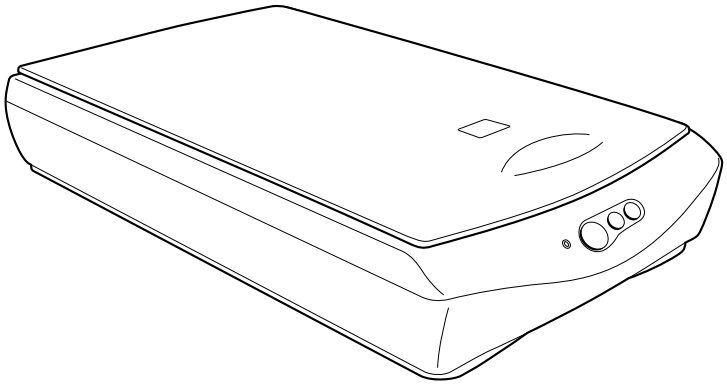
SERVICE MANUAL



Color Image Scanner

EPSON Perfection 1240U

Perfection 1240U PHOTO

EPSON®

SESC00-008

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

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

WARNING 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 EPSON Perfection 1240U and Perfection 1240U PHOTO. 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. ADJUSTMENTS

This product reqires no adjusment.

CHAPTER 6. MAINTENANCE

Provides preventive maintenance procedures and the lists of Epson-approved lubricants required for servicing the product.

APPENDIX

Provides the following additional information for reference:

- ***Connector Pin Assignments***
- ***Parts List***
- ***Exploded Diagrams***

Revision Status

Revision	Issued Date	Description
A	August 9, 2000	First Release

Contents

CHAPTER

1

PRODUCT DESCRIPTION

1.1 Features

EPSON Perfection 1240U consists of two models : 1240U and 1240U PHOTO. Major features are as follows. Perfection 1240U PHOTO has the TPU (transparency unit) as standard unit.

MAJOR FEATURES

- Best suited speed / best image quality A4 color image scanner for consumer use
  - High quality
    Resolution: 1200 dpi (Optical resolution by 6 line CCD with 30600 pixels)
    Depth: 14 bit-in, 14 bit-out
  - High speed
    Monochrome 2 value: 6.5 msec/line
    Full Color: 7.0 msec/line
    Note) 1200dpi, High speed mode
- EASE OF USE
  - EPSON Smart Panel
    Same functions as 'Stylus Scan 2000/2500'. Achieve easy scanning with three buttons.
  - Instant Photo Print Utility
    Modified from 'Perfection 1200'
  - New TWAIN functions
    DTR (Document Type Recognition), Auto skew correction.
    TWAIN is version up from Perfection 1200.
- To make it smaller and lighter
  Use AC Adapter. Scanner design is slimmer and lighter without internal power supply. Scanner weight is only 2.8kg. and Size is 269x435x93mm (WxDxH)
- Option
  Film Adapter 2 (same as Perfection 1200)

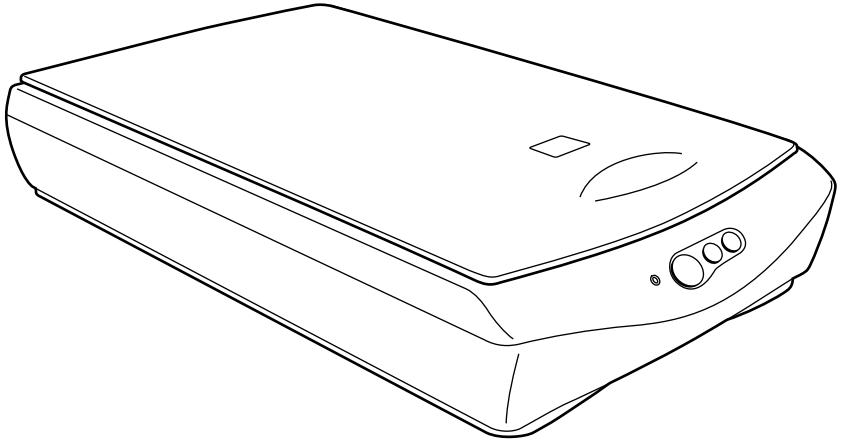


Figure 1-1. Exterior View of Perfection 1240U

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:
  10200 x 14040 pixels (1200 dpi)
- Scanning Resolution:
  - Main 1200 dpi (Optical resolutionby 6 line CCD with 30600 pixels)
  - Sub 2400 dpi with Micro Step
- Output resolution: 50 ~ 4800 dpi (1 dpi step)
  (9600dpi scanning is achieved by 4800dpi x200%)
- Gray scale levels: 14 bits/pixel (Input 14 bits/pixel, Output 1-14/bits/ pixel)
- Color Separation: By the color filter of CCD
- Zoom: 50 ~ 200% (1% step)
- Scanning Speed:
  - Color: 7.0 msec/line
  - Monochrome (bi-level): 6.5 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 1 level
- 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)
  Dither (User defined) 2 modes (A, B)
- Interface (Resident): 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)
- 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 : Film Adapter
- Power Switch: None
- Operating System: Microsoft Windows 98 (pre-install model)
  Windows2000
  (pre-install model, or up grade of pre-install model of Win 98)
  Millennium
  (pre-install model, or up grade of pre-install model of Win 98)
  Macintosh System 8.1 or later
  (Macintosh with standard connection with USB)

ELECTRICAL SPECIFICATIONS

- Scanner unit electrical specifications
  - Rated input voltage: DC24V
  - Power consumption: Approx.20W (Operating)
Approx.10W (Stand-by)
  - Rated input current: 0.8A : DC24V
- AC adapter electrical characteristics
  - Rated input voltage: AC100-120V (AC100V model)
AC220-240V (AC200V model)
  - Input voltage: AC 100 -120V ±10%
AC 220 - 240V ±10%
  - Rated input Current : 0.7A (Input AC100V)
0.4A (Input AC200V)
  - Rated Frequency Range: 50-60 Hz
  - Input Frequency Range: 49.5-60.5 Hz
  - Rated output voltage: DC24V
  - Rated output current 0.8A
  - 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: NOM
UL 1950
CSA C22.2 NO.950
EN60950
IEC60950
- EMC: FCC Part15 Subpart B Class B
CSA C108.8 Class B
AS/NZS3548 Class B
CISPR Pub22 Class B
CNS 1348 Class B
Korea EMC
- 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
	IEC60801-2/60801-3/60801-4

- EPA: Energy Star Program

RESISTANCE TO ELECTRIC NOISE

- Static electricity
  - Panel: below 10kv, no error
below 15kv, no damage
  - Metal below 7kv, no error
below 15kv, no damage

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: 269(W) x 435(D) x 93(H) mm
- Weight: Approx. 2.8 Kg

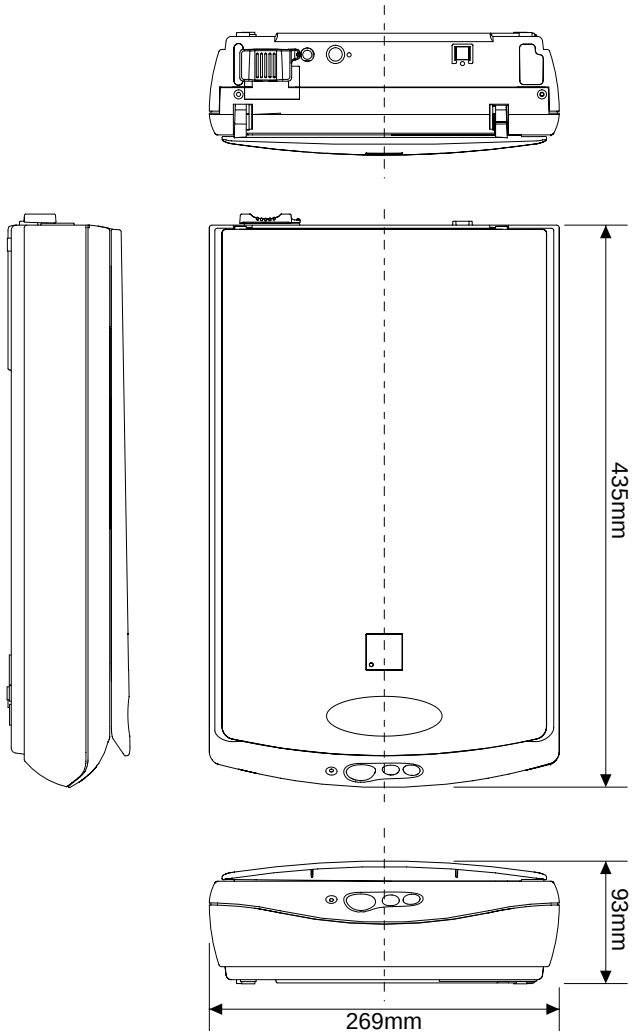


Figure 1-2. Exterior Dimension of the Perfection 1240U

1.3 Interface Specifications

This section provides specifications of the USB, the only interface supported by the Perfection 1240U and the Perfection 1240U PHOTO.

1.3.1 USB Specifications

Any items not included in this specification shall be in compliance with Universal Serial Bus Specification Revision 1.1.

- ☐ Configuration: See Table 1-2.
- ☐ Electric specification: Compliant to Full Speed mode (12Mbit/s) of Universal Serial Bus Specification Revision 1.0.
- ☐ Connector: One Receptacle (Series B)
- ☐ Connector Pin Assignment: See the following figure.

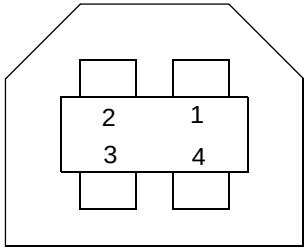


Figure 1-3. Connector Pin Location

Table 1-1. Connector Pin Assignment

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

Table 1-2. Configuration

Element	Description
Device	• Class: Vendor specific • Subclass: Vendor specific • Protocol: Vendor specific • Maximum packet size for endpoint 0: 64bytes • Vendor ID: 0x04B8 (Seiko EPSON Corp.) • Product ID: 0x010B • Number of possible configurations: 1
Configuration	• Number of interfaces supported by this configuration: 1 • Characteristics: Self-powered • Remote wake up feature: Not supported • Maximum of possible consumption: 2mA
Interface	• No Alternate setting • Number of endpoints used by this interface (excluding endpoint 0): 2 • Class: Vendor specific • Subclass: Vendor specific • Protocol: Vendor specific
Endpoint 1	• Bulk IN transfer • Maximum data transfer size: 64 byte
Endpoint 2	• Bulk OUT transfer • Maximum data transfer size: 64 byte
String Descriptor	• iManufacturer: “EPSON” • iProduct: “Perfection 1240U”

1.4 Control Codes

The command levels of this scanner are ESC/I (B8) and FS. The commands supported are shown in the table below.

Table 1-3. Control Codes

classification	Name	Code
Execute Command	ID Request	ESC I
	Status Request	ESC F
	Extended Status Request	ESC f
	Request Command Parameters	ESC S
	Start Scanning	ESC G
	Push Button Status Request	ESC !
	Extended ID Request	FS I
	Scanner Status Request	FS F
	Scanning Parameter Request	FS S
	Start New Scanning	FS G
Set Data Format	Set Data Format	ESC D i
	Set Resolution	ESC R n1 n2
	Set Zooming	ESC Hi1 i2
	Set Scanning Area	ESC A n1 n2 n3
	Set Color	ESC C i
	Set Mirroring	ESC Ki
	Set Scanning Parameter	FS W
Image Correction	Set Brightness	ESC Li
	Set Gamma Correction	ESC Z i
	Down Load Gamma Table	ESC z i d [256]
	Set Sharpness Control	ESC Qi
Image Disposition	Set Half-tone Processing	ESC Bi
	Set Auto Area Segmentation	ESC si
	Down Load Dither Pattern	ESC bijd [j^2]
	Set Color Correction	ESC Mi
	Down Load Color Correction	ESC m d [9]
	Set Threshold	ESC ti
Auxiliary	Set Scanning Mode	ESC g i
	Initialize	ESC @
	Set Line Counter	ESC d i
	Option Control	ESC ei
	Set Film Type	ESC Ni
	Set Focus Position	ESC pi
	Request Focus Position	ESC q
	Eject Paper	FF
Control	Normal Response	ACK
	Abnormal Response	NACK
	Stop Scanning	CAN
	Header	STX

1.5 Switches

☐ Push Button Switch (3) - Front (See Figure 1-4.)

