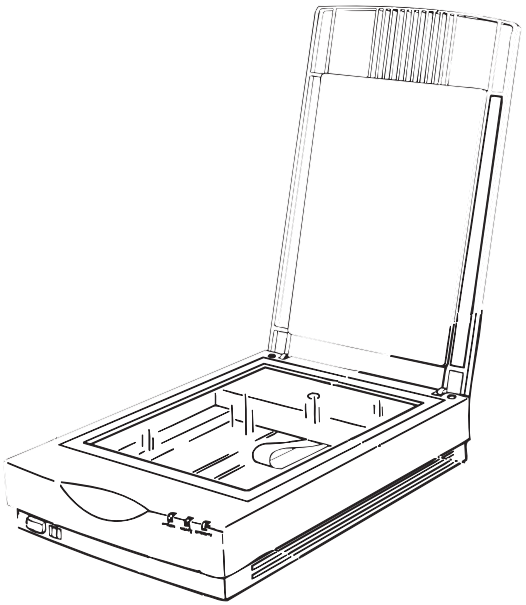
SERVICE MANUAL



Color Image Scanner

GT-5500

EPSON®

4008399

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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 GT5500. 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
A	1997/09/15	All	First release
B	1997/11/10	Pages from 7-4 through 7-11	Chapter 7 has been reorganized with some .EPS and .PDF files inserted.

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CHAPTER

1

PRODUCT DESCRIPTIONS

1.1 OVERVIEW

The GT-5500 is a flat-bed type color image scanner. The main features of this scanner are described in this section.

GENERAL

Type:	Flat-bed color image scanner
Scanning method:	Movement of the scanning head
Photoelectric device:	Color CCD line sensor
Light source:	Xe-gas cold cathode fluorescent lamp
Scanning resolution:	400 (Main) × 400 (Sub) dpi
Output resolution:	50 to 1600 dpi (1 dpi step)
Maximum effective picture element:	3400 × 4680 pixel (400 dpi)
Scanning speed:	At 400 dpi/A4/Draft mode; Monochrome (Bi-level) =1.9 ms/line Color = 5.8 ms/line
Maximum readable area:	A4/US letter size; 216 × 297 mm (8.5" × 11.7")

IMAGING FUNCTIONS

Pixel depth:	8 bit per pixel Input: 10 bit (each color) Output: 8 bit (each color)
Color separation:	CCD color filter
Zoom:	50 to 200%
Gamma correction:	CRT 2 levels (A/B) Printer 3 levels (A/B/C) User Definable (1 level)
Color correction:	Impact dot printer Thermal printer Ink jet printer CRT display User defined (1 level)
Brightness control:	7 levels
Line art:	Fixed threshold TET (Text Enhanced Technology)
Digital half toning	AAS (Auto Area Segmentation)
Error diffusion (Bi-level ,quad level)	3 modes (A,B,C), Dither (resident) 4 modes (A,B,C,D) User defined 2 modes (A,B)

INTERFACE

Standard interface:	SCSI 2 (25/50 pin connector)

SOFTWARE

Command level:	ESC/I-B6

ENVIRONMENTAL CONDITION

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

ELECTRICAL SPECIFICATION

Rated voltage:	AC 100 - 120 V AC 220 - 240 v
Input voltage:	AC 100 - 120 V ±10% AC 220 - 240 v ±10%
Rated current:	0.5 A (Input = Ac 100 V) 0.3 A (Input = AC 200 V)
Rated frequency range:	50 - 60 Hz
Input frequency range:	49.5 - 60.5 Hz
Power consumption:	Approximately 25 W
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)

SAFETY, EMC

Safety regulation:	(UL1950) (CSA C22.2 NO. 950) EN60950 (VDE) EN60950 Nordic Deviation (NEMKO) (FCC Part15 Subpart B Class B: USA) (CSA C108.8 Class B: Canada) AS/NZS3548 Class B EN61000-3-2 EN61000-3-3 EN50082-1 IEC 801-2 IEC 801-3 IEC 801-4 AS/NZS3548

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.

PHYSICAL DIMENSIONS AND WEIGHT

Dimensions:	297 (W) x 433 (D) x 87 mm (H) (See Figure 1-1.)
Weight:	Approximately 5 Kg

DOCUMENT

Reflective type:	Smooth surface

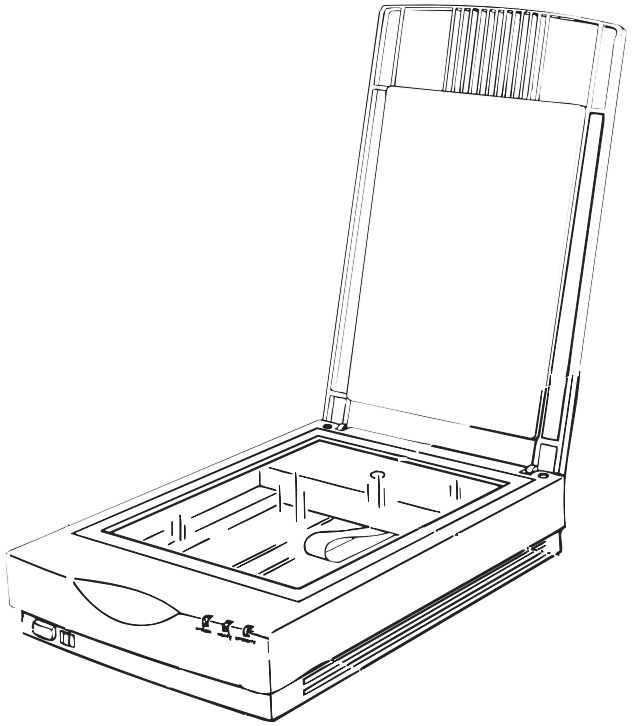


Figure 1-1. Exterior View of GT-5500

1.2 OPERATION

This section describes panel operations and LED indications of GT-5500.

1.2.1 Switches

- "**OPERATE**" switch
  Turns the scanner on and off.
  When the power is turned on, the scanner is initialized.

- "**Reset**" switch
  Initializes the scanner.

- Rotary switch
  0-7: SCSI ID
  Others: Reserved
  (Factory setting ID = 2)
- Terminator switch
  On: Terminator = On (default)
  Off: Terminator = Off

1.2.2 LED Specification

LED	Description
READY	On when the scanner power is on.
OPERATE	On when the scanner is ready to receive data. Note the LED status while the scanner is reading the image. It appears flickering because it comes on when it is ready to receive data (ACK or CAN) and goes off otherwise. This LED also indicates error status in combination with the ERROR LED.
ERROR	Indicates an error status. See Page 1-4 for details.

1.2.3 Error

Command Error

LED Status	Cause	Operation/Condition
READY ERROR	Undefined command is detected.	The scanner ignores the undefined command or parameter and sends NACK, and waits for the next command or parameter.
Remedy	The error condition is cleared when the scanner receives a correct command.	

Communication Error

LED Status	Cause	Operation/Condition
READY ERROR	Wrong procedure/ operation is detected in communication.	The lamp goes off and the scanner stops operating.
Remedy	Turn the scanner Off and back On or press the “RESET” switch. [Acceptable command] No command can be accepted.	

Fatal Error

LED Status	Cause	Operation/Condition
READY ERROR	• The lamp is broken. • The scanner power is turned on before the transportation screw is removed. • System breakdown	• The lamp goes off and the scanner stops operating. • Sets the status bit “7”.
Remedy	Perform one of the followings after eliminating the cause. • Turn off and back on the scanner. • Press the “RESET” switch. • Send the ESC@ codes to the scanner. • INIT signal in the parallel interface turns active. [Acceptable command] ESCC F, ESC f, ESC @	

CHAPTER

2

OPERATING PRINCIPLES

2.1 BASIC STRUCTURE OF THE SCANNER

EPSON scanner GT-5500 is mainly composed of the scanner mechanism, electrical circuits and the housing.

- ❑ Scanner mechanism
  Scanning mechanism for reading image on the document.

- ❑ Electrical circuits
  - ■ B063MAIN-B: Control circuit
    (Equipped for the SCSI interface version only.)
  - ■ B063ISN: Image sensor circuit
  - ■ B063PSB/PSE: Power supply circuit

- ❑ Housing
  The housing consists of the following:
  - ■ Document table
  - ■ Document cover: Covers the document to avoid exposure to light
  - ■ Lower housing: Accommodates the electrical circuits and the scanner mechanism.

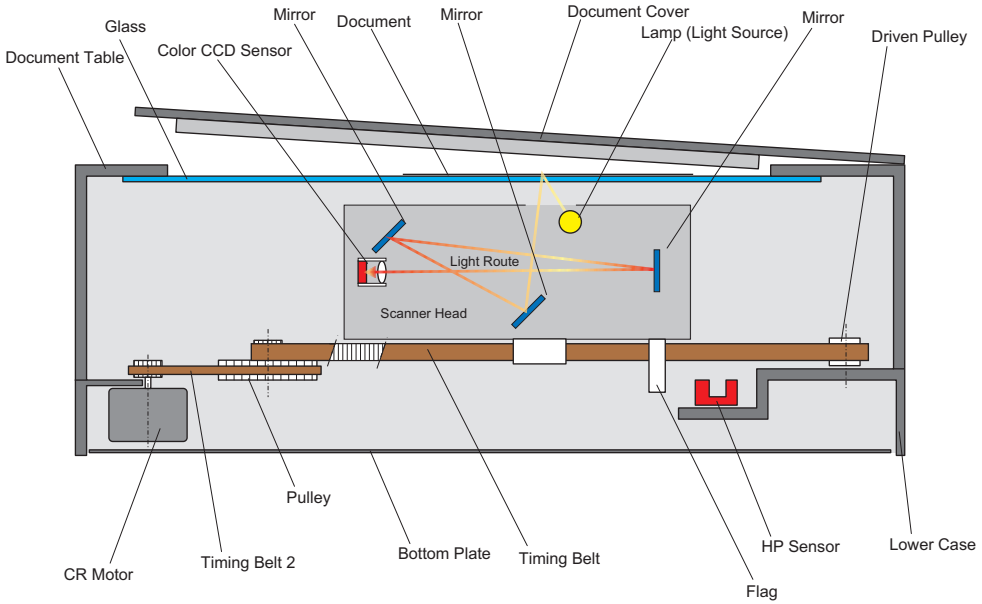


Figure 2-1. Cross Section of the Scanner Mechanism

2.1.1 Scanner Mechanism

The scanner mechanism of the scanner is composed of the following:

- ■ Color CCD
- ■ Image sensor circuit board
- ■ Scanner head equipped with the lamp (light source) and inverter circuit board for the light source
- ■ CR unit which moves the scanner head for reading image.

The CR unit has the CR motor, timing belt, pulley, timing belt 2, driven pulley, and the HP sensor.
See Figure 2-1 for the cross section of the scanner mechanism.

The document to be scanned is placed on the glass in the document table unit with the printed face down. Light from the lamp is emitted to scan the image in the main scan direction, and the light then enters the color CCD after being reflected on some mirrors one after another.
The carriage motor drives the timing belt by means of the pulleys and 2 timing belts to move the scanner head in the sub scan direction. The home position is detected by the HP sensor. Since a stepping motor is used for the carriage motor, carriage head position is controlled under the open loop system while the carriage head is off the home position. The scanner performs main and sub scanning, referring to the origin point and the origin point determined by the home position, respectively.

2.2 ELECTRICAL CIRCUIT

2.2.1 Electrical Circuit Structure

The electrical circuit of the scanner includes the following:

- CPU
- Image sensor circuit by the color CCD
- Imaging processor circuit by the gate array
- Control circuit composed of the CR motor driver circuit which moves the scanner head in the sub scan direction.
- Power supply circuit which produces voltage used to control and drive the scanner.

Note that the inverter circuit for the light source is included in the electrical circuit. However, since it is the whole unit, no detailed information on the circuit is provided in this section.

2.2.2 Control Circuit Operations

2.2.2.1 Image Sensor Circuit

The color CCD has 3 CCDs, and each of them is equipped with a filter which corresponds to one of 3 primary colors (R, G, and B). Since the light from the lamp (light source) is white light, color image data is separated into red, green, and blue through the RGB filters on the Color CCD. Once the light is separated, the separated lights are converted into the electrical signals RED, GREEN, and BLUE. The signals are then converted into the 10-bit digital signals and are finally input to the gate array E02A26.

2.2.2.2 Image Processor Circuit

Under CPU's control, the gate array processes image data , using the following functions:

- Shading correction
- Line correction
- Zoom/Reduction
- Bi/Quad formatting
- TET (Text Enhancement Technology)
- AAS (Auto Area Segmentation)
- Gamma correction
- Color correction
- Smoothing

Image data manipulated in the gate array is transferred to the host computer through the interface circuit.
The CPU manages the following as well as image processing at the gate array:

- Controls the LED.
- Receives the signals from the HP sensor.
- Controls the interface and the carriage motor.

2.2.2.3 CR Motor Driver Circuit

The CR motor driver IC (M546670P) drives the stepping motor controlled by the constant-current control system based on the current set signals and the phase data signals from the CPU.
Table 2-1 shows the major circuit elements and their corresponding functions.

