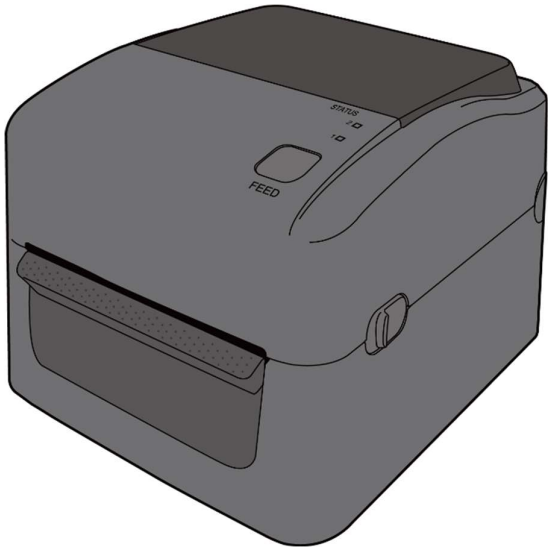
WS4 DT SERIES Printer

Technical Manual

WS408DT / WS412DT



WS4-DT-r01-30-12-16TM

Contents

Preface

This manual describes technical information about WS4 DT printers, including installation guides, operating guides, printer setting tool help, network architecture overview and technical drawings. It doesn't contain programming examples. For more information about printer programming, see related documents.

Who should read this manual

This manual is intended for dealers, technicians and users who need to install and manage the hardware, firmware and network of WS4 DT printers.

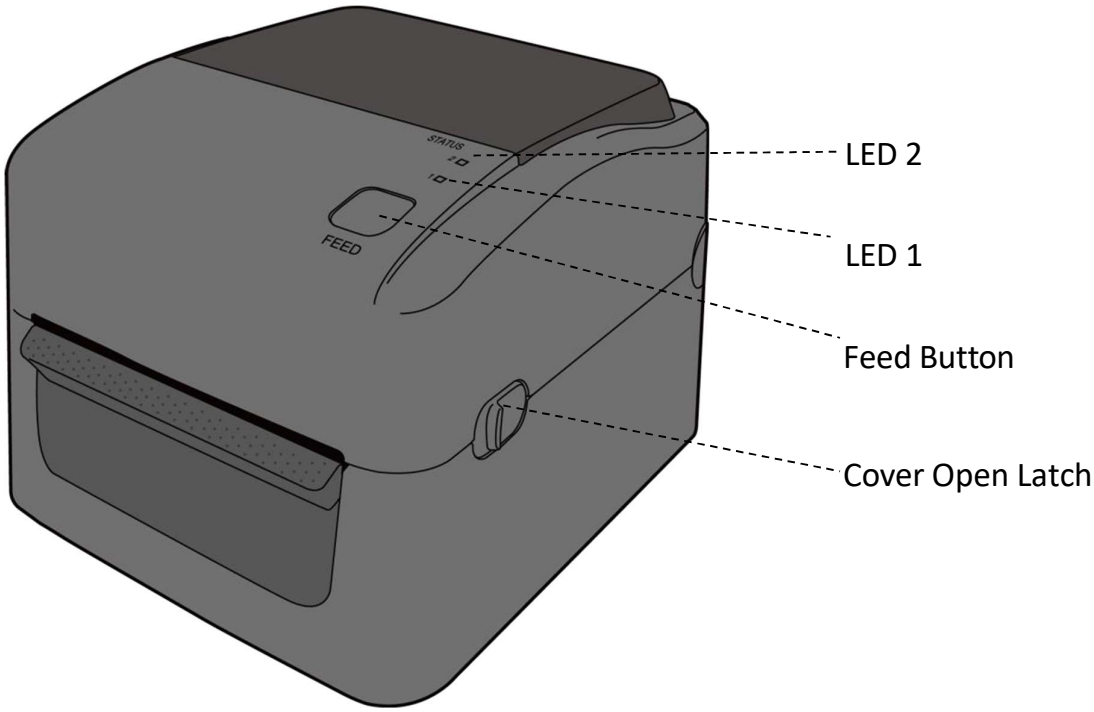
Related Documents

- WS4 DT Series Owner's Manual

1 Understand Your Printer

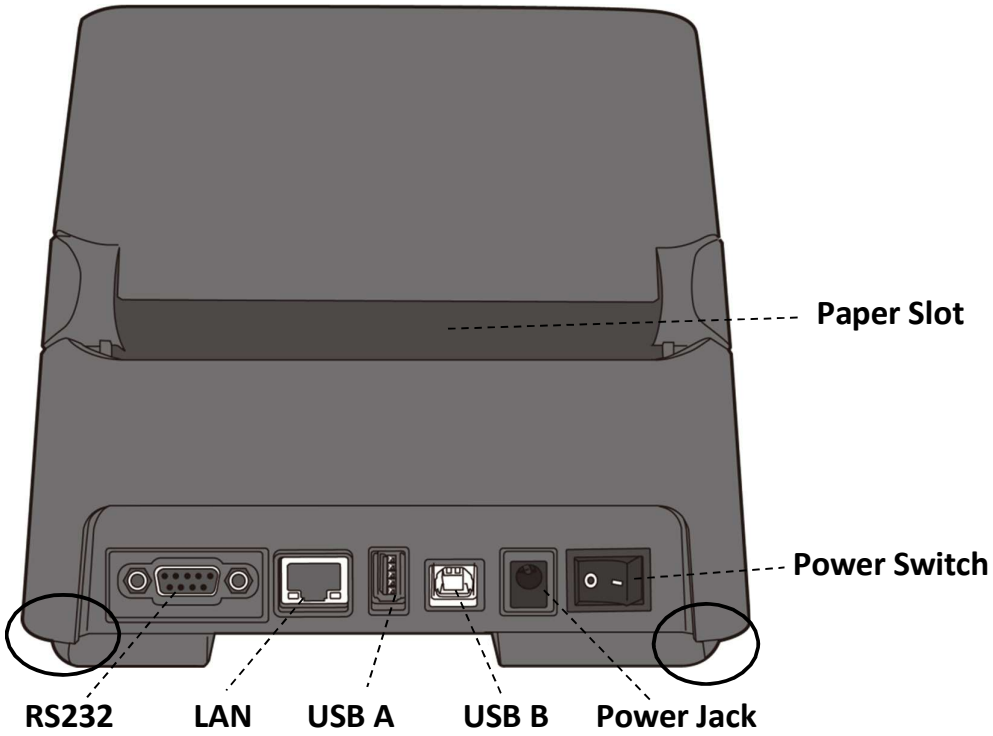
This chapter provides an overview of your printer.

1.1 Perspective View



1.2 Back View

Standard Model

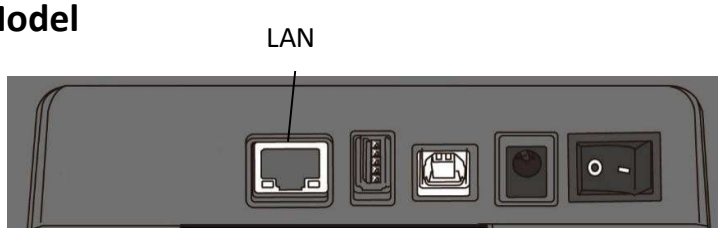


Caution The areas indicated by the ellipse have sharp edges. To avoid injury, be careful not to touch them when handling the printer.

Caution To avoid injury, be careful not to trap your fingers in the paper slot while opening or closing the top cover.

Optional Interfaces

LAN Model



1.3 Interior View

Warning The printhead becomes very hot during printing. Do not touch the printhead or touch around it directly after printing. By doing so you may get burnt.

1.4 Printer Button and Lights

This section describes the functions of your printer button and lights.

1.4.1 Feed Button

The **FEED** button is not simply for feeding label. It is able to act as a feed, pause, resume, restore and run button. The following table shows its functions.

Function	Description
Feed	Feed a blank label.
Pause	Pause printing, if pressed during printing.
Resume	Resume printing, if pressed in pause mode.
Restore	Restore your printer to the online mode, if pressed after fixing the error.
Run	Run the command of the system mode after selecting the command.

1.4.2 Status Lights

Your printer has two status lights: LED 1 and LED 2. They are helpful for checking printer's condition. Both lights have three colors: green, orange and red; they also have three blinking speed: fast, medium and slow. LED 1 glows green when your printer is working properly; it glows orange or red when your printer encounters issues. LED 2 indicates the issue your printer runs into. The following tables show the LEDs behavior and the condition they indicate.

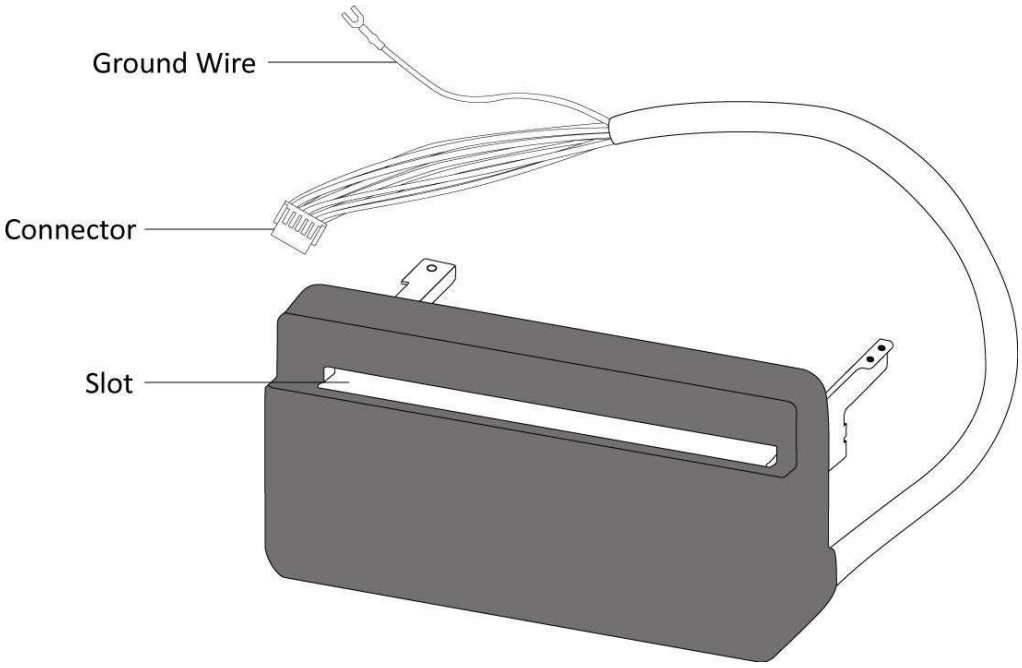
Symbol	Blinking Speed	Blinking Interval
**	Fast	0.5 Second
*	Slow	2 Seconds
* LED2 + *LED1	Slow	LED2 & LED1 Blinking Interval at same time
* LED2 + LED1 *	Slow	LED2 & LED1 Blinking Interval at different timing

LED 2	LED 1	Description	LED indicate Label
Green	Green	The printer is ready to print.	
Green	** Green	The printer is transmitting data.	
* Green	* Green	In pause.	V
* Green	Green *	The printer is writing data to the flash or USB memory. The USB memory is being initialized.	
Green	Orange	Head high temperature.	V
Green	** Orange	The print module is opened when the printer is turned on.	
Orange	Orange	Paper jam.	V
** Orange	** Orange	The media is out when the print data is sent to the printer. Paper end.	V
Red	Orange	The printhead is broken.	V
Red	*Orange	Communication error (RS-232C).	
Red	**Orange	Cutter error (with optional cutter).	V
Red	Red	Cover (Thermal Head) open error during printing.	V
Red	* Red	An EEPROM for backup cannot be read or written properly.	
		A command has been fetched from an odd address.	
		Word data has been accessed from a place other than the boundary of the word data.	
		Long word data has been accessed from a place other than the boundary of the long word data.	
Red	** Red	Command error.	V
* Red	Red *	Flash ROM on the CPU board error or USB memory error.	
		An erase error has occurred when formatting the USB memory.	
		Unable to save files due to insufficient USB memory.	

2 Accessories Installation

This chapter describes how to install accessories on your printer.

2.1 Cutter



A cutter is used to cut the label after it is printed out. Full cutter cuts a label off from a media roll.

To install a full cutter:

Step 1. Remove the base and the middle frame

This part describes how to dismantle your printer.

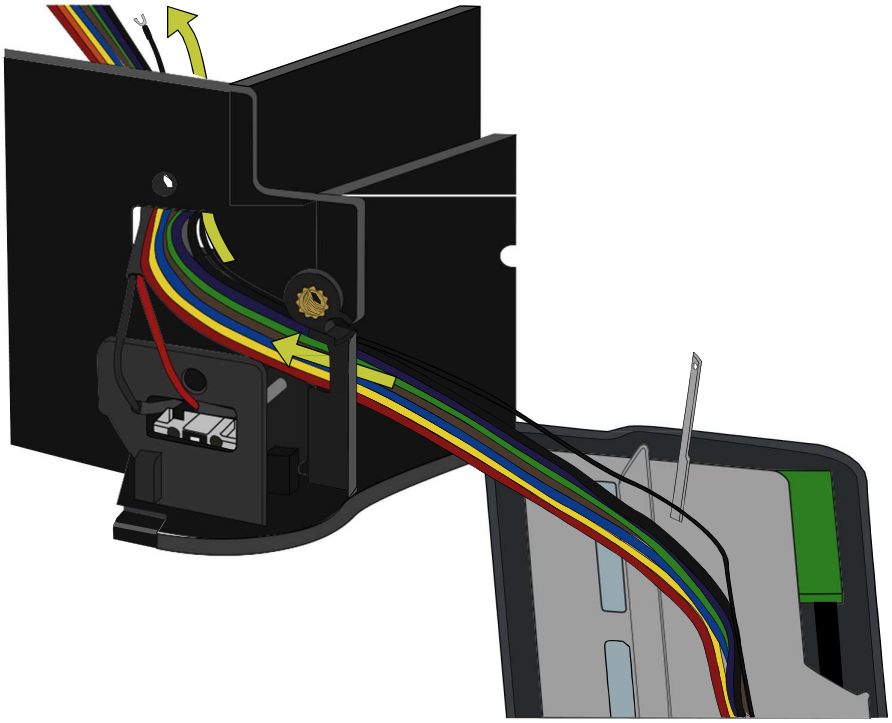
1. Open the top cover.
2. Loosen and remove two screws on each side of the tear bar.
3. Remove the tear bar from your printer.
4. Turn over your printer.
5. Loosen and remove four screws from the base.

6. Lift the base and unplug all the cables.
7. Remove the base and the middle frame.

Step 2. Connect the cutter to the main board

This part describes how to thread the cutter cable and wire and connect them to the main board.

1. Thread the cutter cable and the ground wire (fork terminal) into two square holes beside the right side of the platen roller.



2. Reinstall the middle frame.
3. Plug the cutter connector to **J8**, which is the white port located to the right of the main board. Connect the ground wire to the screw beside **J8** after loosening the screw a bit and then tighten the screw to secure the wire.
4. Plug all other cables back into the main board.
5. Reinstall the base and the secure it with four screws.
6. Turn over your printer and open the top cover.

Step 3. Secure the cutter to your printer

This part describes how to remove the platen roller and secure the cutter to your printer.

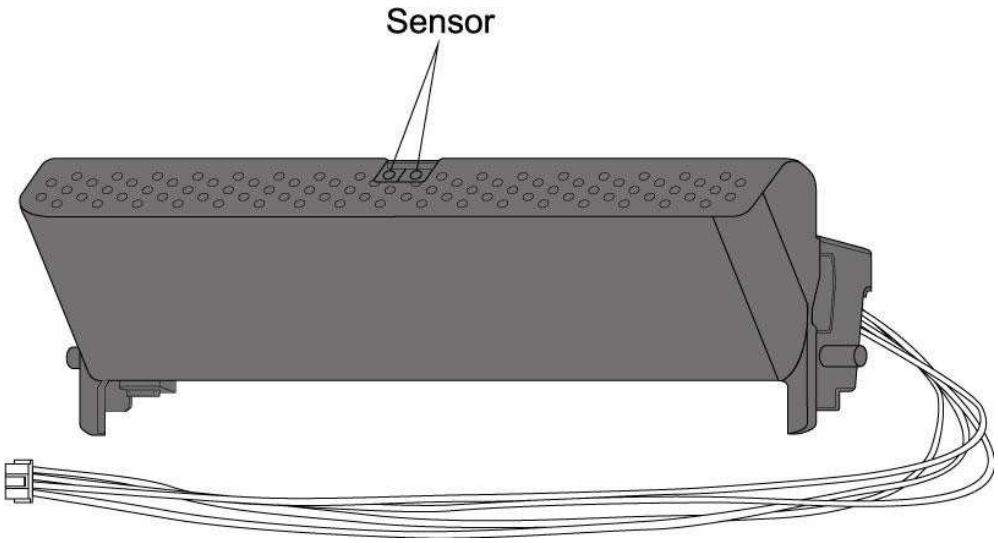
1. Locate two clasps on both sides of the platen roller. Slightly press them inward and rotate them 90 degrees, so the handles of the clasps point up.
2. Lift the platen roller.
3. Align the two screw holes of the cutter with the screw holes on both sides of the platen roller and fit the cutter dowel (at the bottom of the cutter) into the square hole on the middle frame.
4. Secure the cutter with two screws.
5. Reinstall the platen roller.

Step 4. Test the cutter

This part describes how to use the cutter to cut your label.

1. Press the holder lock on the **Media Roll Holders** to slide them outward, and place the media roll between the holders. Make sure the print side is up and the media roll is clamped tightly by the holders.
2. Pull the media until it reaches out of your printer. Thread the media under the media guides.
3. Thread the media into the slot of the cutter.
4. Close the top cover.
5. Send a print job or press the **FEED** button to test if the cutter works.

2.2 Dispenser



A dispenser automatically removes the liner from the printed label. The dispenser sensor detects if a peeled label is taken away.

To install a dispenser:

Step 1. Remove the base and the middle frame

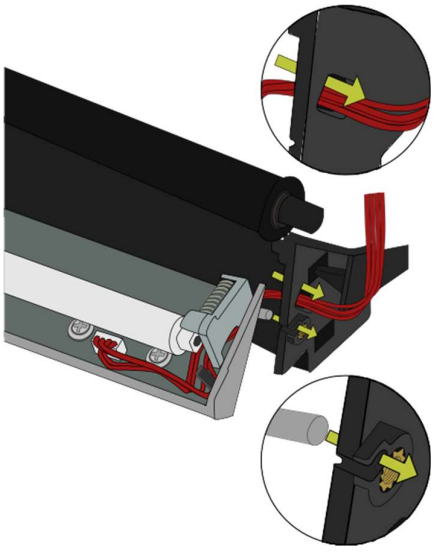
This part describes how to dismantle your printer.

1. Open the top cover.
2. Loosen and remove two screws on each side of the tear bar.
3. Remove the tear bar from your printer.
4. Turn over your printer.
5. Loosen and remove four screws from the base.
6. Lift the base and unplug all the cables.
7. Remove the base and the middle frame.
8. Turn over your printer.

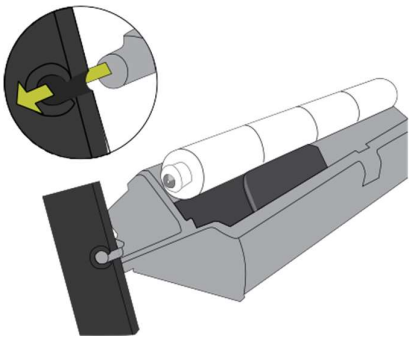
Step 2. Connect the dispenser to the main board

This part describes how to thread the dispenser cable and connect it to the main board.

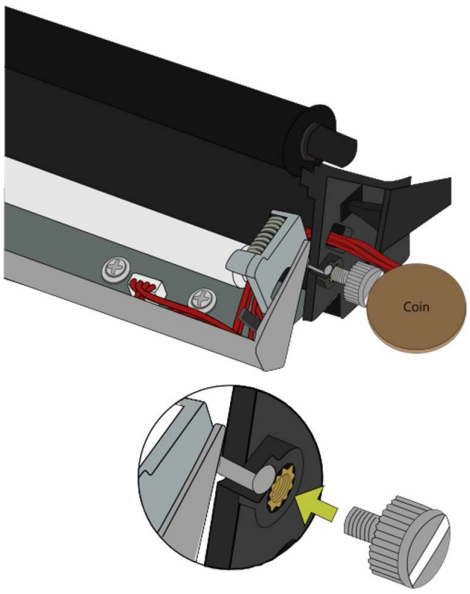
1. Thread the dispenser cable into the square hole beside the right side of the platen roller and slightly push the right dowel into the hole.



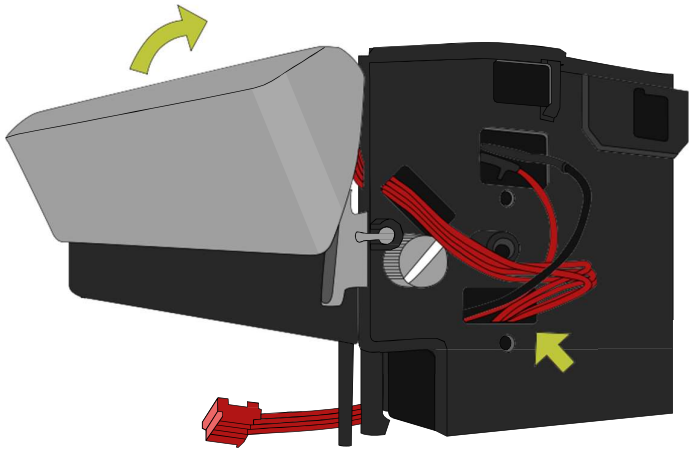
2. On the left side, gently press the dispenser to the right to give some space for the left dowel and slightly push the left dowel into the hole.



3. Use a coin to tighten the thumbscrew to the hole beside the right dowel.



4. Close the dispenser and thread the cable into the lower square hole.



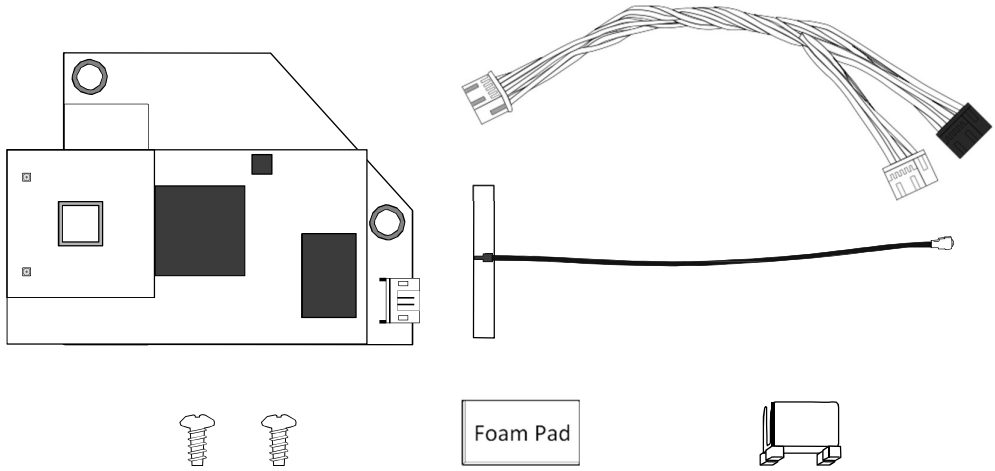
5. Turn over your printer.
6. Reinstall the middle frame.
7. Plug the dispenser connector to **J14**, which is the red port located to the right of the main board.
8. Plug all other cables back into the main board.
9. Reinstall the base and the secure it with four screws.
10. Turn over your printer.

Step 3. Test the dispenser

This part describes how to use the dispenser to peel the liner.

1. Open the dispenser.
2. Press the holder lock on the **Media Roll Holders** to slide them outward and place the media roll between the holders. Make sure the print side is up and the media roll is clamped tightly by the holders.
3. Pull the media until it reaches out of your printer. Thread the media under the media guides.
4. Remove 1-3 labels from the liner at the start of the media.
5. Thread the liner under the plate (beside the platen roller) and the dispenser, until the first label touches the platen roller.
6. Close the dispenser and close the top cover.
7. Send a print job or press the **FEED** button to test if the dispenser works.

2.3 Wireless LAN Module



The Wireless LAN module provides Wireless LAN connectivity for your printer.

To install a Wireless LAN module:

Step 1. Remove the base and the middle frame

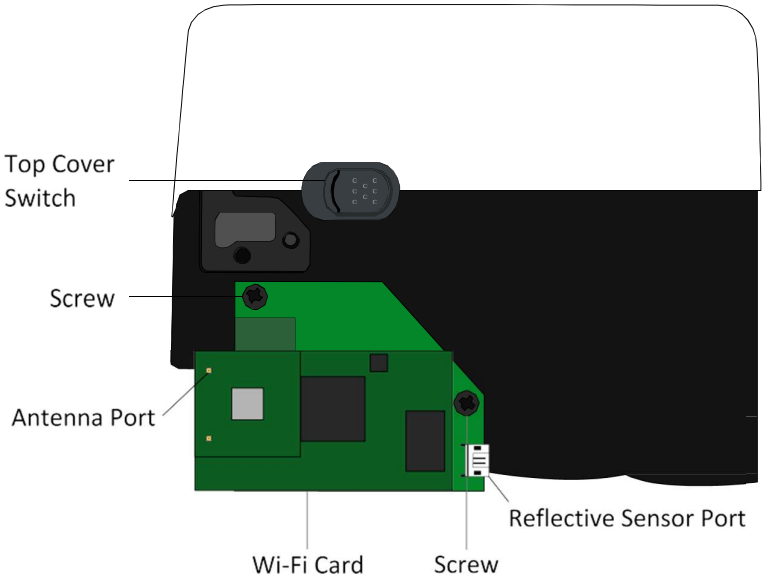
This part describes how to dismantle your printer.

1. Open the top cover.
2. Loosen and remove two screws on each side of the tear bar.
3. Remove the tear bar from your printer.
4. Turn over your printer.
5. Loosen and remove four screws from the base.
6. Lift the base and unplug all the cables.
7. Remove the base and the middle frame.

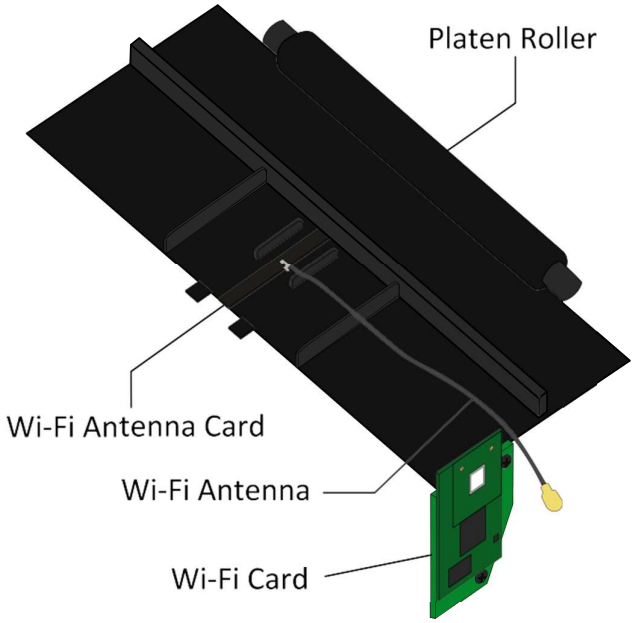
Step 2. Secure the Wireless LAN card and connect it to the main board

This part describes how to thread the Wireless LAN card cable and connect it to the main board.

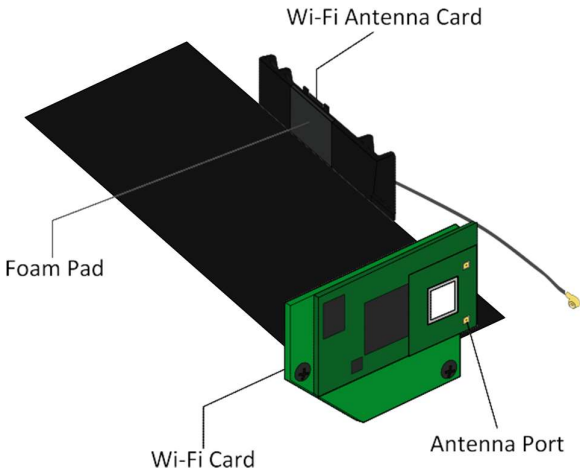
1. Pull out the reflective sensor cable from the hole.
2. Plug the reflective sensor cable to the **Reflective Sensor** port of the Wireless LAN card.



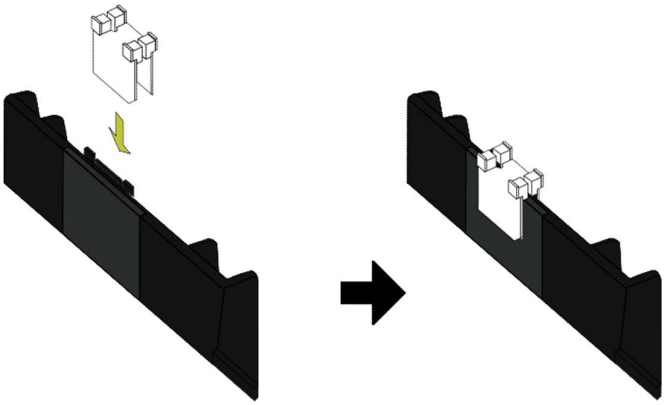
3. On the right side of your printer, find two screw holes under the top cover switch, align the two holes on the Wireless LAN card with them and secure the card with two screws.
4. Tear off the back tape of the Wireless LAN antenna card.
5. On the front side of your printer, stick the Wireless LAN antenna card between two ribs at the center. The Wireless LAN antenna must point to where the Wireless LAN card has been placed.



6. Paste the foam pad to the surface behind the Wireless LAN antenna card.

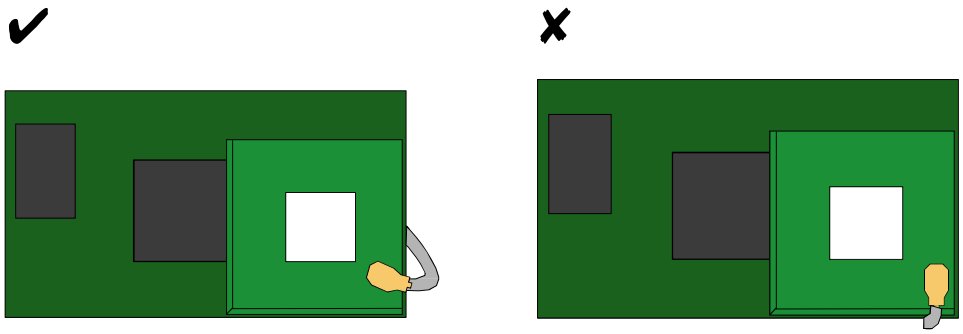


7. Use the clip to fasten the Wireless LAN antenna card and the foam pad.



8. Attach the antenna to the **Antenna** port. The figures below show the correct (left) and incorrect (right) wiring.

Caution Incorrect wiring may damage the antenna cable.



