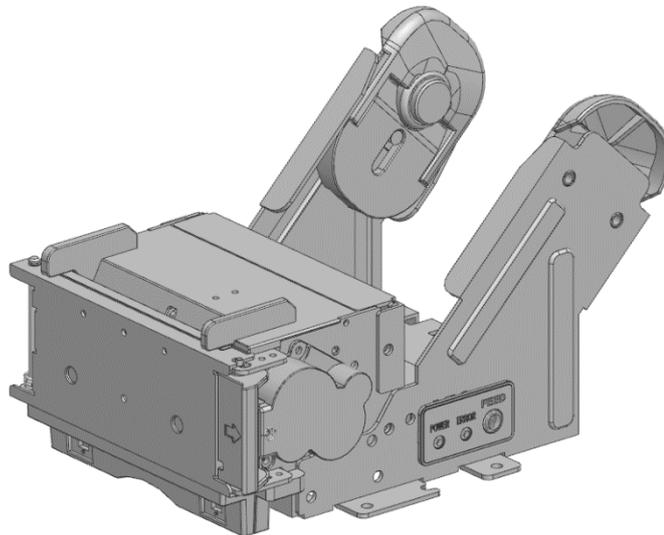
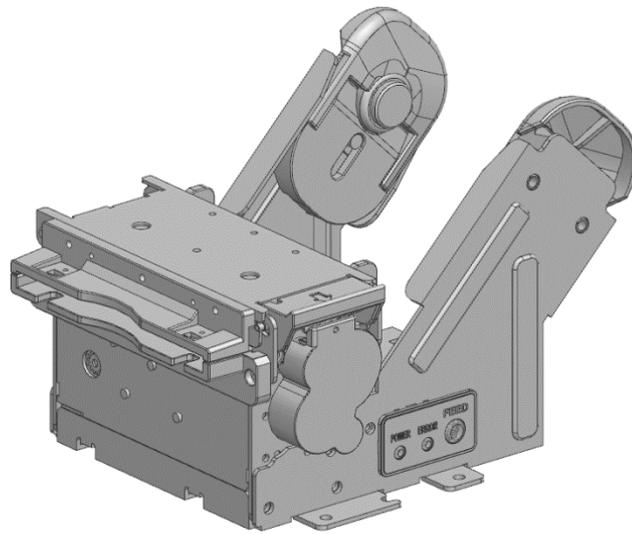


User Manual

HMK-056

HMV-056



※Safety Caution!



Caution : Please follow the directions while using the product, or it may cause malfunctions, serious injuries, or even death.

- Do not disassemble or modify the product.
- Remove jammed paper while switching off the power
- Keep at the specified voltage.
- Do not wash the product.
- Avoid hitting or causing an impact to the product.
- Prevent the product from the wet or humid environment.



Caution : Please follow the directions while using the product, or it may cause malfunctions, serious injuries, or even death.

- When you find any problem, contact us and take an action.
- Please power off during cleaning of the device.
- Please ventilate the space where the product works in often.
- Please install the product away from the near interferences.
- Please install the wiring in a safe place.
- Please follow the directed terms of compliance in using the electrical product.

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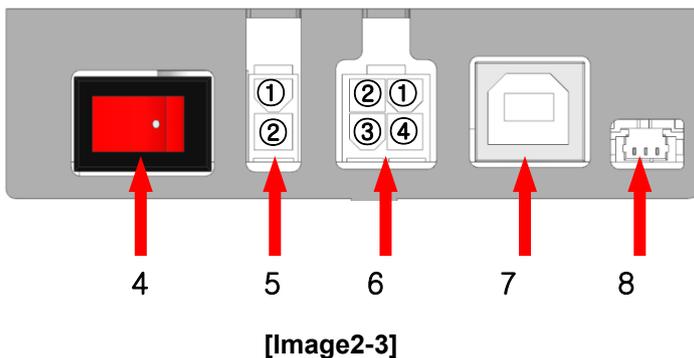
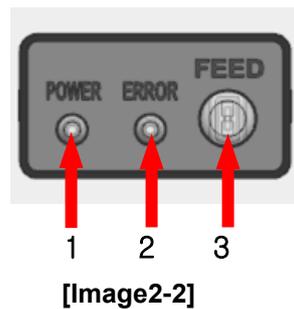
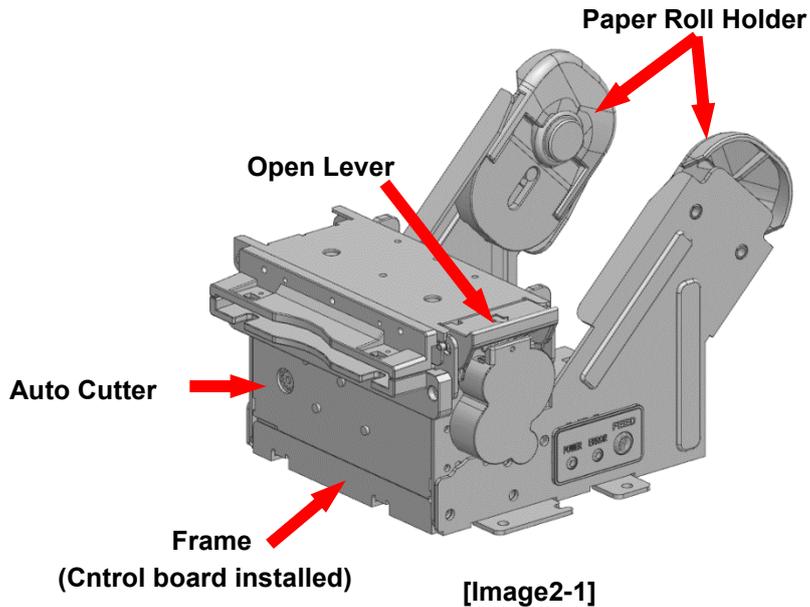
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1. General Specifications

Printing Method		Direct Linear Thermal	
Dot Density		203DPI (8dots/mm(W) x 8dots/mm(H))	
Number of dots/line		448 dots	
Paper Feeding Width(1 step)		0.125mm	
Paper Thickness		50 μ m ~ 150 μ m	
Paper Roll Diameter (MAX)		Φ 100 (OPTION Φ 150, Φ 200)	
Paper Width		60mm	
Printing Width		56mm	
Numbers of Characters per Line (Default Value)	Font A(12x24)	36characters	
	Font B(9x16)	48characters	
	Korean A(24x24)	18characters	
	Korean B(16x16)	27characters	
Printing Speed		Max 200mm/s	
Font Size	Font A(12x24)	1.50 x 3.00mm	
	Font B(9x16)	1.13 x 2.00mm	
	Korean A(24x24)	3.00 x 3.00mm	
	Korean B(16x16)	2.00 x 2.00mm	
Numbers of Characters		English 95	
		Extended Character(Code page) : 128 x 10	
Barcode	1 Dimension	UPC-E, EAN8, EAN13, ITF, CODABAR, CODE39, CODE93, CODE128	
	2 Dimension	PDF417, QR CODE	
Auto Cutter		Guillotine Type (Full / Partial Cut)	
Interface	Serial	RS232C	
	USB	USB2.0 Full Speed	
Receiving Buffer Size		4Kbyte	
SMPS Specifications		Input Voltage	100V ~ 240V(AC)
		Output Voltage	24V(DC) (Maximum 25.5V)
		Output Current	2.5A
Life Span (25°C, average humidity)		Thermal Head 100Km(100 Million Pulses) Auto Cutter : 2Milion Cuts	
Environment Condition	Temperature	Operating -20°C ~ 60°C(#1) (-4°F ~ 140°F) (#1) Guaranteed operating temperature range of the product is only from 0°C to 45°C, the guaranteed life time of product may be reduced if used outside the guaranteed temperature range. Storage -25°C ~ 60°C (-13°F ~ 140°F)	
	Humidity	Operating 40 ~ 85% RH (Noncondensing only) Storage 40 ~ 95% RH	
Weight		Horizontal type : 481g Vertical type : 514g	
External Dimensions		Horizontal type : 99 x 138 x 92 (mm) Vertical type : 99 x 150 x 93 (mm)	
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2. Names of Parts and External Dimensions

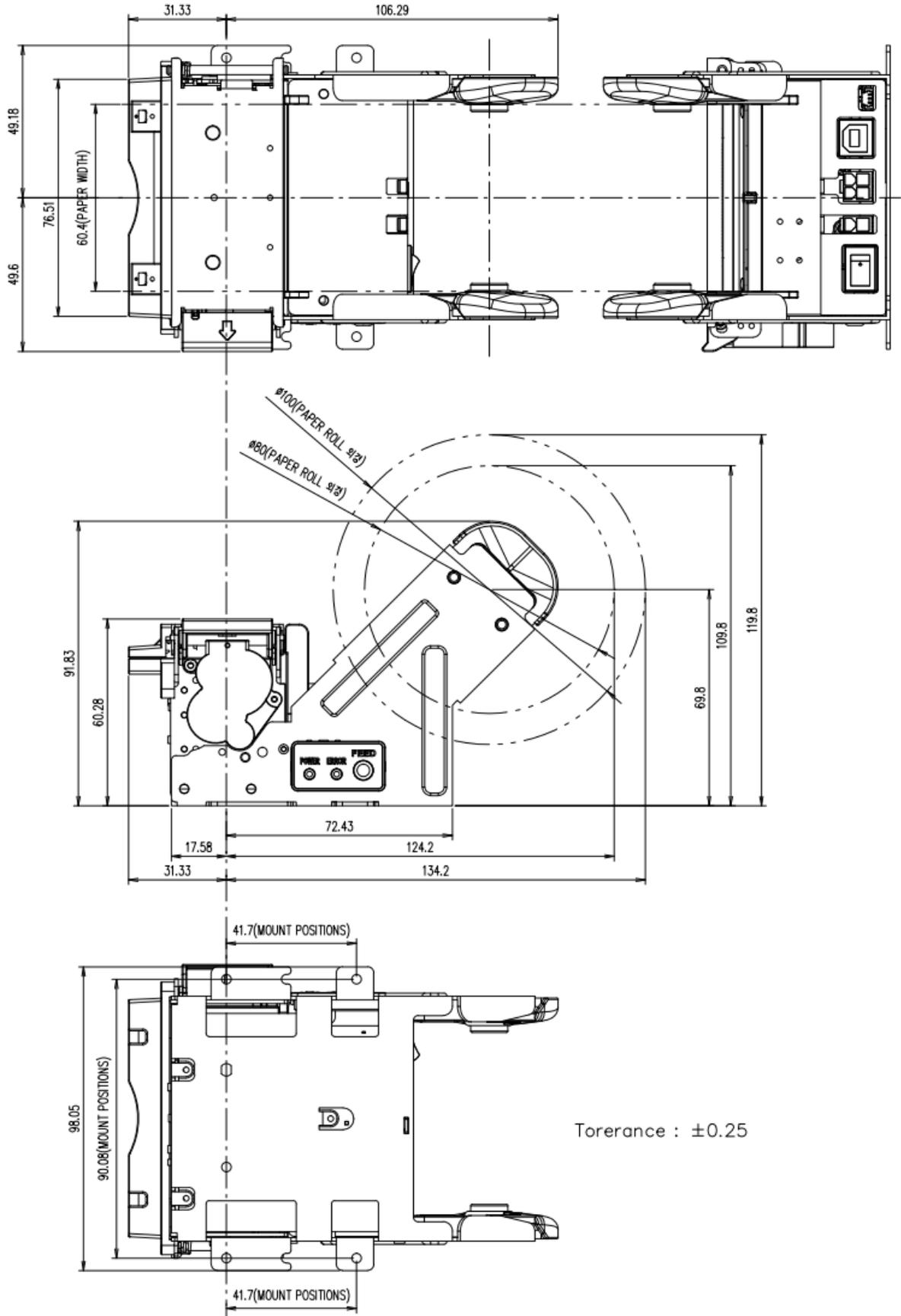
2-1) Component Overview



- 1. Power LED
 - 2. Error LED
 - 3. Feed Button
 - 4. Power Switch
 - 5. DC (24VDC)
 - 6. Comm. Connector (Serial, Female 4 pin)
 - 7. Comm. Connector (USB, Type B)
 - 8. Near End Sensor Connector
- Comm. Connector (Serial, Female 4 pin)

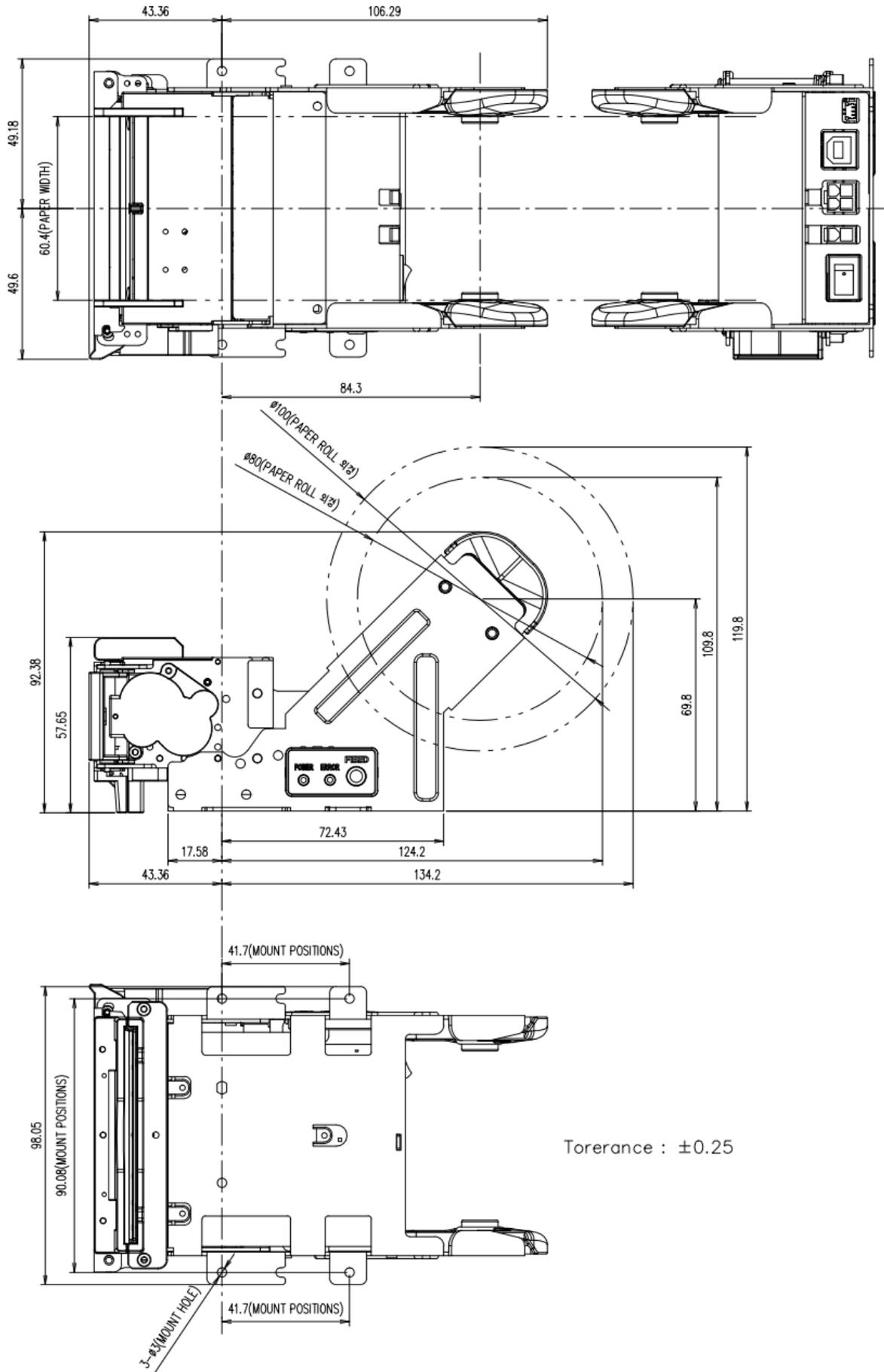
2-2) External Dimensions

2-2-1) HMK-056



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2-2-2) HMV-056



	Model	Rev.	Page
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2-3) Model Number

