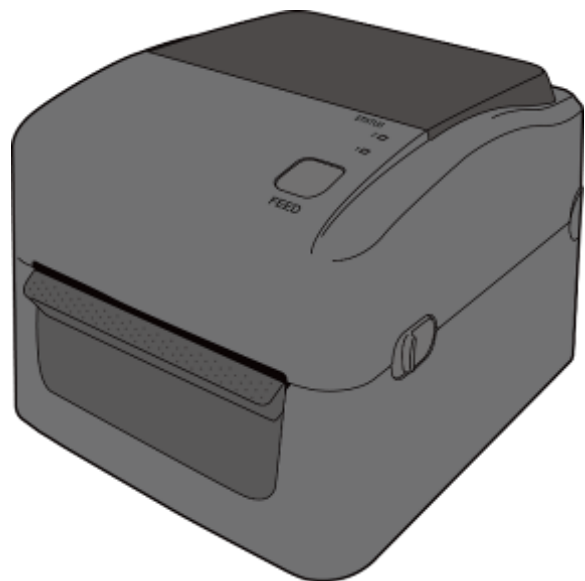




# **WS4 DT Series Printer**

## **Service Manual**

WS408DT / WS412DT



WS4-DT-r07-04-03-21SM

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# Contents

<b>1</b>	<b>Introduction .....</b>	<b>1</b>
1.1	About This Manual .....	1
1.2	Warnings and Cautions.....	1
<b>2</b>	<b>Maintenance .....</b>	<b>2</b>
2.1	Print Head Maintenance .....	2
<b>3</b>	<b>Spare Parts List .....</b>	<b>3</b>
<b>4</b>	<b>Spare Parts Removal and Assembly .....</b>	<b>12</b>
4.1	Top Cover .....	12
4.2	Platen Roller and Front Cover .....	13
4.3	Main Board and Bottom Cover .....	14
4.4	Mid Cover .....	16
4.5	Motor .....	16
4.6	Sensors .....	18
4.7	TPH .....	21
4.8	RTC Battery Replacement .....	21
	Printer Status and Interface Connection .....	23
4.9	Printer Status Indication .....	23
4.10	Printer Connector Pin Assignment.....	24

# 1 Introduction

## 1.1 About This Manual

This service manual gives the information necessary for you to adjust and repair the WS4 DT printer. This service manual is written only for SATO authorized service personnel. The information in this manual is confidential to general users.

This service manual is used as an extension of the operator manual. For basic specification, Installation, operation and configurations of the printer, refer to the operator manual of the WS4 DT printer.

## 1.2 Warnings and Cautions

Before doing maintenance, please notice the following:

- Put the device in a safe place.
- Please keep the device in a clean and dry area.



### **WARNING**

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When replace or install any parts, please check following:

- Turn off power.
- Disconnect the power cord of the AC Adapter.
- Disconnect the USB cable.

### **CAUTION (Static Discharge)**

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- The printer electronics are sensitive to static discharge.
- Wear an anti-static wristband and attach it to the printer chassis.

### **CAUTION (Replace Parts)**

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- Please do not wear jewelry.
- Please do not get hands and parts wet.

