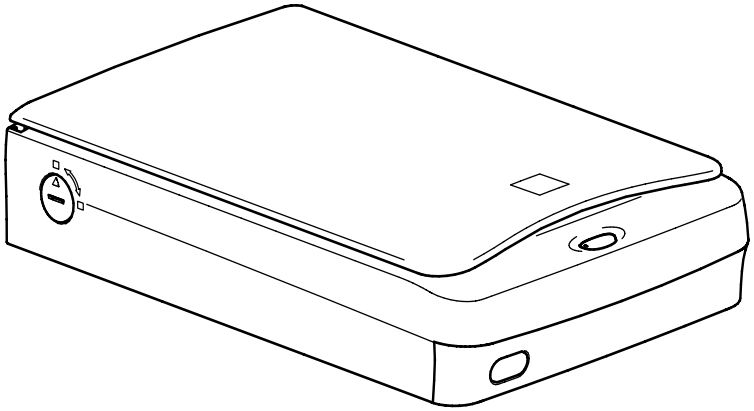
SERVICE MANUAL



Color Image Scanner

EPSON Perfection 1640SU
1640SU PHOTO
1640SU OFFICE

EPSON®

SESC00-010

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PRECAUTIONS

Precautionary notations throughout the text are categorized relative to 1)Personal injury and 2) damage to equipment.

Signals a precaution which, if ignored, could result in serious or fatal personal injury. Great caution should be exercised in performing procedures preceded by a WARNING heading.

Signals a precaution which, if ignored, could result in damage to equipment.

The precautionary measures itemized below should always be observed when performing repair/maintenance procedures.

DANGER

1. ALWAYS DISCONNECT THE PRODUCT FROM THE POWER SOURCE AND PERIPHERAL DEVICES PERFORMING ANY MAINTENANCE OR REPAIR PROCEDURES.
2. NOWORK SHOULD BE PERFORMED ON THE UNIT BY PERSONS UNFAMILIAR WITH BASIC SAFETY MEASURES AS DICTATED FOR ALL ELECTRONICS TECHNICIANS IN THEIR LINE OF WORK.
3. WHEN PERFORMING TESTING AS DICTATED WITHIN THIS MANUAL, DO NOT CONNECT THE UNIT TO A POWER SOURCE UNTIL INSTRUCTED TO DO SO. WHEN THE POWER SUPPLY CABLE MUST BE CONNECTED, USE EXTREME CAUTION IN WORKING ON POWER SUPPLY AND OTHER ELECTRONIC COMPONENTS.

WARNING

1. REPAIRS ON EPSON PRODUCT SHOULD BE PERFORMED ONLY BY AN EPSON CERTIFIED REPAIR TECHNICIAN.
2. MAKE CERTAIN THAT THE SOURCE VOLTAGES IS THE SAME AS THE RATED VOLTAGE, LISTED ON THE SERIAL NUMBER/RATING PLATE. IF THE EPSON PRODUCT HAS A PRIMARY AC RATING DIFFERENT FROM AVAILABLE POWER SOURCE, DO NOT CONNECT IT TO THE POWER SOURCE.
3. ALWAYS VERIFY THAT THE EPSON PRODUCT HAS BEEN DISCONNECTED FROM THE POWER SOURCE BEFORE REMOVING OR REPLACING PRINTED CIRCUIT BOARDS AND/OR INDIVIDUAL CHIPS.
4. IN ORDER TO PROTECT SENSITIVE MICROPROCESSORS AND CIRCUITRY, USE STATIC DISCHARGE EQUIPMENT, SUCH AS ANTI-STATIC WRIST STRAPS, WHEN ACCESSING INTERNAL COMPONENTS.
5. REPLACE MALFUNCTIONING COMPONENTS ONLY WITH THOSE COMPONENTS BY THE MANUFACTURE; INTRODUCTION OF SECOND-SOURCE ICs OR OTHER NONAPPROVED COMPONENTS MAY DAMAGE THE PRODUCT AND VOID ANY APPLICABLE EPSON WARRANTY.

PREFACE

This manual describes basic functions, theory of electrical and mechanical operations, maintenance and repair procedures of Perfection 1640SU, Perfection 1640SU PHOTO and Perfection 1640SU OFFICE. The instructions and procedures included herein are intended for the experienced repair technicians, and attention should be given to the precautions on the preceding page. The chapters are organized as follows:

CHAPTER 1. PRODUCT DESCRIPTIONS

Provides a general overview and specifications of the product.

CHAPTER 2. OPERATING PRINCIPLES

Describes the theory of electrical and mechanical operations of the product.

CHAPTER 3. TROUBLESHOOTING

Provides the step-by-step procedures for troubleshooting.

CHAPTER 4. DISASSEMBLY AND ASSEMBLY

Describes the step-by-step procedures for disassembling and assembling the product.

CHAPTER 5. ADJUSTMENT

This product reqires no adjustment.

CHAPTER 6. MAINTENANCE

Provides preventive maintenance procedures.

APPENDIX

Provides the following addition information for reference:
- Connector Pin Assignments
- Parts lists
- Exploded Diagrams

Revision Status

Revision	Issued Date	Description
A	August 9, 2000	First Release

Contents

CHAPTER

1

PRODUCT DESCRIPTION

1.1 Features

EPSON Perfection 1640 consists of three models: 1640SU, 1640SU PHOTO and 1640SU OFFICE. Major features are as follows. Perfection 1640SU PHOTO has the TPU (transparency unit) as standard unit. Perfection 1640SU OFFICE has the ADF (automatic document feeder) as standard unit.

MAJOR FEATURES

- ☐ High quality:
  - ■ Resolution: 1600 dpi (Optical resolution by 6 line CCD with 40800 pixels)
  - ■ depth: 14 bit (14 bit-in, 14 bit-out)
- ☐ High speed:
  - ■ Monochrome: 3.0 msec/line
  - ■ Color: 8.7 msec/line
    (Equivalent to ’Perfection 1200U/S’)
- ☐ Ease of Use
  - ■ EPSON Smart Panel
    -Same functions as ’Stylus Scan 2000/2500’.
    -Achieve easy scanning with a start button.
    -Export a image data to applications easily.
  - ■ Instant Photo Print Utility
    Modify from ’Perfection 1200’
  - ■ New Twain functions
    -ITR(Image Type Recognition)
    -Auto skew correction
- ☐ Hybrid Interface
  Include both USB and SCSI interfaces in one
- ☐ Option
  - ■ ADF(Based on ’Perfection 636 ADF’, and change external design according to ’Perfection 1640SU’)
  - ■ Film Adapter (Same sa ’Perfection 1200 Film Adapter’)

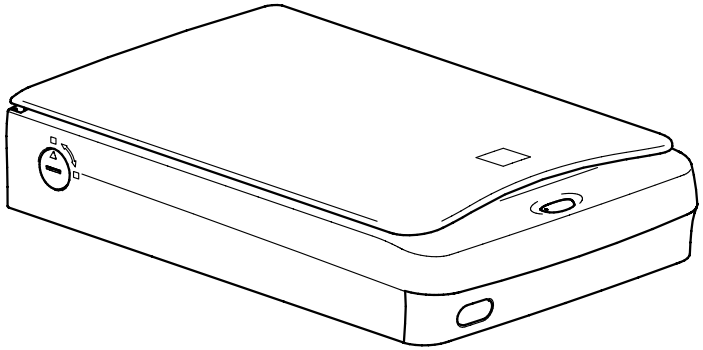


Figure 1-1. Exterior View of Perfection 1640SU

1.2 Product Description

GENERAL SPECIFICATION

- Product Type: Flatbed color image scanner
- Sub-scanning method: Movement of the Scanner-Head
- Photoelectric device: 6 line alternate color CCD
- Maximum Read Area: 8.5 x 11.7 (216 x 297mm)
- Maximum effective picture element:
  13600 x 18720 pixels (1600 dpi)
- Scanning Resolution:
  - Main 1600 dpi (Optical resolution by 6 line CCD with 40800 pixels)
  - Sub 3200 dpi with Micro Step
- Output resolution: 50 ~ 6400 dpi (1 dpi step)
  (12800dpi scanning is achieved by 6400dpi x 200%)
- Gray scale levels: 14 bits/pixel (Input 14 bits/pixel, Output 1-8/bits/pixel)
- Color Separation: By the color filter of CCD
- Zoom: 50 ~ 200% (1% step)
- Scanning Speed:
  - Color: 8.7 msec/line
  - Monochrome (bi-level): 3.0 msec/line
- Command level: ESC/I (B8), FS
- Gamma Correction: CRT 2 level (A, B)
  PRINTER 3 level (A, B, C)
  User defined 1 level
- Color Correction: Impact-Dot Printer
  Thermal Printer
  Ink-Jet Printer
  CRT Display
  User defined
- Brightness: 7 levels
- Line Art: Fixed threshold
  TET (Text Enhancement Technology)
- Digital halftoning: AAS
  Error Diffusion 3 modes (A, B, C)
  (Bi-level, Quad-level) Dither (Resident) 4 modes (A, B, C, D)
  Dither (User defined) 2 modes (A, B)
- Interface (Resident): SCSI (50-pin Half pitch Connectors) x 1pcs
  USB (Type-B Receptacle Connector) x 1pc
- USB Hosts: All of USB ports work correctly. (The functionality of the USB port (s) must be ensured by the vendor of the Host)
- Number of Hub: This device must be in the Tier 1 or 2 with recommended USB cable. (Tier1:Host-this device Tier2: Host-Hub-this device)
- Light Source: White Cold cathode Fluorescent Lamp
- Option : ADF, Film Adapter
- Start button: Ease of use with EPSON Smart Panel
- Operating System:
  - SCSI I/F: Microsoft Windows 95/98, Windows NT4.0/Windows2000
    Microsoft Windows Millennium Edition
    Macintosh System 8.0 or later
  - USB I/F: Microsoft Windows 98 (Pre-install model)
    Microsoft Windows2000 (Pre-install model or upgrade model from Windows 98 pre-install model)
    Microsoft Windows Millennium Edition (Pre-install model or upgrade model from Windows 98 pre-install model)
    Apple System 8.1 or later (USB equipped model)

ELECTRICAL SPECIFICATIONS

- Rated voltage: AC100-120V
AC220-240V
- Input voltage: AC 100 -120V ±10%
AC 220 - 240V ±10%
- Rated Current : 0.5A (Input AC100V)
0.3A (Input AC200V)
- Rated Frequency Range: 50-60 Hz
- Input Frequency Range: 49.5-60.5 Hz
- Power consumption: Approx. 25W (Operating)
Approx. 10W (Stand-by)
- Insulation resistance: 10 MΩ at 500VDC (between AC line and chassis)
- Dielectric strength: AC.1.2kV, 1 min (between AC line and chassis)

SAFETY, EMC, EPA

- Safety: UL 1950 (UL)
CSA C22.2 NO.950 (CSA)
EN60950 (VDE)
IEC950 (ROSTEST, PSB)
- EMC: FCC Part15 Subpart B Class B
CSA C108.8 Class B
AS/NZS3548 Class B
CISPR Pub22 Class B
CNS 1348 Class B
- CE Marking:
Low Voltage Directive 73/23/EEC EN60950
EMC Directive 89/336/EEC EN55022 Class B
EN6100-3-2
EN6100-3-3
EN50082-1
IEC60801-2/801-3/801-4
- EPA: Energy Star Program

RESISTANCE TO ELECTRIC NOISE

- Static electricity: panel - 10 kV
metal - 7kV/150 pF, 150Ω

ENVIRONMENTAL CONDITIONS

- Temperature:
  - Operating: 5 °C to 35 °C
  - Storage: -25 °C to 60 °C
- Humidity:
  - Operating: 10 to 80%, no condensation
  - Storage: 10 to 85%, no condensation

RELIABILITY

- MCBF: 30, 000 cycle

OPERATING CONDITIONS

- Dust: Ordinary office or home conditions. Extreme dust should be avoided.
- Illumination: Operation under direct sunlight or near strong light source is not guaranteed and should be avoided.

DOCUMENT

- Reflective type: Documents which has a smooth surface such as a printing and photograph.
- Transparency type (with transparency unit)
Reversal film
Negative film

PHYSICAL DIMENSIONS AND WEIGHT

- Dimensions: 289(W) x 442(D) x 96(H) mm
- Weight: Approx. 4.5 Kg

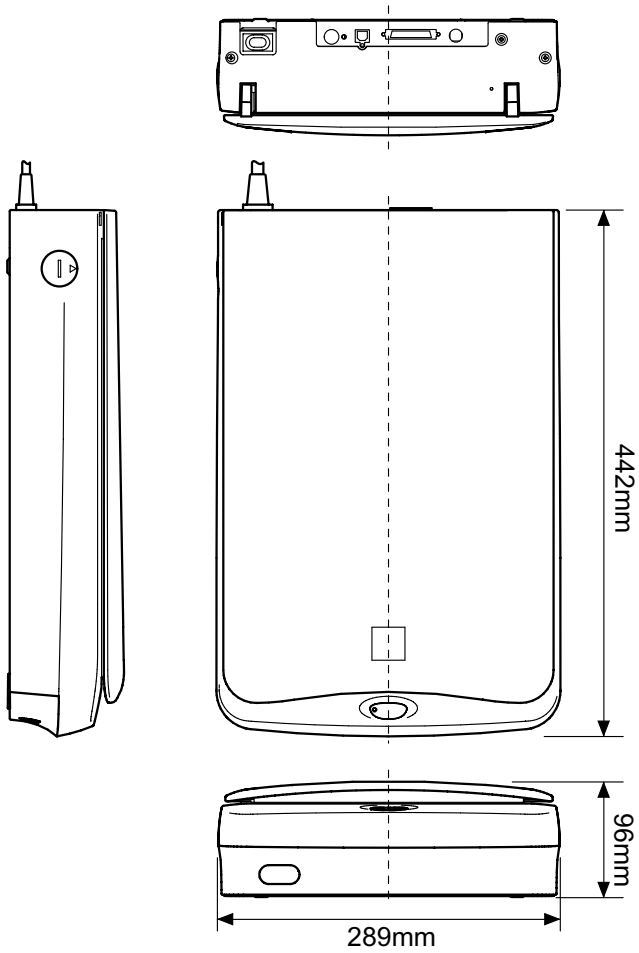


Figure 1-2. Size

1.3 Interface Specification

1.3.1 SCSI Interface

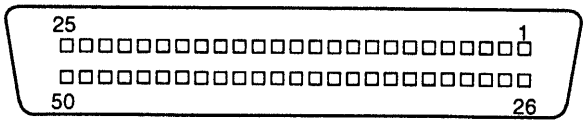
- Basic specifications
  Any items not included in this specification shall be in compliance with ANSI X 3T9.2/375R Revision 10L (SCSI 2)
- Function
  The following functions are available, which are included in ANSI X3T9.2/ 375R Revision 10L (SCSI 2)

Table 1-1. SCSI Interface Function

Function	Note
Bus Free Phase	
Arbitration phase	
Selection /Re-selection phase	
Command phase	The LUN (Logical Unit Number) is fixed at “0” in this device. The Command Link Function is not supported.
Data in phase	
Data out phase	
Status phase	
Message in phase	
Message out phase	
Attention condition	
Reset condition	

  - SCAM (SCSI Configured Auto Magically specification) [X3T9.2/93-109r5]
- Electric specification
  Compliant to ANSI X3T9.2/375R Revision 10L (SCSI 2)
  Single ended

- Connector: Two 50-pin connectors
- Terminator: Internal terminator
  (always ON ----terminator available)
- SCSI ID: The SCSI ID is set with a rotary switch on the rear panel.
  The switch numbers are corresponded to the available address and can be set from 0 to 7.
  Others are reserved
  Factory setting ID=2



50pin connector

Figure 1-3. SCSI Connector Pin Assignment

Table 1-2. SCSI Connector Pin Assignment

Signal	I/O	Pin No.	Specification
GND		1 ~12 14 ~ 25 35 ~ 37 39, 40, 42	
NC		13	
DB0	I/O	26	Data Bus 0
DB1	I/O	27	Data Bus 1
DB2	I/O	28	Data Bus 2
DB3	I/O	29	Data Bus 3
DB4	I/O	30	Data Bus 4
DB5	I/O	31	Data Bus 5
DB6	I/O	32	Data Bus 6
DB7	I/O	33	Data Bus 7
DBP	I/O	34	Data Bus Parity
TERMPWR		38	Terminator Power
ATN	I	41	Attention
BSY	I/O	43	Busy
ACK	I	44	Acknowledge
RST	I	45	Reset
MSG	O	46	Message
SEL	I/O	47	Select
C/D	O	48	Command/Data
REQ	O	49	Request
I/O	O	50	Input/Output

1.3.2 USB Interface

☐ Component: This device supports the following configurations.

Table 1-3. Configurations

Device	Class: Vender-specific Max. packet size of endpoint 0: 64 byte Vender ID: 0x04B8 Product ID: 0x010A No.of component: 1
Component	Supported Interface: 1 Characteristic • Self power • Remote wake up function support Power consumption:2mA
Interface 0	substitutes setting value: NO Endpoint: 2 Class: Vender-specific
End point 1	Bulk IN transfer Max. packet size: 64 byte
End point 2	Bulk out transfer Max. packet size: 64 byte
String descriptor	Producer: “EPSON” Product Name: Perfection 1640

☐ Electric specification: Compliant to the high speed (12M bps) mode of Universal Serial Bus Specification Rev.1.1.

☐ Connector: Receptacle (Series B) (Figure 1-4 and Table1-4)

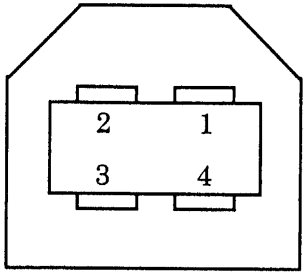


Figure 1-4. Receptacle (Series B)

Table 1-4. Connector Pin Assignment

Pin No.	Signal
1	VCC
2	- Data
3	+ Data
4	GND

1.4 Control Code

The command level is ESC/I-B7 and supported commands are shown below.

Table 1-5. Control Codes

Category	Command Name	Code
Execute Command	ID request	ESC I
	Status request	ESC F
	Extension status request	ESC f
	Status setting request	ESC S
	Read start command	ESC G
	Push Button Status request	ESC !
	Expansion ID request	FS I
	Scanner Status request	FS F
	Read parameter request	FS S
	New read start	FS G
Data format setting	Sets Data format	ESC D i
	Sets resolution rate	ESC R n1 n2
	Sets zoom rate	ESC H i1 i2
	Sets the reading range	ESC A n1 n2 n3 n4
	Sets the color	ESC C i
	Mirroring	ESC K i
	Sets reading parameter	FS W
Correction process	Set brightness	ESC L i
	Set Gamma correction	ESC Z i
	Set Gamma correction table	ESC z i d0 d1...d255
	Set sharpness	ESC Q i

Table 1-6. Control Codes

Category	Command Name	Code
Image process	Set Digital Halftoning	ESC B i
	Set Auto Area Segmentation	ESC s i
	Download Dither Pattern	ESC b ijd (j2)
	Color correction	ESC M i
	Download Color Correction	ESC m df d2...d9
	Set Threshold	ESC t i
Auxiliary	Set scanning mode	ESC g i
	Initialize	ESC @
	Set line counter	ESC d i
	Control option	ESC e i
	Focus adjustment	ESC p i
	Focus position status request	ESC q
	Eject paper	FF
	Film type	ESC N i
Control	Normal response	ACK
	Abnormal response	NACK
	Abort scanning	CAN
	Header	STX

1.5 Exterior Function

1.5.1 Switch Specification

- OPERATE Switch
  - Turns the scanner ON/OFF
  - Pressing this switch at power ON initializes the scanner
- PUSH Button
  The status of this button can be checked by [ESC !].
- SCSI ID switch (rotary type)
  0 - 7: SCSI ID (Factory setting ID=2)
  Other: Reserved

1.5.2 Indicators

- Indicator display
  - OPERATE (Green LED)
    OPERATE switch is ON and power is ON.
  - READY (Green LED)
    *This lamp becomes ON when the command or receiving/sending the data is available. (During scanning, READY lamp repeats blinking, according to the data transfer)
    *READY lamp blinks with with ERROR LED when an error occurs.
  - ERROR (Red LED)
    This lamp blinks when an error (s) is detected.

Table 1-7. Error Indication

READY LED (green)	ERROR LED (red)	Error type
ON	ON	Command error
OFF	Blink	Communication error
OFF	Blink	Fatal error
Blink	Blink	Option error

1.6 Process when an error happens

- Command error
  - Cause: Unidentified command or unidentified command parameter is detected.
  - Disposition: The scanner ignores the wrong command or parameter. (Therefore, the current setting or the default value remain effective.)
    Scanner sends NACK, and waits for the next command or parameter.
  - Indicator: Red LED ON
  - Remedy: The error condition is cleared when the scanner receives a correct command.
- Interface error (Communication error)
  - Cause: Wrong procedure is detected in the interface communication. In the case of SCSI, a transmission is frozen more than 30 seconds except BUS FREE phase.
  - Disposition: The lamp goes off and the scanner stops operation.
  - Indicator: READY LED Off
    ERROR LED (red) blinking (short interval)
  - Remedy: Turn the scanner off and then back on. RST signal in SCSI turns active.
  - Acceptable command : Nothing
- Fatal error
  - Cause: The lamp is broken. Power is turned on before removing the transportation screw.
  - Disposition: The lamp goes off and the scanner stops operation.
    The bit 7 of the status byte is set.
  - Indicator: READY LED Off
    ERROR LED Blinks
  - Remedy: Turn the scanner off and then back on. Send ESC@ code to the scanner. RESET signal in SCSI turns active. Complete BUS DEVICE RESET message in SCSI.
  - Acceptable command: ESC F, ESC f, ESC @
- Option error:
  This error occurs by the following causes, when an optional unit is installed and its operation is available by the optional control command (ESC e).
  - Cause: Unit cover open
    Paper Empty
  - Disposition: The bit 7 of the status byte is set to “1”
  - Indicator: READY LED Blink
    ERROR LED Blink
  - Remedy: Remove the error condition
  - Acceptable command: ESC F, ESC f, ESC @

CHAPTER

2

OPERATING PRINCIPLES

2.1 Engine Mechanism

This section explains the engine function and operating principles. Engine can be divided into Carriage Unit and Carriage Move Mechanism.

