BIXOLON®

SPP-R220 Command Manual

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1. Notice

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2. SPP-R220 Supported Commands

No.	Command	Function
1	**EOT**	Transmit status
2	**HT**	Horizontal tab
3	**LF**	Print and line feed
4	**FF**	Form feed (in page mode)
5	**CR**	Print and carriage return
6	**DLE**	Set real-time command mode
7	**CAN**	Cancel the print data in page mode
8	**ESC SP**	Set the character right space
9	**ESC !**	Set print mode
10	**ESC $**	Set absolute print position
11	**ESC ***	Specify bit image mode
12	**ESC -**	Turn underline mode on/off
13	**ESC 2**	Select default line spacing
14	**ESC 3**	Set line spacing
15	**ESC =**	Select peripheral device
16	**ESC @**	Initialize printer
17	**ESC D**	Set horizontal tab positions
18	**ESC E**	Turn emphasized mode on/off
19	**ESC G**	Turn double-strike mode on/off
20	**ESC J**	Print and feed paper
21	**ESC L**	Select page mode
22	**ESC M**	Select character font/ MSR card read
23	**ESC R**	Specify an international character set
24	**ESC S**	Select standard mode
25	**ESC T**	Select print direction in page mode
26	**ESC W**	Set print area in page mode
27	**ESC **	Set relative print position
28	**ESC a**	Set position alignment
29	**ESC d**	Print and feed n lines
30	**ESC t**	Select character code table
31	**ESC {**	Turn upside-down print mode on/off

No.	Command	Function
32	**FS &**	Select Kanji character mode
33	**FS .**	Cancel Kanji character mode
34	**GS !**	Select character size
35	**GS $**	Set absolute vertical print position in page mode
36	**GS (A**	Execute test print
37	**GS (F**	Set black mark control functions
38	**GS (k**	Specify and print the symbol
39	**GS (L** **GS 8 L**	Select graphics data
40	**GS :**	Start/end macro definition
41	**GS B**	Turn white/black reverse print mode on/off
42	**GS H**	Select print position of HRI characters
43	**GS I**	Transmit printer ID
44	**GS I b**	Transmit battery status
45	**GS L**	Set left margin
46	**GS T**	Set print position to the beginning of print line
47	**GS W**	Set print area width
48	**GS **	Set relative vertical print position in page mode
49	**GS ^**	Execute macro
50	**GS a**	Enable/disable Automatic Status Back (ASB)
51	**GS f**	Select font for HRI characters
52	**GS h**	Set bar code height
53	**GS k**	Print bar code
54	**GS r**	Transmit status
55	**GS v 0**	Print raster bit image
56	**GS w**	Set bar code width
57	**BS L A**	Execute automatic calibration in black mark mode
58	**BS L L**	Select black mark mode
59	**BS L R**	Select receipt mode
60	**BS M**	Select device font type
61	**BS M S**	Sentinel character set up commands
62	**FS D**	Draw Line & Box

2-1 Command Description Items

Command

Function: Command function outline

Code: Command format expressed in ASCII, hexadecimal, and decimal codes

Range: Argument value (Setting range) for the command

Default: Initial argument value for the command

Description: Detailed command function description

Remarks: Additional information about using the command

Differences: Variations depending on the printer model

Example: Refer to example command code

2-2 Details of Control Commands

EOT

Function: **Transmit status**

Code:

ASCII	EOT	n
Hex	04	n
Decimal	4	n

Range: 1 ≤ n ≤ 4

Default: None

Description: This command transmits the printer-related status specified by n as follows:

n	Function
1	Transmit printer status
2	Transmit off-line status
3	Transmit error status
4	Transmit paper roll sensor status

■ Printer transmits the following status

n=1: Printer status

Bit	Binary	Hex	Decimal	Status
0	0	00	0	Not used. Fixed to Off
1	1	02	2	Not used. Fixed to On
2	0	00	0	Not used. Fixed to Off
3	0	00	0	Online
	1	08	8	Offline
4	1	10	16	Not used. Fixed to On
5	0	00	0	Not used. Fixed to Off
6	0	00	0	Not used. Fixed to Off
7	0	00	0	Not used. Fixed to Off

n=2: Off-line status

Bit	Off/On	Hex	Decimal	Status
0	Off	00	0	Fixed
1	On	02	2	Fixed
2	Off	00	0	Cover is closed
	On	04	4	Cover is open
3	Off	00	0	Paper is not being fed by using the paper FEED button
	On	08	8	Paper is being fed by the paper FEED button
4	On	10	16	Fixed
5	Off	00	0	No paper-end stop
	On	20	32	Printing is being stopped
6	Off	00	0	Fixed
7	Off	00	0	Fixed

n=3: Error status

Bit	Binary	Hex	Decimal	Status
0	0	00	0	Not used. Fixed to Off
1	1	02	2	Not used. Fixed to On
2	0	00	0	Not used. Fixed to Off
3	0	00	0	Not used. Fixed to Off
4	1	10	16	Not used. Fixed to On
5	0	00	0	Not used. Fixed to Off
6	0	00	0	Not used. Fixed to Off
7	0	00	0	Not used. Fixed to Off

n=4: paper sensor status

Bit	Binary	Hex	Decimal	Status
0	0	00	0	Not used. Fixed to Off
1	1	02	2	Not used. Fixed to On
2	0	00	0	Not used. Fixed to Off
3	0	00	0	Not used. Fixed to Off
4	1	10	16	Not used. Fixed to On
5,6	00	00	0	Paper end sensor: paper present
	11	60	96	Paper end sensor: paper not present
7	0	00	0	Not used. Fixed to Off

Remarks:

- This command can be executed in a real time mode using DLE.
- In a real time mode, the status is transmitted to the host upon being requested that can check the printer operational condition with it and takes appropriate measures accordingly.

Differences: None

HT

Function: **Horizontal tab**

Code:

ASCII	HT
Hex	09
Decimal	9

Range: None

Default: None

Description: This command moves the print position to the next horizontal tab position. If the next horizontal tab position is not specified, this command will be void.

Remarks:
- The horizontal tab position is set by <ESC> D.
- With the underline mode turned on, the underline printing is not applied to the tab space created by this command.

Differences: None

Example:
- Input:

0x54 0x45 0x53 0x54 0x0a
0x54 0x09 0x45 0x09 0x53 0x09 0x54 0x0a

- Output:



LF

Function: **Print and line feed**

Code:

ASCII	LF
Hex	0A
Decimal	10

Range: None

Default: None

Description: This command prints the data in the print buffer and feeds one line based on the current set line spacing in standard mode.

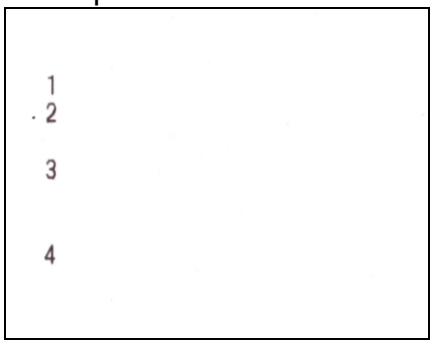
Remarks:
- In page mode, the printer does not perform actual printing, but moving only the print position to the next line.

Differences: None

Example:
- Input:

```
0x31
0x0a
0x32
0x0a 0x0a
0x33
0x0a 0x0a 0x0a
0x34 0x0a
```

■ Output:



FF

Function: **Form feed (in page mode)**

Code:

ASCII	FF
Hex	0C
Decimal	12

Range: None

Default: None

Description: This commands prints all data collected in the printer buffer In page mode. After completion of printing, the printer is returned to standard mode.

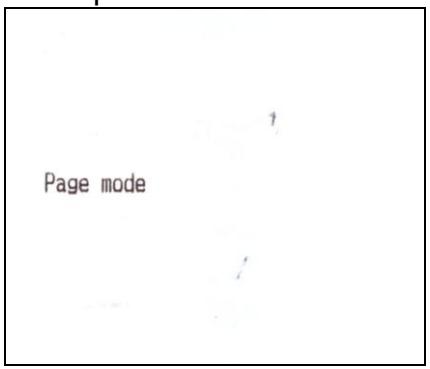
Remarks:
- The printer is returned to standard mode after completion of printing.
- This command works in page mode enabled by ESC L

Differences: None

Example:
- Input:

0x1b 0x4c
0x1b 0x57 0x00 0x00 0x00 0x00 0x80 0x01 0xf0 0x00
0x50 0x61 0x67 0x65 0x20 0x6d 0x6f 0x64 0x65 0x0a
0x0c

■ Output:



CR

Function: **Print and carriage return**

Code:

ASCII	CR
Hex	0D
Decimal	13

Range: None

Default: None

Description: This command prints the data. With auto line feed enabled, it performs printing and one line feeding same as LF.

Remarks: ■ Auto line feed is only enabled with a parallel interface using the DIP switch.

Differences: None

DLE

Function: **Set real-time command mode**

Code:

ASCII	DLE
Hex	10
Decimal	16

Range: None

Default: None

Description: This command enables commands to be operable in real-time.

Remarks:
- A single command following this command is regarded as a real time command.
- The real time command is stored into the receive buffer and executed with higher priority than other commands.
- If this command is processed as a parameter of the other command, the data following this command might bring about the unwanted result.
- The commands that are allowed to be executed in real time mode vary depending on the printer model.

Differences:
- Commands that can be executed in real time mode: EOT, GS r, GS I, GS I b

CAN

Function: **Cancel the print data in page mode**

Code:

ASCII	CAN
Hex	18
Decimal	24

Range: None

Default: None

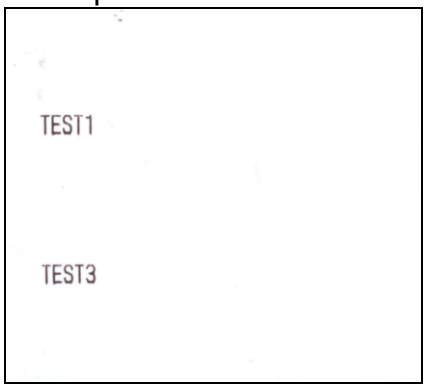
Description: This command clears the receive buffer and print buffers in page mode.

Remarks: ■ This command is effective only in page mode that is set by ESC L.

Differences: None

Example: ■ Input:
0x54 0x45 0x53 0x54 0x31 0x0a
0x1b 0x4c
0x1b 0x57 0x00 0x00 0x00 0x00 0x80 0x01 0xf0 0x00
0x54 0x45 0x53 0x54 0x32 0x0a
0x18
0x0c
0x54 0x45 0x53 0x54 0x33 0x0a

■ Output:



ESC SP

Function: **Set the character right space**

Code:

ASCII	ESC	SP	n
Hex	1B	20	n
Decimal	27	32	n

Range: 0 ≤ n ≤ 255

Default: n=0

Description:
- This command sets the size of space to right of character.
  - Right space = n × [horizontal motion units].

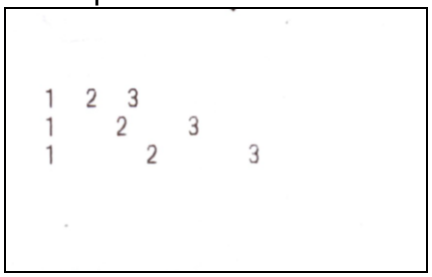
Remarks:
- In a double width mode, the right space will be doubled.
- Horizontal motion unit varies depending the printer model.

Differences:
- Horizontal motion unit: 0.125mm(1/203 inch)

Example:
- Input:

```
0x1b 0x20 0x20
0x31 0x32 0x33 0x0a
0x1b 0x20 0x40
0x31 0x32 0x33 0x0a
0x1b 0x20 0x60
0x31 0x32 0x33 0x0a
```

■ Output:



ESC !

Function: **Set print mode**

Code:

ASCII	ESC	!	n
Hex	1B	21	n
Decimal	27	33	n

Range: 0 ≤ n ≤ 255

Default: n=0

Description: This command selects print mode(s) with bits having following meanings.

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Character font A selected
	On	01	1	Character font B selected
1,2	Off	00	0	Reserved
3	Off	00	0	Emphasized mode not selected
	On	08	8	Emphasized mode selected
4	Off	00	0	Double-height mode not selected
	On	10	16	Double-height mode selected
5	Off	00	0	Double-width mode not selected
	On	20	32	Double-width mode selected
6	Off	00	0	Reserved
7	Off	00	0	Underline mode not selected
	On	80	128	Underline mode selected

Remarks:

- As alternative to this command, ESC M, ESC E and ESC – can be used for the selection for character font, emphasized mode and underline mode respectively.
- The entire character print width is underlined, but the space skipped by HT is not.
- If both double width and double height are selected, the characters will be quadrupled.

Differences:

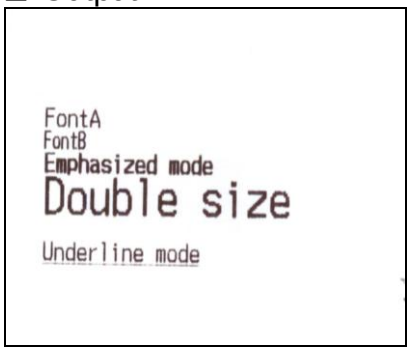
- Character configuration(Font A, Font B): Font A(12 × 24), Font B(9 x 17)

Example:

■ Input :

```
0x1b 0x21 0x00
0x46 0x6f 0x6e 0x74 0x41 0x0a
0x1b 0x21 0x01
0x46 0x6f 0x6e 0x74 0x42 0x0a
0x1b 0x21 0x08
0x45 0x6d 0x70 0x68 0x61 0x73 0x69 0x7a 0x65 0x64 0x20 0x6d 0x6f 0x64 0x65 0x0a
0x1b 0x21 0x30
0x44 0x6f 0x75 0x62 0x6c 0x65 0x20 0x73 0x69 0x7a 0x65 0x0a
0x1b 0x21 0x80
0x55 0x6e 0x64 0x65 0x72 0x6c 0x69 0x6e 0x65 0x20 0x6d 0x6f 0x64 0x65 0x0a
```

■ Output :



ESC $

Function: **Set absolute print position**

Code:

ASCII	ESC	$	nL	nH
Hex	1B	24	nL	nH
Decimal	27	36	nL	nH

Range: 0 ≤ (nL + nH x 256) ≤ 65535 (0 ≤ nH ≤ 255, 0 ≤ nL ≤ 255)

Default: None

Description: This command specifies the next print starting position in reference to the left edge of the print area. The printing start position is calculated using (nL + nH x 256) x (vertical or horizontal motion units).

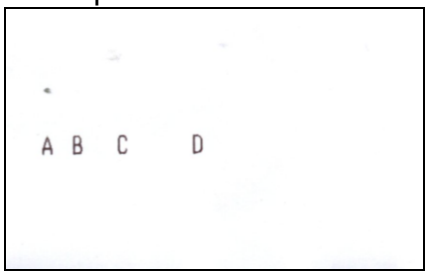
Remarks:
- Any setting values that go beyond the printable area is ignored.
- In standard mode, the horizontal motion unit is used for the calculation.
- In page mode, the horizontal motion unit is applied when printing start poison is defined to the upper right or lower right of print area using ESC T, otherwise, the vertical motion unit is used.

Differences:
- Horizontal motion unit: 0.125mm(1/203 inch)

Example:
- Input:

```
0x41
0x1b 0x24 0x20 0x00
0x42
0x1b 0x24 0x50 0x00
0x43
0x1b 0x24 0xa0 0x00
0x44
0x0a
```

■ Output:



ESC *

Function: **Specify bit image mode**

Code:

ASCII	ESC	*	m	nL	nH	d1...dk
Hex	1B	2A	m	nL	nH	d1...dk
Decimal	27	42	m	nL	nH	d1...dk

Range:
m = 0, 1, 32, 33
0 ≤ nL ≤ 255
0 ≤ nH ≤ 3
0 ≤ d ≤ 255
k = nL + nH × 256 [in case of m = 0, 1]
k = (nL + nH × 256) × 3 [in case of m = 32, 33]

Default: None

Description:
■ This command specifies the bit image for the mode m as to the number of dots specified by nL and nH.
- d specifies the bit image data with 1 for printed data and 0 for not printed.
- k denotes the number of horizontal dots.

DPI : Dots per Inch (25.4mm)

m	Mode	Number of dots in vertical direction	Vertical dot density (DPI)	Horizontal dot density (DPI)	Number of bytes (k)
0	8-dot single-density	8	203/3	203/2	nL + nH x 256
1	8-dot double-density	8	203/3	203	nL + nH x 256
32	24-dot single-density	24	203	203/2	(nL + nH x 256) x 3
33	24-dot double-density	24	203	203	(nL + nH x 256) x 3

Remarks:
■ If the bit image data being entered is beyond the number of dots to be printed, the surplus will be discarded.
■ If the value of m is beyond the conditions, the subsequent data after m will be treated as normal data.

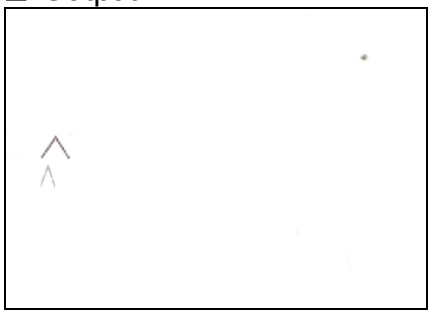
Differences: None

Example:

■ Input:

0x1b 0x2a 0x00 0x0f 0x00 0x01 0x02 0x04 0x08 0x10 0x20 0x40 0x80 0x40 0x20 0x10 0x08 0x04 0x02 0x01
0x0a
0x1b 0x2a 0x01 0x0f 0x00 0x01 0x02 0x04 0x08 0x10 0x20 0x40 0x80 0x40 0x20 0x10 0x08 0x04 0x02 0x01
0x0a

■ Output:



ESC –

Function: **Turn underline mode on/off**

Code:

ASCII	ESC	-	n
Hex	1B	2D	n
Decimal	27	45	n

Range: 0 ≤ n ≤ 2, 48 ≤ n ≤ 50

Default: n=0

Description:

■ This command enables the print data following it to be printer out underlined.

• The underline mode varied depending on the following values of n:

n	Function
0,48	Turns off underline mode
1,49	Turns on underline mode, set at 1-dot thick
2,50	Turns on underline mode, set at 2-dot thick

Remarks:

■ The spaces generated by horizontal tab are not underlined.

■ Using bit 7 of ESC !, the underline mode can be activated/deactivated as well.

Differences: None

Example:

■ Input:

```
0x1b 0x2d 0x00
0x54 0x45 0x53 0x54 0x30 0x30
0x0a 0x0a
0x1b 0x2d 0x01
0x54 0x45 0x53 0x54 0x30 0x31
0x0a 0x0a
0x1b 0x2d 0x02
0x54 0x45 0x53 0x54 0x30 0x32
0x0a
```

■ Output:



ESC 2

Function: **Select default line spacing**

Code:

ASCII	ESC	2
Hex	1B	32
Decimal	27	50

Range: None

Default: None

Description: This command sets the default line spacing The default line spacing is approximately 3.75 mm, which is equivalent to 30 dots.