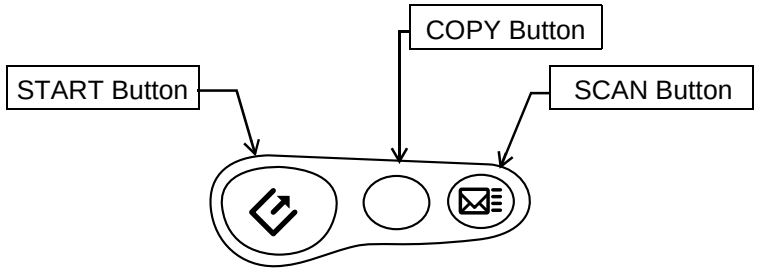


Figure 1-4. Push Button Switch

☐ EPSON Smart Panel

Same functions as 'Stylus Scan 2000/2500'. Achieve easy scanning with three buttons.

- START Button: EPSON Smart Panel (ESP) is run, and export a image data to application which user assigned to relate with the START button. (This button is user programmable)
- COPY Button: The COPY Button is assigned to the Copy utility on ESP. The copy utility is run and activate scanning and printing by pushing button. (This button is not User programmable.)
- SCAN Button: The SCAN Button is assigned to the PhotoDeluxe on ESP. Scanning starts full automatically and export a image data to PhotoDeluxe. (This button is not User programmable.)

1.6 Indicator Descriptions

LED indicator shows the various conditions by turning on/off or blinking. Conditions indicated by LED indicator are as listed below:

☐ Status	Display
■ Ready or receiving Push Button Event command:	Green on
■ Stand-by or receiving Push Button Event command:	Green on
■ Busy or initialization:	Green Blinking at low speed
■ Error:	Red on or red blinking at high speed or orange blinking at high speed
■ Operate OFF:	Light off

1.7 Error Indications

COMMAND ERROR

- Cause: Undefined command or undefined command parameter is received.
- Disposition: The scanner ignores the wrong command or parameter,(Maintain at current settings.) Scanner sends NACK, and waits for the next command or parameter.
- Indicator: Red LED lighting up.
- Remedy: Once the correct command is received, the error condition is cleared.

INTERFACE ERROR

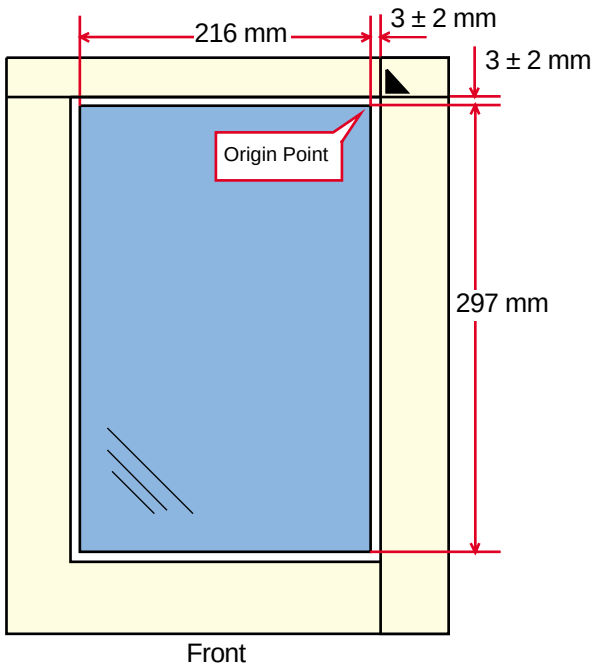
- Cause: Detects the wrong action in the communication procedure.
- Disposition: Lamp goes off and scanner stops operating.
- Indicator: Red LED High speed blinking
- Remedy: Turn power off and then turn it on again.
Plug out and in the USB connector
- Acceptable command: None

FATAL ERROR

- Cause: Lamp is broken.
Power is turned on or command is received without removing the transportation lock.
Scanner unit fault.
- Disposition: Lamp goes off and the scanner stops operating.
The bit 7 of the status byte is set.
- Indicator: Red LED High speed blinking
- Remedy: (After cause is remove)
Switch off the power and turn it on again.
Send initialization command (ESC @).
Plug out and in the USB connector.
- Acceptable command: [ESC F, ESC f, ESC @]

1.8 Manuscript Table

☐ Dimension: 216 mm (Horizontal) x 297 mm (Vertical)



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.

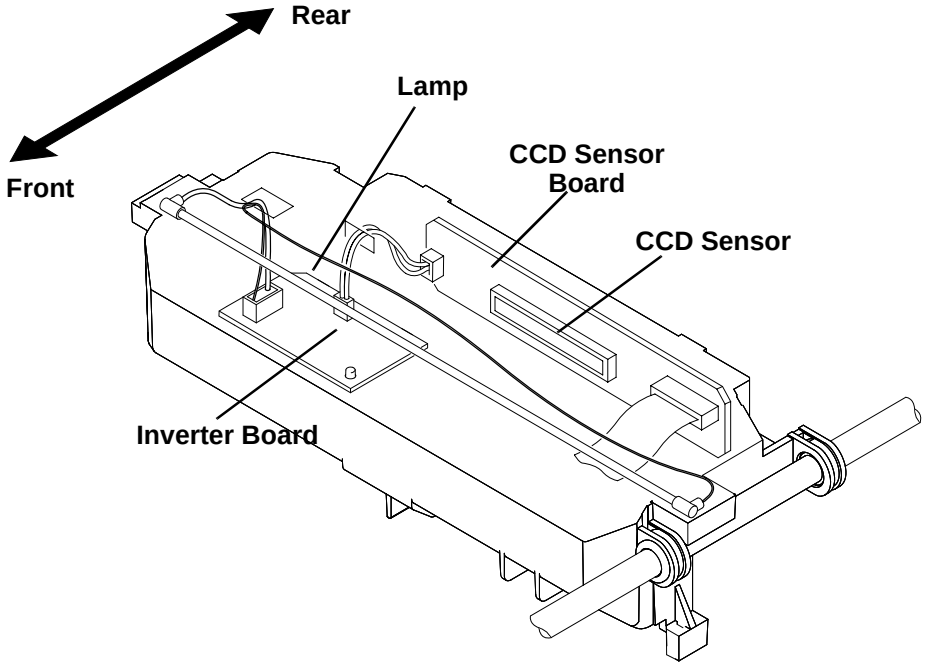


Figure 2-1. Carriage Unit Component

- ☐ 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.

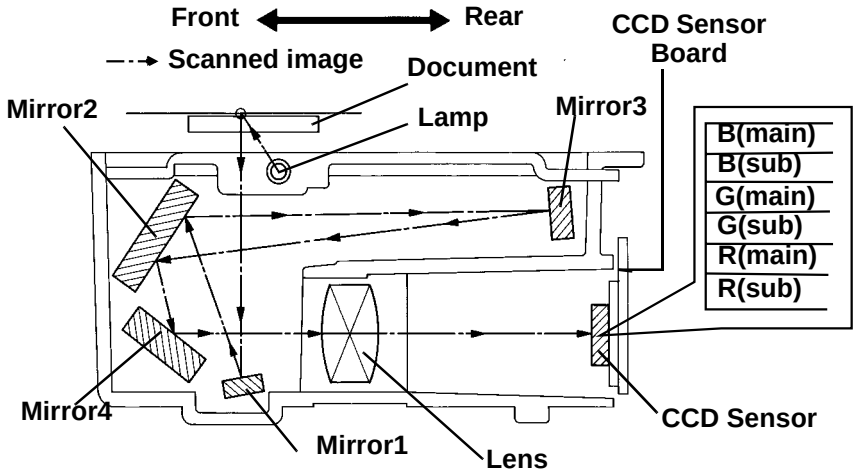


Figure 2-2. Mirror, Lens Mechanism

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.

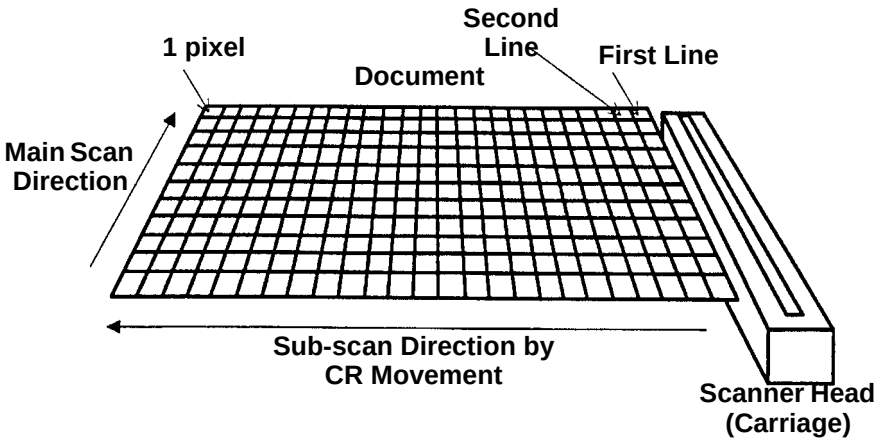


Figure 2-3. Carriage Movement

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)

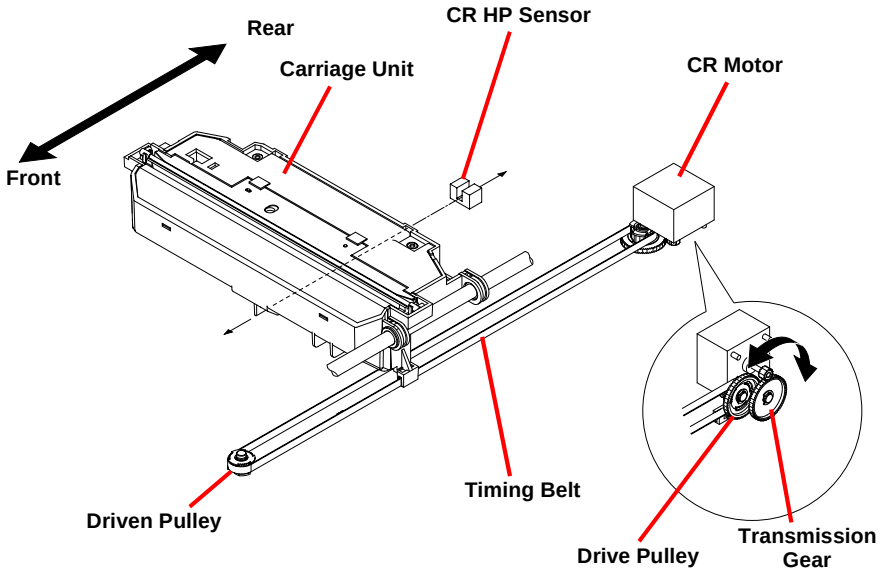


Figure 2-4. Carriage Operation

2.2 Control Circuit

The CPU (IC12) of this scanner is a one-tip 16-bit bus CPU operating at 20MHz. ASIC (IC10) manages input signal correction, image processing, and controlling the CCD sensor board and USB interface. The power supply control uses a DC/DC converter to generate 5 V and 12 V signals from the 24 V DC input. Table 2-1 shows the major IC functions.

Table 2-1. Major ICs

IC	Location	Functions
M37920	IC12	CPU 24-bit Address Bus 16-bit Data Bus
MB81F6416420-102	IC13	SDRAM 4M x 16bit
IS61C6416	IC17	SRAM 64k x 16bit
E02A32SA	IC10	ASIC: Manages the following: • Input image signal correction • CCD control • Line control • Image processing • Memory control • Data in/output control
A3957SLBTR	IC4,5	CR motor driver IC
M51953A	IC11	Reset IC
M27C1001-10F1	IC9	PROM 4M x 8bit
IS61C256AH	IC16	SRAM 32k x 8bit
GP1S58V	PC1	CR home position sensor
NJM2360	IC1,2	DC/DC Converter
AD9822	IC19	8bit A/D Converter
E02A35BA	IC14	USB interface control
SSR20.00BA	CR1	Clock 20MHz
NJM78M12	IC8	Regulator (12VDC)

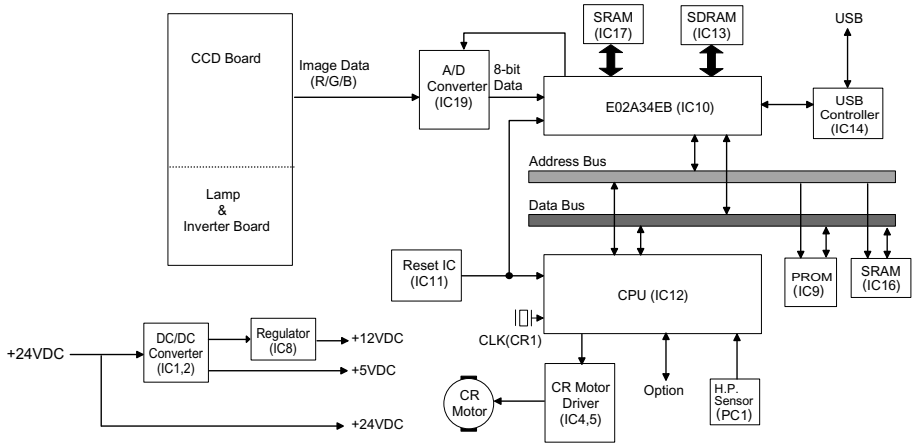


Figure 2-5. Control Circuit Diagram

CHAPTER

3

TROUBLESHOOTING

3.1 Overview

This chapter describes troubleshooting procedures for this scanner.