HM□-056



※ Frame Type

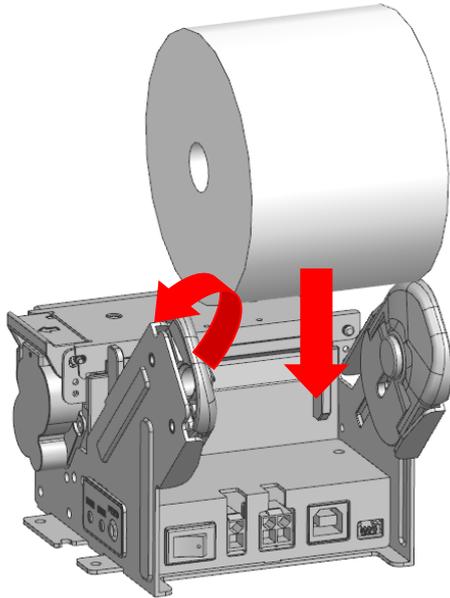
K : Kiosk(Fixture) Type

V : Vertical Type

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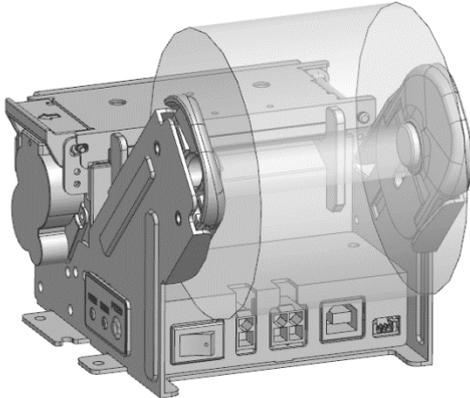
3. Operation

3-1) Loading Paper



1. Push the left lever and move the paper roll down in the direction of the arrow.

[Image3-1]



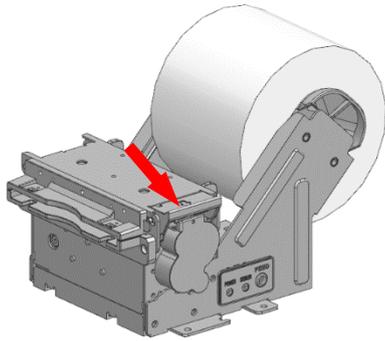
2. Release the left lever and the paper roll are loaded.

[Image3-2]

3-2) Paper Changing

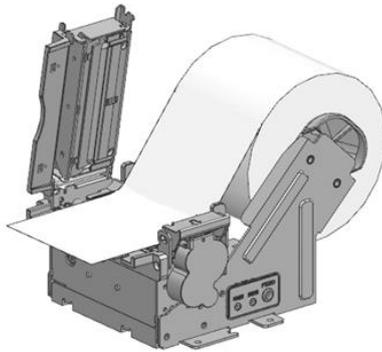
You can change the paper roll in two ways.

3-2-1) Clamshell Method



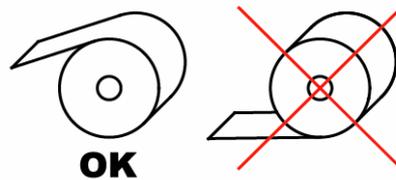
[Image3-3]

1. Push the open lever to open the cover.

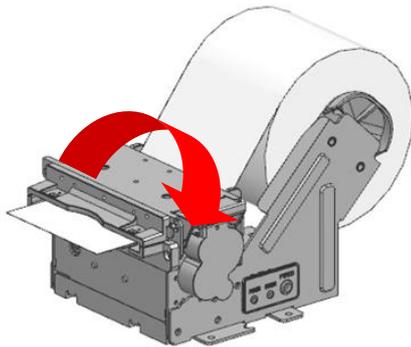


[Image3-4]

. Insert the paper into the feeding entrance. Take care of the side of the paper roll. [Image3-5]
Keep putting the paper in until it sticks out the auto cutter.



[Image3-5]

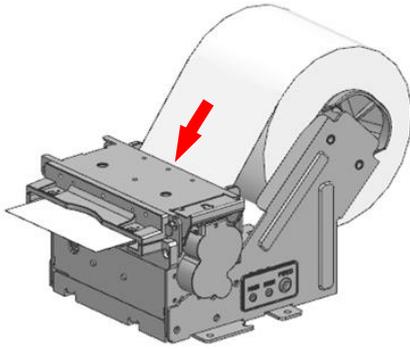


[Image3-6]

3. Close the cover in the direction of the arrow in [Image 3-6].
After changing the paper rolls, you can press the feed button to check whether it works properly.

* If the paper does feed out well, open the cover and insert the paper again.

3-2-2) Auto Loading Method



[Image3-7]

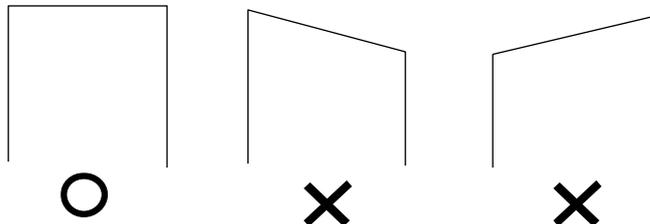
1. Turn on the power.

2. Cut the end of the paper like the [Image 3-8]

3. When the cover is closed, push the paper into the feeding entrance and the printer will start the auto loading. It will cut the paper after feeding it to a certain point.

※ Push the paper deeply into the entrance.

※ The motor makes some noises, which are normal.

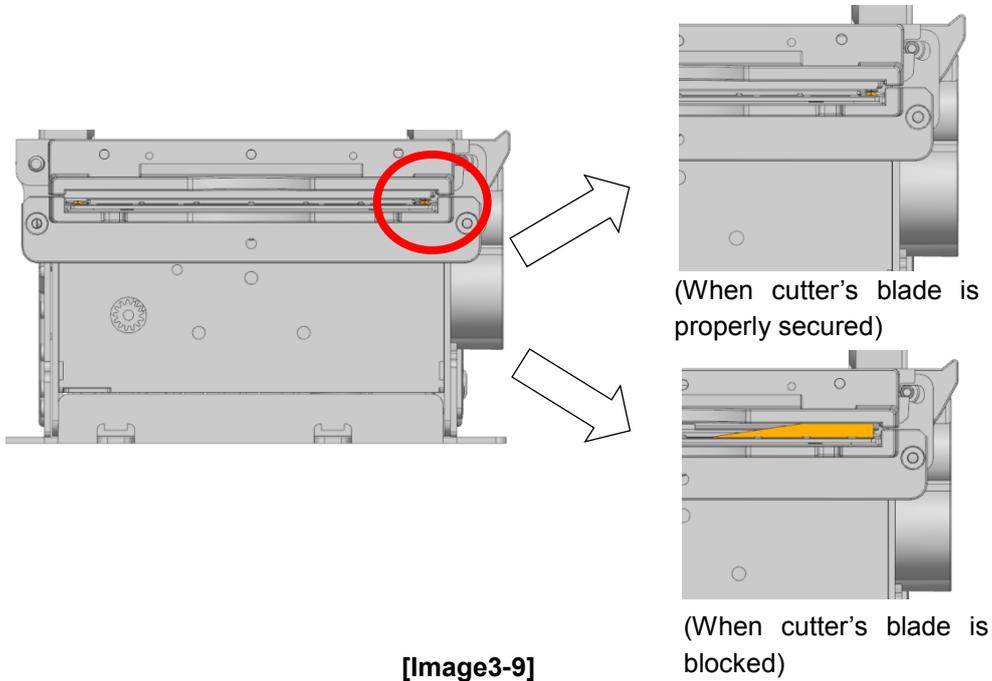


[Image3-8]

3-3) Jam Removal

In case of paper jam, you can remove it following the below steps.

1. Turn off the power and check whether the paper path is blocked by the auto cutter's blade.



2. If the cutter's blade is blocked, you can reboot the printer and it returns to the proper place.

3-4) Self-Test

You can print the self-test by pressing the feed button twice or turning on the printer while pressing the feed button. Self-test shows you the below information.

```
*****
HMC-056 Control Board
Firmware   : VerX .XX
Create    : 20XX/XX/XX
*****

Interface and Setting information
-----
Interface   : USB & RS-232C
Baud Rate  : 19200
Data Bit   : 8 Bit
Parity     : None
Stop Bit   : 1 or 2
-----

Peripheral & Setting Information
-----
USB Status  : B
```

- Model Name
- Firmware Version and Created Date
- Interface Configuration
- Sample Print

3-5) HEX Dump Print

Turn the power off and back on after the confirmation of HEX DUMP in Initial Setting Mode. After printing as [HEX DUMP MODE], it will print all receiving data to 16 hexadecimal data for all receiving data. This would be useful when developing an application because this notifies the transmission status.

- Prints when 12 digits are received.
- Data under 12 digits will print when you press the feed button.
- Control Code (Below $1F_{16}$) prints as “.”
- Prints as “^” when 80_{16} or above.

[Print Sample]

16 hexadecimal indicator	ASCII indicator
[HEX DUMP MODE]	
41 42 43 44 45 46 47 47 49	A B C D E F G H I
30 31 32 33 34 35 36 37 38	0 1 2 3 4 5 6 7 8
FF 1B 69	^ . i

3-6) Firmware Update

Printer program is easily updateable from PC with the Flash Memory equipped.
When updating, it is demanding to be acquainted with the following order before executing.

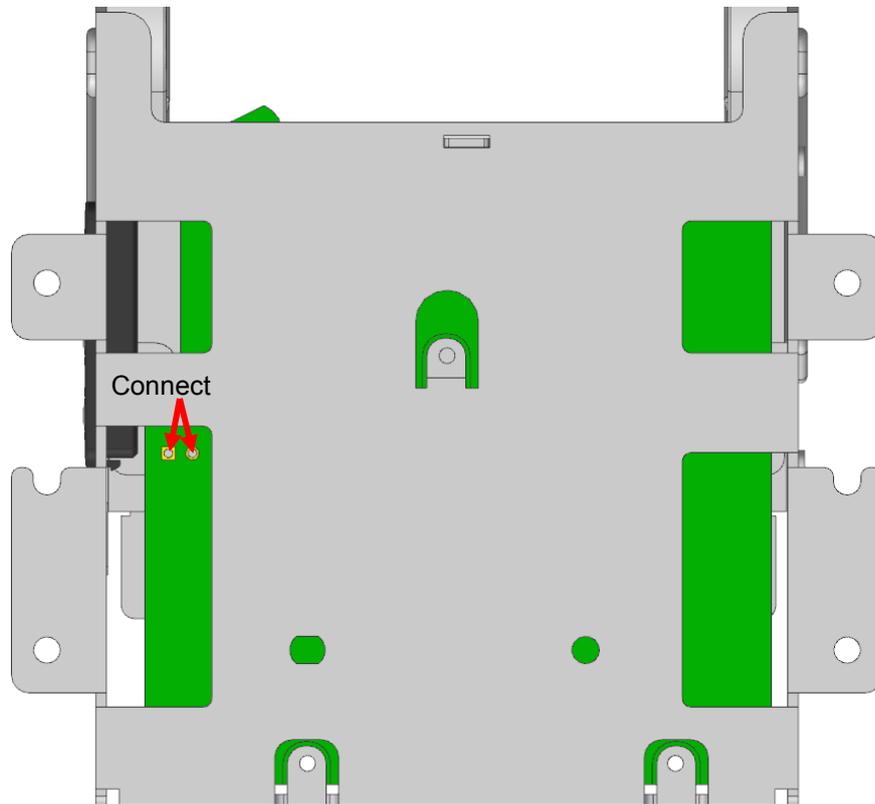
- 1) Turn the power off and back on. (Dip SW manipulation is unnecessary)
- 2) Check the connectivity of Printer and the communication cable.
(You can save time updating by using USB cable)
- 3) Run the update after configuring the model name and communication port through the provided update program.
The ERROR LED will turn off and it will turn back on few seconds later, and the update will start when the LED starts flashing rapidly.
Do not turn off the printer until the update is complete
- 4) Update Complete notification will display when the process is complete.
※If the ERROR LED flashes slowly during the update, then the process is in error, so you need to terminate the update program, and repeat the process from the direction number 1) after checking the abnormalities on the device.
- 5) The printer will reset automatically after the update and will return to the ready to use status.

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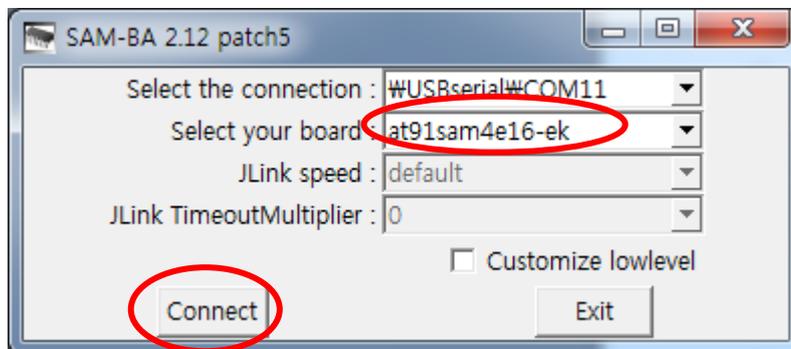
3-7) Firmware Restoration

You can restore the printer following the below when it does not boot up due to the firmware damage or update errors.

- 1) Find the location of the jumpers in the bottom of the printer.
- 2) Connect both of JP2 pins with 2.5mm pin header or something.



- 3) Connect the data cable and turn on the power
- 4) Set the port on the provided booting program and then select "at91sam4e16-ek" at 'Select your board' prompt and click on 'Connect' button.
(Either of RS-232 or USB is available for data cable.)(USB can save your time on loading.)

