WS4 TT Series Printers
Service Manual

WS408TT / WS412TT

Contents

1 Introduction
1.1 About This Manual
This service manual gives the information necessary for you to adjust and repair the WS4 TTprinter. 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 TT printer.

1.2 Warnings and Cautions

Before doing maintenance, please notice the followings:

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

WARNING

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)

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

CAUTION (Replace Parts)

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

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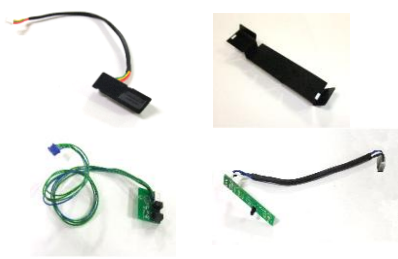- Do not touch the print head with bare hands or hard objects.

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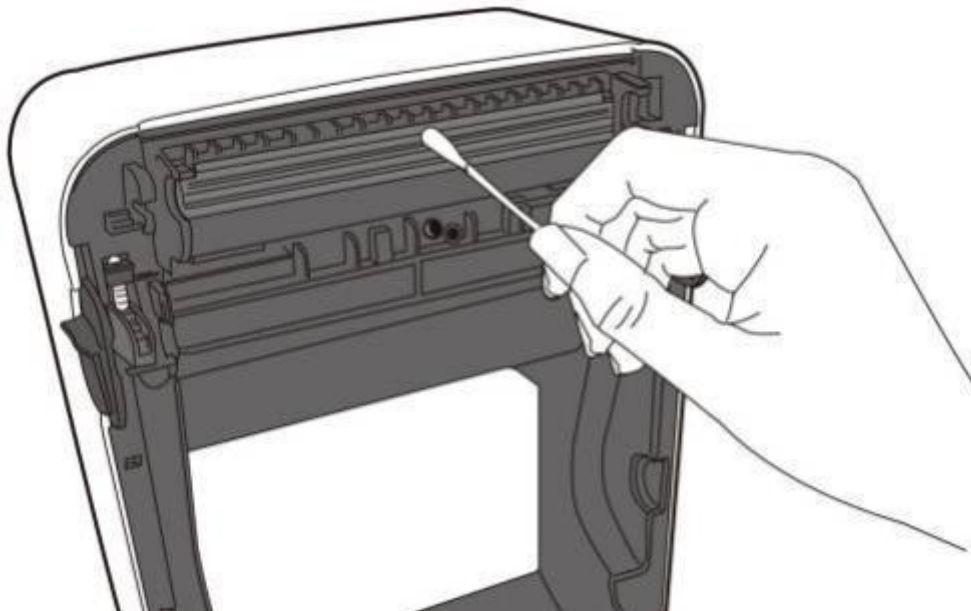
📝 **Note:** Print head warranty becomes void if print head's serial number is removed, altered, defected, or made illegible, under any circumstance.

3 Spare Parts List

Parts Number	Description	Picture
59-WT2A1-001	RIBBON-ADAPTERS-WS4TT	
59-WT2A2-001	ASSY-PLATEN-WS4TT	
59-WT2A3-001	ASSY-MAIN-PCBA-WS4-LAN (USB + LAN)	
59-WT2A3-011	ASSY-MAIN-PCBA-WS4-STD (USB + LAN + RS232C)	
59-WT2A4-001	ASSY-SENSORS-WS4TT	

Parts Number	Description	Picture
59-WT2A5-001	ASSY-MOTOR-WS4TT	
~~59-WT2A6-001~~ Replaced by 59-WT2A6-021	~~SW-PSU-WS4TT-N~~	
59-WT2A7-001	ASSY-PANEL-PCBA-WS4TT	
59-WT2A8-001	HRNS-PRINT-HEAD-WS4TT	
59-WT2A9-001	GEARS-WS4TT	
59-WT205-001	ASSY-PRINT-HEAD-203-WS4TT	

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Parts Number	Description	Picture
59-WT301-001	ASSY-PRINT-HEAD-300-WS4TT	
59-WT2B2-001	SPRING-PRINT-HEAD-WS4TT	
59-WT2B3-001	ASSY-TOP-COVER-WS4TT	
59-WT2B4-001	MID-COVER-WS4TT	
59-WT2B5-001	PRINTER-FRAME-WS4TT	
59-WT2B6-001	ASSY-MEDIA-HLDR-R-WS4TT	

