

# SERVICE MANUAL



*Color Flat Bed Scanner*  
**EPSON GT-10000**



**EPSON®**



SESC99005

## Notice:

- All rights reserved. No part of this manual may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SEIKO EPSON CORPORATION.
- The contents of this manual are subject to change without notice.
- All effort have been made to ensure the accuracy of the contents of this manual. However, should any errors be detected, SEIKO EPSON would greatly appreciate being informed of them.
- The above notwithstanding SEIKO EPSON CORPORATION can assume no responsibility for any errors in this manual or the consequences thereof.

EPSON is a registered trademark of SEIKO EPSON CORPORATION.

General Notice: Other product names used herein are for identification purpose only and may be trademarks or registered trademarks of their respective owners. EPSON disclaims any and all rights in those marks.

Copyright © 1999 SEIKO EPSON CORPORATION. Printed in Japan.



# 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 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 GT-10000. 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 OUTLINE**

*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 & 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.*

## **CHAPTER 7. APPENDIX**

*Provides the following additional information for reference:*

- *Connector Pin Assignment*
- *Circuit Board Component Layout*
- *Circuit Board Diagram*
- *Exploded Diagrams & ASP List*

## Revision Status

Revision	Issued Date	Description
A	June 14, 1999	First Release

# Table of Contents

## CHAPTER 1 PRODUCT OUTLINE

Overview .....	9
Specifications .....	10
Basics .....	10
Image Handling Specifications .....	10
Electrical Specifications .....	11
Safety, EMC, EPA .....	11
Resistance to Electric Noise .....	11
Environmental Specifications .....	11
Reliability .....	11
Operating Conditions .....	11
Original Document Condition .....	12
Physical Dimensions and Weight .....	12
Interface Specifications .....	13
SCSI Interface .....	13
Basic Specifications .....	13
Functions .....	13
SCSI Electrical Specifications .....	13
Connectors .....	13
Terminator .....	13
SCSI ID Setting .....	13
Commands .....	14
Status .....	15
Display Messages .....	15
Connector pin arrangement .....	16
IEEE 1394 Serial Bus Interface *Option* .....	16
Control Code .....	17
Operation Specifications .....	18
Buttons and Switches .....	18
LED Specifications .....	19
Switch Setting .....	19
Error Indication .....	20
Available Scan Area .....	20
Transportation Screw .....	21

## CHAPTER 2 OPERATING PRINCIPLES

General Description .....	23
Mechanical Operation of the Scanner .....	24
Electrical Circuit Operations .....	25
Control Circuit Operation .....	25
Power Supply Circuit Operation .....	26

## CHAPTER 3 TROUBLESHOOTING

Overview .....	29
Errors and Causes of Errors .....	29
Troubleshooting .....	30
Test Points .....	30
Troubleshooting Other Errors .....	30
Troubleshooting Circuit Board Errors .....	35
Power Supply Board (B054PSH Board) .....	35
Control Circuit Board (B093MAIN Board) .....	35

## CHAPTER 4 DISASSEMBLY & ASSEMBLY

Overview .....	37
Tools .....	37
Screws .....	38
Disassembly Procedures .....	40
Document Cover Unit Removal .....	41
Electrical Circuit Removal .....	41
Main Boards Removal .....	42
Scanner Body Disassembly .....	44
Upper Housing Removal .....	44
Scanner Mechanism Removal .....	45
Scanner Mechanism Disassembly .....	46
Panel Board Assembly Removal .....	46
Sub Board Assembly Removal .....	47
HP Sensor (CR) Removal .....	48
CR Motor Assembly Removal .....	48

Glass Frame Assembly Removal .....	49
Lamp Assembly and Inverter Board Assembly Removal .....	52
Option Frame Assembly Removal .....	54

## ***CHAPTER 5 ADJUSTMENTS***

---

Updating Firmware .....	56
Preparations Before Updating .....	56
Updating Firmware .....	57
Light Correction .....	61
Necessary Tools .....	61
Light Correction Procedure .....	61

## ***CHAPTER 6 MAINTENANCE***

---

## ***CHAPTER 7 APPENDIX***

---

Connector Pin Assignment .....	67
Connector Pin Assignment .....	67
Connector Summary .....	67
Main Board Circuit Signals .....	68
Circuit Board Component Layout .....	72
Circuit Diagram .....	74
Exploded Diagrams & ASP List .....	76
Exploded Diagrams .....	76
ASP List .....	79

**CHAPTER**

**1**

# **PRODUCT OUTLINE**

## 1.1 Overview

---

The EPSON GT-10000 is an business/office A3 size flat-bed type color image scanner for use with Microsoft® Windows®. The main features of the scanner are:

- High resolution  
Optical resolution is 600 dpi  
12 bit in, 8 bit out
- Wide readable area  
Scans up to A3 size originals
- High-speed scanning  
A3 portrait with full color = 4mS/line
- Option  
Auto Document Feeder (same as GT-12000)
- Network-use software  
EPSON TWAIN Pro Network  
EPSON Scan Server
- Scan-Navigation button support  
The scan button is functional when using the EPSON TWAIN Pro Network
- Fast SCSI support  
Up to 10MB/S in synchronous data transfer mode
- International Energy Star compliant
- High-speed serial interface (planned option for Windows 2000)  
IEEE1394 serial interface standard
- Quick operation  
Xenon-Gas Cold Cathode Fluorescent Lamp does not require warm-up period (same as GT-12000).



## 1.2 Specifications

### 1.2.1 Basics

Type:	Wide area, flat-bed color image scanner
Scanning Method:	Sub-Scanning mirror movement system
Photoelectric Device:	Color CCD Line sensor
Light Source:	Xe-Gas Cold Cathode Fluorescent Lamp
Noise level:	50dB or less during operation
Document size:	Up to A3
Max. Effective Pixels:	7020 x 10200 (600dpi)
Max. Scan Area:	297 x 432mm (11.7 x 17.0 inches)
Scanning Resolution:	600 (Main) by 1200 (Sub) dpi
Output Resolution:	50 to 4800dpi (1dpi increments)
Zoom:	50~200% (1% increments)
Scanning Speed:	See the table below.

**Table 1-1. Scanning Speed**

Setting	Time required
Monochrome x2	Approx. 1.4mS/line
256 Grayscale	Approx. 4.0mS/line
Full color	Approx. 4.0mS/line

Note: Figures taken at 600dpi

Command Codes:	ESC/I Command (B7 level) FS Command
----------------	--

Option:	ADF (same unit as GT-12000)
Interfaces:	SCSI (50 pin connector) IEEE1394 serial interface (option for Windows 2000)

### 1.2.2 Image Handling Specifications

#### GAMMA CORRECTION

Five standard levels, plus one user definable  
 CRT A & B  
 Printer A, B, & C

#### COLOR CORRECTION

Four standard levels, plus one user definable  
 Dot Matrix Printer  
 Thermal Printer  
 Ink Jet Printer  
 Color Monitor (CRT)

#### BRIGHTNESS CONTROL

Seven levels

#### IMAGE PROCESSING

Two output methods: Bi-level = Fixed threshold  
 TET (Text Enhancement Technology)

Half-toning: Error diffusion A, B, & C  
 Dithering A, B, C, & D  
 User-defined dithering A & B

Focusing: AAS (Auto-Area Segmentation)



### 1.2.3 Electrical Specifications

Power supply voltage:	Universal power Rated voltage = AC100 - 120 V (AC ± 10%) Rated voltage = AC220 - 240 V (AC ± 10%)
Rated frequency range:	50~ 60 Hz (49.5 - 60.5 Hz)
Power consumption:	Approximately 50W (without option) Approximately 55W (with option)
Insulation resistance:	10MΩ or more (DC 500V between AC line and chassis)
Dielectric strength:	AC1.2kV rms / minute (between AC line and chassis)

### 1.2.4 Safety, EMC, EPA

Safety:	UL1950 (UL) CSA C22.2 NO.950 (CSA) EN60950 (VDE) IEC950 (ROSTEST, PSB)
EMC:	FCC Part15 Subpart B Class B CSA C108.8 Class B AS/NZS3548 Class B CISPR Pub22 Class B CNS13438 Class B
CE Marking:	
Low Voltage Directive 73/23/EEC	EN60950
EMC Directive 89/336/EEC	EN55022 Class B EN61000-3-2

EN61000-3-3
EN 50082-1
IEC 801-2
IEC 801-3
IEC 801-4
EPA: Energy Star Program

### 1.2.5 Resistance to Electric Noise

Static Electricity:	Panel = 10kV Metallic parts = 7kV (150pF/150Ω)
---------------------	---

### 1.2.6 Environmental Specifications

Temperature:	Operating = 5 to 35°C When not in use = -25 to 60°C
Humidity:	Operating = 10 to 80% (no condensation) Storage = 10 to 85% (no condensation)

### 1.2.7 Reliability

Main unit:	MCBF: carriage = 100,000 cycles Hinge = 25,000 turns
------------	---

### 1.2.8 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.



## 1.2.9 Original Document Condition

Reflective type: Smooth surface such as a printing and photograph.

## 1.2.10 Physical Dimensions and Weight

Dimensions: 656 (W) x 458 (D) x 176 mm (H)  
(See Figure 1-1.)

Weight: Approximately 21 Kg

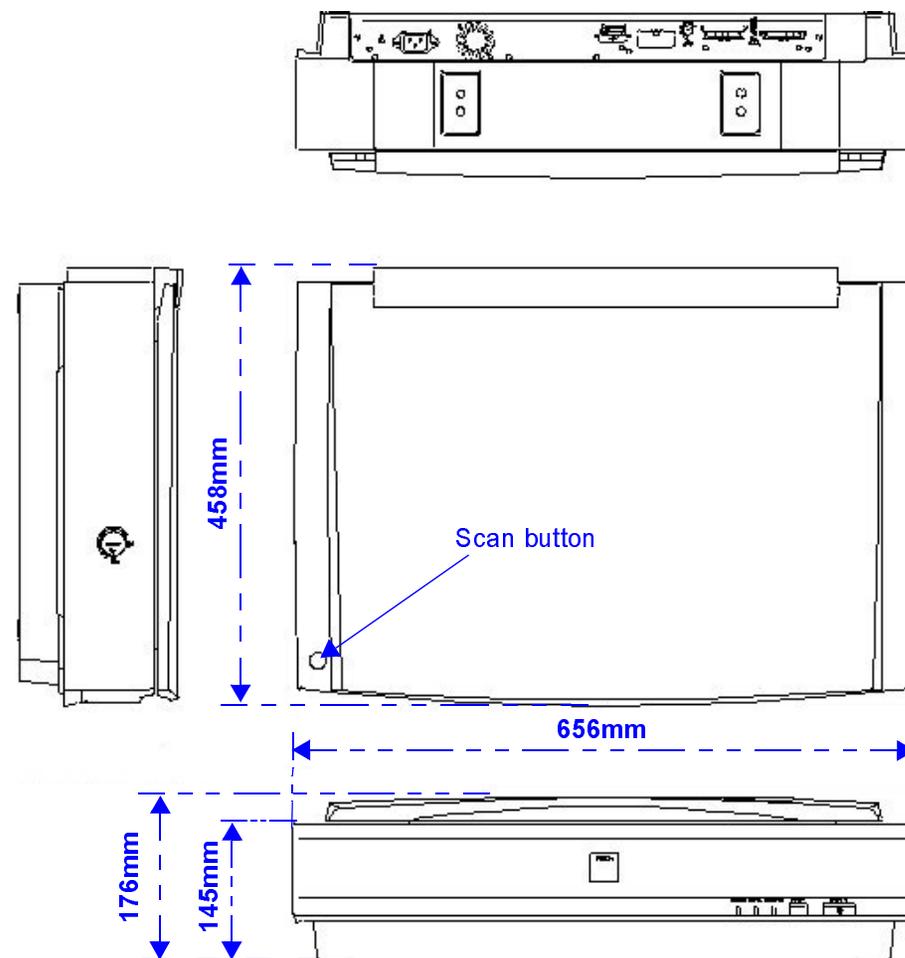


Figure 1-1. External Dimensions of the GT-10000

## 1.3 Interface Specifications

This scanner is equipped with two standard SCSI interfaces.

### 1.3.1 SCSI Interface

#### 1.3.1.1 Basic Specifications

The SCSI interface specifications are described below, any items not included in the following pages are in conformance with ANSI X3T9.2/375R revision 10L (SCSI-2).

#### 1.3.1.2 Functions

The following functions are included in ANSI X3T9.2/375R revision 10L (SCSI-2).

Table 1-2. Functions

Phase/Condition	Notes
BUS FREE	
ARBITRATION	
SELECTION/RESELECTION	
COMMAND	<ul style="list-style-type: none"> <li>In this setup, LUN (logical Unit Number) is fixed at 0</li> <li>Command link function is not supported</li> </ul>
DATA IN	
DATA OUT	
STATUS	
MESSAGE IN	
MESSAGE OUT	
ATTENTION (condition)	
RESET (condition)	

The Level 1 SCAM target function is available. This is included in ANSI T10/1142D revision 15.

#### 1.3.1.3 SCSI Electrical Specifications

This device conforms to regulations of the Single-ended drivers and receivers included in ANSI X3T9.2/375R revision 10L (SCSI-2).

**NOTE:** The length of the interface cable is limited to three meters when using FAST SCSI. (Synchronous data transfer)

#### 1.3.1.4 Connectors

Two 50-pin high-density connectors

#### 1.3.1.5 Terminator

Internal terminator, set with the switch on the rear panel

#### 1.3.1.6 SCSI ID Setting

- ID is set using the rotary switch on the rear panel, from 0 to 7. Other ID numbers are reserved. SCSI-ID setting switch



**Be sure to set the scanner to a SCSI ID number that is not already in use.**

Table 1-3. ID Setting

ID Number	Availability	Note
0	Available	Normally assigned to other SCSI devices such as a hard disk drive
1	Available	Normally assigned to other SCSI devices such as a hard disk drive
2	Available	Scanner default setting
3	Available	

www.tonerplus.com.ua

ID Number	Availability	Note
4	Available	
5	Available	
6	Available	
7	Available	Normally assigned to the SCSI host adapter.
Blank	Not Available	Not effective / Not used
Blank	Available	Used for firmware updates

Table 1-4. Terminator Switch

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



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

### 1.3.1.7 Commands

This printer uses the following group “0” processor commands.

Table 1-5.

Command	Code	Description
Test Unit Ready	00h	Confirms operation
Request Sense	03h	Requires a Sense data *1
Receive	08h	Data transmission from Target to Initiator
Send	0Ah	Data transmission from Initiator to Target
Inquiry	12h	Requests information from SCSI device *2

\*1: SCSI-2 sense data format available

\*2: The inquiry data is shown in the table below.

Table 1-6.

Peripheral Qualifier	000b	When an LUN other than #0 is specified, this value is set in 011b
Peripheral Device Type	03h	Processor When an LUN other than #0 is specified, this value is set in 1fh
RMB	00h	Non-removable
Devie Type Modifier	00h	
ISO version	00h	
ECMA version	00h	
ANSI version	02h	SCSI-2
AENC	0b	Does not support asynchronous event notification

www.tonerplus.com.ua

TrmIOP	0b	Does not support Terminate I/O Process message
Response Data Format	02h	
Additional length	23h	
RelAdr	0b	Does not support relative addressing for this logical unit
Wbus32	0b	Does not support 32-bit wide data transfers
Wbus16	0b	Does not support 16-bit wide data transfers
Sync	1b	Supports synchronous data transfer
Linked	0b	Does not support linked commands for this logical unit
CmdQue	0b	Does not support tagged command queuing for this logical unit
SftRe	0b	Hard reset alternative
Vendor ID	"EPSON", 20h, 20h, 20h	
Product ID	"Scanner", 20h, "*****", 20h	Note:: ***** = the product name
Product Revision	"****"	Note:: ***** = the product name
Vendor Specific	00h, 00h, 00h, ffh	

### 1.3.1.8 Status

The status is determined as follows.

**Table 1-7. Status Conditions**

Status	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
GOOD	R	R	0	0	0	0	0	R
CHECK CONDITION	R	R	0	0	0	0	1	R
BUSY	R	R	0	0	1	0	0	R

Note: R = reserved

### 1.3.1.9 Display Messages

**Table 1-8. Message Summary**

Code	Message	Direction	Negate ATN before last ACK
00h	Command complete	In	-
01h	(Extended messages)		
02h	Save Data Pointer	In	-
03h	Restore Pointer	In	-
04h	Disconnect	In	-
05h	Initiator Detected Error	Out	Yes
06h	Abort	Out	Yes
07h	Message Rejection	In/Out	Yes
08h	No Operation	Out	Yes
09h	Message Parity Error	Out	Yes
0ch	Bus Device Reset	Out	Yes
80h-ffh	Identify	In/Out	No

In = Target to Initiator  
 Out = Initiator to Target  
 Yes = Initiator shall negate ATN before last ACK of message  
 No = Initiator may or may not negate ATN before last ACK of message

Table 1-9. Extended Message

Code	Extended Message Name	Negate ATN before last ACK
01h	SYNCHRONOUS DATA TRANSFER REQUEST	Yes
03h	WIDE DATA TRANSFER REQUEST	Yes

1.3.1.10 Connector pin arrangement

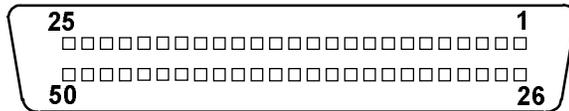


Figure 1-2.

Table 1-10. SCSI Connector Functions

Signal	In/Out	Pin Number	Description
GND		1~12, 14~25, 35~37, 39, 40, 42	
NC		13	
DB0	I/O	26	Data Bus 0
DB1	I/O	27	Data Bus 1
DB2	I/O	28	Data Bus 2
DB3	I/O	29	Data Bus 3
DB4	I/O	30	Data Bus 4
DB5	I/O	31	Data Bus 5
DB6	I/O	32	Data Bus 6
DB7	I/O	33	Data Bus 7
DBP	I/O	34	Data Bus Parity
TERMPWR		38	Terminator Power
ATN		41	Attention
BSY	I/O	43	Busy
ACK		4	Acknowledge
RST		45	Reset

Table 1-10. (continued)SCSI Connector Functions

Signal	In/Out	Pin Number	Description
MSG	O	46	Message
SEL	I/O	47	Select
C/D	O	48	Command / Data
REQ	O	49	Request
I/O	O	50	Input / Output

1.3.2 IEEE 1394 Serial Bus Interface \*Option\*

For details see the separate IEEE 1394 Serial Bus Interface service manual.



## 1.4 Control Code

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

**Table 1-11. Control Code Summary**

Category	Command	Code
Execute Command	Identity Request	ESC I
	Status Request	ESC F
	Extended Status Request	ESC f
	Parameter Request	ESC S
	Initiate Scan	ESC G
	Request Push Button Status	ESC !
	Request Extended ID	FS I
	Request Scanner Status	FS F
	Request Scan Parameters	FS S
	Initiate New Scan	FS G
Set Data Format	Set Data Format	ESC D i
	Set Resolution	ESC R n1 n2
	Set Zoom	ESC H i1 i2
	Set Scan Area	ESC A n1 n2 n3 n4
	Set Color	ESC C i
	Set Mirroring	ESC K I
	Set Scan Parameter	FS W
Set Image Correction	Set Brightness	ESC L i
	Set Gamma Correction	ESC Z i
	Download Gamma Table	ESC z i d0 d1~d255
	Set Sharpness	ESC Q i

**Table 1-11. Control Code Summary (continued)**

Category	Command	Code
Image Processing	Set Digital Halftoning	ESC B i
	Set Auto Area Segmentation	ESC s i
	Download Dither Pattern	ESC b i j d (j^2)
	Set Color Correction	ESC M i
	Download Color Correction	ESC m d1 d2~d9
	Set Threshold	ESC t i
Miscellaneous	Set Scanning Mode	ESC g i
	Initialize	ESC @
	Set Line Counter	ESC d i
	Control Option	ESC e i
	Eject Paper	FF
	Feed Paper	PF
Control	Normal Response	ACK
	Abnormal Response	NACK
	Stop Scanning	CAN
	Header	STX

## 1.5 Operation Specifications

### 1.5.1 Buttons and Switches

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

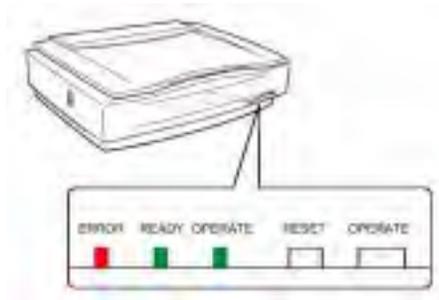


Figure 1-3. Control Panel Indicators and Buttons

- OPERATE button**  
Turns on and off the scanner. When turned on, it initializes the scanner.
- RESET button**  
Re-initializes the scanner.
- SCSI ID (rotary) switch**  
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.



Figure 1-4. SCSI ID Switch

- SCSI terminator**  
Determines the internal terminator setting between ON - last SCSI device on the daisy chain and OFF - not the last SCSI device on the daisy chain.

**NOTE:** The factory default setting for this switch is ON (terminated).



Figure 1-5. SCSI Terminator Switch

## 1.5.2 LED Specifications

This scanner has the following 3 LED indicators:

**OPERATE indicator (Green)**

Indicates whether the scanner is on or off.

**READY indicator (Green)**

On when the scanner is ready to receive commands. Flashes when data is sent to/from the host computer.

When an error occurs, indicates the error type in combination with the ERROR LED indicator.

**ERROR indicator (Red)**

On when an error occurs.