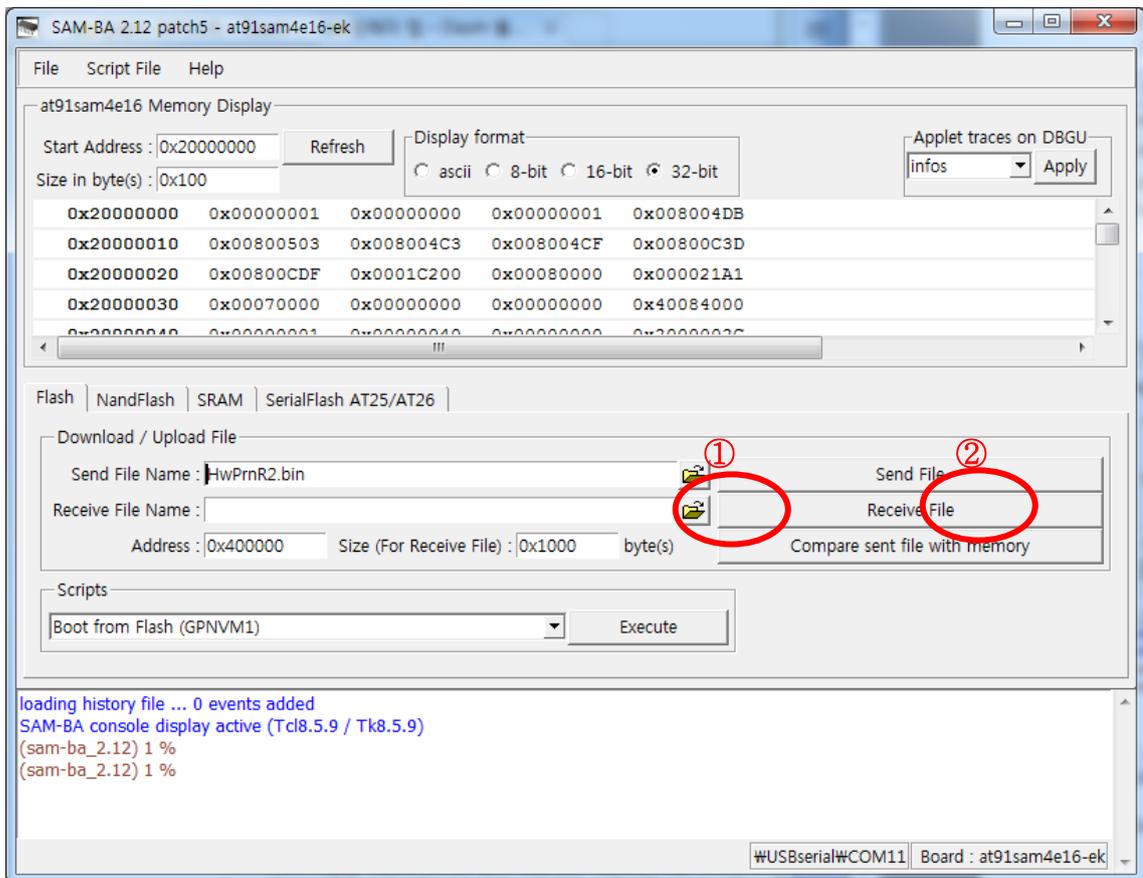


- 5) It is demanding to release the jumper short after running the booting program.
If you miss this process, the data will disappear after the firmware restoration.
- 6) Click on "File open" icon next to 'Send File Name', to select the target model's firmware

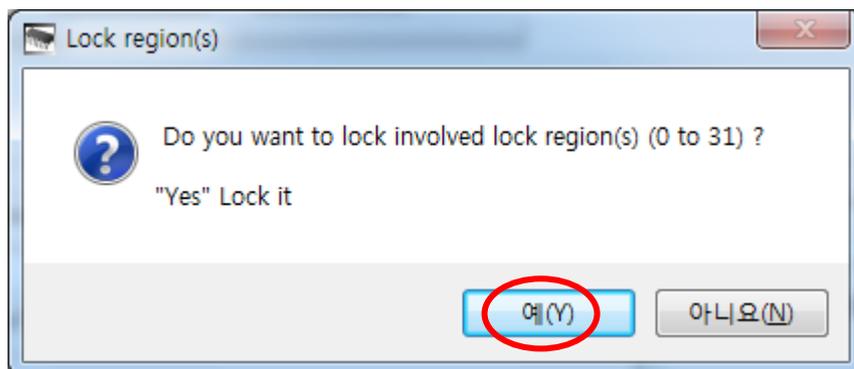
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and click on 'Send File' Button.

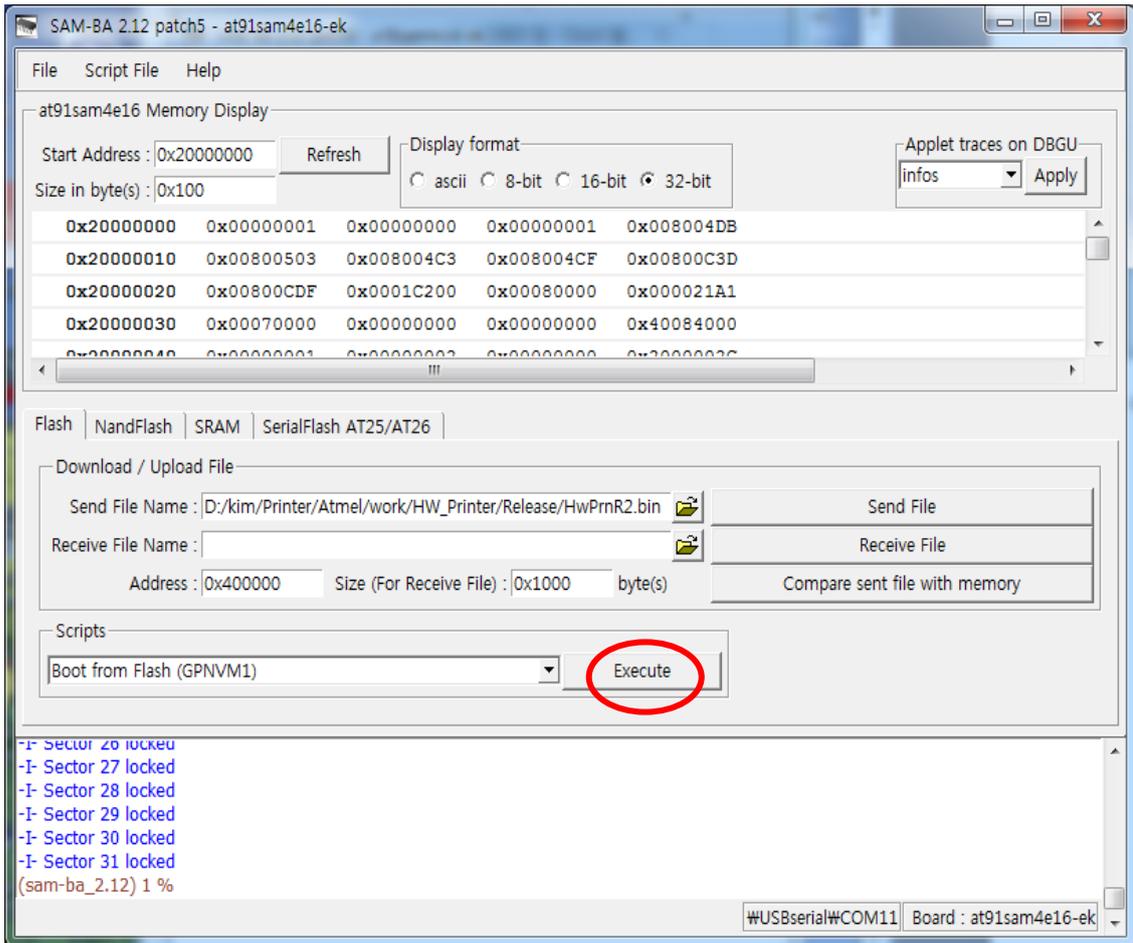
(※Caution Do not modify other parameter's value.)



7) There will be a prompt after the file transmit is complete, click "YES(Y)" button on the prompt.



8) Under Scripts filed, set the value to 'Boot from Flash(GPNVM1)' and then click on "Execute".



9) Restart the printer by turning the power off and back on.

3-8) Communication Setting

Set the printer configuration and the communication condition to the host with the Memroy switch utility program.

※ Caution

All information on memory switch will be deleted during the configuration and please reconfigure the list of Code Page and Print Option.

3-8-1) Manual Configuration

1) Run the printer in initial configuration mode.

※How to run in Initial Configuration Mode

When you turn the printer's power on while pressing the FEED button for more than 2 seconds, the PE LED and ERROR LED will simultaneously turn on / flash and run the initial configuration mode. (9600 BPS, PARITY NONE, HARDWARE HANDSHAKE)

2) After you run the initial configuration mode, it is printed as follows

```
[Menu]
 1.Baud rate
 2.Parity
 3.Flow control
 4.Hex Dump Mode
 5.Print Density
 6.Auto Melody
 7.Cut Mode
 8.Auto Buzzer
 9.Print Speed
Select and then Enter...

Enter : Press the feed button once for
        more than 1second.
Select: Press the feed button many times
        less than 1second as menu number.
Exit  : Turn power off then on.
```

Press feed button for more than 1 second to 'Enter', press less than 1 second to select item. For example, if you'd like to change the Auto Melody option in the list number 6, press the FEED button less than 1 seconds 6 times, and more than 1 seconds 1 time. When terminating the configuration, just turn off and back on.

3) Continuing from the previous, you can confirm after selecting the category on the printed list.

```
Ex) [Baud rate]
     -> 1.9600
        2.19200
        3.38400
        4.115200

     -> : Indicate current set status
     Select and then Enter...
```

Meaning, '(->)' indicates the current setting. When changing the settings, select from the list and if you want to move to the next menu without making any changes, then just confirm without selecting from the list.

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4) Subsequently, you can then learn the results of the change in the printing paper.

It was changed successfully!

Indicates that the changes get applied without a problem.

The value is invalid, try again!

Displayed when the selected item is invalid or moved to another menu without changing the item.

5) You may find the configuration results by checking the position of the arrow character (->), after printing the test page or entering preferences mode, by selecting one of the list

3-8-2) Setting by the memroy switch program

You can set the printer's fucntions and conditions with the host with the memroy switch utility program.

※ Caution : All information stored in memory switch will be deleted during the setting and please reconfigure Code Page and Print Option as well.

1) Start the printer in initial settings mode

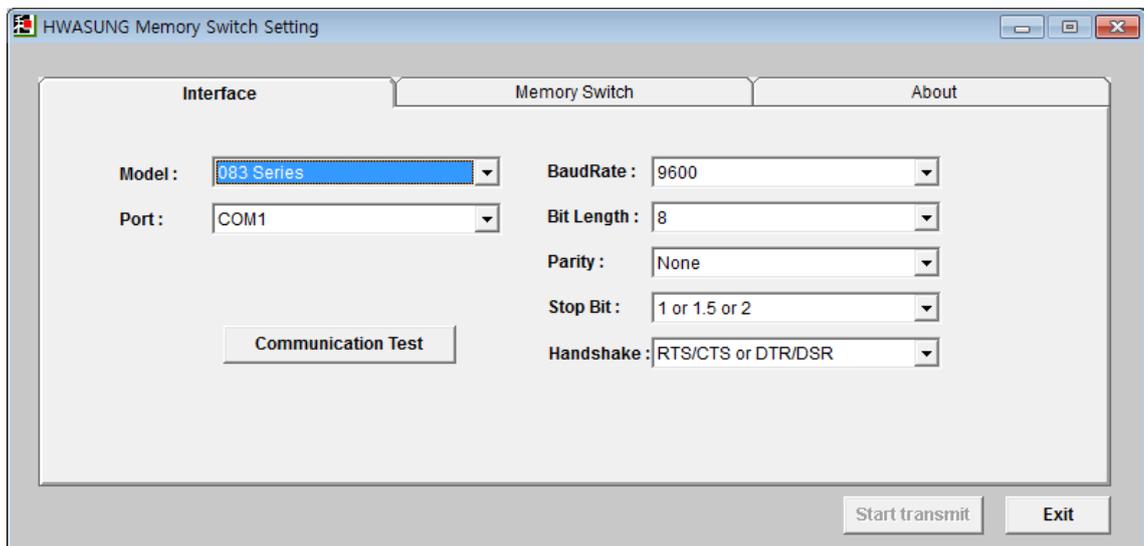
※Operation Methods for starting the initial settings mode

[If you turn on the printer while pressing down on FEED button for 2 seconds or more, the PE LED and the ERROR LED will light/flash in interchangeably and boot in initial settings mode (9600 BPS, PARITY NONE, HARDWARE HANDSHAKE)]

-> **Skip this step when using the USB interface for settings.**

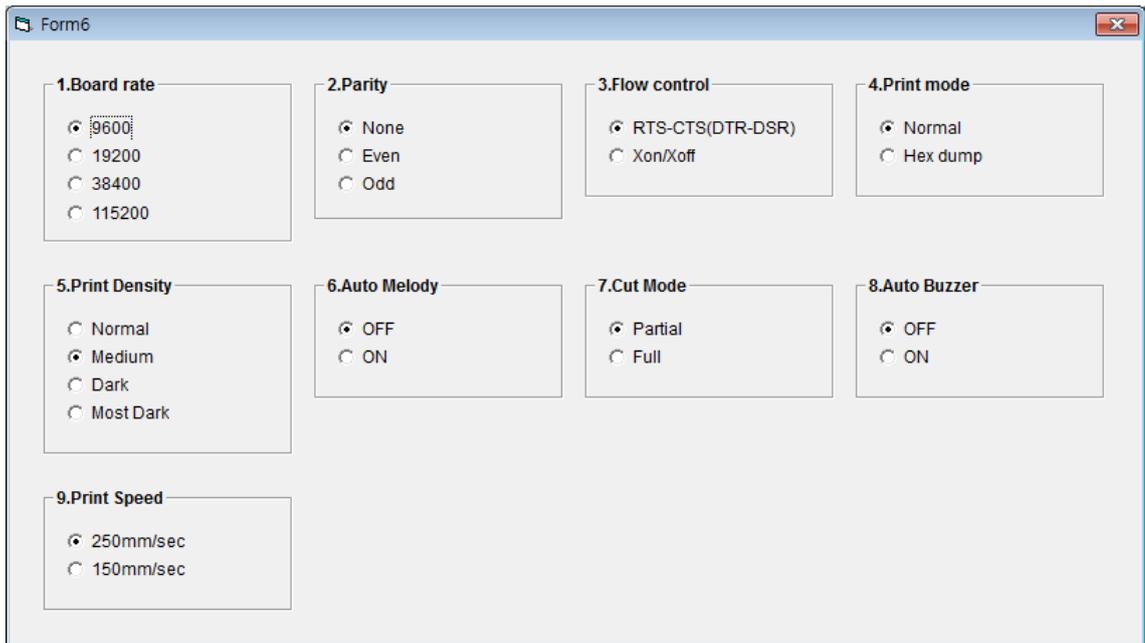
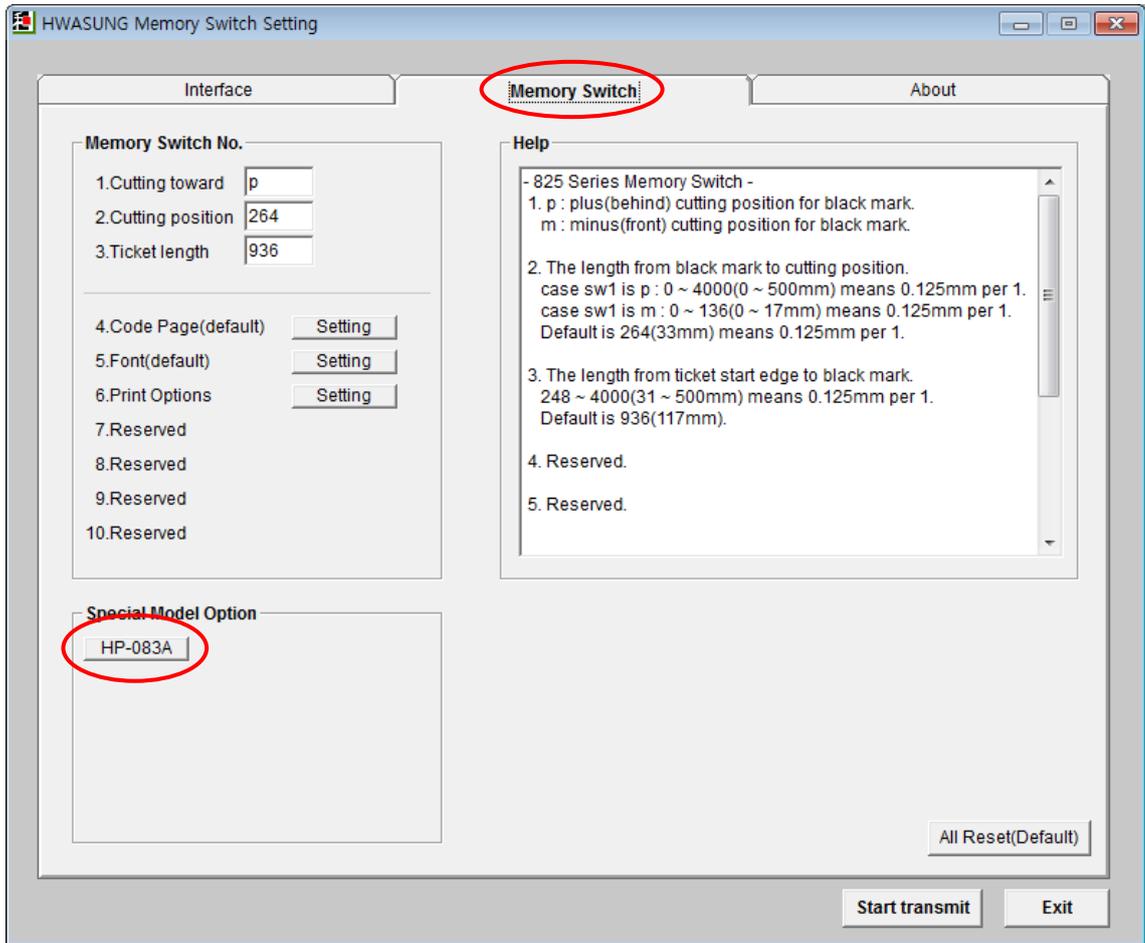
2) Run the utility program and after selecting the communication port in use, set the Baudrate to 9600, and click on the Communication Test button.

