

# ***Command Reference***

# **SK1-31/21**

 **SANEI ELECTRIC INC.**

V2.6 1006

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# Command explanation

This printer has command emulations (ESC/POS) which is widely used for mini printers. The commands are used for controlling the printer operations such as paper feed, printing characters and setting of format etc.

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# I . Command Description (ESC/POS :MODE-A)

## I -1. Paper Feed Command

CR

<b>Applicable</b>	<b>SK1-31</b>	<b>SK-21</b>			
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[Name] Carriage return / linefeed  
[Code] <0D>h  
[Function] Prints data in the print buffer and makes linefeed based on the linefeed amount.  
[Detail] 

- After execution, sets the beginning of a line as the start position of printing.
- LF code received immediately following CR is ignored.
- CR code received immediately following LF is effective.

LF

<b>Applicable</b>	<b>SK1-31</b>	<b>SK-21</b>			
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---

[Name] Carriage return / linefeed  
[Code] <0A>h  
[Function] Performs the same operation as CR.  
[Detail] 

- After execution, sets the beginning of a line as the printing start position.
- LF code received immediately following CR is ignored.
- CR code received immediately following LF is effective.

## ESC J

Applicable	SK1-31	SK-21			
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- 
- [Name] Printing and feed forward  
[Code] <1B>h <4A>h n  
[Defined area]  $0 \leq n \leq 255$   
[Function] <Standard mode>  
Prints data in the print buffer and feeds paper based on [n x paper feed pitch].  
<Page mode>  
Moves along y-axis in the forward direction.  
[Detail]
  - After execution, sets the beginning of a line as the printing start position.
  - Receives no influence from the setting of the linefeed amount.
  - This command is invalid for label print in standard mode.

## ESC j

Applicable	SK1-31	SK-21			
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- 
- [Name] Printing and back feed  
[Code] <1B>h <6A>h n  
[Defined area]  $0 \leq n \leq 255$   
[Function] <Standard mode>
  - Prints data in print buffer and backfeeds paper based on [n x dot pitch].<Page mode>
  - The cursor moves to reverse against specified direction in page memory area.[Detail]
  - When data is stored in printer buffer, the printer linefeeds first and feeds [n x dot pitch] in reverse.
  - When data is not stored in printer buffer, the printer feeds [n x dot pitch] in reverse.
  - In the case of label mode does not execute this command to throw a "n" parameter.

### [Caution]

**Note1) When the printer prints after executing this command, feed the paper more than 2mm in forward.**

**Note2) This command is only used for adjusting the top of the form and avoid using other purpose.  
to avoid unexpecting paper jams.**

## ESC d

Applicable	SK1-31	SK-21			
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- 
- [Name] Printing and consecutive (n) line feed.  
[Code] <1B>h <64>h n  
[Defined area]  $0 \leq n \leq 255$   
[Function] <Standard mode>  
Prints data in the print buffer and makes paper feed forward by n lines.  
<Page mode>  
Move along y-axis in the forward direction by n lines.  
[Detail]
  - After execution, makes the beginning of a line as the printing start position.

## FF

Applicable	SK1-31	SK-21			
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- 
- [Name] Page length printing (Standard mode)  
Prints all data in the page memory , then return to the standard mode (Page mode)
- [Code] <0C>h
- [Function] <Standard mode>  
Performs form feed based on the page length setting (ESC C).  
<Page mode>  
Returns to the standard mode after page memory batch printing.
- [Detail]
  - After execution, sets the beginning of a line as the next printing start position.
  - After returning, it becomes the same as ESC S.

## ESC C

Applicable	SK1-31	SK-21			
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- 
- [Name] Set the page length
- [Code] <1B>h <43>h n
- [Defined area]  $1 \leq n \leq 255$
- [Function] Set the number of lines in a page used for the page length printing command (FF).
- [Detail]
  - With the value set with the command, the page length printing command (FF) perform a form feed in the standard mode.
  - This command is not executed in the page mode.



## HT

Applicable	SK1-31	SK-21			
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- 
- [Name] Horizontal tab
- [Code] <09>h
- [Function] Moves the printing position to the next horizontal tab position.
- [Detail]
- When the horizontal tab position is not specified, this command is ignored.
  - When the horizontal tab position exceeds the printing area, sets the tab position to the starting position of the next line.
  - To set the horizontal tab position, use Horizontal tab setting (ESC D).
  - The initial value of the horizontal tab is at an interval of every eight (8) characters.

## ESC D

Applicable	SK1-31	SK-21			
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- 
- [Name] Set horizontal tab
- [Code] <1B>h <44>h n1...nk <00>h
- [Defined area]  $1 \leq n \leq 255$   
 $1 \leq k \leq 32$
- [Function] Sets the horizontal tab position  
The n indicates the number of digits from the starting position of a line to the setting position.  
The k indicates the number of tabs that can be set in a line.
- [Detail]
- The horizontal tab position to be set as [character width x n].
  - The character width includes the right space and the horizontal size at character enlargement.
  - All previous values are reset.
  - Up to 32 tab positions can be set in a line. When the number of tab positions exceeds the limit, the data that follow the limit is not processed with the horizontal tab setting command but processed as ordinary data.
  - The tab positions are set in the ascending order and end with a NUL code.  
When the setting position is not in the ascending order (when a smaller value is set than the previous one), it is recognized as a NULL code.
  - Even if character width is adjusted after the setting, the set tab positions are retained

## ESC 2

Applicable	SK1-31	SK-21			
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- 
- [Name] Sets the initial linefeed value  
 [Code] <1B>h <32>h  
 [Function] Return the linefeed amount per line to the initial value.  
 [Detail]
  - Makes setting valid for the standard mode.
  - Makes setting valid for the page mode.

## ESC 3

Applicable	SK1-31	SK-21			
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- 
- [Name] Set the linefeed value  
 [Code] <1B>h <33>h n  
 [Defined area]  $0 \leq n \leq 255$   
 [Function] Set the linefeed amount per line in [n x dot pitch].  
 [Detail]
  - Makes setting valid for the standard mode.
  - The default value is n = 28.
  - The height of smaller linefeed depends on data stored in the buffer.
  - When the linefeed amount is smaller than the height of characters in the buffer, the linefeed amount defaults the character height.
  - If no characters are stored, the printer processes the height of the linefeed specified.
  - Makes setting valid for the page mode.

## ESC SP

Applicable	SK1-31	SK-21			
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- 
- [Name] Set the right margin  
 [Code] <1B>h <20>h n  
 [Defined area]  $0 \leq n \leq 127$   
 [Function] Sets the right space amount per character to [n x dot pitch].  
 [Detail]
  - When the character size is horizontally doubled, the right space amount is accordingly increased.
  - This command has no influence on kanji characters.
  - The maximum of n is 127(approx.15.87mm).
  - If n overs the maximum then it is replaced to the maximum value.
  - The default value is n=0.
  - Makes setting valid for the standard mode.
  - Makes setting valid for the page mode.

GS L

Applicable	SK1-31	SK-21			
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[Name] Set the left margin  
 [Code] <1D>h <4C>h nl nh  
 [Defined area]  $0 \leq nl \leq 255$   
 $0 \leq nh \leq 255$   
 [Function] <Standard mode>  
 Sets the left margin as  $[(nh \times 256 + nl) \times \text{dot pitch}]$ .  
 <Page mode>  
 Makes setting valid for the standard mode.  
 [Detail]
 

- The maximum settable left margin defines the permissible area for horizontal printing.
- When the parameter exceeds the printable area, it defaults to the printable area.
- The initial value is  $nh=nl=0$ .

 <Standard mode>
 

- Setting is enabled only for the beginning of a line.

 <Page mode>
 

- This command is not executed in the page mode, but the value is stored as a valid setting in the standard mode.

GS W

Applicable	SK1-31	SK-21			
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[Name] Set the printing area width  
 [Code] <1D>h <57>h nl nh  
 [Defined area]  $0 \leq nl \leq 255$   
 $0 \leq nh \leq 255$   
 $n = nh \times 256 + nl$   
 [Function] <Standard mode>  
 Set the printing area width as  $[n \times \text{dot pitch}]$ .  
 <Page mode>  
 Makes setting valid for the standard mode.  
 [Detail]
 

- Sets the printable area other than the left margin within horizontal printing area.
- When the parameter exceeds the printable area, the area is rounded to the horizontal printable area.
- The initial value is shown in the table.

Applicable model	Printing width	Initial value
SK1-31	80mm/(640dot)	639
SK1-31	72mm/(576dot)	575
SK1-31/21	56mm/(448dot)	447
SK1-31/21	54mm/(432dot)	431

<Standard mode>
 

- Setting is enabled only for the beginning of a line.

 <Page mode>
 

- This command is not executed in the page mode, but the value is stored as a valid setting in the standard mode.

## ESC \$

Applicable	SK1-31	SK-21			
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- 
- [Name] Set absolute position of the printing area
- [Code] <1B>h <24>h nl nh
- [Defined area]  $0 \leq nl \leq 255$   
 $0 \leq nh \leq 255$   
 $0 \leq nhnl \leq 127$
- [Function] <Standard mode>  
Sets the printing area by the absolute position based on the left margin.  
The setting width is  $[(nh \times 256 + nl) \times \text{dot pitch}]$ .  
<Page mode>  
Makes setting valid for the standard mode.
- [Detail]
  - When the parameter exceeds the maximum value of nhnl, this command is ignored.  
<Standard mode>
  - Setting is enabled only for the beginning of a line.  
<Page mode>
  - This command is not executed in the page mode, but the value is stored as a valid setting in the standard mode.

## ESC a

Applicable	SK1-31	SK-21			
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- 
- [Name] Align the position
- [Code] <1B>h <61>h n
- [Defined area]  $0 \leq n \leq 2$
- [Function] <Standard mode>  
Align the printing data of a line with the specified point.  
n=0 : Left alignment  
n=1 : Center alignment  
n=2 : Right alignment  
<Page mode>  
Makes setting valid for the standard mode.
- [Detail]
  - The position is aligned in the set printing area.
  - The initial value is n=0.  
<Standard mode>
  - Setting is enabled only for the beginning of a line.  
<Page mode>
  - This command is not executed in the page mode, but the value is stored as a valid setting in the standard mode.

## I -4. Character Modification Command

ESC !

**Applicable** SK1-31 SK-21

[Name] Modify character specifications in a batch

[Code] <1B>h <21>h n

[Defined area]  $0 \leq n \leq 255$

[Function] Specifies the printing mode in a batch.