## 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:

**Table 1-12. SCSI ID Setting**

ID No.	Availability	Note
0	○	Normally assigned to other SCSI devices such as a hard disk drive
1	○	Normally assigned to other SCSI devices such as a hard disk drive
2	○	Scanner default setting
3	○	Reserve
4	○	Reserve
5	○	Reserve
6	○	Reserve

ID No.	Availability	Note
7	○	Reserve
Blank	X	
Blank	○	Used for firmware updates



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

**Table 1-13. Terminator Switch**

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



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

## 1.5.4 Error Indication

If an error occurs, determine the error type referring to the status of the READY and ERROR LED indicators.

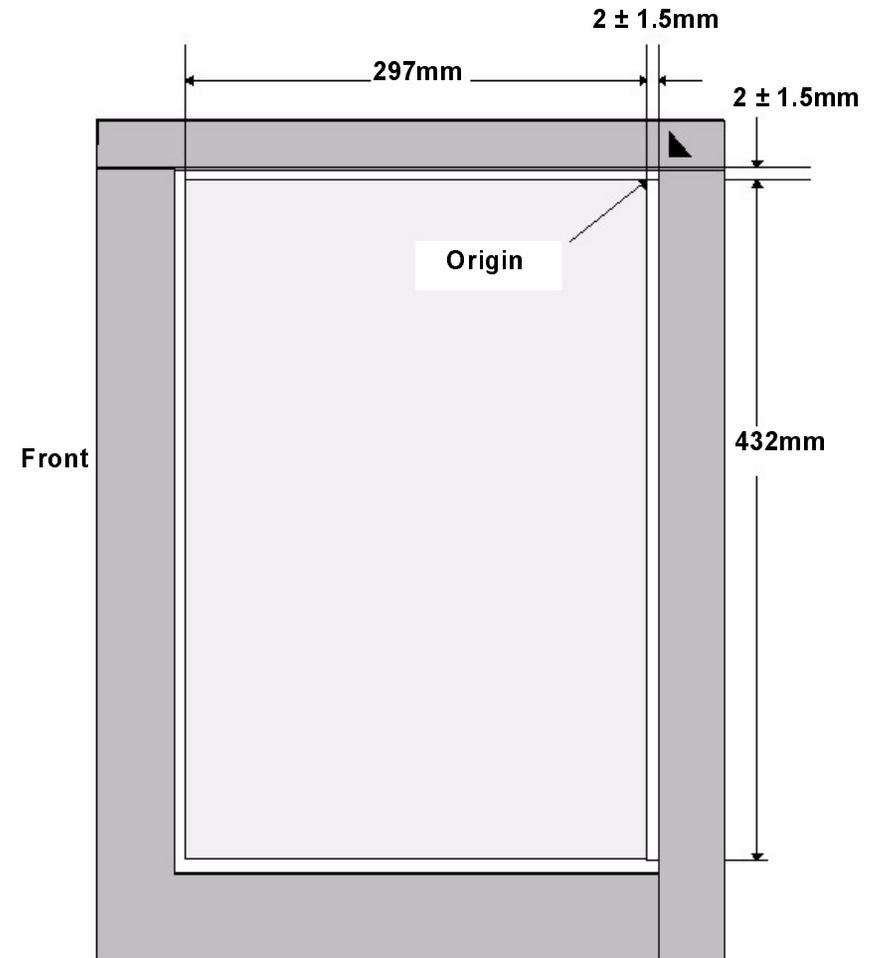
**Table 1-14. Indicator Status and Corresponding Errors**

READY	ERROR	Error Type
On	On	Command error
Off	Flashing	Communication error
Flashing	Flashing	Fatal error
Off	Off	Option error

*Note: See Chapter 3 Troubleshooting for details on solving the error.*

## 1.5.5 Available Scan Area

The origin point for this scanner is marked at the rear left corner of the document table when viewed from the front. See Figure 1-6 for the maximum scan area.



**Figure 1-6. Maximum Scan 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.

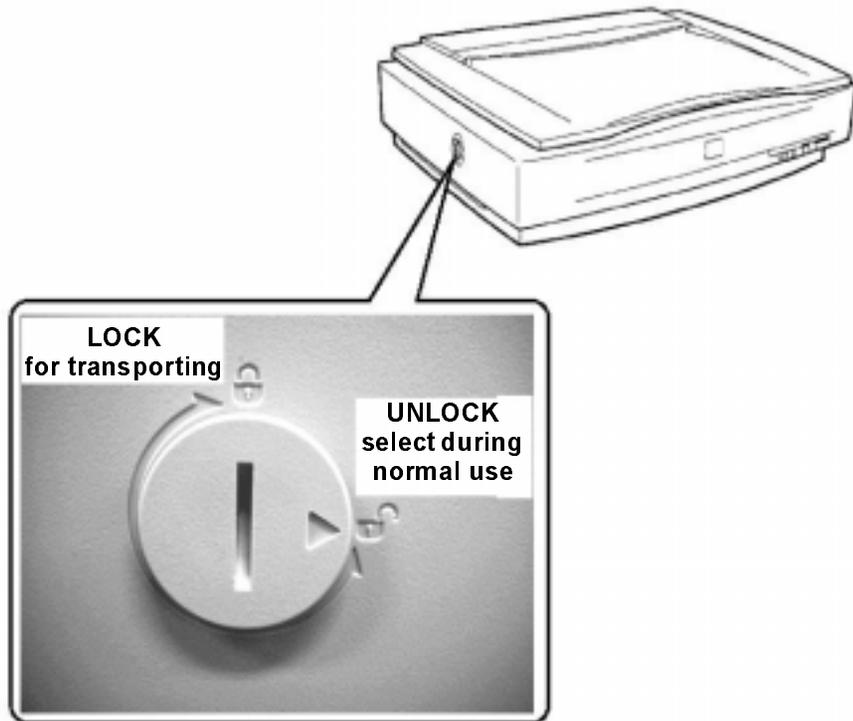


Figure 1-7. Transportation Screw

**CHAPTER**

**2**

# **OPERATING PRINCIPLES**

## 2.1 General Description

The EPSON GT-10000 is mainly composed of the following units:

- Scanner mechanism  
(Lamp and mirror mechanism and drive unit, 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, and 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. Since the separate units in the mechanism such as the lamp 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 the only connections from the boards lead to the connector board in the scanner mechanism, the shield compartment is easy to remove and the scanner is easy to maintain.

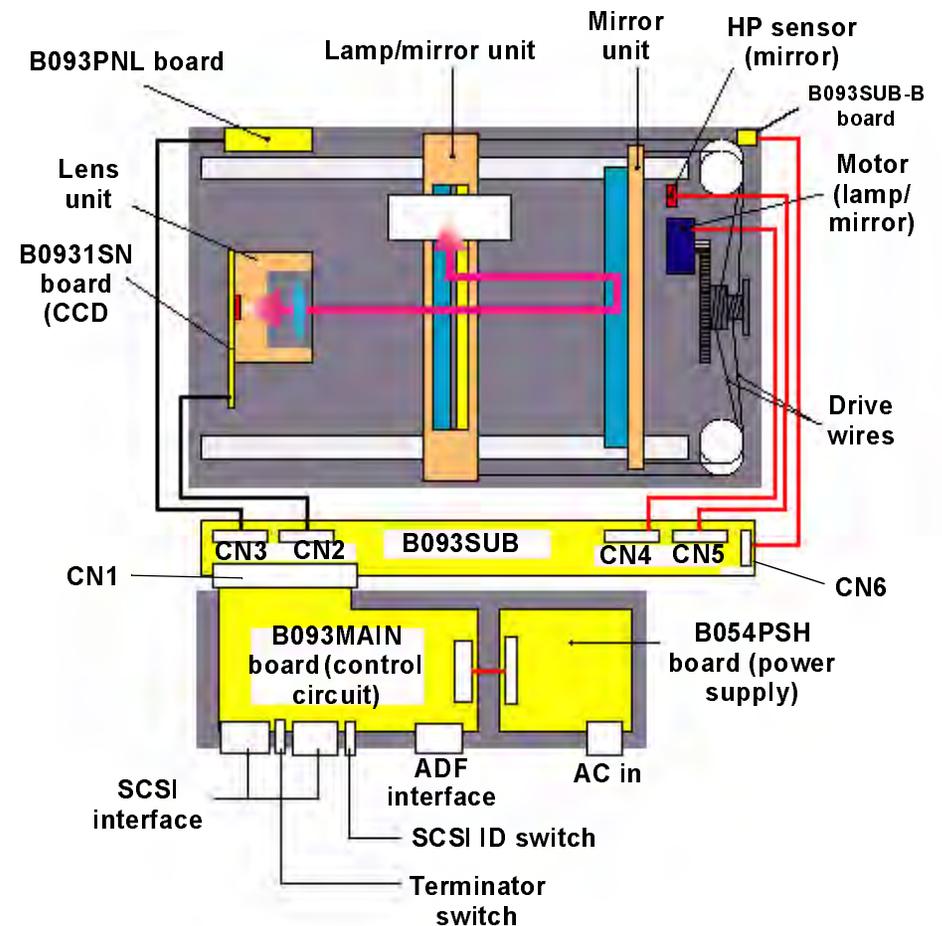


Figure 2-1. Main Mechanism Structure of GT-10000

## 2.2 Mechanical Operation of the Scanner

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.

The vertical distance between the lamp plus the mirror in the Lamp/mirror unit and the document surface remain constant. The vertical distance between the mirrors in the Mirror unit also remains constant. However, the horizontal distances between the Lamp/mirror unit (rate = x2) and the Mirror unit (rate = x1) as well as between the Mirror unit and Lens unit are constantly changing.

The stepping motor drives both movable units via wires.

The CCD sensor and the lens are united into one unit, which is semi-fixed on the base frame. The only difference from GT-12000 is that the CCD lens focus is fixed.

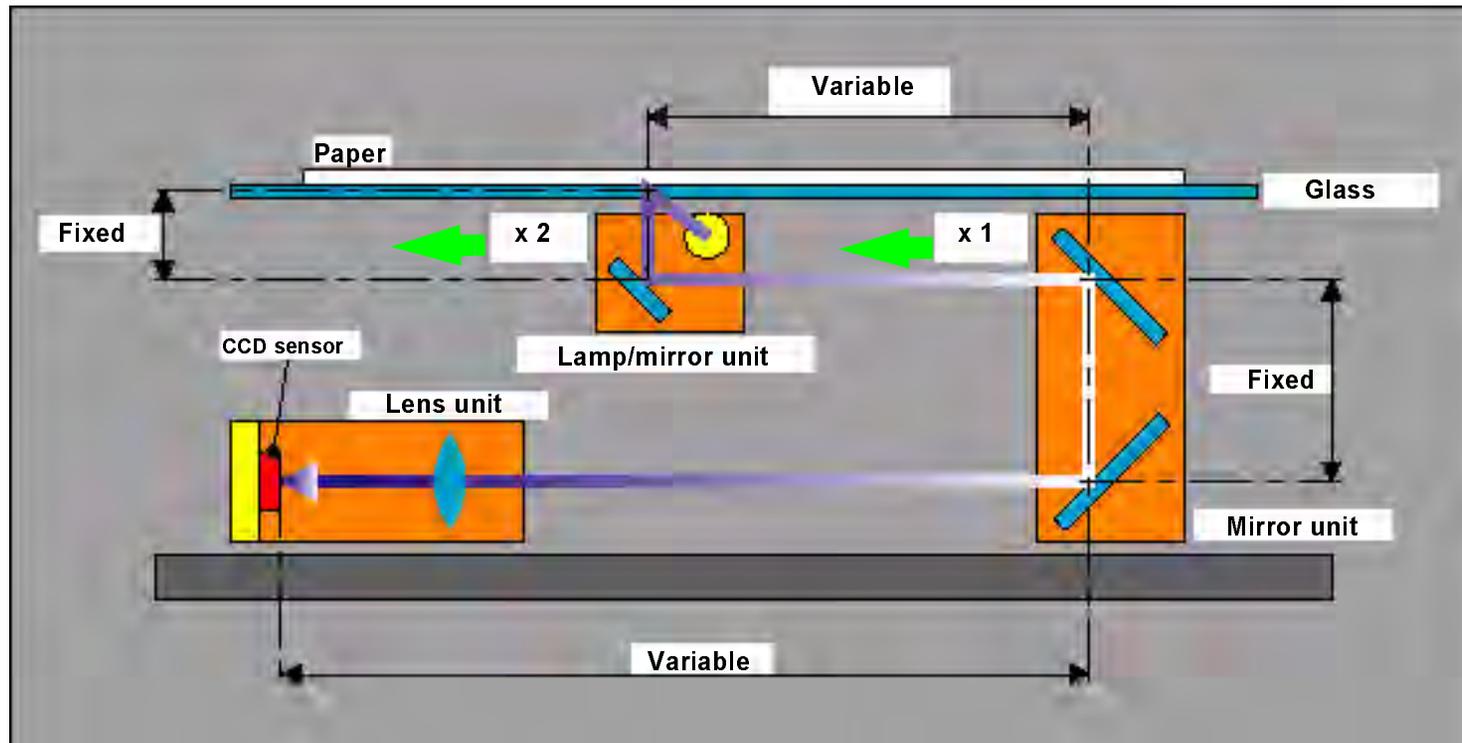


Figure 2-2. Optical Unit Structure

## 2.3 Electrical Circuit Operations

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

### 2.3.1 Control Circuit Operation

The control circuits of this scanner are:

- B093MAIN board (Main control circuit board)
- B093ISN board (CCD sensor board located on the CR)
- B054PSH board
- B093SUB board (Relay board)
- B093SUB-B board (Copy button control)
- B054PNL board (control panel)

Among the various functions controlled by the B093MAIN board as well as the B093ISN, these boards control the scanning process from the CCD sensors to the image signal processing as described below.

- B093ISN 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 signals into 12-bit digital data.
- B093 MAIN Board (processes image data)  
ASIC (IC10) on this board manages most of the following functions:
  - Shading correction:  
Performs image data correction on a black and white basis.
  - Processes the image data according to various setting information provided by the host, such as gamma correction, color correction, and halftoning correction.

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

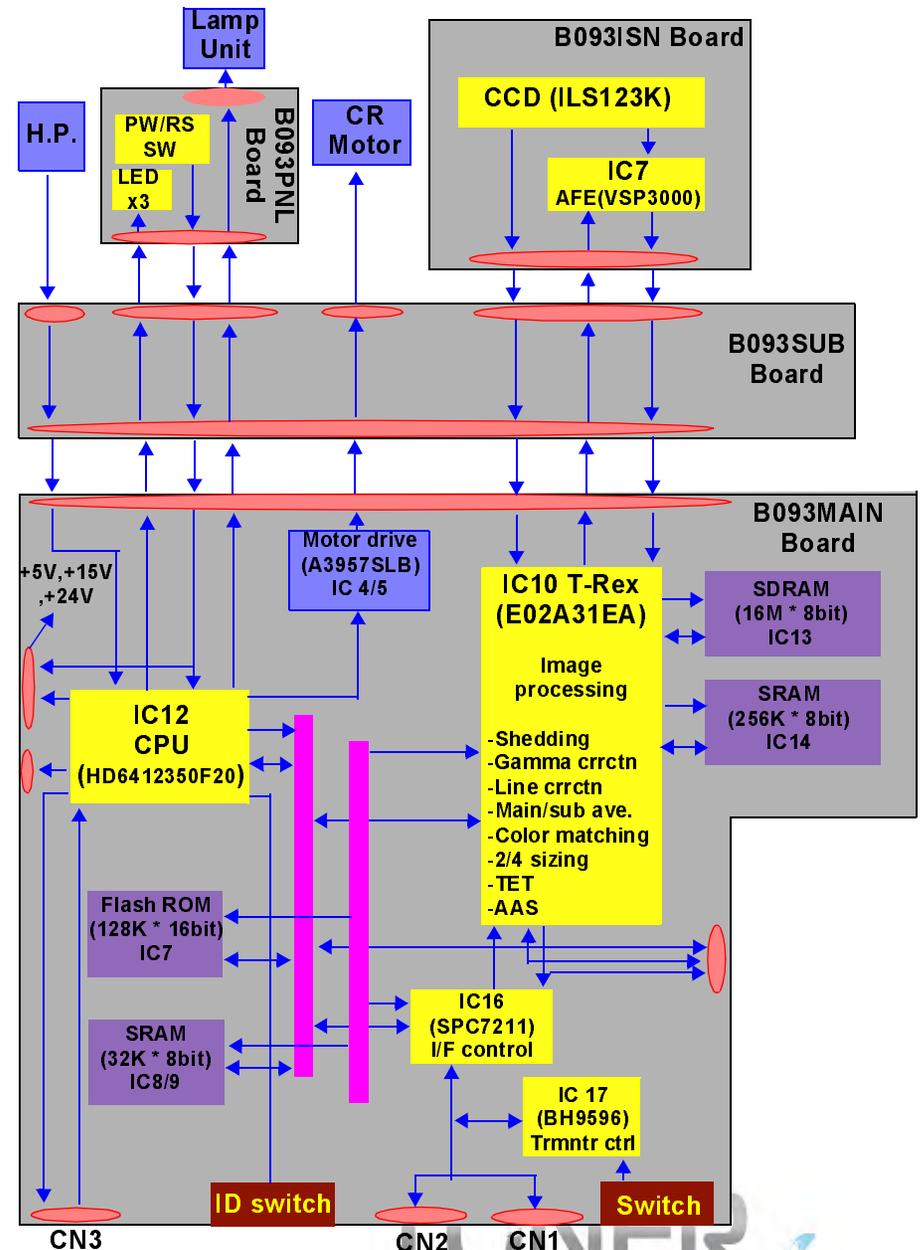


Figure 2-3. Control Circuit Composition

www.tonerplus.com.ua

**B093MAIN BOARD**

Name	Location	Description
CPU HD6412350F20	IC12	The CPU that controls this entire operation of this board and operates at 20 MHz. Voltage = 5.0V ± 10%
T-REX E02A31EA	IC10	The image processor that controls the functions described below, operates at 48Mhz. Voltage = 3.3V ± 0.3V <ul style="list-style-type: none"> <li>• CCD control</li> <li>• Line correction processing</li> <li>• Buffer memory</li> <li>• Image processing</li> </ul>
SPC7211	IC16	The SCSI interface processor operates at 40Mhz. Voltage = 5.0V ± 10%.
A3957SLB	IC4/5	Motor drive control
BH9596	IC17	Terminator control

**B093ISN BOARD**

Name	Location	Description
CCD sensor ILX123K	IC9	Color CCD line sensor outline: <ul style="list-style-type: none"> <li>• Effective pixel = 7250 pixels x 3 colors</li> <li>• Light shield = 16 pixels x 3 colors</li> <li>• Bi-D scanning rate = Max. 6 million pixels/second</li> <li>• Shutter function</li> </ul>
ADC VSP3000	IC2	A/D converter processing IC Resolution = 12 bit

**B093SUB BOARD**

This relay board connects the B093MAIN board (which is located on a metal, shielded tray) with the B093ISN and B054PNL boards.

**B054PNL BOARD**

This board has a power switch (push-lock), RESET switch and LED indicators (OPERATE, READY, ERROR). (Same board used in GT-12000; compatible.)

**2.3.2 Power Supply Circuit Operation**

Since the power supply circuit board B054PSH for this scanner meets the universal specification requirements, it can be used with rated voltage from 100V to 240V AC.

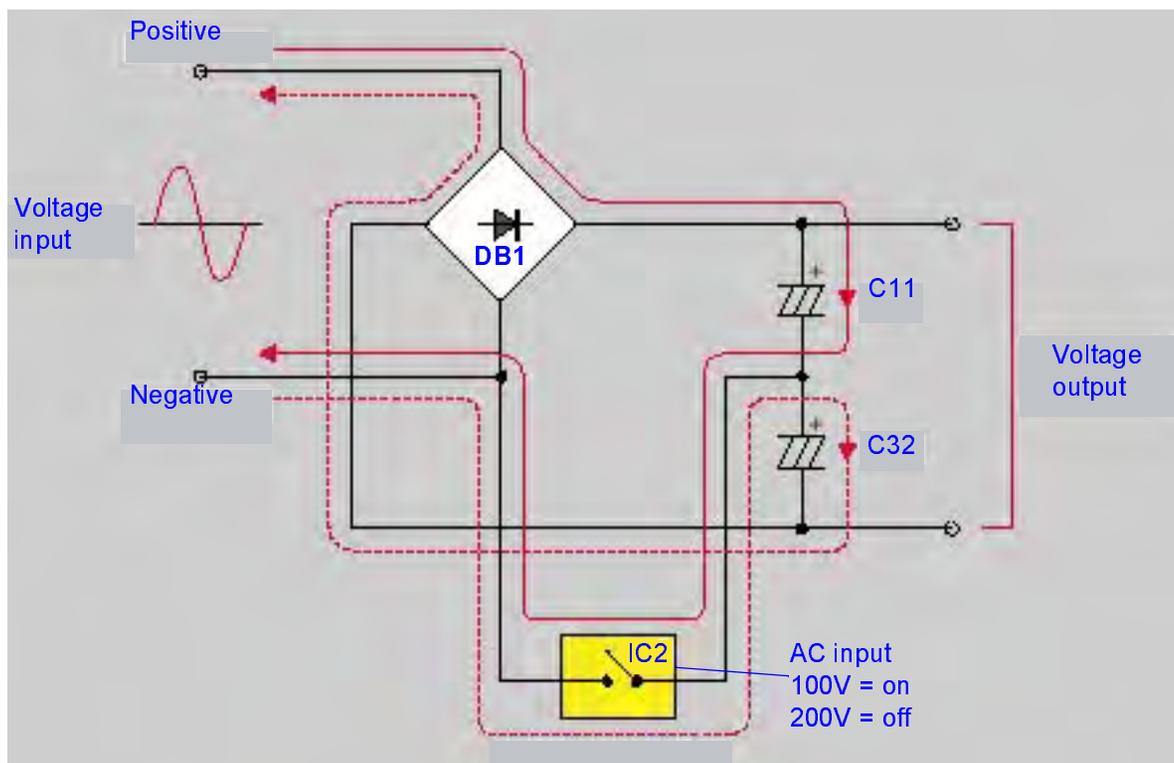
The electrical circuit for the AC input part is designed on the basis of 200V line. In case the input voltage is 200V line level, the ordinary full wave rectifying system is used. With this system, the voltage is rectified by the diode bridge DB1 and then smoothed by the serial smoothing capacitors C11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

On the other hand, if the input voltage is 100V line level, the double-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 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. The final VDC (approximately 250 VDC) is equivalent to the output voltage produced by the 200V line. At power-on, the control circuit (IC2) is activated by the full wave rectifying system. Then, if the input voltage is the 100 VDC line level, the system automatically switches to the double-voltage rectifying system after a certain period set by the circuit.

