HM-080 Control Board
HMC-080S,HMC-080P

(Included.Serial,Parallel)

Ver 1.2

HWASUNG
ticket·kiosk printer

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No.	Date	Remark	Page	Ver.
1	07-05-02	Addition of the rule command		
2	07-05-11	Addition the barcode & the laster bitmap	32,33	1.2

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1. General Specifications

1-1) Printing Specifications

1) Print Method Thermal line printing
2) Dot Density 8dot/mm, 203dpi, 1dot=0.125mm
3) Printing Speed 160mmm/sec
4) Printing Width 80mm
5) Characters (Max) / line : 53 fonts(ASCII, 1 byte), 26 fonts(Korean, 2 bytes)

1-2) FONT

1) Alphafet FONT A(12 x 24) 95 fonts, FONT B(8 x 16) 95 fonts
2) Extended Graphic FONT A(12 x 24) 128, FONT B(8 x 16) 95
3) International Englisih,French ,Germany,Denamark,Denamark1/2 , Swedish,Spanish1/2,Latin American,Norway,Japanese,
*** Customized Language available**
4)Korean FONT A Godics (24 x 24), Myong Jo (24 x 24, Option)

1-3) Internal Buffer

Receive Buffer 4kbyte

1-4)Electrical Characteries

1) Voltage to operate

Supply Voltage	24V±10%	Motor, Head
Logic Voltage	5V±5%	Logic circuit, Paper / Head-up => sensors

2) Current Consumption (at 24v)

Average 1.2A (at ASCII Printing)
Peak 11A (at print duty 100%, For 10 seconds or less)
Stand-by 0.15A

1-5) Enviornmental Conditions

1) Temperature Operating 0℃ to 40℃
Storage -20℃ to 60℃
(non frost)
2) Humidity Operating 40 to 50%RH in not dew condensation
Storage 10 to 90%RH (non frost)

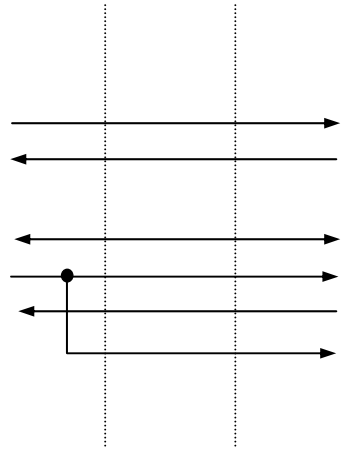
2. Configuratoin

2-1) SERIAL(RS-232C) => HMC-080S

1) Data Transmission Serial
2) Hand Shaking Hardware (RTS/CTS)
3) Baud Rate 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 BPS
4) Data Bit 7, 8 bit
5) Parity None, Even,Odd
6) Stop Bit 1, 2 bit
7) Connector DSUB-9 Female

PRINTER

PIN	SIGNAL	IN/OUT
1	N.C	-
2	TxD	OUT
3	RxD	IN
4	DSR	IN
5	GND	-
6	DTR	OUT
7	CTS	IN
8	RTS	OUT
9	N.C	-



HOST

Pin	SIGNAL	IN/OUT
1	DCD	-
2	RxD	IN
3	TxD	OUT
4	DTR	OUT
5	GND	-
6	DSR	IN
7	RTS	OUT
8	CTS	IN
9	RI	-

※ The cable should be straight (1:1) with DSUB9(Male)-SUB9(Female).

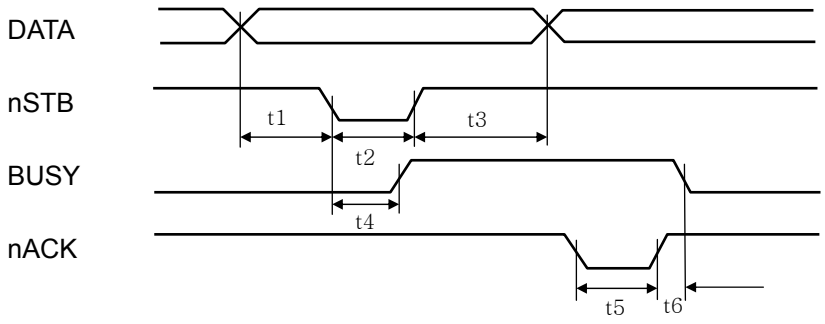
2-2) PARALLEL (IEEE-1284) => HMC-080P

1) Data Transmission Serial
2) Hand Shaking STROBE,BUSY,ACK
3) Connector I/O 22 Pin Mini Connector

4) Electrical Characteries

Input / Output	Singal Symbol	Spec.		Condition
		Min	Max	
Output	V_{OL}	-	0.2V	IOL=0.1mA
	V_{OH}	4.75	5.25	
	I_{OL}	-	-32mA	V_{CC}=5V
	I_{OH}	-	32mA	
Input	V_{IL}	-	0.8V	
	V_{IH}	2.0V	-	
	I_{OL}	-	-25mA	V_{CC}=5V
	I_{OH}	-	25mA	

5) Data Receiving Timing



Symbol	Characteristios	Specifications	
		Min	Max
t1	Data Setup Time	0.75	-
t2	STROBE Pulse Width	0.75	-
t3	Data Hold Time	0.75	-
t4	BUSY Output Delay Time	-	0.75
t5	ACK Pulse Width	0.2(Typ.)	0.2(Typ.)
t6	BUSY Release Time	0.5(Typ.)	0.5(Typ.)

(Unit : μsec)

2-3) Dip1 Switch

1) SW1,2,3 (Only for HMC-080S)

SW1	SW2	SW3	Baud Rate(BPS)
OFF	OFF	OFF	1200
ON	OFF	OFF	2400
OFF	ON	OFF	4800
ON	ON	OFF	9600
OFF	OFF	ON	19200
ON	OFF	ON	38400
OFF	ON	ON	57600
			-

2) SW 4 (Only for HMC-080S)

SW4	Data Bit
ON	7
OFF	8

3) SW 5,6 (Only for HMC-080S)

SW5	SW6	Parity
OFF	OFF	None
ON	OFF	Even
-	ON	Odd

4) SW 7 (Only for HMC-080S)

SW7	Stop Bit
OFF	1 STOP
ON	2 STOP

5) SW8 (HMC-080S,HMC-080)

SW8	Printer Mode
ON	HEX DUMP mode
OFF	NORMAL mode

2-4) Dip2 Switch

1) SW1 (Only for HMC-080S)

SW1	Real Time Command (Valid / Unvalid)
ON	DLE Command on
OFF	DLE Command off

2) SW2

SW2	(Not Fixed)
-	Reserve

3) SW3

SW3	(Not Fixed)
-	Reserve

4) SW4 (Only for HMC-080S,HMC-080P)

SW4	Update / Print
ON	Update Mode
OFF	Print Mode

2-5) Inner Connector

1) CN1 : Power Switch Connector (Housing : YH396-02)

Pin	Circuit	Remark
1	V+	+24
2	V+	+24

2) CN2 : Functional Extension Connector (53014-0710, Molex)

Pin	Circuit	Remark
1	NEAR C	NEAR END Detection Input
2	FEED IN	FEED Switch Input
3	A	Sensor Power (220Ω Resistance)
4	ERROR LED	ERROR LED Out (330Ω Resistance)
5	MARK C	BLACK MARK Detction Input
6	GND	GND
7	VDD	Logic Power (+5V)

※ Once ERROR LED fixed, Connect Cathode in Pin No.4 and Anode in VDD(+5V)

3) CN3 Thermal Head Control Connector (S15B-PH-K-S, JST)

Pin	Circuit	Remark
1	COM	+24V
2	COM	+24V
3	GND	
4	GND	
5	VDD	
6	TM	Thermistor
7	/STROBE1	Low Active
8	/STROBE2	Low Active
9	CLOCK	
10	/LATCH	Low Active
11	SI	
12	GND	
13	GND	
14	COM	+24V
15	COM	+24V

4) CN4 Motor Connector (53014-0610, Molex)

