ESC/POS Command Manual

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	< Add >		
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11	GS (k pL pH cn fn n (fn=68)	Sets the PDF417 module height	
12	GS (k pL pH cn fn n (fn=69)	Sets the error correction level for PDF417 symbols	
13	GS (k pL pH cn fn n (fn=80)	Stores symbol data in the PDF417 symbol storage area.	
14	GS (k pL pH cn fn n (fn=81)	Prints the PDF417 symbol data in the symbol storage area.	

Command Descriptions

Command Notation

[Name]	The name of the control command.
[Format]	The code sequence. In this description, < > H denotes hexadecimal numbers, < >denotes decimal numbers and < > B denotes binary numbers. [ ] k indicates the contents of the [ ] should be repeated k times.
[Range]	The allowable range for the arguments.
[Description]	Description of the command function.
[Details]	If necessary provides important information on setting and using the printer command.
[Default]	The default values for the commands.
[Reference]	List related commands.
[Example]	Example of using the commands.

The numbers denoted by <>H is hexadecimal.
The numbers denoted by <>B is binary.

Print Commands

The WTP series   supports the following commands for printing characters and advancing paper.

HT

[Name]	Horizontal tab
[Format]	ASCII HT Hex 09 Decimal 9
[Description]	Moves the print position to the next tab position.

[Details]   ·This command is ignored unless the next tab position has been set.
            ·If the next horizontal tab position exceeds the printing area, the printer
                sets the printing position to [Printing area width + 1].
            ·Horizontal tab positions are set using "**ESC D"**.
             ·If this command is received when the printing position is at [printing area width +1], the printer
                executes print buffer-full printing of the current line and horizontal tab processing from the
                beginning of the next line.
            ·The default setting of the horizontal tab position for the paper roll is font A
                (12 x 24) every 8th character (9th, 17th, 25th, … column).

[Reference]   **ESC D**

LF

[Name]   Print and line feed

[Format]   ASCII   LF
             Hex   0A
             Decimal 10

[Description] ·Prints the data in the print buffer and feeds one line based on the current
                line spacing.

[Details]   ·This command sets the print position to the beginning of the line.

[Reference]   **ESC 2, ESC 3**

CR

[Name]   Print and carriage return.

[Format]   ASCII   CR
             Hex   0D
             Decimal 13

[Description]   When automatic line feed is enabled, this command functions the same as LF; when automatic
                line feed is disabled, this command is ignored.

[Details]   ·Sets the print starting position to the beginning of the line.
               ·The automatic line feed is ignored.

[Reference]   **LF**

FF

[Name]   Print and return to standard mode in page mode.

[Format]   ASCII   FF
             Hex   0C
             Decimal 12

[Description] Prints the data in the print buffer and returns to standard mode.

[Details]   ·The buffer data is deleted after being printed.
·The printing area set by **ESC W** is reset to the default setting.
·The printer does not execute paper cutting.
·This command sets the print position to the beginning of the line.
·This command is enabled only in page mode.

[Reference]   **ESC FF, ESC L, ESC S**

CAN

[Name]   Cancel print data in page mode

[Format]   ASCII   CAN
Hex   18
Decimal   24

[Description]   In page mode, delete all the print data in the current printable area.

[Details]   ·This command is enabled only in page mode.
 ·If data that existed in the previously specified printable area also exists in
  the currently specified printable area, it is deleted.

[Reference]   **ESC L, ESC W**

DLE EOT *n*

[Name]   Real-time status transmission.

[Format]   ASCII   DLE   EOT   *n*
Hex   10   04   *n*
Decimal   16   4   *n*

[Range]   1≤n≤4

[Description]   Transmits the selected printer status specified by n in real-time,
according to the following parameters:
       n=1 : Transmit printer status
       n=2 : Transmit off-line status
       n=3 : Transmit error status
       n=4 : Transmit paper roll sensor status

[Details]   ·The printer transmits the current status. Each status is represented by
   one-byte data.
·The printer transmits the status without confirming whether the host
   computer can receive data.
·The printer executes this command upon receiving it.
·This command is executed even when the printer is offline, the receive
   buffer is full, or there is an error status.
·When Auto Status Back (ASB) is enabled using the **GS** a command, the
   status transmitted by the **DLE EOT** command and the ASB status must
   be differentiated.

·Even though the printer is not selected using **ESC =** (select peripheral
device), this command is effective.

[Notes]　　　　·The status is transmitted whenever the data sequence of
<10>H<04>H<n> (1≤n≤4) is received.

Example :
In **ESC * m nL nH d1…dk**　d1=<10>H, d2=<04>H, d3=<01>H

·This command should not be used within the data sequence of another
command that consists of 2 or more bytes.

Example :
If you attempt to transmit **ESC 3 n** to the printer, but DTR (DSR for
the host computer) goes to MARK before *n* is transmitted and then
DLE EOT 3 interrupts before *n* is received, the code <10> H for **DLE
EOT 3** is processed as the code for **ESC 3** <10>H.

n = 1: Printer status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off
1	On	02	2	Not used. Fixed to On
2	Off	00	0	Drawer open/close signal is LOW (connector pin 3).
	On	04	4	Drawer open/close signal is HIGH (connector pin 3).
3	Off	00	0	On-line
	On	08	8	Off-line.
4	On	10	16	Not used. Fixed to On
5,6	-	-	-	Undefined.
7	Off	00	0	Not used. Fixed to Off.

n = 2: Off-line status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off
1	On	02	2	Not used. Fixed to On
2	Off	00	0	Cover is closed
	On	04	4	Cover is open
3	Off	00	0	Paper is not being fed by using the FEED button
	On	08	8	Paper is being fed by the FEED button
4	On	10	16	Not used. Fixed to On
5	Off	00	0	No paper-end stop
	On	20	32	Printing is being stopped
6	Off	00	0	No error
	On	40	64	Error occurs
7	Off	00	0	Not used. Fixed to Off

Bit 5: Becomes on when the paper end sensor detects paper end and printing stops.

n= 3: Error status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off
1	On	02	2	Not used. Fixed to On
2	-	-	-	Undefined

3	Off	00	0	No auto-cutter error
	On	08	8	Auto-cutter error occurs
4	On	10	16	Not used. Fixed to On
5	Off	00	0	No unrecoverable error
	On	20	32	Unrecoverable error occurs
6	Off	00	0	No auto-recoverable error
	On	40	64	Auto recoverable error occurs
7	Off	00	0	Not used. Fixed to Off

Bit 3:   If these errors occur due to paper jams or the like, it is possible to recover by
         correcting the cause of the error and executing **DLE ENQ n** ($1 \le n \le 2$). If an error
         due to a circuit failure (e.g. wire break) occurs, it is impossible to recover.

Bit 6: When printing is stopped due to high print head temperature until the print head
       temperature drops sufficiently or when the paper roll cover is open during printing,
       bit 6 is On.

n = 4: Continuous paper sensor status

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Not used. Fixed to Off
1	On	02	2	Not used. Fixed to On
2,3	Off	00	0	Paper roll near-end sensor: paper adequate
	On	0C	12	Paper near-end is detected by the paper roll near-end sensor.
4	On	10	16	Not used. Fixed to On
5,6	Off	00	0	Paper roll sensor: Paper present
	On	60	96	Paper roll end detected by paper roll sensor
7	Off	00	0	Not used. Fixed to Off

[Reference]   **DLE ENQ, GS a, GS r**

DLE ENQ n

[Name]   Real-time request to printer

[Format]   ASCII   DLE   ENQ   n
                    Hex   10   05   n
                    Decimal   16   5   n
[Range] $1 \le n \le 2$

[Description]   Responds to a request from the host computer.
                    n specifies the requests as follows:

n	Request
1	Recover from an error and restart printing from the line where the error occurred
2	Recover from an error aft clearing the receive and print buffers

[Details]   ·When the printer is disabled with ESC = (Select peripheral device), this
                     command is effective.
                    ·This command is effective only when an auto-cutter error occurs.
                    ·The printer starts processing data upon receiving this command.
                    ·This command is executed even when the printer is offline, the receive buffer is full, or there is
                     an error status with a serial interface model.
                    ·The status is also transmitted whenever the data sequence of <10>H<05>H< n> ($1 \le n \le 2$) is
                     received.
                        Example:
                        In **ESC * ** * m nL nH d**k, d1 = <10>H, d2 = <05>H, d3 = <01>H
                    ·This command should not be contained within another command that consists of two or more

bytes.

Example:

If you attempt to transmit **ESC 3 n** to the printer, but DTR (DSR for the host computer) goes to MARK before n is transmitted, and **DLE ENQ 2** interrupts before n is received, the code <10>H for **DLE ENQ 2** is processed as the code for **ESC 3** <10>H.

[Reference]   **DLE EOT**

DLE DC4 *n m t*

[Name]   Generate pulse at real-time

[Format]

	ASCII	DLE	DC4	n	m	t
	Hex	10	14	n	m	t
	Decimal	16	20	n	m	t

[Range]   n=1
         m=0,1
         $1 \le t \le 8$

[Description]   Outputs the pulse specified by t to connector pin m as follows:

m	Connector pin
0	Drawer kick-out connector pin 2.
1	Drawer kick-out connector pin 5.

The pulse **ON** time is [t x 100 ms] and the **OFF** time is [t x 100 ms].

[Details]   ·When the printer is in an error status when this command is processed, this command is ignored.

·When the pulse is output to the connector pin specified while **ESC p** or **DEL DC4** is executed while this command is processed, this command is ignored.
·The printer executes this command upon receiving it.
·This command is executed even when the printer is off-line, the receive buffer is full, or there is an error status.
·If print data includes the same character strings as this command, the printer performs the same operation specified by this command. The user must consider this.
·This command should not be used within the data sequence of another command that consists of 2 or more bytes.
·This command is effective even when the printer is disabled with **ESC =** (Select peripheral device).

[Reference]   **ESC p**

ESC FF

[Name]   Print data in page mode

[Format]

	ASCII	ESC	FF
	Hex	1B	0C
	Decimal	27	12

[Description]   In page mode, prints all buffered data in the printable area collectively.

[Details]   ·This command is enabled only in page mode.
                 ·After printing, the printer does not clear the buffered data, setting value for **ESC T** and **ESC W**, and the position for buffering character data.

[Reference]   **FF, ESC L, ESC S**

ESC SP n

[Name]   Set right-side character spacing

[Format]   ASCII   ESC   SP n
                Hex   1B   20 n
                Decimal   27   32 n

[Range] $0 \le n \le 255$

[Description]   Sets the character spacing for the right side of the character to
                  [n x horizontal or vertical motion units].

[Details]   ·The right-side character spacing for double-width mode is twice the
                    normal value. When characters are enlarged, the right-side character
                    spacing is n times normal value.
                 ·This command does not affect the setting of Kanji characters.
                 ·This command sets values independently in each mode (standard and page modes).
                 ·The horizontal and vertical motion units are specified by **GS P.**
                    Changing the horizontal or vertical motion units does not affect the current right-side spacing.
                 ·The **GS P** command can change the horizontal (and vertical) motion unit. However, the value
                    cannot be less than the minimum horizontal movement amount, and it must be in even units
                    of the minimum horizontal movement amount.
                 ·In standard mode, the horizontal motion unit is used.

                 ·In page mode, the horizontal or vertical motion unit differs in page mode, depending on starting
                    position of the printable area as follows:
                    ①When the starting position is set to the upper left or lower right of the printable area using
                       ESC T, the horizontal motion unit (x) is used.
                    ②When the starting position is set to the upper right or lower left of the printable area using
                       ESC T, the vertical motion unit (y) is used.
                 ·The maximum right-side spacing is 35.983 mm {255/180"}. Any setting exceeding the maximum
                    is converted to the maximum automatically.

[Default] $n = 0$

[Reference]   **GS P**

ESC ! *n*

[Name]   Select print mode(s)

[Format]   ASCII   ESC   !   *n*
                          Hex   1B   21   *n*
                          Decimal 27   33   *n*

[Range]   0≤*n* ≤255

[Description]   Selects print mode(s) using *n* as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Character font A (12x24)
	On	01	1	Character font B (9x24)
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	Off	00	0	Emphasized mode not selected.
	On	08	8	Emphasized mode selected.
4	Off	00	0	Double-height mode not selected.
	On	10	16	Double-height mode selected.
5	Off	00	0	Double-width mode not selected.
	On	20	32	Double-width mode selected.
6	-	-	-	Undefined.
7	Off	00	0	Underline mode not selected.
	On	80	128	Underline mode selected.

[Details]   ·When both double-height and double-width modes are selected,
                     quadruple size characters are printed.
               ·The printer can underline all characters, but can not underline the space set by **HT** or 90°
                     clockwise rotated characters.
               ·The thickness of the underline is selected by **ESC-,** regardless of the character size.

