TOSHIBA

TOSHIBA TEC EUROPE Retail Information Systems

TRST-A1x ESC-Sequenzen
TRST-A10 & TRST-A15

Version 1.3

Der schnellste Bondruck…
… hat jetzt 2 Seiten

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CHANGE RECORD				
REV	DATE	Page	DESCRIPTION OF CHANGE	APPROVAL
1.0	31/Jul/06		Initial version	
1.1	13/Oct/06	P.1 P.2~5 P.27 P.66 P.67 P.67,68 P.69,74~77 P.68	Add basic functions of USB I/F & Parallel I/F Add 'WinDriverUsed' in table Add command of Print Raster Graphics (Windows driver only) Change format of Print Current Configuration Add comment I/F card concern Separate each I/F card mount Add comment 'Doesn't print at Windows driver' Add SET DIRECTION of Parallel I/F card mount	
	19/Oct/06	P.1 P.7 P.65 P.68 P.69,74~77 P.74 P.75 P.75 P.75	Add Code page of 437 & 858 Change Default of Character Pitch & Character Set Separate Main Menu format to each printer Add SET USB INTERFACE TYPE Change comment 'The set countent is invalid at Windows driver' Add Code page of 437 & 858 Add comment 'This setting is 'GENT dual' only' Add comment 'Doesn't print at Windows driver' Add notes of print mode concern	
1.2	27/Oct/06	P.11 P.20 P.20 P.24 P.68 P.70 P.70	Change calculate unit of Set Line Spacing Modify command name to Select character code table Delete command 'ESC R' Modify function of Select International Character Set by 'ESC R' Xxxx in Fig. Change select name of USB INTERFACE TYPE Delete SET DIRECTION of Parallel I/F card mount	
	30/Oct/06	P.69 P.73	Change default setting in 'SET BAUD RATE' Change default setting in 'SET CARRIAGE RETURN USAGE''	
	9/Nov/06	P.20 P.57	Add Code page of 437 & 858 on ESC t Add Code page of 437 & 858 in Appendix1	
1.3	10/Nov/06	P.68	Change Diagnostics Format - Add Version to Boot Firmware & Flash Firmware - Remove P/N from Boot Firmware & Flash Firmware - Add version information of SBCS (Version & Revision)	
	16/Nov/06	P.70	Add SET DIRECTION of Parallel I/F card mount	
	22/Nov/06	P.35,37, 38 P.1 P.19 P.52 P.53	Add Real Time Commands for USB Delete 'superscript' , 'Italic' & 'subscript' from Print attribute Add definition for '2dot underline' in ESC - Delete Italic function of Download 1-Line Top/Bottom Message Delete 'Script mode' in Limitation of US e	
	28/Nov/06	P.3	Exchange Function name ESC R [Select character code table] -> [Select International Character Set] ESC t [Select International Character Set] -> [Select character code table]	

CHANGE RECORD				
REV	DATE	Page	DESCRIPTION OF CHANGE	APPROVAL
1.3 conti	28/Nov/06	P.3 P.17 P.18 P.20,22 P.3,28 P.31 P.43 P.47 P.71 P.79	Delete 'ESC R' (Because the description overlapped) Change Default Code Page in 'ESC %' (850 -> 437) Change Default Code Page in 'ESC ?' (850 -> 437) Move explanation of 'Summary of Rotated Printing' Correction of error in writing (2F -> 2C) Delete explanation of 'Two byte character code' Correction of error in writing (delete 'the') Add Printer Setting Change Change description example (Model number : TRST-A10 or TRST-A15) (USB Type : Vendor Specific class) Change description in Note (HID class -> Vendor Specific class)	
	15/Dec/06	P.1 P.12 P.13 P.29 P.30 P.37 P.48 P.61 P.65 P.71 P.73 P.76 P.79 P.88	Delete Byte Mode in Parallel Mode Change 'standard pitch' and 'compressed pitch' Change 'standard pitch' and 'compressed pitch' Change parameter range of Print Raster Graphics 1 <= (mL + mH x 256) <= 10 Delete 'Transmit peripheral device status' command Correction of error in writing ('Off' -> 'On' , '0' -> '1') Change parameter define in 'US DC1' USB Interface Type ('00'->'01','01'->'02') Printer Driver Type ('01'->'00','00'->'01') Change character '0x97' in CodePage866 Delete explanation sentence Change word Printer Driver Type -> Printer Drv Type Change click type 1 Click -> Long Click 2 Clicks -> Short Click Correction of message SET PDF417 MAX COLUMN PRINT Delete 'SET CODE PAGE ?' message & select guidance Change Version & Revision format	
	15/Jan/07	P.27 P.29 P.31 P.48 P.49 P.50 P.79 P.82	Delete command 'Print Advanced Raster Graphics' Add command 'Download BMP Logo' and 'Select the Current Logo (Downloaded Bit Image)' Effective command 'Transmit peripheral device status' Add command 'Read from Non-Volatile Memory', 'Write to Non-Volatile Memory (NVRAM)' & 'Select Memory Type (SRAM/Flash) Where to Save Logos or User-Defined Fonts or Macro' Add command 'Flash Allocation' and 'Erase User Flash Sector' Change command code 'US DC1' -> 'US 6' Add 'SET RECEIVE BUFFER SIZE' Correction of error in writing ('Enable' -> 'Enable Receipt Sync.') ('Disable' -> 'Disable Receipt Sync,')	
	23/Jan/07	P.68 P.77	Delete 'Code Page 857' Change of output format of 'Permanent Talies'	

CHANGE RECORD				
REV	DATE	Page	DESCRIPTION OF CHANGE	APPROVAL
1.3 conti	16/Feb/07	P.8 P.29 P.36,37 P.38 P.39 P.68 P.77,93, 95	Delete command 'Select Paper Sensors to Output Paper End Signals (Parallel)' Change parameter range of Print Raster Graphics 1 <= (mL + mH x 256) <= 100 Change command code 'DLE EOT' -> 'ESC n' Change command code 'DLE ENQ' -> 'ESC o' Change command code 'GS ENQ' -> 'ESC h' Insert 'Code Page 857' Serial Number 10column -> 11column	

Contents

General

This specification is a firmware specification for single station POS printer.

Printer basic functions

- **General**

Serial I/F - **Protocol** - **Data length** - **Stop bits** - **Parity** - **Baud rate**	 DTR/DSR, XON/XOFF 8, 7 bits 1, 2 bit Non, Even, Odd 9600, 19200, 38400, 57600, 115200 bps
USB I/F **- Speed** **- Device class**	USB 2.0 Full speed mode Vendor-Specific class for OPOS driver (T.B.D.) Printer class for Windows driver (T.B.D.)
Parallel I/F (option) **- mode**	IEE1284 Compatible, Nibble

- **Receipt**

	80mm model	**58mm model**
Resolution	203.2 dpi x 203.2 dpi (8 dots/mm)	
Printable area **- Font A** **- Font B** **- Graphics**	 48 char. = 576 dots 64 char. = 576 dots 576 dots	 36 char. = 432 dots 48 char. = 432 dots 432 dots
Character configuration **- Font A** **- Font B**	 12(H) X 24(V) dots 9(H) X 24(V) dots	
Character set	Code page 437, 850, 852, 857, 858, 860, 863, 865, 866, 1252	
Print line height	Minimum 24 dots (3 mm) selectable	
Print attribute	Double width , Double high ,rotate , under line, scalable, bold, inverse image characters	

Emulation

1 Command list

The printer supports the commands shown below.

Command sequence		Function	Remarks
Printer Function Commands			
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ESC D	1BH 44H	Set Horizontal Tabs	12
ESC \	1BH 5CH	Set Relative Print Position	13
ESC a	1BH 61H	Select Justification	13
GS L	1DH 4CH	Set Left Margin	14
GS W	1DH 57H	Set Printing Area Width	15

Command sequence		Function	Remarks
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ESC !	1BH 21H	Select Print Modes	16
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ESC &	1BH 26H	Define User-Defined Characters	17
ESC -	1BH 2DH	Select or Cancel Underline Mode	18
ESC ?	1BH 3FH	Cancel User-Defined Characters	18
ESC E	1BH 45H	Select or Cancel Emphasized Mode	18
ESC G	1BH 47H	Select Double Strike	19
ESC M	1BH 4DH	Select Character Font	19
ESC R	1BH 52H	Select International Character Set	23
ESC V	1BH 56H	Select or Cancel 90 Degrees Clockwise Rotated Print	20
ESC r	1BH 72H	Select Print Color	20
ESC t	1BH 74H	Select Character Code Table	19
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DC1	11H	Print Raster Graphics	24
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ESC ,	1BH 2CH	Print Raster Graphics（TBD）	27
US + “BMP”	1FH + “BMP”	Download BMP Logo	27
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ESC v	1BH 76H	Transmit Paper Sensor Status	30
GS I	1DH 49H	Transmit Printer ID	30
GS r	1DH 72H	Transmit status	31
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Command sequence		Function	Remarks
Barcode Commands			
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GS k	1DH 6BH	Print Bar Code	38
GS w	1DH 77H	Set Bar Code Width	40
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CAN	18H	Cancel Print Data in Page Mode	41 ,WinDriverUsed
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Command sequence		Function	Remarks
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GS SI	1DH 0FH	Return Main Program Flash CRC	53
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US h	1FH 68H	Start/End Pre-Defined Back Side Printing	59
US i	1FH 69H	Define Minimum Receipt Length	61 ,WinDriverUsed

2 Command Descriptions

2.1 Printer Function Commands

The printer function commands control the following basic printer functions and are described in order of their hexadecimal codes:

1. Resetting the printer
2. Cutting the paper
3. Opening the cash drawers

2.1.1 Perform Full Knife Cut

ASCII: ESC i
Hexadecimal: 1B 69
Decimal: 27 105

Cuts the receipt, leaving .20 inch (5 mm) of paper. This command is implemented the same as Partial Knife Cut (1B 6D). Line Feed is executed first if print buffer is not empty.

2.1.2 Perform Partial Knife Cut

ASCII: ESC m
Hexadecimal: 1B 6D
Decimal: 27 109

Cuts the receipt, leaving 5 mm (.20 inch) of paper. This command is implemented the same as Full Knife Cut (1B 69).

Exceptions:
Line Feed is executed first if the buffer is not empty.

2.1.3 Generate Tone

ASCII: ESC BEL
Hexadecimal: 1B 07
Decimal: 27 7

Generates an audible tone. Performed by the printer to signal certain conditions.

2.1.4 Select Peripheral Device (for Multi-Drop)

ASCII: ESC = *n*
Hexadecimal: 1B 3D *n*
Decimal: 27 61 *n*
Value of *n*: 0 (Bit 0), device not selected
1 (Bit 1), device selected
Default: 1 (Bit 1), device selected

Selects the device to which the host computer sends data.

Exception:
This command is ignored.

2.1.5 Initialize Printer

ASCII: ESC @
Hexadecimal: 1B 40
Decimal: 27 64
Default:
Character Pitch: 16.9 CPI
Column Width: 48 characters (80mm)
36 characters (58mm)
Extra Dot Rows: 2
Character Set: Code Page 437
Printing Position: Column One

Clears the print line buffer and resets the printer to the default settings for the startup configuration (refer to Default settings above.)
Single-Wide, Single-High, Non-Rotated, and Left-Aligned characters are set and User-defined characters or logo graphics are cleared (Flash Memory is not affected). Tabs reset to default.

2.1.6 Select Paper Sensors to Output Paper End Signals (Parallel Only)

ASCII: ESC c 3 *n*
Hexadecimal: 1B 63 33 *n*
Decimal: 27 99 51 *n*
Value of *n*:
If either bit 0 or bit 1 is on, the paper roll near-end sensor is selected as the paper sensor outputting paper-end signals.
If either bit 2 or bit 3 is on, the paper roll end sensor is selected as the paper sensor outputting paper-end signals.

Bit	Position	Hex	Decimal	Function
0	Off	00	0	Paper roll near end sensor disabled
	On	01	1	Paper roll near end sensor enable
1	Off	00	0	Paper roll near end sensor disabled
	On	02	2	Paper roll near end sensor enabled
2	Off	00	0	Paper roll end sensor disabled
	On	04	4	Paper roll end sensor enabled
3	Off	00	0	Paper roll end sensor disabled
	On	08	8	Paper roll end sensor enabled
4,5,6,7	-	-	-	Undefined

Range of *n* : 1 - 255
Default: 15

Specifies the paper sensor to output a paper end signal. Multiple sensors may be selected to signal when paper has run out. When multiple sensors have been selected, anytime one of the sensors detects a paper end, the paper end signal is output.
When this command is executed a sensor is switched. The paper end signal switching is delayed depending on the receive buffer state.

2.1.7 Select Sensors to Stop Printing

ASCII: ESC c 4 *n*
Hexadecimal: 1B 63 34 *n*
Decimal: 27 99 52 *n*
Value of *n*:

Bit	Function
0,1	Stop Receipt on Receipt Low
2-7	Undefined.

Default: 0

Determines which sensor stops printing on the respective station. The command does not affect the paper out sensor on the receipt station, which will automatically stop the printer when the paper is depleted.

2.1.8 Enable or Disable Panel Buttons

ASCII: ESC c 5 *n*
Hexadecimal: 1B 63 35 *n*
Decimal: 27 99 53 *n*
Value of *n*: 0 = Enable
1 = Disable
Default: 0 (Enable)

Enables or disables the Paper Feed Button. If the last bit is 0, the Paper Feed Button is enabled. If the last bit is 1, the Paper Feed Button is disabled.

Related Information:
Functions that require using the Paper Feed Button (except for the Execute Macro [1D 5E] command) cannot be used when it is disabled with this command.

2.1.9 Generate Pulse to Open Cash Drawer

ASCII: ESC p *n* p1 p2
Hexadecimal: 1B 70 *n* p1 p2
Decimal: 27 112 *n* p1 p2
Value of *n*: 0, 48 = Drawer1
1, 49 = Drawer 2
Value of *p1*: 0 - 255
Value of *p2*: 0 - 255

Sends a pulse to open the cash drawer.

Formulas:
The value for either *p1* or *p2* is the hexadecimal number multiplied by 2 msec to equal the total time.
1. On time = *p1* x 2 msec
2. Off time = *p2* x 2 msec

Related Information:
The off-time is the delay before the printer performs the next operation.
Refer to cash drawer specifications for required on and off times.

2.1.10 Select Cut Mode and Cut Paper

ASCII: GS V *m* or GS V *m n*
Hexadecimal: 1D 56 *m* or 1D 56 *m n*
Decimal: 29 86 *m* or 29 86 *m n*
Value of *m* : Selects the mode as shown in the table
Value of *n* : Determines cutting position only if *n* is 65 or 66.

m	Feed and Cut Mode
0,48	Full cut (no extra feed). Partial cut on the GENT.
1,49	Partial cut (no extra feed).
65	Feeds paper to cutting position + *(n* times vertical motion unit), and cuts the paper completely.
66	Feeds paper to cutting position + *(n* times vertical motion unit), and performs a partial cut.

Range of m: 0, 48; 1, 49
65, 66 (when used with n)
Range of n: 0 – 255
Default of n: 0
Default of m: 0

Selects a mode for cutting paper and cuts the paper. There are two formats for this command, one requiring one parameter *m*, the other requiring two parameters *m* and n. The format is indicated by the parameter *m.*

Formulas:
n times the vertical motion unit is used to determine the cutting position to which the paper is fed.

Exceptions:
If *m* is out of the specified range, the command is ignored.

2.1.11 Print Test Form

ASCII: US t
Hexadecimal: 1F 74
Decimal: 31 116
Prints the current printer configuration settings on the receipt.
Disabled in page mode.

2.2 Vertical Positioning and Print Commands

The vertical positioning and print commands control the vertical print positions of characters on the receipt.

2.2.1 Print and Feed Paper One Line

ASCII: LF
Hexadecimal: 0A
Decimal: 10

Prints one line from the buffer and feeds paper one line.
Carriage Return/Line Feed pair prints and feeds only one line.

2.2.2 Print and Carriage Return

ASCII: CR
Hexadecimal: 0D
Decimal: 13

Prints one line from the buffer and feeds paper one line. The printer can be set through the configuration menu to ignore or use this command. Some applications expect the command to be ignored while others use it as print command.

Related Information:
See Ignoring/Using the Carriage Return in *Diagnostics* for more information.
Carriage Return/ Line Feed pairs prints and feeds only one line.

2.2.3 Set Line Spacing to 1/6 Inch

ASCII: ESC 2
Hexadecimal: 1B 32
Decimal: 27 50
Default: 0.13 Inch (3.33 mm)

Sets the default line spacing to 1/6 of an inch (4.25 mm).

2.2.4 Set Line Spacing

ASCII: ESC 3 *n*
Hexadecimal: 1B 33 *n*
Decimal: 27 51 *n*
Value of *n*: *n* / 203 inches
Range of *n*: 0 – 255
Default: Receipt .13 inch (3.37 mm or 7.52 lines per inch, 3 extra dot rows.)

Sets the line spacing to n/203 inches.
The minimum line spacing is 8.5 lines per inch. The line spacing equals the character height when *n* is too small.
If the Set Horizontal and Vertical Minimum Motion Units command (1D 50) is used to change the horizontal and vertical minimum motion unit, the parameters of this command (Set Line Spacing) will be interpreted accordingly.

Related Information:
For more information, see the description of the Set Horizontal and Vertical Minimum Motion Units command in this document.

2.2.5 Print and Feed Paper

ASCII: ESC J *n*
Hexadecimal: 1B 4A *n*
Decimal: 27 74 *n*
Value of *n*: *n* / 203 inches
Range of *n*: 0 - 255

Prints one line from the buffer and feeds the paper.
The line height equals the character height when *n* is too small.

The line height equals the character height when *n* is too small.

If the Set Horizontal and Vertical Minimum Motion Units command (1D 50) is used to change the horizontal and vertical minimum motions units, the parameters of this command (Print and Feed paper) will be interpreted accordingly.

Related Information:
For more information, see the description of the Set Horizontal and Vertical Minimum Motion Units command in this document.

2.2.6 Print and Feed *n* Lines

ASCII: ESC d *n*
Hexadecimal: 1B 64 *n*
Decimal: 27 100 *n*
Value of *n*: Number of lines to be printed and fed.
Range of *n*: 1 – 255
(0 is interpreted as 1 on the receipt station)

Prints one line from the buffer and feeds paper *n* lines at the current line height.

2.2.7 Set Horizontal and Vertical Minimum Motion Units

ASCII: GS P *x y*
Hexadecimal: 1D 50 *x y*
Decimal: 29 80 *x y*
Value of *x*: Horizontal
Value of *y*: Vertical
Range of *x*: 0 – 255
Range of *y*: 0 – 255
Default: of *x*: 203
Default: of *y*: 203

Sets the horizontal and vertical motion units to 1/*x* inch and 1/*y* inch respectively.
When *x* or *y* is set to 0, the default setting for that motion unit is used.
The default horizontal motion is *x, y* = 203.

2.3 Horizontal Positioning Commands

The horizontal positioning commands control the horizontal print positions of characters on the receipt.

2.3.1 Horizontal Tab

ASCII: HT
Hexadecimal: 09
Decimal: 9

Moves the print position to the next tab position set by the Set Horizontal Tab Positions (1B 44 *n1 n2* ... 00) command. The print position is reset to column one after each line.
Tab treats the left margin as column one, therefore changes to the left margin will move the tab positions.
When there are no tabs defined to the right of the current position, or if the next tab is past the right margin, line feed is executed.
Printer initialization sets 32 tabs at column 9, 17, 25, …. (Every 8 characters)

2.3.2 Set Column

ASCII: ESC DC4 *n*
Hexadecimal: 1B 14 *n*
Decimal: 27 20 *n*
Value of *n*:
1 - 48 (Standard, 80mm), 1-36 (Standard, 58mm)
1 - 64 (Compressed, 80mm), 1-48 (Compressed, 58mm)
Default of *n*: 1

Prints the first character of the next print line in column *n*. It must be sent for each line not printed at column one. The value of *n* is set to one after each line.

2.3.3 Set Absolute Starting Position

ASCII: ESC $ *n1 n2*
Hexadecimal: 1B 24 *n1 n2*
Decimal: 27 36 *n1 n2*
Value of *n*: Number of dots to be moved from the beginning of the line.
Value of *n1*: Remainder after dividing *n* by 256.
Value of *n2*: Integer after dividing *n* by 256.

The values for n1 and n2 are two bytes in low byte, high byte word orientation.
Sets the print starting position to the specified number of dots (up to the right margin) from the beginning of the line. The print starting position is reset to the first column after each line.

Formulas:
Determine the value of *n* by multiplying the column for the absolute starting position by 13 (receipt standard pitch) or 10 (compressed pitch). The example shows how to calculate column 29 (10 dots per column) as the absolute starting position.
28 x 10 = 280 dots (beginning of column 29)
280/256 = 1, remainder of 24
n1 = 24 n2 = 1

Related Information:
This command is also used in the graphics mode.
See Graphics Commands in this chapter for more information.

If the Set Horizontal and Vertical Minimum Motion Units command (1D 50) is used to change the horizontal and vertical minimum motion unit, the parameters of this command (Set Absolute Print Position) will be interpreted accordingly. For more information, see the description of the Set Horizontal and Vertical Minimum Motion Units command (1D 50) in this document.

2.3.4 Set Horizontal Tabs

ASCII: ESC D *[n] k* NUL
Hexadecimal: 1B 44 *[n] k* 00
Decimal: 27 68 *[n] k* 0
Value of *n*: Column for tab minus one.
n is always less than or equal to the current selected column width.
Value of *k*: 0 - 32
Default: Every 8 characters from column. 1 (9, 17, 25, etc.) for normal print.

Sets up to 32 horizontal tab positions *n* columns from column one, but does not move the print position. See the Horizontal Tab (09) command. The tab positions remain unchanged if the character widths are changed after the tabs are set.
This command ends with hexadecimal 00; hexadecimal 1B 44 00 clears all tabs. Tabs assumed to be in strictly ascending order. A tab out of order terminates the command string as if it were 00, and remaining tab values are taken as normal data.

Formulas:

Set the tab positions in ascending order and put Hex 00 at the end.
Hex 1B 44 00 (number of tabs not specified) clears all tab positions.

Exceptions:
The tabs cannot be set higher than the column width of the current pitch.

2.3.5 Set Relative Print Position

ASCII: ESC \ *n1 n2*
Hexadecimal: 1B 5C *n1 n2*
Decimal: 27 92 *n1 n2*
Value of *n*:
To Move the Relative Starting Position Right of the Current Position by *n* dots:
n1 = Remainder after dividing *n* by 256.
n2 = Integer after dividing *n* by 256.
The values for n1 and n2 are two bytes in low byte, high byte word orientation.
To Move the Relative Starting Position Left of the Current Position by *n* dots:
n1 = Remainder after dividing (65,536-n) by 256
n2 = Integer after dividing (65,536-n) by 256
The values for n1 and n2 are two bytes in low byte, high byte word orientation.
Moves the print starting position the specified number of dots either right (up to the right margin) or left (up to the left margin) of the current position. The print starting position is reset to the first column after each line. (Set Relative Print Position—continued on the next page)

Formulas:
To move to the left:
Determine the value of *n* by multiplying the number of columns to move left of the current position by 13 (standard pitch) or 10 (compressed pitch). The example shows how to set the relative position two columns in standard pitch (10 dots per column) to the left of the current position.
2 x 10 = 20 dots (two columns to be moved left of the current position) 65,536-20 = 65516
65,516/256 = 255, remainder of 236 *n1* = 236 *n2* = 255

To move to the right:
Determine the value of *n* by multiplying the number of columns to move right of the current position by 10 (standard pitch) or 8 (receipt compressed pitch). The example shows how to set the relative position two columns in standard pitch (10 dots per column) to the right of the current position.
2 x 10 = 20 dots (two columns to be moved right of the current position) 20/256 = 0, remainder of 20 *n1* = *20 n2* = 0

Related Information:
If the Set Horizontal and Vertical Minimum Motion Units command (1D 50) is used to change the horizontal and vertical minimum motion unit, the parameters of this command (Set Relative Print Position) will be interpreted accordingly. For more information, see the description of the Set Horizontal and Vertical Minimum Motion Units command (1D 50) in this document.

