DCS & Labeling Worldwide

E/Pro Programming Reference

For printer models:

CL408/412e
CL608/612e
M8400RVe
M5900RVe
M8459/60/85/90Se
CT400/410, D508/D512
M84Pro
M10e
XL400/410e
LM408/412e
CG208/212
CG408/412
TG308/312

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FCC Statement

The printer complies with the requirements in Part 15 of FCC Rules for a Class B Computing Device. Operating the printer in a residential area may cause unacceptable interference to radio and TV reception. If the interference is unacceptable, you can reposition the equipment, which may improve reception.

PRINTER REFERENCE TABLE

Each printer model (product) applicable to this document has been assigned a reference letter character and is listed below. The Table Of Contents identifies specific commands and the products to which they apply.

- **CL408/412e (A)**
- **CL608/612e (B)**
- **M8400RVe (C)**
- **M5900RVe (D)**
- **M8459/60/85/90Se (E)**
- **CT400/410, D508/D512 (F)**
- **M84Pro (G)**
- **M10e (H)**
- **XL400/410e (I)**
- **LM408/412e (J)**
- **CG208/212 (K)**
- **CG408/412 (L)**
- **TG308/312 (M)**

TABLE OF CONTENTS

STANDARD COMMAND CODES

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INTRODUCTION

- About This Manual
- Print Area Calculation

ABOUT THIS MANUAL

This manual is laid out consistent with the product discussed and provides all of the information required for printer programming.

This manual also incorporates the use of special information boxes. Examples of these boxes and the type of information provided in each, are below.

WARNING: PROVIDES INFORMATION THAT, IF UNHEEDED, MAY RESULT IN PRESONAL INJURY.

CAUTION: PROVIDES INFORMATION THAT, IF UNHEEDED, MAY RESULT IN EQUIPMENT DAMAGE.

ATTENTION: Provides information that is deemed of special importance but will not result in personal injusry or product damage if unheeded.

NOTE: Provides helpful hints to assist in performing the tasks at hand.

LCD DISPLAY: Provides the specific display that should be visible on the LCD at that point.

A comprehensive Table Of Contents provided at the front of this manual facilitates rapid movement within. The contents identify the different Units, Chapters, and Sections. Each references the page number of their commencement and all printers applicable to each command identified. Each printer model is identified by an assigned letter character that may be referenced on the page preceding the Table Of Contents.

The pages of this manual have embedded headers and footers to assist the user in identifying his or her exact position within the manual. The header provides the unit number followed by its name. The footer identifies the product on the left, the page number in the center, and the manual's part number to the right side of the page.

Page enumeration is two-part with each separated by a hyphen. The first character set references the Unit and the second identifies the page number. Page numbers begin with the numeral (1) one at the commencement of a new unit and ascend sequentially.

PRINT AREA CALCULATION

Many print applications may not require labels that fill the entire printable area of the printer. Therefore it is important to understand how to calculate print size so that the printed image does not exceed the label size.

There are two axis to consider when calculating for print position; horizontal and vertical. The horizontal axis is lateral positioning parallel with the print head and is measured from the right side of the media to the left. The vertical axis is the label length from the front to its rear.

This juncture point of the horizontal and vertical axis is referred to as the Base Reference Point (or zero point) and all measurement is incremental along those axis' from there. The allowable ranges for these references is dependent on the particular printer to accommodate different print widths and resolutions.

A1 COMMAND

The A1 command is the preferred method of configuring the printer for media size. If using media smaller than the print head width, use this command to specify the media size and adjust the start position corresponding to that. The backing paper must be included in media size considerations. This command would be as follows:

<A1>aaaaabbbb

a = Height of Label
b = Width of Label

> NOTE: The valid ranges for each of the above may be found in the product manuals.

A3 COMMAND

Before beginning to send code, one must perform some simple calculations to determine print positioning. Firstly, determine the print resolution and maximum print width of the printer. This information is provided in the Technical Data unit of the Operator Manual and Service Manuals.

The print resolution of the print head has a direct bearing on the "dots per inch" (DPI) of print density. The corresponding formula for a 203 Resolution print head on a printer with 4.1 Maximum Print Width would be:

Resolution (DPI) x Maximum Printable Width (Linear Inches) =
Maximum Printable Width (Linear Dots)

203 (DPI) x 4.1 (Linear Inches) = 832 (Linear Dots)

Once this is done, one must calculate the label width in linear dots. That formula would be as follows for a 2 inch wide label:

Resolution (DPI) x Label Width (Linear Inches) =
Label Width (Linear Dots)

203 (DPI) x 2.0 (Linear Inches) = 406 (Linear Dots)

Lastly, one must calculate the horizontal distance to offset printing to accommodate for the difference in size from the printer's maximum printable width to the label width. That formula would be as follows using the above examples:

Maximum Printable Width (Linear Dots) - Label Width (Linear Dots) =
Print Offset (Linear Dots)

832 (Linear Dots) - 406 (Linear Dots) = 426 (Linear Dots)

In the above example, 426 would be the required command entry to reset the initial base reference point (or zero point) to the new base reference point (or zero point) based on the label's width.

Note that with each additional horizontal or vertical adjustment, the New Base Reference Point will always be positioned relative to the last base reference point - not the Initial Base Reference Point. In other words, the only way to return to the Initial Base Reference Point is to either use commands to reverse the prior commands, or to

delete all positioning commands to return the printer to its default state.

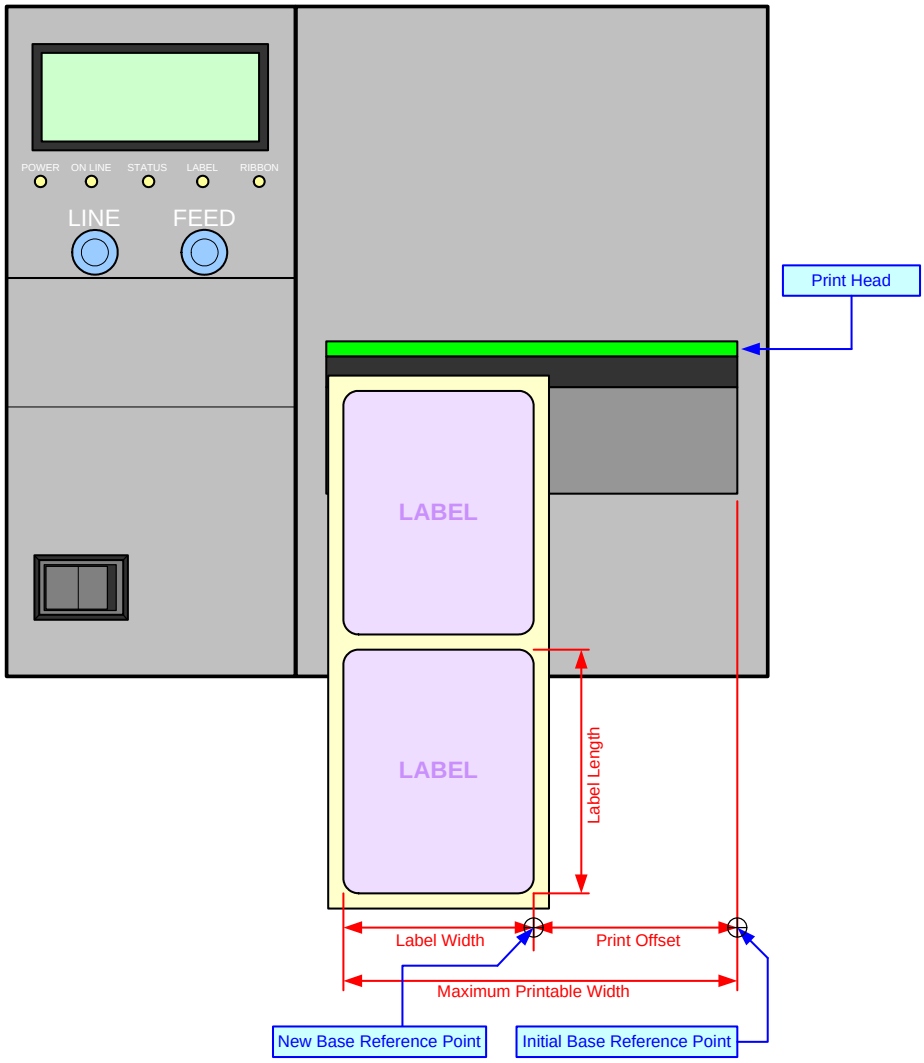

Figure 1-1, Print Area Calculation

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PROGRAMMING CONCEPTS

- **Programming Language**
- **Selecting Protocol Codes**
- **Using Basic**
- **Print Position Commands**

PROGRAMMING LANGUAGE

A programming language for a printer is a familiar concept to most programmers. It is a group of commands that are designed to use the internal intelligence of the printer. The commands, which are referred to as SATO Command Codes, contain non-printable ASCII characters (such as **<STX>**, **<ETX>**, **<ESC>**) and printable characters. These commands must be assembled into an organized block of code to be sent as one data stream to the printer, which in turn interprets the command codes and generates the desired label output. The programmer is free to use any programming language available to send the desired data to the printer.

The printer command codes used are based upon “Escape” (1B hexadecimal) sequences. Typically there are four types of command sequences:

<ESC>{Command}

These commands generally tell the printer to perform a specific action, like “clear the memory.”

<ESC>{Command} {Data}

Commands with this format tell the printer to perform a specific action which is dependent upon the following data, like “print X labels”, where the value for X is contained in the data.

<ESC>{Command} {Parameter}

These commands set the operational parameters of the printer, like “set the print speed to 3.”

<ESC>{Command} {Parameter} {Data}

Some commands can contain both Parameter and Data elements, such as “print a Code 39 symbol containing the data.”

SELECTING PROTOCOL CODES

Protocol codes are the special control characters that prepare the printer to receive instructions. For example, the **<ESC>** character tells the printer that a command code will follow and the **<ENQ>** character asks for the printer status.

There are two pre-defined different sets of Protocol Control codes to choose from. Each set is made up of six special characters. The Standard Protocol Control codes are non-printable characters, and the Non-Standard Protocol Control codes are printable characters. The Non-Standard set may be useful on host computers using protocol converters or in an application where non-printable ASCII characters cannot be sent from the host.

> This manual uses the Standard Protocol Control codes for all of the examples. Alternately, the user may define and download a set of custom Protocol Control Codes (see Appendix D).

PROTOCOL CODES			
CONTROL CHARACTER	**STANDARD DSW2-7 OFF**	**NON-STANDARD DSW2-7 ON**	**DESCRIPTION**
STX	02 Hex	7B Hex = {	Data start
ETX	03 Hex	7D Hex = }	Data end
ESC	1B Hex	5E Hex = ^	Command Code to follow
ENQ	05 Hex	40 Hex = @	Get printer status, Bi-Com Mode
CAN	18 Hex	21 Hex = !	Cancel print job, Bi-Com mode
Off-Line	40 Hex	5D Hex =]	Take printer Off-Line

USING BASIC

It may be useful to test your printer using a BASIC program on a PC or write your actual production programs in BASIC. Whatever the reason, if working in BASIC, some of the following hints may be helpful.

Set the WIDTH of the output device to 255 characters to avoid automatically sending <CR> and <LF> characters after every line. The command string should be continuous and uninterrupted by <CR> and/or <LF> commands. The examples given in this manual are printed on separate lines because they will not fit on a single line and do not contain <CR> and/or <LF> characters. If these characters are needed, they are explicitly noted by the inclusion of <CR> and <LF> notations.

If using the printer's RS232C interface, it is necessary to set the computer COM porton so the CTS and DSR signals are ignored. Send OPEN "COM" statements as follows:

OPEN "COM1:9600,E,8,1,CS,DS"AS #1

This sets the host computer's COM1 port RS232C communication parameters for 9600 baud, Even parity, 8 Data bits, 1 Stop bit and directs the port to ignore the CTS and DSR control signals.

It may be desirable to assign the <ESC> character to a string variable to reduce keystrokes since this character is often used.

The following two examples use Standard Protocol codes in BASIC.

PRINTING WITH THE PARALLEL PORT	
5 REM CL612 Parallel Example	Identifies the program as a CL612 parallel port print label. The "REM" prevents this data from being sent to the printer and is only displayed on the screen.
10 E$=CHR$(27)	Sets the "E$" string as an <ESC> character
20 WIDTH "LPT1",255	Sets the width of the output to 255 characters
30 LPRINT E$;"A";	Sends an "<ESC>A" command code to the LPT1 parallel port
40 LPRINT E$;"H400";E$;"V100";E$;"XL1SATO";	Sends the data "SATO" to be to be placed 400 dots horizontally and 100 dots vertically on the label and printed in the "XL" font.
50 LPRINT E$;"Q1";	Instructs the printer to print one label.
60 LPRINT E$; "Z";	Tells the printer that the last commandhas been sent. The printer can nowcreate and print the job.

PRINTING WITH THE RS232C PORT	
5 REM CL612 Parallel Example	Identifies the program as a CL612e RS232C port print label. The “REM” prevents this data from being sent to the printer and displays it only on the screen.
10 E$=CHR$(27)	Sets the“E$”string as an <ESC>character.
OPEN “COM1:9600,N,8,1,CS,DS”AS #1	Opens the COM1 port for output and sets the parameters as 9600 baud, No parity, 8 Data bits, 1 Stop bit and instructs the port to ignore the CTS and DSR control signals.
30 PRINT #1,CHR$ (2);	Sends an <STX> (ASCII Code a decimal “2”) to the printer instructing it to prepare to receive a message.
50 PRINT #1,E$;"A";	Sends an “<ESC>A” command code to Print Port #1 opened by statement 20 above.
60 PRINT#1, E$; "H400"; E$; "V100"; E$; "XL1SATO"	Sends the data “SATO” to be placed 400 dots horizontally and 100 dots vertically on the label and printed in the“XL” autosmoothed font.
50 PRINT #1, E$;"Q1";	Instructs the printer to print a quantity of one label.
60 PRINT #1, E$; “Z”;	Informs the printer that the last command has been sent and printing can occur.
70 PRINT #1,CHR$ (3);	Sends an <ETX> (ASCII Code decimal “3”) informs the printer of message end. Identifies the program as a CL612e RS232C port print label. The “REM” prevents this data from being sent to the printer and displays it only on the screen.

PRINT POSITION COMMANDS

There are three methods using command codes to properly orient print images on a label. They are as follows:

MEDIA SIZE COMMAND

The Media Size Command (<ESC>A1) allows specification of the label width and length so the printer may autmatically adjust itself relative to the command entry. However, the label size specified and the actual label size must match.

EXAMPLE: <ESC>A1aaaaabbbb

a = Label Length

b = Label Width

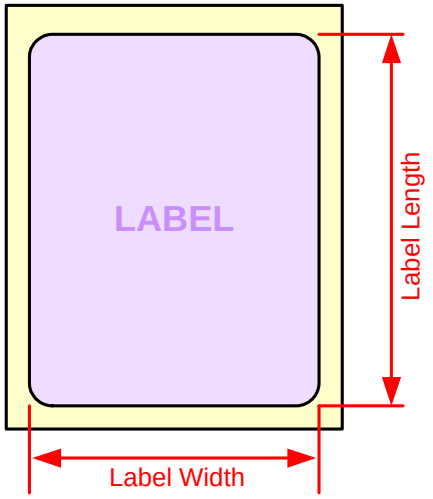

Figure 2-1, Media Measurement

BASE REFERENCE POINT COMMAND

The Base Reference Point Command (<ESC>A3) establishes the zero point of the Horizontal and Vertical axis so the distance may be calculated in dots from that point to the label's edge. This command immediately follows the Data Start Command.

EXAMPLE: Label Width = total dots - = 406 dots

New Base Ref Point = Max Print Width - Label Width

= (dot quantity) - (406 dots) = 426 dots

Issue Base Reference Point command <ESC>A3 after the data Start command.

<ESC>A<ESC>A3H0426V0001. . . . . .

HORIZONTAL OFFSET COMMAND

Allows print image orientation by combining a part of both methods above by establishing the media size and then orienting it through base reference point adjustment.

EXAMPLE: A Printer with 8-dpmm:

Label Width = 2" x 25.4 mm/in x 8 dpmm = 406 dots

New Base Reference Point = Maximum Print Width - Label Width

= (832 dots) - (406 dots) = 426 dots

Each <ESC>H command would have the value “426” added to it to correctly position each field.

> NOTE: The <ESC>A3 Base Reference Point command can also shift the reference point in a negative direction (toward the outside edge of the label).

The Command Code subsection contains a sample label output for each command code. These samples reflect how the printed information would appear on a 4.25 inch wide label.

If you want to test any of the sample label outputs and are using labels less than five inches in width, it is recommended that the Base Reference Point command be added to the data stream to print the image onto the label.

The addition of the Base Reference Point command to the data stream will help adjust the print. See the following two examples or refer to the Base Reference Point command description.

EXAMPLE: <ESC>A

<ESC>H0050<ESC>V0100<ESC>L0303<ESC>XMSATO

<ESC>H0050<ESC>V0200<ESC>B103100*SATO*

<ESC>H0070<ESC>V0310<ESC>L0101<ESC>XUSATO

<ESC>Q1<ESC>Z

If using a 2 inch wide label, the entire image may not appear on the label. By adding the following Base Reference Point command to the second line of the data stream, the base reference point will be changed, causing the image to shift toward the inside of the printer where it can be printed on the narrower label.

EXAMPLE: M8400RVe data stream results in a 2 inch wide label:

<ESC>A

<ESC>**A3H0406V0001**

<ESC>H0050<ESC>V0100<ESC>L0303<ESC>XMSATO

<ESC>H0050<ESC>V0200<ESC>B103100*SATO*

<ESC>H0170<ESC>V0310<ESC>L0101<ESC>XUSATO

<ESC>Q1

<ESC>Z

The image is moved horizontally to the right 2 inches (406 dots) so that itcan be printed on a 2 inch wide label. For more information, see the Base Reference Point command description.

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COMMAND QUICK REFERENCE

- **A through Z (all commands)**

COMMAND QUICK REFERENCE

INSTRUCTION	DESCRIPTION
A	**Start Code**. Begins all print jobs
~Aaaaa	**Cut, Label.** Specifies the quantity of labels to print between each cut. It is independent of the Quantity command. aaaa = Quantity of labels between each cut
~aaaa	**Cut, Job.** Cuts labels at a specified interval in a print job. Quantity of labels printed is equal to the product of the quantity specified x the value of aaaa. aaaa = Quantity of labels between each cut (0001 to 9999)
~(NULL)	**Multiple Cut Specification.** Cuts a specified quantity of times for a specified quantity of labels resulting in one or more labels between each cut sequence. a = Print quantity until cut (0 to 9999)
~B	**Cut, Last.** Cuts any printed labels that remain in the printer.
AOa	**Auto Online.** Allows the automatic online on power up setting to be enabled or disabled. a = 0: Powers up in the online mode 1: Powers up in the offline mode
A1aaaabbbb	**Media Size (dots).** Specifies the label size in dots. aaaa = Label height in dots (0 to Vmax) bbbb = Label width in dots (0 to Hmax)
A1aabbbccc	**Media Size (mm).** Specifies the label size in millimeters for XL400/410e and TG308e and TG312e printers. a = Label Type 0T: Tag Label 0T: Adhesive Label b = Vertical Dimension in millimeters 025 to 300 Tag (XL400e) 019 to 300 Label (XL400e) 025 to 240 Tag (XL410e) 019 to 240 Label (XL410e) c = Horizontal Dimension in millimeters 032 to 100 Tag (XL400/410e) 029 to 100 Label (XL400/410e)
&	**Store Form Overlay**. Stores a specified label image in the printer's volatile form overlay memory.
AR	**Normal Print Length**. This command resets the printer to the Standard print length (7 inches).
&Raa	**Form Overlay, Recall.** Recalls a label image previously stored in Expanded Memory. aa = Storage number (00 to 99)

COMMAND QUICK REFERENCE	
INSTRUCTION	**DESCRIPTION**
&S,aa,bbbb,cccc	**Form Overlay, Store.** Stores a label image in Expanded Memory. aa = Storage number (00 to 99) bbbb = Horizontal size of window to be stored (50 to Hmax) cccc = Vertical size of window to be stored (50 to Vmax)
A(space)Z	**Form Feed**. Feeds a blank tag or label.
*a,bbb	**Clear Memory Card.** Stores a label image in Expanded Memory. a = Memory section to be cleared. G: SATO graphics file (001 to 999) P: PCX graphics file (001 to 999) F: Stored formats (001 to 999) O: TrueType fonts, memory card (001 to 009) R: BMP graphic file (001 to 999) bbb = BMP graphic file (001 to 999)
*a	**System Clear.** Stores a label image in Expanded Memory for the CT400/410 printers. a = Clear Item (blank): Single item receive, edit buffer T: Foreign character registration area &: Form overlay X: All clear
@,nn...n	**Offline/Pause.** Signals the printer to go offline after upon job completion. nn...n = Optional message to be displayed on the LCD (max 32 characters).
A3H-aaaa-Vbbbb	**Base Reference Point**. Establishes a new base reference point position for the current label. Units of measurement are dots. - = Optional character. If included, will shift reference point in negative direction. aaaa = Horizontal reference point bbbb = Vertical reference point
AX	**Print Area Enlargement.** This command sets the printer to the Expanded print length (14 inches). <ESC>EX0 is the recommended replacement.

COMMAND QUICK REFERENCE

INSTRUCTION	DESCRIPTION
Babbcccd	**Bar Codes**. Prints a 1:3 ratio barcode. a = 0: Codabar 1: Code 39 2: Interleaved 2 of 5 (I 2/5) 3: UPC-A/EAN-13 4: EAN-8 5: Industrial 2 of 5 6: Matrix 2 of 5 7: reserved 8: reserved 9: reserved A: MSI B: reserved C: Code 93 D: reserved E: UPC-E F: Bookland G: Code 128 H: SSCC/UCC128 bb = Number of dots (01 to 12) for narrow bar and narrow space ccc = Bar height in dots (001 to 999) d = SSCC only 0: No human readable text 1: Human readable at top 2: Human readable at bottom
BCaabbbccn...n	**CODE 93 Barcode.** Prints a CODE 93 barcode. a = Narrow bar width (01 to 12 dots) b = Height of barcode (001 to 999 dots) c = Digit quantity of data (01 to 99) n = Print data
BDabbccc	**Bar Codes**. Prints a 2:5 ratio barcode, except for UPC, EAN, Code 93, Code 128 and SSCC symbols, which are fixed width bar codes. For values a, bb, ccc and d see instructions for Babbcccd. For UPC/EAN bar codes, this command puts descender bars and human readable text below the symbol.
BFaabbbn...n	**Bookland.** Prints a Bookland barcode. a = Narrow bar width (01 to 12 dots) b = Height of barcode (001 to 999 dots) n = Print data
BGaabbn...n	**CODE 128.** Prints a CODE 128 barcode. a = Narrow bar width (01 to 12 dots) b = Height of barcode (001 to 999 dots) n = Print data

COMMAND QUICK REFERENCE	
INSTRUCTION	**DESCRIPTION**
BIaabbbcn...n	**SSCC.** Prints a SSCC barcode. a = Narrow bar width (01 to 12 dots) b = Barcode height (001 to 999 dots) c = Barcode expository font specification 0: Without HRI 1: HRI available in upper part of barcode 2: HRI available in upper part of barcode n = Barcode print data (17 digits fixed)
BJaa..abb..b BJDccccddddee...e	**True Type Font, Store.** Prepares the Expanded Memory to accept True Type font data. aa...a = 40 byte font description bb...b = 10 byte date field ccccc = Memory Offset (hexadecimal) dddd = Data size in bytes (max = 2000) ee...e = Font data to be downloaded
BJFaaaaaaaa	**Card, Format.** Initializes the Memory Area and formats it for use. Should be preceded by the Memory Area Select command for the memory area to be initialized. aaaa....a = 8 character alphanumeric password
BJS	**Print Memory Card Status.** Reports the status of the currently active Memory Card to the host by printing a status label.
BJTaabbccddeefffgg..g	**True Type Font, Recall.** Recalls a previously stored bit mapped TrueType font for use. aa = Font ID (01 to 99) bb = Horizontal Expansion (01 to 12) cc = Vertical Expansion (01 to 12) dd = Reserved, always 00 ee = Character pitch (01 to 99) ffff = Number of characters gg...g = Data to be printed using font

COMMAND QUICK REFERENCE

INSTRUCTION	DESCRIPTION
BKaabbcddeefffnn...n	**PDF417.** Prints PDF417 2-D symbols. aa = Minimum module dimension (03-09 dots). Will not print for values of 01, 02 or greater than 09 bb = Minimum module pitch dimension (04-240 dots). Will not print for values of 01, 02, 03 or greater than 25 c = Security level (1-8) dd = Code words per line (01-30). If 00 is specified for dd and ee, printer will automatically optimize settings ee = Rows/symbol (00 or 03). If 00 is specified for dd *and* ee, printer will automatically optimize settings fff = Number of characters to be encoded (0001-2700) g = Not specified, standard PDF417 M: Micro PDF417 T: Truncated PDF417 nn...n = Data to be printed.
BLabbcccn...n	**UPC-A barcode (No HRI).** Specifies UPC-A Barcode with start and end bar in the same length with guard bar.
	a = Barcode type: H: UPC-A (“H” fixed)
	b = Narrow bar width: Valid range: 01 to 12 dots
	c = Barcode height: CG200 Series: 001 to 999 dots
	n = Print data: Data: 11 digits fixed
BL ~d	**UPC-A barcode (Font designation).** Specifies font type of UPC-A (with HRI characters)**.** a = Barcode type: H: UPC-A (“H” fixed) b = Narrow bar width: Valid range: 01 to 12 dots c = Barcode height: CG200 series: 001 to 999 dots n = Print data: Barcode data: 11 digits fixed d = Font XU (CG200 Series only) XS (CG200 Series only) XM (CG200 Series only) XB (CG200 Series only) XL (CG200 Series only) OA OB U* (CG200 Series only) S* (CG200 Series only) M* (CG200 Series only) WB* (CG200 Series only) WL* (CG200 Series only) n = Print data: Interpretation data: 12 digits fixed

COMMAND QUICK REFERENCE	
INSTRUCTION	**DESCRIPTION**
BMabbcccn...n	**UPC-A barcode (with HRI).** Specifies UPC-A barcode with HRI characteristics**.** The start and end bar height will be the same length as that of guard bars. a = Barcode type = H: UPC-A (“H” fixed) b = Narrow bar width = Valid range: 01 to 12 dots c = Barcode height CG200 series: 001 to 999 dots n = Print data: Data: 11 digits fixed
BPn...n	**Postnet**. Prints Postnet bar codes. n...n = 5 digit ZIP (Postnet-32 format) 6 digits (Postnet-37 format) 9 digit ZIP+4 (Postnet -52 format) 11 digit ZIP+4+DPC (Postnet-62, Delivery Point format)
BQ	**QR Code.** Prints QR CODE of 2D code. a = Error correction level 1: 7% high density 2: 15% standard 3: 30% high reliability 4: 25% b = Concatenation mode 0: Normal Mode 1: Concatenation mode c = Size of one side of cell (01 to 32) d = Quantity of partitions by concatenation mode (01 to 16) e = Sequential number partitioned by concatenation (01 to 16) f = Concatenation mode parity data (00 to FF) g = Character mode 1: Number Mode 2: Alphanumeric Mode 3: Binary Mode h = Quantity of data (0001 to 7366) n = Print data.

COMMAND QUICK REFERENCE

INSTRUCTION	DESCRIPTION
BTabbccddee	**Bar Codes**. Variable Ratio. provides the ability to print a bar code with a ratio other than those specified through the standard bar code commands (B, BD, and D). a = Bar code option: 0: Codabar 1: Code 39 2: Interleaved 2 of 5 5: Industrial 2 of 5 6: Matrix 2 of 5 bb = Narrow space in dots (01-99) cc = Wide space in dots (01-99) dd = Narrow bar in dots (01-99) ee = Wide bar in dots (01-99)
BVa,b,c, ddddddddd,eee, f f f,gg..g	**Maxicode**. Prints 2-D Maxicode symbols per AIM I.S.S. specification. a = Position of symbol within the set b = Total number of symbols in the set c = Mode dd..d = 9 digit numeric Postal Code eee = 3 digit numeric Country Code f f f = 3 digit numeric Service Class gg..g = Data, terminated by <ESC>
BWaabbb	**Bar Codes**. Expansion. Works together with the BT command to specify an expansion factor and the bar code height for the particular symbol being printed. aa = Expansion factor by which the width of all bars and spaces is increased (01 to 12) bbb = Bar height by dot (004 to 999 dots)
BXaabbccddeeefffghh	**Data Matrix**. Data Format. Specifies the format of the Data Matrix 2-D symbology. aa = Format ID (01 to 06, If ECC200 is selected (bb=20) this field is ignored bb = Error correction level (00, 05, 08,10,14, 20 or 200. All other values processed as 00 cc = Horizontal cell size (03 to 12 dots/cell) dd = Vertical cell size (03 to 12 dots per cell) eee = Cells per line. Use 000 for optimized symbol fff = Cell lines. Use 000 to optimize g = Mirror image 0: Normal Print 1: Reverse Print hh = Guide cell thickness (01 to 15) 01 indicates normal type

COMMAND QUICK REFERENCE	
INSTRUCTION	**DESCRIPTION**
C	**Repeat Label**. Prints a duplicate of the last label printed.
CBabb	**Tear-off correction. Corrects tear-off value.** a = Increment or decrement: +: Increment -: Decrement bb = Distance to move (mm): -5 to 98
CIa	**Sensor selection.** Makes minor adjustments of darkness for the best print quality. a = Sensor type: 0: Sensor is not used. 1: I-mark (CX-compatible) 2: Transmissive
CCa	**Card, Slot for Use.** Selects the memory area for all following expanded memory commands. a = Memory Area 1 b = Memory Area 2
CLa	**CR/LF Deletion.** Deletes the occurrence of CR/LF characters in the data stream. a = 0: Do not delete CR/LF 1: Delete CR/LF
CRaaaaabcd	**Serial port.** Sets serial port. aaaaa = BAUD rate: 9600: 9600 bps 19200: 19200 bps 38400: 38400 bps b = Parity: N: Non parity O: Odd number E: Even number c = Data bit: 7: 7 bit 8: 8 bit d = Stop bit 1: 1 bit 2: 2 bit
CPa	**Ribbon.** Selects the use or disuse of ribbon. a = Ribbon type: 0: Direct thermal (ribbon is not required) 1: Thermal transfer (ribbon is required)

COMMAND QUICK REFERENCE	
INSTRUCTION	**DESCRIPTION**
CSa	**Print Speed Selection**. Specifies a unique print speed in in./sec. through software for a particular label. a = Speed Range
CTa	**Cut number unit.** Cuts label at a specified interval in a print job. a = Number of labels between each cut: Quantity range: 0 to 9999.
Dabbcccn	**Barcode, Ratio 1:2.** Prints a 1:3 ratio barcode. a = Barcode Type 0: NW-7 1: CODE39 2: Interleaved 2 of 5 3: JAN/EAN-13 (fixed ratio) 4: JAN/EAN-8 (fixed ratio) 5: Industrial 2 of 5 6: Matrix 2 of 5 H: UPC-A (fixed ratio) b = Narrow bar width (01 to 12 dots) c = Barcode height (001 to 999 dots) n = Barcode print data
dn...n	**Barcode, Human Readable Information (HRI).** Specifies the character type of human readable information of barcode. Used in conjunction with the preceding <ESC>D. d = Character type specification XU XS XM XB XL OA OB HRI data n = HRI print data
DCxx...x	**Data Matrix**. Print Data. Prints data using Data Matrix format specified in BX Data Format command. xx...x = Data to be printed. Cannot exceed 500 characters.
DIa	**Interface.** Specifies the interface used to connect with a host. a = Interface 0: USB/Wireless LAN 1: RS-232C or LAN 2: Keypad

COMMAND QUICK REFERENCE	
INSTRUCTION	**DESCRIPTION**
$a,bbb,ccc,d	**Font, Vector.** Specifies printing of the unique SATO vector font. a = A: Helvetica Bold (proportional spacing) B: Helvetica Bold (fixed spacing) b = Font width (50 to 999 dots) c = Font height (50 to 999 dots) d = Font variation (0 to 9) as follows: 0: Standard 1: Standard open (outlined) 2: Gray (mesh) pattern 1 3: Gray (mesh) pattern 2 4: Gray (mesh) pattern 3 5: Standard, shadow 1 6: Standard, shadow 2 7: Standard mirror image 8: Italic 9: Italic open (outlined)
$=n	**Outline Font Print.** Specifies the print of outline font. n = Print data
Eaaa	**Line Feed**. Provides the ability to print multiple lines of the same character size without specifying a new print position for each line. aaa = Number of dots (1 to 999) between the bottom of the characters on one line to the top of the characters on the next line.
EJ	**Media Ejection.** Enables forward and backward motion for cutting and printing.
EP	**Print End Position.** Specifies the label stop position in the sensor valid mode.
EU	**EAN/UCC Composite.** Specifies the composite symbol of EAN/UCC. a = 1D barcode symbology 01: RSS-14 (13 digits for 1D data) 02: RSS-14 Truncated (13 digits for 1D data) 03: RSS-14 Stacked (13 digits for 1D data) 04: RSS-14 Stacked Omni-directional (13 digits for 1D data) 05: RSS Limited (13 digits for 1D data) 07: UPC-A (11 digits for 1D data) 08: UPC-E (10 digits fixed for 1D data) 09: EAN13 (12 digits for 1D data) 10: EAN8 (7 digits for 1D data) b = Minimum bar width (01 to 12 dots) n = Data (Sum of 1D and 2D codes up to 120 digits)
EX	**Memory Area Enlarge Specification.** Specifies the enlargement of the print area in the vertical direction. **a** = 0: Internal memory slot number specification
EX0	**Expanded Print Length**. Expands the print length to 9999 dots.

COMMAND QUICK REFERENCE	
INSTRUCTION	**DESCRIPTION**
Faaaabcccc ddee	**Sequential Numbering.** Allows the printing of sequencing fields (text, bar codes) where all incrementing is done within the printer. aaaa = Number of times to repeat the same data (0001 to 9999) b = Plus or minus symbol (+ for increments; - for decrements) cccc = Value of step for sequence (001 to 9999) dd = Quantity of digits for sequential numbering (01 to 99) ee = Quantity of digits free for sequential numbering (01 to 99)
FCaaabbbcd	**Print circles.** Specifies the printing of circles. a = Radius (5 to 999 dots) b = Line width (1 to 999 dots) c = Section number (0 to 8: Omissible) d = Pattern (0 to 3: Omissible) 0: Solid black line 1: Gray 1 2: Gray 2 3: Gray 3
FTaaaabbbbccccd	**Print triangles.** Specifies the printing of triangles. a = Side length (10 to 2000 dots) b = Line width (1 to 1000 dots) c = Base length (10 to 2000 dots) Omissible. d = Pattern (0 to 3) Omissible. 0: Solid black line 1: Gray 1 2: Gray 2 3: Gray 3
FMa	**Format memory card.** Specifies the format (initialization) of memory card. a = User ID: Up to 8 bytes in alphanumeric and symbols.
FP	**Print memory card status.** Prints the status of memory card.

COMMAND QUICK REFERENCE	
INSTRUCTION	**DESCRIPTION**
FWaabcccc	**Line**. Prints a line. Units of measurement are dots. aa = Line width b = V: Vertical line H: Horizontal line cccc = Vertical line length dddd = Horizontal line length
FXaaabcccdddeee	**Data Matrix**. Sequential Numbering. Prints sequential numbered Data Matrix 2-D symbols. aaa = Number of duplicate labels (001 to 999) b = Increment or decrement +: Increment -: Decrement ccc = Increment/decrement steps (001 to 999) ddd = Sequential numbering start position (001 to 999) from left side eee = Incremented data length (001 to 999). Measured from start position
Gabbbccc(data)	**Custom Graphics**. Allows the creation and printing of graphic images using a dot-addressable matrix. a = Specifies format of data stream to follow B: Binary H: Hexadecimal bbb = Number of horizontal 8 x 8 blocks ccc = Number of vertical 8 x 8 blocks data = Data to describe the graphic image
GCaaa	**BMP File, Recall.** Recalls BMP graphic files stored in Expanded Memory.
GIabbbcccdddee...e	**Graphic, Store.** Stores a graphic image in the memory card to be called later for printing on a label. a = Specifies format of data stream to follow B: Binary H: Hexadecimal bbb = Number of horizontal 8 x 8 blocks ccc = Number of vertical 8 x 8 blocks ddd = Graphics storage number (001 to 999) ee...e = Data to describe the graphic image
GMaaaaa	**BMP File**. Downloads BMP file to the internal graphics image memory. aaaaa = Quantity of bytes to download (max DOS file size is 32K)
GPaaaaa	**PCX File**. Downloads PCX file to the internal graphics image memory. aaaaa = Quantity of bytes to download (max DOS file size is 32K)

COMMAND QUICK REFERENCE

INSTRUCTION	DESCRIPTION
GRccc	**Graphic, Recall.** Recalls for printing the graphic image stored by the GI command. ccc = Storage number (001 to 999)
GTaaa,bbbbb, nn. . . n	**BMP File, Store.** Stores BMP files in Expanded Memory. aaa = Storage area number (001 to 999) bbbbb = Size of BMP file in bytes nn....n = Data
Haaaa	**Horizontal Position**. Specifies a field's horizontal location across the width of the label from the current base reference point. The units of measurement are dots.
I	**Batch Separator.** To issue a tag with a special marking so that it can easily be divided on the stacker. Is applicable only to the XL400/410e printers. a = Batch separator type 1: Divided mark method 2: Separator method
I2abcde	**Serial interface.** Specifies serial interface. a Baud rate = 0: 9600 BPS = 1: 19200 BPS = 2: 38400 BPS = 3: 57600 BPS b Data bit = 0: 8 bit = 1: 7 bit c Parity = 0 = No parity 1 = Odd 2 = Even d Stop bit = 0 = 1bit 1 = 2bit e Control = 0 = READY/BUSY control (Single item buffer) 1 = READY/BUSY control (Multi item buffer) 2 = XON/XOFF 3 = Driver protocol 4 = Status 3
I3a	**LAN Interface.** Specifies LAN interface. a = 0: 2 port connection, or unsolicited (for driver protocol) = 1: 2 port connection or solicited by ENQ (for driver protocol) = 2: 1 port connection or solicited by ENQ (STATUS3)
IDaa	**Job ID Store**. Stores the Job ID number. aa = Job ID number assigned (01 to 99)

COMMAND QUICK REFERENCE	
INSTRUCTION	**DESCRIPTION**
IGa	**Sensor Type Selection.** Selects the sensor type. a = 0: Reflective (Eye-Mark) sensor 1: Transmissive (See-Thru) sensor 2: Sensor not used
I1abbb	**IEEE1284.** Specifies the receive mode and ACK width of IEEE1284. a = Receive mode (Default: 0): 0: Multi item buffer 1: Single item buffer b = ACK width: Valid range: 010 to 200 (1-50ns)
J	**Journal Print**. Provides the ability to print text line by line. Fixed spacing between lines and characters.
Kab90cc	**Custom Designed Characters, Recall**. Recalls for printing a custom character stored by the Tabcc(data) command. a = 1: 16 x 16 matrix 2: 24 x 24 matrix b = Indicates the format that data stream was stored B: Binary H: Hexadecimal cc = Memory location where the character was stored. Valid locations are 21 to 52 or "!" to "R" in hex values.
Laabb	**Character, Expansion**. Expands characters in both directions. aa = Multiple to expand horizontally (01 to 12) bb = Multiple to expand vertically (01 to 12)
LAa	**Language.** Specifies the display language for the LCD. a = 0: English 1: French 2: German 3: Spanish 4: Italian 5: Portuguese
LDa,b,c,d,e,f,g,i,jj	**User Download.** Downloads a user defined set of Alternate Protocol Command Codes.
LFa	**Online Feed.** To enable or disable online label feed. a = 0: Enables label feed when online 1: Disables label feed when online
LHa	**Zero Slash.** Allows printing zeroes with or without a slash. a = 0: Prints zeroes without a slash 1: Prints zeroes with a slash
M	**Font type**. Specifies the 13W x 20H dot matrix font (includes descenders).
NC (EJ)	**Eject and Cut.** Cuts any printed labels that remain in the printer.
OA	**Font type**. Specifies the OCR-A font.

COMMAND QUICK REFERENCE	
INSTRUCTION	**DESCRIPTION**
OB	**Font type**. Specifies the OCR-B font dot matrix.
OL	**Online.** Changes the printer status from offline to online.
Paa	**Character Pitch**. Designates the number of dots between characters. aa = Number of dots between characters (01 to 99)
(aaaa,bbbb	**Reverse Image.** Reverse image from black to white and vice versa. The units of measure are dots. aaaa = Horizontal length in dots of area to be reversed. bbbb = Vertical height in dots of area to be reversed.
PCaa,bbPCF,a,.....z	**Flash ROM Setup.** Sets the default printer configuration in Flash ROM. **a** = Item number setting (F = setting of all items) **b-z** = Sets content Appendix Reference Table XXXX for CT400/410 printer Appendix Reference Table XXXX for all other printers
PD	**Small Label Size Specification.** Specifies parameters relative to small label size. Only applicable to the M10e printer. a = Vertical dimension (480 to 3600 dots) b = Horizontal dimension (480 to 1600 dots) c = Label size (00 to 99 dots) d = Multiple cut labels (01 to 99)
%a	**Rotate, Fixed Base Reference Point.** a = 0: Sets print to normal direction 1: Sets print to 90 degrees counter-clockwise 2: Sets print to 180 degrees rotated (upside down) 3: Sets print to 270 degrees counter-clockwise (90x CW)
PG	**EEPROM Setup.** Sets the default printer configuration in EEPROM. a-z = Sets content Appendix Reference Table 43 for CT400/410 printer Appendix Reference Table 42 for XL408/410e printers Appendix Reference Table 41 for M10e printer Appendix Reference Table 40 for all other printers
PHa	**Print Method, Thermal/Thermal Transfer.** Selects the thermal printing method. a = 0: Thermal transfer printing 1: Direct thermal printing
PIaaa,bbbbb,cc...c	**PCX File, Store.** Stores a PCX graphic file. aaa = Storage number (001 to 999) bbbbb = Number of bytes in the file to be stored cc...c =

COMMAND QUICK REFERENCE	
INSTRUCTION	**DESCRIPTION**
PMa	**Print Mode Selection.** Selects desired backfeed operation. a = 0: No backfeed, continuous operation 1: Tear-Off 2: Cut, backfeed after print 3: Cut, backfeed before print 4: Cut, no backfeed 7: Dispense, backfeed after print 8: Dispense, backfeed before print
POabcc	**Offset Specification.** Specifies label stop position. Only applicable to the CT400/410 printers. a = Offset specification 0: Cutter motion 1: Dispenser motion 2: Tear-Off motion 3: Continuous motion b = Offset direction +: Forward -: Backward c = Offset Distance (00 to 99 dots)
#	**Start Position Specification.** Specifies the vertical print start position. Only applicable to the XL400/410e printers. a = Shift direction +: Forward -: Backward b = Shift distance XL400e: 000 to 400 dots XL410e: 000 to 600 dots
#Ea	**Print Darkness.** Specifies a new print darkness setting.
PR	**Fixed Font Spacing**. Returns the printer to fixed character spacing mode.
PS	**Proportional Font Spacing**. Places the printer in the proportional character spacing mode. Will not work with U Font.
PYaaa	**PCX File, Recall.** Recalls a PCX graphics file. aaa = The storage number assigned to the file (001 to 999)
Qaaaaaa	**Print Quantity**. Specifies the total number of labels to print. aaaaaa = Total quantity of labels to print for the job (000001-999999)
RC	**Sheet Unit Cut Quantity Specification.** Specifies the sheet cut quantity for small labels. Only applicable to the M10e printer. a = Number (01 to 99)

COMMAND QUICK REFERENCE

INSTRUCTION	DESCRIPTION
RDabb,ccc,ddd,nn...n	**Font Type**. Specifies the internal AGFA raster fonts. a = F: Specifies Futura font P: Specifies CG Palcio font S: CG Century Schoolbook font G: CG Triumvirate Condensed font V: CG Univers font t: CG Times font bb = 0: No character set 1: ISO 8859/1 Latin1 2: ISO 8859/2 Latin2 3: ISO 8859/9 Latin5 4: CP-737 DOSGreek 5: CP-885 DOS Cyrillic 6: CP-864 DOSArabic 8: PC-850 Multilingual ccc = Horizontal Size (16 to 999 dots or P08 to P72 point size) ddd = Vertical Size (16 to 999 dots or P08 to P72 point size) nn..n = Data to be printed
REa	**Telegraphic Message End Specification.** Specifies the telegraphic message end relative to small labels. Only applicable to the M10e printer. a = Operates when ending 0: Discharge motion 1: Discharge motion + Cut motion
RFabn...n	**Recall and Print of Font & Logo.** Calls and prints font and logo downloaded with Label Gallery's "GalleryMemMaster". a = Font ID number (01 to 99) b = Print digit (1 to 9999) n = Print data
RI	**Label Size Specification.** Specifies label dimensions. Only applicable to the M10e printer. a = Sheet width (1500 to 3200 dots) b = Sheet length (480 to 3600 dots) c = Label width (0 to 60 dots) d = Label length (00 to 60 dots) e = Small label width (480 to 3200 dots) f = Small label length (480 to 3600 dots) g = Label width quantity (01 to 06) h = Label length quantity (01 to 07)

COMMAND QUICK REFERENCE	
INSTRUCTION	**DESCRIPTION**
RMhvab	**Mirror Rotate.** Prints mirror image of print data. h = Horizontal position start 1 to 0832 dots (CL408e / M8400RVe / M84Pro-2) 1 to 1248 dots (CL412e / M84Pro-3) 1 to 1216 dots (CL608e / M8460Se) 1 to 1984 dots (CL612e) 1 to 0896 dots (M5900RVe / M8459Se) 1 to 3200 dots (M10e) 1 to 1024 dots (M8485Se) 1 to 1344 dots (M8490Se) 1 to 2496 dots (M84Pro-6) v = Vertical position start 1 to 1424 dots (CL408e / M8400RVe / M84Pro-2) 1 to 2136 dots (CL412e / M84Pro-3) 1 to 1424 dots (CL608e / M8460Se) 1 to 2136 dots (CL612e) 1 to 1424 dots (M5900RVe / M8459Se) 1 to 3600 dots (M10e) 1 to 1424 dots (M8485Se) 1 to 2136 dots (M8490Se) 1 to 4272 dots (M84Pro-6) a = Horizontal range (8 to 9999) b = Vertical range (8 to 9999)
RPa	**Reprint Configuration.** Specifies the setting of reprint. a = Reprint setting 0: Normal (no reprint setting) 1: Reprint setting
RS	**Send Sheet Specification.** Specifies paper delivery (feed operation) of marked unit (Eye-mark, Gap) for small label. Only applicable to the M10e printer.
RTa	**Print Order Specification.** Specifies the order or arrangement of small labels. Only applicable to the M10e printer. a = Print direction 0: Horizontal 1: Vertical
RWa	**Sheet Copy Quantity Specification.** Specifies the quantity of copies of each sheet of small labels. Only applicable to the M10e printer. a = Quantity (01 to 99)
S	**Font type**. Specifies the 8W x 15H dot matrix font (includes descenders).
/	**Form Overlay, Recall.** Recalls the label image from the printer's form overlay memory for printing.
/Dbbc...c	**Field, Recall.** To recall a field previously stored in the memory card. bb = Quantity of fields to be recalled (01 to 99) cc...c = Data to be placed in field

COMMAND QUICK REFERENCE	
INSTRUCTION	**DESCRIPTION**
/Nbb,cc	**Field, Store.** To store a field in the memory card. bb = Field number (01 to 99) cc = Quantity of characters in the field
2D10	**2D Code.** Specifies PDF417 of 2D code. a = Minimum module width (01 to 09 dots) b = Minimum module height (01 to 24 dots) c = Security level (0 to 8) d = Quantity of data code words per line (01 to 30) 00: Automatic (width varies on data quantity specified) e = Quantity of lines per symbol (03 to 90) 00: Automatic (width varies on data quantity specified) f = Code type 0: Normal (if digit is omitted, the default is zero) 1: Truncated scale m = Data size (1 to 2681 bytes) n = Print data
2D12	**2D Code.** Specifies Micro PDF417 of 2D code. a = Minimum module width (01 to 09 dots) b = Minimum module height (01 to 24 dots) c = Quantity of data code words per line (1 to 4 columns) d = Quantity of lines per symbol (4 to 44 lines) e = Binary mode 0: Normal (if digit is omitted, the default is zero) 1: Binary m = Data size (0001 to 0366 bytes) n = Print data

COMMAND QUICK REFERENCE	
INSTRUCTION	**DESCRIPTION**
2D20	**2D Code.** Specifies Maxi Code of 2D code. a = Mode 2: Delivery only (numeric) 3: Delivery only (Alphanumeric) 4: Standard symbol 6: Reader only b = Service class (001 to 999 numeric) c = Country code (001 to 999 numeric) d = Postal code Mode 2 (0 to 999999999) Mode 3 (000000 to 999999) m = Data size (1 to 138 bytes) n = Print data
2D30/2D31	**2D Code.** Specifies QR Code (Model 1 or Model 2) of 2D code. a = Error correction level L: 7% M: 15% Q: 25% H: 30% b = Cell size (01 to 32 dots) c = Data setting mode 0: Manual 1: Automatic d = Concentration mode 0: Normal 1: Concentration e = Quantity of partitions by concentration mode (01 to 16) f = Sequential number partitioned by concentration mode (01 to 16) g = Concentration mode parity data (00 to FF) k = Character mode 1: Numeric mode 2: Alphanumeric mode 3: Kanji mode m = Data size 2D30: Model 2 (1 to 2953 bytes) 2D31: Model 1 (1 to 486 bytes) n = Print data

COMMAND QUICK REFERENCE	
INSTRUCTION	**DESCRIPTION**
2D32	**2D Code.** Specifies QR Code (Micro QR Code) of 2D code. a = Error correction level L: 7% M: 15% Q: 25% b = Cell size (01 to 32 dots) c = Data setting mode 0: Manual 1: Automatic k = Character mode 1: Numeric mode 2: Alphanumeric mode 3: Kanji mode m = Data size (1 to 15 bytes, set when selecting binary) n = Print data
2D50	**2D Code.** Specifies Data Matrix (ECC200) of 2D code. a = Cell width (01 to 16 dots) b = Cell height (01 to 16 dots) c = Quantity of cells per line (000 fixed) d = Quantity of lines (000 fixed) m = Data size (1 to 3116 bytes, set when selecting binary) n = Print data Specify 7EH, 00H when printing 00H Specify 7EH, 7EH when printing 7EH
T1	**Register external character of 16x16 dots in memory card.** a = [Data type] = H: Hex character B: Binary code b = [Registration font code address] = <JIS> H: “21” to “7F” Up to 95 registries B: 21H to 7FH Up to 95 registries <Shift JIS> H: “40” to “9E” Up to 95 registries B: 40H to 9EH Up to 95 registries n = [External character data]
T2	**Register external character of 24x24 dots in memory card.** a = [Data type] = H: Hex character B: Binary code

