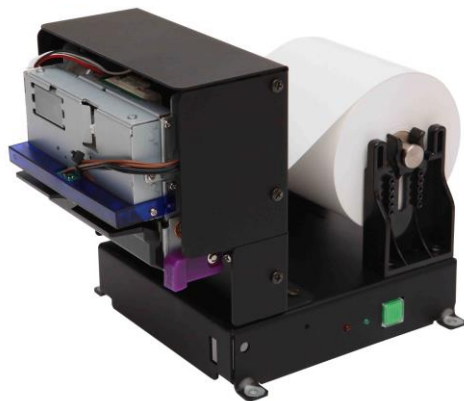# Technical Manual

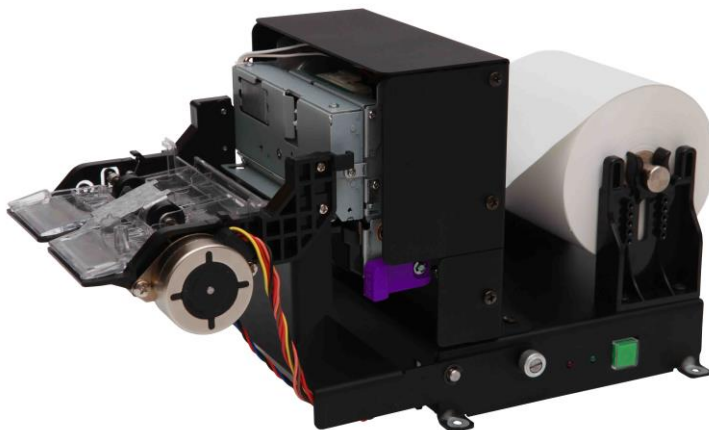## (Model : HMC-081 /HMK-081 / HMKP-081)

*Technical Manual = User manual / Relese 2

Model : HMK-081

Model : HMKP-081

<NOTICE> . All features and specifications described are subject to charge without notice.
. If you have any questions, please contact us.

CAUTION

- Please do not disassemble / reorganize the product.

- Please do not the remove the paper jam during power on.

- Pleased do not exceed the standard power voltage.

- Please do not wash off the product.

- Please do not press / shock the product.

- Please do not put the product at the moist (humid) condition.

- Please contact us if there is any problem.

- Please power off once remove the paper jam.

- Please clear the air / open the disclosed place.

- Please set the product without damage enviornment.

- Please set the product at the stable place.

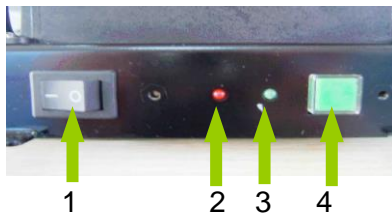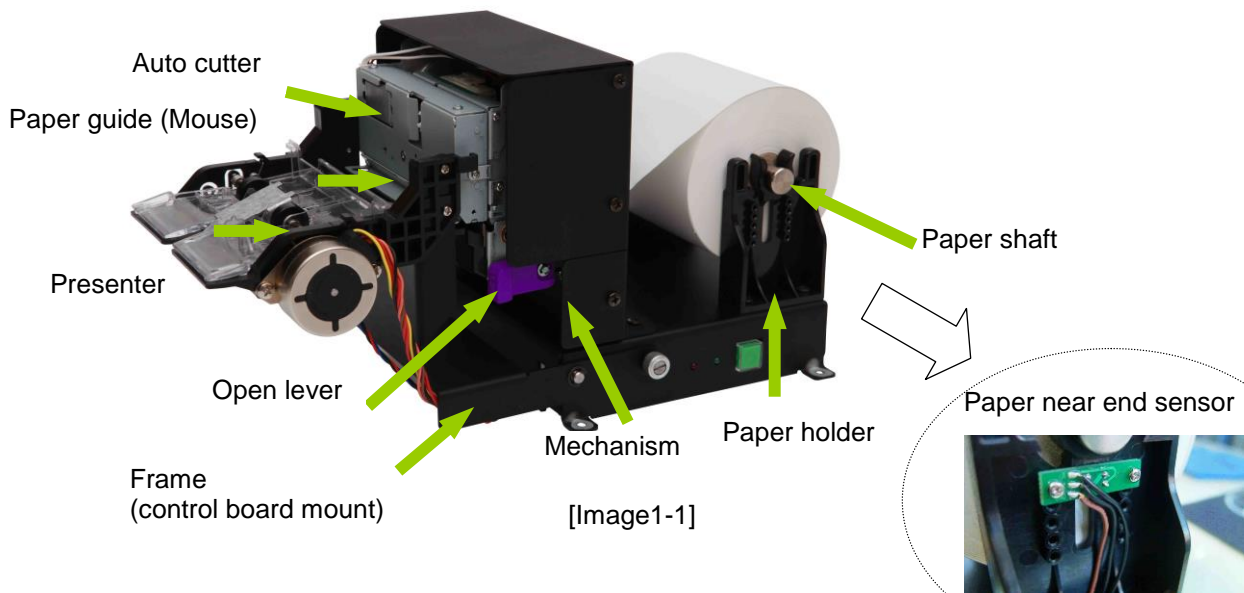- Pleaes keep the requires as necessary as general electrics.

CONTENTS

1. Printer features & External dimension
1-1) Name of each parts

Auto cutter

Paper guide (Mouse)

Presenter

Open lever

Frame
(control board mount)

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Paper holder

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[Image1-1]

Paper near end sensor

[Image1-2]

1.Power switch.

2.Error LED.

3.Power LED.

4.Feed switch.

5.Dip switch 1

6.Dip switch 2

7.DC Jack (24VDC)

8.Serial connector (RS232C, Straight ,Female 9 pin)

9.USB connector (USB, Type B)

10.Ethernet connector (Ethernet) : Option
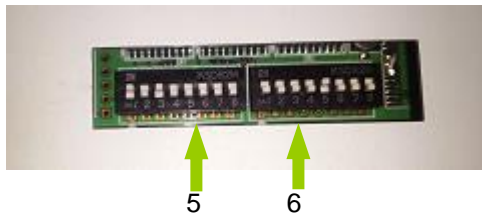
BOTTOM
[Image1-3]

REAR
[Image1-4]

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1-2) Dimension

[Image1-6] Standard type
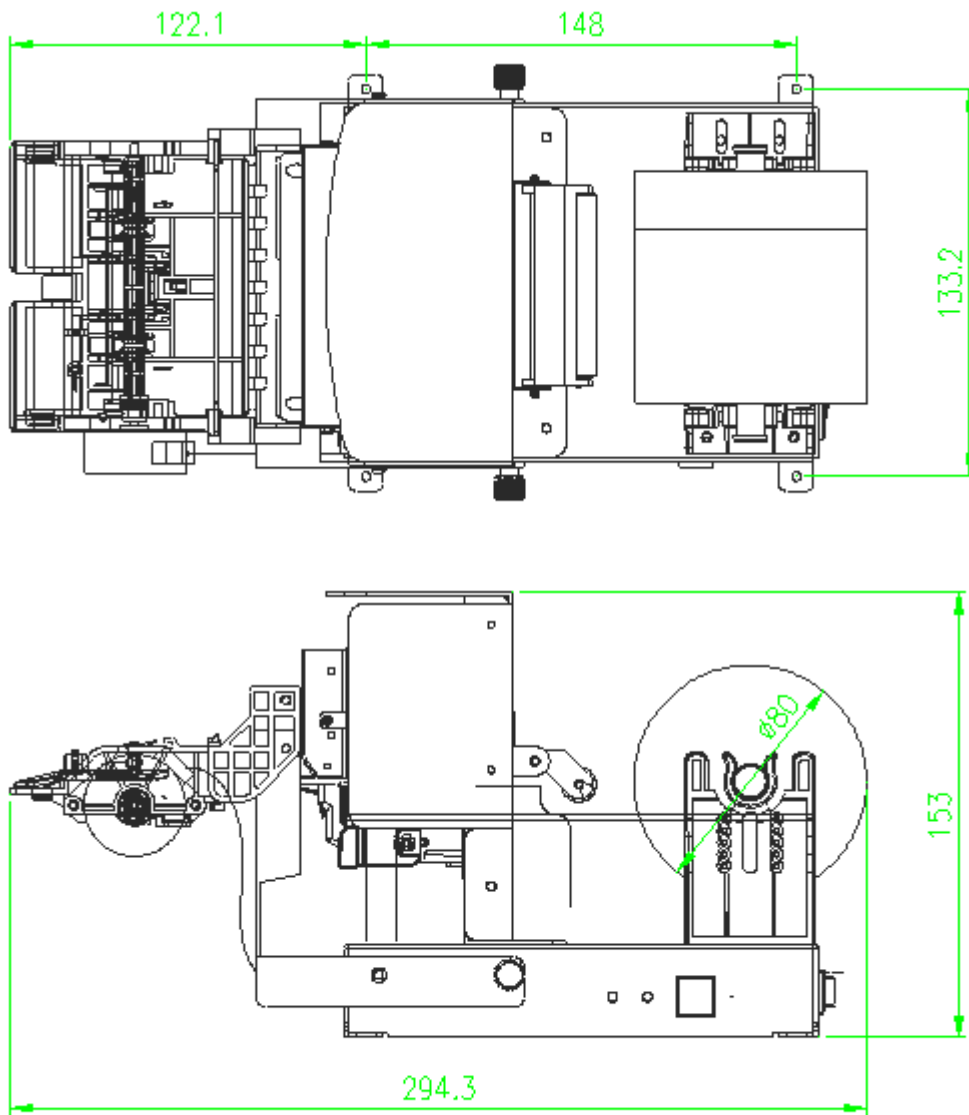
[Image1-7] Presenter type

1-3) Model number

HM□□-081□

※ Interface
   (blank) : RS-232C & USB combo
   E   :   Ethernet(LAN)

※ Presenter
   (blank) : Standard type.
   P   : Presenter type.

※ Frame
   K   : Frame type.
   C   : Board type.

2. Operation

2-1) Paper width

[Image 2-1]

* There are two sides for the paper guide.
  One is on the left, The other is on the right.
* Please refer to the Image 2-1.

2-3 inch
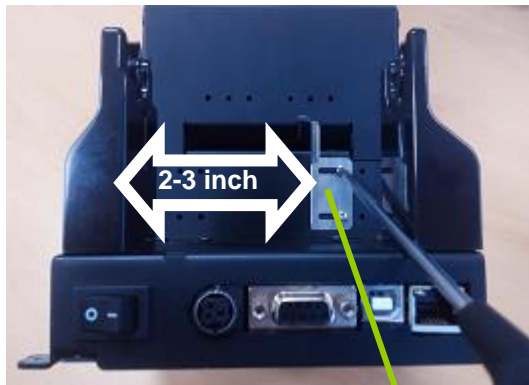
[Image 2-2]

Paper guide

* Please adjust the paper guide,
  and screw two pcs 3x4.
* Please refer to the image Image 2-2.

* There are two types of paper guide.
* One is the paper guide for the left side.
* The other is the paper guide for the right side.
* It is the same way to adjust / screw,
  even it's the left side, or it's the right side.

2-2) Paper set up : There are two ways to change the paper set up.

2-2-1) Clam shell type
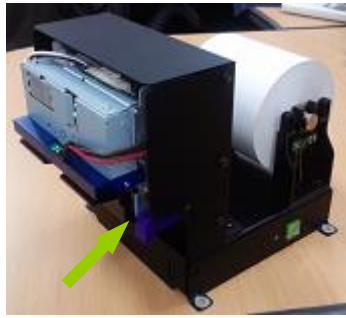
[Image 2-6]

1. Please press down the 'open lever' and open the 'cover'.
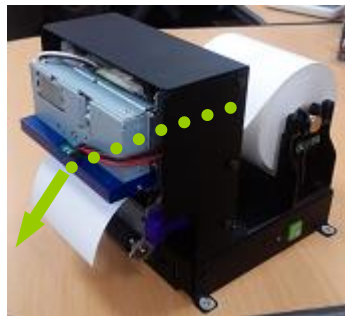
[Image 2-7]

2. Please inser the paper.
Please make sure about the paper side which is printed.
Please refer to the image [Image 2-8].
Notice : Please insert the paper, till the paper comes out from the cutter.

[Image 2-8] OK
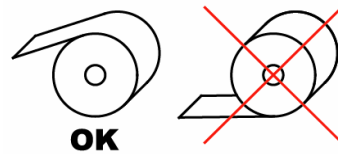
[Image 2-9]

3. Please close the cover as [Image 2-9].
Please press the feed button, and make sure if the paper feeds.
It is to make sure about if the paper set up correctly.

Notice : If the paper doesn't feed correctly, you open the cover and try to set up the paper again.

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2-2-2) Auto loading
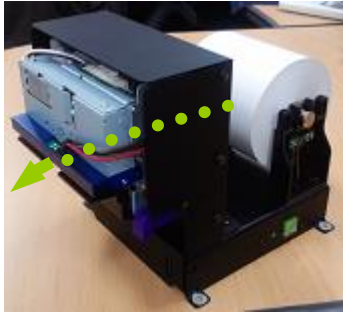
[Image 2-10]

1. Please switch on the power.

2. Please cut the paper off as the image [Image 2-11].

3. Please insert the paper, till the paper comes out from the cutter.
* You can see the paper is loading automacially, and the printer feeds and cuts the paper.

Notice: it's normal, even you hear the motor sound.
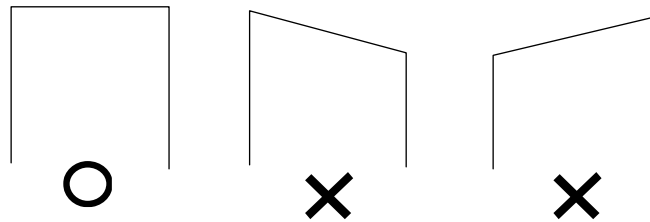
[Image 2-11]

Notice : If it is a type of presenter type, please remove the paper inside of the presenter, and set up the paper.

2-3) Paper Jam

Please follow the instructions, when it occurs the paper jam.

1.Please switch off the power, and make sure if the cutter blade prevents the paper from feeding / printing.
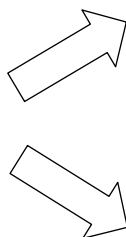
Cutter blade is not preventing
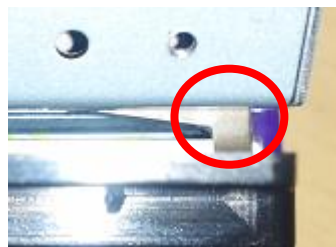
Cutter blade is preventing the paper from feeding and printing.

2. Please use the knob and turn one direction, and make sure about if the cutter blade is not preventing, or is preventing the paper from feeding and printing.