2.1.1 Carriage Unit

Carriage unit is mainly composed of CCD sensor board, Inverter board, Lamp (light source), Mirror and Lens mechanism.

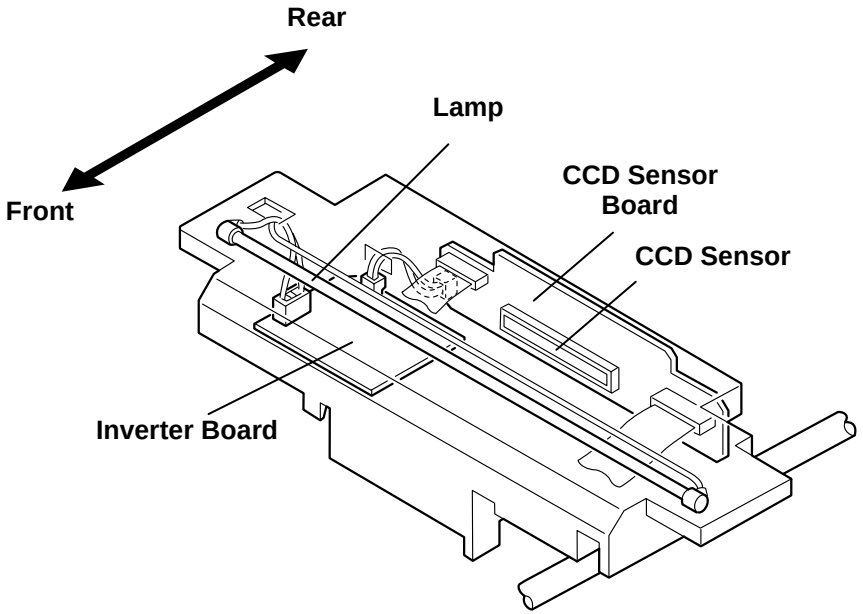


Figure 2-1. Carriage Unit Component

- ☐ CCD Sensor Board: This board has Color CCD line sensor (independent R,G,B), and controls it and drives circuit.
- ☐ Inverter Board: This board generates voltage to drive the lamp by pressuring up to the +24VDC and converting it from direct current to alternating current.
- ☐ Lamp: White cold fluorescent Lamp is used as light source. When the light quantity is not stable, the scanner blinks the Operate light until the light becomes stable and goes to stand-by mode.
- ☐ Mirror and Lens Mechanism: The light emitted to the document reaches the CCD sensor after being reflected on some mirrors one after another. Not by changing the light source to create R/G/B light component which can be found in the previous models, Color CCD itself creates each R/G/B light component.

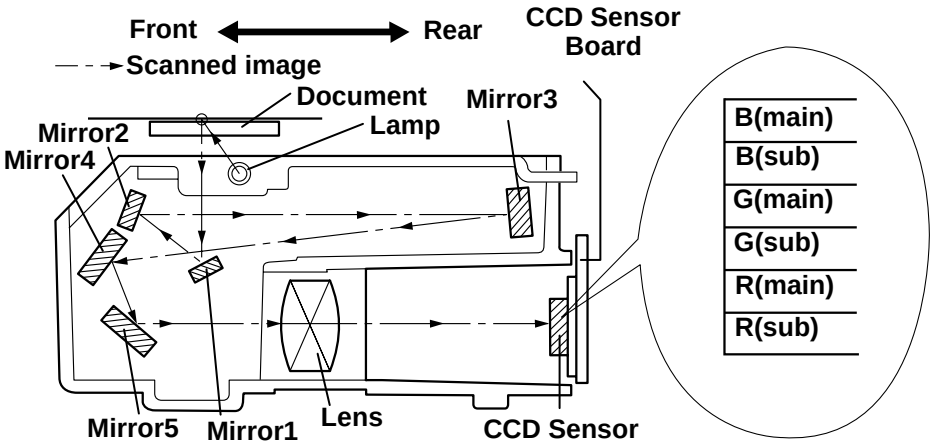


Figure 2-2. Mirror, Lens Mechanism

2.1.2 Carriage Move Mechanism

Scanning image is performed in the main scan direction (=1 line) by the CCD sensor and in the sub-scan direction (=several lines) combined with carriage unit movement. (See the figure below)

Line type, color CCD sensor can scan 1 line in main scan direction (parallel to the carriage unit) by one time. When scanning next lines after the second line in sub-scan direction, CR driving moves the carriage unit, which has CCD sensor inside, and scan the other lines. The scanned data is sent to the control board. The scanned data for “n” lines and “n-1” line are processed consecutively.

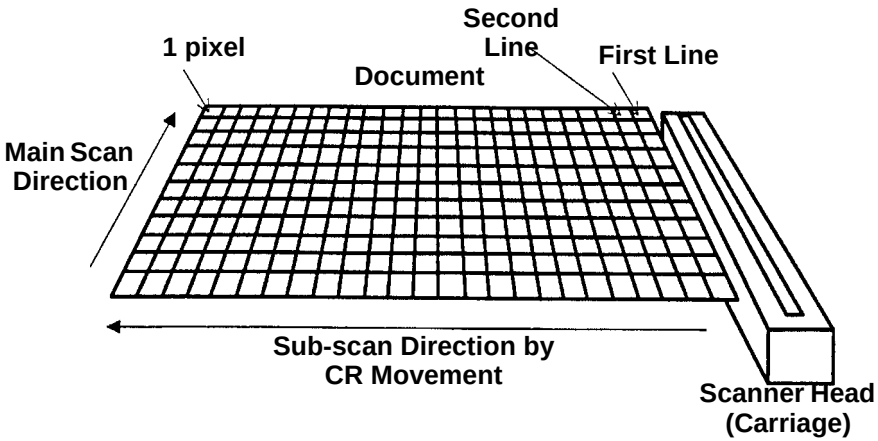


Figure 2-3. Carriage Movement

Carriage Unit slides into sub-scan direction along with the guide rail. For this sliding operation, the carriage motor drives the timing belt attached to the carriage unit by conveying the driving force through the drive pulley and reduction gear. Scanning start position is determined by CR HP sensor, which is located on the control board. Since the stepping motor is used for CR motor, carriage home position is controlled under the open loop system. (See the figure below)

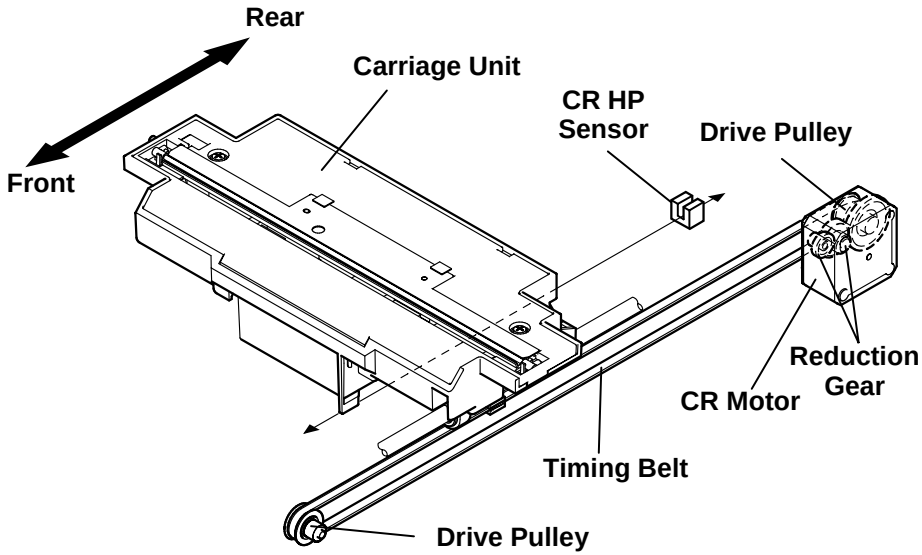


Figure 2-4. Carriage Operation

2.2 Power Supply Circuit

Power supply circuit in this scanner generates direct current DC power necessary for driving the controller board and scanner engine. Table below shows each power supply circuit for different destinations.

Table 2-1. Power Supply Circuit Board for Destination

Specification	Unit Part No.	Fuse
100-120 VAC Range	2031592	2.5 A/125 VAC
220-240 VAC Range	2031593	T2.5AH/250 VAC

Figure 2-5 shows diagram of power supply circuit.
Output from the power supply circuit is performed by closing or opening the No. 4 pin of CN102 connector. When opening, as it is shown in the Table below, each output voltage becomes active. Also, each output voltage has over current protection and over voltage protection circuit.

Table 2-2. Output and Protection Function

Output Voltage	Output Current	Over Current Protection (Current value to activate)	Over voltage Protection (Voltage value to activate)
5 VDC	1.2A	Fold-back characteristic. Automatic Recovery. (Less than 1A)	Shut down. Turn off the power and back on to recover. (5.5 -7.5 VDC)
12 VDC	0.2A	Constant current limiting. Automatic Recovery. (less than 0.5 A)	Shut down. Turn off the power and back on to recover. (14 -17 VDC)
24 VDC	0.7A	Shut down. Turn off the power and back on to recover.	Shut down. Turn off the power and back on to recover. (28 -33 VDC)

NOTE: *1. If a part of output is shut down, all the other output are also shut down.*
2. Off time required to recover is maximum 5 minutes.

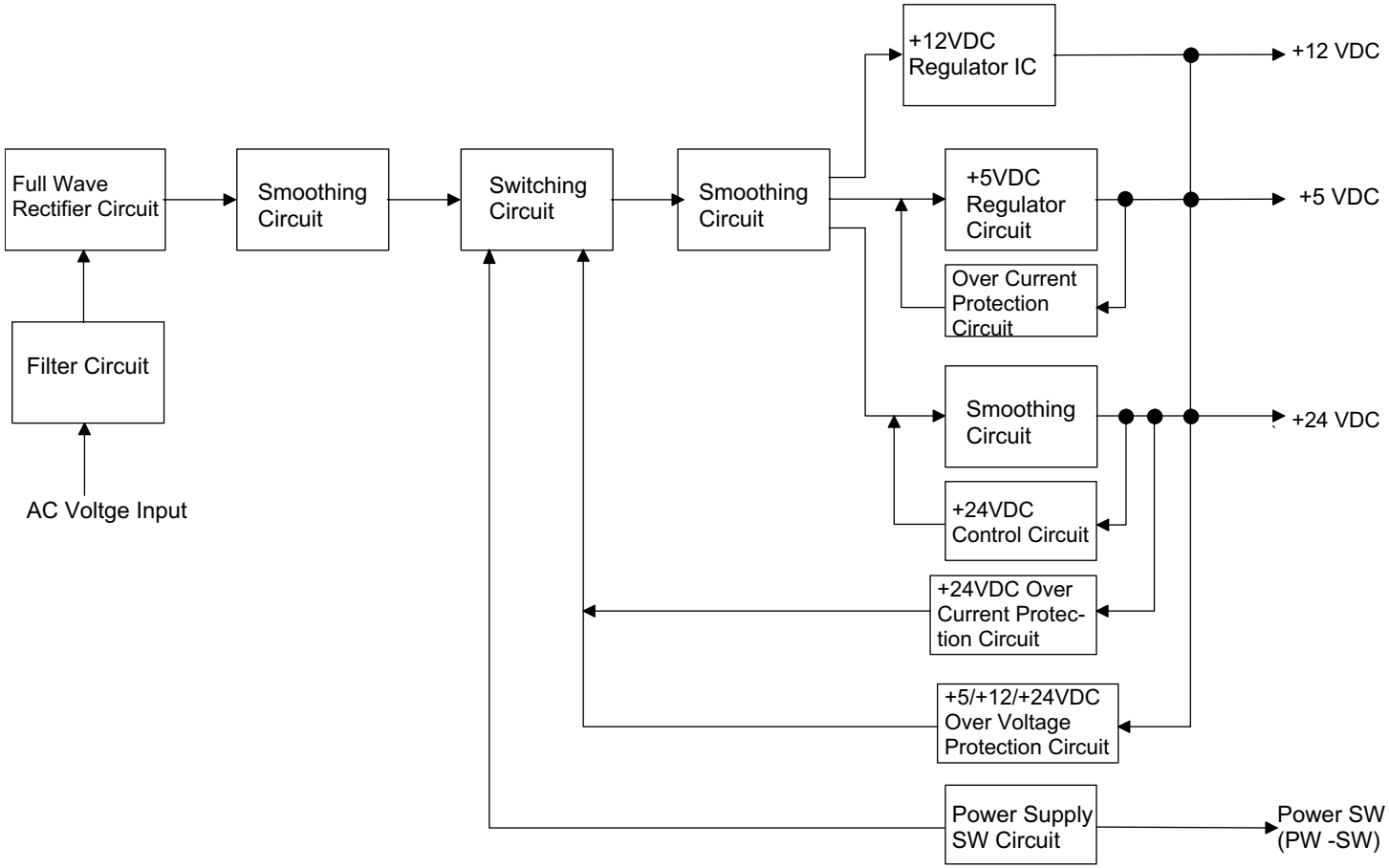


Figure 2-5. Power Supply Circuit Block Diagram

2.3 Control Circuit

2.3.1 Control Circuit Overview

This scanner uses the one-tip 16-bit bus CPU (IC9) at 20MHz frequency. Image data processing, correction, CCD sensor board, A/D converter control are operated at ASIC (IC3). Table 2-3 shows major IC functions.

Table 2-3. Major ICs

IC	Location	Function
H8S/2350	IC9	CPU 24-bit Address Bus 16-bit Data Bus
E02A34EB	IC3	ASIC • CCD Control • Line (sharpness) Control • Image Processing • Memory Control
MB81F641642D	IC8	SDRAM 64Mbit
IS61C256AH	IC4, IC6	SRAM 32k x 8 bit
A3957SLB	IC1, 2	CR motor driver IC
MBM28F200B	IC5	PROM
BH9596FP-Y	IC14	Terminator IC
SPC7215F0A	IC18	SCSI/USB Controller
SSA20.00BR	CR2	20 MHz clock for CPU

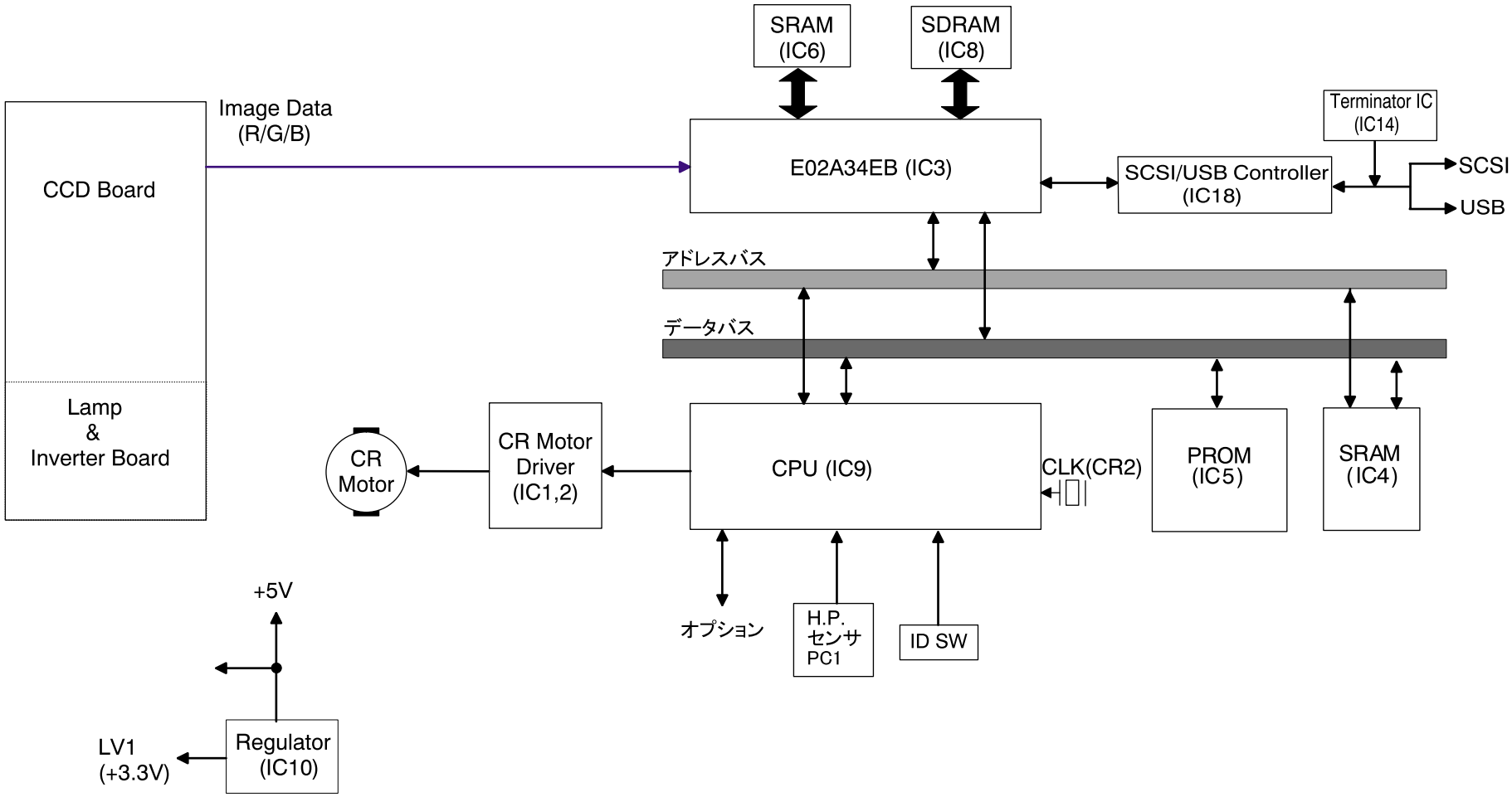


Figure 2-6. Control Circuit Block Diagram

CHAPTER

3

TROUBLESHOOTING

3.1 Overview

This chapter explains the troubleshooting of this scanner.

3.2 Self-Diagnostic Function

The self-diagnostic function of this scanner lets the scanner to check the condition of each component automatically. If it detects a faulty component, it indicates the status using the Operate light. See Table3-1.

Table 3-1. Self-Diagnostic Indication

LED Light		Error Type (Cause, Remedy)
Green	Red	
OFF	ON	***Command Error*** • Cause: Unidentified command or unidentified command parameter is detected. • Disposition: The scanner ignores the wrong command or parameter. (Therefore, the current settings or the default value remain effective) Scanner sends NACK, and waits next command or parameter. • Remedy: The error condition is cleared when the scanner received a correct command.
OFF	Blink	***Interface Error*** • Wrong procedure is detected in the interface communication. In the case of SCSI, a transmission is frozen more than 30 seconds except BUS FREE phase. • Disposition: The lamp goes off and the scanner stops operation. • Turn off the scanner and then back on. RST signal in SCSI turns active. • Acceptable command: Nothing
OFF	Blink	***Fatal Error*** • Cause: The lamp is broken. Power is turned on before removing the transportation screw. System break down. • Disposition: The lamp goes off and the scanner stops operation. The bit 7 of the status is set. • Remedy: Turn the scanner off and then back on. Send ESC@ codes to the scanner. RESET signal in SCSI turns active. Complete BUS DEVICE RESET message in SCSI. • Acceptable command: [ESC F, ESC f, ESC @]
Blink	Blink	***Option Error*** (Only when the optional unit is installed and operation is available by [ESC e].) • Cause: Unit cover open, or paper Empty • Disposition: The bit 7 of the status byte is set to “1”. • Remedy:Remove the error condition. • Acceptable command:[ESC F, ESC f, ESC @]

3.3 Troubleshooting

This section describes troubleshooting from the abnormal phenomenon. You can isolate the faulty unit based on the abnormal phenomenon. See the table below to find the closest phenomenon and the corresponding table to refer to.

Table 3-2. Abnormal Phenomenon and corresponding Tables

Phenomenon	Description	Ref, Table
Scanner does not operate even its power is On.	• Operate Light on the control panel does not come On. • Scanner does not operate the initialization.	3-3 3-4
Fatal Error occurs and is not cleared after turning off and back on the scanner.	• Carriage Unit does not operate. • Carriage Unit crashes into the front or rear frame and then the error is indicated. • The lamp does not light up.	3-5 3-6 3-7
Scanned image is unclear.	Scanned image is unclear.	3-8
"Interface Error" is indicated.	• SCSI Interface Error • USB Interface Error	3-9 3-10
"Option Error" occurs. Optional unit (ADF/TPU) does not operate.	• Optional unit does not operate correctly.	3-11

Table 3-3. Panel LED does not turn On.

Cause	Step	Checkpoint	Finding	Solution
Connector CN1 on the power board is disconnected.	1	Is the connector CN1 on the power board disconnected?	Yes	Connect CN1 properly.
Connector CN101 or CN102 on the power board disconnected.	2	Is the connector CN101 or CN102 on the power board disconnected?	Yes	Connect CN101 or 102 properly.
Fuse on the power board has blown out.	3	Has the fuse on the power board blown out?	Yes	Replace the fuse.
The power board.is broken.	4	With the scanner On, check the voltage output level between pins 8/ 9(+) and pins 6/7(-) on the power board. Is the voltage +5VDC?	No	Replace the power board.
Connector CN7 on the power board is disconnected.	5	Is the connector CN7 on the control board disconnected?	Yes	Connect CN7 properly.
The control board is broken.	6	---	---	Replace the control board.