Bit	Item description	Function
0	Character font	0 : Font A 1: Font B
1	Undefined	—
2	Undefined	—
3	Bold character	0 : Cancel 1: Specified
4	Double-height	0 : Cancel 1: Specified
5	Double-width	0 : Cancel 1: Specified
6	Undefined	—
7	Underline	0 : Cancel 1: Specified

- [Detail]
- When specifying both bit 4 and 5 as “1”, character size becomes double-height and double-width.
  - The underline is 2-dot pitch.
  - Settings except Bold and Character font are enabled only for a 1-byte size character.
  - A setting can be specified by other commands, the last command is enabled.
  - The default value is n=0.

ESC G

ESC E

**Applicable** SK1-31 SK-21

[Name] Specify the bold character / cancel

[Code] <1B>h <47>h n

<1B>h <45>h n

[Defined area]  $0 \leq n \leq 255$

[Function] Specifies and cancel the bold printing.

n=<xxxxxxx0>B : Cancel

n=<xxxxxxx1>B : Specified

- [Detail]
- n is valid only for the least significant bit.
  - The initial value is n=0.

## ESC {

Applicable	SK1-31	SK-21			
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[Name] Specify Inverse printing / cancel  
[Code] <1B>h <7B>h n  
[Defined area]  $0 \leq n \leq 255$   
[Function] <Standard mode>  
Specifies and cancels inversed printing.  
n=<xxxxxxx0>B : Cancel  
n=<xxxxxxx1>B : Specified  
<Page mode>  
Invalidation (forbiddance)  
[Detail] 

- n is valid only for the least significant bit.
- The default value is n=0.

<Standard mode>

- Setting is enabled only for the beginning of a line.

<Page mode>

- Ignores this command.

## ESC -

Applicable	SK1-31	SK-21			
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[Name] Specify underline / cancel  
[Code] <1B>h <2D>h n  
[Defined area]  $0 \leq n \leq 255$   
[Function] Cancels and specifies the underline.  
n=<xxxxx000>B : Underline 0-dot pitch  
|  
n=<xxxxx111>B : Underline 7-dot pitch  
[Detail] 

- This command is valid only for the least significant three bits of n.
- The command is valid only for the 1-byte character.
- The underline is added to the character width and the character space, but not added to the skipped area by HT command and all that.
- It is not added to the black and white reverse characters.
- The default value is n=0.

## GS !

Applicable	SK1-31	SK-21			
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- [Name] Set a character size
- [Code] <1D>h <21>h n
- [Defined area]  $0 \leq n \leq 255$
- [Function] Specify the character size
- n=<xxxx0000>B: Vertical direction magnification ratio 1 time <minimum>  
|  
n=<xxxx0111>B: Vertical direction magnification ratio 8 times <maximum>
- n=<0000xxxx>B: Horizontal direction magnification 1 time <minimum>  
|  
n=<0111xxxx>B: Horizontal direction magnification 8 times <maximum>
- [Detail]
- This command is valid for all characters except the HRI characters.
  - Magnification ratios outside the specified range are ignored.
  - The default value is n=0.

## GS B

Applicable	SK1-31	SK-21			
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- [Name] Specify the black and white reverse character / cancel
- [Code] <1D>h <42>h n
- [Defined area]  $0 \leq n \leq 255$
- [Function] Cancels and specifies a black and white reverse character.
- n=<xxxxxxx0>B : Cancel  
n=<xxxxxxx1>B : Specified
- [Detail]
- This command is valid only for the least significant bit of n.
  - The default value is n=0.

## GS b

Applicable	SK1-31	SK-21			
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- [Name] Specify or Cancel the smoothing font
- [Code] <1D>h <62>h n
- [Defined area]  $0 \leq n \leq 255$
- [Function] Specify and Cancel a smoothing font .
- n=<xxxxxxx0>B : Cancel  
n=<xxxxxxx1>B : Specified
- [Detail]
- This command is valid only for the least significant bit of n.
  - The default value is n=0.
  - This command is applied from a software version more than V120 .

## ESC M

Applicable	SK1-31	SK-21			
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[Name] Choose a character font

[Code] <1B>h <4D>h n

[Defined area]  $0 \leq n \leq 255$

[Function] Choose a character font.

n=0, 48 : Font A(12 × 24, 24 × 24)

n=1, 49 : Font B( 8 × 16, 16 × 16)

n=2, 50 : Font B( 8 × 16, 16 × 16)

- [Detail]
- Only the least significant bit of n is valid.
  - This command is also valid for kanji characters.
  - The command can be also set by ESC ! but the command processed last is valid.
  - The default value is n=0.
  - The n parameter '2', '50' is applied from a software version more than V115 .

## ESC R

Applicable	SK1-31	SK-21			
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[Name] Choose an international character

[Code] <1B>h <52>h n

[Defined area]  $0 \leq n \leq 8$

[Function] Choose a character set of a country shown below.

n=0 : USA

n=1 : France

n=2 : Germany

n=3 : England

n=4 : Denmark

n=5 : Sweden

n=6 : Italy

n=7 : Spain

n=8 : Japan

- [Detail]
- Data outside the specified range is ignored.
  - The default value is n=3 (Model type is not japan)



## ESC t

Applicable	SK1-31	SK-21			
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[Name] Choosing the character code table

[Code] <1B>h <74>h n

[Defined area]  $0 \leq n \leq 10$

[Function] Choose the following character set.

n=0:PC437 / 1:katakana / 2 : PC850 / 3:PC852 / 4:PC857 / 5:PC858 /  
6:PC863 / 7:PC865 / 8:PC866 / 9:WPC1252 / 10:PC860

- [details]
- Ignores data except specified area.
  - It is not effective to the double bytes characters.
  - The n after 3 is value only Font A type.
  - It entries to volatile memory, not to non-volatile memory.
  - The default is setting into the software memory . (The setting is n=0 in factory shipment)

## ESC &

Applicable	SK1-31	SK-21			
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[Name] Register a download character

[Code] <1B>h <26>h y c1 c2 [x1 d1...d(y × x1)] ... [xk d1...d(y × xk)]

[Defined area] y=3

$20h \leq c1 \leq c2 \leq 7Eh$

$1 \leq x \leq 12$  (When character Font A is chosen)

$1 \leq x \leq 9$  (When character Font B is chosen)

$0 \leq d \leq 255$

[Function] Defines the download pattern for the specified character code.

y= Number of bytes in the vertical direction

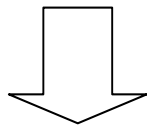
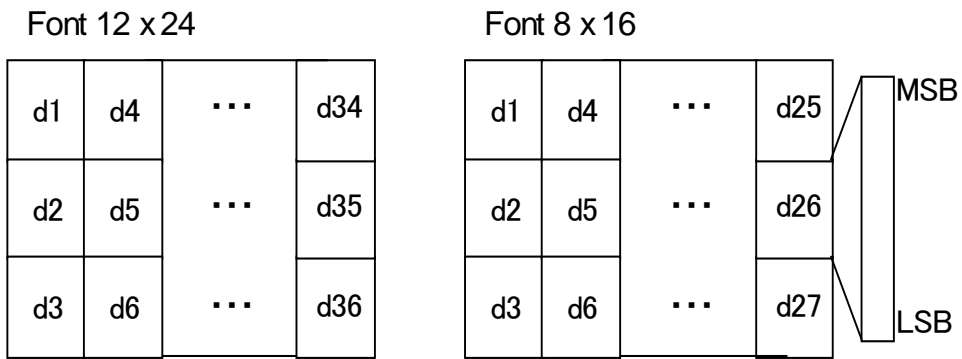
c1= Character definition start code

c2= Character definition end code

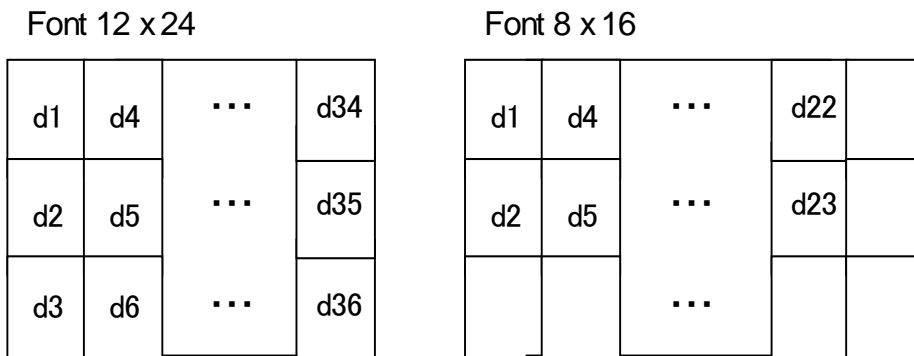
x= Number of bits in a horizontal direction

- [Detail]
- c1=c2 is set when only one character is defined.
  - d is the graphic data of a download character.
  - The right space surplus given by x specification is handled as a blank.
  - When the command is specified for the previously registered code, the character is overwritten.
  - When using a registered download character, specify ESC %.
  - Specify Font B as width of 8 dots and height of 16 dots.

### Registration image



### Character output range



### ESC ?

Applicable	SK1-31	SK-21			
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[Name] Erase a download character

[Code] <1B>h <3F>h n

[Defined area] 20h ≤ n ≤ 7Eh

[Function] Erases the download character of a specified code.

[Detail]

- n indicates a defined character code. After erasing, an internal character is printed.
- When a specified character code is not defined, the command is ignored.

ESC %

**Applicable**

**SK1-31**

**SK-21**

---

[Name] Specify and cancel a download character

[Code] <1B>h <25>h n

[Defined area]  $0 \leq n \leq 255$

[Function] Cancels and specifies a download character set.

n=<xxxxxxx0>B : Cancel

n=<xxxxxxx1>B : Specified

- [Detail]
- Only the least significant bit of n is valid.
  - When resetting a download character set, specify the internal character set.
  - When a download character set is specified, a definition code is specified as the download character. Otherwise, undefined code is specified as an internal character.
  - The default value is n=0.