Knob

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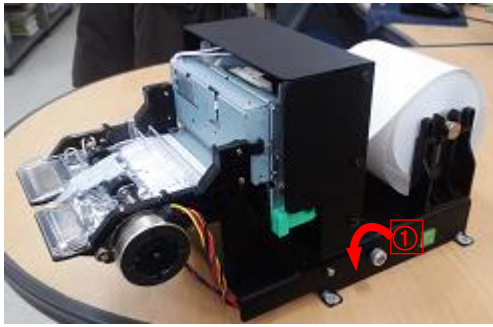
3. Please turn the captive screw ① as counterclockwise.
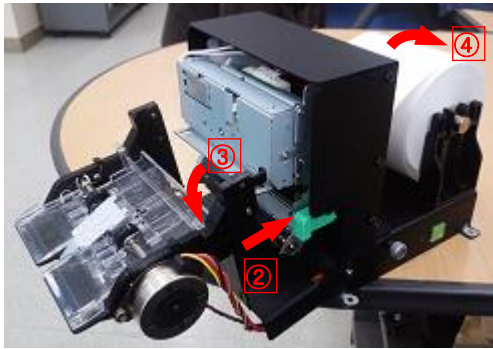
4. Please press down the open lever ②,③
and remove the paper jam.

Notice Please do not use any knife, or any sharp device, so that the platen roller doesn't hurt.

Notice The above image about the presenter type.
The standard type is the same with the presenter type as image above,
when you remove the paper jam.

Notice Please make sure about you turn off the power, when you remove the paper jam.

2-4) Self-test

Please turn off and on the power, while you press down the feed button.
You can see the following informations are being feeded.

```
*****************************
HMC-081 Control Board
Firmware  :  R2.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
Auto Cutter  :  Built-in
```

- Model.
- Firmware version / creare date.
- Interface.
- Dip switch.
- Sample.

Notice Please refer to the specification of Dip switch 2-8).

2-5) HEX Dump

Please power on after the dip switch 8 (up) of 1.
Then it prints all data in hex character (16 antilogarithm),
after [Hex Dump Mode] prints out as '[Printing sample]'.

It could know the printer status. It will be useful for the application development.

- It prints, if the data receives the digit 12.
- Please press the feed button, if the data receives less than the digit 12.
- The control code ($1F_{16}$ below) prints ".".
- The 80_{16} above prints "^".

[Printing sample]

16 antilogarithm   ASCII

```
[HEX DUMP MODE]
41 42 43 44 45 46 47 47 49 4A 4B 4C    A B C D E F G H I J K L
30 31 32 33 34 35 36 37 38 39 1B 4A    0 1 2 3 4 5 6 7 8 9 . J
FF 1B 69                               ^ . i
```

2-6) Onboard update

Please conduct the updates, after refering the following steps.

1) Please switch off and on(Do not need to control Dip Switch)

2) Please check the connection between the printer and the data cable.
   * Please make sure about if it is the right cable.
   * If use USB cable, save the time to update the firmware

3) Please conduct the provided program , then set up the model and Interface port

   If the error LED is turned off and is lighted on slightly after 4 seconds,
   then the updated is being started.
     * Please do not switch off the printer power, till the update is complete.

4) The update will be complete, once the update indicates complete.
     * If the error LED keeps the light goes in and out, it's error.
     Please stop the update program and make sure the cable and other connections.
     Please return the process "1." and follow the step again.

5) Atfer update, automatically the printer will be reset for using and use the printer.
.

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2-7)Rebooting Firmware

* If the firmware was an error or damaged, not reset, please recover the firmware as following.

    1)Check for the jumper which is beside Dip Switch on the bottom of printer

    2)By using Pin Header(2.5mm), Connect between both of Pins
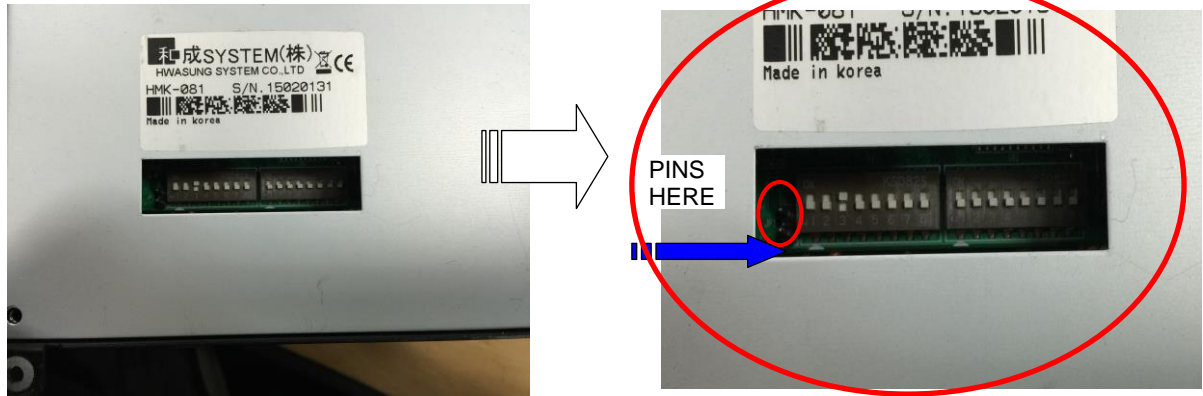
    3) Connect the cable to printer, then turn on the power of printer

    4) Using the provided Booting Program and setting the interface port.
       Then, Select board -> at91sam4e16-ek and click "Connect "
       (RS-232 and USBport Possible only, However, the cable is only one to connect)
       (If using the USB port, Save the time to set up)
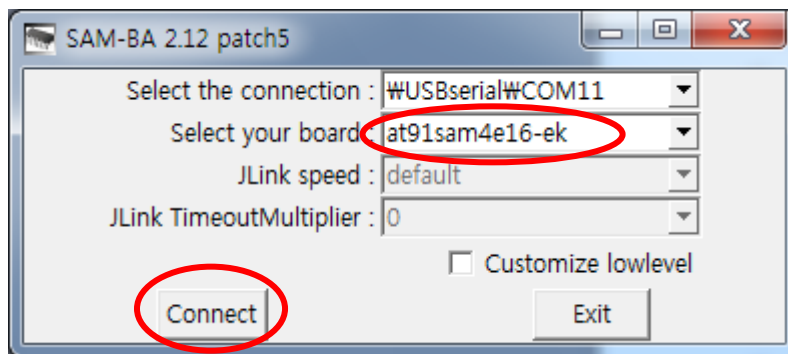
    5) Atfer rebooting, Please remove JP2(Jumper Pins)

* If pass this step, it would not be rebooted after recover the firmware.

6) Click the " ICON " in the Send file Name then atfer open the firmware file for Target model,
   Then, Click   "Send File Button"

*Notice : Do not revise the Parameter value.
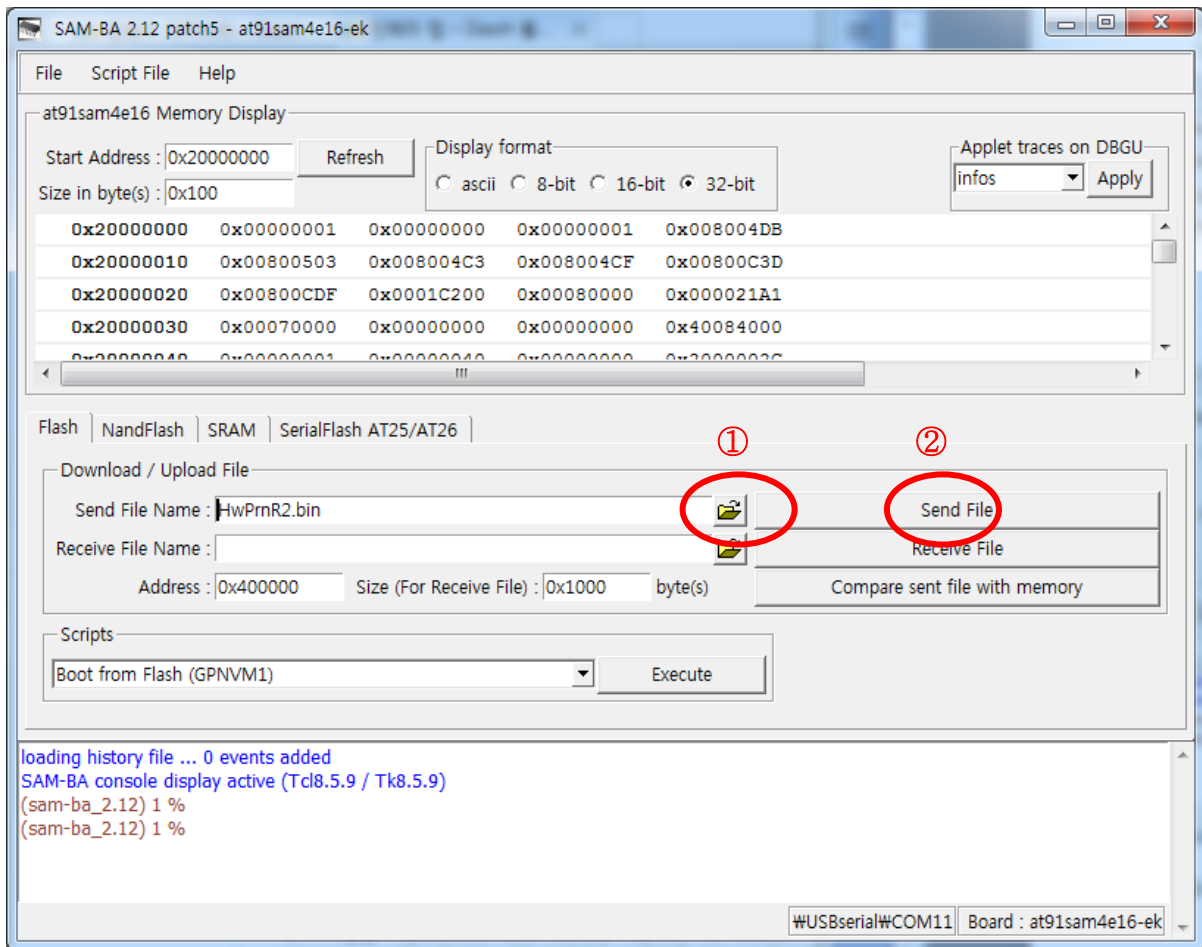
7) Atfer the file is complete to transfer, Click "Yes "
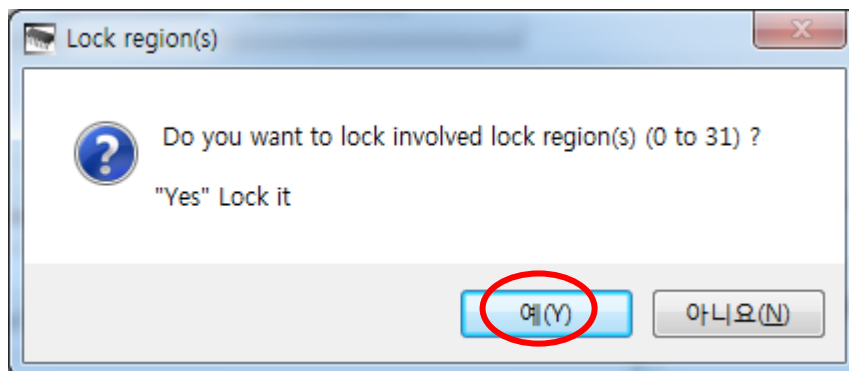
8) Click "Excute" button, atfer checking for stting up "Boot from Flash(GPNVM1) in Scripts.
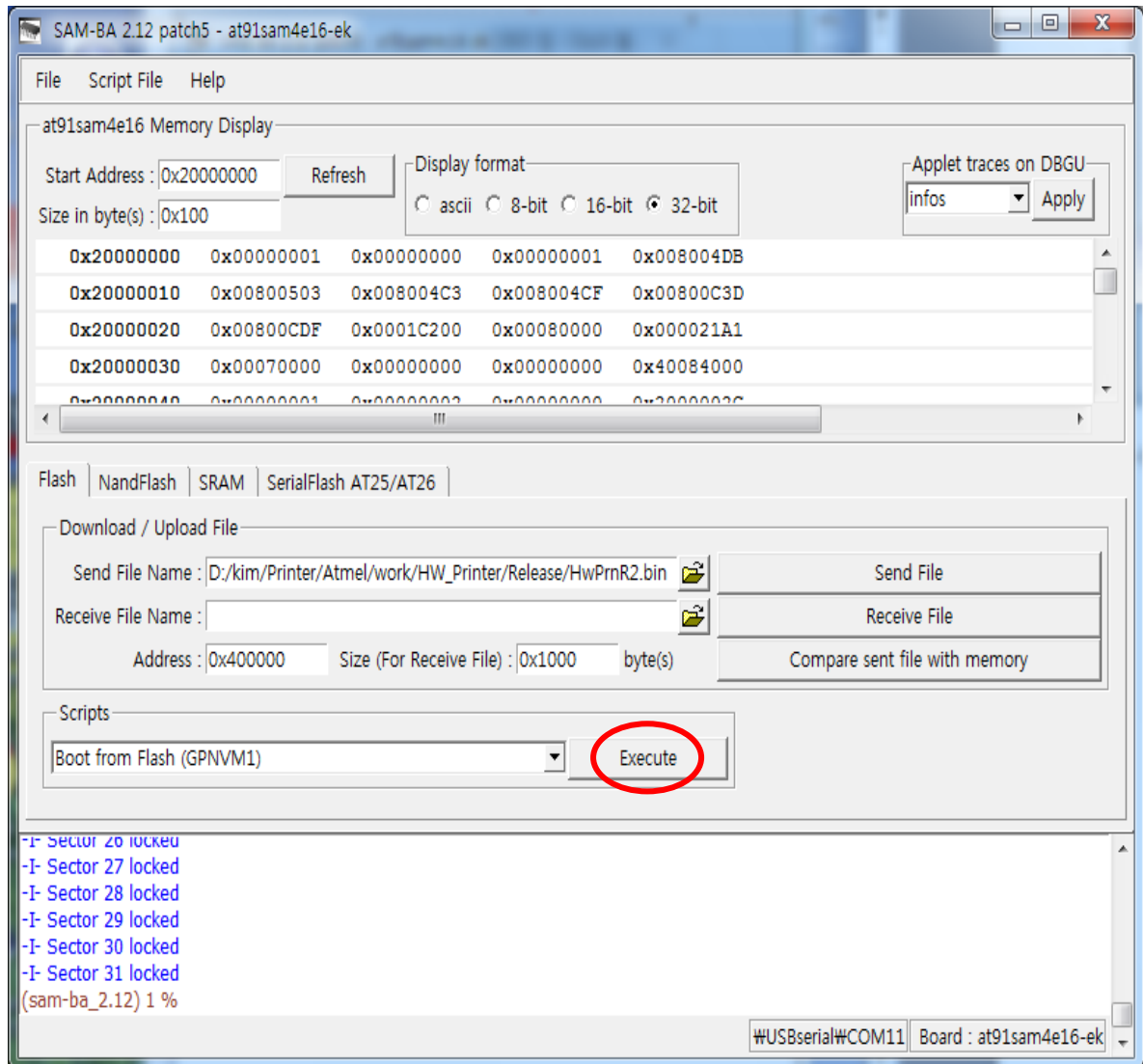
9) To re-operate printer, Tune off and on

2-8) Dip switch

Please control the dip switch between the printer & the host for the protocol condition.
There are 1 and 2 of dip switch.

