

PP7X PRINTER OPERATION MANUAL



Pinnacle Technology Corp.

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1 FEATURES

- ※ Original patented oblique paper-sensor. Detect the paper precisely, even if the paper is stuck to the end of paper slot or paper roll is in different position (desktop or hang on the wall).
- ※ Special paper cutter design (the movable cutter is on the upper side). In this case, paper jam problem can be solved by simply opening the printer cover. Currently ordinary printers cannot solve the paper jam problem easily, only by pull back the gear to return the cutter.
- ※ With black mark sensor.
- ※ Optional automatically Paper-cutter module.
- ※ Unique mechanism to make paper installation easily.
- ※ With water-proof design. The rubber sticker in the paper outlet is able to prevent from water, oil.
- ※ Support with ESC/POS command collection, in addition to Aclas protocol.
- ※ POS printer: supermarket, restaurants, retails to print the sales receipt.
- ※ Can work as a fiscal printer, by adding optional displays (client&operator) and functional keys.

2 SPECIFICATIONS

Print Method	thermal print
Resolution	203dpi
Speed	150mm/s (PP7MX); 250mm/s (PP7HX)
Printer Head Life	50km
Effective Width	72mm
Paper Width	80mm±0.1
Paper Feed	roll feeding
Power Supply	DC24V 2A Adapter (AC100~240V)
Interface	1 cash drawer interface compatibles with EPSON 1 USB port (PP7XU) 1 parallel port (PP7XD) 1 Ethernet port (PP7XE) 1 RS232 port (PP7XW4/PP7X3/PP7XW2/PP7XWB)
Work Temperature	0°C ~ 40°C
Work Humidity	5% ~ 85%
Weight	approx. 0.82kg
Size	196.5*145*135mm

3 ACCESSORIES



Adapter



PC Disk



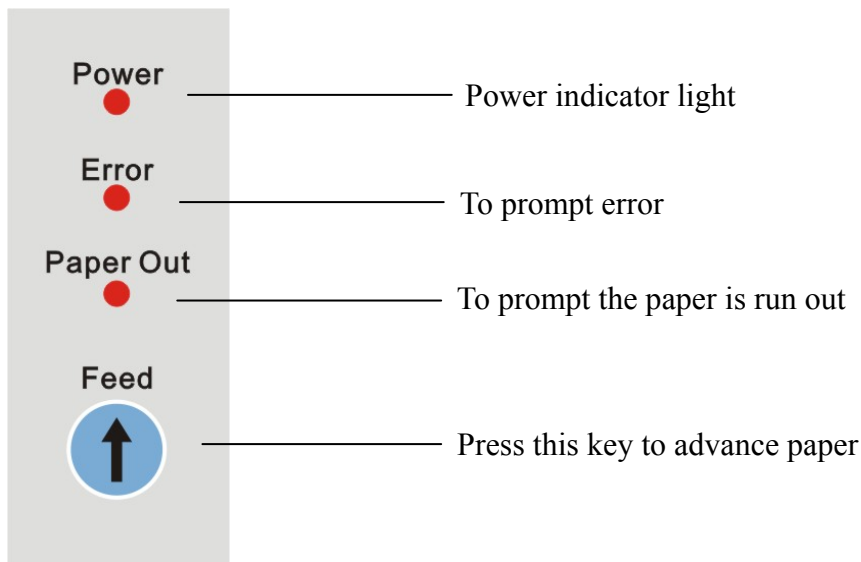
User manual

4 GET TO KNOW THE PRINTER

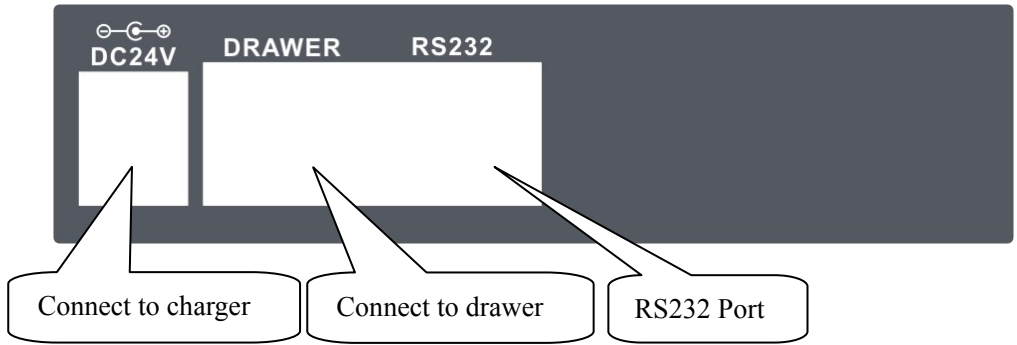


→ The switch to open the upper cover

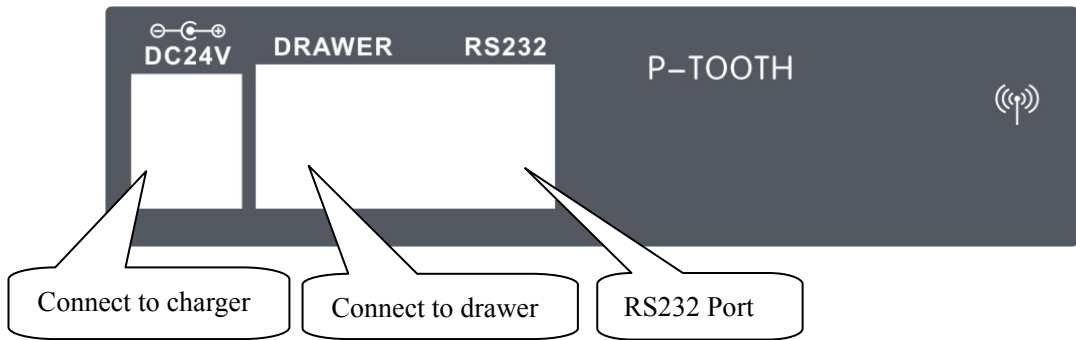
→ Power switch



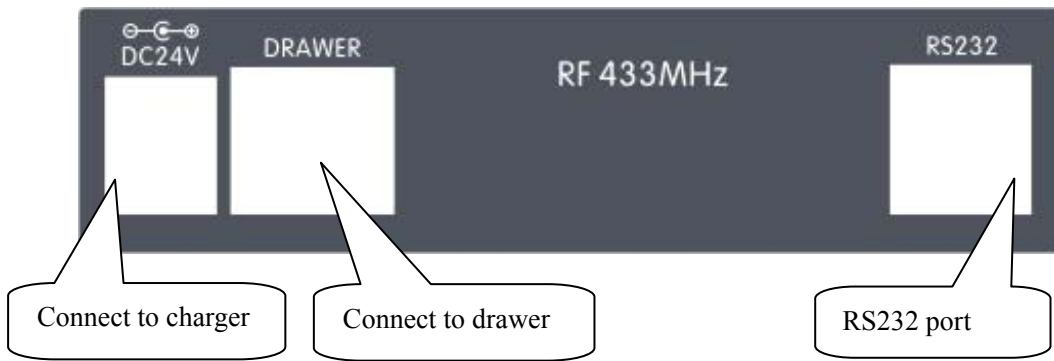
INTERFACE:



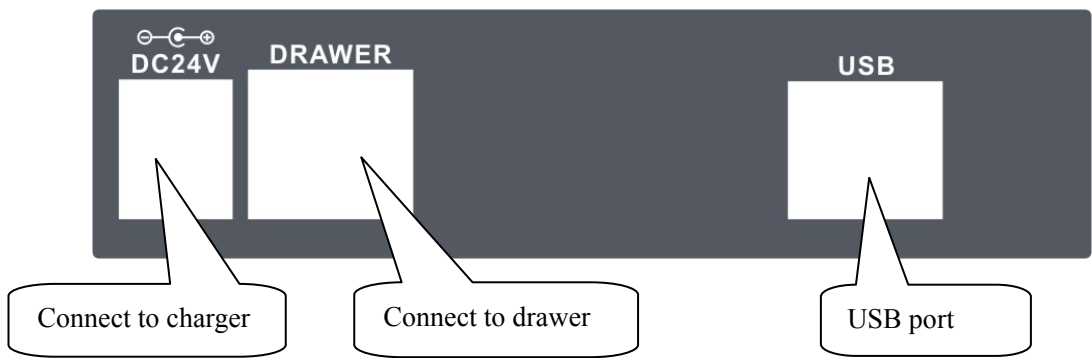
[Model: PP7X3]



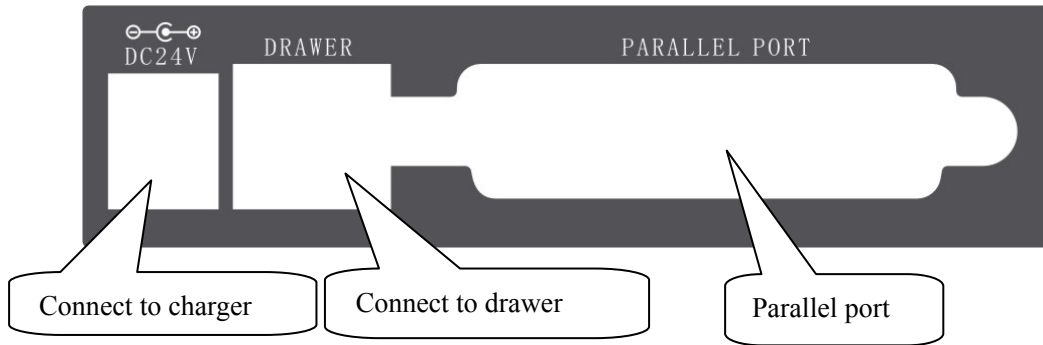
[Model: PP7XW2]



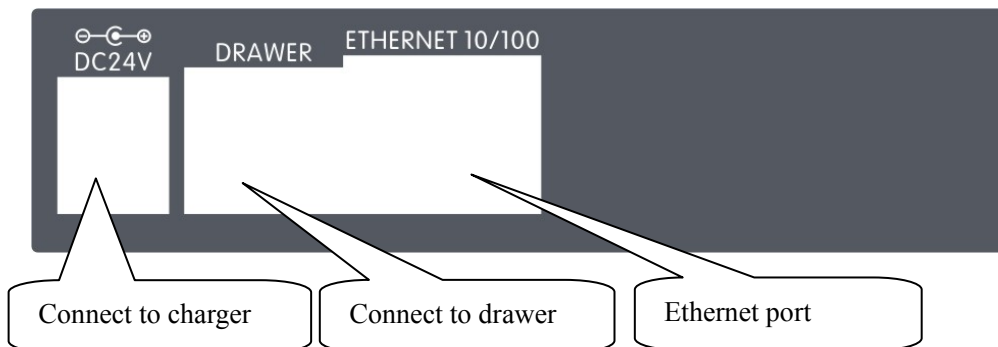
[Model: PP7XW4]



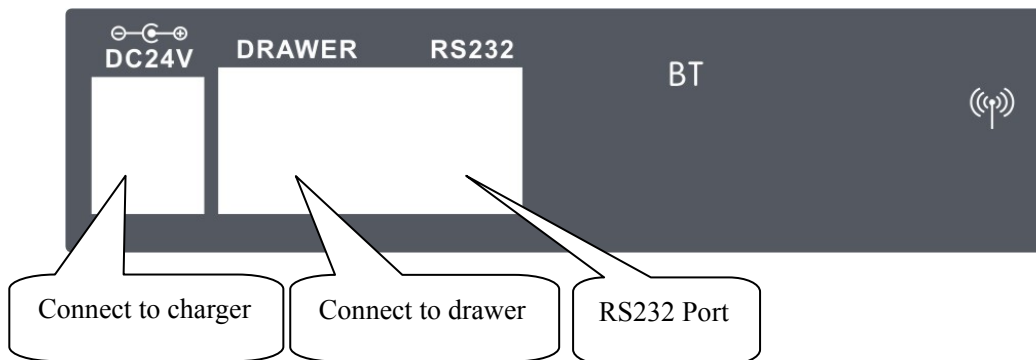
[Model: PPXU]



[Model: PP7XD]



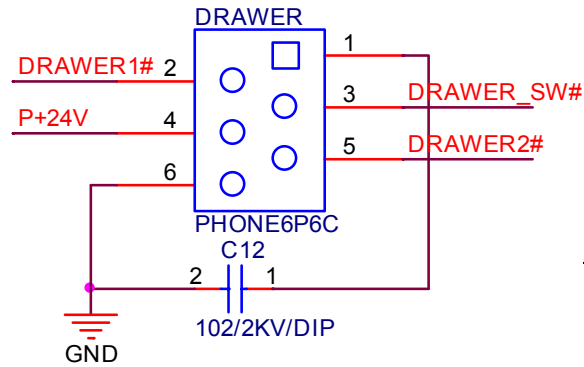
[Model: PP7XE]



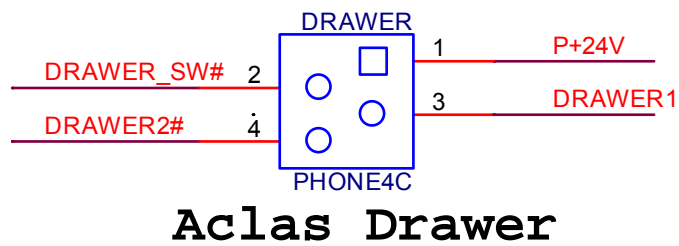
[Model: PP7XWB]

5 DRAWER PORT DEFINITION

The drawer port definition is similar to EPSON. The definition of 6PIN port is as follows:



The definition of 4PIN port (Pinnacle self-defined) is as follows:

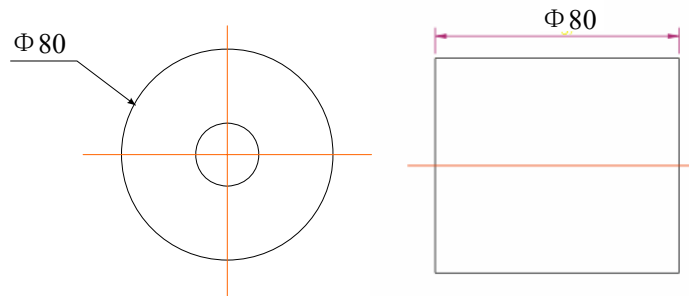


6 INSTALLATION AND MAINTENANCE

6.1 Paper Installation

➤ **Paper roll diemnsion:**

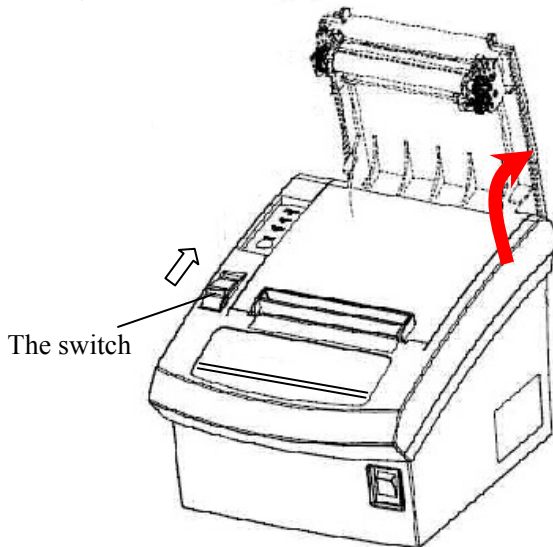
Unit: mm



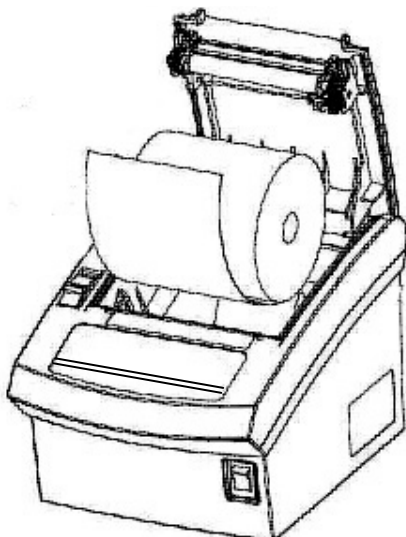
Note: Bad quality thermal paper may quickly damage the thermal printer head, please use high quality thermal paper. (Bad quality thermal paper: roughness paper surface may quickly wear the pinter head; bad sensitive result in selecting ‘dark’ density level, which may reduce the life time of the printer head.)

➤ **Installation:**

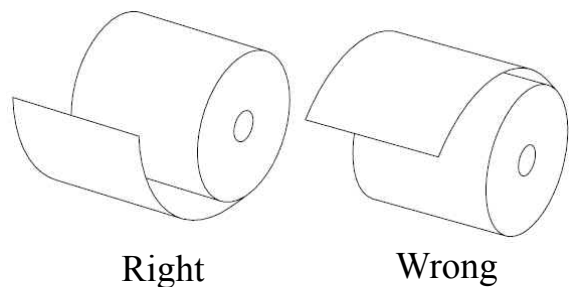
When there is no paper in the printer, the light ‘Paper Out’ will be on, and you need to install paper immediately.



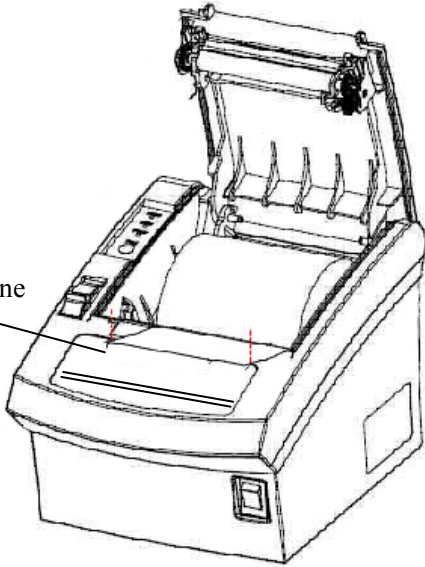
1. Push the switch as the arrow shows in the picture to open the cover.



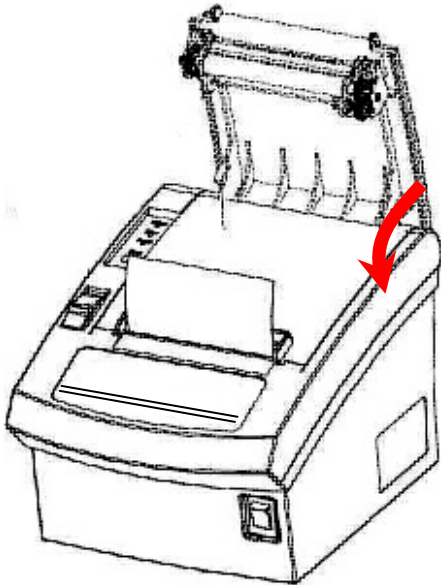
2. Place the paper roll into the paper house.



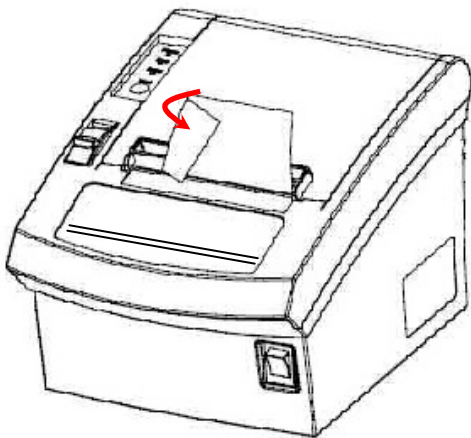
The alignment line



3. Let the paper parallel with the alignment line.



4. Pull out the leading edge of paper and close the printer cover.



5. Tear off the spare paper and finish paper replacing.

6.2 Print Test Page

Press key 'Feed' and hold it, and then power on the machine at the same time, it will print a piece of Test Page. The information of this Test Page includes the printer's model, version, IP address (Ethernet port), ID and the default setting of the dip switch when leave factory.

6.3 Thermal Printer Head Cleaning

The thermal printer head is probably dirty, if part of letters is not printed distinctly. Please clean the thermal printer head by alcohol dabbed swab, otherwise heat will be hard to dissipate, which may damage the printer head.

Note: High-quality thermal paper is able to reduce possibilities of polluting the printer head, and almost no need to clean it.



Attention: Do not touch the thermal printer head.

6.4 Communication Board Replacement

Note: Make sure that PP7X is powered off when you are changing the communication board. Power off PP7X for more than 10s, then the communication board can be replaced.



Use the cross screwdriver unscrew these two screws.



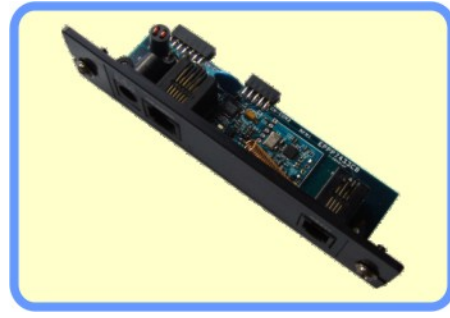
Note: we suggest that you should tighten the two screws side by side to avoid damaging the main board.

Take off the communication board and replace it.

You can change the following communication boards according to your needs. And after replacement, please refer to the corresponding chapter according to the model.



RS232 port module
[Model: PP7X3]



433MHz wireless port module
[Model: PP7XW4]

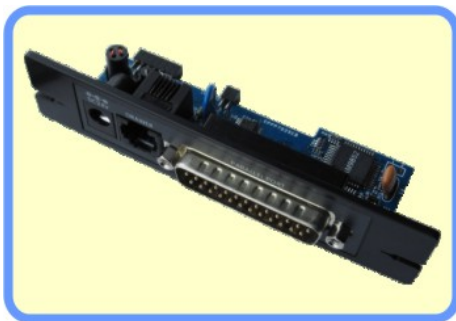


2.4GHz

P-tooth wireless communication port module
[Model: PP7XW2]



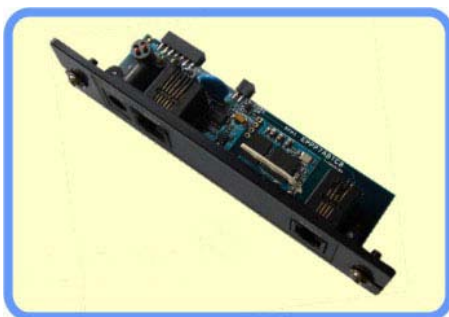
USB port module
[Model: PP7XU1]



Parallel port module
[Model: PP7XD]



Ethernet port module
[Model: PP7XE]

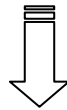
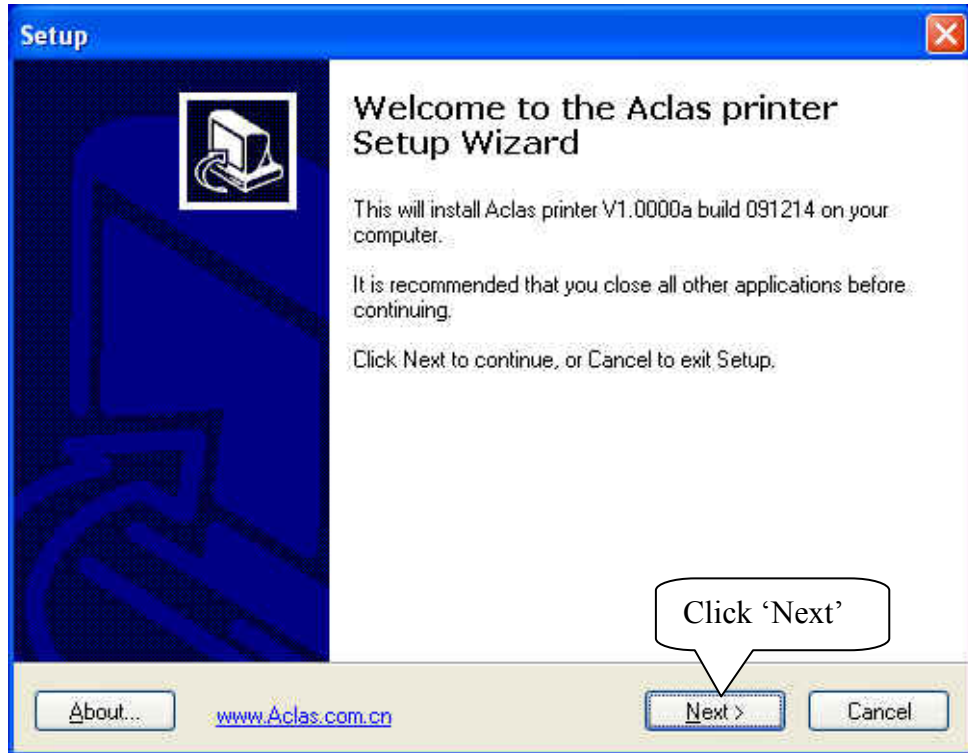


