PP6800/PP8000
COMMAND DETAILS

CODES (HEX/CONTROL): **<09> / {HT}**
NAME: Horizontal tab
FUNCTION: **Moves the print position to the next horizontal tab position**
EXPLANATION:

1. If all horizontal tab position has been cleared by {ESC} D {NUL}, this command is ignored.

2. The default setting of the horizontal tab positions are set at every 8th character (9th, 17th, 25th, …column).

3. If there is no more horizontal tab position set to the right of the print position within the printing area, this command advances print position to the beginning of next line.

4. Horizontal tab positions can be set with {ESC} D command. When horizontal tab positions are set in font A (12 x 24) characters printing mode, switching into font B (8 x 16) characters mode the tab positions will still align to that in font A printing.

5. Horizontal tab positions can be reset to default values with {ESC} @.

6. Since the printer executes print buffer-full printing when print data before a {LF} received exceeds a line's worth, if this command is received when the printing position is already at next line the horizontal tab processing is executed from the beginning of this next line.

CODES (HEX/CONTROL): **<0A> / {LF}**
NAME: Print and line feed
FUNCTION: **Print data in print buffer and feed one line**

EXPLANATION:

1. Print buffer is cleared after data printed. In text mode. When printer receives data more than a line's worth before a {LF}, the printer executes print buffer-full printing.
2. Paper advances by one line based on the current line spacing after print.
3. In page mode the printing and paper feed does not actually occur on receiving this command. But the data after {LF} will be arranged in next line.
4. This command sets the print position to the beginning of the line after line feed.

CODES (HEX/CONTROL): <0C> / {FF}
NAME: Print and return to text mode in page mode
FUNCTION: Prints the data in the print buffer collectively and returns to text mode
EXPLANATION:

1. This command works only in page mode.
2. The buffer data is cleared after being printed.
3. The last printing settings in page mode printing such as underline, character font, emphasized, double strike, character size and reverse printing remain the same for text mode printing after this command.
4. The printing area set by {ESC} W in page mode remains the same after this command.
5. The printer does not execute paper cutting by this command.
6. This command sets the print position to the beginning of line in text mode.

CODES (HEX/CONTROL): <0D> / {CR}
NAME: Carriage return
FUNCTION: Set the printing position to the beginning of the line
EXPLANATION:

1. When automatic line feed is enabled, this command functions the same as {LF};

when automatic line feed is disabled, this command is ignored.

2. Sets the print starting position to the beginning of the line.

3. This command is ignored in a serial interface model.

4. This command is set according to the DIP switch position 7 of SW 1 is set to On with a parallel interface model.

CODES (HEX/CONTROL): <10> <04> <*n*> / {DLE} {EOT} *n*
NAME: Real-time status transmission
FUNCTION: Transmits the selected printer status in real time
RNAGE: $1 \leq n \leq 4$
EXPLANATION:

1. The parameter *n* specifies content group of printer status to be transmitted as below.

    $n = 1$: Transmit printer status

    $n = 2$: Transmit off-line status

    $n = 3$: Transmit error status

    $n = 4$: Transmit paper sensor status

2. The printer transmits the current status as specified by *n*. Each status is represented by one-byte data.

3. If the value of *n* is out of the specified range ($1 \leq n \leq 4$), This command is ignored.

4. The printer transmits the status regardless of the handshaking condition of the host computer.

5. The printer executes this command upon receiving it regardless of unprocessed data in receive buffer.

6. This command executes with a serial interface model even when the printer is off-line, when the receive buffer is full, or when there is an error status.

7. With a parallel interface model, when DIP switch position 4 (or 1 - 4) is set to OFF this command can only be executed when the printer is under normal status (on line, no error, not busy). When DIP switch position 4 (or 1 – 4) is set to ON, this command can not be executed when the printer is busy but can be executed when the printer is off-line or there is an error status.

8. The status is transmitted whenever the data sequence of <10>h <04>h <*n*> (1≤ *n* ≤ 4) is received even when this sequence is in fact part of data in other command. However, that command containing this data sequence still works when it takes its turn in printer processing queue.

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

9. This command should not be used when the printer is processing data sequence of another command that consists of 2 or more bytes.

Example:

If the printer is going to execute {ESC} 3 *n* by retrieving it from input buffer, DTR (DSR for the host computer) goes to MARK (busy) before *n* is retrieved, but {DLE} {ENQ} 2 interrupts before *n* is retrieved from input buffer, the code <10>H for {DEL} {ENQ} 2 is processed as the code for {ESC} 3 <10>h.

10. When Auto Status Back (ASB) is enabled by using the {GS} a command, the status transmitted by the {DLE} {EOT} command and the ASB status must be differentiated.

11. Status responses from the printer are regulated in tables below as defined by value of *n*.

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	00	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	FEED button is used for macro execution
	On	08	8	FEED button is used to feed the paper
4	On	10	16	Not used. Fixed to On
5	Off	00	0	Not used Fixed to Off
6	Off	00	0	No error
	On	40	64	Error occurs
7	Off	00	0	Not used Fixed to Off

Bit 6: Errors indicated by this bit do not include cover open neither paper jam.

$n = 3$: 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: The auto cutter error together with cover open error, paper near end status, paper end status and paper jams status are considered as recoverable errors. Because it is possible to recover to non-errors status by correcting the cause of the error and executing {DLE} {ENQ} n ($1 \leq n \leq 2$)

Bit 5: if an error due to improperly shut down or 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 roll near-end sensor: paper near-end
4	On	10	16	Not used. Fixed to On
5,6	Off	00	0	Paper end sensor: paper present
	On	60	96	Paper end sensor: paper end
7	Off	00	0	Not used. Fixed to Off

CODES (HEX/CONTROL): <10> <05> <*n*>/ {DLE} {ENQ} *n*
NAME: Real-time request to printer
FUNCTION: Request to printer in real-time
RANGE: $1 \leq n \leq 2$
EXPLANATION:

1. The parameter *n* specifies content according to the printer status as below:

    n =1 Recover from an error and restart printing from the line where the error occurred.

    n = 2 Recover from an error aft clearing the receive and print buffers.

2. This command is effective only when an auto-cutter error occurs.

3. This printer starts processing data upon receiving this command.

4. This command executes with a serial interface model even when the printer is off-line, when the receive buffer is full, or when there is an error status.

5. With a parallel interface model, when DIP switch position 4 (or 1 - 4) is set to OFF this command can only be executed when the printer is under normal status (on line, no error, not busy). When DIP switch position 4 (or 1 – 4) is set to ON, this command can not be executed when the printer is busy but can be executed when the printer is off-line or there is an error status

6. The status is also transmitted whenever the data sequence of <10>h<05>h<*n*>(1≤ *n* ≤ 2) is received.

Example:

In **{ESC} * *m nL nH dk***, d1= <10>h, d2=<05>h, d3=<01>h

6. 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 {DEL} {ENQ} 2 is processed as the code for {ESC} 3 <10>h.

7. {DLE}{ENQ} 2 enables the printer to recover from an error after clearing the data in the receive buffer and the print buffer. The printer retains the settings that were in effect when the error occurred. The printer can be initialized completely by using this command and {ESC} @. This command is enabled only for errors that have the possibility of recovery, except for print head temperature error.

CODES (HEX/CONTROL): <18> / {CAN}
NAME: Cancel print data in page mode
FUNCTION: In page mode, deletes all the print data in the printing buffer
EXPLANATION:

1. This command executed only in page mode. It is ignored in text mode.
2. All data in page mode print buffer will be cleared. If a repeatable print has been performed, the printed data will be cleared from print buffer by this command, but all printing settings including print position remain. In other words, the starting position for next printing in Page mode follows last position printed.

CODES (HEX/CONTROL): <1B> <0C> / {ESC} {FF}

NAME: repeatable print data in page mode
FUNCTION: Repeatable print all buffered data
EXPLANATION:

1. This command works only in page mode.

2. In page mode, this command can repeatable print all buffered data. After printing, it still in page mode does not return to text mode.

3. After printing, the printer does not clear the buffered data, and all printing settings including print position remain. In other words, the starting position for next printing in Page mode follows last position printed.

CODES (HEX/CONTROL): <1B> <20> <n>/ {ESC} {SP} n
NAME: Set right-side character spacing
FUNCTION: Set right-side character spacing
RANGE: $0 \leq n \leq 255$
EXPLANATION:

1. Set the character spacing for the right side of the character to (n x horizontal or vertical motion units).

2. The right-side character spacing for double-width mode is double the normal value. When characters are enlarged, the right-side character spacing is follows characters enlarged n times for normal value.

3. The underline mode is available in right-side character spacing.

4. If the right-side character spacing exceeds printing area, the printer sets the printing position to the beginning of next line.

5. This command sets values independently in each mode (text and page modes).

CODES (HEX/CONTROL): <1B> <21> <n> / {ESC} ! n
NAME: Select print mode
FUNCTION: Selects print mode
RANGE: $0 \leq n \leq 255$

EXPLANATION:

1. This command specifies *n* as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Character font A (12 x 24)
	On	01	1	Character font B (8 x 16)
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

2. When both –height and double-width modes are selected, quadruple size characters are printed.

3. The printer can underline all characters, but can not underline the space set by {HT} or 90°clockwise rotated characters.

4. The thickness of the underline is that selected by {ESC} -, regardless of the character size.

5. When some characters in a line are double or more height, all the characters on the line are aligned at the baseline.

6. {ESC} E can also turn on or off emphasized mode. However, the setting of the last received command is effective.

7. {ESC} - can also turn on or off underline mode. However, the setting of the last received command is effective.

8. {GS} ! can also select character size. However, the setting of the last received command is effective.