1)Dip switch 1
※RS-232C (Dip2 SW4)

a)1,2,3 : Baud rate

SW1	SW2	SW3	Baud Rate(BPS)
OFF	OFF	OFF	921600
ON	OFF	OFF	2400
OFF	ON	OFF	4800
ON	ON	OFF	9600
OFF	OFF	ON	19200
ON	OFF	ON	38400
OFF	ON	ON	57600
ON	ON	ON	115200

b)4 : Data bit

SW4	Data bit
ON	- -
OFF	- -

c)5,6: Paraity

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

d)7 : Stop bit

SW7	Stop bit
OFF	- -
ON	- -

e)8 : Print mode

SW8	Print mode
ON	HEX DUMP
OFF	NORMAL

※ Ethernet mode (Dip2 SW4)

a)1 : Ethernet IP mode

SW1	IP Mode
ON	DHCP IP(DHCP)
OFF	Static IP

b)2 : Ethernet booting mode

SW2	Boot Mode
ON	Factory mode. It sets up the mode by the factory.
OFF	User mode. It sets up the model by the user.

※**Notice** :
please refer to how to set up the ethernet.

2)Dip switch 2

a)1: Contoller Mode

SW1	Contoller Mode
ON	Ticket Mode
OFF	Standard Mode

b) 2 :

SW2	Black Mark valid/invalid	Description
ON	Black Mark valid	After the black mark is detected, the initial paper is positioned.
OFF	Black Mark invalid	The black mark of the initial paper is not detected.

Notice : If it's valid, please use the paper with the black mark, or it occurs the paper jam.
Notice : Please make sure the specification of the paper should be the same with the registered informations.
Notice : Please refer to 2-8) memory switch.

c) 3 :

SW3	First Page Mode	Description
ON	First Page No Cut	The paper is not cut, once the initial paper is positioned.
OFF	First Page Cut	The paper is cut, once the initial paper is positioned.

Notice : Please make sure the specification of the paper should be the same with the registered informations.
Notice : Please refer to 2-8) memory switch.

d) 4 :

SW4	RS-232C/Ethernet Mode	Description
ON	Ethenet Mode	Ethernet interface is valid.
OFF	RS-232C Mode	RS-232C interface is valid.

Notice : You can't use the interface Ethernet and the interface RS-232C together.

e) 5 :

SW5	JamSensor valid /invalid	Description
ON	Jam Sensor valid	Jam Sensor is valid.
OFF	Jam Sensor invalid	Jam Sensor is invalid.

Notice : Jam Sensor assembly is option.
Notice : If the Jam sensor assembly is not accomodated and the jam sensor is valid (on), it dectects the paper Jam. It means it's not workinig normally.

f) 6 :

SW6	Presenter valid / invalid	Description
ON	Presenter valid	Presenter is valid.
OFF	Presenter invalid	Presenter is invalid.

Notice : Presenter is option.
Notice : If the presenter is not accomodated and the presenter is valid (on), it dectects the paper Jam. It means it's not workinig normally.

g) 7 :

SW7	Command Mode	Description
ON	ESC/P	ESC/P Command Mode
OFF	HWASUNG	Hwasung Command Mode

h) 8 : Update / print mode

SW8	Update / print mode	Description
ON	Update mode	Firmware update mode
OFF	Print mode	Standard print mode

2-9) Memory switch

Please set the function of internal memory.
※ Please use the provided program - 'memory swtich setting utility program'.
※ The value is not deleted until the next value is changed, even though power off.

Memory SW	Value	Explaination
SW1	p or m	
SW2	0~1200 or 0~136	
SW3	248-4000	
SW4	Base Code Page	Setting one default value for each country
SW5	Base Font	Setting one of 1). 2byte codes : korean(24 x 24), korean(16 x 16), Japenes(24x24), Chinese(24x24). 2).1byte codes : ASCII(12x24), ASCII(8x16,9x16)
SW6	Reservation	
SW7	Reservation	
SW8	Reservation	
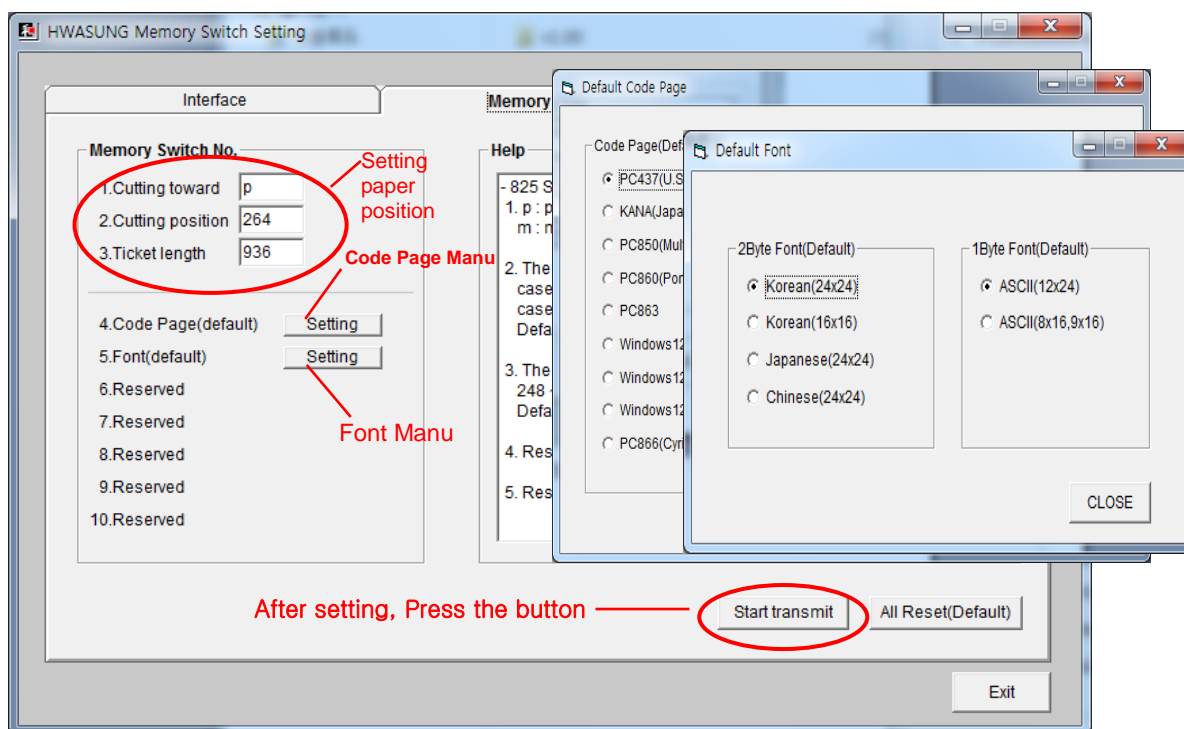
1) SW1 :
  * p(70_{16})   : After command the cutting DC3 + "i", it will be cut from the black mark starting
                point to the value in the SW2 (plus) as the image below.
  * m($6D_{16}$) : After command the cutting DC3 + "i", it will be cut from the black mark starting
                point to the value in the SW2 (minus) as the image below.

2) SW2 : The distance from the black mark starting point to the cutting position
  * SW1 /p : You can set the value as 0~1200(0 ~ 150mm).
  * SW1/ m : You can set the value as 0~120(0 ~ 15mm).
      ※ A value point indicates 0.125mm ex) In case of 100, 100 x 0.125 = 12.5mm
      ※ SW1,SW2 is used to set the cutting option (Black mark search as Full cut) at the Window
        Driver (Window driver : DC3 + "i")

Example)

Ex) SW1 = p, SW2 = 100,

Ex) SW1 = m, SW2 = 100,
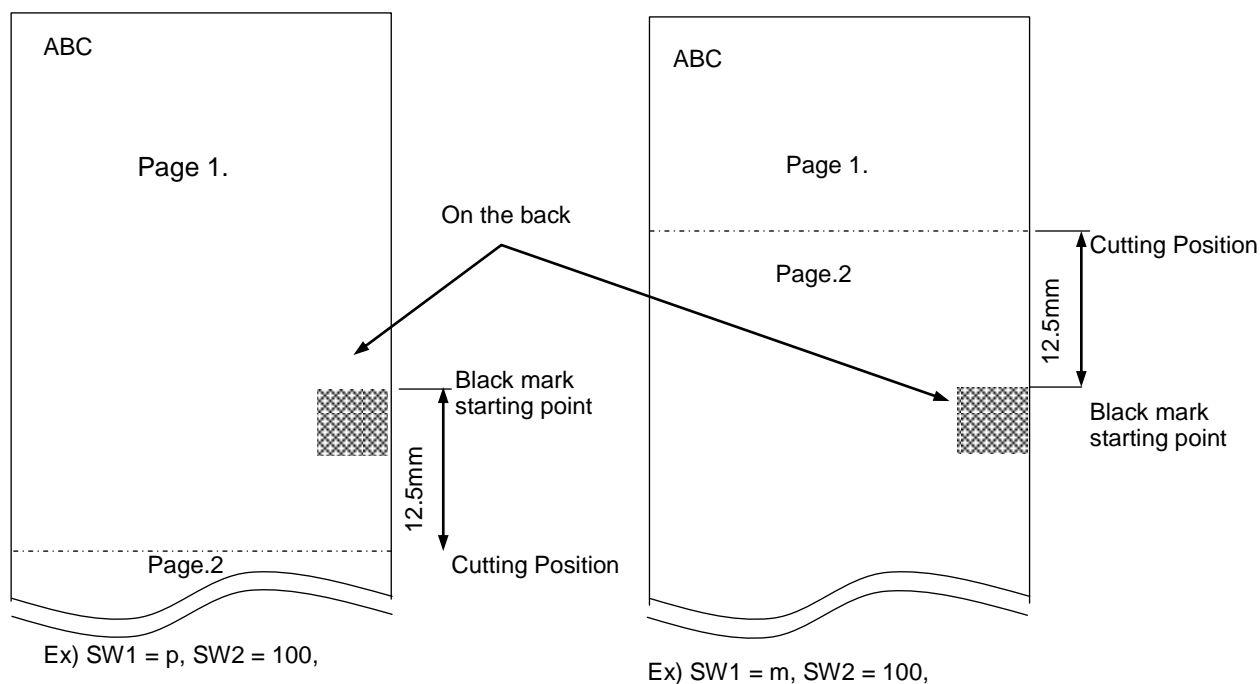
3)SW3 : It is to set up the distance from the starting point of Ticket to the point of black mark.
　　　It is to set up the initial position of the first page,if the dip switch is the mode 'First page No cut'.
You can set up the range 0~120 or 120~4000.
0~120 should be 0~15mm, if the cutting position is the forepart of black mark.
12~4000 should be 15~500mm, if the cutting position is the rearpart of the black mark.

Notice : The value '1' means 0.125mm.
For example) 300 x 0.125mm = 37.5mm
Notice : The factory mode is 1048(131mm), and is the black mark for the right side.
Notice : Please refer to 7.Ticket recommend.

Example)

ABCD

Page 1.

0~15mm or 15~500mm

Notice:Black mark for the lef side, and rear side.

Starting point of black mark

Page 2.

[Front page,printing side]
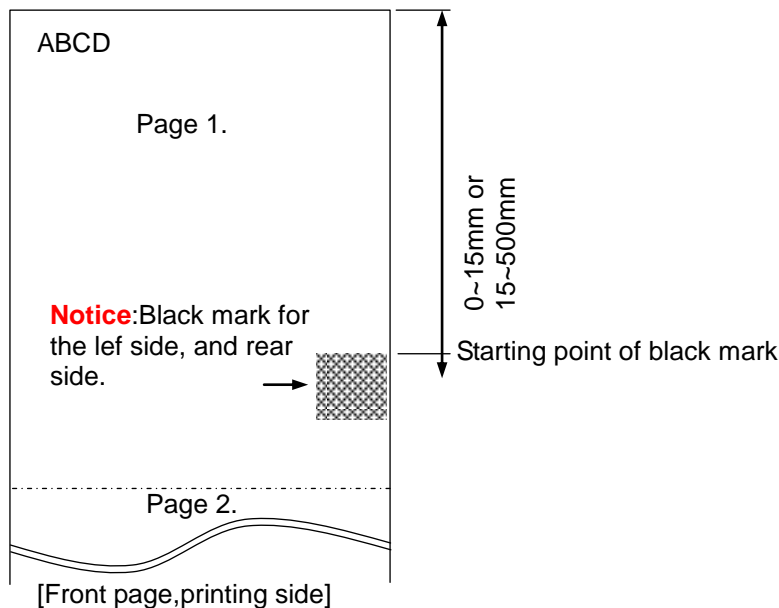
2)Please make sure "Memory Switch" changed

* Atfer change "Memory Switch Value", Please do self-test.

```
[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
```

2-10) Internal connector

1)CN1 : AC adapter Jack (AC00093-12-03,TECHWIN)

Pin	Descript	Remark
1	+24V	
2	GND	
3	N.C	

You can make the choice one of two, when you put the order.

2)CN2 : DC connector (YAW396-02,Yeonho)

Pin	Descript.	Remark
1	+24V	
2	GND	

※Alternative one : YH396-02,old Unlock type)

3)CN3 : (20017WS-03,Yeonho or 53014-0310,Molex)

Pin	Descript.	Remark
1	PR_A	Presenter sensor power
2	PR_C	Presenter dectection output
3	GND	

4)CN4 : Power switch connector (YAW396-02,Yeonho)

Pin	Descript.	Remark
1	+24V	+24V output voltage
2	+24V	+24V input voltage

5)CN5 : Mechanism connector (SMW200-32C,Yeonho)

Pin No.	Descript.	Remark	Pin No.	Descript.	Remark
1	+24V	+24V	17	SI2	TPH Serial Input
2	GND	GND	18	TH	Thermoster
3	+24V	+24V	19	+24V	+24V
4	GND	GND	20	GND	GND
5	+24V	+24V	21	CUT_A	Cutter Control A
6	GND	GND	22	CUT_B	Cutter Control B
7	+24V	+24V	23	HM_SW	Cutter Home Switch
8	GND	GND	24	Paper_A	Paper sensor power
9	N.C		25	Paper_C	Paper sensor signal
10	N.C		26	HD_UP	Cover open signal
11	/LATCH	TPH Latch	27	A	Motor operation A
12	VDD	+5V	28	B	Motor operation B
13	/STROBE1	TPH STROBE1	29	/A	Motor operation /A
14	/STROBE2	TPH STROBE2	30	/B	Motor operation /B
15	CLOCK	TPH CLOCK	31	MARK_A	Blackmark sensor power
16	N.C		32	MARK_C	Blackmark sensor signal

6)CN6 : Extended connector (20017WS-07,Yeonho or 53014-0710,Molex)

Pin No.	Descript.	Remark
1	NEAR C	NEAR END dectection
2	FEED IN	FEED switch input
3	NEAR_A	Near end sensor power (220Ω resistance through)
4	ERROR LED	Error LED (680Ω resistance through)
5	N.C	
6	GND	GND
7	VDD	Logic power (+5V)

Notice : If the ERROR LED is accomodated,
please connect Andobe to VDD(+5V), and connect Cathode to Pin4.