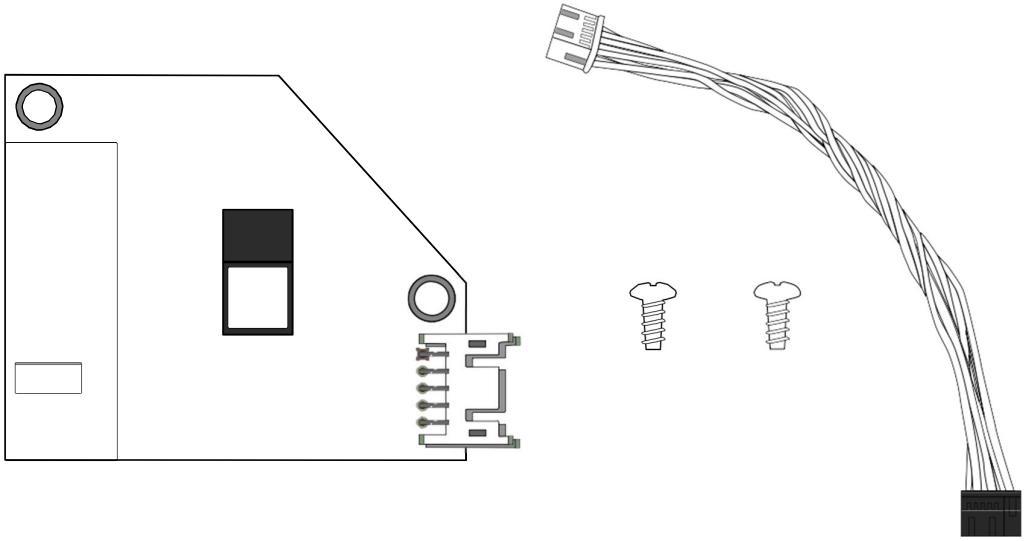
9. Reinstall the middle frame.
10. Plug the Wireless LAN cable 1 (white connector) to **J13**, which is the white port located to the lower-right of the main board.
11. Plug the Wireless LAN cable 2 (black connector) to **J15**, which is the black port located to the lower-right of the main board.

Step 3. Reinstall the base and the tear bar

This part describes how to reinstall the parts you took off.

1. Plug all other cables back into the main board.
2. Reinstall the base and the secure it with four screws.
3. Turn over your printer.
4. Reinstall the tear bar and secure it with two screws.
5. Close the top cover.

2.4 Bluetooth Module



The Bluetooth module provides Bluetooth connectivity for your printer.

To install a Bluetooth module:

Step 1. Dismantle your printer

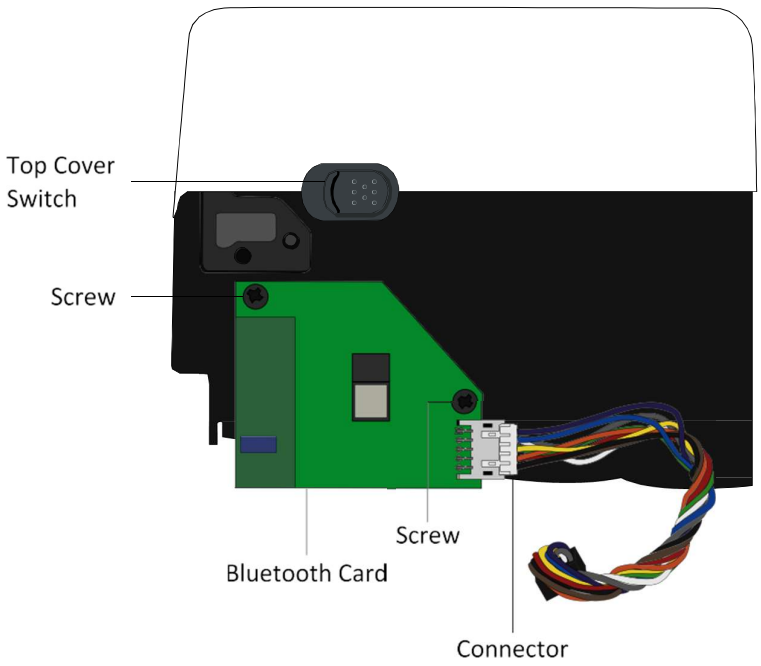
This part describes how to remove the base and the middle frame.

1. Open the top cover.
2. Loosen and remove two screws on each side of the tear bar.
3. Remove the tear bar from your printer.
4. Turn over your printer.
5. Loosen and remove four screws from the base.
6. Lift the base and unplug all the cables.
7. Remove the base and the middle frame.

Step 2. Secure the Bluetooth card and connect it to the main board

This part describes how to thread the Bluetooth card cable and connect it to the main board.

1. Plug the Bluetooth cable (white connector) to the port on the Bluetooth card.
2. On the right side of your printer, find two screw holes under the top cover switch, align the two holes on the Bluetooth card with them and secure the card with two screws.



3. Reinstall the middle frame.
4. Plug the Bluetooth cable to **J15**, which is the black port located to the lower-right of the main board.

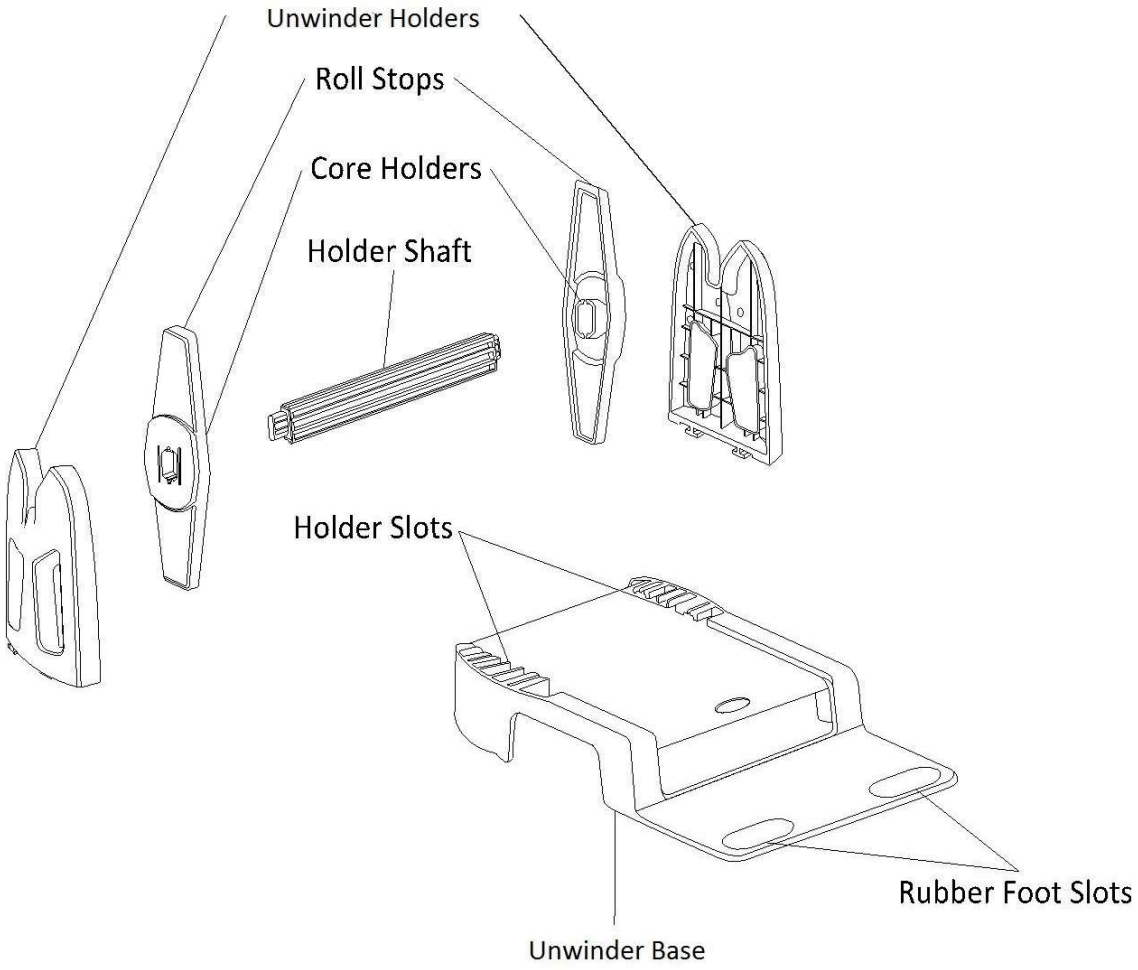
Step 3. Reinstall the base and the tear bar

This part describes how to reinstall the parts you took off.

1. Plug all other cables back into the main board.
2. Reinstall the base and the secure it with four screws.
3. Turn over your printer.
4. Reinstall the tear bar and secure it with two screws.
5. Close the top cover.

2.5 External Unwinder

An external unwinder can hold up to 8-inch outer diameter media roll. It allows you to print labels without frequently replacing media rolls.



To install an external Unwinder:

1. Slide the **Unwinder Holders** into the **Holder Slots**, until the holders snap into the place.
2. Thread the power cord and the connection cable into the bottom slot of **Unwinder Base**, until they reach out of the front slot.
3. Insert the **Holder Shaft** into your media roll.
4. Do one of the following to assemble the **Holder Shaft** and the **Roll Stops**:

- If the inside diameter of the media roll is 1-inch, make sure the **Core Holders** are facing inward, and then insert the **Roll Stops** into each end of the **Holder Shaft**.
- If the inside diameter of the media roll is 3-inch, make sure the **Core Holders** are facing outward, and then insert the **Roll Stops** into both ends of the **Holder Shaft**.

5. Place the **Holder Shaft** on the **Unwinder Holders**.
6. Place your printer on the **Unwinder Base**. Fit your printer's rear rubber feet into the **Rubber Foot Slots**.
7. Attach the power cord and the connection cable to your printer.
8. Pull out the media and thread it into the rear slot of your printer.

3 System Mode

The system mode consists of status light color combinations. It contains a list of commands for you to select and run.

To enter the system mode and run the command, do the following:

1. Turn off your printer.
2. Press and hold the **FEED** button and turn on your printer.
3. Both status lights glow solid orange for a few seconds. Next, they turn to green shortly and then turn to other colors.
4. When status lights show the color combination you need, release the **FEED** button immediately.
5. Press the **FEED** button to run the command.

The following table is the command list of the system mode.

LED 1	LED 2	Command
Green	Red	Transmissive Sensor Calibration
Green	Orange	Reflective Sensor Calibration
Red	Red	Reset Your Printer
Red	Orange	Reserved
Orange	Red	Reserved
Orange	Green	Self-Test and Dump Mode

3.1 Media Sensor Calibration

Each type of media roll has its own label separators, such as gaps, holes, notches or black marks. Those separators need to be detected by media sensors, so the label can be printed in correct position. SATO WS4 DT printers provide transmissive and reflective sensor calibration for media detection. Do the following to use them.

1. Make sure the media is properly loaded, the print module is closed and your printer's power switch is set to the **OFF** position.
2. Press and hold the **FEED** button and turn on your printer.
3. Both status lights glow solid orange for a few seconds. Next, they turn to green shortly, and then turn to other colors. Do one of the following to select the sensor:
   - If you want to calibrate the transmissive sensor, when LED 1 turns to green and LED 2 turns to red, release the **FEED** button immediately.
   - If you want to calibrate the reflective sensor, when LED 1 turns to green and LED 2 turns to orange, release the **FEED** button immediately.
4. Press the **FEED** button. The media calibration is complete after your printer feeds 3-4 labels and stops.

3.2 Reset Your Printer

By resetting your printer, you can return your printer to the state it was in when you receive it. This can help you solve some problems caused by settings changed during the printing.

Do the following to reset your printer:

1. Turn off your printer.
2. Press and hold the **FEED** button, and turn on your printer.
3. Both status lights glow solid orange for a few seconds. Next, they turn to green shortly and then turn to other colors. When both lights turn to red, release the **FEED** button immediately.
4. Press and hold the **FEED** button for 3 seconds and release it. Both status lights blink red three times, and turn to solid orange for a few seconds. After your printer is reset, LED 2 goes out while LED 1 turns to solid green.

Important In step 4, if you do not hold the **FEED** button long enough, LED 2 will blink orange three times while LED 1 goes out. It means your printer is not reset.

3.3 Self-Test and Dump Mode

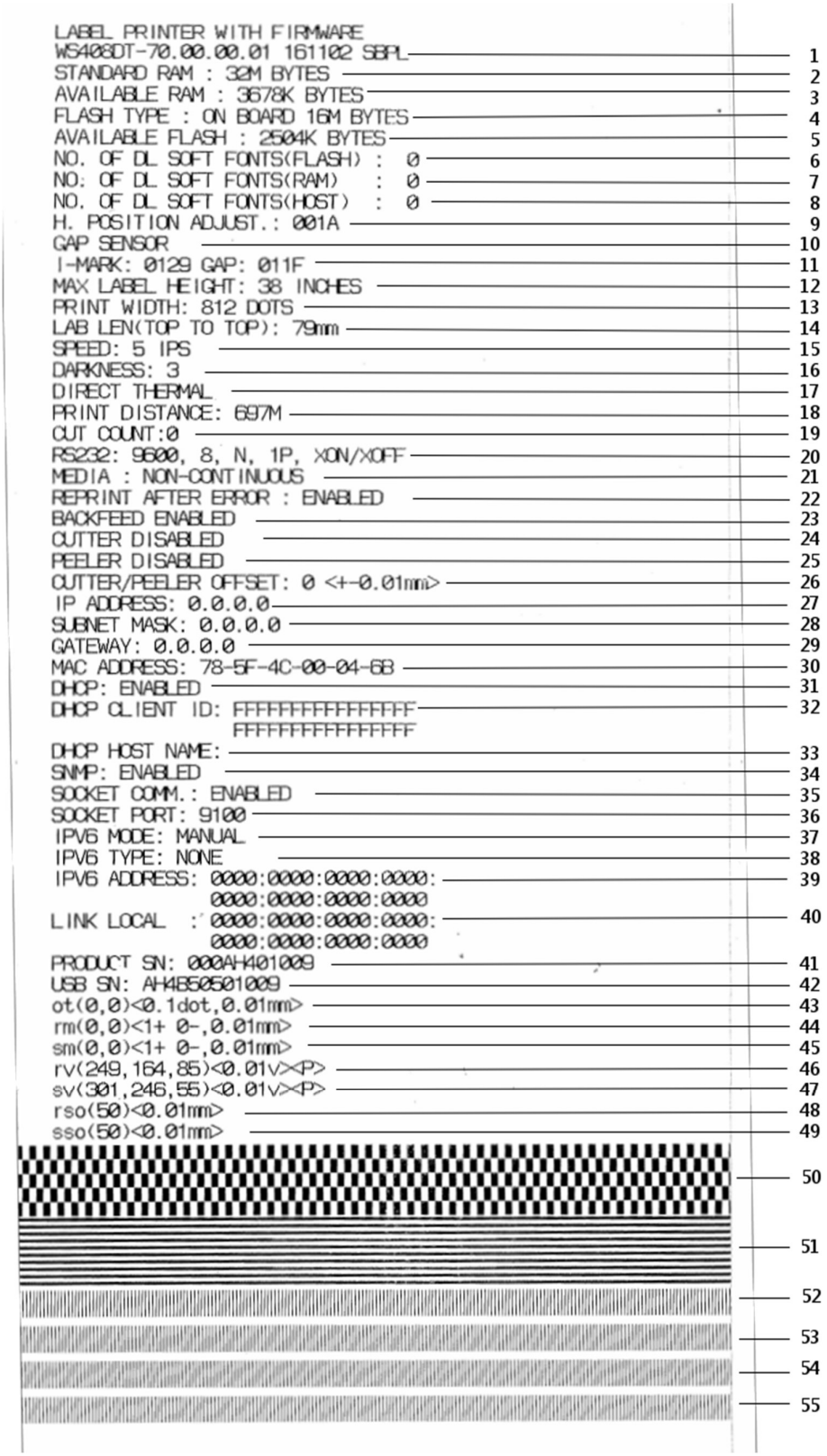
Your printer can run a self-test to print a configuration label, which helps you understand the current settings of your printer.

3.3.1 Self-Test

1. Turn off your printer.
2. Press and hold the **FEED** button and turn on your printer.
3. Both status lights glow solid orange for a few seconds. Next, they turn to green shortly, and then turn to other colors. When LED 1 turns to orange and LED 2 turns to green, release the **FEED** button.
4. Press the **FEED** button to print a configuration label.

Your printer has five (5) emulation languages: SZPL. The figure below shows its configuration label.

SBPL


LABEL PRINTER WITH FIRMWARE
WS408DT-70.00.00.01 161102 SBPL 1
STANDARD RAM : 32M BYTES 2
AVAILABLE RAM : 3678K BYTES 3
FLASH TYPE : ON BOARD 16M BYTES 4
AVAILABLE FLASH : 2504K BYTES 5
NO. OF DL SOFT FONTS(FLASH) : 0 6
NO: OF DL SOFT FONTS(RAM) : 0 7
NO. OF DL SOFT FONTS(HOST) : 0 8
H. POSITION ADJUST.: 001A 9
GAP SENSOR 10
I-MARK: 0129 GAP: 011F 11
MAX LABEL HEIGHT: 38 INCHES 12
PRINT WIDTH: 812 DOTS 13
LAB LEN(TOP TO TOP): 79mm 14
SPEED: 5 IPS 15
DARKNESS: 3 16
DIRECT THERMAL 17
PRINT DISTANCE: 697M 18
CUT COUNT:0 19
RS232: 9600, 8, N, 1P, XON/XOFF 20
MEDIA : NON-CONTINUOUS 21
REPRINT AFTER ERROR : ENABLED 22
BACKFEED ENABLED 23
CUTTER DISABLED 24
PEELER DISABLED 25
CUTTER/PEELER OFFSET: 0 <+-0.01mm> 26
IP ADDRESS: 0.0.0.0 27
SUBNET MASK: 0.0.0.0 28
GATEWAY: 0.0.0.0 29
MAC ADDRESS: 78-5F-4C-00-04-6B 30
DHCP: ENABLED 31
DHCP CLIENT ID: FFFFFFFFFFFFFFFF 32
FFFFFFFFFFFFFFFF
DHCP HOST NAME: 33
SNMP: ENABLED 34
SOCKET COMM.: ENABLED 35
SOCKET PORT: 9100 36
IPV6 MODE: MANUAL 37
IPV6 TYPE: NONE 38
IPV6 ADDRESS: 0000:0000:0000:0000: 39
0000:0000:0000:0000
LINK LOCAL : 0000:0000:0000:0000: 40
0000:0000:0000:0000
PRODUCT SN: 000AH401009 41
USB SN: AH4B50501009 42
ot(0,0)<0.1dot,0.01mm> 43
rm(0,0)<1+ 0-,0.01mm> 44
sm(0,0)<1+ 0-,0.01mm> 45
rv(249,164,85)<0.01v><P> 46
sv(301,246,55)<0.01v><P> 47
rso(50)<0.01mm> 48
sso(50)<0.01mm> 49
50
51
52
53
54
55

1. Version Information

The firmware version and its build date.

2. Standard RAM

Total SDRAM size.

3. Available RAM

RAM is able to be used.

4. Flash Type

The flash memory type and size.

5. Available Flash

Flash is able to be used.

6. No of DL soft fonts (FLASH)

The number of fonts is downloaded in Flash.

7. No of DL soft fonts (RAM)

The number of fonts is downloaded in RAM.

8. No of DL soft fonts (HOST)

The number of fonts is downloaded in USB HOST.

9. H. Position Adjust

Move the print position horizontally.

10. Sensor Type

The media sensor type. It is Gap(transmissive) or I-Mark(reflective) sensor.

11. Label-less Calibration Value

Check if a label-less calibration has been performed on your printer. If not, the value is 0000.

12. Max Label Height

The max label length you can print at a time. For 200 dpi models, it is 100 inches; for 300 dpi models, it is 50 inches.

13. Print Width

The print width in dots.

14. Lab Len (Top to Top)

For non-continues media, it is the length between the tops of two labels.

15. Speed

The speed of printing. The unit is inch per second (ips).

16. Darkness

The current darkness.

17. Print Method

It is direct thermal printing.

18. Print Length

The total print length.

19. Cut Count

It counts the times the cutter cuts.

20. RS232 Protocol

It lists RS-232C settings in the following order: baud rate, data length, parity check, stop bit and flow control.

21. Media

The media type in use.

22. Reprint After Error

When it is enabled, your printer reprints the label after the error fixed if it is printed incorrectly due to the error.

23. Backfeed Enabled/Disabled

Enable or disable backfeed during the printing process. When it is enabled, your printer moves the paper forward in a predefined length 1 second after printing, and pulls the paper back in a predefined length once the printing begins again. When it is disabled, your printer won't move the paper at all.

24. Cutter Enabled/Disabled

Enable or disable the cutter during the printing process.

25. Dispenser Enabled/Disabled

Enable or disable the dispenser during the printing process.

26. Cutter/Dispenser Offset

Move the cutting line or the peeling position forward or backward. The value in the angle brackets is the offset unit.

27. IP Address

The static IP address of your printer. The default value is "192.168.1.1."

28. Subnet Mask

The manually specified subnet mask of your printer. The default value is "255.255.255.0."

29. Gateway

The manually specified gateway of your printer. The default value is "0.0.0.0."

30. MAC Address

The unique address assigned to your printer that connects to the internet.

31. DHCP

When DHCP is enabled, it assigns an IP address to your printer automatically.

32. DHCP Client ID

It is an arbitrary value sent to the DHCP server to reserve an IP address for your printer.

33. DHCP Host Name

The name of a DHCP client.

34. SNMP

When it is enabled, the host gets or sets parameters registered as SNMP entities.

35. Socket Communication

When it is enabled, the host communicates with your printer via the socket.

36. Socket Port

The socket number of your printer.

37. IPv6 Mode

It determines how you get the IPv6 address of your printer. There are three modes: MANUAL, DHCPv6 or AUTO.

38. IPv6 Type

It is the IPv6 address type of your printer. There are four types: NONE, NORMAL, EUI and ANY.

39. IPv6 Address

The static IPv6 address of your printer.

40. Link Local Address

The IPv6 address that used in a network segment. It is allocated automatically.

41. Product SN

The serial number of product.

42. USB SN

The Serial number of USB host.

43. TPH and Cutter Offset

For developers to debug.

44. Reflective Sensor Gap Calibration

For developers to debug.

45. See-Through Sensor Gap Calibration

For developers to debug.

46. Reflective Sensor Profile

For developers to debug.

47. See-Through Sensor Profile

For developers to debug.

48. Reflective Sensor Offset

For developers to debug.

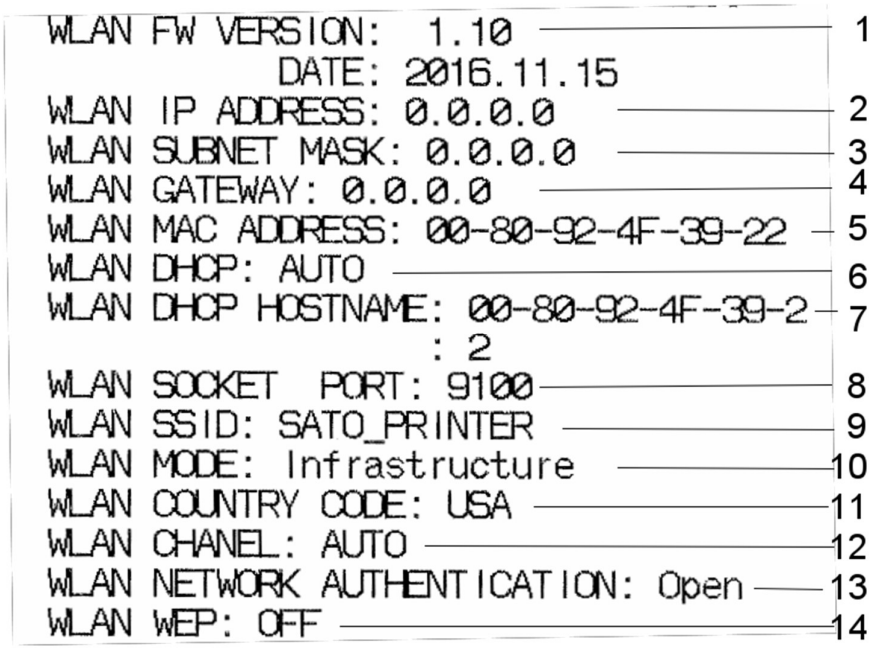
49. See-Through Sensor Offset

For developers to debug.

50-55. TPH Test Pattern

You can use them to check broken pins on the printhead.

If your printer has a Wireless LAN module, your SBPL configuration label will contain the following entries:



1. FW Version and Date

Wireless LAN card firmware version and date.

2. IP Address

The IP address of your printer. When DHCP is enabled, it shows the automatically assigned IP address; when DHCP is disabled, it shows the manually specified IP address.

3. Subnet Mask

The manually specified IPv4 subnet mask of your printer.

4. Gateway

The gateway of your printer. When DHCP is enabled, it shows the automatically assigned gateway; when DHCP is disabled, it shows the manually specified gateway.

5. MAC Address

The unique address assigned to your printer that connects to the internet.

6. DHCP

When DHCP is enabled, it assigns an IP address to your printer automatically.

7. DHCP Hostname

It is the name of a DHCP client

8. Socket Port

The socket number of your printer.

9. SSID

Short for service set identifier. It is the name of a wireless local area network.

10. Mode

It determines how you connect your printer to a network.

Infrastructure: If you connect through an access point, select this.

Ad hoc: if you connect through a device which has connected to a network, select this. In Ad hoc mode, you can only use Open authentication.

11. Country Code

The country or region.

12. Channel

The Wireless LAN channel.

13. Network authentication

It allows any device to authenticate to an access point (AP) and gain access to a network.

14. WEP

*ON***:** Encrypt data to WEP encryption. *OFF***:** WEP encryption off.

If your printer has a Bluetooth module, your SBPL configuration label will contain the following entries:

1. BT Device

The Bluetooth device name of your printer.

2. BT PIN

The Bluetooth passkey of your printer.

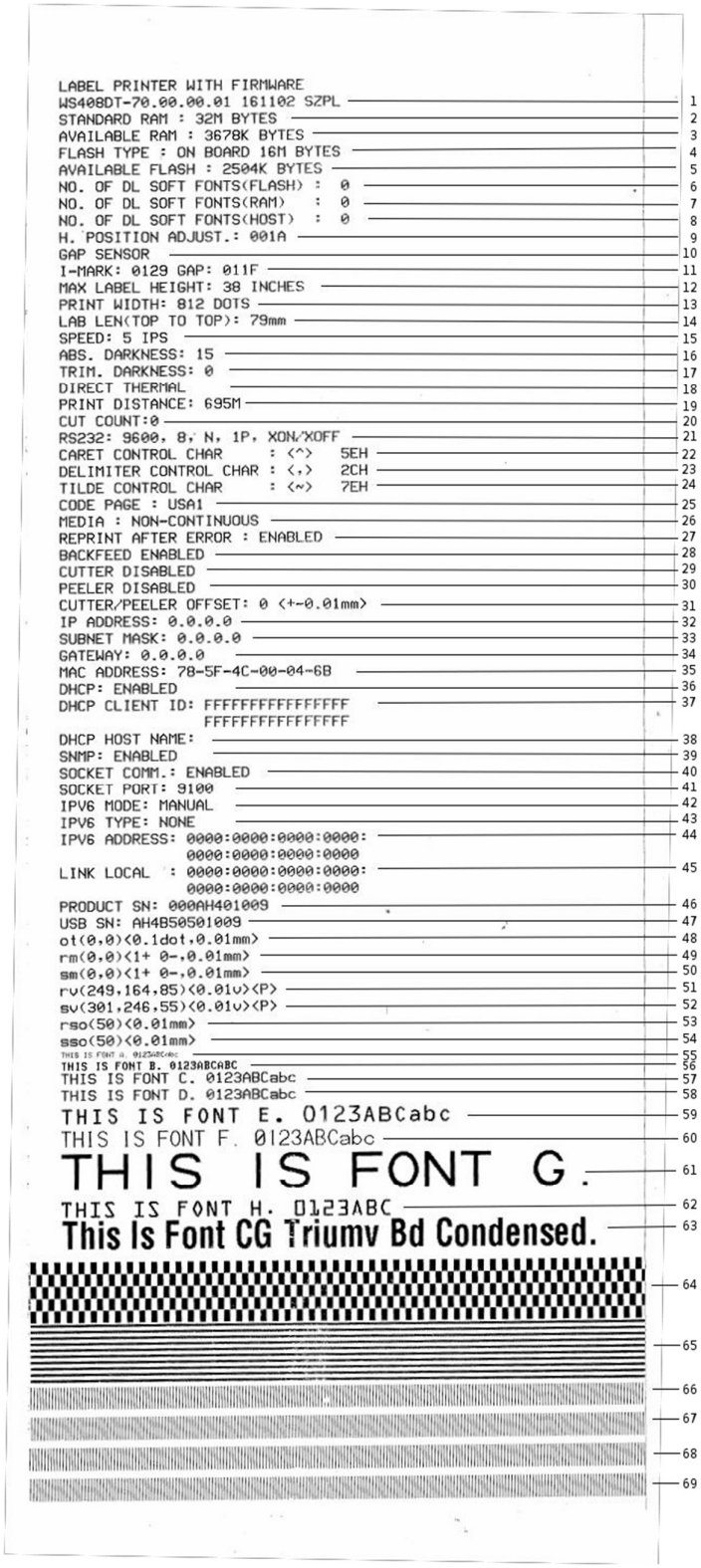
3. BT MAC Address

The Bluetooth MAC address of your printer.

4. BT MAC Address Barcode

The barcode of the Bluetooth MAC address of your printer.