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CODES (HEX/CONTROL): **<1B> <24> <nL> <nH> / {ESC} $ nL nH**
NAME: Set absolute print position
FUNCTION: Sets the distance from the beginning of the line
RANGE: $0 \le nL \le 255$ $0 \le nH \le 255$
EXPLANATION:

1. Sets the distance from the beginning of the line to the position at which subsequent characters are to be printed.
2. The distance from the beginning of the line to the print position is [$nL + nH$ x 256] x (vertical or horizontal motion unit in inches)].
3. Settings outside the specified printable area the printer set the printing position to the beginning of next line.
4. If left margin has been set before absolute print position the left margin value depend on the absolute print position.
5. In text mode, the horizontal motion unit x is used.
6. In page mode, 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.

CODES(HEX/CONTROL) : **<1B> <25> <n> / {ESC} % n**
NAME: Select/cancel user-defined character set
FUNCTION: Select or cancels the user-defined character set
RANGE: $0 \le n \le 255$
EXPLANATION:

1. When the LSB of $n = 0$ the user-defined character set is canceled.
   When the LSB of $n = 1$ the user-defined character set is selected.
2. When the user-defined character set is canceled, the internal character set is

automatically selected.

3. *n* is available only for the least significant bit.

CODES (HEX/CONTROL): <1B> <26> <y> <c₁> <c₂> [<x₁> <d(1,1)> … <d(1,(y x x₁))>] … [<xₖ> <d(k,1)> ... <d(k,(y x xₖ))>] / {ESC} & y c₁ c₂ [x₁ d(1,1) … d(1,(y x x₁)) … [xₖ d(k,1) ... d(k,(y x xₖ)]

NAME: **Define user-defined characters**

FUNCTION: **Define user-defined characters**

RANGE: $y = 3$ $20 \leq c1 \leq c2 \leq 126$ $k = c2 - c1 + 1$ $0 \leq d \leq 255$

$0 \leq x \leq 0C$ for Font A (12 x 24) $0 \leq x \leq 09$ for Font B (8 x 16)

EXPLANATION:

1. Parameter *y* represents the number of bytes in vertical direction.

2. c_1 specifies the beginning character code for the definition, c_2 specifies the final code, and each *x* specifies the number of dots in the horizontal direction.

3. The allowable character code range is from ASCII code {20}h to{7E}h (95 characters).

4. It is possible to define multiple characters for consecutive character codes. If only one character is desired, use $c_1 = c_2$

5. The later definition of user-defined characters will replace the previous value.

6. *d*'s are the dot data for the characters. The dot pattern is the horizontal direction from the left side. Any remaining dots on the right side are blank. Refer to example next page for detail.

7. When the user-defined characters are used to define characters in font B (8 x 16), every 3 rd byte of data is non-effective.

8. The user-defined character definition is cleared when:

   - {ESC} @ is executed
   - {ESC} ? is executed
   - {FS} q is executed
   - {GS} * is executed
   - The printer is reset or the power is turned off

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9. Examples:

When font A (12 x 24) is selected:
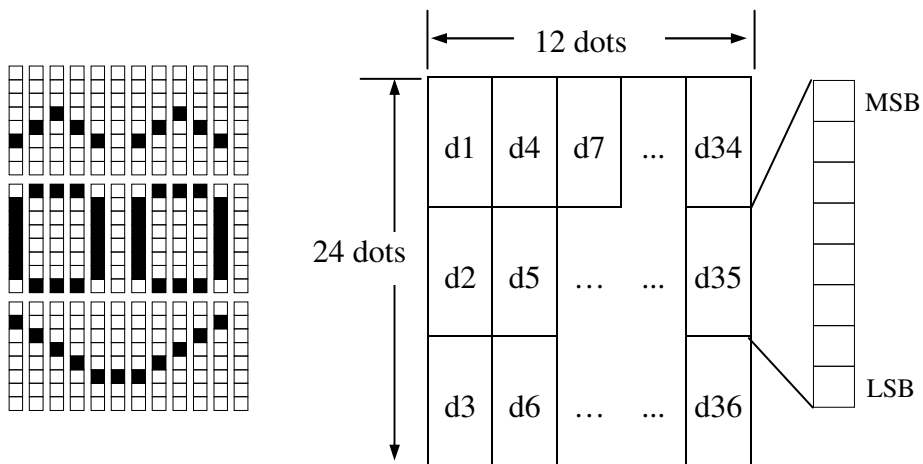
12 dots

MSB

d1 | d4 | d7 | ... | d34

24 dots

d2 | d5 | … | … | d35

d3 | d6 | … | … | d36

LSB

To define above character to code 41h (to replace "A"), the whole command would then be (in hexadecimal): 1B 26 03 41 41 0C 04 7E 40 08 81 20 10 81 10 08 81 08 04 7E 04 00 00 04 04 7E 04 08 81 08 10 81 10 08 81 20 04 7E 40 00 00 00

When font B (8 x 16) is selected:
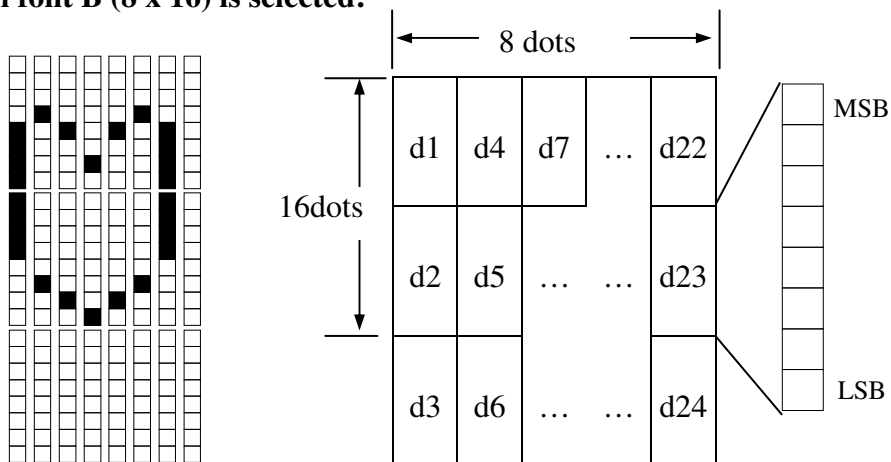
8 dots

MSB

d1 | d4 | d7 | … | d22

16dots

d2 | d5 | … | … | d23

d3 | d6 | … | … | d24

LSB

To define above character to code 41h (to replace "A"), the whole command would then be (in hexadecimal): 1B 26 03 41 41 08 0F F0 00 10 04 00 08 02 00 02 01 00 08

02 00 10 04 00 0F F0 00 00 00 00

CODES (HEX/CONTROL): <1B> <2A> <m> <nL> <nH> <d₁>…<dk>
/ {ESC} {*} {m} {nL} {nH} {d₁}…{dk}
NAME: Select bit-image mode
FUNCTION: Selects bit-image mode
RANGE: m=0,1,20,21 $0 \leq nL \leq$ FF $0 \leq nH \leq 03$ $0 \leq d \leq$ FF
EXPLANATION:

1. This command specifies {m} for the number of dots by {nL} and {nH}, as follows:

{m}	Mode (Density)	Vertical Direction		Horizontal Direction	
		Number of dots	Dot Density	Dot Density	Number of Data (k)
0	8-dot single	8	60 DPI	90 DPI	{nL} +{nH} x 256
1	8-dot double	8	60 DPI	180 DPI	{nL} +{nH} x 256
20	24-dot single	24	180 DPI	90 DPI	[{nL} +{nH} x 256] x 3
21	24-dot double	24	180 DPI	180 DPI	[{nL} +{nH} x 256] x 3

2. If the values of {m} is out of the specified range, {nL} and {nH} data following are processed as normal data.

3. This command works in text mode and page mode.

4. 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

5. If the bit-image data input exceeds the number of dots to be printed on a line, the excess as normal data.

6. {d} indicates the bit-image data. Set a corresponding bit to 1 to print a dot or to 0 to not print a dot.

7. This command is not affected by print modes: {ESC}{SP}, {ESC}{-}, {ESC}{E}, {ESC}{G}, {ESC}{M}, {ESC}{V}, {GS}{!}, {GS}{B}. Except upside-down printing mode.

8. 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
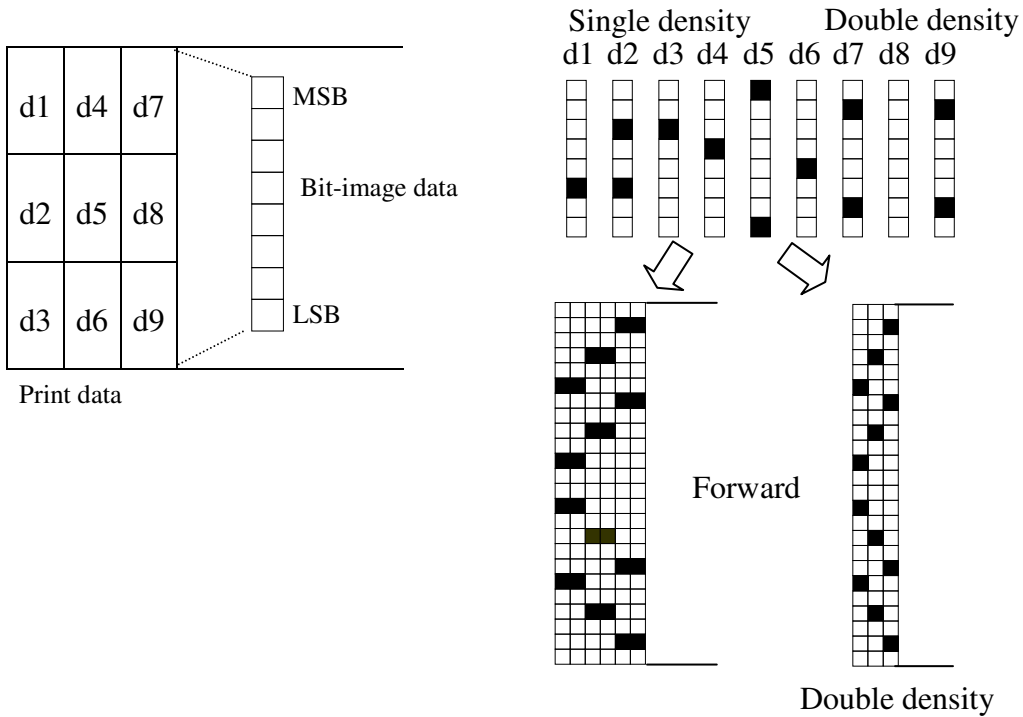
amount of data.

