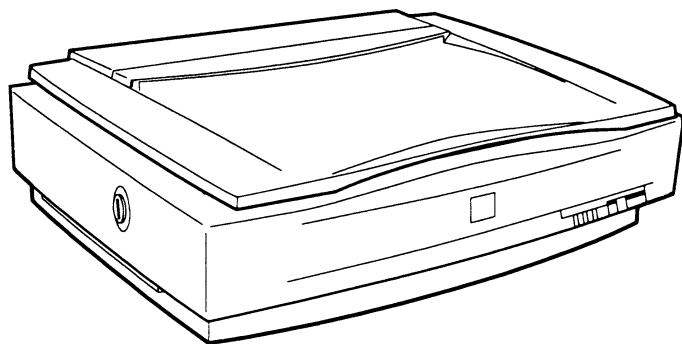


SERVICE MANUAL



Color Image Scanner
EPSON GT-12000



EPSON®

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PRECAUTIONS

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 UNFAMILIER 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 GT-12000. 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

Provides Epson-approved methods for adjustment.

CHAPTER 6. MAINTENANCE

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

APPENDIX

Provides the following additional information for reference:

- Connector pin assignments
- Electric circuit boards components layout
- Exploded diagram
- Electrical circuit boards schematics

REVISION STATUS

Rev.	Date	Page(s)	Contents
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CHAPTER

1

PRODUCT DESCRIPTIONS

1.1 OVERVIEW

The GT-12000 is an A3 size flat-bed type color image scanner. The main features of the scanner are:

- ☐ High resolution
Optical resolution is 800 dpi.
- ☐ Wide readable area
Accommodates up to A3 size.
- ☐ High-quality image
12bit A/D input/output (optical density is 3.0.)
- ☐ High-speed scanning
Scanning A3/Portrait At 800dpi / Draft-mode;
Full-color = Approx. 15mS/line
256 Gray = Approx. 10.8mS/line
Line art = Approx. 10.8mS/line
- ☐ Adjustable Focusing function
Adjustable up to 5mm above the surface of document table.
- ☐ Quick operation
Xe-Gas Cold Cathode Fluorescent Lamp allows no initial light-up for immediate scanning.
- ☐ New command level: ESC/I-B8 (B6 level with Focus control)
- ☐ Optional unit enhancing the function of the unit
 - Transparency Unit
 - Duplex scanning ADF (Automatic Document Feeder)

1.2 SPECIFICATION

GENERAL

Type:	Flat-bed color image scanner
Scanning Method:	Sub-Scanning mirror movement system
Photoelectric Device:	Color CCD Line sensor
Color Separation:	Color filter separation
Light Source:	Xe-Gas Cold Cathode Fluorescent Lamp
Scanning Resolution:	800 (Main) by 800 (Sub) dpi
Output Resolution:	50 to 3200dpi (1dpi increment)
Effective Picture Element:	9760 by 13760 pixel (Max.)
Maximum Readable Area:	12.2 by 17.2 inch (310 by 437mm)
Scanning Speed:	At 800 dpi / Draft mode;

Table 1-1. Scanning Speed

Original	A4/Portrait	A4/Portrait - A3/Portrait
Reading Area	Less than 210mm	210 to 310mm
Line Art	Approx. 7.5mS/line	Approx. 10.8mS/line
256 Gray-scale	Approx. 7.5mS/line	Approx. 10.8mS/line
Full Color	Approx. 10.0mS/line	Approx. 15.0mS/line

IMAGING FUNCTIONS

Gradation:	Input/internal process = 12bit/pixel Output = 8 or 12bit/pixel
Zoom:	50 to 200% (1% increment)
Gamma Correction:	CRT (A/B) PRINTER (A/B/C) User definable (1 level)
Color Correction:	Impact-Dot Printer Thermal Printer Ink jet Printer CRT Display User definable (1 level)
Brightness Control:	7 levels
Image Processing:	Bi-level= Fixed threshold TET Half-toning= Error diffusion (A/B/C) Dither (Resident) (A/B/C/D) Dither (user definable) (A/B)
Focusing:	One-piece CCD/Lens movement system

INTERFACE

Standard Interface:	Bi-Directional Parallel SCSI (50/50 pin connectors)
---------------------	--

SOFTWARE

Commend Level:	ESC/I-B8 (B6 level with Focus control)
----------------	--

ELECTRICAL SPECIFICATION

Power supply voltage:	[120 V version] Rated voltage = AC100 - 120 V ($\pm 10\%$) [220-240 V version] Rated voltage = AC220 - 240 V ($\pm 10\%$)
Rated frequency range:	50 / 60 Hz (49.5 - 60.5 Hz)
Power consumption:	Approximately 60 W (without an optional unit) Maximum 75 W (with an optional unit)
Insulation resistance:	10 M Ω at 500 VDC (between AC line and chassis)
Dielectric strength:	AC 1.5 KV / minute (between AC line and chassis)
Static electricity:	Panel = 10 KV Metal = 7 KV / 150 pF, 150 Ω

SAFETY, EMC

Safety regulation:	UL1950 with D3 CSA C22.2 NO. 950 with D3
Low voltage directive 73/23/EEC:	EN60950 (TUV) EN60950 Nordic Deviation (NEMKO) FCC Part15 Subpart B Class B (USA) CSA C108.8 Class B (Canada) AS/NZS3548 Class B
EMC:	
Directive 89/336/EEC:	EN55022 Class B EN61000-3-2 EN61000-3-3 EN50082-1 IEC 801-2 IEC 801-3 IEC 801-4

ENVIRONMENTAL CONDITIONS

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

RELIABILITY

Main unit:	MCBF 100,000 cycle
------------	--------------------

OPERATING CONDITIONS

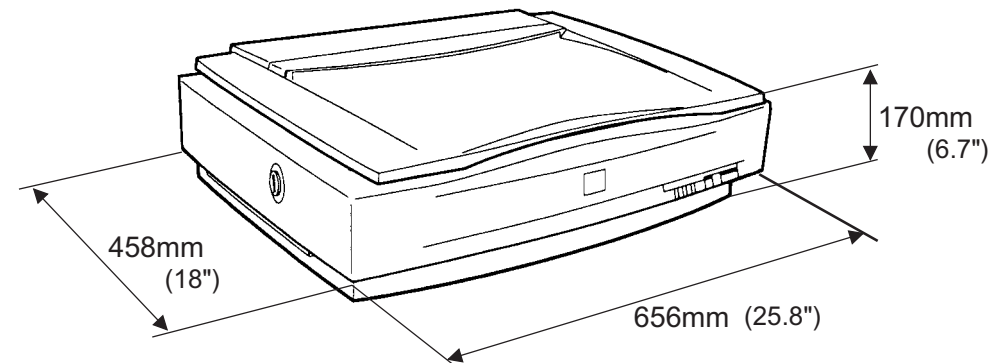
Dust:	Ordinary office or home conditions. (Should be kept away from extreme dust.)
Illumination:	Operation under direct sunlight or near strong light source should be avoided.

DOCUMENT

Reflective type:	Smooth surface such as a printing and photograph.
Transparency type:	Reversal film, Negative film Note: The optional transparency unit must be used.

PHYSICAL DIMENSIONS AND WEIGHT

Dimensions:	656 (W) x 458 (D) x 170 mm (H) (See Figure 1-1.)
Weight:	Approximately 20 Kg

**Figure 1-1. External Dimension of the GT-12000**

1.3 INTERFACE SPECIFICATION

This scanner is equipped with the following interfaces:

☐ Bi-directional Parallel Interface

- Data: 8 bit parallel
- Handshake: BUSY, /ACK handshaking
- Signal: TTL level
- Connector: 36 pins (Amphenol)

☐ SCSI interface

- Function: Conforms to ANSI Standard X3.131-1986.
- Electrical specification: Conforms to ANSI Standard X3.131-1986.
(TTL compatible level)
- Connector: 50 / 50 pin (Amphenol)
- Terminator: Internal terminator
Switches between “active” and “inactive”
- SCSI ID Set with an internal rotary switch
(Range: 0 - 7)

1.4 CONTROL CODE

The command level for this scanner is ESC/I-B8. The commands supported are shown in the table below.

Table 1-2. Control Code Summary

Category	Command Name	Code
Execute Command	Identity Request	ESC I
	Status Flag Request	ESC F
	Extended Status Flag Request	ESC f
	Parameter Request	ESC S
	Scanning Start	ESC G
	Scanning End	ESC E
Data Format Setting	Set Data Format	ESC Di
	Set Resolution	ESC R n1 n2
	Set Zooming	ESC H i1 i2
	Set Read Area	ESC A n1 n2 n3 n4
	Set Color	ESC Ci
	Mirroring	ESC Ki
Image Setting	Set Brightness	ESC Li
	Set Gamma Correction	ESC Zi
	Download Gamma Table	ESC zi d0 d1 - d255
	Set Sharpness	ESC Qi
Image Processing	Set Digital Halftoning	ESC Bi
	Set Auto Area Segmentation	ESC si
	Download Dither Pattern	ESC b l l j d (j2)
	Set Color Correction	ESC Mi
	Download Color Correction	ESC m d1 d2 - d9
	Set Threshold	ESC t
	Set Contrast	ESC c

Table 1-3. Control Code Summary (continued)

Category	Command Name	Code
Auxiliary	Set Scanning Mode	ESC gi
	Initialize	ESC @
	Set Line Counter	ESC di
	Control Option	ESC ei
	Set Focus	ESC pi
	Focus Position Request	ESC q
	Set Ratio Correction for Main and Sub Scan	ESC Wi
	Set the Film type	ESC Ni
	Eject Paper	ESC FF
	Feed Paper	ESC PF
Control	Normal Response	ACK
	Abnormal Response	NACK
	Abort Scanning	CAN
	Header	STX

1.5 OPERATION SPECIFICATIONS

1.5.1 Switch Specification

This scanner is equipped with 4 switches. Their functions are described below:

- ❑ **“OPERATE”**
 - Turns on and off the scanner.
 - Pressing this switch for power-on initializes the scanner.
- ❑ **“RESET”**
Initializes the scanner.
- ❑ **SCSI ID rotary switch** (located at the back of the scanner)
Sets the SCSI device ID for this scanner when the SCSI interface is used to connect the scanner with the host computer.
Note: The factory default value for this scanner is “2”.
- ❑ **SCSI terminator setting switch** (located at the back of the scanner)
Alternates the internal terminator setting between “Connected” and “Disconnected” when the SCSI interface is in use.
Note: The factory default setting for this switch is “On” (Connected).

1.5.2 LED Specification

This scanner has the following 3 LED indicators:

- ❑ **OPERATE** ■
Indicates the scanner’s power On/Off status. It is on when the scanner power is on.
- ❑ **READY** ■
 - Comes on when the scanner is ready to receive commands. It flickers during scanning due to data transmission between the host computer and the scanner.
 - Indicates an error type in combination with the ERROR LED indicator when an error has occurred.
- ❑ **ERROR** ■
Comes On when an error has occurred.

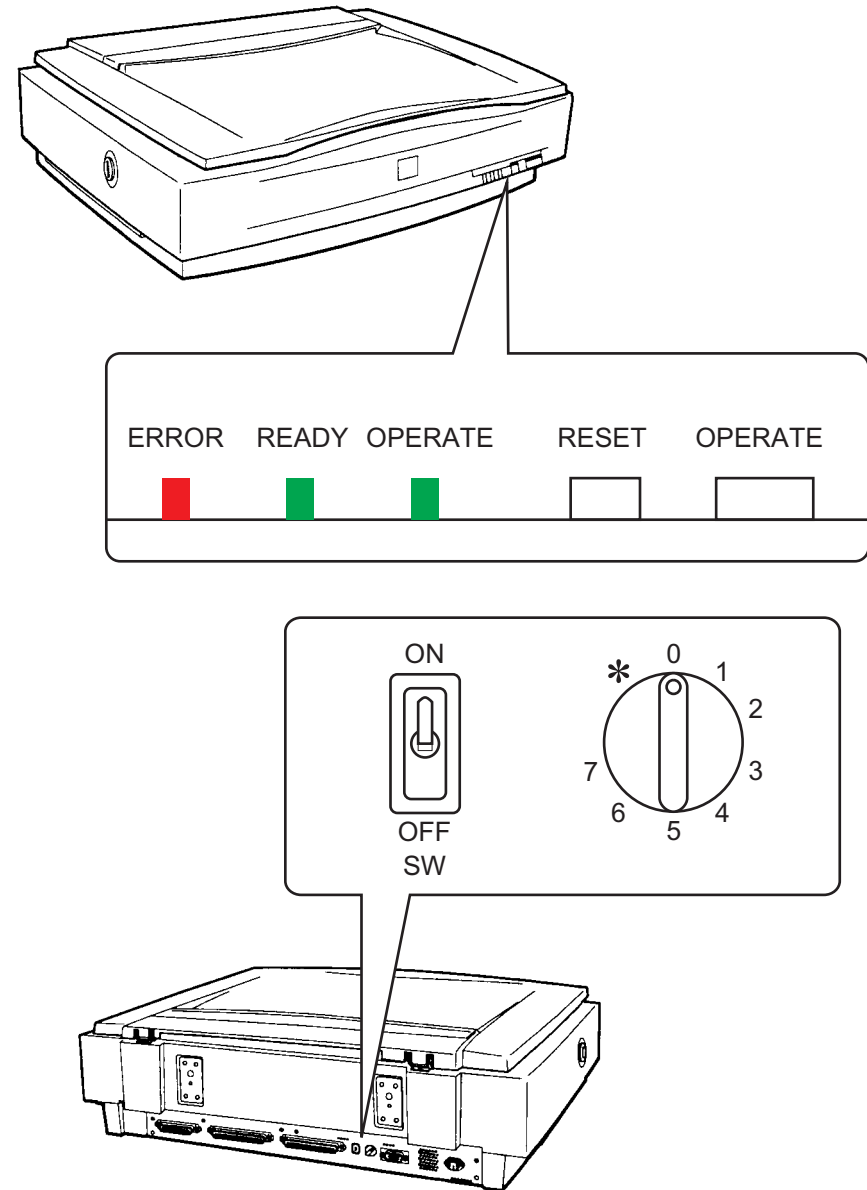


Figure 1-2. Buttons, Switches and LED Indicators

1.5.3 Switch Setting

Among the switches equipped with this scanner, SCSI switch and the terminator switch, which are used for SCSI interface, have the following settings:

☐ SCSI-ID setting switch

ID No.	Availability	Note
0	Available	Normally assigned to other SCSI device such as a hard disc.
1	Available	Normally assigned to other SCSI device such as a hard disc.
2	Available	Set at the factory to the scanner.
3	Available	
4	Available	
5	Available	
6	Available	
7	Available	Normally assigned to the SCSI host adopter.
(Blank)	Not Available	Not effective / Not used
*	Not Available	Not effective / Not used

✓CHECK POINT

Do not set the ID number that is already assigned to other SCSI device.

☐ Terminator switch

Setting	Note
ON	Connects to the terminal resistor. /Factory default setting
OFF	Disconnects from the terminal resistor.

✓CHECK POINT

Be aware that the terminator switch must be set according to the scanner location on the “daisy-chain”.

1.5.4 Error Indication

When an error has occurred, the error type is indicated by the corresponding combination of the “READY” and “ERROR” LED indicators.

Table 1-4. Error Types and Corresponding Indications

READY ■	ERROR ■	Error Type
ON	ON	Command error
OFF	Blinks	Communication error
Blinks	Blinks	Fatal error
OFF	OFF	Option error

Note: The remedies for these errors are provided in Chapter 3 “Troubleshooting”.

1.5.5 Readable Area

The origin point for this scanner is marked at the rear left corner of the document table viewed from the front. See Figure 1-3 for the maximum readable area of the scanner.

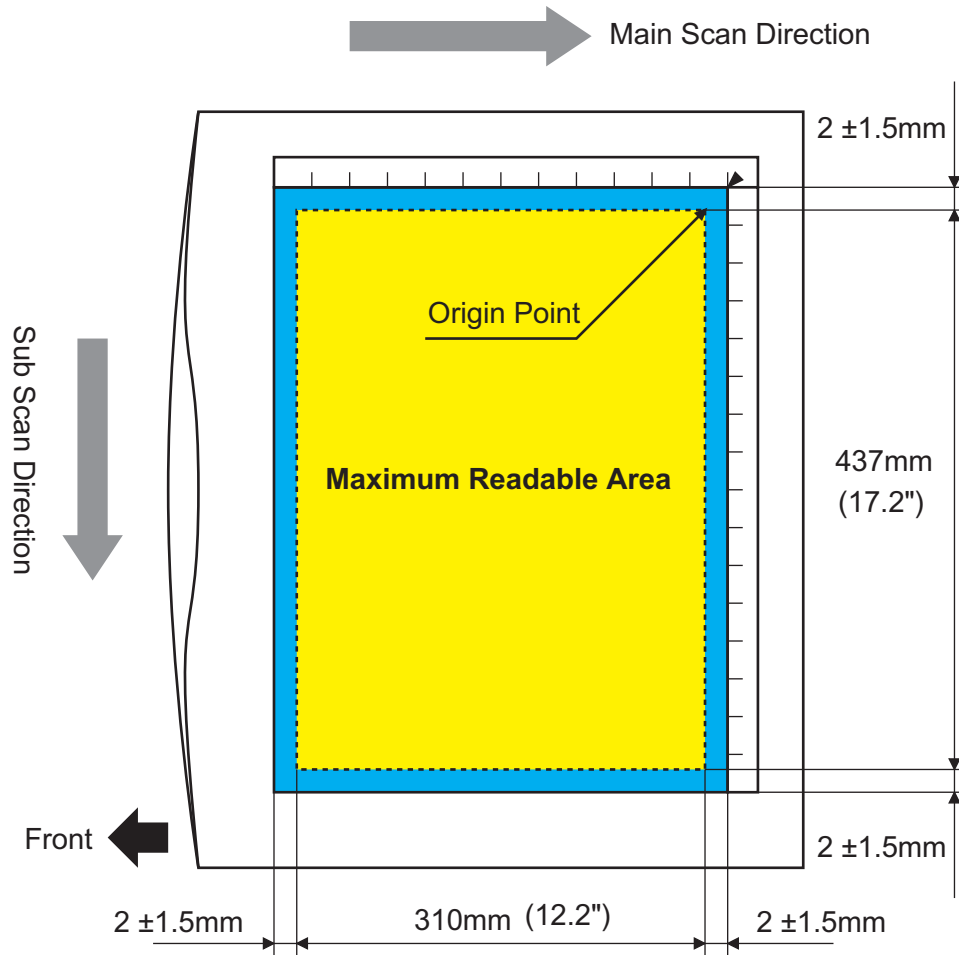


Figure 1-3. Maximum Readable Area

1.5.6 Transportation Screw

A transportation screw is attached to the left side of the scanner viewed from the front. Fastening the screw fixes the CR to protect the scanner from the shock while the scanner is transported or moved. Be sure to turn the screw to the unlocking position (Described in the figure below.) before turning the scanner power on.

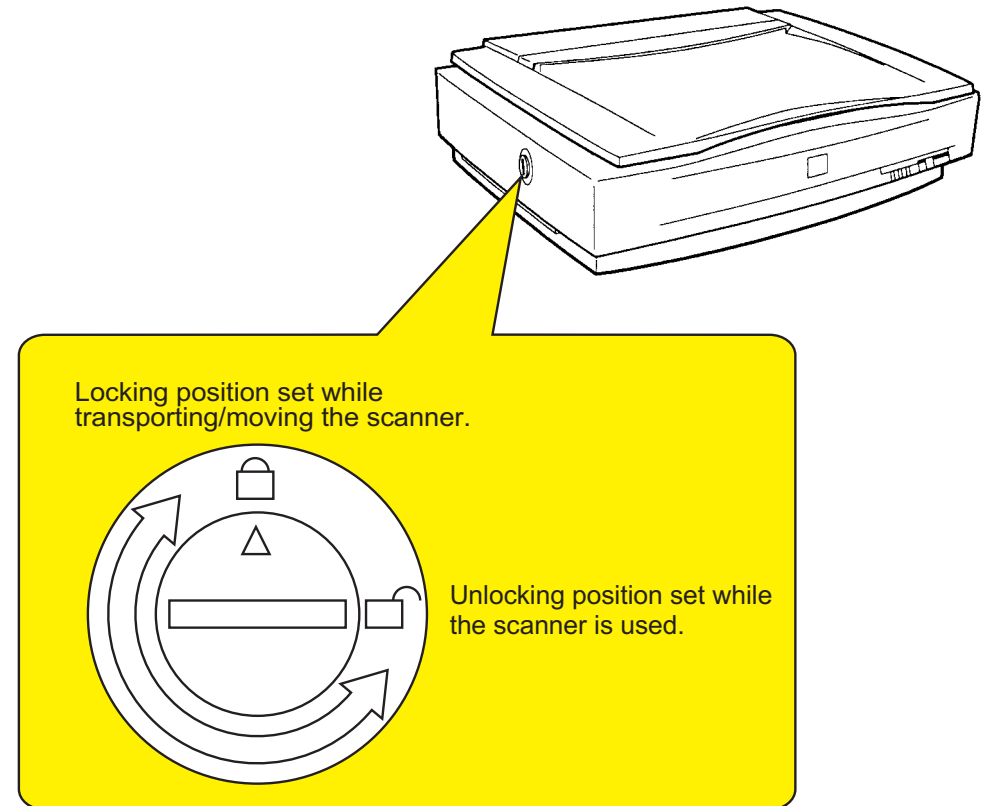


Figure 1-4. Transportation Screw

CHAPTER

2

OPERATING PRINCIPLES

2.1 GENERAL DESCRIPTION

The EPSON GT-12000 is mainly composed of the following units:

- ❑ Scanner mechanism
(Lamp/Mirror units, CR drive mechanism, integral lens/CCD sensor unit drive mechanism)
- ❑ Control Circuit
- ❑ Power supply circuit

The EPSON flat-bed type scanners usually read images by moving the integral CR unit which consists of the lamp, mirror, lens/CCD sensor. This scanner, however, characteristically has the CCD sensor and the lens in the whole unit attached onto the mechanism as an independent unit. This scanner is also equipped with the newly designed focusing function which enables the scanner to focus by adjusting the distance between the lens and the CCD sensor. Therefore, the lens unit is set movable and driven by the specified motor. Since the separate units in the mechanism such as the lamp (light source) and the mirrors move at their own speed for reading, the incident distance of the reflected light from the document to the CCD sensor is kept constant.