▌ SZPL


LABEL PRINTER WITH FIRMWARE
WS408DT-70.00.00.01 161102 SZPL
STANDARD RAM : 32M BYTES
AVAILABLE RAM : 3678K BYTES
FLASH TYPE : ON BOARD 16M BYTES
AVAILABLE FLASH : 2504K BYTES
NO. OF DL SOFT FONTS(FLASH) : 0
NO. OF DL SOFT FONTS(RAM) : 0
NO. OF DL SOFT FONTS(HOST) : 0
H. POSITION ADJUST.: 001A
GAP SENSOR
I-MARK: 0129 GAP: 011F
MAX LABEL HEIGHT: 38 INCHES
PRINT WIDTH: 812 DOTS
LAB LEN(TOP TO TOP): 79mm
SPEED: 5 IPS
ABS. DARKNESS: 15
TRIM. DARKNESS: 0
DIRECT THERMAL
PRINT DISTANCE: 695M
CUT COUNT:0
RS232: 9600, 8, N, 1P, XON/XOFF
CARET CONTROL CHAR : <^> 5EH
DELIMITER CONTROL CHAR : <,> 2CH
TILDE CONTROL CHAR : <~> 7EH
CODE PAGE : USA1
MEDIA : NON-CONTINUOUS
REPRINT AFTER ERROR : ENABLED
BACKFEED ENABLED
CUTTER DISABLED
PEELER DISABLED
CUTTER/PEELER OFFSET: 0 <+-0.01mm>
IP ADDRESS: 0.0.0.0
SUBNET MASK: 0.0.0.0
GATEWAY: 0.0.0.0
MAC ADDRESS: 78-5F-4C-00-04-6B
DHCP: ENABLED
DHCP CLIENT ID: FFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFF
DHCP HOST NAME:
SNMP: ENABLED
SOCKET COMM.: ENABLED
SOCKET PORT: 9100
IPV6 MODE: MANUAL
IPV6 TYPE: NONE
IPV6 ADDRESS: 0000:0000:0000:0000:
0000:0000:0000:0000
LINK LOCAL : 0000:0000:0000:0000:
0000:0000:0000:0000
PRODUCT SN: 000AH401009
USB SN: AH4B50501009
ot(0,0)<0.1dot,0.01mm>
rm(0,0)<1+ 0-,0.01mm>
sm(0,0)<1+ 0-,0.01mm>
rv(249,164,85)<0.01v><P>
sv(301,246,55)<0.01v><P>
rso(50)<0.01mm>
sso(50)<0.01mm>
THIS IS FONT A. 0123ABCabc
THIS IS FONT B. 0123ABCABC
THIS IS FONT C. 0123ABCabc
THIS IS FONT D. 0123ABCabc
THIS IS FONT E. 0123ABCabc
THIS IS FONT F. 0123ABCabc
THIS IS FONT G.
THIS IS FONT H. 0123ABC
This Is Font CG Triumv Bd Condensed.
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1. Version Information

The firmware version and its build date.

2. Standard RAM

Total SDRAM size.

3. Available RAM

RAM is able to be used.

4. Flash Type

The flash memory type and size.

5. Available Flash

Flash is able to be used.

6. No of DL soft fonts (FLASH)

The number of fonts is downloaded in Flash.

7. No of DL soft fonts (RAM)

The number of fonts is downloaded in RAM.

8. No of DL soft fonts (HOST)

The number of fonts is downloaded in USB HOST.

9. H. Position Adjust

Move the print position horizontally.

10. Sensor Type

The media sensor type. It is Gap(transmissive) or I-Mark(reflective) sensor.

11. Label-less Calibration Value

Check if a label-less calibration has been performed on your printer. If not, the value is 0000.

12. Max Label Height

The max label length you can print at a time. For 200 dpi models, it is 100 inches; for 300 dpi models, it is 50 inches.

13. Print Width

The print width in dots.

14. Lab Len (Top to Top)

For non-continues media, it is the length between the tops of two labels. You can also use the SZPL command `^LL` to define it. By default, it is 10 mm.

15. Speed

The speed of printing. The unit is inch per second (ips).

16. ABS. Darkness

The current darkness. You can use the SZPL command `~SD` to define it.

17. Trim. Darkness

The adjustment of the current darkness. You can use the SZPL command `^MD` to define it.

18. Print Method

It is direct thermal printing.

19. Print Length

The total print length.

20. Cut Count

It counts the times the cutter cuts.

21. RS232 Protocol

It lists RS-232C settings in the following order: baud rate, data length, parity check, stop bit and flow control.

22-24. Control Character

The control character your printer is using.

25. Code Page

The character set table.

26. Media

The media type in use.

27. Reprint After Error

When it is enabled, your printer reprints the label after the error fixed if it is printed incorrectly due to the error.

28. Backfeed Enabled/Disabled

Enable or disable backfeed during the printing process. When it is enabled, your printer moves the paper forward in a predefined length 1 second after printing, and pulls the paper back in a predefined length once the printing begins again. When it is disabled, your printer won't move the paper at all.

29. Cutter Enabled/Disabled

Enable or disable the cutter during the printing process.

30. Dispenser Enabled/Disabled

Enable or disable the dispenser during the printing process.

31. Cutter/Dispenser Offset

Move the cutting line or the peeling position forward or backward. The value in the angle brackets is the offset unit.

32. IP Address

The static IP address of your printer. The default value is "192.168.1.1."

33. Subnet Mask

The manually specified subnet mask of your printer. The default value is "255.255.255.0."

34. Gateway

The manually specified gateway of your printer. The default value is "0.0.0.0."

35. MAC Address

The unique address assigned to your printer that connects to the internet.

36. DHCP

When DHCP is enabled, it assigns an IP address to your printer automatically.

37. DHCP Client ID

It is an arbitrary value sent to the DHCP server to reserve an IP address for your printer.

38. DHCP Host Name

The name of a DHCP client.

39. SNMP

When it is enabled, the host gets or sets parameters registered as SNMP entities.

40. Socket Communication

When it is enabled, the host communicates with your printer via the socket.

41. Socket Port

The socket number of your printer.

42. IPv6 Mode

It determines how you get the IPv6 address of your printer. There are three modes: MANUAL, DHCPv6 or AUTO.

43. IPv6 Type

It is the IPv6 address type of your printer. There are four types: NONE, NORMAL, EUI and ANY.

44. IPv6 Address

The static IPv6 address of your printer.

45. Link Local Address

The IPv6 address that used in a network segment. It is allocated automatically.

46. Product SN

The serial number of product.

47. USB SN

The Serial number of USB host.

48. TPH and Cutter Offset

For developers to debug.

49. Reflective Sensor Gap Calibration

For developers to debug.

50. See-Through Sensor Gap Calibration

For developers to debug.

51. Reflective Sensor Profile

For developers to debug.

52. See-Through Sensor Profile

For developers to debug.

53. Reflective Sensor Offset

For developers to debug.

54. See-Through Sensor Offset

For developers to debug.

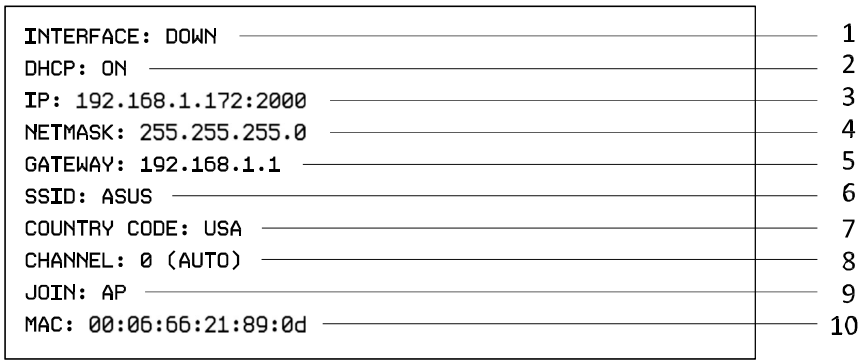
55-63. Font Image

You can use them as the reference to check your label font.

64-69. TPH Test Pattern

You can use them to check broken pins on the printhead.

If your printer has a Wireless LAN module, your SZPL configuration label will contain the following entries:



1. Interface

It detects if your printer connects to a network. When it's online, it shows "UP"; when it's offline, it shows "DOWN."

2. DHCP

When DHCP is enabled, it assigns an IP address to your printer automatically.

3. IP Address

The IP address of your printer. When DHCP is enabled, it shows the automatically assigned IP address; when DHCP is disabled, it shows the manually specified IP address.

4. Netmask

The netmask of your printer. When DHCP is enabled, it shows the automatically assigned netmask; when DHCP is disabled, it shows the manually specified netmask.

5. Gateway

The gateway of your printer. When DHCP is enabled, it shows the automatically assigned gateway; when DHCP is disabled, it shows the manually specified gateway.

6. SSID

Short for service set identifier. It is the name of a wireless local area network.

7. Country Code

The country or region.

8. Channel

The Wireless LAN channel.

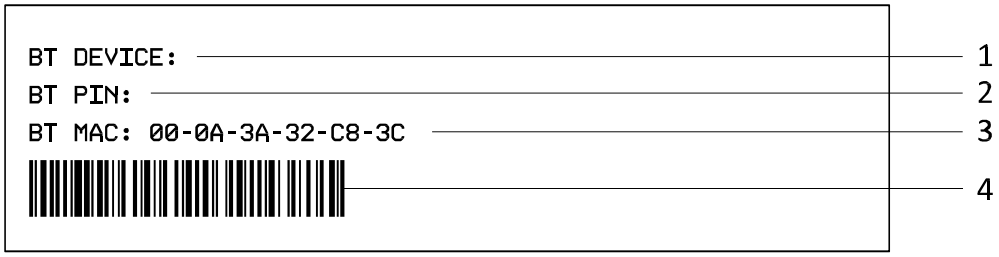
9. Join

It determines how you connect your printer to a network. It's either AP (Access Point) or Ad hoc.

10. MAC Address

The unique address assigned to your printer that connects to the internet.

If your printer has a Bluetooth module, your SZPL configuration label will contain the following entries:



5. BT Device

The Bluetooth device name of your printer.

6. BT PIN

The Bluetooth passkey of your printer.

7. BT MAC Address

The Bluetooth MAC address of your printer.

8. BT MAC Address Barcode

The barcode of the Bluetooth MAC address of your printer.

▌ SDPL


R8/E94/PC/PCA/PCB/LG
Courier Fonts:
ASD Smooth font (18 points) - 12
ASD Smooth font (14 points) - 123456789
ASD Smooth font (12 points) - 123456789 ABCa
ASD Smooth font (1 points) - 123456789 ABCabcXyz
ASD Smooth font (8 points) - 123456789 ABCabcXyz
123456789
This is internal font 7. OCR-A ABCabc
THIS IS INTERNAL FONT
THIS IS INTERNAL FONT 5. 012345678
THIS IS INTERNAL FONT 4. 012345678
THIS IS INTERNAL FONT 3. 0123456789 ABCABC
This is internal font 2. 0123456789 ABCabcXyz
sso(50)<0.01mm>
rso(50)<0.01mm>
sv(301.246.55)<0.01u><P>
rv(249.164.85)<0.01u><P>
sm(0.0)<1+ 0~.0.01mm>
rm(0.0)<1+ 0~.0.01mm>
ol(0.0)<0.1dot.0.01mm>
USB SN: AH4850501009
PRODUCT SN: 000AH401009
0000:0000:0000:0000
LINK LOCAL : 0000:0000:0000:0000:
0000:0000:0000:0000
IPV6 ADDRESS: 0000:0000:0000:0000:
IPV6 TYPE: NONE
IPV6 MODE: MANUAL
SOCKET PORT: 9100
SOCKET COMM.: ENABLED
SNMP: ENABLED
DHCP HOST NAME:
FFFFFFFFFFFFFFF
DHCP CLIENT ID: FFFFFFFFFFFFFFF
DHCP: ENABLED
MAC ADDRESS: 78-5F-4C-00-04-6B
GATEWAY: 0.0.0.0
SUBNET MASK: 0.0.0.0
IP ADDRESS: 0.0.0.0
CUTTER/PEELER OFFSET: 0 <+-0.01mm>
PEELER DISABLED
CUTTER DISABLED
BACKFEED ENABLED
REPRINT AFTER ERROR : ENABLED
MEDIA : NON-CONTINUOUS
STD CTRL CODES
CODE PAGE : PC-850
RS232: 9600,8,N,1P,XON/XOFF(SOFTWARE)
CUT COUNT:0
PRINT DISTANCE: 697M
DIRECT THERMAL
DARKNESS: 10
SPEED: 5 IPS
LAB LEN(TOP TO TOP): 79mm
PRINT WIDTH: 812 DOTS
MAX LABEL HEIGHT: 30 INCHES
I-MARK: 0129 GAP: 011F
GAP SENSOR
H. POSITION ADJUST.: 001A
NO. OF DL SOFT FONTS(HOST) : 0
NO. OF DL SOFT FONTS(RAM) : 0
NO. OF DL SOFT FONTS(FLASH) : 0
AVAILABLE FLASH : 2504K BYTES
FLASH TYPE : ON BOARD 16M BYTES
AVAILABLE RAM : 3678K BYTES
STANDARD RAM : 32M BYTES
WS408DT-70.00.00.01 161102 SDPL
LABEL PRINTER WITH FIRMWARE

▌ SEPL


LABEL PRINTER WITH FIRMWARE
WS408DT-70.00.00.01 161102 SEPL
STANDARD RAM : 32M BYTES
AVAILABLE RAM : 3678K BYTES
FLASH TYPE : ON BOARD 16M BYTES
AVAILABLE FLASH : 2504K BYTES
NO. OF DL SOFT FONTS(FLASH) : 0
NO. OF DL SOFT FONTS(RAM) : 0
NO. OF DL SOFT FONTS(HOST) : 0
H. POSITION ADJUST.: 001A
GAP SENSOR
I-MARK: 0129 GAP: 011F
MAX LABEL HEIGHT: 38 INCHES
PRINT WIDTH: 812 DOTS
LAB LEN(TOP TO TOP): 79mm
SPEED: 5 IPS
DARKNESS: 7
DIRECT THERMAL
PRINT DISTANCE: 696M
CUT COUNT:0
RS232: 9600, 8, N, 1P, XON/XOFF
CODE PAGE : English (437)
MEDIA : NON-CONTINUOUS
REPRINT AFTER ERROR : ENABLED
BACKFEED ENABLED
CUTTER DISABLED
PEELER DISABLED
CUTTER/PEELER OFFSET: 0 <+-0.01mm>
IP ADDRESS: 0.0.0.0
SUBNET MASK: 0.0.0.0
GATEWAY: 0.0.0.0
MAC ADDRESS: 78-5F-4C-00-04-6B
DHCP: ENABLED
DHCP CLIENT ID: FFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFF
DHCP HOST NAME:
SNMP: ENABLED
SOCKET COMM.: ENABLED
SOCKET PORT: 9100
IPV6 MODE: MANUAL
IPV6 TYPE: NONE
IPV6 ADDRESS: 0000:0000:0000:0000:
0000:0000:0000:0000
LINK LOCAL : 0000:0000:0000:0000:
0000:0000:0000:0000
PRODUCT SN: 000AH401009
USB SN: AH4B50501009
ot(0,0)<0.1dot,0.01mm>
rm(0,0)<1+ 0-,0.01mm>
sm(0,0)<1+ 0-,0.01mm>
rv(249,164,85)<0.01v><P>
sv(301,246,55)<0.01v><P>
rso(50)<0.01mm>
sso(50)<0.01mm>
This is internal font 1. 0123456789 ABCabcXyz
This is internal font 2. 0123456789 ABCabcXyz
This is internal font 3. 0123456789 ABCabcXyz
This is internal font 4. 0123456789 ABCXYZ
THIS IS INTERNAL FONT

▌ SIPL

```
LABEL PRINTER WITH FIRMWARE
WS408DT-70.00.00.01 161102 SIPL
STANDARD RAM : 32M BYTES
AVAILABLE RAM : 3678K BYTES
FLASH TYPE : ON BOARD 16M BYTES
AVAILABLE FLASH : 2504K BYTES
NO. OF DL SOFT FONTS(FLASH) :  0
NO. OF DL SOFT FONTS(RAM)   :  0
NO. OF DL SOFT FONTS(HOST)  :  0
H. POSITION ADJUST.: 001A
GAP SENSOR
I-MARK: 0129 GAP: 011F
MAX LABEL HEIGHT: 38 INCHES
PRINT WIDTH: 812 DOTS
LAB LEN(TOP TO TOP): 79mm
SPEED: 5 IPS
DARKNESS: 15
DIRECT THERMAL
PRINT DISTANCE: 696M
CUT COUNT:0
RS232: 9600, 8, N, 1P, XON/XOFF
MEDIA : NON-CONTINUOUS
REPRINT AFTER ERROR : ENABLED
BACKFEED ENABLED
CUTTER DISABLED
PEELER DISABLED
CUTTER/PEELER OFFSET: 0 <+-0.01mm>
IP ADDRESS: 0.0.0.0
SUBNET MASK: 0.0.0.0
GATEWAY: 0.0.0.0
MAC ADDRESS: 78-5F-4C-00-04-6B
DHCP: ENABLED
DHCP CLIENT ID: FFFFFFFFFFFFFFFF
                FFFFFFFFFFFFFFFF
DHCP HOST NAME:
SNMP: ENABLED
SOCKET COMM.: ENABLED
SOCKET PORT: 9100
IPV6 MODE: MANUAL
IPV6 TYPE: NONE
IPV6 ADDRESS: 0000:0000:0000:0000:
              0000:0000:0000:0000
LINK LOCAL  : 0000:0000:0000:0000:
              0000:0000:0000:0000
PRODUCT SN: 000AH401009
USB SN: AH4B50501009
ot(0,0)<0.1dot,0.01mm>
rm(0,0)<1+ 0-,0.01mm>
sm(0,0)<1+ 0-,0.01mm>
rv(249,164,85)<0.01v><P>
sv(301,246,55)<0.01v><P>
rso(50)<0.01mm>
sso(50)<0.01mm>
```

3.3.2 Dump Mode

Your printer enters Dump mode after running a self-test. In this mode, characters are printed in hexadecimal codes, allowing users and engineers to debug the system.

To return to the online mode:

- Turn off your printer and turn it on again.
- In SATO WS4 Printer Utility, in the **Navigation** pane, click **Tool**. In the **Properties** pane, click **Reboot Printer** and click **Send**.

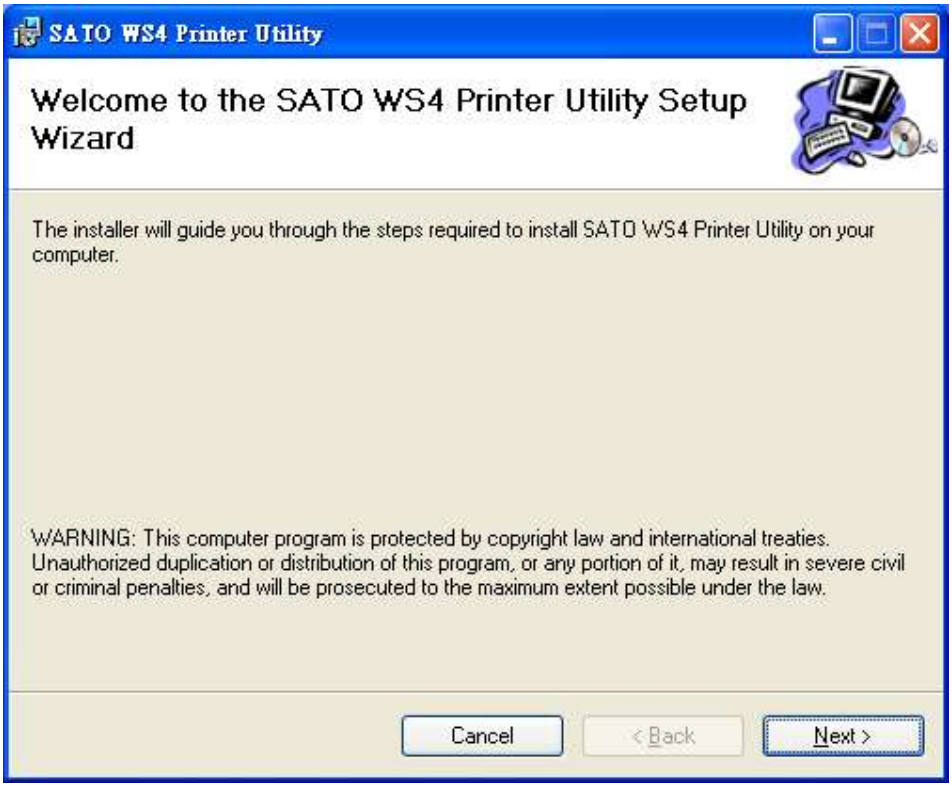
This is applicable for SZPL, SDPL and SEPL.

4 SATO WS4 Printer Utility

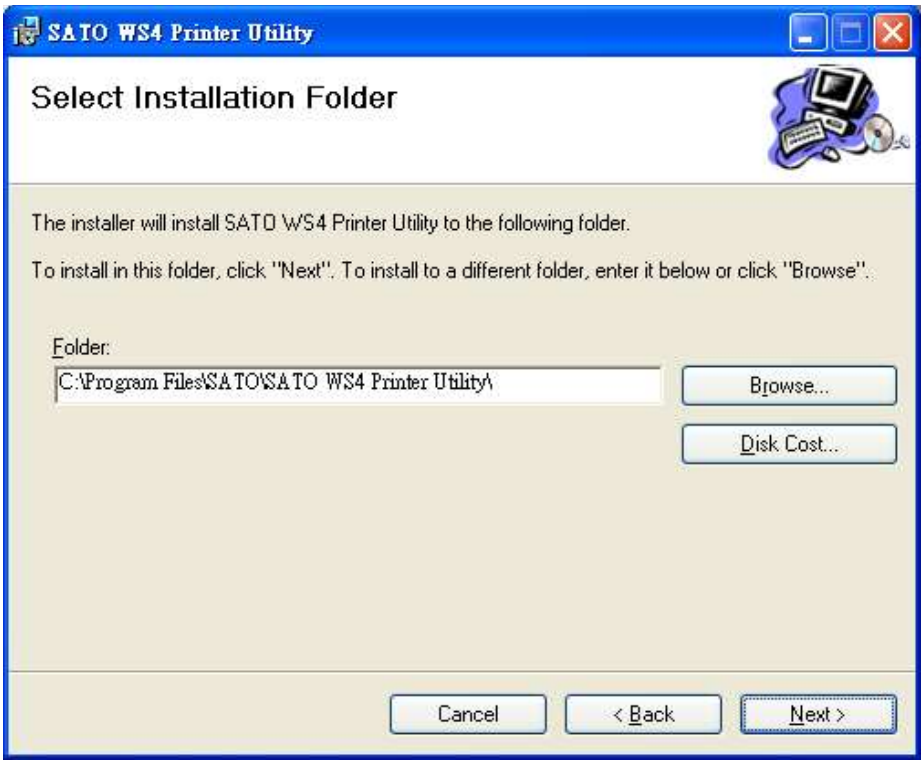
SATO WS4 Printer Utility provides a user-friendly interface to configure your printer. You can define properties, update firmware and send commands in SATO WS4 Printer Utility.

4.1 Install SATO WS4 Printer Utility

1. Download the SATO WS4 Settings utility from your local SATO Resources website and start the installation process.
2. Locate the installation file on the CD and click it.
3. In the **SATO WS4 Printer Utility** dialog box, click **Next**.

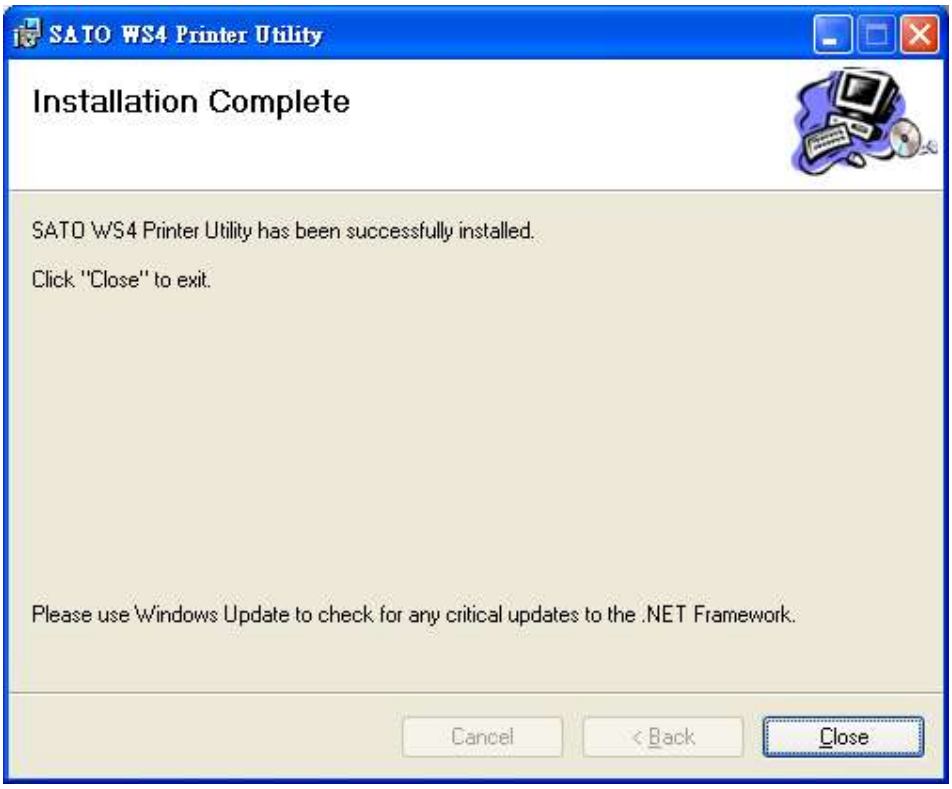


4. In this dialog box, follow the instructions to choose the installation path and then click **Next**.



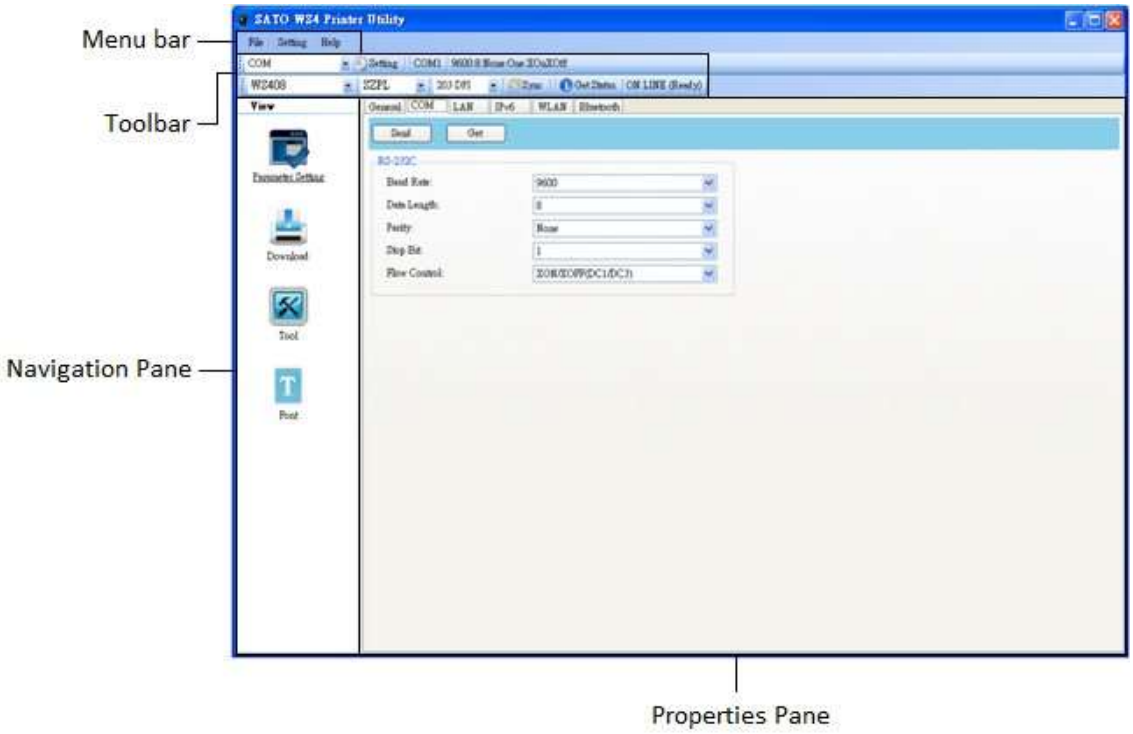
5. In this dialog box, click **Next**.

6. After the installation of SATO WS4 Printer Utility is complete, click **Close**.



4.2 Work with SATO WS4 Printer Utility

Start SATO WS4 Printer Utility. Its interface looks like this:



- **Menu bar** It includes SATO WS4 Printer Utility menus.
- **Toolbar** It provides ports, port settings, emulation languages, printer dpi and printer status.
- **Navigation Pane** You can switch between the listed items to view their tabs.
- **Properties Pane** You can view and manage printer properties or perform tasks.

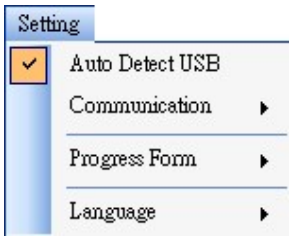
4.2.1 Menu bar

There are three menus in the menu bar: **File**, **Setting** and **Help**.

File

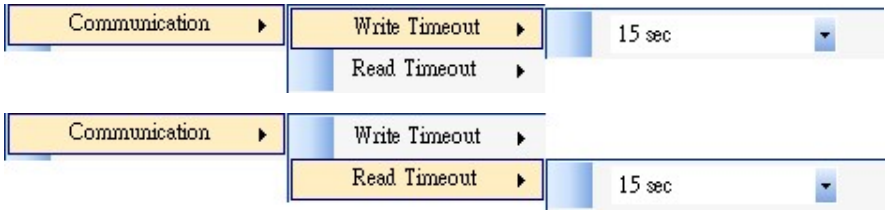
- **Export** Export your printer settings to an XML file, including all parameters, port settings and firmware information.
- **Import** Import printer settings from an XML file.
- **Exit** Exit SATO WS4 Printer Utility.

Setting



- **Auto Detect USB** When you connect your printer to a computer with a USB cable, SATO WS4 Printer Utility automatically detects it and shows the USB information in the **Port Name** and **Port Information**. By default, it is enabled.

- **Communication**

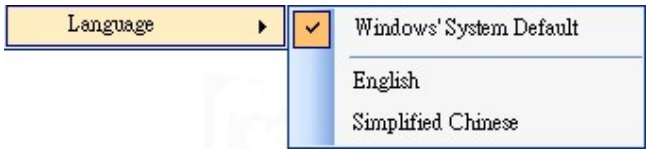


It includes **Write Timeout** and **Read Timeout**. They determine how long your computer (or other devices) waits printer's response when it attempts to write or read data to your printer. The default value is 15 seconds, meaning that the computer waits 15 seconds and displays an error message if it doesn't receive any response.