ESC \*

Applicable	SK1-31	SK-21			
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[Name] Specify the bit image

[Code] &lt;1B&gt;h &lt;2A&gt;h m nl nh d1 ... dk

[Defined area] m=0, 1, 32, 33

 $0 \leq nl \leq 255$  $0 \leq nh \leq 3$  $0 \leq d \leq 255$ 

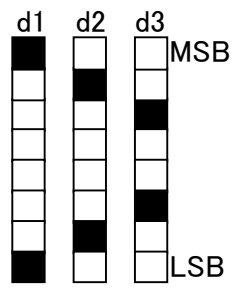
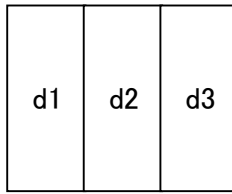
[Function] The bit image equivalent to the number of dots in a horizontal direction that are specified with nl, nh is printed. The printing pattern follows the mode specified with m.

m	Mode	Vertical dots	Horizontal dots	Number of data size ( k )
0	8-dot single density	8	Refer to table below.	$nh \times 256 + nl$
1	8-dot double density	8		$nh \times 256 + nl$
32	24-dot single density	24		$(nh \times 256 + nl) \times 3$
33	24-dot double density	24		$(nh \times 256 + nl) \times 3$

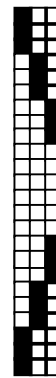
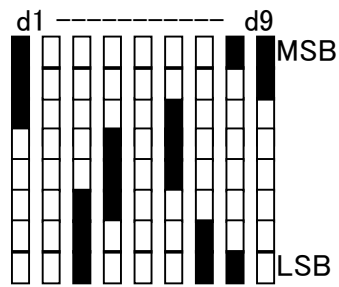
- [Detail]
- When m is outside the defined area, data subsequent to nl is not processed with the command but as ordinary data.
  - nl and nh indicates the number of dots in the horizontal direction for dot image printed.
  - When number of dots specified is larger than the printable area, data is discarded.
  - The printing start position follows the cursor position at the corresponding time.
  - In inverted image printing, data is inverted but not influenced by the others ( bold, black and white reversion etc.)
- <Standard mode>
- As for data development method, see the figure of next page.
- <Page mode>
- For data development method, see How to do Character Development in Page Mode.

Applicable Model	Printing width/(dot)	Single density / Double density
SK1-31	80mm/(640dot)	320/640
SK1-31	72mm/(576dot)	288/576
SK1-31/21	56mm/(448dot)	224/448
SK1-31/21	54mm/(432dot)	216/432

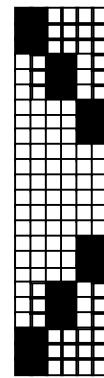
8dot bit-image



24dot bit-image



Double density



Single density

Applicable	SK1-31	SK-21			
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[Name] Register the download bit image

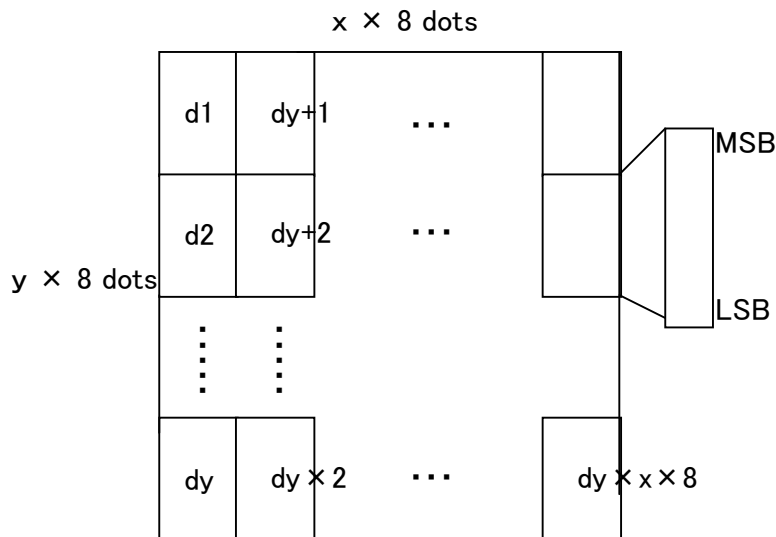
[Code] <1D>h <2A>h x y d1 ... d (xxyx8)

[Defined area]  $1 \leq x \leq 255$   
 $1 \leq y \leq 48$  where,  $(xxyx8) \leq$  user memory empty area  
 $0 \leq d \leq 255$

[Function] Registers bit image data with a size specified by x and y in the user memory.  
 X indicates that the horizontal size is (X x 8) dots.  
 Y indicates that the vertical size is (Y x 8) dots.

- [Detail]
- When the parameter is out of the specified range, this command is ignored.
  - For the empty area of the user memory, refer to “user memory” by Technical Guide.
  - As for data development method, see the figure below.

Download bit image configurarion



[Name] Print the download bit image

[Code] <1D>h <2F>h m

[Defined area]  $0 \leq m \leq 3$ ,  $48 \leq m \leq 51$

[Function] The registered download bit image is printed in a mode specified with m.

m	Printing mode	Contents
0, 48	Normal mode	Printing at ordinary size.
1, 49	Horizontal double-sized mode	Printing by double-width.
2, 50	Vertical double-sized mode	Printing by double-height.
3, 51	Double-width and double-height mode	Printing by double width and height.

- [Detail]
- When download bit image is not defined, this command is ignored.
  - The printing mode other than inverse printing command has no influence .
  - Even if the area out of printable range, the fraction section that protrudes in units of bytes in the right direction is printed.  
<Standard mode>
  - If data remains in the print buffer, the printer prints that data and then prints the download bit-image.  
<Page mode>
  - For data development manner, see [How to do Character Development](#) in Page Mode.

Applicable	SK1-31	SK-21			
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[Name] Specify the high-speed bit image  
 [Code] <12>h <56>h nl nh d1 ... dk  
 [Defined area]  $0 \leq nl \leq 255$   
 $0 \leq nh \leq 255$   
 $0 \leq d \leq 255$

[Functions] Prints bit image of the number of lines specified by nl and nh.

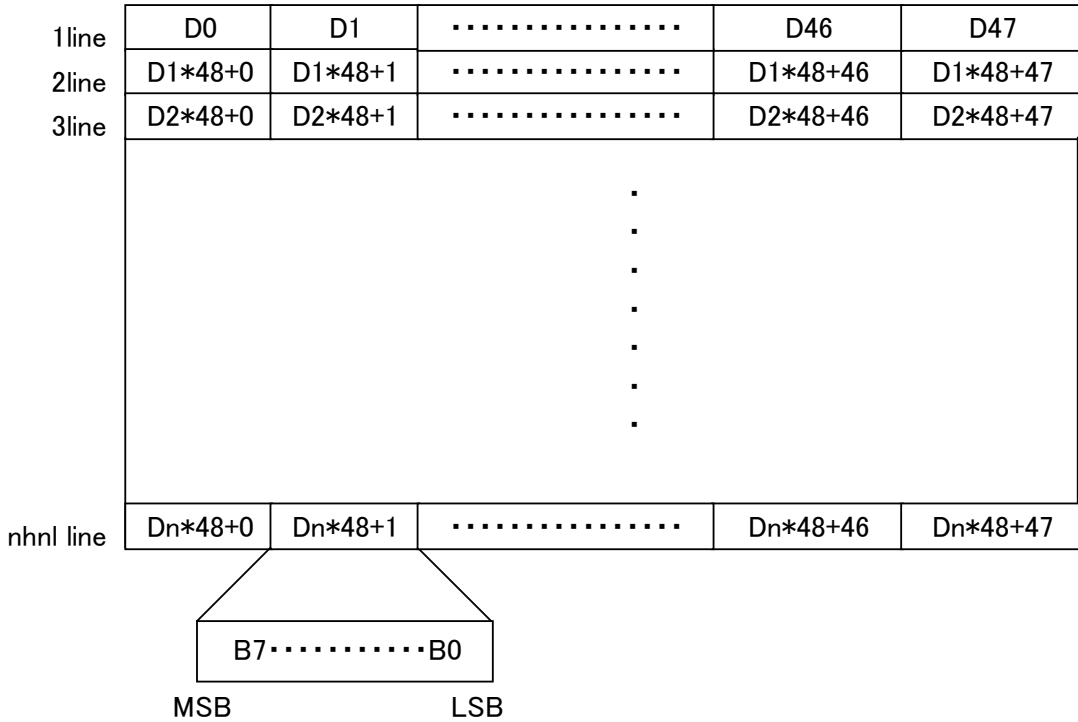
Data size / line(m)	Number. of entire data (k)
Refer to table below	$(nh \times 256 + nl) \times m$

- [Detail]
- nl and nh indicate the number of vertical lines. (nh×256+nl line)
  - This command is invalid for specifying and canceling the inverse print.
  - This command is not effected by inverse printing command.
  - Refer to "Notice of graphic printing" by Technical Guide.
  - As for image development method, see the following figure .
  - Ignores this command in the page mode.

(Table)

Applicable mode	Printing width/(dot)	Data size / line(m)
SK1-31	80mm/(640dot)	80
SK1-31	72mm/(576dot)	72
SK1-31/21	56mm/(448dot)	56
SK1-31/21	54mm/(432dot)	54

Example: m=48 of graphics data configuration





Applicable	SK1-31	SK-21			
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[Name] Print pressed rasta bit image

[Code] <12>h <76>h n [m1 [code + data length] [d1...dk](line)] ...  
[mn [code + data length] [d1...dk](line)]

[Definition area]  $0 \leq n \leq 255$   
 $0 \leq m \leq 3$   
 $0 \leq d \leq 255$  (Image data)

[Function] Extracts 1 line to n lines by the rule specified m, and prints bit image.

n : Extraction line number

m : Specifies press mode

m=0: Normal press

m=1: Specifies blank line (1 line all 0)

m=2: Copies pre line

m=3: Copies pre line, and overwrite data to byte position specified.

[Press rule: m=0]

- Press mode use byte length way, so that specifies [code + data length] at top.
- The code specifies unpress or press.

1. Press

Code + Data length: 80h + 00h~7Fh (00H specifies 1 byte length)

Data: Specifies one byte image data, then extracted with data length specified.

2. Unpress

Code + Data length: 00h + 01h~7Fh

Data: Specifies image datas as much as data length.

Applicable model	Printing width/(dot)	Specify a data range in press	Specify a data range in unpress	Total data size / line
SK1-31	80mm/(640dot)	0-79	1-80	80
SK1-31	72mm/(576dot)	0-71	1-72	72
SK1-31/21	56mm/(448dot)	0-55	1-56	56
SK1-31/21	54mm/(432dot)	0-53	1-54	54

※Total data length should be matched with the number of data.

Ex. m=0 89 FF 46 AA(1) BB(2) ... EE(46h)

① Extracts image data <FF> to 10 bytes.

② Sets 47H bytes unpressed image data <AA, BB, CC, DD, EE, FF>.

“Data length: 10byte + “Data length: 46h byte = total data size / line 80 byte

[Press rule: m=3]

- Copies pre line, and overwrite image data to byte position specified.

Position: 0 to 127

Data: one byte image data

Last code: 80H~FFH <The top bit needs 1>

Ex. m=3 0A AA 10 BB 80

Copies pre line, and sets <AA> to D(10) position and <BB> to D(16) position.

[Dateils] • Ignores this command in the page mode.  
• Printing direction only upright.

ESC b

Applicable	SK1-31	SK-21			
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[Name] Specify the high-speed bit image with indicated printing width

[Code] <1B>h <62>h y nl nh [d1...dk]

[Defined area]  $0 \leq y \leq$  Table below

$0 \leq nl \leq 255$

$0 \leq nh \leq 255$

$0 \leq d \leq 255$

[Function] Print a bit image by specified printing y width and nl/nh height.

