Line Thermal Printer

Command Emulator ESC/POS Mode Command Specifications

Revision 1.02

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Special Products Operating Division

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This is the Command Emulator Command Specifications Manual created based on Command Emulator dedicated commands and the ECS/POS Command Specifications Manual.

Information contained herein applies to the following models.

< Applicable Models>

・ TSP100 Series

1. Command Emulator

The commands outlined below are dedicated to the Command Emulator.

1-1) Command List

Commands	Name
ESC US A	Set print region with in mm units
ESC US f	Switch to country of destination (specify country)
ESC US p	Specify delimiter

1-2) COMMAND DETAILS

ESC US A n

[Name] Set print region with in mm units

[Code]

ASCII	ESC	US	A	n
Hexadecimal	1B	1F	41	n
Decimal	27	31	65	n

[Defined Area] 0 ≦ n ≦ 255

[Initial Value] Depends on Config setting

[Function] Sets the printer region width to n mm.

This sets the print region width when processing this command, and unprinted data remaining in the expanded buffer is printed.

The print region width is set by left alignment.

The left and right margin settings are initialized.

The print region width is set by left alignment so the horizontal tab positions are not initialized.

ESC @ initializes this command setting. (Returns to the Config setting)

ESC US f n

[Name] Switch to country of destination (specify country)

[Code]

ASCII	ESC	US	f	n
Hexadecimal	1B	1F	66	n
Decimal	27	31	102	n

[Defined Area] 0 ≦ n ≦ 4

48 ≦ n ≦ 52 (“0” ≦ n ≦ “4”)

[Initial Value] Depends on Config setting

[Function] Specifies country of destination.

ESC @, and CAN initialize this command setting. (Returns to the Config setting)

n	Country of Destination
0, “0”	SBCS
1, “1”	Japan
2, “2”	China
3, “3”	Taiwan
4, “4”	Korea

Only in STAR Line Mode; See the specifications below.

The default ANK pitch is switched by the memory switch writing command <ESC> <GS> #.

	Default ANK Pitch	International Characters		Code Page	
		Default	<ESC> "R" n	Default	<ESC><GS> "t" n
SBCS	12/15 dots	USA	Command Enabled	Normal	Command Enabled
Japan	12/15 dots	Japan	Command Disabled (Ignores 3 Bytes)	Normal (Katakana)	Command Disabled (Ignores 4 Bytes)
China	13/15 dots	USA	Command Enabled	Normal (Katakana)	Command Disabled (Ignores 4 Bytes)
Taiwan	13/15 dots	USA	Command Enabled	Normal (Katakana)	Command Disabled (Ignores 4 Bytes)
Korea	13/15 dots	Korea	Command Disabled (Ignores 3 Bytes)	Normal (Katakana)	Command Disabled (Ignores 4 Bytes)

ESC US p n

[Name] Specify delimiter

[Code]

ASCII	ESC	US	p	n
Hexadecimal	1B	1F	70	n
Decimal	27	31	112	n

[Defined Area] $0 \leqq n \leqq 3$

$48 \leqq n \leqq 51$ ("0" $\leqq$ n $\leqq$ "3")

[Initial Value] ---

[Function] Specifies delimiter.

n	Content
0, "0"	Top of document
1, "1"	Top of page
2, "2"	Bottom of page
3, "3"	Bottom of document

This command determines the printing job data boundary for the command emulator plug-in.

The plug-in finds these delimiters and executes the process.

If the command emulator plug-in is not registered, these delimiters are ignored.

2. ESC/POS Mode

2-1) Command List

• Font Style and Character Set

Commands		Difference to F/W Specifications (When applicable)
ESC t	Select character code table	
ESC R	Select international characters	
ESC M	Select character font	
ESC SP	Set character right space amount	A value not in the printing region will not expand the printing region.

• Character Expansion, Print Modes

Commands		Difference to F/W Specifications (When applicable)
ESC !	Batch specify print mode	
ESC -	Select/cancels underling mode	
ESC E	Specify/cancel emphasized printing	
ESC G	Specify/cancel double printing	
ESC V	Specify/cancel 90˚ right rotation of characters	
GS !	Specify character size	
GS B	Specify/cancel white/black inverted printing	
GS b	Specify/cancel smoothing	3 bytes ignored
ESC {	Specify/cancel upside-down printing	

• Line spacing

Commands		Difference to F/W Specifications (When applicable)
LF	Line feed	
CR	Carriage return	
ESC 2	Set the initial line feed amount	
ESC 3	Set the line feed amount	
ESC J	Print and feed paper	
ESC d	Print and feed paper n lines	If 40 inches are exceeded, execution follows the parameter setting.

• Page Mode

Commands		Difference to F/W Specifications (When applicable)
FF	Print in page mode and recover	1 byte ignored
CAN	Cancel print data in page mode.	1 byte ignored
ESC FF	Print data in page mode	2 bytes ignored
ESC L	Select page mode	2 bytes ignored
ESC S	Select standard mode	2 bytes ignored
ESC T	Select character print direction in page mode.	3 bytes ignored
ESC W	Set print region in page mode	10 bytes ignored
GS $	Specify character vertical direction absolute position in page mode	4 bytes ignored
GS ¥	Specify character vertical direction relative position in page mode	4 bytes ignored

• Horizontal Direction Position

Commands		Difference to F/W Specifications (When applicable)
HT	Horizontal tab	Ignored when <HT> arrives at a position exceeding the print region, prints data, and performs a line feed.
ESC D	Set horizontal tab position	
ESC $	Specify absolute position	
ESC ¥	Specify relative position	
ESC a	Position alignment	
GS L	Set left margin	When print region is set to less than 0, the print region is fixed to 1 dot.
GS W	Set print region region	When print region is set to less than 0, the print region is fixed to 1 dot.
GS T	Move to top of line	

• Download

Commands		Difference to F/W Specifications (When applicable)
ESC %	Specify/cancel download character set	
ESC ?	Delete download characters	
ESC &	Define download characters	Can be registered simultaneously to download bit images.

• Bit Image Graphics

Commands		Difference to F/W Specifications (When applicable)
ESC *	Specify bit image mode	
FS p	Print NV bit image	4 bytes ignored when command is ignored.
FS q	Define NV bit image	Register after data remaining in the print buffer is printed. *1
GS *	Define the download bit image	Can be registered simultaneously to download characters.
GS /	Print the download bit image	
GS v 0	Print the raster bit image	When data remains in the print buffer, data is received and discarded for the amount of the counter.
FS g 1	Write data to user NV memory.	Data for amount of counter is ignored.
FS g 2	Read format user NV memory data	10 bytes ignored

• Bar Codes

Commands		Difference to F/W Specifications (When applicable)
GS H	Select HRI character print position	
GS f	Select HRI character font	
GS h	Set bar code height	When 0, command is ignored.
GS k	Print bar code	*
GS w	Set bar code horizontal size	

• Cutter Control

Commands		Difference to F/W Specifications (When applicable)
GS V	Cut paper	

• Drawer-Kick Connector Control

Commands		Difference to F/W Specifications (When applicable)
ESC p	Specify pulse	The pulse width of the 5th pin of the drawer-kick connector is fixed.
DLE DC4	Real-time output of specified pulse	Not real-time; the pulse width of the 5th pin of the drawer-kick connector is fixed.

• Status

Commands		Difference to F/W Specifications (When applicable)
DLE EOT	Real-time status transmission	Not real-time; when using a serial port emulator, operations are possible.
GS a	Enable/disable transmission of automatic status	Only transmission of status; when using a serial port emulator, operations are possible.
GS I	Transmission of printer ID	When using a serial port emulator, operations are possible.
GS r	Transmission of status	When using a serial port emulator, operations are possible.

• Chinese Characters

Commands		Difference to F/W Specifications (When applicable)
FS !	Batch specify Chinese character print mode	
FS &	Specify Chinese character mode	Expansion beyond 3x; Enhanced printing possible for 90˚ rotation.
FS -	Specifies/cancels underlining of Chinese Characters	
FS .	Cancel Chinese character mode	
FS 2	Define external characters	Registration not possible for Shift-JIS mode; Can print characters registered in JIS mode.
FS C	Select Chinese character code	
FS S	Set Chinese character space amount	A value not in the printing region will not expand the printing region.
FS W	Specifies/cancels double-tall, double wide Chinese characters	

• Basic Calculated Pitch

Commands		Difference to F/W Specifications (When applicable)
GS P	Set basic calculated pitch	

• Others

Commands		Difference to F/W Specifications (When applicable)
ESC @	Initialize printer	
DLE ENQ	Real-time request to printer	3 bytes ignored
ESC =	Select peripheral device	3 bytes ignored
ESC c 3	Selects paper out sensor to validate at paper out signal output	4 bytes ignored
ESC c 4	Select paper out sensor to enable at printing stop	4 bytes ignored
ESC c 5	Enable/disable panel switches	4 bytes ignored
GS (A	Run a test print	7 bytes ignored
GS (K	Set print density	7 bytes ignored
GS (N	Select 2-color printing	7 bytes ignored
GS E	Set print speed	3 bytes ignored
GS :	Start/end macro definition	2 bytes ignored
GS ^	Execute macro	5 bytes ignored

• Counter Printing

Commands		Difference to F/W Specifications (When applicable)
GS C 0	Set counter print mode	5 bytes ignored
GS C 1	Set counter mode (A)	9 bytes ignored
GS C 2	Set counter value	5 bytes ignored
GS C ;	Set counter mode (B)	13 bytes ignored
GS c	Print counter	2 bytes ignored

• Black Mark

Commands		Difference to F/W Specifications (When applicable)
FF	Print in page mode, recover, TOF and cut	1 byte ignored
DLE ENQ	Real-time request to printer	3 bytes ignored
GS FF	Move to black mark detection position	2 bytes ignored
GS (F	Adjust black mark detection position	9 bytes ignored
GS M n = 1	Save black mark adjustment position	7 bytes ignored
GS M n = 2	Load black mark adjustment position	7 bytes ignored
GS M n = 3	Set auto-load of black mark adjustment position	7 bytes ignored
GS <	Mechanical initialization of printer	2 bytes ignored
GS V	Cut paper	Same as operations in normal mode

• Star Original Commands

Commands		Difference to F/W Specifications (When applicable)
ESC RS F	Select font	
ESC GS #	Set memory switch	*2

• Star Original For Presenter

Commands		Difference to F/W Specifications (When applicable)
ESC SYN 0	Execute presenter paper recovery	4 bytes ignored
ESC SYN 1	Set presenter automatic recovery function and recovery time	
ESC SYN 3	Acquire presenter paper counter	
ESC SYN 4	Initialize presenter paper counter	

• Star Original　Mark Commands

Commands		Difference to F/W Specifications (When applicable)
ESC GS * 0	Print mark	Counter byte ignored
ESC GS * 1	Specify mark height and line feed amount	10 bytes ignored
ESC GS * 2	Specify mark color and horizontal width in each mark number	9 bytes ignored
ESC GS * W	Register mark format to non-volatile memory	4 bytes ignored
ESC GS * C	Initialize mark format from non-volatile memory	4 bytes ignored

• Star Original　Auto Logo Commands

Commands		Difference to F/W Specifications (When applicable)
ESC GS / W	Register Auto Logo setting to non-volatile memory	4 bytes ignored
ESC GS / C	Initialize Auto Logo setting from non-volatile memory	4 bytes ignored
ESC GS / 1	Set ON/OFF for Auto Logo function	5 bytes ignored
ESC GS / 2	Set command characters	5 bytes ignored
ESC GS / 3	Set user macro 1	Counter byte ignored
ESC GS / 4	Set user macro 2	Counter byte ignored
ESC GS / 5	Set command character switching method	5 bytes ignored
ESC GS / 6	Set partial cut just prior to Auto Logo printing	5 bytes ignored

• Star Original　User Command

Commands		Difference to F/W Specifications (When applicable)
ESC GS BEL	Ring buzzer	6 bytes ignored

• Star Original　PDF417 Commands

Commands		Difference to F/W Specifications (When applicable)
ESC GS x S 0	Set bar code size	8 bytes ignored
ESC GS x S 1	Set security level (ECC)	6 bytes ignored
ESC GS x S 2	Set module x direction size	6 bytes ignored
ESC GS x S 3	Set module aspect ratio	6 bytes ignored
ESC GS x D	Set bar code data	Counter byte ignored
ESC GS x P	Print bar code	4 bytes ignored
ESC GS x I	Get bar code expansion information	4 bytes ignored

• Star Original　Print Start Trigger Control Commands

Commands		Difference to F/W Specifications (When applicable)
ESC GS g 0	Print starting trigger	6 bytes ignored
ESC GS g 1	Set print start timer	

• Star Original　QR Code Commands

Commands		Difference to F/W Specifications (When applicable)
ESC GS y S 0	Set model	6 bytes ignored
ESC GS y S 1	Set error correction level	6 bytes ignored
ESC GS y S 2	Set cell size	6 bytes ignored
ESC GS y D 1	Set data (auto)	Counter byte ignored
ESC GS y D 2	Set data (manual)	Counter byte ignored
ESC GS y P	Print QR code	4 bytes ignored
ESC GS y I	Get expansion information (bar code size)	4 bytes ignored

2-2) Command Details

2-2-1) Font Style and Character Set

ESC t n

Name Select character code table
Code ASCII ESC t n
Hex. 1B 74 n
Decimal 27 116 n

Defined Region 0 ≤n ≤5, 16 ≤n ≤19, n = 255
Initial Value n=0

Function Select page n of the character code table.

n	Character Type
0	PC437 (USA: Standard Europe)
1	Katakana
2	PC850(Multilingual)
3	PC860(Portuguese)
4	PC863(Canadian-French)
5	PC865(Nordic)
16	WPC1252
17	PC866 (Cyrillic #2)
18	PC852 (Latin2)
19	PC858
255	Blank page

ESC R n

Name Select international characters

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

Defined Region 0 ≤n ≤13
Initial Value n=0

Function Selects the character set for the country listed below.

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

ESC M n

Name Select character font

Code

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

Defined Region n = 0, 1, 48, 49

Function Selects character font.

n	Function
0,48	Selects Font A (12 x 24).
1,49	Selects Font B (9 x 17).

Details
- It is possible to select the character font using ESC! (Batch specify Chinese character print mode), but the last command received is effective.

STAR
- The following are the font configurations on STAR printers.

Character Fonts	Horizontal Dots x Vertical Dots
Font A	12 x 24 Dots
Font B	9 x 24 Dots

ESC SP n

Name	Set character right space amount			
Code	ASCII	ESC	SP	n
	Hex.	1B	20	n
	Decimal	27	32	n

Defined Region 0 ≦n ≦255
Initial Value n=0

Function Sets the right space amount for the character to [n x basic calculated pitch].

Details
- If the character horizontal direction magnification ratio is more than 2, the right space amount is also enlarged accordingly.
- This command does not affect Chinese characters.
- Right space amounts can be set independently for both the standard and page modes.
- The basic calculated pitch is set by GSP (Set basic calculated pitch). Also, after setting the right space amount, it is not affected even if the basic calculated pitch is changed.
- If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.
- In standard mode, the basic calculated pitch (x) for the horizontal direction is used.
- The ANK character width is ("left space amount" + "ANK font dot count" + "right space amount") x (basic calculated pitch). (See the information on character specifications in the appropriate printer specifications manual for details on the ANK font dot count.)
- In page mode, the basic calculated pitch that is used according to the starting point varies.
a.When the starting point is specified to be upper left or lower right by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (x) for the horizontal direction is used.
b.When the starting point is specified to be upper right or lower left by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (y) for the horizontal direction is used.
- The maximum value that can be set for the right space amount is approximately 35.983 mm (or 255/180 inch). Specifications that exceed the maximum value are rounded off to that value.

Command Emulator Disabled in Page Mode.
A value not in the printing region will not expand the printing region.

2-2-2) Character Expansion, Print Modes

ESC ! n

Name Batch specify print mode

Code

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

Defined Region 0 ≤n ≤255
Initial Value n=0

Function Specifies batch print mode

Bit	Function	"0"	"1"
7	Underline	OFF	ON
6	Undefined	--	--
5	Double wide expanded	OFF	ON
4	Double tall expanded	OFF	ON
3	Emphasized printing .	OFF	ON
2	Undefined		--
1	Undefined	--	--
0	Character Fonts	Font-A	Font-B

Details

- Quadruple-size characters are printed by specifying both double-tall (bit 4 = 1) and double-wide (bit 5 = 1) modes.
- An underline is applied to the entire character width, including the ESC SP (character right space amount). However, underlines are not applied to portions that have been skipped using HT (horizontal tab) or ESC V (character 90 degree rotation).
- The thickness of the underline is set by ESC - (specify/cancel underlines) regardless of the character.
- The base line for characters is the same when there are characters having different vertical direction ratios in the same line.
- The setting of the last received command is effective even when emphasized printing is executed by the ESC E (specify/cancel emphasized printing) command.
- The setting of the last received command is effective even when underlines are executed by the (ESC -) Specify/cancel underline command.
- The setting of the last received command is effective even when character size is executed by the GS! command.
- Emphasized printing (bit 3) is effective for ANK and Chinese characters. Other printing modes are effective only on ANK characters.
- Specifications using this command are ignored in HRI characters.

STAR The following are the font configurations on STAR printers.

Character Fonts	Horizontal Dots x Vertical Dots
Font A	12 x 24 Dots
Font B	9 x 24 Dots
Chinese Character Fonts	24 x 24 Dots

ESC – n

Name Specify/cancels underline mode

Code

ASCII	ESC	_	n
Hex.	1B	2D	n
Decimal	27	45	n

Defined Region 0 ≤ n ≤ 2, 48 ≤ n ≤ 50

Initial Value n = 0

Function Specifies or cancels underlines.

n	Function
0, 48	Cancels underline
1, 49	Sets to one-dot width underline and specifies underlines.
2, 50	Sets to two-dot width underline and specifies underlines.

Details

- An underline is applied to the entire character width, including the ESC SP (character right space amount). However, underlines are not applied to portions that have been skipped using HT (horizontal tab) or ESC V (character 90 degree rotation).
- Underlines are not applied to ESCV (characters rotated 90 degrees clockwise) or GSB (black/white inverted characters).
- When underline mode is cancelled by setting the value of n = 0 or n = 48, subsequent data is not underlined, and the underline thickness set before the mode is turned off is maintained. The default underline thickness is 1 dot.
- Character size does not affect the set underline thickness.
- Underline mode can also be turned on or off by using ESC ! (batch specify print mode). Note, however, that the last received command is effective. Therefore, if the underline mode is canceled using the ESC – command after specifying underlines using the ESC ! command, the ESC ! command is cancelled.
- This command does not affect Chinese characters.

STAR

- Underlines are applied to the following positions for both Font A and Font B.
- 1-dot thickness underline → 24^{th} dot
- 2-dot thickness underline → 23^{rd} and 24^{th} dot

ESC E n

Name	Specify/cancel emphasized characters			
Code	ASCII	ESC	E	n
	Hex.	1B	45	n
	Decimal	27	69	n

Defined Region: 0 ≤ n ≤ 255

Initial Value: n = 0

Function:
- Specifies or cancels emphasized characters.
- Cancels emphasized characters when n = <*******0>B.
- Specifies emphasized characters when n = <*******1>B.

Detail:
- n is effective only when it is the lowest bit.
- The setting of the last received command is effective even when emphasized printing is executed by the ESC! (Batch specify print mode) command.
- This command is enabled for ANK characters and Chinese characters.

ESC G n

Name	Specify/cancel double printing			
Code	ASCII	ESC	G	n
	Hex.	1B	47	n
	Decimal	27	71	n

Defined Region: 0 ≤ n ≤ 255

Initial Value: n = 0

Function: Specifies or cancels double printing.
- Cancels double printing when n = <*******0>B.
- Specifies double printing when n = <*******1>B. Details
- n is effective only when it is the lowest bit.
- This printer is not capable of double printing, so the print is the same as when using emphasized printing.
- This command is enabled for ANK characters and Chinese characters.

ESC V n

Name	Specify/cancel character 90 degree clockwise rotation Code			
	ASCII	ESC	V	n
	Hex.	1B	56	n
	Decimal	27	86	n

Defined Region: 0 ≤ n ≤ 1, 48 ≤ n ≤ 49

Initial Value: n = 0

Function: Specifies or cancels character 90 degree clockwise rotation.