2.3.6 Select Justification

ASCII: ESC a *n*
Hexadecimal: 1B 61 *n*
Decimal: 27 97 *n*
Value of *n*: 0, 48 = Left Aligned
1, 49 = Center Aligned
2, 50 = Right Aligned
Range of *n*: 0 – 2, 48-50
Default: 0 (Left aligned)

Specifies the alignment of the characters, graphics, logos, and bar codes on the receipt station.

Exceptions:
The command is valid only when input at the beginning of a line.

2.3.7 Set Left Margin

ASCII: GS L *nL nH*
Hexadecimal: 1D 4C *nL nH*
Decimal: 29 76 *nL nH*
Range of *nL*: 0 - 255
Range of *nH*: 0 - 255
Default: 80 mm paper width: 576 dots (the maximum printable area)
58 mm paper width: 432 dots (the maximum printable area)

Sets the left margin of the printing area. The left margin is set to (((*nH* X 256) + *n*L) times horizontal motion unit) inches. The horizontal motion units are set by the Set Horizontal and Vertical Minimum Motion Units command (1D 50), described in this manual.
The width of the printing area is set by the Set Printing Area Width command (1D 57), which follows this command. See the Set Printing Area Width command (1D 57) in this document for a description of that command.
If the setting exceeds the printable area, the maximum value of the printable area is used.
The maximum printable area is 576 dots. See the illustration.

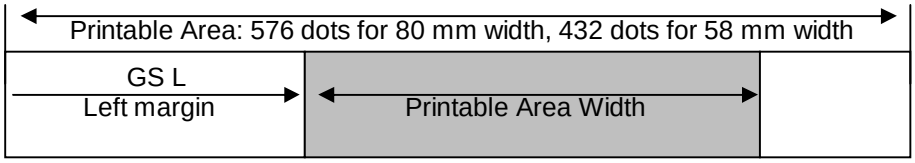
Formulas:
To set the left margin to one inch at the default horizontal motion unit of 1/203 inches, send the four-byte string:

GS L 203 0

Or, to set the left margin to two inches at the default horizontal motion unit of 1/203 units per inch, send the four-byte string:

GS L 150 1

Where 2 inches = 406/203, and 406 = (1 X 256) + 150.



Exceptions:
The command is effective only at the beginning of a line.
This command is ignored if the line buffer is not empty.

2.3.8 Set Printing Area Width

ASCII: GS W *nL nH*
Hexadecimal: 1D 57 *nL nH*
Decimal: 29 87 *nL nH*
Range of *nL*: 0 - 255
Range of *nH*: 0 - 255
Default: 80 mm paper width: 576 dots (the maximum printable area)
58 mm paper width: 432 dots (the maximum printable area)

Sets the width of the printing area. If the setting exceeds the printable area, the maximum value of the printable area is used.
The width of the printing area is set to (((*nH* X 256) + *n*L) times horizontal motion unit) inches.
The horizontal motion units are set by the Set Horizontal and Vertical Minimum Motion Units command (1D 50).
The width of the printing area follows the Set Left Margin command (1D 4C).
See the Set Left Margin command (1D 4C…) earlier in this document for a description.

Formulas:
To set the width of the printing area to one inch at the default horizontal motion unit of 1/203 inches, send the four-byte string:

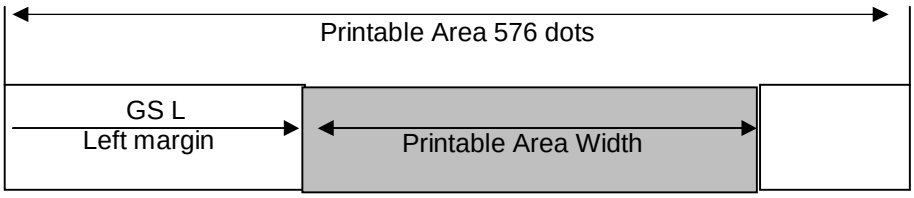
GS W 203 0

Or, to set the width of the printing area to two inches at the default horizontal motion unit of 1/203 units per inch, send the four-byte string:

GS W 150 1

Where 2 inches = 406/203, and 406 = (1 X 256) + 150.

Exceptions:
This command is effective only at the beginning of a line.
This command is ignored if the line buffer is not empty.
If the setting exceeds the printable area, the maximum value of the printable area is used.
The maximum printable area is 576 dots for 80 mm paper width and 432 dots for 58 mm paper width.
See the illustration in the Set Left Margin command. (1D 4C)



Print Characteristic Commands

These commands control what the printed information looks like: selection of character sets, definition of custom-defined characters, and setting of margins.
The commands are described in order of their hexadecimal codes

2.3.9 Set Character Right-Side Spacing

ASCII: ESC SP *n*
Hexadecimal: 1B 20 *n*
Decimal: 27 32 *n*
Value of *n*: 0 - 32
Default: 0

Sets the right side character spacing to *[n* x horizontal or vertical motion units]. Values for this command are set independently in Standard and Page Mode.
The units of horizontal and vertical motion are specified by the Set Horizontal and Vertical Minimum Motion Units (1D 50…) command.
Changes in the horizontal or vertical units do not affect the current right side character spacing. When the horizontal or vertical motion unit is changed by the Set Horizontal and Vertical Minimum Motion Units (1D 50…) command the value must be in even units and not less than the minimum amount of horizontal movement.
In Standard Mode the horizontal motion unit is used.
In Page Mode the horizontal or vertical motion unit differs and depends on the starting position of the printable area. When the starting printing position is the upper left or lower right of the printable area (set by Select Print Direction in Page Mode, 1B 54 *n*) the horizontal motion unit (*x*) is used. When the starting printing position is the upper right or lower left of the printable area (set by Select Print Direction in Page Mode, 1B 54 n) the vertical motion unit (*y*) is used.

2.3.10 Select Print Modes

ASCII: ESC ! *n*
Hexadecimal: 1B 21 *n*
Decimal: 27 33 *n*
Value of *n*: Pitch selection (standard, compressed, double high, or double wide.)

Bit	Function	0	1
Bit0	Pitch	Standard pitch[1] 16.9 CPI 48 Col/Line (80 mm) 36 Col/Line (58 mm)	Compressed pitch 22.6 CPI (Receipt) 64 Col/Line (80 mm) 48 Col/Line (58 mm)
Bit3	Emphasized mode	Canceled	Set
Bit4	Double height[2]	Canceled	Set
Bit5	Double Width	Canceled	Set
Bit7	Underline mode	Canceled	Set
Bits 1,2 6 are not used			

[1] Standard and compressed pitch cannot be used together in the same line.
[2] Double-high characters cannot be used with normal characters in the same line.
Default: 0 (for bits 0, 3, 4, 5, 7)

Selects the print mode: standard, compressed, double high, or double wide.

Related Information:
The bits in this command perform the same function as the standalone functions:

1B 45 *n*	Emphasized
1B 2D *n*	Underline
1B 4D n	Select Character Font

2.3.11 Select or Cancel User-Defined Character Set

ASCII: ESC % *n*
Hexadecimal: 1B 25 *n*
Decimal: 27 37 *n*
Value of *n*: 0= Code Page 850
1= User-defined (RAM character set)
2= Code Page 850
Range of *n*: 0 – 2
Default: 0 (Code Page 850)

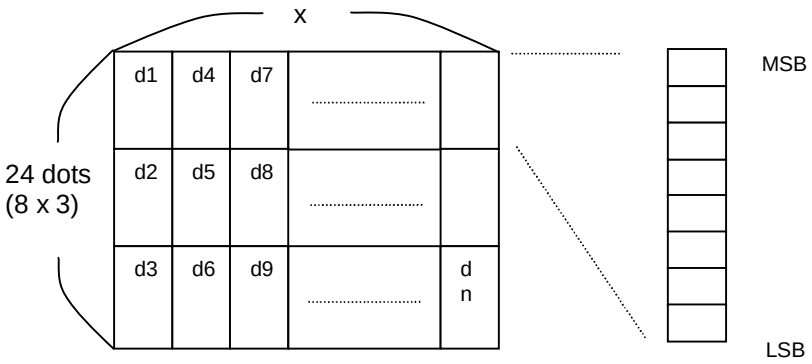
Selects the character set. When an undefined RAM character is selected, the Code Page 850 character is used. See the "Appendix 1: Character set" for the character sets.

2.3.12 Define User-Defined Characters

ASCII: ESC & 3 *c1 c2 n1 d1 ... nn dn*
Hexadecimal: 1B 26 3 *c1 c2 n1 d1 ... nn dn*
Decimal: 27 38 3 *c1 c2 n1 d1 ... nn dn*

Defines and enters downloaded characters into RAM. The command may be used to overwrite single characters. User-defined characters are available until power is turned off or the Initialize Printer command (1B 40) is received.
Any invalid byte (*s, c1, c2, n1*) aborts the command.
The command clears bit image logo data from RAM. The illustration below provides a sample of a character cell.

Defining User-Defined Characters
Defines and enters downloaded characters into RAM.



Values and Ranges:
Receipt
c = the ASCII codes of the first *(*c1) and last *(*c2) characters respectively
c1 = Hex 20-FF (Hex 20 is always printed as a space)
c2 = Hex 20-FF (Hex 20 is always printed as a space)
To define only one character, use the same code for both *c1* and *c2*.
n = the number of dot columns for the nth character as specified by *n1 ... nn*
n = 1-13 (standard pitch), 12 and less accepted but ignored
n = 1-13 (compressed pitch), 12 and less accepted but ignored
d = the column data for the nth character as specified by *d1 ... dn*
The number of bytes for a particular character cell is 3 x *n*.
The bytes are printed down and across each cell.

2.3.13 Select or Cancel Underline Mode

ASCII: ESC - *n*
Hexadecimal: 1B 2D *n*
Decimal: 27 45 *n*
Value of *n*: 0, 48 = Cancel underline mode
1, 49 = Select underline mode
Default of *n*: 0 (Cancels underline mode)

Turns underline mode on or off. Underlines cannot be printed for spaces set by the Horizontal Tab, Set Absolute Start Position, or Set Relative Print Position commands.
This command and the Select Print Mode(s) command (1B 21) turn underline on and off in the same way.

Exceptions:
This command is ignored if *n* is out of the specified range.

2.3.14 Cancel User-Defined Characters

ASCII: ESC ? *n*
Hexadecimal: 1B 3F *n*
Decimal: 27 63 *n*
Value of *n*: Specified character code
Range of *n*: 32 - 255

Cancels the pattern defined for the character code specified by *n.* After the user-defined character is canceled, the corresponding pattern from Code Page 850 is printed.

Exceptions:
This command is ignored if *n* is out of range or if the user-defined character is not defined.

2.3.15 Select or Cancel Emphasized Mode

ASCII: ESC E *n*
Hexadecimal: 1B 45 *n*
Decimal: 27 69 *n*
Value of *n*: 0 (bit 0), not selected
1 (bit 0), selected
Range of *n*: 0 – 255
Default: 0 (bit 0)

Starts or stops emphasized printing. The printer is reset to the standard Print Mode after Clear Printer (0x10) command is received.

Exceptions:
Only the lowest bit of *n* is effective.
Emphasized printing can not be used with bit-images or downloaded bit-images.

Related Information:
This command and the Select Print Mode(s) command (1B 21) function identically.

2.3.16 Select Double Strike

ASCII: ESC G *n*
Hexadecimal: 1B 47 *n*
Decimal: 27 71 *n*
Value of *n*: 0 = Off
1 = On

Turns double strike mode on. Identical to Emphasized mode. The printer is reset to the standard print mode after a line has been printed.

Exceptions:
The settings do not apply in Page Mode. However they can be set or cleared in Page Mode.
Double-strike printing cannot be used with bit-images or downloaded bit-images.
Related Information:
Printer output is the same as in Emphasized Mode.

2.3.17 Select Character Font

ASCII: ESC M *n*
Hexadecimal: 1B 4D *n*
Decimal: 27 77 *n*
Value of *n*: 0, 48 = Font A (Standard pitch font)
1, 49 = Font B (Compress pitch font)

This command select character font. This command is same as bit0 of Select Print Modes command (1B 21).

2.3.18 Select character code table

ASCII: ESC t *n*
Hexadecimal: 1B 74 *n*
Decimal: 27 116 *n*
Value of *n*:

0 = Code Page 437
1 = not used
2 = Code Page 850
3 = Code Page 860
4 = Code Page 863
5 = Code Page 865
6 = Code Page 852
7 = Code Page 866
8 = Code Page 857
9 = Code Page 1252
10 = Code Page 858

Default: Code Page 437

Selects the character set to be used. See “Appendix 1: Character Set” for the character sets.
There are two codes for this command. Both codes perform the same function.

Exceptions:
The character sets cannot be used together on the same line.

Related Information:
This command may also be known as Select Character Code Table.

Select Character Code Table
See the previous command, Select International Character Set.

2.3.19 Select or Cancel 90 Degrees Clockwise Rotated Print

ASCII: ESC V *n*
Hexadecimal: 1B 56 *n*
Decimal: 27 86 *n*
Value of *n*: 0 = Cancel
1 = Set
Default: 0 (Cancel)

Rotates characters 90 degrees clockwise. The command remains in effect until the printer is reset. See Summary of Rotated Printing in this chapter.

2.3.20 Select Print Color

ASCII: ESC r *n*
Hexadecimal: 1B 72 *n*
Decimal: 27 114 *n*
Value of *n*: 0 = Monochrome
1 = 2 Color
Default: 0 (Monochrome)

Selects color printing. Color printing is valid for character, graphics, logo and barcode.

Exceptions:
This command is valid when color paper option is set to 2-color paper.

2.3.21 Select or Cancel Upside Down Printing Mode

ASCII: ESC { *n*
Hexadecimal: 1B 7B *n*
Decimal: 27 123 *n*
Value of *n*: 0 = Cancel
1 = Set
Default: 0 (Cancel)

Prints upside-down characters. The character order is inverted in the buffer so text is readable. Only bit 0 is used. Bits 1-7 are not used. See Summary of Rotated Printing in this document for more information.

Exceptions:
The command is valid only at the beginning of a line.

2.3.22 Select Character Size

ASCII: GS ! *n*
Hexadecimal: 1D 21 *n*
Decimal: 29 33 *n*
Value of *n*: 1 - 8 = vertical number of times normal font
1 – 8 = horizontal number of times normal font
Range of *n*: 00 – 07, 10 – 17, … 70 – 77
Default: 0

Selects the character height using bits 0 to 3 and selects the character width using bits 4 to 7, as follows:

Character Width Selection

HEX	Decimal	Width
00	0	1 (normal)
10	16	2 (two times width)
20	32	3 (three times width)
30	48	4 (four times width)
40	64	5 (five times width)
50	80	6 (six times width)
60	96	7 (seven times width)
70	112	8 (eight times width)

Character Height Selection

HEX	Decimal	Height
00	0	1 (normal)
01	1	2 (two times height)
02	2	3 (three times height)
03	3	4 (four times height)
04	4	5 (five times height)
05	5	6 (six times height)
06	6	7 (seven times height)
07	7	8 (eight times height)

This command is effective for all characters (except for HRI characters).
In Standard Mode, the vertical direction is the paper feed direction, and the horizontal direction is perpendicular to the paper feed direction. However, when character orientation changes in 90 degree clockwise-rotation mode, the relationship between vertical and horizontal directions is reversed.
In Page Mode, vertical and horizontal direction are based on the character orientation. When characters are enlarged with different sizes on one line, all the characters on the line are aligned at the baseline.
The Select Print Mode (1B 21 n) command can also select or cancel double-width and double-height modes. However, the setting of the last received command is effective.

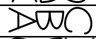
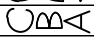
Exceptions:
If *n* is out of the defined range, this command is ignored.
This command is only valid for the receipt station.

2.3.23 Select or Cancel White/Black Reverse Print Mode

ASCII: GS B *n*
Hexadecimal: 1D 42 *n*
Decimal: 29 66 *n*
Value of *n*: 0 (Bit 0) = Off
1 (Bit 0) = On
Range of *n*: 0 – 255
Default: 0 (Off)

Turns on White/Black reverse printing mode.
In White/Black reverse printing mode, print dots and non-print dots are reversed, which means that white characters are formed by printing a black background. When the White/Black reverse printing mode is selected it is also applied to character spacing which is set by Right-Side Character Spacing (1B 20).
This command can be used with built-in characters and user-defined characters, but does not affect the space between lines.
White/Black Reverse Print Mode does not affect bit image, downloaded bit image, bar code, HRI characters, and spacing skipped by Horizontal Tab (09), Set Absolute Starting Position (1B 24…), and Set Relative Print Position (1B 5C).
White/Black reverse mode has a higher priority than Underline Mode.
When Underline Mode is on and White/Black Reverse Print Mode is selected, Underline Mode is disabled, but not canceled.

Summary of Rotated Printing
The table shows the combinations of Set/Cancel Upside-Down Print and Set/Cancel Rotated Print (clockwise). The samples of the print show only the normal size characters. Double-wide and double-high characters are printed in the same orientation. They may also be mixed on the same line.

Upside Down (1B 7B *n*)	Rotated CW (1B 56 *n*)	Resulting output
Canceled	Canceled	
Canceled	Set	
Set	Canceled	
Set	Set	

Note: The following print modes cannot be mixed on the same line:
1. Standard and compressed pitch
2. Vertical (normal) and rotated
3. Right-side up and upside down
4. Single high (normal) and double high

2.3.24 Select or Cancel Smoothing Mode

ASCII: GS b *n*
Hexadecimal: 1D 62 *n*
Decimal: 29 98 *n*

This command is ignored.

2.3.25 Select International Character Set

ASCII: ESC R *n*
Hexadecimal: 1B 52 *n*
Decimal: 27 82 *n*

n	Character Set
0	USA
1	France
2	Germany
3	UK
4	Denmark Ⅰ
5	Sweden
6	Italy
7	Spain
8	Japan
9	Norway
10	Denmark Ⅱ
11	Spain Ⅱ
12	Latin America
13	Republic of Korea

2.4 Graphics Commands

These commands are used to enter and print graphics data and are described in order of their hexadecimal codes.

2.4.1 Print Raster Graphics

ASCII: DC1 *n1 … nk*
Hexadecimal: 11 *n1 … nk*
Decimal: 17 *n1 … n72*
Value of *n*: *n1 … nk* = Data bytes
Range of *n*: 0 – 255
Value of *k*: *k* = 72 : 80mm, *k* = 54 : 58mm

Prints one row of data. *n1 … nk*:bytes describing the line to print.

Exceptions:
Raster graphics is not available in Page Mode.

2.4.2 Select Bit Image Mode

ASCII: ESC * *m n1 n2 d1 ... dn*
Hexadecimal: 1B 2A *m n1 n2 d1 ... dn*
Decimal: 27 42 *m n1 n2 d1 ... dn*

Sets the print resolution and enters one line of graphics data into the print buffer. Excess data is accepted but ignored. Any print command is required to print the data, after which the printer returns to normal processing mode.
See the illustration graphic representation of the bit image.

Values:

Value of *m*	Mode	No. of Dots (Vertical)	No. of Dots (Horizontal)	No. of Dots/Line
0	8 Dot Single Density	8 (68DPI)	0-288 (101DPI, 80mm) 0-216 (101DPI, 58mm)	8x288 (80 mm) 8x216 (58 mm)
1	8 Dot Double Density	8 (68DPI)	0-576 (203DPI, 80mm) 0-432 (203DPI, 58mm)	8x576 (80 mm) 8x432 (58 mm)
32	24 Dot Single Density	24 (203DPI)	0-288 (101DPI, 80mm) 0-216 (101DPI, 58mm)	24x288 (80 mm) 24x216 (58 mm)
33	24 Dot Double Density	24 (203DPI)	0-576 (203DPI, 80mm) 0-432 (203DPI, 58mm)	24x576 (80 mm) 24x432 (58 mm)

Value of *n* (8 Dot Single Density Mode)	Value of n (24 dot Single Density Mode)	Value of *d*
n1 + (256 x *n2*)	3 x [*n1* + (256 x *n2*)]	Number of Bytes of Data*

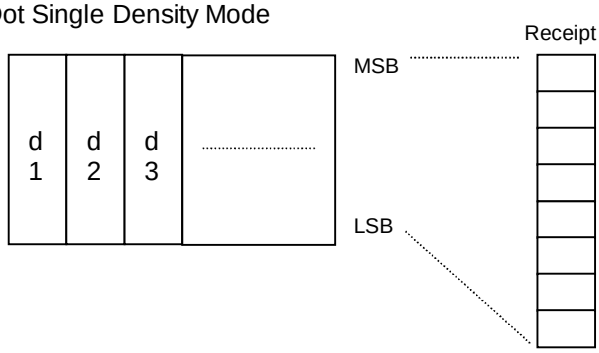
*Printed left to right (8-dot mode); Printed down then across (24-dot mode).

Formulas:

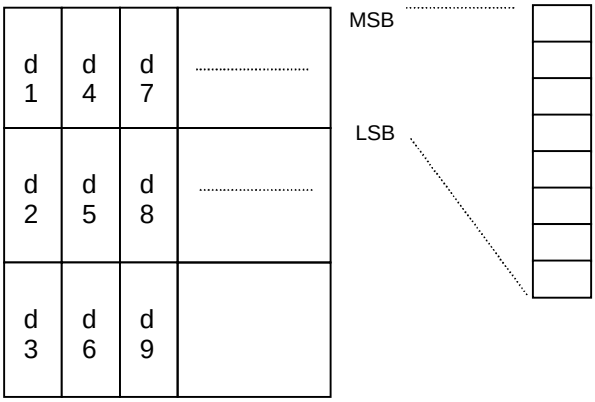
8 Dot Single Density *n1* + (256 x *n2*)

24 Dot Single Density 3 x [*n1* + (256 x *n2*)]

8 Dot Single Density Mode



24 Dots Single Density Mode



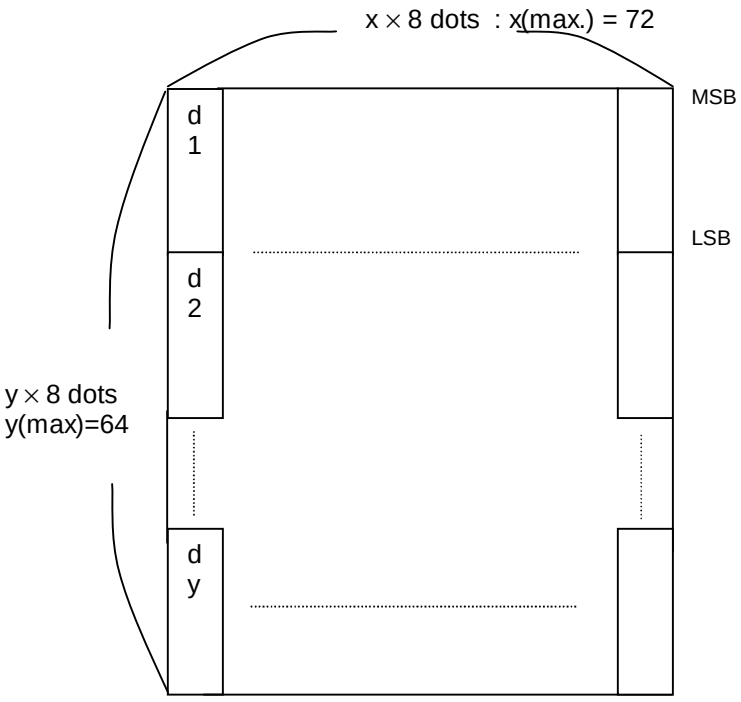
2.4.3 Define Downloaded Bit Image

ASCII: GS * *n1 n2 d1 ... dn*
Hexadecimal: 1D 2A *n1 n2 d1 ... dn*
Decimal: 29 42 *n1 n2 d1 ... dn*
Value of *n1*: See the following table.
Value of *n2*: See the following table.
Value of *d*: See the following table.