- [Details]
- nl and nh indicate the number of vertical lines. (nh×256+nl line)
  - This command is invalid for specifying and canceling the inverse print.
  - Refer to “Notice of graphic printing” by Technical Guide.
  - As for image development method, see the following figure at **DC2 V**.
  - Ignores this command in the page mode.
  - This command can be applied to software version V1.20 or later.
  - y indicate the width length byte.

Table :

Applicable model	'y' of maximum value
SK1-31	80
SK1-31	72
SK1-31/21	56
SK1-31/21	54

Explanation of Page Mode Command

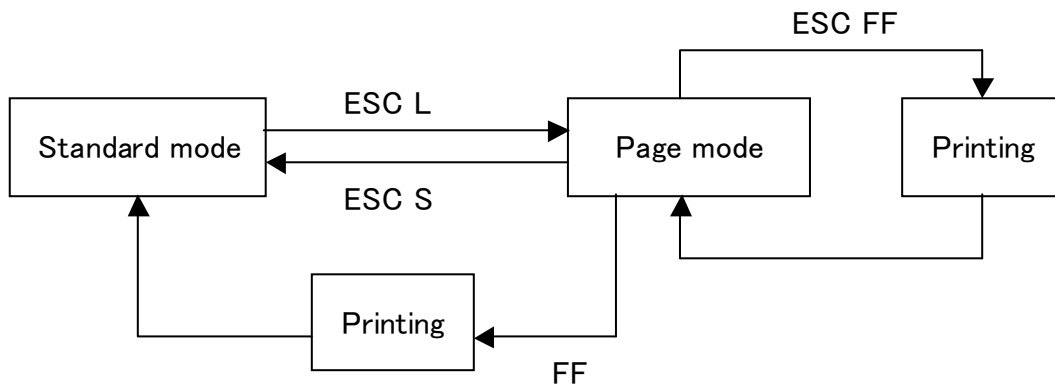
This printer has two printing modes, the standard mode and the page mode.

In the standard mode, the printer prints or feeds the paper each time it receives the print or paper feed commands. On the other hand, in the page mode, the print or paper feed commands are executed to the printing area on the specified memory and the printer does not respond.

When ESC FF or FF is executed, the printer prints all the data organized in the printing area.

It means that when the data, "SANEI"<CR> is transferred to print characters and start a new line, a string of "SANEI" is printed and a new line is started in the standard mode, however in the page mode, a string of "SANEI" is written in the specified printing area in the memory and the position for the next data is moved to the next line in the area within the memory.

<Flow between page mode and standard mode>



## ESC L

Applicable	SK1-31	SK-21			
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[Name]	Select the page mode
[Code]	<1B>h <4C>h
[Function]	<Standard mode> Change the standard mode to the page mode. <Page mode> Invalidation (forbiddance)
[Detail]	<Standard mode> <ul style="list-style-type: none"><li>Setting is enabled only for the beginning of a line.</li></ul> <Page mode> <ul style="list-style-type: none"><li>Ignores this command.</li><li>Returns to standard mode by <b>FF</b> or <b>ESC S</b></li><li>Defines the printing area by <b>ESC W</b></li><li>Selects the character printing direction by <b>ESC T</b></li><li>Below are the different command settings between page mode and standard mode.<ol style="list-style-type: none"><li>Setting the space: <b>ESC SP</b>, <b>FS S</b></li><li>Setting printing and feeding: <b>ESC 2</b>, <b>ESC 3</b></li></ol></li><li>The commands below may be set in page mode, however they are not executed in page mode, but are enabled after returning the standard mode.<ol style="list-style-type: none"><li>Specify the printing area: <b>GS L</b>, <b>GS W</b>, <b>ESC \$</b></li><li>Aligning the position: <b>ESC a</b></li></ol></li><li>Below commands are ignored at page mode.<ol style="list-style-type: none"><li>Specify and cancel the inverted character: <b>ESC {</b></li></ol></li><li>The command of <b>ESC @</b> is for initialization and page mode returns to the standard mode.</li></ul>

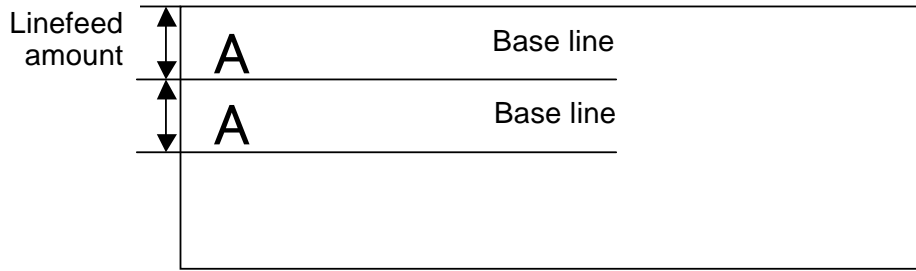
## ESC S

Applicable	SK1-31	SK-21			
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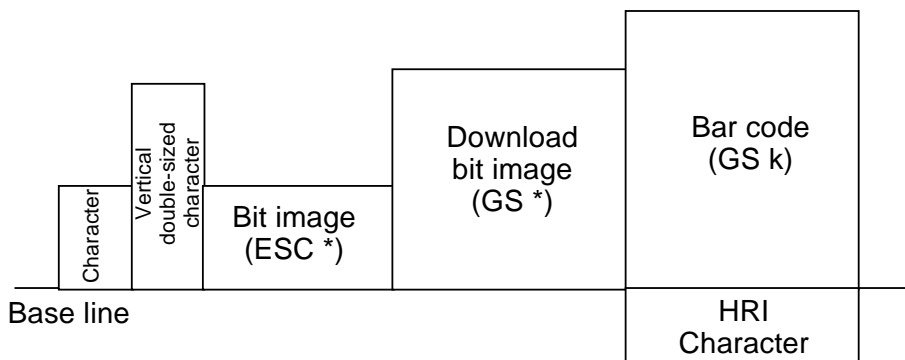
---

[Name]	Select the standard mode
[Code]	<1B>h <53>h
[Function]	<Standard mode> Invalidation (forbiddance) <Page mode> Changes the page mode to the standard mode.
[Detail]	<Standard mode> <ul style="list-style-type: none"><li>Ignores this command.</li></ul> <Page mode> <ul style="list-style-type: none"><li>Even when data is found in the page memory, the page mode is terminated without further printing.</li><li>After execution, makes the beginning of a line the printing start position.</li></ul>

## How to do Character Development in Page Mode



Character data development position



Print data development position

### ESC FF

Applicable	SK1-31	SK-21			
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- 
- [Name] Print all page mode memories
- [Code] <1B>h <0C>h
- [Function] Performs batch printing of the printing area.
- [Detail]
- Ignores this command in the standard mode.
  - After execution, setting of ESC W, ESC T is retained.
  - After execution, the data in the page memory is retained.

## CAN

Applicable	SK1-31	SK-21			
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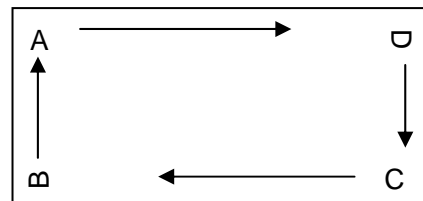
- [Name] Erase the print buffer (Standard mode), and clear page mode memories (Page mode)
- [Code] <18>h
- [Function] <Standard mode>  
Clears the print buffer.
- <Page mode>  
Clears all data in specified area of the page mode by ESC W.
- [Detail] <Standard mode>
- The beginning of a line is treated as the printing start position after execution.
- <Page mode>
- The command returns the development position to the start position of the ESC T command after execution.

## ESC T

Applicable	SK1-31	SK-21			
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- [Name] Select printing direction and initial position
- [Code] <1B>h <54>h n
- [Defined area]  $0 \leq n \leq 3$
- [Function] In the page mode, Choose the character printing direction and start point to see the following figure.

N	Start point and printing direction as figure right.
0	A
1	B
2	C
3	D



- [Detail]
- Ignores this command in the standard mode.
  - The printing development position is specified area by ESC W command.
  - The X axis and Y axis are reversed in the development direction.
    - Edits a print image direction (A, C)
      - Y axis : ESC J, ESC 2, ESC 3
      - X axis: ESC SP, FS S
    - Edits a print image direction (B, D)
      - Y axis : ESC SP, FS S
      - X axis : ESC J, ESC 2, ESC 3
  - The default value is n=0.

ESC W

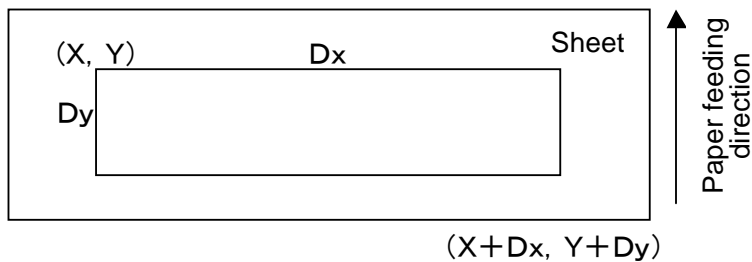
Applicable	SK1-31	SK-21			
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[Name] Defining the print area  
 [Code] <1B>h <57>h xl xh yl yh dxl dxh dyl dyh  
 [Defined area]  $0 \leq (xh \times 256 + xh) \leq$  Refer to Table.1 below  
 $1 \leq (dxh \times 256 + dxl) \leq$  Refer to Table.1 below  
 $0 \leq (yh \times 256 + yl) \leq 1999$   
 $1 \leq (dyh \times 256 + dyl) \leq 2000$

Table1.

Applicable model	Printing width	X Maximum	Dx Maximum
SK1-31	80mm/(640dot)	638	639
SK1-31	72mm/(576dot)	574	575
SK1-31/21	56mm/(448dot)	446	447
SK1-31/21	54mm/(432dot)	430	431

[Function] Sets the printing area in the page mode.  
 1. X-axis origin= $(xh \times 256 + xl) \times \text{dot pitch}$   
 2. Y-axis origin= $(yh \times 256 + yl) \times \text{dot pitch}$   
 3. X-axis length= $(dxh \times 256 + dxl) \times \text{dot pitch}$   
 4. Y-axis length= $(dyh \times 256 + dyl) \times \text{dot pitch}$



- [Detail]
- Ignores this command in the standard mode.
  - During operation, when a parameter outside the definition area is set, a code up to dyh is acquired and invalidates the command.
  - Use the ESC T command to specify the development direction and starting point of the character position.
  - When X-direction data exceeds maximum value, Dx is rounded.
  - When Y-direction data exceeds , Dy is rounded.
  - When performing printing, the maximum set value in the Y axis is the printing length.
  - When not set by the command, the printing length is determined by the initial value. (The X,Y is minimum, and the Dx,Dy is maximum.)
  - The linefeed from the base line follows the initial linefeed value (ESC 2) and the linefeed value (ESC 3).
  - The default xl, xh, yl, yh is all zero, and dxl, dxh, dyl, dyh is maximum.