Remarks:

- The line spacing can be set independently in standard mode and in page mode.
- The setting of this command remains effective until ESC !, ESC @, printer reset or power cycling is executed.

Differences:

- Default line spacing: 3.75 mm(30 dots)

ESC 3

Function: **Set line spacing**

Code:

ASCII	ESC	3	n
Hex	1B	33	n
Decimal	27	51	n

Range: 0 ≤ n ≤ 255

Default: Corresponding to the default line spacing defined by ESC 2

Description:
- This command sets the line spacing using a following rule.
  - Line spacing = n x (vertical or horizontal motion units)

Remarks:
- With standard mode selected, the vertical motion unit is used.
- In page mode, the horizontal motion unit is applied when printing start poison is defined to the upper right or lower right of print area using ESC T, otherwise, the vertical motion unit is used.
- The line spacing is settable independently for each of standard and page modes.

Differences:
- Vertical or horizontal motion unit and maximum line spacing settable:

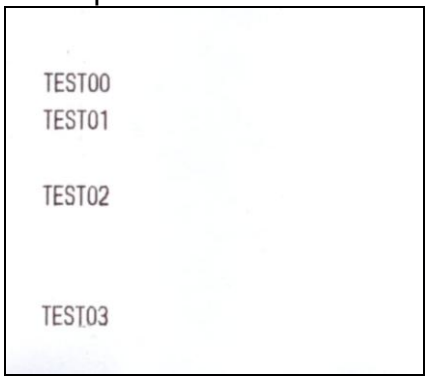
Model	Vertical unit	Horizontal unit	Max line spacing
SPP-R220	0.125mm (1/203 inches)	0.125mm (1/203 inches)	31.875mm

Example:

■ Input:

```
0x54 0x45 0x53 0x54 0x30 0x30
0x1b 0x33 0x50
0x0a
0x54 0x45 0x53 0x54 0x30 0x31
0x1b 0x33 0xa0
0x0a
0x54 0x45 0x53 0x54 0x30 0x32
0x1b 0x33 0xff
0x0a
0x54 0x45 0x53 0x54 0x30 0x33
0x0a
```

■ Output



ESC =

Function: **Select peripheral device**

Code:

ASCII	ESC	=	n
Hex	1B	3D	n
Decimal	27	61	n

Range: 1 ≤ n ≤ 3

Default: n =1

Description: ■ The selection of peripherals according to the n value is as follows.

n	**Function**
1,3	Printer Activation
2	Printer Deactivation

Remarks: ■ When the printer is deactivated, all received data is not recognized, but “ESC =” and real-time commands are recognized.

Differences: None

ESC @

Function: **Initialize printer**

Code:

ASCII	ESC	@
Hex	1B	40
Decimal	27	64

Range: None

Default: None

Description: This command cancels conditions previously set and initializes the printer to the conditions having existed at power on.

Remarks:
- The data in the printer buffer is cleared.
- The settings of DIP switch are not re-read.
- The data in the receive buffer is not discarded.
- All of the settings such as print mode and line feed are cleared.
- NV graphics and NV user memory are not cleared.
- In page mode, this command removes the data in print areas, restores the initial settings and returns to standard mode.

Differences: None

ESC D

Function: **Set horizontal tab position**

Code:

ASCII	ESC	D	n1...nk	NUL
Hex	1B	44	n1...nk	00
Decimal	27	68	n1...nk	0

Range: 1 ≤ n ≤ 255 , 0 ≤ k ≤ 32

Default: n=8, 16, 24, 32, 40,....., 232, 240, 248

Description:
- This command sets the horizontal tab position.
  - n defines the number of columns from the beginning of the line to the horizontal tab setting.
  - k denotes the number of horizontal tab positions to be set.
  - The horizontal tab position is stored as a value of [character width x n] measured form the beginning of the line.

Remarks:
- The data [n]k signifying the set position is transmitted in the ascending order and ends with a NUL code.
- ESC D NUL cancels all horizontal tab positions.
- Tab position is set at the value of [character width x n] from the beginning of the line.
- The character width includes the space to the right of the character, and it will be twice the normal character when the double width characters are selected.
- If the data [n]k is equal to or smaller than the preceding data [n]k-1, the horizontal tab setting has been completed.
- Up to 32 horizontal tabs can be set, the data exceeding this limit is processed as normal ones.
- Even if the character width is changed after setting the horizontal tab positions, the horizontal tab positions remain unchanged.

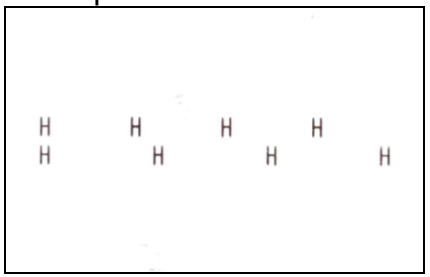
Differences: None

Example:

■ Input:

0x48 0x09 0x48 0x09 0x48 0x09 0x48
0x0a
0x1b 0x44 0x0a 0x14 0x1e 0x00
0x48 0x09 0x48 0x09 0x48 0x09 0x48
0x0a

■ Output:



ESC E

Function: **Turn emphasized mode on / off**

Code:

ASCII	ESC	E	n
Hex	1B	45	n
Decimal	27	69	n

Range: 0 ≤ n ≤ 255

Default: n=0

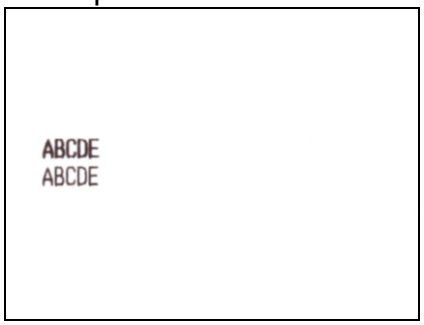
Description:
■ This command turns emphasized mode on or off by toggling the least significant bit of n like following.
- When the LSB of n is 0, emphasized mode is turned off.
- When the LSB of n is 1, emphasized mode is turned on.

Remarks:
■ The setting of this command remains effective until ESC !, ESC @, printer reset or power cycling is executed.

Differences: None

Example:
■ Input:
0x1b 0x45 0x01
0x41 0x42 0x43 0x44 0x45
0x0a
0x1b 0x45 0x00
0x41 0x42 0x43 0x44 0x45
0x0a

■ Output:



ESC G

Function: **Turn double-strike mode on/off**

Code:

ASCII	ESC	G	n
Hex	1B	47	n
Decimal	27	71	n

Range: 0 ≤ n ≤ 255

Default: n=0

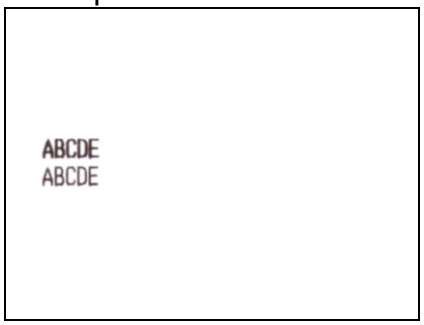
Description: ■ This command turns double-strike mode on or off by toggling the least significant bit of n like following.
- When the LSB of n is 0, emphasized mode is turned off.
- When the LSB of n is 1, emphasized mode is turned on.

Remarks: ■ The setting of this command remains effective until ESC !, ESC @, printer reset or power cycling is executed.

Differences: None

Example: ■ Input:
0x1b 0x47 0x01
0x41 0x42 0x43 0x44 0x45
0x0a
0x1b 0x47 0x00
0x41 0x42 0x43 0x44 0x45
0x0a

■ Output:



ESC J

Function: **Print and feed paper**

Code:

ASCII	ESC	J	n
Hex	1B	4A	n
Decimal	27	74	n

Range: 0 ≤ n ≤ 255

Default: None

Description: This command prints the data in the print buffer and feeds the paper [n X vertical motion unit].

Remarks:

- The maximum feed amount available varies depending on the printer model.
- With standard mode selected, the vertical motion unit is used.
- In page mode, the horizontal motion unit is applied when printing start poison is defined to the upper right or lower right of print area using ESC T, otherwise, the vertical motion unit is used.
- When used in page mode, this command moves only the print position, not executing actual printing.

Differences:

- Vertical motion unit and maximum feed amount:

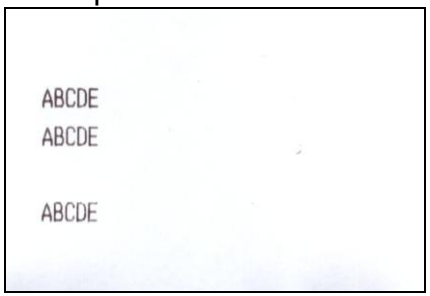
Model	Vertical unit	Max feed amount
SPP-R220	0.125mm (1/203 inches)	31.875mm

Example:

- Input:

```
0x41 0x42 0x43 0x44 0x45
0x1b 0x4a 0x50
0x41 0x42 0x43 0x44 0x45
0x1b 0x4a 0xa0
0x41 0x42 0x43 0x44 0x45
0x0a
```

■ Output:



ESC L

Function: **Select page mode**

Code:

ASCII	ESC	L
Hex	1B	4C
Decimal	27	76

Range: None

Default: None

Description: This command switches from standard mode to page mode.

Remarks:

- For printing in page mode, ESC T defines the print direction and starting position that is within the print area specified by ESC W.
- The conditions by the following commands are defined independently in standard mode and page mode.
  - ESC SP, ESC 2, ESC 3, ESC U, and FS S
- The following commands are not activated in page mode.
  - ESC L, FS q, GS (A, GS (E, GS T
- The following commands are not effective in page mode. The conditions set by these commands in page mode are available when the printer returns to standard mode.
  - ESC a, ESC {, GS L, and GS W
- The printer resumes standard mode by the use of ESC S, FF, and ESC@
- In page mode, the command, FF, prompts printing the data in the printer buffer collectively. LF, CR, ESC J, and ESC d just move the print position, not performing actual printing.

Differences: None

ESC M

Function: **Select character font/ MSR card read**

Code:

ASCII	ESC	M	n
Hex	1B	4D	n
Decimal	27	77	n

Range: n = 0,1,2, 48, 49 ,50 ,67, 68, 69, 70, 71, 72, 73

Default: n=0

Description:

▪ Selects only 1byte character fonts
▪ Selects Card reader mode

n	Function
0, 48	Character font A (12 × 24) selected
1, 49	Character font B (9 × 17) selected
2, 50	Character font C(9 x 24)selected
70	Set 1 track card reader mode
71	Set 2 track card reader mode
72	Set 1,2 track card reader mode
73	Transmits the MSR setting value(s)
68	Set 3 track card reader mode
69	Set 2,3 track card reader mode
66	Set 1,2,3 track card reader mode
99	Cancel MSR reader mode

■ Magnetic card reader is provided with track 1, 2, and 3.
■ Magnetic card read out put format

Refer to function 3 memory switch #7 (8 - 6 & 7 setting) of GS (E command and function 1 of BS M S command.

- When set to Track 1 Read mode

Normal mode

02H 41H 31H 31H 1CH	Max DATA 76 characters (1Track data)	03H 0DH 0AH

1byte sentinel character mode

02H 41H 31H 31H 1CH (Header)	25H (STX)	Max DATA 76 characters (1Track data)	3FH (ETX)	03H 0DH 0AH (End)

Multi byte sentinel characters mode

START characters (Max 10 byte)	Max DATA 76 characters (1Track data)	END characters (Max 10 byte)	0DH 0AH

- When set to Track 2 Read mode

Normal mode

02H 42H 31H 31H 1CH	Max DATA 37 characters (2Track data)	03H 0DH 0AH

1byte sentinel character mode

02H 42H 31H 31H 1CH (Header)	3BH (STX)	Max DATA 37 characters (2Track data)	3FH (ETX)	03H 0DH 0AH (End)

Multi byte sentinel characters mode

START characters (Max 10 byte)	Max DATA 37 characters (2Track data)	END characters (Max 10 byte)	0DH 0AH

- When set to Track 3 Read mode

Normal mode

02H 44H 31H 31H 1CH	Max DATA104 characters (3Track data)	03H 0DH 0AH

1byte sentinel character mode

02H 44H 31H 31H 1CH (Header)	3BH (STX)	Max DATA 104 characters (3Track data)	3FH (ETX)	03H 0DH 0AH (End)

Multi byte sentinel characters mode

START characters (Max 10 byte)	Max DATA 104 characters (3Track data)	END characters (Max 10 byte)	0DH 0AH

- When set to Track 1/2 Read mode

Normal mode

02H 43H 31H 31H 1CH 1CH	Max DATA 76 characters (1Track data)	1CH	Max DATA 37 Characters (2Track data)	03H 0DH 0AH

1byte sentinel character mode

02H 43H 31H 31H 1CH 1CH (Header)	3BH (STX)	Max DATA76 characters (1Track data)	3FH (ETX)	1CH (Separator)	3BH (STX)	Max DATA37 Characters (2Track data)	3FH (ETX)	03H 0DH 0AH (End)

Multi byte sentinel characters mode

START characters (Max 10 byte)	Max DATA 76 characters (1Track data)	END characters (Max 10 byte)	0DH 0AH

START characters (Max 10 byte)	Max DATA 37 characters (2Track data)	END characters (Max 10 byte)	0DH 0AH

- When set to Track 2/3 Read mode

Normal mode

02H 45H 31H 31H 1CH 1CH	Max DATA 37 characters (2Track data)	1CH	Max DATA104 Characters (3Track data)	03H 0DH 0AH

1byte sentinel character mode

02H 45H 31H 31H 1CH 1CH (Header)	3BH (STX)	Max DATA37 characters (2Track data)	3FH (ETX)	1CH (Separator)	3BH (STX)	Max DATA104 Characters (3Track data)	3FH (ETX)	03H 0DH 0AH (End)

Multi byte sentinel characters mode

START characters (Max 10 byte)	Max DATA 37 characters (2Track data)	END characters (Max 10 byte)	0DH 0AH

START characters (Max 10 byte)	Max DATA 104 characters (3Track data)	END characters (Max 10 byte)	0DH 0AH

- When set to Track 1/2/3 Read mode

Normal mode

02H 46H 31H 31H 1CH 1CH	Max DATA76 characters (1Track data)	1CH	Max DATA37 Characters (2Track data)	1CH	Max DATA104 Characters (3Track data)	03H 0DH 0AH

1byte sentinel characters mode

02H 46H 31H 31H 1CH 1CH (Header)	25H (STX)	Max DATA76 characters (1Track data)	3FH (ETX)	1CH (Separator)	3BH (STX)	Max DATA37 Characters (2Track data)	3FH (ETX)	1CH (Separator)	3BH (STX)	Max DATA104 Characters (3Track data)	3FH (ETX)	03H 0DH 0AH (End)

Multi byte sentinel character mode

START characters (Max 10 byte)	Max DATA 76 characters (1Track data)	END characters (Max 10 byte)	0DH 0AH

START characters (Max 10 byte)	Max DATA 37 characters (2Track data)	END characters (Max 10 byte)	0DH 0AH

START characters (Max 10 byte)	Max DATA 104 characters (3Track data)	END characters (Max 10 byte)	0DH 0AH

■ The following shows the format of the MSR setting value transmitted from the printer.

	Hexadecimal	Decimal	Amount of Data
Header	37H	55	1 byte
Flag	80H	128	1 byte
Data	41H ~ 48H	65 ~ 72	1 bytes
NUL	00H	0	1 byte

■ The following describes MSR read mode according to the MSR setting value.

MSR setting value(Hex)	MSR read mode
41	Track 1/2/3 read mode command (3 Track case)
42	Track 1 read mode AUTO trigger (3 Track case)
43	Track 2 read mode AUTO trigger (3 Track case)
44	Track 3 read mode AUTO trigger (3 Track case)
45	Track 1/2 read mode AUTO trigger (3 Track case)
46	Track 2/3 read mode AUTO trigger (3 Track case)
47	Track 1/2/3 read mode AUTO trigger (3 Track case)
48	MSR not used

■ The manual reading of a magnetic card is activated with MSR setting value of 41H that is set by SPP-R220 Unified Utility. In this case, ESC M should be sent to the printer to receive the magnetic card read output prior to swiping the card. In other cases, the printer receives automatically the output whenever the card is read.

Remarks:

■ The printer model has it own configuration of Font A and B.
■ The setting of this command remains effective until ESC !, ESC @, printer reset or power cycling is executed.

Differences:

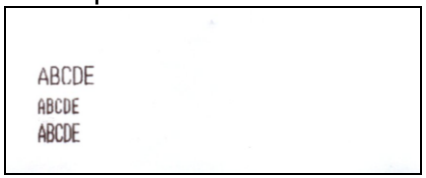
■ Configuration of Font A and B, C: Font A(12 × 24), Font B(9 x 17), Font C(9x24)
■ MSR read mode selection for SPP-R220 is specified using SPP-R220 Unified Utility.

Example:

■ Input:

```
0x1b 0x4d 0x00
0x41 0x42 0x43 0x44 0x45
0x0a
0x1b 0x4d 0x01
0x41 0x42 0x43 0x44 0x45
0xa0
0x1b 0x4d 0x02
0x41 0x42 0x43 0x44 0x45
0x0a
```

■ Output:



ESC R

Function: **Specify international character set**

Code:

ASCII	ESC	R	n
Hex	1B	52	n
Decimal	27	82	n

Range: 0≤ n≤10

Default: n=0

Description: This command specifies international characters according to n values.

n	**Character set**	**n**	**Character set**
0	U.S.A	7	Spain I
1	France	9	Norway
2	Germany	10	Denmark II
3	U.K	11	Spain II
4	Denmark I	12	Latin America
5	Sweden	13	Korea
6	Italy		

Remarks: ■ The setting of this command remains effective until ESC !, ESC @, printer reset or power cycling is executed.