               ·When some characters in a line are double or more height, all the characters on the line are
                     aligned at the baseline.
               ·**ESC E** Can also turn on or off emphasized mode. However, the setting of the last received
                     command is effective.
               ·**ESC -** Can also turn on or off underline mode. However, the setting of the last received
                     command effective.
               ·**GS !** Can also select character size, However, the setting of the last received command is
                     effective.
               ·Emphasized mode is effective for alphanumeric and Kanji. All print modes except emphasized

mode is effective only for alphanumeric.

[Default]   *n* = 0

[Reference]   **ESC E, ESC -, GS !**

ESC $ *nL nH*

[Name]   Set absolute print position

[Format]   ASCII   ESC $ *nL*   *nH*
                  Hex   1B   24   *nL*   *nH*
                  Decimal   27   36   *nL*   *nH*

[Range]   0≤*nL*≤255
                  0≤*nH*≤255

[Description]   Sets the distance from the beginning of the line to the position at which subsequent characters
                  are to be printed.

[Details]   ·The distance from the beginning of the line to the print position is
                      [(*nL* + *nH* x 256) x (vertical or horizontal motion unit)] inches.
                  ·Settings outside the specified printable area are ignored.
                  ·The horizontal and vertical motion units are specified by "**GS P**".
                   ·The **GS P** command can change the horizontal (and vertical) motion unit.
                      However, the value cannot be less than the minimum horizontal movement amount, and it
                      must be in even units of the minimum horizontal movement amount. In standard mode, the
                      horizontal motion unit is used.
                  ·In page mode, the horizontal or vertical motion unit differs depending on the starting position of
                      the printable area as follows :
                      1. When the starting position is set to the upper left or lower right of the printable area
                         using **ESC T,** the horizontal motion unit (x) is used.
                      2. When the starting position is set to the upper right or lower left of the printable area
                         using **ESC T,** the vertical motion unit (y) is used.

[Reference]   **ESC \ , GS $, GS \ , GS P**

ESC % n

[Name]   Select/cancel user-defined character set

[Format]   ASCII   ESC   %   *n*
                  Hex   1B   25   *n*
                  Decimal   27   37   *n*

[Range]   0≤*n* ≤255

[Description]   Selects or cancels the user-defined character set

	·When the LSB of n is 0, the user-defined character set is canceled.

·When the LSB of n is 0, the user-defined character set is canceled.
·When the LSB of n is 1, the user-defined character set is selected.

[Details]   ·When the user-defined character set is canceled, the internal character set is automatically selected.

·n is available only for the least significant bit.

[Default]   n = 0

[Reference]   **ESC &**, **ESC ?**

ESC & y c1 c2 [x1 d1…d(y × x1)]..[xk d1..d(y × xk)]

[Name]   Define user-defined characters

[Format]

ASCII	ESC	&	y	c1	c2 *[x1 d1...d(y × x1)]...[xk d1...d(y × xk)]*
Hex	1B	26	y	c1	c2 *[x1 d1...d(y × x1)]...[xk d1...d(y × xk)]*
Decimal	27	38	y	c1	c2 *[x1 d1...d(y × x1)]...[xk d1...d(y × xk)]*

[Range] $y = 3$
$32 \le c1 \le c2 \le 126$
$0 \le x \le 12$ Font A (when font A (12 x 24) is selected)
$0 \le x \le 9$ Font B (when font B (9 x 17) is selected)
$0 \le d1 ... d(y \times xk) \le 255$

[Description]   Defines user-defined characters
·y specifies the number of bytes in the vertical direction.
·c1 specifies the beginning character code for the definition, and c2 specifies the final code.
·X specifies the number of dots in the horizontal direction.

[Details]   ·The allowable character code range is from ASCII code <20>H to <7E>(95characters).
·It is possible to define multiple characters for consecutive character codes.
·If only one character is desired, use c1 = c2.
·d is the dot data for the characters. The dot pattern is in the horizontal direction from the left side. Any remaining dots on the right side are blank.
·The data to define a user-defined character is $(y \times x)$ bytes.
·Set a corresponding bit to 1 to print a dot or 0 to not print a dot.
·This command can define different user-defined character patterns by each fonts. To select a font, use **ESC !**
·A user-defined character and a downloaded bit image cannot be defined simultaneously. When this command is executed, the downloaded bit image is cleared.
·The user-defined character definition is cleared when:
    ① **ESC @** is executed.
    ② **ESC ?** is executed.
    ③ **FS q** is executed.
    ④ **GS *** is executed.
    ⑤ The printer is reset or the power is turned off.
·When the user-defined characters are defined in font B (9 x 24), only the most significant bit of the 3rd byte of data in vertical direction is effective.

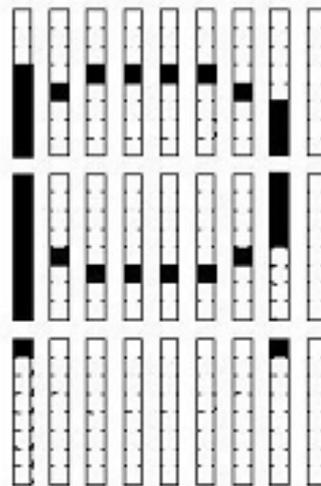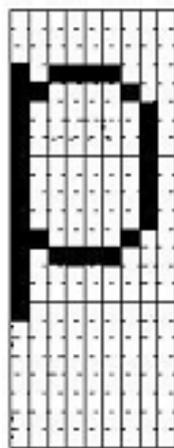[Default]   The internal character set
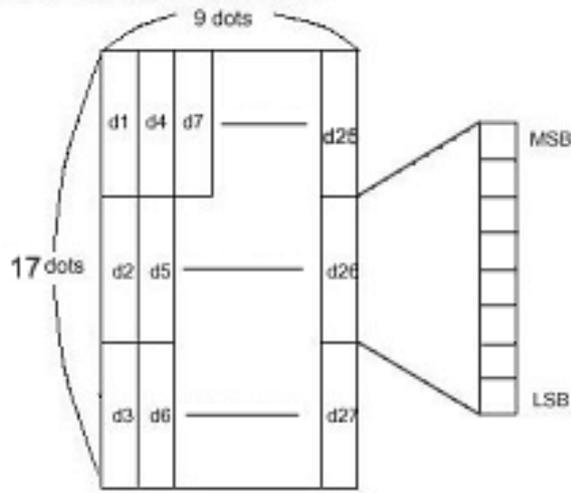
[Reference] **ESC %, ESC ?**

[Example]

• When font A (12 × 24) is selected.

12 dots

24 dots

| d1 | d4 | d7 | ----------- | d34 |

| d2 | d5 | ----------------- | d35 |

| d3 | d6 | ----------------- | d36 |

MSB

LSB
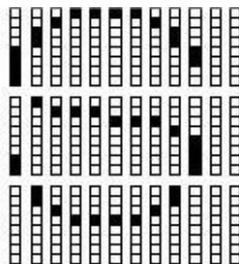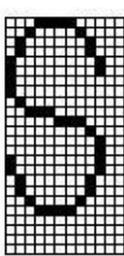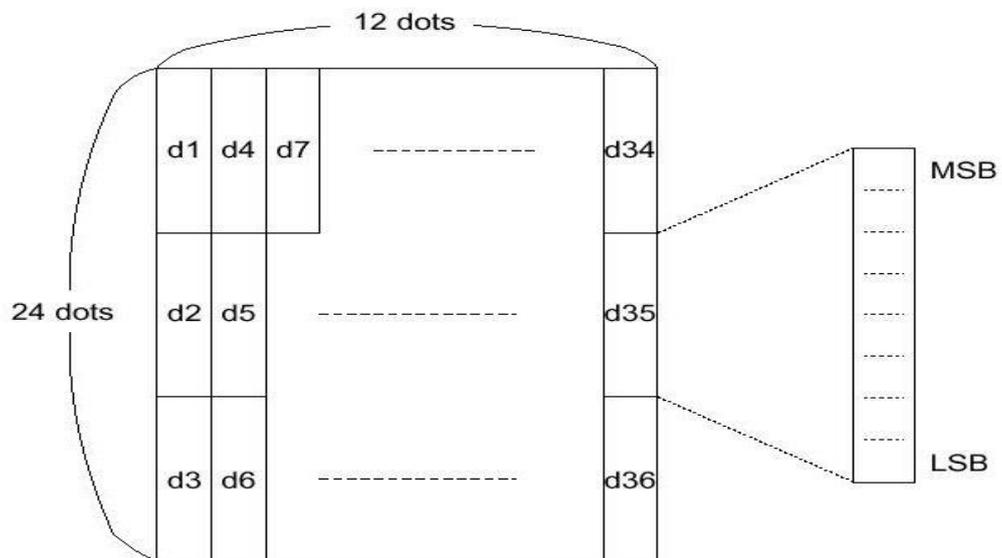
d1 = <0F>H   d4 = <30>H   d7 = <40>H . . . .

d2 = <03>H   d5 = <80>H   d8 = <40>H . . . .

d3 = <00>H   d6 = <00>H   d9 = <20>H . . . .

- When font B (9 ×17) is selected.

d1 = <1F>H   d4 = <08>H   d7 = <10>H...
d2 = <FF>H   d5 = <08>H   d8 = <04>H...
d3 = <80>H   d6 = <00>H   d9 = <00>H...

ESC ⋆ m nL nH [d1...dk]

[Name]   Select bit-image mode

[Format]   ASCII   ESC   ⋆   m   nL   nH   d1...dk
                Hex   1B   2A   m   nL   nH   d1...dk
   Decimal   27   42   m   nL   nH   d1...dk

[Range] m = 0, 1, 32, 33
                $0 \le nL \le 255$
                $0 \le nH \le 3$
                $0 \le d \le 255$

[Description]   Selects a bit-image mode using m for the number of dots specified by nL and nH, as follows:

m	Mode	Vertical	Direction	Horizontal	Direction
		NO. of Dots	Dot Density	Dot Density	Number of (Data(K)
0	8-dot single-density	8	60 DPI	90 DPI	$nL + nH \times 256$
1	8-dot double-density	8	60 DPI	180 DPI	$nL + nH \times 256$
32	24-dot single-density	24	180 DPI	90 DPI	$(nL + nH \times 256) \times 3$
33	24-dot double-density	24	180 DPI	180 DPI	$(nL + nH \times 256) \times 3$

 [dpi : dots per 25.4 mm{1"}]

[Details]   ·If the values of m is out of the specified range, nL and data following are
                        processed as normal data.
                      ·The nL and nH indicate the number of dots of the bit image in the horizontal direction. The
                        number of dots is calculated *by nL + nH x 256.*
                      ·If the bit-image data input exceeds the number of dots to be printed on a line, the excess data is
                        ignored.
                      ·d indicates the bit-image data. Set a corresponding bit of 1 to print a dot or to 0 to not print a dot.
                      ·If the width of the printing area set by **GS L** and **GS W** less than the width required by the data
                        sent with the **ESC** ⋆ command the following will be performed on the line in question (but the
                        printing cannot exceed the maximum printable area) :
                            ① The width of the printing area is extended to the right to accommodate the amount of
                               data.
                            ② If step ① does not provide sufficient width for the data, the left margin is reduced to
                               accommodate the data.
                      ·After printing a bit image, the printer returns to normal data processing mode.
                      ·This command is not affected by print modes(emphasized, double-strike, underline, character
                        size or white/black reverse printing), except upside-down printing mode.
                      ·Refer to Figure 3.12.3 for the bit image development position in page mode.
                      ·The relationship between the image data and the dots to be printed is as follows:
                      ·When 8-dot bit image is selected:

8 dot Bit image
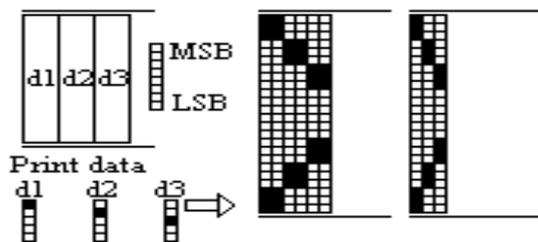
24 dot Bit image
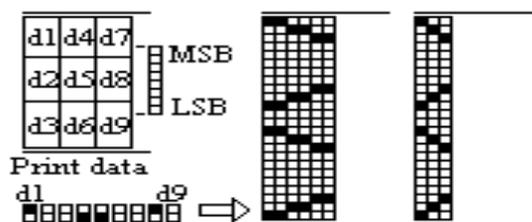
ESC - *n*

[Name]   Turn underline mode on/off

[Format]   ASCII   ESC   -   *n*
               Hex   1B   2D   *n*
               Decimal   27   45   *n*

[Range]   0≤*n*≤2,   48≤*n*≤50

[Description] Turns underline mode on or off, based on the following values of *n*.

n	Function
0, 48	Turns off underline mode
1, 49	Turns on underline mode (1-dot thick)
2, 50	Turns on underline mode (2-dots thick)

[Details]   ·The printer can underline all characters (including right-side character
                   spacing), but cannot underline the space set by **HT**.
               ·The printer cannot underline 90˚ clockwise rotated characters and white/black inverted
                   characters.
               ·When underline mode id turned off by setting the value of *n* to 0 or 48, the following data is not
                   underlined, and the underline thickness set before the mode is turned off does not change.
                   The default underline thickness is 1 dot.
               ·Changing the character size does not affect the current underline thickness.
               ·Underline mode can also be turned on or off by using **ESC**!. Note, however, that the last
                   received command is effective.
               ·This command does not affect Kanji printing.