Table 2-1. Major Circuit Elements and Functions

IC	Location	Function
HD6433044 (CPU)	IC12	The CPU which operates at 16MHz with a 100-pin FQA manages the following: ■ Controls the gate array. ■ Receives data from the HP sensor. ■ Controls the LED. ■ Controls the CR motor.
E02A26 (Gate array)	IC7	This gate array performs the following: ■ Outputs the CCD analog control signals. ■ Controls the reading position. ■ Monitors light amount. ■ Manages image processing (shading correction, Gamma correction, and so on). ■ Controls memory . ■ Controls data output.
ILX516X	IC12	400-dpi reduced type CCD color linear sensor
M64292FP	IC3	Manages A/D conversion
EPROM	IC5	1 M byte ■ Stores the firmware.
SRAM	IC6, IC9	256K ■ Buffer
DRAM	IC4, IC10	4M byte ■ Buffer
M6415AFP	(IC13)	■ Controls the SCSI interface (For B063MAIN-B only)
M54670P	(IC1)	■ CR motor driver

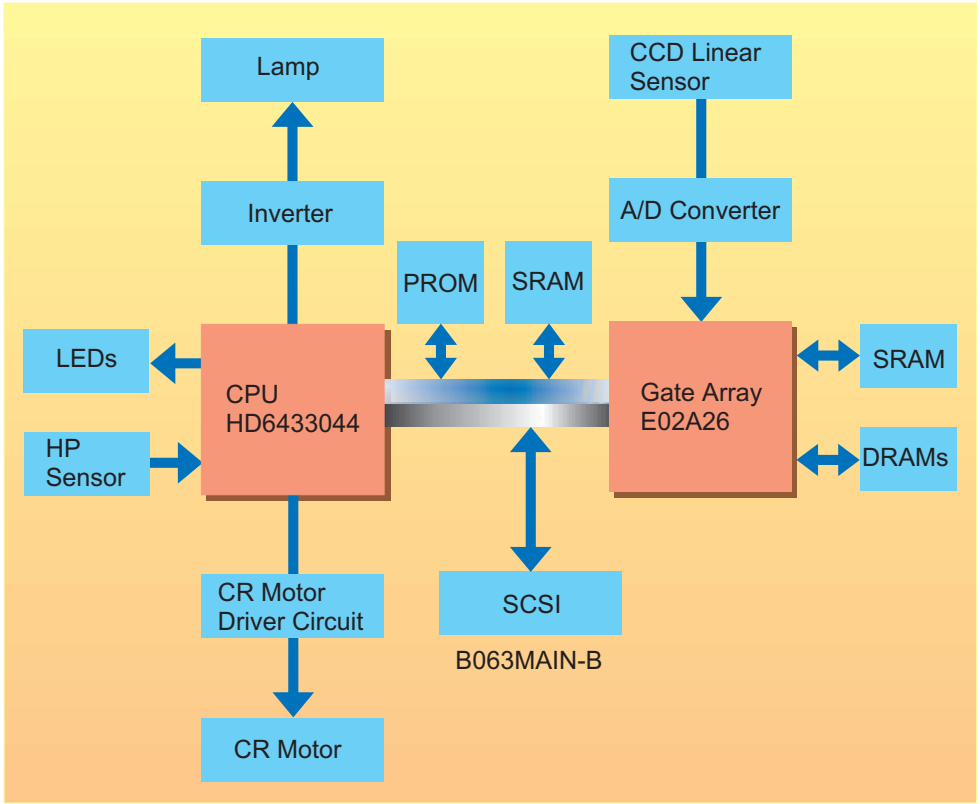


Figure 2-2. Control Circuit Block Diagram

2.2.2.4 Power Supply Circuit

A zero-cross ringing choke type switching regulator circuit is used for the power supply circuit, which makes the circuit light, compact, and efficient. Once AC voltage is input, it is smoothed through the filter circuit on the primary side, and is then produced into +24 VDC and +12 VDC on the secondary side. The +24 VDC is used to drive the CR motor and lamp through the inverter circuit. +12 VDC is stabilized by the 3-terminal regulator and sent to the image sensor circuit. +5VDC is produced out of +24 VDC through the regulator IC.
The power switch of the scanner is connected to the secondary circuit, and is turned On and Off by the switching operation of the switching FET in the primary circuit.
Over current protection circuit and the over voltage protection circuit are included in each voltage line in the secondary circuit to protect the power supply circuit.
Figure 2-3 shows the power supply circuit block diagram.

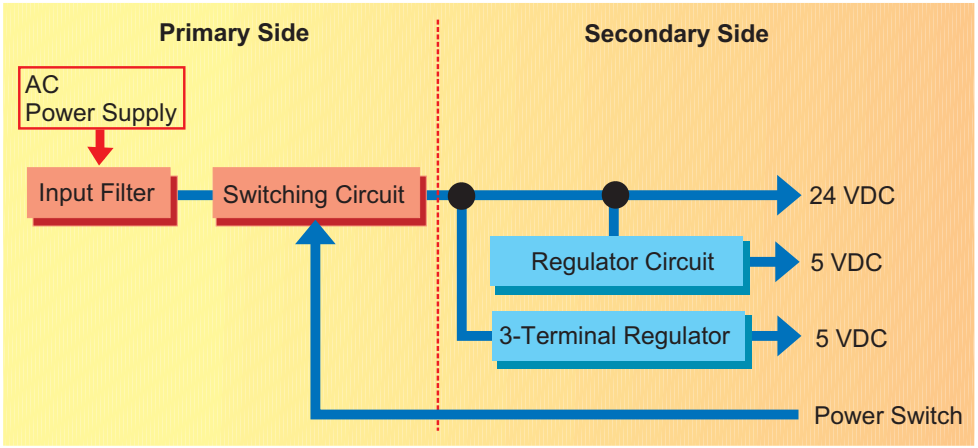


Figure 2-3. Power Supply Board Block Diagram

CHAPTER

3

TROUBLESHOOTING

3.1 OVERVIEW

This scanner is equipped with the self-diagnostic function which allows you to isolate the faulty part in the complicated mechanism of this scanner efficiently.

3.2 SELF-DIAGNOSTIC FUNCNTION

The self-diagnostic function of this scanner lets the scanner to check the condition of each component automatically. If it detects a faulty component, it indicates the status using the LED indicators. (See Section 1.2.3.)
Table 3-1 and Table 3-2 shown motor coil resistance and HP sensor check point, respectively. They also facilitate checking the scanner conditions to the part level.

Table 3-1. Coil Resistance for the CR Motor Assembly

	Coil Resistance
CR motor assembly	15.0 ± 10% (at 25° C)

Table 3-2. HP Sensor Check Point

Sensor	Check Pin	Signal Level	Status
HP sensor	CN6, Pin 1	HIGH (5V)	At the home position
		LOW (GND level)	Off the home position

3.3 TROUBLESHOOTING

This section describes troubleshooting in the following 3 different phases;

- ❑ Troubleshooting for abnormal phenomenon
- ❑ Troubleshooting for abnormal operation of the PSB/PSE board
- ❑ Troubleshooting for abnormal operation of the main control board

3.3.1 Troubleshooting for Abnormal Phenomenon

You can isolate the faulty unit based on the abnormal phenomenon as well as the LED error indication. See Table 3-3 to find the closest phenomenon and the corresponding table to refer to.

Table 3-3. Abnormal Phenomenon and Corresponding Table

Phenomenon	Description	Ref. Table
Scanner power is On but the scanner does not operate.	☐ "OPERATE" LED on the control panel does not come on.	Table 3-4
	☐ The scanner is not initialized.	Table 3-5
"Fatal Error" has occurred and is not cleared after turning off and back on the scanner.	☐ CR unit does not move.	Table 3-6
	☐ CR unit crashes into the front or rear frame and then the error is indicated.	Table 3-7
	☐ The lamp does not light up.	Table 3-8
	☐ The lamp lights up but the error is indicated.	Table 3-9
Scanned image is unclear.	–	Table 3-10
"Interface Error" is indicated.	☐ SCSI interface error	Table 3-11

Table 3-4. "OPERATE" LED Does Not Come On

Step & Cause	Step	Check Point	Finding & Solution
CN1 on the PSB/PSE board is disconnected.	1	Is CN1 on the PSB/PSE board disconnected?	Yes: Connect CN1 properly.
CN2 on the PSB/PSE board is disconnected.	2	Is CN2 on the PSB/PSE board disconnected?	Yes: Connect CN2 properly.
Fuse on the PSB/PSE board has blown out.	3	Has the fuse on the PSB/PSE board blown out? (CR motor coil or lamp may be shorted.)	Yes: Remove the cause of the short and replace the fuse.
PSB/PSE board is defective.	4	With the scanner power on, check the voltage level output between 9/10 (+) and Pin 7/8 (-) for CN2 on the PSB/PSE board. Is the voltage +24 V?	No: Replace the PSB/PSE board.
Connector for the LED board is disconnected.	5	Is CN 7 on the main board disconnected?	Yes: Connect the CN7 on the main board properly.
	6	–	No: Replace the LED board.
Main board is defective.	7	–	– Replace the main board.

Table 3-5. Scanner Is Not Initialized

Step & Cause	Check Point	Finding & Solution
Main board is defective.	–	Replace the main board.

Table 3-6. CR Does Not Move

Step & Cause	Check Point	Finding & Solution
[Step 1] PSB/PSE board is defective.	With the scanner power on, check the output voltage level between the Pin 9/10 (+) and Pin 7/8 (-) for CN2 on the PSB/PSE board. Is it +24 V?	No : Replace the PSB/PSE board.
[Step 2] CR unit is defective.	With the scanner power off, slide the CR unit manually to see if it moves smoothly. If not, check the CR unit, right and left guide rails and the middle rail. Is anything interfering the CR movement?.	Yes: Remove the cause of the problem.
[Step 3] CR motor is defective.	☐ Disconnect CN1 on the main board, then, using the tester, check the coil resistance between Pin 2 and Pin 4 and between Pin 1 and Pin 3. (See Table 3-1.) Is the resistance correct? ☐ If any motor coil is shorted, check the CR motor driver circuit on the main board in the order below: 1. Set the tester to Ohms. 2. Place the (-) lead of the tester on any of Pins 1, 2, 3 or 4 for CN1 on the main board. 3. Place the (+) lead of the tester on. Pin 2 (GND) for CN4 on the main board. With the scanner power off, does the meter show "∞"?	No: Replace the CR motor. Yes: Replace the CR motor and the main board.
[Step 4] Main board is defective.	–	Replace the main board.

Table 3-7.
CR Unit Crashes into the Front / Rear Frame and then the Error is Indicated.

Step & Cause	Check Point	Finding & Solution
HP sensor is defective.	–	Replace the HP sensor.

Table 3-8. Lamp Does Not Light.

Step & Cause	Check Point	Finding & Solution
[Step 1] CN3 on the main board is disconnected.	Is CN3 on the main board disconnected?	Yes: Connect CN3 properly.
[Step 2] The connector on the inverter board in the CR unit is disconnected.	Is the connector on the inverter board in the CR unit disconnected?	Yes: Replace the CR assembly.
[Step 3] The lamp is defective.	Replace the lamp. Does it light?	Yes: –
[Step 4] The inverter board in the CR unit is defective.	Replace the inverter board. Does it operate normally?	Yes: –
[Step 5] Main board is defective.	–	Replace the main board.

Table 3-9. Lamp Lights but an Error is Indicated.

Step & Cause	Check Point	Finding & Solution
[Step 1] CN2 on the main board is disconnected.	Is CN2 on the main board disconnected?	Yes: Connect CN2 properly.
[Step 2] The connector on the CCD board in the CR unit is disconnected.	Is the connector on the CCD board in the CR unit disconnected?	Yes: Replace the CR assembly.
[Step 3] PSB/PSE board is defective.	With the scanner power on, check the output voltage between the Pin 9/10 (+) and Pin 7/8 (-) for CN2. Is it +24 V?	No : Replace the PSB/PSE board.
[Step 4] CR unit is defective.	Replace the CR unit. Does the unit operate normally?	Yes: –
[Step 5] Main board is defective.	–	Replace the main board.

Table 3-10. Scanned Image is Unclear.

Step & Cause	Check Point	Finding & Solution
[Step 1] Dust or stain on the document table glass	Clean the both surfaces of the glass. Is the image scanned clearly?	Yes: –
[Step 2] CR unit is defective.	Replace the CR unit. Is the image scanned clearly?	Yes: –
[Step 3] Main board is defective.	–	Replace the main board.

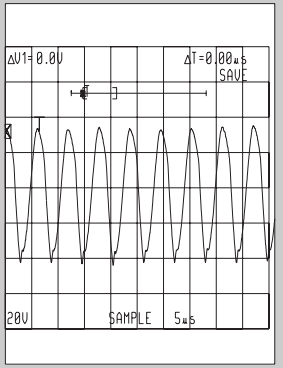
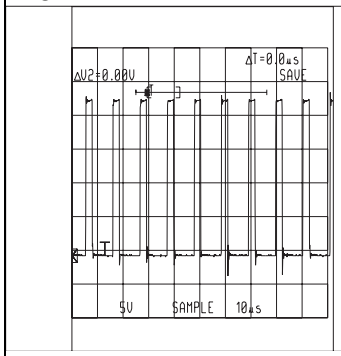
Table 3-11. SCSI Interface Error

Step & Cause	Check Point	Finding & Solution
[Step 1] Terminator switch is set incorrectly.	Check the user's guide for the correct setting . Is the setting correct?	No: Set the terminator switch correctly.
[Step 2] SCSI ID switch is set incorrectly.	Check the user's guide for the correct ID . Is the setting correct?	No: Set the ID correctly.
[Step 3] SCSI interface cable is defective.	Replace the interface cable. Is the operation normal?	Yes: –
[Step 4] Main board is defective.	–	Replace the main board.

3.3.2 Repair of the PSB/PSE Board

This section describes how to troubleshoot the abnormal operations of the PSB/PSE board. Refer to **Table 3-12** which shows the abnormal operations and corresponding causes, check points and solutions. When checking, refer to the sample waveforms and correct resistance values, and perform any necessary operation.

Table 3-12. Repair of the PSB/PSE Board

Cause	Check Point	Solution
☐ Condition: +24 VDC is not output.		
Switching FET is defective.	Check the switching FET for the correct waveform output from the gate terminal.  Waveform 1	Replace the PSB/PSE board.
☐ Condition: +5 VDC is not output.		
Chopper IC51 is defective.	Check the IC51 for the correct waveform output from Pin 7.  Waveform 2	Replace the PSB/PSE board.
☐ Condition: +12 VDC is not output.		
Regulator IC52 is defective.	–	Replace the PSB/PSE board.