Differences: None

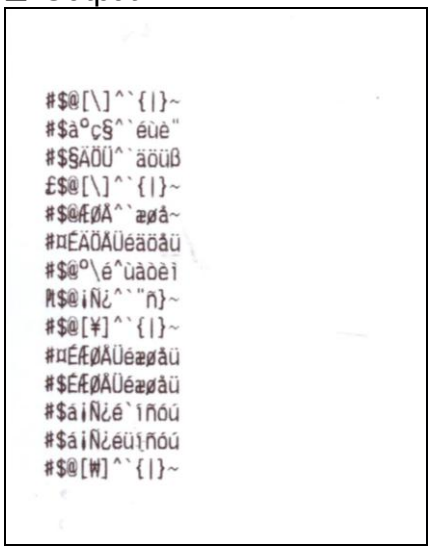
Example: ■ Input:

```
0x1b 0x52 0x00
0x23 0x24 0x40 0x5b 0x5c 0x5d 0x5e 0x60 0x7b 0x7c 0x7d 0x7e
0x0a
0x1b 0x52 0x01
0x23 0x24 0x40 0x5b 0x5c 0x5d 0x5e 0x60 0x7b 0x7c 0x7d 0x7e
0x0a
```

0x1b 0x52 0x02
0x23 0x24 0x40 0x5b 0x5c 0x5d 0x5e 0x60 0x7b 0x7c 0x7d 0x7e
0x0a
0x1b 0x52 0x03
0x23 0x24 0x40 0x5b 0x5c 0x5d 0x5e 0x60 0x7b 0x7c 0x7d 0x7e
0x0a
0x1b 0x52 0x04
0x23 0x24 0x40 0x5b 0x5c 0x5d 0x5e 0x60 0x7b 0x7c 0x7d 0x7e
0x0a
0x1b 0x52 0x05
0x23 0x24 0x40 0x5b 0x5c 0x5d 0x5e 0x60 0x7b 0x7c 0x7d 0x7e
0x0a
0x1b 0x52 0x06
0x23 0x24 0x40 0x5b 0x5c 0x5d 0x5e 0x60 0x7b 0x7c 0x7d 0x7e
0x0a
0x1b 0x52 0x07
0x23 0x24 0x40 0x5b 0x5c 0x5d 0x5e 0x60 0x7b 0x7c 0x7d 0x7e
0x0a
0x1b 0x52 0x08
0x23 0x24 0x40 0x5b 0x5c 0x5d 0x5e 0x60 0x7b 0x7c 0x7d 0x7e
0x0a
0x1b 0x52 0x09
0x23 0x24 0x40 0x5b 0x5c 0x5d 0x5e 0x60 0x7b 0x7c 0x7d 0x7e
0x0a
0x1b 0x52 0x0a
0x23 0x24 0x40 0x5b 0x5c 0x5d 0x5e 0x60 0x7b 0x7c 0x7d 0x7e
0x0a
0x1b 0x52 0x0b
0x23 0x24 0x40 0x5b 0x5c 0x5d 0x5e 0x60 0x7b 0x7c 0x7d 0x7e
0x0a
0x1b 0x52 0x0c
0x23 0x24 0x40 0x5b 0x5c 0x5d 0x5e 0x60 0x7b 0x7c 0x7d 0x7e
0x0a
0x1b 0x52 0x0d

0x23 0x24 0x40 0x5b 0x5c 0x5d 0x5e 0x60 0x7b 0x7c 0x7d 0x7e
0x0a

■ Output:



ESC S

Function: **Select standard mode**

Code:

ASCII	ESC	S
Hex	1B	53
Decimal	27	83

Range: None

Default: None

Description: This command enables standard mode.

Remarks:
- The data in the printer buffer is cleared and the setting by ESC W returns to the default.
- The conditions by the following commands are defined independently in standard mode and page mode.
  - ESC SP, ESC 2, ESC 3, ESC U, and FS S
- In standard mode, CAN, GS $, and GS \ are ignored.

Differences: None

ESC T

Function: **Select print direction in page mode**

Code:

ASCII	ESC	T	n
Hex	1B	54	n
Decimal	27	84	n

Range: 0 ≤ n ≤ 3, 48 ≤ n ≤ 51

Default: n = 0

Description: This command selects the print direction and starting position in page mode.

n	Print Direction	Starting Position
0,48	Left right	Upper left
1,49	Bottom to top	Lower left
2,50	Right left	Lower right
3,51	Top bottom	Upper right

Remarks:

- The print direction set by this command id not effective in standard mode.
- If this command is processed in standard mode, the setting by this command is effective when the printer changes to page mode.
- Depending on the print starting position set by this command, the horizontal motion unit or vertical motion unit is used for the following commands.
  - When the starting position is the upper left or lower right of the print area; ESC SP, ESC $, ESC \ use the horizontal motion unit and ESC 3, ESC J, GS $, GS \ the vertical motion unit.
  - When the starting position is the upper right or lower left of the print area; ; ESC SP, ESC $, ESC \ use the vertical motion unit and ESC 3, ESC J, GS $, GS \ the horizontal motion unit.
- The setting of this command remains effective until ESC !, ESC @, printer reset or power cycling is executed.

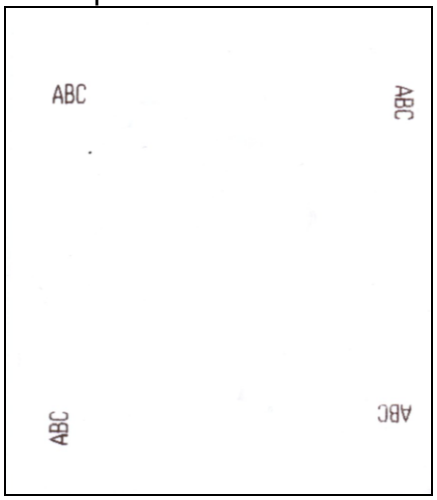
Differences: None

Example:

■ Input:

```
0x1b 0x4c
0x1b 0x57 0x00 0x00 0x00 0x00 0x80 0x01 0x80 0x01
0x1b 0x54 0x00
0x41 0x42 0x43
0x1b 0x54 0x01
0x41 0x42 0x43
0x1b 0x54 0x02
0x41 0x42 0x43
0x1b 0x54 0x03
0x41 0x42 0x43
0x0c
```

■ Output:



ESC W

Function: **Set print area in page mode**

Code:

ASCII	ESC	W	xL	xH	yL	yH	dxL	dxH	dyL	dyH
Hex	1B	57	xL	xH	yL	yH	dxL	dxH	dyL	dyH
Decimal	27	87	xL	xH	yL	yH	dxL	dxH	dyL	dyH

Range:

0 ≤ (xL + xH x 256) ≤ 65535 (0 ≤ xL ≤ 255, 0 ≤ xH ≤ 255)
0 ≤ (yL + yH x 256) ≤ 65535 (0 ≤ yL ≤ 255, 0 ≤ yH ≤ 255)
1 ≤ (dxL + dxH x 256) ≤ 65535 (0 ≤ dxL ≤ 255, 0 ≤ dxH ≤ 255)
1 ≤ (dyL + dyH x 256) ≤ 65535 (0 ≤ dyL ≤ 255, 0 ≤ dyH ≤ 255)

Default:

When paper width of 48mm is selected:
(xL + xH x 256) = 0 (xL=0, xH=0)
(yL + yH x 256) = 0 (yL=0, yH=0)
(dxL + dxH x 256) = 384 (dxL=80, dxH=1)
(dyL + dyH x 256) = 2400 (dyL=60, dyH=9)

Description:

■ This command set the position and the size of the printing area in page mode as following.
- Horizontal starting position = [(xL + xH x 256) x (horizontal motion units)]
- Vertical starting position = [(yL + yH x 256) x (vertical motion units)]
- Horizontal printing area width = [(dxL + dxH x 256) x (horizontal motion units)]
- Vertical printing area width = [(dyL + dyH x 256) x (vertical motion units)]

Remarks:

■ The horizontal and vertical starting positions are out of the printable area, this command is canceled and the following data is processed as normal data.
■ If (Horizontal starting position + Horizontal printing area width) is beyond the printable area, the Horizontal printing area width is set to (Horizontal printing area - Horizontal starting position).
■ If (Vertical starting position + Vertical printing area width) is beyond the printable area, the Vertical printing area width is set to (Vertical printing area - Vertical starting position).
■ This command is not effective in standard mode. If this command is processed in standard mode, the setting by this command is effective when the printer returns to page mode.

■ The setting of this command remains effective until ESC !, ESC @, printer reset or power cycling is executed.

Differences: The maximum printable area(Max horizontal printable area, Max vertical printable area):

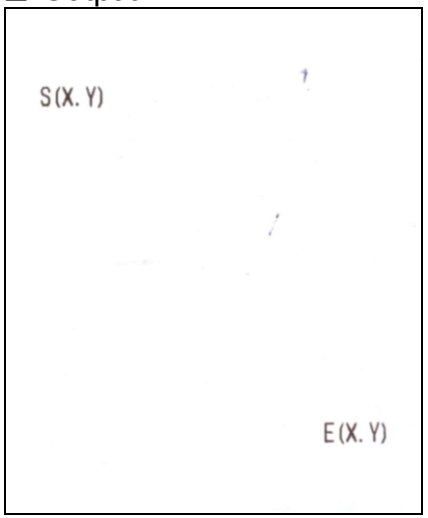
Model	Max horizontal printable area	Max vertical printable area
SPP-R220	48mm(384dots)	300mm(2400dots)

Example:

■ Input:

```
0x1b 0x4c
0x1b 0x57 0x00 0x00 0x00 0x00 0x80 0x01 0x80 0x01
0x53 0x28 0x58 0x2e 0x59 0x29
0x1b 0x24 0x2c 0x01
0x1d 0x24 0x80 0x01
0x45 0x28 0x58 0x2e 0x59 0x29
0x0c
```

■ Output:



ESC \

Function: **Set relative print position**

Code:

ASCII	ESC	\	nL	nH
Hex	1B	5C	nL	nH
Decimal	27	92	nL	nH

Range: 0 ≤ (nL + nH x 256) ≤ 65535 (0 ≤ nL 255, 0 ≤ nH ≤ 255)

Default: None

Description:
- This command sets the print starting position based on the current position to [(nL + nH × 256) × horizontal or vertical motion unit]
  - The print starting position is moved to (nL + nH x 256)in the right direction based on the current position.

Remarks:
- The printer ignores any setting that exceeds the print area.
- When the print area has been exceeded, this command is ignored.
- With standard mode selected, the vertical motion unit is used.
- In page mode, the horizontal motion unit is applied when printing start poison is defined to the upper right or lower right of print area using ESC T, otherwise, the vertical motion unit is used.
- Even if the underline mode is turned on, the space skipped by this command is not printed underlined.

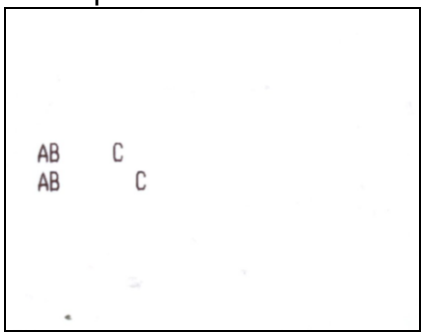
Differences: None

Example:

■ Input:

```
0x41 0x42
0x1b 0x24 0x50 0x00
0x43
0x0a
0x41 0x42
0x1b 0x5c 0x50 0x00
0x43
0x0a
```

■ Output:



ESC a

Function: **Set position alignment**

Code:

ASCII	ESC	a	n
Hex	1B	61	n
Decimal	27	97	n

Range: 0 ≤ n ≤2, 48 ≤ n ≤50

Default: n=0

Description: This command specifies position alignment for all data in one line in standard mode, using n as follows:

n	**Alignment**
0, 48	Left alignment
1, 49	Center alignment
2, 50	Right alignment

Remarks:
- This command is not effective in page mode. If this command is processed in page mode, the setting by this command becomes effective when the printer returns to standard mode.
- The setting of this command remains effective until ESC !, ESC @, printer reset or power cycling is executed.

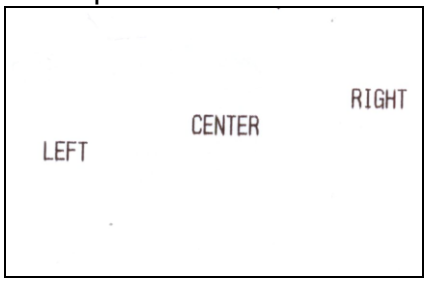
Differences: None

Example:

■ Input:

```
0x1b 0x61 0x02
0x52 0x49 0x47 0x48 0x54
0x0a
0x1b 0x61 0x01
0x43 0x45 0x4e 0x54 0x45 0x52
0x0a
0x1b 0x61 0x00
0x4c 0x45 0x46 0x54
0x0a
```

■ Output:



ESC d

Function: **Print and feed n lines.**

Code:

ASCII	ESC	d	n
Hex	1B	64	n
Decimal	27	100	n

Range: 0 ≤ n ≤ 255

Default: None

Description: This command feeds the paper by n lines after printing the data in the print buffer.

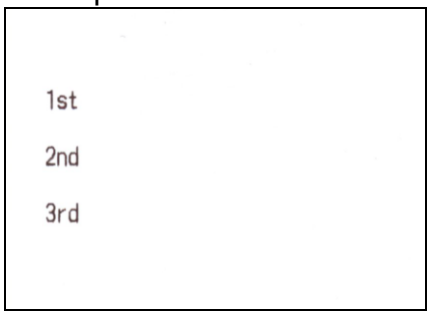
Remarks:
- The per-line paper feed amount is based on the value set by the line spacing related commands, ESC 2 and ESC 3.
- In page mode, this command moves only the print position, not performing actual print.
- If the feed amount set is beyond the maximum feed amount, the feed amount will be set to the maximum feed amount automatically.

Differences:
- Maximum feed amount: 255 lines.

Example:
- Input:

```
0x31 0x73 0x74
0x0a
0x0a
0x32 0x6e 0x64
0x1b 0x64 0x02
0x33 0x72 0x64
0x0a
```

■ Output:



ESC t

Function: **Select character code table**

Code:

ASCII	ESC	t	n
Hex	1B	74	n
Decimal	27	116	n

Range: 0 ≤ n ≤ 5, 16 ≤ n ≤ 19, 21 ≤ n ≤ 31, 33 ≤ n ≤ 41, n=255

Default: For model not supporting Thai character: n=0
For model supporting Thai character support : n = 20

Description: This command specifies code page according to the value of n as follows:

n	Code page
0	Page 0 437 (USA, Standard Europe)
1	Page 1 Katakana
2	Page 2 850 (Multilingual)
3	Page 3 860 (Portuguese)
4	Page 4 863 (Canadian-French)
5	Page 5 865 (Nordic)
16	Page 16 1252 (Latin I)
17	Page 17 866 (Cyrillic #2)
18	Page 18 852 (Latin 2)
19	Page 19 858 (Euro)
21	Page 21 862 (Hebrew DOS code)
22	Page 22 864 (Arabic)
23	Page 23 Thai42
24	Page 24 1253 (Greek)
25	Page 25 1254 (Turkish)

n	Code page
26	Page 26 1257 (Baltic)
27	Page 27 Farsi
28	Page 28 1251 (Cyrillic)
29	Page 29 737 (Greek)
30	Page 30 775 (Baltic)
31	Page 31 Thai14
33	Page 33 1255 (Hebrew New code)
34	Page 34 Thai 11
35	Page 35 Thai 18
36	Page 36 855 (Cyrillic)
37	Page 37 857 (Turkish)
38	Page 38 928 (Greek)
39	Page 39 Thai 16
40	Page 40 1256 (Arabic)
41	Page 41 1258 (Vietnam)
42	Page 42 KHMER(Cambodia)
47	Page 47 1250 (Czech)
48	Page 48 Latin 9
255	User Code Page (Space)

Remarks: ■ The setting of this command remains effective until ESC !, ESC @, printer reset or power cycling is executed.

Differences: None

ESC {

Function: **Turns upside-down printing mode on/off**

Code:

ASCII	ESC	{	n
Hex	1B	7B	n
Decimal	27	123	n

Range: 0 ≤ n ≤ 255

Default: n=0

Description: This command selects/deselects upside-down printing mode according to the least significant bit as follows.

LSB	Upside-down mode
0	Turned off
1	Turned on

Remarks:

- This command is valid only when entered at the beginning of the line.
- The upside-down print mode has no effect in page mode. If this command is processed in page mode, upside-down printing mode is enabled when the printer returns to standard mode.
- 180 rotated characters are printed from right to left in upside-down print mode.
- The setting of this command remains effective until ESC !, ESC @, printer reset or power cycling is executed.

Example

Normal Upside- down Mode

ABCDEF 

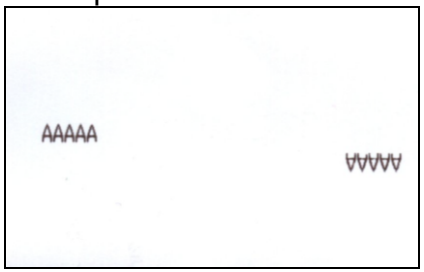
Differences: None

Example:

■ Input:

0x41 0x41 0x41 0x41 0x41
0x0a
0x1b 0x7b 0x01
0x41 0x41 0x41 0x41 0x41
0x0a

■ Output:



FS &

Function: **Select Kanji character mode**

Code:

ASCII	FS	&
Hex	1C	26
Decimal	28	38

Range: None

Default: None

Description: This command sets Kanji character mode.

Remarks:
- This command is available only for the Japanese, Chinese, and Korean models.
- Kanji codes are comprised of 2 bytes and processed in order of the first and second byte.
- The setting of this command remains effective until ESC !, ESC @, printer reset, power cycling or FS is executed.

Differences: None

FS .

Function: **Cancel Kanji character mode**

Code:

ASCII	FS	.
Hex	1C	2E
Decimal	28	46

Range: None

Default: None

Description: This command cancels Kanji character mode.

Remarks:

- This command is available only for the Japanese, Chinese, and Korean models.
- Kanji character mode is enabled using FS &.
- Once Kanji character mode is canceled, the printer processes a character code as 1-byte code of alphanumeric characters.
- The setting of this command remains effective until ESC !, ESC @, printer reset, or power cycling is executed.

Differences: None

GS !

Function: **Select character size**

Code:

ASCII	GS	!	n
Hex	1D	21	n
Decimal	29	33	n

Range: 0 ≤ n ≤ 255
(1 ≤ Vertical enlargement ≤ 8, 1 ≤ Horizontal enlargement ≤ 8)

Default: n=0

Description: ■ This command selects the character height and width using bits 0 to 3, and bits 4 to 7 respectively as follows:

Bit	Function	Setting
0	Specifies the number of times normal font size in the vertical direction	Refer to Table 2 [Enlarged in vertical direction]
1		
2		
3		
4	Specifies the number of times normal font size in the horizontal direction	Refer to Table 1 [Enlarged in horizontal direction]
5		
6		
7		

• Table 1 [Enlarged in horizontal direction]

Hex	Decimal	Enlargement
00	0	1 time (standard)
10	16	2 times
20	32	3 times
30	48	4 times
40	64	5 times
50	80	6 times
60	96	7 times
70	112	8 times

• Table 2 [Enlarged in vertical direction]

Hex	Decimal	Enlargement
00	0	1 time (standard)
01	1	2 times
02	2	3 times
03	3	4 times
04	4	5 times
05	5	6 times
06	6	7 times
07	7	8 times

Remarks:

- The character size set by this command is valid for alphanumeric, user-defined characters, multi-byte code characters such as Chinese, Japanese, and Korean.
- Double width and double height modes can be set by ESC !.
- Multi-byte code characters are specified only by this command.
- The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

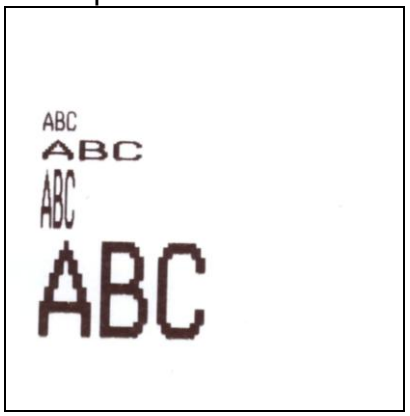
Differences: None

Example:

■ Input:

```
0x41 0x42 0x43
0x0a
0x1d 0x21 0x20
0x41 0x42 0x43
0x0a
0x1d 0x21 0x02
0x41 0x42 0x43
0x0a
0x1d 0x21 0x44
0x41 0x42 0x43
0x0a
```

■ Output:



GS $

Function: **Set absolute vertical print position in page mode**

Code:

ASCII	GS	$	nL	nH
Hex	1D	24	nL	nH
Decimal	29	36	nL	nH

Range: 0 ≤ (nL + nH x 256) ≤ 65535 (0 ≤ nL ≤ 255, 0 ≤ nH ≤ 255)

Default: None

Description: This command sets the absolute vertical print starting position to [(nL + nH × 256) × (vertical or horizontal motion unit)].