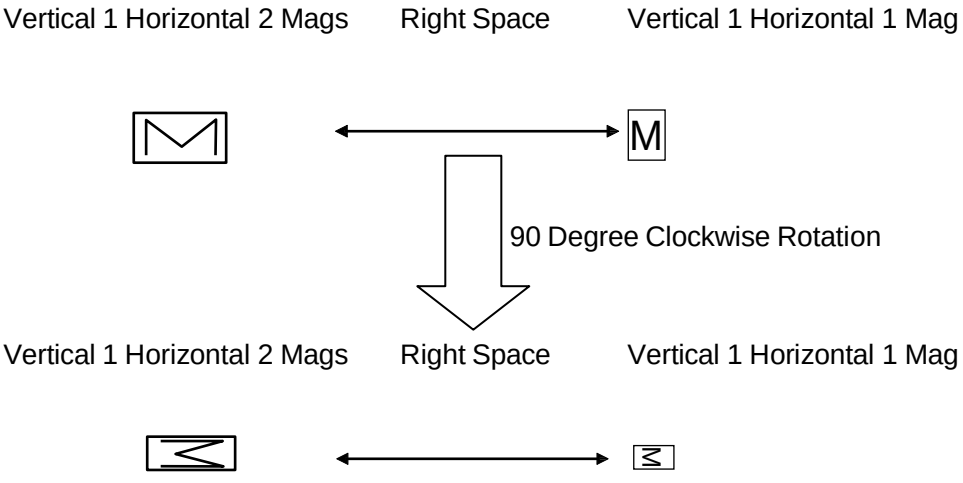
n	Function
0, 48	Cancels 90 degree clockwise rotation
1, 49	Specifies 90 degree clockwise rotation

Details:

- Underlines are not applied to characters rotated 90 degrees clockwise even when ESC !, ESC – or FS – commands are given.
- If 90 degree clockwise rotation is specified, double-wide and double-tall commands in the 90 rotation mode enlarges characters in the opposite directions to double-wide and double-tall commands.
- This command only affects printing in standard mode.
- In page mode, this command is only effective for the setting.
- This command is effective for ANK and Chinese characters.

STAR

- Characters are rotated as shown below when printing 90 degree clockwise rotation characters.



Command Emulator: Disabled in Page Mode.

GS ! n

Name: Select character size

Code:

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

Defined Region: 0 ≤ n ≤ 255
However, 1 ≤ vertical direction magnification ratio ≤ 8, 1 ≤ horizontal direction magnification ratio ≤ 8

Initial Value: n = 0

Function: Specifies the character size (magnification ratio in the vertical and horizontal directions).

Bit	Function	"0"	"1"
7	Specifies horizontal direction magnification ratio	(See table below)	
6			
5			
4			
3	Specifies vertical direction magnification ratio	(See table below)	
2			
1			
0			

<Horizontal Direction Magnification Ratio Specification>

Bit-7	Bit-6	Bit-5	Bit-4	Hor. Dir. Mag. Ratio
0	0	0	0	1
0	0	0	1	2
0	0	1	0	3
0	0	1	1	4
0	1	0	0	5
0	1	0	1	6
0	1	1	0	7
0	1	1	1	8
1	0	0	0	Undefined
				...
1	1	1	1	Undefined

<Vertical Direction Magnification Ratio Specification>

Bit-3	Bit-2	Bit-1	Bit-0	Hor. Dir. Mag. Ratio
0	0	0	0	1
0	0	0	1	2
0	0	1	0	3
0	0	1	1	4
0	1	0	0	5
0	1	0	1	6
0	1	1	0	7
0	1	1	1	8
1	0	0	0	Undefined
				...
1	1	1	1	Undefined

Details
- This command is effective for all characters (ANK and Chinese characters), excluding HRI characters.
- If the vertical and horizontal magnification ratios are outside the defined range, this command is ignored.
- In standard mode, the vertical direction is the paper feed direction; the horizontal direction traverses the paper feed direction. Therefore, when character orientation changes in 90 degree clockwise rotation mode, the relationship between vertical and horizontal directions is reversed.
- In page mode, vertical and horizontal directions are based on the character orientation.
- The base line for characters is the same when there are characters having different vertical direction ratios in the same line.
- The ESC ! (Batch specify print mode) command can also turn double-width and double- height modes on or off, but the setting of the last received command is effective.

Command Emulator: Disabled in Page Mode.

GS B n

Name	Specify/cancel white/black inverted printing
Code	ASCII GS B n Hex. 1D 42 n Decimal 29 66 n
Defined Region	0 ≦ n ≦ 255
Initial Value	n = 0
Function	Specifies or cancels black and white inverted printing. • Cancels black and white inverted printing when n = <*******0>B. • Specifies black and white inverted printing when n = <*******1>B.
Details	• n is effective only when it is the lowest bit. • Internal characters and download characters are targeted for black and white inverted printing. • The right space of set characters set by ESC SP (Set character right space amount) is also targeted for black and white inverted printing. • The following are not targeted for black and white inverted printing. a. ESC* : Bit image b. GS / : Download bit image c. GS k : Bar code d. GS H : HRI Characters e. HT : Skipped portion by horizontal tab f. ESC $: Skipped portion by specification of vertical position g. ESC ¥ : Skipped portion by specification of relative position • This does not affect the line spacing. • Black and white inverted printing has priority over underlines. Therefore, the inverted characters are not underlined, even if underline is specified. However, the underline setting status does not change. • This command is effective for ANK and Chinese characters.

GS b n

Name	Specify/cancel smoothing
Code	ASCII GS b n Hex. 1D 62 n Decimal 29 98 n
Defined Region	0 ≦ n ≦ 255
Initial Value	n = 0
Function	Specifies or cancels smoothing. • Cancels smoothing when n = <*******0>B. • Specifies smoothing when n = <*******1>B.
Details	• n is effective only when it is the lowest bit. • Targets for smoothing are: embedded characters, download characters and external characters • Even if smoothing is specified, it will not be performed if the character is set for magnification in either the vertical or horizontal directions.
Command Emulator	3 bytes are ignored.

ESC { n

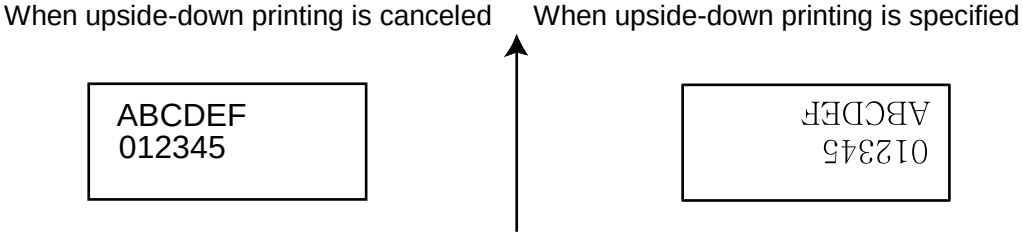
Name	Specify/cancel upside-down printing			
Code	ASCII	ESC	{	n
	Hex.	1B	7B	n
	Decimal	27	123	n

Defined Region 0 ≦ n ≦ 255
Initial Value n = 0

Function
Specifies or cancels upside-down printing.
- Cancels upside-down printing when n = <*******0>H.
- Specifies upside-down printing when n = <*******1>H.

Details
- n is effective only when it is the lowest bit.
- This command is effective only when input at the top of the line when standard mode is being used.
- This command has no affect in page mode. In page mode, this command is only effective for the setting.
- Upside-down printing rotates line data 180 degrees.

STAR
- The characters that are printed in upside-down printing are reversed, but the order of the lines that are printed are not in reverse.



•Upside-down printing is enabled for the following images.
- a. ESC * : Specify bit image mode
- b. GS /: Print download bit images
- c. FS P: Print NV bit image mode

Command Emulator Disabled in Page Mode.

2-2-3) Line spacing

LF

Name	Line feed
Code	ASCII LF Hex. 0A Decimal 10
Function	Prints the data in the print buffer and performs a line feed based on the set line feed amount.
Details	After execution, makes the top of the line the next print starting position.
STAR	When the setting for the line feed amount is smaller than the print data height: a. If there is no print data, a line feed operation is executed according to the line feed amount. b. If there is print data, a line feed operation is executed for the height of the print data.

CR

Name	Print and carriage return
Code	ASCII CR Hex. 0D Decimal 13
Function	• When an automatic line feed is enabled, this command functions in the same way as LF (print and line feed). When the automatic line feed is disabled, this command is ignored.
Details	• This command is ignored with serial interface models. • The operations of this command are selected by the memory switch <CR> code: Ignore/same as <LF> for parallel interface models. • Sets the print position to the beginning of the next line after execution.

ESC 2

Name: Set default line spacing

Code:

ASCII	ESC	2
Hex.	1B	32
Decimal	27	50

Function: Sets line feed amount per one line to approximately 4.23 mm (1/6 inch).

Details: Line spacing can be set independently for both the standard and page modes.

STAR: EPSON has models that have 180 DPI and 203 DPI print heads. STAR's print head is 203 DPI. Therefore, when targeting models with the EPSON 180 DPI print head, it is necessary to correct the line spacing that will generate from the difference in the head's print density.
In this case, the default line spacing on STAR printers is corrected to the following according to the basic calculated pitch correction. This does not apply for target models that have 203 DPI print heads, or models that do not require correction.

sic Calculate Pitch Correction	Default Line Spacing
203 DPI	Approximately 4.23 mm (1/6 inch)
180 DPI	Approximately 3.75 mm

Command Emulator: Disabled in Page Mode.

ESC 3 n

Name: Set line feed amount

Code:

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

Defined Region: $0 \leqq n \leqq 255$

Initial Value: Line feed amount equivalent to approximately 4.23 mm (1/6 inch).

Function: Sets the line space for one line to [n x basic calculated pitch].

Details:
- Line spacing can be set independently for both the standard and page modes.
- The basic calculated pitch is set by GSP (Set basic calculated pitch). Also, after setting the line space, it is not affected even if the basic calculated pitch is changed.
- If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.
- In standard mode, the basic calculated pitch (y) for the vertical direction is used.
- In page mode, the basic calculated pitch that is used according to the starting point varies.
  a. When the starting point is specified to be upper left or lower right by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (x) for the horizontal direction is used.
  b. When the starting point is specified to be upper right or lower left by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (y) for the horizontal direction is used.
- The maximum value that can be set for the line space is approximately 1,016mm (or 40 inches). Specifications that exceed the maximum value are rounded off to that value.

Command Emulator: Disabled in Page Mode.

ESC J n

Name	Print and Paper Feed			
Code	ASCII	ESC	J	n
	Hex.	1B	4A	n
	Decimal	27	74	n
Defined Region	0 ≦ n ≦ 255			
Function	Prints the data in the print buffer and feeds the paper [n x basic calculated pitch].			

Details

- Sets the print position to the beginning of the next line after execution.
- The line spacing amount set by the following commands is not affected.
  a. ESC 2 (Default line feed amount)
  b. ESC 3 (Set line feed amount)
- The basic calculated pitch is set by GSP (Set basic calculated pitch).
- If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.
- In standard mode, the basic calculated pitch (y) for the vertical direction is used.
- In page mode, the basic calculated pitch that is used according to the starting point varies.
  a. When the starting point is specified to be upper left or lower right by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (x) for the horizontal direction is used.
  b. When the starting point is specified to be upper right or lower left by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (y) for the horizontal direction is used.
- Paper is fed approximately 1016 mm if the [n x basic calculated pitch] exceeds approximately 1016 mm (40 inches).

STAR

- When the setting for the line feed amount is smaller than the print data height in standard mode:

a. If there is no print data, a line feed operation is executed according to the line feed amount.
b. If there is print data, a line feed operation is executed for the height of the print data.

Command Emulator Disabled in Page Mode.

ESC d n

Name	Print and feed paper n lines			
Code	ASCII	ESC	d	n
	Hex.	1B	64	n
	Decimal	27	100	n

Defined Region: 0 ≦ n ≦ 255

Function: Prints the data in the print buffer and performs a paper feed of n lines.

Details:
- Sets the print position to the beginning of the next line after printing.
- Line feeds set by the following commands are not affected.
  a. ESC 2: Set default line spacing
  b. ESC 3: Set line feed amount
- Paper is fed approximately 1016 mm (40 inches) if the [n x line feed amount] exceeds approximately 1016 mm (40 inches) .

STAR:
- When the setting for the line feed amount is smaller than the print data height in standard mode:
  a. If there is no print data, a line feed operation is executed according to the line feed amount.
  b. If there is print data, a line feed operation is executed for the height of the print data.

Command Emulator: If 40 inches are exceeded, execution follows the parameter setting.

2-2-4) Page Mode

FF

Name	Print and recover to page mode
Code	ASCII FF
	Hex. 0C
	Decimal 12
Function	Prints all buffered data to the print region collectively, then recovers to the standard mode.
Details	• All buffer data is deleted after printing. • The print area set by ESC W (Set print region in page mode) is reset to the default setting. • No paper cut is executed. • Sets the print position to the beginning of the next line after execution. • This command is enabled only in page mode.
Command Emulator	1 bytes are ignored.

CAN

Name	Cancel print data in page mode
Code	ASCII CAN
	Hex. 18
	Decimal 24
Function	Deletes all print data in the currently set print region in page mode.
Details	• This command is enabled only in page mode. • Portions included in the currently set print region are also deleted, even if previously set print region data.
Command Emulator	1 bytes are ignored.

ESC FF

Name	Print data in page mode		
Code	ASCII	ESC	FF
	Hex.	1B	0C
	Decimal	27	12

Function: Prints all buffered data in the print area collectively in page mode.

Details:
- This command is enabled only in page mode.
- Holds the following information after printing.
  a. Expanded data
  b. Character print direction selection in page mode (ESC T)
  c. Set print region (ESC W) in the page mode.
  d. Character expansion position

Command Emulator: 2 bytes are ignored.

ESC L

Name	Select page mode
Code	ASCII ESC L Hex. 1B 4C Decimal 27 76
Function	Switches from standard mode to page mode.
Details	• Enabled only when input with the top of line. • Invalid when input by page mode. • Returns to standard mode after the following commands are issued. a. FF (Print and recover to page mode) b. ESC S (Select standard mode) • Character expansion position has the starting point specified by ESC T (Character print direction selection in page mode) in the printing region designated by the ESC W (Set print region in the page mode) command. • This command switches the settings for the following commands the values of which can be set independently in standard mode and page mode to those for page mode a. Set space amount:ESC SP, FS S b. Set line feed amount:ESC 2, ESC 3 • The following commands are enabled only when in page mode. a. ESC V: Specify/cancel character 90 degree clockwise rotation b. ESC a: Position alignment c. ESC {: Specify/cancel upside-down printing d. GS L: Set left margin e. GS W: Set print region width • The following command is ignored in page mode. a. GS (A: Test print • The following commands are invalid in page mode. a. FS p: Print NV bit image b. FS q: Define NV bit image c. FS g1: Write data to user NV memory d. GS v0: Print raster bit images e. GS (L m fn (fn = 69): Print NV graphics f. GS (8 m fn (fn = 69): Print NV graphics • Recover to standard mode using ESC@ (initialize printer).
Command Emulator	2 bytes are ignored.

ESC S

Name	Select standard mode
Code	ASCII ESC S Hex. 1B 53 Decimal 27 83
Function	Switches from page mode to standard mode.
Details	• Valid only when input by page mode. • All buffer data in page mode is deleted. • Sets the print position to the beginning of the next line after execution. • The print area set by ESCW (Set print region in page mode) is reset to the default setting. • This command switches the settings for the following commands the values of which can be set independently in standard mode and page mode to those for standard mode a. ESC SP: Set character right space amount b. FS S: Set Chinese character space amount c. ESC 2: Set default line spacing d. ESC 3: Set line feed amount • The following commands are effective only when in standard mode. a. ESC W :Set print region in page mode b. ESC T: Select character print direction in page mode • The following commands are ignored in standard mode. a. GS S: Specify absolute position for character vertical direction in page mode b. GS ¥: Specify relative position for character vertical direction in page mode • Standard mode is selected when the power is turned on, the printer is reset or initialized (ESC @).
Command Emulator	2 bytes are ignored.

ESC T n

Name Select character print direction in page mode

Code

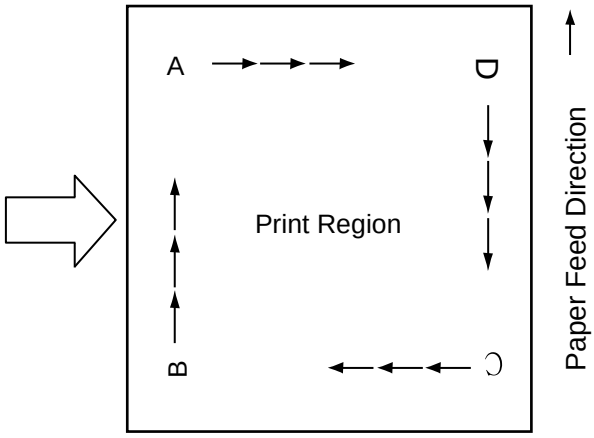
ASCII	ESC	T	n
Hex.	1B	54	n
Decimal	27	84	n

Defined Region $0 \leqq n \leqq 3, 48 \leqq n \leqq 51$

Initial Value n = 0

Function Selects the character printing direction and starting point in page mode.

n	Print Direction	Starting Point
0,48	Left to Right	Upper Left (A in the figure below)
1,49	Bottom to Top	Lower Left (B in the figure below)
2,50	Right to Left	Lower Right (C in the Figure
3,51	Top to Bottom	Upper Right (D in the figure below)



Details
- Executes only a printer internal flag operation when this command is input in standard mode. The command does not affect printing in standard mode.
- The character expansion starting point is in the print region specified by ESC W (Set print region in page mode).
- The basic calculated pitch (x or y) used with the following commands differs according to the starting point.
  a. If the starting point is upper left or lower right (feeds paper and expands characters in the vertical direction)
     Commands using x : ESC SP, ESC $, ESC ¥, FS S
     Commands using y : SC 3, ESC J, GS $, GS ¥
  b. If the starting point is upper right or lower left
     Commands using x : ESC 3, ESC J, GS $, GS ¥
     Commands using y : ESC SP, ESC $, ESC ¥, FS S

Command Emulator 3 bytes are ignored.

ESC W xL xH yL yH dxL dxH dyL dyH

Name	Set print region 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

Defined Region: 0 ≦ xL, xH, yL, yH, dxL, dxH, dyL, dyH ≦ 255

However, this excludes dxL = dxH = 0 or dyL = dyH = 0

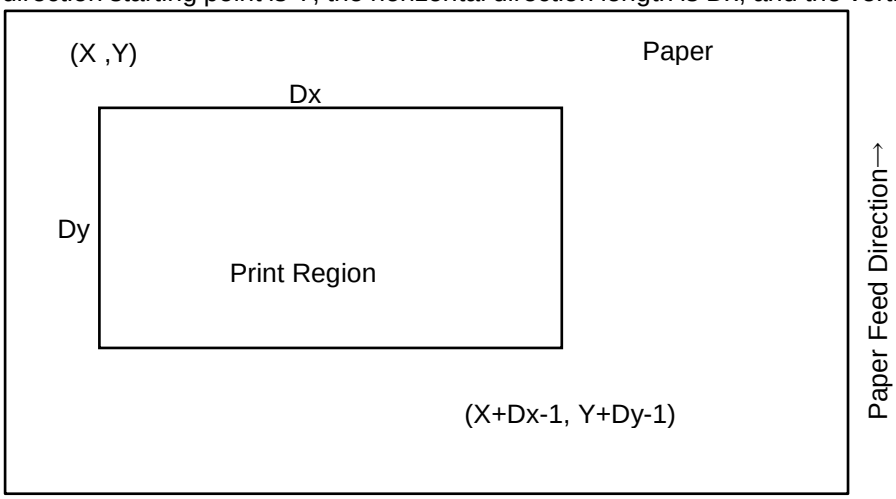
Initial Value: xL = xH = yL = yH = 0

Function: Sets the print region position and size.

- Horizontal direction starting point [(xL + xH x 256) x basic calculated pitch]
- Vertical direction starting point [(yL + yH x 256) x basic calculated pitch]
- Horizontal direction length [(dxL + dxH x 256) basic calculated pitch]
- Vertical direction length = [(dyL + dyH x 256) basic calculated pitch]

Details

- In standard mode, the printer executes only internal flag operations with this command is input.
- If the horizontal direction starting point or vertical direction starting point is outside of the printable region, the command is stopped and normal printing commences from subsequent data.
- If the horizontal direction length or vertical direction length is 0, the command is stopped and normal printing commences from subsequent data.
- The character expansion starting point is the point specified by selecting the character printing direction (ESC T) in page mode in the print region.
- If (horizontal direction starting position + horizontal direction length) exceeds the printable region in the horizontal direction, the horizontal direction length is set to (horizontal direction printable region - horizontal direction starting point).
- If (vertical direction starting position + vertical direction length) exceeds the printable region in the vertical direction, the vertical direction length is set to (vertical direction printable region - vertical direction starting point).
- The basic calculated pitch is set by GSP (Set basic calculated pitch). Also, the set printing region is not changed even if the basic calculated pitch is changed after setting the print region.
- If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.
- The basic calculated pitch (x) is used in the calculated pitch for the horizontal direction starting point and the length in the horizontal direction; and the basic calculated pitch (y) is used in the calculated pitch for the vertical direction starting point and the length in the vertical direction.
- The print region shown in the figure below when the horizontal direction starting is X; the vertical direction starting point is Y; the horizontal direction length is Dx; and the vertical direction length is Dy.



Command Emulator: 10 bytes are ignored.

GS $ nL nH

Name	Specify absolute position for character vertical direction in page mode				
Code	ASCII	GS	$	nL	nH
	Hex.	1D	24	nL	nH
	Decimal	29	36	nL	nH

Defined Region: 0 ≦ nL ≦ 255, 0 ≦ nH ≦ 255

Function: Specifies the character vertical direction position for the data expansion starting position using the absolute position based on the starting point in page mode. The position of the character vertical direction for the next data expansion starting position is the position specified by [(nL + nH x 256) x basic calculated pitch] from the starting point.

