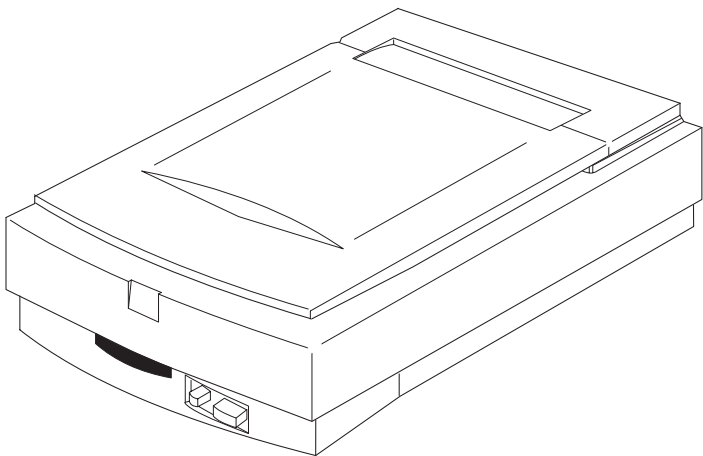


# SERVICE MANUAL



Color Imaging Scanner  
**EPSON GT-9600**



**EPSON®**

SESC98003

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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. NO WORK 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.

# About This Manual

This manual describes basic functions, theory of electrical and mechanical operations, maintenance and repair procedures of GT-9600. 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.

## Contents

This manual consists of six chapters and Appendix.

### **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. DISASSEMBLY AND ASSEMBLY**

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

### **CHAPTER 4. TROUBLESHOOTING**

Describes the step-by-step procedures for the troubleshooting.

### **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

## Symbols Used in This Manual

Various symbols are used throughout this manual either to provide additional information on a specific topic or to warn of possible danger present during a procedure or an action. Be aware of all symbols when they are used, and always read WARNING, CAUTION or NOTE messages.



Indicates an operating or maintenance procedure, practice or condition that, if not strictly observed, could result in injury or loss of life.



Indicates an operating or maintenance procedure, practice, or condition that, if not strictly observed, could result in damage to, or destruction of, equipment.



May indicate an operating or maintenance procedure, practice or condition that is necessary to accomplish a task efficiently. It may also provide additional information that is related to a specific subject, or comment on the results achieved through a previous action.

## Revision Status

[illegible]

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**CHAPTER**

**1**

# **PRODUCT DESCRIPTION**

## 1.1 Overview

This scanner is a revised model of GT-9500 and high-resolution color image scanner for the various use from the designer to the office user. Main features of this scanner are as follow.

### 1.1.1 Features

- High Quality: 800 dpi, 12bit-in, 12bit-out  
OD Value MAX 3.3
- High Speed: Exposure Time 7.5msec/line at 800dpi  
Scanning Time 75 Sec/A4, Full color
- Command Level: ESC/I-B8
- I/F: SCSI

Table 1-1. Optional Items

No.	Name
B81316*	ADF(Auto Document Feeder)
B81315*	TPU (Transparency Uni)

