n1 and n2 are:
 - 1 equal to or less than n1 equal to or less than 255
 - 25 equal to or less than n2 equal to or less than 255
 - 24 equal to or less than n2 - n1

Out of range:

- If n1 or n2 = 0 then the current margin setting is used.
- If n2 exceeds the default range n2 shall be converted to the default value.

	CPI	10	12	15	17.1	20
Narrow Column		80	96	120	138	160

Details:

- The default value of the left margin is the 1st character.
- The margin's positions are absolute. If the character pitch is changed, the margins will NOT move to accommodate the change.
- Character pitch changes afterwards do not affect the distance from the home position.
- n1 n2 indicates the left and right edges of printable area. For example if n1 = 10, n2 = 100, a printable area is from the 10th column to the 100th column: 91 characters are printable.

Print-Line justification – select

Code: ESC a n

Compatibility: **Epson**

Function:

The text position/alignment will be set according to one of the four given modes assigned by n (n is a Binary value).

Range:

n	Justification
0	Left
1	Center
2	Right
3	Full

Details:

- ...❖ **n = 0** Left justification is the default or standard format, in which the left margin is even and the right margin is not.
- ...❖ **n = 1** The centering command centers a line of text between the margins. This command is used for headings, titles and captions.
- ...❖ **n = 2** Right justification is the opposite of left justification. The right margin however is even, the left is not.
- ...❖ **n = 3** Full justification puts extra spaces where necessary so that both the left and right margins are aligned.

Full justification (n = 3) is performed when the printer receives (at the time when printing starts) data exceeding 75% of the maximum number of characters to be printed in a line.
- ...❖ Print position will be affected by the commands which set the left/right margin.
- ...❖ This command causes a print block change. If there is data in the print buffer and this command is sent, the data will be printed before the justification takes affect.

NOTE:

When you use Auto Justification, use carriage returns at the end of paragraphs only, not at the end of each line of text.

Margins – define left margin

Code: ESC % C n1 n2 n3

Compatibility: **ML**

Function:

Define the logical left-most printing position limitation from the left most-physical print position in units of 1/120 inch.

Range:

Variable

	ASCII	Decimal	Hexadecimal
n1	0 – 9	48 – 57	30 – 39
n2	0 – 9	48 – 57	30 – 39
n3	0 – 9	48 – 57	30 – 39

…❖ Argument “n1n2n3”

narrow chassis – 000-900 x1/120 inches (approx. 7.5 inches max.)

Out of range:

…❖ If any digit is out of range, the command is ignored.

Logical limitation:

…❖ If n1n2n3 exceeds the maximum value, the command will also be ignored.

…❖ Set number difference between the left margin and the right margin must be 300 and more when “Emulation Compatibility” of the technical menu is set to “Extension” or “Upper”.

…❖ Set number difference between the left margin and the right margin must be 60 and more when “Emulation Compatibility” of the technical menu is set to “Original”.

Details:

⋯✦ $n_1n_2n_3$ is a 3 digit ASCII number. Since all digits must be defined, any number that does not use all digits must be padded with leading zeros.

EXAMPLE: 8 = 008.

⋯✦ When $n_1n_2n_3 = 000$, the command will be ignored.

⋯✦ When $n_1n_2n_3 = 001$, the left margin will be cleared.

⋯✦ If the left margin is defined after one or more characters have been sent to the current print line, the left margin will not become valid for the current print line, but will be valid on the next print line.

Margins – right margin

Code: ESC % R $n_1 n_2 n_3 n_4$

Compatibility: **ML**

Function:

Define the logical right-most printing position limitation from the left most-physical print position in units of 1/120 inch.

Range:

Variable:

	ASCII	Decimal	Hexadecimal
n_1	0 – 9	48 – 57	30 – 39
n_2	0 – 9	48 – 57	30 – 39
n_3	0 – 9	48 – 57	30 – 39
n_4	0 – 9	48 – 57	30 – 39

⋯✦ Argument

Without left margin 300 <RM equal to or less than 960

With left margin LM + 300 <RM equal to or less than 960

Out of range:

...✦ If any digit is out of range, the command is ignored.

Logical limitation:

...✦ If $n_1n_2n_3$ exceeds the maximum value, the command will also be ignored.

...✦ Set number difference between the left margin and the right margin must be 300 and more when “Emulation Compatibility” of the technical menu is set to “Extension” or “Upper”.

...✦ Set number difference between the left margin and the right margin must be 60 and more when “Emulation Compatibility” of the technical menu is set to “Original”.

Relative move inline forward

Code: ESC d Ln Hn

Compatibility: **IBM**

Function:

Move the print position $n/120''$ to the right from the current printhead position.

Range:

...✦ Specify dot position following n_1 and n_2 .

...✦ n_1 and n_2 range = 0 . 255

...✦ Limit 0 equal to or less than $n_1 + (n_2 * 255)$ equal to or less than 1632

Out of range:

...✦ Values beyond the right margin will be ignored.

Details:

...✦ If score is set, any horizontal positioning is scored.

Horizontal tabs – define stop – by characters

Code: ESC HT n

Compatibility: **ML**

Function:

Set n horizontal tabs for each channel n.

Range:

...❖ Range n = 0 - 255 (Bit 7 of n is ignored.)

Details:

...❖ This command is available when the Emulation Compatibility of the technical menu is set to “Upper” or “Original”.

VERTICAL CONTROL

LINE SPACING – SELECT FIXED AMOUNT

1/6 inch

Code: ESC 2

Compatibility: **Epson**

Function:

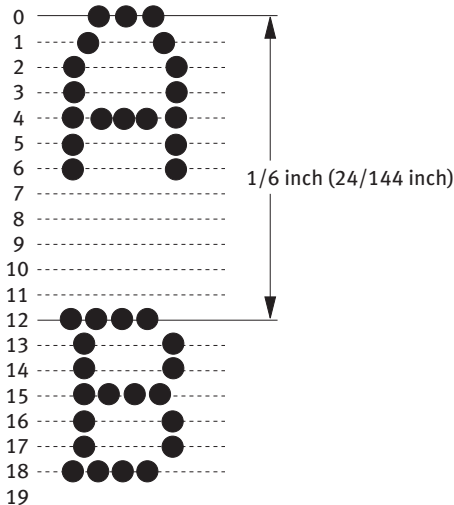
Set the line spacing to 1/6 inch units (6 LPI).

Details:

- This command will remain in effect until a new line spacing command is sent to the printer.
- This command does not set the top of form position.
- LF, VT, or CR (if Auto F is on) execute in units of 1/6 inch when this function is active.

Related functions:

- LF, VT, CR (and Auto LF)



1/6 inch

Code: ESC 6

Compatibility: **ML**

Function:

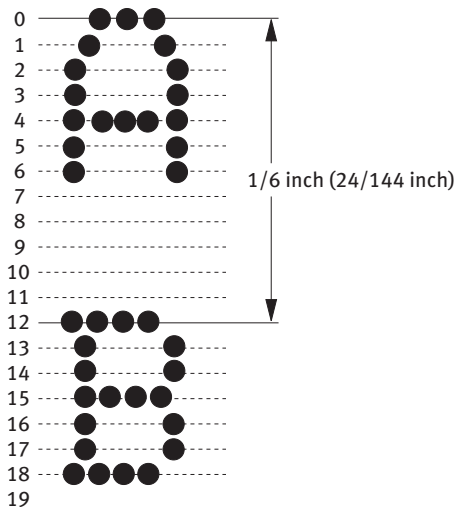
Set the line spacing to 1/6 inch units (6 LPI).

Details:

- This command will remain in effect until a new line spacing command is sent to the printer.
- This command does not set the top of form position.
- LF, VT, or CR (if Auto F is on) execute in units of 1/6 inch when this function is active.

Related functions:

- LF, VT, CR (and Auto LF)



1/8 inch

Code: ESC 0

Compatibility: **Epson/IBM**

Function:

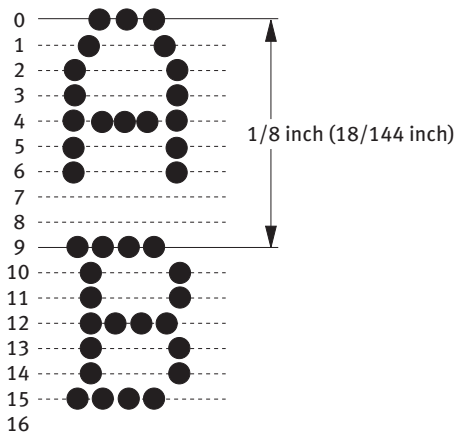
Set the line spacing to 1/8 inch units (8 LPI).

Details:

- ⌘ This command will remain in effect until a new line spacing command is sent to the printer.
- ⌘ This command does not set the top of form position.
- ⌘ LF, VT, or CR (if Auto F is on) execute in units of 1/8 inch when this function is active.

Related functions:

- ⌘ LF, VT, CR (and Auto LF)



1/8 inch

Code: ESC 8

Compatibility: **ML**

Function:

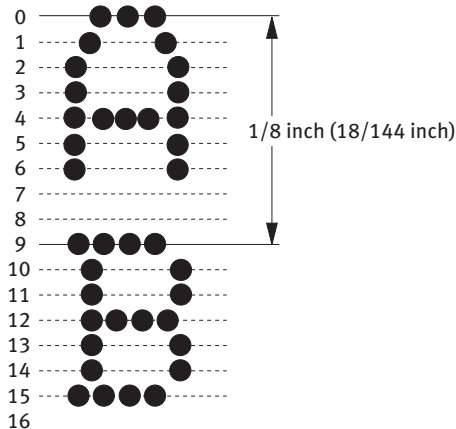
Set the line spacing to 1/8 inch units (8 LPI).

Details:

- This command will remain in effect until a new line spacing command is sent to the printer.
- This command does not set the top of form position.
- LF, VT, or CR (if Auto F is on) execute in units of 1/8 inch when this function is active.

Related functions:

- LF, VT, CR (and Auto LF)



7/72 inch

Code: ESC 1

Compatibility: **Epson/IBM**

Function:

Set the line spacing to 7/72 inch units.

Details:

- ✦ This command remains in effect until a new line spacing command is sent to the printer.
- ✦ This command does not set the top of form position.
- ✦ LF, VT or CR (if Auto LF is on) execute in units of 7/72 inch when this function is active.

Related functions:

- ✦ LF, VT, CR (and Auto LF)

Define amount – n/72 inch

Code: ESC A n

Compatibility: **IBM**

Function:

Store the line feed amount in 1/72-inch units.

Range:

$$n = 0 - 255$$

Out of range:

Not applicable—cannot receive a value larger than 255 (FFH).

Details:

- ✦ If n = 0, the line feed amount is 0 and subsequent print-line will overprint over the same print-line.
- ✦ This command does not set the top of form position.
- ✦ The ESC 2 command sets the line feed amount stored by this command.

Define amount – n/72 inch

Code: ESC An

Compatibility: **Epson**

Function:

Set the line spacing to n/72 inch.

Range:

n = 0 to 85, n = 128 to 213 (Bit 7 of the n code is invalid.)

Out of range:

Any value of n not within the allowable range will be ignored.

Details:

- ...✦ If n = 0, the line feed amount is 0 and subsequent print-lines will overprint over the same print-line.
- ...✦ This command does not set the top of form position.
- ...✦ Power on default or the I-Prime signal resets the LF unit to the current MENU value.

Define amount – n/216 inch

Code: ESC 3 n

Compatibility: **Epson/IBM**

Function:

Set line spacing to n/216 inch.

Range:

n = 0 – 255 (Epson), n = 1 – 255 (IBM)

Details:

- ...✦ If n = 0, the line feed amount is 0 and subsequent characters will print over the same print-line (Epson). If n = 0 is specified, this command will be invalid and the previously set line feed amount remains effective (IBM).
- ...✦ This command does not set the top of form position.

- ...❖ Power on default or the I-Prime signal resets the LF unit to the current MENU value.
- ...❖ LF, VT, or CR (if Auto LF is on) execute in units of $n/72$ inch when this function is active.

Related functions:

- ...❖ LF, CT, CR (and Auto LF)

Activate amount defined by $n/72$ inch

Code: ESC 2

Compatibility: **IBM**

Function:

Activate the line feed amount defined by the ESC A “n” command.

Details:

- ...❖ If no ESC A n sequence has been defined, the line spacing amount will be according to current MENU value.

Related functions:

- ...❖ ESC A n

Line feed – execute amount – $n/216$ inch

Code: ESC J n

Compatibility: **Epson/IBM**

Function:

Execute an $n/216$ inch line feed without changing the currently stored line spacing value.

Range:

$n = 0 - 255$ (Epson), $n = 1 - 255$ (IBM)

Details:

... The printer prints the contents of the buffer without a carriage return (Epson).

Moves the current print position to the print start position of next line (left margin position) when the “Auto CR” feature is set to “Yes” in MENU mode (IBM).

... This command does not need a cancel code, since it is executed only once.

... No feed is performed when $n = 0$ (Epson).

... If $n = 0$ is specified, this command will be invalid (IBM).

Related functions:

... “Double Wide (expanded) - one line only” designated by SO and ESC SO will not be reset when the “Emulation Compatibility” of the technical menu is set to “Extension”.

... “Double Wide (expanded) - one line only” designated by SO and ESC SO will be reset when the “Emulation Compatibility” of the technical menu is set to “Upper” or “Original”.

Fine LF – execute – n/144 inch

Code: ESC % 5 n

Compatibility: **Epson/IBM/ML**

Function:

Initiate printing action; print data in the print buffer by causing a print block change and execute a n/144 inch line feed, then a carriage return.

Range:

	DECIMAL	HEXADECIMAL
n	0 – 2556	00 – FF

As the eight bit (b7) is ignored, the effective range of n1 is as follows ..

DECIMAL	HEXADECIMAL	N
0 – 127	00 – 7FH	0 – 127 (0/144” – 127/144”)
128 – 255	80 – FFH	

Out of range:

Not applicable, cannot receive a value larger than 255 (FF)H or smaller than 0.

Details:

- ❖ If $n = 0$ the line spacing will be set to a distance of zero, upon execution of a LF.
- ❖ If the line spacing is set to zero ($n_1 = 0$), no paper feeding will occur when a LF is executed, but any data in the print buffer will be printed (just as if only a CR was executed.)

Line spacing – define amount – $n/144$ inch

Code: ESC % 9 n

Compatibility: **Epson/IBM/ML**

Function:

Set the line spacing to $n/144$ units.

Range:

	DECIMAL	HEXADECIMAL
n	0 – 2556	00 – FF

The eight bit (b7) is ignored so the effective range of n_1 is as follows ...

DECIMAL	HEXADECIMAL	N
0 – 127	00 – 7FH	
128 – 255	80 – FFH	0 – 127 (0/144" – 127/144")

Out of range:

Not applicable, cannot receive a value larger than 255 (FF)H or smaller than 0.

Details:

- ❖ If $n = 0$ the line spacing will be set to a distance zero, upon execution of a LF.
- ❖ If the line spacing is set to zero ($n = 0$), no paper feeding will occur when a LF is executed, but any data in the print buffer will be printed (just as if only a CR was executed).

Line feed – execute forward LF with CR

Code: LF

Compatibility: **Epson/IBM**

Function:

Initiate printing action; print data in the print buffer by causing a print block change and execute a line feed, then a carriage return. Moves the current print position to the print start position of next line (left margin position) when the “Auto CR” feature is set to “Yes” in MENU mode. (IBM)

Details:

- ...✦ Line spacing pitch will be set by ESC A n, ESC 0, ESC 2, ESC 3 n, ESC 1, ESC % 9 n. Otherwise, the LF pitch will be set by the current MENU when power is on or I-Prime signal is received.
- ...✦ This code will cancel enlarged character mode set by the ESC SO (Epson mode only) and SO code before the LF code or only spaces before this code, only line feed is performed.

Code: LF

Compatibility: **ML**

Function:

Initiate printing action. Print data in the print buffer by causing a print block change and execute a line feed, then a carriage return.

Details:

- ...✦ This command is equivalent to the composite command (ESC.?.N:) where n = (23) H.
- ...✦ The line spacing is set by ESC.6, ESC.8 or ESC.%9.n command. The line spacing will be set to the default line pitch after a default sequence (power up, I-Prime, and CAN.)

Line feed – automatic LF—ON/OFF

Code: ESC 5 n

Compatibility: **IBM**

Function:

Enables/disables the automatic Line Feed. The printer performs an automatic LF each time it receives a carriage return (CR).

Range:

n = 0 – 255

odd numbers = Automatic LF enabled

even numbers = Automatic LF disabled

Line feed – W/O carriage return

Code: ESC DC2

Compatibility: **ML**

Function:

Initiate printing action. Print data in the print buffer by causing a print block change, feed the paper the pre-defined line spacing amount, and set the next printable data's print position to the last position of the previous line (no CR performed).

Line feed – execute direct skip

Code: ESC VT n1 n2

Compatibility: **ML**

Function:

Initiate printing action. Print data in the print buffer by causing a block change, feed the paper the number of lines defined by this command, and set the next printable data's print position to the left margin.

Range:

ASCII	Decimal	Hexadecimal
n1 0 – 9	48 – 57	30 – 39
n2 0 – 9	48 – 57	30 – 39

Out of range:

The command will be ignored.

Details:

...✦ If n1 n2 = 00, no paper feeding is performed.

Form length – define amount – by inches

Code: ESC C nul n

Compatibility: **Epson/IBM**

Function:

Sets the form length to n inches.

Range:

n = 1– 22 (Epson)

1– 255 (IBM)

Out of range:

...✦ n = 0 or n > 22 (Epson) will last valid setting and ignore the command.

Details:

...✦ This command does not affect vertical tab settings. (IBM) This command will reset vertical tab settings to their default values (Epson).

...✦ When this command is valid, it cancels the “Skip Over Perforation” feature even if the feature has been selected in the MENU mode.

...✦ Top of form position is set by this command.

Form length – define amount – by lines

Code: ESC C n

Compatibility: **Epson/IBM**

Function:

Set the form length to n lines length to n lines.

Range:

n = 1 – 127 (Epson)

1 – 255 (IBM)

Out of range:

✦ If $n = n > 127$ (Epson), bit 7 is cleared and set that value as is.

Details:

✦ This command does not affect vertical tab settings (IBM). It will reset vertical tab settings to their default values (Epson).

✦ Top of form will be set.

✦ When this command is valid, it cancels the “Skip Over Perforation” feature even if the feature has been set in the MENU mode.

✦ The amount of each line defined by this command, is equal to the current LF spacing defined by ESC 0, ESC 2, ESC A n, ESC 3 n, ESC 1, ESC % 9n.

✦ If $n = 0$ or 128 (Epson), this command is treated as ESC C NUL n.

Related functions:

✦ ESC 0, ESC 2, ESC A n and ESC 3 n, ESC 1, ESC % 9 n.

Form length – define amount – by 1/2 inch

Code: ESC G n1 n2

Compatibility: **ML**

Function:

Define the logical form length by the amount of $n1n2 \times 1/2$ inch and set the TOF position.

Range:

✦ Variables

	ASCII	Decimal	Hexadecimal
n1	0 – 9	48 – 57	30 – 39
n2	0 – 9	48 – 57	30 – 39

Argument:

n1n2 range = 00 – 99

Out of range:

The command will be ignored.

Details:

- ...❖ If $n_1n_2 = 00$, the page length will default to the value defined by MENU.
- ...❖ Maximum form length, $1/2 \times 99 = 49.5$ inches.
- ...❖ Factory setting: $1/2 \times 22 = 11$ inches.

Form length – define amount – by lines

Code: ESC F $n_1 n_2$

Compatibility: **ML**

Function:

Define the logical form length by number of lines, and set the TOF position.

Range:

...❖ Variables

	ASCII	Decimal	Hexadecimal
n_1	0 – 9	48 – 57	30 – 39
n_2	0 – 9	48 – 57	30 – 39

Argument:

n_1n_2 range = 00 – 99

Out of range:

The command will be ignored.

Details:

- ...❖ If $n_1n_2 = 00$, the page length will default to the value defined by MENU.

- ...❖ Maximum form length is based upon current LF spacing. If this spacing is set to 144/144 inch (maximum value for line spacing), the maximum form length will be $99 \times 1 \text{ inch} = 99 \text{ inches}$.
- ...❖ If line spacing defined, by ESC % 9 n, is zero, this command will effectively be ignored.
 ESC % 9 0 = 0 line spacing.
 ESC F n1 n2 where n1 n2 = any value.
 Line Spacing Form Length
 $0 \times (\text{any value}) = \text{form length}$.
- ...❖ This command will set the top of form and the top of VFU.
- ...❖ Factory setting: 11 inches.

Form feed—execute

Code: FF

Compatibility: **Epson/IBM**

Function:

Prints the data in the print buffer followed by a carriage return, then feeds the paper to the next TOF position.

Details:

- ...❖ Factory setting of form length is eleven (11) inches. (MENU)
- ...❖ Pressing FORM FEED button on the operator panel feeds the paper forward to the next top of form position.
- ...❖ A Form feed will be performed to the next top of form position even when the FF is received at the top of form position.
- ...❖ Double width by ESC SO (Epson mode only) and SO will be reset.
- ...❖ Power up or 1 Prime will set TOF.

Form feed—execute

Code: FF

Compatibility: **ML**

Function:

Initiate printing action. Print data in the print buffer by causing a print block change, feed the paper the defined form length amount and set the next printable data's print position to the left-margin.

Details:

- ...✦ Paper length can be set by the ESC F n1 n2 or the ESC G n1 n2 commands.
- ...✦ Upon power-up, or reception of a reset command, the page length will default to the value set in MENU.
- ...✦ Factory setting of Form Length is 11 inches.

Top of form—define

Code: ESC 5

Compatibility: **ML**

Function:

Define the top of the form (logical page) and the top of the VFU by logically “marking” the current vertical print position.

Details:

- ...✦ This command does not affect the CSF or SASF function.

Margins—define bottom margin (auto skip)

Code: ESC % S n

Compatibility: **ML**

Function:

Define the size of the area at the bottom of the logical page which will automatically be skipped over by feeding the paper until the next TOF position.

...❖	Range:		ASCII	Decimal	Hexadecimal
	n1		0 – 9	48 – 57	30 – 39

Out of range:

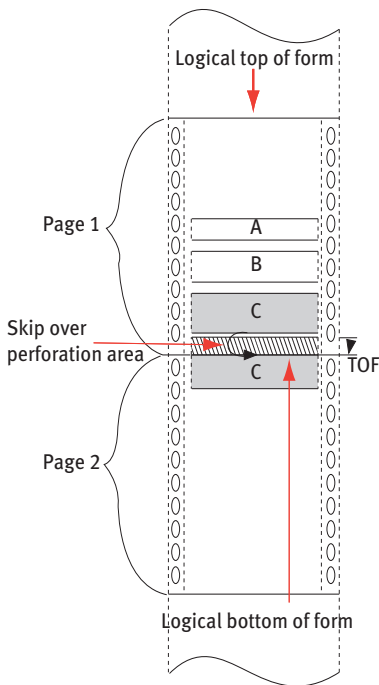
The command will be ignored.

Details:

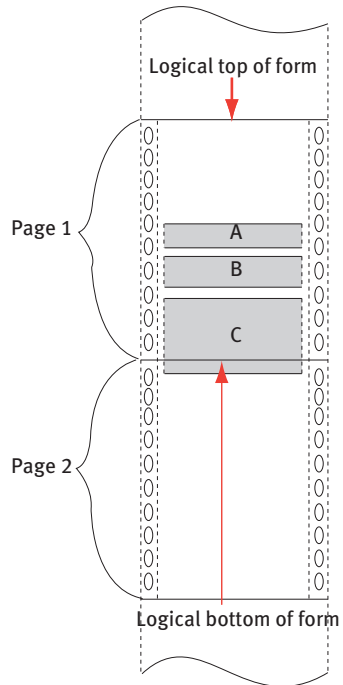
- ...❖ If n = 0, the Auto-skip function is enabled.
- ...❖ The distance that is skipped is twice the value of “n” multiplied by 1/6 inch (6 LPI).

$$“n” \times 2 \times 1/6 = \text{Auto-skip distance.}$$
- ...❖ If Auto-skip (Skip Over Perforation) function is selected in Menu, the distance that will be skipped is 1 inch.
- ...❖ When in the Hex-Dump secondary mode, the Auto-skip function will operate according to the MENU selection.
- ...❖ Form length and TOF must be set before the Auto-skip area is defined.
- ...❖ Refer to the table following, for further details.
- ...❖ Any printing operation which encroaches upon the bottom margin area, such as LF, Print Data + LF, Print Data + CR will cause the paper to be fed over the margin area. Printing will then resume on the next page .
- ...❖ When the current line spacing is defined by ESC ((8 LPI) or ESC % 9 n, (n/144 LPI) the auto skip function is performed when the remaining amount of the logical page is as follows...

VARIABLE N1	INCHES (n1 x 2 x 1/6)	EQUIVALENT NO. OF 6 LPI	NO. OF STEPS OF THE LF MOTOR	COMMENT
0	0	0	0	No skip
1	2/6	2	48	Skip
2	4/6	4	96	Skip
3	6/6	6	144	Skip
4	8/6	8	192	Skip
5	10/6	10	240	Skip
6	12/6	12	288	Skip
7	14/6	14	336	Skip
8	16/6	16	384	Skip
9	18/6	18	432	Skip



Description:
Data "C" that encroaches on the "Skip Over Perf" area is printed at the next TOF.



Description:
No area of the logical form is skipped. Data A, B and C are printed as pictured.

Top of form—define

Code: ESC 4

Compatibility: **IBM**

Function:

Logically “mark” the current vertical print position.

Details:

⌘ This command does not affect the CSF or SASF function.

Margins—define bottom margin (auto skip)

Code: ESC N n

Compatibility: **Epson/IBM**

Function:

Set the skip-over perforation to n lines, according to the current LF value.

Range:

⌘ Range n = 0 – 127 (Epson)
0 – 255 (IBM)

Out of range:

Epson

- ⌘ The n value has to be less than the current form length.
If n is equal to or greater than the form length, this function will be ignored.
- ⌘ If n = 0 or n = 128, the last skip over perforation value will remain as previously set.
- ⌘ If n > 127, bit 7 is cleared and the length is set to the resulting value of 4.

IBM

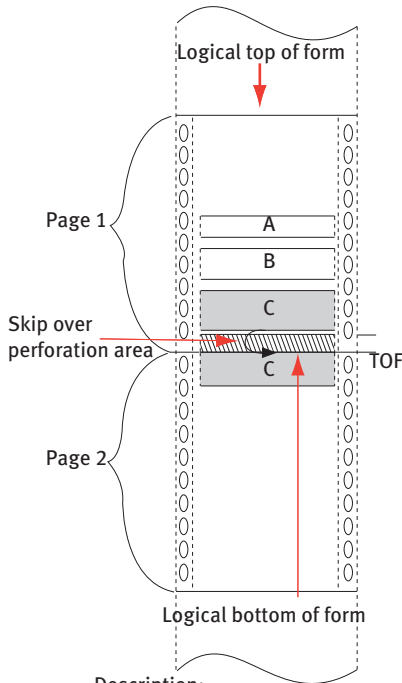
- ⌘ The n value can be set regardless of paper length.
- ⌘ Not applicable—cannot receive value larger than 255 (FFH).

Details:

- ❖ The skip over perforation will be reset by ESC O or page length set command.
- ❖ Skip over perforation distance will not be affected by a change in the line pitch.
- ❖ Entering to the area of skip over perforation by LF, VT, CR (with LF), ESC J n and auto line feed will cause the skip over perforation and feed to the top of form.

Related functions:

- ❖ Line length value is based on ESC 0, ESC 2, ESC A n, or ESC 3 n, ESC 1, ESC % 9 n.



Description:
Data "C" that encroaches on the "Skip Over Perf" area is printed at the next TOF.

Margins – cancel bottom margin (auto skip)

Code: ESC O

Compatibility: **Epson/IBM**

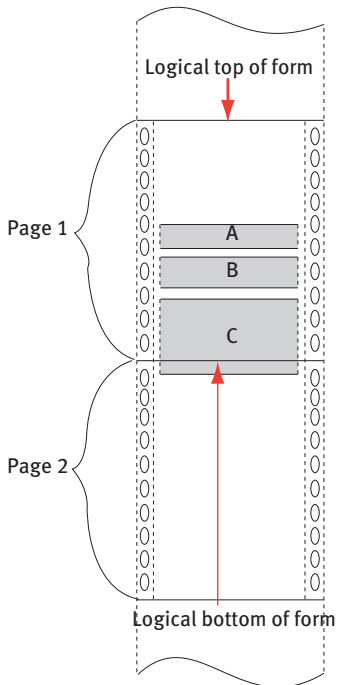
Function:

Cancel Skip-Over Perforation.

Details:

- ❖ Skip over perforation is cleared when power down/power up / Prime occurs.
- ❖ Skip over perforation is canceled when the form length is changed by the following codes:

ESC C n and ESC C nul n.



Description:

No area of the logical form is skipped. Data A, B and C are printed as pictured.

Vertical tabs – select channel

Code: ESC / n

Compatibility: **Epson**

Function:

Select a vertical tab channel, specified by n.

Range:

...❖ n = 0 – 7, n = 128 – 135

Out of range:

...❖ If n is not a number between 0 and 7 nor between 128 and 135, the command value will be ignored.

Details:

...❖ Within each channel there can be up to 16 vertical tabs which are independently set.

...❖ In order to access the vertical tabs within each channel VT or CHR\$(11) can be used.

...❖ Tabs set by the ESC B command correspond to channel #0.

Related functions:

...❖ Vertical Tab

Vertical tabs – define tab stops

Code: ESC B n1 n2 ... nk NUL

Compatibility: **Epson/IBM**

Function:

Set the specified number of vertical tabs.

Range:

...❖ k specifies the number of vertical tabs.

k = 1 – 16 (Epson)

1 – 64 (IBM)

...✦ n is the specific line number at which each vertical tab is to be set.

n = 1 – 255

Out of range:

...✦ Value of k and n which exceed the maximum will be ignored.

...✦ Paper will be loaded on printer even if the vertical tab setting exceeds the number of lines between TOFs (one page length).

Details:

...✦ To use n setting of 255 the line spacing must be set at less than 3/72 inch.

...✦ Vertical tab stops are absolute, they are not changed by changing the line spacing (Epson). If the line feed amount value is changed after the vertical tab setting declaration, vertical tab stops will be executed according to the new line spacing (IBM). They remain at the same distance from TOF.

...✦ The tab sequence must be terminated by CHR\$(0) or any number less than the last tab or nk (Epson). The ESC sequence is terminated by CHR\$(0). (IBM)

...✦ The vertical tabs set by this command correspond to channel #0.

...✦ n value must be increasing. n1<n2<n3< ... <nk.

Related functions:

...✦ ESC B nul will reset the TAB setting.

Vertical tabs – define tab stops in channels

Code: ESC b n m1 m2 ... mk NUL

Compatibility: **Epson**

Function:

Set m vertical tabs for each channel n.

Range:

m = 0 – 255 (Bit 7 of m is ignored.)

n = 0 – 7

Out of range:

...❖ If $n > 7$, the command will be ignored.

Details:

...❖ The VFU has 8 channels $n = (0 \text{ to } 7)$ and up to 16 tab stops ($m = 1 \text{ to } 16$). The vertical tab setting may exceed the number of lines between TOFs (one page length).

...❖ This sequence must be terminated by $\text{CHR}\$(0)$, or any number less than m_k .

...❖ Tab settings are not affected by subsequent changes in line spacing.

...❖ m value must be increasing. $m_1 < m_2 < m_3 < \dots < m_k$.

Related functions:

...❖ On power up n is set to channel no. 0. This means the same as ESC B.

Vertical tab—execute

Code: VT

Compatibility: **Epson/IBM**

Function:

Print the data in the buffer and advance the paper to the next tab stop.

Details:

...❖ If vertical tabs are default set, this command will function the same as LF.

...❖ Executing more than the legal number of vertical tabs set will cause execution of the first vertical tab of the channel on the next page.

Related functions:

...❖ Double width mode set by ESC SO (Epson mode only) or SO will be reset.

Vertical tabs – define tab stops in channels (VFU)

Code: Part 1 Part 2 Part 3
 DC4 sp ... sp n1

Compatibility: **ML**

Function:

Define up to a total of 54 vertical tab stops in a maximum of 12 channels.

Range:

Variable	ASCII	Decimal	Hexidecimal
n1 (Chan. Number) =	1 – <	49 – 60	31 – 3C

Argument

TAB STOP (argument) = 1 to 54 occurrence

Repeating constant = s1 ... sx = 1 to 127 spaces

Details:

❖ This command is composed of 3 parts ...

Part 1 (initiator)	Part 2 (argument)	Part 3 (terminator)
DC4	SP...SP n1 (repeat)	?

– Part 1 is the initiator and is sent once.

– Part 2 consists of a variable number of spaces, each representing 1 print line, and a tab channel number “n1”. This part can be sent multiple times.

– Part 3 is the terminator, and is only sent once.

❖ The maximum number of spaces “SP” in all arguments is 127. This number is the total sum of all “SP”s even if the “SP”s are associated with difference arguments.

❖ The maximum number of tab stops (Part 2) or arguments is 54.

❖ The same tab channel can be defined more than once.

❖ VFU loading sets the top form.

Vertical tabs — execute

Code: VT n

Compatibility: **ML**

Function:

Initiate printing action. Print data in the print buffer by causing a print block change and feed the paper to the next channel stop specified by “n”.

Range:

ASCII (channel no.)	Decimal	Hexidecimal
1	49	31
2	50	32
3	51	33
4	52	34
5	53	35
6	54	36
7	55	37
8	56	38
9	57	39
:	58	3A
;	59	3B
<	60	3C

Out of range:

The command will be ignored.

Logical limitation:

…❖ If a channel number which is not defined in the VFU load sequence, is specified in this command, this command will be ignored.

Details:

…❖ This command is available when “Emulation Compatibility” of the technical menu is set to “Extension”.

Paper-out sensor – enable

Code: ESC 9

Compatibility: **Epson/IBM**

Function:

Enable the paper out sensor. This activates an alarm lamp when 0.5 inch or less of paper remains.

Details:

...✦ Upon detection, the alarm lamp is lit and the printer is deselected.

...✦ Paper out detector can also be enabled by MENU.

...✦ Manual Paper Out Override.

While the paper end lamp is on, if the SEL switch is depressed, 1 line of data is printed, and line feed is executed.

Paper override function is valid until the next TOF position is reached. After the next TOF is reached, the function becomes invalid.

When SEL switch is depressed after paper is reset (paper end switch off), the following states return and the printer is in the select mode:

SEL lamp light on.

Paper lamp light off.

I/F becomes select (receivable) state.

...✦ While Paper Out Override is active, if multiple line feeds are received by the printer, the printer executes the line feeds until the TOF position is reached. If there are line feeds that couldn't be executed because the TOF was reached, they are "saved" and will execute after new paper is inserted.

...✦ Unprinted data will be saved in the buffer and printed after paper is replaced and the SEL switch is depressed. If data in the print buffer is not printed because paper out was detected, the data will not be lost and can be printed after the paper is replaced and the SEL switch is depressed.

Paper-out sensor – disable

Code: ESC 8

Compatibility: **Epson/IBM**

Function:

Disables the paper out sensor.

Details:

- ⋯⌘ Paper error detector can also be disabled by MENU.
- ⋯⌘ Printer prints up to TOF, then stops. Paper End LED turns ON.

Paper-out detection override – enable/disable

Code: ESC E n

Compatibility: **ML**

Function:

Enable/disable the paper out detection override function in which even though the printer has detected that only 1 inch of paper remains to be printed on, printing action can still execute until the next TOF is reached.

Range:

- | | |
|---------|------------------------------------------|
| n = 1 | Paper Out Detection Override = Disabled. |
| n < > 1 | Paper Out Detection Override = Enabled. |

Out of range:

The command will be ignored.

Details:

- ⋯⌘ When the printer's paper sensor switch detects that only 1 inch of paper remains in the platen path and the "Paper Out Detection Override" function is disabled (i.e. the printer is in the normal paper detection mode), the printer:
 - stops printing
 - immediately turns on PE/FAULT signals

- switches itself OFF LINE
- switches the SEL LED = OFF
- switches the ALARM LED = On (Paper end is detected).
- ❖ While this condition exists, you can continue to print by pressing the SEL switch. When this happens, the SEL LED = on and only one line of text is printed followed by a LF. After the 1 line is printed the SEL LED = OFF and the printer returns to the deselect state it was in before the SEL switch was pressed. This process can be repeated until the next TOF is reached.
- ❖ During Paper-out detection override process (described above), if continuous LFs are executed, the printer will advance the paper until the next TOF is reached. Once the next TOF is reached, all remaining feeds will be negated.
- ❖ When the Paper Out Detection Override = enabled, when 1 inch of paper is detected in the platen path, the paper-out condition is overridden, and printing continues normally. If there is enough data, the printer will continue to print beyond the physical edge of the paper and will continue to print on the platen until the next TOF is reached.
- ❖ The alarm (paper-out) LED will turn on regardless of if the Paper-Out Override function is enabled or disable.
- ❖ The TOF will be maintained even if paper out switch is disabled.
- ❖ This function is not available when the CSF is connected.

Cut-sheet feeder – single sheet insert

Code: ESC EM I

Compatibility: **Epson/IBM**

Function:

Feed a single cut-sheet into the printer.

Details:

- ❖ This command starts printing and performs carriage returns regardless of the paper mode.

- ...❖ If paper is already loaded, the printer will eject that sheet and feed another sheet to the TOF position.
- ...❖ If there is data in the print buffer and paper is already loaded, this command causes the data to be printed, the current sheet ejected and then the new sheet inserted.

Cut-sheet feeder – single sheet eject

Code: ESC EM R

Compatibility: **Epson/IBM**

Function:

If a CSF is installed, paper already in the platen path is ejected.

Details:

- ...❖ This command starts printing and performs carriage returns regardless of the paper mode.
- ...❖ An LF code at the end of the page automatically causes the next sheet to be loaded.
- ...❖ If data is in the print buffer, it is printed before the sheet is ejected.

Cut-sheet feeder – single sheet insert

Code: ESC S

Compatibility: **ML**

Function:

Feed a single Cut-Sheet into the printer.

Details:

- ...❖ If a CSF is not installed, this command is ignored.
- ...❖ If paper is already loaded, the printer will eject that sheet and feed another sheet to the TOF position.
- ...❖ If there is data in the print buffer and paper is already loaded, this command causes the data to be printed, the current sheet ejected and then the new sheet inserted.

Cut-sheet feeder – single sheet eject

Code: ESC V

Compatibility: **ML**

Function:

Eject the cut-sheet paper that is currently in the platen path.

Details:

- ...❖ This command is ignored when a CSF is not installed.
- ...❖ Any vertical feed command (LF, VT, FF, Direct Skip etc.) that advances the logical page beyond the physical page will cause the next sheet to be loaded.
- ...❖ If data is in the print buffer, it is printed before the sheet is ejected.

Cut-sheet feeder – Dual bin CSF bin select

Code: ESC EM n

Compatibility: **ML**

Function:

Select a sheet bin on Dual Bin CSF

Details:

n = 01H, 31H, 81H, B1H – Set a sheet bin on Dual Bin CSF to bin 1

n = 02H, 32H, 82H, B2H – Set a sheet bin on Dual Bin CSF to bin 2

Out of range

The command will be ignored.

Details:

- ...❖ This command is ignored when Dual Bin CSF is not installed.
- ...❖ On receiving this command, a sheet is inserted from the bin selected.
- ...❖ This command cannot function to perform sheet insertion/ejection.

- ...❖ In the following instances, the default bin selected by the menu is set:
 - Turning on the power
 - Receiving I-PRIME signals
 - Receiving the ESC CAN command

Dual bin CSF, bin select

Code: ESC EM n

Compatibility: **Epson/IBM**

Function:

Form loading bin is set for dual bin CSF.

Range:

n = 01H, 31H, 81H, B1H ... The form loading bin from dual bin CSF is set on bin 1.

n = 02H, 32H, 82H, B2H ... The form loading bin from dual bin CSF is set on bin 2.

Out of range:

This command becomes invalid, and the previously established mode remains.

Details:

- ...❖ The loading/ejection of the form is not performed on reception of the command.
- ...❖ The form is loaded from the bin set for form loading after reception of this command.
- ...❖ This command is valid regardless of the paper mode. The command, however, functions when the dual bin CSF is installed.

Composite command for setting line feed quantity

ESC DLE H Pno A1 A2 P1 P2 P3

Code: 1B 10 48 in hexadecimal, 27 16 72 in decimal

Compatibility: **ML**

Functions:

This command specifies the quantity of line feeding by parameter A1 (Basic LF Quantity) and feeds paper by the specified quantity.

❖ Valid ranges and meanings of parameters:

- (a) Pno: Specifies the length (in bytes) of parameters following the “Pro” parameter. The most significant bit (MSB) is voided.

00H equal to or less than Pno equal to or less than FFH

Pno < 05H: This command is voided and the number of bytes specified by the “Pno” parameter are discarded.

- (b) A1: Specifies a basic line feeding pitch. The most significant bit (MSB) is voided.

00H equal to or less than A1 equal to or less than FFH

A1=00H, 30H 1/60" pitch (Reserved)

A1=01H, 31H 1/72" pitch

A1=02H, 32H 1/144" pitch (Reserved)

A1=03H, 33H 1/180" pitch

A1=04H, 34H 1/216" pitch

A1=05H, 35H 1/360" pitch (Reserved)

When any other parameter value is specified, the number of bytes specified by the “Pno” parameter are discarded.

- (c) A2: Specifies setting of parameters or execution of this command. The most significant bit (MSB) is voided.

00H equal to or less than A2 equal to or less than FFH.

A2 = even number: Sets the quantity of line feeding.

A3 = odd number: Feeds paper by the specified quantity of line feeding.

- (d) P1 to P3: Specifies the quantity of line feeding according to the specified line feed pitch (by parameter A1). Each parameter uses the lower four bits of a byte to indicate a value of 1 to 9. (The higher four bits of each byte are ignored.)

P1 – Hundreds digit of the LF quantity

P2 – Tens digit of the LF quantity

P3 – Ones digit of the LF quantity

The LF quantity must always be three digits long.

...❖ This command can be entered anywhere on a line.

...❖ This command will not set TOF.

...❖ When an even value is specified for the A2 parameter (to set parameters of this command), the following items are enabled:

- (a) The specified LF quantity is referenced by the following operations: LF, VT, CR (with LF), automatic carriage return, setting of page length, perforation skip, etc.

- (b) The LF quantity of “000” can be specified (by parameters P1 to P3).

- (c) The printer does not start printing.