When succeeding in communication, the Start transmit button will activate.



-> **When configuring with USB interface, set the Port to USB.**

3) After Clicking on the Memory Switch tab, select HMK-056 under 'Special Model Option' drop down menu. Then select the relevant contents in each appearing forms and click on the 'Start Transmit' Button. Turn off the power to the printer then back on after finishing the configuration and the printer will work in the configured value.



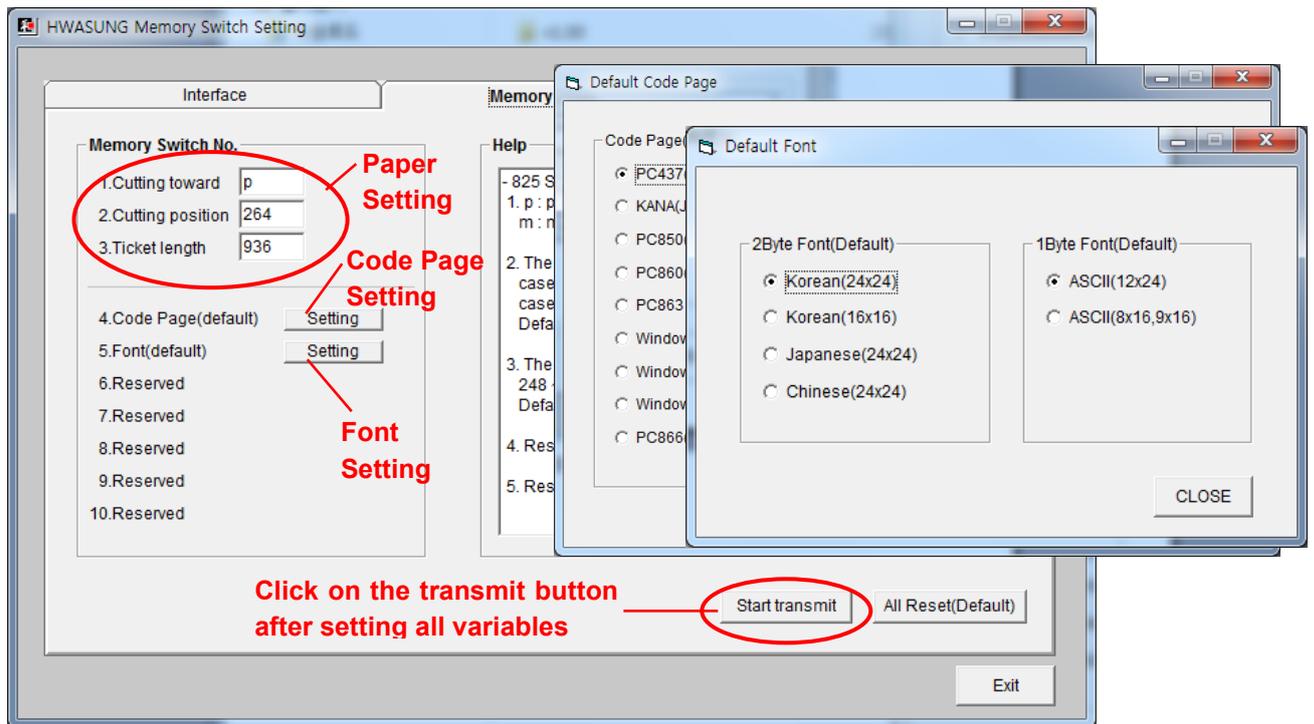
3-9) Memory Switch

Use non-volatile memory to set the function.

※Please use the provided 'Memory Switch Utility' for the setting.

※Once you've set the value, it will not reset even if you turn off the power so the value will remain until you make the change.

Memory SW	Set Value	Description
SW1	p OR m	
SW2	0~1200 OR 0~136	
SW3	248 ~ 4000	
SW4	Basic Code Page	Setting one of the Code Page out of the option to be a default
SW5	Basic Font	2 byte code will set the default from Korean (24x24), Korean (16x16), Japanese (24x24), Chinese (24x24). 1byte code will set the default from ASCII (12x24), ASCII(8x16,9x16).
SW6	Reserve	
SW7	Reserve	
SW8	Reserve	



1)SW1 :

- p(70₁₆) Setting : When executing cutting command (DC3 + "i"), move from the black mark point to the plus position up to the value set in SW2, then cut from that position.
- m(6D₁₆) Setting : When executing the cutting command (DC3 + "i", move up to the value set in SW2, then cut in that position.

2)SW2 : Setting the distance from the black mark point to the cutting position

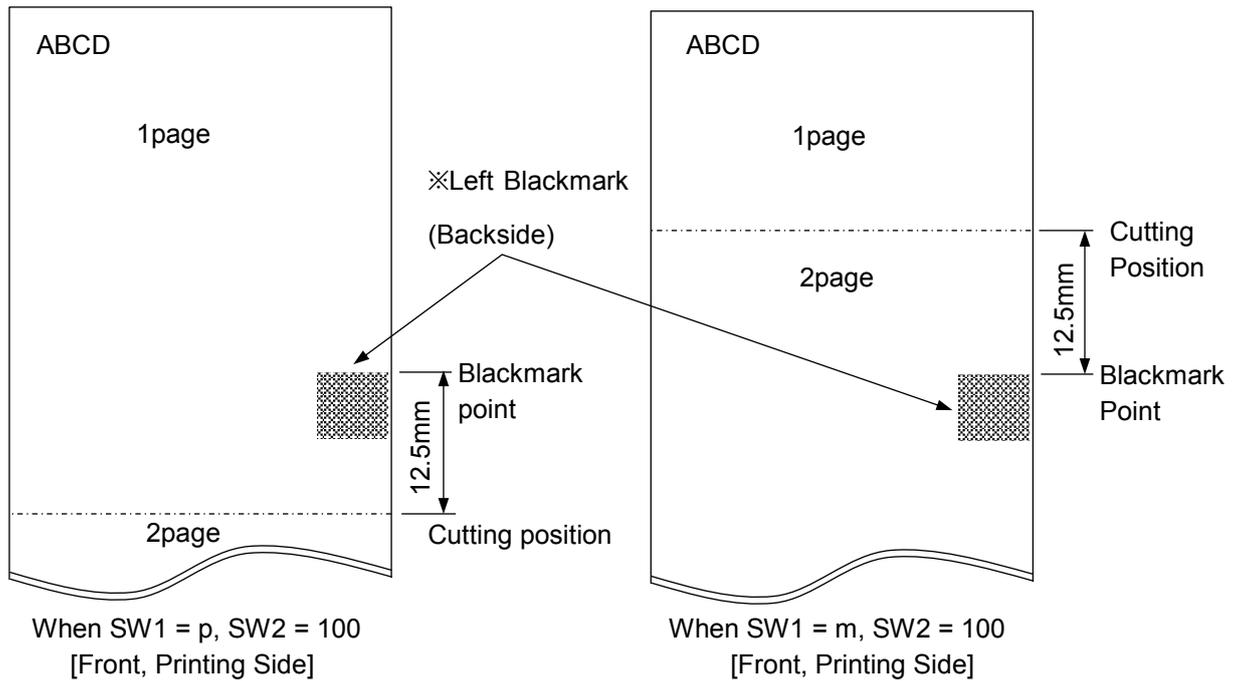
- When SW1 is @ p : You can set from 0~1200(0 ~ 150mm).
- When SW1 is @ m : You can set from 0~120(0 ~ 15mm).

※Indicates 0.125mm per set value → ex) When set on 100 : $100 \times 0.125 = 12.5\text{mm}$

※ SW1 and SW2 are also used in Windows Driver to set the Cutting option to Black Mark Search

(Full Cut). (Windows Driver : use DC3+"i" command)

ex)



3)SW3 : Sets the distance from the ticket start point to the black mark point.

When setting the First Page No Cut, it is used to set the initial position of the first piece of paper.

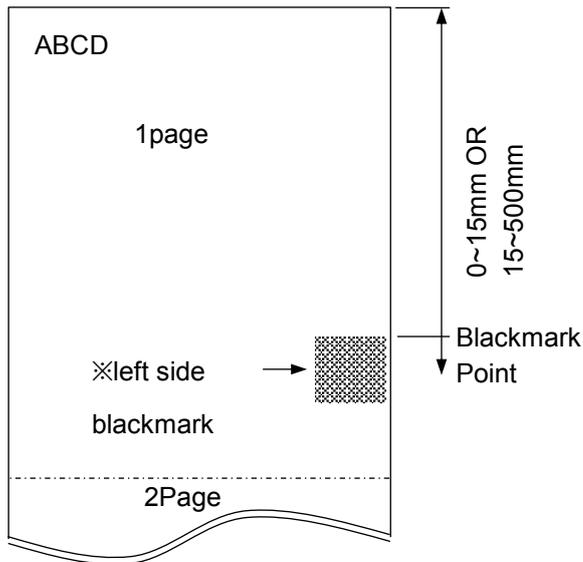
You can set up 0~120(0 ~ 15mm : When cutting position is in front of blackmark) OR to 120~4000(15 ~ 500mm when cutting position is behind the blackmark)

※Indicates 0.125mm per set value —————> ex) When setting it 300 : 300 x 0.125 = 37.5mm

※The default setting is based on the blackmark on right side and set to 1048(131mm).

※Please reference the ticket standards 7. for the detailed information.

ex)



[Front, Printing Side]

2)Memory Switch Modification Check

※After adjusting the memory switch, check the modified details by running a self test.

When you turn on the power while holding down the FEED button, start self-test and stop printing.

Press the FEED button one more time to display the contents of the memory switch.

```
[Memory Switch information]
=====
Code Page = PC437(U.S)
2Byte Font = Korean(24x24)
1Byte Font = ASCII(12x24)
Mem1:FFh
Mem2:FFh,FFh
Mem3:FFh,FFh
Mem4:00h
Mem5:00h
Mem6:FFh
Mem7:FFh
Mem8:FFh
Mem9:FFh
Mem10:FFh
```

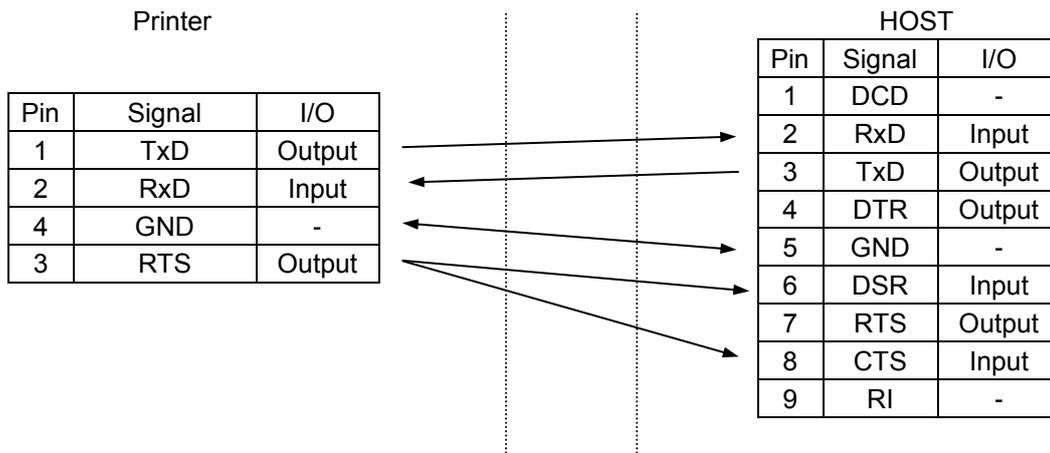
(Example of memory switch content checking self test printing)

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4.Interface Specification

4-1) RS-232C

- 1)Data Transfer Method : Serial
- 2)Handshake : Hardware (RTS/CTS or DTR/DSR)
- 3)Baud Rate : 9600, 19200, 38400, 57600, 115200 BPS
- 4)Data Bit : 8bit
- 5)Parity : None, Odd, Even
- 6)Stop Bit : 1, 2 bit
- 7)Connector : CHD1140-4
- 8)Cable : DSUB9(Female) – 4pin customized cable



4-2) USB

- 1)Standard : USB 2.0 Compatible, Full Speed(12Mb) response
- 2)Connector : Type B
- 3)Cable : USB2.0 Standard Cable
- 4)Data Methods : Bulk IN, Bulk OUT
 - Bulk IN : End point 6,
 - Bulk OUT : End point 2
 - Full Speed : Max Packet Size 64 Byte(Bulk OUT),64 Byte(Bulk IN)

5. Command Reference

Command	Function	Page
CR	Print and Lineup	27
LF	Print and Lineup	27
CAN	Print Data Delete	27
HT	Horizontal Tab	27
FF	Restores PAGE MODE PRINT or STANDARD MODE	28
SUB x	Graphic Expansion Mode	28
SUB p	Offline Output through paper detection	28
SUB b	Blackmark Detection	28
SUB R	Border of characters (square)	29
SUB s	Print Speed	29
ESC D	Horizontal Tab Location	30
ESC SP	Gap between ASCII Characters	30
ESC !	Designating ASCII Character Arrangement	30
ESC \$	Designating Absolute Path in Print	31
ESC *	Bit Image (Vertical Arrangement)	32
ESC -	ASCII Character Underline	33
ESC 2	Initial Row Space	34
ESC 3	Column Space	34
ESC @	Printer Reset	34
ESC E	Bold Format	34
ESC G	Double Print	35
ESC J	FEED	35
ESC j	BACK FEED	35
ESC M	Font	35
ESC R	International Character	36
ESC a	Print Range	36
ESC d	Print and Row Unit FEED	37
ESC {	180° Rotation	37
ESC i	Paper Cutting	37
ESC m	Paper Cutting	37
FS !	Collective Designation of Korean Character Mode	38
FS &	Designating Korean Character Mode from Graphic Extended Mode	38
FS .	Cancel Korean Character Mode from Graphic Extended Mode	38
FS -	Korean Character Underline	39
FS S	Korean Character Spacing	39
FS W	Korean Character Size	39
FS q	Register NV Logo (Bit Image)	40
FS p	Print NV Logo	40
GS !	Expand Characters	41
GS (K (fn=49)	Character Density	41
GS (K (fn=97)	Operating in Low Power	42
GS B	Black and White Cross Character	42
GS H	Barcode Text	42
GS L	Left Margin	43
GS V	Paper Cutting	43
GS W	Print Area Setting	43

Command	Function	Page
GS h	Barcode Height	43
GS k	Barcode Character	44
GS w	Barcode Expand / Minimize	45
GS r	Status Check	45
GS a	Status Check Auto Reply	46
ESC S	STANDARD MODE Setting	47
ESC L	PAGE MODE Setting	47
ESC T	PAGE MODE Character Direction Setting	48
ESC W	PAGE MODE Character Field Setting	49
ESC FF	Execute Page Area's Character	50
DLE ENQ	Real Time Buffer Clear	51
DLE EOT	Transmit Real Time Printer Status	51
GS v	Roster Bit Image (Horizontal)	52
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CR

[Function] Print and carriage return
[Code] ASCII CR
Hex 0Dh
Decimal 13
[Range] -
[Description] Equal to LF.