ESC =

Applicable	SK1-31	SK-21			
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[Name] Select peripheral

[Code] &lt;1B&gt;h &lt;3D&gt;h n

[Definition area]  $0 \leq n \leq 255$ 

[Function] Selects peripheral in which the data from host computer is effective.

BIT	Function
0	0: Printer invalid 1: Printer effective
1	Undefined
2	Undefined
3	Undefined
4	Undefined
5	Undefined
6	Undefined
7	Undefined

[Detail] · When selects printer invalid, then printer ignores data without **ESC =**.

ESC i

Applicable	SK1-31	SK-21			
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[Name] Full cut

[Code] &lt;1B&gt;h &lt;69&gt;h

[Function] Execute full cut.

ESC m

Applicable	SK1-31	SK-21			
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[Name] Partial cut

[Code] &lt;1B&gt;h &lt;6D&gt;h

[Function] Execute partial cut.



GS V

Applicable	SK1-31	SK-21			
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[Name] Paper cut  
[Code] <1B>h <66>h m or <1B>h <66>h m n (m=65, 66)  
[Definition area] m=0,1,48,49,65,66  
0 ≤ n ≤ 255  
[Function] Cut specified paper  
m=0, 48: Execute full cut  
m=1, 49: Execute partial cut  
m=65: Feeds paper n × dot pitch and execute full cut  
m=66: Feeds paper n × dot pitch and execute partial cut

ESC n

Applicable	SK1-31	SK-21			
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[Name] Partial cut so that a lot of paper residual.  
[Code] <1B>h <6D>h  
[Function] Execute partial cut so that a lot of paper residual.

ESC c 3

Applicable	SK1-31	SK-21			
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[Name] Select paper sensor to output PE signal  
 [Code] <1B>h <63>h <33>h n  
 [Definition area]  $0 \leq n \leq 255$   
 [Function] Select paper sensor for paper empty.

BIT	FUNCTION
0 Note1	0 : Disable near end sensor 1 : Enable near end sensor
1 Note1	0 : Disable near end sensor 1 : Enable near end sensor
2	0 : Disable paper empty sensor 1 : Enable paper empty sensor
3	0 : Disable paper empty sensor 1 : Enable paper empty sensor
4	Undefined
5	Undefined
6	Undefined
7	Undefined

Note1. This function is valid only for the model with near end sensor.

- [Detail]
- Allows to select several sensors at once.
  - Outputs the signal when one of sensors detect the paper near end or paper empty while enabling several sensors.
  - Depending on receiving buffer, delay time for switching sensors is occurred.
  - Bit 0, 1 and Bit 2, 3 show the same detection sensor and if one of Bit is "1", the sensor is enabled.
  - When the software memory "OFF-LINE BUSY" is OFF, the command does not perform the error signal in the PE signal on the outside interface .
  - The default is n=12.

ESC c 5

Applicable	SK1-31	SK-21			
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[Name] Specify or cancel panel switch  
 [Code] <1B>h <63>h <35>h n  
 [Definition area]  $0 \leq n \leq 255$   
 [Function] Specifies or cancels panel switch.  
           n=<xxxxxxx0>B : Specifies panel switch  
           n=<xxxxxxx1>B : Cancels panel switch

- [Detail]
- Only the last bit of n is effective.
  - When cancels panel switch, then all panel switch is canceled without POWER button.
  - The default is n=0.

GS a

Applicable	SK1-31	SK-21			
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[Name] Valid/Invalid of automatic status transmission

[Code] &lt;1D&gt;h &lt;61&gt;h n

[Defined area]  $0 \leq n \leq 255$ 

[Function] Selects the status which is transmitted automatically.

Bit	Function	Number
0	Undefined	
1	0 : Not select online/offline status 1 : Select online/offline status	②
2	0 : Not select error status 1 : Select error status	③
3	0 : Not select paper detection status 1 : Select paper detection status	④
4	Undefined	
5	Undefined	
6	Undefined	
7	Undefined	

- [Detail]
- When selected any status, all status(4 bytes) is transmitted at first, and after that all status is transmitted by the timing of changing the status which is selected.
  - This command is put to receive buffer at first, so that the action delays if the buffer has many datas.
  - The 4 bytes status is transmitted without the check of host status.
  - This command is valid only in the Virtual-COM interface .
  - The default is n=0.

First byte (Printer information)

Bit	Status	No.	Value
0	Non-use		0
1	Non-use		0
2	Non-use		0
3	Online Offline	②	0 1
4	Non-use		1
5	Undefined		—
6	Undefined		—
7	Non-use		0

Second byte (error information)

Bit	Status	No.	Value
0	Undefined		—
1	Undefined		—
2	Undefined		—
3	Non auto cutter error	③	0
	Auto cutter error		1
4	Non-use		0
5	Non Voltage error	③	0
	Voltage error		1
6	Non auto recoverable error	③	0
	Auto recoverable error		1
7	Non-use		0

Third byte (Paper detection information)

Bit	Status	No.	Value
0,1	Paper detection No paper	④	0 1
2,3	Near end paper detection No near end paper		④
4	Non-use		
5	Undefined		—
6	Undefined		—
7	Non-use		0

Forth byte (Paper detection status of option)

Bit	Status	No.	Value
0	In the case of the bezel mode-A * Non-use	④	0
	In the case of the bezel mode-B * Non paper course out. * Paper course out detection.		0 1
	In the case of the presenter * Non paper course out. * Paper course out detection.		0 1
1	In the case of bezel mode-A * The bezel sensor is not detected. * The bezel sensor is detected.	④	0 1
	<b>Note1</b> In the case of bezel mode-B * The bezel sensor is detected the paper after cut-action.		1
<b>Note1</b>	In the case of the presenter. * The presenter sensor is detected the paper after cut-action.		1
2,3	Undefined		--
4	Non-use		0
5,6	Undefined		--
7	Non-use		0

**Note1.** This bit is cleared to '0' after pull out the paper. Meanwhile, cancel the printing data.

**Note2.** The Bit 0 or 1 is '0' in the case having no bezel / presenter .

**Note3.** The Bit 0 or 1 can be applied to software version V1.38 or later.

Applicable	SK1-31	SK-21			
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[Name] Transmit status

[Code] <1D>h <72>h n

[Defined area] n=1, 2, 49, 50

[Function] Transmits status specified to host.

n=1, 49 : Transmits status of paper detection.

n=2, 50 : Undefined

[Detail] • This command is valid only in the Virtual-COM interface .

• This command inputs to receive buffer at first, so if receive buffer has a lot of data, the action will delay.

• The printer sends the status without checking the status of host.

(n=1, 49)

Bit	Function
0,1	0 : Paper detected 1 : No paper detected
2,3	0 : Near end paper detected 1 : No near end paper detected
4	Non-use (0)
5	Undefined
6	Undefined
7	Non-use (0)

(n=2, 50)

Bit	Function
0	Non-use (0)
1	Undefined
2	Undefined
3	Undefined
4	Non-use (0)
5	Undefined
6	Undefined
7	Non-use (0)

GS E

Applicable	SK1-31	SK-21			
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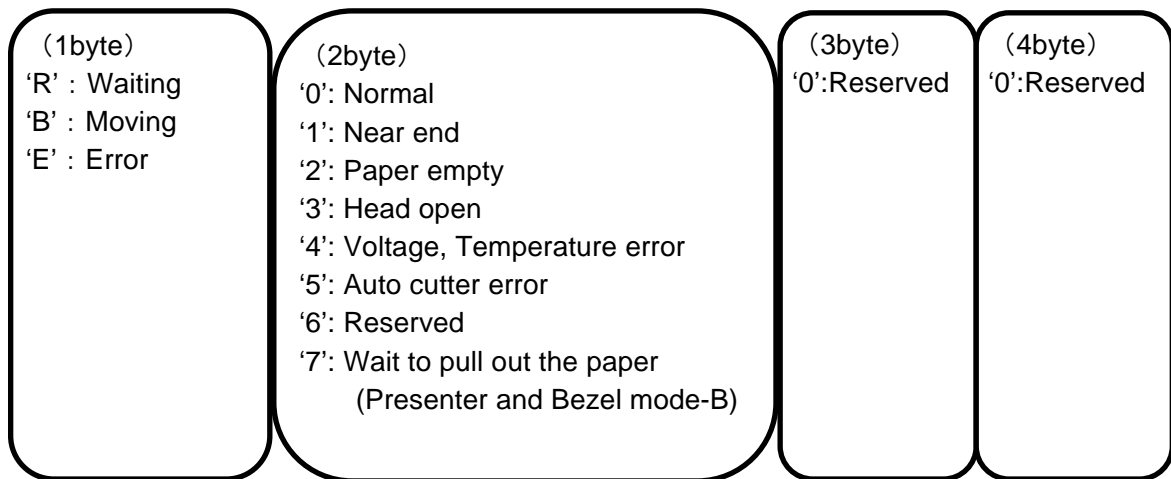
[Name] Answer the string  
 [Code] <1D>h <45>h n STRING(d1...dk)  
 [Defined area]  $1 \leq n \leq 16$   
 $20h \leq d \leq 7Eh$   
 [Function] Sends the STRING which length is specified by n,  
 The printer returns as the data style DLE STX STRING DLE ETX.  
 n: STRING length  
 Ex.)  
 Host Printer  
 GS E 04h "ABCD" →→→ (Receive)  
 (Receive) ←←← DLE STX "ABCD" DLE ETX  
 [Detail]
 

- When the n is out of range, the command is ignored.
- This command inputs to receive buffer at first, so if receive buffer has a lot of data, the action will delay.
- The printer sends the string without checking the status of host.
- This command is valid only in the Virtual-COM interface .

GS R 1

Applicable	SK1-31	SK-21			
------------	--------	-------	--	--	--

[Name] Check printer status  
 [Code] <1D>h <52>h n  
 [Defined area] n= 1 or '1'  
 [Function] Sends printer status as the style of DLE STX Status(4 bytes) DLE ETX.  
 The printer status 4 bytes are like next.



Ex.) Host Printer  
 GS R 01h →→→ (Receive)  
 (Receive) ←←← DLE STX "E200" DLE ETX <When paper empty >

[Detail]
 

- This command inputs to receive buffer at first, so if receive buffer has a lot of data, the action will delay.
- The printer sends the status without checking the status of host.
- This command is valid only in the Virtual-COM interface .

Applicable	SK1-31	SK-21			
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[Name] Send printer ID

[Code] <1D>h <49>h n

[Definition area] n=1 to 3 or '1' to '3'/ 65 to 67

[Function] Send specified the printer - ID

- [Detail]
- This command inputs to receive buffer at first, so if receive buffer has a lot of data, the action will delay.
  - The printer sends the status without checking the status of host.
  - This command is valid only in the Virtual-COM interface .