Value of *n1*	Value of *n2*	Value of *d*
1 – 72 (8 x *n1* = Number of Horizontal Dot Columns)	1 – 64 (Number of Vertical Bytes)*	Bytes of Data (Printed down, then across)

* The number of bytes sent is represented by the following formula:
n = 8 x *n1* x *n2 (n1* x *n2* must be less than or equal to 4608).

Enters a downloaded bit image (such as a logo) into RAM with the number of dots specified by *n1* and *n2*. The downloaded bit image is available until power is turned off, another bit image is defined, or either Initialize Printer (1B 40), or Define User-Defined Character Set (1B 26), command is received. See the illustration on the following page for a graphic representation of the downloaded bit image.



Exceptions:
See the illustration for the Print Downloaded Bit Image command (1D 2F) for a representation of the bit image.

2.4.4 Print Downloaded Bit Image

ASCII: GS / *m*
Hexadecimal: 1D 2F *m*
Decimal: 29 47 *m*
Value and Range of m:

Value of *m*	Print Mode	Vertical DPI[1]	Horizontal DPI[1]
0	Normal	203	203
1	Double Width	203	101
2	Double Height	101	203
3	Quadruple	101	101

[1] Dot density measured in dots per inch

Prints a downloaded bit image in RAM on the receipt station at a density specified by *m*.
It is ignored if any data is in the print buffer, if the downloaded bit image is undefined, or if the data defined exceeds one line.

2.4.5 Print Raster Graphics (Windows driver only)

ASCII: ESC , *c mL mH d1 d2 d3 --------- d80*
Hexadecimal: 1B 2F *c mL mH d1 d2 d3 --------- d80*
Decimal: 27 47 c mL mH d1 d2 d3 --------- d80
Value of *c*: 00H : Black only
01H : Red only
02H : Black and Red
When c is 02H, graphics data(d1 – d80) are sent to the printer twice.
1'st data(d1 – d80) is for red color and 2'nd data(d1 – d80) is for black color.
Value of *mL,mH*: mL, mH is vertical dot count.
The value means number of raster.
Value of *d*: *d1* … *d80* = Data bytes
Range: $0 \leq c \leq 2$
1 <= (mL + mH x 256) <= 100

This command prints raster graphics.
Exceptions:
Null data should set to remainder bit(s).

2.4.6 Download BMP Logo

ASCII: US (+*.BMP file)
Hexadecimal: 1F (+*.BMP file)
Decimal: 31 (+*.BMP file)
Value: Maximum width = 576
Maximum height = 512

Enters a BMP file into RAM or Flash.
This command is used by sending the file data of a monochrome BMP file preceded by a 0x1F.
The bit map is stored in the printer in the same manner as a down loaded bit image.
The downloaded BMP file can be printed by using the Print Downloaded Bit Image (1D 2F m) command.

Exceptions:
BMP file images that are not monochrome are ignored.

Related Information:
See 1F 33 n (Select Memory Type to save logos.)

2.4.7 Select the Current Logo (Downloaded Bit Image)

ASCII: US 0 *n*
Hexadecimal: 1F 30 *n*
Decimal: 31 48 *n*
Range of *n*: 0 – 255

Selects a logo to be defined or printed. The active logo *n* remains in use until this command is sent again with a different logo *n*.
When this command precedes a logo definition, that definition is stored in Flash Memory as logo *n*. If there is already a different definition in Flash Memory for logo *n*, the first is inactivated and the new definition is used. The inactive definition is not erased from Flash and continues to take up space in Flash Memory.
When this command precedes a logo print command and *n* is different from the previously active logo selected, the printer retrieves the logo definition for *n* from Flash Memory and prints it. If there is no definition for logo *n*, then no logo is printed.

In the case of a previously existing application that expects only one possible logo, the printer will not receive the Select Current Logo (1F 30 *n*) command. In this case, the printer assigns 0 as the active logo identifier. It automatically stores any new logo definition in Flash Memory as logo 0, inactivating any previous logo 0 definition. If the Flash Memory space available for logos fills up with inactive logo 0 definitions, the firmware erases the old definitions at the next power cycle. This is the only case in which the printer erases Flash Memory without an application command.
In the case of a new application using multiple logos, the Select Current Logo (1F 30 *n*) command is used. After that, the printer no longer automatically erases the logo definition Flash Memory page when it fills with multiple definitions. A new application using multiple logos, writing a user-defined character set into Flash Memory, or both, is responsible for erasing the logo and user-defined character set Flash Memory page when the logo area is full or before a new character set is defined.

2.5 Status Commands

Status Command Introduction
The GENT has two methods of providing status to the application.
These methods are through Batch Status Commands, and Real Time Status Commands. An application may use one or more of these methods to understand the current status of the printer. A brief description of each of these methods follows.

Batch Status Commands
These commands are sent to the printer and stored in the printer's buffer. Once the printer has processed all the previous commands these commands are processed and the proper status is returned to the application. In the event a condition causes the printer to go BUSY, it stops processing commands from the printer buffer. If a Batch Status Command remained in the buffer during this busy condition, it would not be processed. In fact, no Batch Commands are processed while the printer is in this state.

Real-Time Commands
These commands are sent to the printer and are NOT stored in the printer's buffer. Instead, they are acted on immediately (regardless of the printer's BUSY status) and their response (if any) is returned to the application. This gives the application the ability to query the printer when it is in a busy state in order to correct whatever fault has occurred.

Batch Mode
For RS-232C printers, these commands enable the printer to communicate with the host computer following the selected handshaking protocol, either DTR/DSR or XON/XOFF. They are stored in the printer's data buffer as they are received, and are handled by the firmware in the order in which they are received.
When a fault occurs, the printer will go busy at the RS-232C interface and not respond to any of the Batch Mode Printer Status commands. If the fault causing the busy condition can be cleared, such as by loading paper, or letting the thermal printhead cool down, the printer will resume processing the data in its receive buffer.

2.5.1 Transmit peripheral device status

ASCII: ESC u 0
Hexadecimal: 1B 75 *0*
Decimal: 27 117 0
Return Value:

Bit 0	Bit 1
1 = Drawer1 closed	1 = Drawer 2 closed
0 = Drawer 1 open	0 = Drawer 2 open

(Bits 2-7 are not used)

Transmits current status of the cash drawers. One byte is sent to the host computer. In DTR/DSR protocol the printer waits for DSR =SPACE. If a drawer is not connected, the status will indicate it is closed.

2.5.2 Transmit Paper Sensor Status

ASCII: ESC v
Hexadecimal: 1B 76
Decimal: 27 118

Sends status data to the host computer. The printer sends one byte to the host computer when it is not busy or in a fault condition. In DTR/DSR protocol, the printer waits for DSR = SPACE.

Status Byte (RS-232C)

Bit	Function	0 Signifies	1 Signifies
0	Receipt Paper	Ok	Low
1	Receipt Cover	Closed	Open
2	Receipt Paper	Ok	Out
3	Knife Position	Ok	Jam
4	Always Zero	Fixed to Zero	Fixed to Zero
5	Temperature	In valid range	Too hot or too cold
6	Voltage	In valid range	Too high or too low
7	Not used	Fixed to Zero	Fixed to Zero

Related Information:
See Real Time Commands, in this document for details about fault condition reporting.

2.5.3 Transmit Printer ID

ASCII: GS I *n*
Hexadecimal: 1D 49 *n*
Decimal: 29 73 *n*
Value of *n*: 1, 49 = Printer model ID
2, 50 = Type ID
3, 51 = ROM version ID
4, 52 = Logo definition

Transmits the printer ID specified by n. This command is a batch mode command; that is, the response is transmitted after all prior data in the receive buffer has been processed. There may be a time lag between the printer receiving this command and transmitting the response.

Transmits the printer ID specified by *n* as follows:

n	Printer ID	Definition	ID(hex)
1, 49	Printer model ID	GENT	0x01
2, 50	Type ID	Installed options	Refer to the following table
3, 51	ROM Version ID	ROM version	0x00
4, 52	Logo Definition	Logo Definition	Refer to the following table

Type ID (n=2)

bit	Off/On	Hex	Decimal	Function
0	Off	00	0	No two-byte character code installed
	On	01	1	Two-byte character code installed
1	Off	00	0	No knife installed
	On	02	2	knife installed
2	-	-	-	Undefined
3	-	-	-	Undefined
4	Off	00	0	Not used. Fixed to off.
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to off.

Type ID (n=4)

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	No logo definition loaded by application.
	On	01	1	Logo loaded by application.
1	-	-	-	Undefined
2	-	-	-	Undefined
3	-	-	-	Undefined
4	Off	00	0	Not used. Fixed to off.
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to off.

2.5.4 Transmit Status

ASCII: GS r *n*
Hexadecimal: 1D 72 *n*
Decimal: 29 114 *n*
Values of *n*: 1, 49 = printer status
2, 50 = cash drawer status

Transmits the status specified by n. This is a batch mode command which transmits the response after all prior data in the receive buffer has been processed. There may be a time lag between the printer receiving this command and transmitting the response, depending on the receive buffer status.
When DTR/DSR RS232C communications handshaking control is selected, the printer transmits the one byte response only when the host signal DSR indicates it is ready to receive data.
When XON/XOFF RS232C communications handshaking control is selected, the printer transmits the one byte response regardless of the host signal DSR.
The status bytes to be transmitted are described in the following four tables.

Printer status (n=1, 49)

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Paper present
	On	01	1	Paper exhausted
1	Off	00	0	Cover closed
	On	02	2	Cover open
2	Off	00	0	Paper present
	On	04	4	Paper exhausted
3	-	-	-	Undefined
4	Off	00	0	Not used. Fixed to off.
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to off.

Cash drawer status (n=2, 50)

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	One or both cash drawers open
	On	01	1	Both cash drawers closed
1	Off	00	0	One or both cash drawers open
	On	02	2	Both cash drawers closed
2	-	-	-	Undefined
3	-	-	-	Undefined
4	Off	00	0	Not used. Fixed to off.
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to off.

Range of *n*: 1 – 2
49 - 50

Exceptions:
When *n* is out of the specified range, the command is ignored.

2.5.5 Recognizing Data from the Printer

An application sending various Real Time and non-Real Time commands to which the printer responds can determine which command a response belongs to by the table below.
Responses to Transmit Peripheral Device Status (1B 75) and Transmit Paper Sensor Status (1B 76) are non-Real Time responses and will arrive in the order in which they were solicited.

Batch Mode Response		**Response Recognized By:**
ASCII	**HEX**	
ESC u 0	1B 75 0	0 0 0 0 0 0 x x Binary
ESC v	1B 76	0 0 0 0 0 x x x Binary
GS I *n*	1D 49 n	0 x x 0 x x x x Binary
GS r *n*	1D 72 n	0 x x 0 x x x x Binary

Real-Time Response		**Response Recognized By:**
ASCII	**HEX**	
DLE EOT *n*	10 04 n	0 x x 1 x x 1 0 Binary
GS ENQ	1D 05	1 x x x x x x x Binary
XON		0 0 0 1 0 0 0 1 Binary
XOFF		0 0 0 1 0 0 1 1 Binary

2.5.6 Real Time Commands

These commands provide an application interface to the printer even when the printer is not handling other commands (RS-232C communication interface only):
1. Real Time Status Transmission
2. Real Time Request to Printer
3. Real Time Printer Status Transmission

The Batch Mode Printer Status commands are placed in the printer's data buffer as they are received and handled by the firmware in the order in which they are received. If the paper exhausts while printing data that was in the buffer ahead of the status command, the printer goes busy at the RS-232C interface and suspends processing the data in the buffer until paper is reloaded. This is true for all error conditions: knife home error, thermal printhead overheat, etc.
In addition, there is no way to restart the printer after a paper jam.
The Real Time commands are implemented in two ways to correct these problems. Both implementations offer the same functionality; which one you choose depends on the current usage of your application.

Rules for Using Real Time Commands

Three situations must be understood when using real time commands.
First, the printer executes the Real Time command upon receiving it and will transmit status regardless of the condition of the DSR signal.
Second, the printer transmits status whenever it recognizes a Real Time Status Transmission command sequence, even if that sequence happens to occur naturally within the data of another command, such as graphics data.
In this case the sequence will also be handled correctly as the graphics data it is intended to be when the graphics command is executed from the buffer.
Third, care must be taken not to insert a Real Time command into the data sequence of another command that consists of two or more bytes.
In this case the printer will use the real time command sequence bytes instead of the other command's parameter bytes when finally executing that other command from the buffer; the other command will NOT be executed correctly.
These three situations generally preclude use of standard DOS drivers for the serial communication ports when using real time commands.

Moving Data Through the Buffer

Another consideration is that an application should take care not to let the buffer fill up with real time commands when the printer is busy at the RS-232C interface. A busy condition at the RS-232C interface can be determined by bit 3 of the response to 1D 05 or 10 04 1.
The reason for a particular busy condition can be determined by other responses to 10 04 n.
Although the printer responds to Real Time commands when it is busy, it will place them into the buffer behind any other data there, and flush them out in the order in which they were received. When the printer is busy due simply to buffer full (that is, it can't print data as fast as it can receive it), then data continues to be processed out of the buffer at approximately print speed and the Real Time commands will eventually get flushed out.
When the printer is busy due to an error condition, then data stops being processed out of the buffer until the condition clears one way or another. In either case, but more quickly in the case of an error condition, the buffer can fill with real time commands.
When the DLE sequences are being used, the last byte stored when the buffer fills up could be the DLE code, with no room for the subsequent EOT or ENQ.

Similarly, when the GS sequences are being used, the last byte stored when the buffer fills up could be the GS code, with no room for the subsequent ENQ. When this lone GS byte is finally processed out of the buffer it will use the next byte, whatever it is, as the second byte in its GS sequence.
To guard against this situation, an application should determine the cause of a busy condition and take appropriate action or pace further real time commands to avoid filling the buffer. There are a minimum of 256 bytes available in the printer's buffer when it goes busy.

2.5.7 Real Time Status Transmission

DLE Sequence
ASCII: DLE EOT *n*
Hexadecimal: 10 04 *n*
Decimal: 16 4 *n*
Values of *n*: DLE Sequence
1 = Transmit printer status
2 = Transmit RS-232C busy status
3 = Transmit error status
4 = Transmit receipt paper status

Transmits the selected one byte printer status specified by *n* in Real Time according to the following parameters.

Exceptions:
The command is ignored if *n* is out of range.
An application using the DLE sequence must send EOT within 100 milliseconds of DLE or the printer will misinterpret the DLE.

Related Information:

Transmit printer status (n =1)

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Undefined. Fixed to off.
1	On	02	2	Undefined. Fixed to on
2	Off	00	0	One or both cash drawers open
	On	04	4	Both cash drawers closed
3	Off	00	0	On line state (Not busy at the RS232C interface)
	On	08	8	Off line state (Busy at the RS232C interface)
4	On	10	16	Not used. Fixed to on.
5	-	-	-	Undefined
6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to off.

Transmit 0ffline status (n=2)

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Undefined. Fixed to off.
1	On	02	2	Undefined. Fixed to on
2	Off	00	0	Cover closed
	On	04	4	Cover open
3	Off	00	0	Paper Feed Button is not pressed
	On	08	8	Paper Feed Button is pressed
4	On	10	16	Not used. Fixed to on.
5	Off	00	0	Printing not stopped due to paper condition
	On	20	32	Printing stopped due to paper condition
6	Off	00	0	No error condition
	On	40	64	Error condition exists in the printer
7	Off	00	0	Not used. Fixed to off.

Transmit error status (n=3)

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Undefined. Fixed to off.
1	On	02	2	Undefined. Fixed to on
2	Off	00	0	Undefined. Fixed to off
3	Off	00	0	No knife error
	On	08	8	Knife error occurred
4	On	10	16	Not used. Fixed to on.
5	Off	00	0	No unrecoverable error
	On	20	32	Unrecoverable error occurred
6	Off	00	0	Thermal printhead temp. and power supply voltage are in range
	On	40	64	Thermal printhead temp. and power supply voltage are out of range
7	Off	00	0	Not used. Fixed to off.

Transmit paper roll sensor status (n=4)

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Undefined. Fixed to off.
1	On	02	2	Undefined. Fixed to on
2	Off	00	0	Paper adequate
	On	04	4	Paper low (if paper low sensor enabled)
3	Off	00	0	Paper adequate
	On	08	8	Paper low (if paper low sensor enabled)
4	On	10	16	Not used. Fixed to on.
5	Off	00	0	Paper present
	On	20	32	Paper exhausted
6	Off	00	0	Paper present
	On	40	64	Paper exhausted
7	Off	00	0	Not used. Fixed to off.

2.5.8 Real Time Request to Printer

	DLE Sequence
ASCII:	DLE ENQ *n*
Hexadecimal:	10 05 *n*
Decimal:	16 5 *n*
Values of *n*:	1 = Recover and restart 2 = Recover and clear buffers

The printer responds to a request from the host specified by *n*. The operations performed depend on the value of *n*, according to the following parameters.

***n* = 1:**

Restarts printing from the beginning of the line or page (decided by printing mode and diagnostics setting) where an error occurred, after recovering from the error. If reprint message is defined by Download 1-line Top/Bottom/Reprint Message into ROM (US e command) and 'Reprint the Error Page' is selected by diagnostics, printer prints the reprint message before reprinting of error page.
Print settings that are normally preserved from line to line, such as character height and width, are still preserved with this command. This sequence is ignored except when the printer is busy due to an error condition.
If the receipt is selected, this command will attempt recovery from a knife error. Other errors associated with the receipt, such as paper out or printhead overheating, can be recovered from only by clearing the specific condition, such as loading paper or letting the printhead cool down.

Recovery printing
The recovery printing is selected as follows.

Single side mode	Line Recovery
Double side mode	Line Recovery (Reprint Error Page setting = Resume from Error) Page Recovery (Reprint Error Page setting = Reprint Error Page)

***n* = 2:**

Recovers from an error after clearing the receive and print buffers.
Print settings that are normally preserved from line to line, such as character height and width, are still preserved with this command.
This sequence is ignored except when the printer is busy due to an error condition.
The same error recovery possibilities exist as for *n* = 1.

Exceptions:

The command is ignored if *n* is out of range.

2.5.9 Real Time Printer Status Transmission

ASCII: GS ENQ
Hexadecimal: 1D 05
Decimal: 29 5

Transmits one byte status of the printer in real time.

Value of Byte:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Paper adequate
	On	01	1	Paper low (if paper low sensor enabled)
1	Off	00	0	Paper adequate
	On	02	2	Paper low (if paper low sensor enabled)
2	Off	00	0	Cover closed
	On	04	4	Cover open
3	Off	00	0	RS-232C interface not busy
	On	08	8	RS-232C interface busy
4	Off	00	0	One or both cash drawers open
	On	10	16	Both cash drawers closed
5	Off	00	0	Undefined. Fixed to off.
6	Off	00	0	No error condition
	On	40	64	Error condition exists in the printer
7	Off	00	0	Not used. Fixed to on.

2.6 Bar Code Commands

These commands format and print bar codes and are described in order of their hexadecimal codes.
Note: firmware ranges from 1 dot per module to 5 dots per module (DPM) printed on the receipt. The default is 2 DPM.

2.6.1 Select Printing Position for HRI Characters

ASCII: GS H *n*
Hexadecimal: 1D 48 *n*
Decimal: 29 72 *n*
Value of *n*: Printing position
0 = Not printed
1 = Above the bar code
2 = Below the bar code
3 = Both above and below the bar code
Default: 0 (Not printed)

Prints HRI (Human Readable Interface) characters above or below the bar code.

2.6.2 Select Pitch for HRI Characters

ASCII: GS f *n*
Hexadecimal: 1D 66 *n*
Decimal: 29 102 *n*
Value of *n*: Pitch
0 = Standard Pitch at 16.9 CPI on receipt
1 = Compressed Pitch at 22.6 CPI on receipt
Default: (Standard Pitch at 16.9 CPI)

Selects standard or compressed font for printing Bar Code characters.

2.6.3 Select Bar Code Height

ASCII: GS h *n*
Hexadecimal: 1D 68 *n*
Decimal: 29 104 *n*
Value of *n*: Number of dots
Range of *n*: 1 – 255
Default: 162

Sets the bar code height to *n* dots or n/8 mm *(*n/203 inch) for receipt.

2.6.4 Print Bar Code

	First Variation	Second Variation
ASCII:	GS k *m d1…dk* NUL	GS k *m n d1…dn*
Hexadecimal:	1D 6B *m d1…dk* 0	1D 6B *m n d1…dn*
Decimal:	29 107 *m d1…dk* 0	29 107 *m n d1…dn*

Values:
First Variation: String terminated with NUL Character
m = 0 – 6, 10
d = 32 - 126 (see the table)
n = 1 - 255 (see the table)
Selects the bar code type and prints a bar code for the ASCII characters entered. If the width of the bar code exceeds one line, the barcode is not printed.
There are two variations to this command. The first variation uses a NUL character to terminate the string; the second uses a length byte at the beginning of the string to compensate for the Code 128 bar code, which can accept a NUL character as part of the data. With the second variation the length of byte is specified at the beginning of the string.

Fixed-length codes can be aligned left, center, or right using the Align Positions command (1B 61). The check digit is calculated for UPC and JAN (EAN) codes if it is not sent from the host computer. Six-character zero-suppressed UPC-E tags are generated from full 11 or 12 characters sent from the host computer according to standard UPC-E rules. Start/Stop characters are added for Code 39 if they are not included.

First Variation

m	**Barcode type**	**Data**	***n*; Length**
0	UPC-A	48 – 57 (ASCII numerals)	Fixed Length: 11, 12
1	UPC-E	48 – 57	Fixed Length: 11, 12
2	JAN-13(EAN13)	48 – 57	Fixed Length: 12, 13
3	JAN-8(EAN8)	48 – 57	Fixed Length: 7, 8
4	CODE39	48 – 57, 65 – 90 (ASCII alphabet), 32, 36, 37, 43, 45, 46, 47 (ASCII special characters) d1=dk=42 (start/stop code is supplied by printer if necessary)	Variable length
5	Interleaved 2 of 5 (ITF)	48 – 57	Variable length (Even number)
6	CODABAR (NW-7)	65 – 68, start code 48 – 57, 36, 43, 45, 46, 47, 58	Variable length
10	PDF417	1 – 255	Variable length

Second Variation: Length of Byte Specified at Beginning of String
m = 65 - 73, 75 (see the table)
d = 0 - 127 (see the table)
n = 1 - 255 (see the table)
The value of *m* selects the bar code system as described in the table.
When data is present in the print buffer, the printer processes the data following *m* as normal data.
The variable *d* indicates the character code to be encoded into the specified bar code system.
See the table. If character code *d* cannot be encoded, the printer prints the bar code data processed so far, and the following data is treated as normal data.

Second Variation

m	**Barcode type**	**Data**	***n*; Length**
65	UPC-A	48 – 57 (ASCII numerals)	Fixed Length: 11, 12
66	UPC-E	48 – 57	Fixed Length: 11, 12
67	JAN-13(EAN13)	48 – 57	Fixed Length: 12, 13
68	JAN-8(EAN8)	48 – 57	Fixed Length: 7, 8
69	CODE39	48 – 57, 65 – 90 (ASCII alphabet), 32, 36, 37, 43, 45, 46, 47 (ASCII special characters) d1=dk=42 (start/stop code is supplied by printer if necessary)	Variable length
70	Interleaved 2 of 5 (ITF)	48 – 57	Variable length (Even number)
71	CODABAR (NW-7)	65 – 68, start code 48 – 57, 36, 43, 45, 46, 47, 58	Variable length
72	Code 93	0 – 127	Variable length (A748 native mode only)
73	Code 128	0 – 105 d1=103 – 105 (must be a start code) d2=0 – 102 (Data bytes) (Stop code is provided by the printer	Variable length

10	PDF417	0 – 255	Variable length (A748 native mode only)

Exceptions:
Illegal data cancels this command.
The command is valid only at the beginning of a line.
When the bar code printing area exceed 72mm
If bar width "1" => ignore this command (Barcode is not printed.)
If bar width "2-6" => print barcode using selected bar width -1
Note) The readability of scanner may be affected when bar width is changed to “1”.