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	<ul style="list-style-type: none"> <li>• Motor drive power source</li> <li>• Power source for the lamp (inverter)</li> </ul>
+15 V	+12 V production (Drives the cooling fan for the metal, shielded tray that contains the B093MAIN and B054PSH boards.)



**Figure 2-4. Double-voltage Rectifier Circuit Operation**



CHAPTER

3

# TROUBLESHOOTING

### 3.1 Overview

This chapter describes troubleshooting techniques to help you solve any scanner problems you may encounter. First see the next section to determine what kind of error has occurred, and then see the appropriate explanation in the following pages to determine the correct solution.

#### 3.1.1 Errors and Causes of Errors

The self-diagnostic function equipped with this scanner automatically detects the operating status of all major parts. The scanner communicates any detected error and the cause of the error using a combination of the indicator lights as described below.

#### COMMAND ERROR

Table 3-1.

LED Status	Cause	Operation/Condition
 <b>READY</b>  <b>ERROR</b>	Received undefined command or illegal parameter.	Ignores the wrong command /parameter (no change made to the current settings), and returns NACK to wait for the next command/ parameter.
Remedy	The error is cleared when a legal command or parameter is received.	

#### COMMUNICATION ERROR

Table 3-2.

LED Status	Cause	Operation/Condition
 <b>READY</b>  <b>ERROR (flashing)</b>	<ul style="list-style-type: none"> <li>Wrong communication procedure or operation detected.</li> <li>For SCSI I/F, if the error occurred in any phase except "bus free", communication and operations stop for over 30 seconds.</li> </ul>	The lamp goes off and the scanner stops operating.
Remedy	<ul style="list-style-type: none"> <li>Turn the scanner off and back on or press the RESET button.</li> <li>For SCSI, send "RESET" signal.</li> </ul>	

#### FATAL ERROR

Table 3-3.

LED Status	Cause	Operation/Condition
 <b>READY</b>  <b>ERROR (both flashing)</b>	Hardware error, such as <ul style="list-style-type: none"> <li>The lamp does not light.</li> <li>Scanner turned on with the CR unlocked.</li> <li>Other defects in the scanner.</li> </ul>	<ul style="list-style-type: none"> <li>The lamp goes off and the scanner stops operating.</li> <li>Sets the status bit to bit "7".</li> </ul>
Remedy	<ul style="list-style-type: none"> <li>Turn the scanner off and back on or press the "RESET" switch.</li> <li>Send initialize command *ESC @".</li> <li>Send SCSI "bus device reset"</li> <li>For SCSI, send "RESET" signal.</li> </ul>	



OPTION ERROR

Table 3-4.

LED Status	Cause	Operation/Condition
<input type="checkbox"/> <b>READY</b> <input type="checkbox"/> <b>ERROR</b>	Option error, such as <ul style="list-style-type: none"> <li>• The scanner cover is open.</li> <li>• Paper out</li> <li>• Other similar error</li> </ul>	Sets the status bit to bit "7".
Remedy	Solve the error.	



An [Option Error] can be detected only when the option is properly installed.

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.

Table 3-5. Motor Check Points

Motor	Test Point	Signal Level
Motor (for driving the mirror)	<Cable connector> Between Pins 1 and 3 Between Pins 2 and 4	15.0 Ω

SENSORS

Condition: Test the sensors with the power on.

Table 3-6. Sensor Check Points

Motor	Test Point	Signal Level
HP sensor (Mirror)	<B093SUB board> CN4: Pin 1 (Signal) Pin 2 (GND)	<ul style="list-style-type: none"> <li>• High when the mirror unit is in the home position.</li> <li>• Low when it is outside of its home position.</li> </ul>



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

3.1.2.2 Troubleshooting Other Errors

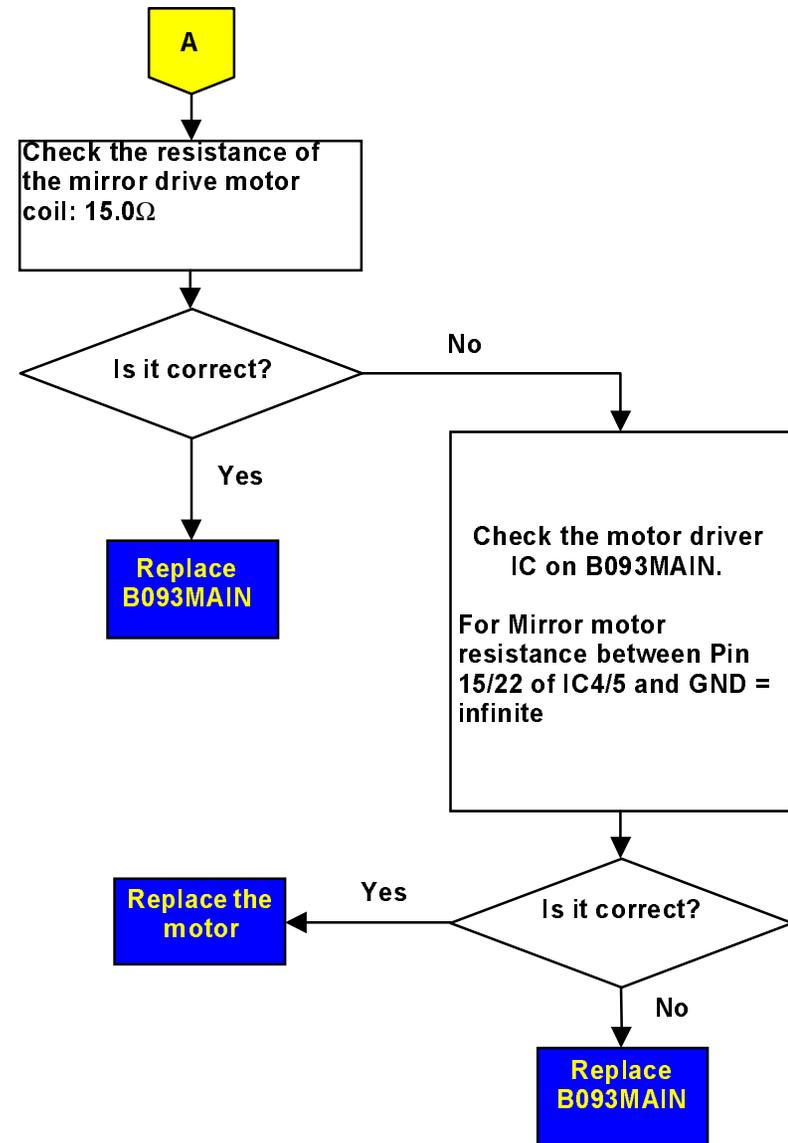
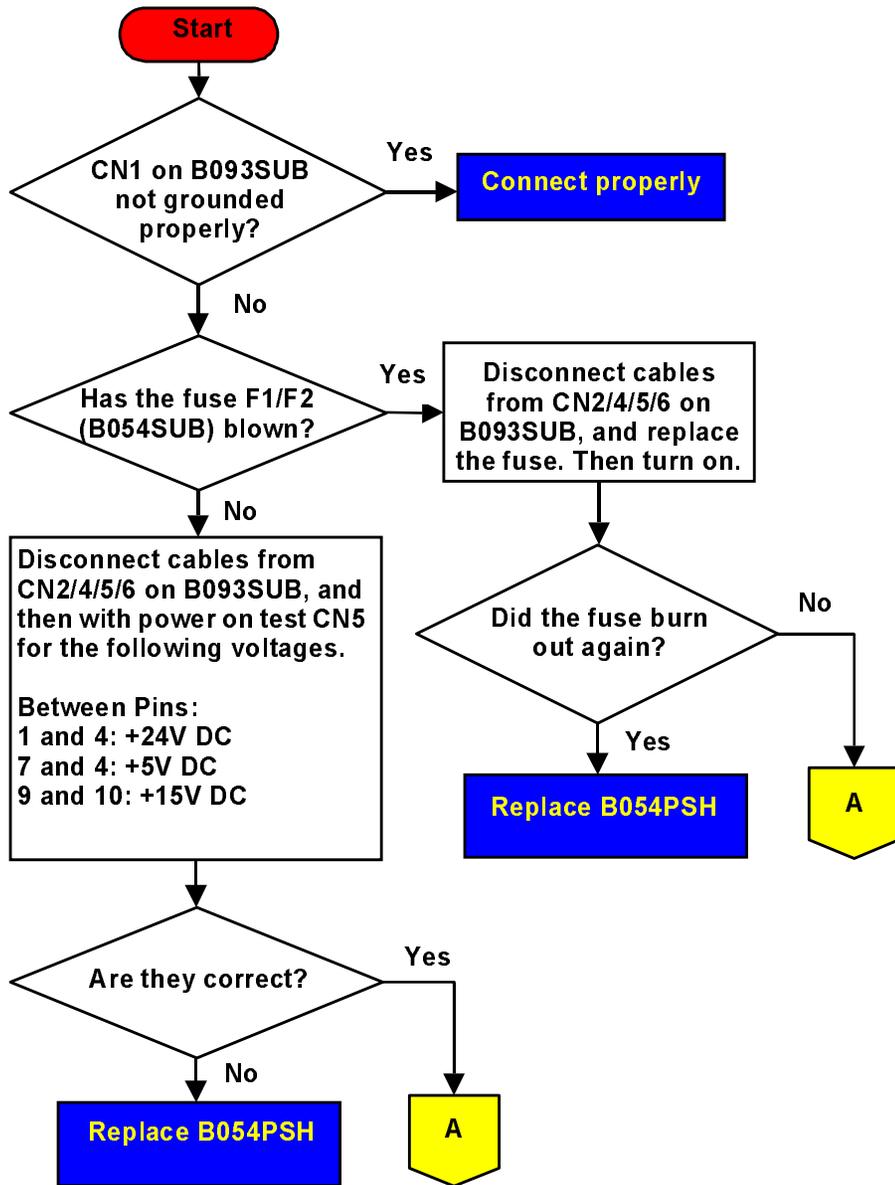
See the table below for miscellaneous errors not covered in the previous sections.

Table 3-7. In case of abnormal performance

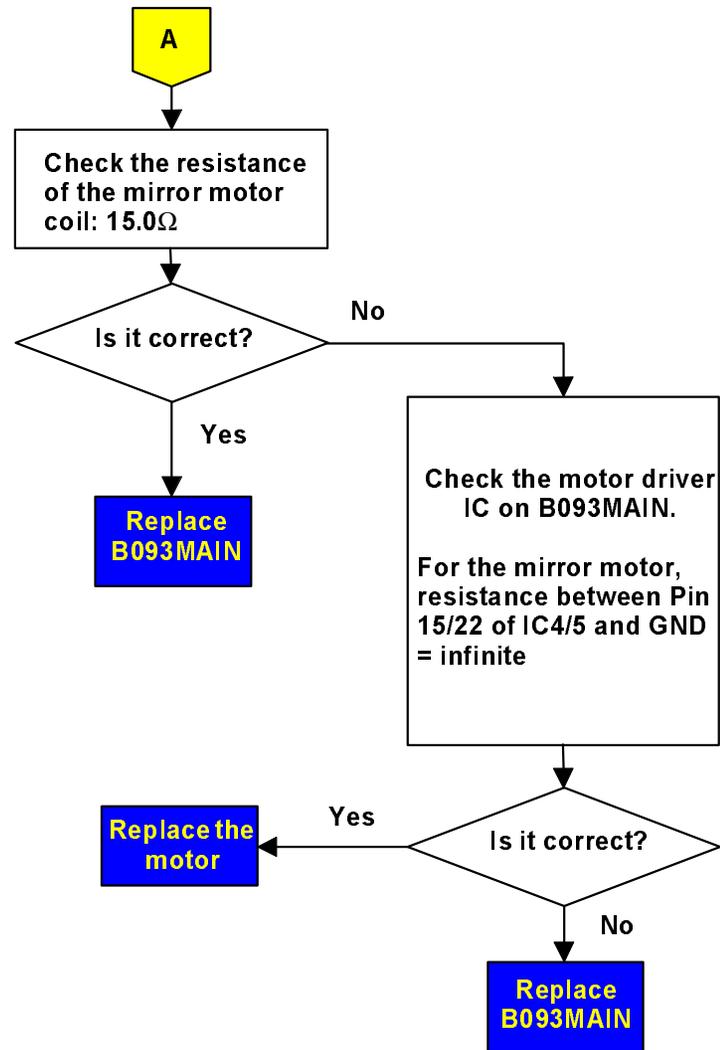
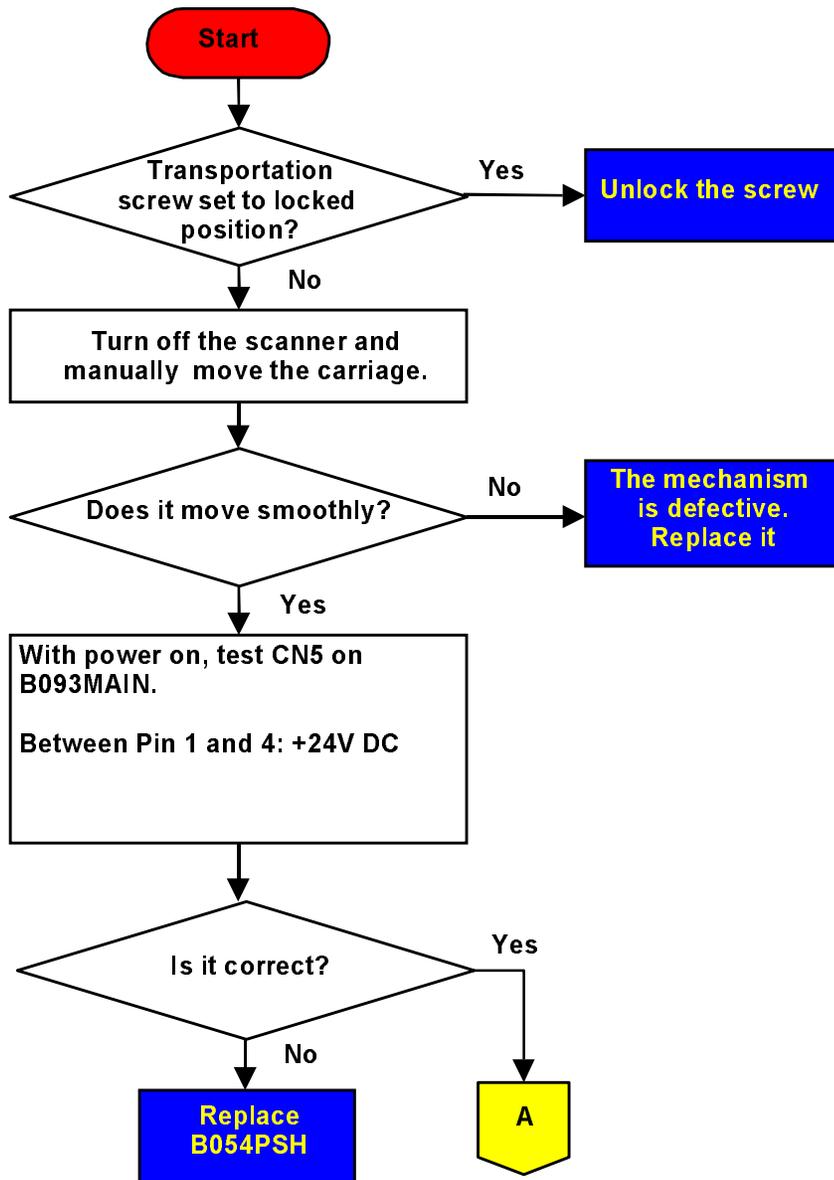
Phenomenon	Description	Refer to Flowchart
The scanner doesn't operate at power on.	"OPERATE" LED does not light.	Figure 3-1
"Fatal Error" is indicated and does not clear after the scanner is turned off and back on	CR does not move.	Figure 3-1
	Abnormal movement of CR, such as crashing into the frame.	Figure 3-3
"Communication Error" is indicated	Lamp does not light	Figure 3-4
	SCSI not set properly or defective	Figure 3-5
The scanner does not scan images properly.	Black lines, White banding, and so on	Figure 3-6



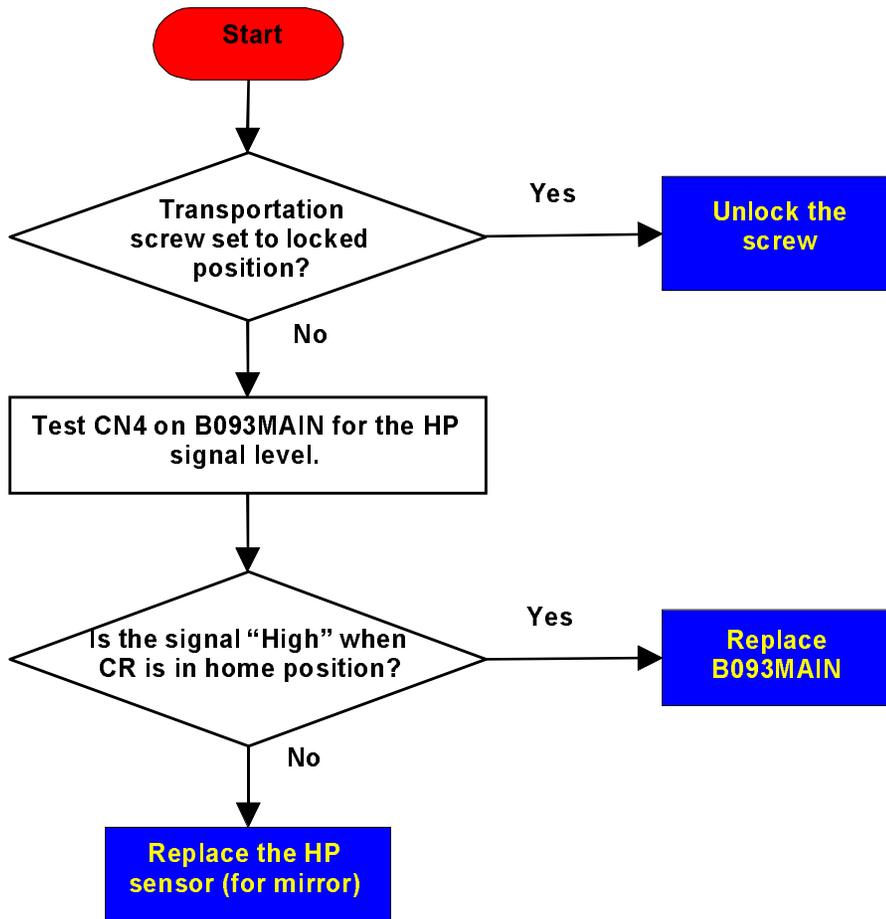
Flowchart 3-1. COperate light does not light up



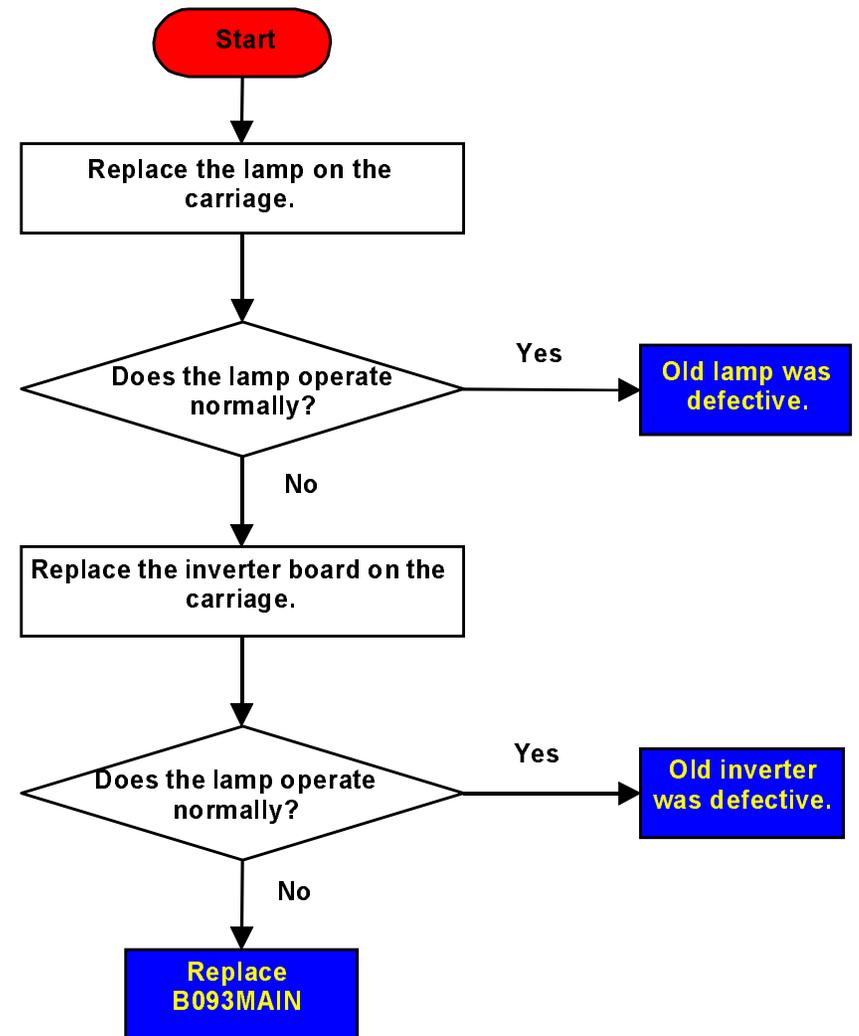
Flowchart 3-2. CR (Mirror/lamp) does not move