- (d) The LF quantity specified on the menu is used in the following cases:

...❖ When the printer receives an INITIALIZE command (ESC @) (or when “Reset Inhibit” on the menu is “No”)

...❖ When the printer receives a software I-PRIME command (ESC } NUL)

...❖ When the printer receives an Emulation Change command (ESC { Pn) (except for identical simulation)

- ...❖ When the printer receives an I/F I-PRIME-N signal (or when “I-Prime” on the menu is not “Invalid”)
- ...❖ When a setting is made on the menu
- ...❖ When the printer is reset by a switch
- ...❖ When the printer is powered on
- ...❖ When the printer receives a Menu Factory Value Load command (ESC DLE 02H)
- ...❖ When the printer receives a Menu Set command (ESC DLE D)
- ...❖ When an odd value is specified for the A2 parameter (to execute the command), the printer performs the following:
 - (a) Reads data in the print buffer, prints it out, then moves the print head to the top of the next line.
 - (b) Releases the 1-line Wide mode by SO/ESCSO.
 - (c) Prints and return the print head to the top of the line even when an LF quantity of “000” is specified by parameters P1 to P3.
 - (d) Skips to the next TOF when a Perforation Skip command is entered.
 - (e) The LF quantity is not affected by the specified LF quantity.
 - (f) Moves the print head to the left margin to indicate the next print position when the Incremental Print mode is set.

CSF Control

Code: ESC [D Ln Hn pft fc sd

Compatibility: **IBM**

Function:

Controls the CSF function.

Range and Meaning of Ln Hn:

...❖ Meaning (Setting of Parameter Value)

Ln, Hn shows a parameter value after it.

Ln, Hn = Ln+Hn x256

...❖ Ranges

0 equal to or less than Ln equal to or less than Ln 255,

0 equal to or less than Hn equal to or less than 255

...❖ Relationship between Ln and Hn Values, and Command Sequence

– Ln = Hn = 00H

Up to ESC [Ln Hn is received and discarded, and data following it is treated as print data.

– 01H Ln+Hn × 256 03H

Up to the parameter of a value specified by Ln+Hnx256 is valid (the setting of that number is also valid).

Example: At Ln+Hn × 256 = 1, up to pft is valid.

– 04H Ln+Hn × 256 FFFFH

Up to sd is valid, and data beyond it is received and discarded by (Ln+Hnx256)-3 bytes.

Range and Meaning of pft

...❖ Meaning (Paperfeed mode Turning)

pft=01H .. The system is placed in single paperfeed mode to cause one-off page ejection.

pft=03H .. The system is placed in auto paperfeed mode.

A pft that takes on a value other than the above becomes invalid, and the paperfeed mode remains unchanged.

Range:

0 equal to or less than pft equal to or less than 255

Single Paperfeed Mode only for One Page

...❖ This mode is established at pft=01H.

...❖ Single paperfeed is valid for the next page.

When paperfeed is finished ... Single paperfeed will apply to the next page to be fed.

After the printing and ejection of the page, single paperfeed is disabled from the data that follows the page.

When paperfeed has yet to be performed .. Single paperfeed is valid for a page to be fed.

When the sheet that follows the affected page is fed with data after the reception of a command, or fed by the LF or FF command or another means, single paperfeed is disabled.

...❖ IF, with the reception of data for the next page, a paper jam condition occurs, paperfeed or printing will not resume until the paper jam is cleared using the SEL switch (clearing the paper jam. The use of the SEL switch, makes the system feed paper automatically and print).

...❖ Single paperfeed is valid only for one page. Auto paperfeed mode is used from the next page.

...❖ This mode does not have any effect on switch-selected paperfeed (single paperfeed control is not performed).

Paperfeed using commands (including FF code) is under single paperfeed mode control, as for paperfeed with normal data.

...❖ Auto paperfeed mode:

A page-over function automatically feeds the next sheet.

Range and Meaning of sd

...❖ Meaning (Selection of CSF Bin)

sd=01H: CSF 1 Bin is set.

sd=02H: CSF 2 Bin is set.

sd that takes on a value other than the above becomes invalid, the setting remains the same.

Range

0 equal to or less than sd equal to or less than 255

Set Page Length in defined unit

Code: ESC (C Ln Hn Lp Hp

Compatibility: **Epson**

Function:

Set page length for the currently selected paper mode. Paper modes are Top, Rear, Bottom and CSF.

Range:

Ln : 0 ~ 255

Hn : 0 ~ 255

Lp : 0 ~ 255

Hp : 0 ~ 255

Page Length = (Lp + Hp equal to or less than 256) x defined unit

0 < Page Length equal to or less than 22 inch.

Details

❖ Default basic unit is 1/216 inch.

❖ When the page length set by the command equals 0 inch or exceeds 22 inch, the command becomes invalid. Page length previously defined is effective.

Set Page format

Code: ESC (c Ln Hn Lt Ht Lb Hb

Compatibility: **Epson**

Function:

Sets the Top and Bottom Margins in the defined unit.

Range:

Ln : 0 ~ 255 Hn : 0 ~ 255

Lt : 0 ~ 255 Ht : 0 ~ 255

Lb : 0 ~ 255 Hb : 0 ~ 255

Top margin = (Lt + Ht x 256) x defined unit

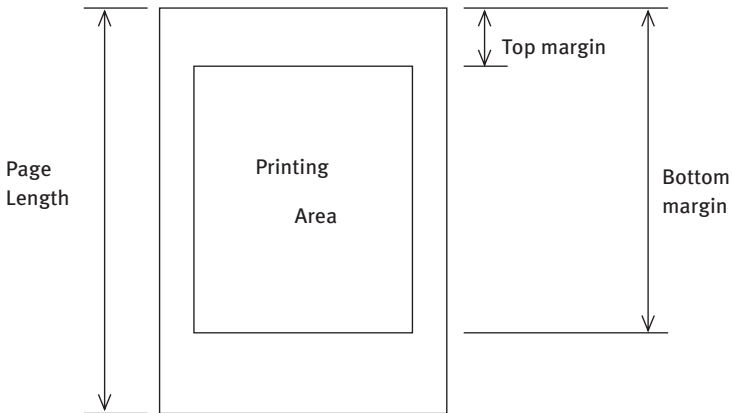
Bottom margin = (Lb + Hb x 256) x defined unit

Details:

❖ Top margin < bottom margin

❖ Bottom margin < 22 inches

❖ Default unit is 1/216 inch.



Vertical tabs—execute

Code: VT

Compatibility: **ML**

Function:

Print the data in the buffer and advance the paper to the next tab stop.

Details:

This command is available when the “Emulation Compatibility” of the technical menu is set to “Upper” or “Original”.

COMMAND SUMMARY

EPSON (EPS)

HORIZONTAL CONTROL

ASCII CODE	FUNCTION NAME
CR	CARRIAGE RETURN – EXECUTE
BS	BACKSPACE
DEL	DELETE
ESC U n	PRINT DIRECTION – SELECT UNI/DIRECTIONAL PRINT
ESC <	PRINT DIRECTION – UNIDIRECTIONAL PRINT_ONE LINE ONLY
ESC \$ n1 n2	PRINT POSITION – EXECUTE PRINT POSITION FROM LEFT MARGIN
ESC \ n1 n2	PRINT POSITION – DEFINE INDEXED POSITION – BY DOT COLUMN
ESC | n1 n2	PRINT POSITION–DEFINE RELATIVE DOT POSITION
ESC DLE @n A1 A2 P1 P2 P3	SET PRINT POSITION
ESC D x1 x2 x3...xk NUL	HORIZONTAL TABS – DEFINE STOPS – BY CHARACTERS HT HORIZONTAL TAB – EXECUTE
ESC n	MARGINS – DEFINE LEFT MARGIN
ESC Q n	MARGINS – DEFINE RIGHT MARGIN
ESC a n	PRINT – LINE JUSTIFICATION – SELECT

VERTICAL CONTROL

ASCII CODE	FUNCTION NAME
ESC 2	LINE SPACING – SELECT FIXED AMOUNT – 1/6 "
ESC 0	LINE SPACING – SELECT FIXED AMOUNT – 1/8 "
ESC 1	LINE SPACING – SELECT FIXED AMOUNT – 7/72 "
ESC A n	LINE SPACING – DEFINE AMOUNT – n/72 "
ESC 3 n	LINE SPACING – DEFINE AMOUNT – n/216 "
ESC J n	LINE FEED – EXECUTE AMOUNT – n/216 "
ESC % 5 n	FINE LF – EXECUTE – n/144 " AMOUNT
ESC % 9 n	LINE SPACING – DEFINE AMOUNT – n/144 "
LF	LINE FEED –EXECUTE FORWARD LF WITH CR
ESC C nul n	FORM LENGTH – DEFINE AMOUNT – BY INCHES
ESC C n	FORM LENGTH – DEFINE AMOUNT – BY LINES
FF	FORM FEED – EXECUTE
ESC N n	MARGINS – DEFINE BOTTOM MARGIN (AUTO SKIP)
ESC 0	MARGINS – CANCEL BOTTOM MARGIN (AUTO SKIP)
ESC / n	VERTICAL TABS – SELECT CHANNEL
ESC B n1 n2...nk NUL	VERTICAL TABS – DEFINE TAB STOPS
ESC b n m1 m2... mk NUL	VERTICAL TABS – DEFINE TAB STOPS IN CHANNELS

ASCII Code	FUNCTION NAME
VT	VERTICAL TAB – EXECUTE
ESC 9	PAPER – OUT SENSOR – ENABLE
ESC 8	PAPER – OUT SENSOR – DISABLE
ESC EM I	CUT – SHEET FEEDER – SINGLE SHEET INSERT
ESC EM R	CUT – SHEET FEEDER – SINGLE SHEET EJECT
ESC DLE H Pno A1 A2	LINE SPACING SELECT/EXECUTION P1 P2 P3 COMPOUND COMMAND
ESC (C Ln Hn Lp Hp	SET PAGE LENGTH IN DEFINED UNITS
ESC (c Ln Hn Lt Ht Lb Hb	SET PAGE FORMAT

SYMBOL SETS

ASCII Code	FUNCTION NAME
ESC R n	INTERNATIONAL LANGUAGE CHARACTER SET – SELECT
ESC t n	CHARACTER TABLE – SELECT
ESC I n	CONTROL CODES OR PRINTABLE CHARACTERS – ON/ OFF
ESC 6	CONTROL CODES OR PRINTABLE CHARACTERS – ON
ESC 7	CONTROL CODES OR PRINTABLE CHARACTERS – OFF
ESC 4	ITALIC CHARACTER SET – SELECT
ESC 5	ITALIC CHARACTER SET – CANCEL
ESC (t Ln Hn Pn1 Pn2 Pn3	EPSON CHARACTER TABLE SELECT

FONT DESCRIPTION

ASCII Code	FUNCTION NAME
ESC x n	PRINT QUALITY – SELECT MODE – UTL/NLQ
ESC (n	PRINT QUALITY – SELECT HIGH SPEED DRAFT
ESC k n	TYPESTYLES – SELECT
ESC : NUL n NUL	CUSTOM FONT – CREATE – COPY ROM DATA TO RAM
ESC & m n1 n2 a d1...d11	CUSTOM FONT – CREATE – CHAR – a d1...d11 PATTERN – UTL DLL
ESC % n	CUSTOM FONT – SELECT DLL FONT
ESC P	CHARACTER PITCH – SELECT 10 CPI
DC2	CHARACTER PITCH – SELECT 10 CPI
ESC M	CHARACTER PITCH – SELECT 12 CPI
ESC :	CHARACTER PITCH – SELECT 12 CPI
ESC g	CHARACTER PITCH – SELECT 15 CPI
SI	CHARACTER PITCH – SELECT CONDENSED (17, 20 CPI)
ESC SI	CHARACTER PITCH – SELECT CONDENSED (17, 20 CPI)
DC2	CHARACTER PITCH – CANCEL CONDENSED (17, 20 CPI)
ESC SP n	INTER – CHARACTER CLEARANCE – DEFINE AMOUNT – BY DOT COLUMN

ASCII CODE	FUNCTION NAME
ESC p n	CHARACTER CELL SIZE – PROPORTIONAL WIDTH – ON/OFF
ESC X Pn Lp Hp	SELECT FONT BY PITCH AND POINT
ESC y n	SELECT FONT

TEXT PRINT FEATURES

ASCII CODE	FUNCTION NAME
ESC – n	UNDERLINE – ON/OFF
ESC E	EMPHASIZED – ON
ESC F	EMPHASIZED – OFF
ESC G	ENHANCED (DOUBLE STRIKE) – ON
ESC H	ENHANCED (DOUBLE STRIKE) – OFF
ESC W n	DOUBLE WIDE (EXPANDED) – ON/OFF
SO	DOUBLE WIDE (EXPANDED) – ONE LINE ONLY - ON
ESC SO	DOUBLE WIDE (EXPANDED) – ONE LINE ONLY - ON
DC4	DOUBLE WIDE (EXPANDED) – ONE LINE ONLY - OFF
ESC w n	DOUBLE HEIGHT – ON/OFF
ESC S n	SCRIPT – SUPER/SUB – SELECT
ESC T	SCRIPTS – SUPER/SUB – CANCEL

GRAPHICS MODE

ASCII CODE	FUNCTION NAME
ESC * m n1 n2 (GRAPHICS DATA)	BIT IMAGE GRAPHICS – SELECT DENSITY AND ENTER GRAPHICS
ESC ^ m n1 n2 (GRAPHICS DATA)	BIT IMAGE GRAPHICS – SELECT 9 PIN MODE
ESC ? m n	BIT IMAGE GRAPHICS – REASSIGN GRAPHIC'S DENSITY COMMANDS
ESC K n1 n2 (GRAPHICS DATA)	BIT IMAGE GRAPHICS – DOUBLE HORIZONTAL DENSITY
ESC L n1 n2 (GRAPHICS DATA)	BIT IMAGE GRAPHICS – DOUBLE HORIZONTAL DENSITY –NORMAL SPEED
ESC Y n1 n2 (GRAPHICS DATA)	BIT IMAGE GRAPHICS – DOUBLE HORIZONTAL DENSITY – HIGH SPEED
ESC Z n1 n2 (GRAPHICS DATA)	BIT IMAGE GRAPHICS – QUADRUPLE HORIZONTAL DENSITY

COMPOSITE COMMAND

ASCII CODE	FUNCTION NAME
ESC ! n	COMPOSITE COMMANDS – SELECT PRINT FEATURES AND PITCH

GENERAL CONTROL

ASCII Code	FUNCTION NAME
CAN	RESET – CLEAR PRINT BUFFER
ESC @	RESET – CLEAR BUFFER AND INITIALIZE PRINTER
ESC >	MSB CONTROL – SET MSB EQUAL TO 1
ESC =	MSB CONTROL – SET MSB EQUAL TO 0
ESC #	MSB CONTROL – CANCEL MSB CONTROL
DC3	PRINT SUPPRESS – ON
ESC Q ETX	PRINT SUPPRESS – ON
ESC Q SYN	PRINT SUPPRESS – ON
DC1	PRINT SUPPRESS – OFF
ESC s n	PRINT SPEED – HALF – ON/OFF
ESC { n	EMULATION MODE SWITCHING
ESC } NUL	PRINTER INITIALIZATION
ESC i	INCREMENTAL PRINT SELECT
ESC (U Ln Hn data	SET UNIT
ESC DLE O Pno Pn	Quiet mode – ON/OFF

IBM

HORIZONTAL CONTROL

ASCII CODE	FUNCTION NAME
CR	CARRIAGE RETURN – EXECUTE
BS	BACKSPACE
ESC U n	PRINT DIRECTION – SELECT UNI/DIRECTIONAL PRINT
ESC % B n1 n2 n3 n4	PRINT POSITION – DEFINE PRINT POSITION FROM LEFT MARGIN
ESC | n1 n2	PRINT POSITION – DEFINE RELATIVE DOT POSITION
ESC DLE @n A1 A2 P1 P2 P3	SET PRINT POSITION
ESC D x1 x2 x3...xk NUL	HORIZONTAL TABS – DEFINE STOPS – BY CHARACTERS HT HORIZONTAL TAB – EXECUTE
ESC R	HORIZONTAL TABS – DEFINE STOPS – DEFAULT VALUES
ESC X n1 n2	MARGINS – DEFINE LEFT & RIGHT MARGIN
ESC d Ln Hn	RELATIVE MOVE INLINE FORWARD

VERTICAL CONTROL

ASCII CODE	FUNCTION NAME
ESC 0	LINE SPACING – SELECT FIXED AMOUNT – 1/8 "
ESC 1	LINE SPACING – SELECT FIXED AMOUNT – 7/72 "
ESC A n	LINE SPACING – DEFINE AMOUNT – n/72 " ON/OFF
ESC 3 n	LINE SPACING – DEFINE AMOUNT – n/216 "
ESC 2	LINE SPACING – ACTIVATE AMOUNT DEFINED BY n/72 "
ESC J n	LINE FEED – EXECUTE AMOUNT – n/216 "
ESC % 5 n	FINE LF – EXECUTE – n/144 " AMOUNT
ESC % 9 n	LINE SPACING – DEFINE AMOUNT – n/144 "
LF	LINE FEED – EXECUTE FORWARD LF WITH CR
ESC 5 n	LINE FEED – AUTOMATIC LF – ON/OFF
ESC C nul n	FORM LENGTH – DEFINE AMOUNT – BY INCHES
ESC C n	FORM LENGTH – DEFINE AMOUNT – BY LINES
FF	FORM FEED – EXECUTE
ESC 4	TOP OF FORM – DEFINE
ESC N n	MARGINS – DEFINE BOTTOM MARGIN (AUTO SKIP)
ESC 0	MARGINS – CANCEL BOTTOM MARGIN (AUTO SKIP)
ESC B n1 n2...nk NUL	VERTICAL TABS – DEFINE TAB STOPS
VT	VERTICAL TAB – EXECUTE
ESC 9	PAPER – OUT SENSOR – ENABLE
ESC 8	PAPER – OUT SENSOR – DISABLE
ESC EM I	CUT – SHEET FEEDER – SINGLE SHEET INSERT
ESC EM R	CUT – SHEET FEEDER – SINGLE SHEET EJECT

ASCII CODE	FUNCTION NAME
ESC DLE H Pno A1 A2	LINE SPACING SELECT/EXECUTION P1 P2 P3 COMPOUND COMMAND
ESC [F Ln Hm pft fc sd	CUT – SHEET FEEDER CONTROL

SYMBOL SETS

ASCII CODE	FUNCTION NAME
ESC 7	IBM CHAR SET I – SELECT
ESC 6	IBM CHAR SET II – SELECT
ESC \ n1 n2	IBM CHAR SET III (ALL CHAR) – CONTINUOUS SELECT
ESC ^	IBM CHAR SET III (ALL CHAR) – PRINT ONE CHARACTER ONLY
ESC ! n	INTERNATIONAL LANGUAGE CHARACTER SET – SELECT
ESC [T Ln Hn NUL NUL Hcp Lcp NUL	SELECT CODE PAGE

FONT DESCRIPTION

ASCII CODE	FUNCTION NAME
ESC # 0	PRINT QUALITY – SELECT HIGH SPEED DRAFT
ESC I n	PRINT QUALITY – SELECT FONT
ESC [d 01H 00H n	SET PRINT QUALITY
ESC [l Ln Hn data	SELECT FONT
ESC k n	TYPESTYLES – SELECT
ESC \$	CUSTOM FONT – CREATE – COPY ROM DATA TO RAM
ESC = c1 c2 m n a1 a2 d1...d11 a1 a2 d1...d11...	CUSTOM FONT – CREATE – CHAR – PATTERN – UTL/NLQ DLL
DC2	CHARACTER PITCH – SELECT 10 CPI
ESC :	CHARACTER PITCH – SELECT 12 CPI
ESC g	CHARACTER PITCH – SELECT 15 CPI
SI	CHARACTER PITCH – SELECT CONDENSED (17, 20 CPI)
ESC SI	CHARACTER PITCH SELECT – 20 CPI
ESC V n	INTER – CHARACTER CLEARANCE – DEFINE AMOUNT – BY DOT COLUMN
ESC P n	CHARACTER CELL SIZE – PROPORTIONAL WIDTH – ON/ OFF
ESC DLE F Pro Pn Lp Hp	SELECT FONT BY PITCH AND POINT

TEXT PRINT FEATURES

ASCII CODE	FUNCTION NAME
ESC – n	UNDERLINE – ON/OFF
ESC_ n	OVERSCORE – ON/OFF
ESC E	EMPHASIZED – ON
ESC F	EMPHASIZED – OFF
ESC G	ENHANCED (DOUBLE STRIKE) – ON
ESC H	ENHANCED (DOUBLE STRIKE) – OFF
ESC W n	DOUBLE WIDE (EXPANDED) – ON/OFF
SO	DOUBLE WIDE (EXPANDED) – ONE LINE ONLY - ON
DC4	DOUBLE WIDE (EXPANDED) – ONE LINE ONLY - OFF
ESC [@n1 n2 m1 m2 m3 m4	DOUBLE HEIGHT AND WIDTH –ON/OFF
ESC S n	SCRIPT – SUPER/SUB – SELECT
ESC T	SCRIPTS – SUPER/SUB – CANCEL
ESC % G	SLANT – ON
ESC % H	SLANT – OFF

GRAPHICS MODE

ASCII CODE	FUNCTION NAME
ESC K n1 n2 (GRAPHICS DATA)	BIT IMAGE GRAPHICS – DOUBLE HORIZONTAL DENSITY
ESC L n1 n2 (GRAPHICS DATA)	BIT IMAGE GRAPHICS – DOUBLE HORIZONTAL DENSITY –NORMAL SPEED
ESC Y n1 n2 (GRAPHICS DATA)	BIT IMAGE GRAPHICS – DOUBLE HORIZONTAL DENSITY – HIGH SPEED
ESC Z n1 n2 (GRAPHICS DATA)	BIT IMAGE GRAPHICS – QUADRUPLE HORIZONTAL DENSITY

GENERAL CONTROL

ASCII CODE	FUNCTION NAME
CAN	RESET – CLEAR PRINT BUFFER
ESC Q ETX	PRINT SUPPRESS – ON
ESC Q SYN	PRINT SUPPRESS – ON
DC1	PRINT SUPPRESS – OFF
ESC j	STOP PRINT
ESC { n	EMULATION MODE SWITCHING
ESC } NUL	PRINTER INITIALIZATION
ESC [K Ln Hn Init Id Parm 1 Parm 2	SET INITIAL CONDITION
ESC i	INCREMENTAL PRINT SELECT
ESC DLE O Pno Pn	Quiet mode – ON/OFF

BARCODE

ASCII Code	FUNCTION NAME
ESC DLE A P1 N1 N2 N3 N4	SELECT BARCODE N5 N6 N7 N8
ESC DLE B P1 Pm [DATA]	PRINT BARCODE DATA
ESC DLE C P1 [DATA]	PRINT POSTNET BARCODE DATA
ESC [f 06H 00H k m s v1 v2 c	SETUP BARCODE PARAMETER EAN13/8, CODE39/128, I2of5, UPC-A, PostNet
ESC [p n1 n2 d1 d2	SETUP BARCODE PARAMETER EAN13/8, CODE39/128, I2of5, UPC-A, POSTNET

The following table details the validity of commands for the IBM emulation. The “Emulation Compatibility” of the technical menu should be set to “Extension”, “Upper” or “Original”.

MICROLINE (ML)

HORIZONTAL CONTROL

ASCII CODE	FUNCTION NAME
CR	CARRIAGE RETURN – EXECUTE
BS	BACKSPACE
ESC –	PRINT DIRECTION – UNI-DIRECTIONAL
ESC =	PRINT DIRECTION – BI-DIRECTIONAL
ESC % B n1 n2 n3 n4	PRINT POSITION – DEFINE PRINT POSITION FROM LEFT MARGIN
ESC % E n1 n2 n3 n4	PRINT POSITION – DEFINE RIGHT RELATIVE POSITION
ESC % F n1 n2 n3 n4	PRINT POSITION – DEFINE LEFT RELATIVE POSITION
ESC DLE @n A1 A2 P1 P2 P3	SET PRINT POSITION
ESC HT X1, Y1 Z1, ..., X _m Y _m Z _m CR	HORIZONTAL TABS – DEFINE STOPS – BY CHARACTERS
ESC ETX X1 Y1 Z1 W1, ..., X _m Y _m Z _m W _m CR	HORIZONTAL TABS – DEFINE STOPS – BY DOT COLUMN
HT	HORIZONTAL TAB – EXECUTE
ESC % C n1 n2 n3	MARGINS – DEFINE LEFT MARGIN
ESC % R n1 n2 n3 n4	MARGINS – RIGHT MARGIN

VERTICAL CONTROL

ASCII CODE	FUNCTION NAME
ESC 6	LINE SPACING – SELECT FIXED AMOUNT – 1/6 "
ESC 8	LINE SPACING – SELECT FIXED AMOUNT – 1/8 "
ESC % 5 n	FINE LF – EXECUTE – n/144 " AMOUNT
ESC % 9 n	LINE SPACING – DEFINE AMOUNT – n/144 "
LF	LINE FEED – EXECUTE FORWARD LF WITH CR
ESC DC2	LINE FEED – W/O CARRIAGE RETURN
ESC VT n1 n2	LINE FEED – EXECUTE DIRECT SKIP
ESC G n1 n2	FORM LENGTH – DEFINE AMOUNT – BY 1/2 "
ESC F n1 n2	FORM LENGTH – DEFINE AMOUNT – BY LINES
FF	FORM FEED – EXECUTE
ESC 5	TOP OF FORM – DEFINE
ESC % S n	MARGIN – DEFINE BOTTOM MARGIN (AUTO SKIP)
DC4 SP...SP n1 ?	VERTICAL TABS – DEFINE TAB STOPS IN CHANNELS (VFU)
VT n	VERTICAL TABS – EXECUTE
ESC E n	PAPER – OUT DETECTION OVERRIDE – ENABLE/DISABLE
ESC S	CUT – SHEET FEEDER – SINGLE SHEET INSERT
ESC V	CUT – SHEET FEEDER – SINGLE SHEET EJECT
ESC DLE H Pno A1 A2	LINE SPACING SELECT/EXECUTION P1 P2 P3 COMPOUND COMMAND

SYMBOL SETS

ASCII CODE	FUNCTION NAME
ESC ! 0	SYMBOL SET – OKIDATA – STANDARD – SELECT
ESC !	1 BLOCK GRAPHICS TABLE SELECT
ESC ! 2	SYMBOL SET – OKIDATA – IBM – SELECT
ESC ! n	INTERNATIONAL LANGUAGE CHARACTER SET – SELECT
ESC [T Ln Hn NUL NUL Hcp Lcp NUL	SELECT CODE PAGE

FONT DESCRIPTION

ASCII CODE	FUNCTION NAME
ESC # 0	PRINT QUALITY – SELECT HIGH SPEED DRAFT
ESC 0	PRINT QUALITY – SELECT UTILITY
ESC 1	PRINT QUALITY – SELECT NLQ
ESC 3	PRINT QUALITY – SELECT NLQ – GOTHIC
ESC 2	CUSTOM FONT – SELECT UTL DLL FONT
ESC 7	CUSTOM FONT – SELECT SYNTHETIC – NLQ DLL FONT
ESC k n	TYPESTYLES – SELECT
ESC \$	CUSTOM FONT – CREATE – COPY ROM DATA TO RAM
ESC g	CHARACTER PITCH – SELECT 15 CPI
RS	CHARACTER PITCH – SELECT 10 CPI
FS	CHARACTER PITCH – SELECT 12 CPI
GS	CHARACTER PITCH – SELECT 17.1 CPI
ESC # 3	CHARACTER PITCH – SELECT 20 CPI
ESC N n	CHARACTER DENSITY – DEFINE INTER – CHARACTER CLEARANCE – BY DOT COLUMN
ESC Y	CHARACTER CELL SIZE – PROPORTIONAL WIDTH – ON
ESC Z	CHARACTER CELL SIZE – PROPORTIONAL WIDTH – OFF
ESC % A m n1...n11	CUSTOM FONT – CREATE PATTERN – UTL DLL – ASCENDER
ESC % D m n1...n11	CUSTOM FONT – CREATE PATTERN – UTL DLL – DESCENDER
ESC DLE F Pro Pn Lp Hp	SELECT FONT BY PITCH AND POINT

TEXT PRINT FEATURES

ASCII CODE	FUNCTION NAME
ESC C	UNDERLINE – ON
ESC D	UNDERLINE – OFF
ESC T	EMPHASIZE – ON
ESC H	ENHANCED – ON
ESC I	EMPHASIZED AND ENHANCED – OFF
US	DOUBLE WIDE – SELECT
ESC US n	DOUBLE HIGH – SELECT
ESC L	SUBSCRIPTS – ON
ESC M	SUBSCRIPTS – OFF
ESC J	SUPERSCRIPIT – ON
ESC K	SUPERSCRIPIT – OFF
ESC ! /	SLANT – ON
ESC ! *	SLANT – OFF

GRAPHICS MODE

ASCII CODE	FUNCTION NAME
ETX	BIT IMAGE GRAPHICS – ENTER
ETX STX	BIT IMAGE GRAPHICS – EXIT
ESC P	BIT IMAGE GRAPHICS – TRUE SINGLE HORIZONTAL DENSITY
ESC Q	BIT IMAGE GRAPHICS – TRUE SINGLE HORIZONTAL DENSITY
ESC R	BIT IMAGE GRAPHICS – TRUE DOUBLE HORIZONTAL DENSITY
ESC # Q	BIT IMAGE GRAPHICS – DOUBLE SPEED QUASI– QUADRUPLE HORIZONTAL DENSITY
ETX LF	BIT IMAGE GRAPHICS – EXECUTE LF WITH CR – TEXT AMOUNT
ETX DC2	BIT IMAGE GRAPHICS – EXECUTE LF WITHOUT CR – TEXT AMOUNT
ETX SO	BIT IMAGE GRAPHICS – EXECUTE LF WITH CR – GRAPHICS AMOUNT
ETX DC4	BIT IMAGE GRAPHICS – EXECUTE LF WITHOUT CR – GRAPHICS AMOUNT

COMPOSITE COMMANDS

ASCII CODE	FUNCTION NAME
ESC & n1 n2 n3 n4 :	SELECT PRINT MODES AND FEATURES
ESC * n :	BIT IMAGE GRAPHICS MODES AND FEATURES
ESC ? n :	CARRIAGE RETURN AND LINE FEED CONTROL

GENERAL CONTROL

ASCII CODE	FUNCTION NAME
CAN	RESET – CLEAR PRINT BUFFER
ESC CAN	RESET – PRINT DATA AND INITIALIZE PRINTER
DC3	PRINT SUPPRESS – ON
DC1	PRINT SUPPRESS – OFF
ESC <	PRINT SPEED – HALF
ESC >	PRINT SPEED – FULL
ESC { n	EMULATION MODE SWITCHING
ESC } NUL	PRINTER INITIALIZATION
ESC i	INCREMENTAL PRINT SELECT
ESC DLE O Pno Pn	Quiet mode – ON/OFF

BARCODE

ASCII CODE	FUNCTION NAME
ESC DLE A P1 N1 N2 N3 N4	SELECT BARCODE N5 N6 N7 N8
ESC DLE B P1 Pm [DATA]	PRINT BARCODE DATA
ESC DLE C P1 [DATA]	PRINT POSTNET BARCODE DATA

COMMAND TABLES

The tables following detail the validity of commands for each emulation. The “Emulation Compatibility” of the technical menu should be set to “Extension”, “Upper” or “Original”.

IBM EMULATION

(✓ = Valid command; ✗ = Invalid command; T = Trap command).

COMMAND	HEX	FUNCTION	EMULATION COMPATIBILITY		
			EXTENSION	UPPER	ORIGINAL
BS	8	Backspace	✓	✓	T
HT	9	Horizontal tab	✓	✓	✓
LF	0A	line feed	✓	✓	✓
VT	0B	Vertical tab	✓	✓	✓
FF	0C	Form feed	✓	✓	✓
CR	0D	Carriage return	✓	✓	✓
SO	0E	Select double-wide mode (1 line)	✓	✓	✓
SI	0F	Select condensed mode	✓	✓	✓
DC1	11	Cancel print suppress mode	✓	✓	✗
DC2	12	Select 10 CPI	✓	✓	✓
DC4	14	Cancel double-wide mode (1 line)	✓	✓	✓
CAN	18	Cancel Data	✓	✓	✓
ESC DLE @	1B to 40	Set print position	✓	✓	T
ESC DLE A	1B to 41	Select barcode	✓	✓	T
ESC DLE B	1B to 42	Print barcode data	✓	✓	T
ESC DLE C	1B to 43	Print postnet barcode data	✓	✓	T
ESC DLE F	1B to 46	Select font by pitch and point	✓	✓	T
ESC DLE H	1B to 48	Select / Perform Line Feed	✓	✓	T
ESC DLE O	1B to 4F	Quiet mode - ON/OFF	✓	✓	T
ESC SI	1B 0F	Select condensed mode (20 CPI)	✓	✓	✗

COMMAND	HEX	FUNCTION	EMULATION COMPATIBILITY		
			EXTENSION	UPPER	ORIGINAL
ESC EM	1B 19	Cut-sheet feeder control	✓	✓	✓
ESC !	1B 21	International character set	✓	✓	✓
ESC #	1B 23	Select HSD mode	✓	✓	✓
ESC \$	1B 24	Copy std set to DLL CG	✓	✓	T
ESC % 5	1B 25 35	Perform n/144-" LF	✓	✓	✗
ESC % 9	1B 25 39	Select n/144-" line spacing	✓	✓	✗
ESC % B	1B 25 42	Set print position by dot	✓	✓	T
ESC % G	1B 25 47	Select italic mode	✓	✓	✗
ESC % H	1B 25 48	Cancel italic mode	✓	✓	✗
ESC –	1B 2D	Turn underlining mode ON/OFF	✓	✓	✓
ESC 0	1B 30	Select 1/8-" line spacing	✓	✓	✓
ESC 1	1B 31	Select 7/72-" line spacing	✓	✓	✓
ESC 2	1B 32	Start n/72-" line spacing	✓	✓	✓
ESC 3	1B 33	Select n/216-" line spacing	✓	✓	✓
ESC 4	1B 34	Set TOF	✓	✓	✗
ESC 5	1B 35	Automatic LF	✓	✗	✗
ESC 6	1B 36	Select character set 2	✓	✓	✓
ESC 7	1B 37	Select character set 1	✓	✓	✓
ESC 8	1B 38	Disable paper-out sensor	✓	✓	✓
ESC 9	1B 39	Enable paper-out sensor	✓	✓	✓
ESC :	1B 3A	Select 12 CPI	✓	✓	✓
ESC =	1B 3D	Character font image download	✓	✓	✗
ESC A	1B 41	Select n/72-" line spacing	✓	✓	✓

COMMAND	HEX	FUNCTION	EMULATION COMPATIBILITY		
			EXTENSION	UPPER	ORIGINAL
ESC B	1B 42	Set VT	✓	✓	✓
ESC C	1B 43	Set page length in lines	✓	✓	✓
ESC C NUL	1B 43 00	Set page length in "es	✓	✓	✓
ESC D	1B 44	Set HT	✓	✓	✓
ESC E	1B 45	Select emphasized mode	✓	✓	✓
ESC F	1B 46	Cancel emphasized mode	✓	✓	✓
ESC G	1B 47	Select double-strike mode	✓	✓	✓
ESC H	1B 48	Cancel double-strike mode	✓	✓	✓
ESC I	1B 49	Select Print mode	✓	✓	✓
ESC J	1B 4A	Perform n/216-" LF	✓	✓	✓
ESC K	1B 4B	Select single-density graphics	✓	✓	✓
ESC L	1B 4C	Select double-density graphics	✓	✓	✓
ESC N	1B 4E	Set skip over perforation	✓	✓	✓
ESC O	1B 4F	Cancel skip over perforation	✓	✓	✓
ESC P	1B 50	Turn proportional mode ON/OFF	✓	✓	✗
ESC Q	1B 51	Select print suppress mode	✓	✓	✗
ESC R	1B 52	Set all tabs to power on settings	✓	✓	✗
ESC S	1B 53	Select superscript / subscript mode	✓	✓	✓
ESC T	1B 54	Cancel superscript / subscript mode	✓	✓	✓
ESC U	1B 55	Turn unidirectional mode ON/OFF	✓	✓	✓
ESC V	1B 56	Set intercharacter space	✓	✓	T
ESC W	1B 57	Turn double-wide mode ON/OFF	✓	✓	✓
ESC X	1B 58	Set left/right Margins	✓	✓	T

COMMAND	HEX	FUNCTION	EMULATION COMPATIBILITY		
			EXTENSION	UPPER	ORIGINAL
ESC Y	1B 59	Select high-speed double-density graphic	✓	✓	✓
ESC Z	1B 5A	Select quadruple-density graphics	✓	✓	✓
ESC [@	1B 5B 40	Turn double-high wide, line spacing mode ON/OFF	✓	✓	T
ESC [F	1B 5B 46	CSF Control	✓	✓	T
ESC [I	1B 5B 49	Select font	✓	✓	T
ESC [K	1B 5B 4B	Set initial condition	✓	✓	T
ESC [T	1B 5B 54	Set code page	✓	✓	✓
ESC [d	1B 5B 64	Set Print Quality	✓	✓	T
ESC [f	1B 5B 66	Set Barcode parameter	✓	✓	T
ESC [p	1B 5B 70	Set Barcode data	✓	✓	T
ESC ¥	1B 5C	Print continuously from all characters chart	✓	✓	✗
ESC ^	1B 5E	Print single character from all characters chart	✓	✓	✗
ESC	1B 5F	Turn overscore mode ON/OFF			
ESC d	1B 64	Relative move inline forward			
ESC g	1B 67	Select 15 CPI			
ESC i	1B 69	Turn incremental print mode ON/OFF			
ESC j	1B 6A	Stop printing			
ESC k	1B 6B	Select NLQ Font			
ESC {	1B 7B	Change emulation mode			
ESC |	1B 7C	Set relative print position			
ESC }	1B 7D	Software I-PRIME			

EPSON EMULATION

(✓ = Valid command; X = Invalid command; T = Trap command).

COMMAND	HEX	FUNCTION	EMULATION COMPATIBILITY		
			EXTENSION	UPPER	ORIGINAL
BS	8	Backspace	✓	✓	✓
HT	9	Horizontal tab	✓	✓	✓
LF	0A	line feed	✓	✓	✓
VT	0B	Vertical tab	✓	✓	✓
FF	0C	Form feed	✓	✓	✓
CR	0D	Carriage return	✓	✓	✓
SO (ESC SO)	0E (1B 0E)	Select double-wide mode (1 line)	✓	✓	✓
SI (ESC S1)	0F (1b 0F)	Select condensed mode	✓	✓	✓
DC1	11	Cancel print suppress mode	✓	✓	✓
DC2	12	Cancel condensd mode	✓	✓	✓
DC3	13	Select print suppress mode	✓	✓	✓
DC4	14	Cancel double-wide mode (1 line)	✓	✓	✓
CAN	18	Cancel Data	✓	✓	✓
DEL	7F	Delete character	✓	✓	✓
ESC DLE @	1B to 40	Set print position	✓	✓	T
ESC DLE A	1B to 41	Select barcode	✓	✓	T
ESC DLE B	1B to 42	Print barcode data	✓	✓	T
ESC DLE C	1B to 43	Print postnet barcode data	✓	✓	T
ESC DLE H	1B to 48	Select / Perform Line Feed	✓	✓	T
ESC DLE O	1B to 4F	Quiet mode - ON/OFF	✓	✓	T
ESC EM	1B 19	Cut-sheet feeder control	T	✓	✓
ESC SP	1B 20	Set inter-character space	✓	✓	T
ESC !	1B 21	Master select	✓	✓	✓
ESC #	1B 23	Cancel MSB mode	✓	✓	✓
ESC \$	1B 24	Set absolute print position	✓	✓	T

COMMAND	HEX	FUNCTION	EMULATION COMPATIBILITY		
			EXTENSION	UPPER	ORIGINAL
ESC %	1B 25	Select user-defined set	✓	✓	T
ESC % 5	1B 25 35	Perform n/144-" LF	✓	✓	✗
ESC % 9	1B 25 39	Select n/144-" line spacing	✓	✓	✗
ESC &	1B 26	Define user-defined characters	✓	✓	T
ESC (	1B 28	Select HSD mode	✓	✓	✓
ESC (B	1B 28 42	Print barcode	✓	✓	✗
ESC (C	1B 28 43	Set page length in defined unit	✓	✓	T
ESC (U	1B 28 55	Set unit	✓	✓	T
ESC (c	1B 28 63	Set page format	✓	✓	T
ESC (t	1B 28 74	Assign character table	✓	✓	✓
ESC *	1B 2A	Select graphics mode	✓	✓	✓
ESC -	1B 2D	Turn underlining mode ON/OFF	✓	✓	✓
ESC /	1B 2F	Select VT channel	✓	✓	T
ESC 0	1B 30	Select 1/8-" line spacing	✓	✓	✓
ESC 1	1B 31	Select 7/72-" line spacing	✓	✓	✓
ESC 2	1B 32	Start 1/6-" line spacing	✓	✓	✓
ESC 3	1B 33	Select n/216-" line spacing	✓	✓	✓
ESC 4	1B 34	Set italic mode	✓	✓	✓
ESC 5	1B 35	Cancel italic mode	✓	✓	✓
ESC 6	1B 36	Printable code area expansion	✓	✓	✓
ESC 7	1B 37	Cancel ESC 6	✓	✓	✓
ESC 8	1B 38	Disable paper-out sensor	✓	✓	✓
ESC 9	1B 39	Enable paper-out sensor	✓	✓	✓
ESC :	1B 3A	Copy ROM into RAM	✓	✓	T
ESC <	1B 3C	Select uni-directional mode (1 line)	✓	✓	✓
ESC =	1B 3D	Set MSB to 0	✓	✓	✓

COMMAND	HEX	FUNCTION	EMULATION COMPATIBILITY		
			EXTENSION	UPPER	ORIGINAL
ESC >	1B 3E	Set MSB to 1	✓	✓	✓
ESC ?	1B 3F	Reassign graphics mode	✓	✓	✓
ESC @	1B 40	Initialise printer	✓	✓	✓
ESC A	1B 41	Select n/72-" line spacing	✓	✓	✓
ESC B	1B 42	Set VT	✓	✓	✓
ESC C	1B 43	Set page length in lines	✓	✓	✓
ESC C NUL	1B 43 00	Set page length in "es	✓	✓	✓
ESC D	1B 44	Set HT	✓	✓	✓
ESC E	1B 45	Select emphasised mode	✓	✓	✓
ESC F	1B 46	Cancel emphasised mode	✓	✓	✓
ESC G	1B 47	Select double-strike mode	✓	✓	✓
ESC H	1B 48	Cancel double-strike mode	✓	✓	✓
ESC I	1B 49	Printable code area expansion	✓	✓	✓
ESC J	1B 4A	Perform n/216-" LF	✓	✓	✓
ESC K	1B 4B	Select single-density graphics	✓	✓	✓
ESC L	1B 4C	Select double-density graphics	✓	✓	✓
ESC M	1B 4D	Select 12 CPI	✓	✓	✓
ESC N	1B 4E	Set skip over perforation	✓	✓	✓
ESC O	1B 4F	Cancel skip over perforation	✓	✓	✓
ESC P	1B 50	Select 10 CPI	✓	✓	✓
ESC Q	1B 51	Set right margin	✓	✓	✓
ESC R	1B 52	International character set (set code page)	✓	✓	✓
ESC S	1B 53	Select superscript / subscript mode	✓	✓	✓
ESC T	1B 54	Cancel superscript / subscript mode	✓	✓	✓

COMMAND	HEX	FUNCTION	EMULATION COMPATIBILITY		
			EXTENSION	UPPER	ORIGINAL
ESC U	1B 55	Turn unidirectional mode ON/OFF	✓	✓	✓
ESC W	1B 57	Turn double-wide mode ON/OFF	✓	✓	✓
ESC X	1B 58	Select font by pitch and point	✓	✓	✗
ESC Y	1B 59	Select high-speed double-density graphic	✓	✓	✓
ESC Z	1B 5A	Select quadruple-density graphics	✓	✓	✓
ESC ¥	1B 5C	Set relative position	✓	✓	T
ESC ^	1B 5E	Select 9 pin graphics	✓	✓	✓
ESC a	1B 61	Select justification	✓	✓	T
ESC b	1B 62	Se VT in channels	✓	✓	T
ESC e	1B 65	Set relative tab stop	T	✓	✓
ESC f	1B 66	Set relative print position	T	✓	✓
ESC g	1B 67	Select 15 CPI	✓	✓	✗
ESC i	1B 69	Turn incremental print mode ON/OFF	✓	✓	T
ESC k	1B 6B	Select NLQ Font	✓	✓	T
ESC l	1B 6C	Set left margin	✓	✓	
ESC p	1B 70	Turn proportional mode ON/OFF	✓	✓	T
ESC s	1B 73	Turn half speed mode ON/OFF	✓	✓	✓
ESC t	1B 74	Select character table	✓	✓	✓
ESC w	1B 77	Turn double height mode ON/OFF	✓	✓	T
ESC x	1B 78	Select NLQ or draft	✓	✓	✓
ESC y	1B 79	Select font	✓	✓	✗
ESC {	1B 7B	Change emulation mode	✓	✓	✗
ESC }	1B 7D	Software I-PRIME	✓	✓	✗

ML EMULATION

(✓ = Valid command; X = Invalid command; T = Trap command).

