

# S4xx Series Service Guide



Version: 5.1

The Service Guide was written mainly for engineers.

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# Chapter 1: Overview

## 1-1 Overview

HiTi Photo Printer S4XX SERIES is a branded new printer able to print in high-speed & high-quality. HiTi photo printers are stylish and compact. HiTi printers can print 6x4" (10x15cm) photos, ID photos (various sizes), name cards, post cards, greeting cards, season cards, calendars, and stickers.

There are 3 different ways to operate the HiTi Photo Printer S4XX SERIES:

1. PC link mode: The printer can be connected to a personal computer via a USB cable.
2. Standalone mode: The HiTi Photo Printer S4XX SERIES can also be operated without a direct or indirect connection to a personal computer. This printing style is called standalone printing. In this mode, images are being selected with the handheld TFT monitor. S4XX SERIES features 'onboard' multi-card readers. Memory cards can be inserted into the card slot. Images can be selected on the handheld TFT monitor.
3. PictBridge/ PTP mode: It is available to connect a DSC to a HiTi Photo Printer S4XX SERIES directly via USB host. The DSC can be used as a mass storage and users can preview and print photos by operating with the controller (PTP). Furthermore, users can select and print photos through DSC (PictBridge).

The S4XX SERIES includes one of the following functions:

#### Printing Process

- YMCO 4 passes (Yellow, Magenta, Cyan, and Over-coating)
- Over coating ensures that HiTi's printouts can be kept a longer time than inkjet printer's printouts.

#### High Quality Resolution

- S4XX SERIES: 403x403 DPI

#### Convenience

- All HiTi Photo Printer ship with "Photo Desiree", a photo editing program designed for printing 4"x6" photos, id photos, calendars, photo name cards, and photo greeting cards.
- HiTi "Photo Desiree" enhances and enables very easy usage for your photo printer. It allows you to turn your S4XX SERIES into a digital mini lab you can operate from home.
- You can download the latest firmware and other software from the HiTi website to your computer. Firmware is being updated per USB cable.
- Multi-memory card support. HiTi Photo Printer S4XX SERIES provides two types of memory card slots.
- Stand-alone operation & PC link: You can instantly preview what you want to print.
- S4XX SERIES can be used to read your images from a memory card (it has the functions of a card reader).

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# 1-2 Specifications

Item	Description
<b>Model Name</b>	HiTi Photo Printer S4XX SERIES
<b>Printing Method</b>	Dye Diffusion Thermal Transfer continuous tone printing
<b>Gradations</b>	256 levels per Yellow, Magenta, Cyan color (8 bits), total 16.77 million true colors
<b>Resolution</b>	403x403 DPI
<b>Paper Size</b>	4 in.x7 in. with detachable boundary
<b>Printing Size</b>	4 in.x6 in., (100mmx152mm)
<b>Paper Feed and capacity</b>	Cassette type automatic feeder 30 pieces (keep 5 pieces tolerance to avoid users overload the papers) 4"x 6" photo, 4x4 sticker, 4/2/4 sticker, 1x1 sticker compatible
<b>Ribbon capacity</b>	50 images for YMCO
<b>Printing Speed</b>	Print speed= at most 75sec for YMCO 4 pass and 256 level per color in Standalone mode and 75sec in PC mode.
<b>Continuous printing</b>	Up to 10 pages
<b>Operating Temperature</b>	59° ~90°F (15° ~32°C)
<b>Operating Humidity</b>	20 ~75% RH
<b>Card Socket</b>	Compact Flash Type II slot x 1 and Four-in-one socket x 1(MS, SD, MMC, SM) with read
<b>Connection Interface</b>	USB 2.0 full speed interface with PC
<b>Indicator</b>	1 LED indicator with 2 colors
<b>File Format Support</b>	EXIF, JPEG, DPOF
<b>Power Supply</b>	100~240V, 50/ 60 Hz
<b>Weight</b>	2.4 kg
<b>Operating System</b>	Windows 98/ ME/ 2000/ XP/ Vista/ Window7 Linux & Mac OS 10.2 and above
<b>Minimum System Requirement</b>	Win 98/ME: 64MB RAM, Pentium PC Win 2000/ XP: 128MB RAM, Pentium PC
<b>Certification</b>	UL, TUV-GS, FCC, CE, BSMI, CCC, C-Tick, VCCI
<b>Accessories Included</b>	Paper Cassette, USB cable, CD-ROM (with printer drivers, bundle software and electronic manual), AC power cord
<b>Consumables option</b>	25/50 image photo kit, 25/50 image 4x4 sticker kit, 25/50 image 4/2/4 sticker kit and 25/50 image 1x1 sticker kit

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# 1-3 S4xx Series Differential

S400	S420	PARTS NAME
P/N		
48.P1812.00A	48.P2003.001	ASSY MANUAL KIT A MODEL
48.P1812.00B		ASSY MANUAL KIT B MODEL
48.P1812.00C		ASSY MANUAL KIT C MODEL
48.P1812.00T		ASSY MANUAL KIT T MODEL
48.P1812.00E		ASSY MANUAL KIT E MODEL
57.P1817.011 + 57.P1818.001 + 57.P1819.001	57.P2001.001 + 57.P2002.001 + 57.P2003.001	DAZZLE CARTON + CASSETTE BOX + CASSETTE PAD
61.P1805.001 + 61.P1806.001 + 61.P1807.001 + 61.P1808.001	61.P2001.001 + 61.P2002.001 + 61.P2003.001 + 61.P2004.001	CUSHION UP R + CUSHION UP L + CUSHION DOWN R + CUSHION DOWN L
40.U1500.B01	40.U150B.R01	USB CABLE
40.P1801.R04	40.P2001.R02	Controller Cable
45.P1806.021 45.P18R6.021	45.P20R6.011	TPH INTERFACE BD L
45.P180H.031 45.P18RH.031	45.P20RH.011	TPH INTERFACE BD R
45.P1804.021 45.P18R4.041	47.P2008.001	CONTROLLER BOARD
45.P1801.022 45.P1801.032	45.P20R1.032	MAIN BOARD
48.P1809.001	48.P2001.001	ASSY BACK COVER
48.P1810.001	48.P2002.001	ASSY FRONT COVER
56.P1841.001 56.P1841.003	56.P2005.011	FRONT_DOOR
47.P1803.001	47.P2003.001	ASSY CONTROLLER

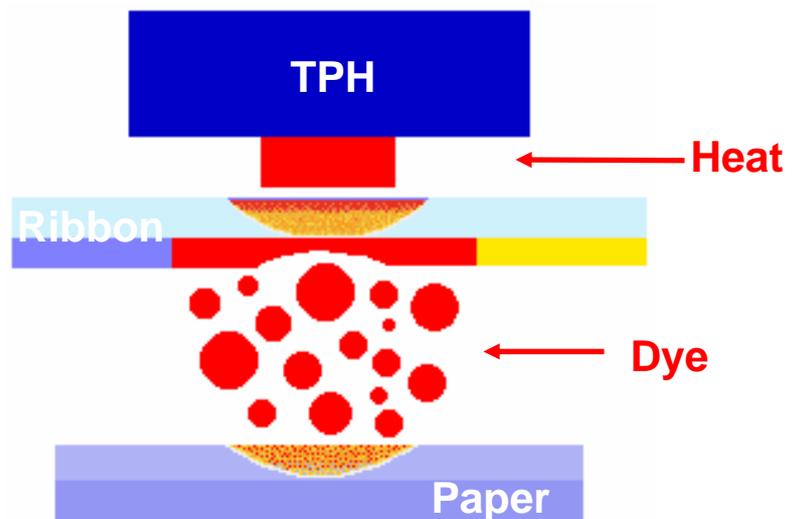
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# Chapter 2: Theory of Operation

## 2-1 Dye Diffusion Thermal Transfer (D2T2)

**Dye Diffusion Thermal Transfer (D2T2)**, the world's leading technology in photo printing processes, uses a thermal printing head (TPH) to sequentially heat three ribbon panels that are coated with yellow, magenta and cyan dye. The heat process turns the dye into gas that diffuses into a thin receiving layer on top of the paper. An overcoat is then layered down on top of the paper to protect the color against water and ultraviolet rays and to prevent it from fading.

Compared with some other photo-capable printing technologies, such as Thermal Autochrome (Fujifilm), Variable Dot (Fujicopian) and Inkjet (Canon, Epson and HP), Dye Diffusion Thermal Transfer creates the most realistic photo quality. To the naked eye it is indistinguishable from photographic prints. Its continuous-tone printing produces 256 color gradation levels in each pixel independently while other technologies, like Variable Dot and Inkjet, have to make different dot sizes to increase the resolution in half-tone to achieve similar effects.



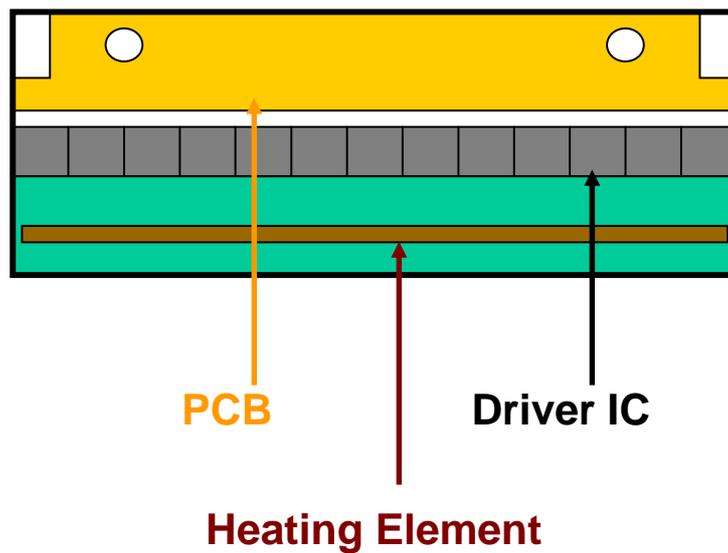
The Thermal Print Head (TPH) sequentially heats three ribbon panels that are coated with dye in yellow, magenta and cyan. The heat process turns the dye into gas that diffuses into a thin receiving layer on top of the paper. An overcoat is then layered down on top of the paper to protect the color against water and ultraviolet and to prevent it from fading.

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## 2-2 Hardware

### 2-2-1 Thermal Print Head (TPH)

**Thermal Print Head (TPH)** is the key component for D2T2 printer, like the inkjet printing head for inkjet printer.



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## 2-2-2 Main Board & ASIC

**Main Board**= Mother board; **ASIC**= HiTi CPU

The ASIC is an IC (Integrated Chip) located on the Main Board. The ASIC was designed by the HiTi R&D department and features an 8032 MCU. The ASIC drives the USB controller, controls the embedded SDRAM, MCU I/F, USB I/F, memory I/F, and GIO interface.

The Firmware stored in FW IC controls the actions of the printer by reading and writing the registers.

The VR (Variable Resistance) on the main board is used to adjust the voltage of the ribbon sensor.

*(More details about VR adjustment are located in Chapter 4)*

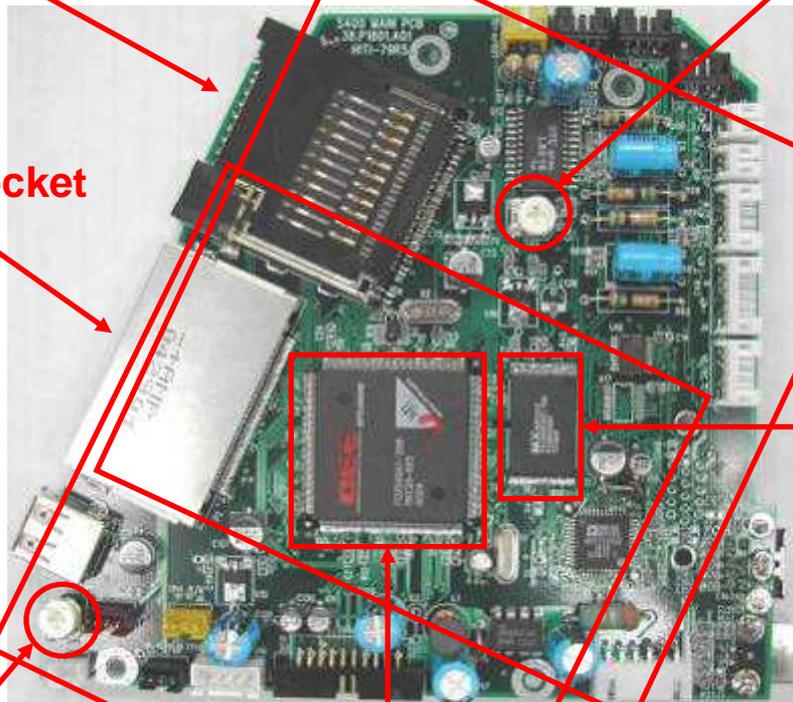
Besides, there are 2 memory card sockets on the Main Board. One is for Compact Flash and the other is for Smart Media/ Multi-Media-Card/ Secure Digital Card/Memory Stick.

**4 in 1 memory card socket**

**VR\_F on Main-board**

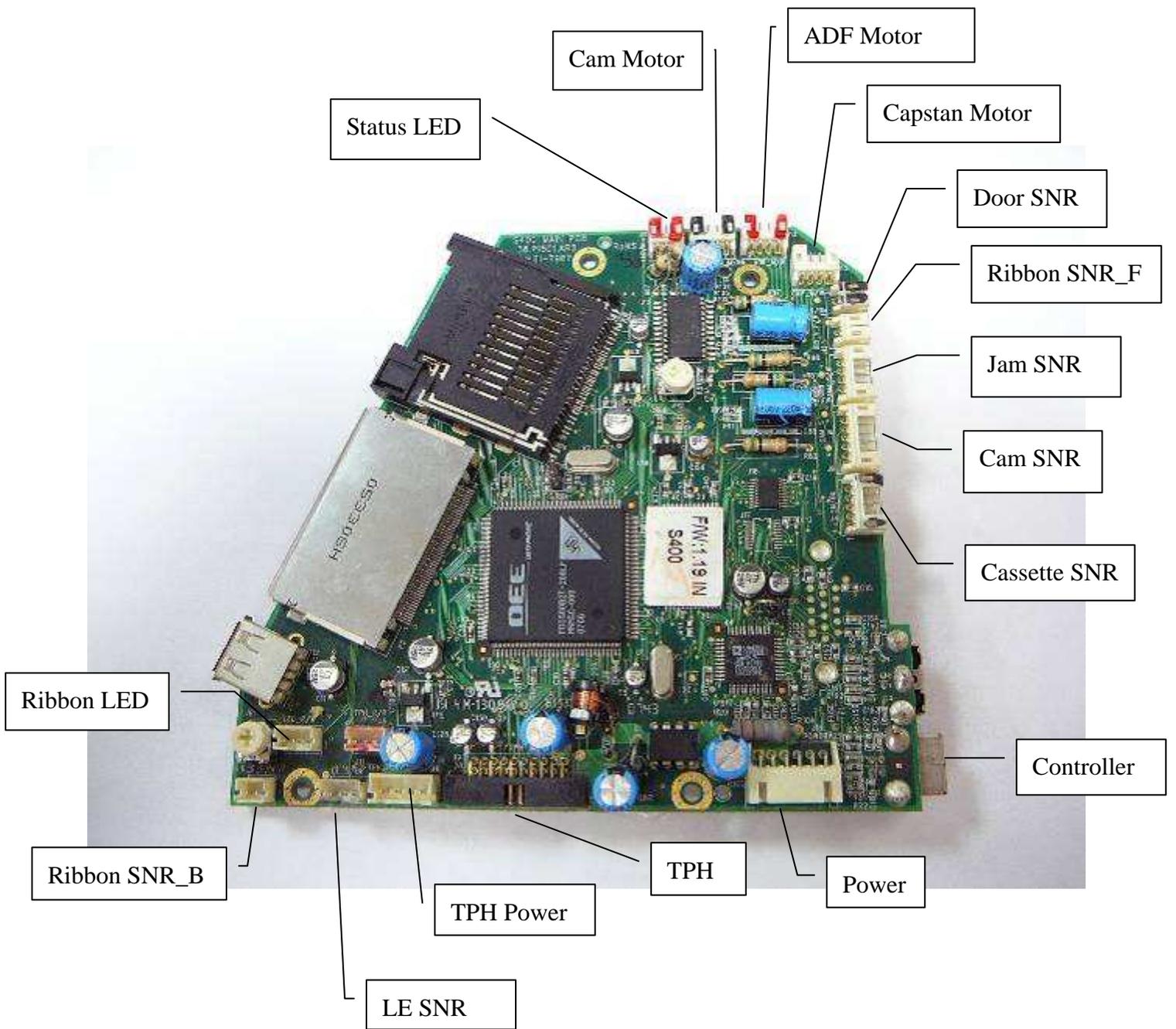
**Compact Flash socket**

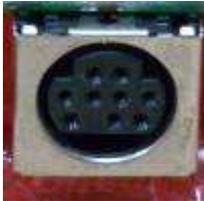
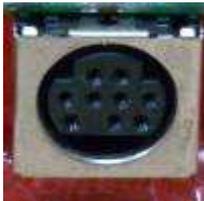
**FW IC**



**VR\_B on Main-board**

**ASIC**



S400 & S420 Main Board Difference		
	S400	S420
Photo	<p>Analog</p> 	<p>Analog</p>  <p>Digital</p> 
Signal	Analog	Analog / Digital (2008 W35 phase in)
Memory Card	MMC, SM, SD, MS, CF I ,CF II	MMC, SDHC, SD, MS, CF I ,CF II
Controller Cable Connector	<p>Analog</p> 	<p>Analog</p>  <p>Digital</p> 

## 2-2-3 Power Board

**Power Board** contains a universal AC input, DC +20V/ 7V output and a USB interface.

The illustration below shows the image of power board.

The VR (variable resistance) on the power board is used to adjust the voltage of the THP.

This controls the color density of the printout.

(More details about VR adjustment are located in Chapter 4)

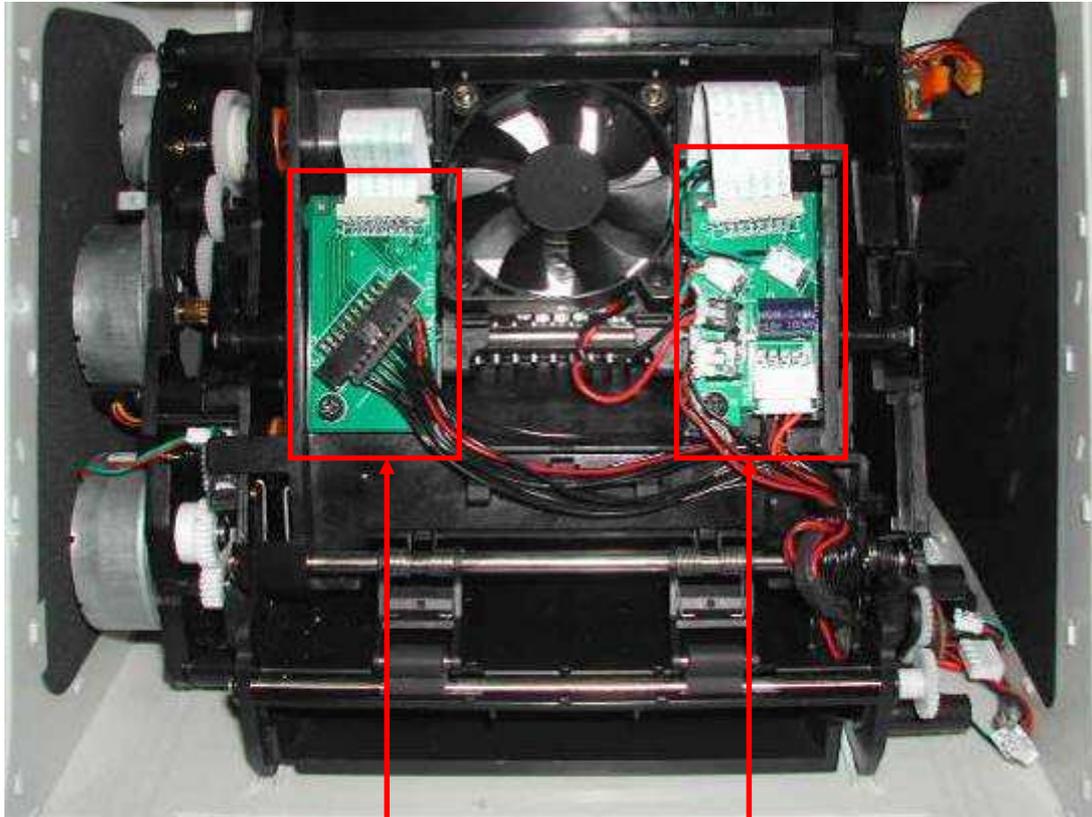


**VR on Power-board**

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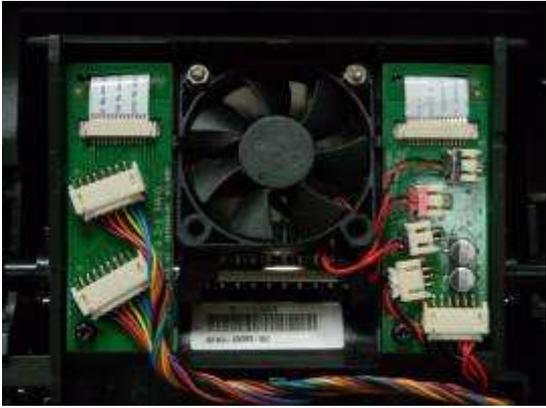
## 2-2-4 TPH Board

**TPH Boards (L and R)** connects the cables to the sensors, fan and TPH on the TPH linkage (Ribbon LED, Cassette Sensor, TPH and fan). The TPH board connects then to the motherboard.



**TPH Board-L**

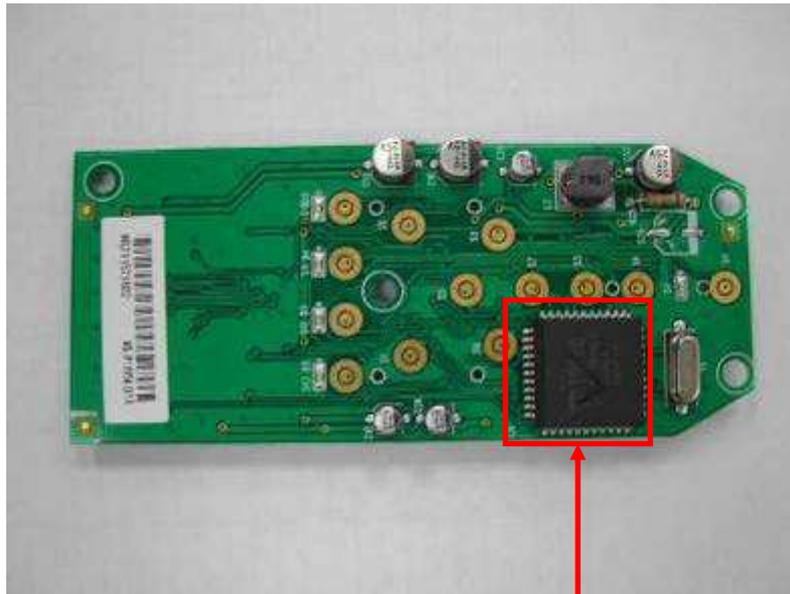
**TPH Board-R**

	S400	S420
Photo		<p data-bbox="1109 208 1214 293"><b>S420</b> Analog</p>  <p data-bbox="1114 734 1209 775">Digital</p> 

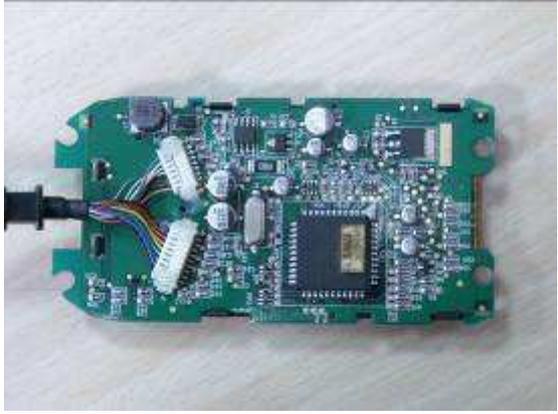
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## 2-2-5 Controller Board

**Controller board** uses an 80-series CPU with 4KB on-chip FLASH EPROM for the central control – this would include an initial setting of the LCD driver IC, the LED backlight control, the button-pushed sensing and communication with the main board. The serial EPROM stores the setting data of the LCD that was received at the calibration process. The CPU will read the serial EPROM and complete the initial setting for LCD after it has been powered on.



**EPROM**

	S400	S420
Photo		<p data-bbox="1107 255 1209 293">Analog</p>  <p data-bbox="1114 734 1203 772">Digital</p> 

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## 2-2-6 Cam Motor

**Cam motor** is a bipolar motor which drives the CAM to control the Platen roller's & Pinch roller's position.

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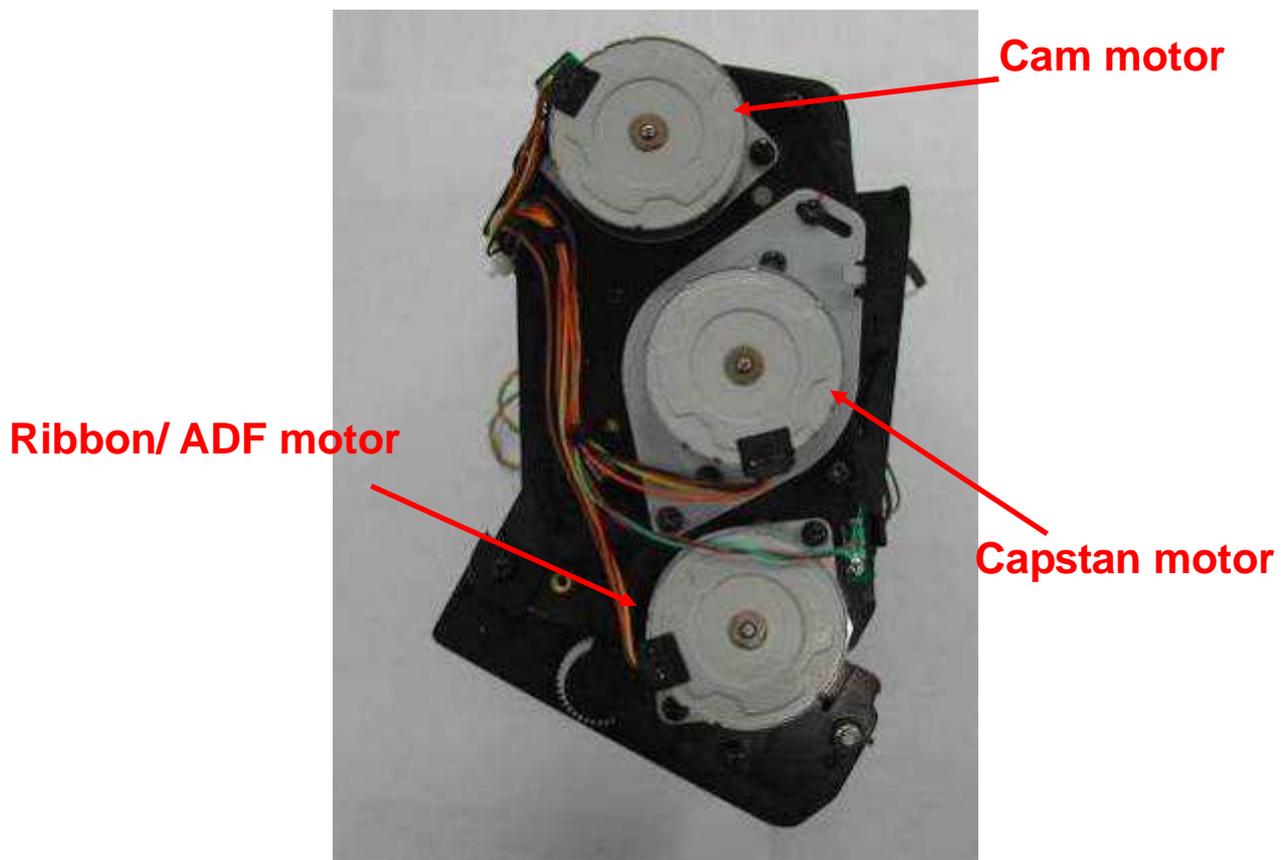
## 2-2-7 Capstan Motor

**Capstan motor** is a bipolar motor which drives the Capstan roller to control the movement of the paper.

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## 2-2-8 Ribbon/ ADF Motor

**Ribbon/ ADF motor** is a bipolar motor which feeds paper into the printing path and then rolls the ribbon to the right starting position.



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## 2-2-9 Status/ Error LED

**Status/ Error LED** indicates the status of the printer. It also communicates any error messages.

For example: The steadily shining Green LED indicates the ready stage of the printer. The blinking Green LED indicates that the printer is busy. The blinking Orange LED indicates that an error has happened.