Pin	Circuit	Remark
1	A	φ1
2	B	φ2
3	+24V	Only Unipolar to operate
4	+24V	Only Unipolar to operate
5	/A	φ3
6	/B	φ4

5) CN5 Power DC Connector (AC00093-12-03, TECHWIN OPTO)

Pin	Circuit	Remark
1	V-	GND
2	V+	+24V
3	NC	(Non connection)

6) CN6 Auto Cutter Connector (5267-04A, Molex)

Pin	Circuit	Remark
1	CUT A	Operation Signal (CUT_A)
2	CUT B	Operation Signal (CUT_B)
3	SW	Detection Switch
4	GND	Detection Switch GND

7) CN7 Sensor Connector (53014-0510, Molex)

Pin	Circuit	Remark
1	GND	

2	GND	
3	VA	Sensor Power (220Ωresistance Pass)
4	Paper Detector Signal	
5	Head-up Detection Signal	

8) CN8 (HMC-080S, RS-232C, DSUB9, FEMALE)

Pin	Circuit	Remark
1	N.C	
2	TxD	
3	RxD	
4	DSR	
5	GND	
6	DTR	
7	CTS	
8	RTS	
9	N.C	

9) CN8 (HMC-080P,Parallel DSUB25, FEMALE)

Pin	Interchangeable	Nibble
1	nStrobe	(Unfixed)
2	D0	(Unfixed)
3	D1	(Unfixed)
4	D2	(Unfixed)
5	D3	(Unfixed)
6	D4	(Unfixed)
7	D5	(Unfixed)
8	D6	(Unfixed)
9	D7	(Unfixed)
10	nACK	PtrClk
11	Busy	PtrBusy / D3,7
12	PError	AckDataReq / D2,6
13	Select	Xflag / D1,5
14	nAutoFd	HostBusy
15	nFault	nDataAvail / D0,4
16	nInit	(Unfixed)
17	nSelectIn	1284-Active
18	GND	GND
19	GND	GND
20	GND	GND
21	GND	GND
22	GND	GND
23	GND	GND
24	GND	GND
25	GND	GND

10) CN9 (Assistant Sensor)

Pin	Circuit	Remark
1	C	Sensor Detection Siganl (Input)
2	NC	
3	A	Sensor Power (220Ω Resistance Pass)
4	NC	
5	NC	
6	GND	GND
7	GND	GND

11)CN10 DC Power (Only for HMC-060S)

Pin	Circuit	Remark
1	+	+24V
2	-	GND

2-6) Onboard Update

By using flash memory ,it's simple update on the computer,
Especially, the remote update is available, so ROM is not necessary to change,
and save your time.

1) Pls position 'ON' the SW4 in the Dip2 and switch off and on
Then ERROR LED(red) will be power off at twice.

2) Pls check the PC cable connected with printer.
* The cable should be connected 1:1 with RTS(Printer)-CTS(Host) connected

3) Pls conduct the given update program.
The update will be started after ERROR LED is off for 4 seconds.
Pls do not switch off the printer till the update ends.

4) The update will be end once the update finish appear on the screen.
If the ERROR LED is appeared as on and off continuously, it could be error update.
Pls Repeat 1) article.

5) Use the printer after the SW4 in Dip2 position OFF and switch on & off.

3. Command Summary

3-1) Command Directory

CR

[Name] Print and carriage return
[Format] ASCII CR
Hex 0Dh
Decimal 13
[Range] -
[Descript] equal LF

LF

[Name] Print and line feed
[Format] ASCII LF
Hex 0Ah
Decimal 10
[Range] -
[Descript] ①STANDARD MODE:
After printing the data and go to return according as the fixed data.
②PAGE MODE:
The fixed data can be only conduted, according as the fixed data.
[Caution] The LF is ignored behind of CR

CAN

[Name] Cancel print data in page mode
[Format] ASCII CAN
Hex 18h
Decimal 24
[Range] -
[Dsecirpt] -

HT

[Name] Horizontal tab
[Format] ASCII HT
Hex 09h
Decimal 9
[Range] -
[Descript] Moves the print position to the next tab poisition
[Caution] Horizontal tab position are to set in ESC+'D'+n.

FF

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

[Format]

ASCII	FF	
Hex	0Ch	
Decimal	12	

[Range] -

[Descript] Print the data in the print buffer and returns to standard mode

[Caution] Use ESC+FF once standard mode not to return

SUB+'x'+n

[Name] Extension Graphic Mode, Korean Mode

[Format]

ASCII	SUB	x	n
Hex	1A	78h	n
Decimal	26	120	n

[Range] 0≤n≤1

[Initial Value] n=0

[Descript] n=0 : Korean Mode, First code is A1h more, automatically transfer Korean in 2 bytes

n=1 : Extension Graphic Mode, Every code is setting in 1 byte
Extension Graphic font will be printed

SUB+'p'+n

[Name] Off line printing in paper detection

[Format]

ASCII	SUB	p	n
Hex	1A	70h	n
Decimal	26	112	n

[Range] 0≤n≤1

[Initial Value] n=1

[Descript] n=0 : Not transition to offline once paper empty (data communication available)

n=1 : Transition to offline once paper empty (data communication not avaiable)

SUB+'b'+n

[Name] Black mark detection

[Format]

ASCII	SUB	b	n
Hex	1A	62h	n
Decimal	26	98	n

[Range] 0≤n≤3

[Descript] n=0 : the feeding in easy flow direction till black mark is out

n=1 : the feeding in easy flow direction till black mark is detected

n=2 : the feeding in reverse direction till black mark is out

n=3 : the feeding in reverse directoin till black mark is detected

[Caution] the feeding range is restricted in 30Cm

Once the detection distance is over in 30Cm, it could be jammed

SUB+'R'+n

[Name] Set the character outline

[Format]

ASCII	SUB	b	n
Hex	1A	52h	n
Decimal	26	82	n

[Range] 0≤n≤1

[Descript] n=0 : cancel outline (border) of character in tetragon
n=1 : Set outilne (border) of charcater in tetragon

[Caution] the horizontal extension is valid as extended as eight times
the vertical extension is valid as extended as two times

SUB+'s'+n

[Name] Set the printing speed

[Format]

ASCII	SUB	s	n
Hex	1A	73h	n
Decimal	26	82	n

[Range] 1≤n≤10

[Initial Value] n=10

[Descirpt]

n=1 :	Printing Speed 70mm/s	n=8	: Printing Speed 140mm/s
n=2 :	Printing Speed 80mm/s.	n=9	: Printing Speed 150mm/s
n=3 :	Printing Speed 90mm/s	n=10	: Printing Speed 160mm/s
n=4 :	Printing Speed 100mm/s	n=11	: Printing Speed 170mm/s
n=5 :	Printing Speed 110mm/s	n=12	: Printing Speed 180mm/s
n=6 :	Printing Speed 120mm/s	n=13	: Printing Speed 190mm/s
n=7 :	Printing Speed 130mm/s	n=14	: Printing Speed 200mm/s

[Caution] Control command density once the low speed makes printing density (be) unclear

SUB+'1'

[Name] Choise of rule 1
[Format] ASCII SUB 1
Hex 1A 31h
Decimal 26 49
[Descript] Choose the rule 1 of two rules (rule1 or rule2).

SUB+'2'

[Name] Choise of rule 2
[Format] ASCII SUB 1
Hex 1A 32h
Decimal 26 50
[Descript] Choose the rule 2 of two rules (rule1 or rule2).

SUB+'W'+nL+nH+kL+kH

[Name] Writing the rule data
[Format] ASCII SUB W nL nH kL kH
Hex 1A 57h nL nH kL kH
Decimal 26 87 nL nH kL kH
[Range] 0≤nL+nHx256≤448, (0≤nL≤255, 0≤nH≤3)
0≤kL+kHx256≤448, (0≤kL≤255, 0≤kH≤3)
[Descript] It writes 1 from nL+nHx256 to kL+kHx256.
[Caution] If the range is exceed, the data will be ignored.
If the writing is set up, the data is not erased, until you do power off or you receive the command (the rule clear).