2. If step 1 does not provide sufficient width for the data, the left margin is reduced to accommodate the data.

9. After printing a bit image, the printer returns to normal data processing mode.

10. The relationship between the image data and the dots to be printed is as follows:

When 8-dot bit image is selected:
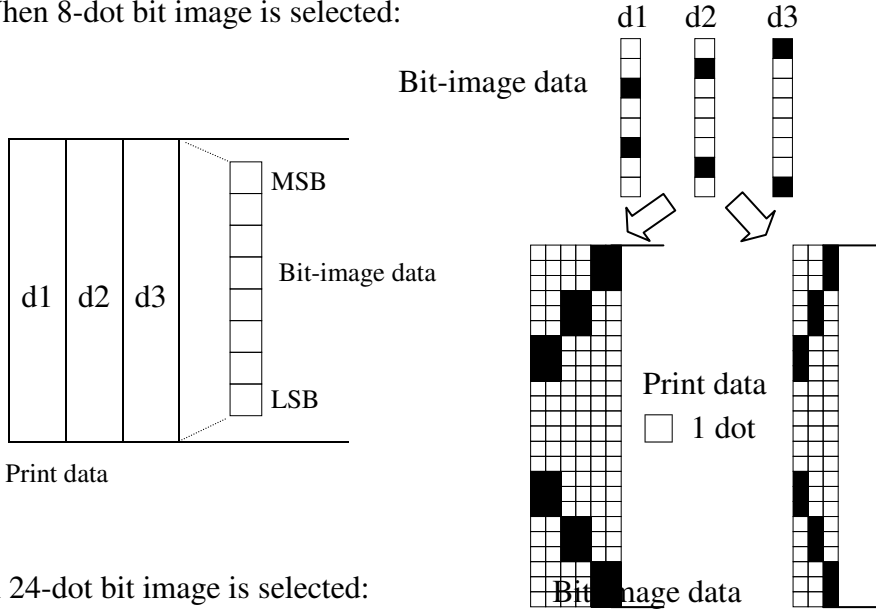
When 24-dot bit image is selected:

CODES (HEX/CONTROL): <1B> <2D> <*n*> / {ESC} - *n*
NAME: Turn underline mode on/off
FUNCTION: Turns underline mode on or off
RANGE: $0 \le n \le 2, 48 \le n \le 50$
EXPLANATION:

1. 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)

2. The printer can underline all characters (including right-side character spacing, user-defined character) but cannot underline the space set by {HT} and all big image printing.
3. The printer cannot underline 90° clockwise rotated characters and white/black inverted characters.
4. Changing the character size does not affect the current underline thickness.

CODES (HEX/CONTROL): <1B> <32> / {ESC} 2
NAME: Select default line spacing
FUNCTION: Select default line spacing
RANGE: $0 \le n \le 255$
EXPLANATION:

1. The default line spacing 1/6.75-inch (approximately 3.76 mm).
2. The line spacing can be set independently in text mode and in page mode.

CODES (HEX/CONTROL): <1B> <33> <*n*> / {ESC} 3 *n*
NAME: Set line spacing

FUNCTION: Sets the line spacing
RANGE: $0 \leq n \leq 255$
EXPLANATION:

3. The line spacing is [n x vertical or horizontal motion unit] inches.
4. The line spacing can be set independently in text mode and in page mode.
5. The horizontal and vertical motion unit are specified by {GS} P. Changing the horizontal or vertical motion unit does not affect the current line spacing.
6. In text mode, the vertical motion unit y is used.
7. In page mode, this command functions as follows, depending on the starting position of the printable area:
   - When 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.
   - When the starting position is set to the upper right or lower left of the print able area using {ESC} T, the horizontal motion unit x is used.

CODES (HEX/CONTROL): <1B> <3F> <n> / {ESC} ? n
NAME: Cancels user-defined characters
FUNCTION: Cancels user-defined characters
RANGE: $20 \leq n \leq 126$
EXPLANATION:

1. 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.
2. If a user-defined character has not been defined for the specified character code, the printer ignores this command.

CODES (HEX/CONTROL): <1B> <40> / {ESC} @
NAME: Initialize printer
FUNCTION: Reset printer settings
EXPLANATION:

1. Clears the data in the printing buffer and resets the printer mode to the text mode that was in effect when the power was turned on.
2. The macro definition is not cleared.
3. The NV bit image data is not cleared.

CODES (HEX/CONTROL): <1B> <44> <n_1> … <n_k> <00> / {ESC} D n_1 … n_k {NUL}
NAME: Horizontal tab position setting
FUNCTION: Sets horizontal tab positions
RANGE: $1 \leq n \leq 255$ $1 \leq k \leq 33$
EXPLANATION:

1. In this command data *n* specifies the column number for setting a horizontal tab position from the beginning of the line, number *k* indicates the total number of horizontal tab position to be set. Any excessive tab position data (more than 33) before the terminating {NUL} code will be printed as normal data.
2. The horizontal tab position as measured from the beginning of the line is determined by *n* x character width at the moment the positions are set by this command. The character width includes influences from font type selection, the right-side character spacing, and double-width characters etc. These positions will no longer move if later in application the character width is changed.
3. This command cancels the previous horizontal tab settings. Therefore {ESC} D {NUL} clears all horizontal tab settings.
4. If the horizontal tab position exceeds printing area, the printer sets printing position to the beginning of next line. Any further setting beyond this point is disregarded.
5. All *n's* in this command must be given in ascending order. Any *n* with value smaller than any of its precedents will be disregarded.

CODES (HEX/CONTROL): <1B> <45> <*n*> /{ESC} E *n*

NAME: Turn emphasized mode on/off
FUNCTION: Turns emphasized mode on or off
RANGE: $0 \le n \le 255$
EXPLANATION:

1. The parameter n specifies turn emphasized mode as below:

   $n = 0$ emphasized mode is turned off.

   $n = 1$ emphasized mode is turned on.

2. Only the least significant bit of n is enabled.

3. This command is ignored in page mode.

CODES (HEX/CONTROL): <1B> <47> <n> / {ESC} G n
NAME: Turn on/off double-strike mode
FUNCTION: Turn double-strike mode on or off
Range: $0 \le n \le 255$
EXPLANATION:

1. The parameter n specifies turn on/off double-strike mode as below:

   $n = 0$ double-strike mode is turned off

   $n = 1$ double-strike mode is turned on

2. Only the lowest bit of n is enabled.

3. This command is ignored in page mode.

4. Printer output is the same in double-strike mode and in emphasized mode.

CODES (HEX/CONTROL): <1B> <4A> <n> / {ESC} J n
NAME: Print and feed paper
FUNCTION: Prints the data in the print buffer and feeds the paper
RANGE: $0 \le nL \le 255$
EXPLANATION:

1. Feeds the paper is [n x vertical or horizontal motion unit in inches].

2. After printing, this command sets the print starting position to the beginning of the

line.

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

4. The {GS} P command can change the vertical (and horizontal) motion unit.

CODES (HEX/CONTROL): <1B> <4C> / {ESC} L
NAME: Select page mode
FUNCTION: Switches from text mode to page mode
EXPLANATION:

1. This command is enabled only when processed at the beginning of a line in text mode.

2. This command has no effect in page mode.

3. This command sets the position where data is buffered to the position specified by {ESC} T within the printing area defined by {ESC} W.

4. The printer returns to text mode when power is turned on, the printer is rest, or {ESC} @ is used.

CODES (HEX/CONTROL): <1B> <4D> <n> / {ESC} M n
NAME: Select character font
FUNCTION: Selects character fonts
RANGE: n = 0, 1, 48, 49
EXPLANATION:

1. Selects character fonts:

n	Function
0, 48	Character font A (12 x 24) selected
1, 49	Character font B (8 x 16) selected

2. It switches character font either in text or page mode.

CODES (HEX/CONTROL): <1B> <52> <n> / {ESC} R *n*
NAME: Select an international character set
FUNCTION: Selects an international character set
RANGE: $0 \le n \le 13$, $n = 15$
EXPLANATION:

1. Selects an international character set *<n>* from the below 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
13	Korea
15	Ex-Yugoslavia

2. The select an international character is cleared when:

    - {ESC} @ is executed.
    - {FS} q is executed.
    - The printer is reset or the power is turned off.

CODES (HEX/CONTROL): <1B> <53> / {ESC} S
NAME: Select text mode
FUNCTION: Switch from page mode to text mode

EXPLANATION:

1. This command is effective only in page mode.
2. Data buffered in page mode are cleared.
3. This command sets the print position to the beginning of the line.