LF

[Function] Print and line feed
[Code] ASCII LF
Hex 0Ah
Decimal 10
[Range] -
[Description] ①STANDARD MODE:
After printing the data and go to return accordingly to fixed data.
②PAGE MODE:
Only the fixed data can be conducted, according to the fixed data.
[Caution] The LF is ignored behind of CR

CAN

[Function] Cancel print data in page mode
[Code] ASCII CAN
Hex 18h
Decimal 24
[Range] -
[Description] The print data will be deleted in print area

HT

[Function] Horizontal tab
[Code] ASCII HT
Hex 09h
Decimal 9
[Range] -
[Description] Moves the print position to the next tab position
[Caution] Horizontal tab positions are to set in ESC+'D'+n.

FF

[Function]	Print and return to standard mode and page mode		
[Code]	ASCII	FF	
	Hex	0Ch	
	Decimal	12	
[Range]	-		
[Description]	Print the data in the print buffer and returns to standard mode		
[Caution]	When it does not return to STANDARD MODE then use ESC+FF.		

SUB+'x'+n

[Function]	Extension Graphic Mode, Korean Mode			
[Code]	ASCII	SUB	x	n
	Hex	1A	78h	n
	Decimal	26	120	n
[Range]	0≤n≤1			
[Initial Value]	n=0			
[Description]	n=0 : Korean Mode, First code is A1h more, automatically transfer Korean in 2 bytes n=1 : Extension Graphic Mode, Every code setting is in 1 byte Extension Graphic font will be printed			

SUB+'p'+n

[Function]	Offline printing in paper detection			
[Code]	ASCII	SUB	p	n
	Hex	1A	70h	n
	Decimal	26	112	n
[Range]	0≤n≤1			
[Initial Value]	n=1			
[Description]	n=0 : Does not transition to offline when paper is empty (data communication available) n=1 : Transition to offline when paper is empty (data communication not available)			

SUB+'b'+n

[Function]	Black mark detection			
[Code]	ASCII	SUB	b	n
	Hex	1A	62h	n
	Decimal	26	98	n
[Range]	0≤n≤3			
[Description]	n=0 : Feeds in forward direction until the sensor passes the blackmark. n=1 : Feeds in forward direction until it detects the blackmark. n=2 : Feeds in reversed direction until the sensor passes the blackmark. n=3 : Feeds in reversed direction until it detects the blackmark.			
[Caution]	The feeding range is restricted in 30cm. Once the detection distance is over in 30Cm, it could be jammed.			

SUB+'R'+n

[Function]	Set the character outline			
[Code]	ASCII	SUB	b	n
	Hex	1A	52h	n
	Decimal	26	82	n
[Range]	0≤n≤1			
[Description]	n=0 : cancel outline (border) of character in tetragon. n=1 : Set outline (border) of character in tetragon.			
[Caution]	When expanding in horizontal it is effective up to 8 times, however It is only effective up to 2 times for vertical expansion.			

SUB+'s'+n

[Function]	Set the printing speed			
[Code]	ASCII	SUB	s	n
	Hex	1A	73h	n
	Decimal	26	82	n
[Range]	1≤n≤14			
[Initial Value]	n=14			
[Description]	n=1 : Prints in Speed 70mm/s.		n=11 : Prints in Speed 170mm/s.	
	n=2 : Prints in Speed 80mm/s.		n=12 : Prints in Speed 180mm/s.	
	n=3 : Prints in Speed 90mm/s.		n=13 : Prints in Speed 190mm/s.	
	n=4 : Prints in Speed 100mm/s.		n=14 : Prints in Speed 200mm/s.	
	n=5 : Prints in Speed 110mm/s.			
	n=6 : Prints in Speed 120mm/s.			
	n=7 : Prints in Speed 130mm/s.			
	n=8 : Prints in Speed 140mm/s.			
	n=9 : Prints in Speed 150mm/s.			
	n=10 : Prints in Speed 160mm/s.			
[Caution]	As the print speed lowers, the print density becomes dim, so you need to control the density using the density command.			

ESC+'D'+n1...nk+NUL

[Function] Sets the horizontal position

[Code] 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

[Description] Sets the horizontal tab position.

[Caution] n: indicates the figures from the initial position of the line to the set position.
 k: indicates the total tabs per line.

ESC+SP+n

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

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

[Range] 0≤n≤255

[Initial Value] n=0

[Description] Set in n x 0.125mm the space amount on the right side of ASCII character

[Caution] Set the Korean space in FS+'S'+n.

ESC+'!' +n

[Function] Set character all at once

[Code] ASCII ESC ! n
 Hex 1B 21h n
 Decimal 27 33 n

[Range] 0≤n≤255

[Initial Value] n=0

[Description] Set font & character in the same time.

[Caution] If it's Korean, the Font / the Stress is valid only.

Bit	Function	Hex	Decimal
0	0: Font 12x24, 24x24	00h	0
	1: Font 8x16, 16x16	01h	1
1	-	-	-
2	-	-	-
3	0: Stress Cancel	00h	0
	1: Stress Setting	08h	8
4	0: Cancel Vertical Extension	00h	0
	1: Vertical Extension Setting	10h	16
5	0: Cancel Horizontal Extension	00h	0
	1: Horizontal Extension Setting	20h	32
6	-	-	-
7	0: Cancel Underline	00h	0
	1: Underline Setting	80h	128

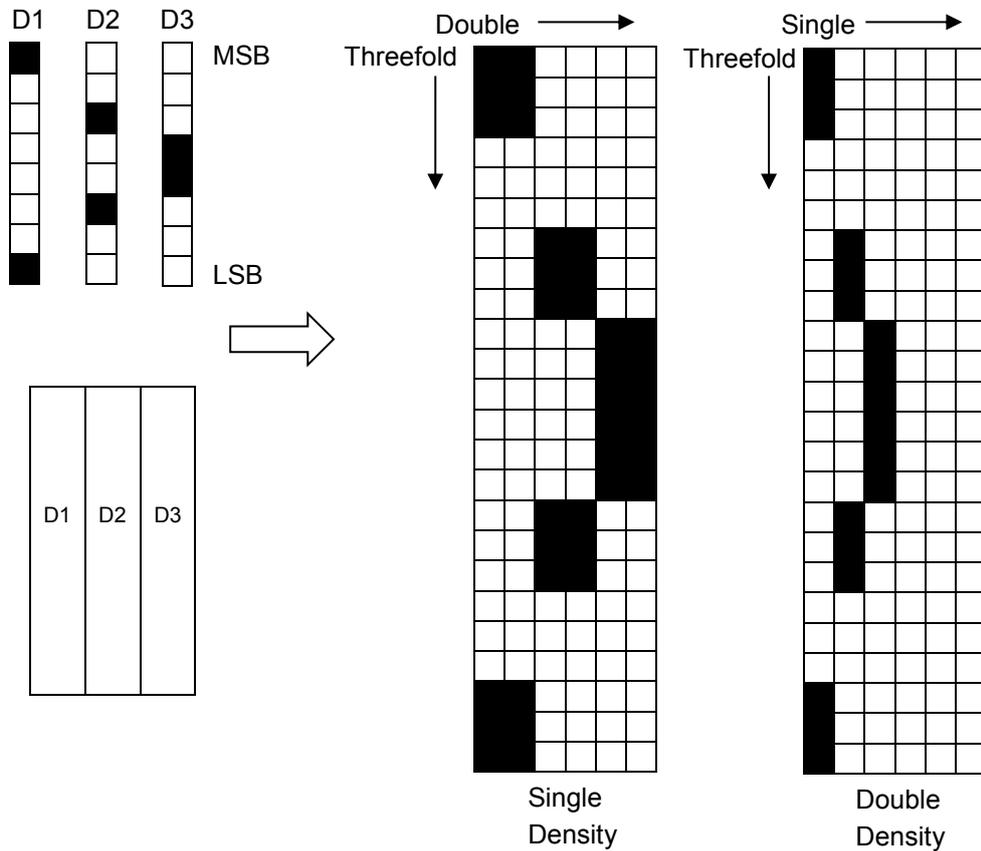
ESC+'\$'+nL+nH

[Function]	Absolute Position Settings				
[Code]	ASCII	ESC	\$	nL	nH
	Hex	1B	24h	nL	nH
	Decimal	27	36	nL	nH
[Range]	$0 \leq nL + nH \times 256 \leq 65535, 0 \leq nL \leq 255, 0 \leq nH \leq 255$				
[Initial Value]	nL=0, nH=0				
[Description]	Move the position from the space of left ending to $(nL + nH \times 256) \times 0.125\text{mm}$. Move the position into the space of left ending, if the area is over.				

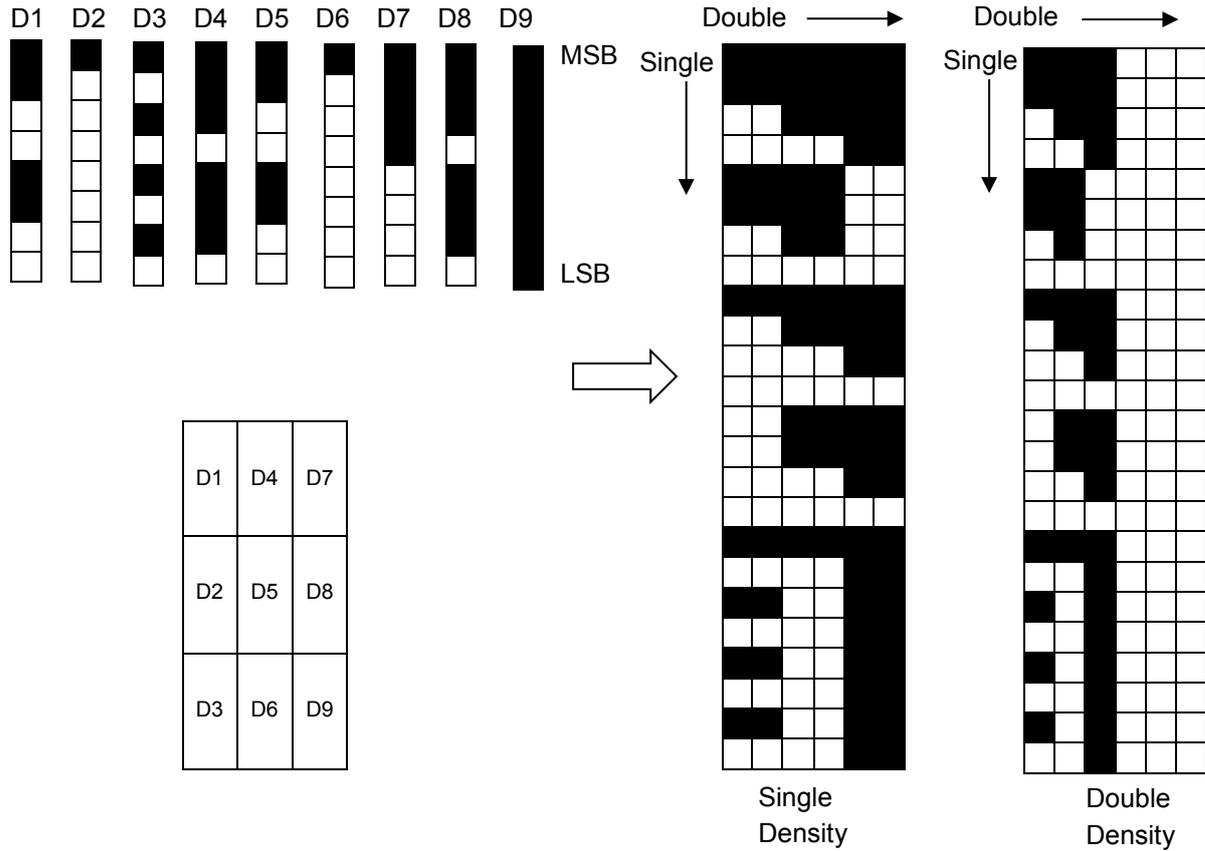
[Function] bitmap image setting
 [Code] ASCII ESC * m nL nH d1...dk
 Hex 1B 2Ah m nL nH d1...dk
 Decimal 27 42 m nL nH d1...dk
 [Range] m = 0, 1, 32, 33
 1≤nL+nH×256≤1023, 0≤nL≤255, 0≤nH≤3, 0≤d≤255
 [Description] Due to fixing nL+nH×256, Printing from bit data to graphic data in Mode m

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



•24 Dot Mode



ESC+¹+n

[Function] Set / Cancel underline
 [Code] ASCII ESC - n
 Hex 1B 2Dh n
 Decimal 27 45 n
 [Range] 0 ≤ n ≤ 255,
 [Initial Value] n=0,
 [Description] 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 initial line spacing
[Format] ASCII ESC 2
Hex 1B 32h
Decimal 27 50
[Range] $0 \leq n \leq 255$,
[Initial Value] n=0
[Descript] Set the interval of initial value in 4mm

ESC+'3'+n

[Name] Set the line spacing using minimum units
[Format] ASCII ESC 3 n
Hex 1B 33h n
Decimal 27 51 n
[Range] $0 \leq n \leq 255$,
[Initial Value] n=0
[Descript] Set the interval of line in $n \times 0.125$ mm

ESC+'@'

[Name] Rest printer (Initialize the printer)
[Format] ASCII ESC @
Hex 1B 40h
Decimal 27 64
[Range] $0 \leq n \leq 255$,
[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] $0 \leq n \leq 255$,
[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] $0 \leq n \leq 255$,
 [Initial Value] n=0
 [Descript] n=0, cancel the printing twice for font thickness
 n=1, set the printing twice for font thickness

ESC+'J'+n

[Name] Feeding
 [Format] ASCII ESC J n
 Hex 1B 4Ah n
 Decimal 27 74 n
 [Range] $0 \leq n \leq 255$
 [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] $0 \leq n \leq 255$
 [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] $0 \leq n \leq 2$
 [Initial Value] n=0
 [Descript] Select printer font

		n	
Precedence 4bits(Korean fonts)		Subordinate 4bits (ASCII)	
0000	Korean 24x24 Gothic	0000	12x24
0001	Korean 16 x 16 General	0001	8x16(9x16)
0010	Japanese 24 x 24 Bodoni	0010	56x88 big fonts, only 0~9 numbers
0011	Chinese 24 x 24 Gothic	0011	Reservation

Notice : When you set up one of fonts, you can use "Memory Switch Setting program" without comment. If you need any more information, please refer to How to use Memory Switch Setting Program.