SUB+'C'

[Name] Rule CLEAR
[Format] ASCII SUB C
Hex 1A 43h
Decimal 26 67
[Descript] It clears all of data (as) zero you choosed.
[Caution] Please use this command, once you do rewrite the rule data.
If you need to speed up the processing, you use the command on/off.

SUB+'O'

[Name] Rule ON

[Format]	ASCII	SUB	O
	Hex	1A	4Fh
	Decimal	26	79

[Descript] Once you set up the command, the rull will be printing with the character or font.

SUB+'F'

[Name] Rule OFF

[Format]	ASCII	SUB	O
	Hex	1A	46h
	Decimal	26	70

[Descript] Once you set up the command, the rull will be preserved.

SUB+'P'

[Name] Printing a dot of Rule 1.

[Format]	ASCII	SUB	P
	Hex	1A	50h
	Decimal	26	80

[Descript] It's printing a dot of rule 1.

[Caution] Please do not use this command if you print the character or the graphic.
Please use the Rule ON if you print the character or the graphic.
Please use this command if you print the rule between row and row at the space.

ESC+'D'+n1…nk+NUL

[Name] Set the horizontal position

[Format]	ASCII	ESC	D	n1…nk	NUL
	Hex	1B	44h	n1…nk	00
	Decimal	27	68	n1…nk	0

[Range] 1≤n≤255, 0≤k≤32

[Descript] Set the horizontal tab position

[Caution] n : Indicating the figures from the start poistion of line to set position
K : indicating the total tabs per line

ESC+SP+n

[Name] Set the space amount on the right of ASCII character

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

[Range] 0≤n≤255

[Initial Value] n=0

[Descript] Set in n x 0.125mm the space amount on the right of ASCII character
[Caution] Set the Korean space in FS+'S+n

ESC+'!'+n

[Name] -
[Format] ASCII ESC ! n
Hex 1B 21h n
Decimal 27 33 n
[Range] 0≤n≤255
[Initial Value] n=0
[Descript] Set font & character in the same time
[Caution] -

Bit	Format	Hex	Decimal
0	0: Font 12x24, 24x24	00h	0
	1: Font 8x16, 16x16	01h	1
1	-	-	-
2	-	-	-
3	0: Cancel the stress	00h	0
	1: Set the stress	08h	8
4	0: Cancel the extension in Vertical	00h	0
	1: Set the extension in Vertical	10h	16
5	0: Cancel the extension in Horizontal	00h	0
	1: Set the extension in Horizontal	20h	32
6	-	-	-
7	0: Cancel the underline	00h	0
	1: Set the underline	80h	128

ESC+'$'+nL+nH

[Name]	Set absolute poisition				
[Format]	ASCII	ESC	$	nL	nH
	Hex	1B	24h	nL	nH
	Decimal	27	36	nL	nH
[Range]	0≤nL+nH×256≤65535, 0≤nL≤255, 0≤nH≤255				
[Initial Value]	nL=0, nH=0				
[Descript]	Move the printing position from left ending space to (nL+nH×256)×0.125mm				
	Move the printing position in left ending once printing position is over				

ESC+'*'+m+nL+nH+d1+…+dk

[Name] Set the bitmap image

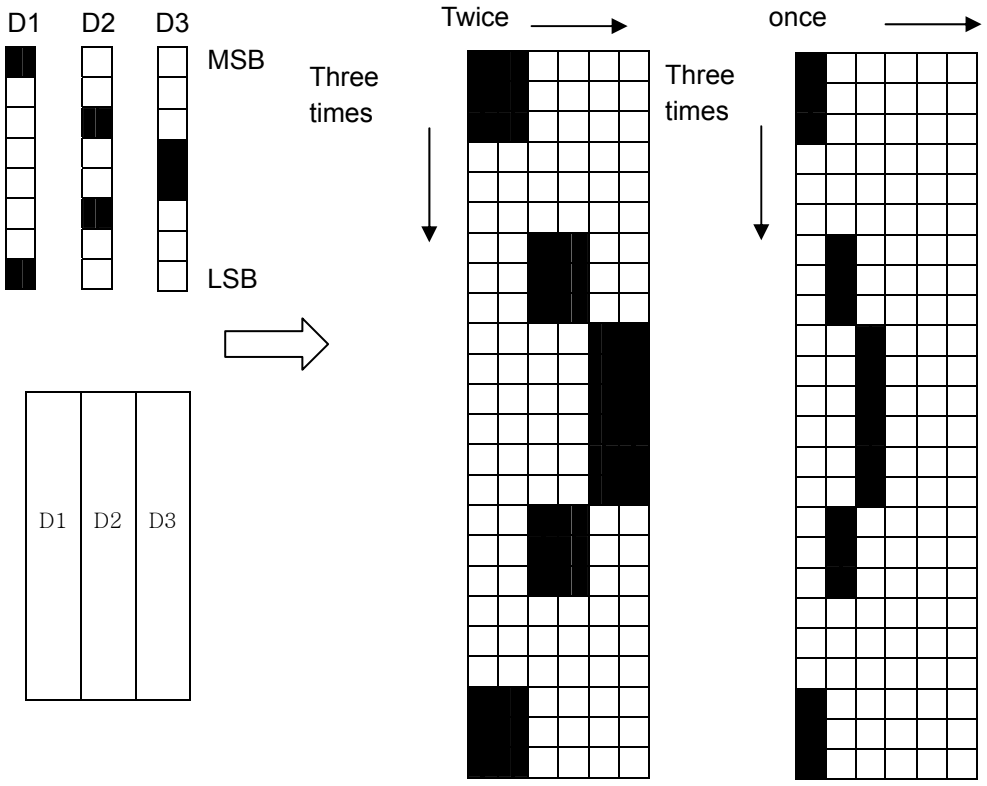
[Format]							
	ASCII	ESC	*	m	nL	nH	d1…dk
	Hex	1B	2Ah	m	nL	nH	d1…dk
	Decimal	27	42	m	nL	nH	d1…dk

[Range] m=0,1,32,33
1≤nL+nH×256≤1023, 0≤nL≤255, 0≤nH≤3, 0≤d≤255

[Descirpt] Due to fixing nL+nHx256, Printing from bit data to graphic data in Mode m

m	Mode	Dots in vertical	Dots in horizontal	Data (k)
0	8dots Single Density	8	224	nL+nH×256
1	8dots Double Density	8	448	nL+nH×256
32	24dots Single Density	24	224	(nL+nH×256)×3
33	24dots Double Density	24	448	(nL+nH×256)×3