[Default]   *n* = 0

[Reference]   **ESC !**

ESC 2

[Name]   Select default line spacing

[Format]   ASCII   ESC   2
               Hex   1B   32
               Decimal   27   50

[Description] Selects approximately 4.23 mm {1/6"} spacing.

[Details]   ·The line spacing can be set independently in standard mode and in
                   page mode.

[Reference]   **ESC 3**

ESC 3 *n*

[Name]   Set line spacing

[Format]   ASCII   ESC   3   *n*
                    Hex   1B   33   *n*
                    Decimal 27   51   *n*

[Range]   0≤*n* ≤255

[Description]   Sets the line spacing to [*n* x (vertical or horizontal motion unit)] inches.

[Details]   ·The line spacing can be set independently in standard mode and in
                      page mode.
                    ·The horizontal and vertical motion unit is specified by **GS P.**
                      Changing the horizontal or vertical motion unit does not affect the current line spacing.
                    ·The **GS P** command can change the horizontal (and vertical) motion unit.
                      However, the value cannot be less than the minimum vertical movement amount, and it must
                      be in even units of the minimum vertical movement amount.
                    ·In standard mode, the vertical motions until (y) is used.
                     ·In page mode, this command function as follows, depending on the
                       starting position of the printable area :
                        ①When the starting position is set to the upper left or lower right to the printable area
                            using **ESC T**, the vertical motion unit *(y)* is used.
                        ②When the starting position is set to the upper right or lower left of
                            the printable area using **ESC T**, the horizontal motion unit *(x)* is used.

                    ·The maximum paper feed amount is 1016 mm {40"}. Even if a paper feed amount of more than
                      1016 mm{40"}is set, the printer feeds the paper only 1016 mm{40"}
[Default]   Line space is equivalent to approximately 4.23 mm{1/6"}.

[Reference]   **ESC 2, GS P**

ESC = *n*

[Name]   Set peripheral device

[Format]   ASCII   ESC   =   *n*
                    Hex   1B   3D   *n*
                    Decimal 27   61   *n*

[Range]   1≤*n* ≤255

[Description]   Selects device to which host computer sends data, using n as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Printer disabled
	On	01	1	Printer enabled
1-7	-	-	-	Undefined

[Details]   ·When the printer is disabled, it ignores all data except for error-recovery
commands (**DLE EOT, DLE ENQ, DLE DC4**) until it is enabled by this command.

[Default] n=1

ESC ? n

[Name]   Cancel user-defined characters

[Format]

	ASCII	ESC	?	n
	Hex	1B	3F	n
	Decimal	27	63	n

[Range] $32 \leq n \leq 126$

[Description]   Cancels user-defined characters.

[Details]   ·This command cancels the pattern defined for the character code
specified by n. After the user-defined characters is canceled, the corresponding pattern for the
internal character is printed.
·This command deletes the pattern defined for the specified code in the
font selected by **ESC** !.
·If a user-defined character has not been defined for the specified
character code, the printer ignores this command.

[Reference]   **ESC &**, **ESC %**

ESC @

[Name]   Initialize printer

[Format]

	ASCII	ESC	@
	Hex	1B	40
	Decimal	27	64

[Description]   Clears the data in the print buffer and resets the printer mode to the mode
that was in effect when the power was turned on.

[Details]   ·The DIP switch settings are not checked again.
·The data in the receive buffer is not cleared.
·The macro definition is not cleared.
·The NV bit image data is not cleared.
·The data of the NV user memory is not cleared.

ESC D [*n1...nk*] NUL

[Name]   Set horizontal tab positions

[Format]

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

[Range] $1 \leq n \leq 255$
$0 \leq k \leq 32$

[Description]   Set is horizontal tab positions.
    ·*n* specifies the column number for setting a horizontal tab position from the beginning of the line.
·*k*   indicates the total number of horizontal tab positions to be set.

[Details]   ·The horizontal tab position is stored as a value of [character width x *n*]
    measured from the beginning of the line. The character width includes the right-side character spacing, and double-width characters are set with twice the width of normal characters.
·This command cancels the previous horizontal tab settings.
 ·When setting *n* = 8, the print position is moved to column 9 by sending **HT.**
 ·Up to 32 tab positions (*k*=32) can be set. Data exceeding 32-tab positions s is processed as normal data.
·Transmit [*n*]*k* in ascending order and place a **NUL** code 0 at the end.
 ·When [*n*]k is less than or equal to the preceding value [*n*]*k*-1, tab setting is finished and the following data is processed as normal data,
·**ESC D NUL** cancels all horizontal tab positions.
 ·The previously specified horizontal tab positions do not change, even if the character width changes.
 ·The character width is memorized for each standard and page mode.

[Default]   The default tab positions are at intervals of 8 characters (columns 9, 17, 25, ...) for the font A (12 X 24).

[Reference]   **HT**

ESC E *n*

[Name]	Turn emphasized mode on/off			
[Format]	ASCII	ESC	E	*n*
	Hex	1B	45	*n*
	Decimal	27	69	*n*

[Range]   0≤*n* ≤255

[Description]   Turns emphasized mode on or off.
·When the LSB of *n* is 0, emphasized mode is turned off.
·When the LSB of *n* is 1, emphasized mode is turned on.

[Details]   ·Only the least significant bit of *n* is enabled.
·This command and **ESC!** Turn on and off emphasized mode in the same way. Be careful when this command is used with **ESC!.**

[Default]   *n* = 0

[Reference]   **ESC !**

ESC G *n*

[Name]	Turn on/off double-strike mode			
[Format]	ASCII	ESC	G	*n*
	Hex	1B	47	*n*
	Decimal	27	71	*n*

[Range]   0≤*n* ≤255
[Description]   Turns double-strike mode on or off.
·When the LSB of *n* is 0, double-strike mode is turned off.
·When the LSB of *n* is1, double-strike mode is turned on.

[Details]   ·Only the lowest bit of *n* is enabled.
·Printer output is the same in double-strike mode and in emphasized mode.

[Default]   *n* = 0

[Reference]   **ESC E**

ESC J *n*

[Name]	Print and feed paper

[Format]

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

[Range] $0 \leq n \leq 255$

[Description]   Prints the data in the print buffer and feeds the paper [*n* x vertical or horizontal motion unit].

[Details]

·After printing is completed, this command sets the print starting position to the beginning of the line.

·The paper feed amount set by this command does not affect the values set by **ESC 2** or **ESC 3.**

·The horizontal and vertical motion unit is specified by **GS P.**

·The **GS P** command can change the vertical (and horizontal) motion unit. However, the value cannot be less than the minimum vertical movement, and it must be in even units of the minimum vertical movement amount.

·In standard mode, the printer uses the vertical motion unit(*y*).

·In page mode, this command functions as follows, depending on the starting position of the printable area.

①When the starting position is set to the upper left or lower right of the printable area using **ESC T,** the vertical motion unit (y) is used.

②When the starting position is set to the upper right or lower left of the printable area using **ESC T,** the horizontal motion unit (x) is used.

·The maximum line spacing is 1016 mm{40"}. When the setting value exceeds the maximum, it is converted to the maximum automatically.

[Reference]   **GS P**

ESC L

[Name]	Select page mode

[Format]

ASCII	ESC	L
Hex	1B	4C
Decimal	27	76

[Description]   Switches from standard mode to page mode.

[Details]   ·This command is enabled only when input at the beginning of a line in standard mode.
·This command has no effect in page mode.
 ·After printing by **FF** is completed or by using **ESC S**, the printer returns to standard mode.
 ·This command sets the position where data is buffered to the position specified by **ESC T** within the printing area defined by **ESC W**.
 ·This command is switches the setting for the following commands (in which the values can be set independently in standard mode and page mode) to those for page mode.
   ① Set right-side character spacing : **ESC SP, FS S**
    ② Select default line spacing : **ESC 2, ESC3**
·Only valve settings is possible for the following commands in page mode; these commands are not executed.
   ① Turn 90° clockwise rotation mode on/off: **ESC V**

   ② Select justification: **ESC a**
   ③ Turn upside-down printing mode on/off: **ESC {**
   ④ Set left margin: **GS L**
   ⑤ Set printable area width: **GS W**
 ·The following command is ignored in page mode:
    ①Execute test print: **GS W**
·The following command is not available in page mode:
   ①   Print NV bit image : **FS p**
   ②   Define NV bit image : **FS q**
   ③   Print raster bit image : **GS v 0**
 ·The printer returns to standard mode when power is turned on, the printer is reset, or **ESC @** is used.

[Reference]   **FF, CAN, ESC FF, ESC S, ESC T, ESC W, GS $, GS ＼**

ESC M n

[Name]   Select character font

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

[Range]   n= 0, 1 , 48, 49

[Description]   Selects character fonts

n	Function
0, 48	Character font A (12 X 24) Selected
1, 49	Character font B (9 X 24) Selected

[Details]   ·The **ESC !** command can also select the character fonts. However, the
                  setting of the last received command is effective.

[Reference]   **ESC !**

ESC R *n*

[Name]   Select an international character set

[Format]   ASCII   ESC   R   *n*
                  Hex   1B   52   *n*
                  Decimal   27   82   *n*

[Range]   0≤*n* ≤13

[Description]   Selects an international character set *n* from the following table:

n	Character Set
0	U. S. A
1	France
2	Germany
3	U. K.
4	Denmark I
5	Sweden
6	Italy
7	Spain I
8	Japan
9	Norway
10	Denmark II

| 11 | Spain II |
| 12 | Latin America |

[Default]   *n* = 0

[Reference]   3.2.12 International Character Set

Country	ASCII code (Hex)											
	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
U.S.A	#	$	@	[	\	]	^	`	{	|	}	~
France	#	$	à	°	ç	§	^	`	é	ù	è	¨
Germany	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
U.K.	£	$	@	[	\	]	^	`	{	|	}	~
Denmark I	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Italy	#	$	@	°	\	é	^	ù	à	ò	è	ì
Spain I	Pt	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~
Japan	#	$	@	[	¥	]	^	`	{	|	}	~
Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Denmark II	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Spain II	#	$	á	¡	Ñ	¿	é	`	í	ñ	ó	ú
Latin America	#	$	á	¡	Ñ	¿	é	ü	í	ñ	ó	ú

ESC S

[Name]   Select standard mode

[Format]   ASCII   ESC   S
                Hex   1B   53
                Decimal   27   83

[Description]   Switches from page mode to standard mode.
[Details]   ·This command is effective only in page mode.
                  ·Data buffered in page mode and the printable area developed in page mode are cleared.
                  ·This command is switches the setting for the following command (in which the values can be set independently in standard mode and page mode) to those for standard mode:
                    ① Set right-side character spacing: **ESC SP, FS S**
                    ② Select default line spacing : **ESC 2, ESC 3**
                  ·The following commands are enabled only to set in standard mode.
                    ① Set printing area in page mode : **ESC W**
                    ② Set print direction in page mode : **ESC T**
                  ·The following commands are ignored in standard mode.
                    ① Set absolute vertical print position in page mode : **GS $**
                    ② Set relative vertical print position in page mode : **GS ∖**
                  ·Standard mode is selected automatically when power is turned on, the

printer is reset, or command **ESC @** is used.