CODES (HEX/CONTROL) : <1B> <54> <n> / {ESC} T *n*
NAME: Select print direction in page mode
FUNCTION: Selects the print direction and starting position in page mode
RANGE: $0 \leq n \leq 3$ $48 \leq n \leq 51$
EXPLANATION:

1. The parameter *n* specifies the print direction as below:

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)
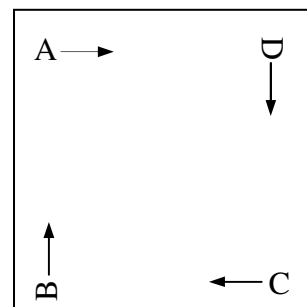
2. This command does not apply in text mode.
3. This command sets the position where data is buffered within the printing area set by {ESC} W.

CODES (HEX/CONTROL): <1B> <56> <n> / {ESC} V *n*
NAME: Turn 90° clockwise rotation mode on/off
FUNCTION: Turns 90° clockwise rotation mode on/off
RANGE: $n = 0, 1, 48, 49$

EXPLANATION:

1. This command specifies *n* as follows:

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

2. This command works only in text mode. However, the setting is always effective.

3. When underline mode is turned on, the printer does not underline 90° clockwise-rotated.

4. 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.

CODES (HEX/CONTROL): <1B> <57> <xL> <xH> <yL> <yH> <dxL> <dxH> <dyL> <dyH> / {ESC} W xL xH yL yH dxL dxH dyL dyH
NAME: Set printing area in page mode
FUNCTION: Set printing area in page mode
RANGE: $0 \le xL, xH, yL, yH, dxL, dxH, dyL, dyH \le 255$ (except $dxL = dxH = 0$ or $dyL = dyH = 0$)

EXPLANATION:

1. This command sets horizontal starting position, vertical starting position, printing area width, and printing area height are defined as *X*, *Y*, *Dx*, *Dy* respectively. Each setting for the printing area is calculated as follows:

    $X = [(xL + xH \times 256) \times (\text{horizontal motion unit})]$

    $Y = [(yL + yH \times 256) \times (\text{vertical motion unit})]$

    $Dx = [(dxL + dxH \times 256) \times (\text{horizontal motion unit})]$

    $Dy = [(dyL + dyH \times 256) \times (\text{vertical motion unit})]$

2. This command does not apply in text mode.

3. 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.

4. If the printing area width or height is set to 0 [$dxL = dxH = 0$, $dyL = dyH = 0$], the printer stops command processing and processes the following data as normal data.

5. 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:
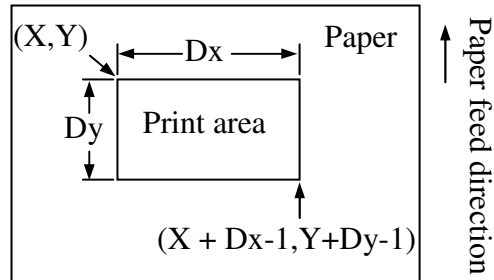
CODES (HEX/CONTROL): **<1B> <5C> <nL> <nH> / {ESC} \ *nL nH***

NAME: Set relative print position

FUNCTION: Sets the print starting position based on the current position

RANGE: $0 \le nL \le 255$ $0 \le nH \le 255$

EXPLANATION:

1. This command sets the distance from the current position to [(nL + nH x 256) x horizontal or vertical motion unit].

2. Any setting that exceeds the printable area is ignored.

3. This command sets values independently in each mode (text and page modes).

4. When pitch N is specified to the right:

   $nL + nH$ x 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:

   $nL + nH$ x 256 = 65536 - N

5. The print starting position moves from the current position to [N x horizontal or vertical motion unit].

CODES (HEX/CONTROL): <1B> <61> <n> / {ESC} a *n*
NAME: Select justification
FUNCTION: Aligns all the data in one line
RANGE: $0 \leq n \leq 2$, $48 \leq n \leq 50$
EXPLANATION:

1. The parameter *n* specifies select justification as below:

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

2. The command enabled only when processed at the beginning of the line in text mode.

3. If this command is input in page mode, the printer performs only internal flag operations.

4. This command has no effect in page mode.

5. This command executes justification in the printing area.

Left justification	Centering	Right justification
ABC	ABC	ABC
ABCD	ABCD	ABCD
ABCDE	ABCDE	ABCDE

CODES (HEX/CONTROL)**: <1B> <63> <33> <*n*> / {ESC} c 3 *n***
NAME: Select paper sensor(s) to output paper end signals
FUNCTION: Selects the paper sensor(s) to output paper end signals
RANGE: $0 \leq n \leq 255$
EXPLANATION:

1. 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 out sensor disabled
	On	04	4	Paper out sensor enabled
3	Off	00	0	Paper out sensor disabled
	On	08	8	Paper out sensor enabled
4-7	-	-	-	Undefined

2. 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.

3. The command is available only with a parallel interface and is ignored with a serial interface.

4. Sensor is switched when executing this command the paper end signal switching be delayed depending on the receive buffer state.

5. 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.

6. When all the sensors are disabled, the paper end signal always outputs a paper present status.

CODES (HEX/CONTROL): <1B> <63> <34> <n> / {ESC} c 4 n
NAME: Select paper sensor(s) to stop printing
FUNCTION: Select paper sensor(s) used to stop printing
RANGE: $0 \le n \le 255$
EXPLANATION:

1. 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 out sensor disabled
	On	02	2	Paper out sensor enabled
2-7	-	-	-	Undefined

2. When a paper sensor is enabled with this command, printing is stopped only when the corresponding paper is selected for printing.

3. When a paper-out is detected by the paper roll sensor, the printer goes off-line after printing stops.

4. When either bit 0 or 1 is on, the printer selects the paper roll near-end sensor for the paper sensor to stop printing.

CODES (HEX/CONTROL): <1B> <63> <35> <n> / {ESC} c 5 n
NAME: Enable/disable panel buttons
FUNCTION: Enables or disables the panel buttons
RANGE: $0 \le n \le 255$
EXPLANATION:

1. This command n specifies panel buttons as below:

    $n = 0$ Panel buttons are enabled.

    $n = 1$ Panel buttons are disabled.

2. Only the lowest bit of n is valid.

3. When the panel buttons are disabled, the panel buttons does not works when the

printer cover is closed.

4. In this printer, the panel buttons are the FEED button.

5. In the macro ready mode, the FEED button works regardless of the settings of this command; however, the paper cannot be fed by using these buttons.

CODES (HEX/CONTROL): <1B> <64> <n> / {ESC} d n
NAME: Print and feed n lines
FUNCTION: Prints the data in the print buffer and feeds n lines
RANGE: $0 \le n \le 255$
EXPLANATION:

1. This command sets the print starting position to the beginning of the line.

2. The paper will feed n lines according to line spacing value set by {ESC} 2 or {ESC} 3.

3. This command does not affect the line spacing set by {ESC} 2 or {ESC} 3.

CODES (HEX/CONTROL): <1B> <70> <m> <t1> <t2> / {ESC} p m $t1$ $t2$
NAME: Generate pulse
FUNCTION: Outputs the pulse specified
RANGE: m = 0, 1, 48, 49 $0 \le t1 \le 255, 0 \le t2 \le 255$
EXPLANATION:

1. The parameter $t1$ and $t2$ specifies generate pulse as below:

m	Connector pin
0, 48	Drawer kick-out connector pin 2
1, 49	Drawer kick-out connector pin 5

2. The pulse ON time is [$t1$ x 2ms] and the OFF time is [$t2$ x 2ms]

3. If $t2 < t1$, the OFF time is [$t1$ x 2ms]

CODES (HEX/CONTROL): **<1B> <74> *<n>* / {ESC} t *n***
NAME: Select character code table
FUNCTION: Select character code table
RANGE: *n* = 0 ~ 5, 17, 19, 255
EXPLANATION:

1. Selects a page *n* from the character code table:

n	Hex	Page
0	00	0 [PC437 (U.S.A., Standard Europe)]
1	01	1 [katakana]
2	02	2 [PC850 (Multilingual)]
3	03	3 [PC860 (Portuguese)]
4	04	4 [PC863 (Canadian-French)]
5	05	5 [PC865 (Nordic)]
17	11	17 [PC 866 (Cyrillic #2) included in standard & Russian models]
19	13	19 [PC858 (EURO)]
255	FF	255 [PC869 (Greek) included in Greek model only]
255	FF	255 [Thai included in Thai model only]

2. The select character code is cleared when:

    ● {ESC} @ is executed.
    ● {FS} q is executed.
    ● The printer is reset or the power is turned off.

CODES (HEX/CONTROL): **<1B> <7B> *<n>* / {ESC} { *n***
NAME: Turns on/off upside-down printing mode
FUNCTION: Turns upside-down printing mode on or off
RANGE: $0 \le n \le 255$
EXPLANATION:

1. The parameter *n* specifies upside-down printing as below:

    n = 0 upside-down printing mode is turned off.

    n = 1 upside-down printing mode is turned on.

2. Only the lowest bit of *n* is valid.

3. This command is enabled only when processed at the beginning of a line in text mode.

4. When this command is input in page mode, the printer performs only internal flag operations.

5. This command does not affect printing in page mode.

6. In upside-down printing mode, the printer rotates the line to be printed by $180°$ and then prints it.

Paper feed direction
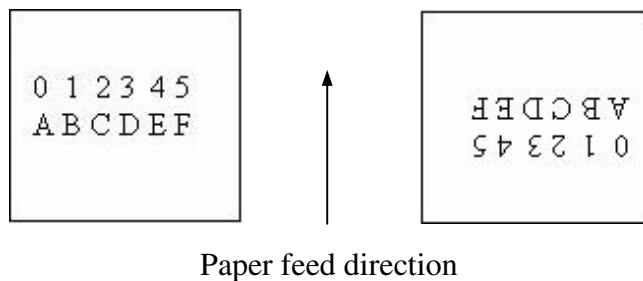
CODES (HEX/CONTROL): **<1C> <70> <n> <m> / {FS} p *n* *m***
NAME: Print NV bit image
FUNCTION: Prints NV bit image
RANGE: $1 \le n \le 255$ $0 \le m \le 3$ $48 \le m \le 51$
EXPLANATION:

1. The parameter *n* specifies which NV bit image to print using the mode as below:

m	Mode	Vertical dot density (DPI)	Horizontal dot density (DPI)
0, 48	Normal	180	180
1, 49	Double-width	180	90
2, 50	Double-height	90	180
3, 51	Quadruple	90	90

n is the number of the NV bit image (defined using the {FS} q command), if *n* out of the range this command is ignored.

m Specifies the bit image mode, if *m* out of the range this command is not available.