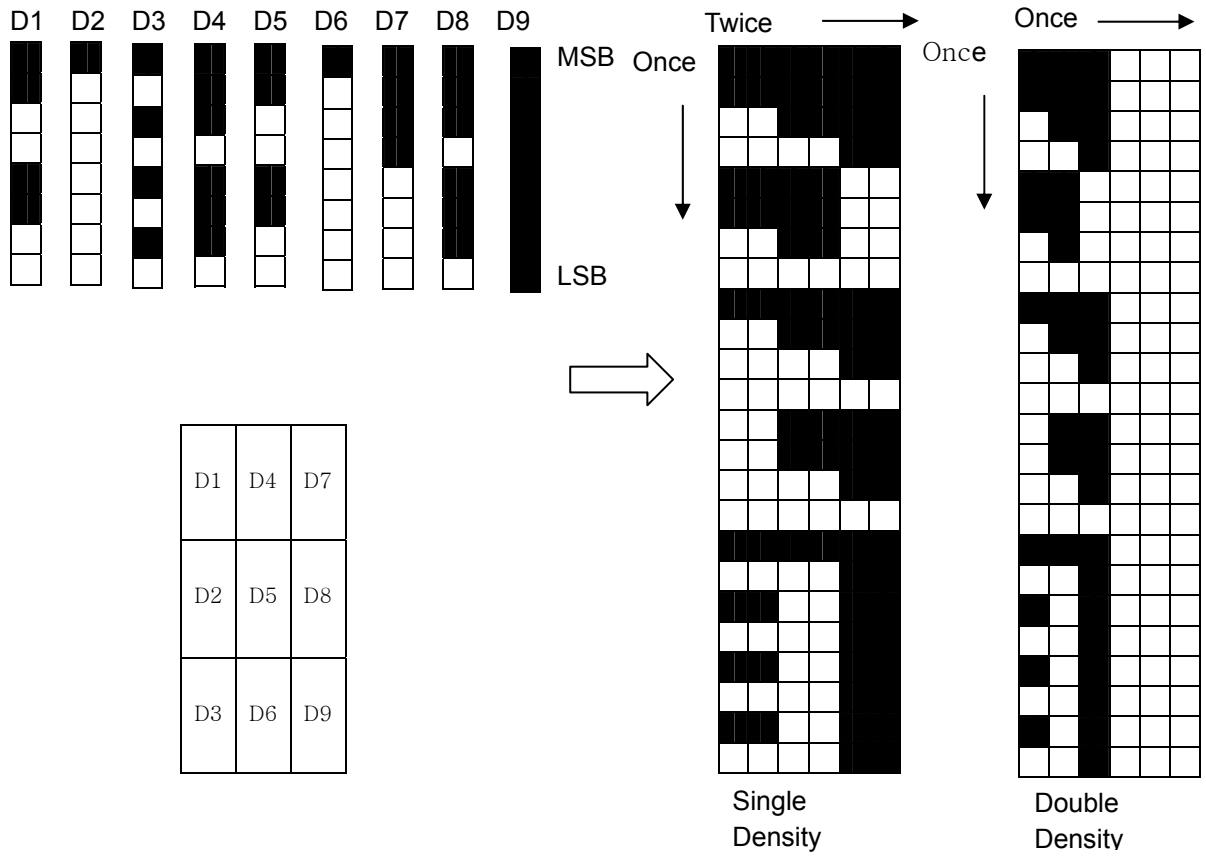
•8 dots Mode



Single Double

20

•24 dots Mode



ESC+'-'+n

[Name]	Set / Cancel underline			
[Format]	ASCII	ESC	-	n
	Hex	1B	2Dh	n
	Decimal	27	45	n
[Range]	0≤n≤255,			
[Invitial Value]	n=0,			
[Descript]	Set / Cancel underline			

n	Function
0	Cancel underline
1	Set underline in thick 0.125mm
2	Set underline in thick 0.25mm
3	Set underline in thick 0.375mm
4	Set underline in thick 0.5mm
5	Set underline in thick 0.625mm
6	Set underline in thick 0.75mm
7	Set underline in thick 0.875mm

ESC+'2'

[Name]	Set the interval of initial line			
[Format]	ASCII	ESC	2	
	Hex	1B	32h	
	Decimal	27	50	
[Range]	0≤n≤255,			
[Initial Value]	n=0			
[Descirpt]	Set the interval of initial value in 4mm			

ESC+'3'+n

[Name]	Set the interval of line			
[Format]	ASCII	ESC	3	n
	Hex	1B	33h	n
	Decimal	27	51	n
[Range]	0≤n≤255,			
[Initial Value]	n=0			
[Descript]	Set the interval of line in n x 0.125mm			

ESC+'@'

[Name]	Rest printer		
[Format]	ASCII	ESC	@
	Hex	1B	40h
	Decimal	27	64
[Range]	0≤n≤255,		
[Descript]	Clear buffer & Initialize all parameter		

ESC+'E'+n

[Name]	Set the font in thick			
[Format]	ASCII	ESC	E	n
	Hex	1B	45h	n
	Decimal	27	69	n
[Range]	0≤n≤255,			
[Initial Value]	n=0			
[Descript]	n=0, cancel the font in thick			
	n=1, set the font in thick			

ESC+'G'+n

[Name]	Set the printing double for font thickness			
[Format]	ASCII	ESC	G	n
	Hex	1B	47h	n
	Decimal	27	71	n
[Range]	0≤n≤255,			
[Initial Value]	n=0			
[Descript]	n=0, cancel the printing twice for font thickness			
	n=1, set the printing twice for font thickeness			

ESC+'J'+n

[Name]	Feeding			
[Format]	ASCII	ESC	J	n
	Hex	1B	4Ah	n
	Decimal	27	74	n
[Range]	0≤n≤255			
[Descript]	Printing the data inner buffer, feeding in n x 0.125mm			

ESC+'j'+n

[Name]	Back Feeding			
[Format]	ASCII	ESC	j	n
	Hex	1B	6Ah	n
	Decimal	27	106	n
[Range]	0≤n≤255			
[Descript]	Printing the data inner buffer and back feeding in n x 0.125mm			

ESC+'M'+n

[Name]	Select font			
[Format]	ASCII	ESC	M	n
	Hex	1B	4Dh	n
	Decimal	27	77	n
[Range]	0≤n≤2			
[Initial Value]	n=0			
[Descript]	Select printer font			

n	Font
0	12x24(ASCII), 24x24(Korean)
1	8x16(ASCII)

ESC+'R'+n

[Name] Select the International fonts

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

[Range] 0≤n≤13

[Initial Value] n=13

[Descirpt] Select the international fonts asf:-

n	Country Name
0	USA
1	France
2	Germany
3	England
4	Denmark1
5	Sweden
6	Italian
7	Spain1
8	Japanese
9	Norway
10	Denmark2
11	Spain2
12	Latin America
13	Korea

ESC+'a'+n

[Name] Align the printing

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

[Range] 0≤n≤2

[Initial Value] n=0

[Descript] Align the printing position

n	Printing Position
0	Left
1	Middle
2	Right

ESC+'d'+n

[Name] Printing and feeding 'n' line

[Format]				
	ASCII	ESC	d	n
	Hex	1B	64h	n
	Decimal	27	100	n

[Range] 0≤n≤255

[Descript] Printing the date & feeding 'n' line

ESC+'{'+n

[Name] Turning 180°

[Format]				
	ASCII	ESC	d	n
	Hex	1B	7Bh	n
	Decimal	27	123	n

[Range] 0≤n≤255

[Initial Value] n=0

[Descript] Set the reverse image

[Caution] Move the standard from the left to the right

n	Function
0	Cancel 180°
1	Set 180°

ESC+'i'

[Name] Full Cutting

[Format]			
	ASCII	ESC	i
	Hex	1B	69h
	Decimal	27	105

[Descript] Cutting the paper completely

ESC+'m'

[Name] Partial Cutting

[Format]			
	ASCII	ESC	i
	Hex	1B	6Dh
	Decimal	27	109

[Descript] Cutting the paper partially

ESC+'S'