COMMAND QUICK REFERENCE

INSTRUCTION	DESCRIPTION
	b = [Registration font code address] = <JIS> H: “21” to “7F” Up to 95 registries B: 21H to 7FH Up to 95 registries <Shift JIS> H: “40” to “9E” Up to 95 registries B: 40H to 9EH Up to 95 registries n = [External character data]
Tabcc(data)	**Store Custom Designed Characters**. To create and store custom characters or images in the printer’s volatile memory. See Kab90cc to recall the character for printing. a = 1: 16 x 16 matrix 2: 24 x 24 matrix b = Specifies data stream format to follow B: Binary H: Hexadecimal cc = Memory location to store the character. Valid locations are 21 to 52 or “!” to “R” in hex values (data) = Data to describe the character
TK	**Forced tear off.** Executes Tear off compulsory.
TPa	**Test Print.** Allows test labels to be printed via host command. a = 0: Small user test print 1: Large user test print 2: Small factory test print 3: Large factory test print
TWaaa	Option waiting time. Specifies waiting time for options. aaa = Waiting time: Valid range: 005 to 200 (unit: 100ms)
2S	**Two-Color Print Range Specification.** Specifies a two-color print range. Only applicable to the CT400/410 printers. a = Head lock 0: Left side 1: Right side 2: Both sides b = Start vertical position (specify label vertical size in dots c = End vertical position (specify label vertical size in dots
U	**Font type**. Specifies a 5W x 9L dot matrix font (includes descenders).
_Daan...n	**Variable Data Specification.** Specifies variable data for small labels. Only applicable to the M10e printer. a = Field number (01 to 99) n = Variable data

COMMAND QUICK REFERENCE	
INSTRUCTION	**DESCRIPTION**
_F	**Smart Label Start Specification.** To show the start of small label print specification. Only applicable to the M10e printer.
_Nab	**Format Specification.** Specifies small label format. Only applicable to the M10e printer. a = Field number (01 to 99) b = Data digit (01 to 99)
_Qab	**Label Print Number Specification.** Specifies the print number for small labels. Only applicable to the M10e printer. a = Print number (0001 to 9999) b = 0: Auto new line 1-9: Quantity of blank labels
Vbbbb	**Vertical Position**. Specifies a field's vertical location down the length of the label from the current base reference point. Units of measurement are dots.
WA (elements)	**Calendar Print.** Prints the date and/or time field (up to 16 characters) from the printer's internal clock. Use slash to separate date elements and colon to separate time elements. The calendar feature is a purchase option and will only be applicable to those printers so ordered. Elements = YY: 2 digit Year (00 to 99) YYYY: 4 digit Year (1981 to 2080) MM: Month (01 to 12) DD: Day (01 to 31) HH: 12 Hour (00 to 11) hh: 24 Hour Clock (00 to 23) mm: Minutes (00 to 59) ss: Seconds (00 to 59) TT: AM or PM JJJ: Julian Date (000 to 366) WW: Week (00 to 53) ww: Week (01 to 54)
WBa	**Font Type**. Specifies the 18W x 30L dot matrix font (includes descenders). a = 0: Disables auto-smoothing of font 1: Enables auto-smoothing if expansion is greater than 3
WDHaaaaVbbbbXccccYdddd	**Copy Image Area (Partial Copy)**. To copy an image to another location of the label. aaaa = Horizontal position of the top left corner of image area bbbb = Vertical position of the top left corner of image area cccc = Horizontal length of image area dddd = Vertical length of image area
WIa	**IP Address setup.** Specifies IP address setup method. a = 0: Manual setup 1: DHCP
WKnn...n	**Job Name**. Stores the job name. nn..n = Job name, up to 16 ASCII characters

COMMAND QUICK REFERENCE

INSTRUCTION	DESCRIPTION
WLa	**Font type**. Specifies the 28W x 52L dot matrix font (including descenders). a = 0: Disables auto-smoothing of font 1: Enables auto-smoothing if expansion is greater than 3
WMa	**RARP.** Specifies if RARP is disabled or enabled. When enabled, RARP will automatically obtain IP address in start up. a = 0: Disabled 1: Enabled
WPabbb	**Calendar Increment.** To add a value to the printer's current date and/or time. Does not change the printer's internal time setting. The calendar feature is a purchase option and will only be applicable to those printers so ordered. a = Y: Years M: Months D: Days h: Hours bbb = Numeric data: Week (00-99), Years (1-9), Months (01-99), Days (001-999), Hours (001-999).
WSa	**Print Work Shift Information.** Specifies the printing of work shift information (shift name, start time, etc). Only applicable to the M8459/60/85/90Se printers. a = Print content 1: Shift code 2: Printer use start time 3: Shift name
WTaabbccddee	**Calendar Set.** To set the time and date of the printer's internal clock. aa = Year (00-99) bb = Month (01-12) cc = Day (01-31) dd = Hour (00-23) ee = Minute (00-59)
WZa,b,c,ddddddddddd,eeeeeeeeee,fffffffffff,gggg,hhh,iii,j,k, ...zzzzzzzz	**Wireless LAN.** Sets up wireless LAN. Format 1 To set up all items a = Item number: F: All items D: Default settings b . . . z = Set value (as shown in the rows below) Format 2 To set up specific items a Item number: Valid range: 1-25 b Set value (as shown in the rows below)

COMMAND QUICK REFERENCE	
INSTRUCTION	**DESCRIPTION**
	b = DHCP/BOOTP 0: Disabled 1: Use DHCP/BOOTP c = RARP 0: Disabled 1: Enabled d = IP address 000000000000 - 255255255255 e = Subnet mask: 000000000000 - 255255255255 f = Default gateway 000000000000 - 255255255255 g = Socket connection timeout 0000 - 3600 h = FTP timeout 030 - 500 i = LPD timeout 030 - 500 j = Wireless LAN mode 0: Infrastructure mode 1: Ad-hoc mode k = SSID 1 - 32 character+s (*1) l = Channel 01 - 11 (CG200 series) m = Security type 0 None 1 WEP 2 WPA 3 WPA2 4 Dynamic WEP n = Wireless LAN authentication 0 Open system 1 Shared key o = WEP key 1 A+5 or 13 characters (ASCII) (*1) B+10 or 26 digits (HEX) (*2) p = WEP key 2 A+5 or 13 characters (ASCII) (*1) B+10 or 26 digits (HEX) (*2) q = WEP key 3 A+5 or 13 characters (ASCII) (*1) B+10 or 26 digits (HEX) (*2)

COMMAND QUICK REFERENCE	
INSTRUCTION	**DESCRIPTION**
	r = WEP key 4 A+5 or 13 characters (ASCII) (*1) B+10 or 26 digits (HEX) (*2) s = WEP key index 1-4 t = Authentication (WPA/WPA2) 0 WPA-PSK 1 EAP u = Encryption (WPA/WPA2) 0 TKIP 1 AES v = Pre-Shared key 8 - 63 characters (*1) w = EAP authentication 0 None 1 Reserved 2 EAP-TLS 3 EAP-PEAP 4 Reserved 5 EAP-LEAP 6 EAP-TTLS x = User name 1 - 63 characters (*1) y = Password 0 - 32 characters (*1) z = Password for private key 0 - 32 characters (*1)
W1a~a	**IP Address Setting**
	a~a = IP address: 12 digits fixed
W2a~a	**Subnet Mask.** Specifies Subnet Mask.
	a~a = Subnet mask: 12 digits fixed
W3a~a	**Default Gateway.** Specifies Default Gateway. a~a = Default gateway: 12 digits fixed
XBa	**Font Type.** Specifies 48W x 48L dot matrix font (includes descenders). a = 0: Disables auto-smoothing of font 1: Enables auto-smoothing if expansion is greater than 3 n = Print data

COMMAND QUICK REFERENCE	
INSTRUCTION	**DESCRIPTION**
XCL	**Font Type.** Specifies 48W x 36L dot matrix font (includes descenders). Only applicable to the XL400/410e printers.
XCS	**Font Type.** Specifies 32W x 24L dot matrix font (includes descenders). Only applicable to the XL400/410e printers.
XLan...n	**Font Type.** Specifies the 48W x 48H dot matrix font (includes descenders). a = Smoothing specification 0: Smoothing disabled 1: Smoothing enabled n = Print data
XM	**Font type**. Specifies the 24W x 24H dot matrix font (includes descenders).
XS	**Font type**. Specifies the 17W x 17H dot matrix font (includes descenders). Only applicable to the XL400/410e printers.
XU	**Font type**. Specifies the 5W x 9L dot matrix font (includes descenders).
YEa	**Label Specification.** Temporarily specifies label specification. Only applicable to the CT400/410 printers. a = Label type 0: Adhesive label 1: Tag
YR,aaa/D,bb,cc...c	**Recall Format/Field**. To recall a field from a format previously stored in the memory card. aaa = Number of format to be recalled (001 to 999) bb = Number of field to be recalled (01-99) cc...c = Data to be placed in field
YS,aaa/Nbb,cc	**Store Format/Field**. To store a field in a format in the memory card. aaa = Format number (001 -999) bb = Field number (01-99) cc = Number of characters in the field
Z	**Stop Code**. Ends all print jobs.
0 (zero)	**Replace Data (Partial Edit)**. Provides the ability to replace a specified area of the previous label with new data.

(*1) Alphanumeric or symbols. Except for [,] (comma) or ["] (double quotation)

(*2) ‘0’ to ‘9’, ‘A’ to ‘F’

4

STANDARD COMMAND CODES

- Control Commands
- Modification Commands
- Print Position Commands
- Font Commands
- Barcode Commands
- 2D Code Commands
- System Commands
- Memory Card Commands
- Intelligent Command
- Graphic Commands

CONTROL COMMANDS

START/STOP LABEL	
FUNCTION	For all print jobs, the Start command must precede the data and the Stop command must follow. The print job will not run properly if these are not in place.
FORMAT	Start Command: <ESC>**A** Stop Command: <ESC>**Z** <ESC>A must precede data <ESC>Z must follow data.
EXAMPLE	<ESC>**A** <ESC>H0001<ESC>V0100<ESC>WB1SATO <ESC>H0130<ESC>V0200<ESC>B103150*SATO* <ESC>H0170<ESC>V0360<ESC>L0202<ESC>S*SATO* <ESC>Q1 <ESC>**Z**
OUTPUT	This command does not result in printer output.
NOTES	There is no output for these commands they are not accompanied by other label printing commands. However, these commands must precede and follow each print job sent to the printer.

PRINT QUANTITY	
FUNCTION	To specify the total quantity of labels to print for a given print job.
FORMAT	<ESC>**Qaaaaaa** aaaaaa = Total number of labels to print (1 to 999999) Place just preceding <ESC>Z, unless <ESC>~ exists, then preceding that command. This command must be present in every print job.
EXAMPLE	<ESC>A <ESC>H0100<ESC>V0100<ESC>WB1SATO <ESC>**Q3** <ESC>Z
OUTPUT	Three labels containing the data “SATO” will be printed.
NOTES	To cancel a print job, turn off the printer or send the <ESC>CAN code if using the Bi-Com mode. Multi-Buffer jobs can be cleared with the Clear Print Job (<ESC>*) and Memory command. When used with the Sequential Numbering (<ESC>F) command, the Print Quantity value should be equal to the total number of labels to be printed. If a Print Quantity is not specified, the printer will not print a label. For this command, leading zeroes do not have to be entered. The command “Q1” is equivalent to “Q000001”.

JOB ID, STORE	
FUNCTION	To add an identification number to a job. The status of the job can then be determined using the ENQ command in the Bi-Com status mode.
FORMAT	<ESC>**IDaa** aa = Job ID assigned (00 to 99) Place immediately following the <ESC>A in the job data stream.
EXAMPLE	<ESC>A <ESC>**ID01** <ESC>V200<ESC>H100<ESC>P0<ESC>$B,100,100,6 <ESC>$=SATOPRINTER <ESC>Q2 <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	When status return is used on interface protocol, the specified Job ID Number can be set at the telegraphic status. The status can confirmed by sending status request (ENQ). Status return interface protocol is valid when status request (ENQ) is received during printing. At the status return interface protocol,

JOB NAME	
FUNCTION	This command is to identify a particular job using a descriptive name.
FORMAT	<ESC>**WKnnn. . . n** nn..n = Job Name assigned, up to 16 ASCII characters Place immediately following the <ESC>A in the job data stream.
EXAMPLE	<ESC>A <ESC>**WKSATO** . . . Job . . . <ESC>Z
OUTPUT	This command does not result in printer output. The information is returned to the host upon receipt of a Bi-Com status request.
NOTES	Works only in Bi-Com 4 mode. The Job Name must be stored before Bi-Com status mode can be used. If more than one Job Name is sent in a single job, i.e. <ESC>A <ESC>WKSATO . . . . . . <ESC>WKSATO AMERICA . . . . . . The last name transmitted will be used.

MODIFICATION COMMANDS

CHARACTER, EXPANSION

FUNCTION	To independently expand characters in both the horizontal and vertical directions. The command allows enlargement of the base size of each font (except the vector font) up to 12 times in either direction.
FORMAT	<ESC>**Laabb** aa = Multiple to expand horizontally (01 to 12) bb = Multiple to expand vertically (01 to 12) Place preceding the data to be expanded.
EXAMPLE	<ESC>A<ESC>H0100<ESC>V0100<ESC>XMSATO <ESC>H0100<ESC>V0200<ESC>**L0402**<ESC>XMSATO <ESC>H0100<ESC>V0300<ESC>**L0204**<ESC>XMSATO <ESC>Q1 <ESC>Z
OUTPUT	(4-1) 
NOTES	Expanded characters are typically used with this command for added emphasis or for long distance readability. This command will expand the following fonts: Fonts U, S, M, XU, XS, XM, OA & OB and fonts WB, WL, XB and XL. This command will also affect the following commands: Character Pitch Characters, Custom-Designed The Character Expansion value is in effect for the current print job until a new expansion command is specified. The Line and Box command, if used within the data stream, may return all subsequent text to the default expansion of 1 x 1. Therefore, either send the Character Expansion command before all printed data, or send Line and Box commands last, preceding the Quantity (<ESC>Q) command.

CHARACTER, PITCH

FUNCTION	To designate the amount of spacing (in dots) between characters. This command provides a means of altering character spacing for label constraints or to enhance readability.
FORMAT	<ESC>**Paa** aa = Number of dots between characters (00 to 99) Place preceding the text to be printed.
EXAMPLE	<ESC>A <ESC>H0025<ESC>V0075<ESC>L0202<ESC>XB1SATO <ESC>H0025<ESC>V0175<ESC>L0202<ESC>**P20**<ESC>XB1SATO <ESC>H0025<ESC>V0275<ESC>L0202<ESC>**P40**<ESC>XB1SATO <ESC>Q1 <ESC>Z
OUTPUT	(4-2) 
NOTES	This command is affected by the <ESC>L Character Expansion command. The character pitch is actually the product of the current horizontal expansion multiple and the designated pitch value. Example: <ESC>L0304 <ESC>P03 Pitch = (03) x (03) = 9 dots To avoid confusion, you may want to include the <ESC>L Character Expansion command and this command together in your program. This command affects fonts U, S, M, XU, XS, XM, OA & OB, WB, WL, XB and XL, and the vector font. Character Pitch will always revert to the default value unless it is specified before each new font command in the data stream. This command also affects Codabar, Code 39 and Industrial 2 of 5 bar codes.

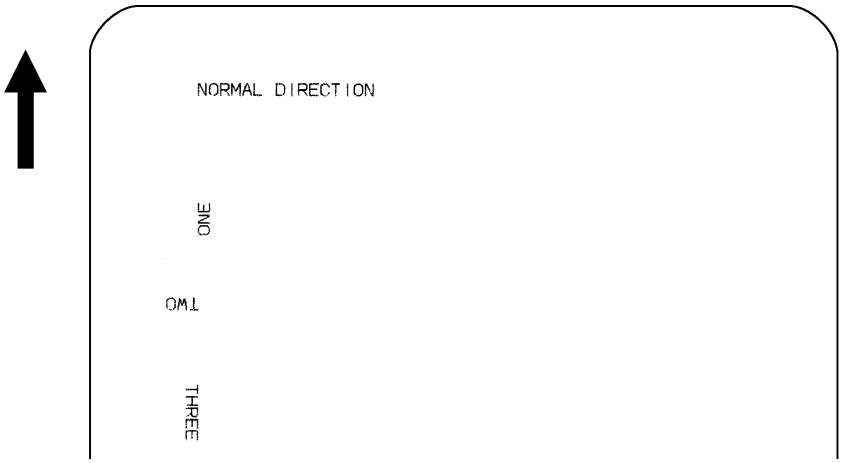
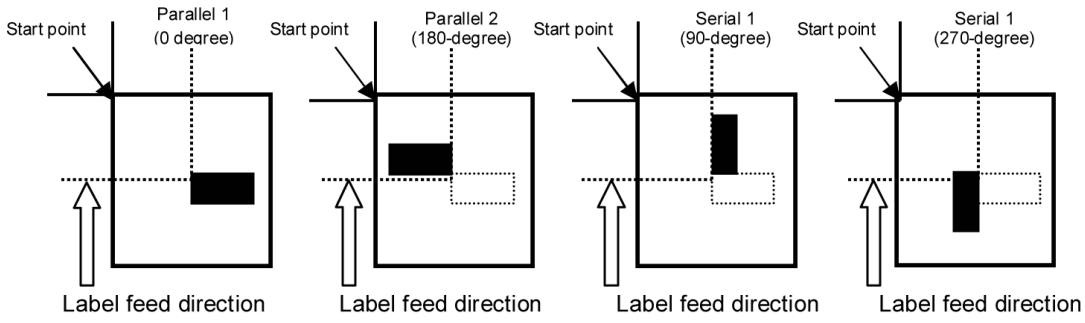
CHARACTER, FIXED SPACING

FUNCTION	To reset proportional spacing and place the printer back to fixed spacing.
FORMAT	<ESC>**PR** Place preceding the fixed space data.
EXAMPLE	<ESC>A <ESC>H0100<ESC>V0050<ESC>PS <ESC>L0202<ESC>XMPROPORTIONAL SPACING <ESC>H0100<ESC>V0180<ESC>**PR** <ESC>L0202<ESC>XMFIXED SPACING <ESC>Q1 <ESC>Z
OUTPUT	(4-3) 
NOTES	This command only works with proportionally spaced fonts: XU, XM, XS, XL and XB.

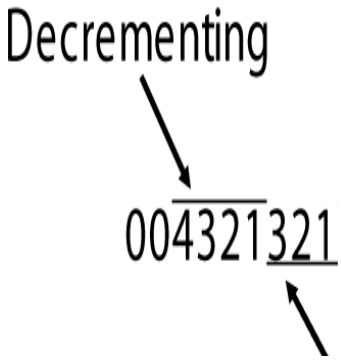
CHARACTER, PROPORTIONAL SPACING

FUNCTION	To specify the printing of proportional or fixed spacing for proportionally spaced fonts.
FORMAT	<ESC>**PS** Set to proportional spacing Reset to fixed spacing. Place preceding the data to be proportionally spaced.
EXAMPLE	<ESC>A <ESC>H0100<ESC>V0050<ESC>**PS** <ESC>L0202<ESC>XMPROPORTIONAL SPACING <ESC>H0100<ESC>V0180<ESC>PR <ESC>L0202<ESC>XMFIXED SPACING <ESC>Q1 <ESC>Z
OUTPUT	(4-4) 
NOTES	Once this command is sent in the data stream, it is in effect until the end of the print job unless a reset command is sent.

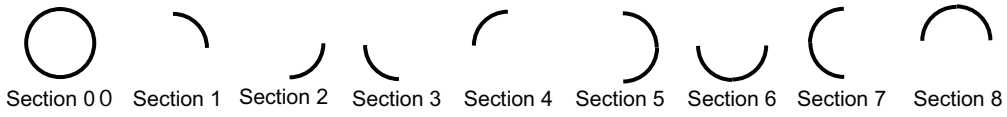
ROTATE, FIXED BASE REFERENCE POINT

FUNCTION	To rotate the print direction in 90° increments without changing the location of the base reference point. The diagram below illustrates the use of the Rotate (<ESC>%) command. Note that the entire print area is shown, but your label will probably not be as large as the entire area.
FORMAT	<ESC>**%a** a = 0: Sets print to normal direction 1: Sets print to 90°CCW 2: Sets print to 180° rotated (upside down) 3: Sets print to 270° CCW Place preceding any printed data to be rotated.
EXAMPLE	<ESC>A <ESC>**%0**<ESC>L0202<ESC>H0200<ESC>V0100<ESC>MNORMAL DIRECTION <ESC>**%1**<ESC>H0200<ESC>V0300<ESC>MONE <ESC>**%2**<ESC>H0200<ESC>V0400<ESC>MTWO <ESC>**%3**<ESC H0200<ESC>V0500<ESC>MTHREE <ESC>Q1 <ESC>Z
OUTPUT	(4-5a) 
NOTES	The specified values are valid until another Rotate (<ESC>%) command is received. Receipt of a Stop Print (<ESC>Z) command will reset the setting to the default value. (4-5b) 

SEQUENTIAL NUMBERING

FUNCTION	To print sequential fields (text, bar codes) where all incrementing is done within the printer. Up to eight different sequential fields can be specified per label. Sequencing is effective for up to 99-digit numeric data within each field.
FORMAT	<ESC>**Faaaabcccc,dd,ee,g** aaaa = Number of times to repeat the same data (0001 to 9999) b = Plus or minus symbol (+ for increments; - for decrements) cccc = Value of step for sequence (0001 to 9999) dd = Sequential numbering digit quantity (01 to 99). The first character starts after those exempted in ee. If digits are omitted, 8 is default ee = Number of digits free from sequential numbering (0 to 99) starting with the right most position. If digits are left out, the default is 0. g = Count base 1 Decimal Count 2 Hexadecimal Base Place preceding the starting value to be incremented or decremented.
EXAMPLE	<ESC>A<ESC>H0100<ESC>V0100<ESC>MSERIAL NUMBER: <ESC>H0100<ESC>V0200 <ESC>**F0001+0005** <ESC>L0202<ESC>M1000<ESC>Q2<ESC>Z
OUTPUT	(4-6a) 
NOTES	The value specified for Print Quantity should be equal to the number of different sequential values desired multiplied by the number of repeats specified. Example: To print 2 sets each of numbers 1001-1025 on separate labels, we need 50 total labels. <ESC>F001-001,04,03 (4-6b)  It is necessary to specify the print position for each sequential field on a label. Up to eight different sequential fields can be specified per label. Alpha characters are ignored.

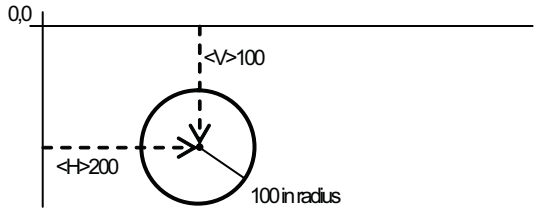
PRINT CIRCLES

FUNCTION	Specifies the printing of circles.
FORMAT	<ESC>**FCaaabbbcd** a = 5 to 999 dots (radius) b = 1 to 999 dots (line width) c = 0 to 8 (section number) (Omissible. If digit is left out, the default is 0. For more details, see the section number below. d = 0 to 3 (pattern) (Omissible. If digit is left out, the default is 0.) 0: Solid black line 1: Gray 1 2: Gray 2 3: Gray 3
EXAMPLE	Solid line circle of 100 dots in radius, 8 dots in line width. <A> <V>100<H>200**<FC>,100,8,0,0** <Q> <Z>
OUTPUT	Section number 

PRINT CIRCLES

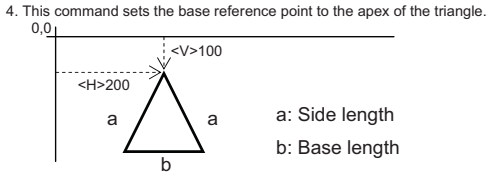
NOTES

1. When a sectional number value outside of the range is specified, it will be processed as “0.” (Command error will not occur.)
2. When the pattern designation value is outside of the range specified, it will be processed as “0.” (Command error will not occur.)
3. When the print start position is outside of the printable area, printing will not be performed due to command error.
4. This command sets the base reference point to the center of a circle.

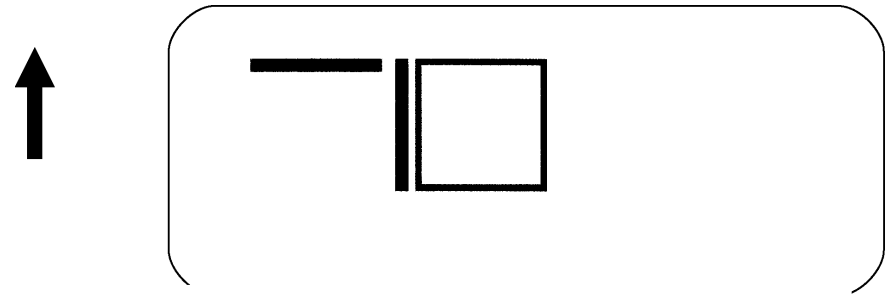


5. This command can be registered to the format.
6. If setting the line width wider, it will be widened to the inside circle.

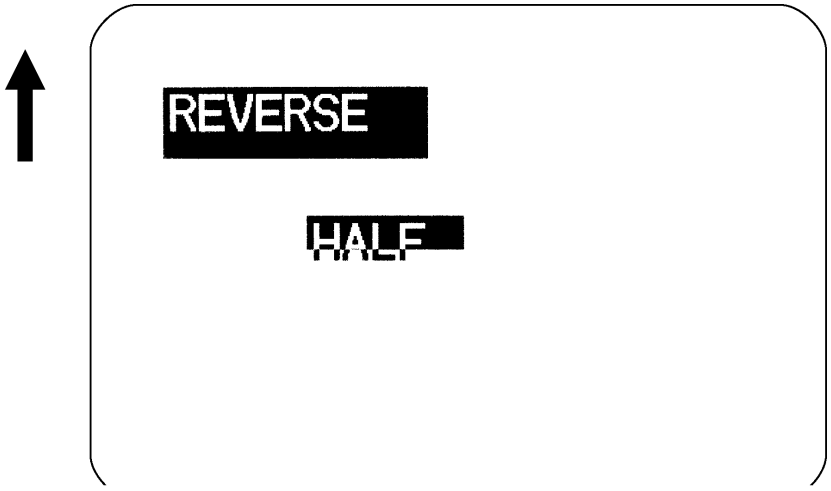
PRINT TRIANGLES

FUNCTION	Specifies the printing of triangles.
FORMAT	<ESC>**FT,aaaa,bbbb(,cccc,d)**
	a = 10 to 2000 dots (side length) b = 1 to 1000 dots (line width) c = 10 to 2000 (base length) (Omissible. If digits are left out, its value will be equal to the length of sides.) d = 0 to 3 (pattern) (Omissible. If digit is left out, the default is 0.) 0: Solid black line 1: Gray 1 2: Gray 2 3: Gray 3
EXAMPLE	Side length: 100 dots. Line width: 8 dots. Base length: 100 dots. <A> <V>100<H>200**<FT>,100,8,100,0** <Q>2 <Z>
OUTPUT	
NOTES	1. When the pattern designation value is outside of the range specified, it will be processed as "0." 2. When the print start position is outside of the printable area, printing will not be performed due to command error. 3. When the base length is not equal to the length of sides, printing will not be performed due to command error. 4. This command sets the base reference point to the apex of the triangel.  5. This command can be registered to the format. 6. If setting the line width, it will be widened to the inside triangle. 7. When setting an odd number to the base length, 1 will be added to the base length automatically.

PRINT, LINES & BOXES

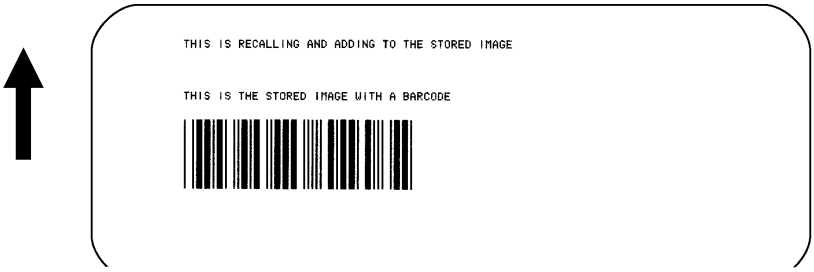
FUNCTION	To print horizontal lines, vertical lines, and boxes as images on the label.
FORMAT	Line: <ESC>**FWaabcccc** aa = Width of horizontal line in dots (01 to 99) b = Line orientation H Horizontal line V Vertical Line cccc = Length of line in dots Box: <ESC>**FWaabbVccccHdddd** aa = Width of horizontal side in dots (01 to 99) bb = Width of vertical side in dots (01 to 99) cccc = Length of vertical side in dots dddd = Length of horizontal side in dots Place following the necessary positioning commands.
EXAMPLE	<ESC>A <ESC>H0100<ESC>V0100<ESC>**FW20H0200** <ESC>H0320<ESC>V0100<ESC>**FW20V0200** <ESC>H0350<ESC>V0100<ESC>**FW1010H0200V0200** <ESC>Q1 <ESC>Z
OUTPUT	(4-7) 
NOTES	It is recommended that all lines and boxes be specified in the normal print direction. Use the <ESC>EX0 Expanded Print Length command for maximum label length.

REVERSE IMAGE

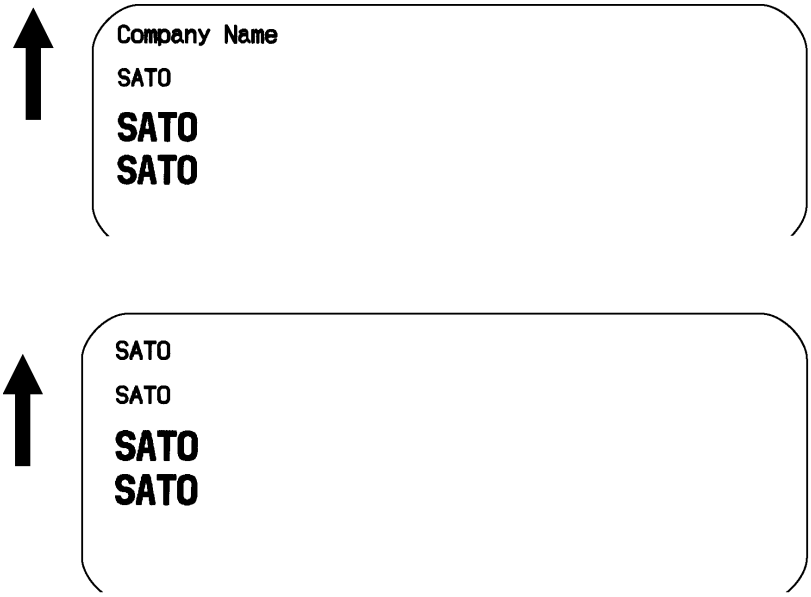
FUNCTION	To reverse an image area from black to white and vice versa. Use the Print Position commands (<ESC>H and <ESC>V) to locate the top left corner of the reverse image area.
FORMAT	<ESC>**(aaaa,bbbb** a = Horizontal length in dots of reverse image area b = Vertical height in dots of reverse image area. Must be preceded by all other data and be placed just before <ESC>Q.
EXAMPLE	<ESC>A <ESC>H0050<ESC>V0120<ESC>L0202<ESC>WB1REVERSE <ESC>H0250<ESC>V0300<ESC>L0202<ESC>WB1HALF <ESC>H0040<ESC>V0110<ESC>**(370,100** <ESC>H0240<ESC>V0290<ESC>**(220,47** <ESC>Q1 <ESC>Z
OUTPUT	(4-8) 
NOTES	A reverse image area is affected by the rotate commands. Therefore, always assume the printer is in the normal print orientation when designing and sending the Reverse Image command. If using reverse images with the form overlay, place this command before the Form Overlay command in the data stream. If the height and width to be reversed contains anything other than alphanumeric data, the area is not printed. If the values specified exceed the maximum ranges, the reverse image is not created.

FORM OVERLAY, STORE	
FUNCTION	To store a label image in the volatile form overlay memory. Only one label image may be stored in this memory area at a time.
FORMAT	<ESC>**&** Must be preceded by all other data and placed just before Stop (<ESC>Z) command.
EXAMPLE	<ESC>A <ESC>H0100<ESC>V0125 <ESC>STHIS IS THE STORED IMAGE WITH A BARCODE <ESC>H0100<ESC>V0165<ESC>B103100*12345* <ESC>**&** <ESC>Z
OUTPUT	This command does not result in printer output. It stores the label image in the overlay buffer.
NOTES	Remember that this storage is volatile. Therefore, if the printer loses power, the overlay must be sent again. The overlay is recalled using the Form Overlay Recall (<ESC>/) command. Form overlays do not have to be recompiled each time they are called to be printed and therefore may result in much faster print output.

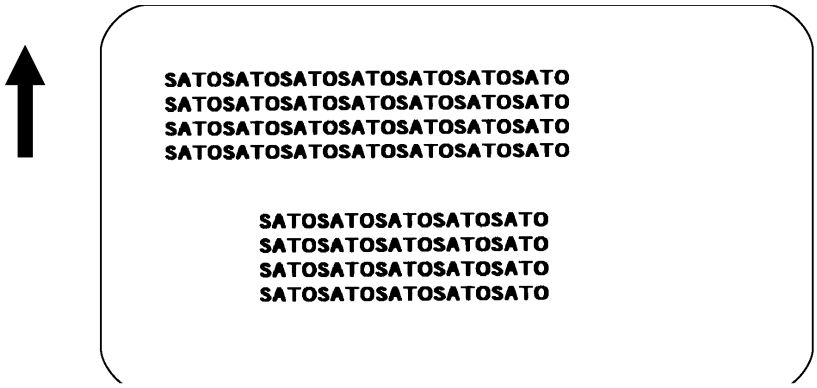
FORM OVERLAY, RECALL

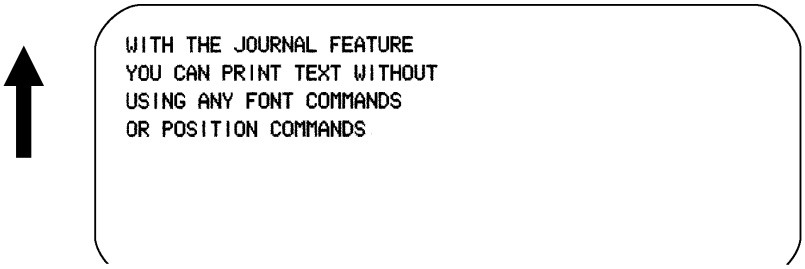
FUNCTION	To recall the label image from the form overlay memory for printing. Additional or different data can be printed with the recalled image.
FORMAT	<ESC>***I*** Must be preceded by all other data and placed just before Print Quantity (<ESC>Q) command.
EXAMPLE	<ESC>A <ESC>H01000<ESC>V0125 <ESC>STHIS IS THE STORED IMAGE WITH A BARCODE <ESC>H0100<ESC>V0165<ESC>B103100*12345* <ESC>&<ESC>Z <ESC>A<ESC>H0100<ESC>V0050 <ESC>STHIS IS RECALLING AND ADDING TO THE STORED IMAGE<ESC>***I*** <ESC>Q1 <ESC>Z
OUTPUT	(4-9) 
NOTES	The overlay is stored using the Form Overlay Store (<ESC>&) command. If this command is used with the Expanded Print Length (<ESC>EX0) command the Form Overlay length cannot exceed 9999 dots.

REPLACE DATA (PARTIAL EDIT)

FUNCTION	To replace a specified area of the previous label with new data. This command will cause the previous label to print along with any changes specified within the current data stream.
FORMAT	<ESC>**0** (<ESC>zero) Must follow <ESC>A and precede all other print data
EXAMPLE	<ESC>A <ESC>H0025<ESC>V0020<ESC>WB0Company Name <ESC>H0025<ESC>V0085<ESC>WB1SATO <ESC>H0025<ESC>V0150<ESC>WL0SATO <ESC>H0025<ESC>V0215<ESC>WL1SATO <ESC>Q1<ESC>Z <ESC>A <ESC>**0**<ESC>H0025<ESC>V0020<ESC>WB0SATO <ESC>Q1 <ESC>Z
OUTPUT	(4-10) 
NOTES	Specify the exact same parameters for the image to be replaced as were specified in the original data stream; including rotation, expansion, pitch, etc. This will ensure the new data will exactly replace the old image. If the replacement data contains fewer characters than the old data, then the characters not replaced will still be printed. This command will not function if the power has been cycled off and back on since the last label was printed. Proportional Pitch text cannot be used with this command.

COPY IMAGE AREA (PARTIAL COPY)

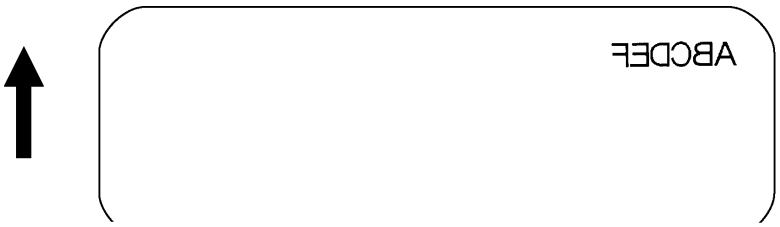
FUNCTION	To copy an image from one location to another on the same label. This may be useful for duplicating individual fields or entire sections of the label with only one command.
FORMAT	<ESC>**WDHaaaaVbbbbXccccYdddd** aaaa = Horizontal position of the top left corner of the area bbbb = Vertical position of the top left corner of the area cccc = Horizontal length of the image area to be copied dddd = Vertical length of the image area to be copied Place anywhere within the data stream after specifying the location of the duplicate image.
EXAMPLE	<ESC>A <ESC>H0050<ESC>V0050<ESC>E010<ESC>XM SATOSATOSATOSATOSATOSATOSATO SATOSATOSATOSATOSATOSATOSATO SATOSATOSATOSATOSATOSATOSATO SATOSATOSATOSATOSATOSATOSATO <ESC>H0180<ESC>V0250<ESC>**WDH0130V0050X0400Y0200** <ESC>Q1 <ESC>Z
OUTPUT	(4-11) 
NOTES	Use the Print Position (V and H) commands to locate the new area for the duplicate image. Position of the new target area must not be inside the original image. If you use the Rotate command; the V, H, X, and Y axis will be reversed. If the reference area of the target image exceeds the print area, it will not be printed.

JOURNAL PRINTING	
FUNCTION	To print text in a line by line format on a label. By specifying this command, you automatically select Font XS with a Character Expansion of 2x2. You also establish a base reference point of H2,V2. The character pitch is 2 dots and the line gap is 16 dots. Simply issue an ASCII <CR> at the end of each text line.
FORMAT	<ESC>**J** Place immediately following <ESC>A.
EXAMPLE	<ESC>A <ESC>**J** WITH THE JOURNAL FEATURE YOU CAN PRINT TEXT WITHOUT USING ANY FONT COMMANDS OR POSITION COMMANDS <ESC>Q1 <ESC>Z
OUTPUT	(4-12) 
NOTES	Journal mode assumes a maximum label width. Otherwise, you may print where there is no label and damage your print head. It is effective only for the current print job.

RECALL AND PRINT OF FONT & LOGO

FUNCTION	**Prints the downloaded font or logo specified.**
FORMAT	<ESC>**RF** a = Font ID number (01 to 99) b = Print digit (1 to 9999) n = Print data Place after <ESC>H but before <ESC>Q1.
EXAMPLE	<ESC>A <ESC>H0100<ESC>V0100<ESC>**RF020002,826B** <ESC>Q1 <ESC>Z
OUTPUT	(4-13) 
NOTES	Specify the value of Unicode for print data. When calling and printing a logo, specify Print digit: 0002, Print data: <6B82>$_{16}$. Note that <826B>$_{16}$ is the value of Shift JIS code of L.

MIRROR IMAGE

FUNCTION	To allow mirror image printing of data, such as on transparent labels to be applied to a glass or other transparent surface.
FORMAT	<ESC>**RM** Place after the label data.
EXAMPLE	Label #1 <ESC>A <ESC>A1<ESC>H0100<ESC>V0050<ESC>XL0ABCDEF <ESC>**RM** <ESC>Q1 <ESC>Z
OUTPUT	(4-14) 
NOTES	The <ESC>A1 Media defines the area to be mirrored. This command can be used with the Rotate Fixed Base Reference Point (<ESC>%) command. Note that the reference point rotation is dependent upon the location of the <ESC>% command in the data stream. This command should not be specified more than once in any single job. This command cannot be used with commands requiring re-editing of the print area, such as Sequential Numbering, Real time clock or Copy Image Area. Any data outside the area defined by the Media Size (<ESC>A1) command is not mirrored the command is treated as a command error. Any print job containing the <ESC>RM command and without any print data will be treated as a command error.

VARIABLE DATA SPECIFICATION

FUNCTION	Specifies variable data for small labels. Only applicable to the M10e printer.
FORMAT	<ESC>_**Daa,nn...n** a = Field number (01 to 99) n = Variable data Place after <ESC>H and <ESC>V but before <ESC>Q.
EXAMPLE	<ESC>A <ESC>A106363060<ESC>600,1020,0,0 <ESC>_F <ESC>_N01,04<ESC>V100<ESC>H200<ESC>L0202<ESC>XMABCD <ESC>_N02,07<ESC>V200<ESC>H200<ESC>L0202<ESC>B103200*11111* <ESC>_N03,02<ESC>V100<ESC>H400<ESC>L0202<ESC>XM99 <ESC>_**D01,AAAA**<ESC>_**D02,*22222***<ESC>_**D03,22**<ESC>_Q1 <ESC>_**D01,BBBB**<ESC>_**D02,*33333***<ESC>_**D03,33**<ESC>_Q2 <ESC>_**D02,*44444***<ESC>_**D03,44**<ESC>_Q4 <ESC>Z
OUTPUT	(4-15) 
NOTES	If Variable Data Specification <ESC>_D is omitted, the content specified under Format Specification <ESC>_N will be printed. However, if variable data is specified from Variable Data Specification <ESC>_D, it will continue to that content and printing.

SMALL LABEL START

FUNCTION	To show the start of small label print specification. Only applicable to the M10e printer.
FORMAT	<ESC>_**F** Place after <ESC>H and <ESC>V but before <ESC>Q.
EXAMPLE	<ESC>A <ESC>A106363060 <ESC>PD,600,1020,0,0 <ESC>_**F** <ESC>V100<ESC>H200<ESC>L0101<ESC>XMHEADER LABEL <ESC>Q1 <ESC>_**F** <ESC>V100<ESC>H200<ESC>L0202<ESC>EMABCD <ESC>V200<ESC>H200<ESC>L0202<ESC>B103200*11111* <ESC>Q6 <ESC>_**F** <ESC>V100<ESC>H200<ESC>L0101<ESC>XMFOOTER LABEL <ESC>Q1 <ESC>Z
OUTPUT	(4-16) 
NOTES	If there is a sequential number specification after <ESC>_F, the sequential numbers will be printed on every small label. Small label print quantities specified under <ESC>_Q. Do not specify registration specification from <ESC>_F onward. If specified, accurate print motion may not be conducted.

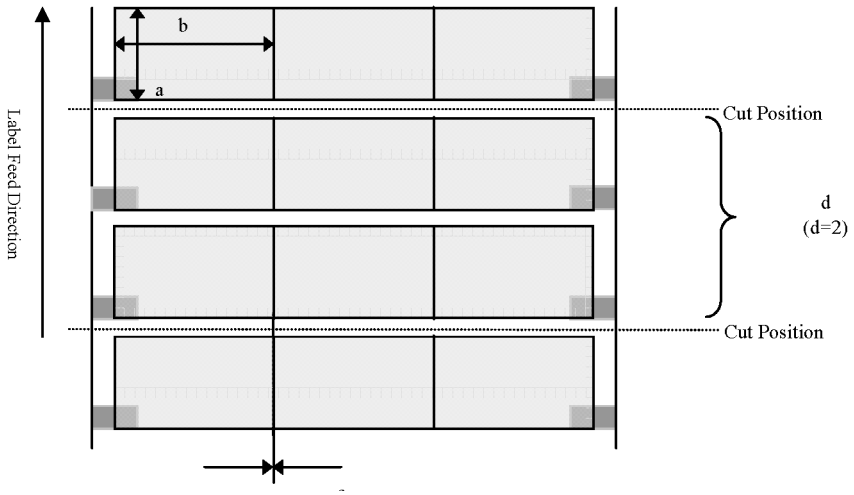
FORMAT SPECIFICATION

FUNCTION	Specifies small label format. Only applicable to the M10e printer.
FORMAT	<ESC>_**N** a = Field number (01 to 99) b = Data digit (01 to 99) Place before <ESC>H and <ESC>V.
EXAMPLE	<ESC>A <ESC>A1,06363060<ESC>PD,600,1020,0,0 <ESC>_F <ESC>_**N,01,04**<ESC>V100<ESC>H200<ESC>L0202<ESC>XMABCD <ESC>_**N,02,07**<ESC>V200<ESC>H200<ESC>L0202<ESC>B103200*11111* <ESC>_**N,03,02**<ESC>V100<ESC>H400<ESC>L0202<ESC>XM22 <ESC>_D,01,AAAA<ESC>_D,02,*22222*<ESC>_D,03,22<ESC>_Q,1 <ESC>_D,01,BBBB<ESC>_D,02,*33333*<ESC>_D,03,33<ESC>Q,2 <ESC>_D,01,CCCC<ESC>_D,02,*44444*<ESC>_D,03,44<ESC>Q,4 <ESC>Z
OUTPUT	(4-17) 
NOTES	Only 1-D barcode characters can be specified under <ESC>_N. Specify the small label print number with <ESC>_Q. Do not specify command for registration after <ESC>_N. If specified, accurate print motion might not be conducted.

LABEL PRINT QUANTITY

FUNCTION	Specifies the print number for small labels. Only applicable to the M10e printer.
FORMAT	<ESC>_**Q** a = Print quantity (0001 to 9999) b = Blank label (omittable) 0: Auto new line 1-9: Blank label quantity Place before <ESC>Z.
EXAMPLE	<ESC>A <ESC>A106363060 <ESC>PD,600,1020,0,0 <ESC>_F <ESC>V100<ESC>H200<ESC>P2<ESC>L0202<ESC>XMABCD <ESC>V200<ESC>H200<ESC>P2<ESC>L0202 <ESC>B103200*11111*<ESC>_**Q,4,2** <ESC>_F <ESC>V100<ESC>H200<ESC>P2<ESC>L0202<ESC>XMBBBB <ESC>V200<ESC>H200<ESC>P2<ESC>L0202 <ESC>B103200*22222*<ESC>_**Q,2,1** <ESC>Z
OUTPUT	(4-18) 
NOTES	The print quantity of small label can be specified under <ESC>_Q.

SMALL LABEL SIZE SPECIFICATION

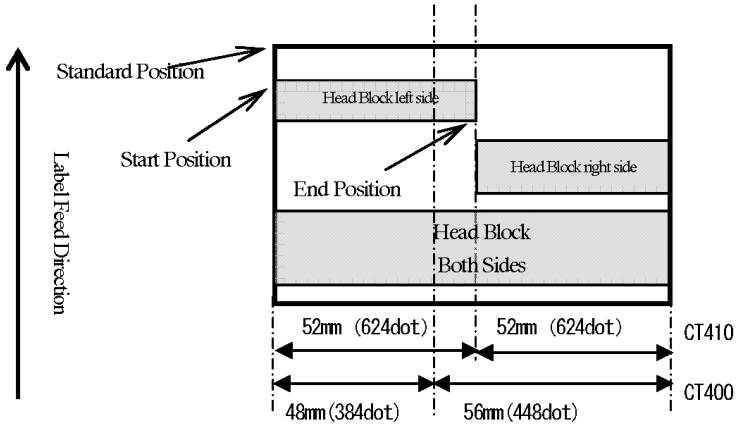
FUNCTION	Specifies parameters relative to small label size. Only applicable to the M10e printer.
FORMAT	<ESC>**PD** a = Vertical dimension (480 to 3600 dots) b = Horizontal dimension (480 to 1600 dots) c = Label size (00 to 99 dots) d = Multiple cut labels (01 to 99) Place after the page size command.
EXAMPLE	Vertical dimension: 600, horizontal dimension: 1020, label size: 0, multiple cuts: 2. <ESC>A <ESC>A106363060 <ESC>**PD,600,1020,0,2** <ESC>V100<ESC>H100<ESC>P2<ESC>L0202<ESC>XMABCD <ESC>Q2 <ESC>Z
OUTPUT	(4-19) 
NOTES	If <ESC>PD is different from <ESC>A1, it becomes an error. The specification of <ESC>_N relates to after small labels of <ESC>PD. Specification <ESC>_D is ignored. From <ESC>PD, horizontal column label numbers will be automatically calculated and printed.

TELEGRAPHIC MESSAGE END SPECIFICATION

FUNCTION	Specifies the telegraphic message end relative to small labels. Only applicable to the M10e printer.
FORMAT	<ESC>**RE** a = Operates when ending 0: Discharge motion 1: Discharge motion + Cut motion Place after <ESC>A but before <ESC>Z.
EXAMPLE	<ESC>A <ESC>**RE0** <ESC>Z
OUTPUT	**This command does not result in printer output.**
NOTES	After receiving <ESC>RE, the editing of horizontal row will be ended and will conduct feed motion. As printing may end in the middle of the horizontal row label due to the print quantity, the label may result in being blank. The <ESC>RE command specifies telegraphic ending of small label at the printer driver and cannot be combined with other standard commands. The feed motion becomes “0” when the cutter feature is not available.

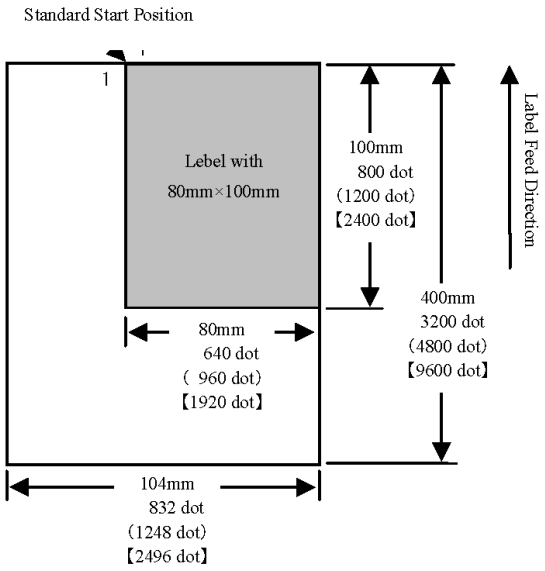
SHEET SENDING SPECIFICATION	
FUNCTION	Specifies paper delivery (feed operation) of marked unit (eye-mark, gap) for small label. Only applicable to the M10e printer.
FORMAT	<ESC>**RS** Place after <ESC>A but before <ESC>Z.
EXAMPLE	<ESC>A <ESC>**RS** <ESC>Z
OUTPUT	**This command does not result in printer output.**
NOTES	Only used for single items. The <ESC>RS command specifies the small label sheet sending of eye-mark unit at the printer driver and cannot be combined with other standard commands.