Details:

- When not in page mode, this command is ignored.
- Specifications for absolute positions that exceed the specified print range are ignored.
- The position of the character horizontal direction of the data expansion starting position does not move.
- The starting point that is used as a reference is specified by ESC T.
- The following operations occur depending on the starting point of (Selecting the character printing direction in page mode) ESC T.
  a. If the starting point is upper left or lower right, specify the absolution position for the paper feed direction (character vertical direction). Use the basic calculated pitch (y) for the horizontal direction at this time.
  b. If the starting point is upper right or lower left, specify the absolution position for the paper feed in the vertical direction (character vertical direction). Use the basic calculated pitch (x) for the horizontal direction at this time.
- The basic calculated pitch is set by GSP (Set basic calculated pitch).
- If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.

Command Emulator: 4 bytes are ignored.

GS ¥ nL nH

Name	Specify relative position for character vertical direction in page mode				
Code	ASCII	GS	¥	nL	nH
	Hex.	1D	5C	nL	nH
	Decimal	29	92	nL	nH

Defined Region

0 ≦ nL ≦ 255

0 ≦ nH ≦ 255

Function

- Specifies the character vertical direction position for the data expansion starting position using the relative position based on the current point in page mode. This sets the position moved from the current position to [(nL + nH x 256) x basic calculated pitch] for the next data expanding starting position.

Details

- When not in page mode, this command is ignored.
- If the direction below the current position is specified for the characters, specify a positive number; if the direction above is specified, a negative number is used.
- Negative numbers are represented by the complement of 65536. For example, when moving in the upward direction N pitches, use:

  nL + nH × 256 = 65536-N
- Specifications for relative positions that exceed the specified print region are ignored.
- The following operations occur depending on ESC T (Selecting the character printing direction in page mode).

  a. If the starting point is upper left or lower right, specify the relative position for the paper feed direction.
  Use the basic calculated pitch (y) for the horizontal direction at this time.

  b. If the starting point is upper right or lower left, specify the relative position for the paper feed in the vertical direction. Use the basic calculated pitch (x) for the horizontal direction at this time.
- The basic calculated pitch is set by GSP (Set basic calculated pitch).
- If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.

Command Emulator

4 bytes are ignored.

2-2-5) Horizontal Direction Position

HT

Name	Horizontal tab	
Code	ASCII	HT
	Hex.	09
	Decimal	9

Function: Moves print position to next horizontal tab position.

Details:
- This command is ignored if the next tab is not set.
- If the next tab position exceeds the print region, the print position is moved to [print region + 1].
- The horizontal tab position is set by ESC D (Set/cancel horizontal tab position).
- When the print position is at the [print region + 1] position and this command is received, the current line buffer full is printed and a horizontal tab is executed from the top of the next line.
- The initial value of the horizontal tab position is every 8 characters of Font A (the 9th, 17th, 25th positions, etc.)

Command Emulator: Ignored when <HT> arrives at a position exceeding the print region, prints data, and performs a line feed.

ESC D n1 n2 … nk NUL

Name	Set horizontal tab position						
Code	ASCII	ESC	D	n1	n2 ...	nk	NUL
	Hex.	1B	44	n1	n2 ...	nk	NUL
	Decimal	27	68	n1	n2 ...	nk	NUL

Defined Region
$1 \leqq n \leqq 255$
$0 \leqq k \leqq 32$

Initial Value
- Every 8 characters when using Font A (12 x 24) and the setting for the right spacing of characters is 0. (9^{th} column, 17^{th} column, 25^{th} column …)

Function
Sets horizontal tab position
- n specifies the column number for setting a horizontal tab position from the left margin or the beginning of the line.
- k indicates the number of horizontal tab positions to be set.

Details
- The horizontal tab position is a value of from the left margin or the beginning of the line [n x character width].
  Character width is the horizontal width including ESC SP (character right space). If the character horizontal direction magnification ratio is more than 2, the character width is also enlarged accordingly.
- This command cancels the previous set horizontal tab settings.
- When horizontal tab position setting n = 8, the next print position is moved to column 9 by executing HT (horizontal tab).
- Up to 32 tab positions (k = 32) can be set. Subsequent data exceeding that is processed as normal data.
- <n> for specifying horizontal position settings is input in ascending order. It is quit using <00>H. If <n> is less than or equal to the preceding value <n>, horizontal tab setting is completed and subsequent data is processed as normal data.
- ESC D NULL cancels all horizontal tab positions.
- Previously specified horizontal tab positions do not change, even if the character width changes after setting the horizontal tab position.
  The character width is stored for standard and page modes.

STAR
- When using Chinese character mode, set for the pitch of the ANK fonts (Font-A and Font-B).
- If <n> exceeds the printable region, set the horizontal tab position to the position +1 of the maximum print column count.

Command Emulator Disabled in Page Mode.

ESC $ nL nH

Name	Specify absolute position				
Code	ASCII	ESC	$	nL	nH
	Hex.	1B	24	nL	nH
	Decimal	27	36	nL	nH

Defined Region
0 ≦ nL ≦ 255
0 ≦ nH ≦ 255

Function
Specifies the next printing starting position using an absolute position based on the left margin position. The next printing starting position is the position specified by [(nL+nH×256) × basic calculated pitch] from the left margin position.

Details
- Specifications exceeding the print range are ignored.
- The basic calculated pitch is set by GSP (Set basic calculated pitch).
- If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.
- In standard mode, the basic calculated pitch (x) for the horizontal direction is used.
- In page mode, the basic calculated pitch that is used according to the starting point varies.

a. When the starting point is specified to be upper left or lower right by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (x) for the horizontal direction is used.

b. When the starting point is specified to be upper right or lower left by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (y) for the horizontal direction is used.

STAR
Top of line does not exist when this command is used to specify anything other than the left margin position. The top of the line is maintained only when the same position as the left margin position is specified.

Command Emulator Disabled in Page Mode.

ESC ¥ nL nH

Name	Specify relative position				
Code	ASCII	ESC	¥	nL	nH
	Hex.	1B	5C	nL	nH
	Decimal	27	92	nL	nH

Defined Region

0 ≦ nL ≦ 255
0 ≦ nH ≦ 255

Function

- Specifies the next print starting position with a relative position based on the current position. This sets the position from the current position to [(nL + nH x 256) x basic calculated pitch] for the next print starting position.

Details

- Specifications exceeding the print range are ignored.
- If the right direction of the current position is specified for the character direction, specify a positive number; if the left direction is specified, a negative number is used.
- Negative numbers is represented by the complement of 65536. For example, when moving in the left direction n pitches, use:

  nL + nH × 256 = 65536-N
- The basic calculated pitch is set by GSP (basic calculated pitch setting).
- If there are fractions in the result, correct to the minimum mechanical pitch and discard.
- Use the basic calculated pitch (x) for the horizontal direction in standard mode.
- The following operations occur according to the starting point in page mode.

  a. If the starting point is set to upper left or lower right by the ESC T (Select character print direction in page mode) command, specify the relative position of the vertical direction in the paper feed.
  Use the basic calculated pitch (x) for the horizontal direction at this time.
  b. If the starting point is set to upper right or lower left by the ESC T (Select character print direction in page mode) command, move the print position in the paper feed direction.
  Use the basic calculated pitch (y) for the horizontal direction at this time.

Command Emulator Disabled in Page Mode.

ESC a n

Name Position alignment

Code

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

Defined Region 0 ≦ n ≦ 2, 48 ≦ n ≦ 50

Initial Value n = 0

Function Aligns all print data in one line to a specified position.

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

Details
- This command is effective only when input at the top of the line when standard mode is being used.
- This command does has no affect in page mode. In page mode, this command is only effective for the setting.
- Specifies the alignment position in the printing region that has been set.
- Portions skipped using the following commands are also targeted for position alignment.

a. HT : Horizontal tab
b. ESC $: Specify absolute position
c. ESC ¥ : Specify relative position

[Ex.]

Left alignment	**Center**	**Right alignment**
ABC	ABC	ABC
ABCD	ABCD	ABCD
ABCDE	ABCDE	ABCDE

Command Emulator Disabled in Page Mode.

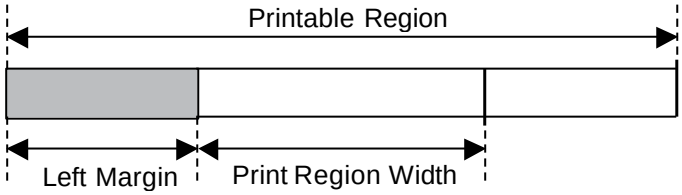
GS L nL nH

Name	Set left margin				
Code	ASCII	GS	L	nL	nH
	Hex.	1D	4C	nL	nH
	Decimal	29	76	nL	nH

Defined Region
0 ≦ nL ≦ 255
0 ≦ nH ≦ 255

Initial Value
nL = 0,nH = 0

Function
- nL and nH set the specified left margin.
- The left margin is [(nL + nH x 256) x basic calculated pitch]



Details
- This command is effective only when input at the top of the line when standard mode is being used.
- This command has no affect in page mode. This command is only effective for the setting.
- The maximum setting for the left margin is the same size as the printable region for the horizontal direction.
  Specifications that exceed the maximum value are rounded off to that value.
- The basic calculated pitch is set by GSP (Set basic calculated pitch). Also, after setting the left margin, it is not affected even if the basic calculated pitch is changed.
- Use the basic calculated pitch (x) for the horizontal direction of GS P (Set basic calculated pitch) to calculate the left margin.
  If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.

Command Emulator
Disabled in Page Mode.
When print region is set to less than 0, the print region is fixed to 1 dot.

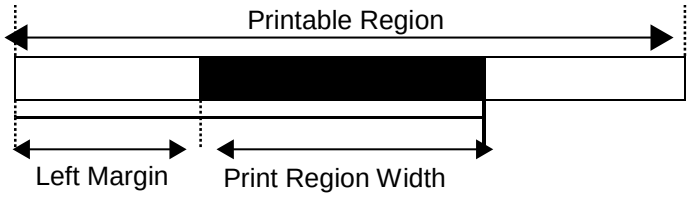
GS W nL nH

Name	Set print region width				
Code	ASCII	GS	W	nL	nH
	Hex.	1D	57	nL	nH
	Decimal	29	87	nL	nH

Defined Region
0 ≦ nL ≦ 255
0 ≦ nH ≦ 255

Initial Value
Print Region

Function
- Sets the print region width specified by nL and nH.
- Print region width is [(nL + nH x 256) x basic calculated pitch].



Details
- This command is effective only when processed at the top of the line when standard mode is being used.
- This command has no affect on page mode when in page mode. Only the setting is effective for this command.
- When a value that exceeds the printable region of one line, the entire region, excluding the left margin, is set as the print region width.
- The basic calculated pitch is set by GSP (Set basic calculated pitch). Also, the set printing region width is not changed even if the basic calculated pitch is changed after setting the print region width.
- Use the basic calculated pitch (x) for the horizontal direction of GS P (Set basic calculated pitch) to calculate the print region width.
  If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.
- If the print region width is smaller than the width of the first character expanded at the top of the line (including the right space), the following are processed only on that line.
  1. The print region is expanded to the right for the size of that character within the range that does not exceed the printable region.
  2. If there is not enough space even if 1. is executed, the print region is expanded to the left side.
  3. If there is not enough space even if 2. is executed, the right space deleted.

Command Emulator
Disabled in Page Mode.
When print region is set to less than 0, the print region is fixed to 1 dot.

GS T n

Name	Move to top of line			
Code	ASCII	GS	T	n
	Hex.	1D	54	n
	Decimal	29	84	n

Defined Region n = 0,1,48,49

Function Moves print position to top of line.

• This command is effective only in standard mode. It is ignored in page mode.

n	Function
0, 48	After erasing data in the printer buffer, it moves the print position.
1, 49	After printing data in the printer buffer, it moves the print position.

Command Emulator Disabled in Page Mode.

2-2-6) Download

ESC % n

Name	Specify/cancel download character set
Code	ASCII ESC % n Hex. 1B 25 n Decimal 27 37 n
Defined Region	0 ≦ n ≦ 255
Initial Value	n = 0
Function	Specifies or cancels the download character set. • When n = <*******0>B, the download character set is cancelled. • When n = <*******1>B, the download character set is specified.
Details	• n is effective only when it is the least significant bit. • When the download character set is cancelled, the internal character set is automatically specified.
STAR	Because ESC& (define download characters) and GS* (define download bit images) are used in the same region, they cannot both be defined simultaneously. a. When download characters are defined, previously defined download bit images are b. Conversely, when download bit images are defined, previously defined download characters are cleared and the definition returns to same the internal character set.

ESC ? n

Name	Delete download characters
Code	ASCII ESC ? n Hex. 1B 3F n Decimal 27 63 n
Defined Region	32 ≦ n ≦ 126
Function	Deletes the download characters to the specified character code.
Details	• n specifies the character code to delete the defined pattern. After deleting, the printer prints the same pattern as the internal characters. • Deletes the specified code definition pattern of the character code selected by ESCM and ESC !. • This command is ignored when the specified character code is undefined.

ESC& yc1c2 [x1d1...d (y x x1)] ... [axd1...d (yxax)]

Name	Define download characters				
Code	ASCII	ESC	&	y	c1c2 [x1 d1 ... d (yX x1)] ... [a xd1 ... d (y× ax)]
	Hex.	1B	26	y	c1c2 [x1 d1 ... d (yX x1)] ... [a xd 1 ... d (y×ax)]
	Decimal	27	38	y	c1c2 [x1 d1 ... d (yX x1)] ... [a xd 1 ... d (y×ax)]

Defined Region
y = 3
32 ≦ c1 ≦ c2 ≦ 126
0 ≦ x ≦ 12 (Font A), 0 ≦ x ≦ 9 (Font B)
0 ≦ d1....d (y×ax) ≦ 255

Initial Value
Same pattern as internal character set

Function
Defines the download characters to the specified character code.
- y specifies the number of bytes in the vertical direction.
- c1 specifies the starting character code for the definition; c2 specifies the final character code.
- x specifies the number of dots in the horizontal direction for the definition.

Details
- The definable character code range is from ASCII code <20>H to <7E>H.
- It is possible to define multiple characters for consecutive character codes with one definition. If only one character is desired, use c1 = c2.
- If x=0, a space is registered.
- d is the dot data for the characters. It indicates the horizontal direction x dot pattern from the left side. If x does not meet the number of dots configuring the character, any remaining dots on the right side are blank.
- The data to define download characters is (y x x) bytes.
- Bits that correspond to the dots to print are 1, and the bits that correspond to the dots that are not printed are 0 in the definition data.
- This command can define different download characters for each font. To select a font, use ESC M or ESC !.
- ESC & (define download characters) and GS * (define download bit images) cannot both be defined simultaneously.

a. When download characters are defined, previously defined download bit images are cleared.
b. Conversely, when download bit images are defined, previously defined download characters are cleared and the definition returns to same the internal character set.

- Defined download characters are cleared under the following executions.

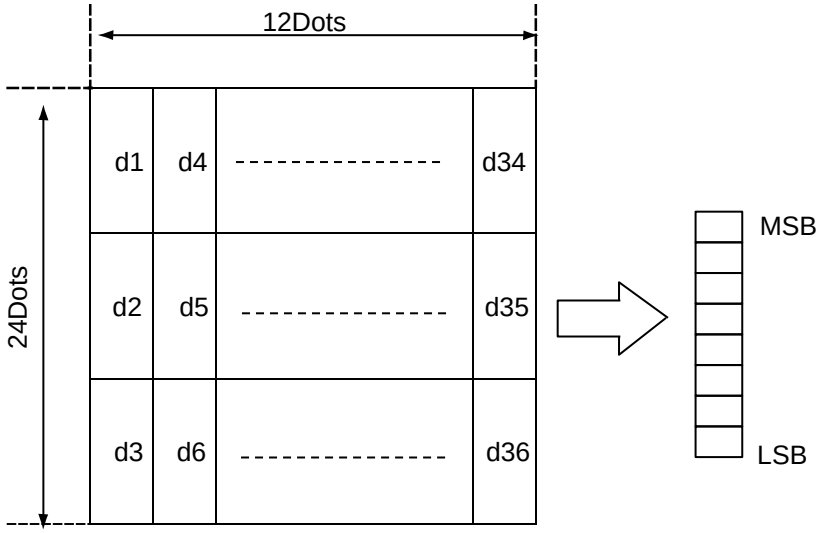
a. When the printer is initialized (ESC@)
b. When download bit images are defined (GS*)
c. When download characters are deleted (ESC?)
d. When NV bit images are defined (FSq)
e. When the printer power is turned off

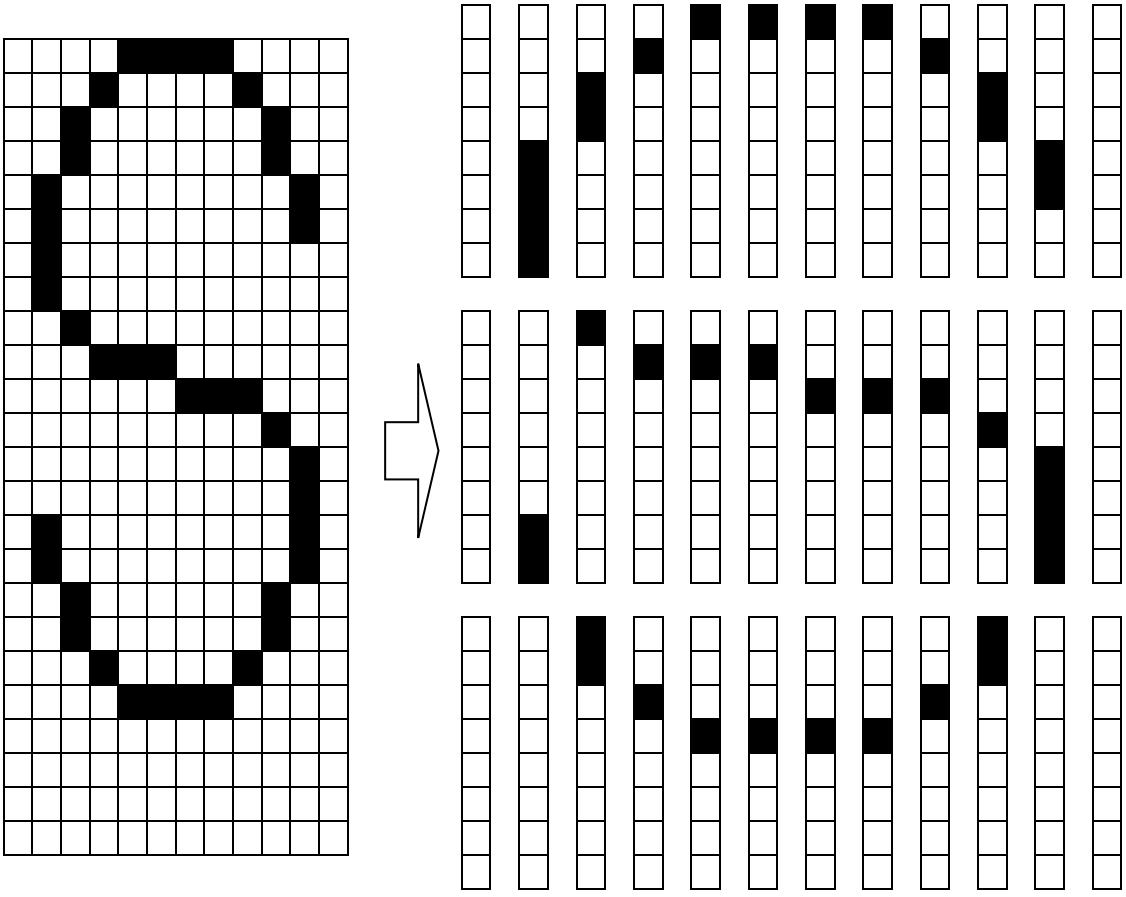
STAR
Font configurations and regions for effective parameters on STAR printers

Character Fonts	Horizontal Dots x Vertical Dots	y	x	Data Count
Font A	12 x 24 Dots	3	12	36 bytes
Font B	9 x 24 Dots	3	9	27 bytes

Command Emulator
Can be registered simultaneously to download bit images.