3.3.3 Repair of the Main Control Board

This section describes how to troubleshoot the abnormal operations of the main control board. Table 3-13 shows 4 different types of phenomenon and corresponding conditions and the tables to refer to.

Table 3-13. Repair of the Main Control Board

Phenomenon	Condition	Ref. Table
The scanner does not operate at all.	☐ CPU does not operate at all.	Table 3-14 Table 3-15
"Fatal Error" is indicated.	☐ CR motor does not operate at all. ☐ CR does not stop at the home position. ☐ The lamp does not light. ☐ White standard is not read.	Table 3-16 Table 3-16 Table 3-16 Table 3-17
Image is not scanned clearly.	–	Table 3-18
"Interface Error" is indicated.	☐ SCSI interface circuit is defective.	Table 3-19

See the corresponding table and follow the instruction. When checking, refer to the correct waveforms and resistance values provided and take any necessary actions..

Table 3-14.
Phenomenon: The Scanner Does Not Operate At All.

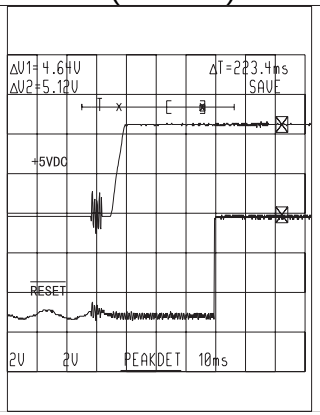
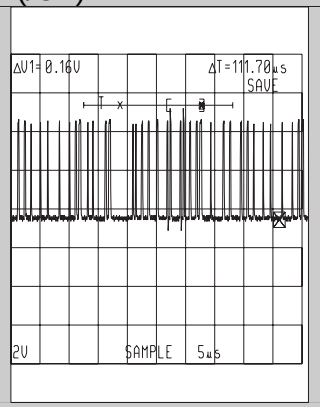
Cause	Check Point	Solution
☐ **Condition: CPU (IC12) does not operate at all.**		
Reset circuit is defective.	Check +5 VDC and IC8 for the correct waveform output from Pin7 (/RESET).  Waveform 3	Replace the main control board.
Correct ROM is not selected.	Check IC5 for the correct waveform output from Pin 22 (/CE).  Waveform 4	Replace the main control board.

Table 3-15.
Phenomenon: The Scanner Does Not Operate At All. (continued)

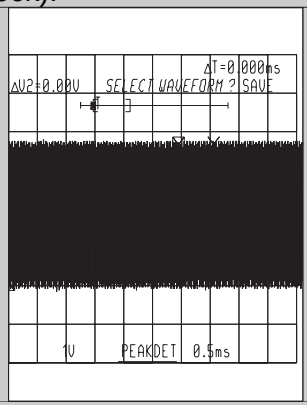
Cause	Check Point	Solution
☐ **Condition: CPU (IC12) does not operate at all. (continued)**		
RAM is defective.	–	Replace the main control board.
CPU is defective.	Check IC12 for the correct clock waveform output from Pin 66 or Pin 67 (CPU clock).  Waveform 5	Replace the main control board.

Table 3-16.
Phenomenon: "Fatal Error" is Indicated.

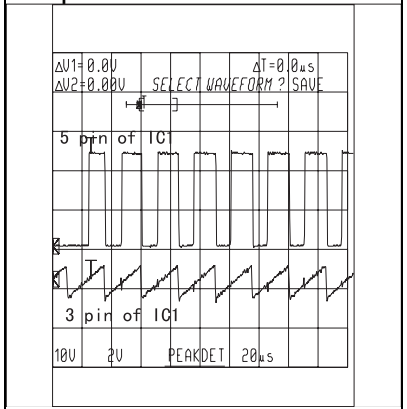
Cause	Check Point	Solution
☐ **Condition 1:**	**CR does not operate at all.**	
Motor driver IC1 is defective.	Check IC1 for the waveform output from Pin 3 and Pin 5.  Waveform 6	Replace the main control board.
☐ **Condition 2:**	**CR does not stop at the home position.**	
CPU (IC12) is defective.	When the CR enters the home position, check the connector CN6 for the change in signal output from Pin 1. Does it change from Low to High?	If so, replace the main control board.
☐ **Condition 3:**	**The lamp does not light.**	
Transistor Q1 is defective.	Is the signal input to the base of the transistor?	If not, Replace the main control board.
CPU (IC12) is defective.	Check IC12 for the signal output from Pin 3. Does it switch between High and Low?	If not, Replace the main control board.

Table 3-17.
Phenomenon: : "Fatal Error" is Indicated. (continued)

Cause	Check Point	Solution
☐ **Condition 4:**	**White standard can not be read.**	
Transistors Q2, Q3 and Q4 are defective.	Is the signal input to the base of the transistor?	If not, replace the main control board.
IC3 is defective.	Is the signal input to the Pins 1, 3 and 5 of IC3?	If not, Replace the main control board.
Imaging process gate array is defective.	–	Replace the main control board.

Table 3-18.
Phenomenon: Image is not Scanned Clearly.

Cause	Check Point	Solution
☐ **Condition: –**		
Imaging process gate array or CPU is defective.	–	Replace the main control board.

Table 3-19.
Phenomenon: "Interface Error" is Indicated.

Cause	Check Point	Solution
☐ **Condition: Bi-directional interface circuit is defective.**		
IC13 is defective.	–	Replace the main control board.

CHAPTER

4

DISASSEMBLY AND ASSEMBLY

4.1 OVERVIEW

This chapter describes procedures for disassembling GT-5500 and precaution to take during transportation.

4.1.1 Precaution

Be sure to read the following precaution prior to disassembling or assembling the scanner.

⚠WARNING

Before servicing, make sure that the power cable is disconnected from the AC power socket and the interface cable is removed. Be aware that voltage is still applied to the primary circuit on the power supply board after the scanner power is turned off by power switch operation.

⚠CAUTION

- ***Before disassembling the scanner or checking operation, remove the transportation screw located at the back of the scanner. (See Figure 4-1.) Transportation screw is used to fix the carriage assembly during transporting the scanner.***
- ***After disassembling, assembling or adjusting the scanner, perform any necessary maintenance including cleaning to keep the scanner in optimum condition.***
- ***Tighten the transportation screw to fix the CR assembly before returning the scanner to the customer.***
- ***Never disassemble the CR assembly since it may cause the optical axis to be dislocated. Therefore, the screw securing the CR cover to the CR assembly also must not be removed.***

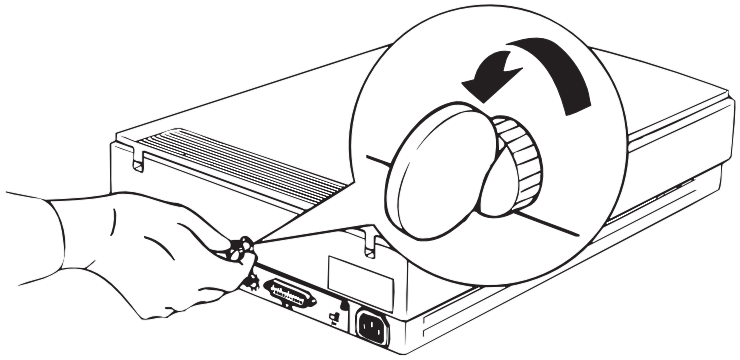


Figure 4-1. Transportation Screw Removal

4.1.2 Tools

When disassembling and assembling the scanner, use the specified tools listed in Table 4-1.

Table 4-1. Tool List

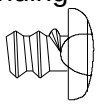
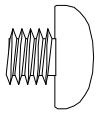
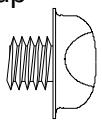
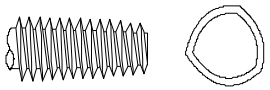
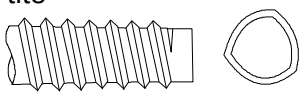
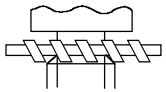
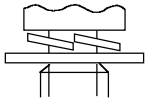
Tool Names	Part No.
Phillips screw driver No. 1	B743800200
Phillips screw driver No. 2	B743800100
Tweezers	B641000100
Round-nose pliers	B740400100
Standard screw driver	B743000100

4.1.3 Small Parts

In this manual, abbreviations are used for small parts, such as screws and washers.

Table 4-2. Abbreviations for Small Parts

Abbreviation	Part Name
CP	Cross-recessed Pan head screw
CB	Cross-recessed Binding head screw
CBS	Cross-recessed Binding head S-tite screw
CBP	Cross-recessed Binding head P-tite screw
CBB	Cross-recessed Binding head B-tite screw
CSB	Cross-recessed Cup head B-tite screw
CPS(O)	Cross-recessed Pan head S-tite screw with Outside toothed lock washer
CPS(SP)	Cross-recessed Pan head S-tite screw with Spring washer and Plain washer

Head		Body	Washer
Top	Side		
Cross-recessed 	Binding  Pan  Cup 	Normal – S-tite  B-tite  P-tite 	Sems B  With spring washer 

4.1.4 Service Shipping Check List

Before returning the scanner to the customer, use the check list below to ensure that the repaired scanner is ready for return. All items in the list must be checked without fail to ensure that service has been properly done.

Table 4-3. Service Shipping Check List

Category	Item to check	Check
Operation ■ CR assembly (scanner head)	Does the lamp (light source) light normally?	☐ Checked ☐ Not necessary
■ CR mechanism	Does the CR move smoothly?	☐ Checked ☐ Not necessary
■ Image feeding	Is image feed performed normally by the utility software?	☐ Checked ☐ Not necessary
Function enhancement	The ROM version is_____ .	☐ Checked ☐ Not necessary
Cleaning	Is the document glass in the upper housing assembly clean?	☐ Checked ☐ Not necessary
	Is the inside of the scanner free from dust?	☐ Checked ☐ Not necessary
	Is the outer cases of the scanner clean?	☐ Checked ☐ Not necessary
Shipping condition	Is the transportation screw tightened to fix the CR assembly?	☐ Checked ☐ Not necessary
	Is the document cover attached?	☐ Checked ☐ Not necessary
Separate items	■ Power cable ■ Interface cable	☐ Checked ☐ Not necessary

4.2 DISASSEMBLY AND ASSSEMBLY

⚠WARNING

Before servicing, make sure that the power cable is disconnected from the AC power socket and the interface cable is removed. Be aware that voltage is still applied to the primary circuit on the power supply board after the scanner power is turned off by the power switch operation.

⚠CAUTION

- ***Before disassembling the scanner or checking operation, remove the transportation screw at the back of the scanner. (See Figure 4-1.) Transportation screw is used to fix the carriage assembly during transporting the scanner.***
- ***After disassembling, assembling or adjusting the scanner, perform any necessary maintenance including cleaning to keep the scanner in optimum condition.***
- ***Never disassemble the CR assembly since it may cause the optical axis to be dislocated. Therefore, the screw securing the CR cover to the CR assembly also must not be removed.***

This section describes procedures for disassembling the scanner. Unless specified, no assembling procedures is provided, since it can be performed by reversing the disassembly procedures. The disassembling procedures given in this manual only refer to the main units which have greater relation to scanner function and some units and parts to be serviced for maintenance. Therefore, refer to exploded diagrams provided in Appendix for further information on units and parts.

See the flowchart in the right column which shows disassembling procedure of the scanner.

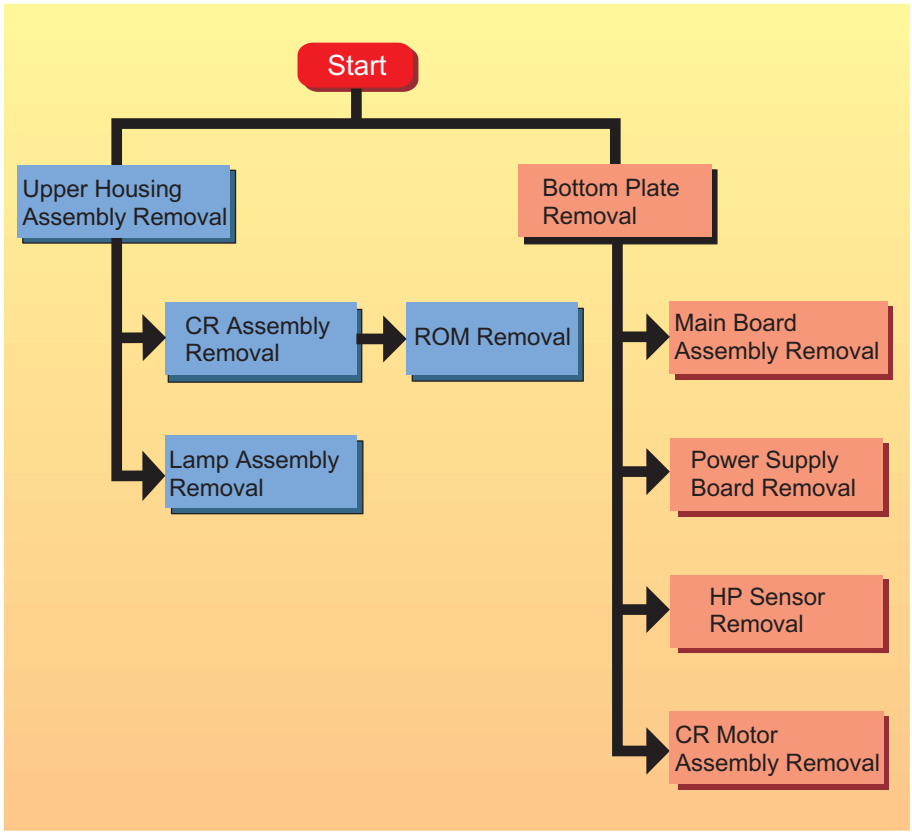


Figure 4-2. Disassembling Flowchart

4.2.1 Upper Housing Assembly Removal

1. Remove the document cover.
2. Remove 2 CBS screws (M3x8) and 2 CBP screws (3x12) securing the upper housing assembly to the lower housing assembly.
3. Remove the upper housing assembly along with the harness for the panel LED.
4. Remove the LED board from the reverse side of the upper housing assembly.