(More details about Error messages are located in Chapter 2 later)

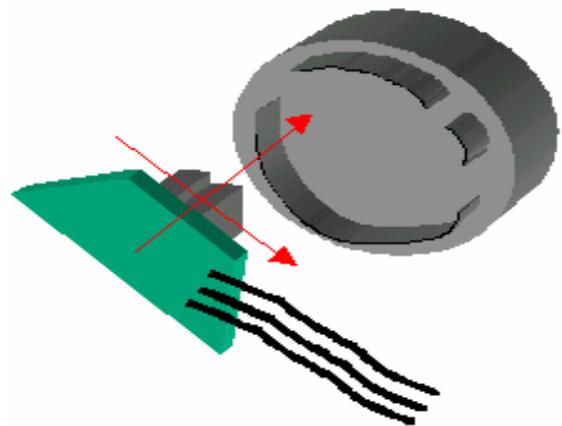
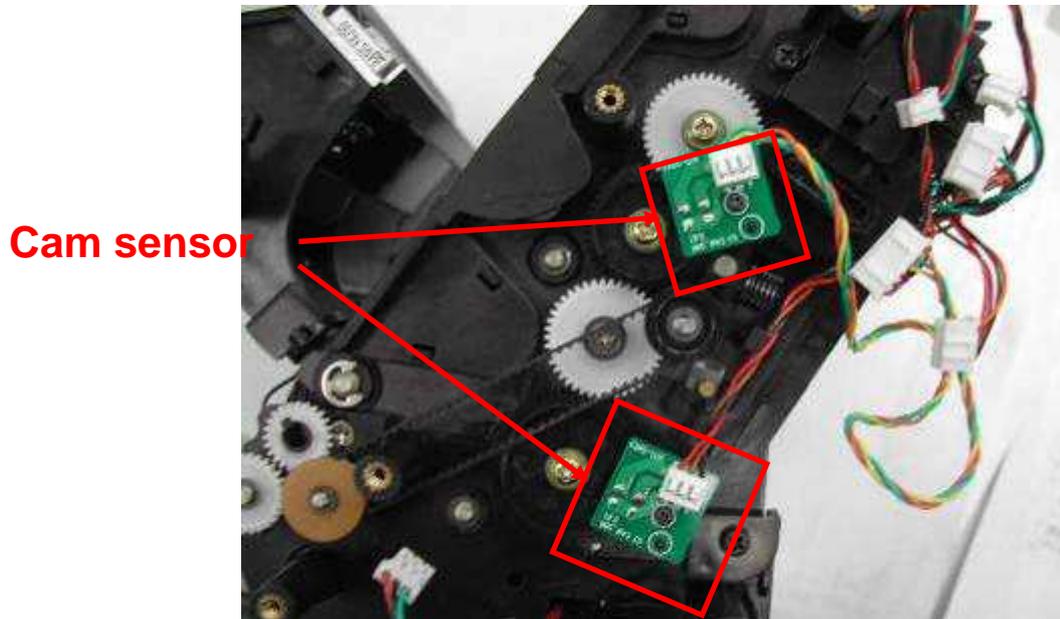
### Status/ Error LED



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## 2-2-10 Cam Sensor

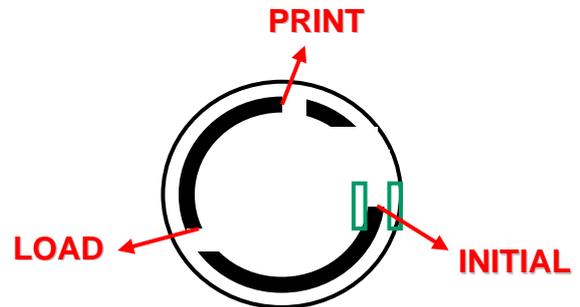
Depending on the printer's status, the positions of the platen roller and the pinch roller stay different. The Cam controls the movement of the platen roller between these positions, and **Cam Sensor** detects & feeds the position's information back to the firmware. There are three different platen roller positions:



### **P1 = Initial Position**

The gap between the platen roller & TPH is at its largest, and the pinch roller is relaxed. The printer is at this position when the printer powers on or resets.

### **P2 = Load Position**



The gap between platen roller & TPH is not as large as at P1. The gap enables the ribbon to wind. The pinch roller touches the capstan roller and enables the loading of the paper.

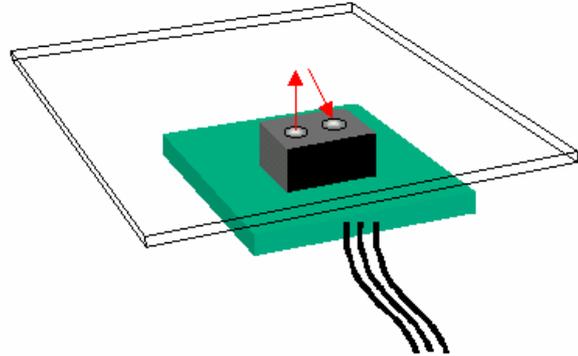
### **P3 = Print Position**

The platen roller is close to the TPH, and the pinch roller touches the capstan roller which enables paper to move forward and backward.

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## 2-2-11 Leading Edge (LE) Sensor, Jam Sensor and Back Door Sensor

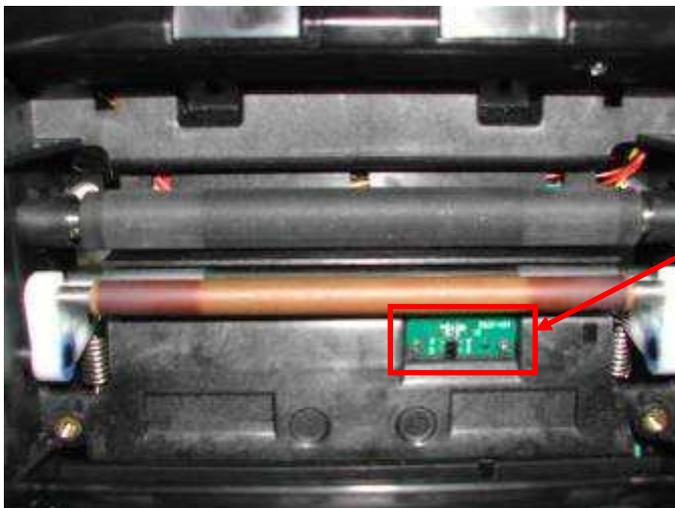
### Door Sensor



The purpose of **leading edge (LE) sensor** and **jam sensor** is to detect the status of paper. The sensor will be on when it detects the loading of paper. The Sensor will be off if it does not detect paper loading.

The **back door Sensor** is to detect the status of the back door. The sensor will be on when the door is closed. The Sensor will be off if the door is opened.\*

\* **Back door Sensor has been canceled.**

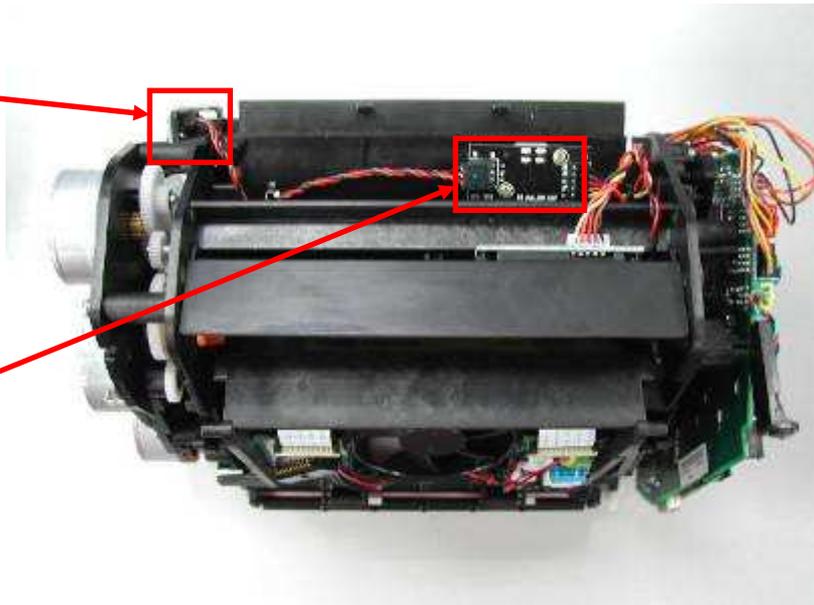
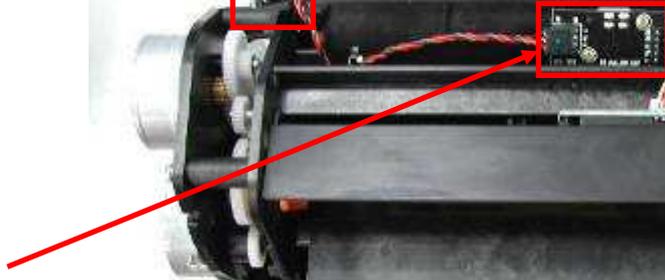


**Leading Edge sensor**

**Back door sensor**



**Jam sensor**



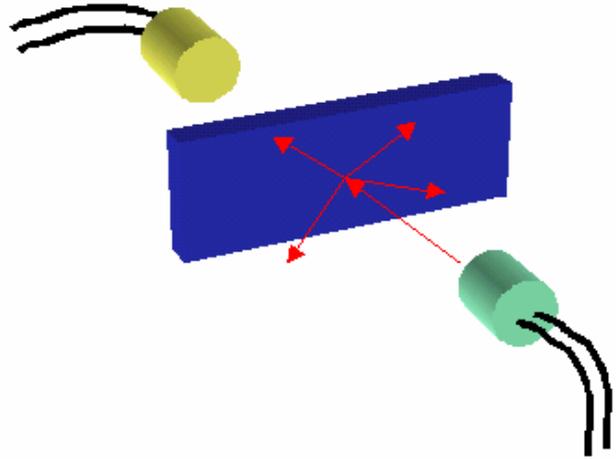
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## 2-2-12 Ribbon LED/ Ribbon Sensor

The Ribbon LED and Ribbon Sensor are used to search the color of the ribbon; they enable the printer to detect the correct ribbon color.

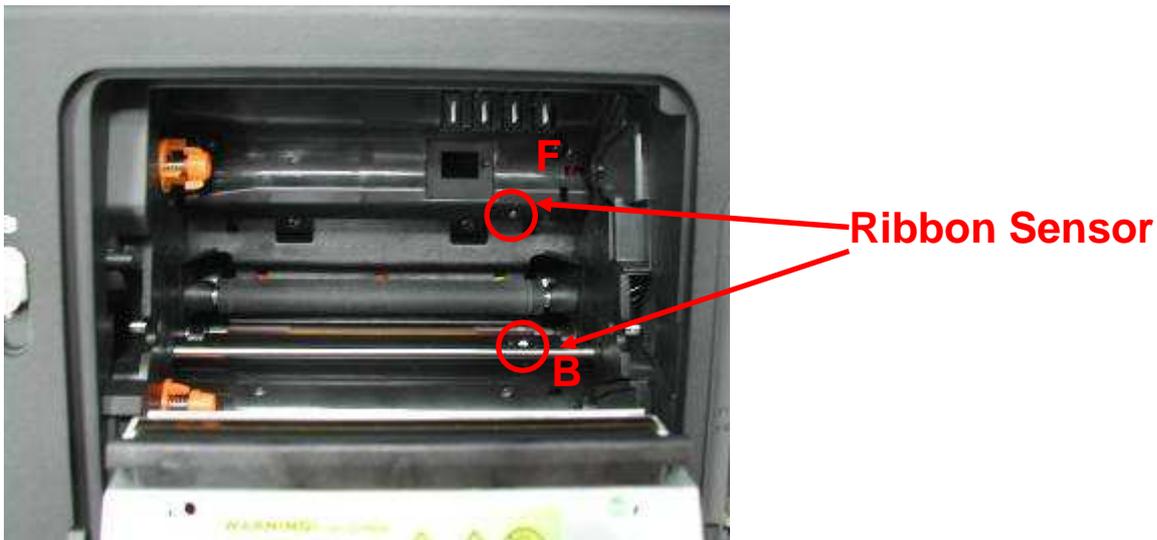
There are double couples of Ribbon LED's and Ribbon sensors for ribbon detection in a S4XX SERIES. It is securer against ribbon search function than before.

Operation Theory: The light of the Ribbon LED goes through the ribbon. At the yellow and overcoat layers, the ribbon sensor detects a HIGH value. In the magenta and cyan layers, the ribbon sensor detects a LOW value.\*

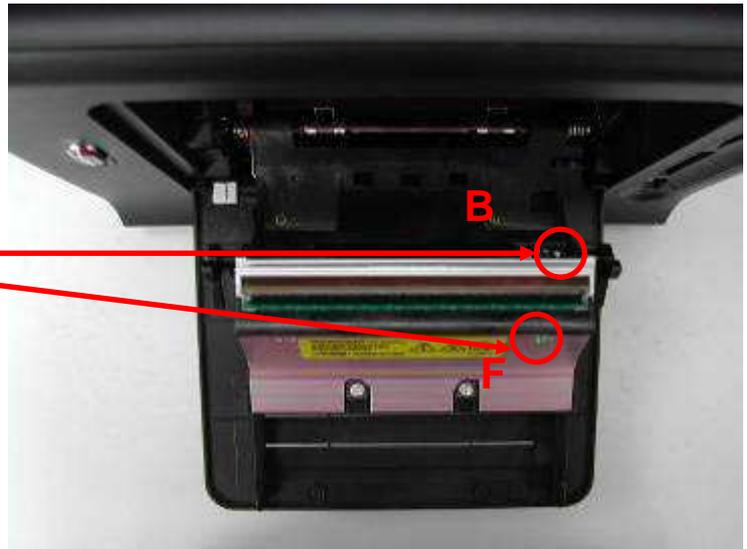


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\* '2009/W1 = No ribbon LED/Sensor F', Please update firmware to the latest version so printer can work properly after removing ribbon LED/Sensor F.



**Ribbon LED**

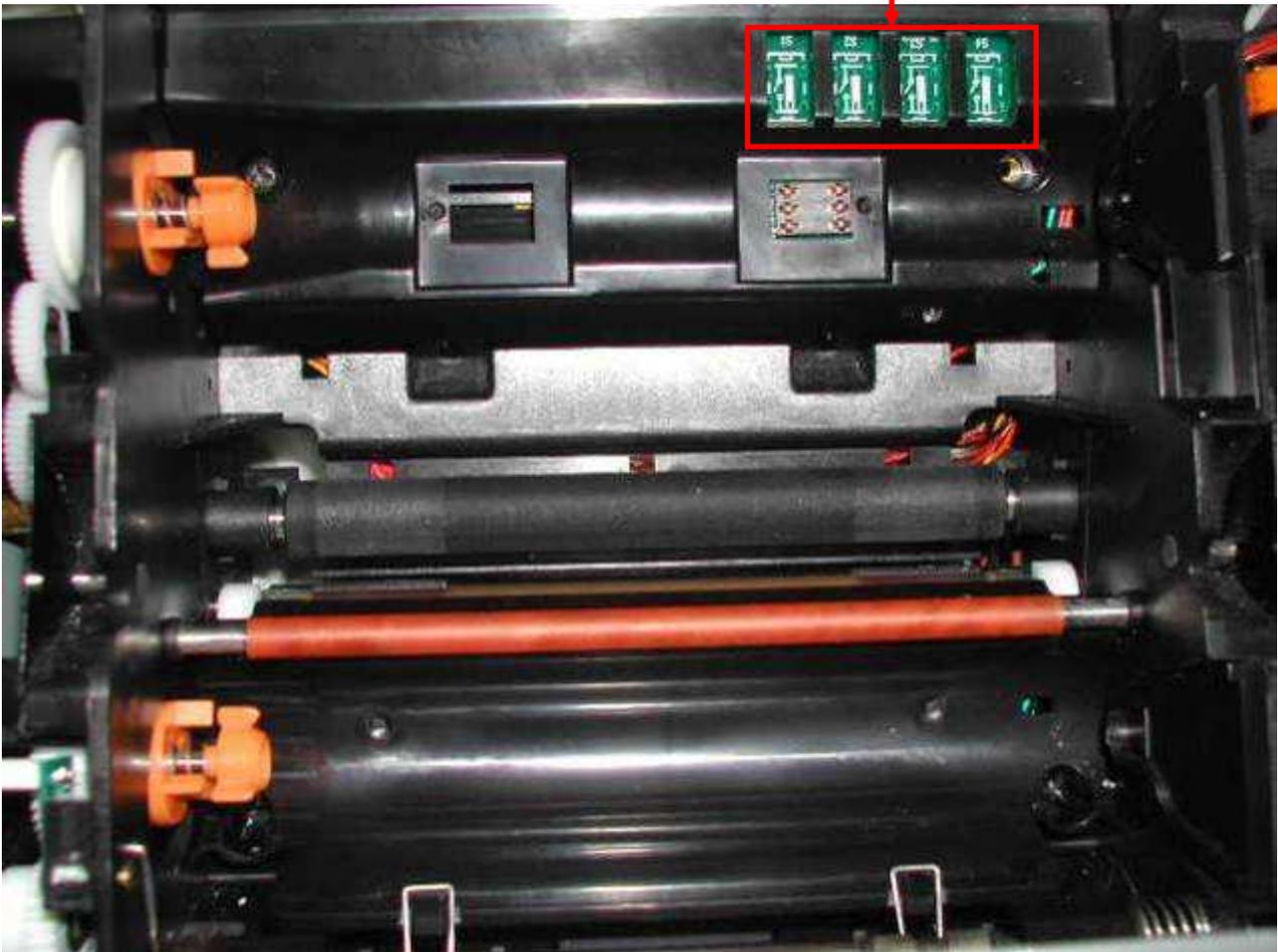


## 2-2-13 Ribbon Cassette Sensor

It is used to detect the status and the type of the ribbon cassette. The ribbon cassette sensor will be on if the ribbon cassette type is correct; the ribbon cassette sensor will be off if the ribbon cassette type is wrong.

The type of the ribbon will be detected by this Ribbon Cassette Sensor.

### Ribbon Cassette sensor



**S400**



**Photo**

**S420**



**S400 can use S420 Ribbon, but S420 cannot use S400 Ribbon.**

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## 2-2-14 Ribbon Door Sensor

It is used to detect the status of the ribbon door. The ribbon door sensor will be on if the ribbon door is closed; the ribbon door sensor will be off if the ribbon door is opened.

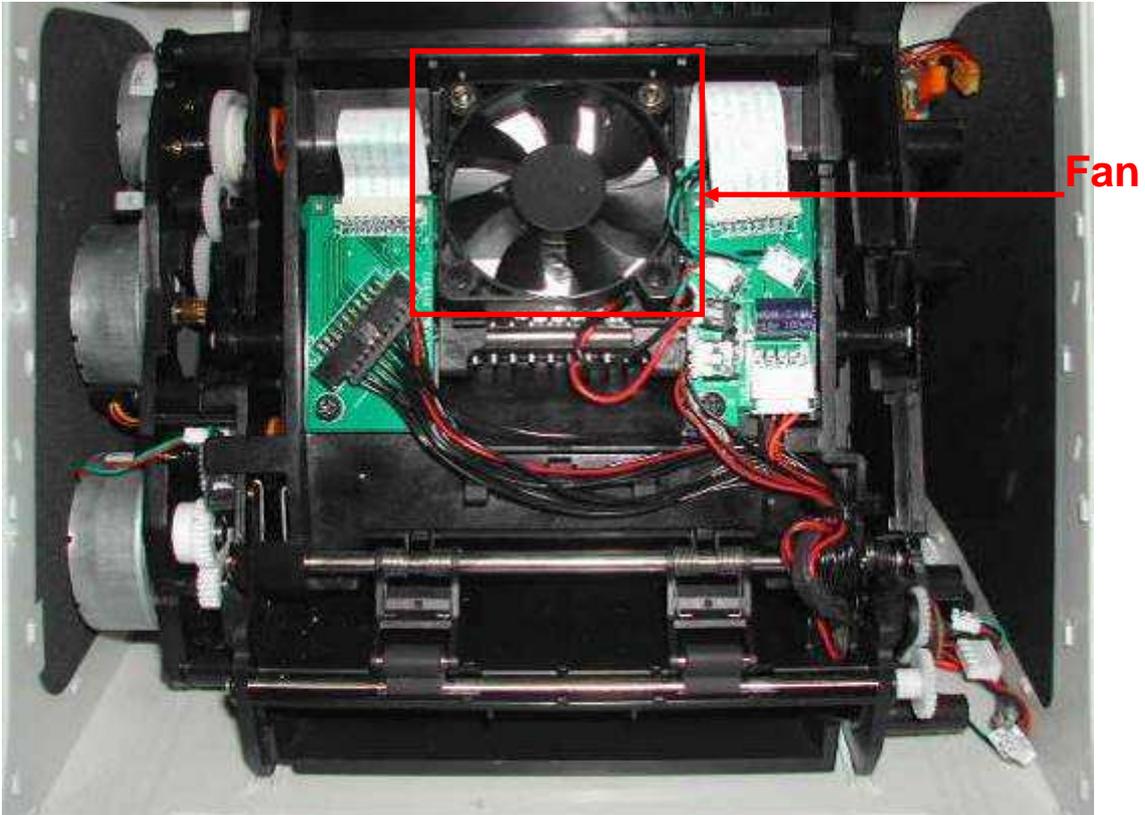
### Ribbon Door sensor



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## 2-2-15 Fan

The Fan reduces the temperature of the TPH (Thermal Print Head). The fan only starts to operate as soon as the temperature reaches a certain degree.



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## 2-3 Mechanism

### 2-3-1 Introduction

The following picture shows the profile of S4XX SERIES (Fig. 1). There are three components, which can be moved or opened by user, as below:

1. Door Button  
Push down the button, and then the front cover will be opened. At this status, user can install the ribbon cassette, or remove it from the printer (see Fig. 2).
2. Paper cassette  
User can insert or remove paper cassette, if user wants to reload papers or close the paper door so as to prevent dust (Fig. 3).
3. Back door dust-proof  
User can assemble the dust-proof cover, if he wishes to get better printing quality. By using back door dust-proof, user can prevent paper from dust during printing process (Fig. 4).

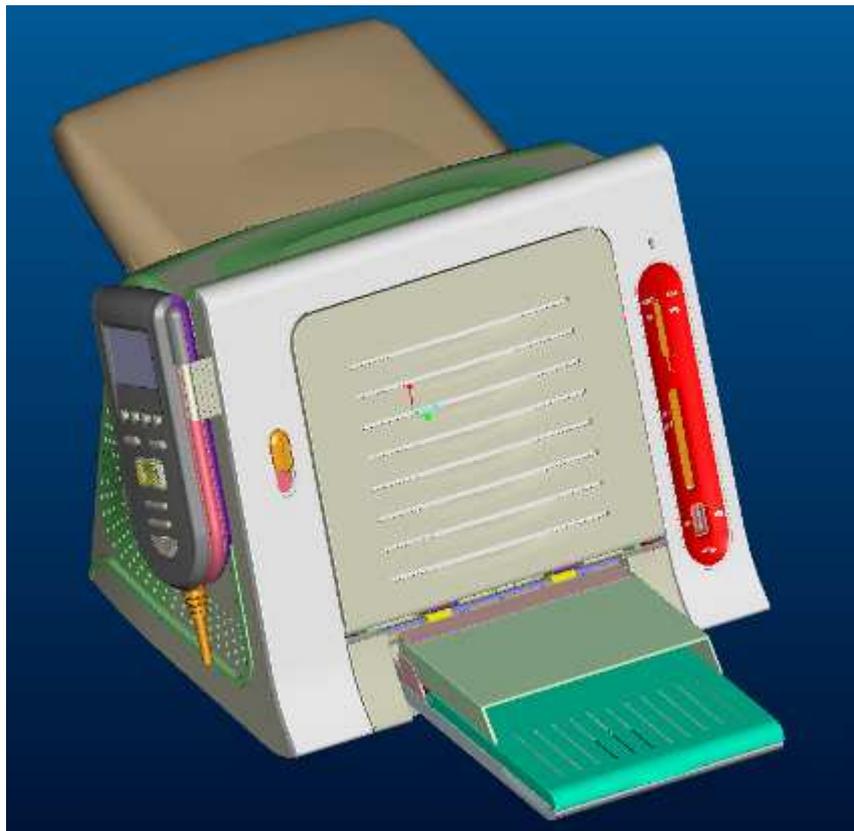


Fig. 1 Profile of S4XX SERIES

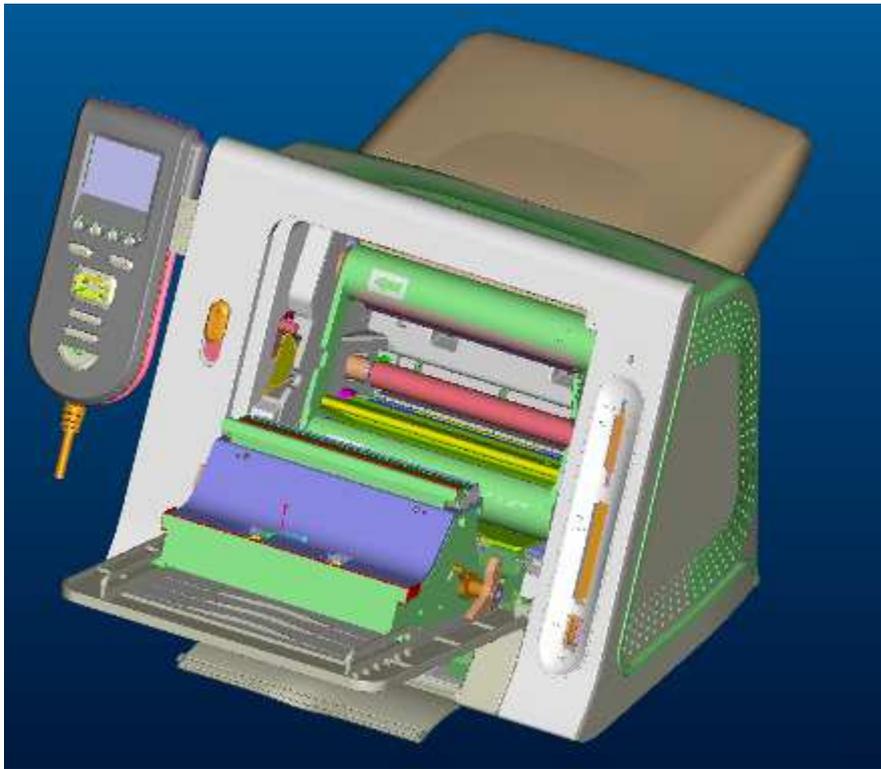


Fig. 2 Front Cover Open Status

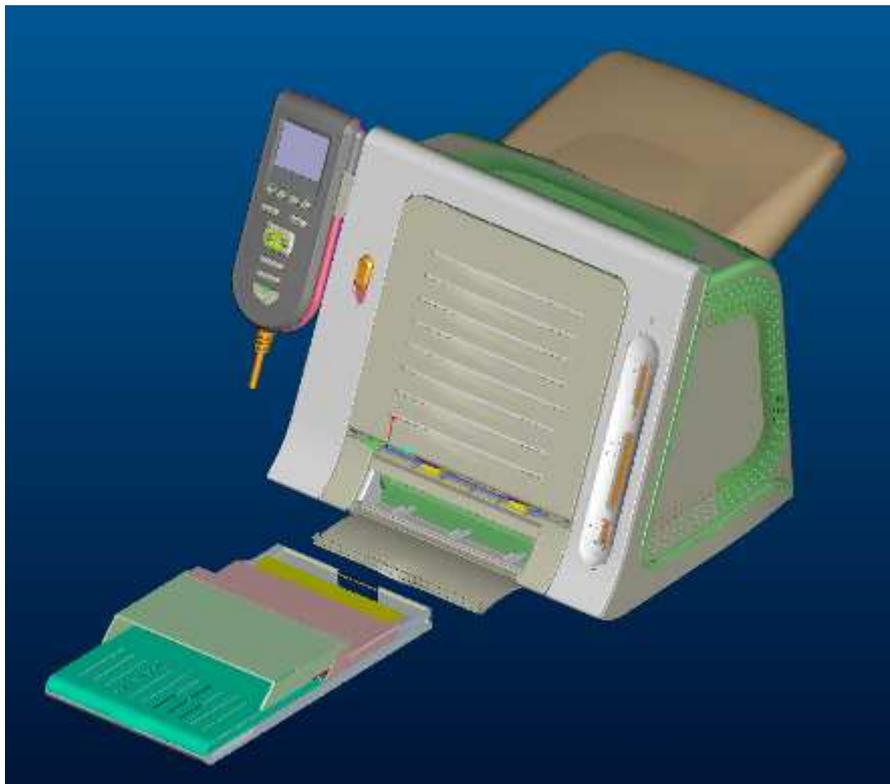


Fig. 3 Paper Cassette Moving Status

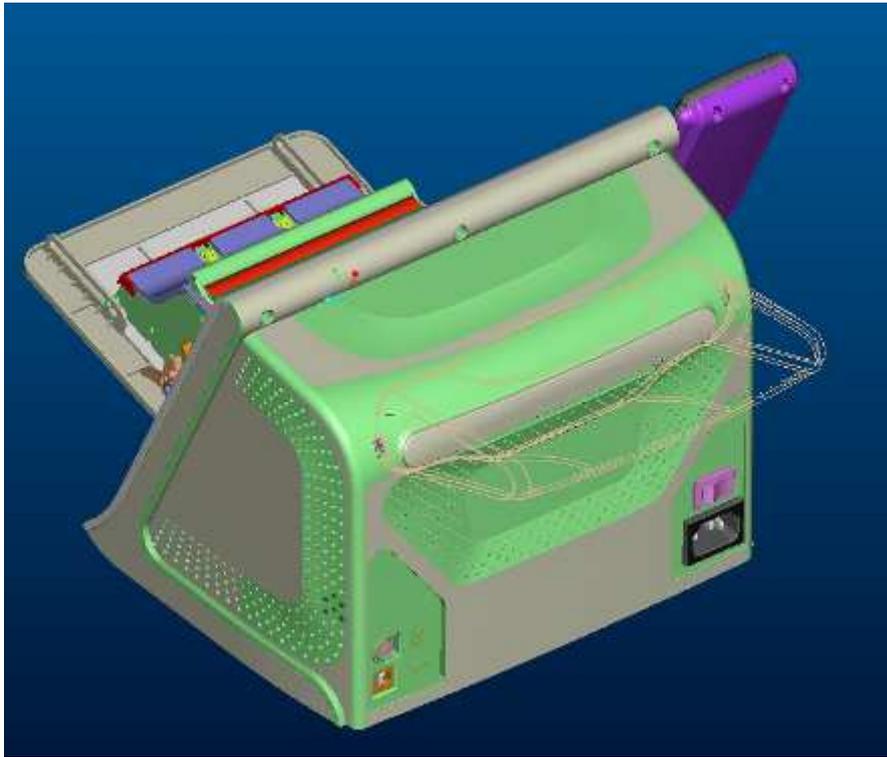


Fig. 4 Back door dust-proof Status

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## 2-3-2 Transmission

In order to drive the ribbon, to feed the paper and to control cam position, three motors are used in S4XX SERIES (Fig. 5). The purpose of three motors and devices are as below:

1. ADF & RIBBON MOTOR

Move paper forwards to capstan roller when feeding paper and supply a torque to drive the ribbon during printing process.