[Sending value]

1) n=1 to 3

n	ID	Value (1 byte, 16 hexadecimal)
1, '1'	Product	SP1-21: 31H SK1-31: 32H
2, '2'	Type	BIT0: 0 : 2 bytes code is not available. 1 : 2 bytes code is available. BIT1 to 7: 0 : Reserved
3, '3'	ROM version	ROM version

2) n=65 to 67

Send "header <5F> + Character lines + NULL<00>"

n	ID	Sending characters
65	ROM version	"V1.00" (in case of V1.00)
66	Manufacturer	"SANEI"
67	Model name	"SP1-21" (Model: SP1-21)

ESC s

Applicable	SK1-31	SK-21			
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[Name] Send a printer information

[Code] <1B>h <73>h n

[Defined area] n from 2 to 5

[Function] Send a printer information according to "n".

Return style is "header<FF>" + n + "information data" (below table).

N	Information type	Information data
2	Model Name	Maximum 32 degree. The data size is variable, the end of code's NULL.
3	Software version1	The data size is fixed to 8 degree (Not end of code).
4	Software version2	The data size is fixed to 8 degree (Not end of code).
5	Software memory	The data size is fixed to 4 degree (Not end of code). Return the software memory 1 to 4 by binary code.

- [Detail]
- This command inputs to receive buffer at first, so if receive buffer has a lot of data, the action will delay.
  - The printer sends the status without checking the status of host.
  - This command can be applied to software version V1.20 or later.
  - This command is valid only in the Virtual-COM interface .

Applicable	SK1-31	SK-21			
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[Name] Send a printer status in the present.  
 [Code] <1B>h <76>h  
 [Function] Sends a printer status with 1 byte length as table

(Table)

Bit	Status (Active: 1)
0	Near end paper detection
1	Open Thermal head
2	No paper
3	Temperature detection
4	Auto cutter error detection
5	In the case of bezel mode-A Non-use (0) In the case of bezel mode-B Paper course out detection. In the case of the presenter Paper course out detection.
6	In the case of bezel mode-A The bezel sensor is detected. In the case of bezel mode-B The bezel sensor is detected the paper after cut-action. In the case of the presenter. The presenter sensor is detected the paper after cut-action.
7	Running the stored buffer mode in <b>GS G</b> .

- [Detail]
- This command inputs to receive buffer at first, so if receive buffer has a lot of data, the action will delay.
  - The printer sends the status without checking the status of host.
  - This command can be applied to software version V1.20 or later.
  - This command is valid only in the Virtual-COM interface .



## FS Q

Applicable	SK1-31	SK-21			
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- 
- [Name] Specification of image registration into the nonvolatile memory
- [Code] <1C>h <51>h n
- [Defined area]  $0 \leq n \leq 2$
- [Function] Saves data that follows the command as image data into the nonvolatile memory numbered with n.
- [Detail]
- Subsequently, continues registration until the FS R command is executed.
  - The maximum of dot line is approx. 1600 lines (200mm) in each memory.  
If the printing image exceeds the maximum lines, the image exceeded is not effective.
  - When n=2 is specified, the area covers over n=0 and n=1 memories, so that the maximum of dot line expands to approx. 3200 lines.
  - Paper-feed commands such as ESC J are not registered as printing image.
  - During execution of the command, the inverse/erect specification cannot be changed.
  - This command is invalid when all numbers of memory are not cleared at registration mode.
- [Caution]
- **Frequent registration into the nonvolatile memory may cause the memory to fail. Never use the nonvolatile memory for frequent rewriting.**
  - **Do not turn off the power during execution of the command. The printer may be damaged.**

## FS R

Applicable	SK1-31	SK-21			
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- 
- [Name] Cancel Image registration in the nonvolatile memory
- [Code] <1C>h <52>h n
- [Defined area]  $0 \leq n \leq 2$
- [Function] Cancel the image data registration into the nonvolatile memory specified by n.
- [Detail]
- Cancel the execution of FS Q command.
  - The following data returns to a usual state of operation.

## FS O

<b>Applicable</b>	<b>SK1-31</b>	<b>SK-21</b>			
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- 
- [Name] Set printing image registered in the nonvolatile memory.  
[Code] <1C>h <4F>h n  
[Defined area]  $0 \leq n \leq 2$   
[Function] Set printing mode to the printing image registered into the nonvolatile memory numbered with n.
- [Detail]
- Subsequently, continues printing received data linked with printing image registered in the nonvolatile memory until the FS P command is executed.
  - When the inverse/erect setting of the received data is not the same as the printing image registered in the nonvolatile memory, the command does not make linkage with the printing image.
  - The paper feed command such as ESC J does not make linkage with the printing image.
  - During execution of the command, inverse/erect specification cannot be changed.
  - This command is invalid when all numbers of memory specified by n are not cleared at registration mode.

## FS P

<b>Applicable</b>	<b>SK1-31</b>	<b>SK-21</b>			
-------------------	---------------	--------------	--	--	--

- 
- [Name] Cancel printing image registered in the nonvolatile memory  
[Code] <1C>h <50>h n  
[Defined area]  $0 \leq n \leq 2$   
[Function] Cancel printing image of the nonvolatile memory specified by n.  
[Detail]
- Cancel the execution of FS O command.
  - This command finishes the link with printing image registered in the nonvolatile memory.

## DC3 A

<b>Applicable</b>	SK1-31	SK-21			
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- 
- [Name] Choose ruled line buffer A  
 [Code] <13>h <41>h  
 [Function] Chooses a ruled line buffer A.  
 [Detail]
  - The ruled line buffer contains two independent internal buffers (buffer A and buffer B), and this command designates Buffer A as the active buffer.
  - Buffer A is the default value.

## DC3 B

<b>Applicable</b>	SK1-31	SK-21			
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- 
- [Name] Choose ruled line buffer B  
 [Code] <13>h <42>h  
 [Function] Chooses ruled line buffer B.  
 [Detail]
  - The ruled line buffer contains two independent internal buffers (buffer A and buffer B), and this command designates Buffer B as the active buffer.
  - Buffer A is the default value.

## DC3 C

<b>Applicable</b>	SK1-31	SK-21			
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- 
- [Name] Clear the ruled line buffer  
 [Code] <13>h <43>h  
 [Function] Clear the contents of a chosen ruled line buffer.  
 [Detail]
  - The clear data is all dots "0".

## DC3 D

<b>Applicable</b>	SK1-31	SK-21			
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- 
- [Name] Write dot specification to the ruled line buffer  
 [Code] <13>h <44>h nl nh  
 [Defined area]  $0 \leq nl \leq 255$   
 $0 \leq nh \leq 3$   
 [Function] Writes "1" (black spot) at the specified dots position of the ruled line buffer. The position specified is  $[(nh \times 256 + nl) \times \text{dot pitch}]$ .  
 [Detail]
  - The range of the ruled line buffer is "0" to "1023" dots. Irrespective of the printable area, it writes "1" (black spot) in the ruled line buffer.
  - When specifying a parameter outside the specified range, the command is ignored.

## DC3 L

Applicable	SK1-31	SK-21			
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- 
- [Name] Write line specification of the ruled line buffer
- [Code] <13>h <4C>h nl nh ml mh
- [Defined area]  $0 \leq nl \leq 255$   
 $0 \leq nh \leq 3$   
 $0 \leq ml \leq 255$   
 $0 \leq mh \leq 3$
- [Function] Writes "1" (black spot) in a range of nhnl through mhml dots to the ruled line buffer.  
 $0 \leq nhnl \leq mhml \leq 1023$   
 $nhnl = (nh \times 256 + nl) \times \text{dot pitch}$   
 $mhml = (mh \times 256 + ml) \times \text{dot pitch}$
- [Detail]
- The range of the ruled line is "0" to "1023" dots. Irrespective of the printable area, "1" (black dot) is written in the specified dot range of a chosen ruled line buffer.
  - When specifying a parameter outside the specified range, the command is ignored.

## DC3 +

Applicable	SK1-31	SK-21			
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- 
- [Name] Enable the ruled line printing mode
- [Code] <13>h <2B>h
- [Function] Permit the printing mode of the ruled line buffer.
- [Detail]
- After enabling, when printing data (including CR/ LF) is printed, the dot pattern in a chosen ruled line buffer is overwritten and printed.
  - This command is not influenced by the right margin setting (GS L) or printing area width setting (GS W).
  - In initialization, the printing mode of the ruled line is disabled.
- <Standard mode>
- Data in the ruled line, within the limit of the printing area, can be printed. But data outside the printing area is not printed.
- <Page mode>
- The printing line is limited by Page mode specifications, but the range of the ruled line buffer data that conforms to the page horizontal size or vertical size is printed without any influence.

## DC3 -

<b>Applicable</b>	<b>SK1-31</b>	<b>SK-21</b>			
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[Name] Disable the ruled line printing mode  
[Code] <13>h <2D>h  
[Function] Disables the printing mode of the ruled line buffer.  
[Detail] 

- After disabling, the dot pattern in the ruled line buffer is not overwritten and printed.

## DC3 P

<b>Applicable</b>	<b>SK1-31</b>	<b>SK-21</b>			
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[Name] Execute printing of 1-dot ruled line  
[Code] <13>h <50>h  
[Function] Prints data in the print buffer and prints a 1-dot line in a chosen ruled line buffer.  
[Detail] 

- When data is not stored in the print buffer, it prints a 1-dot line of the ruled line buffer.
- When the print mode of the ruled line buffer is disabled, printing is not performed.
- In page mode, it prints to page memory.

ESC @

Applicable	SK1-31	SK-21			
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---

[Name] Initialization  
 [Code] <1B>h <40>h  
 [Function] Initialize the printer.  
 [Detail]
 

- Initialize the user memory assignment.
- Data in the reception buffer is retained.
- Data in the print buffer is cleared.
- All the command settings are initialized.
- The data in the nonvolatile memory is retained.
- The setting of peripheral device command is retained.

DC2 D

Applicable	SK1-31	SK-21			
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[Name] Reserve and release a user memory for download character registration area  
 [Code] <12>h <44>h n  
 [Defined area]  $0 \leq n \leq 255$   
 [Function] Reserves and releases the download character area in user memory.  
     <xxxxxxx0>B : Download character area release  
     <xxxxxxx1>B : Download character area reservation  
 [Detail]
 

- When the download character area is released, the memory capacity of user memory increases by the amount of the released download character area.
- After releasing download character memory, registration is not performed.
- When download character area is reserved, the printer allocates 4,560 bytes of memory capacity for download character.
- After reservation, download character registration is performed.
- The default value is n=1 (reserved).