TWO-COLOR PRINT RANGE SPECIFICATION

FUNCTION	Specifies a two-color print range. Only applicable to the CT400/410 printers.
FORMAT	<ESC>**2S** a = Head lock specification 0: Left side 1: Right side 2: Both sides b = Start vertical position (specify label vertical size in dots) c = End vertical position (specify label vertical size in dots) Place before the quantity command.
EXAMPLE	<ESC>A <ESC>A108000832 <ESC>V100<ESC>H200<ESC>P2<ESC>L0304<ESC>XMABCD <ESC>**2S2V0001Y0600** <ESC>Q2 <ESC>Z
OUTPUT	(4-20) 
NOTES	When <ESC>2S is used, also use the <ESC>A1 command. Two-color print range can register to 10. Print quantity will be influenced by print speed and print darkness. Barcodes printed in two-color may not be clearly read by the scanner. Use parameter “D” for print darkness <ESC>#E during two-color printing. Black color printing cannot be performed inside of the block specified under <ESC>2S. Two-color printing may not be clearly seen on the inner side of 2mm. For CT400, the center position becomes closer to the left side from 4mm (32 dots) to the print head center.

PRINT POSITION COMMANDS

MEDIA SIZE (DOTS)

FUNCTION	To set the size of the media.
FORMAT	<ESC>**A1aaaabbbb** aaaa = Label Height in dots (0 to Hmax) bbbb = Label Width in dots (0 to Vmax) Place in a separate data stream to the printer.
INPUT	<ESC>A <ESC>**A108000640** <ESC>Z
OUTPUT	This command does not result in printer output. It is used to automatically adjust the offset values for the size of label being used. The sample command stream specifies a label 640 dots wide by 800 dots long in 203 DPI. (4-21)  Value of ( ) is 12 dot/mm Value of 【 】 is 24 dot/mm
NOTES	The Base Reference point is always the on the right (looking at the front of the printer) side of the print head. This command adjusts the Base Reference Point to correspond with the right edge of the loaded media. If the label size is changed, then this command must be respecified to center the print image on the label. All eight variables “aaaa” and “bbbb” must be included in this command.

MEDIA SIZE (MM)

FUNCTION

Specifies the media size in millimeters.

FORMAT

<ESC>**A1aabbbccc**

a = Media type: OT: Tag (Center hole tag, Side hole tag, Notched tag, I-mark tag, Not sensor)

Media type: OL: Label (I-mark label, Gap label, Not sensor)

b = Height of media in mm: See the table below.

c = Width of media in mm: See the table below.

EXAMPLE

<A>
<A1>0T060042
<Z>
<A>
<I1>
<V>100<H>200<P>2<L>0304<XS>ABCDE
<Q>
<Z>

OUTPUT

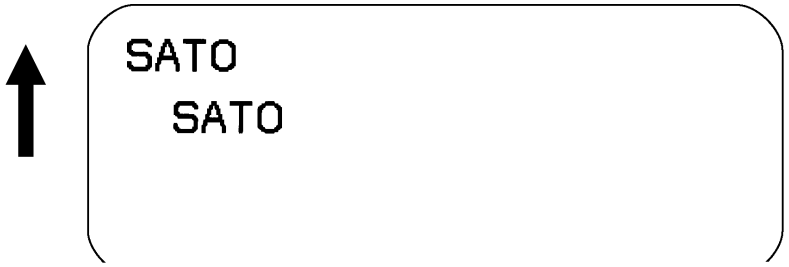
NOTES

1. For specifying the media size, include the size of backing paper.
2. If the media setting on the printer side and [Media type] are not equal, a command error will occur
3. If [Media size check] in expansion setting is enabled, the validity of setting on the printer side, and the setting specified by the Media Size <A1> command will be checked. If their settings are not equal, a pitch size error will occur.
4. If a pitch size error occurs, the data received by the printer will be cleared. Check the Media Size <A1> command again and send the print data. The Media Size <A1> command can be omitted, but this command is required when printing multiple media.
5. When the use of sensor is prohibited, this command will be valid whether you select tag or label for [Media type].

[Validity]

Model	Media type	Print area compatibility	Height of media in mm	Width of media in mm
TG308	Tag	Standard	025 to 300	032 to 080
		Expansion	025 to 300	032 to 100
	Label	Standard	019 to 300	025 to 080
		Expansion	019 to 300	025 to 100
TG312	Tag	Standard	025 to 240	032 to 080
		Expansion	025 to 240	032 to 100
	Label	Standard	019 to 240	025 to 080
		Expansion	019 to 240	025 to 100

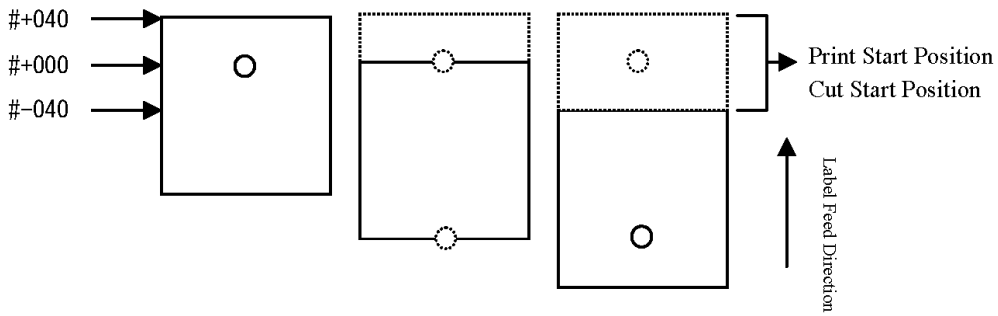
PRINT POSITION

FUNCTION	The Horizontal and Vertical commands specify the top left corner of a field or label, using the current base reference point as an origin. They also establish a reference point for subsequent fields until the next horizontal and/or vertical print position command is issued.
FORMAT	Horizontal Position: <ESC>**Haaaa** Vertical Position: <ESC>**Vbbbb** aaaa = Number of horizontal dots from base reference point (1 to Hmax) bbbb = Number of vertical dots from base reference point (1 to Vmax) Place preceding any print field description of lines/boxes, fonts, bar codes, or graphics.
EXAMPLE	<ESC>A <ESC>**H0025**<ESC>**V0050**<ESC>L0303<ESC>MSATO <ESC>**H0100**<ESC>**V0150**<ESC>MSATO <ESC>Q2 <ESC>Z
OUTPUT	(4-22) 
NOTES	To expand the print length to the maximum limit, the Expanded Print Length (<ESC>EX0) command must be used. If any part of an image is placed past maximum allowable dots across the label, that part of the image will be lost. Leading zeroes do not have to be entered - command “V1” is equivalent to “V0001”.

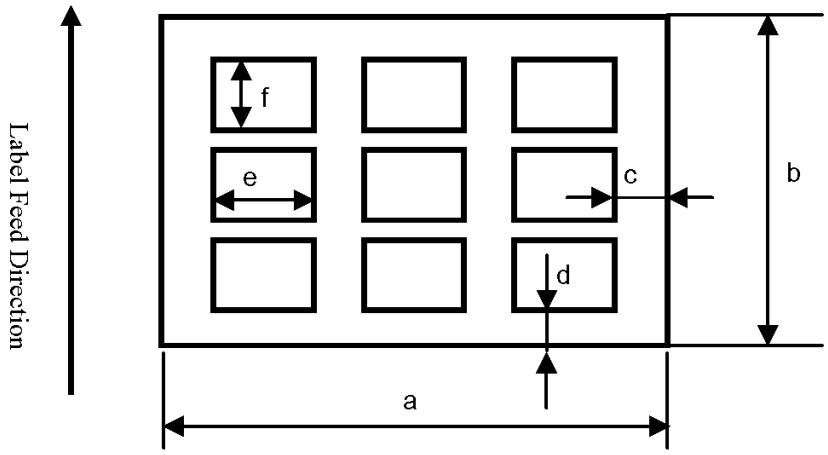
OFFSET SPECIFICATION

FUNCTION	Specifies label stop position. Only applicable to the CT400/410 printers.
FORMAT	<ESC>**PO** a = Offset specification 0: Cutter motion 1: Dispenser motion 2: Tear-Off motion 3: Continuous motion b = Offset direction +: Forward -: Backward c = Offset distance (00 to 99 dots) Place after <ESC>A but before <ESC>Z.
EXAMPLE	<ESC>A <ESC>**PO3+08** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	It's not necessary to specify <ESC>PO for normal label print. Specify this command when a proper gap is located.

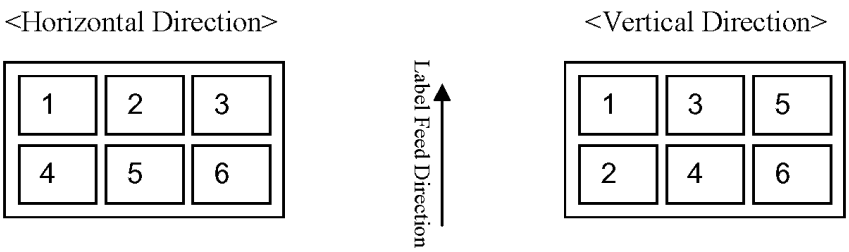
START POSITION SPECIFICATION

FUNCTION	Specifies the vertical print start position. Only applicable to the XL400/410e printers.
FORMAT	<ESC># a = Shift direction +: Forward -: Backward b = Shift distance XL400e: 000 to 400 dots XL410e: 000 to 600 dots Place after <ESC>A but before <ESC>Z.
EXAMPLE	<ESC>A <ESC>**#+040** <ESC>Z
OUTPUT	(4-23) 
NOTES	The cut start position for tags will be shifted together with the change of start position. The <ESC># command is valid for specification of every label or tag type.

LABEL SIZE SPECIFICATION

FUNCTION	Specifies label dimensions. Only applicable to the M10e printer.
FORMAT	<ESC>**RI** a = Sheet width (1500 to 3200 dots) b = Sheet length (480 to 3600 dots) c = Label width (0 to 60 dots) d = Label length (00 to 60 dots) e = Small label width (480 to 3200 dots) f = Small label length (480 to 3600 dots) g = Label width quantity (01 to 06) h = Label length quantity (01 to 07) Place immediately following <ESC>A.
EXAMPLE	<ESC>A <ESC>**RI2196,1236,24,36,0700,0400,03,03** <ESC>A112362196 <ESC>RW02 <ESC>Z
OUTPUT	(4-24) 
NOTES	Command <ESC>RI data becomes error when different from <ESC>A1 specification. The quantity of labels in the horizontal column will be automatically calculated and printed by <ESC>RI command. The <ESC>RI command sets information relating to label size at the printer driver and cannot be combined with other standard commands.

LABEL SIZE SPECIFICATION

FUNCTION	Specifies the order or arrangement of small labels. Only applicable to the M10e printer.
FORMAT	<ESC>**RT** a = Print direction 0: Horizontal 1: Vertical Place immediately following <ESC>A.
EXAMPLE	<ESC>A <ESC>**RT0** <ESC>RI3200,1200,00,00,1600,0600,02,02 <ESC>A!12003200 <ESC>Z
OUTPUT	(4-25) 
NOTES	Command <ESC>RT specifies label print order of small labels by the printer driver and cannot be combined with other standard commands.

FONT COMMANDS

FONTS: S, M, U, OA, OB, XB, XL, XS, XM, XU

FUNCTION	To print text images on a label. These are eight of the built-in fonts available on the printer. All matrices include descenders.
FORMAT	Font XU: <ESC>**XU** Font U: <ESC>**U** Font XS: <ESC>**XS** Font S: <ESC>**S** Font XM: <ESC>**XM** Font M: <ESC>**M** Font OA: <ESC>**OA** Font OB: <ESC>**OB** Place preceding the data to be printed.
EXAMPLE	<ESC>A <ESC>PS <ESC>H0001<ESC>V0100<ESC>L0202<ESC>**XUSATO** <ESC>H0001<ESC>V0175<ESC>L0202<ESC>**XSSATO** <ESC>H0001<ESC>V0250<ESC>L0202<ESC>**XMSATO** <ESC>H0001<ESC>V0325<ESC>L0101<ESC>**OASATO** <ESC>H0001<ESC>V0400<ESC>L0101<ESC>**OBSATO** <ESC>H0300<ESC>V0100<ESC>L0202<ESC>**USATO** <ESC>H0300<ESC>V0175<ESC>L0202<ESC>**SSATO** <ESC>H0300<ESC>V0250<ESC>L0202<ESC>**MSATO** <ESC>Q1<ESC>Z
OUTPUT	(4-26) 
NOTES	Characters may be enlarged through the use of the Character Expansion command and character spacing may be altered through the use of the Character Pitch command. The default is 2 dots between characters. Custom characters or fonts may also be created - refer to Custom-Designed Characters (<ESC>T) command. It is recommended to use a spacing of 5 dots for OCR-A and 1 dot for OCR-B. The matrices for the OA and OB fonts are scaled so that they will remain a constant size according to the OCR-A and OCR-B specifications when printed on different resolution printers. The proportionally spaced fonts XU, XS, XM, XL and XA can be printed with fixed spacing using the Proportional Space (<ESC>PS) command. **Refer to Appendix: Reference Tables 1 through 7 for additional information.**

SMOOTHING FONTS: WB, WL, XB, XL

FUNCTION	To print text images on a label. These are the four auto-smoothing fonts available on the printer.
FORMAT	Font WB: <ESC>**WBa** Font XB: <ESC>**XBa** Font WL: <ESC>**WLa** Font XL: <ESC>**XLa** a = 0: Disables auto-smoothing of font 1: Enables auto-smoothing of font (see notes below) Place preceding the data to be printed.
EXAMPLE	<ESC>A <ESC>PS <ESC>H0100<ESC>V0100<ESC>**WB0SATO** <ESC>H0100<ESC>V0185<ESC>**WB1SATO** <ESC>H0100<ESC>V0270<ESC>**WL0SATO** <ESC>H0100<ESC>V0355<ESC>**WL1SATO** <ESC>H0300<ESC>V0100<ESC>**XB0SATO** <ESC>H0300<ESC>V0185<ESC>**XB1SATO** <ESC>H0300<ESC>V0270<ESC>**XL0SATO** <ESC>H0300<ESC>V0355<ESC>**XL1SATO** <ESC>Q1 <ESC>Z
OUTPUT	(4-27) 
NOTES	Auto-smoothing (when enabled) is only effective if the character expansion rate is at least (3) times in each direction. Characters may be enlarged through the use of the Character Expansion (<ESC>L) command. Character spacing may be altered through the use of the Character Pitch (<ESC>A) command. A font must be defined for each field to be printed. There is no default font.

FONT, RASTER

FUNCTION	To print point size characters created using font definitions.
FORMAT	<ESC>A<ESC**>RDabb,ccc,ddd,nn. . .n** a = A: Times B: CG Triumvirate bb = 00: Always ccc = Horizontal size (4 - 999 dots or P02 - P99) ddd = Vertical size (4 - 999 dots or P02 - P99) nn..n = Data to be printed. Place within the normal command stream.
EXAMPLE	<ESC>A <ESC>V0100<ESC>H0100 <ESC>**RDA00,P28,P28,CG Times** <ESC>V0200<ESC>H0100 <ESC>**RDB00,075,075,CG Triumvirate** <ESC>Q1 <ESC>Z
OUTPUT	(4-28) 
NOTES	The “cccc” Horizontal Size and “dddd” Horizontal Size parameters can be entered either in dots or points, but both parameters must use the same value types. If point size is used, the point size is preceded by a “P”. **Refer to Appendix: Reference Table 8 for additional information.**

FONT, VECTOR

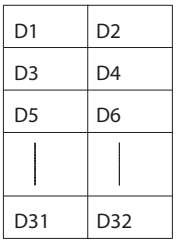
FUNCTION	To specify printing of the unique SATO vector font. The vector font allows large characters to be printed with smooth, round edges. Each character is made of a number of vectors (or lines), and will require slightly more printer compiling time.
FORMAT	Specify Vector Font: <ESC>**$a,b,c,d** Data for Vector Font: <ESC>**$=(data)** a = A: Helvetica Bold (proportional spacing) B: Helvetica Bold (fixed spacing) b = Font width (50-999) c = Font height (50-999 dots) d = Font variation (0-9) as follows: 0: Standard 1: Standard open (outlined) 2: Gray (mesh) pattern 1 3: Gray (mesh) pattern 2 4: Gray (mesh) pattern 3 5: Standard open, shadow 1 6: Standard open, shadow 2 7: Standard mirror image 8: Italic 9 Italic open, shadow Place immediately preceding the data to be printed.
EXAMPLE	<ESC>A <ESC>H0100<ESC>V0100<ESC>**$A,100,100,0** <ESC>**$=SATO AMERICA** <ESC>H0100<ESC>V0200<ESC>**$=VECTOR FONT** <ESC>H0100<ESC>V0350<ESC>**$A,200,300,8<ESC>$=SATO** <ESC>Q1<ESC>Z
OUTPUT	(4-29) 
NOTES	The Pitch command can be used with Vector fonts. If the font size designation is out of the specified range, a default value of 50 is used. The font width and height values include ascenders, descenders, and other space. A font must be defined for each field to be printed. There is not a default font.

FONT: XCL, XCS	
FUNCTION	To print text on a label. Specifies dot matrix font including descenders. Only applicable to the XL400/410e printers.
FORMAT	<ESC>**XCL** <ESC>**XCS** nn...n = Print data XCL: 48 x 36 dots XCS: 32 x 24 dots Place immediately following the enlargement command <ESC>L.
EXAMPLE	<ESC>A <ESC>V100<ESC>H200<ESC>P2<ESC>L0304<ESC>**XCL,01234** <ESC>Q2 <ESC>Z
OUTPUT	**Prints fonts of the prescribed type.**
NOTES	XCL and XCS fonts allow setting of fixed Pitch with 34 types of care symbols each. **Refer to Appendix: Reference Table 9 for additional information.**

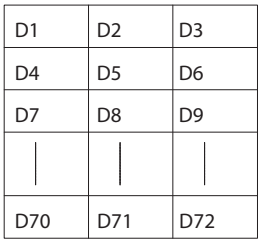
EXTERNAL CHARACTER RECALL TEXT FLOW

FUNCTION	Specifies recall print specifications of vertical and horizontal text flow of external character registered in printer memory. Commands k1 and k2 are for vertical recall and K1 and K2 are for horizontal.
FORMAT	<ESC>**K1, K2, k1, or k2** a = External specification mode H: HEX character specification B: Binary code specification I: With smoothing function (HEX code) C: With smoothing function (binary code) J: With highlighting function (HEX code) D: With highlighting function (binary code) K: With smoothing & highlighting function (HEX code) E: With smoothing & highlighting function (binary code) b = JIS registration code H, I, J, K: 9021 to 907F B, C, D, E: 9021H to 907FH Shift JIS registration code H, I, J, K: F040 to F09E B, C, D, E: F to F09EH Place after <ESC>V and <ESC>H but before <ESC>Z.
EXAMPLE	Example with 24 x 24 external callout specification, HEX code data of JIS <ESC>A <ESC>T1H21 00FF . . . . . FF00 <ESC>Z <ESC>A <ESC>V100<ESC>H200<ESC>**K1H9021** <ESC>Q2 <ESC>Z Example with 16 x 16 external callout specification, binary code data of Shift JIS <ESC>A <ESC>T2B<ESC>40 00FF . . . . . FF00 <ESC>Z <ESC>A <ESC>V100<ESC>H200<ESC>**k2B**<ESC>90<ESC>40 <ESC>Q2 <ESC>Z
OUTPUT	**These commands do not result in visual printer output.**
NOTES	Re-register if normal printing is not conducted.

STORE 16X16 DOTS EXTERNAL CHARACTER

FUNCTION	Register external character of 16x16 dots in memory card.
FORMAT	<ESC>**T1abbn~n** a = Data type = H: Hex character B: Binary code b = Registration font code address <ESC>JIS H: “21” to “7F” Up to 95 registries B: 21H to 7FH Up to 95 registries <ESC>Shift JIS H: “40” to “9E” Up to 95 registries B: 40H to 9EH Up to 95 registries n = External character data
EXAMPLE	<ESC>A <ESC>CC1 **<ESC>T1H2100FF00FF ～ 3C0000FF** <ESC>Z
OUTPUT	External file 16 x 16 
NOTES	1. Existing data can be overwritten. 2. The Card Slot <ESC>CC command must be sent prior to this command. 3. An error may occur due to capacity shortage when this command and other commands related to registration are used at the same time. In such a case, you need to store the data on another card or replace the card with a card of larger capacity. 4. Data will be out in the order as shown in the output illustration above.

STORE 24X24 DOTS EXTERNAL CHARACTER

FUNCTION	Register external character of 24x24 dots in memory card.
FORMAT	<ESC>**T2abbn~n** a = Data type = H: Hex character B: Binary code b = Registration font code address <ESC>JIS H: “21” to “7F” Up to 95 registries B: 21H to 7FH Up to 95 registries <ESC>Shift JIS H: “40” to “9E” Up to 95 registries B: 40H to 9EH Up to 95 registries n = External character data
EXAMPLE	<ESC>A <ESC>CC1 **<ESC>T2H2100FF00FF ～ 3C0000FF** <ESC>Q2 <ESC>Z
OUTPUT	External file 24 x 24 
NOTES	1. Existing data can be overwritten. 2. The Card Slot <ESC>CC command must be sent prior to this command. 3. An error may occur due to capacity shortage when this command and other commands related to registration are used at the same time. In such a case, you need to store the data on another card or replace the card with a card of larger capacity. 4. Data will be out in the order as shown in the Output illustration above.

BARCODE COMMANDS

BAR CODES	
FUNCTION	To print bar code images on a label.
FORMAT	2:5 narrow/wide ratio: <ESC>**BDabbcccn...n** 1:3 narrow/wide bar ratio: <ESC>**Babbcccdn...n** 1:2 narrow/wide bar ratio: <ESC>**Dabbcccdn...n** a = 0: Codabar 1: Code 39 2: Interleaved 2 of 5 (I 2/5) 3: UPC-A / EAN-13 4: EAN-8 5: Industrial 2 of 5 6: Matrix 2 of 5 7: reserved 8: reserved 9: reserved A: MSI B: reserved C: Code 93 D: reserved E: UPC-E F: Bookland G: Code 128 I: SSCC/UCC128 bb = Number of dots (01-12) for narrow bar and narrow space ccc = Bar height in dots (001-999) d = SSCC/UCC128 only. Not used for other bar code types 0: No human readable text 1: Human readable at top 2: Human readable at bottom Place immediately preceding the data to be encoded.

BAR CODES

EXAMPLE

Note: Carriage Returns and Line Feeds have been added to the command listing for clarity and should not be included in the actual data stream.

<ESC>A
<ESC>H0025<ESC>V0025<ESC>**B103100*CODE 39***
<ESC>H0155<ESC>V0130<ESC>XS*CODE 39*
<ESC>H0025<ESC>V0200<ESC>**BD20210045676567**
<ESC>H0075<ESC>V0310<ESC>XM45676567
<ESC>H0025<ESC>V0375<ESC>**BD30215001234567890**
<ESC>H0025<ESC>V0600<ESC>**BD50210012345**
<ESC>H0175<ESC>V0710<ESC>XS12345
<ESC>H0025<ESC>V0775<ESC>**BD60210012345**
<ESC>H0105<ESC>V0885<ESC>XS12345
<ESC>H0025<ESC>V0950<ESC>**BA03100123455**
<ESC>H0095<ESC>V1060<ESC>XS12345
<ESC>H0025<ESC>V1125<ESC>**BC03100081234ABCD**
<ESC>H0080<ESC>V1240<ESC>XS1234ABCD
<ESC>H0525<ESC>V0025<ESC>**B002100A12345B**
<ESC>H0565<ESC>V0135<ESC>XS12345
<ESC>H0475<ESC>V0200<ESC>**BD303100123456789012**
<ESC>H0525<ESC>V0375<ESC>**BD4031001234567**
<ESC>H0525<ESC>V0550<ESC>**DE03100123456**
<ESC>H0500<ESC>V0600<ESC>OB0<ESC>H0533<ESC>V0655<ESC>OB123456
<ESC>H0350<ESC>V0725<ESC>**D30315009827721123**
<ESC>L0101<ESC>H0320<ESC>V0800<ESC>OB0
<ESC>H0365<ESC>V0878<ESC>OB98277<ESC>H0505<ESC>V0878<ESC>OB21123
<ESC>H0665<ESC>V0760<ESC>**BF0313021826**
<ESC>H0680<ESC>V0730<ESC>OB21826
<ESC>H0425<ESC>V1125<ESC>**D30315000633895260**
<ESC>L0101<ESC>H0395<ESC>V1200<ESC>OB0
<ESC>H0440<ESC>V1278<ESC>OB06338<ESC>H0580<ESC>V1278<ESC>OB95260
<ESC>H0730<ESC>V1155<ESC>**BF0314024**<ESC>H0745<ESC>V1125<ESC>OB24
<ESC>H0325<ESC>V0950<ESC>**BG03100>GAB>D789>C123456**
<ESC>H0435<ESC>V1055<ESC>XSAB789123456<ESC>Q1<ESC>Z

BAR CODES

OUTPUT

Without Incrementing:

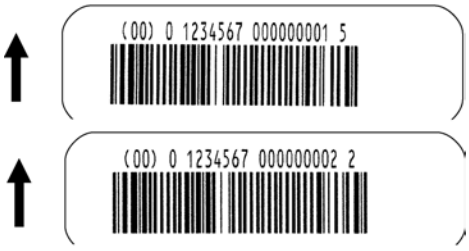
<ESC>A<ESC>H0100<ESC>V0100
<ESC>**BI10415010123456700000001**
<ESC>Q2<ESC>Z

(4-31a)

With Incrementing:

<ESC>A<ESC>H0100<ESC>V0100
<ESC>**F001+001**<ESC>**BI10415010123456700000001**
<ESC>Q2<ESC>Z

(4-31b)



BAR CODES

NOTES

Human readable data will be printed only when a valid Thin Bar Width is selected within the barcode command and it complies to the following table:

Printer DPI	Valid Thin Bar Value (bb)
203	02, 03
305	03, 04
609	06, 07, 08

The Code 128, UCC 128, MSI, and Code 93 bar codes are not affected by the narrow to wide ratios.

The Codabar, Code 39, Industrial 2 of 5, and Matrix 2 of 5 bar codes are affected by the Character Pitch command. This command must be placed before the Bar Code command.

Because of their unique characteristics, two-dimensional (2D) symbols are covered separately.

For UCC128, the FNC1 code is automatically inserted and the Mod 10 and Mod 103 check digits are automatically calculated. For the MSI bar code, the check digit is not automatically calculated.

The <ESC>D and <ESC>BD commands are not valid for the MSI, Code 128, Code 93, UPC-E, Bookland, UCC128 and Postnet symbologies.

A user can automatically print HRI without the d.

Refer to Appendix: Reference Tables 11, 12, and 13 for additional information.

BARCODE, HUMAN READABLE INFORMATION

FUNCTION	To specify character type of barcode explanation words..
FORMAT	<ESC>**Dabbcccn~n+ <d>n~n** a = Barcode Type = 3: JAN/EAN-13 4**:** JAN/EAN-8 H**:** UPC-A b = Thin Bar Width valid range: 01**~**12 (dot) c = Barcode Height**:** valid range: 001**~**999 (dot) n = Print Data (barcode data) d = Character Type Specification = XU XS XM XB XL OA OB U# S# M# WB# WL# # Is the old compatibility font. n Print Data = Explanation Word Data
EXAMPLE	Barcode type: JAN/EAN-13, Thin Bar Width: 02, Barcode Height: 120, Barcode data: 4902471006795, Character Type: XS, Explanation Word Data: 4902471006795 <ESC>A <ESC>V100<ESC>H200<ESC>D3021204902471006795 <ESC>XS4902471006795 <ESC>Q2 <ESC>Z
OUTPUT	

BARCODE, HUMAN READABLE INFORMATION

NOTES

1. To add human readable at the specified character type.
2. Data not within the specified value will not be printed out. When barcode ratio is small, and HRI font type size is large, the Human Readable characters may overlap one another.
3. Human readable will be performed further at the appropriate location of printer.
4. Human Readable data will be printed only when a valid Thin Bar Width is selected within the barcode command and it complies to the following table.

Printer DPI	Valid Thin Bar Value (bb)
203	02, 03
305	03, 04
609	06, 07, 08

5. A user can automatically print HRI without the d.

CODE 93	
FUNCTION	Specifies CODE93 barcode.
FORMAT	<ESC>**BCaabbbccn~n** a = Narrow bar width (01 to 12 dots) b = Barcode Height (001 to 999 dots) c = **Data Digit Number (01 to 99)** n = **Print Data (barcode data)** Place anywhere after <ESC>V but before <ESC>Q.
EXAMPLE	<ESC>H0100<ESC>V0125<ESC>**BC03100081234ABCD** <ESC>H0155<ESC>V0240<ESC>XS1234ABCD
OUTPUT	(4-33) 
NOTES	The quantity of digit data and input data must be equal. A command error will occur if the digit data and input data are not equal. **Refer to Appendix: Reference Table 14 for additional information.**

BOOKLAND	
FUNCTION	Specifies Bookland barcode.
FORMAT	<ESC>**BFaabbn~n** a = Narrow bar width (01 to 03dots) b = Barcode Height (001 to 999 dots) n = **Print Data (numeric (0 to 9) 2 to 5 digits)** Place anywhere after <ESC>V but before <ESC>Q.
EXAMPLE	<ESC>H0325<ESC>V0725<ESC>D30315009827721123 <ESC>L0101<ESC>H0295<ESC>V0800<ESC>OB0 <ESC>H0340<ESC>V0878<ESC>OB98277 <ESC>H0480<ESC>V0878<ESC>OB21123 <ESC>H640<ESC>V0760<ESC>**BF0313021826** <ESC>H655<ESC>V0730<ESC>OB21826
OUTPUT	(4-34)  
NOTES	Only numeric can be specified as print data. Refer to the attached table. **Refer to Appendix: Reference Table 15 for additional information.**

CODE128	
FUNCTION	Specifies CODE128 barcode.
FORMAT	<ESC>**BGaabbbn~n** a = Narrow bar width (01 to 12 dots) b = Barcode Height (001 to 999 dots) n = **Print Data (barcode data and subset shift codes)** Place anywhere after <ESC>V but before <ESC>Q.
EXAMPLE	<ESC>H0200<ESC>V0550<ESC>**BG03100>GAB>B789>C123456** <ESC>H0310<ESC>V0665<ESC>XSAB789123456
OUTPUT	(4-35) 
NOTES	Specify Start Code at the head of the data. (1) Start Code A = <ESC>G (2) Start Code B = <ESC>H (3) Start Code C = <ESC>I When using “Start Code C”, specify the print data in even numbered digits. When the print data contains an odd number of digits, specify “Start Code A” or B” to change the first character of the print data. Examples: 1) 15 digits [123456789012345] <ESC>B1<ESC>C23456789012345 2) 9 digits/Alphanumeric 6 digits [123456789ABC123] <ESC>C12345678<ESC>B9ABC123 If using “Start Code C” to specify an odd numbered digit, “0” will be added to the end of the print data before printing. When a Start Code is omitted, data will be printed with “Start Code B”. Shift codes are used to change the subset type within the barcode data. Shift codes: E Subset A Shift Code D Subset B Shift Code C Subset C Shift Code **Refer to Appendix: Reference Table 16 for additional information.**

SSCC/UCC128

FUNCTION	Specifies SSCC (Serial Shipping Container Code) barcode.
FORMAT	<ESC>**BIaabbbcn~n** a = Narrow bar width (01 to 12 dots) b = Barcode Height (001 to 999 dots) c = Barcode Expository Font Specification 0: Not Human Readable 1: Human Readable (upper part) 2: Human Readable (lower part) n = **Print Data** **For barcode data, refer to the UCC/EAN128 code table. EAN128 (Barcode for Standard Carton ID) fixed 18 digits:** **Identifier of a continuous code for freight packaging** **Digit 1: Container type** **Digits 2 to 8: Shipper identification** **Digits 9 to 17: Container sequential numbering** ***Note that check digit is automatically added; therefore, specify data in 17 digits excluding check digit.*** Place anywhere after <ESC>V but before <ESC>Q.
EXAMPLE	Without incrementing: <ESC>A <ESC>H0100<ESC>V0100<ESC>**BI10415010123456000000001** <ESC>Q2 <ESC>Z With incrementing: <ESC>A <ESC>H0100<ESC>V0100<ESC>F001+001 <ESC>**BI10415010123456700000001** <ESC>Q2 <ESC>Z

SSCC/UCC128

OUTPUT

Without incrementing:

(4-36a)

With incrementing:

(4-36b)

NOTES

UCC128 code is exclusive to Standard Carton ID. When printing in EAN128, designed for the markets in the medical, fresh food, or flowers and plants, use CODE128 Barcode <ESC>BG to specify print data with application identification or separator that matches each specification.

Start character code, function character, end character code, and identification code (corresponds only to “00”) are added automatically.

Modulus 10 check character and modulus 103 check character are automatically generated.

Sequential number of barcode data is available.

Line pitch between barcode and expository font is fixed at 10 dots.

If the width of expository font is wider than that of the barcode, it starts printing from the print start position of barcode.

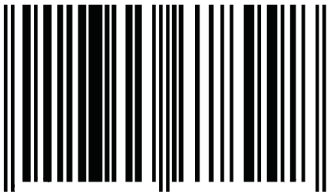
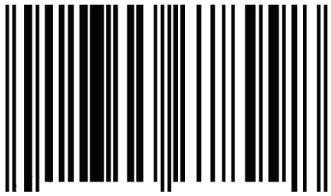
If the width of expository font is narrower than that of the barcode, expository font will be aligned to the center of barcode for printing.

Prints expository font in OCR-B.

If the expository font is outside of the print area, it will not be printed. When HRI is available, specify Vertical Print Position (<ESC>V) and Horizontal Print Position (<ESC>H) in consideration of print of expository font.

Refer to Appendix: Reference Table 17 for additional information.

UPC-A BARCODE (NO HRI)

FUNCTION	Specifies UPC-A Barcode with start/end bar in the same length with guard bar.
FORMAT	<ESC>**BLabbcccn~n** a = Barcode type = H: UPC-A("H"Fixed) b = Narrow bar width = Valid range : 01 to 12 dots c = Barcode height = 001 to 999 dots n = Print data = Data: 11 digits fixed
EXAMPLE	Barcode type: UPC-A, Narrow bar width: 03, Barcode height: 120, Print data: 01234567890 <ESC>A <ESC>V100<ESC>H100**<ESC>BLH0312001234567890** <ESC>Q2 <ESC>Z
OUTPUT	 Print result of UPC-A by command <D>  Print result of UPC-A by command <BL>
NOTES	1. This command supports UPC-A. Selecting barcode type other than "H" will result in a command error. 2. Refer to the following settings. Barcode setting Guard bar: Yes; HRI: No; Ratio: Fixed 3. If a parameter is specified out of the range, its behavior will not be supported. 4. When using command <ESC>D to print UPC-A, the character bars will be all in the same length. The command <ESC>BL will print the start bar and end bar in the same length as that of guard bars.

UPC-A BARCODE (FONT DESIGNATION)

FUNCTION	Specifies font type of UPC-A (with HRI characters)
FORMAT	<ESC>**BL**abbcccn~n ~ <**d**>n~n a = Barcode type = H: UPC-A (“H” fixed) b = Narrow bar width = Valid range: 01 to 12 dots c = Barcode height = 001 to 999 dots n = Print data = Barcode data: 11 digits fixed d = Font = XU XS XM XB XL OA OB U S M WB WL n = Print data = Interpretation data : 12 digits fixed
EXAMPLE	Barcode type : UPC-A, Narrow bar width : 02, Barcode height : 120 Barcode data : 01234567890, Font type : X21, Translation data : 012345678905 <ESC>A <ESC>V100<ESC>H200<ESC>BLH0212001234567890 <ESC>X21,012345678905 <ESC>Q2 <ESC>Z
OUTPUT	

UPC-A BARCODE (FONT DESIGNATION)

NOTES

1. This command supports UPC-A only. Selecting barcode type other than “H” will be a command error.

2. Recommended narrow bar width for UPC-A with HRI:

8 dot/mm resolution [02], [03]

12 dot/mm resolution [03], [04]

3. Calculate the 12th check digit of HRI data by using Modulus 10.

4. Refer to the settings in the table below.

Barcode setting

Guard bar	HRI	Ratio
Yes	Yes	Fixed

5. If a parameter is specified out of the range, its behavior will not be supported.

6. The command <ESC>D with specifying font type to print UPC-A will print the character bars all in the same length. On the other hand, the command <ESC>BL with font type selection will print the start bar and end bar in the same length as that of guard bars.

When printing UPC-A with command <ESC>D followed by <font type> data, its HRI can be printed from under the start/end bar, because the length of them is short. When printing UPC-A with command <ESC>BL followed by <font type> data, character spacing of the HRI will be smaller than command <ESC>BL because the length of start and end bars is longer.

UPC-A BARCODE (WITH HRI)

FUNCTION	Specifies UPC-A barcode with HRI characters. The start and end bar height will be the same length as that of guard bars.
FORMAT	<ESC>**BMabbcccn~n** a = Barcode type = H : UPC-A (“H” fixed) b = Narrow bar width = Valid range : 01 to 12 dots c = Barcode height: 001 to 999 dots n = Print data = Data : 11 digits fixed
EXAMPLE	Barcode type : UPC-A, Narrow bar width : 02, Barcode height : 120, Print data : 20123948573 <ESC>A> <ESC>V240<ESC>H100<BM>H0212020123948573 <ESC>Q2 <ESC>Z
OUTPUT	 UPC-A with command <BD>  UPC-A with command <BM>

UPC-A BARCODE (WITH HRI)

NOTES

1. This command supports UPC-A only. Selecting barcode type other than “H” will be a command error.

2. Recommended narrow bar width for UPC-A with HRI characters:

8 dots/mm resolution [02], [03]

12 dots/mm resolution [03], [04]

3. Refer to the following settings.

Barcode setting

Guard bar	HRI	Ratio
Yes	Yes	Fixed

4. If a parameter is specified out of the range, its behavior will not be supported.

5. The command <BD> with specifying font type to print UPC-A will print the character bars all in the same length. On the other hand, the command <BM> will print the start bar and end bar in the same length as that of guard bars.

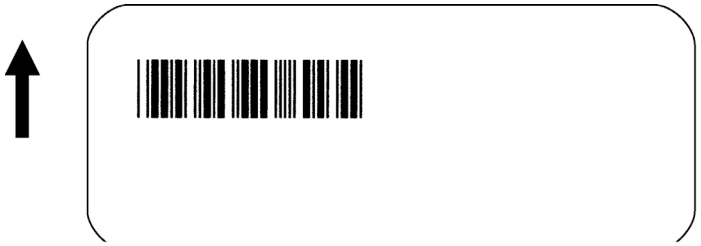
When printing UPC-A with command <BD>, its HRI can be printed from under the start/end bar, because the length of them is short. When printing UPC-A with command <BML>, character spacing of the HRI will be smaller than command <BL>.

POSTNET	
FUNCTION	To print Postnet bar codes.
FORMAT	<ESC>**BPn...n** n...n = 5 digits (Postnet-32 format) 6 digits (Postnet-37 format) 9 digits (Postnet-52 format) 11 digits (Postnet-62, Delivery Point format) Place immediately preceding the data to be encoded.
EXAMPLE	<ESC>A <ESC>H0100<ESC>V0120<ESC>**BP94089** <ESC>H0100<ESC>V0160<ESC>**BP123456** <ESC>H0100<ESC>V0200<ESC>**BP123456789** <ESC>H0100<ESC>V0240<ESC>**BP12345678901** <ESC>Q1 <ESC>Z
OUTPUT	(4-37) 
NOTES	If the number of data digits does not match those listed, the command is ignored. Only numeric data will be accepted. **Refer to Appendix: Reference Table 18 for additional information.**

VARIABLE RATIO BARCODES

FUNCTION	To print a bar code with a ratio other than those specified through the standard bar code commands (B,BD, and D). This is done through individual control of each of the bar code elements (bars, spaces) as shown above. Remember that this command only applies to the five bar code types shown.
FORMAT	<ESC>**BTabbccddee** a = Bar Code Symbol: 0: Codabar 1: Code 39 2: Interleaved 2 of 5 5: Industrial 2 of 5 6: Matrix 2 of 5 bb = Narrow space in dots (01 to 99) cc = Wide space in dots (01 to 99) dd = Narrow bar in dots (01 to 99) ee = Wide bar in dots (01 to 99) Place following the print position commands and preceding <ESC>BW.
EXAMPLE	<ESC>A <ESC>H0050<ESC>V0050<ESC>**BT101030103** <ESC>BW03100*1234* <ESC>Q1 <ESC>Z
OUTPUT	(4-38) 
NOTES	This command must be immediately followed by the Bar Code Expansion (<ESC>BW) command. You may use only one variable ratio bar code per label. If the data specified in this command is incorrect, the command is ignored and the ratio used will be based on the previous setting.

BARCODE EXPANSION

FUNCTION	This command works together with the <ESC>BT command to specify an expansion factor and the bar code height for the particular symbol being printed.
FORMAT	<ESC>**BWabbb** aa = Expansion factor by which the width of all bars and spaces will be increased (01 to 12) bbb = Bar height by dot (004 to 999 dots) Place immediately following the <ESC>BT command and preceding data to be encoded.
EXAMPLE	<ESC>A <ESC>H0050<ESC>V0050<ESC>BT101030103 <ESC>**BW04100*1234*** <ESC>Q1 <ESC>Z
OUTPUT	(4-39) 
NOTES	This command must be preceded by the Variable Ratio Bar Codes (<ESC>BT) command. The following bar codes will be affected by the Character Pitch command: Codabar, Code 39, Interleaved 2 of 5, Matrix 2 of 5. **Refer to Appendix: Reference Tables 19 and 20 for additional information.**

EAN/UCC COMPOSITE SYMBOL

FUNCTION	This command specifies the composite symbol of EAN/UCC.
FORMAT	<ESC>**EUaabbbn...n** a = 1D barcode symbology Format 1 01: RSS-14 02: RSS-14 Truncated (13 digits maximum) 03: RSS-14 Stacked (13 digits maximum) 04: RSS-14 Stacked Omni-directional (13 digits maximum) 05: RSS Limited (13 digits maximum) 07: UPC-A (11 digits maximum) 08: UPC-E (10 digits fixed) 09: EAN13 (12 digits maximum) 10: EAN8 (7 digits maximum) Format 2 11: UCC/EAN128 with CC-A/B (48 digits maximum) 12: UCC/EAN128 with CC-C (48 digits maximum) b = Minimum bar width (01 to 12 dots) c = Barcode height (001 to 500 dots, only applicable to Format 2) n = Print data (sum of 1D and 2D codes up to 120 digits) Between <ESC>A and <ESC>Z but following <ESC>H and <ESC>V.
EXAMPLE	Example using RSS-14: <ESC>A <ESC>H100<ESC>V100 <ESC>**EU0104036123456789011990102** <ESC>Q1 <ESC>Z
OUTPUT	(4-40)  (01)  (02)  (03)  (04)  (05)  (07)  (08)  (09)  (10)  (11)  (12)

EAN/UCC COMPOSITE SYMBOL

NOTES	
	Both Formats The parameter feature varies depending on 1D barcode symbology. The parameter for barcode height is only designable for UCC/EAN128 (EU11, EU12). The print data parameter can accept up to 120 digits for 1D and 2D data. For 2D data, when 1D barcode symbology and alphanumeric are mixed, the designable data quantity may vary. The entire composite symbol size changes depending on the specification of minimum bar width. If the composite symbol exceeds the printable area, only the portion located within the area will print; however, a scanner may occasionally read such a composite symbol. If the value in 1D barcode symbology is not set to the data portion, the composite symbol will not print. This command does not support the RSS Expand command. Print of HRI cannot be designated with this command. Rotation <ESC>% is available, but Enlargement <ESC>L is disabled. Format 2 Barcode height (c) is specified when Minimum Bar Width is “01”. For instance, if setting Minimum Bar Width to 03 and Barcode Height is 100, the Barcode Height will be 300 dots. To specify the print of composite symbol, delimit 1D and 2D data with “I” (7Ch). Use “#” (23h) to specify FNC1 (GS) of CC-C for PDF417) as data.

2D CODE COMMANDS

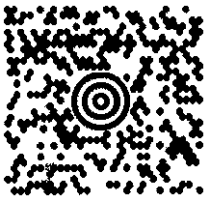
PDF417

FUNCTION	Specifies PDF417 of 2D code.
FORMAT	<ESC>**BKaabbcddeeffffg~g, h** a = Minimum Module Width (01 to 09 dots) b = Minimum Module Height (01 to 24 dots) c = Security Level (0 to 8) d = Number of Data Code Words per Digit (01 to 30) 00: Automatic (width depends on data number specified) e = Digit Number per Symbol (03 to 90) 00: Automatic (height depends on data number specified) f = Data Digit Number (0001 to 2681) g = Print Data (data) h = PDF Code Type When omitted: PDF417 T: Truncated scale M: Micro PDF Place anywhere after <ESC>V but before <ESC>Q.
EXAMPLE	<ESC>V0100<ESC>H0100<ESC>**BK0607400000021PDF417 PDF417 PDF417**
OUTPUT	(4-41) 
NOTES	The minimum module width can be set to 01 and 02; however, it may not read properly. 01, 02, and 03 are designable for minimum module height and may cause a reading problem. If specifying “00” for Number of Data Code Words per Digit and Digit Number per Symbol, the size of height to width (aspect ratio) will be at 1:2 based on the number of print data. If increasing the security level, it is necessary to specify a higher value for Digit Number per Symbol or Number of Data Code Words per Digit. The maximum Digit Number of Data is 2681; however, it may vary depending on the specification of minimum module size, security level, and print data type. If the specification of parameter or number of data is not matching, printing will not be properly performed. **Refer to Appendix: Reference Table 21 and 22 for additional information.**

QR CODE

FUNCTION	Specifies QR Code of 2D code.
FORMAT	<ESC>**BQ** (Manual setting) <ESC>**BQ** (Auto setting) a = Error correction level 1: 7% high density 2: 15% standard 3: 30% high reliability 4: 25% b = Concentration mode 0: Normal mode 1: Concentration mode c = Cell size (01 to 32) d = Number of partitions by concentration mode (01 to 16) e = Sequential number partitioned by concentration mode (01 to 16) f = Concentration mode parity data (00 to ff) g = Character mode 1: Number mode 2: Alphanumeric mode 3: Binary mode h = Data number (0001 to 7366) n = Data Place anywhere after <ESC>V but before <ESC>Q.
EXAMPLE	<ESC>A <ESC>H0100<ESC>V0100<ESC>**BQ3010,112345** <ESC>Q1 <ESC>Z
OUTPUT	(4-42) 
NOTES	Carry out XOR logic operation of all the partitioned print data of the QR code and then, specify this operation data in hexadecimal character. This is referred to as “Parity Data”. When the character mode is set to other than binary mode, it is not necessary to set the data number parameter. **Refer to Appendix: Reference Tables 23, 24, 25, and 26 for additional information.**

MAXI CODE

FUNCTION	Specifies Maxi code of 2D code.
FORMAT	<ESC>**BVa, b, c, ddddddddd, eee, fff, n~n** a = Position of Maxicode symbol within set (1 to 8) b = Total quantity of Maxicode symbols within set (1 to 8) c = Mode 2: for Mode 2 carrier message for domestic UPS shipments 3: for Mode 3 carrier message for international UPS shipments 4: standard symbol 6: for reader d = Zip Code (9 digit postal code) e = Country Code (001 to 999) f = Service Class (001 to 999) n = Data determined by <ESC> Place anywhere after <ESC>V but before <ESC>Q.
EXAMPLE	<ESC>A<ESC>V0100<ESC>H0100 <ESC>**BV1,1,2,123456789,840,001,[)<RS>01<GS>961Z01547089<GS>UPSN<GS>056872<GS>348<GS>99999999<GS>001/005<GS>029<GS>N<GS><GS>LENEXA<GS>KS<RS><EOT>** <ESC>Q1 <ESC>Z
OUTPUT	(4-43) 
NOTES	For mode 2, specify up to 9 numeric digits; and for mode 3, specify fixed 6 digits (alphanumeric - use English capital letters). “00H” cannot be specified for print data. **Refer to Appendix: Reference Table 27 for additional information.**

DATA MATRIX CODE

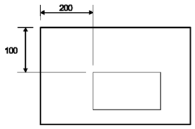
FUNCTION	Specifies Data Matrix Code of 2D code.
FORMAT	<ESC>**BXaabbccddeeeffffghh** a = Format ID (01 to 06 dots) b = Error Correction Level **00: ECC000** **05: ECC050** **08: ECC080** **10: ECC100** **14: ECC140** **20: ECC200** c = Cell Width (01 to 16 dots/cell) d = Cell Pitch (01 to 16 dots/cell) e = Number of Cells per Line (008 to 148) 000: Automatic) f = Number of Cell Line (008 to 148) 000: Automatic g = Mirror Image 0: Normal Image (standard print) 1: Mirror Image h = Guide Cell Size (01 to 15) Place anywhere after <ESC>V but before <ESC>Q.
EXAMPLE	<ESC>A <ESC>V0100<ESC>H0100 <ESC>**BX05051010000000001** <ESC>DCDATA MATRIX DATA MATRIX <ESC>Q1 <ESC>Z
OUTPUT	**(4-44)** 
NOTES	If “20” is specified for Error Correction Level, the specification of Format ID, Mirror Image, and Size of Guide Cell will be ignored. “01” and “02” are designable for Cell Width and Cell Pitch; however, they may not read properly. In this case, “00” will be an error. If “000” is specified for Number of Cells per Line and Number of Cell Lines, optimum matrix size is automatically set based on the number of data. The thickness of normal type guide cell is “01”. **Refer to Appendix: Reference Table 28 for additional information.**

DATA MATRIX CODE, DATA	
FUNCTION	Specifies data for the data matrix code of 2D code.
FORMAT	<ESC>**DC** n = Print data Place after <ESC>BX.
EXAMPLE	<ESC>A <ESC>H0100<ESC>V0100<ESC>BX05051010000000001 <ESC>**DC1234567890** <ESC>Q1 <ESC>Z
OUTPUT	**Must be used in conjunction with <ESC>BX to result in output.**
NOTES	This code must be placed after the <ESC>BX command.