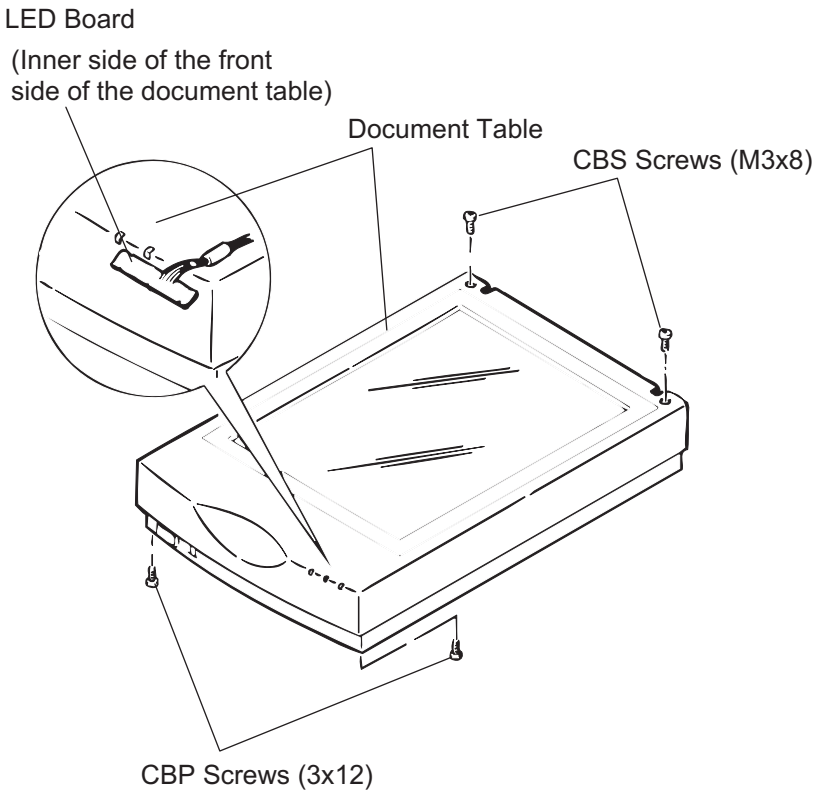


Figure 4-3. Upper Housing Assembly Removal

4.2.2 CR Assembly Removal

1. Remove the document cover and the upper housing assembly. (See Section 4.2.1.)
2. Disconnect the FFCs for the CR assembly from the connectors CN2 and CN3 on the MAIN-B board.
3. Remove the FFCs along with the ferrite core.
4. Remove the FFCs from the ferrite core.
5. Remove the extension spring (940).
6. Remove 1 CPS(SP) screw (M3x6) securing the driven pulley holder to the middle rail assembly, and remove the holder.
7. Remove the timing belt from the drive pulley.
8. Slide the CR assembly to the middle of the scanning area and remove it from the indented areas of the side frames.

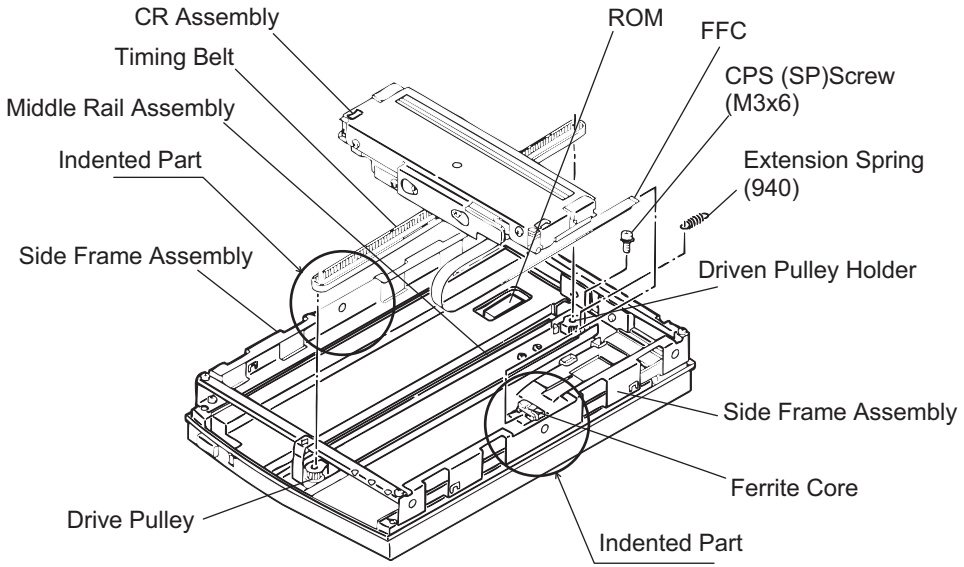


Figure 4-4. CR Assembly Removal

4.2.3 ROM Removal

1. Remove the document cover and the upper housing assembly. (See Section 4.2.1.)
2. Remove the ROM. (See Figure 4-4.)

4.2.4 Bottom Plate Removal

1. Remove 9 CBS screws (M3x6) and 8 CBP screws (3x12) securing the bottom plate to the lower housing assembly at the bottom of the scanner.
2. Remove the bottom plate.

⚠CAUTION ***Be sure to place the scanner turned over on a soft and clean cloth to protect the glass surface in the upper housing assembly.***

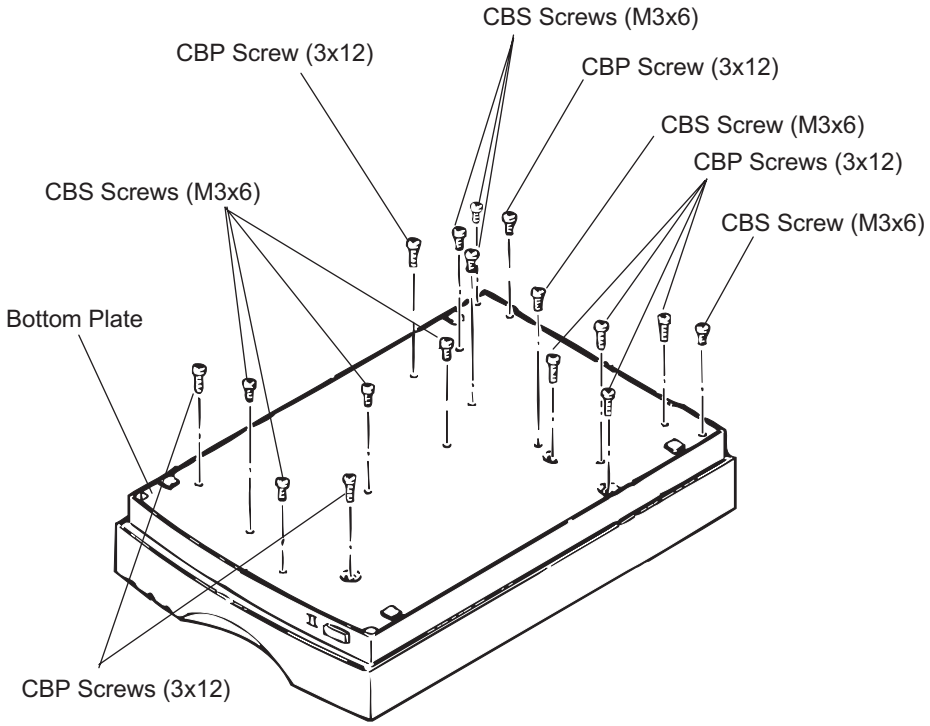


Figure 4-5. Bottom Plate Removal

4.2.5 B063MAIN-B Board Removal

1. Remove the upper housing assembly. (See Section 4.2.1.)
2. Disconnect the FFCs for the CR assembly from the connectors CN2 and CN3 on the B063MAIN-B board.
3. Remove the bottom plate. (See Section 4.2.4.)
4. Remove the harnesses from the connectors CN1, CN6 and CN7 on the B063MAIN-B board.
5. Remove the following screws securing the B063MAIN-B board to the lower housing assembly:
   - 2 CSB-tite (3x12)
   - 1 CBS (M3x8)
   - 1 CBS (M2.5x8)
   - 1 CPS(O) (M3x6)
6. Holding up the B063MAIN-B board, disconnect the connector CN4
7. Remove the B063MAIN-B board along with the I/F plate.

⚠CAUTION ***Be sure to place the scanner turned over on a soft and clean cloth to protect the glass surface in the upper housing assembly.***

✓CHECK POINT ***When connecting the harness to the CN4 on the B063MAIN-B board, align the red stripe with the Pin 1 of the connector.***

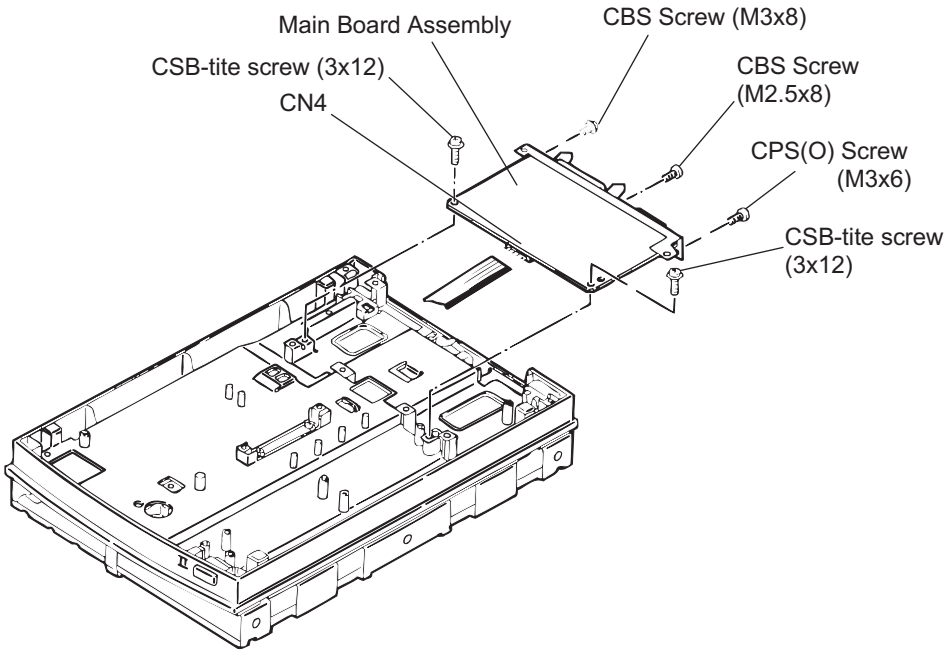


Figure 4-6. B063MAIN-B Board Removal

4.2.6 Power Supply Board Removal

1. Remove the bottom plate. (See Section 4.2.4.)
2. Remove 3 CBP screws (3x12) securing the power supply board to the lower housing assembly.
3. Disconnect the connectors CN1 and CN2, and remove the power supply board.

✓CHECK POINT

When connecting the harness to the connector CN2 on the power supply board, align the red stripe with the Pin 1 of the connector.

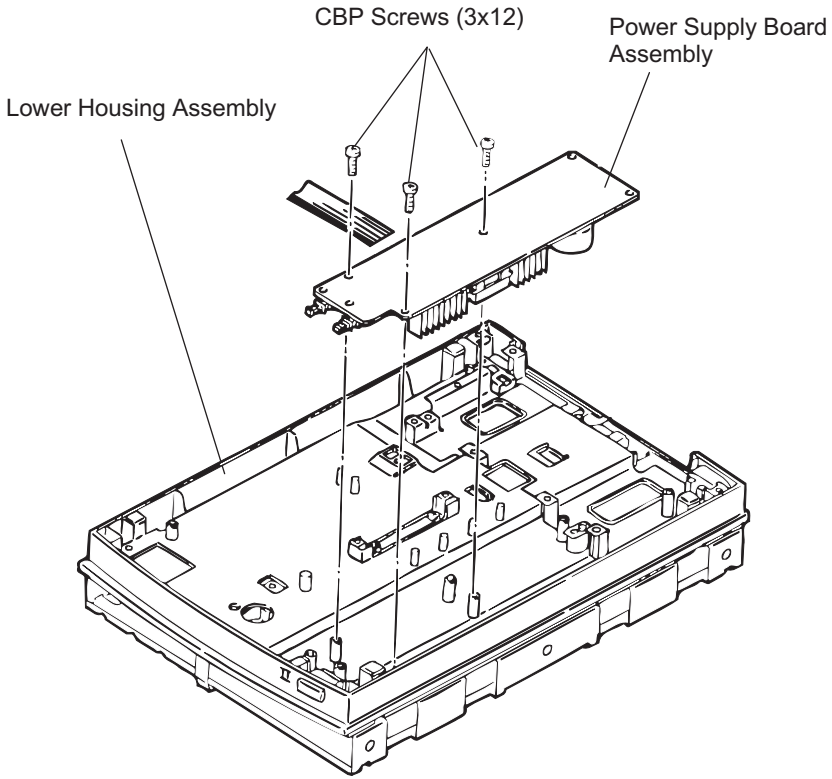


Figure 4-7. Power Supply Board Removal

4.2.7 HP Sensor Removal

1. Remove the upper housing assembly. (See Section 4.2.1.)
2. Remove the bottom plate. (See Section 4.2.4.)
3. Disconnect the harness for the HP sensor from the connector CN6 on the B063MAIN-B board.
4. Release 2 hooks fixing the HP sensor to the lower housing assembly, then remove the HP sensor along with the harness.