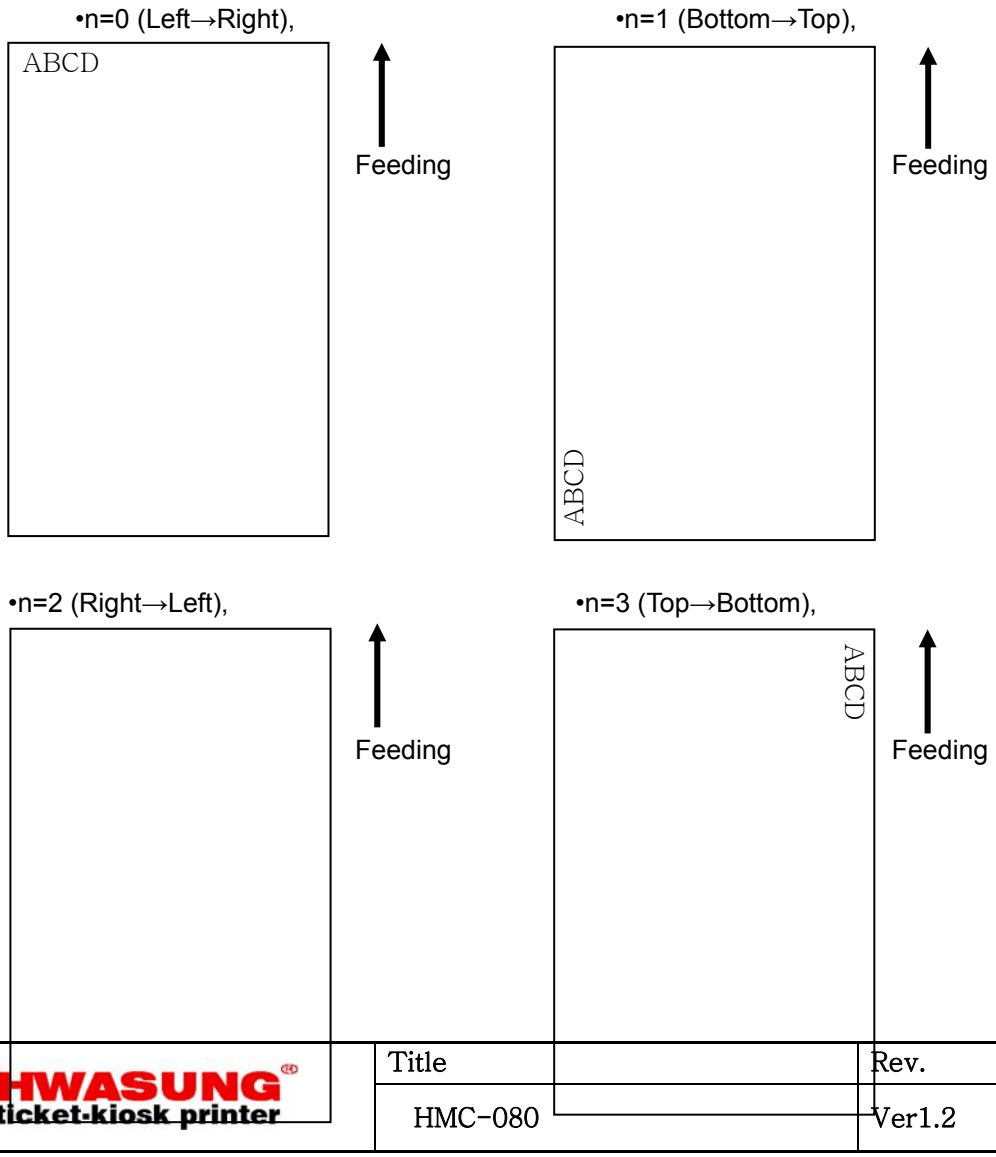
[Name]	Set the Standard mode		
[Format]	ASCII	ESC	S
	Hex	1B	53h
	Decimal	27	83
[Descript]	Swtiches from page mode to standard mode		

ESC+'L'

[Name]	Select page mode		
[Format]	ASCII	ESC	L
	Hex	1B	4Ch
	Decimal	27	76
[Range]	0≤n≤255		
[Initial Value]	n=0		
[Descript]	Switches from standard mode to page mode		

ESC+'T'+n

[Name]	Select print direction in page mode			
[Format]	ASCII	ESC	T	n
	Hex	1B	54h	n
	Decimal	27	84	n
[Range]	0≤n≤3			
[Initial Value]	n=0			
[Descript]	Select the print direction & start position in page mode			



ABCD

ESC+'W'+xL+xH+yL+yH+dxL+dxH+dyL+dyH

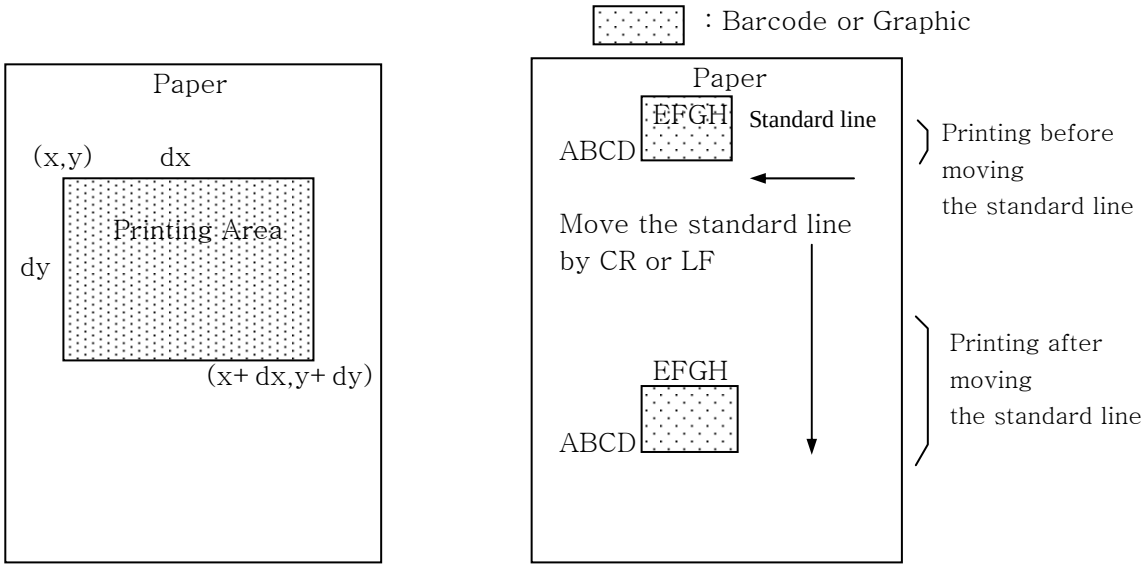
[Name]	Set printing area in page mode										
[Format]	ASCII	ESC	W	xL	xH	yL	yH	dxL	dxH	dyL	dyH
	Hex	1B	57h	xL	xH	yL	yH	dxL	dxH	dyL	dyH
	Decimal	27	87	xL	xH	yL	yH	dxL	dxH	dyL	dyH

[Range] 0≤xL+xH×256≤65535 (0≤xL≤255, 0≤xL≤255)
0≤yL+yH×256≤65535 (0≤yL≤255, 0≤yL≤255)
1≤dxL+dxH×256≤65535 (0≤dxL≤255, 0≤dxL≤255)
1≤dyL+dyH×256≤65535 (0≤dyL≤255, 0≤dyL≤255)

[Initial Value] (xL+xH×256)=0 (0mm, xL=0, xH=0)
(yL+yH×256)=0 (0mm, yL=0, yH=0)
(dxL+dxH×256)=448 (56mm, dxL=C0h, dxH=01h)
(dyL+dyH×256)=1200 (150mm, dyL=B0h, dyH=04h)

[Descript] Set printing area & starting point
Horizontal starting point : (xL+xH×256) × 0.125mm
Vertical starting point : (yL+yH×256) × 0.125mm
Horizontal size : (dxL+dxH×256) × 0.125mm
Vertical size : (dyL+dyH×256) × 0.125mm

[Caution] The maximum page width is available 56mm
The maximum page length is available 150mm
Barcode & graphic data is executed as per standard line,
If the size exceed the standard line, move the standardline by CR or LF.



FS+'!'+n

[Name] Set the printing mode in Korean

[Format]

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

[Range] 0≤n≤255

[Initial Value] n=0

[Descript] Set the printing mode in Korean

[Caution] Only valid in Koean

Bit	Function	Hex	Decimal
0	-	00h	0
1	-	00h	0
2	Cancel the horizontal extension	00h	0
	Set the horizontal extension	04h	4
3	Cancel the vertical extension	00h	0
	Set the vertical extension	08h	8
4	-	00h	0
5	-	00h	0
6	-	00h	0
7	Cancel the underline	00h	0
	Set the underline	80h	128

FS+'&'

[Name] Set to print Korean mode (2bytes Mode)

[Format]

ASCII	FS	&
Hex	1C	26h
Decimal	28	38

[Descript] Set to print Korean mode (2bytes Mode)

[Caution] Set to print Korean mode in extended graphic mode
Appointment is not required in Korean mode, due to auto detection

FS+'.'

