Printer Command

Command Manual

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1.1. Print Commands.

Woosim Printer supports the following commands for printing character and advancing paper:

Command	Name
LF	Print and line feed
ESC J	Print and feed paper
ESC d	Print and feed **n** lines
FF	Print and return to standard mode (in page mode)
ESC FF	Print data in page mode

LF

[Name]	Print and line feed			
[Format]	ASCII	LF		
	HEX	0A		
	Decimal	10		
[Description]	Print the data in the print buffer and feeds one line based on the current line spacing.			
[Note]	This command sets the print position to the beginning of the line.			
[Reference]	**ESC 2, ESC 3**			
[Application]	All printers			

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** dots.			
[Application]	All printers			

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 (text line).

[Note] 1) This command sets the print starting position to the beginning of the line.

2) This command does not affect the line spacing set by **ESC 2** or **ESC 3**.

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

[Application] All printers

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 collectively and returns to standard mode.

[Note] 1) The buffer data is deleted after being printed.

2) The printing area set by **ESC W** is reset to the default setting.

3) This command sets the print position to the beginning of the line.

4) This command is enabled only in page mode.

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

[Application] All printers

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 printing area collectively.		
[Note]	This command is enabled only in page mode.		
	After printing the printer does not clear the buffered data, setting values for **ESC T** and **ESC W**, and the position for buffering.		
[Reference]	**FF, ESC L, ESC S**		
[Application]	All printers		

1.2. Line Spacing Commands.

Woosim Printer supports the following commands for setting line spacing.

These commands only set the line spacing; they do not actually advance the paper.

The line spacing set using these commands affects the results of **LF** and **ESC d**.

Command	Name
ESC 2	Select default line spacing
ESC 3	Set line spacing

ESC 2

[Name]	Select default line spacing		
[Format]	ASCII	ESC	2
	HEX	1B	32
	Decimal	27	50
[Description]	Selects 30 dots (approximately 3.75mm) spacing.		
[Note]	The line spacing can be set independently in standard mode and in page mode.		
[Reference]	**ESC 3**		
[Application]	All printers		

ESC 3 n

[Name]	Set line spacing			
[Format]	ASCII	ESC	3	n
	HEX	1B	33	n
	Decimal	27	51	n
[Range]	$0 \leq n \leq 255$			
[Description]	Sets the line spacing to **n** dots.			
[Note]	The line spacing can be set independently in standard mode and in page mode.			
[Reference]	**ESC 2**			
[Application]	All printers			

1.3. Character Commands.

Woosim Printer supports the following commands for setting character font and size:

Command	Name
ESC SP	Set right-side character spacing
ESC R	Select an international character set
ESC !	Select print mode
ESC -	Turn underline mode on/off
ESC E	Turn emphasized mode on/off
ESC t	Select character code table
ESC {	Turn upside-down
GS !	Select character size
GS B	Turn white/black reverse printing mode on/off

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** dots.			
[Note]	1) The right side character spacing for double-width mode is twice the normal value. When characters are enlarged, the right side character spacing is also enlarged.			
	2) This command sets values independently in page or standard mode.			
[Default]	n = 0			
[Application]	All printers			

ESC R n

[Name] Select an international character set.

[Format]

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

[Range] $0 \le n \le 10$

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

[Default] n = 0

[Application] All printers

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

ESC t n

[Name] Select character code table.

[Format]

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

[Range] M16C/ARM version : $0 \le n \le 5$, n = 255

RX version : $0 \le n \le 50$, n = 255

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

The alphanumeric characters (20H (decimal 32) to 7FH (decimal 127)) are the same for each page.

The extended characters (80H (decimal 128) to FFH (decimal 255)) are different for each page.

[Note] 1) Character code table can be different by printer version.

2) Reference : http://msdn.microsoft.com/en-us/goglobal/bb964653.aspx

http://en.wikipedia.org/wiki/Code_page

[Default] n = 0 (specially, default can be other)

[Application] All printers

< M16C, ARM Version >

n	Character Code Table	Remark (size)
0	Page 0 [CP437 (USA, Standard Europe)]	12x24 9x24
1	Page 1 [Katakana]	
2	Page 2 [Multilingual CP850]	
3	Page 3 [Portuguese CP860]	
4	Page 4 [ISO8859-15 (Latin9)]	
5	Page 5 [Polish]	
255	DBCS (Double Byte Character System) ** One of them is installed of blank.	Kor(16x24, 24x24) Chn_Big5 (16x16) Chn_GB2312 (16x16) Jpn_Shift JIS (24x24)

< RX Version >

n	Character Code Table	Remark (size)
0	Page 0 USA, Standard Europe [CP437]	12x24 9x24 8x16
1	Page 1 Katakana	
2	Page 2 Multilingual(Latin-1) [CP850]	
3	Page 3Portuguese [CP860]	
4	Page 4 Canadian-French [CP863]	
5	Page 5 Nordic [CP865]	
6	Page 6 Slavic(Latin-2) [CP852]	
7	Page 7 Turkish [CP857]	
8	Page 8 Greek [CP737]	
9	Page 9 Russian(Cyrillic) [CP866]	
10	Page 10 Hebrew [CP862]	
11	Page 11 Baltic [CP775]	
12	Page 12 Polish	

n	Character Code Table	Remark (size)
13	Page 13 Latin-9 [ISO8859-15]	12x24 9x24 8x16
14	Page 14 Latin1[Win1252]	
15	Page 15 Multilingual Latin I + Euro[CP858]	
16	Page 16 Russian(Cyrillic)[CP855]	
17	Page 17 Russian(Cyrillic)[Win1251]	
18	Page 18 Central Europe[Win1250]	
19	Page 19 Greek[Win1253]	
20	Page 20 Turkish[Win1254]	
21	Page 21 Hebrew[Win1255]	
22	Page 22 Vietnam[Win1258]	
23	Page 23 Baltic[Win1257]	
24	Page 24 Azerbaijani	
25 ~ 29	Reserved	
30	Thai[CP874]	12x24 9x24 (same as Page 0) 8x16 (same as Page 0)
31 ~ 39	Reserved	
40	Page 25 Arabic [CP720]	16x24 9x24 (same as Page 0) 8x16 (same as Page 0)
41	Page 26 Arabic [Win 1256]	
42	Page 27 Arabic (Farsi)	
43	Page 28 Arabic presentation forms B	
44 ~ 49	Reserved	
50	Page 29 Hindi_Devanagari	16x24 9x24 (same asPage 0) 8x16 (same asPage 0)
255	DBCS (Double Byte Character System) ** One of them is installed of blank.	Kor(16x24, 24x24) Chn_Big5 (24x24) Chn_GB18030 (24x24) Jpn_Shift JIS (24x24)

ESC ! n

[Name] Select print mode.

[Format]

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

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

[Description] Select print mode(s) using n as follows.

[Note]

1) When both double-height and double-width modes are selected, quadruple size characters are printed.
2) The printer can underline all characters, but can not underline the space set By **HT**.
3) The thickness of the underline is that selected by **ESC -**, regardless of the character size.
4) When some characters in a line are double or mode height, all the characters on the line are aligned at the baseline.
5) **ESC -** can also turn on or off underline mode. However, the setting of the last received command is effective.
6) **GS !** can also select character size. However, the setting of the last received command is effective.

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

[Application] All printers

Bit	Binary	Hex	Function
0 ~ 2	xxxx x000	00	Character font A (12 x 24)
	xxxx x001	01	Character font B (9 x 24)
	xxxx x010	02	Character font C (8 x 16) : RX Only
	xxxx x011	03	Reserved
	xxxx x100	04	Reserved
	xxxx x101	05	Reserved
	xxxx x110	06	Reserved
	xxxx x111	07	Reserved
3	xxxx 0xxx	00	Emphasized mode not selected
	xxxx 1xxx	08	Emphasized mode selected
4	xxx0 xxxx	00	Double-height mode not selected
	xxx1 xxxx	10	Double-height mode selected
5	xx0x xxxx	00	Double-width mode not selected
	xx1x xxxx	20	Double-width mode selected
6	x0xx xxxx	00	Reserved
	x1xx xxxx	40	Reserved
7	0xxx xxxx	00	Underline mode not selected
	1xxx xxxx	80	Underline mode selected

ESC - n

[Name] Turn underline mode on/off

[Format]

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

[Range] $0 \le n \le 2$

$48 \le n \le 50$

[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 dot thick)

[Notes]

1) The printer can underline all characters (including right-side character spacing), but cannot underline the space set by **HT**.
2) The printer cannot underline white/black inverted characters.
3) When underline mode is 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.
4) Changing the character size does not affect the current underline thickness
5) Underline mode can also be turned on or off by using **ESC !**.
   However, that the last received command is effective.

[Default] n = 0

[Reference] **ESC !**

[Application] All printers

ESC E n

[Name] Turn emphasized mode On/Off.

[Format]

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

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

[Description] Turns emphasized mode on or off.

When the LSB(least significant bit) is 0, emphasized mode is turned off.

When the LSB(least significant bit) is 1, emphasized mode is turned on.

[Note] 1) Only the least significant bit of **n** is available.

2) 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 !**

[Application] All printers

ESC { n

[Name] Turn On/Off upside-down printing mode

[Format]

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

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

[Description] Turns upside-down printing mode on or off

When the LSB is 0, upside-down mode is turned off.

When the LSB is 1, upside-down mode is turned on.

[Note] 1) Only the significant bit of **n** is available.

2) This command is enabled only when processed at the beginning of a line in standard mode.

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

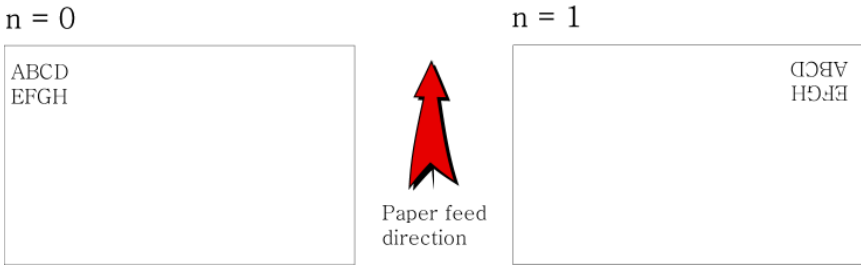
4) This command does not affect printing in page mode.

5) In upside-down printing mode, the printer rotates the line to be printed by 180 degree and then prints it.

[Default] n = 0

[Application] All printers

[Example]



GS ! n

[Name] Select character size

[Format]

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

[Range] 0 ≤ bit0~2 ≤ 7, 0 ≤ bit4~6≤ 7

[Description] (1 ≤ vertical number of times normal font size ≤ 8,
1 ≤ horizontal number of times normal font size ≤ 8)

Selects the character width using bits 0 to 2 and selects the character height using bit 4 to 6, as follows;

[Notes] 1) This command is effective for all characters.

2) The bit 3 and bit 7 are ignored.

3) In standard mode, the vertical direction is the paper feed direction, and the horizontal direction is perpendicular to the paper feed direction.