The control circuit board and the power supply circuit board are stored in the separate shield compartment. Since it is only connected to the connector board in the scanner mechanism, it is removed and maintained with ease.

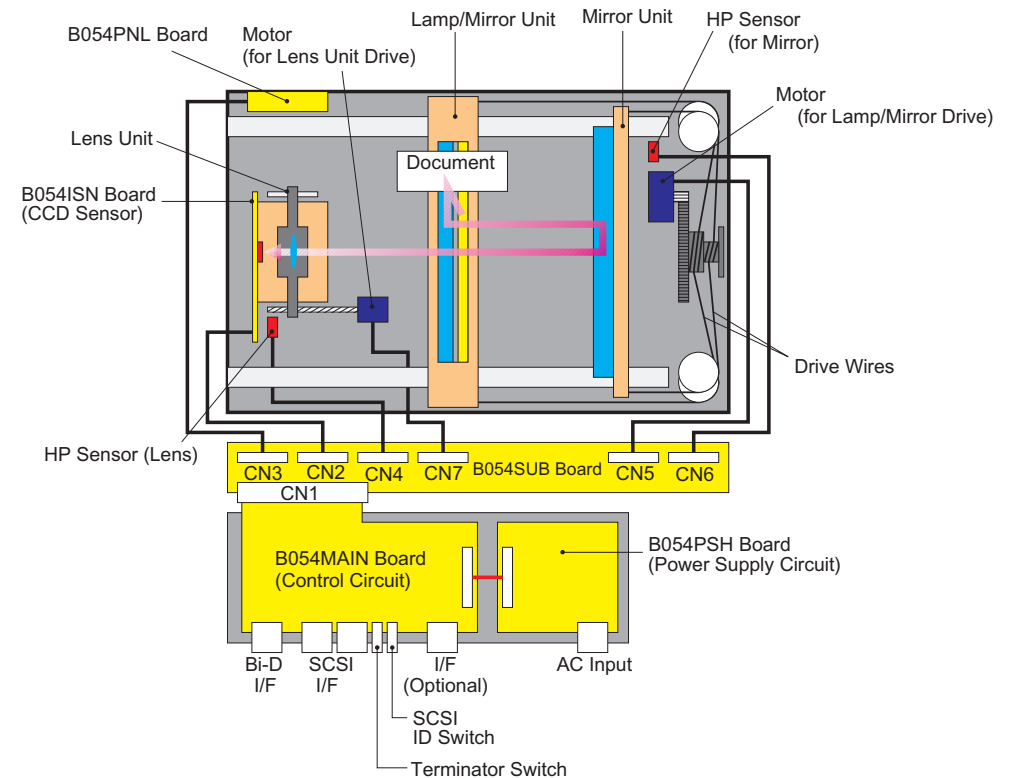


Figure 2-1. Main mechanism Structure of the GT-12000

2.2 MECHANISM OPERATING PRINCIPLES

Compared with other EPSON scanners, the main feature of this scanner lies in its new optical mechanism used for reading images. Instead of the united lamp & CCD movement system used for other scanners, this scanner scans with the fixed CCD sensor and separate lamp and the mirror units. Since the color CCD line sensor is used for the reading device, only one light source is equipped and light is separated through the RGB color filter.

As shown in Figure 2-2, the light source (high luminance cold cathode xenon lamp), the first reflection mirror unit and the second reflection mirror unit move independently at their own speed. Therefore the length of the incident light reflected from the document to the CCD sensor is kept constant. (Otherwise, excluding the fixed L1 and L2, LV1 and LV2 keep changing to make the incident light length "L" constant.) Drive from the stepping motor moves each mirror unit via the wires.

The CCD sensor and the lens are united into one unit, which is semi-fixed on the base frame. For focusing function, it moves toward the optic with the drive sent from the motor. (The focusing area with this function is from 0 to 5 mm (maximum) above from the glass surface.

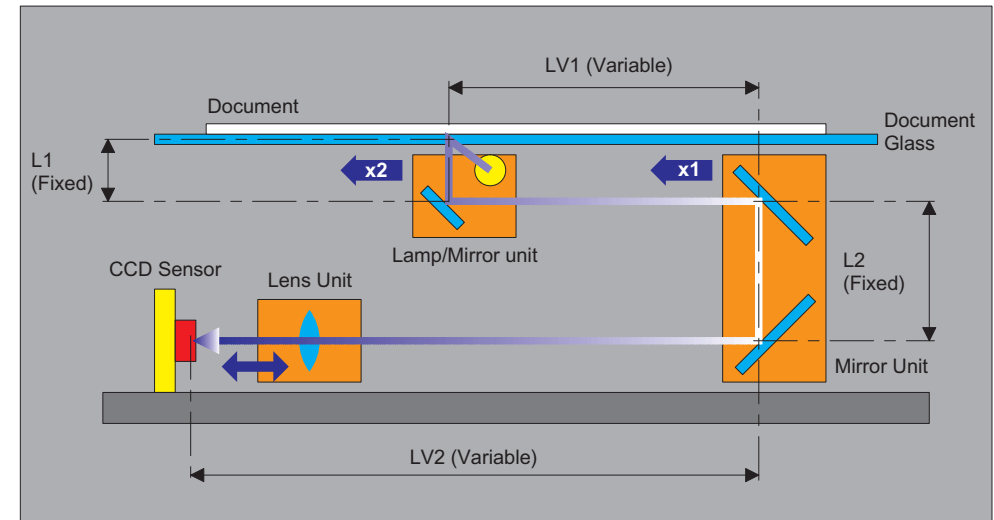


Figure 2-2. Optical Unit Structure

2.3 ELECTRICAL CIRCUIT OPERATIONS

This section describes the electrical circuit of the GT-12000.

2.3.1 Control Circuit Operation

The control circuits of this scanner are:

- ❑ B054MAIN board (Main control circuit board)
- ❑ B054SUB board (Relay board)
- ❑ B054PNL board (Control panel board)
- ❑ B054ISN board (CCD sensor board located on the CR)

Among various functions controlled by B054MAIN board, the core control circuit of the scanner, and B054ISN, process from reading image with the CCD sensor to processing image signals is described below:

- ❑ B054ISN Board (CCD image sensor)
 - Photoelectric conversion:
Converts light reflected from the document (light energy) into electrical energy (electrical charge).
 - Amplification
 - A/D conversion:
Converts the image data produced in the form of analog electrical signal into 12-bit digital data.
- ❑ B054 MAIN Board (processing image data)
ASIC (IC24) on this board manages most of the following functions:
 - Shading correction:
Performs image data correction on a black and white basis.
 - Numbers of image correction such as gamma correction, color correction, halftoning correction. (They are carried out according to the settings on the host side.)

After passed these processes, image data is finally output to the host.

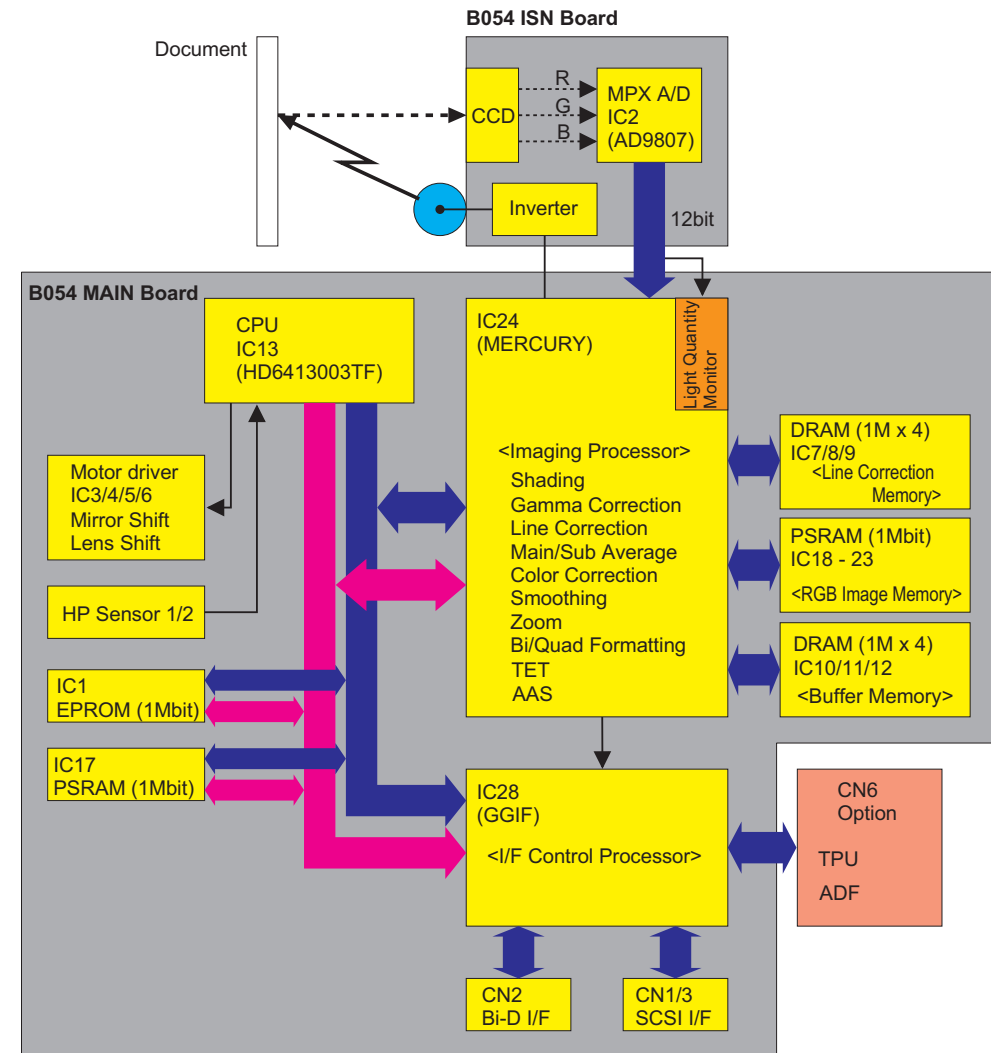


Figure 2-3. Control Circuit Block Chart

B054MAIN BOARD

Name	Location	Description
CPU HD6413003TF	IC13	The CPU, which operates at 16 MHz, controls this board.
ASIC MERCURY	IC24	an image processor which controls the followings: <ul style="list-style-type: none"> • CCD • Line correction memory • Buffer memory • Image processing
ASIC CGIF	IC28	This I/F control processor controls the followings: <ul style="list-style-type: none"> • SCSI I/F • Bi-D I/F • Address decode • PSRAM refresh • Reset control
DRAM (1MX4)	IC7-9 IC10-12	Line correction memory Buffer memory
PSRAM (1M)	IC8-23	RGB image memory
ROM (1M)	IC1	Firmware memory

B054ISN BOARD

Name	Location	Description
CCD sensor ILX734K	IC1	Color CCD line sensor <ul style="list-style-type: none"> • Effective pixel = 10500x3 lines • Single side reading system • Shutter function
ADC AD9807	IC2	A/D converter processing IC Minimum resolution = 12 bit

B054SUB BOARD

This is a relay board, a module is in the shield compound along with the PSB/PSE board, which connects the B054ISN in the mechanism with the B054PNL board.

B054PNL BOARD

This board has a power switch (push-lock), RESET switch and LED indicators (OPERATE, READY, ERROR).

2.3.2 Power Supply Circuit Operation

Since the power supply circuit board B054PSH for this scanner meets the universal specification, it can use the rated voltage in the range from 100V to 240V.

The electrical circuit for the AC input part is designed on the basis of 200V line. In case the input voltage is 200V line level, the ordinary full wave rectifying system is used. With this system, the voltage is rectified by the diode bridge DB1 and then smoothed by the serial smoothing capacitors C11 and C32 to produce approximately 250 VDC.

On the other hand, if the input voltage is 100V line level, the doubled voltage rectifying system is used instead. With this system, the input AC current is separated into the following 2 flows; the positive half cycles of the current flow through the control IC (IC2) (from Pin 2 to Pin 3) via the diode bridge (DB1) and the smoothing capacitor C11, and the negative half cycles of the current, however, flow through the smoothing capacitor (C32) and DB1 via IC2 (from Pin 3 to Pin 2). Through these flows, the positive and negative AC current are separately charged in the smoothing capacitors C11 and C32, respectively, and the doubled VDC (approximately 250 VDC) equivalent to the input voltage of the 200V line is produced. At power-on, the control circuit (IC2) is activated by the full wave rectifying system. Then, if the input voltage is 100 VDC line level, the system is automatically switched to the doubled voltage rectifying system after certain period set by the circuit constant.

Except for the full wave rectifier circuit/voltage doubler rectifier circuit at the AC input part, the normal RCC (Ringing Choke Converter) regulator circuit is used for the rest part of the power supply circuit, and the different levels of VDC are distributed to corresponding mechanisms, as shown in Table 2-1:

Table 2-1. DC Output Power

Output VDC	Application
+5 V	Logic power lines
+24 V	<input type="checkbox"/> Motor drive power source <input type="checkbox"/> Power source for the lamp (inverter)
+15 V	+12 V production (Power used to drive the cooling fan for the shield compartment which stores B054 MAIN and B054PSH.)

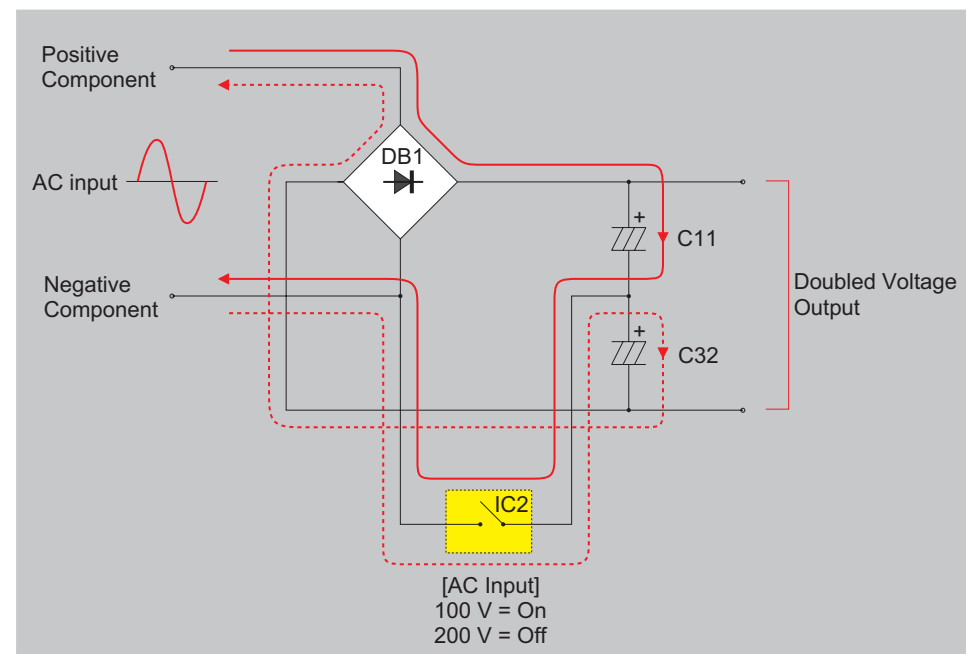


Figure 2-4. Voltage Doubler Rectifier Circuit Operation

CHAPTER

3

TROUBLESHOOTING

3.1 OVERVIEW

This chapter describes the troubleshooting which enables you to solve the problem efficiently when the scanner is operating abnormally. The remedies for the errors detected by the self-diagnostic function and the check point for each phenomenon are described in the following sections.

3.1.1 Error Detection by the Self-Diagnostic Function

The self-diagnostic function equipped with this scanner automatically detects operating status of each part. The abnormal phenomenon detected by the function and remedies are as follows:



Command Error

LED Status	Cause	Operation/Condition
<div><div></div> READY</div> <div><div></div> ERROR</div>	Undefined command is detected.	Ignores the wrong command /parameter (No change made for the current settings.), and returns NACK to wait for the next command/ parameter.
Remedy	The error is cleared by the correct command/ parameter.	



Communication Error

LED Status	Cause	Operation/ Condition
<div><div></div> READY</div> <div><div></div> ERROR</div>	<ul style="list-style-type: none">• Wrong procedure/operation is detected in communication.• In case of SCSI, communication stops for over 30 seconds in any phase other than bus free phase.	The lamp goes off and the scanner stops operating.
Remedy	Turn the scanner Off and back On or press the “RESET” switch.	

Fatal Error

LED Status	Cause	Operation/Condition
 READY  ERROR	<Defect in the hardware> <ul style="list-style-type: none"> The lamp does not light. Scanner is turned on with the CR unlocked. Other defects in the scanner. 	<ul style="list-style-type: none"> The lamp goes off and the scanner stops operating. Sets the status bit "7".
Remedy	Turn the scanner Off and back On or press the "RESET" switch.	

Option Error

LED Status	Cause	Operation/Condition
 READY  ERROR	<Defect in the options> <ul style="list-style-type: none"> The scanner cover is left open. Paper end, etc.. 	Sets the status bit "7".
Remedy	Remove the cause of the error.	

✓CHECK POINT

[Option Error] is detected when the option is installed in the operative condition only.

3.1.2 Troubleshooting

This section provides test points for each major unit and check points for each abnormal phenomenon.

3.1.2.1 Test Points

Test points for the motors and sensors are shown in the tables below.

Motors

❑ Condition: Test the motor without any cables connected.

Motor	Test Point	Signal Level
Motor (for driving the mirror)	<Cable connector> Between Pin 1 and Pin3 Between Pin 2 and Pin 4	15.0 Ω
Motor (for driving the focusing mechanism)	<Cable connector> Between Pin 1 and Pin3 Between Pin 2 and Pin 4	15.5 Ω

Sensors

❑ Condition: Test with the scanner power on.

Motor	Test Point	Signal Level
HP sensor (Mirror)	<B054SUB board> CN6: Pin 1 (Signal) Pin 2 (GND)	H: In the home position L: Off the home position
HP sensor (Lens/CCD)	<B054SUB board> CN4: Pin 1 (Signal) Pin 2 (GND)	H: In the home position L: Off the home position



Be careful not to short-circuit the signals while checking them.

3.1.2.2 Check Points for Abnormal Phenomenon

See the table below which shows the abnormal phenomenon typically occurs.