## 2 Maintenance

### 2.1 Print Head Maintenance



**Warning:** Always turn off the printer before cleaning.

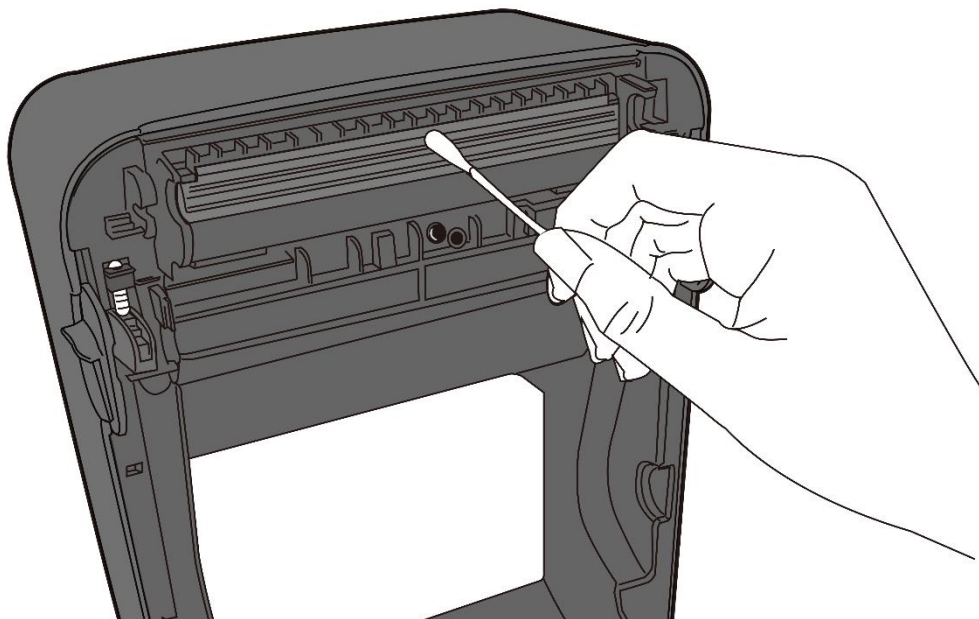
It is essential to keep print head clean if you want the best printing quality. We strongly recommend that you clean the print head when loading a new media roll. If the printer is operated in critical environment or the print quality declines, you need to clean the print head more frequently.

Keep in mind these things before you clean TPH:

- Keep water away in case of corrosion on heating elements.
- If you just finish printing, wait until the print head cools down.
- Do not touch the print head with bare hands or hard objects.

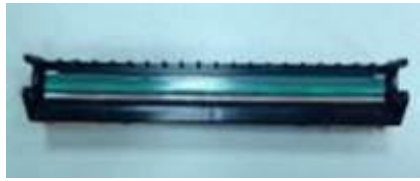


Cleaning Steps:

1. Moisten a soft cloth or a cotton swab with ethyl alcohol.
2. Gently wipe the print head in one direction. That is, wipe it only from left to right or vice versa. Do not wipe back-and-forth, in case dust or dirt attaches to the print head again.



**Note:** Print head warranty becomes void if print head's serial number is removed, altered, defected or made illegible, under any circumstance.

### 3 Spare Parts List

Parts Number	Description	Picture
WD204-001	PRINT HEAD (203dpi) WS408DT	
WD301-001	PRINT HEAD (300dpi) WS412DT	
59-WD2A1-001	ASSY-PLATEN-WS4DT-ST	
59-WD2A2-001	ASSY-SENSORS-WS4DT	
59-WT2A3-001	ASSY-MAIN-PCBA-WS4-LAN (USB + LAN)	
59-WT2A3-011	ASSY-MAIN-PCBA-WS4-STD (USB + LAN + RS232C)	






Parts Number	Description	Picture
59-WD2A3-001	ASSY-MOTOR-WS4DT	
59-WD2A4-001	SW-PSU-WS4DT	
59-WD2A4-011	SW-PSU-WS4DT-CN	
59-WD2A5-001	ASSY-PANEL-PCBA-WS4DT	
59-WD2A6-001	HRNS-PRINT-HEAD-WS4DT	






Parts Number	Description	Picture
59-WD2A7-001	GEARS-WS4DT	
59-WD2A8-001	SPRING-PRINT-HEAD-WS4DT	
59-WD2A9-001	ASSY-TOP-COVER-WS4DT-ST	
59-WD2B1-001	MID-COVER-WS4DT-ST	
59-WD2B2-001	UPPER-CHASSIS-WS4DT	
59-WD2B3-001	ASSY-MEDIA-HLDR-R-WS4DT-ST	


Parts Number	Description	Picture
59-WD2B4-001	ASSY-MEDIA-HLDR-L-WS4DT-ST	
59-WD2B5-001	BOTTOM-COVER-WS4DT-LAN	
59-WD2B5-011	BOTTOM-COVER-WS4DT-STD	
59-WD2B6-001	FRONT-COVER-WS4DT	
59-WD2B9-001	PANEL-CABLE -WS4DT	

Parts Number	Description	Picture
59-WD2C1-001	LOWER-CHASSIS-WS4DT	
59-WD2C2-001	RACK-HOLDER-SIDE-WS4DT	
59-WD2C3-001	RACK-HOLDER-MID-WS4DT	
59-WD2C4-001	LATCH-WS4DT	
59-WD2C5-001	HINGE-COVER-WS4DT-ST	