2.6.5 Select Bar Code Width

ASCII: GS w *n*
Hexadecimal: 1D 77 *n*
Decimal: 29 119 *n*
Values of *n*: 1, 2, 3, 4, 5, 6
Default: 3 for receipt

Sets the bar code width to *n* dots.

Formulas:
n + 1/8 mm *(n* + 1/203 inch)

Caution :
When selecting a bar code width of 1 the readability rate is impacted.

2.7 Page Mode Commands

Page Mode is one of two modes. Standard Mode is typical of how most printers operate by printing data as it is received and feeding paper as the various paper feed commands are received. Page Mode is different in that it processes or prepares the data as a “page” in memory before it prints it. Think of this as a virtual page. The page can be any area within certain parameters that you define. Once the printer receives the (0x0C) command, it prints the page and returns the printer to Standard Mode.

The Select Page Mode command (1B 4C) puts the printer into Page Mode. Any commands that are received are interpreted as Page Mode commands. Several commands react differently when in Standard Mode and Page Mode. The descriptions of these individual commands in this chapter indicate the differences in how they operate in the two modes.

2.7.1 Print and Return to Standard Mode

ASCII: FF
Hexadecimal: 0C
Decimal: 12

For Single Side Mode, the processed data is printed and the printer returns to Standard Mode. The developed data is deleted after being printed.

For Double Side Mode, the developed data is kept in print buffer and return to Standard Mode. When Paper-Cut command is received, printer will print all developed data (page mode data and standard mode data).

Exceptions:
This command is enabled only in Page Mode.

2.7.2 Cancel Print Data in Page Mode

ASCII: CAN
Hexadecimal: 18
Decimal: 24

Deletes all the data to be printed in the “page” area. Any data from the previously selected “page” area that is also part of the current data to be printed is deleted.

Exceptions:
This command is only used in Page Mode.

2.7.3 Print Data in Page Mode

ASCII: ESC FF
Hexadecimal: 1B 0C
Decimal: 27 12

Collectively prints all buffered data in the printing area.
After printing, the printer does not clear the buffered data and sets values for Select Print Direction in Page Mode (1B 54 n) and Set Print Area in Page Mode (1B 57…), and sets the position for buffering character data.

For Double Side Mode, this command is ignored.

Exceptions:
This command enabled only in Page Mode.

2.7.4 Select Page Mode

ASCII: ESC L
Hexadecimal: 1B 4C
Decimal: 27 76

Switches from Standard Mode to Page Mode. After printing has been completed either by the Print and Return to Standard Mode (FF) command or Select Standard Mode (1B 53) the printer returns to Standard Mode. The developed data is deleted after being printed.
This command sets the position where data is buffered to the position specified by Select Print Direction in Page Mode (1B 54) within the printing area defined by Set Print Area in Page Mode (1B 57).
This command switches the settings for the following commands (which values can be set independently in Standard Mode and Page Mode) to those for Page Mode.
1. Set Right-Side Character Spacing (1B 20)
2. Select 1/6-Inch Line Spacing (1B 32)
3. Set Line Spacing (1B 33)

It is possible only to set values for the following commands in Page Mode. These commands are not executed.
4. Select or Cancel 90 Degree Clockwise Rotation (1B 56)
5. Select Justification (1B 61)
6. Select or Cancel Upside-Down Printing (1B 7B).
7. Set Left Margin (1D 4C)
8. Set Print Area Width (1D 57)

Exceptions:
The command is enabled only when input at the beginning of a line.
The command has no effect if Page Mode has previously been selected.

2.7.5 Select Standard Mode

ASCII: ESC S
Hexadecimal: 1B 53
Decimal: 27 83

Switches from Page Mode to Standard Mode. In switching from Page Mode to Standard Mode, data buffered in Page Mode are cleared, the printing area set by Set Print Area in Page Mode (1B 57) is initialized and the print position is set to the beginning of the line.
This command switches the settings for the following commands (the values for these commands can be set independently in Standard Mode and Page Mode) to those for Standard Mode:
1. Set Right-Side Character Spacing (1B 20)
2. Select 1/6 Inch Line Spacing (1B 32)
3. Set Line Spacing (1B 33)

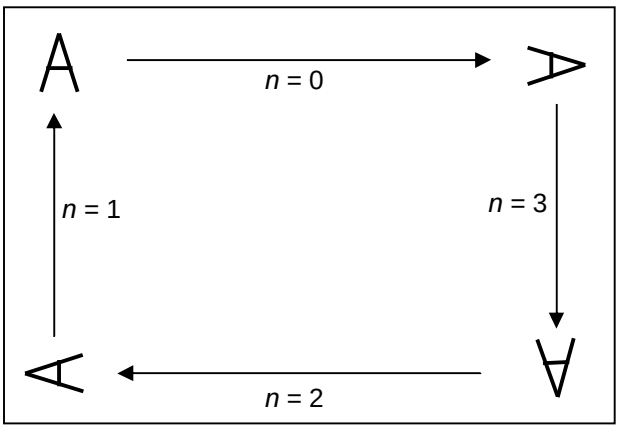
Standard Mode is automatically selected when power is turned on, the printer is reset, or the Initialize Printer command (1B 40) is used.

Exceptions:
This command is effective only in Page Mode.

2.7.6 Select Print Direction in Page Mode

ASCII: ESC T *n*
Hexadecimal: 1B 54 *n*
Decimal: 27 84 *n*
Value of n: 0 = Upper left corner proceeding across page to the right
1 = Lower left corner proceeding up the page
2 = Lower right corner proceeding across page to the left(upside down)
3 = Upper right corner proceeding down page

Selects the printing direction and start position in Page Mode. See the illustration.
The command can be sent multiple times so that several different print areas, aligned in different print directions, can be developed in the printer's page buffer before being printed the the Print and Return to Standard mode command (0C).



Default: 0 (Upper left corner proceeding across page to the right)

Exceptions:
This command is valid only in Page Mode.
This command is ignored if the value of *n* is out of the specified range.

2.7.7 Set Printing Area in Page Mode

ASCII: ESC W *n1, n2 ...n8*
Hexadecimal: 1B 57 *n1, n2 ...n8*
Decimal: 27 87 *n1,n2 ...n8*
Range of *n*: 0 – 255
Default: *n1* – *n4* = 0
n5 = 64
n6 = 2
n7 = 64
n8 = 2

Sets the position and size of the printing area in Page Mode.
The command can be sent multiple times so that several different print areas, aligned in different print directions, can be developed in the printer's page buffer before being printed by the Print and Return to Standard mode command (0C).
Defaults equal an origin of 0,0 and a size of 576x576. This command is allowed in any mode.

Formulas:

The starting position of the print area is the upper left of the area to be printed (x0, y0). The length of the area to be printed in the y direction is set to dy inches. The length of the area to be printed in the x direction is set to dx inches. Use the equations to determine the Value of x0, y0, dx, and dy.
See the illustration for a graphic representation of the printing area. For more information about the fundamentalcalculation pitch, see the Set Horizontal and Vertical Minimum Motion Units command (1D 50).

1. x0 = [(*n1* + *n2* x 256) x (horizontal minimum motion units)]
2. y0 = [(*n3* + *n4* x 256) x (vertical minimum motion units)]
3. dx = [(*n5* + *n6* x 256) x (horizontal minimum motion units)]
4. dy = [(*n7* + *n8* x 256) x (vertical minimum motion units)]
   Keep the following notes in mind for this command.
5. The minimum motion units depends on the vertical or horizontal direction.
6. The maximum printable area in the x direction is 576/203 inches.
7. The maximum printable area in the y direction is 2000/203 inches.

Exception:
This command is effective only in Page Mode.

2.7.8 Set Absolute Vertical Print Position in Page Mode

ASCII: GS $ *nL nH*
Hexadecimal: 1D 24 *nL nH*
Decimal: 29 36 *nL nH*

Formulas:

[(*nL* + *nH* X 256) x (vertical or horizontal motion unit)] inches.
Sets the absolute vertical print starting position for buffer character data in Page Mode.
The vertical or horizontal motion unit for the paper roll is used and the horizontal starting buffer position does not move.
The reference starting position is set by Select Print Direction in Page Mode (1B 54).
This sets the absolute position in the vertical direction when the starting position is set to the upper left or lower right; and sets the absolute position in the horizontal direction when the starting position is set to the upper right or lower left. The horizontal and vertical motion units are specified by the Set Horizontal and Vertical Minimum Motion Units (1D 50) command.

The Set Horizontal and Vertical Minimum Motion Units (1D 50) command can be used to change the horizontal and vertical motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.

Exceptions:
This command is effective only in Page Mode.
If the [(*nL* + *nH* x 256) x (vertical or horizontal motion unit)] exceeds the specified printing area, this command is ignored.

2.7.9 Set Relative Vertical Print Position in Page Mode

ASCII: GS \ *nL nH*
Hexadecimal: 1D 5C *nL nH*
Decimal: 29 92 *nL nH*

Sets the relative vertical print starting position from the current position. This command can also change the horizontal and vertical motion unit. The unit of horizontal and vertical motion is specified by this command.
This command functions as follows, depending on the print starting position set by Select Print Direction in Page Mode (1B 54):

- When the starting position is set to the upper left or lower left of the printing area, the vertical motion unit *(*y) is used.
- When the starting position is set to the upper right or lower left of the printing area, the horizontal motion unit *(x)* is used.

Value:
The value for the horizontal and vertical movement cannot be less than the minimum horizontal movement amount, and must be in even units of the minimum horizontal movement amount.

Formulas:
The distance from the current position is set to [(*nL* + *nH* x 256) x vertical or horizontal motion unit] inches. The amount of movement is calculated only for the receipt.
When pitch *n* is specified to the movement downward:

nL + *nH* x 256 = *n*

When pitch *n* is specified to the movement upward (the negative direction), use the complement of 65536.
When pitch *n* is specified to the movement upward:

65536 – (*nL* + *nH* x 256) = *n*

Exceptions:
This command is used only in Page Mode, otherwise it is ignored.
Any setting that exceeds the specified printing area is ignored.

2.8 Macro Commands

These commands are used to select and perform a user-defined sequence of printer operations.

2.8.1 Start or End Macro Definition

ASCII: GS :
Hexadecimal: 1D 3A
Decimal: 29 58

Starts or ends macro definition. Macro definition begins when this command is received during normal operation and ends when this command is received during macro definition. The macro definition is cleared, during definition of the macro, when the Execute Macro (1D 5E) command is received.

The defined contents of the macro are not cleared by the Initialize Printer (1B 40), thus, the Initialize rinter (1B 40) command may be used as part of the macro definition.
If the printer receives a second Select or Cancel Macro Definition (1D 3A) command immediately after previously receiving a Select or Cancel Macro Definition (1D 3A) the printer remains in the macro undefined state.

Formulas:
The contents of the macro can be defined up to 50 Kbytes.

Exceptions:
If the macro definition exceeds 50 Kbytes, excess data is not stored.

2.8.2 Execute Macro

ASCII: GS ^ *r t m*
Hexadecimal: 1D 5E *r t m*
Decimal: 29 94 *r t m*
Value of *r*: The number of times to execute the macro.
Value of *t*: The waiting time for executing the macro.
Value of *m*: Macro executing mode
0 (Bit0): The macro executes *r* times continuously with waiting time specified by *t*.
1 (Bit0): The printer waits for feed button to be pressed after waiting for the period specified by *t*. If the button is pressed, the printer executes the macro once. The printer repeats the operation *r* times.

Executes a macro. After waiting for a specified period the printer waits for the Paper Feed Button to be pressed. After the button is pressed, the printer executes the macro once. The printer repeats this operation the number of specified times.
When the macro is executed by pressing the Paper Feed Button *(m* = 1), paper cannot be fed by using the Paper Feed Button.

Formulas:
The waiting time is *t* x 100 msec for every macro execution.

Exceptions:
When a macro is being defined, if this command is without change Macro ID, printer will clear this Macro at Macro execution.
If the macro is not defined or if *r* is 0, nothing is executed.

2.9 User Data Storage Commands

2.9.1 Read from Non-Volatile Memory

ASCII: US 1 *k*
Hexadecimal: 1F 31 *k*
Decimal: 31 49 *k*
Range of *k*: 20 – 63 (decimal)

Reads a two-byte word from location *k* in the history EEROM. The printer returns the word at the next available opportunity.

2.9.2 Write to Non-Volatile Memory (NVRAM)

ASCII: US 2 n1 n2 *k*
Hexadecimal: 1F 32 n1 n2 *k*
Decimal: 31 50 n1 n2 *k*
Value of *n1* : 1st Byte
Value of *n2* : 2nd Byte
Range of *k*: 20 – 63 (decimal)

Writes the two-byte word, n1 n2, to location *k* in history EEROM.

2.9.3 Select Memory Type (SRAM/Flash) Where to Save Logos or User-Defined Fonts or Macro

ASCII: US 3 *n*
Hexadecimal: 1F 33 *n*
Decimal: 31 51 *n*
Value of *n*: 48-53

Specifies whether to load the logos or user-defined characters or macro to Flash Memory or to RAM (volatile memory). The selection remains in effect until it is changed via this command or until the power cycles.

n = 48 (ASCII *n* = 0)

Loads active logo to RAM only. This is used to print a special logo but not have it take up Flash Memory. A logo defined following this command is not preserved over a power cycle.

n = 49 (ASCII *n* = 1)

Loads active logo to Flash Memory. This is the default condition for logo Flash storage. A logo defined following this command is stored in Flash Memory.

n = 50 (ASCII *n* = 2)

Loads user-defined characters to RAM only. This is the default condition for user-defined character storage. Any user-defined characters defined following this command are not preserved over a power cycle.

n = 51 (ASCII *n* = 3)

Loads user-defined characters to Flash Memory. An application must use this command to store user-defined characters in Flash Memory.
Any user-defined characters defined following this command are stored in Flash Memory. A user-defined character cannot be redefined in Flash Memory. The Flash Memory page must be erased by an application before redefining user-defined characters. For more information, see the Erase User Flash Sector (1F 35 n) command.

n = 52 (ASCII *n* = 4)

Loads Macro to RAM only. This is the default condition for Macro. Any Macro defined following this

command is not preserved over a power cycle.

n = 53 (ASCII *n* = 5)

Loads Macro to Flash Memory. A Macro defined following this command is stored in Flash Memory.

2.9.4 Flash Allocation

ASCII: US 4 *n1 n2*
Hexadecimal: 1F 34 *n1 n2*
Decimal: 31 52 *n1 n2*
Default of *n*1: 1 (see below)
Default of *n2*: 1 (see below)

n1 is the number of 64k sectors used for logos and user-defined characters.
n2 is the number of 64k sectors used for user data storage.
This command sets the allocation of Flash sectors between user data storage and logos/user-defined characters. This allocation is saved in the EEPROM of the printer and is therefore saved across power cycles.Printer always keeps 64 Kbytes for User-defined characters.

n1 + *n2* <= 5 (3M)

n1	n2	User Defined Character	Download Logo	User Storage Data
0	5	64 Kbytes	0 Kbytes	320 Kbytes
1	4	64 Kbytes	64 Kbytes	256 Kbytes
2	3	64 Kbytes	128 Kbytes	192 Kbytes

If *n1* + *n2* is greater than the maximum number of sectors available, the command is ignored. Reissuing this command with different parameters will erase all sectors.

2.9.5 Erase User Flash Sector

ASCII: US 5 *n*
Hexadecimal: 1F 35 *n*
Decimal: 31 53 *n*
Value of *n*: 49

Erases a page of Flash Memory and sends a carriage return when the operation is complete.

n = 49 (ASCII *n* = 1)

This command erases all sectors available for user-defined characters and multiple logos. The page should be erased in two situations: when the logo definition area is full and an application is attempting to define new logos, and when an application wants to replace one user-defined character set with another. In both cases, all logos and character set definitions are erased and must be redefined.

Important:
While erasing Flash Memory, the printer disables all interrupts, including communications. To provide feedback to the application, the printer responds to the application when the erase is complete. After sending the Erase User Flash Sector (1F 35 n) command, an application should wait for the response from the printer before sending data.
Otherwise, data will be lost. If an application is unable to receive data, it should wait a minimum of five seconds after sending the Erase User Flash Sector (1F 35 n) command before sending data.

2.9.6 Printer Setting Change

ASCII: US 6 [*m n*], [*m n*] … [*m n*] 0FFH
Hexadecimal: 1F 36 [*m n*], [*m n*] … [*m n*] 0FFH
Decimal: 31 54 [*m n*], [*m n*] … [*m n*] 0FFH
Value of *m*, *n*:

m **(Hexadecimal)**	**Function**	***n*** **(Hexadecimal)**	**Function**
10	Interface type	00 01 02	USB/RS232C * RS232C USB
11	Baud rate	00 01 02 03 04	115200 bps 57600 bps 38400 bps **19200 bps *** **9600 bps ***
12	Number of data bit	00 01	8 data bits * 7 data bits
13	Number of stop bit	00 01	1 stop bits * 2 stop bits
14	Parity	00 01 02	No parity * Even parity Odd parity
15	Flow control	00 01	Software (XON/XOFF) Hardware (DTR/DSR) *
16	Data reception errors option	00 01	Ignore errors Print “?” *
17	One line buffer option	00 01	Normal size receive buffer(4K) * One line buffer(128 Bytes)
18	DSR signal control	00 01	Enabled Disabled *
~~**19**~~	~~**Printer ID**~~	~~**00**~~ ~~**01**~~ ~~**02**~~	~~**7158Native ID ***~~ ~~**Emulated Printer ID**~~ ~~**7167 Native ID**~~
~~**20**~~	~~**Emulation**~~	~~**00**~~ ~~**01**~~ ~~**02**~~ ~~**03**~~	~~**A758 emulation ***~~ ~~**A756 emulation**~~ ~~**A750 emulation**~~ ~~**A767 emulation**~~
21	Default lines per inch	00 01 02	8.13 lines per inch 7.52 lines per inch * 6 lines per inch
22	Carriage return usage	00 01	**Ignore CR *** **Use CR as Print cmd. ***
~~**23**~~	~~**Asian mode**~~	~~**00**~~ ~~**01**~~	~~**Enable Asian mode**~~ ~~**Disable Asian mode ***~~
24	Power LED control	00 01	Disabled * Enabled
25	Receipt synchronization	00 01	Synchronization enabled Synchronization disabled *
27	PDF417 Print Column	00 01	9 Columns * 14 Columns
30	Print density	00 01 02	**100% *** 110% **120% ***
31	Paper Low sensor option	00 01	Paper low sensor enable * Paper low sensor disable

m **(Hexadecimal)**	**Function**	***n*** **(Hexadecimal)**	**Function**
32	Paper width	00 01	80 mm * 58 mm
33	Knife option	00 01	Enable knife * Disable knife
36	Max Power option	00 01	55 W * 75 W
37	Color Paper option	00 01	One Color Paper * Two Color Paper
40	Default code page	**00** **01** **02** **03** **04** ~~**05**~~ **06** ~~**07**~~ **08** **09** ~~**0A**~~ **0B** ~~**0C**~~ ~~**0D**~~ ~~**0E**~~ **0F**	**437 *** **850** **852** **858** **860** ~~**862**~~ **863** ~~**864**~~ **865** **866** ~~**874**~~ **1252** ~~**Katakana**~~ ~~**932 (or 936, 949, 950)**~~ ~~**Hangary**~~ **857**
50	EEPROM default setting	00	EEPROM default setting
60	Thermal Printing Mode	00 01 02 03	Single Sided Mode * Double Sided Mode with Single Side command Double Sided Mode with Double Side Command Double Sided Mode with Pre-Defined data
61	Upside Down Printing for Double Side	00 01 02 03	Front: Normal, Back: Normal * Front: Upside down, Back Normal Front: Normal, Back: Upside Down Front: Upside Down, Back Upside Down
62	Swap Front Side and Back Side	00 01	Not Swap * Swap Front side and Back side
63	Pre-Defined Bottom/Top Message	00 01 02 03	No Message * Bottom Message on Front Top Message on Back Both Bottom Message on Front and Top Message on Back
64	Minimum Receipt Length (Remainder after dividing Min. Receipt Length by 256)	00-FF	Length in dot rows for Minimum receipt length
65	Minimum Receipt Length (Integer after dividing Min. Receipt Length by 256)	00-FF (max value to be defined)	Length in dot rows for Minimum receipt length
66	Reprint when Error Occurs	00 01	Resume printing from last error line * Reprint the error page
67	Reprint Message	00 01	No Message * Reprint Message

68	USB Interface Type	~~00~~01 ~~01~~02	**Vendor Specific class *** **Printer class**
69	**Printer Driver Type** **(for Parallel I/F)**	~~**01**~~**00** ~~**02**~~**01**	**OPOS driver *** **Windows driver**

Set the printer configuration specified by *m* and *n*. If m or n is out of range, this command is ignored. But the printer waits the data until terminator code “0FFH”.

Notes

This command changes configuration setting in EEPROM. If same value that is set in EEPROM is set, this command doesn’t write to EEPROM.

2.10 Flash Download Commands

These commands are used to load firmware into the printer.
The commands are listed in numerical order according to their hexadecimal codes. Each command is described and the hexadecimal, decimal, and ASCII codes are listed.
There are three ways to enter the Download Mode.
1. Powering the printer up with DIP Switch 2 up.
2. While the printer is running normally, use the command Switch to Flash Download Mode, to leave normal operation and enter the Download Mode.
3. If the Flash if found corrupted during Level 0 diagnostics the Download Mode is automatically entered after the printer has reset.
The printer never goes directly from the Download Mode to normal printer operation. To return to normal printer operation either the operator must turn the power off and then on to reboot or the application must send a command to cancel Download Mode and reboot.

2.10.1 Switch to Flash Download Mode

ASCII: ESC [}
Hexadecimal: 1B 5B 7D
Decimal: 27 91 125

Puts the printer in Flash Download Mode in preparation to receive commands controlling the downloading of objects into Flash Memory.
When this command is received, the printer leaves normal operation and can no longer print transactions until the Reboot the Printer command (1D FF) is received or the printer is rebooted.
This command does not affect the current communication parameters.
Once the printer is in Flash Download Mode, this command is no longer available.

2.10.2 Request Printer ID

ASCII: GS NUL
Hexadecimal: 1D 00
Decimal: 29 0

Returns ACK (06 hex) + 12 bytes ASCII string describing the Flash Memory Boot Sector Firmware part number. Ex : 189-1234567A

2.10.3 Return Segment Number Status of Flash Memory

ASCII: GS SOH
Hexadecimal: 1D 01
Decimal: 29 1

Returns the size of the Flash used. There may be 8, 16, or 32 sectors (64K each) in Flash Memory. This command assures that the firmware to be downloaded is the appropriate size for Flash Memory. The value returned is the maximum sector number that can be accepted by the Select Sector to download (1D 02 n) command.

Exceptions:
Available only in Download Mode.

2.10.4 Select Flash Memory Sector to Download

ASCII: GS STX *n*
Hexadecimal: 1D 02 *n*
Decimal: 29 2 *n*
Value of *n*: the Flash sector to which the next download operation applies
Range of *n*: 0 – 7 (512K)
0 – 15 (1 mB)
0 – 31 (2 mB)

Selects the Flash sector (nn) for which the next download operation applies. The values of the possible sector are restricted, depending upon the Flash part type. The printer transmits an ACK if the sector number is acceptable or an NAK if the sector number is not acceptable.
Sector numbers start at 0.

Exceptions:
Available only in Download Mode.

2.10.5 Get Firmware CRC

ASCII: GS ACK
Hexadecimal: 1D 06
Decimal: 29 6

Causes the printer to calculate the CRC for the currently selected sector and transmits the result. This is performed normally after downloading a sector to verify that the downloaded firmware is correct. The printer also calculates the CRC for each sector during power up and halts the program if any sector is erroneous.
The printer transmits ACK if the calculated CRC is correct for the selected sector; NAK if the CRC is incorrect or if no sector is selected.

2.10.6 Return Microprocessor CRC

ASCII: GS BEL
Hexadecimal: 1D 07
Decimal: 29 7

Returns the CRC calculated over the boot sector code space.