*** Caution** : In case of Big Font as 56x88, it would be possible to extend font size as much as Double (Width and Length) and other fonts would be possible to extend the font size as 8 times

ESC+'R'+n

[Name] Select the International character
 [Format] ASCII ESC R n
 Hex 1B 52h n
 Decimal 27 82 n
 [Range] $0 \leq n \leq 13$
 [Initial Value] n=13
 [Descript] Select the international character as 14 units((#,\$,@,[,\,],^,`,{|,},~)

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] $0 \leq n \leq 2$
 [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] $0 \leq n \leq 255$
[Descript] Printing the data & feeding 'n' line

ESC+'{' +n

[Name] Turning 180°
[Format] ASCII ESC d n
Hex 1B 7Bh n
Decimal 27 123 n
[Range] $0 \leq n \leq 255$
[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

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
 (Pls refer the command of SUB+'x'+n)

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] $0 \leq n \leq 2$
 [Initial Value] n=0
 [Descript] Set the underline of Korean

n	function
0	Cancel the underline
1	0.125mm
2	0.25mm
3	0.375mm
4	0.5mm
5	0.625mm
6	0.75mm
7	0.875mm

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] $0 \leq n1 \leq 255, 0 \leq n2 \leq 255$
 [Initial Value] n=0
 [Descript] Set the space between Korean characters
 Set the left space in $n1 \times 0.125\text{mm}$
 Set the right space in $n2 \times 0.125\text{mm}$

FS+'W'+n

[Name] Set the font size in Korean
 [Format] ASCII FS W n
 Hex 1C 57h n
 Decimal 28 87 n
 [Range] $0 \leq n1 \leq 255$
 [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

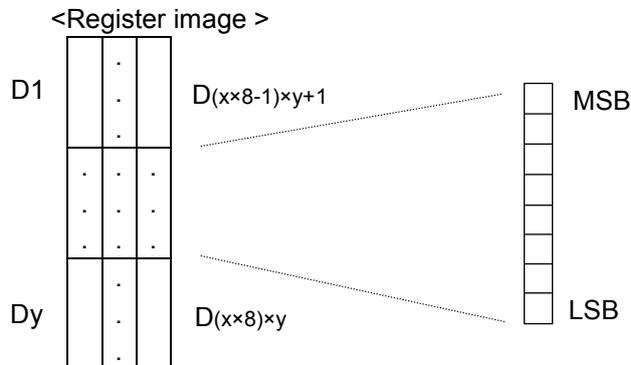
FS+'q'+n+(xL+xH+yL+yH+d1...dk)1.....+(xL+xH+yL+yH+d1...dk)n

[[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] $1 \leq n \leq 255$
 $0 \leq xL + xH \times 256 \leq 65535$ ($0 \leq xL \leq 255, 0 \leq xH \leq 255$)
 $0 \leq yL + yH \times 256 \leq 65535$ ($0 \leq yL \leq 255, 0 \leq yH \leq 255$)
 $0 \leq d \leq 255$
 $k = (xL + xH \times 256) \times (yL + yH \times 256) \times 8$
 Capable register : 64kbytes

[Descript.] Register the logo non-volatilization
 n : Total unit of N/V logo
 xL,xH : Set the horizontal dot in $(xL + xH \times 256) \times 8$
 yL,yH : Set the vertical dot in $(xL + xH \times 256) \times 8$
 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 registration / deletion at 100000 cycles,
 It's not recommended frequent registration / deletion,
 due to memory damage

You can register very easily, if you download the program of logo registration.



FS+'p'+n+m

[Name] Printing N/ V logo
 [Format] ASCII FS p n m
 Hex 1C 70h n m
 Decimal 28 112 n m
 [Range] $1 \leq n \leq 255, 0 \leq m \leq 3$
 [Initial Value] n=0
 [Descript.] m : printing the registered N/V in 'm' mode
 n : indicating the registered 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 extension
 [Format] ASCII GS ! n
 Hex 1D 21h n
 Decimal 29 33 n
 [Range] $0 \leq n \leq 255$ (horizontal / vertical portions is restricted maxim value 8)
 [Initial Value] n=0
 [Descript.] Set the proportion of character extension
 [Caution] Calculate the numeric value if vertical & horizontal is extended in the same time
 ex.) x3 (Horizontal Rate), x3 (Vertical Rate) : $n=3 \times 2 + 2 = 34$

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

Extension in Horizontal

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

Extension in Vertical

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
 $0 \leq m \leq 5, 251 \leq m \leq 255$
 [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

[Caution] In case of setting the density above the standard level will shorten the thermalhead's life cycle.
 It is recommended to use within the standard density range.

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 will be effective once the power capacity is short.
 The Second division of electric current (ampere) will be half than the 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] $0 \leq nL \leq 255, 0 \leq nH \leq 255$
 [Initial Value] $nL+nH \times 256 = 0$ (nL=0, nH=0)
 [Descript] The left margin is set in $(nL+nH \times 256) \times 0.125\text{mm}$.

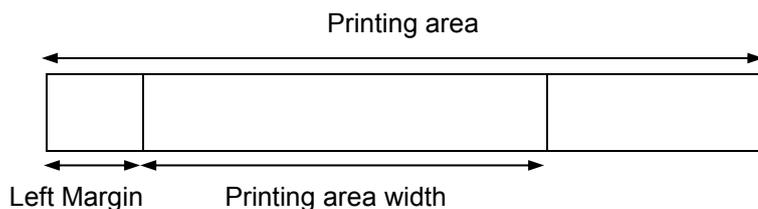
GS+'V'+m

[Name] Select cut mode and cut paper
 [Format] ASCII GS V m
 Hex 1D 56h m
 Decimal 29 86 m
 [Range] $0 \leq m \leq 1$
 [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
 [Range] $0 \leq nL \leq 255, 0 \leq nH \leq 255$
 [Initial Value] $nL+nH \times 256 = 448$ (56mm, nL=0, nH=0)
 [Descript] Set printing area width from the left margin in $(nL+nH \times 256) \times 0.125\text{mm}$



GS+'h'+n

[Name] Select barcode height
 [Format] ASCII GS h n
 Hex 1D 68h n
 Decimal 29 104 n
 [Range] $1 \leq n \leq 255$
 [Initial Value] n=162 (20.25mm)
 [Descript] Select barcode height by $n \times 0.125\text{mm}$

[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, add "{", set as 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

Please add up the initial character of CODE A, CODE B, CODE C at the first, so that you could know the kind of CODE128.

CODE128	Initial character	Example of barcode
CODE A	g	"gABCD"
CODE B	h	"hABCD"
CODE C	i	"iABCD"

GS+'w'+n

[Name]	Set the horizontal 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 horizontal 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]	<p>The status is not ready till the printer is offline, If the receiver buffer is full at the printer offline, this command is not able to receive, and is not able to respond to the status. Therefore we recommend the real time command (DLE+EOT)..</p>			

[Name] Enable / Disable automatic status back (ASB)
 [Format] ASCII GS a n
 Hex 1D 61h n
 Decimal 29 97 n
 [Range] $0 \leq n \leq 1$
 [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	Status	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 jam	00h	0
	1 : Paper with jam	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 (jam)	00h	0
	1 : Cutter error (jam)	20h	32
6	0 (unused)	00h	0
7	0: No paper in the Support Sensor	00h	0
	1: Paper in the Support Sensor	80h	128

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

ESC+'S'

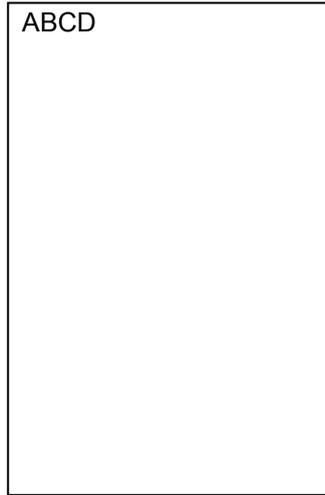
[Name] Set the Standard mode
[Format] ASCII ESC S
Hex 1B 53h
Decimal 27 83
[Descript] Switches from page mode to standard mode.

ESC+'L'

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

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

•n=0(Left→Right),



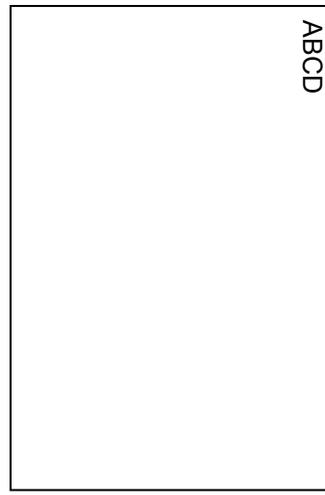
•n=1(Bottom→Top),



•n=2(Right→Left),



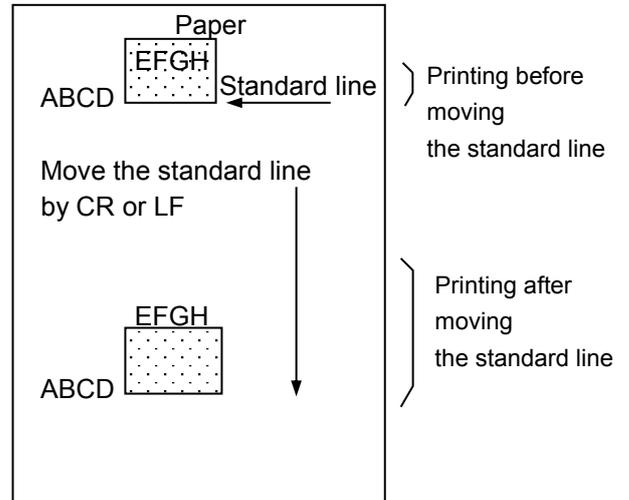
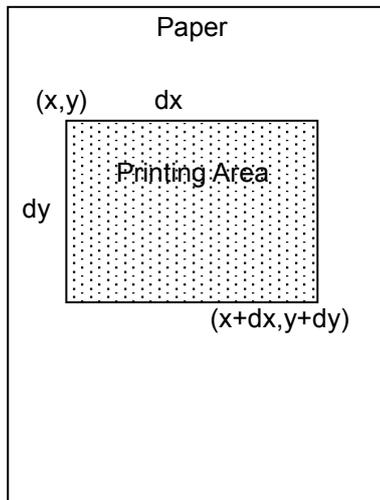
•n=3(Top→Bottom),



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]	$0 \leq xL+xH \times 256 \leq 65535$ ($0 \leq xL \leq 255, 0 \leq xH \leq 255$) $0 \leq yL+yH \times 256 \leq 65535$ ($0 \leq yL \leq 255, 0 \leq yH \leq 255$) $1 \leq dxL+dxH \times 256 \leq 65535$ ($0 \leq dxL \leq 255, 0 \leq dxH \leq 255$) $1 \leq dyL+dyH \times 256 \leq 65535$ ($0 \leq dyL \leq 255, 0 \leq dyH \leq 255$)										
[Initial Value]	$(xL+xH \times 256) = 0$ (0mm, xL=0, xH=0) $(yL+yH \times 256) = 0$ (0mm, yL=0, yH=0) $(dxL+dxH \times 256) = 448$ (56mm, dxL=C0h, dxH=01h) $(dyL+dyH \times 256) = 1200$ (150mm, dyL=B0h, dyH=04h)										
[Descript]	Set printing area & starting point Horizontal starting point : $(xL+xH \times 256) \times 0.125\text{mm}$ Vertical starting point : $(yL+yH \times 256) \times 0.125\text{mm}$ Horizontal size : $(dxL+dxH \times 256) \times 0.125\text{mm}$ Vertical size : $(dyL+dyH \times 256) \times 0.125\text{mm}$										
[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.										

 : Barcode or Graphic



ESC+FF

[Name]	Printing the page area
[Format]	ASCII ESC FF Hex 1Bh 0Ch Decimal 27 12
[Range]	Please edit the received data at the page area. The page area will be printed all at once, when you use this command.
[Descript]	The page area remains. Please use the command ESC+S, If you want all clear.

DLE+ENQ+n

[Name] Realtime buffer clear, or reset.
[Format] ASCII DLE ENQ n
Hex 10h 05h n
Decimal 16 5 n

[Range] n=2,3

1)n=2

[Descript] The realtime will clear each buffer of the printer, as soon as this command is conducted.

[Caution] If the offline is valid, and the printer receive the data same with this command, The printer will be working the same with this comand. (Bit image, Data.)
You don't need to be caution,once this command will be invalid if it's online.

2)n=3

[Descript] The realtime will reset the printer, as soon as this command is conducted.

[Range] The command ESC+@ will be reset.

However, it doesn't work at the paper jam, cutting jam, has to reset compulsory.

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 realtime send a byte of printer status, when this command is conducted.

[Caution] Please refer to the table of the printer status.
If the offline is valid, and the printer receive the data same with this command, The printer will be working the same with this comand. (Bit image, Data.)

<data 1 byte of status transmission>

Bit	Status	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 jam	00h	0
	1 : Paper with jam	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 (jam)	00h	0
	1 : Cutter error (jam)	20h	32
6	0 (unused)	00h	0
7	0: No paper in the Support Sensor	00h	0
	1: Paper in the Support Sensor	80h	128

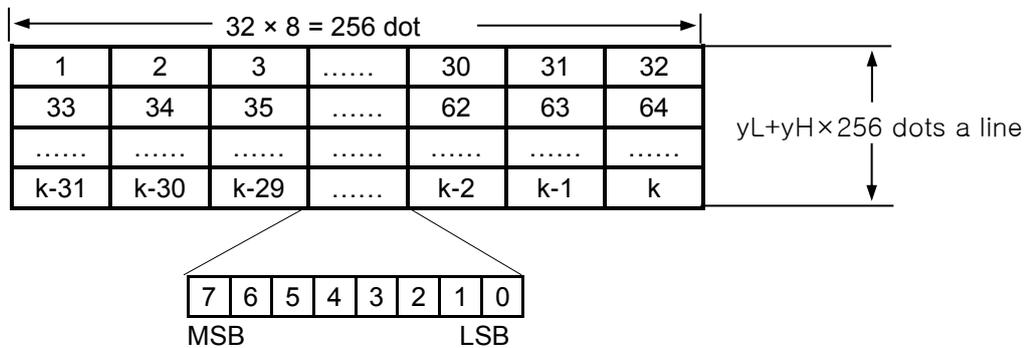
[Name] Raster bit image
 [Format] ASCII GS v 0 m xL xH yL yH d1..dk
 Hex 1D 76h 30h m xL xH yL yH d1..dk
 Decimal 28 118 48 m xL xH yL yH d1..dk
 [Range] $0 \leq m \leq 3$ or $48 \leq m \leq 51$,
 $1 \leq (xL+xH \times 256) \leq 150$ ($0 \leq xL \leq 150, xH=0$)
 $1 \leq (yL+yH \times 256) \leq 436$ ($0 \leq yL \leq 255, 0 \leq yH \leq 1$)
 $0 \leq d \leq 255$ ($yL+yH \times 256$)
 $K(\text{All data}) = (xL+xH \times 256) \times (yL+yH \times 256)$
 [Descript] The raster bit image will be recognized in mode m.
 xL,xH appoint the data (byte) of horizontal at image data.
 yL,yH appoint the dta (dot line) of vertical at image data.