7)CN7 : USB connector (Type B)

Pin	Descript.	Remark
1	VBUS	VBUS input
2	D-	Data-
3	D+	Data+
4	GND	Signal GND
5	FG1	Frame GND1
6	FG2	Frame GND2

8)CN8 : RS232C connector (DSUB9, FEMALE)

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

9)CN9 : Sub sensor connector (20017WS-03,Yenho or 53014-0310,Molex)

Pin	Descript.	Remark
1	A	Sensor power
2	C	Sensor output
3	GND	GND

10)CN10 : Presenter connector (20017WS-06,Yenho or 53014-0610,Molex)

Pin	Descript.	Remark
1	A	Presenter Motor A
2	N.C	
3	/A	Presenter Motor /A
4	/B	Presenter Motor /B
5	N.C	
6	B	Presenter Motor B

11)CN11 : Decoration LED connector (20017WS-02,Yenho or 53014-0210,Molex)

Pin	Descript.	Remark
1	DECO_A	Deco LED power
2	DECO_C	Deco LED operation signal

12)CN12: Ethernet connector (RB1-125BAG1A.UDE)

Pin	Descript.	Remark	Pin
1	TD+	OUT	Transmit Data+
2	TD-	OUT	Transmit Data-
3	TCT	OUT	
4	N.C	-	None Connection
5	N.C	-	None Connection
6	RCT	IN	
7	RD+	IN	Receive Data+
8	RD-	IN	Receive Data-

2-11) Presenter

It is a dispensor to prevent the paper jam from the end user.
It is a dispensor to discharge the printed paper out all at once.
Notice : It is not a dispensor, like retractor pulling back the printed paper,
UNLESS it is taken in time.

2-10-1)Operation
 1)The printing is the same with the printer which the presenter is not accomodated.
 2)The presenter prints the printed paper out all at once,
 after it direct the command printing and the cutting.

2-10-2)**Caution**
 1)The partial cut is not available. The full cut is available only.
 2)The maximum paper length is limited to 50cm a format.
 3)The minimum paper length is limited to 7cm.
 4)You have to use the paper width 72mm ~ 81mm.

3. General Specification

3-1) Specification
1) Printing   : Direct thermal printer
2) Resolution   : 8dot/mm, 203dpi, 1dot=0.125mm
3) Total dots a line   : 640dot/line
4) Printing speed   : 200mm/sec,max (24V, 25℃)
5) Paper width   : 60~81mm(Max)
6) Heating resistance : 800Ω±3%

3-2) Operation voltage

Operation voltage	24V±10%	Motor,Thermal print head
Logic voltage	5V±5%	Paper sensor, TPH control,Sensor for TPH

3-3) Paper loading capacity
180 gf·cm above(if it's operated 1200pps)

3-4) Weight
about 1.60kg (HMK-081)

3-5) Operation condition (temperature / Humid)
1) Temperature : 0～40℃
2) Humidity : 40～80%RH(in not dew condensation)
Notice : The printing is subject to the operation condition.

3-6) Storage condition (temperature / Humid)
1) Temperature : -25～40℃
2) Humidity : 40～90%RH(in not dew condensation)
Notice : The printing is subject to the storage condition.

3-7) MCBF
1) Thermal Print Head : 100Km(100 million pulse)
2) Auto cutter : 1,000,000

4. Interface specification

4-1) RS-232C

1)Data Transmission : serial
2)Hand shake   : Hardware (RTS/CTS or DTR/DSR)
3)Baud Rate   : 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 BPS
4)Data Bit   : 7, 8bits
5)Parity   : None, Odd, Even
6)Stop Bit   : 1 ,2bits
7)Connector   : DSUB-9 Female
8)Cable   : DSUB9(Male)-DSUB9(Female) straight(1:1) cable

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	–
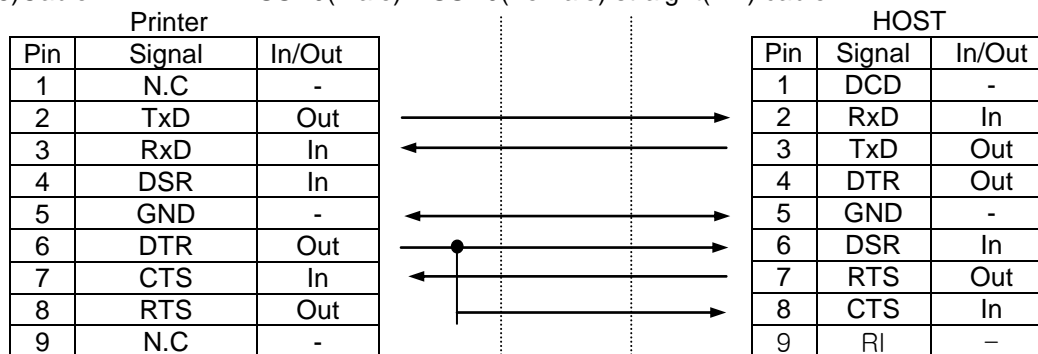
4-2) USB

1)Spec.   : USB 2.0, Full Speed(12Mb) and High Speed(480Mb)
2)Connector   : Type B
3)Cable   : USB2.0 cable
4)Transmission   : 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)
.

4-3) Ethernet

1)Protocol   : TCP/IP
2)Standard   : IEEE 802.3 10BASE-T 및 IEEE 802.3u 100BASE-TX
3)Connector : RB1-125BAG1A(UDE)
4)Pin

Pin	Signal	In/Out	Description
1	TD+	OUT	Transmit Data+
2	TD-	OUT	Transmit Data-
3	TCT	OUT	
4	N.C	-	None Connection
5	N.C	-	None Connection
6	RCT	IN	
7	RD+	IN	Receive Data+
8	RD-	IN	Receive Data-

Notice : Please refer to how to set up Ethernet.

5. Command

Command	Function	Page
CR	Print and carriage return	32
LF	Print and line feed	32
CAN	Cancel print data in page mode	32
HT	Horizontal tab	32
FF	Print end position label to start printing	32
SUB x	Extended Graphic Mode	33
SUB p	Off line printing per paper detection	33
SUB b	Black mark detection	33
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ESC D	Set horizontal tab positions	34
ESC SP	Set character right side spacing (ASCII)	34
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ESC 2	Set 1/6 inch line spacing	38
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ESC @	Printer reset (Initialize printer)	38
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ESC M	Select character font	39
ESC R	Select internatonal character set	39
ESC a	Align position	40
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ESC m	Paper cutting	40
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FS .	Cancel the korean in extended graphic mode	41
FS -	Set the underline of Korean	42
FS S	Space Korean	42
FS W	Set the font size of Korean	42
FS q	Register Non Volatile logo(bit-image)	43
FS p	Print N/V logo print	43
GS !	Extension of character	44
GS (K (fn=49)	Printing density	44
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GS B	Printing black in reverse	45
GS H	Barcode character	45
GS L	Left space	45
GS V	Cutting paper	46
GS W	Set the printing area	46

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]   ① STANDARD MODE:
  After printing the data and go to return according as the fixed data.
② PAGE 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 and 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	

[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.		

[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).		

[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.		

[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.		

[Name]	Set the printing speed		
[Format]	ASCII	SUB	s	n
	Hex	1A	73h	n
	Decimal	26	82	n

[Range]   1≤n≤14

[Initial Value]   n=14

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

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

[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.

[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

[Name]   Set character all at once

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

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

[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 position from the space of left ending to (nL+nH×256)×0.125mm.

           Move the position into the space of left ending, if the area is over.

[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

       $1 \leq nL+nH \times 256 \leq 1023$, $0 \leq nL \leq 255$, $0 \leq nH \leq 3$, $0 \leq d \leq 255$

[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

• 8dots mode

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•24 dots Mode

D1	D4	D7
D2	D5	D8
D3	D6	D9

Single Density

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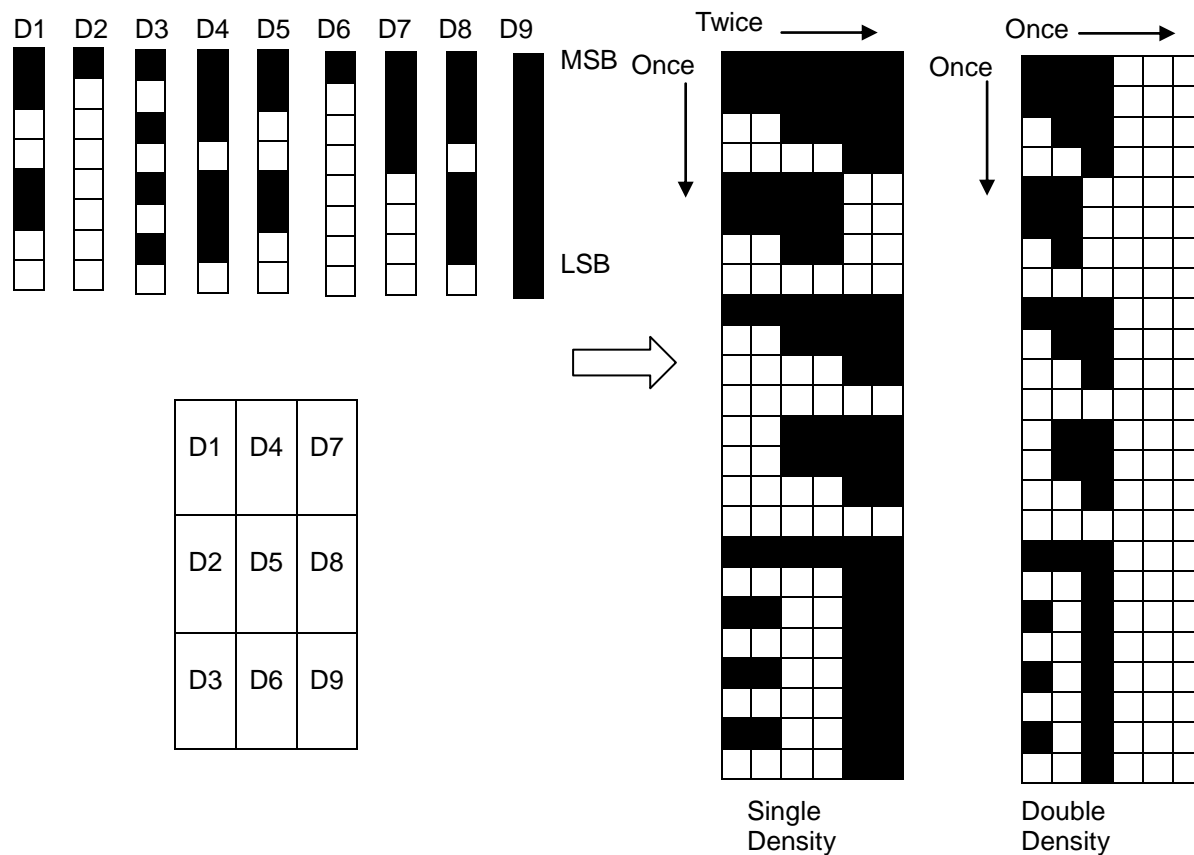
[Name]	Set / Cancel underline		
[Format]	ASCII	ESC	-	n
	Hex	1B	2Dh	n
	Decimal	27	45	n
[Range]	0≤n≤255,		
[Invitial Value]	n=0,		
[Descript]	Set / Cancel underline		

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 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			

[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			

[Name]	Select font			
[Format]	ASCII	ESC	M	n
	Hex	1B	4Dh	n
	Decimal	27	77	n
[Range]	0≤n≤255			
[Initial]	n=0			
[Descript]	Select 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 commend. 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 octuple

[Name]	Select the International character			
[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 character as follows:-			

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

SC+'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	{	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		
[Caution]	If it's a kiosk printer with the dispensor, such as presenter, it wouldn't cut the partial paper. It should cut the full paper.		

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[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

[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.
                   (Ref.SUB+'x'+n command)

[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)

[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 double.
n=1, Set the font size double.

[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 registeration / deletion at 100000 cycles,

       It's not recommended frequent registeration / deletion,

       due to memory damage

<Register Image >

D1 $D(x \times 8-1) \times y+1$ MSB

Dy $D(x \times 8) \times y$ LSB
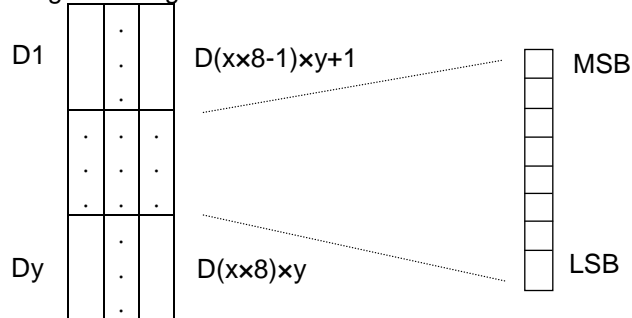
[Name]	Printing N/ V logo
[Format]	ASCII FS p n m
	Hex 1C 70h n m
	Decimal 28 112 n m

[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 regsitered logo in the 'n'.

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

[Name]	Set the proportion of character extention
[Format]	ASCII GS ! n

[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

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

[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

[Caution] We don't recommend the density we don't mention,
because it damages the life of thermal print head.

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 capacity 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				

Printing area

Left Margin   **Printing area width**
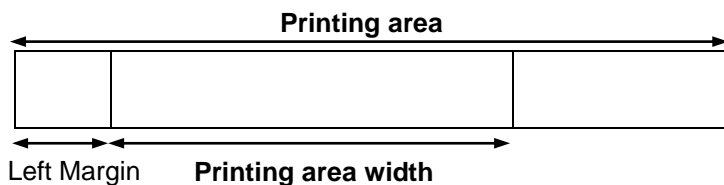
GS+'h'+n

[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			

[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 characeres 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

Notice : Also, you have to add the following initial code, when you start CODE A, CODE B, CODE C. It is to recognize CODE128.