Formulas:
ACK <low byte> <high byte>

2.10.7 Erase the Flash Memory

ASCII: GS SO
Hexadecimal: 1D 0E
Decimal: 29 14

Causes the entire Flash Memory (except the boot) to be erased.
The printer returns ACK if the command is successful; NAK if it is unsuccessful.

Exceptions:
Available only in Download Mode.

2.10.8 Return Main Program Flash CRC

ASCII: GS SI
Hexadecimal: 1D 0F
Decimal: 29 15

Returns the CRC calculated over the Flash firmware code space. The format of the response is ACK

<low byte> <high byte>.

2.10.9 Erase Selected Flash Sector

ASCII: GS D LE *n*
Hexadecimal: 1D 10 *n*
Decimal: 29 16 *n*
Value and Range of *n*:
0 – 7 = 512K bytes Flash
0 – 15 = 1M bytes Flash
0 – 31 = 2M bytes Flash

Erases the previously selected sector. The printer transmits ACK when the sector has been erased. If the previous sector is not successfully erased, or if no sector was selected, the printer transmits NAK.

Exceptions:
Available only in Download Mode.

2.10.10 Download to Active Flash Sector

ASCII: GS DC1 *al ah cl ch d1…dn*
Hexadecimal: 1D 11 *al ah cl ch d1…dn*
Decimal: 29 17 *al ah cl ch d1…dn*
Value of *al*: low byte of the address
Value of *ah*: high byte of the address
Value of *cl*: low byte of the count
Value of *ch*: high byte of the count
Value of *d*: data bytes, from 1 to n

Contains a start address (*ah* * 256 + *al*) and count (*ch* * 256 + *cl*) of binary bytes to load into the selected sector, followed by that many bytes. The start address is relative to the start of the sector. Addresses run from 0 to 64K.
The printer may return one of several responses. ACK means that the data was written correctly and the host should transmit the next block.
NAK means that, for some reason, the data was not written correctly.
This could mean that communications failed or that the write to Flash failed. The alternatives seem to be to retry the block or halt loading and assume a hardware failure.

Value of *n* (for number of data bytes)	Range of Address (*al ah*)	Range of Count (*cl ch*)
((*ch* * 256) + *cl)*	2000-FFFF (hexadecimal)	0001-0400 (hexadecimal)

Range:
Addresses run from 0 to 64K.
Related Information:
Available only in Download Mode.

2.10.11 Reboot the Printer

ASCII: GS (SPACE)
Hexadecimal: 1D FF
Decimal: 29 255

Ends the load process and reboots the printer. Before executing this command, the printer should have firmware loaded and external switches set to the runtime settings. Application software for downloading should prompt the user to set the external switches and confirm before sending this command. If the downloading was started from a diagnostic, the reboot will cause the printer to reenter download state unless the external switches are changed.

2.11 Double side print command (These commands are supported by 2ST model only)

2.11.1 General Explanation

Printer prepare four kinds of thermal receipt printing mode:

1. Single sided mode same as current manner,

2. Double sided mode with single side command.
   It is using current printing manner. Printer receives single sided data until paper cut command then print data is automatically separated into two parts where first part prints on front side and second part prints on backside. (Refer Appendix 3 How to make printing pattern from single side to double side.)

3. Double sided mode with Double side command.
   Printing data can be selectively printed on front/back side of receipt paper. Once this mode is selected, printer starts to store the data until print start command or paper cut command is received before start printing.

4. Double sided mode with pre-defined data.
   Printer printreceived data on the front side and pre-defined data on the back. Printer starts printing when paper cut command is received.

This thermal receipt printing mode can be selected either printer diagnostics or command (Printer Setting Change: 1F 11 and Select Thermal Printing Mode: 1F 60).

2.11.2 Select Thermal Printing Modes

ASCII: US ' *n*
Hexadecimal: 1F 60 *n*
Decimal: 31 96 *n*
Value of *n*: 0 = Single Sided Mode
1 = Double Sided Mode with Single Side Command
2 = Double Sided Mode with Double Side Command
3 = Double Sided Mode with Pre-defined Data

Default: The selected setting in diagnostic mode

Selects the thermal printing mode: single side or double side mode. If single side mode is selected, thermal printing can only be executed on front side of receipt paper. If Double side mode is selected, printing can be executed on front side and/or backside of receipt paper.

With selection n=0, printing format is same as existing firmware.

With selection n=1(Single Side Command), print buffer is first divided into two parts. The first half of print buffer will be printed on front side and the second half of print buffer will be printed on backside of receipt paper.
(Exception: The command Select Thermal Printing Side and Start Double Sided Printing will be ignored)

With selection n=2(Double Side Command), print buffer can be selectively printed on front/back side of receipt paper.
When printer is switched from other thermal mode to Double Side Mode w/Double Side Command, printer's default selected side is Front Side.

Sending a 1Fh 62h will print data.

With selection n=3(Pre-defined data), pre-defined data is printed on the backside and received command will is printed on the front side.
Backside data will be printed only once for each single receipt. Receipt length is determined by the longer side.

This command is valid only on receipt station.
When Thermal Printing Mode is changed, printer will always be in standard mode, and printer will print if there is any data in print buffer.

The Printer Setting Change command (1FH 11H) is used to store setting.

2.11.3 Select Thermal Printing Side

ASCII: US a *n*
Hexadecimal: 1F 61 *n*
Decimal: 31 97 *n*
Value of *n*: 0 = Front Side
1 = Back Side
Default: 0 (Front Side)

Selects the thermal printing side: front side, back side in Double Side Mode w/Double Side Command.(1Fh 60h 02h)
This command is valid for subsequent lines.

Exceptions:
The command is enabled only when input at the beginning of a line, printer is in Double Side Mode w/ Double Side Command, and receipt station is selected.

If either side is larger than buffer size, printer prints out automatically and print buffer is cleared. Thermal printing mode and selected print size are not changed.

If current side is in page mode when this command is received, printer will return to standard mode and clear defined page area before changing side.

Limitations
Character attributes are not changed when print side is changed.

2.11.4 Start Double Sided Printing

ASCII: US b
Hexadecimal: 1F 62
Decimal: 31 98

Start double sided printing.
This command executes if the Thermal Printing Modes, Double Side Mode with Double Side Command is selected (n=2), and receipt station is selected, otherwise, this command is ignored.
Receipt length is determined by the longer side.

After printer prints out, both sides are in standard mode. If printer is in page mode when receive this command, page mode data will be printed and defined page area will be cleared.

2.11.5 Select or Cancel Upside Down Printing for Double Side Mode

ASCII: US c *n*
Hexadecimal: 1F 63 *n*
Decimal: 31 99 *n*
Values of n:
Bit 0 = 0: Cancel Front Side upside down printing
1: Enable Front Side upside down printing
Bit 1 = 0: Cancel Back Side upside down printing
1: Enable Back Side upside down printing

Printing side (Front/Back side) is physical side of printing.

Default: 0 (Cancel upside printing for both side)

This command will print the data upside down on the side as defined by n.

This command is valid in Double Side Mode when receipt is selected. Before start Double side printing, only the last received select or cancel upside down printing command is effective.

Execution of this command doesn't change EEPROM setting.
The Printer Setting Change command (1FH 11H) is used to store setting.

2.11.6 Swap Front Side and Back Side

ASCII: US d *n*
Hexadecimal: 1F 64 *n*
Decimal: 31 100 *n*
Values of n: 0: Cancel swap.
1: Swap Front Side and Back Side. Original Front Side data is printed on backside and original Back Side data is printed on front side.
Default: 0 (Cancel swap)

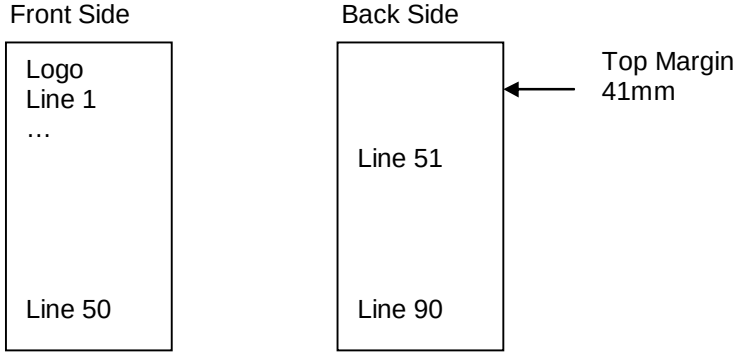
This command will swap the front side data and backside data when in Double Side Mode.

Before swapping Front Side and Back Side, the Front Side data is printed via Front Side thermal head. After swapping, the Front Side data is printed via Backside thermal head

Before starting double side printing, only the last received swap front side and backside command is effective.

This command is valid only when Double Side Mode (all 3 double side modes (1Fh 60h 01h, 02h or 03h)) and receipt station are selected.
Execution of this command doesn't change EEPROM setting.
The Printer Setting Change command (1FH 11H) is used to store setting.

Limitation:
For Double Side Mode w/Single Side Command, if Logo is printed immediately before paper cut, after swap, the printing pattern on Front Side (Backside before swap) will have 41mm blank area.



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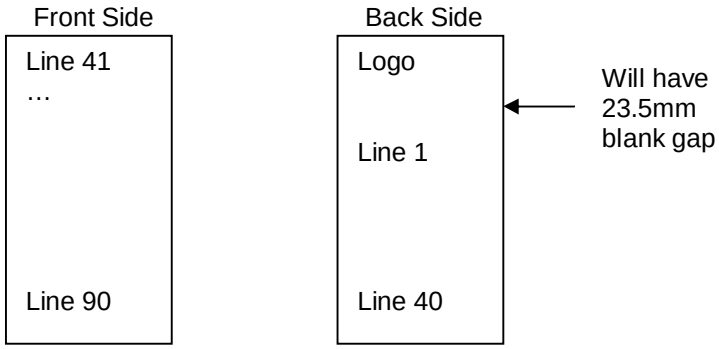


2.11.7 Download 1-line Top/Bottom/Reprint Message into ROM

ASCII: US e *n* k_1 d_1 d_2 … d_i NUL
Hexadecimal: 1F 65 *n* k_1 d_1 d_2 … d_i 0
Decimal: 31 101 *n* k_1 d_1 d_2 … d_i 0
Values: *n*: The line number. *n* = 0,1,2,3,4,5
k_1: The character attribute
d_1, d_2, … , d_i: Strings of 1-line Text Message. Strings terminated with NUL

This command will download one line of text into ROM.
The message is used in all Double Side Modes. User can select to automatically add a 1-line/2-line text message at bottom of Front Side or/and at top of Back Side or at top of page reprint data after error recovery.

Front Side uses line 0 and line1, and Back Side uses line 2 and line 3.
Printing side (Front/Back side) is logical side of printing.
Logical Front Side is the side that contains Line 1.
Logical Back Side is the side that contains last line.
Physical Front side is the side printed by the front thermal head.
Physical Back side is the side printed by the back thermal head.
Reprint message uses line 4 and line 5.

The line number n

n	Message	printing side
0	Bottom Message line 1	Logical Front Side
1	Bottom Message line 2	
2	Top Message line 1	Logical Back Side
3	Top Message line 2	
4	Reprint Message line 1	Physical Front Side
5	Reprint Message line 2	

Setting of Character Attribute

k_1			
Bit 7	0: Italic Mode off		1: Italic Mode on
Bit 6	0: Inverse video mode off		1: Inverse video mode on
Bit 5	0: Black		1: Color
Bit 4	0: Emphasize mode off		1: Emphasize mode on
Bit 3	0: Double width off		1: Double width on
Bit 2	0: Double height off		1: Double height on
Bit 1&0	Bit1	Bit0	
	0	0	Underline mode off
	0	1	1 dot underline
	1	0	2 dot underline

Characters exceeded one line will be ignored.
If command sequence is US e n k NUL, printer will clear the nth line message in Flash ROM.

If only one line is defined, printer will only print the defined line.

When print data is only one side data, Top/Bottom message won't be printed.

Limitation:
1. Some attributes are not supported – Script mode, Double strike mode, 90° Left/Right Rotation, Print Start Position, Character size.
2. Attribute cannot be changed within one line.
3. The printable width for Top/Bottom message is 576 dots (80mm paper), or 432 dots (58mm paper). If 58 mm print width is selected, printer automatically uses compress pitch font to print Top/Bottom/Reprint message.
4. Top/Bottom/Reprint message is printed based on diagnostic setting. If user changes printer setting during printer operation, the current top/bottom/reprint message is not affected unless the message is redefined or printer is restarted.

2.11.8 Enable Top/Bottom Message

ASCII: US f *n*
Hexadecimal: 1F 66 *n*
Decimal: 31 102 *n*
Values of n:

Bit 0 = 0: Disable pre-defined bottom message on front side
1: Enable pre-defined bottom message on front side
Bit 1 = 0: Disable pre-defined top message on back side
1: Enable pre-defined top message on back side
Bit 2 = 0: Disable reprint message.
1: Enable reprint message.

Default: 0 (Disable predefined bottom and top message)

When this function is enabled, printer will automatically add a 1-line or 2-line text message at the bottom/top of front side/backside of receipt.

This command is only valid when Double Side Modes (1Fh 60h 01h , 02h or 03h) (All w/Single Side Command and w/Double Side Command and w/Pre-defined data) and receipt station is selected.

Execution of this command doesn't change EEPROM setting. ,
The Printer Setting Change command (1FH 11H) is used to store setting.

Notes:
In following case, printer cannot print Top/Bottom message.
- When one side data is not existed, Top/Bottom message is not printed even if Top/Bottom message is enable.
- When front side data only contain a page mode, and there is no 17.5 mm Line Feed for next receipt's top margin.
In this case, the page mode is regarded as "Top Margin" as it is the only print item in front side.
Firmware will remove this "Top Margin" from front side data and then front side will become empty page.
Therefore printer will disable Top/Bottom Message automatically, as the front side is an empty page

2.11.9 Select nth Macro

ASCII: US g *n*
Hexadecimal: 1F 67 *n*
Decimal: 31 103 *n*
Value of n: 1 to 25
Default: *n* = 1

Select nth macro for definition or execution.

The same commands are used to define macro and execute macro as below.
Start or End Macro Definition (GS :)
Execute Macro 1Dh 5Eh(GS ^)

The Macro buffer size is up to 25*2048 bytes. A macro can exceed 2048 bytes, but total macros cannot exceed 50 Kbytes.

Printer will not check Macro data validity during Macro definition.
Macro can be nested, but only can be nested 1 Macro deep.

Exception
If GS ^ (Execute Macro) is in Macro data without change Macro ID, this Macro will be cleared during first time execution.

Printer will not check whether Macro is nested more than 1 Macro deep during Macro definition. If printer executes a Macro nested with 2 (or more) Macro deep, printer will abort execution before the 2nd deep Macro's execution.
For example, command sequence is
1F 67 03(Select 3rd Macro), 1D 3A(Start/End Macro definition) data… 1F 67 01(Select 1st Macro) … 1D 5E(Execute selected Macro) data… 1D 3A(End Macro definition)
In this example, Macro #3 is defined, and it will execute Macro #1. However, if the definiton of Macro #1 is changed and it is nested with another Macro, printer will abort Macro #3's execution.

2.11.10 Start or End Pre-Defined Back Side Printing Data Definition

ASCII: US h
Hexadecimal: 1F 68
Decimal: 31 104

Starts or ends Pre-Defined Back Side Printing and stored into the ROM. Pre-defined back side printing definition begins when this command is received during normal operation and ends when this command is received during Pre-defined back side printing definition.
If the printer receives a second "Start or End Pre-Defined Back Side Printing" immediately after previously receiving a "Start or End Pre-Defined Back Side Printing" the printer will clear Pre-Defined Back Side Printing data.

Exceptions:
During definition of pre-defined backside printing data, printer will not check data validity.

If pre-defined backside data definition contains GS : (Start or End Macro Definition), the definition will be cleared during the first execution (when Double Side Mode w/Predefined Backside is selected).

Below commands are ignored in predefined backside data.
1F 60 (Select Double Side Mode w/Predefined Backside Data)
1F 65 (Download 1 line Text Message into ROM)
All knife cut command.

Limitation:

1. If pre-defined back data includes Macro and Macro is re-defined in pre-define backside mode, the pre-defined back data cannot be updated immediately.

   Example:
   Pre-defined back data is defined as below in DS mode w/Pre-defined Backside
   1F 68 (Start Pre-Defined Back Side Printing Data Definition)
   1F 67 1 (Select No.1 Macro)
   1D 5E 1 0 0 (Execute Macro)
   1F 68 (End Pre-Defined Back Side Printing Data Definition)

   Then user redefine Macro 1, then pre-defined back data cannot be updated unless it is re-defined.

2. Pre-defined backside data are designed to store text and graphic data.
   If some commands other than text and graphics are included, printer may not be able to work properly.
   Consider below scenario,
   Printer's default thermal mode is DS. Mode w/PreDfn Back.

3. Pre-defined backside data is printed based on printer default settings (LPI, Code Page and Paper Width) unless user changes them by command in definition of predefined backside data.

4. When printer makes image for predefined backside data, character attributes are all disabled or set to OFF and printout page format (left/right margin, print area) is set to default. In other words, the initial status of character attribute and page format is OFF or default setting.

5. After printer makes image for predefined backside data, character attributes, page format, code page and LPI are same as the settings before the image making. However, other settings may not be same as those before the image making. User may send 10h (clear printer) to clear all settings.

2.11.11 Define Minimum Receipt Length

ASCII: US i *n1 n2*
Hexadecimal: 1F 69 *n1n2*
Decimal: 31 105 *n1 n2*
Value of *n*: Number of dots to be moved from the beginning of the line.
Value of *n1*: Remainder after dividing *n* by 256. (0 – 255)
Value of *n2*: Integer after dividing *n* by 256. (0 – 255)
Default: ***n1* = 0**
***n2* = 0**

This command defines the minimum receipt length to start the conversion from single side to double side. This setting is enabled for only "Double Sided Mode with Single Side Command". (1F 60 01)

If the Set Horizontal and Vertical Minimum Motion Units command (1D 50) is used to change the horizontal and vertical minimum motion unit, the parameters of this command (Minimum Receipt Length) will be interpreted accordingly.

Printer will not split receipt into two sides if defined length is less than 23.5mm.

Formulas:
To set minimum receipt length to two inches at the default vertical motion unit of 1/203 inches, send the four-byte string:

US i 150 1

2 inches = 2 x 203 = 406, and 406 = (1 X 256) + 150.

Notes:
Receipt length in this command refer to the length from top of the receipt to the last valid print line.

(excluding Top Marigin area and line feed)

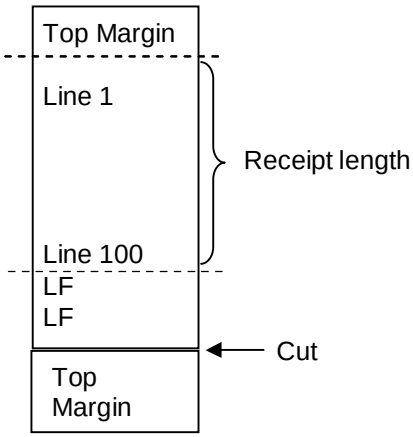


Figure: Single side receipt sample

If the printing line exceed Minimum Receipt Length, printer changes page from next line.
For example, When line pitch is set to 7.52 LPI and Minimum Receipt Length is set to 1 inch.
If application send 10 line data, printer print 8 lines in first page and print 2 lines in next page.

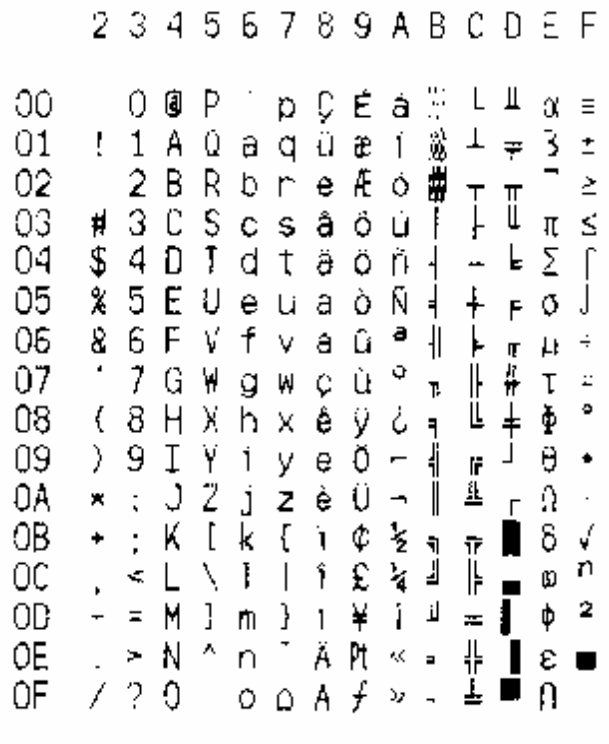
The maximum length that can set by this command is;

Single Side Mode (Mono)	120 Inch
Single Side Mode (Color)	60 Inch
Double Side Mode (Mono)	60 Inch
Double Side Mode (Color)	30 Inch

3 Appendix 1 Character sets

3.1 Single byte character

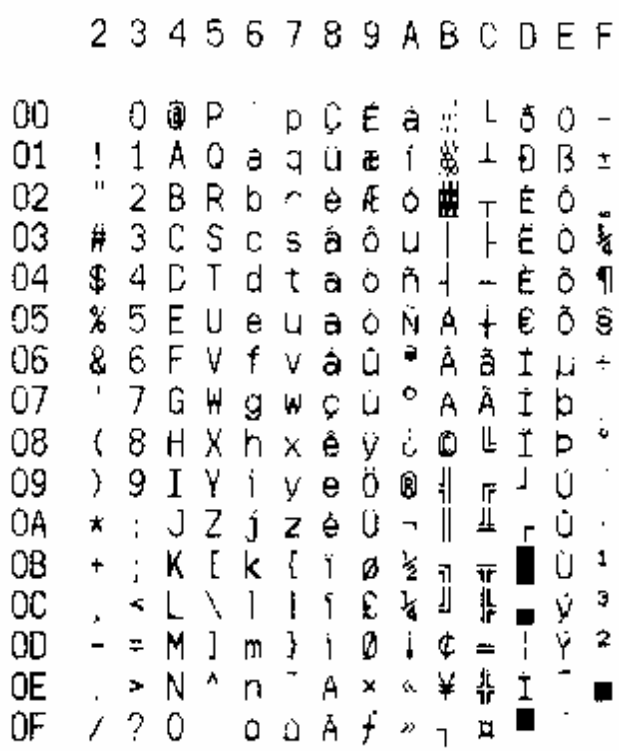
Code Page 437.



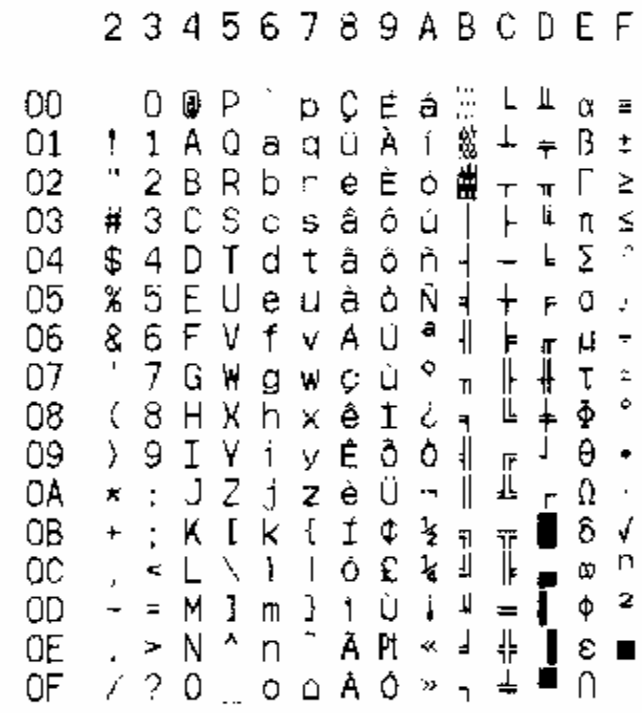
Code Page 850.

Code Page 852.