Table 3-4. Scanner is not initialized

Cause	Step	Checkpoint	Finding	Solution
Connector CN1 on the power board is disconnected.	1	Is the connector CN1 on the power board disconnected?	Yes	Connect CN1 properly.

Table 3-5. Carriage Unit does not operate

Cause	Step	Checkpoint	Finding	Solution
Power board is broken.	1	With the scanner power on, check the voltage output level between the Pins 4/5(+) and Pins 6/7 (-) for CN101 on the power board. Is it +24VDC?	No	Replace the power board.
Carriage Unit (or CR move mechanism) is broken.	2	Is grease (G-26) applied correctly?	No	Apply the grease to the appointed position. (See Ch6)
	3	• With power ON and the scanner upper case removed, does CR motor move? • With the CR motor removed, does the carriage unit move smoothly?	No	Check the carriage move mechanism and replace the corresponding parts or disassemble and assemble the part.
CR Motor is broken	4	Disconnect the connector CN6 on the main board, then use the tester and check the coil resistance between Pin2 and 4 and between Pin1 and 3. Is the resistance of 2 points about 6.2Ω?	No	Replace the CR motor.
	5	If any motor coil is shorted, check the CR motor drive circuit in the order below. 1.)Set the tester on Ohms. 2.)Place the (-) lead of the tester on any of Pins 1,2, 3 or 4 of CN6 on the main board. 3.)Place the (+) lead of the tester on Pin 6/7 of CN7 on the main board. With the scanner off, does the meter show "∞"?	No	Replace the main board.
Main board is broken.	6	---	---	Replace the main board.

Table 3-6. Carriage moves but an error is indicated

Cause	Step	Checkpoint	Finding	Solution
CR home position sensor is broken.	1	Check the signal level. • Check the signal/status level between C(+) and E(-) of PC1. H (about 4.5V)/ when C-E of PC1 is closed. L (0.3V)/when C-E of PC1 is opened.	--	Replace the CR home position sensor (PC1) on the main board.

Table 3-7. Lamp does not light up

Cause	Step	Checkpoint	Finding	Solution
Connector CN4 on the control board is disconnected.	1	Is the connector CN4 on the control board disconnected?	Yes	Connect CN4 properly.
Connector CN1 or CN2 on the CCD board disconnected.	2	Is the connector CN1 or CN2 on the CCD board disconnected?	Yes	Connect CN1 or 2 properly.
Lamp is not connected properly to the connector on the inverter board.	3	Is the lamp connected properly to the connector on the inverter board?	No	Connect the lamp properly.
Lamp is broken.	4	Does the lamp light after it is replaced?	Yes	Replace the lamp.
Inverter board is broken.	5	Does it operate properly after replacing it?	Yes	Replace the inverter board.
Main board is broken.	6	---	---	Replace the main board.

Table 3-8. Scanned image is unclear

Cause	Step	Checkpoint	Finding	Solution
Mirror in the carriage unit is dirty.	1	Is the image scanned clearly after cleaning the mirror?	No	Clean the lamp surface.
CCD sensor board is broken.	2	---	--	Replace the CCD board.
Main board is broken.	3	---	---	Replace the main board.

Table 3-9. SCSI Interface Error

Cause	Step	Checkpoint	Finding	Solution
Terminator switch is set wrong.	1	Check the user's guide for the correct setting. Is the setting correct?	No	Set the terminator correctly.
SCSI setting is wrong.	2	Check the user's guide for the correct setting. Is the setting correct?	No	Set the SCSI correctly.
TWAIN driver, which comes with the scanner is not installed correctly.	3	Is the TWAIN driver installed correctly?	No	Install the TWAIN driver correctly (or reinstall)
SCSI cable is defective.	4	Replace the SCSI cable. Is the operation normal?	Yes	Replace the SCSI cable.
Main board is broken.	5	---	---	Replace the main board.

Table 3-10. USB Interface Error

Cause	Step	Checkpoint	Finding	Solution
Host and O/S does not support the USB.	1	On the Windows, go to "My Computer"→"Property"→"Device Manager", then, check if "Universal serial bus controller" is effective.	No	Replace the host.
TWAIN driver, which comes with the scanner is not installed correctly	2	Is the TWAIN driver installed correctly?	No	Install the TWAIN driver correctly (or reinstall)
USB cable is broken.	3	Replace the USB cable. Is the operation normal?	Yes	Replace the USB cable.
Main board is broken.	4	---	---	Replace the main board.

Table 3-11. Option TPU/ADF does not operate

Cause	Step	Checkpoint	Finding	Solution
The cable of the optional unit is disconnected.	1	Is the connector CN3 on the control board disconnected?	Yes	Connect the CN3 properly.
Main board is broken.	2	---	---	Replace the main board.
Optional unit is broken.	3	+24V line:Lamp, Motor +5V line: Sensor, logic circuit.	---	Replace the defective part of the optional unit.

CHAPTER

4

DISASSEMBLY AND ASSEMBLY

4.1 Overview

This chapter describes for disassembling Perfection 1200 and precaution to take during transportation.

4.1.1 Precaution

WARNING

- **Before servicing, make sure that the power cable is disconnected from the AC power socket and the interface cable is removed.**
- **Wear a pair at gloves to protect your hand from the sharp edge in the scanner mechanism.**

CAUTION

- **Use the stable and level table which has enough strength for disassembling and assembling the scanner.**
- **Get yourself enough room for servicing, considering the size of the scanner.**

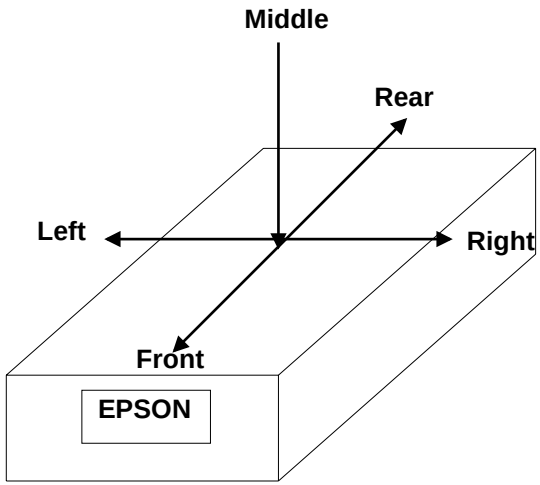


Figure 4-1. Notations

4.1.2 Tools

Tools used for servicing are as listed in the table below.

Table 4-1. Tools

Description	Availability	SE Part No.
(+) Screw Driver	O	B743800200
(-) Screw Driver	O	B743000100
A pair of Tweezers	O	B641000100
Cutting Plier	O	B740400100

4.1.3 Screws

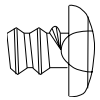
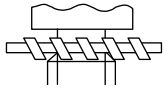
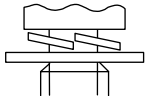
Screws used in this scanner are listed in the table below. Be sure to use the correct types and numbers of screws for each part when assembling the scanner.

Table 4-2. Abbreviation for Screws

Abbreviation	Name
CP	Cross-recessed Pan head screw
CBS	Cross-recessed Binding head S-tite screw
CCP	Cross-recessed Cup head P-tite

NOTE: *Refer to Table 4-3 for screw shapes.*

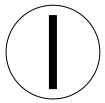
Table 4-3. Screws

Head Shape		Type	Washer
Hole	Appearance		
Cross-recessed 	Binding  Pan  Cup 	Standard --- S-Tite  B-Tite  P-Tite 	With Outside toothed lock washers  With Spring lock washers 

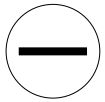
4.2 Disassembly Procedures

4.2.1 Carriage Lock Release

1. Release the carriage lock located at left side of the scanner body by using (-) screw driver.



Release



Lock

Figure 4-2. Carriage Lock Position

CAUTION

When you need to lock again for transportation, lock it while letting the carriage be at home position.

4.2.2 Document Cover Removal

1. Open the document cover vertically and pull it out upward.

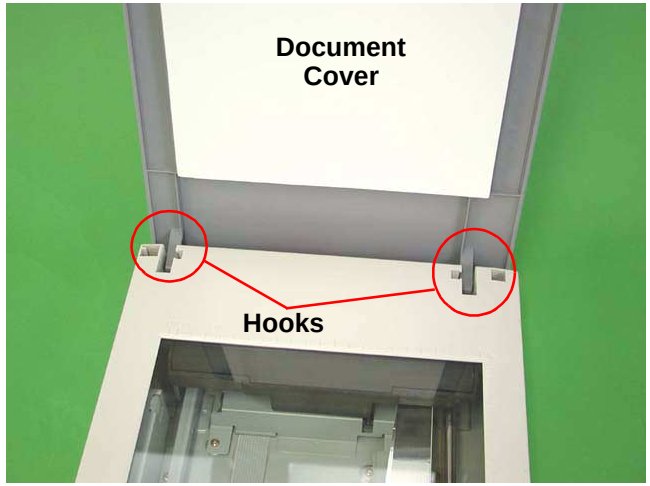


Figure 4-3. Document Cover Removal

4.2.3 Upper Cover Removal

1. Release the carriage lock. (see Section 4.2.1)
2. While holding the original cover with both hands so that it does not come off, turn the main unit upside down.
3. Remove the two screws (CCS, M3x6) which are securing the front cover, and then remove the front cover.
4. While holding the original cover with both hands so that it does not come off, return the main unit to its original position.
5. Remove the document cover. (see Section 4.2.2)
6. Release two silver screws (CBS, M3x6) from the back of the scanner.

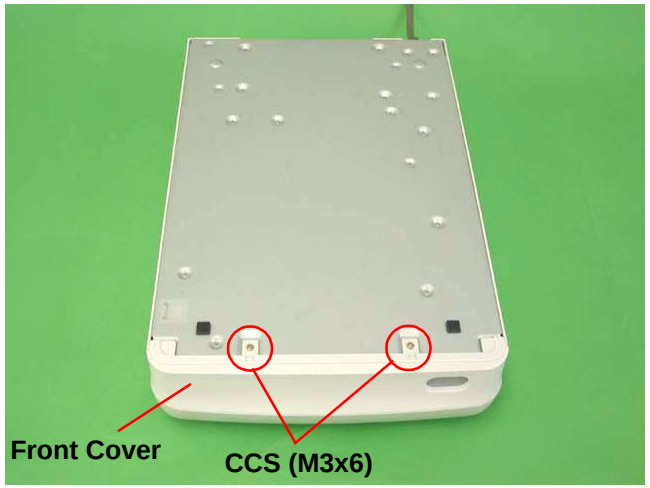


Figure 4-4. Front Cover Removal

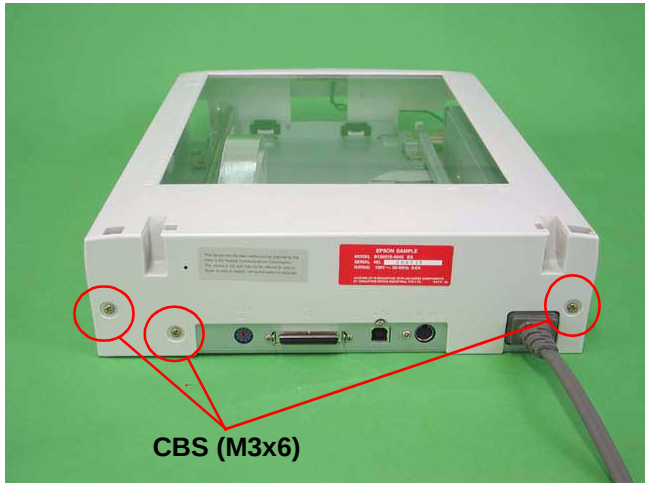


Figure 4-5. Upper Cover Removal (1)

7. Lift up the rear side of the upper cover and remove the upper cover toward yourself, reeleasing three hooks securing the upper cover.
8. Disconnect the connector (CN2) from the sub board.

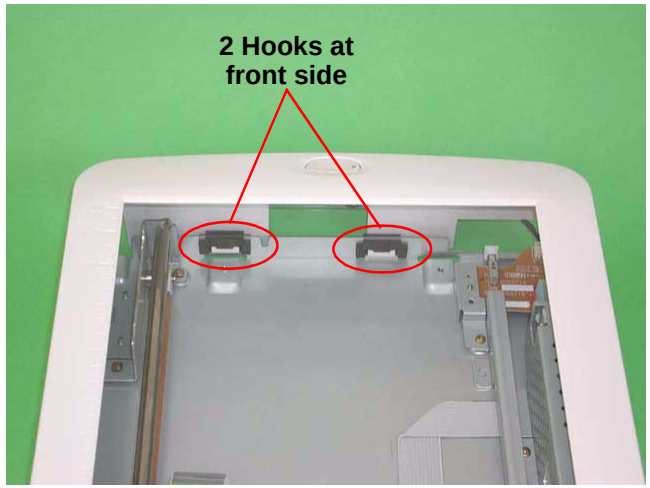


Figure 4-6. Upper Cover Removal (2)

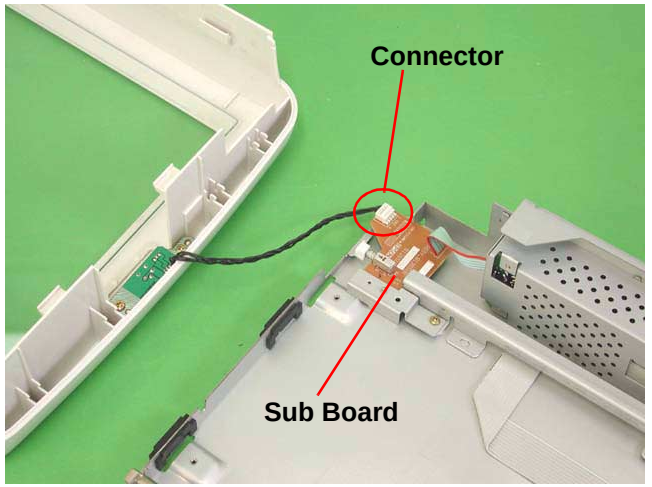


Figure 4-7. Upper Cover Removal (3)

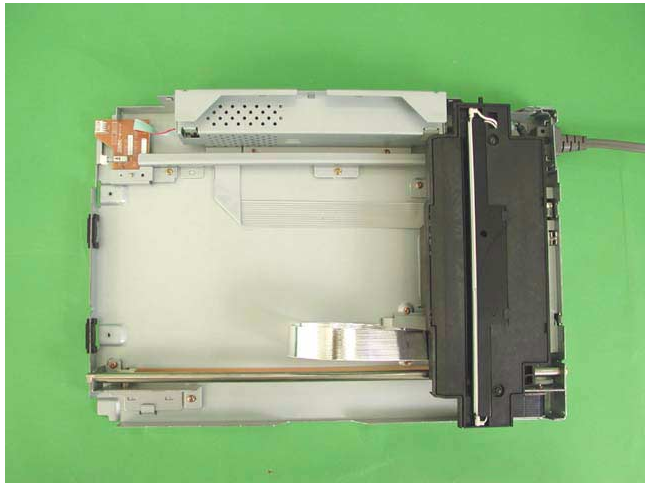


Figure 4-8. After removing the upper cover

4.2.4 Panel Board Removal

1. Release the carriage lock. (See Section 4.2.1)
2. Remove the upper cover. (See Section 4.2.3)
3. Remove the two screws (CBP, M3x8), then remove the panel board.

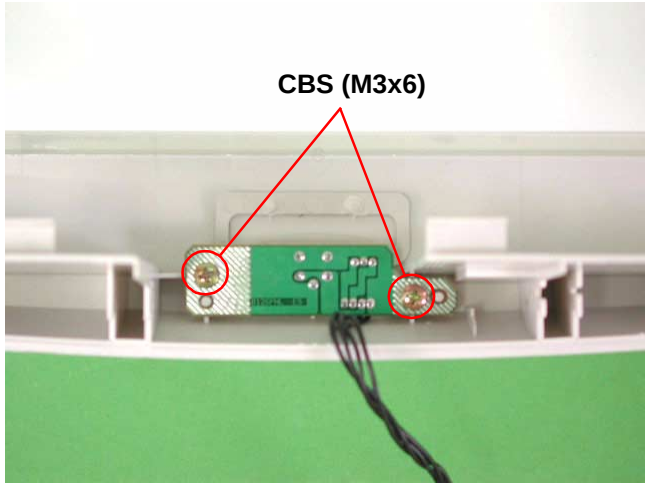


Figure 4-9. Panel Board Removal

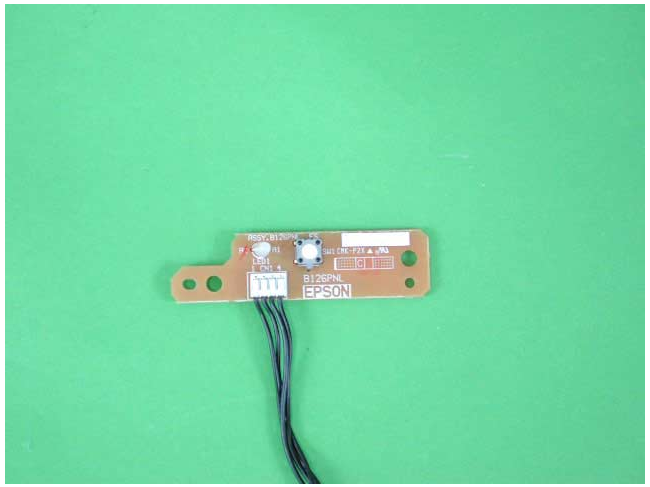


Figure 4-10. Panel Board

4.2.5 Inverter Lamp/Inverter Board Removal

1. Release the carriage lock. (see Section 4.2.1)
2. Remove the upper cover. (see Section 4.2.3)
3. Remove 2 black screws (CCP, M3x8) on the carriage unit.
4. Remove the carriage unit upper cover by lifting it up and pulling it front by the (-) screw driver.

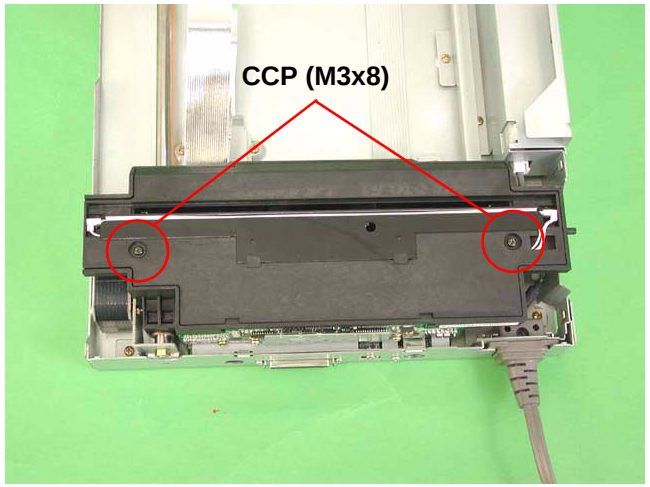


Figure 4-11. Disassembly of the Carriage Unit (1)

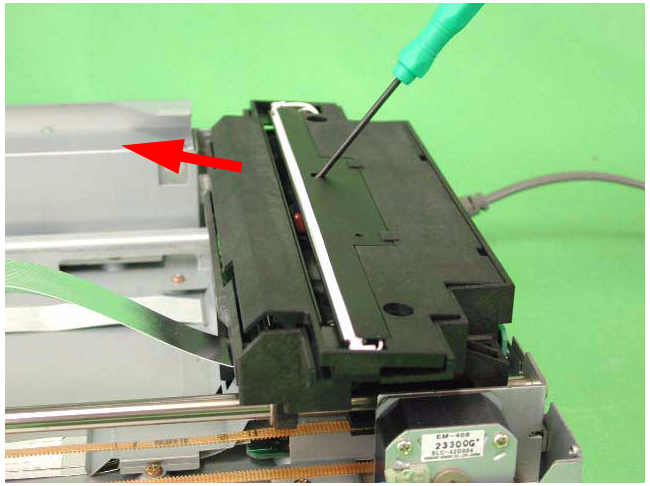


Figure 4-12. Disassembly of the Carriage Unit (2)

5. Remove the inverter lamp connector from the inverter board.
6. Remove one black screw and a connector (2-pin) for CCD sensor board, then remove the inverter board.
7. Remove the inverter lamp from the upper cover.

CAUTION

When installing the inverter lamp, locate the wire as it is shown in figures 4-13 and 4-14.