4) In page mode, vertical and horizontal directions are based on the character orientation.

5) The **ESC !** command can also turn double width and double height modes on or off.

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

Hex	Decimal	Width
00	0	1 (normal)
01	1	2 (double width)
02	2	3
03	3	4
04	4	5
05	5	6
06	6	7
07	7	8

Character Width Selection

Hex	Decimal	Height
00	0	1 (normal)
10	16	2 (double height)
20	32	3
30	48	4
40	64	5
50	80	6
60	96	7
70	112	8

Character Height Selection

[Default] n = 0

[Reference] **ESC !**

[Application] All printers

GS B n

[Name] Turn white/black reverse printing mode On/Off.

[Format]

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

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

[Description] Turns White/Black reverse printing mode on or off.

[Notes]
1) When the LSB is 0, white/black reverse printing mode is turned off.
2) When the LSB is 1, white/black reverse printing mode is turned on.
3) Only the lowest bit of n is valid.
4) This command is available for built in characters and user defined characters.
5) When white/black reverse printing mode is on, it also applied to character spacing set by **ESC SP**.
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.

[Default] n = 0

[Application] All printers

1.4. Print Position Commands.

Woosim supports the following commands for setting the print position

Command	Name
ESC $	Set absolute print position
**ESC **	Set relative print position
ESC a	Select justification
HT	Horizontal tab
ESC D	Set horizontal tab positions
GS L	Set left margin
GS W	Set printing area width
ESC W	Set printing area in page mode
ESC T	Select print direction in page mode
GS $	Set absolute vertical print position in page mode
**GS **	Set relative vertical print position in page mode
ESC O	Set print starting position.

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]	Set the print starting position based on the beginning of the line.				
[Notes]	1) This command moves the print starting position to (nL + nH * 256) dots from the beginning of the line.				
	2) Any setting that exceeds the printable are is ignored.				
[Reference]	**ESC \, GS $, GS **				
[Application]	All printers				

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]	Set the print starting position based on the current position				
[Notes]	1) This command moves the print starting position to (nL + nH * 256) dots from the current position. 2) Any setting that exceeds the printable area is ignored 3) When pitch N is specified to the right, nL + nH * 256 = N When pitch N is specified to the left (the negative direction), use the complement of 65536. (nL + nH * 256 = 65536 - N)				
[Reference]	**ESC $**				
[Application]	All printers				

ESC a n

[Name] Select justification

[Format]

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

[Range] $0 \leq n \leq 2$

$48 \leq n \leq 50$

[Description] Aligns the character data in one line to the specified position.

n selects the type of justification as follows;

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

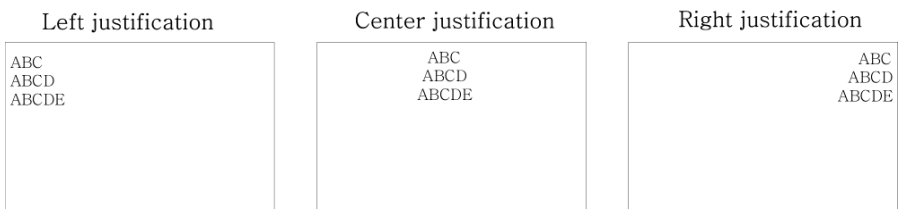
[Notes]

1) The command is enabled only when processed at the beginning of the line in standard mode.
2) If this command is input in page mode, the printer performs only internal flag operations.
3) This command has no effect in page mode.
4) This command executes justification in the area between the current position and the end of printing area.
5) This command is available only with text data.
6) When this command is used, **HT, ESC ** can not be used.
7) When this command is used, the top of line data has to be text data.

[Default] n = 0

[Application] All printers

[Example]



HT

[Name] Horizontal Tab

[Format] ASCII HT

HEX 09

Decimal 9

[Description] Moves the print position to the next horizontal tab position.

[Note] 1) This command is ignored unless the next horizontal tab position has been set.

2) If the next horizontal tab position exceeds the printing area, the printer executes buffer-full printing of the current line and horizontal tab processing from the beginning of the next line.

3) Horizontal tab positions are set with **ESC D**.

4) The default tab positions are every 0 characters.

[Reference] **ESC D**

[Application] All printers

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] $1 \leq n \leq 255$, $1 \leq k \leq 32$

[Description] Set horizontal tab position

[Notes] 1) **n** specifies the column number from the beginning of the line.

2) **k** indicates the total number of horizontal tab positions to be set.

3) This command cancels the previous horizontal tab settings.

4) When setting n=8, the print position is moved to column 9 by sending **HT**.

5) Data exceeding 32 tab positions is processed as normal data.

6) Transmit [n]k in ascending order and place a NUL(00H) at the end.

7) 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.

8) **ESC D** NUL cancels all horizontal tab positions.

[Default] The default tab positions are at intervals of 0 characters.

[Reference] **HT**

[Application] All printers

GS L nL nH

[Name] Set left margin.

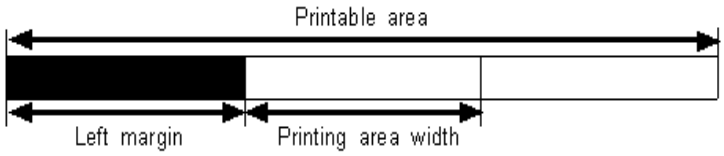
[Format]

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

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

[Description] Set the left margin using nL and nH.

[Notes] 1) The left margin is set to (nL + nH *256) dots.



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

3) In page mode, the printer performs only internal flag operations.

4) This command does not affect printing in page mode.

5) If the setting exceeds the printable area, this command is ignored.

6) If any data in buffer exists the printer prints out the data and then executes this command.(It's same as <CR> <GS> L)

[Default] nL = 0, nH = 0

[Reference] **GS W**

[Application] All printers

GS W nL nH

[Name] Set printing area width

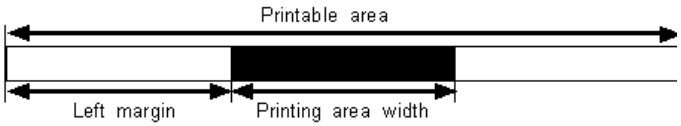
[Format]

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.

[Notes] 1) The printing area width is set to (nL+nH *256) dots.



2)In page mode, the printer performs only internal flag operations.

3) This command does not affect printing in page mode.

4) If the [left margin + printing area width] exceeds the printable area, this command is ignored.

5) If any data in buffer exists the printer prints out the data and then executes this command.(It's same as <CR> <GS> W)

[Default] **1** inch product :192 (nL = 192, nH = 0)

2 inch product : 384 (nL = 128, nH = 1)

3 inch product : 576 (nL = 64, nH = 2)

4 inch product : 832 (nL = 64, nH = 3)

[Reference] **GS L**

[Application] All printers

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] $0 \leq xL,xH,yL,yH,dxL,dxH,dyL,dyH \leq 255$

(except dxL=dxH=0 or dyL=dyH=0)

[Description] Sets the size and position of the printing area in page mode as follows:

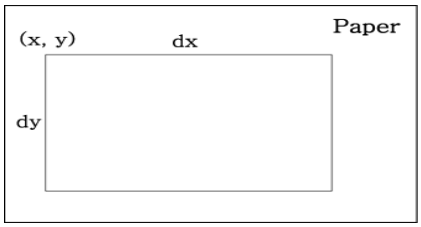
Horizontal starting position (x) = (xL + xH * 256)

Vertical starting position (y) = (yL +yH * 256)

Printing area width (dx) = (dxL + dxH * 256)

Printing area height (dy) = (dyL + dyH * 256)

The printing area is set as shown in the figure below.



[Note] 1) In standard mode, the printer executes only internal flag operation.

2) If the horizontal or vertical starting position is set outside the printable area or if the printing area width or height is set to 0, this command is ignored.

3) If (x + dx > printable area), the printing area width is set to (printable area - x).

4) If (y + dy > printable area), the printing area height is set to (printable area - y).

[Default] xL = xH = yL = yH = 0

1 inch product : 192 (dxL = 192, dxH = 0)

2 inch product : 384 (dxL = 128, dxH = 1)

3 inch product : 576 (dxL = 64, dxH = 2)

4 inch product : 832 (dxL = 64, dxH = 3)

Default : 2400 (dyL = 96, dyH = 9)

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

[Application] All printers

ESC T n

[Name] Select print direction in page mode

[Format]

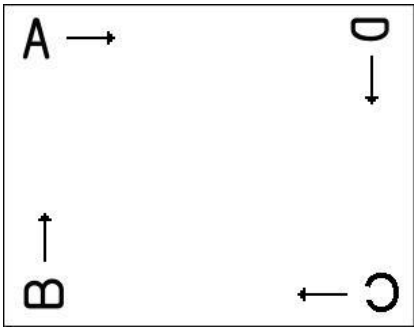
ASCII	ESC	T	n
HEX	1B	54	n
Decimal	27	84	n

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

[Description] Selects 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)



[Notes]
1) In standard mode, the printer executes only internal flag operation.
2) This command sets the direction and starting position in the printing area set by **ESC W**.
3) If 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.
4) If the starting position is the upper right or lower left of the printing area, data is buffered in the paper feed direction.

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

[Application] All printers

GS $ nL nH

[Name]	Set absolute vertical print position in page mode.				
[Format]	ASCII	GS	$	nL	nH
	HEX	1D	24	nL	nH
	Decimal	29	36	nL	nH
[Range]	$0 \le nL \le 255, 0 \le nH \le 255$				
[Description]	Sets the absolute vertical print starting position for buffered data in page mode.				
[Notes]	1) This command sets the absolute print position to (nL+nH * 256) dots.				
	2) This command is effective only in page mode.				
	3) If the position exceeds the specified printing area, this command is ignored.				
	4) This command operates depending on the print starting position set 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.				
[Reference]	**ESC $, ESC T, ESC W, ESC \, GS **				
[Application]	All printers				

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 ≤ nL ≤ 255, 0 ≤ nH ≤ 255				
[Description]	Sets the relative vertical print starting position from the current position.				
[Notes]	1) This command moves the vertical print starting position to (nL + nH * 256) dots from the current vertical printing position. 2) This command is effective only in page mode. 3) When pitch N is specified to the movement downward; nL + nH * 256 = N When pitch N is specified to the movement upward (the negative direction), use the complement of 65536. (nL + nH * 256 = 65536 - N) 4) Any setting that exceeds the specified printing area is ignored. 5) This command operates depending on the print starting position set 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.				
[Reference]	**ESC $, ESC T, ESC W, ESC \, GS $,**				
[Application]	All printers				

ESC O xL xH yL yH

[Name]	Set print starting position.						
[Format]	ASCII	ESC	O	xL	xH	yL	yH
	HEX	1B	4F	xL	xH	yL	yH
	Decimal	27	79	xL	xH	yL	yH
[Description]	Set horizontal starting position and vertical starting position in page mode. Horizontal starting position = xL + xH * 256 Vertical starting position = yL + yH * 256						
[Note]	This command is effective only in page mode.						
[Application]	All printers						

1.5. Bit-Image Commands.

Woosim Printer supports the following bit-image command.