CODE128	Initial code	For example, the barcode data ABCD.
CODE A	g	"gABCD"
CODE B	h	"hABCD"
CODE C	i	"iABCD"

[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

[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 developed
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

[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

Bit	Satus	Hex	Decimal
0	0 : Paper 1 : No paper	00h 01h	0 1
1	0 : Printer head down 1 : Printer head up	00h 02h	0 2
2	0 : Paper w/o jamm 1 : Paper with jamm	00h 04h	0 4
3	0 : Paper adequate 1 : Paper Near End	00h 08h	0 8
4	0 : Print complete 1 : Print or Feeding	00h 10h	0 16
5	0 : Cutter no- error (jamm) 1 : Cutter error (jamm)	00h 20h	0 32
6	0 : Not available	00h	0
7	0 : Paper invalid at sub sensor 1 : Paper valid at sub sensor	00h 80h	0 128

※ the status of bit 4 is 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]	Swtiches from page mode to standard mode		

ESC+'L'

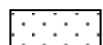| [Name]	Select page mode		
[Format]	ASCII	ESC	L
	Hex	1B	4Ch
	Decimal	27	76
[Range]	0≤n≤255		
[Initial Value]	n=0		
[Descript]	Switches from standard mode to page mode		

[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

•n=0 (Left→Right),

ABCD

Feeding

•n=1 (Bottom→Top),

ABCD

Feeding

•n=2 (Right→Left),

ABCD

Feeding

•n=3 (Top→Bottom),

ABCD

Feeding

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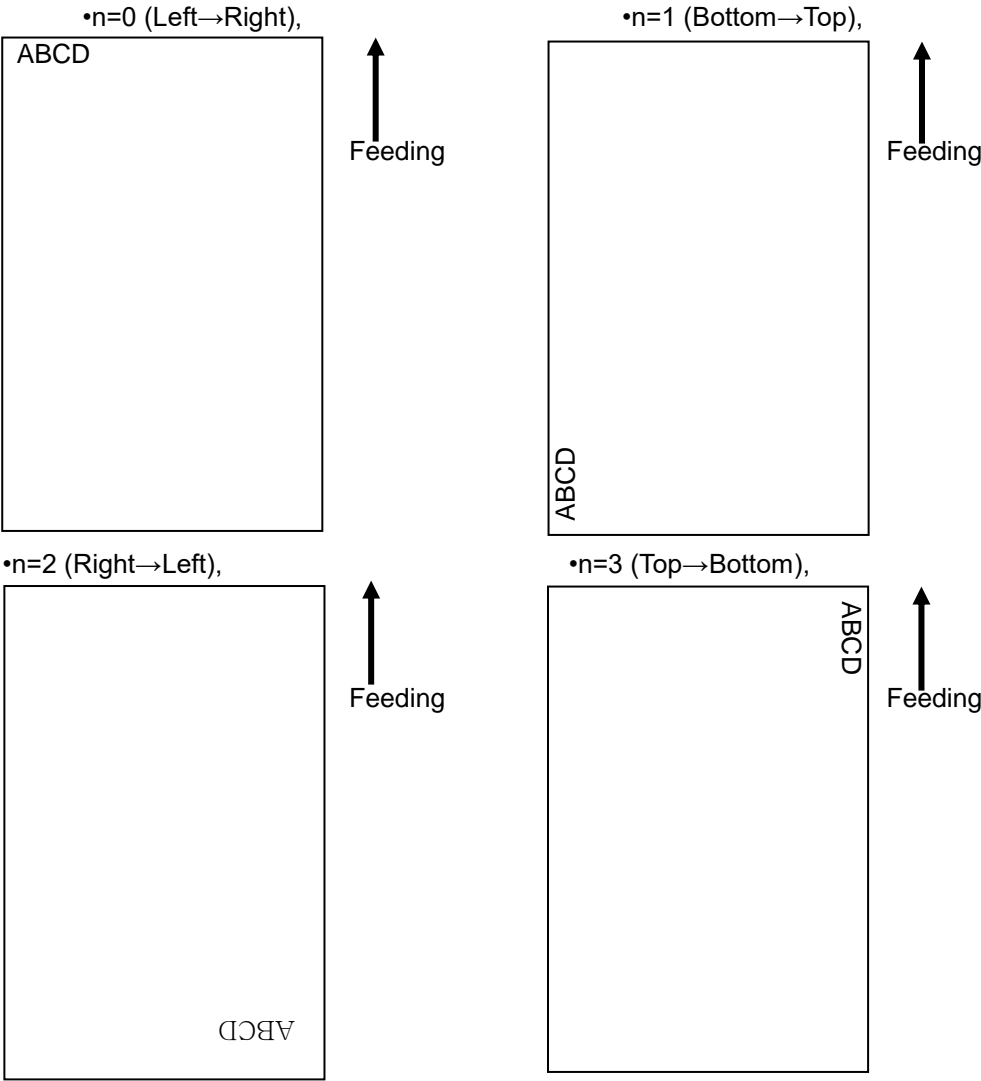
[Name]	Set printing area in page mode								
[Format]	ASCII ESC	W	xL	xH	yL	yH	dxL	dxH	dyL	dyH
	Hex 1B	57h	xL	xH	yL	yH	dxL	dxH	dyL	dyH
	Decimal 27	87	xL	xH	yL	yH	dxL	dxH	dyL	dyH

[Range] $0 \leq xL+xH \times 256 \leq 65535$ $(0 \leq xL \leq 255, 0 \leq xL \leq 255)$
$0 \leq yL+yH \times 256 \leq 65535$ $(0 \leq yL \leq 255, 0 \leq yL \leq 255)$
$1 \leq dxL+dxH \times 256 \leq 65535$ $(0 \leq dxL \leq 255, 0 \leq dxL \leq 255)$
$1 \leq dyL+dyH \times 256 \leq 65535$ $(0 \leq dyL \leq 255, 0 \leq dyL \leq 255)$

[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 : $(xL+xH \times 256) \times 0.125mm$
Vertical starting point : $(yL+yH \times 256) \times 0.125mm$
Horizontal size : $(dxL+dxH \times 256) \times 0.125mm$
Vertical size   : $(dyL+dyH \times 256) \times 0.125mm$

[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.
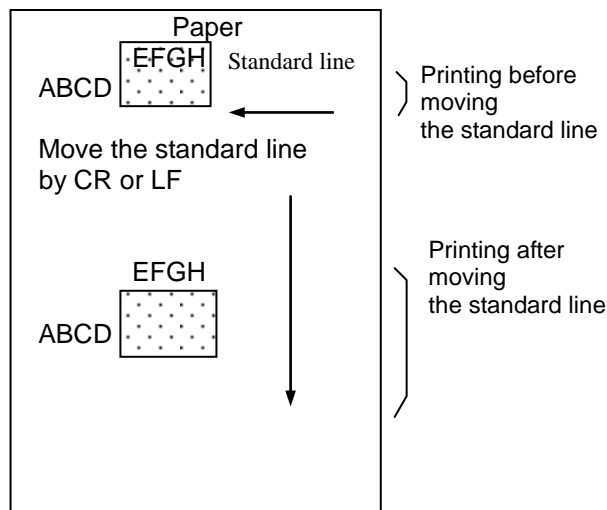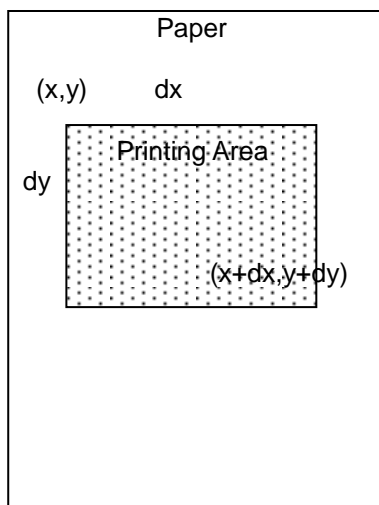
ESC+FF

[Name]	Printing the page area.		
[Format]	ASCII	ESC	FF
	Hex	1Bh	0Ch
	Decimal	27	12
[Description]	It prints the page area all at once.		
[Caution]	Please use the command ESC+S to clear the data,		
	Because the data is not deleted, after it printed.		

[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=2,3
[Descript]　n=2 : Clear each buffer of the printer in realtime.
　　　　　　n=3 : Printer reset compulsory
　　　　　　It will be reset compulsory without printer status, such as error, buffer.

Esc+@ (Standard rest) :
It will not be operated until the buffer data will be remaind in the printer.

[Caution]　　This command is only effective when DIP SW1 is on at the SECOND SWITCH.
　　　　　　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)

[Name]　　　Realtime status transmission
[Format]　ASCII　　　DLE　　EOT　　n
　　　　　Hex　　　　10h　　04h　　n
　　　　　Decimal　　16　　　4　　　n
[Range]　　n=2
[Descript]　The printer transmits is 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 as below.
　　　　　　If the command is received same data, it could be same operation
　　　　　　(Bit image data,etc)

\<Status transmission data \>

Bit	Satus	Hex	Decimal
0	0 : Paper 1 : No paper	00h 01h	0 1
1	0 : Printer head down 1 : Printer head up	00h 02h	0 2
2	0 : Paper w/o jamm 1 : Paper with jamm	00h 04h	0 4
3	0 : Paper adequate 1 : Paper Near End	00h 08h	0 8
4	0 : Print complete 1 : Print or Feeding	00h 10h	0 16
5	0 : Cutter no- error (jamm) 1 : Cutter error (jamm)	00h 20h	0 32
6	0 : Not available	00h	0
7	0 : Paper invalid at sub sensor 1 : Paper valid at sub sensor	00h 80h	0 128

[Name]   Laster 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≤m≤3 또는 48≤m≤51,
            1≤(xL+xH×256)≤150   (0≤xL≤150, xH=0)
            1≤(yL+yH×256)≤436   (0≤yL≤255, 0≤yH≤1)
            0≤d≤255 (yL+yH×256)
            K (All data) = (xL+xH×256) × (yL+yH×256)
[Descript]   The laster 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 laster 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×256 = 32 byte,

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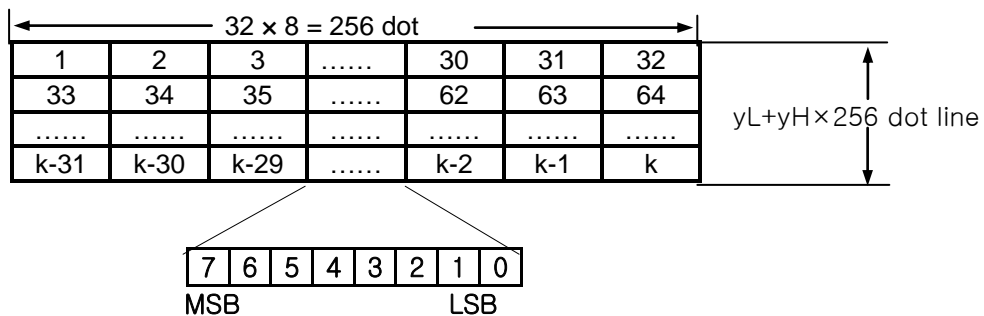
[Name]   2D Barcode.
[Format]   ASCII   SUB   B   n1   n2   n3   d1…………dk
                Hex   1A   42h   n1   n2   n3   d1…………dk
                Decimal   26   66   n1   n2   n3   d1…………dk
[Range]   Please refer the table below.
[Descript]   Please choose the barcode by the data of barcode.

                              n1 : two dimension of barcode
                              n2 : the number of data of barcode
                              n3 : size of barcode
                              d1… dk : the data of barccode

n1	Barcode
1	PDF417
2	QR code

1) PDF417

n2	Number of data
	1 < n2 ≤ 255

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

※ Vertical is set automatically.

[Name]   Buzzer setting
[Format]   ASCII   SUB   z   n1   n2
                Hex   1A   7Ah   n1   n2
                Decimal   26   122   n1   n2
[Range]   0≤n1≤50 or 0≤n2≤50,
[Descript]   Buezzer length set as 100msec(0.1sec) (Max 5sec)
                n1=0 (It's silent.) n1= the time length of Buzzer ON
                n2= The time length of Buzzer OFF

                * when n1 is " 0 ", No Buzzer

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[Name]   Cutting after it detects the black mark.
[Format]   ASCII   DC3   i
                Hex   13   69h
                Decimal   19   105

[Descript]   - The value is not deleted until the next value is changed, even though power off.
                  If you register the information at SW1,SW2, the black mark detects automatically,
                  Then it cuts the registerd points.
                - Please use the provided program - 'Memory swtich setting utility program'.
                - Please refer the 2-8)Memory switch.

[Name]   Line 1 (Vertical, Horizontal)
[Format]   ASCII   SUB   1
                Hex   1A   31h
                Decimal 26   49
[Descript]   It chooses the line 1 of vertical, horizontal.

[Name]   Line 2 (Vertical, Horizontal)
[Format]   ASCII   SUB   1
                Hex   1A   32h
                Decimal   26   50
[Descript]   It chooses the line 2 of vertical, horizontal.

[Name]   Write (Vertical, Horizontal)
[Format]   ASCII   SUB   W   nL   nH   kL   kH
                Hex   1A   57h   nL   nH   kL   kH
                Decimal   26   87   nL   nH   kL   kH
[Range] $0 \le nL+nH \times 256 \le 640$、 $(0 \le nL \le 255, 0 \le nH \le 3)$
                $0 \le kL+kH \times 256 \le 640$、 $(0 \le kL \le 255, 0 \le kH \le 3)$
[Descript]   You can write 1 from $nL+nH \times 256$ to $kL+kH \times 256$.
[Caution]   The range will be ignored, if the range is over.
                The data will not be deleted, till you command the data to clear, or power off.

[Name]   Clear (Vertical, Horizontal)
[Format]   ASCII   SUB   C
                Hex   1A   43h
                Decimal   26   67
[Range]   The all of line will be clear as 0 (zero).

[Caution]   Please direct ON/OFF to speed up the process.
                It is to write again the data of line.

[Name]   ON (Vertical, Horizontal)
[Format]   ASCII   SUB   O
                Hex   1A   4Fh
                Decimal   26   79
[Descript]   It writes the character together.

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[Name]	OFF (Vertical, Horizontal)		
[Format]	ASCII	SUB	F
	Hex	1A	46h
	Decimal	26	70
[Descript]	The line will be invalid, and the data reserved.		

[Name]	Print one dot line (Vertical, Horizontal)		
[Format]	ASCII	SUB	P
	Hex	1A	50h
	Decimal	26	80
[Descript]	Print one dot line (Vertical, Horizontal)		
[Caution]	Please do not use the command, when you print the character, and the image.		
	Please use the command ON.		
	Please use this command, when you print the line at the space.		