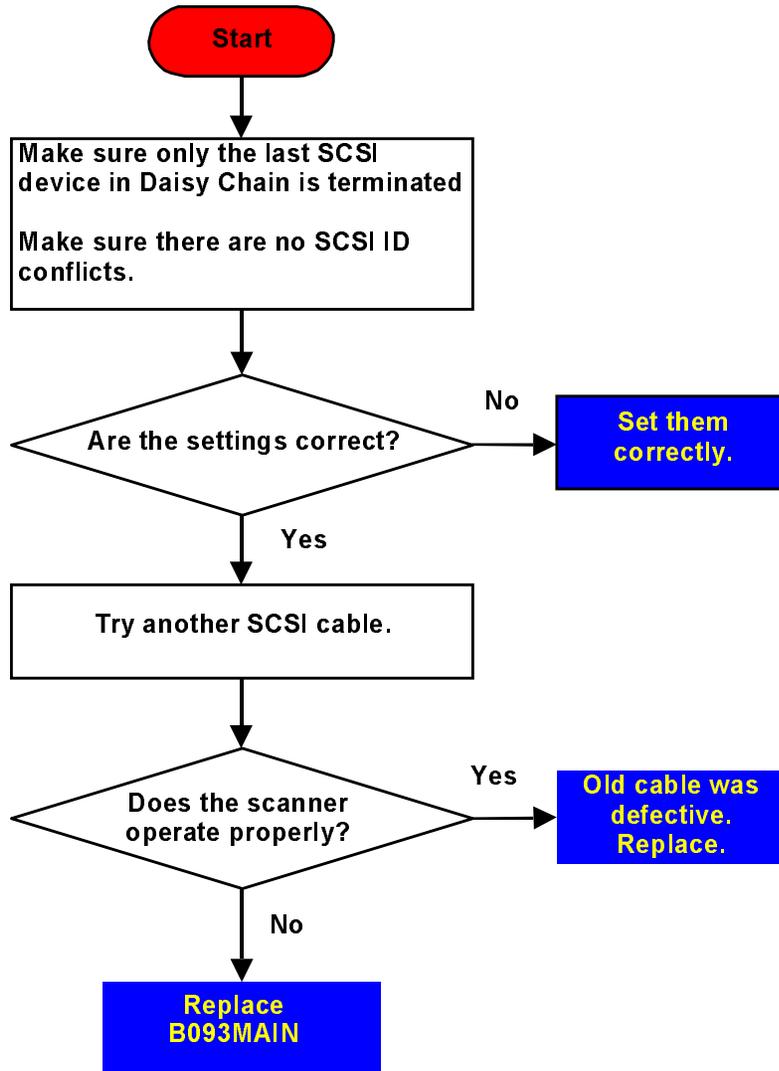
Flowchart 3-3. CR moves abnormally (crashes into frame)



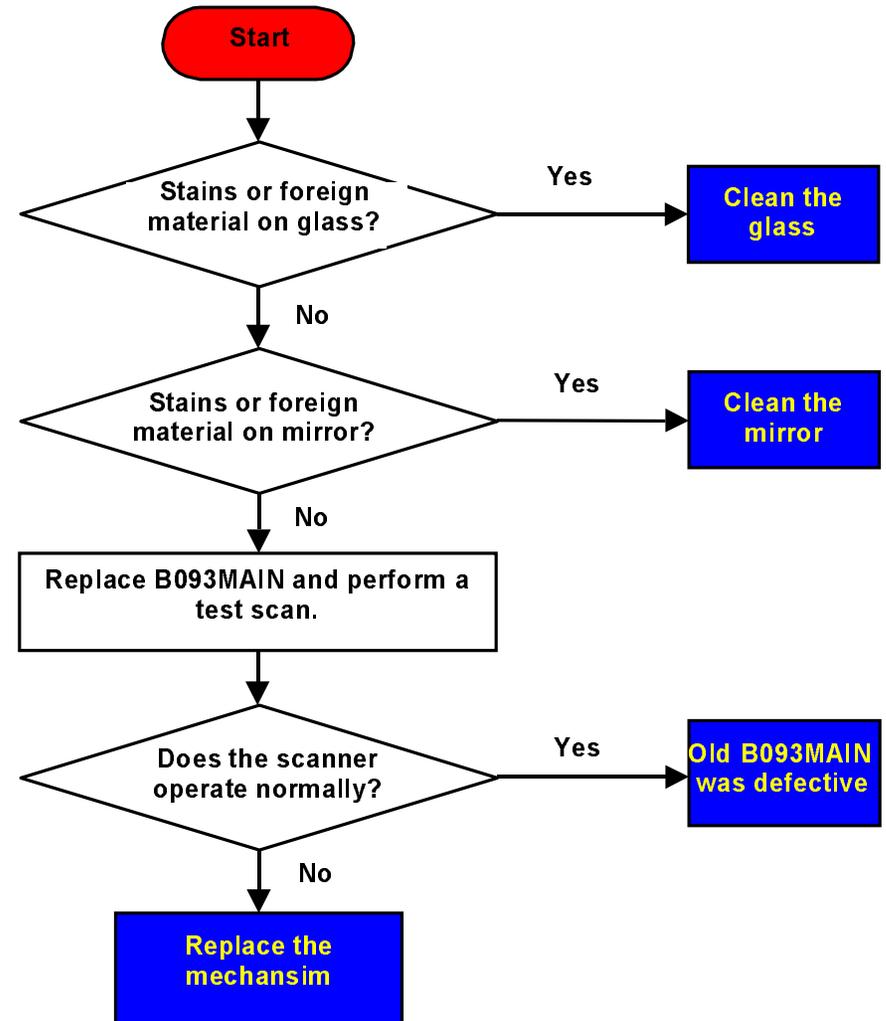
Flowchart 3-4. Lamp does not light



Flowchart 3-5. SCSI I/F communication error occurs



Flowchart 3-6. Scanned image is abnormal



### 3.1.3 Troubleshooting Circuit Board Errors

This section describes the check points for the electrical circuit boards.

#### 3.1.3.1 Power Supply Board (B054PSH Board)

Table 3-8. B054PSH Board Troubleshooting

Phenomenon	Check Points
<Abnormal voltage> +5VDC is not output.	Test the signal waveform output between Pins 8 and 11 (chopping waveform) for IC51 (TL494)
<Abnormal voltage> +24 VDC is not output.	Test the drain waveform at the Switching FET/Q1
<Abnormal voltage> +15 VDC is not output	Test the signal waveform output from Pin 1 for IC52 (78M15)

#### 3.1.3.2 Control Circuit Board (B093MAIN Board)

Table 3-9. B093MAIN Board Troubleshooting

Phenomenon	Check Points
<No operation at all> Reset IC is defective.	Check the reset IC (IC11) for the signal waveforms output from the following pins: Pin 7 (for +5V input) Pin 5 (for PWRS output)
<No operation at all> EPROM access error	Check the CPU (IC12) for the ROM access signal waveforms output from the following pins: Pin 2 (for CS0 signal) Pin 91 (for RD signal)
<No operation at all> CPU is defective.	Check the clock signal waveform input to the following pin: Pin 85 (for XTAL input)
<"Fatal Error"> Motor (for mirror) drive circuit is defective.	Check the Driver IC (IC 4/5) Phase drive signal waveform output from Pin 15/22

Table 3-9. B093MAIN Board Troubleshooting (continued)

Phenomenon	Check Points
<"Fatal Error"> Carriage does not stop at the home position.	Check if the signal waveform input to Pin 110 of the CPU (IC12) changes in accordance with the CR position.
<"Fatal Error"> Lamp does not light.	Check the output from Pin 95 of ASIC (IC12)
<"Fatal Error"> White standard level is not read properly.	Check the signal output waveform for ASIC (IC12) Pin 202:
<"Communication Error"> Bi-directional I/F and SCSI I/F	Main cause: ASIC (IC16) is defective. (Replace IC 16 or B093MAIN board.)
<Image is read abnormally>	Main cause: ASIC (IC10) is defective. (Replace IC 10 or B093MAIN board.)



**CHAPTER**

**4**

# **DISASSEMBLY & 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.



- **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 two people.**



- **Never disassemble any scanner parts unless specified to do so, because this scanner mechanism needs precise assembly and adjustment to maintain accurate control system at its satisfactory level.**
- **Secure 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 for transportation.**

### 4.1.1 Tools

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

**Table 4-1. Tool List**

Description	Availability	SE Parts Code	Reference
(+) Screw Driver (No. 2)	⊙	-	Versatile
(+) Screw Driver (No. 1)	⊙	-	ditto
Box Driver (Diagonal: 6mm)	⊙	-	ditto
Box Driver (Diagonal: 5mm)	⊙	-	ditto
Tweezers	⊙	-	ditto
Leveling Tools (3 stages and 1 adjuster as 1 set)	○	1039140	Same as GT-12000
Mechanism Lift Handle	○	1040176	ditto
Light Correcting Panel	○	1050003	Exclusively designed for GT-10000.
White Standard Chart	○	1050004	Exclusively designed for GT-10000. (Must be attached to the Light Correcting Panel before use.)

- ⊙ Commercially available.
- Not commercially available.



## 4.1.2 Screws

Screws used in this scanner are listed in the table below. However, the list does not include the screws which are used for servicing not specified in this manual. 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	CPFS M3x8		Black
2	CB M3x6		Gold
3	CP M2.5x8		Silver
4	Screw Lock Screw (Diagonal: 5 mm)		Silver
5	Brass Spacer (Hexagon) (Diagonal: 6mm)		Silver

**Table 4-2. Screw List (continued)**

No.	Screw Type / Specification	Appearance	Color
6	CPS M4x12		Silver
7	CB M4x10		Gold
8	CPS M4x18		Gold
9	CR; B Damper Shaft		Gold
10	CB M3x3		Gold

Table 4-2. Screw List (continued)

No.	Screw Type / Specification	Appearance	Color
11	CB M3x12		Black
12	CB M4x6		Gold
13	CPFS M3x8		Gold

## 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 box involve use of the adjusting tools exclusively designed for this scanner. Therefore, make sure that you read the instructions in each section carefully to figure out the procedures before servicing.

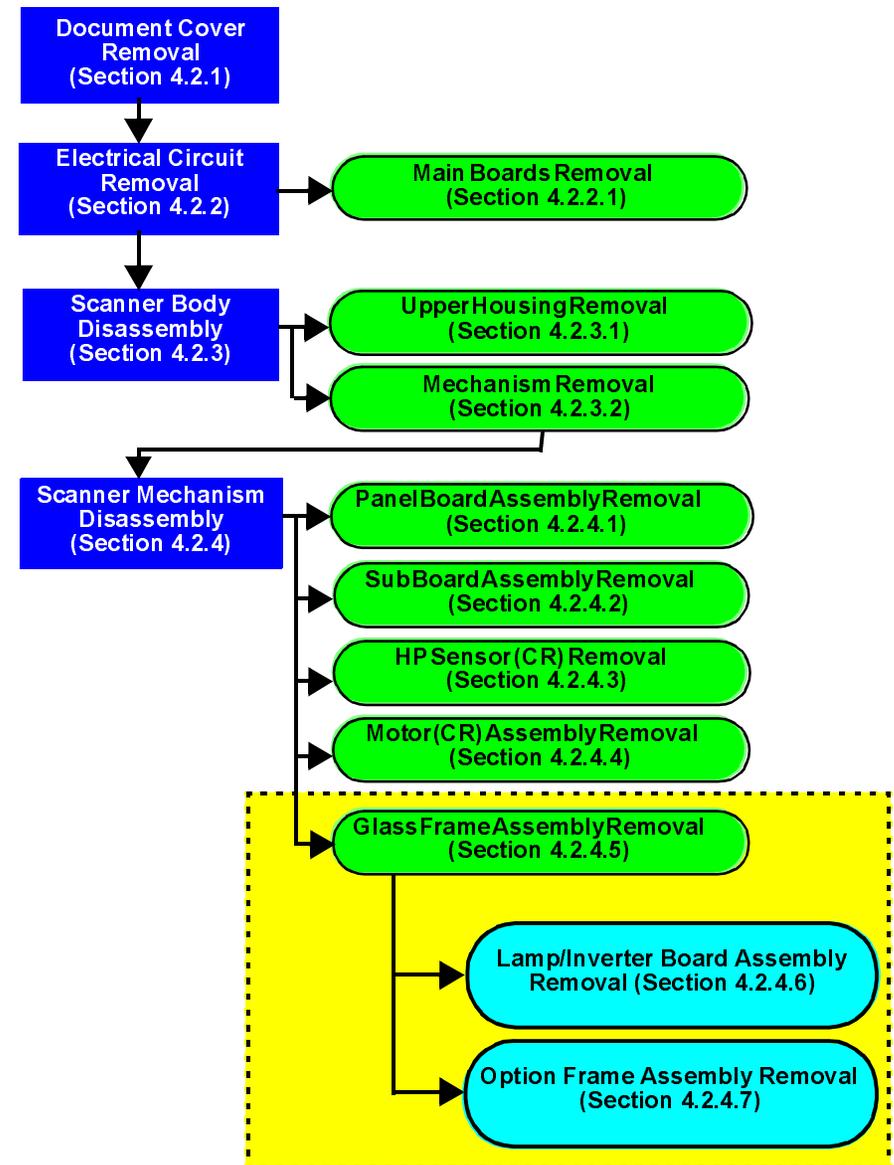


Figure 4-1. Disassembly Procedure for GT-10000

## 4.2.1 Document Cover Unit Removal

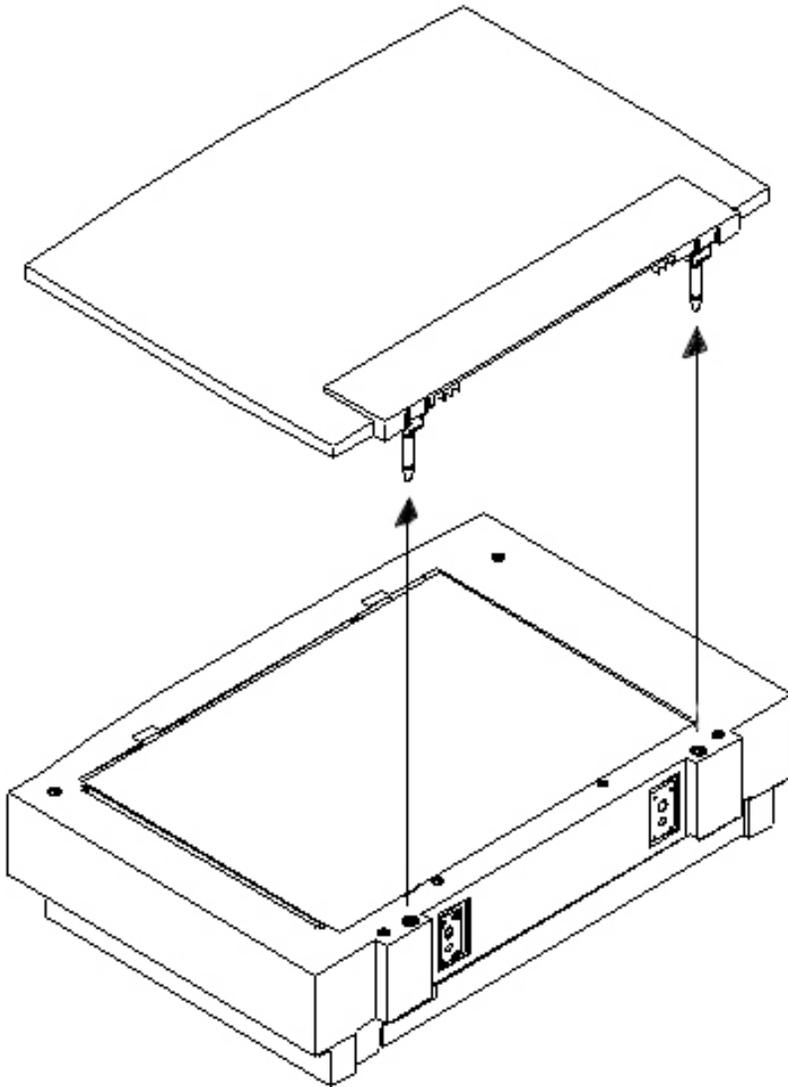


Figure 4-2. Document Cover Unit Removal

## 4.2.2 Electrical Circuit Removal

The major electrical circuit boards (B093MAIN 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.1) securing the shield compartment which contains the electrical circuit boards at the back of the scanner. Then take out the compartment from the scanner.

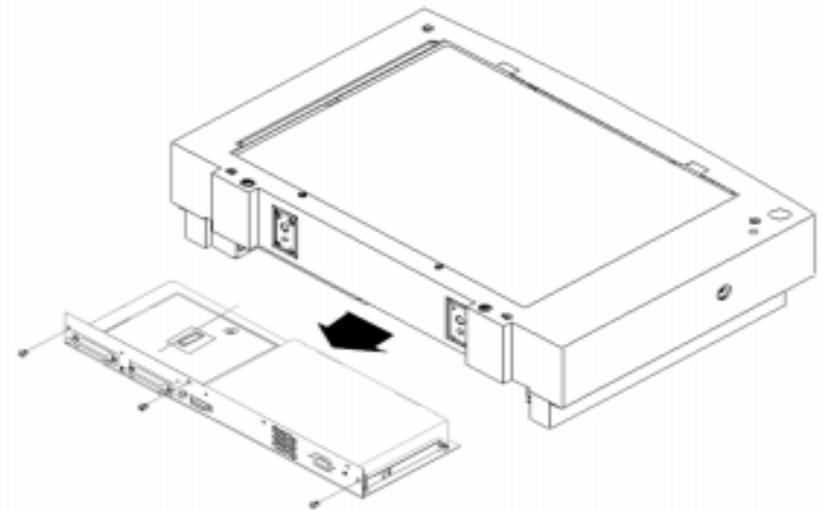


Figure 4-3. Shield Compartment Removal

CHECK  
POINT



For easy removal, pull the translucent card spacers located at both sides of the shield compartment.

### 4.2.2.1 Main Boards Removal

Main boards stored in the shield compartment should be removed in the following procedure:

1. Remove the shield compartment. (See 4.2.2.)
2. Remove 18 screws (No.2) securing the top shield and the top shield cover, and remove both units together.

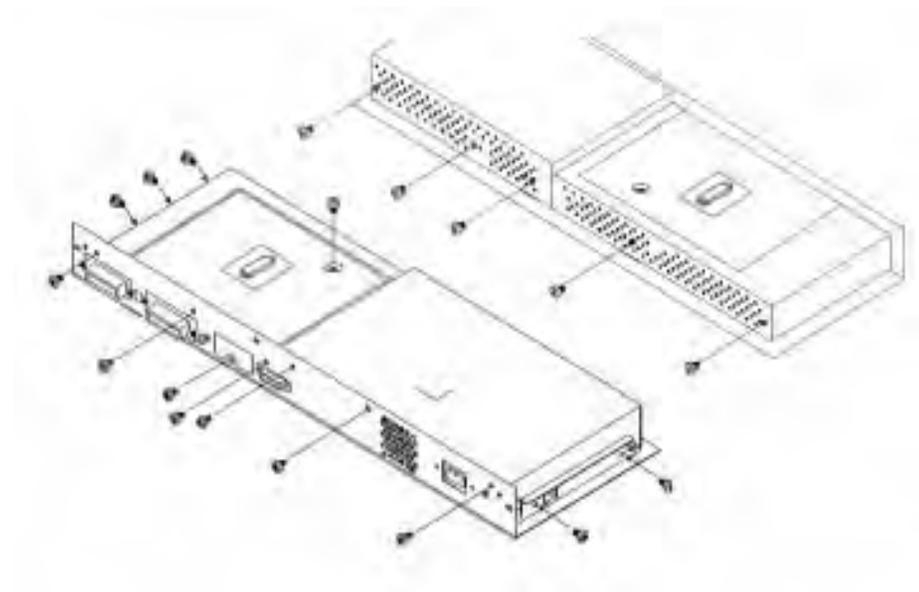


Figure 4-4. Removal of Top Shield and Shield Cover

#### 3. Main Board Assembly Removal

Disconnect the connector cables from connectors CN5 and CN7 on the main board assembly.

4. Remove the following screws securing the main board assembly, and a brass spacer securing the top shield, and remove the main board:
  - 6 screws: No. 2, securing the board along the edges.
  - 6 screws: No. 3 = 4 screws securing the SCSI I/F connector; No. 4 = 2 screws securing the ADF OPTION connector.