- **Progress Form**

When **Add Date/Time information** is enabled, the current date and time are added into the message in the **Download Firmware** dialog box.

- **Language**

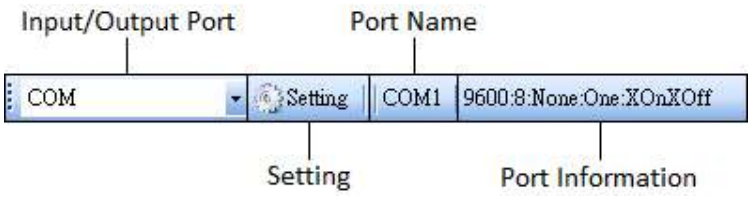


It is the language of SATO WS4 Printer Utility interface. You can select **Windows's System Default**, **English** or **Simplified Chinese**. By default, it uses your system default.

Help

- **Contents** The help content of SATO WS4 Printer Utility. You can press F1 to display it.
- **About** The version and copyright information about SATO WS4 Printer Utility.

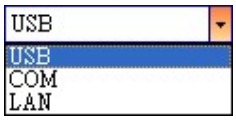
4.2.2 Toolbar



The toolbar has two rows. The first row includes three items.

- **Input/Output Port** The port you use for the data transmission between the computer and your printer.
- **Setting** You can click it to configure the port settings.
- **Port Name** It shows the port name.
- **Port Information** It shows the port information.

SATO WS4 Printer Utility provides three ports for data transmission.



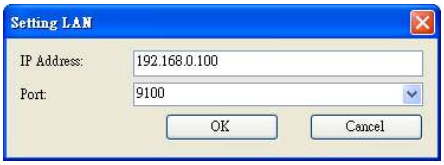
USB

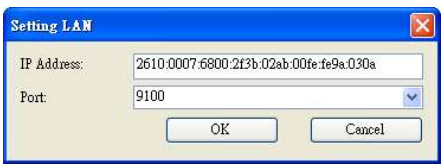
It shows the USB information in the **Port Name** and **Port Information** as soon as the computer detects your printer. By default, the computer automatically detects the **USB** port. You can select the printer you want if your computer is connected to multiple printers via USB. Click **Search** to search the hot-plugging USB printer.

COM

It is the serial port and related to the **COM** tab in **Parameter Setting**. The settings of the **COM** port need to be the same as those in the **COM** tab, except for **Port Name**, which lets you select the **COM** port you want if your computer is connected to multiple printers via COM. If you want to reset all of COM settings, click **Default**.

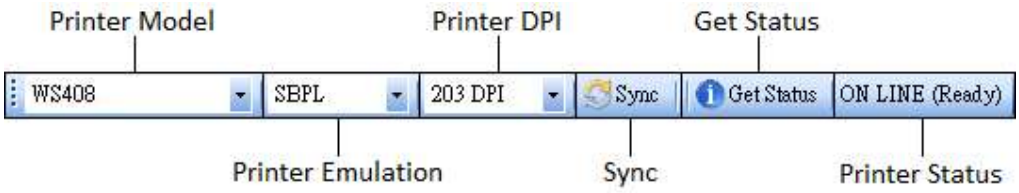
LAN





It is the Ethernet port and related to the **LAN** tab in **Parameter Setting**. It supports IPv4 and IPv6 addresses. For more information about Setting up a network connection, see *Set up LAN connection*, *Set up IPv6*

connection and *Set up WLAN connection*.



The second row of the toolbar includes six items.

- **Printer Model** Printer models.
- **Printer Emulation** The emulation language of your printer. The emulation you choose affects the tabs displayed in the **Properties** pane.
- **Printer DPI** The print resolution of your printer. It provides 203 dpi and 300 dpi.
- **Sync** Get the current settings of **Printer Model**, **Printer Emulation** and **Printer DPI** from your printer.
- **Get Status** Detect if your printer is ready for use.
- **Printer Status** It shows the result of **Get Status**.

Printer Status

Status	Description
ON LINE (Ready)	The top cover (head) was closed in the online mode.
HEAD OPEN	The top cover (head) was opened in the online mode.
ON LINE (Operating)	The printer is operating.
ACCESSED BY OTHER	Exclusively accessed by other host.
PAUSE	In pause.
ON LINE (Waiting for Stripping)	Waiting for stripping.
COMMAND ERROR	A command error was found while analyzing the command.
COMMS ERROR	A parity error, overrun error or framing error occurred during the RS-232C transmission.
PAPER JAM	A paper jam occurred during paper feed.

Status	Description
CUTTER ERROR	The cutter is experiencing issues.
NO PAPER	The label has run out.
HEAD OPEN ERROR	Attempt to feed or issue the label with the top cover (head) open.
HEAD ERROR	A broken pin has been found on the thermal head.
EXCESS HEAD TEMP	The thermal head temperature has become excessively high.
NO PAPER (Last label has been issued)	The last label has been issued properly and the label has run out.
MEMORY WRITE ERROR	An error has occurred while writing data into the flash ROM or USB memory.
FORMAT ERROR	An erase error has occurred in formatting the flash ROM or USB memory.
MEMORY FULL	Saving failed because of the insufficient capacity of the flash ROM or USB memory.
SAVING	In font or PC command save mode. (to flash ROM or to USB memory)
	The flash ROM or USB memory is being initialized.
SAVING ERROR	An EEPROM for backup cannot be read or written properly.
UPDATING FIRMWARE NOW	The printer is updating firmware.
BLUETOOTH ERROR	Bluetooth initialization error.
	Bluetooth setting parameter error.
WIRELESSLAN ERROR	WirelessLAN initialization error.
	WirelessLAN setting parameter error.
UPDATING FIRMWARE ERROR	An error occurred during the firmware update.
UNKNOWN	The status is unknown.

4.2.3 Navigation pane

The **Navigation** pane includes four items: **Parameter Setting**, **Download**, **Tool** and **Font**. Each item has its own tabs, and each tab has a **Send**, **Get**, **Add** or **Delete**

button (Some of them only have **Send**). **Send** is to send your settings to your printer; **Get** is to get the current settings of your printer; **Add** is to add file to the

list object; **Delete** is to delete file from the list object. You can also right-click in the **Properties** pane and select **Send**, **Get**, **Add** or **Delete** in the shortcut menu. Each time you click **Send**, your printer restarts to apply the change.

Important You can send data via all ports, but can only get data via the **USB**, **COM** and **LAN** ports.

Parameter Setting

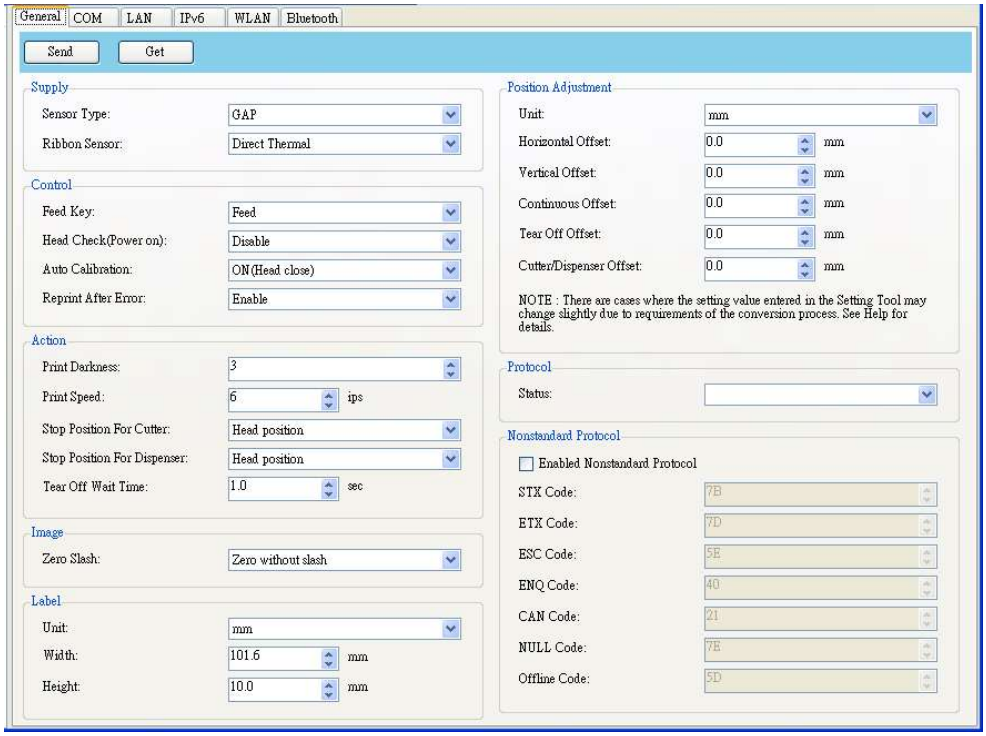
Parameter Setting is used to configure printer settings. It includes six tabs: **General**, **COM**, **LAN**, **IPv6**, **WLAN** and **Bluetooth**.

General

The **General** tab provides general printer settings. It is related to the emulation language you choose. Each language provides its own properties.

- SBPL

SBPL provides settings grouped in the **Supply**, **Control, Action, Image, Label, Position Adjustment, Protocol** and **Nonstandard Protocol** area.



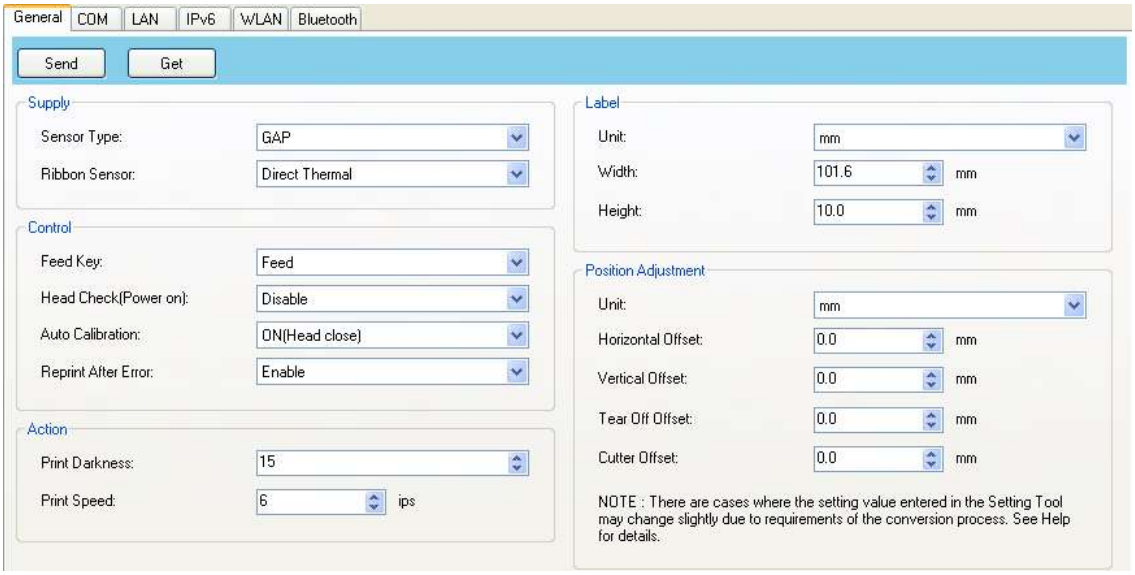
Property Name	Description
Sensor Type	It is the media sensor you are using. It includes **I-MARK**, **GAP** and **None**. When you perform media calibration, the sensor is set to the one you select.
Ribbon Sensor	**Thermal Transfer** Your printer uses the ribbon sensor to detect the ribbon, it is mean **Thermal Transfer** (TT). **Direct Thermal** Disable the ribbon sensor, it is mean **Direct Thermal** (DT).
Feed Key	It defines the action of the **FEED** button. **Feed** Your printer feeds a blank label each time the button is pressed. **Reprint** Your printer reprints the last label each time the button is pressed.
Head Check (Power on)	**Enable** Your printer checks broken pins on the printhead automatically once your printer is turned on. **Disable** Disable the auto head check.
Auto Calibration	**ON (Power on)** Your printer automatically calibrates media using a media sensor once it restarts or is turned on. **ON (Head close)** Your printer automatically calibrates media using a media sensor every time you close the print module when the printer is turned on.

Property Name	Description
	ON (Power on and Head close) Your printer automatically calibrates media using a media sensor after power on and every time you close the print module when the printer is turned on. **OFF** You need to manually calibrate media using a media sensor as you change the media, or your printer won't work properly.
Reprint After Error	**Enable** Your printer when caused by the error condition. The label is reprinted as soon as the error condition is corrected. **Disable** Disable the reprint after error.
Print Darkness	Adjust the darkness relative to the current darkness setting. The range is +1~ +5, and the value is adjustable in increments of ± 1.
Print Speed	Determine the media speed during printing. The range is +2 ~ +6, and the value is adjustable in increments of ± 1 ips.
Stop Position for Cutter	**Blank** Printer does not install cutter module. **Head Position** Stop the paper forward on the head position. **Cutter Position** Stop the paper forward on the cutter position.
Stop Position for Dispenser	**Blank** Printer does not install dispenser module. **Head Position** Stop the paper forward on the head position. **Dispense Position** Stop the paper forward on the dispenser position.
Tear Off Wait Time	Your printer moves the paper forward in a predefined time after printing, and pulls the paper back in a predefined length once the printing begins again.
Zero Slash	Display a zero with or without a slash through it.
Unit(Label)	**mm** Change the unit of **label** to millimeter. **inch** Change the unit of **label** to inch.
Width	Set the print width.
Height	Set the length of the label when using continuous media.
Unit (Position Adjustment)	**mm** Change the unit of **Position Adjustment** to millimeter.

Property Name	Description
	Inch Change the unit of **Position Adjustment** to inch. **dots** Change the unit of **Position Adjustment** to dots.
Horizontal Offset	Move the print position horizontally. The positive number is left, and the negative number is right.
Vertical Offset	Move the print position vertically. The positive number is forward, and the negative number is backward.
Continuous Offset	Adjust the continuous offset at which the continues label is cut.
Tear Off Offset	Adjust the rest position of the media after a label is printed, which changes the position at which the label is torn or cut.
Cutter/Dispenser Offset	Adjust the cutter/dispenser offset position at which the label is peel or cut.
Status	This is communication protocol for SBPL. **Status 3** is Enq response and **Status 4** is for the communication via driver.
STX Code	When you use non-standard code, you can set the code in this section.
ETX Code	When you use non-standard code, you can set the code in this section.
ESC Code	When you use non-standard code, you can set the code in this section.
ENQ Code	When you use non-standard code, you can set the code in this section.
CAN Code	When you use non-standard code, you can set the code in this section.
NULL Code	When you use non-standard code, you can set the code in this section.
Offline Code	When you use non-standard code, you can set the code in this section.

- SDPL, SEPL, SIPL, SZPL and AUTO

SDPL, SEPL, SIPL, SZPL and **AUTO** provides settings grouped in the **Supply**, **Control, Action, Label** and **Position Adjustment** area.



Property Name	Description
Sensor Type	It is the media sensor you are using. It includes **I-MARK**, **GAP** and **None**. When you perform media calibration, the sensor is set to the one you select.
Ribbon Sensor	**Thermal Transfer** Your printer uses the ribbon sensor to detect the ribbon, it is mean **Thermal Transfer** (TT). **Direct Thermal** Disable the ribbon sensor, it is mean **Direct Thermal** (DT).
Feed Key	It defines the action of the **FEED** button. **Feed** Your printer feeds a blank label each time the button is pressed. **Reprint** Your printer reprints the last label each time the button is pressed.
Head Check (Power on)	**Enable** Your printer checks broken pins on the printhead automatically once your printer is turned on. **Disable** Disable the auto head check.
Auto Calibration	**ON (Power on)** Your printer automatically calibrates media using a media sensor once it restarts or is turned on. **ON (Head close)** Your printer automatically calibrates

Property Name	Description
	media using a media sensor every time you close the print module when the printer is turned on. **ON (Power on and Head close)** Your printer automatically calibrates media using a media sensor after power on and every time you close the print module when the printer is turned on. **OFF** You need to manually calibrate media using a media sensor as you change the media, or your printer won't work properly.
Reprint After Error	**Enable** Your printer when caused by the error condition. The label is reprinted as soon as the error condition is corrected. **Disable** Disable the reprint after error.
Print Darkness	Adjust the darkness relative to the current darkness setting. The range is 0 ~ +30, and the value is adjustable in increments of ± 1.
Print Speed	Determine the media speed during printing. The range is +2 ~ +6, and the value is adjustable in increments of ± 1 ips.
Unit(Label)	**mm** Change the unit of **label** to millimeter. **inch** Change the unit of **label** to inch.
Width	Set the print width.
Height	Set the length of the label when using continuous media.
Unit(Position Adjustment)	**mm** Change the unit of **Position Adjustment** to millimeter. **Inch** Change the unit of **Position Adjustment** to inch. **dots** Change the unit of **Position Adjustment** to dots.
Horizontal Offset	Move the print position horizontally. The positive number is left, and the negative number is right.
Vertical Offset	Move the print position vertically. The positive number is forward, and the negative number is backward.
Tear Off Offset	Adjust the rest position of the media after a label is printed, which changes the position at which the label is torn or cut.
Cutter Offset	Adjust the cutter offset position at which the label is peel or cut.

mm/inch/dot conversion process in Position Adjustment is as follows;

1. **Input to the form in Setting Tool**

Unit	Value Setting condition
mm	The value is adjustable in increments of ± 0.1 mm and rounded to the 1st decimal place.
inch	The value is adjustable in increments of ± 0.01 inch and rounded to the 2nd decimal place.
dot	The value is adjustable in increments of ± 1 dot and rounded to an integer place.

2. **Units Conversion process**

1) When sending the value to the printer

The setting value is transmitted as **dot** information to the printer.

Case	Conversion process	Calculation (Setting value = A)		Rounding method
Case 1	mm ⇒ dot	203dpi	A / 25.4 × 203	Rounded down to an integer place
		300dpi	A / 25.4 × 300	
Case 2	inch ⇒ dot	203dpi	A × 203	
		300dpi	A × 300	

2) When getting the value from the printer

The setting value is transmitted as **dot** information from the printer.

Case	Conversion process	Calculation (Getting value = B)		Rounding method
Case 3	dot ⇒ mm	203dpi	B × 25.4 / 203	Rounded down to the 1st decimal place. e.g. 2.183 -> 2.1
		300dpi	B × 25.4 / 300	
Case 4	dot ⇒ inch	203dpi	B / 203	Rounded down to the 2nd decimal place. e.g. 2.117 -> 2.11
		300dpi	B / 300	

"mm/inch ⇔ dot" conversion always has a calculation difference in converting units. These are cases where the setting value entered in the Setting Tool may change slightly due to requirements of the conversion process.

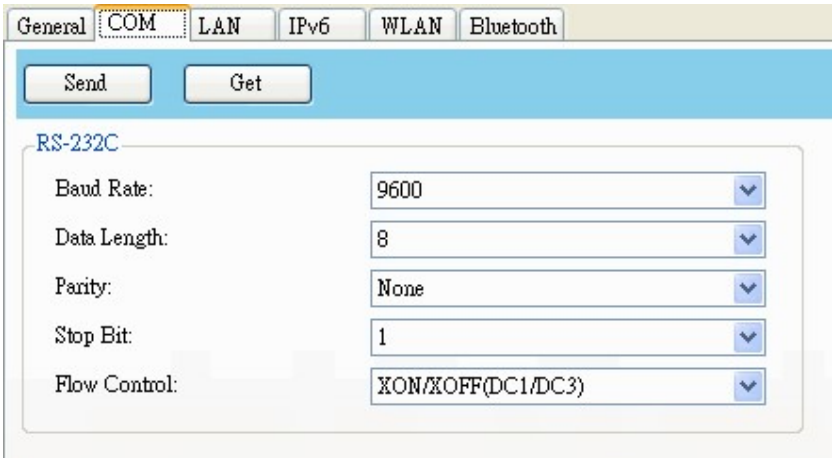
e.g. In case of **3.2** mm setting:

3.2 / 25.4 × 203 = 25.5 ⇒**25** dot (Sending value to the printer)

25 × 25.4 / 203 = 3.12 ⇒**3.1** mm (Getting value from the printer)

COM

The **COM** tab provides the settings of the RS-232C port. When you use COM as your port, make sure the settings in the **COM** tab are the same as the port settings, or your printer won't work properly.



Property Name	Description
Baud Rate	The rate of signals transmitted per second. The larger the number, the faster the data transmission.
Data Length	The length of the data transmitted. It can be set to **7** or **8** bits.
Parity	It can be set to **Odd**, **Even** or **None**. A parity bit is added to a string of data bits to check if the data is correct. **Odd** The total number of "ones" in the data plus the parity bit is an odd number. **Even** The total number of "ones" in the data plus parity bit is an even number. **None** No parity check is used.
Stop Bit	The stop bit is at the end of a string of data bits. It is used in asynchronous transmission to let the receiver know that the string of data bits being transmitted is end.
Flow Control	Flow control is used to control the data flow between the computer and your printer. **XON/XOFF (DC1/DC3)** It is software flow control that uses control characters to handle data transmission. When your printer is unable to process the data the computer send, it

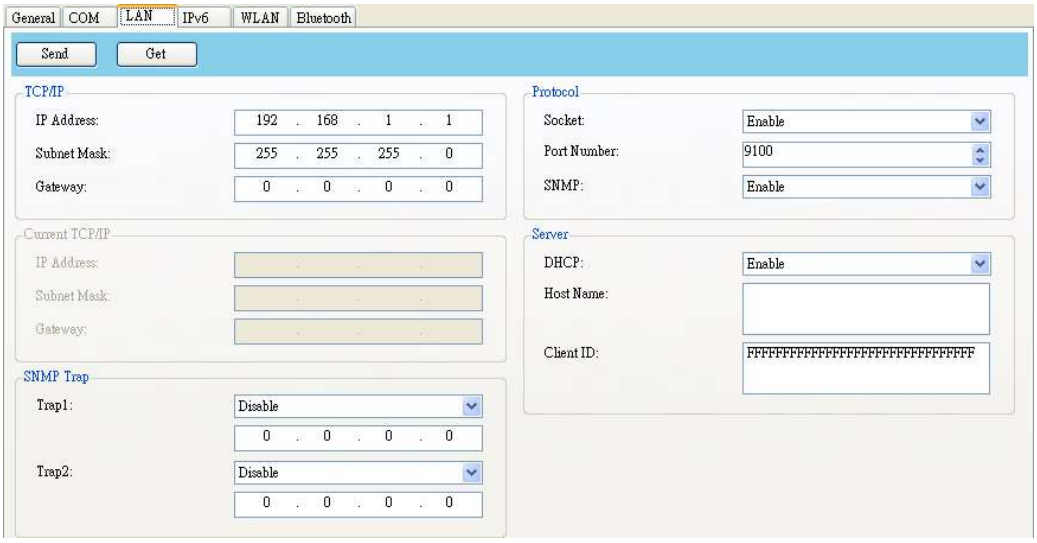
sends an XOFF signal to tell the computer to stop sending data; once your printer is able to accept data, it sends an XON signal to notify the computer to resume sending data.

RTS It is hardware flow control that uses dedicated wires to handle data transmission. When the computer is ready to send data to your printer, it sends a Request to Send (RTS) signal to your printer. If your printer is able to accept the data, it sends a Clear to Send (CTS) signal to the computer. That is, the computer starts sending data when it sees CTS on; it stops sending when it sees CTS off.

None No control is used for the handshake.

LAN

The **LAN** tab provides network settings, including **TCP/IP**, **Current TCP/IP**, **Protocol**, **Server** and **SNMP Trap**.



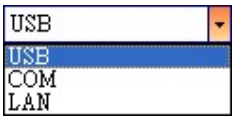
Property Name	Description
IP Address (TCP/IP)	The static IP address of your printer.
Subnet Mask (TCP/IP)	The manually specified subnet mask of your printer.
Gateway (TCP/IP)	The manually specified gateway of your printer.
IP Address (Current TCP/IP)	The current IP address of your printer.
Subnet Mask (Current TCP/IP)	The current subnet mask of your printer.
Gateway (Current TCP/IP)	The current gateway of your printer.
Socket	**Enable** The host communicates with your printer via the socket. **Disable** Disable the socket.
Port Number	The LAN port number of your printer.
SNMP	**Enable** The host gets or sets parameters registered as SNMP entities. **Disable** Disable SNMP.
DHCP	**Enable** The DHCP server assigns an IP address, the subnet mask and the gateway to your printer automatically. By default, it is enabled. **Disable** You need to specify an IP address, the subnet mask and the gateway to your printer

Property Name	Description
	manually.
Host Name	It is the name of a DHCP client. The host name allows up to 32 alphanumeric characters. You can leave it blank or type a name you want. By default, there is no host name.
Client ID	It is an arbitrary value sent to the DHCP server to reserve an IP address for your printer. **Client ID** allows up to 32 hexadecimal characters. If you leave it blank, your printer automatically assigns “FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF” as the client ID.
Trap 1	Trap is a message type of SNMP. When **Trap 1** is enabled and its IP address is set correctly, your printer alerts the computer of the specified IP address as your printer is experiencing problems.
Trap 2	Same as Trap 1.

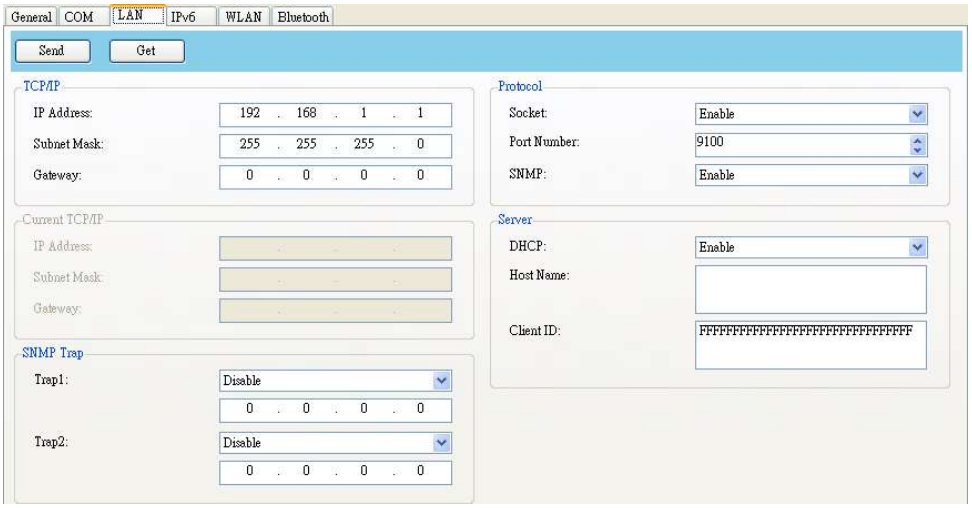
Set up LAN connection

If you want to use the **LAN** port to transfer data, you need to set up the network connection in the **LAN** tab.

1. Connect your printer and computer to a network device (hub, switch or router) with Ethernet cables.
2. In the **Input/Output Port** list, click **USB** or **COM**.

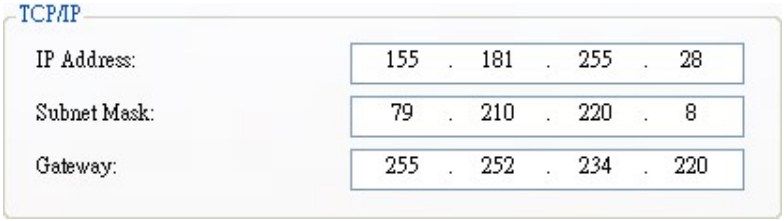


3. In the **Navigation** pane, click **Parameter Setting**, and click the **LAN** tab.

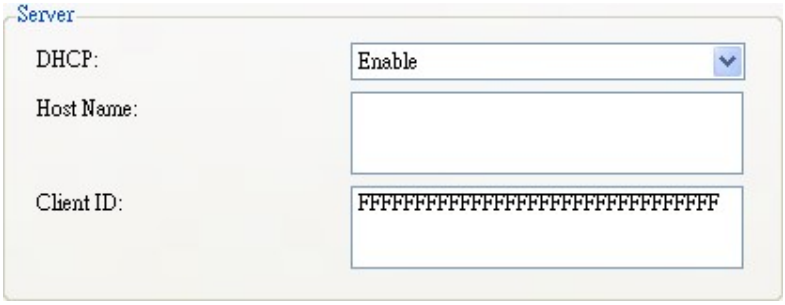


4. Do one of the following to configure your TCP/IP settings:

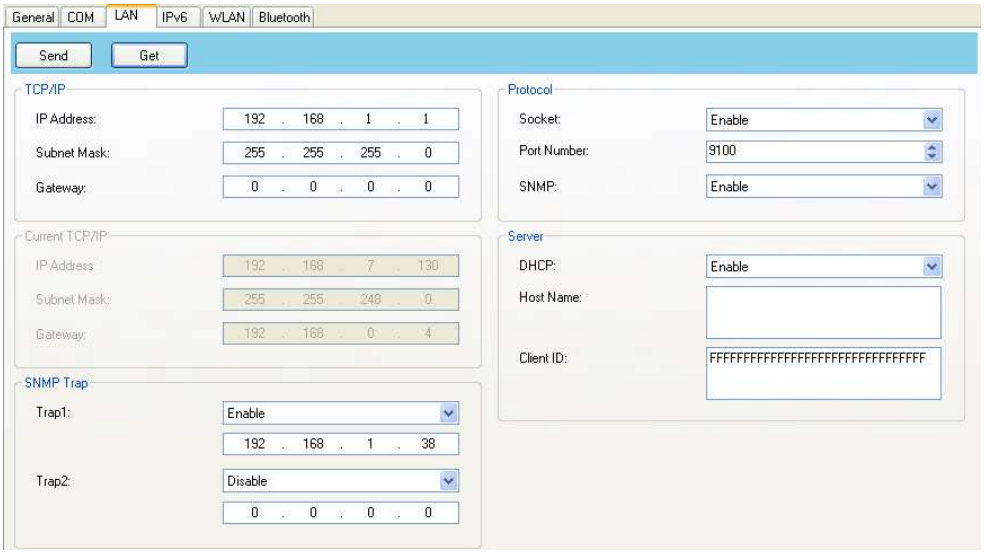
- If you have a static IP address, fill the **IP Address**, **Subnet Mask** and **Gateway** box under **TCP/IP** according to your network settings and click **Send**.