Parts Number	Description	Picture
59-WD2C6-001	SHAFT-LATCH-WS4DT	
<del>59-WD2A4-021</del>  Replaced by 59-WD2A4-001	<del>SW-PSU-WS4DT-EX1</del>	
59-WD2C7-001	POWER-CORD-WS4DT-CN	
59-WD2C7-061	POWER-CORD-WS4DT-EX1	
59-WD2C7-031	POWER-CORD-WS4DT-EU (For EU, VN-NESIA and KR Area Code)	

Parts Number	Description	Picture
59-WD2C7-011	POWER-CORD-WS4DT-UK (For UK, SP and MY Area Code)	
59-WD2C7-021	POWER-CORD-WS4DT-TH	
59-WD2C7-041	POWER-CORD-WS4DT-IND	
59-WD2C7-051	POWER-CORD-WS4DT-PA	
59-WD2C7-071	POWER-CORD-WS4DT-BR	

Parts Number	Description	Picture
59-WD2C7-081	POWER-CORD-WS4DT-AR	
59-WD2C7-091	POWER-CORD-WS4DT-SA	
59-WT2A3-031	ASSY-MAIN-PCBA-WS4-LAN-RTC USB + LAN (RTC)	
59-WT2A3-041	ASSY-MAIN-PCBA-WS4-STD-RTC USB + LAN + RS232C (RTC)	
59-WD2C8-001	PACKAGING-BOX-SET-WS4DT	
59-WD205-001	BRACKET-CUTTER-S	

59-WD2C7-041	POWER-CORD-WS4DT-IND	
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## 4 Spare Parts Removal and Assembly

### 4.1 Top Cover

Open the top cover. (Figure A-1)

- 1 Use screwdriver to loosen the 4 screws which marked in orange. Disconnect cable to feed button. (Figure A-1)
- 2 Take off the top cover. (Figure A-2)



**Warning:**

Always turn off printer power before removal.

A-1



A-2



## 4.2 Platen Roller and Front Cover

### Platen Roller

1. Remove the dispenser plate by lifting it upward. (Figure B-1)
2. Slightly push both pinches to release the platen roller from printer module as shown in Figure B-1, and then pull the two pinches upward to take off the platen roller. (Figure B-2)



#### Warning:

Always turn off printer power before removal.

B-1



B-2



### 4.3 Main Board and Bottom Cover

1. Put the printer up-side-down, loosen screws to remove the power cover. Continue to loosen the 4 screws which marked in yellow to remove the bottom cover. (Figure C-1)
2. Disconnect all cables from MB then lift up the whole printer module. (Figure C-2)
3. Use screwdriver to loosen the 2 screws which marked in orange. Now, the main board and bottom cover can be taken out separately. (Figure C-3)



**Warning:**

Always turn off printer power before removal.

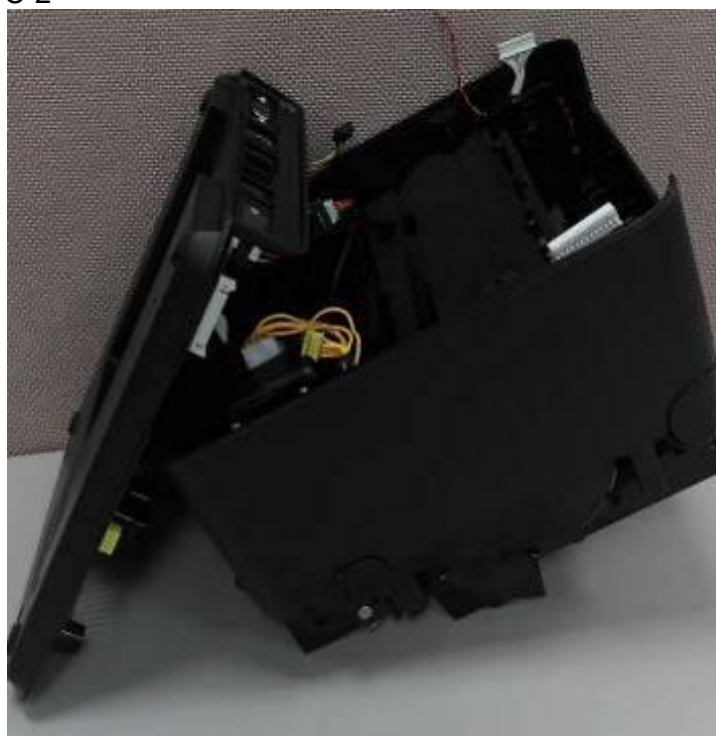
**Caution:**

When disconnect the power cord, please wait 10 seconds before removing any connectors from the printer.