* d is a data for raster bit.

m	Mode	Expansion
0, 48	Normal	X1
1, 49	Horizontal expansion	X2
2, 50	Vertical expansion	X2
3, 51	Horizontal,Vertical expansion	X2 (Horizontal & Vertical)

Ex) Expansion image

$xL+xH \times 256 = 32$ byte,



SUB+'B'+n1+n2+n3+d1.....dk

[Name] 2 dimension barcode (2D)
 [Format] ASCII SUB B n1 n2 n3 d1.....dk
 Hex 1A 42h n1 n2 n3 d1.....dk
 Decimal 26 66 n1 n2 n3 d1.....dk
 [Range] Please refer to the following table.
 [Descript] Please use the barcode according to the number of data.
 n1 : Type of 2D barcode
 n2 : Number of data
 n3 : Size of barcode
 d1... dk : Barcode data

n1	Type of 2D barcode
1	PDF417
2	QR code

1) PDF417

n2	Number of data
	1 < n2 ≤ 255

n3	Size of barcode
3	Horizontal 3
4	Horizontal 4
5	Horizontal 5
6	Horizontal 6
7	Horizontal 7
8	Horizontal 8
9	Horizontal 9

2)QR code

n2	Number of data
n3=1	1 < n2 ≤ 17
n3=3	1 < n2 ≤ 53
n3=5	1 < n2 ≤ 106
n3=9	1 < n2 ≤ 230

n3	Size of barcode
1	Version 1
3	Version 3
5	Version 5
9	Version 9

※PDF417 Vertical size automatic setting.

SUB+'z'+n1+n2

[Function] Buzzer Sound Length Setting
 [Code] ASCII SUB z n1 n2
 Hex 1A 7Ah n1 n2
 Decimal 26 122 n1 n2
 [Range] 0≤n1≤50 or 0≤n2≤50,
 [Description] Setting the buzzer sound length in 100msec(0.1sec) unit. (Max 5sec)
 n1=Buzzer ON time
 n2=Buzzer OFF time
 Buzzer will not sound when n1 is set to 0. (Buzzer Sound Cancel Setting)

DC3+'i'

[Function] Cutting after Blackmark Auto-detection.

[Code] ASCII DC3 i
Hex 13 69h
Decimal 19 105

[Description] When printing, the printer will automatically detect the blackmark and store the information in the internal memory switch and then reads the information registered in SW1, SW2 to cut the paper at the designated position.

※Refer to 2-8) Memory Switch for the detailed information.

※Use the provided Memory Switch Utility Program to register data on the Memory Switch.

SUB+'1'

[Name] Choice 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] Choice 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] $0 \leq nL + nH \times 256 \leq 448$, ($0 \leq nL \leq 255$, $0 \leq nH \leq 3$)
 $0 \leq kL + kH \times 256 \leq 448$, ($0 \leq kL \leq 255$, $0 \leq kH \leq 3$)
[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.
[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+'t'+n

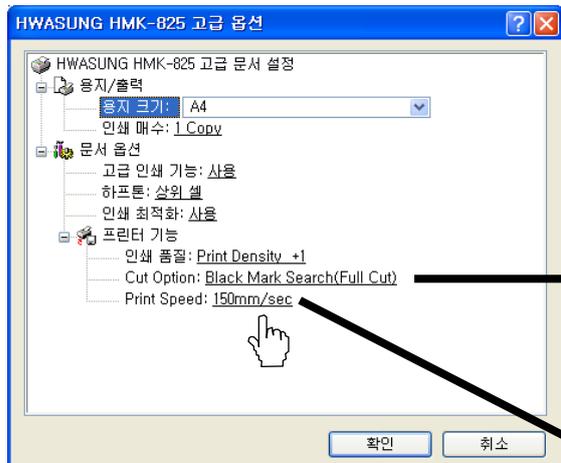
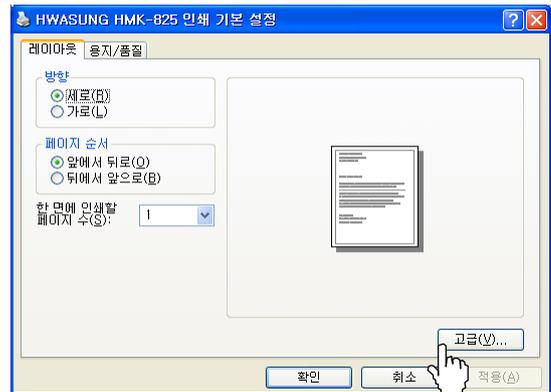
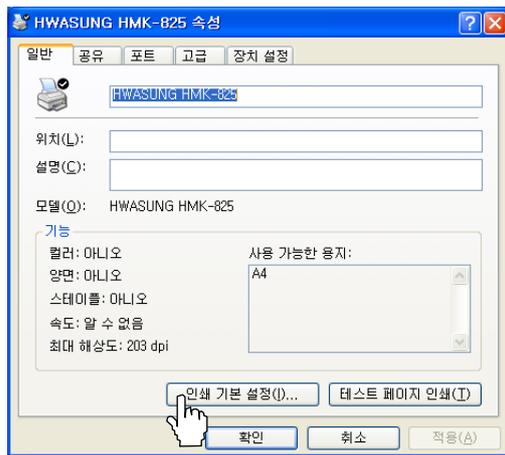
[Name] International Code Page
[Format] ASCII ESC t n
Hex 1B 74h n
Decimal 27 116 n
[Range] $0 \leq n \leq 8$
[Initial] n=0
[Descript] You can set up the code page according to the following table.
[Caution] SUB + x command 1 byte valid. Korean mode is not invalid.

n	Code Page
0	PC437(US)
1	KANA(JAPAN)
2	GREEK
3	Windows1251
4	PC866(Cyillic #2)
5	Windows1250(Poland)
6	PC850(Multilingual)
7	PC860(Portugal)
8	Windows1252
9	Iran System Encoding Standard
10	PC857(Turkish)
11	PC864(ARABIC)

6. Windows Driver

6-1) Printer Configuration Settings

- 1) Please open the screen of printer / fax, and click 'the basic setting (I)' of the general tap.
- 2) Please click Advanced Tab(V).
- 3) Please refer to the following images, and set up each details. You can select on each dropdown list to set the Density, Cutting Option, and Print Speed Setting.



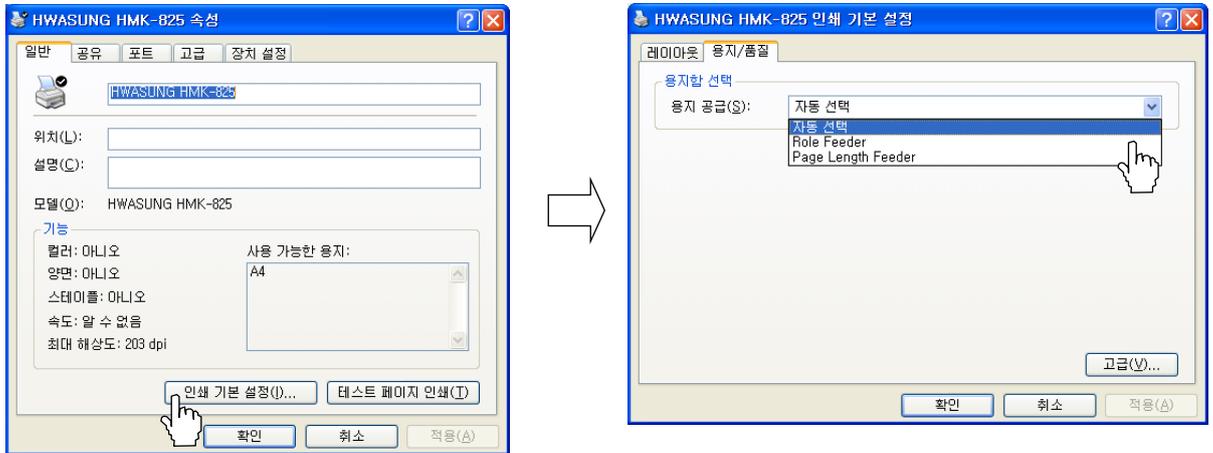
No Cut : No Cut, just Print.
 Full Cut : Full Cut after print.
 Partial Cut : Partial Cut after print.
 Black Mark Search(Full Cut) :
 The cutting position from the black mark will be set by the memory switch.

※All are printed graphically, so the print quality may vary depending on the amount of data printed.
 Print to meet the criteria below for smooth printing.
 Print Width 60mm: Set the speed to 150mm.

6-2) Paper Feed Setting

Please set the form feeding after printing.

- 1) Open the Printer and Fax folder, then click on the Basic Setting (I) under General tab.
- 2) Please click the paper /quality tab, and select from the Paper Feed dropdown list.



- 3) Auto Select / Role Feeder : : After printing, the form feeding is not conducted any more regardless of the paper length. This setting is used when the printed material length is irregular. As you can see from the example below, the feeding will not happen even if you set the margin through the Visual Basic, so you'd have to set the FontSize smaller and print "." to set the cutting position through Dummy Form Feeding.

Example)

'----- Example Dummy form feeding to cutting position -----'

```
Printer.Print " " & vbLf
Printer.Print " " & vbLf
Printer.Print " " & vbLf
```

```
Printer.FontSize = 2
Printer.Print "." ' dummy print for form feeding
Printer.EndDoc
```

- 4) page length Feeder : After print, execute form feeding up to the set page length.
Set when the printed materials are fixed to a certain length.

6-3) New Paper Settings

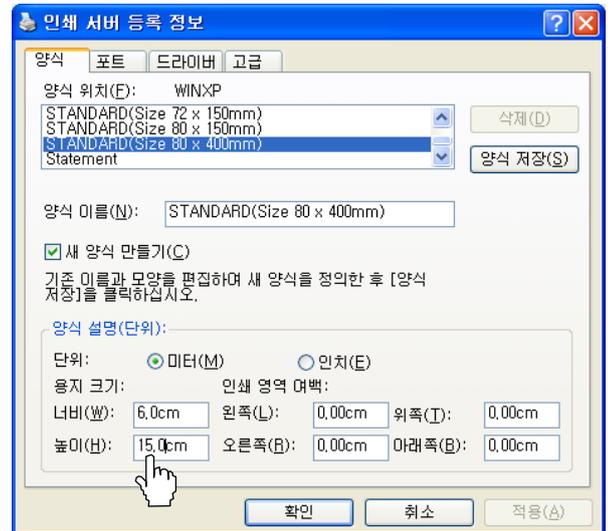
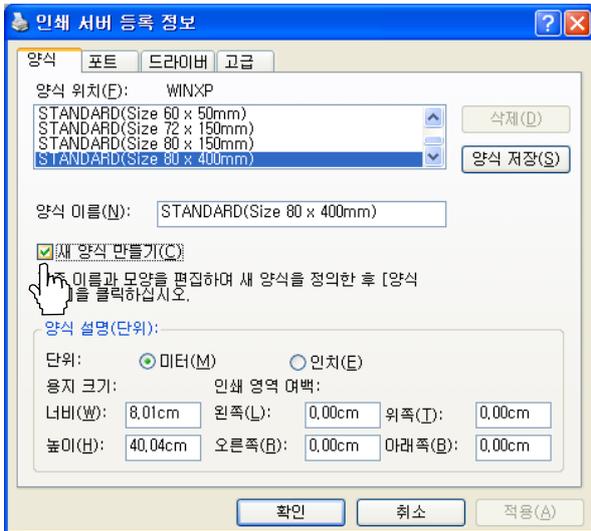
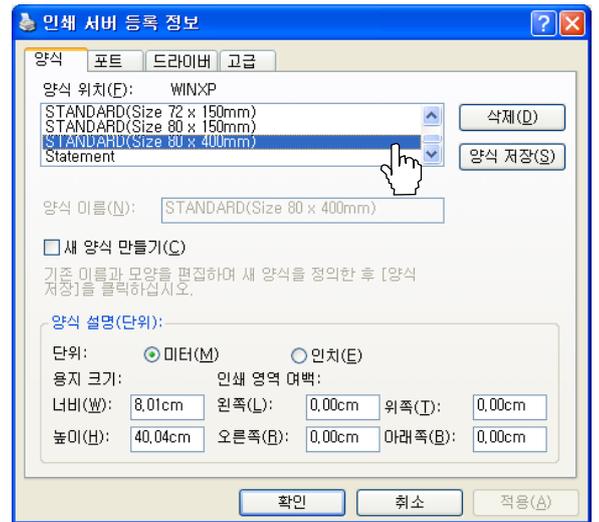
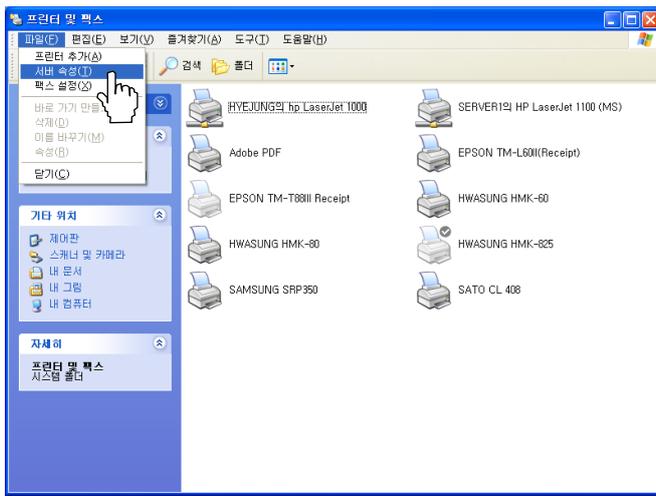
You can create and use a paper size that fits your system.

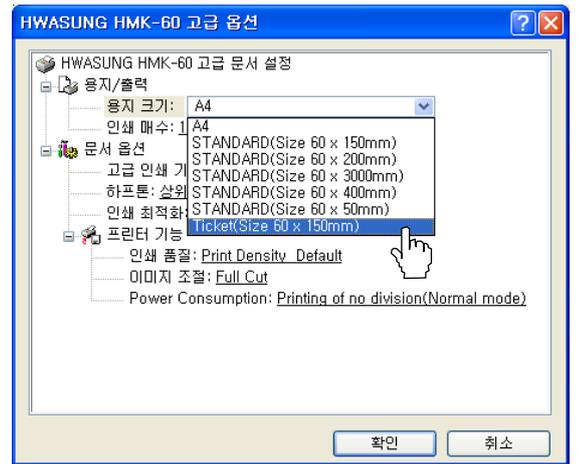
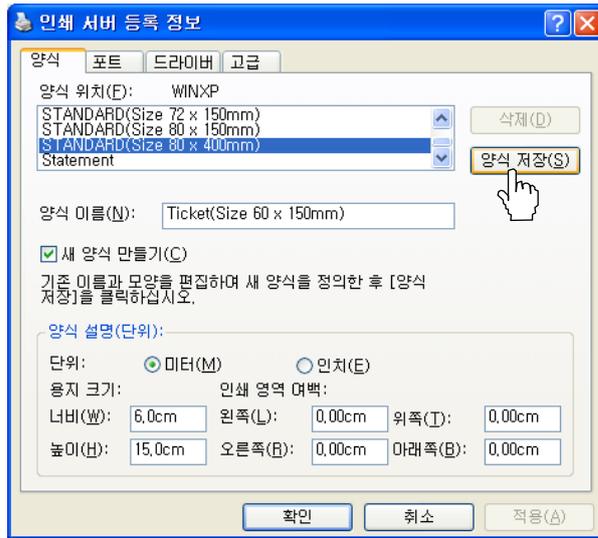
The below is an example of making **60mm x 150mm** sized paper.

- 1) Open the Printer and Fax Screen, then click on the server property under File Menu.
- 2) Select the STANDARD(Size 80 x 400mm) from Form Location.
- 3) Check the "Create New Form" box.
- 4) Click the paper size field and input 6.0cm (W), 15.0cm(H).