DATA MATRIX CODE, SEQUENTIAL NUMBER

FUNCTION	Specifies sequential numbering for the data matrix code of 2D code.
FORMAT	<ESC>**FX** a = Quantity of duplications to print (001 to 999) b = Flag of increase/decrease +: Increase -: Decrease c = Quantity of increase/decrease (001 to 999) d = Start position of sequential numbering (001 to 999) e = Incremented data length from start position (001 to 999) Place before <ESC>BX.
EXAMPLE	<ESC>A <ESC>H0100<ESC>V0100<ESC>**FX001+001005003** <ESC>BX011002020000000001 <ESC>DC00006000 <ESC>Q1 <ESC>Z
OUTPUT	**Label Set 1:** **(4-45a)**  **Label Set 2:** **(4-45b)** 
NOTES	This code must be placed before the <ESC>BX command. **Refer to Appendix: Reference Table 29 for additional information.**

2D10 (PDF417)

FUNCTION	Specifies PDF417 of 2D code.
FORMAT	<ESC>**2D10,aa,bb,c,dd,ee,(f)** <ESC>**DNmmmm,n...n** a = Minimum module width (01 to 09 dots) b = Minimum module height (01 to 24 dots) c = Security level (0 to 8) d = Quantity of data code words per line (10 to 30) 00: Automatic (width varies on data quantity specified) e = Quantity of lines per symbol (03 to 90) 00: Automatic (width varies on data quantity specified) f = Code type 0: Normal (if digit is omitted, the default is zero) 1: Truncated scale m = Data size (1 to 2681 bytes) n = Print data Between <ESC>A and <ESC>Z but following <ESC>H and <ESC>V.
EXAMPLE	Example - Minimum module width: 03 dots, Minimum module height: 09 dots, Security level: 3, Words per line: 03, Lines per symbol: 18, Code type: Truncated. <ESC>A <ESC>V100<ESC>H100 <ESC>**2D10,03,09,3,03,18,1** <ESC>**DN0010,0123456789** <ESC>Q2 <ESC>Z
OUTPUT	**(4-46a)** 
NOTES	Set the PDF417's base reference point for printing with Vertical Print Position <ESC>V and Horizontal Print Position <ESC>H (<ESC>V100<ESC>H200<ESC>2D10****). (4-46b)  When d=e=00, the size of height to width (aspect ratio) will be at 1:2. If the specification of "d", "e" and the data quantity do not match, printing will not be properly performed. If increasing the security level, it is necessary to specify a higher value for "d" and "e". The minimum mode width can be set to 01 and 02; however, this may not be properly read. 01, 02, and 03 are designable for minimum module height; however, a reading problem may result. Sequential numbering is disabled with this command and print position cannot be specified by auto linefeed. Designation of print for 00H-FFH and registration of format are enabled. Increase the value of minimum module when selecting the higher print quality and increase the value of security level when setting the read rate higher. The height of printed characters may vary.

2D12 (MICRO PDF417)

FUNCTION	Specifies Micro PDF417 of 2D code.
FORMAT	<ESC>**2D12,aa,bb,c,dd,(e)** <ESC>**DNmmmm,n...n** a = Minimum module width (01 to 09 dots) b = Minimum module height (01 to 24 dots) c = Quantity of data code words per line (1 to 4 columns) d = Quantity of lines per symbol (4 to 44) e = Binary mode 0: Normal (if digit is omitted, the default is zero) 1: Binary m = Data size (0001 to 0366 bytes) n = Print data Between <ESC>A and <ESC>Z but following <ESC>H and <ESC>V.
EXAMPLE	Example - Minimum module width: 02 dots, Minimum module height: 04 dots, Words per line: 01, Lines per symbol: 14. <ESC>A <ESC>V100<ESC>H100 <ESC>**2D12,02,04,1,14** <ESC>**DN0010,0123456789** <ESC>Q2 <ESC>Z
OUTPUT	**(4-47)** 
NOTES	<ESC>DNmmmm,n...n (when Binary mode is set to 1) <ESC>DNn...n (when binary mode is set to 0) The quantity of lines per symbol is set by the quantity of data code words per line. When the data includes alphabet (uppercase/lowercase letters), numeric and control codes, the quantity of characters used will affect the maximum data quantity. **Refer to Appendix: Reference Tables 30 and 31 for additional information.**

2D20 (MAXI CODE)

FUNCTION	Specifies Maxi Code of 2D code.
FORMAT	<ESC>**2D20,a(,bbb,ccc,d...d)** <ESC>**DNmmmm,n...n** a = Mode 2: Delivery only (numeric) 3: Delivery only (alphanumeric) 4: Standard symbol 6: Reader only b = Service class (001 to 999 numeric) c = Country code (001 to 999 numeric) d = Postal code Mode 2 (0 to 999999999, numeric only) Mode 3 (000000 to 999999, alpha-numeric with capital letters) m = Data size (1 to 138 bytes) n = Print data Between <ESC>A and <ESC>Z but following <ESC>H and <ESC>V.
EXAMPLE	Example - Mode: Delivery only (numeric), Service class: 003, Country code: 081, Postal code: 123456789. <ESC>2 <ESC>V100<ESC>H100 <ESC>**2D20,2,003,081,123456789** <ESC>**DN0010,0123456789** <ESC>Q2 <ESC>Z
OUTPUT	**(4-48)** 
NOTES	Enter parameters for b, c, and d when selecting modes 2 or 3, omit them when selecting modes 4 or 6. Modes 2 & 3: 123 maximum numeric print data, 84 alphanumeric. Modes 4 & 6: 138 maximum numeric print data, 93 alphanumeric. The size of Maxi code printed will not be affected by data quantity. When designating a parameter other than specified or when the print data size does not match, printing will not be performed. When selecting modes 4 or 6, set data size (m) to 12 to allow the Maxi Code to be read by scanner. **Refer to Appendix: Reference Table 32 for additional information.**

2D30/31 (QR CODE)

FUNCTION	Specifies QR Code of 2D code.
FORMAT	<ESC>**2D30,a,bb,c,d,(ee,ff,gg)** <ESC>**DNmmmm,n...n** or <ESC>**DSk,n...n** <ESC>**2D31,a,bb,c,d,(ee,ff,gg)** <ESC>**DNmmmm,n...n** or <ESC>**DSk,n...n** a = Error correction level L: 7% M: 15% Q: 25% H: 30% b = Cell size (01 to 32 dots) c = Data setting mode 0: Manual 1: Automatic d = Concentration mode 0: Normal 1: Concentration e = Quantity of partitions by concentration mode (01 to 16) f = Sequential number partitioned by concentration mode (01 to 16) g = Concentration mode parity data (00 to FF) k = Character mode 1: Numeric 2: Alphanumeric 3: Kanji m = Data size 2D30: Model 2 (1 to 2953 bytes) 2D31: Model 1 (1 to 486 bytes) n = Print data Between <ESC>A and <ESC>Z but following <ESC>H and <ESC>V.
EXAMPLE	Example - Error correction level: 7%, Cell size: 05, Data setting mode: manual, Concentration mode: normal. <ESC>A <ESC>V100<ESC>H200 <ESC>**2D31,L,05,0,0** <ESC>**DS1,012345** <ESC>Q2 <ESC>Z
OUTPUT	**(4-49)** 

2D30/31 (QR CODE)

NOTES	
	Enter parameters for e, f, and g when selecting 1: Concentration (d), omit them when selecting 0: Normal. Designation of print data will vary do to the setting of parameter c. Parameter e allows specification/connection of QR Codes that were partitioned by concentration mode. Parameter f allows specification of a specifically partitioned QR Code. Parameter g carries out XOR logic operation of all partitioned print data of the QR Code, then specifies this operational data in hexadecimal character (parity data). Parameter k is to only be set if selecting data setting mode as 0: Manual. Binary specification is available for this setting and its data designation command varies. Parameter m is to only be set if XXXXXXXXXXXXXXXXXXXXXXXX When designating a parameter other than specified or when the print data quantity does not match, printing will not be performed. For data portion, data designation command varies depending on the parameter setting or the data selected. Data Setting 1: Auto or for binary 0: Manual = <ESC>DNmmmm,n...n. Data Setting for parameters other than binary in 0: Manual = <ESC>DS1,n...n (Numeric) <ESC>DS2,n...n (Alphanumeric) <ESC>DS3,n...n (Kanji) Enter parameters followed by data. When entering more data, specify the data consecutively or printing will not be properly performed. The total print data size (n) is to 7000 bytes. The maximum data blocks that can be entered is 200. **Refer to Appendix: Reference Tables 33 and 34 for additional information.**

2D32 (MICRO QR CODE)

FUNCTION	Specifies QR Code of 2D code.
FORMAT	<ESC>**2D32,a,bb,c** <ESC>**DNmmmm,n...n** or <ESC>**DSk,n...n** a = Error correction level L: 7% M: 15% Q: 25% b = Cell size (01 to 32 dots) c = Data setting mode 0: Manual 1: Automatic k = Character mode 1: Numeric 2: Alphanumeric 3: Kanji m = Data size (1 to 15 bytes) n = Print data Between <ESC>A and <ESC>Z but following <ESC>H and <ESC>V.
EXAMPLE	Example - Error correction level: 7%, Cell size: 04. <ESC>A <ESC>V100<ESC>H200 <ESC>**2D32,L,04** <ESC>**DS1,012345** <ESC>Q2 <ESC>Z
OUTPUT	**(4-50a)** 

2D32 (MICRO QR CODE)

NOTES

Binary specification is available for parameter k - its data designation command will vary.

Set parameter m when selecting binary.

When designating a parameter other than specified or when the print data quantity does not match, printing will not be performed.

For data portion, data designation command varies depending on the parameter setting or the data selected.

Data Setting 1: Auto or for binary 0: Manual = <ESC>DNmmmm,n...n.

Data Setting for parameters other than binary in 0: Manual =
<ESC>DS1,n...n (Numeric)
<ESC>DS2,n...n (Alphanumeric)
<ESC>DS3,n...n (Kanji)

Micro QR code data size list table

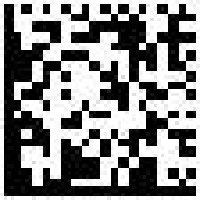
Version	Error correction	Number	Alphabet	Kanji	Binary
M 1 (11×11)	L (missing detection only)	5	—	—	—
M 2 (13×13)	L M	1 0 8	6 5	— —	— —
M 3 (15×15)	L M	2 3 1 8	1 4 1 1	6 4	9 7
M 4 (17×17)	L M Q	3 5 3 0 2 1	2 1 1 8 1 3	9 8 5	1 5 1 3 9

Enter parameters followed by data. When entering more data, specify the data consecutively or printing will not be properly performed.

The total print data size (n) is to 7000 bytes. The maximum data blocks that can be entered is 200.

Refer to Appendix: Reference Tables 35, 36, and 37 for additional information.

2D50 (DATA MATRIX - ECC200)

FUNCTION	Specifies Data Matrix (ECC200) of 2D code.
FORMAT	<ESC>**2D50,aa,bb,ccc,ddd** <ESC>**DNmmmm,n...n** a = Cell width (01 to 16 dots) b = Cell height (01 to 16 dots) c = Quantity of cells per line (000 fixed) d = Quantity of cell lines (000 fixed) m = Data size (1 to 3116 bytes) n = Print data Specify 7EH, 00H when printing 00H Specify 7EH, 7EH when printing 7EH Between <ESC>A and <ESC>Z but following <ESC>H and <ESC>V.
EXAMPLE	Example - Cell width: 3 dots, Cell height: 3 dots. <ESC>A <ESC>V100<ESC>H200 <ESC>**2D50,03,03,000,000** <ESC>**DN0010,0123456789** <ESC>Z
OUTPUT	**(4-51)** 
NOTES	When designating a parameter other than specified or when the print data quantity does not match, printing will not be performed. When selecting the print format, leave more than 2mm margin around Data Matrix to be properly read by scanner. Data Format - Numeric: 3116, Alphanumeric: 2335, Binary (01H-FFH): 1556. **Refer to Appendix: Reference Table 38 for additional information.**

SYSTEM COMMANDS

PRINT SPEED

FUNCTION

To specify a unique print speed through software for a particular label. This allows flexibility in finding the best performance and quality for the particular label format, media, and ribbon.

FORMAT

<ESC>**CSa**

a = Designates the speed selection in ips

Place immediately after <ESC>A and immediately before <ESC>Z in a separate data stream.

Refer to the product manual for specific print speed increments.

EXAMPLE

<ESC>A <ESC>**CS6** <ESC>Z

OUTPUT

This command does not result in printer output.

NOTES

This becomes the new setting for all subsequent print jobs, unless changed. All subsequent labels will print at this speed unless the speed is changed with this command or through the Operator Panel.

The setting is stored in non-volatile memory and is not affected by cycling the power.

Model	Default Value	Parameter Valid Range
CL408e/412e	4	2, 3, 4, 5, 6
M-8400RVe	6	2, 4, 6, 8, 10
M-5900RVe	3	2, 3, 4, 5, 6
CL608e/612e	6	4, 6, 8
CT400	4	2, 3, 4, 5, 6
CT410	4	2, 3, 4
XL400e	6	5, 6, 7, 8
XL410e	5	4, 5, 6
M-10e	4	3, 4, 5
M-8485Se	6	4, 6, 8, 10, 12
M-8490Se	6	4, 6, 8
M-8460Se	6	4, 6, 8
M-8459Se	4	2, 3, 4, 5
M-84Pro-2	6	2, 4, 6, 8, 10
M-84Pro-3	6	2, 4, 6, 8
M-84Pro-6	3	2, 3, 4, 5, 6

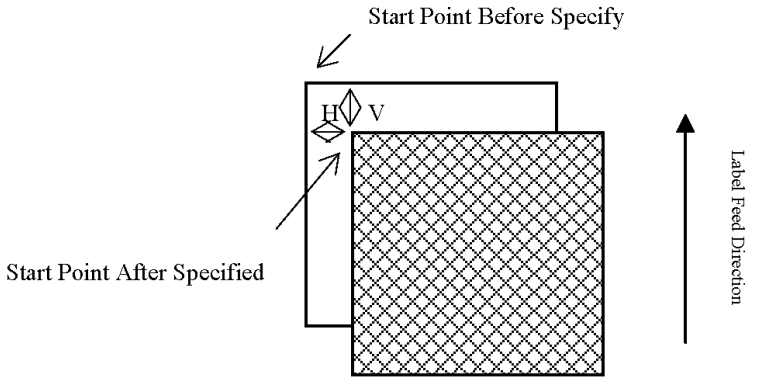
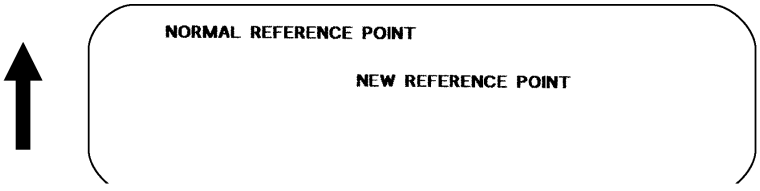
Print Speed against Parameter		
2	: 2 inch/sec	(50mm/sec)
3	: 3 inch/sec	(75mm/sec)
4	: 4 inch/sec	(100mm/sec)
5	: 5 inch/sec	(125mm/sec)
6	: 6 inch/sec	(150mm/sec)
7	: 7 inch/sec	(175mm/sec)
8	: 8 inch/sec	(200mm/sec)
10	: 10 inch/sec	(250mm/sec)
12	: 12 inch/sec	(300mm/sec)

PRINT DARKNESS

FUNCTION	To specify a new print darkness setting through software control for unique media and ribbon combinations.
FORMAT	<ESC>**#Ea** a = Print Darkness Value Must be placed immediately after <ESC>A and immediately before <ESC>Z in its own separate data stream. Refer to the product manual for specific print speed increments.
EXAMPLE	<ESC>A <ESC>**#E2** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	This becomes the new setting in the printer configuration for all subsequent print jobs unless changed. The setting is stored in non-volatile memory and is not affected by cycling power. The lightest setting is the smallest value and the darkest setting is the largest value. 【Parameter「a」Default Value and Valid Range】

Model	Default Value	Parameter Valid Range	Model	Default Value	Parameter Valid Range
CL408e/412e M-8400RVe CT400/410DT/TT M-10eDT/TT XL400e/410e M-5900RVe M-8459Se M-84Pro-2/3/6	3：Normal	1：Light 2：Medium Light 3：Normal 4：Medium Dark 5：Dark	CL608e/612e M-8485Se/90Se/60Se	2：Normal	1：Light 2：Normal 3：Dark

BASE REFERENCE POINT

FUNCTION	To establish a new base reference point for the current label. The base reference point is the top left corner or “origin” from where all print position commands are based. This command may be very helpful when using labels less than four inches wide to place images on the printable label surface. It may also be used to move images past preprinted fields on a label.
FORMAT	<ESC>**A3H-aaaa-Vbbbb** - = This character is optional. When present, it specifies that The horizontal offset is in the negative direction. If it is left out the offset direction is positive. aaaa = Horizontal Print Offset (-Hmax to +Hmax) bbbb = Vertical Print Offset (-Vmax to +Vmax) Place preceding all images based on the new base reference point.
EXAMPLE	<ESC>A <ESC>L0202 <ESC>H0025<ESC>V0025<ESC>WB0MNORMAL REFERENCE POINT <ESC>**A3H0300V0075** <ESC>H0100<ESC>V0050<ESC>WB0MNEW REFERENCE POINT <ESC>Q1 <ESC>Z
OUTPUT	(4-52a)  (4-52b) 

BASE REFERENCE POINT

NOTES

Use of this command will set the printer's Vertical/Horizontal Offset configuration until a new Base Reference Point command is issued or the setting is changed from the operator panel.

This command may be used more than once in a print job.

An alternative to using this command is to make changes to your current Horizontal and Vertical Print Position commands.

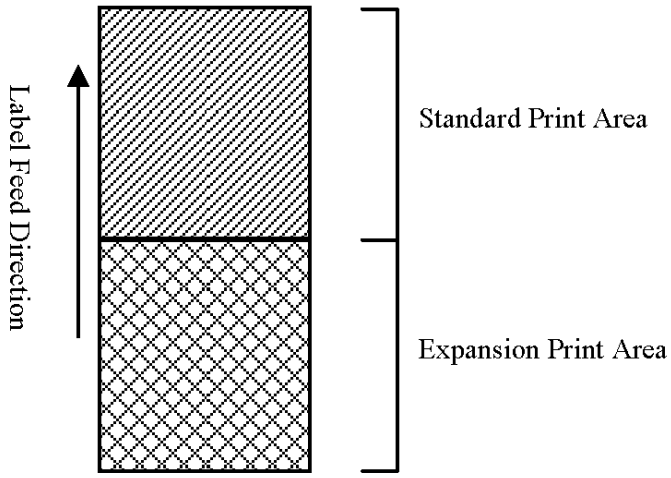
Example: If the current base reference point is H=1, V=1 and you wish to move all the fields on your label downward vertically by 150 dots. You could either, (1) add the Base Reference Point command or, (2) change all the vertical position commands by an additional 150 dots.

For a more detailed example of the Base Reference Point command, refer to the Introduction unit.

The printer will not "wrap" if any part of a character or image extends beyond the last print dot position. It will disappear and not be visible on any part of the label.

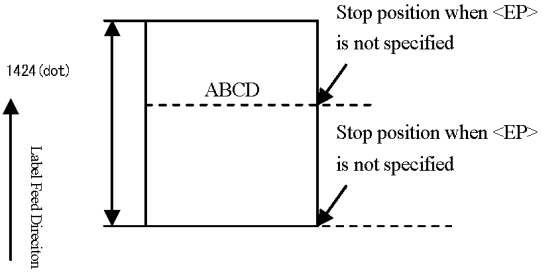
Model	H Direction Correction (dot)	V Direction Correction (dot)
CL408e	1～832	1～1424
CL412e	1～1248	1～2136
M-84Pro-3	1～1344	1～2136
CL608e M-8460Se	1～1216	1～1424
CL612e	1～1984	1～2136
CT400DT/TT	1～832	1～3200
CT410DT/TT	1～1248	1～4800
M-8400RVe M-84Pro-2 M-5900RVe M-8459Se	1～896	1～1424
M-10eDT/TT	1～3200	1～3600
XL400e	1～800	1～2400
XL410e	1～1200	1～2880
M-8485Se	1～1024	1～1424
M-8490Se	1～1344	1～2136
M-84Pro-6	1～2688	1～4272

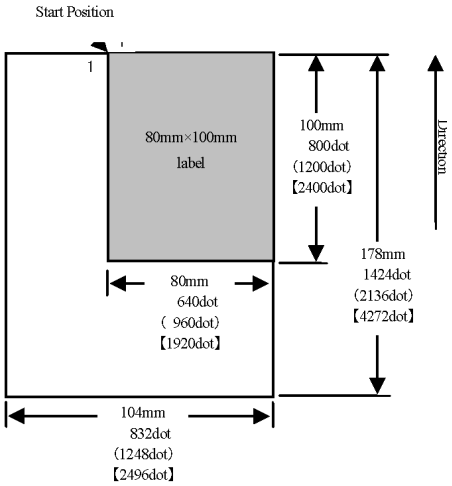
PRINT AREA, STANDARD, OR PRINT AREA, ENLARGEMENT

FUNCTION	Specifies the print area to be standard height of 178 mm or enlarged to 356 mm.
FORMAT	<ESC>**AR** Standard print area <ESC>**AX** Enlarged print area Place after <ESC>A within the data stream.
EXAMPLE	<ESC>A <ESC>**AR** <ESC>Z
OUTPUT	**(4-53)** 
NOTES	This command changes the print area of pitch direction. Insert this command after Start of Data Transmission (<ESC>A). To return to the standard print area, power off the printer to cancel the command. **Refer to Appendix: Reference Table 39 for additional information.**

PRINT END POSITION

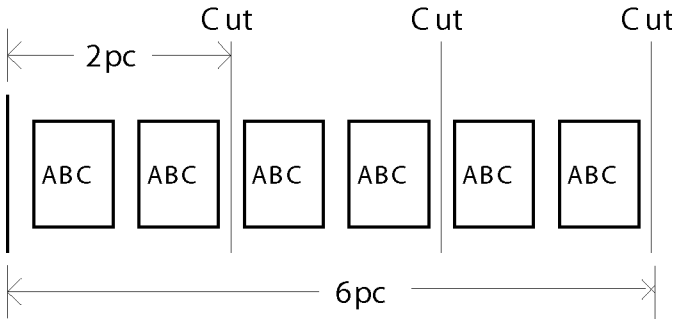
FUNCTION	Changes the label stop position in the sensor disabled mode.
FORMAT	<ESC>**EP** Place after <ESC>A within the data stream.
EXAMPLE	<ESC>A <ESC>**EP** <ESC>Z
OUTPUT	**This command does not result in printer output.**
NOTES	Specify as a set with Label Size command <ESC>A1 and only valid when sensor is disabled. **(4-54)**



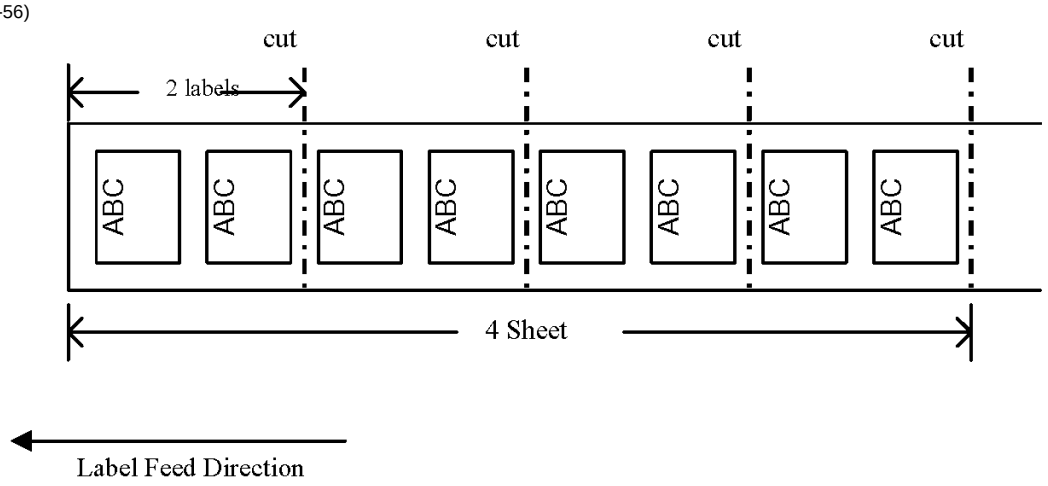


Value of ( ) is 12dot/mm
Value of 【 】 is 24dot/mm

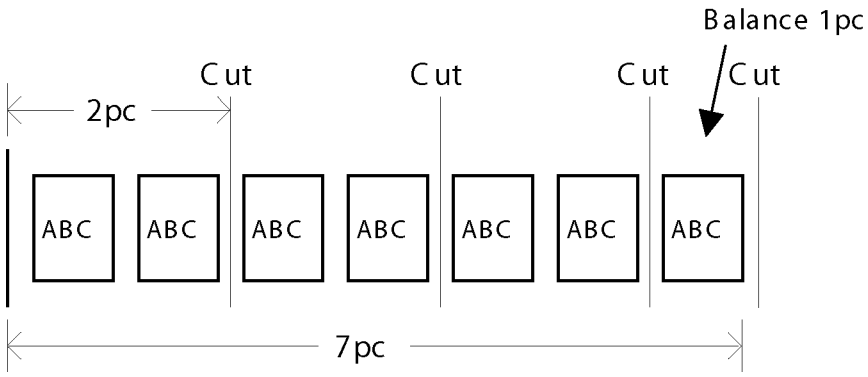
CUT, JOB

FUNCTION	Regulates label cutting when using a cutter assembly with the printer. This command allows the cutting of a multi-part tag or label at a specified interval within a print job.
FORMAT	<ESC>**~aaaa** aaaa = Number of labels to print between each cut (1 to 9999) Place following the Print Quantity command <ESC>Q.
EXAMPLE	<ESC>A <ESC>H0020<ESC>V0020<ESC>XB1ABC<ESC>Q3 <ESC>**~0002** <ESC>Z
OUTPUT	This set of commands will print 6 labels (3 x 2) with two labels between each cut. (4-55) 
NOTES	The optional label cutter must be installed and the printer configured for its use for this function to be valid. If the cut value is (a = 0), the cutter is inactive. A "~" (tilde) character or <NUL> (ASCII 00 Hex) character can be used in this command. It is recommended that the "~" be used whenever possible. When using the Cutter command, the total number of labels printed is the product of the cut value and the print quantity.

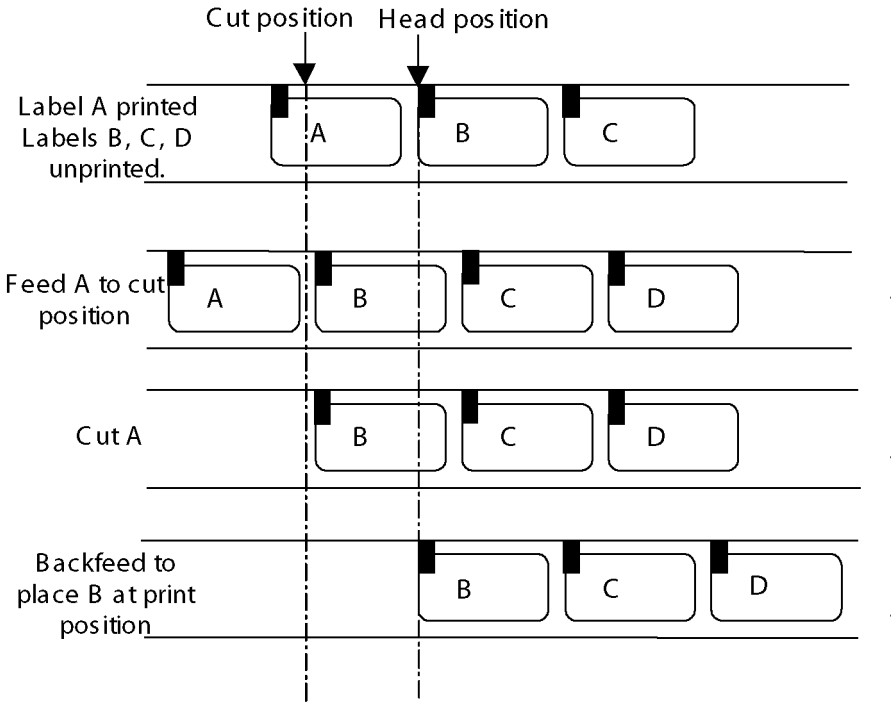
MULTIPLE CUTS

FUNCTION	Cuts a specified quantity of time for a specified quantity of labels resulting in one or more labels between each cut sequence.
FORMAT	<ESC>**~(NULL)aaaa** a = Print quantity until cut (0 to 9999) **Place immediately following the <ESC>Q command.**
EXAMPLE	<ESC>A <ESC>V100<ESC>H200<ESC>P2<ESC>L0202<ESC>XMABC <ESC>Q4 <ESC>**~2** <ESC>Z
OUTPUT	(4-56) 
NOTES	Only valid for cutter specified models. One cut per label when <ESC>~ is not specified at the Cut Motion Mode. Do not perform cut when at a=0. The accumulation of print labels and cut quantity shall not exceed a maximum of 999999. Command <ESC>Q specifies the sheet quantity to be cut. This command cannot be used in conjunction with the <ESC>~A command.

CUT, LABEL

FUNCTION	Regulates label cutting when using a cutter assembly with the printer. This command allows the cutting of a multi-part tag or label at a specified interval within a print job. It differs from the <ESC>~ Cut Job command in that it does not interact with the quantity command.
FORMAT	ESC>**~Aaaaa** aaaa = Number of labels to print between each cut (1 to 9999) Place preceding the <ESC>Q Print Quantity command.
EXAMPLE	This set of commands will print seven labels with two labels between each cut. One label will be cut separately.
OUTPUT	(4-57) 
NOTES	The optional cutter assembly must be installed and enabled to use this function. If the cutter option has been enabled in the printer configuration and the cut value is (a = 0), the cutter is inactive. This command is independent of the <ESC>Q Quantity command. It will cut the specified number of labels.

CUT, LAST

FUNCTION	Regulates label feed and cutting when using a cutter assembly with the printer. This command allows the cutting of a printed multi-part tag or label that is left in the printer after a job is cut.
FORMAT	<ESC>**~B** Place in a separate data stream sent to the printer.
EXAMPLE	<ESC>A <ESC>**~B** <ESC>Z
OUTPUT	This command will feed the last printed label to the cut position, cut the label and then back feed to the head position in preparation for printing the next job. (4-58) 
NOTES	Only valid for cutter specified models. Divide and use command <ESC>~B separate from commands <ESC>A and <ESC>Z and cannot be used in combination with other commands. Is only valid when at stop status without performing cut motion after print motion has ended.

TEAR-OFF CORRECTION

FUNCTION	Corrects tear-off value.
FORMAT	<ESC>**CBabb** a = Increment or Decrement +: Increment - : Decrement bb = Distance to move (mm) -5 to 98
EXAMPLE	<ESC>A **<ESC>CB+19** <ESC>Z
OUTPUT	
NOTES	1. If the command <ESC>CB-02 is executed after <ESC>CB+06, the tear-off position becomes -2 mm. 2. Maximum setting value is 98 mm. Values larger than that will be indicated as 98 mm. 3. Setting range is from -5 mm to 98 mm. 4. Setting value is effective after powering off the printer. 5. Current setting value will be printed in the TearOffset section of factory test print (2nd label).

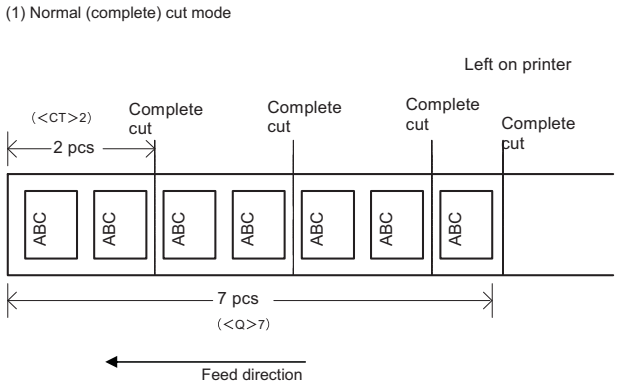
SENSOR SELECTION	
FUNCTION	Makes minor adjustments of darkness for the best print quality.
FORMAT	<ESC>**CIa** a = Sensor type 0 : Sensor is not used 1 : I-mark (CX-compatible) 2 : Transmissive Default value is 2.
EXAMPLE	<ESC>A **<ESC>CI1** <ESC>Z
OUTPUT	
NOTES	

SERIAL PORT

FUNCTION	Sets serial port.
FORMAT	<ESC>**CRaaaaa,b,c,d** aaaaa = Baud rate 9600 : 9600bps 19200 : 19200bps 38400 : 38400bps b = Parity N : Non parity O : Odd number E : Even number c = Data bit 7 : 7Bit 8 : 8Bit d = Stop bit 1 : 1Bit 2 : 2Bit
EXAMPLE	<ESC>A **<ESC>CR9600,N,8,1** <ESC>Z
OUTPUT	
NOTES	1. This setting can be checked in user test print (3rd label). 2. Restart the printer to enable this command setting.

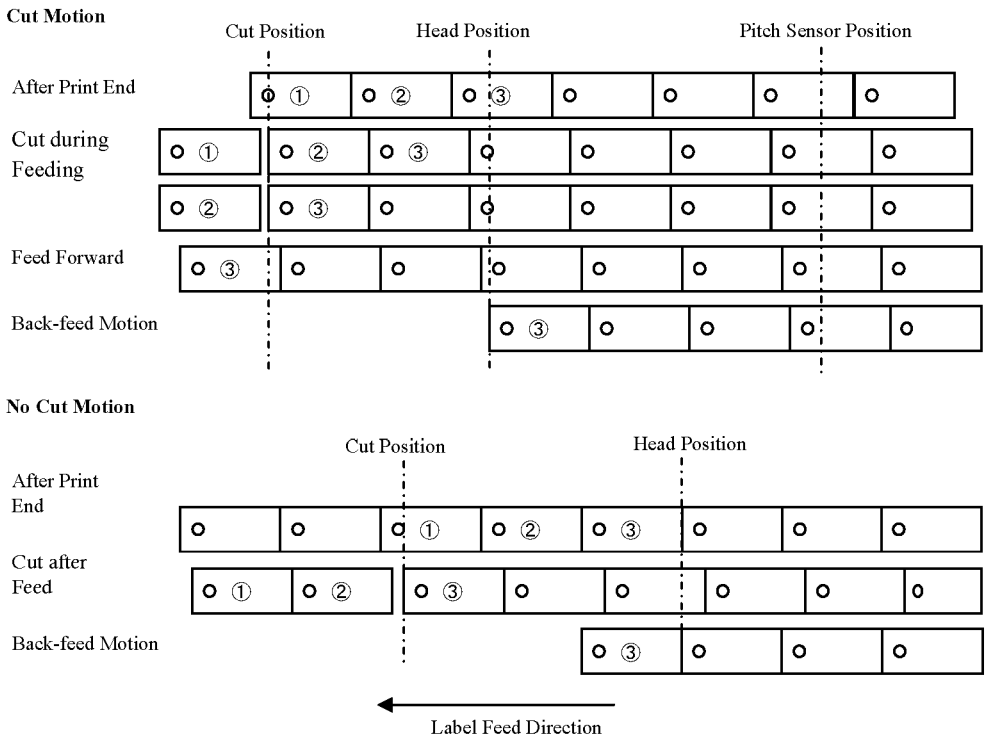
RIBBON	
FUNCTION	Selects the use or disuse of ribbon.
FORMAT	<ESC>**CPa** a = Ribbon type 0 : Direct thermal (Ribbon is not required) 1 : Thermal transfer (Ribbon is required)
EXAMPLE	<ESC>A **<ESC>CP1** <ESC>Z
OUTPUT	
NOTES	Ribbon type can be set.

CUT NUMBER UNIT

FUNCTION	Cuts label at a specified interval in a print job.
FORMAT	<ESC>**CTaaaa** a = Number of labels between each cut = Qty range : 0 to 9999
EXAMPLE	<ESC>A <ESC>V100<ESC>H200<ESC>P2<ESC>L0202<ESC>X22,ABC **<ESC>CT2** <ESC>Q7 <ESC>Z
OUTPUT	
NOTES	1. Valid only for cutter-mounted models. 2. If the parameter is not specified by this command <ESC>CT, each label will be cut after being printed. 3. In case the parameter “a” is set to 0, no label will be cut. 4. Set this command before <ESC>Q command. 5. This command can not be used in combination with other cut commands <ESC>~ or <ESC>~A.

INTERFACE	
FUNCTION	Specifies the interface used to connect with the host computer.
FORMAT	<ESC>**DI** a = Interface 0: USB 1: RS-232C / LAN / IEEE1284 2: Keypad 3: Scanner / Smart keyboard
EXAMPLE	<ESC>A **<ESC>DI0** <ESC>Z
OUTPUT	
NOTES	1. Set this command between start code <ESC>A and stop code <ESC>Z. 2. This command will be valid after rebooting. 3. Set <ESC>DI2 to use Keypad. Only in this case, connection with Keypad will be checked and supplied with power. While powering to Keypad, connection check will be executed at fixed intervals and the printer stops supplying power when disconnected. Connection check will not be done after that.

MEDIA EJECTION

FUNCTION	Enables forward and backfeed motion for cutting and printing. Applicable to the XL4e printer series, and to the TG308e/TG312e.
FORMAT	<ESC>**EJ** Place in a separate data stream sent to the printer.
EXAMPLE	<ESC>A <ESC>**EJ** <ESC>Z
OUTPUT	(4-59) 
NOTES	1. Feed motion is different due to the validation of cut motion. 2. This command was formerly called the Feed Specification command in this document, prior to Version E.

MEMORY AREA ENLARGE SPECIFICATION

FUNCTION

To specify enlargement of Print Area (vertical direction).

FORMAT

<ESC>**EXa**

a = Slot Number Specification =
0: Internal Memory

Place immediately preceding the data to be encoded.

EXAMPLE

<ESC>A
<ESC>EX0
<ESC>ESCZ

OUTPUT

Model	Print Resolution (Head Density)	Standard	Standard Print Area <AR>	Enlargement Print Area <AX>	Standard Enlargement <EX>0
CL408e M-8400RVe CL608e M-5900RVe	203dpi (8dot/mm)	1424dot (178mm)	1424dot (178mm)	2848dot (356mm)	9999dot (1249mm)
CL412e CL612e	305dpi (12dot/mm)	2136dot (178mm)	2136dot (178mm)	4272dot (356mm)	9999dot (833mm)
M-10e	305dpi (12dot/mm)	3600dot (300mm)	3600dot (300mm)	4188dot (349mm)	5040dot (420mm)
XL400e	203dpi (8dot/mm)	2400dot (300mm)			9999dot (1249mm)
XL410e	305dpi (12dot/mm)	2880dot (240mm)			9999dot (833mm)
M-8485Se M-8460Se M-8459Se	203dpi (8dot/mm)	1424dot (178mm)	1424dot (178mm)	2848dot (356mm)	9999dot (1249mm)
M-8490Se	305dpi (12dot/mm)	2136dot (178mm)	2136dot (178mm)	4272dot (356mm)	9999dot (833mm)
M-84Pro-2	203dpi (8dot/mm)	1424dot (178mm)	1424dot (178mm)	2848dot (356mm)	9999dot (1249mm)
M-84Pro-3	305dpi (12dot/mm)	2136dot (178mm)	2136dot (178mm)	4272dot (356mm)	9999dot (833mm)
M-84Pro-6	609dpi (24dot/mm)	4272dot (178mm)	4272dot (178mm)	8544dot (356mm)	

The data inside parentheses ( ) is the value converted from dots to mm. The value was rounded off to the whole number (in order to avoid the use of the decimal point).

NOTES

1. It cannot be used together with Internal Memory Register Data (Form Overlay Register, Foreign Character Register)
2. When you specify slot at Memory Area Enlarge Specification <ESC>EX, specify it first after printer power is switched On.
3. Standard Print Area Specification <ESC>AR and Enlargement Print Area <ESC>AX become invalid.
4. If the number 1 is specified as parameter, print area will be enlarged at the internal memory.

FORMAT MEMORY CARD	
FUNCTION	Specifies the format (initialization) of memory card.
FORMAT	<ESC>**FM** a = User ID = Up to 8 bytes in alphanumeric and symbols Place this command between <ESC>A start code and <ESC>Z stop code.
EXAMPLE	<ESC>A> <ESC>CC1 **<ESC>FMSATO** <ESC>Z
OUTPUT	
NOTES	1. Make sure to specify the card slot number to be used for the <ESC>CC command before the <ESC>FM command. 2. The <ESC>FM command is used for initializing a memory card and this command cannot be used in combination with other commands. 3. Care should be exercised when using this command as it destroys any data previously written to the card. SATO is not liable for any data loss.

PRINT MEMORY CARD STATUS	
FUNCTION	Prints the status of the memory card.
FORMAT	<ESC>**FP**
EXAMPLE	<ESC>A <ESC>CC1 <ESC>FP <ESC>Z
OUTPUT	
NOTES	1. This command is used to print the memory card status and cannot be used in combination with other commands. 2. The status can be checked with the media of width 56 mm and height 90 mm.

OFFLINE/PAUSE	
FUNCTION	Specifies when, and under what circumstances, the printer goes into an off-line state. When used within a print job, the printer goes off-line after finishing the print job.
FORMAT	<ESC>@**,nn . . . n** nn...n = Optional display message on the LCD (32 characters max.) Place anywhere between <ESC>A and <ESC>Z.
EXAMPLE	<ESC>A <ESC>@**, LOAD BLUE LABELS AND PLACE PRINTER ON-LINE** ...Job... <ESC>Z
OUTPUT	This command does not result in printer output. The printer is placed in the Off-Line mode as soon as the current print job is finished.
NOTES	When using this command and the print job specifies <ESC>Q10, all ten labels will print before the printer goes off-line. Press the LINE key to return the printer to an on-line status.

ONLINE	
FUNCTION	Changes the printer from offline to online status.
FORMAT	<ESC>**OL** Place anywhere between <ESC>A and <ESC>Z.
EXAMPLE	<ESC>A <ESC>**OL** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	Tis command is not valid in single-item mode.

AUTO ONLINE	
FUNCTION	To allow the printer to power up in the Online mode ready to receive data.
FORMAT	<ESC>**AOa** a = 0: Printer automatically powers up in the Online mode. 1: Printer automatically powers up in the Offline mode. Place in a separate command stream before label data is transmitted to the printer.
EXAMPLE	<ESC>A <ESC>**AO1** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	This command can also be set using the LCD panel. The last setting received, whether it is via this command or manually input via the LCD panel will be active. The printer default setting can be set by user download.

REPEAT LABEL	
FUNCTION	To print a duplicate of the last label printed.
FORMAT	<ESC>**C** Place immediately after <ESC>A and immediately before <ESC>Z in a separate data stream.
EXAMPLE	<ESC>A <ESC>**C** <ESC>Z
OUTPUT	A duplicate of the previous label will be printed.
NOTES	This command will not have an effect if the printer's power is cycled off and back on since printing the previous label.

EEPROM SETUP	
FUNCTION	Registers the operation of the printer in EEPROM.
FORMAT	<ESC>**PG** Place immediately after <ESC>A.
EXAMPLE	<ESC>A <ESC>**PG** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	This command is not necessary with normal label printing. The operational settings specified are still in effect after powering off the printer. **Refer to Appendix: Reference Tables 40, 41, 42, and 43 for additional information.**

FLASH ROM SETUP	
FUNCTION	Registers the operation of the printer in EEPROM.
FORMAT	<ESC>**PC** Place immediately after <ESC>A.
EXAMPLE	<ESC>A <ESC>**PC26,1** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	Go to the Advanced Mode or Service Mode for configuration. These command setting will remain in effect after powering off the printer. The entire or partial parameter entries is omissible by using commas for total settings. Any commas that are omitted will result in those settings remaining as default. **Refer to Appendix: Reference Tables 44, 45, 46, and 47 for additional information.**

SENSOR TYPE	
FUNCTION	To select a label sensing method for a print job.
FORMAT	<ESC>**IGa** a = 0: Reflective (Eye-Mark) sensor 1: Gap (transmissive) sensor 2: Sensor not used. Place in separate data stream sent to the printer.
EXAMPLE	<ESC>A <ESC>**IG1** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	When the power is cycled, the value set by this command is lost and replaced by the default value stored in the EEPROM. To change the value stored in the EEPROM, use the Printer Setting (<ESC>PC) command. The sensor type may also be set by the use of DSW2-2. The setting priority is determined by the priority setting in the LCD,

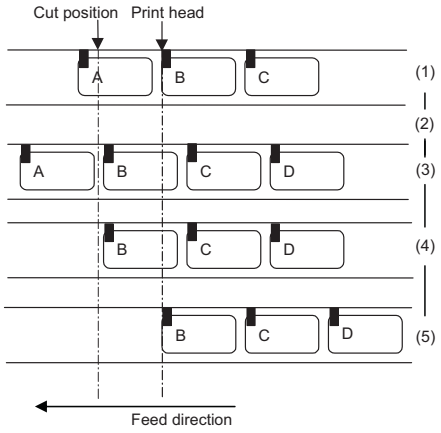
IEEE1284	
FUNCTION	Specifies the receive mode and ACK width of IEEE1284.
FORMAT	<ESC>**I1abbb** a = Receive mode (Default: 0) 0 : Multi item buffer 1 : Single item buffer b = ACK width: Valid range: 010 to 200 (1=50ns)
EXAMPLE	<ESC>A **<ESC>I10010** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	1. It is not necessary to use this IEEE1284 <ESC>I1 command under normal conditions. 2. The set parameter by this command will become valid after rebooting.

SERIAL INTERFACE

FUNCTION	Specifies the setting of the serial interface.
FORMAT	<ESC>**I2abcde** a = BAUD rate: 0 = 9600bps 1 = 19200bps 2 = 38400bps 3 = 57600bps b = Data bit 0 = 8bit 1 = 7bit c = Parity 0 = No parity 1 = Odd 2 = Even d = Stop bit 0 = 1bit 1 = 2bit e = Control 0 = READY/BUSY control (Single item buffer) 1 = READY/BUSY control (Multi item buffer) 2 = XON/XOFF 3 = Driver protocol 4 = Status 3 Place this command between <ESC>A start code and <Z> stop code..
EXAMPLE	<ESC>A **<ESC>I210003** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	The set parameter will become valid after rebooting.

LAN INTERFACE	
FUNCTION	Specifies LAN Interface.
FORMAT	<ESC>**I3** a = LAN mode 0 : 2 port connection/unsolicited (for driver protocol) 1 : 2 port connection /solicited by ENQ (for driver protocol) 2 : 1 port connection /solicited by ENQ (STATUS3)
EXAMPLE	<ESC>A **<ESC>I30** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	

EJECT AND CUT

FUNCTION	Cuts any printed labels that remain in the printer..
FORMAT	<ESC>**NC (EJ)**
EXAMPLE	<ESC>A **<ESC>NC (EJ)** <ESC>Z
OUTPUT	(1) Label stop position A: Printed B: Not printed C: Not printed D: Not printed (2) Command received (3) Label is fed to the cut position. (4) Label is cut off. (5) Label is back fed to the head position. 
NOTES	1. Valid only for cutter models. 2. This command is used to cut the last label remaining in the printer. 3. This command should be used by differentiating between Start code <ESC>A and Stop code <ESC>Z. 4. This command <ESC>NC (EJ) may not be used in combination with other commands. 5. This command <ESC>NC (EJ) is valid while the printer is not working after having printed and having finished the cutting operation. Tip: This command is used to cut remaining label in printer after the commands <ESC>CT0 or <ESC>~0 is executed.

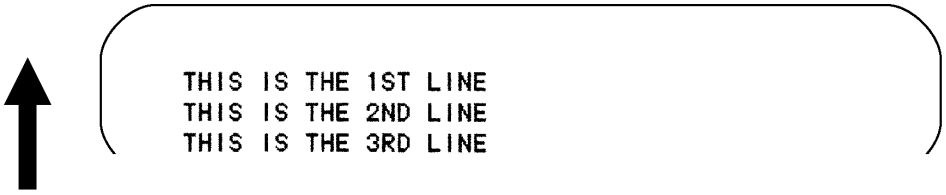
PRINT METHOD, THERMAL/THERMAL TRANSFER

FUNCTION	To set the printing method used for a job
FORMAT	<ESC>**PHa** a = 0: Thermal transfer printing 1: Direct thermal printing Place in separate data stream sent to the printer.
EXAMPLE	<ESC>A <ESC>**PH1** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	When the power is cycled, the value set by this command is lost and replaced by the default value stored in the EEPROM. To change the value stored in the EEPROM, use the Printer Setting (<ESC>PC) command or use the Printer Setting Utility program contained on the CD-ROM shipped with the printer.

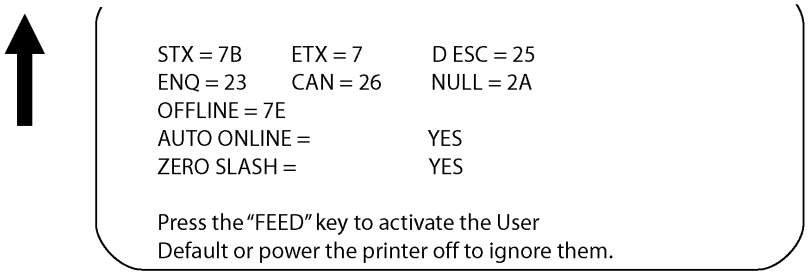
PRINT MODE SELECTION

FUNCTION	To set the printing method used for a job
FORMAT	<ESC>**PMa** a = 0: Continuous 1: Tear-Off 7: Dispense, backfeed after print 8: Dispense, backfeed before print Place in separate data stream sent to the printer.
EXAMPLE	<ESC>A <ESC>**PM1** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	When the power is cycled, the value set by this command is lost and replaced by the default value stored in the EEPROM. To change the value stored in the EEPROM, use the Printer Setting (<ESC>PC) command or use the Printer Setting Utility program contained on the CD-ROM shipped with the printer.