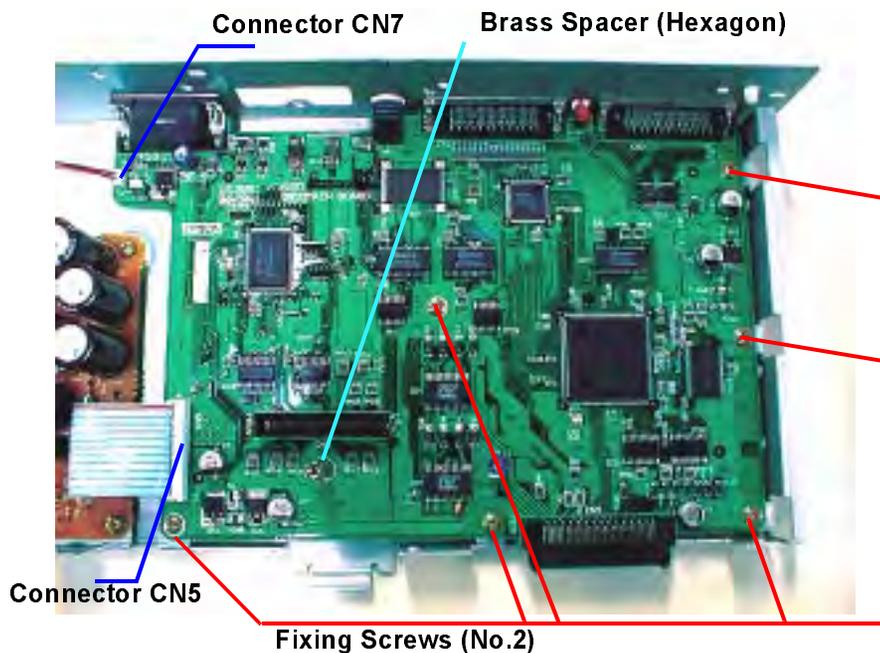


Figure 4-5. Main Board Assembly Removal (a)

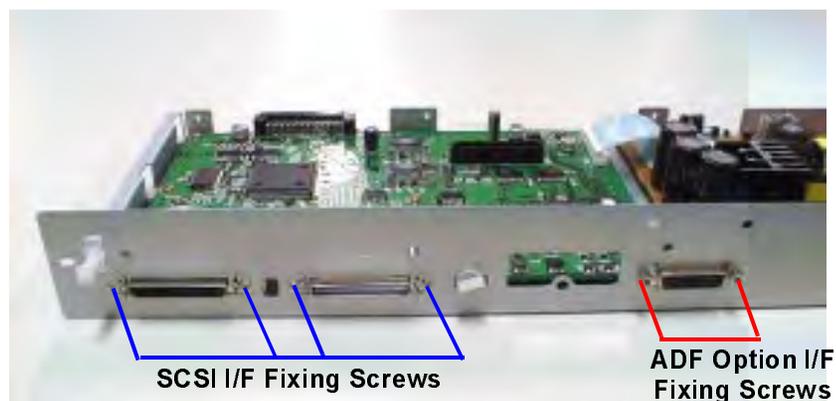


Figure 4-6. Main Board Assembly Removal (b)

5. Power Supply Board Assembly Removal

- Remove the connector cables from connector CN1 on the power supply board assembly and connector CN5 on the main board assembly.

6. Remove 6 screws (No.2) securing the power supply board assembly and remove the power supply board.

Power Supply Connector CN1

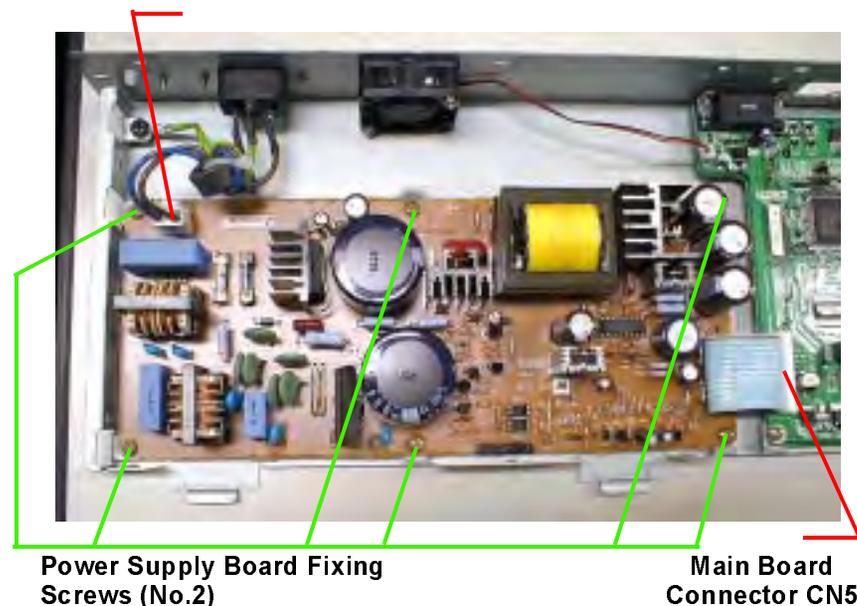


Figure 4-7. Power Supply Board Assembly Removal

## 4.2.3 Scanner Body Disassembly

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

### 4.2.3.1 Upper Housing Removal

#### CAUTION



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

1. Remove the document cover (See Figure 4.2).
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.6 and No.7) securing the upper housing to the chassis on the scanner. Note that the 2 front screws are covered with the screw caps. Pinch them out with tweezers prior to removing the screws.
4. Lift up the upper housing to remove it.

#### CHECK POINT



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

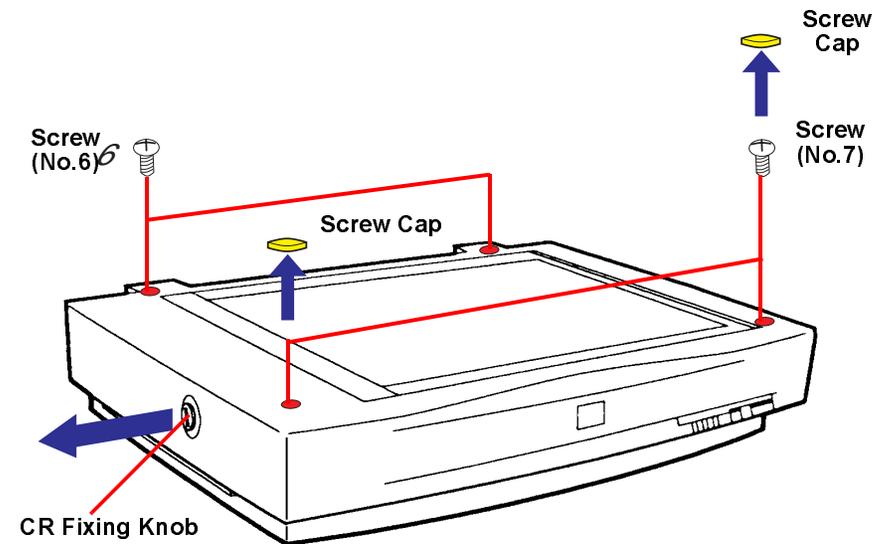


Figure 4-8. Upper Housing Removal

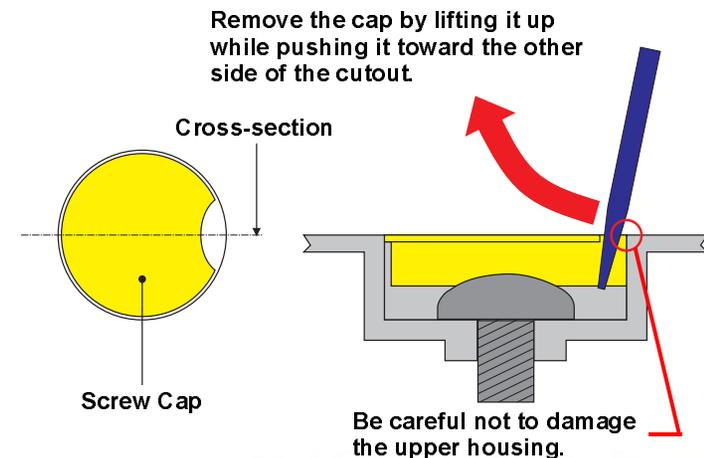


Figure 4-9. Screw Caps Removal

[www.tonerplus.com.ua](http://www.tonerplus.com.ua)

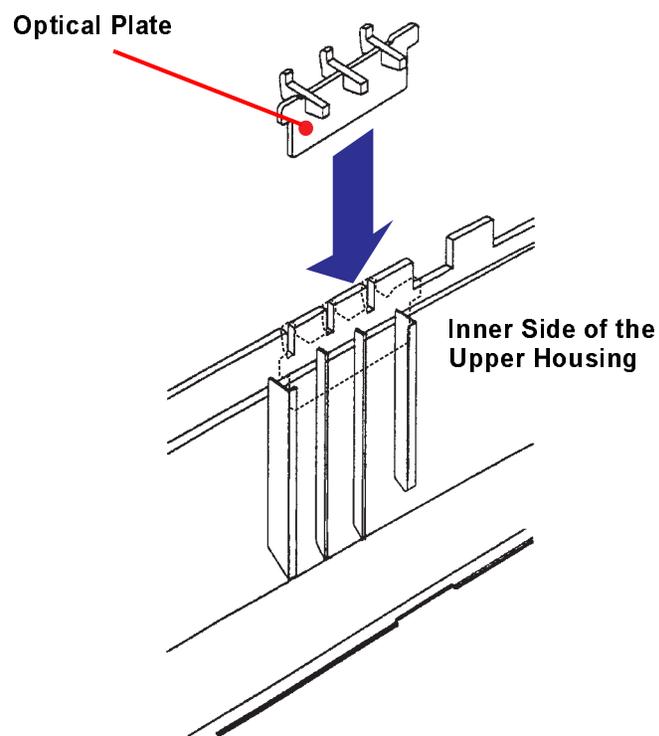


Figure 4-10. Optical Plate Installation

**CHECK  
POINT**



Note the following when installing the scanner mechanism:

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

Place the removed mechanism on flat stable surface.

#### 4.2.3.2 Scanner Mechanism Removal

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

1. Remove the upper housing (See 4.2.3.1).
2. Remove 4 screws (No.8) securing the scanner mechanism to the lower housing. Then remove the mechanism from the lower housing.

## 4.2.4 Scanner Mechanism Disassembly

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



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

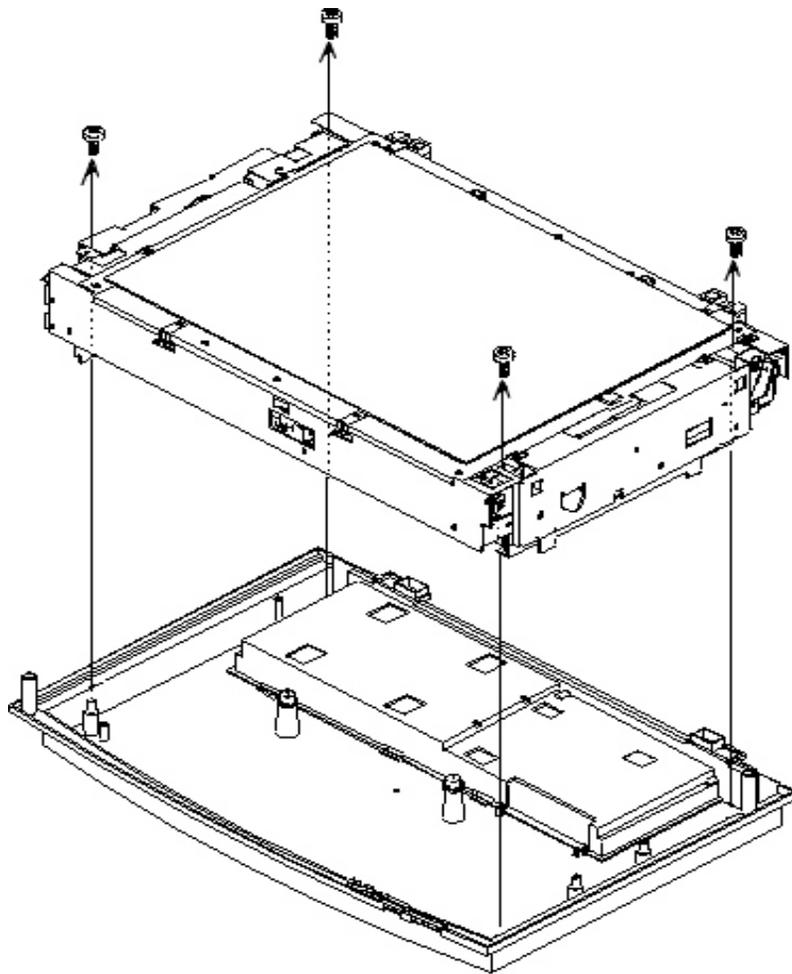


Figure 4-11. Scanner Mechanism Removal

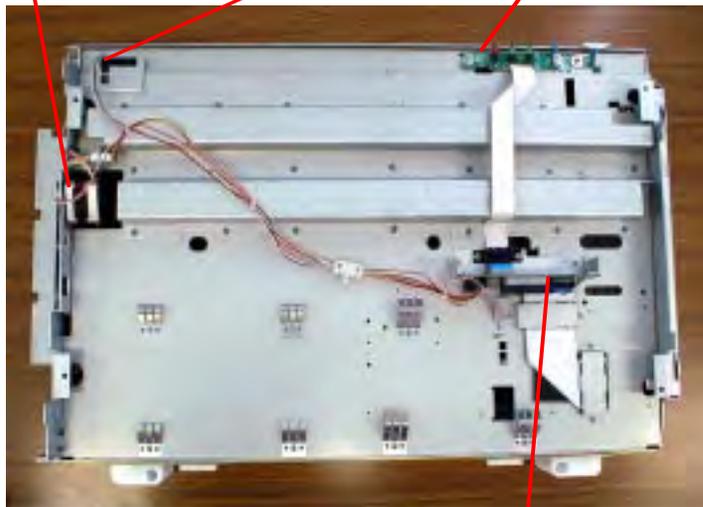
### 4.2.4.1 Panel Board Assembly Removal

1. Remove the scanner mechanism (See 4.2.3.2).
2. Turn the mechanism over and place it on a flat surface.
3. Disconnect the white cable from CN1 and the black cable from CN2 of the panel board assembly.
4. Remove 2 screws (No.2) securing the panel board assembly, and remove the assembly.



**CHECK POINT** Unit arrangement at the bottom of the mechanism is as shown on the following page.

CR Motor Assembly CR HP Sensor Panel Board Assembly



Sub Board Assembly

Figure 4-12. Unit Arrangement

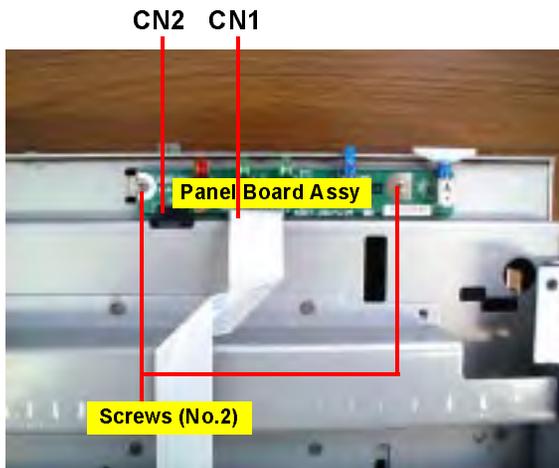


Figure 4-13. Panel Board Assembly Removal

#### 4.2.4.2 Sub Board Assembly Removal

1. Remove the scanner mechanism (See 4.2.3.2).
2. Turn the mechanism over and place it on a flat surface.
3. Disconnect all connector cables from the sub board assembly (B093SUB).
4. Remove 4 screws (No.3) securing the board to the bracket, and remove the board.

CHECK  
POINT



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

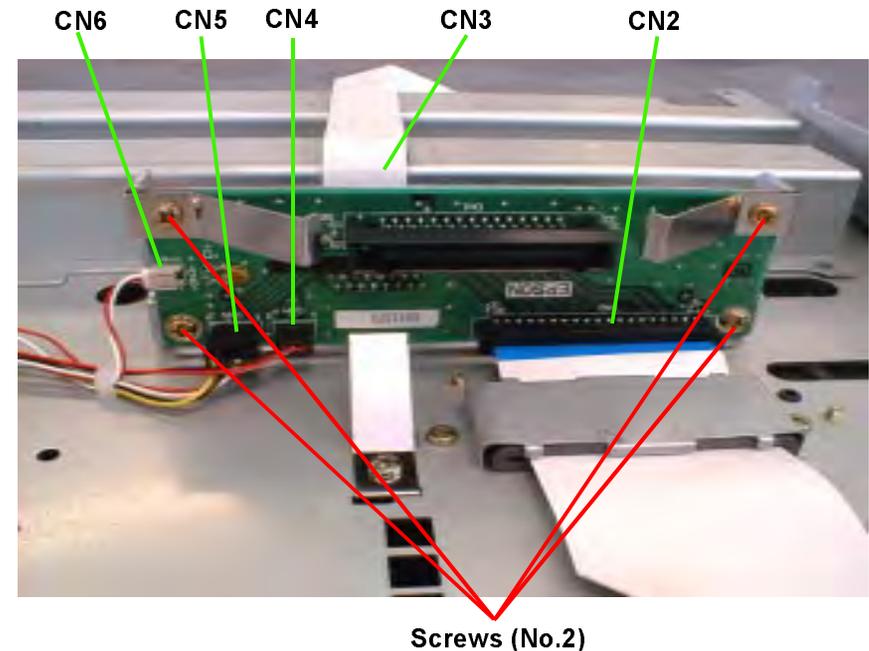


Figure 4-14. Sub Board Assembly Removal

#### 4.2.4.3 HP Sensor (CR) Removal

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

1. Remove the scanner mechanism (See 4.2.3.2).
2. Unlock the carriage fixing screws, and move the carriage mirror assembly away from the HP.
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.

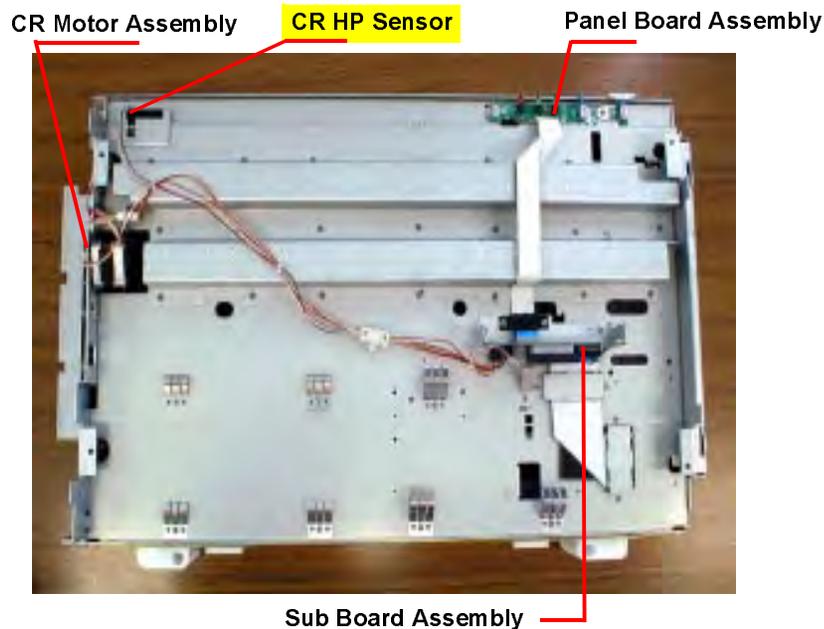


Figure 4-15. HP Sensor (CR) Removal

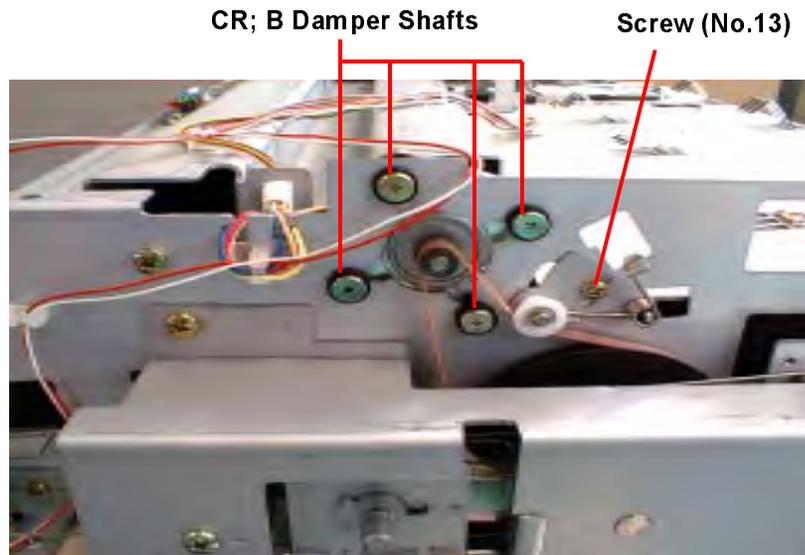
#### 4.2.4.4 CR Motor Assembly Removal

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

1. Remove the scanner mechanism (See 4.2.3.2).
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.13) and the bush to remove the tension lever assembly.
4. Disconnect the cable for the motor from the relay connector and remove 4 CR; B damper shafts (No.9), and then remove the motor.