[Name] Cancel Korean mode (2Bytes mode)

[Format]

ASCII	FS	.
Hex	1C	2Eh
Decimal	28	46

[Descript] Cancel Korean mode (2Bytes mode)

[Caution] In case of cancel 2 bytes mode in extended graphic mode
Appointment is not required due to auto detection in Korean mode
(Ref.SUB+'x'+n command)

FS+'-'+n

[Name] Set the underline of Korean

[Format]	ASCII	FS	-	n
	Hex	1C	2Dh	n
	Decimal	28	45	n

[Range] 0≤n≤2
[Initial Value] n=0
[Descript] Set the underline of Korean

n	Function
0	Cancel the underline of Korean
1	Set the thickness of underline in 0.125mm
2	Set the thickness of underline in 0.25mm

FS+'S'+n1+n2

[Name] Set the space between Korean characters

[Format]	ASCII	FS	S	n1	n2
	Hex	1C	53h	n1	n2
	Decimal	28	83	n1	n2

[Range] 0≤n1≤255, 0≤n2≤255
[Initial Value] n=0
[Descript] Set the space between Korean characters
Set the left space in n1×0.125mm
Set the right space in n2×0.125mm

FS+'W'+n

[Name] Set the font size in Korean

[Format]	ASCII	FS	W	n
	Hex	1C	57h	n
	Decimal	28	87	n

[Range] 0≤n1≤255
[Initial Value] n=0
[Descript] Set the Korean font size twice (HorizontalxVertical) in Korean
n=0, Cancel the font size two times
n=1, Set the font size two times

FS+'q'+n+(xL+xH+yL+yH+d1…dk)1……+(xL+xH+yL+yH+d1…dk)n

[Name] Register logo (bitmap image) non volatilization

[Format]

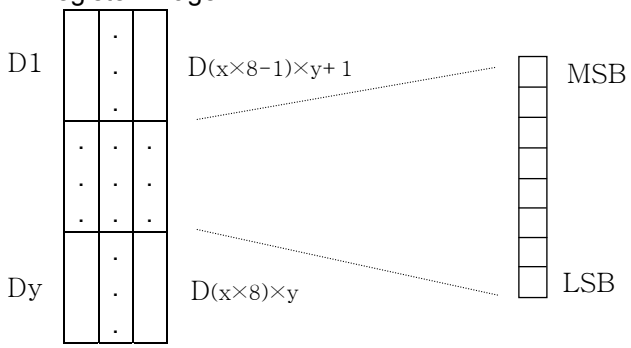
ASCII	FS	q	n (xL xH yL yH d1..dk)1…(xL xH yL yH d1..dk)n
Hex	1C	71h	n (xL xH yL yH d1..dk)1…(xL xH yL yH d1..dk)n
Decimal	28	113	n (xL xH yL yH d1..dk)1…(xL xH yL yH d1..dk)n

[Range]
1≤n≤255
0≤xL+xH×256≤65535 (0≤xL≤255, 0≤xH≤255)
0≤yL+yH×256≤65535 (0≤yL≤255, 0≤yH≤255)
0≤d≤255
k=(xL+xH×256)×(yL+yH×256)×8
Capable register : 64kbytes

[Descript.]
Register the logo non-volatilization
n : Total unit of N/V logo
xL,xH : Set the horizontal dot in (xL+xH×256)×8
yL,yH : Set the vertical dot in (xL+xH×256)×8
k : Bitmap image of a N/V logo

[Caution]
Register various as much as NV's capa.
Required to delete all if (it is) registered again.
Renewable registeration / deletion at 100000 cycles,
It's not recommended frequent registeration / deletion,
due to memory damage

<Register Image >



FS+'p'+n+m 31

[Name] Printing N/ V logo

[Format]					
	ASCII	FS	p	n	m
	Hex	1C	70h	n	m
	Decimal	28	112	n	m

[Range] 1≤n≤255, 0≤m≤3

[Initial Value] n=0

[Descript.] m : printing the registered N/V in 'm' mode
n : indicating the regsitered logo in the 'n'.

m	Printing mode
0	Standard
1	Horizontal extension
2	Vertical extension
3	Horizontal,vertical extension in the same time

GS+'!'+n

[Name] Set the proportion of character extention

[Format]				
	ASCII	GS	!	n
	Hex	1D	21h	n
	Decimal	29	33	n

[Range] 0≤n1≤255 (horizontal / vertical portions is restricted maxim value 8)

[Initial Value] n=0

[Descript.] Set the proportion of character extention

[Caution] Caculate the numberic value if vertical & horizontal is extended in the same time
ex.) x3 (Horizontal Rate), x3(Vertical Rate) : n=32+2=34

Bit	Function
0-3	Set the extension proportion in vertical
4-7	Set the extension proportion in horizontal

Extension in Horizontal **Extension in Vertical**

n(Hex)	n(Decimal)	Rate
00h	0	x1
10h	16	x2
20h	32	x3
30h	48	x4
40h	64	x5
50h	80	x6
60h	96	x7
70h	112	X8

n(Hex)	n(DecimaL)	Rate
00h	0	x1
01h	1	x2
02h	2	x3
03h	3	x4
04h	4	x5
05h	5	x6
06h	6	x7
07h	7	X8

GS+'('+'K'+pL+pH+fn+m (fn=49)

[Name] Set the printing density

[Format]	ASCII	GS	(	K	pL	pH	fn	m
	Hex	1D	28h	4Bh	pL	pH	fn	m
	Decimal	29	40	75	pL	pH	fn	m

[Range] pL=2, pH=0, fn=49
0≤m≤5, 251≤m≤255

[Initial Value] m=0

[Descript] Set the printing density

m	Density	m	Density
-	-	0	Standard
251	Level –5	1	Level +1
252	Level –4	2	Level +2
253	Level –3	3	Level +3
254	Level –2	4	Level +4
255	Level -1	5	Level +5

GS+'('+'K'+pL+pH+fn+m (fn=97)

[Name] Operating thermal head partially

[Format]	ASCII	GS	(	K	pL	pH	fn	m
	Hex	1D	28h	4Bh	pL	pH	fn	m
	Decimal	29	40	75	pL	pH	fn	m

[Range] pL=2, pH=0, fn=97
0≤m≤2

[Initial Value] m=0

[Descript] Set the operation of partial thermal head

[Caution] This function is effective in case of power capa is short.

The Second division of electric current (ampere) will be half than first division.

m	Partial operation
0	Initial setting (first division)
1	First Division
2	Second Division

GS+'B'+n

[Name] Reverse printing in black

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

[Range] 0≤n≤255

[Initial Value] n=0

[Descript] Reverse printing in black
n=0, standard printing
n=1, reverse printing in black

GS+'H'+n

[Name] Select the printing position of HRI characters (Barcode)

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

[Range] 0≤n≤3

[Initial Value] n=0

[Descript] Select the printing positions of numerical value & characters

n	Printing Position
0	Non printing
1	Above the barcode
2	Below the barcode
3	Both above & below barcode

GS+'L'+nL+nH

[Name] Select the left margin

[Format]	ASCII	GS	L	nL	nH
	Hex	1D	4Ch	nL	nH
	Decimal	29	76	nL	nH

[Range] 0≤nL≤255, 0≤nH≤255

[Initial Value] nL+nH×256=0 (nL=0, nH=0)

[Descript] The left margin is set in (nL+nH×256)×0.125mm.