COMMAND	HEX	FUNCTION	EMULATION COMPATIBILITY		
			EXTENSION	UPPER	ORIGINAL
ETX	3	Start graphics mode	✓	✓	✓
BS	8	Backspace	✓	✓	X
HT	9	Horizontal tab	✓	✓	✓
LF	0A	line feed with CR	✓	✓	✓
VT	0B	Vertical tab (VFU)	✓	✓	✓
FF	0C	Form feed	✓	✓	✓
CR	0D	Carriage return	✓	✓	✓
DC1	11	Cancel print suppress mode	✓	✓	X
DC3	13	Select print suppress mode	✓	✓	X
DC4	14	Set VT	✓	✓	X
CAN	18	Cancel Data	✓	✓	✓
FS	1C	Select 12 CPI	✓	✓	✓
GS	1D	Select 17.1 CPI	✓	✓	✓
RS	1E	Select 10 CPI	✓	✓	✓
US	1F	Selectr double width mode	✓	✓	✓
ETX STX	03 02	Cancel graphics mode	✓	✓	✓
ETX LF	03 0A	Perform graphics LF with CR	✓	✓	✓
ETX SO	03 0E	Perform 14 (16)/144 " graphics LF with CR	✓	✓	✓
ETX DC2	03 12	Perform graphics LF	✓	✓	✓
ETX DC4	03 14	Perform 14 (16)/144 " graphics LF	✓	✓	✓
ESC ETX	1B 03	Set HT by dot	✓	✓	X
ESC HT	1B 09	Set HT by character	✓	✓	✓
ESC HT CR	1B 09 0D	Clear HT memory	✓	X	X
ESC VT	1B 0B	Vertical skip	✓	✓	✓
ESC DLE @	1B 10 40	Set print position	✓	✓	T
ESC DLE A	1B 10 41	Select barcode	✓	✓	T

COMMAND	HEX	FUNCTION	EMULATION COMPATIBILITY		
			EXTENSION	UPPER	ORIGINAL
ESC DLE B	1B 10 42	Print barcode data	✓	✓	T
ESC DLE C	1B 10 43	Print postnet barcode data	✓	✓	T
ESC DLE F	1B 10 46	Select font by pitch and point	✓	✓	T
ESC DLE H	1B 10 48	Select / Perform Line Feed	✓	✓	T
ESC DLE O	1B 10 4F	Quiet mode - ON/OFF	✓	✓	T
ESC DC2	1B 12	Line feed	✓	✓	✓
ESC CAN	1B 18	Initialise printer	✓	✓	✗
ESC US	1B 1F	Turn double high mode ON/OFF	✓	✓	✗
ESC !	1B 21	International character set	✓	✓	✓
ESC ! *	1B 21 2A	Cancel italic mode	✓	✓	✗
ESC ! /	1B 21 2F	Select italic mode	✓	✓	✗
ESC ! 0	1B 21 30	Select standard character	✓	✓	✓
ESC ! 1	1B 21 31	Selectvt block graphics character	✓	✓	✓
ESC ! 2	1B 21 32	Select IBM character	✓	✓	✗
ESC # 0	1B 23 30	Select HSD mode	✓	✓	✓
ESC # 3	1B 23 33	Select 20 CPI	✓	✓	✗
ESC # Q	1B23 51	Select quadruple density graphics	✓	✓	✗
ESC \$	1B 24	Copy standard set to DLL CG	✓	✓	✗
ESC % 5	1B 25 35	Perform n/144-" LF	✓	✓	✓
ESC % 9	1B 25 39	Select n/144-" line spacing	✓	✓	✓
ESC % A	1B 25 41	Load DLL ascender	✓	✓	✗
ESC % B	1B 25 42	Set print position by dot	✓	✓	✗
ESC % C	1B 25 43	Set left margin	✓	✓	✓
ESC % D	1B 25 44	Load DLL descender	✓	✓	✗

COMMAND	HEX	FUNCTION	EMULATION COMPATIBILITY		
			EXTENSION	UPPER	ORIGINAL
ESC % E	1B 25 45	Relative move inline forward	✓	✓	✗
ESC % F	1B 25 46	Relative move inline backward	✓	✓	✗
ESC % R	1B 25 52	Set right margin	✓	✓	✗
ESC % S	1B 25 53	Set skip over perforation	✓	✓	✓
ESC &	1B 26	Master select	✓	✓	✗
ESC *	1B 2A	Select graphics mode	✓	✓	✗
ESC –	1B 2D	Select uni-directional mode	✓	✓	✓
ESC 0	1B 30	Select UTL font	✓	✓	✓
ESC 1	1B 31	Select 7/72-" line spacing	✓	✓	✓
ESC 2	1B 32	Start NLQ-courier font	✓	✓	✗
ESC 3	1B 33	Select DLL-UTL font	✓	✓	✗
ESC 5	1B 35	Set TOF	✓	✓	✓
ESC 6	1B 36	Select 1/6 " line spacing	✓	✓	✓
ESC 7	1B 37	Select DLL-NLQ font	✓	✓	✗
ESC 8	1B 38	Select 1/8 " line spacing	✓	✓	✓
ESC <	1B 3C	Select half speed mode	✓	✓	✗
ESC =	1B 3D	Cancel uni-directional mode	✓	✓	✓
ESC >	1B 3E	Cancel half speed mode	✓	✓	✗
ESC ?	1B 3F	Select CR/LF mode	✓	✓	✗
ESC C	1B 43	Select underlining mode	✓	✓	✓
ESC D	1B 44	Cancel underlining mode	✓	✓	✓
ESC E	1B 45	Select paper-out sensor disable/enable	✓	✓	✓
ESC F	1B 46	Set page length in lines	✓	✓	✓

COMMAND	HEX	FUNCTION	EMULATION COMPATIBILITY		
			EXTENSION	UPPER	ORIGINAL
ESC G	1B 47	Set page length in "es	✓	✓	✗
ESC H	1B 48	Select double-strike mode	✓	✓	✓
ESC I	1B 49	Cancel emphasized / double-strike mode	✓	✓	✓
ESC J	1B 4A	Select superscript mode	✓	✓	✓
ESC K	1B 4B	Cancel superscript mode	✓	✓	✓
ESC L	1B 4C	Select subscript mode	✓	✓	✓
ESC M	1B 4D	Cancel subscript mode	✓	✓	✓
ESC N	1B 4E	Set intercharacter space	✓	✓	✗
ESC P	1B 50	Select single-density graphics	✓	✓	✓
ESC Q	1B 51	Select single-density graphics	✓	✓	✓
ESC R	1B 52	Select double-density graphics	✓	✓	✓
ESC S	1B 53	CSF single sheet insert	✓	✓	✓
ESC T	1B 54	Select emphasised mode	✓	✓	✓
ESC V	1B 56	CSF single sheet eject	✓	✓	✓
ESC Y	1B 59	Select proportional spacing mode	✓	✓	✗
ESC Z	1B 5A	Cancel proportional spacing mode	✓	✓	✗
ESC [T	1B 5B 54	Set codepage	✓	✓	✓
ESC g	1B 67	Select 15 CPI	✓	✓	✗
ESC i	1B 69	Turn incremental print mode ON/OFF	✓	✓	✗
ESC k	1B 6B	Select NLQ Font	✓	✓	✗
ESC {	1B 7B	Change emulation mode			T
ESC }	1B 7D	Software I-PRIME			✗

SYMBOL SETS

IBM

CHAR SET 1 – SELECT

Code: ESC7

Compatibility: **IBM**

Function:

Selects IBM Character Set 1.

CHAR SET II – SELECT

Code: ESC 6

Compatibility: **IBM**

Function:

Selects IBM character set 2

CHAR SET III (ALL CHARACTERS) – CONTINUOUS – SELECT

Code: ESC \ n1 n2

Compatibility: **IBM**

Function:

Selects IBM character Set II. (All Characters Chart).

Range:

❖ n1 and n2 are equal to the total number of characters that are desired to be printed.

ie: total count = $n1 + (n2 * 256)$

Details:

❖ All codes including control codes, specified after this command is sent are printable characters.

❖ After the character count is reached, the printer no longer interprets the control codes as printable characters.

IBM CHAR SET III (ALL CHARACTERS) – PRINT ONE CHAR ONLY

Code: ESC ^

Compatibility: **IBM**

Function:

Select IBM Set III (All characters chart) and print only one character.

Details:

⋯❖ This command functions exactly the same as the “ESC\n1 n2” where n1 = 1 and n2 = 0.

OKIDATA (ML) –STANDARD – SELECT

Code: ESC ! 0

Compatibility: **ML**

Function:

Select the OKIDATA – Standard Symbol set.

Details:

⋯❖ Description of OKIDATA – Standard symbol set.

LOCATION	DESCRIPTION	COUNT
00H – 1FH	ASCII Control Codes	32
20H – 7FH	ASCII Printable Characters	96
90H – 9FH	ASCII Control Codes	32
A0H – FFH	IBM Printable Characters	96

⋯❖ 16 locations in this character set are used as International Language substitute locations. When an international language is selected by the ESC ! n1 command, the appropriate International language character pattern is printed.

OKIDATA (ML) – BLOCK – SELECT

Code: ESC ! 1

Compatibility: **ML**

Function:

Select the OKIDATA – Block Graphics Symbol set.

Details:

❖ Description of OKIDATA – Block Graphics symbol set:

7 Bit Modet

LOCATION	DESCRIPTION	COUNT
(S1) 00H – 1FH	ASCII Control Codes	32
20H – 7FH	ASCII Printable Characters	96
(S0) 00H – 1FH	ASCII Control Codes	32
20H – 5FH	ASCII Printable Characters	96
60H – 7FH	Trapped Codes	32

8 Bit Mode

LOCATION	DESCRIPTION	COUNT
00H – 1FH	ASCII Control Codes	32
20H – 7FH	ASCII Printable Characters	96
80H – FFH	OKIDATA Block Graphics	128

❖ 16 locations in this character set are used as International Language substitute locations. When an International language is selected by the ESC ! n1 command, the appropriate International language character pattern is printed.

OKIDATA – IBM – SELECT

Code: ESC ! 2

Compatibility: **ML**

Function:

Select the OKIDATA-IBM symbol set.

Details:

❖ Description of OKIDATA—IBM symbol set:

LOCATION	DESCRIPTION	COUNT
00H – 02H	ASCII Control Codes	3
03H – 06H	IBMI Printable Characters	4
07H – 14H	ASCII Control Codes	14
15H	IBMI Printable Characters	1
16H – 1FH	ASCII Control Codes	10
20H – FFH	IBMI Printable Characters	224

❖ 16 locations in this character set are used as International Language substitute locations. When an International language is selected by the ESC ! n1 command, the appropriate International language character pattern is printed.

INTERNATIONAL LANGUAGE CHARACTER SET—SELECT

Code: ESC R n

Compatibility: **Epson**

Function:

Selects an international language character set and code page specified by the number n.

Range:

PN	INTERNATIONAL CHARACTER SET
0 (00H)	American, ASCII
1 (01H)	French
2 (02H)	German
3 (03H)	British
4 (04H)	Danish I
5 (05H)	Swedish I
6 (06H)	Italian
7 (07H)	Spanish I
8 (08H)	Japanese
9 (09H)	Norwegian
10 (0AH)	Danish II

PN	INTERNATIONAL CHARACTER SET
11 (0BH)	Spanish II
12 (0CH)	Latin American
13 (0DH)	French Canadian
14 (0EH)	Dutch
15 (0FH)	Swedish II
16 (10H)	Swedish III
17 (11H)	Swedish IV
18 (12H)	Turkish
19 (13H)	Swiss I
20 (14H)	Swiss II
64 (40H)	Publisher

PN	CODE PAGE SET
21 (15H)	Cyrillic II-866
22 (16H)	Polska Mazovia
23 (17H)	ISO Latin2
24 (18H)	Serbo Croatic I
25 (19H)	Serbo Croatic II
26 (1AH)	Multilingual 850
27 (1BH)	Norway 865
28 (1CH)	Portugal 860
29 (1DH)	Turkey
30 (1EH)	Greek ABG (Reserved)
31 (1FH)	Greek ABC (Reserved)
32 (20H)	Greek DEG (Reserved)
33 (21H)	Greek Quattro (Reserved)

PN	CODE PAGE SET
34 (22H)	Greek SYS 25 (Reserved)
35 (23H)	Greek ME 29 (Reserved)
36 (24H)	Greek 927 mod (Reserved)
37 (25H)	Greek 927 (Reserved)
38 (26H)	Greek 437
39 (27H)	Greek 928
40 (28H)	Greek 851 (Reserved)
41 (29H)	Greek 437 CYPRUS
42 (2AH)	ECMA-94
43 (2BH)	Canada French
44 (2CH)	Cyrillic I - 855
45 (2DH)	Cyrillic II - 866
46 (2EH)	East Europe Latin II - 852

PN	CODE PAGE SET
47 (2FH)	Greek 869
49 (31H)	Windows East Europe
50 (32H)	Windows Greek
51 (33H)	Latin 5 (Windows Turkey)
52 (34H)	Windows Cyrillic
54 (36H)	Hungarian CWI
55 (37H)	Kamenicky (MJK)
57 (39H)	Turkey 857
58 (3AH)	Roman-8
60 (3CH)	Hebrew NC (862)
61 (3DH)	Hebrew OC
62 (3EH)	Windows Hebrew
63 (3FH)	KBL-Lithuanian

PN	CODE PAGE SET
66 (42H)	Ukrainian
67 (43H)	ISO Latin 6 (8859/10)
68 (44H)	Windows Baltic
69 (45H)	Cyrillic Latvian
72 (48H)	Bulgarian
73 (49H)	Icelandic-861
74 (4AH)	Baltic 774
80 (50H)	BRASCI
81 (51H)	Abicomp
82 (52H)	ISO8859-15
83 (53H)	Multilingual858
85 (55H)	Greek_737

Code: ESC ! n

Compatibility: **IBM/ML**

Range:

No.	PN	LANGUAGE
1	(40)H (64)D	ASCII (ø)
2	(41)H (65)D	ASCII (O)
3	(42)H (66)D	British
4	(43)H (67)D	German
5	(44)H (68)D	French
6	(45)H (69)D	Swedish I
7	(46)H (70)D	Danish I
8	(47)H (71)D	Norwegian
9	(48)H (72)D	Dutch
10	(49)H (73)D	Italian

No.	PN	LANGUAGE
	(4A)H (74)D	TRS-80
	(4B)H (75)D	Spanish
	(4C)H (76)D	Swedish II
	(4D)H (77)D	Swedish III
	(4E)H (78)D	Swedish IV
	(4F)H (79)D	Turkish
	(50)H (80)D	Swiss I
	(51)H (81)D	Swiss II
	(5A)H (90)D	Publisher

CODE PAGE SET—SELECT

Code: ESC [T Ln Hn NUL NUL Hcp Lcp NUL

Compatibility: **IBM/ML**

Function:

Select the code page.

Range:

...✦ Ln, Hn specifies the subsequent data amount

$$\text{Data amount} = (\text{Ln} + \text{Hn} \times 256)$$

...✦ Ln, Hn = 0 to 255

When Ln = 0, 0 Hn 3 are specified, the currently selected code page will remain effective and this command is discarded.

...✦ NUL = 0 to 255

...✦ Hcp, Lcp are used to specify the code page ID number.

$$\text{ID No.} = (\text{Hcp} \times 255 + \text{Lcp})$$

...✦ Hcp, Lcp = 0 to 255

Out of range:

The command is ignored.

Details:

...✦ No international language character conversion is performed except for the USA character code.

...✦ The ID number causes the printer to select the corresponding code page directly.

ID (Hcp, Lcp)	CODE PAGE
437 (1B5H)	USA
737 (2E1H)	Greek_737
774 (306H)	Baltic 774
850 (352H)	Multilingual
852 (354H)	East Europe Latin II - 852
855 (357H)	Cyrillic I - 855
857 (359H)	Turkey 857
858 (35AH)	Multilingual858
860 (35CH)	Portugual
861 (35DH)	Icelandic-861
862 (35EH)	Hebrew NC (862) (same as 406)
863 (35FH)	Canada French
865 (361H)	Norway
866 (362H)	Cyrillic II - 866

ID (HCP, LCP)	CODE PAGE
869 (365H)	Greek 869
895 (37FH)	Kamenickey (MJK)
1000 (3E8H)	Greek ABG (Reserved)
1001 (3E9H)	Greek ABC (Reserved)
1002 (3EAH)	Greek DEC (Reserved)
1003 (3EBH)	Greek Quattro (Reserved)
1004 (3ECH)	Greek SYS 25 (Reserved)
1005 (3EDH)	Greek ME 29 (Reserved)
1006 (3EEH)	Greek 927 mod (Reserve)d
1007 (3EFH)	Greek 927 (Reserved)
1008 (3F0H)	Greek 437
1009 (3F1H)	Greek 928
1010 (3F2H)	Greek 851 (Reserved)
1011 (3F3H)	Greek 437 CYPRUS
1012 (3F4H)	Turkey
1013 (3F5H)	Cyrillic II - 866 (same as 866)
1014 (3F6H)	Polska Mazovia
1015 (3F7H)	ISO Latin 2
1016 (3F8H)	Serbo Croatic I
1017 (3F9H)	Serbo Croatic II
1018 (3FAH)	ECMA-94
1019 (3FBH)	Windows East Europe
1020 (3FCH)	Windows Greek
1021 (3FDH)	Windows Turkey
1022 (3FEH)	Windows Cyrillic
1024 (400H)	Hungarian CWI
1027 (403H)	Ukrainian
1028 (404H)	Roman-8
1029 (405H)	ISO Latin6 (8859/10)
1030 (406H)	Hebrew NC
1031 (407H)	Hebrew OC
1032 (408H)	Windows Hebrew
1033 (409H)	KBL-Lithuanian
1034 (40AH)	Windows Baltic
1035 (40BH)	Cyrillic Latvian
1072 (430H)	Bulgarian
1081 (439H)	ISO8859-15

SLANT/GRAPHICS CHARACTER TABLE—SELECT

Code: ESC t n

Compatibility: **Epson**

Function:

Select the type of character table, setting by the command ESC (t Ln Hn Pn1 Pn2 Pn3.

Range:

...❖ n = 00H ... selects character table 0.

...❖ n = 01H ... selects character table 1.

CONTROL CODES OR PRINTABLE CHARACTERS – ON/OFF

Code: ESC I n

Compatibility: **Epson**

Function:

Enables the printer to print the characters stored in decimal locations 0-6, 16-17, 21-23, 25-26, 28-31 and 128-134, 144-145, 149-151, 153-154, 156-159 as printable characters, not control codes.

Range:

...❖ n = 1 Interprets code 0-6, 16-17, 21-23, 25-26, 28-31 and 128-134, 144-145, 149-151, 153-154, 156-159 as printable characters.

...❖ n = 0 Interprets code 0-6, 16-17, 21-23, 25-26, 28-31 and 128-134, 144-145, 149-151, 153-154, 156-159 as non-printable characters, i.e. control codes.

Details:

...❖ This function allows the user to store User-defined characters in locations that normally correlate to control codes.

CONTROL CODES OR PRINTABLE CHARACTERS – ON

Code: ESC 6

Compatibility: **Epson**

Function:

Enable the printer to interpret the decimal locations 128 – 159, 255 as printable characters, not as control codes.

Details:

⋯✦ This function allows the user to store User-defined characters in locations that normally correlate to control codes.

CONTROL CODES OR PRINTABLE CHARACTERS – OFF

Code: ESC 7

Compatibility: **Epson**

Function:

Cancel ESC 6. Decimal locations 128-159, 255 are interpreted as control codes, not as printable characters.

Details:

⋯✦ This function allows the user to store User-defined characters in locations that normally correlate to control codes.

ITALIC CHARACTER SET – SELECT

Code: ESC 4

Compatibility: **Epson**

Function:

Select the alternate character set composed of an italicised character.

Details:

⋯✦ Italic characters are printed using a slat algorithm.

⋯✦ See priority table for detail command combination.

⋯✦ Italic characters may be overlapped on the next character cell.

Related functions:

⋯❖ This mode can also be selected by the ESC ! n command.

ITALIC CHARACTER SET—CANCEL

Code: ESC 5

Compatibility: **Epson**

Function:

Cancel the Alternate Character Set (Italics characters).

Related functions:

⋯❖ This mode can also be reset by the ESC ! n command.

CHARACTER TABLE DESIGNATION

Code: ESC (t Ln Hn Pn1 Pn2 Pn3

Compatibility: **Epson**

Function:

Store character tables, which are set in Pn2 and Pn3, each in Pn1-indicated areas (two types, tables 1 and 2).

ESC t sets either of the two areas to makes one table selectable.

Ranges:

Effective Ranges and Meanings of Ln Hn.

0(00H)=<Ln=<255(FFH)

0(00H)=<Hn=<255(FFH) MSB is invalid

Ln Hn shows the number of bytes of parameters after it.

Number of Bytes of these Parameters = Ln+Hn×256.

At Ln+Hn×256=<2, this command is invalid and data of Ln+Hn×256 bytes is received and discarded.

At Ln+Hn×256 >3, data of (Ln+Hn×256)-3 bytes is received and discarded after the reception of Pn1, Pn2 and Pn3.

This parameter is specified usually with a value, e.g.
Ln+Hn x256 =3.

⋯✦ Effective Ranges, Effective Values and Meanings of Pn1, Pn2 and Pn2

0(00H) Pn1 255(FFH) MBS is invalid.

0(00H) Pn2 255(FFH) MBS is invalid.

0(00H) Pn3 255(FFH) MBS is invalid.

⋯✦ A table is selected according to each combination of Pn2 and Pn3 and specified based on Pn1.

Effective values of Pn1: Pn1=00H, 01H, 30H, 31H

Effective values of Pn2 and Pn3 are shown in the following table.

Varying combinations of Pn2 and Pn3, and Tables Selected

PN2 (HEX)	PN3 (HEX)	CHARACTER TABLE
0	0	Italic
1	0	PC437
3	0	PC850 (Muliti-lingual)
7	0	PC860 (Portugese)
8	0	PC863 (Canadian French)
9	0	PC865 (Norway)

For Pn1, Pn2 and Pn3 that take on values other than effective ones

Immediately following power-on The default setting shown in (4) is active (menu setting).

Except for the above The setting is left as set in the previously table.

Detail

⋯✦ Varying the value of Pn1 permits the specification of up to two types of tables.

⋯✦ The value of Pn1 that corresponds to a table desired to be used is assigned to Pn to select, using ESC t Pn, either of specified two types of tables.

Example: Two types of tables are stored in two areas.

- The following shows tables that are defined as defaults after power-on:

	VALUE OF Pn	TABLE SELECTED
Table 0	00H (30H)	Italic
Table 1	01H (31H)	Menu selected

Menu-selectable Tables (Code Page)

- USA
 - Multilingual
 - Portuguese
 - Canada-French
 - Norway
- DLL Copy is used to copy the mode where printing is being performed.
 - When a table change is made by ESC t Pn, international character settings remain unchanged.
 - When a code page set by ESC (t is selected by ESC t Pn, the selected code page becomes effective and international character conversion is performed.
 - For Code Page Setting by ESC R Pn (Pn = 26 to 28, 43)
When effective code page setting is performed by the ESC R command, the code page is set to table 1 of ESC t. For a code page to be effective by ESC R, ESC t 1 must be set.
International character conversion is not performed (the setting remains the same).
When international character setting is performed by ESC R Pn (Pn = 0 to 14, 64), the code page is "USA."

FONT DESCRIPTION

Print quality – select mode – UTLINLQ

Code: ESC × n

Compatibility: **Epson**

Function:

Either Utility or NLQ print quality mode.

Range:

...✦ Range n = 01H, 31H, 81H, B1H selects NLQ character font.

...✦ Range n = 00H, 30H, 80H, B0H selects Utility character font.

Out of range:

...✦ This command will be ignored when the value is:

02H – 2FH or 32H – 7FH or 82H – AFH or B2H – FFH

Details:

...✦ NLQ and UTILITY Modes are printed in 10, 12, 15, 17.1, and 20 CPI.

...✦ Utility 10 CPI mode is the factory default setting.

...✦ See attachments for UTL & NLQ Print Mode/Features Combination Priority Chart

Print quality – select HSD

Code: ESC # 0

Compatibility: **IBM**

Function:

Select High Speed Draft Character Set.

Details:

...✦ If inter-character clearance is defined while the High Speed Draft (HSD) mode is selected, additional blank dot columns will be suppressed.

- ❖ The HSD mode will be suppressed during the proportional print mode.
- ❖ Accessible addresses:
 - 03H – 06H
 - 15H
 - 20H – 7FH
 - 80H – AFH
 - E0H – F3H
 - F6H – FFH
 Other areas will not be printed in High Speed draft mode.
- ❖ See attachments for UTL & NLQ Print Mode/Features Combination Priority Charts.

Print quality – select HSD

Code: ESC (n

Compatibility: **Epson**

Function:

Select High Speed Draft Character Set.

Range:

n = 00H, 30H, 80H, or B0H HSD is selected.

n = any other value The current mode will remain effective.

Details:

- ❖ If inter-character clearance is defined while the High Speed Draft (HSD) mode is selected, additional blank dot columns will be suppressed.
- ❖ The HSD mode will be suppressed during the proportional print mode.
- ❖ Accessible addresses:
 - 03 – 06H

15H
 20H — 7FH
 80H — AFH
 E0H — F3H
 F6H — FFH

Other addresses will not be printed in High Speed draft mode.

❖ See attachments for UTL & NLQ Print Mode/Features Combination Priority Charts.

Print quality – select font

Code: ESC I n

Compatibility: **IBM**

Function:

Select print mode according to the value of n.

Range:

Pn is set as 0 (00H) <= Pn <= 255 (FFH)

MSB VALUE OF PRINT MODE	
n	LSB
	XXXX0000B Print following letters in ROM UTL
	XXXX0001B Print following letters in Fast Font (HSD 12 CPI)
	XXXX0010B Print following letters in ROM NLQ (Sans Serif)
E	XXXX0011B Print following letters in NLQ II (Courier)
S	XXXX0100B Print following letters in DLL UTL
C	XXXX0101B Print following letters in Fast Font (DLL UTL 12 CPI)
	XXXX0110B Print following letters in DLL NLQ
!	XXXX0111B Print following letters in DLL NLQ II
	XXXX1011B Print following letters in Alternate ROM NLQ II (Courier)
	XXXX1111B Print following letters in Alternate DLL NLQ I

Out of Range:

This command will be ignored and the last set will remain.

Print quality – select HSD

Code: ESC # 0

Compatibility: **ML**

Function:

Select the High Speed Draft (HSD) Print Quality Mode which prints a print speed of 433 CPS, for fast throughput.

Details:

- ...❖ The HSD mode can be combined with all other print features except proportional and inter-character clearance print modes.
- ...❖ Only normal Alpha-numeric printable characters can be printed in the HSD mode.
- ...❖ HSD mode is mutually exclusive with the other print quality modes, NLQ and utility.
- ...❖ Refer to the illustration attachments “Print Mode/Feature Combination Chart” for details of the valid combination of Print Quality Modes and Print Features.
- ...❖ HSD prints in one pass of the print head.

Print quality – select utility

Code: ESC 0

Compatibility: **ML**

Function:

Select the Utility Print Quality Mode which prints at a speed of 325 CPS and provides speed with good print quality.

Details:

- ...❖ The Utility (UTL) Print Quality Mode is considered the “normal” mode of printing and can be combined with most Print Features.
- ...❖ Utility mode is mutually exclusive with the other print quality modes, NLQ and HSD.

- ...❖ Refer to the illustration attachments “Print Mode/Features Combination Chart” for details of legal combinations of Print Quality Modes and Print Features.
- ...❖ UTL prints in one pass of the print head.

Print quality – select NLQ

Code: ESC 1

Compatibility: **ML**

Function:

Selects the Near Letter Quality (NLQ) Print Quality Mode which prints at 81 CPS, but provides the best print quality.

Details:

- ...❖ NLQ Print Quality is achieved by printing twice the number of dots, both vertically and horizontally, compared to UTL Print Quality in the same physical space.
- ...❖ NLQ is mutually exclusive with the other print quality modes, UTL and HSD.
- ...❖ Refer to the illustration attachments “Print Mode/Features Combination Chart” for details of legal combinations of Print Quality Modes and Print Features.
- ...❖ NLQ prints in two passes of the print head. The second pass is shifted downward 1/144 inch.
- ...❖ NLQ is printed in 10, 12, 15, 17.1 and 20 CPI.

Print quality – select NLQ – Gothic

Code: ESC 3

Compatibility: **ML**

Function:

Select the Near Letter Quality (NLQ) Print Quality Mode which prints a Gothic typestyle at 81 CPS.

Details:

- ...❖ NLQ Print Quality is achieved by printing twice the number of dots, both vertically and horizontally, compared to UTL Print Quality in the same physical space.
- ...❖ NLQ Gothic is mutually exclusive with the other print quality modes, NLQ Courier, UTL and HSD.
- ...❖ Refer to the illustration attachments “Print Mode/Features Combination Chart” for details of legal combinations of Print Quality Modes and Print Features.
- ...❖ NLQ prints in two passes of the printhead. The second pass is shifted downward 1/144 inch.
- ...❖ NLQ is printed in 10, 12, 15, 17.1, and 20 CPI.

Custom font – select UTL DLL font

Code: ESC 2

Compatibility: ML

Details:

- ...❖ 256 characters can be loaded. However, DLL characters fonts cannot be printed since the following character codes are handled as a function.
 - 00H to 02H, 07H to 14H, 16H to 1FH
- ...❖ Since UTL custom characters (DLL) are stored in RAM, they will be lost if power to the printer is turned off.
- ...❖ UTL Custom Characters definition commands are:
 - ascender characters = ESC % A m n1 ... n11
 - descender characters = ESC % D m n1 ... n11
 - copy ROM to RAM
- ...❖ This command is equivalent to the composite command (ESC.&.n:), where:
 - $n3 - n2 = 1$

If an International language is specified (ESC ! n command) while the UTL Custom Character Font is active, the International language does not become effective until the UTL Custom Character Font is deactivated.

- ❖ If an International language is specific (ESC ! n command) while the UTL custom character font is active, the commands that deactivate UTL Custom Characters have the following affect on the International Language command ...

COMMAND TO DEACTIVATE ESC 2 RESULTS

UTL	(ESC 0)	International Language is active and Print Quality = UTL
NLQ	(ESC 1)	International Language is active and Print Quality = NLQ
NLQ – DLL	(ESC 7)	International Language is not activated. Synthetic NLQ Quality Custom Characters are selected.

Custom font – select synthetic–NLQ DLL font

Code: ESC 7

Compatibility: **ML**

Function:

Select the NLQ print quality custom character font (DLL) which is synthesized from the UTL custom character data.

Details:

- ❖ 256 characters can be loaded. However, DLL characters fonts cannot be printed since the following character codes are handled as a function.
00H to 02H, 07H to 14H, 16H to 1FH
- ❖ This font is created by reading the UTL custom character data, that was previously loaded, and algorithmically synthesizing extra dots so that the effective print quality of the characters is NLQ quality. Refer to the “Illustration/Attachments” for details.
- ❖ The synthetic NLQ custom character font is deactivated by selection of either UTL (ESC 0), NLQ (ESC 1) or UTL Custom characters (ESC 2).

- ❖ If an International language is specified (ESC ! n command) while the Synthetic NLQ custom character font is active, the commands that deactivate Synthetic custom characters have the following affect on the International Language command...

COMMAND TO DEACTIVATE ESC 2 RESULTS

UTL	(ESC 0)	International Language is active and Print Quality = UTL
NLQ	(ESC 1)	International Language is active and Print Quality = NLQ
NLQ – DLL	(ESC 7)	International Language is not activated. Synthetic NLQ Quality Custom Characters are selected.

Typestyles – select

Code: ESC k n

Compatibility: **Epson / IBM / ML**

Function:

Select a NLQ typestyle.

Range:

n = 00H, 30H, 80H, B0H Courier

n = 01H, 31H, 81H, B1H Gothic

n = 05H, 35H, 85H, B5H OCR-B (OEL only)

Out of range:

- ❖ This command will be ignored if n does not equal one of the above values.

Custom font – create – copy ROM data to RAM

Code: ESC : NUL n NUL

Compatibility: **Epson**

Function:

Access the pre-defined ROM character patterns as if they were copied to DLL RAM.

Range:

...❖ The number n indicates the NLQ font typeface number when they are copied to RAM.

n = 00H, 80H NLQ Courier.

n = 01H, 81H NLQ Gothic.

n = 05H, 85H NLQ OCR-B.

Details:

...❖ This command actually does not cause the pre-defined ROM character data to be transferred to the RAM DLL area, rather, for all characters (addresses) not defined by the user, the data is actually read from ROM. The only time that the data is read from RAM is when the character pattern is created by the user. By the user creating the character data and defining its address, this causes the F/W to reroute the “data read” from the normal ROM data, to the DLL RAM data.

...❖ Any previously defined DLL data will be erased if this command is executed.

...❖ The character patterns are stored in the volatile RAM.

Custom font – create – copy ROM data to RAM

Code: ESC \$

Compatibility: **IBM/ML**

Function:

Access the pre-defined ROM character patterns as if they were copied to DLL RAM.

Details:

- ...❖ This command does not actually cause the pre-defined ROM character data to be transferred to the RAM DLL area, rather for all characters (addresses) not defined by the user, the data is actually read from ROM. The only time that the data is read from RAM is when the character pattern is created by the user. By the user creating the character data and defining its address, this causes the F/W to re-route the “data read” from the normal ROM data, to the DLL RAM data.
- ...❖ Any previously defined DLL data will be erased if this command is executed.
- ...❖ The character patterns are stored in the volatile RAM.
- ...❖ Both Utility and NLQ Courier ROM characters are “copied” to DLL RAM.

Custom font – create character pattern – UTL DLL

Code: part 1 part 2 part 2' ESC & m n1 n2 a d1 ... d11 a d1 ... d11

Compatibility: **Epson**

Function:

Define up to 256 character patterns using a 11H × 8V matrix and store the pattern in RAM.

Range:

m = decimal 0

n1 = decimal 0 – 255

n2 = decimal 0 – 255

a = decimal 0 – 255, decimal representation of a 8 bit binary number (see explanation below).

d1 = decimal 0 – 255

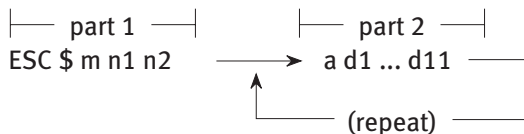
d2 = decimal 0 – 255

Variable purpose:

- ...❖ m = area of RAM in which to store DLL, currently only 1 area is available (i.e. “m” is a constant value equal to zero).
- ...❖ n1 = Starting character (address) to be redefined by the user.
- ...❖ n2 = Ending character (address) to be redefined by the user.
- ...❖ a = attribute byte “a” bit definition (bits 7-0) ...
 - b7 = 1 = ascender, dot rows 1-8
0 = descender, dot rows 2-9
 - b6-b4 = Interpreted as a binary number. Specifies the left offset (starting column to print) of the first dot column to be printed. Used to reduced leading white space. Maximum of 7 bytes can be ignored.
The count begins with byte #1.
 - b3-b0 = Interpreted as a binary number. Specifies the ending column to print of the last column of data to be printed. The difference between this number and the left-offset is equal to the character’s width. Maximum ending column is 12.
- ...❖ d1-d11 = column data, each column of data = 1 byte. Column #1 = byte #1.

Details:

- ...❖ This command is composed of 2 parts ...



Part 1, which is “ESC & m n1 n2” is only sent once, while part 2, “a1d1 ... d11” is repeated for each character pattern that is required to be defined.

...❖ Character locations that can be defined:

1. normal operation DLL

(20)H – (7F)H 96 characters

(A0)H – (FF)H 64 characters

Total 160 characters

2. with ESC 6 (print code expansion area) ...

(20)H – (7F)H 96 characters

(80)H – (9F)H 32 characters

(A0)H – (FF)H 64 characters

Total 192 characters

3. with ESC I (print code expansion area) ...

(00)H – (1F)H 32 characters

(20)H – (7F)H 96 characters

(80)H – (9F)H 32 characters

(A0)H – (FF)H 96 characters

Total 256 characters

...❖ If less than 256 characters are to be defined, all character locations (address) must be consecutive from the starting character.

...❖ Downloading data to one code position does not affect any other code position that has already been loaded.

...❖ Since the DLL character reside in volatile RAM, they are not saved when power is turned off.

...❖ This command initiates printing action (print block).

...❖ DLL characters can be combined with most print features, emphasized, enhanced, double width. For exact combinations, refer to attachments Print Mode/Features Combination Chart.

...❖ The NLQ print feature used in conjunction with this command will cause utility character interpolation printing.

- ❖ Changing the “Emulation Mode” setting in MENU mode will cause all stored DLL data to be copied.
- ❖ Ascender characters can be defined in rows 1 through 8, and column 1 through 11.
- ❖ Ascender characters can be defined in rows 2 through 9, and column 1 through 11.
- ❖ When underlining a descender DLL character, the underline occupies the same row as the bottom row of the character.

Custom font – create character pattern – UTL/NLQ DLL

Code: part 1 part 2 part 2' ESC = c1 c2 m n a1 a2 d1 ... d11 a1 a2 d1 ... d11 ...

Compatibility: **IBM**

Function:

To define up to 256 character patterns for a 11 H × 8V (UTL), 23 × 8V (NLQ) matrix and store the pattern in RAM.

Range:

- c1 = decimal 0 – 255
- c2 = decimal 0 – 13
- m = decimal 20 or 21
- n = decimal 0 – 255
- a1 = decimal 0 – 255 (see a1's bit definition below)
- a2 = decimal 0 – 255 (see a2's bit definition below)
- d1 = decimal 0 – 255
- d11 = decimal 0 – 255

Variable purpose:

c1 = Low byte of total data count.

c2 = High byte of total data count.

m = print ID, selects print quality i.e. 20 = UTL or 21 = NLQ II/
Alternate NLQ II

n = starting character (address) to be redefined by the user.

al = Attribute #1's bit definition (bits 7 – 0)...

b7 = 0 = ascender, dot rows 1 – 8

1 = descender, dot rows 2 – 9

b6 – b2 = ignored

– Utility DLL (b1 – b0):

b1 – b0 = 00 = No 12-high expansion. Bit 7 is valid.

01 = Line graphics char. Bottom dot will be expanded down to rows 9, 10, & 12. Bit 7 is ignored. NLQ used in conjunction with this command will cause vertical, horizontal, and diagonal line enhancement.

10 = Shading character. The bottom dots in col 1,2, 3 & 4 will be expand downward to rows 9,10, 11 & 12. NLQ is ignored.

11 = NUL is expanded 4 dots downward. Bit 7 of a 1 is ignored.

– NLQ DLL (b1-b0):

b1 – b0 = 00 = No 12-high expansion. Bit 7 is valid

01 = Line graphics char. Bottom dot will be expanded down to rows 9, 10, & 12. Bit 7 is ignored. NLQ used in conjunction with this command will cause vertical, horizontal, and diagonal line enhancement.

10 = Shading character. The top dots in col. 1, 4, 5 & 7 will be expanded downward to rows 17, 19, 21, & 23. Bit 7 is ignored (ascender/descender).

11 = Same as 01.

– Utility DLL (b1-b0):

a2 = Attribute #2's bit definition (bits 7–0)

b7 = unknown

b6 – b4 = Interpreted as a binary number. Specifies the left offset of first dot column to be printed. Used to reduce leading white space. Maximum of 7 bytes can be ignored. The count begins with byte #1.