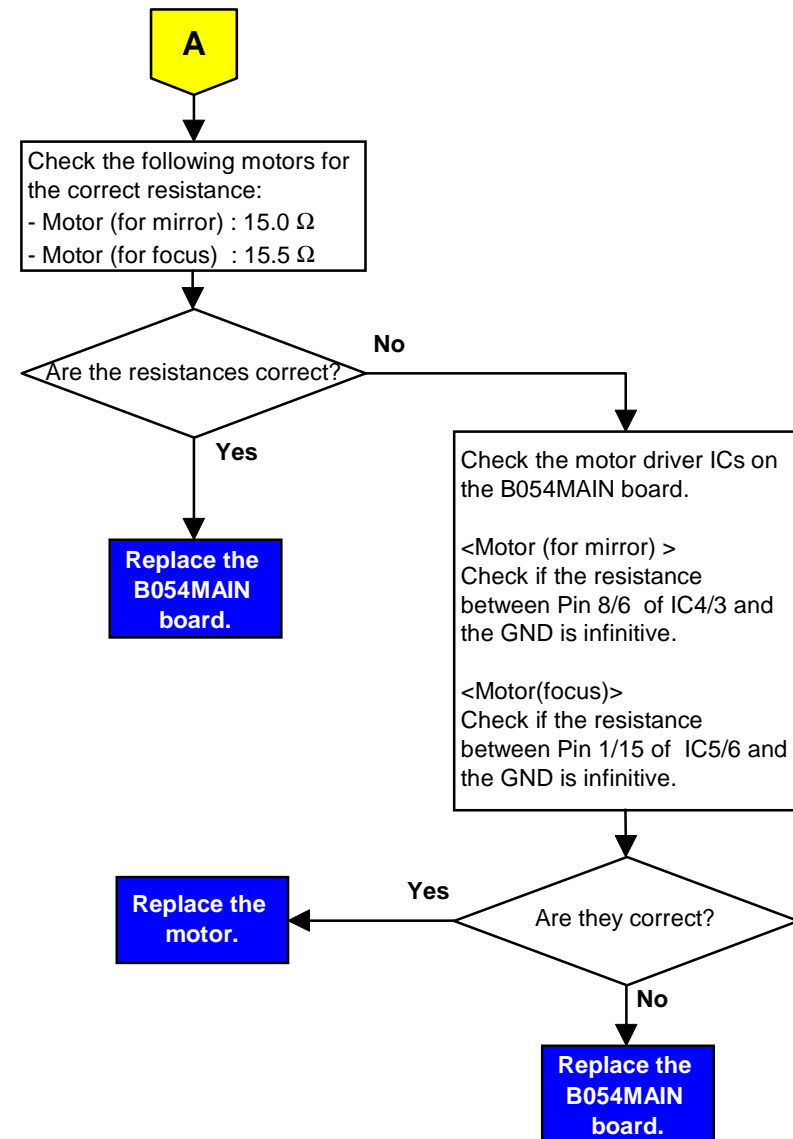
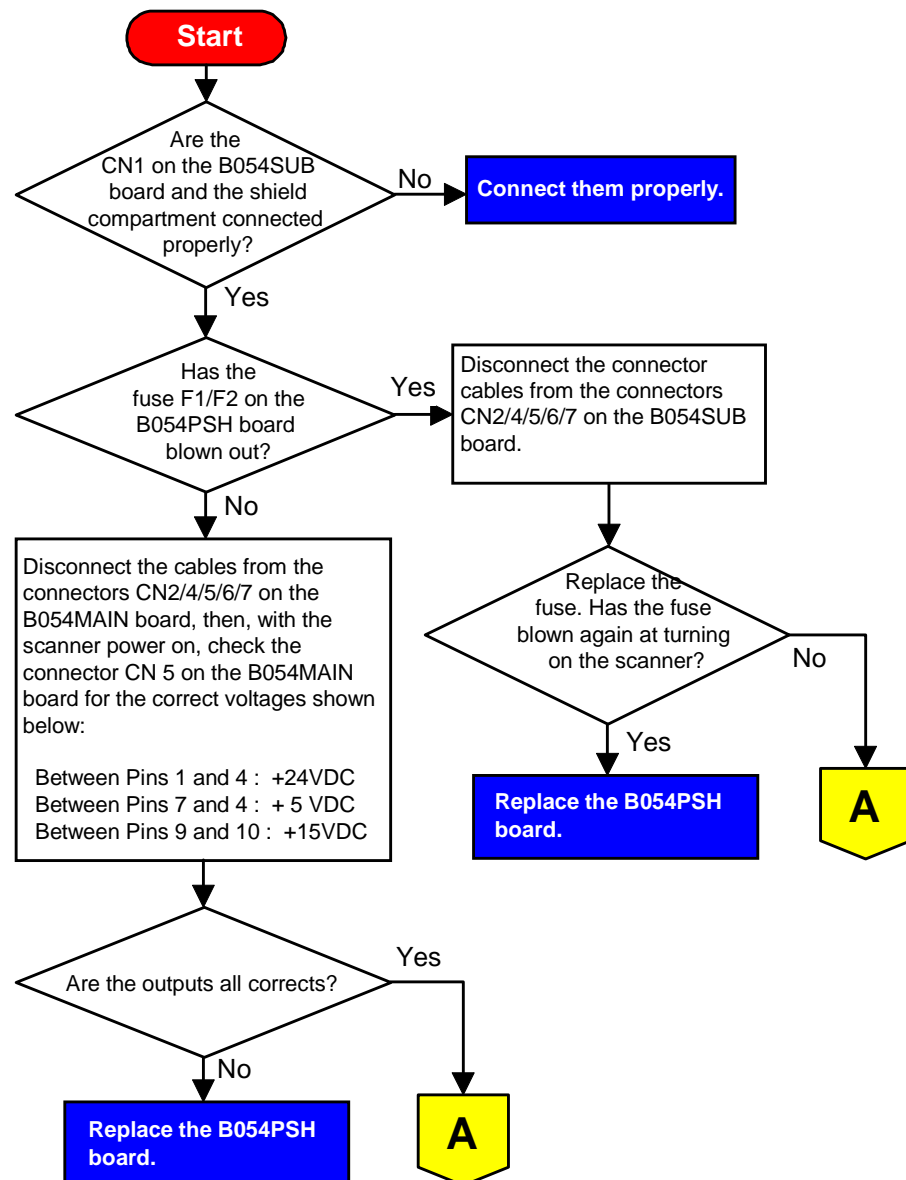
Table 3-1. Abnormal Phenomenon

Abnormal Phenomenon	Description	Flowchart to refer
The scanner doesn't operate at power on.	"OPERATE" LED does not light.	3-1
"Fatal Error" is indicated and is not cleared after the scanner is turned off and back on	CR does not move.	3-2
	Abnormal movement of CR, such as crashing into the frame.	3-3
	Lamp does not light.	3-4
"Communication Error" is indicated.	Error when Bi-directional parallel I/F is used.	3-5
	Error when the SCSI is used.	3-6
Scanned image is abnormal.	Black lines, White banding, and so on	3-7

Check points for the major units listed for each phenomenon are shown in the following pages.

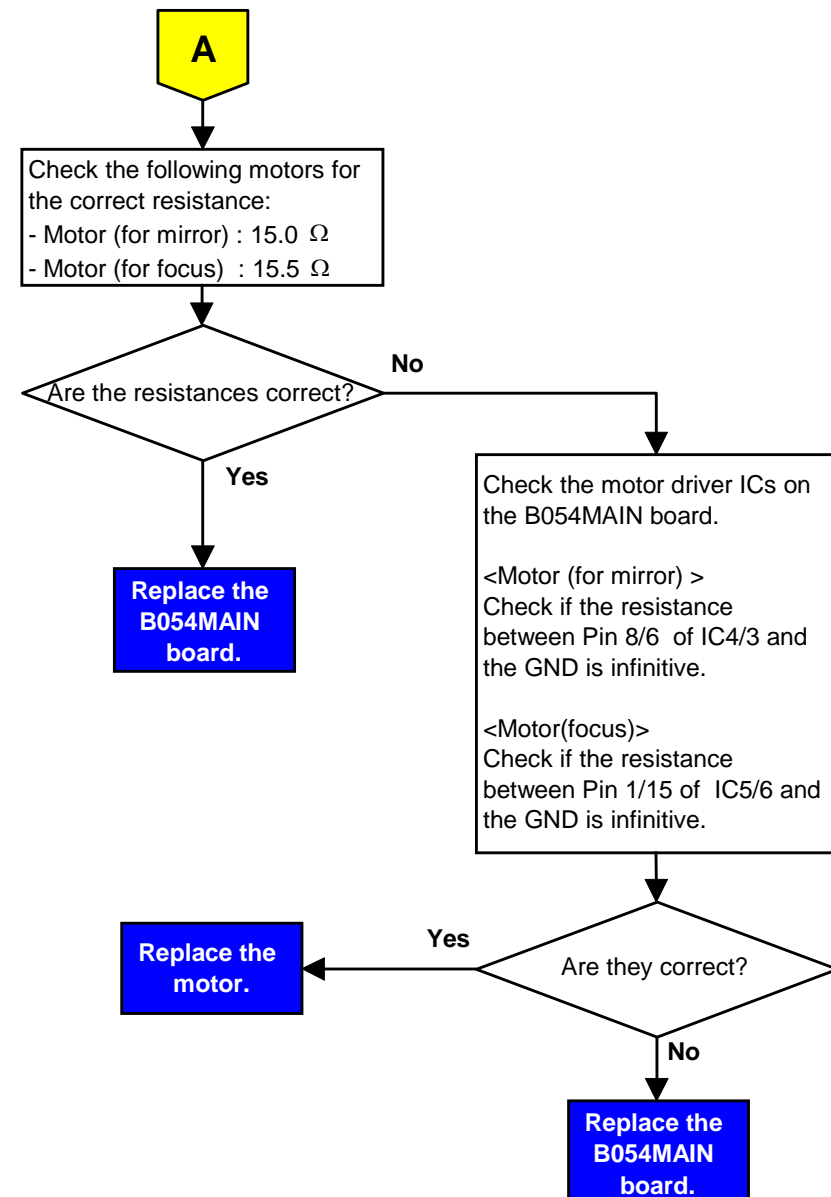
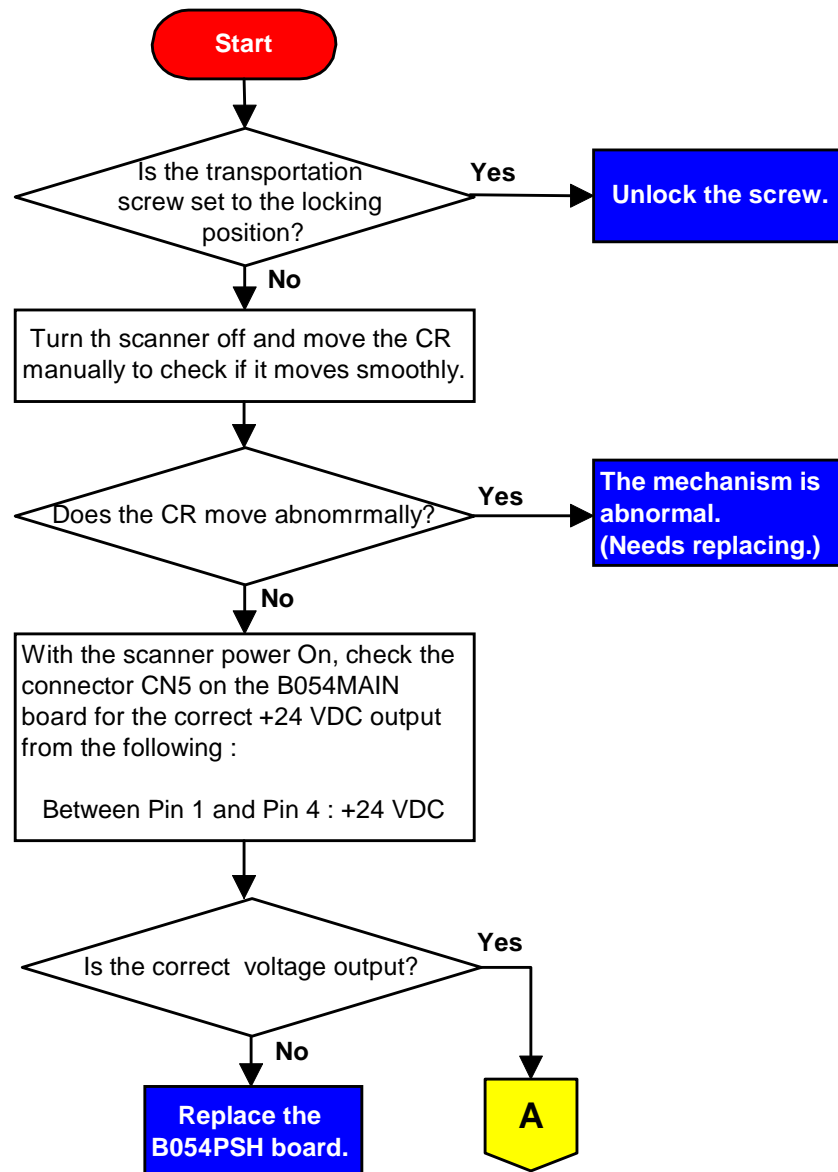
Flowchart 3-1

Phenomenon: "Operate" LED does not light.



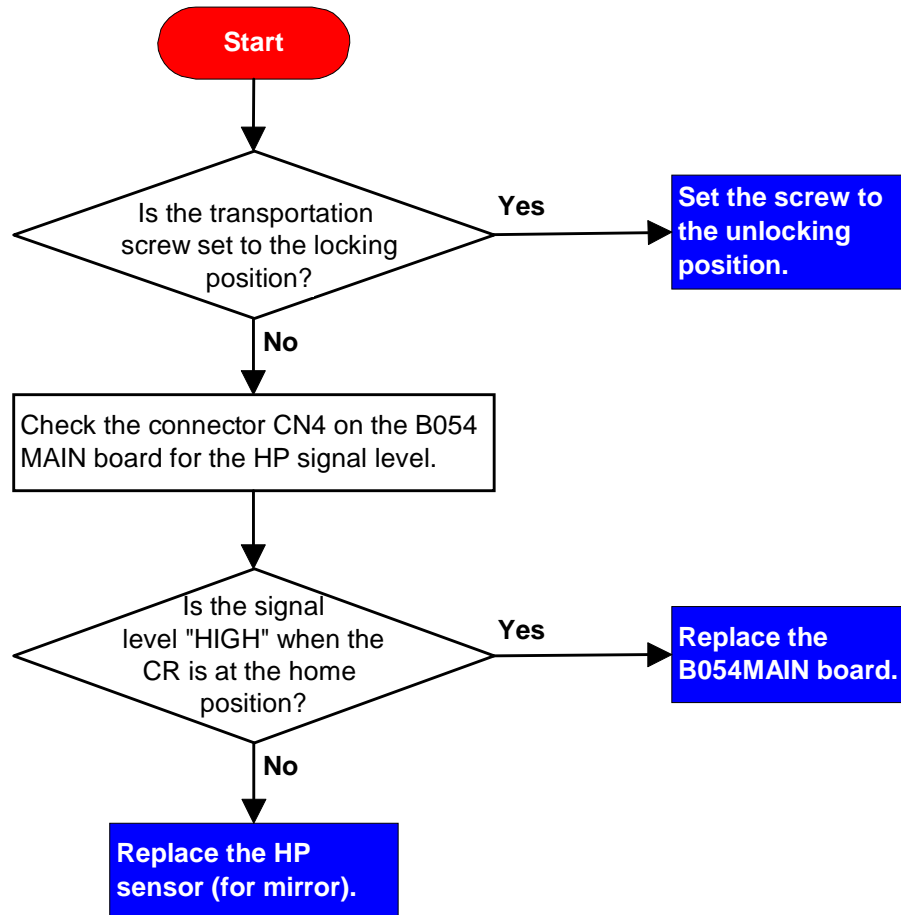
Flowchart 3-2

Phenomenon: CR (Mirror/Lamp) does not move.



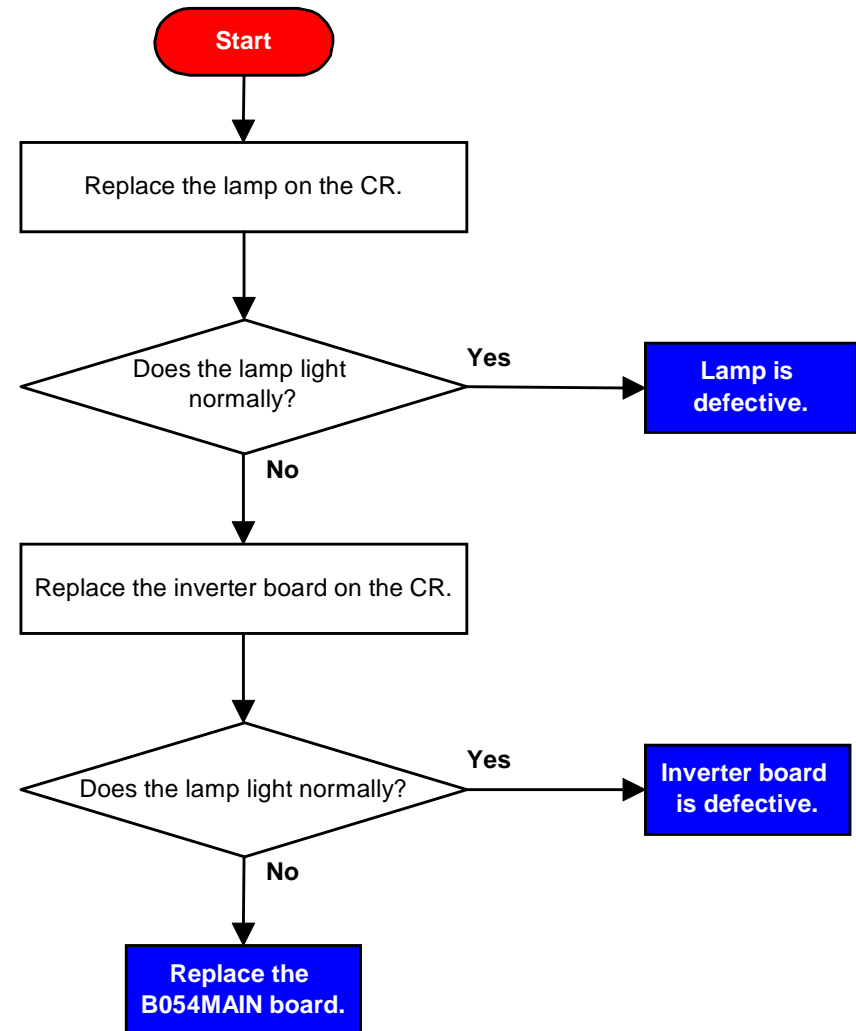
Flowchart 3-3

Phenomenon: CR moves abnormally. (Crashing into the frame)



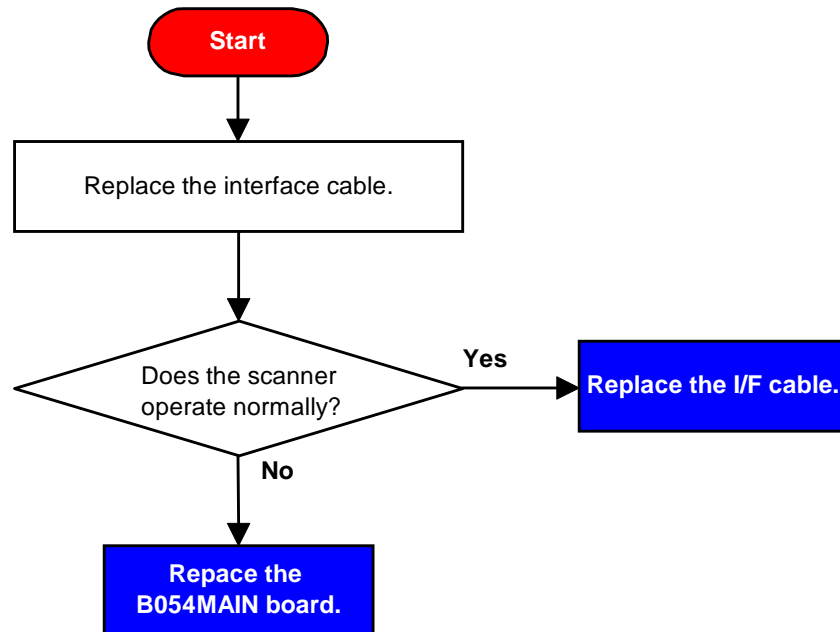
Flowchart 3-4

Phenomenon: Lamp does not light.