Parts Number	Description	Picture
59-WT2B7-001	ASSY-MEDIA-HLDR-L-WS4TT	
59-WT2B8-001	BOTTOM-COVER-WS4TT-LAN	
59-WT2B8-011	BOTTOM-COVER-WS4TT-STD	
59-WT2B9-001	FRONT-COVER-WS4TT	
59-WT2C2-001	ASSY-MEDIA-ROLLER-WS4TT	
59-WT2C3-001	POWER-CORD-WS4TT-CN	

Parts Number	Description	Picture
59-WT2C3-061	POWER-CORD-WS4TT-EX1	
59-WT2C3-031	POWER-CORD-WS4TT-EU	
59-WT2C3-011	POWER-CORD-WS4TT-UK	
59-WT2C3-021	POWER-CORD-WS4TT-TH	
59-WT2C3-041	POWER-CORD-WS4TT-IND	
59-WT2C3-051	POWER-CORD-WS4TT-PA	

Parts Number	Description	Picture
59-WT2C3-071	POWER-CORD-WS4TT-BR	
59-WT2C3-081	POWER-CORD-WS4TT-AR	
59-WT2C3-091	POWER-CORD-WS4TT-SA	
59-WT2C4-001	ASSY-GUIDE-ROLLER-WS4TT	
59-WT2A6-011 Valid until 2021 April	SW-PSU-WS4TT-N-EX1	
59-WT2C5-001	PACKAGING-BOX-SET-WS4TT	

Parts Number	Description	Picture
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-WT207-001	LEVER-RIBBON-BLOCK-WS4TT	
59-WT208-001	BRACKET-RIBBON-WS4TT	
59-WT209-001	HOLDER-RIBBON-WS4TT	
59-WT210-001	CAP-RIBBON-HOLDER-WS4TT	

Parts Number	Description	Picture
59-WT2A6-021	SW-PSU-WS4TT-N	

4 Spare Parts Removal and Assembly
4.1 Top Cover

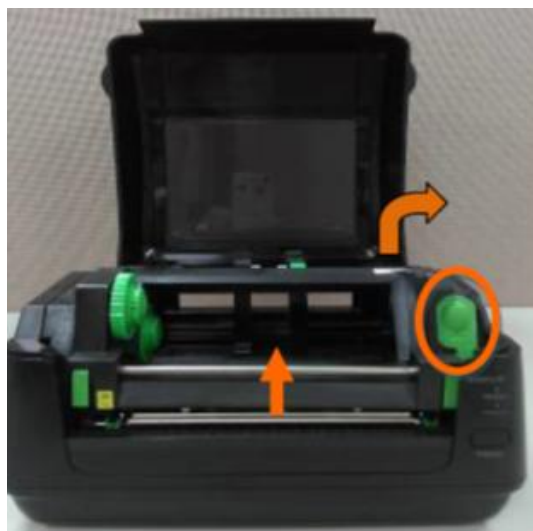|	
1 Open the top cover. (Figure A-1) 2 Take off the top cover and push the right latch in orange and lifting the TPH module upward. (Figure A-2) 3 Then we can see the TPH and the Roller Platen in orange. (Figure A-3) ⚠️ **Warning:** Always turn off printer power before removal.	A-1
	A-2

	A-3
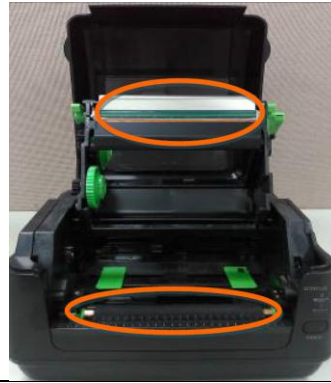
4.2 Roller Platen and Front Cover.
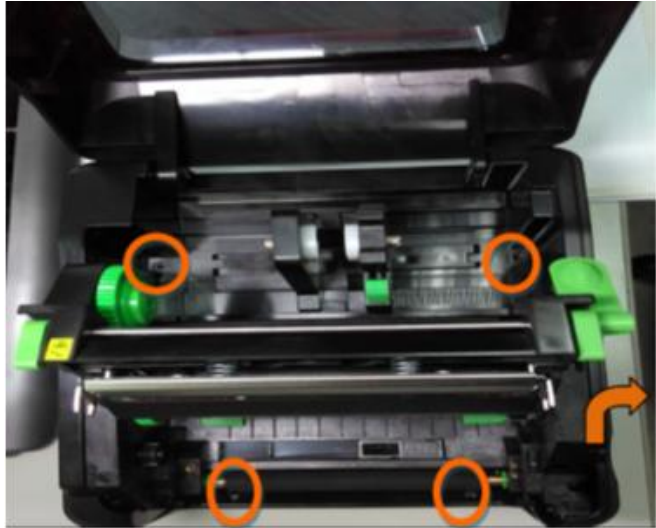
Roller Platen