3.2 Self-Diagnostic Function

The self-diagnostic function of the scanner lets the scanner itself detect abnormal conditions. When the scanner detects an abnormality, it shows an error using the LED. See Table 3-1 for the errors detected by the self-diagnostic function.

Table 3-1. Errors Detected by the Self-Diagnostic Function

LED Condition	Error Type (Cause Remedy)
Red LED lighting up	***Command Error*** **Cause:** Undefined command or undefined command parameter is received. **Disposition:** The scanner ignores the wrong command or parameter, (Maintain at current settings.) Scanner sends NACK, and waits for the next command or parameter. **Remedy:** Once the correct command is received, the error condition is cleared.
Red LED High speed blinking	***Interface Error*** **Cause:** Detects the wrong action in the communication procedure. **Disposition:** Lamp goes off and scanner stops operating. **Remedy:** ● Turn power off and then turn it on again. ● Plug out and in the USB connector. **Acceptable command:** None
Red LED High speed blinking	***Fatal Error*** **Cause:** ● Lamp is broken. ● Power is turned on or command is received without removing the transportation lock. ● Scanner unit fault. **Disposition:** ● Lamp goes off and the scanner stops operating. ● The bit 7 of the status byte is set. **Remedy:** (After cause is remove) ● Switch off the power and turn it on again. ● Send initialization command (ESC @). ● Plug out and in the USB connector. **Acceptable command:** [ESC F, ESC f, ESC @]

3.3 Troubleshooting

This section describes how to troubleshoot problems according to exhibited phenomenons.
See Table 3-2 that enables you to find the defective part to the unit level. Then refer to the corresponding table for checkpoints and solutions.

Table 3-2. Problems and Corresponding Tables to Refer to

Phenomenon	Problem	Refer to:
The scanner is turned on but does not operate.	The scanner is not initialized.	Table 3-3
"Fatal Error" occurs. The scanner is turned off and back on but still shows the same error.	The carriage unit does not operate.	Table 3-4
	The carriage unit operates but the error is indicated.	Table 3-5
	The lamp does not light up.	Table 3-6
Image is not read clearly.	Image is not read clearly.	Table 3-7
"Communication Error" occurs. Communication with the host is attempted again, but the same error occurs.	USB interface error	Table 3-8

Table 3-3. The scanner is not Initialized.

Cause	Step	Checkpoints	Finding	Remedy
Connector is disconnected.	1	Check all connectors. Are any connectors disconnected?	Yes	Connect any disconnected connectors.
			No	Replace the main board.

Table 3-4. The carriage unit does not operate.

Cause	Step	Checkpoints	Finding	Remedy
CN3 on the main board is disconnected.	1	Check that CN3 is disconnected.	Yes	Connect CN3 on the main board properly.
The carriage drive mechanism is defective.	2	Is grease (G-26) properly applied? (See Chapter 6.)	No	Apply grease to the specified points properly.
	3	• With the upper housing removed, turn the scanner on, and check that the CR motor is live. • Remove the CR motor, and check that the carriage unit moves smoothly.	No	Check the carriage unit, and replace any defective part or disassemble and assemble the scanner again.
The CR motor is defective.	4	Disconnect CN3 on the main board. Then, using a tester, check that the coil resistance at each point below is 4.8Ω. 1. Between Pins 2 and 4 (Motor side) 2. Between Pins 1 and 3 (Motor side)	No	Replace the CR motor.
The main board is defective.	5	---	---	Replace the main board.

Table 3-5. The carriage unit operates but the error is indicated.

Cause	Step	Checkpoints	Finding	Remedy
The scanner upper case has been removed.	1	Has the scanner upper case been removed?	Yes	Install the scanner upper case.
Problem with main circuit board	2	---	---	Replace the main circuit board.

Table 3-6. The lamp does not light up.

Cause	Step	Checkpoints	Finding	Remedy
CN1 on the main board is disconnected.	1	Check that CN1 is disconnected.	Yes	Connect CN1 on the main board properly.
CN1 or CN2 on the CCD sensor board is disconnected.	2	Check that CN1 or CN2 on the CCD sensor board is disconnected.	Yes	Connect CN1 or CN2 on the CCD sensor board properly.
The connector for the lamp is not properly connected to the inverter board.	3	Check that the connector is properly connected to the inverter board.	No	Connect the connector properly.
The lamp is defective.	4	After replacing the lamp, check that the lamp lights up.	Yes	Replace the lamp.
The inverter board is defective.	5	After replacing the inverter board, check that the lamp lights up.	Yes	Replace the inverter board.
The main board is defective.	6	---	---	Replace the main board.

Table 3-7. Image is not read clearly.

Cause	Step	Checkpoints	Finding	Remedy
Any mirror in the carriage unit or the surface of the lamp is dirty.	1	After cleaning the mirror(s), check that image is read clearly.	No	Clean the surface of the lamp.
The CCD sensor board is defective.	2	---	---	Replace the carriage unit.
The main board is defective.	3	---	---	Replace the main board.

Table 3-8. USB Interface Error

Cause	Step	Checkpoints	Finding	Remedy
The host does not support USB.	1	On the Windows, access My Computer > Property > Device Manager, and check that Universal Serial Bus Controller is effective.	No	Replace the host.
The TWAIN driver attached for the scanner is not properly installed.	2	Check that the driver for the scanner is installed properly.	No	Instal the correct driver properly.
The USB cable is defective.	3	After replacing the USB cable, check that the error is not indicated.	No	Replace the USB cable.
The main board is defective.	4	---	---	Replace the main board.

Table 3-9. Option TPU does not operate

Cause	Step	Checkpoint	Finding	Solution
The cable of the optional unit is disconnected.	1	Is the connector CN6 on the control board disconnected?	Yes	Connect the CN6 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

ASSEMBLY AND DISASSEMBLY

4.1 Overview

This chapter describes procedures for disassembling the EPSON Perfection 1240U. Unless otherwise specified, the scanner can be disassembled by reversing the disassembly procedures.

4.1.1 Precautions

WARNING

- **Disconnect the power cable before disassembling or assembling the scanner.**
- **Wear a pair at gloves to protect your hand from the sharp edge in the scanner mechanism.**

CAUTION

When servicing, note the points below:

- **Consider the size of the scanner and make enough room for servicing.**
- **Since this scanner is a precision equipment, service it on a flat, level, heavy-duty table.**

The directions used in this chapter are defined as shown in Figure 4-1.

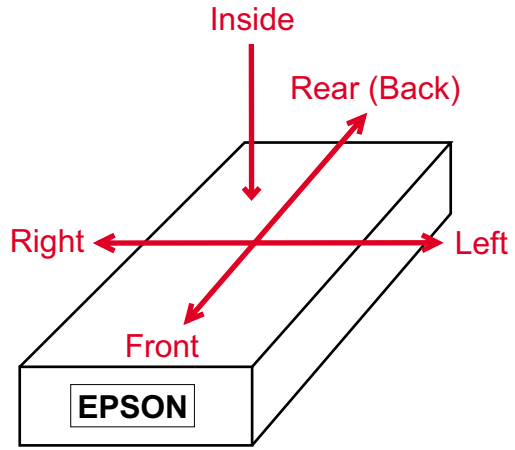


Figure 4-1. Directions

4.1.2 Tools

Use the tools specified in Table 4-1.

Table 4-1. Tools

Names	Availability	Part Number
Phillips screw driver (#2)	O	B743800200
Standard screw driver	O	B743000100
Pliers	O	B740400100
Tweezers	O	B641000100

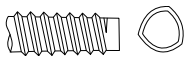
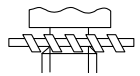
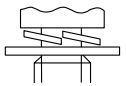
4.1.3 Screws

The screws used in the scanner are as shown in Table 4-2. Make sure you always use the correct type and number of screws for the assembling part. See Table 4-3 for the screw appearances.

Table 4-2. Screw Specifications

Abbreviation	Description
CP	Cross-recessed Pan Head screw
CBP	Cross-recessed Binding Head P-tite screw
CCP	Cross-recessed Cup Head P-tite screw

Table 4-3. Screw Appearances

Head appearance		Type	Washer
Top	Side		
Cross-recessed 	Binding  Pan  Cup 	Standard - - - - B-tite  P-tite 	With Outside Toothed lock washer  With Spring lock washer 

4.2 Disassembly Procedures

4.2.1 Releasing the Carriage Lock

1. Disconnect the AC adapter from the scanner body.
2. Check that the carriage lock at the back of the scanner body is released.

Released Locked

Figure 4-2. Carriage lock position

CAUTION

When locking the carriage for transporting the scanner, make sure the carriage is at the home position.

4.2.2 Document Cover Removal

1. Open the Document Cover.
2. Lift the Document Cover by its edges to remove it.

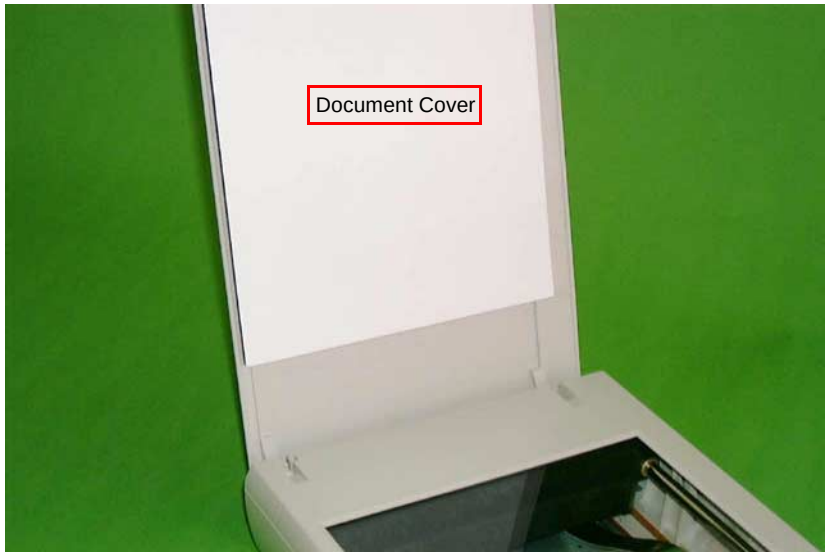


Figure 4-3. Document Cover Removal (1)

Figure 4-4. Document Cover Removal (2)

4.2.3 Upper Housing Removal

1. Release the Carriage Lock. (See Section 4.2.1.)
2. Remove the Document Cover. (See Section 4.2.2.)
3. Remove the two screws (gold, CBP, M3x8) at the back of the scanner body.
4. Lifting up the rear end of the Upper Housing, release the two hooks with pushing the Upper Housing toward the front, and then remove the Upper Housing.

CAUTION

When removing the Upper Housing, make sure two hooks are released from the Lower Housing.

Figure 4-5. Upper Housing Removal (1)

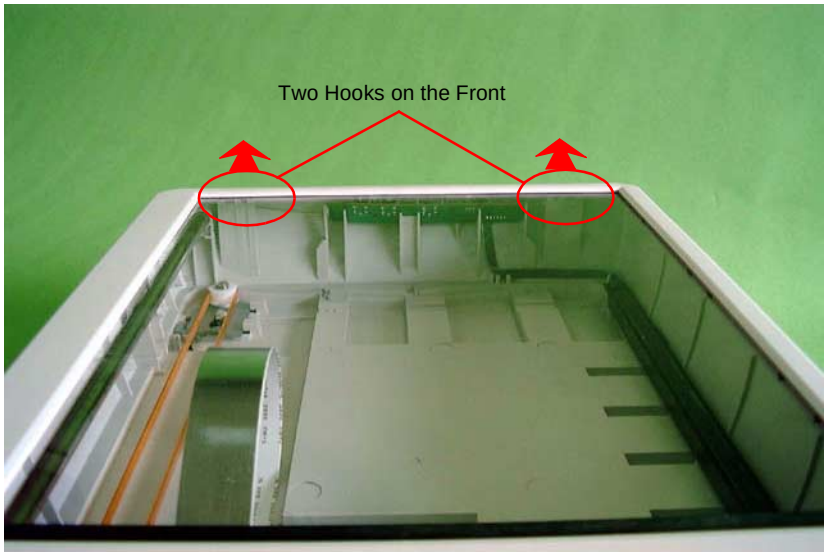


Figure 4-6. Upper Housing Removal (2)

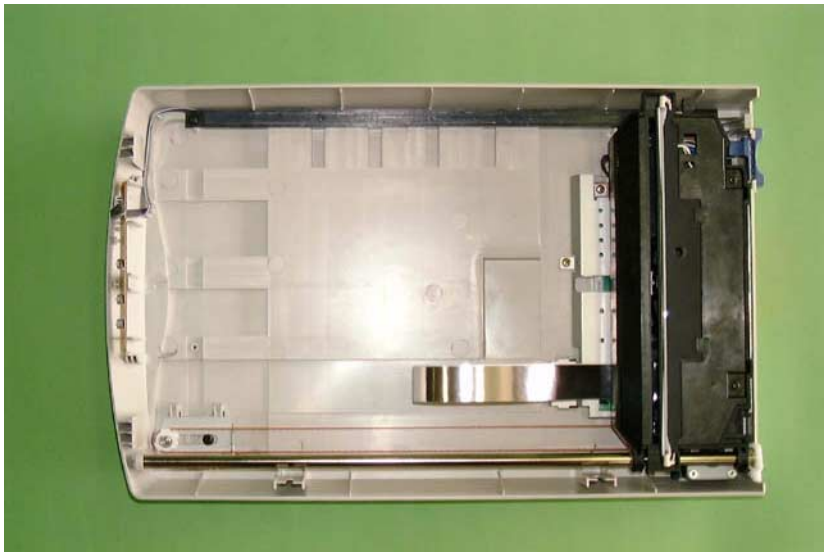


Figure 4-7. After Removing the Upper Housing

4.2.4 Inverter Lamp / Inverter Board Removal

1. Release the Carriage Lock. (See Section 4.2.1.)
2. Remove the Document Cover. (See Section 4.2.2.)
3. Remove the Upper Housing. (See Section 4.2.3.)
4. Remove the two screws (CCP, M3x8) on the Carriage Unit. (See Figure 4-8.)
5. Using a standard screw driver, lift up the carriage cover in the Carriage Unit, and then move it to the back to remove it. (See Figure 4-9.)