C-1



C-2



C-3



## 4.4 Mid Cover

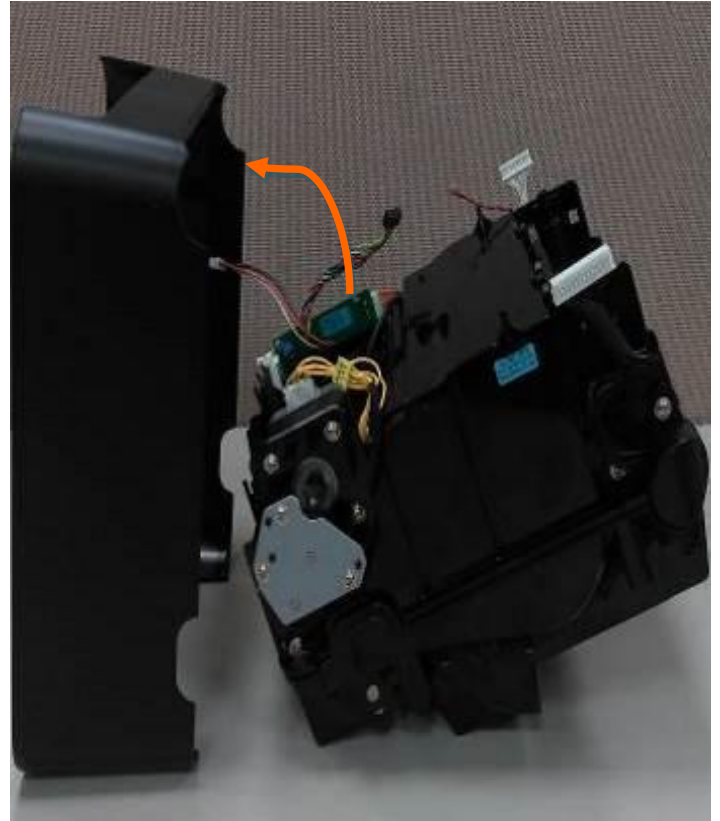
1. Remove the main board and bottom cover first
2. Pull the mid cover downward and take out it. (Figure D-1)



### Warning:

- Always turn off printer power before removal.
- Before replacing TPH, please wait for the printer head temperature to cool.

D-1



## 4.5 Motor

1. Remove the mid cover of the printer first, and then cut cable tie which locates the cable of motor as shown in Figure E-1.
2. Using screwdriver to loosen the 3 screws from the printer module. (Figure E-2)
3. Take the motor as shown in Figure E-3



### Warning:

Always turn off printer power before removal.

### Caution:

- When disconnect the power cord, please wait 10 seconds after removing any connectors from the printer.
- Wait for the motor temperature to cool.