GS+'V'+m

[Name] Select cut mode and cut paper

[Format]	ASCII	GS	V	m
	Hex	1D	56h	m
	Decimal	29	86	m

[Range] 0≤m≤1

[Initial Value] m=0

[Descript] Select a mode for cutting paper

m	Function
0	Full Cutting
1	Partial Cutting

GS+'W'+nL+nH

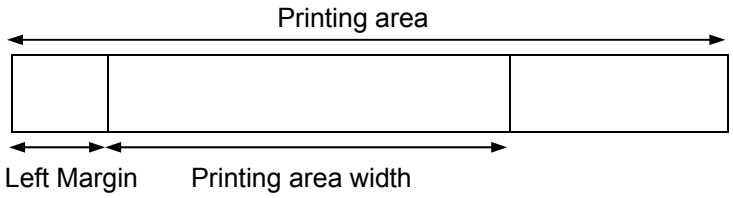
[Name] Set printing area width

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

[Rasnge] 0≤nL≤255, 0≤nH≤255

[Initial Value] nL+nH×256=448 (56mm, nL=0, nH=0)

[Descript] Set printing area width from the left margin in (nL+nH×256)×0.125mm



GS+'h'+n

[Name] Select barcode height

[Format]	ASCII	GS	h	n
	Hex	1D	68h	n
	Decimal	29	104	n

[Range] 1≤n≤255

[Initial Value] n=162 (20.25mm)

[Descript] Select barcode height by n×0.125mm

GS+'k'+m+d1…dn+NUL

[Name] Print barcode

[Format]

ASCII	GS	k	m	d1…dn	NUL
Hex	1D	6Bh	m	d1…dn	00h
Decimal	29	107	m	d1…dn	0

[Range] 1≤m≤7, n & d depend on barcode system used

[Descript] Refer the table as below

m	Barcode system	n (Barcode data numbers)	d (barcode data)
1	UPC-E	n=7 (check digit is automatically added)	48≤d≤57
2	EAN13	n=12 (check digit is automatically added)	48≤d≤57
3	EAN8	n=7 (check digit is automatically added)	48≤d≤57
4	CODE39	1≤n (Start & Stop characteres is automatically added	48≤d≤57, 65≤d≤90 d=32,36,37,43,45,46,47
5	ITF(I of 2/5)	1≤n (Only even number)	48≤d≤57
6	CODABAR	1≤n	48≤d≤57, 65≤d≤68 d=36,43,45,46,47,58
7	CODE128	2≤n≤255 (Check digit , Stop character Is automatically added)	0≤d≤127

[Caution] In CODE128, set additional “{“ in 2bytes when the special character as below

Special character	Barcode data		
	ASCII	Hex	Decimal
SHIFT	{S	7Bh, 53h	123, 83
CODE A	{A	7Bh, 41h	123, 65
CODE B	{B	7Bh, 42h	123, 66
CODE C	{C	7Bh, 43h	123, 67
FNC1	{1	7Bh, 31h	123, 49
FNC2	{2	7Bh, 32h	123, 50
FNC3	{3	7Bh, 33h	123, 51
FNC4	{4	7Bh, 34h	123, 52
“{“	{{	7Bh, 7Bh	123, 123

GS+’w’+n

[Name] Set the vertical size of barcode

[Format]

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

[Range] 1≤n≤4

[Initial Value] n=2

[Descript.] Set the vertical size of barcode

n	Module width	Two level barcode	
		Narrow	Wide
1	0.25mm	0.125mm	0.375mm
2	0.375mm	0.25mm	0.625mm
3	0.5mm	0.375mm	1mm
4	0.625mm	0.5mm	1.25mm

* Multi Level barcode : UPC-E, EAN13, EAN8
* 2 level barcode : CODE39, ITF, CODABAR

GS+'r'+n

[Name]	Transmit status			
[Format]	ASCII	GS	r	n
	Hex	1D	72h	n
	Decimal	29	114	n
[Range]	n=1			
[Descript]	Transmit current status of printer			
[Caution]	The status is not ready till the printer is offline,			
	The command is executed when the data in receive buffer is devloped			
	Therefore automatic status function (GS+'a'+n) is to use better,			
	It is used for re-confirm in on-line after automatic status is received			

GS+'a'+n

[Name] Enable / Disable automatic status back (ASB)

[Format]

ASCII	GS	a	n
Hex	1D	61h	n
Decimal	29	97	n

[Range] 0≤n≤1

[Initial Value] n=1

[Descript] Enable / Disable ASB
If the status is changed after checking the printer status,
the status is automatically executed.
This command is executed to enable or disable.

n	Function
0	Disable automatic status back
1	Enable automatic status back

<Status transmission data >

Bit	Satus	Hex	Decimal
0	0 : Paper	00h	0
	1 : No paper	01h	1
1	0 : Printer head down	00h	0
	1 : Printer head up	02h	2
2	0 : Paper w/o jamm	00h	0
	1 : Paper with jamm	04h	4
3	0 : Paper adequate	00h	0
	1 : Paper Near End	08h	8
4	0 : Print complete	00h	0
	1 : Print or Feeding	10h	16
5	0 : Cutter no- error (jamm)	00h	0
	1 : Cutter error (jamm)	20h	32
6	0	00h	0
7	0	00h	0

※ the status of bit 4 is effective when the realtime command DLE + EOT + n,
The others are fixed '0'.

GS+'v'+'0'+m+xL+xH+yL+yH+d1+…+dk

[Name] Laster bitmap image

[Format]

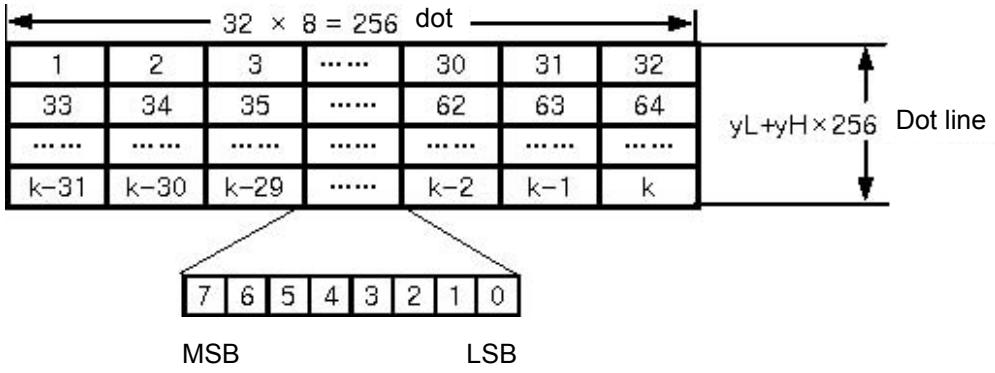
ASCII	GS	v	0	m	xL	xH	yL	yH	d1..dk
Hex	1D	76h	30h	m	xL	xH	yL	yH	d1..dk
Decimal	28	118	48	m	xL	xH	yL	yH	d1..dk

[Range] 0≤m≤3 or 48≤m≤51,
1≤(xL+xH×256)≤15 (0≤xL≤150, xH=0)
1≤(yL+yH×256)≤436 (0≤yL≤255, 0≤yH≤1)
0≤d≤255 (yL+yH×256)
k (total date) = (xL+xH×256) × (yL+yH×256)

[Description] You can print the laster image at the range of 'm'.
You can fix the number of horizontal data in xL,xH.
You can fix the number of vertical dot in yL,yH.
'd' indicates the laster bitmap image.

m	Mode	Enlarge
0,48	Normal	Once
1,49	Horizontal enlarge	Twice hor.
2,50	Vertical enlarge	Three times ver.
3,51	Hor.Ver.enlarge	Twice hor.Three ver.

For example) In case of xL+xH×256 = 32,



[Name] 2D Barcode

[Format]

ASCII	SUB	B	n1	n2	n3	d1……dk
Hex	1A	42h	n1	n2	n3	d1……dk
Decimal	26	66	n1	n2	n3	d1…… 0ł

[Range] Please refer the table.

[Description] Please use the appropriate barcode with the number of barcode.

n1 : barcode type

n1	Barcode type
1	PDF417
2	QR code

n2 : the number of barcode

n3 : the size of barcode

d1……dk : barcode data

1) PDF417

n2	Number of Barcode
	1 < n2 ≤ 255

n3	Barcode size (number of horizontal)
3	3
4	4
5	5
6	6
7	7
8	8
9	9

2) QR code

n2	Barcode size (number of horizontal)
n3=1	1 < n2 ≤ 17
n3=3	1 < n2 ≤ 53
n3=5	1 < n2 ≤ 106
n3=9	1 < n2 ≤ 230

n2	Barcode size
n3=1	Version 1
n3=3	Version 3
n3=5	Version 5
n3=9	Version 9

* Vertical is an automatical set.