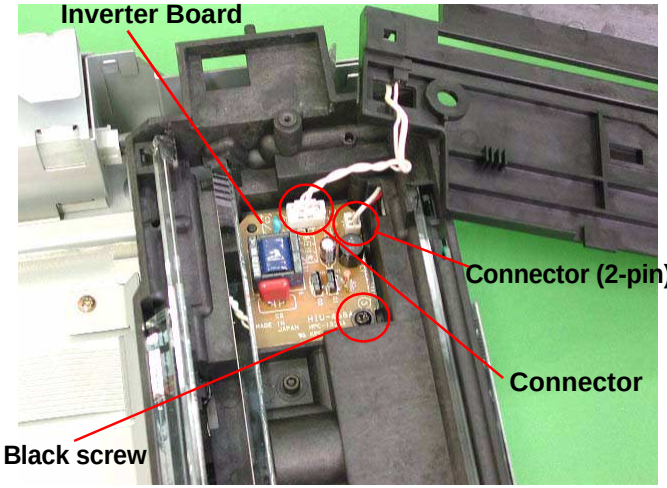


Figure 4-13. Disassembly of the Carriage Unit (3)

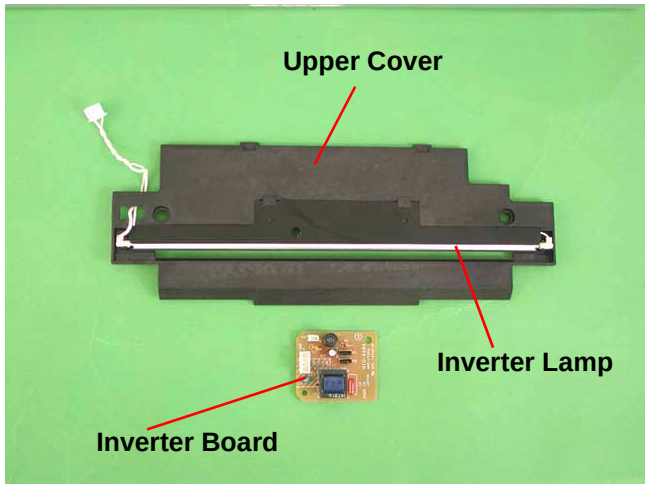


Figure 4-14. Inverter Lamp Removal

4.2.6 Main Board Removal

1. Release the carriage lock. (See Section 4.2.1)
2. Remove the upper cover. (See Section 4.2.3)
3. After removing 3 gold screws (CBS, M3x5) and 2 rear hooks, remove the shield cover.

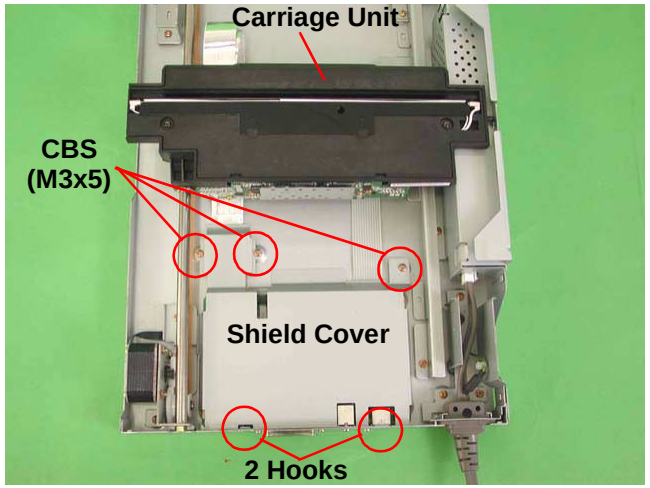


Figure 4-15. Main Board Removal (1)

4. Remove 2 screws (CP, M2.5x6) located around the I/F connector behind the scanner body and 2 screws (CP, M3x5).
5. Remove each cable from CR motor connector (CN6), carriage FFC connector (CN4, 5) and power supply unit connector (CN7).
6. Remove the four screws (CBS, M3x5) which are securing the main board to the main unit.
7. Lift up the front part of the main board, pulling it toward you, and remove the connector from the scanner body. Then, remove the main board.

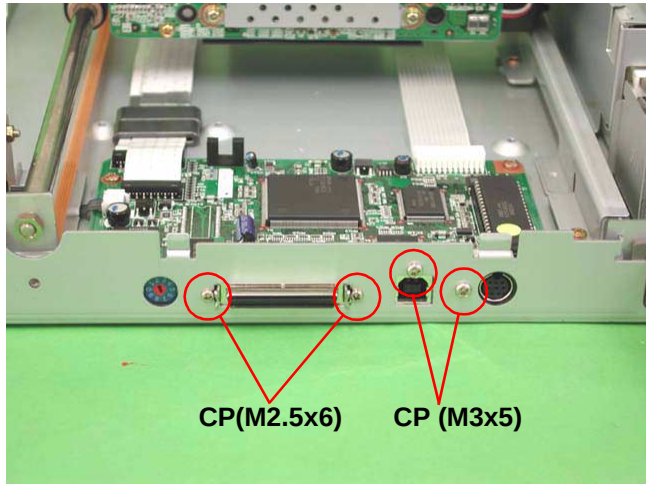


Figure 4-16. Main Board Removal (2)

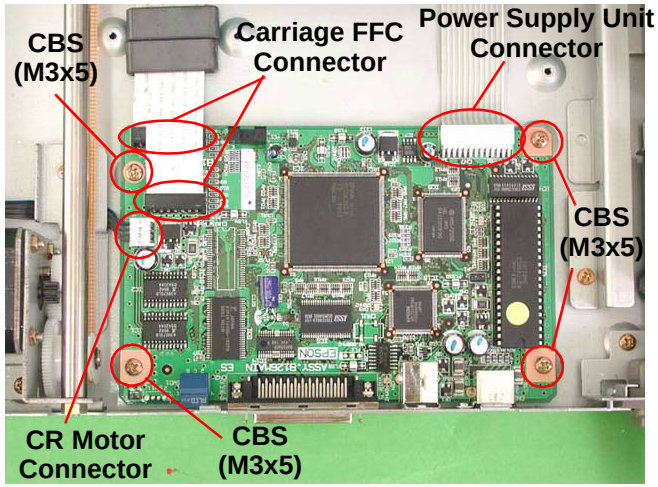


Figure 4-17. Main Board Removal (3)

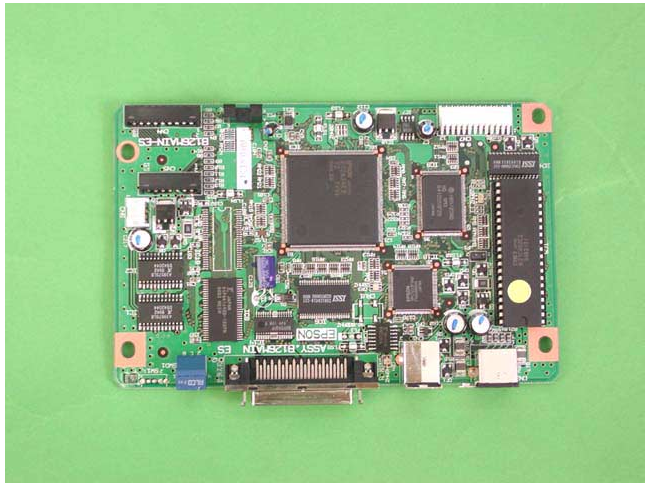


Figure 4-18. Main Board

4.2.7 Carriage Unit Removal

1. Release the carriage lock. (See Section 4.2.1)
2. Remove the upper cover. (See Section 4.2.3)
3. Remove the hexagon nut located back of the carriage guide shaft.
4. Remove the two screws (CBS, M3x5) which are securing the driven pulley assembly.

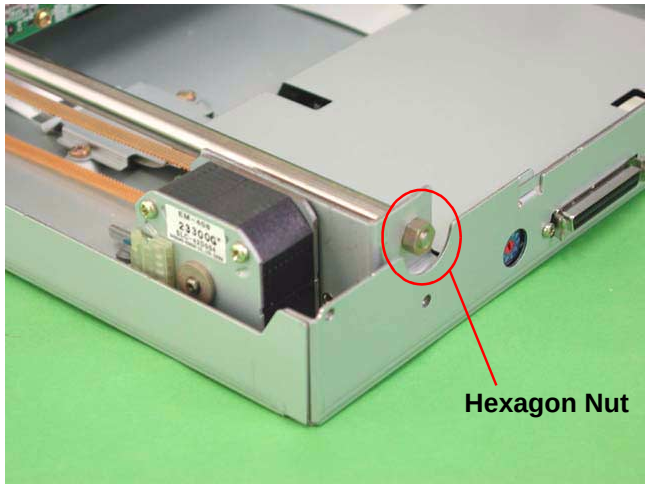


Figure 4-19. Hexagon Nut Removal

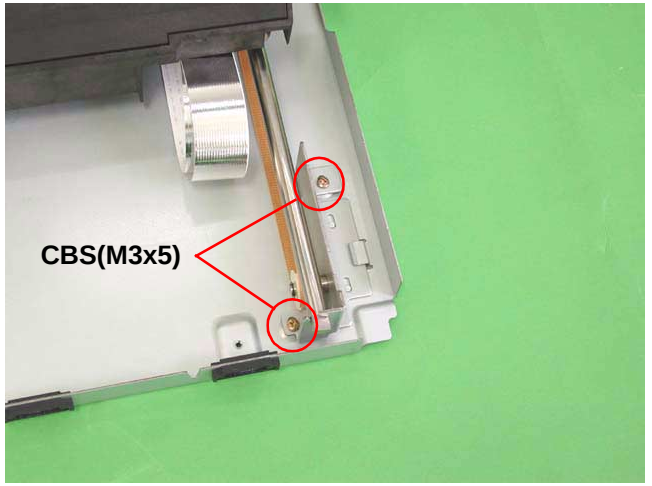


Figure 4-20. Driven Pulley Assembly Removal (1)

5. Remove the driven pulley assembly from the frame toward the arrowed direction.
6. Remove the carriage guide shaft from the driven pulley assembly, and then remove the carriage guide shaft from the carriage unit.

Figure 4-21. Driven Pulley Assembly Removal (2)

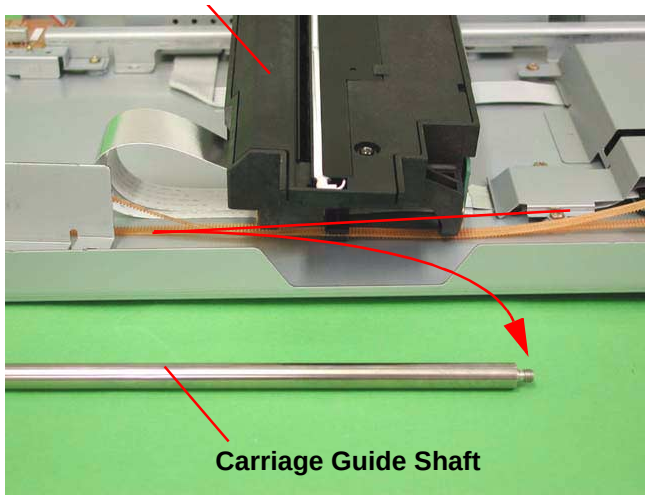


Figure 4-22. Carriage Guide Shaft Removal

7. Remove the timing belt from the carriage driven pulley and the CR motor unit.
8. Remove the timing belt from the carriage.

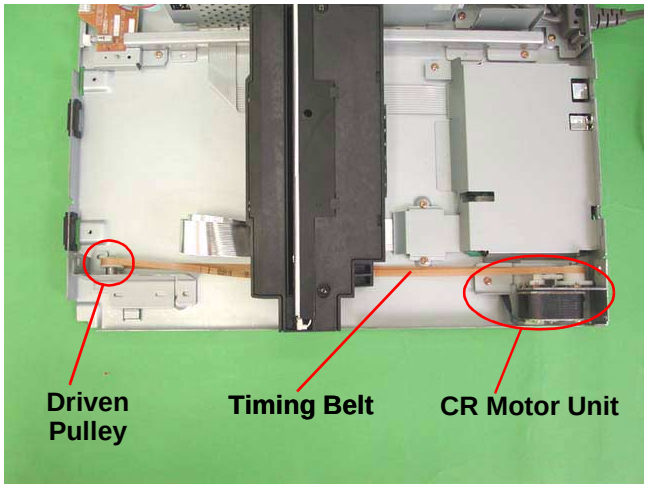


Figure 4-23. Timing Belt Removal (1)

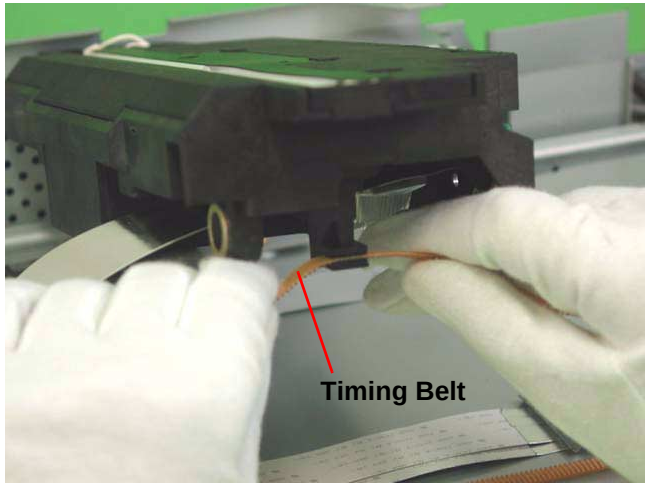


Figure 4-24. Timing Belt Removal (2)

9. Disconnect the two FFCs (white) from the rear of the carriage unit (connectors and fixing tabs), and then remove the carriage unit.

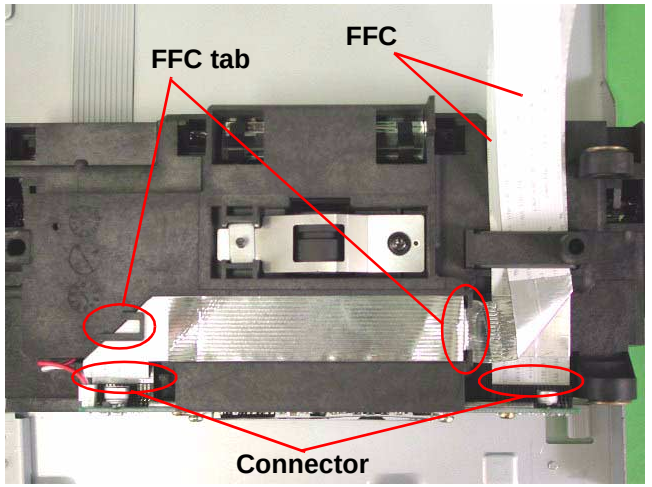


Figure 4-25. Carriage Unit Removal

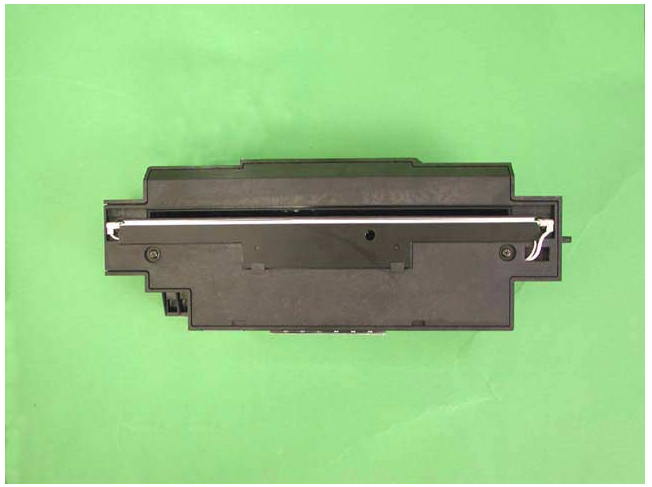


Figure 4-26. Carriage Unit

4.2.8 Carriage Motor Removal

1. Release the carriage lock. (See section 4.2.1)
2. Remove the upper cover. (See section 4.2.3)
3. Remove the carriage unit. (See section 4.2.6)
4. Remove 3 gold screws (CBS, M3x5)and 2 rear hooks, and remove the shield cover for the main board.
5. Remove 2 gold screws (CBS, M3x5) fixing the CR motor unit.
6. Remove CR motor unit cable from the connector of the main board, and remove the CR motor unit.

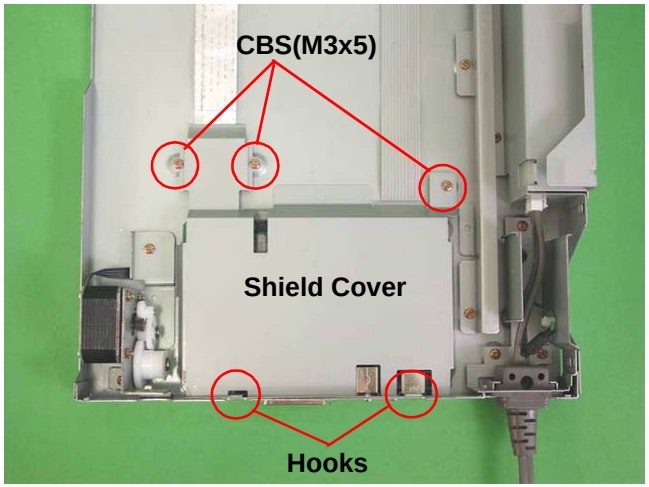


Figure 4-27. Removing the Shield for the Main Board

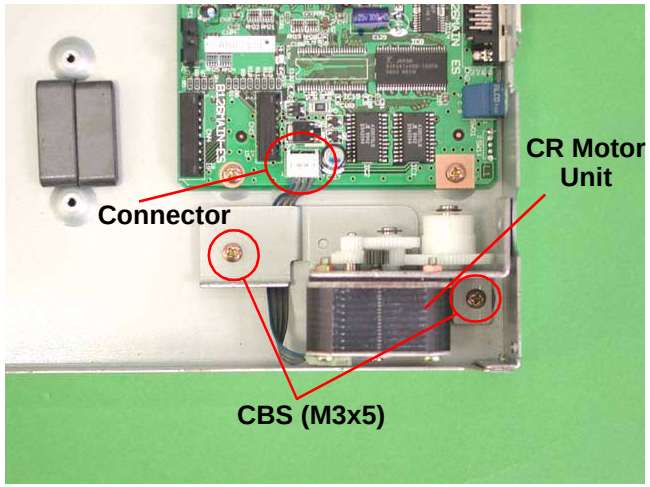


Figure 4-28. CR Motor Unit Removal

4.2.9 Sub Board Removal

1. Release the carriage lock. (See Section 4.2.1)
2. Remove the upper cover. (See Section 4.2.3)
3. Remove one gold screw (CBS, M3x6), and the shield cover for the panel board.

CAUTION

In the next steps, move the carriage back and forth slowly by hand, according to your necessity.

4. Disconnect the connector of the sub board from the power unit, then remove the sub board assembly.

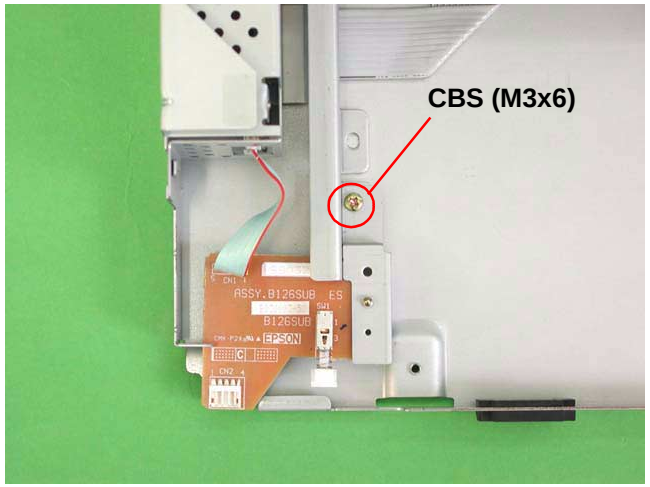


Figure 4-29. Sub Board Removal (1)

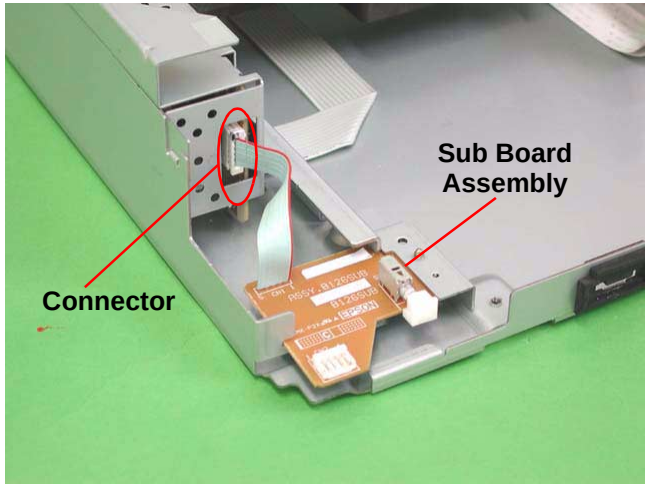


Figure 4-30. Sub Board Removal (2)

5. Remove one gold screw (CBS, M3x6), then remove the sub board.

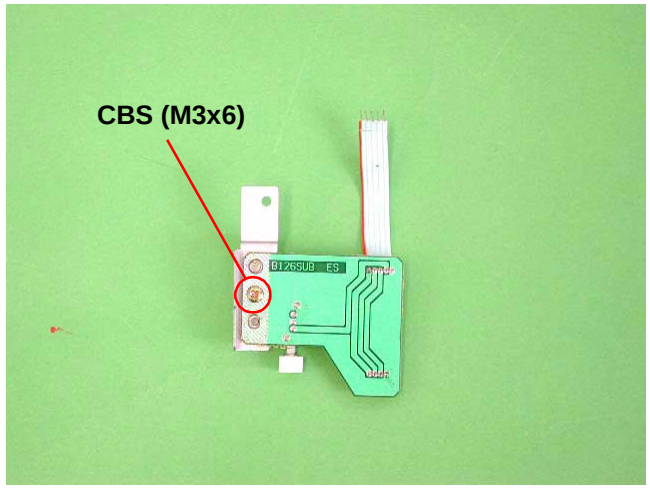


Figure 4-31. Sub Board Removal (3)

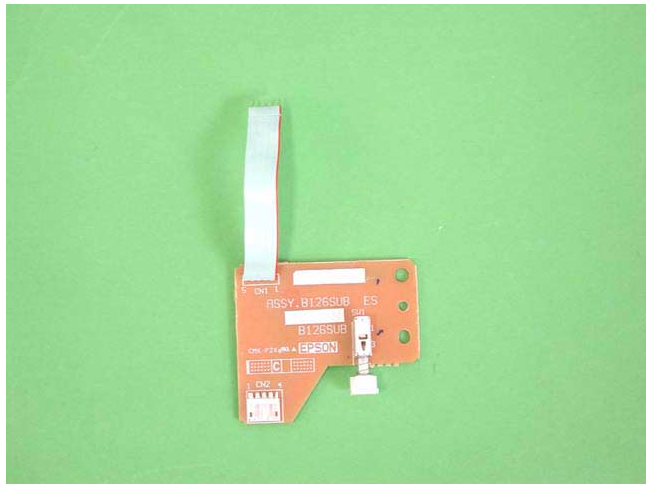


Figure 4-32. Sub Board

4.2.10 Power Supply Board Removal

1. Release the carriage lock. (See Section 4.2.1)
2. Remove the upper cover. (See Section 4.2.3)

CAUTION

In the next steps, move the carriage back and forth slowly by hand, according to your necessity.