Figure 4-8. Carriage Unit Disassembly (1)

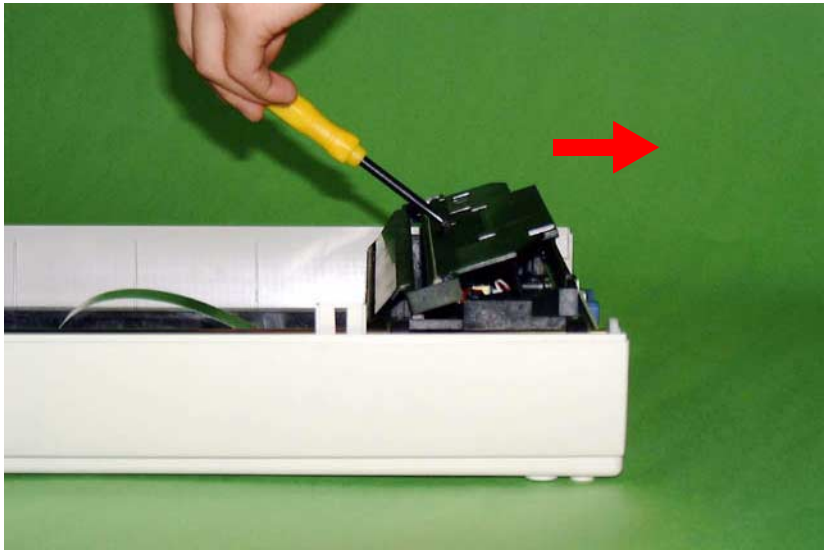


Figure 4-9. Carriage Unit Disassembly (2)

6. Disconnect the connector for the Inverter Lamp from the Inverter Board.

7. Disconnect the 2-pin connector for the CCD sensor.

8. Release the two hooks, and then remove the Inverter Board.

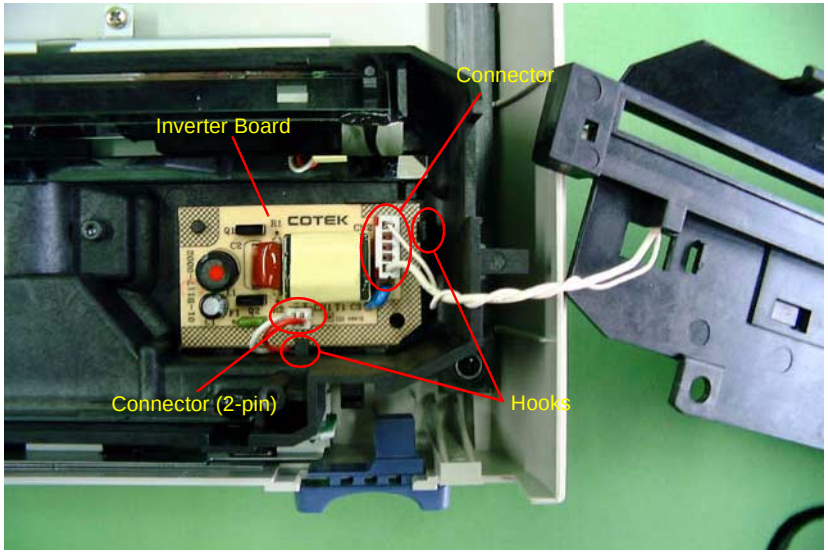


Figure 4-10. Inverter Board Removal

9. Remove the Lamp Cover from the Carriage Cover.

10. Remove the Inverter Lamp from the carriage cover.

CHECK POINT

- **When installing the Inverter Lamp, be sure to connect it to the hook on the Carriage Cover.**
- **When removing the Inverter Lamp, be careful not to touch the Inverter Lamp directly.**
- **The Inverter Board will be warm immediately after the power is turned off, so wait for it to cool sufficiently before removing it.**

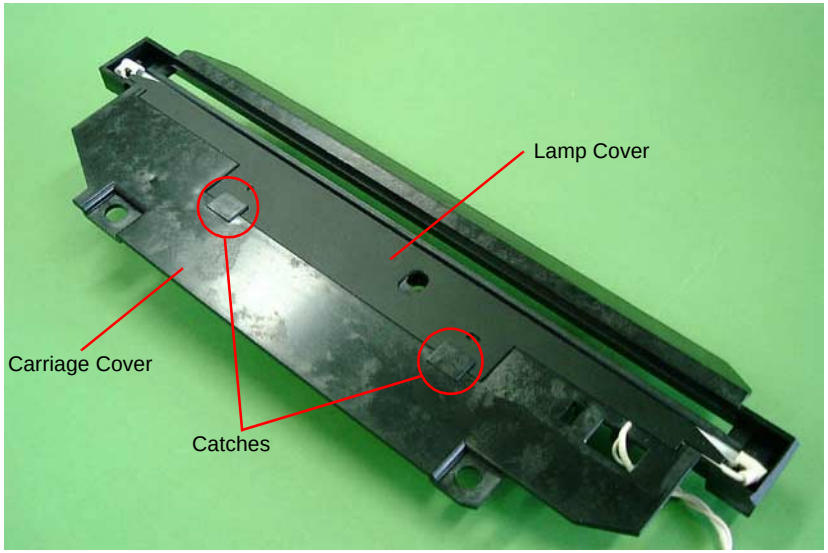


Figure 4-11. Inverter Lamp Removal (1)

Figure 4-12. Inverter Lamp Removal (2)

4.2.5 Carriage Unit Removal

1. Release the Carriage Lock. (See Section 4.2.1.)
2. Remove the Document Cover. (See Section 4.2.2.)
3. Remove the Upper Housing. (See Section 4.2.3.)
4. Remove the Clip Shaft.
5. Raise the Carriage Unit slightly to remove it from the timing belt, remove the Carriage Guide Shaft, and then remove the Carriage Unit.

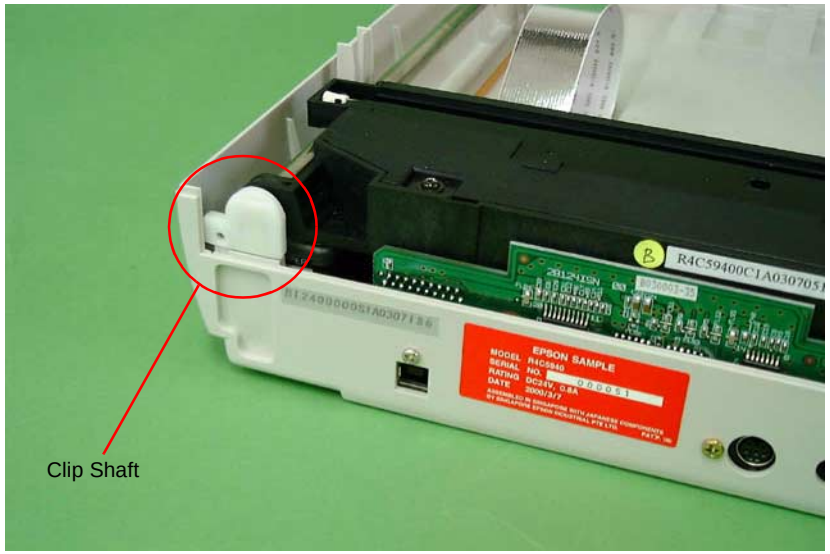


Figure 4-13. Carriage Unit Removal (1)

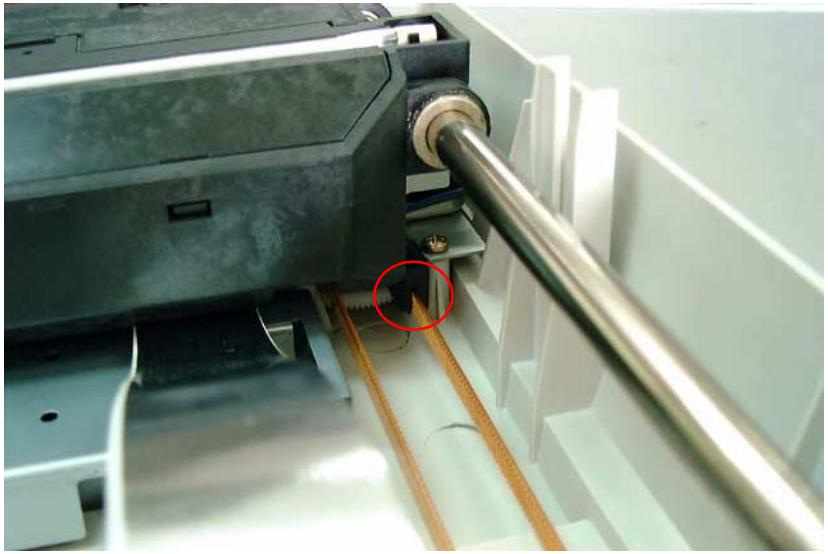


Figure 4-14. Carriage Unit Removal (2)

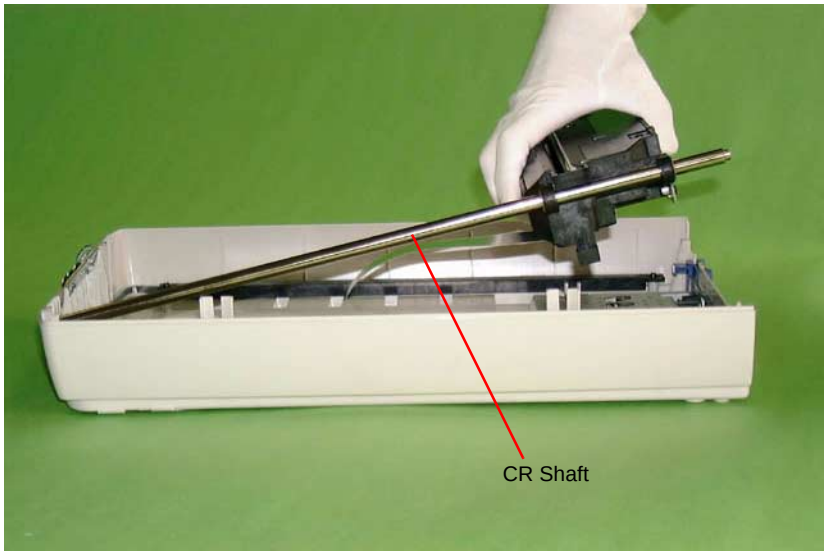


Figure 4-15. Carriage Unit Removal (3)