[Reference]   **FF, ESC FF, ESC L**

## ESC T *n*

| [Name] | Select print direction in page mode |

[Format]   ASCII   ESC   T   *n*
              Hex   1B   54   *n*
              Decimal   27   84   *n*

[Range]   0≤*n* ≤3,
                48≤*n* ≤51

[Description]   Select the print direction and starting position in page mode.
                   n specifies the print direction and starting position as follows:

n	Print Direction	Starting Position
0, 48	Left to right	Upper left(A in the figure)
1, 49	Bottom to top	Lower left(B in the figure)
2, 50	Right to left	Lower right(C in the figure)
3, 51	Top to bottom	Upper right(D in the figure)
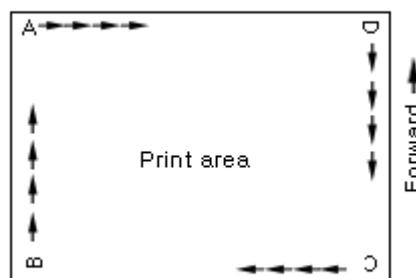
[Details]   ·When the command is input in standard mode, the printer executes only
                    internal flag operation. This command does not affect printing in standard
                    mode.
                   ·This command sets the position where data is buffered within the printing area set by **ESC W**.
                   ·Parameters for horizontal or vertical motion units *(x or y)* differ as
                    follows, depending on the starting position of the printing area:
                        ①If the starting position is the upper left or lower right of the printing
                          area, data is buffered in the direction perpendicular to the paper feed direction:
                        Commands using horizontal motion units: **ESC SP, ESC $, ESC **
                        Commands using vertical motion units: **ESC 3, ESC J, GS $, GS **
                        ②If the starting position is the upper right or lower left of the printing
                          area, data is buffered in the paper feed direction :
                        Commands using horizontal motion units : **ESC 3, ESC J, GS &, GS **
                        Commands using vertical motion units : **ESC SP, ESC $, ESC **

[Default]   *n* = 0

[Reference]   **ESC $, ESC L, ESC W, ESC \ , GS $, GS P, GS **

ESC V *n*

[Name]	Turn 90° clockwise rotation mode on/off

[Format]

ASCII	ESC	V	*n*
Hex	1B	56	*n*
Decimal	27	86	*n*

[Range] $0 \leq n \leq 1, 48 \leq n \leq 49$

[Description]   Turns 90° clockwise rotation mode on or off.
n is used as follows:

n	Function
0, 48	Turns off 90˚ clockwise rotation mode
1, 49	Turns on 90˚ clockwise rotation mode

[Details]   ·When underline mode is turned on, the printer does not underline 90°
clockwise-rotated characters.
·Double-width and double-height commands in 90° rotation mode enlarge characters in the
opposite directions from double height and double-width commands in normal mode.
·This command affects printing in standard mode. However, the setting is
always effective.

[Default]   *n* = 0

[Reference]   **ESC !, ESC –**

ESC W *xL xH yL yH dxL dxH dyL dyH*

[Name]	Set printing area in page mode

[Format]

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

[Range] $0 \leq$ *xL xH yL yH dxL dxH dyL dyH* ≤ 255 (except *dxL=dxH=0 or dyL=dyH=0*)

[Description]   ·The horizontal starting position, vertical starting position, printing area
width, and printing area height are defined as x0, y0, dx, dy,
respectively.
Each setting for the printable area is calculated as follow:
x0 = [(xL + xH x 256) x (horizontal motion unit)]
y0 = [(yL + yH x 256) x (vertical motion unit)]
dx = [(dxL + dxH x 256) x (horizontal motion unit)]
dy = [(dyL + dyH x 256) x (vertical motion unit)]
The printing area is set as shown in the figure below.

[Details]   ·If this command is input in standard mode, the printer executes only
internal flag operation. This command does not affect printing in standard mode.
·If the horizontal or vertical starting position is set outside the printable area, the printer stops
command processing and processes the following data as normal data.
·If the printing area width or height is set to 0, the printer stops command processing and
processes the following data as normal data.
·This command sets the position where data is buffered to the position specified by **ESC T** within
the printing area.
·If (horizontal starting position + printing area width) exceeds the printable area, the printing area
width is a automatically set to (horizontal printable - horizontal starting position).
·If (vertical starting position + printing area height) exceeds the printable area, the printing area
height is automatically   set to(vertical printable area - vertical starting position).
·The horizontal and vertical motion units are specified by **GS P**.
Changing the horizontal or vertical motion unit does not affect the current printing area.
·The **GS P** command can change the horizontal (and vertical) motion unit.
However, the value cannot be less than the minimum horizontal movement amount, and it
must be in even units of   minimum horizontal movement amount.
·Use the horizontal motion unit for setting the horizontal starting position area width, and use the
vertical motion unit for setting the vertical starting position and printing area height.

·When the horizontal starting position, vertical starting position, printing area width, and printing
area height are   defined as *X ,Y, Dx*, and *Dy* respectively, the printing area is set as shown
in the figure below.
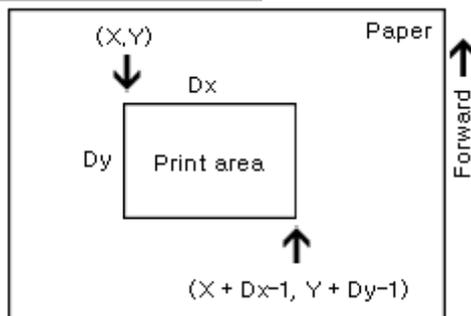
·This printable area for this printer is approximately 72.2 mm {512/180"}
in the horizontal direction and approximately 117.3 mm {1662/360"} in
the vertical direction.

[Default] $xL = xH = yL = yH = 0$
                 $dxL = 0, dxH = 2, dyL = 126, dyH = 6$

[Reference]   **CAN, ESC L, ESC T, GS P**

ESC ＼ *nL nH*

[Name]	Set relative print position

[Format]

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

[Range] $0 \leq nL \leq 255$
                 $0 \leq nH \leq 255$

[Description]   Sets the print starting position based on the current position by using the horizontal or vertical
                motion unit.
                ·This command sets the distance from the current position to [(*nL*+ *nH* x 256) x (horizontal or
                    vertical unit)].

[Details]   ·Any setting that exceeds the printable area is ignored.
                 ·When pitch *N* is specified to the right :
                    $nL + nH \times 256 = N$
                    When pitch *n* is specified to the left (the negative direction), use the complement of 65536.
                    When pitch *n* is specified to the left : $nL + nH \times 256 = 65536 – n$.
                 ·The print starting position moves from the current position to [*n* x horizontal or vertical motion
                    unit].
                ·The horizontal and vertical motion units are specified by **GS P.**
                 ·The **GS P** command can change the horizontal (and vertical) motion unit.
                    However, the value cannot be less than the minimum horizontal movement amount,
                    and it must be in even units of the minimum horizontal movement amount.
                ·In standard mode, the horizontal motion unit is used.
                ·In page mode, the horizontal or vertical motion unit differs as follows,
                    depending on the starting point of the printing area :
                    ①When the starting position is set to the upper left or lower right of the printable area using
                       ESC T, the horizontal motion unit (*x*) is used.
                    ②When the starting position is set to the upper right or lower left of the printable area using
                       ESC T, the vertical motion unit (*y*) is used.

[Reference]   **ESC $, GS P**

ESC a *n*

[Name]   Select justification

[Format]   ASCII   ESC   a   *n*
              Hex   1B   61   *n*
              Decimal   27   97   *n*

[Range]   0≤*n* ≤2,48 ≤*n* ≤50

[Description]   Aligns all the data in one line to the specified position
                n selects the justification as follows:

n	Justification
0, 48	Left justification
1, 49	Centering
2, 50	Right justification

[Details]   ·The command is enabled only when processed at the beginning of the
                 line in standard mode.
                ·If this command is input in page mode, the printer performs only internal
                  flag operation.
                ·This command has no effect in page mode.
                ·This command executes justification in the printing area.
                ·This command justifies the space area according to **HT, ESC $** or **ESC ＼**

[Default]   *n* = 0

[Example]

Left justification   Centering   Right justification

ABC	ABC	ABC
ABCD	ABCD	ABCD
ABCDE	ABCDE	ABCDE

ESC c 3 *n*

[Name]   Select paper sensor(s) to output paper end signals

[Format]

ASCII	ESC	c	3	n
Hex	1B	63	33	n
Decimal	27	99	51	n

[Range] $0 \leq n \leq 255$

[Description]   Selects the paper sensor(s) to output paper end signals.
·Each bit of *n* is used as follows:

Bit	Off / On	Hex	Decimal	Function
0	Off	00	0	Paper roll near-end sensor disabled
	On	01	1	Paper roll near-end sensor enabled
1	Off	00	0	Paper roll near-end sensor disabled
	On	02	2	Paper roll near-end sensor enabled
2	Off	00	0	Paper roll end sensor disabled
	On	04	4	Paper roll end sensor enabled
3	Off	00	0	Paper roll end sensor disabled
	On	08	8	Paper roll end sensor enabled
4 – 7	-	-	-	Undefined

{Details}   ·It is possible to select multiple sensors to output signals. Then, if any of
the sensors detects a paper end, the paper end signal is output.
·The command is available only with a parallel interface and is ignored with a serial interface.
·Sensor is switched when executing this command. The paper end signal
switching be delayed depending on the receive buffer state.
·If either bit 0 or bit 1 is on, the paper roll near-end sensor is selected as the paper sensor
outputting paper-end signals
·If either bit 2 or bit 3 is on, the paper roll end sensor is selected as the paper sensor outputting
paper-end signals.
·When all the sensors are disabled, the paper end signal always outputs a paper present status.

[Default]   *n* = 15

ESC c 4 *n*

[Name]   Select paper sensor(s) to stop printing

[Format]   ASCII   ESC   c   4   *n*
                Hex   1B   63   34   *n*
                Decimal 27   99   52   *n*

[Range] $0 \leq n \leq 255$

[Description]   Selects the paper sensor(s) used to stop printing when a paper-end is detected,   using *n* as follows.

Bit	Off / On	Hex	Decimal	Function
0	Off	00	0	Paper roll near end sensor disabled.
	On	01	1	Paper roll near end sensor enabled
1	Off	00	0	Paper roll near end sensor disabled
	On	02	2	Paper roll near end sensor enabled
2 – 7	-	-	-	Undefined

[Details]   ·When a paper sensor is enabled with this command, printing is stopped
                  only   when the corresponding paper is selected for printing.
                ·When a paper-end is detected by the paper roll sensor, the printer goes off-line   after printing
                  stops.
                ·When either bit 0 or 1 is on, the printer selects the paper roll near-end sensor   for the paper
                  sensor to stop printing.

[Default]   n = 0

ESC c 5 n

[Name]   Enable / disable panel buttons

[Format]   ASCII   ESC   c   5   *n*
                Hex   1B   63   35   *n*
                Decimal 27   99   53   *n*

[Range] $0 \leq n \leq 255$

[Description]   Enables or disables the panel buttons.
                 ·When the LSB of n is 0, the panel buttons are enabled.
                 ·When the LSB of n is 1, the panel buttons are disabled.

[Details]   ·Only the lowest bit of n is valid.
        ·When the panel buttons are disabled, none of them are usable when the
          printer cover is closed.
        ·In this printer, the panel buttons are the FEED button.
        ·In the macro ready mode, the FEED button are enabled regardless of the settings of this
          command; however, the paper cannot be fed by using these buttons.

[Default] $n = 0$

ESC d *n*

[Name]   Print and feed *n* lines

[Format]

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

[Range] $0 \leq n \leq 255$

[Description]   Prints the data in the print buffer and feeds *n* lines.

[Details]   ·This command sets the print starting position to the beginning of the line
        ·This command does not affect the line spacing set by **ESC 2** or **ESC 3**.
        ·The maximum paper feed amount is 1016 mm{40"}. If the paper feed
          amount(n x line spacing) of more than 1016 mm{40"} is specified, the printer feeds the paper
          only 1016 mm{40"}.

[Reference]   **ESC 2, ESC 3**

ESC p *m t1 t2*

[Name]   Generate pulse

[Format]

ASCII	ESC	p	*m*	*t1*	*t2*
Hex	1B	70	*m*	*t1*	*t2*
Decimal	27	112	*m*	*t1*	*t2*

[Range]   m = 0, 1, 48, 49
        $0 \leq t1 \leq 255, 0 \leq t2 \leq 255$

[Description]   Outputs the pulse specified by t1 and t2 to connector pin m as follows:

m	Connector pin
0, 48	Drawer kick-out connector pin2.
1, 49	Drawer kick-out connector pin5.

[Details]   ·The pulse ON time is [*t1* x 2 ms] and the OFF time is [*t2* x 2 ms].
        ·If *t2* < *t1*, the OFF time is [*t1* x 2 ms]

[Reference]   **DLE DC4**

ESC t *n*

[Name]   Select character code table

[Format]   ASCII   ESC   t   *n*
                Hex   1B   74   *n*
                Decimal 27   116   *n*

[Range]   0≤*n*≤5, 16≤*n*≤26, *n* = 255

[Description]   Selects a page *n* from the character code table.

n	Page
0	PC437 [U.S.A., Standard Europe]
1	Katakana
2	PC850 [Multilingual]
3	PC860 [Portuguese]
4	PC863 [Canadian-French]
5	PC865 [Nordic]
17	PC866 [Cyrillic #2]
255	Space page

[Default]   *n* = 0

[Reference]   Factory default set code page

Code page	Language
CP737	Greek
CP852	Latin2
CP857	Turkish
CP862	Hebrew
CP864	Arabic
CP866	Cyrillic
CP1252	Latin1(Spanish)
CP1253	Greek
ISO8859	Latin5(Turkish)

ESC { *n*

[Name]	Turns on/off upside-down printing mode

[Format]   ASCII   ESC   {   *n*
             Hex   1B   7B   *n*
   Decimal   27   123   *n*

[Range]   0 ≤ n ≤ 255

[Description]   Turns upside-down printing mode on or off.
                ·When the LSB of *n* is 0, upside-down printing mode is turned off.
                ·When the LSB of *n* is 1, upside-down printing mode is turned on.