3. Remove the cable of the sub board from the power supply board connector (See figure 4-30)
4. Remove AC cable connector (lock type;Pick and release) from the power supply board.

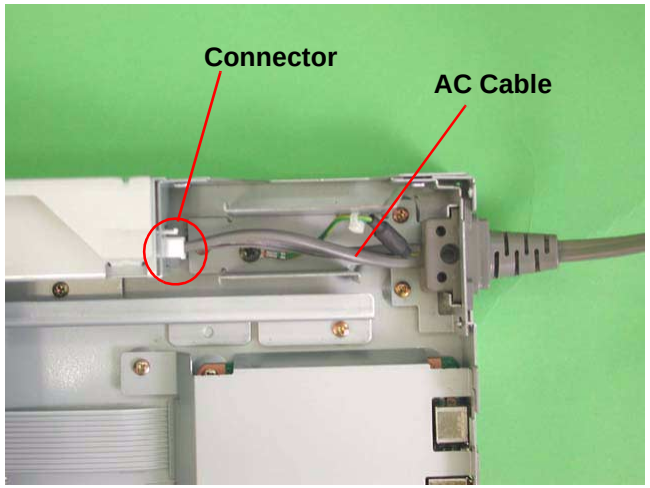


Figure 4-33. Power Supply Board Removal (1)

5. Remove 2 gold screws (CBS, 3x5) securing the shield board of the power supply board, and remove the shield board toward inside of the body.
6. Disconnect the connector (lock type; push and release) and remove 5 gold screws (CBS, 3x4) and power supply board from the shield board.

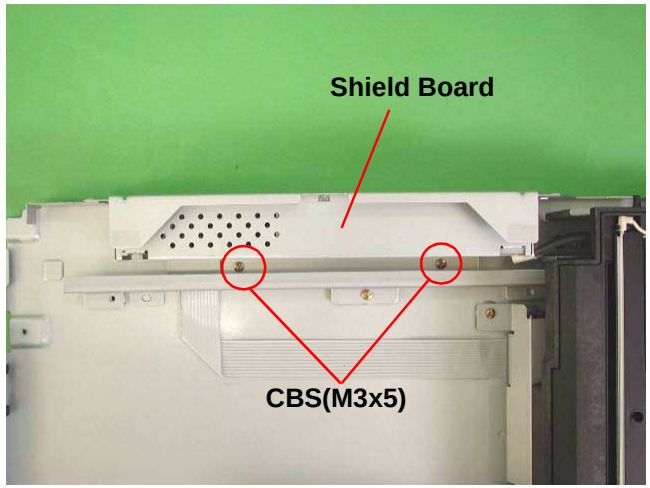


Figure 4-34. Power Supply Board Removal (2)

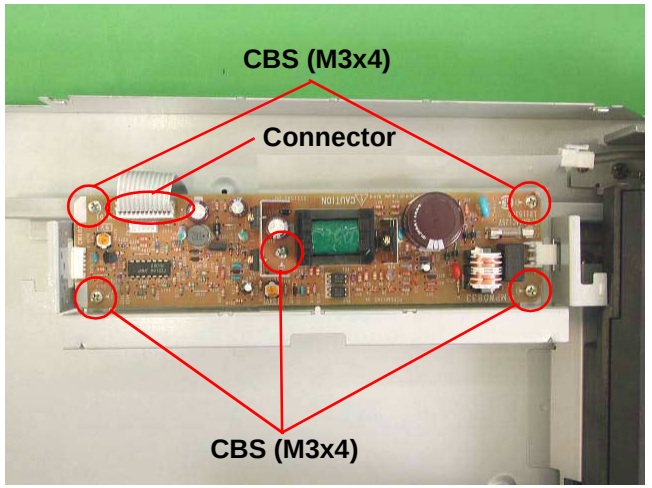


Figure 4-35. Power Supply Board Removal (3)

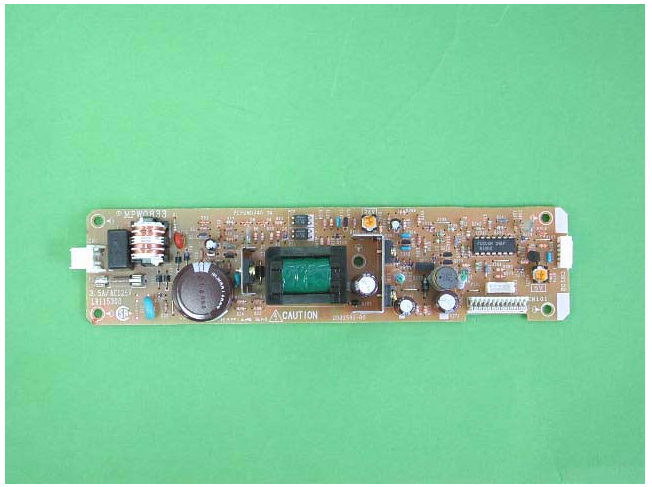


Figure 4-36. Power Supply Board

CHAPTER

5

ADJUSTMENT

This scanner needs no adjustment at the level of the service, including part replacement, specified in Chapter 4 “Disassembly and Assembly”.

CHAPTER

6

MAINTENANCE

6.1 Overview

This chapter provides information necessary to keep the scanner function in optimum condition constantly and to prevent troubles.

6.1.1 Cleaning

Perform cleaning when stain is noticeable. Stain on the document glass, particularly, has direct effect on the scanned image. Therefore, be sure to clean the glass well to remove stain thoroughly.

CAUTION

Never apply any organic solvent such as thiner and benzine, since there may damage deteriorate plastic and rubber parts.

- ☐ Outer Cases
  Wipe stain off with a clean cloth which is moisted with water and then squeezed tightly. To remove sever stain, use neutral detergent.
- ☐ Document Glass
  Remove dust and paper debris with a dry clean cloth. If stain is severe or foreign object is stuck, use a cloth absorbed with neutral detergent. If trace is left, wipe it off well with a dry, clean cloth again.

6.1.2 Lubrication

When the carriage unit needs to be replaced, or the operation sound of the carriage movement becomes noisy, it is necessary to apply lubrication. Following tables show the recommended grease type and lubrication points.

Table 6-1. Recommended Grease

Type	Name	Supply Quantity	Part No.	Specification
Grease	G-26	40g	B702600001	E*

NOTE: *"E" means exclusive product for EPSON. (Not available on the market)*

Table 6-2. Lubrication Points

Figure	Lubrication Points	Lubrication
6-1	Transmission Gear Shaft of the CR motor and Drive pulley shaft	G-26 (1x3mm)
6-1	Driven Pulley Shaft	G-26 (1x3mm)

CAUTION

Excessive lubrication may damage the mechanism part or cause the malfunction of the operation.

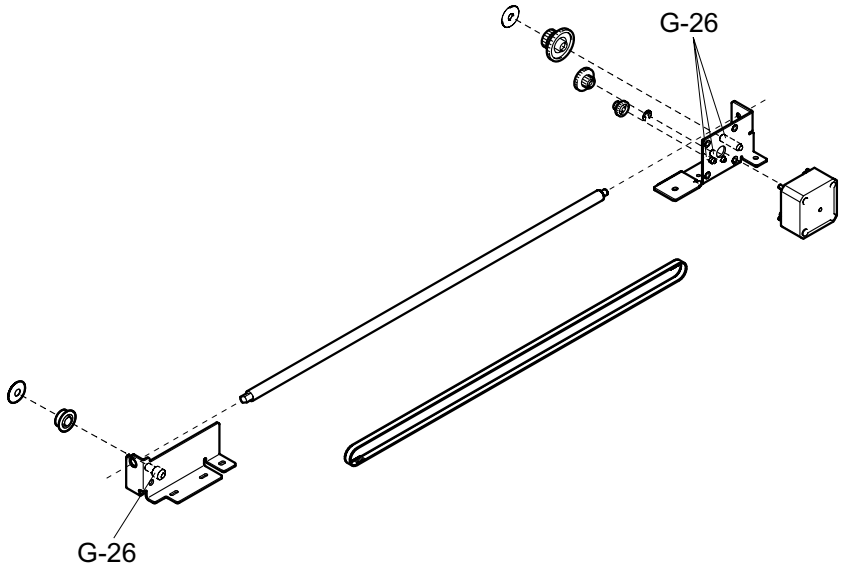


Figure 6-1. Lubrication Points

CHAPTER

7

APPENDIX

7.1 Overview

This section provides useful information for servicing this scanner.

7.1.1 Interconnection

Following figures show interconnection of the scanner.

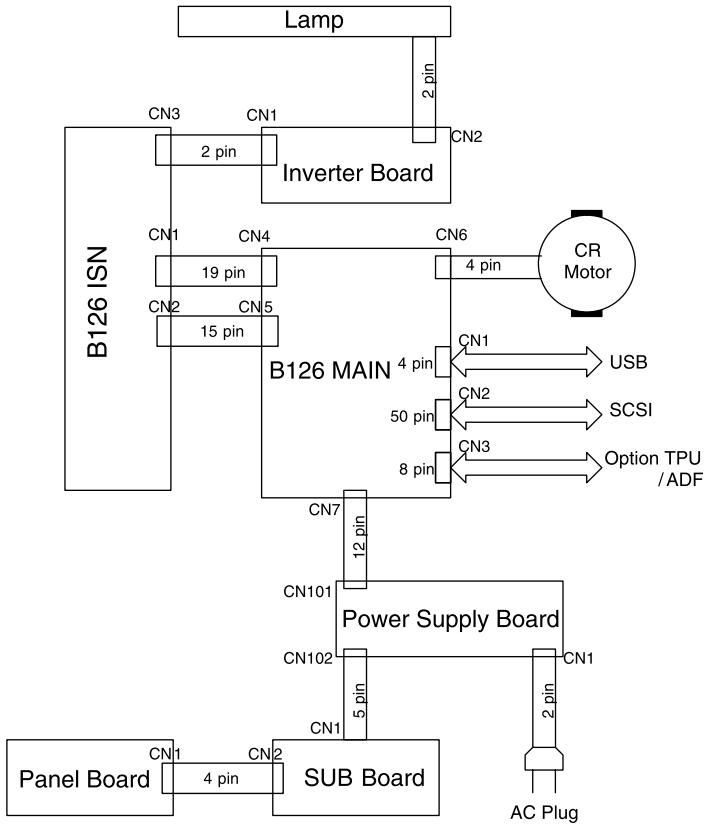


Figure 7-1. Interconnection

7.1.2 Connector Assignment

The table below shows the connections for each connector.

Table 7-1. Connector Summary

Board	Connector	Connected to	Pin No.	Tables to refer
Main Board (B126 Main)	CN1	USB connector	4	1-4
	CN2	SCSI connector	50	1-2
	CN3	To option	8	7-2
	CN4	CCD board	19	7-3
	CN5	CCD board	15	7-4
	CN6	CR motor	4	7-5
	CN7	Power supply board	12	7-6
Power supply board	CN1	AC input	2	7-7
	CN101	Main board	12	7-6
	CN102	Sub board	5	7-8
CCD board (B126 ISN)	CN1	Main board	19	7-3
	CN2	Main board	15	7-4
	CN3	Inverter board	2	7-9
Inverter board	CN1	CCD board	2	7-9
	CN2	Lamp	2	7-10
Sub board	CN1	Power supply board	5	7-8
	CN2	Panel board	4	7-11

7.1.3 Connector

Table 7-2. Main Board CN3

Pin No.	Signal	I/O
1	+5V	O
2, 5	GND	--
3	+24	O
4	L0D	O
6	RXD	I
7	TxD	O
8	SCK	O

Table 7-3. Main Board CN4

Pin No.	Signal	I/O
1	+5V	O
2	LCMP	O
3	ADCK	O
4,10,19	GND	--
5	SNCK4	O
6	SNCK3	O
7	LOAD	O
8	SD	O
9	SCK	O
11	D0	I
12	D1	I
13	D2	I
14	D3	I
15	D4	I
16	D5	I
17	D6	I
18	D7	I

Table 7-4. Main Board CN5

Pin No.	Signal	I/O
1	INV_GND	--
2	+24V	O
3,6	GND	--
4,5	+12V	O
7	SHB	O
8	SHG	O
9	SHR	O
10	SH	O
11	SNCK2	O
12	SNCK1B	O
13	SNCK1A	O
14	SNCK1C	O
15	CD_EN	O

Table 7-5. Main Board CN6

Pin No.	Signal	I/O
1	BX	O
2	AX	O
3	B	O
4	A	O

Table 7-6. Main Board CN7

Pin No.	Signal	I/O
1	OP-LED	O
2	ERR-LED	O
3	RP-SW	I
4, 5	+24V	I
6,7,11,12	GND	--
8, 9	+5V	I
10	+12V	I

Table 7-7. Power Supply Board CN1

Pin No.	Signal	I/O
1	AC (H)	I
2	AC (L)	I

Table 7-8. Power Supply Board CN102

Pin No.	Signal	I/O
1	GREEN	O
2	RED	O
3	Push-SW	I
4	PW-SW	I
5	GND	--

Table 7-9. CCD Board CN3

Pin No.	Signal	I/O
1	24V	O
2	GND	--

Table 7-10. Inverter Board CN2

Pin No.	Signal	I/O
1	LAMP	O
2	LAMP	O

Table 7-11. Sub Board CN2

Pin No.	Signal	I/O
1	GREEN	I
2	RED	I
3	Push-SW	O
4	GND	--

7.2 Circuit Diagram

The figure on the next page shows the circuit diagram of B126 MAIN.

- ☐ B126 MAIN BOARD

7.3 Parts List & Exploded Diagram

Table 7-12. Parts List

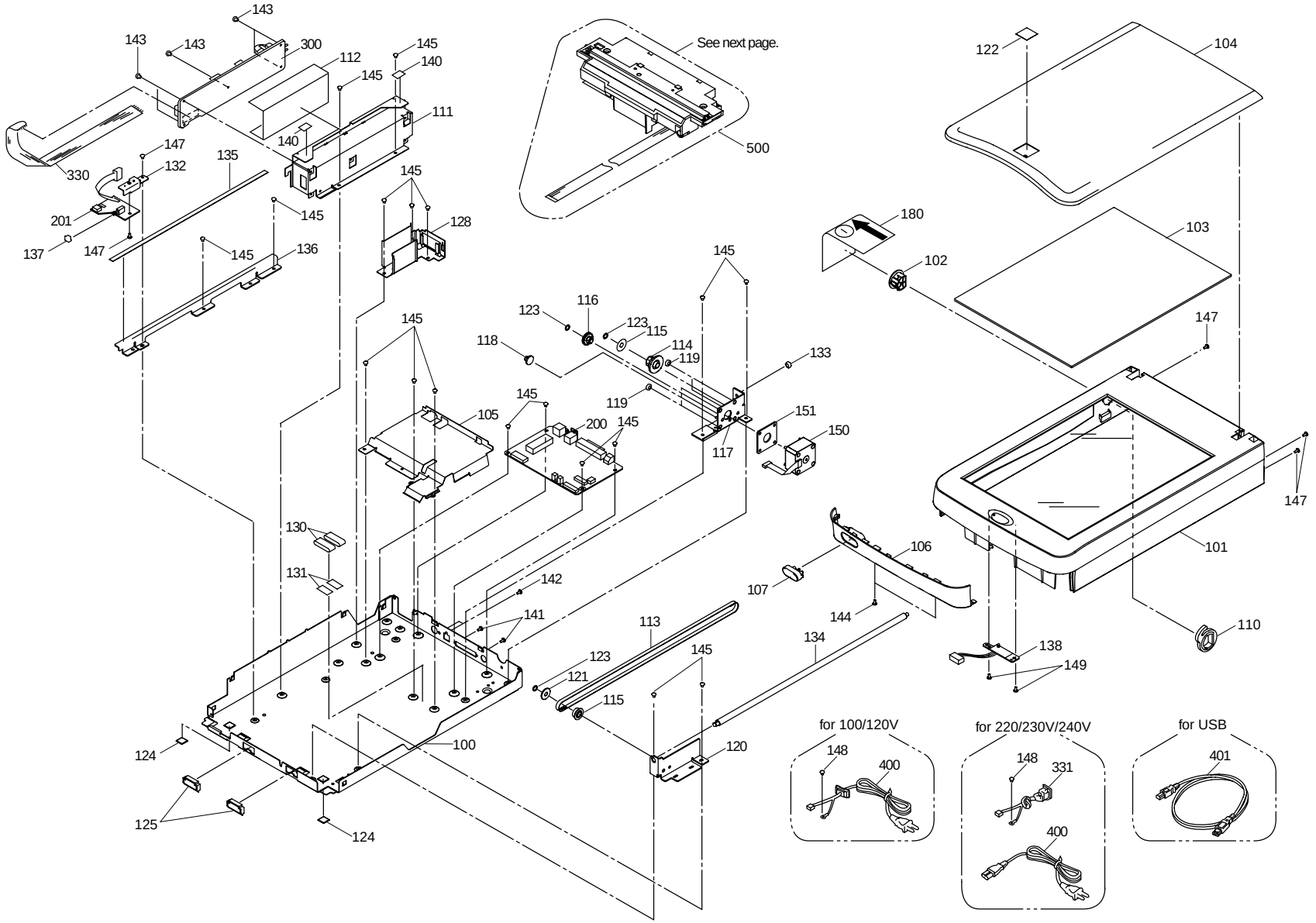
Diagram Number	Parts Name
100	FRAME,BASE
101	HOUSING,ASSY.,UPPER;ASP
102	KNOB,MOUNT,CARRIAGE;B
103	MAT,COVER,DOCUMENT
104	COVER,DOCUMENT
105	COVER,MAIN BOARD
106	HOUSING,FRONT
107	KEYTOP,POWER SWITCH
110	LEVER,MOUNT,CARRIAGE
111	COVER,PS BOARD
112	SHEET,P/S BOARD
113	TIMING BELT
114	PULLEY,DRIVE
115	FLANGE,PULLEY
116	PULLEY,IDLE,A
117	HOLDER SUB ASSY.,PULLEY DRIVE
118	PULLEY,IDLE,B
119	6N,3,F/ZN
120	HOLDER SUB ASSY.,PULLEY DRIVEN
121	PULLEY,DRIVEN
122	LOGO PLATE 27.5X27.5
123	PLANE WASHER,4.5X0.5X8,L/NA
124	FOOT

Table 7-12. Parts List (continued)

Diagram Number	Parts Name
125	BUSHING,HOUSING
128	COVER,INLET
130	FERRITE CORE
131	DOUBLE SIDE TAPE,22X10
132	HOLDER,SWITCH BOARD
133	6N,5,F/ZN
134	SHAFT,CR
135	SHEET,SLIDE
136	RAIL,CR
137	SUPPORT,P-SW
138	BOARD ASSY.,PANEL
140	SHEET,COVER,P/S BOARD
141	C.P. SCREW
142	C.P.SCREW
143	C.B.S. SCREW
144	C.C.S. SCREW
145	C.B.S-TITE R.SCREW,3X5,F/ZN
147	C.B.S-TITE R.SCREW,3X6,F/ZN
148	C.B.(O) SCREW,4X4,F/ZG
149	C.B.P-TITE SCREW,3X8,F/ZN
150	MOTOR,CR
151	DAMPER,MOTER
180	LABEL,CARRIAGE LOCK
200	BOARD ASSY., MAIN
201	BOARD ASSY.,SUB

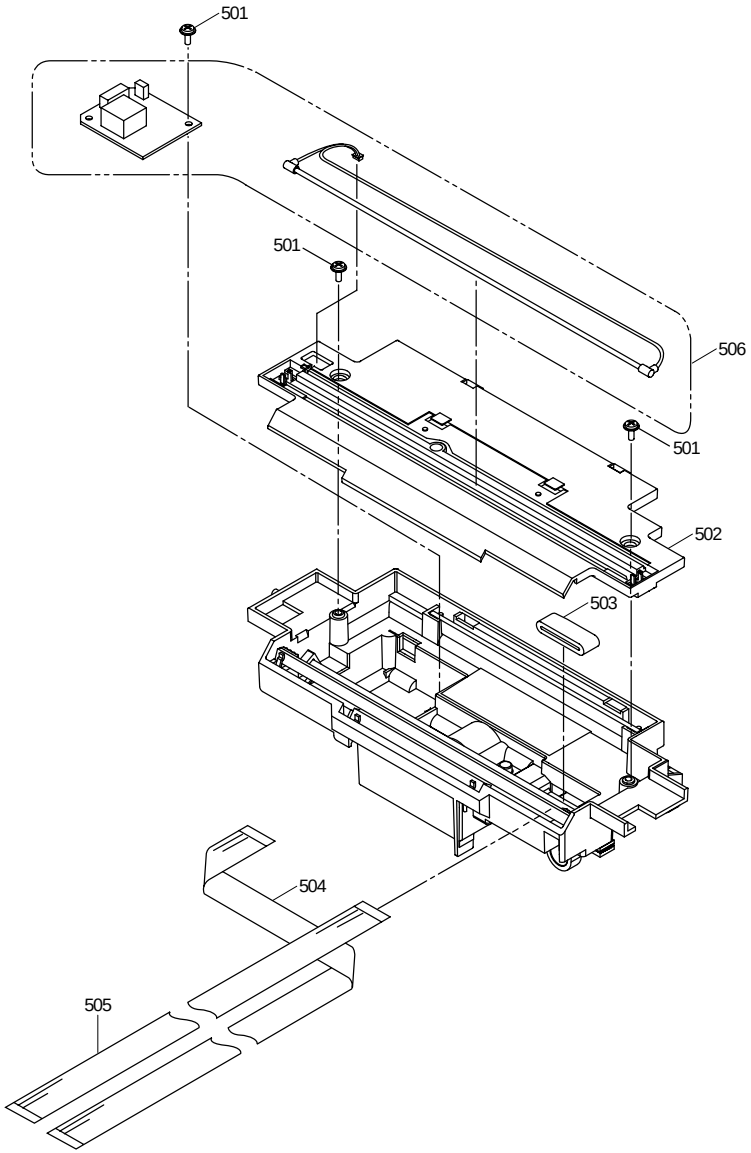
Table 7-12. Parts List (continued)