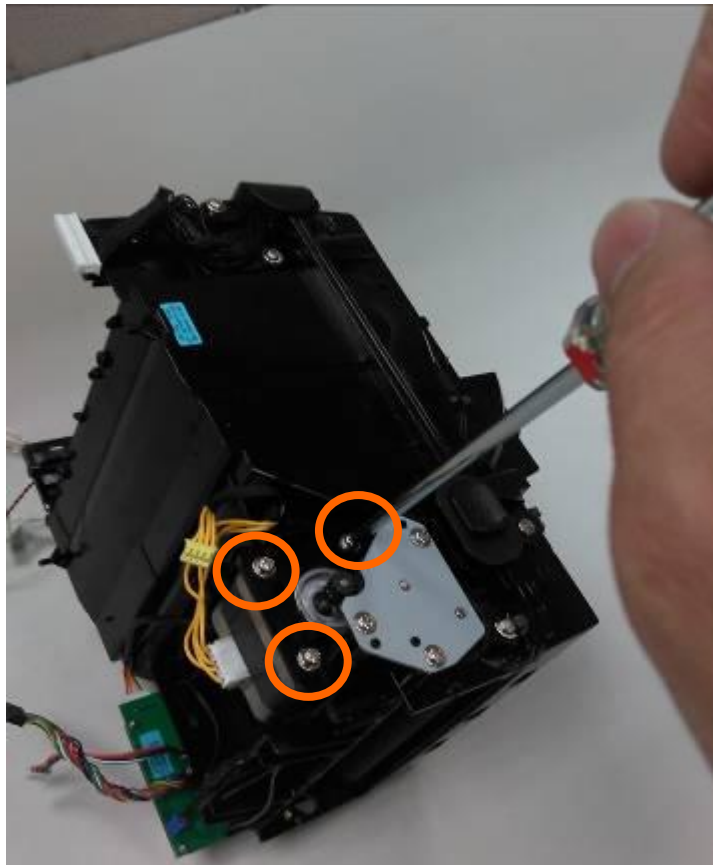
E-1



E-2



E-3



## 4.6 Sensors

### Transmissive Sensor

1. Take off the top cover(refer to disassemble the top cover). (Figure F-1)
2. Use screwdriver to loosen the 2 screws which are marked in yellow, and draw out the shaft from the latch. (Figure F-2)
3. Then we can see the Transmissive Sensor and disassemble it. (Figure F-3)

### Reflective Sensor

1. Remove the bottom cover main board mid cover and motor. (Refer to the procedure 4.3)  
Then we can see the Reflective Sensor which is marked in orange. (Figure F-4)
2. Disassemble the Reflective Sensor from bottom side of the printer. (Figure F-4)
3. From upside of the printer to disconnect the cable from the Reflective Sensor. (Figure F-5)



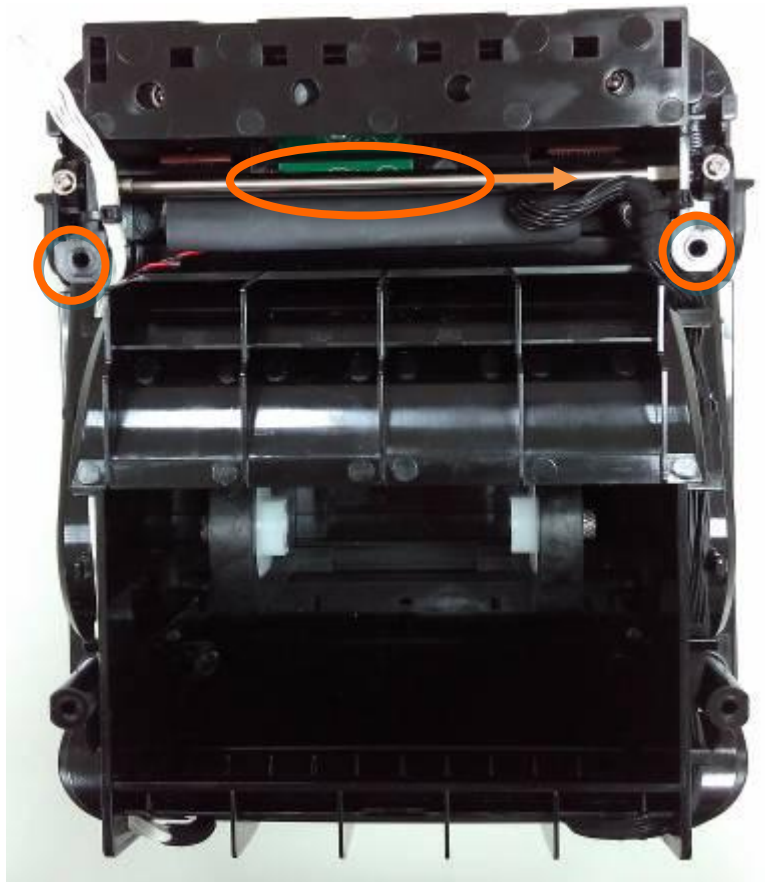
#### Warning:

Always turn off printer power before removal.

F-1



F-2



F-3



F-4



F-5



## 4.7 TPH

1. Pull the latch which marked in orange to the left until the left part of TPH is released. (Figure G-1)
2. Pull the TPH out. (Figure G-2)
3. Disconnect the two cables which marked in orange to take the TPH out. (Figure G-2)



### Warning:

- Always turn off printer power before removal.
- Before replacing TPH, please wait for the printer head temperature to cool.