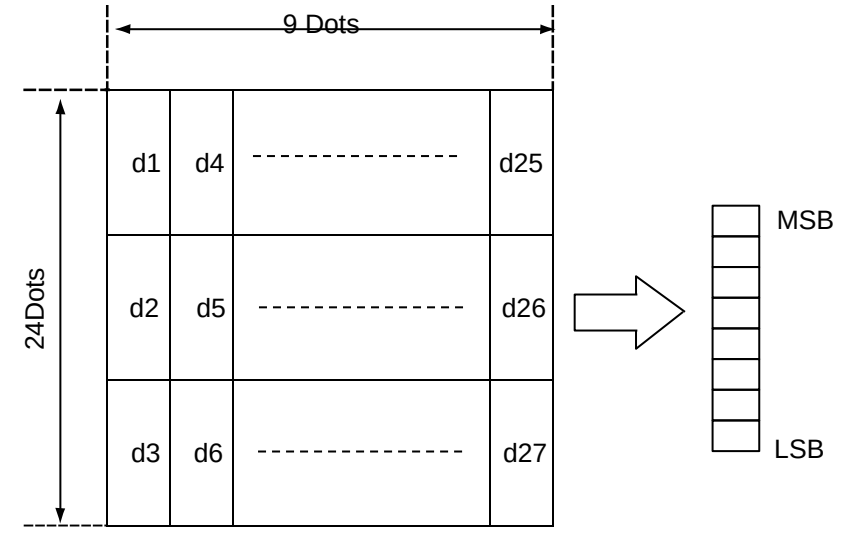
[Ex.:] When Font A (12 x 24) is selected

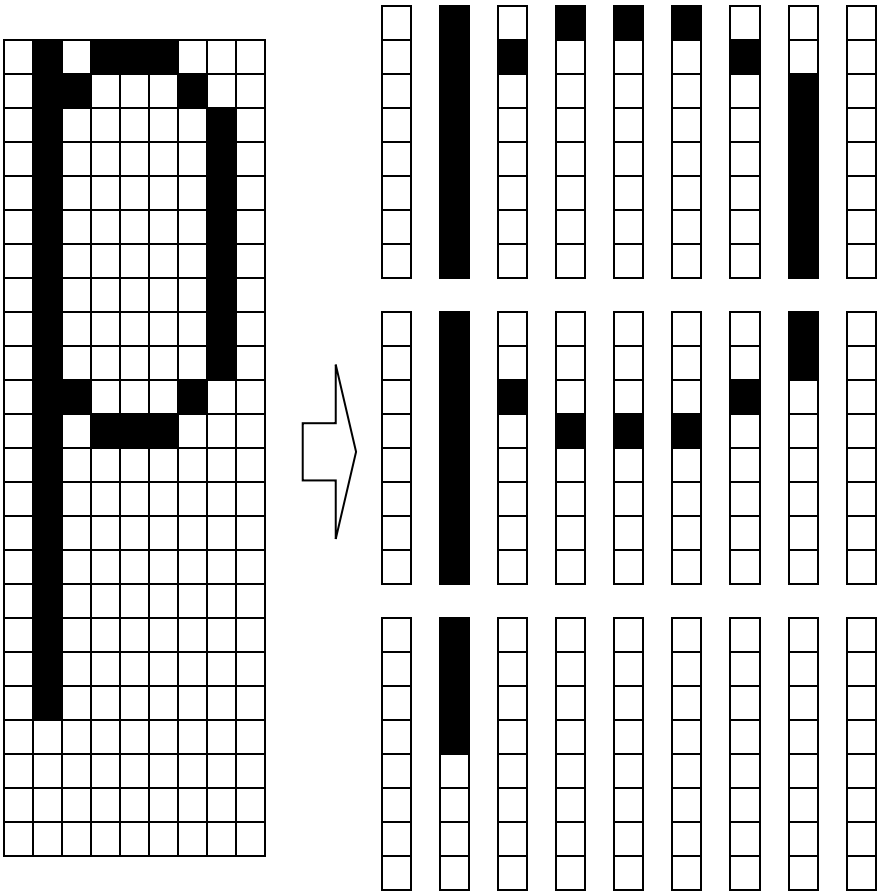




d1=<00>H d4=<0F>H d7=<30>H ····
d2=<00>H d5=<03>H d8=<80>H ····
d3=<00>H d6=<00>H d9=<C0>H ····

[Ex.:] When Font B (9 x 24) is selected





d1=<00>H d4=<FF>H d7=<40>H ····

d2=<00>H d5=<F3>H d8=<20>H ····

d3=<00>H d6=<F0>H d9=<00>H ····

2-2-7) Bit Image Graphics

ESC * m nL nH d1…dk

Name 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

Defined Region
m = 0,1,32,33
0 ≦ nL ≦ 255
0 ≦ nH ≦ 3
0 ≦ d ≦ 255

Function Selects a bit-image mode in mode *m* for the number of dots specified by *nL* and *nH*.

m	Mode	Number of Vert. Dir. Dots	Number of Hor. Dir. Dots	Density of Hor. Dir. Dots	Data Count (k)
0	8-dot single density	8	60 DPI	90 DPI	nL+nH×256
1	8-dot double density	8	60 DPI	180 DPI	nL+nH×256
32	24-dot single density	24	180 DPI	90 DPI	(nL+nH×256) ×3
33	24-dot double density	24	180 DPI	180 DPI	(nL+nH×256) ×3

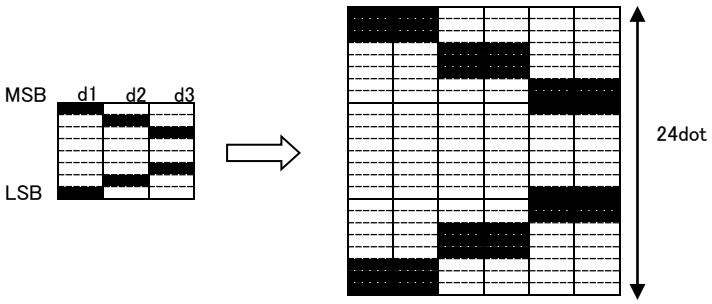
Details
- If the value of m is out of the specified range, nL and subsequent data are processed as normal data.
- nL and nH indicate the number of dots in the bit image in the horizontal direction to print. The number of dots is calculated by (nL + nH x256).
- If the bit-image data input exceeds the number of dots that can be printed on one line, the excess data is discarded.
- d indicates the bit-image data. Bits that correspond to the dots to print are 1, and the bits that correspond to the dots that are not printed are 0.
- After processing bit images, the printer returns to normal data processing.
- Excluding upside-down printing, print modes (emphasized printing, double printing, underlines, character sizes and black/white inverted printing) are unaffected.
- For details on the bit image expansion position in the page mode, see section 2. Explanations of the Page Mode.

STAR
- Dot density (when the STAR printer head = 203 DPI) on STAR printers.

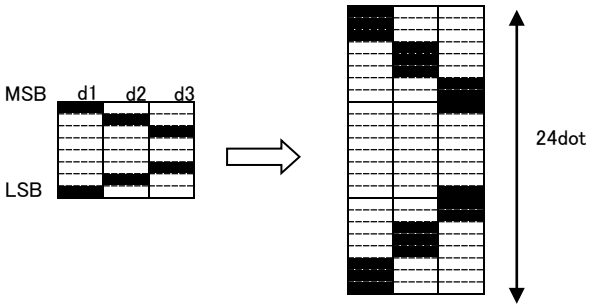
m	Mode	Density of Vert. Direction Dots	Density of Hor. Direction Dots
0	8-dot single density	67 DPI	101 DPI
1	8-dot double density	67 DPI	203DPI
32	24-dot single density	203DPI	101 DPI
33	24-dot double density	203DPI	203DPI

- Fonts A and B and Chinese characters can be used together.

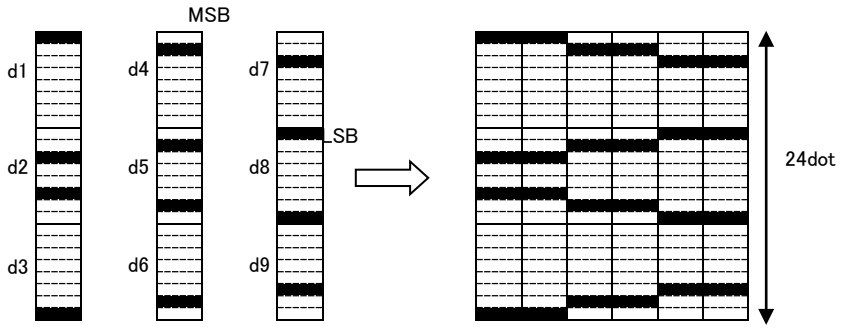
<8Dots Single Density>



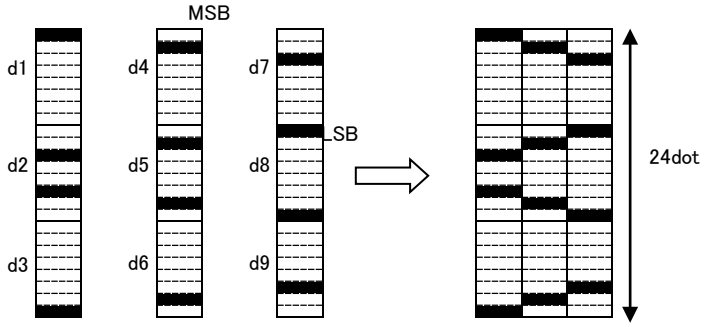
<8Dots Double Density>



<24Dots Single Density>



<24Dots Double Density>



FS p n m

Name: Print NV bit image

Code:

ASCII	FS	p	n	m
Hex.	1C	70	n	m
Decimal	28	112	n	m

Defined Region: $1 \leqq n \leqq 255$

$0 \leqq m \leqq 3, 48 \leqq m \leqq 51$

Function: Prints NV bit image n using mode m.

m	Mode	Density of Vertical Direction Dots	Density of Horizontal Direction Dots
0, 48	Normal Mode	180 DPI	180 DPI
1, 49	Double-wide Mode	180 DPI	90 DPI
2, 50	Double-tall Mode	90 DPI	180 DPI
3, 51	Quadruple Mode	90 DPI	90 DPI

- n specifies the NV bit image number.
- m specifies the bit-image mode.

Details:

- NV bit image is a bit image defined in non-volatile memory by FS q and printed by this command.
- This command is ignored when the specified NV bit image n is undefined.
- This command is effective only when no data exists in the print buffer in standard mode.

If data exists, 2 bytes are ignored.

- When in page mode, this command is disabled.
- Excluding upside-down printing, print modes (emphasized printing, double printing, underlines, character sizes, black/white inverted printing and 90 degree clockwise rotation) are unaffected.
- If bit image specification is of a size that exceeds the print region, the data in the print region is targeted for printing, but the excessive data is not printed.
- This command feeds dots (for the height *n* of the NV bit image) in normal and double-width modes, and (for the height of the NV bit image n x 2) in double-height and quadruple modes, regardless of the line spacing specified by ESC 2 (Set default line spacing) or ESC 3 (Set line feed amount).
- After printing the bit image, this command sets the print position to the top of the line and processes the subsequent data as normal data.

STAR:

- Dot density (when the STAR printer head = 203 DPI) on STAR printers.

m	Mode	Density of Vertical Direction Dots	Density of Horizontal Direction Dots
0, 48	Normal Mode	203 DPI	203 DPI
1, 49	Double-wide Mode	203 DPI	101 DPI
2, 50	Double-tall Mode	101 DPI	203 DPI
3, 51	Quadruple Mode	101 DPI	101 DPI

Command Emulator: Register after data remaining in the print buffer is printed.
Disabled in Page Mode.

FS q n [xL xH yL yH d1...dk] 1... [xL xH yL yH d1...dk] n

Name	Define NV bit image								
Code	ASCII	FS	q	n	[xL xH yL yH d1...dk]1	...	[xL xH yL yH d1...dk]	n	
	Hex.	1C	71	n	[xL xH yL yH d1...dk]1	...	[xL xH yL yH d1...dk]	n	
	Decimal	28	113	n	[xL xH yL yH d1...dk]1	...	[xL xH yL yH d1...dk]	n	

Defined Region

$1 \leqq n \leqq 255$
$0 \leqq xL \leqq 255$
$0 \leqq xH \leqq 3$ However, $1 \leqq (xL+xH\times256) \leqq 1023$
$0 \leqq yL \leqq 255$
$0 \leqq yH \leqq 1$ However, $1 \leqq (yL+yH\times256) \leqq 288$
$0 \leqq d \leqq 255$
$k = (xL+xH\times256) \times (yL+yH\times256) \times 8$

Function

Defines the specified NV bit image.
- n specifies the number of NV bit images to define.
- xL and xH specify the horizontal direction for one NV bit image (xL + xH x 256) x 8 dots.
- yL and yH specify the vertical direction for one NV bit image (yL + yH x 256) x 8 dots.

Details

- This command erases all previously defined NV bit images. The printer cannot redefine only one of several data definitions that had been defined before. Therefore, all data must be resent.
- Mechanical operations (such as initializing the position of the print head when the cover is open, feeding paper using a switch) cannot be executed from the time this command commences its process until a hardware reset is completed.
- NV bit image is a bit image defined by this command in non-volatile memory and is printed by the FS p (Print NV bit image) command.
- This command is effective only when processed at the top of the line when standard mode is being used.
- When in page mode, this command is disabled.
- This command is effective when 7 bytes of FS to yH of the command are processed normally.
- When the amount of data exceeds the capacity left in the range defined by xL, xH, yL, yH, the printer processes an argument that is out of the defined range.
- This command is invalid when processing an argument that is out of the defined range with the initial NV bit image data.
- The printer terminates processing of this command and starts writing data to the non-volatile memory if an argument out of the defined range is processed on the second and subsequent NV bit image data. This invalidates the NV bit image being defined (making it undefined), but the NV bit images prior to that are valid.
- d specifies defined data. Bits that correspond to the dots to print are 1, and the bits that correspond to the dots that are not printed are 0.
- An n number of NV bit images are defined in ascending order from 01H. Therefore, The first data of [xLxHyLyHd1…dk] is an NV bit image of the number 01H. The final data of [xLxHyLyHd1…dk] is the NV bit image of the number n.
  This matches with the NV bit image number that is specified for NV bit image printing (by FS p).
- See the printer's product specifications manual for details on NV memory capacity.
- One NV bit image definition data is configured by [xL xH yL yH d1…dk]. Therefore, if defining only one NV bit image data, n = 1. The data of [xL xH yL yH d1…dk] is processed only once. This uses ([data: (xL + xH x 256) x (yL + yH x 256) x 8] + [Data: 4]) of non-volatile memory.
- The maximum region for NV bit image definition varies according to the printer model. Several NV bit images can be defined, but NV bit image data that exceeds the maximum definition region with a total capacity of (data bit image data + header) cannot be defined.

- The printer is in a BUSY state just prior to writing to the non-volatile memory. The printer will be in a BUSY state prior to writing data regardless of the conditions for a BUSY state.
- The sending of ASB status and detection of status are not possible while processing this command even when the ASB function is specified.
- When processing this command while defining a macro, the macro definition is terminated and the command commences with processing.
- NV bit images that have been defined are not initialized by the ESC @ (Initialize printer), a reset or by turning off the printer's power.
- This command only defines the NV bit image, but it does not print it. To print an NV bit image, use FS p (Print NV bit image).

Notes:

- There is the potential of damaging the non-volatile memory by overusing the command, so only use this command once a day to write to the non-volatile memory.
- The printer executes a hardware reset just after writing to the non-volatile memory. Therefore, download characters and download bit images and macros are handled as being undefined and the reception buffer and print buffer are cleared. The printer returns all settings to their default status.
- The printer may enter a BUSY state while writing data to the non-volatile memory when using this command. While the printer is BUSY, the printer will stop receptions so data will not be received from the host (including real-time commands).

STAR

- Dot density (when the STAR printer head = 203 DPI) on STAR printers.

m	Mode	Density of Vertical Direction Dots	Density of Horizontal Direction Dots
0, 48	Normal Mode	203 DPI	203 DPI
1, 49	Double-wide Mode	203 DPI	101 DPI
2, 50	Double-tall Mode	101 DPI	203 DPI
3, 51	Quadruple Mode	101 DPI	101 DPI

Command Emulator

Write to xml file.

After registration: Settings on the Command Emulator are initialized to the xml file contents. (<ESC> @ operation + clear external character registration)

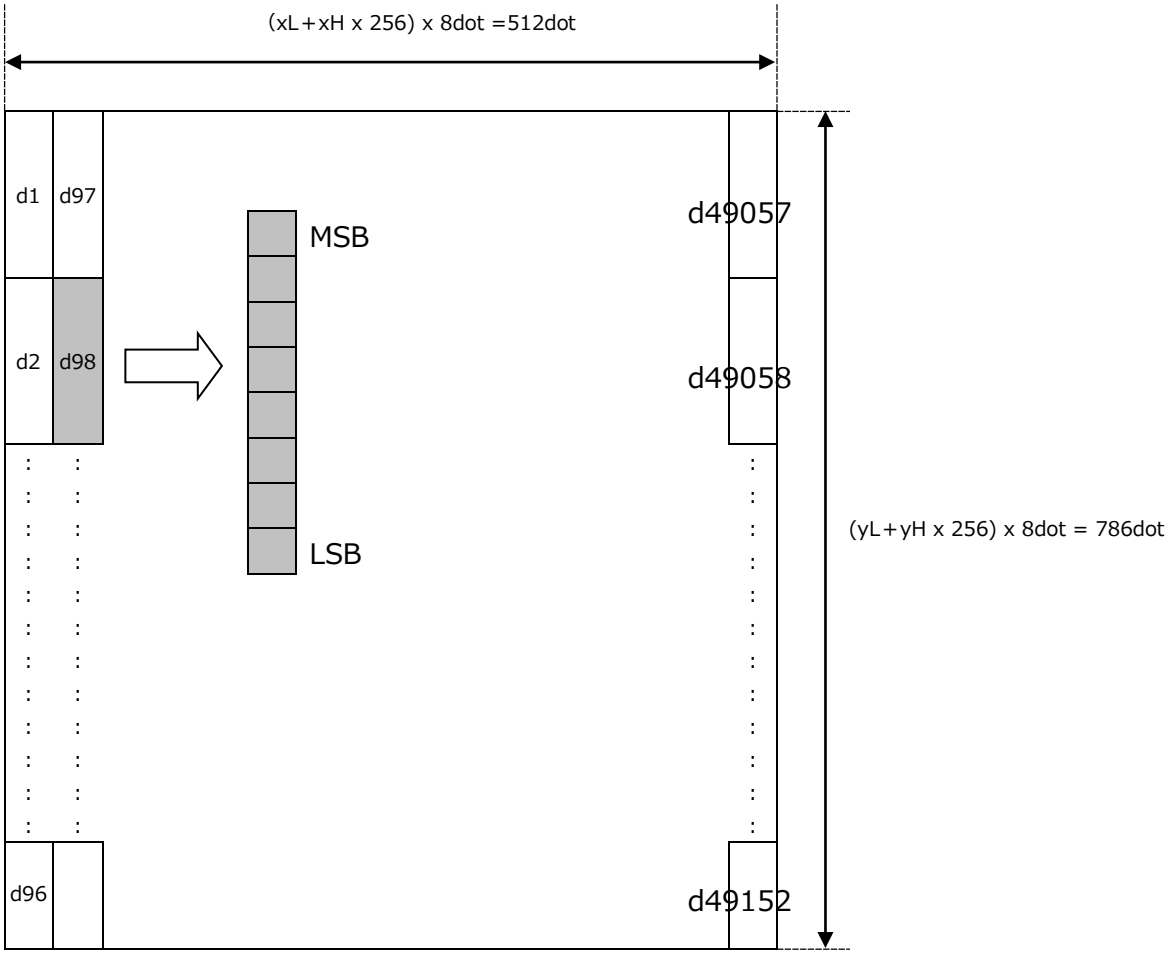
Registration size up to 65535 x 65535 (normally 1023 x 288)

4 bytes ignored when command is ignored.

Disabled in Page Mode.

[Ex.:]

When xL = 64, xH = 0, yL = 96, yH = 0



GS * xy d1 … d (xX yX 8)

Name	Define download bit images				
Code	ASCII	GS	*	x	yd1...d (x×y×8)
	Hex.	1D	2A	x	yd1...d (x×y×8)
	Decimal	29	42	x	yd1...d (x×y×8)

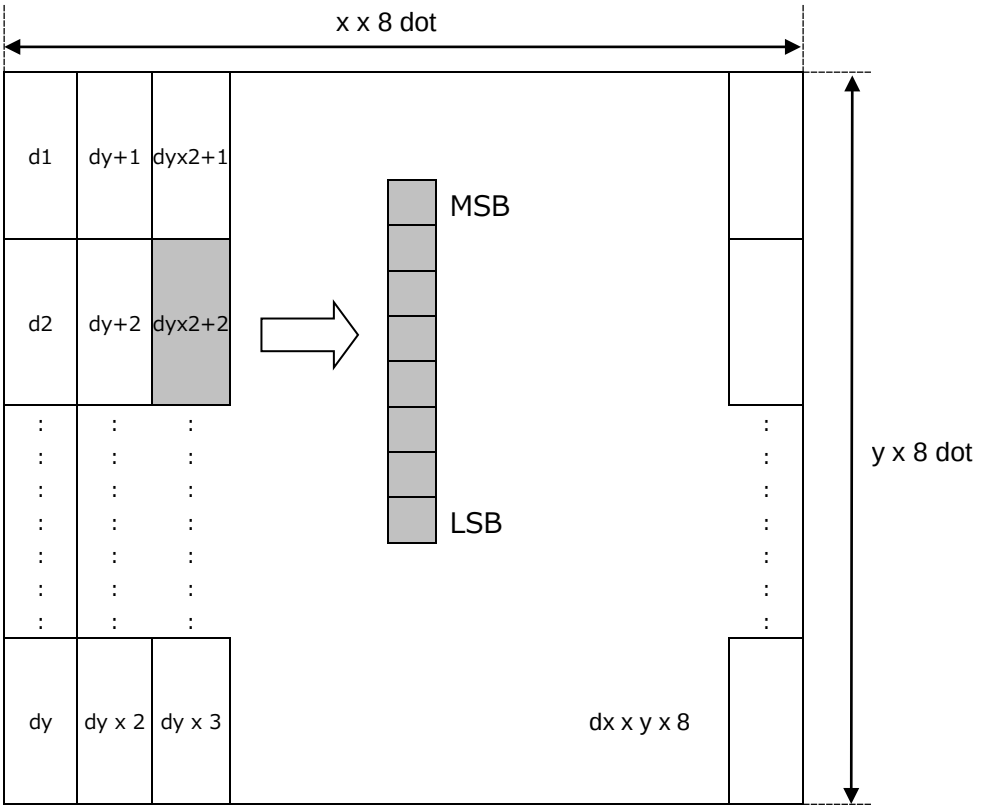
Defined Region
1 ≦ x ≦ 255
1 ≦ y ≦ 48 However, x × y ≦ 1536
0 ≦ d ≦ 255

Function
Defines the download bit image of the number of dots specified by x and y.
- x specifies the number of dots in the horizontal direction.
- y specifies the number of bytes in the vertical direction.