1. From upside of the printer, use screwdriver to loosen 4 screws which are marked in orange. Then we can take off the front cover. (Figure B-1)

2. When we face to the printer ,taking out the left and right bushing which are marked in orange, then we could take out the Roller Platen. (Figure B-2)
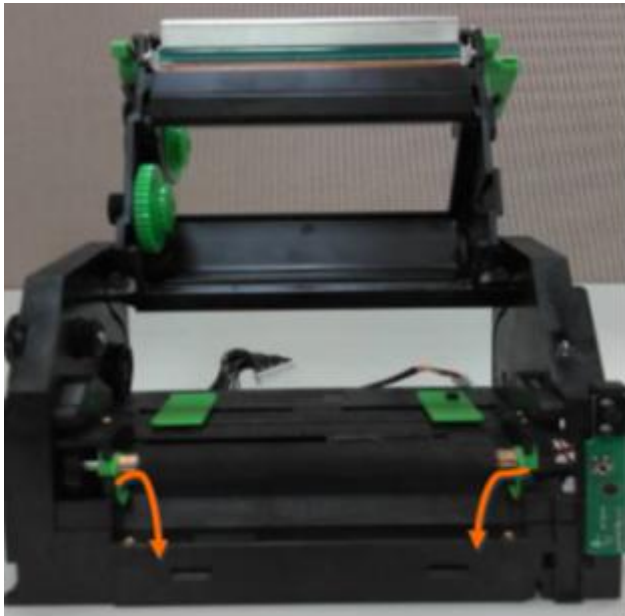
⚠️

Warning:
Always turn off printer power before removal.

B-1

B-2

4.3   Main Board and Bottom Cover

1. After taking off top, mid and front cover, we can see Main Board connect with cable and Bottom Cover from backside of the printer. (Figure C-1)
2. Disconnect all cables from MB then lift up and separate the whole printer module. (Figure C-2)
3. **Using screwdriver to loosen 4 screws which are marked in orange. Then the main board and bottom cover could be separated. (Figure C-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.

C-1

C-2

	C-3

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4.4 Mid Cover
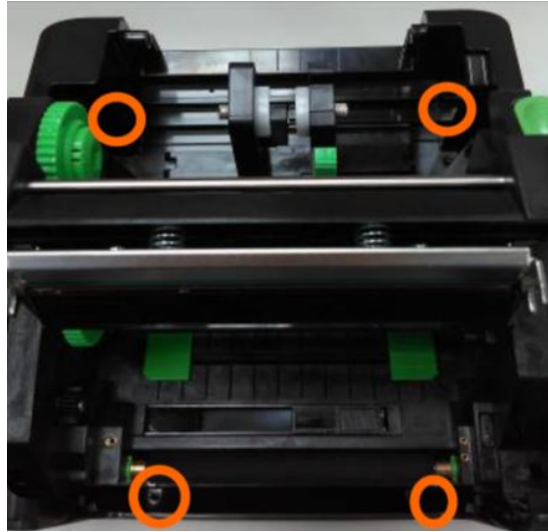
1. From upside of the printer, use screwdriver to loosen 4 screws which are marked in orange. Then we can take out the front cover first. (Figure D-1)
2. Secondly, from broadside to pull the mid cover upward and take it out. (Figure D-2)
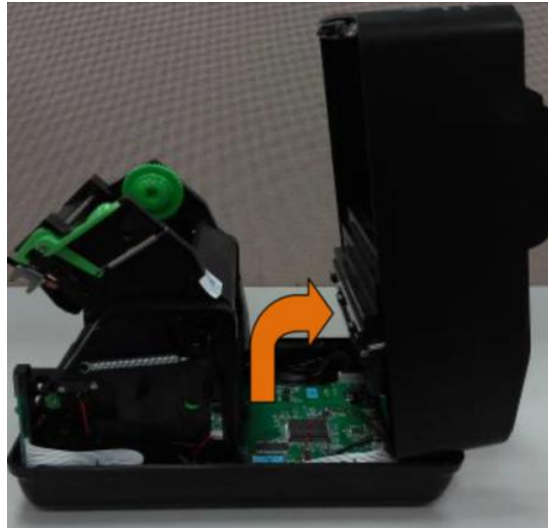
Warning:
- Always turn off printer power before removal.
- Before replacing TPH, please wait for the printer head temperature to cool.