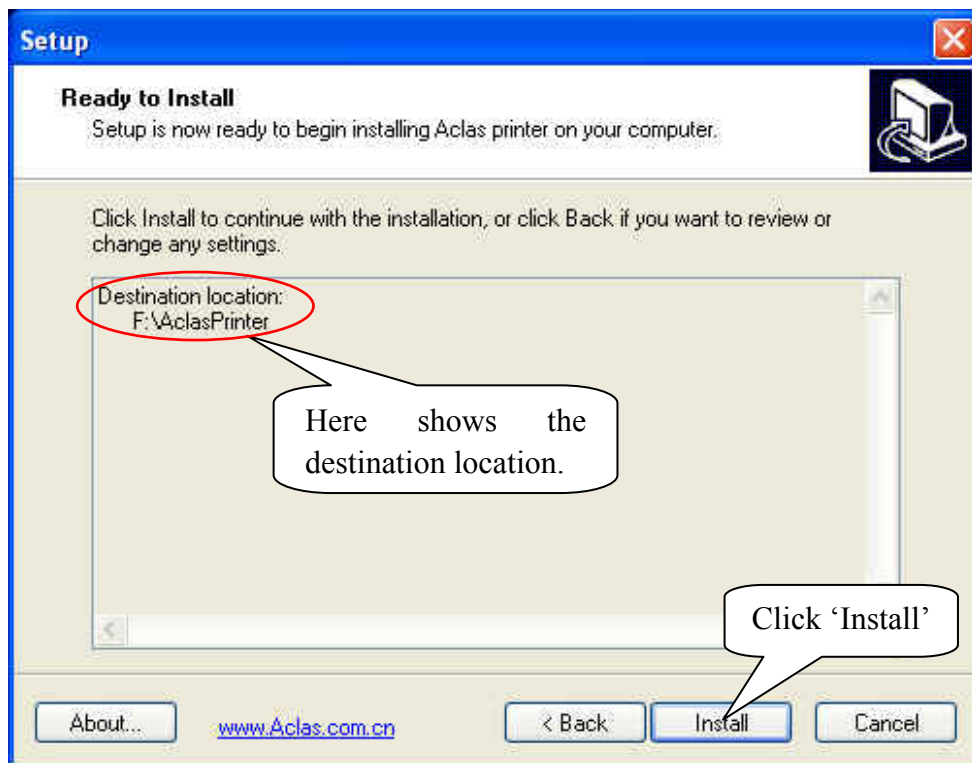
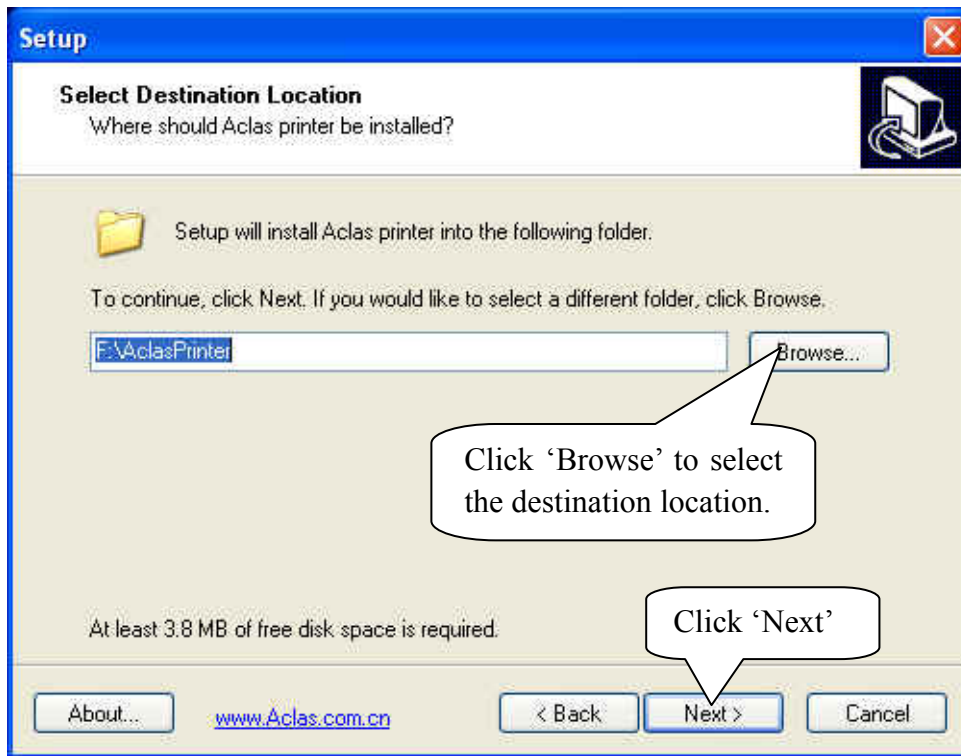
BT wireless communication port module
[Model: PP7XWB1]

7 MODEL: PP7XU

7.1 Printer Driver Installation

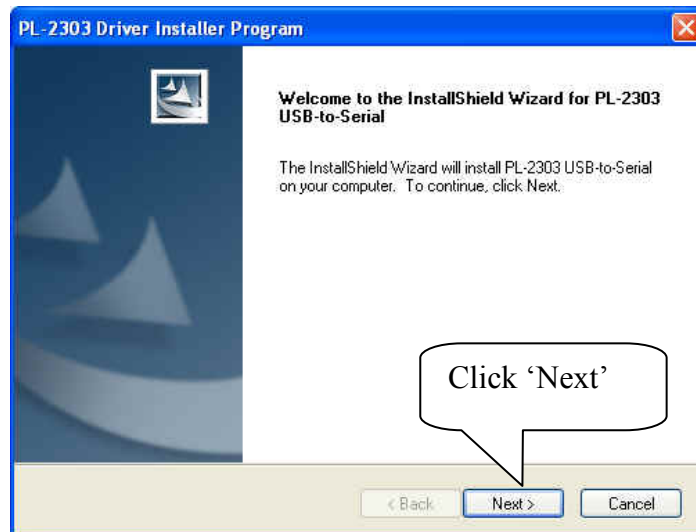
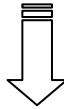
Connect the PP7X to PC. Click 'Aclas printer.exe' on the CD-disk, which is packed along with your computer. Install the printer driver as follows:

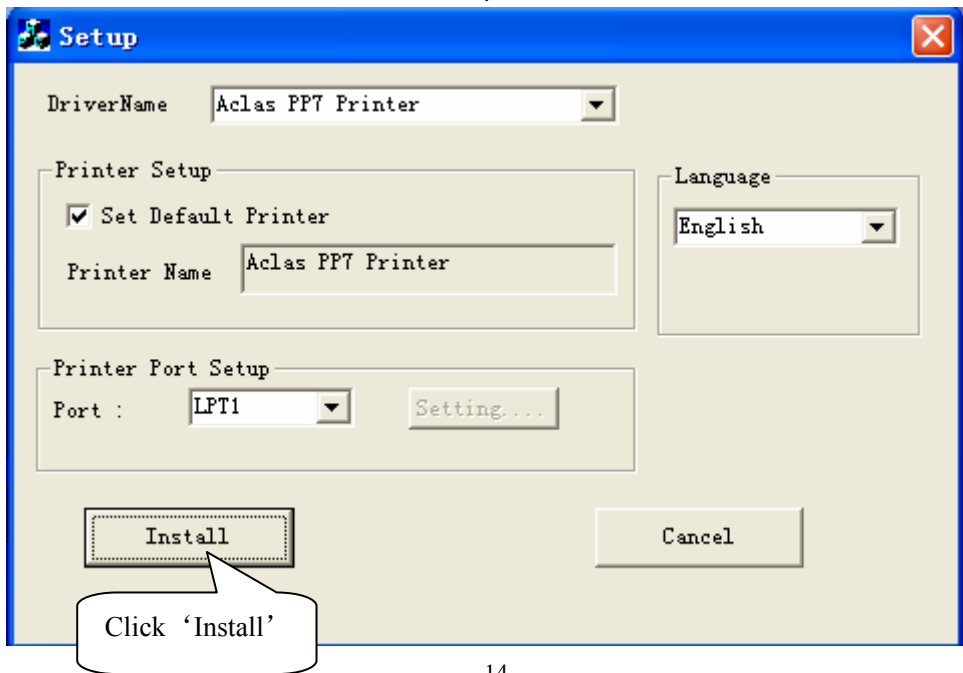
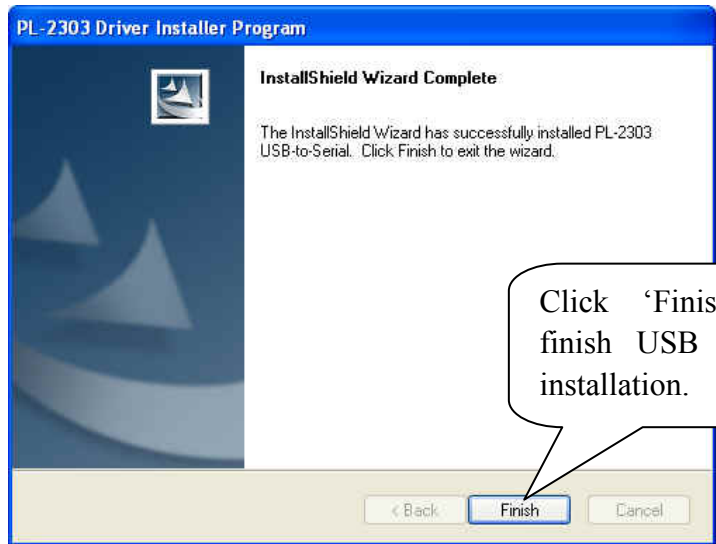
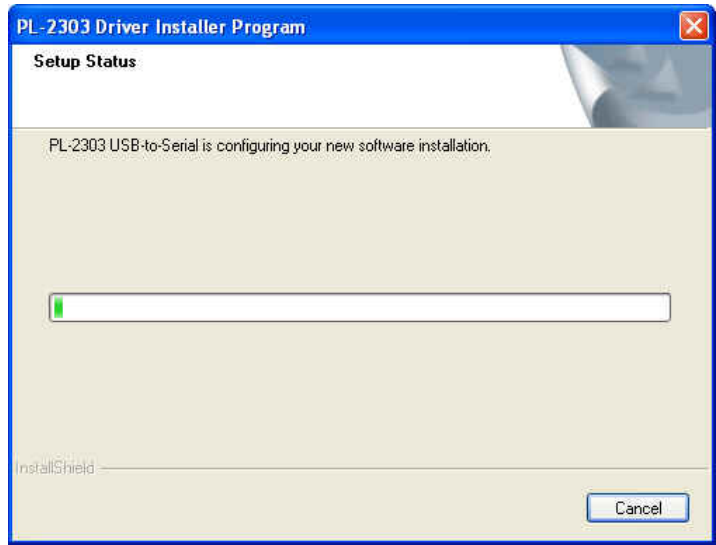


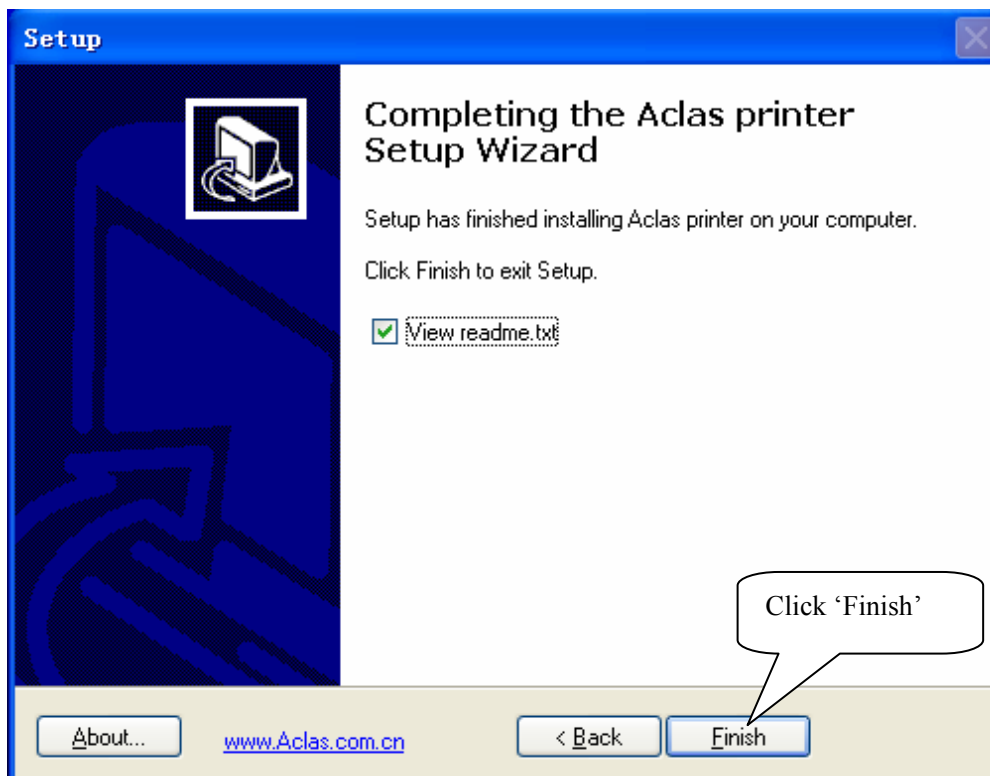




Note: If it is USB printer, please tick the box and click "NEXT" .If not, please directly click "NEXT" .





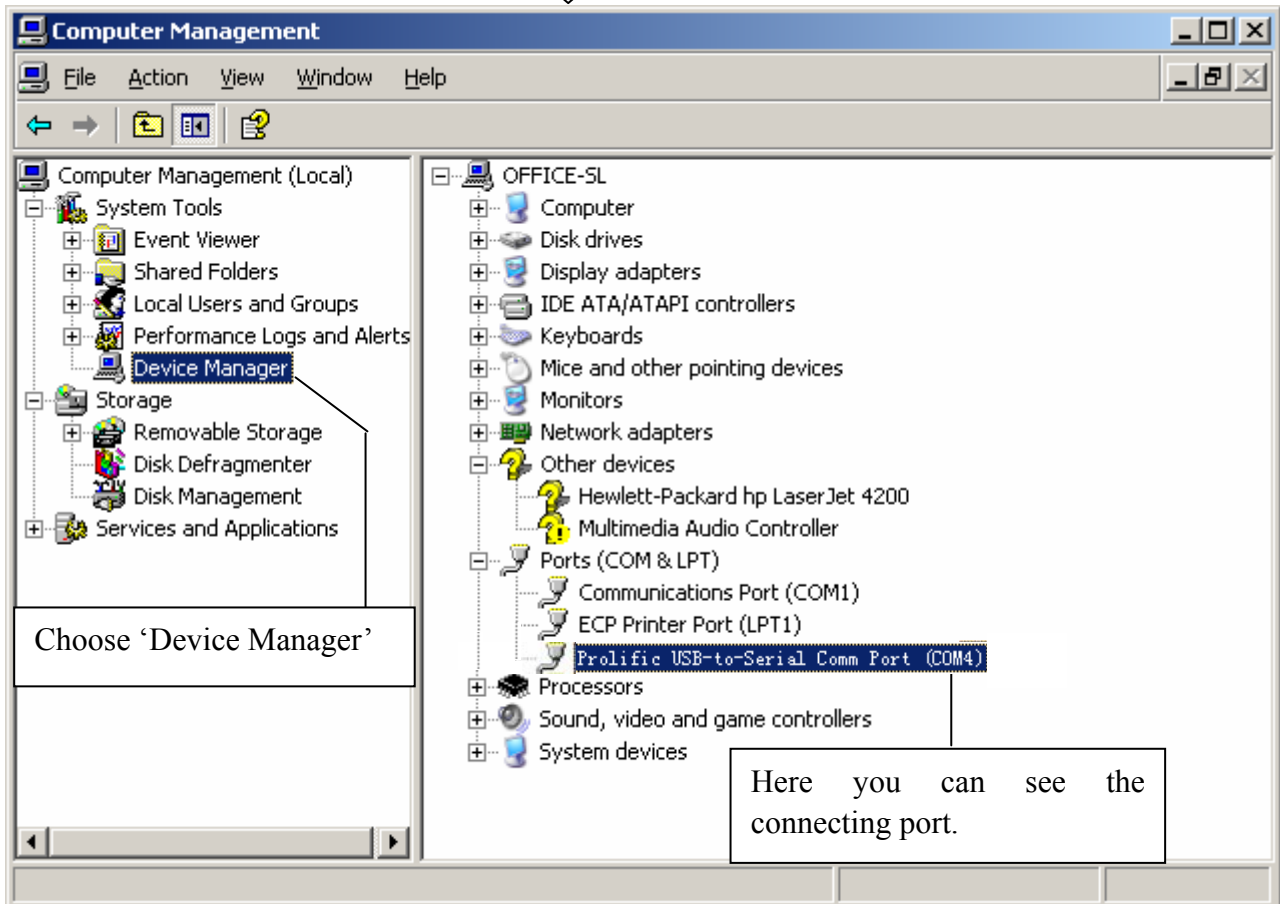
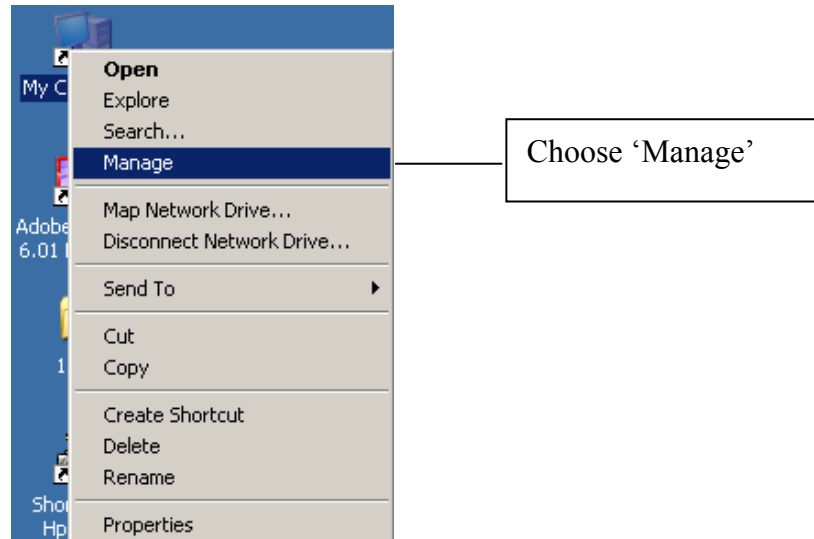


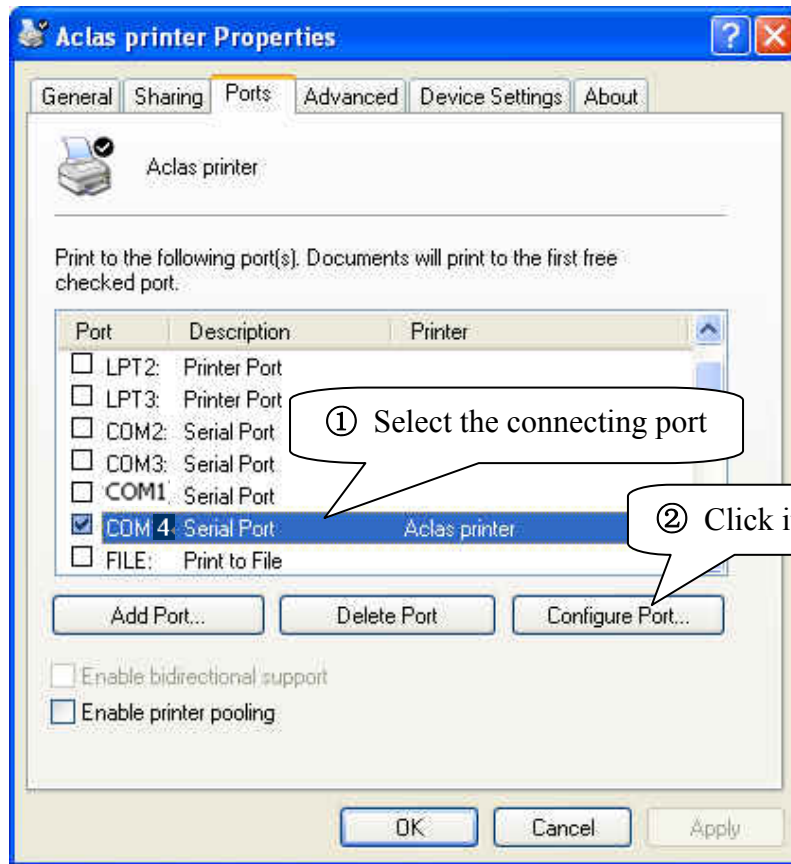
Finally, click 'Finish' to finish printer driver installation.

7.2 How to Know the Connecting Port

After you install USB driver, restart computer, and connect the PP7X to the computer. Then, you can follow steps below to know which port is connected.

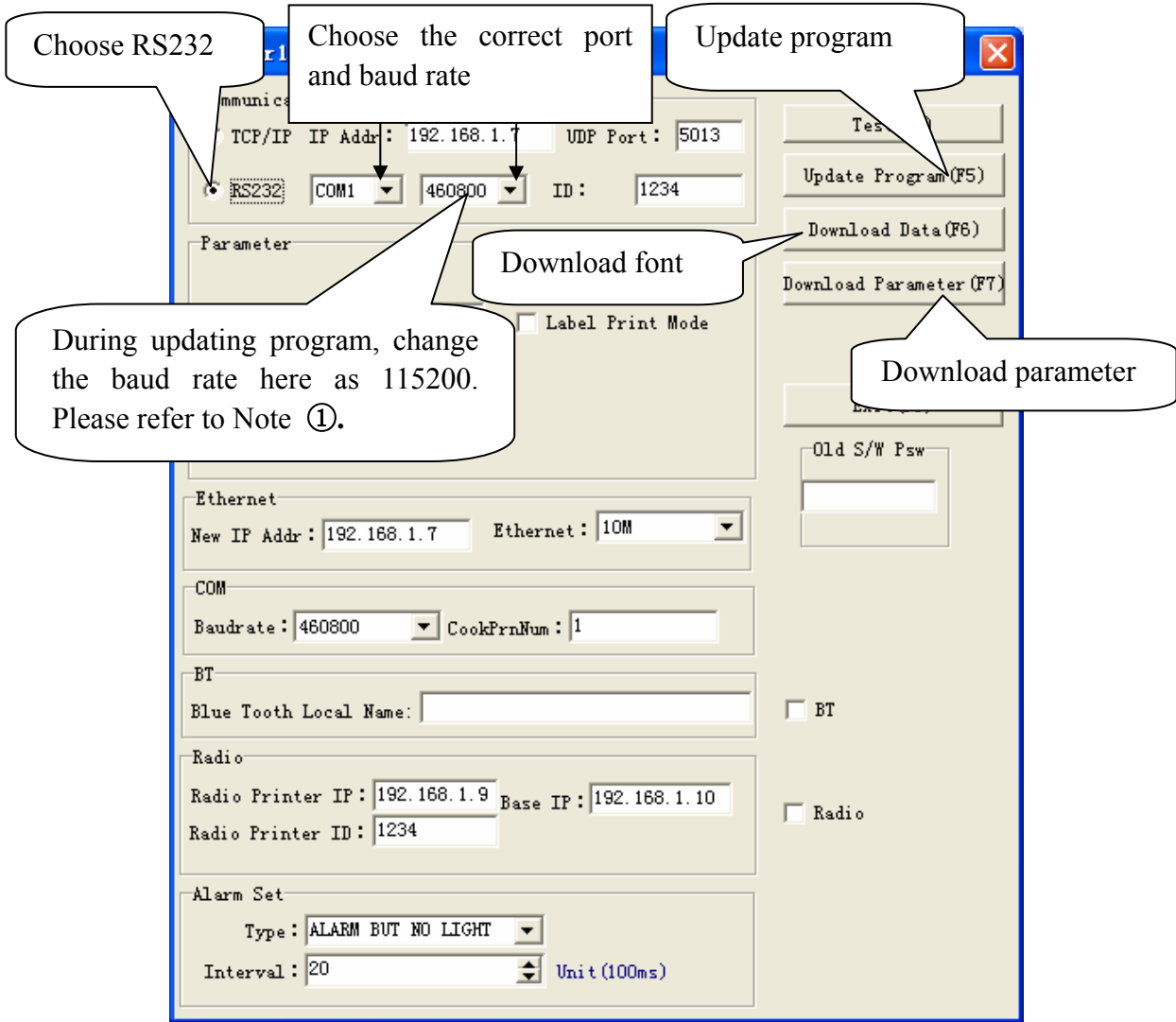
Right click 'My Computer' icon on the desktop, and choose 'Manage':





7.3 Software Description

In the disk, you can find the software 'PP7_en.exe' in the file 'PC-SW', double click to open it. Here, you can use the software to update program and download data. Connect PP7X to PC.



Note: ① Please set the baud rate as 460800 before updating program, when the downloading is paused, click 'Cancel', and change the baud rate as 115200, and then you can update program again.

② The baud rate of PP7XU is fixed at '460800'.

③ Print density can be adjusted via Dip Switch, please refer to Chapter 13.

You can change baud rate (9600\19200\38400\115200) and print density by dip switch.

8 MODEL: PP7XW4/PP7XW2

The communication distance: PP7XW4 is up to 100m without obstacle

PP7XW2 is up to 10m without obstacle

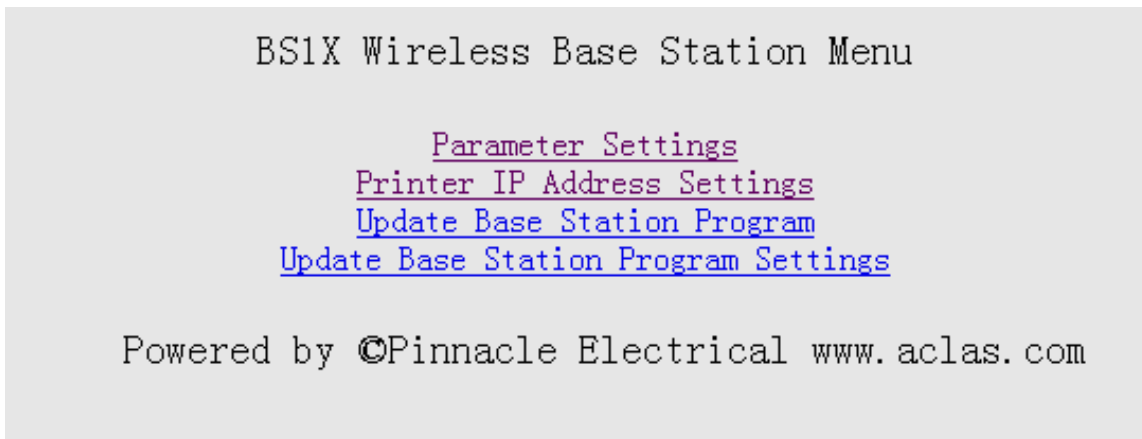
PP7X printers of this model are able to communicate with PC by two ways, via 433MHz Base Station or 2.4G Dongle. If you use 433MHz Base Station, please refer to Chapter 8.1; if use 2.4G Dongle, please refer to Chapter 8.2.