Command	Name
ESC *	Select bit image mode
ESC X 4	Define user-defined bit image
ESC f	Print download bit image

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,

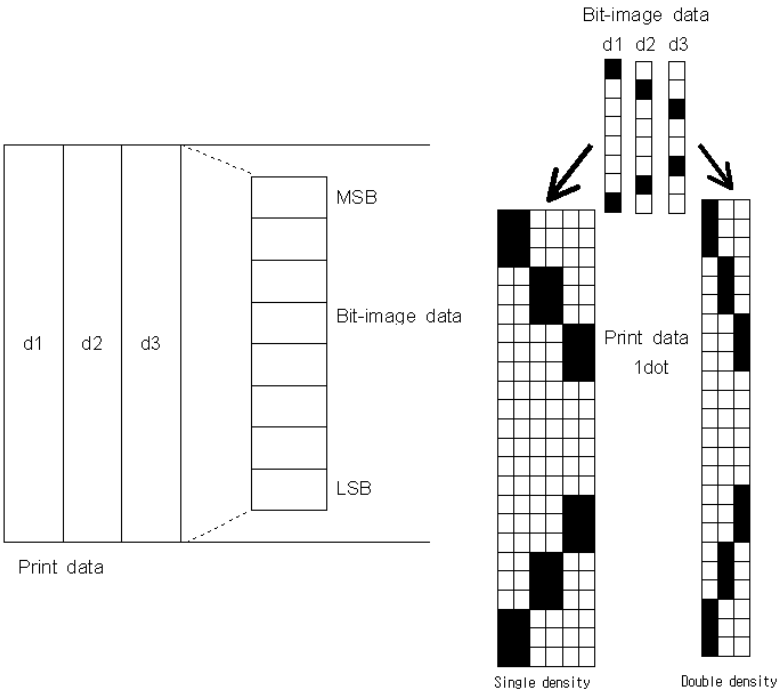
m	mode	Vertical direction		Horizontal direction	
		Number of Dots	Dot density	Dot density	Number of Data
0	8 dot single density	8	≒68 DPI	≒102 DPI	nL+nH*256
1	8 dot double density	8	≒68 DPI	≒203 DPI	nL+nH*256
32	24 dot single density	24	≒203DPI	≒102 DPI	(nL+nH*256)*3
33	24 dot double density	24	≒203 DPI	≒203 DPI	(nL+nH*256)*3

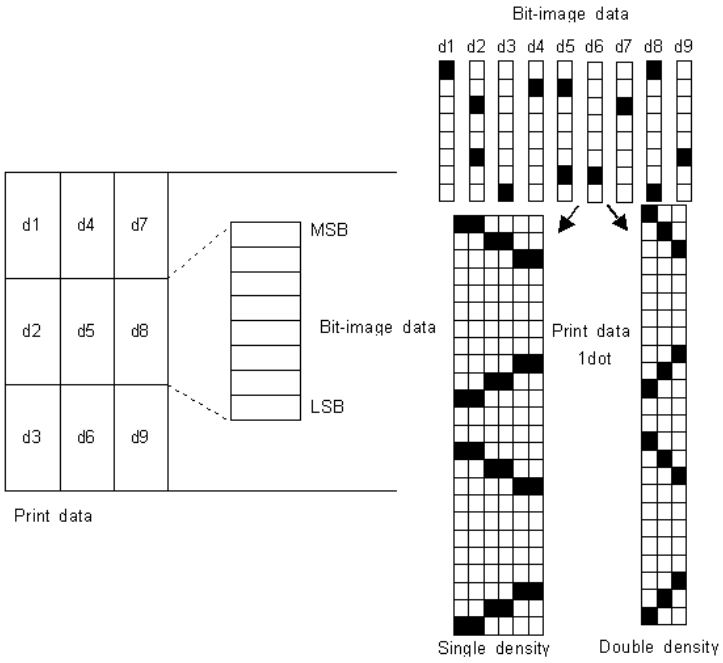
[Notes]

1) If the values of m is out of the specified range, nL and data following are processed an normal data.
2) The nL and nH indicate the number of dots of the bit image in the horizontal direction.
3) The number of dots is calculated by nL + nH * 256.
4) If the bit-image data input exceeds the number of dots to be printed on a line, the excess data is ignored.
5) d indicates the bit-image data. set a corresponding bit to 1 to print a dot or to 0 to not print a dot.
6) After printing a bit image, the printer returns to normal data processing mode.
7) This command is not affected by print modes (emphasized, underline, character size or White/Black reverse printing), except upside-down printing mode.
8) The relationship between the image data and the dots to be printed is as follows;

[Application] All printers

- When 8-dot bit image is selected





ESC X 4 x y d1…dk

[Name] Define user-defined bit-image

[Format]

ASCII	ESC	X	4	x	y	d1…dk
HEX	1B	58	34	x	y	d1…dk
Decimal	27	88	52	x	y	d1…dk

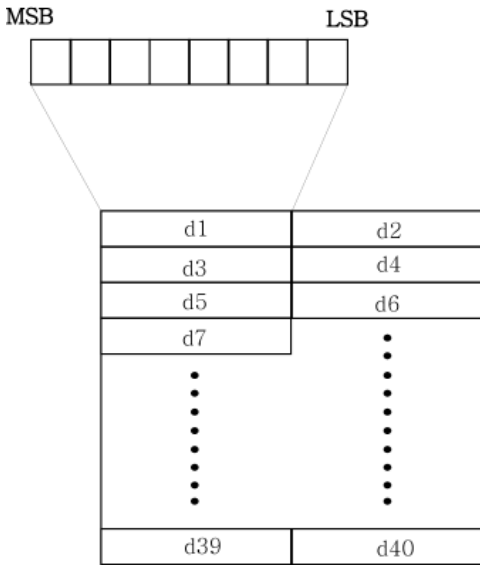
[Description] **ESC X 4 x y d1** ... **d**(x * y) defines a user-defined bit image using ***x***.

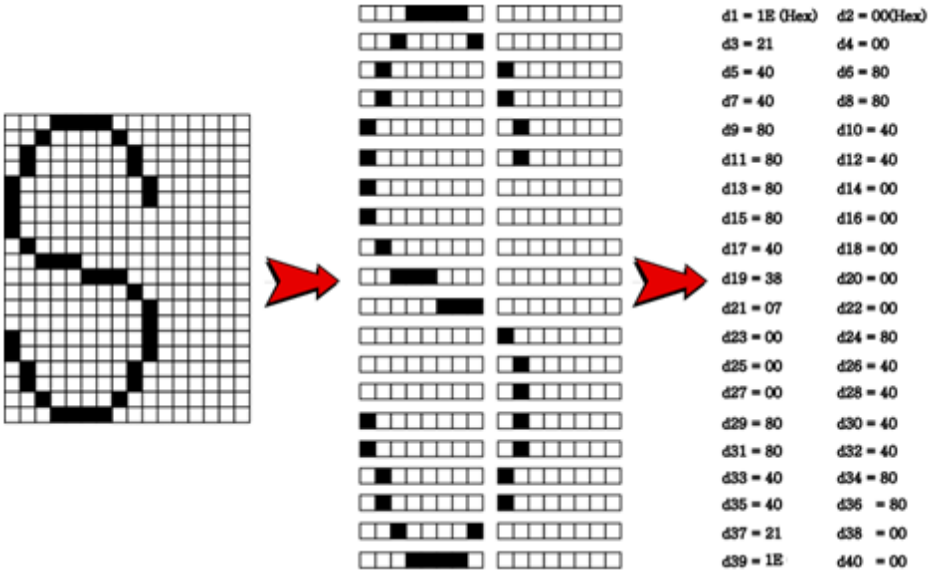
8 dots in the horizontal direction and ***y*** dots in the vertical direction.

- Horizontal direction dots = (x * 8)dots

- Vertical direction dots = (y)dots

x =2, y= 20





[Reference] **ESC W, ESC O, FF**

[Application] All printers

ESC f n

[Name] Print downloaded bit-image

[Format]

ASCII	ESC	f	n
HEX	1B	66	n
Decimal	27	102	n

[Range] 0 ≤ n ≤ 255 (n = bit-image number)

[Description] Print downloaded bit-image.

[Notes] 1) If the selected bit-image is download correctly, you can print out the downloaded bit-image with referred commands below.

Bit-image 1: 0x1b 0x66 0x00 0x0c Bit-image 2: 0x1b 0x66 0x01 0x0c

2) The width of bit-image must be x8 pixel.

3) For bit-image, you're required to use the download program that we offer.

4) According to the printer version, the size available for download is different.

5) Support image format :

- BMP : 1bit, 4bit, 8bit, 24bit
- JPG
- PCX : 1bit

Version	Descriprion
M37702	- 2 bit-images can be downloaded at once. - Bit-image 1 : 25KB or less Bit-image 2 : 30KB or less
M16C	- If the size of bit-image file is less than 4K (4096byte), you can download 8 files to the maximum and up to 32K bytes.
ARM / RX	- If the size of bit-image file is less than 4K (4096byte), you can download 60 files to the maximum and up to 243K bytes. - Bit-image can not exceed the height of the 2400pixel.

*** Maximum bit-image size of the printer by inch ***

1inch : 192 x 2400 2inch : 384 x 2400

3inch : 576 x 2400 4inch : 832 x 2400

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

[Application] All printers

1.6. Status Commands.

Command	Name
ESC v	Transmit printer status
DLE EOT EOT	Real-time paper status transmission
ESC V	Get Printer Information
ESC Y	Download procedure in printer

ESC v

[Name] Transmit printer status

[Format]

ASCII	ESC	v
HEX	1B	76
Decimal	27	118

[Description] Transmits the printer status.

Printer	M37702		M16C / ARM / RX	
	Paper In	Paper Out	Paper In	Paper Out
MOBILE	0 (30H)	1 (31H)	0 (30H)	1 (31H)
	NULL(00H)	anything		
PANEL	NULL(00H)	0CH	NULL(00H)	0CH

[Note] The printer status value is different according to each printer models or printer option.

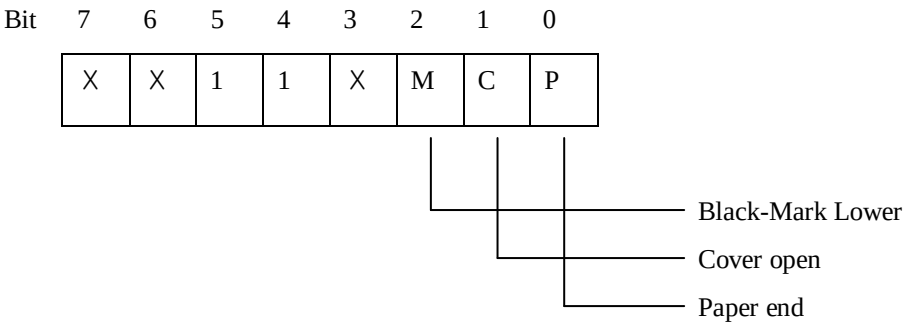
Please refer to the model's operator manual for sensor position of each printer model.