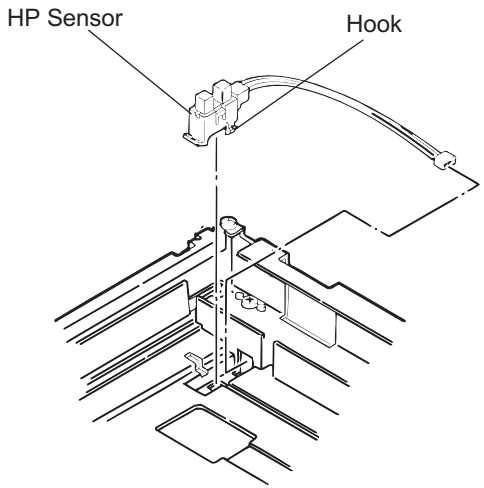


Figure 4-8. HP Sensor Removal

✓CHECK POINT

HP sensor can be remove without removing the bottom plate. It can be done by removing the upper housing assembly and then releasing the hooks securing the HP sensor to the lower housing assembly.

4.2.8 CR Motor Assembly Removal

1. Remove the upper housing assembly (See Section 4.2.1.)
2. Remove the extension spring (940). (See Section 4.2.2.)
3. Loosen 1 CPS (SP) screw (M3x6) fixing the driven pulley holder and remove the timing belt from the driven pulley.
4. Remove the bottom plate.
5. Disconnect the harness for the motor from the connector CN1 on the B063MAIN-B board.
6. Remove 1 CBP screw (3x12) and 2 CBS screws (M3x6) securing the motor frame to the lower housing assembly and the middle rail assembly.
7. Remove the CR motor assembly along with the motor frame assembly.
8. Loosen the CBS screw (M3x4) fixing the belt tension to the motor frame assembly to loosen the timing belt; B.
9. Remove the timing belt from the drive pulley of the motor.
10. Remove 2 CBS screws (M3x4) securing the motor frame assembly to the motor and remove the CR motor assembly.

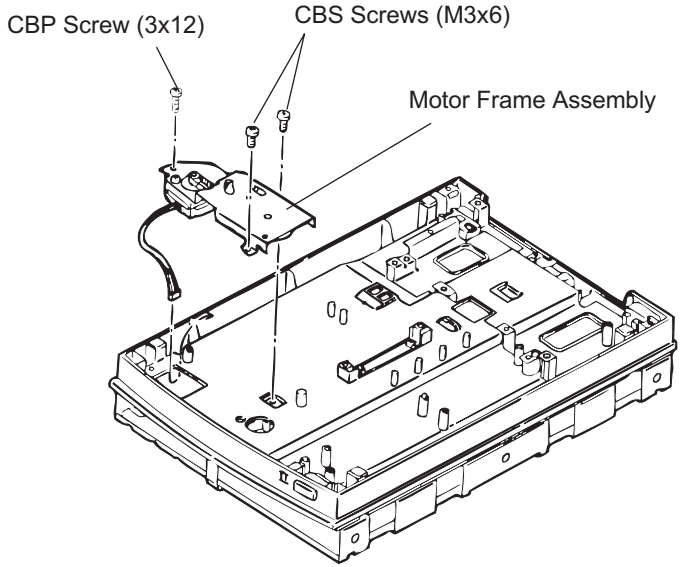


Figure 4-9. Motor Frame Assembly Removal

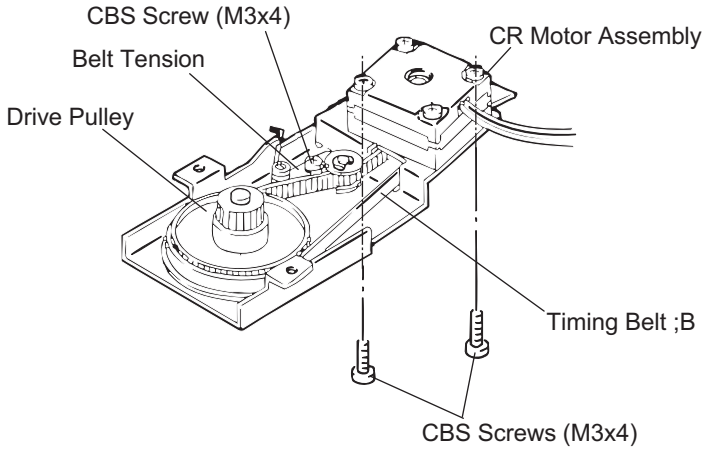


Figure 4-10. CR Motor Assembly Removal

CHAPTER

5

ADJUSTMENT

No adjustment is required for this scanner.

CHAPTER

6

MAINTENANCE

6.1 MAINTENANCE

It is required to take proper measure to keep the scanner in optimum condition over a long period and to prevent any potential trouble. Use a neutral cleaning agent to remove external dirt, and use a vacuum cleaner to remove dust and other debris. Be sure that the document cover glass is free of dirt. Dirt on the glass can reduces reading quality. If the glass is dirty, clean it with a dry, clean and soft cloth.

⚠CAUTION

Do not use thinner, trichlene, or ketones, since these may cause deterioration of plastic and rubber parts.

6.2 LUBIRICATION

Lubricate the scanner after any unit/part is disassembled or replace, or when the scanner is operating with abnormal noise. The lubricant specified for the scanner and lubricating point are listed in Table 6-1 and Table 6-2, respectively.

Table 6-1. Lubricant

Type	No.	Amount	Part No.	Availability
Grease	G-20	40g	B702000001	EPSOMN exclusive

Table 6-2. Lubricating Point

Reference	Lubricating Point	Lubricant	Amount
Figure 6-1	Middle rail assembly	G-20	Figure 6-1

⚠CAUTION

- ***Use only the specified type of lubricant to ensure good performance of the scanner.***
- ***Be sure to apply specified amount of lubricant. Applying excess amount of the lubricant may leave dirt or cause abnormal operation of the scanner.***

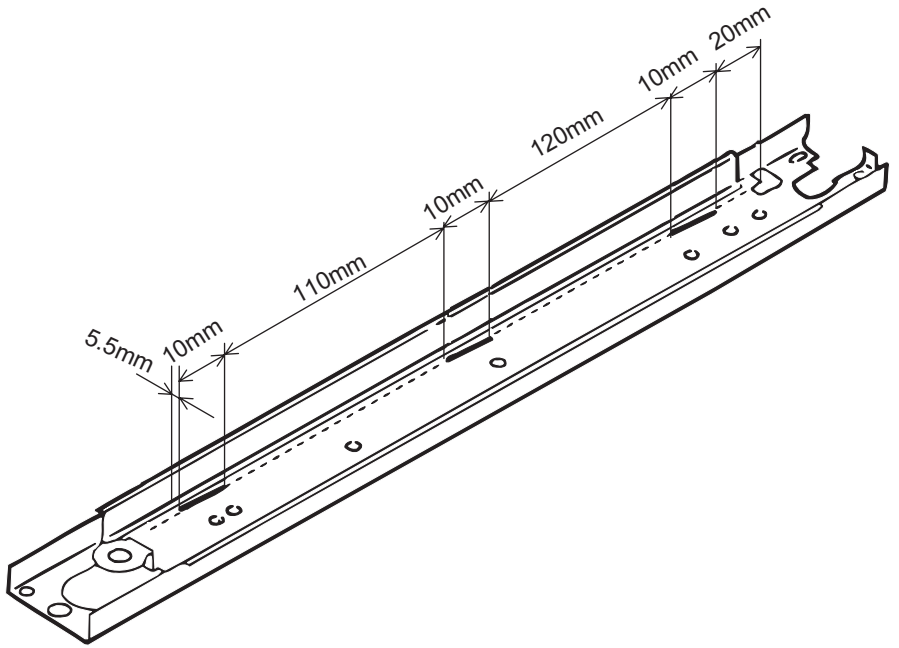


Figure 6-1. Lubricating Point

CHAPTER

7

APPENDIX

7.1 CONNECTOR PIN ASSIGNMENT

Table 7-1and Figure 7-1 show the connector summary and interconnection of the primary components, respectively.

Table 7-1. Connector Summary

Board	Connector	Description	Pins
B063MAIN-B	CN 1	Connector for CR motor	4 pins
	CN 2	Connector for CCD sensor	12 pins
	CN 3	Connector for inverter	10 pins
	CN 4	Connector for B063PSB	10 pins
	CN 6	Connector for HP sensor	3 pins
	CN 7	Connector for LED	4 pins
	CN 8	Connector for interface	50 pins
B063PSB/ B063PSE	CN 1	Connector for AC line	2 pins
	CN 2	Connector for B063MAIN-B	10 pins

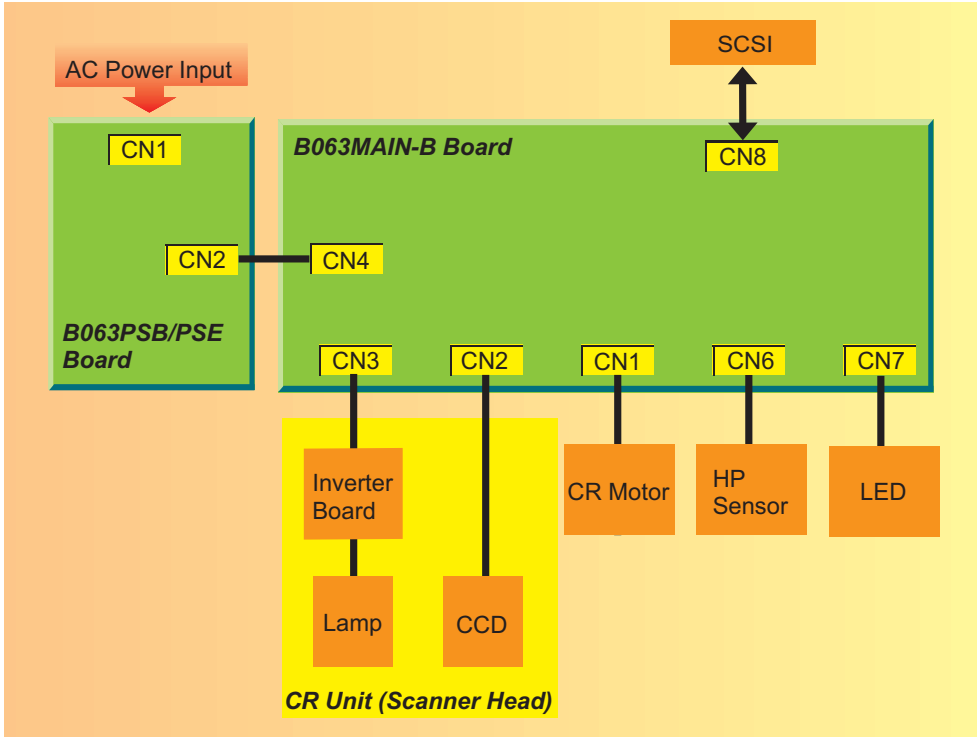


Figure 7-1. Interconnection of the Components

Table 7-2. CN1 Pin Assignment

Pin No.	Signal Name	I/O	Description
1	/B	O	CR motor /B phase
2	/A	O	CR motor /A phase
3	B	O	CR motor B phase
4	A	O	CR motor A phase

Table 7-3. CN2 Pin Assignment

Pin No.	Signal Name	I/O	Description
1	+5V	—	+5VDC
2	F1X	O	CCD control signal
3	F2X	O	CCD control signal
4	RS	O	CCD control signal
5	SH	O	CCD control signal
6	+12V	—	+12VDC
7	G	I	Image data G
8	GND	—	Ground
9	B	I	Image data B
10	GND	—	Ground
11	R	I	Image data R
12	GND	—	Ground

Table 7-4. CN3 Pin Assignment

Pin No.	Signal Name	I/O	Description
1	+24V	—	+24VDC
2	+24V	—	+24VDC
3	GND	—	Ground
4	GND	—	Ground
5	LC	O	Lamp control signal
6	GND	—	Ground
7	GND	—	Ground
8	GND	—	Ground
9	GND	—	Ground
10	GND	—	Ground

Table 7-5. CN4 Pin Assignment

Pin No.	Signal Name	I/O	Description
1	RSW	I	Reset switch signal
2	GND	—	Ground
3	GND	—	Ground
4	+12V	—	+12VDC
5	+5V	—	+5VDVC
6	+5V	—	+5VDC
7	GND	—	Ground
8	GND	—	Ground
9	+24V	—	+24VDC
10	+24V	—	+24VDC

Table 7-6. CN6 Pin Assignment

Pin No.	Signal Name	I/O	Description
1	HP	I	Carriage home position signal
2	+5V	—	+5VDC
3	GND	—	Ground

Table 7-7. CN7 Pin Assignment

Pin No.	Signal Name	I/O	Description
1	ERR	O	ERROR LED control signal
2	OP	O	OPERATE LED control signal
3	RDY	O	READY LED control signal
4	CMN	—	COMMON control signal

Table 7-8. CN8 Pin Assignment (for SCSI)

Signal Name	Pin No. (25 pin)	Pin No. (50 pin)	I/O	Description
GND	7, 9, 4, 16,18,24	1–12, 14–25, 35–37, 39,40,42	—	Ground
NC	—	13	—	—
DB0	8	26	I/O	Data Bus 0
DB1	21	27	I/O	Data Bus 1
DB2	22	28	I/O	Data Bus 2
DB3	10	29	I/O	Data Bus 3
DB4	23	30	I/O	Data Bus 4
DB5	11	31	I/O	Data Bus 5
DB6	12	32	I/O	Data Bus 6
DB7	13	30	I/O	Data Bus 7
DBP	20	34	I/O	Data Bus Parity
TERM PWR	25	38	—	Terminal Power
ATN	17	41	I	Attention
BSY	6	43	I/O	Busy Signal
ACK	5	4	I	Acknowledge signal
RST	4	45	I	Reset signal
MSG	2	46	O	Message signal
SEL	19	47	I/O	Select signal
C/D	15	48	O	Command/Code
REQ	1	49	O	Request signal
I/O	3	50	O	Input/Output signal