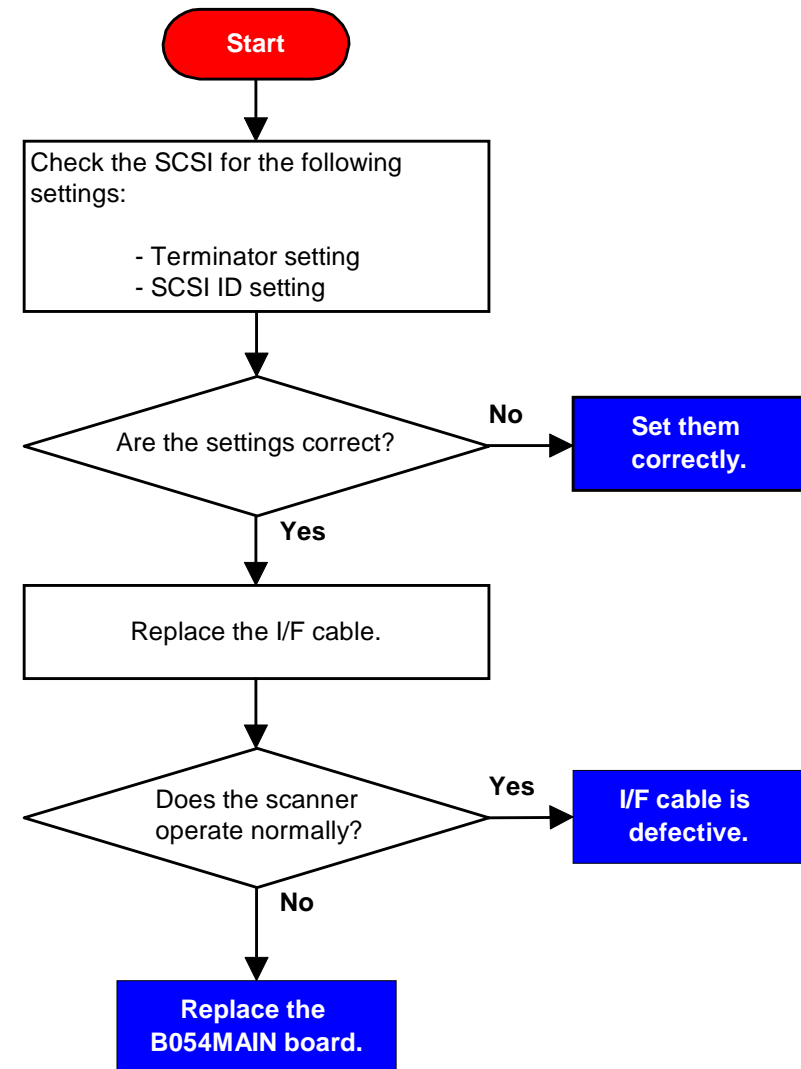
Flowchart 3-5

Phenomenon: "Communication Error" (Bi-directional I/F) is indicated.



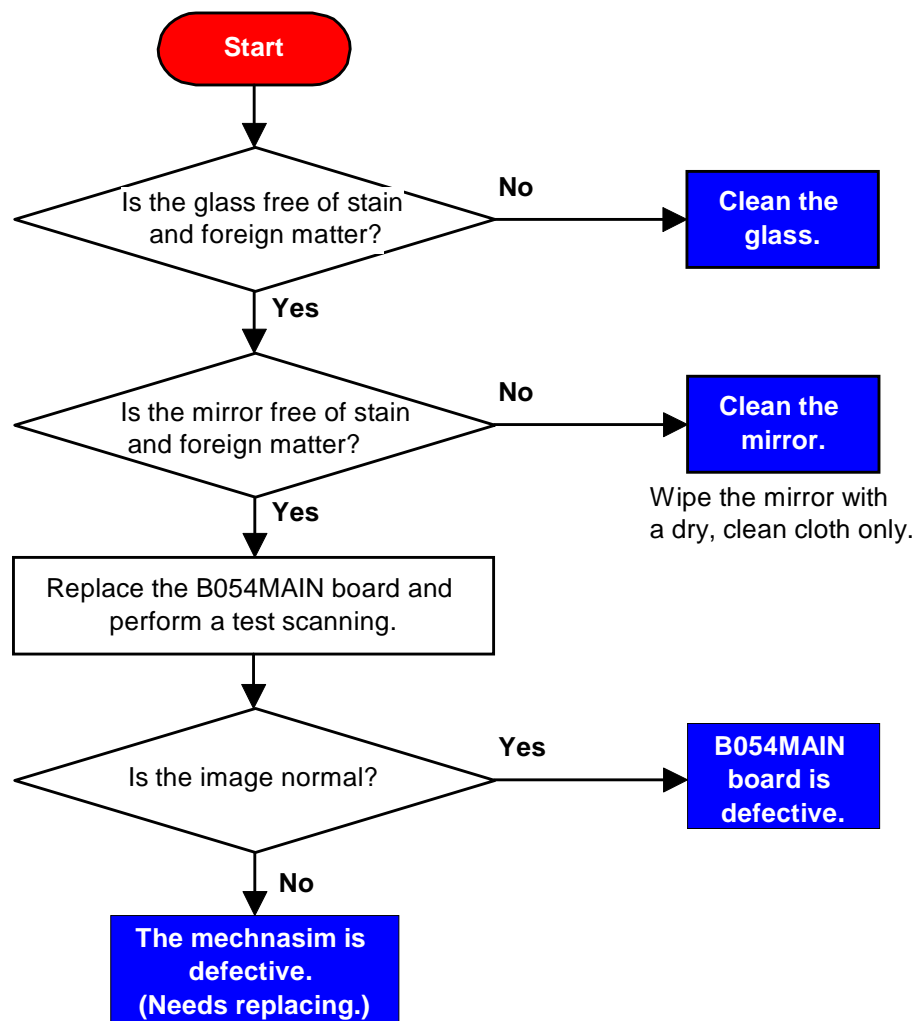
Flowchart 3-6

Phenomenon: "Communication Error" (SCSI) is indicated.



Flowchart 3-7

Phenomenon: Scanned image is abnormal.



3.1.3 Troubleshooting for Electrical Circuit

This section describes the abnormal phenomenon and corresponding check points for each electrical circuit board.

3.1.3.1 Power Supply Board (B054PSH Board)

Phenomenon	Check Points
<Abnormal voltage> +5VDC is not output.	Check IC51 (TL494): <ul style="list-style-type: none">• Signal waveform output from Pin 8/11 (chopping waveform)
<Abnormal voltage> +24 VDC is not output.	Check the Switching FET/Q1: <ul style="list-style-type: none">• Waveform at the drain
<Abnormal voltage> +15 VDC is not output.	Check IC52 (78M15): <ul style="list-style-type: none">• Signal waveform output from Pin 1

3.1.3.2 Control Circuit Board (B054MAIN Board)

Phenomenon	Check Points
<No operation at all> Reset IC is defective.	Check the reset IC (IC2) for the signal waveforms output from the following pins: <ul style="list-style-type: none">• Pin 7 (for +5V input)• Pin 6 (for PWRES output)
<No operation at all> ROM access is bad.	Check the CPU (IC13) for the ROM access signal waveforms output from the following pins: <ul style="list-style-type: none">• Pin 104 (for CS0 signal)• Pin 78 (for RD signal)
<No operation at all> CPU is defective.	Check the clock signal waveform input to the following pin: <ul style="list-style-type: none">• Pin 75 (for XTAL input)

Phenomenon	Check Points
<"Fatal Error"> Motor (for mirror) driver circuit is defective.	Check the Driver IC (IC3/4): <ul style="list-style-type: none"> Phase drive signal waveform output from Pin 8/6
<"Fatal Error"> Motor (for focus) driver circuit is defective.	Check the driver IC (IC5/6): <ul style="list-style-type: none"> Phase drive signal waveform output from Pin 1/15
<"Fatal Error"> CR does not stop at the home position.	<ul style="list-style-type: none"> Check if the signal waveform input to Pin 91 of CPU (IC13) changes in accordance with the CR position.
<"Fatal Error"> Lamp does not light.	Check the following for the lamp signal output: <ul style="list-style-type: none"> Output from Pin 166 of ASIC (IC24) Emitter waveform at Tr (Q1)
<"Fatal Error"> White standard level is not read properly.	Check ASIC (IC28): <ul style="list-style-type: none"> Signal waveform output from Pin 161
<"Communication Error"> Bi-directional I/F / SCSI I/F	Main cause: ASIC (IC28) is defective. (Replace IC28 or B054MAIN board.)
<Image is read abnormally>	Main cause: ASIC (IC24) is defective. (Replace IC24 or B054MAIN board.)

CHAPTER

4

DISASSEMBLY AND ASSEMBLY

4.1 OVERVIEW

This chapter describes how to disassemble this scanner. Unless otherwise specified, assembly can be accomplished by following disassembly procedures in reverse order.

WARNING

- *Be sure to disconnect the power cable from the AC power socket prior to servicing.*
- *Since this scanner weighs heavy (approximately 20 Kg), it must be carried by 2 people.*

CAUTION

- *Never disassemble any scanner parts unless specified to do so, because this scanner mechanism needs assembling and adjusting rather exactly to preserve accurate control system at its satisfactory level.*
- *Get yourself enough room for servicing, considering the size of the scanner.*
- *Since this scanner weighs as heavy as approximately 20 kg, be sure to perform servicing on a heavy-duty, level table.*
- *Make sure that the “CR fixing knob” is set to the locking position to fix the CR by the rear before packing the scanner.*

4.1.1 Tools

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

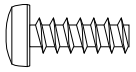
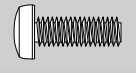
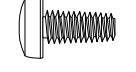
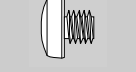
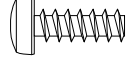
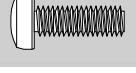
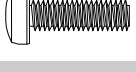
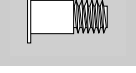
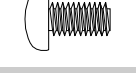
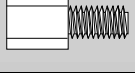
Table 4-1 .Tool List

Description	Availability	SE Part No.
Exclusive adjusting tools (Leveling tools)	EPSON exclusive	Code: 1039140
Phillips screw driver (No.2)	○	—
Standard screw driver (No.1)	○	—
Tweezers	○	—

4.1.2 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. Screw List

No.	Screw Type / Specification	Appearance	Color
1	CBP M4x12		Silver
2	CB M4x10		Gold
3	CBS M3x6		Red copper
4	CB M3x4		Gold
5	CBP M3x8		Gold
6	CB M3x6		Gold
7	CB M3x12		Black
8	CR;B damper shaft (Thread part: M3x3)		Gold
9	CP M3x6		Silver
10	Screw lock screw (Diagonal: 5 mm)		Silver

4.2 DISASSEMBLY PROCEDURES

This section describes disassembling and removing procedures for each major unit of the scanner.

See the flowchart in Figure 4-1. The jobs in the yellow boxes involve using the adjustment tools exclusively designed for this scanner. Therefore, make sure that you read the instruction for the section to refer to carefully to figure out the procedure before servicing.

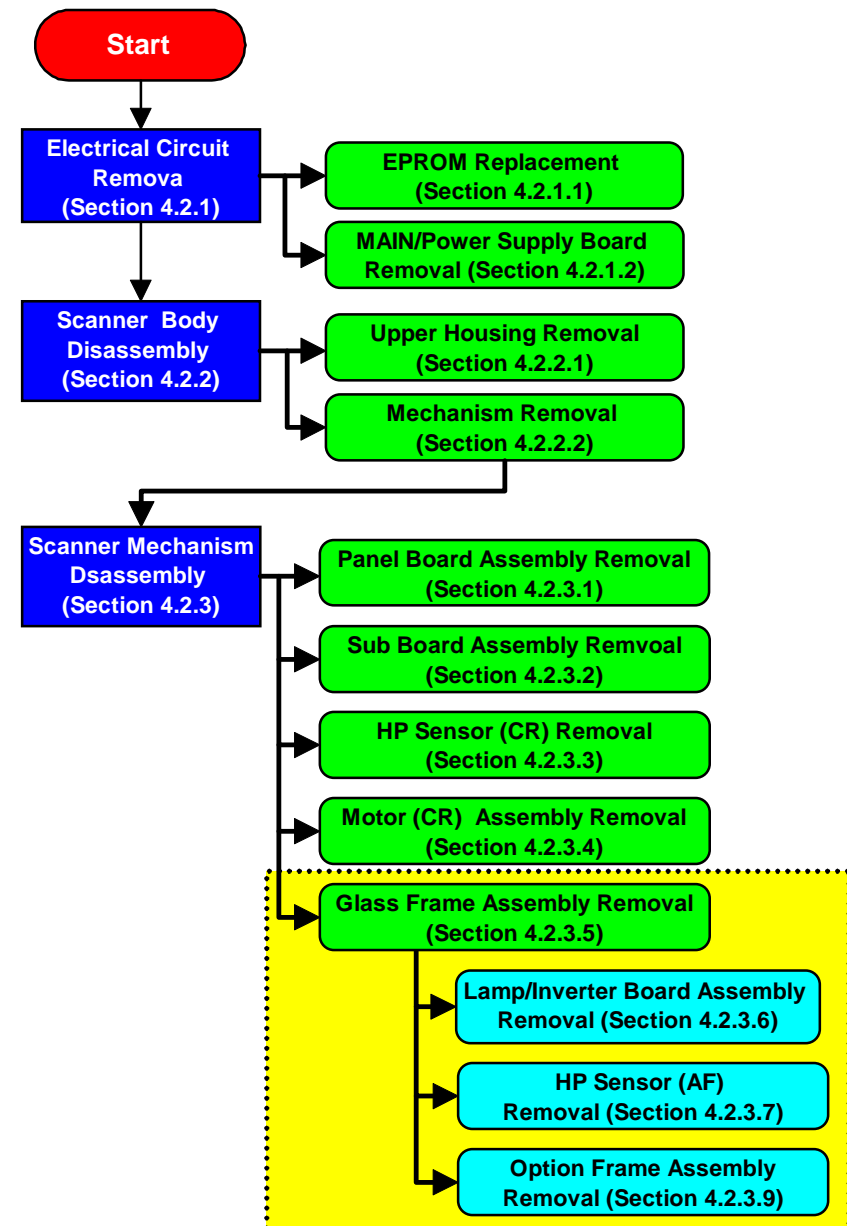


Figure 4-1. Procedure for Disassembling the GT-12000

4.2.1 Electrical Circuit Removal

The major electrical circuit boards (B054MAIN and B054PSH) of this scanner are all stored in one independent shield compartment. Therefore, they can be removed in one unit (board unit) from the scanner with ease.

1. Disconnect the AC power cable from the scanner.
2. Remove 3 screws (No.5) securing the shield compartment which contains the electrical circuit boards at the back of the scanner. Then take out the compartment from the scanner to remove.

✓CHECK POINT

For easy removal, insert a driver or equivalent into the bail lock of the interface and pull it.

4.2.1.1 EPROM Replacement

In case of EPROM replacement, remove the ROM cover attached on the board unit.

1. Remove the board unit. (See Section 4.2.1.)
2. Remove 1 screw (No.3) fixing the ROM cover, and remove the cover.
3. Remove the EPROM from the IC socket and install a new EPROM.

⚠CAUTION

When installing the ROM, make sure that the leads are not bent and the ROM is installed in the right direction.

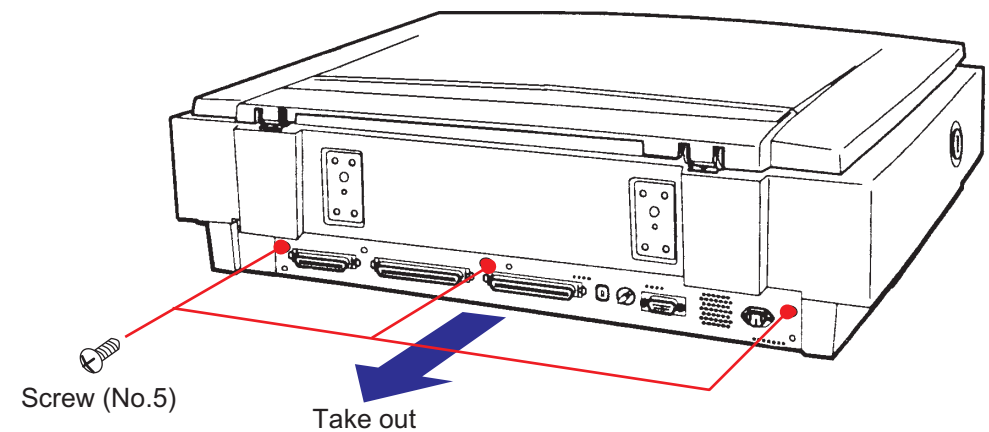


Figure 4-2. Shield Compartment Removal

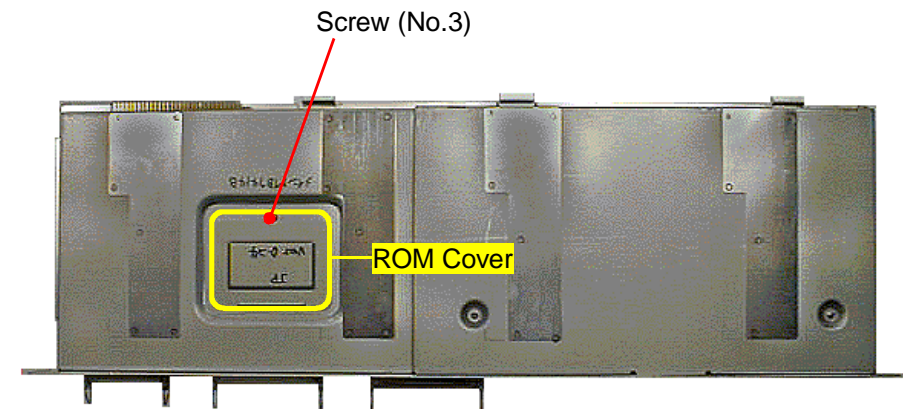


Figure 4-3. ROM Cover Removal

4.2.1.2 MAIN/B054PSH Board Removal

B054MAIN and B054PSH boards stored in the shield compartment are removed in the following procedure:

1. Remove the shield compartment. (See Section 4.2.1.)
2. Remove 12 screws (No.3) securing the top shield of the board unit, then remove the top shield.
3. **[MAIN board assembly removal]**
Disconnect the connector cables from the connector CN5 and CN9 on the MAIN board.
4. Remove the following screws securing the MAIN board, and remove the MAIN board:
 - 6 screws (No.3): Fixing the board along the edges.
 - 6 screws (No. 9): Securing the I/F connector.
 - 2 screws (No.10): Securing the optional I/F connector.
5. **[Power supply board assembly removal]**
Remove the connector cables from the connector CN1 on the power supply board assembly and the connector CN5 on the MAIN board assembly.
6. Remove 6 screws (No.3) securing the power supply board assembly and remove the power supply board.

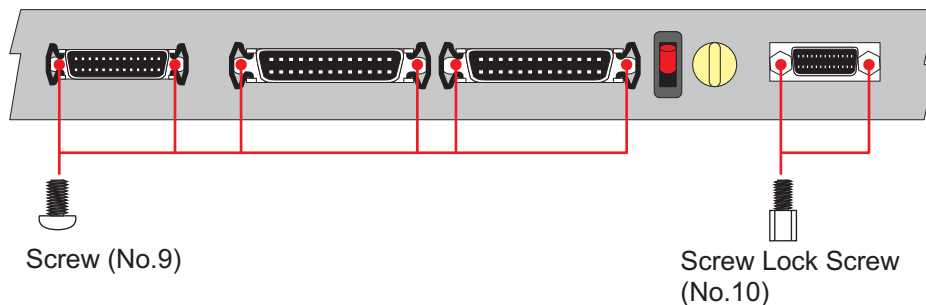


Figure 4-4. I/F Connector Fixing Screw Removal

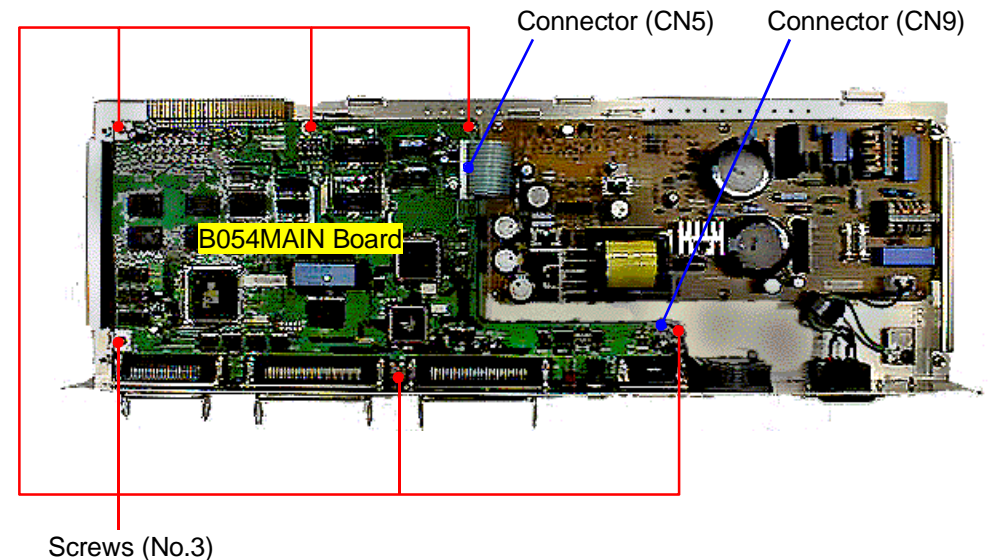


Figure 4-5. MAIN Board Removal

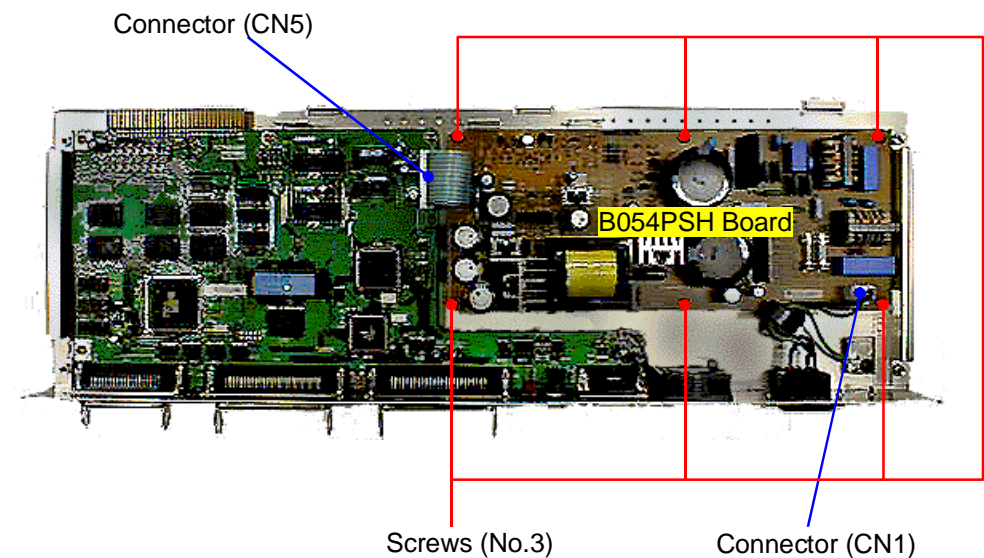


Figure 4-6. Power Supply Board Removal

4.2.2 Scanner Body Disassembly

This section describes procedures for disassembling the major units of the scanner.