8.1 Wireless 433MHz Base Station

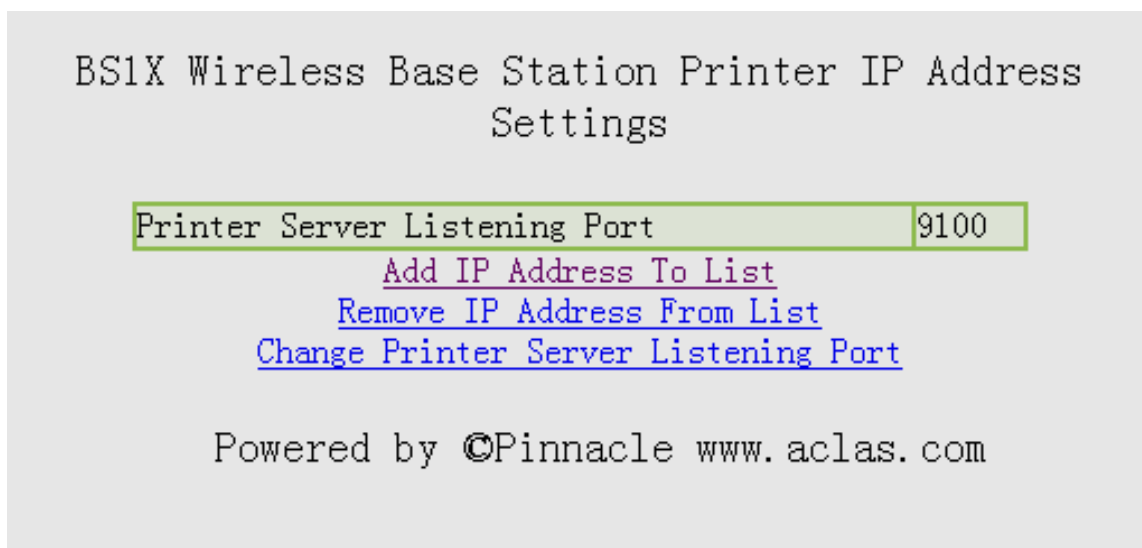
➤ Wireless Printer Setting:

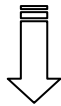
If Base Station needs to communicate with printer, the following operation should be carried out.

1. Enter 'station menu' interface, choose 'Printer IP Address Settings' item:



2. Add, Remove, or change printer sever listening port in the interface below:





3. If choose 'Add IP Address To List' to add printer, please input the new added printer's 'IP address' and 'comments', and click 'add'; if you need to resetting, click 'Reset'.

BS1X Wireless Base Station Add IP Address To List

IP address:

Comments:

Powered by ©Pinnacle www.aclas.com

4. If you choose 'Remove IP Address From List', please input the new added printer's IP address or comments, and click 'Remove'; if you need to resetting, please click 'Reset'.

Remove IP Address From List

IP address:

Comments:

Powered by ©Pinnacle www.aclas.com

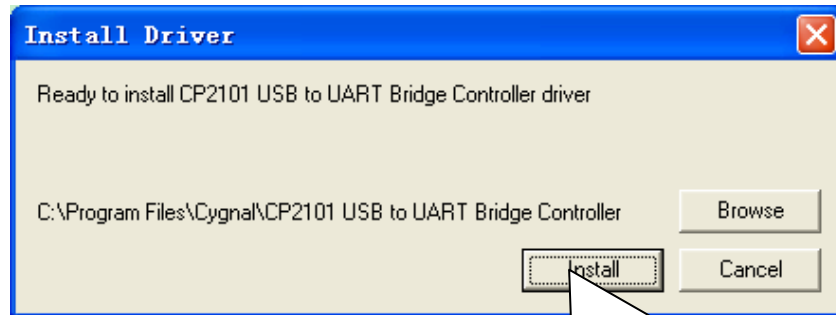
8.2 Wireless 433 USB Dongle/2.4G

8.2.1 USB Dongle Driver Installation

Before you install printer driver, you need to install the USB dongle driver first.

Insert the USB dongle into PC.

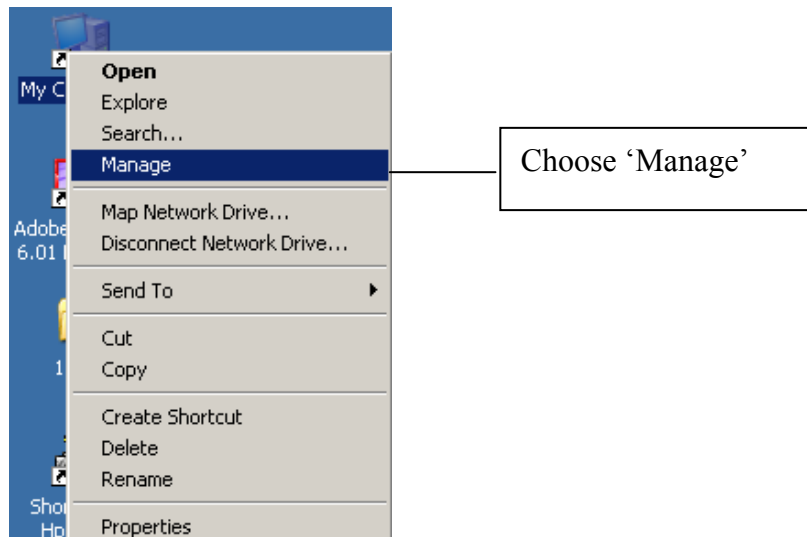
Double-click file *Setup.exe*, pop-up this window:

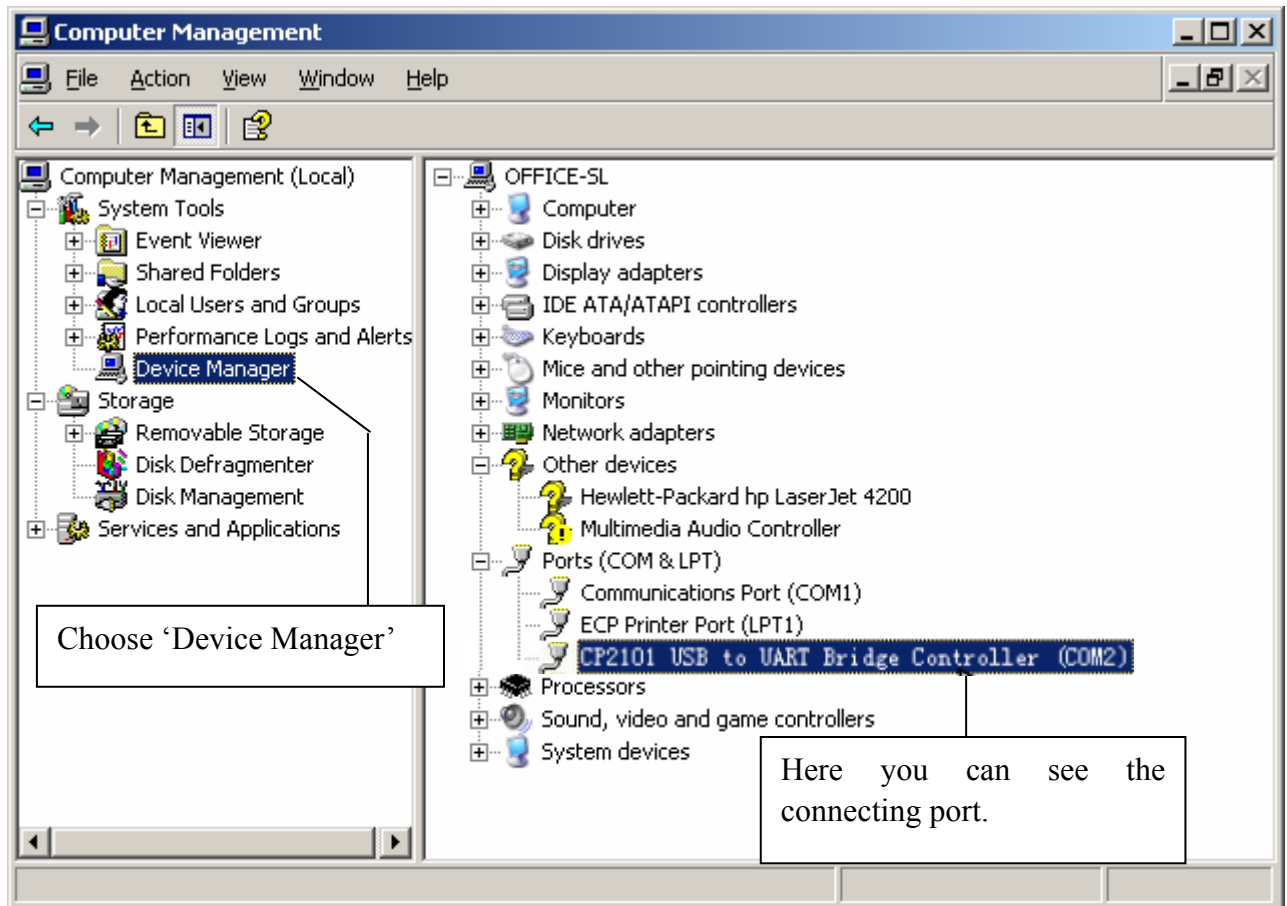


8.2.1 How to Know the Connecting Port

After you install USB dongle driver, restart computer, and insert the 433 dongle into the USB port of computer. Then, you can follow below steps to know which port is connected.

Right click 'My Computer' icon on the desktop, and choose 'Manage':



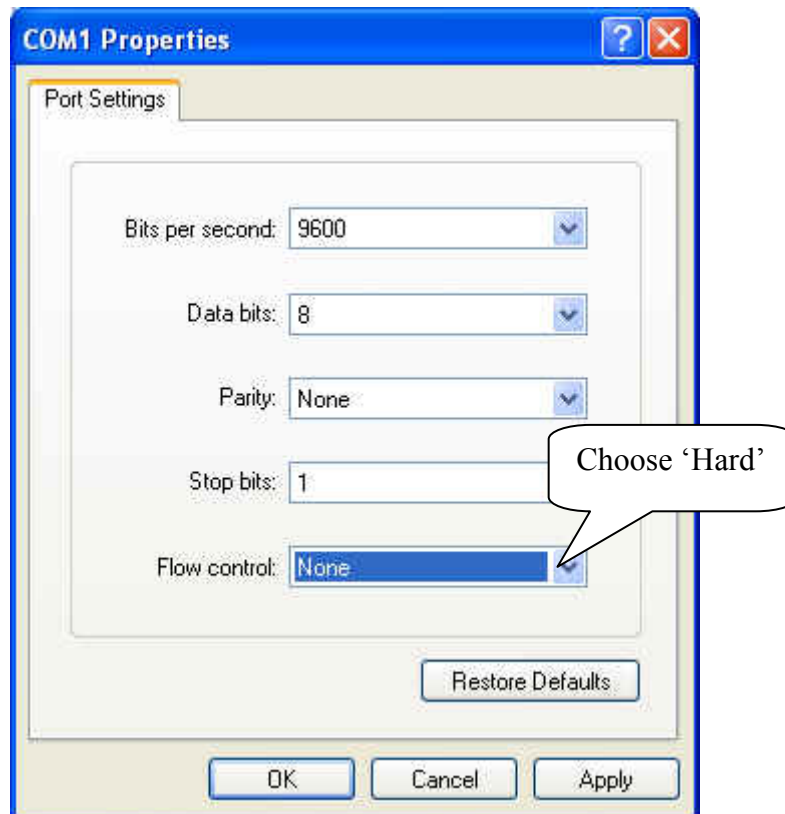


8.3 Printer Driver Installation

Note: The working baudrate of wireless 433 printer is '9600', its printing speed is relatively lower, it had better not use driver printing, we suggest that you should adopt command print.

Connect the PP7X to PC. Click 'Aclas printer.exe' on the CD-disk, which is packed along with your computer. And then install the printer driver, please refer to chapter 7.1 for details, and choose the printer port as the connecting port shows in Chapter 8.2 when you install the driver.

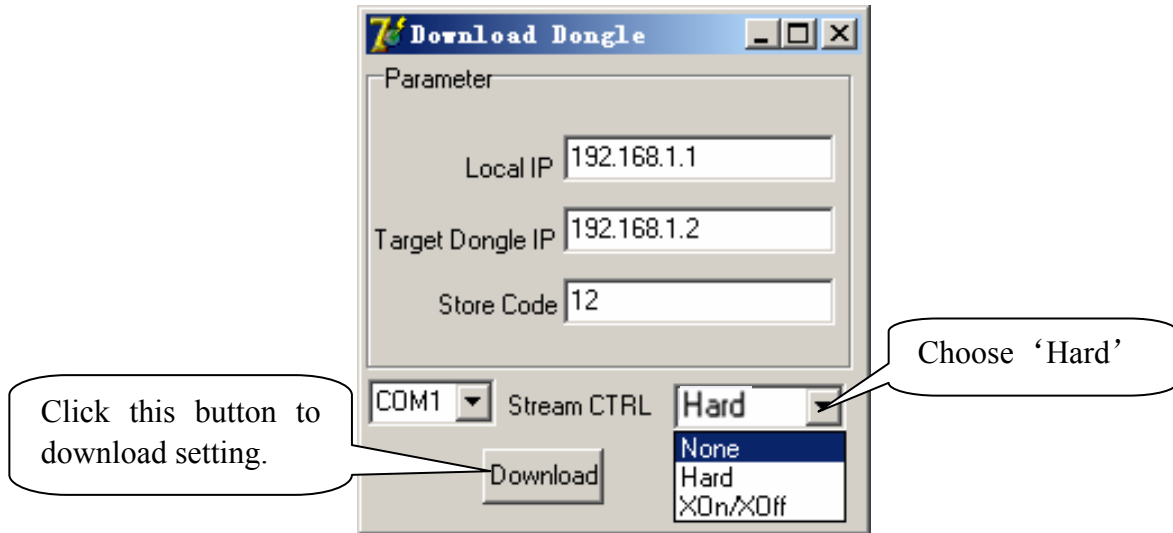
Please note that 'Flow control' must choose 'Hard' in port setting; please refer to the picture below.



8.4 Software Description

1. Dongle Parameter Setting

In the disk, you can find the file 'DownloadDongle.exe', double click to open it.



Local IP: the IP of 433 dongle.

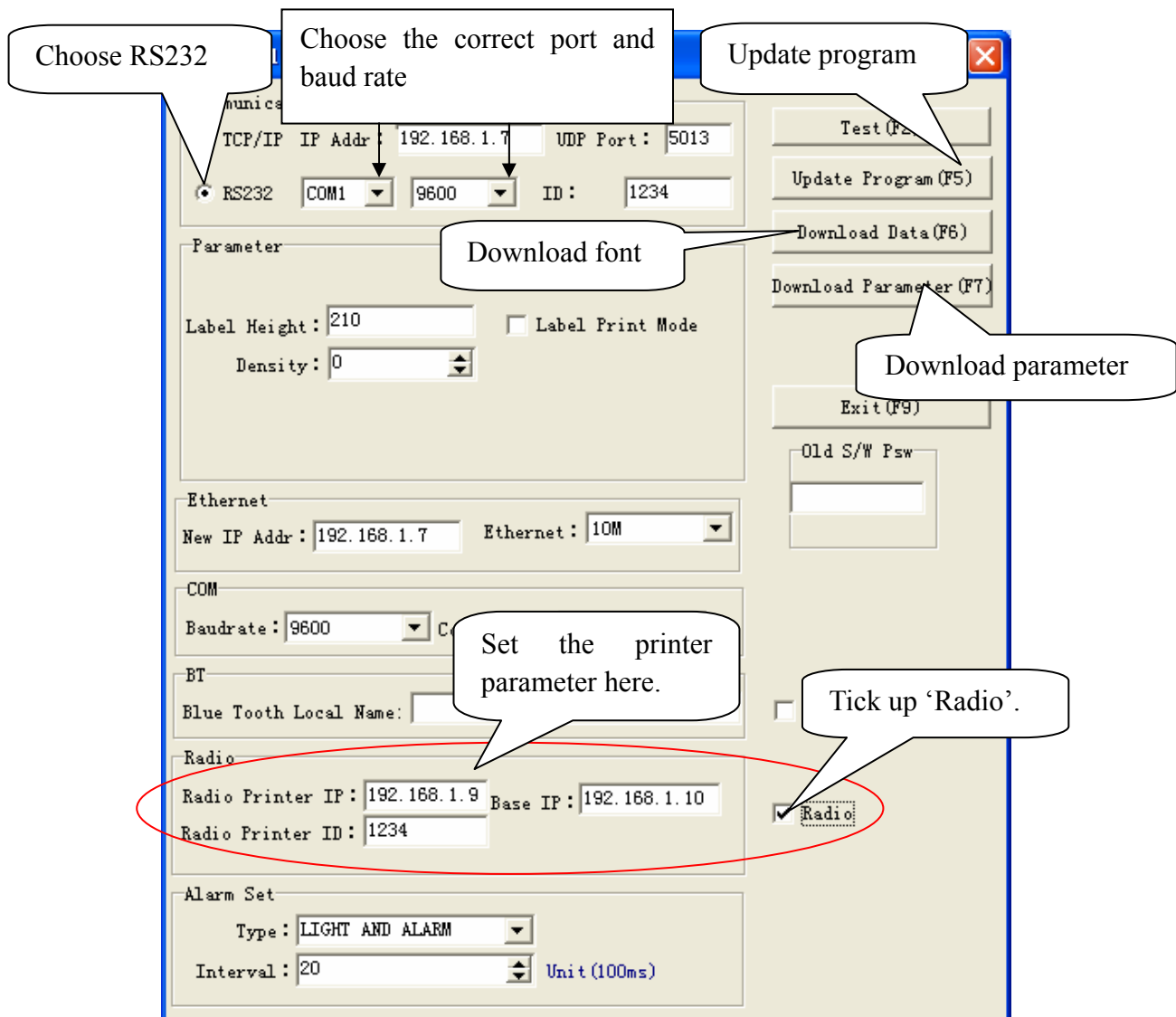
Target Dongle IP: the wireless IP address of PP7HW4.

Stream CTRL: stream control, if the transmitting data is over 255byte, please choose 'Hard'. If the software is used to transmit data, please set the stream control as 'Hard'.

Note: After click the button 'Download', if the system display "Download OK", it prompts the parameter setting is successful, and then please pull out the dongle and insert it again; if the system display "Fail", please check whether you choose the correct COM port, or whether the COM port is occupied by other equipment.

2. PP7W4/PP7W2 Parameter Setting

In the disk, you can find the software 'PP7_en.exe' in the file 'PC-SW', double click to open it. Here, you can use the software to update program and download data. Connect PP7X to PC.



Baud Rate: set printer baud rate, it must be 9600.

Radio Printer IP: the wireless IP address of PP7XW4/PP7XW2.

Base IP: here input the IP of 433 dongle.

Radio Printer ID: it must be the same as Store Code, or PP7XW4 cannot communicate with 433 dongle

Note:

1. Local IP should be the same with Base IP.
2. Target Dongle IP should be the same with Radio Printer IP.
3. Store Code should be the same with Radio Printer ID.
4. Printer Baud Rate must be 9600.

You must obey above notes (2 ~ 5) strictly, or the wireless communication cannot be successful.

5. If you want to communicate via communication wire directly, then you can change baud rate. The baud rate (9600,19200,38400,115200) and the print density can be adjusted via Dip Switch, please refer to Chapter 13 for detail.

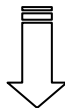
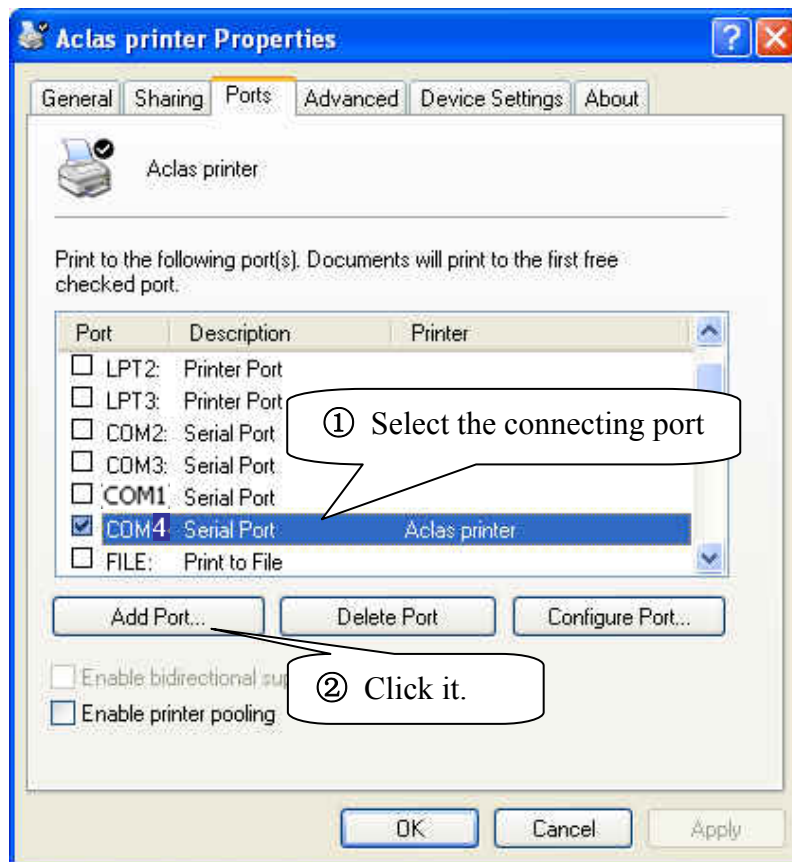
9 MODEL: PP7XE

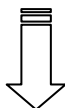
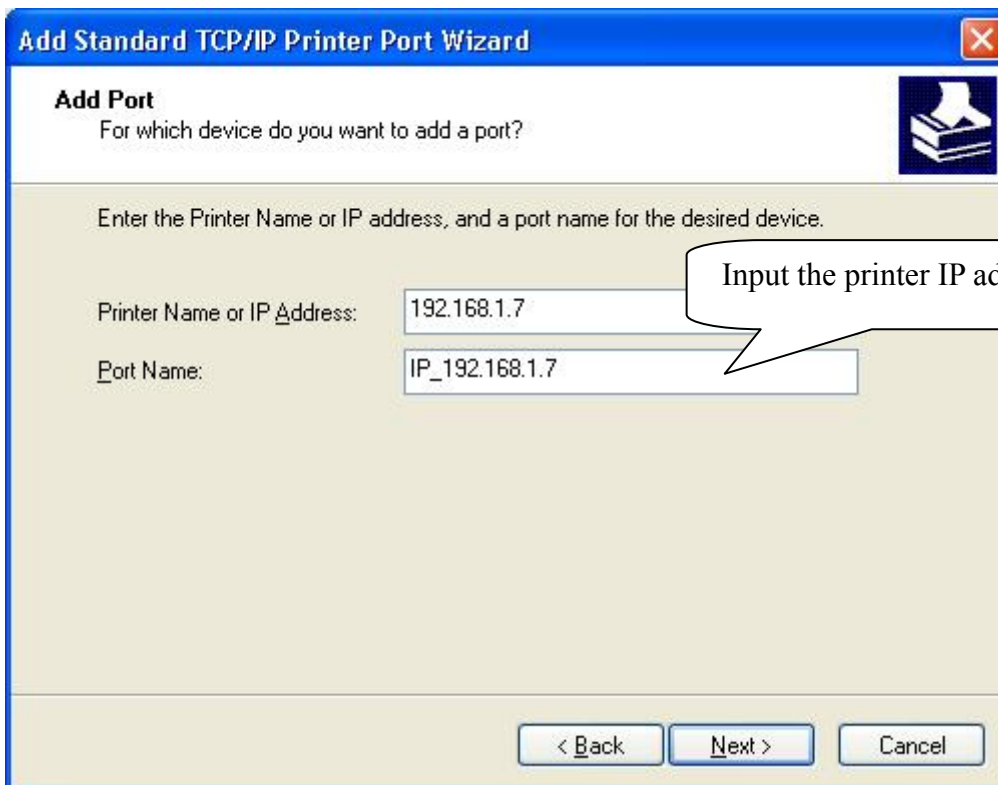
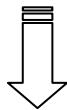
9.1 Printer Driver Installation