The reader will be lowered in reading at the 2D barcode.
In order to be reading better, we recommend that you lower the speed, in order to minimize the spreading at the printing. Please refer the commands, such as printing speed,etc.

DLE+ENQ+n

[Name]	Realtime request the printer to be clear each buffer			
[Format]	ASCII	DLE	ENQ	n
	Hex	10h	05h	n
	Decimal	16	5	n
[Range]	n=2			
[Descript]	This command is processed immediatley when it is received.			
[Caution]	This command is effective when DIP SW1 is on			
	This command is excuted when the printer is offline.			
	If the command is received same data, it could be same operation			
	(Bit image data,etc)			
	(Ref, this command is invalid once online)			

DLE+EOT+n

[Name]	Realtime status transmission			
[Format]	ASCII	DLE	EOT	n
	Hex	10h	04h	n
	Decimal	16	4	n
[Range]	n=2			
[Descript]	The printer transmits the current data.			
	Each status item is represented by one-byte data			
[Caution]	This command is only effective if DIP SW1 is on.			
	Pls refer the status at the table, page 29			
	If the command is received same data, it could be same operation			
	(Bit image data,etc)			

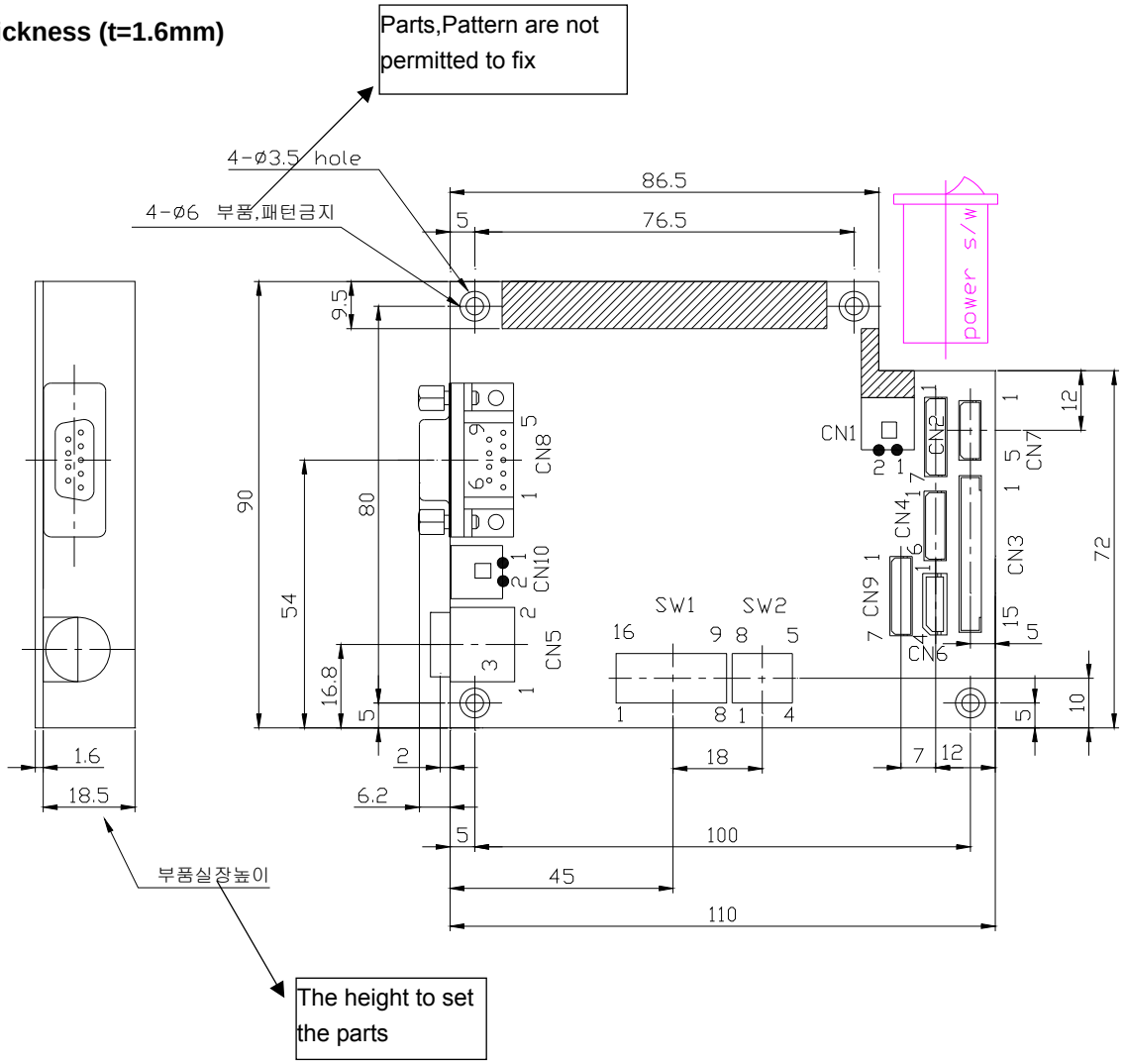
4.Sample Program

The details below are of VB6.0 sample program.

```
Private Sub Command1_Click()

    MSComm1.CommPort = 1                ‘COM1
    MSComm1.Settings = "38400,n,8,1"    ‘SET RS-232C"
    MSComm1.PortOpen = True
    MSComm1.RTSEnable = True
    MSComm1.Handshaking = comRTS        ‘ RTS flow control

    MSComm1.Output = "1234567890ABCDEFG" & Chr(&H0A)
    MSComm1.Output = "I LOVE YOU SO MUCH" & Chr(&H0A)

    ‘--------- BARCODE --------------------------------
    MSComm1.Output = Chr(&H1D) & "h" & Chr(40) ' barcode height
    MSComm1.Output = Chr(&H1D) & "k" & Chr(5)   ' barcode type
    MSComm1.Output = "010001200307311439" & Chr(0)   ' barcode data

    ‘ ---------- CUTTING -----------------------------
    MSComm1.Output = Chr(&H1D) & "V" & Chr(0)   ' FULL CUTTING

    MSComm1.PortOpen = False

End Sub
```

5. Board Dimensions

Thickness (t=1.6mm)



The thermal paper recommended for Thermal Print Head / Auto cutter.		
Model	**Part**	**Paper recommended**
HMC-060	TPH	MODEL : TF50KS-E2D (NIPPON PAPER)
HM-060C	AUTO CUTTER	CALIPER : 65-180 ㎛
HMC-080	TPH	MODEL : TF50KS-E (NIPPON PAPER)
HM-080C	AUTO CUTTER	CALIPER : 65-110 ㎛
HMK-060	TPH	MODEL : TF50KS-E2D (NIPPON PAPER)
	AUTO CUTTER	CALIPER : 65-180 ㎛
HMK-080	TPH	MODEL : TF50KS-E (NIPPON PAPER)
	AUTO CUTTER	CALIPER : 65-110 ㎛
HMKP-080	TPH	MODEL : TF50KS-E (NIPPON PAPER)
	AUTO CUTTER	CALIPER : 65-110 ㎛
HMK-825	TPH	MODEL : TF50KS-E2D (NIPPON PAPER)
	AUTO CUTTER	CALIPER : 65-110 ㎛
	AUTO CUTTER	CALIPER : 65-110 ㎛
HMKP-825	TPH	MODEL : TF50KS-E2D (NIPPON PAPER)
	AUTO CUTTER	CALIPER : 65-110 ㎛
HP-058	TPH	MODEL : TF50KS-E2D (NIPPON PAPER) MODEL : PD190R (OJI PAPER) MODEL : PD160R-N (OJI PAPER) MODEL : PD160R-63 (OJI PAPER)
	AUTO CUTTER	CALIPER : 60-80 ㎛

*** If it is the thermal paper which does not recommend as those above, the lifes at TPH and Cutter could be changed.**

*** If it is the thermal paper which does not recommend as those above, the printing condition could be changed.**