Diagram Number	Parts Name
300	BOARD ASSY.,POWER SUPPLY
330	HARNESS
400	POWER CABLE ASSY.
401	I/F CABLE
500	CARRIAGE,ASSY.
501	C.C.P-TITE,3X8,F/ZB
502	COVER,CARRIAGE
503	FERRITE CORE
504	HARNESS,FFC(A)
505	HARNESS,FFC(B)
506	LAMP SET,ASP



GT-8700/GT-8700F/Perfection 1640SU/Photo/Office No.01 Rev.01 10237

Figure 7-2. Exploded Diagram No. 1



GT-8700/GT-8700F/ Perfection 1640SU/Photo/Office No.02 Rev.01 10237

Figure 7-3. Exploded Diagram No. 2

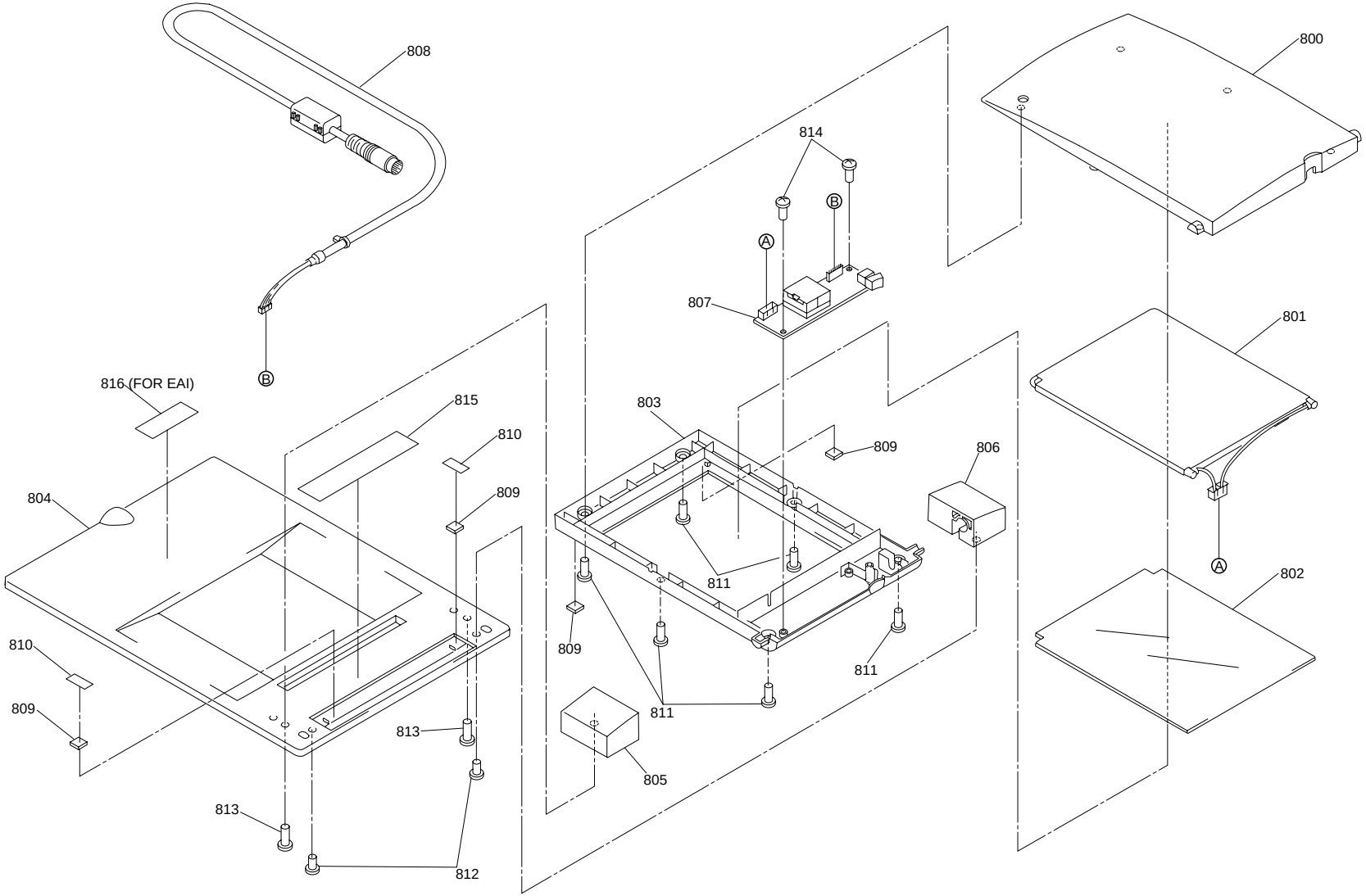
7.4 TPU; Parts List

Table below shows the parts list of TPU (Transparency Unit).

Table 7-13. TPU Parts List

Number	Parts Name
800	Housing Assembly, Upper
801	Back Light Assembly
802	Cover, Illumination
803	Housing, Lower
804	Housing, Base
805	Housing, Fasten, R
806	Housing, Fasten, L
807	Board Assembly, Inverter
808	Harness
809	Foot
810	Sheet, Spacer
811	+, Binding B-tite 3X10 F/NI
812	+, Binding B-tite 4X8 F/ZN
813	+, Binding B-tite Screw
814	+, Binding P-tite Screw
815	Label, Caution TPU
816	Label, UL;B

7.5 Exploded Diagram for TPU



GT-8700F/ Perfection 1640SU PHOTO FILM ADAPTER No.04 Rev.01 10237

Figure 7-4. Exploded Diagram for TPU

7.6 Optional Part; ADF

7.6.1 General Description

- Features
  - Compact and Light weight (319(W) x 508(D) x 137(H) mm), Approx. 2.2Kg
  - Capacity of paper setting is up to 30 pieces.
  - Scanning speed is 5.5 PPM (at A4, Line art, 300 dpi, and Draft mode)
  - Using a transparency film to scanning area. User can change the transparency film. (10 k-pieces of paper are readable by one transparency film)
- Connectivity
  This automatic document feeder (ADF) can be used with models which are compatible with the previous GT70ADF as well as with the R4C5950 (Perfection 1640SU).

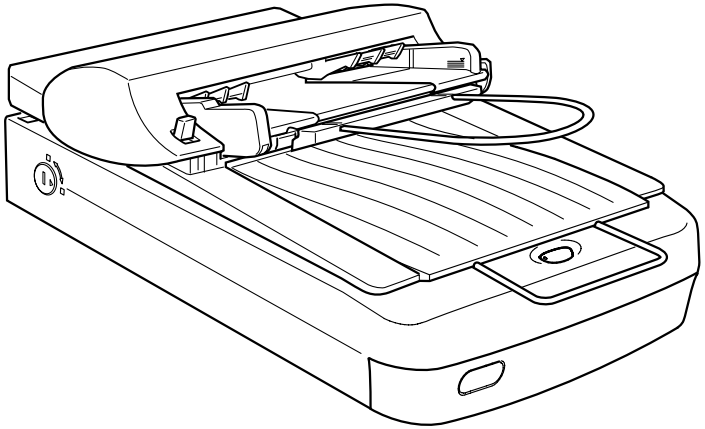


Figure 7-5. Scanner with ADF

7.6.2 Specification

7.6.2.1 General Specification

Product type:	Sheet through
Paper supply:	Face up load
Paper out:	Face down eject
Separate paper way:	Friction by roller
Paper setting quantities:	30 pcs (at 55g/m^2 paper, Maximum total thickness is less than 6mm)
Original point:	Opposite side against Scanner original point
Scanning area:	Scanning through a Transparency sheet
Document setting position:	Set the left side of Document to the left side of ADF's paper setting and support the right side of Document by ADF's paper guide.

7.6.2.2 Efficiency

Noise:	54dB or lower, No unpleasant and abnormal noise
Miss feed ratio:	1% or lower
Jam ratio:	1% or lower (0.1% or lower, at XEROX-Paper and room temperature)
Pile up feed ratio:	1% or lower
Skew:	Less than $\pm$ 0.5°C
Original point accuracy:	0 $\pm$ 3mm, from Document left edge and Document top edge
Feeding pitch accuracy:	Less than $\pm$1%
Color deviation:	Less than 1 dot (at 600dpi) Less than 2 dot (the document area of top and bottom 5cm)

7.6.2.3 Document

- Applied color: Color and Monochrome
- Paper quality: High quality paper, Bond paper, Check paper, (Recycled paper)
- Paper thickness: Thickness: 0.07- 0.16mm
  Ream Weight: 50 - 105 Kg/m^2
- Paper size: Minimum width:85mm
  Maximum width:216mm
  Minimum length:127mm
  Maximum length:356mm
- No match paper: Transparency paper, Coating paper, Cutting paper, Label sheet (with past), OHP film, Carbon paper, Japanese paper, Catalog paper.
  The document with staples or other objects.
  The document with holes or ripped.
  The document which has curled and folded.

7.6.2.4 Electrical Specification

- Rated input Voltage: DC 24V ±10%
  DC 5V ±5%
- Rated input Current: 24V:0.8A
  5V :0.2A

7.6.2.5 Environmental Conditions

- Temperature: Operating 10 ~ 32 °C
  Storage -20 ~ 60 °C
- Humidity: Operating 20 ~ 80%, no condensation
  Storage 20 ~ 85%, no condensation

7.6.2.6 Reliability

- Load/Eject: MCBF 20000 sheets (Transparency film: MCBF 10000 sheets)
  MCBF 12000 cycle

7.6.2.7 Operating Conditions

- Dust: Ordinary office or home conditions, Extreme dust should be avoided.
- Illumination: Operation under direct sunlight or near strong light source is not guaranteed and should be avoided.

7.6.2.8 Safety, EMC, EPA

- Safety: UL1950 (UL)
  CSA C22.2 NO.950 (CSA)
  EN60950 (VDE)
  IEC950 (ROSTEST, PSB)
- EMC: FCC Part 15 Subpart B Class B
  CSA C108.8 Class B
  AS/NZS3548 Class B
  CISPR Pub22 Class B
  CNS13438 Class B
- CE Marking:
  - Low Voltage Directive 73/23/EEC: EN60950
  - EMC Directive 89/336/EEC: EN55022 Class B, EN 50082-1, IEC 801-2, IEC 801-3, IEC 801-4
  - EPA: Energy Star Program

7.6.2.9 Resistance to Electric Noise

- Static electricity: Casing 10kV
  Metal 7kV/150pF, 150 Ohms

7.6.2.10 Physical Dimensions and Weight

- ☐ Dimensions: 319(W) x 508(D) x 137(H) mm
- ☐ Weight: Approx. 2.2Kg

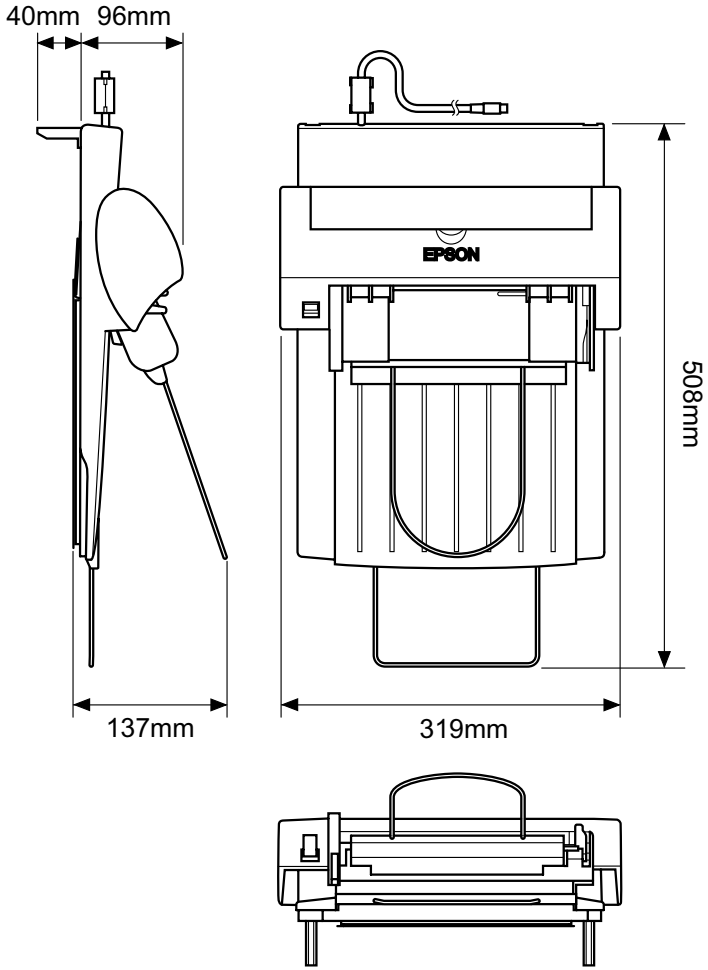
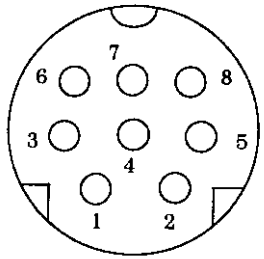


Figure 7-6. ADF Size

7.6.3 Interface

- ☐ Connector shape: 8 pin DIN connector (Male)



IF

Figure 7-7. Connector Shape

- ☐ Pin Assignment

Table 7-14. Pin Assignment

Pin No.	Signal	I/O	Description
1	+5V	PWR	
2	GND	PWR	
3	+24V	PWR	
4	LOD	IN	Serial data latch
5	GND	PWR	
6	SO	OUT	Serial out data
7	SI	IN	Serial in data
8	SCK	IN	Serial clock

7.7 ADF: Disassembly

Here explains disassembly procedures of ADF. Unless otherwise specified, disassembled units or parts can be reassembled by reversing the disassembly procedure.

7.7.1 B81314 Main Board Removal

1. Remove the tray.
2. Flip over the ADF so that you can see the bottom of the ADF. Remove 2 screws (silver, P-tite, M3x6) securing the cover of the bottom of the main board.

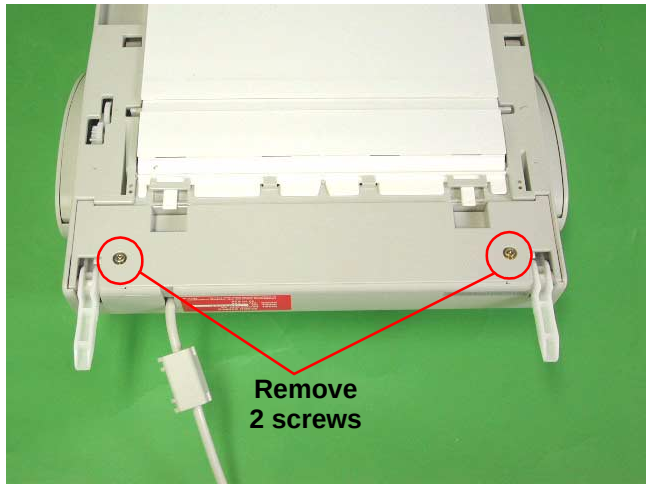


Figure 7-8. 2 screws on the back of ADF

3. Disconnect 5 cables from B81314 Main board and remove 5 screws (gold, P-tite).
4. Remove B81314 main board.

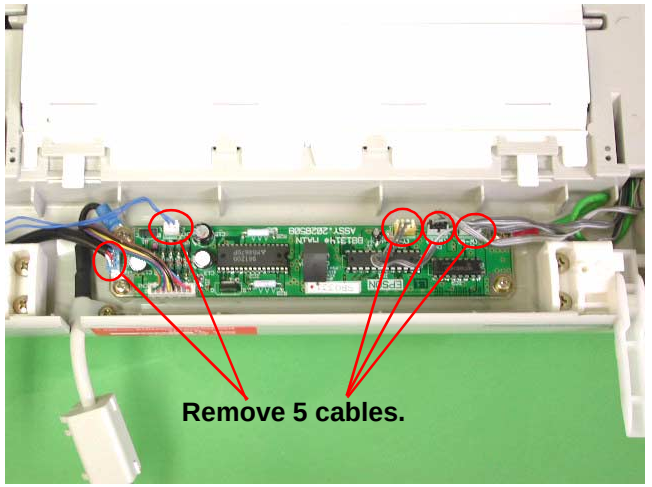


Figure 7-9. Removing the B81314 Board (1)

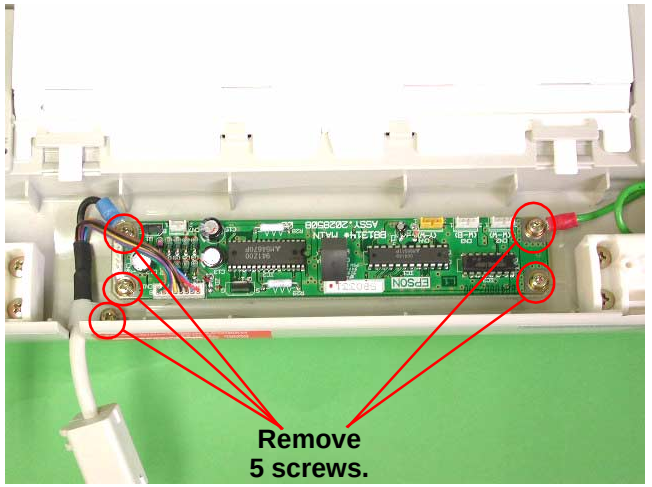


Figure 7-10. Removing B81314 Board (2)

7.7.2 ASF Part

1. Remove 6 cables from the B81314 Main Board.
2. Open the cover and remove a guide bar. Also, disengage right and left connections of the interior paper guide and remove the cover from the case shaft.

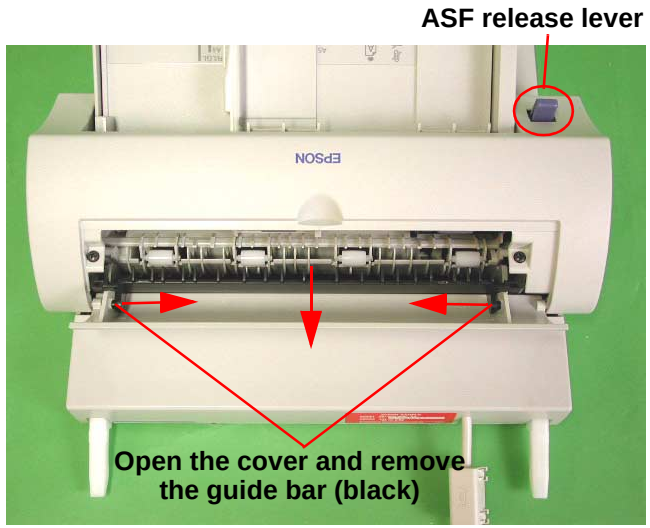


Figure 7-11. Guide Removal

3. Open the ASF release lever.
4. Remove 2 screws (gold, P tite) and 2 metal parts.

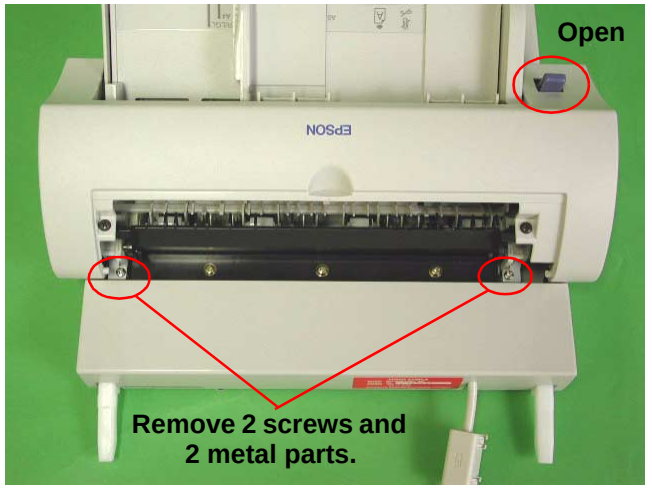


Figure 7-12. Removing Screws and Metal Parts

7.7.2.1 Disassembly of ASF Part

1. In order to remove the cover, remove 2 screws (black, CB + washer) located on the right and left edges of the front cover. Flip over and remove 2 screws (gold, P-tite+ washer) from the bottom, then remove the cover.