CAUTION

When removing the CR fixing knob or screw caps, be careful not to damage the upper housing.

4.2.2.1 Upper Housing Removal

1. Remove the document cover.
2. Using tweezers, remove the CR fixing knob attached to the left side of the scanner.
3. Remove 4 screws (2 for each of No.1 and No.2) securing the upper housing to the chassis on the scanner. Note that the front 2 screws are covered with the screw caps. Using tweezers, pinch them out prior to removing the screws.
4. Lift up the upper housing to remove it.

CHECK POINT

When installing the upper housing, make sure that the optical plate is installed on the specified position.

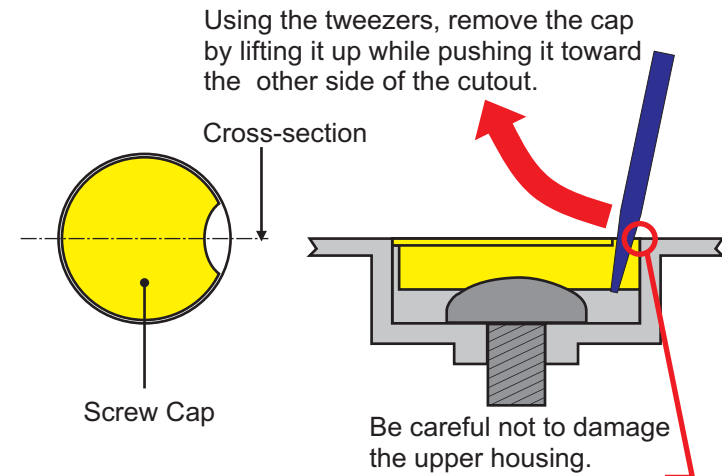
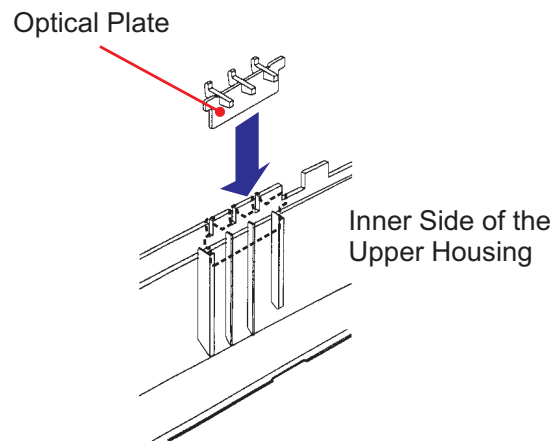


Figure 4-7. Screw Cap Removal

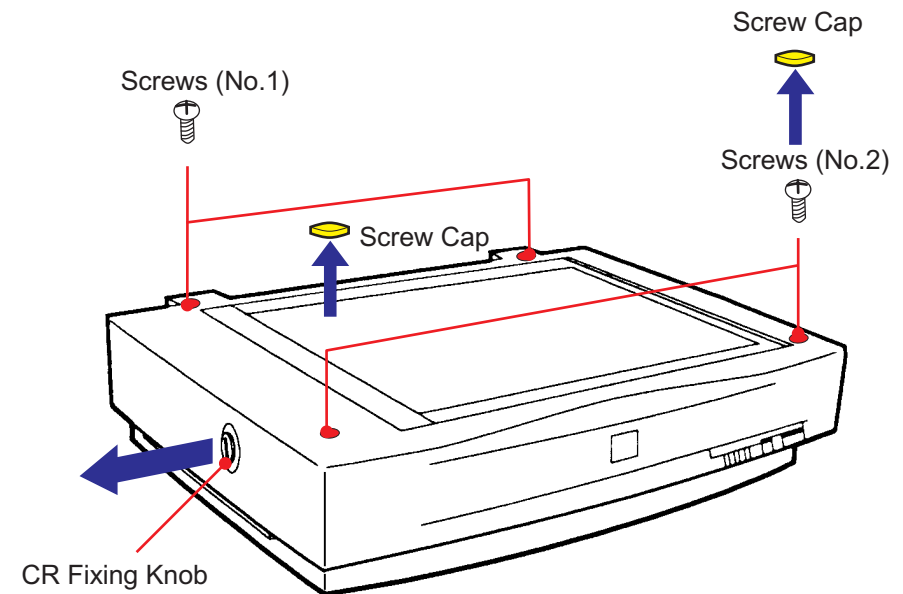


Figure 4-8. Upper Housing Removal

4.2.2.2 Scanner Mechanism Removal

The scanner mechanism can be removed from the lower housing in the following procedure:

1. Remove the upper housing. (See Section 4.2.2.1.)
2. Remove 4 screws (No.1) securing the scanner mechanism to the lower housing at the bottom. Then remove the mechanism from the lower housing.

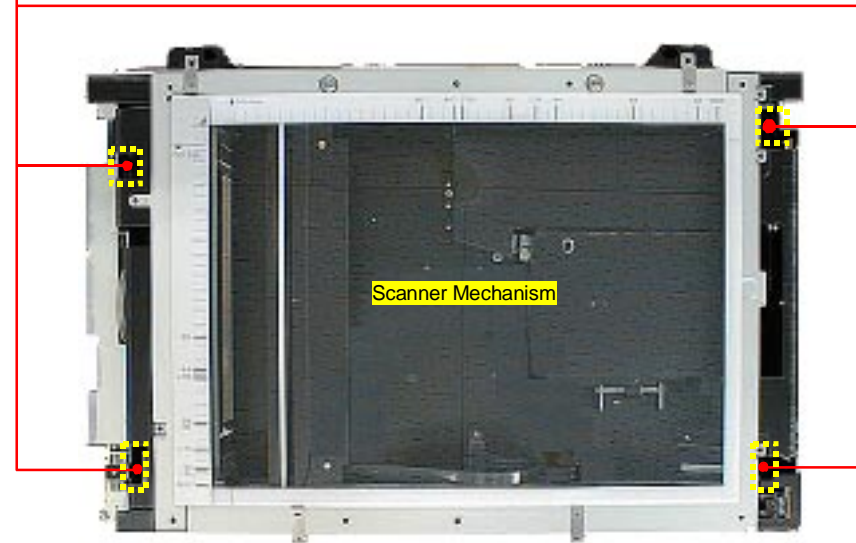
✓CHECK POINT

■ **Note the following when installing the scanner mechanism:**

- 1) *Remove the key tops for the power switch and reset switches from the lower housing.*
- 2) *Install the scanner mechanism to the lower housing.*
- 3) *Reinstall the key tops.*

■ **Place the removed mechanism on flat stable surface.**

Screws (No.1)



Front Side of the Scanner

Figure 4-9. Scanner Mechanism Removal

4.2.3 Scanner Mechanism Disassembly

The rest part of the chapter describes the procedures for removing the major parts/units in the scanner mechanism.

⚠ CAUTION

Note that producing this scanner requires rather precise assembly and adjustment to ensure accurate control system. Therefore, never disassemble any scanner parts unless specified to do so.

4.2.3.1 Panel Board Assembly Removal

1. Remove the scanner mechanism. (See Section 4.2.2.2.)
2. Turn the mechanism over and place it on a flat surface.
3. Disconnect all connector cables from the panel board assembly.
4. Remove 2 screws (No.6) securing the panel board assembly and remove it.

✓ CHECK POINT

Unit arrangement at the bottom of the mechanism is as shown below.

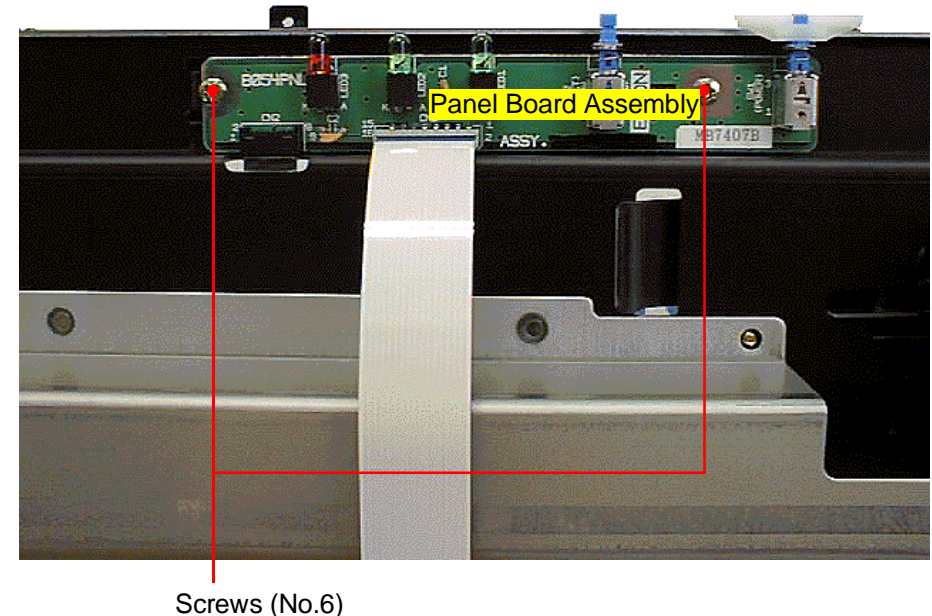
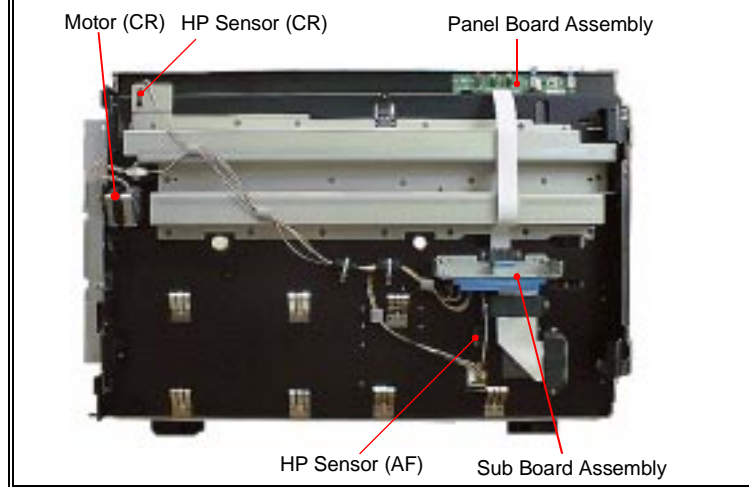


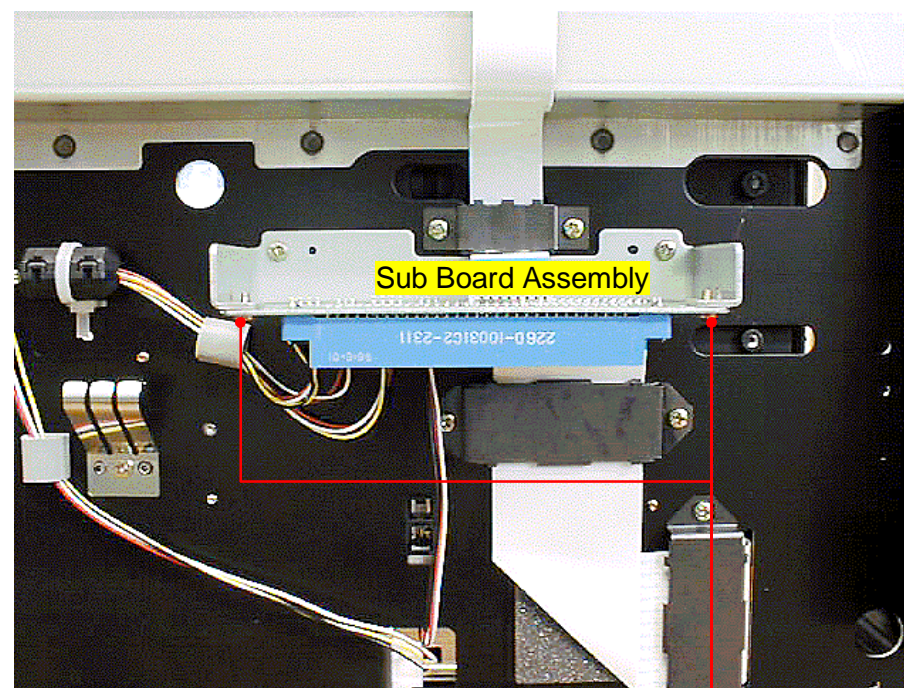
Figure 4-10. Panel Board Assembly Removal

4.2.3.2 Sub Board Assembly Removal

1. Remove the scanner mechanism. (See Section 4.2.2.2.)
2. Turn the mechanism over and place it on a flat surface.
3. Disconnect all connector cables from the sub board assembly (B054SUB board).
4. Remove 2 screws (No.3) securing the board to the bracket and remove the sub board.

✓CHECK POINT

When placing the scanner up side down, lay a clean soft cloth under the scanner to protect the glass surface.



Screws (No.6)

Figure 4-11. Sub Board Assembly Removal

4.2.3.3 HP Sensor (CR) Removal

This section describes procedure for removing the HP sensor which detects the reference position for the carriage mirror assembly.

1. Remove the scanner mechanism. (See Section 4.2.2.2.)
2. Move the carriage mirror assembly away from the HP (home position).
3. Turn the mechanism over and place it on a flat surface.
4. Release the hook fixing the HP sensor at the bottom of the mechanism and remove the HP sensor unit. Then disconnect the connector cable from the removed HP sensor.

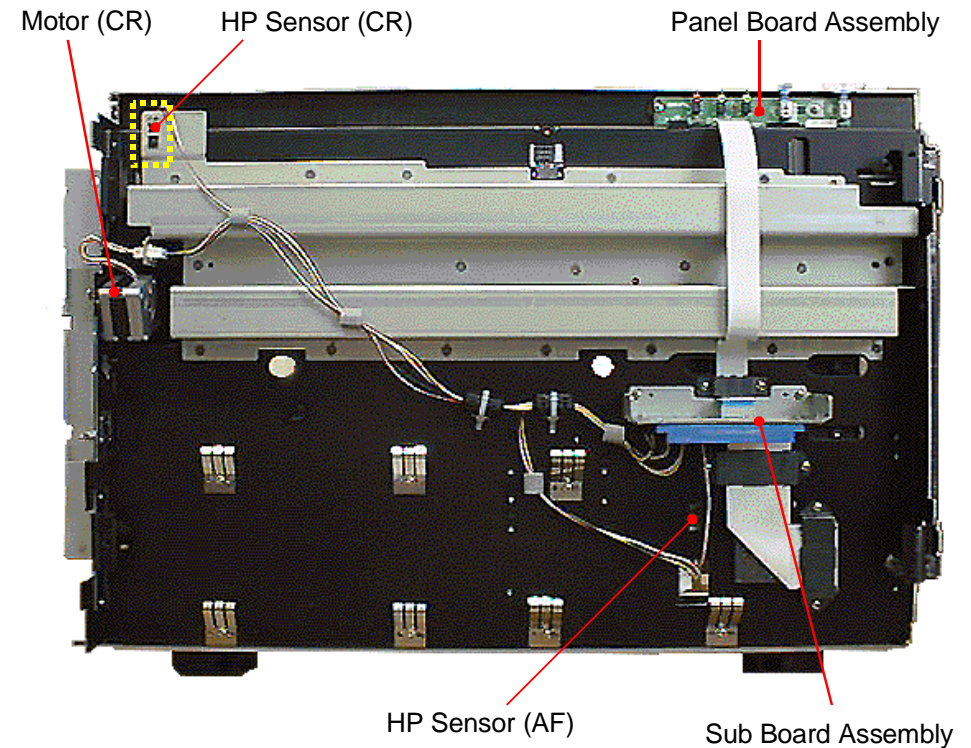


Figure 4-12. HP Sensor (CR) Removal

4.2.3.4 CR Motor Assembly Removal

This section describes procedure for removing the motor unit which drives the carriage mechanism (mirror/lamp).

1. Remove the scanner mechanism. (See Section 4.2.2.2.)
2. Turn the mechanism over and place it on a flat surface.
3. Unhook the torsion spring from the tension lever assembly, then remove 1 screw (No.6) to remove the tension lever assembly.
4. Disconnect the cable for the motor from the relay connector and remove 4 CR damper shafts; B (No.8) securing the motor, then remove the motor.

✓CHECK POINT

When assembling, hook the spring to the tension lever assembly first, then fasten the screw.

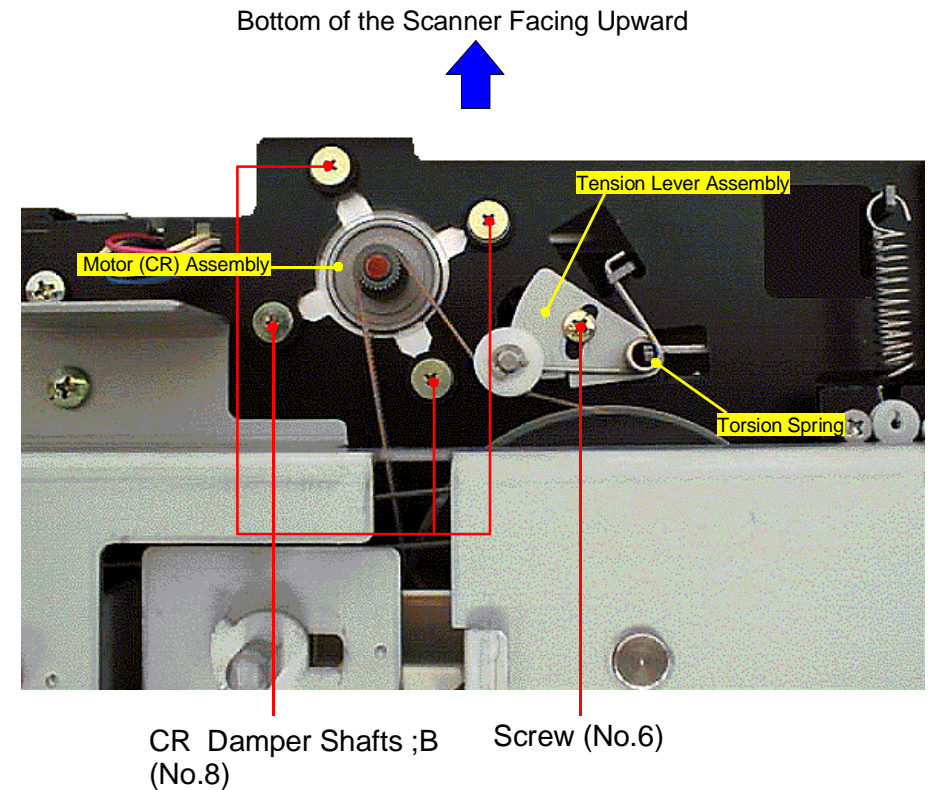


Figure 4-13. CR Motor Assembly Removal

4.2.3.5 Glass Frame Assembly Removal and Pre-operation

Since the glass frame assembly is one of the reinforcing parts of the mechanism, whole mechanism may be deformed if it is removed. Be sure to follow the instruction provided in this section during any service which involves removing the glass frame assembly.