7.2 COMPONENT LAYOUT

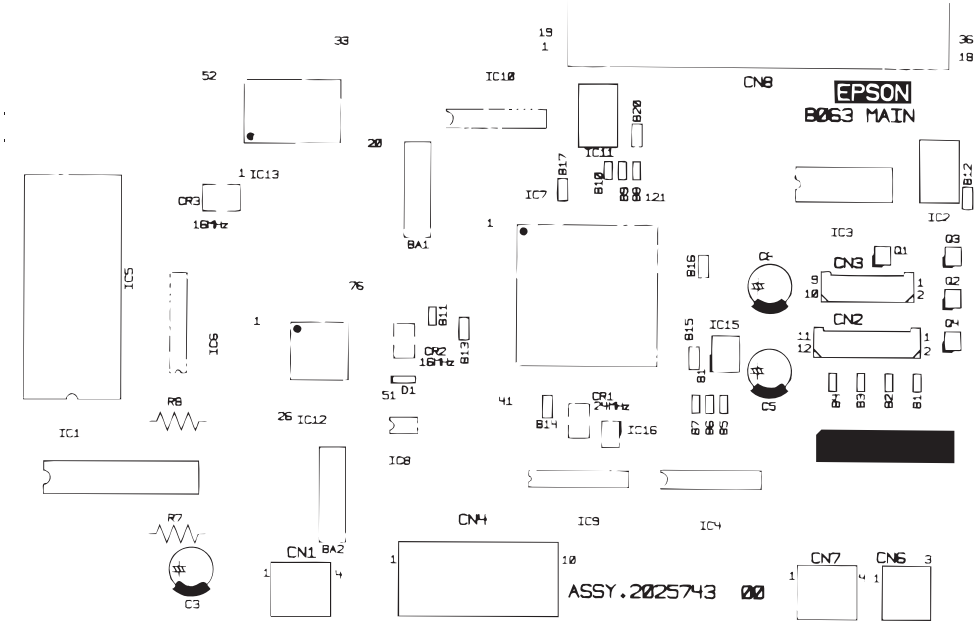


Figure 7-2. B063MAIN Board Component Layout

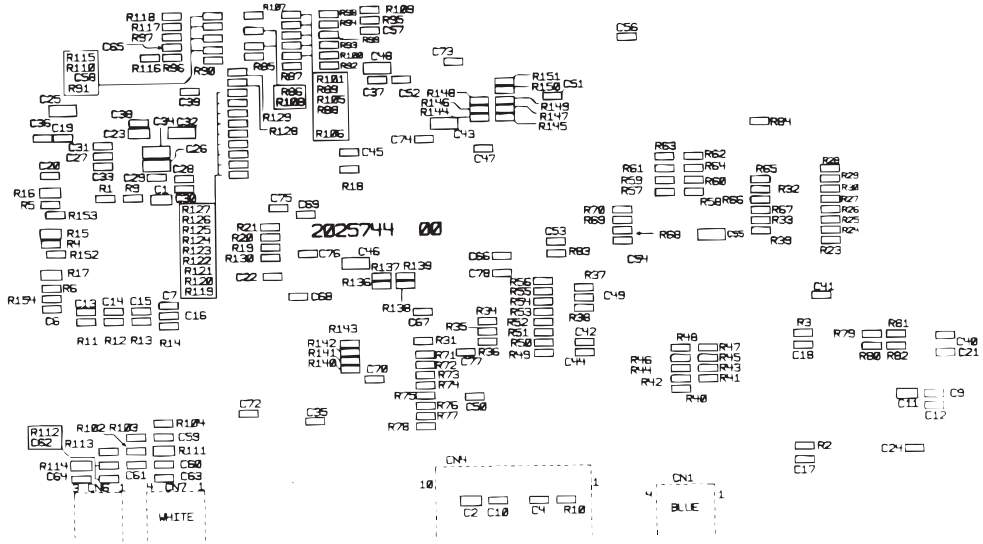


Figure 7-3. B063MAIN Board Component Layout (Soldered Side)

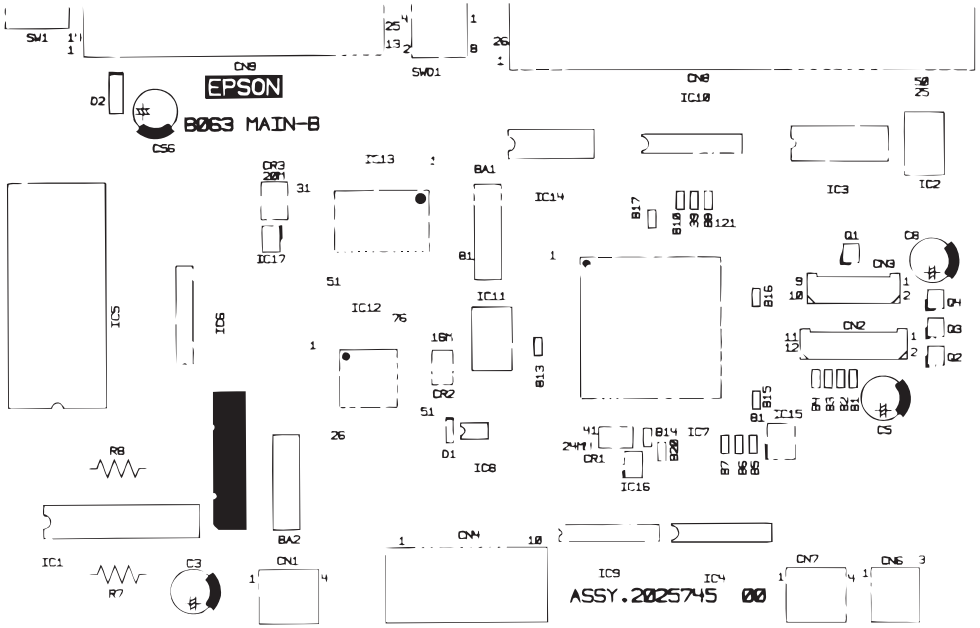


Figure 7-4. B063MAIN-B Board Component Layout

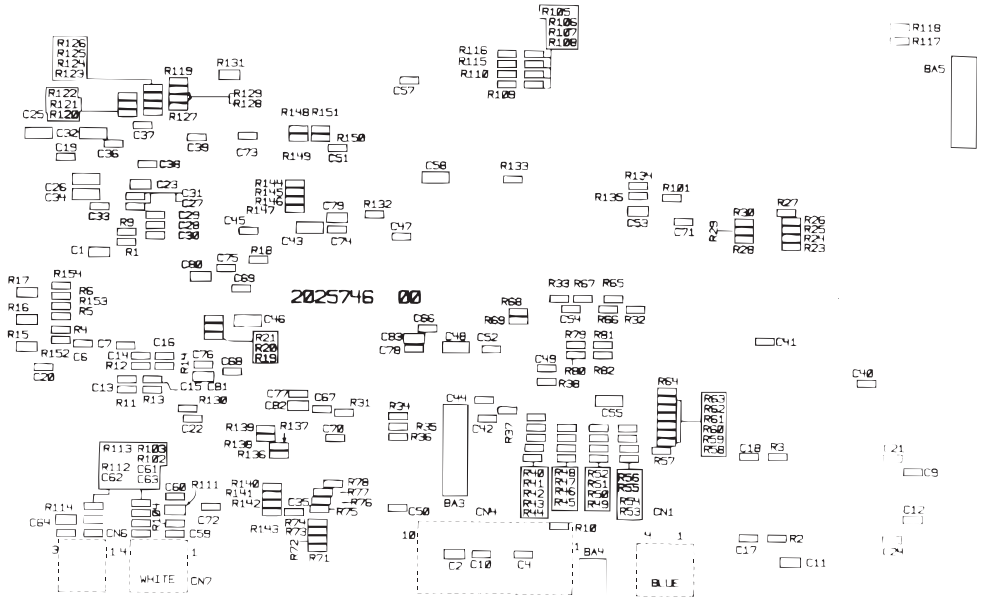


Figure 7-5. B063MAIN-B Board Component Layout (Soldered Side)

Figure 7-6. B063ISN Board Component Layout

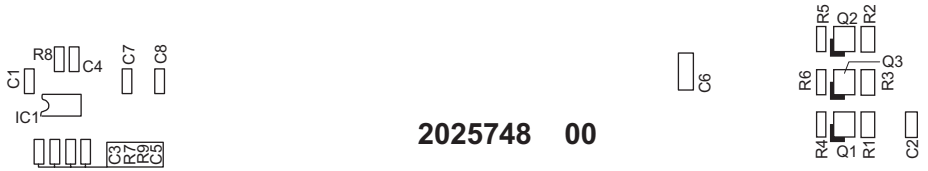


Figure 7-7. B063ISN Board Component Layout (Soldered Side)