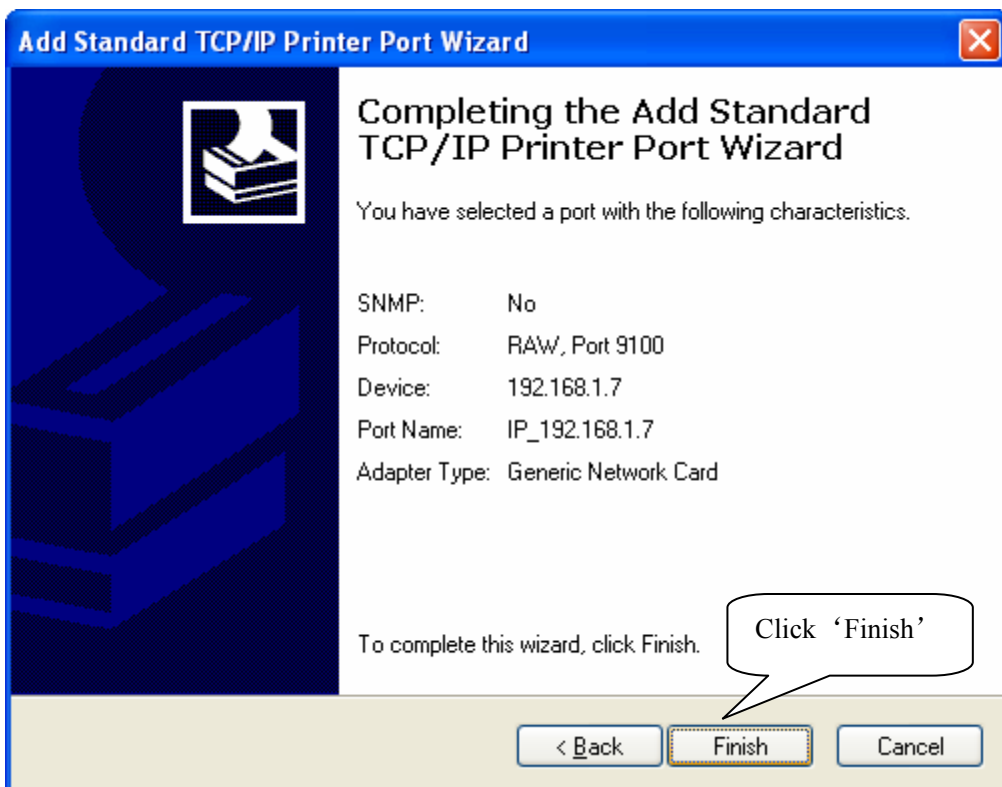
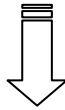
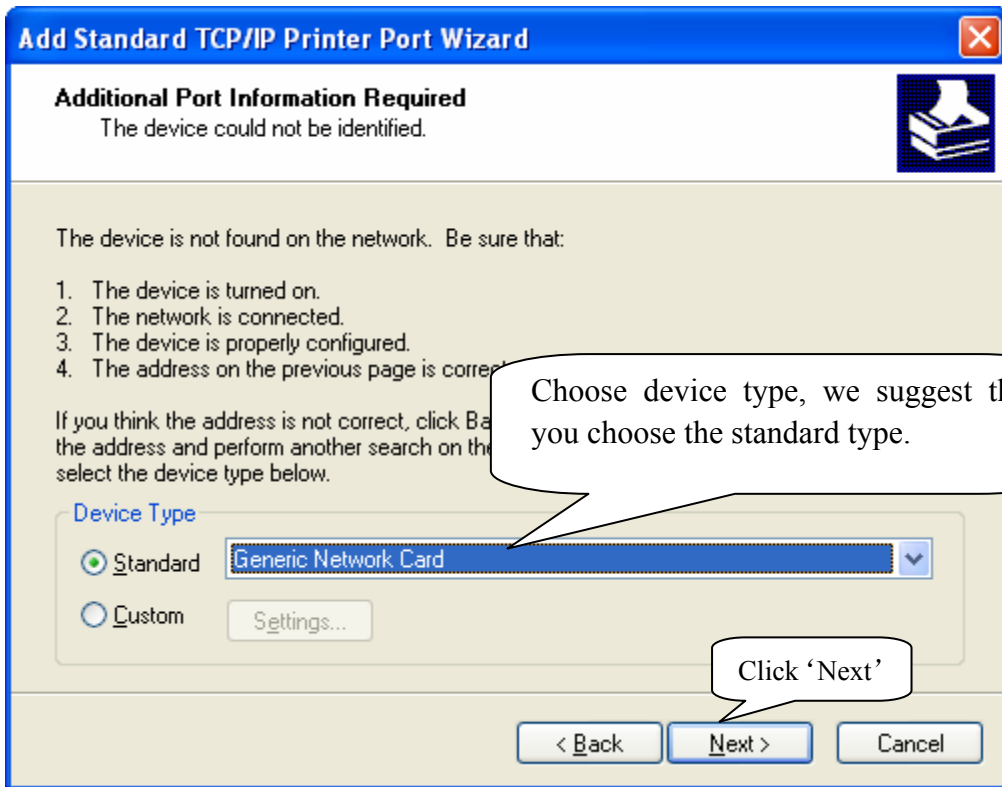
Note: If you want to use driver printing to realize many PC to communicate with many PP7X printer, please contact our company.

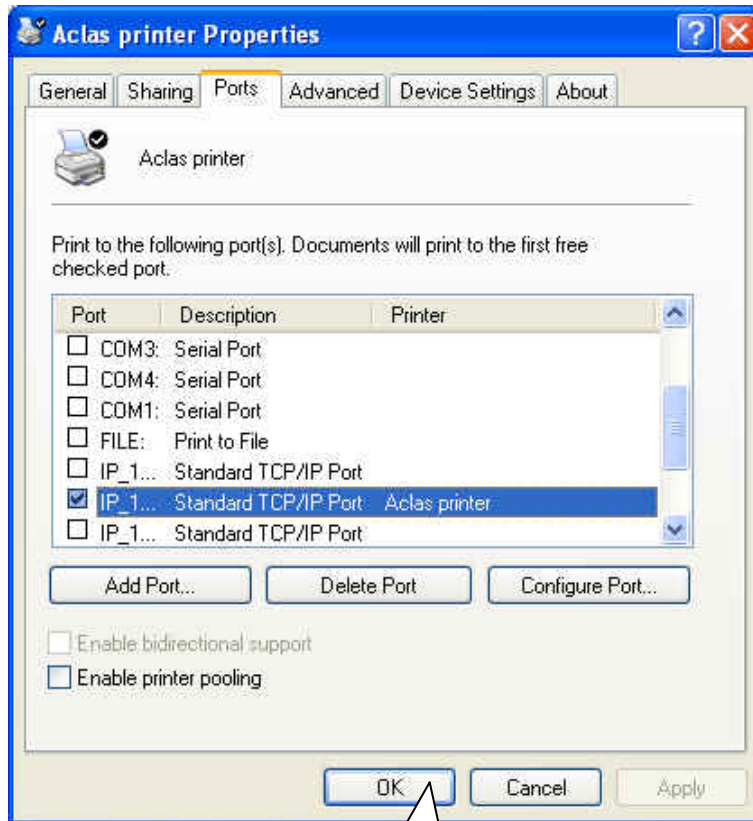
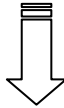
Connect the PP7X to PC. Click 'Aclas printer.exe' on the CD-disk, which is packed along with your computer. And then do as Chapter 7.1, but no need to choose port or do other settings. **Just install the program, and find the file 'Aclasprinter.inf' in the path you installed.**

And then install the driver, please do as follows:





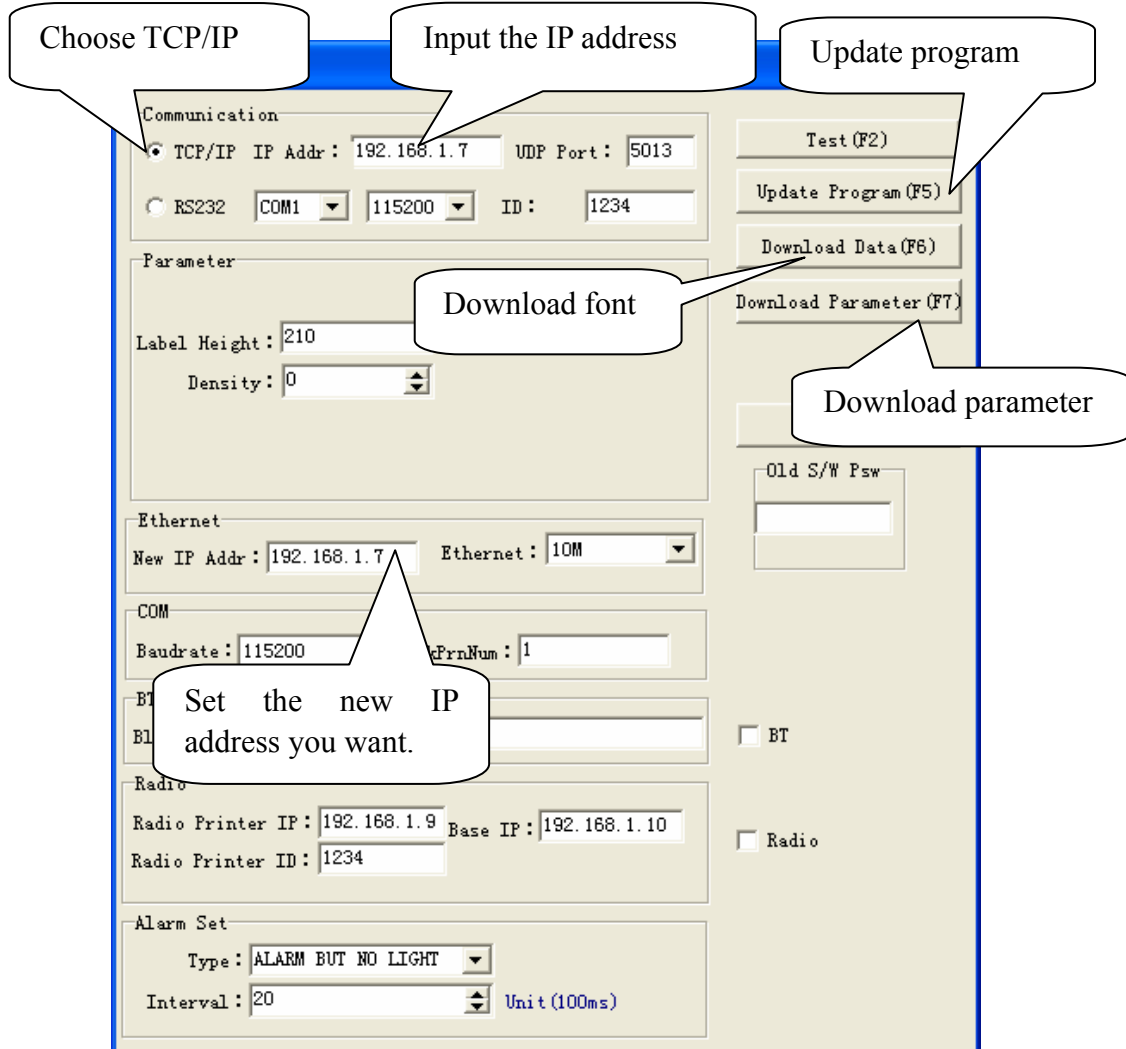




Click it

9.2 Software Description

In the disk, you can find the software 'PP7_en.exe' in the file folder 'PC-SW', double click to open it. Here, you can use the software to update program and download data.



Note: ① you can update the program at any printer's IP.

② 'Download Data', means download font. Please set the parameter in the left column if choose this item. Press 'F6' on the keyboard, and then choose the file in the FONT file folder.

③ 'Download Parameter', means download parameter. After set the parameter, press 'F7' on the keyboard, and then choose the file in the Parameter file folder.

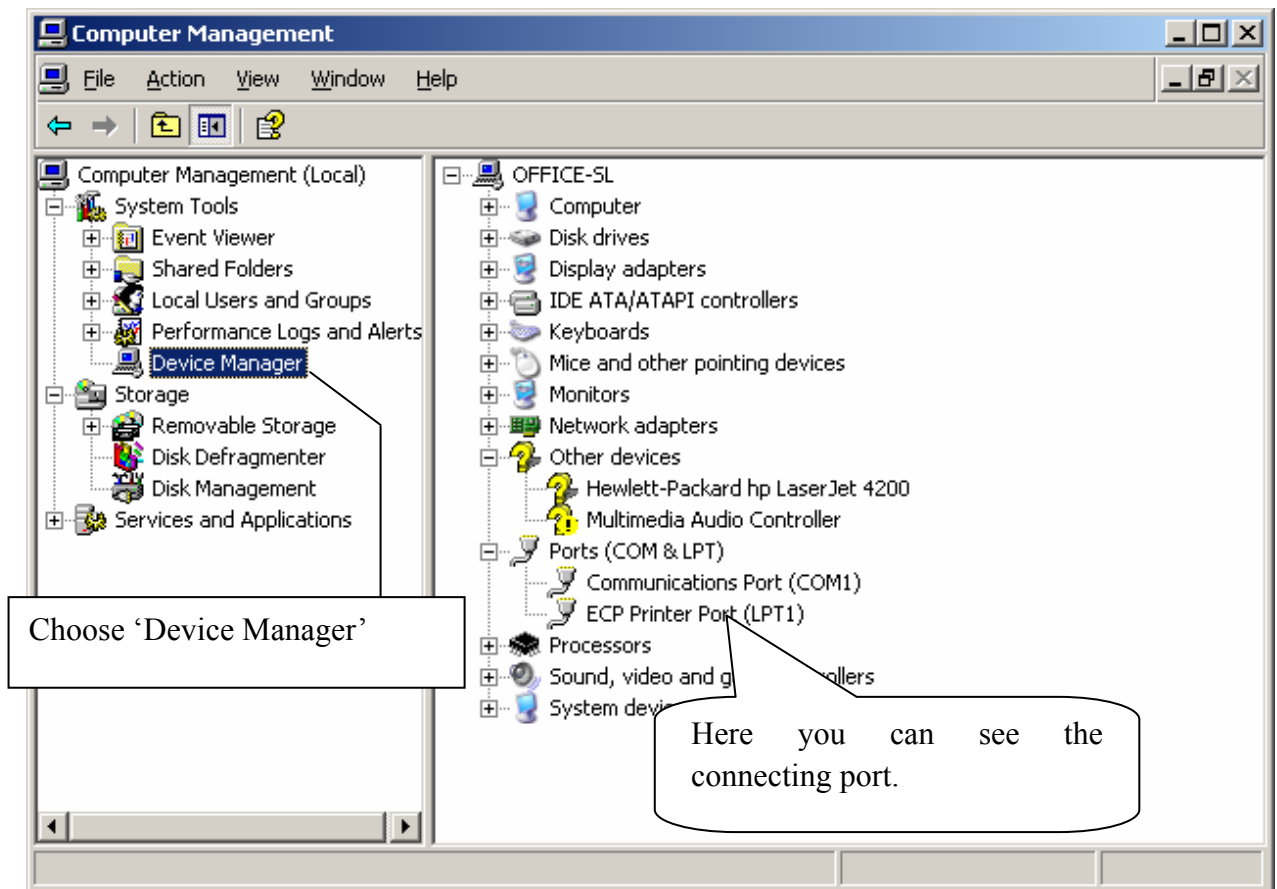
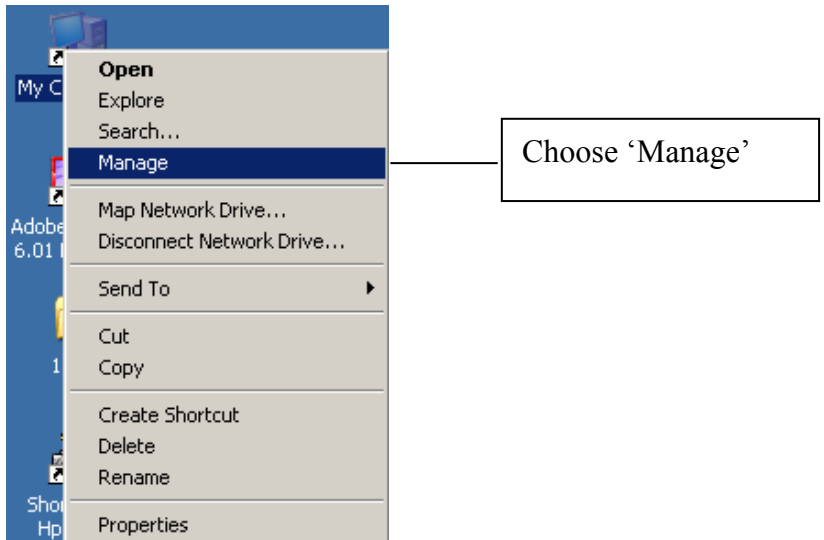
④ Print density can be changed via Dip Switch, please refer to Chapter 13 for detail.

10 MODEL: PP7XD

10.1 How to Know the Connecting Port

After you connect the PP7X to the computer, then, you can follow the steps below to know which port is connected.

Right click 'My Computer' icon on the desktop, and choose 'Manage':



10.2 Printer Driver Installation

Connect the PP7X to PC. Click 'Aclas printer.exe' on the CD-disk, which is packed along with your computer.

And then install the printer driver, please refer to chapter 7.1 for details, and choose the printer port as the connecting port shows in Chapter 10.1 when you are install the driver.

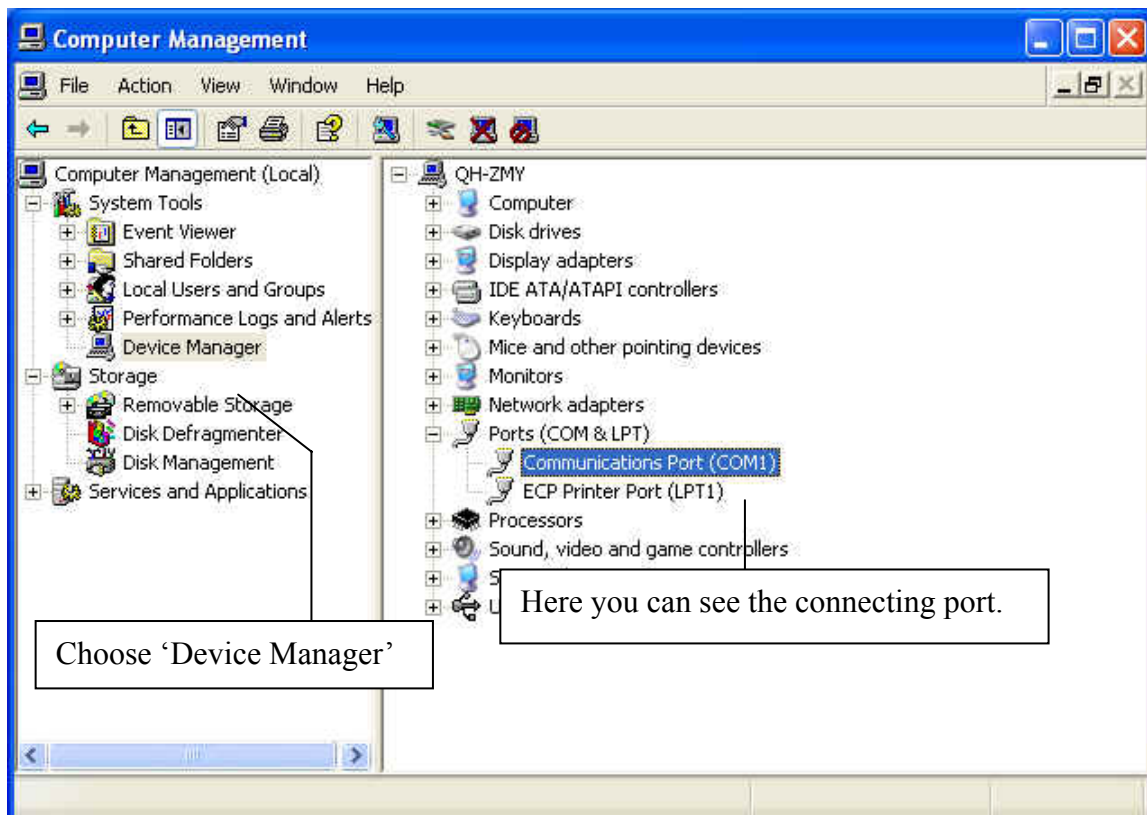
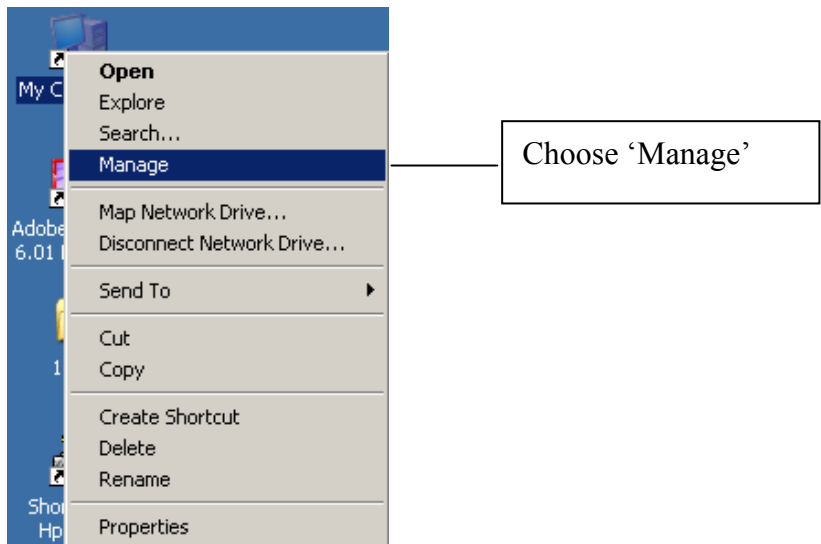
If you want to update the program of PP7XD, please contact with our company (our after service hot line is 86-592-5710087).

11 MODEL: PP7X3

11.1 How to Know the Connecting Port

Connect the PP7X to the computer. Then, you can follow the steps below to know which port is connected.

Right click 'My Computer' icon on the desktop, and choose 'Manage':

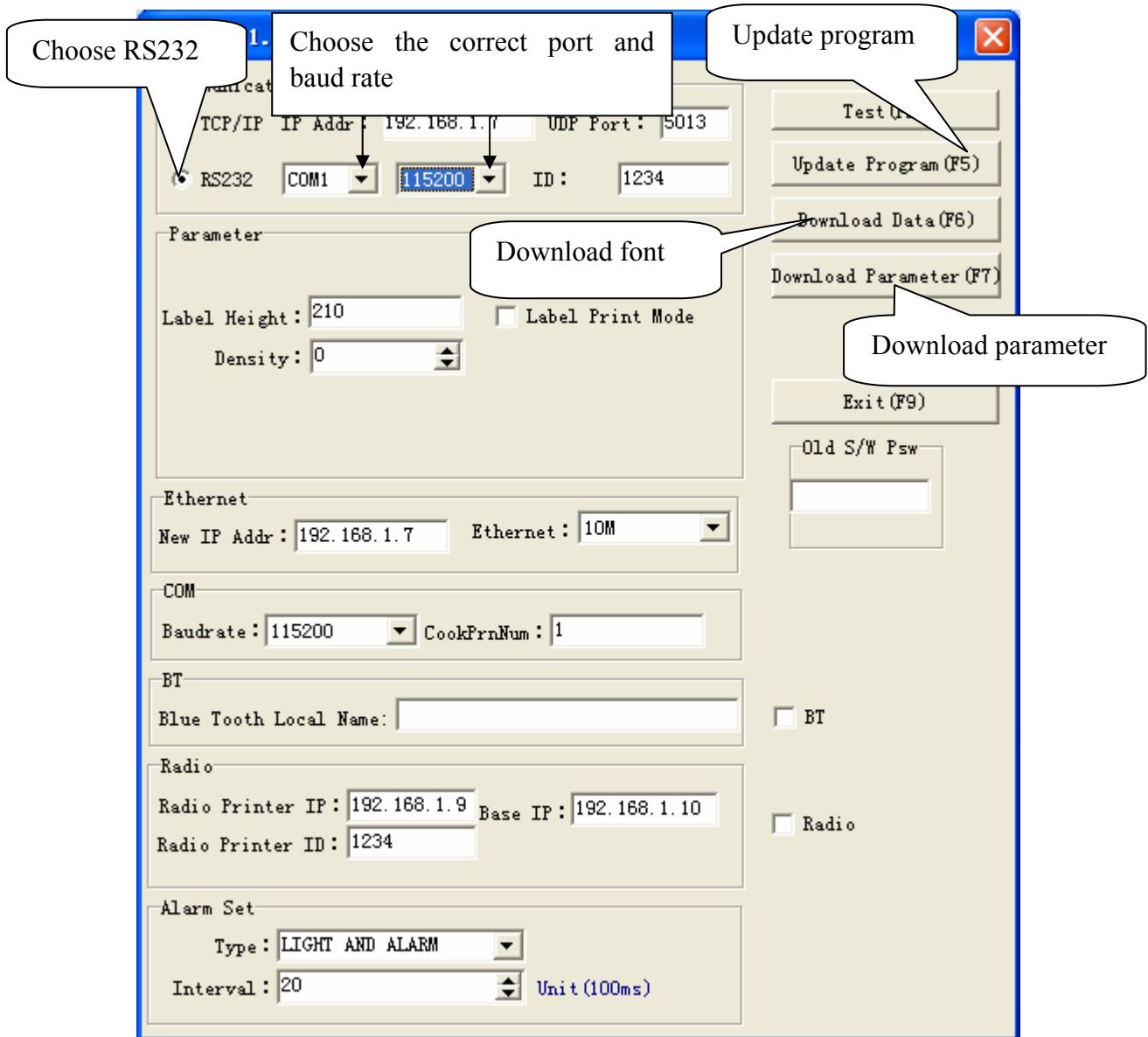


11.2 Printer Driver Installation

Connect the PP7X to PC. Click 'Aclas printer.exe' on the CD-disk, which is packed along with your computer. You can know more details of installing the printer driver in Chapter 7.1.

11.3 Software Description

In the disk, you can find the software 'PP7_en.exe' in the file folder 'PC-SW', double click to open it. Here, you can use the software to update program and download data. Connect PP7X to PC.



Note: ① The available baud rate for this printer is 9600, 19200, 38400, 115200, 460800.