CAUTION

Be aware the following when removing the document glass during any service:

- Always set the scanner on the adjusting tools exclusively designed for this scanner.
- Set the scanner on a stable, level table.
- Make sure that the scanner mechanism is installed to the lower housing while servicing.
- Be sure to fit all the rubber foot at the bottom of the scanner in the top indents of the stages and the adjuster. (Any of the foot must not be placed over the top surface of the tool.)

1. Remove the upper housing. (See Section 4.2.2.1.)
2. Refer to the figures in the right column and set the adjusting tools (leveling tools) under the scanner to level the scanner, as instructed below:
 - 1) Set the scanner on 3 stages, making each of the specified feet of the scanner sit on the corresponding stage.
 - 2) Set the adjuster under the rubber foot in the front right corner of the scanner bottom, aligning the center of the adjuster with the one of the rubber foot. Make sure that you can see the groove on the adjuster when it is set.
 - 3) Hold the base of the adjuster with a hand and spin the table to make it reach the bottom of the scanner by its own forth.
 - 4) Turn the table [2 quarters] manually, which can be measured by 4 divisions on the table and the groove on the base, to push the table up from the position where the table was moved up to by the spin.
 - 5) After adjusting, make sure that each corner of the scanner is securely in contact with the corresponding tool.

Note: Directions are described when the scanner is viewed from the front.

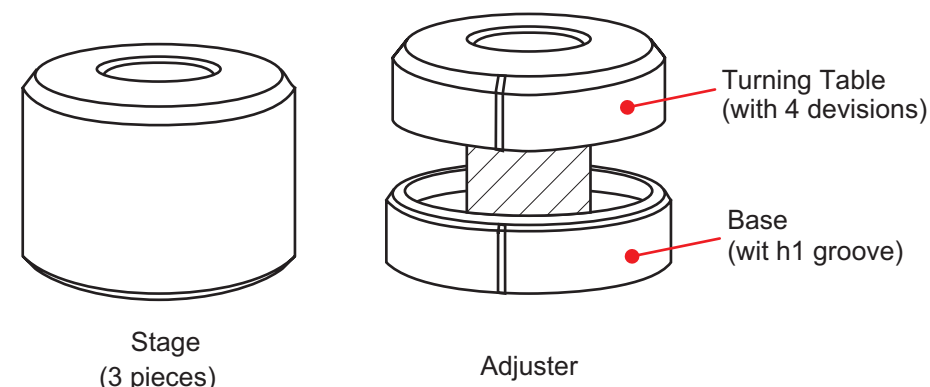


Figure 4-14. Adjusting Tools

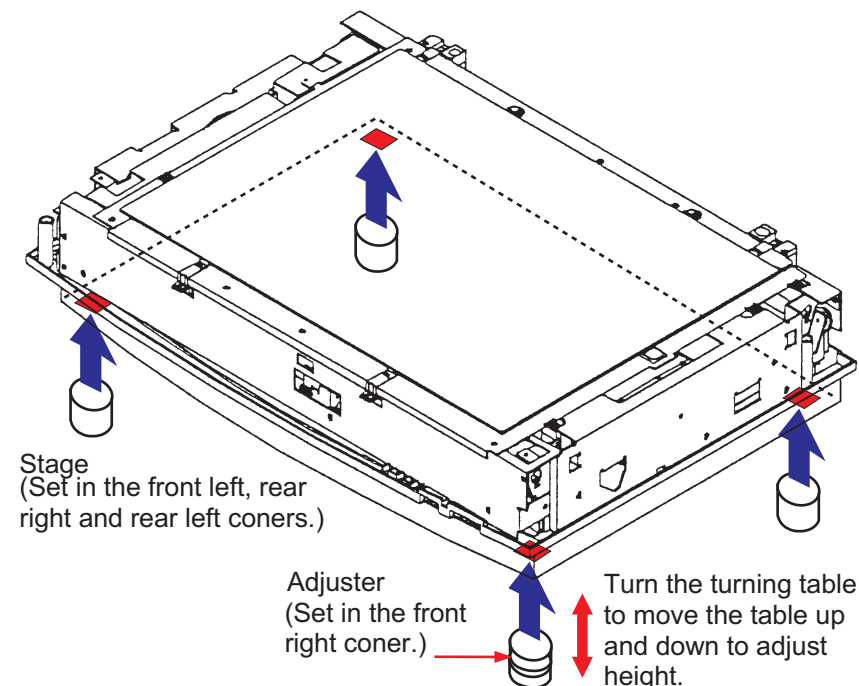


Figure 4-15. Tool Position and Adjusting Method

<Continued to the next page.>

3. Remove 9 screws and remove the glass frame assembly. The screws to be removed and their locations are as follows:

- No.4: 5 screws securing the glass frame assembly by the right and left sides.
- No.1: 2 screws securing the glass frame assembly by the rear edge.
- No.3: 2 screws securing the glass frame assembly by the front edge.

Note: Directions are described when the scanner is viewed from the front.



When reinstalling the glass frame assembly, refer to Section 4.2.3.5.1 to set the glass frame assembly on the correct position. Failure in this operation will cause the CR to start scanning at a wrong position.

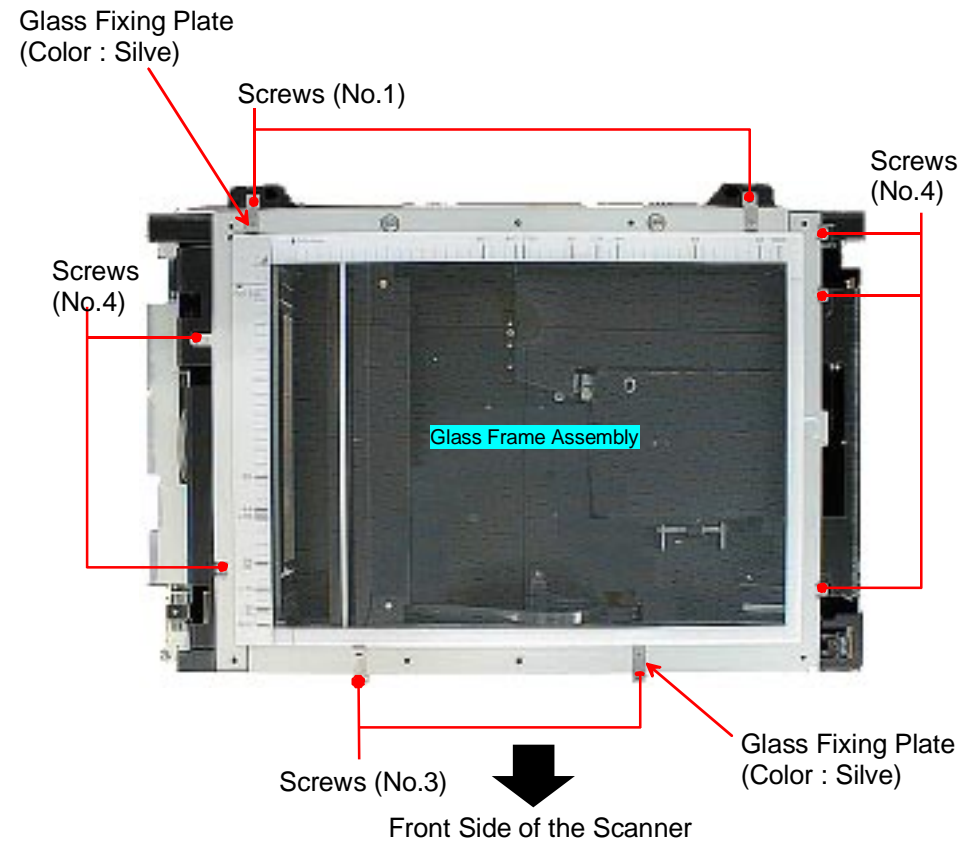


Figure 4-16. Glass Frame Assembly Removal

4.2.3.5.1 Glass Frame Assembly Installation

After the glass frame assembly has been removed for any purpose, it must be reinstalled in the following procedure.

1. Place the glass frame assembly to the specified position in the scanner mechanism.
2. Referring to the Figure 4-17, determine the installation position for the glass frame assembly.
 - 1) Push the whole glass frame assembly from the front against the positioning bushes (color: silver) on the top side of the rear frame. (Glass edge is in contact with the bushes with this operation.)
 - 2) Keeping the glass frame assembly in contact with the bushes, move the assembly left to push it against the positioning bump on the top surface of the left side frame.
3. When the glass frame assembly is correctly positioned, fix it with 9 screws.

✓CHECK POINT

When installing the glass frame assembly, ensure that 4 glass fixing plates are properly positioned. (See Figure 4-16.)

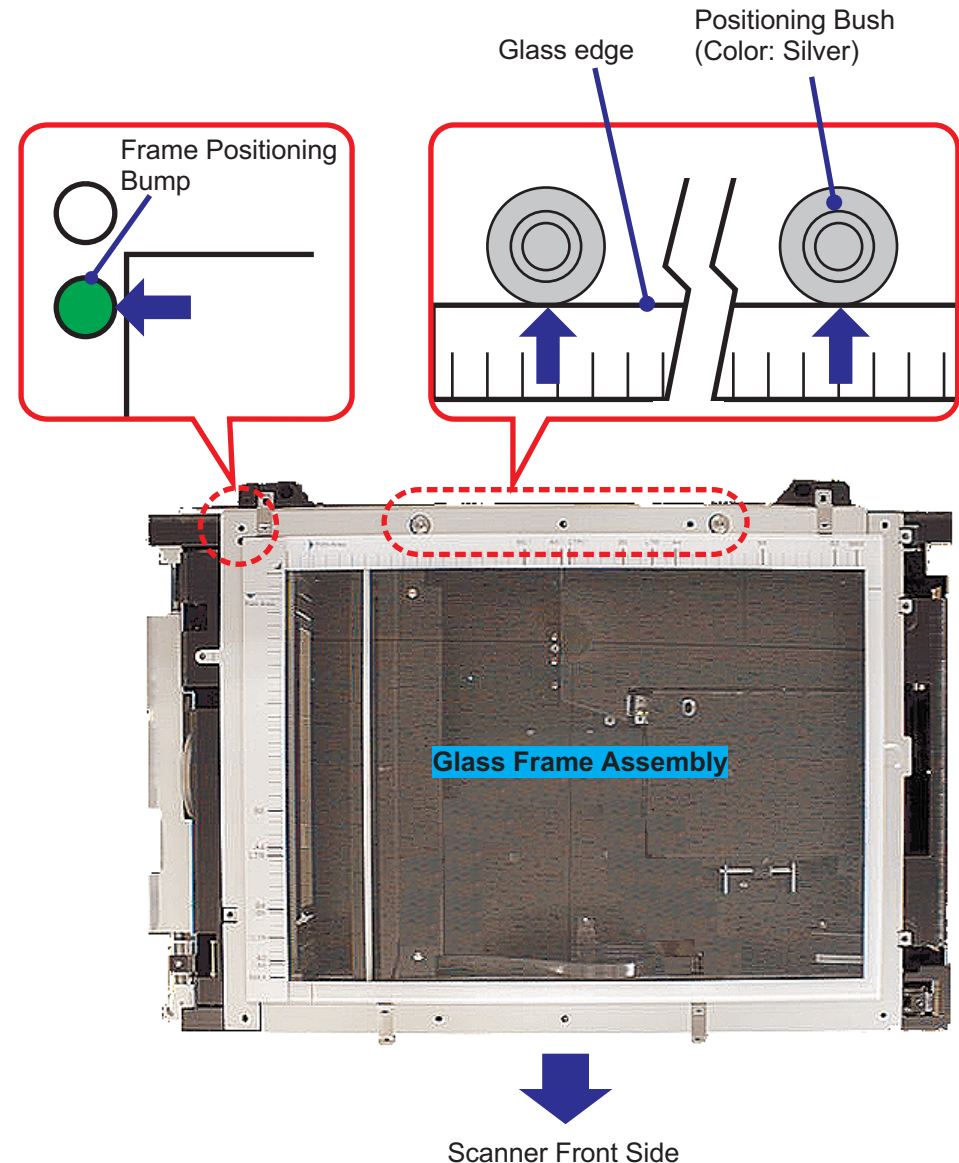


Figure 4-17.

Determining the Glass Frame Assembling Installation position

4.2.3.6 Lamp Assembly and Inverter Board Assembly Removal

This section describes how to remove the lamp assembly and the inverter board assembly from the carriage.

1. Remove the glass frame assembly. (See Section 4.2.3.5.)
2. Move the CR to the position indicated in Figure 4-19. (The position where the front and rear frames are indented.)
3. Remove 2 screws (No.6) securing the carriage mirror cover and slide the cover toward the rear side of the scanner to release the engagement with the hook on the carriage. Then lift up the cover and remove it.

<Continued to the following page.>

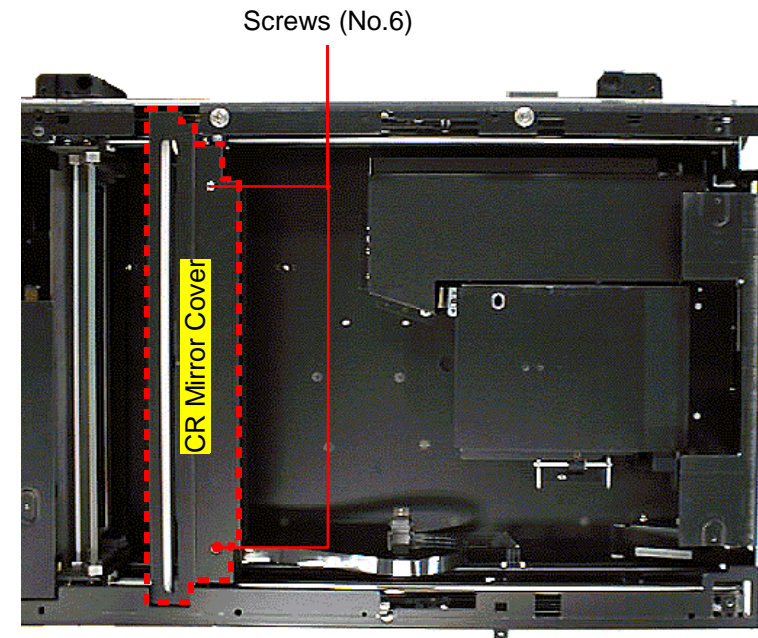


Figure 4-18. CR Mirror Cover Removal

4. Disconnect the connector cable for the lamp from the connector CN2 on the inverter board assembly. Then remove the lamp from the carriage.
5. Disconnect the cable (black) from the connector CN1 on the inverter board assembly. Then remove the bracket (silver) fixing the ferrite core.
6. Remove 2 screws (No.6) securing the inverter board assembly.
7. Slide the inverter board assembly toward the front side of the scanner to release the engagement with the hook on the carriage. Then remove the inverter board.

✓CHECK POINT

When assembling, make sure that the cover is securely engaged with the hook on the carriage.

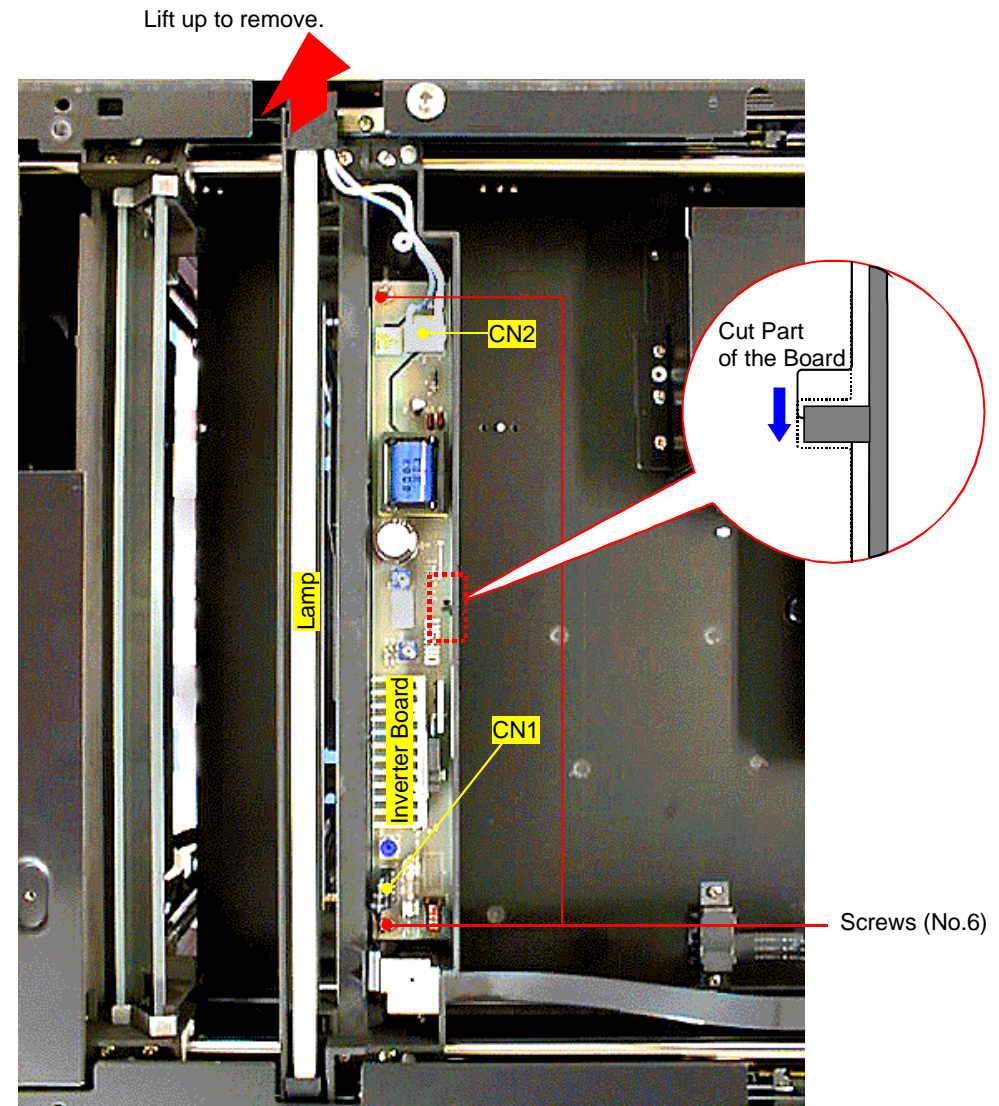
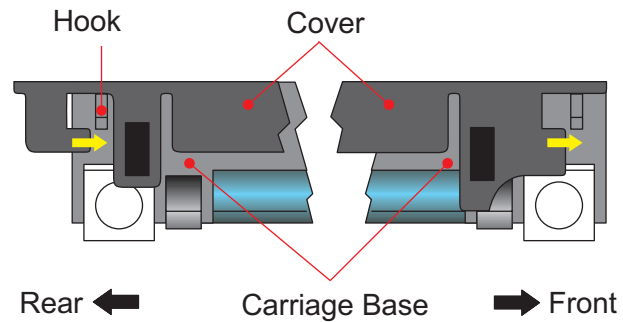


Figure 4-19.
Lamp Assembly and Inverter Board Assembly Removal

4.2.3.7 HP (AF) Sensor Removal

This section describes the procedure for removing the HP sensor which detects the reference position for the AF drive mechanism (lens/CCD sensor unit).

1. Remove the glass frame assembly. (See Section 4.2.3.5.)
2. Remove 4 screws (No.3) securing the AF drive mechanism cover which covers the AF drive mechanism and remove the cover.
3. Rotate the screw pulley at the end of the screw shaft (a thread shaft) manually to move the detection flag to the area where it does not overlap with the HP sensor.
4. Release the hook fixing the HP sensor and remove it, then disconnect the cable from the sensor.

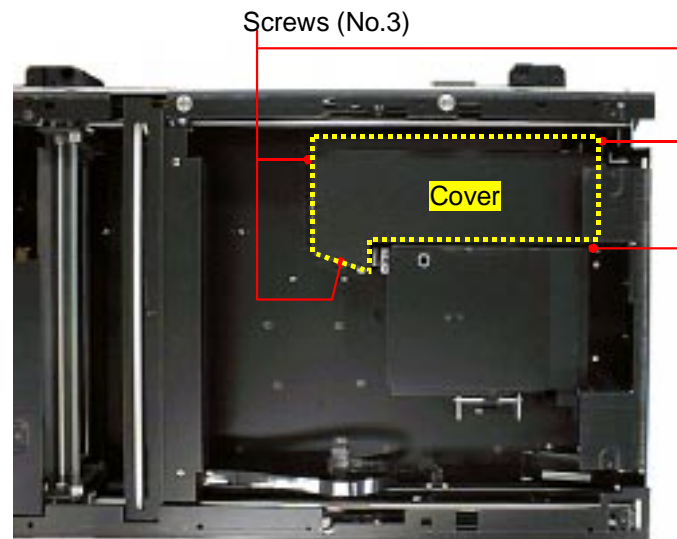


Figure 4-20. AF Drive Mechanism Cover Removal

Rotate this pulley manually.