LINE FEED

FUNCTION	To print multiple lines of the same character size without specifying a new print position for each line.
FORMAT	<ESC>**Eaaa** aaa = Number of dots (001-999) between the bottom of the characters on one line to the top of the characters on the next line. Place preceding the text that will use the line feed function.
EXAMPLE	<ESC>A <ESC>**>E010**<ESC>H0050<ESC>V0050<ESC>L0202<ESC>S THIS IS THE 1ST LINE<CR> THIS IS THE 2ND LINE<CR> THIS IS THE 3RD LINE<CR> <ESC>Q1<ESC>Z
OUTPUT	(4-60) 
NOTES	With the Line Feed (<ESC>E) command, specify the number of dots you want between each line. Then, send an ASCII <ESC>CR at the end of each line of text. The printer automatically identifies the size of the last character, moves down the number of dots specified, and begins printing the next line. It is effective only for the current data stream. When printing lines or boxes in the same data stream with the Line Feed command, the Lines and Boxes command should be specified last, preceding Quantity (<ESC>Q) command. This command is invalid only if the value specified is zero. Following this command with a <ESC>CR character will allow printing with auto line feed. The print position will be determined from the value specified and the H value set in the printer. If several “H” values are specified after this command, the print position will be determined by the “H” value last specified. The font to be used must be redefined after each “H” command.

USER DOWNLOAD

FUNCTION	Allows the user to define custom Protocol Command codes.
FORMAT	<ESC>**LDa,** a = Replacement character for STX b = Replacement character for ETX c = Replacement character for ESC d = Replacement character for ENQ e = Replacement character for CAN f = Replacement character for NUL g = Replacement character for OFFLINE h = Auto-Online. Printer powers up in the online mode. 0: Yes 1: No i = Zero Slash. Places a slash through the “0” character. 0: Yes 1: No j = Hexa-decimal character for Euro-character Place immediately following <ESC>A within its own stream.
EXAMPLE	<ESC>A <ESC>**LD,{,},%,#,&,*,~,0,0,D5** <ESC>Z
OUTPUT	A Protocol Command code status label will be printed as a result of the successful download of a custom set of Protocol Command codes. (4-61) 
NOTES	Commas must be used to separate the parameters. If a parameter is omitted between two commas, the default Non-Standard Protocol Command codes for that parameter will be used. If more or less than 10 commas is included in the command, the entire command sequence will be ignored. If a combination of characters are outside the hexadecimal range, the entire command sequence will be ignored. Downloading Auto Online and Zero Slash settings will overwrite the values selected using the LCD panel. If these settings are changed using the LCD panel, they will overwrite any previously downloaded settings. **Refer to Appendix: Reference Table 48 for additional information.**

REPRINT CONFIGURATION	
FUNCTION	Specifies the configuration of reprinting.
FORMAT	<ESC>**RPa** a = 0: Normal (no print) 1: Reprint setting Place immediately following <ESC>A.
EXAMPLE	<ESC>A <ESC>**RP0** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	This function may also be set through the LCD and is not disclosed to users.

LANGUAGE	
FUNCTION	Specifies the display language for the LCD.
FORMAT	<ESC>**LAa** a = Bar Code Symbol 0: English 1: French 2: German 3: Spanish 4: Italian 5: Portuguese Place immediately following <ESC>A.
EXAMPLE	<ESC>A <ESC>**LA0** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	This function may also be set through the LCD.

CR/LF DELETION	
FUNCTION	Configures the deletion function of CR/LF.
FORMAT	<ESC>**CLa** a = 0: Normal (no deletion) 1: Delete CR/LF Place anywhere between <ESC>A and <ESC>Z.
EXAMPLE	<ESC>A <ESC>**CL1** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	This function may be set through the LCD and is not disclosed to users.

ZERO SLASH	
FUNCTION	To allow printing of numeric zeroes with a slash.
FORMAT	<ESC>**LHa** a = 0: Print zeroes without slash 1: Print zeroes with slash Place in a separate data stream before any label data is transmitted.
EXAMPLE	<ESC>A <ESC>**LH0** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	This command can also be set using the LCD panel. The last setting received, whether it is via this command or manually input via the LCD panel will be active.

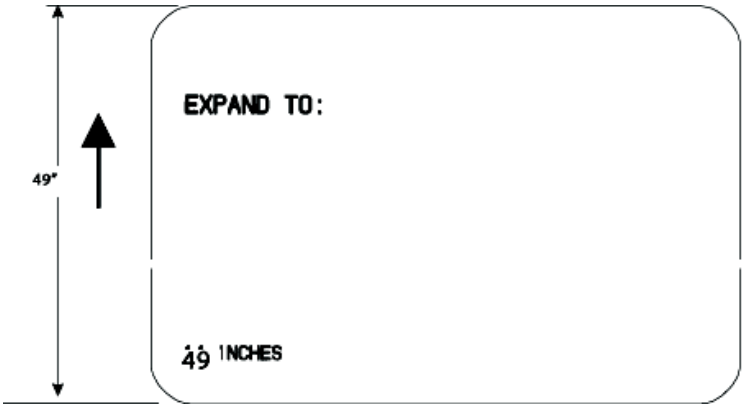
ONLINE FEED	
FUNCTION	Enables label feeding when in the online mode.
FORMAT	<ESC>**LFa** a = 0: Enables label feed when online. 1: Disables label feed when online Place in a separate command stream before label data is transmitted to the printer.
EXAMPLE	<ESC>A <ESC>**LF0** <ESC>Z
OUTPUT	Feeds a blank label when entering the online mode.
NOTES	This command can also be set using the LCD panel. The last setting received, whether it is via this command or manually input via the LCD panel will be active. The printer default setting can be set by user download.

OPTION WAITING TIME	
FUNCTION	Specifies waiting time for option operations.
FORMAT	<ESC>**TWaaa** aaa = Waiting time for option operation = Valid range: 005 to 200 (unit: 100 ms)
EXAMPLE	Waiting time for option operation = 1.5 seconds <ESC>A **<ESC>TW015** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	This command specifies, in Tear-off mode, the waiting time between print completion and Tear-off motion. The set parameter becomes valid soon after receiving the command and will be retained after power off.

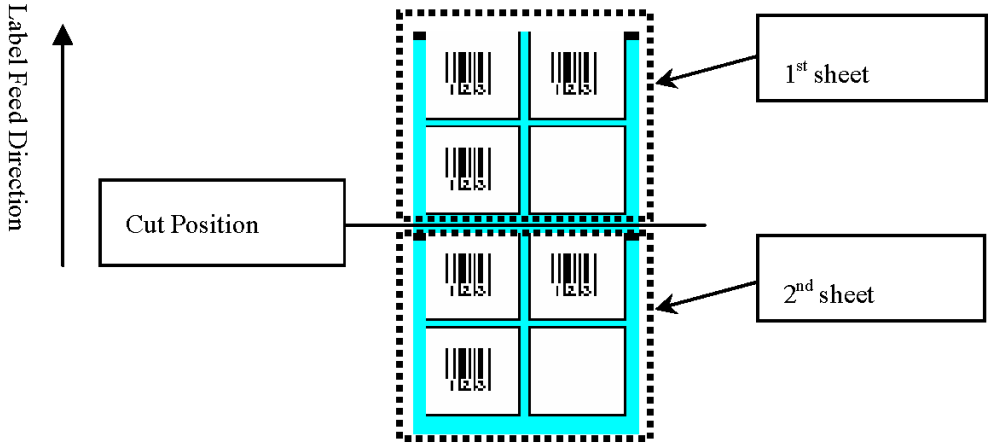
FORCED TEAR OFF	
FUNCTION	Executes Tear off compulsory.
FORMAT	<ESC>**TK**
EXAMPLE	<ESC>A **<ESC>TK** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	1. This command can be specified only in Tear off mode. 2. With this command, the printer executes Tear off motion without waiting the time set by command <ESC>TW. If the next data is received before Tear off motion, Tear off is executed compulsory. 3. This command can not be used in combination with other commands. Do not send this command in a row. Tip: This command can be used to save the time set by command <ESC>TW, if it is certain that there is no following item.

TEST PRINTING	
FUNCTION	Allows test labels to be printed via software control.
FORMAT	<ESC>**TPa** a = 0: Small User test print. 1: Large User test print 2: Small Factory test print 3: Large Factory test print Place in a separate command stream.
EXAMPLE	<ESC>A <ESC>**TP2** <ESC>Z
OUTPUT	A small factory test label is printed.
NOTES	A test print can also be initiated via the LCD panel.

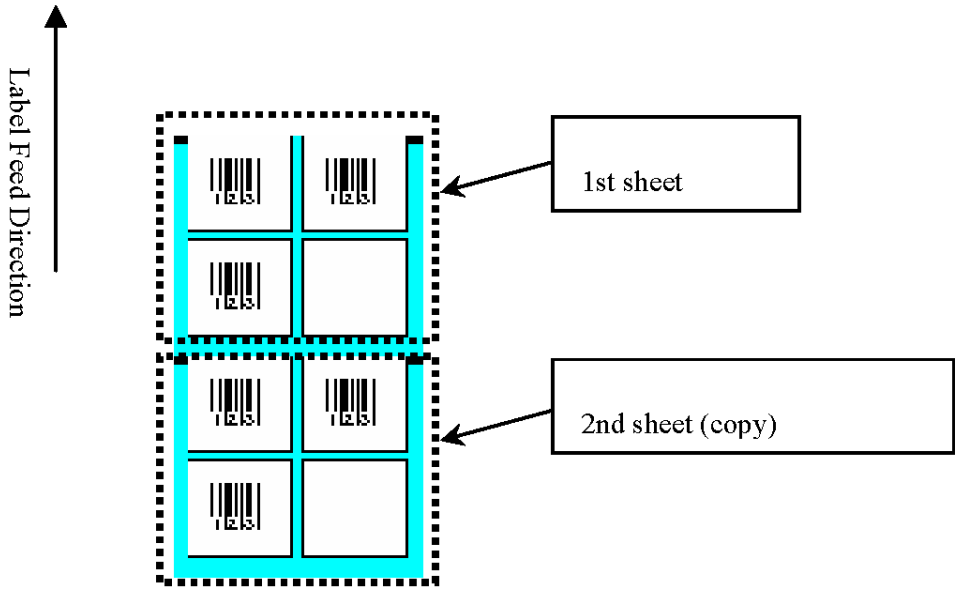
PRINT LENGTH, EXPANSION

FUNCTION	To increase the maximum print length (in feed direction) for a label.
FORMAT	<ESC>**EX0** Sets the print length to maximum <ESC>**AR** Resets the maximum print length to 7" (178 mm) Must follow the Start Code command within it is own separate data stream.
EXAMPLE	<ESC>A <ESC>**EX0** <ESC>Z <ESC>**A** <ESC>H0050<ESC>V0100<ESC>WB1EXPAND TO: <ESC>H0050<ESC>V2700<ESC>WB1MAX INCHES <ESC>Q1 <ESC>Z <ESC>**A** <ESC>**AR** <ESC>Z
OUTPUT	(4-62) 
NOTES	"EX0" is effective until "AR" is sent to reset the printer to its standard print length, or until the printer is re-powered. When this command is used with the Store Form Overlay (<ESC>&) command the form length cannot exceed the maximum specified. If a job contains elements out of the memory range, it is ignored. If the Forms Overlay (<ESC>&) command is used with Expanded Memory to expand the print area, the Form Overlay length is still limited to the maximum. **Refer to Appendix: Reference Tables 49 and 50 for additional information.**

SHEET UNIT CUT QUANTITY

FUNCTION	Specifies the sheet cut quantity for small labels. Only applicable to the M10e printer.
FORMAT	<ESC>**RCaa** a = Sheet cut quantity (01 to 99) Place before quantity command and <ESC>Z.
EXAMPLE	<ESC>A <ESC>RI3200,1200,00,00,1600,0600,02,02 <ESC>A112003200 <ESC>**RC01** <ESC>Z
OUTPUT	(4-63) 
NOTES	Sheet is a certain range specified under <ESC>A1 when it is divided into small labels under <ESC>R1. The command <ESC>RC specifies the sheet cut quantity of small labels at the printer driver and cannot be combined with other standard commands.

SHEET UNIT COPY QUANTITY

FUNCTION	Specifies the quantity of copies of each sheet of small labels. Only applicable to the M10e printer.
FORMAT	<ESC>**RWaa** a = Sheet copy quantity (01 to 99) Place before quantity command and <ESC>Z.
EXAMPLE	<ESC>A <ESC>RI3200,1200,00,00,1600,0600,02,02 <ESC>A112003200 <ESC>**RW01** <ESC>Z
OUTPUT	(4-64) 
NOTES	Sheet is a certain range specified under <ESC>R1 when it is divided into small labels under <ESC>A1. The command <ESC>RW specifies the sheet copy quantity of small labels at the printer driver and cannot be combined with other standard commands.

IP ADDRESS SETUP	
FUNCTION	Specifies IP address setup method.
FORMAT	<ESC>**WIa** a = IP Address setup 0: Manual setup 1: DHCP Place this command between <ESC>A start code and <ESC>Z stop code.
EXAMPLE	<ESC>A **<ESC>WI1** <ESC>Z
OUTPUT	This command does not result in printer output. Setting can be printed on the factory test print.
NOTES	You cannot use this command in combination with other commands. The set parameter will become valid after rebooting. Default setting of IP Address is as follows: IP Address setup: 1 (DHCP)

RARP

FUNCTION	Specifies if RARP is disabled or enabled. When enabled, RARP will automatically obtain IP address in start up.
FORMAT	<ESC>**WM** a = RARP 0: Disabled 1: Enabled Place this command between <ESC>A start code and <ESC>Z stop code.
EXAMPLE	<ESC>A **<ESC>WM1** <ESC>Z
OUTPUT	This command does not result in printer output. Setting can be printed on the factory test print.
NOTES	You cannot use this command in combination with other commands. The set parameter will become valid after rebooting. Default setting is as follows: IP Address: 1 (RARP Enabled)

WIRELESS LAN

FUNCTION	Sets up wireless LAN.
FORMAT	<ESC>**WZ** Format 1 To set up all items <ESC>WZa,b,c,ddddddddddd,eeeeeeeeeee,fffffffffff,gggg,hhh,iii,j,k ,. . . . . zzzzzzzz a = Item number: F: All items D: Default settings b . . . z = Set value (as shown in the rows below) Format 2 To set up specific items <ESC>WZaa,b a = Item number: Valid range: 1-25 b = Set value: See table below for more detail.

WIRELESS LAN

FORMAT

Setting items

No	Item No	Item	Description	Digit
b	1	DHCP/BOOTP	0 Disabled 1 Use DHCP/ BOOTP	1
c	2	RARP	0 Disabled 1 Enabled	1
d	3	IP address	000000000000 - 255255255255	12
e	4	Subnet mask	000000000000 - 255255255255	12
f	5	Default gateway	000000000000 - 255255255255	12
g	6	Socket connection timeout	0000 - 3600	4
h	7	FTP timeout	030 - 500	3
i	8	LPD timeout	030 - 500	3
j	9	Wireless LAN mode	0 Infrastructure mode 1 Ad-hoc mode	1
k	10	SSID	1 - 32 characters (*1)	32
l	11	Channel	01 - 14 (EV200R series) 01 - 11 (CG200 series)	2
m	12	Security type	0 None 1 WEP 2 WPA 3 WPA2 4 Dynamic WEP	1
n	13	Wireless LAN authentication	0 Open system 1 Shared key	1
o	14	WEP key 1	A＋5 or 13 characters (ASCII) (*1) B＋10 or 26 digits (HEX) (*2)	27
p	15	WEP key 2	A＋5 or 13 characters (ASCII) (*1) B＋10 or 26 digits (HEX) (*2)	27
q	16	WEP key 3	A＋5 or 13 characters (ASCII) (*1) B＋10 or 26 digits (HEX) (*2)	27
r	17	WEP key 4	A＋5 or 13 characters (ASCII) (*1) B＋10 or 26 digits (HEX) (*2)	27
s	18	WEP key index	1 - 4	1
t	19	Authentication （WPA/WPA2）	0 WPA-PSK 1 EAP	1
u	20	Encryption (WPA/WPA2)	0 TKIP 1 AES	1
v	21	Pre-Shared key	8 - 63 characters (*1)	63
w	22	EAP authentication	0 None 1 Reserved 2 EAP-TLS 3 EAP-PEAP 4 Reserved 5 EAP-LEAP 6 EAP-TTLS	1
x	23	User name	1 - 63 characters (*1)	63
y	24	Password	0 - 32 characters (*1)	32
z	25	Password for private key	0 - 32 characters (*1)	32

(*1) Alphanumeric or symbols. Except for [,] (comma) or [“] (double quotation).

(*2) ‘0’ to ‘9’, ‘A’ TO ‘F’

WIRELESS LAN

FORMAT

Default settings

No	Item No.		Description	Digit
b	1	DHCP/BOOTP	0 Disabled	1
c	2	RARP	0 Disabled	1
d	3	IP address	192168001001	12
e	4	Subnet mask	255255255000	12
f	5	Default gateway	000000000000	12
g	6	Socket connection timeout (sec)	0060	4
h	7	FTP timeout (sec)	030	3
i	8	LPD timeout (sec)	030	3
j	9	Wireless LAN mode	1 Ad-hoc mode	1
k	10	SSID	"SATO"	32
l	11	Channel	11	2
m	12	Security type	0 None	1
n	13	Wireless LAN authentication	0 Open system	1
o	14	WEP key 1	" " (NULL)	14
p	15	WEP key 2	" " (NULL)	14
q	16	WEP key 3	" " (NULL)	14
r	17	WEP key 4	" " (NULL)	14
s	18	WEP key index	1	1
t	19	Authentication (WPA/WPA2)	0 WPA-PSK	1
u	20	Encryption (WPA/WPA2)	0 TKIP	1
v	21	Pre-Shared key	" " (NULL)	63
w	22	EAP authentication	0 None	1
x	23	User name	" " (NULL)	63
y	24	Password	" " (NULL)	32
z	25	Password for private key	" " (NULL)	32

Notes:

1. Use the valid subnet address (=consistent with the IP address currently used) for the default gateway.

2. WPA, WPA2 or Dynamic WEP cannot be used on Ad-hoc mode.

WIRELESS LAN	
EXAMPLE	Example 1: Setting all items: <ESC>A <ESC>WZF,0,1,192168001002,255255255000,192168001001,???????? <ESC>Z Example 2: Setting to default: <ESC>A <ESC>WZD <ESC>Z Example 3: Setting specific items: <ESC>A <ESC>WZ4,255255255000 <ESC>Z Example 4: To specify 0 character in password authentication: <ESC>A <ESC>WZ24, <ESC>Z Notes: This command can be used with type 1 (USB, Serial) only. Place this command between start code <ESC>A and stop code <ESC>Z. This command may not be used in combination with other commands. Setting can be printed on the factory test print. The set parameter will become valid after rebooting. When you reset to default, the values of Default settings will be used. All or some parameter entities is omissible by using commas. However, commas are not omissible. When specifying item number 24 or 25, by omitting set value, 0 character setting will be available.
OUTPUT	Setting can be printed on the factory test print.

IP ADDRESS SETTING	
FUNCTION	Specifies IP address.
FORMAT	<ESC>**W1** a~a = IP address = 12 digits fixed Place this command between <ESC>A start code and <ESC>Z stop code..
EXAMPLE	<ESC>A **<ESC>W1123220000040** <ESC>Z
OUTPUT	This command does not result in printer output. Setting can be printed on the factory test print.
NOTES	You cannot use this command in combination with other commands. The set parameter will become valid after rebooting. Default setting of IP address is as follows: IP address: 000000000000

SUBNET MASK	
FUNCTION	Specifies Subnet mask.
FORMAT	<ESC>**W2a~a** a~a = Subnet mask = 12 digits fixed Place this command between <ESC>A start code and <ESC>Z stop code.
EXAMPLE	<ESC>A **<ESC>W2255255255000** <ESC>Z
OUTPUT	This command does not result in printer output. Setting can be printed on the factory test print.
NOTES	You cannot use this command in combination with other commands. The set parameter will become valid after rebooting. Default setting of Subnet mask is as follows: Default gateway: 000000000000

DEFAULT GATEWAY	
FUNCTION	Specifies default gateway.
FORMAT	<ESC>**W3** a~a = Default gateway = 12 digits fixed Place this command between <ESC>A start code and <ESC>Z stop code..
EXAMPLE	<ESC>A **<ESC>W3128220001001** <ESC>Z
OUTPUT	This command does not result in printer output. Setting can be printed on the factory test print.
NOTES	You cannot use this command in combination with other commands. The set parameter will become valid after rebooting. Default setting of Default gateway is as follows: Default gateway: 000000000000

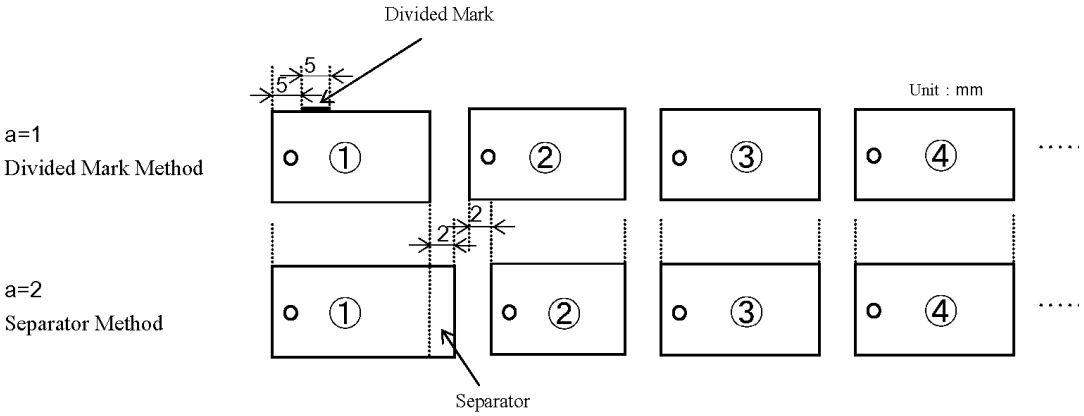
WORK-SHIFT PRINT INFORMATION

FUNCTION	Specifies the printing of work shift information (shift name, start time, etc.). Only applicable to the M8459/60/85/90Se printers.
FORMAT	<ESC>**WSa** a = Print content 1: Shift code 2: Printer use start time 3: Shift name
EXAMPLE	<ESC>A <ESC>S <ESC>V050<ESC>H050<ESC>L0101<ESC>MSHIFT CODE: <ESC>V050<ESC>H300<ESC>L0202<ESC>**WS1** <ESC>V100<ESC>H050<ESC>L0101<ESC>MSTART TIME: <ESC>V100<ESC>H300<ESC>L0202<ESC>**WS2** <ESC>WB0 <ESC>V150<ESC>H050<ESC>L0101<ESC>MSHIFT NAME: <ESC>V150<ESC>H300<ESC>L0101<ESC>**WS3** <ESC>Q1 <ESC>Z
OUTPUT	(4-65) **SHIFT CODE: 1** **START TIME: 12:02** **SHIFT NAME: MORNING**
NOTES	If work shift information is set invalid at the printer's LCD hidden settings mode, it will become a command error. Before the command <ESC>WS, character type to print the work shift information can be specified by font command without any print data. If font specification command is not conducted, print it by using U character. The U, S, M, WB, WL, XU, XS, XM, XB, and XL are valid font types for specification. The font specification command specifies the character type of <ESC>WS and becomes the default value at the next item <ESC>A. The font specification comand for print data will not influence on the print content of <ESC>WS.

LABEL SPECIFICATION	
FUNCTION	Temporarily specifies label specification. Only applicable to the CT400/410 printers.
FORMAT	<ESC>**YEa** a = Label type 0: Adhesive label 1: Tag Place immediately following the <ESC>A command.
EXAMPLE	<ESC>A <ESC>**YE0** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	To change the setting value that is recorded in the printer, specify <ESC>PG or <ESC>PC commands.

INTELLIGENT COMMANDS

BATCH SEPARATOR

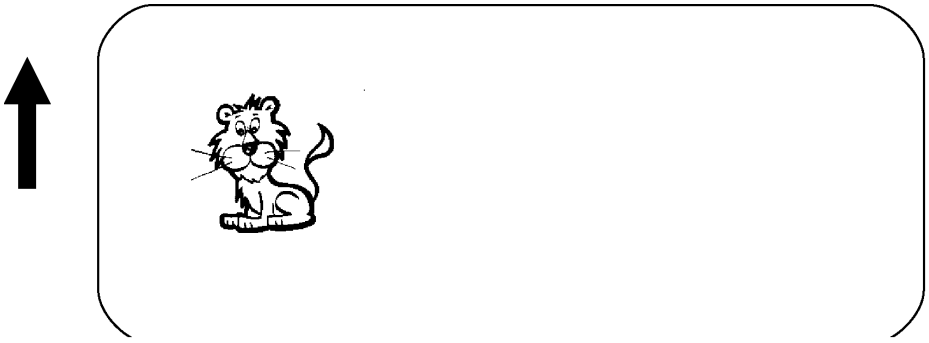
FUNCTION	To issue a tag with a special marking so that it can easily be divided on the stacker. Only applicable to the XL400/410e printers.
FORMAT	<ESC>**Ia** a = Batch separator type 1: Divided mark type 2: Separator method Place immediately following the <ESC>A command.
EXAMPLE	<ESC>A <ESC>**I1** <ESC>V100<ESC>H200<ESC>P2<ESC>L0202<ESC>XMABCD <ESC>Q5 <ESC>Z
OUTPUT	(4-66) 
NOTES	When using the divided mark method and <ESC>Q is more than two pieces, place a black divided mark on the edge of the first piece of label. When using the separator method and the cut motion is available at the tag (center hold, horizontal hole, angle R, eye-mark), the tag will be 12mm longer than normal length of the first piece of label and the second tag wil be 12mm shorter than the first. This command was formerly called the Divided Motion Specification in this document, prior to Version E.

GRAPHIC COMMANDS

GRAPHICS, CUSTOM

FUNCTION	To create and print custom graphics (logos, pictures, etc.) on a label.
FORMAT	<ESC>**>Gabbbccc(data)** a = Specifies format of data stream to follow B Binary format H Hexadecimal format bbb = Number of horizontal 8 x 8 blocks ccc = Number of vertical 8 x 8 blocks (data) = Hex data to describe the graphic image Place anywhere within the data stream after the necessary position commands.
EXAMPLE	<ESC>A <ESC>H0100<ESC>V0100<ESC>**GH006006** FFFFFFFFFFFFFFFFFFFFFFFC00000000003 C00000000003C000FFFFFFF3C00080000013 C00080000013C0009FFFFF13C00080000013 C00080000013C0009FFFFF13C00080000013 C00080000013C000FFFFFFF3C00000000003 C00000000003C00000000003C00000000003 C00000000003C00000000003C00003C00003 C00007E00003C0000FF00003C0000FF00003 C0000FF00003C0000FF00003C00007E00003 C00003C00003C00003C00003C00003C00003 C00003C00003C00003C00003C00003C00003 C00003C00003C00003C00003C00003C00003 C00003C00003C00001800003C00000000003 C00000000003FFFFFFFFFFFFFFFFFFFFFFFF <ESC>H0300<ESC>V0100<ESC>XSPLEASE PLACE YOUR DISK <ESC>H0300<ESC>V0150<ESC>XSIN A SAFE PLACE <ESC>Q1<ESC>Z
OUTPUT	(4-67) 
NOTES	Graphic images may be printed along with other data to enhance label appearance or eliminate the need for preprinted label stock. Using a dot-addressable matrix, design the graphic image in 8 x 8 dot blocks, then send it in a binary format to the printer. Do not use <ESC>CR or <ESC>LF characters as line delimiters within graphic data or the actual image will not be printed as specified. A custom graphic cannot be enlarged by the Character Expansion <ESC>L command and is not affected by either of the Rotation commands. Always design the graphic image in the appropriate orientation. **Refer to Appendix: Reference Table 51 for additional information.**

GRAPHICS, BMP FILE

FUNCTION	To allow the creation and printing of graphic images using a BMP file format.
FORMAT	<ESC>**GMaaaaa,(data)** aaaaa = Number of bytes to be downloaded Place anywhere within the job data stream.
EXAMPLE	<ESC>A <ESC>V0100<ESC>H0100<ESC>**GM03800,(...Data...)** <ESC>Q1 <ESC>Z
OUTPUT	(4-68) 
NOTES	The maximum number of bytes that can be downloaded is 32K (compressed) and includes the BMP header information. The maximum size of the uncompressed BMP file is 64K. If the uncompressed file exceeds 64K, the graphic will not print. Only black and white BMP files can be downloaded. The file size specified by this command is the DOS file size in bytes.

GRAPHICS, PCX FILE

FUNCTION	To allow the creation and printing of graphic images using a PCX file format.
FORMAT	<ESC>**GPaaaaa**,(data) aaaaa = Number of bytes to be downloaded Place anywhere within the job data stream.
EXAMPLE	<ESC>A <ESC>V0150<ESC>H0100<ESC>**GP03800,(...Data...)** <ESC>Q1 <ESC>Z
OUTPUT	(4-69) 
NOTES	The maximum number of bytes that can be downloaded is 32K (compressed). The number specified by this command includes the PCX header information. The maximum size of the uncompressed PCX file is 64K. If the uncompressed file exceeds 64K, the graphic will not print. Only black and white PCX files can be downloaded. The file size specified by this command is the DOS file size in bytes.

5

OPTIONAL COMMAND CODES

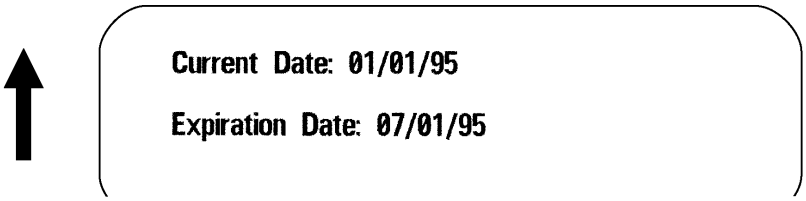
- Calendar Commands
- Memory Card Commands

CALENDAR COMMANDS

CALENDAR PRINTING

FUNCTION	Prints the date and/or time field from the printer's internal clock.
FORMAT	<ESC>**WA(elements)** Elements = YYYY: 4 digit (1981 to 2080) YY: 2 digit (00 to 91) MM: Month (01 to 12) DD Day (01 to 31) HH: 12 Hour clock (00 to 11) hh: 24 Hour clock (00 to 23) mm: Minute (00 to 59) ss: Seconds (00 to 59) TT: AM or PM JJJ: Julian Date (001 to 366) WW: Week (00 to 53) ww: Week (01 to 54) Place anywhere within the data stream.
EXAMPLE	<ESC>A <ESC>H0100<ESC>V0100<ESC>XB1The current date is: <ESC>XB1<ESC>**WAMM/DD/YY** <ESC>H0100<ESC>V0200<ESC>XB1The current time is: <ESC>XB1<ESC>WAhh:mm <ESC>Q1<ESC>**Z**
OUTPUT	This command does not result in printer output.
NOTES	The date and time elements may be placed in any order for printing. Use slash (/) to separate date elements and colon (:) to separate time elements. Up to 16 characters are allowed. The font must be specified prior. The printer's internal clock may be set through the Calendar Set command. This command may be used up to six times per job. The Copy (<ESC>WD), Mirror Image (<ESC>RM) or Reverse Image (<ESC>/) commands cannot be used with this command. Century ranges are: for year = YY, any year equal to or greater than 80 and less than or equal to 99, then the century equals 19 for year specified as YYYY=1999, and printed as <ESC>WAYY, will be equal to 99. The Julian date is the accumulated day from January 1st to the current date. The first day of the year is January 1st (001) and the last day of the year is December 31st (365 or 366 for leap years). The TT command should not be specified for printing in numeric only barcodes.

CALENDAR INCREMENT

FUNCTION	Prints the date and/or time field from the printer's internal clock.
FORMAT	<ESC>**WPabbb** a = Y: Years M: Months W: Week number D: Days h: Hours bbb = Numeric data Years (0 to 9) Months (01 to 99) Weeks (00 to 99) Days (001 to 999) Hours (000 to 999) Place anywhere within the data stream.
EXAMPLE	<ESC>A <ESC>H0100<ESC>V0100<ESC>XB1Current Date: <ESC>WAMM/DD/YY <ESC>**WPM06** <ESC>H0100<ESC>V0200<ESC>XB1Expiration Date: <ESC>WAMM/DD/YY <ESC>Q1<ESC>Z
OUTPUT	(5-1) 
NOTES	Once the year increments past "99" it will wrap back to "00". This command can only be used once per data stream. The printer's internal clock may be set through the Calendar Set command. If a print quantity of more than one label per job is used, the same time and date will be on each label of the entire print job. Calendar Increment Example: 1998 January 15 (ww=03) plus 48 weeks = week 51. The Week Calendar specification follows ISO8601. Days of the week are numbered 1 through 7, beginning with Monday. The first week of the year is the week containing the first Thursday. If January 1st falls on Friday, it belongs to the last week of the previous year. If December 31st falls on a Wednesday, it belongs to the first week of the following year. If Calendar Increment calculation extends over the year, the result belongs to the week number of the following year.

CALENDAR CONFIGURATION

FUNCTION	To set the time and date of the printer's internal clock.
FORMAT	<ESC>**WTaabbccddee** aa = Year (00 to 99) bb = Month (01 to 12) cc = Day (01 to 31) dd = Hour (00 to 23) ee = Minute (00 to 59) Place anywhere within the data stream.
EXAMPLE	<ESC>A <ESC>**WT9312251300** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	Once the year increments past "99" it will wrap back to "00". This command can only be used once per data stream. The printer's internal clock may be set through the Calendar Set command. If a print quantity of more than one label per job is used, the same time and date will be on each label of the entire print job. Calendar Increment Example: 1998 January 15 (ww=03) plus 48 weeks = week 51. The Week Calendar specification follows ISO8601. Days of the week are numbered 1 through 7, beginning with Monday. The first week of the year is the week containing the first Thursday. If January 1st falls on Friday, it belongs to the last week of the previous year. If December 31st falls on a Wednesday, it belongs to the first week of the following year. If Calendar Increment calculation extends over the year, the result belongs to the week number of the following year.

MEMORY CARD COMMANDS

CARD SLOT FOR USE	
FUNCTION	Specifies the card slot for use.
FORMAT	<ESC>**CCa** a = 0: Internal (1 fixed) 1: Memory Area 1 2: Memory Area 2 Place immediately following <ESC>A.
EXAMPLE	<ESC>A <ESC>**CC1** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	Specify this command for memory card function. When the card is not inserted, a card error will occur.

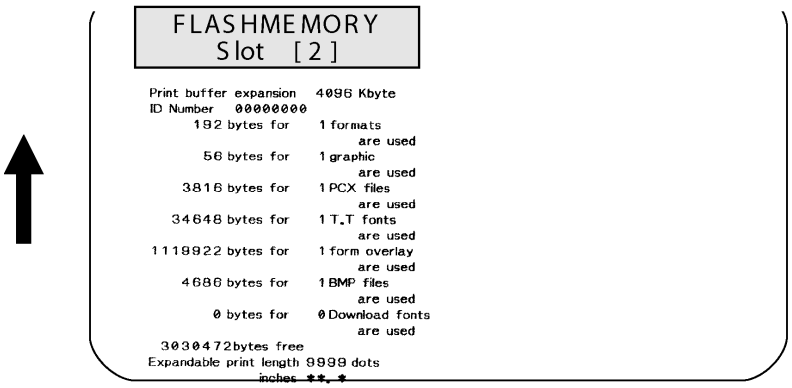
CARD FORMAT	
FUNCTION	Specifies the format (initialization) of memory card.
FORMAT	<ESC>**BJFa** a = User ID (up to 8 bytes of alphanumerics and symbols) Place anywhere between <ESC>A and <ESC>Z.
EXAMPLE	<ESC>A <ESC>CC1 <ESC>**BJFsatocard** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	This command is not valid without an optional memory card. Specify the Card Slot for Use <CC> prior to using this command. This command is for formatting a memory card and cannot be used in combination with other commands. If formatting the card by accident, registered data will be erased.

MEMORY CARD CLEAR

FUNCTION	Clears the entire contents in the optional memory card.
FORMAT	<ESC>***a,** a = Item to be cleared G: SATO Graphic P: PCX File M: BMP File F: Format O: True Type Font R: Form Overlay b = Registration number 000 to 999 True Type Font 001 to 999 Except True Type Font Place anywhere between <ESC>A and <ESC>Z.
EXAMPLE	<ESC>A <ESC>***0,09** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	Specify the Card Slot for Use <CC> prior to using this command. To clear all data of the memory card, use Card Format <BJF>.

SYSTEM CLEAR	
FUNCTION	Clears the specific system contents.
FORMAT	<ESC>***a** a = Item to be cleared None: 1 item reception buffer, edit buffer (cannot reprint) T: Foreign character register area &: Form overlay X: All clear Place anywhere between <ESC>A and <ESC>Z.
EXAMPLE	<ESC>A <ESC>***T** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	All data sent prior to <ESC>*X will be cleared, but end data will not be cleared during printing. If this comand is used, send the next data after 100 milliseconds has transpired. Print motion will not stop if it is specified during print motion. If just * is set, all jobs will be cleared.

PRINT MEMORY CARD STATUS

FUNCTION	Prints the status of memory card.
FORMAT	<ESC>**BJS** Place immediately following <ESC>CC#.
EXAMPLE	<ESC>A <ESC>CC1 <ESC>**BJS** <ESC>Z
OUTPUT	(5-2) 
NOTES	This command is for printing the memory card status and cannot be used in combination with other commands. The status can be chaecked with the label of W68mm and H90mm.

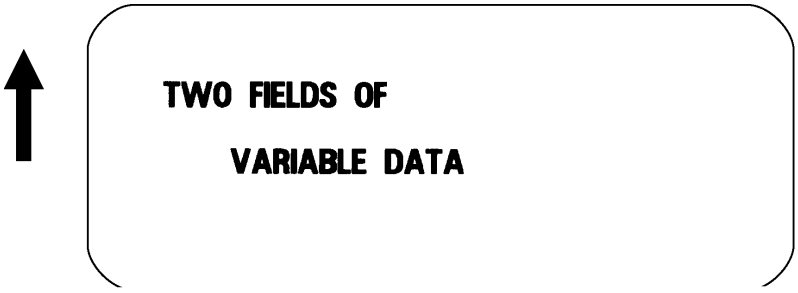
TRUE TYPE FONT, RECALL

FUNCTION	Specifies to invoke True Type Font.
FORMAT	<ESC>**BJRabbccddeeffffgg...g** <ESC>**BJT,aa,bb,cc,dd,ee,ffff,gg...g** a = Font ID (0 to 9) b = Horizontal magnification (01 to 12) c = Vertical Magnification (01 to 12) d = Character Pitch (01 to 99) e = Backup (00 fixed) f = Print Character Quantity (0000 to 9999) g = Data Place anywhere between <ESC>A and <ESC>Z.
EXAMPLE	<ESC>A <ESC>H0100<ESC>V0100<ESC>**BJR10101010000010SATO** <ESC>Q1 <ESC>Z
OUTPUT	(5-3) 
NOTES	This command is not valid without an optional memory card. Specify the Card Slot for Use <CC> prior to using this command.

TRUE TYPE FONT, STORE

FUNCTION	Specifies the storageTrue Type Font.
FORMAT	Begin download <ESC>**BJ(aa...abb..b** Download <ESC>**BJDccccddddee...e** End download <ESC>**BJ** a = Font Description (specification of 40 bytes of font) b = Date (10 bytes of date data) c = Memory Offset (5 bytes of memory offset in hex) d = Quantity of Data bytes (0001 to 2000) e = Font data to download (0001 to 2000) Place anywhere between <ESC>A and <ESC>Z.
OUTPUT	This command does not result in printer output.
NOTES	This command is not valid without an optional memory card. Specify the Card Slot for Use <CC> prior to using this command.

FORMAT/FIELD, RECALL

FUNCTION	To recall a field from a stored format and place new data in the field.
FORMAT	<ESC>**YR,aa<ESC>/D,bb,cc....c** aa = Format number to be recalled (01 to 99) bb = Field number to be recalled (01 to 99) cc...c = Data to placed in the recalled field Place immediately following the <ESC>CC Slot Select command.
EXAMPLE	<ESC>A <ESC>CC1 <ESC>**YR,02<ESC>/D,01,TWO FIELDS OF <ESC>/D,02,VARIABLE DATA** <ESC>Q1<ESC>Z
OUTPUT	(5-4) 
NOTES	This command requires the Expanded Memory option. Only one format can be recalled at a time. However, multiple fields can be recalled from the same format. The number of data characters contained in the “cc...c” field cannot exceed the value designated in the <ESC>/N Field Store command. If it does, the data will be truncated to fit the field length defined in the store command.

FORMAT/FIELD, STORE

FUNCTION	To store a format field description in the memory card.
FORMAT	<ESC>**YS,aa<ESC>/N,bb,cc....c** aa = Format number to be stored(01 to 99) bb = Field number to be stored (01 to 99) cc...c = Field length to be stored (01 to 99) Place immediately following the <ESC>CC Memory Area Select command.
EXAMPLE	<ESC>A <ESC>CC1 <ESC>**YS,02<ESC>/N,01,13<ESC>V0100<ESC>H0100<ESC>XB1** <ESC>/N,02,13<ESC>V0200<ESC>H0200<ESC>XB1 <ESC>Z
OUTPUT	There is no printer output as a result of this command. See <ESC>YR Format/Field Recall command.
NOTES	This command requires the Expanded Memory option. When storing multiple formats, enter <ESC>A and <ESC>Z with one format. Specify the Card Slot fo Use <ESC>CC prior to using this command. Use Field Store <ESC>/N in conjunction with this command. Attempts to store using a predefined field number will result in an error and the targeted content will be printed. **Refer to Appendix: Reference Table 52 for additional information.**

FORM OVERLAY, RECALL	
FUNCTION	To recall the label image from stored in the Expanded Memory.
FORMAT	<ESC>**&R,aa** aa = Storage number (01 to 99) Place immediately following the <ESC>CC Memory Area Select command.
EXAMPLE	<ESC>A <ESC>CC1 <ESC>**&R,01** <ESC>Q1<ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	The Expanded Memory option is required fro this command. The <ESC>CC Memory Area Select command must be sent prior to this command. Several images stored under different storage numbers can be printed with this command. The storage number must be speciifed. A read/write error will occur if an unused storage number is specified. The label image can be moved by using the <ESC>V and <ESC>H commands when it is stored along with a window size. If it exceeds the printable area by being moved, the label image will be trancated.

FORM OVERLAY, STORE

FUNCTION	To store fixed print contents to the memory card.
FORMAT	<ESC>**&S,aa,bbbb,cccc** aa = Store number (01 to 99) bbbb = Horizontal size of window (50 to H max) cccc = Vertical size of window (50 to V max) Place immediately following the <ESC>CC Memory Area Select command.
EXAMPLE	<ESC>A <ESC>CC1 <ESC>**&S,01** <ESC>Z
OUTPUT	This command does not result in printer output.
NOTES	The Memory Area Select (<ESC>CC) command must be sent prior to this command. The label image must be divided from other label images by the <ESC>A and <ESC>Z bounding commands. The parameters of “bbbb” and “cccc” may be omitted. By specifying them, the label image can be moved by using the <ESC>V and <ESC>H position commands when recalling the label image. If the repositioned label image exceeds beyond the printable area, the image wil be truncated. If an <ESC>A1 Media Size command has been sent to the printer, the maximum size that can be stored is the size of the label defined in the command. A label image cannot be stored in a location that already contains data. Graphics, PCX and BMP files can be stored but their combined size cannot exceed memory. The forms stored by this command are cleared by the <ESC>*R command. **Refer to Appendix: Table 53 for additional information.**

FORM OVERLAY, STORE

Example A: Normal Operation

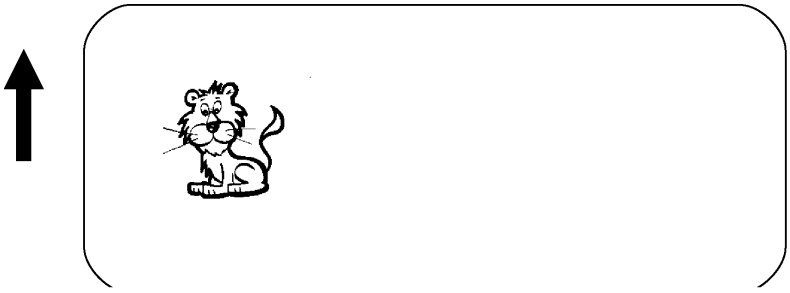
<ESC>A
<ESC>V100<ESC>H100<ESC>P2<ESC>L0202
<ESC>XMABCD
<ESC>V60<ESC>H60
<ESC>FW0808V800H400
<ESC>V320<ESC>H60
<ESC>FW04H400
<ESC>CC1
<ESC>**&S1**
<ESC>Z

Example B: When window size is specified

<ESC>A
<ESC>A1800400
<ESC><ESC>V100<ESC>H00<ESC>P2<ESC>L0202
<ESC>XMABCD
<ESC>CC1
<ESC>**&S, 1, 20, 200**
<ESC>Z

Example C: When print is specified after <ESC>&S

<ESC>A
<ESC>V100<ESC>H100<ESC>P2<ESC>L0202
<ESC>XMABCD
<ESC>V60<ESC>H60
<ESC>FW0808V800H400
<ESC>V320<ESC>H60
<ESC>FW04H400
<ESC>CC1
<ESC>**&S1**
<ESC>V200<ESC>H100<ESC>OB12345
<ESC>Z

BMP FILE, RECALL	
FUNCTION	To recall a previously stored BMP file stored in Expanded Memory.
FORMAT	<ESC>**GCaaa** aaa = Storage number (001 to 999) Place after the CC Memory Area Select command.
EXAMPLE	<ESC>A <ESC>CC1<ESC>V100<ESC>H100 <ESC>**GC001** <ESC>Q1<ESC>Z
OUTPUT	(5-6) 
NOTES	The <ESC>CC Memory Area Select command must be sent before this command. The printed image can be expanded or rotated.

BMP FILE, STORE

FUNCTION	To store for printing a graphic file in a BMP format in the optional Expanded Memory.
FORMAT	<ESC>**GTaaa,bbbbb,nn...n** aaa = Storage number (001 to 999) bbbbb = Size of BMP file in bytes nn..n+ = Data Place within its own data stream specifying the placement of the graphic.
EXAMPLE	<ESC>A <ESC>CC1<ESC>**GT001, 12345, nn...n** <ESC>Q1<ESC>Z
OUTPUT	There is no printer output as a result of this command.
NOTES	This command requires the Expanded Memory Option. See your SATO representative for details. Data must be sent in binary format. The Memory Area Select Command <ESC>CCa must be sent before this command. The first 62 bytes of the stored file is used for the header and the remainder is the BMP image data. The graphic will not be printed correctly if the specified size does not match the actual graphic size. Only black and white non-compressed BMP files can be stored. Color BMP files will cause an error. If you try to store an image in a memory area that already contains data, an error will occur.

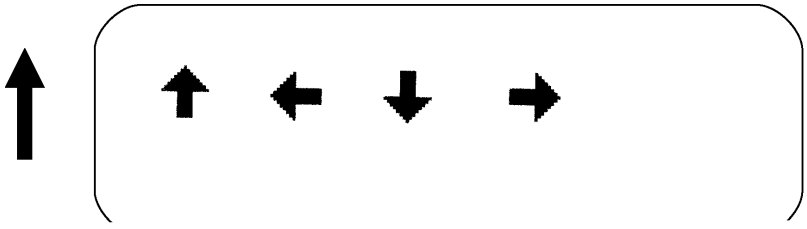
PCX FILE, RECALL

FUNCTION	To recall for printing a graphic file previously stored in a PCX format in the Memory Card.
FORMAT	<ESC>**PY**aaa aaa = Storage number (001 to 999) This command must be placed within its own data stream specifying the placement of the graphic.
EXAMPLE	Normal Rotation <ESC>A<ESC>CC1 <ESC>V0100<ESC>H0050<ESC>**PY001** <ESC>Q1<ESC>Z Rotate Base Reference Point <ESC>A<ESC>CC1<ESC>**%1** <ESC>V0330<ESC>H0160<ESC>**PY001** <ESC>Q1<ESC>Z 2nd Rotation, Base Reference Point <ESC>A<ESC>CC1<ESC>**%2** <ESC>V0330<ESC>H0600<ESC>**PY001** <ESC>Q1<ESC>Z 3rd Rotation, Base Reference Point <ESC>A<ESC>CC1<ESC>**%3** <ESC>V0100<ESC>H0800<ESC>**PY001** <ESC>Q1<ESC>Z
OUTPUT	(5-7) 
NOTES	This command requires Expanded Memory option. See your SATO representative for details. See the <ESC>PI Store PCX Graphics command.

PCX FILE, STORE

FUNCTION	To store for later printing a PCX graphic file in the Expanded Memory.
FORMAT	<ESC>**Plaaa,bbbbb,**{data} aaa = Storage number (001 to 999) bbbbb = Size of PCX File in bytes. {data} = Data Place within its own data stream.
EXAMPLE	BASIC Program to download a PCX file to Expanded Memory Area 1, Storage Area 1 OPEN .C:\WIZARD\GRAPHICS\LION.PCX. FOR INPUT AS #2 DA$ = INPUT$(3800,#2) C$ = CHR$(27) WIDTH .LPT1:.,255 LPRINT C$;"A";C$;"CC1"; LPRINT C$; .**PI001,03800,.;DA$** LPRINT C$;"Z"; CLOSE #2
OUTPUT	There is no printer output as a result of this command. See <ESC>PY PCX Graphics Recall command.
NOTES	This command requires Expanded Memory option. See your SATO representative for details. Graphics cannot be stored as part of a format. Only black and white PCX files can be stored. The file size specified by this command is the DOS file size in bytes.

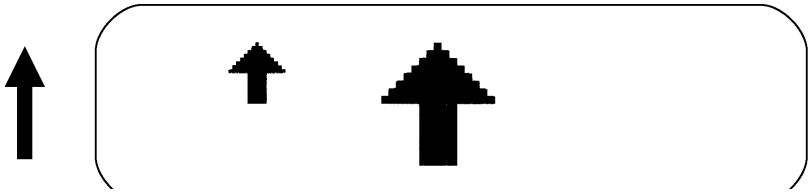
CUSTOM GRAPHICS, RECALL

FUNCTION	Use the Recall command any time you want to print a graphic image on a label along with other printed data.
FORMAT	<ESC>**GRaaa** aaa = Storage number (001 to 999) The Recall command is sent in a secondary data stream to print the graphic, and follows any necessary position or size commands.
EXAMPLE	Non Rotated Graphic <ESC>A<ESC>CC1 <ESC>V0100<ESC>H0080<ESC>L0505 <ESC>**GR001** <ESC>Q1<ESC>Z Graphic Rotated 90° <ESC>A<ESC>CC1<ESC>%1 <ESC>V0180<ESC>H0250<ESC>L0505 <ESC>**GR001** <ESC>Q1<ESC>Z Graphic Rotated 180° <ESC>A<ESC>CC1<ESC>%1 <ESC>V0180<ESC>H0500<ESC>L0505 <ESC>**GR001** <ESC>Q1<ESC>Z Graphic Rotated 270° **<**ESC>A<ESC>CC1<ESC>%3 <ESC>V0100<ESC>H0600<ESC>L0505 <ESC**>GR001** <ESC>Q1<ESC>Z
OUTPUT	(5-8) 
NOTES	The graphic image to be stored cannot be rotated before it is stored. It can be rotated when it is recalled. Graphic images cannot be stored as part of a label format. See the <ESC>GI Custom Graphic Store command.