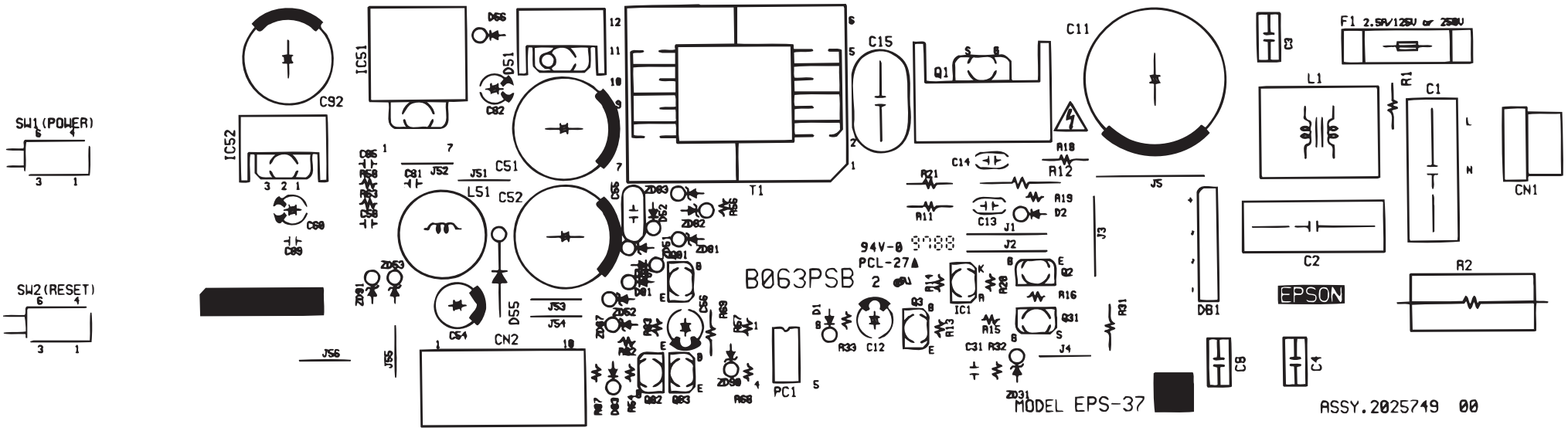


Figure 7-8. B063PSB Board Component Layout

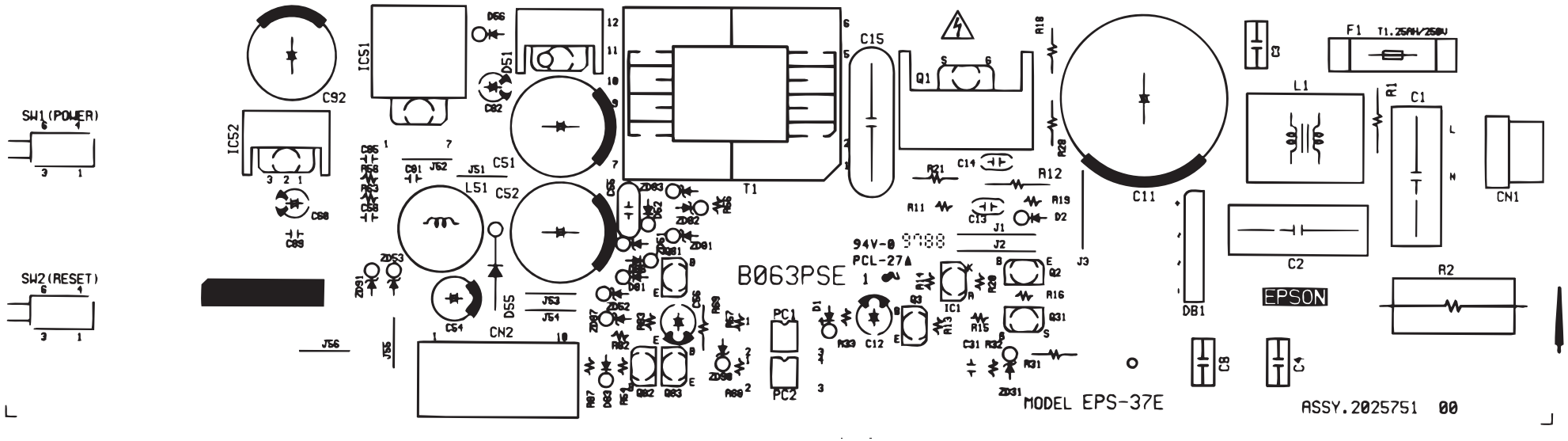
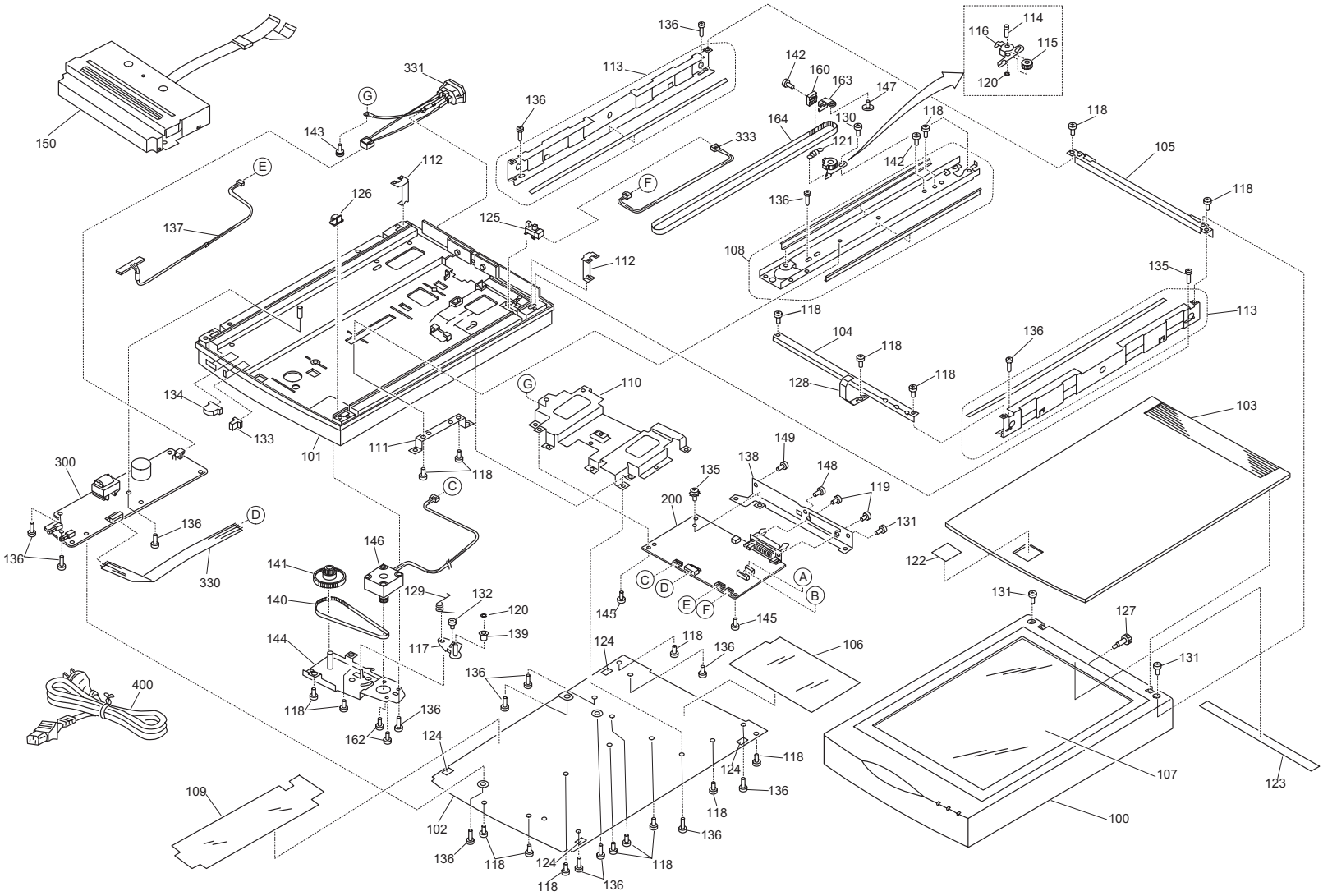


Figure 7-9. B063PSE Board Component Layout

7.3 EXPLODED DIAGRAM



EXPLODED DIAGRAM FOR GT-5500 ART/WINS/WINP (1)

Figure 7-10. Exploded Diagram

7.4 DIMENSIONS AND WEIGHT

Physical Dimensions: 297 mm (W) x 443 (D) mm x 87 mm (H)
11.6 inch (W) x 17.0 inch (D) x 3.4 inch (H)
Weight: Approximately 5 kg

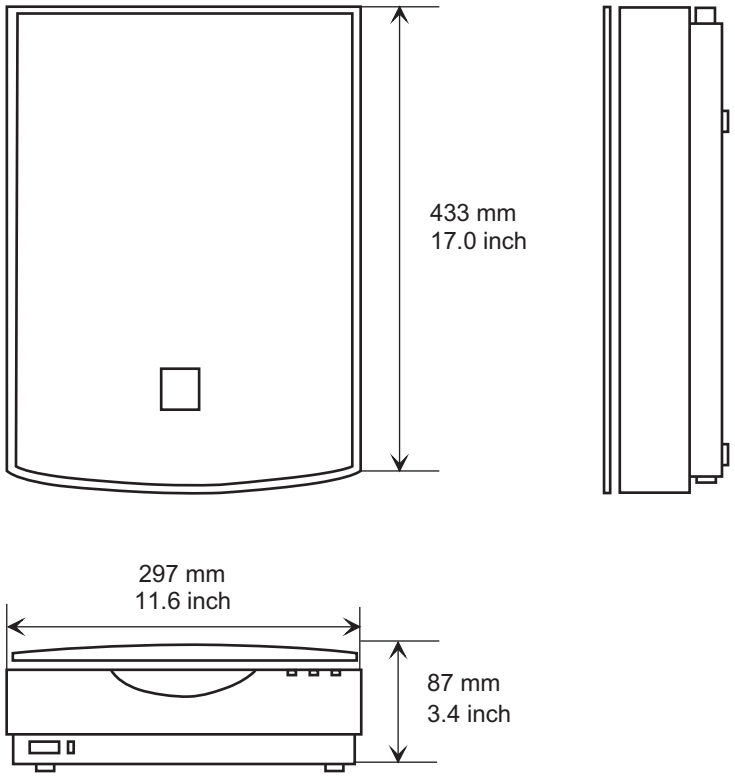
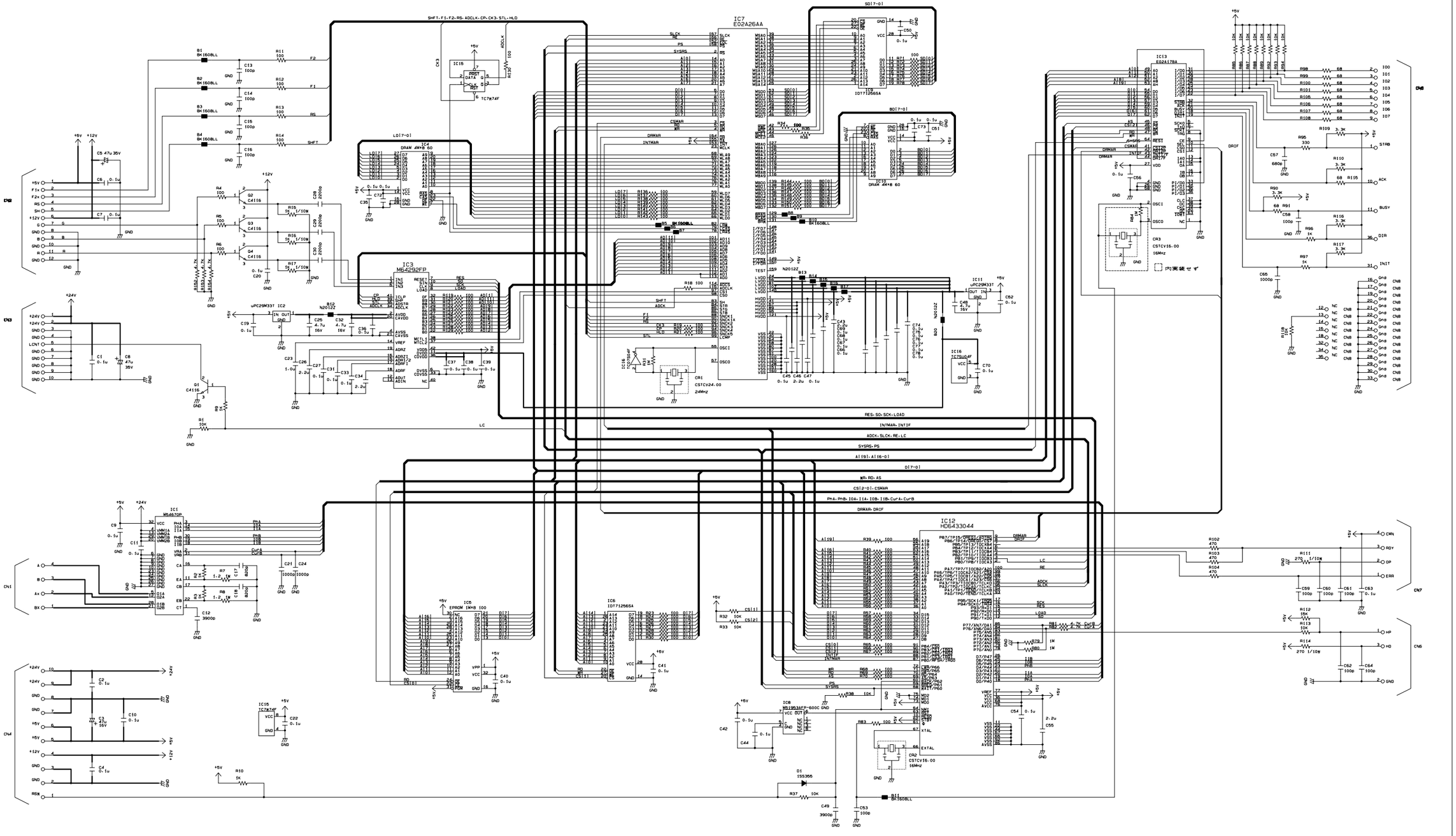