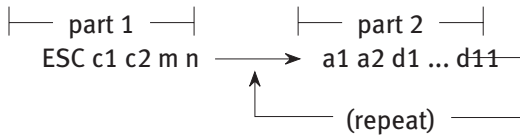
b3 – b0 = Interpreted as a binary number. Specifies the number of dot columns to be printed (width of the printable dot columns). Each character is followed by a mandatory blank column which cannot be removed. This blank column is not included in the character width. Specified widths greater than 11 will be interpreted as 11 (max. value).

– NLQ DLL (b1 – b0): reserved

d1–d11 = column data, each column of data = 1 byte
Column #1 = byte #1.
UTL's 12th column data always = blank
NLQ's 24th column data always = blank
NLQ's MSB = top pin, adjacent dots are not allowed.

Details:

- ⌘ This command is composed of 2 parts ...



Part 1, which is “ESC = c1 c2 m n” is only sent once, while part 2, “a1 a2 d1 ... d11” is repeated for each character pattern that is desired to be defined.

UTL NLQ's Part 2 = 13 (2 + 11) bytes of data

NLQ NLQ's Part 2 = 48 (2 + 46) bytes of data

- ⌘ c1 and c2 define the number of bytes (a1, a2, d1-d11), of the characters pattern, to download:

$$\text{Total count} = (\# \text{ of characters} * 13) + 2$$

$$c2 = \text{total count} / 256 \text{ with no remainder}$$

$$c1 = \text{remainder}$$

$$\text{ex: total count} = (94 * 13) + 2 = 1224$$

$$1224 / 256 = 4 \text{ } 200 / 256$$

$$c1 = 200$$

$$c2 = 4$$

- ⌘ If less than 256 characters are to be defined, all character locations (address) must be consecutive from the starting character.
- ⌘ Downloading data to one code position does not affect any other code position that has already been loaded.
- ⌘ Since the DLL characters reside in volatile RAM, they are not saved when power is turned off.
- ⌘ This command initiates printing action (print block).

- ...❖ To clear the DLL RAM area, send only Part 1 of the command with:

ASCII..... ESC = NUL NUL

Hex..... 1B 3D 00 00

Decimal .. 27 61 0 0

- ...❖ Changing the emulation mode in MENU will cause stored DLL data to be erased.
- ...❖ 256 DLL characters location (00) H—(FF)H, can be defined by the user.

Custom font — select DLL font

Code: ESC % n

Compatibility: **Epson**

Function:

Select the user-defined font.

Range:

- ...❖ • When n = 01H, 31H, 81H, B1H, the DLL character set will be selected.

n = 00H, 30H, 80H, B0H the DLL character set mode will be reset and the pre-defined character set will be selected.

Out of range:

- ...❖ If n does not equal the above values this command is ignored.

Character pitch — select 10 CPI

Code: ESC P

Compatibility: **Epson**

Function:

10 CPI, 12 CPI, or 15 CPI mode: 10 characters per inch

15 CPI, (condense suppress), 17.1 CPI, or 20 CPI mode: 17.1 characters per inch.

Details:

- ...✦ Since all character pitches are mutually exclusive, this pitch will be “turned-off” if another pitch command is received.
- ...✦ 10 CPI is the factory default for character pitch.
- ...✦ This commands will not cancel double width mode.
- ...✦ 10 CPI and compress = 17.1 CPI.

Character pitch — select 10 CPI

Code: DC2

Compatibility: **IBM**

Function:

Select 10 CPI character pitch which positions each dot column of the character 1/120 inch apart.

Details:

- ...✦ Since all character pitches are mutually exclusive, this pitch will be “turned-off” if another pitch command is received.
- ...✦ This command will not cancel the double width mode.

Character pitch —s elect 12 CPI

Code: ESC M

Compatibility: **Epson**

Function:

10 CPI, 12 CPI, or 15 CPI mode: 12 characters per inch
15 CPI (condense suppress), 17.1 CPI, or 20 CPI mode: 20 characters per inch

Details:

- ...✦ Since all character pitches are mutually exclusive, this pitch will be “turned-off” if another pitch command is received.
- ...✦ This command does not cancel double width.
- ...✦ In the compress mode, 20 CPI is selected.

Character pitch — select 12 CPI

Code: ESC :

Compatibility: **IBM**

Function:

10 CPI, 12 CPI, or 15 CPI mode: 12 characters per inch.

17.1 CPI or 20 CPI mode: 12 or 20 characters per inch (in accordance with the “SI Select Pitch (12 CPI)” setting in MENU mode.

Details:

- Since all character pitches are mutually exclusive, this pitch will be “turned-off” if another pitch command is received.
- Printing does not start if ESC : is received during 12 CPI.
- Character pitch commands become effective immediately upon receipt, thereby allowing a pitch change within a line.
- This command will not cancel the double width mode.

Character pitch — select 15 CPI

Code: ESC g

Compatibility: **Epson / IBM / ML**

Function:

Selects 15 characters per inch (15CPI).

Epson

10 CPI mode:	15 CPI
12 CPI mode:	15 CPI
15 CPI mode:	15 CPI
15 CPI (condense suppress) mode:	15 CPI (condense suppress)
17.1 CPI mode:	15 CPI (condense suppress)
20CPI mode:	15 CPI (condense suppress)

IBM / ML

10 CPI mode:	15 CPI
12 CPI mode:	15 CPI
15 CPI mode:	15 CPI
17.1 CPI mode:	15 CPI
20CPI mode:	15 CPI

Details:

- ⌘ This command does not clear the elongated character mode (double width printed character) (**Epson, IBM**).
- ⌘ This command clears elongated character mode (**ML**).
- ⌘ This command does not start printing.

Character pitch — select condensed (17, 20 CPI)

Code: SI

Compatibility: **Epson**

Function:

Compress the current character pitch.**n**

Epson

10 CPI mode:	17.1 CPI
12 CPI mode:	20 CPI
15 CPI mode:	15 CPI (condense suppress)
15 CPI (condense suppress) mode:	15 CPI (condense suppress)
17.1 CPI mode:	17.1 CPI
20CPI mode:	20 CPI

IBM

When the printer receives this command in the following CPI modes, the command sets the character pitch as given below (in accordance with the “SI Select Pitch (10 CPI)” and “SI Select Pitch (12 CPI)” settings in MENU mode).

10 CPI mode:	15 or 17.1 CPI
12 CPI mode:	12 or 20 CPI
15 CPI mode:	15 or 17.1 CPI
17.1 CPI mode:	15 C or 17.1 CPI
20CPI mode:	15, 17 or 20 CPI

Details:

⌘ This command does not cancel double width.

Related functions:

⌘ ESC SI and SI are function identically.

Character pitch – cancel condensed (17, 20 CPI)

Code: DC2

Compatibility: **Epson**

Function:

Cancels condensed pitch, returns pitch to the pitch that was selected before the condensed pitch was activated.

10 CPI mode:	10 CPI
12 CPI mode:	12 CPI
15 CPI mode:	15 CPI
15 CPI (condense suppress) mode:	15 CPI
17.1 CPI mode:	10 CPI
20CPI mode:	12 CPI

Character pitch – select 10 CPI

Code: RS

Compatibility: **ML**

Function:

Select 10 CPI (120 DPI) character pitch.

Details

⌘ Since all character pitches are mutually exclusive, this pitch will be “turned-off” if another pitch command is received.

⌘ 10 CPI is the factory default for character pitch.

⌘ This command cancels double width mode.

⌘ When character pitch (CPI) is changed, the printer will change the character pitch of the printing block data when it receives the next print data, and will print the data in the printer buffer.

⌘ Pitch changes are allowed anywhere on the print line.

Character pitch — select 12 CPI

Code: FS

Compatibility: **ML**

Function:

Select 12 CPI (144 DPI) character pitch.

Details:

- ...✦ Since all character pitches are mutually exclusive, this pitch will be “turned-off” if another pitch command is received.
- ...✦ This command cancels double width.
- ...✦ When character pitch (CPI) is changed, the printer will change the character pitch of the printing block data when it receives the next print data, and will print the data in the printer buffer.
- ...✦ Pitch changes are allowed anywhere on the print line.

Character pitch — select 17.1 CPI

Code: GS

Compatibility: **ML**

Function:

Select 17.1 CPI (206 DPI) character pitch.

Details:

- ...✦ Since all character pitches are mutually exclusive, this pitch will be “turned-off” if another pitch command is received.
- ...✦ This command cancels double width.
- ...✦ If the printer is in 17.1 CPI (206 DPI) previous to entering Bit Image Graphics will be 60 DPI (10 CPI).
- ...✦ When character pitch (CPI) is changed, the printer will change the character pitch of the printing block data when it receives the next print data, and will print the data in the print buffer.
- ...✦ Pitch changes are allowed anywhere on the print line.

Character pitch — select 20 CPI

Code: ESC # 3

Compatibility: **ML**

Function:

Select 20 CPI (144 DPI) character pitch.

Details:

- Since all character pitches are mutually exclusive, this pitch will be “turned-off” if another pitch command is received.
- This command and cancels double width.
- If the printer is in 20 CPI (240 DPI) previous to entering Bit Image Graphics, the resultant density in Bits Image Graphics will be 60 DPI (10 CPI).
- When character pitch (CPI) is changed, the printer will change the character pitch of the printing block data when it receives the next print data, and will print the data in the printer buffer.
- Pitch changes are allowed anywhere on the print line.

Character density – define inter-character clearance – by dot column

Code: ESC N n

Compatibility: **ML**

Function:

Define the number of blank dot columns (n) to be added on to the end of the normal character cell matrix.

Range:

Decimal	Hexadecimal
n = 0 – 11	00 – 0B

Out of range:

The command will be ignored.

Details:

- ❖ If the double width print feature is specified while this command is active, the number of additional blank dot columns will be doubled.
 - Example: Normal Width $(9 + 3) + 5 = 17$ columns.
 - Double Width $(9 + 3 + 5) \times 2 = 34$ columns.
- ❖ This command is not effective in the following print modes:
 - Bit Image Graphics.
 - HSD
- ❖ The normal character cell matrix has 3 blank dot columns that are pre-defined and cannot be changed by the user. The additional blank dot columns defined by this command are added to this normal cell.

Example:

	NORMAL CELL	ADDITIONAL BLANK COLUMNS	TOTAL CELL
1. n = 0	(9 + 3)	+ 0	12
2. n = 5	(9 + 3)	+5	17

- ❖ This command remains in effect until one of the following commands are received:
 - Next ESC.N.n command.
 - CAN
 - ESC CAN
 - I-Prime
- ❖ This command is effective in both the Utility Mode and NLQ mode. Any value of “n” will produce the same physical amount of trailing white space after the characters for both NLQ and UTL.
- ❖ Pre-defined (default) inter-char clearance is as follows:
 - 3/120 inch for 10 CPI
 - 3/144 inch for 12 CPI

3/180 inch for 15 CPI

3/206 inch for 17.1 CPI

3/240 for 20 CPI

⋯⌘ Maximum inter character clearance:

n = 11 (max. value)

14/120 inch for 10 CPI

14/144 inch for 12 CPI

14/180 inch for 15 CPI

14/206 inch for 17.1 CPI

14/240 inch for 20 CPI

Character pitch select 20 CPI

Code: ESC SI

Compatibility: **IBM**

Function:

Selects 20 characters per inch (20 CPI).

Details

⋯⌘ This command does not clear the elongated character mode (double width printed character).

⋯⌘ This command does not start printing.

Inter-character clearance – define amount by dot column

Code: ESC SP n

Compatibility: **Epson**

Function:

Defines the number of blank dot columns to add to the right side of each character.

Range:

⋯⌘ Range n = 0 to 255 (Bit 7 of n is ignored.)

Details:

- ❖ n is the number of dots to be added to the right of each character.
- ❖ In double width, the value of clearance will be automatically doubled.

Example:

1 dot column is added to the right side of a normal size character. When double width is activated, the 1 dot column will be doubled.

- ❖ Dots width of clearance is:

10 CPI – 1/120j±

12 CPI – 1/144j±

15 CPI – 1/180j±

17 CPI – 1/206j±

20 CPI – 1/240j±

- ❖ Once set, the clearance does not change until reset.
- ❖ The command to set clearance between characters is executed immediately upon recognition by the printer.
- ❖ This command is not effective for Graphics modes.

Inter-character clearance – define amount – by dot column

Code: ESC V n

Compatibility: **IBM**

Function:

Defines the number of blank dot columns to add to the right side of each character.

Range:

0 n 11

Out of range:

If n > 11 is specified, n will be truncated to 11. Any value of n > 11 will be truncated.

Details:

- ...✦ Once set, the clearance does not change until reset.
- ...✦ The command to set clearance between characters is executed immediately upon recognition by the printer.
- ...✦ The pre-defined character cell matrix has 3 blank dot columns as part of the character option. Using this command only additional blank dot columns can be added to the character.
- ...✦ This command is not effective for Graphics modes.

Character cell size – proportional width – ON / OFF

Code: ESC p n

Compatibility: **Epson**

Function:

Turns on/off the proportional character pitch in which each character has a different cell width in order to unify the “white space” between characters.

Range:

n = 01H, 31H, 81H, or B1H Proportional Spacing = On

n = 00H, 30H, 80H, or B0H Proportional Spacing = Off

Out of range:

If n does not equal the above values this command is ignored.

Details:

- ...✦ Previous print mode (print quality and pitch) will be maintained.
- ...✦ Proportional spacing can also be designated by ESC ! n, the Master select command.
- ...✦ Proportional spacing set by ESC ! n can be reset by ESC p 0.

Character cell size – proportional width – ON/OFF

Code: ESC P n

Compatibility: **IBM**

Function:

Turn on/off the proportional character pitch in which each character has a different cell width in order to unify the “white space” between characters.

Range:

If n = odd valued numbers, proportional Mode = ON.

If n = even valued numbers, proportional Mode = OFF.

Out of range:

If n does not equal the above values this command is ignored.

Details:

- ...❖ NLQ Proportional mode has priority over other print qualities and character pitches.
- ...❖ When Proportional mode is cancelled, the printer returns to the previous setting.

Character cell size – proportional width – ON

Code: ESC Y

Compatibility: **ML**

Function:

Turn off the proportional character cell print feature which unifies the amount of white space surrounding each character for better overall print quality.

Details:

- ...❖ Proportional Character Cells are available for all Print Quality modes except HSD.
- ...❖ Command can be activated anywhere within a print line.

Character cell size – proportional width – OFF

Code: ESC Z

Compatibility: **ML**

Function:

Turn off the Proportional Character Cell print feature.

This command is ignored if the Proportional Character Cell print feature is not activated.

Custom font – create pattern – UTL DLL – ascender

Code: ESC % A m n1 ... n11

Compatibility: **ML**

Function:

Define up to 256 ascender character patterns using an 11H × 7V character matrix.

(Data loaded with the following character codes cannot be printed).

00H to 02H, 07H to 14H, 16H to 1FH

Range

	DECIMAL	HEX-DECIMAL	CHAR. COUNT
m =	0 – 255	00 – FF	256
1 – n11	0 – 270	0 – 7F	

Variable purpose:

m = address of defined pattern

1 – n11 = Column data, each column of data = 1 byte.

Out of range.

❖ Since the 8 bit of n1 – n11 is ignored, data defined as (80)H – (FF)H will be interpreted as (00)H – (7F)H.

Details:

❖ Since UTL custom characters (DLL) are stored in RAM.

❖❖❖ Pattern data definition:

- Adjacent “dots” in the same **row** are not allowed.
- The 8th bit of n1 – n11 is ignored.
- All column data (n1 – n11) must be defined.

Custom font – create pattern – UTL DLL – descender.

Code: ESC % D m n1...n11

Compatibility: **ML**

Function:

Define up to 256 descender character patterns using a 11H x 7V character matrix.

However, data loaded with the following character codes cannot be printed.

00H to 02H, 07H to 14H, 16H to 1FH

Range:

	DECIMAL	HEX-DECIMAL	CHAR. COUNT
m =	0 – 255	00 – FF	256
n1 – n11	0 – 1270	0 – 7F	

Variable Purpose:

m = address of defined pattern.

n1 – n11 = column data, each column of data = 1 byte.

Out of range:

- ❖❖❖ Since the 8 bit of n1 – n11 is ignored, data defined as (80)H – (FF)H will be interpreted as (00)H – (7F)H.

Details:

- ❖❖❖ Since UTL custom characters (DLL) are stored in RAM, they will be lost if power to the printer is turned off.

❖❖❖ Pattern data definition:

- Adjacent “dots” in the same **row** are not allowed.

- The 8th bit of n1 – n11 is ignored.
- All column data (n1 – n11) must be defined.

Select Font by Pitch and Point

Code: ESC X Pn Lp Hp

Compatibility: **Epson**

Function:

Selects a font according to the specified character pitch and point.

Range:

Pn = 00H ~ FFH

Lp = 00H ~ FFH

Hp = 00H ~ FFH

Details:

...❖ Pn: Specifies the proportional spacing.

Pn = 0 Fixed spacing.

Pn = 1 Proportional spacing.

...❖ Lp Hp: Specifies a point.

Np value = (Lp + Hp x 256).

Point = Np x 0.5.

Np value	Point
0 ~ 43	Setting ignored
44 ~ 431	22 ~ 215
432~	216

Select Font by Pitch and Point

Code: ESC DLE F Pn0 Pn Lp Hp

Compatibility: **IBM/ML**

Function:

Select a font according to the specified character pitch and point.

Range:

Pn0 = 00H ~ FFH

Pn = 00H ~ FFH

Lp = 00H ~ FFH

Hp = 00H ~ FFH

Details:

...❖ Pn0: Specifies the number of bytes of the succeeding parameter (usually Pn0 = 3).

...❖ Pn: Specifies the proportional spacing.

Pn = 0 Fixed spacing.

Pn = 1 Proportional spacing.

...❖ Lp Hp: Specifies a point.

Np value = (Lp + Hp x 256).

Point = Np x 0.5.

Np value	Point
0 ~ 43	Setting ignored
44 ~ 431	22 ~ 215
432~	216

Set Print Quality

Code: ESC [d 01H 00H n

Compatibility: **IBM**

Function:

Set print quality.

Range:

00H Ln·Hn FFFFH

00H Pn FFH

Details:

❖ Sets the parameter bytes after Ln·Hn by Ln·Hn.

Parameter bytes = Ln + Hn × 256(byte).

When Ln + Hn × 256 > 2, data of (Ln + Hn × 256) – 1 byte is received and discarded after receiving Pn.

❖ Meaning of Pn is shown in the table below:

Pn	MEANING
00H	Invalid
01H ~ 3FH	HSD
40H ~ 7FH	Utility
80H ~ FFH	NLQ
FFH	Follows the menu setting

Select font

Code: ESC [I Ln Hn Hfid Lfid Hfwd Lfwd fa Nul Hcp Lcp

Compatibility: **IBM**

Function:

Set font typeface, character pitch, spacing attributes and code page.

Range:

❖ Ln and Hn set the parameter bytes after Ln and Hn.

$Ln, Hn = Ln + Hn \times 256$ (Byte).

Valid range:

$0H \leq Ln, Hn \leq FFFFH$

Ln, Hn = 01H	Makes this command invalid
Ln, Hn = 02H, 03H	Makes fid setting valid and keeps other modes unchanged
Ln, Hn = 04H	Makes fid and fwd settings valid and keeps fa mode unchanged
Ln, Hn = 05H, 06H, 07H	Makes fid, fwd and fa settings valid and keeps cp unchanged
Ln, Hn = 08H	Makes all of fid, fwd, fa and cp settings valid
Ln, Hn = 09H	Makes all of fid, fwd, fa and cp settings valid, and receives and discards parameter data after 9 bytes

❖ The font ID designated by Hfid and Lfid sets a font typeface.

$Hfid, Lfid = Hfid \times 256 + Lfid$

Valid range:

$01H \leq Hfid, Lfid \leq FFFFH$

Typeface setting is invalid if Hfid, Lfid = OOH. Setting is also invalid if a font ID is set which is not listed in the following table:

FONT ID (HFID-LFID)	FONT NAME (TARGET PR)	FONT ID (HFID-LFID)	FONT NAME (TARGET PR)
011	Courier 10	036	Gothic 10
018	Courier 10 Italic	039	Gothic 10 Emphasise
046	Courier 10 Emphasise	087	Gothic 12
057	Courier 10 Emphasise Italic	109	Gothic 12 Italic
085	Courier 12	110	Gothic 12 Emphasise
092	Courier 12 Italic	157	Gothic PS
108	Courier 12 Emphasize	162	Gothic PS Italic
116	Courier 12 Emphasize Italic	174	Gothic PS
171	Courier PS	220	Gothic 15 Emphasize
172	Courier PS Italic	222	Gothic 15
184	Courier PS Emphasize	241	Gothic 10 DW DH
185	Courier PS Emphasize Italic	242	Gothic 10 DW DH Emphasize
214	Courier 15 Emphasize	243	Gothic 10 DW DH Emphasize
215	Courier 15 Italic	255	Gothic 17
216	Courier 15 Emphasize Italic	281	Gothic 20
223	Courier 15	396	Gothic 20
244	Courier 10 DW DH	397	Gothic 17
245	Courier 10 DW DH Emphasize	398	Gothic 15
246	Courier 10 DW DH	399	Gothic 12
253	Courier 17 Emphasize		
254	Courier 17		
454	Courier 20		
491	Courier 12		
492	Courier 15		
493	Courier 17		
491	Courier 20		

Footnote: DW = Double Wide, DH = Double Height, PS = Proportional Spacing

...❖ Hfwd and Lfwd set character pitch (CPI).

$$\text{Hfwd, Lfwd} = \text{Hfwd} \times 256 + \text{Lfwd}$$

Character pitch = Hfwd, Lfwd inch (unit: 1/1440")/1440

Valid range:

$$01\text{HHfwd, LfwdFFFFH}$$

The character pitch does not change if Hfwd, Lfwd = 0H.

Hfwd-Lfwd:	Set value:
0109H~FFFFH	10CPI DW DH
00D9H~0108H	12CPI DW
00B5H~00D8H	15CPI DW
009DH~00B4H	17CPI DW
0085H~009CH	10CPI
006DH~0084H	12CPI
005BH~006CH	15CPI
004FH~005AH	17CPI
0000H~004EH	20CPI SubScript

...❖ The fa sets the following spacing attributes:

When fid is valid, the settings of fwd and fa will be invalid.

fa = 01H : follows the settings of fwd

fa = 02H, 03H : Makes fwd setting invalid and prints by proportional.

fa = parameters other than above : Makes fwd setting invalid.

••• The font ID designated by Hfid and Lfid sets a font typeface.

00 =< Hfid, Lfid =< OFFFFH

CODE PAGE ID (HFID-LFID) (HEX)	CODE PAGE NAME
1B5	USA
2E1	Greek_737
306	Baltic_774
352	Multilingual
354	East Europe Latin II-852
357	Cyrillic I-855
359	Turkey_857
35A	Multilingual 858
35C	Portugal
35D	Icelandic-861
35E	Hebrew NC (862)
35F	Canada French
361	Norway
362	Cyrillic II-866
365	Greek
37F	Kamenicky (MJK)
3F0	Greek_439
3F1	Greek_928
3F3	Greek_437 CYPRUS
3F4	Turkey
3F5	Cyrillic II-866

CODE PAGE ID (HFID-LFID) (HEX)	CODE PAGE NAME
3F6	Polska Mozovia
3F7	ISO Latin 2
3F8	Serbo Croatic I
3F9	Serbo Croatic II
3FA	ECMA-94
3FB	Windows East Europe
3FC	Windows Greek
3FD	Latin 5 (Windows Turkey)
3FE	Windows Gyrillic
400	Hungarian CWI
403	Ukrainian
404	Roman-8
405	ISO Latin 6 (8859/10)
404	Hebrew NC (862)
407	Hebrew OC
408	Windows Hebrew
409	KBL-Lithuanian
40A	Windows Baltic
40B	Cyrillic Latvian
430	Bulgarian
439	ISO 8859-15

Select font

Code: ESC y n

Compatibility: **Epson**

Function:

Select HSD font or UTL font.

Range:

00Hf”Pn”FFH

Detail:

- ❖ When Pn = 00H, 30H, 80H, B0H, selects UTL(normal) font.
- ❖ When Pn = 01H, 31H, 81H, B1H, selects HSD(high speed) font.
- ❖ This command is only valid in UTL and HSD mode and suppressed in NLQ mode.

TEXT PRINT FEATURES

Underlined – ON/OFF

Code: ESC - n

Compatibility: **Epson/IBM**

Function:

Turn ON/OFF the underline printing feature which prints a continuous line under the characters, spaces and punctuations of entire text.

Range:

Epson

If n = 01H, 31H, 81H, B1H Underline = ON.

If n = 00H, 30H, 80H, B0H Underline = OFF.

IBM

If n = odd valued numbers, Underline = ON.

If n = even valued numbers, Underline = OFF.

Out of range:

- ❖ If n does not equal the above values this command is ignored.

Details:

- ❖ The underline is printed at the same time that the character is printed, by logically “ORing” the 9 pin (bottom pin) with rest of the characters column data.
- ❖ Underline prints under the bottom row of descenders.

- ...❖ The underline command does not underline graphics or any horizontal printhead positioning commands such as HTs, Print Start Position, Indexed Print Position or Left/Right Margins. The white space created by Indexed Print Position (ESC\) is underlined.
- ...❖ Underline for Super/Subscript will be placed in the same position as for normal characters.
- ...❖ This command does not initiate printing action (block change).
- ...❖ Space (20H) will be underlined.
- ...❖ Multiple underline characters (5FH) produce a continuous unbroken underline.

Overscore – ON / OFF

Code: ESC _ n

Compatibility: **IBM**

Function:

Turn on/off the overscore printing feature which prints a continuous line above the characters, spaces and punctuation of entire text.

Range:

- ...❖ If n = odd valued numbers, Overscore = ON.
- ...❖ If n = even valued numbers, Overscore = OFF.

Out of range:

- ...❖ If n does not equal the above values this command is ignored.

Details:

- ...❖ The overscore is printed at the same time that the character is printed by logically “ORing” the # 1 pin (top pin) with the rest of the characters column data.
- ...❖ The overscore command does not overscore graphics or any horizontal printhead positioning commands such as HTs, Start Position, Indexed Print Position or Left/ Right Margins.

- ...❖ Overscore for Super/Subscript will be placed in the same position as for normal characters.
- ...❖ This command does not initiate printing action (block change).

Underline – ON

Code: ESC C

Compatibility: **ML**

Function:

Turn on the underline printing feature which prints a continuous line under the characters, spaces and punctuations of entire text.

Details

- ...❖ The underline is printed at the same time that the character is printed, by logically “ORing” the 9th pin (bottom pin) with rest of the characters column data.
- ...❖ Underline prints under the bottom row of descenders.
- ...❖ Underlining is not available when combined with the following modes, feature, and characters.
 - Line Graphics and the Integral sign.
 - Horizontal spacing specified by following commands...
 - Horizontal Tab
 - Horizontal Positioning (Print Positioning etc.)
 - Bit Image Graphics
- ...❖ Underline for Super/Subscript will be placed in the same position as for normal characters.
- ...❖ This command does not initiate printing action (block change).
- ...❖ Space (&H20) will be underlined.

- ❖ This command is equivalent to the composite command (ESC.&.n.), where:
 - n4 – b2 = 1 Underlining ON
 - n4 – b2 = 0 Underlining OFF
- ❖ The 5FH code can also be used to underline.
- ❖ This command remains in effect until one of the following reset commands/conditions are executed...
 - Default command I-PRIME
 - CAN
 - ESC CAN
 - Power up
- ❖ The underlining of double height characters will occur 2/72 inch lower than the underlining of single height characters. Both characters, however, sit on the same baseline.
- ❖ Refer to the illustration attachments for further details.

Underline – OFF

Code: ESC D

Compatibility: **ML**

Function:

Turn on the underline printing feature which prints a continuous line under the characters, spaces and punctuations of entire text.

Emphasized – ON

Code: ESC E

Compatibility: **Epson/IBM**

Function:

Turn on Emphasized printing feature which logically duplicates each column of the character data, printing the data slightly shifted to the right from the original column data position.

Details:

- ❖ Emphasized mode is printed at half the normal print speed.
- ❖ Emphasized printing can be selected at the same time as Enhanced printing.
- ❖ This command does not initiate printing action (block change).
- ❖ Emphasized printing is printed in 1 pass by logically duplicating each column of the character's column data and printing that data 1/2 the distance to the right of the original positions of column #1 and #2.

column data

1	2	1	1'	2	2'
0	0	0	0	0	0
0		0	0		
	0			0	0
0	0	0	0	0	0

- ❖ Emphasized print remains on until it is turned off by the ESC F command.
- ❖ Graphics data cannot be emphasized; this is only a text printing feature.

Related functions:

- ❖ Emphasized printing can also be selected by the ESC! n command (Epson).

Emphasized – OFF

Code: ESC F

Compatibility: **Epson/IBM**

Function:

Turn off the Emphasized printing feature.

Related functions:

This command also resets the Emphasized mode set by ESC ! n (Epson).

Enhanced (double strike) – ON

Code: ESC G

Compatibility: **Epson/IBM**

Function:

Turns on the Enhanced printing feature which logically duplicates each column of the character data, printing the second data slightly shifted vertically downward from the original column data position.

Details:

- ...❖ Enhanced printing can be selected at the same time as Emphasized printing.
- ...❖ This command does not initiate printing action (block change).
- ...❖ Enhanced printing is printed in 2 passes by printing the original line of data, then executing a 1/144-inch LF and printing the same data again.
- ...❖ Enhanced print remains on until it is turned off by the ESC H command.
- ...❖ Graphics data cannot be enhanced, this is only a text printing feature.

Related functions:

- ...❖ Enhanced printing can also be set by ESC! n command (Epson).

Emphasized – ON

Code: ESC T

Compatibility: **ML**

Function:

Turn on the Emphasized printing feature which logically duplicates each column of the character data, printing the data slightly shifted to the right from the original column data position.

Details:

- ...❖ Emphasized mode is printed at half the normal print speed: This command does not initiate printing action (block change).
- ...❖ Emphasized printing is printed in 1 pass by logically duplicating each column of the character's column data and printing that data 1/2 the distance to the right of the original position of column #1 and #2.

column data

1	2	1	1'	2	2'
0	0	0	0	0	0
0		0	0		
	0			0	0
0	0	0	0	0	0

- ...❖ Emphasized print remains on until it is turned off by the ESC I command.
- ...❖ Graphics data cannot be emphasized; this is only a text printing feature.
- ...❖ Emphasized printing can be combined with Custom Characters (DLL), NLQ and Enhanced print. Refer to Illustration attachments "Print Mode/Features Combination Table" for more details.

Related functions:

- ...❖ This command is equivalent to the composite command (ESC.&.n.:

where:

$$n2 - b3 = 1.$$

Enhanced – ON

Code: ESC H

Compatibility: **ML**

Function:

Turns on the Enhanced printing feature which logical duplicates each column of the character data, printing the second data slightly shifted vertically downward from the original row data position.

Details

- ...❖ This command does not initiate printing action (block change).
- ...❖ Enhanced printing is printed in 2 passes by printing the original line of data, then executing a 1/144 inch LF and printing the same data again.
- ...❖ Enhanced print remains on until it is turned off by the ESC I command.
- ...❖ Enhanced data cannot be enhanced; this is only a text printing feature.
- ...❖ Graphics printing can be combined with Custom Characters (DLL) and Emphasized print. Refer to Illustration attachments “Print Mode/Features Combination Table” for more details.

Related functions:

This command is equivalent to the composite command (ESC.&.n.):

where:

$n2 - b4 = 1$ Set

$n2 - b4 = 0$ Reset

Emphasized and enhanced – OFF

Code: ESC I

Compatibility: **ML**

Function:

Turns off both the Enhanced and Emphasized printing features (return to normal printing).

Details:

- ...✦ Enhanced and Emphasized printing will also be canceled by the following...
 - CAN
 - ESC CAN
 - I-PRIME Interface signal

Double wide – select

Code: US

Compatibility: **ML**

Function:

Turns on the Double Wide printing feature which makes each character twice as wide as it's normal width.

Details:

- ...✦ Double width characters are algorithmically created by doubling each column data of the character and printing the double data to the right of the original column data.
- ...✦ Double width can be combined with any character pitch.
- ...✦ Even though the dot column spacing is the same as normal width characters, half the number of characters per inch are produced.

Related functions:

- ...✦ This command is equivalent to the composite command (ESC.&.n.):
 - where:

$$n1 - b4 = 1$$

Double high – select

Code: ESC US n

Compatibility: **ML**

Function:

Turn on/off Double High printing feature which makes each character twice as high as its normal height.

Range:

ASCII	DEC	HEX	
n = 1	49	31	= function ON.
n = any other value			= function OFF.

Out of range:

Command will be ignored.

Details:

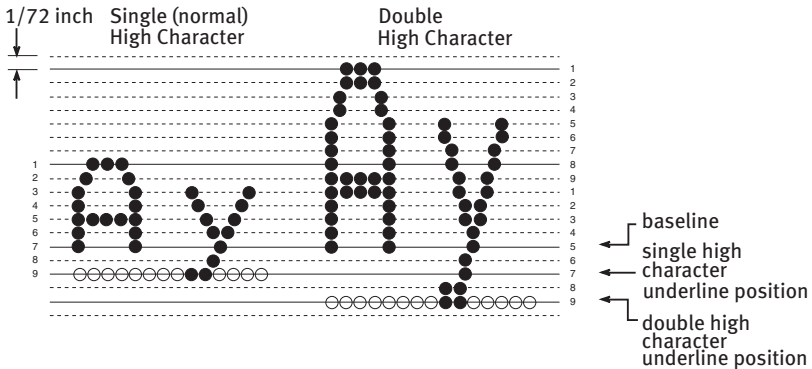
- ...❖ Double High characters are algorithmically created by vertically doubling each dot of the character data, and expanding the character upward.
- ...❖ Double High Characters are printed in 2 passes and sit on the same baseline as normal size characters.
- ...❖ See attachments Print Modes/Features chart for details on which features can be combined with the Double High Characters, and for the Double High Character illustration.
- ...❖ This command can be used with the double width command to print double size characters.
- ...❖ Double height characters can be mixed with normal height characters within the same line.
- ...❖ Double High characters will have an underline position that is 2/72 inch lower than the normal size character's underline position.

Related functions:

⋯⋈ This command is equivalent to the composite command ESC.&.n

where:

$$n4 - b3 = 1.$$



Enhanced (double strike) – OFF

Code: ESC H

Compatibility: **Epson/IBM**

Function:

Turn off the Enhanced printing feature.

Related functions:

⋯⋈ Enhanced mode set by ESC ! n will be reset by ESC H (Epson).

Double wide (expanded) – ON/OFF

Code: ESC W n

Compatibility: **Epson/IBM**

Function:

Turn ON/OFF the Double Wide printing feature which makes each character twice as wide as it's normal width.

Range:

Epson

If n = 01H, 31H, 81H, BAH Double Width = ON.

If n = 00H, 30H, 80H, B0H Double Width = OFF.

IBM

If n = odd valued numbers, Double Width = ON.

If n = even valued numbers, Double Width = OFF.

Out of range:

...✦ If n does not equal the above values this command is ignored.

Details

...✦ Double width characters are algorithmically created by doubling each column data of the character and printing the double data to the right of the original column data.

...✦ Can be used with any character pitch.

...✦ Even though the dot column spacing is the same as normal width characters, half the number of characters per inch are produced.

Related functions:

...✦ This mode can also be set by the ESC ! n command (Epson).

Double wide (expanded) – one line only – ON

Code: SO

Compatibility: **Epson/IBM**

Function:

Toggle the Double Wide printing feature ON / OFF. After activation the command remains in effect for the length of the print line.

Details:

...✦ Double width characters are printed for the length of one line (assuming no command was sent to turn Double Width OFF).

The next text line will be printed with normal width characters since Double Width automatically turns OFF.

- ...❖ If SO and ESC W1 are active, ESC W1 will take precedence.
- ...❖ SO can be canceled by DC4, ESC w n, ESC ! n, LF or CR.

Double wide (expanded) – one line only – ON

Code: ESC SO

Compatibility: **Epson**

Function:

Toggle the Double Wide printing feature on and off. After activation the command remains in effect for the length of the print line.

Details:

- ...❖ Double width characters are printed for the length of one line (assuming no command was sent to turn Double Width off). The next text line will be printed with normal width characters since Double Width automatically turns OFF.
- ...❖ If ESC SO and ESC W1 are active, ESC W1 will take precedence.
- ...❖ ESC SO can be canceled by DC4, ESC w n, ESC ! n, LF or CR.

Double wide (expanded) – one line only – OFF

Code: DC4

Compatibility: **Epson/IBM**

Function:

Turn OFF the Double Wide printing feature which was turned ON by SO or ESC SO.

Details:

- ...❖ Does not cancel double width set by ESC W n or ESC ! n (Epson).

Double height – ON/OFF

Code: ESC w n

Compatibility: **Epson**

Function:

Turns ON/OFF Double High printing feature which makes each character twice as high as it's normal height.

Range:

If n = 01H, 31H, 81H, BAH Double High = ON.

If n = 00H, 30H, 80H, B0H Double High = OFF.

Out of range:

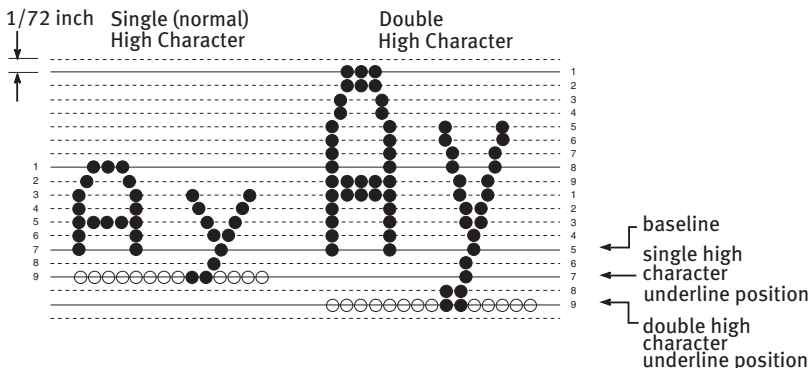
❖ If n does not equal the above values this command is ignored.

Details:

❖ Double High characters are algorithmically created by doubling each row of the character data and printing the new data above the original.

❖ Double High Characters are printed in 2 passes and sit on the same baseline as normal size characters.

❖ See attachments Print Modes/Features chart for information on which features can be combines within Double High feature.



Double height and width – ON/OFF

Code: ESC [@ n1 n2 m1 m2 m3 m4

Compatibility: **IBM**

Function:

Turns ON/OFF Double High and Double Wide writing features or any combination of the two, and selects single or double line spacing.

Range:

n1 = 0 – 255 (normally n1 = 4)

n2 = 0 – 255 (normally n2 = 0)

m1 = 0 – 255

m2 = 0 – 255

m3 = decimal 0 – 255 (see details).

m4 = decimal 0 – 255 (see details).

Purpose of variables:

n1 = lowbyte of total data count

n2 = highbyte of total data count

m1 = unknown (future functionality)

m2 = unknown (future functionality)

m3 = upper nibble = line spacing, low nibble = character height.

m4 = upper nibble = ignored, low nibble = character width.

Out of range:

…❖ Invalid for command of n1 n2 = 0 – 2.

…❖ Ignored for numbers entered after m4 for specified bytes for n1 n2>4.

Details:

⋯❖ m3 explanation table

UPPER NIBBLE	LOWER NIBBLE	DECIMAL EQUIV.	FUNCTION
0	0	0	No change
0	1	1	Line feeds unchanged, single – high character
0	2	2	Line feeds unchanged, double – high character
1	0	16	Single line feeds, character height unchanged
1	1	17	Single line feeds, single – high character
1	2	18	Single line feeds, double – high character
2	0	32	Double line feeds, character height unchanged
2	1	33	Double line feeds, single – high character
2	2	34	Double line feeds, double – high character

For cases other than described above, the line feed and character height will remain in previous mode.

⋯❖ m4 explanation table

UPPER NIBBLE	LOWER NIBBLE	DECIMAL EQUIV.	FUNCTION
0	1	1	Single wide character
0	2	2	Double wide character

For cases other than described above, the character width will remain in previous mode.

⋯❖ This command is a composite command that functionally operates the same as the singular line spacing, character height and character width commands. Both this command and the singular commands can override each other's selections.

Related functions:

⋯❖ Line spacing – ESC A

⋯❖ Character Width – SO, ESC SO, DC4, ESC W.

Scripts – super/sub – select

Code: ESC S n

Compatibility: **Epson/IBM**

Function:

Select Super/Subscript size characters.

Range:

Epson

••• If n = 01H, 31H, 81H, B1H Subscript = ON (Superscript off)

••• If n = 00H, 30H, 80H, B0H Superscript = ON (Subscript off)

IBM

••• If n = odd valued numbers, Subscript = ON (Superscript off)

••• If n = even valued numbers, Superscript = ON (Subscript off)

Out of range:

••• If n does not equal the above values this command is ignored.

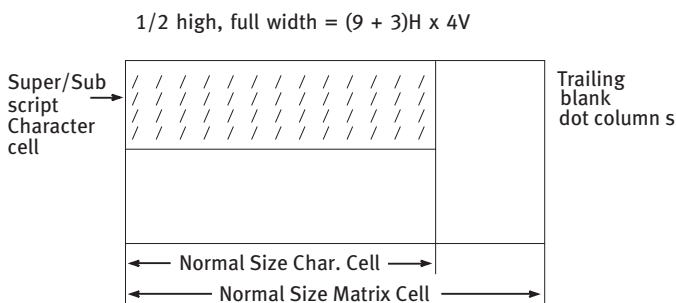
Related functions:

••• ESC T, cancel Scripts.

••• Super/Subscripts can be printed in Utility and NLQ print quality modes as follows:

MODE	SCRIPT
HSD	HSD Super/Subscripts 1/2 high, full width for all CPIs
Utility	Utility Super/Subscripts 1/2 high, full width for all CPIs
NLQ Courier	NLQ Courier Super/Sub scripts 1/2 high, full width for all CPIs
NLQ Sans Serif	Same as NLQ Courier

••• Super/Subscripts are algorithmically created by reading the ROM font data and compressing the character by reading every other dot (both column and row) and reassembling the data starting in the upper left corner of the basic (9 + 3) H × 9v cell matrix.



Note: figure is not to scale

- ❖ See attachments Print Mode/Combination chart for information concerning Super/ Sub script combinations with other print modes/features.

Scripts – super/sub – cancel

Code: ESC T

Compatibility: **Epson/IBM**

Function:

Cancel the Super/Subscript printing command.

Subscripts – ON

Code: ESC L

Compatibility: **ML**

Function:

Select Subscript characters, or if currently printing superscript characters, return to normal size characters.