[Name]	Code Page (International language)		
[Format]	ASCII	ESC	t	n
	Hex	1B	74h	n
	Decimal	27	116	n
[Range]	0≤n≤8		
[Initial]	n=0		
[Descript]	Please refer to the code page below.		

n	Code Page	n	Code Page
0	PC437(USA)	6	PC850(Multilingual)
1	KANA(JAPAN)	7	PC860(Portuguese)
2	Greece	8	WPC1252
3	WPC1251	9	Iran System Encoding Standard
4	PC866(Cyllic #2,Russian)	10	PC857(Turkish)
5	Windows1250(Poland)	11	PC864(ARABIC)

[Caution] 1 byte will be vailid, if it's SUB + x, or FS+"."
2 bytes will NOT be vailid.

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[Name]	High baudrate Realtime status transmission
[Format]	ASCII	DLE

	Hex	10h	AAh	55h	80h	54h	ABh
	Decimal	16	170	85	128	84	171

[Descript]   This command is only operating and using, when high baud rate is 921600.

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.).

<Status transmission data >

Bit	Satus	Hex	Decimal
0	0 : Paper 1 : No paper	00h 01h	0 1
1	0 : Printer head down 1 : Printer head up	00h 02h	0 2
2	0 : Paper w/o jamm 1 : Paper with jamm	00h 04h	0 4
3	0 : Paper adequate 1 : Paper Near End	00h 08h	0 8
4	0 : Print complete 1 : Print or Feeding	00h 10h	0 16
5	0 : Cutter no- error (jamm) 1 : Cutter error (jamm)	00h 20h	0 32
6	0 : Not available	00h	0
7	0 : Paper invalid at sub sensor 1 : Paper valid at sub sensor	00h 80h	0 128

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

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6. Widows Driver

6-1) Set up the function.

1) Please open the screen of printer / fax, and click the basic setting (I) of the general tap.
2) Please click (V).
3) Please refer to the following images, and set up each details.
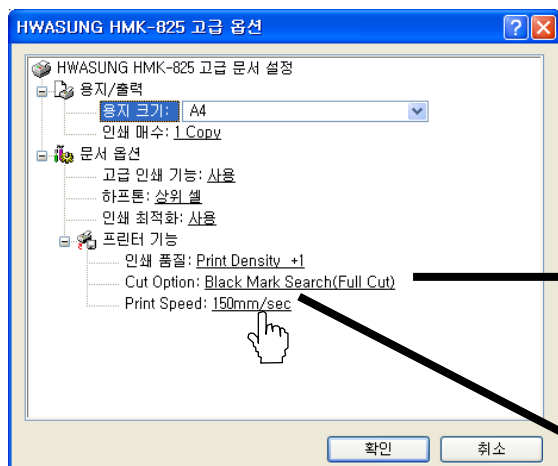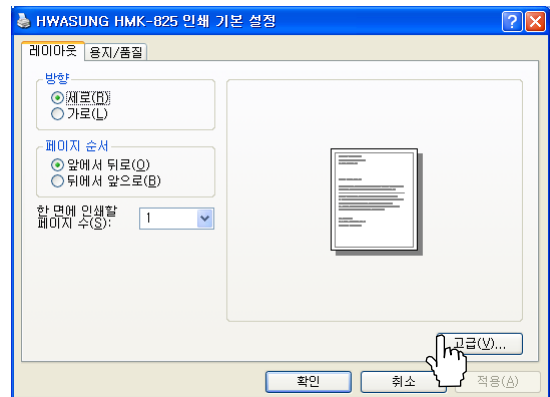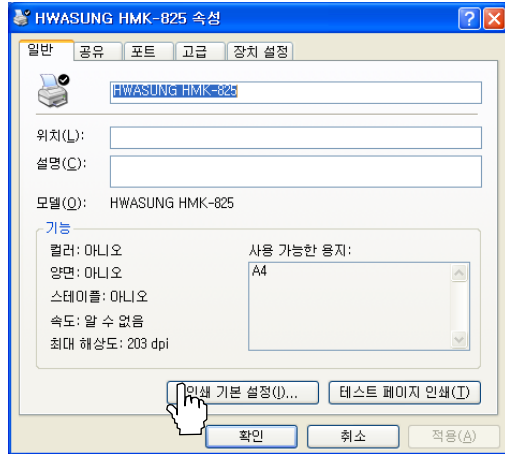
* No Cut : No cutting & Printing.
* Full Cut : Full cutting after printing.
* Partial Cut : Partial cutting after printing.
* Black Mark Search (Full Cut) :
The cutting position from the black mark will be set by the memory switch.

※ The quality of printing will be different, because it prints out as graphic.
  So pls try to print out as below.

  Printing width : 60mm -> Speed 150mm
              80mm -> Speed 130mm

6-2) Set up the paper.

Please set the form feeding after printing.