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

3. This command is not effective when the specified NV bit image has not been defined.

4. In text mode, this command is effective only when there is no data in the print buffer.

5. In page mode, this command is not effective.

CODES (HEX/CONTROL): **<1C> <71> <n> [<xL> <xH> <yL> <yH> <d1> …<d$_k$>]$_l$ … [<xL> <xH> <yL> <yH> <d1> …<d$_k$>]$_n$ / {FS} q n [xL xH yL yH d1 … d$_k$]$_l$ … [xL xH yL yH d1 … d$_k$]$_n$**

NAME: Define NV bit image

FUNCTION: Define the NV bit image

RANGE: $1 \le n \le 255$ $0 \le d \le 255$

$0 \le xL \le 255$ $0 \le xH \le 3$ $1 \le (xL + xH \text{ x } 256) \le 1023$

$0 \le yL \le 255$ $0 \le yH \le 1$ $1 \le (yL + yH \text{ x } 256) \le 288$

$k = (xL + xH \text{ x } 256) \text{ x } (yL + yH \text{ x } 256) \text{ x } 8$

Total defined data area = 2M bits (256K bytes)

EXPLANATION:

1. The parameter n specifies number of NV bit images defined.

   xL, xH specifies [*xL* + *xH* x 256] x 8 dots in the horizontal direction for the NV bit image you are defining.

   yL, yH specifies [y*L* + y*H* x 256] x 8 dots in the vertical direction for the NV bit image you are defining.

2. This command works only when processed at the beginning of a line in text mode.

3. In page mode, this command does not work. The data received are treated as normal data to print.

4. Frequent redefining NV bit image may cause damage in the NV memory. Therefore, it is recommended to write the NV memory less than 10 times a day.

5. This command cancels all NV bit images that have already been defined by this

command. The printer cannot redefine only part of definitions previously defined. In this case, all data needs to be sent again.

6. Example:

To define image #1 and image #2 as

 and
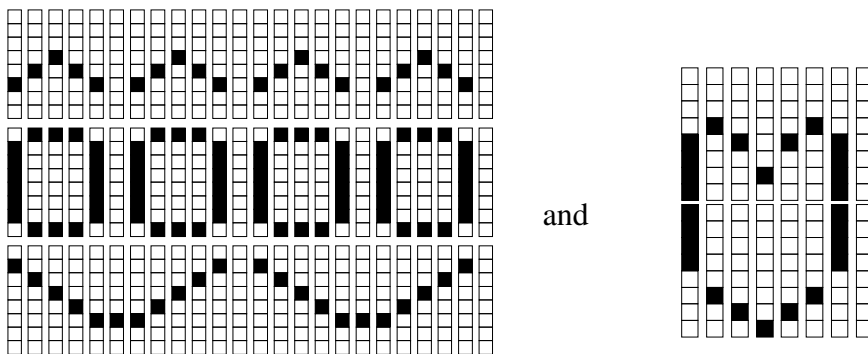
The whole command would be (in hexadecimal):

1C 71 02 03 00 03 00 04 7E 40 08 81 20 10 81 10 08 81 08 04 7E 04 00 00 04 04 7E 04 08 81 08 10 81 10 08 81 20 04 7E 40 00 00 00 04 7E 40 08 81 20 10 81 10 08 81 08 04 7E 04 00 00 04 04 7E 04 08 81 08 10 81 10 08 81 20 04 7E 40 00 00 00 01 00 02 00 0F F0 10 04 08 02 02 01 08 02 10 04 0F F0 00 00

CODES (HEX/CONTROL): <1D> <21> <n> / {GS} ! n
NAME: Select character size
FUNCTION: Select character size
RANGE: $0 \leq n \leq 255$
EXPLANATION:

1. Select the character height using the Low Nibble (bit 0~3) and select the character width using the High Nibble (bit 4~7) of n, as follows:

Character width selection			Character height selection		
High Nibble (bit 0~3)			Low Nibble (bit 4~7)		
Hex	Decimal	Width Amplification	Hex	Decimal	Height Amplification
00	0	1 (normal)	00	0	1 (normal)
10	16	2 (double-width)	01	1	2 (double-height)
20	32	3	02	2	3

30	48	4		03	3	4
40	64	5		04	4	5
50	80	6		05	5	6
60	96	7		06	6	7
70	112	8		07	7	8

2. If *n* is outside of the defined range (either bit 3 or bit 7 = 1), this command is ignored.

3. This command is all characters effective except for HRI characters.

4. This command is not effective on output of commands {ESC} *, {FS} p, {FS} q, {GS} *, {GS} /

5. When characters are enlarged with different sizes on one line, all the characters on the line are aligned at the baseline.

CODES (HEX/CONTROL): <1D> <24> <*nL*> <*nH*> / {GS} $ *nL nH*
NAME: Set absolute vertical print position in page mode
FUNCTION: Sets the absolute vertical print starting position in page mode
RANGE: $0 \le nL \le 255, 0 \le nH \le 255$
EXPLANATION:

1. The command sets the absolute print position to [(nL + nH x 256) x (vertical or horizontal motion unit in inches)].

2. If the [(nL + nH x 256) x (vertical or horizontal motion unit)] exceeds the specified printing area, this command is ignored.

3. This command is effective only in page mode.

4. The reference starting position is that specified by {ESC} T.

5. This command operates as follows, depending on the starting position of the printing area specified by {ESC} T:

● When the starting position is set to the upper left or lower right, this command sets the absolute position in the vertical direction.

● When the starting position is set to the upper right or lower left, this command

sets the absolute position in the horizontal direction.

CODES (HEX/CONTROL): **<1D> <2A> <x> <y> <d$_1$> … <d$_{(<x> x <y> x}$$_{8)}$> / {FS} & x y d$_1$ … d$_{(x\ x\ y\ x\ 8)}$**

NAME: Define downloaded bit image

FUNCTION: Defines a downloaded bit image

RANGE: $01 \le x \le 255$ $01 \le y \le 48$ x x $y \le 1536$ $0 \le d \le 255$

EXPLANATION:

1. This command using the number of dots specified by x and y

   x specifies the number of dots in the horizontal direction.

   y specifies the number of dots in the vertical direction.

2. The number of dots in the horizontal direction is x x 8, in the vertical direction it is y x 8.

3. If x x y is out of the specified range, this command is disabled and printing data as normal.

4. The d indicates bit-image data d specifies a bit printed to 1 and not printed to 0.

5. The downloaded bit image definition is cleared when:
   - {ESC} @ is executed.
   - {ESC} & is executed.
   - {FS} q is executed.
   - Printed is rest or the power is turned off.

6. Example: To define an downloaded bit image as

   The whole command would be (in hexadecimal):

   1D 2A 01 02 0F F0 10 04 08 02 02 01 08 02 10 04 0F F0 00 00
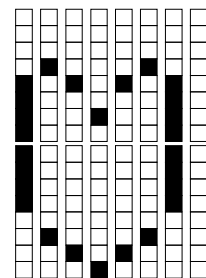
CODES (HEX/CONTROL): **<1D> <2F> <m> / {GS} / m**

NAME: Print downloaded bit image

FUNCTION: **Prints a downloaded bit image**

RANGE: $0 \leq m \leq 3$ $48 \leq m \leq 51$

EXPLANATION:

1. The parameter *m* specifies print downloaded bit image as below:

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

2. This command is ignored if a downloaded bit image has not been defined.

3. In text mode, this command is effective only when there is no data in the print buffer.

4. This command has no effect in the print modes (emphasized, double-strike, underline, character size, or white/black reverse printing), except for upside-down printing mode.

5. If the downloaded bit-image to be printed exceeds the printable area, the excess data is not printed.

CODES (HEX/CONTROL): **<1D> <3A> / {GS} :**

NAME: Start/end macro definition

FUNCTION: **starts or ends macro definition**

EXPLANATION:

1. This command does not effectively in page mode.

2. Macro definition starts when this command is received during normal operation Macro definition ends when this command is received during macro definition.

3. When settings received during macro definition it should remains the same after this command.

4. When {GS} ^ is received during macro definition, the printer ends macro definition and clears the definition and received data as normal.

5. Macro will be clears when the printer power is turned off.

6. The defined contents of the macro are not cleared by {ESC} @. Therefore, {ESC}

@ can be included in the contents of the macro definition.

7. If the printer receives {GS} : again immediately after previously receiving {GS} : the printer remains in the macro undefined state.

CODES (HEX/CONTROL): <1D> <42> <*n*> / {GS} B *n*
NAME: Turn white/black reverse printing mode
FUNCTION: Turns on or off white/black reverse printing mode
RANGE: $0 \le n \le 255$
EXPLANATION:

1. This command specifies by *n* as follows:
   When the LSB of *n* is 0, white/black reverse mode is turned off.
   When the LSB of *n* is 1, white/black reverse mode is turned on.