The printer status value is same as **DLE EOT EOT**.

[Reference] **DLE EOT EOT**

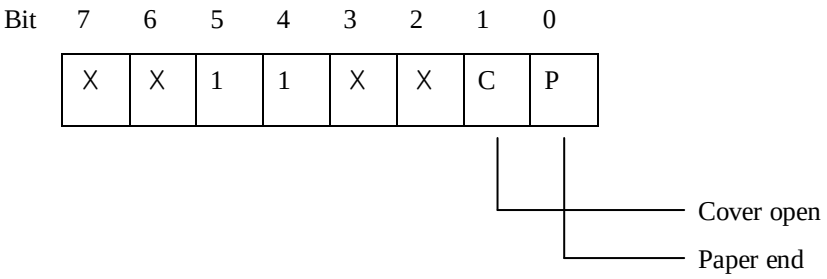
[Application] All printers

① **i250(ARM) / i350/ BT300**



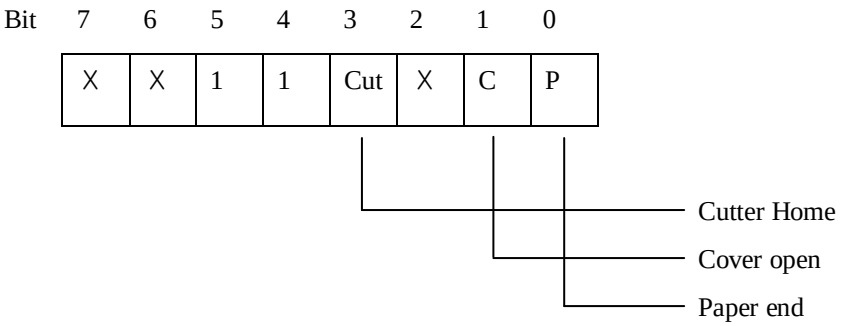
Bit	0 / 1	Status
0	0	Paper end: paper present
	1	Paper end: paper not present
1	0	Cover open: cover closed
	1	Cover open: cover opened
2	0	Black-Mark Lower: mark found
	1	Black-Mark Lower: mark not found
3	-	Not used
4	1	Fixed
5	1	Fixed
6	-	Not used
7	-	Not used

② **R231/R240/R241/R242/R350**



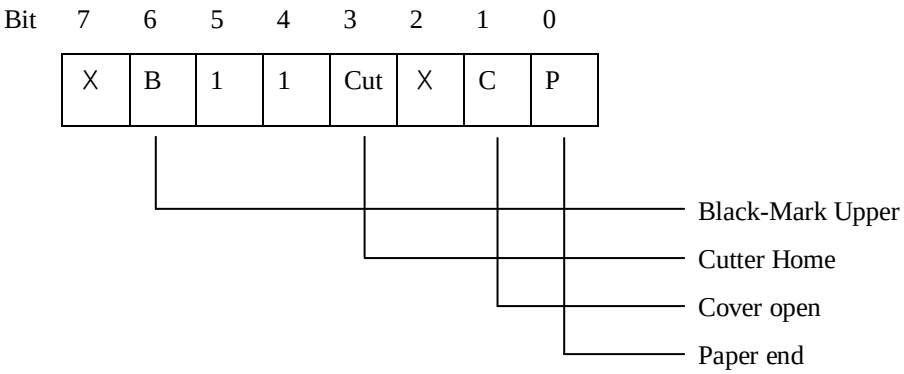
Bit	0 / 1	Status
0	0	Paper end: paper present
	1	Paper end: paper not present
1	0	Cover open: cover closed
	1	Cover open: cover opened
2	-	Not used
3	-	Not used
4	1	Fixed
5	1	Fixed
6	-	Not used
7	-	Not used

③ M410C/MC340/MC350



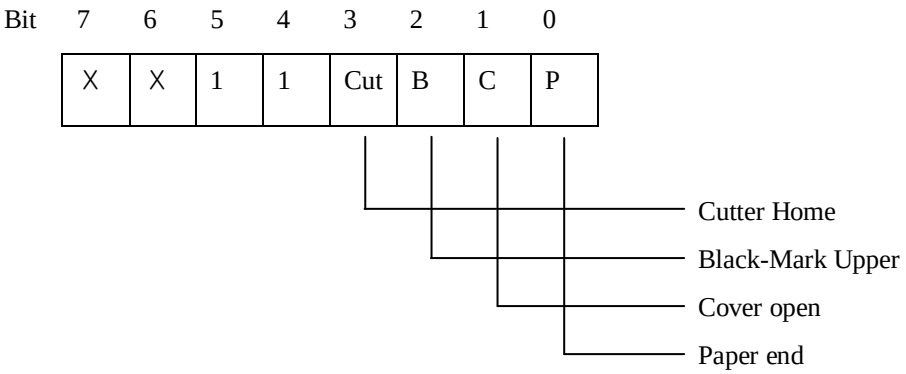
Bit	0 / 1	Status
0	0	Paper end: paper present
	1	Paper end: paper not present
1	0	Cover open: cover closed
	1	Cover open: cover opened
2	-	Not used
3	0	Cutter Home: Home position
	1	Cutter Home: Out of Home position
4	1	Fixed
5	1	Fixed
6	-	Not used
7	-	Not used

④ DM360



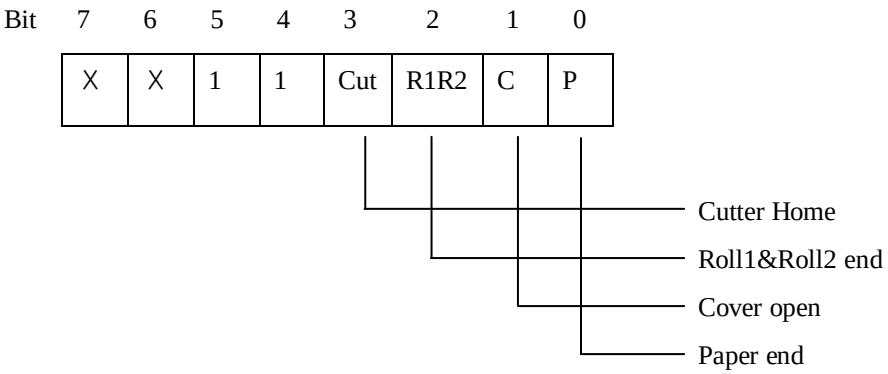
Bit	0 / 1	Status
0	0	Paper end: paper present
	1	Paper end: paper not present
1	0	Cover open: cover closed
	1	Cover open: cover opened
2	-	Not used
3	0	Cutter Home: Home position
	1	Cutter Home: Out of Home position
4	1	Fixed
5	1	Fixed
6	0	Black-Mark Upper: mark found
	1	Black-Mark Upper: mark not found
7	-	Not used

⑤ **DT282/DT382**



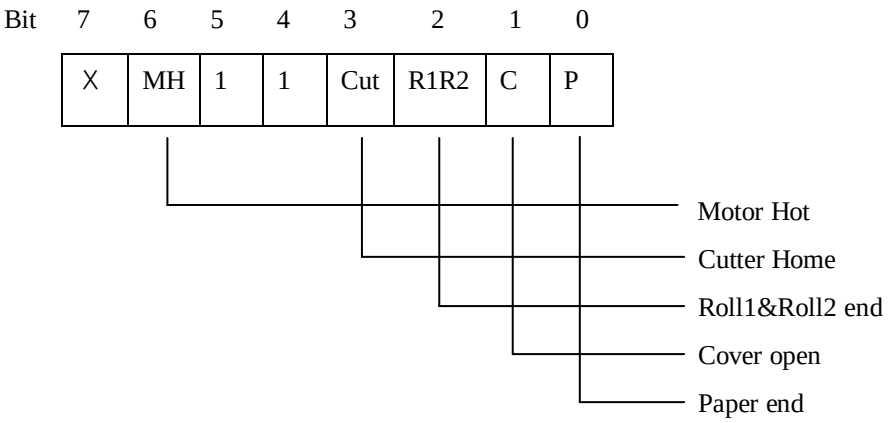
Bit	0 / 1	Status
0	0	Paper end: paper present
	1	Paper end: paper not present
1	0	Cover open: cover closed
	1	Cover open: cover opened
2	0	Black-Mark Upper: mark found
	1	Black-Mark Upper: mark not found
3	0	Cutter Home: Home position
	1	Cutter Home: Out of Home position
4	1	Fixed
5	1	Fixed
6	-	Not used
7	-	Not used

⑥ **DT381**



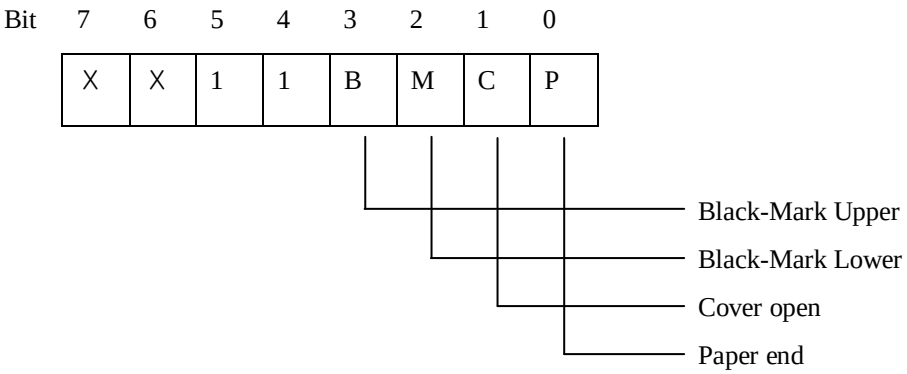
Bit	0 / 1	Status
0	0	Paper end: paper present
	1	Paper end: paper not present
1	0	Cover open: cover closed
	1	Cover open: cover opened
2	0	Roll1&Roll2 end: paper present
	1	Roll1&Roll2 end: paper not present
3	0	Cutter Home: Home position
	1	Cutter Home: Out of Home position
4	1	Fixed
5	1	Fixed
6	-	Not used
7	-	Not used