Details
- Horizontal direction dot count is x X 8 dots; Vertical direction dot count is y X 8 dots
- d indicates the bit-image data.
  Bits that correspond to the dots to print are 1, and the bits that correspond to the dots that are not printed are 0.
- GS * (define download bit images) and ESC& (define download characters) cannot both be defined simultaneously. Download character definitions are cleared by executing this command.
- Defined download bit images are cleared under the following executions.

a. ESC @: Initialize printer
b. ESC &: Define download characters
c. FS q: Define NV bit image
d. When the printer is reset or the power is turned off

- The following illustration shows the relationship between download bit images and the print data.



Command Emulator
Can be registered simultaneously to download characters.

GS / m

Name: Print download bit images

Code:

ASCII	GS	/	m
Hex.	1D	2F	m
Decimal	29	47	m

Defined Region: 0 ≦ m ≦ 3, 48 ≦ m ≦ 51

Function: Prints defined download bit image data using mode m.

m	Print Mode	Density of Vertical Direction Dots	Density of Horizontal Direction Dots
0, 48	Normal Mode	180 DPI	180 DPI
1, 49	Double-wide Mode	180 DPI	90 DPI
2, 50	Double-tall Mode	90 DPI	180 DPI
3, 51	Quadruple Mode	90 DPI	90 DPI

Details:

- This command is ignored if there is no download bit image data defined.
- This command is effective only when no data exists in the print buffer in standard mode.
- Excluding upside-down printing, print modes (emphasized printing, overlap printing, underlines, character sizes and black/white inverted printing) are unaffected.
- If there is download bit image data defined that exceeds the print region, that excess portion is not printed.
- Regardless of the line feed amount set by ESC 2 (Initial line feed amount setting) and ESC 3 (Line feed amount setting), a paper feed is executed for the amount of dots (the height of the download bit image n) when in normal mode and horizontal double wide mode, and for the amount of dots (the height of the download bit image n x 2) when in double high mode and double wide double high mode.
- See section 2.3.2 for details on the download bit image expansion position in page mode.

STAR:

- Dot density (when the STAR printer head = 203 DPI) on STAR printers.

m	Mode	Density of Vertical Direction Dots	Density of Horizontal Direction Dots
0, 48	Normal Mode	203 DPI	203 DPI
1, 49	Double-wide Mode	203 DPI	101 DPI
2, 50	Double-tall Mode	101 DPI	203 DPI
3, 51	Quadruple Mode	101 DPI	101 DPI

Command Emulator: Disabled in Page Mode.

GS v 0 m xL xH yL yH d1 … dk

Name: Print raster bit images

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

Defined Region:

0 ≦ m ≦ 3, 48 ≦ m ≦ 51
0 ≦ xL ≦ 128, xH=0 (0 ≦ xL +xH×256) ≦ 128)
0 ≦ yL ≦ 255, 0 ≦ yH ≦ 15 (0 ≦ yL +yH×256 ≦ 4095)
0 ≦ d ≦ 255
k = (xL+xH×256) × (yL+yH×256) However, k ≠ 0

Function: Prints raster method bit images using mode m.

m	Mode	Density of Vert. Dir. Dots	Density of Hor. Dir. Dots
0, 48	Normal Mode	180 DPI	180 DPI
1, 49	Double-wide Mode	180 DPI	90 DPI
2, 50	Double-tall Mode	90 DPI	180 DPI
3, 51	Quadruple Mode	90 DPI	90 DPI

Details:

- xL and xH specify the horizontal direction data count for one bit image (xL + xH x 256) in bytes.
- yL and yH specify the vertical direction data count for one bit image (yL + yH x 256) in dots.
- This command is effective only when there is no print data in the print buffer when standard mode is selected.
- Print modes (character size, enhanced characters, duplicated characters, upside down, unline, black/white inverted, etc.) do not affect raster bit images.
- Data not in the print region is discarded in dot increments.
- It is possible to specify any position to start printing raster bit images according to HT (Horizontal tab), ESC $ (Specify absolute position), ESC ¥ (Specify relative position) and GS L (Specify let margin). However, if the print starting position is no a multiple of 8, printing speed will decrease.
- ESC a (Position alignment) settings are effective also for raster bit images.
- When executing this command while defining a macro, the macro definition is terminated and the command commences with processing.
  The macro during this time is undefined.
- d specifies defined data.
- Bits that correspond to the dots to print are 1, and the bits that correspond to the dots that are not printed are 0.

STAR:

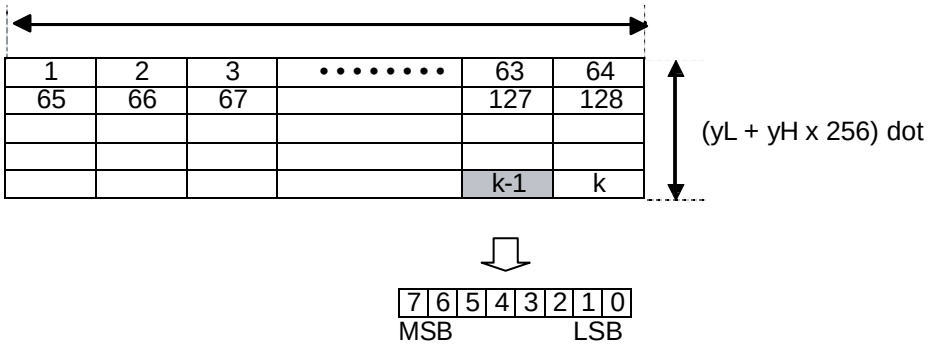
- On STAR printers, the ACK pulse width when using a parallel interface is fixed at 1 µsec.
- When in page mode, transmission of this command is prohibited. If sent, the results of the print are not guaranteed.
- Dot density (when the STAR printer head = 203 DPI) on STAR printers.

m	Mode	Density of Vert. Dir. Dots	Density of Hor. Dir. Dots
0, 48	Normal Mode	203 DPI	203 DPI
1, 49	Double-wide Mode	203 DPI	101 DPI
2, 50	Double-tall Mode	101 DPI	203 DPI
3, 51	Quadruple Mode	101 DPI	101 DPI

Command Emulator: When data remains in the print buffer, data is received and discarded for the amount of the counter.
Disabled in Page Mode.

[Ex.:] When xL + xH × 256 = 64

(xL+xHx256) x 8dot = 512 dot



FS g 1 m a1 a2 a3 a4 nL nH d1 ... dk

Name	Write data to user NV memory										
Code	ASCII	FS	g	1	m	a1	a2	a3	a4	nL	nH d1...dk
	Hex.	1C	67	31	m	a1	a2	a3	a4	nL	nH d1...dk
	Decimal	28	103	49	m	a1	a2	a3	a4	nL	nH d1...dk

Defined Region

m = 0
0 ≦ {a1+ (a2×256) + (a3 × 65536) + (a4×16777216) } ≦ 1023
1 ≦ {nL+ (nH×256) } ≦ 1024
32 ≦ d ≦ 255
k = {nL+ (nH×256) }

Function

Stores data in the user NV memory.

STAR

• STAR printers ignore this command. (It receives and discards the writing data of nL + nH x 256.)

FS g 2 m a1 a2 a3 a4 nL nH

Name	Read user NV memory data										
Code	ASCII	FS	g	2	m	a1	a2	a3	a4	nL	nH
	Hex.	1C	67	32	m	a1	a2	a3	a4	nL	nH
	Decimal	28	103	50	m	a1	a2	a3	a4	nL	nH

Defined Region

m = 0
0 ≦ {a1+ (a2×256) + (a3×65536) + (a4×16777216) } ≦ 1023
1 ≦ {nL+ (nH×256) } ≦ 80

Function

Sends the data in the user NV memory.

STAR

• STAR printers ignore this command.
(They receive and discard FS g 2 m a1 a2 a3 a4 nL nH.)

2-2-8) Bar Codes

GS H n

Name: Select HRI character print position
Code:

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

Defined Region: 0 ≦ n ≦ 3, 48 ≦ n ≦ 51
Initial Value: n = 0
Function: Selects the printing position of HRI characters when printing bar codes.

n	Printing Position
0, 48	No print
1, 49	Above bar code
2, 50	Below bar code
3, 51	Above and below bar code (both)

Details:
- HRI is an acronym for Human Readable Interpretation.
- HRI characters are printed with fonts selected by GS f (Select HRI character font).

GS f n

Name: Select HRI character font
Code:

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

Defined Region: n = 0,1,48,49
Initial Value: n = 0
Function: Selects the printing position of HRI character font when printing bar codes.

n	Font
0, 48	Selects Font A (12 x 24).
1, 49	Selects Font B (9 x 17).

Details:
- HRI is an acronym for Human Readable Interpretation.
- HRI characters are printed in a position specified GS H (Select HRI character print position).

STAR: The following are the HRI character font configurations on STAR printers.

Character Fonts	Horizontal Dots x Vertical Dots
Font A	12 x 24 Dots
Font B	9 x 24 Dots

GS h n

Name	Set bar code height			
Code	ASCII	GS	h	n
	Hex.	1D	68	n
	Decimal	29	104	n

Defined Region 1 ≦ n ≦ 255
Initial Value n = 162
Function Sets bar code height to n dots.
Command Emulator When n=0, command is ignored.

1. GS k m d1 … dk NUL, 2. GS k m n d1 … dk

Name	Print bar code				
Code	1. ASCII	GS	k	md1...dk	NUL
	Hex.	1D	6B	md1...dk	NUL
	Decimal	29	107	md1...dk	NUL
	2. ASCII	GS	k	m	nd1...dk
	Hex.	1D	6B	m	nd1...dk
	Decimal	29	107	m	nd1...dk

Defined Region
1. 0 ≦ m ≦ 6 The definition region of k and d differ according to the bar code type.
2. 65 ≦ m ≦ 73 The definition region of n and d differ according to the bar code type.
3. 65 ≦ m ≦ 78 The definition region of n and d differ according to the bar code type.

Function
Selects bar code type and prints bar codes.

For 1:

m	Bar Code Type	Defined region of k	Defined region of d
0	UPC-A	11 ≦ k ≦ 12	48 ≦ d ≦ 57
1	UPC-E	11 ≦ k ≦ 12	48 ≦ d ≦ 57
2	JAN13 (EAN13)	12 ≦ k ≦ 13	48 ≦ d ≦ 57
3	JAN8 (EAN8)	7 ≦ k ≦ 8	48 ≦ d ≦ 57
4	CODE39	1 ≦ k	48 ≦ d ≦ 57, 65 ≦ d ≦ 90, 32, 36, 37, 43, 45, 46, 47
5	ITF	2 ≦ k (However, this is an even number.)	48 ≦ d ≦ 57
6	CODABAR	1 ≦ k	48 ≦ d ≦ 57, 65 ≦ d ≦ 68, 36, 43, 45, 46, 47, 58

For 2:

m	Bar Code Type	Defined region of n	Defined region of d
65	UPC-A	11 ≦ n ≦ 12	48 ≦ d ≦ 57
66	UPC-E	11 ≦ n ≦ 12	48 ≦ d ≦ 57
67	JAN13(EAN13)	12 ≦ n ≦ 13	48 ≦ d ≦ 57
68	JAN8(EAN8)	7 ≦ n ≦ 8	48 ≦ d ≦ 57
69	CODE39	1 ≦ n ≦ 255	48 ≦ d ≦ 57, 65 ≦ d ≦ 90,32, 36, 37, 43, 45, 46, 47
70	ITF	2 ≦ n ≦ 255 (Even number)	48 ≦ d ≦ 57
71	CODABAR	1 ≦ n ≦ 255	48 ≦ d ≦ 57, 65 ≦ d ≦ 68,36, 43, 45, 46, 47, 58
72	CODE93	1 ≦ n ≦ 255	0 ≦ d ≦ 127
73	CODE128	2 ≦ n ≦ 255	0 ≦ d ≦ 127

Details

For 1:

- This command is quit by the NULL code.
- For UPC-A and UPC-E, a bar code is printed when 12 bytes of bar code data are input. Subsequent data is processed as normal data.
- For JAN13 (EAN13), a bar code is printed when 13 bytes of bar code data are input. Subsequent data is processed as normal data.
- For JAN8 (EAN8), a bar code is printed when 8 bytes of bar code data are input. Subsequent data is processed as normal data.
- The data count for ITF bar codes is always even numbered. If the data count is odd numbered, the last data is ignored.

For 2:

- n specifies the data count. n bytes from the next data is processed as bar code data.
- If n is outside of the defined region, the command is stopped and normal printing commences from subsequent data.
- ITF bar code data count must always be odd. The last data will be ignored for even numbered data.

When in standard mode:

- If d is outside of the defined region, only a paper feed is executed and normal printing commences from subsequent data.
- If the horizontal width of the bar code exceeds the print region of one line, the paper is fed without printing the bar code.
- Executes a paper feed for the height of the bar code (including HRI characters when HRI character printing is specified) regardless of the line feed amount using the following commands.
  a. ESC 2: Set default line spacing
  b. ESC 3: Set line feed amount
- This command is effective only when no data exists in the print buffer. If there is data in the print buffer, data after m is printed as normal data.
- Sets the next print position to the beginning of the next line after printing the bar code.
- Print mode (enhanced printing, duplex printing, underlines, character size, 90˚ rotation) is unaffected, except upside-down printing.

When in page mode:

- Executes only a bar code expansion but does not print it. After expanding the bar code, the next dot after the last data of the bar code is the starting position for the expansion of subsequent data.
- If d is outside of the defined region, the command is stopped and normal printing commences from subsequent data. The position for starting data expansion does not move.
- If the horizontal width of the bar code exceeds the print region of one line, the data expansion starting position is moved to the left side outside the printing region without printing the bar code.

<When using CODE 93 bar code (m = 72)>

• Prints an HRI character (□) of the start characters at the top of the HRI character string.
• Prints an HRI character (□) of the end characters at the top of the HRI character string.
• Prints HRI characters of the control characters (00H to 1FH and 7FH) combining (■) and one letter of the alphabet.

Control Characters			HRI Characters	Control Characters			HRI Characters
ASCII	Hex.	Decimal		ASCII	Hex.	Decimal	
NUL	00	0	■U	DLE	10	16	■P
SOH	01	1	■A	DC1	11	17	■Q
STX	02	2	■B	DC2	12	18	■R
ETX	03	3	■C	DC3	13	19	■S
EOT	04	4	■D	DC4	14	20	■T
ENQ	05	5	■E	NAK	15	21	■U
ACK	06	6	■F	SYN	16	22	■V
BEL	07	7	■G	ETB	17	23	■W
BS	08	8	■H	CAN	18	24	■X
HT	09	9	■I	EM	19	25	■Y
LF	0A	10	■J	SUB	1A	26	■Z
VT	0B	11	■K	ESC	1B	27	■A
FF	0C	12	■L	FS	1C	28	■B
CR	0D	13	■M	GS	1D	29	■C
SO	0E	14	■N	RS	1E	30	■D
SI	0F	15	■O	US	1F	31	■E
				DEL	7F	127	■T

<When using CODE 128 bar code (m = 73)>

• See the ECS/POS Command Specifications Manual.
• To print CODE 128 bar codes on this printer, be careful of the following points to send the bar code data.

a. At the top of the bar code string, always set the code set selection characters (either of the CODE A, CODE B, or CODE C) to select the initial code set.

b. Specify special characters using the two characters of '{' and one subsequent character. Also, the '{' of the ASCII characters are specified by sending '{' for two characters consecutively.

Special Characters	Transmission Data		
	ASCII	Hex.	Decimal
SHIFT	{S	7B, 53	123, 83
CODE A	{A	7B, 41	123, 65
CODE B	{B	7B, 42	123, 66
CODE C	{C	7B, 43	123, 67
FNC1	{1	7B, 31	123, 49
FNC2	{2	7B, 32	123, 50
FNC3	{3	7B, 33	123, 51
FNC4	{4	7B, 34	123, 52
'{'	{{	7B, 7B	123, 123

- If the top of the bar code data string is not a code set selection character, the command is stopped and processing is handled normally from subsequent data.
- If the combination of '{' and 1 character immediately after does not conform to either of the special characters, the command is stopped and processing is handled normally from subsequent data.
- If a character that cannot be used with the selected code set is received, the command is

stopped and processing is handled normally from subsequent data.
- HRI characters that correspond to shift characters and code set selection characters are not printed.
- HRI characters of function characters are printed with a space.
- HRI characters of the control characters (00H to 1FH and 7FH) are printed with a space.

STAR

- If printing bar codes that require check digits on STAR printers, even if the check digit is sent as a bar code, the check digit that was calculated on the printer is printed.

Command Emulator

When bar code data is outside of definition, printer performs a line feed for the currently set line feed amount.
When data remains in the print buffer, data is discarded until NULL, or data is discarded for the amount of the counter.
To receive characters that cannot be used with Code 128, data is discarded until NULL, or data is discarded for the amount of the counter.
Disabled in Page Mode.

GS w n

Name: Set bar code horizontal size

Code:

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

Defined Region: $1 \leqq n \leqq 6$

Initial Value: n = 3

Function: Sets the bar code horizontal size.

n	Multi-level Bar Code Module Width [mm]	Binary Level Bar Code	
		Fine Element Width [mm]	Thick Element Width [mm]
1	0.141	0.141	0.423
2	0.282	0.282	0.706
3	0.423	0.423	1.129
4	0.564	0.564	1.411
5	0.706	0.706	1.834
6	0.847	0.847	2.258

Details:

- Multi-level bar codes specify the follow bar code types.
  UPC-A, UPC-E, JAN13 (EAN13), JAN8 (EAN8), CODE 93, CODE 128
- Binary level bar codes specify the follow bar code types.
  CODE39, ITF, CODABAR

STAR:

- The bar codes that are printed do not conform to each standard, so you should confirm before actual use.
  Particularly, if n = 1 is specified, the bar code is not guaranteed.
- The following are the module widths on STAR printers.

n	Multi-level Bar Code Module Width [mm]	Binary Level Bar Code	
		Fine Element Width [mm]	Thick Element Width [mm]
1	0125	0.125	0.375
2	0.25	0.25	0.625
3	0.375	0.375	1.125
4	0.5	0.5	1.375
5	0.625	0.625	1.75
6	0.75	0.75	2.25

2-2-9) Cutter Control

a) GS V m , b) GS V m n

Name	Cut paper				
a)					
Code	ASCII	GS	V	m	
	Hex.	1D	56	m	
	Decimal	29	86	m	
b)					
Code	ASCII	GS	V	m	n
	Hex.	1D	56	m	n
	Decimal	29	86	m	n

Defined Region
1) m = 0,1,48,49
2) m = 65, 66, 0 ≦ n ≦ 255

Function
Executes specified paper cut.

m	Function
0, 48	Full cut
1, 49	Partial cut (one point uncut)
2, 50	Not Used
3, 51	Not Used
65	Feeds paper to (cutting position + [n x basic calculated pitch]) and performs a full cut
66	Feeds paper to (cutting position + [n x basic calculated pitch]) and performs a partial cut (one point uncut)
67	Not Used
68	Not Used

Details
• This command is effective only when processed at the top of the line when standard mode is being used.

1) • Cuts paper.
2) • This command is effective only when processed at the top of the line when standard mode is being used.
   • Feeds paper to the cutting position when n = 0, then cuts the paper.
   • Feeds paper [n x basic calculated pitch] beyond the cutting position when n ≠ 0, then cuts the paper.
   • The basic calculated pitch is set by GSP (Set basic calculated pitch).
   • Use the basic calculated pitch (y) relating to the vertical direction for the paper feed amount. If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.

STAR
• The auto-cut function differs according to the model. A partial cut is executed on those models that cannot perform a full cut.
A full cut is executed on those models that cannot perform a partial cut. Refer to the product specifications manual for the specifications of the auto-cut function.
• Models that do not have the auto-cut function do not cut paper. However, commands that accompany a paper feed of (cutting position + [n x basic calculated pitch]) (n = 65, 66), a paper feed of (tear bar position + [n x basic calculated pitch]) is executed.