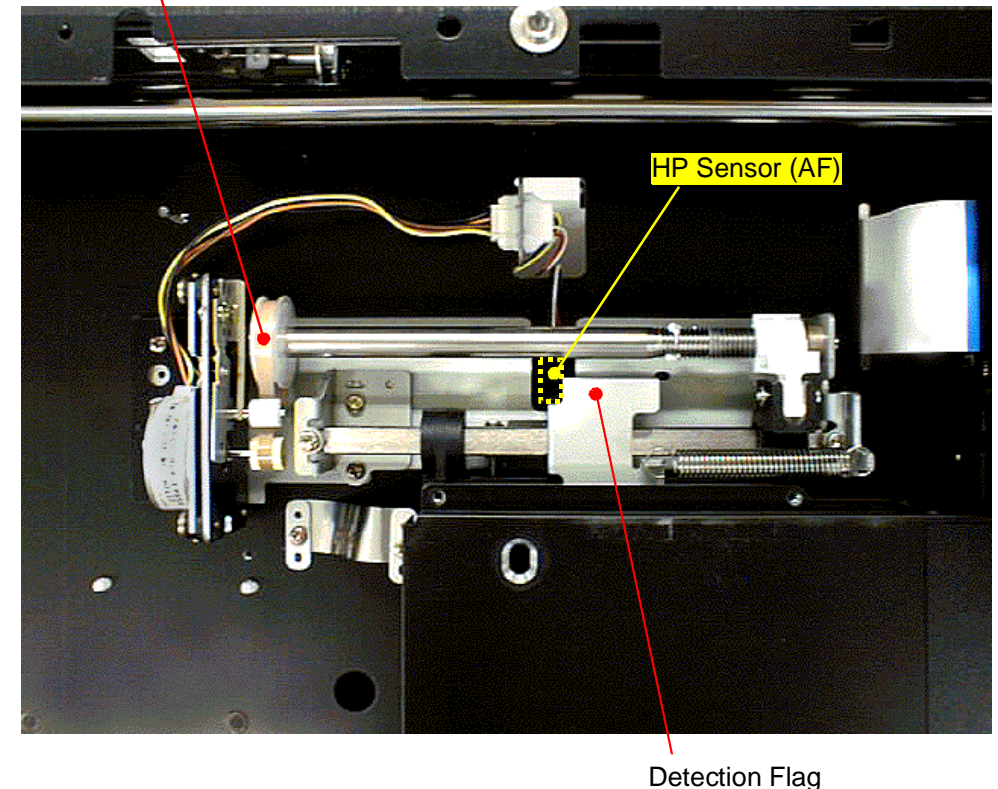


Figure 4-21. HP Sensor (AF) Removal

4.2.3.8 AF Motor Assembly Removal

This section describes how to remove the motor which drives AF drive mechanism.

1. Remove the glass frame assembly. (See Section 4.2.3.5.)
2. Remove 4 screws (No.3) and remove the cover which covers the AF drive mechanism.
3. Remove 2 screws (No.6) and remove the tension plate assembly, spring plate and fixing tension plate to loosen the timing belt.
4. Disconnect the cable for the motor from the relay connector, then remove 4 screws (No.4) securing the motor and remove the motor.

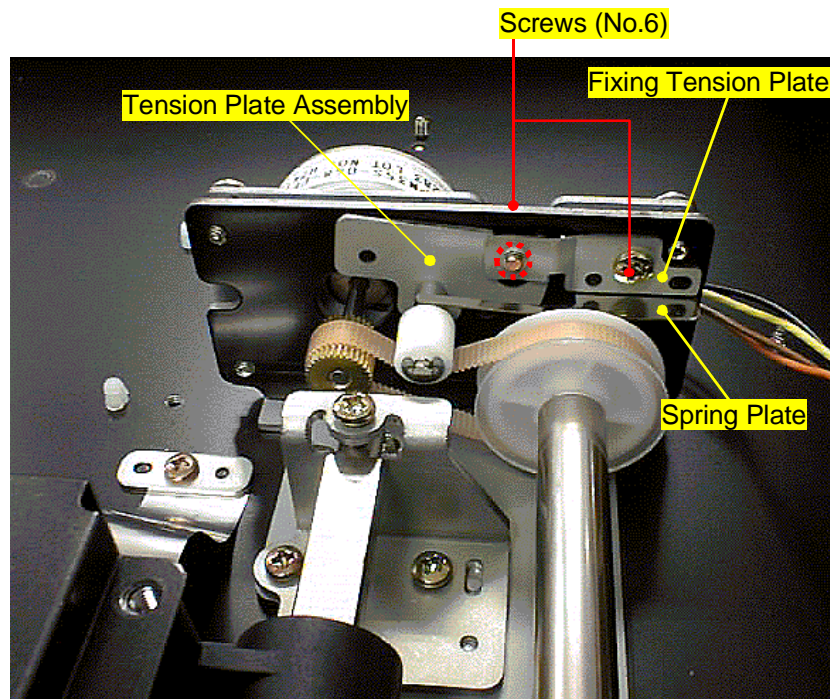


Figure 4-22. Tension Plate Assembly Removal

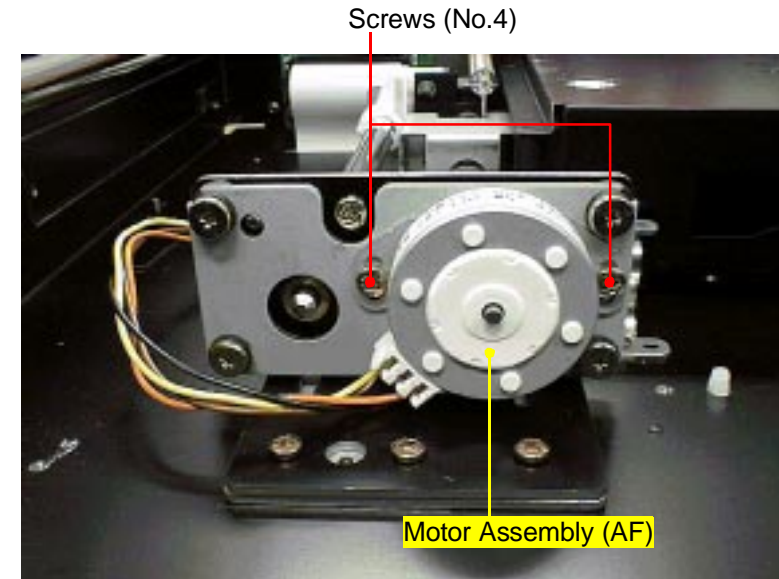


Figure 4-23. AF Motor Assembly Removal

CAUTION

You are required to set the timing belt with a special care while installing the AF motor assembly. Be sure to follow the instruction provided in the next page to set the timing belt properly.

4.2.3.9 AF Motor Assembly Installation

Follow the steps below when installing the AF motor assembly to the scanner body.

1. Engaging the timing belt with the pinion gear of the motor, install the motor to the frame with 2 screws (No. 4).
2. Mount the sprint plate, fixing tension plate, and the tension plate assembly, and fix them with 2 screws (No. 6) temporarily. Ensure that the tension plate assembly is upheld by this operation.
3. Turning the screw pulley attached to the screw shaft end manually, loosen the screw fixing the tension plate assembly to tense the belt, then fasten the screw again.

CAUTION

When fixing the tension plate assembly, be careful not to apply excessive tension, since it may cause the motor to rotate improperly.

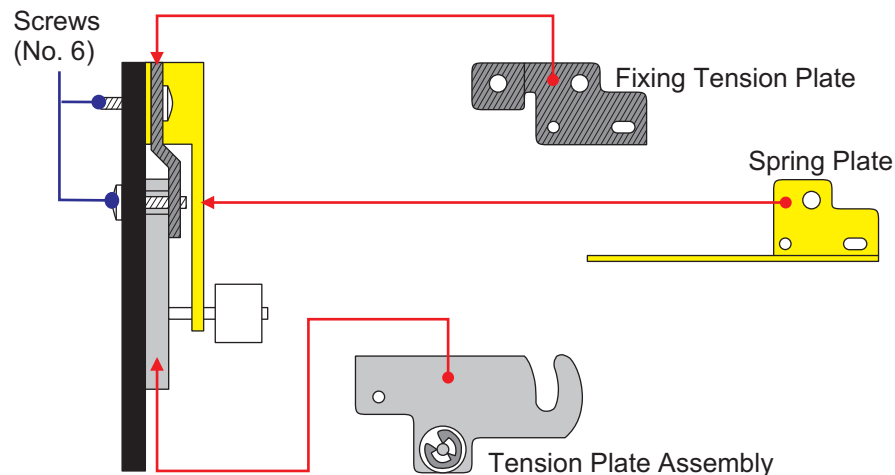


Figure 4-24. Tension Plate Assembly

✓CHECK POINT

When installing the tension plate assembly, make sure that the location bump is not covered with the plate.

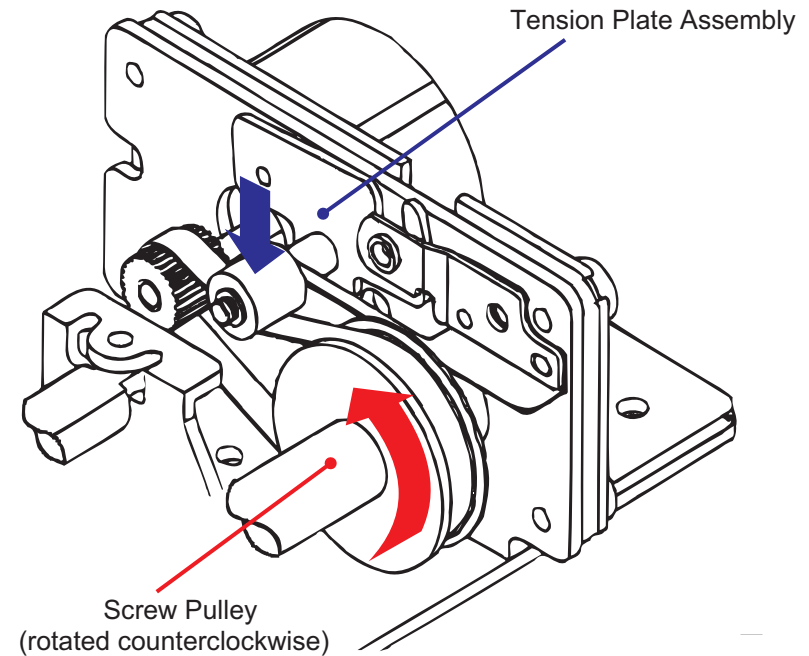


Figure 4-25. Timing Belt Tension

CHAPTER

5

ADJUSTMENT

5.1 OVERVIEW

This scanner requires no adjustment for any service such as disassembling and assembling the scanner including part replacement is provided within the specification in Chapter 4 "Disassemble 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 scanned image. Therefore, be sure to clean the glass well to remove stain thoroughly.



Never apply any organic solvent such as thinner and benzine, since these may deteriorate plastic and rubber parts.

☐ Outer cases

Wipe stain off with a clean cloth which is moistened with water and then squeezed tightly. To remove severe stain, use neutral detergent.

☐ Document glass

Remove dust and paper debris with a dry clean cloth. If stain is severe or foreign matter is stuck, use a cloth absorbed with neutral detergent. If trace is left, wipe it off well with a dry, clean cloth again.



If you need to clean the reverse side of the glass, be sure to remove the glass using the specified adjusting tools.

6.1.2 Lubrication

This scanner needs no lubrication at the level of service specified in the service manual.

CHAPTER

7

APPENDIX

7.1 OVERVIEW

This chapter provides information necessary for servicing.

7.1.1 Connector Pin Assignment

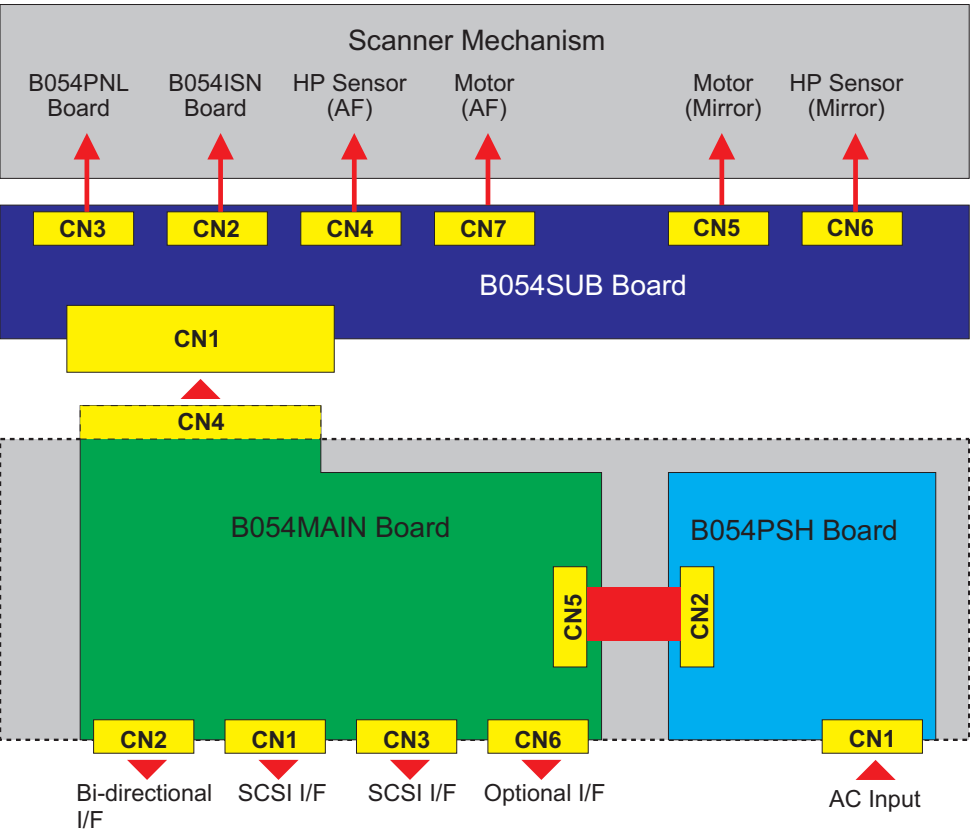


Figure 7-1. Connector Pin Assignment

7.1.2 Connector Summary

Connectors used on the electrical circuit boards are summarized in the table below.

Table 7-1. Connector Summary

Board	CN No.	Function	Ref.
B054MAIN	CN1/3	For connection with SCSI I/F	GT-9500
	CN2	For connection with Bi-directional I/F	GT-9500
	CN4	For connection with B054SUB Board (In a card-edge format)	Page 7-2
	CN5	Power supply line from the B054PSH board	Page 7-3
	CN6	For connection with the option	Page 7-3
B054PSH	CN1	For connection with AC inlet	—
	CN2	⇒ Power supply line for B054MAIN board	Page 7-3
B054SUB	CN1	⇒ For connection to B054MAIN board	Page 7-2
	CN2	⇒ For connection to B054ISN board (CCD sensor, Inverter board)	Page 7-4
	CN3	⇒ For connection to B054PNL board	Page 7-4
	CN4	⇒ For connection to the HP sensor (for focus)	Page 7-4
	CN5	⇒ For connection to the motor (for mirror)	Page 7-4
	CN6	⇒ For connection to HP sensor (for mirror)	Page 7-5
	CN7	⇒ For connection to the motor (for focus)	Page 7-5

B054MAIN – CN4

No.	Signal Name	Function
A1	GND	GND
A2	GND	GND
A3	ADD2	Address (2)
A4	ADD0	Address (0)
A5	A/D	AD clock
A6	WR	WR signal for ADC
A7	CLP	Clamp signal for ADC
A8	SG	Shutter (Green) for CCD
A9	RSP	Reset signal for CCD
A10	TG	Shift signal for CCD
A11	AD1	Image data (1) after AD conversion
A12	AD3	Image data (3) after AD conversion
A13	AD5	Image data (5) after AD conversion
A14	AD7	Image data (7) after AD conversion
A15	AD9	Image data (9) after AD conversion
A16	AD11	Image data (11) after AD conversion
A17	GND	GND
A18	RESETSW	Reset SW signal
A19	LED(R)	LED (READY) signal
A20	+5	Power supply (+5V)
A21	GND	GND
A22	LAMP	Lamp signal
A23	+24	Power supply (+24V)
A24	GND	GND
A25	HMF(P)	Home sensor (AF) (Power supply)
A26	MFA	Motor (AF) (Phase A)
A27	MFAX	Motor (AF) (Phase /A)
A28	HMM(S)	Home sensor (Mirror) (Signal)
A29	MMB	Motor (Mirror) (Phase B)
A30	MMBX	Motor (Mirror) (Phase /B)
A31	GND	GND

No.	Signal Name	Function
B1	+5V	Power supply (+5V)
B2	+12V	Power supply (+12V)
B3	ADD1	Address (1)
B4	STLN	Start line signal for ADC
B5	CSAP	Chip select ADC
B6	SMP	Sample hold signal for ADC
B7	SB	Shutter (Blue) for CCD
B8	SR	Shutter (Red) for CCD
B9	CK	Clock signal for CCD
B10	AD0	Image data (0) after AD conversion
B11	AD2	Image data (2) after AD conversion
B12	AD4	Image data (4) after AD conversion
B13	AD6	Image data (6) after AD conversion
B14	AD8	Image data (8) after AD conversion
B15	AD10	Image data (10) after AD conversion
B16	GND	GND
B17	POWERSW	Power switch (secondary side)
B18	LED(P)	LED (POWER)
B19	LED(ER)	LED (ERROR)
B20	GND	GND
B21	GND	GND
B22	+24	Power supply (+24V)
B23	+24	Power supply (+24V)
B24	HMF(S)	Home sensor (AF) (Signal)
B25	MFB	Motor (AF) (Phase B)
B26	MFBX	Motor (AF) (Phase /B)
B27	GND	GND
B28	HMM(P)	Home sensor (Mirror) (Power supply)
B29	MMA	Motor (Mirror) (Phase A)
B30	MMAX	Motor (Mirror) (Phase /A)
B31	GND	GND

B054MAIN – CN5

No.	Signal Name	Function
1	+24V	Power supply (for motor drive, lamp)
2	+24V	Power supply (for motor drive, lamp)
3	+24V	Power supply (for motor drive, lamp)
4	GND	GND
5	GND	GND
6	GND	GND
7	+5V	Power supply (for logic line)
8	+5V	Power supply (for logic line)
9	+15V	Power supply (for producing +12V)
10	GND	GND
11	TMP	Output from the thermistor
12	SW	Power switch (Secondary side) control signal

B054MAIN – CN6

No.	Signal Name	Function
1	IN1	TPU (HOME) / Select
2	IN2	TPU (COVER) / Select
3	IN3	Not used.
4	OU5	Lamp control signal
5	IN4	Not used.
6	+5	Power supply (+5V)
7	GND	GND
8	+24	Power supply (+24V)
9	SDAT	Motor drive serial data for TPU
10	SCK	Transfer clock for TPU
11	LOD	Latch pulse for TPU
12	SEL	Select signal for TPU
13	+5	Power supply (+5V)
14	GND	GND
15	+24	Power supply (+24V)
16	+24	Power supply (+24V)
17	GND	GND
18	+5	Power supply (+5V)
19	+5	Power supply (+5V)
20	+24	Power supply (+24V)
21	RXD	RXD signal for ADF
22	/RXD	/RXD signal for ADF
23	/TXD	/TXD signal for ADF
24	TXD	TXD signal for ADF
25	DSR	DSR signal for ADF
26	DTR	DTR signal for ADF

B054SUB – CN2

No.	Signal Name	Function
1	+12	Power supply (+12V)
2	GND	GND
3	+5	Power supply (+5V)
4	GND	GND
5	+5	Power supply (+5V)
6	GND	GND
7	+12V	Power supply (+12V)
8	S2	Address (2)
9	S1	Address (1)
10	S0	Address (0)
11	STL	Start line for ADC
12	A/D	AD clock
13	CS	Chip select signal
14	WR	WR signal for ADC
15	SMP	Sample hold signal for ADC
16	CLP	Clamp signal for ADC
17	SB	Shutter signal (Blue) for CCD
18	SG	Shutter signal (Green) for CCD
19	SR	Shutter signal (Red) for CCD
20	RSP	Reset signal for CCD
21	CK	Clock signal for CCD
22	TG	Shift signal for CCD
23	AD0	Image data (0) after AD conversion
24	AD1	Image data (1) after AD conversion
25	AD2	Image data (2) after AD conversion
26	AD3	Image data (3) after AD conversion
27	AD4	Image data (4) after AD conversion
28	AD5	Image data (5) after AD conversion
29	AD6	Image data (6) after AD conversion
30	AD7	Image data (7) after AD conversion
31	AD8	Image data (8) after AD conversion
32	AD9	Image data (9) after AD conversion
33	AD10	Image data (10) after AD conversion
34	AD11	Image data (11) after AD conversion
35	GND	GND