2. Only the lowest bit of *n* is valid.

3. This command is available for built-characters and user-defined characters.

4. When white/black reverse printing mode is on, it also applied to character spacing set by {ESC} SP.

5. This command does not affect bit image, user-defined bit image, bar code, HRI characters, and spacing skipped by {HT}, {ESC} $, and {ESC} \

6. This command does not affect the space between lines.

7. 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.

CODES (HEX/CONTROL): <1D> <48> <*n*> / {GS} H *n*
NAME: Select printing position for HRI characters
FUNCTION: Selects the printing position of HRI characters when printing a bar code
RANGE: $0 \le n \le 3, 48 \le n \le 51$

EXPLANATION:

1. This command specifies by *n* selects the HRI characters 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

2. HRI represents Human Readable Interpretation.

3. HRI characters are printed using the font specified by {GS} f.

CODES (HEX/CONTROL): <1D> <49> <*n*> / {GS} I *n*
NAME: Transmit printer ID
FUNCTION: Transmits the printer ID
RANGE: $1 \le n \le 3, 49 \le n \le 51$
EXPLANATION:

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

n	Printer ID	Specification	ID (hexadecimal)
1, 49	Printer model ID	PP6000 series	20
2, 50	Type ID	See table below	
3, 51	ROM version ID	Depends on ROM version	

n = 2, Type ID

Bit	Off/on	Hex	Decimal	Function
0	Off	00	0	Two-byte character code not supported
	On	01	1	Two-byte character code supported
1	On	02	2	Auto-cutter equipped
2	Off	00	0	No direct connection with customer display
3	Off	00	0	No MICR reader
4	Off	00	0	Not used. Fixed to off
5	-	-	-	Undefined

| 6 | - | - | - | Undefined |
| 7 | Off | 00 | 0 | Not used. Fixed to off |

2. The printer ID is transmitted when the data in the receive buffer is processed Therefore, there may be a time lag between receiving this command and transmitting the status, depending on the receive buffer status

3. When Auto Status Back (ASB) is enabled using the {GS} a command, the status transmitted by {GS} I and the ASB status must be differentiated.

CODES (HEX/CONTROL): <1D> <4C> <nL> <nH> / {GS} L *nL nH*
NAME: Set left margin
FUNCTION: Sets the left margin in text mode
RANGE: $0 \le nL \le 255$ $0 \le nH \le 255$
EXPLANATION:

1. Sets the margin using *nL* and *nH*. The left margin is set to [(*nL* + *nH* x 256) x horizontal motion unit in inches]

Printable area

Left margin   Printing area width
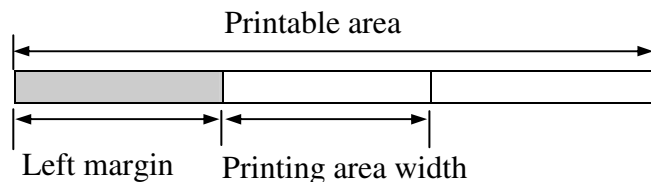
2. This command is effective only processed at the beginning of the line in text mode.

3. This command does not affect in page mode.

4. If the setting exceeds the printable area, the maximum value of the printable area is used.

5. The width of the printing area is extended to the right to accommodate the amount of data. But the printing area does not provide sufficient width for the data, the left margin is reduced to accommodate the data.

CODES (HEX/CONTROL): <1D> <50> <x> <y> / {GS} P *x y*
NAME: Set horizontal and vertical motion units

FUNCTION: Set horizontal and vertical motion units
RANGE: $0 \leq x \leq 255 \qquad 0 \leq y \leq 255$
EXPLANATION:

1. The horizontal direction is perpendicular to the paper feed direction and the vertical direction is the paper feed direction.

2. In text mode, the following commands use x or y, regardless of character rotation (upside-down or 90° clockwise rotation)

3. In page mode, the following command use x or y, depending on character orientation:

   ● When 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)

   ● When 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)

4. The command does not affect the previously specified values.

CODES (HEX/CONTROL):
1. <1D> <56> <m> / {GS} V m
2. <1D> <56> <m> <n> / {GS} V m n
NAME: Select cut mode and cut paper
FUNCTION: Selects a mode for cutting paper and executes paper cutting
RANGE: 1. $m = 1, 49$
          2. $m = 66, 0 \leq n \leq 255$
EXPLANATION:

1. The value of m selects the mode as follows:

m	Print mode
0, 1, 49	Partial cut (one point left uncut)
66	Feeds paper (cutting position +(n x (vertical motion unit)), and cuts the paper partially (one point left (center) uncut)

2. The printer executes this command upon receiving it.

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

[Notes for using command 2]

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

5. When $n \neq 0$, the printer feeds the paper to [cutting position + (n x vertical motion unit)] and cuts it.

CODES (HEX/CONTROL): <1D> <57> <nL> <nH> / {GS} W *nL nH*
NAME: Set printing area width
FUNCTION: Sets the printing area width in text mode
RANGE: $0 \leq nL \leq 255 \quad 0 \leq nH \leq 255$
EXPLANATION:

1. This command sets the printing area width by nL and nH. The printing area width is set to [($nL + nH$ x 256) x horizontal motion unit in inches].

Printable area

Left margin   Printing area width
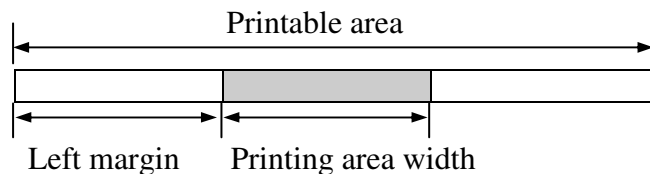
2. This command is effective only when at the beginning of the line.

3. This command is effective only in text mode.

4. If the [left margin + printing area width] exceeds the printable area, [printable area width - left margin] is used.

5. If the width set for the printing area is less than the width of one character, when the character data is to be printed, the following approaches are observed:

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

Printable area

One character width

Left margin   Extend to right edge of one character

Printing area width according to nL and nH
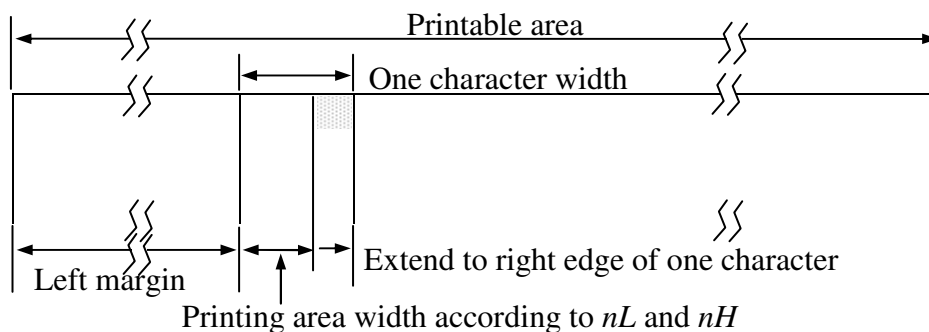
● If the printing area width cannot be sufficiently extended within right edge of printable area, the left margin is reduced to accommodate one character.

Printing area width according to *nL* and *nH*
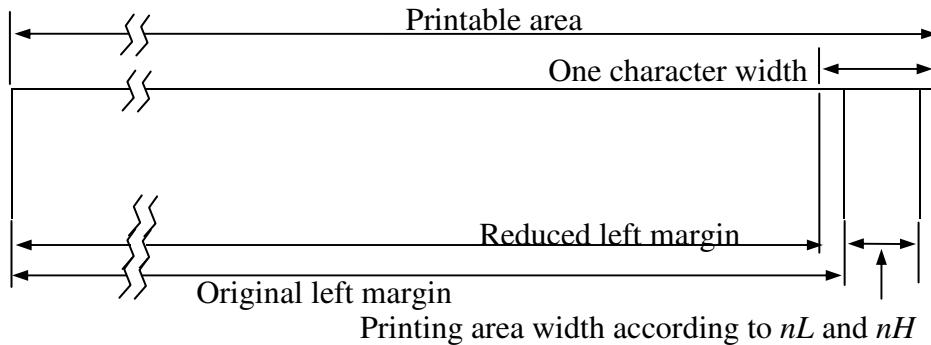
6. If the width set for the printing area is less than width of the image to print, the following processing is performed only on the line in question when a bit image data (e.g., bit image, user-defined bit image) is to be printed.
   1. The printing area width is extended to the right to accommodate the full width of the bit image within the printable area.
   2. If the printing area width cannot be sufficiently extended within the right edge of the printable area, the left margin is reduced to accommodate the full width of the bit image.

CODES (HEX/CONTROL): <1D> <5C> <nL> <nH> / {GS} \ *nL nH*
NAME: Set relative vertical print position in page mode
FUNCTION: Sets the relative vertical print starting position from the current position in page mode
RANGE: $0 \leq nL \leq 255$ $0 \leq nH \leq 255$
EXPLANATION:
1. This command sets the distance from the current position to [(nL + nH x 256) x vertical or horizontal motion unit in inches].
2. This command effective only in page mode.
3. 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:

$nL + nH$ x 256 = 65536 - N

4. Any setting that exceeds the specified printing area is ignored.

5. This command function as follows, depending on the print starting position set by {ESC} T:

   ● When the starting position is set to the upper left or lower right of the printing, the vertical motion unit y is used.

   ● When the starting position is set to the upper right or lower of the printing area, the horizontal motion unit x is used.

CODES (HEX/CONTROL): <1D> <5E> < r> < t> <m> / {GS} ^ r t m
NAME: Execute macro
FUNCTION: Executes macro
RANGE: $0 \leq r \leq 255$ $0 \leq t \leq 255$ m = 0, 1
EXPLANATION:

1. The parameters r specifies the number of time 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.

2. The waiting time is t x 100 ms for every macro execution.

3. If this command is received while a macro is being defined, the macro definition is aborted and the definition is cleared.