2-2-10) Drawer-Kick Connector Control

ESC p m t1 t2

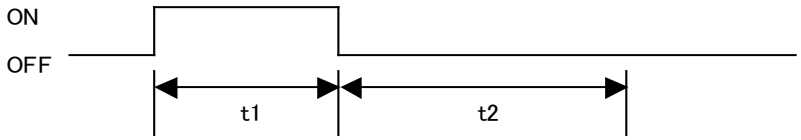
Name	Specify pulse					
Code	ASCII	ESC	p	m	t1	t2
	Hex.	1B	70	m	t1	t2
	Decimal	27	112	m	t1	t2

Defined Region
0 ≦ m ≦ 1, 48 ≦ m ≦ 49
0 ≦ t1 ≦ 255
0 ≦ t2 ≦ 255

Function
This outputs a signal specified by t1 and t2 to the connector pin specified by m.

m	Connector Pin
0, 48	Drawer kick connector pin #2
1, 49	Drawer kick connector pin #5

Details
Drawer kick on time is set to t1 x 2 ms; off time is set to t2 x 2 ms.



When t1 > t2, the value of t2 is processed as t2 = t1.

Command Emulator
The pulse width of the 5th pin of the drawer-kick connector is fixed.

DLE DC4 n m t

Name	Real-time output of specified pulse					
Code	ASCII	DLE	DC4	n	m	t
	Hex.	10	14	n	m	t
	Decimal	16	20	n	m	t

Defined Region
n = 1
m = 0,1
1 ≦ t ≦ 8

Function
This outputs a signal specified by t to the connector pin specified by m.
m = 0: #2 Pin of the drawer kick connector
m = 1: #5 Pin of the drawer kick connector
On time is set to t x 100 msec; Off time is set to t x 100 msec.

Details
- This command is ignored if the printer experiences an error while processing this command.
- This command is ignored while outputting the pulse (while executing either ESC p or DEL DC4) to the connector pin while processing this command.
- This command is processed upon reception.
- This command is executed even when the printer is offline, the reception buffer is full, or there is an error status on serial interface models.
- This command cannot be executed when the printer is busy on parallel interface models. The printer will not enter a BUSY status when offline or when there is an error when BUSY condition of reception buffer full, offline/reception buffer full is handled as a reception buffer full in the DIP switch settings.
- This command is enabled even when the printer specification is disabled by ESC = (select peripheral devices).

Notes:
- Operators must use caution for other commands when a data string that is the same as this command is received because it operates in the same manner as this command.
- Do not use this command to interrupt code strings of other commands that consist of 2 or more codes.

STAR
Printing and drawer drive cannot be performed simultaneously. Therefore, this command is processed when data has been read out from the reception buffer. If the printer is printing, this waits for the printing to end to drive the drawer, so real-time operation is not possible using the reception buffer status.

Command Emulator
Not real-time; the pulse width of the 5th pin of the drawerkick connector is fixed.

2-2-11) Status

DLE EOT n

Name	Real-time status transmission
Code	ASCII DLE EOT n Hex. 10 04 n Decimal 16 4 n
Defined Region	1 ≦ n ≦ 4
Function	Transmits the status specified by n in real-time. n = 1: Transmit printer status n = 2: Transmit offline cause status n = 3: Transmit error cause status n = 4: Transmit continuous paper detector status n = 5: Transmit presenter paper detector status
Details	• The printer transmits the present status. • Each status is represented by one-byte of data. • The printer transmits statuses without confirming whether the host computer can receive data. • This command is executed even when the printer is offline, the reception buffer is full, or there is an error status. • The printer executes this command upon reception. • This command is executed even when the printer is offline, the reception buffer is full, or there is an error status on serial interface models. • This command cannot be executed when the printer is busy on parallel interface models. The printer will not enter a BUSY status when offline or when there is an error when BUSY condition of reception buffer full, offline/reception buffer full is handled as a reception buffer full in the DIP switch settings. • When ASB is enabled , the status transmitted by this command and the ASB status must be differentiated. • This command is enabled even when the printer specification is disabled by ESC = (select peripheral devices). • See next page for details on statuses.
Notes:	• Operators must use caution for other commands when the data string of <10>H<04>H<***n***> (1 ≦ n ≦ 4) is received because it operates in the same manner as this command. Example: In ESC * m nL nH [d1...dk], d1=<10>H, d2=<04>H, d3=<01>H • Do not use this command to interrupt code strings of other commands that consist of 2 or more codes. Example: If you attempt to transmit DLE EOT 3 up to transmitting ESC3 by trying to transmit ESC 3 ***n*** from the host, it is processed as ESC 3 <10>H. Operators must use caution.
Command Emulator	Not real-time; when using a serial port emulator, operations are possible.

1.Printer Status (n = 1)

	Contents	Status	
		“0”	“1”
7	Fixed at “0”		
6	Undefined (“0”)		
5	Undefined (“0”)		
4	Fixed at “1”		
3	ON LINE/OFFLINE Status	ONLINE	OFFLINE
2	Drawer kick connector pin #3	“L”	“H”
	Presenter Cover	Closed	Open
1	Fixed at “1”		
0	Fixed at “0”		

Bit-2: Drawer kick connector #3 pin status is allocated for models not equipped with a presenter; presenter cover status is allocated to those models equipped with a presenter.

2.Online Cause Status (n=2)

Bit	Contents	Status	
		“0”	“1”
7	Fixed at “0”		
6	Error	No error	Error
5	Printing stops because of paper out	None	Print stopped
4	Fixed at “1”		
3	Paper SW input	No SW Input	SW Input
2	Cover Status	Closed	Open
1	Fixed at “1”		
0	Fixed at “0”		

Bit-6: Indicates this error is non-recoverable.

Bit-5: Bit-5 = “1” (Print stopped) when printing stops because there is no paper.

3. Error Cause Status (n=3)

Bit	Contents	Status	
		"0"	"1"
7	Fixed at "0"		
6	Auto-recovery Error	No error	Error
5	Non-recoverable Error	No error	Error
4	Fixed at "1"		
3	Auto-cutter error	No error	Error
2	Black mark error	No error	Error
	Mechanical Error	No error	Error
1	Fixed at "1"		
0	Fixed at "0"		

Bit-2: Black mark error status is allocated for models not equipped with a presenter; mechanical error status is allocated to those models equipped with a presenter.
Black mark error status is set only when the black mark is enabled.
A mechanical error on models provided with a presenter represents a paper jam in the presenter and black mark errors.

4. Continuous Paper Detector Status (n = 4)

Bit	Contents	Status	
		"0"	"1"
7	Fixed at "0"		
6	Paper out sensor	Has paper	Paper Out
5	Paper out sensor	Has paper	Paper Out
4	Fixed at "1"		
3	Near-end Sensor	Has paper	Paper Out
2	Near-end Sensor	Has paper	Paper Out
	Black mark sensor status	White detection	Black detection
1	Fixed at "1"		
0	Fixed at "0"		

Bit-2: This bit functions as the status indicating the near end sensor when the black mark is disabled. When using the black mark, it functions as the status to indicate the black mark sensor status.

GS I n

Name: Transmission of Printer ID

Code:

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

Defined Region: 1 ≦ n ≦ 3, 49 ≦ n ≦ 51, 65 ≦ n ≦ 69

Function: Sends the specified printer ID.

n	Printer ID Type	Specifications
1, 49	Model ID	TM-T88II = 0 x 20
2, 50	Type ID	(See table below; Type ID)
3, 51	ROM Version ID	Depends on the ROM version

<Type ID>

Bit	Function	"0"	"1"
7	Fixed at "0"		
6	Undefined	---	---
5	Undefined	---	---
4	Fixed at "0"		
3	MICR Reader	None	Yes
2	Direct connection to customer display	None	Yes
1	Auto-cutter	None	Yes
0	2 Byte Code Handling	None	Yes

Details

- If using DTR/DSR control when using a serial interface, the printer sends its ID after it has verified that the host has entered a data ready state (the DSR signal is a space). If the host is not able to receive data (DSR signal is a mark), the printer will wait until it is ready.
  The using XON/XOFF control, the printer transmits its ID without verifying whether the host can receive data.
- Because this command is executed while expanding the print buffer, there may be a delay between the reception of the command and printer ID transmission, depending on the reception buffer status.
- (1 ≦ n ≦ 3, 49 ≦ n ≦ 51) sends 1 byte of the printer ID.
- When ASB is enabled, the printer ID transmitted by this command and the ASB status must be differentiated.
- (65 ≦ n ≦ 69) sends the following printer information.
  - Header: Hex. = 5FH/Decimal = 95 (1 byte)
  - Data: Printer Information
  - NUL: Hex. = 00H/Decimal = 0 (1 byte)
- The following processes occur when preparations for transmitting data have been completed.
  1. Executes a READY to BUSY process If the printer is already in a BUSY state, the printer does nothing.
  2. Executes the [Header + Data + NUL] transmission
  3. Executes a BUSY to READY process If the printer is already in a BUSY state for some other reason, it does nothing.

STAR: Spec. A: STAR printers ignore this command if 65 ≦ n ≦ 69 is specified.

Command Emulator: When using a serial port emulator, operations are possible.

GS r n

Name: Transmission of status

Code:

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

Defined Region: n = 1, 2, 49, 50

Function: Sends the specified status.

- n = 1, 49: Sends paper detector status
- n = 2, 50: Sends the drawer kick connector status.

Details:

- When using a serial interface:
- When in DTR/DSR control: Sends the status after checking that the host can received data. If the host is not able to receive data, it waits until reception is possible.
- When in XON/XOFF control:The printer transmits statuses without confirming whether the host computer can receive data.
- Because this command is executed while expanding the reception buffer, there may be a delay between the reception of the command and the status transmission, depending on the reception buffer status.
- When ASB is enabled , the status transmitted by this command and the ASB status must be differentiated.

Detector Status (n = 1, 49)

Bit	Status	"0"	"1"
7	Fixed at "0"		
6	Undefined	---	---
5	Undefined	---	---
4	Fixed at "0"		
3	Paper roll end detector	Has Paper	Paper out
2	Paper roll end detector	Has Paper	Paper out
1	Paper roll near end detector	Has Paper	Paper out
0	Paper roll near end detector	Has Paper	Paper out

Bit-2,3:If the end detector shows there is no paper, the printer will always go offline, so this command is not executed. Therefore, the status of bit - 2 = 1 or bit – 3 = 1 is not sent.

Drawer Kick Connector Status (n = 2, 50)

Bit	Status	"0"	"1"
7	Fixed at "0"		
6	Undefined	---	---
5	Undefined	---	---
4	Fixed at "0"		
3	Undefined	---	---
2	Undefined	---	---
1	Undefined	---	---
0	Drawer kick connector pin #3	"L"	"H"

Command Emulator: When using a serial port emulator, operations are possible.

2-2-12) Chinese Characters

FS ! n

Name: Batch specify Chinese character print mode

Code:

ASCII	FS	!	n
Hex.	1C	21	n
Decimal	28	33	n

Defined Region: 0 ≦ n ≦ 255

Initial Value: n = 0

Function: Batch specifies the Chinese character print mode

Bit	Function	"0"	"1"
7	Underline	OFF	ON
6	Undefined	---	---
5	Undefined	---	---
4	Undefined	---	---
3	Double tall expanded	OFF	ON
2	Expanded wide	OFF	ON
1	Undefined	---	---
0	Undefined	---	---

Details:

- Quadruple-size characters are printed by specifying both double-tall and double-wide modes.
- An underline is applied to Chinese characters for the entire character width, including the FS S (left and right character space amount).
  However, underlines are not applied to portions that have been skipped using HT (horizontal tab) or rotated 90 degrees.
- The width of the Chinese character underline is set by FS - (specify Chinese character underline) regardless of the character size.
- The base line for characters is the same when there are characters having different vertical direction ratios in the same line.
- Chinese character size can be specified by FS W and GS !, but the last executed command is effective.
- Chinese character underline is specified and cancelled by FS -, but the last executed command is effective.

STAR:

- This command is ignored when the memory switch location of use is specified as SBCS (single byte countries).

FS &

Name Specify Kanji mode

Code

ASCII	FS	&
Hex.	1C	26
Decimal	28	38

Function Specifies Kanji mode.

Details

< Japanese Kanji Specifications >

- Kanji mode specification using this command is enabled only when using JIS codes.
- If the Kanji mode is specified, all character codes are handled as 2 byte Chinese character codes.
- Kanji codes are processed in the order first byte, second byte.
- Kanji mode is cancelled as the default setting.
- It is possible to select the Kanji code type using FS C.

< Chinese Kanji Specifications/ Taiwanese Kanji Specifications/ Korean Kanji Specifications>

- If Kanji mode is specified, the first byte that follows processing of the character code equivalent to the first byte of the Kanji code is processed as the second byte of the Kanji code.
- Kanji codes are processed in the order first byte, second byte.
- Kanji mode is specified as the default setting.

STAR

- This command is ignored when the memory switch location of use is specified as SBCS (single byte countries).
- ANK adornment commands are possible for Kanji enhancement (ESC E) and black/white inversion (GS B) However, if the Kanji is enlarged over three times, enhancement is ignored.
- Enhancement of Kanji is ignored for those characters rotated 90 degrees to the right (ESC V) .
- The following shows the 2 byte code defined area.

Specifications	Defined Area	
	Upper Bytes	Lower Bytes
Japanese Kanji Characters JIS Type	0x21 to 0x7E	0x21 to 0x7E
Japanese Kanji Characters/Shift JIS Type	0x81 to 0x9F 0xE0 to 0xEF	0x40 to 0xFE
Chinese Kanji characters	0xA1 to 0xFD	0xA1 to FE (*)
Taiwanese Kanji characters	0xA1 to 0xFD	0x40 to FE
Korean Kanji characters	0xA1 to 0xFD	0xA1 to FE

(*) Bit – 7 of the lower bytes of the Chinese Kanji is always processed as MASK (0xA1A1 → 0xA121)

Command Emulator Expansion beyond 3x; Enhanced printing possible for 90˚ rotation.
This command is ignored if the specification for the location of use is specified as SBCS (single byte countries) by the ESC US f command.

FS – n

Name: Specify/cancel Chinese character underline

Code:

ASCII	FS	-	n
Hex.	1C	2D	n
Decimal	28	45	n

Defined Region: 0 ≦ n ≦ 2, 48 ≦ n ≦ 50

Initial Value: n = 0

Function: Specifies or cancels Chinese character underlines.

n	Function
0, 48	Cancels Chinese character underline
1, 49	Sets to one-dot width Chinese character underline and specifies Chinese character underlines.
2, 50	Sets to two-dot width Chinese character underline and cancels Chinese character underlines.

Details:

- An underline is applied to Chinese characters for the entire character width, including the left and right character space amount.
  However, underlines are not applied to portions that have been skipped using HT (horizontal tab) or rotated 90 degrees to the right.
- When Chinese character underline mode is cancelled by setting the value of n to 0, subsequent Chinese character data is not underlined, and the underline thickness set before the mode is turned off is maintained.
  In default, the underline width for Chinese characters is set to 1 dot.
- The set Chinese character underline width is the constant specified thickness regardless of the size of the character.
- The FS ! (Batch specify Chinese character print mode) command can also turn Chinese character underline mode on or off, but the setting of the last received command is effective.

STAR:

- This command is ignored when the memory switch location of use is specified as SBCS (single byte countries).
- The underline for Chinese characters is applied in the following positions.
- 1-dot width underline → 24th dot
- 2-dot thickness underline → 23rd and 24th dot

FS .

Name	Cancel Chinese character mode
Code	ASCII FS .
	Hex. 1C 2E
	Decimal 28 46
Function	Cancels Chinese characters mode.
Details	< Japanese Language Character Specifications > • Chinese characters mode specification using this command is cancelled only when using JIS codes. • If the Chinese character mode is specified, all character codes are handled as 1 byte ASCII codes. • Chinese character mode is cancelled as the default setting. < Chinese Kanji Specifications/ Taiwanese Kanji Specifications/ Korean Kanji Specifications > • If the Chinese character mode is specified, all character codes are handled as 1 byte ASCII codes. • Chinese character mode is specified as the default setting.
STAR	• This command is ignored when the memory switch location of use is specified as SBCS (single byte countries).
Command Emulator	This command is ignored if the specification for the location of use is specified as SBCS (single byte countries) by the ESC US f command.

FS 2 c1 c2 d1 … dk

Name: Define external character

Code:

ASCII	FS	2	c1	c2d1...dk
Hex.	1C	32	c1	c2d1...dk
Decimal	28	50	c1	c2d1...dk

Defined Region

• c1 and c2 differ according to specifications and code type. See below.

Specifications	c1	c2
Japanese Kanji Specifications (JIS code type)	c1=77H	21H ≦ c2 ≦ 7EH
Japanese Kanji Specifications (SHIFT-JIS code type)	c1=ECH	40H ≦ c2 ≦ 7EH 80H ≦ c2 ≦ 9EH
Chinese Kanji Specifications	c1=FEH	A1H ≦ c2 ≦ FEH
Taiwanese Kanji Specifications	c1=FEH	A1H ≦ c2 ≦ FEH
Korean Kanji Specifications	c1=FEH	A1H ≦ c2 ≦ FEH

• 0 ≦ d ≦ 255

• k = 72

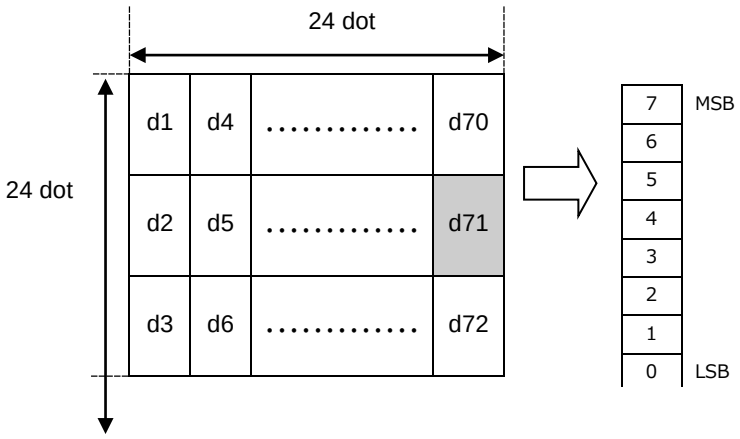
Initial Value: All spaces

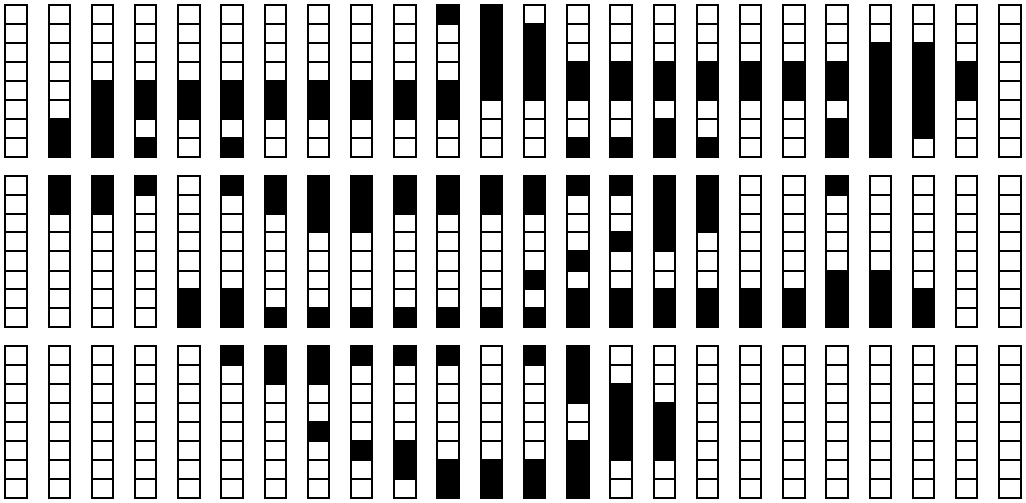
Function: Defines the external character pattern of the Chinese character to a character code specified by c1 and c2.

Details:
- c1 and c2 indicate the Chinese character code that defines the external character; c1 is the first byte; c2 is the second byte.
- d specifies defined data. Bits that correspond to the dots to print are 1, and the bits that correspond to the dots that are not printed are 0.
- Defined data is cleared by ESC @.

STAR:
- This command is ignored when the memory switch location of use is specified as SBCS (single byte countries).
- External character registration of JIS codes and SHIFT-JIS codes for Japanese characters uses the same region.