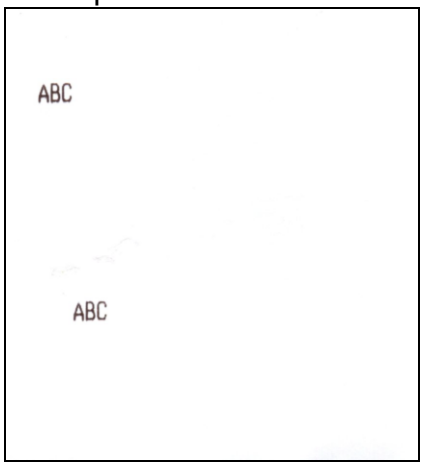
Remarks:
- This command is activated only in page mode and ignored in standard mode.
- Either vertical or horizontal motion unit is used according to the print direction set by ESC T as follows:
  - With the starting position of the upper left or lower right on the print area, the vertical motion unit is used.
  - In other cases, the horizontal motion unit is used.
- The configuration beyond the print area set by ESC W is ignored.

Differences: None

Example:
- Input:

```
0x1b 0x4c
0x1b 0x57 0x00 0x00 0x00 0x00 0x80 0x01 0x80 0x01
0x41 0x42 0x43
0x1d 0x24 0x00 0x01
0x41 0x42 0x43
0x0c
```

■ Output:



GS (A

Function: **Execute test print**

Code:

ASCII	GS	(	A	pL	pH	n	m
Hex	1D	28	41	pL	pH	n	m
Decimal	29	40	65	pL	pH	n	m

Range: (pL + pH x 256) = 2 (pL=2, pH=0)
0 ≤ n ≤ 2, 48 ≤ n ≤ 50
1 ≤ m ≤ 3, 49 ≤ m ≤ 51

Default: None

Description: ■ This command prints a specified pattern for testing on a roll paper.

• Roll paper is selected with n specified as follows:

n	Paper type
0, 48 1, 49 2, 50	Roll paper

• Different kinds of test patterns are selected according to m as follows:

m	Test pattern
1, 49	Hexadecimal dump mode
2, 50	Printer configuration printing
3, 51	Rolling pattern printing

Remarks:
- ■ The printer cancels a macro definition in progress If this command is processed. The macro becomes invalid.
- ■ After completion of this command, a software reset is executed automatically to restore the printer status set during power cycling.
- ■ All of the data transmitted from the host to the printer is printed and identified in hexadecimal dump mode.
- ■ The real time command and ASB operations are not executed during the printing of printer configuration (m=2, 50) and rolling pattern (m=3, 51).

Differences: None

GS (F

Function: **Set black mark control functions**

Code: None

Range: None

Default: None

Description: ■ This command performs various functions to control the black mark(BM) paper as follows:

m	Format	Function
2	GS (F pL pH m a nL nH	Sets the paper feed amount to adjust the paper cutting position after sensing BM.
112	GS (F pL pH m aL aH bL bH	Specifies the black mark paper format.

• pL, pH specifies (pL + (pH ×256)) as the number of bytes after pH (m and [parameter]).

Remarks:
- ■ This command is effective only when the BM(black mark) sensor is enabled.
- ■ This command is stored in the receive buffer and processed in FIFO so that the delay in execution of this command might be occurred.

Differences: None

<Function 2> GS (F pL pH m a nL nH (m=2)

Code:

ASCII	GS	(	F	pL	pH	m	a	nL	nH
Hex	1D	28	46	04	00	02	a	nL	nH
Decimal	29	40	70	4	0	2	a	nL	nH

Range:

(pL + pH × 256) = 4 (pL = 4, pH = 0)
m = 2
a = 0, 48
0 ≤ (nL + nH × 256) ≤ 65535 (0 ≤ nL ≤ 255, 0 ≤ nH ≤ 255)

Default:

nL = 0, nH = 0

Description:

■ This command sets the value for the adjustment of paper cutting position after sensing BM.
- pL, pH specifies (pL + pH × 256) as the number of bytes after pH (m, a, nL, and nH)
- nL, nH specifies [(nL + nH × 256) × vertical motion units] as the adjustment value.

Remarks:

■ This command affects to the cutting operations as follows:
- Paper cut by GS V m n.
- Paper cut after paper feeding triggered by the paper FEED button.
- Paper cut after initializing the BM.(optional)
- Paper cut after paper feeding with the cover closed.(optional)

■ This command is only effective for the forward paper feeding.

■ The maximum adjustable length is 400 mm. If the adjustment value to be specified exceeds the maximum value, the adjustment value is automatically set to the maximum value.

Differences:

None

<Function 112> GS (F pL pH m aL aH bL bH (m=112)

Code:

ASCII	GS	(	F	pL	pH	m	aL	aH	bL	bH
Hex	1D	28	46	05	00	70	aL	aH	bL	bH
Decimal	29	40	70	5	0	112	aL	aH	bL	bH

Range:

(pL + pH × 256) = 5 (pL = 5, pH = 0)
m = 112
0 ≤ (aL + aH × 256) ≤ 65535 (0 ≤ aL ≤ 255, 0 ≤ aH ≤ 255)
0 ≤ (bL + bH × 256) ≤ 65535 (0 ≤ bL ≤ 255, 0 ≤ bH ≤ 255)

Default:

aL = 141, aH = 0 (BM height(top of a BM ~ bottom of BM): 20 mm)
bL = 20, bH = 11 (BM interval(top of a BM ~ top of next BM): 400 mm)

Description:

■ This command sets the black mark paper format.
- pL, pH specifies (pL + pH × 256) as the number of bytes after pH (m, aL, aH,bL, bH).
- aL, aH specifies [(aL + aH × 256) × vertical motion units] as the BM height.
- bL, bH specifies as [(bL + bH × 256) × vertical motion units] as the BM interval.

Remarks:

■ The available BM height ranges from 4 to 20 mm.
■ If the BM height specified is out of range, this command is ignored.
■ The BM interval ranges from 40 to 400 mm.
■ If the BM interval specified is out of range, this command is ignored.

Differences:

None

GS (k

Function: **Specify and print the symbol**

Code: None

Range: None

Default: None

Description: ■ This command processes the data concerning two-dimensional code.
- Symbol type is specified by cn.
- Function code is specified by fn.

cn	Type of Symbol
48	PDF417 (2-dimensional code)
49	QR CODE (2-dimensional code)
50	MAXI CODE(2-dimensional code)
51	DATAMATRIX(2-dimensional code)
52	GS 1 DATABAR
53	AZTEC CODE

cn	fn	Function	
48	65	Function 065	PDF417: Specify the number of columns
	66	Function 066	PDF417: Specify the number of rows
	67	Function 067	PDF417: Specify the width of module
	68	Function 068	PDF417: Specify the module height
	69	Function 069	PDF417: Specify the error correction level
	70	Function 070	PDF417: Specify the option
	80	Function 080	PDF417: Store the received data in the symbol storage area
	81	Function 081	PDF417: Print the symbol data in the symbol storage area

cn	fn	Function	
49	65	Function 165	QR CODE: Select the module
	67	Function 167	QR CODE: Select the size of module
	69	Function 169	QR CODE: Select the error correction level
	80	Function 180	QR CODE: Store the data in the symbol storage area
	81	Function 181	QR CODE: Print the data in the symbol storage area
50	65	Function 265	MAXI CODE: Select the mode
	80	Function 280	MAXI CODE: Store the data in the symbol storage area
	81	Function 281	MAXI CODE: Print the symbol data saved in The symbol storage area
51	67	Function 367	DATAMATRIX: Select the size of module
	80	Function 380	DATAMATRIX: Store the symbol data in the symbol storage area
	81	Function 381	DATAMATRIX: Print the symbol data in the storage area
52	65	Function 465	GS1 DATABAR: Select the type of GS1 barcode to generate.
	66	Function 466	GS1 DATABAR: Select the size of module.
	68	Function 468	GS1 DATABAR: Specify the module height
	70	Function 470	GS1 DATABAR: Specify the height of separator between 2D and 1D barcode symbol.
	80	Function 480	GS1 DATABAR: Store the data in the symbol storage area.
	81	Function 481	GS1 DATABAR: Print the data in the symbol storage area.
53	65	Function 565	AZTEC CODE: module size selection.
	66	Function 566	AZTEC CODE: error level setting
	67	Function 567	AZTEC CODE: mode selection
	80	Function 580	AZTEC CODE: saving of symbol data in storage area.
	81	Function 581	AZTEC CODE: Print the data in the symbol storage area.

Remarks: None

Differences: None

<Function 065> GS (k pL pH cn fn n (fn=65)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n
Hex	1D	28	6B	03	00	30	41	n
Decimal	29	40	107	3	0	48	65	n

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=48, fn=65
0 ≤ n ≤ 30

Default:

n=0

Description:

■ This command specifies the number of columns in the data area of PDF417.
- When n=0, automatic processing is set
- When n is not 0, the number of columns of the data area is set to n code word.

Remarks:

■ Settings of this command affect the processing of Functions 081.
■ With auto processing (n=0) specified, the maximum number of columns in the data area is set to 30 columns.
■ The following data is excluded from the number of columns:
- Start and stop patterns
- Indicator code word of left and right

■ With auto processing (n=0) specified, the number of columns is calculated using the following information.
- Printing area when processing Functions 081
- Module width (Function 067)
- Option setting (Function 070)

■ The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences:

None

<Function 066> GS (k pL pH cn fn n (fn=66)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n
Hex	1D	28	6B	03	00	30	42	n
Decimal	29	40	107	3	0	48	66	n

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=48, fn=66
n=0, 3 ≤ n ≤ 90

Default:

n=0

Description:

■ This command specifies the number of rows in the data area of PDF417.
- When n=0, automatic processing is set
- When n is not 0, the number of rows is set to n rows.

Remarks:

■ Settings of this function affect the processing of Functions 081.
■ With auto processing (n=0) specified, the maximum number of rows is set to 90.
■ With auto processing (n=0) specified, the number of rows is calculated by using the following information:
- Printing area when processing Functions 081
- Module height (Function 068)

■ The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences:

None

<Function 067> GS (k pL pH cn fn n (fn=67)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n
Hex	1D	28	6B	03	00	30	43	n
Decimal	29	40	107	3	0	48	67	n

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=48
fn=67
2 ≤ n ≤ 3

Default:

n=3

Description:

This command sets the width of the module of PDF417 symbol to n dots.

Remarks:

- Settings of this command affect the processing of Functions 081.
- The setting unit for printer models varies.
- The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences:

- Setting unit(1 dot): 0,125 mm(1/203 inch)

<Function 068> GS (k pL pH cn fn n (fn=68)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n
Hex	1D	28	6B	03	00	30	44	n
Decimal	29	40	107	3	0	48	68	n

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=48
fn=68
2 ≤ n ≤ 8

Default:

n=3

Description:

This command sets the module height of PDF417 to [the module width x n]

Remarks:

- Settings of this command affect the processing of Functions 081.
- The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences:

None

<Function 069> GS (k pL pH cn fn m n (fn=69)

Code:

ASCII	GS	(	k	pL	pH	Cn	fn	m	n
Hex	1D	28	6B	04	00	30	45	m	n
Decimal	29	40	107	4	0	48	69	m	n

Range:

(pL + pH x 256) = 4 (pL=4, pH=0)
cn=48
fn=69
m=48
48 ≤ n ≤ 56
0≤n≤8

Default: None

Description:

■ This command specifies the error correction level for PDF417.
  • The error correction level is set by “level”

Remarks:

■ Settings of this function affect the processing of Functions 081.
■ Error correction level specified by “level” (m=48) is as follows:
The number of the error correction codeword is unchanged regardless of the number of codeword in the data area.

n	Function	Number of error correction codeword
48	Error correction level 0	2
49	Error correction level 1	4
50	Error correction level 2	8
51	Error correction level 3	16
52	Error correction level 4	32
53	Error correction level 5	64
54	Error correction level 6	128
55	Error correction level 7	256
56	Error correction level 8	512

■ The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences: None

<Function 070> GS (k pL pH cn fn m (fn=70)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	m
Hex	1D	28	6B	03	00	30	46	m
Decimal	29	40	107	3	0	48	70	m

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=48
fn=70
m=0,1

Default:

m=0

Description:

This command selects the option for PDF417.

m	Function
0	Select the standard PDF417
1	Select the simplified PDF417

Remarks:

- Settings of this function affect the processing of Functions 081.
- When simplified PDF417 symbol is canceled, standard PDF417 symbol is automatically selected.
- The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences:

None

<Function 080> GS (k pL pH cn fn m d1...dk (fn=80)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	m	d1...dk
Hex	1D	28	6B	pL	pH	30	50	30	d1...dk
Decimal	29	40	107	pL	pH	48	80	48	d1...dk

Range:

4 ≤ (pL + pH x 256) ≤ 65535 (0 ≤ pL ≤ 255, 0 ≤ pH ≤ 255)
cn=48
fn=80
m=48
0 ≤ d ≤ 255
k = (pL + pH x 256) – 3

Default: None

Description: This command stores the PDF417 symbol data (d1...dk) in the symbol storage area.

Remarks:

- The data stored in the symbol storage area by this command remains reserved after processing Function 081.
- The following data should not be included in the symbol data d1..dk since this information is automatically added by the printer:
  - Start pattern and stop pattern.
  - Indicator codeword of left and right.
  - The descriptor of symbol length. (the first code word in the data area)
  - The error correction codeword calculated by modulus 929.
- The setting of this command remains effective until the following processing is performed:
  - Executing Function 080
  - Executing ESC @
  - Executing printer reset or power-off

Differences: None

<Function 081> GS (k pL pH cn fn m (fn=81)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	m
Hex	1D	28	6B	03	00	30	51	m
Decimal	29	40	107	3	0	48	81	m

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=48
fn=81
m=48

Default:

None

Description:

This command encodes and prints the PDF417 symbol data in the symbol save area.

Remarks:

- In standard mode, this command is available only when printer is at the beginning of a line or the printer buffer is empty.
- A symbol exceeding the printing area in size can not be printed.
- Printing operation is not processed under the following conditions:
  - There is no data (Function 080 is not processed).
  - If [(number of columns x number of rows) < number of code word] when automatic processing is specified for number of columns and number of rows.
  - Number of code word exceeds 928 in the data area.
- The following data is added automatically by the encode processing:
  - Start pattern and stop pattern.
  - Indicator code word of left and right.
  - The descriptor of symbol length. (the first code word in the data area)
  - The error correction code word calculated by modulus 929.
  - Pad codeword.

■ The data area includes the following codewords:
- Data specified by Function 080.
- The descriptor of symbol length. (the first code word in the data area)
- The error correction code word calculated by modulus 929.
- Pad codeword.

■ When automatic processing (Function 065) is specified, the number of columns is calculated using the following information:
- Current printing area
- Module width (Function 067)
- Option setting (Function 070)
- Codeword in the data area
- The maximum number of columns is 30.

■ When auto processing (Function 066) is specified in page mode, the number of rows is calculated using the following information:
- Current printing area
- Module height (Function 068)
- Codeword in the data area
- The maximum number of rows is 90.

■ Except for character size and upside-down printing mode, none of print mode such as emphasized, double-strike, etc, affects the printing of the symbol.

■ In standard mode, the paper feed amount set by the paper feed setting command does not affect printing of the symbol. The printing position returns to the left side of the printable area after printing the symbol.

■ In page mode, the printer stores the symbol data in the print buffer without executing actual printing.

■ The quiet zone is not included in the printing data. Be sure to include the adequate quiet zone for executing of this command.
- The quiet zone means the spaces surrounding the symbol such as upper, lower, left, and right spaces.

Differences: None

Example:

■ Input:

0x1d 0x28 0x6b 0x03 0x00 0x30 0x41 0x00
0x1d 0x28 0x6b 0x03 0x00 0x30 0x42 0x00
0x1d 0x28 0x6b 0x03 0x00 0x30 0x43 0x03
0x1d 0x28 0x6b 0x03 0x00 0x30 0x44 0x03
0x1d 0x28 0x6b 0x04 0x00 0x30 0x45 0x30 0x32
0x1d 0x28 0x6b 0x03 0x00 0x30 0x46 0x00
0x1d 0x28 0x6b 0x19 0x00 0x30 0x50 0x30
0x68 0x74 0x74 0x70 0x3A 0x2F 0x2F 0x77 0x77 0x77 0x2E
0x62 0x69 0x78 0x6F 0x6C 0x6F 0x6E 0x2E 0x63 0x6F 0x6D
0x1d 0x28 0x6b 0x03 0x00 0x30 0x51 0x30
0x0a

■ Output:



<Function 165> GS (k pL pH cn fn n1 n2 (fn=65)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n1	n2
Hex	1D	28	6B	04	00	31	41	n1	n2
Decimal	29	40	107	4	0	49	65	n1	n2

Range:

(pL + pH x 256) = 4 (pL=4, pH=0)
cn=49
fn=65
n1 = 49, 50
n2 =0

Default:

n1=50, n2 =0

Description:

This command sets the QR Code model as follows:

n1	Function
49	Model 1
50	Model 2

Remarks:

- The setting of this command affects <Function 181>.
- The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences:

None

<Function 167> GS (k pL pH cn n (fn=67)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n
Hex	1D	28	6B	03	00	31	43	n
Decimal	29	40	107	3	0	49	67	n

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=49
fn=67
0<n<9

Default:

n=3

Description:

This command sets the size of the QR Code module to n dots.

Remarks:

- The setting of this command affects the processing of <Function 181>.
- Since the QR CODE module is square, n = module width = module height
- The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences:

None

<Function 169> GS (k pL pH cn n (fn=69)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n
Hex	1D	28	6B	03	00	31	45	n
Decimal	29	40	107	3	0	49	69	n

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=49
fn=69
48≤n≤51

Default:

n=48

Description:

This command sets the error correction level for QR Code.

n	Function	Recovery Amount (%)
48	Error Correction Level L	7
49	Error Correction Level M	15
50	Error Correction Level Q	25
51	Error Correction Level H	30

Remarks:

- The setting of this command affects the processing of <Function 181>.
- Reed-Solomon correction is employed to generate a series of error correction codewords.
- The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences:

None

<Function 180> GS (k pL pH cn fn m d1...dk (fn=80)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	m	d1...dk
Hex	1D	28	6B	pL	pH	31	50	30	d1...dk
Decimal	29	40	107	pL	pH	49	80	48	d1...dk

Range:

4 ≤ (pL + pH x 256) ≤7092 (0 ≤ pL ≤ 255, 0 ≤ pH ≤ 27)
cn=49
fn=80
m=48
0 ≤ d ≤ 255
k = (pL + pH x 256) – 3

Default: None

Description: This command saves symbol data of the QR Code to the symbol storage area.