4. If the macro is not defined or if r is 0,nothing is executed.

5. When the macro is executed [*m* = 1], paper always cannot be fed by using the FEED button.

CODES (HEX/CONTROL): <1D> <61> <*n*> / {GS} a *n*
NAME: Enable/Disable Automatic Status Back (ASB)
FUNCTION: Enables or disables ASB
RANGE: $0 \leq n \leq 255$
EXPLANATION:

1. The parameter *n* specifies the status items 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 disabled.
3	Off	00	0	Paper roll sensor status disabled.
	On	08	8	Paper roll sensor status enabled.
4-7	-	-	-	Undefined.

2. The printer transmits the status when this command is executed. If any of the status items in the table above is enabled, the printer automatically transmits the status whenever the status of enabled item changes. The printer won't respond to change of status of disabled items. However, change of status of the disabled items is also transmitted when the enabled items change.

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

4. 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.

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

6. 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 when the XOFF code is received.

7. The status to be transmitted are as follows:

First bytes (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

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 out sensor: paper present
	On	0C	12	Paper out 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

CODES (HEX/CONTROL): <1D> <62> <*n*> / {GS} b *n*
NAME: Turns smoothing mode on/off
FUNCTION: Turns smoothing mode on or off
RANGE: $0 \le n \le 255$
EXPLANATION:

1. The parameter *n* specifies smoothing mode on or off as follows:

   When the LSB of *n* is 0, smoothing mode is turned off.

   When the LSB of *n* is 1, smoothing mode is turned on.

2. Only the lowest bit of *n* is valid.

3. Smoothing mode is available for built-in, user-defined characters.

4. Even if smoothing mode is turned on, smoothing is not performed when either of character width or character height is the normal size.

CODES (HEX/CONTROL): **<1D> <66> <*n*> / {GS} f *n***

NAME: Select font for Human Readable Interpretation (HRI) characters

FUNCTION: Selects font for the HRI characters when printing a bar code

RANGE: *n* = 0, 1, 48, 49

EXPLANATION:

1. The parameter *n* specifies selects a font as following table:

n	Font
0, 48	Font A (12 x 24)
1, 49	Font B (8 x 16)

2. HRI indicates Human Readable Interpretation.

3. HRI characters are printed at the position specified by {GS} H.

4. This command can't effective set by {ESC} M.

CODES (HEX/CONTROL): **<1D> <68> <*n*> / {GS} h *n***

NAME: Select bar code height

FUNCTION: Selects the height of the bar code

RANGE: $1 \leq n \leq 255$

EXPLANATION:

1. This parameter *n* specifies the number of dots in the vertical direction.

2. {GS} ! Command can't effective the bar code height.

CODES (HEX/CONTROL):

1. **<1D> <6B> <m> <d1> … <dk> <00> / {GS} k m d1 … dk {NUL}**

2. **<1D> <6B> <m> <n> <d1> … <dn> / {GS} k m n d1 … dn**

NAME: Print bar code

FUNCTION: Print bar code

RANGE: 1. $0 \leq m \leq 6$ (k and d depends on the bar code system used)

         2. $65 \leq m \leq 73$ (n and d depends on the bar code system used)

EXPLANATION:

The parameter m specifies a bar code system selected to print as below:

Group	m	Bar code System	Number of data	Acceptable values of d's
1	0	UPC-A	$11 \leq k \leq 12$	48 ~ 57
	1	UPC-E	$11 \leq k \leq 12$	48 ~ 57
	2	JAN13 (EAN13)	$12 \leq k \leq 13$	48 ~ 57
	3	JAN 8 (EAN8)	$7 \leq k \leq 8$	48 ~ 57
	4	CODE39	$1 \leq k$	32, 36, 37, 43, 45 ~ 57, 65 ~ 90
	5	ITF	$2 \leq k$ (even number)	48 ~ 57
	6	CODABAR	$1 \leq k$	36, 43, 45 ~ 58, 65 ~ 68
2	65	UPC-A	$11 \leq n \leq 12$	48 ~ 57
	66	UPC-E	$11 \leq n \leq 12$	48 ~ 57
	67	JAN13 (EAN13)	$12 \leq n \leq 13$	48 ~ 57
	68	JAN8 (EAN8)	$7 \leq n \leq 8$	48 ~ 57
	69	CODE39	$1 \leq n \leq 255$	32, 36, 37, 43, 45 ~ 57, 65 ~ 90 $d1 = dk = 42(1)$
	70	IFT	$1 \leq n \leq 255$ (Even number)	48 ~ 57
	71	CODEABAR	$1 \leq n \leq 255$	36, 43, 45 ~ 58, 65 ~ 68
	72	CODE93	$01 \leq n \leq 255$	0 ~ 127
	73	CODE128	$02 \leq n \leq 255$	0 ~ 127

[Notes in text mode]

1. If n and k go out of the specified range, the printer just ignores this command and only processes the following data as normal data.

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

3. These commands {ESC}-, {ESC} 2, {ESC} 3, {ESC} E, {ESC} G, {ESC} M, {ESC} V, {GS}!, {GS} B become ineffective when this command is in effect.

4. If bar code width exceeds the printing area, this command is ignored.

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

   [Notes in page mode]

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

2. If *d* is out of the specified range, the printer stops command processing and processes the following data as normal data. In this case the data buffer position does not change.

3. If bar code width exceeds the printing area, this command is ignored.

   [Notes for using command format group 1]

1. This command ends with a {NUL} code.

2. 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. If the printer only receiving 11 bytes bar data that last print code data is check sum namely receiving 12 bytes no check sum.

3. When the bar code system used is JAN13 (EAN13), the printer prints the bar code after receiving 13 bytes bar code data and processes the following data as normal data. If the printer only receiving 12 bytes bar data that last print code data is check sum namely receiving 13 bytes no check sum.

4. When the bar code system used is JAN8 (EAN8), the printer prints the bar code after receiving 8 bytes bar code data and processes the following data as normal data. If the printer only receiving 7 bytes bar data that last print code data is check sum namely receiving 8 bytes no check sum.

5. The number of data for IFT bar code must be even numbers when an odd number of data is input, the printer ignores the last received data.

   [Notes for using command format group 2]

1. *n* indicates the number of bar code data, and the printer processes *n* bytes from the

next character data as bar code data. There is no need for the ending {NUL} code.

2. If *n* is out of the specified range, the printer stops command processing and processes the following data as normal data.

When CODE93 [*m* = 72] is used:

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

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

3. The printer prints HRI characters (■ + an alphabetic character) as a control character (<00>h to <1F> 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	BNAK	15	21	■ U
ACK	06	6	■ F	SYN	16	22	■ V
BEL	07	7	■ G	ETB	17	23	■ W
BS	08	8	■ H	CAN	18	24	■ X
HT	09	9	■ I	EM	19	25	■ Y
LF	0A	10	■ J	SUB	1A	26	■ Z
VT	0B	11	■K	ESC	1B	27	■A
FF	0C	12	■ L	FS	1C	28	■ B
CR	0D	13	■ M	GS	1D	29	■ C
SO	0E	14	■ N	RS	1E	30	■ D
SI	0F	15	■ O	US	1F	31	■ E
				DEL	7F	127	■ T

4. Example: To print bar code as "☐Code■M93☐" in Code93 format,

the whole command would be (in hexadecimal):

1D 6B 48 07 43 6F 64 65 0D 39 33

When CODE128 [*m* = 73] is used:

1. Refer to Appendix for the information of the CODE 128 bar code and its code tables.

2. When using the CODE 128 in this printer, take the following points into account for data transmission:
   - The beginning of the bar code data string must be code set selection character (any of CODE A, CODE B or CODE C) which selects the code set to print.
   - 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

3. Example: To print bar code " 345678"
   The whole command would be (in hexadecimal):
   1D 6B 49 05 7B 43 22 38 4E

4. If the bar code data string does start with a code set selection character, the printer stops command processing and processes the following data as normal data.

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

6. If the printer receives characters that cannot be used in the specific code set, the

printer stops command processing and processes the following data as normal data

7. The printer does not print HRI characters that correspond to the function / shift /control characters or code set selection characters.

CODES (HEX/CONTROL): <1D> <72> <n> / {GS} r *n*
NAME: Transmit status
FUNCTION: Transmits the printer status
RANGE: *n* =1, 2, 49, 50
EXPLANATION:

1. Transmits the status specified by *n* as follows:

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

2. 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.

3. 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.

4. 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 out sensor: paper adequate.
	On	0C	12	Paper out sensor: paper out.
4	Off	00	0	Not used Fixed to Off.
5, 6	-	-	-	Undefined.
7	Off	00	0	Not used Fixed to Off.

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.

CODES (HEX/CONTROL): <1D> <76> <30> <m> <xL> <xH> <yL> <yH> [<d1>…<dk>] / {GS} v 0 m xL xH yL yH [d1 … dk]

NAME: Print raster bit image
FUNCTION: Selects Raster bit image mode
RANGE: $m = 0 \sim 3, 48 \sim 51$ $xL, xH, yL, yH, d = 0 \sim 255$

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

EXPLANATION:

1. The parameter *m* specifies print raster bit image as 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	90 DPI	90 DPI

2. *xL, xH*, select the number of data bytes [*xL* + *xH* x 256] in the horizontal direction

for the bit image.

3. *yL, yH*, select the number of data bits [*yL* + *yH* x 256] x 8 in the vertical direction for the bit image.