- If you don't have a static IP address, make sure **DHCP** is enabled and click **Send.**



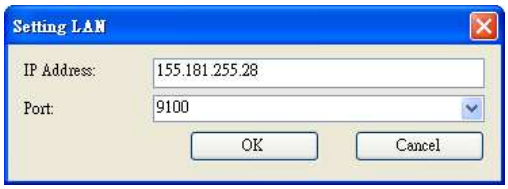
5. After your printer restarts, click **Get** to get the TCP/IP information of your printer. If you are using a static IP address, you'll get the same TCP/IP settings as it is in the previous step; if you are using DHCP, The DHCP server will automatically populate the **IP Address**, **Subnet Mask** and **Gateway** boxes under **Current TCP/IP**.



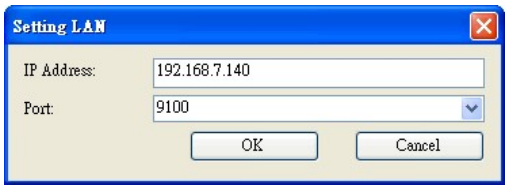
6. In the **Input/Output Port** list, click **LAN**, and click **Setting**.

7. In the **Setting LAN** dialog box, do one of the following to configure your IP address:

- If you are using a static IP address, in the **IP Address** box, enter the IP address under **TCP/IP** in the **LAN** tab, and then click **OK**.



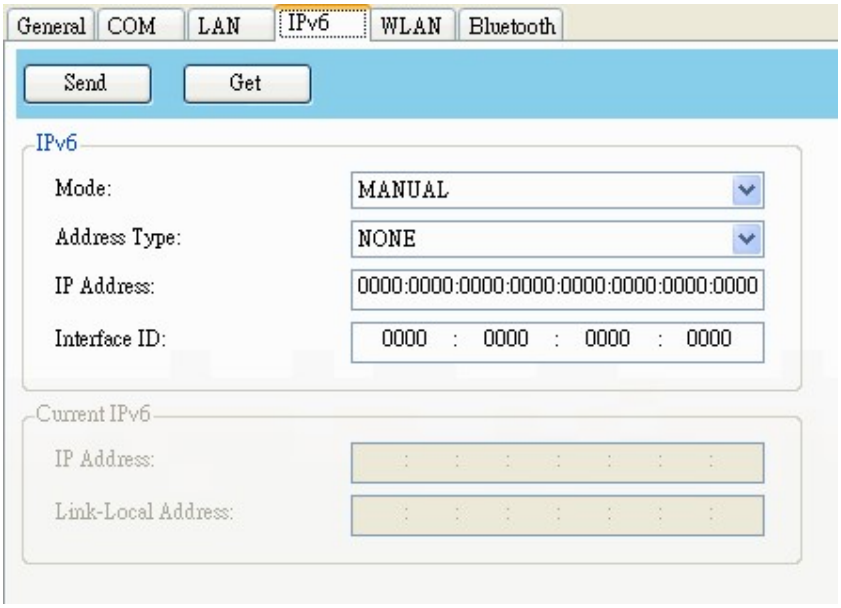
- If you are using a dynamic IP address provided by DHCP, in the **IP Address** box, enter the IP address under **Current TCP/IP** in the **LAN** tab, and then click **OK**.



Note When DHCP is enabled and your printer is idle for a long time, the IP address of your printer may change. Click **Get** to get the new IP address if you find the current IP address is not working.

IPv6

The **IPv6** tab provides IPv6 settings, including **IPv6** and **Current IPv6**.



Property Name	Description
Mode	It determines how you get the IPv6 address of your printer. **MANUAL** Specify an IPv6 address manually. **DHCPv6** An IPv6 address is assigned by a Dynamic Host Configuration Protocol for IPv6 (DHCPv6) server. **AUTO** It uses a stateless address that doesn't require a DHCPv6 server to allocate an IP address. A host generates an IPv6 address from router advertisements and a MAC address. Stateless auto-configuration supports plug and play functionality, which allows the printer to generate an IPv6 address by itself once it connects to an IPv6 network.
Address Type	It is the IPv6 address type of your printer. **NONE** The system won't use the address you specified to generate an IPv6 address. It sets 0000::0000 as the IPv6 address. **NORMAL** It uses a 128-bit unicast address that you specified. **EUI** It is 64-bit Extended Unique Identifier (EUI-64)

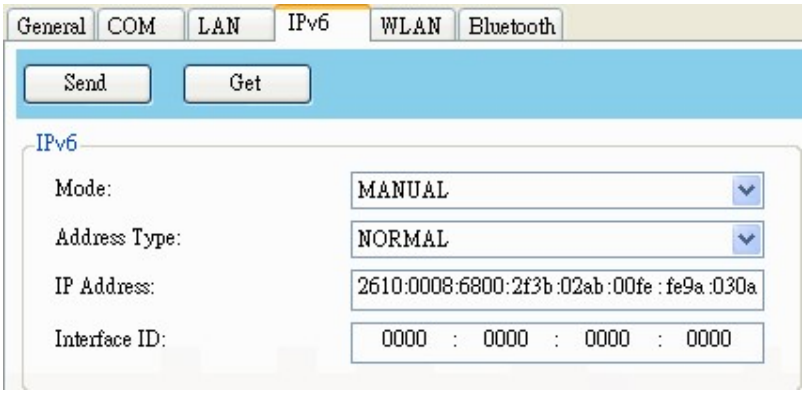
Property Name	Description
	that generates the second half of a unicast IPv6 address (last 64 bits) from a MAC address. You can also specify the second half of the address by entering the interface ID. **ANY** It uses a 128-bit any cast address that you specify. The printer needs to remember that the current address is an any cast address, since its format is the same as a unicast address.
IP Address (IPv6)	The static IPv6 address of your printer.
Interface ID	Short for interface identifier. It is used to identify the network interface of a host. You can specify the interface ID here.
IP Address (Current IPv6)	The current IPv6 address of your printer.
Link-Local Address	It is used for communications on a local network. The address always starts with FE80.

Set up IPv6 connection

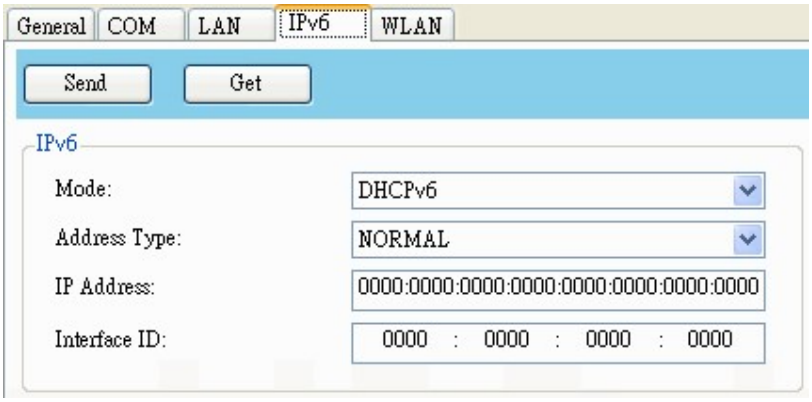
Before you set up IPv6, make sure you have IPv6 connectivity.

1. Do one of the following to configure your IPv6 settings:

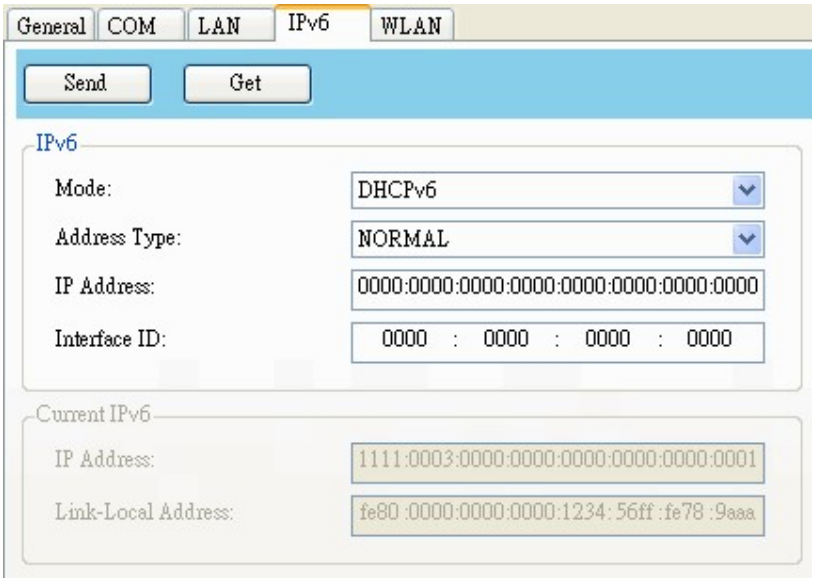
· If you have a static IPv6 address, in the **Mode** list, click **MANUAL**; in the **IP Address** box, enter your IPv6 address, and click **Send**.



· If you don't have a static IPv6 address, in the **Mode** list, click **DHCPv6**; in the **Address Type** list, click **Normal**, and click **Send**.



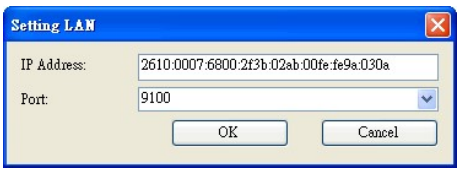
2. After your printer restarts, click **Get** to get its IPv6 information. If you are using a static IPv6 address, you'll get the same settings as it is in the previous step; if you are using DHCPv6, the DHCPv6 server will automatically populate the **IP Address** and **Link-Local Address** boxes under **Current IPv6**.



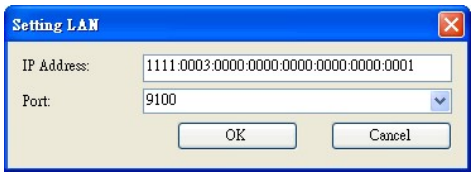
3. In the **Input/Output Port** list, click **LAN**, and click **Setting**.

4. In the **Setting LAN** dialog box, do one of the following to configure your IP address:

- If you are using a static IP address, in the **IP Address** box, enter the IP address under **IPv6** in the **IPv6** tab and click **OK**.



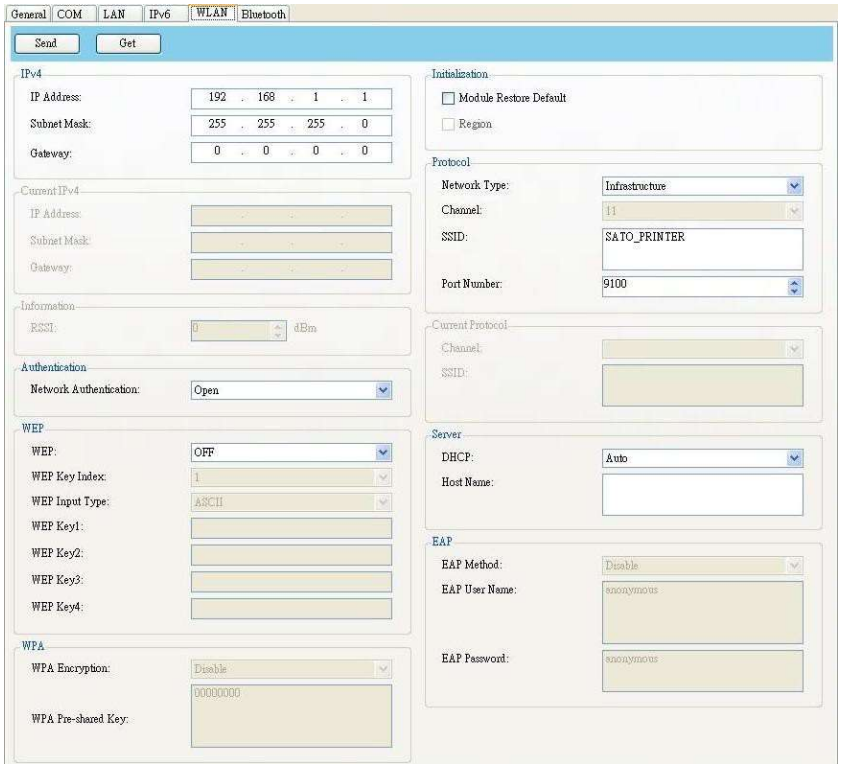
- If you are using a dynamic IP address provided by DHCPv6, in the **IP Address** box, enter the IP address under **Current IPv6** in the **IPv6** tab and click **OK**.



Note If your IPv6 address has consecutive zeros, you can use a double-colon to compress them. For example, if your address is 2607:f0d0:1002:0051:0000:0000:0000:0006, you can shorten it like this: 2607:f0d0:1002:0051::0006. Remember that the double-colon can appear only once in the address. The leading zeros in a section can also be removed, so the shortest version of your address can be written as 2607:f0d0:1002:51::6.

WLAN

The **WLAN** tab provides wireless network settings, including **IPv4**, **Current IPv4**, **Authentication**, **Information**, **WEP**, **WPA**, **Initialization**, **Protocol**, **Current Protocol**, **Server** and **EAP**.



Property Name	Description
IP Address (IPv4)	The static IPv4 address of your printer.
Subnet Mask (IPv4)	The manually specified IPv4 subnet mask of your printer.
Gateway (IPv4)	The manually specified IPv4 gateway of your printer.
IP Address (Current IPv4)	The current IPv4 address of your printer.
Subnet Mask (Current IPv4)	The current IPv4 subnet mask of your printer.
Gateway (Current IPv4)	The current IPv4 gateway of your printer.
RSSI	Short for received signal strength indicator. It measures your Wireless LAN signal strength. The bigger the number, the stronger the signal.
Network Authentication	**Open** It allows any device to authenticate to an access point (AP) and gain access to a network, but only the device with the correct WEP key can receive encrypted data while the AP uses WEP encryption. **WPA-Personal** WPA-Personal uses Pre-Shared Key (PSK) authentication, in which all users use the same password to access a network. WPA is designed to replace WEP. It uses RC4 encryption as WEP, but provides extra security through TKIP. **WPA2-Personal** WPA2-Personal includes all features of WPA-Personal, but it uses AES encryption to enhance security. **802.1X** 802.1X is an IEEE standard that provides EAP-based authentication methods for network access control. It enhances security by centralizing user identification, authentication and key management. **WPA-Enterprise** WPA-Enterprise offers centralized control over a network. It requires an 802.1X authentication server (RADIUS server) to validate users. Each user needs to enter individual username and password to access a network. It uses TKIP and RC4 algorithm to encrypt data.

Property Name	Description
	WPA2-Enterprise WPA2-Enterprise includes all features of WPA-Enterprise, but it uses AES encryption to enhance security.
WEP	**ON** Turn on WEP encryption. **OFF** Turn off WEP encryption.
WEP Key Index	The default key of WEP. You can set four keys and choose one of them as the default.
WEP Input Type	The type of your WEP key. **ASCII** If your key is generated in ASCII, select this. ASCII includes the English alphabet, numbers and punctuation symbols. **HEX** If your key is generated in hexadecimal (HEX), select this. HEX includes the numbers 0 to 9 and the letters A to F.
WEP Key 1-4	You can store four WEP keys.
WPA Encryption	It shows encryption methods depending on your network authentication. **AUTO** It allows the access point to use either TKIP or AES encryption. **TKIP** It is available for **WPA-Personal** and **WPA-Enterprise**. TKIP stands for Temporal Key Integrity Protocol. It is part of 802.11i standard of Wireless LAN. It enhances the security of WEP. TKIP uses 128-bit encryption. It dynamically changes keys for each packet using a rekeying mechanism, providing a strong protection against attackers. **AES** It is available for **WPA2-Personal** and **WPA2-Enterprise**. AES stands for Advanced Encryption Standard. It uses a serial of mathematical operations that repeatedly rearrange data to encrypt it. **Note** 802.11n can only use AES encryption.
WPA Pre-Shared Key	It is a key shared between two parties that use a secure channel for communication. Anyone who knows the key can access the network. The length can be 1-63 alphanumeric

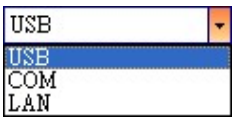
Property Name	Description
	characters excluding double quotation marks (“). Pre-shared key authentication is for home or small offices.
Module Restore Default	It resets all values in the Wireless LAN module.
Network Type	It determines how you connect your printer to a network. **Infrastructure** If you connect through an access point, select this. **Ad hoc** if you connect through a device which has connected to a network, select this. In Ad hoc mode, you can only use **Open** authentication.
Region	The country or region.
Channel	The Wireless LAN channel. You need to use the same channel as other devices for communication. The available channel varies according to your region.
SSID	The service set identifier. It is the name of a wireless network.
Port Number	The wireless LAN port number of your printer.
Channel (Current)	The current Wireless LAN channel.
SSID (Current)	The current service set identifier.
DHCP	**Auto** It tries to get an IP address from a DHCP server first. If failed, it uses the specified one. **Enable** It keeps trying to get an IP address from a DHCP server until it succeeds. **Disable** It uses the specified IP address.
Host Name	It is the name of a DHCP client. The host name allows up to 32 alphanumeric characters. You can leave it blank or type a name you want. By default, there is no host name.
EAP Method	It is available for **802.1X**, **WPA-Enterprise** and **WPA2-Enterprise** authentication. **EAP-LEAP** LEAP stands for Lightweight Extensible Authentication Protocol. It changes

Property Name	Description
	the WEP key for each session, preventing attackers retrieving data by cracking the key. **EAP-TLS** TLS stands for Transport Layer Security. EAP-TLS requires both a client and a server to exchange digital certificates to authenticate each other. It uses Public Key Infrastructure (PKI) to protect communication. A server and a client need to obtain certificates from a certification authority (CA), and use these certificates to validate each other's identity. **EAP-TTLS** TTLS stands for Tunneled Transport Layer Security. It has two stages. First, a server sends its certificate to a client after it received an authentication request. This certificate is used to create an encrypted tunnel (TLS tunnel) between the server and the client. Second, both sides exchange attribute-value pairs (AVP) through this tunnel. **PEAP** Short for Protected Extensible Authentication Protocol. Similar to EAP-TTLS, it creates an encrypted tunnel between a server and a client in the first stage. After that, it starts the second EAP exchange through this tunnel. **EAP-FAST** FAST stands for Flexible Authentication via Secure Tunneling. Similar to PEAP, it has two stages. First, it uses a Protected Access Credentials (PACs) to create an encrypted tunnel. Second, it authenticates the client to the server within the tunnel.
EAP Username	The username for EAP authentication. It accepts 1-63 alphanumeric characters.
EAP Password	The password for EAP authentication. It accepts 1-32 alphanumeric characters.

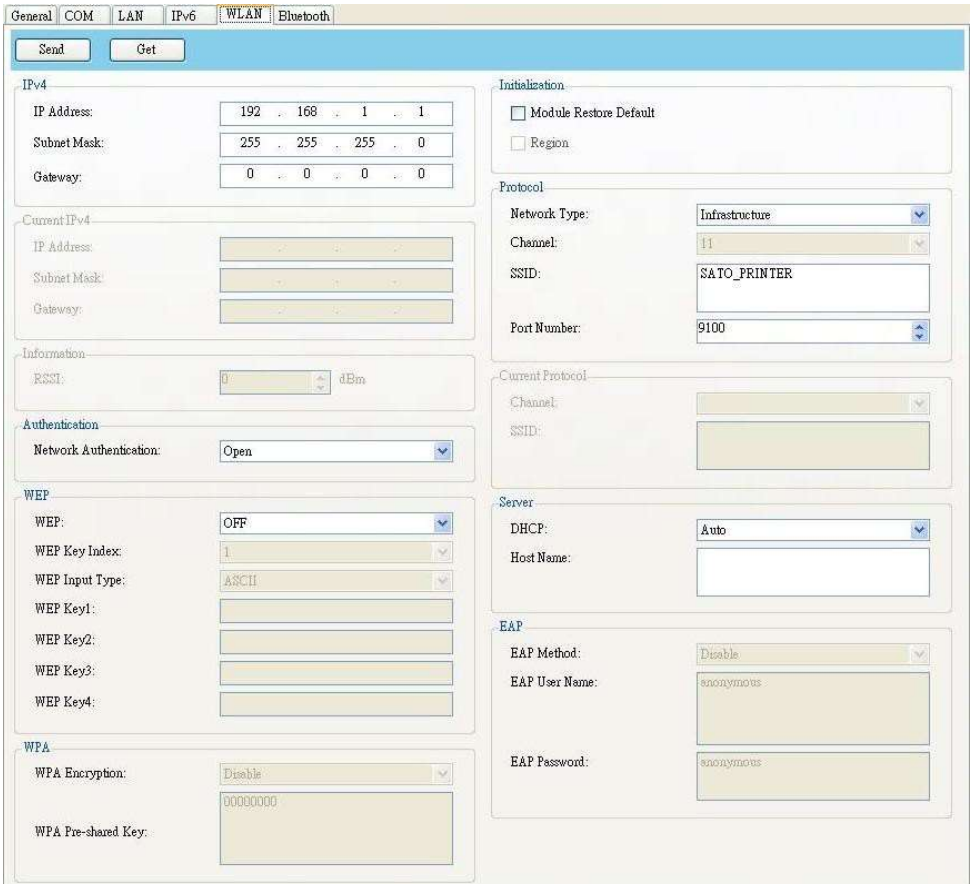
Set Up WLAN Connection

Before you set up a wireless LAN connection, make sure your computer has connected to a wireless network.

1. In the **Input/Output Port** list, click **USB** or **COM**.

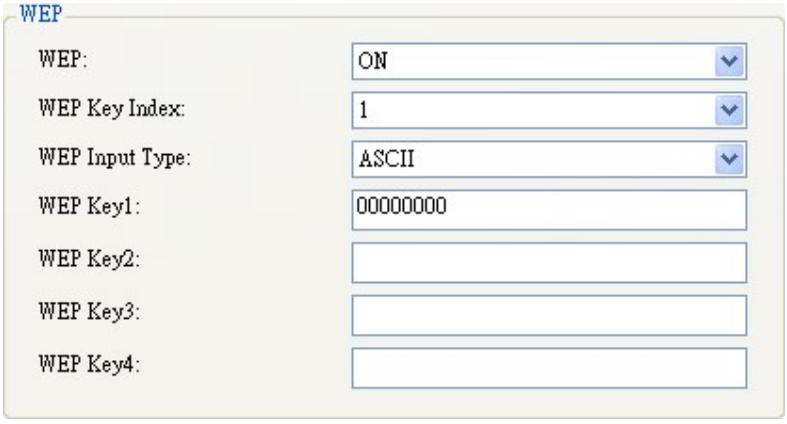


2. In the **Navigation** pane, click **Parameter Setting** and click the **WLAN** tab.

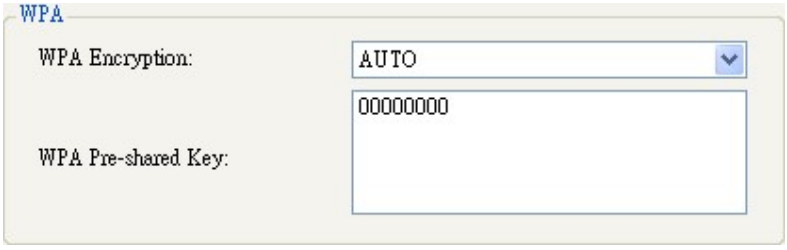


3. In the **SSID** box, enter the network name you've connected and do one of the following to enter your password:

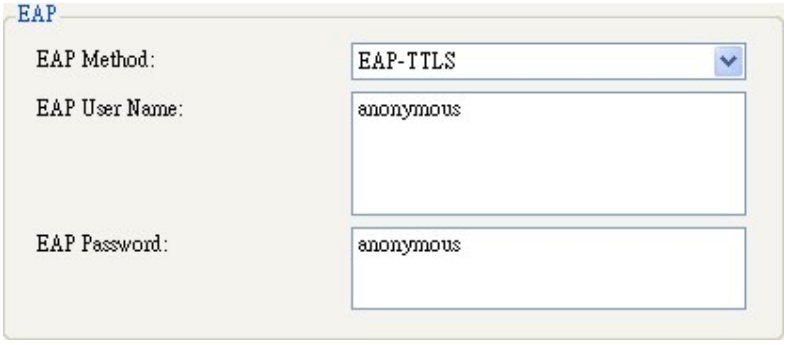
- If you're using **Open** and **WEP** is on, choose your WEP password type in the **WEP Input Type** list. Next, enter your WEP password in one of the **WEP Key** box, and select the key you want to use from the **WEP Key Index** list.



- If you're using **WPA-Personal** or **WPA2 Personal**, enter your password in the **WPA Pre-Shared Key** box.

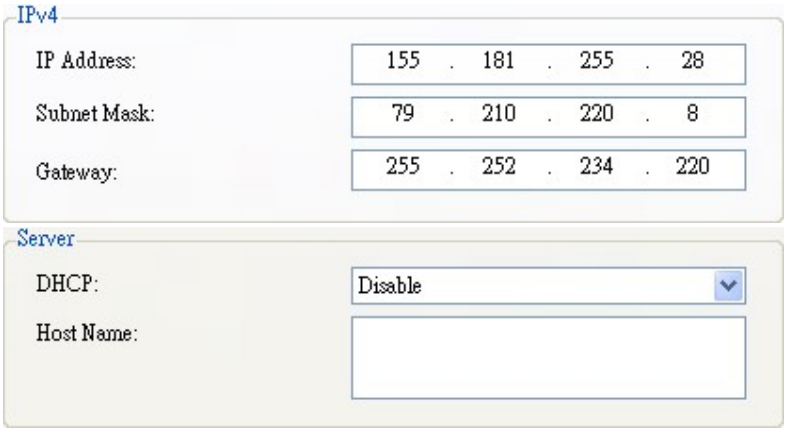


- If you're using **802.1X**, **WPA-Enterprise** or **WPA2 Enterprise**, choose your EAP authentication method in the **EAP Method** list, and enter your username and password in **EAP User Name** and **EAP Password** boxes respectively. If you're using TTLS mode, you can choose the TTLS encryption method from the **TTLS Method** list.



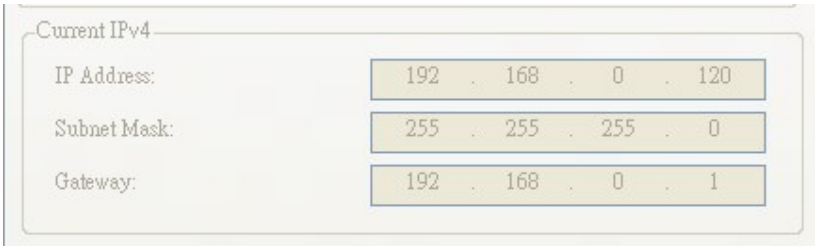
4. Do one of the following to configure your IPv4 settings:

- If you have a static IP address, fill the **IP Address**, **Subnet Mask** and **Gateway** box under **IPv4** according to your network settings, make sure **DHCP** is disabled and click **Send**.



- If you don't have a static IP address, make sure **DHCP** is enabled and click **Send.**

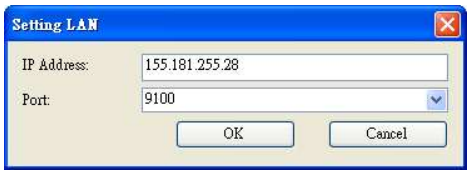
5. After your printer restarts, click **Get** to get the IPv4 information of your printer. If you are using a static IP address, you'll get the same settings as it is in the previous step; if you are using DHCP, the DHCP server will automatically populate the **IP Address**, **Subnet Mask** and **Gateway** boxes under **Current IPv4**.



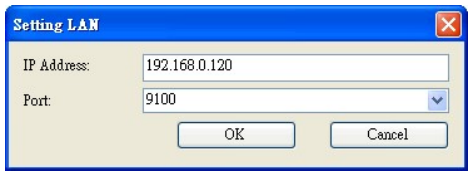
6. In the **Input/Output Port** list, click **LAN**, and click **Setting**.

7. In the **Setting LAN** dialog box, do one of the following to configure your IP address:

- If you are using a static IP address, in the **IP Address** box, enter the IP address under **IPv4** in the **WLAN** tab and click **OK**.

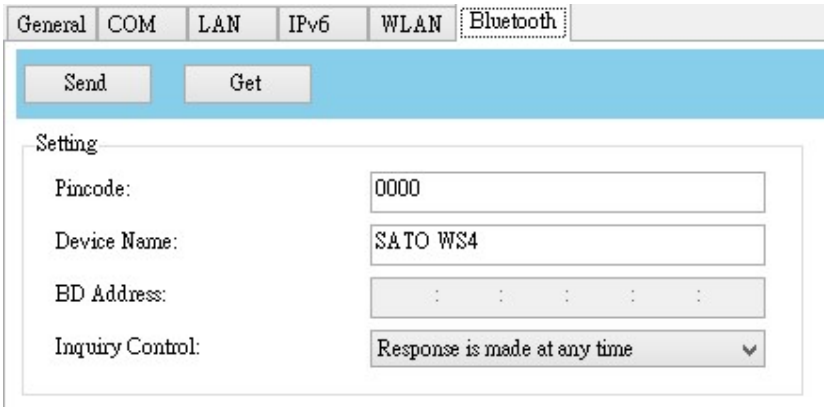


- If you are using a dynamic IP address provided by DHCP, in the **IP Address** box, enter the IP address under **Current IPv4** in the **WLAN** tab and click **OK**.



Bluetooth

The **Bluetooth** tab provides Bluetooth settings.

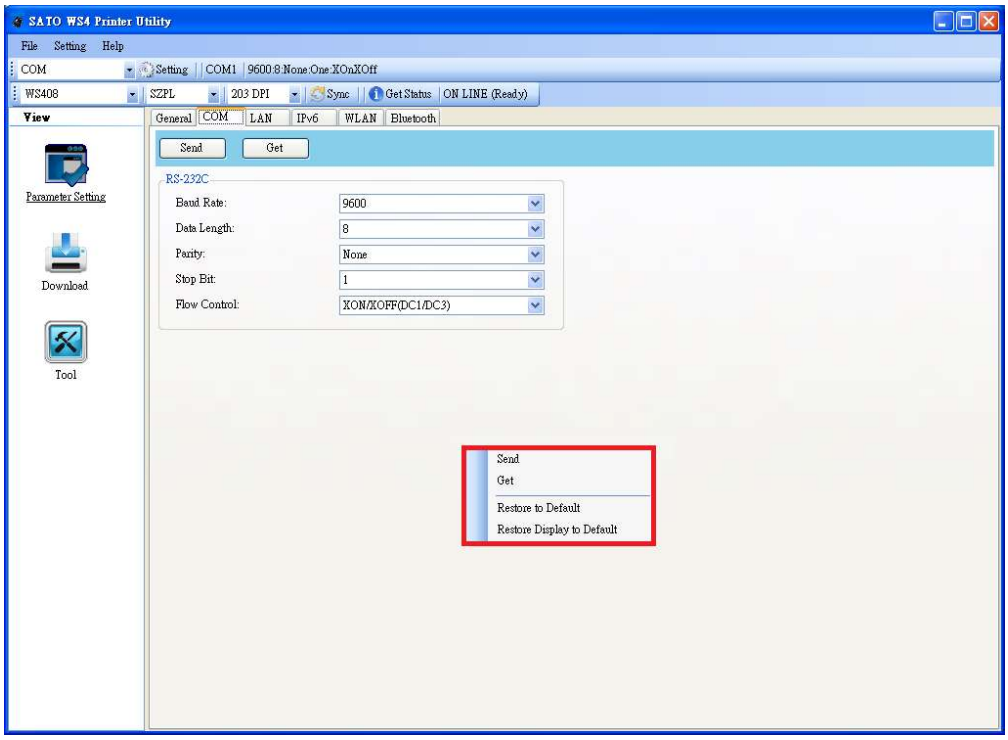


Property Name	Description
Pin Code	The Bluetooth PIN code of your printer. The new PIN code takes effect when you reconnect your printer to your computer.
Device Name	The Bluetooth device name of your printer. The new device name takes effect after you reconnect your printer to your computer.
BD Address	The Bluetooth MAC address of your printer.
Inquiry Control	It determines how your printer is detected by other Bluetooth devices. **Response is made at any time** Your printer is always detectable. **No response** Your printer is not detectable. **Response only within 60sec after a power on** Your printer is detectable in 60 seconds after it is turned on.