Details:

- ❖ This command is equivalent to the composite command (ESC.&.n.), where:

$n2 - b1 = 1$ Set

$n2 - b0 = 1$ Reset

❖ The script commands are not legal, and will be ignored when combined with the following...

– Bit Image Graphics

– Line Graphics (B0)H – (DF)H and (F4)H, (F5)H characters.

❖ Scripts will be printed in the Print Quality modes as follows...

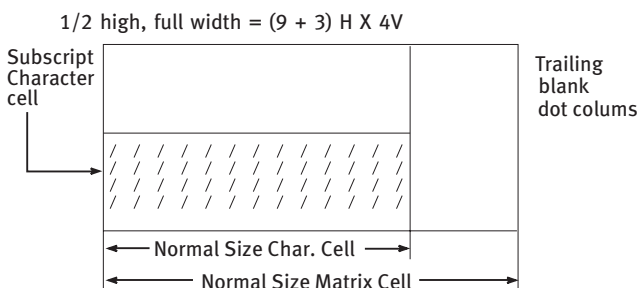
HSD = HSD Super/Subscripts 1/2 high, full width for all CPIs.

Utility = Utility Super/Subscripts 1/2 high, full width for all CPIs.

NLQ Courier = NLQ Courier Super/Subscripts 1/2 high, full width for all CPIs.

NLQ Sans Serif = NLQ Sans Serif Super/Subscript 1/2 high, full width for all CPIs.

❖ Subscripts are algorithmically created by reading the ROM font data and compressing the character by reading every other dot (both column and row) and reassembling the data starting in the lower left corner of the basic (9+3) H x 9V cell matrix.



Note: Figure is not to scale.

❖ See attachments Print Mode/Combination chart for information concerning Super/Subscript combinations with other print modes/features.

Subscripts – OFF

Code: ESC M

Compatibility: **ML**

Function:

Turn subscript OFF (returns to normal size characters).

Superscript – ON

Code: ESC J

Compatibility: **ML**

Function:

Select Superscript characters, or if currently printing subscript characters, return to normal size characters.

Details:

❖ This command is equivalent to the composite command (ESC.&.n.:)

where:

$n2 - b2 = 1$ Set

$n2 - b0 = 1$ Reset

❖ The script commands are not legal, and will be ignored when combined with the following...

– Bit Image Graphics

– Line Graphics B0H – DFH and F4H, F5H characters.

❖ Scripts will be printed in the Print Quality modes as follows:

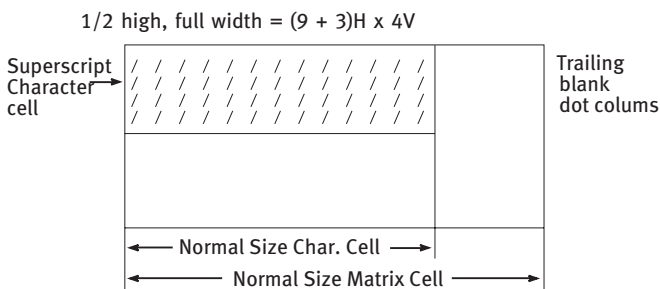
HSD = HSD Super/Subscripts 1/2 high, full width for all CPIs.

Utility = Utility Super/Subscripts 1/2 high, full width for all CPIs.

NLQ Courier = NLQ Courier Super/Subscripts 1/2 high, full width for all CPIs.

NLQ Sans Serif =NLQ Sans Serif Super/Subscripts 1/2 high,
full width for all CPis.

- ❖ Super/Subscripts are algorithmically created by reading the ROM font data and compressing the character by reading every dot (both column and row) and reassembling the data starting in the upper left corner of the basic $(9 + 3)H \times 9V$ cell matrix.



Note: Figure is not to scale.

- ❖ See attachments Print Mode/Combination chart for information concerning Super/Subscript combinations with other print models/features.

Superscript – OFF

Code: ESC K

Compatibility: **ML**

Function:

Turn superscripts OFF (returns to normal size characters).

Slant – ON

Code: ESC % G

Compatibility: **IBM**

Function:

Turn on the slant character feature, which reads normal text character from Font ROM and algorithmically slants then.

Details:

Slanted text characters can be printed in HSD Utility, and NLQ print quality modes.

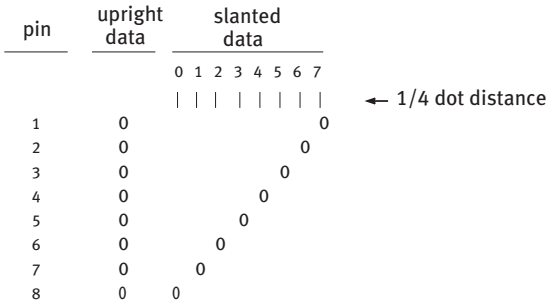
- HSD : Slant
- Utility : Slant
- NLQ Courier : Slant
- NLQ San Serif : Slant

❖ Only text type characters can be slanted. Line graphics, math integral sign (structured by 12 vertical dots) cannot be slanted.

❖ Slanted characters are created by the following algorithm:

For 8 dot high characters ...

- 1st dot row : shifted (1/4 dot × 7) to the right
- 2nd dot row : shifted (1/4 dot × 6) to the right
- 7th dot row : shifted (1/4 dot × 1) to the right
- 8th dot row : shifted (1/4 dot × 0) to the right



❖ If a slanted character is printed next to a normal upright character, the last dot columns of the slanted character are logically “ORed” into one column.

Slant – OFF

Code: ESC % H

Compatibility: **IBM**

Function:

Turns off the slant character feature.

Slant – ON

Code: ESC ! /

Compatibility: **ML**

Function:

Turn on the Slant character feature, which reads normal text character from Font ROM and algorithmically slants then.

Details:

Slanted text characters can be printed in HSD, Utility, and NLQ print quality modes.

HSD : Slant

Utility : Slant

NLQ Courier : Slant

NLQ San Serif : Slant

- ❖ Only text type characters can be slanted. Line graphics, the math integral sign cannot be slanted.
- ❖ Refer to the “Print Mode Combinations” for details of the print mode in which the Italics chars. can be printed by receiving this command.
- ❖ Slanted characters are created from UTL font ROM data.

Slant – OFF

Code: ESC ! *

Compatibility: **ML**

Function:

Turn off the Slant character feature, return to upright character printing.

GRAPHICS MODE

Bit image graphics – select density and enter graphics

Code: ESC * m n1 n2 (graphics data)

Compatibility: **Epson**

Function:

Select the graphics density specified by m, and prints graphics data.

Range:

❖ n1 in conjunction with n2 specifies the total number of dot columns to be printed in graphics.

n1 = 0 – 255 (decimal number).

n2 = 0 – 255 (decimal number).

❖ m selects the graphic mode. See table shown below:

MODE	PINS	M	HOR. DENSITY (DOTS/IN)
Single density	8	0	60
Double density			
High – speed double density*			
Quadruple – density*			
CRT 1			
Plotter (1:1)			
CRT II			
Double Density Plotter			

Note: * Mode is printed in Quasi density.

Out of range:

❖ If m does not equal to the range of n1, n2 = 0 – 255 command is ignored.

Details:

❖ Pin numbering system.

8 pin graphics (1 byte/column)

	PIN No.	DECIMAL VALUE
Top pin	1	128
	2	64
	3	32
	4	16
	5	8
	6	4
	7	2
Bottom pin	8	1

❖ The decimal value which is used for the data elements can be calculated by adding the equivalent decimal values of the dots that need to be printed.

Example:

128	0	128	
64	X		
32	0	32	
16	X		
8	0	8	
4	X		
2	0	2	
1	X		
		total = 170	O = print dot X = not print dot

❖ n2 is used when you want to reserve more than 255 columns for graphics n2 represents a number of groups, each group contains 256 dots.

Example:

When $n_2 = 0$ it selects the first group of 256 dots from 0 to 255.

When $n_2 = 1$ it reserves the next group of 256 dots from 256 to 512 plus the number of dots in n_1 .

n_2 can be calculated as follows:

n = total number of dots to be printed.

$n_2 = \text{INT}(n/256)$

The value of n_1 can be calculated as follows:

$n_1 = n - (n_2 \times 256)$ OR $n \text{ MOD } 256$

Bit image graphics – select 9 pin mode

Code ESC ^ m n_1 n_2 (Graphics data)

Compatibility: **Epson**

Function:

Select nine pin graphics for the number of columns specified by n_1 and n_2 .

Range:

m is a decimal number where:

$m = 0$ Single density graphics.

$m = 1$ Double density graphics.

$m = 2$ High-speed double density graphics.

$m = 3$ Quadruple density graphics.

❖ n_1 , in conjunction with n_2 , specifies the total number of dot columns to be printed in graphics.

❖ n_1 is a decimal number between 0 and 255.

❖ n_2 is a decimal number between 0 and 255 (Bit7 is ignored).

Out of range:

❖ $m > 3$... Command is ignored.

n_1, n_2 ... not applicable, cannot receive value greater than 255 (FFH).

Details:

❖ Pin numbering system:

1. 9 pin graphics (2 bytes/column)

	Pin	Weight	decimal value	
Top pin	1	128	↑	
	2	64		
	3	32		
	4	16		
	5	8		byte 1
	6	4		
	7	2		
	8	1		
Bottom pin	9	128	↓	
		64		
		32		
		16		
		8		byte 2
		4		
		2		
		1		

Note: Bits 0-6 of data byte 2 are ignored.

❖ n2 is used when you want to reserve more than 255 columns for graphics. n2 represents a number of groups, each group contains 256 dots.

Example:

When n2 = 0 it selects the first group of 256 dots from 0 to 255.

When n2 = 1 it reserves the next group of 256 dots from 256 to 512 plus the number of dots in n1.

And so on, until n = 7 which reserves up to 1792 dots plus whatever is equal to n1.

n2 can be calculated as follows:

$$n = \text{total number of dots to be printed.}$$

$$n2 = \text{INT} (n/256)$$

n1 can be calculated as follows:

$$n1 = n - (n2 \times 256) \text{ OR } = n \text{ MOD } 256$$

- ❖ Used for graphics intensive applications such as screen dumps.
- ❖ Each print pattern requires two bytes of data instead of one, as in 8 pin graphics.

Example: To print 70 columns of data,140 bytes must be sent.

Bit image graphics – reassign graphic’s density commands

Code: ESC ? m n

Compatibility: **Epson**

Function:

Reassign one of the graphic density command to another graphic density command.

Range:

- ❖ “m” represents one of the following four graphic modes.

K	Single Density
L	Low Speed Double Density
Y	High Speed Double Density
Z	Quadruple Density.

- ❖ n is decimal value 0–7.

0	60 dpi
1	120 dpi
2	120 dpi (Quasi density)
3	240 dpi (Quasi density)
4	80 dpi
5	72 dpi
6	90 dpi
7	144 dpi

Out of range:

- If n does not equal a value which is specified in the above table, “ESC ? m n” is ignored and data is not printed as Graphics data.

Bit image graphics — single horizontal density

Code: ESC K n1 n2 (graphical data)

Compatibility: **Epson/IBM**

Function:

Select normal speed single density graphics (60 DPI horizontal) for the number of columns specified by n1 and n2.

Range:

- n1 in conjunction with n2 specifies the total number of dot columns to be printed in graphics.
- Range n1, n2 = 0 – 255.
- Number of dot/line:

Narrow

Dots/line	n1	n2
480	224	1

Out of range:

- Not applicable, cannot receive a value greater than 255 (FFH).

Details:

- n2 is used when you want to reserve more than 255 columns for graphics n2 represents a number of groups, each group contains 256 dots.

Example:

When $n_2 = 0$ it selects the first group of 256 dots from 0 to 255.

When $n_2 = 1$ it reserves the next group of 256 dots from 256 to 512 plus the number of dots in n_1 .

n_2 can be calculated as follows:

$n =$ total number of dots to be printed.

$$n_2 = \text{INT} (n/256)$$

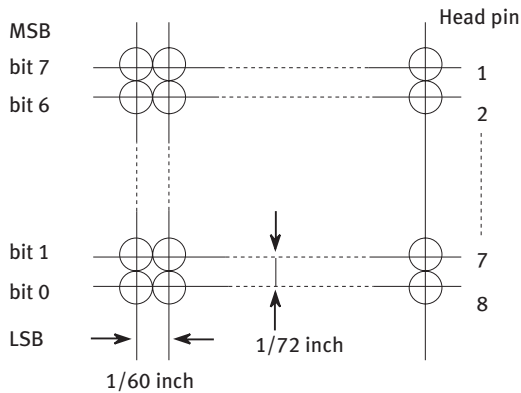
n_1 can be calculated as follows:

$$n_1 = n - (n_2 \times 256) \text{ OR } = n \text{ MOD } 256$$

$$n_2 = \text{INT} (n/256)$$

❖ Low speed single density graphics prints at a density of 60 dots/inch.

❖ Dots spacing example.



Related functions:

❖ This command is equivalent to the 8 pin graphic mode command specified by ESC * "0" n_1 n_2 (Epson).

Bit image graphics – double horizontal density – normal speed

Code: ESC L n1 n2 (graphics data)

Compatibility: **Epson/IBM**

Function:

Select normal speed double density graphics (120 DPI horizontal) for the number of columns specified by n1 and n2.

Range:

...✦ n1 in conjunction with n2 specifies the total number of dot columns to be printed in graphics.

...✦ Range n1, n2 = 0 – 255.

...✦ Number of dot/line.

Narrow

Dots/line	n1	n2
960	192	3

Out of range:

...✦ Not applicable, cannot receive a value greater than 255 (FFH).

Details:

...✦ n2 is used when it is required to reserve more than 255 columns for graphics. n2 represents a number of groups, each group contains 256 dots.

Example:

When n2 = 0 it selects the first group of 256 dots from 0 to 255.

When n2 = 1 it reserves the next group of 256 dots from 256 to 512 plus the number of dots in n1.

n2 can be calculated as follows:

n = total number of dots to be printed.

n2 = INT (n/256)

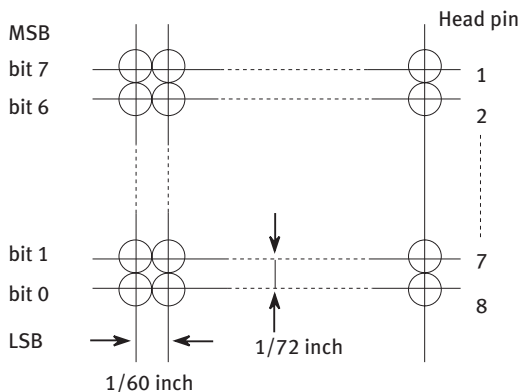
n1 can be calculated as follows:

$$n1 = n - (n2 \times 256) \text{ OR } = n \text{ MOD } 256$$

$$n2 = \text{INT} (n/256)$$

❖ Low speed double density graphics prints at a density of 120 dots/inch.

❖ Dot spacing example.



Related functions:

❖ This command is equivalent to the 8 pin graphic mode command specified by ESC * "1" n1 n2 (Epson).

Bit image graphics – double horizontal density – high speed

Code: ESC Y n1 n2 (graphic data)

Compatibility: **Epson/IBM**

Function:

Selects high speed double density graphics (120 DPI Horizontal) for the number of columns specified by n1 and n2.

Range:

❖ n1 in conjunction with n2 specifies the total number of dot columns to be printed in graphics.

❖ n1, n2 = 0 – 255.

...❖ Number of dots/line:

Narrow

Dots/line	n1	n2
960	192	3

Out of range:

...❖ Not applicable; cannot receive value greater than 255 (FFH).

Details:

...❖ n2 is used when you want to reserve more than 255 columns for graphics. n2 represents a number of groups, each group contains 256 dots.

Example:

When n2 = 0 it selects the first group of 256 dots from 0 to 255.

When n2 = 1 it reserves the next group of 256 dots from 256 to 512 plus the number of dots in n1.

n2 can be calculated as follows:

n = total number of dots to be printed.

$$n2 = \text{INT}(n/256)$$

n1 can be calculated as follows:

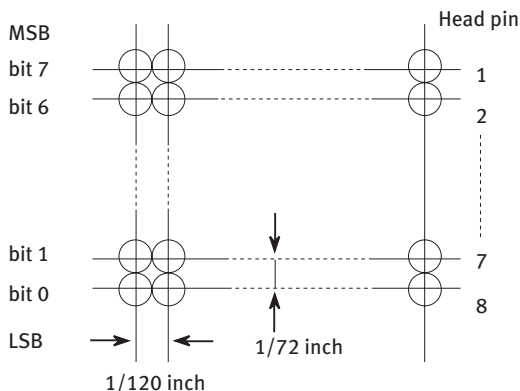
$$n1 = n - (n2 \times 256) \text{ OR } = n \text{ MOD } 256$$

$$n2 = \text{INT}(n/256)$$

...❖ High speed double density prints at a density of 120 dots per inch.

...❖ This is the same density as low speed double density graphics, but the printer cannot place two adjacent dots in the same row (quasi-density).

❖❖❖ Dot spacing example.



(Related functions:

This command is equivalent to the 8 pin graphic mode command specified by ESC * "2" n1 n2 (Epson).

Bit image graphics – quadruple horizontal density

Code: ESC Z n1 n2 (graphics data)

Compatibility: **Epson/IBM**

Function:

Select normal Speed Quadruple density graphics (240 DPI Horizontal) for the number of columns specified by n1 and n2.

Range:

n1 in conjunction with n2 specifies the total number of dot columns to be printed in graphics.

❖❖❖ Range n1, n2 = 0 – 255.

❖❖❖ Maximum number of dot/line:

Narrow

Dots/line	n1	n2
1920	128	7

Out of range:

❖ Not applicable, cannot receive value greater than 255 (FFH).

❖ Details:

n2 is used when you want to reserve more than 255 columns for graphics. n2 represents a number of groups, each group contains 256 dots.

Example:

When n2 = 0 it selects the first group of 256 dots from 0 to 255.

When n2 = 1 it reserves the next group of 256 dots from 256 to 512 plus the number of dots in n1.

n2 can be calculated as follows:

n = total number of dots to be printed.

$$n2 = \text{INT} (n/256)$$

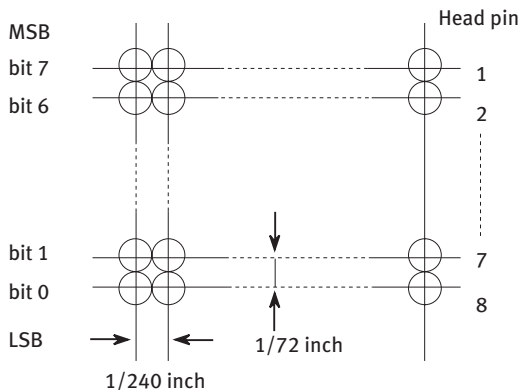
n1 can be calculated as follows:

$$n1 = n - (n2 \times 256) \text{ OR } = n \text{ MOD } 256$$

$$n2 = \text{INT} (n/256)$$

❖ Quadruple density graphics prints at a density of 240 dots per inch (Quasi-density).

❖ Dot spacing example.



Related functions:

- ⌘ This command is equivalent to the 8 pin graphic mode command specified by ESC * “3” n1 n2 (Epson).

Bit image graphics – enter

Code: ETX

Compatibility: **ML**

Function:

Enter bit image graphics.

Details:

- ⌘ Pin / Data numbering system.

	PRINTHEAD PIN NO.	EQUIVALENT DECIMAL VALUE	8 BIT MODE	7 BIT MODE
Top pin (LSB)	1	1	1	1
	2	2	2	2
	3	4	4	4
	4	8	8	8
	5	16	16	16
	6	32	32	32
	7	64	64	64
	8	128	128	X
Bottom pin (MSB)	9	X	X	X

X = cannot use

- ⌘ Since 03H is used as an initiator for commands executed while in the bit image graphics mode, in order to print graphics data represented by 03H, two 03H must be sent to the printer.

Example...

In the “d” above. In order to print the 03H as one column of graphic data, send 03H, 03H.

- The decimal value which is used for the data elements can be calculated by adding the equivalent decimal values of the dots that need to be printed.

Example (8 bit mode)

1	0	1
2	0	2
4	x	
8	x	
16	x	
32	x	
64	x	
128	x	

(0 = print dot; x = not print dot)

3 decimal or 03 hex

- The explanation of the dot density transitions from text, to graphics, back to text is as follows ...

TEXT DOT DENSITY BEFORE ENTERING GRAPHICS		RESULTANT PRIMARY DOT DENSITY	UPON RETURNING TO TEXT	
CPI	DPI	DPI	CPI	DPI
10	120	60	10	120
12	144	72	12	144
15	180	60	15	180
17.1	206	60	17.1	206
20	240	60	20	240

Related functions:

- Composite command “ESC * n:”

Bit image graphics – exit

Code: ETX STX

Compatibility: **ML**

Function:

Exit bit image graphics (return to text mode).

Details:

- Any Print Quality modes and Print Features that were active before entering Bit Image Graphics will be reactivated upon exiting Bit Image Graphics.

Bit image graphics – true single horizontal density

Code: ESC P

Compatibility: **ML**

Function:

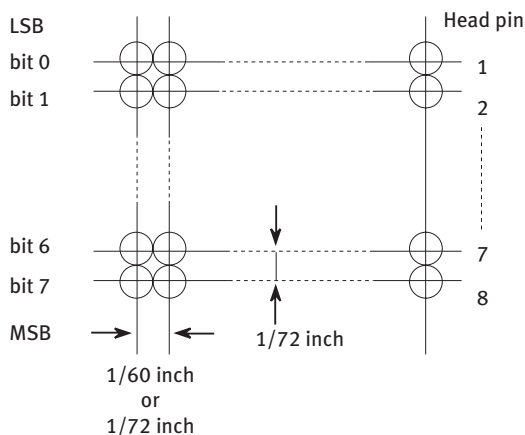
Select true single density graphics based on the text dot density which was previously set.

Details:

- Dot density ...

TEXT DOT DENSITY		RESULTANT GRAPHICS DOT DENSITY
CPI	DPI	DPI
10	120	60 (adjacent dots allowed)
12	144	72
15	180	60
17.1	206	60
20	240	60

❖❖❖ Dot spacing example.



❖❖❖ This command must be sent prior to entering graphics mode.

❖❖❖ Single Density prints at what is labeled as “full” speed and is used as a reference to explain all the other graphics print speeds.

Related functions:

❖❖❖ Composite command “ESC * n1 :”

Bit image graphics – true single horizontal density

Code: ESC Q

Compatibility: **ML**

Function:

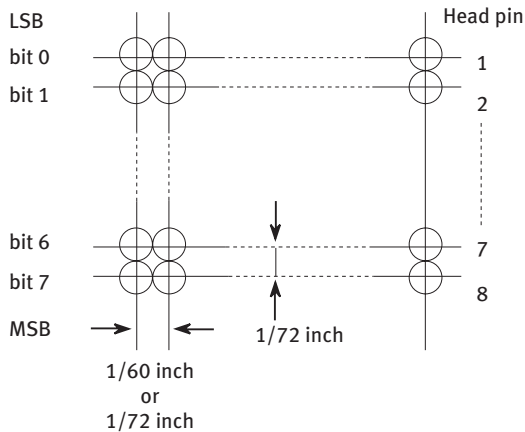
Select true single density graphics based on the text dot density which was previously set.

Details:

❖❖❖ Dot Density ...

TEXT DOT DENSITY		RESULTANT GRAPHICS DOT DENSITY
CPI	DPI	DPI
10	120	60 (adjacent dots allowed)
12	144	72
15	180	60
17.1	206	60
20	240	60

❖❖❖ Dot spacing example.



❖❖❖ This command must be sent prior to entering graphics mode.

❖❖❖ Single Density prints at what is labeled as “full” speed and is used as a reference to explain all the other graphics print speeds.

Related functions:

❖❖❖ Composite command “ESC * n1 :”

Bit image graphics – true double horizontal density

Code: ESC R

Compatibility: **ML**

Function:

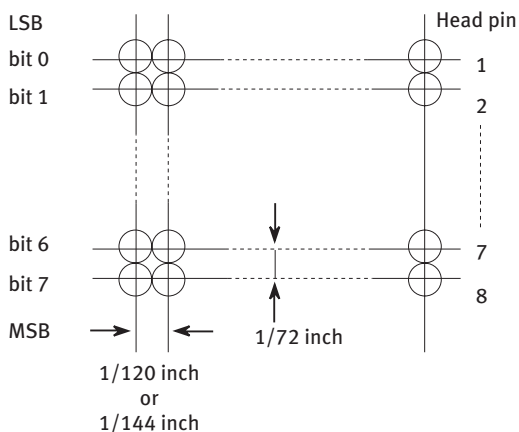
Select true single density graphics based on the text dot density which was previously set.

Details:

❖ Dot Density ...

TEXT DOT DENSITY		RESULTANT GRAPHICS DOT DENSITY
CPI	DPI	DPI
10	120	120
12	144	144
15	180	120
17.1	206	120
20	240	120

❖ Dot spacing example.



❖ Adjacent dots will not be printed when double speed is specified (ESC* n1 :).

❖ This command must be sent prior to entering graphics mode.

- ❖ Double Density prints at half the speed of Single density.
- ❖ Refer to the Illustration attachments for further details.

Related functions:

- ❖ Composite command “ESC* n1 :”

Bit image graphics – double speed, quasi quadruple horizontal density

Code: ESC # Q

Compatibility: **ML**

Function:

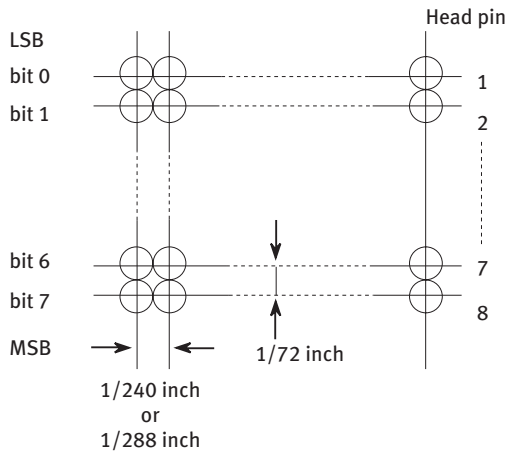
Selects double speed, quadruple density graphics based on the text dot density which was previously set.

Details:

- ❖ Dot Density ...

TEXT DOT DENSITY		RESULTANT GRAPHICS DOT DENSITY
CPI	DPI	DPI
10	120	240 (adjacent dots on the same row are not allowed)
12	144	288
15	180	240
17.1	206	240
20	240	240

- Dot spacing example.



- This command must be sent prior to entering graphics mode.
- Quadruple density will print at half the speed of Single density.
- Refer to the illustration attachments for further details.

Related functions:

- Composite command “ESC* n1 :”

Bit image graphics – execute LF WI CR – text amount

Code: ETX LF

Compatibility: ML

Function:

Initiate printing action, print data in the print buffer by causing a print block change and execute a pre-defined text amount line feed then execute a carriage return.

Details:

- The distance of the pre-defined text line feed is as follows...
 - if, in 6 LPI, the text LF = 24/144 inch
 - if, in 8 LPI, the text LF = 18/144 inch

Bit image graphics – execute LW W/O CR – text amount

Code: ETX DC2

Compatibility: **ML**

Function:

Initiate printing action, print data in the print buffer by causing a print block change and execute a pre-defined text amount line feed, but do not execute a carriage return.

Details:

...❖ The distance of the pre-defined text line feed is as follows...

if, in 6 LPI, the text LF = $24/144$ inch

if, in 8 LPI, the text LF = $18/144$ inch

Bit Image graphics – execute LF with CR – graphics amount

Code: ETX 50

Compatibility: **ML**

Function:

Initiate printing action, print data in the print buffer by causing a print block change and execute a graphics line feed (so that consecutive graphic print lines touch each other) then execute a carriage return.

Details:

...❖ The distance of the graphic line feed is as follows...

if, in 7 bit graphics mode, the graphic LF = $14/144$ inch

if, in 8 bit graphics mode, the graphic LF = $16/144$ inch

Bit image graphics – execute LF W/O CR – graphics amount

Code: ETX DC4

Compatibility: **ML**

Function:

Initiate printing action, print data in the print buffer by causing a print block change and execute a graphics line feed (so that consecutive graphic print lines touch each other) but do not execute a carriage return.

Details:

- ❖ The distance of the graphic line feed is as follows...
 - if in 7 bit graphics mode, the graphic LF = 14/144 inch.
 - if, in 8 bit graphics mode, the graphic LF = 16/144 inch.
- ❖ Because there is no CR executed, the second print line's horizontal starting position will be where the first print line ended.

COMPOSITE COMMANDS

Select print features and pitch

Code: ESC ! n

Compatibility: **Epson**

Function:

Select print feature and CPI according to binary value of “n”.

Range:

...✦ Range n = 0 – 255.

...✦ The value of “n” is composed by selecting a feature or CPI, each of which represents 1 bit of “n”.

Out of range:

...✦ Not applicable; cannot define a value less than 0 or greater than 255 (FFH).

Details:

...✦ The features/CPI selectable by this command are the same as the features/CPI that are selected by individual commands.

...✦ Any feature/CPI select or reset by this function will override the same feature/CPI selected by an individual command. The opposite is also true. If a feature/CPI was originally selected by this composite command, but then reset by an individual command, the feature will not turn off.

...✦ Any invalid combination of features will be set according to the printer’s priority tables. (See “attachments” Print Modes/ Features Combination Tables).

❖ The selectable modes are shown as follows:

n = an 8 bit binary number, each bit having the following definition:

BIT	1	0
b7	Set underline	Reset underline
b6	Set Italics	Reset Italics
b5	Set Double Width	Reset Double width
b4	Set Enhanced	Reset Enhanced
b3	Set Emphasized	Reset Emphasized
b2	Set Compressed	Reset Compressed
b1	Set Proportional	Reset Proportional
b0	Set 12 CPI	Set 10 CPI

Select print modes and features

Code: ESC & n1 n2 n3 n4 :

Compatibility: **ML**

Select Print Quality modes, Print Pitch with one command.

Function:

n1 – n4 are defined by calculating the decimal, or hexadecimal equivalent of the binary number which is defined as follows:

N/BIT	B7	B6	B5	B4	B3	B2	B1	B0
n1	X	0	1	Double width	20 CPI	17.1 CPI* 3	12 CPI *3	10 CPI
n2	X	1	0	Enhancement	Emphasize	SuperScript	SubScript	No Scripts
n3	X	1	1	0	Slant	DLL Mode	NLQ P. Quality	Normal P. Quality
n4	X	1	1	1	Double Height	Underline line	X	HSD P. Quality

1. Any bits defined as literal 0 or 1 should be set as indicated in the above table. These bits identify which “n” is being defined.
2. “x” means “don’t care” and can be either 0 or 1.
3. When both b1 (12 CPI) and b2 (17.1 CPI) are specified for n1, the 15 CPI print mode is selected.

Out of range:

- ❖ If either n2, n3 or n4 is invalid, the command is terminated, but the mode/features related to all previous “n” s will be set. In the case where n1 is invalid, the command is terminated and no modes/features will be set. See below for examples of invalid usage.

Details:

- ❖ Order does not matter when n1 – n4 are defined. Any order is valid because b5 and b6 identify each variable “nx”.
- ❖ The quantity of “n” s being defined also does not matter (up to a maximum of 4).

All four “n”s or any number of “n”s less than four may be defined.

Example of valid uses of this command:

ESC & n4 :

ESC & n3 n2 :

ESC & n2 n4 n3 :

ESC & n1 n3 n2 n4 :

- ❖ The functions selected by this command are the same as the function that are selected by individual commands.
- ❖ Any function selected or reset by this function will override the same function selected by the individual command. The opposite is also true. If a function was originally selected by this composite command, but then reset by an individual command, the function will be OFF.
- ❖ Any invalid combination of functions will be set according to the printer’s priority tables.

(See “attachments” Print Modes/Features Combination Tables).

❖❖❖ Command equivalent table:

N/BIT	B7	B6	B5	B4	B3	B2	B1	B0
n1	–	0	1	US	ESC #3	GS *	FS *	RS
n2	–	1	0	ESC H	ESC T	ESC J	ESC L	ESC K * ESC M
n3	–	1	1	0	ESC ! /	ESC 2	ESC 1	ESC 0
n4	–	1	1	1	ESC US	ESC C	–	ESC #0

* When both b1 (FS) and b2 (GS) are specified for n1, this code achieves a function equivalent to the ESC g code.

b0 of n2 cancels both super/subscript.

❖❖❖ If less than 4 “n”s are defined, the priorities of the table above are still followed. In the event that the same “n” is repeated twice, the last value will have precedence.

❖❖❖ Each bit on n1 – n4 will be processed in order from b0 to b7 as if individual commands were input.

Example:

	b7	b6	b5	b4	b3	b2	b1	b0
n1 (37H)	/	0	1	1	0	0	1	1

In the above example, 12 CPI magnifying mode will be defined as the same as if the result of RS, FS and US were input.

❖❖❖ Examples ...

KEY: “x” = invalid value

Data Stream Result

DATA STREAM	RESULT
X	The command is invalid and “:” is interpreted as normal data.
ESC & n1:	
X	n1’s modes/features are set, and the data after n3 (in this case just “:”) is interpreted as normal data.
ESC & n1 n2 n3:	
X	The last n1’s modes features are set.
ESC & n4 n3 n2 n1:	
X	All modes/features are set
ESC & n1 n2 n3 n4 z1 z2	
X	If the terminator is not “:”, n1, n2, n3, n4 are valid, the composite command is terminated, z1 is discarded and z2 is processed as normal data.
ESC & n1 n1’ n2 n3 n4	
X	n2, n3 and the last n1, are valid, the command is terminated and n4 is discarded.

Bit image graphics modes and features

Code: ESC * n :

Compatibility: **ML**

Function:

Select Bit Image Graphics density and word size with one command.

Range:

n1 – n2 are defined by calculating the decimal or hexadecimal equivalent of the binary number which is defined as follows...

n/bit	b7	b6	b5	b4	b3	b2	b1	b0
n1	X	1	1	Quad Density	Double Density	Single Density	72 DPI	60 DPI
n2	X	1	0	8 bit	Double Speed	X	X	X

*Any bits defined as a literal 0 or 1 should be set as indicated in the above table.
These bits identify which “n” is being defined.*

“x” means “don’t care” and can be either 0 or 1.

Out of range:

If n2, is invalid, the command is terminated, but the functions defined in n1 remain valid. Where n1 is invalid, the command is terminated and no functions are valid. Refer to “Additional Details:” for examples of invalid usage.

Details:

- ❖ Order does not matter when n1 – n2 are defined. Any order is valid because b5 and b6 identify each variable “n×.”
- ❖ The quantity of “n”s being defined also does not matter. Either 1 or 2 “n”s may be defined.

Example of valid uses of this command:

ESC * n2 :

ESC * n1 :

ESC * n2 n1 :

ESC * n1 n2 *

- ❖ The functions selected by this command are the same as the function that are selected by individual commands.
- ❖ Any function selected or reset by this function will override the same function selected by the individual command. The opposite is also true. If a function was originally selected by this composite command, but then reset by an individual command, the function will be “off”.
- ❖ Any invalid combination of functions will be set according to the printer’s priority tables. (See “attachments” Print Modes/ Features Combination Tables).
- ❖ Each bit of n1 and n2 are processed in order from b0 to b7.

Example:

	b7	b6	b5	b4	b3	b2	b1	b0
n1:(7H)	–	1	1	1	1	1	1	1

In the above example, quadruple density of 72 DPI mode will be defined.

- ❖ If less than 2 “n” are defined, the priorities in the table above is still followed. In the event that the same “n” is repeated, the last value will have precedence.

- ❖ Usage Examples...

KEY:“x” = invalid value

DATA STREAM	RESULT
X ESC * n1 n2:	The command is invalid, n2 is ignored and “:” is processed as normal data.
X ESC * n1 n2:	n is valid, n2 terminates the command sequence and “:” is processed as a normal data.
ESC * n1 n1 n1:	The last n1’s modes features are set.
X ESC * n1 n2 z1 z2	If the terminator is not “:”, n1, n2, n3, n4 are valid, the composite command is terminated, z1 is discarded and z2 is processed as normal data.
X ESC * n1 n1 n2:	The last n1 becomes valid, n2 terminates the command and is discarded, and “:” is processed as a normal data.

- ❖ This command must be defined before entering Bit Image Graphics.

❖ If Double (n1 – b3) or Quadruple (n1 – b4) density is defined, Double Speed (n2 – b3) is selectable.

– Normal speed

Single Density

Double Density

– Double Speed

Double density (no consecutive dots allowed)

Quadruple density (no consecutive dots allowed)

Carriage return and line feed control

Code: ESC ? n :

Compatibility: **ML**

Function:

Execute carriage return and line feed operation with one command.

Range:

n1 is defined by calculating the decimal, or hexadecimal equivalent of the binary number which is defined as follows...

n/bit	b7	b6	b5	b4	b3	b2	b1	b0
n1	X	0	1	reverse LF	0	X	Forward LF	CR

Any bits defined as a literal 0 or 1 should be set as indicated in the above table. These bits identify which “n” is being defined.

“x” means “don’t care” and can be either 0 or 1.

Out of range:

Command is ignored.

Details:

❖ The functions selected by this command are the same as the function that are selected by individual commands.

❖ Any function selected or reset by this function will override the same function selected by the individual command. The opposite is also true. If a function was originally selected by this composite command, but then reset by an individual command, the function will be OFF.

❖ Any invalid combination of functions will be set according to the printer's priority tables. (See "attachments" Print Modes/ Features Combination Tables).

❖ Command equivalent table:

n/bit	b7	b6	b5	b4	b3	b2	b1	b0
n1	-	0	1	ESC LF	-	-	LF	CR

❖ b0(CR) and b1 (FOW LF) can be selected simultaneously, however b4 (rev LF) and b1 (FWD LF) cannot be selected simultaneously.

❖ The command scanning sequence is b0 to b7. The last valid bit (command) will have precedence in the event of conflict.

Usage Examples...

KEY:"x" = invalid valuet

DATA STREAM	RESULT
X ESC ? n :	If a column (:) following n is omitted, the mode specified by n will be valid and the next data will be discarded.
X ESC ? n1 z1 z2 :	If the terminator is not ":", n is valid the composite command is terminated, z1 is discarded and z2 is processed as normal data.

❖ Do not execute reverse line feed.

GENERAL CONTROL

Reset – clear print buffer

Code: CAN

Compatibility: **Epson/IBM**

Function:

Clear all printable data in the print buffer.

Details:

⋯✦ This code does not clear or affect the control codes which are resident in the receive buffer (Epson).

This command clears the expanded character mode (double width printer character selected by SO code (IBM).

⋯✦ Functions such as BS, HT, VT etc. (Head positioning commands) are not clear since this command only works on printable data.

Reset – clear buffer and initialize printer

Code: ESC @

Compatibility: **Epson**

Function:

Initialize the printer features/modes and clear the print buffer.

Details:

⋯✦ List of Items Reset:

1. Communication interface signals are reset and printer is put on-line.
2. Print Buffer is cleared.
3. Left Margin = clear (left-most print position).
4. Right Margin = clear (right-most print position). ML521: current menu mode.
5. Horizontal tabs = every 8 characters.

6. Vertical Tabs = all tabs in each channel are cleared and tap channel 0 is selected.
7. Line spacing = Current setting in MENU mode.
8. Page length = current menu value.
9. Skip Over Perforation = current menu value.
10. TOF = current line.
11. DLL = off (ROM characters selected).
12. Print Quality = Current menu value.
13. Typestyle = Current menu value.
14. Character Set = Current menu value.
15. All other features = current menu setting, or if they do not appear in the menu, they are OFF.

MSB control – set MSB equal to 1

Code: ESC >

Compatibility: **Epson**

Function:

Set the Bit 7 of data to 1, regardless of the value of receiving data.

Details:

⋯✦ This code limits the range of received data from 80H to FFH.

MSB control – set MSB equal to 0

Code: ESC =

Compatibility: **Epson**

Function:

Set the bit 7 of data to 0.

Details:

⋯✦ This code limits the range of received data from 00H to 7FH.

MSB control – cancel MSB control

Code: ESC #

Compatibility: **Epson**

Function:

Cancel MSB control; interpret the received data literally.

Details:

...❖ The printer accepts the eight bit “as is” from the computer. (8 bit mode)

Related function:

ESC > , set MSB = 1

ESC = , set MSB = 0

Print suppress – ON

Code: DC3

Compatibility: **Epson**

Function:

Deselect the printer and sets the printer in a state that will not allow the printer to receive any data except DC1.

Details:

...❖ The printer cannot be re-selected by using the select button.

...❖ In print suppress mode, SEL lamp will flash when the printer is selected. When the printer is deselected, SEL lamp will remain off.

Related function:

...❖ DC1, Print Suppress-off.

Print suppress – ON

Code: ESC Q ETX or ESC Q SYN

Compatibility: **IBM**

Function:

Deselect the printer and sets the printer in a state that will not allow the printer to receive any data except DC1.

Details:

- The printer can be re-selected by using the select button.
- SEL lamp will flash while in print suppress mode.

Print suppress – OFF

Code: DC1

Compatibility: **Epson/IBM**

Function:

Re-selects the printer and set the printer to its normal mode where in all data can be received

Details:

- The printer processes all the data sent to it.

Print speed – half – ON/OFF

Code: ESC s n

Compatibility: **Epson**

Function:

Turn ON/OFF the mode where printing is executed at 50% of normal speed depending on the value of n.

Range:

- Range n = 01H, 31H, 81H Half-speed printing = On.
- Range n = 00H, 30H, 80H, or B0H Full speed printing = Off.

Out of range

- ❖ This command will be ignored if n equals any other values except for the values mentioned above.

Details:

- ❖ Half speed mode is used to reduce printer noise.
- ❖ If the print speed is slower than the printer's physical lower speed, the half speed command is ignored and data is printed at that lowest speed.
- ❖ Items not cleared...
 - Custom characters (DLL) are not cleared.

Cancel

Code: CAN

Compatibility: **ML**

Function:

- ❖ Cancel data within the same line before the entry of this code as, and after, that for which printing is initiated.
- ❖ Sets the following modes in response to the entry of this code:

ITEM INITIALISED	INITIALISED CONDITION
Character Pitch	Conforms to a menu-set value.
Linefeed Pitch	Conforms to a menu-set value.
Horizontal Tab	Unaffected.
VFU	Unaffected.
Character Modification	
Horizontal Expansion	Conforms to a menu-set value.
Vertical Expansion	Conforms to a menu-set value.
Underline	Cancelled.
Horizontal Enhancement	Cancelled.
Vertical Enhancement	Cancelled.
(Double Strike)	Cancelled.
Super/Sub Script	Cancelled.
Italics	Conforms to a menu-set value.
Unidirectional Printing Setting	
Character	Prints bi-directionally.
Bit Image Graphics	Conforms to a menu-set value.
Half-speed Printing	Cancelled.