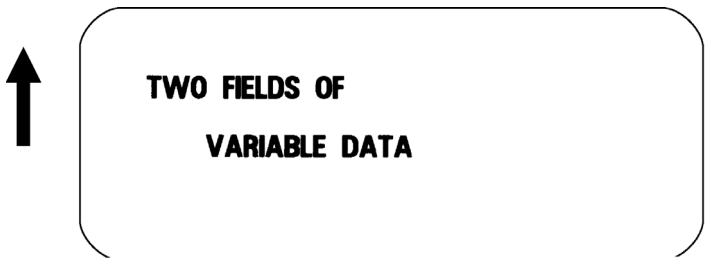
CUSTOM GRAPHICS, STORE

FUNCTION	To provide similar functionality to the <ESC>G Custom Graphic command, but allows for the graphic image to be stored in Expanded Memory. Use the Store command to send the graphic data to the printer's optional Expanded Memory.
FORMAT	<ESC>**Glabbbcccddd{data}** aaa = Specifies character format of the data H: Hex data B: Binary data bbb = Quantity of horizontal 8 x 8 blocks ccc = Quantity of vertical 8 x 8 blocks ddd = Graphics storage quantity (001-099) {data} = Hex or binary data to describe the graphic image Immediately following the <ESC>CC Memory Area Select command.
EXAMPLE	<ESC>A <ESC>CC1 <ESC>**GIH00200200101000380 07C00FE01FF03FF87FFCFFFE07C007C007C007C007C007C007C007C0** <ESC>Z
OUTPUT	There is no printer output as a result of this command. See <ESC>GR Recall Custom Graphics command.
NOTES	Expanded Memory is required to use this command. Its maximum storage capacity is 999 graphics or up to the capacity of the memory card used. If a data transmission error occurs, the printer will beep, the ERROR LED will illuminate, and the image must be transmitted again. Each graphic to be stored must be sent in its own data stream. Example of correct data stream: <ESC>A <ESC>**GIHaaabbb001(DATA)** <ESC>Z <ESC>A <ESC>**GIHaaabbb002(DATA)** <ESC>Z Example of incorrect data stream: <ESC>A <ESC>**GIHaaabbb001(DATA)** <ESC>**GIHaaabbb002(DATA)** <ESC>Z Do not use ASCII <CR> or <LF> characters (carriage return or line feed) as line delimiters within the graphic data or the actual image will not be printed as specified. **Refer to Appendix: Reference Table 54 for additional information.**

CHARACTER, CUSTOM DESIGNED

FUNCTION	To allow for the creation, storage, and printing of custom characters, such as special fonts or logos. Up to 50 individual characters may be stored in the custom character volatile memory.
FORMAT	Store Command: <ESC>**Tabcc** Recall Command: <ESC>**Kab90cc** a = 1 16x16 matrix 2 24x24 matrix b = Specifies the character encoding method for the data stream H Hexadecimal characters B Binary characters cc = Memory location to store/recall the character. Valid memory locations are 21 to 52 (counting in Hex) or "!" or "R" in Binary. (data) = Data to describe the character The Store command is typically sent in its own data stream to the printer, between the Start/Stop commands. The Recall command is sent in a secondary data stream to print the character, and follows any necessary position or size commands.
EXAMPLE	<ESC>A <ESC>**T1H3F0100038007C00FE01FF03FF87FFCFFFE07C007C007C007C007C00**<ESC>Z <ESC>A <ESC>H150<ESC>V100<ESC>L0505<ESC>**K1H903F** <ESC>H350<ESC>V100<ESC>L1010<E SC>**K1H903F** <ESC>Q1 <ESC>Z
OUTPUT	(5-9) 
NOTES	When printing the custom character using the Recall command, the character is affected by the following commands: Character Expansion Character Pitch Line Feed Rotate, Fixed Base Reference Point The characters are stored in volatile memory and must be reloaded if the printer power is lost. Do not use ASCII <CR> or <LF> characters (carriage return or line feed) as line delimiters within the graphic data or the actual image will not be printed as specified.

FIELD PRINT SPECIFICATION

FUNCTION	To cal out items which are registered at the Field Register Specification <ESC>/N and then specify the data.
FORMAT	<ESC>**/D,aa,n...n** a = Field number (01 to 99) n = Data Place following the <ESC>YR command.
EXAMPLE	<ESC>A <ESC>CC1 <ESC>**YR,02**<ESC>**/D,01,TWO FIELDS OF**<ESC>**/D,02,VARIABLE DATA** <ESC>Q1 <ESC>Z
OUTPUT	(5-10) 
NOTES	The print digit number is valid at the specified range of <ESC>/N. If the digit number specified at <ESC>/D is much more than that from <ESC>/N, the specified print digit is valid for printing. Use as a apair with the command <ESC>YR.

FIELD REGISTER SPECIFICATION

FUNCTION	To register the item inside of the field at the Format Register Specification <ESC>/N.
FORMAT	<ESC>**/N,aa,n...n** a = Field number (1 to 99) n = Print digit number (1 to 99)
EXAMPLE	<ESC>A <ESC>CC1 <ESC>YS,01 <ESC>**/N,1,3** <ESC>%0<ESC>V100<ESC>H200<ESC>P2<ESC>L0101<ESC>XMABC <ESC>**/N,2,5** <ESC>%0<ESC>V300<ESC>H40<ESC>B40208049123456 <ESC>Z
OUTPUT	This command does not result in output. Refer to <ESC>YR Format/Field Recall command.
NOTES	Specify the field number with the order start from the small value. Print Vertical Position Specification <ESC>V and Print Horizontal Position Specification <ESC>H shall be specified at every field. It will become default value if none of the specification is made. When specifying foreign characters using foreign character code <ESC>H, a foreign character needs four digits (three foreign characters equals twelve digits). When specifying foreign characters using foreign character code <ESC>B, a foreign character needs two digits (three foreign characters equals six digits). Specify the register digit numbers of fixed field out of value 00. Use this command as a pair with Format Register Specification <ESC>YS. Due to memory limitations, it may not be able to 99 items.

6

BI-DIRECTIONAL COMMUNICATIONS

- **Introduction**
- **Enquire & Response**

INTRODUCTION

Bi-Directional communications is a two-way communications protocol between the host and the printer enabling the host to monitor and control the printer's operational status. The Bi-Com 5 protocol only works in the Multi-Job Buffer mode.

GENERAL CONFIGURATION

Refer to Appendix: Reference Table 40 for printer configuration commands.

SERIAL INTERFACE

For this protocol to function properly with an RS232C Interface, pin 6 (DTR) and pin 5 (CTS) must be held high by the host. To ensure these pins are always in the correct state is to tie pin 20 (DTR) to pin 6 (DSR) and pin 4 (RTS) to pin 5 (CTS) at the printer end on the cable.

RECEIVE BUFFER

This protocol controls information such as reception, print, and cancelation for every item. When the buffer is near full, an error will occur informing the host that either there is not enough memory remaining or that the item quantity has been exhausted.

To release the receive buffer one of those conditions must be remedied.

DATA TRANSMISSION

Data transmissions must be preceded with STX (HEX 02H) and be followed by ETX (HEX 03H) to function.The string must also include the item number or an error will occur. An error will also occur if an incorrect item number is identiifed. BCC must follow <ESC>Z if the BCC function is enabled.

Print Data

<STX><ESC>A<ESC>{ID 00000}{Print Data}<ESC>Z<ESC>BCC<ETX>

Status Request

<STX>SOH{ENQ}00000<ETX>

ENQUIRE & RESPONSE

ENQUIRE (ENQ)

Upon receipt of an ENQ command, the printer responds with status information bounded by an STX/ETX pair. The status information is defined as follows:

<STX>{ # Byte ID }{ # Status Byte }{ # Byte Label Remaining }{ # Byte Job Name }<ETX>

ID	Identifies the current print job ID. Is defined using the Job ID (<ESC>ID) command transmitted with the print job. (2 bytes)
Status	Defines the current status of the printer. (1 byte)
Label Remaining	Defines the quantity of labels remaining in the current print job. 6 bytes)
Job Name	ASCII characters identify the assigned job name by the Job Name (<ESC>WK) command. If the name is less than the required characters, the field will be padded with zeroes. (16 bytes)

If an ENQ is received after the print job specified in the ID bytes has been completed, or the buffer is empty of data, the printer will respond with “space” characters for the ID number (Remaining Labels & Job Name bytes).

The host computer transmits an ENQ to the printer which responds within five milliseconds unless actively printing. If printing, it will respond upon finishing and then resume printing.

Refer to Appendix: Reference Tables 41 and 42 for additional information.

RETURN STATUS BYTES & FORMAT						
1	**5**	**2**	**5**	**2**	**6**	**1**
STX	Item Number	Item Status	Item Number in Process	Item Status in Process	Issues of Item in Process	ETX

CANCEL (CAN)

If a CAN command is received, it will stop the print job and clear all data from the buffers. A delay of five milliseconds is required before any new data may be downloaded. The CAN command is effective upon receipt, even if the printer is offline or in an error condition. The printer will return an ACK if the printer is not in an error condition and a NAK if an error condition exists.

PRINT JOB

Upon receipt of a valid print job (<ESC>A....<ESC>Z), an ACK will be returned by the printer if an error condition does not exist and a NAK if an error condition exists. (Only for RS232 Interface)

PRINT STOP (DLE)

This command stops the printing process. Execution should be avoided while sending print or other data. If an error condition occurs, a NAK is returned and an ACK is returned if one does not.

PRINT START (DC1)

This command enables the printer to exit the pause mode (DLE) by the request command to resume printing (DC1). The host also sends an ENQ command to confirm execution. Execution should be avoided while sending print or other data. Upon receipt of this command, an ACK is returned if an error condition does not exist and a NAK if one does.

OBTAIN HISTORY DATA (LW)

This command enables the printer to send 500-items at a time of CR/LF history data to the host. Avoid any transmission to the printer while history data is being sent to the host. Also avoid the inclusion and use of this command in the print data.

When the Item Number command is not in the receive data, or the command is incorrect, the item number is saved as "*****" and the status as "3" in the history. The Item Number Error may occur at the beginning of print operation and cease operation.

HISTORY DATA		
ITEM	**DESRCIPTION**	**BYTES**
1	Management Flag	1
2	Item Number	5
3	Status 00: Received 01: Issued 02: Cancel 03: Item Number Error 04: BCC Error 05: Designation of Print after Occurance 06: Cancel after Error Occurance 07: Analyzing Unprinted Items 08: Unprocessed Error due to Power Removal	2

RETURN HISTORY DATA BYTES & FORMAT							
1	**5**	**2**	**2**		**5**	**2**	**1**
STX	Item Number	Item Status	CR/LF		Item Number	Item status	ETX

RELEASE RETURN ERROR (SUB)

This command enables the printer to release from an error and resume printing of the item where the error occurred. The host also sends an ENQ command to confirm execution. Avoid the inclusion and use of this command in the print data.

PRINTER STATUS (MG)

Receipt of SOH followed by MG causes the printer to return information bounded by an STX-ETX pair that reports the current operating status of the printer.

PARAMETERS		
BYTE	**VALUE**	**DESCRIPTION**
1	Printer Type	00: Thermal Transfer 01: Direct Thermal
2	Print Resolution (dots per inch)	00: 203 01: 305

PARAMETERS		
BYTE	**VALUE**	**DESCRIPTION**
3	Print Speed (inches per second)	00: 2 01: 3 02: 4 03: 5 04: 6 05: 7 06: 8 07: 9 08: 10 09: 12
4	Mode	00: Not Supported 01: Not Supported 02: Not Supported 03: Label Dispense Print Mode 04: Reserved
5	Not Supported	00: Reserved 01: Reserved 02: Reserved
6	Dispense Position	00: At Print Head Position 01: At Dispense Position
7	Not Supported	00: Reserved
8	Not Supported	41: Reserved 42: Reserved 43: Reserved
9	Print Density	00: Level 1 01: Level 2 02: Level 3 03: Level 4 04: Level 5
10	Sensor Type	00: Reflective (Eye-Mark) 01: Gap (See-Thru) 02: None
11	Zero Slash	00: Disabled 01: Enabled
12	Not Supported	00: Reserved
13	Not Supported	00: Reserved 01: Reserved
14	Online Feed	00: Disabled 01: Enabled
15	Pitch	00: Fixed 01: Proportional
16-17	HEX: 00 to C80 HEX: 00 to 12C	Not Supported
18-19	HEX: 00 to 340 HEX: 00 to 4E0	Not Supported

PARAMETERS		
BYTE	**VALUE**	**DESCRIPTION**
20-21	HEX: 00 to 3E7 HEX: FFFF to FC19	Vertical Base Reference Point Offset (0 to 792 dots) Vertical Base Reference Point Offset (-1 to -792 dots)
22-23	HEX: 00 to 320 HEX: 00 to FCE0	Horizontal Base Reference Point Offset (0 to 800 dots) Horizontal Base Reference Point Offset (-1 to -800 dots)
24	HEX: 00 to 63 HEX: FF to 9D	Not Supported
25	HEX: 00 to 63 HEX: FF to 9D	Not Supported
26	HEX: 00 to 63 HEX: FF to 9D	Not Supported
27	HEX: 00 to 63 HEX: FF to 9D	Dispense Offset (0 to 99 dots) Dispense Offset (-1 to -99 dots)
28	Compatibility Mode	00: Enabled 01: Disabled
29	08 to 40	Not Supported
30	Buzzer	00: Enabled 01: Disabled

COUNTER STATUS (ME)

Receipt of SOH followed by ME causes the printer to return information bounded by an STX-ETX pair that reports the operating status of the printer's life counters.

PARAMETERS		
BYTE	**VALUE**	**DESCRIPTION**
1-8	HEX	Current Life Counter in dots
9-12	HEX	1st (Current) Head Counter in dots
13-16	HEX	2nd (Previous) Head Counter in dots
17-20	HEX	3rd Head Counter in dots
21-24	HEX	Not Supported
25-28	HEX	Not Supported

SENSOR STATUS (SG)

Receipt of SOH followed by SG causes the printer to return information bounded by an STX-ETX pair that reports the current operating status of the printer's sensors.

PARAMETERS		
BYTE	**VALUE**	**DESCRIPTION**
1	HEX	Reflective Sensor Level
2	HEX	Transmissive Sensor Level

PARAMETERS		
BYTE	**VALUE**	**DESCRIPTION**
3	00H 01H	Out of Paper Paper Present
4	00H 01H	Head Open Head Closed

HEAD STATUS (HC)

Receipt of SOH followed by HC causes the printer to return information bounded by an STX-ETX pair that reports the current operating status of the print head.

PARAMETERS		
BYTE	**VALUE**	**DESCRIPTION**
1	00 HEX 01 HEX	Print Head OK Electrical Fault in Print Head

SYSTEM VERSION INFORMATION (SB)

Receipt of SOH followed by SB causes the printer to return information bounded by an STX-ETX pair that reports the system version of the printer.

PARAMETERS		
BYTE	**VALUE**	**DESCRIPTION**
1-50	ASCII	Firmware Version Information

MEMORY STATUS (EB)

Receipt of SOH followed by EB causes the printer to return information bounded by an STX-ETX pair that reports the current user memory allocation.

PARAMETERS		
BYTE	**VALUE**	**DESCRIPTION**
1-4	HEX	Free Font Memory
5-8	HEX	Total Font Memory
9-12	HEX	Free Form Overlay Memory
13-16	HEX	Total Form Overlay Memory
17-20	HEX	Free Graphic Memory
21-24	HEX	Total Graphic Memory

FORM OVERLAY STATUS (FO)

Receipt of SOH followed by FO causes the printer to return information bounded by an STX-ETX pair that reports the forms downloaded into the printer.

PARAMETERS		
BYTE	**VALUE**	**DESCRIPTION**
1-2	01 to 99	Form Registration Number
3-18	ASCII	Form Name

FONT CONFIGURATION (FG)

Receipt of SOH followed by FG causes the printer to return information bounded by an STX-ETX pair that reports information on the stored font or graphic.

PARAMETERS					
BYTE	**VALUE**	**DESCRIPTION**	**BYTE**	**VALUE**	**DESCRIPTION**
1-2	ASCII Font	ID Number	76	HEX	Family Attribute
3-4	00H 01H	Font Graphic	77	HEX	Character set
5-36	ASCII	Font Name	78	HEX	Italic Attribute
37-48	ASCII	Font Style	79-80	HEX	Weight Attribute
49-52	ASCII	Font Point Size	81-82	HEX	Spread
53-54	HEX	Character Width (dots)	83-84	HEX	Assent in Dots
54-60	HEX	Character Height (dots)	85-86	HEX	Registration Start Code
57-60	HEX	Font size	86-87	HEX	Registration End Code
58-64	HEX	Font Registration Number	88-95	HEX	Reserved
65-68	HEX	Font Data Top Address	96-98	HEX	Code
69-72	HEX	Total size	99-100	HEX	Horizontal Valid size
73-74	HEX	Vertical/Horizontal Writing Flag	101-102	HEX	Left Gap Size
75	HEX	Character Pitch (fixed/variable)			

INTERFACE STATUS (IG)

Receipt of SOH followed by IG causes the printer to return information bounded by an STX-ETX pair that reports the type of interface connection currently set.

PARAMETERS		
1	Interface Type	0: IEEE1284 Parallel 1: RS232 Serial 2: Local Area Network (LAN) 3: Universal Serial Bus (USB)

INTERFACE SETTINGS (H2)

Receipt of SOH followed by H2 causes the printer to return information bounded by an STX-ETX pair that reports the current operating parameters of the interface.

PARAMETERS		
1	Bytes Per Second	0: 9600 1: 19200 2: 38400 3: 57600
2	Parity	0: None 1: Odd 2: Even
3	Stop Bits	0: 1 1: 2
4	Communication	0: Singl-Item Buffer with Ready/Busy Flow Control 1: Multi-Item Buffer with ReadBusy Flow Control 2: X-On/X-Off Flow Control 3: Status4 Bi-Comm 4: Status3 Bi-Comm

ITEM NUMBER CHECK

The printer checks the item number of received print data whether the number is increasing one (1) to every item. If an error is detected, the printer activates “ITEM NUMBER ERROR” at the beginning of that item’s print operation ceases printing. The item number error can only be detected if the Check of Item Number is enabled. In addition to various printer keypad functions, a BCC error is released by either sending a SUB command or a CAN command.

Specify the item number starting from “00000” after powering on the printer. Note that print data is the subject of the check of item number and that error detection is not performed for the data that does not accompany print operation - such as registered data and printer setup command. For such data, specify “*****” for its item number.

When specifying the item number with <ESC>IQ, the command for the designation of Start Item Number, the start number for the next data becomes the item number specified in <ESC>IQ.

STATUS BYTE DEFINITION (BI-COM PROTOCOL)

ASCII	HEX	DEFINITION
ONLINE		
0	30	No Errors
1	31	Ribbon Near End
2	32	Buffer Near Full
3	33	Ribbon Near End and Buffer Near Full
4(1)	34	Print Stop (without error)
ONLINE, WAITING FOR DATA		
A	41	No Errors
B	42	Ribbon Near End

ASCII	HEX	DEFINITION
C	43	Buffer Near Full
D	44	Ribbon Near End and Buffer Near Full
E(1)	45	Print Stop (without error)
ONLINE PRINTING		
G	47	No Errors
H	48	Ribbon Near End
I	49	Buffer Near Full
J	4A	Ribbon Near End and Buffer Near Full
K(1)	4B	Print Stop (without error)
ONLINE, WAITING TO DISPENSE A LABEL		
M	4D	No Errors
N	4E	Ribbon Near End
O	4F	Buffer Near Full
P	50	Ribbon Near End and Buffer Near Full
Q(1)	51	Print Stop (without error)
ONLINE, COMPILING PRINT JOB		
S	53	No Errors
T	54	Ribbon Near End
U	55	Buffer Near Full
V(1)	56	Ribbon Near End and Buffer Near Full
W(1)	57	Print Stop (without error)
OFFLINE, ERROR CONDITION		
b	62	Head Open
c	63	Paper End
d	64	Ribbon End
e	65	Media Error
f	66	Sensor Error
g	67	Head Error
j	6A	Cutter Error
k	6B	Other Errors

(1) Not supported by legacy Bi-Comm protocols.

7

APPENDIX

- **Custom Characters/Graphics**
- **Custom Protocol Codes**
- **Reference Tables**
- **Glossary**

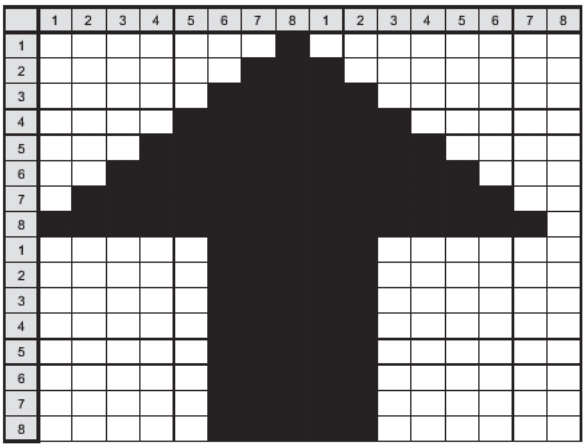
CUSTOM CHARACTERS/GRAPHICS

CUSTOM DESIGNED CHARACTER EXAMPLE

The following example is presented to help understand the use of the Custom Designed Characters command. It demonstrates the design and printing of an “arrow” in a 16 x 16 matrix.

1. Determine which matrix size to use
   - 16 dot x 16 dots
   - 24 dots by 24 dots
2. Lay out a grid and draw the image on the grid.
   - Each square represents one dot
   - Blacken squares for each printed dot

(7a)



3. Transfer the image into two bit map representations and then into hexadecimal or binary format.

ROW	BIT MAP				HEX	
1	0000	0001	0000	0000	01	00
2	0000	0011	1000	0000	03	80
3	0000	0111	1100	0000	07	C0
4	0000	1111	1110	0000	0F	E0
5	0001	1111	1111	0000	1F	F0
6	0011	1111	1111	1000	3F	F8
7	0111	1111	1111	1100	7F	FC
8	1111	1111	1111	1110	FF	FE
9	0000	0111	1100	0000	07	C0
10	0000	0111	1100	0000	07	C0
11	0000	0111	1100	0000	07	C0
12	0000	0111	1100	0000	07	C0
13	0000	0111	1100	0000	07	C0
14	0000	0111	1100	0000	07	C0
15	0000	0111	1100	0000	07	C0
16	0000	0111	1100	0000	07	C0

4. To store the custom designed character in memory using a hexadecimal data stream:

<ESC>A
<ESC>T1H3F0100038007C00FE01FF03FF87FFCFFFE07C007C007C007C007C007C007C007C0
<ESC>Z

5. To recall a custom character from memory, send the following code to the printer. Note the character size was expanded using the <ESC>L command. Other data can also be printed.

<ESC>A
<ESC>L0505<ESC>H0150<ESC>V100<ESC>K1H903F
<ESC>L0505<ESC>H0600<ESC>V100<ESC>K1H903F
<ESC>L0303<ESC>H0125<ESC>V0250<ESC>MTHIS SIDE UP !
<ESC>Q1
<ESC>Z

6. To store the custom designed character in memory using a binary data stream:

<ESC>A
<ESC>T1B3F 01H 00H 03H 80H 07H C0H 0FH E0H 1FH F0H 3FH F8H 7FH FCH FFH FEH 07H C0H 07H
C0H 07H C0H 07H C0H 07H C0H 07H C0H 07H C0H 07H C0H
<ESC>Z

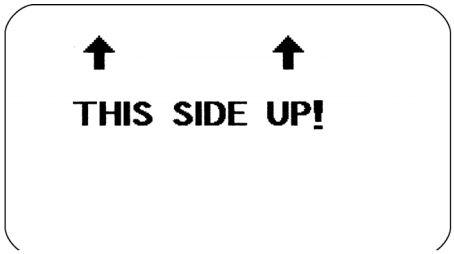
NOTE: The data stream is only half as long as the hexadecimal format because sending the binary equivalent of “11111111” (represented above in its hexidecimal value of FFH), for example, using one eight bit word while it takes two eight bit words to transmit the hexadecimal equivalent “F” and “F”. To send binary characters using BASIC, the expression ìCHR (&HFF) will send the binary equivalent of FF (i.e., 11111111).

7. To recall the custom character from memory, send the following code to the printer:

<ESC>A
<ESC>L505<ESC>H0150<ESC>V100<ESC>K1B903F
<ESC>L505<ESC>H0600<ESC>V100<ESC>K1B903F
<ESC>L0303<ESC>H0125<ESC>V0250<ESC>XMTHISSIDE UP !
<ESC>Q1
<ESC>Z

The printer output for both the hexadecimal and binary format examples is.

(7b)

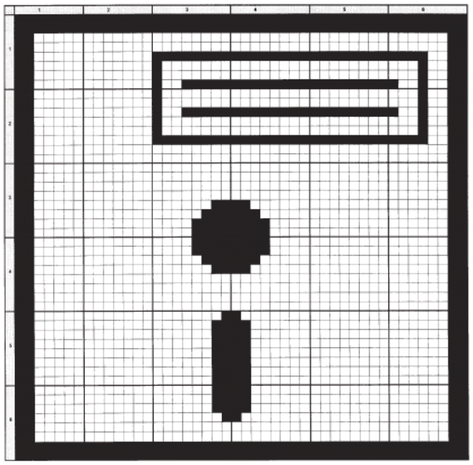


CUSTOM GRAPHICS EXAMPLE

The following example is presented to help you understand the use of the Custom Graphics command. It demonstrates the design and printing of a diskette in a 48 x 48 matrix.

1. Determine the matrix size for the graphic. It must be in 8 dot by 8 dot blocks. The example here has six blocks horizontally and six blocks vertically (48 x 48).
2. Lay out a grid and draw the image on the grid.
    - Each square represents one dot
    - Blacken squares for each printed dot

(7c)



3. Transfer the image into a bit map representation and then into hexadecimal format:

BIT MAP						HEXADECIMAL FORMAT					
1	2	3	4	5	6	1	2	3	4	5	6
11111111	11111111	11111111	11111111	11111111	11111111FF	FF	FF	FF	FF	FF	FF
11111111	11111111	11111111	11111111	11111111	11111111FF	FF	FF	FF	FF	FF	FF
11000000	00000000	00000000	00000000	00000000	00000011C0	00	00	00	00	03	03
11000000	00000000	00000000	00000000	00000000	00000011C0	00	00	00	00	03	03
11000000	00000000	11111111	11111111	11111111	11110011C0	00	FF	FF	FF	03	03
11000000	00000000	10000000	00000000	00000000	00010011C0	00	80	00	00	13	13
11000000	00000000	10000000	00000000	00000000	00010011C0	00	80	00	00	13	13
11000000	00000000	10011111	11111111	11111111	00010011C0	00	9F	FF	FF	13	13
11000000	00000000	10000000	00000000	00000000	00010011C0	00	80	00	00	13	13
11000000	00000000	10000000	00000000	00000000	00010011C0	00	80	00	00	03	03
11000000	00000000	10011111	11111111	11111111	00010011C0	00	9F	FF	FF	13	13
11000000	00000000	10000000	00000000	00000000	00010011C0	00	80	00	00	13	13
11000000	00000000	10000000	00000000	00000000	00010011C0	00	80	00	00	13	13
11000000	00000000	11111111	11111111	11111111	11110011C0	00	FF	FF	FF	F3	F3
11000000	00000000	00000000	00000000	00000000	00000011C0	00	00	00	00	03	03
11000000	00000000	00000000	00000000	00000000	00000011C0	00	00	00	00	03	03
11000000	00000000	00000000	00000000	00000000	00000011C0	00	00	00	00	13	13
11000000	00000000	00000000	00000000	00000000	00000011C0	00	00	00	00	13	13
11000000	00000000	00000000	00000000	00000000	00000011C0	00	00	00	00	13	13
11000000	00000000	00000000	00000000	00000000	00000011C0	00	00	00	00	13	13
11000000	00000000	00000011	11000000	00000000	00000011C0	00	03	C0	00	03	03
11000000	00000000	00000111	11100000	00000000	00000011C0	00	07	E0	00	03	03
11000000	00000000	00001111	11110000	00000000	00000011C0	00	0F	F0	00	03	03
11000000	00000000	00001111	11110000	00000000	00000011C0	00	0F	F0	00	03	03
11000000	00000000	00001111	11110000	00000000	00000011C0	00	0F	F0	00	03	03
11000000	00000000	00001111	11110000	00000000	00000011C0	00	0F	F0	00	03	03
11000000	00000000	00000111	11100000	00000000	00000011C0	00	07	E0	00	03	03
11000000	00000000	00000011	11000000	00000000	00000011C0	00	03	C0	00	03	03
11000000	00000000	00000000	00000000	00000000	00000011C0	00	00	00	00	03	03
11000000	00000000	00000000	00000000	00000000	00000011C0	00	00	00	00	03	03
11000000	00000000	00000000	00000000	00000000	00000011C0	00	00	00	00	03	03
11000000	00000000	00000000	00000000	00000000	00000011C0	00	00	00	00	03	03
11000000	00000000	00000001	10000000	00000000	00000011C0	00	01	80	00	03	03
11000000	00000000	00000011	11000000	00000000	00000011C0	00	03	C0	00	03	03
11000000	00000000	00000011	11000000	00000000	00000011C0	00	03	C0	00	03	03
11000000	00000000	00000011	11000000	00000000	00000011C0	00	03	C0	00	03	03
11000000	00000000	00000011	11000000	00000000	00000011C0	00	03	C0	00	03	03
11000000	00000000	00000011	11000000	00000000	00000011C0	00	03	C0	00	03	03
11000000	00000000	00000011	11000000	00000000	00000011C0	00	03	C0	00	03	03
11000000	00000000	00000011	11000000	00000000	00000011C0	00	03	C0	00	03	03
11000000	00000000	00000011	11000000	00000000	00000011C0	00	03	C0	00	03	03
11000000	00000000	00000011	11000000	00000000	00000011C0	00	03	C0	00	03	03
11000000	00000000	00000011	11000000	00000000	00000011C0	00	03	C0	00	03	03
11000000	00000000	00000001	10000000	00000000	00000011C0	00	01	80	00	03	03
11000000	00000000	00000000	00000000	00000000	00000011C0	00	03	C0	00	03	03
11000000	00000000	00000000	00000000	00000000	00000011C0	00	03	C0	00	03	03
11111111	11111111	11111111	11111111	11111111	11111111FF	FF	FF	FF	FF	FF	FF
11111111	11111111	11111111	11111111	11111111	11111111FF	FF	FF	FF	FF	FF	FF

4. Using the hexadecimal data, send the following code to print the graphic image as designed.

```
<ESC>A<ESC>H0100<ESC>V0100<ESC>GH006006
FFFFFF FFFFFF FFFFFF FFFFFF C00000 000003
C00000 000003 C000FF FFFFF3 C00080 000013
C00080 000013 C0009F FFFF13 C00080 000013
C00080 000013 C0009F FFFF13 C00080 000013
C00080 000013 C000FF FFFFF3 C00000 000003
C00000 000003 C00000 000003 C00000 000003
C00000 000003 C00000 000003 C00003 C00003
C00007 E00003 C0000F F00003 C0000F F00003
C0000F F00003 C0000F F00003 C00007 E00003
C00003 C00003 C00000 000003 C00000 000003
C00000 000003 C00000 000003 C00001 800003
C00003 C00003 C00003 C00003 C00003 C00003
C00003 C00003 C00003 C00003 C00003 C00003
C00003 C00003 C00003 C00003 C00003 C00003
C00003 C00003 C00001 800003 C00000 000003
C00000 000003 FFFFFF FFFFFF FFFFFF FFFFFF
<ESC>Q1<ESC>Z
```

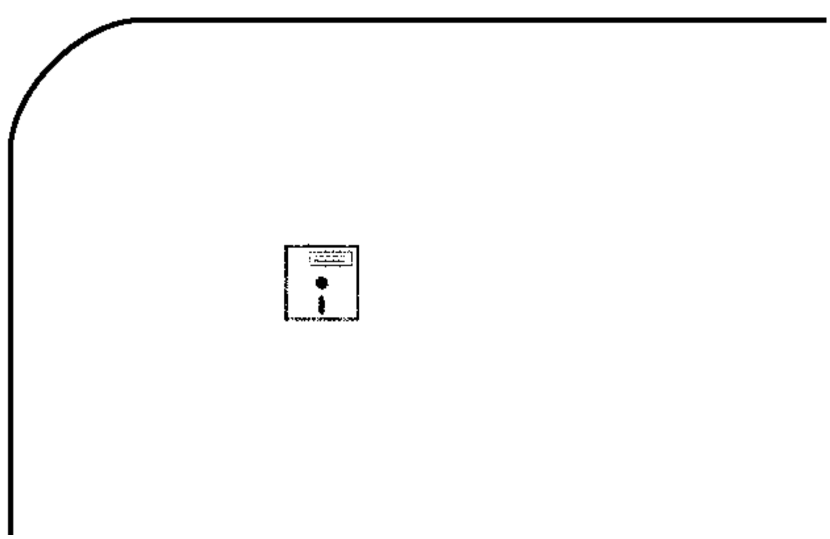
5. To send the data in binary format, the software must convert the data into binary format before transmitting it to the printer. Using the BASIC programming language for example, this is done by notation “CHR$ (&HC0)” which sends the hexidecimal value of “C0” as binary data (11000000). The BASIC program listing for sending this graphic to the printer (using the RS232 port) in binary format is:

```
CLS
OPEN .COM2:9600,N,8,1,CS,DS. FOR OUTPUT AS #1E$ = CHR$(27)
PRINT #1,CHR$(2); E$; .A.; E$; .V0100"; E$; .H0100"; E$; .GB006006";
PRINT #1,CHR$(&HFF);CHR$(&HFF);CHR$(&HFF);CHR$(&HFF);CHR$(&HFF);
PRINT #1,CHR$(&HFF);CHR$(&HFF);CHR$(&HFF);CHR$(&HFF);CHR$(&HFF);
PRINT #1,CHR$(&HFF);CHR$(&HFF);CHR$(&HC0);CHR$(&H00);CHR$(&H00);
PRINT #1,CHR$(&H00);CHR$(&H00);CHR$(&H03);CHR$(&HC0);CHR$(&H00);
PRINT #1,CHR$(&H00);CHR$(&H00);CHR$(&H00);CHR$(&H03);CHR$(&HC0);
PRINT #1,CHR$(&H00);CHR$(&HFF);CHR$(&HFF);CHR$(&HFF);CHR$(&HF3);
PRINT #1,CHR$(&HC0);CHR$(&H00);CHR$(&H80);CHR$(&H00);CHR$(&H00);
PRINT #1,CHR$(&H13);CHR$(&HC0);CHR$(&H00);CHR$(&H80);CHR$(&H00);
PRINT #1,CHR$(&H00);CHR$(&H13);CHR$(&HC0);CHR$(&H00);CHR$(&H9F);
PRINT #1,CHR$(&HFF);CHR$(&HFF);CHR$(&H13);CHR$(&HC0);CHR$(&H00);
PRINT #1,CHR$(&H80);CHR$(&H00);CHR$(&H00);CHR$(&H13);CHR$(&HC0);
PRINT #1,CHR$(&H00);CHR$(&H80);CHR$(&H00);CHR$(&H00);CHR$(&H13);
PRINT #1,CHR$(&HC0);CHR$(&H00);CHR$(&H9F);CHR$(&HFF);CHR$(&HFF);
PRINT #1,CHR$(&H13);CHR$(&HC0);CHR$(&H00);CHR$(&H80);CHR$(&H00);
PRINT #1,CHR$(&H00);CHR$(&H13);CHR$(&HC0);CHR$(&H00);CHR$(&H80);
PRINT #1,CHR$(&H00);CHR$(&H00);CHR$(&H13);CHR$(&HC0);CHR$(&H00);
PRI NT #1,CHR$(&HFF);CHR$(&HFF);CHR$(&HFF);CHR$(&HF3);CHR$(&HC0);
PRINT #1,CHR$(&H00);CHR$(&H00);CHR$(&H00);CHR$(&H00);CHR$(&H03);
PRINT #1,CHR$(&HC0);CHR$(&H00);CHR$(&H00);CHR$(&H00);CHR$(&H00);
PRINT #1,CHR$(&H03);CHR$(&HC0);CHR$(&H00);CHR$(&H00);CHR$(&H00);
PRINT #1,CHR$(&H00);CHR$(&H03);CHR$(&HC0);CHR$(&H00);CHR$(&H00);
PRINT #1,CHR$(&H00);CHR$(&H00);CHR$(&H03);CHR$(&HC0);CHR$(&H00);
PRINT #1,CHR$(&H00);CHR$(&H00);CHR$(&H00);CHR$(&H03);CHR$(&HC0);
PRINT #1,CHR$(&H00);CHR$(&H00);CHR$(&H00);CHR$(&H00);CHR$(&H03);
PRINT #1,CHR$(&HC0);CHR$(&H00);CHR$(&H03);CHR$(&HC0);CHR$(&H00);
PRINT #1,CHR$(&H03);CHR$(&HC0);CHR$(&H00);CHR$(&H07);CHR$(&H00);
PRINT #1,CHR$(&H00);CHR$(&H03);CHR$(&HC0);CHR$(&H00);CHR$(&H0F);
PRINT #1,CHR$(&HF0);CHR$(&H00);CHR$(&H03);CHR$(&HC0);CHR$(&H00);
PRINT #1,CHR$(&H0F);CHR$(&HF0);CHR$(&H00);CHR$(&H03);CHR$(&HC0);
```

```
PRINT #1,CHR$(&H00);CHR$(&H0F);CHR$(&HF0);CHR$(&H00);CHR$(&H03);
PRINT #1,CHR$(&HC0);CHR$(&H00);CHR$(&H0F);CHR$(&HF0);CHR$(&H00);
PRINT #1,CHR$(&H03);CHR$(&HC0);CHR$(&H00);CHR$(&H07);CHR$(&HE0);
PRINT #1,CHR$(&H00);CHR$(&H03);CHR$(&HC0);CHR$(&H00);CHR$(&H03);
PRINT #1,CHR$(&HC0);CHR$(&H00);CHR$(&H03);CHR$(&HC0);CHR$(&H00);
PRINT #1,CHR$(&H00);CHR$(&H00);CHR$(&H00);CHR$(&H03);CHR$(&HC0);
PRINT #1,CHR$(&H00);CHR$(&H00);CHR$(&H00);CHR$(&H00);CHR$(&H03);
PRINT #1,CHR$(&HC0);CHR$(&H00);CHR$(&H00);CHR$(&H00);CHR$(&H00);
PRINT #1,CHR$(&H03);CHR$(&HC0);CHR$(&H00);CHR$(&H00);CHR$(&H00);
PRINT #1,CHR$(&H00);CHR$(&H03);CHR$(&HC0);CHR$(&H00);CHR$(&H01);
PRINT #1,CHR$(&H80);CHR$(&H00);CHR$(&H03);CHR$(&HC0);CHR$(&H00);
PRINT #1,CHR$(&H03);CHR$(&HC0);CHR$(&H00);CHR$(&H03);CHR$(&HC0);
PRINT #1,CHR$(&H00);CHR$(&H03);CHR$(&HC0);CHR$(&H00);CHR$(&H03);
PRINT #1,CHR$(&HC0);CHR$(&H00);CHR$(&H03);CHR$(&HC0);CHR$(&H00);
PRINT #1,CHR$(&H03);CHR$(&HC0);CHR$(&H00);CHR$(&H03);CHR$(&HC0);
PRINT #1,CHR$(&H00);CHR$(&H03);CHR$(&HC0);CHR$(&H00);CHR$(&H03);
PRINT #1,CHR$(&HC0);CHR$(&H00);CHR$(&H03);CHR$(&HC0);CHR$(&H00);
PRINT #1,CHR$(&H03);CHR$(&HC0);CHR$(&H00);CHR$(&H03);CHR$(&HC0);
PRINT #1,CHR$(&H00);CHR$(&H03);CHR$(&HC0);CHR$(&H00);CHR$(&H03);
PRINT #1,CHR$(&HC0);CHR$(&H00);CHR$(&H03);CHR$(&HC0);CHR$(&H00);
PRINT #1,CHR$(&H03);CHR$(&HC0);CHR$(&H00);CHR$(&H03);CHR$(&HC0);
PRINT #1,CHR$(&H00);CHR$(&H03);CHR$(&HC0);CHR$(&H00);CHR$(&H03);
PRINT #1,CHR$(&HC0);CHR$(&H00);CHR$(&H03);CHR$(&HC0);CHR$(&H00);
PRINT #1,CHR$(&H01);CHR$(&H80);CHR$(&H00);CHR$(&H03);CHR$(&HC0);
PRI NT #1,CHR$(&H00);CHR$(&H00);CHR$(&H00);CHR$(&H00);CHR$(&H03);
PRINT #1,CHR$(&HC0);CHR$(&H00);CHR$(&H00);CHR$(&H00);CHR$(&H00);
PRINT #1,CHR$(&H03);CHR$(&HFF);CHR$(&HFF);CHR$(&HFF);CHR$(&HFF);
PRINT #1,CHR$(&HFF);CHR$(&HFF);CHR$(&HFF);CHR$(&HFF);CHR$(&HFF);
PRINT #1,CHR$(&HFF);CHR$(&HFF);CHR$(&HFF);
PRINT #1,E$; .Q1"; E$; .Z"; CHR$(3)
CLOSE #1
```

The printer output for both the hexadecimal and binary format example is:

(7d)



PCX GRAPHICS EXAMPLE

A graphics file in a PCX format may also be transmitted to the printer. The file must not be larger than 32K bytes (DOS file size reported in a DIR listing). For example, the WIZ.PCX image shown below has a file size of 15076 bytes.

(7e)

The uncompressed size (PCX is a compressed file) of the file must not be greater than 64K bytes. Generally this is not a problem unless the graphic image is surrounded by large amount of white space which the PCX algorithm can compress very efficiently. If this is the case, the file should be recaptured to eliminate the surrounding white space as much as possible. The following basic program will send and print this file:

```
OPEN .WIZ.PCX. FOR INPUT AS #2
DA$ = INPUT$(15706, #2)
C$ = CHR$(27)
WIDTH .LPT1:., 255
LPRINT C$; .A.;
LPRINT C$; .V150"; C$; .H100"; C$; .GP15706,.; DA$
LPRINT C$; .Q1"; C$; .Z";
CLOSE #2
```

The printer output for this program is:

(7f)

CUSTOM PROTOCOL CODES

This chapter contains information on creating custom Protocol Command Codes. The Protocol Command Codes tell the printer that a specific type of information is being transmitted to it. As an example, the Standard Protocol Command Code specifies the use of an <ESC>character to tell the printer that the following character(s) will represent a specific command. Sometimes the host computer is unable to generate the character or it uses the <ESC> character to control another function. In this case, an Alternate Protocol Command Code set can be selected for use. When the Alternate set is selected, the <ESC> character is not used and is instead replaced with a “carrot” (^) character. A command stream would then start with an “^” instead of an “<ESC>”. These two sets of Protocol Command Codes are adequate for the majority of all applications, but ocassionally situations occur where conflicts exist when using the Alternate set. In these cases, the user can define and download a custom set of Protocol Command Codes that are stored in non-voltile memory in the printer. After these are downloaded, they replace the Alternate Command Code set.

The command for downloading a new set of Protocol Command Codes takes the form of “<ESC>LD,a,b,c,d,e,f,g,h,i,j j”. The parameters specified for “a” through “i” can be transmitted in either ASCII characters or hex notation, allowing a complete 128 character (except for the “,”) set to be used for selecting the custom code.