⑦ CP280/CP281/CP380/CP381/DT280/DT380/M210C/M310C



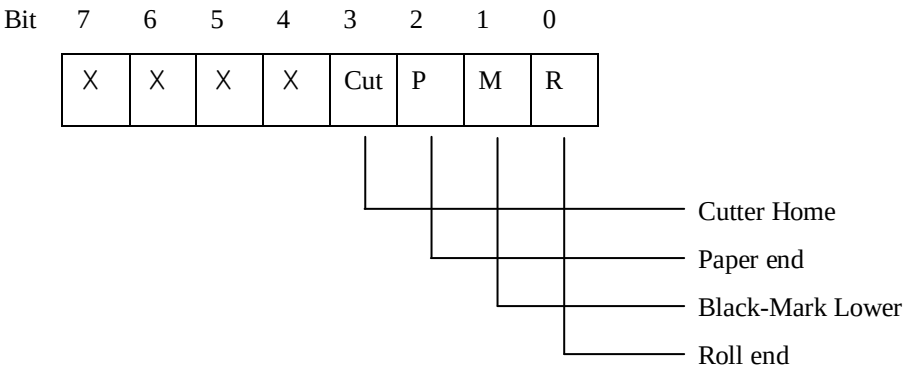
Bit	0 / 1	Status
0	0	Paper end: paper present
	1	Paper end: paper not present
1	0	Cover open: cover closed
	1	Cover open: cover opened
2	0	Roll1&Roll2 end: paper present
	1	Roll1&Roll2 end: paper not present
3	0	Cutter Home: Home position
	1	Cutter Home: Out of Home position
4	1	Fixed
5	1	Fixed
6	0	Motor Hot: Motor Hot use
	1	Motor Hot: Motor Hot not use
7	-	Not used

⑧ i250(RX)/i450/R341/R350



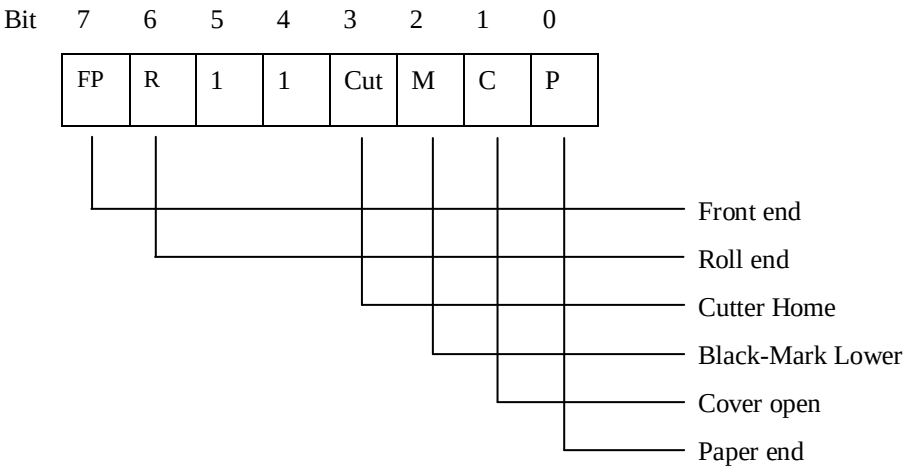
Bit	0 / 1	Status
0	0	Paper end: paper present
	1	Paper end: paper not present
1	0	Cover open: cover closed
	1	Cover open: cover opened
2	0	Black-Mark Lower: mark found
	1	Black-Mark Lower: mark not found
3	0	Black-Mark Upper: mark found
	1	Black-Mark Upper: mark not found
4	1	Fixed
5	1	Fixed
6	-	Not used
7	-	Not used

⑨ **T280/T380**



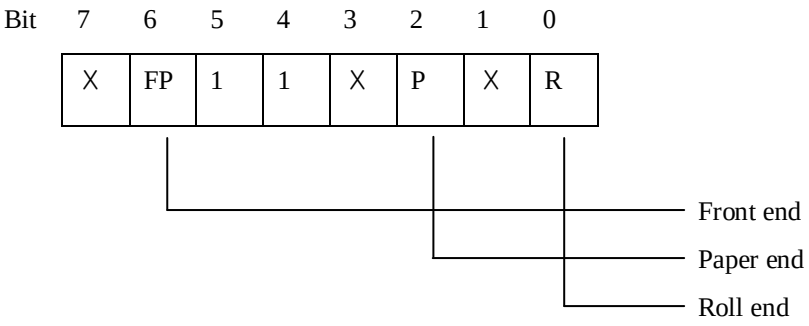
Bit	0 / 1	Status
0	0	Roll end: paper present
	1	Roll end: paper not present
1	0	Black-Mark Lower : mark found
	1	Black-Mark Lower: mark not found
2	0	Paper end: paper present
	1	Paper end: paper not present
3	0	Cutter Home: Home position
	1	Cutter Home: Out of Home position
4	-	Not used
5	-	Not used
6	-	Not used
7	-	Not used

⑩ **BT200**



Bit	0 / 1	Status
0	0	Paper end: paper present
	1	Paper end: paper not present
1	0	Cover open: cover closed
	1	Cover open: cover opened
2	0	Black-Mark Lower : mark found
	1	Black-Mark Lower: mark not found
3	0	Cutter Home: Home position
	1	Cutter Home: Out of Home position
4	1	Fixed
5	1	Fixed
6	0	Roll end: paper present
	1	Roll end: paper not present
7	0	Front end: paper present
	1	Front end: paper not present

⑪ **T80**



Bit	0 / 1	Status
0	0	Roll end: paper present
	1	Roll end: paper not present
1	-	Not used
2	0	Paper end: paper present
	1	Paper end: paper not present
3	-	Not used
4	1	Fixed
5	1	Fixed
6	0	Front end: paper present
	1	Front end: paper not present
7	-	Not used

⑫ P/PP40/S/SC/SD40/SB50/SM/SP/ST/SW/SWC/W/WC/KT40

Bit	7	6	5	4	3	2	1	0
	X	X	1	1	X	X	X	P

Paper end

Bit	0 / 1	Status
0	0	Paper end: paper present
	1	Paper end : paper not present
1	-	Not used
2	-	Not used
3	-	Not used
4	1	Fixed
5	1	Fixed
6	-	Not used
7	-	Not used

DLE EOT EOT

[Name] Real-time printer status transmission

[Format]

ASCII	DLE	EOT	EOT
HEX	10	04	04
Decimal	16	4	4

[Description] Transmits real time printer status.

[Notes] The printer status value is same as **ESC v**.

The printer status value is different according to each printer models or printer option.

[Reference] **ESC v**

[Application] All printers

ESC V

[Name] Get Printer Information

[Format]

ASCII	ESC	V
HEX	1B	56
Decimal	27	86

[Description] Battery capacity level, Printer Status

[Notes] 1) Response is 1 byte

-Low 4 bit : Printer Status

-High 4 bit : Battery Level

Voltage[V]	High 4- bit			
7.4	1	0	0	0
7.5	1	0	0	1
7.8	1	0	1	0
8.2	1	0	1	1

2) MSB(Most Significant Bit) of response is always 1.

3) This command is not supported in the protocol mode.

[Reference] ESC v

[Application] All printers

ESC Y

[Name] Download procedure in printer

[Format] ASCII ESC Y dl … dk m …n

HEX 1B 59 dl … dk m … n

Decimal 27 89 dl … dk m … n

dl … dk index	Length(byte)	Title	Subtitle	Description
0	1	Image type	0x11: PROG_IMAGE	Source data
			0x22: FONT_IMAGE	Font data
			0x33: LOGO_IMAGE	Logo(PCX) data
			0x44: FULL_IMAGE	Source + Font data
			0x55: SIMPLE_IMAGE	Others(Setup data, …)
			0xFF: Model ID	Request model ID
1	4	Data(m…n) Size	(dl[1]*2^24) + (dl[2]*2^16) + (dl[3]*2^8) + dl[4]	
5	2	Checksum	5'st: Even	Data index 0,2,4…: Ex-OR
			6'st: Odd	Data index 1,3,5…: Ex-OR

m … n	Length	Description
Data	Size of dl … dk	Use in the Flash Program

[Description] 1) Before programming in the flash ROM, Receive image data from host and Copy data in RAM.

2) Receiving a command other than the Model ID 0xFF.

Afterwards, Printer performs SW Reset.

[Notes] 1) Model ID 0xFF command does not require a Data and Checksum.

2) If the command is received in two-way communication mode, two-way communication is OFF and command performs.

3) If the command is received in big communication mode of high speed than 115200bps, forward "Invalid BAUD for download" message to Host and command stops.

[Application] Non iPod interface of Apple

1.7. Barcode Commands.

Woosim Printer supports the following barcode commands.

Command	Name
GS h	Set barcode height
GS w	Set barcode width
GS k	Print bar code
GS H	Select printing position of Human Readable Interpretation (HRI) characters
GS 1	Print GS1 Databar barcode
GS Z	Select 2D barcode type
ESC Z	Print 2D barcode

GS h n

[Name]	Set barcode height			
[Format]	ASCII	GS	h	n
	HEX	1D	68	n
	Decimal	29	104	n
[Range]	$1 \leq n \leq 255$			
[Description]	Sets the height of a barcode by dot unit.			
[Default]	n = 60			
[Application]	All printers			

GS w n

[Name] Set barcode width

[Format]

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

[Range] $1 \leq n \leq 8$

[Description] Sets the width of a barcode by dot unit.

If the value of n is out of area, this command is ignored.

[Note] This command affects to PDF417 code print.

[Default] n = 2

[Application] All printers

n	Multi - Level Barcode Module width(mm)	Binary Level Barcode	
		Thin Element width(mm) 0.125 * n	Thick Element width(mm) 0.125 * n * 2.7
1	0.125	0.125	0.375
2	0.25	0.25	0.675
3	0.375	0.375	1.01
4	0.5	0.5	1.35
5	0.625	0.625	1.687
6	0.75	0.75	2.02
7	0.875	0.875	2.36
8	1.0	1.0	2.7

① GS k m d1…dk NUL ② GS k m n d1…dn

[Name] Print barcode

[Format]				
	①ASCII	GS	k	m d1…dk NUL
	HEX	1D	6B	m d1…dk 00
	Decimal	29	107	m d1…dk 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 ≤ m ≤ 6 (k and d depends on the bar code system used.)

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

[Description] Selects a barcode system and print the barcode.

Each **m** specifies a barcode system as follows;

① GS k m d1…dk NUL

m	Barcode System	Number of character	Remarks
0	UPC-A	11 ≤ k ≤ 12	48 ≤ d ≤ 57
1	UPC-E	11 ≤ k ≤ 12	48 ≤ d ≤ 57
2	EAN13	12 ≤ k ≤ 13	48 ≤ d ≤ 57
3	EAN8	7 ≤ k ≤ 8	48 ≤ d ≤ 57
4	CODE39	1 ≤ k	48 ≤ d ≤ 57, 65 ≤ d ≤ 90, d = 32, 36, 37, 43, 45, 46,47
5	ITF	1 ≤ k (even number)	48 ≤ d ≤ 57
6	CODABAR	1 ≤ k	48 ≤ d ≤ 57, 65 ≤ d ≤ 68, d = 36, 43, 45, 46, 47, 58

② **GS k m n d1…dn**

m	Barcode System	Number of characters	Remarks
65	UPC-A	11 ≤ n ≤ 12	48 ≤ d ≤ 57
66	UPC-E	11 ≤ n ≤ 12	48 ≤ d ≤ 57
67	EAN13	12 ≤ n ≤ 13	48 ≤ d ≤ 57
68	EAN8	7 ≤ n ≤ 8	48 ≤ d ≤ 57
69	CODE39	1 ≤ n ≤ 255	48 ≤ d ≤ 57, 65 ≤ d ≤ 90, d = 32, 36, 37, 43, 45, 46,47
70	ITF	1 ≤ n ≤ 255 (even number)	48 ≤ d ≤ 57
71	CODABAR	1 ≤ n ≤ 255	48 ≤ d ≤ 57, 65 ≤ d ≤ 68, d = 36, 43, 45, 46, 47, 58
72	CODE93	1 ≤ n ≤ 255	0 ≤ d ≤ 127
73	CODE128	2 ≤ n ≤ 255	0 ≤ d ≤ 127 d=C1H (FNC1) d=C2H (FNC2) d=C3H (FNC3) d=C4H (FNC4)

[Notes] 1) The ① **GS k m d1…dk NUL** command must be terminated by **NUL**.