ITEM INITIALISED	INITIALISED CONDITION
Clearance between Characters	Cancelled.
Graphics Mode	Switched to a single density setting.
CG	
Font	Conforms to a menu-set value.
ROM/RAM	Set to ROM.
Character Table	Conforms to a menu-set value.
Code Page Setting	Conforms to a menu-set value.
International Character Set	Conforms to a menu-set value.
Zero Font	Conforms to a menu-set value.
NLQ Font	Unaffected.
Left Margin	Unaffected.
Right Margin	Unaffected.
Paper Position	Unaffected.
Print Position	Unaffected.
Page Length (Front/Rear)	Unaffected.
Perforation Skip (Front/Rear)	Unaffected.
Paper End Detection Enabling/ Disabling	Unaffected.
Print Suppression Enabling/ Disabling	Unaffected.
Impact Mode	Conforms to a menu-set value.
Emulation Mode	Unaffected.
Barcode	Assumes the default condition
SI/SO	Set to S1.

Printer Initialization

Code: ESC CAN

Compatibility: **ML**

Function:

- ❖ Print any data stored in the print buffer and brings the system to a state at power-on.
- ❖ Retains data in the receive buffer, resumes operation automatically after the execution of initialization setting by this command, and processes the data without losing it. Menu-set “Reset Inhibit” has effect on this command as follows:

ITEM INITIALISED	INITIALISED CONDITION
Character Pitch	Conforms to a menu-set value.
Linefeed Pitch	Conforms to a menu-set value.
Horizontal Tab	Assumes it's default.
VFU	Cancelled.
Character Modification	
Horizontal Expansion	Conforms to a menu-set value.
Vertical Expansion	Conforms to a menu-set value.
Underline	Cancelled.
Horizontal Enhancement	Cancelled.
Vertical Enhancement	
(Double Strike)	Cancelled.
Super/Sub Script	Cancelled.
Italics	Conforms to a menu-set value.
Unidirectional Printing Setting	
Character	Prints bi-directionally.
Bit Image Graphics	Conforms to a menu-set value.
Half-speed Printing	Cancelled.
Clearance between Characters	Cancelled.
Graphics Mode	Switched to a single density setting
CG	
Font	Conforms to a menu-set value.
ROM/RAM	Set to ROM
Character Table	Conforms to a menu-set value.
Code Page Setting	Conforms to a menu-set value.
International Character Set	Conforms to a menu-set value.
Zero Font	Conforms to a menu-set value.
NLQ Font	Conforms to a menu-set value.
Left Margin	Assumes it's default (home position).
Right Margin	Conforms to a menu-set value.
Paper Position	Set to the TOF position.
Print Position	Set to the left margin.
Page Length (Front/Rear)	Conforms to a menu-set value.
Perforation Skip (Front/Rear)	Conforms to a menu-set value.
Paper End Detection Enabling/ Disabling	Conforms to a menu-set value.
Print Suppression Enabling/ Disabling	Conforms to a menu-set value.
Impact Mode	Conforms to a menu-set value.
Emulation Mode	Unaffected
Barcode	Assumes the default condition
SI/SO	Set to S1

Print suppress – ON

Code: DC3

Compatibility: **ML**

Function:

Activate the print suppress mode in which all data is ignored.
(except DC1)

Details:

- ...❖ The SEL LED will blink to indicate that this function was activated.
- ...❖ All interface signal lines will operate normally.
- ...❖ If this function is indicated in MENU as not effective, then this command will be ignored.

Print suppress – OFF

Code: DC1

Compatibility: **ML**

Function:

Deactivate the print suppress mode and accept all data.

Details:

- ...❖ This function **CANNOT** be deactivated by pressing the SEL switch.
- ...❖ If the printer is not set to “print suppress mode effective”, this function code is ignored.

Print speed – half

Code: ESC <

Compatibility: **ML**

Function:

Turn on the mode where printing is executed at 50% of normal speed.

Details:

- ...❖ Half speed mode is used to reduce printer noise.
- ...❖ If the print speed is slower than the printer's physical lower speed, the half speed command is ignored and data is printed at that lowest speed.

Print speed – full

Code: ESC >

Compatibility: **ML**

Function:

Turn off the mode where printing is executed at 50% of normal speed; return to normal (full) speed printing.

Details:

- ...❖ Full speed mode when throughput is more important than noise.

Stop Print

Code: ESC j

Compatibility: **IBM**

Function:

Execution of this code puts the printer in DESEL mode. (SEL LED turns OFF.)

Details:

- ...❖ The DESEL mode is selected by pressing the SEL switch or loading paper (when the "Auto Select" feature is set to "Yes" in MENU mode).
- ...❖ Prints out data in the printer receiving buffer received prior to the ESC j code.

Emulation mode switching

Code: ESC { n

Compatibility: **Epson/IBM/ML**

Function:

Switch Emulation mode.

Range:

n = 00H, 02H ... Proprinter mode is selected.

n = 40, 41H ... Epson mode is selected.

n = 20H, 21H ... ML mode is selected.

Out of range:

This command is invalid if any value out of the above mentioned range is specified, and the previously set emulation remains.

Details:

- ...❖ Printing is started by this command.
- ...❖ The printer is set into the default state. (Not affected by bin selection of dual bin CSF)
- ...❖ This command has no effect on the MENU items.
- ...❖ The DLL data is set into the default state except when the same emulation as the current one is set.

Printer initialisation

Code: ESC } NUL

Compatibility: **Epson/IBM/ML**

Function:

Printer is initialised, with the print buffer cleared.

Details:

- ...❖ Items initialised:
 1. Print buffer clear

- | | | |
|-----|------------------|----------------------------------|
| 2. | Left margin | = Default |
| 3. | Right margin | = Default |
| 4. | Horizontal tab | = Default (for each 8 character) |
| 5. | Vertical tab | = Default |
| 6. | VFU | = Default |
| | VFU channel | = Channel 0 |
| 7. | Line feed pitch | = Determined by menu |
| 8. | Page length | = Determined by menu |
| 9. | Perforation skip | = Determined by menu |
| 10. | Form position | = TOF |
| 11. | FOM/RAM | = ROM |
| 12. | Print quality | = Determined by menu |
| 13. | Character set | = Determined by menu |
| 14. | Emulation mode | = Determined by menu |

Set initial condition

Code: ESC [K Ln Hn Init Id Parm 1 Parm 2

Compatibility: **IBM**

Function:

Set the initial state of printer.

Range:

⋯✦ Ln, Hn specify the number of subsequent parameter bytes.

00H Ln FFH

00H Hn FFH

The number of subsequent parameter bytes will be $Ln + (Hn \times 256)$ bytes.

When $Ln = Hn = 00H$ is specified, the code between ESC and Hn is discarded and this command mode will be cleared.

Normally, $Hn = 00H$ and $Ln = 01H$ to $04H$ are used.

❖ Init sets the initial state of printer.

Init = 00H

Retains the settings of MENU item A features.

Sets Parm 1 and Parm 2 features for each mode.

Retains DLL font data.

The DLL mode is not cleared. (Retains ROM/RAM set by the ESC In code. However, the print mode complies with the settings of MENU items.)

Init = 01H

Retains the settings of MENU item A features.

Sets Parm 1 and Parm 2 features for each mode.

Sets DLL copy font feature to entire area copy mode.

Init = 04H

Clears the modes of MENU item A features.

Sets Parm 1 and Parm 2 features for each mode.

Clears DLL mode.

Init = 05H

Clears the modes of MENU item A features.

Sets Parm 1 and Parm 2 features for each mode.

Sets DLL copy font feature to entire area copy mode.

Init = FEH

Retains the settings of MENU item A features.

Sets Parm 1 and Parm 2 features for each mode.

Sets DLL copy font feature to entire area copy mode.

Init = FFH

Clears the modes of MENU item A features.

Sets Parm 1 and Parm 2 features for each mode.

Sets DLL copy font feature to entire area copy mode.

Init specifications other than 00H, 01H, 04H, 05H, FEH, and FFH have the same operations as Init = 00H.

❖ Id specifies the printer ID number.

Id = 03H or Id = 16H is

❖ Parm 1 specifies MENU item B features.

BIT	ITEMS SET	OFF (O)	ON (I)
7	Parameter enabled/disabled	Enabled	Disabled
6	Not used . .	–	–
5	Paper end alarm buzzer ON/OFF	None (Always set to OFF)	
4	Auto CR mode	Disabled (LF only)	Enabled (LF + CR)
3	Auto LF mode	Disabled (CR only)	Enabled (CR + LF)
2	Page length	11 inches	12 inches
1	Zero character	Non-slashed	Slashed
0	Character set	Set I	Set II

❖ Parm 2 specifies MENU item C features.

BIT	ITEMS SET	OFF (O)	ON (I)
7	Parameter enabled/disabled	Enabled	Disabled
6	DDL copy font	Copies ROM code page font	Copies Multi-lingual font
5	NLQ print direction (10 CPI)	None (always uses bi-directional printing)	–
4	CPI mode when 12 CPI + compressed data is received	20 CPI	12 CPI
3	Font when NLQ font is selected by switch	NLQ II (Courier)	NLQ (Gothic)
2	Operation of FF code at TOF position	FF operation is performed	FF operation is not performed
1	Page print width	13.6 inches	8 inches
0	CSF mode ON/OFF	None (current mode)	–

Details:

- ❖ This command will be valid when the “Reset Inhibit” feature is set to “No” in MENU mode. If the feature is set to “Yes”, this command is ignored.
- ❖ If print data exists when the printer received this command, the printer starts printing. Carriage return will occur, but there will be no line feeds.
- ❖ DLL copy of the code page is executed in accordance with the bit 6 setting of Parm2.
- ❖ The table below summarizes MENU items to be set and their corresponding parameters.

MENU item A

No	IBM PPR		PRINTER
1	Fast font	ON/OFF	Complies with the Print Mode setting in MENU mode. Utility
2	Italic font	ON/OFF	Complies with the Style setting in MENU mode. Normal
3	Emphaised print	ON/OFF	None (Always set to OFF).
4	Double-high print	ON/OFF	Complies with the Size setting in MENU mode. Normal
5	Double-wide print	ON/OFF	Complies with the Size setting in MENU mode. Normal
6	Pitch	10/12/17.1/20/Prop.	Complies with the Pitch setting in MENU mode. 10 CPI
7	NLQ	ON/OFF	Complies with the Print Mode setting in MENU mode. Utility.

NOTE

Emboldened items in the above table indicate settings of the mode clear state.

MENU item B

No	IBM PPR	PRINTER
1	Paper end alarm buzzer ON/OFF	None (Always set to OFF).
2	Auto CR mode	Complies with the Auto CR setting in MENU mode.
3	Auto LF mode	Complies with the Auto LF setting in MENU mode.
4	Page Length	Complies with the Page Length setting in MENU mode.
5	Zero character	Complies with the Zero Character setting in MENU mode.
6	Character set	Complies with the Character Set setting in MENU mode.

MENU item C

No	IBM PPR	PRINTER
1	DLL copy font	Copies in accordance with the Code Page setting in MENU mode.
2	NLQ print direction (10 CPI)	None (always uses bi-directional printing).
3	CPI mode when 12 CPI + compressed data is received.	Complies with the SI Select (12 CPI) setting in MENU mode.
4	Font when NLQ font is selected by switch	Complies with the Print Mode setting in MENU mode.
5	Operation of FF code at TOF position.	None (FF operation is always enabled).
	Page print width	Complies with the Page Width setting in MENU mode.
6	CSF mode ON/OFF	None (Maintains current printer mode.)

Incremental Print

Code: ESC i Pn

Compatibility: **Epson/IBM/ ML**

Function:

Sets or resets the Incremental Print mode.

Range:

Pn = 00H, 01H, 30H, 31H, 80H, 81H, B0H, and B1H

Details:

...❖ Pn

01H, 31H, 81H, or B1H to set the Incremental Print mode.

00H, 30H, 80H, or B0H to reset the Incremental Print mode.

...❖ In the Incremental Print mode, print starting occurs under the conditions shown below and the next print start position is indicated by the hot stamp which is in the left end of the ribbon protector.

Operating space code: FFH (Note 1)

BS code: 08H

HT code: 09H (Note 1)

CR code: 0DH

LF code: 0AH

FF code: 0CH

LF execution command

Positioning command (Note 1)

Write-margin over

Cancel command (Note 3)

1-character deletion (DEL) (Note 3)

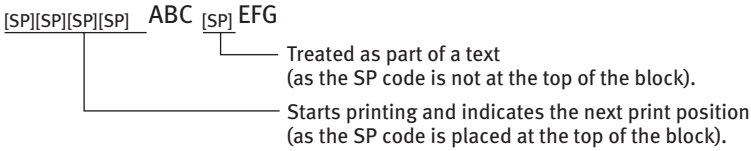
Left/right margin set command (Note 3)

(a) Operating space code “FFH,” HT code “09H,” and positioning command

These codes cause the printer to start and indicate the next print position **only when the code is placed at the top of a block**. Code placed anywhere except the top of a block is treated as part of the text.)

However, when an underscore is added, this code is treated as a character (without indicating the next print position).

Example



[SP]Operating space code

- (b) The timeout printing is specified by “Time Out Print” on the menu.
- (c) This command indicates the next print start position (without starting printing).

Set Unit

Code: ESC (U Ln Hn Pn

Compatibility: **Epson**

Function:

Set the Unit to Pn/4320 inch.

Range:

❖ Range of Ln and Hn

Ln : 0 ~ 255

Hn : 0 ~ 255

Data quantity = Ln + (Hn*256)

❖ With Pn, basic unit is selected.

Pn : 0 ~ 255

Pn	Unit
0 ≤ Pn < 9	No change
10 ≤ Pn < 19	1/432 inch
20 ≤ Pn < 29	1/216 inch
30 ≤ Pn < 39	No change

40 =< Pn =< 49	No change
50 =< Pn =< 59	No change
60 =< Pn =< 69	No change
70 =< Pn 127	No change

❖ Commands affected with this command and default basic unit

ESC (c (SET PAGE FORMAT) 1/216 inch

ESC (C (PAGE LENGTH IN DEFINED UNIT) 1/216 inch

Quiet mode – ON/OFF

Code: ESC DLE O Pno Pn

Compatibility: **Epson/IBM/ML**

Function:

Set or reset the Quiet mode.

Range:

❖ Pno specifies the number of subsequent parameter bytes.

0=<Pno=<FFH (The MSB is ignored).

This command is ignored when Pno = 0.

❖ Pn selects whether to set or reset the Quiet mode.

Pn = 00H, 30H, 80H, B0H to reset the Quiet mode

Pn = 01H, 31H, 81H, B1H to set the Quiet mode

When another type is specified, this command is ignored.

BAR CODES

Select bar code

Code: ESC DLE A P1 N1 N2 N3 N4 N5 N6 N7 N8

Compatibility: **Epson/IBM/ML**

Function:

Select the bar code type and size.

Range:

- P1 specifies the subsequent data amount (the MSB is ignored).
 - P1 = 0, 1, or 3: This command is ignored.
 - P1 = 2, 4, 5, 6, 7, or 8: This command is valid.
 - P1 = 9: Data between N1 and N8 are valid and data from N9 to P1 will be discarded.

- N1 and N2 select the bar code type (the upper 4 bits are ignored).

N1	N2	Bar code type
0	1	EAN8
0	2	EAN13
1	0	UPC-A
1	4	UPC-E
2	0	CODE39
3	0	Interleaved 2 of 5
4	0	Code 128

When values other than the above are specified for N1 and N2, this command is ignored and the data amount specified by P1 is discarded.

- N3 and N4 specify the vertical bar code length. Specify the length by 6/72-inch units (the upper 4 bits are ignored).

Vertical bar code length: $(N3 \times 10 + N4) \times (6/72)$ inch.

N3 = N4 = 0: Maintains the current setting.

N3 × 10 + N4 25: Sets to 24.

- N5 specifies the black bar width.

The minimum black bar width is 1/72 inch.

N5 = 0: Maintains the current setting.

N5 8: Sets to 7.

...❖ N6 specifies the space width.

The minimum space width is 1/72 inch.

N6 = 0: Maintains the current setting.

N6 =< 8: Sets to 7.

...❖ N7 specifies the ratio between wide element and narrow element.

N7 Ratio between wide and narrow elements.

1 2:1

2 2.5:1

3 3:1

4 3.5:1

5 4:1

6 4.5:1

7 5:1

N7 = 0: Maintains the current setting.

N7 =< 8: Sets to 7.

...❖ N8d specifies the character type.

N8 = 0: Appends no character.

N8 = 1: Appends Utility character.

N8 = 2: Appends NLQ character.

The character size is fixed at 12 CPI.

Details:

Default settings of this parameter are listed below.

N1N2 = 10(UPC-A)

N3N4 = 09 (3/4 inch)

N5 = 1(1/72 inch)

N6 =	1(1/72 inch)
N7 =	2(2.5:1)
N8 =	2 (NLQ character)

Print bar code data

Code: ESC DLE B P1 Pm [DATA]

Compatibility: **Epson/IBM/ML**

Function:

Prints the bar code data.

Range:

- ✚ P1 specifies the subsequent data amount (the MSB is ignored).
- ✚ Pm selects mode A, B, or C of CODE128. This parameter is effective only when the CODE128 bar code is selected. When another bar code type is selected, the Pm parameter is ignored.
 - Pm = 65: Selects CODE128 mode A.
 - Pm = 66: Selects CODE128 mode B.
 - Pm = 67: Selects CODE128 mode C.

When data other than the above is specified this command is ignored and the entire code is discarded.

•✚ [DATA] indicates the bar code data.

Details:

The valid number of characters (number of data) for this command is listed below.

Bar code type	Number of characters
EAN8	8
EAN13	13
UPC-A	12

UPC-E	6
CODE39	1 to 50
Interleaved 2 of 5	1 to 50
Code 128 (A, B, C)	1 to 50

Print postnet bar code data

Code: ESC DLE C P1 [DATA]

Compatibility: **Epson/IBM/ML**

Function:

Print the postnet bar code data.

Range:

...❖ P1 specifies the subsequent data amount (the MSB is ignored).

P1: 1 to 20

When data other than the above is specified, this command is ignored and discarded.

...❖ [DATA] indicates the postnet bar code data.

The external code table of bar code data is given in the following pages. Any data not included in the external code table will be ignored.

L/H	0	1	2	3	4	5	6	7
0	-----	-----	-----	0	@ (Check digit)	-----	-----	-----
1	-----	-----	-----	1	-----	-----	-----	-----
2	-----	-----	-----	2	-----	-----	-----	-----
3	-----	-----	-----	3	-----	-----	-----	-----
4	-----	-----	-----	4	-----	-----	-----	-----
5	-----	-----	-----	5	-----	-----	-----	-----
6	-----	-----	-----	6	-----	-----	-----	-----
7	-----	-----	-----	7	-----	-----	-----	-----
8	-----	-----	-----	8	-----	-----	-----	-----
9	-----	-----	-----	9	-----	-----	-----	-----
A	-----	-----	-----	-----	-----	-----	-----	-----
B	-----	-----	-----	-----	-----	-----	-----	-----
C	-----	-----	-----	-----	-----	-----	-----	-----
D	-----	-----	-----	-----	-----	-----	-----	-----
E	-----	-----	-----	-----	-----	-----	-----	-----
F	-----	-----	-----	-----	-----	-----	-----	-----

Bar Code External Code Table UPC-A
 EAN8
 EAN13
 Interleaved 2 of 5
 Postnet

L \ H	0	1	2	3	4	5	6	7
0	-----	-----	-----	0	-----	-----	-----	-----
1	-----	-----	-----	1	-----	-----	-----	-----
2	-----	-----	-----	2	-----	-----	-----	-----
3	-----	-----	-----	3	-----	-----	-----	-----
4	-----	-----	-----	4	-----	-----	-----	-----
5	-----	-----	-----	5	-----	-----	-----	-----
6	-----	-----	-----	6	-----	-----	-----	-----
7	-----	-----	-----	7	-----	-----	-----	-----
8	-----	-----	-----	8	-----	-----	-----	-----
9	-----	-----	-----	9	-----	-----	-----	-----
A	-----	-----	-----	-----	-----	-----	-----	-----
B	-----	-----	-----	-----	-----	-----	-----	-----
C	-----	-----	-----	-----	-----	-----	-----	-----
D	-----	-----	-----	-----	-----	-----	-----	-----
E	-----	-----	-----	-----	-----	-----	-----	-----
F	-----	-----	-----	-----	-----	-----	-----	-----

Bar Code External Code Table UPC-E

L \ H	0	1	2	3	4	5	6	7
0			SP	0	@ (Check digit)	P		
1				1	A	Q		
2				2	B	R		
3				3	C	S		
4			\$	4	D	T		
5			%	5	E	U		
6				6	F	V		
7				7	G	W		
8				8	H	X		
9				9	I	Y		
A			*		L	Z		
B			+		K			
C					L			
D			-		M			
E					N			
F			/		O			

Bar Code External Code Table CODE 39

L \ H	0	1	2	3	4	5	6	7
0	NUL	DLE	SP	0	@	P	FNC3	
1	SOH	DC1	!	1	A	Q	FNC2	
2	STX	DC2	"	2	B	R	SHIFT	
3	ETX	DC3	#	3	C	S	CODE C	
4	EOT	DC4	\$	4	D	T	CODE B	
5	ENQ	NAK	%	5	E	U	FNC 4	
6	ACK	SYN	&	6	F	V	FNC 1	
7	BEL	ETB	'	7	G	W	(Check digit)	
8	BS	CAN	(	8	H	X		
9	HT	EM	)	9	I	Y		
A	LF	SUB	*	:	L	Z		
B	VT	ESC	+	;	K	[
C	FF	FS	,	<	L	\		
D	CR	GS	-	=	M]		
E	SO	RS	.	>	N	^		
F	SI	US	/	?	O	-		

Bar Code External Code Table CODE 128
Code type: A

L \ H	0	1	2	3	4	5	6	7
0			SP	0	@	P	'	p
1			!	1	A	Q	a	q
2			"	2	B	R	b	r
3			#	3	C	S	c	s
4			\$	4	D	T	d	t
5			%	5	E	U	e	u
6			&	6	F	V	f	v
7			'	7	G	W	g	w
8		(Check digit)	(	8	H	X	h	x
9		FNC 3	)	9	I	Y	i	y
A		FNC 2	*	:	J	Z	j	z
B		SHIFT	+	;	K	[	k	{
C		CODE C	,	<	L	\	l	|
D		CODE B	-	=	M	]	m	}
E		FNC 4	.	>	N	^	n	~
F		FNC 1	/	?	O	-	o	DEL

Bar Code External Code Table CODE 128
Code type: B

L \ H	0	1	2	3	4	5	6	7
0	-----	-----	-----	0	@ (Check digit)	-----	-----	-----
1	-----	-----	-----	1	-----	-----	-----	-----
2	-----	-----	-----	2	-----	-----	-----	-----
3	-----	-----	-----	3	-----	-----	-----	-----
4	-----	-----	-----	4	-----	-----	-----	-----
5	-----	-----	-----	5	-----	-----	-----	-----
6	-----	-----	-----	6	-----	-----	-----	-----
7	-----	-----	-----	7	-----	-----	-----	-----
8	-----	-----	-----	8	-----	-----	-----	-----
9	-----	-----	-----	9	-----	-----	-----	-----
A	-----	-----	-----	CODE B	-----	-----	-----	-----
B	-----	-----	-----	CODE A	-----	-----	-----	-----
C	-----	-----	-----	FNC1	-----	-----	-----	-----
D	-----	-----	-----	-----	-----	-----	-----	-----
E	-----	-----	-----	-----	-----	-----	-----	-----
F	-----	-----	-----	-----	-----	-----	-----	-----

Bar Code External Code Table

Code type C

Print Barcode

Code: ESC (B Ln Hn Pk Pm Ps Lv Hv Pc [DATA]

Compatibility: **Epson**

Function:

Print barcode data.

Valid range and meaning of Ln and Hn.

0(00H) Ln 255(FFH)

0(00H) Hn 255(FFH) MSB will be invalid.

Indicates the number of further parameter bytes.

Number of parameter bytes = Ln + Hn x 256.

This parameter will be valid only when set by further parameter bytes (6 bytes) + the number of data bytes (differs depending on barcode type). For the settings other than this, the command will be invalid and the data after the number of bytes designated by this parameter will be received and discarded.

⋯❖ Sets barcode type by parameter Pk.

Pk (Hex) Barcode type

PK (Hex)	BARCODE TYPE
00	EAN-13
01	EAN-18
02	Interleaved 2 of 5
03	UPC-A
04	UPC-E
05	Code 39
06	Code 128
07	Postnet

(MSB valid)

When a barcode type other than above is designated, this command will be invalid and the number of bytes indicated by Ln and Hn will be received and discarded.

- Sets module (black bar and SP bar) width by parameter Pm.

Pm	MODULE WIDTH (1/120")
02	2 Dots
03	3 Dots
04	4 Dots
05	5 Dots

(MSB valid)

For settings other than the than above, width will be 2 dots.

- Sets SP bar width on the basis of parameter Pm setting by parameter Ps.

Ps	ADJUSTMENT VALUE FOR THE STANDARD WIDTH OF SP BAR (1/240" UNIT)
FDH	-3
FEH	-2
FFH	-1
00H	0 (default)
01H	+1
02H	+2
03H	+3

(MSB valid)

For the settings other than the above, value will be 0 setting.

- Sets height (1/72" unit) of black bar by parameter Lv and Hv.
(Black bar height = Lv + Hv × 256).

0(00H) Lv 255(FFH)

0(00H) Hv 255(FFH)

Maximum setting value for height is 2 inches.

(Can be set in 6/72" unit)

SETTING RANGE	SET VALUE	SETTING RANGE	SET VALUE
1 >= Lv·Hv <= 6	6/72 "	79 >= Lv·Hv <= 84	84/72 "
7 >= Lv·Hv <= 12	12/72 "	85 >= Lv·Hv <= 90	90/72 "
13 >= Lv·Hv <= 18	18/72 "	91 >= Lv·Hv <= 96	90/72 "
19 >= Lv·Hv <= 24	24/72 "	97 >= Lv·Hv <= 102	102/72 "
25 >= Lv·Hv <= 30	30/72 "	103 >= Lv·Hv <= 108	108/72 "
31 >= Lv·Hv <= 36	6 36/72 "	109 >= Lv·Hv <= 114	114/72 "
37 >= Lv·Hv <= 42	42/72 "	115 >= Lv·Hv <= 120	120/72 "
43 >= Lv·Hv <= 48	48/72 "	121 >= Lv·Hv <= 126	126/72 "
49 >= Lv·Hv <= 54	54/72 "	127 >= Lv·Hv <= 132	132/72 "
55 >= Lv·Hv <= 60	60/72 "	133 >= Lv·Hv <= 138	138/72 "
61 >= Lv·Hv <= 66	66/72 "	139 >= Lv·Hv <= 144	144/72 "
67 >= Lv·Hv <= 72	72/72 "	145 >= Lv·Hv	144/72 "
73 >= Lv·Hv <= 78	78/72 "		

- Pc: Sets control information.

Pc	MODULE WIDTH
bit 0	Sets check digit 0: Does not add check digit 1: Adds check digit
bit 1	Sets human readable character 0: Prints 1: Does not print
bit 2	Sets flag character print position (Setting invalid) 0: Prints in center 1: Prints in lower line
bit 3	(reserved)
bit 4	(reserved)
bit 5	(reserved)
bit 6	(reserved)
bit 7	(reserved)

••• DATA: Transmits barcode data.

(The following table shows number of barcode data).

BARCODE TYPE	WHEN CHECK DIGIT IS NOT ADDED	WHEN CHECK DIGIT IS ADDED
EAN-13	ODH	OCH
EAN-18	O8H	07H
Interleaved 2 of 5	01H TO 32H	01H to 32H
UPC-A	OCH	0BH
UPC-E	06H	06H
Code 39	01H to 32H	01H to 32H
Code 128	02H to 32H	02H to 32H
POSTNET	06H or 0AH or OCH	05H or 09H or OBH

Set-up Barcode Parameter

Code: ESC [f Ln Hn Pk Pm Ps Lv Hv Pc [DATA]

Compatibility: **IBM**

Function:

••• Sets barcode type.

Valid range and meaning of Ln and Hn.

0(00H) Ln 255(FFH)

0(00H) Hn 255(FFH) MSB will be invalid.

Indicates number of further parameter bytes.

Number of parameter bytes = Ln + Hn x 256

This parameter shall be valid only when set by further parameter bytes (6 bytes) + the number of data bytes (differs depending on barcode type). For the settings other than this, this command will be invalid and the data after the number of bytes designated by this parameter will be received and discarded.

••• Sets barcode type by parameter Pk

PK (Hex)	BARCODE TYPE
B2H	EAN-13
B3H	EAN-8
B4H	Code 39
B6H	Interleaved 2 of 5
B7H	UPC-E
B9H	Postnet
BAH	Code 128

(MSB valid)

When a barcode type other than above is designated, this command will be invalid and the number of bytes indicated by Ln and Hn will be received and discarded.

••• Sets module (black bar and SP bar) width by parameter Pm.

Pm	MODULE WIDTH (1/120")
00H	2 Dots
01H	1 Dot
02H	2 Dots
03H	3 Dots
04H	4 Dots

(MSB valid)

For settings other than above, width will be 2 dots.

- Sets SP bar width on the basis of parameter Pm setting by parameter Ps.

PS	ADJUSTMENT VALUE FOR THE STANDARD WIDTH OF SP BAR (1/240" UNIT)
FDH	-3
FEH	-2
FFH	-1
00H	0 (default)
01H	+1
02H	+2
03H	+3

(MSB valid)

For the settings other than the above, value will be 0 setting.

- Sets height (1/2160" unit) of black bar by parameter Lv and Hv.

(Black bar height = Lv + Hv × 256)

0(00H) Lv 255(FFH)

0(00H) Hv 255(FFH)

Maximum setting value for height is 2 inches. (Possible to be set in 6/72" unit)

SETTING RANGE	SET VALUE
1 >= Lv·Hv >= 180	6/72 "
181 >= Lv·Hv >= 360	12/72 "
361 >= Lv·Hv >= 540	18/72 "
541 >= Lv·Hv >= 720	24/72"
721 >= Lv·Hv >= 900	30/72 "
901 >= Lv·Hv >= 1080	6 36/72"
1080 >= Lv·Hv >= 1260	42/72"
1261 >= Lv·Hv >= 1440	48/72 "
1441 >= Lv·Hv >= 1620	54/72"
1621 >= Lv·Hv >= 1800	60/72 "
1801 >= Lv·Hv >= 1980	66/72"
1981 >= Lv·Hv >= 2160	72/72 "
2161 >= Lv·Hv >= 2340	78/72"

SETTING RANGE	SET VALUE
2341 >= Lv·Hv >= 2520	84/72 "
2521 >= Lv·Hv >= 2700	90/72"
2701 >= Lv·Hv >= 2880	90/72"
2881 >= Lv·Hv >= 3060	102/72"
3061 >= Lv·Hv >= 3240	108/72"
3241 >= Lv·Hv >= 3420	114/72"
3421 >= Lv·Hv >= 3600	120/72"
3601 >= Lv·Hv >= 3780	126/72 "
3781 >= Lv·Hv >= 3960	132/72 "
3961 >= Lv·Hv >= 4140	138/72"
4141 >= Lv·Hv >= 4320	144/72"
4321 >= Lv·Hv	144/72"

...❖ Pc: Sets control information.

Pc	MODULE WIDTH
bit 0	Sets check digit 0: Does not add check digit 1: Adds check digit
bit 1	Sets human readable character 0: Prints 1: Does not print
bit 2	Sets flag character print position (Setting invalid) 0: Prints in center 1: Prints in lower line
bit 3	(reserved)
bit 4	(reserved)
bit 5	(reserved)
bit 6	(reserved)
bit 7	(reserved)

Print postnet bar code data

Code: ESC [p Ln Hn [DATA]

Compatibility: **IBM**

Function:

Print barcode.

Valid range and meaning of Ln and Hn.

0(00H) Ln 255(FFH)

0(00H) Hn 255(FFH)

Indicates number of further parameter bytes.

Number of parameter bytes = Ln + Hn x 256

This parameter shall be valid only when set by further parameter bytes (6 bytes) + the number of data bytes (differs depending on barcode type). For the settings other than this, this command shall be invalid and the data after the number of bytes designated by this parameter will be received and discarded.

DATA: Transmits barcode data.

The following table shows number of barcode data.

BARCODE TYPE	WHEN CHECK DIGIT IS NOT ADDED	WHEN CHECK DIGIT IS ADDED
EAN-13	0DH	0CH
EAN-8	08H	07H
Code 39	01H to 32H	01H to 32H
Interleaved 2 of 5	01H TO 32H	01H to 32H
UPC-A	0CH	0BH
POSTNET	0AH	09H
Code 128	02H to 32H	02H to 32H

CODE PAGE TABLES

USA

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|		0	@	P	'	p	Q	é	á	:	L	ll	a	≡		
1|	!	1	A	Q	a	q	R	ê	â	;	l	ll	B	±		
2|	"	2	B	R	b	r	S	ë	ã	,	l	ll	Γ	±		
3|	#	3	C	S	c	s	T	è	ä	<	l	ll	Π	±		
4|	\$	4	D	T	d	t	U	é	å	>	l	ll	Σ	±		
5|	%	5	E	V	e	v	V	ê	â	~	l	ll	σ	±		
6|	&	6	F	W	f	w	U	ë	ã		l	ll	μ	±		
7|	'	7	G	X	g	x	V	è	ä		l	ll	τ	±		
8|	(	8	H	Y	h	y	W	é	å		l	ll	φ	±		
9|	)	9	I	Z	i	z	X	ê	â		l	ll	Θ	±		
A|	*	:	J	[	j	[	Y	ë	ã		l	ll	Ω	±		
B|	+	;	K	\	k	\	Z	è	ä		l	ll	δ	±		
C|	,	<	L	|	l	|	[	é	å		l	ll	o	±		
D|	.	>	M	^	m	^	\	ê	â		l	ll	ø	±		
E|	-	~	N	~	n	~	|	ë	ã		l	ll	Ε	±		
F|	/	?	O	_	o	_	~	è	ä		l	ll	∅	±		

Multilingual

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|		0	@	P	'	p	Q	é	á	:	L	ll	ó	ó	-	
1|	!	1	A	Q	a	q	R	ê	â	,	l	ll	ö	ö	±	
2|	"	2	B	R	b	r	S	ë	ã	<	l	ll	ë	ë	±	
3|	#	3	C	S	c	s	T	è	ä	>	l	ll	è	è	±	
4|	\$	4	D	T	d	t	U	é	å	~	l	ll	é	é	±	
5|	%	5	E	V	e	v	V	ê	â		l	ll	ê	ê	±	
6|	&	6	F	W	f	w	U	ë	ã		l	ll	ë	ë	±	
7|	'	7	G	X	g	x	V	è	ä		l	ll	è	è	±	
8|	(	8	H	Y	h	y	W	é	å		l	ll	é	é	±	
9|	)	9	I	Z	i	z	X	ê	â		l	ll	ê	ê	±	
A|	*	:	J	[	j	[	Y	ë	ã		l	ll	ë	ë	±	
B|	+	;	K	\	k	\	Z	è	ä		l	ll	è	è	±	
C|	,	<	L	|	l	|	[	é	å		l	ll	é	é	±	
D|	.	>	M	^	m	^	\	ê	â		l	ll	ê	ê	±	
E|	-	~	N	~	n	~	|	ë	ã		l	ll	ë	ë	±	
F|	/	?	O	_	o	_	~	è	ä		l	ll	è	è	±	

Norway

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|		0	@	P	'	p	Q	é	á	:	L	ll	a	≡		
1|	!	1	A	Q	a	q	R	ê	â	,	l	ll	B	±		
2|	"	2	B	R	b	r	S	ë	ã	<	l	ll	Γ	±		
3|	#	3	C	S	c	s	T	è	ä	>	l	ll	Π	±		
4|	\$	4	D	T	d	t	U	é	å	~	l	ll	Σ	±		
5|	%	5	E	V	e	v	V	ê	â		l	ll	σ	±		
6|	&	6	F	W	f	w	U	ë	ã		l	ll	μ	±		
7|	'	7	G	X	g	x	V	è	ä		l	ll	τ	±		
8|	(	8	H	Y	h	y	W	é	å		l	ll	φ	±		
9|	)	9	I	Z	i	z	X	ê	â		l	ll	Θ	±		
A|	*	:	J	[	j	[	Y	ë	ã		l	ll	Ω	±		
B|	+	;	K	\	k	\	Z	è	ä		l	ll	δ	±		
C|	,	<	L	|	l	|	[	é	å		l	ll	o	±		
D|	.	>	M	^	m	^	\	ê	â		l	ll	ø	±		
E|	-	~	N	~	n	~	|	ë	ã		l	ll	Ε	±		
F|	/	?	O	_	o	_	~	è	ä		l	ll	∅	±		

Cyrillic Latvian

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|					@	P	'	p	А	Р	а	Б	С	Д	Е	Ф
1|	!	1	2	3	A	Q	a	q	Б	С	б	Г	Т	У	Ф	Г
2|	"	2	3	4	B	R	b	r	Г	У	г	Д	У	Ф	Г	Д
3|	#	3	4	5	C	S	c	s	Д	Ф	д	Е	Ж	З	И	Л
4|	\$	4	5	6	D	T	d	t	Е	Ж	ж	И	К	Л	М	Н
5|	%	5	6	7	E	U	e	u	Ж	З	з	И	К	Л	М	Н
6|	&	6	7	8	F	V	f	v	З	И	и	Я	А	В	С	Д
7|	'	7	8	9	G	W	g	w	И	Л	л	Я	А	В	С	Д
8|	(	8	9		H	X	h	x	Л	М	м	Я	А	В	С	Д
9|	)	9			I	Y	i	y	М	Н	н	Я	А	В	С	Д
A|	*	:			J	Z	j	z	Н	О	о	Я	А	В	С	Д
B|	+	;			K	[	k	{	О	П	п	Я	А	В	С	Д
C|	,	<			L	\	l	|	П	Я	я	Я	А	В	С	Д
D|	-	=			M	]	m	}	Я	Я	я	Я	А	В	С	Д
E|	.	>			N	^	n	~	Я	Я	я	Я	А	В	С	Д
F|	/	?			O	_	o		Я	Я	я	Я	А	В	С	Д

Roman - 8

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|					@	P	'	p	Q	é	-	á	á	á	á	á
1|	!	1	2	3	A	Q	a	q	ú	é	á	é	á	á	á	á
2|	"	2	3	4	B	R	b	r	é	é	á	é	á	á	á	á
3|	#	3	4	5	C	S	c	s	ó	é	á	é	á	á	á	á
4|	\$	4	5	6	D	T	d	t	ó	é	á	é	á	á	á	á
5|	%	5	6	7	E	U	e	u	ó	é	á	é	á	á	á	á
6|	&	6	7	8	F	V	f	v	ó	é	á	é	á	á	á	á
7|	'	7	8	9	G	W	g	w	ó	é	á	é	á	á	á	á
8|	(	8	9		H	X	h	x	ó	é	á	é	á	á	á	á
9|	)	9			I	Y	i	y	ó	é	á	é	á	á	á	á
A|	*	:			J	Z	j	z	ó	é	á	é	á	á	á	á
B|	+	;			K	[	k	{	ó	é	á	é	á	á	á	á
C|	,	<			L	\	l	|	ó	é	á	é	á	á	á	á
D|	-	=			M	]	m	}	ó	é	á	é	á	á	á	á
E|	.	>			N	^	n	~	ó	é	á	é	á	á	á	á

Icelandic

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

Windows Baltic

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|		0	@	P	'	p	q	r	r	ē			°	Ā	Š	ā
1|	!	1	A	Q	a	q	r	r	,	•	€	£	²	Ā	Š	ā
2|	"	2	B	R	b	r	r	,	•	•	€	£	²	Ā	Š	ā
3|	#	3	C	S	c	s	t	,	•	•	€	£	²	Ā	Š	ā
4|	\$	4	D	T	d	t	u	„	“	“	€	£	²	Ā	Š	ā
5|	%	5	E	U	e	u	v	„	“	“	€	£	²	Ā	Š	ā
6|	&	6	F	V	f	v	x	„	“	“	€	£	²	Ā	Š	ā
7|	'	7	G	W	g	w	x	„	“	“	€	£	²	Ā	Š	ā
8|	(	8	H	X	h	x	y	„	“	“	€	£	²	Ā	Š	ā
9|	)	9	I	Y	i	y	z	„	“	“	€	£	²	Ā	Š	ā
A|	*	:	J	Z	[	j	{	„	“	“	€	£	²	Ā	Š	ā
B|	+	;	K	[	\	k	{	„	“	“	€	£	²	Ā	Š	ā
C|	,	<	L	\	\]	l	}	„	“	“	€	£	²	Ā	Š	ā
D|	-	=	M	]	]	m	}	„	“	“	€	£	²	Ā	Š	ā
E|	.	>	N	^	]	n	}	„	“	“	€	£	²	Ā	Š	ā
F|	/	?	O	_	]	o	}	„	“	“	€	£	²	Ā	Š	ā

Baltic 774

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

KBL - Lithuanian

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|		0	@	P	'	p	q	r	А	Р	а	б	с	д	е	ё
1|	!	1	A	Q	a	q	r	r	Б	С	в	г	д	е	ё	ё
2|	"	2	B	R	b	r	r	r	В	Т	г	д	е	ё	ё	ё
3|	#	3	C	S	c	s	t	t	У	У	ж	д	е	ё	ё	ё
4|	\$	4	D	T	d	t	u	u	Ф	Х	ж	д	е	ё	ё	ё
5|	%	5	E	U	e	u	v	v	Ц	Ч	и	и	и	и	и	и
6|	&	6	F	V	f	v	x	x	Ш	Щ	и	и	и	и	и	и
7|	'	7	G	W	g	w	x	x	З	И	я	я	я	я	я	я
8|	(	8	H	X	h	x	y	y	И	К	к	к	к	к	к	к
9|	)	9	I	Y	i	y	z	z	Я	Л	л	л	л	л	л	л
A|	*	:	J	Z	[	j	{	{	К	л	л	л	л	л	л	л
B|	+	;	K	[	\	k	{	{	л	л	л	л	л	л	л	л
C|	,	<	L	\	\]	l	}	}	л	л	л	л	л	л	л	л
D|	-	=	M	]	]	m	}	}	л	л	л	л	л	л	л	л
E|	.	>	N	^	]	n	}	}	л	л	л	л	л	л	л	л
F|	/	?	O	_	]	o	}	}	л	л	л	л	л	л	л	л