1) Please click the basic setting (I) of the general tap.
2) Please click the tap of paper /quality, and drop down paper providing.
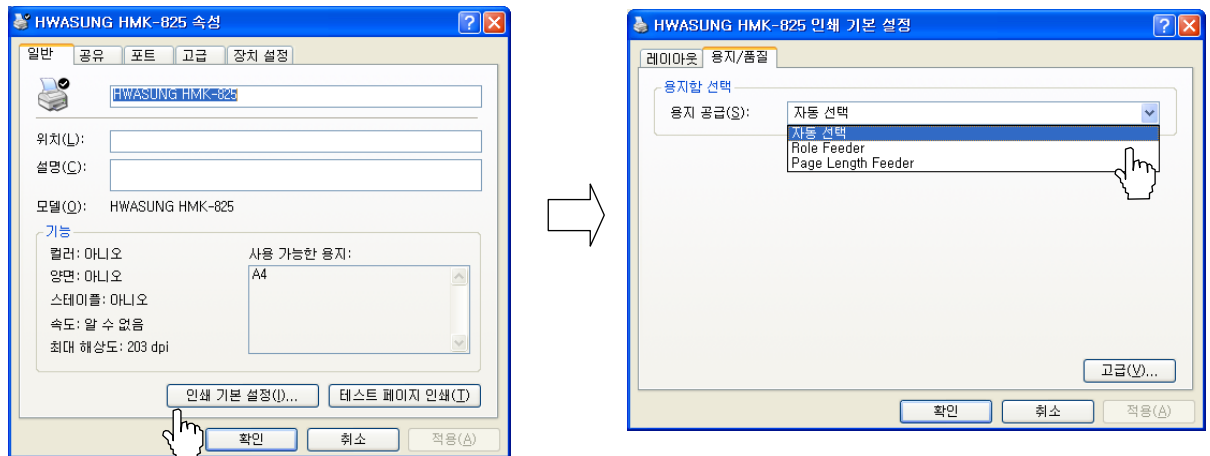
3) Auto & Role Feeder : After printing, the form feeding is not conducted any more.
Please set up if the printing length is not regular.
You can't conduct the feeding, even you set up the space at the program Visual Basic.
We recommend you make the font size smaller, such as ".", and make the position
the cutting.

```
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 printing, The form feeding will be conducted
as long as the length is fixed. It is mostly used when the regular legnth is printed.

6-3) Set up the new paper.

You can make the size of paper you need.
Please refer the example of 60mm x 150mm as below.

1) Please open the screen of printer & fax,and click the server on file / menu.

2) Please choose the STANDARD(Size 80 x 400mm) as image.

3) Please tick 'new documentation (C)' as image.

4) Please type the width 6.0 cm / the height 15.0 cm as image.

5) Please click the 'form install' Ticket (Size 60 x 150mm) as image.

6) Please click the tap 'advanced' and set the paper Ticket(Size 60 x 150mm).
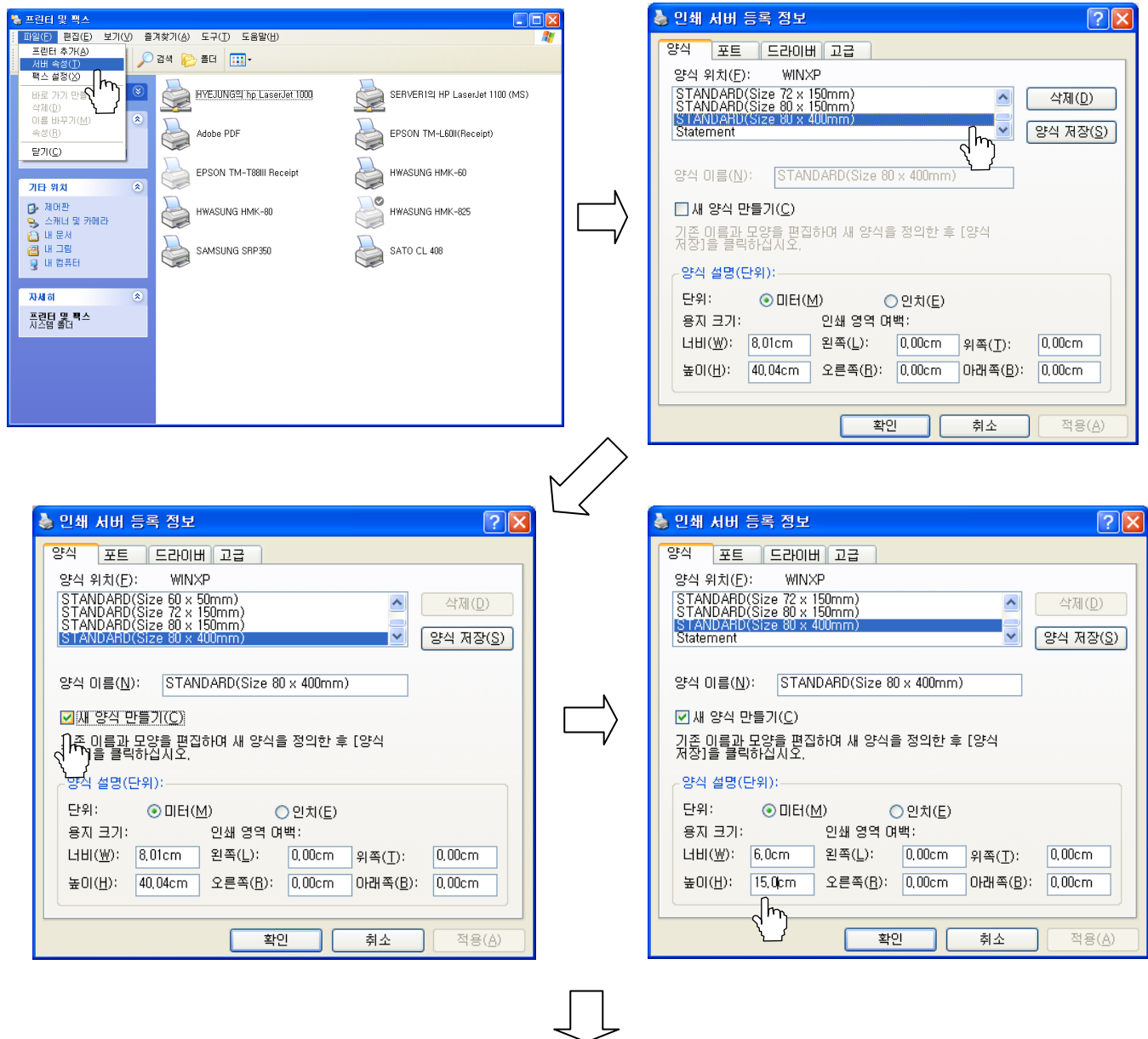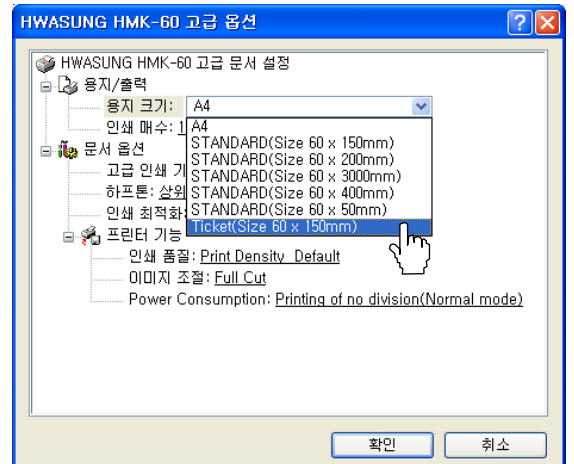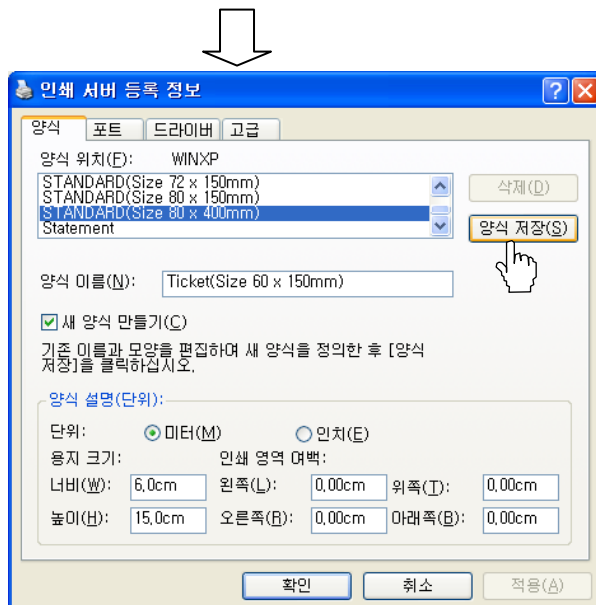
7. Ticket recommend

[Unit:mm]

7-1) It is the case the black mark is on the left.
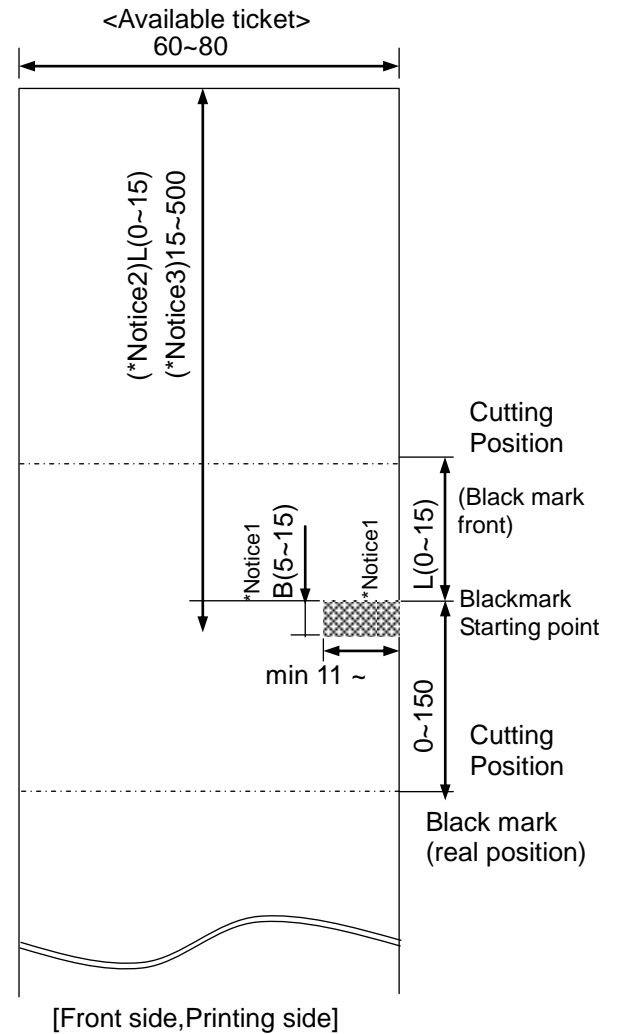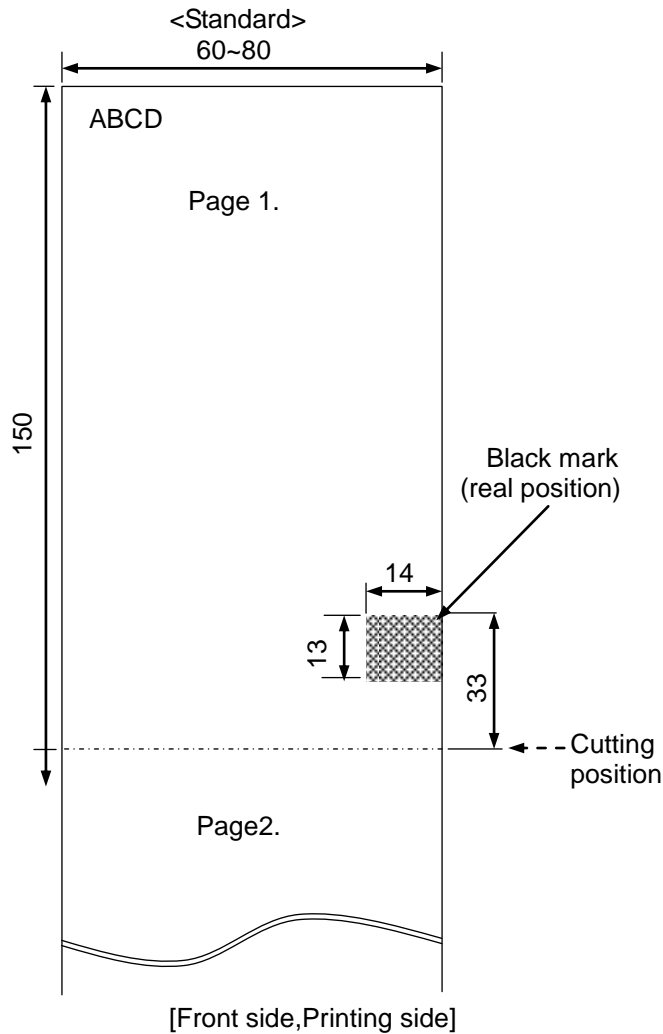
<Standard>
60~80

ABCD

Page 1.

150

Black mark
(real position)

14

13

33

---- Cutting position

Page2.

[Front side,Printing side]

<Available ticket>
60~80

(*Notice2)L(0~15)
(*Notice3)15~500

Cutting Position

(Black mark front)

*Notice1
B(5~15)

*Notice1

L(0~15)

Blackmark
Starting point

min 11 ~

0~150

Cutting Position

Black mark
(real position)

[Front side,Printing side]

[*Notice1]
B : Height Blackmark,
L : Forepart cutting position blackmark
L+B < 15
It should range L < 15 − B.

[*Notice2]
Forepart cutting position blackmark
*It is the same condition with Notice 1.
[*Notice3]
It is the case if the cutting position is
behind of blackmark.

7-2) It is the case the black mark is on the right.
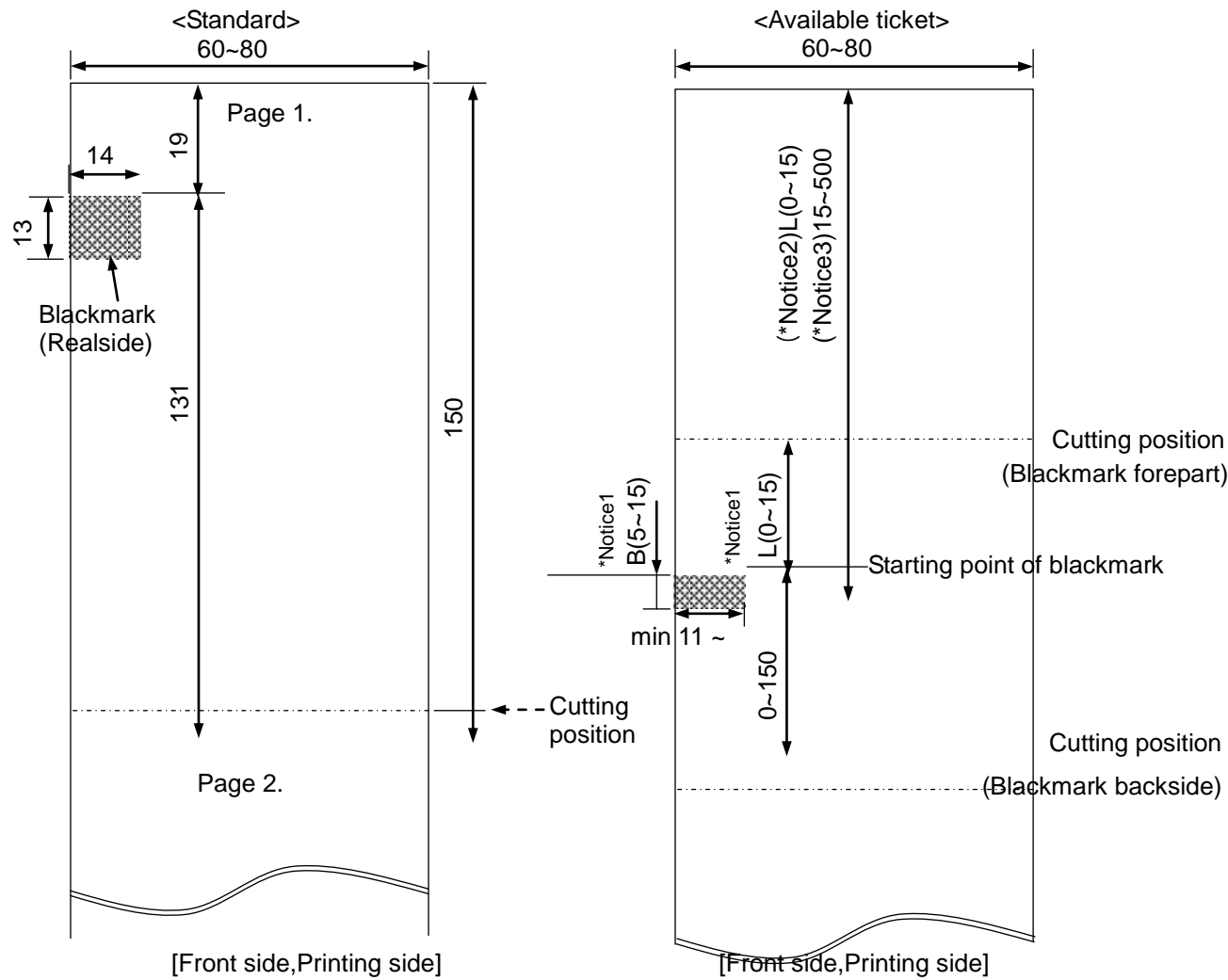
<Standard>
60~80

Page 1.

14

19

13

131

150

Blackmark
(Realside)

Cutting
position

Page 2.

[Front side,Printing side]

<Available ticket>
60~80

(*Notice2)L(0~15)
(*Notice3)15~500

Cutting position
(Blackmark forepart)

*Notice1
B(5~15)

*Notice1
L(0~15)

Starting point of blackmark

min 11 ~

0~150

Cutting position
(Blackmark backside)

[Front side,Printing side]

[*Notice1]
B : Height Blackmark,
L : Forepart cutting position blackmark
L+B < 15
It should range L < 15 – B.

[*Notice2]
Forepart cutting position blackmark
*It is the same condition with Notice 1.
[*Notice3]
It is the case if the cutting position is behind
of blackmark.

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8. 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).

8-1) DLL Interface
Please add the file HwaUSB.DLL at the folder System 32, or the folder SysWow64.

8-1-1) DLL function.

1) long UsbOpen(LPCTSTR SelPrinter);
Please open the port USB by the printer Model "HMK-081"

- ■ Parameters:
  SelPrinter : Printer Model Name
- ■ Return :
  Open normal : 0
  Open error : -3(minus)

2) long PrintStr(LPCTSTR data);
It prints the string.

- ■ Parameters:
  data : String datas
- ■ Return :
  Print normal : 1
  Print error : 0

Notice : 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);
It prints the data one (1) byte.
Please use the 'PrintPackage function' as below, if there are a lot of datas to print.
Then you are able to increase the speed of the transmission.

- ■ Parameters:
  data :   one (1) byte data (0~255)
- ■ Return :
  Print normal : 1
  Print error : 0

4)long NewRealRead(void);
 It reads the printer status data as one (1) byte by the port USB.

- ■ Parameters:
   None
- ■ Return :
   Read normal : Printer status value.
   Read error   : -1(minus)

5)long PrintPacket(unsigned char *PacketBuf,unsigned long PacketLength);
It prints the data by the port USB, as much as the data at the transmission data buffer .

- ■ Parameters:
   PacketBuf : Transmission data buffer pointer.
   PacketLength : Transmissiong data length
Notice : Please do not exceed more than 64 bytes max.

- ■ Return :
   Print normal : 1
   Print error   : 0
Notice   Please do not use any function we don't provide, due to the debug usage.
Notice   Please ask the sample program for more details.
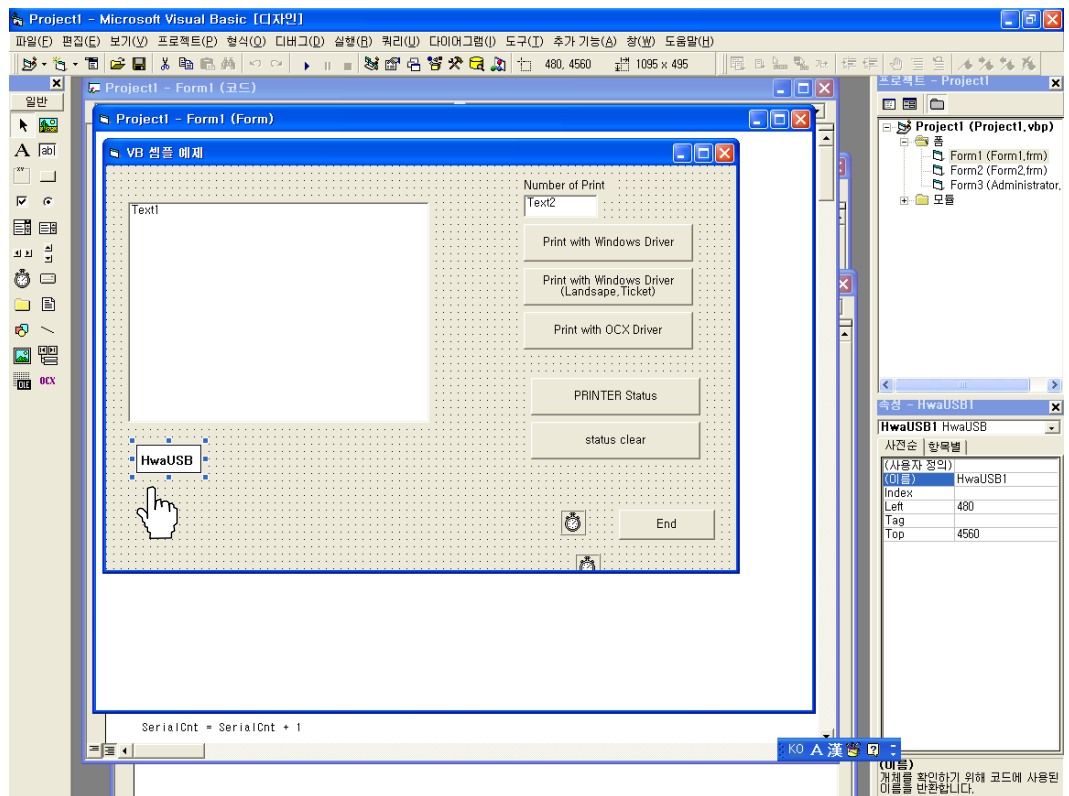
9. OCX Driver

We recommend you to use DLL Diver then OCX Driver(Because when we update, we will use DLL Diver from now on)

9-1) How to use

Please follow the image steps of visual basic as below.
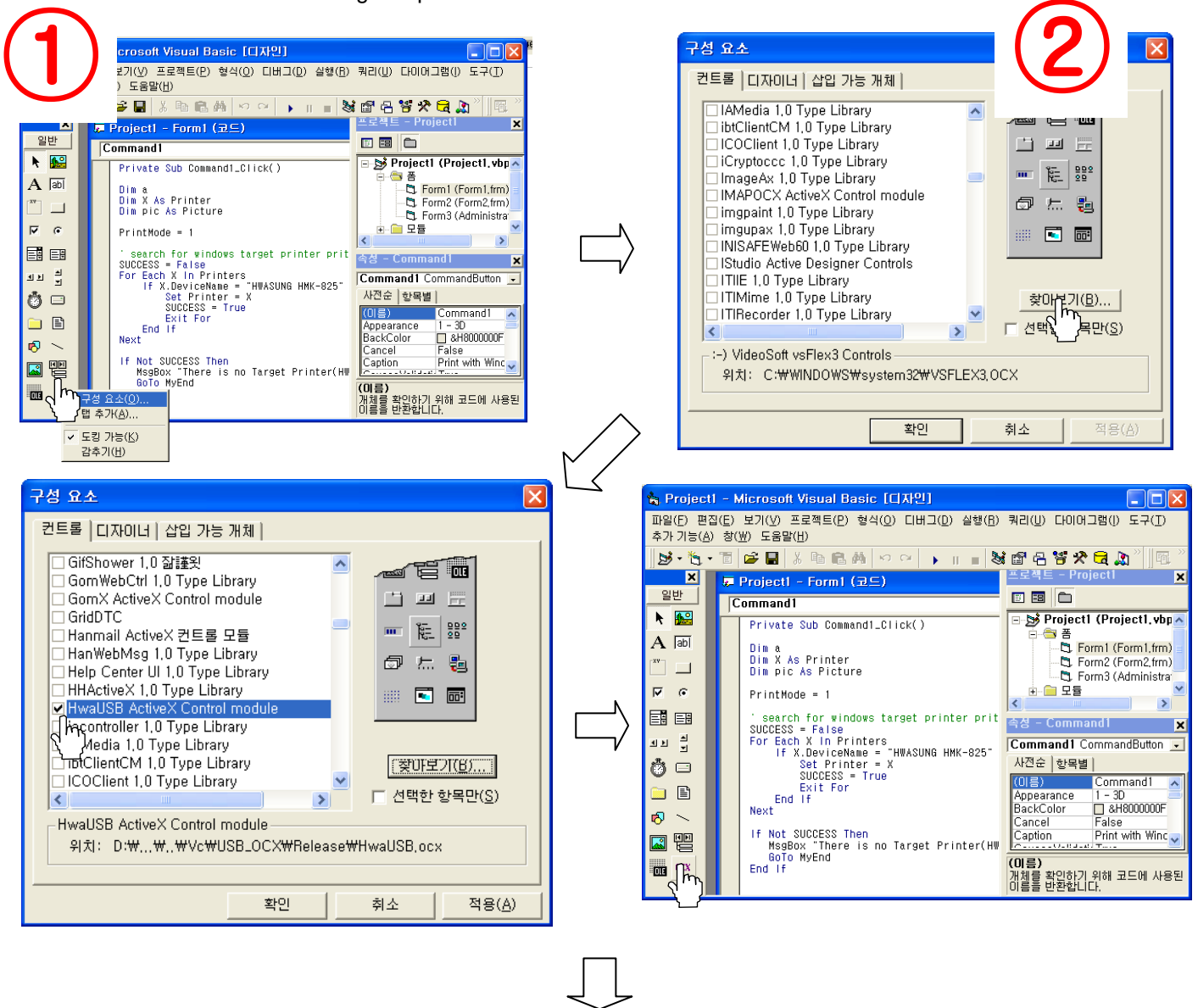
Please ask the person in charge about the sample program.

9-2) Functions

9-2-1) long HwaUSB1.Open (LPCTSTR SelPrinter);
   Please open USB port by Printer Model ("HMK-081").

Notice : Please open the model HMK-825, instead HMK-081.
It is to be compatible with the model HMK-825.

- Parameters :
   SelPrinter : Printer Model Name
- Return :
   Open normal : 0
   Open error : -3 (minus)

9-2-2) void HwaUSB1.Close (void);
   Please close USB port by Printer Model ("HMK-825").