PROTOCOL COMMAND CODES		
PARAMETER	**STANDARD SETTING**	**ALTERNATE SETTING**
a	STX	{
b	ETX	}
c	ESC	^
d	ENQ	@
e	CAN	!
g	OFFLINE	]
h (Auto Online)	No	0=Yes, 1=No
i (Zero Slash)	No	0=Yes, 1=No
j j (Eurocharacter)	D5	User defined

REFERENCE TABLES

TABLE 1: CHARACTER FONT SET (<ESC>XU)

W5 X H9 CHARACTER SIZE, 12 DOTS/MM HEAD DENSITY, THREE-FOLD HEIGHT/WIDTH

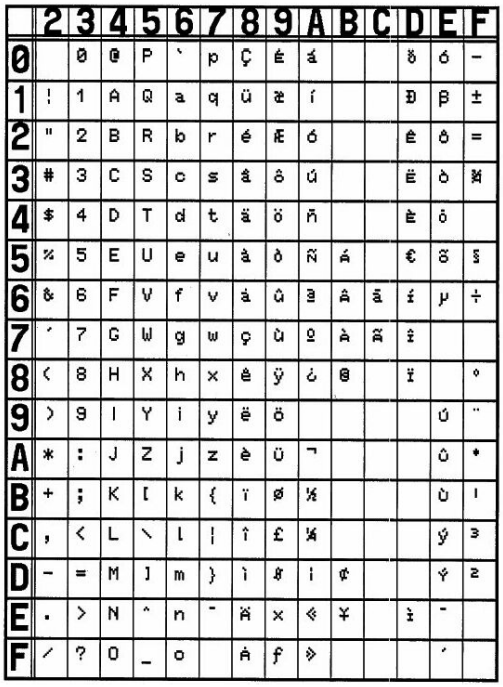


TABLE 2: CHARACTER FONT SET (<ESC>XS)

W17 X H17 CHARACTER SIZE, 12 DOTS/MM HEAD DENSITY, TWO-FOLD HEIGHT/WIDTH

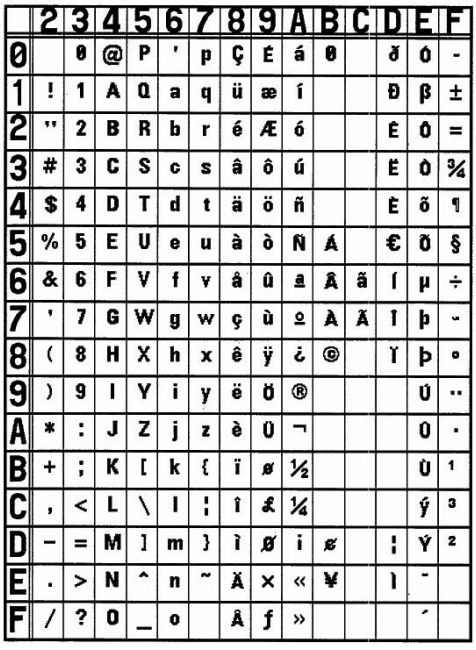


TABLE 3: CHARACTER FONT SET (<ESC>XM)

W24 X H24 CHARACTER SIZE, 12 DOTS/MM HEAD DENSITY, ONE-FOLD HEIGHT/WIDTH

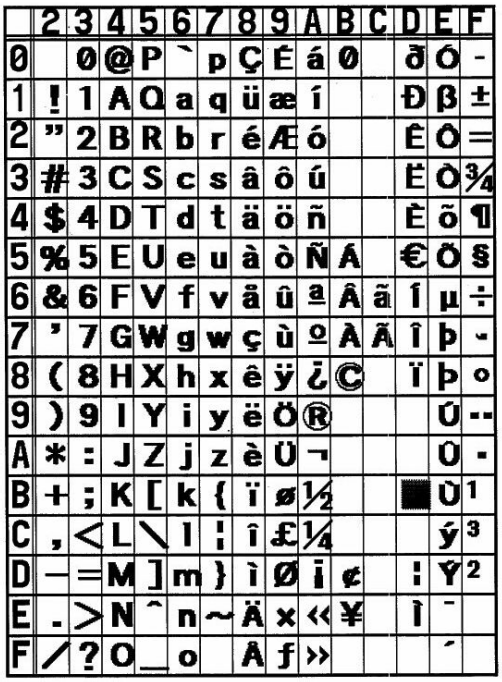


TABLE 4: CHARACTER FONT SET (<ESC>XB)

W48 X H48 CHARACTER SIZE, 12 DOTS/MM HEAD DENSITY, ONE-FOLD HEIGHT/WIDTH

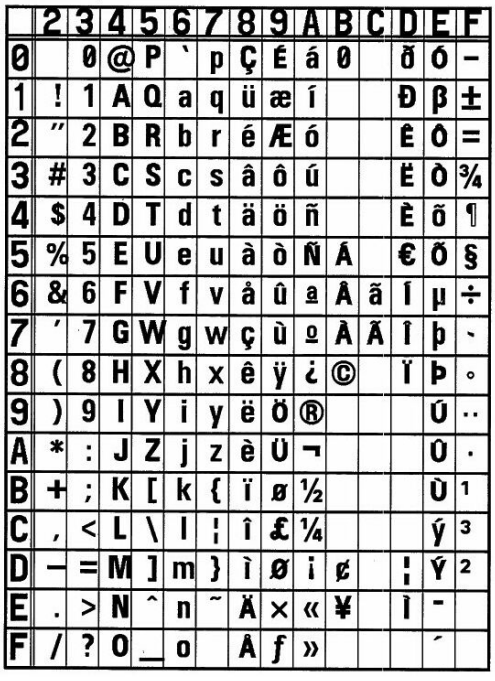


TABLE 5: CHARACTER FONT SET (<ESC>XL)

W48 X H48 CHARACTER SIZE, 12 DOTS/MM HEAD DENSITY, ONE-FOLD HEIGHT/WIDTH

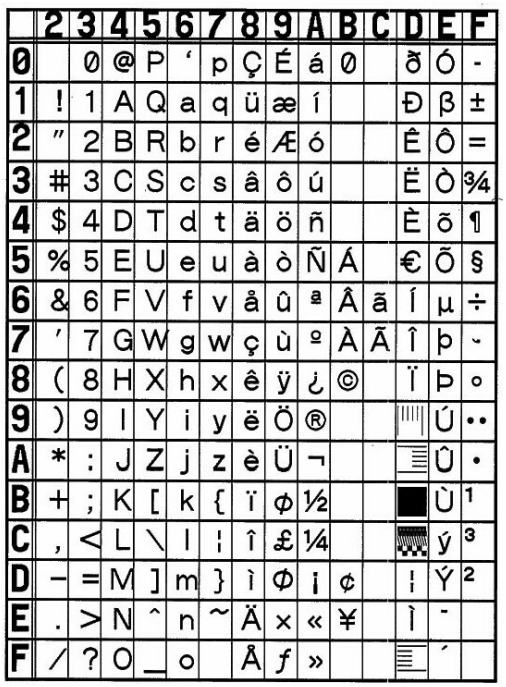


TABLE 6: CHARACTER FONT SET (<ESC>OA)

W24 X H24 CHARACTER SIZE, 12 DOTS/MM HEAD DENSITY, ONE-FOLD HEIGHT/WIDTH

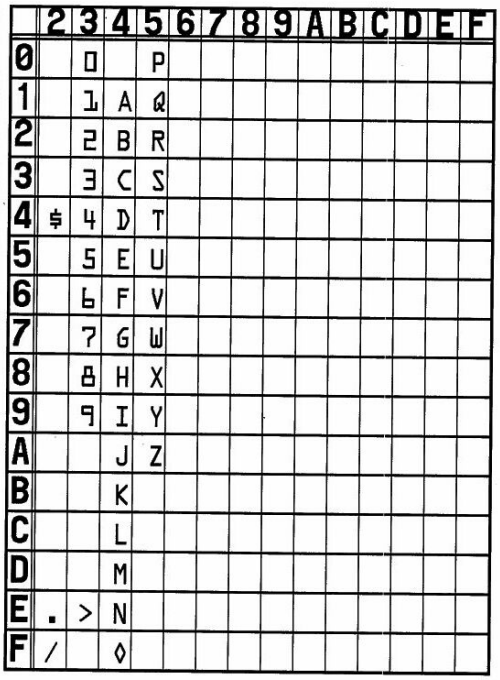


TABLE 7: CHARACTER FONT SET (<ESC>OB)

W24 X H24 CHARACTER SIZE, 12 DOTS/MM HEAD DENSITY, ONE-FOLD HEIGHT/WIDTH

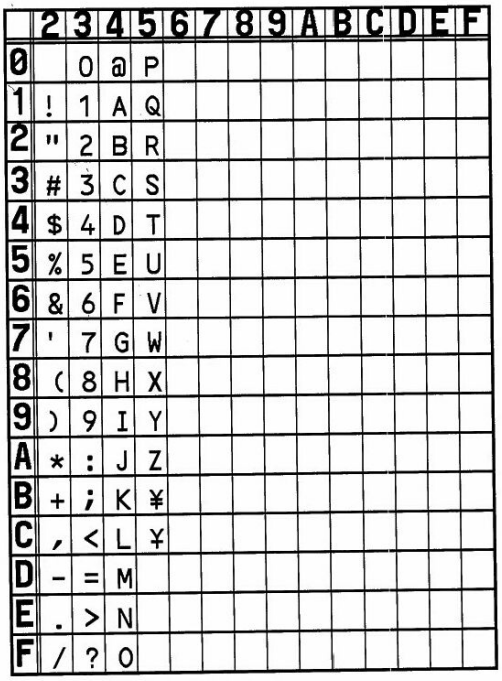


TABLE 8: PARAMETER A & B COMPARISON (<ESC>RD)

PARAMETER B	CHARACTER SET	FONT	PARAMETER A
1	Latin 1	CG Univers CG Times	V t
2	Latin 2		
3	Latin 5		
4	Grk		
5	Cyr		
6	Arb	CG Times	t
7	PC-850	Futura CG Palcio CG Century Schoolbook CG Triumvirate CG Univers CG Times	F P S G V t

TABLE 9: CHARACTER FONT SET (<ESC>XCL/XCS)

SAME FONTS, DIFFERENT SIZES

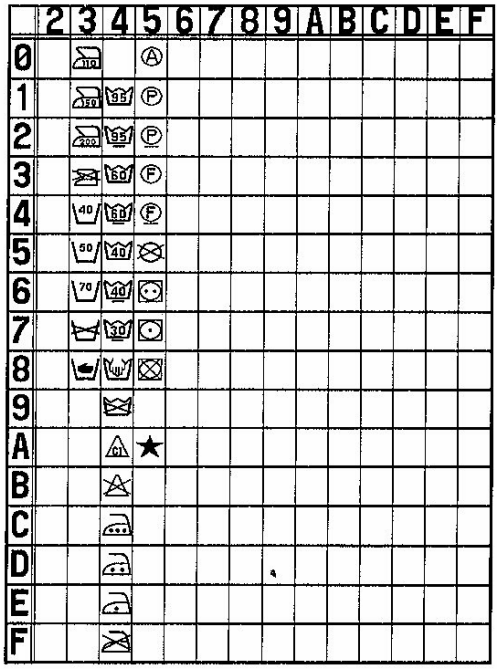


TABLE 10: CHARACTER FONT SET (<ESC>X70-77)

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
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														

TABLE 11: BARCODE TYPE (<ESC>B)			
A	**BARCODE**	**DESCRIPTION**	**RATIO**
0	NW-7 (Codabar)	Set print data including the Start/Stop characters. A, B, C, D, E, N, T, a, b, c, d, e, n, t. When the barcode print data is [123], specify [A123A]. Barcode character pitch is enabled. For print data, refer to the NW-7 code table.	1:3
1	CODE39	Set print data to include the Start/Stop Character [*]. When the barcode print data is [12345], specify [*12345*]. Barcode character pitch is enabled. For print data, refer to the CODE39 code table.	1:3
2	Interleaved 2 of 5	Specify the print data in even-numbered digits. If specifying an odd-numbered digit, “0” will be added to the head of the print data. For print data, refer to the Interleaved 2 of 5 code table.	1:3
3	JAN/EAN13	The barcode will not have a guard bar and human readable information. For print data, refer to the JAN/EAN13 code table.	Fixed
4	JAN/EAN8	The barcode will not have a guard bar and human readable information. For print data, refer to the JAN/EAN13 code table.	Fixed
5	Industrial 2 of 5	The barcode character pitch is enabled. For print data, refer to the Industrial 2 of 5 code table.	1:3
6	Matrix 2 of 5	The barcode character pitch is enabled. For print data, refer to the Matrix 2 of 5 code table.	1:3
A	MSI	The print data can be specified up to 13 digits.	Fixed
C	CODE93	Refer to CODE93 <BC>.	Fixed
E	UPC-E	Specify a 6 digit number for print data.	Fixed
F	BOOKLAND	Specify a 2 to 5 digit number for print data.	Fixed
G	CODE128	Refer to CODE128 <BG>.	Fixed
H	UPC-A	The barcode will not have a guard bar and human readable information. For print data, refer to the UPC-A code table.	Fixed
I	UCC/EAN128	Refer to UCC/EAN128 <BI>.	Fixed
P	POSTNET	Specify in 5, 6, 9, or 11 digits.	Fixed

TABLE 12: BARCODE TYPE (<ESC>BD)			
A	**BARCODE**	**DESCRIPTION**	**RATIO**
0	NW-7 (Codabar)	Set print data including the Start/Stop characters. A, B, C, D, E, N, T, a, b, c, d, e, n, t. When the barcode print data is [123], specify [A123A]. Barcode character pitch is enabled. For print data, refer to the NW-7 code table.	2:5
1	CODE39	Set print data to include the Start/Stop Character [*]. When the barcode print data is [12345], specify [*12345*]. Barcode character pitch is enabled. For print data, refer to the CODE39 code table.	2:5
2	Interleaved 2 of 5	Specify the print data in even-numbered digits. If specifying an odd-numbered digit, “0” will be added to the head of the print data. For print data, refer to the Interleaved 2 of 5 code table.	2:5
3	JAN/EAN13	The barcode will not have a guard bar and human readable information. For print data, refer to the JAN/EAN13 code table.	Fixed
4	JAN/EAN8	The barcode will not have a guard bar and human readable information. For print data, refer to the JAN/EAN13 code table.	Fixed
5	Industrial 2 of 5	The barcode character pitch is enabled. For print data, refer to the Industrial 2 of 5 code table.	2:5
6	Matrix 2 of 5	The barcode character pitch is enabled. For print data, refer to the Matrix 2 of 5 code table.	2:5
H	UPC-A	The barcode will not have a guard bar and human readable information. For print data, refer to the UPC-A code table.	Fixed
NOTE: The model composition ratio may not be available for some barcode types.			

TABLE 13: BARCODE TYPE (<ESC>D)

A	BARCODE	DESCRIPTION	RATIO
0	NW-7 (Codabar)	Set print data including the Start/Stop characters. A, B, C, D, E, N, T, a, b, c, d, e, n, t. When the barcode print data is [123], specify [A123A]. Barcode character pitch is enabled. For print data, refer to the NW-7 code table.	1:2
1	CODE39	Set print data to include the Start/Stop Character [*]. When the barcode print data is [12345], specify [*12345*]. Barcode character pitch is enabled. For print data, refer to the CODE39 code table.	1:2
2	Interleaved 2 of 5	Specify the print data in even-numbered digits. If specifying an odd-numbered digit, "0" will be added to the head of the print data. For print data, refer to the Interleaved 2 of 5 code table.	1:2
3	JAN/EAN13	The barcode will not have a guard bar and human readable information. For print data, refer to the JAN/EAN13 code table.	Fixed
4	JAN/EAN8	The barcode will not have a guard bar and human readable information. For print data, refer to the JAN/EAN13 code table.	Fixed
5	Industrial 2 of 5	The barcode character pitch is enabled. For print data, refer to the Industrial 2 of 5 code table.	1:2
6	Matrix 2 of 5	The barcode character pitch is enabled. For print data, refer to the Matrix 2 of 5 code table.	1:2
H	UPC-A	The barcode will not have a guard bar and human readable information. For print data, refer to the UPC-A code table.	Fixed

NOTE: The model composition ratio may not be available for some barcode types.

TABLE 14: CODE TABLE (<ESC>BC)

CODE 93

					S			I					S				O			
				b8	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
				b7	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
b4	b3	b2	b1		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	0	0	0			SP	0	@	P	`	p								
0	0	0	1	1			!	1	A	Q	a	q								
0	0	1	0	2			”	2	B	R	b	r								
0	0	1	1	3			#	3	C	S	c	s								
0	1	0	0	4			$	4	D	T	d	t								
0	1	0	1	5			%	5	E	U	e	u								
0	1	1	0	6			&	6	F	V	f	v								
0	1	1	1	7			’	7	G	W	g	w								
1	0	0	0	8			(	8	H	X	h	x								
1	0	0	1	9			)	9	I	Y	i	y								
1	0	1	0	A			*	:	J	Z	j	z								
1	0	1	1	B			+	;	K	[	k	{								
1	1	0	0	C			,	<	L	\	l	¦								
1	1	0	1	D			-	=	M	]	m	}								
1	1	1	0	E			.	>	N	^	n	~								
1	1	1	1	F			/	?	O	_	o	DEL								

CODE93 can be specified within 「00H～7FH」

TABLE 15: CODE TABLE (<ESC>BF)

BOOKLAND

					S			I				S				O			
				b8	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
				b7	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
b4	b3	b2	b1		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	0	0	0				0												
0	0	0	1	1				1												
0	0	1	0	2				2												
0	0	1	1	3				3												
0	1	0	0	4				4												
0	1	0	1	5				5												
0	1	1	0	6				6												
0	1	1	1	7				7												
1	0	0	0	8				8												
1	0	0	1	9				9												
1	0	1	0	A																
1	0	1	1	B																
1	1	0	0	C																
1	1	0	1	D																
1	1	1	0	E																
1	1	1	1	F																

TABLE 16: CODE128 DATA VALUES (<ESC>BG)

VALUE	SUBSET A	SUBSET B	SUBSET C	VALUE	SUBSET A	SUBSET B	SUBSET C
0	SP	SP	00	**36**	D	D	36
1	!	!	01	**37**	E	E	37
2	“	“	02	**38**	F	F	38
3	#	#	03	**39**	G	G	39
4	$	$	04	**40**	H	H	40
5	%	%	05	**41**	I	I	41
6	&	&	06	**42**	J	J	42
7	‘	‘	07	**43**	K	K	43
8	.	.	02	**38**	F	F	38
9	)	)	09	**45**	M	M	45
10	*	*	10	**46**	N	N	46
11	+	+	11	**47**	O	O	47
12	,	,	12	**48**	P	P	48
13	-	-	13	**49**	Q	Q	49
14	.	.	14	**50**	R	R	50
15	/	/	15	**51**	S	S	51
16	0	0	16	**52**	T	T	52
17	1	1	17	**53**	U	U	53
18	2	2	18	**54**	V	V	54
19	3	3	19	**55**	W	W	55
20	4	4	20	**56**	X	X	56
21	5	5	21	**57**	Y	Y	57
22	6	6	22	**58**	Z	Z	58
23	7	7	23	**59**	[	[	59
24	8	8	24	**60**	\	\	60
25	9	9	25	**61**	]	]	61

TABLE 16: CODE128 DATA VALUES (<ESC>BG)

VALUE	SUBSET A	SUBSET B	SUBSET C	VALUE	SUBSET A	SUBSET B	SUBSET C
26	:	:	26	**62**	^	^	62
27	;	;	27	**63**	__	__	63
28	<	<	28	**64**	NUL>(space)	. >(space)	64
29	=	=	29	**65**	SOH >!	a or >!	65
30	>J	>J	30	**66**	STX >"	b or >"	66
31	?	?	31	**67**	ETX >#	c or >#	67
32	@	@	32	**68**	EOT >$	d or >$	68
33	A	A	33	**69**	ENQ >%	e or >%	69
34	B	B	34	**70**	ACK >&	f or >&	70
35	C	C	35	**71**	BEL >.	g or >.	71
72	BS >(	h >(	72	**89**	EM >9	y >9	89
73	HT >)	i >)	73	**90**	SUB >:	z >:	90
74	LF >*	j >*	74	**91**	ESC >;	{ >;	91
75	VT >+	k >+	75	**92**	FS ><	| ><	92
76	FF >,	l >,	76	**93**	GS >=	} >=	93
77	CR >-	m >-	77	**94**	RS >>	~ >>	94
78	SO >.	n >.	78	**95**	US >?	DEL >?	95
79	SI >/	o >/	79	**96**	FNC3 >@	FNC3 >@	96
80	DLE >0	p >0	80	**97**	FNC2 >A	FNC2 >A	97
81	DC1 >1	q >1	81	**98**	SHIFT >B	SHIFT >B	98
82	DC2 >2	r >2	82	**99**	Subset C >C	Subset C >C	99
83	DC3 >3	s >3	83	**100**	Subset B >D	FNC4 >D	Subset B >D
84	DC4 >4	t >4	84	**101**	FNC4 >E	Subset A >E	Subset A >E
85	NAK >5	u >5	85	**102**	FNC1 >F	FNC1 >F	FNC1 >F
86	SYN >6	v >6	86	**103**	SUBSET A START CODE >G		
87	ETB >7	w >7	87	**104**	SUBSET B START CODE .H		
88	CAN >8	x >8	88	**105**	SUBSET C START CODE >I		

TABLE 17: CODE TABLE (<ESC>BI)

INTERLEAVED 2 OF 5, MATRIX 2 OF 5, INDUSTRIAL 2 OF 5, UPC-A, JAN/EAN8, JAN/EAN13, UPCC-E, UCC/EAN128, MSI

					S				I				S				O			
				b8	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
				b7	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
b4	**b3**	**b2**	**b1**		**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**A**	**B**	**C**	**D**	**E**	**F**
0	0	0	0	**0**				0												
0	0	0	1	**1**				1												
0	0	1	0	**2**				2												
0	0	1	1	**3**				3												
0	1	0	0	**4**				4												
0	1	0	1	**5**				5												
0	1	1	0	**6**				6												
0	1	1	1	**7**				7												
1	0	0	0	**8**				8												
1	0	0	1	**9**				9												
1	0	1	0	**A**																
1	0	1	1	**B**																
1	1	0	0	**C**																
1	1	0	1	**D**																
1	1	1	0	**E**																
1	1	1	1	**F**																

TABLE 18: CODE TABLE (<ESC>BP)

POSTNET

					S			I					S			O			
				b8	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
				b7	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
b4	b3	b2	b1		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	0	0	0				0												
0	0	0	1	1				1												
0	0	1	0	2				2												
0	0	1	1	3				3												
0	1	0	0	4				4												
0	1	0	1	5				5												
0	1	1	0	6				6												
0	1	1	1	7				7												
1	0	0	0	8				8												
1	0	0	1	9				9												
1	0	1	0	A																
1	0	1	1	B																
1	1	0	0	C																
1	1	0	1	D																
1	1	1	0	E																
1	1	1	1	F																

TABLE 19: CODE TABLE (<ESC>BW)

NW-7

					S			I					S			O			
				b8	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
				b7	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
b4	b3	b2	b1		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	0	0	0			SP	0												
0	0	0	1	1				1	A		a									
0	0	1	0	2				2	B		b									
0	0	1	1	3				3	C		c									
0	1	0	0	4			$	4	D	T	d	t								
0	1	0	1	5				5	E		e									
0	1	1	0	6				6												
0	1	1	1	7				7												
1	0	0	0	8				8												
1	0	0	1	9				9												
1	0	1	0	A			*	:												
1	0	1	1	B			+													
1	1	0	0	C																
1	1	0	1	D			-													
1	1	1	0	E			.		N		n									
1	1	1	1	F			/													

TABLE 20: CODE TABLE (<ESC>BW)

CODE 39

					S				I				S				O			
				b8	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
				b7	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
b4	**b3**	**b2**	**b1**		**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**A**	**B**	**C**	**D**	**E**	**F**
0	0	0	0	**0**			SP	0		P										
0	0	0	1	**1**				1	A	Q										
0	0	1	0	**2**				2	B	R										
0	0	1	1	**3**				3	C	S										
0	1	0	0	**4**			$	4	D	T										
0	1	0	1	**5**			%	5	E	U										
0	1	1	0	**6**				6	F	V										
0	1	1	1	**7**				7	G	W										
1	0	0	0	**8**				8	H	X										
1	0	0	1	**9**				9	I	Y										
1	0	1	0	**A**			*		J	Z										
1	0	1	1	**B**			+		K											
1	1	0	0	**C**					L											
1	1	0	1	**D**			-		M											
1	1	1	0	**E**			.		N											
1	1	1	1	**F**			/		O											

TABLE 21: CODE TABLE (<ESC>BK)

PDF417 & MICRO PDF417

					S				I				S				O			
				b8	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
				b7	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
b4	**b3**	**b2**	**b1**		**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**A**	**B**	**C**	**D**	**E**	**F**
0	0	0	0	**0**			SP	0	@	P	`	p								
0	0	0	1	**1**			!	1	A	Q	a	q								
0	0	1	0	**2**			”	2	B	R	b	r								
0	0	1	1	**3**			#	3	C	S	c	s								
0	1	0	0	**4**			$	4	D	T	d	t								
0	1	0	1	**5**			%	5	E	U	e	u								
0	1	1	0	**6**			&	6	F	V	f	v								
0	1	1	1	**7**			’	7	G	W	g	w								
1	0	0	0	**8**			(	8	H	X	h	x								
1	0	0	1	**9**			)	9	I	Y	i	y								
1	0	1	0	**A**			*	:	J	Z	j	z								
1	0	1	1	**B**			+	;	K	[	k	{								
1	1	0	0	**C**			,	<	L	\	l	¦								
1	1	0	1	**D**			-	=	M	]	m	}								
1	1	1	0	**E**			.	>	N	^	n	~								
1	1	1	1	**F**			/	?	O	_	o	DEL								

PDF417 (includes micro PDF417) can be specified from 「00H～FFH」

TABLE 22: CHARACTER SIZE (<ESC>BK)

MICRO PDF417

※ The symbol size of micro PDF417 is fixed at 34 type according to the following table.

「Symbol size and data number of micro PDF417」

Symbol Size		Maximum Value of Data Digit Number	
cols(d)	rows(e)	Alphabet only (A～Z)	Numeric only
1	11	6	8
	14	12	17
	17	18	26
	20	22	32
	24	30	44
	28	38	55
2	8	14	20
	11	24	35
	14	36	52
	17	46	67
	20	56	82
	23	64	93
	26	72	105
3	6	10	14
	8	18	26
	10	26	38
	12	34	49
	15	46	67
	20	66	96
	26	90	132
	32	114	167
	38	138	202
	44	162	237
4	4	14	20
	6	22	32
	8	34	49
	10	46	67
	12	58	85
	15	76	111
	20	106	155
	26	142	208
	32	178	261
	38	214	313
	44	250	366

※ The mixture of alphabet (capital letters, small letters), numeric and control code will be different based on the character number combination.

TABLE 23: DATA SIZE (<ESC>BQ)

QR (MODEL 1)

Version	Error Correction	Numeric	Alphanumeric	Kanji	Binary
1	L	40	24	10	17
	M	33	20	8	14
21x21	Q	25	15	6	11
	H	16	10	4	7
2	L	81	49	20	34
	M	66	40	17	28
25x25	Q	52	31	13	22
	H	33	20	8	14
3	L	131	79	33	55
	M	100	60	25	42
29x29	Q	81	49	20	34
	H	52	31	13	22
4	L	186	113	48	78
	M	138	84	35	58
33x33	Q	114	69	29	48
	H	76	46	19	32
5	L	253	154	65	106
	M	191	116	49	80
37x37	Q	157	95	40	66
	H	105	63	27	44
6	L	321	194	82	134
	M	249	151	64	104
41x41	Q	201	122	51	84
	H	133	81	34	56
7	L	402	244	103	168
	M	311	188	80	130
45x45	Q	253	154	65	106
	H	167	101	43	70
8	L	493	299	126	206
	M	378	229	97	158
49x49	Q	301	183	77	126
	H	203	123	52	85
9	L	585	354	150	244
	M	441	267	113	184
53x53	Q	369	223	94	154
	H	239	145	61	100
10	L	690	418	177	287
	M	526	319	135	219
57x57	Q	433	262	111	180
	H	291	176	74	121

Version	Error Correction	Numeric	Alphanumeric	Kanji	Binary
11	L	800	485	205	333
	M	608	368	156	253
61x61	Q	493	299	126	205
	H	342	207	87	142
12	L	915	555	234	381
	M	694	421	178	289
65x65	Q	579	351	148	241
	H	390	236	100	162
13	L	1030	624	264	429
	M	790	479	202	329
69x69	Q	656	398	168	273
	H	454	275	116	189
14	L	1167	707	299	486
	M	877	531	225	365
73x73	Q	738	447	189	307
	H	498	302	127	207

TABLE 24: CODE TABLE (<ESC>BQ)

QR CODE (NUMERIC MODE)

					S								S							
				b8	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
				b7	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
b4	b3	b2	b1		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	0	0	0				0												
0	0	0	1	1				1												
0	0	1	0	2				2												
0	0	1	1	3				3												
0	1	0	0	4				4												
0	1	0	1	5				5												
0	1	1	0	6				6												
0	1	1	1	7				7												
1	0	0	0	8				8												
1	0	0	1	9				9												
1	0	1	0	A																
1	0	1	1	B																
1	1	0	0	C																
1	1	0	1	D																
1	1	1	0	E																
1	1	1	1	F																

TABLE 25: CODE TABLE (<ESC>BQ)

QR CODE (ALPHANUMERIC MODE)

					S								S							
				b8	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
				b7	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
b4	b3	b2	b1		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	0	0	0			SP	0		P										
0	0	0	1	1				1	A	Q										
0	0	1	0	2				2	B	R										
0	0	1	1	3				3	C	S										
0	1	0	0	4			$	4	D	T										
0	1	0	1	5			%	5	E	U										
0	1	1	0	6				6	F	V										
0	1	1	1	7				7	G	W										
1	0	0	0	8				8	H	X										
1	0	0	1	9				9	I	Y										
1	0	1	0	A			*	:	J	Z										
1	0	1	1	B			+		K											
1	1	0	0	C					L											
1	1	0	1	D			-		M											
1	1	1	0	E			.		N											
1	1	1	1	F			/		O											

TABLE 26: CODE TABLE (<ESC>BQ)

QR CODE (BINARY MODE)

					S				I				S				O			
				b8	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
				b7	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
b4	**b3**	**b2**	**b1**		**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**A**	**B**	**C**	**D**	**E**	**F**
0	0	0	0	**0**			SP	0	@	P	`	p								
0	0	0	1	**1**			!	1	A	Q	a	q								
0	0	1	0	**2**			”	2	B	R	b	r								
0	0	1	1	**3**			#	3	C	S	c	s								
0	1	0	0	**4**			$	4	D	T	d	t								
0	1	0	1	**5**			%	5	E	U	e	u								
0	1	1	0	**6**			&	6	F	V	f	v								
0	1	1	1	**7**			’	7	G	W	g	w								
1	0	0	0	**8**			(	8	H	X	h	x								
1	0	0	1	**9**			)	9	I	Y	i	y								
1	0	1	0	**A**			*	:	J	Z	j	z								
1	0	1	1	**B**			+	;	K	[	k	{								
1	1	0	0	**C**			,	<	L	\	l	¦								
1	1	0	1	**D**			-	=	M	]	m	}								
1	1	1	0	**E**			.	>	N	^	n	-								
1	1	1	1	**F**			/	?	O	_	o	DEL								

QR Code (binary mode) can be specified within「00H～7FH、A0H～DFH」

TABLE 27: CODE TABLE (<ESC>BV)

MAXI CODE

					S								S							
				b8	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
				b7	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
B4	**b3**	**b2**	**b1**		**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**A**	**B**	**C**	**D**	**E**	**F**
0	0	0	0	**0**			SP	0	@	P	`	p								
0	0	0	1	**1**			!	1	A	Q	a	q								
0	0	1	0	**2**			”	2	B	R	b	r								
0	0	1	1	**3**			#	3	C	S	c	s								
0	1	0	0	**4**			$	4	D	T	d	t								
0	1	0	1	**5**			%	5	E	U	e	u								
0	1	1	0	**6**			&	6	F	V	f	V								
0	1	1	1	**7**			’	7	G	W	g	w								
1	0	0	0	**8**			(	8	H	X	h	x								
1	0	0	1	**9**			)	9	I	Y	i	y								
1	0	1	0	**A**			*	:	J	Z	j	z								
1	0	1	1	**B**			+	;	K	[	k	{								
1	1	0	0	**C**			,	<	L	\	l	¦								
1	1	0	1	**D**			-	=	M	]	m	}								
1	1	1	0	**E**			.	>	N	^	n	~								
1	1	1	1	**F**			/	?	O	_	o	DEL								

MAXI Code is specified from 「01H～FFH」

TABLE 28: FORMAT ID LIST (<ESC>BX)

ERROR CORRECTION	FORMAT ID					
	01	02	03	04	05	06
00 (ECC000)	500	452	394	413	310	271
05 (ECC050)	457	333	291	305	228	200
08 (ECC080)	402	293	256	268	201	176
10 (ECC100)	300	218	190	200	150	131
14 (ECC140)	144	105	91	96	72	63
20 (ECC200)	Numeric			3116		
	Alphanumeric			2335		
	Binary (01h ~ FFh)			1556		

TABLE 29: CODE TABLE (<ESC>FX)

DATA MATRIX

					S								S							
				b8	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
				b7	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
B4	**b3**	**b2**	**b1**		**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**A**	**B**	**C**	**D**	**E**	**F**
0	0	0	0	**0**			SP	0	@	P	`	p								
0	0	0	1	**1**			!	1	A	Q	a	q								
0	0	1	0	**2**			”	2	B	R	b	r								
0	0	1	1	**3**			#	3	C	S	c	s								
0	1	0	0	**4**			$	4	D	T	d	t								
0	1	0	1	**5**			%	5	E	U	e	u								
0	1	1	0	**6**			&	6	F	V	f	v								
0	1	1	1	**7**			’	7	G	W	g	w								
1	0	0	0	**8**			(	8	H	X	h	x								
1	0	0	1	**9**			)	9	I	Y	i	y								
1	0	1	0	**A**			*	:	J	Z	j	z								
1	0	1	1	**B**			+	;	K	[	k	{								
1	1	0	0	**C**			,	<	L	\	l	¦								
1	1	0	1	**D**			-	=	M	]	m	}								
1	1	1	0	**E**			.	>	N	^	n	~								
1	1	1	1	**F**			/	?	O	_	o	DEL								

Data Matrix can be specified from 「00H～FFH」
Specify 「7EH, 00H」 if 00H is specified
Specify 「7EH, 7EH」 if 7EH is specified

TABLE 30: SYMBOL & DATA QUANTITY (<ESC>2D12)

MICRO PDF417

Symbol Size		The maximum number of data		
Cols(c)	Rows(d)	Only the alphabet (A ~ Z)	Only the figure	Binary Mode
1	11	6	8	3
	14	12	17	7
	17	18	26	10
	20	22	32	13
	24	30	44	18
	28	38	55	22
2	8	14	20	8
	11	24	35	14
	14	36	52	21
	17	46	67	27
	20	56	82	33
	23	64	93	38
	26	72	105	43
3	6	10	14	6
	8	18	26	10
	10	26	38	15
	12	34	49	20
	15	46	67	27
	20	66	96	39
	26	90	132	54
	32	114	167	68
	38	138	202	82
	44	162	237	97
4	4	14	20	8
	6	22	32	13
	8	34	49	20
	10	46	67	27
	12	58	85	34
	15	76	111	45
	20	106	155	63
	26	142	208	85
	32	178	261	106
	38	214	313	128
	44	250	366	150

* Mix of Alphabet,figure or Control Code is diffirent by Number of characters of combinations.

TABLE 31: CODE TABLE (<ESC>2D12)

PDF417

					S								S							
				b8	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
				b7	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
b4	b3	b2	b1		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	0	0	0			SP	0	@	P	`	p								
0	0	0	1	1			!	1	A	Q	a	q								
0	0	1	0	2			"	2	B	R	b	r								
0	0	1	1	3			#	3	C	S	c	s								
0	1	0	0	4			$	4	D	T	d	t								
0	1	0	1	5			%	5	E	U	e	u								
0	1	1	0	6			&	6	F	V	f	v								
0	1	1	1	7			'	7	G	W	g	w								
1	0	0	0	8			(	8	H	X	h	x								
1	0	0	1	9			)	9	I	Y	i	y								
1	0	1	0	A			*	:	J	Z	j	z								
1	0	1	1	B			+	;	K	[	k	{								
1	1	0	0	C			,	<	L	\	l	|								
1	1	0	1	D			-	=	M	]	m	}								
1	1	1	0	E			.	>	N	^	n	~								
1	1	1	1	F			/	?	O	_	o	DEL								

Micro PDF417 is designable within [00H ~ FFH].

TABLE 32: CODE TABLE (<ESC>2D20)

MAXI CODE

					S								S							
				b8	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
				b7	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
B4	b3	b2	b1		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	0	0	0			SP	0	@	P	`	p								
0	0	0	1	1			!	1	A	Q	a	q								
0	0	1	0	2			”	2	B	R	b	r								
0	0	1	1	3			#	3	C	S	c	s								
0	1	0	0	4			$	4	D	T	d	t								
0	1	0	1	5			%	5	E	U	e	u								
0	1	1	0	6			&	6	F	V	f	v								
0	1	1	1	7			'	7	G	W	g	w								
1	0	0	0	8			(	8	H	X	h	x								
1	0	0	1	9			)	9	I	Y	i	y								
1	0	1	0	A			*	:	J	Z	j	z								
1	0	1	1	B			+	;	K	[	k	{								
1	1	0	0	C			,	<	L	\	l	¦								
1	1	0	1	D			-	=	M	]	m	}								
1	1	1	0	E			.	>	N	^	n	~								
1	1	1	1	F			/	?	O	_	o	DEL								

Maxi code is designable within [01H ~ FFH].

TABLE 33: DATA SIZE (<ESC>2D30)

QR CODE (MODEL 2)

Version	Error Correction	Numeric	Alpha-numeric	Kanji	Binary
21	L	2232	1352	572	929
	M	1708	1035	438	711
101× 101	Q	1224	742	314	509
	H	969	587	248	403
22	L	2409	1460	618	1003
	M	1872	1134	480	779
105× 105	Q	1358	823	348	565
	H	1056	640	270	439
23	L	2620	1588	672	1091
	M	2059	1248	528	857
109× 109	Q	1468	890	376	611
	H	1108	672	284	461
24	L	2812	1704	721	1171
	M	2188	1326	561	911
113× 113	Q	1588	963	407	661
	H	1228	744	315	511
25	L	3057	1853	784	1273
	M	2395	1451	614	997
117× 117	Q	1718	1041	440	715
	H	1286	779	330	535
26	L	3283	1990	842	1367
	M	2544	1542	652	1059
121× 121	Q	1804	1094	462	751
	H	1425	864	365	593
27	L	3517	2132	902	1465
	M	2701	1637	692	1125
125× 125	Q	1933	1172	496	805
	H	1501	910	385	625
28	L	3669	2223	940	1528
	M	2857	1732	732	1190
129× 129	Q	2085	1263	534	868
	H	1581	958	405	658
29	L	3909	2369	1002	1628
	M	3035	1839	778	1264
133× 133	Q	2181	1322	559	908
	H	1677	1016	430	698
30	L	4158	2520	1066	1732
	M	3289	1994	843	1370
137× 137	Q	2358	1429	604	982
	H	1782	1080	457	742

Version	Error Correction	Numeric	Alpha-numeric	Kanji	Binary
31	L	4417	2677	1132	1840
	M	3486	2113	894	1452
141× 141	Q	2473	1499	634	1030
	H	1897	1150	486	790
32	L	4686	2840	1201	1952
	M	3693	2238	947	1538
145× 145	Q	2670	1618	684	1112
	H	2022	1226	518	842
33	L	4965	3009	1273	2068
	M	3909	2369	1002	1628
149× 149	Q	2805	1700	719	1168
	H	2157	1307	553	898
34	L	5253	3183	1347	2188
	M	4134	2506	1060	1722
153× 153	Q	2949	1787	756	1228
	H	2301	1394	590	958
35	L	5529	3351	1417	2303
	M	4343	2632	1113	1809
157× 157	Q	3081	1867	790	1283
	H	2361	1431	605	983
36	L	5836	3537	1496	2431
	M	4588	2780	1176	1911
161× 161	Q	3244	1966	832	1351
	H	2524	1530	647	1051
37	L	6153	3729	1577	2563
	M	4775	2894	1224	1989
165× 165	Q	3417	2071	876	1423
	H	2625	1591	673	1093
38	L	6479	3927	1661	2699
	M	5039	3054	1292	2099
169× 169	Q	3599	2181	923	1499
	H	2735	1658	701	1139
39	L	6743	4087	1729	2809
	M	5313	3220	1362	2213
173× 173	Q	3791	2298	972	1579
	H	2927	1774	750	1219
40	L	7089	4296	1817	2953
	M	5596	3391	1435	2331
177× 177	Q	3993	2420	1024	1663
	H	3057	1852	784	1273

TABLE 34: DATA SIZE (<ESC>2D31)

QR CODE (MODEL 1)

Version	Error Correction	Numeric	Alpha-numeric	Kanji	Binary
1	L	40	24	10	17
	M	33	20	8	14
21× 21	Q	25	15	6	11
	H	16	10	4	7
2	L	81	49	20	34
	M	66	40	17	28
25× 25	Q	52	31	13	22
	H	33	20	8	14
3	L	131	79	33	55
	M	100	60	25	42
29× 29	Q	81	49	20	34
	H	52	31	13	22
4	L	186	113	48	78
	M	138	84	35	58
33× 33	Q	114	69	29	48
	H	76	46	19	32
5	L	253	154	65	106
	M	191	116	49	80
37× 37	Q	157	95	40	66
	H	105	63	27	44
6	L	321	194	82	134
	M	249	151	64	104
41× 41	Q	201	122	51	84
	H	133	81	34	56
7	L	402	244	103	168
	M	311	188	80	130
45× 45	Q	253	154	65	106
	H	167	101	43	70
8	L	493	299	126	206
	M	378	229	97	158
49× 49	Q	301	183	77	126
	H	203	123	52	85
9	L	585	354	150	244
	M	441	267	113	184
53× 53	Q	369	223	94	154
	H	239	145	61	100

Version	Error Correction	Numeric	Alpha-numeric	Kanji	Binary
10	L	690	418	177	287
	M	526	319	135	219
57× 57	Q	433	262	111	180
	H	291	176	74	121
11	L	800	485	205	333
	M	608	368	156	253
61× 61	Q	493	299	126	205
	H	342	207	87	142
12	L	915	555	234	381
	M	694	421	178	289
65× 65	Q	579	351	148	241
	H	390	236	100	162
13	L	1030	624	264	429
	M	790	479	202	329
69× 69	Q	656	398	168	273
	H	454	275	116	189
14	L	1167	707	299	486
	M	877	531	225	365
73× 73	Q	738	447	189	307
	H	498	302	127	207

TABLE 35: CODE TABLE (<ESC>2D32)

QR CODE (NUMERIC MODE)

					S							I	S						O			
				b8	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
				b7	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
b4	b3	b2	b1		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	0	0	0				0												
0	0	0	1	1				1												
0	0	1	0	2				2												
0	0	1	1	3				3												
0	1	0	0	4				4												
0	1	0	1	5				5												
0	1	1	0	6				6												
0	1	1	1	7				7												
1	0	0	0	8				8												
1	0	0	1	9				9												
1	0	1	0	A																
1	0	1	1	B																
1	1	0	0	C																
1	1	0	1	D																
1	1	1	0	E																
1	1	1	1	F																

TABLE 36: CODE TABLE (<ESC>2D32)

QR CODE (ALPHANUMERIC MODE)

					S								S							
				b8	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
				b7	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
b4	b3	b2	b1		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	0	0	0			SP	0		P										
0	0	0	1	1				1	A	Q										
0	0	1	0	2				2	B	R										
0	0	1	1	3				3	C	S										
0	1	0	0	4			$	4	D	T										
0	1	0	1	5			%	5	E	U										
0	1	1	0	6				6	F	V										
0	1	1	1	7				7	G	W										
1	0	0	0	8				8	H	X										
1	0	0	1	9				9	I	Y										
1	0	1	0	A			*	:	J	Z										
1	0	1	1	B			+		K											
1	1	0	0	C					L											
1	1	0	1	D			-		M											
1	1	1	0	E			.		N											
1	1	1	1	F			/		O											

TABLE 37: CODE TABLE (<ESC>2D32)

QR CODE (BINARY MODE)

					S				I				S				O			
				b8	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
				b7	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
b4	**b3**	**b2**	**b1**		**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**A**	**B**	**C**	**D**	**E**	**F**
0	0	0	0	**0**			SP	0	@	P	`	p								
0	0	0	1	**1**			!	1	A	Q	a	q								
0	0	1	0	**2**			"	2	B	R	b	r								
0	0	1	1	**3**			#	3	C	S	c	s								
0	1	0	0	**4**			$	4	D	T	d	t								
0	1	0	1	**5**			%	5	E	U	e	u								
0	1	1	0	**6**			&	6	F	V	f	v								
0	1	1	1	**7**			'	7	G	W	g	w								
1	0	0	0	**8**			(	8	H	X	h	x								
1	0	0	1	**9**			)	9	I	Y	i	y								
1	0	1	0	**A**			*	:	J	Z	j	z								
1	0	1	1	**B**			+	;	K	[	k	{								
1	1	0	0	**C**			,	<	L	\	l	¦								
1	1	0	1	**D**			-	=	M	]	m	}								
1	1	1	0	**E**			.	>	N	^	n	-								
1	1	1	1	**F**			/	?	O	_	o	DEL								

QR code (binary mode) is designable within [00H ~ 7FH, AOH ~ DFH].

TABLE 38: CODE TABLE (<ESC>2D50)

DATA MATRIX CODE

					S				I				S				O			
				b8	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
				b7	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
B4	b3	b2	b1		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	0	0	0			SP	0	@	P	`	p								
0	0	0	1	1			!	1	A	Q	a	q								
0	0	1	0	2			”	2	B	R	b	r								
0	0	1	1	3			#	3	C	S	c	s								
0	1	0	0	4			$	4	D	T	d	t								
0	1	0	1	5			%	5	E	U	e	u								
0	1	1	0	6			&	6	F	V	f	v								
0	1	1	1	7			’	7	G	W	g	w								
1	0	0	0	8			(	8	H	X	h	x								
1	0	0	1	9			)	9	I	Y	i	y								
1	0	1	0	A			*	:	J	Z	j	z								
1	0	1	1	B			+	;	K	[	k	{								
1	1	0	0	C			,	<	L	\	l	¦								
1	1	0	1	D			-	=	M	]	m	}								
1	1	1	0	E			.	>	N	^	n	~								
1	1	1	1	F			/	?	O	_	o	DEL								

Data matrix code is designable within [00H ~ FFH].

TABLE 39: PARAMETERS (<ESC>AR/AX)

RESOLUTION & PRINT AREA

	Model	Print Resolution (Head Density)	Max Print Area	
			Standard Vertical Length	Expand Vertical Length
1	CL408e	203dpi (8dot/mm)	178mm (1424dot)	356mm (2848dot)
2	CL412e	305dpi (12dot/mm)	178mm (2136dot)	356mm (4272dot)
3	M-8400RVe	203dpi (8dot/mm)	178mm (1424dot)	356mm (2848dot)
4	CL608e	203dpi (8dot/mm)	236mm (1888dot)	472mm (3776dot)
5	CL612e	305dpi (12dot/mm)	178mm (2136dot)	356mm (4272dot)
6	M-5900RVe	203dpi (8dot/mm)	178mm (1424dot)	356mm (2848dot)
7	M-10e	305dpi (12dot/mm)	300mm (3600dot)	349mm (4188dot)
8	M-8485Se	203dpi (8dot/mm)	178mm (1424dot)	356mm (2848dot)
9	M-8490Se	305dpi (12dot/mm)	178mm (2136dot)	356mm (4272dot)
10	M-8460Se	203dpi (8dot/mm)	178mm (1424dot)	356mm (2848dot)
11	M-8459Se	203dpi (8dot/mm)	178mm (1424dot)	356mm (2848dot)
12	M-84Pro-2	203dpi (8dot/mm)	178mm (1424dot)	356mm (2848dot)
13	M-84Pro-3	305dpi (12dot/mm)	178mm (2136dot)	356mm (4272dot)
14	M-84Pro-6	609dpi (24dot/mm)	178mm (4272dot)	356mm (8544dot)

TABLE 40A: PARAMETERS (<ESC>PG)

CL408-412E, M8400RVE, CL608-612E, M5900RVE, M8485SE, M8490SE, M8460SE, M8459SE, M84PRO-2, M84PRO-3, M84PRO-6

『CL408e,CL412e,M-8400RVe,CL608e,CL612e,M-5900RVe,M-8485Se,M-8490Se,M-8460Se,M-8459Se,M-84Pro-2,M-84Pro-3,M-84Pro-6』

No	Item	Content
a	Not in use	00H Fixed
b	Not in use	00H Fixed
c	Print Speed CL408e, CL412e Default Value : 02H (4 inch/sec) Range : 2, 3, 4, 5, 6 inch/sec M-8400RVe Default Value : 04H (6 inch/sec) Range : 2, 4, 6, 8, 10 inch/sec CL608e、CL612e Default Value : 04H (6 inch/sec) Range : 4, 6, 8 inch/sec M-5900RVe Default Value : 01H (3 inch/sec) Range : 2, 3, 4, 5, 6 inch/sec M-8485Se Default Value : 06H (8 inch/sec) Range : 4, 6, 8, 10, 12 inch/sec M-8490Se Default Value : 04H (6 inch/sec) Range : 4, 6, 8 inch/sec M-8460Se Default Value : 04H (6 inch/sec) Range : 4, 6, 8 inch/sec M-8459Se Default Value : 02H (4 inch/sec) Range : 2, 3, 4, 5 inch/sec M-84Pro-2 Default Value : 04H (6 inch/sec) Range : 2, 4, 6, 8, 10 inch/sec M-84Pro-3 Default Value : 04H (6 inch/sec) Range : 2, 4, 6, 8 inch/sec M-84Pro-6 Default Value : 01H (3 inch/sec) Range : 2, 3, 4, 5, 6 inch/sec	00H 2 inch/sec 01H 3 inch/sec 02H 4 inch/sec 03H 5 inch/sec 04H 6 inch/sec 05H 7 inch/sec 06H 8 inch/sec 07H 9 inch/sec 08H 10 inch/sec 09H 11 inch/sec 0AH 12 inch/sec
d	Not in use	00H Fixed
e	Not in use	00H Fixed
f	Not in use	00H Fixed
g	Not in use	00H Fixed
h	Print Darkness Specification (Default Value : 41H)	41H A 42H B (Not in use) valid for CL412e, M-8400RVe, M-84Pro-6 43H C (Not in use) valid for M-84Pro-6 44H D (Not in use) 45H E (Not in use) 46H F (Not in use)
h	Print Darkness Level CL408e/412e, M-8400RVe, M-5900RVe M-8459Se, M-84Pro-2/3/6 Default Value : 03H (Density Level 3) Range : Density Level 1, 2, 3, 4, 5 CL608e/612e, M-8485Se/90Se/60Se Default Value : 02H (Density Level 2) Range : Density Level 1, 2, 3	01H Density Level 1 02H Density Level 2 03H Density Level 3 04H Density Level 4 05H Density Level 5
i	Not in use	00H Fixed

TABLE 40B: PARAMETRS (<ESC>PG)

CL408-412E, M8400RVE, CL608-612E, M5900RVE, M8485SE, M8490SE, M8460SE, M8459SE, M84PRO-2, M84PRO-3, M84PRO-6

『CL408e,CL412e,M-8400RVe,CL608e,CL612e,M-5900RVe,M-8485Se,M-8490Se,M-8460Se,M-8459Se,M-84Pro-2,M-84Pro-3,M-84Pro-6』 (Con't)

No	Item	Content
j	0 Slash (Default Value : 01H)	00H Invalid 01H Valid
k	Kanji Code (Default Value : 00H)	00H JIS Code 01H Shift JIS Code
l	Not in use	00H Fixed
m	Default Feed (Default Value : 00H)	00H Invalid 01H Valid
n	Proportional Pitch (Default Value : 01H)	00H Fixed Pitch 01H Proportional Pitch
o	Vertical Label Size (dot)	CL408e : 「01H～590H」 (1～1424) CL412e : 「01H～858H」 (1～2136) CL608e : 「01H～590H」 (1～1424) CL612e : 「01H～858H」 (1～2136) M-8400RVe : 「01H～590H」 (1～1424) M-5900RVe : 「01H～590H」 (1～1424) M-8485Se : 「01H～590H」 (1～1424) M-8490Se : 「01H～858H」 (1～2136) M-8460Se : 「01H～590H」 (1～1424) M-8459Se : 「01H～590H」 (1～1424) M-84Pro-2 : 「01H～590H」 (1～1424) M-84Pro-3 : 「01H～858H」 (1～2136) M-84Pro-6 : 「01H～10B0H」 (1～4272)
p	Horizontal Size (dot)	CL408e : 「01H～340H」 (1～832) CL412e : 「01H～4E0H」 (1～1248) CL608e : 「01H～4C0H」 (1～1216) CL612e : 「01H～7C0H」 (1～1984) M-8400RVe : 「01H～340H」 (1～832) M-5900RVe : 「01H～380H」 (1～896) M-8485Se : 「01H～400H」 (1～1024) M-8490Se : 「01H～540H」 (1～1344) M-8460Se : 「01H～4C0H」 (1～1216) M-8459Se : 「01H～380H」 (1～896) M-84Pro-2 : 「01H～340H」 (1～832) M-84Pro-3 : 「01H～4E0H」 (1～1248) M-84Pro-6 : 「01H～9C0H」 (1～2496)
q	Vertical Correction Pitch Value (dot)	「00H～318H」 (0～792) 「FFFFH～FCE8H」 (-1～-792)
r	Horizontal Correction Pitch Value (dot)	「00H～318H」 (0～792) 「FFFFH～FCE8H」 (-1～-792)
s	Not in use	00H Fixed
t	Not in use	00H Fixed
u	Not in use	00H Fixed
v	Not in use	00H Fixed
w	Not in use	00H Fixed
x	Not in use	00H Fixed
y	Buzzer Sound Setting (Default Value : 00H)	00H YES 01H NIL

TABLE 41: PARAMETERS (<ESC>PG)

M10E

『M-10e』

No	Item	Content
A	Not in use	00H Fixed
b	Not in use	00H Fixed
c	Print Speed (Default Value : 02H)	01H 3 inch/sec 02H 4 inch/sec 03H 5 inch/sec
d	Not in use	00H Fixed
e	Not in use	00H Fixed
f	Not in use	00H Fixed
g	Not in use	00H Fixed
h	Print Darkness Specification (Default Value : 41H)	41H A 42H B (Not in use) 43H C (Not in use) 44H D (Not in use) 45H E (Not in use) 46H F (Not in use)
h	Print Darkness Level (Default Value : 03H)	01H Density Level 1 02H Density Level 2 03H Density Level 3 04H Density Level 4 05H Density Level 5
i	Not in use	00H Fixed
j	0 Slash (Default Value : 01H)	00H Invalid 01H Valid
k	Kanji Code (Default Value : 00H)	00H JIS Code 01H Shift JIS Code
l	Not in use	00H Fixed
m	Default Feed (Default Value : 00H)	00H Invalid 01H Valid
n	Proportional Pitch (Default Value : 01H)	00H Fixed Pitch 01H Proportional Pitch
o	Vertical Label Size (dot)	「1E0H～E10H」 (480～3600)
p	Horizontal Label Size (dot)	「5DCH～C80H」 (1500～3200)
q	Vertical Correction Point Value (dot)	「00H～318H」 (0～792) 「FFFFH～FCE8H」 (-1～-792)
r	Horizontal Correction Point Value (dot)	「00H～318H」 (0～792) 「FFFFH～FCE8H」 (-1～-792)
s	Not in use	00H Fixed
t	Not in use	00H Fixed
u	Not in use	00H Fixed
v	Not in use	00H Fixed
w	Not in use	00H Fixed
x	Not in use	00H Fixed
y	Buzzer Sound Setting (Default Value : 00H)	00H YES 01H NIL

TABLE 42: PARAMETERS (<ESC>PG)