2) In the ② **GS k m n d1…dn** command, **n** is the number of data.

3) UPC-E barcode : the first byte of data must be 0 (30H).

4) When the number of data for ITF barcode is odd, the printer adds 0(30H) in front of the first data.

5) Be sure to keep spaces on both right and left sides of a barcode. Spaces are different depending on the type of the barcode.

[Reference] **GS h, GS w, GS H, ESC L, ESC W, FF, ESC FF**

[Application] All printers

GS H n

[Name]	Turn HRI characters print mode on/off			
[Format]	ASCII	GS	H	n
	HEX	1D	48	n
	Decimal	29	72	n
[Range]	n = 0 or 1, 48 or 49			
[Description]	Turns HRI characters print mode on or off.			
	When the LSB(least significant bit) of **n** is 1, the mode is turned on;			
	When the LSB is 0, the mode is turned off.			
[Note]	This command affects to PDF417 code print.			
[Default]	n = 0			
[Application]	All printers			

GS 1 m n d1…dk NULL

[Name] Print GS1 Databar barcode

[Format]

ASCII	GS	1	m	n	d1…dk	NULL
HEX	1D	31	m	n	d1…dk	0x00
Decimal	29	49	m	n	d1…dk	0

[Description]

***m* :** GS1 Databar type (0 ~ 6)

0: GS1 Databar Omnidirectional

1: GS1 Databar Truncated

2: GS1 Databar Stacked

3: GS1 Databar Stacked Omnidirectional

4: GS1 Databar Limited

5: GS1 Databar Expanded

6: GS1 Databar Expanded Stacked

***n* :** Segments per row(2~20), only for type 6 (GS1 Databar Expanded Stacked)

This value should be even number. (e.g. 2,4,6,...,20)

***d1…dk* :** Data to be encoded.

(<application identifier> or <application identifiers and data fields>)

When type=0~4, this field should be digits less than 14 because of GTIN-14 only.

When type=5 or 6, this field should comply with the data standard of the GS1 General Specifications.

For AI, use ' [' and ']' instead of ' (' and ')'.

Ex**) "(01)90012345678908(3103)012233"**

➔ **"[01]90012345678908[3103]012233"**

***NULL* :** End of command (0x00)

[Reference] **GS h, GS w, GS H, ESC L, ESC W, FF, ESC FF**

[Application] RX version printer only. (2012/10/11 later)

ex) when type = 0, in this case, data is GTIN-14

(Global Trade Item Number, actual data is first 13 bytes)

"**0001234567890**"

(= 0x30 0x30 0x30 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x30)

This data will be encoded as

"**(01)00012345678905**", (**(01)** is AI and the last '**5**' is check digit)

< Print sample >

GS Z n

[Name] Select 2D barcode type

[Format]

ASCII	GS	Z	n
HEX	1D	5A	n
Decimal	27	90	n

[Range]
n=0 : PDF417(default)
n=1 : DATAMATRIX (ECC200)
n=2 : QR-CODE
n=3 : Micro PDF417
n=4 : Truncated PDF417
n=5 : Maxicode (RX version only, 2012/08/21 later)

[Application] M16C/ARM/RX version printers

ESC Z m n k dL dH d1…dn

[Name] Print 2D barcode

[Format]

ASCII	ESC	Z	m	n	k	dL	dH	d1…dn
HEX	1B	5A	m	n	k	dL	dH	d1…dn
Decimal	27	90	m	n	k	dL	dH	d1…dn

[Application] M16C/ARM/RX version printers

M37702 version printer is applied PDF417 barcode only.

[Description] ① PDF417 : barcode type 0

m specifies column number of 2D bar code. ($1 \le m \le 30$)

n specifies security level to restore when bar code image is damaged.($0 \le n \le 8$)

k is used for define horizontal and vertical ratio.($2 \le k \le 5$)

d is the length of data and it is consist of 2 byte.

dL : 1st byte is lower number.

dH : 2nd byte is upper number.

d1…dn is barcode data.

※ The size of **PDF417** is influenced by barcode width command (**GS w n**).

② DATAMATRIX (ECC200) : barcode type 1

m specifies height of the symbol. (0:auto size)

n specifies width of the symbol. (0:auto size)

k specifies module size. (1~8)

d is the length of data and it is consist of 2 byte.

dL : 1st byte is lower number.

dH : 2nd byte is upper number.

d1…dn is barcode data.

※ When **m** or **n** is 0, the printer selects the barcode size automatically.

The auto sized method are recommended.

<< Table for DATAMATRIX(ECC200 symbol) size >>

Symbol - size		Capacity (bytes)			ECC(%)	Remark
Row	Column	Numeric	Alpha-numeric	Byte (8bit)		
10	10	6	3	3	62.5	
12	12	10	6	5	58.3	
8	18	10	6	5	58.3	rectangular
14	14	16	9	8	55.6	
8	32	20	12	10	52.4	rectangular
16	16	24	15	12	50.0	
12	26	32	21	16	46.7	rectangular
18	18	36	24	18	43.8	
20	20	44	30	22	45.0	
12	36	44	30	22	45.0	rectangular
22	22	60	42	30	40.0	
16	36	34	45	32	42.9	rectangular
24	24	72	51	36	40.0	
26	26	88	63	44	38.9	
16	48	98	72	49	36.4	rectangular
32	32	124	90	62	36.7	

(Continue…)

Symbol - size		Capacity (bytes)			ECC(%)	Remark
Row	Column	Numeric	Alpha-numeric	Byte (8bit)		
36	36	172	126	86	32.8	
40	40	228	168	114	29.6	
44	44	288	213	144	28.0	
48	48	348	258	174	28.1	
52	52	408	303	204	29.2	
64	64	560	417	280	28.6	
72	72	736	549	368	28.1	
80	80	912	681	456	29.6	
88	88	1152	861	576	28.0	
96	96	1392	1041	696	28.1	
104	104	1632	1221	816	29.2	
120	120	2100	1572	1050	28.0	
132	132	2608	1953	1304	27.6	
144	144	3116	2334	1558	28.5	

※ Used only square type for auto-sized symbol.

③ QR-CODE : barcode type 2

m specifies version of the symbol. (1~40, 0:auto size)

n specifies EC level. (L:7%, M:15%,Q:25%,H:30%)

k specifies module size. (1~8)

d is the length of data and it is consist of 2 byte.

dL : 1st byte is lower number.

dH : 2nd byte is upper number.

d1…dn is barcode data.

※ When **m** is 0, the printer selects the barcode size automatically.

The auto sized method are recommended.

<< Table for QR-CODE size(version) >>

Version	Capacity (Codewords) by EC level			
	L (7%)	M (15%)	Q (25%)	H (30%)
1	19	16	13	9
2	34	28	22	16
3	55	44	34	26
4	80	64	48	36
5	108	86	62	46
6	136	108	76	60
7	156	124	88	66
8	194	154	110	86
9	232	182	132	100
10	274	216	154	122
11	324	254	180	140
12	370	290	206	158
13	428	334	244	180
14	461	365	261	197
15	523	415	295	223
16	589	453	325	253

(Continue…)

Version	Capacity (Codewords) by EC level			
	L (7%)	M (15%)	Q (25%)	H (30%)
17	647	507	367	283
18	721	563	397	313
19	795	627	445	341
20	861	669	485	385
21	932	714	512	406
22	1006	782	568	442
23	1094	860	614	464
24	1174	914	664	514
25	1276	1000	718	538
26	1370	1062	754	596
27	1468	1128	808	628
28	1531	1193	871	661
29	1631	1267	911	701
30	1735	1373	985	745
31	1843	1455	1033	793
32	1955	1541	1115	845
33	2071	1631	1171	901
34	2191	1725	1231	961
35	2306	1812	1286	986
36	2434	1914	1354	1054
37	2566	1992	1426	1096
38	2702	2102	1502	1142
39	2812	2216	1582	1222
40	2956	2334	1666	1276

④ Micro PDF417 : barcode type 3

m specifies column number of 2D bar code. ($1 \leq m \leq 4$)

n specifies row number of 2D bar code. ($4 \leq n \leq 44$, 0 : auto size)

k is used for define horizontal and vertical ratio.($2 \leq k \leq 5$)

d is the length of data and it is consist of 2 byte.

dL : 1st byte is lower number.

dH : 2nd byte is upper number.

d1…dn is barcode data.

※ The size of **Micro PDF417** is influenced by barcode width command (**GS w n**).

# of Columns	# of Rows	Max Data Bytes	Max Alpha Characters	Max Digits
1	11	3	6	8
1	14	7	12	17
1	17	10	18	26
1	20	13	22	32
1	24	18	30	44
1	28	22	38	55
2	8	8	14	20
2	11	14	24	35
2	14	21	36	52
2	17	27	46	67
2	40	33	56	82
2	46	38	64	93
2	52	43	72	105
3	6	6	10	14
3	8	10	18	26
3	10	15	26	38
3	12	20	34	49
3	15	27	46	67
3	20	39	66	96

(Continue…)

# of Columns	# of Rows	Max Data Bytes	Max Alpha Characters	Max Digits
3	26	54	90	132
3	32	68	114	167
3	38	82	138	202
3	44	97	162	237
4	4	8	14	20
4	6	13	22	32
4	8	20	34	49
4	10	27	46	67
4	12	34	58	85
4	15	45	76	111
4	20	63	106	155
4	26	85	142	208
4	32	106	178	261
4	38	128	214	313
4	44	150	250	366

⑤ Truncated PDF417 : barcode type 4

m specifies column number of 2D bar code. ($1 \leq m \leq 4$)

n specifies security level to restore when bar code image is damaged.($0 \leq n \leq 8$)

k is used for define horizontal and vertical ratio.($2 \leq k \leq 5$)

d is the length of data and it is consist of 2 byte.

dL : 1st byte is lower number.

dH : 2nd byte is upper number.

d1…dn is barcode data.

※ The size of **Truncated PDF417** is influenced by barcode width command (**GS w n**).

※ It's just the same as the using way with PDF417-barcode, but the barcode type is different.