2. CAPSTAN MOTOR

Rotate capstan roller to move paper during printing process. When it moves forward, it also can exit paper. In addition, when it moves backward, it can rewind ribbon to avoid wrinkle & jam was happened.

3. CAM MOTOR

Move platen roller & pinch roller to suitable position during printing process. In addition, it also controls the open or close status of the back door.

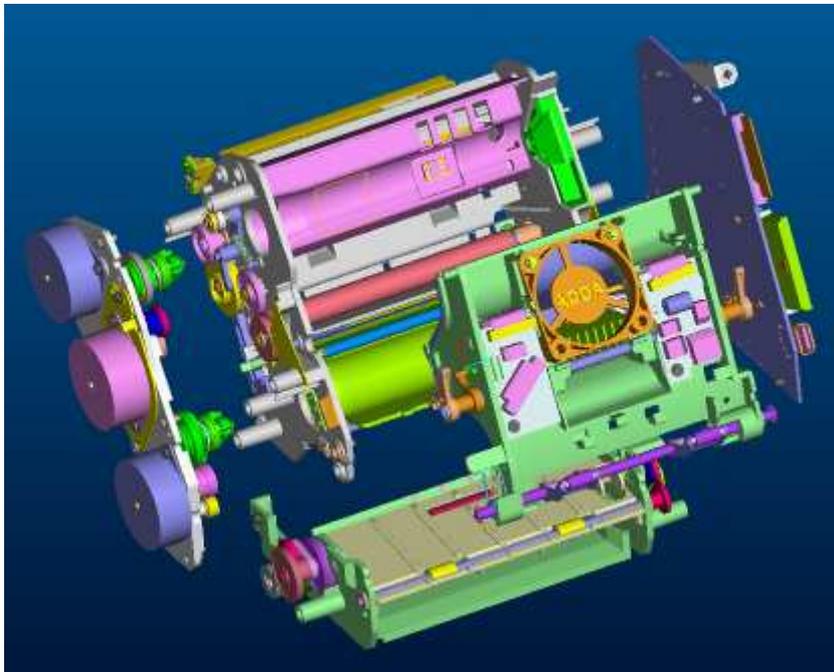


Fig. 5 Three stepping motors

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### 2-3-3 Paper Take-up Section Drive Mechanism

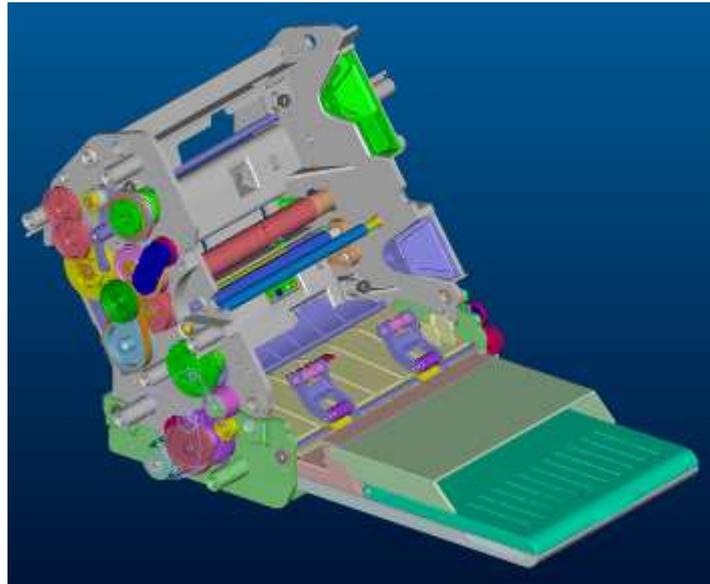


Fig. 6 Paper Take-up Section Drive Mechanism (1)

Auto Document Feeder (ADF) is illustrated as Fig. 6, 7 and Fig. 8, mainly the Paper Lift Device lifts up the paper in the paper cassette, and then the Paper Pick-up Device feeds the paper into the printer. After the paper goes through the Paper Path Separation Device<sup>1</sup>, the paper will be moved between the Pinch Roller and Capstan Roller directly. As long as the Capstan Roller catches the paper, another paper printing mechanism will continue the coming printing action.

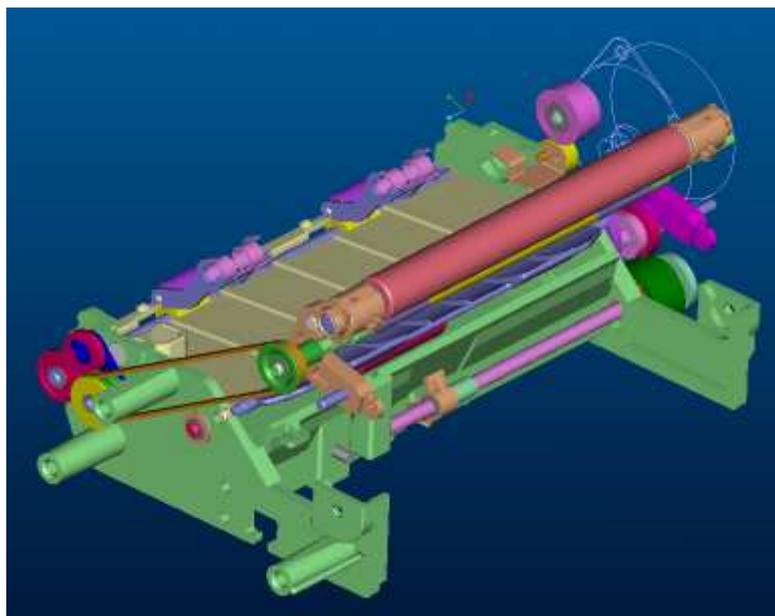


Fig. 7 Paper Take-up Section Drive Mechanism (2)

<sup>1</sup> This device is for separating the paths of feeding a paper and exiting a paper.



Regarding the ADF transmission, it is illustrated as Fig. 9. When the ADF Motor moves clockwise, it drives Gear 1 moving anticlockwise, and swings the Arm-Swing by friction. When Swing Gear and Gear 2 engaged, Swing Gear starts to rotate clockwise and drives Gear 2 moving anticlockwise, and then drives Gear 3 moving clockwise. When Gear 2 is moving, Paper Lift Device is also being active and lifting up the papers in the paper cassette until the paper touches Paper Pick-up Roller. The roller will feed the paper into the printer until the paper arrives at Capstan Roller, Capstan Roller will be in charge of the rest of paper movement.

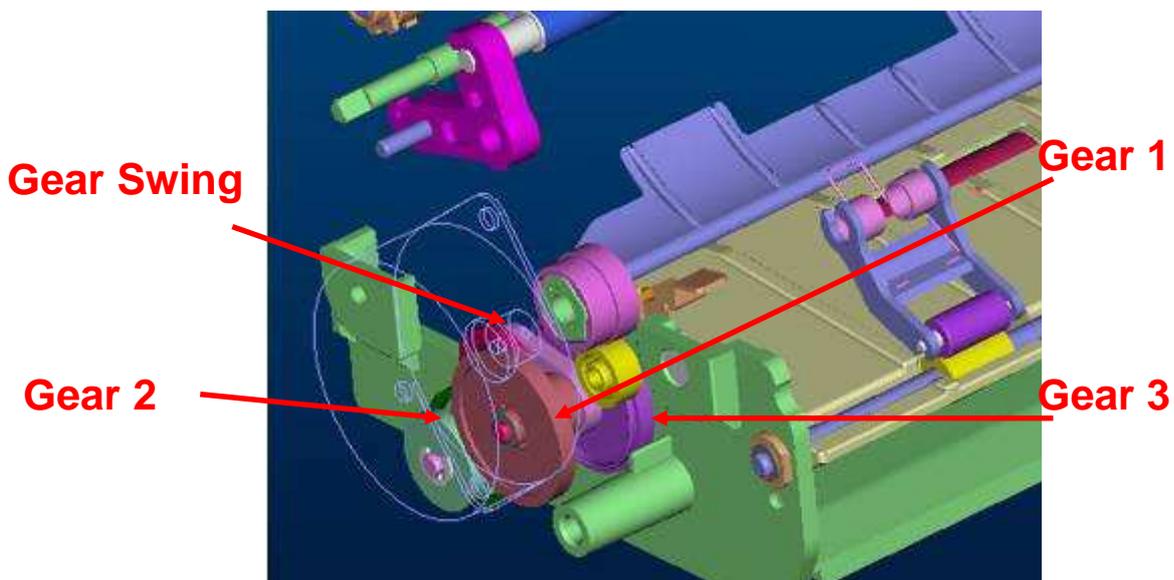


Fig. 9 Paper Take-up Section Drive Mechanism (3)

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## 2-3-4 Ribbon Take-up Section Drive Mechanism

When ADF device feeds the paper into the machine and becomes ready position to print, the next action is to search the ribbon. (In order to avoid getting ribbon jammed) the power for rotating the ribbon is provided by (as shown as Fig. 10): ADF Motor rotates anticlockwise, and drives Gear 1 rotating clockwise and swings the Arm-Swing by friction. When Swing Gear and Gear 2 engaged, Swing Gear starts to rotate anticlockwise and drives Gear 2 moving clockwise, and then drives Gear 3 moving anticlockwise. Then Gear 4 is driven and moving anticlockwise by friction, this chain action makes Ribbon Driver generate a rotating torque, it provides the power for rotating the ribbon.

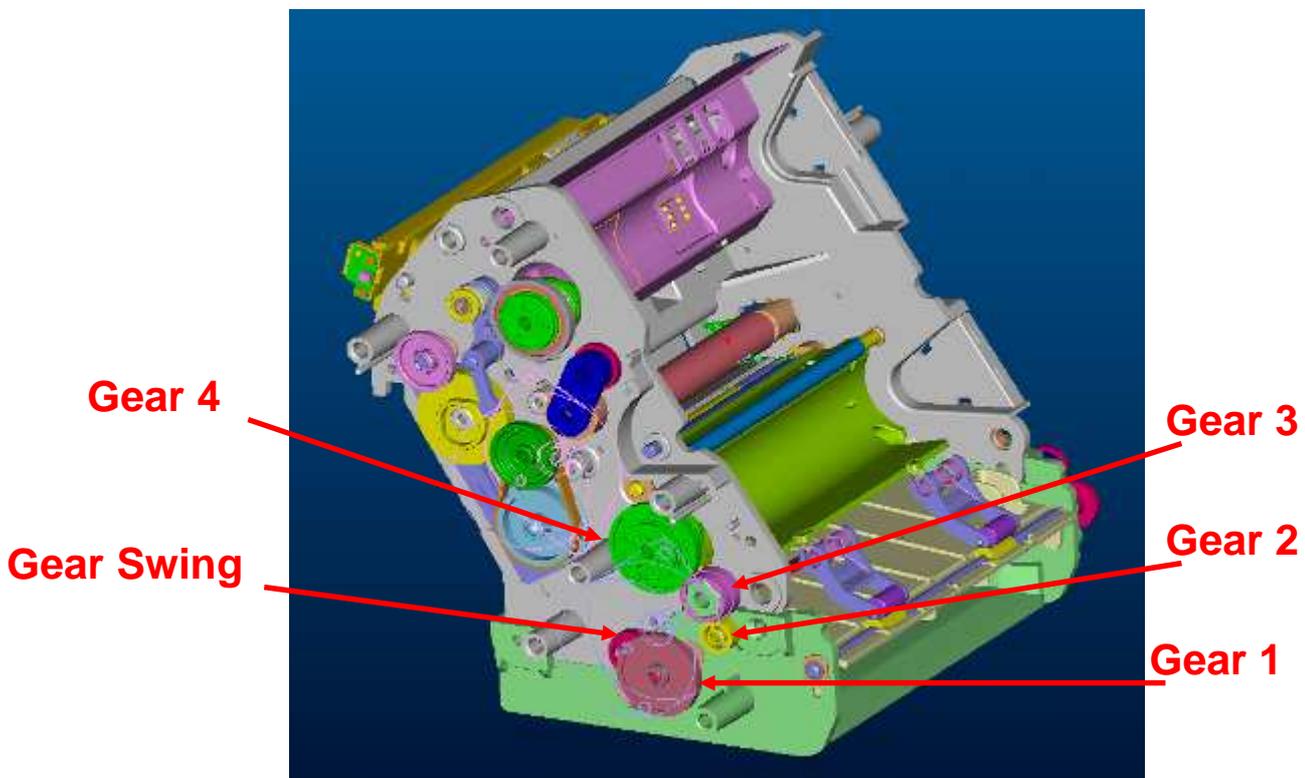


Fig. 10 Ribbon Take-up Section Drive Mechanism (1)

Regarding the theory of torque generation, it is shown as Fig. 11, 12. When Swing Gear touches Gear 1, and Gear 1, Gear2 and Gear 3 start to move simultaneously, Gear 3 will drive two pieces of felts near Gear 3. These two felts rub against to Base-TQL and Gear 3 separately, this friction makes Base-TQL rotating and provides a regular torque to make Ribbon Driver to roll the ribbon; the torque depends on the friction, the friction is controlled by the elasticity of the Spring TQL.

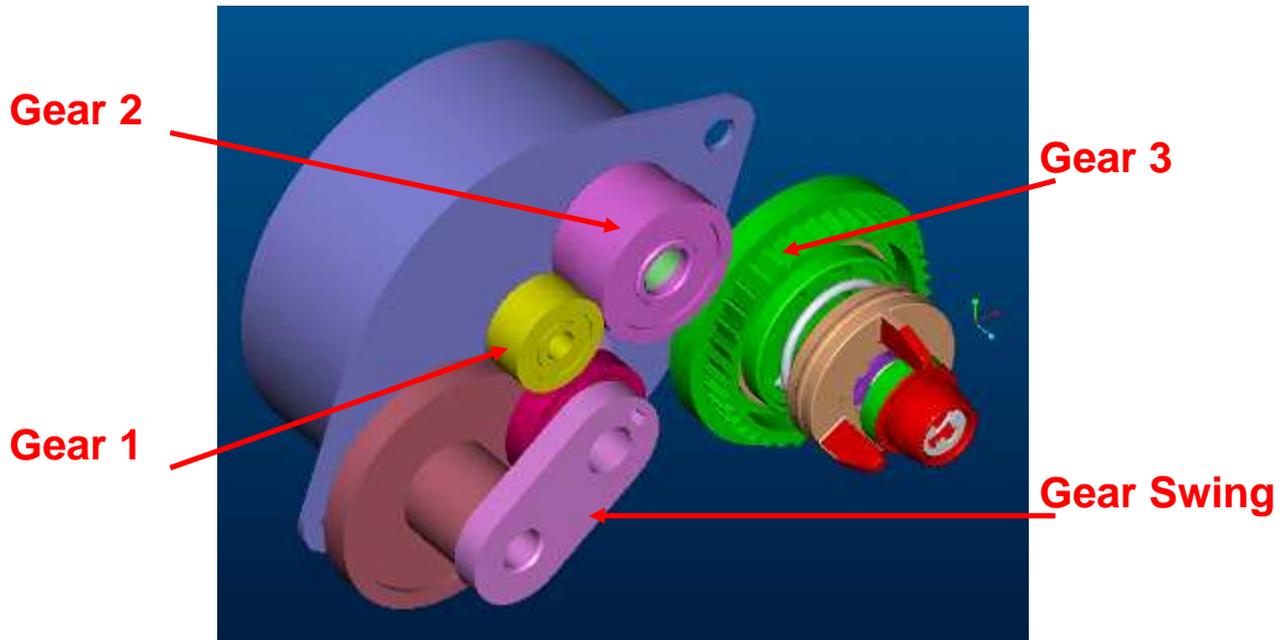


Fig. 11 Ribbon Take-up Section Drive Mechanism (2)

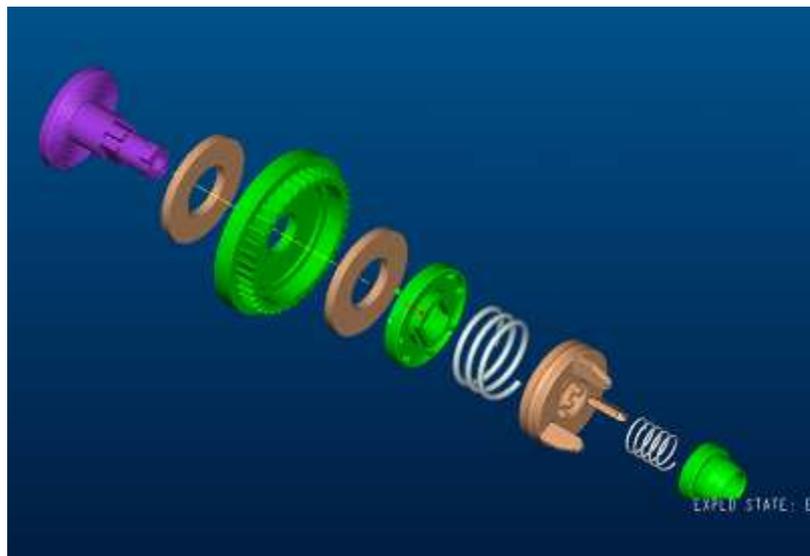


Fig. 12 TQL Structure

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## 2-3-5 Paper Movement Mechanism

### Arm\_Swing\_Rewind

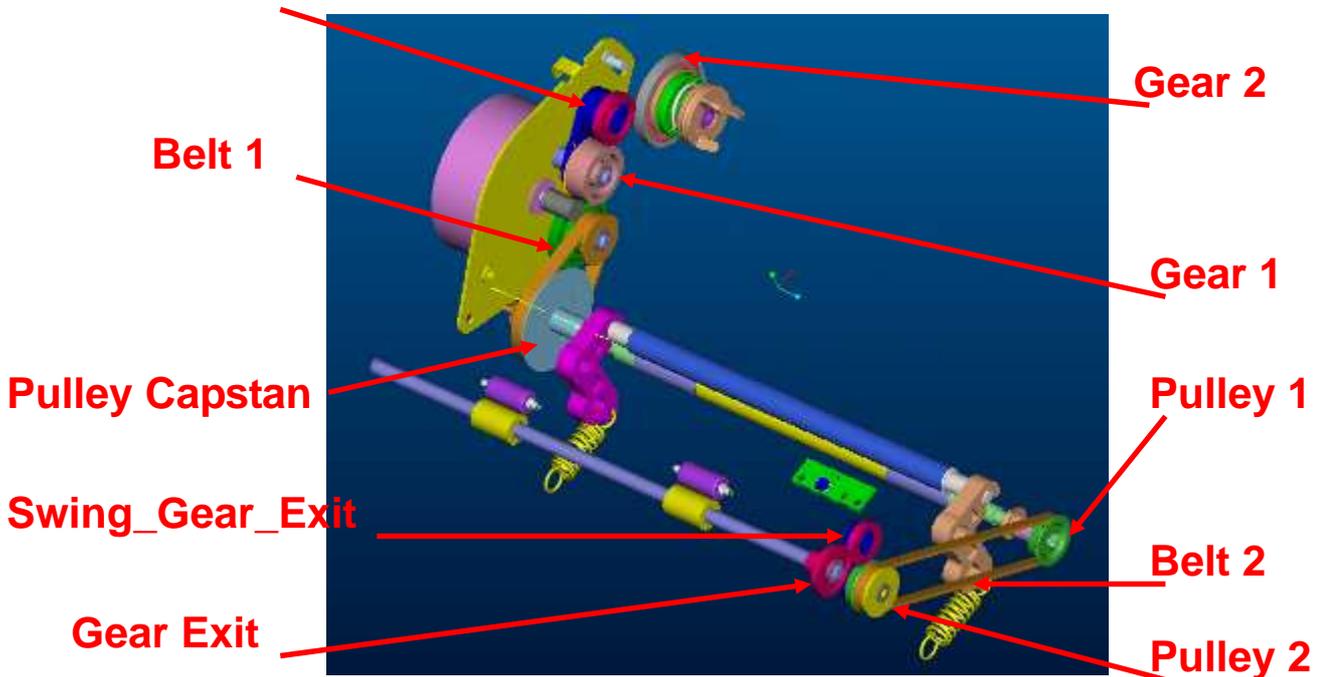


Fig. 13 Paper Movement Drive Mechanism

In order to print a photo completely, the paper has to go back and forth for four times. The force for these movements is totally coming from Capstan Motor; the transmission is shown as Fig. 13. When Capstan Motor is rotating, it drives Pulley Drive, and then transmits the power to Pulley Capstan via Belt 1. The tension Belt 1 needs is provided by the rotation of the motor. As long as the power is transmitted to Pulley Capstan, Capstan Roller is rolled directly. Paper is pressed by Pinch Roller and Capstan Roller. As the Capstan roller is rolling, paper is moved toward and backward.

Besides, Capstan Motor is also in charge of exiting a paper and ribbon rewinding. When Capstan Motor is rotating anticlockwise, Gear 1 will be driven clockwise, and swings Arm-Swing-Rewind clockwise by friction. When Swing-Gear-Rewind and Gear 2 are engaged, Swing-Gear-Rewind starts to move anticlockwise, and drives Gear 2 clockwise. This makes Ribbon Rewind Driver generate a rotating torque to rewind the ribbon.

When Capstan Motor is rotating clockwise, it moves Pulley 1, and then transmits to Pulley 2 via Belt 2; Arm-Swing-Exit is swung anticlockwise by friction. When Swing-Gear-Exit and Gear Exit are engaged, Swing-Gear-Exit starts to rotate clockwise, and drives Gear Exit move anticlockwise. Roller Exit rotates anticlockwise makes the paper exit the printer.

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## 2-3-6 Platen Position and Pinch Separation Mechanism

When the printer is working normally, TPH must press on Platen Roller tightly, and Pinch Roller must press on Capstan Roller. During the paper movement and ribbon search procedures, TPH must stay away from Platen Roller. Besides, in order to avoid deforming Pinch Roller, Capstan Roller and Pinch Roller must be separated when the machine is standby. A chain of gear sets and cams are applied for locating the positions of Pinch Roller and Platen Roller.

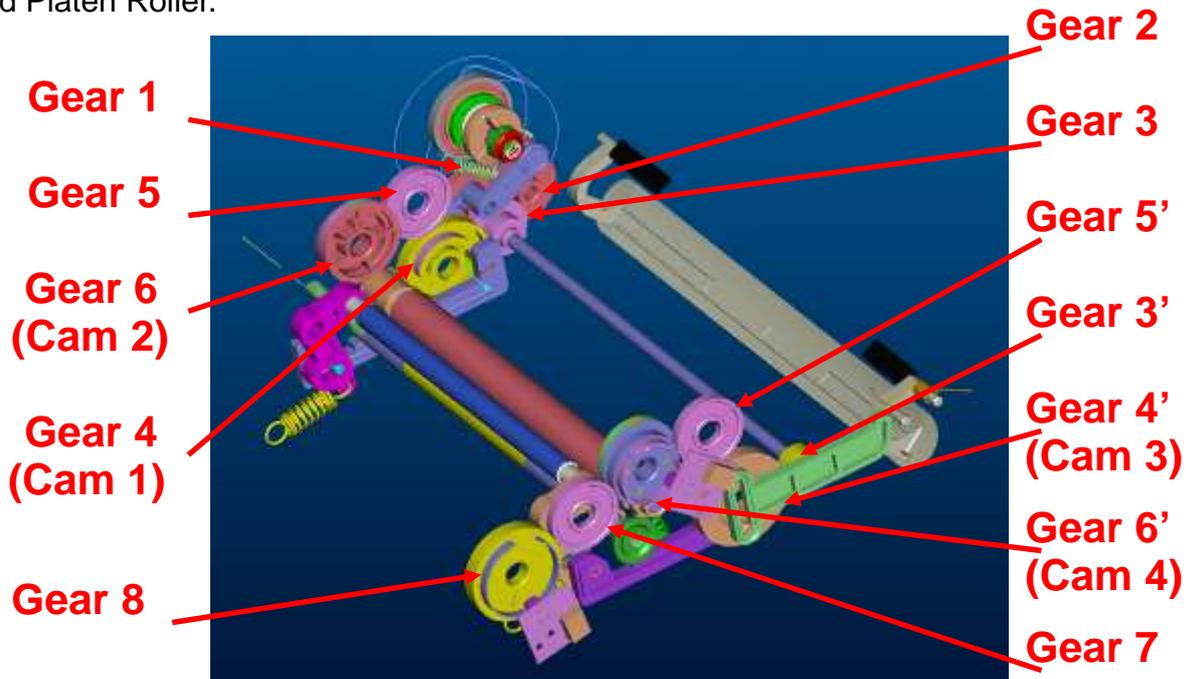


Fig. 14 Platen Position and Pinch Separation Mechanism (1)

The power transmission theory is shown as Fig. 14, 15. When Cam Motor rotates and moves Gear 1 → Gear 2 → Gear 3 continuously, the power will be transmitted to Gear 3' at another side via Shaft-Cam-Platen. It makes the gear sets of both sides can be moved synchronously. At this moment, the power transmission procedure becomes Gear 4, Gear 4' (Cam 1, Cam 3) → Gear 5, Gear 5' → Gear 6, Gear 6' (Cam 2, Cam 4) → Gear 7 → Gear 8. By Cam 1 and Cam 3 with inner cam design, it makes Link 1 and Link 2 move toward and backward to drive Bushing-Pinch to roll and separate Pinch Roller and Capstan Roller.

Besides, By Cam 2 and Cam 4 with exterior cam design, it makes Bushing Platen 1 and Bushing Platen 1' move upward and downward to drive Platen Roller, and then control the gap between TPH and Platen Roller for printing and the paper movement. In order to avoid dust and ribbon jammed, the rolling location of Clutch-RBN-Rewind can be decided by exterior cam design of Cam1, and then control the timing of ribbon rewind. By applying the exterior cam design of Cam 3 and Scotch yoke, the purpose of dust prevention can be achieved by control the timing of opening and closing of Back Door.