Remarks:

■ The symbol data is defined, stored to the symbol storage area by Function 180 and printed by the specification of Function 181. The data remains reserved after completion of printing.

■ The following shows the data available for encoding of QR code.

Character Type	Usable Characters
Numeric Data	“0” ~ “9”
Alphanumeric Data	“0” ~ “9”, “A” ~ “Z”, SP, $, %, *, +, -, ., /, :
Kanji Data	Shift JIS value
8bit Byte Data	00H ~ FFH

■ The setting of this command remains effective until the following processing is performed:

- Performing Function 180
- Performing ESC @
- Performing the printer reset or power-off

Differences: None

<Function 181> GS (k pL pH cn fn m (fn=81)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	m
Hex	1D	28	6B	03	00	31	51	m
Decimal	29	40	107	3	0	49	81	m

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=49
fn=81
m=48

Default:

None

Description:

This command encodes and prints QR Code symbol data saved in the symbol storage area.

Remarks:

■ In standard mode, this command is available only when printer is at the beginning of a line or the printer buffer is empty.
■ A symbol exceeding the printing area in size can not be printed.
■ Printing operation is not processed under the following conditions:
  • There is no data. (Function 180 is not executed)
  • If [(number of columns x number of rows) < number of code words], the numbers of columns and rows are automatically processed.
  • The four types of data compression modes are listed below. According to the symbol data in the data storage area, automatically selects the best suitable compression mode.
    *Numeric Data Code
    *Alphanumeric Data mode
    *Kanji Data mode
    *8 bit Data mode

■ The following data is automatically added by the encoding processing:
- Position sensor pattern
- Segregator for the position sensor pattern
- Timing pattern
- Format information
- Version information
- Error correction code text
- Pad code text
- Indicator for counting bits of bytes
- Mode indicator
- Concluder
- Queue pattern (when model 2 is selected)
- Expansion pattern (when model 1 is selected)

■ Except for character size and upside-down printing mode, none of print mode such as emphasized, double-strike, etc, affects the printing of the symbol.

■ In standard mode, the paper feed amount set by the paper feed setting command does not affect printing of the symbol. The printing position returns to the left side of the printable area after printing the symbol.

■ In page mode, the printer stores the symbol data in the print buffer without executing actual printing.

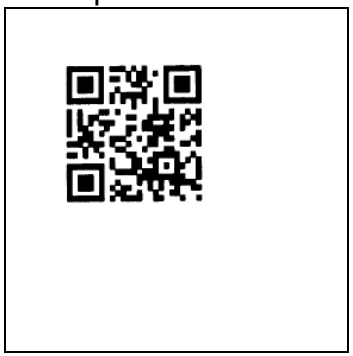
■ The quiet zone is not included in the printing data. Be sure to include the adequate quiet zone for executing of this command.

Differences: None

Example: ■ Input:

```
0x1d 0x28 0x6b 0x04 0x00 0x31 0x41 0x32 0x00
0x1d 0x28 0x6b 0x03 0x00 0x31 0x43 0x05
0x1d 0x28 0x6b 0x03 0x00 0x31 0x45 0x31
0x1d 0x28 0x6b 0x19 0x00 0x31 0x50 0x30
0x68 0x74 0x74 0x70 0x3A 0x2F 0x2F 0x77 0x77 0x77 0x2E
0x62 0x69 0x78 0x6F 0x6C 0x6F 0x6E 0x2E 0x63 0x6F 0x6D
0x1d 0x28 0x6b 0x03 0x00 0x31 0x51 0x30
0x0a
```

■ Output:



<Function 265> GS (k pL pH cn fn n1 n2 (fn=65)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n
Hex	1D	28	6B	03	00	32	41	n
Decimal	29	40	107	3	0	50	65	n

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=50
fn=65
50 ≤ n ≤ 52

Default:

n = 50

Description:

This command selects the mode for Maxi Code

n	**Function**
50	Mode 2 Setting
51	Mode 3 Setting
52	Mode 4 Setting

Remarks:

- The setting of this command affects <Function 281>.
- The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences:

None

<Function 280> GS (k pL pH cn fn m d1...dk (fn=80)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	m	d1...dk
Hex	1D	28	6B	pL	pH	32	50	30	d1...dk
Decimal	29	40	107	pL	pH	50	80	48	d1...dk

Range:

4 ≤ (pL + pH x 256) ≤ 141 (4 ≤ pL ≤141, 0 ≤ pH ≤0)
cn=50
fn=80
m=48
0 ≤ d ≤ 255
k = (pL + pH x 256) – 3

Default: None

Description: This command stores Maxi Code symbol data in the symbol storage area.

Remarks:

■ The data stored in the symbol storage area by this command is processed by Functions 281 and 282. The data remains reserved in the storage.
■ The setting of this command remains effective until the following processing is performed:
- Performing Function 280
- Performing ESC @
- Performing the printer reset or power-off

Differences: None

<Function 281> GS (k pL pH cn fn m (fn=81)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	m
Hex	1D	28	6B	03	00	32	51	m
Decimal	29	40	107	3	0	50	81	m

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=50
fn=81
m=48

Default:

None

Description:

This command encodes and prints Maxi Code symbol data saved in the storage area.

Remarks:

■ In standard mode, this command is available only when printer is at the beginning of a line or the printer buffer is empty.
■ A symbol exceeding the printing area in size can not be printed.
■ Printing operation is not processed under the following conditions:
- There is no data. (Function 280 is not executed)
- The number of numeric characters exceeds 138
- The number of alphanumeric characters exceeds 93
- When mode 2 is selected, the primary message does not include all of the following:

Primary Message	Data Number	Character
Postal code	1~9	Numeric
ISO country code	1~3	Numeric
Service type code	1~3	Numeric

- When mode 3 is selected, the primary message does not include all of the following:

Primary Message	Data Number	Character
Postal code	1~6	Setting Code A
ISO country code	1~3	Numeric
Service type code	1~3	Numeric

■ Modes 2 and 3 are executed according to the following procedures:
(RS, GS indicates the control code of MAXI CODE. y indicates the 2-byte numeric data.)

a) 9-byte data including ” [)>”,”RS”,”01”,”GS”,”yy” are regarded as the Header.
- The next data following the Header is the Primary Message.
- When printing, the Header is placed at the beginning of the Secondary Message.

b) When Header data is absent, the data is regarded as Primary Message.
c) In the Primary Message, GS is used as the separator that divides message into Postal code, ISO country code, and Class of service. This GS is ignored.
d) All data of the Secondary Message is regarded as symbol data.

■ In mode 4, 5, 6, all of the data in the symbol storage area is regarded as Primary Message and Secondary Message.
■ For error correction codeword, the Reed-Solomon algorithm is employed.
■ The following data is automatically added during the encoding process:
- Position sensor pattern
- Position pattern
- Error correction code text
- Mode separator
- Pad code text

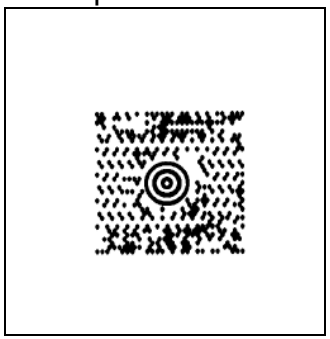
■ In standard mode, the paper feed amount set by the paper feed setting command does not affect printing of the symbol. The printing position returns to the left side of the printable area after printing the symbol.
■ In page mode, the printer stores the symbol data in the print buffer without executing actual printing.
■ The quiet zone is not included in the printing data. Be sure to include the adequate quiet zone for executing of this command.

Differences: None

Example: ■ Input:

```
0x1d 0x28 0x6b 0x03 0x00 0x32 0x41 0x34
0x1d 0x28 0x6b 0x19 0x00 0x32 0x50 0x30
0x68 0x74 0x74 0x70 0x3A 0x2F 0x2F 0x77 0x77 0x77 0x2E
0x62 0x69 0x78 0x6F 0x6C 0x6F 0x6E 0x2E 0x63 0x6F 0x6D
0x1d 0x28 0x6b 0x03 0x00 0x32 0x51 0x30
0x0a
```

■ Output:



<Function 367> GS (k pL pH cn n (fn=67)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n
Hex	1D	28	6B	03	00	33	43	n
Decimal	29	40	107	3	0	51	67	n

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=51
fn=67
2 ≤ n ≤ 3

Default:

n=3

Description:

This command sets the DATAMATRIX Code size.

Remarks:

- This command affects the execution of <Function 381>.
- The setting of this command remains effective until ESC @, printer reset or power cycling is executed.
- Since the DATAMATRIX Code module is square, n = module width = module height.

Differences:

None

<Function 380> GS (k pL pH cn fn m d1...dk (fn=80)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	m	d1...dk
Hex	1D	28	6B	pL	pH	33	50	30	d1...dk
Decimal	29	40	107	pL	pH	51	80	48	d1...dk

Range:

0 ≤ (pL + pH x 256) ≤ 3116 (0≤ pL ≤255, 0 ≤ pH ≤13)
cn=51
fn=80
m=48
0 ≤ d ≤ 255
k = (pL + pH x 256) – 3

Default:

None

Description:

This command stores DATAMATRIX symbol data in the symbol storage area.

Remarks:

- The data stored to the symbol storage area by this command is executed by Function 381. The data remains reserved in the symbol storage area.
- The setting of this command remains effective until the following processing is performed:
  - Performing Function 380
  - Performing ESC @
  - Performing the printer reset or power-off

Differences:

None

<Function 381> GS (k pL pH cn fn m (fn=81)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	m
Hex	1D	28	6B	03	00	33	51	m
Decimal	29	40	107	3	0	51	81	m

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=51
fn=81
m=48

Default:

None

Description:

This command encodes and prints DATAMATRIX symbol data saved in the storage area.

Remarks:

- In standard mode, this command is available only when printer is at the beginning of a line or the printer buffer is empty.
- A symbol exceeding the printing area in size can not be printed.
- Printing operation is not processed under the following conditions:
  - There is no data. (Function 380 cannot be executed)
  - The number of alphanumeric characters exceeds 2334.
  - The number of 8bit byte characters exceeds 1558.
  - The number of numeric characters exceeds 3116.
- DATAMATRIX uses ECC 200 symbols.
- For error correction codeword, the Reed-Solomon algorithm is employed.
- The following data is automatically added during the encoding process:
  - Position pattern
  - Error correction code text
  - Mode separator
  - Pad code text

■ In standard mode, the paper feed amount set by the paper feed setting command does not affect printing of the symbol. The printing position returns to the left side of the printable area after printing the symbol.
■ In page mode, the printer stores the symbol data in the print buffer without executing actual printing.
■ The quiet zone is not included in the printing data. Be sure to include the adequate quiet zone for executing of this command.

Differences: None

Example:

■ Input:

```
0x1d 0x28 0x6b 0x03 0x00 0x33 0x43 0x05
0x1d 0x28 0x6b 0x1b 0x00 0x33 0x50 0x30
0x5a 0x51 0x31 0x31 0x30 0x5f 0x5a 0x65 0x62 0x72
0x61 0x20 0x54 0x65 0x63 0x68 0x6e 0x6f 0x6c 0x6f
0x67 0x69 0x65 0x73
0x1d 0x28 0x6b 0x03 0x00 0x33 0x51 0x30
0x0a
```

■ Output:



<Function 465> GS (k pL pH cn fn n (fn=65)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n
Hex	1D	28	6B	03	00	34	41	n
Decimal	29	40	107	3	0	52	65	n

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=52
fn=65
50 ≤ n ≤ 61

Default:

n=50.

Description:

Selects the GS1 Databar

Remarks:

n	Function
50	RSS14 (GS1 DataBar Omnidirectional)
51	RSS14 Truncated (GS1 DataBar Truncated)
52	RSS14 Stacked (GS1 DataBar Stacked)
53	RSS14 Stacked Omnidirectional (GS1 DataBar Stacked Omnidirectional)
56	UPC-A
57	UPC-E
58	EAN-13
59	EAN-8
60	UCC/EAN-128&CC-A/B
61	UCC/EAN-128&CC-C

■ The setting of this command affects <Function 480> and <Function 481>
■ The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences:

None

<Function 466> GS (k pL pH cn fn n (fn=66)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n1	n2
Hex	1D	28	6B	03	00	34	42	n1	n2
Decimal	29	40	107	3	0	52	66	n1	n2

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=52
fn=66
1 ≤ n1 ≤ 8, 1 ≤ n2 ≤ 8

Default:

n1=2
n2=2

Description:

Set the size of .the GS1 DataBar module height to n1, width to n2 dots.

Remarks:

- The setting of this command affects <Function 480> and <Function 481>
- The setting of this command remains effective until Esc @, printer reset or power cycling is executed

Differences:

None

<Function 468> GS (k pL pH cn fn n (fn=68)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n
Hex	1D	28	6B	03	00	34	44	n
Decimal	29	40	107	3	0	52	68	n

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=52
fn=68
1 ≤ n ≤ 255

Default:

n = 32

Description:

Set the module segment height of UCC/EAN-128 barcode type.
This settings will be effective only UCC/EAN-128 barcode type.

Remarks:

- The setting of this command affects <Function 480> and <Function 481>
- The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences:

None

<Function 470> GS (k pL pH cn fn n (fn=70)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n
Hex	1D	28	6B	03	00	34	46	n
Decimal	29	40	107	3	0	52	70	n

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=52
fn=70
1 ≤ n ≤ 2

Default:

n=2

Description:

Specify the height of separator between 2D and 1D barcode symbol.

Remarks:

- The setting of this command affects <Function 480> and <Function 481>
- The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences:

None

<Function 480> GS (k pL pH cn fn m d1...dk (fn=80)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	m	d1...dk
Hex	1D	28	6B	pL	pH	34	50	30	d1...dk
Decimal	29	40	107	pL	pH	52	80	48	d1...dk

Range:

0 ≤ (pL + pH x 256) ≤ 215 (0≤ pL ≤215, pH = 0)
cn=52
fn=80
m=48
0 ≤ d ≤ 255
k = (pL + pH x 256) – 3
Data format : number1...numberN|character1...characterN

Barcode	NumberN	ChracterN
GS1 DataBar Omnidirectional	0 ≤ numberN ≤ 13	0 ≤ chracterN ≤ 164
GS1 DataBar Truncated	0 ≤ numberN ≤ 13	0 ≤ chracterN ≤ 164
GS1 DataBar Stacked	0 ≤ numberN ≤ 13	0 ≤ chracterN ≤ 45
GS1 DataBar Stacked Omnidirectional	0 ≤ numberN ≤ 13	0 ≤ chracterN ≤ 45
UPC-A	0 ≤ numberN ≤ 12	0 ≤ chracterN ≤ 164
UPC-E	0 ≤ numberN ≤ 12	0 ≤ chracterN ≤ 46
EAN-13	0 ≤ numberN ≤ 12	0 ≤ chracterN ≤ 164
EAN-8	0 ≤ numberN ≤ 12	0 ≤ chracterN ≤ 106
UCC/EAN-128&CC-A/B	0 ≤ numberN ≤ 48	0 ≤ chracterN ≤ 164
UCC/EAN-128&CC-C	0 ≤ numberN ≤ 48	0 ≤ chracterN ≤ 164

Default:

None

Description:

Store GS1 DataBar symbol data in the symbol storage area.

Remarks:

- The data stored to the symbol storage area by this command is executed by Function 481. The data remains reserved in the symbol storage area.
- Encodes a Global Trade Item Number(GTIN) and AI's(Application Identifiers)

- GS1 DataBar holds a 14-digit number.
- GS1 DataBar can carry GTIN-12, GTIN-13 & GTIN-14
- Numeric character(0-9) – No alpha numeric, no special characters.
  Fiex data length – 14digits(encodes 13 with an implied check digit) AI(01) is implied.
  Limeted to GTIN-12, 13 and GTIN-14 with indicator digit 1 only(no other number can be used as an indicator digit)
- The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences: None

<Function 481> GS (k pL pH cn fn m (fn=81)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	m
Hex	1D	28	6B	03	00	34	51	m
Decimal	29	40	107	3	0	52	81	m

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=52
fn=81
m=48

Default:

None

Description:

This command encodes and prints GS1 DataBar symbol data saved in the storage area.

Remarks:

- In standard mode, this command is available only when printer is at the beginning of a line or the printer buffer is Empty.
- A symbol exceeding the printing area in size can not be printed.
- In standard mode, the paper feed amount set by the paper feed setting command does not affect printing of the symbol. The printing position returns to the left side of the printable area after printing the symbol.
- In page mode, the printer stores the symbol data in the print buffer without executing actual printing.

Differences:

None

Example:

- Input:

0x1d 0x28 0x6b 0x03 0x00 0x34 0x41 0x32
0x1d 0x28 0x6b 0x03 0x00 0x34 0x42 0x02 0x02
0x1d 0x28 0x6b 0x03 0x00 0x34 0x43 0x22
0x1d 0x28 0x6b 0x03 0x00 0x34 0x44 0x32
0x1d 0x28 0x6b 0x03 0x00 0x34 0x46 0x02
0x1d 0x28 0x6b 0x25 0x00 0x34 0x50 0x30 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30 0x31 0x7C 0x74 0x68 0x69 0x73 0x20 0x69 0x73 0x20 0x63 0x6F 0x6D 0x70 0x6F 0x73 0x69 0x74 0x65 0x20 0x69 0x6E 0x66 0x6F
0x1d 0x28 0x6b 0x03 0x00 0x34 0x51 0x30

■ Output:



<Function 565> GS (k pL pH cn fn n (fn=65)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n
Hex	1D	28	6B	03	00	35	41	n
Decimal	29	40	107	3	0	53	65	n

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=53
fn=65
1 ≤ n ≤ 8

Default:

n=2

Description:

Set the size of .the Aztec barcode module to n dots.

Remarks:

- The setting of this command affects <Function 580> and <Function 581>
- The setting of this command remains effective until Esc @, printer reset or power cycling is executed

Differences:

None

<Function 566> GS (k pL pH cn fn n (fn=66)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n
Hex	1D	28	6B	03	00	34	46	n
Decimal	29	40	107	3	0	52	70	n

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=53
fn=66
48 ≤ n ≤ 51

Default:

n=49

Description:

Sets the error correction level of the AZTEC code

n	Function	Recovery Amount (%)
48	Error Correction Level L	10
49	Error Correction Level M	23
50	Error Correction Level Q	36
51	Error Correction Level H	50

■ The setting of this function impacts the execution of <Function 581>.
■ This function is effective until ESC @ is executed or the printer power is turned off.

Remarks:

None

Differences:

None

<Function 567> GS (k pL pH cn fn n (fn=67)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	n
Hex	1D	28	6B	03	00	35	43	n
Decimal	29	40	107	3	0	53	67	n

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=53
fn=67
0 ≤ n ≤ 2

Default:

n=0

Description:

Set the mode of .the Aztec barcode module.