**NOTE:** \* The number represented by an asterisk varies, depending on the country.

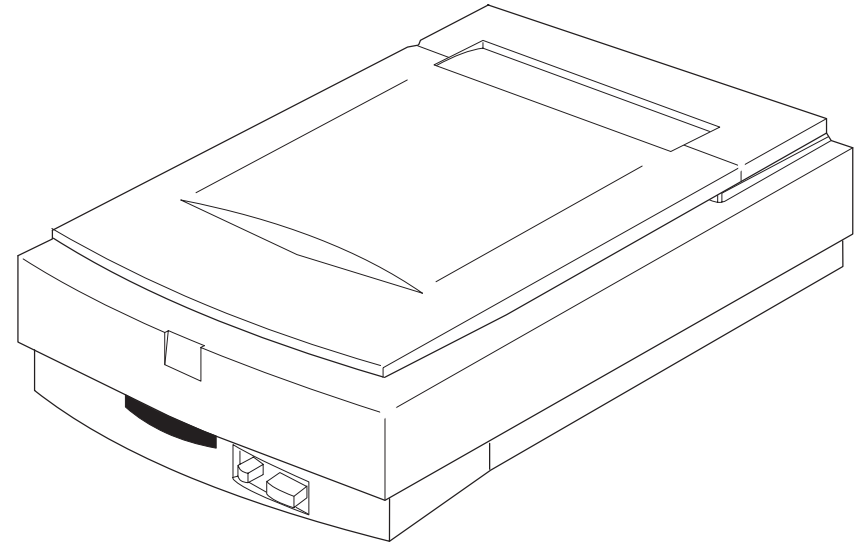


Figure 1-1. Exterior View of GT-9600

## 1.2 Specifications

### 1.2.1 General Specifications

- Product Type\* Flatbed color image scanner
- Sub-scanning device: Movement of the Scanning Head
- Photoelectric device: Color CCD Line Sensor
- Maximum Read Area: 8.5 x 11.7 (216 x 297 mm)
- Maximum Effective Picture Element: 6800 x 9360 pixels (800dpi)
- Scanning Resolution: Main 800 dpi optical  
Sub Max. 3200 dpi with microstep
- Output Resolution: 50 ~ 6400 dpi (1 dpi step)



- ☐ Scanning Speed(600 dpi, Draft Mode):
  - Color 7.5 msec/line
  - Monochrome(bi-level) 7.5 msec/line
- ☐ Color Separation: By the color filter of CCD
- ☐ Command Level: ESC/I-B8
- ☐ Zoom: 50% to 200% (1% step)
- ☐ Pixel depth: 1-12 bits/pixel (Input 12 bits/pixel)
- ☐ Gamma Correction:
  - CRT 2 level (A, B)
  - PRINTER 3 level (A, B, C)
  - User defined 1 level
- ☐ Color Correction:
  - Impact-Dot Printer
  - Thermal Printer
  - Ink-Jet Printer
  - CRT Display
- ☐ Brightness: User defined
- ☐ Line Art:
  - 7 Level
  - Fixed threshold
- ☐ Digital half-toning:
  - TET
  - AAS
- ☐ Bi-level, Quad-level:
  - Error Diffusion 3 mode (A,B,C)
  - Dither(Resident) 4 mode(A, B, C, D)
  - Dither(User defined) 2 mode (A, B)
- ☐ Interface(Resident): SCSI(50-pin Half pitch Connectors)
- ☐ Light Source: White Cold cathode Fluorescent Lamp
- ☐ Option: TPU, ADF

## 1.2.2 Electrical Specification

- ☐ Rated Voltage: AC100-120V/220V-240V
- ☐ Input Voltage:
  - AC100 -120V  $\pm 10\%$
  - AC220 -240V  $\pm 10\%$
- ☐ Rated Current:
  - 0.8A(Input AC 100V)
  - 0.4A(Input AC 220V)
- ☐ Rated Frequency Range:50-60 Hz
- ☐ Input Frequency Range: 49.5-60.5 Hz
- ☐ Power consumption: Approx.40W
- ☐ Insulation Resistance: 10M Ohms at 500 VDC(between AC line and chassis)
- ☐ Dielectric strength: AC 1.5kV, 1 min  
(between AC Line and chassis)

## 1.2.3 Safety, EMC

- ☐ Safety:
  - UL1950 (UL)
  - CSA C22.2 NO.950 (CSA)
  - EN60950 (VDE)
  - EN60950 + Nordic deviation(NEMKO)
- ☐ EMC:
  - FCC Part 15 Subpart B Class B
  - CSA C108.8 Class B
  - AS/NZS3548 Class B
  - CISPR Pub22 Class B
  - CNS13438 Class B
- ☐ CE Marking:
  - Low Voltage Directive 73/23/EEC
  - EN60950

EMC Directive 89/336/EEC

EN55022 Class B  
 EN61000-3-2  
 EN61000-3-3  
 EN 50082-1  
 EC 801-2/801-3/801-4