G-1



G-2



## 4.8 RTC Battery Replacement

1. Put the printer up-side-down, loosen screws to remove the power cover. Continue to loosen the 4 screws which marked in yellow to remove the bottom cover. (Figure H-1)
2. Disconnect all cables from MB then lift up the whole printer module. (Figure H-2)
3. Press the battery release lever to remove the old coin battery and install a new one. (Figure H-3)

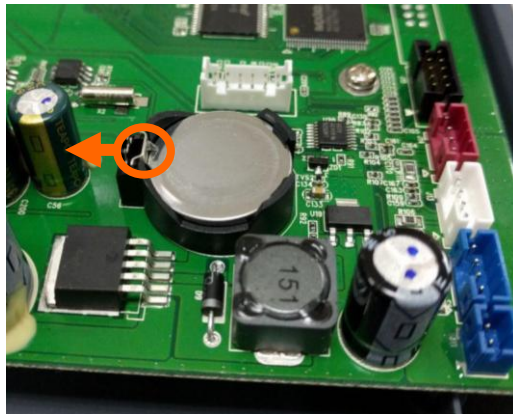
H-1



H-2



H-3



# Printer Status and Interface Connection

## 4.9 Printer Status Indication

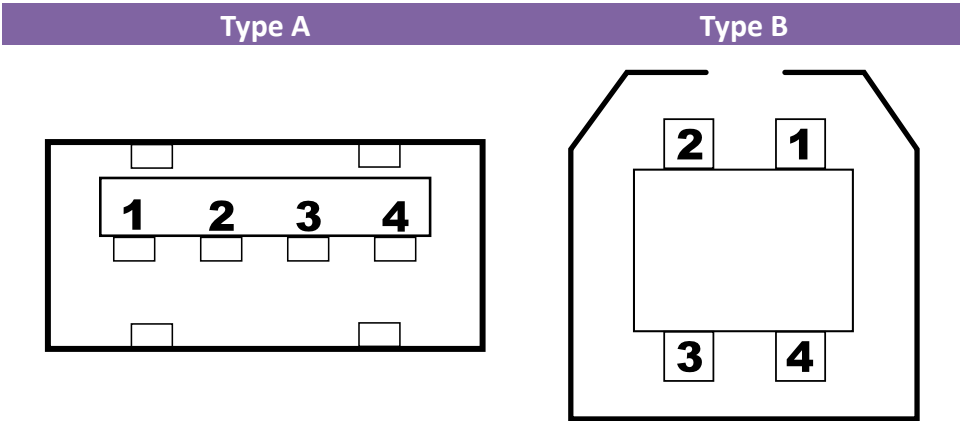
Status lights help you check printer's condition. The following tables show the blinking speed of status lights and the conditions they indicate.

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
		An EEPROM for backup cannot be read or written properly.	
		A command has been fetched from an odd address.	
Red	* Red	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
		Flash ROM on the CPU board error or USB memory error.	
* Red	Red *	An erase error has occurred when formatting the USB memory.	
		Unable to save files due to insufficient USB memory.	

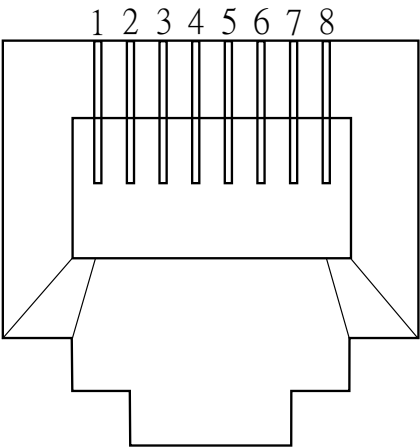
4.10 Printer Connector Pin Assignment

USB



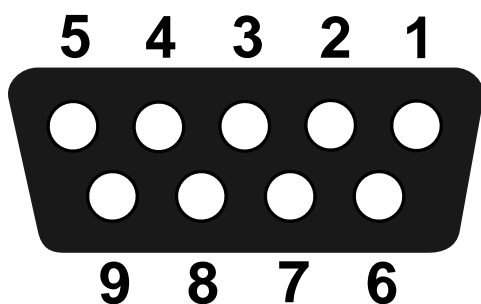
Pin	Signal	Description
1	VBUS	+5V
2	D-	Differential data signaling pair -
3	D+	Differential data signaling pair +
4	Ground	Ground

Ethernet



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

## RS232



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

Host (DB9)			Printer (DB9)		
Signal	Description	Pin	Pin	Description	Signal
CD	Carrier Detect	1	1	Provide 5V Power	+5V
RxD	Receive	2	3	Receive	RxD
TxD	Transmit	3	2	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