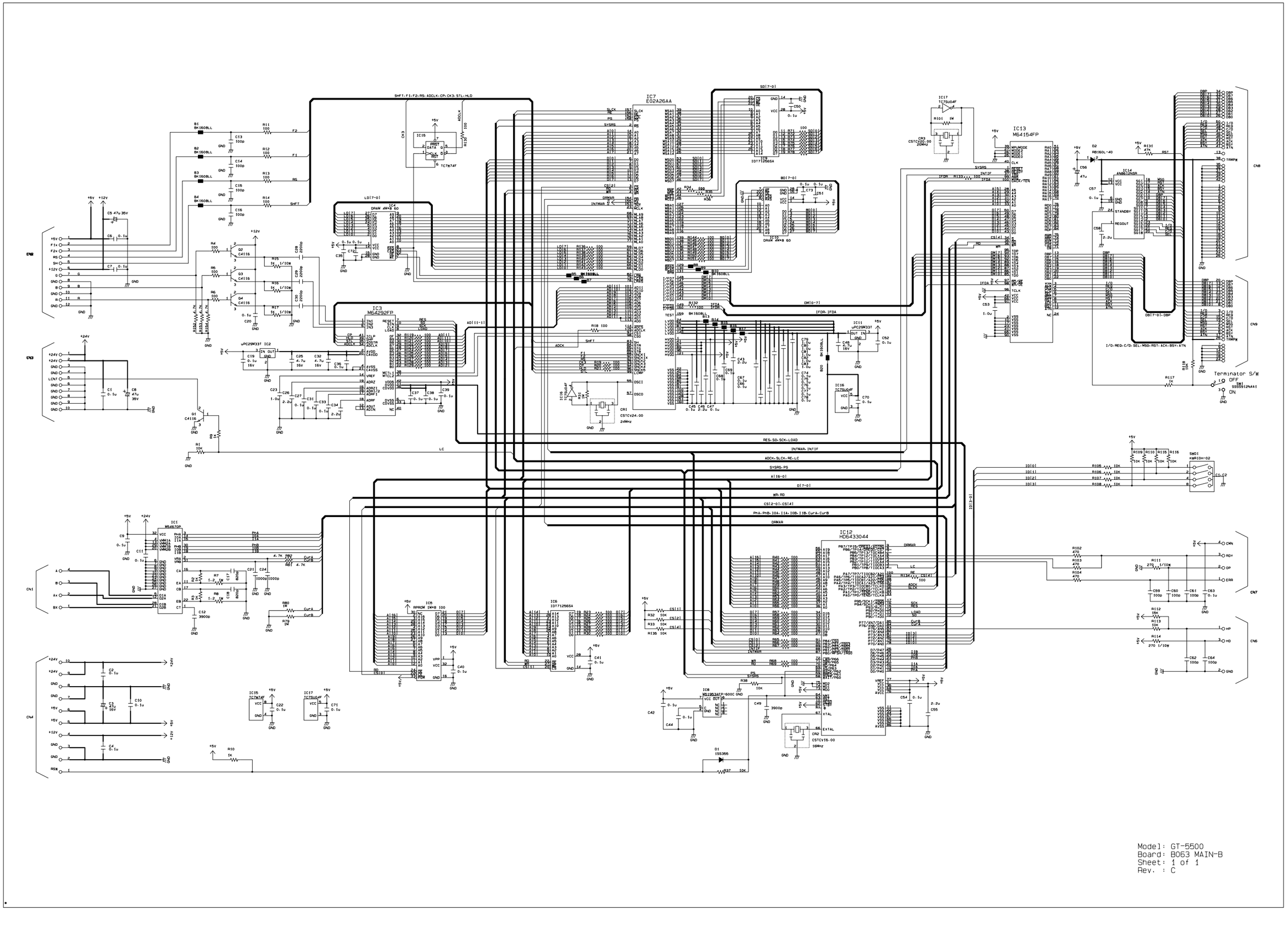
Figure 7-11. Dimensions and Weight

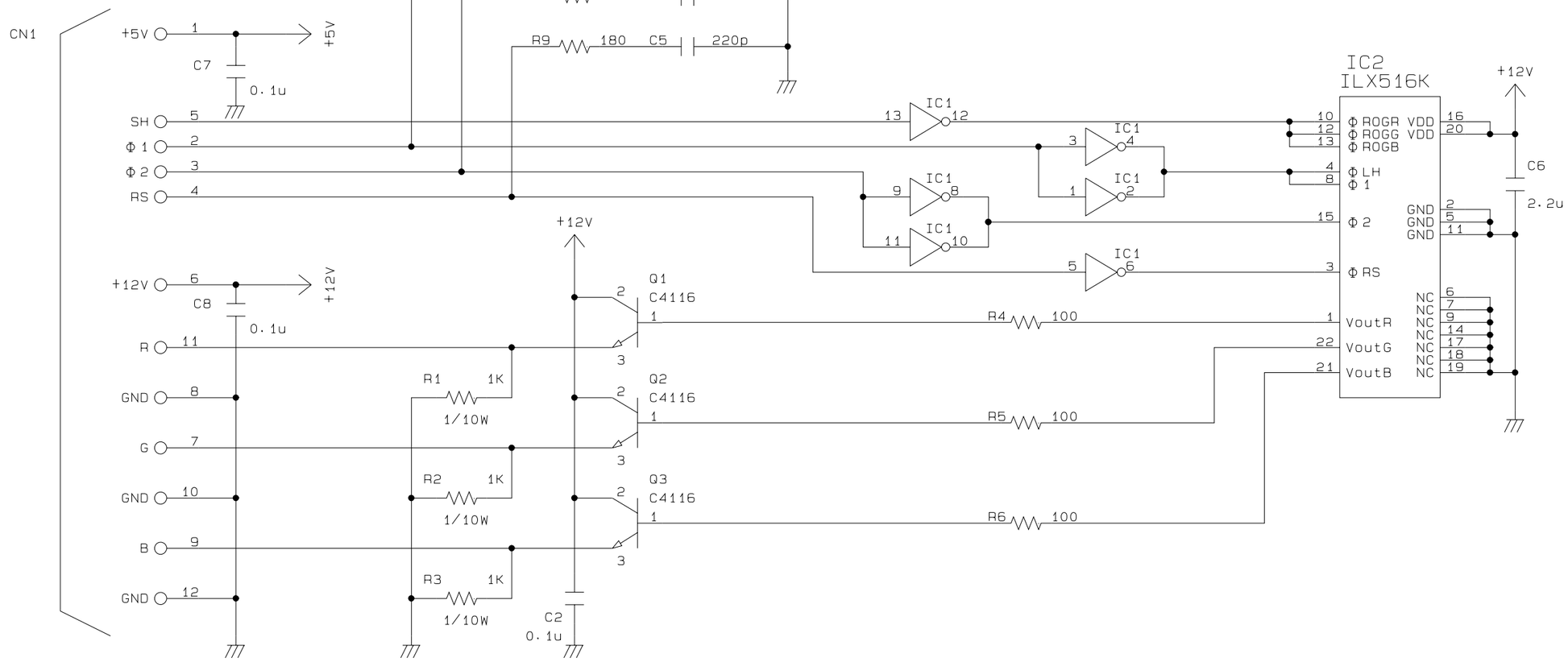
7.5 CIRCUIT DIAGRAMS

See the following pages for the circuit diagrams below:

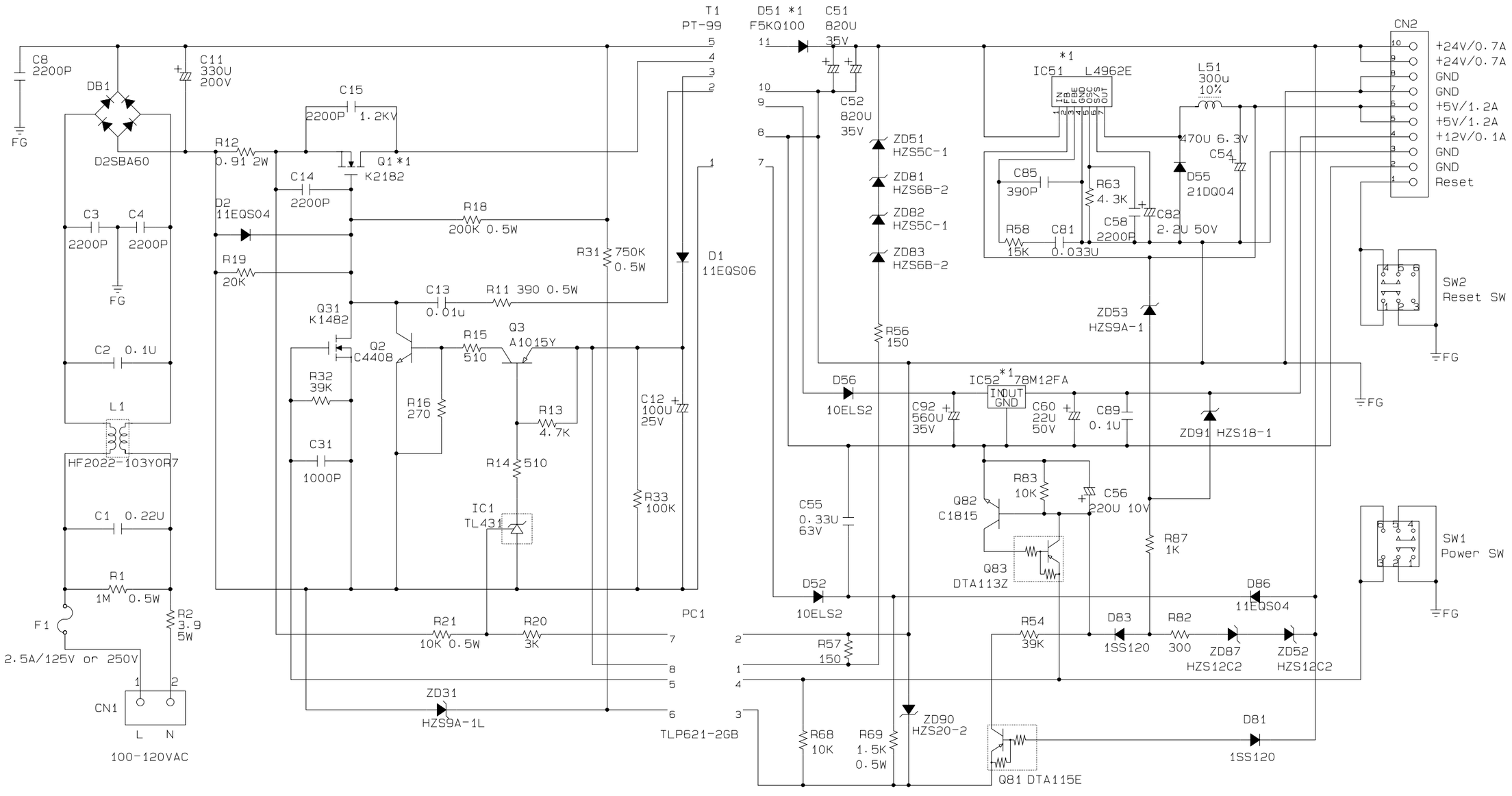
- ❑ B063MAIN Board Circuit Diagram
- ❑ B063MAIN-B Board Circuit Diagram
- ❑ B063ISN Board Circuit Diagram
- ❑ B063PSB Board Circuit Diagram
- ❑ B063PSE Board Circuit Diagram.


SHFT.F1.F2.RS.ADCLK.CP.CK3.STL.HLD
SD17-01
BD17-01
LD17-01
IC7 E02A26AA
IC9 IDT71256SA
IC4 DRAM 4MxB 60
IC3 MB4292FP
IC13 E02A17BA
IC12 HD6433044
IC1 MB4670P
IC5 EPROM 1MxB 100
IC6 IDT71256SA
IC8 MB15B34FP-600C
IC11 uPC29M33T
IC16 TC75S04F
IC15 TC7W74F
IC10 TC7S04F
uPC29M33T IC2
N20102
N20122
CR1 CSTCV24.00 24MHz
CR2 CSTCV16.00 16MHz
CR3 CSTCV16.00 16MHz
D1 1SS355
RES.SO.SCK.LOAD
INTMAR.INT1F
ADCK.SLCK.RE.LC
SYSRS.PS
A[19].A[16-0]
DI7-01
WR.RD.AS
CS[2-0].CSMAR
PHA.PHB.IOA.IIA.IOB.IIB.CurA.CurB
DRMAR.DRIF
STRB
ACK
BUSY
DIA
INIT
CN1
CN2
CN3
CN4
CN5
CN6
CN7
CN8
Model: GT-5500
Board: B063 MAIN
Sheet: 1 of 1
Rev. : C


SHFT-F1-F2-RS-ADCLK-CP-CK3-STL-HLD
LD17-01
SD17-01
BD17-01
AD11-1
DM10-71
IFDR-IFDA
RES-SO-SCK-LOAD
INTMAR-INTIF
ADCK-SLCK-RE-LC
SYSRS-PS
A16-01
D17-01
WR-RD
CS12-01-CS14
PHA-PHB-IOA-IIA-IOB-IIB-CURA-CURB
DRMAR
I/O-REQ-C/D-SEL-MSG-RST-ACK-BSY-ATN
DB17-01-DBP
Terminator S/W
OFF
ON
IC7 E02A26AA
IC13 M64154FP
IC3 M64292FP
IC4 DRAM 4MxB 60
IC5 EPROM 1MxB 100
IC6 IDT71256SA
IC8 WS1953AFP-600C
IC12 HD6433044
IC1 M54620P
IC14 AN8810SBR
IC15 TC7W74F
IC16 TC7SU04F
IC17 TC7SU04F
IC18 TC7W74F
IC19 TC7SU04F
IC11 uPC29M33T
IC2 uPC29M33T
CN1
CN2
CN3
CN4
CN5
CN6
CN7
CN8
CN9
CR1 CSTCV24.00 24MHz
CR2 CSTCV16.00 16MHz
SW1 SSSS912N4A1
SW01 KMR10H-02
Model: GT-5500
Board: B063 MAIN-B
Sheet: 1 of 1
Rev. : C

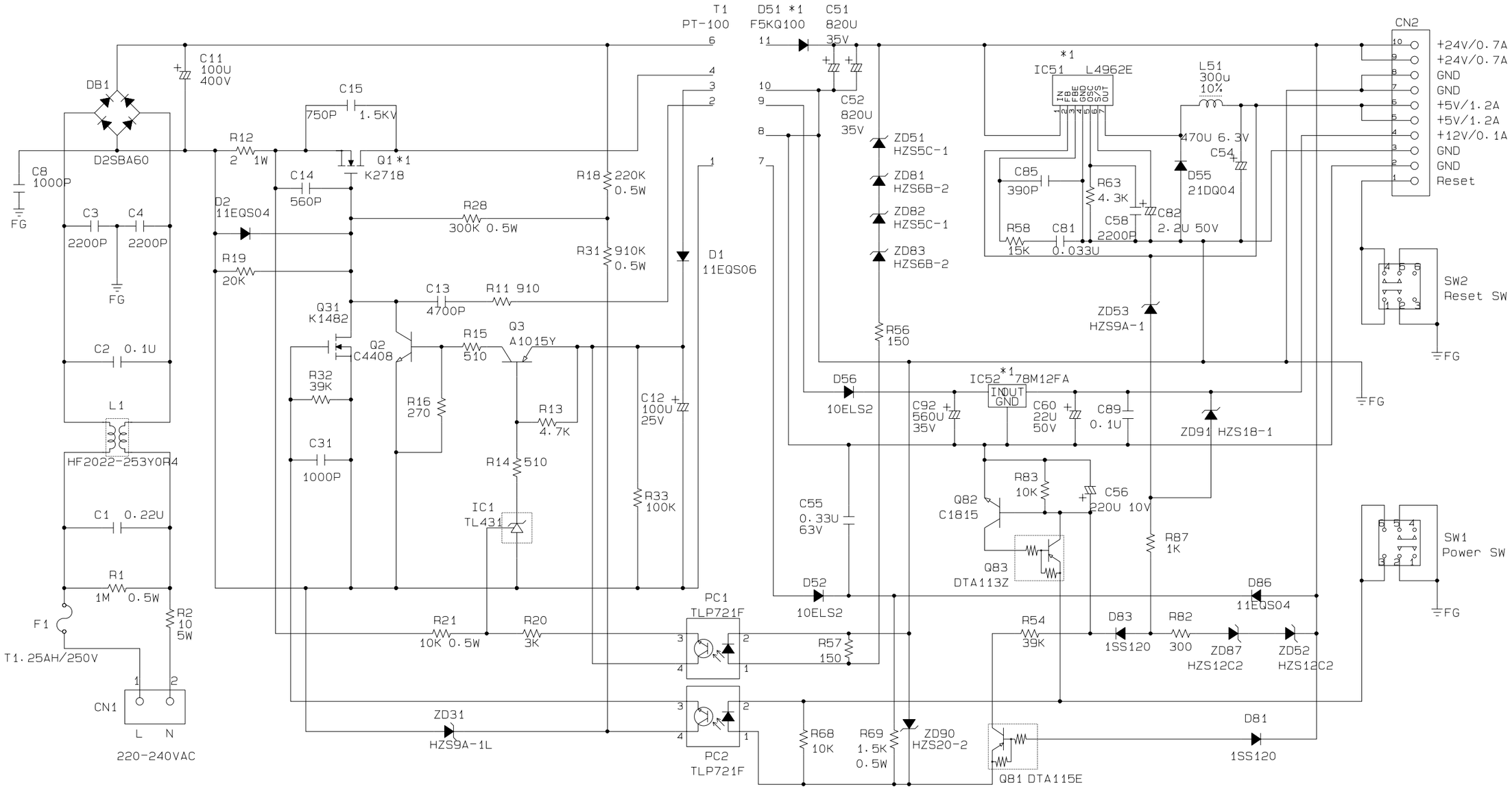


Model: GT-5500
Board: B163 ISN
Sheet: 1 of 1
Rev. : A



*1:With HeatSink

Model: GT-5500
Board: B063PSB BOARD
Sheet: 1 of 1
Rev. : D



*1:With HeatSink

Model: GT-5500
Board: B063PSE BOARD
Sheet: 1 of 1
Rev. : B