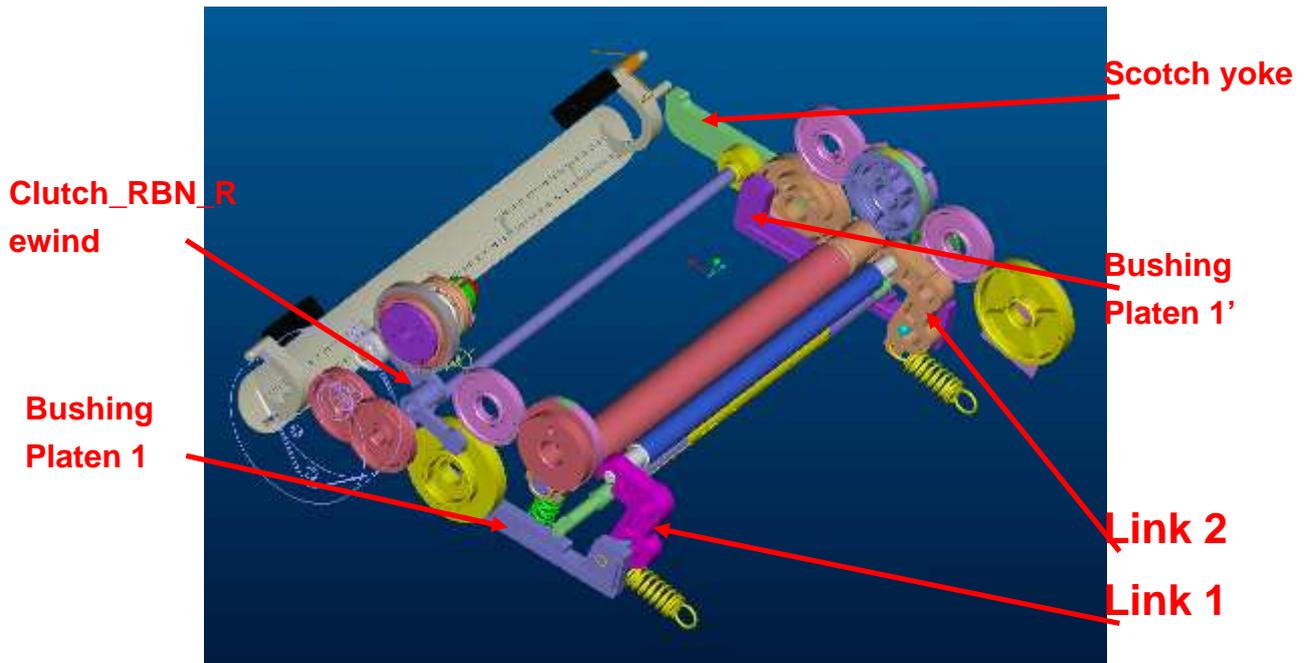


Fig. 15 Platen Position and Pinch Separation Mechanism (2)

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## 2-4 Firmware

### 2-4-1 Firmware Update:

As the firmware is stored in the ICs of the main board, you need to use the easy to use BurnFW.exe application in order to update the printer's firmware. Firmware updates can easily be downloaded from the HiTi support website:

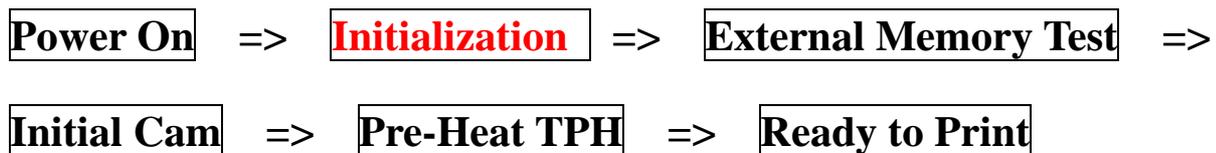
Go to [www.hi-ti.com](http://www.hi-ti.com); then find the 'Support' section.

Firmware updates are always recommended and help to increase the printer's lifetime and efficiency.

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### 2-4-2 Initialization:

When the printer powers on, the initialization process will go through various stages. The status LED will keep blinking until the initialization process has concluded.



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## 2-4-3 Error Messages:

The firmware controlled Status LED shows the error status:

### Green Signal Light:

**Stable:** Printer is ready for processing job

**Blinking slowly:** Printer is processing job or initializing after power on

**Blinking fast:** Printer is writing firmware

***IMPORTANT: NEVER TURN THE PRINTER OFF WHILE ANY LIGHT IS BLINKING OR WHILE YOU CAN STILL HEAR OPERATIONAL SOUNDS FROM THE PRINTER***

### Orange Signal Light:

LED blinking times	Error description	Solution
1	Cover open	<ol style="list-style-type: none"> <li>1. Open and close the cover again.</li> <li>2. Check the Cover Sensor connection.</li> <li>3. Change the <a href="#">Cover Sensor</a>.</li> </ol>
2	Ribbon missing	<ol style="list-style-type: none"> <li>1. Insert the ribbon cartridge again.</li> <li>2. Try with another ribbon set.</li> </ol>
3	Ribbon out	<ol style="list-style-type: none"> <li>1. Confirm the ribbon is finished. Change the ribbon cartridge.</li> <li>2. Check connection of Ribbon LED and Sensor (Front &amp; Back).</li> <li>3. Change the <a href="#">Ribbon LED</a> (Front &amp; Back).</li> <li>4. Change the <a href="#">Ribbon Sensor</a> (Front &amp; Back).</li> </ol>
4	Paper out	<ol style="list-style-type: none"> <li>1. Put new papers.</li> <li>2. Insert the paper cassette again.</li> <li>3. Check LE Sensor connection.</li> <li>4. Change the <a href="#">LE Sensor</a>.</li> </ol>
5	Paper jam	<ol style="list-style-type: none"> <li>1. Clean jammed paper.</li> <li>2. Check LE &amp; Jam Sensor connection.</li> <li>3. Change the <a href="#">Jam Sensor</a> &amp; <a href="#">LE sensor</a>.</li> <li>7. Change <a href="#">Capstan Motor</a>, <a href="#">Capstan Roller</a> or <a href="#">Printer Main Board</a>.</li> <li>8. Change <a href="#">Pinch Roller</a>.</li> </ol>

6	Paper mismatch	Confirm paper and ribbon type
8	Cam error	1.Clean Cam sensor 2.Reassembly Cam gear 3.Change <a href="#">Cam sensor</a> 4.Change Cam gear
9	Nvram error	Change <a href="#">Main BD</a>
10	Ribbon Chip Error	Change Ribbon Change <a href="#">IC Ribbon Sensor BD</a>
11	Asic error	Change <a href="#">Main BD</a>
12	Adc error	1. Check connection of the TPH Wire and Flat Cable between the TPH, TPH Board and Main Board. 2. Change Flat Cable. 3. Change the TPH Wire. 4. Change the <a href="#">TPH Board</a> . 5. Change the <a href="#">Main Board</a> .
13	Fw checksum error	Rewrite firmware
16	Write flash error	Change <a href="#">Main BD</a>

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# Chapter 3: Disassembly

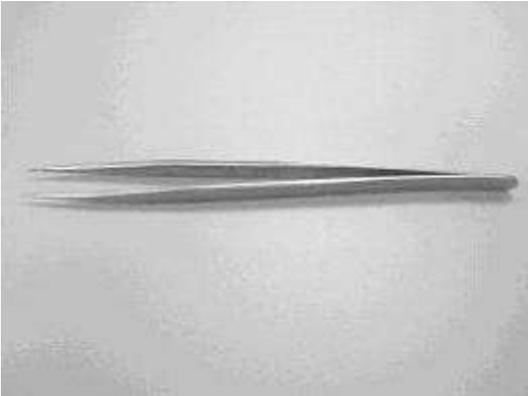
## 3-1 Safety Instructions

- Read these instructions carefully. Save these instructions for future reference.
- Follow all warnings and instructions marked on the printer.
- Unplug the printer from the wall outlet before disassembly.
- Do not place the printer on an unstable cart, stand, or table. The printer may get damaged by a fall.
- Openings in the chassis and the bottom are provided for ventilation purposes and to ensure reliable operation of the printer by protecting it from overheating: these openings must not be blocked or covered.
- Placing the printer on a bed, sofa, rug, or other similar, not firm surfaces may block the openings. The printer should never be placed near or over a radiator or heat register, proper ventilation and cooling must be provided at all times.
- The printer should only be operated with the type of power indicated on the marking label. If you are not sure of the type of power available in your area, consult your dealer or local power company.
- If an extension cord is used with this product, make sure that the total ampere rating of the equipment plugged into the extension cord does not exceed the extension cord ampere rating. Also, make sure that the total rating of all products plugged into the wall outlet does not exceed the fuse rating.

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# 3-2 Tools

**Tweezers**



**IC Clamp**



**Screwdriver– minus**



**Wire Cutter**



**Screwdriver– plus**

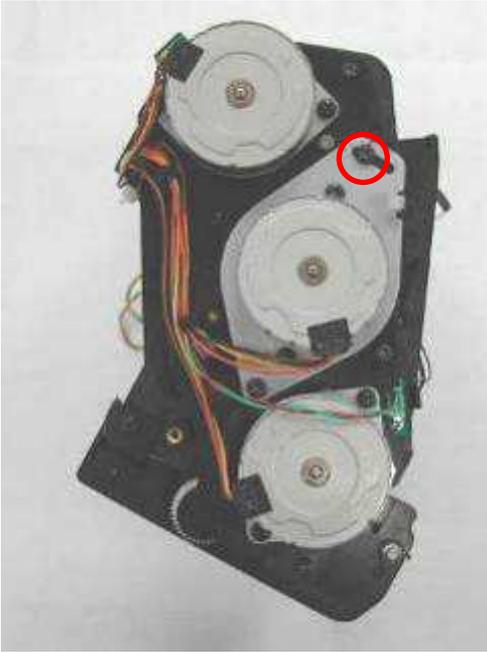


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## 3-3 Do not Disassemble these Parts

HiTi strictly prohibits anyone to disassemble the **Bracket-idle**. The part needs to be calibrated by a specific calibration device and **cannot** be repaired on site.

### Bracket-idle



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## **3-4 Disassembly List**

**Controller**

### **3-4-1 Controller Board and Controller Cable**

**Case**

### **3-4-2 Ribbon Door and Case front**

### **3-4-3 Case Back**

### **3-4-4 Power Board and Sheet Power Board**

**PCB**

### **3-4-5 Main Board**

### **3-4-6 TPH Board, Fan and Ribbon LED B**

**Motor**

### **3-4-7 ADF Motor, Cam Motor and Capstan Motor**

**Wire , Cable,LED & Sensor**

### **3-4-8 Status LED**

### **3-4-9 Cam Sensor**

### **3-4-10 Cover Open Sensor**

### **3-4-11 Jam Sensor**

### **3-4-12 Ribbon Sensor B, LE Sensor and Tray Front**

### **3-4-13 Cassette Sensor and Ribbon Sensor F**

## **Rollers**

### **3-4-14 Capstan Roller and Pinch Roller**

## **Others**

### **3-4-15 TPH**

### **3-4-16 TQL**

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### 3-4-1 Controller Board and Controller Cable

#### Controller Board

S400	P/N: 45.P1804.021
S420	P/N: 47.P2008.001



#### Controller Cable

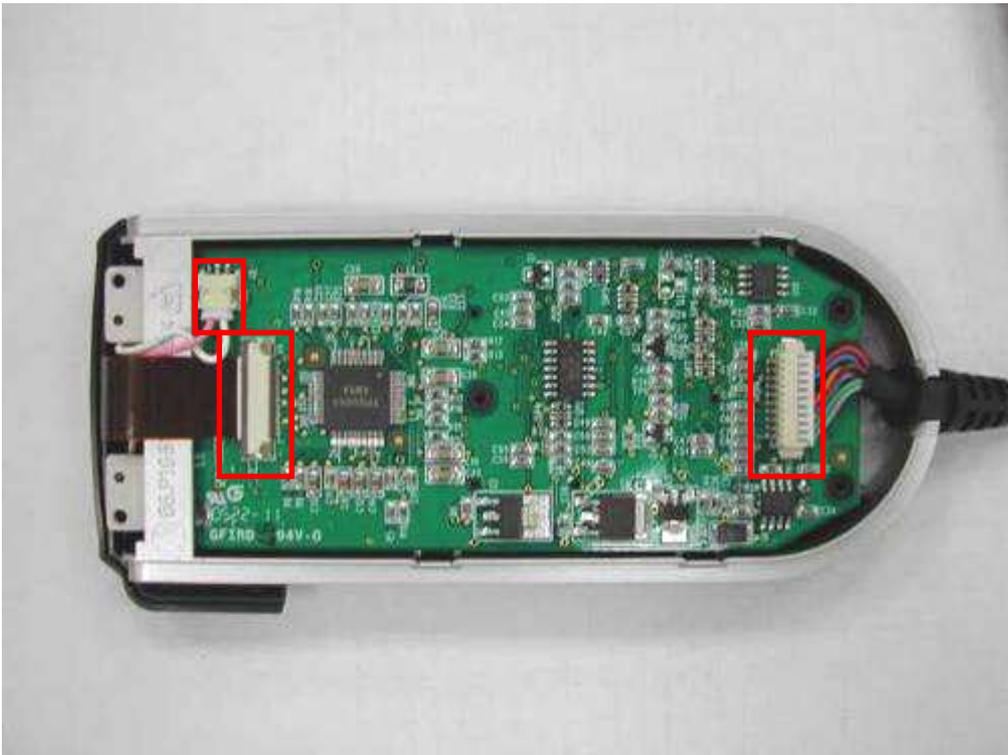
S400	P/N:40.P1801.001
S420	P/N:40.P2001.R02



Unscrew 4 screws from controller case back



Unplug connector of controller cable from controller board  
Unplug 2 connectors to LCD from controller board



### Controller Board



## Controller Cable



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### 3-4-2 Ribbon door and Case front

#### Ribbon Door

<b>S400</b>	<b>P/N: 56.P1841.003</b>
<b>S420</b>	<b>P/N: 56.P2005.011</b>



#### Case Front P/N: 48.P1810.001

<b>S400</b>	<b>P/N: 48.P1810.001</b>
<b>S420</b>	<b>P/N: 48.P2002.001</b>



Unscrew 3 screws from case back



Open ribbon door

Release two bosses of both sides from the slide ways of the ribbon door



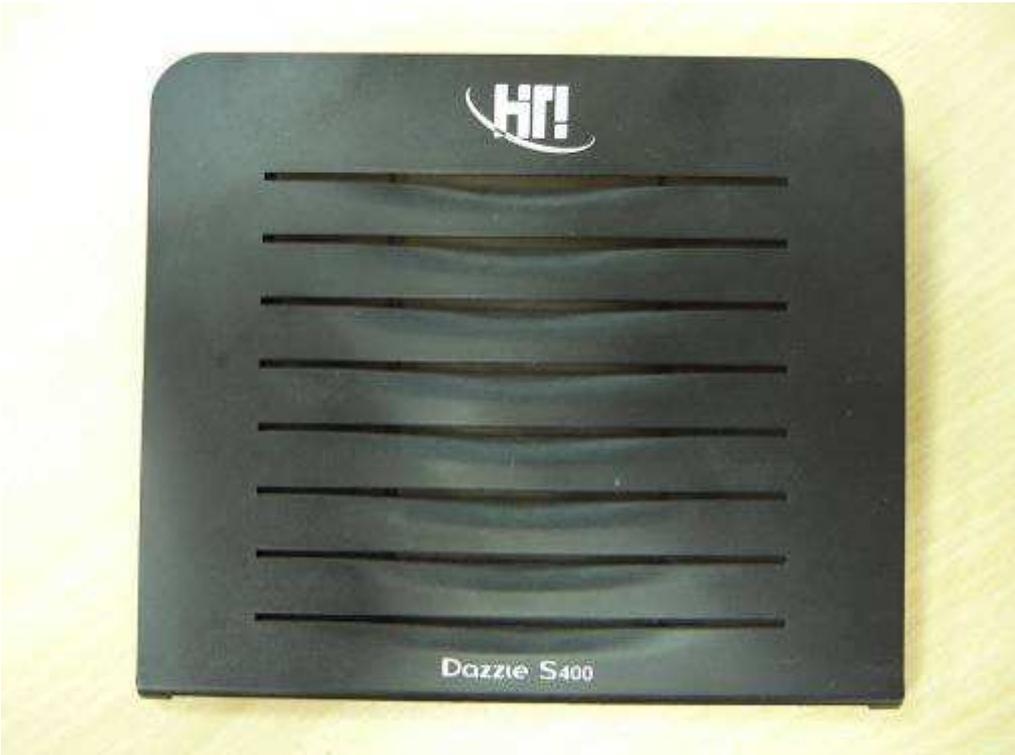
Separate case front from case back with chassis (there are two wedges in the bottom of the case front, have to unlock them firstly)



Separate ribbon door from case front



**Ribbon Door**



**Case Front**



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### 3-4-3 Case back

#### Case Back

S400	P/N: 48.P1809.001
S420	P/N: 48.P2001.001

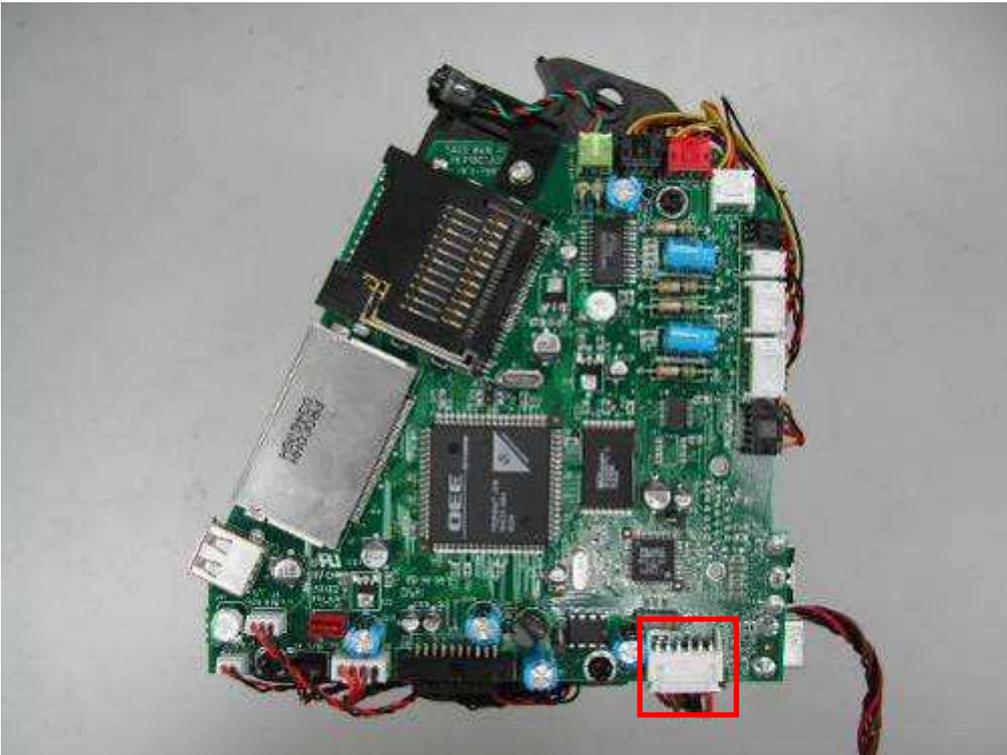


Remove the Case Front according to [3-4-2 Ribbon door and Case front](#) removal procedure

Unscrew 3 screws from chassis



Unplug the connector from main board  
Separate case back and chassis



Unscrew 2 screws from bracket



Unplug 2 connectors and unscrew the screw from power board  
Separate case back and power board



**Case Back**



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# 3-4-4 Power Board and Sheet\_Power\_Board

Power Board

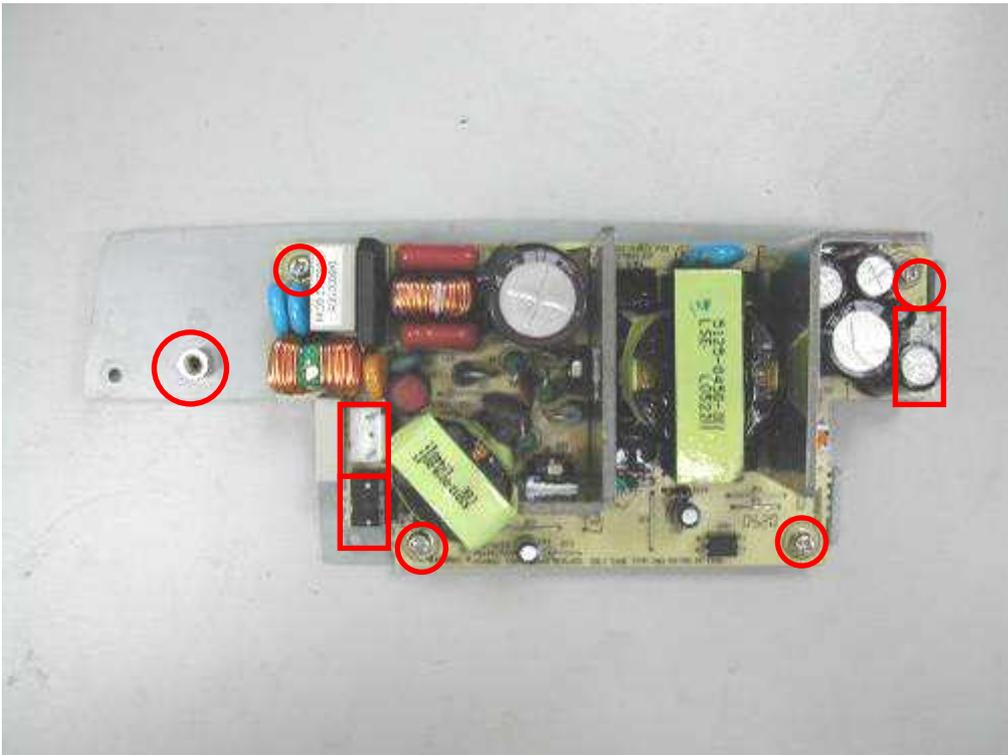
P/N:44.P18R2.009



Unscrew 2 screws from bracket



Unplug 3 connectors and unscrew 4 screws from power board  
Separate case back and power board



**Sheet\_Power\_Board**



## Power Board



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## 3-4-5 Main Board

### Main Board

S400	P/N: 45.P1801.032
S420	P/N: 45.P20R1.041



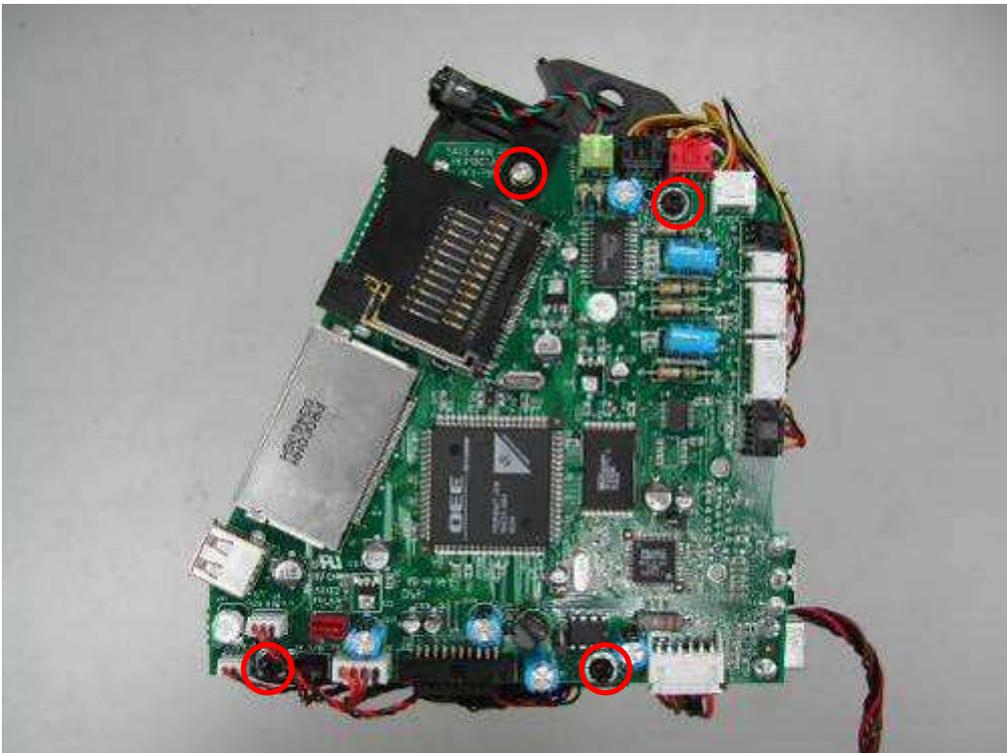
S400



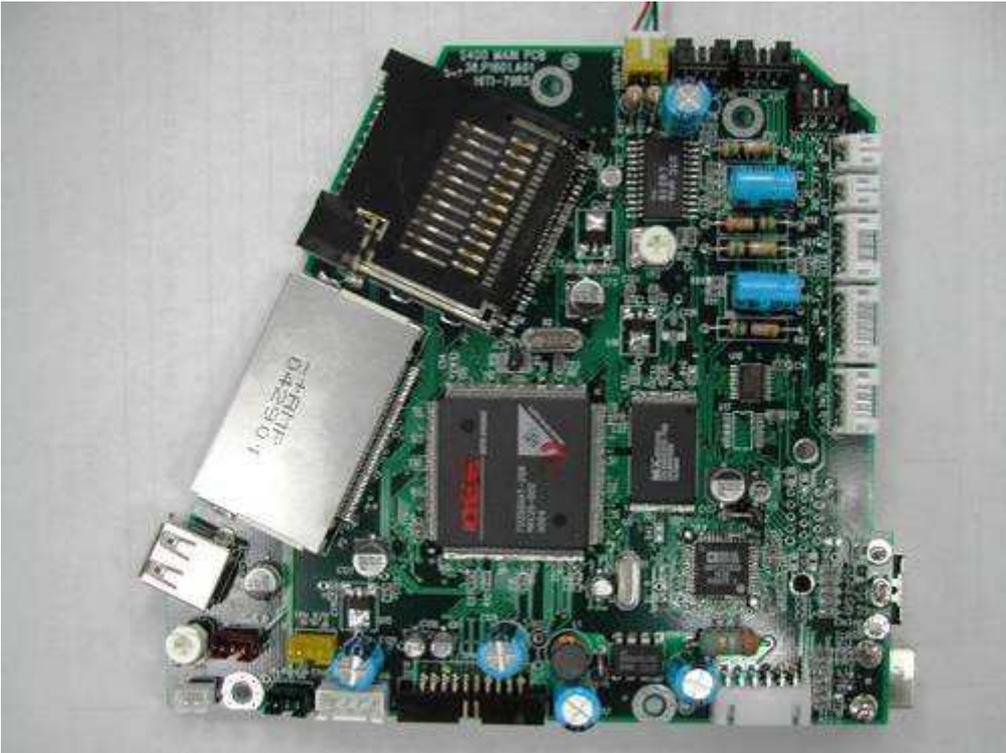
S420

Remove the Case Front and Case Back according to [3-4-2 Ribbon door and Case front](#) and [3-4-3 Case back](#) removal procedure

Unplug all the connectors and unscrew 4 screws from main board



## Main Board



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### 3-4-6 TPH board, Fan and Ribbon LED\_B