② The printer program can be updated at any baud rate.

③ 'Download Data', means download font. Please set the parameter in the left column if choose this item. Press 'F6' on the keyboard, and then choose the file in the FONT file folder.

④ 'Download Parameter', means download parameter. After set the parameter, press 'F7' on the keyboard, and then choose the file in the Parameter file folder.

⑤ The baud rate (9600,19200,38400,115200) and the print density can be changed via Dip Switch, please refer to Chapter 13 for detail.

12 MODEL: PP7XWB

The communication distance of PP7XWB is up to 10m without obstacle.


12.1 BT Driver Installation

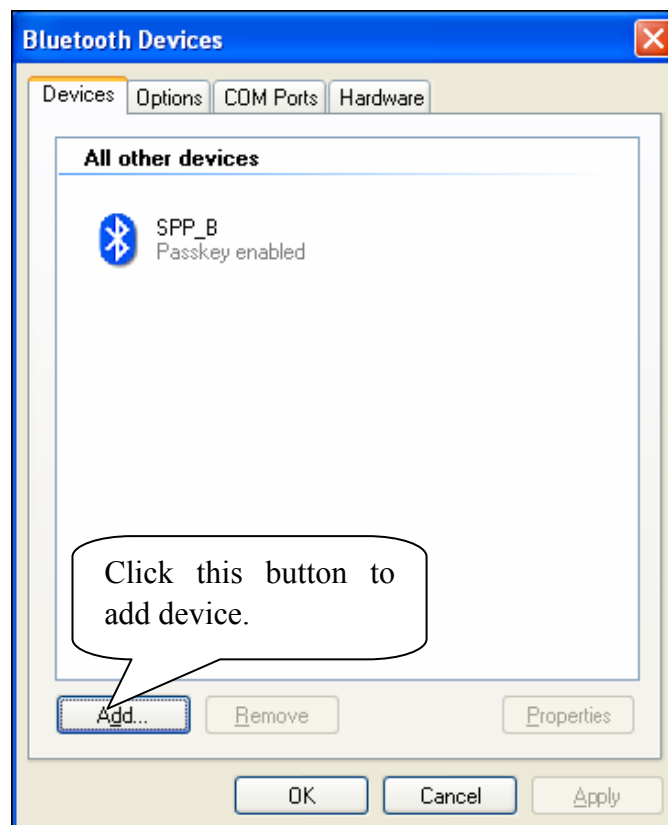
- **Method 1:**

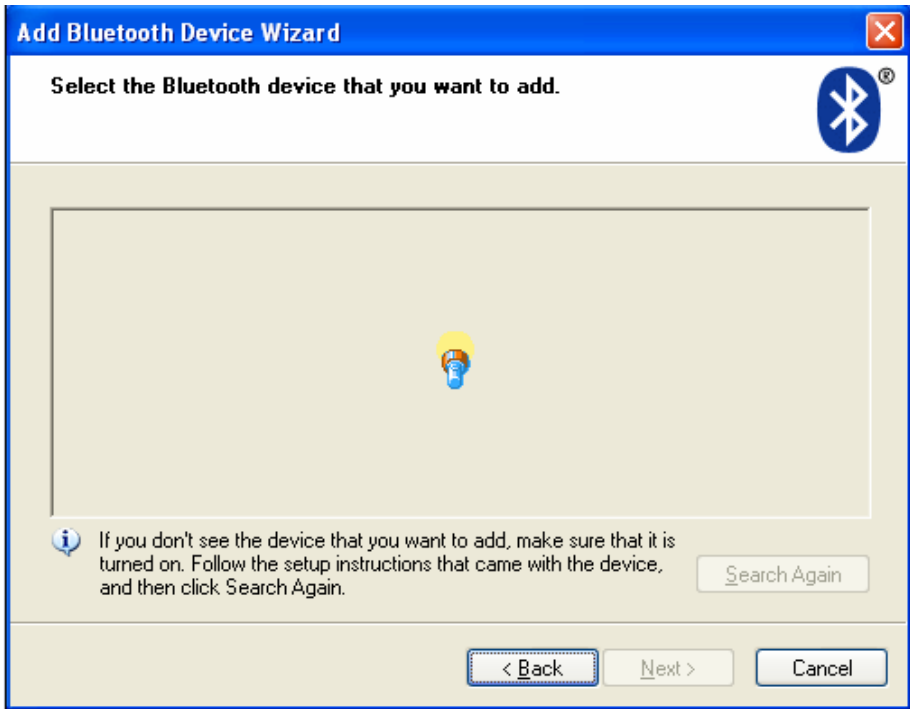
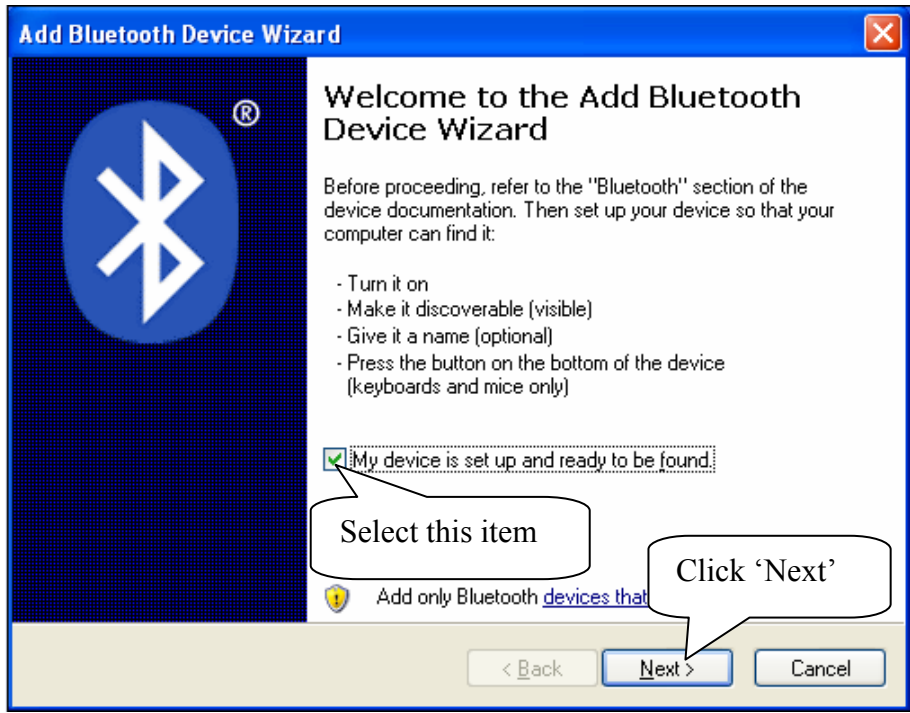
This method is suitable for windows XP/VISTA OS.

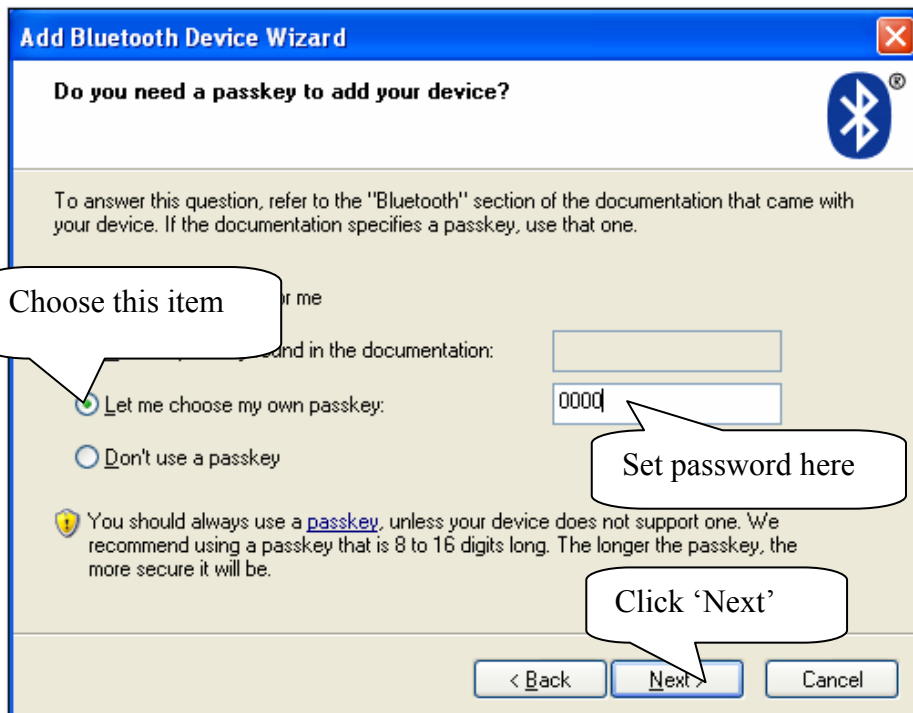
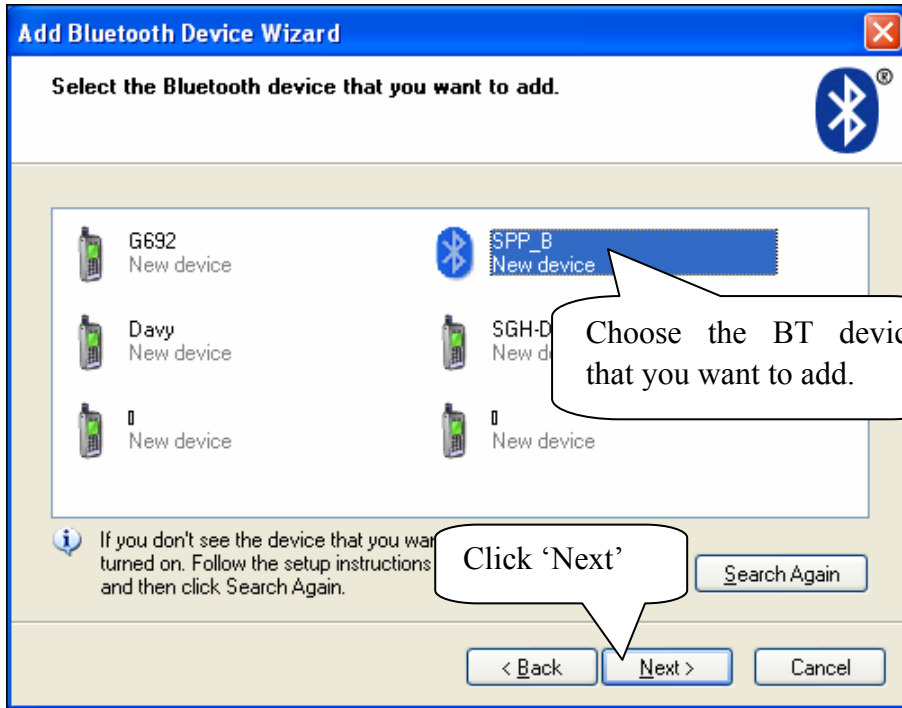
In the package, you can find a BT dongle.

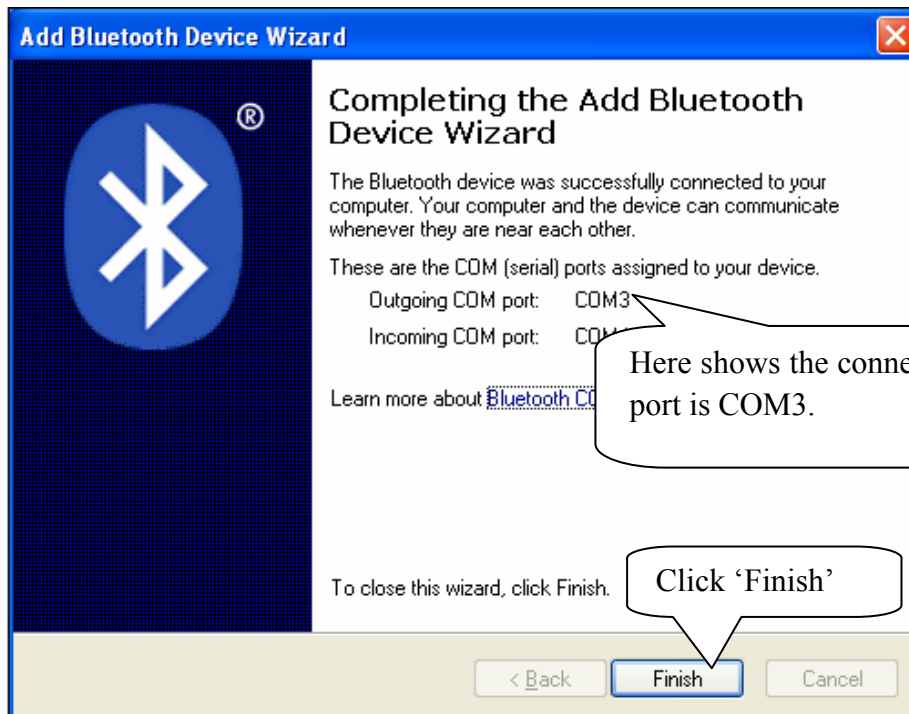
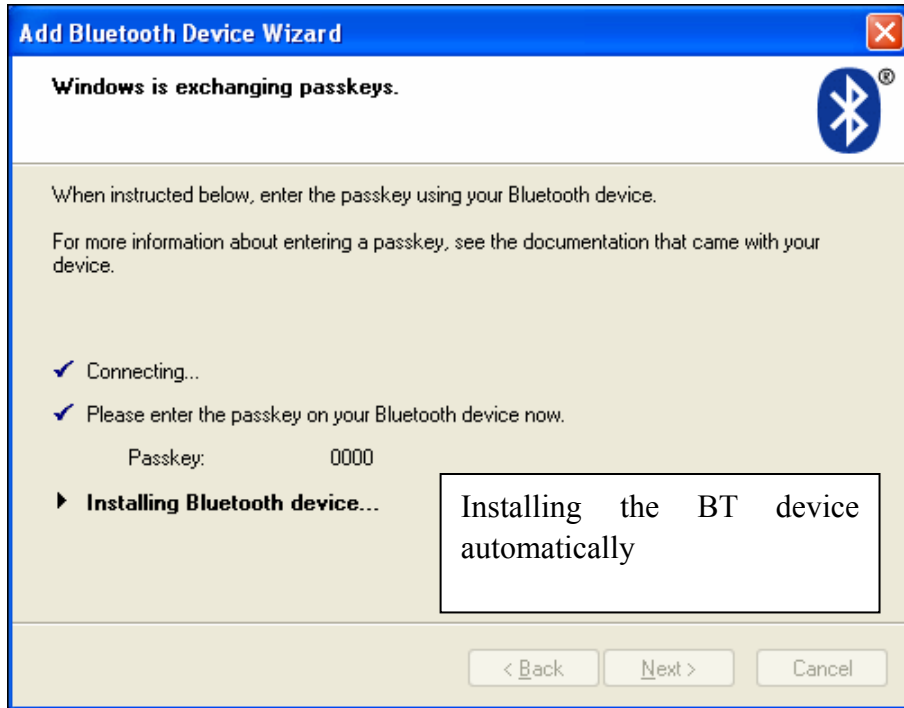


If you will connect the PP8X printer to the PC, insert this dongle into the USB port of PC. The lower right corner of screen will show the icon  , double click it.









● **Method 2:**

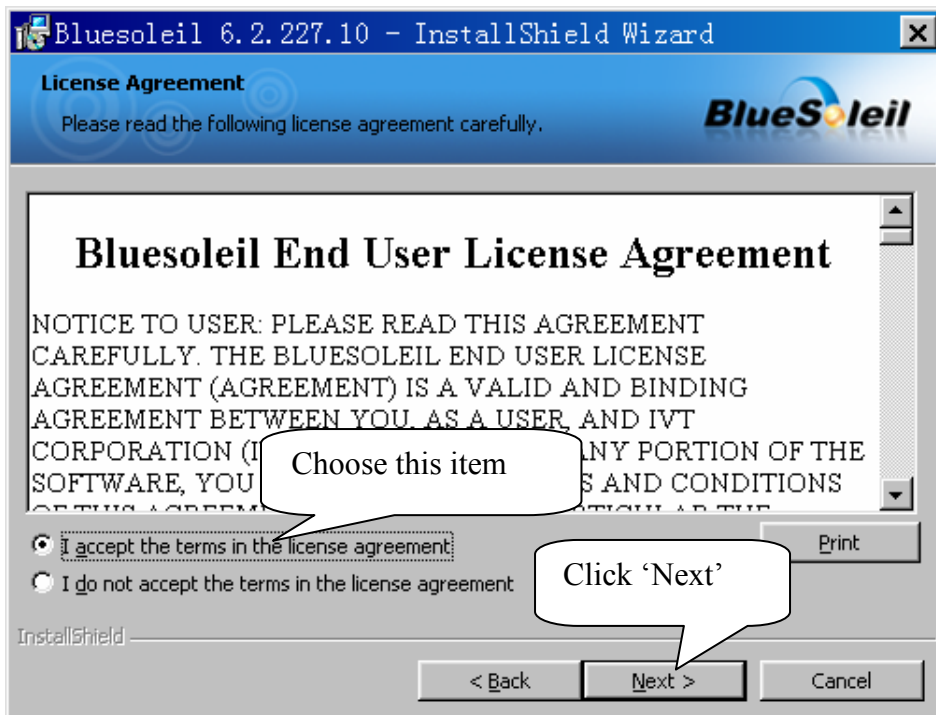
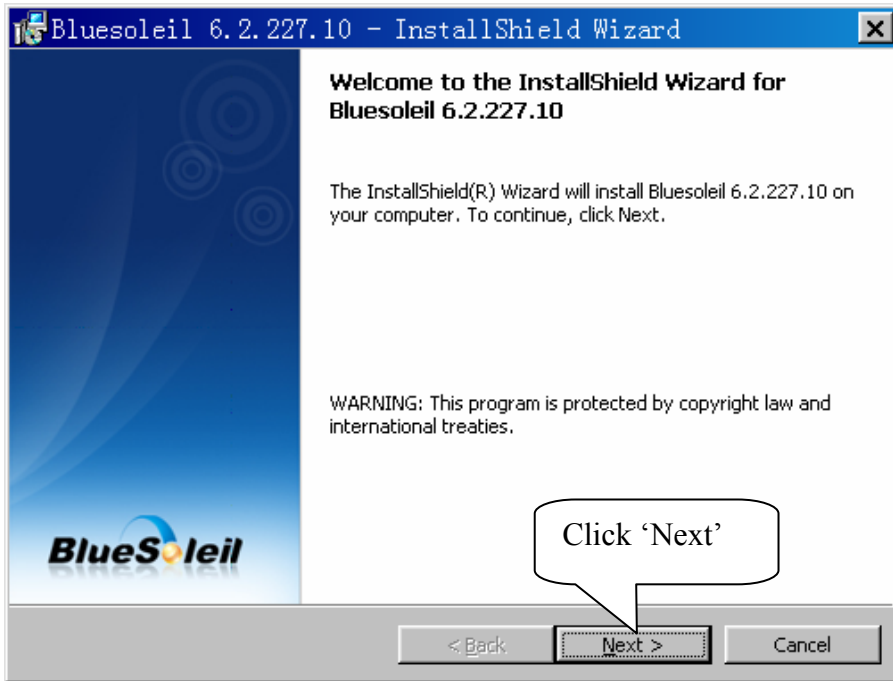
This method is suitable for windows 98/2000/XP/VISTA OS

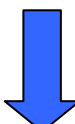
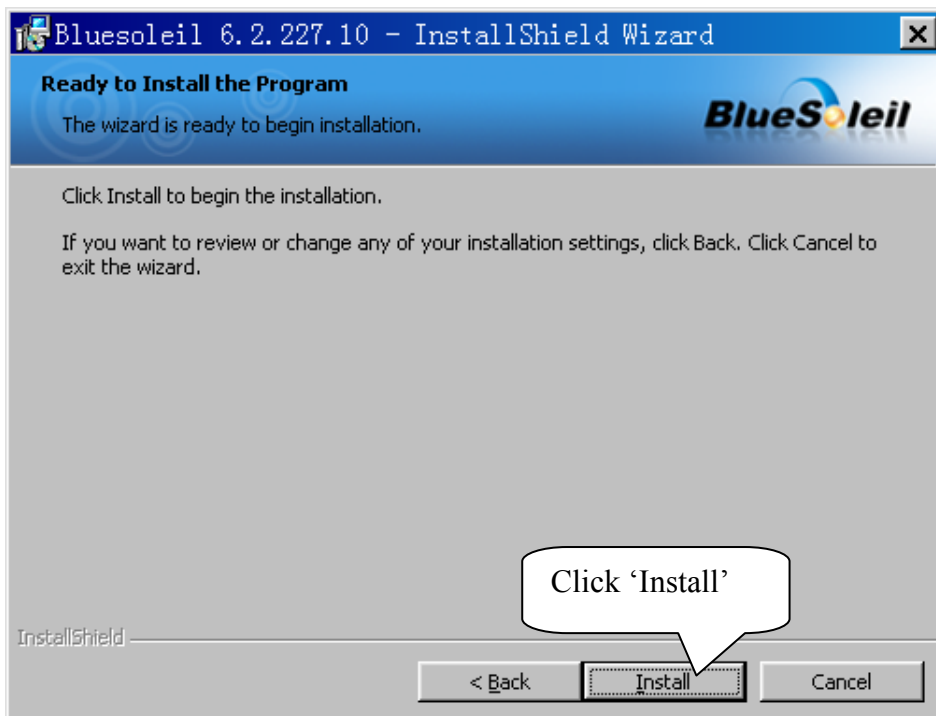
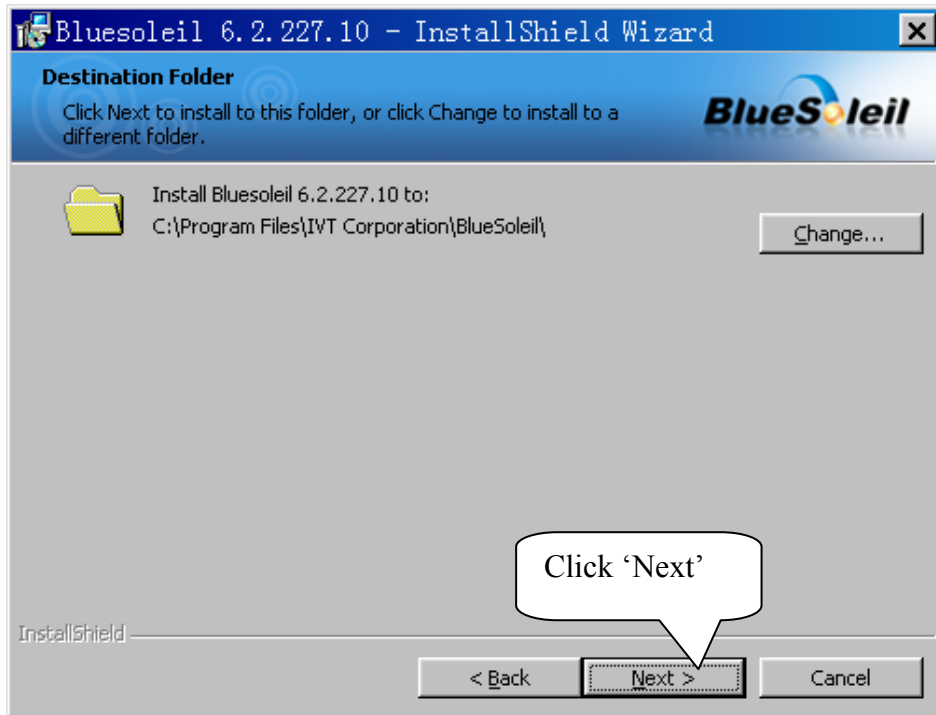
If your operating system is windows 98 or windows 2000, you must install the BT driver first. And if your operating system is window XP or VISTA, the system has the driver itself, no need to install it again.