DC2 G

Applicable	SK1-31	SK-21			
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---

[Name] Reserve and release a user-defined character registration area  
 [Code] <12>h <47>h n  
 [Defined area]  $0 \leq n \leq 255$   
 [Function] Reserves and releases a user memory for the 2byte type of user-defined character area.  
     <xxxxxxx0>B : User-defined character area release  
     <xxxxxxx1>B : User-defined character area reservation  
 [Detail]
 

- When releasing the command, the area is added to the user memory.
- User-defined characters after release are not registered.
- When the user-defined character area is reserved, the printer allocates memory capacity for 1,152 bytes of user-defined characters.
- After reservation, user-defined characters are registered.
- The default value is n=1 (reserved).
- Only the last bit of n is effective.

## DC2 ~

Applicable	SK1-31	SK-21			
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---

[Name] Set printing density  
[Code] <12>h <7E>h n  
[Definition area]  $60 \leq n \leq 150$   
[Function] Sets the printing density.  
[Detail] 

- The unit of n is %.
- This command does not apply to single characters, but to whole line.
- The default accords to memory switch.

## GS ( A

Applicable	SK1-31	SK-21			
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[Name] Self test print  
[Code] <1D>h <28>h <41>h  
[Function] Execute self test printing

## DC1

Applicable	SK1-31	SK-21			
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[Name] Software Reset  
[Code] <11>h  
[Function] 

- Return a printer condition of power start.

  
[Details] 

- In the connection USB, Takes reconnecting of USB for around 30 seconds.
- The received buffer data after this command, lost by working software reset.
- This command can be applied to software version V1.20 or later.

## DC2 R

Applicable	SK1-31	SK-21			
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---

[Name] Read a software memory switch  
[Code] <12>h <52>h m  
[Defined area]  $0 \leq m \leq 6$   
[Function] Sends a software memory switch as the style  
DLE STX information (1 to 6 bytes of binary) DLE ETX.  
m=0 : All a software memory (binary 6 byte length)  
m=1 to 6 : m indicate the number of software memory (binary 1byte)

[Detail] 

- If reads only one memory, indicate to “m” from 1 to 6 as binary code.  
In the software memory constitution, refer to memory table in the **DC2 K** .
- This command inputs to receive buffer at first, so if receive buffer has a lot of data, the action will delay.
- The printer sends the status without checking the status of host.
- This command can be applied to software version V1.20 or later.
- This command is valid only in the Virtual-COM interface .

[Name] Specify the stored buffering mode / cancel

[Code] <1D>h <47>h n

[Defined area] n = 20h, 21h, 30h, 31h  
 IDX = 0 to 255

When parameter n is 31h, it is added the JOB-ID (ID1 to ID4) with 4byte length after n.  
 Ex. 1Dh + 47h + 31h + ID1 + ID2 + ID3 + ID4

[Function] Specifies and cancels the stored buffering mode.

n=20h : Cancel the stored buffering mode

n=21h : Specify the stored buffering mode.

n=30h : Cancel the stored buffering mode and send the JOB-ID.

n=31h ; Specify the stored buffering mode and it's added the JOB-ID .

[Detail]

- The stored buffering mode uses page memory to be incorporated in the printer and it saves the printing image data on standard mode.
- When the stored buffering mode is cancelled, the printing image data saved in the page memory is printed in block.
- The stored buffering can not be used together with the page mode.
- When the length of printing image is more than 200mm, all the data stored until then are printed in block. However, the mode is not cancelled.
- The JOB-ID function, after all the stored data are printed, is to reply the data in accordance with the following formats:  
 Data-format : <FF> <13> ID1 ID2 ID3 ID4
- The reply function is only available on the Virtual-COM interface
- This command can be applied to software version V1.38 or later.



## GS H

Applicable	SK1-31	SK-21			
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[Name] Set the HRI character printing

[Code] <1D>h <48>h n

[Defined area]  $0 \leq n \leq 255$

[Function] Specifies the printing position of the HRI characters at barcode printing.

n=<xxxxxx00>B : Does not print HRI characters.

n=<xxxxxx01>B : Printing on a bar code.

n=<xxxxxx10>B : Printing under a bar code.

n=<xxxxxx11>B : Printing on and under a bar code.

[Detail] 

- The initial value is n=0.
- Only the last two bits are effective.

## GS h

Applicable	SK1-31	SK-21			
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[Name] Set the bar code height.

[Code] <1D>h <68>h n

[Defined area]  $1 \leq n \leq 255$

[Function] Sets the bar code height. Unit n is a dot pitch.

[Detail] 

- The initial value is n=162

## GS w

Applicable	SK1-31	SK-21			
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[Name] Set the barcode width

[Code] <1D>h <77>h n

[Defined area]  $1 \leq n \leq 4$

[Function] Sets the width of a barcode as following table

(Table)

n	JAN/UPC Module width	ITF, CODE39, CODABAR module width	
		Thin bar	Bold bar
1	2-dot pitch	1-dot pitch	3-dot pitch
2	3-dot pitch	2-dot pitch	5-dot pitch
3	4-dot pitch	3-dot pitch	8-dot pitch
4	5-dot pitch	4-dot pitch	10-dot pitch

[Detail] 

- The default value is n=2.but, in the case of CODE128, default value is 2-dot pitch.
- The module width of CODE128 setting conforms to JAN/ UPC.

Applicable	SK1-31	SK-21			
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[Name] Print barcode  
 [Code] <1D>h <6B>h m d1...dk <00>h  
 [Defined area]  $0 \leq m \leq 7$   
 d1 ... dk is barcode data and differs according to the bar code system.  
 [Function] Chooses the bar code system and prints a bar code.

m	Bar code system
0	UPC-A
1	UPC-E
2	JAN13
3	JAN8
4	CODE39
5	ITF
6	NW7(CODABAR)
7	CODE128(EAN128)

[Detail]

- UPC-A has 11 bytes of barcode data and the check digit is internally added.
- UPC-E has 7 bytes of barcode data and the check digit is internally added.
- JAN13 has 12 bytes of barcode data and the check digit is internally added.
- JAN8 has 7 bytes of barcode data and the check digit is internally added.
- IN CODE39, a start/stop module is internally added.
- ITF has an even-number of bytes as bar code data and the start/stop module is internally added.
- In CODE 128, a start module (either start A, start B, or start C) and bar code data are sent. The check digit and stop module are internally added.  
 A separator or check digit for each application identifier by EAN128 are not internally added. Each special character is specified with 2 bytes as follows:

SHIFT	->	7Bh, 53h	"{S "
CODE A	->	7Bh, 41h	"{A "
CODE B	->	7Bh, 42h	"{B "
CODE C	->	7Bh, 43h	"{C "
FNC 1	->	7Bh, 31h	"{1 "
FNC 2	->	7Bh, 32h	"{2 "
FNC 3	->	7Bh, 33h	"{3 "
FNC 4	->	7Bh, 34h	"{4 "
'{'	->	7Bh, 7Bh	"{{ "
Start A	->	67h (103)	"g"
Start B	->	68h (104)	"h"
Start C	->	69h (105)	"i"

- How to develop the data in page mode,  
 see "[How to Do Character Development](#)" at **ESC L** in Page Mode.

## I -14. Two dimensional barcode

(Only for the optioned model)

### GS S

<b>Applicable</b>	<b>SK1-31</b>	<b>SK-21</b>			
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[Name] Change the cell size of two dimensional barcode

[Code] <1D>h <53>h n

[Definition area]  $0 \leq n \leq 1$

[Function] Change the cell size of two dimensional barcode

n=0 : Set initial value of cell size (Default)

n=1 : Enlarge cell size

	Default	After changed
PDF417	2	3
MicroPDF417	2	3
DataMatrix	3	4
QRCode	3	4

[Detail] · The default value is n=0.

### GS Q

<b>Applicable</b>	<b>SK1-31</b>	<b>SK-21</b>			
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[Name] Print two dimensional barcode

[Code] <1D>h <51>h n ...

[Function] Print barcode type specified by n

n = 0:Setting is prohibited

1:Setting is prohibited

2:PDF417

3:MicroPDF417

4:DataMatrix

5:MaxiCode

6:QRCode

\* Refer to the next page for parameter after n.

**PDF417**

GS + Q + 2 +

Type +EncMode +ECC\_LV +Size +nl +nh +Data(1)...Data(n)

Type symbol

0: Standard

1:Truncate

EncMode Encode mode

0: Auto proper encode

1: Binary Encode

ECC\_LV ECC(Error correction control) Level

Specify 0~7

Size

Choose one combination under below table.

Combination table of column and step (X=Column ,Y=step)

0	X 2: Y 4	8	X 12: Y 4
1	X 2: Y 9	9	X 12: Y 9
2	X 2: Y 15	10	X 12: Y 15
3	X 2: Y 20	11	X 12: Y 20
4	X 7: Y 4	12	X 20: Y 4
5	X 7: Y 9	13	X 20: Y 9
6	X 7: Y 15	14	X 20: Y 15
7	X 7: Y 20	15	X 20: Y 20

nl, nh

Specify data size lower byte/ higher byte.

$1 \leq nhnl \leq 448$

\* Max. size of data is changed depending on the selected parameter.

Data(1) ...Data(n)

Barcode data (Input number of data specified by n <n=nhnl>)

## MicroPDF417

GS +Q +3 +

Type +EncMode +Size +n + Data(1)...Data(n)

Type symbol

0:Standard

1:Code128 Emulation mode (No specific regulation)

2:Code128 Emulation mode (Specific industrial regulation FNC1 1st)

3:Code128 Emulation mode (Specific industrial regulation FNC1 2nd)

EncMode Encode mode

0:Auto proper encode

1:Binary encode

Size

Choose one combination under below table.

Combination table of column and step (X=Column ,Y=step)

0	X 1: Y 11	8	X 3: Y 26
1	X 1: Y 17	9	X 3: Y 44
2	X 1: Y 28	10	X 4: Y 4
3	X 2: Y 8	11	X 4: Y 10
4	X 2: Y 17	12	X 4: Y 12
5	X 2: Y 26	13	X 4: Y 26
6	X 3: Y 6	14	X 4: Y 44
7	X 3: Y 12		

n

Specify the size of data

$1 \leq n \leq 150$

\* Max. size of data is changed depending on the selected parameter.

Data(1) ... Data(n)

Barcode data (Input number of data specified by n)

## DataMatrix

GS +Q +4 +  
Type +(Cells or SizeXY) + nl + nh + Data(1)...Data(n)

Type symbol  
0:square  
1:rectangular

Cells (In case the symbol is square)  
Either 10, 18, 22, 26, 32, 40 or 48

SizeXY (In case the symbol is rectangular)  
0:X=18, Y= 8  
1:X=32, Y= 8  
2:X=26, Y=12  
3:X=36, Y=12  
4:X=36, Y=16  
5:X=48, Y=16

nl, nh  
Specify data size lower byte/ higher byte.  
 $1 \leq nhnl \leq 448$   
\* Max. size of data is changed depending on the selected parameter.