[Details]   ·Only the lowest bit of *n* is valid.
               ·This command is enabled only when processed at the beginning of a
                  line in standard mode.
               ·When this command is input in page mode, the printer performs only
                  internal flag operations.
               ·This command does not affect printing in page mode.
               ·In upside-down printing mode, the printer rotates the line to be printed
                  by 180˚ and then prints it.

[Default]   *n* = 0

[Example]
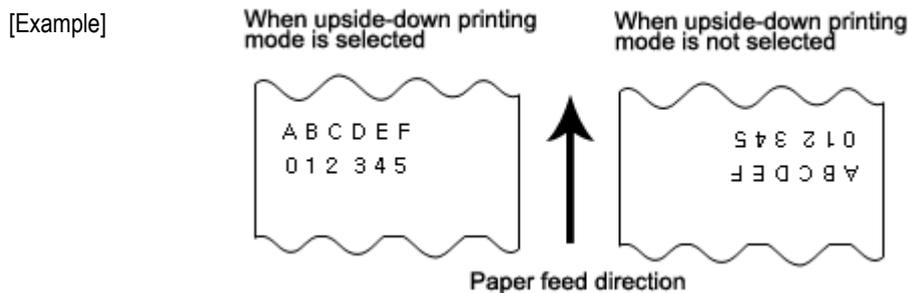
FS p *n m*

[Name]   Print NV bit image

[Format]

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

[Range] $1 \leq n \leq 255$
                   $0 \leq m \leq 3, 48 \leq m \leq 51$

[Description]   Prints a NV bit image *n* using the mode specified by *m*.

m	Mode	Vertical Dot Density	Horizontal Dot Density
0, 48	Normal	180 dpi	180 dpi
1, 49	Double-width	180 dpi	90 dpi
2, 50	Double-height	90 dpi	180 dpi
3, 51	Quadruple	90 dpi	90 dpi

[dpi : dots per 25.4mm {1"}]

[Details]   ·*n* is the number of the NV bit image (defined using the **FS q** command).

          ·*m* specifies the bit image mode.

          ·*NV* bit image means a bit image which is defined in a non-volatile

            memory by **FS q** and printed by **FS p**.

          ·This command is not effective when the specified NV bit image has not

            been defined.

          ·In standard mode, this command is effective only when there is no data

            in the print buffer.

           ·In page mode, the command is not effective.

          ·This command is not affected by print modes (emphasized, double-

            strike, underline, character size, white/black reverse printing, or 90°

            rotated characters, etc.), except upside-down printing mode.

          ·If the printing area width set by **GS L** and **GS W** for the NV bit image is

            less than one vertical line the following processing is performed only on

            the line in question. However, in NV bit image mode, one vertical line

            means 1 dot in normal mode (m=0,48) and in double-height mode

(m=2,50), and it means 2 dots in double-width mode (m=1,49) and in

quadruple mode (m=3,51).

①The printing area width is extended to the right in NV bit image mode

②If the printing area width cannot be extended by one line vertically,

the left margin is reduced to accommodate one line vertically.

·If the downloaded bit-image to be printed exceeds one line, the excess
  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 n x 2 of the NV bit-image) in
  double-height and quadruple modes, regardless of the line spacing
  specified by **ESC 2** or **ESC 3**.
·After printing the bit image, this command sets the print position to the
  beginning of the line and processes the data that follows as normal data.

[References]   **ESC *, FS q, GS/, GS v 0**

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

[Name]   Define NV bit image

[Format]   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*

[Range] $1 \leq n \leq 255$
                $0 \leq xL \leq 255$
                $0 \leq xH \leq 3$ (when $1 \leq (xL + xH \times 256) \leq 1023$)
                $0 \leq yL \leq 255$
                $0 \leq yL \leq 1$ (when $1 \leq (yL + yH \times 256) \leq 288$)
                $0 \leq d \leq 255$
                $k = (xL + xH \times 256) \times (yL + yH \times 256) \times 8$
                        Total defined data area = 2M bits (256K bytes)

[Description]   Define the NV bit image specified by *n*.

[Details]   ·*n* specifies the number of the defined NV bit image.

                ·xL, xH specifies $(xL + xH \times 256) \times 8$ dots in the horizontal direction for the

                    NV bit image you are defining.

                ·yL, yH specifies $(yL + yH \times 256) \times 8$ dots in the vertical direction for the NV

                    bit image you are defining.

                ·This command cancels all NV bit image that have already been defined by

                    this command. The printer can not redefine only one of several data

                    definitions previously defined. In this case, all data needs to be sent

again.

·From the beginning of the processing of this command till the finish of
  hardware reset, mechanical operations (including initializing the position
  of the printer head when the cover is open, paper feeding by using the
  FEED button, etc.) cannot be performed.

·During processing this command, the printer is in BUSY when writing the
  data to the NV user memory and stops receiving data. Therefore it is
  prohibited to transmit the data including the real-time commands during
  the execution of this command.

·NV bit image means a bit image which is defined in a non-volatile memory
  by **FS q** and printed by **FS p**.

·In standard mode, this command is effective only when processed at the
  beginning of the line.

·In page mode, this command is not effective.

·This command is effective when 7 bytes <FS-yH> is processed as a
  normal value.

·When the amount of the data exceeds the capacity left in the range
  defined by xL, xH, yL, yH, the printer processes xL, xH, yL, yH out of the
  defined range.

·In the first group of NV bit image, when any of the parameters xL, xH, yL,
  yH, is out of the definition range, the command is disabled.

·In groups of NV bit image other than the first one, when the printer
  processes xL, xH yL, yH out of the defined range, it stops processing this
  command and stars writing into the NV images. At this time, NV bit image
  that haven't been defined are disabled (undefined), but any NV bit
  images before that are enabled.

·The *d* indicates the definition data. In data (d) a 1 bit specifies a dot to be
  printed and a 0 bit specifies a dot not to be printed.

·This command defines n as the number of a NV image. Number rise in
  order from NV bit image 01H. Therefore, the first data group [xL xH yL yH
  d1...dk] is NV bit image 01H, and the last data group [xL xH yL yH
  d1...dk] is NV bit image *n*. The total agrees with the number of NV bit
  images specified by command **FS p**.

·A definition data of a NV bit image consists of [xL xH vL vH d1...dk].
  Therefore, when only one NV bit image is defined n=1, the printer
  processes a data group [xL xH yL yH d1...dk] once. The printer uses
  ([data:$(xL + xH \times 256) \times (yL + yH \times 256) \times 8$] + [header:4]) bytes of NV

memory.

·The definition area in this printer is a maximum of 2M bits (256K bytes). This command can define several NV bit image, but cannot define a bit image data whose total capacity [bit image data + header] exceeds 2M bytes (256K bytes).

·The printer is busy immediately before writing into NV memory, regardless of the setting of DIP switch 2-1.

·The printer does not transmit ASB status and perform status detection during processing of the command even when ASB is specified.

·When this command is received during macro definition, the printer ends macro definition, and begins performing this command.

·Once a NV bit image is defined, it not erased by performing **ESC @**, reset, and power off.

·This command performs only definition of a NV bit image and does not perform printing. Printing of the NV bit image is performed by the **FS q** command.

[Notes] ·Frequent write command execution may cause damage the NV memory. Therefore, it is recommended to write the NV memory 10 times or less a day.

·The printer performs a hardware reset after the procedure to place the image into the NV memory. Therefore, user-defined characters, downloaded bit image, and macros should be defined only after completing this command. The printer clears the receive and print buffers and resets the mode to the mode that was in effect at power on. At this time, DIP switch setting are checked again.
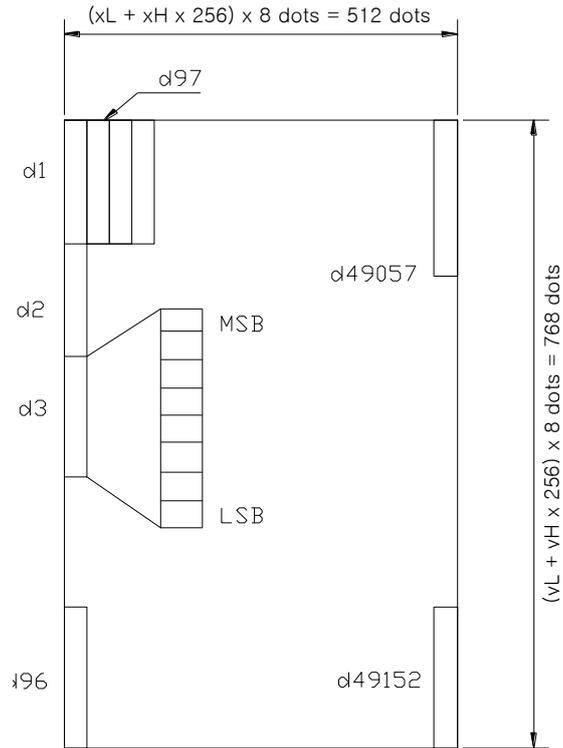n is the number of the NV bit

[Reference] **FS p**

[Example] When $xL = 64$, $xH = 0$, $yL = 96$, $yH = 0$

$$(xL + xH \times 256) \times 8 \text{ dots} = 512 \text{ dots}$$

d97

d1

d49057

d2   MSB

d3

LSB

d196

d49152

$$(vL + vH \times 256) \times 8 \text{ dots} = 768 \text{ dots}$$

GS ! *n*

[Name]   Select character size

[Format]

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

[Range] $0 \leq n \leq 255$
(1 ≤ vertical number of times ≤ 8, 1 ≤ horizontal number of times ≤ 8)

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

Bit	Off/On	Hex	Decimal	Function
0				Character height selection. See Table 2.
1				
2				
3				
4				Character width selection. See Table 1.
5				
6				
7				

Table 1. Character Width Selection.

Hex	Decimal	Width	
00	0	1	(normal)
10	16	2	(double-width)
20	32	3	
30	48	4	
40	64	5	

Table 2. Character Height Selection.

Hex	Decimal	Width	
00	0	1	(normal)
01	1	2	(double-height)
02	2	3	
03	3	4	
04	4	5	

50	80	6		05	5	6
60	96	7		06	6	7
70	112	8		07	7	8

[Details]   ·This command is effective for all characters (except for HRI characters).
              ·If *n* is outside of the defined range, this command is ignored.
                ·In standard mode, the vertical direction is the paper feed direction, and
                  the horizontal direction is perpendicular to the paper feed direction.
                  However, when character orientation changes in 90° 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.
                ·When characters are enlarged with different sizes on one line, all the characters on the line are
                  aligned at the baseline.
                ·The **ESC !** command can also turn double-width and double- height modes on or off.
                  However, the setting of the last received command is effective.

[Default]   *n* = 0

[Reference]   **ESC !**

GS $ *nL nH*

[Name]   Set absolute vertical print position in page made

[Format]   ASCII   GS $ *nL   nH*
              Hex   1D   24   *nL   nH*
              Decimal   29   36   *nL   nH*

[Range]   0 ≤ *nL* ≤ 255*, 0 ≤ nH* ≤ 255

[Description]   ·Sets the absolute vertical print starting position for buffer character data
                    in page mode.
                  ·This command sets the absolute print position to [(*nL* + *nH* ×256) × (vertical or horizontal
                    motion unit)] inches.
                  ·If the [(*nL* + *nH* × 256) × (vertical or horizontal motion unit)] exceeds the
                    specified printing area, this command is ignored.
                  ·The horizontal starting buffer position does not move.
                          ·The reference starting position is that specified by **ESC T**.
                  ·This command operates as follows, depending on the starting position of the printing area
                    specified by **ESC T**:
                    ①When the starting position is set to the upper left or lower right, this
                        command sets the absolute position in the vertical direction.
                     ②When the starting position is set to the upper right or lower left, this
                        command sets the absolute position in the horizontal direction.
                  ·The horizontal and vertical motion units are specified by **GS P**.
                  ·The **GS P** command can change the horizontal and vertical motion unit.
                      However, the value cannot be less than the minimum horizontal movement amount, and it
                      must be in even units of the minimum horizontal movement amount.

[Reference]   **ESC $, ESC T, ESC W, ESC \ , GS \ , GS P**

GS * x y *d1...d* (x × y × 8)

[Name]   Define downloaded bit image

[Format]

ASCII	GS	*	x	y	$d1 \ldots d$ (x x y x 8)
Hex	1D	2A	x	y	$d1 \ldots d$ (x x y x 8)
Decimal	29	42	x	y	$d1 \ldots d$ (x x y x 8)

[Range] $1 \leq x \leq 255$
                $1 \leq y \leq 48$
                x x $y \leq 1536$
                $0 \leq d \leq 255$

[Description]   Defines a downloaded bit image with the number of dots specified by x and y.
                  ·x indicates the number of dots in the horizontal direction.
                  ·y indicates he number of dots in the vertical direction.