Ukranian

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|			0	@	P	`	р	А	Р	а	б	в	г	д	е	ф
1|	!	1	A	Q	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
2|	"	2	B	R	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
3|	#	3	C	S	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
4|	\$	4	D	T	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
5|	%	5	E	U	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
6|	&	6	F	V	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
7|	'	7	G	W	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
8|	(	8	H	X	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
9|	)	9	I	Y	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
A|	*	:	J	Z	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
B|	+	;	K	[	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
C|	,	<	L	\	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
D|	-	=	M	]	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
E|	.	>	N	^	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
F|	/	?	O	_	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё

Bulgarian

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|			0	@	P	`	р	А	Р	а	б	в	г	д	е	ф
1|	!	1	A	Q	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
2|	"	2	B	R	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
3|	#	3	C	S	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
4|	\$	4	D	T	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
5|	%	5	E	U	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
6|	&	6	F	V	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
7|	'	7	G	W	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
8|	(	8	H	X	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
9|	)	9	I	Y	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
A|	*	:	J	Z	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
B|	+	;	K	[	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
C|	,	<	L	\	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
D|	-	=	M	]	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
E|	.	>	N	^	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
F|	/	?	O	_	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё

ISO Latin 6

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|			0	@	P	`	р	А	Р	а	б	в	г	д	е	ф
1|	!	1	A	Q	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
2|	"	2	B	R	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
3|	#	3	C	S	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
4|	\$	4	D	T	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
5|	%	5	E	U	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
6|	&	6	F	V	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
7|	'	7	G	W	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
8|	(	8	H	X	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
9|	)	9	I	Y	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
A|	*	:	J	Z	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
B|	+	;	K	[	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
C|	,	<	L	\	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
D|	-	=	M	]	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
E|	.	>	N	^	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё
F|	/	?	O	_	а	б	в	Г	Б	б	в	Г	Д	Е	р	ё

Latin 5 (Windows Turkey)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|					@	P	'	p	e			°	À	Ë	à	ğ
1|	!	1	2	3	A	Q	a	q	,	,	±	±	Á	Ë	á	ğ
2|	"	2	3	4	B	R	b	r	,	,	±	±	Â	Ë	â	ğ
3|	#	3	4	5	C	S	c	s	f	f	±	±	Ã	Ë	ã	ğ
4|	\$	4	5	6	D	T	d	t			±	±	Ä	Ë	ä	ğ
5|	%	5	6	7	E	U	e	u	-	-	±	±	Å	Ë	å	ğ
6|	&	6	7	8	F	V	f	v	_	_	±	±	Æ	Ë	æ	ğ
7|	'	7	8	9	G	W	g	w	±	±	±	±	Ç	Ë	ç	ğ
8|	(	8	9		H	X	h	x	±	±	±	±	Ç	Ë	ç	ğ
9|	)	9			I	Y	i	y	±	±	±	±	È	Ë	è	ğ
A|	*	:			J	Z	j	z	±	±	±	±	È	Ë	è	ğ
B|	+	;			K	[	k	{	±	±	±	±	É	Ë	é	ğ
C|	,	<			L	\	l	|	±	±	±	±	É	Ë	é	ğ
D|	-	=			M	]	m	}	±	±	±	±	Ê	Ë	ê	ğ
E|	.	>			N	^	n	~	±	±	±	±	Ê	Ë	ê	ğ
F|	/	?			O	_	o		±	±	±	±	Ë	Ë	ë	ğ

Turkey 857

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

Windows Hebrew

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|					@	P	'	p	e			°			ן	ן
1|	!	1	2	3	A	Q	a	q	,	,	±	±			כ	כ
2|	"	2	3	4	B	R	b	r	,	,	±	±			ג	ג
3|	#	3	4	5	C	S	c	s	f	f	±	±			ד	ד
4|	\$	4	5	6	D	T	d	t			±	±			ה	ה
5|	%	5	6	7	E	U	e	u	-	-	±	±			ו	ו
6|	&	6	7	8	F	V	f	v	_	_	±	±			ז	ז
7|	'	7	8	9	G	W	g	w	±	±	±	±			ח	ח
8|	(	8	9		H	X	h	x	±	±	±	±			ט	ט
9|	)	9			I	Y	i	y	±	±	±	±			ך	ך
A|	*	:			J	Z	j	z	±	±	±	±			ל	ל
B|	+	;			K	[	k	{	<	>	±	±			מ	מ
C|	,	<			L	\	l	|			±	±			נ	נ
D|	-	=			M	]	m	}			±	±			ס	ס
E|	.	>			N	^	n	~			±	±			ע	ע
F|	/	?			O	_	o				±	±			פ	פ

Kamennicky (MJK)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|				0	@	P	'	p	ć	č	á	⋮	L	ll	α	≡
1|	!	1	A	1	A	Q	a	q	ć	č	í	⋮	L	ll	α	≡
2|	"	2	B	2	B	R	b	r	ć	č	í	⋮	L	ll	α	≡
3|	#	3	C	3	C	S	c	s	ć	č	í	⋮	L	ll	α	≡
4|	\$	4	D	4	D	T	d	t	ć	č	í	⋮	L	ll	α	≡
5|	%	5	E	5	E	U	e	u	ć	č	í	⋮	L	ll	α	≡
6|	&	6	F	6	F	V	f	v	ć	č	í	⋮	L	ll	α	≡
7|	'	7	G	7	G	W	g	w	ć	č	í	⋮	L	ll	α	≡
8|	(	8	H	8	H	X	h	x	ć	č	í	⋮	L	ll	α	≡
9|	)	9	I	9	I	Y	i	y	ć	č	í	⋮	L	ll	α	≡
A|	*	:	J	:	J	Z	j	z	ć	č	í	⋮	L	ll	α	≡
B|	+	;	K	;	K	[	k	{	ć	č	í	⋮	L	ll	α	≡
C|	,	<	L	<	L	\	l	|	ć	č	í	⋮	L	ll	α	≡
D|	-	=	M	=	M	]	m	~	ć	č	í	⋮	L	ll	α	≡
E|	.	>	N	>	N	^	n	o	ć	č	í	⋮	L	ll	α	≡
F|	/	?	O	?	O	_	o	o	ć	č	í	⋮	L	ll	α	≡

Hebrew NC (862)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|				0	@	P	'	p	נ	ן	á	⋮	L	ll	α	≡
1|	!	1	A	1	A	Q	a	q	נ	ן	í	⋮	L	ll	α	≡
2|	"	2	B	2	B	R	b	r	נ	ן	í	⋮	L	ll	α	≡
3|	#	3	C	3	C	S	c	s	נ	ן	í	⋮	L	ll	α	≡
4|	\$	4	D	4	D	T	d	t	נ	ן	í	⋮	L	ll	α	≡
5|	%	5	E	5	E	U	e	u	נ	ן	í	⋮	L	ll	α	≡
6|	&	6	F	6	F	V	f	v	נ	ן	í	⋮	L	ll	α	≡
7|	'	7	G	7	G	W	g	w	נ	ן	í	⋮	L	ll	α	≡
8|	(	8	H	8	H	X	h	x	נ	ן	í	⋮	L	ll	α	≡
9|	)	9	I	9	I	Y	i	y	נ	ן	í	⋮	L	ll	α	≡
A|	*	:	J	:	J	Z	j	z	נ	ן	í	⋮	L	ll	α	≡
B|	+	;	K	;	K	[	k	{	נ	ן	í	⋮	L	ll	α	≡
C|	,	<	L	<	L	\	l	|	נ	ן	í	⋮	L	ll	α	≡
D|	-	=	M	=	M	]	m	~	נ	ן	í	⋮	L	ll	α	≡
E|	.	>	N	>	N	^	n	o	נ	ן	í	⋮	L	ll	α	≡
F|	/	?	O	?	O	_	o	o	נ	ן	í	⋮	L	ll	α	≡

Hebrew OC

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|				0	@	P	'	p	נ	ן	á	⋮	L	ll	α	≡
1|	!	1	A	1	A	Q	a	q	נ	ן	í	⋮	L	ll	α	≡
2|	"	2	B	2	B	R	b	r	נ	ן	í	⋮	L	ll	α	≡
3|	#	3	C	3	C	S	c	s	נ	ן	í	⋮	L	ll	α	≡
4|	\$	4	D	4	D	T	d	t	נ	ן	í	⋮	L	ll	α	≡
5|	%	5	E	5	E	U	e	u	נ	ן	í	⋮	L	ll	α	≡
6|	&	6	F	6	F	V	f	v	נ	ן	í	⋮	L	ll	α	≡
7|	'	7	G	7	G	W	g	w	נ	ן	í	⋮	L	ll	α	≡
8|	(	8	H	8	H	X	h	x	נ	ן	í	⋮	L	ll	α	≡
9|	)	9	I	9	I	Y	i	y	נ	ן	í	⋮	L	ll	α	≡
A|	*	:	J	:	J	Z	j	z	נ	ן	í	⋮	L	ll	α	≡
B|	+	;	K	;	K	[	k	{	נ	ן	í	⋮	L	ll	α	≡
C|	,	<	L	<	L	\	l	|	נ	ן	í	⋮	L	ll	α	≡
D|	-	=	M	=	M	]	m	~	נ	ן	í	⋮	L	ll	α	≡
E|	.	>	N	>	N	^	n	o	נ	ן	í	⋮	L	ll	α	≡
F|	/	?	O	?	O	_	o	o	נ	ן	í	⋮	L	ll	α	≡

Windows Greek

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

Windows Cyrillic

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

Hungarian CWI

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

E_E_Latin II-852

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|					@	P	'	p	Ç	é	é	á	⋮	L	d	ó
1|	!	1	2	A	B	Q	a	q	ú	í	ó	á	⋮	L	ð	ó
2|	"	2	3	B	R	R	b	r	é	í	ó	á	⋮	L	ö	ó
3|	#	3	4	C	S	S	c	s	á	á	ó	á	⋮	L	ñ	ó
4|	\$	4	5	D	T	T	d	t	á	á	ó	á	⋮	L	í	ó
5|	%	5	6	E	U	U	e	u	ú	á	ó	á	⋮	L	ñ	ó
6|	&	6	7	F	V	V	f	v	ç	í	ó	á	⋮	L	í	ó
7|	'	7	8	G	W	W	g	w	ç	í	ó	á	⋮	L	í	ó
8|	(	8	9	H	X	X	h	x	è	é	ó	á	⋮	L	í	ó
9|	)	9		I	Y	Y	i	y	è	é	ó	á	⋮	L	í	ó
A|	*	:		J	Z	Z	j	z	é	ó	á	⋮	L	í	ó	ó
B|	+	;		K	[	[	k	l	é	ó	á	⋮	L	í	ó	ó
C|	,	<		L	\	\	l	m	é	ó	á	⋮	L	í	ó	ó
D|	-	=		M	^	^	m	n	é	ó	á	⋮	L	í	ó	ó
E|	.	>		N	~	~	n	o	é	ó	á	⋮	L	í	ó	ó
F|	/	?		O			o		é	ó	á	⋮	L	í	ó	ó

Greek_869

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|					@	P	'	p		ı	ı	⋮	L	T	ç	-
1|	!	1	2	A	B	Q	a	q		ı	ı	⋮	L	Y	η	±
2|	"	2	3	B	R	R	b	r		ı	ı	⋮	L	Φ	θ	ı
3|	#	3	4	C	S	S	c	s		ı	ı	⋮	L	Χ	ε	ı
4|	\$	4	5	D	T	T	d	t		ı	ı	⋮	L	Ψ	κ	ı
5|	%	5	6	E	U	U	e	u		ı	ı	⋮	L	Ω	λ	ı
6|	&	6	7	F	V	V	f	v		ı	ı	⋮	L	α	μ	ı
7|	'	7	8	G	W	W	g	w		ı	ı	⋮	L	β	ν	ı
8|	(	8	9	H	X	X	h	x		ı	ı	⋮	L	γ	ξ	ı
9|	)	9		I	Y	Y	i	y		ı	ı	⋮	L	ο	π	ı
A|	*	:		J	Z	Z	j	z		ı	ı	⋮	L	ρ	σ	ı
B|	+	;		K	[	[	k	l		ı	ı	⋮	L	τ	ω	ı
C|	,	<		L	\	\	l	m		ı	ı	⋮	L	υ	ϖ	ı
D|	-	=		M	^	^	m	n		ı	ı	⋮	L	φ	ϗ	ı
E|	.	>		N	~	~	n	o		ı	ı	⋮	L	χ	ϙ	ı
F|	/	?		O			o			ı	ı	⋮	L	ψ	Ϛ	ı

Windows East Europe

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|					@	P	'	p	é	.	~	°	À	Ð	ř	đ
1|	!	1	2	A	B	Q	a	q	,	.	˘	±	Á	Ñ	š	č
2|	"	2	3	B	R	R	b	r	,	"	˘	±	Â	Ň	š	č
3|	#	3	4	C	S	S	c	s	,	"	˘	±	Ã	Ó	š	č
4|	\$	4	5	D	T	T	d	t	,	"	˘	±	Ä	Ô	š	č
5|	%	5	6	E	U	U	e	u	,	"	˘	±	Å	Õ	š	č
6|	&	6	7	F	V	V	f	v	,	"	˘	±	Ä	Ö	š	č
7|	'	7	8	G	W	W	g	w	,	"	˘	±	Ä	Ç	š	č
8|	(	8	9	H	X	X	h	x	,	"	˘	±	Ä	Č	š	č
9|	)	9		I	Y	Y	i	y	,	"	˘	±	Ä	Š	š	č
A|	*	:		J	Z	Z	j	z	,	"	˘	±	Ä	Š	š	č
B|	+	;		K	[	[	k	l	,	"	˘	±	Ä	Š	š	č
C|	,	<		L	\	\	l	m	,	"	˘	±	Ä	Š	š	č
D|	-	=		M	^	^	m	n	,	"	˘	±	Ä	Š	š	č
E|	.	>		N	~	~	n	o	,	"	˘	±	Ä	Š	š	č
F|	/	?		O			o		,	"	˘	±	Ä	Š	š	č

ECMA-94

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
01				0	@	P	'	p	Q	é	;	°	À	Ð	á	ò
11	!	"	1	1	A	Q	a	q	Ù	æ	;	±	Á	Ñ	â	ó
21		#	2	2	B	R	b	r	é	Æ	±	²	Â	Ò	ã	ô
31		\$	3	3	C	S	c	s	á	ø	³	³	Ã	Ó	ä	õ
41		%	4	4	D	T	d	t	â	ö	´	´	Ä	Ô	å	ö
51		&	5	5	E	U	e	u	à	Û	µ	µ	Å	Õ	ä	ø
61		'	6	6	F	V	f	v	á	Ü	¶	¶	Æ	Ö	å	ù
71		(	7	7	G	W	g	w	â	Ý	·	·	Ç	Ø	æ	ú
81		)	8	8	H	X	h	x	ç	Û	¸	¸	È	Ù	ç	û
91		,	9	9	I	Y	i	y	è	Ü	¸	¸	É	Ú	è	ü
A1	*	:			J	Z	j	z	é	Ý	¸	¸	Ê	Û	é	ú
B1	+	;			K	[	k	[	ê	Û	¸	¸	Ë	Ü	ê	û
C1	,	<			L	\	l	\	ë	Ü	¸	¸	Ì	Ý	ë	ü
D1	-	=			M	]	m	]	ì	Ý	¸	¸	Í	Þ	ì	ý
E1	.	>			N	^	n	^	í	Û	¸	¸	Î	ß	í	ÿ
F1	/	?			O	_	o	_	î	Û	¸	¸	Ï	¸	î	ÿ

Cyrillic I-855

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
01				0	@	P	'	p	ђ	ѡ	а	⋮	Л	л	Я	—
11	!	"	1	1	A	Q	a	q	ѣ	Ѣ	А	⋮	Л	л	Я	—
21		#	2	2	B	R	b	r	ѝ	Ѥ	Б	⋮	Л	л	Я	—
31		\$	3	3	C	S	c	s	џ	Ѧ	С	⋮	Л	л	Я	—
41		%	4	4	D	T	d	t	ѡ	ѧ	Ц	⋮	Л	л	Я	—
51		&	5	5	E	U	e	u	ѣ	Ѩ	Ч	⋮	Л	л	Я	—
61		'	6	6	F	V	f	v	ѝ	ѩ	Д	⋮	Л	л	Я	—
71		(	7	7	G	W	g	w	џ	Ѫ	Д	⋮	Л	л	Я	—
81		)	8	8	H	X	h	x	ѡ	ѫ	Е	⋮	Л	л	Я	—
91		,	9	9	I	Y	i	y	ѣ	Ѭ	Ф	⋮	Л	л	Я	—
A1	*	:			J	Z	j	z	ѝ	ѭ	Ф	⋮	Л	л	Я	—
B1	+	;			K	[	k	[	џ	Ѯ	Ф	⋮	Л	л	Я	—
C1	,	<			L	\	l	\	ѡ	ѯ	Г	⋮	Л	л	Я	—
D1	-	=			M	]	m	]	ѣ	Ѱ	Г	⋮	Л	л	Я	—
E1	.	>			N	^	n	^	ѝ	ѱ	Г	⋮	Л	л	Я	—
F1	/	?			O	_	o	_	џ	Ѳ	»	⋮	Л	л	Я	—

Cyrillic II-866

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
01				0	@	P	'	p	А	Р	а	⋮	Л	л	р	ѐ
11	!	"	1	1	A	Q	a	q	Б	С	б	⋮	Л	л	р	ѐ
21		#	2	2	B	R	b	r	В	Т	в	⋮	Л	л	р	ѐ
31		\$	3	3	C	S	c	s	Г	У	г	⋮	Л	л	р	ѐ
41		%	4	4	D	T	d	t	Д	Ф	д	⋮	Л	л	р	ѐ
51		&	5	5	E	U	e	u	Е	Х	е	⋮	Л	л	р	ѐ
61		'	6	6	F	V	f	v	З	Ц	з	⋮	Л	л	р	ѐ
71		(	7	7	G	W	g	w	И	Ч	и	⋮	Л	л	р	ѐ
81		)	8	8	H	X	h	x	И	Ш	и	⋮	Л	л	р	ѐ
91		,	9	9	I	Y	i	y	И	Щ	и	⋮	Л	л	р	ѐ
A1	*	:			J	Z	j	z	К	Ъ	к	⋮	Л	л	р	ѐ
B1	+	;			K	[	k	[	К	Ы	к	⋮	Л	л	р	ѐ
C1	,	<			L	\	l	\	Л	Ь	л	⋮	Л	л	р	ѐ
D1	-	=			M	]	m	]	М	Э	м	⋮	Л	л	р	ѐ
E1	.	>			N	^	n	^	Н	Ю	н	⋮	Л	л	р	ѐ
F1	/	?			O	_	o	_	Н	Я	н	⋮	Л	л	р	ѐ

Greek_437

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|					@	P	'	p	A	P	ι	⋮	Λ	⋮	ω	≡
1|	!	1	A	B	Q	R	a	q	B	Σ	κ	⋮	Λ	⋮	ά	±
2|	"	2	A	B	R	R	b	r	Γ	Τ	λ	⋮	⋮	⋮	έ	±
3|	#	3	C	C	S	S	c	s	Δ	Υ	μ	⋮	⋮	⋮	ή	±
4|	\$	4	D	D	T	T	d	t	E	Φ	ν	⋮	⋮	⋮	ί	±
5|	%	5	E	E	U	U	e	u	Z	Χ	ξ	⋮	⋮	⋮	ό	±
6|	&	6	F	F	V	V	f	v	H	Ψ	ο	⋮	⋮	⋮	ύ	±
7|	'	7	G	G	W	W	g	w	Θ	Ω	π	⋮	⋮	⋮	ώ	±
8|	(	8	H	H	X	X	h	x	Ι	Κ	ρ	⋮	⋮	⋮	·	±
9|	)	9	I	I	Y	Y	i	y	Κ	Α	σ	⋮	⋮	⋮	·	±
A|	*	:	J	J	Z	Z	j	z	Λ	Μ	ς	⋮	⋮	⋮	·	±
B|	+	;	K	K	[	[	k	l	Μ	Ν	τ	⋮	⋮	⋮	·	±
C|	,	<	L	L	\	\	l	m	Ν	Ξ	υ	⋮	⋮	⋮	·	±
D|	-	=	M	M	] ^	] ^	m	n	Ξ	Ο	φ	⋮	⋮	⋮	·	±
E|	.	>	N	N	^	^	n	o	Ο	Π	ψ	⋮	⋮	⋮	·	±
F|	/	?	O	O	_	_	o		Π		ψ	⋮	⋮	⋮	·	±

Greek_928

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|					@	P	'	p	Q	é	'	*	t	Π	σ	π
1|	!	1	A	B	Q	R	a	q	ú	æ	'	*	A	B	σ	ρ
2|	"	2	A	B	R	R	b	r	é	æ	'	*	B	Γ	α	ρ
3|	#	3	C	C	S	S	c	s	á	ð	'	*	Δ	Τ	β	σ
4|	\$	4	D	D	T	T	d	t	â	ð	'	*	E	Υ	γ	τ
5|	%	5	E	E	U	U	e	u	ã	ó	'	*	Z	Φ	δ	υ
6|	&	6	F	F	V	V	f	v	ä	ù	'	*	H	Ψ	ε	φ
7|	'	7	G	G	W	W	g	w	å	ý	'	*	Θ	Χ	ζ	ψ
8|	(	8	H	H	X	X	h	x	ç	è	'	*	H	Ω	η	χ
9|	)	9	I	I	Y	Y	i	y	ê	é	'	*	T	Ι	θ	ω
A|	*	:	J	J	Z	Z	j	z	ë	ê	'	*	Θ	Κ	ι	τ
B|	+	;	K	K	[	[	k	l	í	ë	'	*	«	Λ	λ	ü
C|	,	<	L	L	\	\	l	m	î	é	'	*	»	Μ	μ	ó
D|	-	=	M	M	] ^	] ^	m	n	ï	é	'	*	Υ	Ν	ν	ó
E|	.	>	N	N	^	^	n	o	ä	é	'	*	Ω	Ξ	ξ	ó
F|	/	?	O	O	_	_	o		Å	é	'	*	Ω	Ο	ο	ó

Greek_437 Cyprus

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|					@	P	'	p	A	P	ι	⋮	Λ	⋮	ω	≡
1|	!	1	A	B	Q	R	a	q	B	Σ	κ	⋮	Λ	⋮	ά	±
2|	"	2	A	B	R	R	b	r	Γ	Τ	λ	⋮	⋮	⋮	έ	±
3|	#	3	C	C	S	S	c	s	Δ	Υ	μ	⋮	⋮	⋮	ή	±
4|	\$	4	D	D	T	T	d	t	E	Φ	ν	⋮	⋮	⋮	ί	±
5|	%	5	E	E	U	U	e	u	Z	Χ	ξ	⋮	⋮	⋮	ό	±
6|	&	6	F	F	V	V	f	v	H	Ψ	ο	⋮	⋮	⋮	ύ	±
7|	'	7	G	G	W	W	g	w	Θ	Ω	π	⋮	⋮	⋮	ώ	±
8|	(	8	H	H	X	X	h	x	Ι	Κ	ρ	⋮	⋮	⋮	·	±
9|	)	9	I	I	Y	Y	i	y	Κ	Α	σ	⋮	⋮	⋮	·	±
A|	*	:	J	J	Z	Z	j	z	Λ	Μ	ς	⋮	⋮	⋮	·	±
B|	+	;	K	K	[	[	k	l	Μ	Ν	τ	⋮	⋮	⋮	·	±
C|	,	<	L	L	\	\	l	m	Ν	Ξ	υ	⋮	⋮	⋮	·	±
D|	-	=	M	M	] ^	] ^	m	n	Ξ	Ο	φ	⋮	⋮	⋮	·	±
E|	.	>	N	N	^	^	n	o	Ο	Π	ψ	⋮	⋮	⋮	·	±
F|	/	?	O	O	_	_	o		Π		ψ	⋮	⋮	⋮	·	±

Serbo Croatian I

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	I
0I			0	ž	P	ž	p	Q	é	á	Ł	ll	α	≡	±	Σ	Σ
1I	!	1	A	B	Q	a	q	ú	æ	í	l	ll	α	≡	±	Σ	Σ
2I	"	2	R	R	R	b	r	é	æ	ó	l	ll	α	≡	±	Σ	Σ
3I	#	3	C	D	S	c	s	á	é	ú	l	ll	α	≡	±	Σ	Σ
4I	\$	4	D	E	T	d	t	á	é	ó	l	ll	α	≡	±	Σ	Σ
5I	%	5	E	F	U	e	u	á	é	ó	l	ll	α	≡	±	Σ	Σ
6I	&	6	F	G	V	f	v	á	é	ó	l	ll	α	≡	±	Σ	Σ
7I	'	7	G	H	W	g	w	á	é	ó	l	ll	α	≡	±	Σ	Σ
8I	(	8	H	I	X	h	x	á	é	ó	l	ll	α	≡	±	Σ	Σ
9I	)	9	I	J	Y	i	y	á	é	ó	l	ll	α	≡	±	Σ	Σ
AI	*	:	J	K	Z	j	z	á	é	ó	l	ll	α	≡	±	Σ	Σ
BI	+	;	K	L	[	k	[	á	é	ó	l	ll	α	≡	±	Σ	Σ
CI	,	<	L	M	\	l	m	á	é	ó	l	ll	α	≡	±	Σ	Σ
DI	.	=	M	N	]	m	n	á	é	ó	l	ll	α	≡	±	Σ	Σ
EI	-	>	N	O	^	n	o	á	é	ó	l	ll	α	≡	±	Σ	Σ
FI	/	?	O		_	o		á	é	ó	l	ll	α	≡	±	Σ	Σ

Serbo Croatian II

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	I
0I			0	@	P	'	p	Q	é	á	Ł	ll	α	≡	±	Σ	Σ
1I	!	1	A	B	Q	a	q	ú	æ	í	l	ll	α	≡	±	Σ	Σ
2I	"	2	R	R	R	b	r	é	æ	ó	l	ll	α	≡	±	Σ	Σ
3I	#	3	C	D	S	c	s	á	é	ú	l	ll	α	≡	±	Σ	Σ
4I	\$	4	D	E	T	d	t	á	é	ó	l	ll	α	≡	±	Σ	Σ
5I	%	5	E	F	U	e	u	á	é	ó	l	ll	α	≡	±	Σ	Σ
6I	&	6	F	G	V	f	v	á	é	ó	l	ll	α	≡	±	Σ	Σ
7I	'	7	G	H	W	g	w	á	é	ó	l	ll	α	≡	±	Σ	Σ
8I	(	8	H	I	X	h	x	á	é	ó	l	ll	α	≡	±	Σ	Σ
9I	)	9	I	J	Y	i	y	á	é	ó	l	ll	α	≡	±	Σ	Σ
AI	*	:	J	K	Z	j	z	á	é	ó	l	ll	α	≡	±	Σ	Σ
BI	+	;	K	L	[	k	[	á	é	ó	l	ll	α	≡	±	Σ	Σ
CI	,	<	L	M	\	l	m	á	é	ó	l	ll	α	≡	±	Σ	Σ
DI	.	=	M	N	]	m	n	á	é	ó	l	ll	α	≡	±	Σ	Σ
EI	-	>	N	O	^	n	o	á	é	ó	l	ll	α	≡	±	Σ	Σ
FI	/	?	O		_	o		á	é	ó	l	ll	α	≡	±	Σ	Σ

Turkey

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	I
0I			0	@	P	'	p	Q	é	á	Ł	ll	α	≡	±	Σ	Σ
1I	!	1	A	B	Q	a	q	ú	æ	í	l	ll	α	≡	±	Σ	Σ
2I	"	2	R	R	R	b	r	é	æ	ó	l	ll	α	≡	±	Σ	Σ
3I	#	3	C	D	S	c	s	á	é	ú	l	ll	α	≡	±	Σ	Σ
4I	\$	4	D	E	T	d	t	á	é	ó	l	ll	α	≡	±	Σ	Σ
5I	%	5	E	F	U	e	u	á	é	ó	l	ll	α	≡	±	Σ	Σ
6I	&	6	F	G	V	f	v	á	é	ó	l	ll	α	≡	±	Σ	Σ
7I	'	7	G	H	W	g	w	á	é	ó	l	ll	α	≡	±	Σ	Σ
8I	(	8	H	I	X	h	x	á	é	ó	l	ll	α	≡	±	Σ	Σ
9I	)	9	I	J	Y	i	y	á	é	ó	l	ll	α	≡	±	Σ	Σ
AI	*	:	J	K	Z	j	z	á	é	ó	l	ll	α	≡	±	Σ	Σ
BI	+	;	K	L	[	k	[	á	é	ó	l	ll	α	≡	±	Σ	Σ
CI	,	<	L	M	\	l	m	á	é	ó	l	ll	α	≡	±	Σ	Σ
DI	.	=	M	N	]	m	n	á	é	ó	l	ll	α	≡	±	Σ	Σ
EI	-	>	N	O	^	n	o	á	é	ó	l	ll	α	≡	±	Σ	Σ
FI	/	?	O		_	o		á	é	ó	l	ll	α	≡	±	Σ	Σ

Greek_737

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|					@	P	'	p	A	P	ι	⋮	L	ll	ω	Ω
1|		!	0	1	A	Q	a	q	B	Σ	κ	⋮	L	ll	ά	±
2|		"	2	2	B	R	b	r	Γ	T	λ	⋮	ll	ll	έ	≥
3|		#	3	3	C	S	c	s	Δ	Y	μ	⋮	ll	ll	ή	≤
4|		\$	4	4	D	T	d	t	E	Φ	ν	⋮	ll	ll	ί	ξ
5|		%	5	5	E	U	e	u	Z	Χ	ξ	⋮	ll	ll	ϊ	ψ
6|		&	6	6	F	V	f	v	H	Ψ	ο	⋮	ll	ll	ό	ϕ
7|		'	7	7	G	W	g	w	Θ	Ω	π	⋮	ll	ll	ύ	χ
8|		(	8	8	H	X	h	x	I	α	ρ	⋮	ll	ll	ώ	κ
9|		)	9	9	I	Y	i	y	K	β	σ	⋮	ll	ll	•	•
A|		*	:	:	J	Z	j	z	Λ	γ	τ	⋮	ll	ll	•	•
B|		+	;	;	K	[	k	[	M	δ	υ	⋮	ll	ll	•	•
C|		,	<	<	L	\	l	\	N	ε	φ	⋮	ll	ll	•	•
D|		.	=	=	M	] ^	m	] ^	Ξ	ζ	ψ	⋮	ll	ll	•	•
E|		/	>	>	N	~	n	~	Ο	η	χ	⋮	ll	ll	•	•
F|		/	?	?	O	_	o	_	Π	θ	ψ	⋮	ll	ll	•	•

Polska Mazovia

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|					@	P	'	p	Q	Ę	Z	⋮	L	ll	a	≡
1|		!	0	1	A	Q	a	q	Ü	ę	z	⋮	ll	ll	ą	±
2|		"	2	2	B	R	b	r	é	ł	ó	⋮	ll	ll	ą	≥
3|		#	3	3	C	S	c	s	à	ó	ń	⋮	ll	ll	ę	≤
4|		\$	4	4	D	T	d	t	á	ó	ń	⋮	ll	ll	ę	ξ
5|		%	5	5	E	U	e	u	â	ó	ń	⋮	ll	ll	ę	ψ
6|		&	6	6	F	V	f	v	ã	ó	ń	⋮	ll	ll	ę	φ
7|		'	7	7	G	W	g	w	ä	ó	ń	⋮	ll	ll	ę	χ
8|		(	8	8	H	X	h	x	å	ó	ń	⋮	ll	ll	ę	κ
9|		)	9	9	I	Y	i	y	ä	ó	ń	⋮	ll	ll	ę	•
A|		*	:	:	J	Z	j	z	å	ó	ń	⋮	ll	ll	ę	•
B|		+	;	;	K	[	k	[	ı	ó	ń	⋮	ll	ll	ę	•
C|		,	<	<	L	\	l	\	ı	ó	ń	⋮	ll	ll	ę	•
D|		.	=	=	M	] ^	m	] ^	ı	ó	ń	⋮	ll	ll	ę	•
E|		/	>	>	N	~	n	~	ı	ó	ń	⋮	ll	ll	ę	•
F|		/	?	?	O	_	o	_	ı	ó	ń	⋮	ll	ll	ę	•

ISO Latin 2

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|					@	P	'	p				°	á	D	đ	
1|		!	0	1	A	Q	a	q			À	á	Á	Đ	đ	
2|		"	2	2	B	R	b	r			Á	á	Á	Đ	đ	
3|		#	3	3	C	S	c	s			À	á	Á	Đ	đ	
4|		\$	4	4	D	T	d	t			À	á	Á	Đ	đ	
5|		%	5	5	E	U	e	u			À	á	Á	Đ	đ	
6|		&	6	6	F	V	f	v			À	á	Á	Đ	đ	
7|		'	7	7	G	W	g	w			À	á	Á	Đ	đ	
8|		(	8	8	H	X	h	x			À	á	Á	Đ	đ	
9|		)	9	9	I	Y	i	y			À	á	Á	Đ	đ	
A|		*	:	:	J	Z	j	z			À	á	Á	Đ	đ	
B|		+	;	;	K	[	k	[			À	á	Á	Đ	đ	
C|		,	<	<	L	\	l	\			À	á	Á	Đ	đ	
D|		.	=	=	M	] ^	m	] ^			À	á	Á	Đ	đ	
E|		/	>	>	N	~	n	~			À	á	Á	Đ	đ	
F|		/	?	?	O	_	o	_			À	á	Á	Đ	đ	

Abicomp

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|			0	@	P	'	p				À	Ó	ì	ò		
1|		!	1	A	Q	a	q				Á	Ô	í	ó		
2|		"	2	B	R	b	r				Â	Õ	î	ô		
3|		#	3	C	S	c	s				Ã	Ö	ï	õ		
4|		\$	4	D	T	d	t				Ä	Ø	ï	ö		
5|		%	5	E	U	e	u				Å	Ù	ê	ø		
6|		&	6	F	V	f	v				Ç	Ú	ë	ù		
7|		'	7	G	W	g	w				È	Û	è	ú		
8|		(	8	H	X	h	x				É	Ü	é	û		
9|		)	9	I	Y	i	y				Ê	Ý	ê	ü		
A|		*	:	J	Z	j	z				Ë	Þ	ë	ý		
B|		+	;	K	[	k	{				Ì	ÿ	ì	ÿ		
C|		,	<	L	\	l	|				Í	ÿ	í	ÿ		
D|		-	=	M	]	m	}				Î	ÿ	î	ÿ		
E|		.	>	N	^	n	~				Ï	ÿ	ï	ÿ		
F|		/	?	O	_	o					Ñ	ÿ	ñ	ÿ		

Multi lingual 858

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|			0	@	P	'	p	Ç	é	á	⋮	L	ò	ó	-	±
1|		!	1	A	Q	a	q	Ü	æ	í	⋮	l	ó	ô	±	±
2|		"	2	B	R	b	r	é	£	ó	⋮	l	ó	õ	±	±
3|		#	3	C	S	c	s	á	£	ó	⋮	l	ó	ö	±	±
4|		\$	4	D	T	d	t	à	£	ó	⋮	l	ó	ø	±	±
5|		%	5	E	U	e	u	á	£	ó	⋮	l	ó	ù	±	±
6|		&	6	F	V	f	v	â	£	ó	⋮	l	ó	ú	±	±
7|		'	7	G	W	g	w	ç	£	ó	⋮	l	ó	û	±	±
8|		(	8	H	X	h	x	è	£	ó	⋮	l	ó	ü	±	±
9|		)	9	I	Y	i	y	é	£	ó	⋮	l	ó	ý	±	±
A|		*	:	J	Z	j	z	ê	£	ó	⋮	l	ó	ÿ	±	±
B|		+	;	K	[	k	{	ë	£	ó	⋮	l	ó	ÿ	±	±
C|		,	<	L	\	l	|	è	£	ó	⋮	l	ó	ÿ	±	±
D|		-	=	M	]	m	}	é	£	ó	⋮	l	ó	ÿ	±	±
E|		.	>	N	^	n	~	ê	£	ó	⋮	l	ó	ÿ	±	±
F|		/	?	O	_	o		ë	£	ó	⋮	l	ó	ÿ	±	±

ISO 8859/15

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|			0	@	P	'	p				•	À	Đ	à	đ	
1|		!	1	A	Q	a	q				;	Á	Ñ	á	ñ	
2|		"	2	B	R	b	r				±	Â	Ò	â	ò	
3|		#	3	C	S	c	s				²	Ã	Ó	ã	ó	
4|		\$	4	D	T	d	t				³	Ä	Ô	ä	ô	
5|		%	5	E	U	e	u				´	Å	Õ	å	õ	
6|		&	6	F	V	f	v				µ	Æ	Ö	æ	ö	
7|		'	7	G	W	g	w				¶	Ç	×	ç	÷	
8|		(	8	H	X	h	x				·	È	Ø	è	ø	
9|		)	9	I	Y	i	y				¸	É	Ù	é	ù	
A|		*	:	J	Z	j	z				¹	Ê	Ú	ê	ú	
B|		+	;	K	[	k	{				º	Ë	Û	ë	û	
C|		,	<	L	\	l	|				»	Ì	Ü	ì	ü	
D|		-	=	M	]	m	}				¼	Í	Ý	í	ý	
E|		.	>	N	^	n	~				½	Î	ÿ	î	ÿ	
F|		/	?	O	_	o					¾	Ï	ÿ	ï	ÿ	

Portugal

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0|					@	P	`	p	Ç	é	á	À	L	ll	á	≡
1|	!	1	A	B	Q	R	a	q	Ü	è	â	Á	l	l	â	±
2|	"	2	B	R	R	R	b	r	é	ê	ã	Â	l	l	ã	2
3|	#	3	C	S	S	S	c	s	ó	ë	ä	Ã	l	l	ä	S
4|	\$	4	D	T	T	T	d	t	ô	è	å	Ä	l	l	å	↓
5|	%	5	E	U	U	U	e	u	õ	é	æ	Å	l	l	æ	↓
6|	&	6	F	V	V	V	f	v	ö	ê	ç	Ç	l	l	ç	±
7|	'	7	G	W	W	W	g	w	ù	ë	ç	Ç	l	l	ç	±
8|	(	8	H	X	X	X	h	x	ú	è	è	È	l	l	è	±
9)	9	I	Y	Y	Y	i	y	û	é	é	É	l	l	é	±
A	*	:	J	Z	Z	Z	j	z	ü	ê	ê	Ê	l	l	ê	±
B	+	;	K	[[[k	l	ÿ	ë	ë	Ë	l	l	ë	±
C	,	<	L	\	\	\	l	m	ÿ	è	è	È	l	l	è	±
D	.	=	M] ^] ^] ^	m	n	ÿ	é	é	É	l	l	é	±
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Canada French

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3	#	3	C	S	S	S	c	s	ó	ë	ä	Ã	l	l	ä	S
4	\$	4	D	T	T	T	d	t	ô	è	å	Ä	l	l	å	↓
5	%	5	E	U	U	U	e	u	õ	é	æ	Å	l	l	æ	↓
6	&	6	F	V	V	V	f	v	ö	ê	ç	Ç	l	l	ç	±
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BRASCI

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3	#	3	C	S	S	S	c	s	ó	ë	ä	Ã	l	l	ä	S
4	\$	4	D	T	T	T	d	t	ô	è	å	Ä	l	l	å	↓
5	%	5	E	U	U	U	e	u	õ	é	æ	Å	l	l	æ	↓
6	&	6	F	V	V	V	f	v	ö	ê	ç	Ç	l	l	ç	±
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9)	9	I	Y	Y	Y	i	y	û	é	é	É	l	l	é	±
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MEDIA SPECIFICATION

ABOUT PAPER:

Using unsuitable or damaged paper will result in the paper feed becoming unstable, and a paper jam, paperfold or printing deviation may occur. In an extreme case, this can break the dot wire pin.

Do not use paper that:

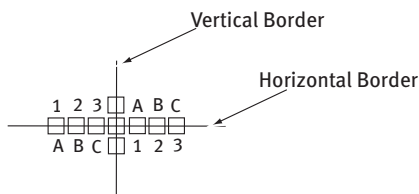
- ❖ Is extremely thin or thick paper (does not satisfy the paper specification)
- ❖ Is too small or big paper (does not satisfy the paper specification)
- ❖ Has a cut-out or window (envelopes)
- ❖ Is pinned together by pin, clip or staple
- ❖ Has its' glued surface exposed, or is wrinkled or peeled apart
- ❖ Has a raised surface (with a relief)
- ❖ Is continuous paper which is folded at a line other than the normal horizontal perforation line
- ❖ Is copy paper having different-size original and carbon papers, or a set of copy papers in which the number of copy papers is different
- ❖ Has its edge or corners torn

PRE-PRINTED PAPER

On pre-printed paper, pay particular attention to the following points:

- ❖ When printing on a pre-printed paper, check that there are no problems with print quality, by testing it in advance (If the reflectance of a part of the pre-printed section becomes 60% or less (especially on black), paper detection sensors in the printer may not detect the paper).

- ❖ Paper sheets must not stick to each other. This can occur if the printing ink of the pre-painted papers is gummy or its drying is incomplete.
- ❖ When pre-printing a vertical or horizontal border, allow space for the borders to be positioned at the center of characters and lines (as shown below). This provides easy setting of the paper position in the printer and allows for paper misalignment.



PAPER STORAGE CONDITIONS

- ❖ Store paper under correct environmental conditions (10 – 30 °C and 30 – 70% relative humidity).
- ❖ When there is a difference between the environmental conditions of the storage and usage locations, only use the paper after conditioning it to the usage environment.

MEDIA TYPE AND SPECIFICATION

TYPE OF PAPER	GUARANTEED	COMMENTS
Continuous paper	YES	See “Continuous paper” on page 281.
Continuous paper with binding holes	Should be OK, but not guaranteed	See “Binding hole” on page 290.
Continuous paper with corner cut	Should be OK, but not guaranteed	See “Cut Corners” on page 291.
Cut-Sheet paper	Yes	See “Cut-Sheet Paper” on page 292.
Cut-Sheet paper with horizontal perforation line	Should be OK, but not guaranteed	See “Perforations” on page 282.
Label Paper	Should be OK, but not guaranteed	See “Label paper” on page 297.

NOTES

...✦ *Standard paper size:*

A4; 8.268 inches × 11.693 inches (210 × 297 mm) – Europe

8.5 inches × 11 inches (215.9 × 279.4 mm) – U.S.A.