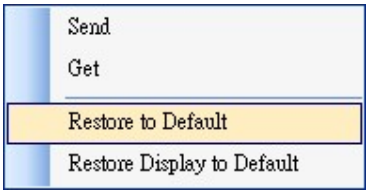
Reset Parameter Setting

If you want to reset **Parameter Setting**, do this:

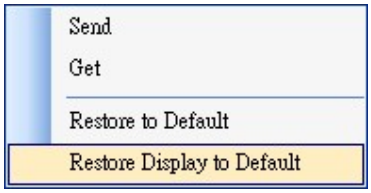
1. In **Parameter Setting**, right-click in the blank area in any tab.



2. In the shortcut menu, do one of the following to reset **Parameter Setting**:



- If you want to restore all of the settings to their default values, click **Restore to Default**.



- If you want to restore the settings of the current tab to their default values, click **Restore Display to Default**.

Download

Download is used to download files to your printer. Tabs in **Download** are related to the emulation language you choose. Remember that you need to set up a network connection before you use the **LAN** port for the data transfer. For further details, see *Set up LAN connection*, *Set up IPv6 connection* and *Set up WLAN connection*.

Firmware

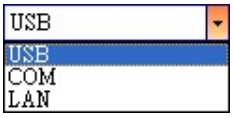
The **Firmware** tab displays in all emulation modes. It is used to update firmware. For information about update firmware in SATO WS4 Printer Utility, see *Update firmware in SATO WS4 Printer Utility*.

General

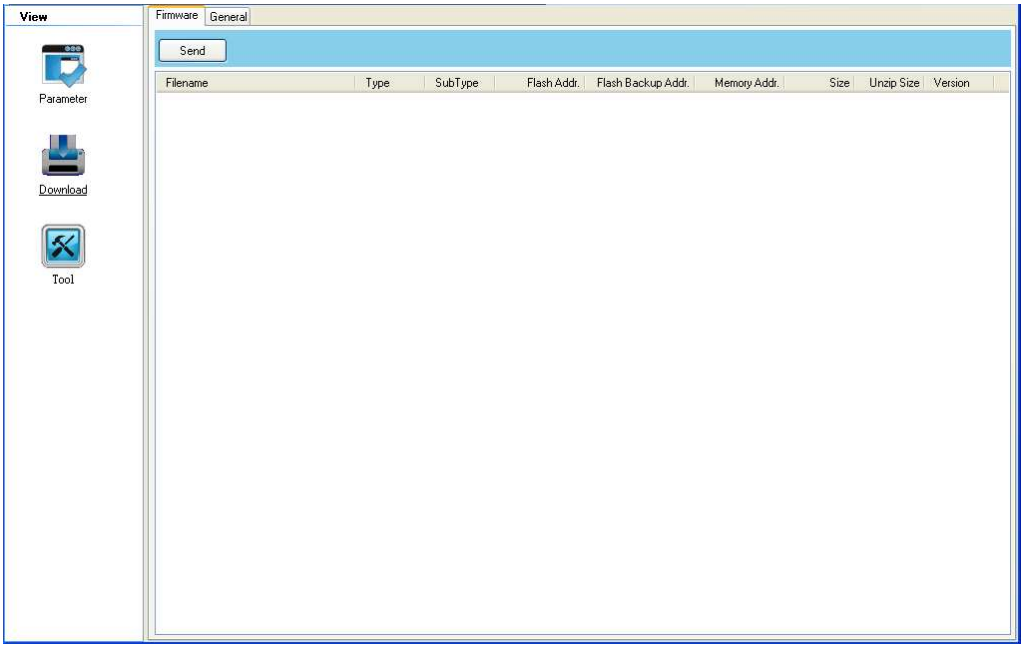
The **General** tab displays in all emulation modes. It is used to send command files to your printer and perform tasks. Command files only run in their corresponding emulations. For example, SZPL command files only run in SZPL emulation.

To run commands on your printer:

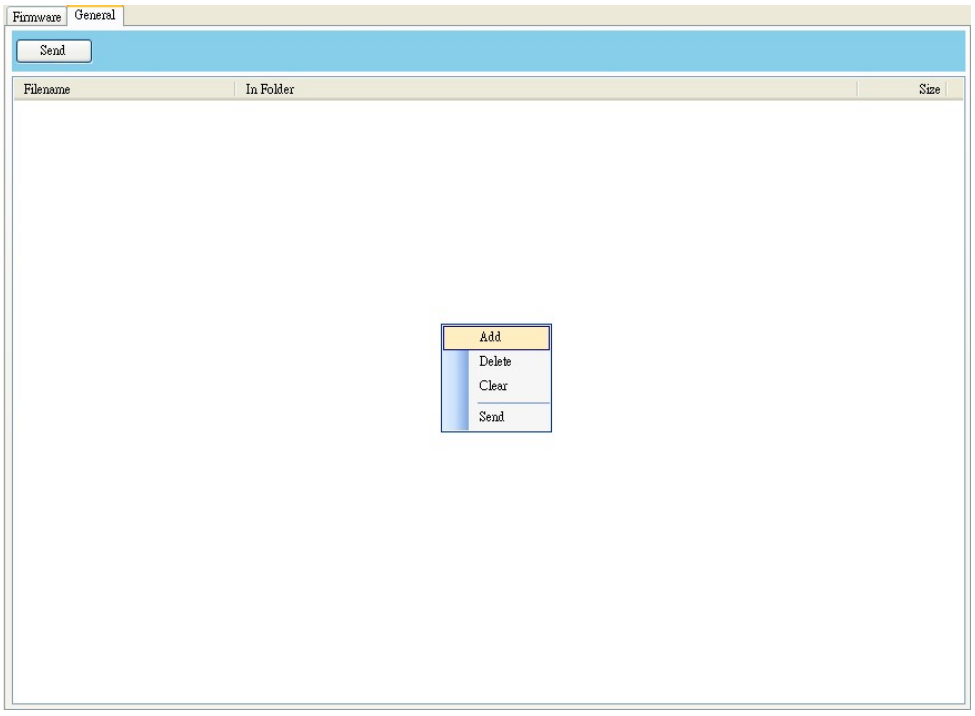
1. Type your commands in any text editor, such as Notepad or WordPad.
2. Save your commands as text files (.txt).
3. In the **Input/Output Port** list, click the port you want to use**.**



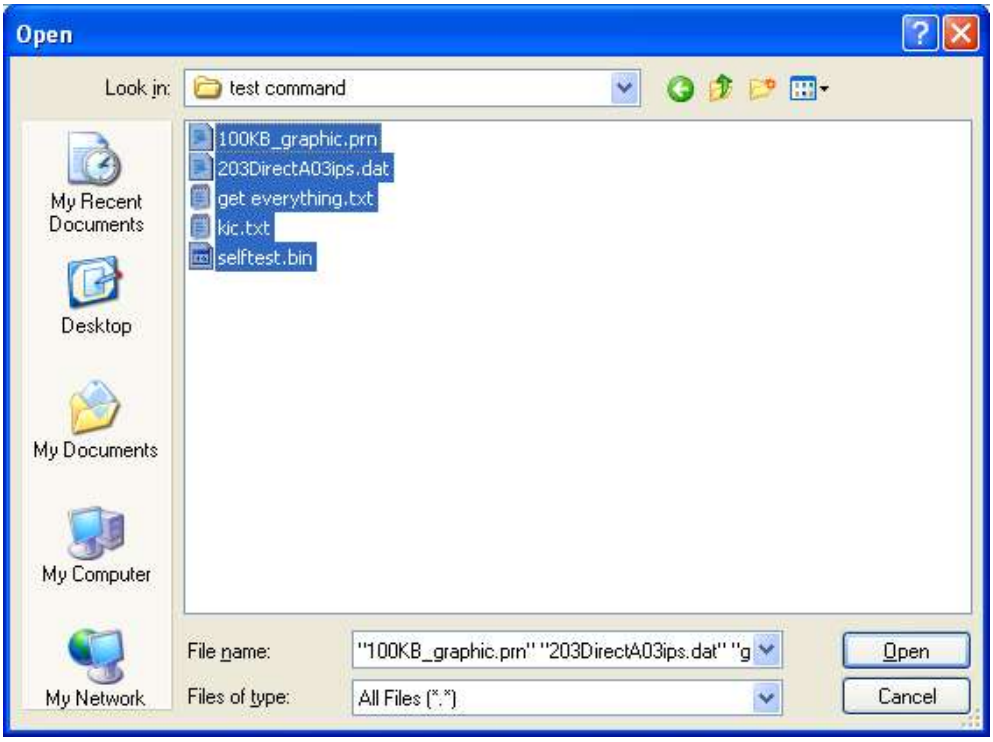
4. Click **Download** in the **Navigation** pane.



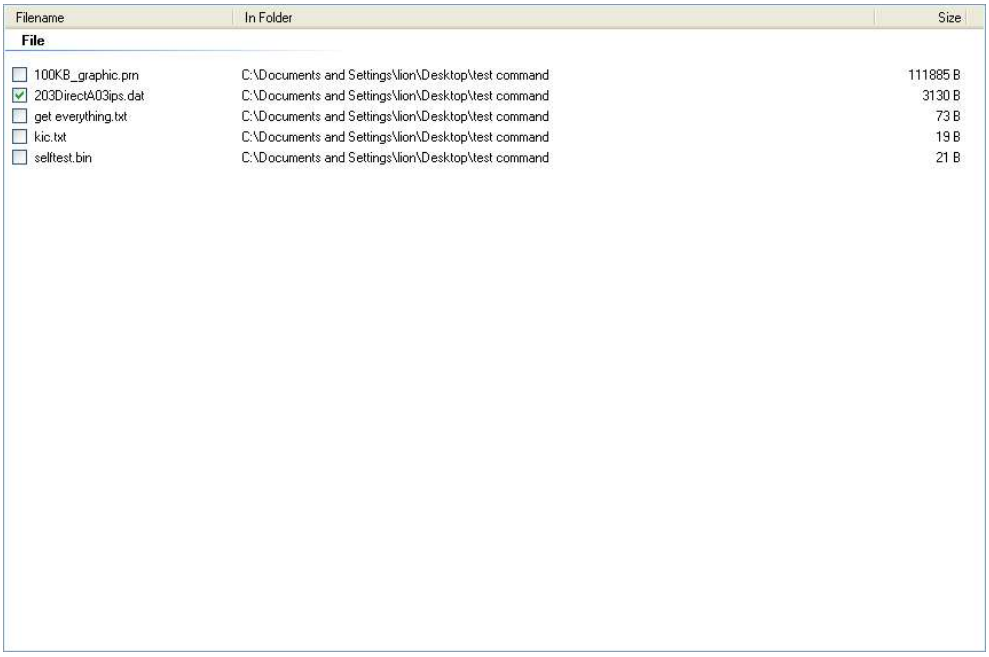
5. Under the **General** tab, right-click in the blank area and click **Add**.



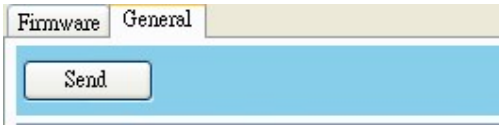
6. In the **Open** dialog box, browse to the folder that contains command files, select them and click **Open**. The command files you select must correspond to the emulation language you use.



7. In the list, select the file you want to use. You can only select one file at a time.



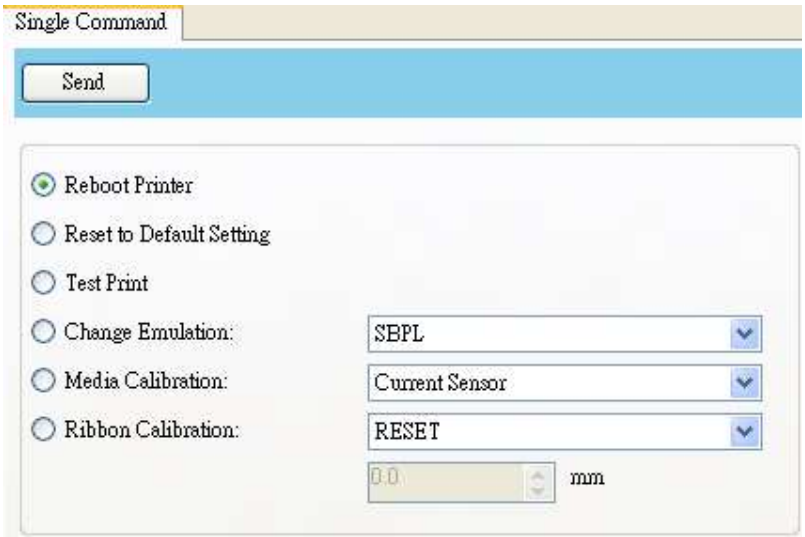
8. Click **Send** to run the command on your printer.



Note If you send a command file and your printer doesn't respond, it is possible that the emulation language is not set correctly. Click **Sync** to get the current setting of **Printer Emulation**.

Tool

Tool is used to send specific commands to your printer. It has the **Single Command** tab, which provides three commands.



- **Reboot Printer** Restart your printer.
- **Reset to Default Setting** Reload factory settings.
- **Test Print** Run a self-test to print a configuration label.
- **Change Emulation** Change the emulation language for your printer.
- **Media Calibration** Change the media sensor for your printer.
- **Ribbon Calibration** It calibrates the ribbon so that your print start position will be more accurate.
  - **RESET** Turn off **Ribbon Calibration**.

- **ON** Turn on **Ribbon Calibration**. Enter the height of your label in the scale box. For example, if the height of your label is 100 mm, enter 100 in the box.

5 Update Firmware

Firmware is the code stored permanently in hardware. It instructs your printer to do its tasks. Benefits of updating firmware include new features, enhanced functionality and improved performance.

Caution Do not open the print module, disconnect your printer from the computer or cut your printer power during the firmware update.

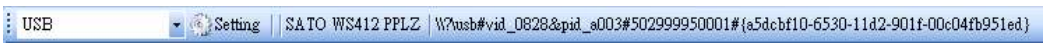
5.1 Update Firmware in SATO WS4 Printer Utility

This section describes how to update printer firmware in SATO WS4 Printer Utility.

5.1.1 Update via the USB or COM Port

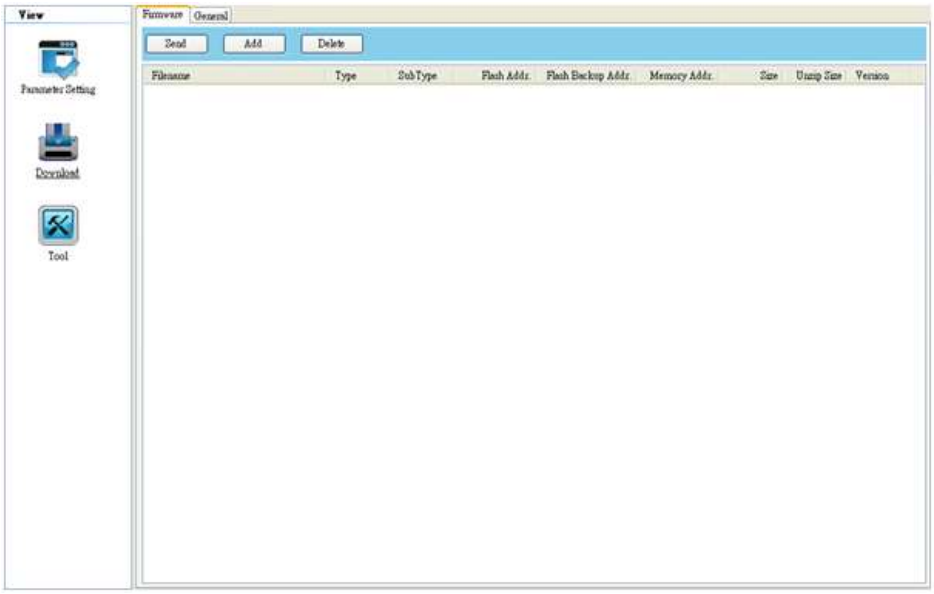
1. Connect your printer and the computer with a USB or a serial cable.
2. Make sure the print module is closed.
3. Turn on your printer, and start SATO WS4 Printer Utility.
4. In the **Input/Output Port** list, click **USB** or **COM**, and do one of the following:

- If you are using the **USB** port, the **Port Name** and **Port Information** automatically shows the USB information. You don't need to do anything.

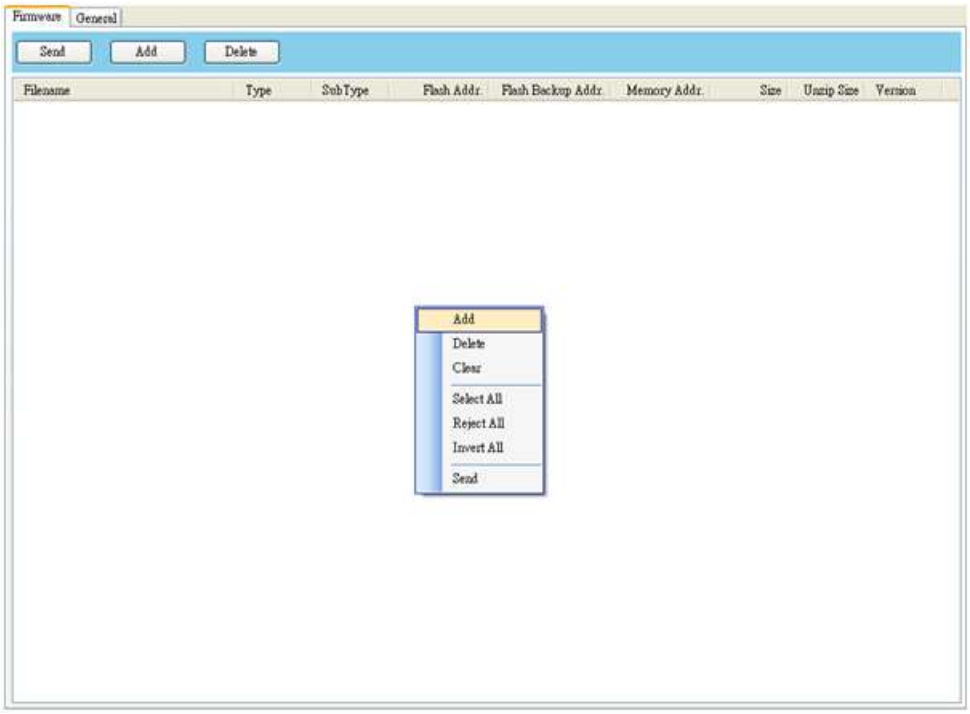


- If you are using the **COM** port, click **Setting**, and change the settings as you want. For example, you can change **Baud Rate** to a higher value to speed up the data transmission. Make sure the port settings are the same as those in the **COM** tab in **Parameter Setting**, or your printer won't work properly.

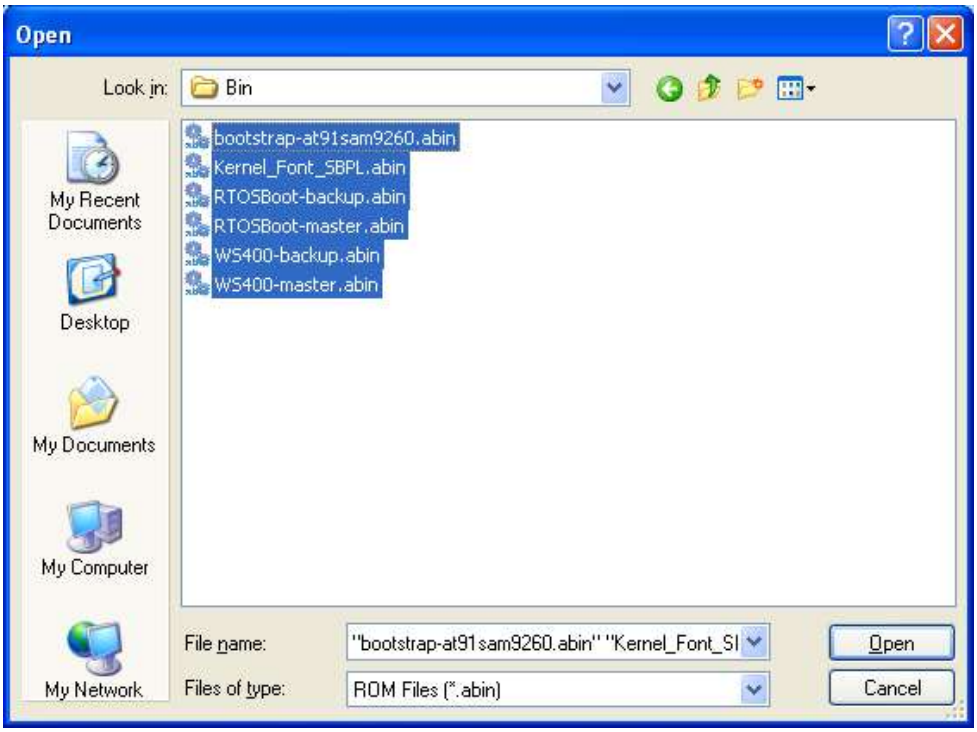
5. In the **Navigation** pane, click **Download** and click the **Firmware** tab.



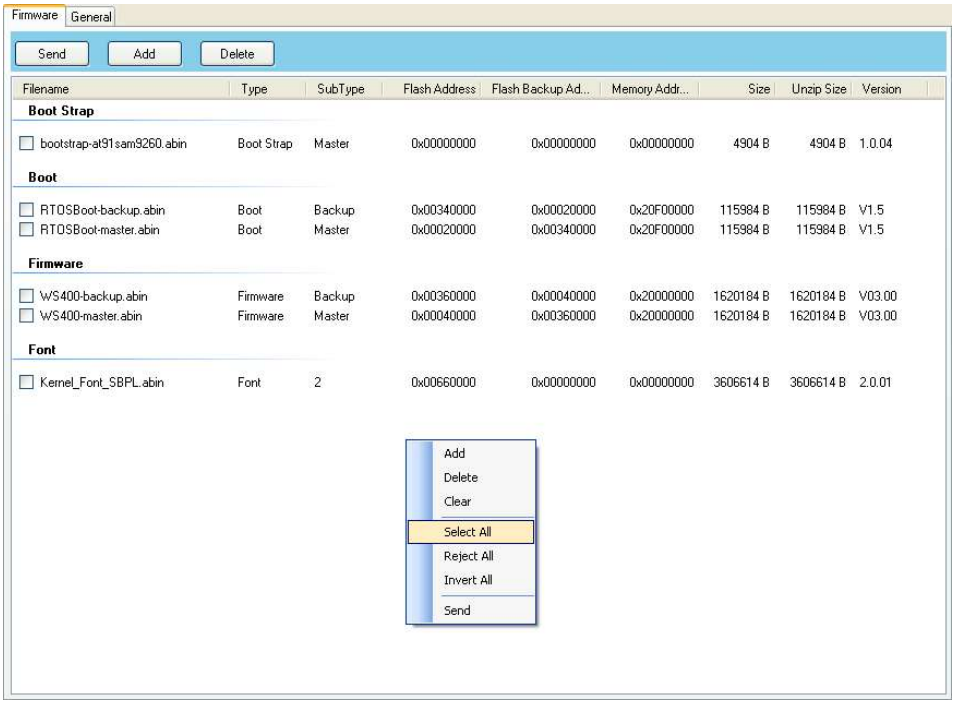
6. Right-click in the blank area and click **Add**.



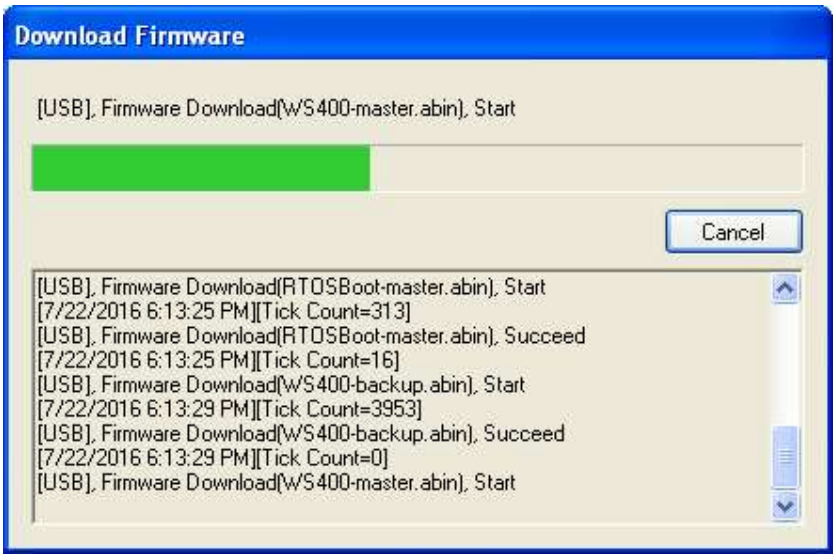
7. In the **Open** dialog box, browse to the folder that contains the firmware files. Select all of them and click **Open**.



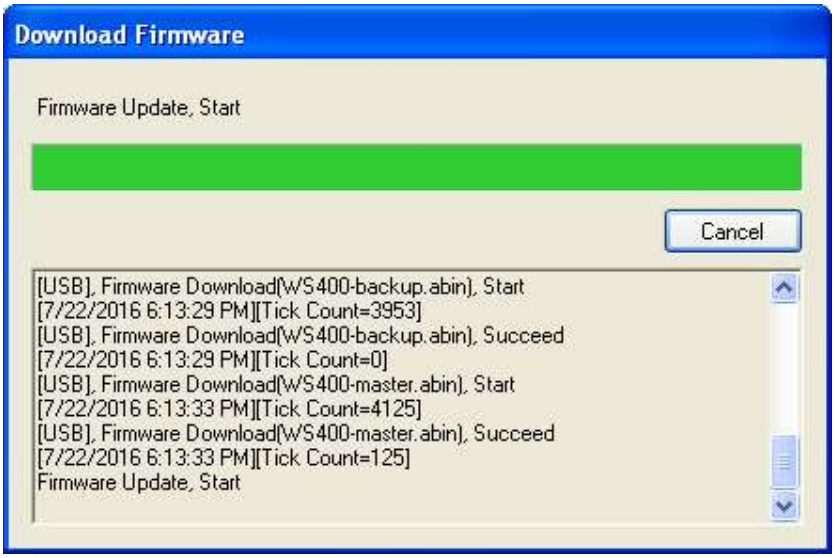
8. If you want to update specific files, select the check boxes of those files; if you want to update all of the firmware files, right-click in the blank area in the list, and click **Select All**.



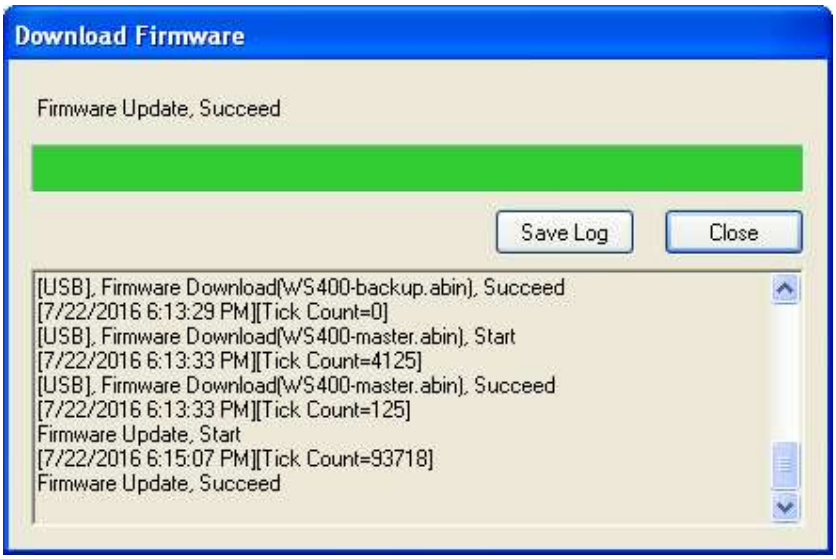
9. Click **Send** to send the firmware files to your printer. During the transmission, LED 1 blinks green. In the **Download Firmware** dialog box, the message shows the file your printer is downloading, and the progress bar indicates the progress of downloading.



10. When the data transmission is complete, your printer starts to update its firmware. During the update, LED 2 turns to red and orange alternatively, while LED 1 turns to solid green. In the **Download Firmware** dialog box, the message shows that your printer is updating the firmware.

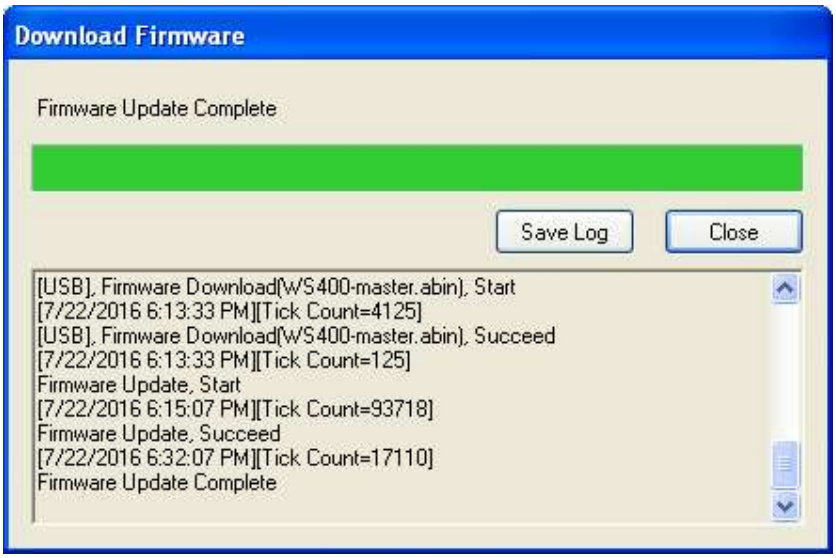


11. Printer will restart automatically after the message “Firmware Update, Succeed” appears.



12. When the update is complete, the message “Firmware Update Complete” appears. Click **Close** to close the dialog box, or click **Save Log** to save the

firmware update log.