[Details]   ·The number of dots in the horizontal direction is x x 8, in the vertical
          direction it is y x 8.
       ·If x x y is out of the specified range, this command is disabled.
       ·The d indicates bit-image data. Data *(d)* specifies a bit printed to 1 and not printed to 0.
       ·The downloaded bit image definition is cleared when:
          ① ESC@ is executed.
          ② ESC & is executed.
          ③ FS q is executed.
          ④ Printer is reset or the power is turned off.
       ·The following figure shows the relationship between the downloaded bit
         image and the printed data.
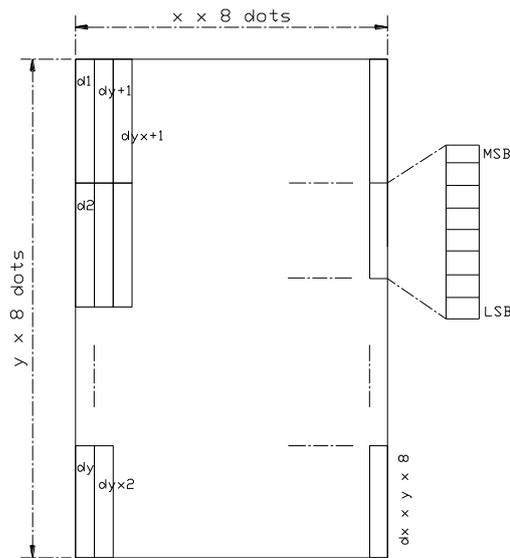
[Reference]   **GS** \

GS / *m*

[Name]   Print down-loaded bit image

[Format]   ASCII   GS   /   *m*
                  Hex   1D   2F   *m*
                  Decimal   29   47   *m*

[Range] $0 \leq m \leq 3, 48 \leq m \leq 51$

[Description]   Prints a downloaded bit image using the mode specified by *m*.
                  m selects a mode from the table below:

m	Mode	Vertical Dot Density	Horizontal Dot Density
0, 48	Normal	180 DPI	180 DPI
1, 49	Double-width	180 DPI	90 DPI
2, 50	Double-height	90 DPI	180 DPI
3, 51	Quadruple	90DPI	90 DPI

[dpi : dots per 25.4 mm {1"}]

[Details]   ·This command is ignored if a downloaded bit image has not been defined.
                  ·In standard mode, this command is effective only when the on data exists
                    in the print buffer.
                  ·This command is not affected by print modes (emphasized, double-strike,
                    underline, or character size, white/black reverse printing), except for
                    upside down mode.
                  ·If the downloaded bit-image to be printed exceeds the printable area, the
                    excess data is not printed.

·If the printing area width set by GS L and GS W is less than one line vertical, the following processing is performed only on the line in question:

   ①   The printing area width is extended to the right up to one line in vertical. In this case, printing does not exceed the printable area.

   ②   If the printing area width cannot be extended by one line in vertical, the left margin is reduced to accommodate one line in vertical.

[Reference]   **GS ∗**

GS :

[Name]   Start/end macro definition

[Format]

ASCII	GS	:
Hex	1D	3A
Decimal	29	58

[Description]   Starts or ends macro definition.

[Details]

·Macro definition starts when this command is received during normal operation.

·Macro definition ends when this command is received during macro definition.

·When **GS ^** is received during macro definition, the printer ends macro definition and clears the definition.

·Macro is not defined when the power is turned on.

·The defined contents of the macro are not cleared by **ESC @**. Therefore, **ESC @** can be included in the contents of the macro definition.

·If the printer receives **GS :** again immediately after previously receiving **GS :** the printer remains in the macro undefined state.

·The contents of the macro can be defined up to 2048 bytes. If the macro definition exceed 2048 bytes, excess data is not stored.

[Reference]   **GS ^**

GS B *n*

[Name]	Turn white/black reverse printing mode

[Format]	ASCII	GS	B	n
	Hex	1D	42	n
	Decimal	29	66	n

[Range] $0 \leq n \leq 255$

[Description]   Turns on or off white/black reverse printing mode.
·When the LSB of *n* is 0, white/black reverse printing mode is turned off.
·When the LSB of *n* is 1, white/black reverse printing mode is turned on.

[Details]   ·Only the LSB of *n* is effective.
·This command is available for built-in characters and user-defined characters.
·When white/black reverse printing mode is on, it also applied to character spacing set by **ESC SP**.
·This command does not affect bit image, user-defined bit image, bar code, HRI characters, and spacing skipped by **HT**, **ESC $**, and **ESC **.
·This command does not affect the space between lines.

·White/black reverse mode has a higher priority than underline mode. Even if underline mode is on, it is disabled (but not canceled) when white/black reverse mode is selected.

[Default]   *n* = 0

GS H *n*

[Name]	Select printing position of HRI characters

[Format]	ASCII	GS	H	n
	Hex	1D	48	n
	Decimal	29	72	n

[Range] $0 \leq n \leq 3, 48 \leq n \leq 51$

[Description]   Selects the printing position of HRI characters when printing a bar code.
n selects the printing position as follows:

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

[Details]   ·HRI means Human Readable Interpretation.
·HRI characters are printed using the font specified by **GS f**.
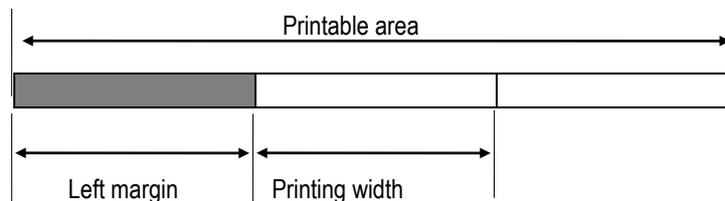
[Default]   *n* = 0

[Reference]   **GS f, GS k**

GS L *nL nH*

[Name]   Set left margin

[Format]

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

[Range] $0 \leq nL \leq 255$
               $0 \leq nH \leq 255$

[Description]   Sets the left margin using *nL* and *nH*.
          ·The left margin is set to [($nL + nH \times 256) \times$ (horizontal motion unit)] inches.

<center>Printable area</center>

<center>Left margin   Printing width</center>

[Details]   ·This command is effective only of the beginning of a line.
           ·If this command is input in page made, the printer performs only internal flag operations.
           ·This command does not affect printing in page made.
           ·If the setting exceeds the printable area, the maximum value of the printable area is used.
           ·The horizontal and vertical motion units are specified by **GS P**. Changing the horizontal or vertical motion unit does not affect the current left margin.

·The horizontal motion unit (x) is used for calculating the left margin. The calculated result is truncated to the minimum value of the mechanical pitch.

[Default] $nL = 0$, $nH = 0$

[Reference]   **GS W, GS P**

GS P *x y*

[Name]   Set horizontal and vertical motion units

[Format]   ASCII   GS   P   *x*   *y*
                        Hex   1D   50   *x*   *y*
                Decimal   29   80   *x*   *y*

[Range] $0 \leq x \leq 255$
                $0 \leq y \leq 255$

[Description]   Sets the horizontal and vertical motion units to 1/x inch and 1/y inch, respectively.
                When x and u are set to 0, the default setting of each value is used. ($x = 180$, $y = 360$)

[Details]   ·The horizontal direction is perpendicular to the paper feed direction and the vertical direction is the paper feed direction.
                ·In standard mode, the following commands use x or y, regardless character rotation (upside-down or 90° clockwise rotation):
                ①   Command using x : **ESC SP, ESC $, ESC ＼, FS S, GS L, GS W**
                ②   Command using y : **ESC 3, ESC J, GS V**
                ·In page mad, the following command use x or y, depending on character orientation:
                ①When the print starting position is set to the upper left or lower right of the printing area using **ESC T** (data is buffered in the direction perpendicular to the paper feed direction):
                Command using x : **ESC SP, ESC $, ESC W, ESC ＼, FS S**
                Command using y : **ESC 3, ESC J, ESC W, GS $, GS ＼, GS V**
                ②When the print starting position is set to the upper right or lower left of the printing area using **ESC T** (data is buffered in the paper feed direction):
                Command using x: **ESC 3, ESC J, ESC W, GS $, GS ＼**

Command using y: **ESC SP, ESC $, ESC W, ESC ＼, FS S, GS V**

·The command does not affect the previously specified values.

·The calculated result from combining this command with others is

truncated to the minimum value of the mechanical pitch.

[Default]   *x* = 180, *y* = 360

[Reference]   **ESC SP, ESC $, ESC 3, ESC J, ESC W, ESC ＼, GS $, GS L, GS V, GS W, GS ＼**

① GS V *m* ② GS V *m n*

[Name]   Select cut mode and cut paper

[Format]

①ASCII	GS	V	*m*	
Hex	1D	56	*m*	
Decimal	29	86	*m*	
②ASCII	GS	V	*m*	*n*
Hex	1D	56	*m*	*n*
Decimal	29	86	*m*	*n*

[Range]   ① *m*= 1,49
        ② *m*=66 , $0 \leq n \leq 255$

[Description]   Selects a mode for cutting paper and executes paper cutting. The value of *m* selects the mode as follows:

m	Print mode
1, 49	Partial cut(one point center uncut)
66	Feeds paper(cutting position + [n x(vertical motion unit)]) , and cuts the paper partially(one point center uncut)

[Details for①and②]

·This command is effective only processed at the beginning of a line.

[Note for ①]

·Only the partial cut is available; there is no full cut.

[Details for②]

·When n = 0, the printer feeds the paper to the cutting position and cuts it.

·When n ≠ 0, the printer feeds the paper to (cutting position + [n ´
   vertical   motion unit]) and cuts it.

·The horizontal and vertical motion unit are specified by **GS P**.

·The paper feed amount is calculated using the vertical motion unit (y).
   However, the value cannot be less than the minimum horizontal movement   amount, and it
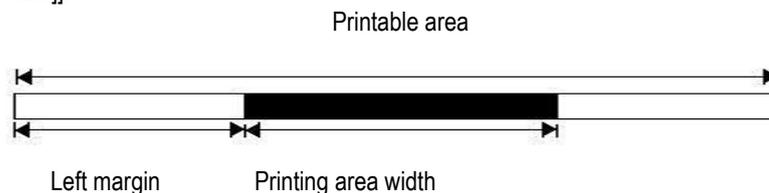   must be in even units of the minimum horizontal movement amount.

GS W *nL nH*

[Name]   Set printing area width

[Format]   ASCII   GS   W   *nL   nH*
                  Hex   1D   57   *nL   nH*
                Decimal   29   87   *nL   nH*

[Range] $0 \le nL \le 255$
                $0 \le nH \le 255$

[Description]   Sets the printing area width to the area specified by *nL* and *nH*.
                 ·The printing area width is set to [(*nL* + *nH* x 256) x horizontal motion
                    unit]].

Printable area

Left margin   Printing area width

[Details]   ·This command is effective only processed at the beginning of the line.
                 ·In page mode, the printer performs only internal flag operations.
                 ·This command does not affect printing in page mode.
                 ·If the [left margin + printing area width] exceeds the printable area, [printable   area width - left
                    margin] is used.
                 ·The horizontal and vertical motion units are specified by **GS** P. Changing the   horizontal and

vertical motion units does not affect the current left margin.

·The horizontal motion unit (x) is used for calculating the printing area width. The calculated result is truncated to the minimum value of the mechanical pitch.

·If the width set for the printing area is less than the width of one character,   when the character data is developed, the following processing is performed:

①   The printing area width is extended to the right to accommodate one   character.

Printable area

Left margin   Extended to right

Printing area width set by nL and nH

②   f the printing area width cannot be extended sufficiently, the left margin is   reduced to accommodate one character

Printable area

① Extended to right

Left margin   ②Reduce left margin
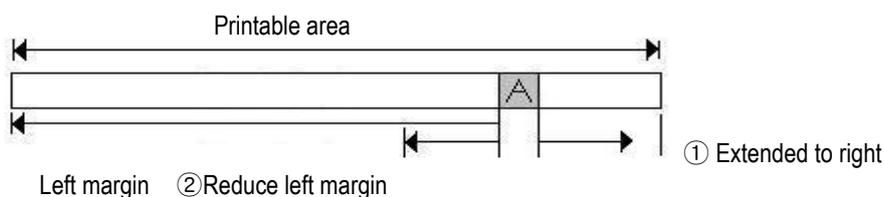
③   If the printing area width cannot be extended sufficiently, the right space is   reduced.

·If the width set for the printing area is less than one line in vertical, the following   processing is performed only on the line in question when data other than   character data (e.g., bit image, user-defined bit image) is developed:

①   The printing area width is extended to the right to accommodate one line in   vertical for the bit image within the printable area.

②   If the printing area width cannot be extended sufficiently, the left margin is   reduced to accommodate one line in vertical.