D-1

D-2

4.5 Motor

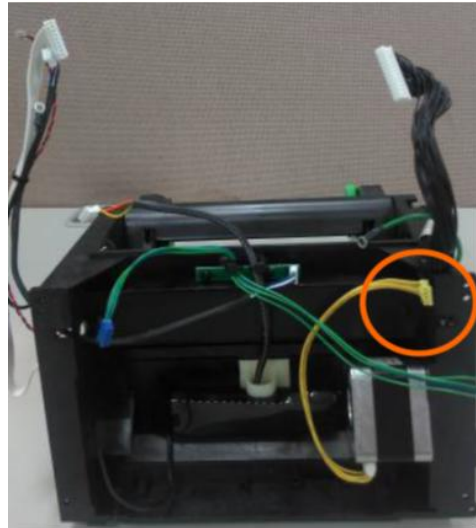|	
1. Separate the whole printer module with main board and disconnect the cable which is marked in orange.(Figure E-1) 2. Using screwdriver to loosen 3 screws which are marked in orange. (Figure E-2) 3. Then we can take the motor out as shown in Figure E-3. ⚠️ **Warning:** Always turn off printer power 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
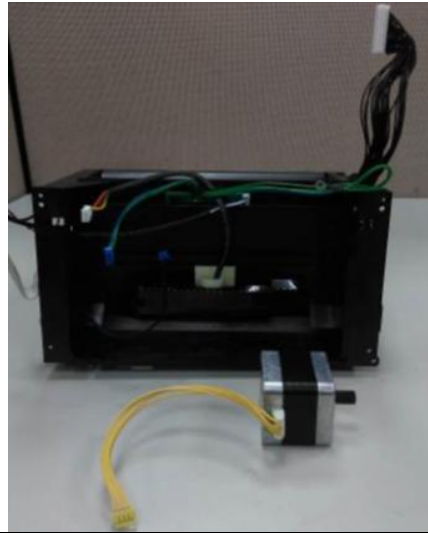
4.6 Sensors

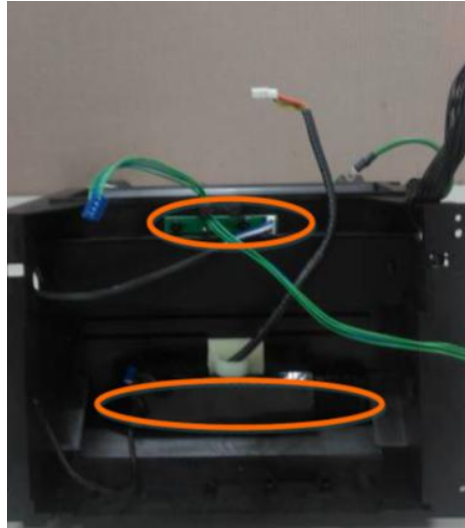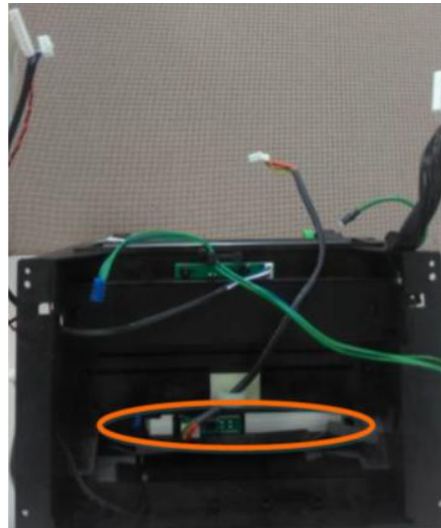|	
Transmissive Sensor **1.** After taking out the whole printer module and separating the motor with it ,we can see the Transmissive Sensor and Reflective Sensor which are marked in orange. (Figure F-1) **Reflective Sensor** **1.** After taking out the Reflective Film, then we can see the Reflective Sensor which is marked in orange. (Figure F-2)	F-1 F-2