Note Sometimes you'll find LED 2 keeps turning to red and orange alternatively after the message "Done" appears. It means your printer is updating the other copy of firmware. There are two copies of firmware stored in your printer: master and backup. They are used to restore each other in case the firmware is lost or corrupted. By default, the master is the primary copy. Your printer uses the backup if the master doesn't work.

5.1.2 Update via the LAN Port

Before you update the firmware via the **LAN** port, you need to set up a network connection. For details, see *Set up LAN connection*, *Set up IPv6 connection* and *Set up WLAN connection*.

1. Make sure the print module is closed.
2. Turn on your printer, and start SATO WS4 Printer Utility.
3. In the **Input/Output Port** list, click **LAN**, and do one of the following:

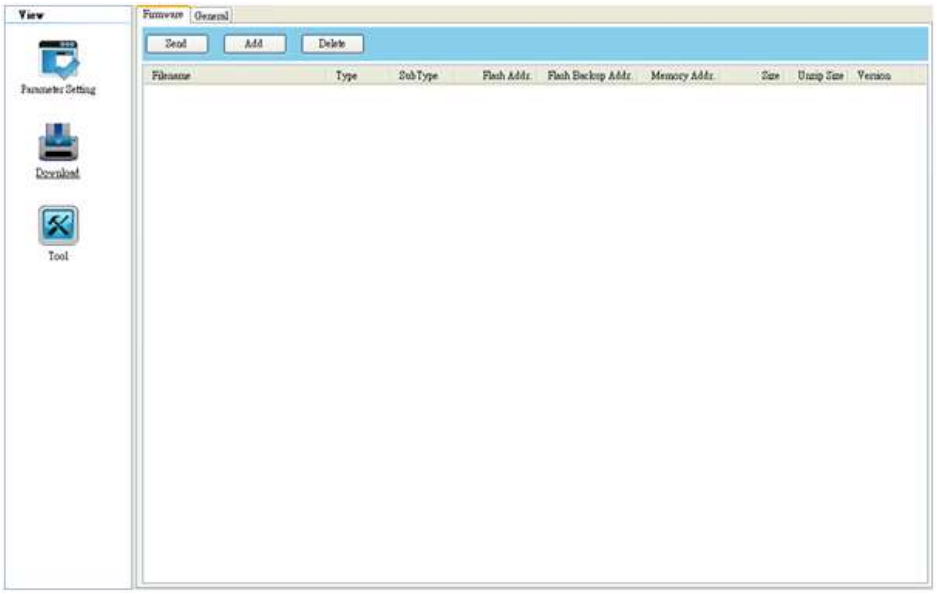
- If you are using the **LAN** port, the **Port Name** and **Port Information** will show the LAN settings after you set up a network connection.

LAN

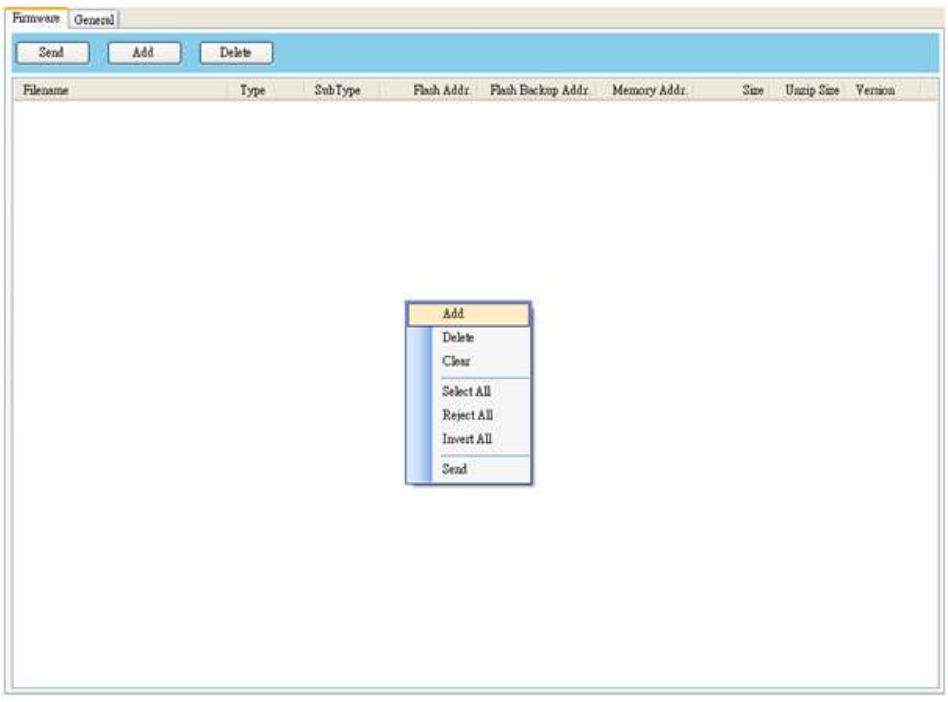
IPv6

WLAN

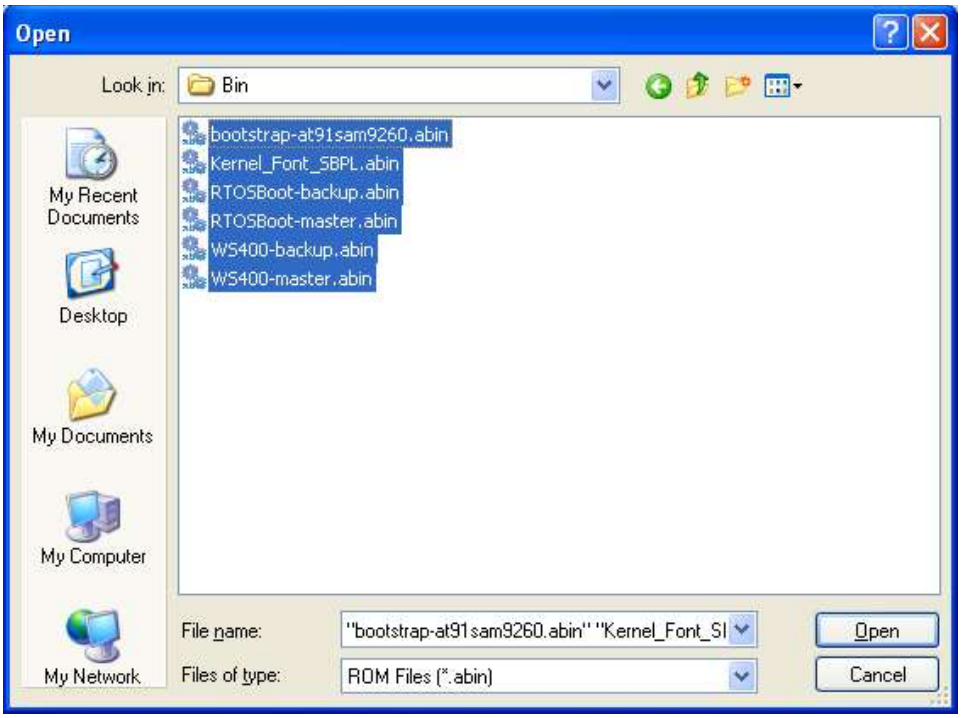
4. In the **Navigation** pane, click **Download** and click the **Firmware** tab.



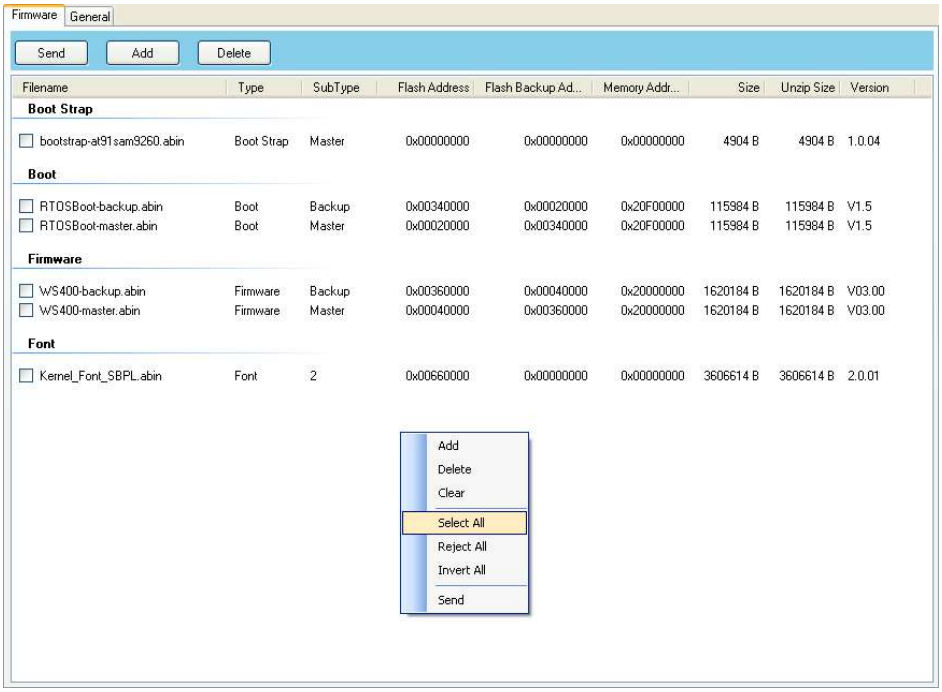
5. Right-click in the blank area and click **Add**.



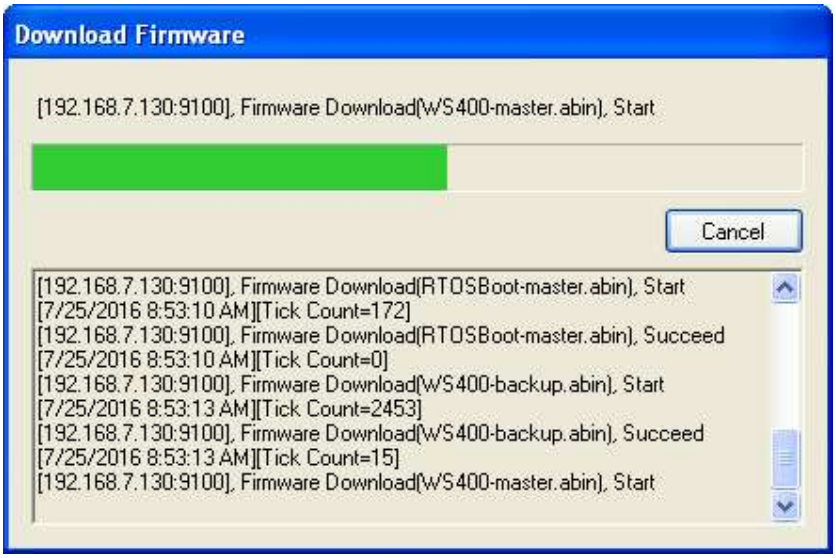
6. In the **Open** dialog box, browse to the folder that contains the firmware files. Select all of them and click **Open**.



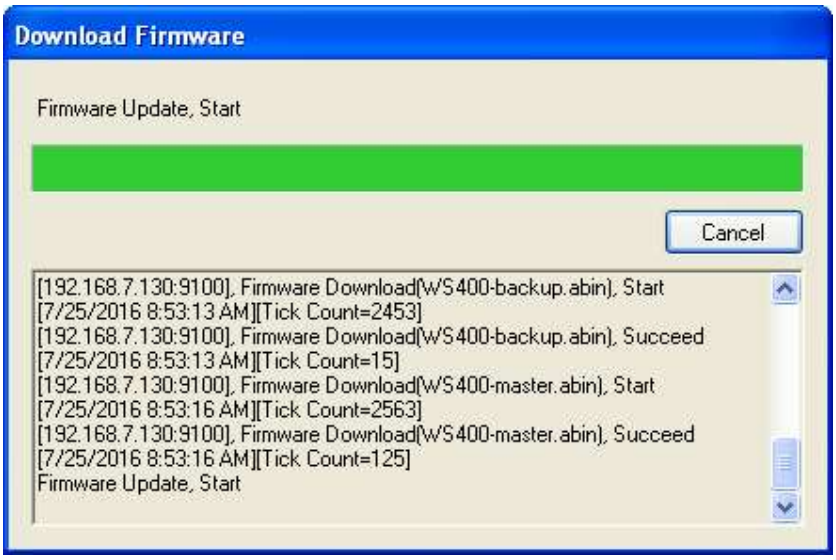
7. If you want to update specific files, select the check boxes of those files; if you want to update all of the firmware files, right-click in the blank area in the list, and click **Select All**.



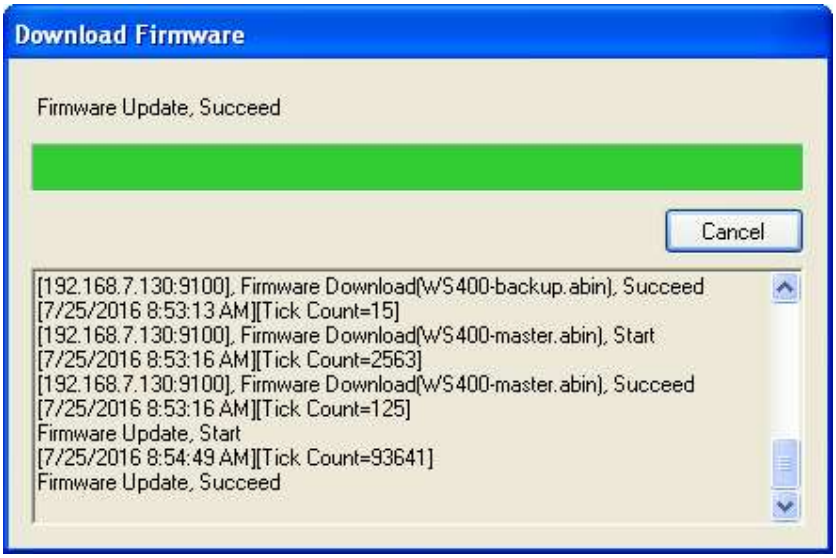
8. Click **Send** to send the firmware files to your printer. During the transmission, LED 1 blinks green. In the **Download Firmware** dialog box, the message shows the file your printer is downloading, and the progress bar indicates the progress of downloading.



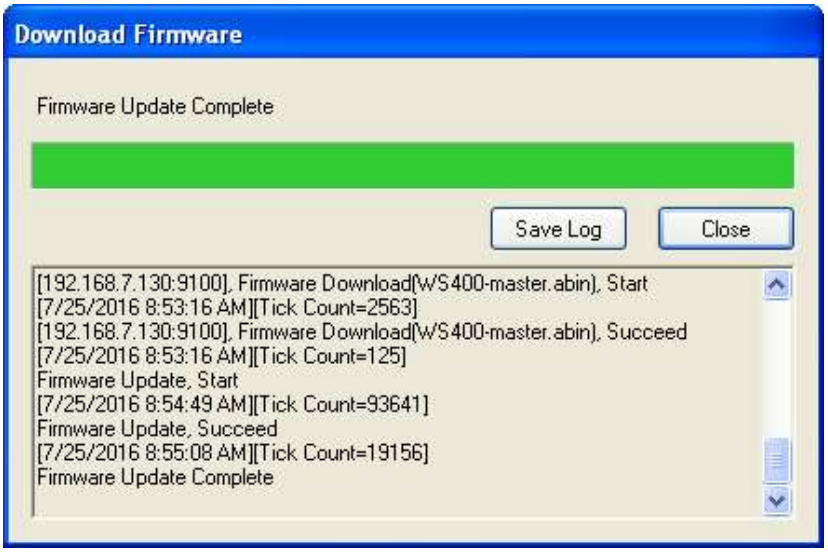
9. When the data transmission is complete, your printer starts to update its firmware. During the update, LED 2 turns to red and orange alternatively, while LED 1 turns to solid green. In the **Download Firmware** dialog box, the message shows that your printer is updating the firmware.



10. Printer will restart automatically after the message “Firmware Update, Succeed” appears.



11. When the update is complete, the message “Firmware Update Complete” appears. At the same time, your printer restarts itself. Click **Close** to close the dialog box or click **Save Log** to save the firmware update log.



5.2 Update Firmware via the USB Host

The USB host is a USB type A port for a USB flash drive, which can be used to quickly update the firmware.

1. Create a folder named “Firmware” in your USB flash drive, and copy the firmware files to it. The file “WS4-master.abin” needs to be in the folder.
2. Make sure the print module is closed and turn off your printer.
3. Turn ON the printer power (or reboot the printer) after insert your USB flash drive to the printer. The printer starts to transmit the firmware when LED bling one and another.

   Note You cannot transmit firmware even if insert your USB flash drive to the printer after turn ON the printer power (or reboot the printer).
4. When LED 1 and LED 2 are all green light, turn off the printer power, then remove USB flash driver.
5. Turn on the printer power. During the update, LED 2 blinks green a few times, and turns to red and orange alternatively. When the update is complete, LED 2 goes out.

Caution Do not remove the USB flash drive during the transmission.

5.3 Update Firmware in Atmel Mode

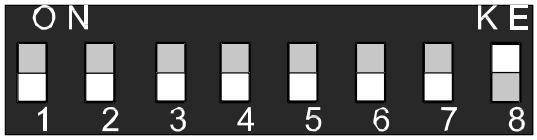
Service Engineer only

Typically, firmware can be updated in SATO WS4 Printer Utility without problems, but there are rare cases SATO WS4 Printer Utility cannot handle. If any unexpected conditions keep you from update firmware in SATO WS4 Printer Utility, you need to update it in Atmel mode.

Step 1. Enter Atmel Mode

This part describes how to enter Atmel mode.

1. Turn off your printer.
2. Turn over your printer.
3. Loosen and remove four screws from the base.
4. Lift the base and unplug all the cables.
5. Locate the DIP switch on the main board. Set Switch 1 and 2 to the **OFF** position (down).

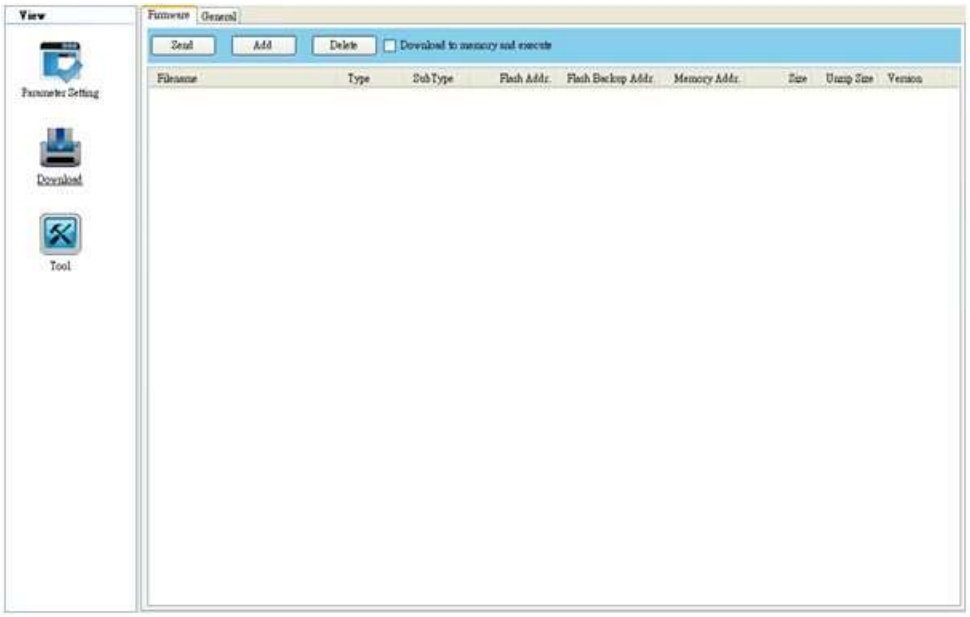


Step 2. Update Your Firmware

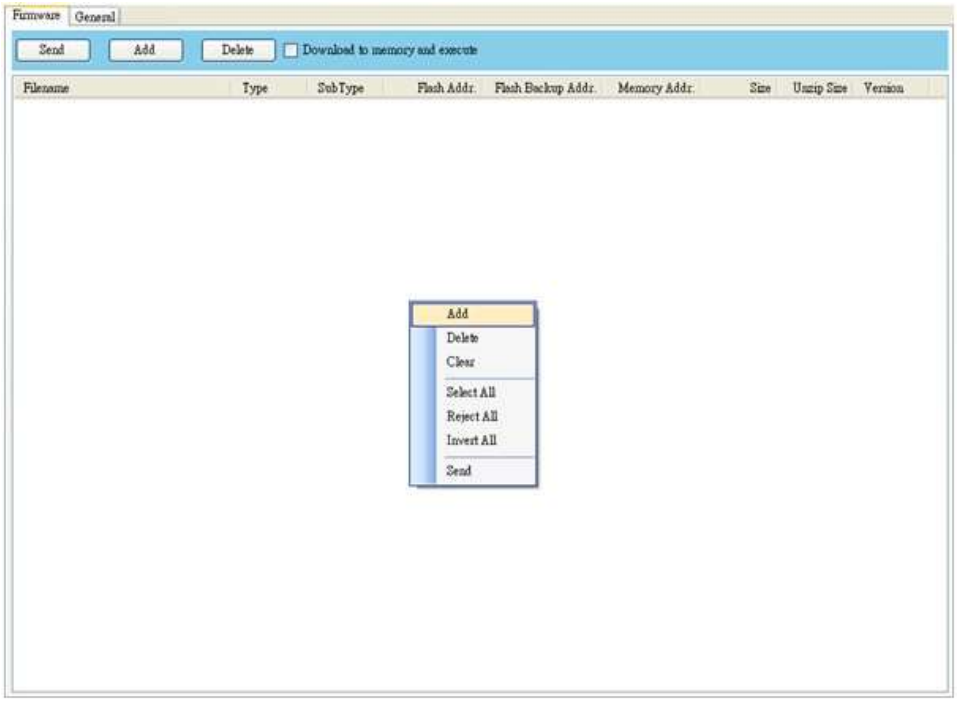
This part describes how to update your firmware in Atmel mode.

1. Plug all the cables back into the main board.
2. Turn on your printer. Both LEDs won’t glow. This is normal.

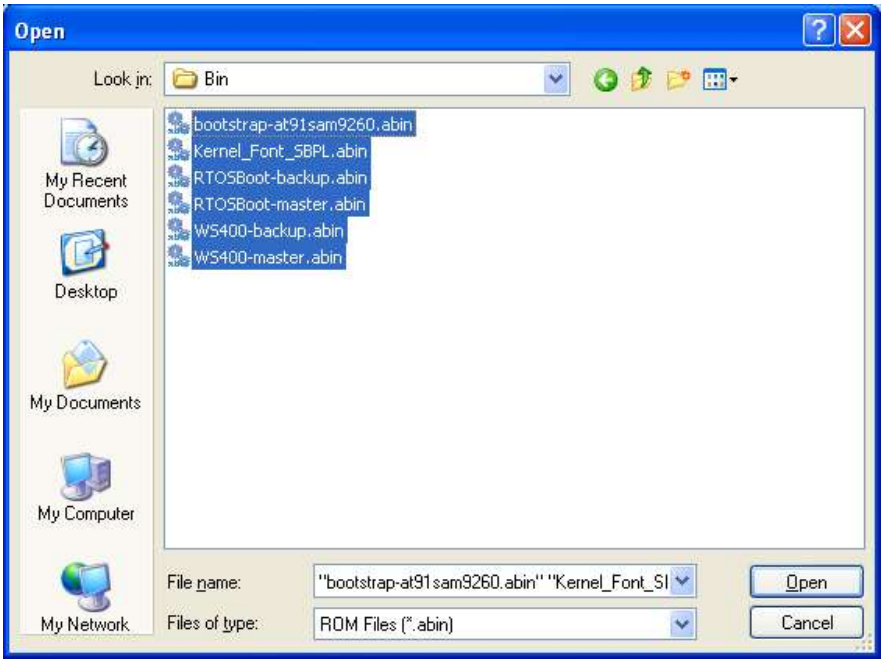
3. Start SATO WS4 Printer Utility. In the **Navigation** pane, click **Download** and click the **Firmware** tab.



4. Right-click in the blank area and click **Add**.

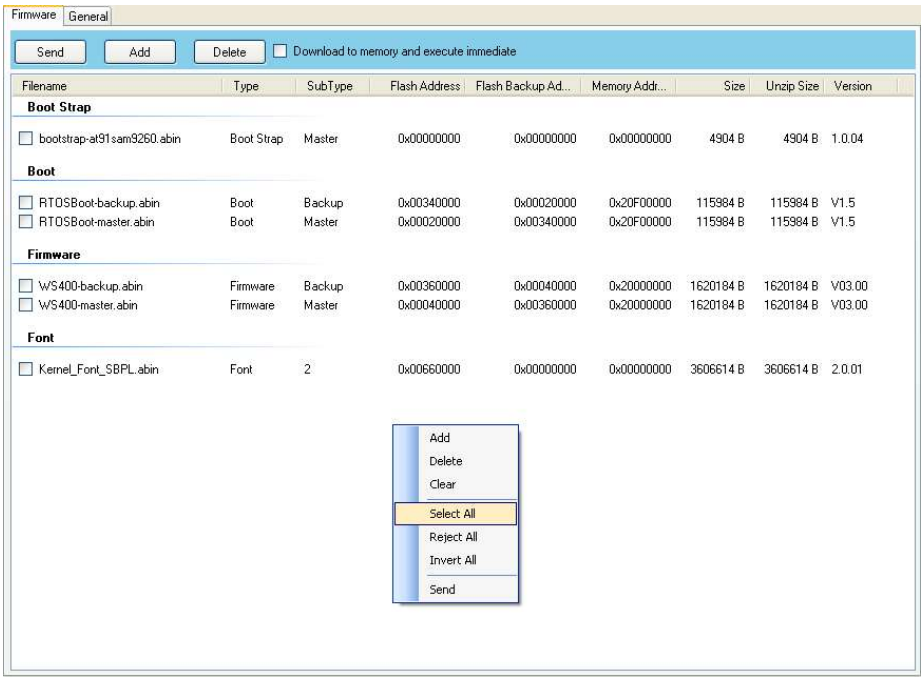


5. In the **Open** dialog box, browse to the folder that contains WS4 firmware files. Select all of them and click **Open**.

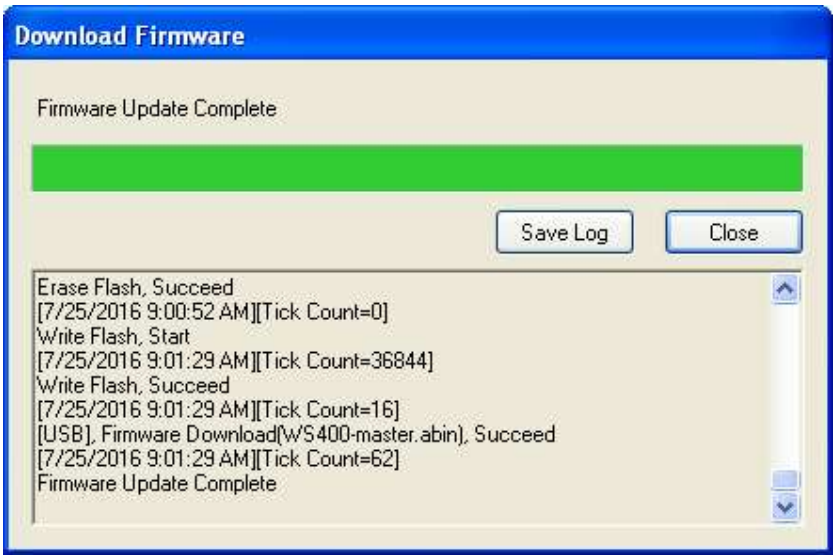


6. Right-click in the blank area in the list and click **Select All** to select all of the check boxes.

   Note: If you want to execute a firmware file without saving it into the flash memory, select the **Download to memory and execute** check box and click **Send**.



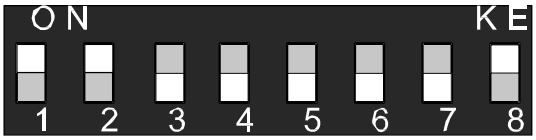
7. Click **Send** to send the firmware files to your printer. When the update is complete, the message “Done” appears. Click **Close** to close the dialog box or click **Save Log** to save the firmware update log.



Step 3. Exit Atmel Mode

This part describes how to exit Atmel mode.

1. Turn off your printer.
2. Set **DIP Switch** 1 and 2 to the **ON** position (up). If it’s inconvenient to set **DIP Switch** while cables are connected, unplug all the cables to do this.



3. Reinstall the base and the secure it with four screws.
4. Turn over your printer.
5. Turn on your printer.

6 Troubleshooting

This chapter provides the information about accessories issues, internal errors and their possible solutions.

6.1 Cutter and Dispenser Issues

Issue	Solution
The cutter is experiencing issues.	▮ If there is a paper jam, clear it. ▮ The cutter has become loose. Fix the cutter in position and tighten it. ▮ The cutter blade is not sharp anymore. Replace your cutter with a new one.
The dispenser is experiencing issues.	▮ If there is a paper jam, clear it. ▮ The dispenser has become loose. Fix the dispenser in position and tighten it. ▮ Make sure the liner is correctly threaded under the plate and the dispenser.