#### TPH Board-L

S400	P/N: 45.P1806.021
S420	P/N: 45.P20R6.011

#### TPH Board-R

S400	P/N: 45.P180H.031
S420	P/N: 45.P20RH.011



TPH Board-L    TPH Board-R

#### Fan

S400	P/N: 17.F5010.006
S420	P/N: 17.FBP20.CA1



Ribbon LED\_B    P/N:40.P1806.R02



Unscrew 3 screws from case back

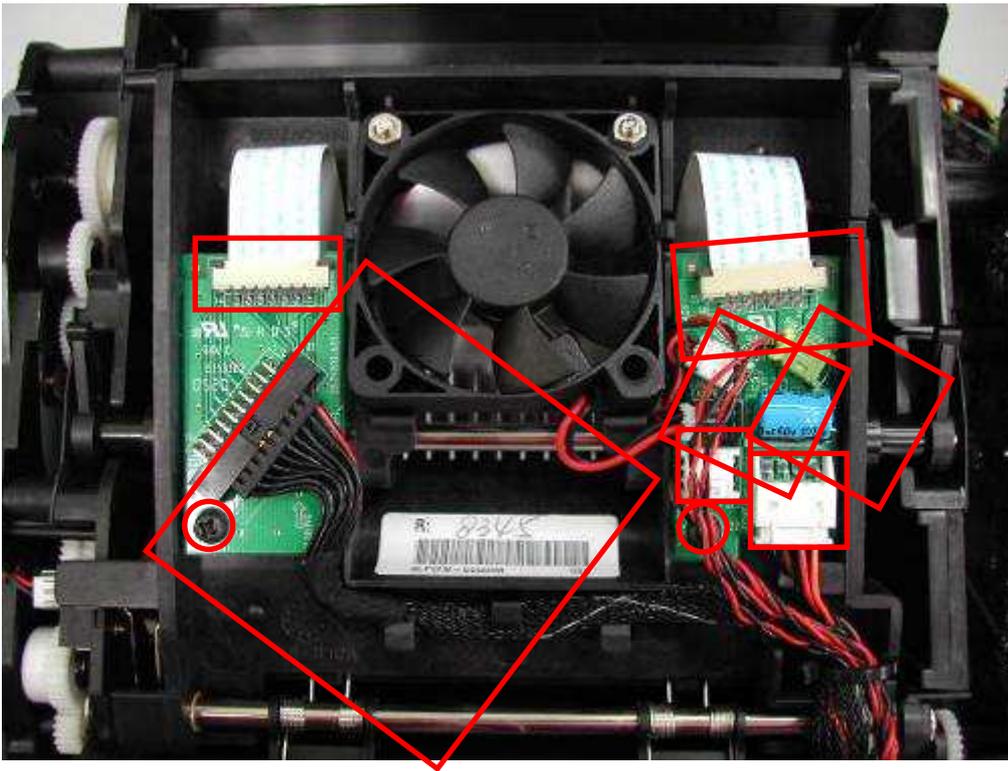


Open ribbon door

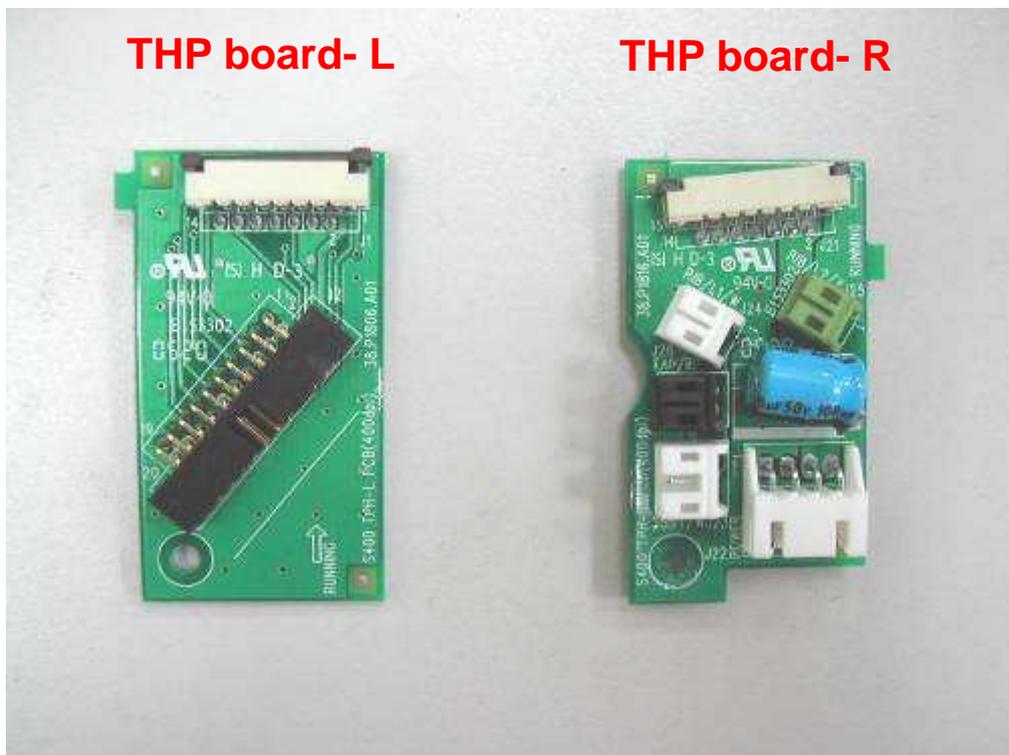
Release two bosses of both sides from the slide ways of the ribbon door



Unscrew 2 screws and unplug 7 connectors from TPH board



Take **TPH Board** out



Unscrew 2 screws from heat sink



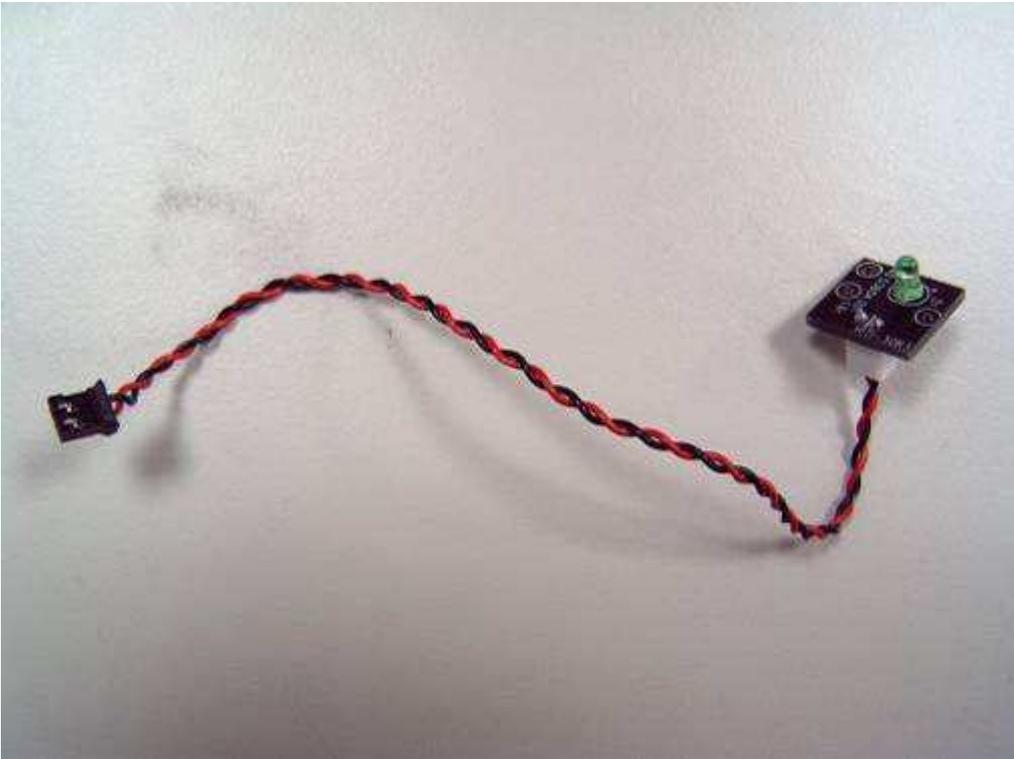
Fan



Unscrew 2 screws from ribbon LED\_B



Ribbon LED\_B

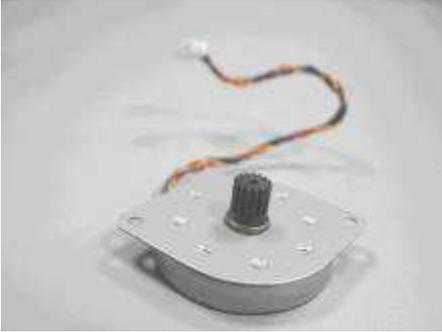


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## 3-4-7 ADF Motor, Cam Motor and Capstan Motor

**ADF Motor**

**P/N: 17.MBP18.BN2**



**Cam Motor**

**P/N: 17.MCP18.BN2**



**Capstan Motor**

**P/N:17.MAP18.BM2**



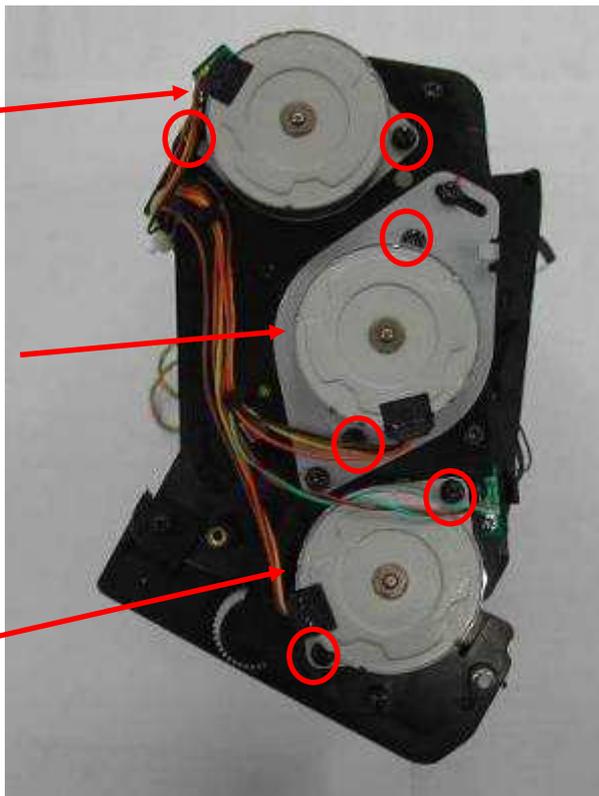
Remove the Case Front and Case Back according to [3-4-2 Ribbon door and Case front](#) and [3-4-3 Case back](#) removal procedure

Unscrew the screws from motor frame

**Cam motor**

**Capstan motor**

**ADF motor**

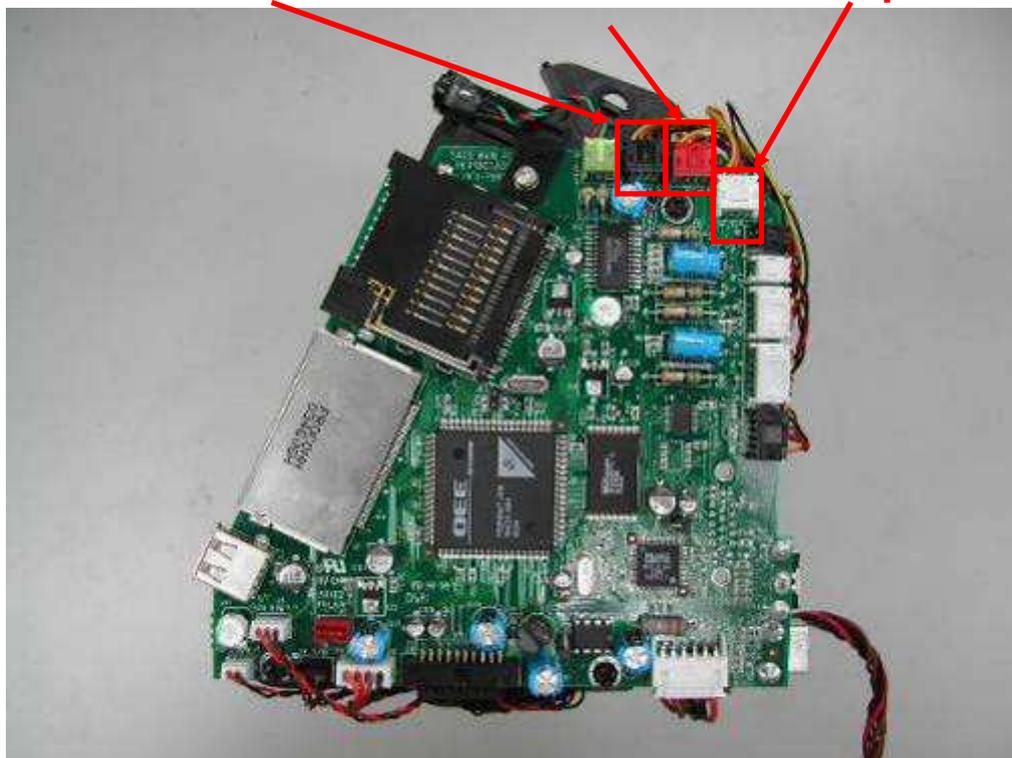


Unplug the connector from main board

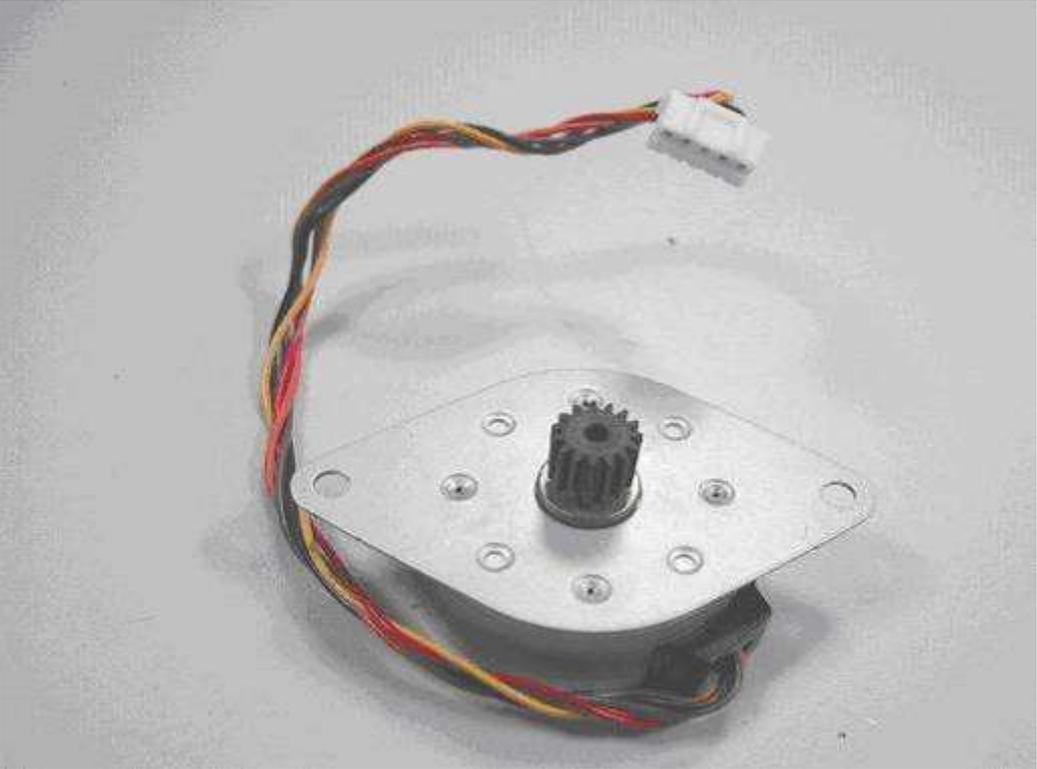
**Cam motor**

**ADF motor**

**Capstan motor**



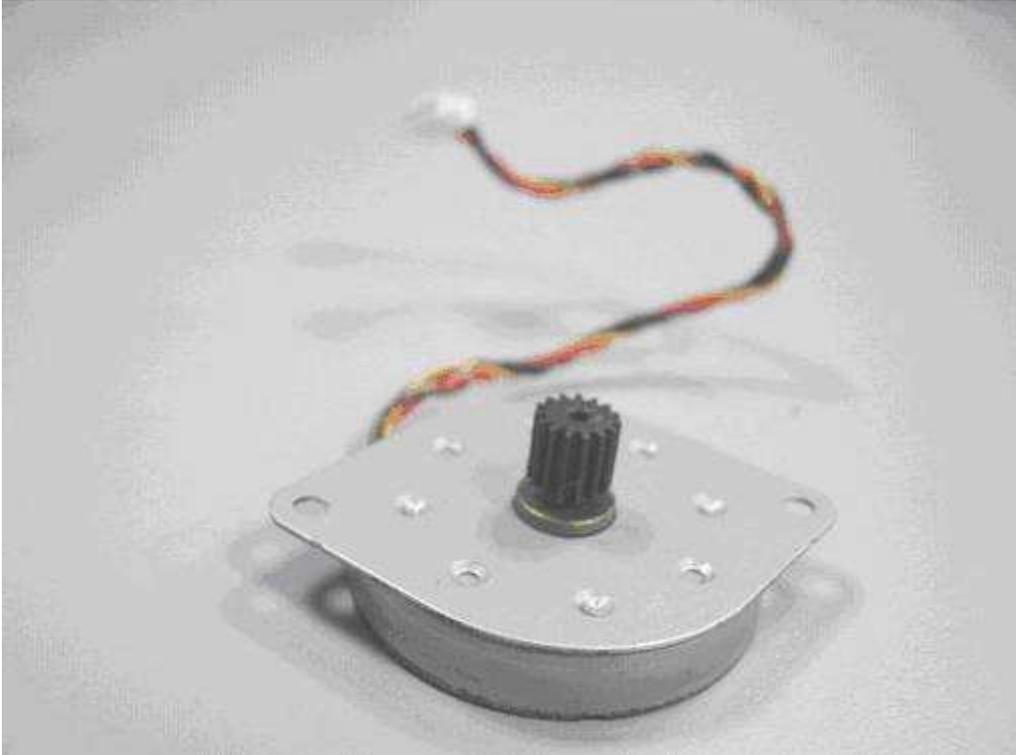
**Cam Motor**



**Capstan Motor**



**ADF Motor**



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## 3-4-8 Status LED

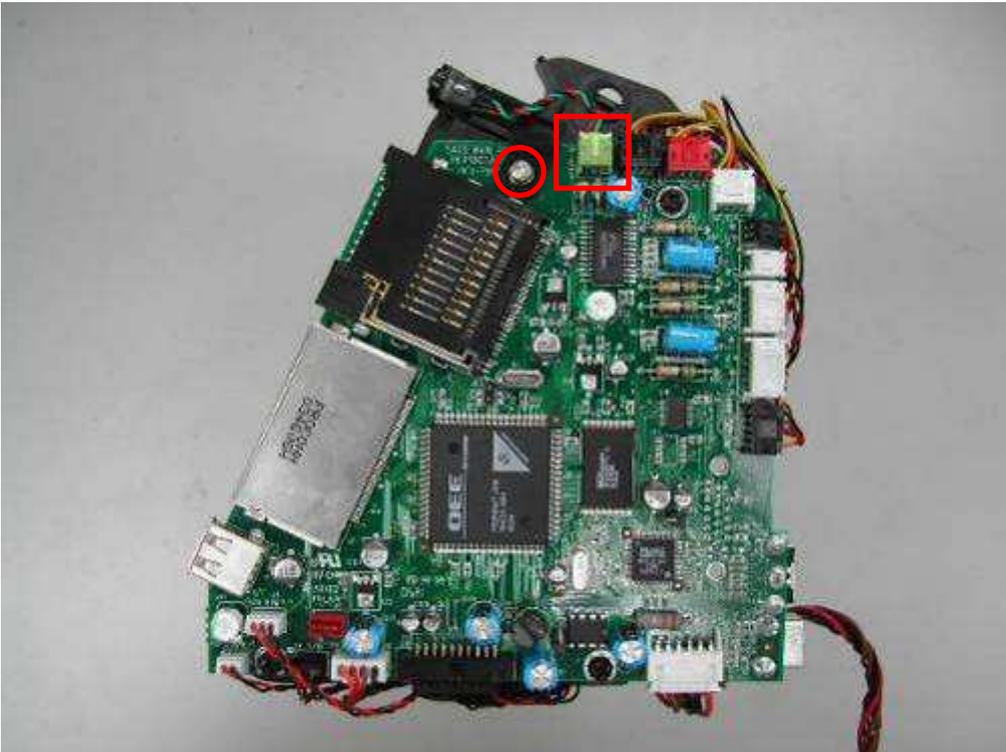
Status LED

P/N: 40.P1804.R01



Remove the Case Front and Case Back according to [3-4-2 Ribbon door and Case front](#) and [3-4-3 Case back](#) removal procedure

Unplug the connector and unscrew the screw from main board



## Status LED



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## 3-4-9 Cam Sensor

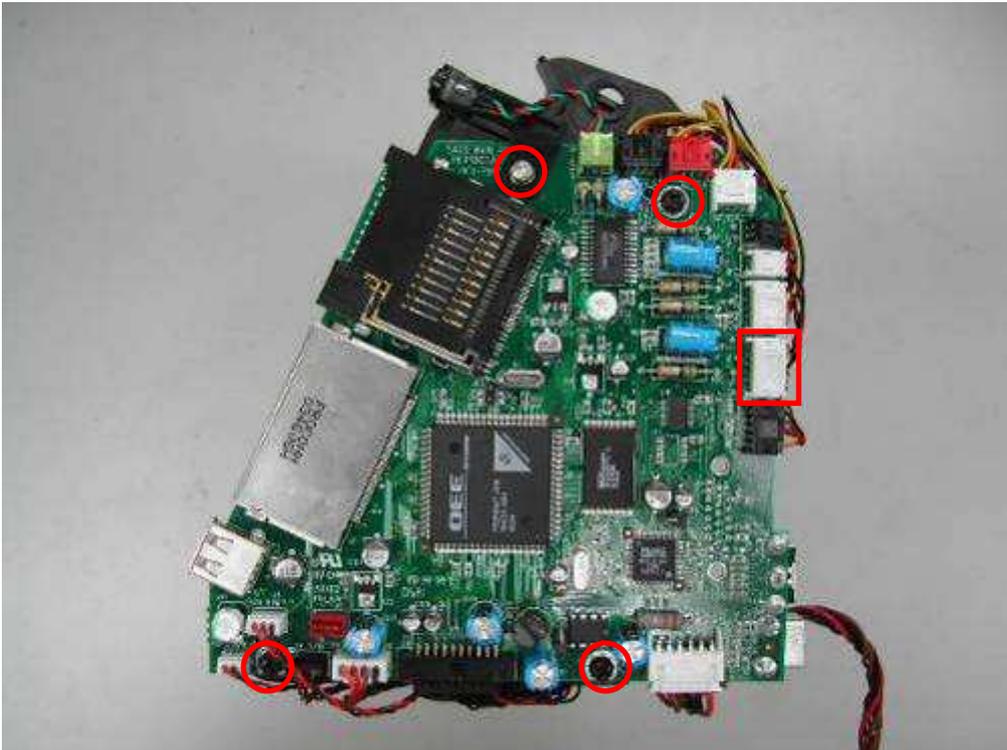
### Cam Sensor

S400	P/N: 40.P1817.001
S420	P/N: 40.P1817.R03

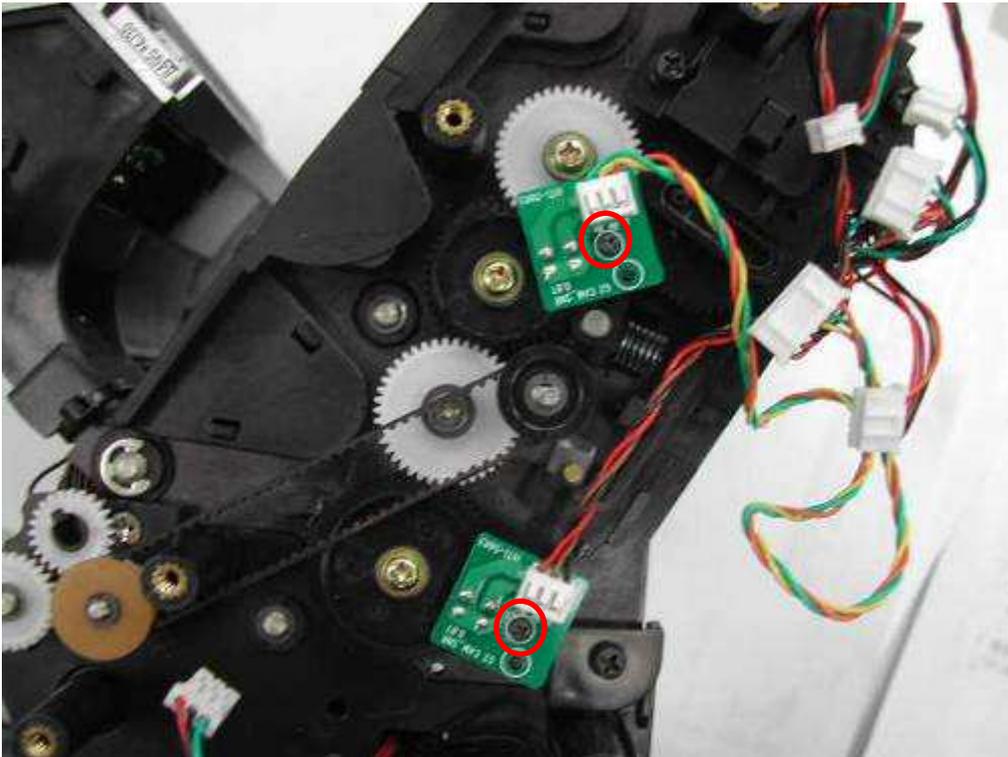


Remove the Case Front and Case Back according to [3-4-2 Ribbon door and Case front](#) and [3-4-3 Case back](#) removal procedure

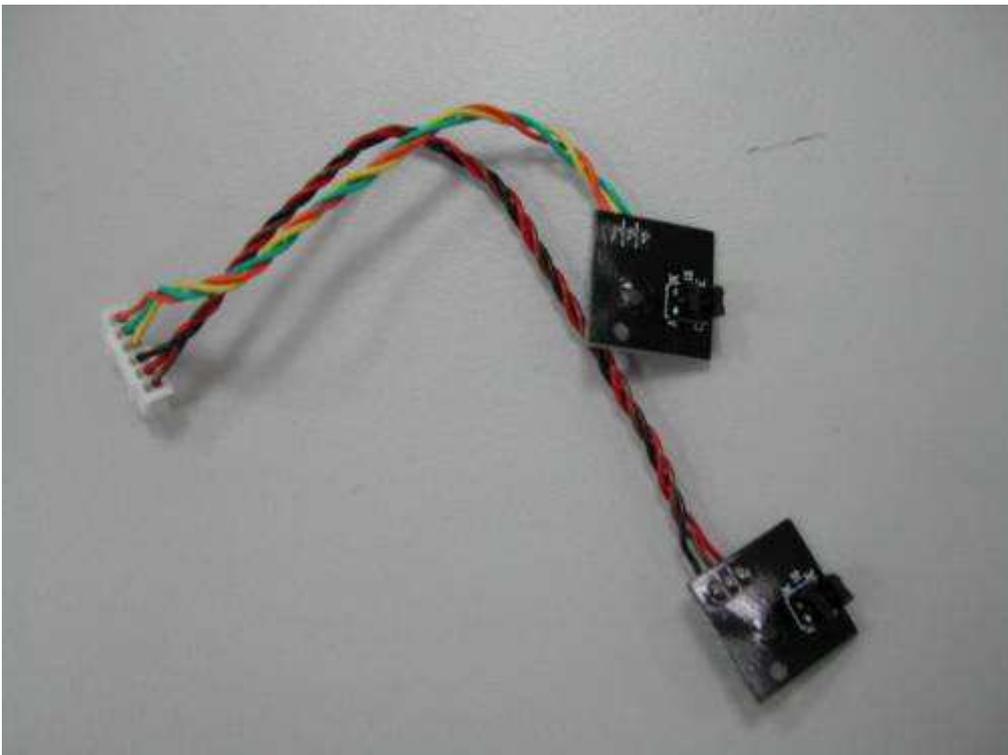
Unplug the connector and unscrew 4 screws from main board



Unscrew 2 screws from cam sensor



Cam Sensor



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## 3-4-10 Cover Open Sensor

Cover Open Sensor

P/N: 40.P1816.R03

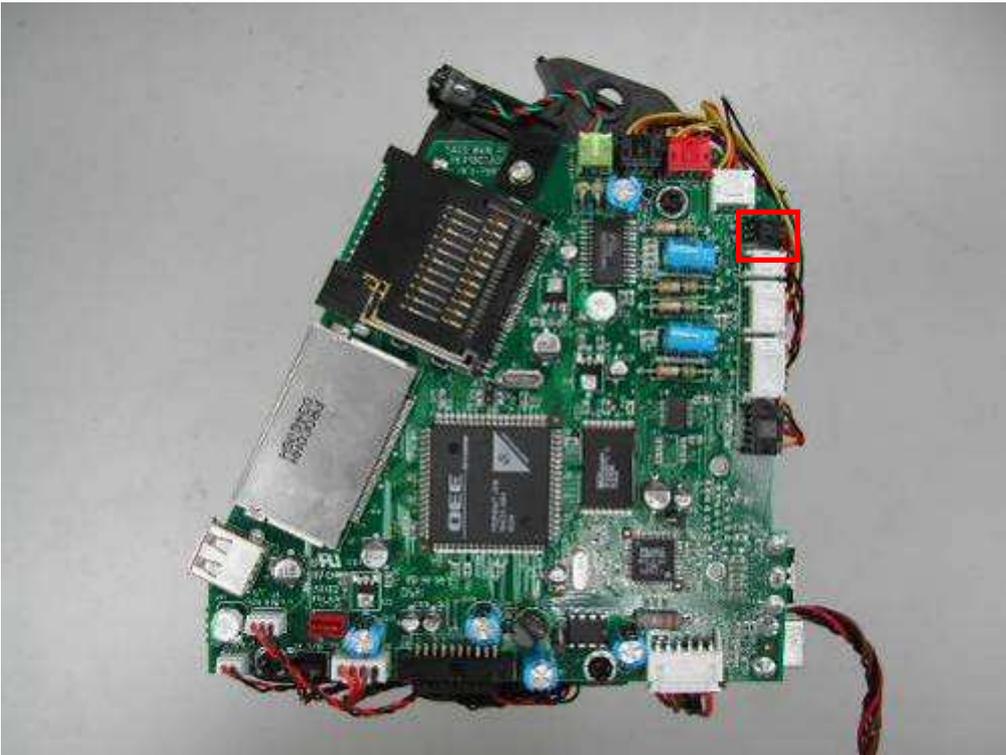


Remove the Case Front and Case Back according to [3-4-2 Ribbon door and Case front](#) and [3-4-3 Case back](#) removal procedure