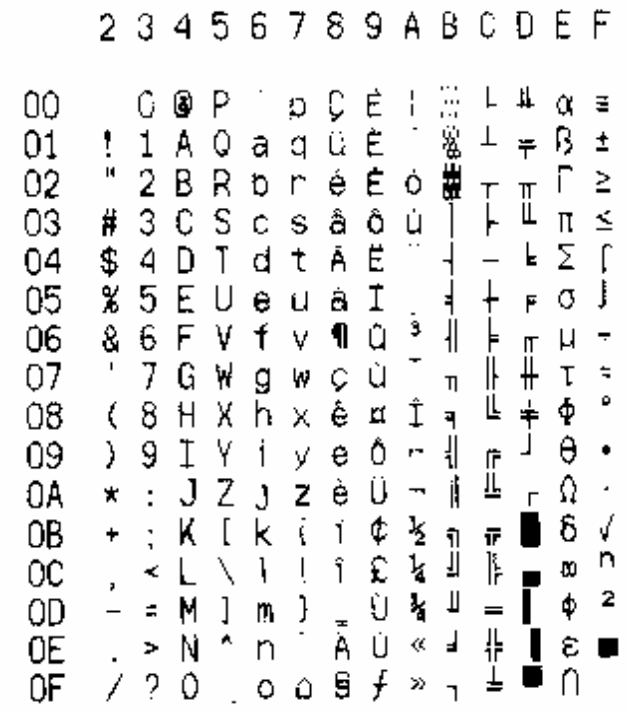
Code Page 858.



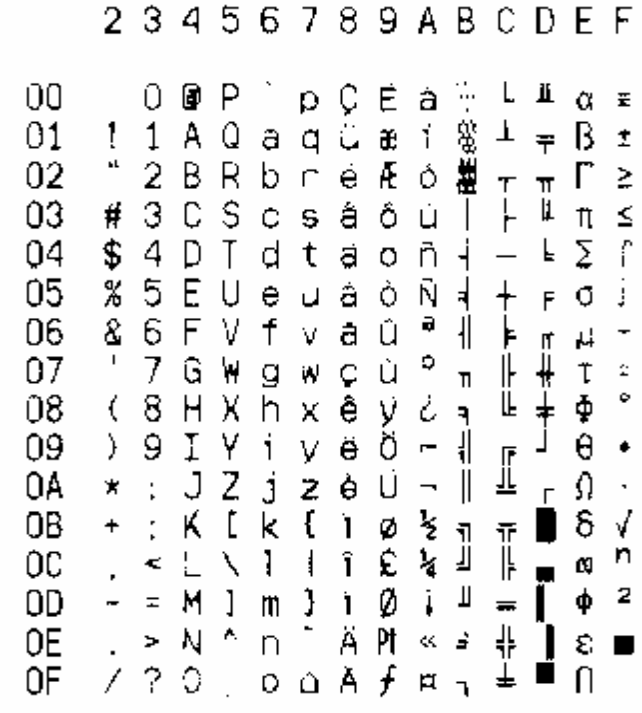
Code Page 860.



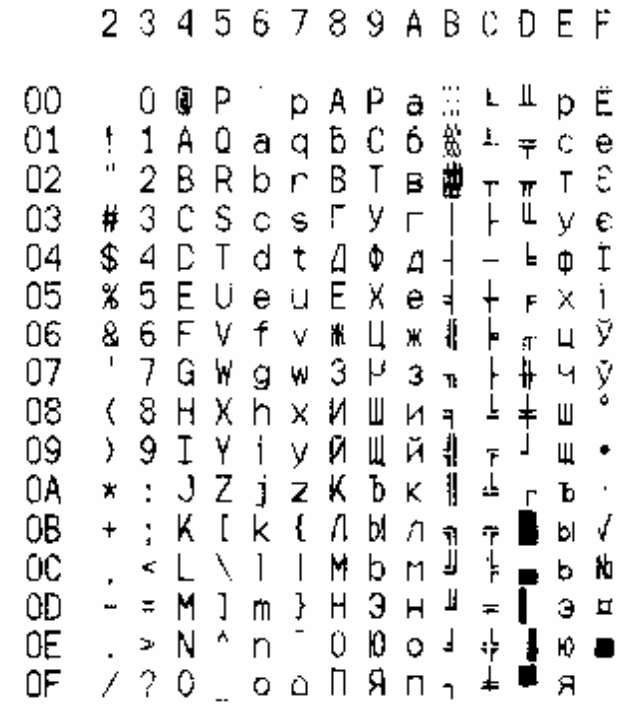
Code Page 863.



Code Page 865.



Code Page 866.



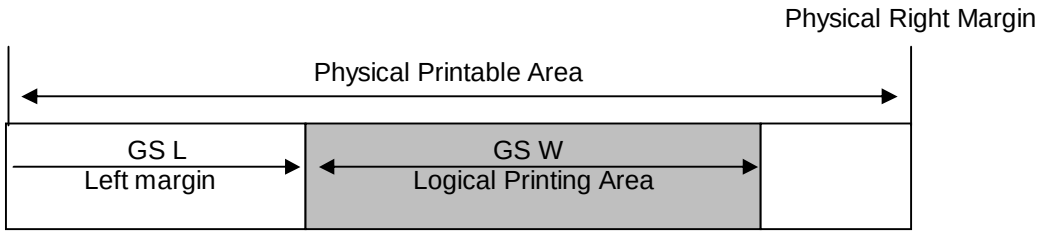
Code Page 1252.

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00		0	@	P	`	p	€			°	À	Ð	à	ð
01	!	1	A	Q	a	q		'	¡	±	Á	Ñ	á	ñ
02	"	2	B	R	b	r	‚	'	¢	²	Â	Ò	â	ò
03	#	3	C	S	c	s	ƒ	"	£	³	Ã	Ó	ã	ó
04	$	4	D	T	d	t	„	"	¤	´	Ä	Ô	ä	ô
05	%	5	E	U	e	u	…	•	¥	µ	Å	Õ	å	õ
06	&	6	F	V	f	v	†	–	¦	¶	Æ	Ö	æ	ö
07	'	7	G	W	g	w	‡	—	§	·	Ç	×	ç	÷
08	(	8	H	X	h	x	ˆ	˜	¨	¸	È	Ø	è	ø
09	)	9	I	Y	i	y	‰	™	©	¹	É	Ù	é	ù
0A	*	:	J	Z	j	z	Š	š	ª	º	Ê	Ú	ê	ú
0B	+	;	K	[	k	{	‹	›	«	»	Ë	Û	ë	û
0C	,	<	L	\	l	|	Œ	œ	¬	¼	Ì	Ü	ì	ü
0D	-	=	M	]	m	}				½	Í	Ý	í	ý
0E	.	>	N	^	n	~	Ž	ž	®	¾	Î	Þ	î	þ
0F	/	?	O	_	o			Ÿ	¯	¿	Ï	ß	ì	ÿ

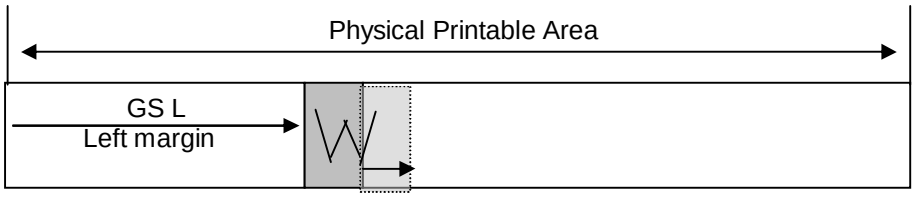
Code Page 857

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00		0	@	P	`	p	Ç	É	á	▒	└	º	Ó	-
01	!	1	A	Q	a	q	ü	æ	í	▓	┴	ª	ß	±
02	"	2	B	R	b	r	é	Æ	ó	▓	┬	Ê	Ô	
03	#	3	C	S	c	s	â	ô	ú	│	├	Ë	Ò	¾
04	$	4	D	T	d	t	ä	ö	ñ	┤	─	È	õ	¶
05	%	5	E	U	e	u	à	ò	Ñ	Á	┼		Õ	§
06	&	6	F	V	f	v	å	û	ğ	Â	ã	Í	µ	÷
07	'	7	G	W	g	w	ç	ù	Ğ	À	Ã	Î		¸
08	(	8	H	X	h	x	ê	İ	¿	©	╚	Ï	×	°
09	)	9	I	Y	i	y	ë	Ö	®	╣	╔	┘	Ú	¨
0A	*	:	J	Z	j	z	è	Ü	¬	╠	╩	┌	Û	·
0B	+	;	K	[	k	{	ï	ø	½	╗	╦	█	Ù	¹
0C	,	<	L	\	l	|	î	£	¼	╝	╠	▄	ì	³
0D	-	=	M	]	m	}	ı	Ø	¡	¢	═	¦	ÿ	²
0E	.	>	N	^	n	~	Ä	Ş	«	¥	╬	Ì	´	■
0F	/	?	O	_	o	⌂	Å	ş	»	┐	¤	▀	'	

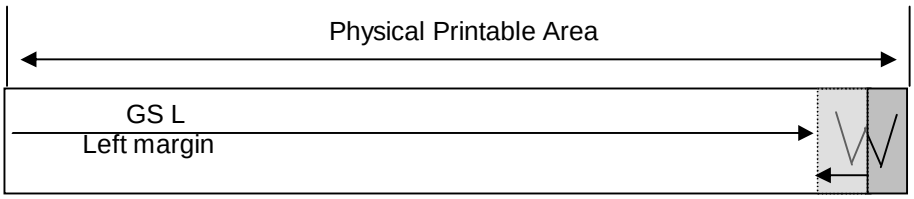
4 Appendix 2 Printable area



- The left margin can be set using GS L command.
- While printing area width is set by GS W command.
- These commands are ignored in page mode.



- If the printing area width is less than the width of 1 character, the right margin is shifted towards right to accommodate the width of 1 character. (This processing is only performed on the line of question.)
- If bitimage or download bitimage is developed, the right margin is shifted towards right to accommodate one line in vertical for that bitimage. (1 dot for double density bitimage and 2 dots for single density bitimage)



- If right margin reaches the physical limit, left margin is shifted towards left to accommodate the width of 1 character. (This processing is only performed on the line of question.)
- If both left and right margins have reach the physical limits, the character right side spacing is reduced to accommodate the character on that line.
- If bitimage or download bitimage is developed, the left margin is shifted towards left to accommodate one line in vertical for that bitimage. (1 dot for double density bitimage and 2 dots for single density bitimage)

5 Appendix 3 How to make printing pattern from single side to double side (Double side mode with single side command)

The print condition is as below.
The distance between cutter and 1st platen 17.5mm
The distance between 1st platen and 2nd platen 23.5mm

(1) Firmware algorithm to separate the printing from single side to double side
The following method is to separate the print buffer into two parts – one part is for front side and the other part is for back side.

a) Store printing data until paper cut
Firmware stores print data until paper cut command.
The print data is stored bit-pattern and information of position for each line.

b) Search last print line
Firmware search last print line then line spacing after last pint line should be consider as space to adjust the distance between printing position and cutter.
If there is any printing within 17.5mm (distance between 1st platen and cutter) like logo, firmware prints on front side.

c) Calculate printing separate position

Firmware accumulate the print space from beginning to the end (searched by step b)) then calculate the separate position by following formula.

Separate Position (SP) =

{Total print space (TP) + 23.5mm(distance between 1st and 2nd platen) } / 2

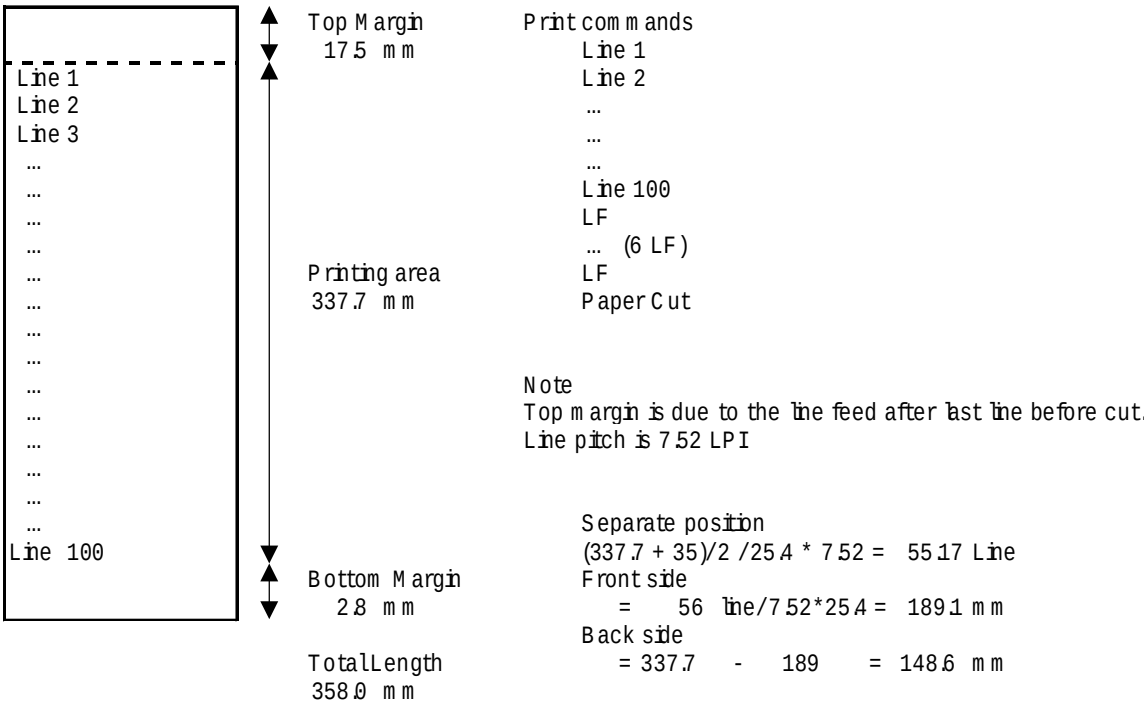
d) Adjust the separate position not to separate the middle of print line

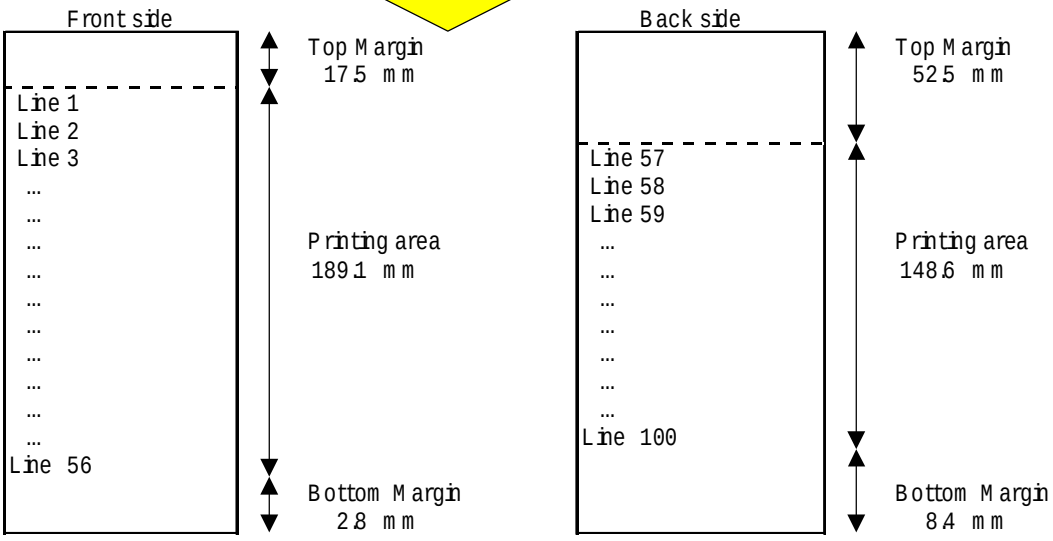
Firmware adjusts separate position not to separate the printing in the middle of print line (includes character attributes such as double height), barcode, and logo.

(2) Example of printing pattern

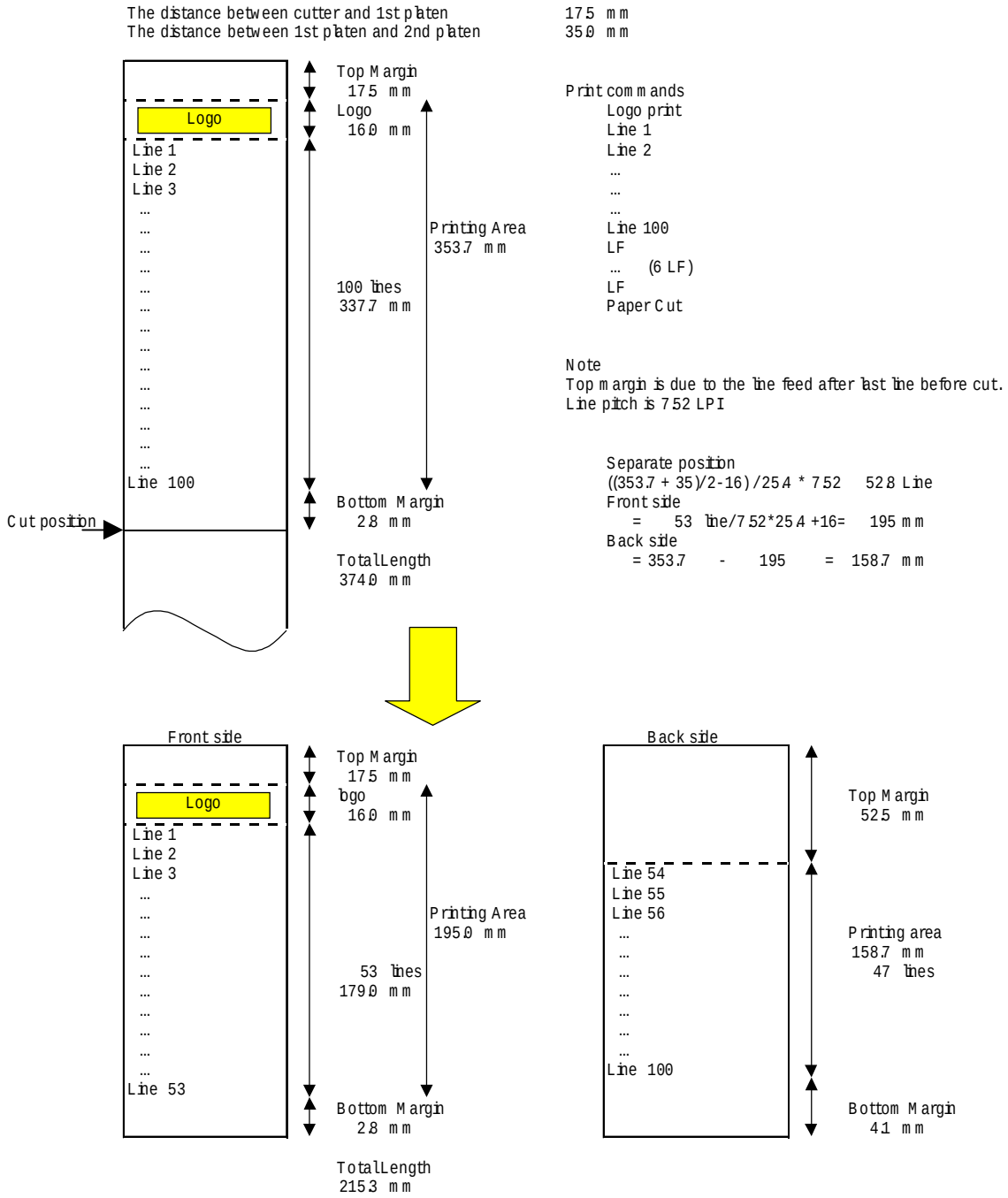
a) Text printing only

The distance between cutter and 1st platen 17.5 mm
The distance between 1st platen and 2nd platen 35.0 mm

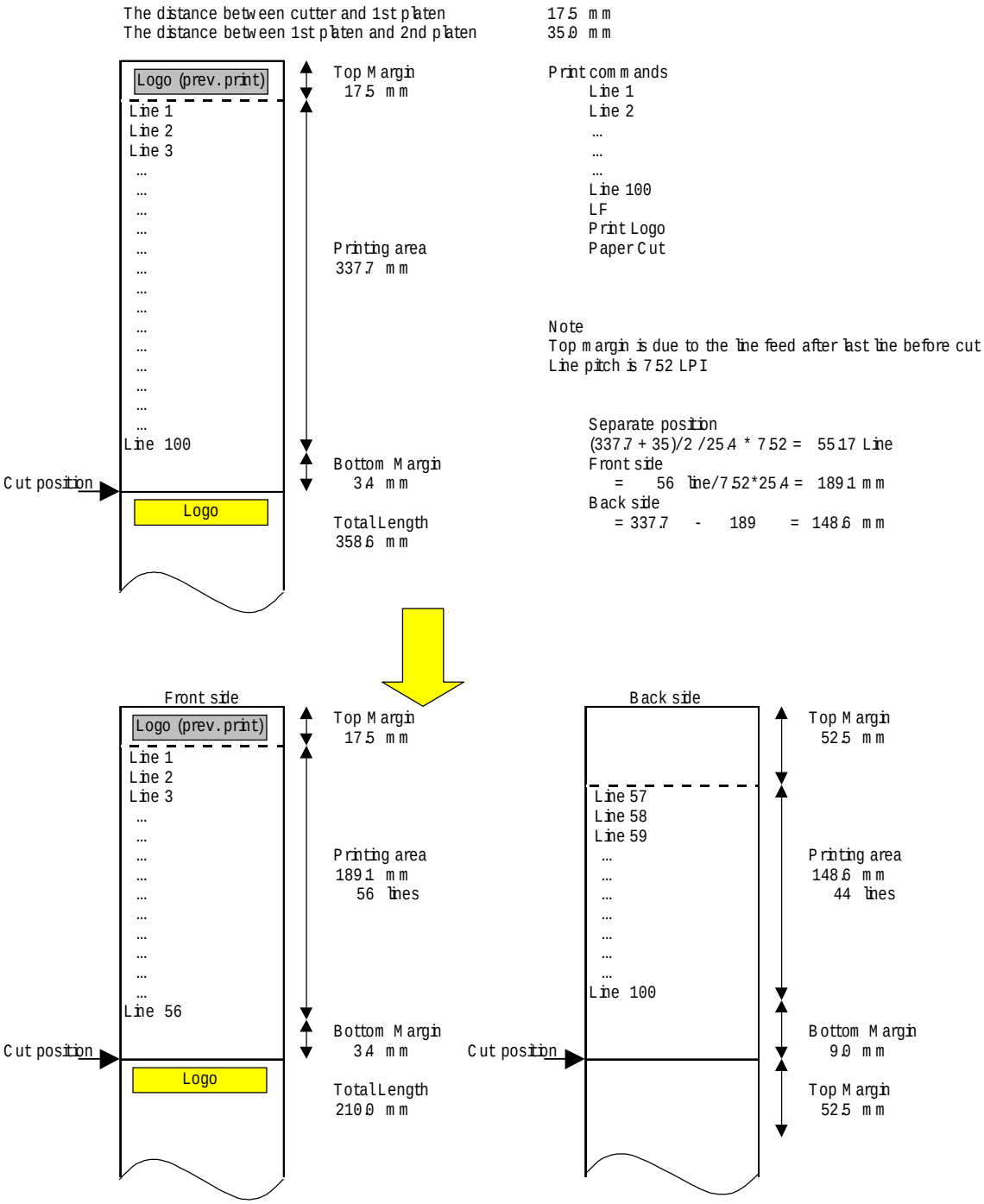




b) Text & logo printing (Logo is printed after paper cut)



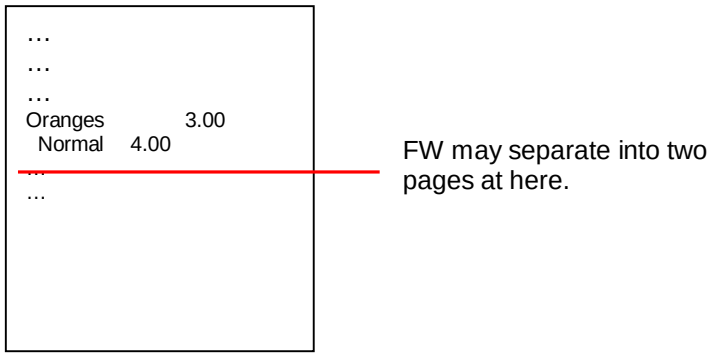
c) Text & logo printing (Logo is printed before paper cut.)