Data(1)...Data(n)  
Input the number of data specified by n<nhnl>

## Max i Code

GS + Q+ 5+

Type +(OPT + SC + CC + PC) + n+ Data(1)...Data(n)

Type symbol

0:Standard

1:Full ECC

2:Construction of string (layout) data

OPT (In case of Type is 2)

BIT0: Specify 1 service class

BIT1: Specify 1 country code

BIT2: Specify 1 post code

\* Must specify one of above BIT.

SC (In case of Type is 2 and BIT0 is 1 specified in above OPT)

ASIC alphanumeric up to specified 3bytes of service class, finishing by NULL

CC (In case of Type is 2 and BIT1 is 1 specified in above OPT Type)

ASIC alphanumeric up to specified 3bytes of country code, finishing by NULL

PC (In case of Type is 2 and BIT2 is 1 specified in above OPT)

ASIC alphanumeric up to specified 6bytes or 9bytes of post code, finishing by NULL

n

Specify the data size.

$1 \leq n \leq 150$

\* Max. size of data is changed depending on the selected parameter.

Data(1)..Data(n)

Barcode data (Input the number of data specified n)

## QRCode

GS + Q+ 6 +  
+ Size +ECC\_LV +nl +nh +Data(1)..Data(n)

Size Symbol Size

1, 4, 6, 8, 10, 12, 14

ECC\_LV ECC(Error collection control)Level

1: L (7%)

2: M (15%)

3: Q (25%)

4: H (30%)

nl, nh

Specify data size lower byte/ higher byte.

$1 \leq nhnl \leq 448$

\* Max. size of data is changed depending on the selected parameter.

Data(1)..Data(n)

Barcode data (Input the number of data specified n<nhnl>)



## I -15. Label Command

(Only for the optioned model)

### DC2 L

Applicable

SK1-31

SK-21

[Name] Set the length of label

[Code] <12>h <4C>h n1 n2 n3 n4

[Definition area]  $1 \leq n1 \leq 255$  (unit:2mm)

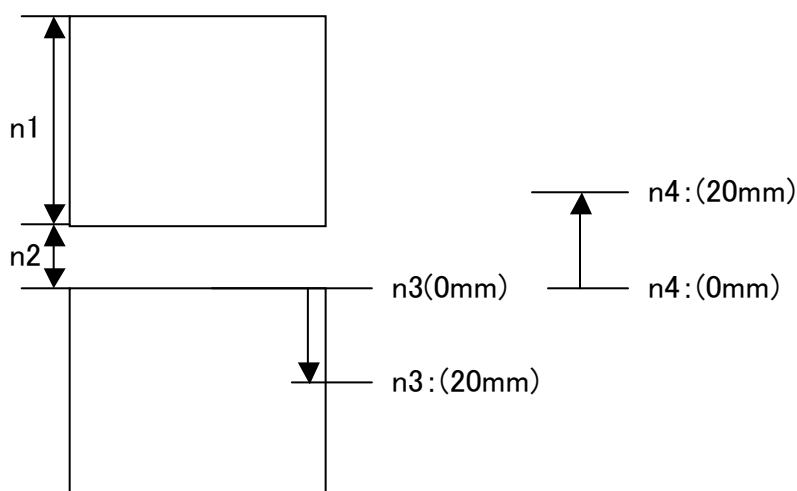
$0 \leq n2 \leq 20$  (unit:1mm)

$0 \leq n3 \leq 20$  (unit:1mm)

$0 \leq n4 \leq 20$  (unit:1mm)

[Function] Set the length of label specified by n1, n2, n3, n4.

- n1 = Length of the printing area
- n2 = Length of gap between labels
- n3 = Feed amount for the beginning of a line after " DC2 l"
- n4 = Feed back amount before the beginning of printing



- [Details]
- Established parameter is registered nonvolatile memory.
  - The length of n1 is calculated by  $n1 \times 2\text{mm}$ .
  - Maximum setting length of n1 is 350mm. When n1 is set beyond maximum value, it is changed to the maximum value.

- [Caution]
- **Do not register parameters into nonvolatile memory multiple times every operation. It may cause the damage of nonvolatile memory.**
  - **Do not turn the power off while executing this command.**

## DC2 I

<b>Applicable</b>	<b>SK1-31</b>	<b>SK-21</b>			
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[Name] Label feed

[Code] <12>h <6C>h

[Function] Feed the position of next label based on the setting label page.

## DC2 B

<b>Applicable</b>	<b>SK1-31</b>	<b>SK-21</b>			
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[Name] Re-detect of marking position

[Code] <12>h <42>h

[Function] Re-detect the current marking position.

[Detail]

- The position will move about 1~2mm when the label is cut.  
Re-detect the current marking position, and adjust the position.
- Set this command top of the printing.
- It makes back feed till re-detection of marking position.  
If no paper before marking position, then the paper will drop out.  
So that keep the paper before marking position.

## DC2 mrk

<b>Applicable</b>	<b>SK1-31</b>	<b>SK-21</b>			
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[Name] Set the marking threshold

[Code] <12>h <6D>h <72>h <6B>h n

[Definition area] n=01h、05 to 30

[Function] Tune the sensitivity of mark sensor.

n=1 : Feed double length of Paper feed setting, and set the best threshold.

n=5 to 30 : Set the voltage of threshold directly. (0.5V to3.0V)

[Detail]

- The default is n=08.
- The value is different in each label, so attention is need for user.

(Supports available only for software release version V1.38 or later, and for the option model)

### ESC h

[Name] Select the active mode on the presenter

[Code] <1B>h <68>h n

[Definition area] n= 0 to 7

[Function] Select the active mode of presenter.  
 n=0 : Automatic release and collect mode.  
 n=1 : Automatic release only mode  
 n=2 : Manual release and collect mode.  
 n=3 : Manual release only mode.  
 n=4 : Execute the release action forcibly  
 n=5 : Execute the collect action forcibly  
 n=6 : OFF (The release and collect mode)  
 n=7 : OFF (The release and collect mode)

- [Detail]
- The default is n=0.
  - The automatic release mode enables to release paper automatically, synchronizing with cutter action.
  - The automatic collect mode enables to collect paper automatically synchronizing with the time-out of collection.
  - The manual release mode enables to release paper by user's command specifications.
  - The manual collect mode enable to collect paper by user's command specifications.
  - How to specify the manual mode is executed by the command of "**ESC r 0**".
  - Function OFF does not work for the presenter of mode.
  - This mode is recommended to use under Function OFF, in case the printing length exceeds 250mm(stuplulated on the specifications) of the paper latch mechanism.

### ESC r 0

[Name] Select the presenter operation

[Code] <1B> <72> <30> n

[Definition area]  $0 \leq n \leq 255$

[Function] Select the operation mode of presenter  
 n=<xxxxxxx0>B : Manual collect operation  
 n=<xxxxxxx1>B : Manual release operation

- [Detail]
- The command is enabled to function when the operation mode is valid by ESC h.

### ESC r 1

[Name] Set the time-out for collection action.

[Code] <1B> <72> <31> n

[Definition area]  $0 \leq n \leq 61$

[Function] Set the time (n × sec) for the time-out of collection.  
 n=0 : Invalid the time-out.

- [detail]
- The default is n=4.

## DC2 K

Applicable	SK1-31	SK-21			
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[Name] Set memory switch

[Code] &lt;12&gt;h &lt;4B&gt;h m n1...n6

[Definition area]  $0 \leq n1 \dots n6 \leq 255$ 

[Function] Sets memory switch.

m = Register mode

m=0: Register all (n1...n6)

m=1~6: Select the register number.

n1(m = 1)

Bit	Menu	Value
0	Command Mode *2	0: Mode-A 1: Mode-B
1	PAPER FEED	0: OFF 1: ON
2	OFFLINE BUSY	0: ON 1: OFF
3,4	Cut after feed-sw *1	0: Non 1: Partial cut 2: Full cut
5	Undefined	--
6	SELECT SENSOR	0: Refelection 1: Transmission
7	MARKING DETECTION	0: OFF 1: ON

n2(m = 2)

Bit	Menu	Value
0,,3	CHARACTER TABLE	0: KATAKANA 1: PC437 2: PC850 3: PC852 4: PC857 5: PC858 6: PC863 7: PC865 8: PC866 9: WPC1252 10: PC860 11-15: Not Change
4,,6	PAPER DENSITY	0: 80% 1: 90% 2: 100% 3: 110% 4: 120% 5: 130% 6: 140% 7: 150%
7	MARKING RE-DETECTION	0: OFF 1: ON

n3(m = 3)

Bit	Menu	Value
0,,2	PAPER/PRINTING WIDTH	[SK1-31] 0: 80/72 1: 60/56 2: 58/54 3: 83/80 4-7: Undefined
3,4,5	MECHANISM SPEED	[SK1-21] Undefined 60/56 58/54 Undefined Undefined
6	Near End Paper *2	0: On 1: Off
7	Undefined	--

n4(m = 4)

Bit	Menu	Value
0,,2	BAUD RATE	0: 1200 1: 2400 2: 4800 3: 9600 4: 19200 5: 38400 6: 57600 7: 115200
3	BIT Length	0: 8Bit 1: 7Bit
4,5	PARITY	0: Non 1: Non 2: Odd 3: Even
6	BUSY CONTROL	0: RTS/CTS 1: XON/XOFF
7	STOP BIT	0: 1-BIT 1: 2-BIT

n5(m = 5)

Bit	Menu	Value
0,,7	Value at Paper Feed	$0 \leq n5 \leq 255$

n6(m = 6)

Bit	Menu	Value
0	USB Device Class *3	0: Printer Device Class 1: Communication Device Class
1,,3	Undefined	
4,5	SELECT BEZEL *3	0: NON (NORMAL MODE) 1: Bezel Mode-A 2: Bezel Mode-B
6,7	Undefined	

- [Detail]
- This command registers to nonvolatile memory, so that it remain when power off.
  - When registration all, set the value m=0, and continue n1...n6 6 bytes data.
  - When registration one, set the value m=1...6, and continue one n.
  - Refer detail to SK1-31 Technical Manual, IV-3. Function setting mode.

[Caution]

- **Frequent registration into the nonvolatile memory may cause the memory to fail.**
- **Never use the nonvolatile memory for frequent rewriting.**
- **Do not turn off the power during execution of the command.**  
**The printer may be damaged.**

[Notice]

- \*1. This parameter can be applied to software version V1.16 or later.
- \*2. This parameter can be applied to software version V1.20 or later.
- \*3. This parameter can be applied to software version V1.30 or later.

# MEMO