·The commands which set the printing area width for bit image printing and its   minimum widths are as follows:

·Bit image (**ESC** *) :
> Single density mode = 2 dots
> Double density mode = 1 dot

·Downloaded bit image (**GS** /):
> Double width mode or Quadruple mode = 2 dots
> Normal mode or Double-height mode = 1 dot

·NV bit image (**FS p**) :
> Double width mode or Quadruple mode = 2 dots
> Normal mode or Double-height mode = 1 dot

·Raster bit image (**GS v 0**) :
> Double width mode or Quadruple mode = 2 dots
> Normal mode or Double-height mode = 1 dot

[Default] $nL = 0$, $nH = 2$

[Reference]   **GS L**, **GS P**

GS ╲ *nL nH*

[Name]   Set relative vertical print position in page mode

[Format]   ASCII   GS   ╲   *nL*   *nH*
                  Hex   1D   5C   *nL*   *nH*
                Decimal   29   92   *nL*   *nH*

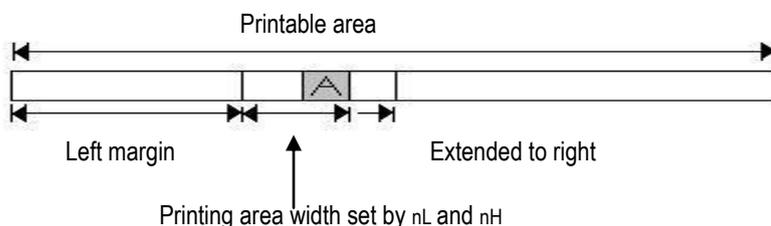[Range] $0 \leq nL \leq 255$
                $0 \leq nH \leq 255$

[Description]   Sets the relative vertical print starting position from the current position in page mode.
                ·This command sets the distance from the current position to [(*nL* + *nH* x 256)   vertical or
                   horizontal motion unit] inches.

[Details]   ·This command is ignored unless page mode is selected.
                 ·When pitch N is specified to the movement downward:
                    nL + *nH x 256 = N*

                    When pitch N is specified to the movement upward (the negative direction), use   the
                    complement of 65536.
                    When pitch N is specified to the movement upward:
                    nL + *nH x 256 = 65536 – N*

                 ·Any setting that exceeds the specified printing area is ignored.
                 ·This command function as follows, depending on the print starting position set   by **ESC T:**
                    ①   When the starting position is set to the upper left or lower right of the   printing, the
                         vertical motion unit (*y*) is used.
                    ②   When the starting position is set to the upper right or lower left of the printing   area, the
                         horizontal motion unit (*x*) is used.
                 ·The horizontal and vertical motion unit are specified by **GS** P.
                 ·The **GS P** command can change the horizontal (and vertical) motion unit.
                    However, the value cannot be less than the minimum horizontal movement   amount, and it
                    must be in even units of the minimum horizontal movement   amount.

[Reference]   **ESC $**, **ESC T**, **ESC W**, **ESC** ╲ , **GS $**, **GS P**

GS ^ *r t m*

[Name]   Execute macro

[Format]   ASCII   GS   ^   *r*   *t*   *m*
                  Hex   1D   5E   *r*   *t*   *m*
                Decimal   29   94   *r*   *t*   *m*

[Range] $0 \leq r \leq 255$
                $0 \leq t \leq 255$
                m=0,1

[Description]   Executes a macro.
                 ·r specifies the number of times to execute the macro.
                 ·t specifies the waiting time for executing the macro.

·m specifies macro executing mode.

When the LSB of m = 0:

The macro executes r times continuously at the interval specified by t.

When the LSB of m = 1:

After waiting for the period specified by t, the PAPER OUT LED indicators blink and the printer waits for the FEED button to be pressed. After the button is pressed, the printer executes the macro once. The printer repeats the operation r times.

[Details]   ·The waiting time is t * 100 ms for every macro execution.
·If this command is received while a macro is being defined, the macro definition is aborted and the definition is cleared.
·If the macro is not defined or if r is 0, nothing is executed.
·When the macro is executed (m = 1), paper always cannot be fed by using the FEED button.

[Reference]   **GS :**

GS a *n*

[Name]   Enable/Disable Automatic Status Back (ASB)

[Format]   ASCII   GS   a   *n*
Hex   1D   61   *n*
Decimal   29   97   *n*

[Range] $0 \leq n \leq 255$

[Description]   Enables or disables ASB and specifies the status items to include, using n as follows:

Bit	Off/ On	Hex	Decimal	Status for ASB
0	Off	00	0	Drawer kick-out connector pin 3 status disabled.
	On	01	1	Drawer kick-out connector pin 3 status enabled.
1	Off	00	0	On-line/off-line status disabled.
	On	02	2	On-line/off-line status enabled
2	Off	00	0	Error status disabled
	On	04	4	Error status enabled.
3	Off	00	0	Paper roll sensor status disabled.
	On	08	8	Paper roll sensor status enabled.
4–7	-	-	-	Undefined.

[Details]   ·If any of the status items in the table above are enabled, the printer transmits the status when this command is executed. The printer automatically transmits the status whenever the enabled status item changes. The disabled status items may

change, in this case, because each status transmission represents   the current status.

·If all status items are disabled, the ASB function is also disabled.

·If the ASB is enabled as a default, the printer transmits the status when the printer data reception and transmission is possible at the first time from when   the printer is turned on.

·The following four status bytes are transmitted without confirming whether the   host is ready to receive data. The four status bytes must be consecutive,   except for the XOFF code.

·Since this command is executed after the data is processed in the receive buffer, there may be a time lag between data reception and status transmission.

·When the printer is disabled by **ESC =** (Select peripheral device), the four   status bytes are transmitted whenever the status changes.

·When using **DLE EOT**, **GS I** , or **GS r**, the status transmitted by these commands and ASB status must be differentiated.

·The status to be transmitted are as follows:

First byte (printer information)

Bit	Off/On	Hex	Decimal	Status for ASB
0	Off	00	0	Not used. Fixed to Off
1	Off	00	0	Not used. Fixed to Off
2	Off	00	0	Drawer kick-out connector pin 3 is LOW
	On	04	4	Drawer kick-out connector pin 3 is HIGH
3	Off	00	0	On-line
	On	08	8	Off-line
4	On	10	16	Not used. Fixed to On
5	Off	00	0	Cover is closed
	On	20	32	Cover is open
6	Off	00	0	Paper is not being fed by using the PAPER FEED button
	On	40	64	Paper is being fed by using the PAPER FEED button
7	Off	00	0	Not used. Fixed to Off

Second byte (printer information)

Bit	Off / On	Hex	Decimal	Status for ASB
0	-	-	-	Undefined.
1	-	-	-	Undefined.
2	-	-	-	Undefined.
3	Off	00	0	No auto cutter error
	On	08	8	Auto cutter error occurred
4	Off	00	0	Not used. Fixed to Off
5	Off	00	0	No unrecoverable error
	On	20	32	Unrecoverable error occurred
6	Off	00	0	No automatically recoverable error
	On	40	64	Automatically recoverable error occurred
7	Off	00	0	Not used. Fixed to Off

Bit 3:   If these errors occur due to paper jams or the like, it is possible to recover by correcting the cause of the error and executing **DLE ENQ _n_** ($1 \le n \le 2$). If an error due to a circuit failure (e.g. wire break) occurs, it is impossible to recover.

Bit 6:   When printing is stopped due to high print head temperature until the print head temperature drops sufficiently or when the paper roll cover is open during printing, bit 6 is On.

Third byte (paper sensor information)

Bit	Off / On	Hex	Decimal	Status for ASB
0,1	Off	00	0	Paper roll near-end sensor: paper adequate
	On	03	3	Paper roll near-end sensor: paper near end
2,3	Off	00	0	Paper roll end sensor: paper present

	On	0C	12	Paper roll end sensor: paper not present
4	Off	00	0	Not used. Fixed to Off
5,6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to Off

Fourth byte (paper sensor information)

Bit	Off / On	Hex	Decimal	Status for ASB
0-3	-	-	-	Undefined
4	Off	00	0	Not used. Fixed to Off
5,6	-	-	-	Undefined
7	Off	00	0	Not used. Fixed to Off.

[Default]   n = 0.

[Reference]   **DLE EOT**, **GS r**

GS f *n*

[Name]   Select font for Human Readable Interpretation (HRI)characters

[Format]
ASCII	GS	f	*n*
Hex	1D	66	*n*
Decimal	29	102	*n*

[Range]   *n* = 0, 1, 48, 49

[Description]   selects a font for the HRI characters used when printing a bar code.
      n selects the font from the following table:

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

[Details]   ·HRI means Human Readable Interpretation.
      ·HRI characters are printed of the position specified by **GS H**.

[Default]   *n* = 0

[Reference]   **GS H, GS k**

GS h *n*

[Name]   Select bar code height

[Format]   ASCII   GS   h   n
                Hex   1D   6B   n
                Decimal 29   104   n

[Range] $1 \leq n \leq 255$

[Description]   Select the height of the bar code.
                n specifies the number of dots in the vertical direction.

[Default]   *n* = 162

[Reference]   **GS k**

①GS k m d1…dk NUL ② GS k m n d1…dn

[Name]   Print bar code

[Format]   ① ASCII   GS   k   m   d1…dk   NUL
                  Hex   1D   6B   m   d1…dn   00
                  Decimal   29   107   m   d1…dn   0
                ② ASCII   GS   k   m   n   d1…dn
                  Hex   1D   6B   m   n   d1…dn
                  Decimal   29   107   m   n   d1…dn

[Range]   ① $0 \leq m \leq 6$(k and d depends on the code system used)
                ② $65 \leq m \leq 73$ *n* and d depends on the code system used)

[Description]   Selects a bar code system and prints the bar code.
                m selects a bar code system as follows:

	m	Bar Code System	Number of Character	Remarks
①	0	UPC – A	$11 \leq k \leq 12$	$48 \leq d \leq 57$
	1	UPC – E	$11 \leq k \leq 12$	$48 \leq d \leq 57$
	2	EAN13	$12 \leq k \leq 13$	$48 \leq d \leq 57$
	3	EAN8	$7 \leq k \leq 8$	$48 \leq d \leq 57$
	4	CODE39	$1 \leq k$	$48 \leq d \leq 57$, $65 \leq d \leq 90$, 32,36,37,43,45,46,47
	5	ITF	$1 \leq k$ (even number)	$48 \leq d \leq 57$

	6	CODABAR	$1 \le k$	$48 \le d \le 57$, $65 \le d \le 68$, 36,43,45,46,47,58
②	65	UPC – A	$11 \le n \le 12$	$48 \le d \le 57$
	66	UPC – E	$11 \le n \le 12$	$48 \le d \le 57$
	67	EAN13	$12 \le n \le 13$	$48 \le d \le 57$
	68	EAN8	$7 \le n \le 8$	$48 \le d \le 57$
	69	CODE39	$1 \le n \le 255$	$48 \le d \le 57$, $65 \le d \le 90$, 32,36,37,43,45,46,47
	70	ITF	$1 \le n \le 255$ (even number)	$48 \le d \le 57$
	71	CODABAR	$1 \le n \le 255$	$48 \le d \le 57$, $65 \le d \le 68$, 36,43,45,46,47,58
	72	CODE93	$1 \le n \le 255$	$0 \le d \le 127$
	73	CODE128	$2 \le n \le 255$	$0 \le d \le 127$

[Details for ①]   ·This command ends with a NUL code.

·When the bar code system used is UPC-A or UPC-E, the printer prints the bar code data after receiving 12 bytes bar code data and processes the following data as normal data.

·When the bar code system used is JAN 13, the printer prints the bar code after receiving 13 bytes bar code data and processes the following date as normal data.

·When the bar code system used is JAN 8, the printer prints the bar code after receiving 8 bytes bar code data and processes the following data as normal data.

·The number of data for ITF bar code must be even numbers. When an odd number of data is input, the printer ignores the last received data.

[Details for②]   ·*n* indicates the number of bar code data, and the printer processes n bytes from the next character data as bar code data.

·If *n* is outside of the specified range the printer stops command processing and processes the following data as normal data.

[Details in standard made]

·If *d* is outside of the specified range, the printer only feeds paper and process the following data as normal data.

·If the horizontal size exceeds printing area, the printer only feeds the paper.

·This command feeds as much paper as is required to print the bar code, regardless of the line spacing specified by **ESC 2** or **ESC 3**.

·This command is enabled only when on data exists in the print buffer.

When data exists in the print butter, the printer processes the data following m as normal data.

·After printing bar code, this command sets the print position to the beginning of the line.

·This command is not affected by print modes (emphasized, double-strike, underline, character size, white/black reverse printing, or 90˚ rotated character, etc), except for upside-down printing mode.

[Details in page made]

·This command develops bar coed data in the print buffer, but does not print it. After processing bar cod data, this command moves the print position to the right side dot of the bar code.

·If d is out of the specified rang, the printer stops command processing and processes the following data as normal data. In this case, the data butter position does not change.

·If bar code width exceeds the printing area, the printer does not print the bar code but moves the data buffer position to the left side out of the printing area.

·Refer to Figure 3.12.3 for bar code data buffer position.

When CODE93 (m=72) is used :

·The printer prints an HRI character (□)as start character at the beginning of the HRI character string.