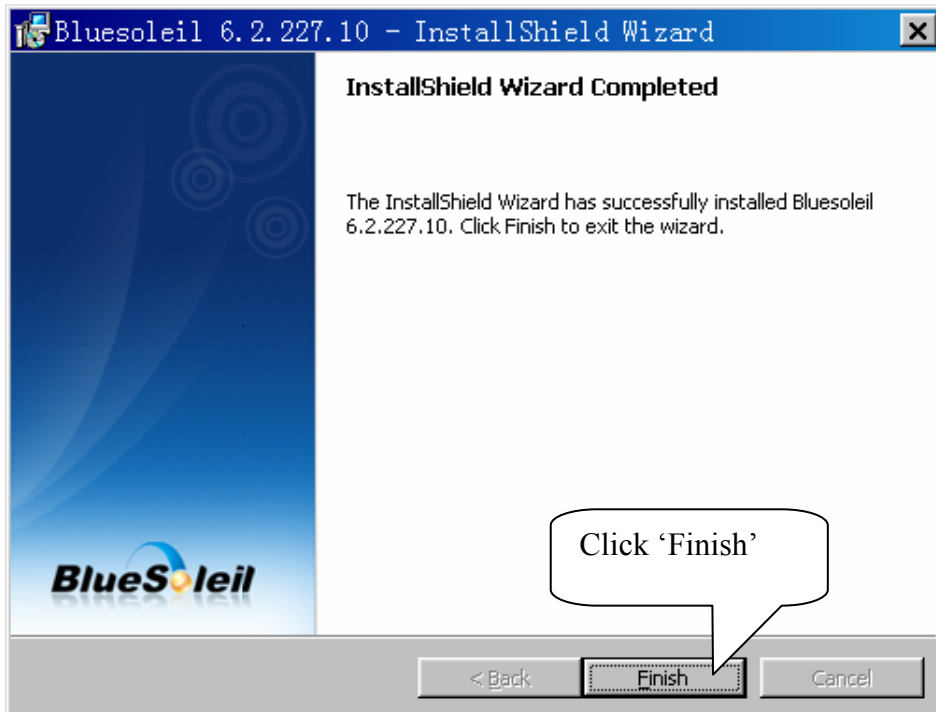
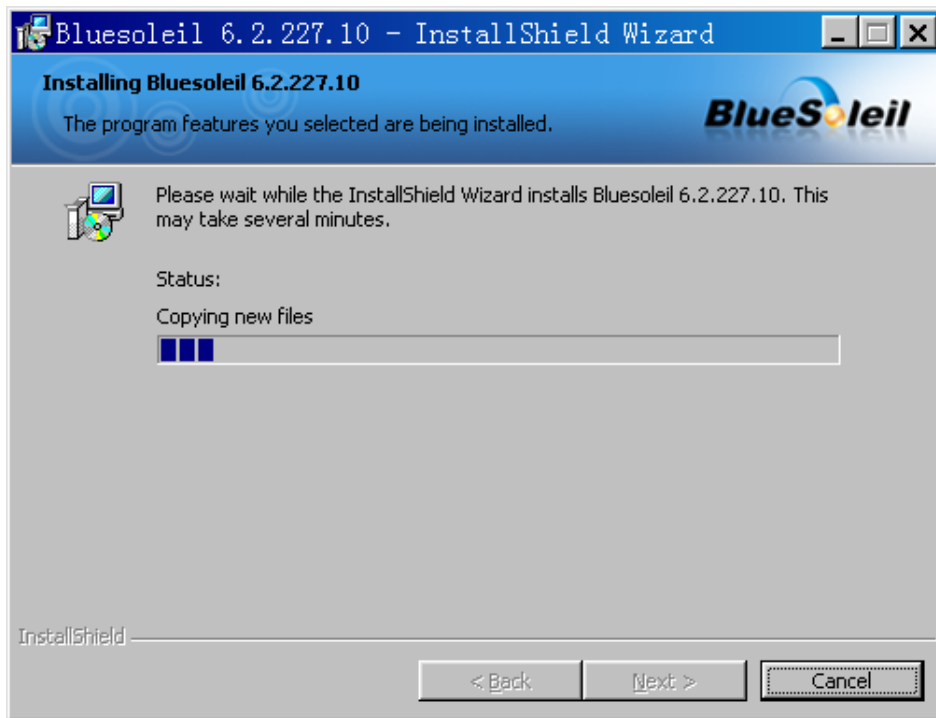
If the 5M limit appeared during installing, please download the genuine driver in this address:
<http://www.bluesoleil.com/download/>

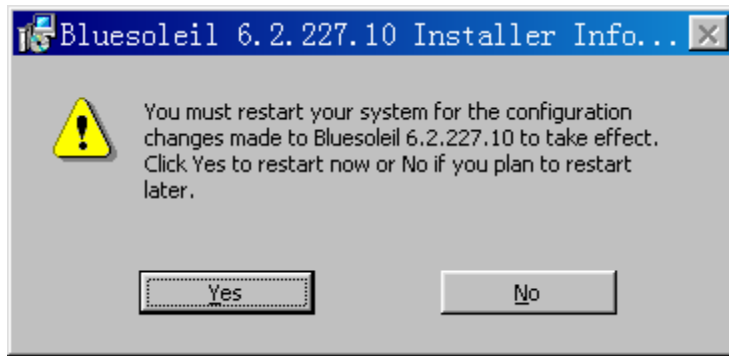


1. Open the file 'IVT BlueSoleil', double click the icon to install the BT driver.






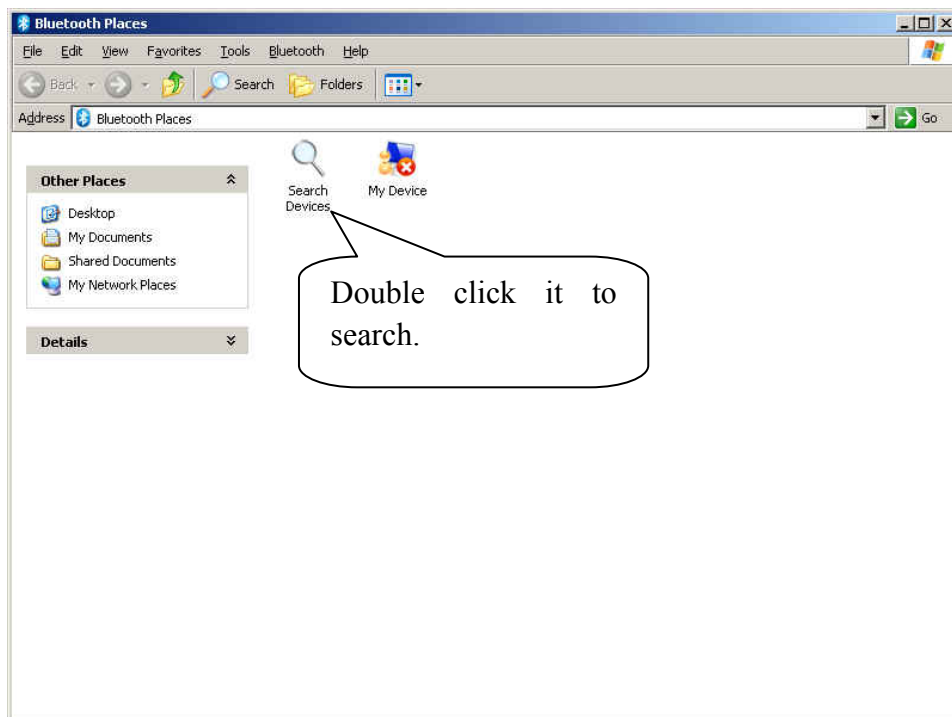


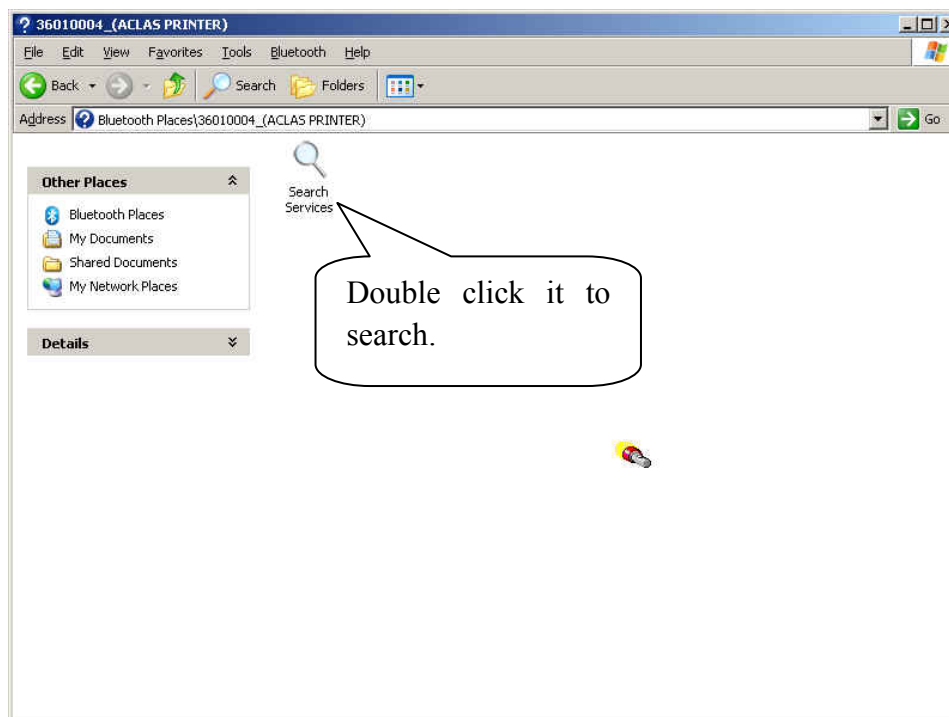
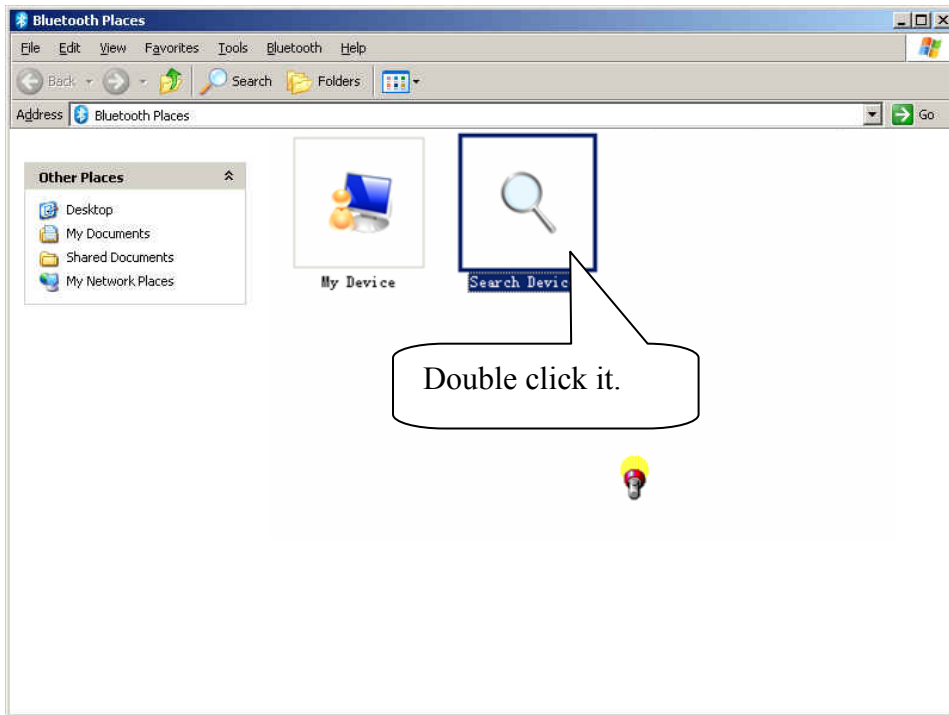


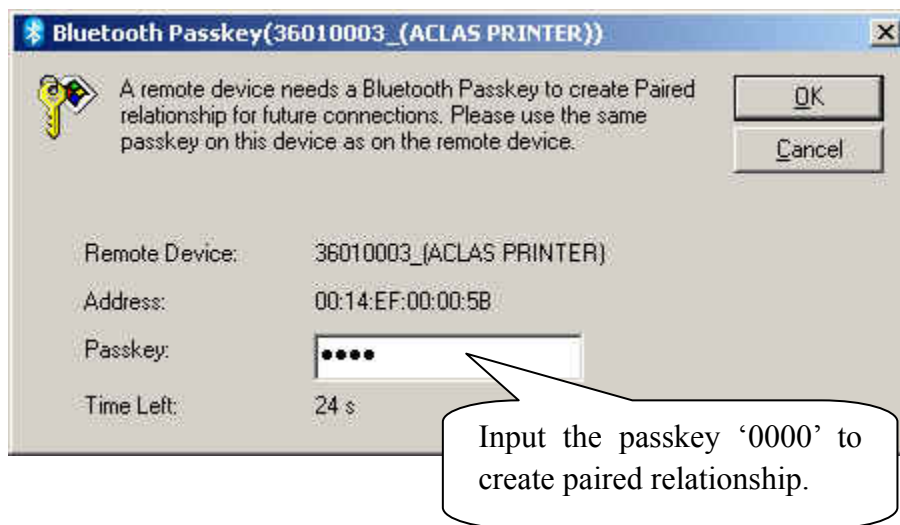
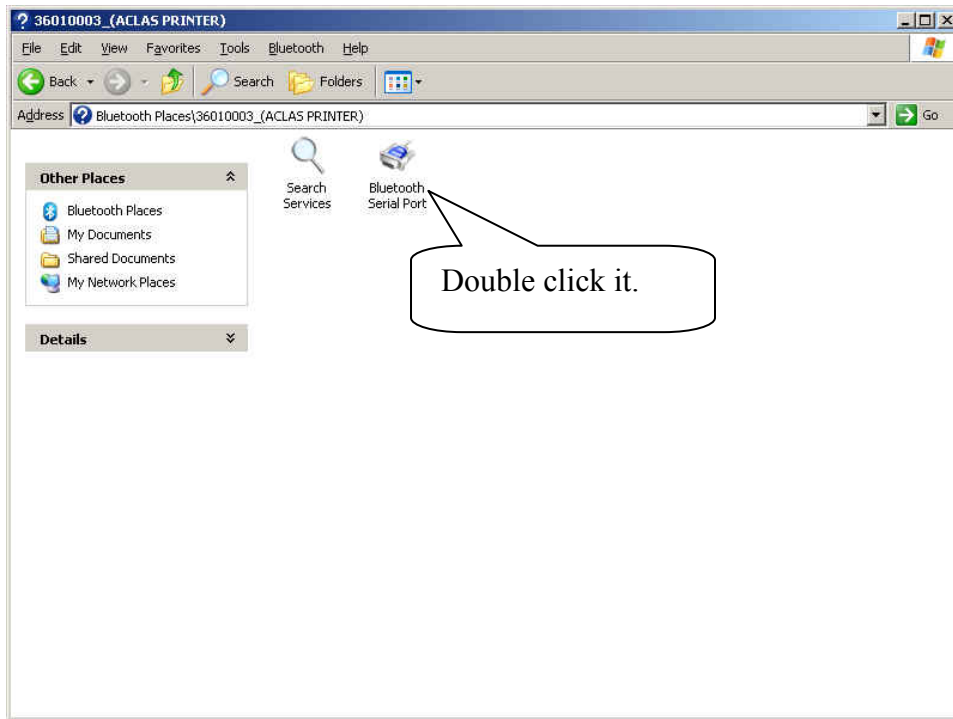
2. After installing the BT driver, you need to match the BT. Insert the BT dongle into USB port of PC, double

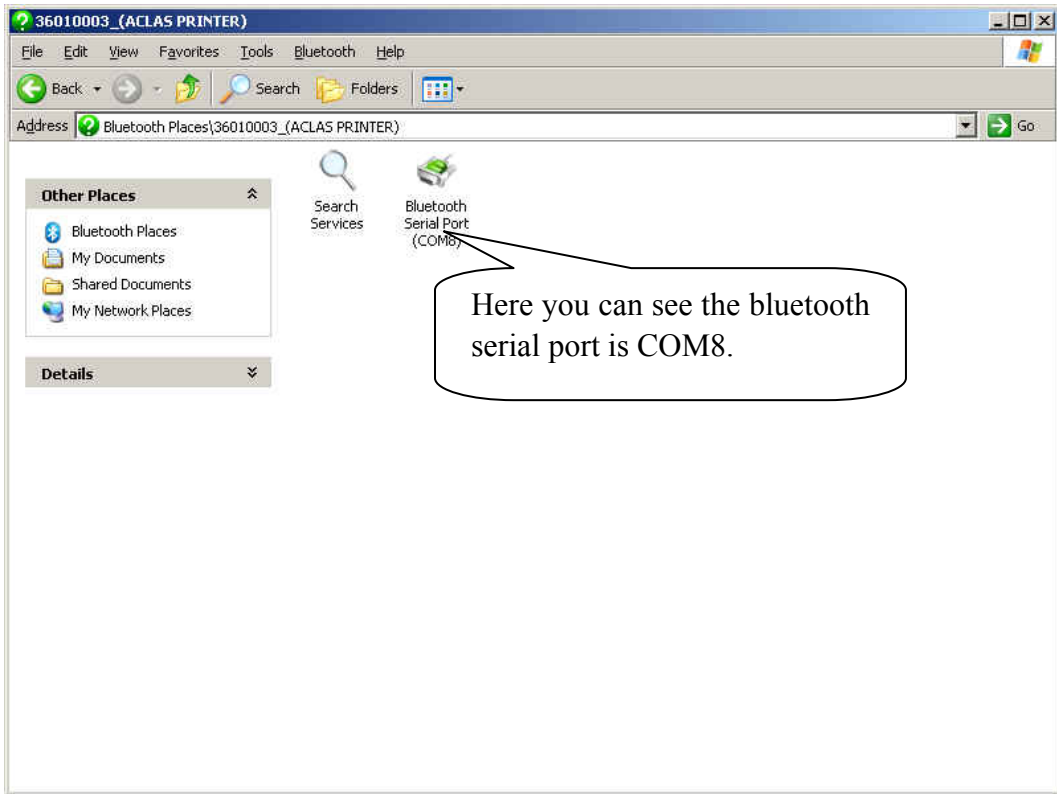
click the icon  .

Note: if the icon is gray, right click the icon  at the right bottom of the window, choose the item 'Turn on Bluetooth'.








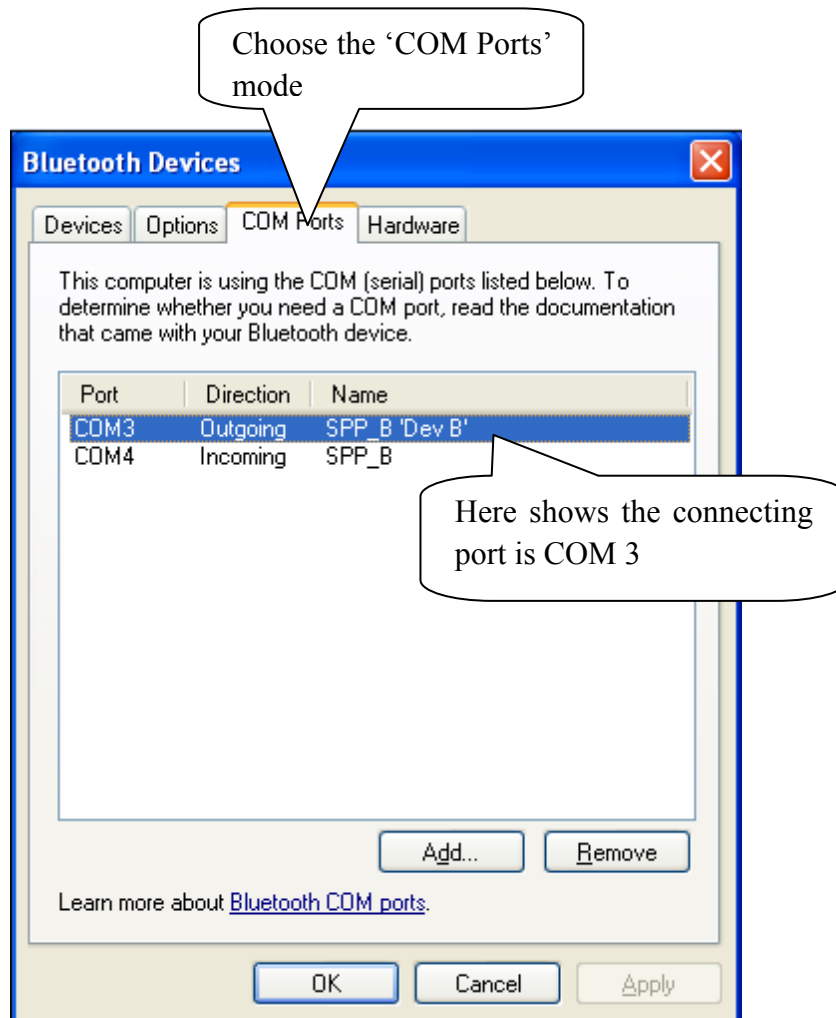


12.2 How to Know the Connecting Port

After installing the driver, you can follow the steps below to know which port is connected.

Double click the icon  .





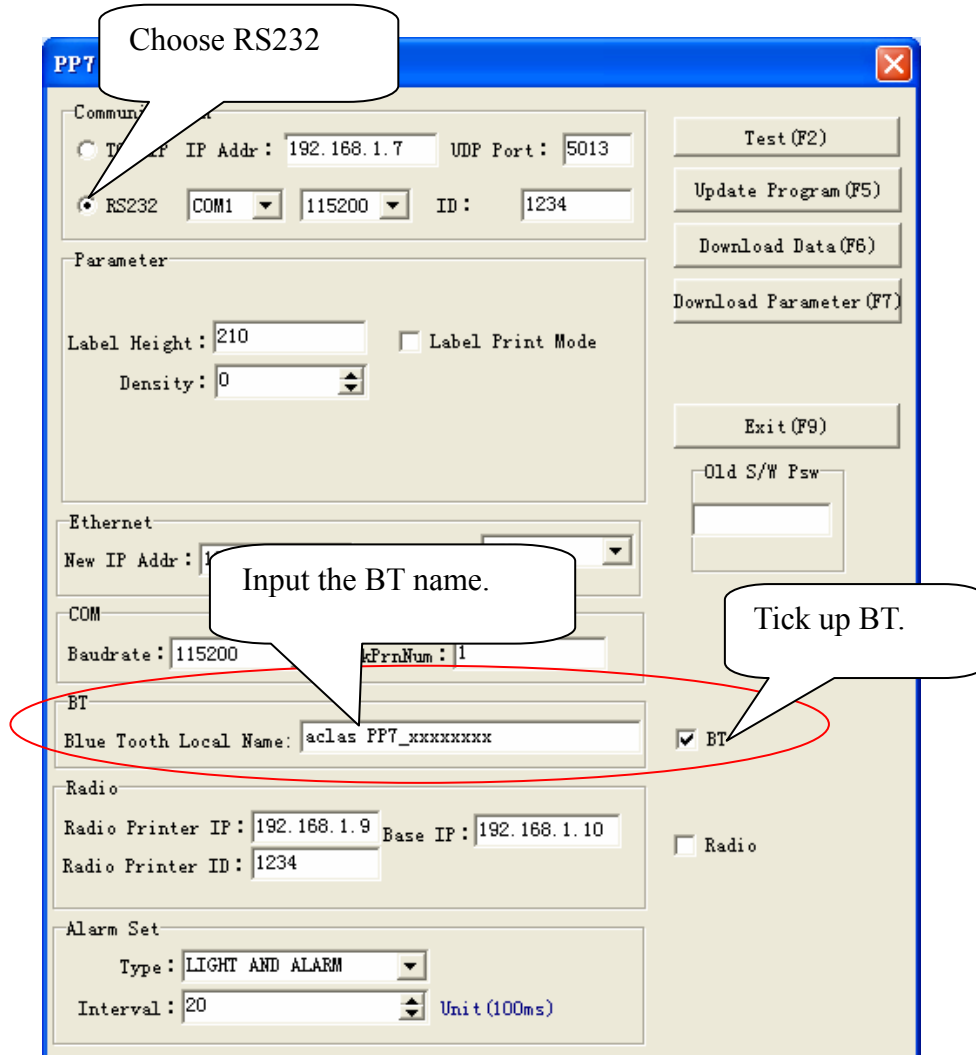
12.3 Printer Driver Installation

Connect the PP7X to PC. Click 'Aclas printer.exe' on the CD-disk, which is packed along with your computer.

And then install the printer driver, please refer to chapter 7.1 for details, and choose the printer port as the connecting port shows in Chapter 12.2 when you are install the driver.

12.4 Software Description

In the disk, you can find the software 'PP7_en.exe' in the file 'PC-SW', double click to open it. Here, you can use the software to update program and download data. Connect PP7X to PC.



Note: ① The available baud rate for this printer is 9600, 19200, 38400, 115200, 460800.

② The printer program can be updated at any baud rate.

③ 'Download Data', means download font. Please set the parameter in the left column if choose this item. Press 'F6' on the keyboard, and then choose the file in the FONT file folder.

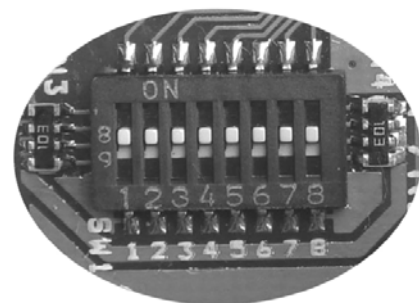
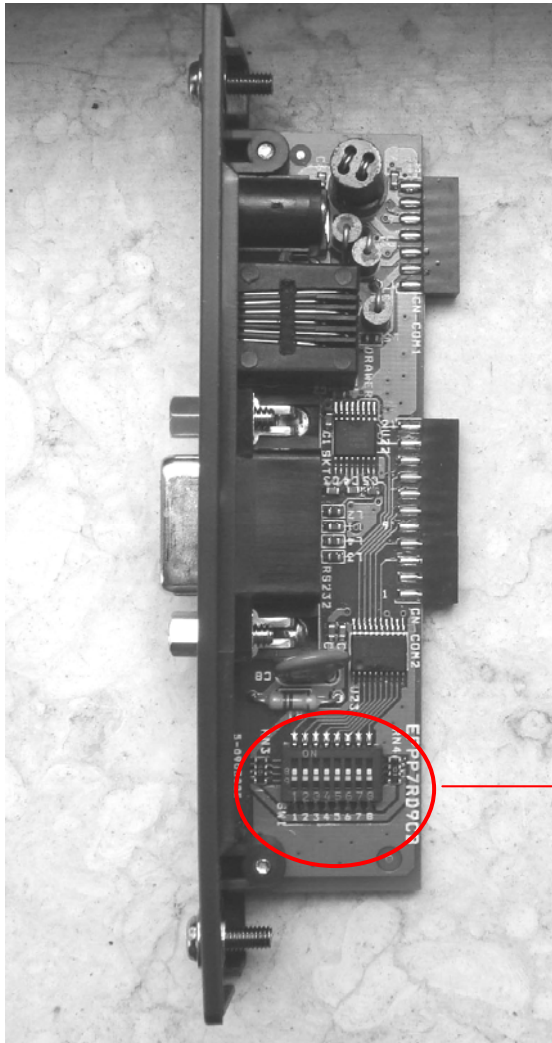
④ 'Download Parameter', means download parameter. After set the parameter, press 'F7' on the keyboard, and then choose the file in the Parameter file folder.