**When assembling, hook the spring to the tension lever assembly first, and fasten the screws.**



Top of the Scanner

Figure 4-16. CR Motor Assembly Removal

#### 4.2.4.5 Glass Frame Assembly Removal

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



- When removing the document glass, make sure to set the scanner on the adjusting tools exclusively designed for this scanner.
- Be sure to fit all the rubber feet of the scanner in the top indents of the stages and the adjuster (Any of the feed should not be placed over the top surface of the tools).
- Set the scanner on a stable and level table.
- Make sure that the scanner mechanism is installed in the lower housing when removing the glass frame assembly.

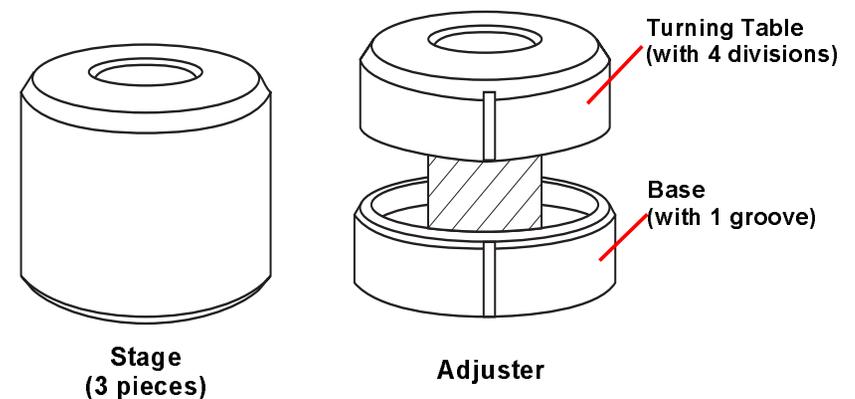
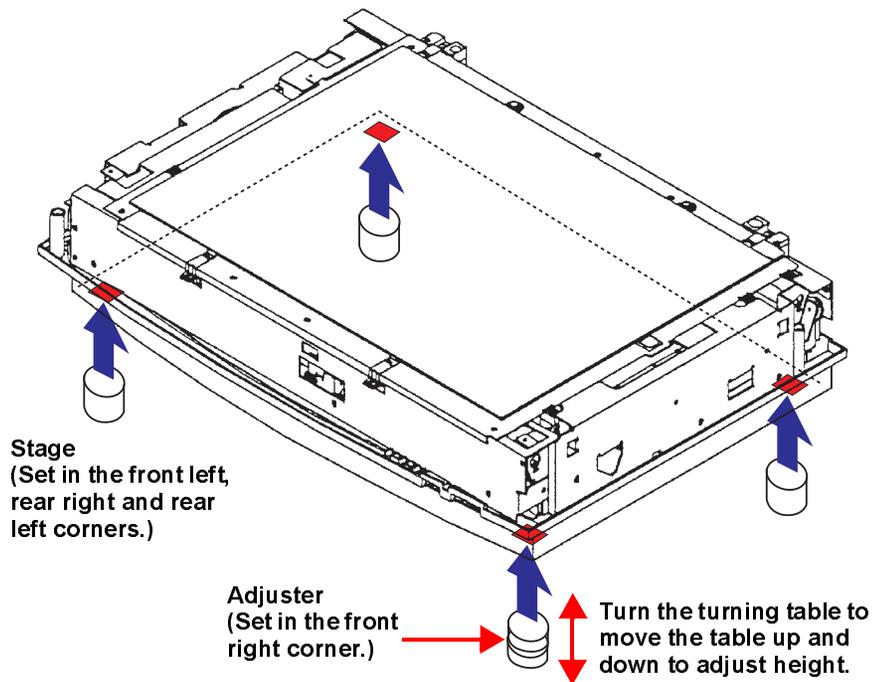


Figure 4-17. Adjusting Tools





**Figure 4-18. Tool Position and Adjusting Method**

1. Remove the upper housing (See 4.2.3.1).
2. Referring to Figure 4-18, set the scanner on the adjusting tools (leveling tools) and level the scanner according to the following procedure:
  - Set the scanner on 3 stages, placing each of the specified rubber feet on the corresponding stage.
  - Set the adjuster under the rubber foot in the front right corner of the scanner bottom, aligning the center of the adjuster with the foot. Make sure that you can see the groove on the base of the adjuster when it is set.
  - Hold the base of the adjuster with a hand and spin the table until it reaches the bottom of the scanner by its own force.

- Turn the table manually [2 quarters], 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.
  - After adjusting, make sure that each corner of the scanner is securely in contact with the corresponding tool.
3. Remove 9 screws (No.10) and remove the glass frame assembly. The screws to be removed and their locations are shown on the following page.



**CAUTION** When reinstalling the glass frame assembly, refer to Section 4.2.3.5.1 to confirm the correct installation position. Misplacing of the glass frame assembly will cause the CR to scan the document from a wrong position.

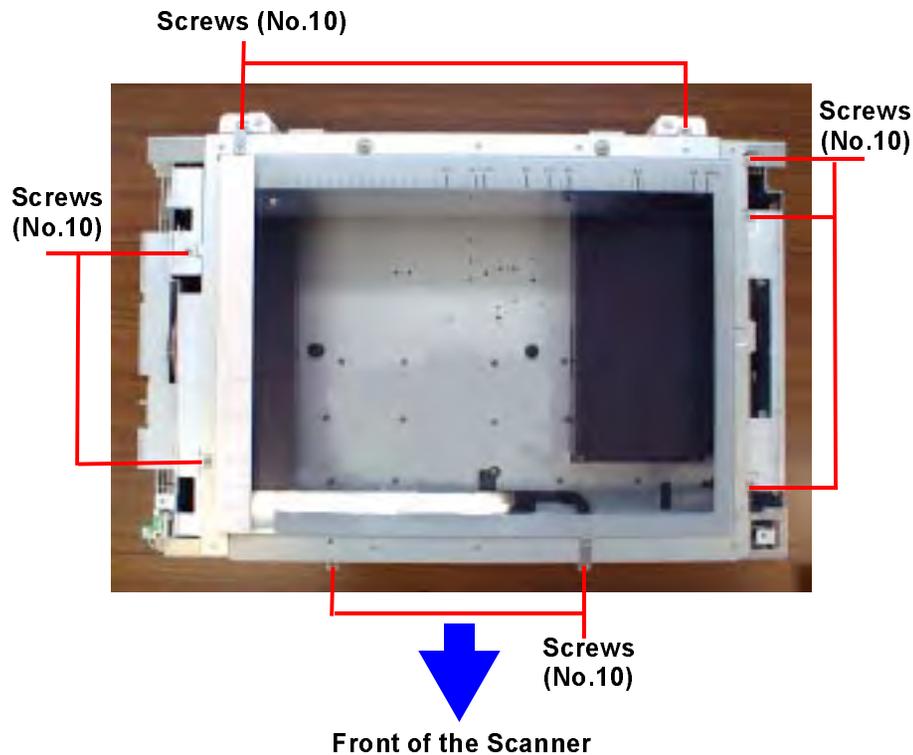


Figure 4-19. Glass Frame Assembly Removal

#### 4.2.4.5.1 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 on the specified position in the scanner mechanism.
2. While referring to Figure 4-20, determine the installation position according to the following procedure:
  - Install the frange shaft stoppers at the 2 bumps located in the rear frame.

- Push the whole glass frame assembly from the front against the frange shaft stoppers until the glass edge is in contact with the bushes.
- Keeping the glass frame assembly in contact with the stoppers, move the assembly toward left and push it against the positioning bump located on the top surface of the left side frame.
- When the glass frame assembly is in the correct position, fix it with 9 screws.



When installing the glass frame assembly, ensure that glass fixing plates (one for each of the front and rear) are properly positioned (See Figure 4-19).

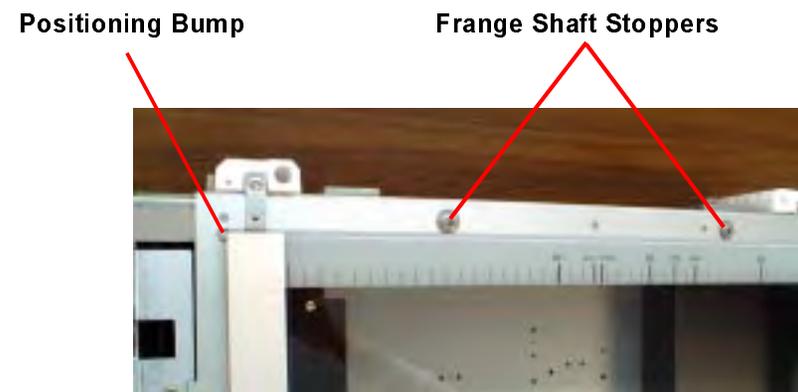


Figure 4-20. Determining the Glass Frame Assembly Position

#### 4.2.4.6 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 4.2.3.5).
2. Move the CR to the position indicated in Figure 4-22 (the position where the front and rear frames are indented).
3. Remove 2 screws (No.2) 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.
4. Disconnect the connector cable for the lamp from the connector (CN2, white) 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.2) 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.

Screw (No.2)

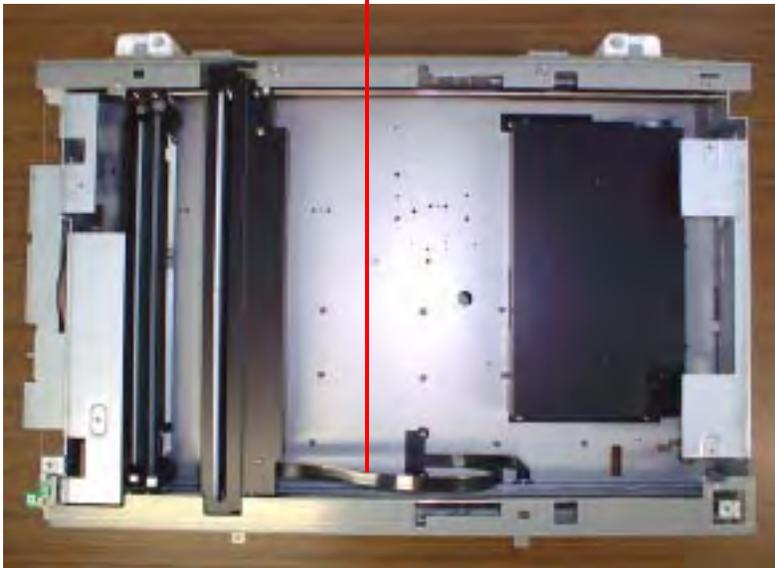
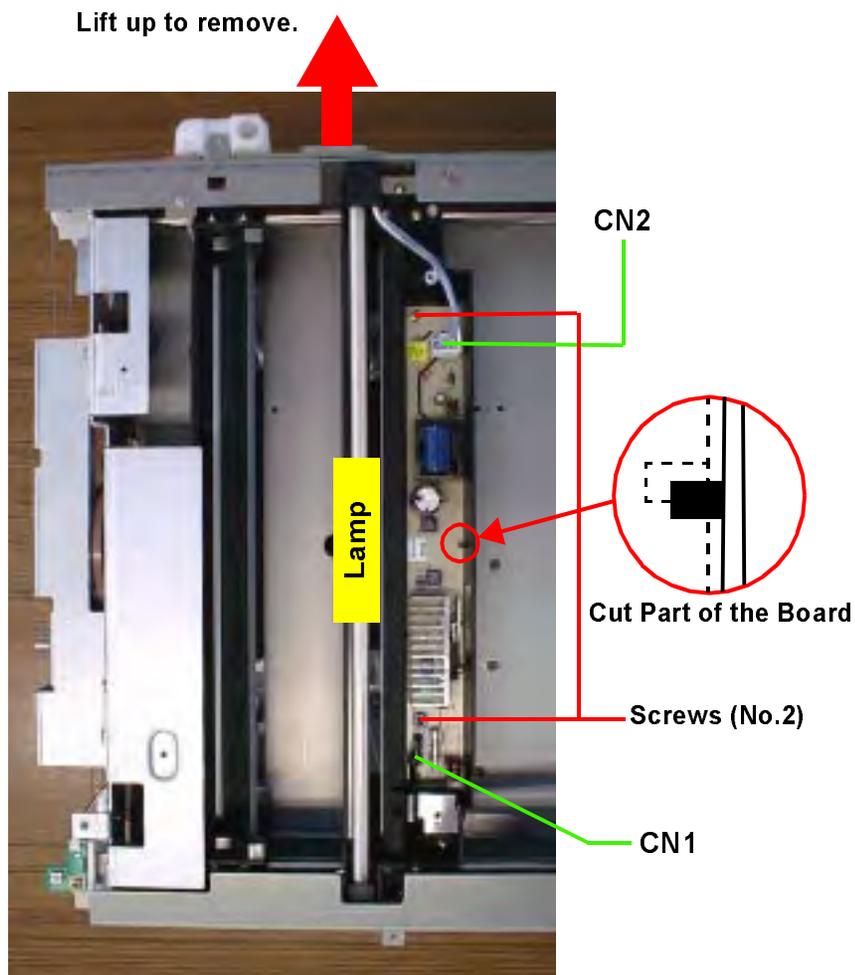


Figure 4-21. Carriage Mirror Cover Removal



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

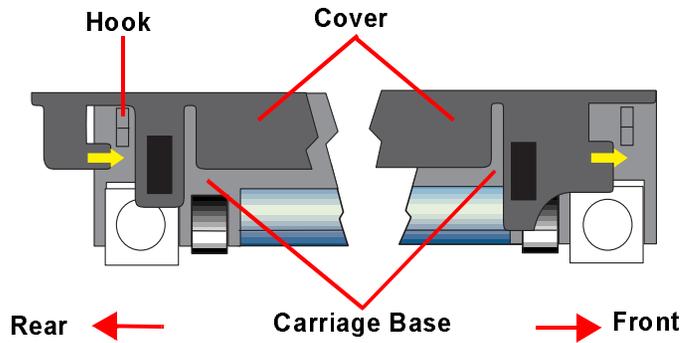


Figure 4-22. Lamp Assembly and Inverter Board Assembly Removal



#### 4.2.4.7 Option Frame Assembly Removal

This section describes how to remove the option frame assembly attached to the back of this scanner.

1. Remove the upper housing (See 4.2.3.1.)
2. Remove 8 screws securing the option frame assembly to the back of the scanner and remove it. The types and locations of the screws to be removed are as follows:
  - No.11: Located in the upper right corner of the option frame assembly (when viewed from the back of the scanner).
  - No.12: Rest of the positions are indicated in Figure 4-23 Option Frame Assembly Removal below.

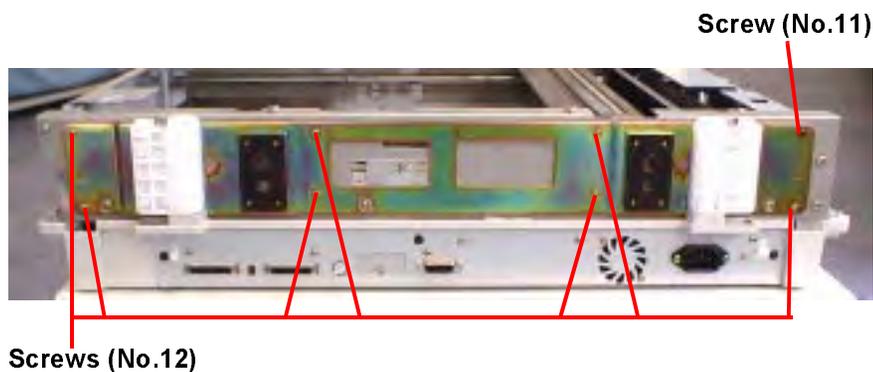


Figure 4-23. Option Frame Assembly Removal

CHAPTER

5

## ADJUSTMENTS

## 5.1 Updating Firmware

To update the firmware, the following are necessary:

- Update Program (K90E02V)
- SCSI Cable

### 5.1.1 Preparations Before Updating

1. Select non-synchronized connection for SCSI on the PC (See manual for each SCSI board). However, since the selection of non-synchronized or synchronized setting cannot be made for the SCSI board which is not equipped with BIOS, it is necessary to check each SCSI board beforehand.
  2. Install the Update Program for the firmware according to the procedure shown below.
- Double-click the program "K90E02V.exe" located in the "Firmware" folder, and the following screen will appear.

- Confirm the installation folder, and click "OK". The program will be automatically installed (data file of the firmware will be placed in the same installation folder), and the following program group will be created on the PC.



Figure 5-2.



Figure 5-1. Installation of Firmware Program

## 5.1.2 Updating Firmware

1. Connect the scanner to the PC via SCSI.
2. Turn on the PC and Windows.
3. Bring up EFlash, and the EFlash start screen shown in Figure 5-3 will appear.



Figure 5-3. Firmware Update Start Screen

4. Click “About” button to display information on the program and the required environment as shown in Figure 5-4.

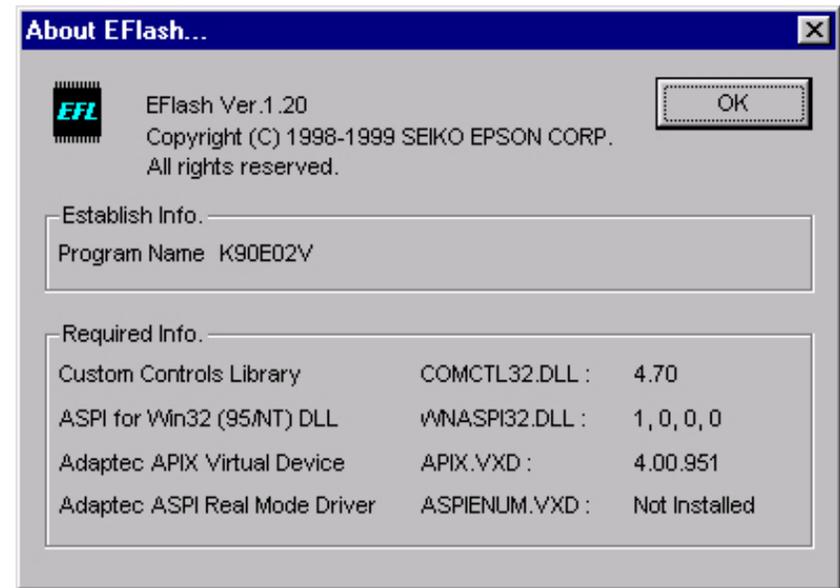


Figure 5-4. Firmware Update Requirements and Environment

5. Double-click anywhere in the above screen other than “OK” button to display “Option” screen (shown in Figure 5-5 on the following page), and select light correction value setting for the firmware update at “Light Correction Value”. If the light correction is necessary after updating the firmware, select “[Production] Perform Light Correction after EFlash”. If firmware update only is desired, select “[User Update] Save and Restore the current value”. To specify the light value, select “[Special] Force to write the specified value” and enter the light value.

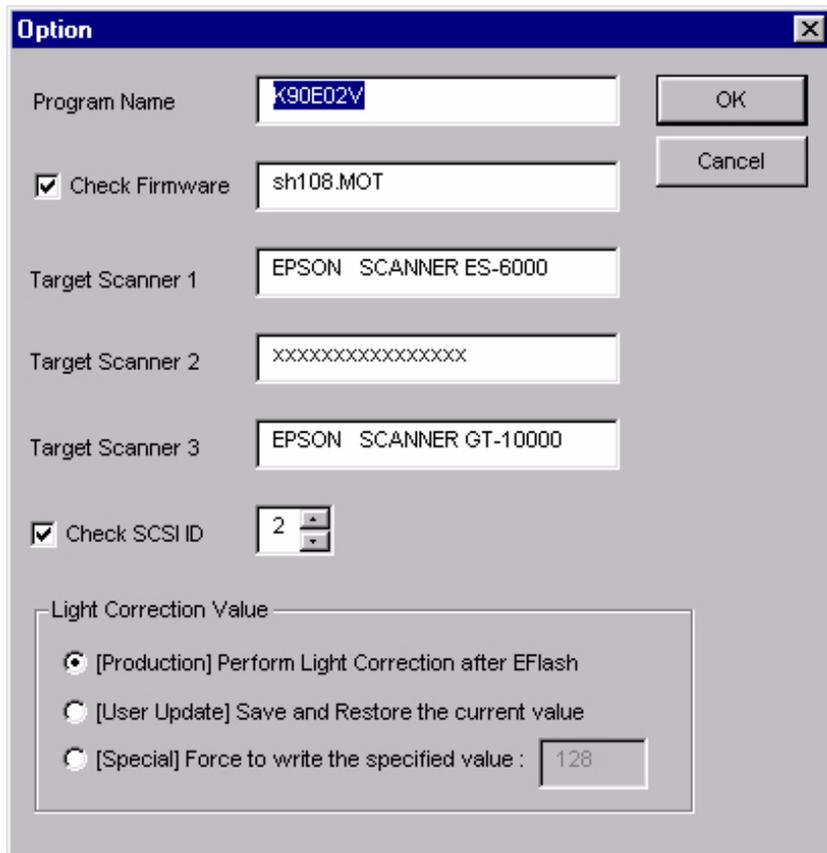


Figure 5-5. Option Window

6. Click "OK" button in Figure 5-5 to go back to Figure 5-4.
7. Click "OK" button in Figure 5-4 to go back to Figure 5-3.
8. Make sure that the scanner is ready (green lamp is on).
9. In Figure 5-3, click "Next" button and upload the firmware according to the following procedure:

10. 1). In Figure 5-6, confirm the version of writing firmware. Name of the scanner and the current version of ROM are shown at "Target Scanner", and the latest version of firmware data is shown right below.