·The printer prints an HRI character(□)as a stop character at the end of the HRI character string.

·The printer HRI characters (■+an alphabetic character) as a control

character(<00>H to <1F>H and <7F>H):

Control character			HRI character	Control character			HRI character
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	■0	US	1F	31	■E
				DEL	7F	127	■T

[Example] Printing **GS k** 72   7   67   111   100   101   13   57   51

When CODE 128 (m = 73) is used:

·Refer to Appendix J for the information of the CODE 128 bar code and is code table.

·When using the CODE 128 in this printer, take the following points into account for data transmission:

① The top of the bar code data string must be code set selection character (any of CODE A, CODE B or CODE C) which selects the first code set.

② Special characters are defined by combining two characters "{" and one character. The ASCⅡ character "{" is defined by transmitting "{" twice consecutively.

Specific character	Transmit 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

[Example] Example data for printing "No. 123456"

In this example, the printer first prints "No." using CODE B, then prints the following numbers using CODE C.

GS k 73 10 123 66 78 111 46 123 67 12 34 56

No.123456

·If the top of the bar code data is not the code set selection character, the printer stops command processing and processes the following data as normal data.

·If combination of "{"and the following character does not apply any special character, the printer stops command processing and processes the following data as normal data.

·If the printer receives characters that cannot be used in the special code set, the printer stops command processing and processes the following data as normal data.

·The printer does not print HRI characters that correspond to the shift characters or code set selection characters.

·HRI character for the function character is space.

·HRI characters for the control character (<00>H to <1F>H and <7F>H)are space.

<Others>   Be sure to keep spaces on both right and left sides of a bar code.
               (Spaces are different depending on the types of the bar code.)

[Reference]   **GS H, GS f, GS h, GS w**

GS r *n*

[Name]   Transmit status

[Format]   ASCII   GS   r   *n*
               Hex   1D   72   *n*
               Decimal   29   114   *n*

[Range]   n=1, 2, 49, 50

[Description]   Transmits the status specified by n as follows:

n	Function
1,49	Transmits paper sensor status
2,50	Transmits drawer kick-out connector status

[Details]   ·When using a serial interface
                    ·When DTR/DSR control is selected, the printer transmits only 1 byte after   confirming the host
                      is ready to receive data (DSR signal is SPACE). If the host   computer is not ready to receive
                      data (DSR signal is MARK), the printer waits   until the host is ready.
                      When XON/XOFF control is selected, the printer transmits only 1 byte without   confirming
                      the condition of the DSR signal.
                    ·This command is executed when the data in the receive buffer is developed. Therefore, there
                      may be a time lag between receiving this command and   transmitting the status, depending
                      on the receive buffer status.
                    ·When Auto Status Back (ASB) is enabled using **GS a**, the status transmitted by   **GS r** and the
                      ASB status must be differentiated using the table in Appendix G.
                    ·The status types to be transmitted are shown below:

Paper sensor status (n = 1, 49):

Bit	Off / On	Hex	Decimal	Status for ASB
0,1	Off	00	0	Paper roll near-end sensor: paper adequate.
	On	03	3	Paper roll near-end sensor: paper near end.
2,3	Off	00	0	Paper roll end sensor: paper adequate.
	On	(0C)	(12)	Paper roll end sensor: paper near end.
4	Off	00	0	Not used. Fixed to Off.
5,6	-	-	-	Undefined.
7	Off	00	0	Not used. Fixed to Off.

Bits 2 and 3:   When the paper end sensor detects a paper end, the printer goes off-line and   does not
                        execute this command. Therefore, bits 2 and 3 do not transmit the   status of paper end.

Drawer kick-out connector status (n = 2, 50):

Bit	Off / On	Hex	Decimal	Function
0	Off	00	0	Drawer kick-out connector pin 3 is LOW.
	On	01	1	Drawer kick-out connector pin 3 is HIGH.
1-3	-	-	-	Undefined.
4	Off	00	0	Not used. Fixed to Off.
5,6	-	-	-	Undefined.
7	Off	00	0	Not used. Fixed to Off.

[Reference]   **DLE EOT**, **GS a**

GS v 0 m xL xH yL yH d1....dk

[Name]   Print raster bit image

[Format]   ASCII   GS   v   0   m   xL   xH   yL   yH
d1...dk

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

[Range] $0 \le m \le 3, 48 \le m \le 51$
                    $0 \le xL \le 255$
                    $0 \le xH \le 255$

$0 \le yL \le 255$

$0 \le yH \le 8$

$0 \le d \le 255$

$k=(xL + xH \times 256) \times (yL + yH \times 256)$ $(k \ne 0)$

[Description]   Selects Raster bit-image mode.

The value of m selects the mode, as follows:

m	Mode	Vertical Dot Density	Horizontal Dot Density
0, 48	Normal	180 dpi	180 dpi
1, 49	Double-width	180 dpi	90 dpi
2, 50	Double-height	90 dpi	180 dpi
3, 51	Quadruple	90 dpi	90 dpi

[dpi : dots per 25.4mm {1"}]

·xL, xH, select the number of data bytes (xL+xH×256) in the horizontal

direction for the bit image.

·yL, yH, select the number of data bytes (xL+xH×256) in the vertical

direction for the bit image.

[Details]   ·In standard mode, this command is effective only when there is no data

in the print buffer.

·This command has no effect in all print modes (character size,

emphasized, double-strike, upside-down, underline, white/black

reverse printing, etc.) for raster bit image.

·If the printing area width set by **GS L** and **GS W** is less than the minimum

width, the printing area is extended to the minimum width only on the line

in question. The minimum width means 1 dot in normal (m=0,48) and

double-height (m=2,50), 2dots in double-width (m=1,49) and quadruple

(m=3,51) modes.

·Data outside the printing area is ready in and discarded on a dot-by-dot

basis.

·The position at which subsequent characters are to be printed for raster bit

image is specified by **HT**(Horizontal Tab) **ESC $** (Set absolute print

position), **ESC ** (Set relative print position), and **GS L** (Ste left margin).

If the position at which subsequent characters are to be printed is not a

multiple of 8, print speed may decline.

·The **ESC a** (Select justification) setting is also effective on raster bit image.

·When this command is received during macro definition, the printer ends

macro definition, and begins performing this command. The definition of

the command should be cleared.

·d indicates the bit-image data. Set time a bit to 1 prints a dot and setting

it to 0 does not print a dot.

GS w *n*

[Name]   Set bar code width

[Format]

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

[Range] $2 \leq n \leq 6$

[Description]   Set the horizontal size of the bar code.

n specifies the bar code width as follows:

n	Module width (mm) for Mult-level Bar code	Binary-level Bar Code	
		Thin element width (mm)	Thick element width (mm)
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

·Multi-level bar codes are as follows:
UPC-A, UPC-E, JAN13 (EAN13), JAN8 (EAN8), CODE93, CODE128
·Binary-level bar codes are as follows:
CODE39, ITF, CODABAR

[Default]   *n* = 3

[Reference]   **GS k**

ESC i

[Name]   Execute paper full cut.

[Format]

ASCII	ESC	i
Hex	1B	69
Decimal	27	105

[Description]   When this command is received, paper is cut (only when the auto cutter is loaded).

ESC m

[Name]   Execute paper partial cut.

[Format]

ASCII	ESC	m
Hex	1B	6D
Decimal	27	109

[Description]   When this command is received, paper is cut (only when the auto cutter is loaded).

GS (k pL pH cn fn n1 n2 (fn=65)

[Name]   Select the QR Code model.

[Format]

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

[Range]   (pL + pH* 256) = 4   (pL=4, pH=0)
    cn = 49
  fn = 65
 n1 = 49,50
  n2 = 0

[Description]   Selects the model for QR Code.
n1   Function
49   Selects model 1.
50   Selects model 2.

GS (k pL pH cn fn n (fn=67)

[Name]   Set the QR Code size of module.

[Format]

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

[Range]   (pL + pH* 256) = 3   (pL=3, pH=0)
    cn = 49
  fn = 67

[Description]   Sets the size of the module for QR Code to n dots.

GS (k pL pH cn fn n (fn=69)

[Name]   Select the QR Code error correction level.

[Format]

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

[Range]   (pL + pH* 256) = 3   (pL=3, pH=0)
    cn = 49
  fn = 69
 47 < n < 52

[Description]   Selects the error correction level for QR code.

n	fuction	Recovery Capacity %(approx.)
48	Selects Error correction level L	7
49	Selects Error correction level M	15
50	Selects Error correction level Q	25
51	Selects Error correction level H	30

GS (k pL pH cn fn m d1…dk (fn=80)

[Name]   Store the QR Code data in the symbol storage area.

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

[Range]   3 < (pL + pH* 256) < 7093   (0 <= pL < 256,0 <= pH < 28)
                  cn = 49
                 fn = 80
                 m = 48
                 0 <= d < 255
                 k = (pL + pH* 256) - 3

[Description]   Store the QR Code symbol data (d1…dk) in the symbol storage area.

GS (k pL pH cn fn m (fn=81)

[Name]   Print the QR Code symbol data in the symbol storage area.

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

[Range]   (pL + pH* 256) = 3   (pL=3, pH=0)
                  cn = 49
                 fn = 81
                  m = 48

[Description]   Encodes and prints the QR Code symbol data in the symbol storage area using the process of
                 <Store the data >.

GS (k pL pH cn fn n (fn=65)

[Name]   Sets the number of columns of the data area for PDF417.

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

[Range]   (pL + pH* 256) = 3   (pL=3, pH=0)
                  cn = 48
                 fn = 65
                 0≤n≤30

[Description]   Sets the number of columns of the data area for PDF417.
                n = 0 specifies automatic processing.

GS (k pL pH cn fn n (fn=66)

[Name]	Sets the number of rows of data area for PDF417.

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

[Range] (pL + pH* 256) = 3   (pL=3, pH=0)
   cn = 48
   fn = 66
   n=0, 3≤n≤90

[Description] Sets the number of rows of data area for PDF417.
   n = 0 specifies automatic processing.

GS (k pL pH cn fn n (fn=67)

[Name]	Sets the module width of one PDF417 symbol to n dots.

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

[Range] (pL + pH* 256) = 3   (pL=3, pH=0)
   cn = 48
   fn = 67
   2≤n≤8

[Description] Sets the module width of one PDF417 symbol to n dots.

GS (k pL pH cn fn n (fn=68)

[Name]	Sets the PDF417 module height

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

[Range] (pL + pH* 256) = 3   (pL=3, pH=0)
   cn = 48
   fn = 68
   2≤n≤8

[Description] Sets the module height to [(module width) × n].

GS (k pL pH cn fn n (fn=69)

[Name]   Sets the error correction level for PDF417 symbols.

[Format] | ASCII | GS | (| k | pL | pH | cn | fn | m | n |
                 |---------|----|-----|-----|----|----|----|----|---|---|
                 | Hex | 1D | 28 | 6B | *04* | *00* | *30* | *45* | *m* | *n* |
                 | Decimal | 29 | 40 | 107 | 4 | 0 | 48 | 69 | m | n |

[Range]   (pL + pH* 256) = 4   (pL=4, pH=0)
                   cn = 48
                   fn = 69
                   m = 48,49
                   48≤n≤56 (when m=48 is specified)
                   1≤n≤40 (when m=49 is specified)

[Description]   Sets the error correction level for PDF417 symbols.

GS (k pL pH cn fn n (fn=80)

[Name]   Stores symbol data in the PDF417 symbol storage area.

[Format] | ASCII | GS | (| k | pL | pH | cn | fn | m | d1…dk |
                 |---------|----|-----|-----|----|----|----|----|---|-------|
                 | Hex | 1D | 28 | 6B | *pL* | *00* | *30* | *50* | *m* | d1…dk |
                 | Decimal | 29 | 40 | 107 | pL | 0 | 48 | 80 | m | d1…dk |

[Range]   4≤(pL + pH* 256) ≤65535   (0≤pL≤255, 0≤pH≤255)
                   cn = 48
                   fn = 80
                   m = 48
                   0≤d≤255
                   k = (pL + pH*256) - 3

[Description]   Stores symbol data (d1...dk) in the PDF417 symbol storage area.
                   Bytes of ((pL + pH × 256) - 3) after m (d1…dk) are processed as symbol data.

GS (k pL pH cn fn n (fn=81)

[Name]   Prints the PDF417 symbol data in the symbol storage area.

[Format] | ASCII | GS | (| k | pL | pH | cn | fn | m |
                 |---------|----|-----|-----|----|----|----|----|---|
                 | Hex | 1D | 28 | 6B | *03* | *00* | *30* | *51* | *m* |
                 | Decimal | 29 | 40 | 107 | 4 | 0 | 48 | 81 | m |

[Range]   (pL + pH* 256) = 3   (pL=3, pH=0)
                   cn = 48
                   fn = 81
                   m = 48

[Description]   Prints the PDF417 symbol data in the symbol storage area..