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4.7 TPH

1. Push and pull down TPH itself in order to separate with the latch which is marked in orange. (Figure G-1)
2. Pull the TPH out and loosen 2 screws which are marked in orange. (Figure G-2)
3. Disconnect the two cables which are marked in orange to take the TPH out. (Figure G-2)
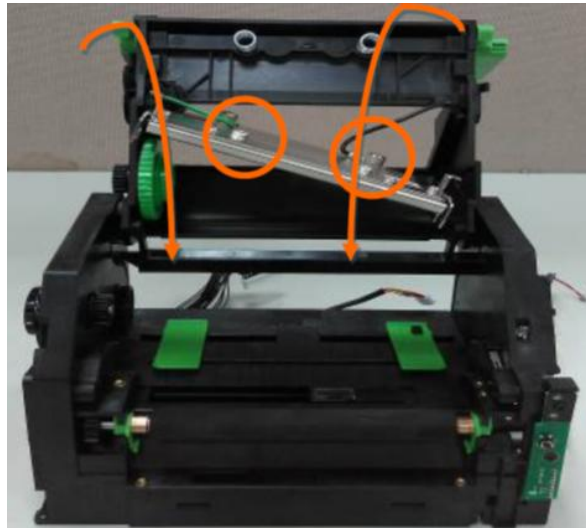
⚠️

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

G-1

G-2

5 Troubleshooting
5.1 Printer Status Indication

Status lights can help you check printer's condition. The following tables show the blinking speed of status lights and the conditions they indicate.
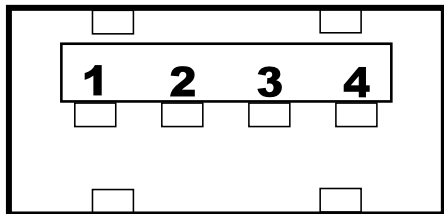
Symbol	Blinking Speed	Blinking Interval
**	Fast	0.5 Second
*	Slow	2 Seconds
* LED2 + *LED1	Slow	LED2 & LED1 Blinking Interval at same time
* LED2 + LED1 *	Slow	LED2 & LED1 Blinking Interval at different timing

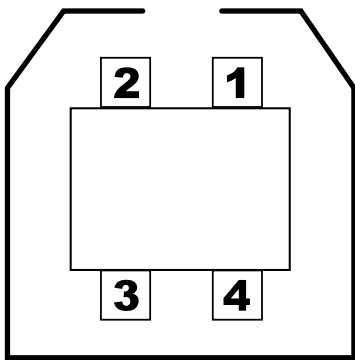| LED 2	LED 1	Description	LED Label indicate
Green	Green	The printer is ready to print.	V
Green	** Green	The printer is transmitting data.	
* Green	* Green	In pause.	V
* Green	Green *	The printer is writing data to the flash or USB memory. The USB memory is being initialized.	
Green	Orange	Head high 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
**Orange	Orange **	Ribbon end or ribbon error. (for thermal transfer models)	V
Red	Orange	The printhead is broken.	V
Red	*Orange	Communication error (RS-232C).	V
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.	V
		An erase error has occurred when formatting the USB memory.	
		Unable to save files due to insufficient USB memory.	

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5.2 Printer Connector Pin Assignment

USB

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

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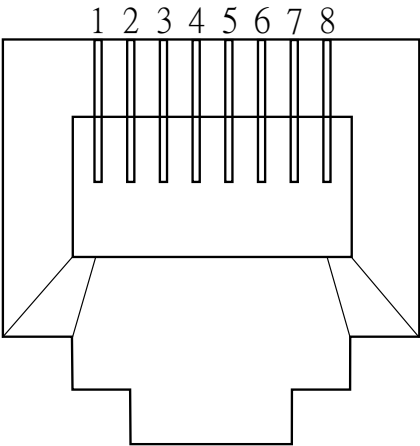
Pin	Signal
1	Transmit+
2	Transmit-
3	Receive+
4	Reserved
5	Reserved
6	Receive-
7	Reserved
8	Reserved

RS232C
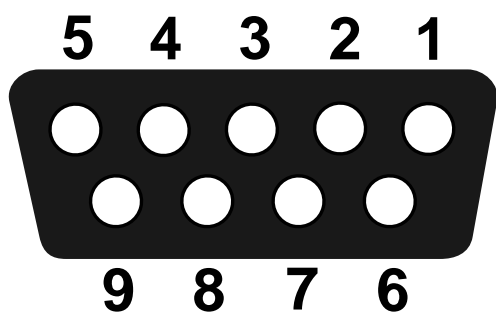
Pin	Signal	Description
1	+5V	Provide 5V Power
2	RxD	Receive
3	TxD	Transmit
4	NC	No Connection
5	GND	Ground
6	Hi	Pull High
7	RTS NC	Request to Send
8	CTS	Clear to Send
9	Hi	Pull High

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

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