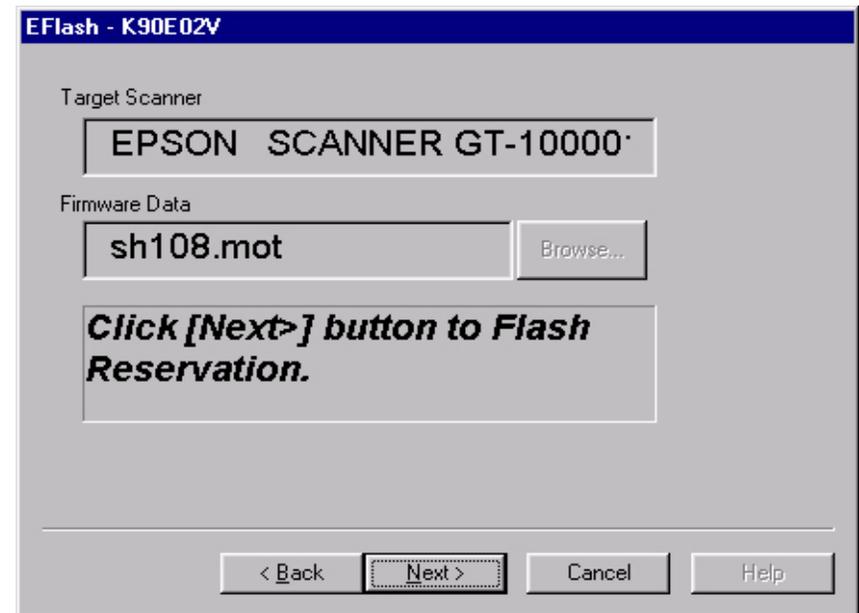


Figure 5-6.

- 2). Click "Next" button for Flash Reservation.

3). When the Flash Reservation is complete, “REBOOT SCANNER!” message box will appear (Figure 5-5).



Figure 5-7.

4). Reboot the scanner. You cannot proceed to the next step without rebooting the scanner. Make sure that “Ready” lamp is on.

5). Click “OK” to start writing the firmware. Writing status is indicated by the progress bar as shown in Figure 5-8 below. When writing process is complete, “REBOOT SCANNER!” message will appear on the screen again.

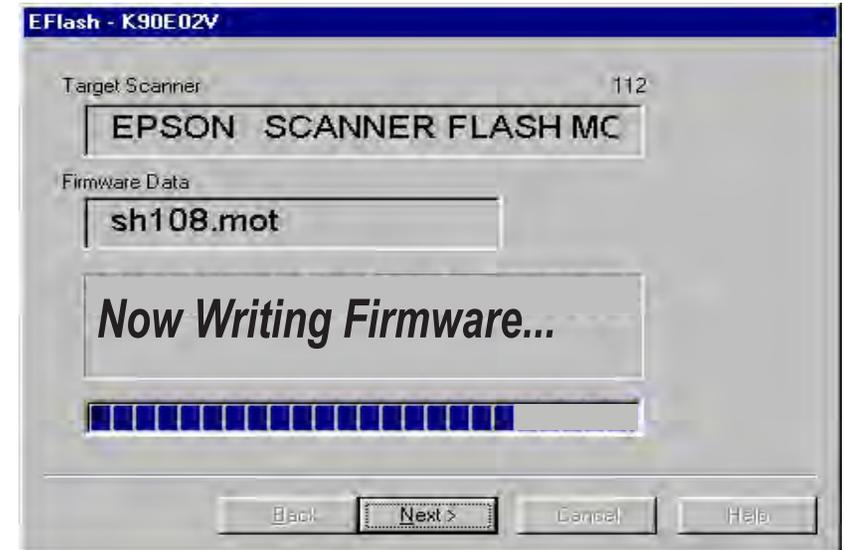


Figure 5-8.

6). Reboot the scanner and click “OK”. The reboot message box will be closed and Figure 5-9 will appear on the screen.

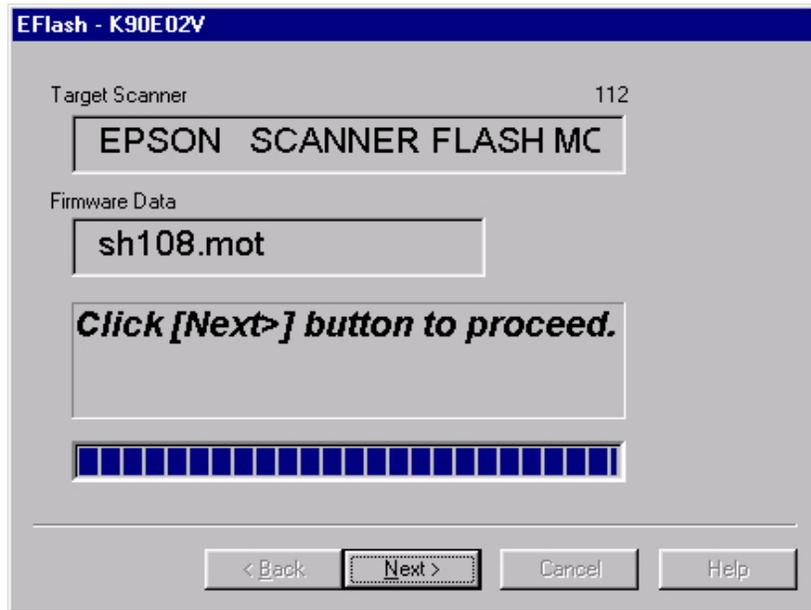


Figure 5-9.

7). Make sure that the scanner is ready, and click “Next”. Figure 5-10 will appear and the scanner version information “Before EFlash” and “After EFlash” will be displayed. Compare the version before and after EFlash to confirm that the firmware has been properly written.

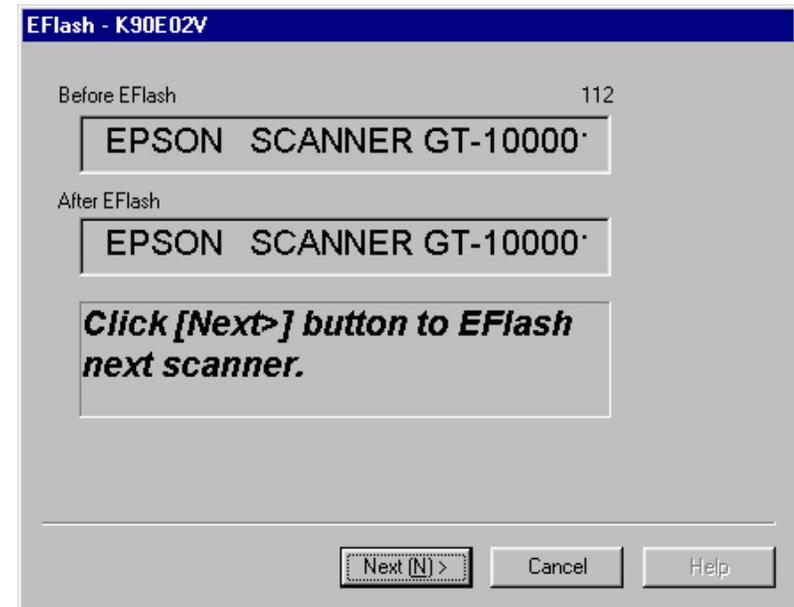


Figure 5-10.

- 8). Click “Next” to go back to the EFlash Start Screen.
- 9). Click “Cancel” to complete the firmware updating procedure.

## 5.2 Light Correction

GT-10000 requires the light correction after the disassembly and assembly procedures described in Chapter 4. Since the Firmware Update Program has "Light Correction Value" setting as shown in 5.1 Updating Firmware, it is recommended that the light correction be conducted together with the firmware update.

### 5.2.1 Necessary Tools

No.	Tool Name	Function	Remark	SEC Parts Code
1	Light Correcting Plate	Decides position of the White Standard Chart and works as a weight.	Two pieces must be used as one set.	1050003
2	White Standard Chart	Functions as white standard for the light correction.	Must be attached to the Light Correcting Plate before use.	1050004

### 5.2.2 Light Correction Procedure

This section describes the procedure for conducting the light correction.

1. Turn off the scanner.
2. Select the SCSI ID 9 with the rotary switch as shown in Figure 5-8 (factory default is 2). ID 9 is not indicated on the switch panel; however, when turning the switch counterclockwise from 0, the next ID is 9.

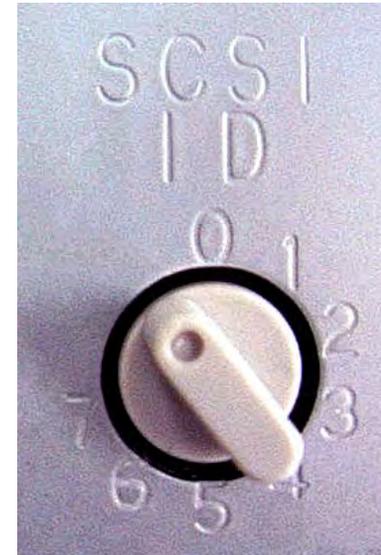


Figure 5-11. SCSI ID for Light Correction

- Remove the Document Unit Cover, and place the light correction tools (Light Correcting Plates attached with the White Standard Chart) on the glass as shown in Figure 5-12.

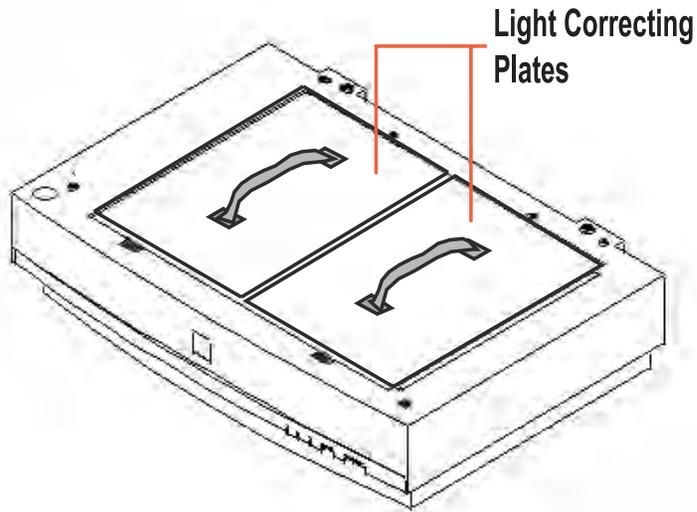


Figure 5-12. Light Correcting Plates Setting

CHECK  
POINT



- White Standard Chart must be tightly attached to the glass surface.
- Use two Light Correcting Plates as one set.

CAUTION



- To ensure the accurate light correction value, the White Standard Chart which has flaws or smudges on its surface must be replaced.
- Replacement procedure for the White Standard Chart is as follows:
  - Peel off the double-face tape attached to the White Standard Chart.
  - Attach the White Standard Chart to the Light Correcting Plates along the two lines engraved on the plate surface.

- While pressing the push button, turn on the scanner. Keep pressing the push button until the lamp turns on.
- The scanner will automatically correct the light value.
- Turn off the scanner, and set the SCSI ID rotary switch back to No. 2. The light correction process is now complete.

CAUTION



If the corrected light value does not meet the standard values, error lamp on the front control panel flashes to indicate an error. In such a case, it is necessary to conduct the light correction again.

CHECK  
POINT



The corrected light value cannot be confirmed until the next time the light correction is conducted (See Figure 5-13).

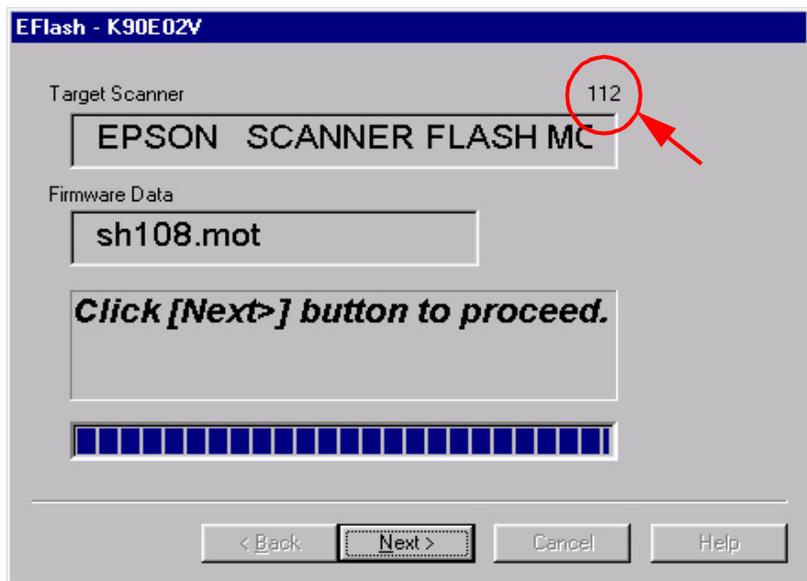


Figure 5-13. Light Value of the Scanner

**CHAPTER**

**6**

# **MAINTENANCE**

Maintenance procedures for GT-10000 are the same as those of GT-12000.



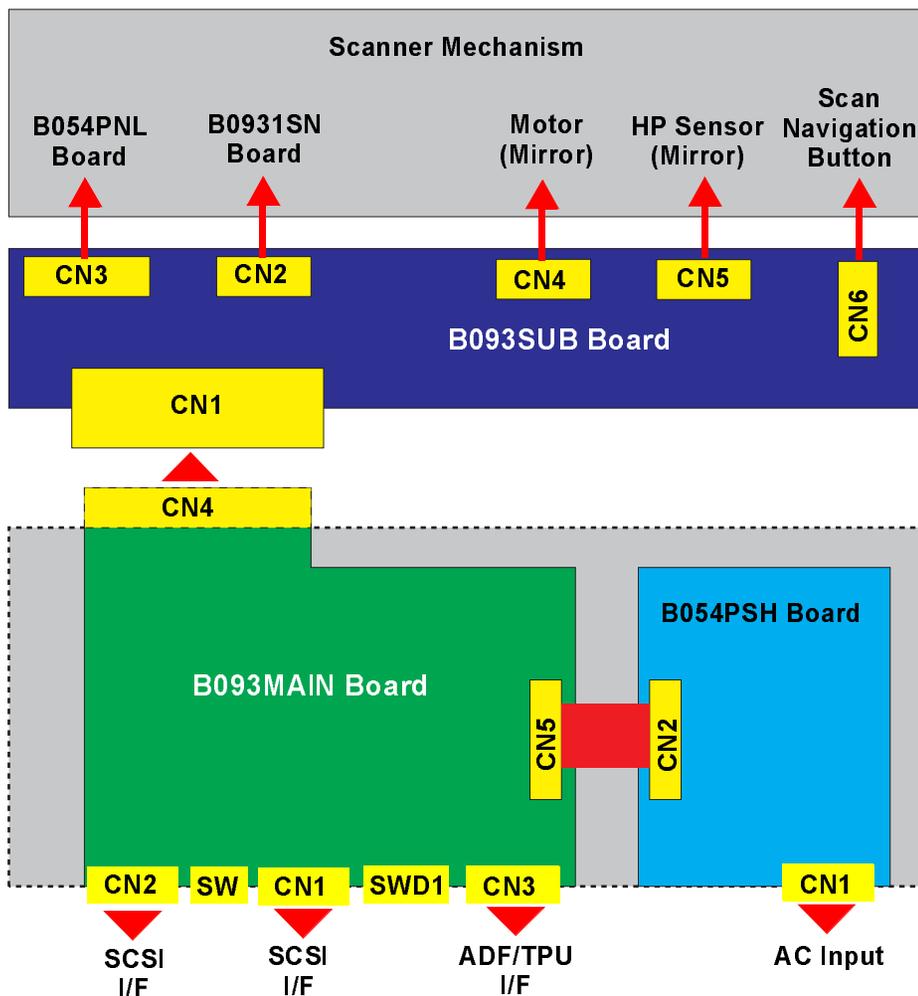
**CHAPTER**

**7**

**APPENDIX**

## 7.1 Connector Pin Assignment

### 7.1.1 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.
B093MAIN	CN1	For connection with SCSI I/F	7.1.2.1 Table 7-4
	CN2	For connection with SCSI I/F	7.1.2.1 Table 7-4
	CN3	For connection with ADF/TPU Option	7.1.2.1 Table 7-6
	CN4	For connection with B093SUB Board	7.1.2.1 Table 7-2
	CN5	Power supply line from B054PSH Board	7.1.2.1 Table 7-3
B054PSH	CN1	For connection with AC inlet	–
	CN2	Power supply line for B093MAIN Board	GT-12000 Service Manual 7-3
B093SUB	CN1	For connection to B093MAIN Board	7.1.2.1 Table 7-2
	CN2	For connection to B0931SN Board	–
	CN3	For connection to B054PNL Board	GT-12000 Service Manual 7-4
	CN4	For connection to the motor	GT-12000 Service Manual 7-5
	CN5	For connection to HP sensor (mirror)	GT-12000 Service Manual 7-5
	CN6	For connection to Scan Navigation Button Board	–



## 7.1.2.1 Main Board Circuit Signals

## B093MAIN – RELAY CONNECTOR (CN4)

Table 7-2.

PIN No.	Signal Name	Function
1	GND	GND
2	GND	GND
3	GND	GND
4	ADCLK	AD clock
5	CLP	Not used.
6	GND	GND
7	STB	Shutter (blue) for CCD
8	STR	Shutter (red) for CCD
9	RS	Reset signal for CCD
10	GND	GND
11	CLKA	Clock signal for CCD
12	GND	GND
13	AD1	Image data (1) after AD conversion
14	AD3	Image data (3) after AD conversion
15	AD5	Image data (5) after AD conversion
16	AD7	Image data (7) after AD conversion
17	AD9	Image data (9) after AD conversion
18	AD11	Image data (11) after AD conversion
19	SLOAD	Serial light signal for ADC
20	SCK1	Serial clock signal for ADC
21	OPSW	Power switch (secondary side)

Table 7-2.

PIN No.	Signal Name	Function
22	LEDP	LED (POWER)
23	LEDR	LED (ERROR)
24	GND	GND
25	GND	GND
26	+24V	Power supply (+24V)
27	+24V	Power supply (+24V)
28	HMMP	Home sensor power supply
29	MMB	Motor (Phase B)
30	MMBX	Motor (Phase /B)
31	+12V	Power supply (+12V)
32	+12V	Power supply (+12V)
33	LCMP	Clamp signal for ADC, Start signal
34	GND	GND
35	CDS2	Data sampling signal for ADC
36	CDS1	Reference sampling signal for ADC
37	STG	Shutter (green) for CCD
38	GND	GND
39	CLKC	LH signal for CCD
40	CLKB	Not used.
41	SHFT	Shift signal for CCD
42	AD0	Image data (0) after AD conversion
43	AD2	Image data (2) after AD conversion
44	AD4	Image data (4) after AD conversion
45	AD6	Image data (6) after AD conversion
46	AD8	Image data (8) after AD conversion

Table 7-2.

PIN No.	Signal Name	Function
47	AD10	Image data (10) after AD conversion
48	GND	GND
49	SDAT1	Serial data signal for ADC
50	PUSHB	Push button signal
51	RSSW	Reset switch
52	LEDR	LED (READY)
53	+5V	Power supply (+5V)
54	GND	GND
55	LMP	Lamp signal
56	+24V	Power supply (+24V)
57	HMM	Home sensor signal
58	MMA	Motor (Phase A)
59	MMA	Motor (Phase /A)
60	GND	GND

---

**B093MAIN - POWER SUPPLY CONNECTOR (CN5)**


---

Table 7-3.

PIN 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

Table 7-3.

PIN No.	Signal Name	Function
7	+5V	Power supply (for logic line)
8	+5V	Power supply (for logic line)
9	+15V	Power supply (for generating +12V)
10	GND	GND
11	TEMP	Output from the thermistor
12	OPSW	Power switch (secondary side) control signal

B093MAIN – SCSI I/F CONNECTOR (CN1, CN2)

Table 7-4.

PIN No.	Signal Name
1	GND
2	GND
3	GND
4	GND
5	GND
6	GND
7	GND
8	GND
9	GND
10	GND
11	GND
12	GND
13	------(NC)
14	GND
15	GND
16	GND
17	GND
18	GND
19	GND
20	GND
21	GND
22	GND
23	GND

Table 7-4. (continued)

PIN No.	Signal Name
24	GND
25	GND
26	SD0
27	SD1
28	SD2
29	SD3
30	SD4
31	SD5
32	SD6
33	SD7
34	SDP
35	GND
36	GND
37	GND
38	TERM PWR
39	GND
40	GND
41	/ATN
42	GND
43	/BSY
44	/ACK
45	/RST
46	/MSG
47	/SEL



Table 7-4. (continued)

PIN No.	Signal Name
48	/CD
49	/REG
50	/IO

**B093MAIN – FAN CONNECTOR (CN2)**

Table 7-5.

PIN No.	Signal Name
1	+12
2	GND

**B093MAIN - OPTION CONNECTOR (CN3)**

Table 7-6.

PIN No.	Signal Name	Function
1	IN1	Not used (TPU[HOME]/Select)
2	IN1	Not used (TPU[COVER]/Select)
3	IN1	
4	OU5	Not used (Lamp control signal)
5	In1	
6	+5	Power supply (+5V)
7	GND	GND
8	+24	Power supply (+24V)
9	SDAT	Not used (Motor drive serial data for TPU)
10	SCK	Not used (Transfer CLK for TPU)
11	LOD	Not used (Latch pulse LOD for TPU)

Table 7-6.