...✦ *Paper width (W): 7.2 inches (182 mm) to 8.5 inches (215.9 mm)*

...✦ *Paper length (L): 14 inches (356 mm) or less*

...✦ *Paper weight: 16 to 24 lb. (60 to 90 g/m²)*

...✦ *Line feed pitch (C): 0.167 inch (4.23 mm) (6 LPI)*

0.125 inch (3.18 mm) (8 LPI) is selectable.

...✦ *Paper must be free of folds and bends.*

...✦ *No multiple-part cut-sheet paper can be used.*

SPROCKET FED PAPER

The tractor feed unit can handle sprocket paper of the following width:

3 to 9.5 inches (76.2 to 241.3 mm) (option)

Use the variable pin platen for sprocket paper width of 9.5 to 10 inches (241.3 to 254 mm) edge-to-edge.

One-part paper:

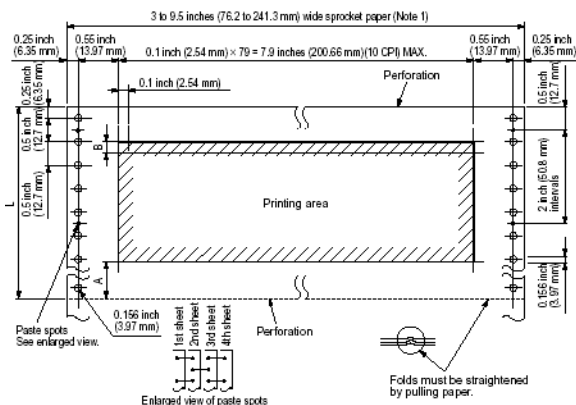
Weight: 14 to 20 lb. (52 to 75 g/m²)

Multiple-part paper:

0.011 inch (0.28 mm) or less total thickness .

	REAM WEIGHT	NUMBER OF SHEETS
Carbon lined paper	9 to 11lbs. (35 to 40g/m ²)	Up to 4 (including the original)
Pressure sensitive paper	9 to 11lbs. (35 to 40g/m ²)	Up to 4 (including the original)
Interleaved paper	14lbs. (52g/m ²)	Up to 3 (including the original)
	9lbs. (35g/m ²)	Up to 4 (including the original)

Multiple-part paper should be fastened by spot-pasting or crimping on both sides, and should be free of wrinkles.



NOTES

... Use the tractor feed unit for paper that is 3 inches (76.2 mm) to 9.5 inches (241.3 mm) wide. Use the variable pin platen for paper of 9.5 inches (241.3 mm) to 10 inches (254 mm) width.

... L: An integer multiple of 1 inch (25.4 mm).

... A: Allow a margin of 0.665 inch (16.9 mm, four lines in 6-LPI mode) before and after perforations to prevent printout from being affected by perforations.

When the paper cutter (access cover) is used, the margin between the printing line and cut line is 0.917 inch (23.28 mm).

... A line feed pitch of 0.167 inch (4.23 mm) (6 LPI) or 0.125 inch (3.18 mm) (8 LPI) is selectable.

... The right margin sprocket holes can only be horizontally oval.

... Weight:

(a) One-part paper: 14 to 20 lb. (52 to 75 g/m²).

(b) Multiple-part paper: Carbon-lined paper or pressure-sensitive paper of 9 to 11 lb. (35 to 40 g/m²) ream weight – up to four sheets, including the original, can be used.

The thickness of multiple-part paper should be 0.011 inch (0.28 mm) or less.

... Multiple-part paper should be fastened by spot-pasting or crimping on both sides, and should be free of wrinkles.

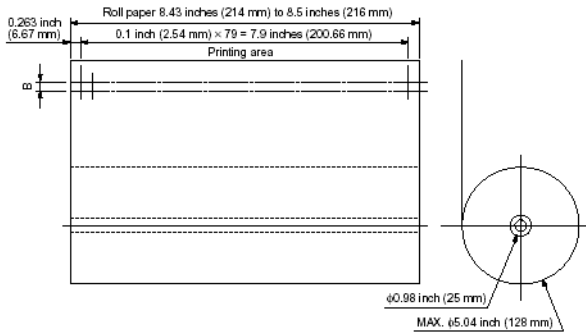
ROLL PAPER

Outside diameter:	5.04 inches (128 mm), maximum
Paper path:	8.43- to 8.5-inch (214 to 216 mm)
Core inside diameter:	0.98 inch (25 mm)
Weight:	14 to 17 lb. (52 to 64 g/m ²)
Line feed pitch (B):	0.167 inch (4.23mm)(6LPI) or 0.125 inch (3.18mm)(8LPI) is selectable.

NOTE

...✚ Multi-part paper cannot be used.

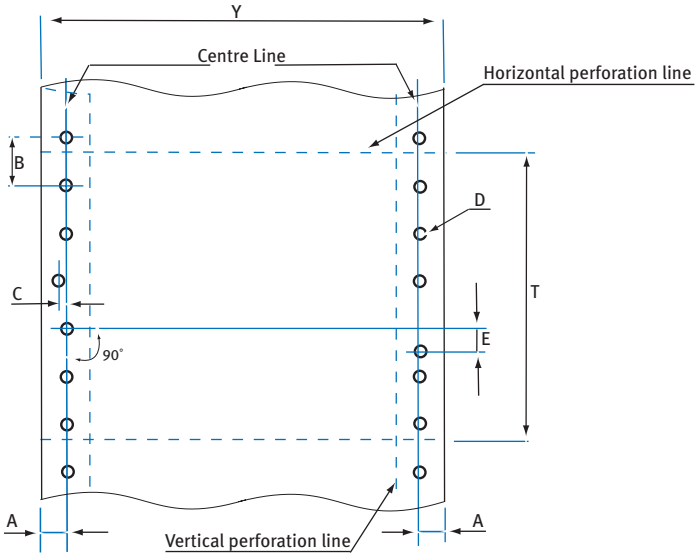
...✚ The roll paper stand (option) must be used.



PAPER SPECIFICATION - DETAIL

CONTINUOUS PAPER

Continuous paper should be folded paper with sprocket holes.



Vertical and horizontal dimensions

(Measurement conditions: Temperature $20 \pm 2\%$; Humidity $65 \pm 2\%$)

1. Vertical dimension (T)

Standard – 279.4mm (11"); Tolerance ± 0.5 mm.

See “Paper size and printing range” later in this chapter, about the available area.

2. Horizontal dimension (Y)

Standard 1 – 254.0mm (10"); Tolerance ± 0.5 mm.

Standard 2 – 381.0mm (15"); Tolerance ± 0.5 mm.

See “Paper size and printing range” later in this chapter, about available area.

3. Fold dimension

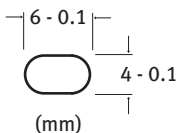
The vertical dimension should be standard and the horizontal perforation line should be used for zigzag folding.

Position and size of feed (sprocket) holes

ITEM	SIZE (MM)	REMARKS
Measurement between the centre line of the sprocket holes and the edge of the paper	A 6.35 ± 0.7	6.35mm average
Sprocket hole diameter	D 4.0 ± 0.1	Diameter of sprocket holes.
Vertical distance between sprocket hole centres	B 12.70 ± 0.05	Vertical distance between centres of adjacent sprocket holes.
Total error of measurement	– ± 0.3 or less	Between the sprocket holes chosen
Sprocket hole centre horizontal deviation	C <0.1	Deviation between sprocket hole centre and the average vertical centre line
Sprocket hole centre vertical deviation	C <0.1	Deviation between a sprocket hole centre and the centre line of the left/ right corresponding sprocket hole

Footnotes:

1. The **centre line** is a line produced by linking 2 arbitrary sprocket holes approx. 254mm apart vertically.
2. The shape of sprocket should be circular at both right and left sides. However, a slight ovality is permitted on the right-hand side.
3. The maximum permitted left – to – right ovality is:



4. Make sure that the paper does not have any residue from sprocket hole punching (punch dust).

Perforations

The dimensions of perforations should be able to withstand maximum paper feed speed but should be able to be cut easily.

Continuous paper between perforations should be sound and should not be torn. Folded lines of blank forms tend to tear easily and paper should be inspected for this.

The most appropriate ratio of the perforated area to the continuous area of scored forms should consider the paper quality, ream weight and number of copies required. The following choices are recommended:

	NUMBER OF COPIES	LENGTH OF EACH PERFORATION	LENGTH OF EACH CONTINUOUS SECTION
Horizontal perforation	1 ~ 6	2 ~ 3mm	1mm
Vertical perforation	1 ~ 6	3mm	1mm

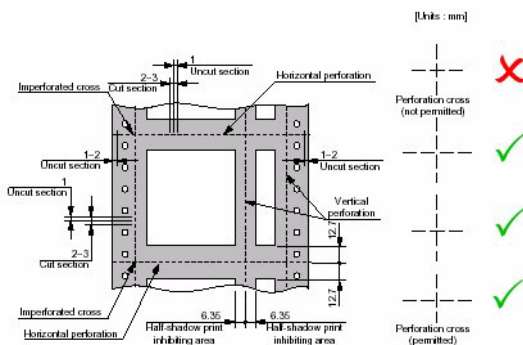
Horizontal perforation

Ensure unperforated margins of 1 – 2mm at top and bottom.

Vertical perforation

Where vertical perforations are made within the printing range, ensure an unprintable margin of 6.35mm (1/4inch) on both side of the perforation line.

In order to prevent tearing, ensure that the vertical and horizontal perforation lines do not cross at a perforation.



PAPER SIZE AND PRINT AREA

Continuous sprocket fed paper (fan fold paper)

The tractor feed unit can handle sprocket paper of the following width:

3 to 9.5 inches (76.2 to 241.3 mm) (option)

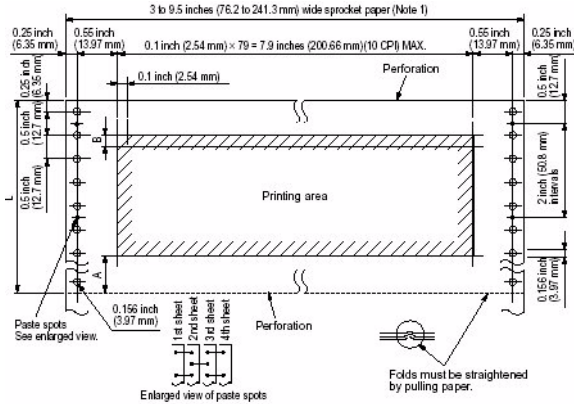
Single-part paper:

Weight: 14 to 20 lb. (52 to 75 g/m²)

Multiple-part paper:

Use 0.011 inch (0.28 mm), or less, total thickness.

TYPE OF PAPER	REAM WEIGHT	NUMBER OF SHEETS
Carbon lined	9 to 11lb (35 to 40g/m ²)	Up to 4 (including the original)
Pressure sensitive	9 to 11lb (35 to 40g/m ²)	Up to 4 (including the original)
Interleaved paper	14lb (52g/m ²) 9lb (36g/m ²)	Up to 3 (including original) Up to 4 (including original)



NOTES

- ...✦ *Use the tractor feed unit for paper that is 3 inches (76.2 mm) to 9.5 inches (241.3mm) wide. Use the variable pin platen for paper of 9.5 inches (241.3mm) to 10inches (25.4mm) wide.*
- ...✦ *L = An integer multiple of 1 inch (25.4 mm).*
- ...✦ *A = Allow a margin of 0.665 inch (16.9 mm, four lines in 6-LPI mode) before and after perforations to prevent printout from being affected. When the paper cutter (access cover) is used, the margin between the printed line and cut line is 0.917 inch (23.28 mm).*
- ...✦ *B = Line feed pitch is 0.167 inch (4.23 mm) for 6 LPI, or 0.125 inch (3.18 mm) if 8 LPI is selected.*
- ...✦ *The right margin sprocket holes must meet the specification for horizontal ovality.*
- ...✦ **Weight**
 - (a) Single-part paper: 14 to 20 lb. (52 to 75 g/m²).*
 - (b) Multiple-part paper: Carbon-lined paper or pressure-sensitive paper of 9 to 11 lb. (35 to 40 g/m²) ream weight: Up to four sheets, including the original, can be used.*
 - The thickness of multiple-part paper should be 0.011 inch (0.28 mm) or less.*
- ...✦ *Multiple-part paper should be fastened by spot-pasting or crimping on both sides, and should be free of wrinkles.*

PAPER REAM WEIGHT

1. **Single-part paper**

- (a)** Ream weight:
 - 52 to 75 g/m² (14 to 20 lbs)
- (b)** Surface coarseness:
 - Sheffield 75 ~ 300 sec
 - Beek 90 ~ 7 sec
- (c)** Paper thickness:
 - 0.07 – 0.1mm (0.003 – 0.004 inches)

2. Multiple-part paper:

PAPER TYPE	REAM WEIGHT	NUMBER OF SHEETS
Carbon-lined paper	9 to 11lb (35 to 40g/m ²)	Up to 4 (including the original) with rear feed
Pressure sensitive	9 to 11lb (35 to 40g/m ²)	Up to 6 (including the original) with bottom feed
Interleaved paper	9 to 11lb (35 to 40g/m ²)	Up to 4 (including original) with rear feed
With carbon paper	9lb (35g/m ²)	Up to 5 (including the original) with bottom feed

NOTES

- ...✦ *The printer can handle multi-part continuous forms with a total thickness of 0.36mm (0.014 inches) or less with rear feed, 0.44mm (0.017 inches) or less with bottom feed.*
 - ...✦ *Carbon paper should be of 35 g/m² (9 lbs) with a thickness of 0.04mm or less.*
 - ...✦ *Multiple-part paper should be fastened by spot-pasting or crimping on both sides, and should be free of wrinkles.*
-

MAXIMUM PAPER THICKNESS

Rear feed – 0.36mm (0.014 inches).

Bottom feed – 0.44mm (0.017 inches).

LAMINATING COPY FORMS

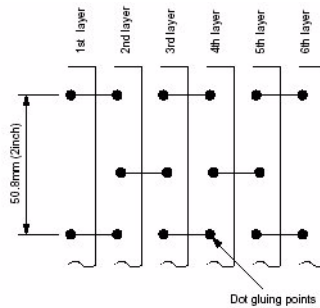
There are two methods laminating copy forms, either dot gluing or stapling.

If there is a problem with layer deviation (print deviation between the top and bottom layers), employ the dot gluing method (Paper staple method may cause a layer deviation of about 4mm).

The use of metallic staples is strictly prohibited.

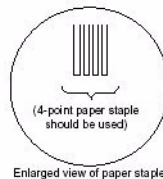
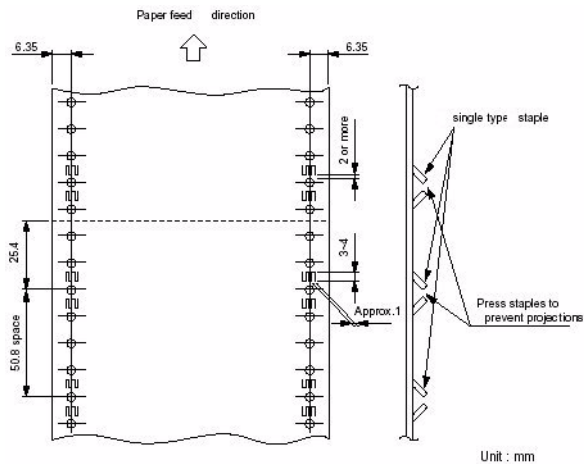
1. Dot gluing

- (a) When using the dot gluing method, always glue both ends. Single end gluing should not be used.
- (b) Dot glued sections should be uniform and the area should be 3 to 5mm. Dot glued sections should always be pressed to eliminate bubbles. Avoid any prominent wrinkles.
- (c) Refer to the drawing below for advice on dot gluing positions.
- (d) Layout dot gluing in offset lines on alternate layers.



2. Paper staples

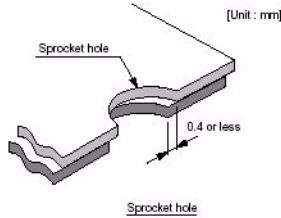
- (a) When using paper staples, always staple both ends.
- (b) Always apply paper staples from the front of blank forms and ensure that no projection remains on the front surface of the paper.
- (c) Paper staples should always be securely fixed and paper should be perfectly flat.
- (d) Use single paper staples, in the paper feed direction.
- (e) When stapling is complete, press the stapled layers to prevent projections.



SPROCKET HOLES

The shape of sprocket holes should be a true circle although the peripheral edges may be toothed. The edges should be flat.

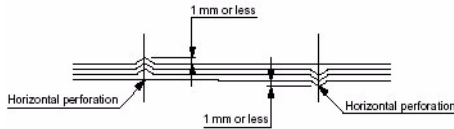
Ensure that the deviation of sprocket holes between layers or carbon papers is 0.4 mm or less.



PROJECTIONS ON HORIZONTAL PERFORATIONS

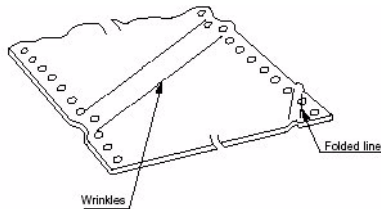
When using carbon papers, projections on the horizontal perforation line should be 1 mm or less in height.

If there are projections, the quality of print may deteriorate, the paper feed become unstable, or a paper jam occur.



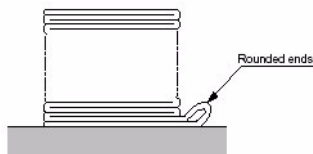
WRINKLES AND FOLDED LINES

Always use paper free from wrinkles and folded lines, especially, with new paper. Discard a few pages at the beginning and end of a paper stack since this is where wrinkles and folded lines tend to occur.



FOLDED ENDS OF THE PAPER

Fold paper alternately *at the horizontal perforation line*. Do not use paper where the ends have become rounded after folding (as illustrated below) since it will have an adverse effect on paper feeds.



BINDING HOLE

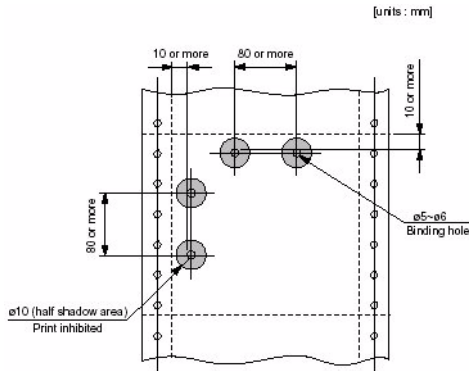
NOTE

Wherever possible, do not use paper with binding holes as it will invalidate the printer warranty. Should a problem arise due to its use, the equipment or its performance cannot be guaranteed.

When use of it is unavoidable, check that there are no problems by testing it in advance.

Notes on using paper with binding holes are given below.

- (a) Do not print within surrounding 5 mm of binding hole.
- (b) Check that no punch dust from binding holes remains on the paper.
- (c) If the paper detection switch recognises a binding hole, it may interpret this hole as the paper end. This may also be interpreted as a paper thickness error.
- (d) Check it there are no projections on the edge of any binding holes. If there are projections, they may be caught on the carriage.
- (e) See the figure below regarding the position of binding holes.



CUT CORNERS

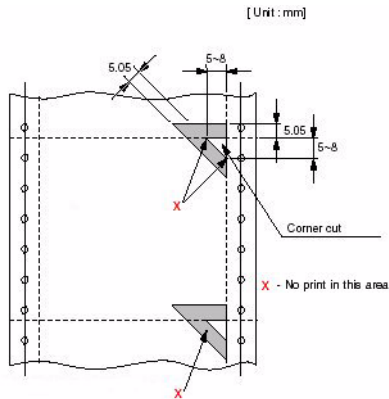
NOTE

Wherever possible, do not use paper with cut corners as it will invalidate the printer warranty. Should a problem arise due to its use, the equipment or its performance cannot be guaranteed.

When use of it is unavoidable, check that there are no problems by testing it in advance.

Notes on using paper with cut corners are given below.

- (a) Do not print within the shaded area around a cut corner (shown in the figure below).
- (b) Check that no punch dust from the corner cut remains on the paper.
- (c) Do not connect horizontal/vertical perforation area to the surroundings of a corner cut in order to prevent paper peeling.
- (d) If the paper detection switch recognises a corner cut, it may interpret this area as the paper end or a paper jam. This may also be interpreted as a paper thickness measuring error.
- (e) See the figure below regarding the position of corner cuts.



CUT-SHEET PAPER

PAPER SIZE AND PRINTABLE RANGE

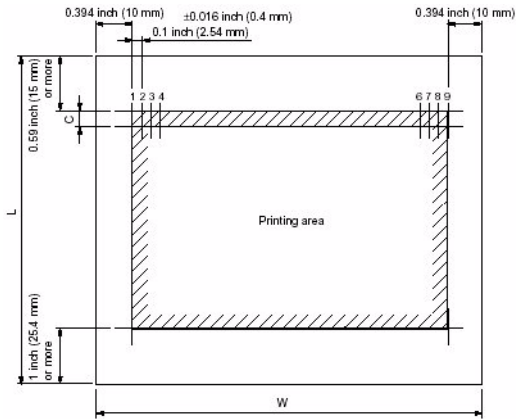
Standard size: 8.5 inches (wide) × 11 inches (long) – U.S.

A4 size 210 mm (wide) × 297 mm (long)] –

Europe

If paper width is 8.5 inches or less, a weight 16 to 20 lb. (60 – 75 g/m²) is preferable.

Multiple-part cut-sheet cannot be used.



NOTES

...✚ Standard paper size:

A4; 8.268 inches × 11.693 inches (210 × 297 mm) – Europe

8.5 inches × 11 inches (215.9 × 279.4 mm) – U.S.A.

...✚ Paper width (W): 7.2 inches (182 mm) to 8.5 inches (215.9 mm).

...✚ Paper length (L): 14 inches (356 mm) or less.

...✚ Paper weight: 16 to 24 lb. (60 to 90 g/m²).

...✚ Line feed pitch (C): 0.167 inch (4.23 mm) (6 LPI) or 0.125 inch (3.18 mm) (8 LPI) can be selected.

...✚ Paper must be free of folds and bends.

...✚ Multiple-part cut-sheet paper cannot be used.

PAPER QUALITY

Using friction feed SASF

(a) Ream Weight

60 ~ 90 g/m² (16 – 24 lbs)

(b) Surface coarseness

Sheffield: 75 ~ 300 sec

Beek: 7 ~ 90 sec

(c) Paper thickness

0.08 ~ 0.11 mm (0.003 ~0.004 inches)

Using a CSF

(a) Ream Weight

60 ~ 90 g/m² (16 – 24 lbs)

(b) Surface coarseness

Sheffield: 75 ~ 300 sec

Beek: 7 ~ 90 sec

(c) Paper thickness

0.08 ~ 0.11 mm (0.003 ~0.004 inches)

NOTES

✦ Use white, fine-quality paper.

✦ Do not use folded paper or malformed paper.

PERFORATED LINES

NOTE

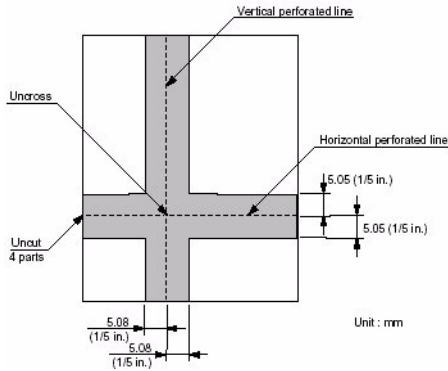
Wherever possible, do not use paper with perforated lines as it will invalidate the printer warranty. Should a problem arise due to its' use, the equipment or its performance cannot be guaranteed.

When use of it is unavoidable, check that there are no problems by testing it in advance.

Notes on using paper with perforated lines are shown below.

1. Specifications for perforated lines in cut-sheet paper are the same as those for perforated lines in fan-fold paper.
2. Do not print within the shaded area around the perforated lines.

The figure below shows an example of a paper with perforated lines.



RULES FOR FOLDS, BENDS, AND CURLS IN CUT-SHEET PAPER

Cut-sheet paper can easily fold, bend, or curl when being handled, carried, or stacked.

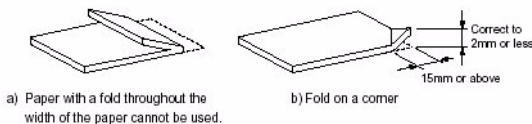
Asses the condition of the paper to the following specifications.

Do not use paper that is outside these specifications, as it could adversely affect paper feed. The printer or its' performance cannot be guaranteed in this instance.

1. Folds

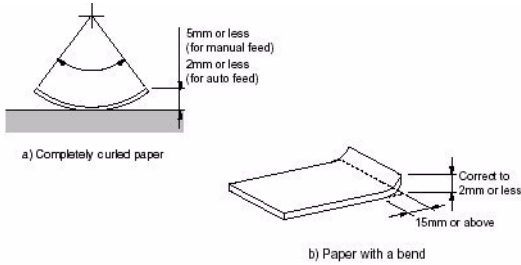
- (a) Paper with a fold that runs throughout the width of the paper cannot be used. (Such a condition cannot be corrected entirely).
- (b) For folded corners, paper can be used if the fold is 2mm or less after being corrected.

However, such paper cannot be used with automatic feeders, such as a cut-sheet feeder, even after correcting.

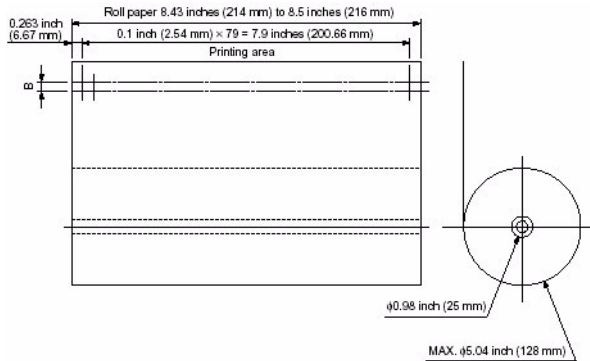


2. Bends and curls

- (a) Paper that curls in a natural state can be used if the curl is 5mm or less using manual feed and 2mm or less using auto-feed such as a CSF.
- (b) Paper where the bend is 2mm or above within 15mm from the bend point cannot be used.



ROLL PAPER



Outside diameter	5.04 inches (128 mm), maximum
Paper path	8.43- to 8.5-inch (214 to 216 mm)
Core inside diameter	0.98 inch (25 mm)
Weight	14 to 17 lb. (52 to 64 g/m ²)
Line feed pitch (B)	0.167 inch (4.23mm)(6LPI) or
(selectable)	0.125 inch (3.18mm)(8LPI)

NOTE

❖ Multiple-part paper cannot be used.

❖ The roll paper stand (option) must be used.

LABEL PAPER

Label paper is a base single continuous paper to which an adhesive coating is applied. This coating is also applied to the labels which are fixed on it. It is essential that the shrinkage difference due to temperature change between the labels and base paper is low, and stickiness and durability is higher and the entire adhesive layer is uniform.

1. Size

Base paper size:

Maximum: 216mm (8.5 inches) x 83mm (3.25 inches).

Label should be 50 mm or more in width and 25 mm or more in length.

Other dimensions and specifications should conform to the specifications for Continues forms –“Sprocket holes” on page 289.

2. Paper Thickness

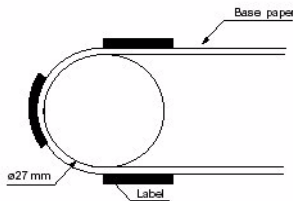
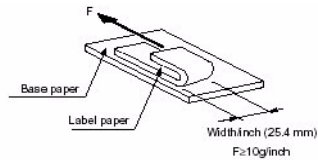
Maximum 0.28mm (0.011 inches)

(Including the base paper thickness)

3. Glue

Peel strength: 10g/inch or more.

The base paper choice shall be such that, when the labelled paper is wound around 180° of a cylinder of diameter $\varnothing 27$, the labels may not peel off from the base paper. In addition, the choice of base paper must be such that labels must not peel off during printing or paper feed.

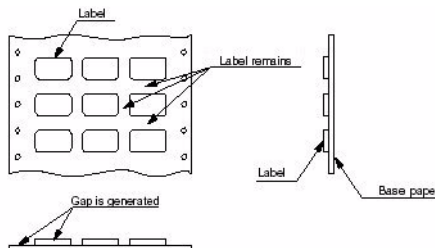


4. Printing must not extend beyond the label edges. If it does, the print head may be damaged. Labels must not have perforations.
5. The paper feed route must be achieved using the pull tractor (option) or bottom push tractor (option) only.

6. Removal of labels

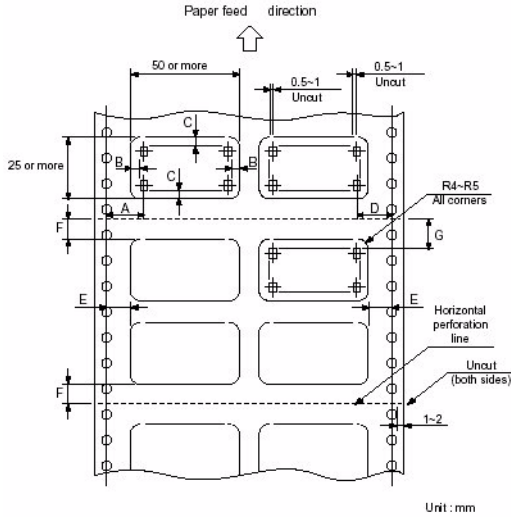
Do not remove label remains from the sheet (this leaves a gap, as shown in the figure below).

Label paper which has had the label remains removed must not be used.



7. Label corner radius: 4.0 – 5.0 mm
8. The cut.....
 - (a)must be to the label (surface paper) only.
 - (b)corresponding to the horizontal perforation line should be the same as the horizontal perforation line with 1 – 2 mm uncut area from both edges.
 - (c)must provide 0.5 – 1 mm uncut area near the right and left corner in the upper section of the label.
9. Label glue should not bleed to the surface of the label.
10. Cloth labels must not be used.
11. Do not load continuous paper with labels that are damaged, curled or wrinkled.
12. Do not leave labels loaded in the printer between jobs. They may curl around the platen and jam when you resume printing.
13. Because labels are sensitive to temperature and humidity, use them only under normal operating conditions, as follows:
15 ~ 25°C (50 to 77°F) / 30 to 60%RH

14. Label paper must only be used with the pull-up tractor (for bottom feed).



Paper size must conform to the specification for “Continuous paper” on page 281.

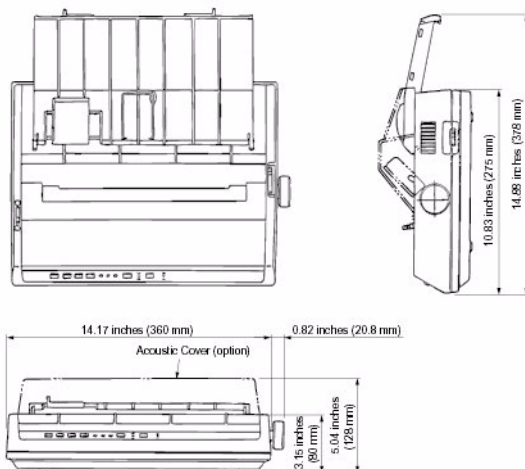
- A: 12.7 ~ 25.4 mm (1/2 ~ 1 inch)
 B: 3.81 mm
 C: 4 mm or more
 D: 12.7 mm (1/2 inches) or more
 E: 6.35 mm (1/4 inches) or more
 F: 6.35 mm (1/4 inches) or more (12.7 mm or more is desirable)
 G: 10.58 mm (5/12 inches) or more (25.4 mm or more guaranteed range for line feed precision)

MACHINE SPECIFICATIONS

OUTSIDE DIMENSIONS

14.17 inches (360 mm) (Width) × 5.04 inches (128 mm) (Height) × 10.96 inches (278.5 mm) (Depth).

These dimensions include the platen knob, tractor feed unit and acoustic cover.



Weight: 4.5Kgs

POWER REQUIREMENTS

AC VERSION

Single phase AC

Input Voltage:

120V model: 120 VAC +6%, -15%

230V model: 230 VAC +15%, -14%

Frequency: 50/60Hz ±2%

Power consumption:

Typical:60W (Rolling ASCII, Utility)

Idle: Max. 28W

DC VERSION

Input Voltage:

9.6 to 31.2 VDC

Power consumption:

4.0 to 1.8A

ENVIRONMENTAL CONDITIONS

Ambient temperature and relative humidity.

	OPERATING	NON- OPERATING	TRANSPORTATION	STORAGE	UNIT
Temperature	41to 95 (5 to 35)	32 to 109.4 (0 to 43)	-40 to 158 (-114 to 70)	14 to 122 (-10 to 50)	°F (°C)
Relative Humidity	20 to 80	10 to 90	5 to 95	5 to 95	% RH

Avoid condensation at all times.

PRINT SPECIFICATION

1. Print method: Impact dot matrix.
2. Number of dot wires: 9.
3. Dot wire diameter: 0.013 inch (0.34 mm).
4. Print Direction Bi-directional, uni-directional printing.
Short-line seeking printing.

5. Print Speed.

PRINT MODE	CHARACTER PITCH				
	10 CPI	12 CPI	15 CPI	17.1CPI	20 CPI
HSD	333 CPS	333 CPS	333 CPS	333 CPS	333 CPS
NLQ	62.5 CPS	62.5 CPS	62.5 CPS	62.5 CPS	62.5 CPS
UTILITY	250 CPS	250 CPS	250 CPS	250 CPS	250 CPS
SSD	–	375 CPS	–	–	–

Footnote: When the “Mechanical Speed” of the technical menu is set to “High”.

6. Throughput rate (ISO 10561 Letter test - Pattern B -).

	HSD	UTILITY	NLQ
Letter Performance five pages (10 cpi)	75 secs.	85 secs.	210 secs
Letter endurance 1h (10 cpi)	240 pages	218 pages	85 pages

*Note: * Figures are given for values measured at a room temperature of 25°C.*

** When the “Mechanical Speed” of the technical menu is set to “High”.*

7. Character sets:

Standard ASCII.

EPSON Character Set (Italics / Graphics).

IBM Character Set I & II.

ML Character Set (Standard / Line Graphics / Block Graphics).

Foreign Character Set: 23 types.

Code Page: 40 types.

Bar Code.

8. Selectable Character Pitches

5 CPI	6CPI	7.5CPI	8.5CPI	10CPI	12CPI	15CPI	17.1CPI	20CPI
0.2inch 5.08mm	0.167inch 4.23mm	0.133inch 3.39mm	0.117inch 2.96mm	0.1inch 2.54mm	0.083inch 2.12mm	0.067inch 1.69mm	0.2058inch 1.48mm	0.05inch 1.27mm

9. Maximum Number of Dot Columns per Line.

(a) Graphics.

SINGLE DENSITY	DOUBLE DENSITY	QUADRUPLE DENSITY
480	960	1920

(b) Text.

PRINT MODE	CHARACTER PITCH				
	10 CPI	12 CPI	15 CPI	17.1 CPI	20 CPI
UTILITY	960	1152	1440	1646	1920
NLQ	1920	2304	2880	3292	3840
HSD	720	864	1080	1234	1440
SSD	768				

10. Maximum Number of Characters per Line.

	CHARACTER PITCH								
	5	6	7.5	8.5	10	12	15	17.1	20
Number of characters	40	48	60	68	80	96	120	137	160

11. Line Feed Pitches.

6 LPI 0.167 inch (4.23 mm).

8 LPI 0.125 inch (3.175 mm).

A variable line feed pitch of $n/216$ inch, $7/72$ inch and $n/72$ inch can also be specified.

12. Line Feed Speed.

6 LPI spacing, one LF = 86 ms or less.

8 LPI spacing, one LF = 71 ms or less.

Continuous paper feed rate is at 3 inches per second.

** When the "Mechanical Speed" of the technical menu is set to "High".*

PAPER FEED SPECIFICATIONS

1. Paper insertion.
 - (a) Rear paper feed.
 - (b) Bottom paper feed.
2. Paper feed method.
 - (a) Friction feed: Standard
An optional roll paper stand and Cut Sheet Feeder is available.
 - (b) Variable pin platen feed: Standard
A pin platen with variable sprocket paper width (9.5 to 10 inches) is standard equipment. An optional Tractor unit is available.
3. Paper tear-off.

The paper can be torn off 11/12 inch (23.3 mm) above the last printed line.

A sharp edge is provided on the access cover for paper tear-off.
4. Paper end detection.
 - (a) With rear paper feed, the paper end is detected when the remaining paper length is about 1 inch (25.4 mm) from the last printed line.
 - (b) With bottom paper feed, the paper end is detected when the remaining paper length is about 1 inch (25.4 mm) from the last printed line.

When the paper end is detected, the printer stops printing and sends a paper end signal to the interface.
5. Automatic carriage centering function.

When inserting the paper, the carriage automatically moves to the center position for ease of paper insertion.

RELIABILITY

MTBF (mean time between failures):

20,000 hours of power-on time.

(Page density: 35%; Duty cycle: 25%).

Printhead life

200 million characters (average).

2500 million dot.

(Page density: 35%; Duty cycle: 25%).

Printer life

12,000 hours of power-on time, or 5 years.

(Page density: 35%; Duty cycle: 25%).

MTTR

15 minutes, major Sub-assembly level.

Definition of terms

Page density: The proportion in area of characters and spaces within the printhead movable area.

Duty cycle: Actual operation rate.

Power on time: 8H/day, 25 days/month and 12 months/year.

STANDARD INTERFACE SPECIFICATIONS

IEEE1284 PARALLEL INTERFACE

1. Connectors and cable.

(a) Printer input socket:

36-pin receptacle “Centronics” type.

(b) Interconnect Cable:

Printer end: 36-pin plug “Centronics” type.

Non-printer end: Typically 25way “D” sub-min., male

Use a cable less than 6 ft (1.8 m) in total length.

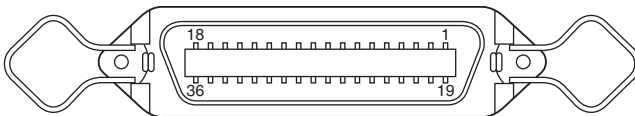
(A shielded cable is required, and the use of twisted-pair wires is recommended for noise prevention.)

2. Interface signal specification.

PIN No.	SIGNAL	DIRECTION	DESCRIPTION	
			COMPATIBLE	NIBBLE
1	–STROBE	To printer	Samples input data when changing from low level to high level.	
2	Data Bit 1	To printer		HostClk
3	Data Bit 2	To printer		←
4	Data Bit 3	To printer		←
5	Data Bit 4	To printer	Input data: High level indicates “1” and low level “0”	←
6	Data Bit 5	To printer		←
7	Data Bit 6	To printer		←
8	Data Bit 7	To printer		←
9	Data Bit 8	To printer		←
10	–ACKNOWLEDGE	From printer	At low level: Indicates character input completion, or function operation end	PrtClk
11	BUSY	From printer	At high level: Indicates data cannot be received At low level: Data can be received	PrtBusy
12	PAPER END	From printer	High level: indicates paper end	AckDataReq
13	SELECT	From printer	High level indicates select (on line) condition	Xflag
14	–AUTO FEED	To printer	When “Auto Feed” in the menu is set as VALID under EPSON mode, this signal goes low and the printer generates a line feed after receiving CR code.	HostBusy
16, 33	0V	–	Signal Ground	←
17	CHASSIS GROUND	–	Frame Ground	←

PIN No.	SIGNAL	DIRECTION	DESCRIPTION	
			COMPATIBLE	NIBBLE
18	+5V	From printer	+5V supply (1.2 mA maximum) +5V on/off is selectable in MENU.	←
19 to 30	0V	–	Twisted pair return (for pins 1 to11)	←
31	–INPUT-PRIME	To printer	When this signal goes low, the printer controller is initialised. The low level should be held for more than 0.5 ms.	←
32	–FAULT	From printer	This signal goes from high to low level when the paper runs out.	nDataAvail
15, 34	–	–	Unused	←
35	–	–	Connected High (to +5V) via a 3.3 K ohm)	←
36	–SELECT-IN	To printer	In the EPSON mode, when menu item “Print Suppress Effective” is Yes , and the SELECT-IN signal is high, the DC1/DC3 code is valid . It is invalid when the signal is low.	IEEE1284 active

3. Pin arrangement:



4. Interface levels:

Low: 0.0V to + 0.8V; high level: +2.4V to +5.0v.

5. Support Mode:

Compatible.

Nibble (PnP device ID only).

UNIVERSAL SERIAL BUS (USB) INTERFACE

Universal Serial Bus Specification Revision 1.1 compliant.

1. Connectors and cable.

(a) Printer input socket:

“B” Receptacle (Upstream Input to the USB Device).

(b) Interconnect Cable:

Printer end: Series “B” Plug.

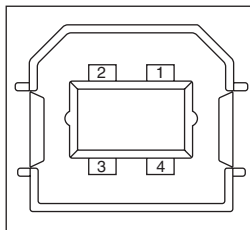
Non-printer end: Series “A” Plug.

Cable Length: Max 5 m (Cable must be met USB Spec Rev 2.0 for normal operation).

2. Interface signal specification.

PIN NUMBER	SIGNAL NAME
1	Vbus
2	D-
3	D+
4	Ground
Sell	Shield

3. Pin arrangement.



4. Mode & Class of Device.

Full - speed Driver

Self - powered Device

5. Data Signalling Rate.

Full - speed function - 12Mb/s

FACTORY DEFAULT SETTINGS

PRINTER CONTROL	EMULATION MODE	IBM
Font	Print mode DRAFT mode Pitch Proportional Spacing Style Size	Utility SSD 10CPI No Normal Single
Symbol Sets	Character Set Language Set Zero Character Code Page Slashed Letter o	Set II ASCII Unslashed USA No
Vertical Control	Line Spacing Skip Over Perforation Page Length	6 LPI No 12"
Set-Up	Graphics 7 or 8 Bits Graphics Receive Buffer Size Paper Out Override Print Registration 7 or 8 Bits Data Word Operator Panel Function Reset Inhibit Print Suppress Effective Auto LF No Auto CR Yes Print DEL Code No SI Select Pitch (10CPI) SI Select Pitch (12CPI) Time Out Print Invalid Auto Select No ESC SI Pitch Select Language Set CSF/RPS Select Impact Mode	Uni-directional 7 64K No 0 8 Semi Operation No Yes No No No 17.1 CPI 20 CPI Invalid No 17.1 CPI Combined RPS Normal
Parallel I/F	I-Prime Pin 18 Auto Feed XT Bi-directional	Buffer Print + 5V Invalid Enable
CSF	Line Spacing Bottom Margin Page Length	6 LPI Valid 12"

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