- Parameters :
   None
- Return :
   None

9-2-3) long HwaUSB1.PrintStr (LPCTSTR data);
   It prints the character line.

- Parameters :
   Data : String datas
- Return :
   Printing normal : 1
   Printing error : 0

   ※ In order to prevent the data loss by the printing timeout,
      Please check the printer status by the RealRed function, and print out.

9-2-4) long HwaUSB1.PrintCmd (unsigned char data);
   It prints a byte (data).

- Parameters :
   Data : 1 byte data (0~255)
- Return :
   Printing normal : 1
   Printing error : 0

9-2-5) long HwaUSB1.RealRead (void);
   It reads the data stauts a byte by USB port.

- Parameters :
   None
- Return :
   Reading normal : The value of printer status
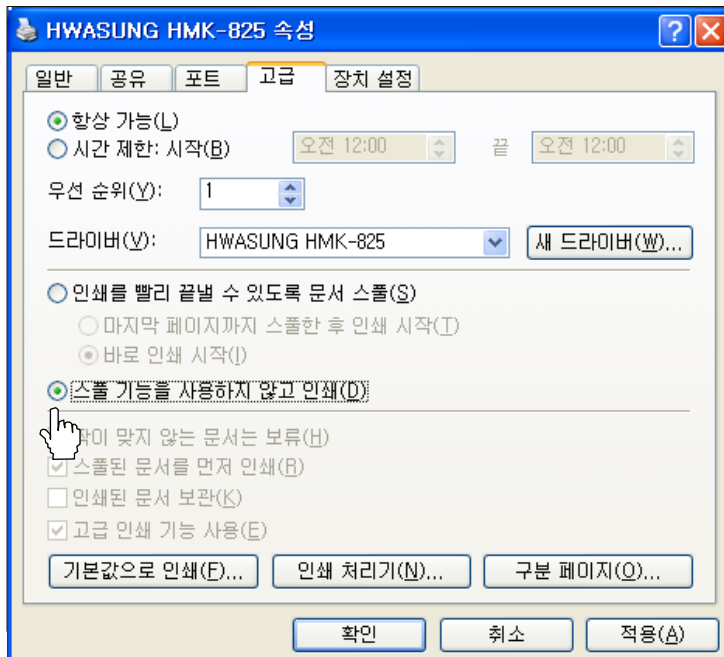   Reading error : -1 (minus)

［**Caution**］
Please do not use the function we don't provide, because it causes the function damage.
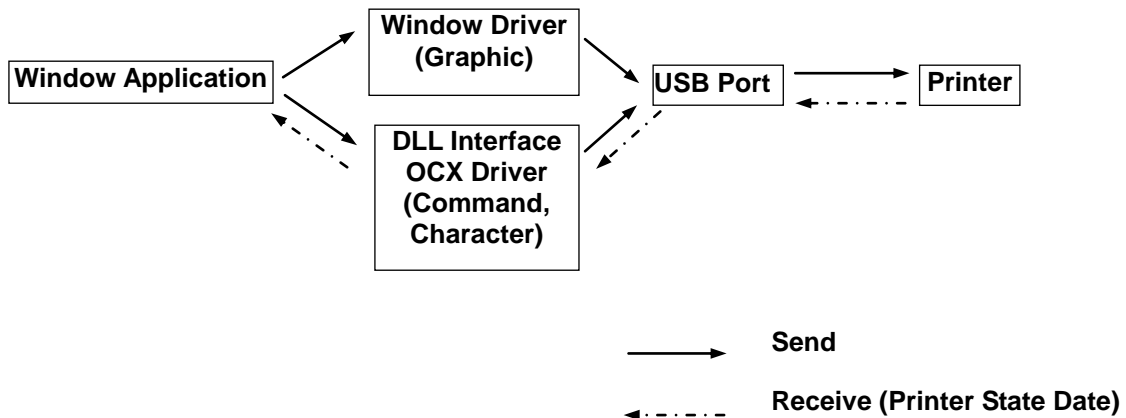Please contact us for the sample program.

9-3) Caution for using USB Interface

If you use the USB interface and windows drivers together, the data will not be printed in regular sequence. So please release the spool, when you wan to use the USB interface and window driver together. If you release the spool, the data receipt is only made by USB Interface.


※ **The Data diafram of window application.**

| Window Application | → | Window Driver (Graphic) | → | USB Port | → | Printer |
| DLL Interface OCX Driver (Command, Character) |

—————→ **Send**

◄— - — - — **Receive (Printer State Date)**

10. How to set up Ethernet

10-1) If it is Static IP Mode,

1) Please connect the network cable to the printer.
2) Please set up the small switch 1 of DIP switch 1 *OFF (Static IP Mode). *OFF: (DIP switch) down
3) Please set up the small switch 2 of DIP switch 1 *ON (Boot into Default Value). *ON: (DIP switch) up
4) Please power on the printer. * IP the factory 192.168.1.250 / The port 9100 will be boot up.
5) Please conduct the program Ethernet Configuration.
6) Please type down the parameter you want at the Target Parameter, and press the button connect.
7) Then you can see the message Success Connection, and the button Start Write will be activated.
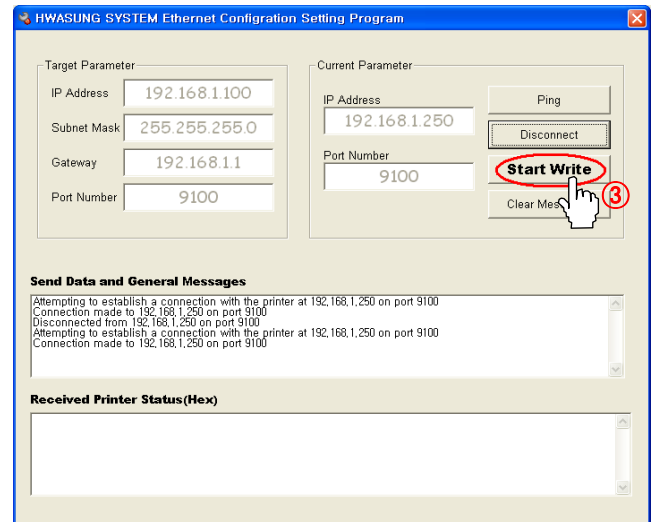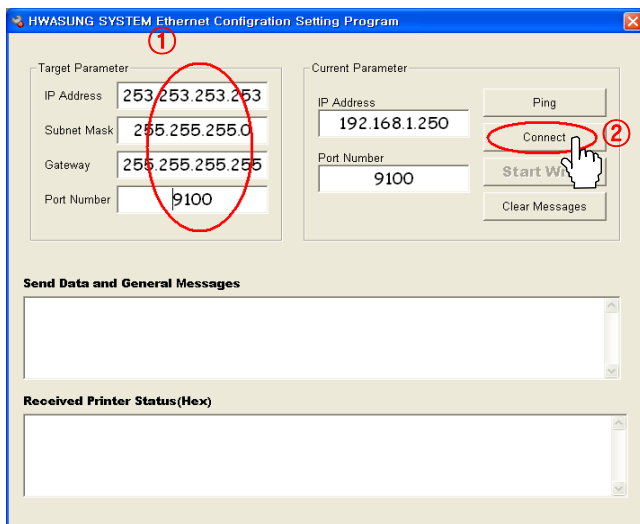
8) Please press the button Start Write.
9) The message indicates the transmission complete, and the parameter will be saved at the non-volatile memory.
10) Please power off the printer.
11) Please set up the small switch 2 of DIP switch 1 *OFF (Boot Into User Value).
*OFF: (DIP switch) down
12) Please power on the printer, once you press down the button feed.
13) Then you can see about the self test is printing, and the parameter for user is printing.
14) Please check the parameter for user.
15) Please power off, and on the printer. The parameter for user is boot up.
You can use the paramer for user at the application.

 Caution) If the IP address is collied with the IP network after you boot up into the default value,
  you can't change the setting.

 We recommend you don't use the share machine, you connect the printer with PC directly.
 Please try to set up the network to avoid with IP address.
 Please try to catch up IP address to avoid automatically, as you boot up DHCP mode.
 Please refer to the next page about DHCP mode.

10-2) If it is Dynamic IP DHCP Mode,

1) Please connect the network cable to the printer.
2) Please set up the small switch 1 of DIP switch 1 *ON (Dynamic IP Mode).*ON: (DIP switch) up
3) Please set up the small switch 2 of DIP switch 1 *OFF (Boot into User Value).
*OFF: (DIP switch) down
4) Please power on the printer.
5) You can see the ERROR LED, the PAPER LED *in and out, every one second.
*in and out : on and off.
It means the protocol is exchanging with the host.
6) The LED *in and out will stop.
*in and out : on and off.
It means the protocol is complete exchanging.

Connecting : The ERROR LED, the PAPER LED *in and out, every one second.

Complete : The LED *in and out will stop. The printer is ready.
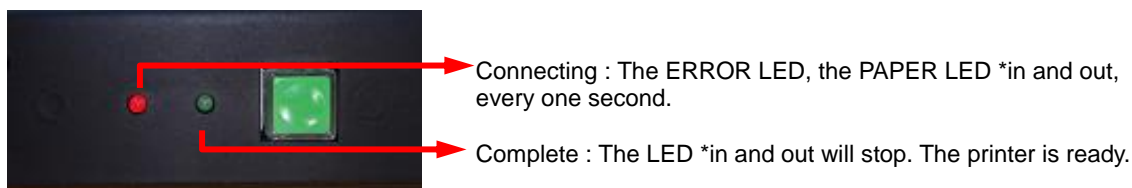
7) Please power off the printer.
8) Please power on the printer, once you press down the button feed.
Then you can see the parmater is printing as you did catch up Dynamic IP DHCP Mode automatically.
9) Please check the parameter you did automatically.
10) Please power off, and on the printer. The parameter you did automatically is boot up.
You can use the paramer at the application.
11) You don't need to change DIP switch.

Caution)
The parameter you did automatically is changed every time,
when Dynamic IP DHCP Mode is boot up. Please take care about it.
We recommend you use the Dynamic IP DHCP Mode,
if you boot up Static IP Mode and need to change the parameter, if the IP is collied with network IP.
We recommend Static IP Mode, when you communicate with application.

Dip switch 1
Small switch 1~8

Dip switch 2
Small switch 1~8
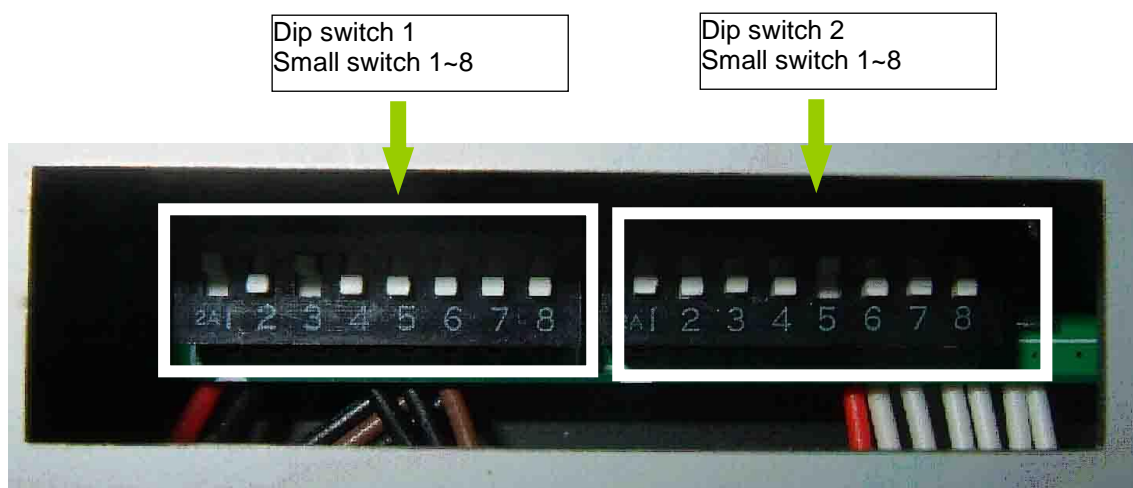
Notice : Please see the bottom of the printer, and you can see the dip switch as image above.

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11. Revision reference

It is a page for the technician to know what is the revision updated.
This page is written in Korea or English

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1	2015-12-03	Reversion		2.0