6. Remove the six screws (gold, CBP, M3x8), and then remove the Main Circuit Board Shield Plate.

7. Use a standard screw driver to remove the Ferrite Core.

8. Disconnect the FFC Cable (white) from the Main Circuit Board.

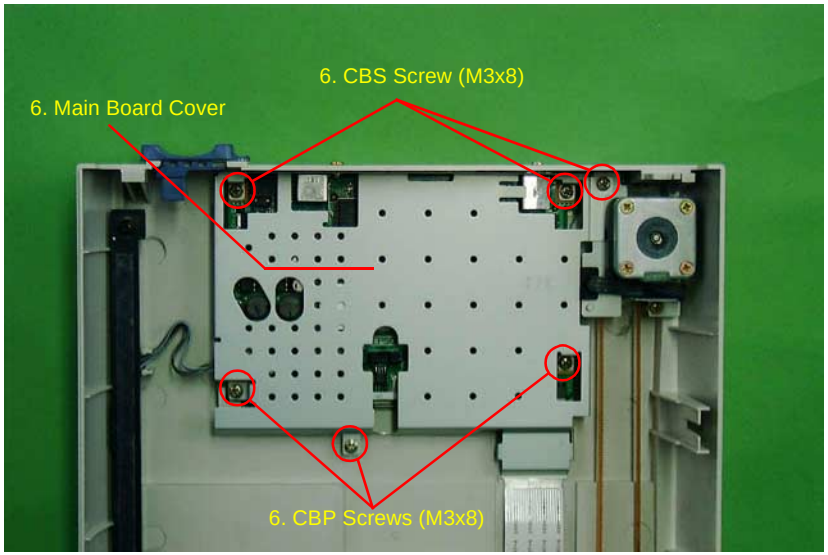


Figure 4-16. Shield Plate Removal

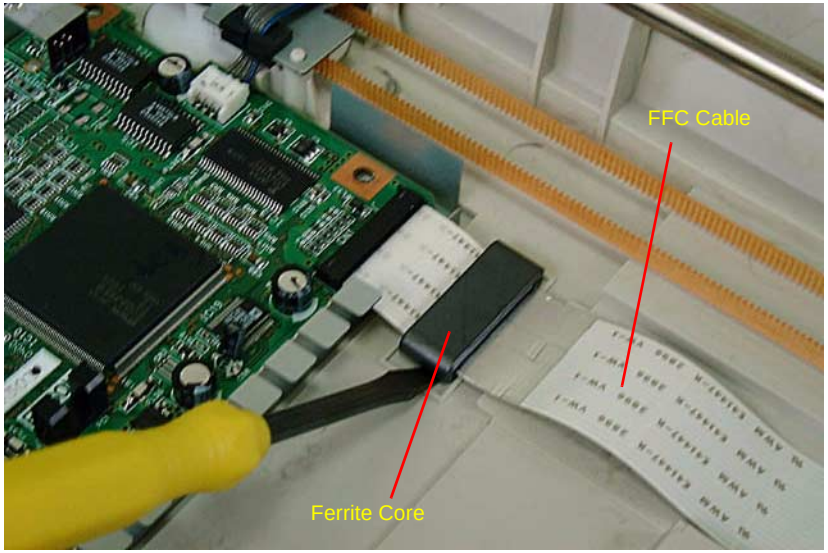


Figure 4-17. Ferrite Core Removal

9. FFC Cable Removal

1) Remove the two screws (CCP, M3x8) on top of the Carriage Unit. (See Section 4.2.4.)

2) Remove the Carriage Cover. (Use a standard screw driver to raise the Carriage Cover and then pull it backward.) (See Section 4.2.4.)

3) Use a standard screw driver to remove the Ferrite Core.

4) Disconnect the FFC Cable (white) from underneath the Carriage Unit (connector and hook x2).

CAUTION

Do not touch the mirror when removing the FFC Cable.

Figure 4-18. FFC Cable Removal (1)

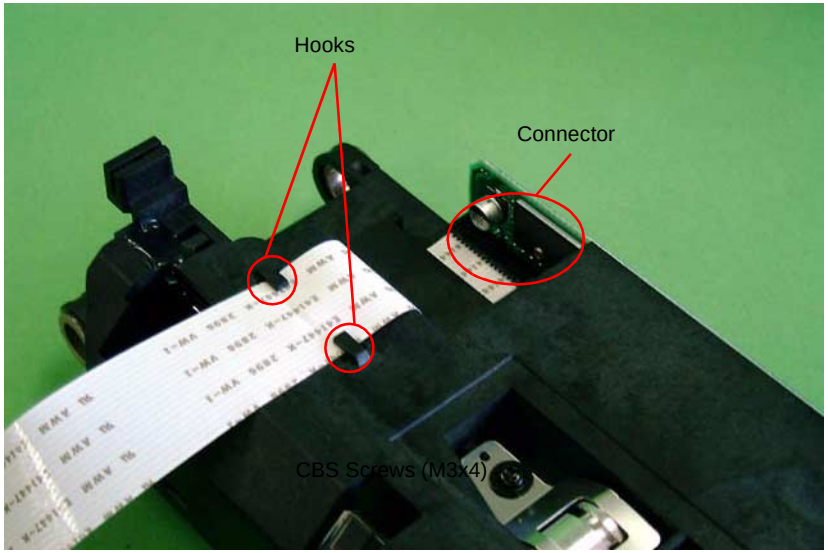


Figure 4-19. FFC Cable Removal (2)

4.2.6 Carriage Motor / Timing Belt Removal

1. Release the Carriage Lock. (See Section 4.2.1.)
2. Remove the Document Cover. (See Section 4.2.2.)
3. Remove the Upper Housing. (See Section 4.2.3.)
4. Remove the Carriage Unit. (See Steps 1-8 in Section 4.2.5.)
5. Remove the six screws (gold, CBP, M3x8) and then remove the main board cover.
6. Remove the screw (gold, CBP, M3x8) securing the CR Motor Unit.
7. Disconnect the cable for the CR Motor Unit from the connector on the main board, and then remove the CR Motor Unit.

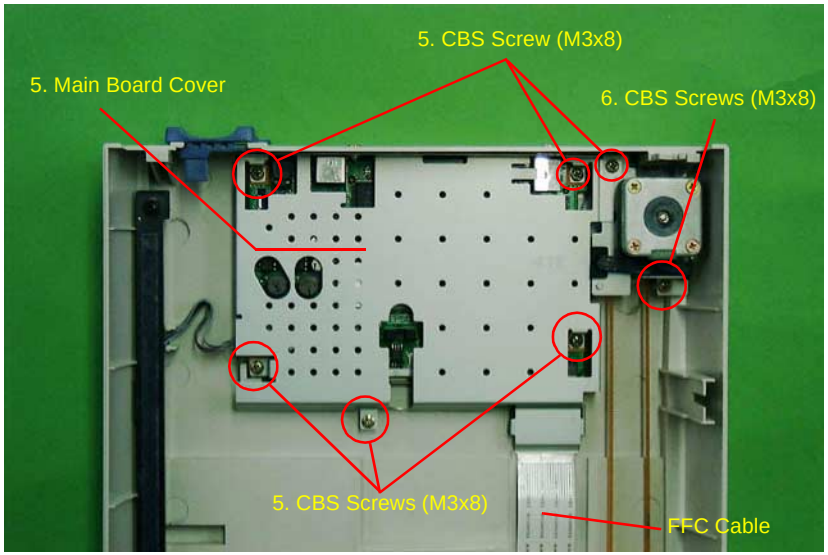


Figure 4-20. Shield Plate Removal

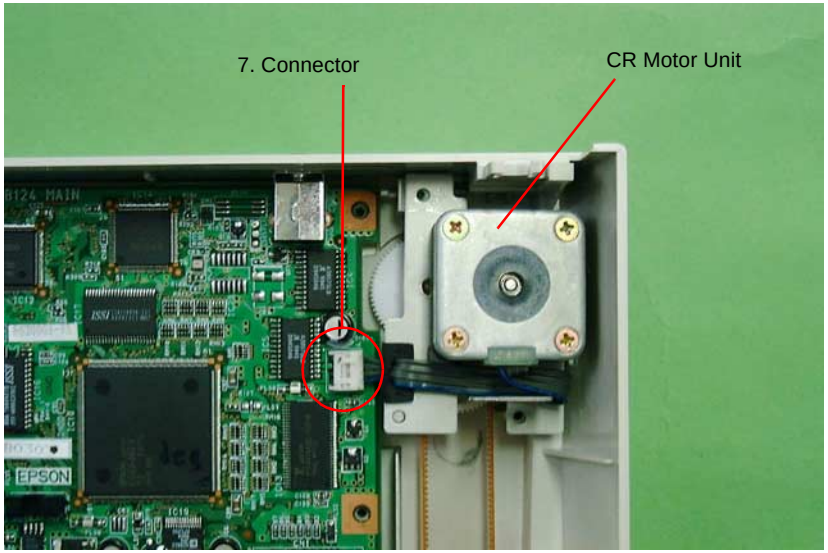


Figure 4-21. CR Motor Unit Removal

8. Follow the steps below to remove the Timing Belt from the CR Motor Unit.

    1) Remove the E-ring from the transmission gear.

    2) Remove the transmission gear.

    3) Remove the E-ring from the drive pulley.

    4) Remove the drive pulley.

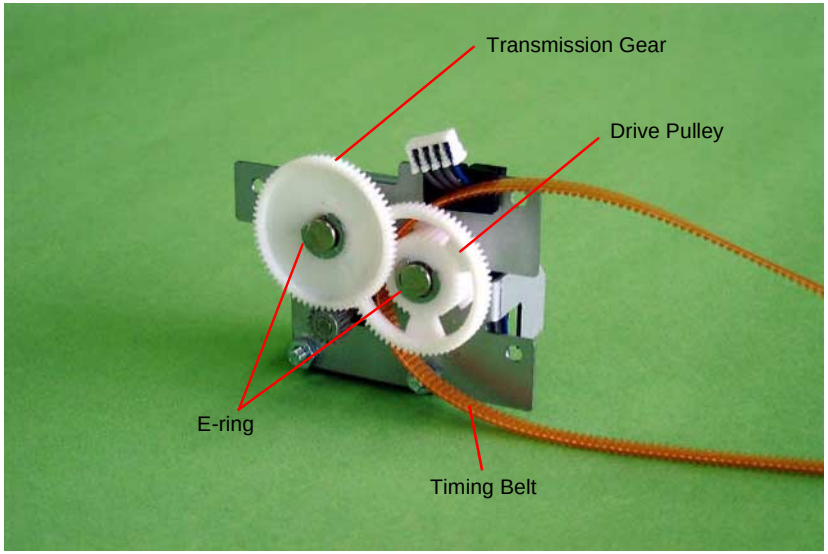


Figure 4-22. Timing Belt Removal

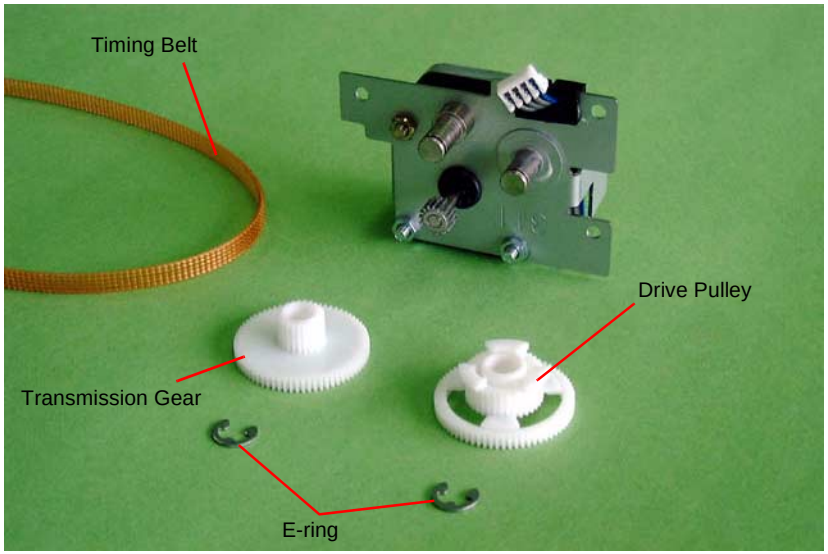


Figure 4-23. Parts in the CR Motor Unit

4.2.7 Main Board Removal

1. Release the Carriage Lock. (See Section 4.2.1.)
2. Remove the Document Cover. (See Section 4.2.2.)
3. Remove the Upper Housing. (See Section 4.2.3.)
4. Slide the Carriage Unit slowly until you see the whole main board cover.
5. Remove the six screws (CBP, M3x8) securing the main board cover, and then remove the main board cover.