⑥ Maxicode : barcode type 5

m mode of MAXICODE (2~6)

n dummy (any value can be set but it will be ignored)

k dummy

d is the length of data and it is consist of 2 byte.

dL : 1st byte is lower number.

dH : 2nd byte is upper number.

d1…dn is barcode data.

when mode is 2 or 3, first 15 byte is primary data.

The following is the structure of primary data.

- Post/Zip code : 9 bytes

If mode is 2, 9-digit(5-digit zip code + 4-digit code extension)

If 4-digit code extension doesn't exist, "0000" must be specified.

If mode is 3, 6-alphanumeric + 3 byte filler(eg. Spaces)

-. Country code : 3-digit (from ISO 3166)

-. Class of service : 3-digit

1.8. Miscellaneous function commands.

Woosim Printer supports the following miscellaneous function commands;

Command	Name
ESC @	Initialize printer
ESC L	Select page mode
ESC S	Select standard mode
CAN	Cancel print data in page mode
ESC p	Generate pulse

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 configuration that is in effect when the power was turned on.		
[Notes]	1) The data in the receive buffer is not cleared. 2) The macro definition is not cleared.		
[Application]	All printers		

ESC L

[Name]	Select page mode		
[Format]	ASCII	ESC	L
	HEX	1B	4C
	Decimal	27	76
[Description]	Switches from standard mode to page mode.		
[Notes]	1) This command has effective in standard mode. 2) By **FF** or **ESC S**, the printer returns to standard mode. 3) This command sets the position to the position specified by **ESC T** within the printing area defined by **ESC W**.		

4) This command switches the settings for the following commands (in which the values can be set independently in standard mode and page mode) to those for page mode;

Set right-side character spacing : **ESC SP**

Select default line spacing : **ESC 2**, **ESC 3**

5) 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 **

[Application] All printers

ESC S

[Name] Select standard mode

[Format]

ASCII	ESC	S
HEX	1B	53
Decimal	27	83

[Description] Switches from page mode to standard mode.

[Note]

1) This command is effective only in page mode.

2) Data buffer in page mode is cleared.

3) This command sets the print position to the beginning of the line.

4) The printing area set by **ESC W** are initialized.

5) This command switches the settings for the following commands (in which the values can be set independently in standard mode and page mode) to those for standard mode;

Set right-side character spacing : **ESC SP**

Select default line spacing : **ESC 2**, **ESC 3**

6) In standard mode, the following commands are enabled only for setting.

Set printing area in page mode : **ESC W**

Select print direction in page mode : **ESC T**

7) 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**

[Application] All printers

CAN

[Name]	Cancel print data in page mode
[Format]	ASCII CAN
	HEX 18
	Decimal 24
[Description]	In page mode, deletes all data in the current printable area.
[Notes]	This command is enable only in page mode.
[Reference]	**ESC L, ESC W**
[Application]	All printers

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 to open cash drawer,					
	As follows:					
	t1 specifies the pulse ON time as [t1 x 2ms].					
	t2 specifies the pulse OFF time as [t2 x 2ms].					
[Example]	1B 70 0 50 50					
	1B 70 1 50 50					
[Application]	DT380, DT381, DT382					

1.9. Line & box commands.

Woosim Printer supports the following line & box commands;

Command	**Name**
GS i	Print line & box in page mode

GS i

[Name]	Print line & box in page mode							
[Format]	ASCII	GS	i	xL	xH	yL	yH	n
	HEX	1D	69	xL	xH	yL	yH	n
	Decimal	29	105	xL	xH	yL	yH	n
[Description]	Print line & box in page mode							
	Horizontal length : xL + xH *256(dot)							
	Vertical length : yL+ yH*256(dot)							
	Line thickness : n (dot)							
	If the horizontal length is 0, it becomes vertical line							
	If the vertical length is 0, it becomes horizontal line							
[Range]	$0 \leq xL, xH, yL, yH \leq 255$							
	$0 \leq n \leq 255$							
[Application]	All printers							

1.10. Black mark detection commands.

Woosim Printer supports the following black mark detection commands;

Command	Name
ESC P	Set the movement position from the black mark.
ESC z ESC y	Feed the paper to the movement position after black mark position.

ESC P yL yH

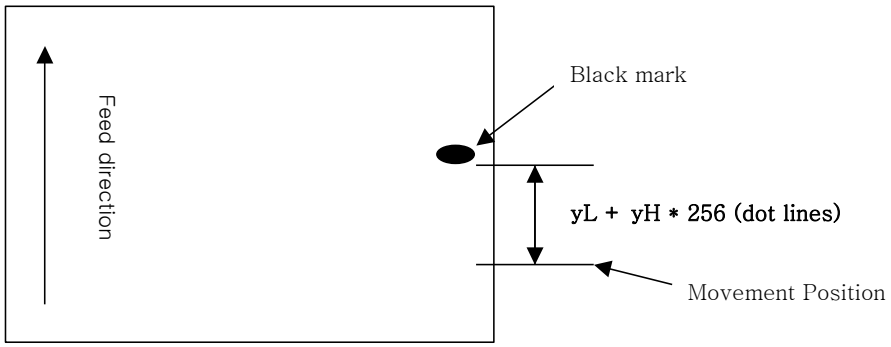
[Name] Set the movement position from the black mark.

[Format]					
	ASCII	ESC	P	yL	yH
	HEX	1B	50	yL	yH
	Decimal	27	80	yL	yH

[Description] The movement position will be set when this command is sent to the printer just once.

[Note] This command should be used alone.

[Application] All printers



ESC z ESC y

[Name] Feed the paper to the movement position after black mark position.

[Format]					
	ASCII	ESC	z	ESC	y
	HEX	1B	7A	1B	79
	Decimal	27	122	27	121

[Description] Feed the paper to the movement position after black mark position.

[Application] All printers

1.11. Graphic commands.

Woosim Printer supports the following graphic commands;

Command	Name
ESC g	Select and Print graphic
ESC g N	Get TTF string width

ESC g n dl … dk

[Name] Select and Print graphic

[Format]

ASCII	ESC	g	n	dl … dk
HEX	1B	67	n	dl … dk
Decimal	27	103	n	dl … dk

n	Function	dl ... dk Parameter	dl ... dk size
1	Draw Line	x1L x1H y1L y1H x2L x2H y2L y2H thick	9
2	Draw Ellipse	x0L x0H y0L y0H aL aH bL bH thick	9
3	Fill Area	xL xH yL yH	4
F	Select TTF file	File name 0x00	Max:30
A	TTF ASCII string	x y ASCII String 0x00	-
U	TTF Unicode string	x y Unicode String 0x00 0x00	-
P	Draw PCX File image	PCX File name 0x00	Max:30

[Description] Draw line, ellipse, PCX file image, fill area and performs the TTF file, TTF ASCII string and TTF Unicode string operations.

[Note] 1) n = 1, 2, 3 performs in page mode.

2) n = 'F', attributes of the file is TTF.

3) n = 'A', 'U', d1...dk size depend on String

4) n = 'P', attributes of the file is PCX.

[Reference] **ESC f**

[Application] ARM, RX version printer

ESC g N n dl … dk

[Name] Get TTF string width

[Format]

ASCI	ESC	g	N	n	dl … dk
HEX	1B	67	4E	n	dl … dk
Decimal	27	103	78	n	dl … dk

n	Function	dl ... dk Parameter	dl ... dk size
A	Get TTF ASCII string width	x y ASCII String 0x00	-
U	Get TTF Unicode string width	x y Unicode String 0x00 0x00	-

[Description] Get TTF string width

[Note]

Response					
ASCII	ESC	g	N	nL	nH
HEX	1B	67	4E	nL	nH

nLnH : width (dots) used to print TTF string.

[Application] ARM, RX version printer

1.12. Mechanism control commands. (optional)

Woosim Printer supports the following mechanism control commands;

Command	Name
GS V	Select cut mode and cut paper
ESC i	Partial cut (One point center uncut)

GS V n

[Name] Select cut mode and cut paper

[Format]

ASCII	GS	V	n
HEX	1D	56	n
Decimal	29	86	n

[Range] n=0, n=1

[Description] **GS V** n select a paper cutting mode and then cut the paper.

[Note]

n	Print Mode
0	Full cut
1	Partial cut

[Application] Panel, POS, Desktop, Kiosk printers

ESC i

[Name] Partial cut (One point center uncut)

[Format]

ASCII	ESC	i
HEX	1B	69
Decimal	27	105

[Description] **ESC i** executes a partial cut of the paper with one point center uncut.

ESC i operates in the same way as **GS V** when n =1 .

[Application] Panel, POS, Desktop, Kiosk printers

1.13. Panel Button Commands. (optional)

Woosim Printer supports the following command for enabling and disabling the panel button.

Command	**Name**
ESC c 5	Enable/disable panel buttons

ESC c 5 n

[Name]	Enable/Disable panel buttons				
[Format]	ASCII	ESC	c	5	n
	HEX	1B	63	35	n
	Decimal	27	97	53	n
[Range]	$0 \leq n \leq 255$				
[Description]	Enables or disables the panel buttons.				
	When the LSB is 0, the panel buttons are enabled.				
	When the LSB is 1, the panel buttons are disabled.				
[Notes]	1) Only the least significant bit of n is valid.				
	2) When the panel buttons are disabled, none of them are usable when the Printer cover is closed.				
	3) In this printer, the panel buttons is the FEED button.				
	4) In the macro ready mode, the FEED button are enabled regardless of the Settings of this command; however, the paper cannot be feed by using these buttons.				
[Default]	n = 0				
[Application]	Panel printers				

1.14. Magnetic Card Reader Commands. (optional)

Woosim Printer supports the following magnetic card reader commands;

(Secured MSR to refer to **Appendix B.)**

Command	Name
ESC M C	Set 1 track (2 track for 23 track MSR) card reader mode.
ESC M D	Set 2 track (3 track for 23 track MSR) card reader mode.
ESC M E	Set 1,2 track (2,3 track for 23 track MSR) card reader mode.
ESC M F	Set 1,2,3 track card reader mode.(123 Track Version only)
ESC M G	Set 3 track card reader mode. (123 Track Version only)
EOT	Cancel card reader mode

ESC M C

[Name]	Set 1 track (2 track for 23 track MSR) card reader mode.			
[Format]	ASCII	ESC	M	C
	HEX	1B	4D	43
	Decimal	27	77	67
[Description]	Enter the magnetic card reader mode for 1 track (2 track).			
[Note]	The printer waits for reading the card.			
	After successful reading,			
	the printer send the data to host and exits the magnetic card reader mode.			
[Application]	MSR (optional) Product			

ESC M D

[Name]	Set 2 track (3 track for 23 track MSR) card reader mode.			
[Format]	ASCII	ESC	M	D
	HEX	1B	4D	44
	Decimal	27	77	68
[Description]	Enter the magnetic card reader mode for 2 track (3 track).			
[Note]	The printer waits for reading the card.			
	After successful reading,			
	the printer send the data to host and exits the magnetic card reader mode.			
[Application]	MSR (optional) Product			

ESC M E

[Name]	Set 1,2track (2,3track for 23 track MSR) card reader mode.			
[Format]	ASCII	ESC	M	E
	HEX	1B	4D	45
	Decimal	27	77	69
[Description]	Enter the magnetic card reader mode for 1,2 track (2,3 track).			
[Note]	The printer waits for reading the card.			
	After successful reading,			
	the printer send the data to host and exits the magnetic card reader mode.			
[Application]	MSR (optional) Product			

ESC M F

[Name]	Set 1,2,3 track card reader mode. (123 Track version only)			
[Format]	ASCII	ESC	M	F
	HEX	1B	4D	46
	Decimal	27	77	70
[Description]	Enter the magnetic card reader mode for 1,2,3 track.			
[Note]	The printer waits for reading the card.			
	After successful reading,			
	the printer send the data to host and exits the magnetic card reader mode.			
[Application]	MSR (optional) Product			

ESC M G

[Name]	Set 3 track card reader mode. (123 Track version only)			
[Format]	ASCII	ESC	M	G
	HEX	1B	4D	47
	Decimal	27	77	71
[Description]	Enter the magnetic card reader mode for 3 track.			
[Note]	The printer waits for reading the card.			
	After successful reading,			
	the printer send the data to host and exits the magnetic card reader mode..			
[Application]	MSR (optional) Product			

EOT

[Name]	Cancel card reader mode.	
[Format]	ASCII	EOT
	HEX	04
	Decimal	4
[Description]	Cancel card reader mode.	
[Application]	MSR (optional) Product	

※ Card specification

The table below summarizes the format of the data stored on each magnetic track.