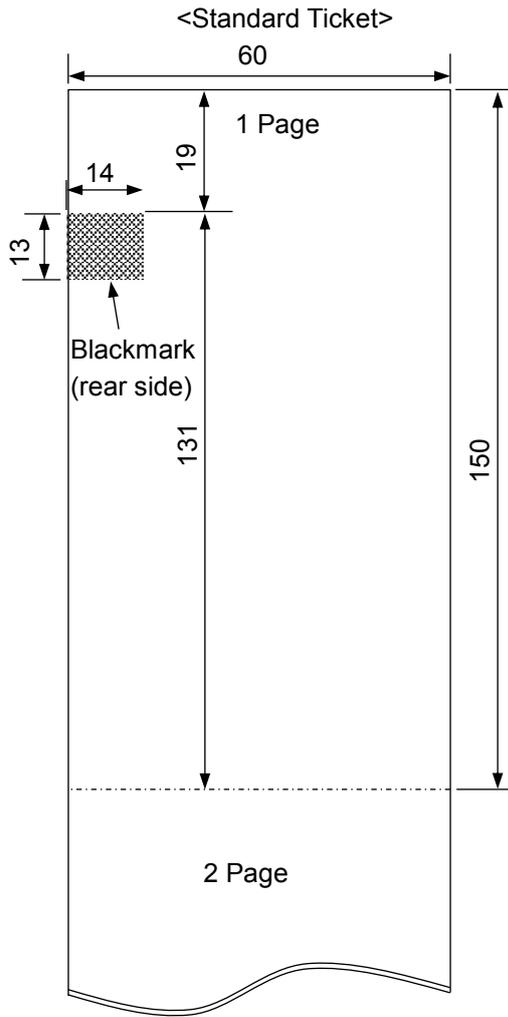
Make sure to make no changes in the print area margin.

- 5) Save the form after creating a custom name for the size. (i.e, Ticket(Size 60 x 150mm)).
- 6) Go to Basic Print Setting -> Advance then Select the newly created Ticket(Size 60 x 150mm)

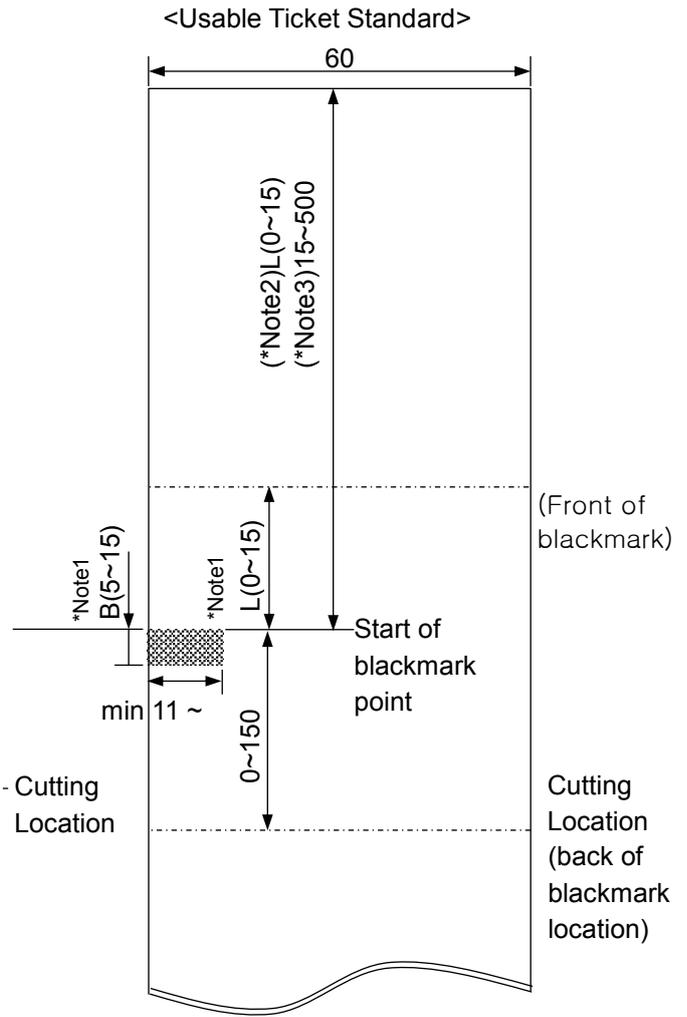




7-2) In case of blackmark on right side



[Front side, Printing side]



[Front side, Printing side]

[*Note1]

B : Blackmark height, L : cutting location in front of blackmark

$L+B < 15$ meaning, it should range within $L < 15 - B$.

[*Note2]

When cutting position is front of blackmark, condition should be the same as Note 1.

[*Note3]

In case of cutting position is behind the blackmark.

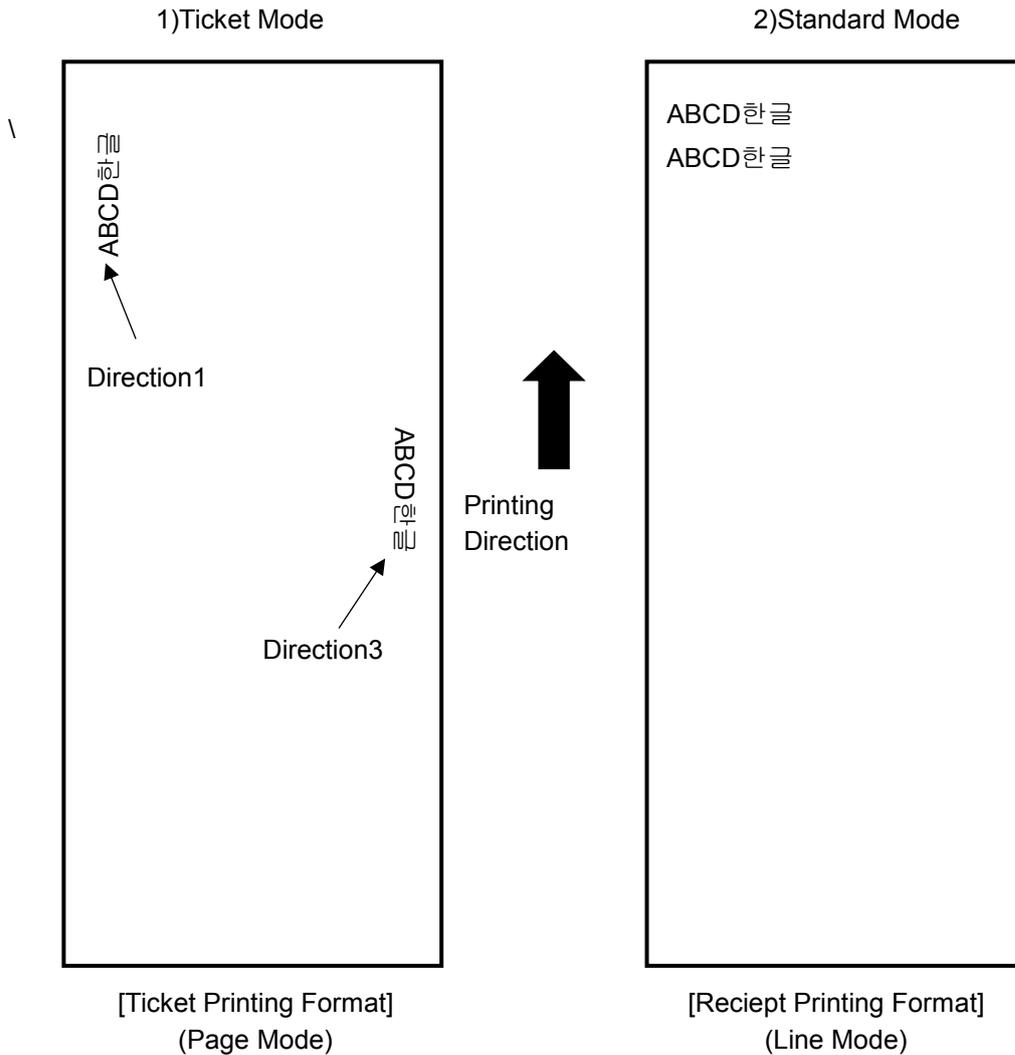
8. Commands for Ticket Mode

There are some differences between commands of Ticket Mode and ones of Standard Mode.

8-1) Switch to Ticket Mode

You can switch into ticket (page mode) from receipt (line mode) on communication setting.
(Please refer to 3-8) Communication Setting.)

※You can find it whether the printer is on Ticket Mode or Standard Mode when you print self-test.

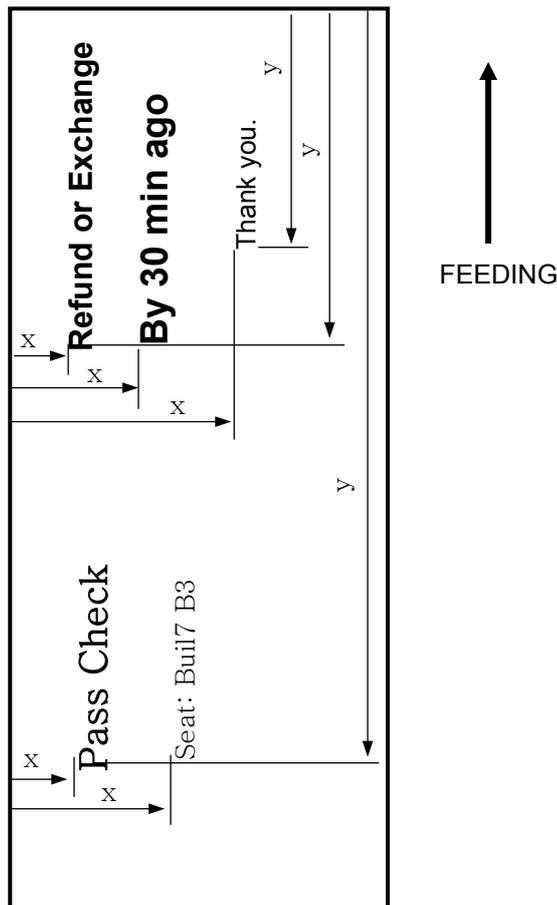


8-2) Commands for Ticket Mode

1) ESC+'W'+x1+x2+x3+x4+y1+y2+y3+y4

[Function]	Set the coordinate of printing area in page mode										
[Format]	ASCII	ESC	W	x1	x2	x3	x4	y1	y2	y3	y4
	Hex	1B	57h	x1	x2	x3	x4	y1	y2	y3	y4
	Decimal	27	87	x1	x2	x3	x4	y1	y2	y3	y4
[Range]	'0'≤x1≤'9' (1000 digit)		'0'≤y1≤'9' (1000 digit)								
	'0'≤x2≤'9' (100 digit)			'0'≤y2≤'9' (100 digit)							
	'0'≤x3≤'9' (10 digit)			'0'≤y3≤'9' (10 digit)							
	'0'≤x4≤'9' (single digit)			'0'≤y4≤'9' (1 digit)							
[Description]	Specify the coordinate of printing area										
	Horizontal starting point : $(x1 \times 1000 + x2 \times 100 + x3 \times 10 + x4 \times 1) \times 0.125\text{mm}$										
	Vertical starting point : $(y1 \times 1000 + y2 \times 100 + y3 \times 10 + y4 \times 1) \times 0.125\text{mm}$										
[Caution]	The maximum printing width is 56mm and the maximum printing length is 150mm.										
	x,y is designated as four digits each, and if less than 1000, fill the front digit with zero.										
	Note that the value of x,y is String , not Decimal or Hex.										
	For example, if you specify coordinates (430,1200), be aware that they are '0430' and '1200'.										
	ESC T-command can be set to n=1 or 3.										

(Ex)



9. USB (User Interface)

Without using the Windows driver, you are able to check the printer status, and transmit / receive the data, by using USB Interface DLL (HwaUSB.DLL) and OCX driver (HwaUSB.OCX).

9-1) DLL Interface

Place the HwaUSB.DLL into the System32 folder or SysWow64 folder depending on your Operating System's bit version.

9-1-1) DLL (Funtions)

1) long UsbOpen(LPCTSTR SelPrinter);

Open the USB port to Printer Model "HMK-081".

- Parameters:
SelPrinter : Printer Model Name
- Return :
Open Normal: 0
Open Error: -3(negative)

2) long PrintStr(LPCTSTR data);

Prints String.

- Parameters:
data : String datas
- Return :
Print Normal : 1
Print Error : 0

※ To prevent the loss of data for the print timeout, please use the function 'NewRealRead' to check the status, and go to the next step, when it's normal.

3) long PrintCmd(unsigned char data);

Prints 1 byte of data. When printing big data spool, use the following PrintPacket Value to increase the transfer Speed.

- Parameters:
data : 1 byte data (0~255)
- Return :
Print Normal : 1
Print Error : 0

 HWASUNG SYSTEM CO.,LTD	Model	Rev.	Page
	HMK-056	Ver1.01	65

4)long NewRealRead(void);

Reads 1 byte of print status data using USB port.

- Parameters:
None
- Return :
Read Normal : Print Status Value
Read Error : -1(Negative)

5)long PrintPacket(unsigned char *PacketBuf,unsigned long PacketLength);

The sending data buffer outputs a USB port for the specified data length.

- Parameters:
PacketBuf : TransmitDataBuffer Pointer
PacketLength : Transmit data length (not to exceed up to 64 bytes)
- Return :
Normal Output : 1
Output Error : 0

※ Do not use functions other than those listed above as they are for debug.

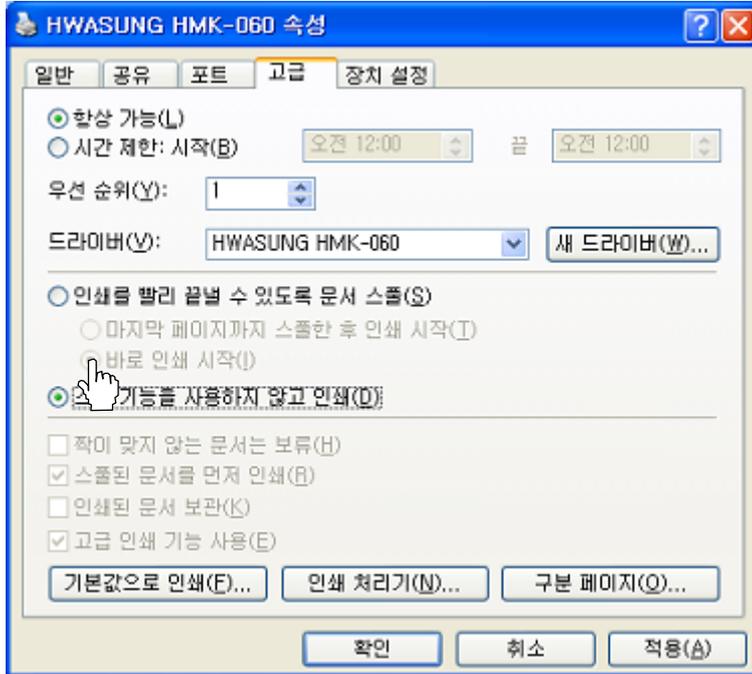
※ For more information, download the sample program from our website.

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9-2) Cautionary Points when using the USB interface

When transmitting jointly with Windows driver with the USB interface, there are cases of data transmission does not complete in order due to the mixed signal from the windows driver data and the USB interface data. In this case, set it to 'without using Printer SpoolFunction' under the printer's property.

There won't be an error during the receiving because it would only work through USB interface when receiving.



※ Windows Application Data Flow Chart