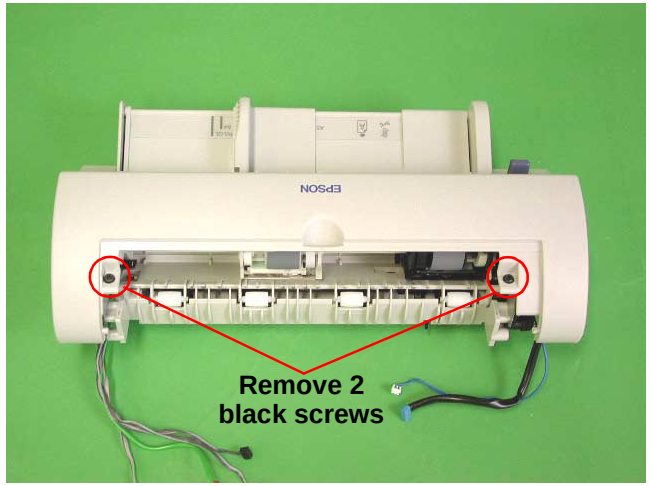


Figure 7-13. Removing Screws (1)

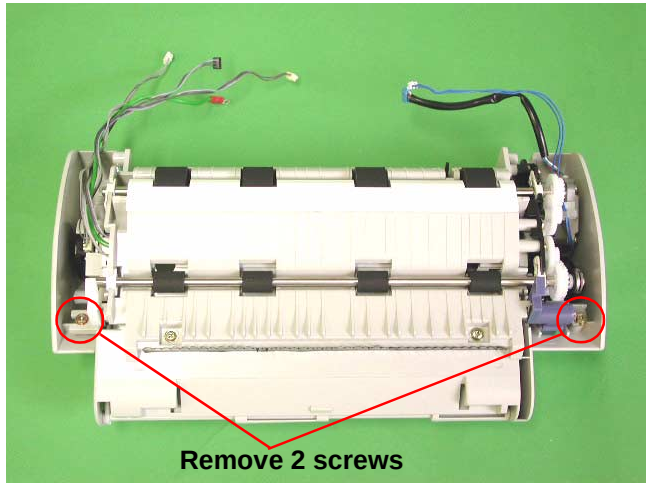


Figure 7-14. Removing screws (2)

2. Remove 4 screws (gold, P-tite + washer), and remove Motor/ Solenoid Assembly.

CAUTION

Since one of the screws is used as a stopper at the slide gear part, be careful when removing the screw because all gears will jump out.**
(See figure7-16 on the next page)

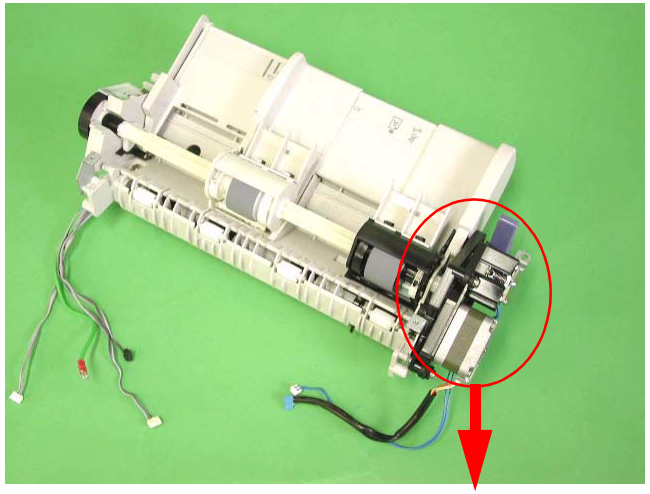


Figure 7-15. Removing Motor/Solenoid Assembly

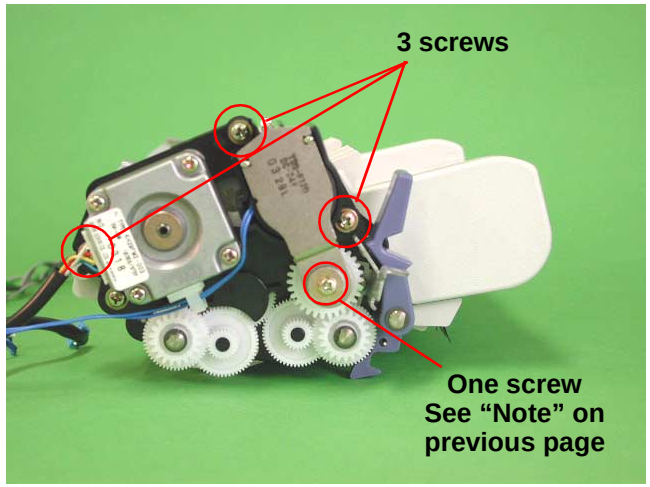


Figure 7-16. Motor/Solenoid Assembly Removal

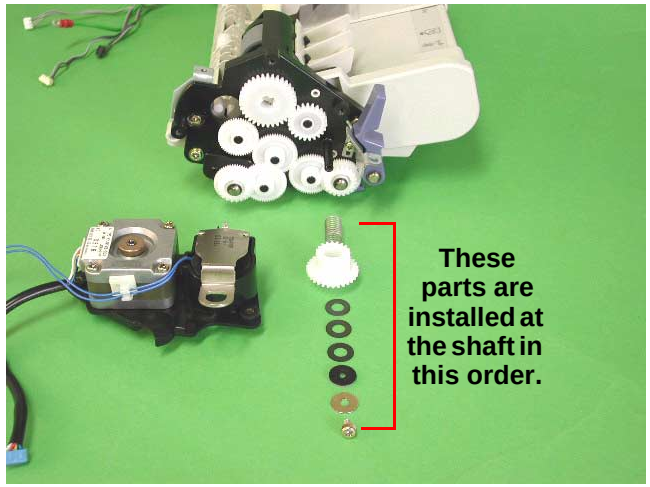


Figure 7-17. Inside Parts

7.7.2.2 Gear Frame

1. Release the lock of 2 shaft supports (white plastic parts) and remove 2 screws.

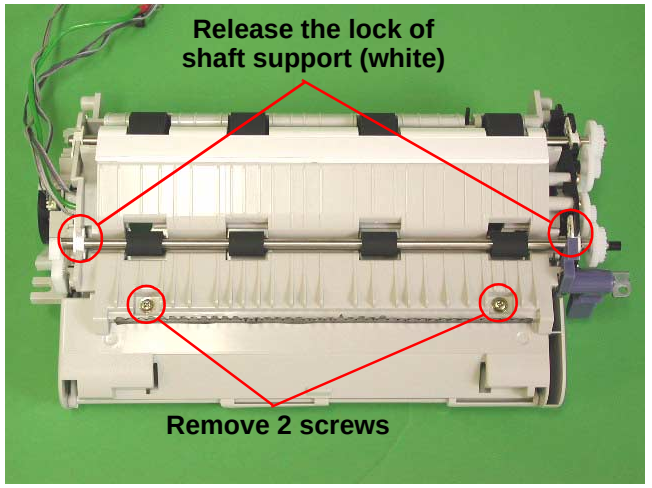


Figure 7-18. Roller Removal (1)

2. Remove the roller shaft (front).

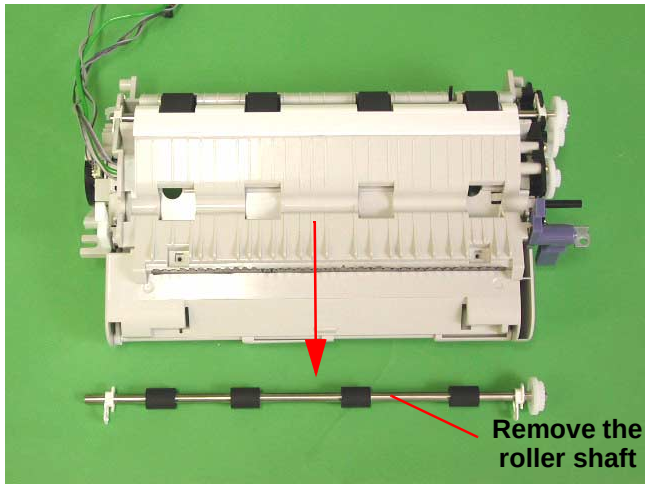


Figure 7-19. Roller Removal (2)

3. Insert (-) driver into the gap shown in the figure below, and remove the white standard board by pushing it to the arrowed direction.

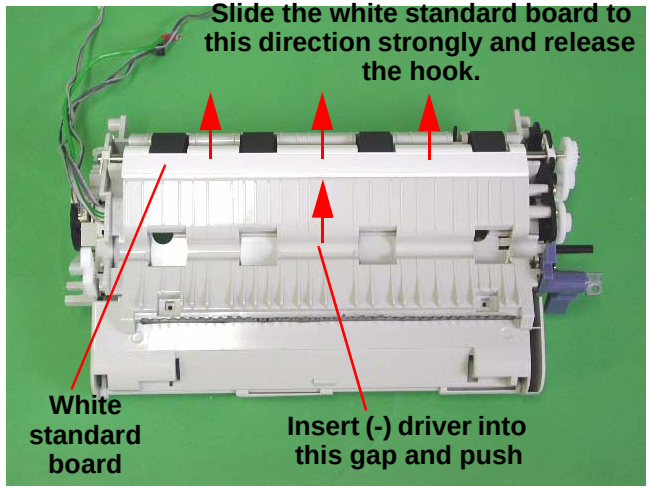


Figure 7-20. Removing the white standard board (1)

4. Release the lock of the shaft supports at right and left and remove the roller shaft (rear).

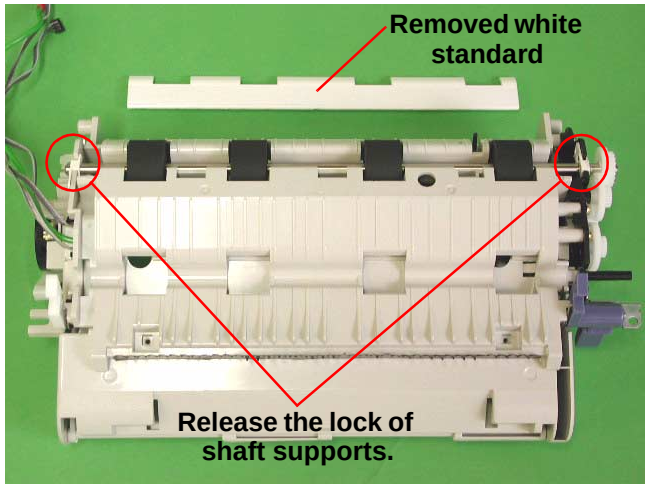


Figure 7-21. Removing the white standard board (2)

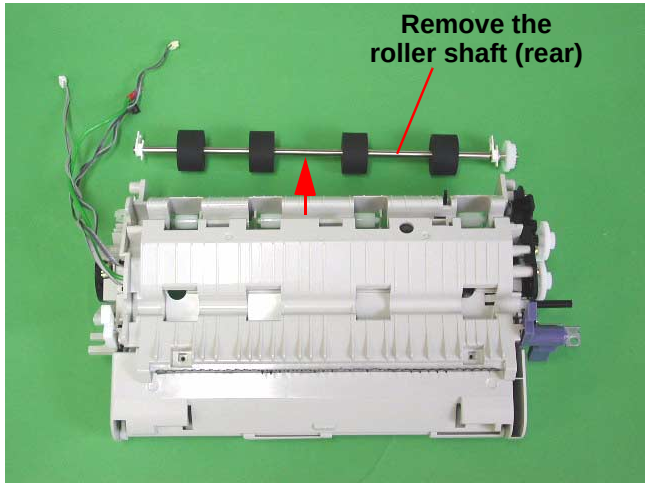


Figure 7-22. Roller Removal

5. Remove one metal part and 3 screws. (When you remove one of the screws, push the release lever to the arrowed direction.

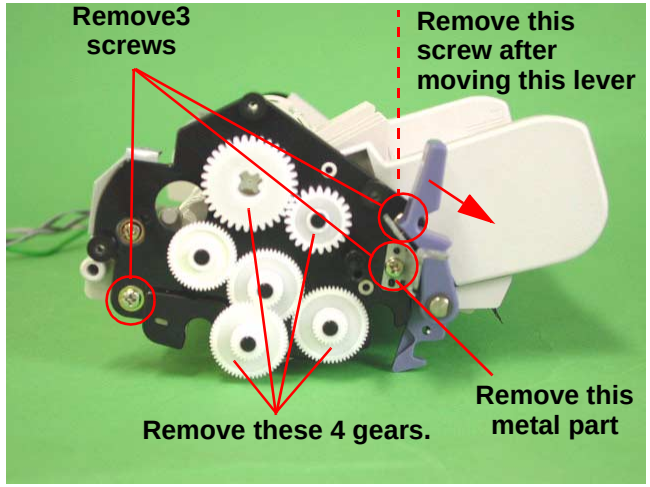


Figure 7-23. Removing gears

6. Remove 4 gears. One of the gear is fixing the hook to the PF roller shaft.
7. Remove 2 screws (gold, P-tite). After removing screws, remove the black plastic frame.

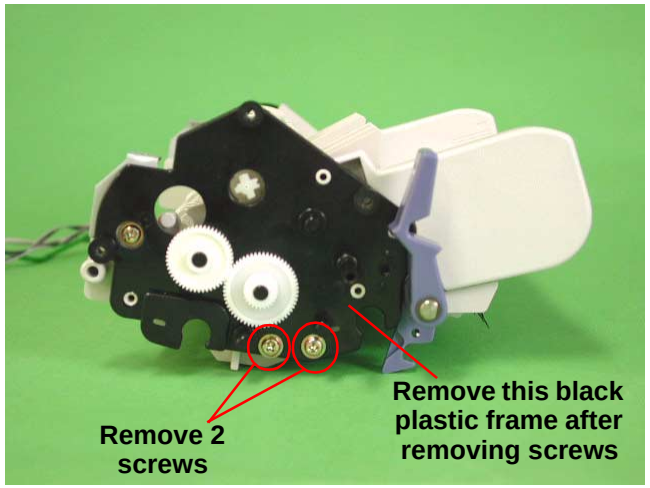


Figure 7-24. Removing the plastic frame

7.7.3 Disassembling the ASF and Frame

1. After moving the paper edge guide in the direction of the arrow, remove the screw (silver, P-tite + washer). Remove the two screws shown in Figure 7-18 now if they have not yet been removed.
2. Separate ASF Assembly and frame part.

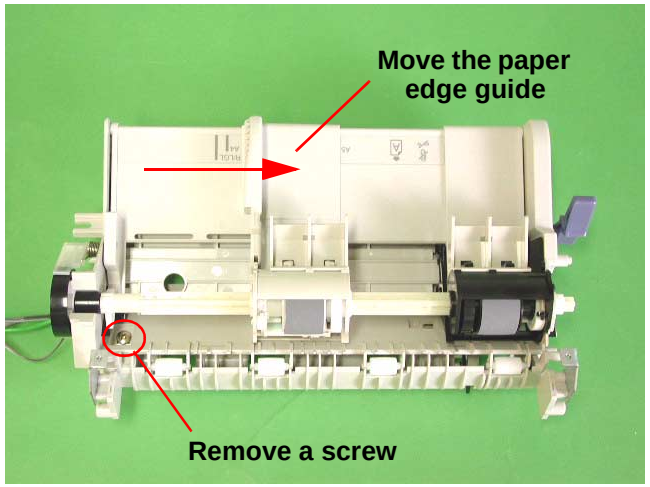


Figure 7-25. Disassembly of ASF and Frame (1)

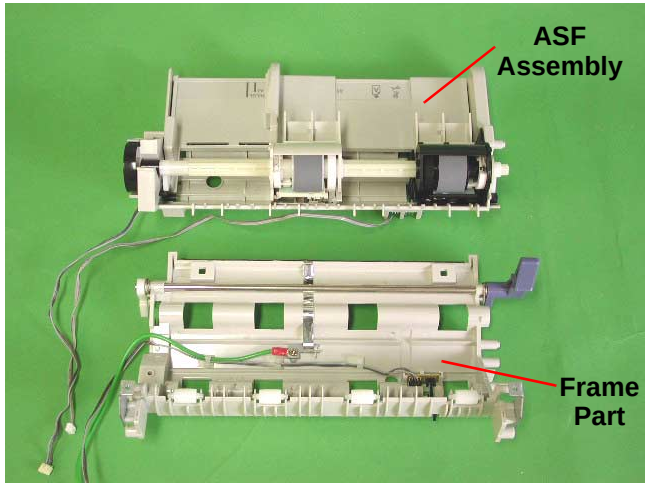


Figure 7-26. Disassembly of ASF and Frame (2)

3. Remove the actuator and PE board assembly.

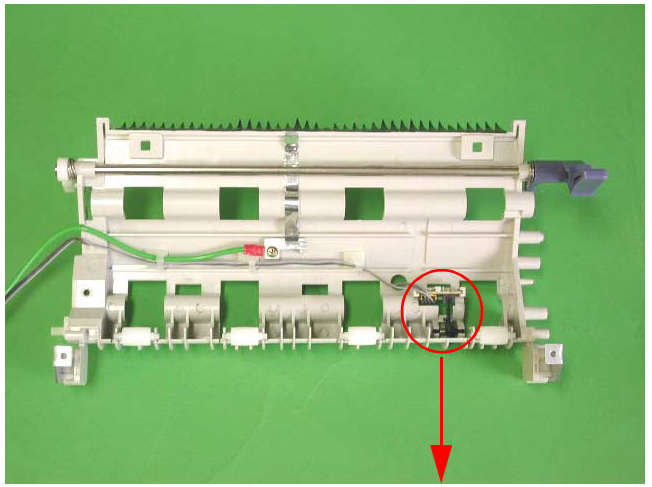


Figure 7-27. Removing Actuator and PE Board Assembly (1)

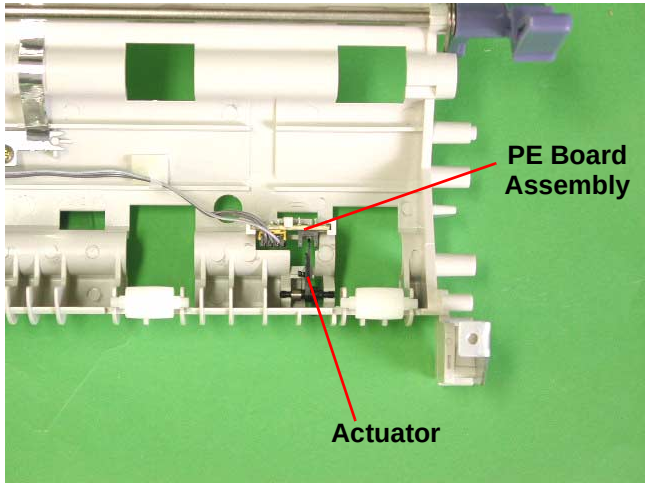


Figure 7-28. Removing Actuator and PE Board Assembly (2)

7.8 Parts List of ADF

Table 7-15. ADF Parts List

Number	Name
101	MAT
102	DOUBLE SIDE TAPE,215X5
108	COVER,LOWER
109	LEVER,OPEN
110	SHEET,INSULATUIIN
111	FRAME,BASE
112	HOLDER,HINGE,R
113	GUIDE,HINGE
114	HOLDER,HINGE,L
115	METAL FITTINGS,RELEASE
116	MOUNTING PLATE,PAPER GUIDE
117	SHEET GUIDE;C
118	SHEET GUIDE,ADAPTER
119	ROLLER,DRIVEN,EJ
120	ROLLER,EJ,SUPPORT
121	SHAFT,ROLLER,EJ
122	COMPRESSION SPRING,3.91
123	ROLLER,DRIVEN,PF
124	SHAFT,ROLLER,PF
125	PRESSING PLATE,PF
126	PAPER GUIDE,PF
127	PAPER GUIDE,LD
128	COVER,TOP
129	HARNESS,ASF
130	CLAMP,CABLE,3
131	HARNESS
132	C.B.P(P1),3X8,F/ZN
133	C.B.P-TITE(P2)SCREW,3X10,F/ZN
134	C.B.P.SCREW,4X12,F/ZN

Table 7-15. ADF Parts List

Number	Name
135	C.B.P-TITE,3X10,F/NI
136	BOARD ASSY.,MAIN
137	SHEET ADAPTER ASSY
138	WIRE,STOPPER
139	SHEET GUIDE;B
140	GROUNDING PLATE
141	ANTI-STATIC BRUSH;B
142	EARTH WIRE,A
201	FRAME,ASF
202	HOPPER
203	EDGEGUIDE
204	CORK
205	LABEL,EDGEGUIDE
206	LEVER,FASTEN,EDGEGUIDE;B
207	EXTENSION SPRING,0.088
208	LEVER,PE,FRONT
209	LEVER,HOPPER,RELEASE
210	DETECTOR,HP;C
211	SLIDER,EDGEGUIDE
212	PAD,BREAK,EDGE GUIDE
213	COMPRESSION SPRING,3.23
214	TORSION SPRING,41.2
215	LEVER,BRAKE
216	PAD,BREAK
217	HARNESS,HP
218	CIRCUIT ASSY,PE
219	HARNESS,PE,FRONT
220	C.B.P.SCREW,4X12,F/ZN
221	C.B.P-TITE(P2)SCREW,3X10,F/ZN
301	FRAME,GEAR
302	FRAME,MOTOR
303	MOTOR ASSY.,ADF