Remarks:

- n=0 : data mode, n=1 : gs1 mode, n=2 : unicode mode.
- In gs1 mode, Extended ASCII characters and control characters are not suppored.
- In gs1 mode, data should start with an AI.
- In unicode mode, only latin-1 characters are supported.
- The setting of this command affects <Function 580> and <Function 581>
- The setting of this command remains effective until Esc @, printer reset or power cycling is executed.

Differences:

None

<Function 580> GS (k pL pH cn fn m d1…dk (fn=80)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	m	d1...dk
Hex	1D	28	6B	pL	pH	35	50	30	d1...dk
Decimal	29	40	107	pL	pH	53	80	48	d1...dk

Range:

0 ≤ (pL + pH x 256) ≤ 3803 (0 ≤ pL ≤ 255, 0 ≤ pH ≤ 14)
cn=53
fn=80
m=48
0 ≤ d ≤ 255
k = (pL + pH x 256) - 3

Default:

None

Description:

Store Aztec barcode symbol data in the symbol storage area.

Remarks:

- The data stored to the symbol storage area by this command is executed by Function 581. The data remains reserved in the symbol storage area.
- Digits only : maximum capacity 3800 digits.
- Alphanumeric text : maximum capacity 300 characters.
- Byte values : maximum capacity 1900 bytes.

Differences:

None

<Function 581> GS (k pL pH cn fn m (fn=81)

Code:

ASCII	GS	(	k	pL	pH	cn	fn	m
Hex	1D	28	6B	03	00	35	51	m
Decimal	29	40	107	3	0	53	81	m

Range:

(pL + pH x 256) = 3 (pL=3, pH=0)
cn=53
fn=81
m=48

Default:

None

Description:

This command encodes and prints Aztec barcode symbol data saved in the storage area.

Remarks:

- In standard mode, this command is available only when printer is at the beginning of a line or the printer buffer is empty.
- A symbol exceeding the printing area in size can not be printed.
- In standard mode, the paper feed amount set by the paper feed setting command does not affect printing of the symbol. The printing position returns to the left side of the printable area after printing the symbol.
- In page mode, the printer stores the symbol data in the print buffer without executing actual printing.

Differences:

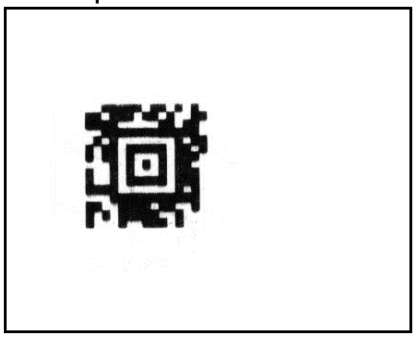
None

Example:

- Input:

0x1d 0x28 0x6b 0x03 0x00 0x35 0x41 0x03
0x1d 0x28 0x6b 0x03 0x00 0x35 0x42 0x02
0x1d 0x28 0x6b 0x03 0x00 0x35 0x43 0x01
0x1d 0x28 0x6b 0x0b 0x00 0x35 0x50 0x30 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38
0x1d 0x28 0x6b 0x03 0x00 0x35 0x51 0x30

■ Output:



GS (L, GS 8 L

Function: **Select graphics data**

Code:

ASCII	GS	(	L	pL	pH	m	fn	[parameter]
Hex	1D	28	4C	pL	pH	m	fn	[parameter]
Decimal	29	40	76	pL	pH	m	fn	[parameter]

ASCII	GS	8	L	p1	p2	p3	p4	m	fn	[parameter]
Hex	1D	38	4C	p1	p2	p3	p4	m	fn	[parameter]
Decimal	29	56	76	p1	p2	p3	p4	m	fn	[parameter]

Range: None

Default: None

Description: This command processes graphics data according to the function code (fn).

fn	Format	Function No.	Function
0, 48	GS (L pL pH m fn	Function 48	Transmits the NV graphics memory capacity.
2, 50	GS (L pL pH m fn	Function 50	Prints the graphics data in the print buffer.
3, 51	GS (L pL pH m fn	Function 51	Transmits the remaining capacity of the NV graphics memory.
64	GS (L pL pH m fn d1 d2	Function 64	Transmits the defined NV graphics key code list.
65	GS (L pL pH m fn d1 d2 d3	Function 65	Deletes all NV graphics data.
66	GS (L pL pH m fn kc1 kc2	Function 66	Deletes the specified NV graphics data.
67	GS (L pL pH m fn a kc1 kc2 b xL xH yL yH [c d1...dk]1...[c d1 dk]b	Function 67	Defines the raster graphics data in the non-volatile memory.
69	GS (L pL pH m fn kc1 kc2 x y	Function 69	Prints the specified NV graphics data.
112	GS (L pL pH m fn a bx by c xL xH yL yH d1...dk	Function 112	Stores the raster graphics data in the print buffer memory.

Remarks:

- This command is adapted to print image data.
- pL, pH specifies the number of bytes following pH using (pL + pH x 256).
- Since frequent writing operation could cause the damage to the NV memory, it is recommended to write only when being required.
- While storing data by this command, the printer is in BUSY state where receiving of data is not available. Therefore, it is not recommended to send data during this process.
- The real time commands and ASB operations are not allowed during NV memory operation process.

Differences: None

<Function 48> GS (L pL pH m fn (fn=0, 48)

Code:

ASCII	GS	(	L	pL	pH	m	fn
Hex	1D	28	4C	pL	pH	m	fn
Decimal	29	40	76	pL	pH	m	fn

Range:

(pL + pH x 256) = 2 (pL=2, pH=0)
m=48, fn=0, 48

Default:

None

Description:

■ Transmits the total capacity of the NV bit-image memory (number of bytes in the memory area).

	Hexadecimal	**Decimal**	**Amount of Data**
Header	37H	55	1 byte
Flag	30H	48	1 byte
Data	30H - 39H	48 - 57	1 - 8 bytes
NUL	00H	0	1 byte

■ The total capacity data is converted to character codes corresponding to decimal data, then transmitted from the MSB.

Remarks:

None

Differences:

■ This command is available in both standard and page modes.

<Function 50> BS ^ L pL pH fn (fn=2, 50)

Code:

ASCII	GS	(	L	pL	pH	m	fn
Hex	1D	28	4C	pL	pH	m	fn
Decimal	29	40	76	pL	pH	m	fn

Range: (pL + pH x 256) = 2 (pL=2, pH=0)
m=48, fn=2, 50

Default: None

Description: This command prints the graphics data defined by the process of Function 112.

Remarks:
- The graphics data stored in the printer buffer is printed.
- This command is available in standard mode, not in page mode.
- The graphics data is defined by Function 112.
- The required amount of line feed pitch is used for printing graphics data, regardless of the existing setting value of the pitch.

Differences:
- This command is available in both standard and page modes.

<Function 51> GS (L pL pH m fn (fn=3, 51)

Code:

ASCII	GS	(	L	pL	pH	m	fn
Hex	1D	28	4C	pL	pH	m	fn
Decimal	29	40	76	pL	pH	m	fn

Range:

(pL + pH x 256) = 2 (pL=2, pH=0)
m=48, fn=3, 51

Default:

None

Description:

■ Transmits the number of bytes of remaining memory (unused area) in the NV user memory.

	Hexadecimal	**Decimal**	**Amount of Data**
Header	37H	55	1 byte
Flag	31H	49	1 byte
Data	30H – 39H	48 - 57	1 - 8 bytes
NUL	00H	0	1 byte

■ The number of bytes of remaining memory is converted to character codes corresponding to decimal data, then transmitted from the MSB.

■ The data length is variable.

Remarks:

None

Differences:

None

<Function 64> GS (L pL pH m fn d1 d2 (fn=64)

Code:

ASCII	GS	(	L	pL	pH	m	fn	d1	d2
Hex	1D	28	4C	pL	pH	m	fn	d1	d2
Decimal	29	40	76	pL	pH	m	fn	d1	d2

Range:

(pL + pH x 256) = 4 (pL=4, pH=0)
m=48
fn=64
d1=75, d2=67

Default:

None

Description:

■ Transmits the defined NV graphics key code list.
- When the key code is present :

	Hexadecimal	**Decimal**	**Amount of Data**
Header	37H	55	1 byte
Flag	72H	114	1 byte
Status	40H or 41H	64 or 65	1 byte
Data	30H - 39H	48 - 57	2 - 80 bytes
NUL	00H	0	1 byte

- When the key code is not present :

	Hexadecimal	**Decimal**	**Amount of Data**
Header	37H	55	1 byte
Flag	72H	114	1 byte
Status	40H	64	1 byte
NUL	00H	0	1 byte

■ If the number of the key code exceeds 40, the key code is transmitted dividing up to 40.
- The status if the continuous transmission data block is present is 41H.
- The status if the continuous transmission data block is not present is 40H.

■ After the [Header-NULL] is transmitted, the printer receives a response from the host; then it performs the process defined by the response. (See the tables below.)

- When the status (existence of the next data block) is Hexadecimal = 41H / Decimal = 65

Response		Process performed
ASCII	Decimal	
ACK	6	Transmits the next data.
NAK	21	Transmits the previous data again.
CAN	24	Ends the process.

- When the status (for the last data block) is Hexadecimal = 40H / 40H/Decimal = 64

Response		Process performed
ASCII	Decimal	
ACK	6	Ends the process.
NAK	21	Transmits the previous data again.
CAN	24	Cancels the process.

Remarks: None

Differences: None

<Function 65> GS (L pL pH m fn d1 d2 d3 (fn=65)

Code:

ASCII	GS	(	L	pL	pH	m	fn	d1	d2	d3
Hex	1D	28	4C	pL	pH	m	fn	d1	d2	d3
Decimal	29	40	76	pL	pH	m	fn	d1	d2	d3

Range:

(pL + pH x 256) = 5 (pL=5, pH=0)
m=48
fn=65
d1=67, d2=76, d3=82

Default:

None

Description:

This command removes all defined NV graphics data.

Remarks:

■ The graphics data is define by Function 67 into the NV graphics memory with the sector dedicated for storing NV graphics data.

Differences:

None

<Function 66> GS (L pL pH m fn kc1 kc2 (fn=66)

Code:

ASCII	GS	(	L	pL	pH	m	fn	kc1	kc2
Hex	1D	28	4C	pL	pH	m	fn	kc1	kc2
Decimal	29	40	76	pL	pH	m	fn	kc1	kc2

Range:

(pL + pH x 256) = 4 (pL=4, pH=0)
m=48
fn=66
32 ≤ kc1 ≤ 126
32 ≤ kc2 ≤ 126

Default: None

Description: This command deletes the NV graphics data corresponding to kc1 and kc2.

Remarks:

- The graphics data is define by Function 67.
- kc1 and kc2 is given to each of the graphics data groups to be stored into the NV graphics memory in the order of download.

Differences: None

<Function 67> GS (L pL pH m fn a kc1 kc2 b xL xH yL yH [c d1...dk]1...[c d1...dk]b (fn=67)

Code:

ASCII	GS	(	L	pL pH m fn a kc1 kc2 b xL xH yL yH [c d1...dk]1...[c d1...dk]b
Hex	1D	28	4C	pL pH m fn a kc1 kc2 b xL xH yL yH [c d1...dk]1...[c d1...dk]b
Decimal	29	40	76	pL pH m fn a kc1 kc2 b xL xH yL yH [c d1...dk]1...[c d1...dk]b

Range:

GS (L parameter
3 ≤ (pL + pH x 256) ≤ 65535 (0 ≤ pL ≤ 255, 0 ≤ pH ≤ 255)
[When using **GS 8 L**: 12 ≤ (**p1** + ≤256 + **p3** ≤65536 + **p4** ≤16777216) ≤253119]
m=48, fn=67, a=48, 32 ≤ kc1 ≤ 126, 32 ≤ kc2 ≤ 126, b=1, 2, 1 ≤ (xL + xH x 256) ≤ 384, 1 ≤ (yL + yH x 256) ≤ 1662
c=49, 0 ≤ d ≤ 255, k = (int ((xL + xH x 256) + 7) / 8) x (yL + yH x 256)

Default:

None

Description:

■ The total capacity of the NV graphic memory is only 256K bytes
■ Defines the raster graphics data in the NV graphics area.
- b specifies the number of the color of the defined data.
- xL, xH specifies the defined data in the horizontal direction to (xL + xH x 256) dots.
- xL, xH specifies the defined data in the vertical direction to (yL + yH x 256) dots.

- c specifies the color of the defined data.

C	Defined data color
49	Color 1

Remarks:

■ Color 1 means black

Differences:

■ Total capacity of the NV graphics memory:
• The total capacity of the NV graphics memory is 256K bytes.

<Function 69> GS (L pL pH m fn kc1 kc2 b x y (fn=69)

Code:

ASCII	GS	(	L	pL	pH	m	fn	kc1	kc2	x	y
Hex	1D	28	4C	pL	pH	m	fn	kc1	kc2	x	y
Decimal	29	40	76	pL	pH	m	fn	kc1	kc2	x	y

Range:

(pL + pH x 256) = 6 (pL=6, pH=0)
m=48, fn=69
32 ≤ kc1 ≤ 126
32 ≤ kc2 ≤ 126
x=1, 2
y=1, 2

Default: None

Description:

■ Prints the NV graphics data defined by the key codes kc1 and kc2. The graphics data is enlarged by x and y in the horizontal and vertical directions.

Remarks:

■ This command prints the NV graphics data defined by Function 67.
■ In page mode, this command is not effective.
■ NV graphics data beyond the print area for one line is not printed.

Differences:

■ This command is effective both in standard and page modes.

<Function 112> GS (L pL pH m fn a bx by c xL xH yL yH d1...dk (fn=112)

Code:

ASCII	GS	(	L	pL pH m fn a bx by c xL xH yL yH d1...dk
Hex	1D	28	4C	pL pH m fn a bx by c xL xH yL yH d1...dk
Decimal	29	40	76	pL pH m fn a bx by c xL xH yL yH d1...dk

Range:

- GS (L parameter
  11 ≤ (pL + pH x 256) ≤ 65535 (0 ≤ pL ≤ 255, 0 ≤ pH ≤ 255)
- Common parameter for GS (L
  m=48, fn=112, a=48
  bx=1, 2
  by=1, 2
  c=49
  1 ≤ (xL+xHx256) ≤ 384
  1 ≤ (yL + yH x 256) ≤ 1662 (when by = 1)
  k = (int ((xL + xH x 256) + 7) / 8) x (yL + yH x 256)

Default: None

Description:

■ This command stores the raster graphics data in the print buffer, enlarged by bx and by in the horizontal and vertical directions.

- xL, xH specifies the raster graphics data in the horizontal direction as (xL + xH x 256) dots.
- yL, yH specifies the raster graphics data in the vertical direction to (yL + yH x 256) dots.
- d denotes the stored data(raster format).
- k denotes the number of the graphics data.
- c specifies the color of the defined data.

c	Defined data color
49	Color 1
50	Color 2

- Color 1 means black, and Color 2 red or blue that is available for 2-color paper.

Remarks:

■ The graphics data is stored in the printer buffer directly.
■ Real time command is not effective during processing of this command.

GS :

Function: **Start/end macro definition**

Code:

ASCII	GS	:
Hex	1D	3A
Decimal	29	58

Range: None

Default: None

Description:
- This command starts or ends macro definition.

Remarks:
- The printer starts macro definition during normal operation and finishes it during macro definition upon receiving this command.
- The printer performs printing during macro definition.
- The macro is executed by GS ^.
- The maximum number of macro data to be defined varies with respect to printer models. The data exceeding this limit is not stored.
- ESC @ does not clear the existing defined macro. The macro remains effective until the printer reset and power cycling are executed.

Differences: None

GS B

Function: **Turns white/black reverse printing mode on / off**

Code:

ASCII	GS	B	n
Hex	1D	42	n
Decimal	29	66	n

Range: 0 ≤ n ≤ 255

Default: n=0

Description:
- This command selects white/black reverse printing mode by setting the least significant bit of n.
  - When the LSB of n is 0, white/black reverse mode is turned off.
  - When the LSB of n is 1, white/black reverse mode is turned on.

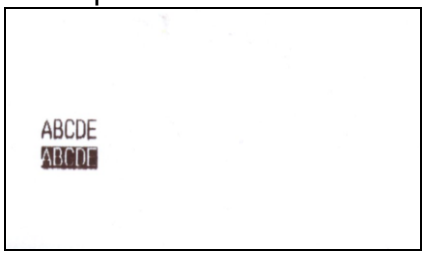
Remarks:
- This command does not affect multi-byte characters such as Kanji, Japanese and Korean.
- The right space defined by ESC SP is affected by this command.
- In white/black reverse mode, the underline mode is not effective.
- This mode remains effective until ESC @, printer reset or power cycling is executed.

Differences: None

Example:
- Input:

0x41 0x42 0x43 0x44 0x45
0x0a
0x1d 0x42 0x01
0x41 0x42 0x43 0x44 0x45
0x0a

■ Output:



GS H

Function: **Selects print position of HRI characters**

Code:

ASCII	GS	H	n
Hex	1D	48	n
Decimal	29	72	n

Range: 0 ≤ n ≤ 3, 48 ≤ n ≤ 51

Default: n=0

Description:

■ This command selects the printing position of HRI (Human Readable Interpretation) characters when printing a bar code.

• The printing position is set according to the value of as follows:

n	Printing position
0, 48	Not printed
1, 49	Above the bar code
2, 50	Below the bar code
3, 51	Both above and below the bar code

Remarks:

■ The font of the HRI characters is defined by GS f.

■ The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

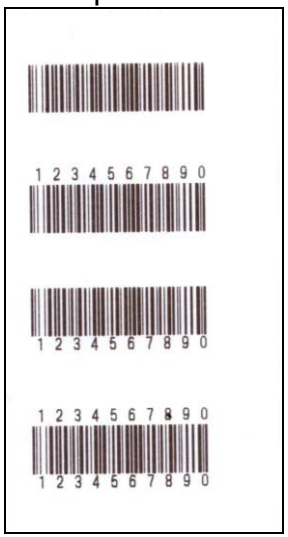
Differences: None

Example:

■ Input:

```
0x1d 0x68 0x50
0x1d 0x48 0x00
0x1d 0x6b 0x49 0x0a 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30
0x1b 0x64 0x03
0x1d 0x48 0x01
0x1d 0x6b 0x49 0x0a 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30
0x1b 0x64 0x03
0x1d 0x48 0x02
0x1d 0x6b 0x49 0x0a 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30
0x1b 0x64 0x03
0x1d 0x48 0x03
0x1d 0x6b 0x49 0x0a 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30
0x0a
```

■ Output:



GS I

Function: **Transmits printer ID**

Code:

ASCII	GS	I	n
Hex	1D	49	n
Decimal	29	73	n

Range: 1 ≤ n ≤ 69

Default: None

Description:

■ This command transmits the printer ID or information.