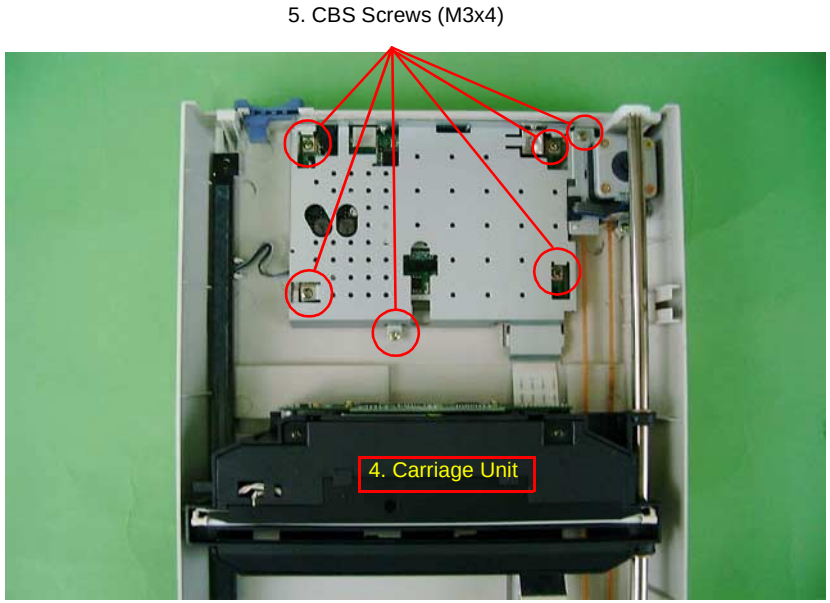


Figure 4-24. Main Board Removal (1)

6. Remove the two screws (CP, M3x5) securing the Main Board.
7. Disconnect the following cables from the corresponding connectors; CR Motor - CN3, carriage FFC, Panel Board - CN4.
8. Remove the Main Board.

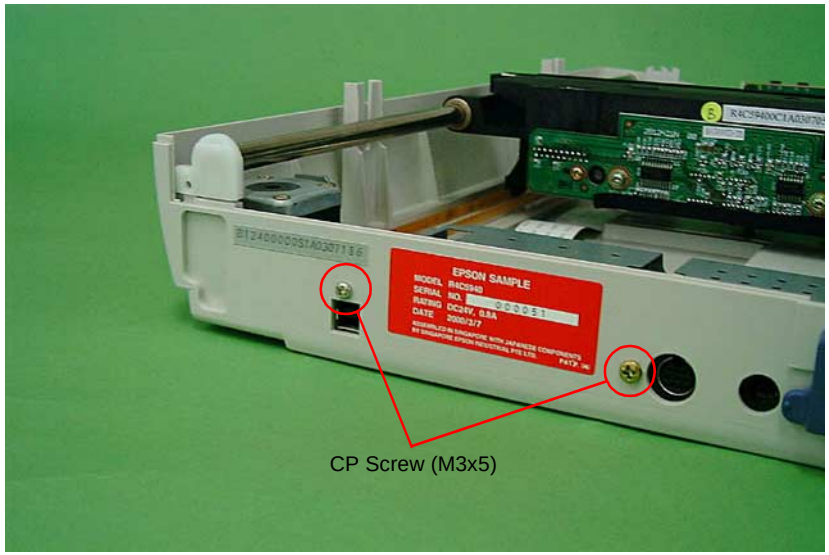


Figure 4-25. Main Board Removal (2)

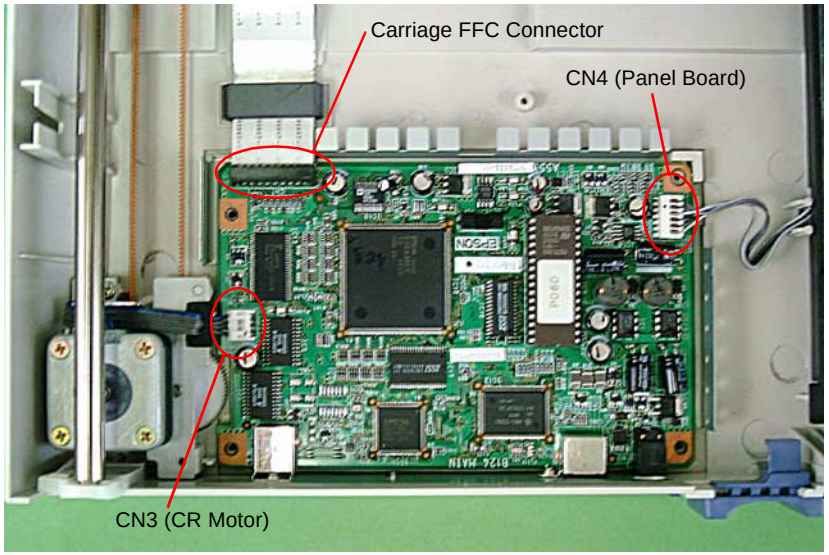


Figure 4-26. Main Board Removal (3)

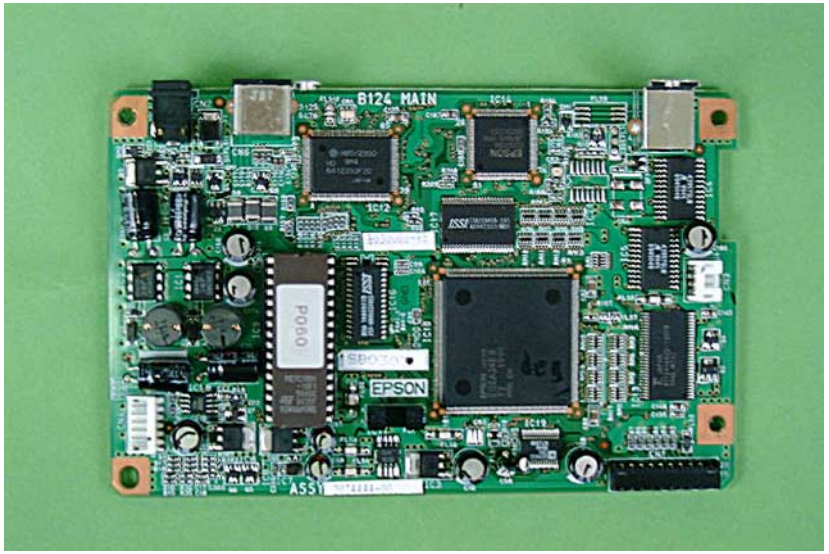


Figure 4-27. Main Board

4.2.8 Panel Board Removal

1. Release the Carriage Lock. (See Section 4.2.1.)
2. Remove the Document Cover. (See Section 4.2.2.)
3. Remove the Upper Housing. (See Section 4.2.3.)
4. Disconnect the Connector (CN1) and Hooks (x2), and then remove the Panel Board.

CHECK POINT

In the following steps, manually move the carriage back and forth slowly if necessary.

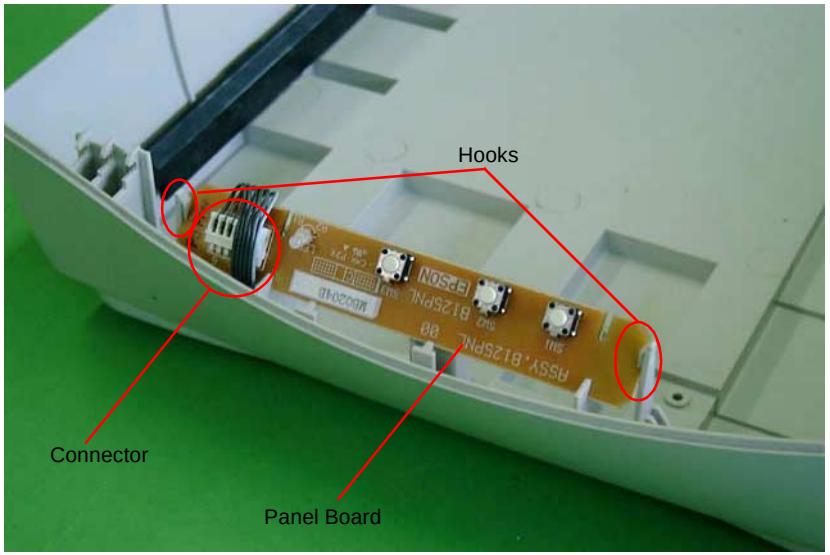


Figure 4-28. Panel Board Removal

4.2.9 Carriage Rail Removal

1. Release the Carriage Lock. (See Section 4.2.1.)
2. Remove the Document Cover. (See Section 4.2.2.)
3. Remove the Upper Housing. (See Section 4.2.3.)
4. Remove the Carriage Unit. (See Steps 1-6 in Section 4.2.5.)
5. Remove the two screws (CCP, M3x8) securing the Carriage Rail, and then remove the Carriage Rail.

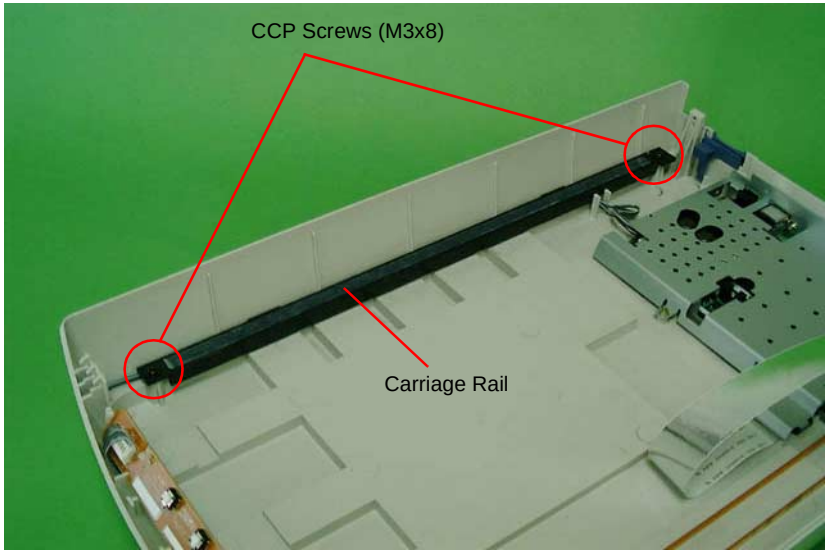


Figure 4-29. Carriage Rail Removal

4.2.10 Driven Pulley Removal

1. Release the Carriage Lock. (See Section 4.2.1.)
2. Remove the Document Cover. (See Section 4.2.2.)
3. Remove the Upper Housing. (See Section 4.2.3.)
4. Remove the Carriage Unit. (See Steps 1-8 in Section 4.2.5.)
5. Remove the Carriage Unit. (See Steps 1-8 in Section 4.2.6.)
6. Release the timing belt from the Driven Pulley.
7. Use a standard screw driver to remove the Torsion Spring from the Hook.
8. Remove the screw (CCP, M3x8) securing the Driven Pulley Holder.
9. Take out the Driven Pulley Holder.
10. Remove the E-ring.
11. Remove the Driven Pulley.

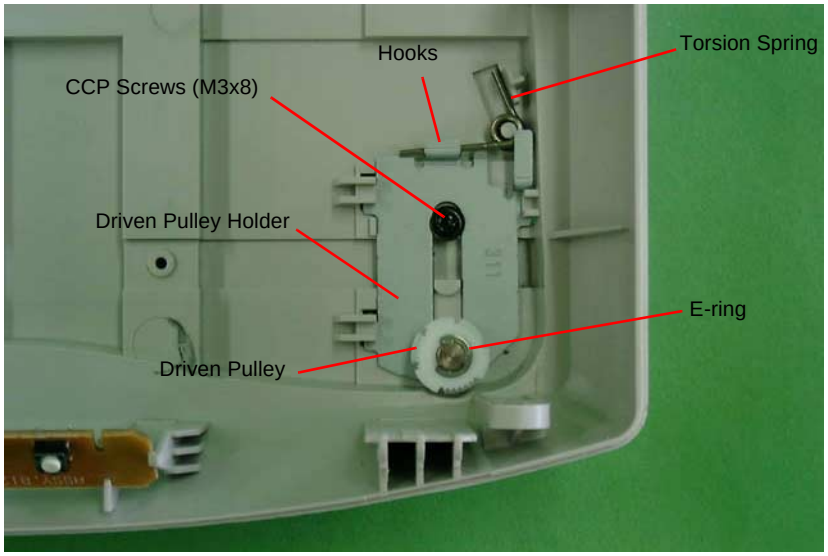


Figure 4-30. Driven Pulley Removal

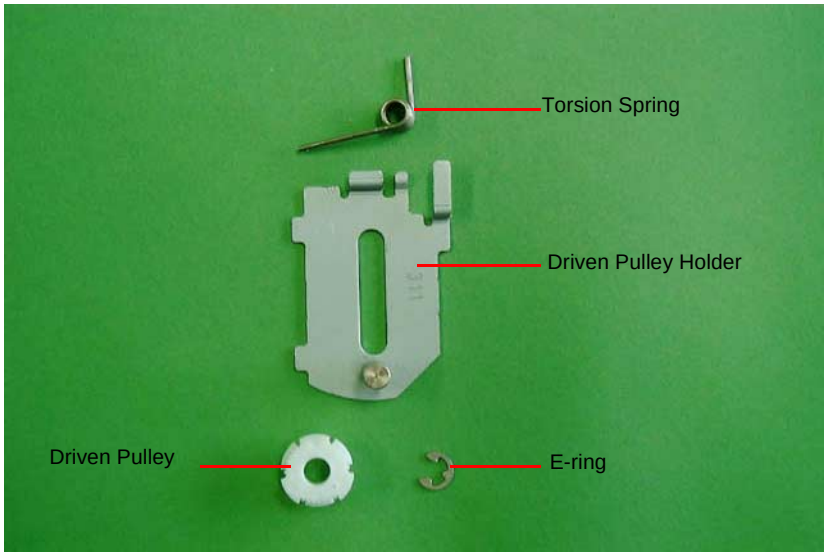


Figure 4-31. Driven Pulley Unit

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 a direct effect on scanned images. Therefore, be sure to clean the glass well to remove stain thoroughly.