Unscrew the screw from Cover open sensor



Unplug the connector from main board



Cover Open Sensor

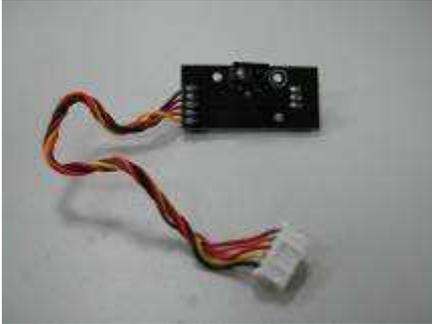


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## 3-4-11 Jam Sensor

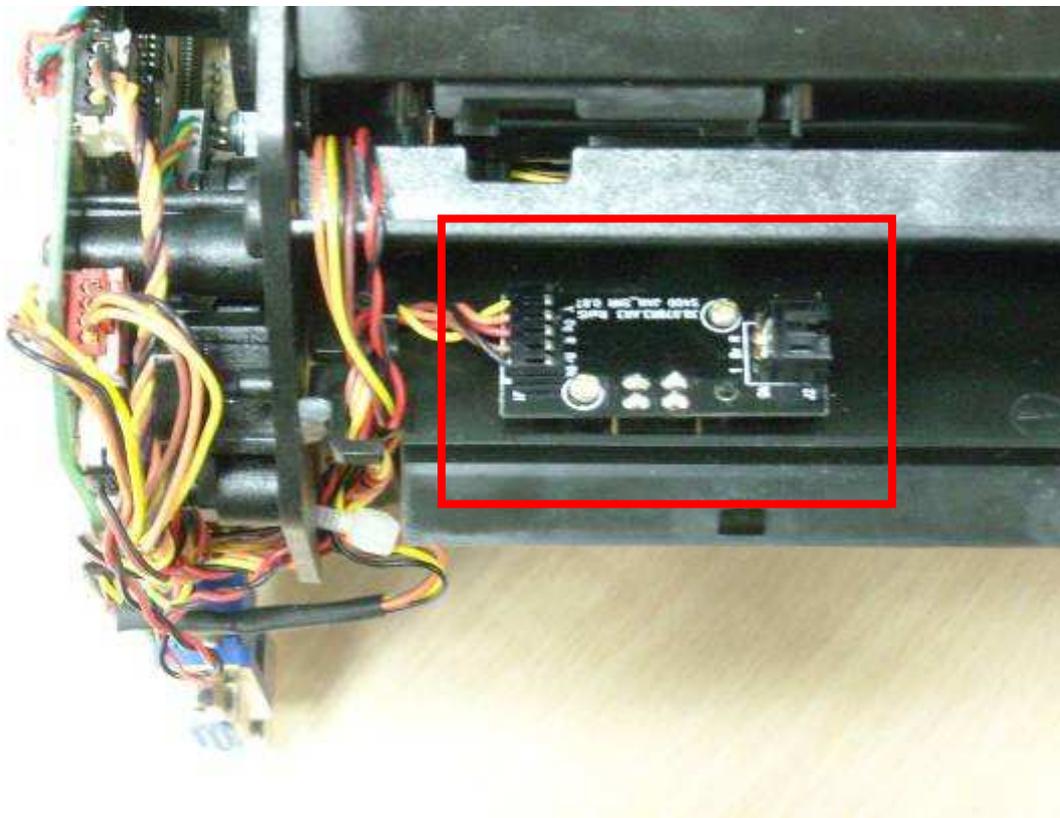
### Jam Sensor

S400	P/N: 40.P1813.R01
S420	P/N: 40.P1813.R02

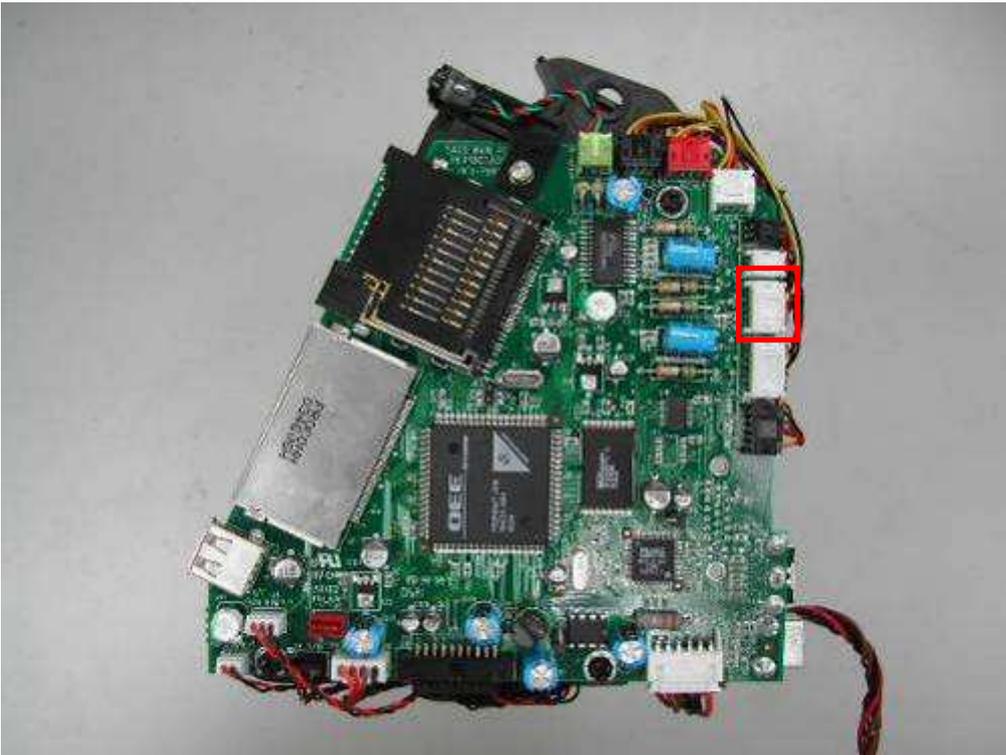


Remove the Case Front and Case Back according to [3-4-2 Ribbon door and Case front](#) and [3-4-3 Case back](#) removal procedure

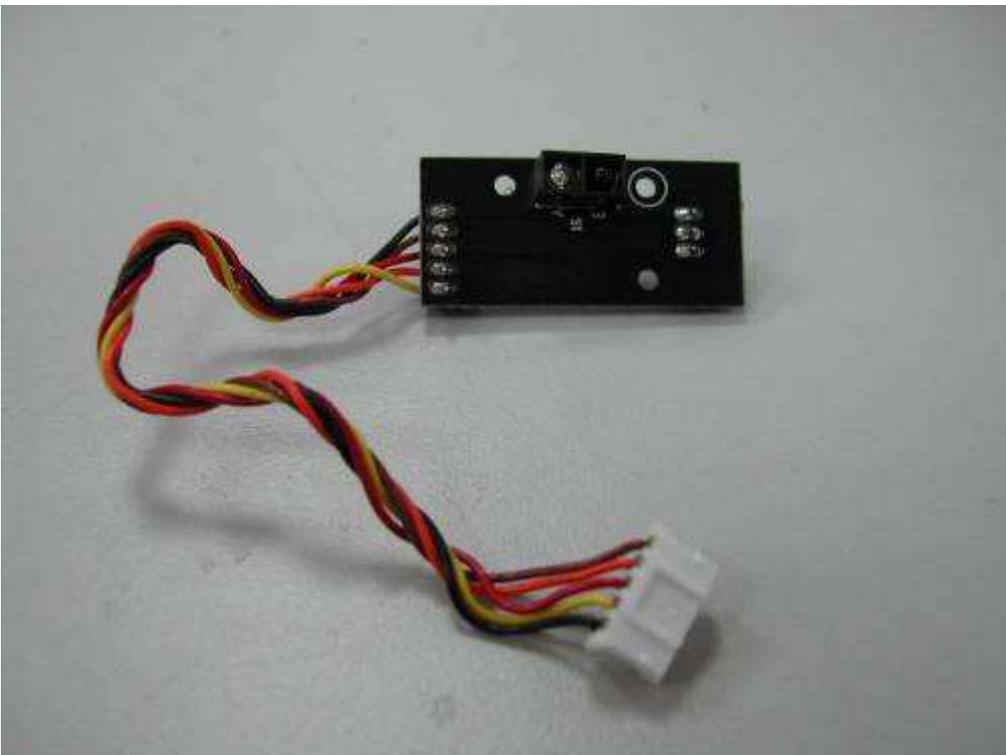
Unscrew the screw from jam sensor



Unplug the connector from main board



Jam Sensor



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## 3-4-12 Ribbon Sensor\_B, LE Sensor and Tray Front

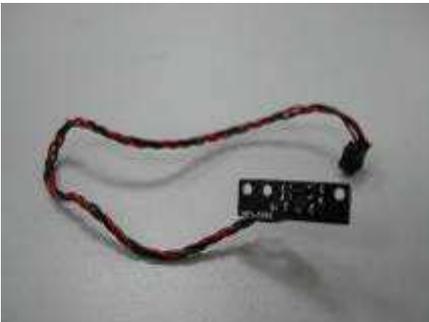
Ribbon Sensor\_B

P/N: 40.P1812.R01



LE Sensor

P/N: 40.P1815.R02



Tray Front

P/N: 56.P1812.001

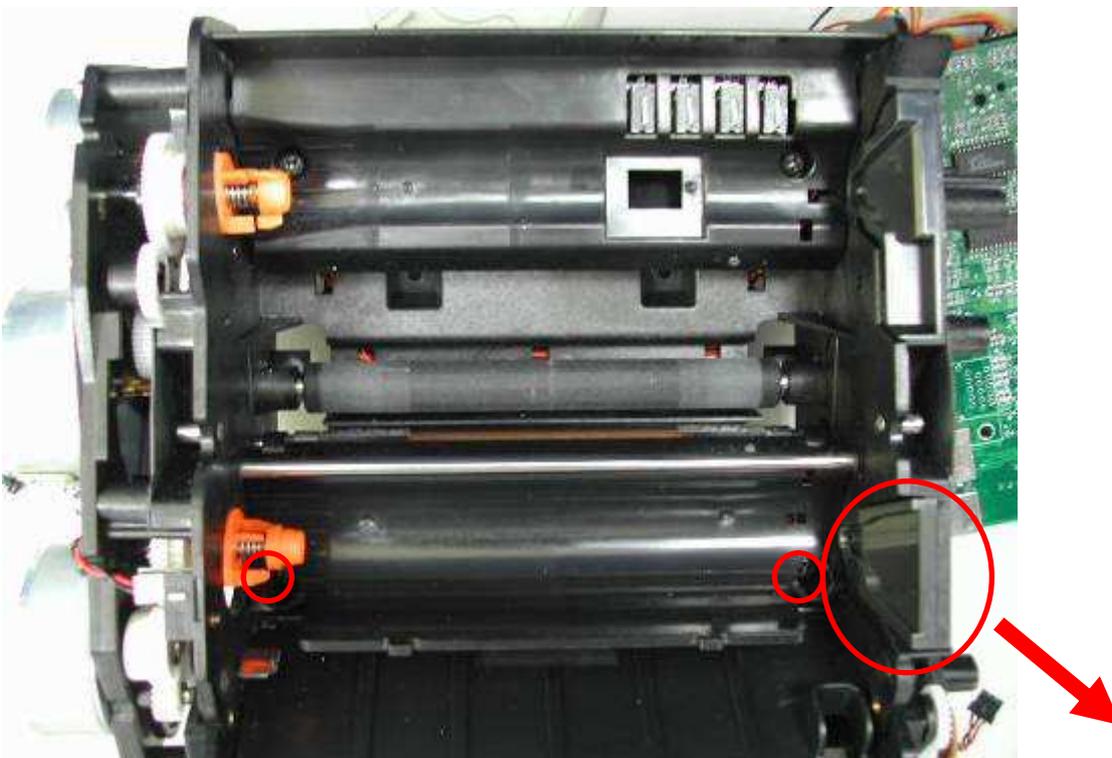


Remove the Case Front and Case Back according to [3-4-2 Ribbon door and Case front](#) and [3-4-3 Case back](#) removal procedure

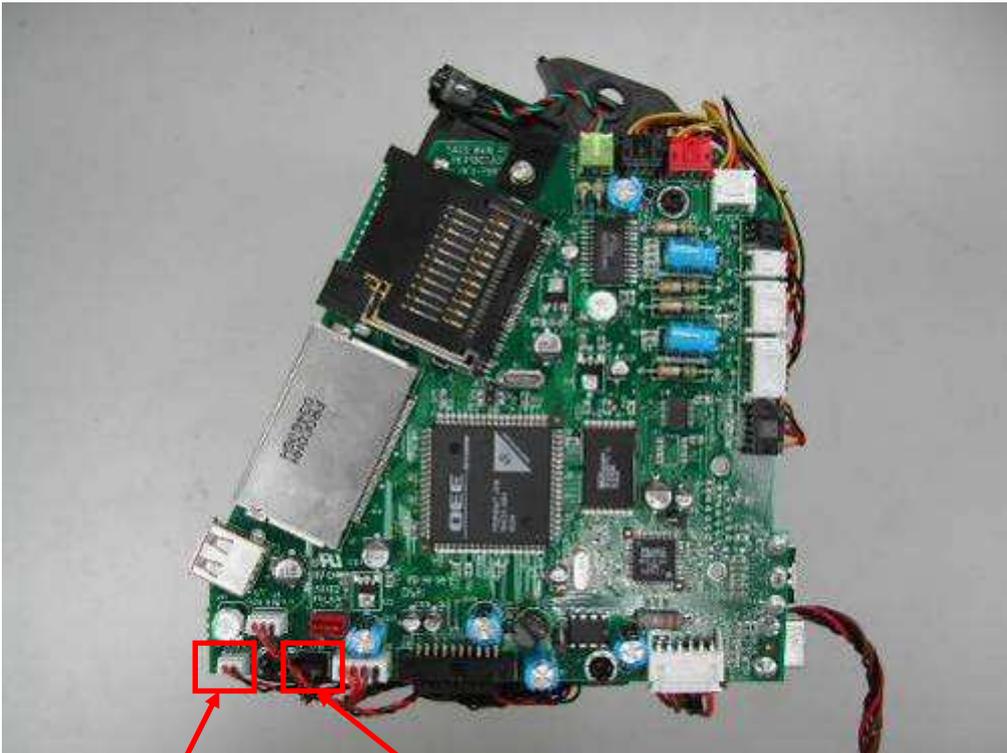
Unscrew 5 screws from motor frame



Unscrew 2 screws from tray front  
Remove the ribbon holder



Unplug the connectors from main board

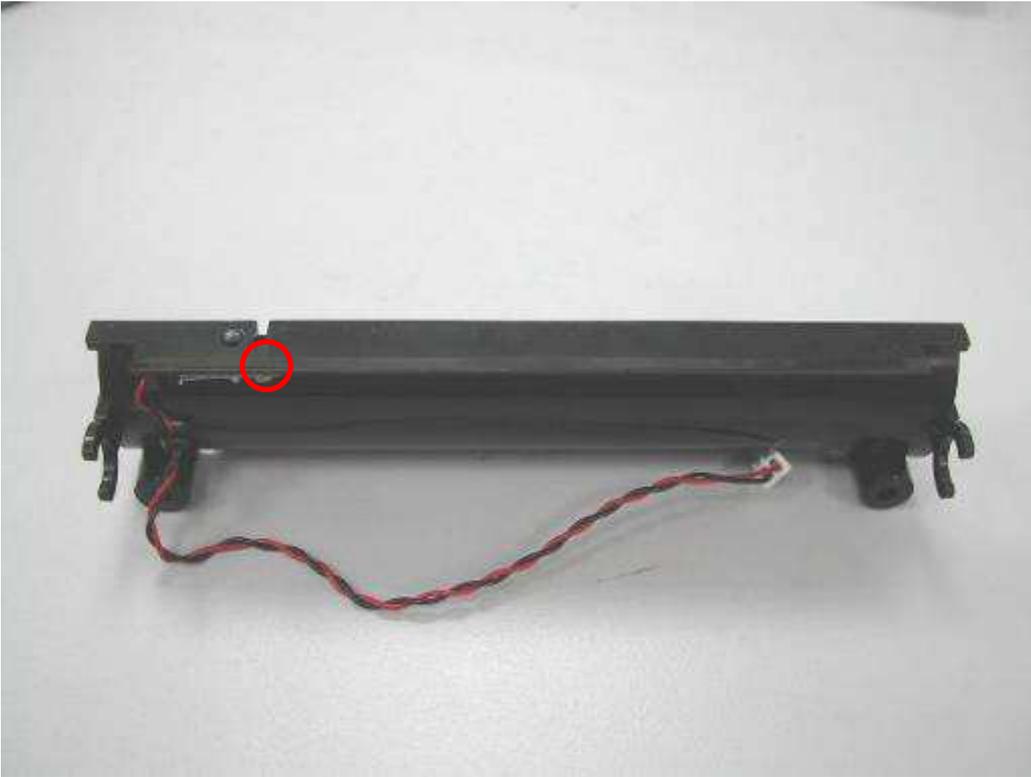


**Ribbon sensor\_B**      **LE sensor**

Take Tray Front off



Unscrew the screw from tray front



Take **Ribbon sensor\_B** out from tray front



Unscrew 2 screws from LE sensor



Take LE Sensor out

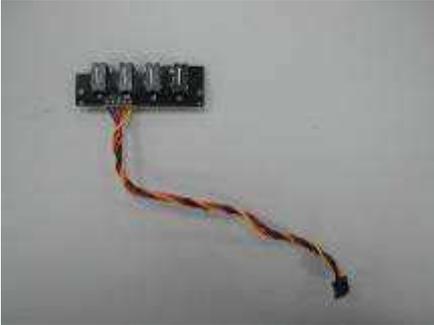


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## 3-4-13 Cassette Sensor and Ribbon Sensor\_F

**Cassette Sensor**

**P/N: 40.P1811.001**



\*Cassette Sensor has been canceled for S420

**Ribbon Sensor\_F**

**P/N: 40.P1810.R01**



\* Ribbon Sensor\_F has been canceled

**CARD MODULE BD S420 M31 ROHS P/N: 45.P20R8.M31**



Remove the Case Front and Case Back according to [3-4-2 Ribbon door and Case front](#) and [3-4-3 Case back](#) removal procedure

Unscrew 5 screws from motor frame



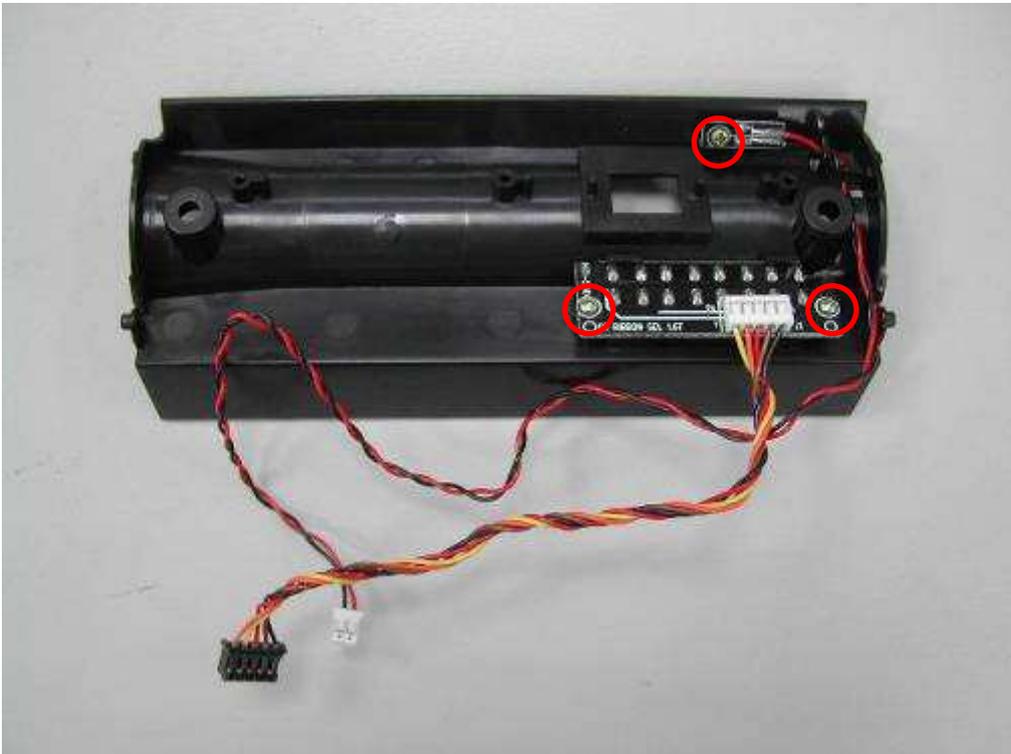
Unscrew 2 screws from carrier back  
Remove the ribbon holder



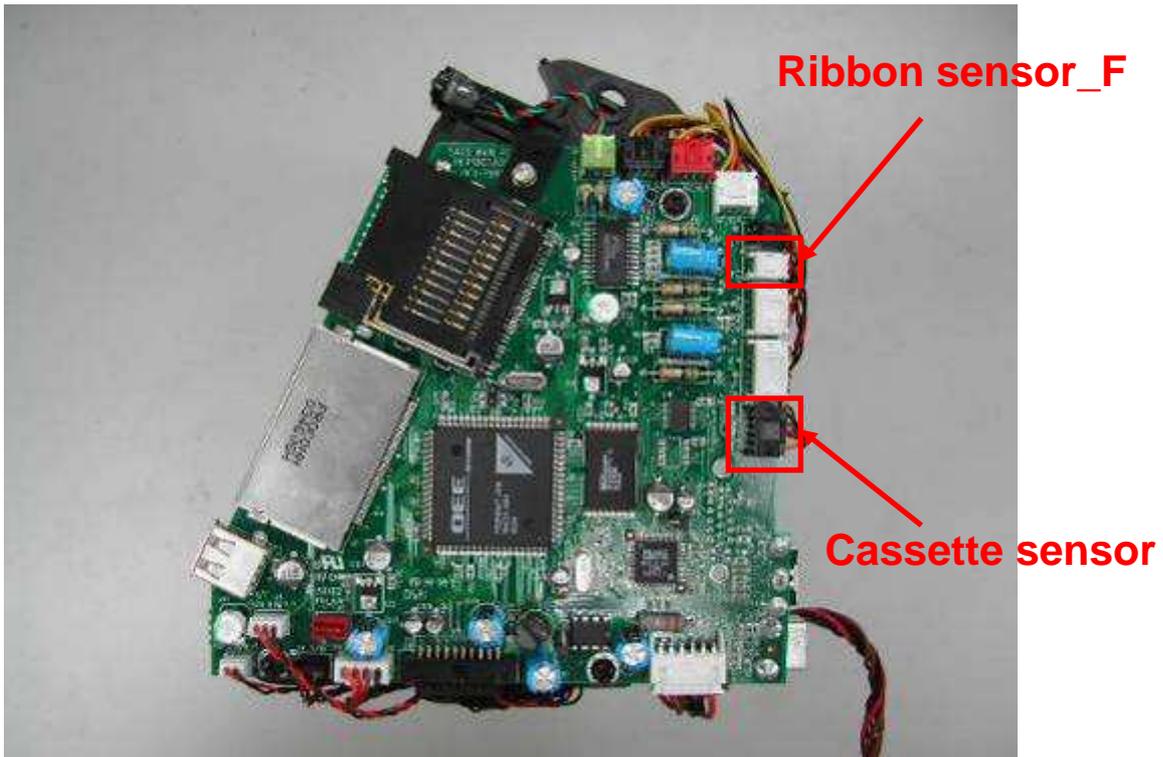
Remove 2 tabs on carrier back  
Take carrier back out



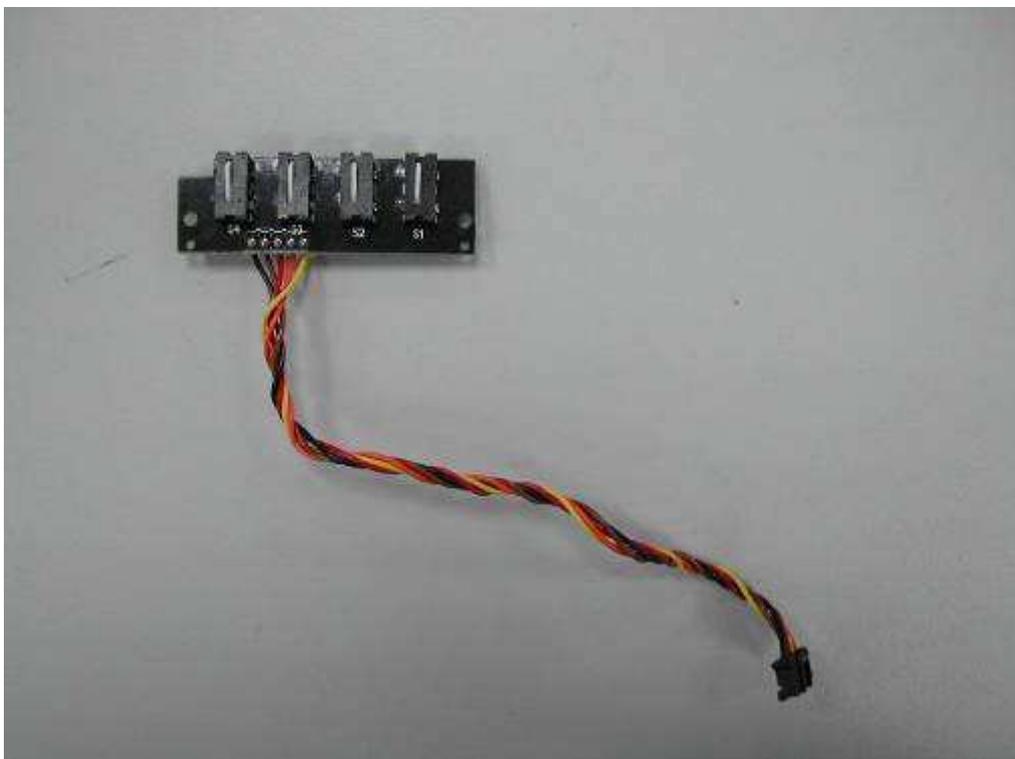
Unscrew 3 screws from carrier back



Unplug the connectors from main board



**Cassette Sensor**



**Ribbon Sensor\_F**



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## 3-4-14 Capstan roller and Pinch roller