XL400-410E

『XL400e, XL410e』

No	Item	Content
a	Not in use	00H Fixed
b	Not in use	00H Fixed
c	Print Speed XL400e Default Value : 04H (6 inch/sec) Range : 5, 6, 7, 8 inch/sec XL410e Default Value : 03H (5 inch/sec) Range : 4, 5, 6 inch/sec	02H 4 inch/sec (XL410e only) 03H 5 inch/sec 04H 6 inch/sec 05H 7 inch/sec (XL400e only) 06H 8 inch/sec (XL400e only)
d	Not in use	00H Fixed
e	Not in use	00H Fixed
f	Not in use	00H Fixed
g	Not in use	00H Fixed
h	Print Darkness Specification (Default Value : 41H)	41H A 42H B (Not in use) 43H C (Not in use) 44H D (Not in use) 45H E (Not in use) 46H F (Not in use)
h	Print Darkness Level (Default Value : 02H)	01H Density Level 1 02H Density Level 2 03H Density Level 3
i	Not in use	00H Fixed
j	0 Slash (Default Value : 01H)	00H Invalid 01H Valid
k	Kanji Code (Default Value : 00H)	00H JIS Code 01H Shift JIS Code
l	Not in use	00H Fixed
m	Not in use	00H Fixed
n	Proportional Pitch (Default Value : 01H)	00H Fixed Pitch 01H Proportional Pitch
o	Vertical Label Size (dot)	XL400e Label 「98H～780H」 (152～2400) Tag 「C8H～780H」 (200～2400) XL410e Label 「E4H～B40H」 (228～2880) Tag 「12CH～B40H」 (300～2880)
p	Horizontal Label Size (dot)	XL400e Label 「100H～320H」 (256～800) Tag 「100H～320H」 (256～800) XL410e Label 「180H～4B0H」 (384～1200) Tag 「180H～4B0H」 (384～1200)
q	Not in use	00H Fixed
r	Not in use	00H Fixed
s	Not in use	00H Fixed
t	Not in use	00H Fixed
u	Not in use	00H Fixed
v	Not in use	00H Fixed
w	Not in use	00H Fixed
x	Not in use	00H Fixed
y	Buzzer Sound Setting (Default Value : 00H)	00H YES 01H NIL

TABLE 43A: PARAMETERS (<ESC>PG)

CT400-410

No	Item	Content	
a	Not in use	00H	Fixed
b	Not in use	00H	Fixed
c	Print Speed (Default Value：02H)	00H 01H 02H 03H 04H	2 inch/sec 3 inch/sec 4 inch/sec 5 inch/sec（CT400DT/TT only） 6 inch/sec（CT400DT/TT only）
d	Not in use	00H	Fixed
e	Cutter Motion	00H 01H 02H	Motion 1（Head Position） Motion 2（Cutter Positon） Motion 3（No Back-feed）
f	Dispenser Motion	00H 01H	Motion 1（Head Positon） Motion 2（Dispenser Position）
g	Non-sepa Motion	00H 01H	Non-sepa (Cutter Position) Non-sepa (No Back-feed)
h	Print Darkness Specification (Default Value：A)	41H 42H 43H 44H 45H 46H	A B C D E F
h	Print Darkness Level (Default Value：03H)	01H 02H 03H 04H 05H	Density Level 1 Density Level 2 Density Level 3 Density Level 4 Density Level 5
i	Sensor Type (Default Value：01H)	00H 01H 02H	Reflection Sensor Penetration Sensor Sensor Ignore Type

TABLE 43B: PARAMETERS (<ESC>PG)

CT400-410

(Con't)

No	Item	Content
j	0 Slash (Default Value : 01H)	00H Invalid 01H Valid
k	Kanji Code (Default Value : 00H)	00H JIS Code 01H Shift JIS Code
l	Label Specification (Default Value : 00H)	00H Label with Glue 01H Tag without Tag
m	Default Feed (Default Value : 00H)	00H Invalid 01H Valid
n	Proportional Pitch (Default Value : 01H)	00H Fixed Pitch 01H Proportional Pitch
o	Vertical Label Size (dot)	CT400 : 「01H～C80H」 (1～3200) CT410 : 「01H～12C0H」 (1～4800)
p	Horizontal Label Size (dot)	CT400 : 「01H～340H」 (1～832) CT410 : 「01H～4E0H」 (1～1248)
q	Vertical Correction Value (dot)	「00H～318H」 (0～792) 「FFFFH～FCE8H」 (-1～-792)
r	Horizontal Correction Value (dot)	「00H～318H」 (0～792) 「FFFFH～FCE8H」 (-1～-792)
s	Label Pitch Off-set (dot)	「00H～63H」 (0～99) 「FFH～9DH」 (-1～-99)
t	TearOff Off-set (dot)	「00H～63H」 (0～99) 「FFH～9DH」 (-1～-99)
u	Cutter Off-set (dot)	「00H～63H」 (0～99) 「FFH～9DH」 (-1～-99)
v	Dispenser Off-set (dot)	「00H～63H」 (0～99) 「FFH～9DH」 (-1～-99)
w	Control Code	00H Standard Code 01H Non-standard Code
x	Label Gap (dot) CT400DT/TT Default Value : 18H CT410DT/TT Default Value : 24H	「00H～40H」 (0～64)
y	Buzzer Sound Setting (Default Value : 00H)	00H YES 01H NIL
z	Serial Interface Priority Setting (Default Value : 01H)	00H DSW Setting Priority 01H Command Setting Priority

TABLE 44A: PARAMETERS (<ESC>PC)

CL408-412E, M8400RVE, CL608-612E, M5900RVE, M8485SE, M8490SE, M8460SE, M8459SE, M84PRO-2, M84PRO-3, M84PRO-6

『CL408e,CL412e,M-8400RVe,CL608e,CL612e,M-5900RVe,M-8485Se,M-8490Se,M-8460Se,M-8459Se,M-84Pro-2,M-84Pro-3,M-84Pro-6』

No	Item No	Item	Content
b	1	Not in use	0 Fixed
c	2	Not in use	0 Fixed
d	3	Print Speed CL408e, CL412e Default Value : 2 (4 inch/sec) Range : 2, 3, 4, 5, 6 inch/sec M-8400RVe Default Value : 4 (6 inch/sec) Range : 2, 4, 6, 8, 10 inch/sec CL608e, CL612e Default Value : 4 (6 inch/sec) Range : 4, 6, 8 inch/sec M-5900RVe Default Value : 1 (3 inch/sec) Range : 2, 3, 4, 5, 6 inch/sec M-8485Se Default Value : 6 (8 inch/sec) Range : 4, 6, 8, 10, 12 inch/sec M-8490Se Default Value : 4 (6 inch/sec) Range : 4, 6, 8 inch/sec M-8460Se Default Value : 4 (6 inch/sec) Range : 4, 6, 8 inch/sec M-8459Se Default Value : 2 (4 inch/sec) Range : 2, 3, 4, 5 inch/sec M-84Pro-2 Default Value : 4 (6 inch/sec) Range : 2, 4, 6, 8, 10 inch/sec M-84Pro-3 Default Value : 4 (6 inch/sec) Range : 2, 4, 6, 8 inch/sec M-84Pro-6 Default Value : 1 (3 inch/sec) Range : 2, 3, 4, 5, 6 inch/sec	0 2 inch/sec 1 3 inch/sec 2 4 inch/sec 3 5 inch/sec 4 6 inch/sec 5 7 inch/sec 6 8 inch/sec 7 9 inch/sec 8 10 inch/sec 9 11 inch/sec A 12 inch/sec
e	4	Not in use	0 Fixed
f	5	Not in use	0 Fixed
g	6	Not in use	0 Fixed
h	7	Not in use	0 Fixed
i1	8	Print Darkness Specification (Default Value : A)	A B (Not in use) valid in CL412e, M-8400RVe, M-84Pro-6 only C (Not in use) valid in M-84Pro-6 only D (Not in use) E (Not in use) F (Not in use)
i2	9	Print Darkness Level CL408e/412e, M-8400RVe, M-5900RVe, M-8459Se, M-84Pro-2/3/6 Default Value : 3 (Density Level 3) Range : Density Level 1, 2, 3, 4, 5 CL608e/612e、M-8485Se/90Se/60Se Default Value : 2 (Density Level2) Range : Density Level 1, 2, 3	1 Density Level 1 2 Density Level 2 3 Density Level 3 4 Density Level 4 5 Density Level 5

TABLE 44B: PARAMETERS (<ESC>PC)

CL408-412E, M8400RVE, CL608-612E, M5900RVE, M8485SE, M8490SE, M8460SE, M8459SE, M84PRO-2, M84PRO-3, M84PRO-6

『CL408e,CL412e,M-8400RVe,CL608e,CL612e,M-5900RVe,M-8485Se,M-8490Se,M-8460Se,M-8459Se,M-84Pro-2,M-84Pro-3,M-84Pro-6』 (con't)

No	Item No	Item	Content
j	10	Not in use	0 Fixed
k	11	0 Slash (Default Value : 1)	0 Invalid 1 Valid
l	12	Kanji Code (Default Value : 0)	0 JIS Code 1 Shift JIS Code
m	13	Not in use	0 Fixed
n	14	Default Feed (Default Value : 0)	0 Invalid 1 Valid
o	15	Proportional Pitch (Default Value : 1)	0 Fixed Pitch 1 Proportional Pitch
p	16	Vertical Label Size (dot)	CL408e : 1~1424 CL412e : 1~2136 CL608e : 1~1424 CL612e : 1~2136 M-8400RVe : 1~1424 M-5900RVe : 1~1424 M-8485Se : 1~1424 M-8490Se : 1~2136 M-8460Se : 1~1424 M-8459Se : 1~1424 M-84Pro-2 : 1~1424 M-84Pro-3 : 1~2136 M-84Pro-6 : 1~4272
q	17	Horizontal Label Size (dot)	CL408e : 1~832 CL412e : 1~1248 CL608e : 1~1216 CL612e : 1~1984 M-8400RVe : 1~832 M-5900RVe : 1~896 M-8485Se : 1~1024 M-8490Se : 1~1344 M-8460Se : 1~1216 M-8459Se : 1~896 M-84Pro-2 : 1~832 M-84Pro-3 : 1~1248 M-84Pro-6 : 1~2496
r	18	Vertical Correction Pitch Value (dot)	-792~792
s	19	Horizontal Correciton Pitch Value (dot)	-792~792
t	20	Not in use	0 Fixed
u	21	Not in use	0 Fixed
v	22	Not in use	0 Fixed
w	23	Not in use	0 Fixed
x	24	Not in use	0 Fixed
y	25	Not in use	0 Fixed
z	26	Buzzer Sound Setting (Default Value : 0)	0 YES 1 NIL

TABLE 45: PARAMETERS (<ESC>PC)

M10E

『M-10e』

No	Item No	Item	Content
b	1	Not in use	0 Fixed
c	2	Not in use	0 Fixed
d	3	Print Speed (Default Value : 2)	1 3 inch/sec 2 4 inch/sec 3 5 inch/sec
e	4	Not in use	0 Fixed
f	5	Not in use	0 Fixed
g	6	Not in use	0 Fixed
h	7	Not in use	0 Fixed
i1	8	Print Darkness Specification (Default Value : A)	A B (Not in use) C (Not in use) D (Not in use) E (Not in use) F (Not in use)
i2	9	Print Darkness Level (Default Value : 3)	1 Density Level 1 2 Density Level 2 3 Density Level 3 4 Density Level 4 5 Density Level 5
j	10	Not in use	0 Fixed
k	11	0 Slash (Default Value : 1)	0 Invalid 1 Valid
l	12	Kanji Code (Default Value : 0)	0 JIS Code 1 Shift JIS Code
m	13	Not in use	0 Fixed
n	14	Default Feed (Default Value : 0)	0 Invalid 1 Valid
o	15	Proportional Pitch (Default Value : 1)	0 Fixed Pitch 1 Proportional Pitch
p	16	Vertical Label Size (dot)	480～3600
q	17	Horizontal Label Size (dot)	1500～3200
r	18	Vertical Correction Pitch Value (dot)	-792～792
s	19	Horizontal Correction Pitch Value (dot)	-792～792
t	20	Not in use	0 Fixed
u	21	Not in use	0 Fixed
v	22	Not in use	0 Fixed
w	23	Not in use	0 Fixed
x	24	Not in use	0 Fixed
y	25	Not in use	0 Fixed
z	26	Buzzer Sound Setting (Default Value : 0)	0 YES 1 NIL

TABLE 46: PARAMETERS (<ESC>PC)

XL400-410E

『XL400e, XL410e』

No	Item No	Item	Content
b	1	Not in use	0 Fixed
c	2	Not in use	0 Fixed
d	3	Print Speed XL400e Default Value : 4 (6 inch/sec) Range : 5, 6, 7, 8 inch/sec XL410e Default Value : 3 (5 inch/sec) Range : 4, 5, 6 inch/sec	2 4 inch/sec (XL410e only) 3 5 inch/sec 4 6 inch/sec 5 7 inch/sec (XL400e only) 6 8 inch/sec (XL400e only)
e	4	Not in use	0 Fixed
f	5	Not in use	0 Fixed
g	6	Not in use	0 Fixed
h	7	Not in use	0 Fixed
i1	8	Print Darkness Specification (Default Value : A)	A B (Not in use) C (Not in use) D (Not in use) E (Not in use) F (Not in use)
i2	9	Print Darkness Level (Default Value : 3)	1 Density Level1 2 Density Level 2 3 Density Level 3 4 Density Level 4 5 Density Level 5
j	10	Not in use	0 Fixed
k	11	0 Slash (Default Value : 1)	0 Invalid 1 Valid
l	12	Kanji Code (Default Value : 0)	0 JIS Code 1 Shift JIS Code
m	13	Not in use	0 Fixed
n	14	Default Feed (Default Value : 0)	0 Invalid 1 Valid
o	15	Proportional Pitch (Default Value : 1)	0 Fixed Pitch 1 Proportional Pitch
p	16	Vertical Label Size (dot)	XL400e Label 152～2400 Tag 200～2400 XL410e Label 228～2880 Tag 300～2880
q	17	Horizontal Label Size (dot)	XL400e Label 256～800 Tag 256～800 XL410e Label 384～1200 Tag 384～1200
r	18	Vertical Correction Pitch Value (dot)	-792～792
s	19	Horizontal Correction Pitch Value (dot)	-792～792
t	20	Not in use	0 Fixed
u	21	Not in use	0 Fixed
v	22	Not in use	0 Fixed
w	23	Not in use	0 Fixed
x	24	Not in use	0 Fixed
y	25	Not in use	0 Fixed
z	26	Buzzer Sound Setting (Default Value : 0)	0 YES 1 NIL

TABLE 47: PARAMETERS (<ESC>PC)

CT400-410

No	Item NO	Item	Content
b	1	Not in use	0 Fixed
c	2	Not in use	0 Fixed
d	3	Print Speed (Default Value：2)	0 2 inch/sec 1 3 inch/sec 2 4 inch/sec 3 5 inch/sec (CT400DT/TT only) 4 6 inch/sec (CT400DT/TT only)
e	4	Not in use	0 Fixed
f	5	Not in use	0 Fixed
g	6	Not in use	0 Fixed
h	7	Not in use	0 Fixed
i1	8	Print Darkness Specification CT400/410DT Default Value：A CT400/410TT Default Value：B	A B C D E F
i2	9	Print Darkness Level (Default Value：3)	1 Density Level 1 2 Density Level 2 3 Density Level 3 4 Density Level 4 5 Density Level 5
j	10	Sensor Type (Default Value：1)	0 Reflection Sensor 1 Penetration Sensor 2 Sensor Ignore Type
k	11	0 Slash (Default Value：1)	0 Invalid 1 Valid
l	12	Kanji Code (Default Value：0)	0 JIS Code 1 Shift JIS Code
m	13	Label Specification (Default Value：0)	0 Sticky Label 1 Non-sticky Tag
n	14	Default Feed (Default Value：0)	0 Invalid 1 Valid
o	15	Proportional Pitch (Default Value：1)	0 Fixed Pitch 1 Proportional Pitch
p	16	Vertical Label Size (dot)	CT400 : 1～3200 CT410 : 1～4800
q	17	Horizontal Label Size (dot)	CT400 : 1～832 CT410 : 1～1248
r	18	Vertical Correction Pitch Value (dot)	-792～792
s	19	Horizontal Correction Pitch Value (dot)	-792～792
t	20	Label Pitch Off-set (dot)	-99～99
u	21	TearOff Off-set (dot)	-99～99
v	22	Cutter Off-set (dot)	-99～99
w	23	Dispenser Off-set (dot)	-99～99
x	24	Control Code	0 Standard Code 1 Non-standard Code
y	25	Label Gap (dot) CT400DT/TT Default Value：24 CT410DT/TT Default Value：36	0～64
z	26	Buzzer Sound Setting (Default Value：0)	0 YES 1 NIL
a1	27	Serial Interface Priority Setting (Default Value：1)	0 DSW Setting Priority 1 Command Setting Priority

TABLE 48: PARAMETERS (<ESC>LD)

FUNCTION	PARAMETER	CONTENT	STANDARD DEFAULT	NON-STANDARD DEFAULT
Proto Code	a (Hex) b (Hex) c (Hex) d (Hex) e (Hex) f (Hex) g (Hex)	STX ETX ESC ENQ CAN NULL Offline	02H 03H 1BH 05H 18H 00H 40H	{ (7BH) } (7DH) ^ (5EH) @ (5EH) ! (21H) - (7EH)] (5DH)
Auto Online	h (ASCII)	0: Yes, 1: No	0 (30H)	0 (30H)
Zero Slash	i (ASCII)	0: Yes, 1: No	0 (30H)	0 (30H)
Euro Code	j (Hex)	D5H	D5H	D5H

TABLE 49: PARAMETERS (<ESC>EX)

Model	Print Resolution (Head Density)	Standard	Standard Print Area <AR>	Enlargement Print Area <AX>	Standard Enlargement <EX>0
CL408e M-8400RVe CL608e M-5900RVe	203dpi (8dot/mm)	1424dot (178mm)	1424dot (178mm)	2848dot (356mm)	9999dot (1249mm)
CL412e CL612e	305dpi (12dot/mm)	2136dot (178mm)	2136dot (178mm)	4272dot (356mm)	9999dot (833mm)
M-10e	305dpi (12dot/mm)	3600dot (300mm)	3600dot (300mm)	4188dot (349mm)	5040dot (420mm)
XL400e	203dpi (8dot/mm)	2400dot (300mm)			9999dot (1249mm)
XL410e	305dpi (12dot/mm)	2880dot (240mm)			9999dot (833mm)
M-8485Se M-8460Se M-8459Se	203dpi (8dot/mm)	1424dot (178mm)	1424dot (178mm)	2848dot (356mm)	9999dot (1249mm)
M-8490Se	305dpi (12dot/mm)	2136dot (178mm)	2136dot (178mm)	4272dot (356mm)	9999dot (833mm)
M-84Pro-2	203dpi (8dot/mm)	1424dot (178mm)	1424dot (178mm)	2848dot (356mm)	9999dot (1249mm)
M-84Pro-3	305dpi (12dot/mm)	2136dot (178mm)	2136dot (178mm)	4272dot (356mm)	9999dot (833mm)
M-84Pro-6	609dpi (24dot/mm)	4272dot (178mm)	4272dot (178mm)	8544dot (356mm)	

Data inside of （ ） convert the dot (dot) to mm （ mm ）, round off to decimal point.

TABLE 50: PARAMETERS (<ESC>AR)

	Model	Print Resolution (Head Density)	Max Print Area	
			Standard Vertical Length	Expand Vertical length
1	CL408e	203dpi (8dot/mm)	178mm (1424dot)	356mm (2848dot)
2	CL412e	305dpi (12dot/mm)	178mm (2136dot)	356mm (4272dot)
3	M-8400RVe	203dpi (8dot/mm)	178mm (1424dot)	356mm (2848dot)
4	CL608e	203dpi (8dot/mm)	236mm (1888dot)	472mm (3776dot)
5	CL612e	305dpi (12dot/mm)	178mm (2136dot)	356mm (4272dot)
6	M-5900RVe	203dpi (8dot/mm)	178mm (1424dot)	356mm (2848dot)
7	M-10e	305dpi (12dot/mm)	300mm (3600dot)	349mm (4188dot)
8	M-8485Se	203dpi (8dot/mm)	178mm (1424dot)	356mm (2848dot)
9	M-8490Se	305dpi (12dot/mm)	178mm (2136dot)	356mm (4272dot)
10	M-8460Se	203dpi (8dot/mm)	178mm (1424dot)	356mm (2848dot)
11	M-8459Se	203dpi (8dot/mm)	178mm (1424dot)	356mm (2848dot)
12	M-84Pro-2	203dpi (8dot/mm)	178mm (1424dot)	356mm (2848dot)
13	M-84Pro-3	305dpi (12dot/mm)	178mm (2136dot)	356mm (4272dot)
14	M-84Pro-6	609dpi (24dot/mm)	178mm (4272dot)	356mm (8544dot)

TABLE 51: PARAMETERS (<ESC>G)

Model	H Direction Maximum Byte	V Direction Maximum Byte
CL408e、M-8400RVe、M-84Pro-2	104	178
CL412e、M-84Pro-3	156	267
CL608e、M-8460Se	152	178
CL612e	248	267
CT400DT/TT	104	400
CT410DT/TT	156	600
M-5900RVe、M-8459Se	112	178
M-10eDT/TT	400	450
XL400e	100	240
XL410e	150	360
M-8485Se	128	178
M-8490Se	168	267
M-84Pro-6	312	534

TABLE 52: REFERENCE (<ESC>YS)

INVALID COMMANDS

Category	Command	Command Name
Control	<Q>	Print Number Specification
	<ID>	JOB ID No Specification
	<WK>	JOB Name Specification
Modification	<&>	Form Overlay Register Specification
	<F>	Sequential Number Specification
	<0>	Part Editing Function Specification
	<RM>	Mirror Rotate Specification
Font	<T1>	16×16 dot Foreign Character Register Specification
	<T2>	24×24 dot Foreign Character Register Specification
Barcode	<BT>	Barcode Ratio Register Specification
2-D Code	<BQ>	QR Code
	<BV>	MAXI Code
	<BK>	PDF417
	<BX>	Data Matrix
Graphic	<G>	Graphic Print Specification
	<GM>	BMP File Print Specification
	<GP>	PCX File Print Specification
System	<CS>	Print Speed Specification
	<#E>	Print Darkness Specification
	<~>	Multiple Cut Specification
	<C>	Re-print Specification
	<*>	Clear Specification
	<@>	Offline Specification
	<OL>	Online Specification
	<EX>	Expandable Memory Specification
Memory Card	<BJF>	Memory Card Format Specification
	<GI>	Graphic Register Specification
	<GT>	BMP File Register Specification
	<PI>	PCX File Register Specification
	</D>	Field Print Specification
	<BJS>	Memory Card Status Print Specification

TABLE 53: PARAMETERS (<ESC>&S)

【Size Specification Range of Window Horizontal Direction】

Model	Valid Range (dot)	Model	Valid Range (dot)
CL408e	1～832	CL412e	1～1248
M-8400RVe	1～832	CL612e	1～1984
CL608e	1～1216	CT410DT/TT	1～1248
CT400DT/TT	1～832	M-10eDT/TT	1～3200
XL400e	1～800	XL410e	1～1200
M-5900RVe	1～896	M-8490Se	1～1344
M-8485Se	1～1024	M-84Pro-3	1～1248
M-8460Se	1～1216	M-84Pro-6	1～2496
M-8459Se	1～896		
M-84Pro-2	1～832		

【Size Specification Range of Window Vertical Direction】

Model	Valid Range (dot)	Model	Valid Range (dot)
CL408e	1～1424	CL412e	1～2136
M-8400RVe	1～1424	CL612e	1～2136
CL608e	1～1424	CT410DT/TT	1～4800
CT400DT/TT	1～3200	M-10eDT/TT	1～3200
XL400e	1～2400	XL410e	1～2880
M-5900RVe	1～1424	M-8490Se	1～2136
M-8485Se	1～1424	M-84Pro-3	1～2136
M-8460Se	1～1424	M-84Pro-6	1～4272
M-8459Se	1～1424		
M-84Pro-2	1～1424		

TABLE 54: PARAMETERS (<ESC>GI)

MAXIMUM BYTES

Model	Horizontal Direction Max Byte	Vertical Direction Max Byte
CL408e、M-8400RVe、M-84Pro-2	104	178
CL412e、M-84Pro-3	156	267
CL608e、M-8460Se	152	178
CL612e	248	267
M-5900RVe、M-8459Se	112	178
M-10eDT/TT	400	450
XL400e	100	240
XL410e	150	360
M-8485Se	128	178
M-8490Se	168	267
M-84Pro-6	312	534

GLOSSARY

GLOSSARY	
AC	(Alternating Current) Electrical current that reverses its direction regularly and continually.
Accessory	An optional assembly that may be used to provide an additional function.
Active Tags	RFID tags which use batteries as partial or complete source of power which are further differentiated by separating them into those with replaceable batteries and those which have the batteries inside a sealed unit. Also referred to as Utilized Active Tags.
Addressability	The ability to address bits, fields, files, or other portions of the storage in an RFID tag.
Advance	To bring forward - the opposite of retract.
Allen Screw	A screw whose head has a hexagonal recess to be driven by an allen wrench.
Aluminum	A silvery, light-weight, metal that resists corrosion.
Anti-Static	Resists static electricity.
Arc	A bow-like curved line or object. The band of sparks between to closely placed electrodes when current leaps the gap from one to the other.
ASCII	(American Standard Code for Information Interchange) The most common format for text files in computers and on the internet. In a ASCII file, each alphabetic, numeric, or special character is represented with a 7-bit binary number (a string of seven 0s or 1s). 128 possible characters are defined.
Assembly	The fitting together of parts, components, or sub-assemblies to form a complete unit.
Asynchronous	A type of two-way communication that occurs with a time delay, allowing participants to respond at their own convenience. This communication allows characters to be sent at irregular intervals by preceding each character with a start bit and following it with a stop bit. The timing of the transmission is not determined by the timing of the previous character.
Audible	A sound loud enough to be heard.
Batch	A grouping of anything.
Baud	The number of signaling elements that occur each second; or stated differently, the number of changes to the transmission media per second in a modulated signal. At slow speeds, one bit of information (signaling element) is encoded in each electrical change. The baud therefore, indicates the number of bits per second (bps) that are transmitted. Assuming asynchronous communication, which requires 10 bits per character, this translates to 30 characters per second (cps). For slow rates, (below 1200 baud), the baud can be divided by 10 to see how many characters per second are sent. At higher speeds, it is possible to encode more than 1 bit in each electrical change. Thusly, 4800 baud may allow 9600 bits to be sent each second. At high data transfer speeds, data transmission rates are usually expressed in bits per second (bps) rather than baud.
Bi-Directional	Capable of operating in two directions along the same plane or medium. In the case a communication cable or an RFID tag, one that transmits as well as receives, read and written.
Binary	A numeral system that represents numeric values using two symbols, typically 0 and 1. A binary number can be represented by any sequence of bits (binary digits), which in turn may be represented by any mechanism capable of being in two mutually exclusive states.
Bits	Refers to a single digit in the binary numeral system. A bit can either be *on* or *off* - a 1 or 0. A byte is a collection of eight bits.
Block Diagram	Shows the interconnections between system components by using a pictorial representation of a system and sub-systems linked to illustrate their relationships.
Bolt	A threaded metal rod with a flanged head that is used with a nut to hold parts together.
Bore	A hole in, or through something.

GLOSSARY	
Bytes	A collection of 8 bits used in the binary system.
Capacity	As it relates to RFID, the number of bits or bytes that can be programmed into a tag. This may represent the bits accessible to the user or the total number - including those reserved to the manufacturer (e.g., parity or control bits).
Capture Window/Field	Region of the scanner field in which an RFID tag will operate.
Cavity	A recessed area in something. In the case of a die set, the core is one of two part with the core being its mating half.
Chamfer	To slice off the corners of an angle to create a beveled edge.
Character	Any single numeral, letter, or symbol.
Chassis Assembly	A group of components or sub-assemblies that comprise the base of an assembly.
Circumference	The periphery of a circle or other rounded object - also the measurement of this distance.
Circuit	A network of wires, resistors, and other electronic devices over which electrical impulses travel.
Clockwise	To rotate from left to right.
Closed Systems	As it relates to RFID, a system in which relevant data regarding the attributes of the object is stored in a common database accessible via data link by referencing the individual ID code.
Collar	A sleeve applied to a rod, shaft, or pipe to prevent sideward motion.
Component	A single part that may applied to others to form an assembly.
Composite	An object that is comprised of, or layered with, two or more materials to achieve a desired outcome.
Concave	A curved recess or hollow - the opposite of convex.
Concentric	Multiple items that share a common center - example: a circle centered within a circle.
Configuration	The arrangement of parts or components to operate in unison for a specific activity.
	To program software to enable, disable, or specify how various features will function.
Connector	Devices for joining electrical and electronic circuits through coupling. Typically, one mating half is a plug (male) and the other is a socket (female).
Convex	A spherical shaped surface - one that is curved outward.
Core	The protruding portion of a die set. The core is one of two parts and the cavity being its mating half. The core is convexed and the cavity is concaved.
CPU	(Central Processing Unit) A programmable device that performs all the instruction, logic, and mathematical processing in a computer - is the brains of the computer. The CPU is a microchip that is installed on a motherboard (primary board) that coordinates hardware components. Also referred to as “processor”.
Counter-Clockwise	To rotate from right to left.
Couple	Two mating halves that are connected - example: a plug or receptacle.
Cubic	The X, Y, and Z axis all being equal in size - a three-dimensional object that is equally proportioned.
Current	The flow or rate of flow of electric force.
Cycle	A single revolution of a potentially reoccurring activity - in the case of printer, one label being printed.
DC	(Direct Current) Electrical current flowing in a single direction.
Density	The quantity within a given or specific area or unit.
Deviation	A change in course or the measurement of that change.
Diameter	A straight line from the outer edge of a circle, through the center, and onward to the opposite edge. Also the measurement of that distance (dimension).
Dimension	Any measurable distance.

GLOSSARY	
Diode	Allows current to flow in one direction but not the other to protect sensitive electronics. A diode functions by compositing two conductive materials with one possessing low resistance to electrical current on one side and high resistance on the other.
Dipswitch Complex	A group of tiny switches directly attached to a circuit board to enable configuration for a particular type of application. These switches are two-position: On/Off.
Direct Thermal	The printing method that uses a chemically coated heat sensitive media. Once the heat from the thermal printhead is applied to the media, the media darkens with the image. Direct thermal printing does not require ribbon and is typically used in applications where the label needs to endure for a year or less.
Disable	To deactivate or make unable to function.
Divergent	To deviate from the norm or to possess opposing positions.
DPI	(Dots Per Inch) The quantity of printed dots within a square inch area - the print density.
DRAM	(Dynamic Random Access Memory) DRAM is the most common kind of RAM and is a network of electrically-charged points in which a computer stores quickly accessible data in the form of 0s and 1s. Each storage or memory cell can be directly accessed if the intersecting row or column is known. Each cell consists of a capacitor and a transistor.
Drive Train	The components and sub-assemblies that comprise the mechanical apparatus of motion or kinetic energy.
Eccentric	Multiple items that do not share the same center - example: a circle whose center axis is not the same as that of another to whom it is connected. The opposite of concentric.
E-Clip	Type E snap ring.
EEPROM	(Electrically Erasable Programmable Read-Only Memory) Are ROM chips that do not have to be removed to be rewritten. Nor does the entire chip have to be completely erased to change a specific portion. Changing the contents does not require additional dedicated equipment. The localized application of an electric field to each cell erases the targeted cells which can be rewritten. Since only 1 byte can be changed at a time, EEPROM's are versatile but slow.
Electronic Label	A label that has an electronic RFID tag embedded within.
Electromagnetic Coupling	In RFID, a system that uses a magnetic field as means of transferring data or power.
Electrostatic Coupling	In RFID, a system which uses the induction of voltage on a plate as a means of transferring data or power.
Ellipse	An oval shape that is symmetrical on either side of its center when divided into quadrants.
Embossed	Characters or graphics that are raised above the remaining surface.
Enable	To activate or make able to function.
Encompass	To surround, encircle, or contain.
Error Correcting Code	(ECC) In RFID, supplemental bits in a data transfer used in conjunction with a polynominal algorithm in order to compute the value of missing or erroneous data bits. Example: for a 32-bit data transmission, seven additional bits are required.
Error Correcting Mode	Relative to RFID, a mode of data communication in which missing or erroneous bits are automatically corrected.
Error Correcting Protocol	Relative to RFID, the rules by which the error-correcting mode operates.
Error Management	In RFID, the techniques used to ensure that only correct information is presented to the system's user.
Error Rate	In RFID, the number of errors per number of transactions.
Exciter	In RFID, the electronics which drive an antenna. When coupled with antenna, they are collectively referred to as a scanner. Also referred to as a transmitter.
Expansion Port	A plug accessing additional 1/0 capability on a computer or peripheral device.
Eye-Mark Media	Print media with a mark on the paper backing between each label for the label sensor to read. This mark is used by the printer to identify the end of the printed label so that the next up can be properly positioned for printing.

GLOSSARY	
Factory Programming	Relative to RFID, the programming of information into a tag occurring as part of the manufacturing process resulting in a read-only tag.
Field Programming	In RFID, programming that usually occurs before the tag is installed on the object to be identified enabling the introduction of data relevant to the specifics of the application. However, the tag would typically have to be removed from its object.
Field Protection	In RFID, the ability to limit the operations that can be performed on portions of data fields stored in a tag.
Fillet	To round off the sharp edges of the angle.
Flange	The projecting rim of an object used to keep another object or objects in place.
Flash Memory	A form of rewritable memory chip that allows multiple memory locations to be erased or written in one programming operation. Flash Memory is very high-speed and non-volatile - does not need power to maintain the stored information. Its information is stored in an array of floating gate transistors called “cells”.
Font	A type or style of letter or numeral characters used in written text.
Frequency	The number of times a signal executes a complete excursion through its maximum and minimum values and returns to the same value. The number of vibration cycles.
Gap Media	Print media with a space between each label where only the paper backing exists. The printer’s sensor uses this “gap” to identify when the printed label ends and to properly position the next label for printing.
Gauge	A unit of measurement used to describe the nominal thickness of wire. The higher the gauge number, the smaller the diameter.
Gear	A system of toothed wheels meshed together so that the motion of one is passed on to the others.
Gigabytes	Used to describe data transfer rates or storage capacity of 1 billion bytes.
Groove	An elongated slot cut into an object.
Hertz	Radio waves or other electromagnetic radiation resulting from oscillations of electricity in a conductor. Also the measurement of those oscillations.
Hexidecimal	A numbering system composed of six letters (A-F) and ten numbers (0-9) used to condense binary numbers.
Hex Screw	A threaded rod having a flanged head that is comprised of six sides - a type of hardware used to attach two or more objects.
Hole	In engineering: a recess that does not penetrate completely through as a bore or orifice. Term may be casually used in lieu of a bore or orifice.
Horizontal	On a level plane ninety-degrees from vertical.
Hz	(Hertz) Radio waves or other electromagnetic radiation resulting from oscillations of electricity in a conductor. Also the measurement of those oscillations.
Icon	An image or picture that has a specific meaning.
I.D. Filter	In RFID, software that compares a newly read ID with those in a database or set.
Idle Gear	A toothed wheel that is not directly driven, but instead receives motion from another.
Idle Roller	A non-toothed wheel that is not driven - in the case of printers, it is typically used to provide tension on a timing belt. Also referred to as “tension roller”.
Illuminate	To give or emit light.
Inductive Coupling	In RFID, systems that use the inducing of a current in a coil as a means of transferring data or power.
Intermittent	Stopping and starting again at intervals.
In-Use Programming	The ability to read from, and write to, an RFID tag while attached to its object.
Junction	A place or point of joining or crossing.
Kinetic	The science dealing with the motion of masses in relation to the forces acting on them.

GLOSSARY	
Key	The button on a panel that may be pressed to send an electrical signal to influence a predetermined activity.
Keyed	A physical object shaped in a manner so as to prevent unwanted movement or to ensure desired movement.
Kg	(Kilogram) A unit of weight measure within the metric system.
Kilo-Bytes	Used to describe data transfer rates or storage capacity of approximately 1000 bytes.
Knob	A rounded handle to facilitate the manual opening, closing, securing, or otherwise movement of the object to which it is attached.
Knurled	An item that has recessed grooves or elevated areas on its surface to increase manual grip.
Label	Print media that has been used or printed upon that has adhesive on one side.
LAN Interface	(Local Area Network) A computer network limited to the immediate area, consequently capable of transmitting data at a very fast rate. Usually the computer is limited to the same building, or floor of a building, as the periphery device.
Latch	An object that is designed to be moved from one position to another for the purpose of preventing or allowing the opening of another object.
Lateral	Movement to the left or to the right - horizontal movement.
LCD	(Liquid Crystal Display) A display technology involving optical glass panels whose opacity can be controlled by electrical signals. A liquid crystal surface is sandwiched between two polarizing panels and when voltage is applied to certain areas, the crystal darkens. A light source behind the panel transmits through the transparent crystals and is mostly blocked by the darkened ones.
LED	(Light Emitting Diode) A semiconductor light source that emits visible light or invisible infrared radiation. The color of the emitted light depends on the chemical composition of the semiconducting material used.
Lever	An object that turns on a fixed point usually to engage or disengage a latch.
Laminate	A film or sheet placed onto and adhered flatly over another material.
Life	Relative to RFID, the functional period within which maintenance, adjustment, and repair is not reasonably expected.
Linear	The measurement of length without consideration of other dimensions.
Linerless Media	Print media that does not have a space between each label as does the eye-mark and gap type media. This media is continuous and is divided based on printer programming.
Link	An active connection to another document, graphic, or address. By selecting the designated button, text, graphic, or screen location; one is taken to the predetermined linked location.
M	(Meter) A unit of measure in the metric system equal to 39.37 inches.
MB	(Megabytes) Used to describe data transfer rates or storage capacity of approximately 1 million bytes depending on the manner of compression.
MM	(Millimeter) A unit of measure in the metric system equal to 0.03937 (1/25) inches.
Media	In printing, a batch of unprinted labels or tags.
Megabytes	Used to describe data transfer rates or storage capacity of approximately 1 million bytes depending on the manner of compression.
Menu	A display of items that may be chosen.
Meter	A unit of measure in the metric system equal to 39.37 inches.
Millimeter	A unit of measure in the metric system equal to 0.03937 (1/25) inches.
Module	A self-contained unit that may be plugged into another unit to operate.
Multimeter	A device that is used to measure output units relating to electrical current.
Memory Card	Relative to RFID, a read/write or reprogrammable tag in credit card size.
Memory Modules	A read/write or reprogrammable RFID tag.
Mobile Inventory Vehicle	In RFID, a vehicle equipped with a system for locating tagged vehicles, containers, and other objects for the purpose of inventory control.

GLOSSARY	
Modulation	In RFID, the methods of altering carriers in order to transmit the encoded information.
Nest	A set of similarly shaped objects with one smaller and resting within the other.
Nominal	The point between a positive and negative deviation which is considered to be optimum.
Nut	A small metal block with a threaded hole through its center for screwing onto a bolt.
Nylon Material	A milky-white, synthetic material used in manufacturing that is purchased in blocks and machined to the desired shape - resembles plastic.
Offset	In label printing, it is the repositioning distance that the printer must make after advancing the printed label for cutting or dispensing. The offset is the distance that the media must be retracted following one of those activities so that printing may again take place.
Omni-Directional	The ability of an RFID tag to operate in any orientation.
Orientation	Having to do with the manner or angle of placement.
Orientation Sensitivity	In RFID, the range or measurement of decreased readability by non-optimal orientation.
Orifice	An opening for which something is to pass through - similar to a bore.
O-Ring	A typically circular object made of round, elastic material to provide a seal between two objects.
Oscillate	To move back and forth along a span.
Pan Head Screw	A threaded rod with a rounded, flanged head used to attach multiple object together.
Paper	In printing applications, the temporary backing for print media. The paper is removed following printing so the label may be applied.
Parallel	Objects extending in the same direction maintaining the same distance part.
Parallel Interface	An interface between computer and printer where the computer sends multiple bits of information to the printer simultaneously by sending each bit over a separate wire.
Parameter	The span or area that something is allowed to exist or operate.
Parity	A simple form of error checking that is used in serial communication. A parity bit is a binary digit that is added to a group of bits to detect the presence of an error. The parity bit take on the value of an 0 or a 1 to satisfy a constraint on the overall parity of a binary number. The parity scheme in use must be specified as even or odd. Parity is even if there are an even number of 1 bits, and odd otherwise. None may also be chosen.
Passive Tags	Passive RFID tags that do not contain an internal power source. They are externally powered and typically derive their power from the carrier signal radiated from the scanner.
PC	(Personal Computer) An electronic computing device that may be individually and independently used or coupled to other similar devices.
Perforation	A series of through-holes in a material to facilitate tearing apart.
Perpendicular	At right angles to a given line or plane - a vertical line is perpendicular to a horizontal one and vise-versa.
Phenolic Material	A black, synthetic material used in manufacturing that is purchased in blocks and machined to the desired shape - resembles plastic.
Pinion Gear	A smaller gear meshed with a larger one.
Pitch	Physical top of form of media placed under the print head elements in the feed direction.
Plastic	A synthetic material typically rigid in nature that is molded to its useful shape. Plastic is typically injection molded along with its color additive and may be of any color chosen.
Post	A pin or shaft to which an object may be tethered or latched.
Potentiometer	A variable resistor used to adjust voltage to affect various mechanical activities. This electronic component is comprised of two terminals connected to either end of an resistive element and a conductor that can be moved between the two ends, thus allowing the creation of a resistor or voltage divider.
Primary	Something first in order or importance.
Print Assembly	The sub-assembly of a printer that comprise the printing components.

GLOSSARY	
Print Head	The device on a direct thermal or thermal transfer printer containing the heating elements that causes an image to be transferred to print media.
Processor	A programmable device that performs all the instruction, logic, and mathematical processing in a computer - is the brains of the computer. The processor is a microchip that is installed on a motherboard (primary board) that coordinates hardware components. Also referred to as “CPU”.
Profile	A side view of an item.
Program	To enter or send to the processor, the control parameters for electronic equipment to operate.
Proportional	To be equal.
Proximity Sensor	A device that detects and signals the presence of a selected object at, or near, the sensor’s location.
Pulley	A toothed wheel for providing movement to a belt.
Quadrant	One quarter of the circumference of a circle.
Radial	Branching out in equal distances from a common center.
Radius	A straight line from the center of a circle or sphere to its periphery - also the measurement of its distance.
RAM	(Random Access Memory) A network of electrically-charged points in which a computer stores quickly accessible data in the form of 0s and 1s. Each storage or memory cell can be directly accessed if the intersecting row or column is known.
Ratio	The quotient of one quantity divided by another of the same kind.
Reader	Relative to RFID, a device containing the digital electronics which extract and separate the information from the format definition and error management bits.
Read/Write	Relative to RFID, many applications require that new data or revisions to data already in the tag, be entered while it remains on the object. Some items with this capability of being re-programmable are read/write tags, memory cards, or memory modules.
Receive Buffer	An area of temporary data storage to help compensate for differences in the transfer rate and the processing ability of the printer.
Receptacle	A female connector to which a male connector may be inserted - typically for electrical current.
Relay	A simple electro-mechanical switch made up of an electromagnet and a set of contacts. Relays use a small amount of power to energize things that require a greater amount of energy. Sometimes relays are serial connected so that one smaller relay activates a larger relay which in turn, activates another larger still, and so on until the thing that is desired to be activated - is.
Retain	To keep or to hold in place.
Retract	To withdraw - the opposite of advance.
Resistor	A two-terminal electrical or electronic component that resists the flow of current producing a voltage drop between its terminals in accordance with Ohm’s law. This electrical resistance is equal to the voltage drop across the resistor, divided by the current that is flowing through it.
RF/AIS	(Radio Frequency Automatic Identification Systems)
RF/DC	Systems that communicate over a radio link between a host computer and a data source. RF/DC enhances the capabilities of automatic ID Systems by providing the capabilities of hare-wire data communications without the physical restrictions interconnecting wires.
RFID	(Radio Frequency Identification) A method of identifying unique items using radio waves. Typically, a reader communicates with a tag, which holds digital information in a microchip. But there are chipless forms of RFID tags that use material to reflect back a portion of the radio waves beamed at them.

GLOSSARY	
RFID Tags	A system of finding the position or location of assets. A microchip attached to an antenna that is packaged in a way that it can be applied to an object. The tag picks up signals from, and sends signals to, a reader. The tag contains a unique serial number, but may have other information and come in many forms, such as smart labels that can have a barcode printed on it, or can simply be mounted inside a carton or embedded in plastic. RFID tags can be active, passive, or semi-passive. Each tag broadcasts a signal to be received by three reader antennas. The time each signal is received is passed on to a software system that uses triangulation to calculate the location of the asset.
Ribbon	A thin, flexible strip with layers of material; one of which contains ink used to produce an image on print media.
Ribbon Core	A thick cardboard sleeve onto which ribbon is wound.
Rigid	Not flexible - stiff.
ROM	(Read-Only Memory) ROM is a memory chip. It is programmed with specific data when it is manufactured. There are five basic types: ROM, PROM, EPROM, EEPROM, and Flash Memory. Each type has unique characteristics, but they all are types of memory that have two things in common: the stored data is non-volatile (not lost when power is removed) and the stored data is unchangeable or requires a special operation to do so. ROM chips contain a grid of columns and rows. A diode is used to connect the lines and gain access to the data if the value is 1. If the value is 0, the lines are not connected and access is denied.
RPM	(Revolutions Per Minute) The number of cycles within the time span of one minute.
Route	The path or course taken to get from one location to another - example: the routing of a cable within a machine.
SAM	(Serial Access Memory) Stores data as a series of memory cell that can only be accessed sequentially. Works very well for memory buffers where data is normally stored in the order in which they will be used.
SBPL	(SATO Basic Programming Language)
Scale	The units to measure distance - or a short tool for measurement. To increase or decrease the proportionate size of an object - example: text or graphics on a printed label.
Scanner	In RFID, an antennas transmitter and receiver electronics integrated in a single package.
Screen	An electronic display.
Seat	To nest or couple one object to another. The same as to nest.
Secondary	The next to follow the primary in sequence or importance.
SEMBL	A SATO specific mode of printer operation that can execute the program of BASIC format in the printer. This allows the printer to be configured and operated without interfacing with an external computer or software.
Sensitivity	The degree of ease or difficult to gain a response - example: a sensor transmitter signal may require increase to penetrate the thickness of print media in order to be receipted by its receiver.
Sensor	A device that responds to a physical stimulus and produces and electronic signal.
Separation	The operational distance between two RFID tags.
Sequential	One to follow another in a specified order - examples: 1, 2, 3; A, B, C.
Serial Interface	A general-purpose interface that can be used for almost any type of device in which only 1 bit of communication is transmitted at a time.
Set Screw	Attachment hardware specifically used to secure an object may be moved in a specific position or location.
Shaft	Any rod, bar, or tube.

GLOSSARY	
Simultaneous	To take place at the same time.
Sleeve	A thin hollow material that is inserted onto another to provide proportionate spacing.
Snap Ring	A circular clip that may be applied to a shaft, etc. to prevent another object from moving - used to retain objects in position.
Solid	An item that is not porous.
	An item that is not transparent or translucent.
Spacer	Any object of purpose to maintain a specific distance from two other objects - example: a sleeve or washer.
Spindle	A shaft or rod that is fixed on one or both ends and spins on its axis while maintaining its projection.
SRAM	(Static Random Access Memory) A type of memory that is faster and more reliable than the more common DRAM. The term *static* is derived from the fact that it doesn't need to be refreshed like DRAM.
Stainless Steel	A shiny, mirror-like carbon steel alloyed with chromium to inhibit rust.
Steel	Metal that contains a specific percentage of carbon. The percentage of carbon determines its strength, in addition to how prone it is to rust.
Stepper Motor	An electrical motor designed to rotate in both directions and to move in incremented distances.
Sub-Assembly	A group of components assembled to form a complete unit that is a part of a larger unit.
Switch	A small mechanical device when altered sends an electrical signal to influence a predetermined activity. Unlike a button or key, switches may have multiple positions.
Tag	The transmitter/receiver pair of transceiver plus the information storage mechanism attached to the object. It is referred to as the tag, transponder, electronic label, code plate, and various other terms. Although transponder is technically the most accurate, the most common term, and the one preferred by the Automatic Identification Manufacturers, is tag.
Thermal Transfer	The printing method that creates an image by transferring ink from a heat activated ribbon onto the media using the heat from a thermal printhead. A printhead is composed of a set of pins referred to as "elements" which may be selectively heated through electrical induction. Regular paper media is used in this application in conjunction with the heat sensitive ribbon. The ribbon deposits a coating of dark material onto the paper when exposed to intense heat. Thermal transfer printing is more durable than direct thermal printing and is often used when a label needs to endure longer than a year.
Thermodynamics	The science that deals with the relationship of heat and mechanical energy - also the conversion of one into the other.
Threads	The spiral grooves on the shaft of a screw,
Three-Dimensional	The three projectories of an object: X axis is the distance left and right, the Y axis is the distance up and down, and the Z axis is the distance inward and outward.
Torsion Spring	A piece of wire bent into a spiral and connected on each end by different objects to allow them to be pulled apart and then automatically return to their original position once released.
Transformer	A device used to increase or decrease electricity's voltage and current. The device consists of one or more windings (typically copper) which, the ratio of the number of turns inversely determines the voltage change. The windings are wrapped around a magnetic core affecting magnetic induction.
Transistor	A device used to amplify a signal or open and close a circuit. Is constructed of a semiconductive material and is comprised of three terminals where one can be used to control the flow of current through the other two.
Translucent	When a medium is of a condition so as to allow light to filter.
Transparent	When a medium is of a condition so one can see through it unfettered.
Transponder	The part of a tag that includes the antenna and that is used to emit a response to a signal.
Tread	The act of an object making repetitive contact upon another that is in motion.

GLOSSARY	
Troubleshoot	The act of locating the source of a problem or problems.
Two-Dimensional	Two of the projectories of an object: X axis is the distance left and right and the Y axis is the distance up and down. In a two-dimensional perspective, the Z axis is not recognized.
Uniform	The state of multiple objects being the same.
Units	Any fixed quantity, measure, etc.
USB Interface	(Universal Serial Bus) An external peripheral interface standard for communication between a computer and external peripherals over a cable using bi-serial transmission.
Value	The quantity for which a symbol stands.
Vertical	A plane or axis that is plum - the Y axis.
Voltage	The units of electrical force - the ampere current that flows through a conductor.
Volume	The amount of space occupied in three dimensions - cubic contents.
	The strength or loudness of sound.
Washer	A flat disk of metal, rubber, etc., used to make a seat for the head of a bolt, screw, or nut.
Wattage	The amount of electrical power to operate an electrically powered device - arrived by multiplying amperage by voltage.
Wear	To diminish in quality by repetitive activity.
Wireless	Operates with electromagnetic waves and not with conducting wire.
Wiring Harness	Multiple electrical wires bundled together.
X-ON/X-Off	A protocol for controlling the flow of data between computers and other devices on an asychronous serial connection. For example, a computer typically sends data to a printer faster than the printer can print. The printer contains a buffer where data is stored until it catches up, a small microprocessor in the printer sends back an Xoff signal to stop sending data. When enough data is printed and the buffer storage becomes free, the printer sends an Xon signal to resume sending data.

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