	ISO-1 Track (IATA)
Recording Density	210 BPI
Recording Capacity	79 characters
Data Format	Alphanumeric
Data Capacity	76 characters

	ISO-2 Track (ABA)
Recording Density	75 BPI
Recording Capacity	40 characters
Data Format	Numeric
Data Capacity	37 characters

	ISO-3 Track (MINTS)
Recording Density	210 BPI
Recording Capacity	107 characters
Data Format	Numeric
Data Capacity	104 characters

※ Magnetic Card Data Output Format

< 1 / 2 Track Version >

- **Track 1**

02H 43H 31H 31H 1CH	DATA (76 Characters)	1CH 03H 0DH 0AH

- **Track 2**

02H 44H 31H 31H 1CH	DATA (37 Characters)	03H 0DH 0AH

- **Track 1,2**

02H 45H 31H 31H 1CH 1CH	DATA(76)	1CH	DATA(37)	1CH 03H 0DH 0AH

< 2 / 3 Track Version >

- **Track 2**

02H 43H 31H 31H 1CH	DATA (37 Characters)	1CH 03H 0DH 0AH

- **Track 3**

02H 44H 31H 31H 1CH	DATA (104 Characters)	03H 0DH 0AH

- **Track 2,3**

02H 45H 31H 31H 1CH 1CH	DATA(37)	1CH	DATA(104)	1CH 03H 0DH 0AH

※ Magnetic Card Data Output Format

< 1 / 2 / 3 Track Version >

- **Track 1**

02H 43H 31H 31H 1CH	DATA (76 Characters)	1CH 03H 0DH 0AH

- **Track 2**

02H 44H 31H 31H 1CH	DATA (37 Characters)	03H 0DH 0AH

- **Track 1,2**

02H 45H 31H 31H 1CH 1CH	DATA(76)	1CH	DATA(37)	1CH 03H 0DH 0AH

- **Track 1,2,3**

02H 46H 31H 31H 1CH 1CH	DATA(76)	1CH	DATA(37)	1CH

DATA(104)	1CH 03H 0DH 0AH

- **Track 3**

02H 47H 31H 31H 1CH	DATA (104 Characters)	03H 0DH 0AH

1.15. Smart Card Reader Commands. (optional)

Woosim Printer supports the following smart card reader commands;

Command	**Name**
ESC N	Enter the Smart Card Reader mode
~ EOT ~	Exit the Smart Card Reader mode

ESC N

[Name]	Smart card reader mode.
[Format]	ASCII ESC N
	HEX 1B 4E
	Decimal 27 78
[Description]	Enter the Smart Card Reader mode.
	For using the Smart Card Reader, you must use **ESC N** command.
	After **ESC N** command, use the smart card reader control command.
	When this command use, you can see the "SCR MODE" display on LCD.
[Application]	Smart card (optional) Product

~ EOT ~

[Name]	Exit smart card reader mode.
[Format]	ASCII ~ EOT ~
	HEX 7e 04 7e
	Decimal 126 4 126
[Description]	Exit smart card reader mode.
	If you want exit smart card mode, you must use this command.
[Application]	Smart card (optional) Product

1.16. Instruction for Auto Power saving mode.

The printer in the power saving mode will recover to the print ready mode when receiving commands or button operations.
However, print data received while shifting from the power saving mode to the print ready mode (for approx. 1 sec.) is discarded and cannot be printed.
Therefore, if the printer is in the power saving mode, please be sure to recover it to the print ready mode before sending print data.

[How to Recover to Print Ready Mode & How to Check]

1) Send the Status command(DLE EOT EOT), and Try to re-send it until receiving the transmission value which is from 30H to 37H.

Or

2) Press the FEED Button or the MODE Button and confirm that the Power lamp (Green LED) is turned on.

** The printer status value is different according to each printer models or printer option.

2. Revision History

Date	Version	Comments
Aug. 14. 2009	1.0	Initial Release
Sep. 25. 2009	1.1	ESC Z command description part modification. ESC ! command description part modification. ESC t command addition ESC v command description part modification
Nov.11.2009	1.2	ESC a command description part modification. ESC Z command description part modification. GS ! command description part modification. GS w command description part modification. GS : command delete. (Macro functions) GS ^ command delete. (Macro functions) MSR output format modification.
Jan.06.2010	1.3	ESC a command description part modification. GS w barcode width table and description modification. GS L command description part modification. GS W command description part modification. Description for Auto Power Down Mode.
Feb.01.2010	1.4	ESC a command description part modification. GS L command description part modification. GS W command description part modification. GS H command description part modification. GS w command description part modification. ESC X 2 command addition. Character code tables addition.
Feb.03.2010	1.5	ESC X 4 command note part addition. ESC X 2 command note part addition.

Date	Version	Comments
Apr.07.2010	1.6	GS w command description part modification.
May.11. 2010	1.7	ESC f command addition.
Dec.22.2010	1.8	ESC Z command description part additions(data length).
Jan.28.2010	1.9	ESC Z command 2d barcode part additions. (Micro PDF417, Truncated PDF417)
May.31.2011	2.0	ESC v commmd sensor table addition.
Apr.19.2012	2.1	Secured MSR command additions – Appendix C
Aug.13.2012	2.2	Maxicode 2D barcode addition –RX Version only
Oct.11.2012.	2.3	GS1 Databar barcode addition –RX Version only
Oct.24.2012	2.4	ESC t, ESC ! command modification
Nov.28.2012	2.5	ESC t, ESC f command modification ESC p command addition. Introduction of Protocol section deleted.
May.21.2014	2.6	ESC t commmad : RX font table modification GS k command description part additions(UPC-E barcode).
Apr.10.2015	2.7	ESC g command addition.
Jan.18.2016		ESC v, ESC a, GS W command description part modification. ESC g command modification. ESC g N, ESC V, ESC Y command addition. ESC P command description part modification

Appendix A

A. MISCELLANEOUS NOTES

1. Printer mechanism handling

1) Do not pull the paper out when the cover is closed.

2) Because the thermal elements of the print head and driver ICs are easy to break, so do not touch them with any metal objects.

3) Since the areas around the print head become very hot during and just after printing, do not touch them.

4) Do not use the cover open button except when necessary.

5) Do not touch the surface of the print head because bust and dirt can stick to the surface and damage the elements.

6) Thermal paper containing Na, K, Cl ions can harm the print head thermal elements. Therefore, be sure to use only the specified paper.

7) If you want to use label paper, please contact your dealer for assistance.

2. Thermal paper handling

- Notes on using thermal paper

Chemicals and oil on thermal paper may cause discoloration and faded printing.

Therefore, pay attention to the following;

1) Use water paste, starch paste, polyvinyl paste, or CMC paste when gluing thermal paper.

2) Volatile organic solvents such as alcohol, ester, and ketone can cause discoloration.

3) Some adhesive tapes may cause discoloration or faded printing.

4) If thermal paper touches anything which includes phthalic acid ester plasticizer for a long time, it can reduce the image formation ability of the paper and can cause the printed image to fade. Therefore, when storing thermal paper in a card case or sample notebook, be sure to use only products made from polyethylene, polypropylene, or polyester.

5) If thermal paper touches diazo copy paper immediately after copying, the printed surface may be discolored.

6) Thermal paper must not be stored with the printed surfaces against each other because the printing may be transferred between the surfaces.

7) If the surface of thermal paper is scratched with a hard metal object such as a nail, the paper may become discolored.

- Notes on thermal paper storage

Since color development begins at 70℃ (158℉), thermal paper should be protected from high temperature, humidity, and light, both before and after printing.

1) Store paper away from high temperature and humidity.
Do not store thermal paper near a heater or in enclosed places exposed to direct sunlight.

2) Avoid direct light Extended exposure to direct light may cause discoloration or faded printing.

3. Others

Because this printer uses plated steel, the manual cutting edge may be subject to rust.
However, this does not affect the printer performance.

Appendix B

◈ Secured Magnetic Card Reader

Command	Name
ESC M C	Enter to MSR mode.
ESC M D	"
ESC M E	"
ESC M F	"
ESC M G	"
ESC M J	"
ESC M X	Cancel card reader mode
ESC M S	Send MSR Module Command

ESC M C(D, E, F, G, J)

[Name] Enter to MSR mode.

[Format]

ASCII	ESC	M	C	D	E	F	G	J
HEX	1B	4D	43	44	45	46	47	4A
Decimal	27	77	67	68	69	70	71	74

[Description] Enter the magnetic card reader mode

[Note] The printer waits for reading the card.

After successful reading, the printer send the data to host.

[Application] Secured MSR Product.

ESC M X

[Name] Cancel card reader mode.

[Format]

ASCII	ESC	M	X
HEX	1B	4D	58
Decimal	27	77	88

[Description] Cancel card reader mode and exits the magnetic card reader mode.

[Application] Secured MSR Product.

ESC M S nH nL command-data

[Name]	Send command to MSR.						
[Format]	ASCII	ESC	M	S	nH	nL	command-data
	HEX	1B	4D	53			
	Decimal	27	77	83			

[Description] - nH = high byte of the length of command-data

- nL = Low byte of the length of command-data

- command-data = MSR Module command format (*** Note)

[Application] Secured MSR Product.

* Note:

For further information about MSR Module command format, please contact Woosim technical support center.

- E-mail: woosimsystems@woosim.com

- Tel: +82-2-2107-3700