PIN No.	Signal Name	Function
12	SEL	Not used (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 for ADF
22	/RXD	/RXD for ADF
23	/TXD	/TXD for ADF
24	TXD	TXD for ADF
25	DSR	DSR for ADF
26	DTR	DTR for ADF

## 7.2 Circuit Board Component Layout

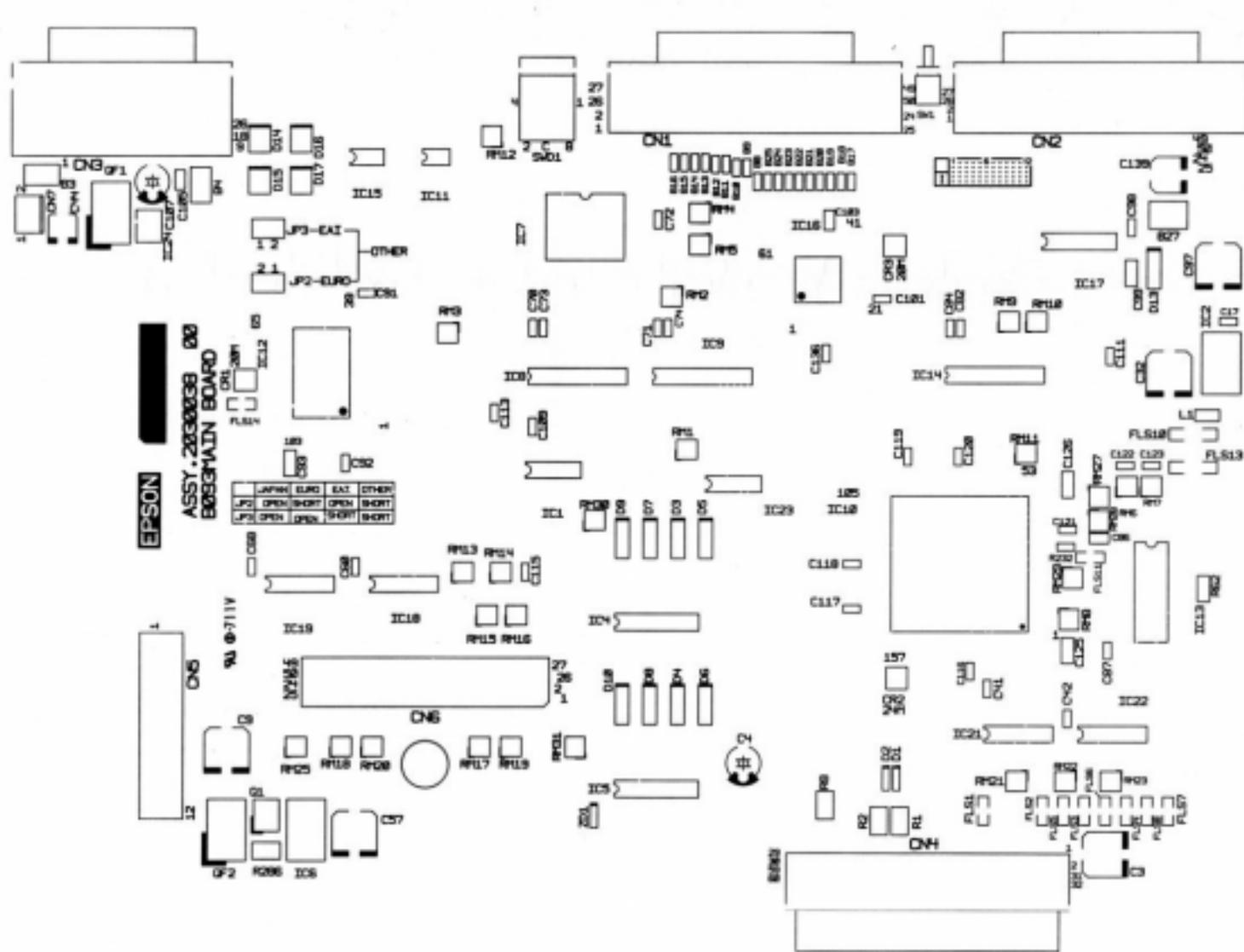


Figure 7-1. Component Layout - B093MAIN Board

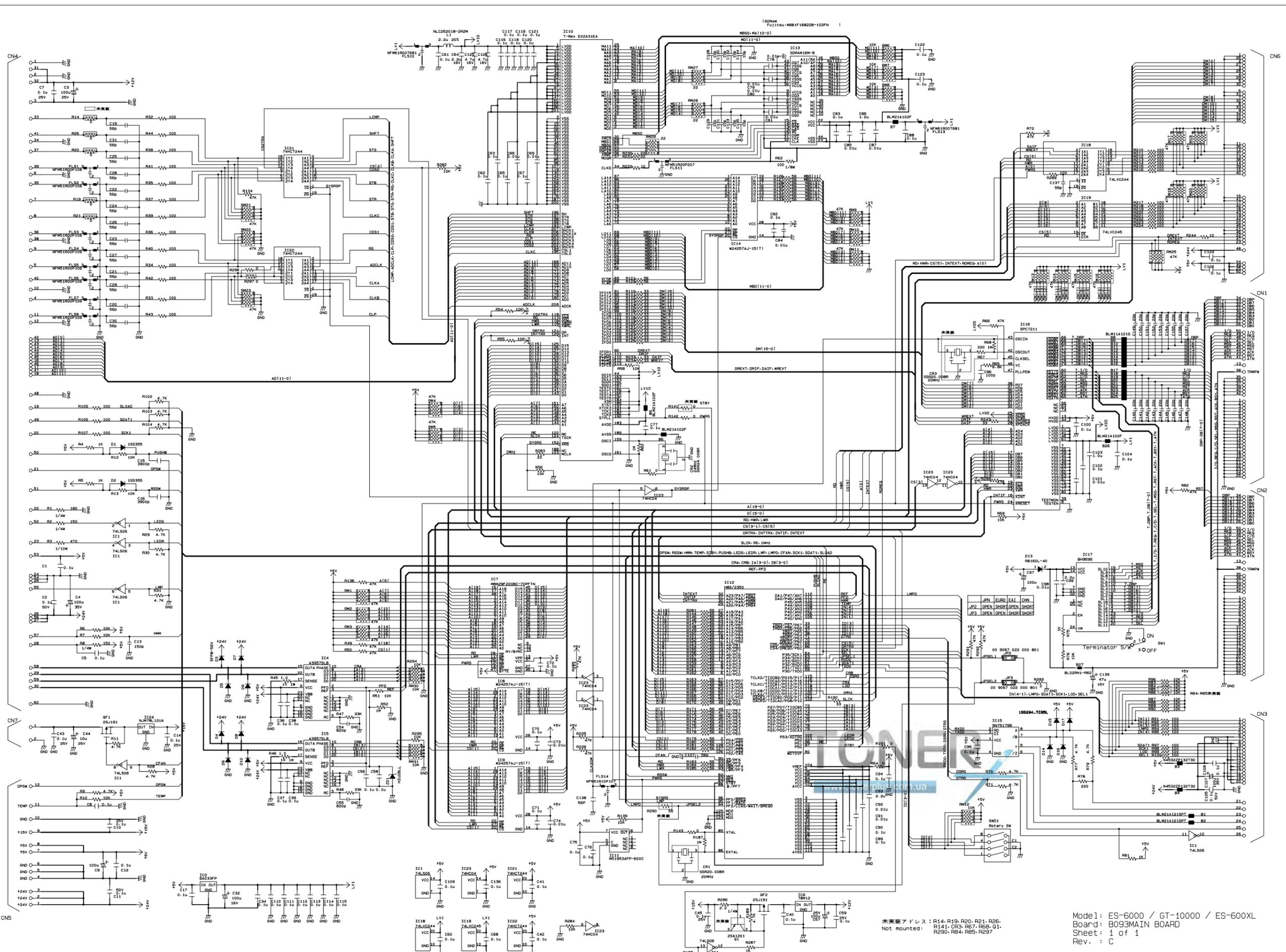


Component layout of the Power Supply Board Assembly is the same as that of GT-12000 (B054PSH Board). Refer to the corresponding section of the GT-12000 Service Manual.

## 7.3 Circuit Diagram

---

Circuit diagram of the main board is shown on the following page.



未実装アドレス: R14, R19, R20, R21, R26, R141, CR3, R67, R68, G1, R290, R64, R65, R297  
 Model: ES-6000 / GT-10000 / ES-600XL  
 Board: B093MAIN BOARD  
 Sheet: 1 of 1  
 Rev.: C

## 7.4 Exploded Diagrams & ASP List

---

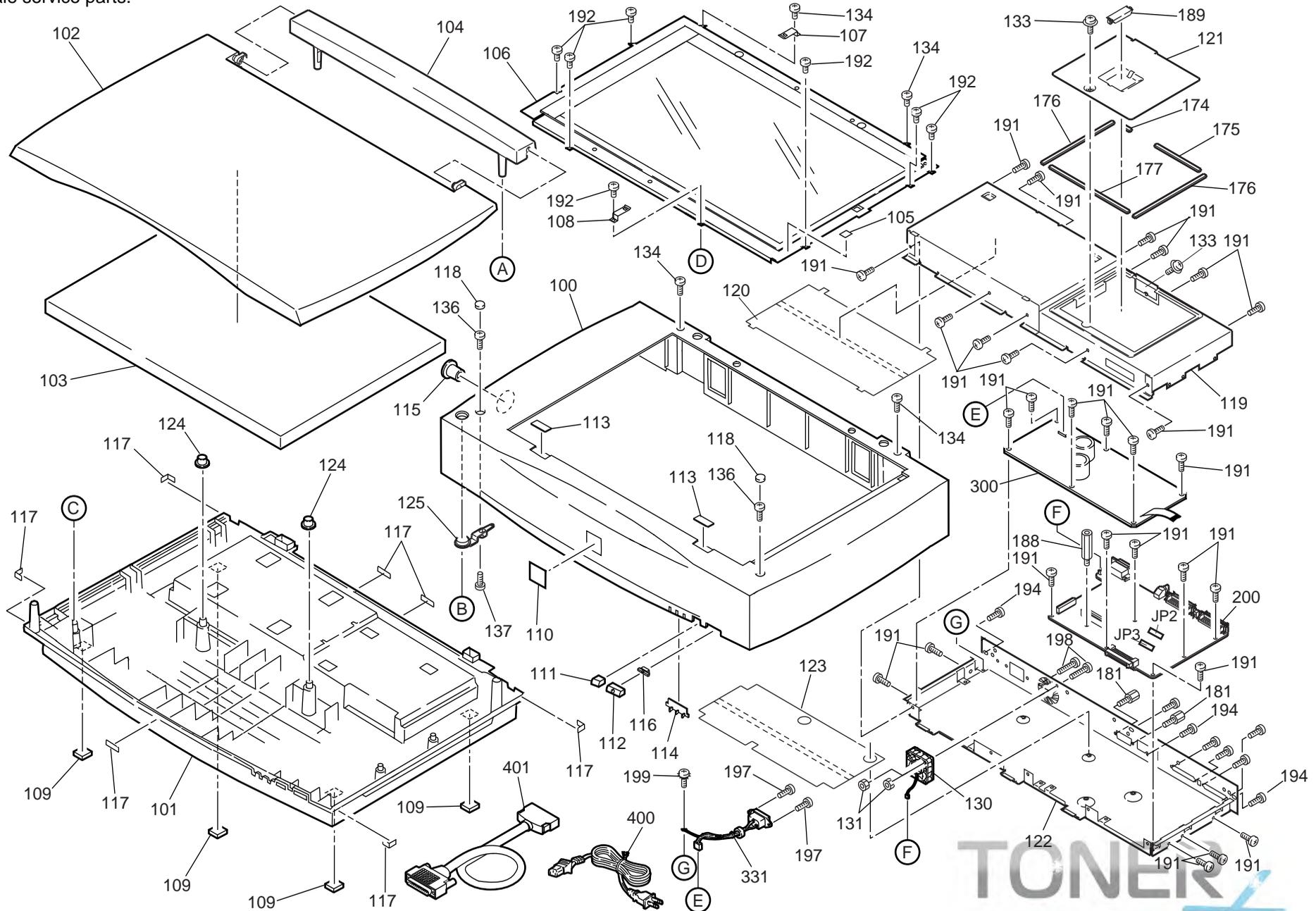
### 7.4.1 Exploded Diagrams

Exploded diagrams of this scanner are shown on the following pages.

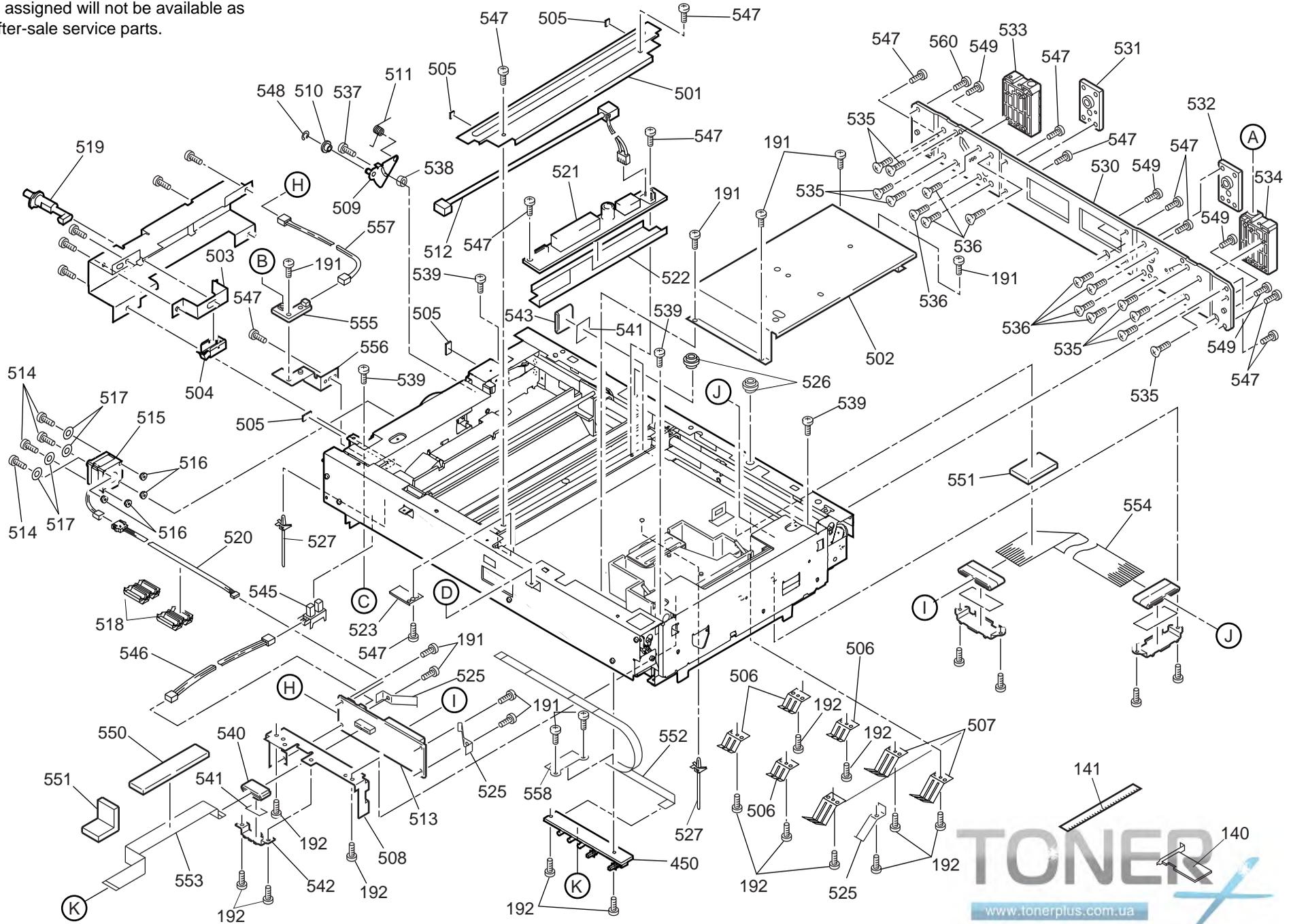
- GT-10000 No.01
- GT-10000 No.02



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



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



## 7.4.2 ASP List

Table 7-7.

Drawing No.	Parts Code	Name
100	1045003	HOUSING, UPPER
101	1036233	HOUSING, LOWER
102	1045030	COVER, DOCUMENT
103	1045007	MAT, COVER, DOCUMENT
104	1045031	COVER, DOCUMENT, B
105	1038165	SHEET, INSULATION
106	1045013	FRAME ASSY., GLASS, B
107	1036636	MOUNT PLATE, GLASS, REAR
108	1036244	MOUNT PLATE, GLASS, FRONT
109	1036595	FOOT
110	1047927	LOGO PLATE, C
111	1036236	KEYTOP, RESET SWITCH
112	1036235	KEYTOP, POWER SWITCH
113	1036238	PLATE, MAGNET
114	1036241	OPTICAL PLATE
115	1036263	KNOB, FASTEN, CR
116	1036886	SUPPORT, SWITCH
117	1036246	SHEET, CASE
118	1036592	CAP, SCREW
119	1044992	SHIELD, TOP
120	1044994	INSULATOR, POWER SUPPLY, UPPER
121	1045020	COVER, SHIELD, TOP
122	1044991	SHIELD, MAIN

Table 7-7.

Drawing No.	Parts Code	Name
123	1044993	INSULATOR, POWER SUPPLY, LOWER
124	1036245	CAP, LOCATE
125	1045006	KEYTOP, START SWITCH
130	2030331	FAN ASSEMBLY
131	1006805	HEXAGON NUT M3, F/ZN
133	1045269	C.C. SCREW, 3X6, F/ZB
134	1036880	C.B.P-TITE SCREW 4X12 F/NI
136	B010304611	C.B. SCREW M4X10
137	1016009	C.B.P-TITE SCREW 3X8 F/ZN
140	2031635	SCSI BARD
141	1047905	SCALE, SUB
174	1045023	GASKET, SHIELD
175	1045024	GASKET, SHIELD, B
176	1045025	GASKET, SHIELD, C
177	1045026	GASKET, SHIELD, D
181	1036624	SCREW LOCK
188	1045120	BSB SPACER
189	1045027	GRIP, COVER, SHIELD
191	B300204211	C.B.S. SCREW M3X6
192	B010350511	C.B. SCREW M3X3
194	1045289	C.
197	B300204311	C.B.S. SCREW M3X8
198	1003978	C.B. SCREW M3X20
199	B045800115	C.B.(O) SCREW M4X8 F/ZG
200	2030038	BOARD ASSY, MAIN

www.tonerplus.com.ua

Table 7-7.

Drawing No.	Parts Code	Name
300	2025122	BOARD ASSY.,PS
331	2025126	HARNESS
400	2002364	POWER CABLE,(VD31303SA-10A)
401	2031709	INTERFACE CABLE
450	2025234	BOARD ASSY., PNL
500	2032531	MECHA UNIT,ASP
501	1036327	COVER,CARRIAGE,MIRROR
502	1045000	COVER,HOLDER,LENS
503	1036261	FASTENING PLATE,CR
504	1036264	SPRING,FASTEN,CR
505	1036331	STOPPER,CR
506	1036314	SPRING,GROUND
507	1044988	GROUNDING PLATE,FRAME
508	1044987	SUPPORT PLATE,BOARD,CONNECTOR
509	1036979	LEVER ASSY.,TENSION
510	1025473	ROLLER,TENSION
511	1050062	TORSION SPRING, 100.9
512	2025176	LAMP ASSY.
513	2030042	BOARD ASSEMBLY.,SUB
514	1017596	SHAFT,DAMPER,CR;B
515	2030332	MOTOR ASSEMBLY,CR
516	1012618	DAMPER,CR
517	1008492	PLAIN WASHER
518	1047010	FERRITE CORE
519	1036262	SHAFT,FASTEN,CR

Table 7-7.

Drawing No.	Parts Code	Name
520	2025158	HARNESS,MOTOR,CR
521	2025177	BOARD ASSY.,INVERTER
522	1036326	INSULATION PLATE,INVERTER
523	1036332	GROUNDING PLATE,LAMP,FFC
525	1044989	GROUNDING PLATE,BARD,SUPPORT PLATE
526	1047906	FLANGE,SHAFT,STOPPER
527	X510060030	SNAP BAND
530	1044985	FRAME,OPTION
531	1043766	MOUNT PLATE,L
532	1043767	MOUNT PLATE,R
533	1036321	HOLDER,L
534	1036322	HOLDER,R
535	1036884	
536	1038310	C.F.S.SCREW,4X10,F/ZN
537	1014853	C.P.F.S-TITE,3X8,F/ZN
538	1050061	SPACER,3*1.6
539	1038311	C.B.P-TITE SCREW,4X18,F/ZN
540	2025173	FERITECORE
541	1036598	DOUBLE SIDE TAPE,12.5X17
542	1036313	MOUNT PLATE,FERRITE CORE,PANEL
543	2025172	FERITECORE
545	2021833	DETECTOR,HP;C
546	2025156	HARNESS,HP,CR
547	B010303311	C.B.SCREW M3X6
548	B150300611	RETAINING RING

Table 7-7.

Drawing No.	Parts Code	Name
549	B010304411	C.B.SCREW M4X6
550	1047790	FORM,SHIELD;C
551	1047791	FORM,SHIELD;D
552	2030340	CABLE,INVERTOR
553	2030179	
554	2030180	
555	2030182	BOARD ASSY.,SUB
556	1044990	HOLDER,BOARD,SWITCH
557	2030181	
558	1038167	SHEET,FFC
560	B010303618	C.B.SCREW M3X12