CAUTION

Never apply any organic solvents such as thinner or benzene, since these may deteriorate plastic and rubber parts.

- ☐ Outer Cases
  Wipe dirt off with a clean cloth, moistened with water and squeezed tightly. To remove severe stains, use a neutral detergent.
- ☐ Document Glass
  Remove dust and paper debris with a dry, clean cloth. If the dirt is severe or foreign matter is stuck on the glass, use a cloth soaked with neutral detergent. If any trace is left, wipe it off with a dry, clean cloth again.

6.1.2 Lubrication

You need to lubricate the carriage unit if you have replaced it or notice it making abnormal noise. See the following tables for the recommended grease type and points to apply it.

Table 6-1. Recommended Grease

Grease Type	Contents	Part Number	Availability
G-26	40g	B702600001	E *

**: EPSON exclusive (Not on the market)*

Table 6-2. Lubrication Points

Figure	Lubrication Points	Lubrication
Figure 6-1	Transmission gear shaft of the CR motor and drive pulley shaft.	G-26 (1x3 mm) for each
Figure 6-1	Driven pulley shaft	G-26 (1x3 mm)

CAUTION

Excessive lubrication may cause the carriage mechanism to be damaged or operate abnormally.

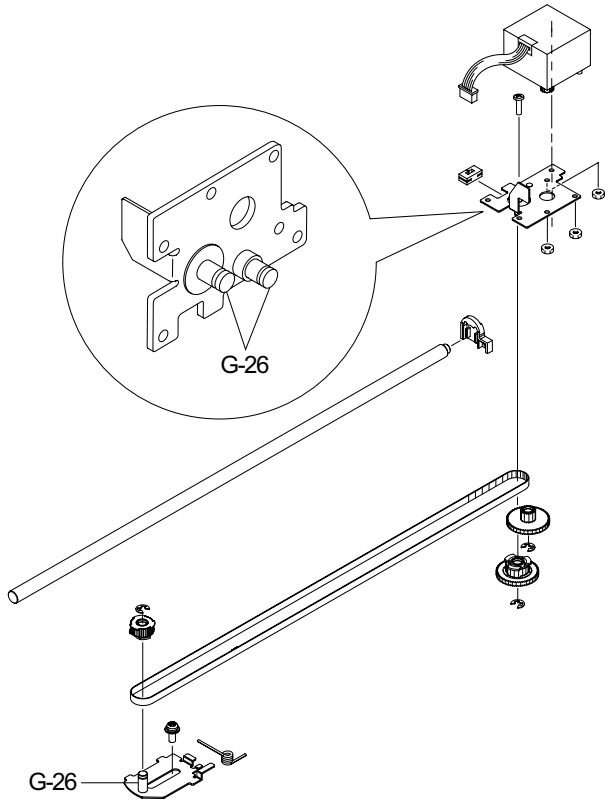


Figure 6-1. Lubrication Points

CHAPTER

7

APPENDIX

7.1 Overview

This section provides useful information for servicing this scanner.

7.1.1 Interconnection

Following figures shows interconnection of the scanner.

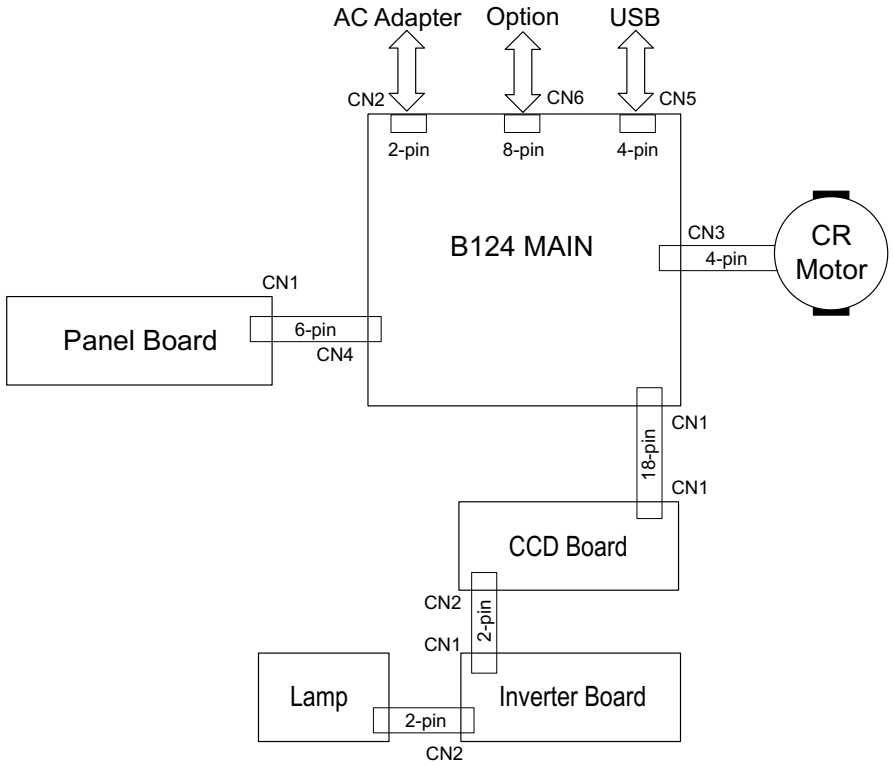


Figure 7-1. Interconnection

7.1.2 Connector Assignment

Table 7-1. Connector Summary- B124MAIN

Connector Number	Description	Number of Pins	Refer to:
B124MAIN Board			
CN1	To the CCD Sensor Board	18	Table 7-2
CN2	AC Input	2	Table 7-3
CN3	To the CR Motor	4	Table 7-4
CN4	To the Panel Board	6	Table 7-5
CN5	To the USB Cable	4	Table 1-1
CN6	To Option	8	Table 7-6
CCD Sensor Board			
CN1	To the Main Board	18	Table 7-2
CN2	To the Inverter Board	2	Table 7-7
Inverter Board			
CN1	To the CCD Sensor Board	2	Table 7-7
CN2	To the Lamp	2	Table 7-8
Panel Board			
CN1	To the Main Board	6	Table 7-5

Table 7-2. Main Board - CN1

Pin No.	Signal	I/O
1, 3, 5, 7, 18	GND	-
2	B	I
4	R	I
6	G	I
8	B-SH	O
9	R-SH	O
10	G-SH	O
11	SH	O
12	12V	O
13	F1X	O
14	F2X	O
15	RS	O
16	5V	O
17	24V	O

Table 7-3. Main Board - CN2

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

Table 7-4. Main Board - CN3

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

Table 7-5. Main Board - CN4

Pin No.	Signal	I/O
1	GND	-
2	OP-LED	O
3	ERR-LED	O
4	PM-SW1	I
5	PM-SW2	I
6	PM-SW3	I

Table 7-6. Main Board - CN6

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

Table 7-7. CCD Sensor Board - CN2

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

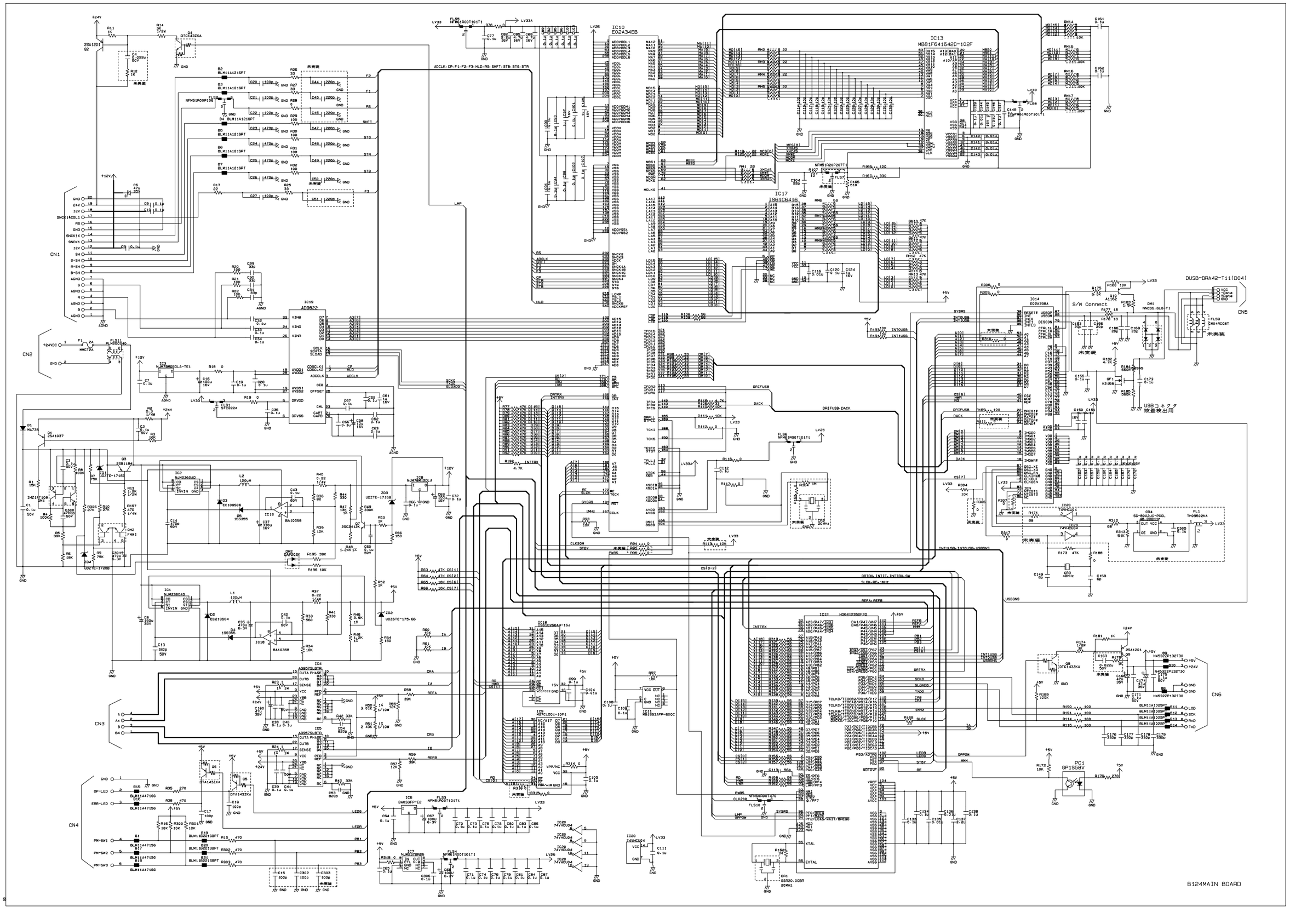
Table 7-8. Inverter Board - CN2

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

7.2 Circuit Diagram

The figure on the next page shows the circuit diagram of B124 MAIN.