**Capstan Roller**      **P/N: 53.P1809.002**

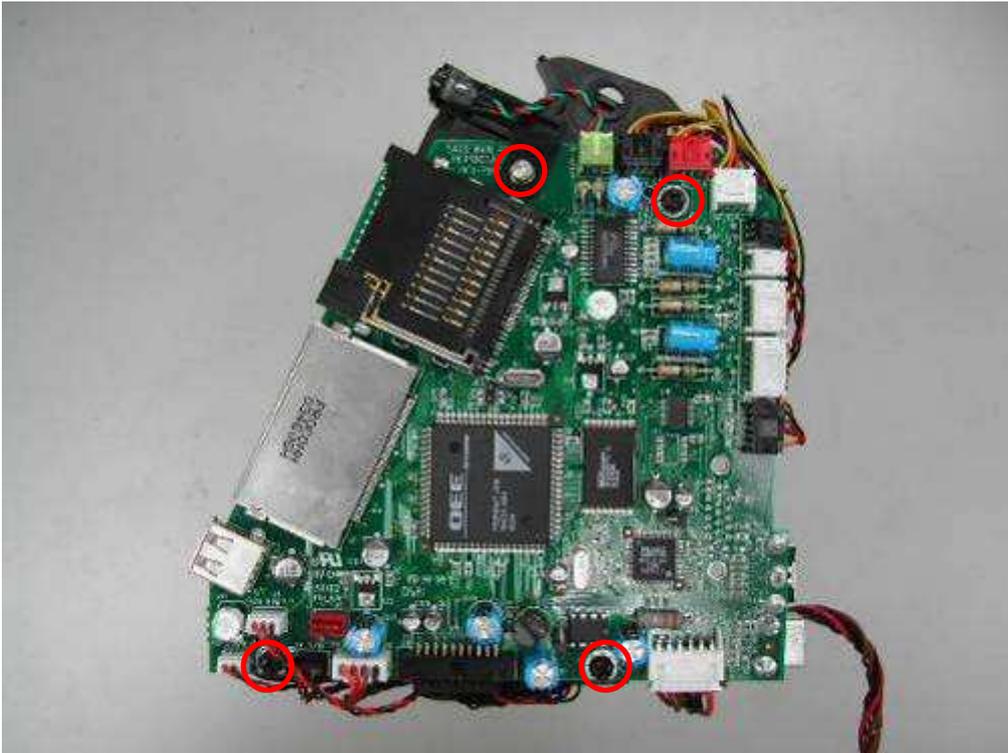


**Pinch Roller**      **P/N: 59.P0112.003**

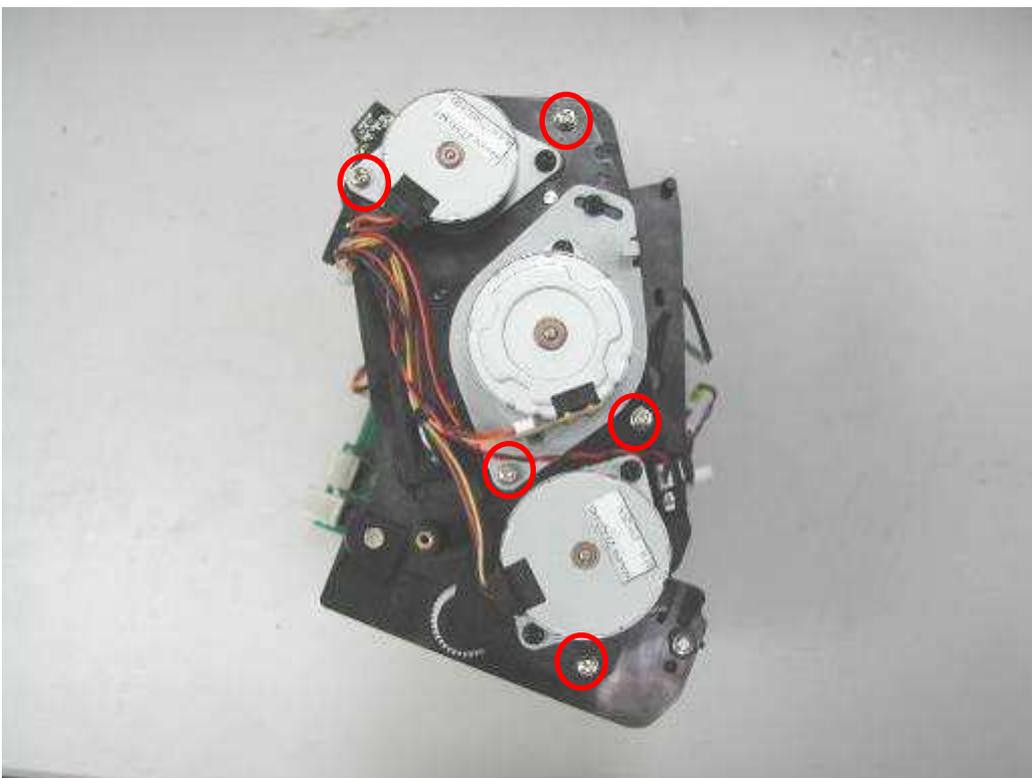


Remove the Case Front and Case Back according to [3-4-2 Ribbon door and Case front](#) and [3-4-3 Case back](#) removal procedure

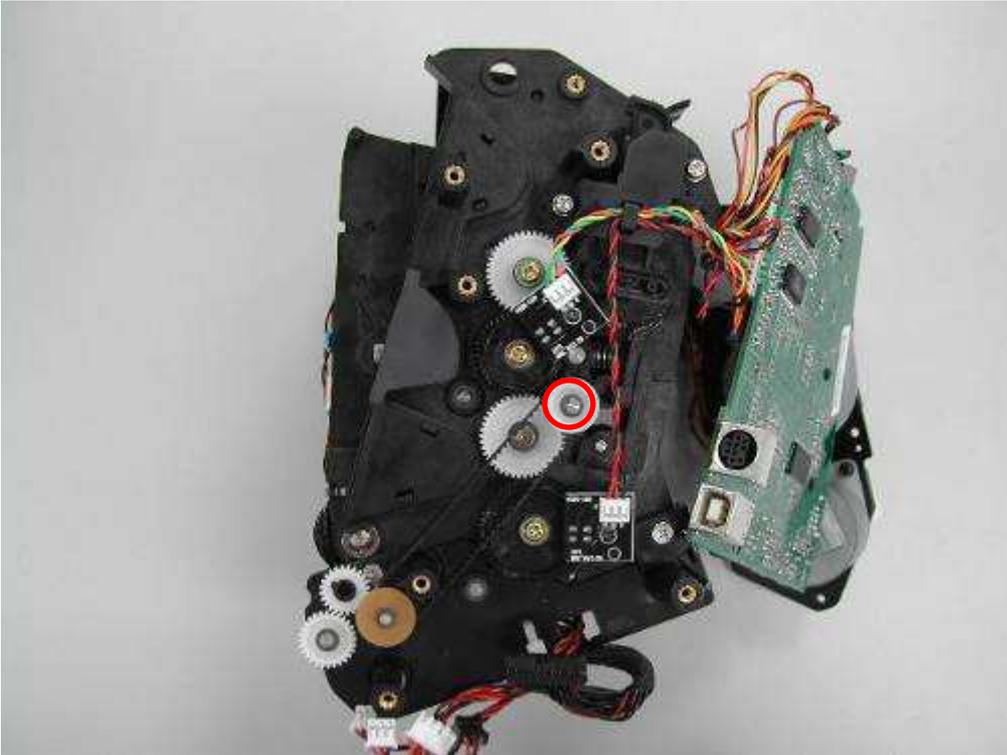
Unscrew 4 screws from main board



Unscrew 5 screws from motor frame



Take the c-ring off



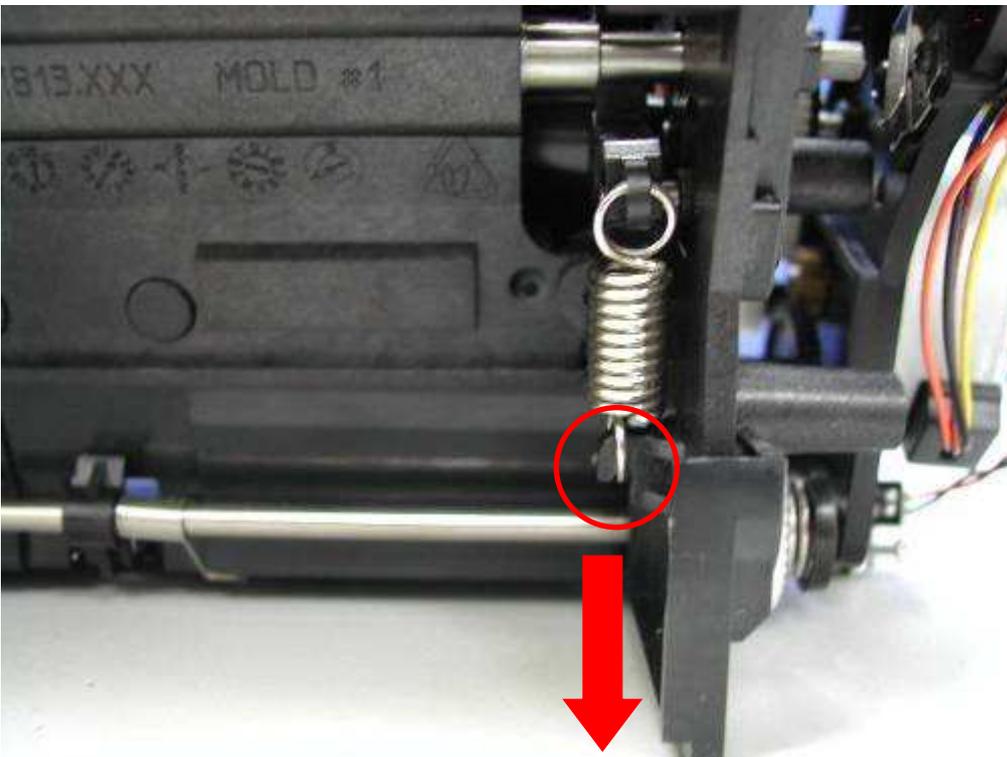
Pull **Capstan roller** out



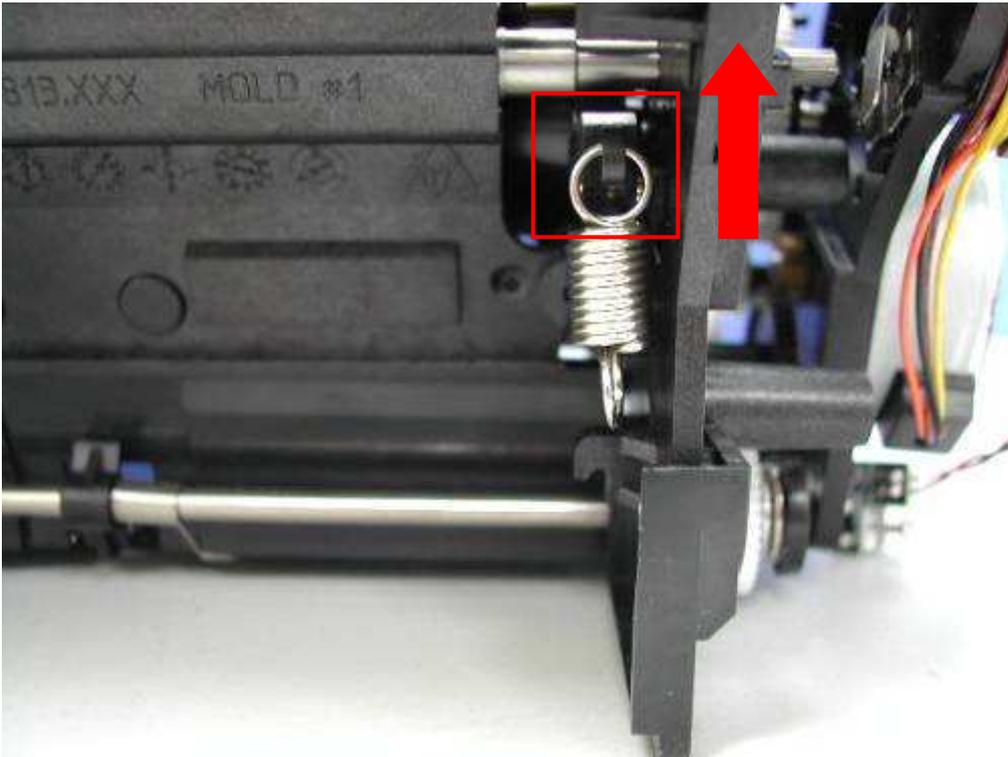
## Capstan Roller



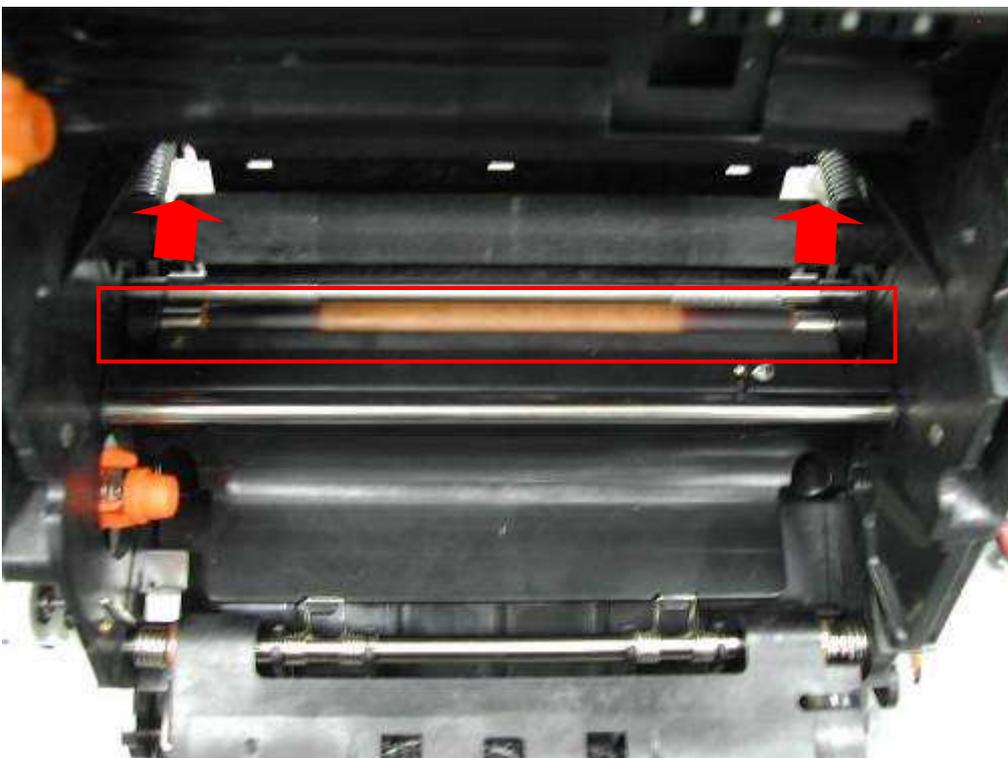
Release pinch spring. (Apply caution when you pull down the spring. Do not stretch the spring and do not pull too hard)



Pull bushing pinch upwards and push pinch roller backwards



Push pinch roller upwards and pull pinch roller





**Pinch Roller**



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## 3-4-15 TPH

TPH

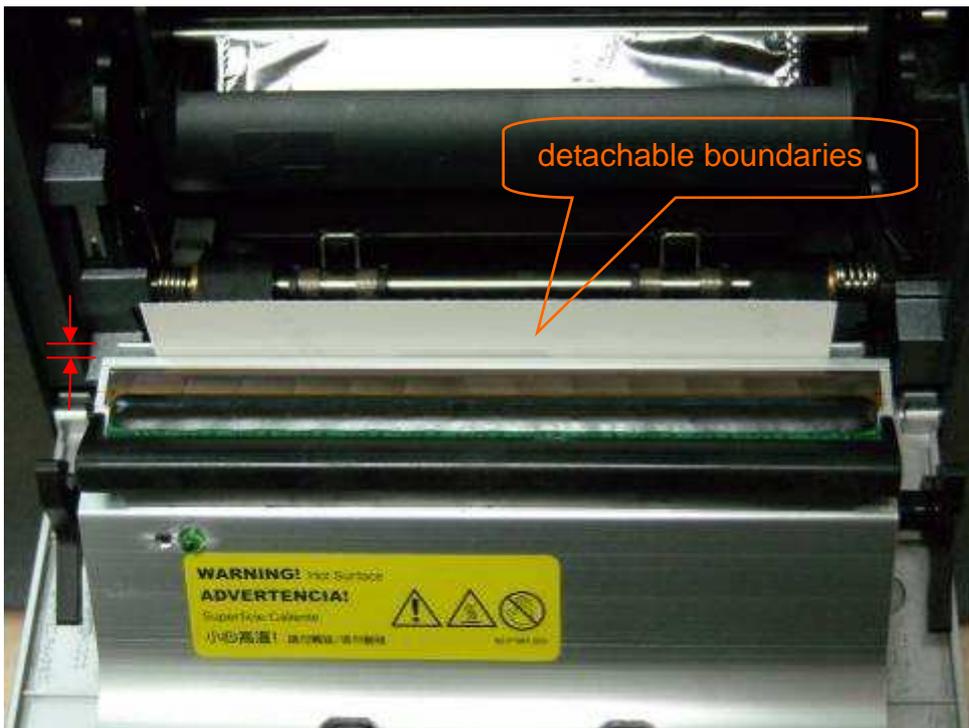
P/N: 37.P4740.T03



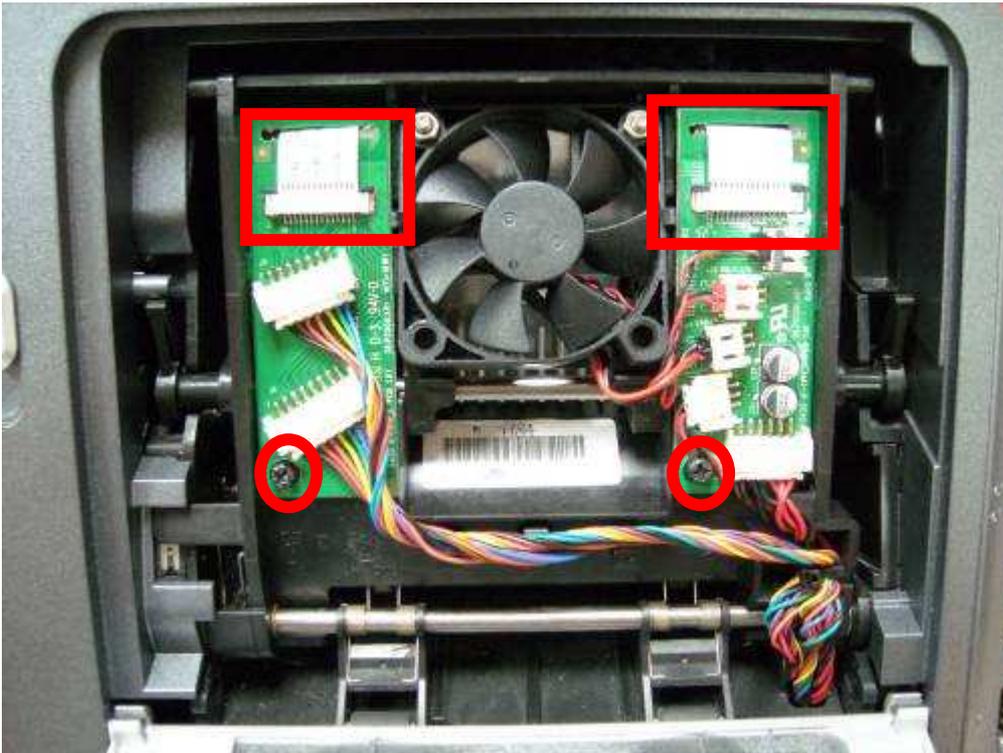
Remove the Case Front according to [3-4-2 Ribbon door and Case front](#)

Use several pieces of detachable boundary to measure the gap

By this way, we can get the approximate distance of the gap when we assemble the TPH.



Unplug 2 flat cables and unscrew 2 screws from TPH BD



Unscrew 2 screws behind the TPH BD

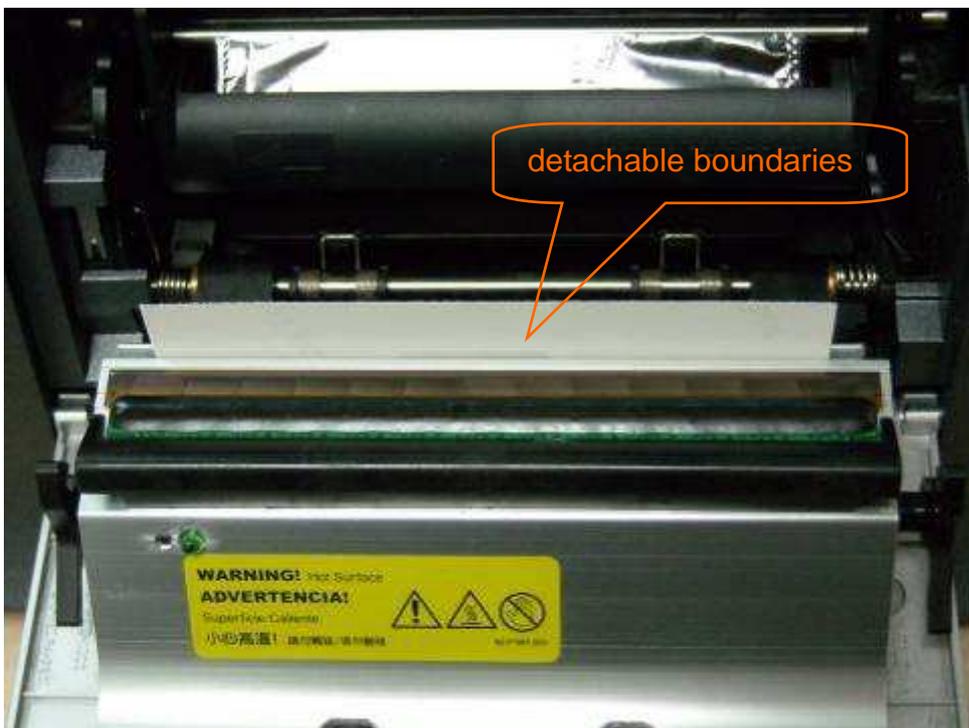


## TPH



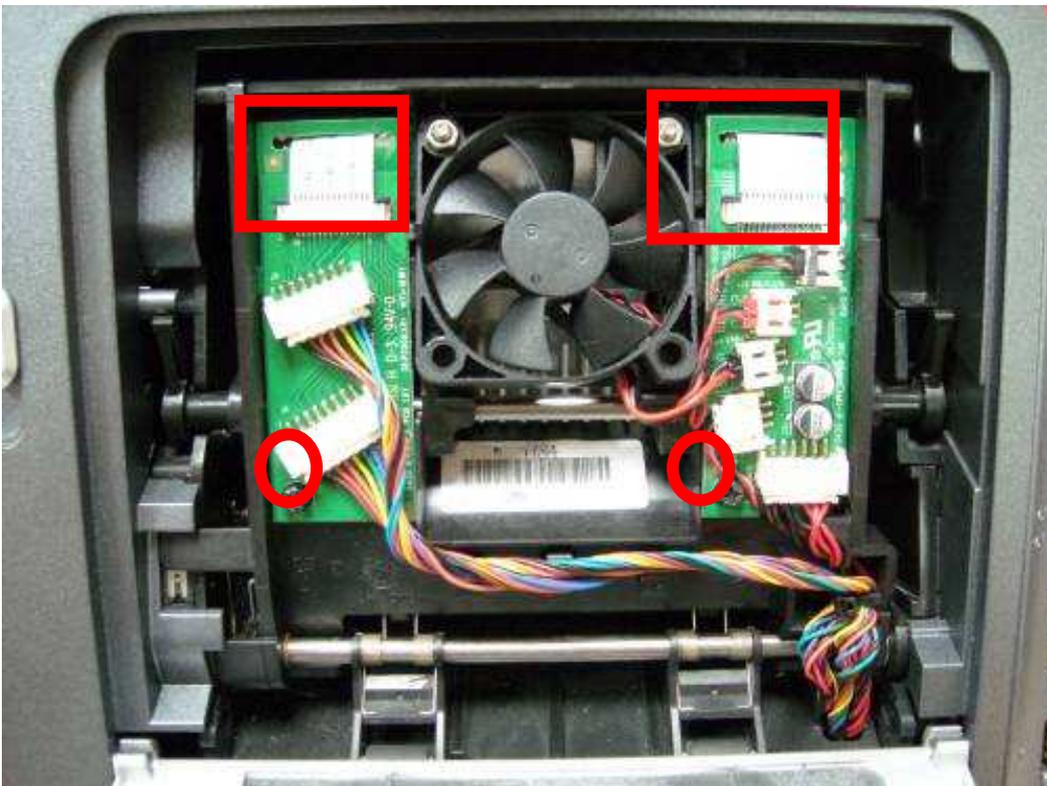
## TPH Assembly

Put new TPH on the linkage, align the gap by detachable boundaries and screw 2 screws behind the TPH BD.

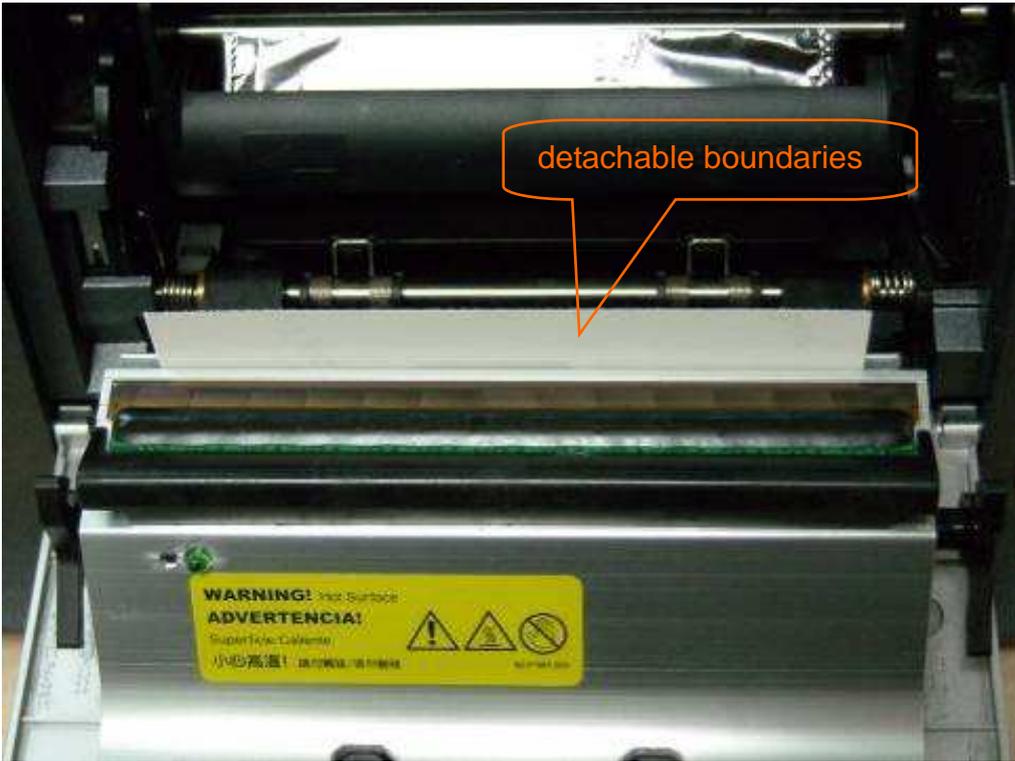




Plug 2 flat cables and screw 2 screws on TPH BD



Align the gap by detachable boundaries again then check the printout.  
If the density is low, adjust the distance of the gap ( $\pm 1$  or  $\pm 2$  piece of detachable boundaries).