(3) Limitation

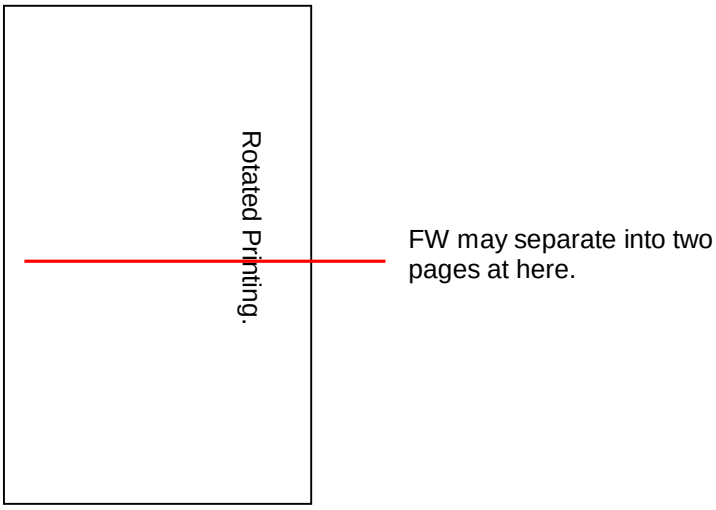
a) Grouped lines

If several lines are grouped as below, for Double Side Mode with Single Side Command, firmware may separate these lines and print them on two sides.



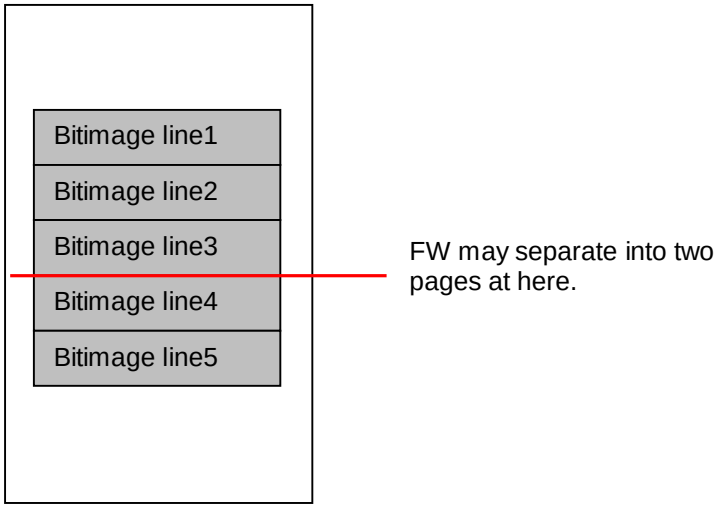
b) Rotated Mode

Firmware may separate these words and print them on two sides.



c) Bitimage printing

Firmware may separate the graphic print used by bitimage command (ESC * and ESC Y) onto two pages.



6 Diagnostics Overview

The printer performs three types of diagnostic tests to help troubleshoot problems and configure the printer. Each of these is described in detail in the sections that follow.

Startup (Level 0) Diagnostics
The printer performs these tests during the startup cycle.

Printer Configuration (Level 1)
Allows configuration of the printer using a Configuration Menu that is printed on a receipt. One of the configuration settings makes it possible to put the printer into diagnostic mode for running the print test.

Runtime (Level 2) Diagnostics
The printer checks the status of these conditions during normal operation.

Remote (Level 3) Diagnostics
The printer keeps track of these counters during normal operation and prints them upon request.

7 Startup (Level 0) Diagnostics

The printer automatically performs start up diagnostics during the startup cycle when power is supplied or when the printer goes on-line.

Start up diagnostics comprise the following actions:

- Turn off motors
- Perform CRC check of the firmware ROM, read external RAM
  Failure causes start up diagnostics to stop.
- EEPROM check
  Failure causes start up diagnostics to stop.
- Paper Status LED is turned on
- Check if paper is present
- Return the knife to the home position
  Failure causes a fault condition.
- Check if printer door is closed
  Failure causes turning on the Paper Status LED until the door is closed.

When the last step is complete, the Paper Feed button is enabled and the printer is ready for normal operation. Information about the test is available to the communication interface through the commands. If the printer has not been turned on before, or a new EEPROM has been installed, the default values for the printer functions (set in Level 1 Diagnostics) are loaded into the EEPROM during start up diagnostics. See the tables in “Level 1 Diagnostics” for the printer settings. If the EEPROM load has failed, the Paper Status LED is turned on.

8 Configuring the Printer (Level 1)

If you need to select certain functions, or change settings, use the scrolling menu feature. This feature prints instructions on the receipt for selecting and changing any of the functions and parameters.

Caution: Be extremely careful changing any of the printer settings to avoid changing other settings that might affect the performance of the printer.

To Configure the Printer:
Set DIP switch 1 to ON, DIP switch 2 to OFF.
Press and hold receipt feed switch while disconnecting and reconnecting the power, this will reset the printer. The printer will print the current configuration, then cuts the papers to print the Configuration Menu. If you don't press and hold the feed button after resetting the printer, the printer will go to Online Mode directly.

This configuration menu allows you to set general printer parameters.
Sub-menus are entered and selections are made using the Paper Feed Button.
- short Click : Feed Button is quickly depressed then released
- long Click : Feed Button is held down more than 1 second then released

After you make your selection, the printer will feed the paper, print out your selection and the menu, let you input new selection. (Refer to the Appendix)
Currents setting are marked with an asterisk (*).

For 'GENT Dual'

******** *Main Menu* ********
****

Select a sub-menu:

- EXIT	-> 1 Click
- Print Current Configuration	-> 2 Clicks
- Set Communication Interface	-> 3 Clicks
- Set Diagnostics Modes	-> 4 Clicks
- Set Emulation/Software	-> 5 Clicks
- Set Hardware Options	-> 6 Clicks
- Set Default Code page	-> 7 Clicks
- Set Double Side Modes	-> 8 Clicks
- Set EEPROM To Default	-> 9 Clicks

Enter code, then hold Button DOWN
at least 1 second to validate

For 'GENT single'

******** *Main Menu* ********
****

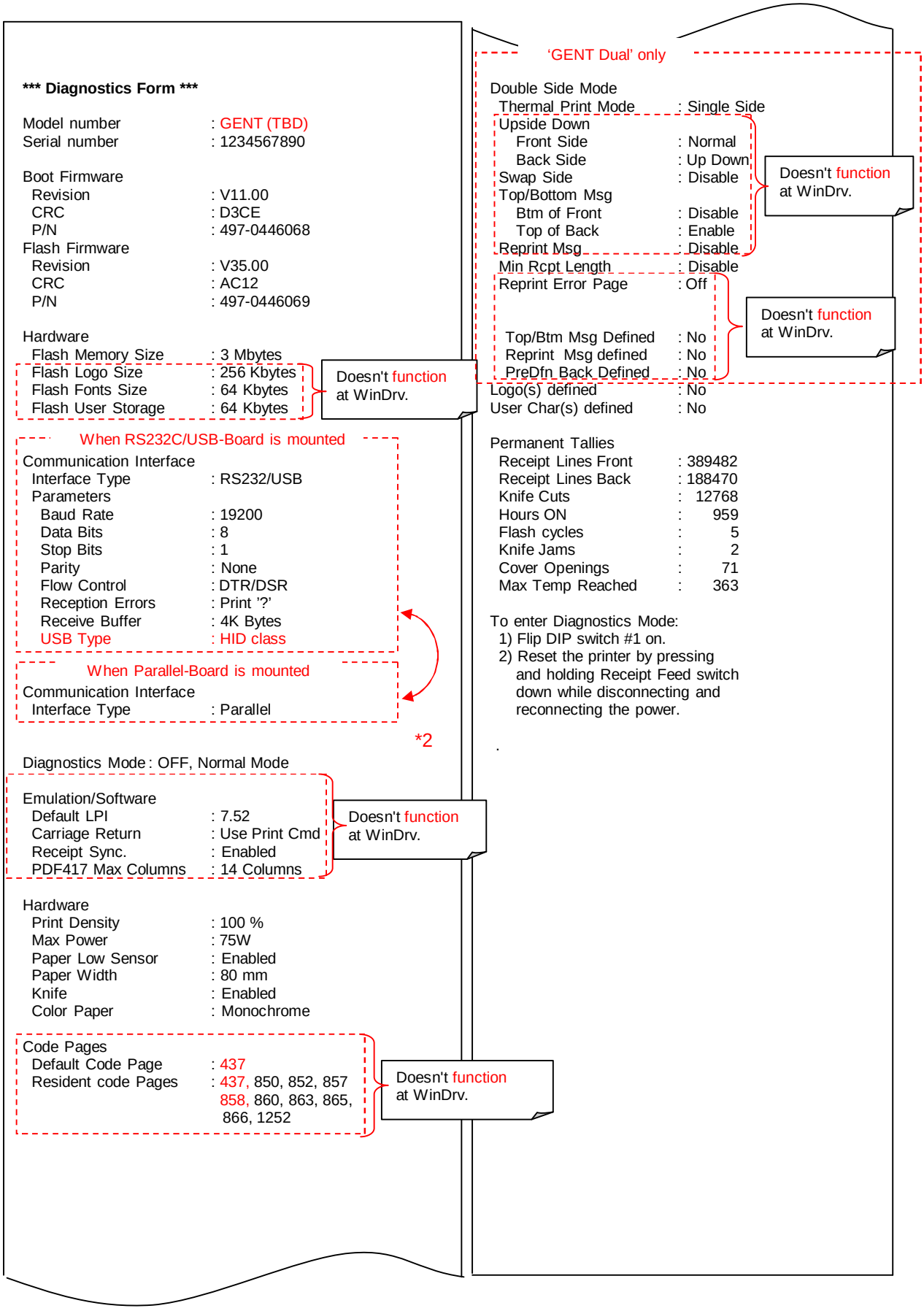
Select a sub-menu:

- EXIT	-> 1 Click
- Print Current Configuration	-> 2 Clicks
- Set Communication Interface	-> 3 Clicks
- Set Diagnostics Modes	-> 4 Clicks
- Set Emulation/Software	-> 5 Clicks
- Set Hardware Options	-> 6 Clicks
- Set Default Code page	-> 7 Clicks
- Set EEPROM To Default	-> 8 Clicks

Printers are generally shipped with all appropriate configuration settings pre-set at the factory. The only time you should need to change the printer configuration is if you install a new option or change software. It is also possible you may need to run certain tests using the Configuration Menu.
You configure the printer using a convenient Configuration Menu that is printed on receipt paper. The Configuration Menu prints instructions and setting options interactively as you go through the configuration process. The following functions and parameters can be changed with the scrolling Configuration Menu.

8.1 Print Current Configuration

This is the sample of prints out the current printer configuration settings.



8.2 Communications Interface Setting

Set the communication interface settings using the configuration menu

Caution: Be extremely careful changing any of the printer settings to avoid inadvertently changing other settings that might affect the performance of the printer.

Press the Paper Feed Button for the communications settings you want.
Defaults are marked with an asterisk (*).

F/W must recognize whether I/F card is [RS232c/USB] or [Parallel] automatically.

8.2.1 [RS232c/USB] I/F card mount

**** SET INTERFACE TYPE ?**

YES	-> Long Click
NO	-> Short Click
RS232/USB	-> 1 Click
RS232	-> 2 Clicks
USB	-> 3 Clicks

Enter code, then hold Button Down
At least 1 second to validate

**** SET BAUD RATE ?**

YES	-> Long Click
NO	-> Short Click
115200 Baud	-> 1 Click
57600 Baud	-> 2 Clicks
38400 Baud	-> 3 Clicks
19200 Baud	-> 4 Clicks
9600 Baud	-> 5 Clicks

Enter code, then hold Button DOWN
At least 1 second to validate

**** SET NUMBER OF DATA BITS ?**

YES	-> Long Click
NO	-> Short Click
8 Data Bits	-> Long Click
7 Data Bits	-> Short Click

**** SET NUMBER OF STOP BITS ?**

YES	-> Long Click
NO	-> Short Click
1 Stop Bits	-> Long Click
2 Stop Bits	-> Short Click

**** SET PARITY ?**

YES	-> Long Click
NO	-> Short Click
No Parity*	-> 1 Click
Even Parity	-> 2 Clicks
Odd Parity	-> 3 Clicks

Enter code, then hold Button DOWN
At least 1 second to validate

**** SET FLOW CONTROL METHOD ?**

YES	-> Long Click
NO	-> Short Click
Software (XON/XOFF)	-> Long Click
Hardware (DTR/DSR)	-> Short Click

**** SET DATA RECEPTION ERRORS OPTION ?**

YES	-> Long Click
NO	-> Short Click
Ignore Errors	-> Long Click
Print '?'*	-> Short Click

**** SET RECEIVE BUFFER SIZE ?**

YES	-> Long Click
NO	-> Short Click
4K Bytes*	-> Long Click
One Line	-> Short Click

**** SET USB INTERFACE TYPE ?**

YES	-> Long Click
NO	-> Short Click
Vendor Specfic class	-> 1 Click
Pinter class	-> 2 Clicks

Enter code, then hold Button DOWN
At least 1 second to validate

8.2.2 [Parallel] I/F card mount

**** SET RECEIVE BUFFER SIZE ?**

YES	-> Long Click
NO	-> Short Click
4K Bytes*	-> Long Click
One Line	-> Short Click

**** SET PRINTER DRIVER TYPE ?**

YES	-> Long Click
NO	-> Short Click
OPOS driver	-> 1 Click
Windows driver	-> 2 Clicks

Enter code, then hold Button Down
At least 1 second to validate

8.3 Diagnostics Modes

**** SET DIAGNOSTICS MODE ?**

YES	-> Long Click
NO	-> Short Click
OFF, Normal Mode	-> 1 Click
Data Scope Mode	-> 2 Clicks
Receipt Test Mode	-> 3 Clicks

Enter code, then hold Button DOWN
At least 1 second to validate

Data Scope Mode (Enable or Disable)

Data scope mode helps troubleshoot communication problems and runs during a normal application (after being enabled through printer configuration). The data scope mode test prints a hexadecimal dump of all data sent to the printer: "1" prints as hexadecimal 31, "A" as hexadecimal 41 and so on.
Data Scope Mode is enabled and disabled using the configuration menu.
Caution: Be extremely careful changing any of the printer settings to avoid inadvertently changing other settings that might affect the performance of the printer.

To run Data Scope Mode:
1. After you have enabled Data Scope Mode through the configuration menu, exit the configuration menu.
2. Run a transaction from the host computer. All commands and data sent from the host computer will be printed as hexadecimal characters as shown in the illustration.

```
30 31 32 33 34 35 36 37 38 39 40 41     :     0 1 2 3 4 5 6 7 8 9 @ A
41 42 43 44 45 46 47 48 49 50 51 52     :     A B C D E F G H I J K L
```

To exit Data Scope Mode:
1. Enter the configuration menu again. See *Configuring the Printer.*
2. Disable Data Scope Mode.
3. Exit the configuration menu. The printer is on-line and can communicate normally with the host computer.

Receipt Test Mode (Enable or Disable)

Receipt Test Mode prints all the code pages. Receipt Test Mode is enabled and disabled using the configuration menu.
Caution: Be extremely careful changing any of the printer settings to avoid inadvertently changing other settings that might affect the performance of the printer.

To run Receipt Test Mode:
1. After you have enabled Receipt Test Mode through the configuration menu, exit the configuration menu.
2. Push the Paper Feed Button.
3. The receipt station will print code pages.
4. The test ends with a cut.
5. Go to step 2 again to repeat this test.

To exit Receipt Test Mode:
1. Enter the configuration menu again. See Configuring the Printer.
2. Disable Receipt Test Mode.
3. Exit the configuration menu. The printer is on-line and can communicate normally with the host computer.

8.4 Software Options (The set content is invalid at Windows driver.)

Default Lines Per Inch

Set the lines per inch using the configuration menu. Answer No to the questions printed on the receipt until you come to the instructions for Lines Per Inch.

Caution: Be extremely careful changing any of the printer settings to avoid inadvertently changing other settings that might affect the performance of the printer.

Press the Paper Feed Button for the lines per inch you want.

**** SET DEFAULT LINES PER INCH ?**

YES	-> Long Click
NO	-> Short Click
8.13 Lines per Inch	-> 1 Click
7.52 Lines per Inch*	-> 2 Clicks
6 Lines per Inch	-> 3 Clicks

Enter code, then hold Button DOWN
At least 1 second to validate

Note: Press the Paper Feed Button for at least one second to validate the selection.

Set Carriage Return Usage

Set the carriage return usage using the configuration menu. Answer No to the questions printed on the receipt until you come to the instructions for Carriage Return Usage.

Caution: Be extremely careful changing any of the printer settings to avoid inadvertently changing other settings that might affect the performance of the printer.
Press the Paper Feed Button for the carriage return usage you want.

**** SET CARRIAGE RETURN USAGE ?**

YES	-> Long Click
NO	-> Short Click
Ignore CR*	-> Long Click
Use CR as Print Cmd*	-> Short Click

Set Receipt Synchronization

Set the receipt synchronization using the configuration menu. Answer No to the questions printed on the receipt until you come to the instructions for Receipt Synchronization.

This setting will select the timing of the returning the status for buffered status command.
When "Receipt synchronization" is enabled, printer returns the status for buffered status command after confirming the start of printing. When "Receipt synchronization" is disabled, printer returns the status for buffered status command immediately after decoding the status command.
The following commands are the buffered status command.

1B 75 0	Transmit Peripheral Device Status
1B 76	Transmit Printer Status
1D 49 n	Transmit Printer ID
1D 72	Transmit Status

Caution: Be extremely careful changing any of the printer settings to avoid inadvertently changing other settings that might affect the performance of the printer.
Press the Paper Feed Button for the receipt synchronization mode you want.

**** SET RECEIPT SYNCHRONIZATION ?**

YES	-> Long Click
NO	-> Short Click
Enabled	-> Long Click
Disabled*	-> Short Click

SET PDF417 MAX PRINT COLUMN

This function makes it possible for the user to select the print columns for the PDF417 bar code printing. The selections are 9 or 14 columns. The end result is the height of the bar code printing. The default setting is 9 columns. (See “Configuring the Printer” for instructions on how to enter the Configuration Menu to change this setting.)

**** SET PDF417 COLUMN PRINT ?**

YES	> Long Click
NO	> Short Click
9 Columns*	> 1 Click
14 Columns	> 2 Clicks

Enter code, then hold Button DOWN at least 1 second to validate

8.5 Hardware Options

Set Print Density

Set the print density using the configuration menu. Select Hardware Options in the Configuration Menu and answer the questions printed on the receipt.

Caution: Be extremely careful changing any of the printer settings to avoid inadvertently changing other settings that might affect the performance of the printer.

Press the Paper Feed Button for the print density you want.

**** SET PRINT DENSITY ?**

YES	-> Long Click
NO	-> Short Click
100 %*	-> 1 Click
110 %	-> 2 Clicks
120 %	-> 3 Clicks

Enter code, then hold Button DOWN
At least 1 second to validate

Note: Press the Paper Feed Button for at least one second to validate the selection.

Set Maximum Power Option

Set the maximum power option using the configuration menu. Answer No to the questions printed on the receipt until you come to the instructions for maximum power option.

Caution: Be extremely careful changing any of the printer settings to avoid inadvertently changing other settings that might affect the performance of the printer.

Press the Paper Feed Button for the option you want.

**** SET MAX POWER OPTION ?**

YES	-> Long Click
NO	-> Short Click
55W Power Supply*	-> Long Click
75W Power Supply	-> Short Click

Set Paper Low sensor Option

Set the paper low sensor option using the configuration menu. Answer No to the questions printed on the receipt until you come to the instructions for paper low sensor option.

Caution: Be extremely careful changing any of the printer settings to avoid inadvertently changing other settings that might affect the performance of the printer.

Press the Paper Feed Button for the option you want.

**** SET PAPER LOW SENSOR OPTION ?**

YES	-> Long Click
NO	-> Short Click
Enable Paper Low Sensor*	-> Long Click
Disable Paper Low Sensor	-> Short Clicks

Set Paper Width

Set the paper width for Receipt unit option using the configuration menu. Answer No to the questions printed on the receipt until you come to the instructions for paper width option.

Caution: Be extremely careful changing any of the printer settings to avoid inadvertently changing other settings that might affect the performance of the printer.

Press the Paper Feed Button for the paper width option you want.

**** SET PAPER WIDTH ?**

YES	-> Long Click
NO	-> Short Click
Paper Width = 80 mm*	-> 1 Click
Paper Width = 58 mm	-> 2 Clicks

Enter code, then hold Button DOWN
At least 1 second to validate

Note: Press the Paper Feed Button for at least one second to validate the selection.

Set Knife Option

Set the Knife option using the configuration menu. Answer No to the questions printed on the receipt until you come to the instructions for knife option.

Caution: Be extremely careful changing any of the printer settings to avoid inadvertently changing other settings that might affect the performance of the printer.

Press the Paper Feed Button for the option you want.

**** SET KNIFE OPTION ?**

YES	-> Long Click
NO	-> Short Click
Enable Knife*	-> Long
Disable Knife	-> Short

Set Color Paper Option

Set the color paper option using the configuration menu. Answer No to the questions printed on the receipt until you come to the instructions for color paper option.

Caution: Be extremely careful changing any of the printer settings to avoid inadvertently changing other settings that might affect the performance of the printer.

Press the Paper Feed Button for the option you want.

**** SET COLOR PAPER OPTION ?**

YES	-> Long Click
NO	-> Short Click
Monochrome*	-> Long Click
Color Paper	-> Short Click

Note: Press the Paper Feed Button for at least one second to validate the selection.

8.6 Default Code Page (The set content is invalid at Windows driver.)

This selection is used to select the default code page.
Caution: Be extremely careful changing any of the printer settings to avoid inadvertently changing other settings that might affect the performance of the printer.

Press the Paper Feed Button for the Default Code Page you want.

**** SET CODE PAGE MENU?**

Code Page 437*	-> 1 Click
Code Page 850	-> 2 Clicks
Code Page 852	-> 3 Clicks
Code Page 857	-> 4 Clicks
More -> 5 Clicks	
Enter code, then hold Button DOWN	
At least 1 second to validate	
Code Page 858	-> 1 Click
Code Page 860	-> 2 Clicks
Code Page 863	-> 3 Clicks
Code Page 865	-> 4 Clicks
More	-> 5 Clicks
Enter code, then hold Button DOWN	
At least 1 second to validate	
Code Page 866	-> 1 Click
Code Page 1252	-> 2 Clicks

Note: Press the Paper Feed Button for at least one second to validate the selection.

8.7 Double Side Printing Settings

Set the double side printing settings using the configuration menu.

Caution: Be extremely careful changing any of the printer settings to avoid inadvertently changing other settings that might affect the performance of the printer.

Press the Paper Feed Button for the double side printing settings you want.
Defaults are marked with an asterisk (*).

Set Thermal Print Mode (This setting is 'TRST-A15' only.)

This setting allows the user to select double side printing mode.
Press the Paper Feed Button for the option you want.

**** SET THERMAL PRINT MODE ?**

YES	-> Long Click
NO	-> Short Click

Single Side*	-> 1 Click
Double Side w/Single Cmd	-> 2 Clicks
Double Side w/Double Cmd	-> 3 Clicks
Double Side w/ Predfn Back	-> 4 Clicks (Doesn't print at Windows driver)

Enter code, then hold Button Down
At least 1 second to validate

Note)
The setting of 'Double Side w/Predfn Back' is valid only for 'Vendor specific class' USBType.
When it is set to 'Double Side w/Predfn Back' when USB Type is 'Vendor specific class', and USB Type is set to 'Printer class' afterwards, it is set to 'Single Side' by the automatic operation.