6.2 Internal Errors

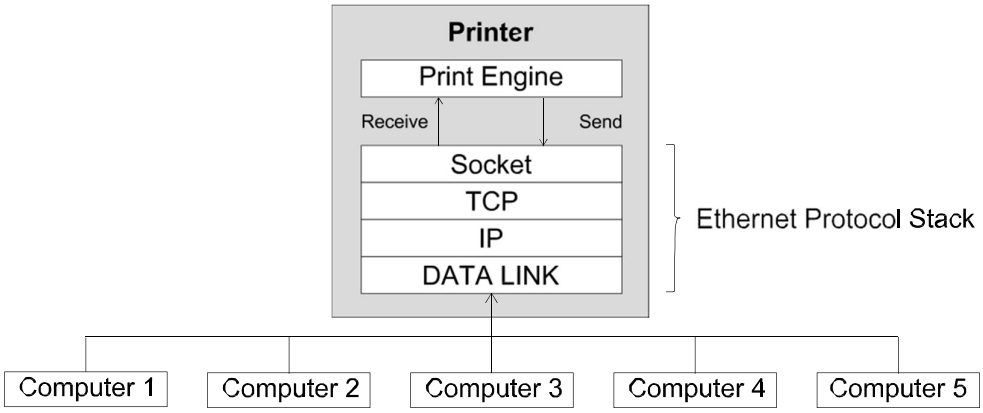
Error	Solution
Communication error (RS-232C).	▮ Check the serial cable to see if it is working okay. ▮ Make sure the serial cable is connected properly and the computer is turned on. ▮ In **SATO WS4 Printer Utility**, the settings of the **COM** port need to be the same as those in the **COM** tab in **Parameter**. ▮ The serial cable might not be wired correctly or might be damaged. Try to rewire it or get a new one.
Flash ROM on the CPU board error or USB memory error. An erase error has occurred when formatting the USB memory.	▮ Check your USB flash drive and see if it works properly. ▮ Make sure your USB flash drive is tightly plugged. ▮ The flash ROM or USB drive is damaged. Replace it.
Unable to save files due to insufficient USB memory.	▮ Delete the files on your USB drive to free some space, or replace your USB drive with an empty one.
Command error.	▮ Press the **FEED** button. ▮ Turn off your printer, and turn it on again.
An EEPROM for backup cannot be read or written properly.	▮ It is possible that the EEPROM is damaged. Replace it or the main board.
A command has been fetched from an odd address. Word data has been accessed from a place other than the boundary of the word data. Long word data has been accessed from a place other	▮ Check your commands and make sure they are correct.

Error	Solution
than the boundary of the long word data.	
An undefined command in a place other than the delay slot has been decoded.	
An undefined command in the delay slot has been decoded.	
A command which rewrites the data in the delay slot has been decoded.	

7 Network

This chapter provides the information about your printer networking.

7.1 Network Architecture



As the figure shows, the network architecture includes several layers, and each layer corresponds to the layer in the Open Systems Interconnection (OSI) model.

The print engine is on the application layer. It is a set of programs that handle most jobs for your printer, such as receiving data, analyzing data, drawing images, printing images and returning status. It communicates with TCP via the socket.

The socket is on the session layer. It is an application program interface (API) that opens, receives, sends and closes TCP sessions between your printer and network nodes to exchange data.

Transmission Control Protocol (TCP) and Internet Protocol (IP) are on the transport and the network layer, respectively. These two layers work closely together. The transport layer secures end-to-end data transfer by establishing a reliable connection that includes features such as packet resend control, packet order control, flow control and error checking. TCP is the protocol commonly used in transport layer.

IP is the commonly used protocol in the network layer. It defines an address system and provides end-to-end communication for data transmission. The packet is delivered based on the IP address in the IP header, which is attached to the packet. However, the packet may be lost, corrupted or out-of-order when it travels across the network, because IP doesn't ensure the delivery. TCP can prevent most of these things happen.

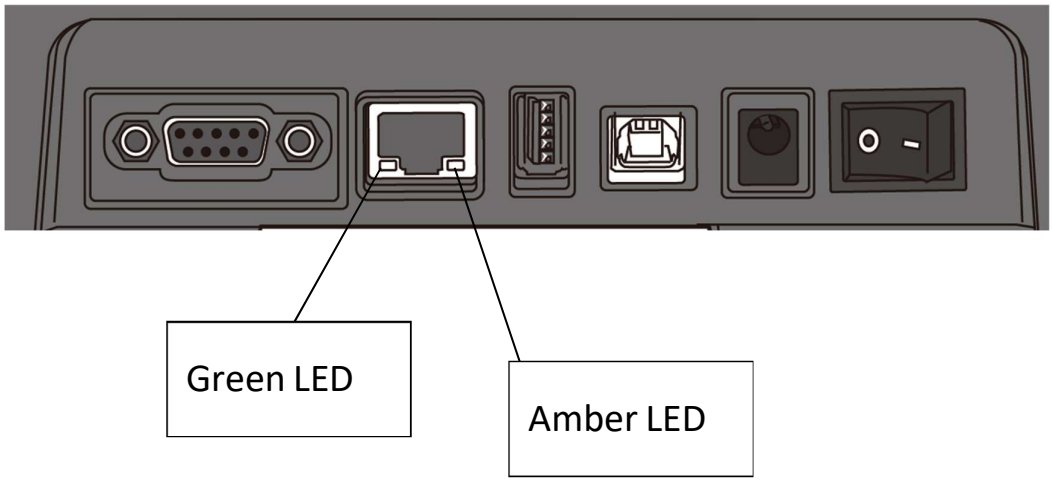
The data link is on the data link layer. Its task is to create and manage a reliable data transmission between two adjacent nodes in a network via MAC addresses. It divides the data from the network layer into bits, encodes these bits into frames prior to transmission, and decodes them at the destination. The data link also provides the error control and flow control. The error control uses a frame check sequence (FCS) to ensure that the delivered frames are intact and the flow control ensures that the fast sender doesn't overwhelm the slow receiver with data.

This architecture allows up to five computers to connect to a printer via the same port. When you turn on your printer, it opens the maximum number of ports and is waiting for a session request. Once your printer receives a request, it establishes a session and set it as "connected." If all of the sessions are occupied, no more connection is allowed. In this case, your printer returns the RST signal to the computer that made a request via the TCP protocol. When your printer finishes its communication with the computer, it releases the session to get ready for a new connection.

Data processing is determined by the connection priority. When your printer connects to multiple computers, it only processes the data from the oldest session (the first connected computer). The connection priority changes when there is a disconnection. Other computer needs to wait until its session becomes the oldest.

7.2 Ethernet Status Indicators

LED	Indicator	Status	Description	Note
Green	Speed	ON	100 Mbps	When both LEDs are off, there is no Ethernet connection.
		OFF	10 Mbps	
Amber	Link Activity	ON	Link Up	
		OFF	Link Down	
		Blink	Activity	



8 Specifications

This chapter provides specifications of your printer. Specifications are subject to change without notice.

8.1 Printer

Model	WS408DT	WS412DT
Print method	Direct Thermal	
Resolution	203 dpi (8 dots/mm)	300 dpi (12 dots/mm)
Media Alignment	Centered	
Operation Mode	Standard: Continuous **mode**, Tear-off **mode** Optional: Cutter **mode**, Dispenser **mode**	
Sensor	Media Sensor: Gap Sensor (Transmissive, Fixed) I-Mark Sensor (Reflective, Movable)	
	Head Open Switch	
Print Speed	2, 3, 4, 5, 6 inches/sec (50.8, 76.2, 101.6, 127, 152.4 mm/sec) 2 &3 ips for peel off mode	2, 3, 4 inches/sec (50.8, 76.2, 101.6 mm/sec) 2 &3 ips for peel off mode
Print Darkness	Darkness level – SBPL: 1~5 Default – SBPL: 3	
Max Printable Area	Length 999 mm x Width 104 mm	Length 999 mm x Width 104 mm
Non-Printable Area	Pitch Direction - Top: 1.5 mm, Bottom: 1.5 mm (excluding liner) Width Direction - Left: 1.5 mm, Right: 1.5 mm (excluding liner)	
Print Ratio	Average print ratio within 15 % or less (whole print layout area) Full width with 1 mm pitch is required	
Interface	STD Model: USB (Type A and Type B), Ethernet, RS232C LAN Model: USB (Type A and Type B), Ethernet	
Optional Interface	Wireless LAN, Bluetooth	
Accessories	Dispenser, Full Cutter, External Unwinder	
CPU	32bit RISC	

Model	WS408DT	WS412DT
Onboard Memory	Standard Memory (Flash ROM): 16 MB User Memory: 3 MB Standard Memory (SDRAM): 32 MB	
External Memory	USB: Max 16 GB	
Panel	2 LED, 1 Button	
LED	1st LED: Red and Green (Various Combinations: Orange) 2nd LED: Red and Green (Various Combinations: Orange)	
Font	Bitmap: XS, XU, XM, XB, XL, OCR-A, OCR-B Scalable: CG Times, CG Triumvirate	

8.2 Media

Properties	Description
Media Size	**Continuous Mode** Length: 8 mm ~ 996 mm (including liner 11mm~999mm) Width: 22.4 mm ~ 115 mm (including liner 25.4 ~ 118 mm) **Tear-Off Mode** Length: 30 mm ~ 996 mm (including liner 33mm~999mm) Width: 22.4 mm ~ 115 mm (including liner 25.4 ~ 118mm) **Dispenser Mode** Length: 35 mm ~ 150.4 mm (including liner 38mm~153.4mm) Width: 22.4 mm ~ 115 mm (including liner 25.4 ~ 118 mm) **Cutter Mode** Length: 35 mm ~ 993 mm (including liner 38mm~996mm) Width: 22.4 mm ~ 115 mm (including liner 25.4 ~ 118 mm) Media Thickness: 0.06~0.19mm Max Roll Diameter Size: 127 mm (5 inches) Max Roll Diameter Size for External Unwinder: 203.2 mm (8 inches)
Media Type	Direct Thermal Label Direct Thermal Tag Roll Paper (Inside Wound or Outside Wound) Fanfold Paper

8.3 Bar Codes

Programming Language	SZPL\SDPL\SEPL
One Dimensional Bar Code	UPC-A UPC-E JAN/EAN CODE39 CODE93 CODE128 GS1-128 (UCC/EAN128) CODABAR (NW-7) ITF Industrial 2of5 MSI UPC add-on code POSTNET GS1 DataBar Omnidirectional GS1 DataBar Truncated GS1 DataBar Stacked GS1 DataBar Stacked Omnidirectional GS1 DataBar Limited GS1 DataBar Expanded GS1 DataBar Expanded Stacked
Two Dimensional Bar Code	QR Code PDF417 (including MicroPDF) DataMatrix (ECC200) GS1 DataMatrix MaxiCode
Composite Symbol	EAN-13 Composite (CC-A/CC-B) EAN-8 Composite (CC-A/CC-B) UPC-A Composite (CC-A/CC-B) UPC-E Composite (CC-A/CC-B) GS1 DataBar Composite (CC-A/CC-B) GS1 DataBar Truncated Composite (CC-A/CC-B) GS1 DataBar Stacked Composite (CC-A/CC-B) GS1 DataBar Expanded Stacked Composite (CC-A/CC-B)

Programming Language	SZPL\SDPL\SEPL
	GS1 DataBar Expanded Composite (CC-A/CC-B) GS1 DataBar Stacked Omnidirectional Composite (CC-A/CC-B) GS1 DataBar Limited Composite (CC-A/CC-B) GS1-128 Composite (CC-A/CC-B/CC-C)

8.4 Wireless LAN

Properties		Wireless LAN I/F		
Hardware	Protocol	IEEE802.11b/g/n		
	Enabled Device	WS4 Series		
	Operating Temperature	-4 degF (-20 degC) ~ 185 degF (+85 degC)		
	Destination	USA	Europe	
	Frequency (Center Channel)	2412 ~ 2462 MHz	2412 ~ 2472 MHz	
	Channel	1 ~ 11 ch	1 ~ 13 ch	
	Spacing	5 MHz		
	Transmission Speed/ Modulation	IEEE 802.11b	Transmission Method	Conforming to IEEE 802.11b DSSS method
			Channel	Depending on the country
			Data Transmission Speed/Modulation	11/5.5 Mbps: CCK 2 Mbps: DQPSK 1 Mbps: DBPSK
		IEEE 802.11g	Transmission Method	Conforming to IEEE 802.11g OFDM method DSSS method
			Channel	Depending on the country
			Data Transmission Speed/Modulation	54/48 Mbps: 64 QAM 36/24 Mbps: 16 QAM 18/12 Mbps: QPSK 9/6 Mbps: BPSK
		IEEE 802.11n	Transmission Method	Conforming to IEEE802.11n OFDM method
			Channel	US)1-11ch (JP/DE)1-13ch
			Data Transmission Speed/Modulation	20MHz : 6.5M / 7.2M / 13M / 14.4M / 19.5M / 21.7M / 26M /28.9M /

39M / 43.3M / 52M / 57.8M / 58.5M / 65M /

Properties		Wireless LAN I/F
		72.2M(Auto-sensing)
	Antenna	External antenna
	Aerial power	802.11b Max +15 dBm
		802.11g Max +17 dBm
		802.11n Max +17 dBm
Software	Connection mode	Infrastructure, Adhoc
	Default IP Address	192.168.1.1
	Default Subnet Mask	255.255.255.0
	Default ESSID	SATO_PRINTER
	Default DHCP	Enable
	Security	IEEE 802.11i
	Cryptography	WEP (64/128bit), TKIP (WPA), AES (WPA2)
	Authorization	Shared Key, Open System, PSK, PEAP, TLS, TTLS, LEAP, EAP-FAST
	Protocol (*)	TCP/IP, Socket, LPD（LPR）, DHCP
	Wireless LAN Parameter and Status Monitor	Parameter: Command (Printer Utility)

8.5 Bluetooth

Properties	Bluetooth I/F
Standard	Bluetooth 2.1 + EDR or later
Enable Device	WS4 Series
Operating Temperature	41°F (5°C) ~ 104°F (40°C)
Storage Temperature	-4°F (-20°C) ~ 140°F (60°C)
Operating Humidity	25 ~ 85 % Non-condensing R.H
Storage Humidity	10 ~ 90 % Non-condensing R.H
Connection Form	Only one-to-one connection is supported.
Support Profile	Serial Port Profile (SPP) PIN code is supported.
Class of Radio Transmission	CLASS 2
Transmission Method	Bi-directional (Half-duplex)
Flow Control	Credit based flow control
Operating Mode	Slave Mode
Transmission Distance	10m without obstacles (360 degrees)
SR Mode in Page/Inquiry Scanning	R1 Scan Interval 1.28 sec. Scan Window 22.5 msec.
RF Frequency Range	2402 ~ 2480 MHz
Nominal Output Power	+4 dBm (2.51 mW) MAX

8.6 Ethernet

Properties	Description
Port	RJ-45
Speed	10Base-T/100Base-T (Auto Detecting)
Protocol	ARP, IP, ICMP, UDP, TCP, HTTP, DHCP, Socket, LPR, IPv4, SNMPv2
Mode	TCP Server/Client, UDP Client
Technology	HP Auto-MDIX, Auto-Negotiation

8.7 Electrical and Operating Environment

Properties	Range
Power Supply	Voltage: AC 100 V ~ 240 V ± 10 % (full range) Frequency: 50 Hz - 60 Hz ± 5 %
Power Consumption	60 W
Temperature	Operating: 5 °C ~ 40 °C Storage: -20 °C ~ 60 °C
Humidity	Operating: 25 %RH ~ 85 %RH (non-condensing) Storage: 10 %RH ~ 90 %RH (non-condensing)

8.8 Physical Dimension

Dimension	Size and Weight
Size	W 183.8 mm x D 225.9 mm x H 166.0 mm
Weight	Approx. 1.74 kg (excluding media and options) or less

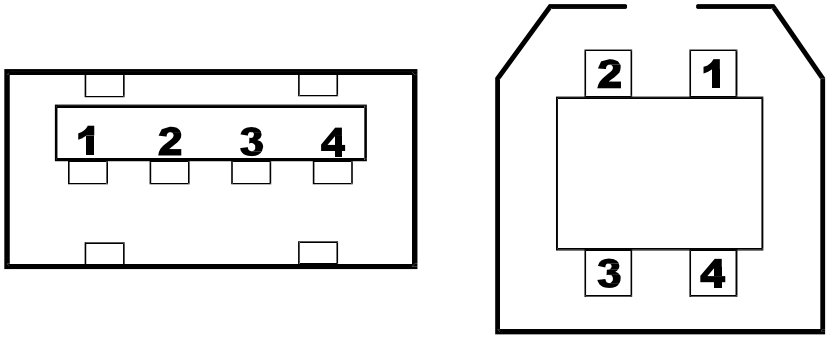
8.9 Interfaces

This section provides information about IO port specifications for your printer.

8.9.1 USB

Your printer has two USB ports: type A and type B. Typically, type A is found on computers and hubs; type B is found on devices and hubs. The figure below shows their pinouts.

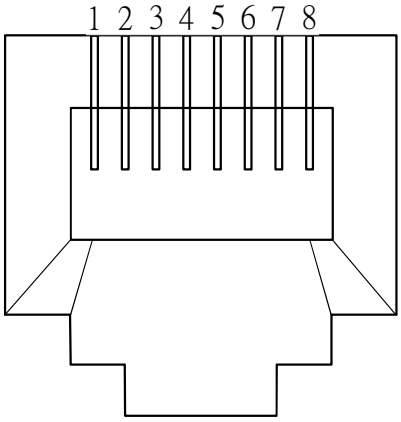
Type A	Type B



Pin	Signal	Description
1	VBUS	+5V
2	D-	Differential data signaling pair -
3	D+	Differential data signaling pair +
4	Ground	Ground

8.9.2 Ethernet

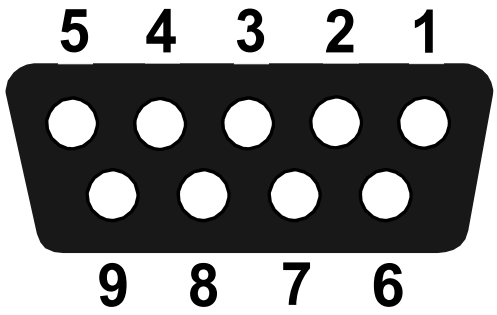
The Ethernet uses RJ-45 cable, which is 8P8C (8-Position 8-Contact). The figure below shows its pinout.



Pin	Signal
1	Transmit+
2	Transmit-
3	Receive+
4	Reserved
5	Reserved
6	Receive-
7	Reserved
8	Reserved

8.9.3 RS-232C

The RS-232C on your printer is DB9 female. It transmits data bit by bit in asynchronous start-stop mode. The figure below shows its pinout.



Pin	Signal	Description
1	+5V	Provide 5V Power
2	RxD	Receive
3	TxD	Transmit
4	NC	No Connection
5	GND	Ground
6	Hi	Pull High
7	RTS NC	Request to Send
8	CTS	Clear to Send
9	Hi	Pull High

Speed: 2400, 4800, 9600, 19200, 38400, 57600, 115200 Bauds

Parity: Odd, Even or None

Data Bits: 7 or 8 Bits

Stop Bits: 1 or 2 Bits

Flow Control: XON/XOFF or RTS

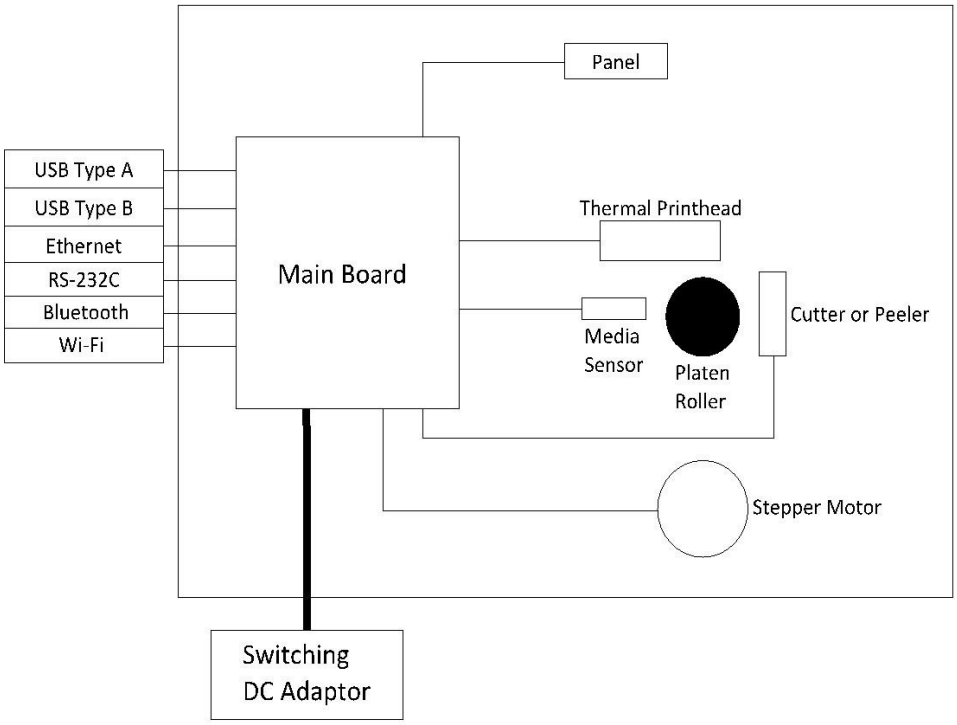
Default Parameters: 9600 Bauds, No Parity, 8 Data Bits, 1 Stop Bit, XON/XOFF

Host (DB9)			Printer (DB9)		
Signal	**Description**	**Pin**	**Pin**	**Description**	**Signal**
CD	Carrier Detect	1	1	Provide 5V Power	+5V
RxD	Receive	2	2	Receive	RxD
TxD	Transmit	3	3	Transmit	TxD
DTR	Data Terminal Ready	4	4	No Connection	NC
GND	Ground	5	5	Ground	GND
DSR	Data Set Ready	6	6	Pull High	Hi
RTS	Request to Send	7	7	Request to Send	RTS
CTS	Clear to Send	8	8	Clear to Send	CTS
CI		9	9	Pull High	Hi

9 Technical Drawings

This chapter provides technical drawings of your printer.

9.1 Main Board Diagram



Main Board

A printed circuit board assembly (PCBA) consists of a microcontroller, flash memory, SDRAM and more.

Panel

A two-layer PCBA consists of one button and two LEDs.

Media Sensor

A two-layer PCBA consists of a reflective and a transmissive sensor, which is designed for media detection.

Thermal Printhead (TPH)

It consists of a line of tiny resistors that is electronically controlled to produce heat for printing. For direct thermal printing, a TPH directly heats up an area of the thermal paper to produce an image.

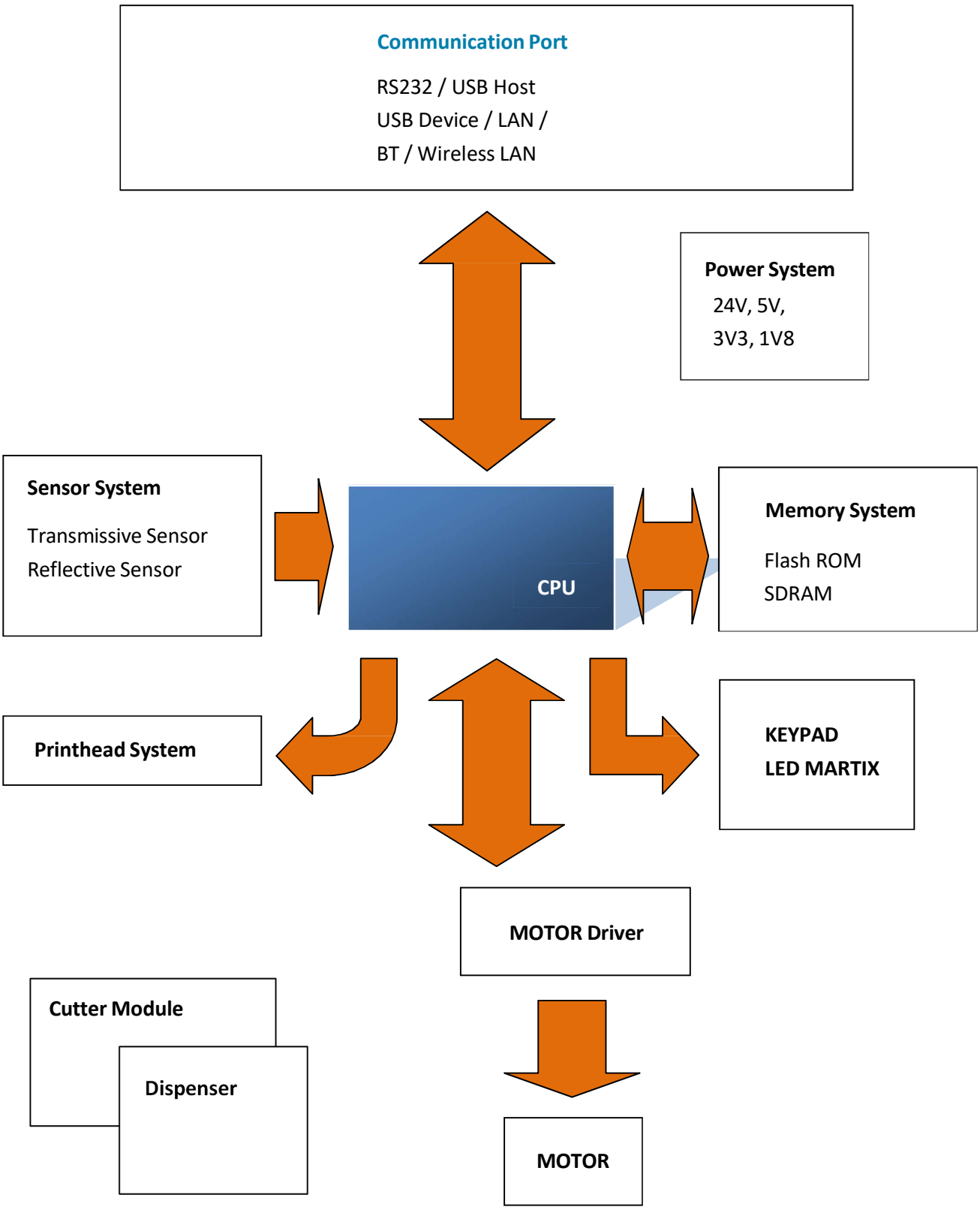
Stepper Motor

A stepper motor rotates certain degrees in each step-in response to an electronic pulse.

Cutter or Dispenser (Optional)

A cutter is a guillotine cutter which automatically cuts the printed label. There are two cutting types: full and partial. A dispenser automatically removes the liner from a printed label. The sensor on the dispenser detects if the peeled label is taken away.

9.2 System Diagram



Microcontroller (U11)

The microcontroller (MCU) is AT91SAM9260. The MCU is like a microcomputer which integrates CPU, memory, I/O ports, timers and other components. The CPU it uses is ARM926-based processor.

Flash memory (U18)

The flash memory stores firmware, graphics, label formats, soft fonts and BASIC files.

SDRAM (U17)

SDRAM is volatile memory, typically storing working buffers and parameters. After the power is turned off, all of the data is gone.

RS-232 Buffer (U14)

Convert the serial port signal to/from microcontroller to RS-232 voltage level.

Keypad LED Matrix

It is an interface for users to interact with your printer. It has a **FEED** button and two LEDs.

Power (U13, U15, D19)

A regulator converts 24V DC to 5V DC as the VCC source for most of components on main board. LDOs are 5V to 3.3V for I/O, 3.3V to 1.8V for CPU core.

Motor Driver (U2)

The motor driver is BD63877. It acts as an amplifier, which takes low-current signals and generates high-current signals. Since the motor typically requires voltages or currents that exceed what the circuitry can provide, the motor driver is capable of providing higher voltages or currents for the motor.

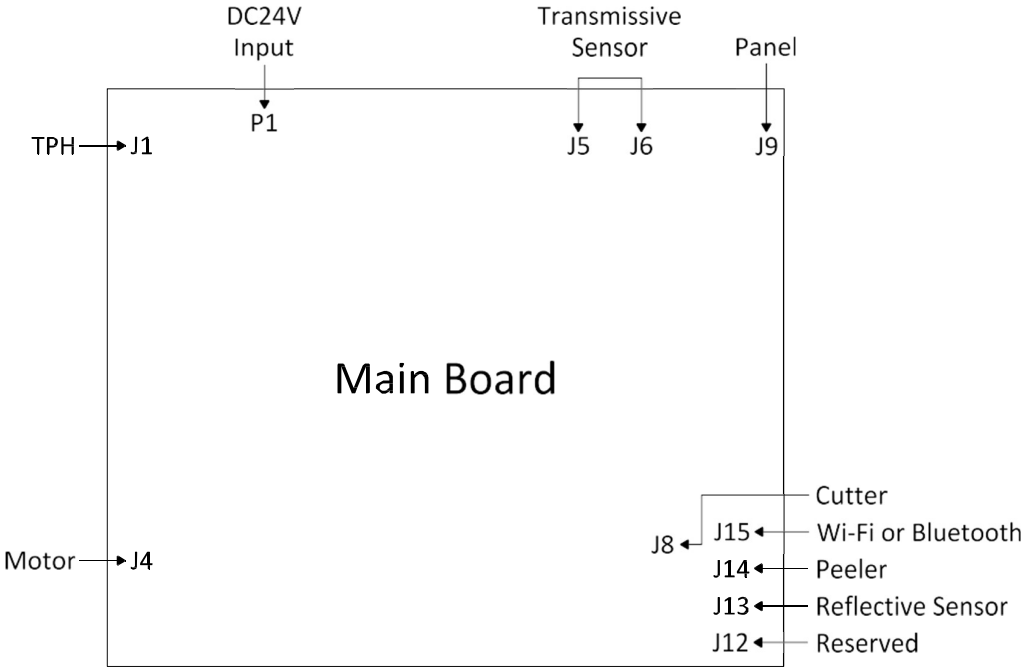
Ethernet PHY (U9)

It is used to send and receive Ethernet frames. It complies with the IEEE 802.3 specifications for 10BASE-T and 100BASE-TX.

TPH Driver (U4)

The TPH driver IC is used to switch TPH heaters on and off.

9.3 Wiring Diagram



Appendix A: DIP Switch

DIP Switch	Description	Description	Default
1	Switch between the firmware mode and Atmel mode.	ON: Firmware mode. It boots your printer from the flash memory. OFF: Atmel mode. It boots your printer from CPU ROM. **Important** In Atmel mode, DIP 2 (watchdog) must be set to OFF.	ON
2	Enable or disable the watchdog.	ON: Enable watchdog OFF: Disable watchdog	ON
3	Reserved.	N/A	OFF
4	Reserved.	N/A	OFF
5	Reserved.	N/A	OFF
6	Reserved.	N/A	OFF
7	Select your printer type. It needs to be used with DIP 8.	DIP 7 <ON>, DIP 8 <ON> Printer Type: For developers to debug DIP 7 <ON>, DIP 8 <OFF> Printer Type: DT Reserve DIP 7 <OFF>, DIP 8 <ON> Printer Type: DT global DIP 7 <OFF>, DIP 8 <OFF> Printer Type: TT global	Depending on your printer type
8	Select your printer type. It needs to be used with DIP 7.		Depending on your printer type