4. In text mode, this command is effective only when there is no data in the print buffer.

5. Data outside the printing area is read in and discarded on a dot-by-dot basis.

6. This command has no effect in all print modes set by commands {ESC} SP, {ESC} -, ESC E, {ESC} G, {ESC} M, {ESC} V, {GS}!, {GS} B

7. If the printing area width set by {GS} L and {GS} W is less than one dot for single width bit image or two dots for double width bit image, the printing area is extended to that minimum width only on the line in question.

(Example)   When *xL* + *xH* x 256= 64

$\leftarrow$ [*xL* + *xH* x 256] x 8 = 512 dots $\longrightarrow$

1	2	3	… …	62	63	64
65	66	67	… …	126	127	128
			… …			
			… …	k-2	k-1	k

yL + y*H* x 256 dots

| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

MSB   LSB
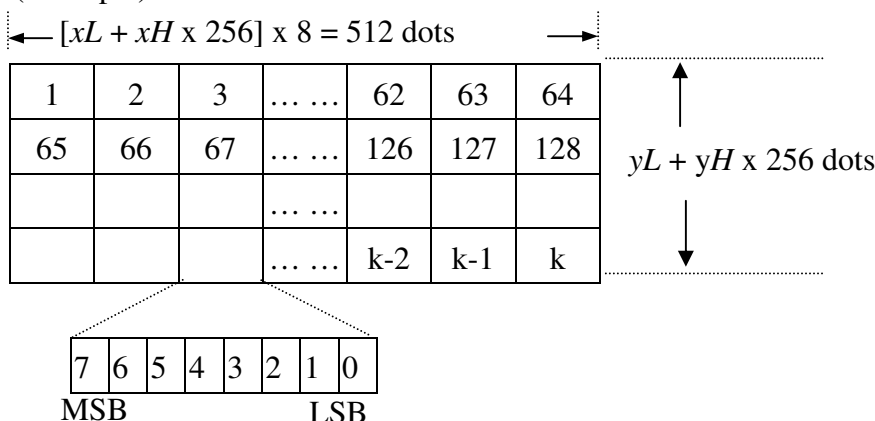
CODES (HEX/CONTROL): <1D> <77> <*n*> / {GS} w *n*
NAME: Set bar code width
FUNCTION: Set the horizontal size of the bar code
RANGE: $2 \le n \le 6$
EXPLANATION:

1. The number *n* specifies the bar code width as follows:

n	Module width (mm) for multi-level bar code	Binary-level bar code (mm)	
		Thin element width	Thick element width

02	0.251	0.251	0.628
03	0.376	0.376	1.004
04	0.501	0.501	1.411
05	0.628	0.628	1.630
06	0.752	0.753	2.007

2. Multi-level bar codes include follows:

   UPC-A, UPC-E, JAN13 (EAN13), JAN8 (EAN8), CODE93, CODE128

3. Binary-level bar codes include follows:

   CODE39, ITF, CODABAR

POSIFLEX

APPENDIX: CODE 128 BAR CODE

Description of the CODE 128 Bar Code

In CODE 128 bar code system, it is possible to represent 128 ASCII characters and 2-digit numerals using one bar code character that is defined by combining one of the 103 bar code characters and 3 code sets. Each code set is used for representing the following characters:

- Code set A: ASCII character 00h to 5Fh
- Code set B: ASCII characters 20h to 7Fh
- Code set C: 2-digit numeral characters using one bar code character (100 numerals from 00 to 99).
- SHIFT characters

  In code set A, the character just after SHIFT is processed as a character for code set B. In code set B, the character just after SHIFT is processed as the character for code set A. SHFIT characters cannot be used in code set C.
- Code set selection character (CODE A, CODE B, CODE C)

  Each character switches code set selection to code set A, B, or C accordingly.
- Function character (FNC1, FNC2, FNC3, FNC4)

  The usage of function characters depends on the application software. In code set C, only FNC1 is available.

Code Tables

Printable characters in code set A

Character	Hex	Decimal	Character	Hex	Decimal	Character	Hex	Decimal
NUL	00	0	(	28	40	P	50	80
SOH	01	1	)	29	41	Q	51	81
STX	02	2	*	2A	42	R	52	82
ETX	03	3	+	2B	43	S	53	83
EOT	04	4	,	2C	44	T	54	84
ENQ	05	5	-	2D	45	U	55	85
ACK	06	6	.	2E	46	V	56	86
BEL	07	7	/	2F	47	W	57	87
BS	08	8	0	30	48	X	58	88
HT	09	9	1	31	49	Y	59	89
LF	0A	10	2	32	50	Z	5A	90
VT	0B	11	3	33	51	[	5B	91
FF	0C	12	4	34	52	\	5C	92
CR	0D	13	5	35	53	]	5D	93
SO	0E	14	6	36	54	^	5E	94
SI	0F	15	7	37	55	_	5F	95
DLE	10	16	8	38	56	FNC1	7B, 31	123,49
DC1	11	17	9	39	57	FNC2	7B, 32	123,50
DC2	12	18	:	3A	58	FNC3	7B, 33	123,51
DC3	13	19	;	3B	59	FNC4	7B, 34	123,52
DC4	14	20	<	3C	60	SHIFT	7B, 53	123,83
NAK	15	21	=	3D	61	CODE B	7B, 42	123,66
SYN	16	22	>	3E	62	CODE C	7B, 43	123,67
ETB	17	23	?	3F	63			
CAN	18	24	@	40	64			
EM	19	25	A	41	65			
SUB	1A	26	B	42	66			
ESC	1B	27	C	43	67			
FS	1C	28	D	44	68			
GS	1D	29	E	45	69			
RS	1E	30	F	46	70			
US	1F	31	G	47	71			
SP	20	32	H	48	72			
!	21	33	I	49	73			
"	22	34	J	4A	74			
#	23	35	K	4B	75			
$	24	36	L	4C	76			
%	25	37	M	4D	77			
&	26	38	N	4E	78			
'	27	39	O	4F	79			

Printable characters in code set B

Character	Hex	Decimal	Character	Hex	Decimal	Character	Hex	Decimal
SP	20	32	H	48	72	p	70	112
!	21	33	I	49	73	q	71	113
"	22	34	J	4A	74	r	72	114
#	33	35	K	4B	75	s	73	115
$	24	36	L	4C	76	t	74	116
%	25	37	M	4D	77	u	75	117
&	26	38	N	4E	78	v	76	118
'	27	39	O	4F	79	w	77	119
(	28	40	P	50	80	x	78	120
)	29	41	Q	51	81	y	79	121
*	2A	42	R	52	82	z	7A	122
+	2B	43	S	53	83	{	7B, 7B	123,123
,	2C	44	T	54	84	|	7C	124
-	2D	45	U	55	85	}	7D	125
.	2E	46	V	56	86	─	7E	126
/	2F	47	W	57	87	DEL	7F	127
0	30	48	X	58	88	FNC1	7B, 31	123,49
1	31	49	Y	59	89	FNC2	7B, 32	123,50
2	32	50	Z	5A	90	FNC3	7B, 33	123,51
3	33	51	[	5B	91	FNC4	7B, 34	123,52
4	34	52	\	5C	92	SHIFT	7B, 53	123,83
5	35	53	]	5D	93	CODE A	7B, 41	123,66
6	36	54	^	5E	94	CODE C	7B, 43	123,67
7	37	55	_	5F	95			
8	38	56	`	60	96			
9	39	57	a	61	97			
:	3A	58	b	62	98			
;	3B	59	c	63	99			
<	3C	60	d	64	100			
=	3D	61	e	65	101			
>	3E	62	f	66	102			
?	3F	63	g	67	103			
@	40	64	h	68	104			
A	41	65	i	69	105			
B	42	66	j	6A	106			
C	43	67	k	6B	107			
D	44	68	l	6C	108			
E	45	69	m	6D	109			
F	46	70	n	6E	110			
G	47	71	o	6F	111			

Printable characters in code set C

Character	Hex	Decimal	Character	Hex	Decimal	Character	Hex	Decimal
00	00	0	40	28	40	80	50	80
01	01	1	41	29	41	81	51	81
02	02	2	42	2A	42	82	52	82
03	03	3	43	2B	43	83	53	83
04	04	4	44	2C	44	84	54	84
05	05	5	45	2D	45	85	55	85
06	06	6	46	2E	46	86	56	86
07	07	7	47	2F	47	87	57	87
08	08	8	48	30	48	88	58	88
09	09	9	49	31	49	89	59	89
10	0A	10	50	32	50	90	5A	90
11	0B	11	51	33	51	91	5B	91
12	0C	12	52	34	52	92	5C	92
13	0D	13	53	35	53	93	5D	93
14	0E	14	54	36	54	94	5E	94
15	0F	15	55	37	55	95	5F	95
16	10	16	56	38	56	96	60	96
17	11	17	57	39	57	97	61	97
18	12	18	58	3A	58	98	62	98
19	13	19	59	3B	59	99	63	99
20	14	20	60	3C	60	FNC1	7B, 31	123,49
21	15	21	61	3D	61	CODE A	7B, 41	123,65
22	16	22	62	3E	62	CODE B	7B, 42	123,66
23	17	23	63	3F	63			
24	18	24	64	40	64			
25	19	25	65	41	65			
26	1A	26	66	42	66			
27	1B	27	67	43	67			
28	1C	28	68	44	68			
29	1D	29	69	45	69			
30	1E	30	70	46	70			
31	1F	31	71	47	71			
32	20	32	72	48	72			
33	21	33	73	49	73			
34	22	34	74	4A	74			
35	23	35	75	4B	75			
36	24	36	76	4C	76			
37	25	37	77	4D	77			
38	26	38	78	4E	78			
39	27	39	79	4F	79			