Command Emulator: Registration not possible for Shift-JIS mode; Can print characters registered in JIS mode.





d1=<00>H	d4=<03>H	d7=<0F>H	d10=<0D>H	d13=<0C>H	d16=<0D>H	・・・
d2=<00>H	d5=<0C>H	d8=<0C>H	d11=<80>H	d14=<03>H	d17=<83>H	・・・
d3=<00>H	d6=<00>H	d9=<00>H	d12=<00>H	d15=<00>H	d18=<80>H	・・・

FS C n

Name: Select Chinese character code type

Code:

ASCII	FS	C	n
Hex.	1C	43	n
Decimal	28	67	n

Defined Region: n = 0, 1, 48, 49

Initial Value: n = 0

Function: Selects the Chinese character code type.

n	Selection
0, 48	JIS Code Type
1, 49	SHIFT-JIS Code Type

Details:

- If using the JIS code type, the Chinese characters codes below are effective. This command is enabled only when using Japanese language specifications.
  First Byte: <21>H to <7E>H
  Second Byte: <21>H to <7E>H
- If using the SHIFT-JIS code type, the Chinese characters codes below are effective.
  First Byte: <81>H to <9F>H and <E0>H to <EF>H
  Second Byte: <40>H to <7E>H and <80>H to <FC>H

STAR:

- This command is ignored when the memory switch location of use is specified as SBCS (single byte countries).

FS S n1 n2

Name	Set Chinese character space amount
Code	ASCII FS S n1 n2 Hex. 1C 53 n1 n2 Decimal 28 83 n1 n2
Defined Region	0 ≦ n1 ≦ 255 0 ≦ n2 ≦ 255
Initial Value	n1 = 0,n2 = 0
Function	Sets the Chinese character left and right space amounts. • Left space amount: n1 x (basic calculated pitch) • Right space amount: n2 x (basic calculated pitch)
Details	• The space amount set by this command is the amount when using standard sized characters. When expanding characters more than double in the horizontal direction, the space amount is [set amount x horizontal direction magnification]. • Space amount can be set independently for both the standard and page modes. • The basic calculated pitch is set by GSP (Set basic calculated pitch). Also, after setting the Chinese character space amount, it is not affected even if the basic calculated pitch is changed. • If there are fractions in the result, correct to the minimum mechanical pitch and discard. • Use the basic calculated pitch (x) for the horizontal direction in standard mode. • The Kanji character width is (“left space amount” + “Kanji font dot count” + “right space amount”) x (basic calculated pitch). (See the information on character specifications in the appropriate printer specifications manual for details on the Kanji font dot count.)) • In page mode, the basic calculated pitch that is used according to the starting point is shown below. a. When the starting point is specified to be upper left or lower right by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (x) for the horizontal direction is used. b. When the starting point is specified to be upper right or lower left by the ESC T command, the basic calculated pitch (y) for the vertical direction is used. c. The maximum value for the left or right space for Chinese characters is approximately 35.893 mm (255/180 inches). Specifications that exceed the maximum value are rounded off to that value.
STAR	• This command is ignored when the memory switch location of use is specified as SBCS (single byte countries).
Command Emulator	Disabled in Page Mode. A value not in the printing region will not expand the printing region.

FS W n

Name	Specify/cancel double-tall, double wide Chinese characters			
Code	ASCII	FS	W	n
	Hex.	1C	57	n
	Decimal	28	87	n

Defined Region: 0 ≦ n ≦ 255
Initial Value: n = 0

Function

Specifies or cancels quadruple size Chinese characters.
- Cancels quadruple size when n = <*******0>B.
- Specifies quadruple size when n = <*******1>B.

Details

- n is effective only when it is the lowest bit.
- Quadruple size characters are those characters that have both vertical and horizontal directions expanded simultaneously.
- If quadruple size is cancelled using this command, the next Chinese character data is printed at normal size.
- The base line for characters is the same when there are characters having different vertical direction ratios in the same line.
- The FS ! (Batch specify Chinese character print mode) command or GS ! (Specify character size) can also specify the Chinese character size, but the setting of the last received command is effective.

STAR

- This command is ignored when the memory switch location of use is specified as SBCS (single byte countries).

2-2-13) Basic Calculated Pitch

GS P x y

Name	Set basic calculation pitch				
Code	ASCII	GS	P	x	y
	Hex.	1D	50	x	y
	Decimal	29	80	x	y

Defined Region
0 ≦ x ≦ 255
0 ≦ y ≦ 255

Initial Value
x = 180,y = 360

Function
Sets the horizontal direction basic calculation pitch to approximately 25.4 [(1/x) inch] and the vertical direction basic calculation pitch to approximately 25.4 [(1/x) inch].
• When x = 0, the horizontal direction basic calculation pitch is returned to its initial value.
• When y = 0, the vertical direction basic calculation pitch is returned to its initial value.

Details
The horizontal direction indicates a direction perpendicular to the paper feed; and the vertical direction indicates the paper feed direction.
• In standard mode, use the parameter that indicates the following regardless of the character direction (upside down, 90˚ rotation, etc.).
a. Commands that use x:ESC SP, ESC $, ESC ¥, FS S, GS L, GS W
b. Commands that use y:ESC 3, ESC J, GS V
• In page mode, use the parameter that indicates the following according to character direction.
a. When starting point is upper left or lower right by ESC T (Selection of character print direction in page mode):
Commands that use x:ESC SP, ESC $, ESC W, ESC ¥, FS S
Commands that use y:ESC 3, ESC J, ESC W, GS $, GS ¥, GS V
b. When starting point is upper right or lower left by ESC T (Selection of character print direction in page mode):
Commands that use x:ESC 3, ESC J, ESC W, GS $, GS ¥
Commands that use y:ESC SP, ESC $, ESC W, ESC ¥, FS S, GS V
• Each set value is unaffected even if this command is executed.
• If there is a fraction in the result of the calculation when combined with another command, it is corrected with the minimum mechanical pitch, and the remainder is discarded.

STAR
To improve the difference in distance calculations that are generated by the difference in print density (Star = 203 DPI/Epson = 180 DPI) with the installed print head, Star printers have a “basic calculation pitch correction” . By setting this to 203 DPI, it corrects the value calculated using the basic calculation pitch such as ESC $ (Move to absolute position), and GS L (Left margin) to enable the same distance of movement as an Epson printer.
However, data such as fonts and bit images cannot be corrected with basic calculation pitch correction.

• Basic calculation pitch correction: 203DPI or 180DPI
• Basic calculation pitch correction when left margin is specified
• Basic calculation pitch: X Y
• Left margin specification value: nL nH

(1) When basic calculation pitch correction has selected 203 DPI
Left margin = (nL + nH x 256) x 2032/X/10(Decimals are discarded.)
(2) When basic calculation pitch correction has selected 180 DPI
Left margin = (nL + nH x 256) x 180/X(Decimals are discarded.)

2-2-14) Other

ESC @

Name	Initialize printer		
Code	ASCII	ESC	@
	Hex.	1B	40
	Decimal	27	64

Function: Clears data from the print buffer and sets the printer to its default settings.

Details:
- DIP switch settings are not reload.
- Data in the reception buffer is maintained.
- Macro definition information is maintained.
- NV bit image definition information is maintained.
- User NV memory data is maintained.
- When page mode is selected, this recovers to standard mode.

STAR: The printer is initialized by this command under the following conditions.
- Selection of an effective paper out detector for paper out signal output (ESC c 3n)
- Select an effective paper out detector for printing stop (ESC c 4n)

Command Emulator: Disabled in Page Mode.

DLE ENQ n

Name	Real-time request to printer			
Code	ASCII	DLE	ENQ	n
	Hex.	10	05	n
	Decimal	16	5	n

Defined Region 1 ≦ n ≦ 2
Function Responds to requests n specifications from the host in real-time.

Command Emulator 3 bytes ignored.

ESC = n

Name	Select peripheral device			
Code	ASCII	ESC	=	n
	Hex.	1B	3D	n
	Decimal	27	61	n

Defined Region 0 ≦ n ≦ 255
Initial Value n = 1
Function Selects the peripheral device for which the data is effective from the host computer.

Command Emulator 3 bytes ignored.

ESC c 3 n

Name	Select paper out sensor to enable at paper out signal output				
Code	ASCII	ESC	c	3	n
	Hex.	1B	63	33	n
	Decimal	27	99	51	n

Defined Region 0 ≦ n ≦ 15
Initial Value Spec. A: n = 15
Spec. B: n = 0
Function Selects paper out detector that outputs a paper out signal when paper has run out.

Command Emulator 4 bytes ignored.

ESC c 4 n

Name	Select paper out sensor to enable at printing stop				
Code	ASCII	ESC	c	4	n
	Hex.	1B	63	34	n
	Decimal	27	99	52	n

Defined Region 0 ≦ n ≦ 255
Initial Value n = 0
Function Selects the paper out detector to stop printing when paper has run out.
Command Emulator 4 bytes ignored.

ESC c 5 n

Name	Enable/disable panel switches				
Code	ASCII	ESC	c	5	n
	Hex.	1B	63	35	n
	Decimal	27	99	53	n

Defined Region 0 ≦ n ≦ 255
Initial Value n = 0
Function Toggles the panel switches between enabled and disabled.
Command Emulator 4 bytes ignored.

GS (A pL pH n m

Name	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

Defined Region {pL+ (pH×256) } = 2 (pL = 2, pH = 0)
0 ≦ n ≦ 2, 48 ≦ n ≦ 50
1 ≦ m ≦ 3, 49 ≦ m ≦ 51
Function Executes the specified test print.
Command Emulator 7 bytes ignored.

GS (K pL pH fn m (Fn=49)

Name	Set print density							
Code	ASCII	GS	(	K	pL	pH	fn	m
	Hex.	1D	28	4B	pL	pH	fn	m
	Decimal	29	40	75	pL	pH	fn	m

Defined Region {pL + (pH × 256) } = 2 (pL = 2, pH = 0)
fn = 49
250 ≦ m ≦ 255, 0 ≦ m ≦ 6
Initial Value m = 0
Function Sets print density.
Command Emulator 7 bytes ignored.

GS (N pL pH n m

Name	Specify print color							
Code	ASCII	GS	(	N	pL	pH	n	m
	Hex.	1D	28	4E	pL	pH	n	m
	Decimal	29	40	78	pL	pH	n	m

Defined Region {pL+ (pH×256) } = 2 (pL = 2,pH = 0)
n = 48
m = 49,50
Initial Value m = 49
Function Specifies print color in 2 color print mode.
Command Emulator 7 bytes ignored.

GS E n

Name	Set printing speed			
Code	ASCII	GS	E	n
	Hex.	1D	45	n
	Decimal	29	69	n

Defined Region 0 ≦ n ≦ 255
Initial Value n = 0
Function Sets print speed.
Command Emulator 3 bytes ignored.

GS :

Name	Start/end macro definition		
Code	ASCII	GS	:
	Hex.	1D	3A
	Decimal	29	58

Function: Starts and ends macro definition.

Command Emulator: 2 bytes ignored.

GS ^ r t m

Name	Execute macro					
Code	ASCII	GS	^	r	t	m
	Hex.	1D	5E	r	t	m
	Decimal	29	94	r	t	m

Defined Region:
0 ≦ r ≦ 255
0 ≦ t ≦ 255
0 ≦ m ≦ 1

Function:
• Executes a defined macro.

Command Emulator: 2 bytes ignored.

2-2-15) Counter Printing

GS C 0 n m

Name	Set counter print mode					
Code	ASCII	GS	C	0	n	m
	Hex.	1D	43	30	n	m
	Decimal	29	67	48	n	m

Defined Region: 0 ≦ n ≦ 5
0 ≦ m ≦ 2, 48 ≦ m ≦ 50

Function: Sets the serial number counter print mode.

Command Emulator: 5 bytes ignored.

GS C 1 aL aH bL bH n r

Name	Set Counter Mode (A)									
Code	ASCII	GS	C	1	aL	aH	bL	bH	n	r
	Hex.	1D	43	31	aL	aH	bL	bH	n	r
	Decimal	29	67	49	aL	aH	bL	bH	n	r

Defined Region: 0 ≦ aL ≦ 255, 0 ≦ aH ≦ 255
0 ≦ bL ≦ 255, 0 ≦ bH ≦ 255
0 ≦ n ≦ 255, 0 ≦ r ≦ 255

Function: Sets the counter mode for the serial counter.

Command Emulator: 9 bytes ignored.

GS C 2 nL nH

Name	Set counter mode value					
Code	ASCII	GS	C	2	nL	nH
	Hex.	1D	43	32	nL	nH
	Decimal	29	67	50	nL	nH

Defined Region: 0 ≦ nL ≦ 255
0 ≦ nH ≦ 255

Initial Value: nL = 1, nH = 0

Function: Sets the serial number counter value.

Command Emulator: 5 bytes ignored.

GS C ; sa; sb; sn; sr; sc;

Name	Set Counter Mode (B)												
Code	ASCII	GS	C	;	sa	;	sb	;	sn	;	sr	;	sc	;
	Hex.	1D	43	3B	sa	3B	sb	3B	sn	3B	sr	3B	sc	3B
	Decimal	29	67	59	sa	59	sb	59	sn	59	sr	59	sc	59

Defined Region
"0" ≦ sa ≦ "65535"
"0" ≦ sb ≦ "65535"
"0" ≦ sn ≦ "255"
"0" ≦ sr ≦ "255"
"0" ≦ sc ≦ "65535"

Function: Sets the serial number counter counting mode and counter value.

Command Emulator: 13 bytes ignored.

GS c

Name	Print counter		
Code	ASCII	GS	c
	Hex.	1D	63
	Decimal	29	99

Function: After expanding the current serial counter value as print data (a character string) to the print buffer, the printer counts up or counts down according to the count mode.

Command Emulator: 2 bytes ignored.

2-2-16) Black Mark

The following commands control top of form functions using black mark paper.
The following commands are effective only when black mark is set to be effective.

FF

Name	Print and recover to page mode
Code	ASCII FF Hex. 0C Decimal 12
Function	Prints all buffered data to the print region collectively, then recovers to the standard mode.
Details	• All buffer data is deleted after printing. • The print area set by ESC W (Set print region in page mode) is reset to the default setting. • No paper cut is executed. • Sets the print position to the beginning of the next line after execution. • This command is enabled only in page mode.
STAR	• The TOF position (black mark) varies according to the paper used and to customer specifications.
Command Emulator	1 bytes ignored.

DLE ENQ n

Name	Real-time request to printer
Code	ASCII DLE ENQ n Hex. 10 05 n Decimal 16 5 n
Defined Region	$1 \leqq n \leqq 2$
Function	Responds to requests n specifications from the host in real-time. n specifications are below.
Command Emulator	3 bytes ignored.

GS FF

Name	Top of form of mark paper		
Code	ASCII	GS	FF
	Hex.	1D	0C
	Decimal	29	12

Function: Top of form of mark paper

Command Emulator: 2 bytes ignored.

GS (F pL pH a m nL nH

Name	Set black mark adjustment value								
Code	ASCII	GS	(	F	pL	pH	a	m	nL	nH
	Hex.	1D	28	46	pL	pH	61	m	nL	nH
	Decimal	29	40	70	pL	pH	97	m	nL	nH

Defined Region: (pL+pHx256) = 4, pL = 4, pH = 0
$1 \leqq a \leqq 2$
m = 0,1,48,49
$0 \leqq nL + nH \times 256 \leqq 65535$, $0 \leqq nL \leqq 255$, $0 \leqq nH \leqq 255$

Function: Sets the adjustment value of the black mark detection position.

Command Emulator: 9 bytes ignored.

GS (M pL pH n m (Function Code: n = 1, 49)

Name	Save black mark adjustment value							
Code	ASCII	GS	(	M	pL	pH	n	m
	Hex.	1D	28	4D	pL	pH	n	m
	Decimal	29	40	77	pL	pH	n	m

Defined Region: (pL+pHx256) = 2, pL = 2, pH = 0
n = 1, 49
$1 \leqq m \leqq 3$, $49 \leqq m \leqq 51$

Function:
- Saves the black mark adjustment value set by the GS (F command to the mth region in the volatile memory.

Command Emulator: 7 bytes ignored.

GS (M pL pH n m (Function Code: n = 2, 50)

Name	Load black mark adjustment value						
Code	ASCII	GS	(	M	pL	pH	n	m
	Hex.	1D	28	4D	pL	pH	n	m
	Decimal	29	40	77	pL	pH	n	m

Defined Region (pL+pHx256) = 2, pL = 2, pH = 0
n = 2, 50
1 ≦ m ≦ 3,49 ≦ m ≦ 51

Function Loads the m position black mark adjustment value in the volatile memory.

Command Emulator 7 bytes ignored.

GS (M pL pH n m (Function Code: n = 3, 51)

Name	Set black mark adjustment value auto-load when powering on						
Code	ASCII	GS	(	M	pL	pH	n	m
	Hex.	1D	28	4D	pL	pH	n	m
	Decimal	29	40	77	pL	pH	n	m

Defined Region (pL+pHx256) = 2, pL = 2, pH = 0
n = 3, 51
1 ≦ m ≦ 3, 49 ≦ m ≦ 51

Function Validates/invalidates the black mark adjustment value auto-load when powering on.

Command Emulator 7 bytes ignored.

GS <

Name	Mechanically initialize printer		
Code	ASCII	GS	<
	Hex.	1D	3C
	Decimal	29	60

Function Cuts paper after feeding to the TOF (black mark).

Command Emulator 7 bytes ignored.

GS V m n

Name: Cut paper

Code:

ASCII	GS	V	m	n
Hex.	1D	56	m	n
Decimal	29	86	m	n

Defined Region: m = 65, 66, 0 ≦ n ≦ 255

Function: Executes the specified paper cut.

m	Function
65	Feeds paper to (cutting position + [n x basic calculated pitch]) and performs a full cut
66	Feeds paper to (cutting position + [n x basic calculated pitch]) and performs a partial cut (one point uncut)
67	Not Used
68	Not Used

Details:

- This command is effective only when processed at the top of the line when standard mode is being used.
- Feeds paper to the TOF position (black mark) when n = 0, then cuts the paper.
- Feeds paper [n x basic calculated pitch] beyond the TOF position (black mark) when n ≠ 0, then cuts the paper.
- The basic calculated pitch is set by GSP (Set basic calculated pitch).
- Use the basic calculated pitch (y) relating to the vertical direction for the paper feed amount. If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.

STAR:

- The auto-cut function differs according to the model. A partial cut is executed on those models that cannot perform a full cut.
  A full cut is executed on those models that cannot perform a partial cut. Refer to the product specifications manual for the specifications of the auto-cut function.
- Models that do not have the auto-cut function do not cut paper. However, commands that accompany a paper feed of (cutting position + [n x basic calculated pitch]) (n = 65, 66), a paper feed of (tear bar position + [n x basic calculated pitch]) is executed.
- The TOF position (black mark) varies according to the paper used and to customer specifications.

2-2-17) STAR original Command

ESC RS F n

Name: Select Font

Code:

ASCII	ESC	RS	F	n
Hex.	1B	1E	46	n
Decimal	27	30	70	n

Defined Region: 0 ≦ n ≦ 1, n = 16

Initial Value: n = 0

Function:

• Selects the font.

n	Font
0	Font A (12 x 24 dots)
1	Font B (9 x 24 dots)
16	OCR B (16 x 24 dots)

The functions outlined below are disabled when the OCR B font is selected.
• Code page
• Blank code page
• Country characters
• Slashed zero
Character modifier, expansion and external character settings are disabled when using the OCR B font for reading using a scanner. Check the OCR B font in actual use before using.

ESC GS # m N n1 n2 n3 n4 LF NUL

Name: Memory Switch Settings

Code:

	ASCII	ESC	GS	#	m	N	n1	n2	n3	n4	LF	NUL
	Hex.	1B	1D	23	m	N	n1	n2	n3	n4	0A	00
	Decimal	27	29	35	m	N	n1	n2	n3	n4	10	0

Defined Region

48 ≦ n1 ≦ 57 (”0” ≦ n1 ≤ “9”), 65 ≦ n1 ≦ 70 (”A” ≦ n1 ≤ “F”), 97 ≦ n1 ≦ 102 (“a” ≦ n1 ≦ “f”)
48 ≦ n2 ≦ 57 (”0” ≦ n2 ≤ “9”), 65 ≦ n2 ≦ 70 (”A” ≦ n2 ≤ “F”), 97 ≦ n2 ≦ 102 (“a” ≦ n1 ≦ “f”)
48 ≦ n3 ≦ 57 (”0” ≦ n3 ≤ “9”), 65 ≦ n3 ≦ 70 (”A” ≦ n3 ≤ “F”), 97 ≦ n3 ≦ 102 (“a” ≦ n3 ≦ “f”)
48 ≤ n4 ≤ 57 (”0” ≦ n4 ≤ “9”), 65 ≦ n4 ≦ 70 (”A” ≦ n4 ≤ “F”), 97 ≦ n4 ≦ 102 (“a” ≦ n4 ≦ “f”)

m = 87, 84, 44, 43, 45, 64 (m = “W”, “T”, “,”, “+”, “-”, “@”)
48 ≦ N ≦ 57 (”0” ≦ N ≦ “9”), 65 ≦ N ≦ (*)70 (”A” ≦ N ≦ (*)“F”), 97 ≦ N ≦ (*) 102, (“a” ≦ N ≦ (*) (*) “f”)
(*) The memory switch defined area differs according to the model.

Function

• Sets the memory switches

Memory switch information defined by the command to write is written to the volatile memory.

When writing to the volatile memory by the command to write, the printer executes a reset.