• Transmits 1 byte of printer ID, using n as follows:

n	Printer ID	Specification
1,49	Printer model ID	Printer model
2,50	Type ID	Printer type
3,51	Printer feature ID	Printing method and Printer size

• Transmits specified printer information, using n as follows:

n	Printer ID type	Specification
65	Firmware version	Firmware version
66	Manufacturer	BIXOLON
67	Printer model	Printer model
69	Code page	Currently enabled code page

Remarks:

■ Printer information (When n = 65, 66, 67, 69) consist of [Header ~ NULL] data as shown below:

Transmitted data	Hex	Decimal	Amount of data
Header	5FH	95	1byte
Printer information	Depends on the model	Depends on the model	0-15 bytes
NUL	00H	0	1byte

■ The firmware version can be confirmed by self test printing.

■ This command can be executed in real-time command mode using DLE.

Differences: ■ The printer ID is shown according to printer models as follows:

Printer ID	SPP-R220
1(Printer model ID)	0x41
2(Type ID)	Type ID varies depending on functions the printer supports as follows: - 0x01 (Multi-byte character) - 0x02 (Autocutter) - 0x03 (Autocutter + Multi-byte character) - 0x04 (Customer display) - 0x05 (Multi-byte character + Display) - 0x07 (Customer display + Autocutter + Multi-byte Character)
3(Printer feature ID)	0x69
66(Manufacturer)	BIXOLON
67(Printer model)	SPP-R220
69(Language of Font)	Code page currently being used. Refer to cod page setting command, ESC t.

GS I b

Function: **Transmits battery status**

Code:

ASCII	GS	I	b
Hex	1D	49	62
Decimal	29	73	98

Range: None

Default: None

Description:

■ This command transmits the battery power status of the printer.

• The printer transmits [Header ~ NUL] data as shown below:

Transmitted data	Hex	Decimal	Amount of data
Header	37H	55	1byte
Identifier	45H	69	1byte
Remaining battery power	30h-34H	48-52	1byte
NUL	00H	0	1byte

• “Remaining battery power“ is indicated as following:

Hex	Decimal	Remaining battery power level
30H	48	Full(F)
31H	49	High(H)
32H	50	Middle(M)
33H	51	Low(L)

Remarks:

■ The remaining battery amount can be examined by the battery LED.

■ When the remaining battery power reaches Low level, the red LED of battery starts blinking as an alert signal.

■ This command can be executed in real-time command mode using DLE.

Differences: None

GS L

Function: **Set left margin**

Code:

ASCII	GS	L	nL	nH
Hex	1D	4C	nL	nH
Decimal	29	76	nL	nH

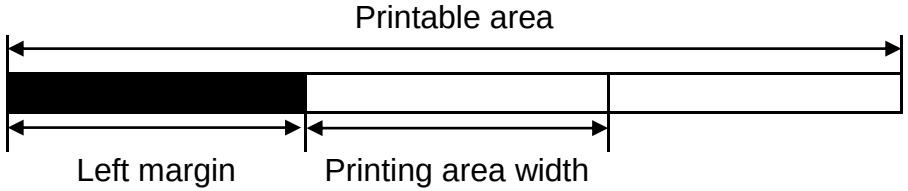
Range: 0 ≤ nL ≤ 255, 0 ≤ nH ≤ 255

Default: (nL + nH x 256)=0 (nL=0, nH=0)

Description: This command sets the left margin specified to [(nL + nH x 256) x (horizontal motion units)].

Remarks:

- The left margin is not effective in page mode. If the left margin is enabled in page mode, the setting is available when the printer returns to standard mode.
- When the setting is beyond the printable area, the left margin is automatically set to the maximum value of the printable area.
- Since the left margin is the same as the leftmost side of the printable area, the left side of the printable area is changed according to the left margin specified.
- The setting of this command remains effective until ESC @, printer reset or power cycling is executed.



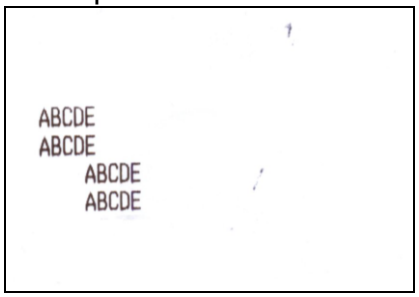
Differences: None

Example:

■ Input:

```
0x41 0x42 0x43 0x44 0x45
0x0a
0x41 0x42 0x43 0x44 0x45
0x0a
0x1d 0x4c 0x30 0x00
0x41 0x42 0x43 0x44 0x45
0x0a
0x41 0x42 0x43 0x44 0x45
0x0a
```

■ Output:



GS T

Function: **Set print position to the beginning of print line**

Code:

ASCII	GS	T	n
Hex	1D	54	n
Decimal	29	84	n

Range: n=0, 1, 48, 49

Default: None

Description:
■ This command sets the print position to the beginning of the print line.
• n specifies how data in the print buffer is processed when this command is executed.

n	Function
0, 48	Sets the print position after the data in the print buffer is deleted.
1, 49	Sets the print position after the data in the print buffer is printed.

Remarks:
■ This command is effective only in standard mode, and ignored in page mode.
■ When n =1,49, the printer prints the data in the print buffer and executes a line feed, based on the line feed amount specified.
■ When n=0,48, the printer removes the print data in the print buffer.
■ After processing this command, the print position moves to the left of the print area. The printer buffer will be empty.
■ This command is ignored if the print position is already the begaining of the line.

Differences: None

Example:
■ Input:
0x54 0x45 0x53 0x54 0x30
0x1d 0x54 0x00
0x54 0x45 0x53 0x54 0x31
0x1d 0x54 0x01

■ Output:



GS W

Function: **Set printing area width**

Code:

ASCII	GS	W	nL	nH
Hex	1D	57	nL	nH
Decimal	29	87	nL	nH

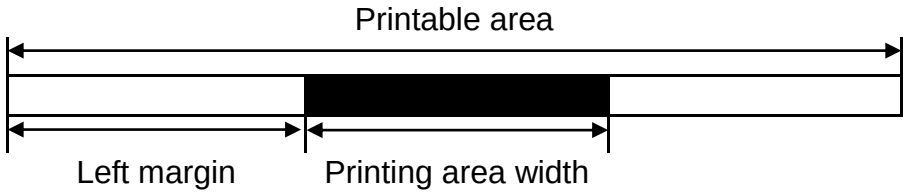
Range: 0 ≤ nL ≤ 255, 0 ≤ nH ≤ 255

Default: (nL + nH x 256)=384 (nL=80, nH=1)

Description: This command sets the printing area width to [(nL + nH x 256) x (horizontal motion units)].

Remarks:

- The printing area width is not effective in page mode. If the printing area width is enabled in page mode, the setting is available when the printer returns to standard mode.
- When (left margin + printing area width) exceeds the printable area, the printing area width is automatically set to (printing area width - left margin).
- The setting of this command remains effective until ESC @, printer reset or power cycling is executed.



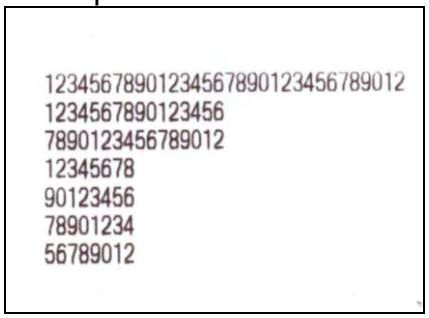
Differences: None

Example:

■ Input:

0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30 0x31 0x32
0x0a
0x1d 0x57 0xc0 0x00
0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30 0x31 0x32
0x0a
0x1d 0x57 0x60 0x00
0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30 0x31 0x32
0x0a

■ Output:



GS \

Function: **Set relative vertical print position in page mode**

Code:

ASCII	GS	\	nL	nH
Hex	1D	5C	nL	nH
Decimal	29	92	nL	nH

Range: 0 ≤ nL ≤ 255, 0 ≤ nH ≤ 255

Default: None

Description: This command moves the vertical print position to [(nL + nH x 256) x (vertical or horizontal motion units)] relative to the current position in page mode.

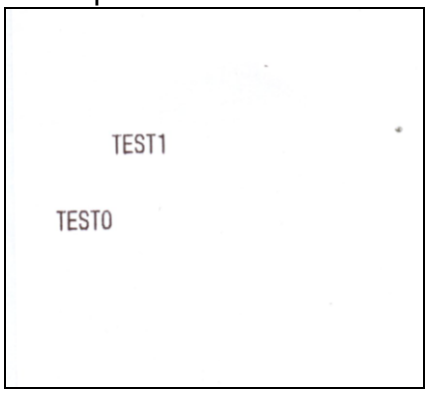
Remarks:
- This command is effective in page mode. When used in standard mode, it is ignored.
- The setting exceeding the print area set by ESC W is ignored.
- With standard mode selected, the vertical motion unit is used.
- In page mode, the horizontal motion unit is used when printing start poison is defined to the upper right or lower right of print area using ESC T, otherwise, the vertical motion unit is used.

Differences: None

Example:
- Input:

```
0x1b 0x4c
0x1b 0x57 0x00 0x00 0x00 0x00 0x80 0x01 0x80 0x01
0x1d 0x24 0x50 0x00
0x1d 0x5c 0xc0 0x00
0x54 0x45 0x53 0x54 0x30
0x1d 0x24 0xc0 0x00
0x54 0x45 0x53 0x54 0x31
0x0c
```

■ Output:



GS ^

Function: **Execute macro**

Code:

ASCII	GS	^	r	t	m
Hex	1D	5E	r	t	m
Decimal	29	94	r	t	m

Range:
0 ≤ r ≤ 255
0 ≤ t ≤ 255
m=0, 1

Default: None

Description:
■ This command executes a macro using parameters as following:
- r specifies the number of times to execute the macro.
- t specifies the waiting time before the macro is executed.
- m specifies macro executing mode as shown below.

m	Function
0	Executes the macro r times continuously at the interval specified by t.
1	The printer waits for the paper FEED button to be pressed for the time specified by t. The macro is executed once when the button is pressed. This operation is repeated r times.

Remarks:
■ The macro is defined by GS:.
■ If the macro is not defined or r = 0, the command is ignored.
■ The macro function is useful to print the same data repeatedly.

Differences: None

GS a

Function: **Enable/Disable Automatic Status Back (ASB)**

Code:

ASCII	GS	a	n
Hex	1D	61	n
Decimal	29	97	n

Range: 0 ≤ n ≤ 255

Default: n=0

Printers:

Description:
- This enables or disables ASB (Automatic Status Back) according to n.
  - ASB is enabled when n > 0.

Remarks:
- ASB is the function that transmit the printer status such as cover open/close and Online/Offline] continuously at the time interval specified regardless of the status change if ASB is enabled. Using this ASB function, the host can check to see if the printer is running properly.
- Once ASB has been enabled, the printer continues to transmit the current printer status at the specified interval until ASB is disabled.
- When n = 0, ASB is disabled. The printer stops transmitting the status.
- With parallel and USB interface, the printer status is transmitted whenever the host computer changes to the reverse mode regardless of the printer status change. It is recommended that the periodic time interval at which the host changes to reverse mode is more than 500ms in order to receive the correct status.
- With serial interface, ASB status is transmitted continuously at the interval of 1 sec even if the status is not changed.
- The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

■ The printer information transmitted is comprised of 4 bytes as follows:

• First byte(printer information)

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off
1	Off	00	0	Not used. Fixed to Off
2	On	04	4	Not used. Fixed to On
3	Off	00	0	On-line
	On	08	8	Off-line
4	Off	10	16	Not used. Fixed to On
5	Off	00	0	Cover is close
	On	20	32	Cover is open
6	Off	00	0	Paper is not being fed by the paper feed button
	On	40	64	Paper is being fed by the paper feed butto
7	Off	00	0	Not used. Fixed to Off

• Second byte(printer information)

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off
1	Off	00	0	Not used. Fixed to Off
2	Off	00	0	Not used. Fixed to Off
3	Off	00	0	Not used. Fixed to Off
4	Off	00	0	Not used. Fixed to Off
5	Off	00	0	Not used. Fixed to Off
6	Off	00	0	Not used. Fixed to Off
7	Off	00	0	Not used. Fixed to Off

• Third byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Function
0,1	Off	00	0	Not used. Fixed to Off
2,3	Off	00	0	Paper end sensor: paper present
	On	0C	12	Paper end sensor: no paper present
4	Off	00	0	Not used. Fixed to Off
5	Off	00	0	Not used. Fixed to Off
6	Off	00	0	Not used. Fixed to Off
7	Off	00	0	Not used. Fixed to Off

• Fourth byte (paper sensor information)

Bit	Off/On	Hex	Decimal	Function
0	On	01	1	Not used. Fixed to On
1	On	02	2	Not used. Fixed to On
2	On	04	4	Not used. Fixed to On
3	On	08	8	Not used. Fixed to On
4	Off	00	0	Not used. Fixed to Off
5	Off	00	0	Not used. Fixed to Off
6	Off	00	0	Not used. Fixed to Off
7	Off	00	0	Not used. Fixed to Off

GS f

Function: **Select font for HRI characters**

Code:

ASCII	GS	f	n
Hex	1D	66	n
Decimal	29	102	n

Range: n=0, 1, 48, 49

Default: n=0

Description: This command selects a font for the HRI(Human Readable Interpretation) characters used when printing a bar code, using n as follows:

n	**Font**
0, 48	Font A
1, 49	Font B

Remarks:
- The setting of this command is applied to only HRI characters.
- The printing position of HRI characters are specified by GS H.
- The configurations of Font A and B vary depending on the printer model.

Differences:
- Configuration of font: FrontA(12x24, Font B(9x24)

Example:

■ Input:

0x1d 0x68 0x50
0x1d 0x48 0x02
0x1d 0x66 0x01
0x1d 0x6b 0x49 0x0a 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30 0x0a
0x1d 0x66 0x00
0x1d 0x6b 0x49 0x0a 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30 0x0a

■ Output:



GS h

Function: **Selects bar code height**

Code:

ASCII	GS	h	n
Hex	1D	68	n
Decimal	29	104	n

Range: 1 ≤ n ≤ 255

Default: n=162

Description: This command sets the height of the bar code to n dots.

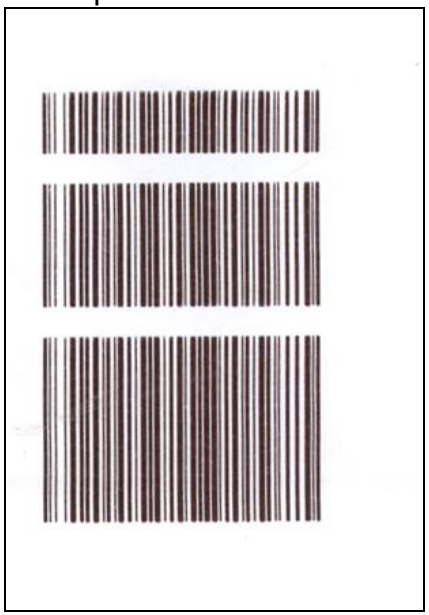
Remarks:
- The unit of n depends on the printer model.
- The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

Differences:
- Unit of one dot: 0.125mm(1/203 inch)

Example:
- Input:

```
0x1d 0x68 0x40
0x1d 0x6b 0x49 0x0a 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30
0x0a
0x1d 0x68 0x80
0x1d 0x6b 0x49 0x0a 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30
0x0a
0x1d 0x68 0xc0
0x1d 0x6b 0x49 0x0a 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30
0x0a
```

■ Output:



GS k

Function: **Print bar code**

Code:

①	**ASCII**	GS	k	m	d1...dk	NUL
	Hex	1D	6B	m	d1...dk	NUL
	Decimal	29	107	m	d1...dk	NUL
②	**ASCII**	GS	k	m	n	d1...dn
	Hex	1D	6B	m	n	d1...dn
	Decimal	29	107	m	n	d1...dn

Range: ① 0 ≤ m ≤ 6 ② 65 ≤ m ≤ 73
K, m, n depend on the barcode system

Default: None

Description: ■ This command selects a bar code system and prints the bar code.
- k indicates the number of bytes of bar code data.
- n specifies the number of bytes of bar code data.
- d specifies the character code data of the bar code data to be printed.

For range ①

m	Bar Code System	Range of k	Range of d
0	UPC-A	11 ≤ k ≤ 12	48 ≤ d ≤ 57
1	UPC-E	11 ≤ k ≤ 12	48 ≤ d ≤ 57
2	JAN13(EAN)	12 ≤ k ≤ 13	48 ≤ d ≤ 57
3	JAN8(EAN)	7 ≤ k ≤ 8	48 ≤ d ≤ 57
4	CODE39	1 ≤ k	48 ≤ d ≤ 57, 65 ≤ d ≤ 90, d=32,36,37,43,45,46,47
5	ITF	1 ≤ k (even number)	48 ≤ d ≤ 57
6	CODABAR	1 ≤ k	48 ≤ d ≤ 57, 65 ≤ d ≤ 68, d=36,43,45,46,47,58

For range ②

m	Bar Code System	Range of k	Range of d
65	UPC-A	11 ≤ n ≤ 12	48 ≤ d ≤ 57
66	UPC-E	11 ≤ n ≤ 12	48 ≤ d ≤ 57
67	JAN13(EAN)	12 ≤ n ≤ 13	48 ≤ d ≤ 57
68	JAN8(EAN)	7 ≤ n ≤ 8	48 ≤ d ≤ 57
69	CODE39	1 ≤ n ≤ 255	48 ≤ d ≤ 57, 65 ≤ d ≤ 90, d=32,36,37,43,45,46,47
70	ITF	1 ≤ n ≤ 255 (even number)	48 ≤ d ≤ 57
71	CODABAR	1 ≤ n ≤ 255	48 ≤ d ≤ 57, 65 ≤ d ≤ 68, d=36,43,45,46,47,58
72	CODE93	1 ≤ n ≤ 255	0 ≤ d ≤ 127
73	CODE128	2 ≤ n ≤ 255	0 ≤ d ≤ 127

Remarks:

- The bar code width exceeding the print area can not be specified.
- Except for character size and upside-down printing mode, none of print mode such as emphasized, double-strike, etc, affects the printing of the barcode.
- The quiet zone of the bar code (left and right spaces of the bar code) should be considered when using this command.

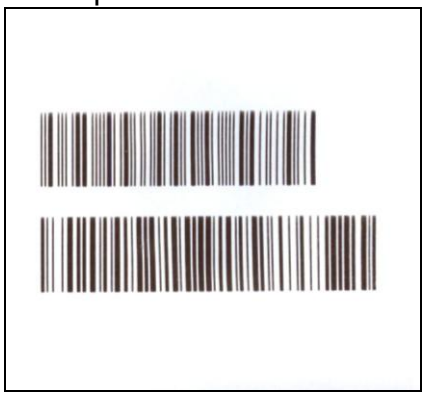
Differences: None

Example:

- Input:

```
0x1d 0x68 0x50
0x1d 0x77 0x02
0x1d 0x6b 0x06 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30 0x41 0x42 0x43 0x00
0x0a
0x1d 0x6b 0x49 0x0d 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30 0x41 0x42 0x43
0x0a
```

■ Output:



GS r

Function: **Transmit status**

Code:

ASCII	GS	r	n
Hex	1D	72	n
Decimal	29	114	n

Range: n=1, 2, 49, 50

Default: None

Description: The command transmits the status specified by n as follows:

n	**Function**
1, 49	Transmits paper sensor status

Remarks:

■ The status is one byte.