Table 7-15. ADF Parts List

Number	Name
304	SOLENOID ASSY.
305	DAMPER,CR
306	SPACER,SOLENOID
307	FLANGE
308	COMBINATION GEAR,15.2,24
309	U-TYPE SPRING WASHER,5.2X0.4X10,S/NA
310	COMPRESSION SPRING,0.39
311	COMBINATION GEAR,17.6,22
312	COMBINATION GEAR,9.6,22.8
313	SUPR GEAR,18.4
314	SPUR GEAR,27.2
315	SUPR GEAR,20
316	SPACER,3X6.5,ZMC
317	CLIP
318	MOUNTING PLATE,FRONT
320	C.B.P-TITE(P2)SCREW,3X10,F/ZN
321	C.B.P.SCREW,4X12,F/ZN
322	C.B.P(P1),3X8,F/ZN
323	C.B.(P2)SCREW,3X5,F/ZN
324	C.B.B(P2),2.9X12,F/ZN
325	PLANE WASHER,4.5X0.5X8,L/NA
326	C.B.(P2)SCREW,3X8,F/ZN
327	PLAIN WASHER
401	BASE,WHITE
402	SHEET,WHITE
403	SHAFT,RELEASE
404	ANTI-STATIC BRUSH;C
405	PAPER GUIDE,MAIN
406	HOUSING
407	LEVER,PE,REAR
408	TORSION SPRING,0.22
409	ROLLER,GUIDE

Table 7-15. ADF Parts List

Number	Name
410	CIRCUIT ASSY,PE
411	MOUNTING PLATE,REAR,L
412	CLIP
413	MOUNTING PLATE,REAR,R
414	ROLLER ASSY.,PF;B
415	ROLLER ASSY.,EJ
416	BUSHING,6
417	LEVER,RELEASE
418	TORSION SPRING,125.17,L
419	TORSION SPRING,125.17,R
420	LEVER,RELEASE;B
421	PLANE WASHER,4.5X0.5X8,L/NA
422	C.B.S.(P2),3X6,F/ZB
423	C.B.P-TITE(P2)SCREW,3X10,F/ZN
424	RETAINING RING
425	ALUMINUM FOIL TAPE,80X7
426	EARTH WIRE,B
427	MOUNTING PLATE,PAPER GUIDE
428	C.B.P-TITE SCREW,3X6,F/ZN
501	SHAFT,ROLLER,LD
502	PAPER LOADING ASSY.,LEFT
503	PAPER LOADING ASSY.,RIGHT
504	ROLLER,ASSY.,LD,LEFT
505	ROLLER,ASSY.,LD,RIGHT
506	COVER,ROLLER,LD,LEFT
507	COVER,ROLLER,LD,RIGHT
508	COMPRESSION SPRING,1.66
509	HOLDER,SHEET,PAPER FEED
510	SHEET,PF
511	BUSHING,FASTEN,SHAFT,LEFT
512	LEVER,HOPPER,RELEASE
513	WHEEL,DETECT

7.9 ADF Exploded Diagram

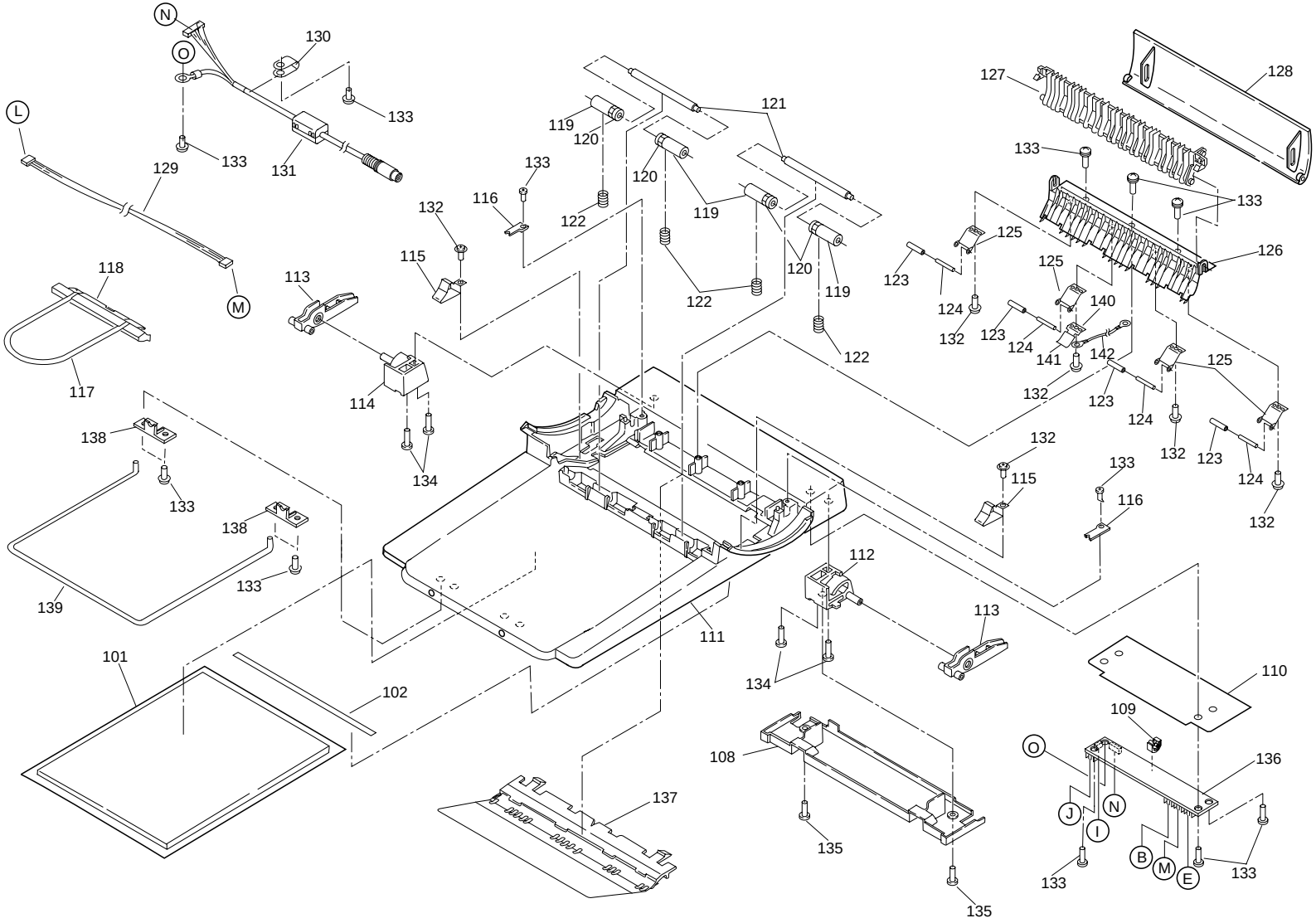


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Figure 7-29. ADF Exploded Diagram (1)

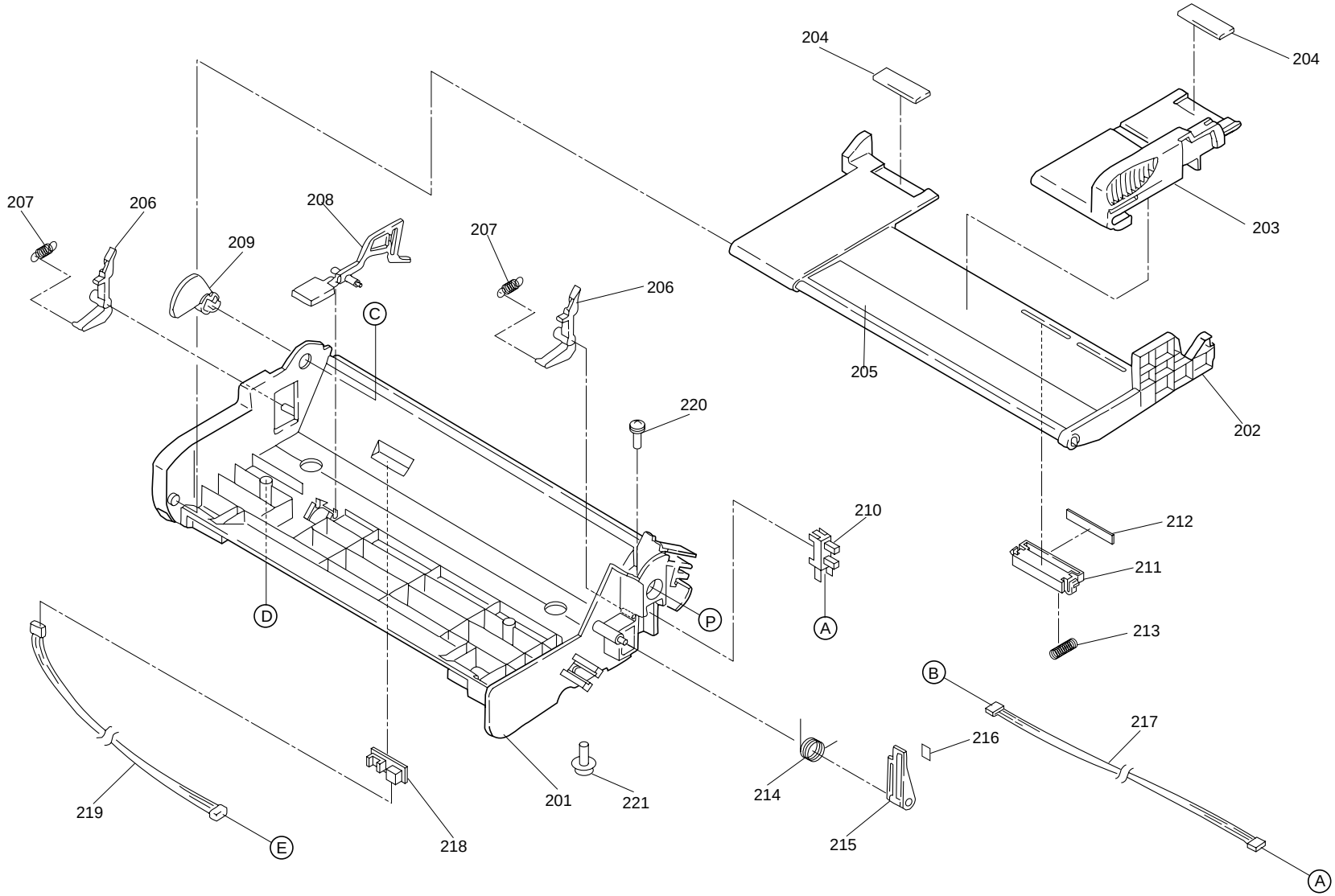

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Figure 7-30. Exploded Diagram (2)

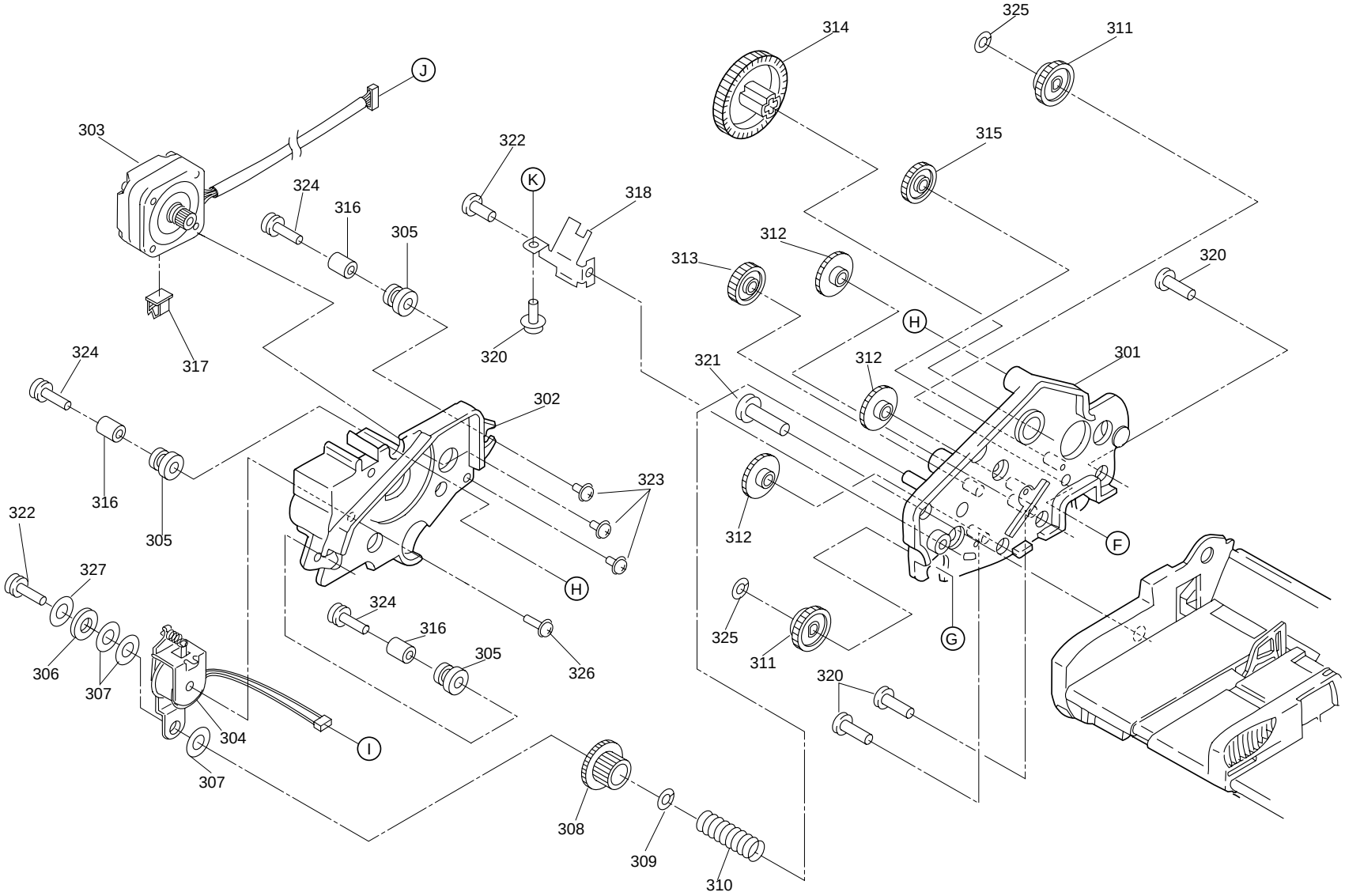

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Figure 7-31. Exploded Diagram (3)

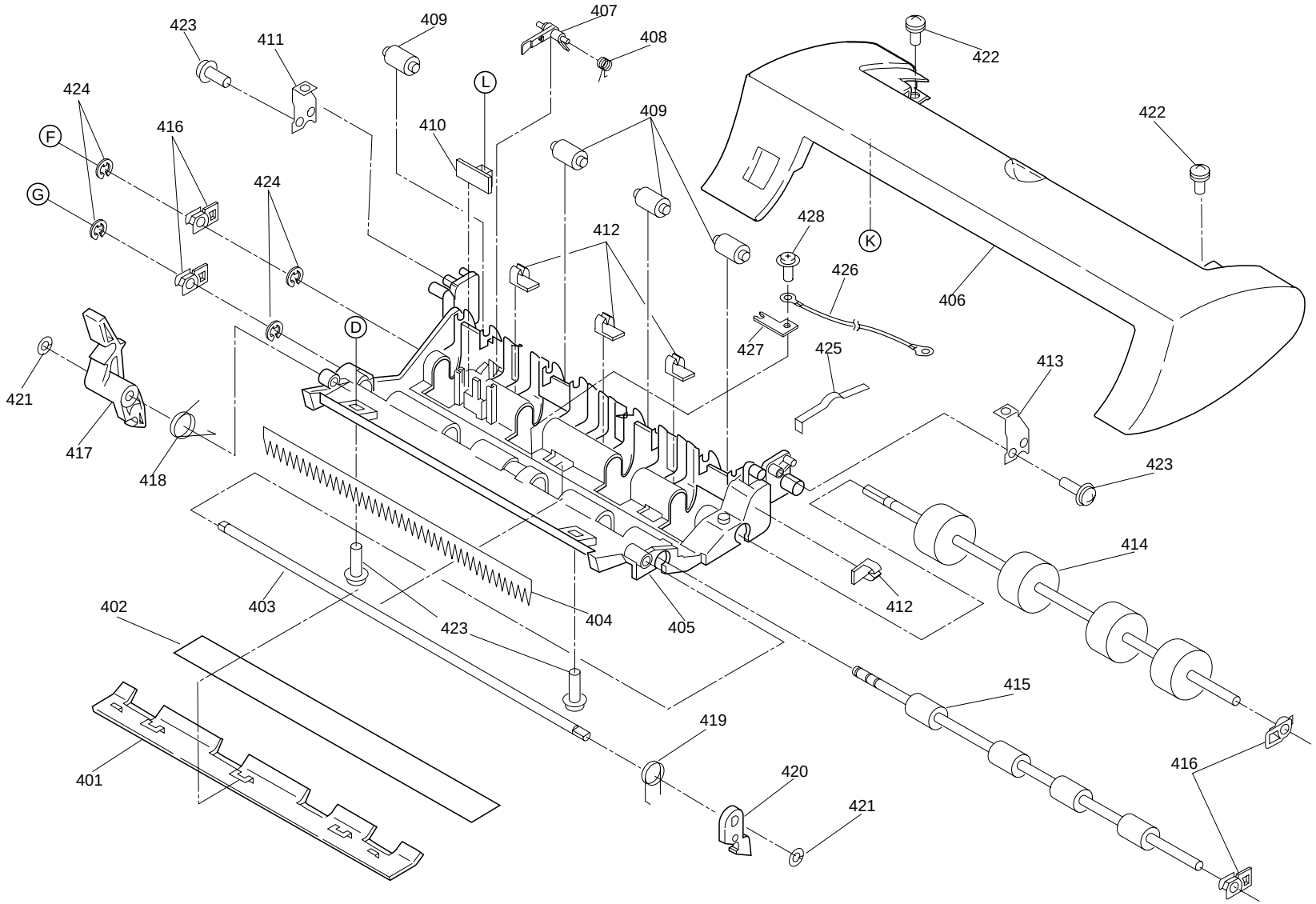

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Figure 7-32. Exploded Diagram (4)

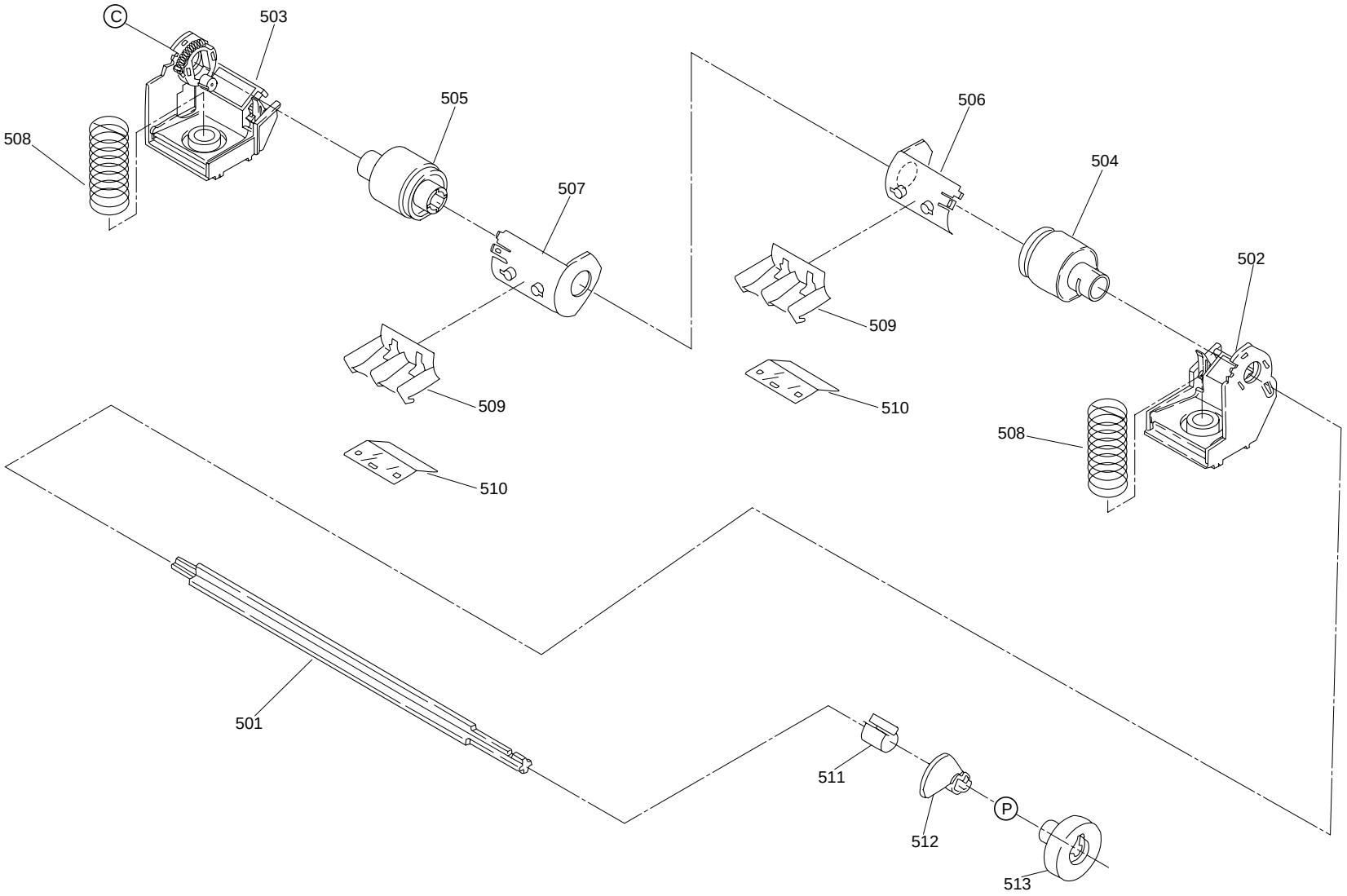

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Figure 7-33. Exploded Diagram (5)