Function	Class	m	N	n1 n2 n3 n4
Definition data write and reset	Write	“W”	Fixed at “0”	Fixed at “0000”
Definition data write and reset and test print	Write	“T”	Fixed at “0”	Fixed at “0000”
Data Definition (Data Specification)	Definition	“,”	N	n1 n2 n3 n4
Data definition (Set specified bit)	Definition	“+”	N	n1 n2 n3 n4
Data definition (Clear specified bit)	Definition	“-”	N	n1 n2 n3 n4
Data Definition (Initialize all data)	Definition	“@”	Fixed at “0”	Fixed at “0000”
Data Definition (Load Factory Default Setting)	Defiition	“*”	Fixed at “0”	Fixed at “0000”

- m: Select mode
- N: Memory switch number to specify
- n1 n2 n3 n4: Specified Data
  - m = “,” → Specified Data
  - m = “+” → Bit number to set
  - m = “-” → Bit number that was cleared.

Command Emulator

Write to xml file. (No self-print)
Not written to printer, but printer is reset.

2-2-18) Reserved

2-2-19) STAR Original Presenter Control Commands

The following commands control the presenter functions.
The following commands are effective only on models equipped with a presenter.

ESC SYN 0 n

Name	Execute presenter paper recovery				
Code	ASCII	ESC	SYN	0	n
	Hex.	1B	16	30	n
	Decimal	27	22	48	n

Defined Region n = 0, 48(”0”)
Initial Value n = 0

Function Executes presenter paper recovery.

Command Emulator 4 bytes ignored.

ESC SYN 1 n

Name	Set presenter paper recovery function and automatic recovery time				
Code	ASCII	ESC	SYN	1	n
	Hex.	1B	16	31	n
	Decimal	27	22	49	n

Defined Region $0 \leqq n \leqq 255$

Initial Value Memory Switch Setting

Function Sets presenter paper automatic recovery function and automatic recovery time.

Command Emulator 4 bytes ignored.

ESC SYN 3 n

Name	Get presenter paper counter				
Code	ASCII	ESC	SYN	3	n
	Hex.	1B	16	33	n
	Decimal	27	22	51	n

Defined Region n = 0, 1, 48, 49

Function Acquires presenter paper counter.

Command Emulator 4 bytes ignored.

ESC SYN 4 n

Name	Initialize presenter paper counter				
Code	ASCII	ESC	SYN	4	n
	Hex.	1B	16	34	n
	Decimal	27	22	52	n

Defined Region n = 0

Function Initializes the presenter paper counter (paper reel counter/paper recovery counter).

Command Emulator 4 bytes ignored.

2-2-20) STAR Original Mark Commands

This command is specialized for printing mark sheets for lotteries. This command can print lines.

ESC GS * 0 n m1 m2 m3 … mk

Name	Print mark										
Code	ASCII	ESC	GS	*	0	n	m1	m2	m3	. . .	mk
	Hex.	1B	1D	2A	30	n	m1	m2	m3	. . .	mk
	Decimal	27	29	42	48	n	m1	m2	m3	. . .	mk

Defined Region “001” ≦ n ≦ ”255”
“0” ≦ m ≦ ”9”
k = n

Initial Value ---

Function Prints the mark number specified by m, based on the mark format (mark height, mark line feed amount, each mark color, and each mark horizontal width) that is preset.

Command Emulator Counter byte ignored.

ESC GS * 1 h v

Name	Specify mark height and line feed						
Code	ASCII	ESC	GS	*	1	h	v
	Hex	1B	1D	2A	31	h	v
	Decimal	27	29	42	49	h	v

Defined Region “001” ≦ h ≦ ”255”
“001” ≦ v ≦ ”255”
h ≦ v

Initial Value Non-volatile memory

Function Specifies mark height and line feed amount

Command Emulator 10 bytes ignored.

ESC GS * 2 m c w

Name	Specify mark color and mark horizontal width for each mark number							
Code	ASCII	ESC	GS	*	2	m	c	w
	Hex.	1B	1D	2A	32	m	c	w
	Decimal	27	29	42	50	m	c	w

Defined Region
"0" ≦ m ≦ "9"
"0" ≦ c ≦ "1"
"001" ≦ w ≦ "999"

Initial Value
Non-volatile memory

Function
Specifies mark color and mark horizontal width for each mark number.

Command Emulator
9 bytes ignored.

ESC GS * W

Name	Register mark format to non-volatile memory				
Code	ASCII	ESC	GS	*	W
	Hex.	1B	1D	2A	57
	Decimal	27	29	42	87

Defined Region

Initial Value

Function
Registers the mark format (mark height, mark line feed amount, each mark color, and each mark horizontal width) to the non-volatile memory.

Command Emulator
4 bytes ignored.

ESC GS * C

Name	Initialize mark format in the non-volatile memory				
Code	ASCII	ESC	GS	*	C
	Hex.	1B	1D	2A	43
	Decimal	27	29	42	67

Defined Region

Initial Value

Function
Initializes the registered mark format (mark height, mark line feed amount, each mark color, and each mark horizontal width) in the non-volatile memory. After initialization, the printer is reset.

Command Emulator
4 bytes ignored.

2-2-21) STAR Original Auto Logo Commands

ESC GS / W

Name	Register Auto Logo setting to non-volatile memory				
Code	ASCII	ESC	GS	/	W
	Hex.	1b	1d	2f	57
	Decimal	27	29	47	87

Defined Region ---
Initial Value ---
Function Registers Auto Logo setting to non-volatile memory
Command Emulator 4 bytes ignored.

ESC GS / C

Name	Initialize Auto Logo setting to non-volatile memory				
Code	ASCII	ESC	GS	/	C
	Hex.	1b	1d	2f	43
	Decimal	27	29	47	67

Defined Region ---
Initial Value ---
Function Initializes registered data in the non-volatile memory of the Auto Logo function.
Command Emulator 4 bytes ignored.

ESC GS / 1 n

Name	Auto Logo Function On/Off Setting					
Code	ASCII	ESC	GS	/	1	n
	Hex.	1b	1d	2f	31	n
	Decimal	27	29	47	49	n

Defined Region $0 \leqq n \leqq 2$
Initial Value n = 0
Function Turns the Auto Logo function on and off.
Command Emulator 5 bytes ignored.

ESC GS / 2 n

Name	Set command character					
Code	ASCII	ESC	GS	/	3	n
	Hex.	1b	1d	2f	32	n
	Decimal	27	29	47	50	n

Defined Region 32 ≦ n ≦ 127, n = 0
Initial Value n = 0
Function Sets the Auto Logo function command character.
Command Emulator 5 bytes ignored.

ESC GS / 3 nL nH d1 d2 … dk

Name	Set user macro 1							
Code	ASCII	ESC	GS	/	3	nL	nH	d1d2...dk
	Hex.	1b	1d	2f	33	nL	nH	d1d2...dk
	Decimal	27	29	47	51	nL	nH	d1d2...dk

Defined Region 1 ≦ nL ≦ 64
nH = 0
1 ≦ (nL+nHx256) ≦ 64
dk = (nL+nHx256)
0 ≦ d ≦ 255
Initial Value No user macro 1 setting
Function Sets the user macro 1 of the Auto Logo function.
Command Emulator Counter byte ignored.

ESC GS / 4 nL nH d1 d2 ... dk

Name	Set user macro 2								
Code	ASCII	ESC	GS	/	4	nL	nH	d1	d2...dk
	Hex.	1b	1d	2f	34	nL	nH	d1	d2...dk
	Decimal	27	29	47	52	nL	nH	d1	d2...dk

Defined Region 1 ≦ nL ≦ 64
nH = 0
1 ≦ (nL+nHx256) ≦ 64
dk = (nL+nHx256)
0 ≦ d ≦ 255
Initial Value No user macro 2 setting
Function Sets the user macro 2 of the Auto Logo function.
Command Emulator Counter byte ignored.

ESC GS / 5 n

Name	Set command character switching method					
Code	ASCII	ESC	GS	/	5	n
	Hex.	1b	1d	2f	35	n
	Decimal	27	29	47	53	n

Defined Region 0 ≦ n ≦ 1
Initial Value n = 0
Function Sets the Auto Logo function command character switching method.
Command Emulator 5 bytes ignored.

ESC GS / 6 n

Name	Set partial cut before Auto Logo printing					
Code	ASCII	ESC	GS	/	6	n
	Hex.	1b	1d	2f	36	n
	Decimal	27	29	47	54	n

Defined Region 0 ≦ n ≦ 1
Initial Value n = 0
Function Sets a partial cut before the Auto Logo printing.
Command Emulator 5 bytes ignored.

2-2-22) Reserved

2-2-23) STAR Original Buzzer Commands

ESC GS BEL m t1 t2

Name	Ring buzzer						
Code	ASCII	ESC	GS	BEL	m	t1	t2
	Hex.	1B	1D	07	m	t1	t2
	Decimal	27	29	7	m	t1	t2

Defined Area	1 ≦ m ≦ 2
	1 ≦ t1 ≦ 255
	1 ≦ t2 ≦ 255
Initial Value	- - -
Function	Rings the buzzer.
Command Emulator	6 bytes ignored.

2-2-24) PDF417 Command

ESC GS x S 0 n p1 p2

Name	Set PDF417 bar code size								
Code	ASCII	ESC	GS	x	S	0	n	p1	p2
	Hex.	1B	1D	78	53	30	n	p1	p2
	Decimal	27	29	120	83	48	n	p1	p2

Defined Area: n = 0, 1
When n = 0:1 ≦ p1 ≦ 99, 1 ≦ p2 ≦ 99
When n = 1:p1 = 0 or 3 ≦ p1 ≦ 90, p2 = 0 or 1 ≦ p2 ≦ 30 (However, this excludes p1 = p2 = 0)

Initial Value: n = 0, p1 = 1, p2 = 2

Function: Parameter details

n (Specify Method to Specify Bar Code Size)		p1, p2 (Size Specification)
0	USE_LIMITS (Specify ratio of bar code horizontally and vertically)	p1: p2: Proportions of Vertical (p1) and Horizontal (p2) However, p1: p2 = 1: 99 to 10:1 (p1/p2 = 0.01 to 10)
1	USE_FIXED (Specifies number of lines and number of columns of bar code.)	p1: Number of lines (0, 3 to 90), p2: Number of columns (0, 1 to 30) However, p1 * p2 ≦ 928 When either p1 or p2 specifies 0, it indicates that that setting value is variable.

Setting the bar code size using this command specifies the general size of the bar code. The size will automatically be corrected according to the other settings.

Command Emulator: 8 bytes ignored.

ESC GS x S 1 n

Name	Set PDF417 ECC (security level)						
Code	ASCII	ESC	GS	x	S	1	n
	Hex.	1B	1D	78	53	31	n
	Decimal	27	29	120	83	49	n

Defined Area: 0 ≦ n ≦ 8

Initial Value: n = 1

Function: Parameter details
• n:ECC level (0 to 8)

Command Emulator: 6 bytes ignored.

ESC GS x S 2 n

Name	Set PDF417 module X direction size						
Code	ASCII	ESC	GS	x	S	2	n
	Hex.	1B	1D	78	53	32	n
	Decimal	27	29	120	83	50	n

Defined Area 1 ≦ n ≦ 10
Initial Value n = 2
Function Parameter details
• n:Sets the module X direction size (x-dim). Units: Dots
It is recommended that 2 ≦ n when specifying using this command.
When using with n = 1, check by actual use.

Command Emulator 6 bytes ignored.

ESC GS x S 3 n

Name	Set PDF417 module aspect ratio						
Code	ASCII	ESC	GS	x	S	3	n
	Hex.	1B	1D	78	53	33	n
	Decimal	27	29	120	83	51	n

Defined Area 1 ≦ n ≦ 10
Initial Value n = 3
Function Parameter details
• n:Sets the module aspect ratio (asp).
The module Y direction size (x-dim x asp) is set using this command.
It is recommended that 2 ≦ n when specifying using this command.
When using with n = 1, check by actual use.

Command Emulator 6 bytes ignored.

ESC GS x D nL nH d1 d2 … dk

Name	Set PDF417 bar code data									
Code	ASCII	ESC	GS	x	D	nL	nH	d1	d2	…	dk
	Hex.	1B	1D	78	44	nL	nH	d1	d2	…	dk
	Decimal	27	29	120	68	nL	nH	d1	d2	…	dk

Defined Area
0 ≦ nL ≦ 255, 0 ≦ nH ≦ 255
1 ≦ (nL + nH x 256) ≦ 1024
0 ≦ d ≦ 255
1 ≦ k ≦ 1024

Initial Value

Function
Parameter details
• nL + nH x 256: Bar code data count
• dk : Bar code data (Maximum 1024 data)
When [nL + nH x 256] is outside of the definition, data of [nL + nH x 256] bytes is discarded.

Command Emulator
Counter byte ignored.

ESC GS x P

Name	Print PDF417 bar code				
Code	ASCII	ESC	GS	x	P
	Hex.	1B	1D	78	50
	Decimal	27	29	120	80

Defined Area

Initial Value

Function
This command prints bar code data or expands it to the image buffer.
Also, this command is ignored if the following errors occur.
• When an error is generated when generating a bar code, due to the combination of the bar code set
• When the bar code data that is generated exceeds the printable size of PDF417
• When the print data exceeds the currently set print region
When a bar code is printed, always verify it by actual use.

Standard mode
If there is unprinted data in the line buffer, after that data is printed, and this command is executed, the bar code is printed. Therefore, it is not possible to print with other data (characters, bit images, or bar codes) existing in the same line.
Page mode
This command only expands bar code data to the image buffer.

Command Emulator
4 bytes ignored.

ESC GS x I

Name	Get PDF417 bar code expansion information				
Code	ASCII	ESC	GS	x	I
	Hex.	1B	1D	78	49
	Decimal	27	29	120	73

Defined Area ---
Initial Value ---

Function When printing a bar code with the current settings and at the print starting position using this command, error information is sent from the printer.

Command Emulator 4 bytes ignored.

2-2-25) Reserved

2-2-26) Reserved

2-2-27) Reserved

2-2-28) STAR Original Print Starting Trigger Control Commands

This command is for models equipped with an expansion control function for page control of line unit commands, by controlling the image buffer by page.

ESC GS g 0 m n

Name	Print starting trigger						
Code	ASCII	ESC	GS	g	0	m	n
	Hex.	1B	1D	67	30	m	n
	Decimal	27	29	103	48	m	n

Defined Area m = 0, n = 0
Initial Value ---
Function Starts printing when there is unprinted data in the image buffer.
It is prohibited to send this command while in the raster mode.

Command Emulator 6 bytes ignored.

ESC GS g 1 m n

Name	Print starting timer						
Code	ASCII	ESC	GS	g	1	m	n
	Hex.	1B	1D	67	31	m	n
	Decimal	27	29	103	49	m	n

Defined Area m = 0, 0 ≦ n ≦ 255
Initial Value Depends on the model
Function Sets the print starting timer specified at n x 10 msec.

Command Emulator 6 bytes ignored.

2-2-29) QR Code Command

* Note that QR code is a registered trademark of DENSO WEB.

ESC GS y S 0 n

Name	Set QR code model						
Code	ASCII	ESC	GS	y	S	0	n
	Hex.	1B	1D	79	53	30	n
	Decimal	27	29	121	83	48	n

Defined Area 1 ≦ n ≦ 2
Initial Value n = 2
Function Sets the model.
• Parameter details

n	Set Model
1	Model 1
2	Model 2

Command Emulator 6 bytes ignored.

ESC GS y S 1 n

Name	Set QR code mistake correction level						
Code	ASCII	ESC	GS	Y	S	1	n
	Hex.	1B	1D	79	53	31	n
	Decimal	27	29	121	83	49	n

Defined Area 0 ≦ n ≦ 3
Initial Value n = 0
Function Sets the mistake correction level.
• Parameter details

n	Mistake Correction Level	Mistake Correction Rate (%)
0	L	7
1	M	15
2	Q	25
3	H	30

Command Emulator 6 bytes ignored.

ESC GS y S 2 n

Name	Set QR code cell size						
Code	ASCII	ESC	GS	y	S	2	n
	Hex.	1B	1D	79	53	32	n
	Decimal	27	29	121	83	50	n

Defined Area: 1 ≦ n ≦ 8
Initial Value: n = 3

Function: Sets the cell size.
- Parameter details
- n: Cell size (Units: Dots)
- It is recommended that the specification using this command be 3 ≦ n.

If n = 1 or 2, check by actually using.

Command Emulator: 6 bytes ignored.

ESC GS y D 1 m nL nH d1 d2 … dk

Name	Set QR code cell size (Auto Setting)											
Code	ASCII	ESC	GS	y	D	1	m	nL	nH	d1	d2	…	dK
	Hex.	1B	1D	79	44	31	m	nL	nH	d1	d2	…	dK
	Decimal	27	29	121	68	49	m	nL	nH	d1	d2	…	dK

Defined Area:
m = 0
0 ≦ nL ≦ 255, 0 ≦ nH ≦ 255
1 ≦ nL + nH x 256 ≦ 7089 (k = nL + nH x 256)
0 ≦ d ≦ 255

Initial Value: ---

Function: Automatically expands the data type of the bar code and sets the data.
- Parameter details
- nL + nH x 256: Byte count of bar code data
- dk: Bar code data (Max. 7089 bytes)
- When using this command, the printer receives data for the number of bytes (k) specified by nL and nH. The data automatically expands to be set as the bar code data.
- Indicates the number bytes of data specified by the nL and nH. When processing Chinese character (Kanji) codes, two bytes is one character.
- Command analysis is terminated if the command is outside of the defined area. Bar code data is cleared at this time.
- The data storage region of this command is shared with the manual setting command so data is updated each time either command is executed.

Command Emulator: Counter byte ignored.

ESC GS y D 2 a m1 n1L n1H d11 d12 • • • d1k m2 n2L n2H d21 d22 • • • d2k ml • • • dlk

Name: Set QR code cell size (Manual setting)

Code:

ASCII	ESC	GS	y	D	2	a	m1	n1L	n1H	d11	d12	...	d1K
Hex.	1B	1D	79	44	32	a	m1	n1L	n1H	d11	d12	...	d1K
Decimal	27	29	121	68	50	a	m1	n1L	n1H	d11	d12	...	d1K

ASCII	m2	n2L	n2H	D21	d22	...	d2K	ml	...	dlk
Hex.	m2	n2L	n2H	D21	d22	...	d2K	ml	...	dlk
Decimal	m2	n2L	n2H	D11	d22	...	d2K	ml	...	dlk

Defined Area:
1 ≦ a ≦ 255
1 ≦ m ≦ 4
0 ≦ nL ≦ 255, 0 ≦ nH ≦ 255
1 ≦ nL + nH x 256 ≦ 7089 (k = nL + nH x 256)
0 ≦ d ≦ 255
1 ≦ l ≦ 255

Initial Value: ---

Function: Specifies the bar code data type and sets the data.

- Parameter details
- a: Block count
- m: Input data type
- nL + nH x 256: Bar code data byte count
- dk: Bar code data (Max. 7089 bytes)

m	Data Type	Data Definition Region (d)
1	Numbers	“0” to “9”
2	English Characters	“”, “$”, “%” “*”, “+”, “-“ “.” “/”, “:”, “0” to “9”, “A” to “Z”, “a” to “z”
3	Binary	0x00 to 0xFF
4	Kanji (Shift JIS)	0x8140 to 0x9FFC, 0xE040 to 0xEBBF
		However, the lower 8 bits are 0x40 to 0x7E, and 0x80 to 0xFC

- The printer receives the data type specified by m, and the data of the number of bytes (k) specified by nL and nH, based on the block count specified by a.
- 1 block specified by a indicates m1, n1L, n1H, d11 • • • d1k (data type + data count + bar code data), and by continuously sending these a multiple of times, one bar code data can mix data types.
- It is possible to set a maximum of 255 blocks with one command transmission.
- nL and nH specify the number of bytes of the data, so when using Kanji, calculate that 1 character has 2 bytes.
- If this command is outside of the definition region, immediately stop the command analysis process.

When doing so, the bar code data is cleared.

- This command data storage region is shared with the automatic setting command, so data is updated each time either command is executed.
- When the data type is specified as the English Characters (m=2) and “a” to “z” are transmitted, these are converted to the upper-case “A” to “Z” and the bar code are generated.

Command Emulator: Counter byte ignored.

ESC GS y P

Name	Print QR code				
Code	ASCII	ESC	GS	y	P
	Hex.	1B	1D	79	50
	Decimal	27	29	121	80

Defined Area ---
Initial Value ---

Function
Prints bar code data.
Standard mode
When receiving this command, if there is unprinted data in the image buffer, the printer will print the bar code after printing the unprinted print data.
Page mode
Only expands to bar code data image buffer.
A margin of more than 4 cells is required around the QR code. The user should ensure that space.
Always check printed bar codes in actual use.

Command Emulator 4 bytes ignored.

ESC GS y I

Name	Get QR code expansion information				
Code	ASCII	ESC	GS	y	I
	Hex.	1B	1D	79	49
	Decimal	27	29	121	73

Defined Area ---

Initial Value ---

Function Sends information on generated image sizes and errors in bar code expansion using the current settings. Therefore, it is possible to check whether printing is possible prior to actual printing.

Command Emulator 4 bytes ignored.

URL: http://www.starmicronics.com/support/