⑤ After start the BT printer for about 6 seconds, it will print out the information of its system version, machine code, and BT name, etc.

⑥ The baud rate (9600,19200,38400,115200) and print density can be changed via Dip Switch, please refer to Chapter 13 for detail.

13 DIP SWITCH

➤ The communication port module is with dip switch, please refer to the picture below:



The Dip Switch

➤ There are 8 switches altogether. Some of the printer's function or parameter can be set via adjust SW-1~ SW-8. the table below is the default setting when leave factory.

	SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SW-8
Parallel port								
Ethernet								
USB	ON	ON	ON	ON	OFF	ON	ON	ON
2.4G P-tooth								
433								
8P								
6P	ON	ON	ON	ON	OFF	ON	OFF	OFF
D9								
BT								

Note:

1. Parallel port, Ethernet, USB, 2.4G P-tooth, and 433MHz wireless, the switch of these communication boards are ON, except SW-5 is OFF;
2. BT, P8, P6, and D9, the switch of these communication boards are ON, except SW-5, SW-7, and SW-8 are set as OFF;
3. SW-7 and SW-8 are set as OFF, it indicates the baud rate is 115200;
4. SW-5 is OFF and SW-6 is ON, it indicates the print density is Class 2.

➤ There are 8 Dip Switch altogether, each switch has its own function, please refer to the diagram below:

DIP-8	Function	ON	OFF
SW-1	Select cutter	Yes	No
SW-2	Reserve		
SW-3	Reserve		
SW-4	Select RS232 HandShaking	Yes	No
SW-5	Select print density	Light	Dark
SW-6	Select print density	Light	Dark
SW-7	Select baudrate		
SW-8	Select baudrate		

a) SW-5 and SW-6 are used to set print density, the on/off status of SW-5 and SW-6 is able to compose differernt desity. Please refer to the table below:

SW-5	SW-6	Heat Time	Density
ON	ON	600us	Dark
ON	OFF	500us	Middle Dark
OFF	ON	420us	Middle Light
OFF	OFF	360us	Light

NOTE: We suggest that you should not select ‘dark’ density level, or it may reduce the life time of the printer head for 15%.

b) SW-7 and SW-8 are used to control baudrate, the on/off status of SW-7 and SW-8 is able to compose diferent baudrate. Please refer to the diagram below:

SW-8	SW-7	Baudrate
ON	ON	9600
ON	OFF	19200
OFF	ON	38400
OFF	OFF	115200

NOTE:

- 1) As for the Dip Switch is relatively tiny, yet we need some tools that are relatively tiny to switch them, for example, the head of ball pen or pencil.
- 2) Press key ‘Feed’ and hold it, and start the machine at the same time, it will print a piece of Test Page. The function of the dip switch is based on the information of this Test Page.

14 COMMANDS

The command explanations include the following parts:

- 1) **Name and the general description of the command's function**---This is the first part for the command description; it presents the command's ASCII code format and general description of its function.
- 2) **Format**---This part used ASCII coding form, decimal code, and hex code to describe the command.
- 3) **(Parameter) Range**---This part gives the range of the variable. If there is special explanation, it should be the decimal value. E.g. $1 \leq n \leq 4$, in which the number '1' is the decimal value, but the ASCII coding form.
- 4) **Description**---This part is to explain the command in detail.
- 5) **Note**---This part gives the attention items of the command. As the commands may interfere with each other when they are used in different modes or when they co-work with different commands, yet this part gives the details for these attention items.

Command	Decimal	Hex	Function
LF	10	0A	Print and line feed
FF	12	0C	Print and recover to page mode
CAN	24	18	Cancel print data in page mode
CR	13	0D	Print and carriage return
ESC FF	27 12	1B 0C	Print data in page mode
ESC \	27 92	1B 5C	Specify relative position
ESC S	27 83	1B 53	Select standard mode
ESC T	27 84	1B 54	Select character print direction in page mode
ESC !	27 33	1B 21	Select print mode(s)
ESC -	27 45	1B 2D	Turn underline mode on/off
ESC {	27 123	1B 7B	Turn upside-down printing mode on/off
ESC 2	27 50	1B 32	Select default line spacing
ESC 3	27 51	1B 33	Set line spacing
ESC D	27 68	1B 44	Set horizontal tab positions
HT	9	09	Horizontal tab
ESC SP	27 32	1B 20	Set right-side character spacing
ESC J	27 74	1B 4A	Print bitmap lattice data, and feed n lines
ESC L	27 76	1B 4C	Select page mode
ESC \$	27 36	1B 24	Set absolute print position
ESC W	27 87	1B 57	Set printing area in page mode
ESC @	27 64	1B 40	Initialize printer
ESC =	27 61	1B 3D	Select printer on or off
ESC *	27 42	1B 2A	Select bit-image mode
ESC v	27 118	1B 76	Transmit paper sensor status
DLE EOT	16 4	10 04	Transmit real-time state
FS !	28 33	1C 21	Set Chinese characters mode
FS S	28 83	1C 53	Set Chinese character space amount
ESC i	27 105	1B 69	Execute partial-cut
GS V	29 86	1D 56	Select paper-cut mode and cut paper
ESC p	27 112	1B 70	Bring impulse

GS	!	29 33	1D 21	Select character size
GS	\$	29 36	1D 24	Specify absolute position for character vertical direction in page mode
GS	L	29 76	1D 4C	Set left margin
GS	\	29 92	1D 5C	Specify relative position for character vertical direction in page mode
GS	P	29 80	1D 50	Set basic calculated pitch

Command		Decimal	Hex	Function
GS	H	29 72	1D 48	Select printing position of HRI characters
GS	h	29 104	1D 68	Set bar code height
GS	w	29 119	1D 77	Set bar code width
GS	k	29 107	1D 6B	Print bar code
ESC	t	27 116	1B 74	Select character code table

● **LF** Print and line feed

Format:	ASCII	LF
	Decimal	10
	Hex	0A

Note:

1. **LF prints the data in the print buffer and fed per line based on the current line space.**
2. **Print characters with CR command.**

● **FF** Print and recover to page mode

Format:	ASCII	FF
	Decimal	12
	Hex	0C

Description: Prints all buffered data to the print region collectively, then recovers to the standard mode.

Note:

- * All buffer data is deleted after printing.
- * The print area set by ESC W (Set print region in page mode) is reset to the default setting.
- * No paper cut is executed.
- * Sets the print position to the beginning of the next line after execution.
- * This command is enabled only in page mode.

Reference: ESC FF, ESC L, ESC S

● **CAN** Cancel

Format:	ASCII	CAN
	Decimal	24
	Hex	18

Description: Deletes all print data in the currently set print region in page mode.

Note: .

- * This command is enabled only in page mode.
- * Portions included in the currently set print region are also deleted, even if previously set print region data.

Reference: ESC L, ESC W

● **CR** Print and carriage return

Format:	ASCII	CR
	Decimal	13
	Hex	0D

Note:

1. Set the print position to the beginning of the line.
2. Print characters with LF command.

● **ESC FF** print data in page mode

Format:	ASC II	ESC	FF
	Decimal	27	12
	Hex	1B	0C

Description: Prints all buffered data in the print area collectively in page mode.

Note:

- * This command is enabled only in page mode.
- * Holds the following information after printing.
 - a. Expanded data
 - b. Character print direction selection in page mode (ESCT)
 - c. Set print region (ESCW) in the page mode.
 - d. Character expansion position

Reference: FF, ESCL, ESCS

● **ESC \ nL nH** Specify relative position

Format:	ASC II	ESC	FF
	Decimal	27	92
	Hex	1B	5C

Range: $0 \leq nL \leq 255$, $0 \leq nH \leq 255$

Description: Specifies the next print starting position with a relative position based on the current position. This sets the position from the current position to $[(nL + nH \times 256) \times \text{basic calculated pitch}]$ for the next print starting position.

Note:

- * Specifications exceeding the print range are ignored.
- * If the right direction of the current position is specified for the character direction, specify a positive number; if the left direction is specified, a negative number is used.
- * Negative numbers is represented by the complement of 65536. For example, when moving in the left direction n pitches, use: $nL + nH \times 256 = 65536 - N$
- * The basic calculated pitch is set by GSP (basic calculated pitch setting).
- * If there are fractions in the result, correct to the minimum mechanical pitch and discard.
- * Use the basic calculated pitch (x) for the horizontal direction in standard mode.
- * The following operations occur according to the starting point in page mode.
 - a. If the starting point is set to upper left or lower right by the ESC T (Select character print direction in page mode) command, specify the relative position of the vertical direction in the paper feed. Use the basic calculated pitch (x) for the horizontal direction at this time.
 - b. If the starting point is set to upper right or lower left by the ESC T (Select character print direction in page mode) command, move the print position in the paper feed direction. Use the basic calculated pitch (y) for the horizontal direction at this time.

Reference: ESC \$, GS P

● **ESC S** Select standard mode

Format:	ASC II	ESC	FF
	Decimal	27	83
	Hex	1B	53

Description: Switches from page mode to standard mode.

Note:

- * Valid only when input by page mode.
- * All buffer data in page mode is deleted.
- * Sets the print position to the beginning of the next line after execution.
- * The print area set by ESCW (Set print region in page mode) is reset to the default setting.
- * This command switches the settings for the following commands the values of which can be set independently in standard mode and page mode to those for standard mode
 - a. ESC SP :Set character right space amount
 - b. FS S :Set Chinese character space amount
 - c. ESC 2 :Set default line spacing
 - d. ESC 3 :Set line feed amount
- * The following commands are effective only when in standard mode.
 - a. ESC W :Set print region in page mode
 - b. ESC T :Select character print direction in page mode
- * The following commands are ignored in standard mode.
 - a. GS S :Specify absolute position for character vertical direction in page mode
 - b. GS \ :Specify relative position for character vertical direction in page mode
- * Standard mode is selected when the power is turned on, the printer is reset or initialized (ESC @).

Reference: FF, ESC FF, ESC L

● **ESC T** Select character print direction in page mode

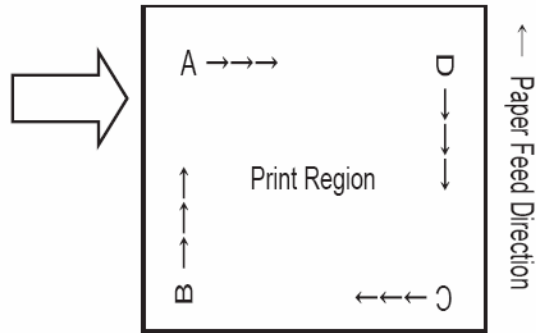
Format:	ASC II	ESC	FF
	Decimal	27	84
	Hex	1B	54

Range: $0 \leq n \leq 3, 48 \leq n \leq 51$

Initial Value: $n = 0$

Description: Selects the character printing direction and starting point in page mode.

n	Print Direction	Starting Point
0, 48	Left to Right	Upper Left (A in the figure below)
1, 49	Bottom to Top	Lower Left (B in the figure below)
2, 50	Right to Left	Lower Right (C in the figure below)
3, 51	Top to Bottom	Upper Right (D in the figure below)



Note:

- * Executes only a printer internal flag operation when this command is input in standard mode. The command does not affect printing in standard mode.
- * The character expansion starting point is in the print region specified by ESC W (Set print region in page mode).
- * The basic calculated pitch (x or y) used with the following commands differs according to the starting point.
 - a. If the starting point is upper left or lower right (feeds paper and expands characters in the vertical direction)
 - Commands using x : ESC SP, ESC \$, ESC \, FS S
 - Commands using y : ESC 3, ESC J, GS \$, GS \
 - b. If the starting point is upper right or lower left
 - Commands using x : ESC 3, ESC J, GS \$, GS \
 - Commands using y : ESC SP, ESC \$, ESC \, FS S

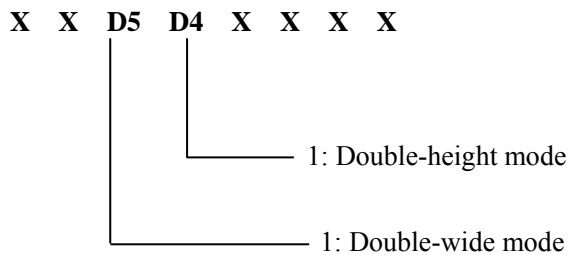
Reference: ESC \$, ESC L, ESC W, ESC \, GS \$, GS P, GS \

● **ESC !** Select print modes

Format:	ASC II	ESC	!	n
	Decimal	27	33	n
	Hex	1B	21	n

Note:

ESC ! n selects print modes using n as follows. The default character font depends on the DIP switch setting. The defaults for other print modes are set to n=0



● **ESC -** Turn underline mode on/off

Format:	ASC II	ESC	-	n
	Decimal	27	45	n
	Hex	1B	2D	n

Range: $0 \leq n \leq 1$
 0: turn underline mode off
 1: turn underline mode on

● **ESC {** Turn upside-down printing mode on/off

Format:	ASC II	ESC	{	n
	Decimal	27	123	n
	Hex	1B	7B	n

Range: $0 \leq n \leq 255$

ESC { n turns upside-down printing mode on or off. When the LSB (least significant bit) of n is 1, upside-down printing mode is turned on; when it is 0, upside-down printing mode is turned off. The default setting is n=0. When upside-down mode is turned on, the printer prints 180°-rotated characters from right to left. The line printing order is not reversed; therefore, be careful of the order of the data transmitted. In standard mode, this command is enabled only when processed at the beginning of a line. In page mode, an internal flag is activated and this command is enabled when the printer returns to standard mode.

● **ESC 2** Select default line spacing

Format:	ASC II	ESC	2
	Decimal	27	50
	Hex	1B	32

Description: Sets line feed amount per one line to approximately 4.23 mm (1/6 inch).

Note: Line spacing can be set independently for both the standard and page modes.

Reference: ESC 3

● **ESC 3** Set line spacing

Format:	ASC II	ESC	3	n
	Decimal	27	51	n
	Hex	1B	33	n

Range: $0 \leq n \leq 255$

Description: Sets the line space for one line to [n x basic calculated pitch].

Note:

- * ESC 3 n sets the line spacing to $n \times$ (vertical or horizontal motion unit). The default setting of the paper feed amount is 1/6 inch (n=60). The maximum line spacing amount is 40 inches. When standard mode is selected, the vertical motion unit set by GS P is used. When page mode is selected, the vertical or horizontal motion unit set by GS P is used for the print direction set by ESC T.
- * The line spacing can be set independently in standard mode and in page mode.
- * The basic calculated pitch is set by GSP (Set basic calculated pitch). Also, after setting the line space, it is not affected even if the basic calculated pitch is changed.
- * If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.
- * In standard mode, the basic calculated pitch (y) for the vertical direction is used.
- * In page mode, the basic calculated pitch that is used according to the starting point varies.
 - a. When the starting point is specified to be upper left or lower right by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (x) for the horizontal direction is used.
 - b. When the starting point is specified to be upper right or lower left by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (y) for the horizontal direction is used.
- * The maximum value that can be set for the line space is approximately 1,016mm (or 40 inches). Specifications that exceed the maximum value are rounded off to that value.

Reference: ESC 2, GS P

- **ESC D** Set horizontal tab positions

Format:	ASC II	ESC	D	n1 ... nk NUL
	Decimal	27	68	n1 ... nk 00
	Hex	1B	44	n1 ... nk 0
Range:	1 ≤ n ≤ 255			
	0 ≤ k ≤ 32			

Description: ESC D n1 ... nk NUL sets a horizontal tab position to n columns from the beginning of a line, with k indication the total number of horizontal tab positions to be set. When a left margin is set in standard mode, the position of the left margin is the beginning of the line. A maximum of 32 tab positions can be set. This command cancels any previous horizontal tab settings. The default tab positions are every eight characters for the font A (12×24).

Note: The character width is stored for standard and page modes.

Reference: HT

- **HT** Horizontal tab

Format:	ASCII	HT
	Decimal	9
	Hex	09

Description: Moves the print position to the next horizontal tab position.

Notes: This command is ignored unless the next horizontal tab position has been set.

If the next horizontal tab position exceeds the printing area, the printer sets the printing position to [printing area width + 1].

Horizontal tab positions are set with ESC D.

If this command is received when the printing position is at [printing area width + 1], the printer executes print bufferfull printing of the current line and horizontal tab processing from the beginning of the next line.

Please refer to ESC D

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

Format:	ASCII	ESC	SP	n
	Decimal	27	32	n
	Hex	1B	20	n

Range: 0 ≤ n ≤ 255

ESC SP n sets the right-side character spacing to n ' (horizontal or vertical motion unit). It is used to change the spacing between characters. The default setting is n=0. When standard mode is selected, the horizontal motion unit set by GS P is used. When page mode is selected, the vertical or horizontal motion unit set by GS P is used for the print direction set by ESC T.

This command is effective for all characters (except for HRI characters).

- **ESC J** Print and feed paper

Format:	ASC II	ESC	J	n
	Decimal	27	74	n
	Hex	1B	4A	n

Range: 0 ≤ n ≤ 255

Description: ESC J n prints the data in the print buffer and feeds the paper n×(vertical or horizontal motion unit). This command is used to temporarily feed a specific length without changing the line spacing set by other commands. The maximum paper feed amount is 40 inches. When standard mode is selected, the vertical motion

unit set by GS P is used. When page mode is selected, the vertical or horizontal motion unit set by GS P is used from the print direction set by ESC T.

Note:

- * In standard mode, the basic calculated pitch (y) for the vertical direction is used.
- * In page mode, the basic calculated pitch that is used according to the starting point varies.
 - a. When the starting point is specified to be upper left or lower right by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (x) for the horizontal direction is used.
 - b. When the starting point is specified to be upper right or lower left by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (y) for the horizontal direction is used.
- * Paper is fed approximately 1016 mm if the [n x basic calculated pitch] exceeds approximately 1016mm (40 inches).

Reference: GS P

● **ESC L** Select page mode

Format:	ASC II	ESC	L
	Decimal	27	76
	Hex	1B	4C

Description: Switches from standard mode to page mode.

Note:

- * Enabled only when input with the top of line.
- * Invalid when input by page mode.
- * Returns to standard mode after the following commands are issued.
 - a. FF (Print and recover to page mode)
 - b. ESC S (Select standard mode)
- * Character expansion position has the starting point specified by ESC T (Character print direction selection in page mode) in the printing region designated by the ESC W (Set print region in the page mode) command.
- * This command switches the settings for the following commands the values of which can be set independently in standard mode and page mode to those for page mode.
 - a. Set space amount: ESC SP, FS S
 - b. Set line feed amount: ESC 2, ESC 3
- * The following commands are enabled only when in page mode.
 - a. ESC V :Specify/cancel character 90 degree clockwise rotation
 - b. ESC a :Position alignment
 - c. ESC { :Specify/cancel upside-down printing
 - d. GS L :Set left margin
 - e. GS W :Set print region width
- * The following command is ignored in page mode.
 - a. GS (A :Test print
- * The following commands are invalid in page mode.
 - a. FSp :Print NV bit image
 - b. FSq :Define NV bit image
 - c. FSg1 :Write data to user NV memory
 - d. GSv0 :Print raster bit images
- * Recover to standard mode using ESC@ (initialize printer).

Reference: FF, CAN, ESC FF, ESC S, ESC T, ESC W, GS \$, GS \

● **ESC \$** Set absolute print position

Format:	ASC II	ESC	\$	nL	nH
	Decimal	27	36	nL	nH
	Hex	1B	24	nL	nH
Range:	0 ≤ nL ≤ 255				
	0 ≤ nH ≤ 255				

Description: Specifies the next printing starting position using an absolute position based on the left margin position. The next printing starting position is the position specified by $[(nL+nH \times 256) \times \text{basic calculated pitch}]$ from the left margin position.

Note:

- * Specifications exceeding the print range are ignored.
- * The basic calculated pitch is set by GSP (Set basic calculated pitch).
- * If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.
- * In standard mode, the basic calculated pitch (x) for the horizontal direction is used.
- * In page mode, the basic calculated pitch that is used according to the starting point varies.
 - a. When the starting point is specified to be upper left or lower right by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (x) for the horizontal direction is used.
 - b. When the starting point is specified to be upper right or lower left by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (y) for the horizontal direction is used.

Reference: ESC \ , GS \$, GS \ , GS P

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

Format:	ASC II	ESC	W	xL xH yL yH dxL dxH dyL dyH	
	Decimal	27	87	xL xH yL yH dxL dxH dyL dyH	
	Hex	1B	57	xL xH yL yH dxL dxH dyL dyH	
Range:	0 ≤ xL, xH, yL, yH, dxL, dxH, dyL, dyH ≤ 255				
	(except for dxL = dxH = 0 or dyL = dyH = 0)				

Description:

ESC W xL xH yL yH dxL dxH dyL dyH sets the size and position of the printing area in page mode as follows:

Horizontal starting position = $(xL + xH \times 256)$ (horizontal motion unit)

Vertical starting position = $(yL + yH \times 256)$ (vertical motion unit)

Printing area width = $(dxL + dxH \times 256)$ (horizontal motion unit)

Printing area height = $(dyL + dyH \times 256)$ (vertical motion unit)

The default settings are as follows:

xL = 0, xH = 0, yL = 0, yH = 0

dxL = 0, dxH = 2, dyL = 126, dyH = 6

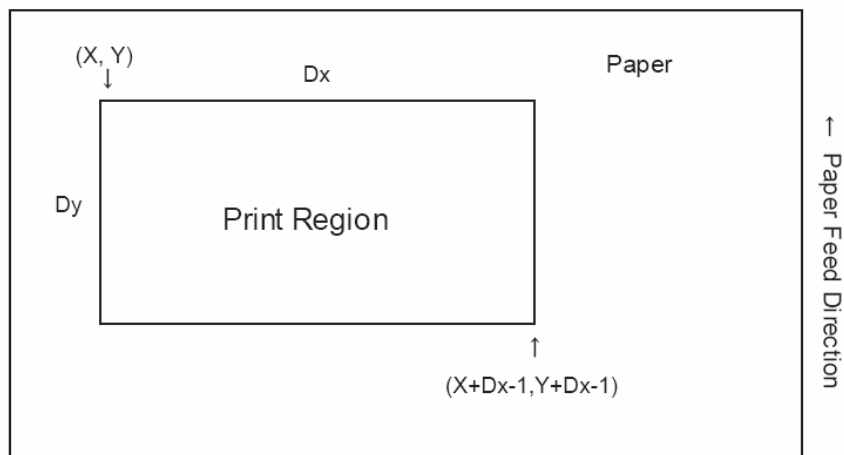
This command is enabled only in page mode. If this command is processed in standard mode, an internal flag is activated and this command is enabled when the printer selects page mode.

The horizontal and vertical motion units use the horizontal and vertical values set by the GS P command. The default settings of the horizontal and vertical motion units are 1/180 and 1/360 inches, respectively.

Note:

- * In standard mode, the printer executes only internal flag operations with this command is input.
- * If the horizontal direction starting point or vertical direction starting point is outside of the printable region, the command is stopped and normal printing commences from subsequent data.

- * If the horizontal direction length or vertical direction length is 0, the command is stopped and normal printing commences from subsequent data.
- * The character expansion starting point is the point specified by selecting the character printing direction (ESC T) in page mode in the print region.
- * If (horizontal direction starting position + horizontal direction length) exceeds the printable region in the horizontal direction, the horizontal direction length is set to (horizontal direction printable region - horizontal direction starting point).
- * If (vertical direction starting position + vertical direction length) exceeds the printable region in the vertical direction, the vertical direction length is set to (vertical direction printable region – vertical direction starting point).
- * The basic calculated pitch is set by GSP (Set basic calculated pitch). Also, the set printing region is not changed even if the basic calculated pitch is changed after setting the print region.
- * If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.
- * The basic calculated pitch (x) is used in the calculated pitch for the horizontal direction starting point and the length in the horizontal direction; and the basic calculated pitch (y) is used in the calculated pitch for the vertical direction starting point and the length in the vertical direction.
- * The print region shown in the figure below when the horizontal direction starting is X; the vertical direction starting point is Y; the horizontal direction length is Dx; and the vertical direction length is Dy.



Reference: CAN, ESC L, ESC T, GSP

● **ESC @** Initialize printer

Format:	ASC II	ESC	@
	Decimal	27	64
	Hex	1B	40

ESC @ initializes the printer. All settings, including character font and line spacing settings, are canceled. The data in the print buffer is cleared and the printer mode is reset to the mode that was in effect when the power was turned on. The DIP switch settings are not checked again, the data in the receive buffer is not cleared, and any macro definitions are not cleared.

- **ESC = n** Select peripheral device

Format:	ASCII	ESC	=	n
	Decimal	27	61	n
	Hex	1B	3D	n

Range: $0 \leq n \leq 255$

ESC = n selects the device to which the host computer sends data, based on the value of n as follows:

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Printer disabled
	On	01	1	Printer enabled
1-7	-	-	-	Undefined

When the LSB (least significant bit) of n is 1, the printer is enabled; when it is 0, the printer is disabled. When the printer is disabled, it ignores all received data with the exception of DLE ENQ 1 and DLE ENQ 2. The default setting is n. If ASB is enabled when the printer is disabled by ESC =, the printer transmits a 4-byte status message whenever the status changes.