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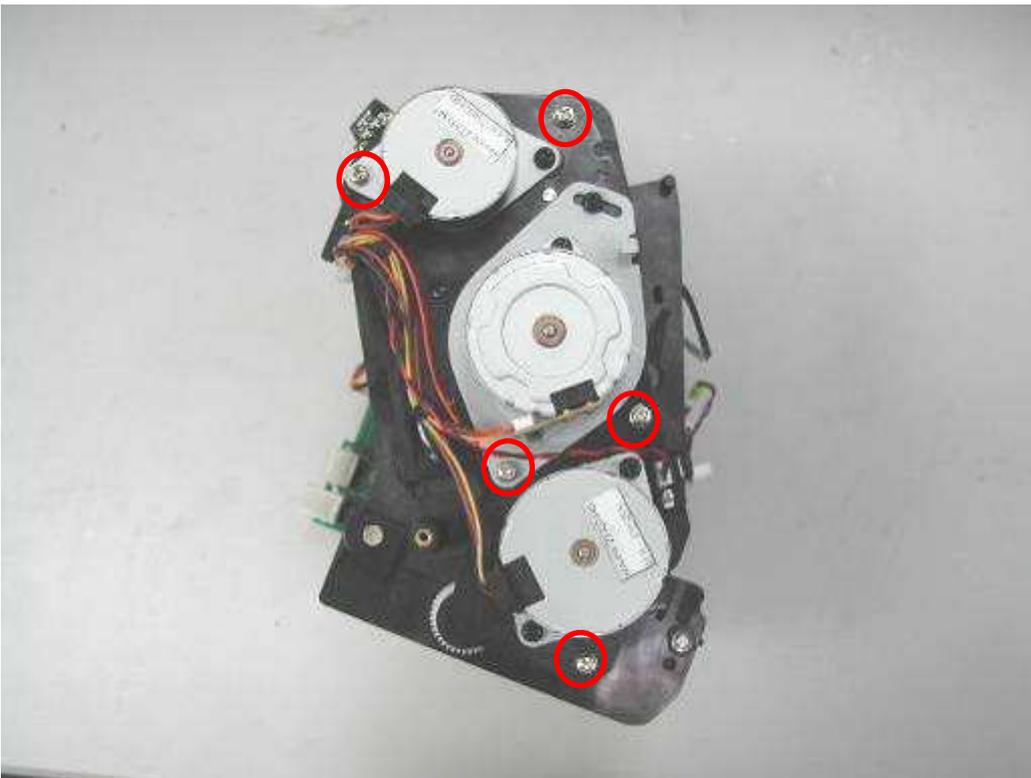
## 3-4-16 TQL

TQL P/N:47.P1801.011

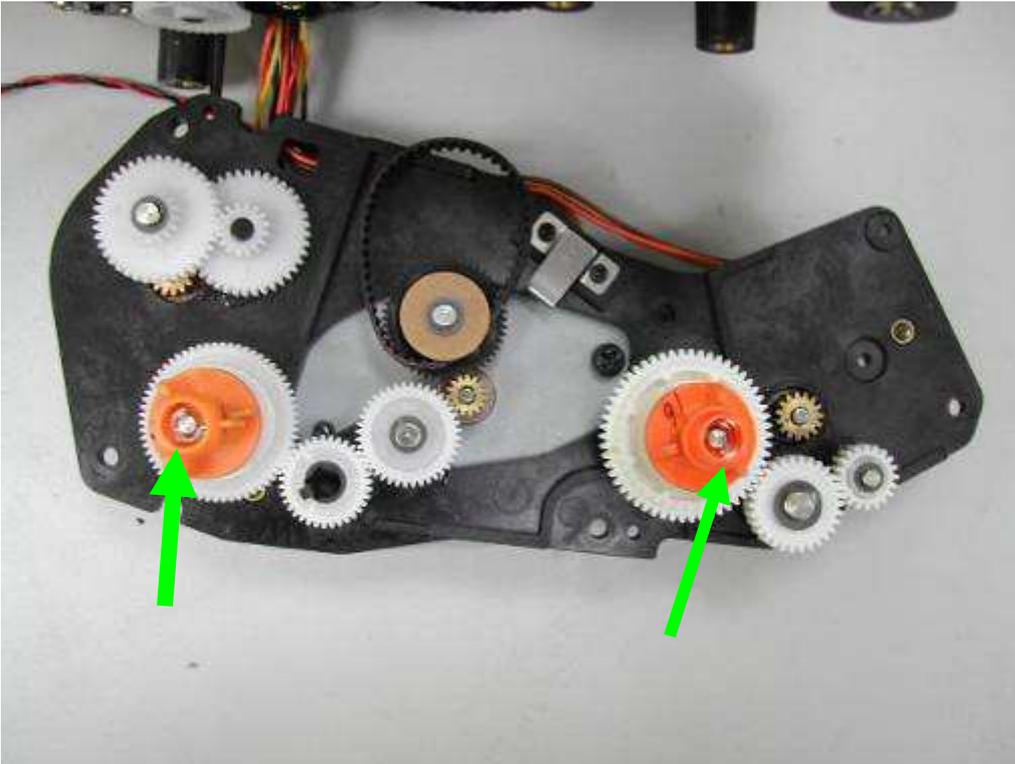


Remove the Case Front and Case Back according to [3-4-2 Ribbon door and Case front](#) and [3-4-3 Case back](#) removal procedure

Unscrew 5 screws from motor frame



Take e-ring out



Take **TQL** out



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# Chapter 4: Adjustments

## 4-1 Safety Instructions

- Read these instructions carefully. Save these instructions for future reference.
- Follow all warnings and instructions marked on the product.
- Unplug this product from the wall outlet before cleaning.
- Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product
- Openings in the cabinet and the bottom are provided for ventilation; to ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered.
- Placing the product on a bed, sofa, rug, or other similar surface should never block the openings. These products should never be placed near or over a radiator or heat register, or in a built-in installation unless proper ventilation is provided
- This product should be operated from the type of power indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company
- If an extension cord is used with this product, make sure that the total ampere rating of the equipment plugged into the extension cord does not exceed the extension cord ampere rating. Also, make sure that the total rating of all products plugged into the wall outlet do not exceed the fuse rating

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## 4-2 Tools

### Screwdriver- plus



### Digital Meter



### Glue (screw lock)



## HTools (Trouble shooting program)



## New yellow frame



## Printed magenta frame (printed whole black)

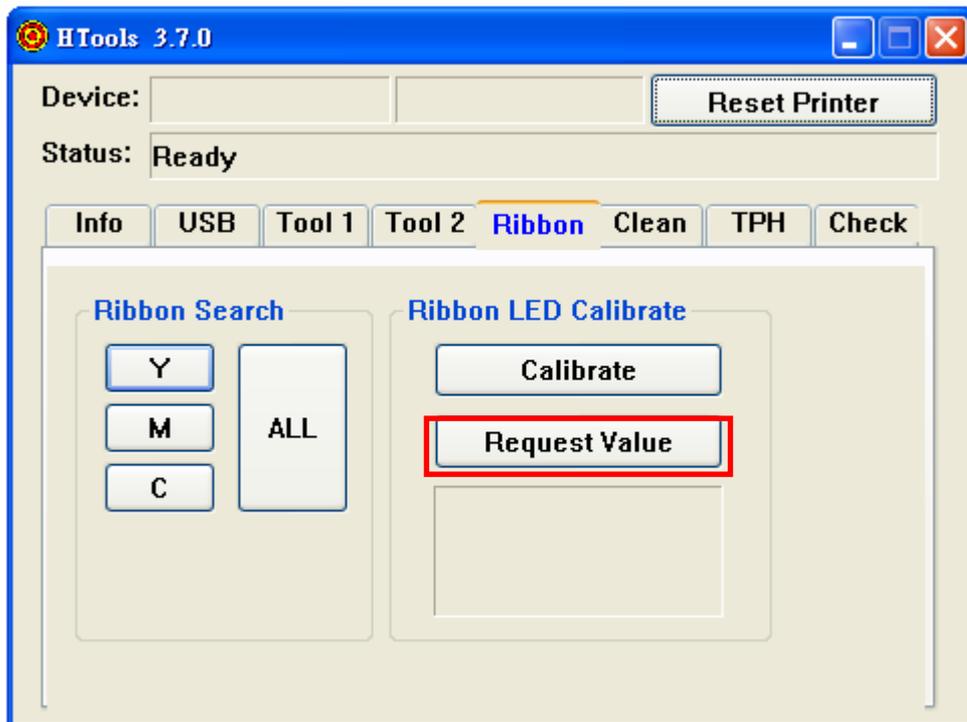


## 4-3 VR on Main Board

VR on Main Board is used to adjust the voltage output from ribbon sensor. There are 2 sets of ribbon sensor and LED in S400, but only the back set has the auto-calibration function.

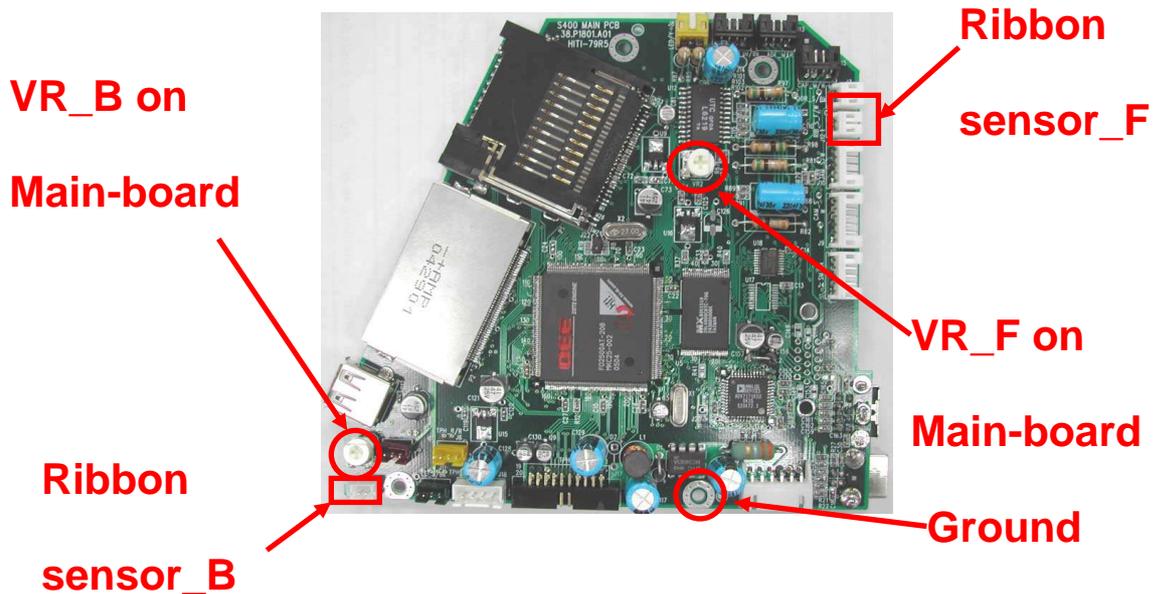
### Voltage test and adjust method

1. Manually wind the ribbon to a **new yellow frame**, and insert it into the printer.
2. Power on the printer and connect the USB cable to your PC.
3. Start HTools.exe, and click on: **Request Value**.

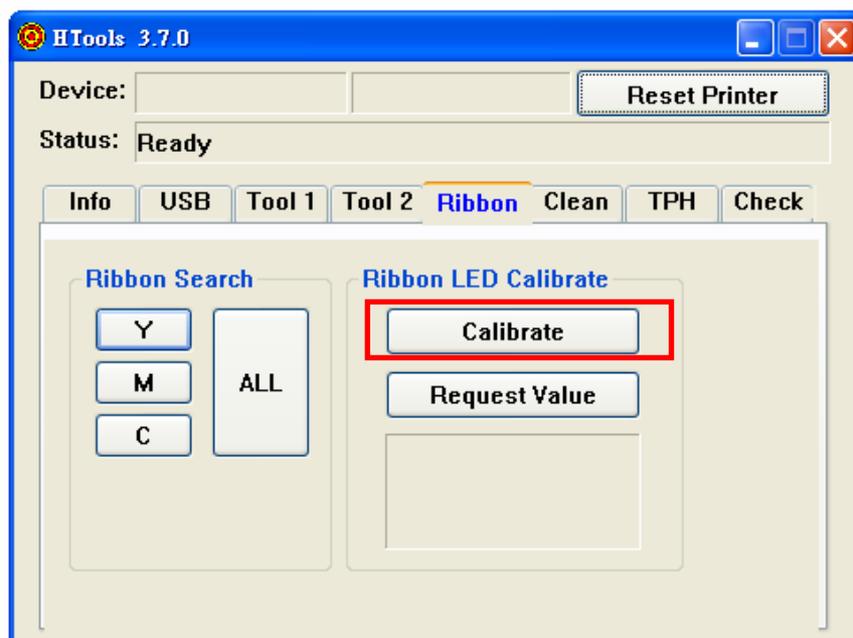


4. Select DC voltage in the digital meter.
5. Touch/ contact the black probe with the ground screw.

6. Touch/ contact the red probe with the solder of black cable on the connector of ribbon sensor.



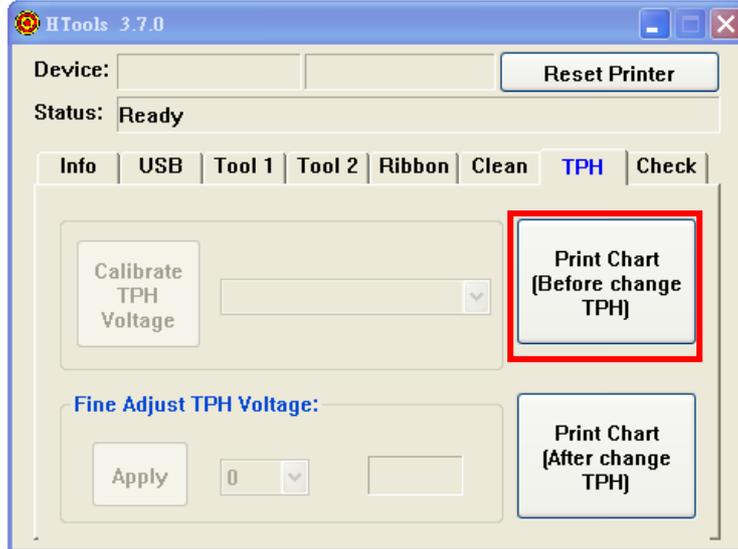
7. Test and adjust the VR1 and VR2 **as possible as close to 3.00V**
8. Check with a **printed (whole black) magenta frame**. The voltage should be **under 1.60V**.
9. If ok, add some glue onto the VR adjusters on the main board.
10. If not, please change the ribbon sensor and/ or ribbon LED and adjust the voltage again.
11. In the end, insert the ribbon with a **new yellow** frame and click **“Calibrate”** in HTools.exe.



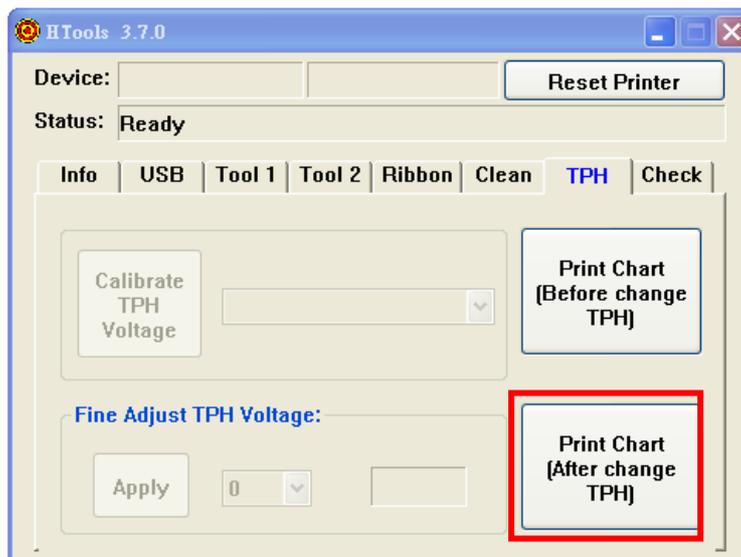
# 4-4 VR on Power Board

## Voltage test and adjust method

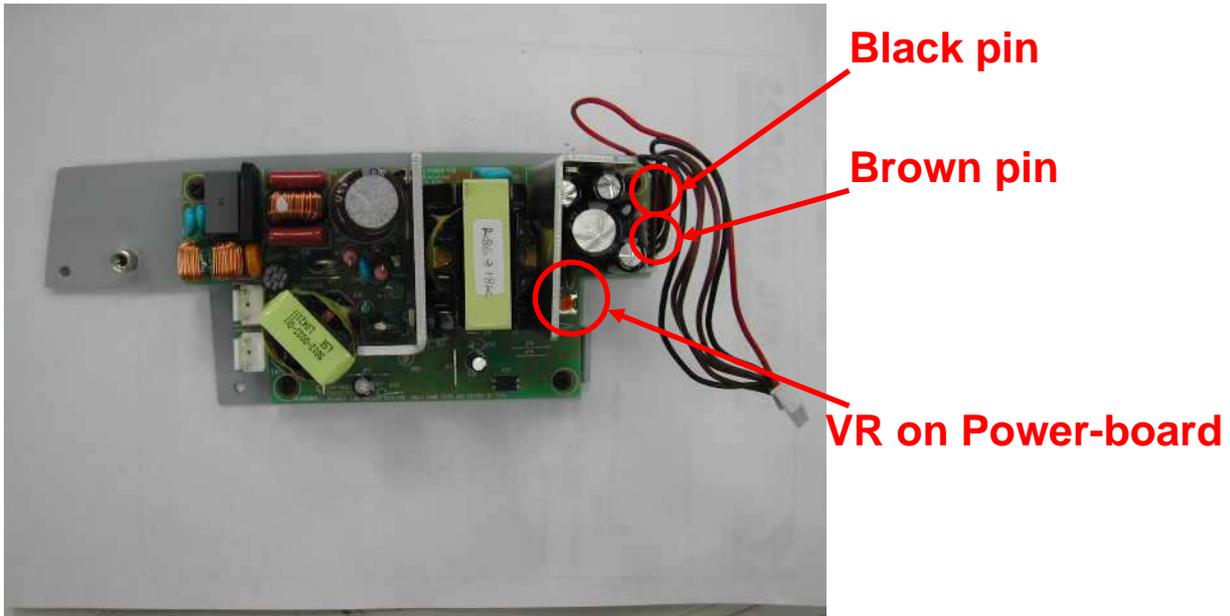
1. Before replacing TPH, please print reference charts first (P1).



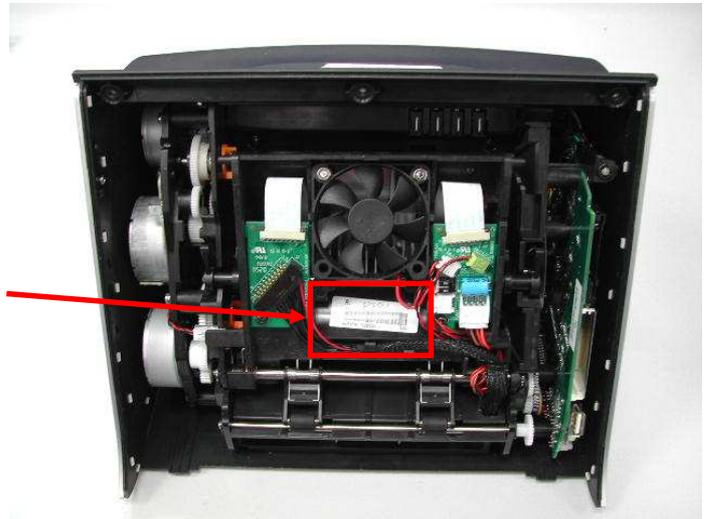
2. After replacing TPH, take multi-meter and select DC voltage.
3. Contact black probe with the solder of the brown pin on power connector.
4. Contact red probe with the solder of the black pin on power connector.
5. Check TPH value on the label on the THP linkage and find the voltage from below formula or table.
6. Adjust to correct voltage then Print Chart (P2).



7. If P2 color density is not close to P1 color density, please adjust VR again then print P2 and compare to P1.
8. Until P1 and P2 color density are close, then add glue on VR to fix the voltage.



**TPH value Label & Number**



## Formula and table

Formula:  $V \times V/R = 0.080$

**V**: voltage on power connector

**R**: TPH Value

TPH Value	Volt
5100	20.20
5200	20.40
5300	20.59
5400	20.78
5500	20.98
5600	21.17
5700	21.35
5800	21.54
5900	21.73
6000	21.91

TPH Value	Volt
6100	22.09
6200	22.27
6300	22.45
6400	22.63
6500	22.80
6600	22.98
6700	23.15
6800	23.32
6900	23.49
7000	23.66

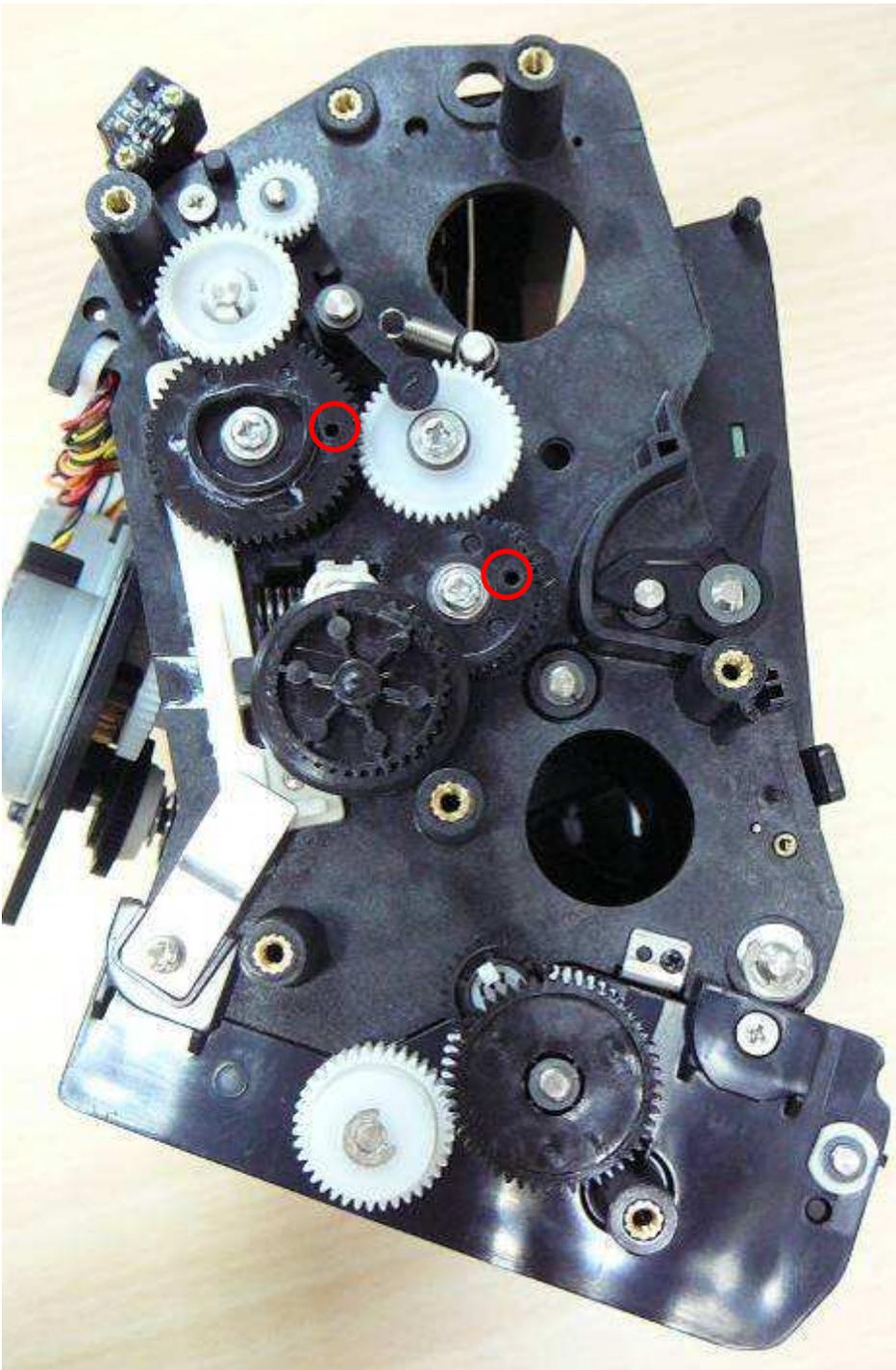
TPH Value	Volt
7100	23.83
7200	24.00
7300	24.17
7400	24.33
7500	24.49
7600	24.66
7700	24.82
7800	24.98
7900	25.14
8000	25.30

TPH Value	Volt
8100	25.46
8200	25.61
8300	25.77
8400	25.92
8500	26.08
8600	26.23
8700	26.38
8800	26.53
8900	26.68
9000	26.83

## 4-5 Cam Position

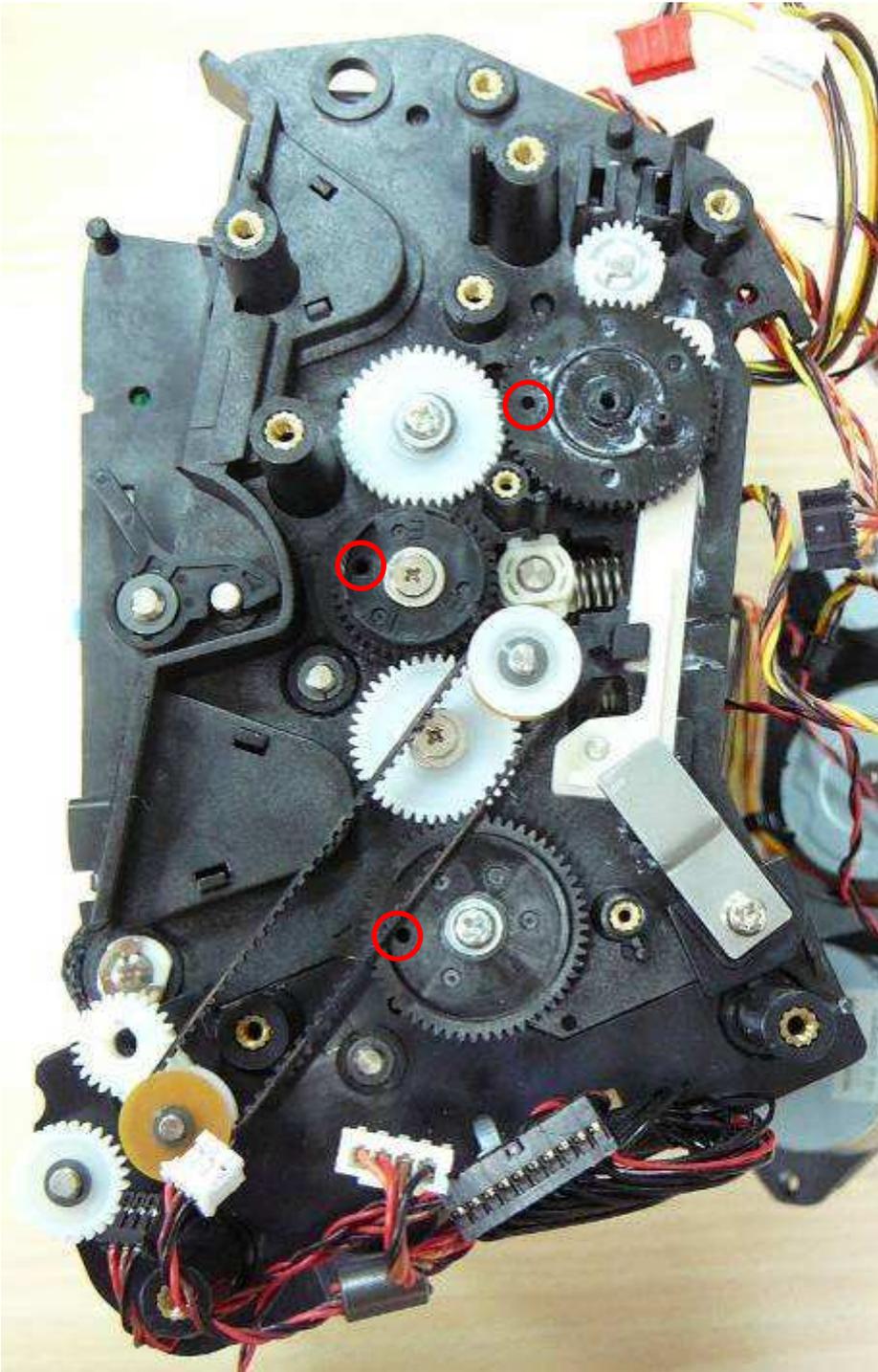
The Cam Platen Error is very unlikely and the exact cause of that error has not yet been established. In the rather unlikely event of a cam/platen error the gears (on both sides) are no longer adjusted properly and are no longer synchronous and hence need to be re-adjusted and re-aligned.

### Left Side



As an illustration, there are two holes on the gears and two holes on the chassis under the gears. Please align each two holes for alignment.

## Right Side



As an illustration, there are three holes on the gears and three holes on the chassis under the gears. Please align each two holes for alignment.

Please do the right side and the left side alignment at the same time.

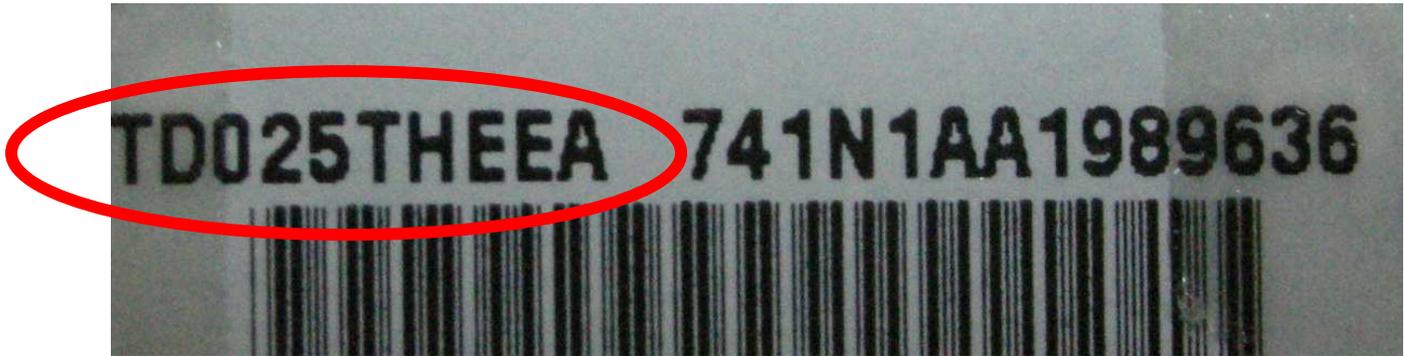
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# Chapter 5: ECR/ECN of S420 LCD Modification

On 2008 week35, HiTi upgraded S420 LCD and Controller Board.

The way to identify the NEW LCD version:

Take out the LCD panel from controller. Check the label backside. If the label shows **“TD025THEEA”** that means the LCD panel is new type. Which could only work with controller FW after 0.96?



There are the ECR/ECN descriptions below.

1. “NEW LCD” **could work** normally with “NEW Controller Board”
2. “NEW LCD” **could not work** with “OLD Controller Board” in any case
3. “OLD LCD” **could work** normally with “OLD Controller Board”
4. “OLD LCD” **could work** normally with “NEW Controller Board”, **only if** the FW of “NEW Controller Board” is downgraded to FW\_v0.95

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# Chapter 6: Contact Information

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