Set Upside Down (The set content is invalid at Windows driver.)

This setting allows the user to select upside-down character printing for each side in double side printing.
Press the Paper Feed Button for the option you want.

**** SET UPSIDE DOWN ?**

YES	-> Long Click
NO	-> Short Click

F:Normal, B:Normal*	-> 1 Click
F:Up Down, B:Normal	-> 2 Clicks
F:Normal, B:Up Down	-> 3 Clicks
F:Up Down, B:Up Down	-> 4 Clicks

Enter code, then hold Button DOWN
At least 1 second to validate

Set Swap Front & Back Side (The set content is invalid at Windows driver.)

This setting allows the user to exchange front side data and back side data.
Press the Paper Feed Button for the option you want.

**** SET SWAP FRONT&BACK SIDE ?**

YES	-> Long Click
NO	-> Short Click
Disable*	-> 1 Click
Enable	-> 2 Clicks

Enter code, then hold Button DOWN
At least 1 second to validate

Set Top/Bottom Message (The set content is invalid at Windows driver.)

This setting allows the user select whether Top/Bottom messages are disable or enable.
Press the Paper Feed Button for the option you want.

**** SET TOP/BOTTOM MSG ?**

YES	-> Long Click
NO	-> Short Click
Top:Disable,Btm:Disable*	-> 1 Click
Top:Disable,Btm:Enable	-> 2 Clicks
Top:Enable, Btm:Disable	-> 3 Clicks
Top:Enable, Btm:Enable	-> 4 Clicks

Enter code, then hold Button DOWN
At least 1 second to validate

Set Reprint Message (The set content is invalid at Windows driver.)

This setting allows the user to select whether Reprint message is disabled or enabled. The printer allows for predefining of a message on the front side of the receipt. The printing of the lines are enabled as shown in the chart below.
Press the Paper Feed Button for the option you want.

**** SET REPRINT MSG?**

YES	-> Long Click
NO	-> Short Click
Disable*	-> 1 Click
Enable	-> 2 Clicks

Enter code, then hold Button DOWN
At least 1 second to validate

Set Minimum Receipt Length

This setting allows the user selects minimum receipt length.
Press the Paper Feed Button for the option you want.

**** SET MIN RECEIPT LENGTH ?**

YES	-> Long Click
NO	-> Short Click

Disable*	-> 1 Click
5 inch	-> 2 Clicks
10 inch	-> 3 Clicks
15 inch	-> 4 Clicks

Enter code, then hold Button DOWN
At least 1 second to validate

Set Reprint Error Page (The set content is invalid at Windows driver.)

This setting allows the user selects to execute reprint error page data.
Press the Paper Feed Button for the option you want.

**** SET REPRINT ERROR PAGE ?**

YES	-> Long Click
NO	-> Short Click

Resume Print from Error*	-> 1 Click
Reprint Error Page	-> 2 Clicks

Enter code, then hold Button DOWN
At least 1 second to validate

8.8 EEPROM to Default Settings

This selection resets the configuration to the Default Settings.

Caution: Be extremely careful changing any of the printer settings to avoid inadvertently changing other settings that might affect the performance of the printer.

**** RESET EEPROM TO DEFAULT VALUES ?**

YES	-> Long Click
NO	-> Short Click

9 MFG Adjustment

If you need to change settings for mechanical, or perform the printer test, use the scrolling menu feature. This feature prints instructions on the receipt for selecting and changing any of the functions and parameters.

Caution: Be extremely careful changing any of the printer settings to avoid changing other settings that might affect the performance of the printer.

MFG Adjustment:

1. Set DIP switch 1 to ON, DIP switch 2 to ON.
2. Press and hold paper feed button, press the reset button. The printer will print the current configuration, then cuts the papers to print the MFG Adjustment Menu.
3. If you don't press and hold the feed button, the printer will go to Online Mode directly.

This configuration menu allows you to set mechanical adjustment parameters and select printer test. Sub-menus are entered and selections are made using the Paper Feed Button.

- short Click : Feed Button is quickly depressed then released
- long Click : Feed Button is held down more than 1 second then released

===== Mfg Adjustment Menu =====

Select a sub-menu:

- EXIT	-> 1 Click
- Rolling ASCII Print Test	-> 2 Clicks
- H Print Test	-> 3 Clicks
- Duty Check Print Test	-> 4 Clicks
- Print Current Setting	-> 5 Clicks
- Reset all EEPROM to Default	-> 6 Clicks

Enter code, then hold Button DOWN
at least 1 second to validate

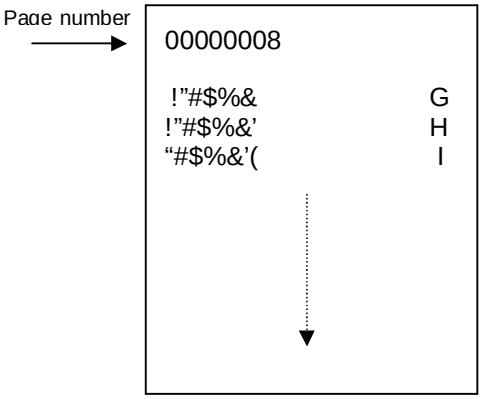
9.1 Rolling ASCII print test

This option let you run rolling ASCII printing test. The printer prints the resident character set in standard pitch continuously. When Rolling ASCII print (Rcpt)is selected, printer prints the following menu. After selection of the printing side, test print will start.

**** SELECT PRINTING SIDE?**

Front Side Only -> 1 Click
Back Side Only -> 2 Click
Double Side -> 3 Click
Enter code, then hold Button DOWN
At least 1 second to validate

Press the Paper Feed Button to start or stop the test.



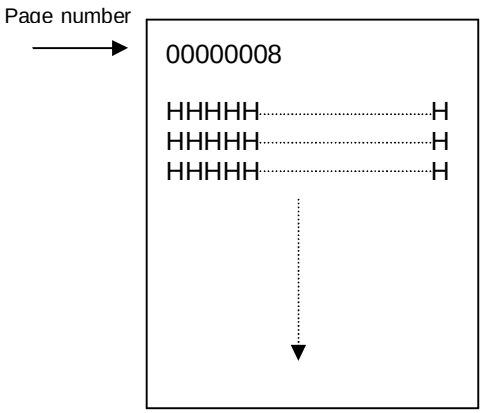
9.2 H print test

This option let you run H printing test. The printer prints the 'H' character in standard pitch continuously. When H Pirnt Test(Rcpt) is selected, printer prints the following menu. After selection of the printing side, test print will start.

**** SELECT PRINTING SIDE?**

Front Side Only -> 1 Click
Back Side Only -> 2 Click
Double Side -> 3 Click
Enter code, then hold Button DOWN
At least 1 second to validate

Press the Paper Feed Button to start or stop the test.



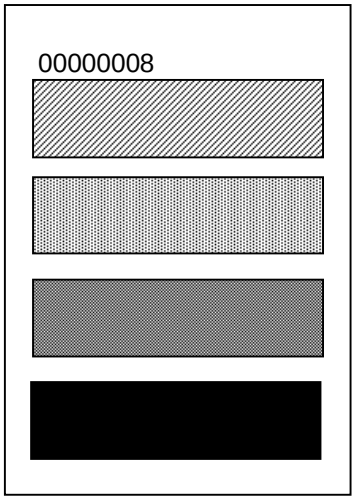
9.3 Duty check print test

This option let you run duty check printing test. The printer prints the 12.5%, 25%, 50% and 100% duty original pattern. When Duty Check Print(Rcpt) is selected, printer prints the following menu. After selection of the printing side, test print will start.

**** SELECT PRINTING SIDE?**

Front Side Only -> 1 Click
Back Side Only -> 2 Click
Double Side -> 3 Click
Enter code, then hold Button DOWN
At least 1 second to validate

Press the Paper Feed Button to start or stop the test.



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9.4 Print current setting

This option let you print current setting on receipt.

Press the Paper Feed Button to start the test.

****** Current Setting Form ******

Model number	: TRST-A10 or TRST-A15
Serial number	: 1234567890
Boot Firmware	
Version	: V11.00
Revision	: 12
CRC	: D3CE
Flash Firmware	
Version	: V35.00
Revision	: 12
CRC	: AC12
SBCS	
Version	: V01.00
Revision	: 12

9.5 EEPROM to Default Settings

This selection resets the configuration to the Default Settings. It will reset the entire EEPROM values to default setting.

**** RESET EEPROM TO DEFAULT VALUES ?**

YES	-> Long Click
NO	-> Short Click

10 Runtime (Level 2) Diagnostics

Runtime diagnostics run during normal printer operation. When the following conditions occur, the printer automatically turns off the appropriate motors and disables printing to prevent damage:

- Paper out
- Cover open
- Knife unable to home
- Print-head too hot
- Power supply voltage out of range

The Paper Status LED signals when these conditions occur as well as indicates what state or mode the printer is in.

Status	LED Behavior
Power Off	Off
Firmware Download	Very Fast Blink
Level 0 Diagnostics	Fast Blink
Paper Low	Slow Blink
Temperature Error	Fast Blink
Voltage Error	Fast Blink
Paper Out	Fast Blink
Knife Jam	Fast Blink, then Slow Blink
Cover Open	Fast Blink
All other states	On

11 Remote (Level 3) Diagnostics

Remote diagnostics keeps track of the following tallies and prints them on the receipt during the print test. See the sample test printout in “Configuring the Printer” in this document. These tallies can be used for quality control and to determine the printer’s state of health, allowing for preventative maintenance or workload balancing to be done before a printer has problems.

- Serial number
- Model number
- CRC number
- Number of lines printed
- Number of cuts
- Number of hours the printer has been on
- Number of flash cycles
- Maximum temperature reached
- Number of cutter jams
- Number of times the door is open

12 Where to save the setting of Double side mode and Serial Number, Model Name

Parameter	Size	Where	Remark
Thermal Printing Mode	2 bits	EEPROM	
Upside Down Mode	2 bits	EEPROM	
Swap Front & Back	1 bit	EEPROM	
Bottom and Top Message	2 bits	EEPROM	
Reprint when Error Occur	1 bit	EEPROM	
Minimum Receipt Length	1 byes	EEPROM	
Pre-defined Top and Buttom message	1024 bytes	Flash ROM	
Pre-defined back side printing	4096 bytes	Flash ROM	
Macro	50 Kbytes	Flash ROM	50 Kbytes is shared by 25 Macros
Serial Number	**10 bytes**	**Flash ROM**	**Change from EEPROM to Flash**
Model Name	**15 bytes**	**Flash ROM**	**Change from EEPROM to Flash**

13 Command Comparison list

No	Command sequence	Function	Remarks	TRST-A10	TRST-A15	ESC/POS	TM88 (not latest model)	
1	Printer Function Commands							
1	ESC i	1BH 69H	Perform Full Knife Cut	Y	Y	Y		Eliminate 19H
2	ESC m	1BH 6DH	Perform Partial Knife Cut	Y	Y	Y		Eliminate 1AH
3	ESC BEL	1BH 07H	Generate Tone	Y	Y	N		
4	ESC <	1BH 3CH	Return Home	N	N	Y		Slip function
5	ESC =	1BH 3DH	Select Peripheral Device (for Multi-drop)	N	N	Y	Y	
6	ESC @	1BH 40H	Initialize Printer	Y	Y	Y	Y	
7	ESC C	1BH 43H	Set Slip Paper Eject Length	N	N	Y		Slip function
8	ESC c 0	1BH 63H 30H	Select Receipt or Slip for Printing; Slip for MICR Read	N	N	Y		Slip function
9	ESC c 1	1BH 63H 31H	Select Receipt or Slip for Setting Line Spacing	N	N	Y		Slip function
10	ESC c 3	1BH 63H 33H	Select Paper Sensors to Output Paper End Signals (Parallel only)	Y	Y	Y	Y	
11	ESC c 4	1BH 63H 34H	Select Sensors to Stop Printing	Y	Y	Y	Y	
12	ESC c 5	1BH 63H 35H	Enable or Disable Panel Buttons	Y	Y	Y	Y	
13	ESC f	1BH 66H	Set Slip Paper Waiting Time	N	N	Y		Slip function
14	ESC p	1BH 70H	Generate Pulse to Open Cash Drawer	Y	Y	Y	Y	
15	GS V	1DH 56H	Select cut mode and cut paper	Y	Y	Y	Y	
16	US t	1FH 74H	Print Test Form	Y	Y	N		TSE unique
	Vertical Positioning and Print Commands							
17	LF	0AH	Print and Feed Paper One Line	Y	Y	Y	Y	
18	FF	0CH	Print and Eject Slip	N	N	Y		Slip function
19	CR	0DH	Print and Carriage Return	Y	Y	Y	Y	
20	ESC 2	1BH 32H	Set Line Spacing to 1/6 Inch	Y	Y	Y	Y	
21	ESC 3	1BH 33H	Set Line Spacing	Y	Y	Y	Y	
22	ESC J	1BH 4AH	Print and Feed Paper	Y	Y	Y	Y	
23	ESC K	1BH 4BH	Print and Reverse Feed Paper	N	N	Y	N	
24	ESC d	1BH 64H	Print and Feed n Lines	Y	Y	Y	Y	
25	ESC e	1BH 65H	Print and Reverse Feed n Lines	N	N	Y	N	

26	GS P	1DH 50H	Set Horizontal and Vertical Minimum Motion Units	Y	Y	Y	Y	
	Horizontal Positioning Commands							
27	HT	09H	Horizontal Tab	Y	Y	Y	Y	
28	ESC DC4	1BH 14H	Set Column	Y	Y	N		
29	ESC $	1BH 24H	Set Absolute Starting Position	Y	Y	Y	Y	
30	ESC D	1BH 44H	Set Horizontal Tabs	Y	Y	Y	Y	
31	ESC \	1BH 5CH	Set Relative Print Position	Y	Y	Y	Y	
32	ESC a	1BH 61H	Select Justification	Y	Y	Y	Y	
33	GS L	1DH 4CH	Set Left Margin	Y	Y	Y	Y	
34	GS W	1DH 57H	Set Printing Area Width	Y	Y	Y	Y	
	Print Characteristic Commands							
35	ESC SP	1BH 20H	Set Character Right-Side Spacing	Y	Y	Y	Y	
36	ESC !	1BH 21H	Select Print Modes	Y	Y	Y	Y	
37	ESC %	1BH 25H	Select or Cancel User-Defined Character Set	Y	Y	Y	Y	
38	ESC &	1BH 26H	Define User-Defined Characters	Y	Y	Y	Y	
39	ESC -	1BH 2DH	Select or Cancel Underline Mode	Y	Y	Y	Y	
40	ESC ?	1BH 3FH	Cancel User-Defined Characters	Y	Y	Y	Y	
41	ESC E	1BH 45H	Select or Cancel Emphasized Mode	Y	Y	Y	Y	
42	ESC G	1BH 47H	Select Double Strike	Y	Y	Y	Y	
43	ESC M n	1B 4D n	Select character font	Y	Y	Y		
44	ESC R	1BH 52H	Select International Character Set	Y	Y	Y	Y	
45	ESC U	1BH 55H	Select or Cancel Unidirectional Printing Mode	N	N	Y		Slip function
46	ESC V	1BH 56H	Select or Cancel 90 Degrees Clockwise Rotated Print	Y	Y	Y	Y	
47	ESC r	1BH 72H	Select Print Color	Y	Y	Y		
48	ESC t	1BH 74H	Select Character Code Table	Y	Y	Y	Y	
49	ESC {	1BH 7BH	Select or Cancel Upside Down Printing Mode	Y	Y	Y	Y	
50	GS !	1DH 21H	Select Character Size	Y	Y	Y	Y	
51	GS B	1DH 42H	Select or Cancel White/Black Reverse Printing Mode	Y	Y	Y	Y	
52	GS b	1DH 62H	Select or Cancel Smoothing Mode	N	N	Y	Y	Smoothing
	Graphics Commands							
53	DC1	11H	Print Raster Graphics	Y	Y	Y		
54	ESC *	1BH 2AH	Select Bit Image Mode	Y	Y	Y	Y	
55	GS *	1DH 2AH	Define Downloaded Bit Image	Y	Y	Y	Y	

56	GS /	1DH 2FH	Print Downloaded Bit Image	Y	Y	Y	Y	
57	ESC ,	1BH 2CH	Print Downloaded Bit Image	Y	Y	Y	Y	
58	US + „BMP“ file	1FH + „BMP“	Download BMP Logo	Y	Y	Y	Y	
59	US 0,	1FH 30H	Set Current Logo (Downloaded Bit Image)	Y	Y	Y	Y	
	Status Commands (Batch Mode)							
60	ESC u n	1BH 75H n	Transmit Peripheral Device Status	Y	Y	Y		
61	ESC v	1BH 76H	Transmit Printer Status	Y	Y	Y		
62	GS l	1DH 49H	Transmit Printer ID	Y	Y	Y	Y	
63	GS r	1DH 72H	Transmit status	Y	Y	Y	Y	
	Status Commands (Real Time)							
64	**GS a n**		**Enable/disable Automatic Status Back (ASB)**	N	N	**Y**	Y	ASB: Patent
65	ESC n	1BH 6EH	Real Time Status Transmission	Y	Y	Y	Y	
66	ESC o	1BH 6FH	Real Time Request to Printer	Y	Y	Y	Y	
67	ESC h	1BH 68H	Real Time Printer Status Transmission	Y	Y	Y		
	Barcode Commands							
68	GS H	1DH 48H	Select Printing Position for HRI Characters	Y	Y	Y	Y	
69	GS f	1DH 66H	Select Pitch for HRI Characters	Y	Y	Y	Y	
70	GS h	1DH 68H	Set Bar Code Height	Y	Y	Y	Y	
71	GS k	1DH 6BH	Print Bar Code	Y	Y	Y	Y	
72	GS w	1DH 77H	Set Bar Code Width	Y	Y	Y	Y	
	Page Mode Commands							
73	FF	0CH	Print and Return to Standard Mode	Y	Y	Y	Y	
74	CAN	18H	Cancel Print Data in Page Mode	Y	Y	Y	Y	
75	ESC FF	1BH 0CH	Print Data in Page Mode	Y	Y	Y	Y	
76	ESC L	1BH 4CH	Select Page Mode	Y	Y	Y	Y	
77	ESC S	1BH 53H	Select Standard Mode	Y	Y	Y	Y	
78	ESC T	1BH 54H	Select Print Direction in Page Mode	Y	Y	Y	Y	
79	ESC W	1BH 57H	Set Printing Area in Page Mode	Y	Y	Y	Y	
80	GS $	1DH 24H	Set Absolute Vertical Print Position in Page Mode	Y	Y	Y	Y	
81	GS \	1DH 5CH	Set Relative Vertical Print Position in Page Mode	Y	Y	Y	Y	
	Macro Commands							
82	GS :	1DH 3AH	Start or End Macro Definition	Y	Y	Y	Y	
83	GS ^	1DH 5EH	Execute Macro	Y	Y	Y	Y	
	User Data Storage Commands							

84	US 1	1FH 31H	Read from Non-Volatile Memory (NVRAM)	Y	Y	Y	
85	US 2	1FH 32H	Write to Non-Volatile Memory (NVRAM)	Y	Y	Y	
86	US 3	1FH 33H	Select Memory Type (SRAM/Flash)	Y	Y	Y	
87	US 4	1FH 34H	Flash Allocation	Y	Y	Y	
88	US 5	1FH 35H	Erase User Flash Sector	Y	Y	Y	
89	US 6	1FH 36H	Printer Setting Change	Y	Y	Y	
	MICR command (ESC/POS)						
90	FS a 0 n		Read check paper	N	N	Y	Slip function
91	FS a 1		Load check paper to print starting position	N	N	Y	Slip function
92	FS a 2		Eject check paper	N	N	Y	Slip function
93	FS b		Request retransmission of check paper reading result	N	N	Y	Slip function
94	FS c		MICR mechanism cleaning	N	N	Y	Slip function
95	DLE EOT BS n		Real-time MICR status transmission	N	N	Y	Slip function
96	Flash Download Commands (Not ESC/POS)						
97	ESC [}	1BH 5BH 7DH	Switch Flash Download Mode	Y	Y	N	TSE unique
98	GS NULL	1DH 00H	Request Printer ID	Y	Y	N	TSE unique
99	GS SOH	1DH 01H	Return Segment Number Status of Flash Memory	Y	Y	N	TSE unique
100	GS STX	1DH 02H	Select Flash Memory Sector to Download	Y	Y	N	TSE unique
101	GS ACK	1DH 06H	Get Firmware CRC	Y	Y	N	TSE unique
102	GS BEL	1DH 07H	Return Microprocessor CRC	Y	Y	N	TSE unique
103	GS SO	1DH 0EH	Erase the Flash Memory	Y	Y	N	TSE unique
104	GS SI	1DH 0FH	Return Main Program Flash CRC	Y	Y	N	TSE unique
105	GS DLE	1DH 10H	Erase Selected Flash Sector	Y	Y	N	TSE unique
106	GS DC1	1DH 11H	Download to Active Flash Sector	Y	Y	N	TSE unique
107	GS SP	1DH FFH	Reboot the Printer	Y	Y	N	TSE unique
	Double side printing command (Not ESC/POS)						
108	US '	1FH 60H	Select Thermal Printing Modes	N	Y	N	
109	US a	1FH 61H	Select Thermal Printing Side	N	Y	N	
110	US b	1FH 62H	Start Double Sided Printing	N	Y	N	
111	US c	1FH 63H	Select or Cancel Upside Down Printing for Double Sided Printing	N	Y	N	
112	US d	1FH 64H	Swap Front Side and Back Side	N	Y	N	
113	US e	1FH 65H	Download 1-Line Top/Bottom Message into ROM	N	Y	N	
114	US f	1FH 66H	Enable Pre-Defined Top/ Bottom Message	N	Y	N	

115	US g	1FH 67H	Select nth Macro	N	Y	N		
116	US h	1FH 68H	Start/End Pre-Defined Back Side Printing	N	Y	N		
117	US i	1FH 69H	Define Minimum Receipt Length	N	Y	N		
	ESC/POS other commands							
118	GS FF		Print and eject label	N	N	Y	N	TM88 does not support
119	GS M		Turn condensed mode on/off	N	N	Y	N	TM88 does not support
120	ESC F		Set/cancel cut sheet reverse eject	N	N	Y	N	TM88 does not support
121	ESC o		Stamp	N	N	Y	N	TM88 does not support
122	ESC q		Paper release	N	N	Y	N	TM88 does not support
123	FS &		Select Kanji character mode	N	N	Y	N	TM88 does not support
124	FS .		Cancel Kanji character mode	N	N	Y	N	TM88 does not support
125	FS C		Select Kanji character code system	N	N	Y	N	TM88 does not support
126	FS L		Select double-density page mode	N	N	Y	N	TM88 does not support
127	GS <		Initialize printer mechanism	N	N	Y	N	TM88 does not support
128	GS A		Ajdust label printing starting position	N	N	Y	N	TM88 does not support
129	GS C 0		Select counter print mode	N	N	Y	N	TM88 does not support
130	GS C 1		Select count mode (A)	N	N	Y	N	TM88 does not support
131	GS C 2		Select counter	N	N	Y	N	TM88 does not support
132	GS C		Select count mode (B)	N	N	Y	N	TM88 does not support
133	GS E n		Select head control method	N	N	Y	N	TM88 does not support
134	GS c		Print counter	N	N	Y	N	TM88 does not support
135	GS z		Set on-line recovery wait time	N	N	Y	N	TM88 does not support
136	ESC L		Select page mode	N	N	Y	N	TM88 does not support
137	GS v		Print Raster bit image	N	N	Y	N	TM88 does not support
	TRST-56 other command							
138	FS g 3		Writing data into the download user NV memory	N	N	N	N	
139	FS g 4		Reading data into the download user NV memory	N	N	N	N	
140	FS p		Printing the download NV bit image	N	N	N	N	
141	FS q		Defining the download NV bit image	N	N	N	N	
142	DLE DC4		Outputting specified pulse in real-time	N	N	N	N	
143	ESC =		Data input control	N	N	N	N	
144	GS (A		Execution of test printing	N	N	N	N	