- ☐ B124 MAIN BOARD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IC16 M5M5256AH-15J
IC9 H27C1001-10F1
IC4 A3957SLBTR
IC5 A3957SLBTR
IC6 BA033FP-E2
IC7 NJM2370R26
IC18 BA10358
IC1 NJM2360AD
IC2 NJM2360AD
IC3 NJM78M05DLA-TE1
IC8 NJM78M09DLA
IC11 M51953AFP-600C
IC20 74VHCU04
IC21 74VHC08
CN1
CN2
CN3
CN4
CN5
CN6
S/W Connect
USBコネクタ
検査検出用
B124MAIN BOARD

7.3 Parts List and Explode Diagrams

Table 7-9. Parts List

Ref.#	Description	Ref.#	Description	Ref.#	Description
100	HOUSING ASSY.,LOWER;ASP	131	TIMING BELT	201	WIRE HARNESS
101	HOUSING ASSY.,UPPER;ASP OTHERS	132	HOLDER ASSY.,PULLEY,DRIVEN	300	AC ADAPTER
102	LEVER,MOUNT,CARRIAGE	133	TORSION SPRING,238	400	POWER CABLE
103	MAT,COVER,DOCUMENT	134	SHAFT,CR	401	HARNESS
104	COVER,DOCUMENT	135	RETAINING RING	450	BOARD ASSY.,PNL
105	FERRITE CORE	136	CLIP SHAFT	500	CARRIAGE ASSY.
106	RAIL,CR	137	PULLEY,DRIVE	501	FERRITE CORE
107	FOOT	138	PULLEY,IDLE	502	HARNESS
108	DOUBLE SIDE TAPE,22X10	140	C.B.P-TITE SCREW,3X8,F/ZN	503	C.C.P-TITE,3X8,F/ZB
109	HOOK,HOUSING	141	C.C.P-TITE,3X8,F/ZB	504	COVER,CARRIAGE
110	COVER,MAIN BOARD	142	C.P.SCREW	505	LAMP SET,ASP;N
111	BASE PLATE,MAIN BOARD	150	MOTOR,ASSY.,CR	506	COVER,LAMP
112	SHEET,SLIDE	151	HOLDER ASSY.,MOTOR	507	DOUBLE SIDE TAPE,22X10
113	GASKET,ROM	152	COVER,HARNESS	508	REFLECTER,LAMP
120	LOGO PLATE 27.5X27.5	153	6N,3,F/ZN	509	SHEET,CARRIAGE,LOCK
130	PULLEY,DRIVEN	200	BOARD ASSY., MAIN	510	COVER,HOLE

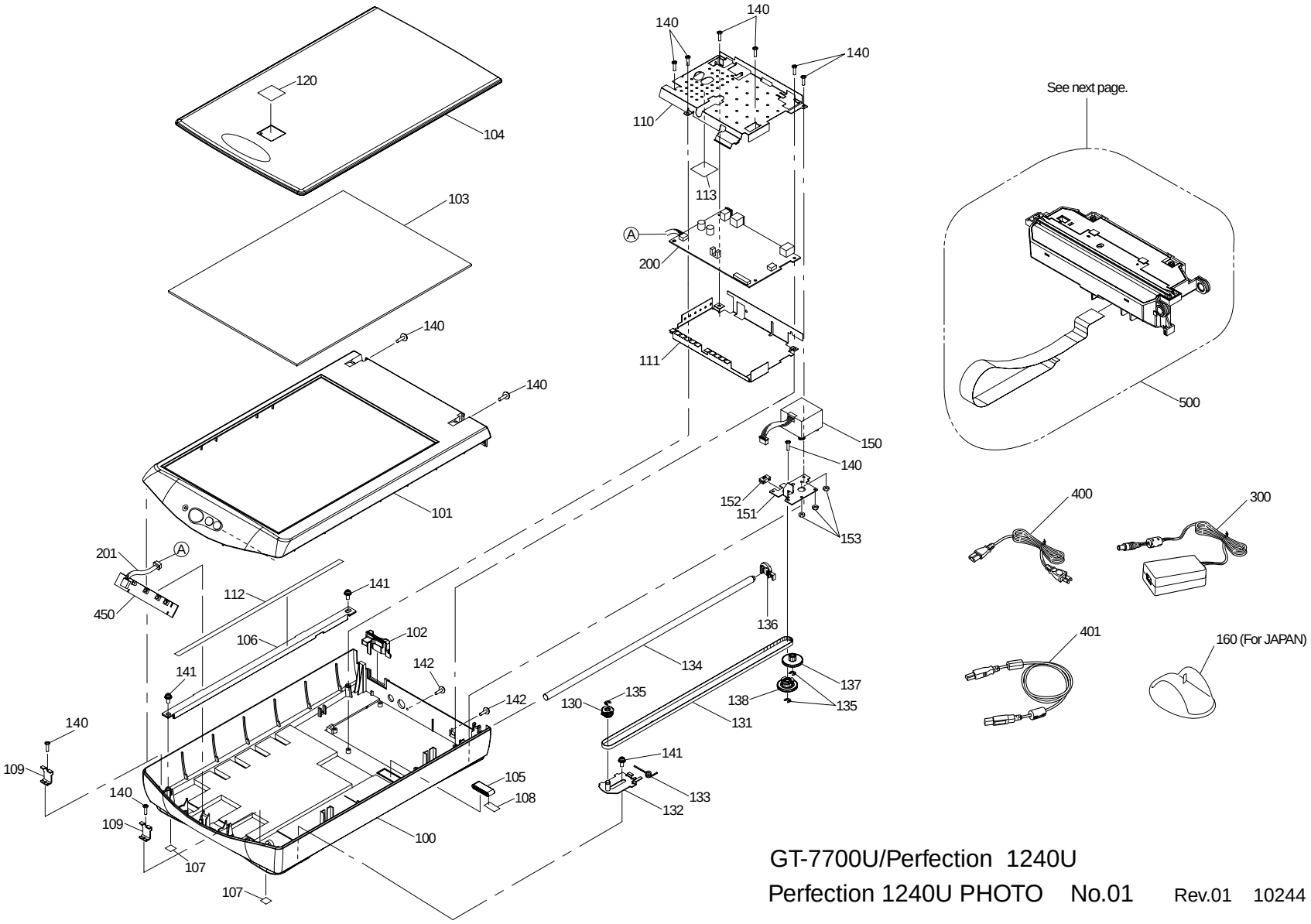

Figure 7-2. Exploded Diagram No.1

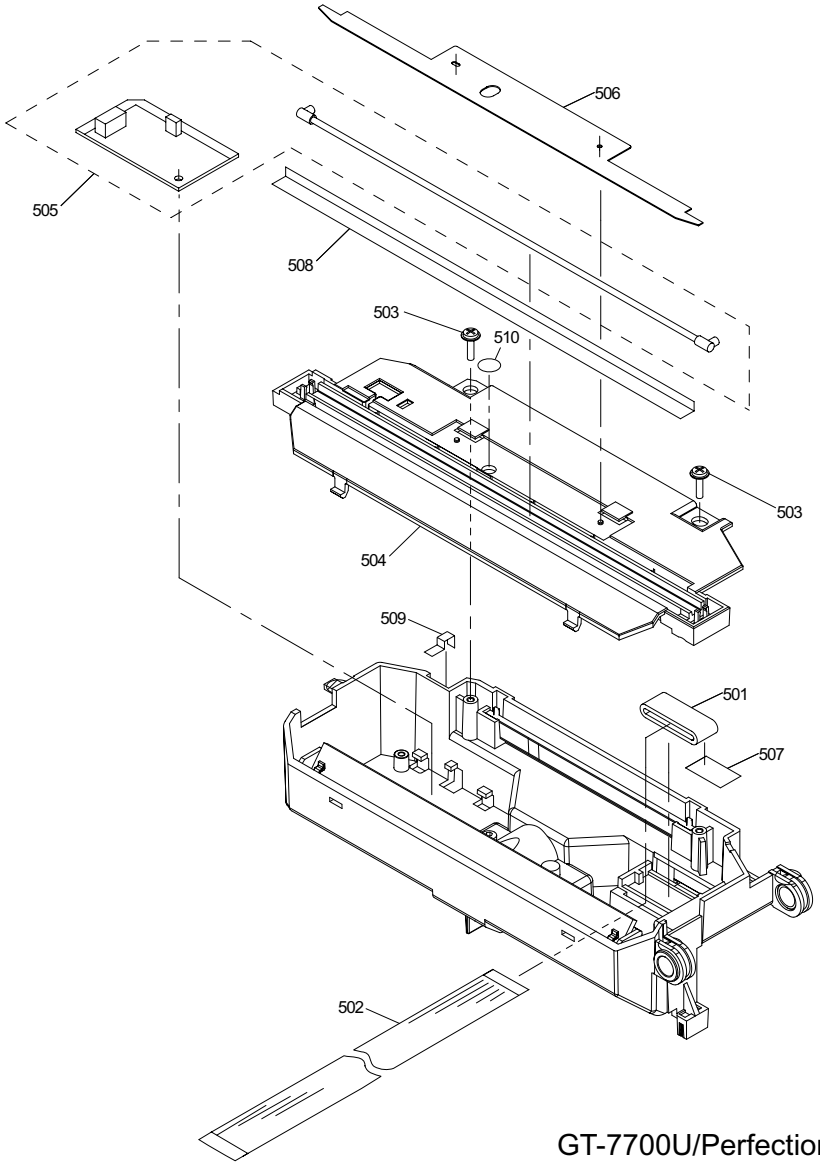

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Figure 7-3. Exploded Diagram No.2

7.4 TPU; Parts List

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

Table 7-10. TPU Parts List

Number	Parts Name
800	HOUSING ASSY.,UPPER
801	B/L ASSY.
802	COVER,ILLUMINATION
803	HOUSING,LOWER
804	HOUSING,BASE
805	HOUSING,FASTEN,R
806	HOUSING,FASTEN,L
807	BOARD ASSY.,INVERTER
808	HARNESS
809	FOOT
810	SHEET,SPACER
811	C.B.B. SCREW
812	C.B.B.SCREW
813	C.B.B. SCREW
814	C.B.P-TITE SCREW,3X8,F/ZN
815	LABEL,CAUTION TPU
816	LABEL,UL;B
820	FILM HOLDER
821	FILM HOLDER;B
822	FILM HOLDER;C
823	FILM HOLDER,35
824	LABEL,FILMHOLDER

7.5 Exploded Diagram for TPU

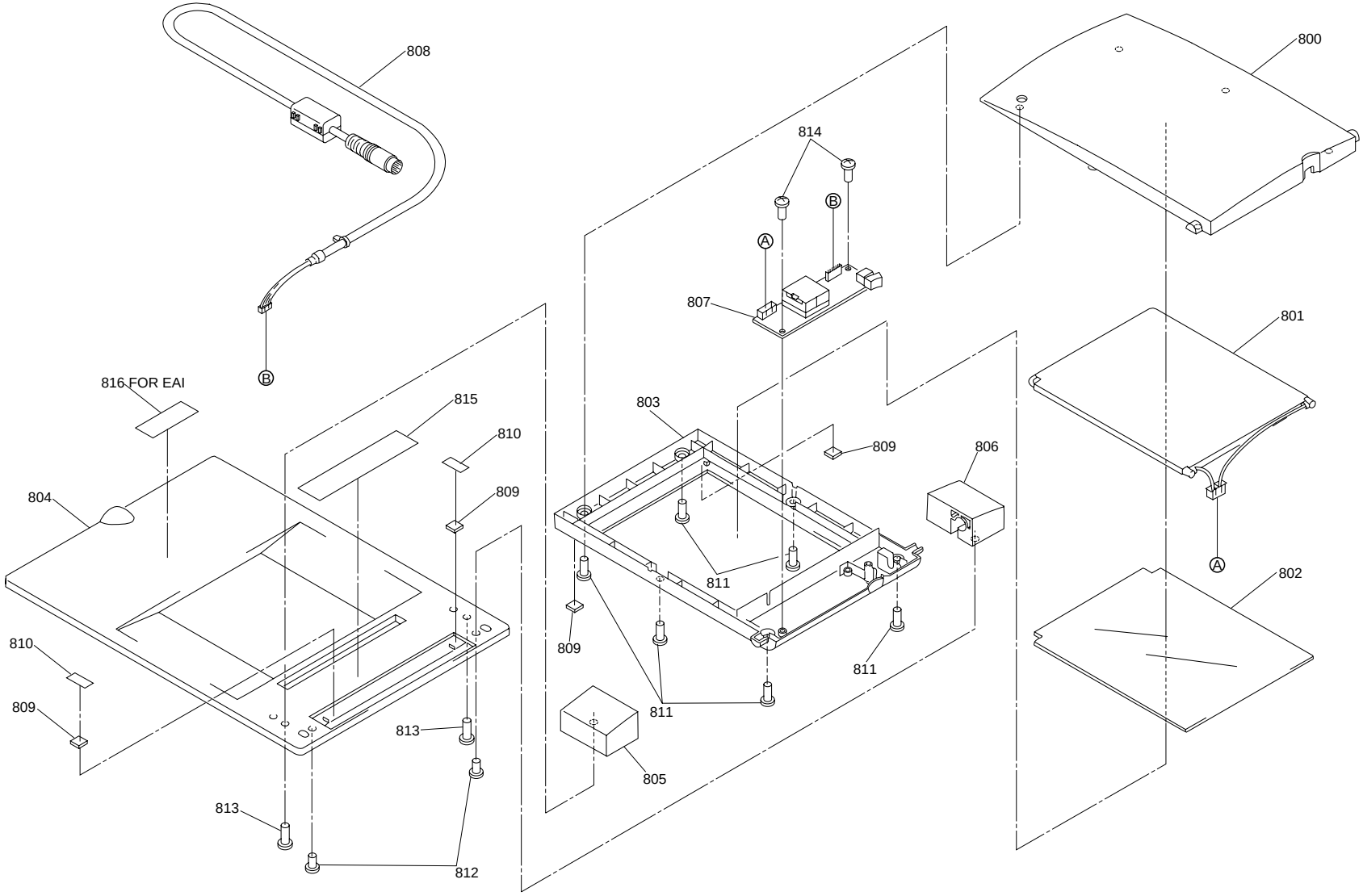

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Figure 7-4. Exploded Diagram for TPU

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