B054SUB – CN3

No.	Signal Name	Function
1	+24	Power supply (+24V)
2	+24	Power supply (+24V)
3	+24	Power supply (+24V)
4	+24	Power supply (+24V)
5	LAMP	Lamp signal
6	GND	GND
7	GND	GND
8	GND	GND
9	GND	GND
10	+5V	Power supply (+5V)
11	LED (ERR)	LED (ERROR)
12	LED (RES)	LED (READY)
13	LED (POW)	LED (POWER)
14	RESETSW	RESET switch signal
15	POWERSW	POWER switch signal
16	GND	GND

B054SUB – CN4

No.	Signal Name	Function
1	HMF(S)	Home sensor (AF) (Signal)
2	GND	GND
3	HMF(P)	Home sensor (AF) (Power supply)

B054SUB – CN5

No.	Signal Name	Function
1	MFB	Motor (AF) (Phase B drive signal)
2	MFA	Motor (AF) (Phase A drive signal)
3	MFBX	Motor (AF) (Phase /B drive signal)
4	MFAX	Motor (AF) (Phase /A drive signal)

B054SUB – CN6

No.	Signal Name	Function
1	HMM(S)	Home sensor (Mirror) (Signal)
2	GND	GND
3	HMM(P)	Home sensor (Mirror) (Power supply)

B054SUB – CN7

No.	Signal Name	Function
1	MMB	Motor (Mirror) (Phase B drive signal)
2	MMA	Motor (Mirror) (Phase A drive signal)
3	MMBX	Motor (Mirror) (Phase /B drive signal)
4	MMA X	Motor (Mirror) (Phase /A drive signal)

7.2 COMPONENT LAYOUT

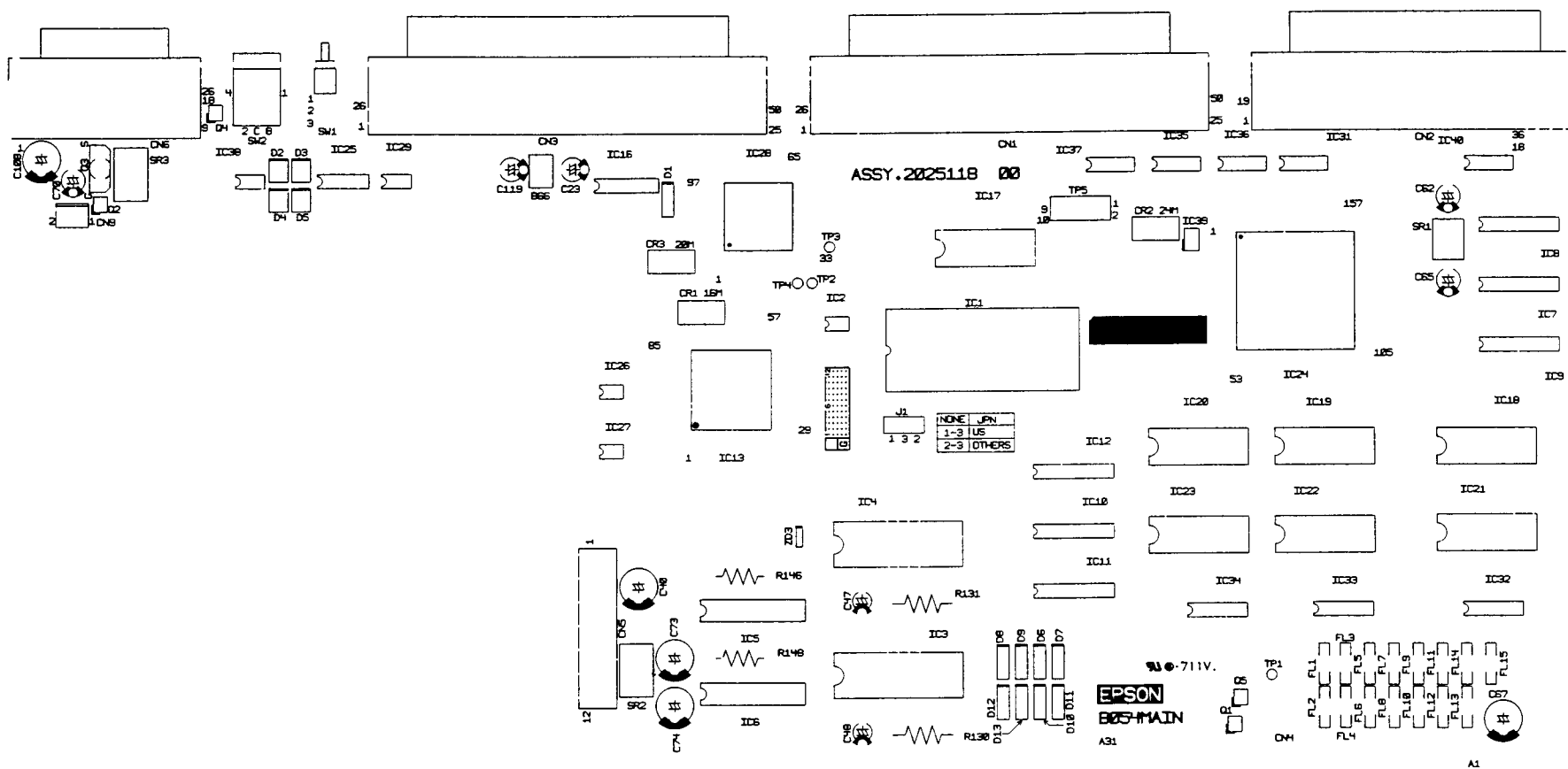


Figure 7-2. Component Layout - B054MAIN Board

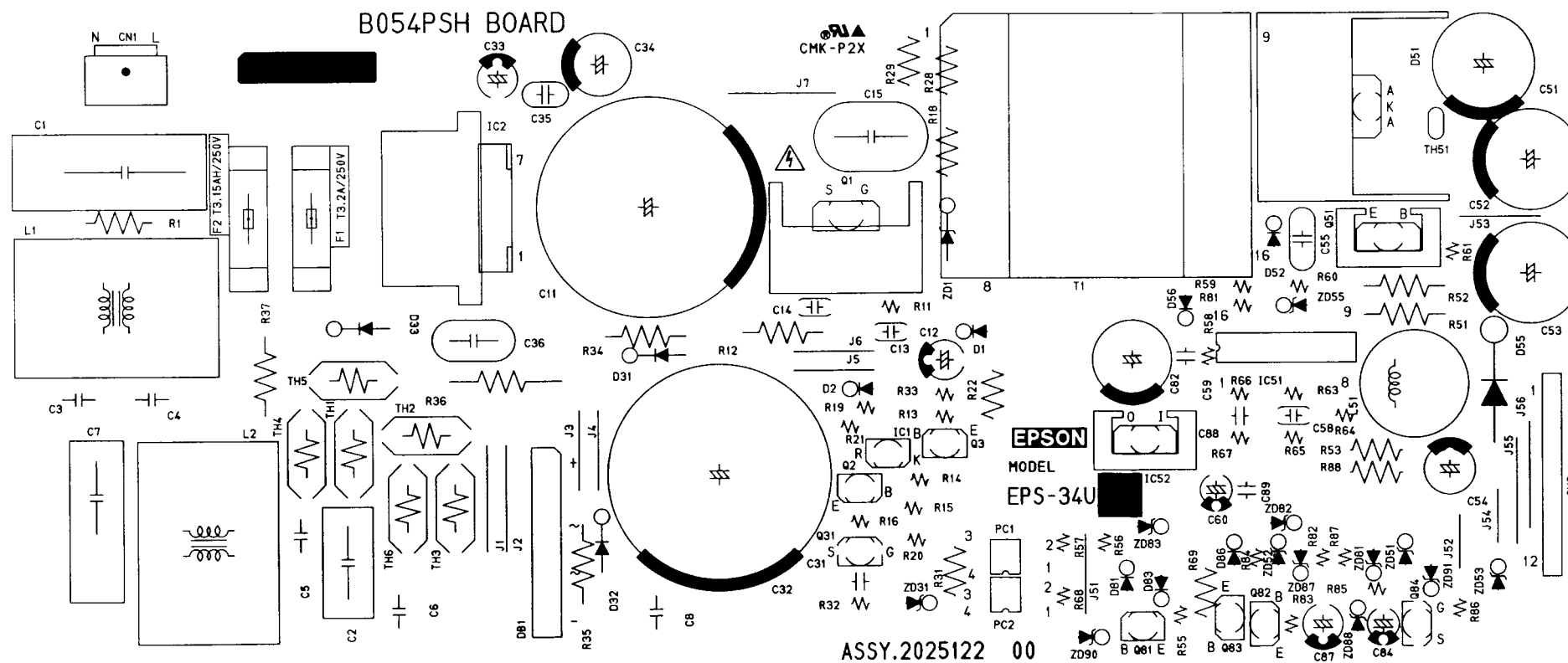


Figure 7-3. Component Layout - B054PSH Board

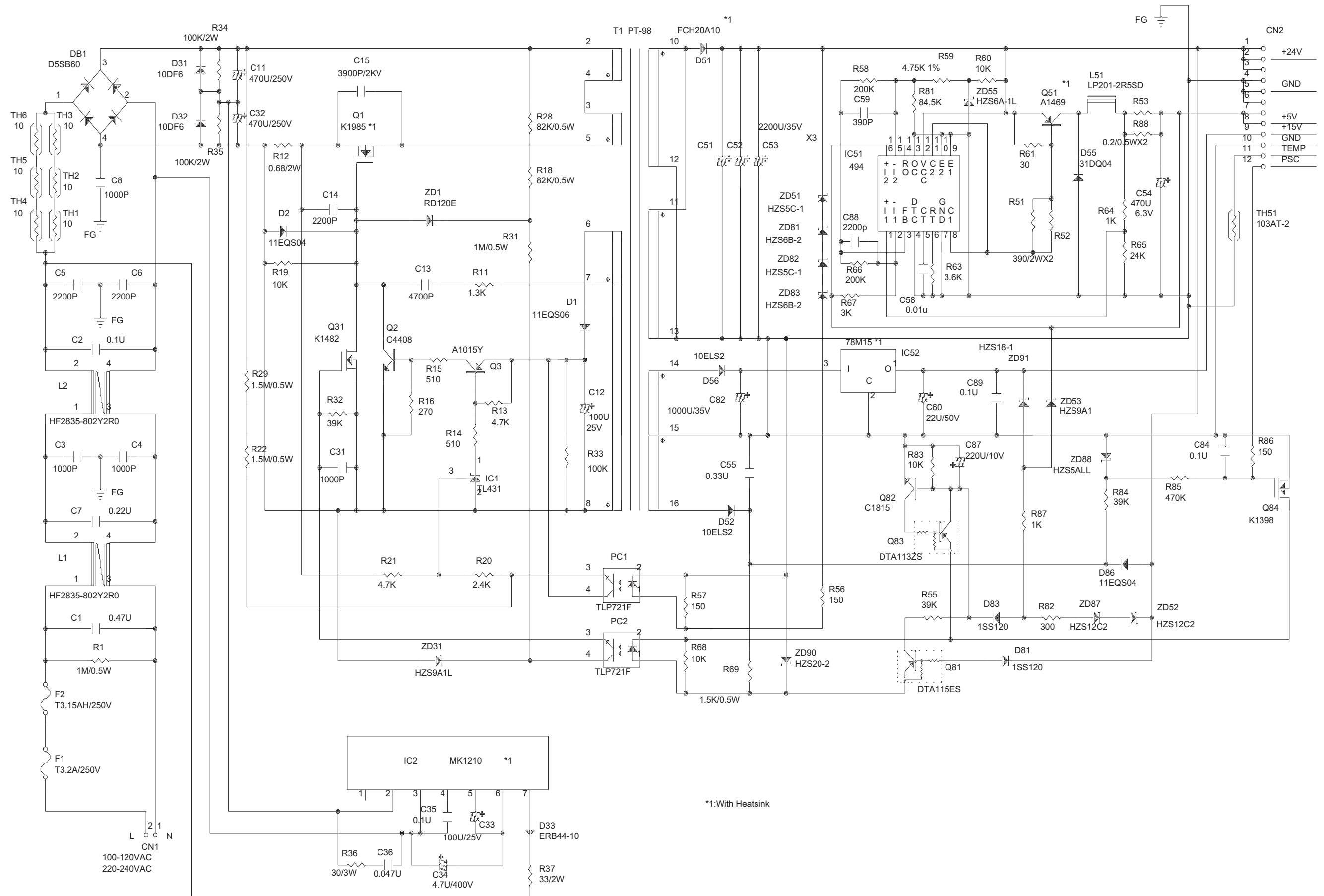
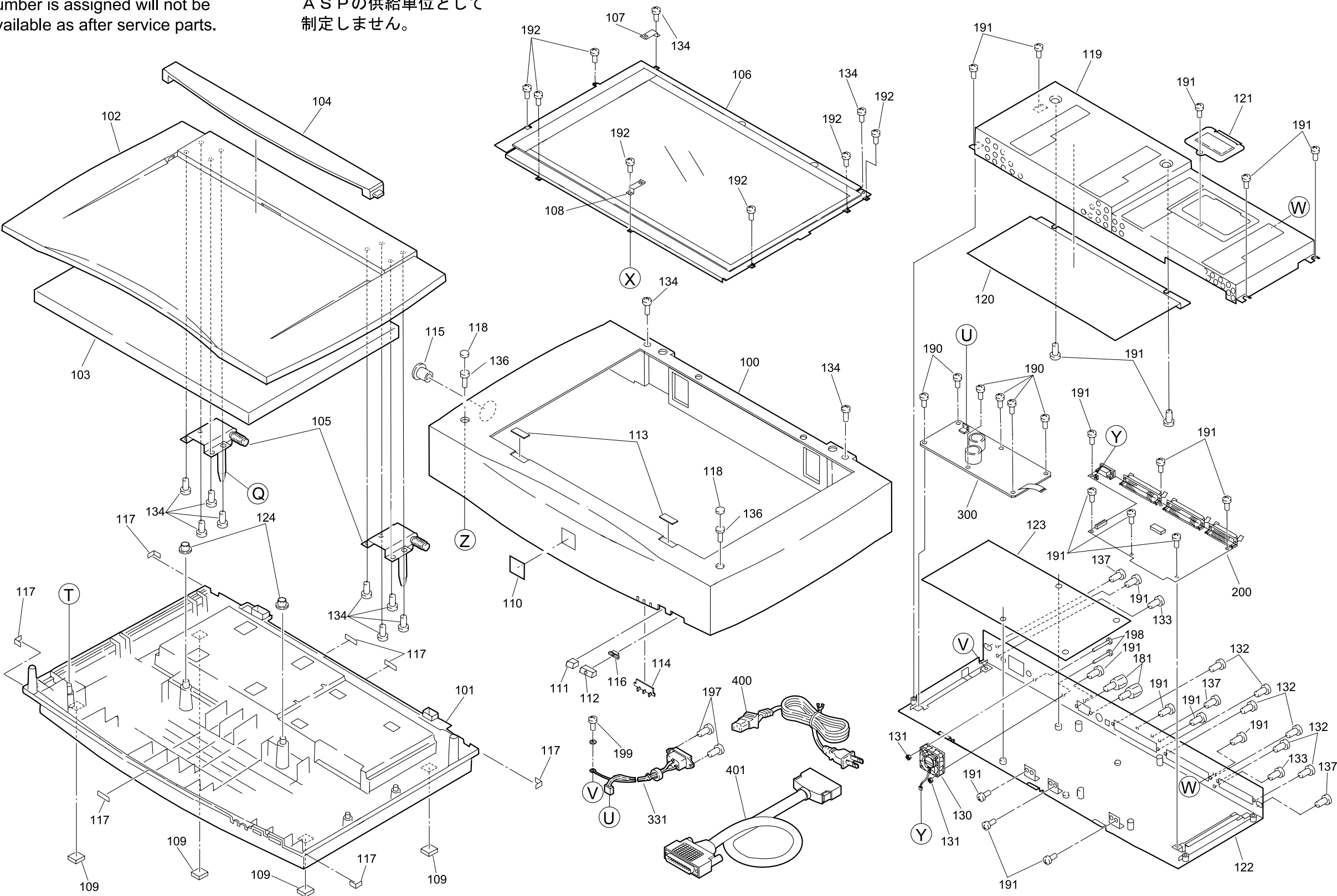


Figure 7-5. B054PSH Board Circuit Diagram

7.4 EXPLODED DIAGRAMS

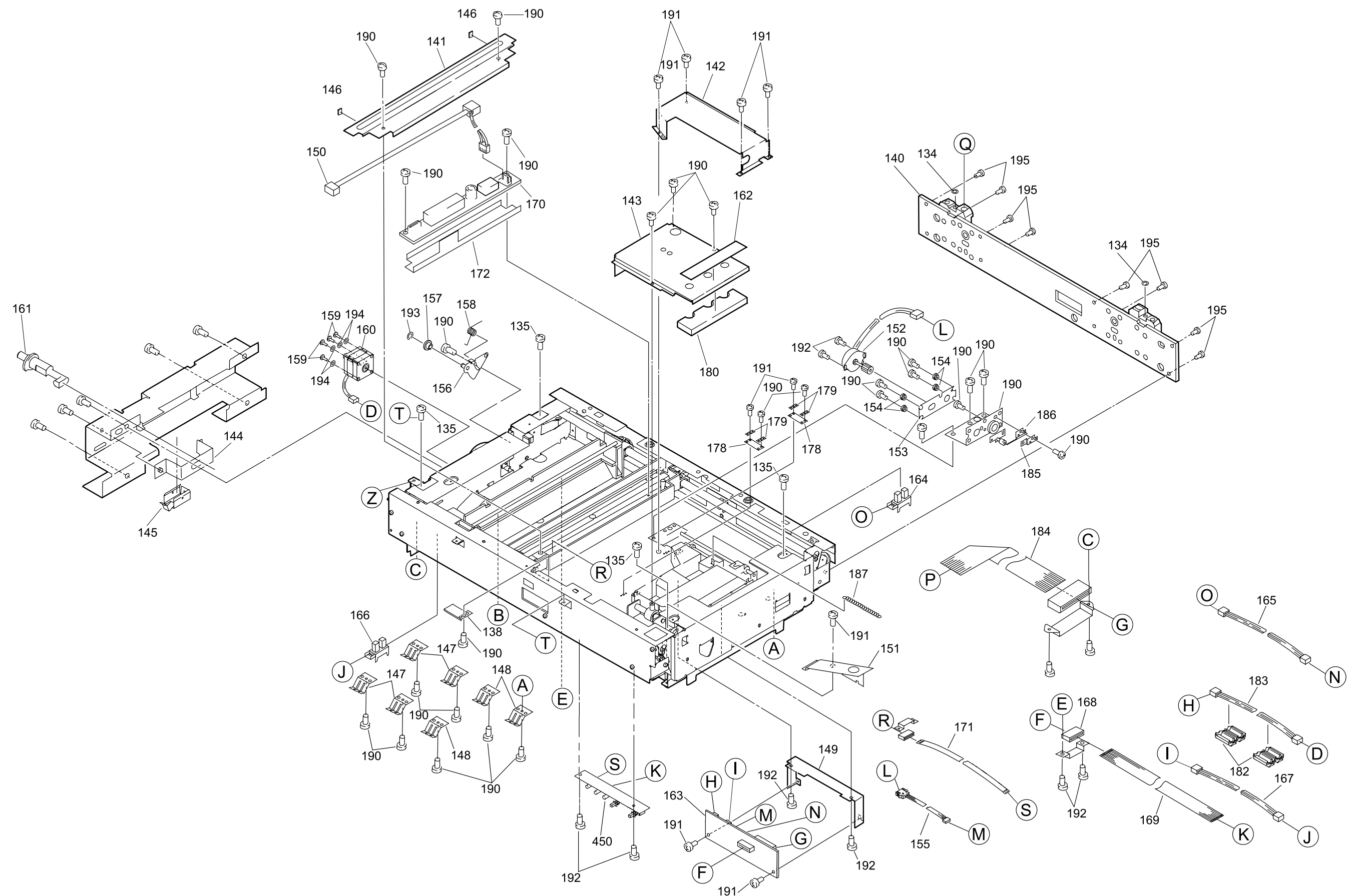
The parts to which no reference number is assigned will not be available as after service parts.

図番の無い部品については、
A S Pの供給単位として
制定しません。



EXPLODED DIAGRAM FOR ES-8000 / GT-12000 / Expression 836 (1)

Figure 7-6. Exploded Diagrams (1)



EXPLODED DIAGRAM FOR ES-8000 / GT-12000 / Expression 836 (2)

Figure 7-7. Exploded Diagrams (2)