- **ESC *** Select bit-image mode

Format:	ASCII	ESC	*	m	nL	nH	d1 ... dk
	Decimal	27	42	m	nL	nH	d1 ... dk
	Hex	1B	2A	m	nL	nH	d1 ... dk

Range: m=0, 1, 32, 33

$0 \leq nL \leq 255$

$0 \leq nH \leq 3$

$0 \leq d \leq 255$

ESC * m nL nH d1 ... dk selects a bit-image mode using m for the number of dots specified by (nL + nH×256). Set a bit to 1 to print a dot, or set a bit to 0 to not print a dot. d indicates the bit image data. The modes selectable by m are as follows:

m	Mode	Vertical direction		Horizontal direction	
		Number of bits for vertical data	Dot density (DPI)	Dot density (DPI)	Amount of data (k)
0	8-dot single-density	8	68	101	192
1	8-dot double-density	8	68	203	384
2	24-dot single-density	24	203	101	192
33	24-dot double-density	24	203	203	384
39	24-dot double-density	24	203DPI	203DPI	384

- **ESC v** Transmit paper sensor status

Format:	ASCII	ESC	v
	Decimal	27	118
	Hex	1B	76

ESC v transmits the status of a paper sensor as 1 byte of data. This command allows the host to obtain the near-end or paper-out status for each line. GS r 1 can also be used to check the status. GS r is recommended for

transmitting the paper sensor status. The status to be transmitted is shown in the table below.

Bit	Off/On	Hex	Decimal	Status
0,1	Off	00	0	Paper roll near-end sensor: paper adequate.
	On	03	3	Paper roll near-end sensor: paper near end.
	Off	00	0	Paper roll end sensor: paper present.
	On	(0C)	(12)	Paper roll end sensor: paper not present.
4	Off	00	0	Not used. Fixed to Off.
5,6	-	-	-	Undefined.
7	Off	00	0	Not used. Fixed to Off.

● **DLE EOT n** Transmit real-time state

Format:	ASCII	DLE	EOT	n
	Decimal	16	4	n
	Hex	10	04	n

Range: $1 \leq n \leq 4$

Note: ① This command is only suitable for the printer model of serial port.

② Transmit the real-time state parameter n of the printer, in order to designate the deferent printer state, define as follows:

n=1: transmit printer state;

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Fixed to Off
1	On	02	2	Fixed to On
2	Off	00	0	Cash drawer open
	On	04	4	Cash drawer closed
3	Off	00	0	Online
	On	08	8	Offline
4	On	10	16	Fixed to On
5	Off	00	00	Not wait for online resume
	On	20	32	Wait for online resume
6	—	—	—	Undefined
7	Off	00	00	Fixed to Off

n=2: transmit offline state;

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Fixed to Off
1	On	02	2	Fixed to On
2	Off	00	0	Upper cover closed
	On	04	4	Upper cover open
3	Off	00	0	Not press paper feed key
	On	08	8	Press paper feed key
4	On	10	16	Fixed to On
5	Off	00	00	Paper adequate

	On	20	32	Printer no paper
6	Off	00	0	No error
	On	40	64	Error
7	Off	00	0	Fixed to Off

n=3: transmit error state;

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Fixed to Off
1	On	02	2	Fixed to On
2		—	—	Undefined
3	Off	00	0	Cut no error
	On	08	8	Cut error
4	On	10	16	Fixed to On
5	Off	00	0	No beyond retrieve error
	On	20	32	Beyond retrieve error
6	Off	00	0	Printer temperature and voltage normal
	On	40	64	Printer temperature or voltage over range
7	Off	00	0	Fixed to Off

n=4: transmit paper roll sensor state;

Bit	Off/On	Hex	Decimal	Function
0	Off	00	0	Fixed to Off
1	On	02	2	Fixed to On
2, 3	Off	00	0	Paper adequate
	On	0C	12	Paper near end
4	On	10	16	Fixed to On
5,6	Off	00	00	Paper adequate
	On	60	96	Paper end
7	Off	00	0	Fixed to Off

- **FS ! n** Set Chinese characters printing mode compages

Format: ASCII FS ! n
 Decimal 28 33 n
 Hex 1C 21 n

Range: $0 \leq n \leq 255$

Set the parameter n of Chinese characters printing mode as follows:

Digit	0/1	Hex	Decimal	Function
0, 1		—	—	Undefined.
2	0	00	0	Double-width mode not selected.

	1	04	4	Double-width mode selected.
3	0	00	0	Double-height mode not selected.
	1	08	8	Double-height mode selected.
4-6		--	--	Undefined.
7	0	00	0	Underline not selected.
	1	128	80	Underline selected.

● **FS S n1 n2** Set Chinese character space amount

Format:	ASCII	FS	S	n1	n2
	Decimal	28	83	n1	n2
	Hex	1C	53	n1	n2

Range: $0 \leq n1 \leq 255, 0 \leq n2 \leq 255$

Initial value: $n1=0, n2=0$

Description: 1. Sets the Chinese character space amount and right space amount.

2. Left space amount: $n1 \times$ (basic calculated pitch)

3. Right space amount: $n2 \times$ (basic calculated pitch)

Note:

- * The space amount set by this command is the amount when using standard sized characters. When expanding characters more than double in the horizontal direction, the space amount is [set amount \times horizontal direction magnification].
- * Space amount can be set independently for both the standard and page modes.
- * The basic calculated pitch is set by GSP (Set basic calculated pitch). Also, after setting the Chinese character space amount, it is not affected even if the basic calculated pitch is changed.
- * If there are fractions in the result, correct to the minimum mechanical pitch and discard.
- * Use the basic calculated pitch (x) for the horizontal direction in standard mode.
- * In page mode, the basic calculated pitch that is used according to the starting point is shown below.
 - a. When the starting point is specified to be upper left or lower right by the ESC T command (Character print direction selection in page mode), the basic calculated pitch (x) for the horizontal direction is used.
 - b. When the starting point is specified to be upper right or lower left by the ESC T command, the basic calculated pitch (y) for the vertical direction is used.
 - c. The maximum value for the left or right space for Chinese characters is approximately 35.893 mm (255/180 inches). Specifications that exceed the maximum value are rounded off to that value.

Reference: GSP

● **ESC I** Execute partial-cut (one point left uncut)

Format: <1B>H<69>H

Description: Execute a partial-cut of the paper.

● **①GS V m ②GS V m n** Select paper-cut mode and cutting paper

Format:	①ASCII	GS	V	m
	Hex	1D	56	m
	Decimal	29	86	m
	②ASCII	GS	V	m n
	Hex	1D	56	m n
	Decimal	29	86	m n

Range: ① $m = 0, 48, 1, 49$

② m =65, 66, 0 ≤ n ≤ 255

Paper-cut

M	Paper-cut mode
0, 48	Full-cut
1, 49	Partial-cut
65,66	Feed paper ([n* (lengthways moving unit) inch]) and partial-cut

- m = 0, 48, 1, 49, cutting paper directly.
- m= 65, 66, feeding paper [the distance between printing position and the paper cutter + n*(lengthways moving unit)], and then cutting paper.
- Measuring the formfeed distance by lengthways moving unit

• **ESC p m t1 t2** Bring impulse

Format:	ASCII	ESC	p	m	t1	t2
	Hex	1B	70	m	t1	t2
	Decimal	27	112	m	t1	t2

Range: m = 0, 48, 1, 49
 0 ≤ t1 ≤ 255
 0 ≤ t2 ≤ 255

- The time of getting impulse is [t1*2] millisecond, and the cutting time is [t2*2] millisecond.
- When t2 < t1, then printer disposing t1*2 millisecond.
- If t2 is less than 50, suppose t2 as 50.

• **GS ! n** Select character size

Format:	ASCII	GS	!	n
	Hex	1D	21	n
	Decimal	29	33	n

Range: 0 ≤ n ≤ 255

GS ! n selects the character height using bits 0 to 3, and selects the character width using bits 4 to 7.
 Character width selection is as follows:

Hex	Decimal	Width
00	0	1 (normal)
10	16	2 (double-width)

Character height selection is as follows:

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

Note:

- * This command is effective for all characters (ANK and Chinese characters), excluding HRI characters.
- * If the vertical and horizontal magnification ratios are outside the defined range, this command is ignored.
- * In standard mode, the vertical direction is the paper feed direction; the horizontal direction traverses the paper feed direction. Therefore, when character orientation changes in 90 degree clockwise rotation mode, the relationship between vertical and horizontal directions is reversed.
- * In page mode, vertical and horizontal directions are based on the character orientation.
- * The base line for characters is the same when there are characters having different vertical direction ratios in the same line.
- * The ESC ! (Batch specify print mode) command can also turn double-width and double-height modes on or off, but the setting of the last received command is effective.

Reference: ESC !

● **GS \$ nL nH** Specify absolute position for character vertical direction in page mode

Format: ASCII GS ! nL nH

Hex 1D 24 nL nH

Decimal 29 36 nL nH

Range: $0 \leq nL \leq 255, 0 \leq nH \leq 255$

Description: Specifies the character vertical direction position for the data expansion starting position using the absolute position based on the starting point in page mode. The position of the character vertical direction for the next data expansion starting position is the position specified by $[(nL + nH \times 256) \times \text{basic calculated pitch}]$ from the starting point.

Note:

- * When not in page mode, this command is ignored.
- * Specifications for absolute positions that exceed the specified print range are ignored.
- * The position of the character horizontal direction of the data expansion starting position does not move.
- * The starting point that is used as a reference is specified by ESC T.
- * The following operations occur depending on the starting point of (Selecting the character printing direction in page mode) ESC T.
 - a. If the starting point is upper left or lower right, specify the absolute position for the paper feed direction (character vertical direction). Use the basic calculated pitch (y) for the horizontal direction at this time.
 - b. If the starting point is upper right or lower left, specify the absolute position for the paper feed in the vertical direction (character vertical direction). Use the basic calculated pitch (x) for the horizontal direction at this time.
- * The basic calculated pitch is set by GSP (Set basic calculated pitch).
- * If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.

Reference: ESC \$, ESC T, ESC W, ESC \, GS P, GS \

● **GS L nL nH** Set left margin

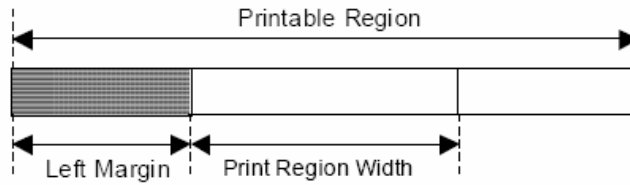
Format: ASCII GS L nL nH

Hex 1D 4C nL nH

Decimal 29 76 nL nH

Range: $0 \leq nL \leq 255, 0 \leq nH \leq 255$

- Description:** 1. nL and nH set the specified left margin.
 2. The left margin is $[(nL + nH \times 256) \times \text{basic calculated pitch}]$



Note:

- * This command is effective only when input at the top of the line when standard mode is being used.
- * This command has no affect in page mode. This command is only effective for the setting.
- * The maximum setting for the left margin is the same size as the printable region for the horizontal direction. Specifications that exceed the maximum value are rounded off to that value.
- * The basic calculated pitch is set by GSP (Set basic calculated pitch). Also, after setting the left margin, it is not affected even if the basic calculated pitch is changed.
- * Use the basic calculated pitch (x) for the horizontal direction of GS P (Set basic calculated pitch) to calculate the left margin. If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.

Reference: GS P, GS W

● **GS \ nL nH** Specify relative position for character vertical direction in page mode

Format: ASCII GS \ nL nH
 Hex 1D 5C nL nH
 Decimal 29 92 nL nH

Range: $0 \leq nL \leq 255, 0 \leq nH \leq 255$

Description: Specifies the character vertical direction position for the data expansion starting position using the relative position based on the current point in page mode. This sets the position moved from the current position to $[(nL + nH \times 256) \times \text{basic calculated pitch}]$ for the next data expanding starting position.

Note:

- * When not in page mode, this command is ignored.
- * If the direction below the current position is specified for the characters, specify a positive number; if the direction above is specified, a negative number is used.
- * Negative numbers are represented by the complement of 65536. For example, when moving in the upward direction N pitches, use: $nL + nH \times 256 = 65536 - N$
- * Specifications for relative positions that exceed the specified print region are ignored.
- * The following operations occur depending on ESC T (Selecting the character printing direction in page mode).
 - a. If the starting point is upper left or lower right, specify the relative position for the paper feed direction. Use the basic calculated pitch (y) for the horizontal direction at this time.
 - b. If the starting point is upper right or lower left, specify the relative position for the paper feed in the vertical direction. Use the basic calculated pitch (x) for the horizontal direction at this time.
- * The basic calculated pitch is set by GSP (Set basic calculated pitch).
- * If the calculation results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.

Reference: ESC \$, ESC T, ESC W, ESC \, GS \$, GS P

● **GS P x y** Set basic calculated pitch

Format:	ASCII	GS	P	x	y
	Hex	1D	50	x	y
	Decimal	29	80	x	y

Range: $0 \leq x \leq 255$, $0 \leq y \leq 255$

Initial value: $x = 180$, $y = 360$: EPSON targeted model print head 180 DPI

$x = 203$, $y = 203$: EPSON targeted model print head 203 DPI

Description: Sets the horizontal basic calculated pitch to approximately $25.4/x$ mm [(1/x) inch], and the vertical basic calculated pitch to approximately $25.4/y$ mm [(1/y) inch].

$x = 0$: Returns the horizontal basic calculated pitch to its default value.

$y = 0$: Returns the vertical basic calculated pitch to its default value.

Note:

- * Horizontal direction refers to the vertical direction in reference to paper feed; Vertical direction refers to the direction of paper feed.
- * With standard mode, use the parameters shown below regardless of the direction of the characters (upside down, or rotated 90 degrees).
 - a. Commands using x : ESC SP, ESC \$, ESC \, FSS, GSL, GSW
 - b. Commands using y : ESC 3, ESC J, GSV
- * With page mode, use the parameters shown below according to the direction of the characters.
 - a. If the starting point is upper left or lower right using ESC T (Character print direction selection in page mode) (feeds paper and expands characters in the vertical direction):

Commands using x : ESC SP, ESC \$, ESCW, ESC \, FSS

Commands using y : ESC3, ESCJ, ESCW, GS\$, GS\, GSV
 - b. If the starting point is upper right or lower left using ESC T (Character print direction selection in page mode) (expands characters in the paper feed direction):

Commands using x : ESC 3, ESC J, ESCW, GS \$, GS \

Commands using y : ESC SP, ESC \$, ESCW, ESC \, FSS, GSV
- * This command has no affect on any previously set setting values.
- * If the calculation combining other commands results in fractions, the pitch is corrected to a minimal mechanical pitch and the rest is discarded.

Reference: ESC SP, ESC \$, ESC 3, ESC J, ESC W, ESC \, GS \$, GS L, GS V, GS W, GS \

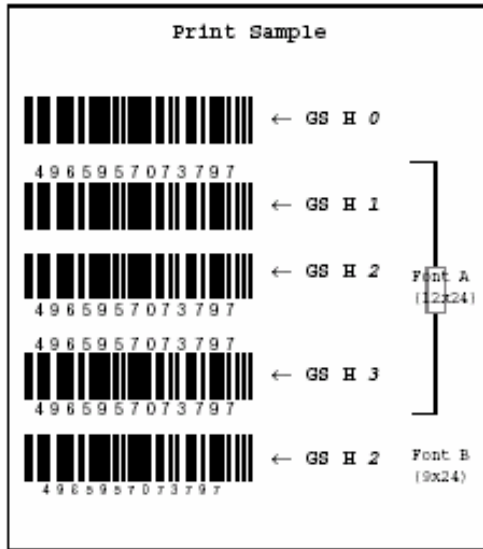
● **GS H n** Select printing position of HRI characters

Format:	ASCII	GS	H	n
	Hex	1D	48	n
	Decimal	29	72	n

Range: $0 \leq n \leq 3$
 $48 \leq n \leq 51$

GS H n selects the printing position for HRI characters when printing a bar code. n selects the printing position as follows:

The default setting is $n=0$. HRI characters are printed at the position specified by GS H.



● **GS h n** Set bar code height

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

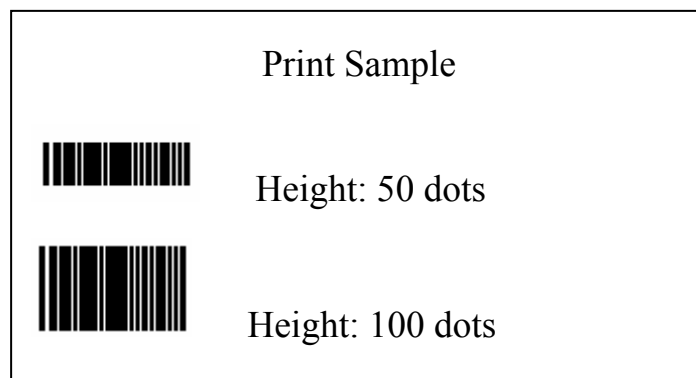
Range: $1 \leq n \leq 255$

GS h n selects the height of a bar code. n specifies the number of dots in the vertical direction. One dot corresponds to 1/180 inch. The default setting is n=162.

```

Program Example
PRINT #1,CHR$(&H1D);"h";CHR$(50);Set height to 50
PRINT #1,CHR$(&H1D);"k";CHR$(2);Print bar code
PRINT #1,"496595707379";CHR$(0);
PRINT #1,CHR$(&HA);
PRINT #1,CHR$(&H1D);"h";CHR$(100);Set height to 100
PRINT #1,CHR$(&H1D);"k";CHR$(2);Print bar code
PRINT #1,"496595707379";CHR$(0);
PRINT #1,CHR$(&HA);

```



● **GS w n** Set bar code width

Format:	ASCII	GS	w	n
	Hex	1D	77	n
	Decimal	29	119	n

Range: $2 \leq n \leq 6$

GS w n selects the horizontal size of a bar code. n specifies the bar code width as shown below. The multilevel bar codes are UPC-A, UPC-E, JAN13 (EAN13), JAN8 (EAN8), CODE93, and CODE128. The binary level bar codes are CODE39, ITF, and CODABAR. The default setting is n=3.

n	Module Width (mm) for Multilevel Bar Code	Binary Level Bar Code	
		Thin Element Width (mm)	Thick Element Width (mm)
2	0.282	0.282	0.706
3	0.423	0.423	1.129
4	0.564	0.564	1.411
5	0.706	0.706	1.834
6	0.847	0.847	2.258

Program Example

```

PRINT #1,CHR$(&H1D);"w";CHR$(3);Set width size to 3
PRINT #1,CHR$(&H1D);"k";CHR$(2);Print bar code
PRINT #1,"496595707379";CHR$(0);
PRINT #1,CHR$(&HA);
PRINT #1,CHR$(&H1D);"w";CHR$(4);Set width size to 4
PRINT #1,CHR$(&H1D);"k";CHR$(2);Print bar code
PRINT #1,"496595707379";CHR$(0);
PRINT #1,CHR$(&HA);
PRINT #1,CHR$(&H1D);"w";CHR$(5);Set width size to 5
PRINT #1,CHR$(&H1D);"k";CHR$(2);Print bar code
PRINT #1,"496595707379";CHR$(0);
PRINT #1,CHR$(&HA);

```

Print Sample



Width size 3



Width size 4



Width size 5

● **GS k m d1 ... dk NUL GS k m n d1 ... dn** Print bar code

Format:	①ASCII	GS	k	m d1 ... dk NUL
	Hex	1D	6B	m d1 ... dk 00
	Decimal	29	107	m d1 ... dk 0
	②ASCII	GS	k	m n d1 ... dn
	Hex	1D	6B	m n d1 ... dn
	Decimal	29	107	m n d1 ... dn

Range: ① $0 \leq m \leq 6$ (k and d depend on the bar code system used)
 ② $65 \leq m \leq 73$ (n and d depend on the bar code system used)

①GS k m d1 ... dk NUL and ②GS k m n d1 ... dn select a bar code system and print the bar code. m specifies a bar code system as follows:

m		Bar Code System	Number of Characters	Remarks
①	0	UPC-A	$11 \leq k \leq 12$	$48 \leq d \leq 57$
	1	UPC-E	$11 \leq k \leq 12$	$48 \leq d \leq 57$
	2	JAN13 (EAN13)	$12 \leq k \leq 13$	$48 \leq d \leq 57$
	3	JAN8 (EAN8)	$7 \leq k \leq 8$	$48 \leq d \leq 57$
	4	CODE39	$1 \leq k$	$48 \leq d \leq 57, 65 \leq d \leq 90,$ $d = 32, 36, 37, 43, 45, 46, 47$
	5 6	ITF CODABAR	$1 \leq k$ (even number) $1 \leq k$	$48 \leq d \leq 57$ $48 \leq d \leq 57, 65 \leq d \leq 68,$ $d = 36, 43, 45, 46, 47, 58$
②	65	UPC-A	$11 \leq n \leq 12$	$48 \leq d \leq 57$
	66	UPC-E	$11 \leq n \leq 12$	$48 \leq d \leq 57$
	67	JAN13 (EAN13)	$12 \leq n \leq 13$	$48 \leq d \leq 57$
	68	JAN8 (EAN8)	$7 \leq n \leq 8$	$48 \leq d \leq 57$
	69	CODE39	$1 \leq n \leq 255$	$48 \leq d \leq 57, 65 \leq d \leq 90,$ $d = 32, 36, 37, 43, 45, 46, 47$
	70 71	ITF CODABAR	$1 \leq n \leq 255$ (even number) $1 \leq n \leq 255$	$48 \leq d \leq 57$ $48 \leq d \leq 57, 65 \leq d \leq 68,$ $d = 36, 43, 45, 46, 47, 58$
	72	CODE93	$1 \leq n \leq 255$	$0 \leq d \leq 127$
	73	CODE128	$2 \leq n \leq 255$	$0 \leq d \leq 127$

Note: for ①

- * This command is quit by the NULL code.
- * For UPC-A and UPC-E, a bar code is printed when 12 bytes of bar code data are input. Subsequent data is processed as normal data.
- * For JAN13 (EAN13), a bar code is printed when 13 bytes of bar code data are input. Subsequent data is processed as normal data.
- * For JAN8 (EAN8), a bar code is printed when 8 bytes of bar code data are input. Subsequent data is processed as normal data.
- * The data count for ITF bar codes is always even numbered. If the data count is odd numbered, the last data is ignored.

For ②:

- * n specifies the data count. n bytes from the next data is processed as bar code data.
- * If n is outside of the defined region, the command is stopped and normal printing commences from subsequent data.

When in standard mode:

- * If d is outside of the defined region, only a paper feed is executed and normal printing commences from

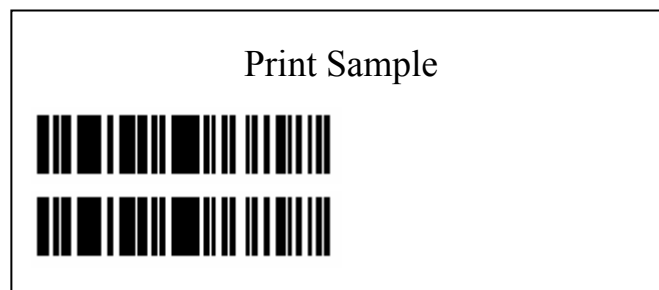
subsequent data.

- * If the horizontal width of the bar code exceeds the print region of one line, the paper is fed without printing the bar code.
- * Executes a paper feed for the height of the bar code (including HRI characters when HRI character printing is specified) regardless of the line feed amount using the following commands.
 - a. ESC 2: Set default line spacing
 - b. ESC 3: Set line feed amount
- * This command is effective only when no data exists in the print buffer. If there is data in the print buffer, data after m is printed as normal data. Sets the next print position to the beginning of the next line after printing the bar code.
- * Excluding upside-down printing, print modes (emphasized printing, double printing, underlines character sizes) are unaffected.

When in page mode:

- * Executes only a bar code expansion but does not print it. After expanding the bar code, the next dot after the last data of the bar code is the starting position for the expansion of subsequent data.
- * If d is outside of the defined region, the command is stopped and normal printing commences from subsequent data. The position for starting data expansion does not move.
- * If the horizontal width of the bar code exceeds the print region of one line, the data expansion starting position is moved to the left side outside the printing region without printing the bar code.

```
Program Example
PRINT #1,CHR$(&H1D);"k";CHR$(2);Print bar code
PRINT #1,"496595707379";CHR$(0);
PRINT #1, CHR$(&HA);
PRINT #1, CHR$(&H1D); "k";CHR$(67); CHR$(12);
PRINT #1,"496595707379"; Print bar code
```



Reference: GS H, GS f, GS h, GS w

● **ESC t n** Select character code table

Format:	ASCII	ESC	t	n
	Hex	1B	74	n
	Decimal	27	116	n

Range: $0 \leq n \leq 5$

n = 255

ESC t n selects a page n from the character code table as follows. The default setting is page 0 (n=0).

The alphanumeric characters (20H (decimal 32) to 7FH (decimal 127)) are the same for each page. The extended characters (80H (decimal 128) to FFH (decimal 255)) are different for each page.

15 COMMAND SAMPLE (hex command)

```
1d 68 64 1d 6b 02 34 39 36 35 39 35 37 30 37 33 37 39 00 0a
    //print a barcode width 1, height 100
1d 77 02 1d 6b 02 34 39 36 35 39 35 37 30 37 33 37 39 00 0a
    // print a barcode width 2, height 100
1d 77 02 1d 6b 02 32 32 30 30 30 30 32 30 30 30 35 30 35 00 0a
    // print EAN-13 barcode
1d 6b 00 30 30 30 30 30 30 30 30 30 30 00 0a
    //print UPC-A barcode
1d 6b 03 30 30 30 30 30 30 30 00 0a
    //print EAN-8 barcode
1d 6b 04 30 30 30 30 30 30 30 30 30 30 00 0a
    // CODE39
1d 68 64 1d 48 03 1d 6b 04 30 30 30 30 30 30 30 30 30 00 0a
    //set the position of digits on the barcode
```