■ The status to be transmitted is as follows:

• Paper sensor status (n=1, 49):

Bit	**Off/On**	**Hex**	**Decimal**	**Function**
0, 1	Off	00	0	Paper near-end sensor: Paper adequate
	On	03	3	Paper near-end sensor: Paper near end
2, 3	Off	00	0	Paper end sensor: Paper present
	On	0C	12	Paper end sensor: Paper not present
4	Off	00	0	Fixed
5	Off	00	0	Reserved
6	Off	00	0	Reserved
7	Off	00	0	Fixed

Bits 2 and 3: This command can not be executed when the printer is offline due to the lack of paper. Therefore, the status of bit 2 (1) and bit 3 (1) is not transmitted.

■ This command can be executed in real-time mode using DLE.

Differences: None

GS v 0

Function: **Print raster bit image**

Code:

ASCII	GS	v	0	m	xL xH yL yH d1...dk
Hex	1D	76	30	m	xL xH yL yH d1...dk
Decimal	29	118	48	m	xL xH yL yH d1...dk

Range:

0 ≤ m ≤ 3, 48 ≤ m ≤ 51
1 ≤ (xL + xH x 256) ≤ 384 (0 ≤ xL ≤ 80, 0 ≤ xH ≤ 1)
1 ≤ (yL + yH x 256) ≤ 1662 (0 ≤ yL ≤ 126, 0 ≤ yH ≤ 6)
0 ≤ d ≤ 255
1≤ k ≤ 119664

Default: None

Description:

■ This command prints a raster bit image according to the mode defined by m.

DPI : Dots per Inch (25.4mm)

m	Mode	Vertical dot density (DPI)	Horizontal dot density (DPI)
0, 48	Normal	203	203
1, 49	Double-width	203	203/2
2, 50	Double-height	203/2	203
3, 51	Quadruple	203/2	203/2

- xL, xH specifies (xL + xH x 256) byte(s) in the horizontal direction for the bit image.
- yL, yH specifies (yL + yH x 256) dot(s) in the vertical direction for the bit image.
- d specifies the definition data of the bit image data.

Remarks:

■ In standard mode, this command is effective when the printer buffer is empty and the printer is in the beginning of the line. If the buffer is not empty, after processing m, the printer treats the following data as normal data.
■ In page mode, the bit image is stored in the print buffer, not being printed.
■ None of the print modes such as emphasized, double-strike, etc, affects the printing of the bit image.
■ The default dot density set by GS L is applied to printing of the bit image.

Differences:

DPI : Dots per Inch (25.4mm)

m	Mode	Vertical dot density (DPI)	Horizontal dot density (DPI)
0, 48	Normal	203	203
1, 49	Double-width	203	203/2
2, 50	Double-height	203/2	203
3, 51	Quadruple	203/2	203/2

GS w

Function: **Set bar code width**

Code:

ASCII	GS	w	n
Hex	1D	77	n
Decimal	29	119	n

Range: 2 ≤ n ≤ 6

Default: n=3

Description: ■ This command sets the horizontal size of the bar code, using n as follows:

n	**Multi-level bar code module width (mm)**	**Binary-level bar code**	
		Thin element width (mm)	**Thick element width (mm)**
2	0.250	0.250	0.625
3	0.375	0.375	1.000
4	0.500	0.500	1.250
5	0.625	0.625	1.625
6	0.750	0.750	2.000

- n specifies the bar code module width.

Remarks: ■ The setting of this command is effective for the following bar codes:
- Multi-level bar codes (UPC-A, UPC-E, JAN13, HAN8, CODE93, CODE128)
- Binary-level bar codes (CODE39, ITF, CODABAR)

■ The setting of this command remains effective until ESC @, printer reset or power cycling is executed.

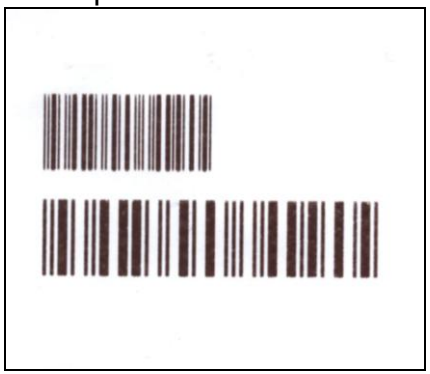
Differences: None

Example:

■ Input:

0x1d 0x68 0x50
0x1d 0x77 0x02
0x1d 0x6b 0x46 0x0a 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30 0x0a
0x1d 0x77 0x04
0x1d 0x6b 0x46 0x0a 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30 0x0a

■ Output:



BS L A

Function: **Execute automatic calibration in black mark mode**

Code:

ASCII	BS	L	A
Hex	08	4C	41
Decimal	8	76	65

Range: None

Default: None

Description: This command executes auto calibration in black mark mode.

Remarks:
- This command is effective only in the black mark mode.
- This command feeds 3 black marks to read the black mark and stores the optimal value into NV memory that is used to locate the black mark.
- The printer moves the printing position to the leading edge of the black mark using the optimal value stored.

Differences: None

BS L L

Function: **Select black mark mode**

Code:

ASCII	BS	L	L
Hex	08	4C	4C
Decimal	8	76	76

Range: None

Default: None

Description:
- This commands selects black mark mode
  - The label mode must be set for printing on the black mark paper.

Remarks:
- This command is enabled in receipt mode.
- This command can activate the black mark mode even if the receipt mode is predefined by the memory switch(Msw8-5). However, since the mode specified by the memory switch(Msw8-5) is set to the default mode, the receipt mode becomes effective after the printer reset or power cycling is executed.
- The memory switch(Msw8-5) should be enabled to maintain the black mark mode after the printer reset or power cycling.
- Once the printer has entered the black mark mode, it is necessary to perform the procedures as follows for the proper operation:
  - Executing the automatic calibration to figure out the location of each black mark paper.
  - Readjusting the printing position by pressing paper Feed button or opening/closing the printer cover.

Differences: None

BS L R

Function: **Select receipt mode**

Code:

ASCII	BS	L	R
Hex	08	4C	52
Decimal	8	76	82

Range: None

Default: None

Description:
- This command selects receipt mode
  - The receipt mode must be set for printing on the continuous roll paper.

Remarks:
- This command is enabled only in label mode.
- This command can activate the receipt mode even if the label mode is predefined by the memory switch(Msw8-5). However, since the mode specified by the memory switch(Msw8-5) is set to the default mode, the label mode becomes effective after the printer reset or power cycling is executed.
- The memory switch(Msw8-5) should be disabled to maintain the receipt mode after the printer reset or power cycling.

Differences: None

BS M

Function **Select device font type**

Code:

ASCII	BS	M	n	m
Hex	08	4D	n	m
Decimal	08	77	n	m

Range: 65 ≤ m ≤ 67 (m = 65,66,67)
n = 0

Default: n = 0

Description: ■ Font type select by m value as follows:

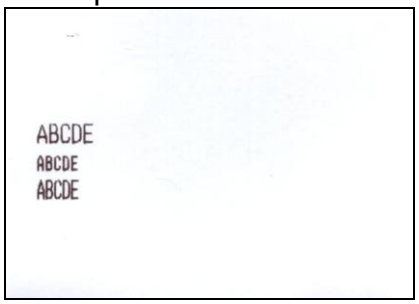
m	Function (Select font type)
65	Font A (12x24)
66	Font B (9x17)
67	Font C (9x24)

Remarks: ■ The setting of this command remains effective until ESC !, ESC M ESC @, printer reset or power cycling is executed.

Example: ■ Input:

```
0x08 0x4d 0x00 0x41
0x41 0x42 0x43 0x44 0x45
0x0a
0x08 0x4d 0x00 0x42
0x41 0x42 0x43 0x44 0x45
0x0a
0x08 0x4d 0x00 0x43
0x41 0x42 0x43 0x44 0x45
0x0a
```

■ Output:



BS M S

Function **Sentinel character set up commands**

Code:

ASCII	BS	M	S	pL	pH	fn1	n
Hex	08	4D	53	pL	pH	fn1	n
Decimal	08	77	83	pL	pH	fn1	n

Range:
0 ≤ n ≤ 2
(pL+pHx256) = 2
fn=49

Default: Depends on memory switch 8-6~7 setting value.

Description: ■ Sets sentinel characters by n value as follows:

n	Mode	Description
0, 48	Normal	Transmits data as normal data without sentinel characters.
1, 49	1-byte sentinel character	Adds 1-byte sentinel characters to the beginning and the end of card data and then transmits to host. STX: 1 Track (%), 2, 3 Track (;), EXT: 1, 2, 3 Track (?)
2, 50	Multi-byte sentinel characters	Adds Start characters and End characters to the beginning and the end of card data and then transmits to host.

- When set to 1-byte sentinel character mode, 1-byte sentinel characters are added to the beginning parts and the end parts of each track data.
  -1 Track sentinel characters: STX (%), EXT (?)
  -2 Track sentinel characters: STX (;), EXT (?)
  -3 Track sentinel characters: STX (;), EXT (?)
- When set to Multi-byte sentinel characters mode, the header and the footer, which have been used in normal mode, are not used any more and the specified Start characters and End characters are added to the beginning parts and the end parts of each track data to be transmitted.
- When set to Multi-byte sentinel characters mode but Start characters and End characters are not set by fn2 and fn3 of BS M S command respectively, the default Start and End characters are applied to card data to be transmitted to host.

- When set to Multi-byte sentinel characters mode, <CR/LF> characters after End characters are automatically applied to the card data to be transmitted to host.

Remarks:

MSR Data Transmission Format by Setting Mode

Refer to ESC M command and the function 3 memory switch #7 (8 – 6 & 7 setting) of GS (E command.

- When set to Track 1 Read mode

Normal mode

02H 41H 31H 31H 1CH	Max DATA 76 characters (1Track data)	03H 0DH 0AH

1byte sentinel character mode

02H 41H 31H 31H 1CH (Header)	25H (STX)	Max DATA 76 characters (1Track data)	3FH (ETX)	03H 0DH 0AH (End)

Multi byte sentinel characters mode

START characters (Max 10 byte)	Max DATA 76 characters (1Track data)	END characters (Max 10 byte)	0DH 0AH

- When set to Track 2 Read mode

Normal mode

02H 42H 31H 31H 1CH	Max DATA 37 characters (2Track data)	03H 0DH 0AH

1byte sentinel character mode

02H 42H 31H 31H 1CH (Header)	3BH (STX)	Max DATA 37 characters (2Track data)	3FH (ETX)	03H 0DH 0AH (End)

Multi byte sentinel characters mode

START characters (Max 10 byte)	Max DATA 37 characters (2Track data)	END characters (Max 10 byte)	0DH 0AH

- When set to Track 3 Read mode

Normal mode

02H 44H 31H 31H 1CH	Max DATA104 characters (3Track data)	03H 0DH 0AH

1byte sentinel character mode

02H 44H 31H 31H 1CH (Header)	3BH (STX)	Max DATA 104 characters (3Track data)	3FH (ETX)	03H 0DH 0AH (End)

Multi byte sentinel characters mode

START characters (Max 10 byte)	Max DATA 104 characters (3Track data)	END characters (Max 10 byte)	0DH 0AH

- When set to Track 1/2 Read mode

Normal mode

02H 43H 31H 31H 1CH 1CH	Max DATA 76 characters (1Track data)	1CH	Max DATA 37 Characters (2Track data)	03H 0DH 0AH

1byte sentinel character mode

02H 43H 31H 31H 1CH 1CH (Header)	3BH (STX)	Max DATA76 characters (1Track data)	3FH (ETX)	1CH (Separator)	3BH (STX)	Max DATA37 Characters (2Track data)	3FH (ETX)	03H 0DH 0AH (End)

Multi byte sentinel characters mode

START characters (Max 10 byte)	Max DATA 76 characters (1Track data)	END characters (Max 10 byte)	0DH 0AH

START characters (Max 10 byte)	Max DATA 37 characters (2Track data)	END characters (Max 10 byte)	0DH 0AH

- When set to Track 2/3 Read mode

Normal mode

02H 45H 31H 31H 1CH 1CH	Max DATA 37 characters (2Track data)	1CH	Max DATA104 Characters (3Track data)	03H 0DH 0AH

1byte sentinel character mode

02H 45H 31H 31H 1CH 1CH (Header)	3BH (STX)	Max DATA37 characters (2Track data)	3FH (ETX)	1CH (Separator)	3BH (STX)	Max DATA104 Characters (3Track data)	3FH (ETX)	03H 0DH 0AH (End)

Multi byte sentinel characters mode

START characters (Max 10 byte)	Max DATA 37 characters (2Track data)	END characters (Max 10 byte)	0DH 0AH

START characters (Max 10 byte)	Max DATA 104 characters (3Track data)	END characters (Max 10 byte)	0DH 0AH

- When set to Track 1/2/3 Read mode

Normal mode

02H 46H 31H 31H 1CH 1CH	Max DATA76 characters (1Track data)	1CH	Max DATA37 Characters (2Track data)	1CH	Max DATA104 Characters (3Track data)	03H 0DH 0AH

1byte sentinel characters mode

02H 46H 31H 31H 1CH 1CH (Header)	25H (STX)	Max DATA76 characters (1Track data)	3FH (ETX)	1CH (Separator)	3BH (STX)	Max DATA37 Characters (2Track data)	3FH (ETX)	1CH (Separator)	3BH (STX)	Max DATA104 Characters (3Track data)	3FH (ETX)	03H 0DH 0AH (End)

Multi byte sentinel character mode

START characters (Max 10 byte)	Max DATA 76 characters (1Track data)	END characters (Max 10 byte)	0DH 0AH
START characters (Max 10 byte)	Max DATA 37 characters (2Track data)	END characters (Max 10 byte)	0DH 0AH
START characters (Max 10 byte)	Max DATA 104 characters (3Track data)	END characters (Max 10 byte)	0DH 0AH

Differences: None

BS M S PL PH fn2 m d1~dk

Function **Set start sentinel characters**

Code:

ASCII	BS	M	S	pL	pH	fn2	m	d1~dk
Hex	08	4D	53	pL	pH	32	m	d1~dk
Decimal	08	77	83	pL	pH	50	m	d1~dk

Range:

3 ≤ (pL+pHx256) ≤ 12
m = 49, 50, 51 32 ≤d ≤127, k ≤ 10
fn = 50

Default:

Track 1 : “START1 “
Track 2 : “START2 “
Track 3 : “START3 “

Description:

- m defines the track to set Start characters.
- d indicates the characters to be set as Start characters.
- k indicates the number of characters to be used as Start characters.
- k is defined as (PL + PH x 256) – 2.
- If Multi-byte sentinel characters mode is set by fn1 after setting Start characters, the Start characters are added to the beginning parts of each. track data after reading card data and then the card data is transmitted.
- The specified Start characters are saved to non-volatile memory so the setting value is not changed even though the printer is reset.

Remarks: None

BS M S PL PH fn3 m d1~dk

Function **Set end sentinel characters**

Code:

ASCII	BS	M	S	pL	pH	fn3	m	d1~dk
Hex	08	4D	53	pL	pH	33	m	d1~dk
Decimal	08	77	83	pL	pH	51	m	d1~dk

Range:

3 ≤ (pL+pHx256) ≤ 12
m = 49, 50, 51 32 ≤d ≤127, k ≤ 10
fn = 50

Default:

Track 1 : “END”
Track 2 : “END”
Track 3 : “END”

Description:

- m defines the track to set an End character.
- d indicates the character to be set as an End character.
- k indicates the number of characters to be used as End characters.
- k is defined as (PL + PH x 256) – 2.
- If Multi-byte sentinel characters mode is set by fn1 after setting End. characters, the End characters are added to the end parts of each track data after reading card data and then the data is transmitted.
- If d is set to Null 1-byte, it allows the setting of no End character.
- The specified End characters are saved to non-volatile memory so the setting value is not changed even though the printer is reset

Remarks: None

BS M S PL PH fn4 m

Function **Transmit Start and End characters setting information**

Code:

ASCII	BS	M	S	pL	pH	fn4	m
Hex	08	4D	53	pL	pH	34	m
Decimal	08	77	83	pL	pH	52	m

Range:
(pL+pHx256) = 2
fn = 50
m = 49, 50, 51

Default: None

Description:
- m defines the track to be transmitted.
- The transmission format is as follows:

	Hexadecimal	**Decimal**	**Amount of Data**
Header	37H	55	1 byte
Flag	81H	129	1 byte
Track	31H~33H	49~51	1byte
Start characters	20H ~ 7FH	32~127	Max 10 bytes
Separate	1F	31	1byte
End characters	20H~7FH	32~127	Max 10 bytes
NUL	00H	0	1 byte

- The track on the above table indicates the track information of transmission data.
- For example, the track value of 31H indicates the information on the Start and End characters of Track 1.
- If d is set to Null 1-byte in fn3, End characters are not transmitted.

Remarks: None

FS D

Function **Draw Line & Box**

Code:

ASCII	FS	D	L	I	N	E	Xs(pL,pH)	Ys(pL,pH)	Xe(pL,pH)	Ye(pL,pH)	m
Hex	1C	44	4C	49	4E	45	Xs(pL,pH)	Ys(pL,pH)	Xe(pL,pH)	Ye(pL,pH)	m
Decimal	28	68	76	73	78	69	Xs(pL,pH)	Ys(pL,pH)	Xe(pL,pH)	Ye(pL,pH)	m

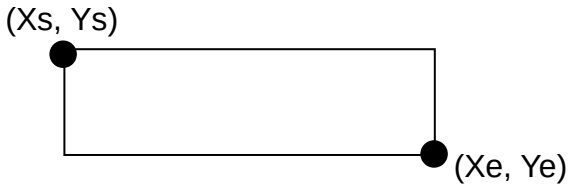
ASCII	FS	D	B	O	X	Xs(pL,pH)	Ys(pL,pH)	Xe(pL,pH)	Ye(pL,pH)	m
Hex	1C	44	42	4F	58	Xs(pL,pH)	Ys(pL,pH)	Xe(pL,pH)	Ye(pL,pH)	m
Decimal	28	68	66	79	88	Xs(pL,pH)	Ys(pL,pH)	Xe(pL,pH)	Ye(pL,pH)	m

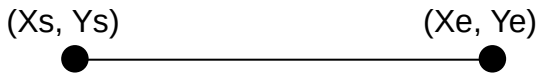
Range: 0 ≤ Xs(pL + pHx256) ≤ 384, 0 ≤ Ys(pL + pHx256) ≤ 65535,
0 ≤ Xe(pL + pHx256) ≤ 384, 0 ≤ Ye(pL + pHx256) ≤ 65535
0 ≤ m ≤ 16

Default: None

Description:

- Xs, Ys defines the start position of box and line.
- Xe, Ye defines the end position of box and line.
- m defines the thick of box and line.
- The line thick is 0.125*(2+m) mm.
  If m set to 0, then line thick is 0.25 mm.





Remarks: Drawing line and box work in page mode only.
The print direction command(ESC T) will not be applied.
print direction is aways left to right.