### 1.2.4 Resistance to electric noise

- ☐ Static electricity: Panel - 10kv  
 Metal-7kV /150pF, 150 Ohms

### 1.2.5 Environmental Conditions

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

### 1.2.6 Reliability

- ☐ Main unit MCBF 100000 cycle

### 1.2.7 Operating Conditions

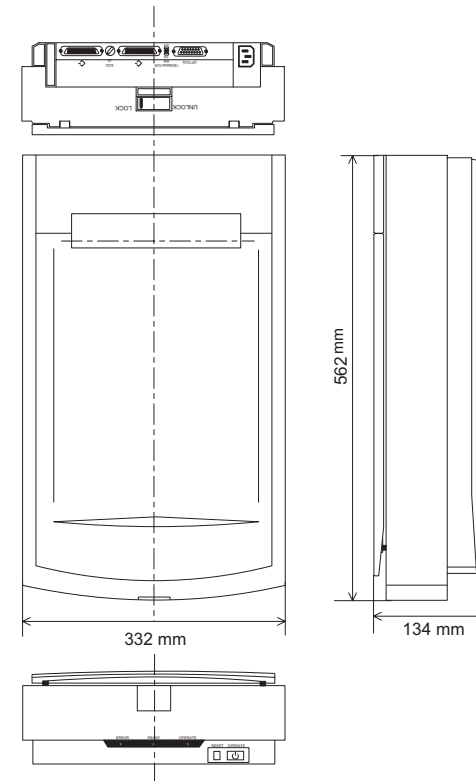
- ☐ Dust Ordinary office or home conditions.  
 Extreme dust should be avoided.
- ☐ Illumination Operation under direct sunlight or near strong  
 light source is not guaranteed and should be  
 avoided.

### 1.2.8 Document

- ☐ Reflective type: Documents which has a smooth surface
- ☐ Transparency type: (With transparency unit)  
 Reversal film  
 Negative film

### 1.2.9 Physical Dimension

- ☐ Dimension 332(W) x 562(D) x 134(H) mm
- ☐ Weight Approximately 8.5Kg



## 1.3 Interface

This section explains interface of this scanner. This scanner is equipped with SCSI as standard interface. Refer to Service Manual of GT-9500 for pin alignment.

### 1.3.1 SCSI

Any items not included in this specification shall be in compliance with ANSI X3. 131-1994 (SCSI 2).

- ☐ Function: The following functions are available, which are included in ANSI X3. 131-1994 (SCSI 2).

1. Bus free phase
2. Arbitration phase
3. Selection/Re-selection phase
4. Command phase  
Note) The LUN(Logical Unit Number) is fixed at "0" in this device.  
The command Link Function is not supported.
5. Data phase  
Data in phase  
Data out phase
6. Status phase
7. Message phase  
Message in phase  
Message out in phase
8. Attention condition
9. Reset condition

SCAM(SCSI Configured Auto Matically specification) [ANSI T10/1142 rev.15]

- ☐ Electric Specification  
Compliant to ANSI X3. 131-1994 (SCSI 2)  
Single ended
- ☐ Connector  
Two 50-pin connectors (Half Pitch)
- ☐ Terminator  
Internal terminator  
Enable to control "active" or "inactive" by a switch. (SW=ON --- Terminator available)
- ☐ SCSI ID  
The SCSI ID is set with a rotary switch on the rear panel.  
The switch numbers are corresponded to the available address and can be set from 0 to 7. Factory setting ID=2.
- ☐ Command  
This device use the following group "0" processor commands.

**Table 1-2. Command List**

Command	Code	Description
Test Unit Ready	00h	Confirm for operation
Request Sense	03h	Require a Sense data*1
Receive	08h	Data transmission from Target to Initiator
Send	0Ah	Data Transmission from Initiator to Target
Inquiry	12h	Require information of SCSI devise*2
Send Diagnostic	1Dh	Send diagnostic

**NOTE:** \*1 Only the extension sense data format is supported for sense data returned by the Request Sense Command.

\*2 The Inquiry data is as follows. (see the next page)

byte	data		
0	03h	Peripheral device type:	: 3(Processor)
1	00h	RMB	: : 0
		device Type restriction:	: 0
2	02h	ISO Version	: : 0
		ECMA Version	: : 0
		ANSI Version	: : 2
3	02h	AENC	: : 0
		Trml0P	: : 0
		Response data format:	: 2
4	23h		
5	00h		
6	00h		
7	00h		
Vender unique parameter byte:			
'EPSON', 20h, 20h, 20h			
'SCANNER', 20h, 'xxxxxxx', 20h, '****',			
00h, 00h, 00h, FFh]			
Note: '****' ROM version			

□ Status: All bits are defined as follows.

Table 1-3. Status

Status	Status Bits							
	7	6	5	4	3	2	1	0
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: means reserved bit.

Table 1-4. Message

Message	Code	Direction	Completion of ATN
Command Complete	00h	In	--
Extended Messages	01h	In/Out	--
Save Data Pointer	02h	In	--
Restore Pointer	03h	In	--
Disconnect	04h	In	--
Initiator Detect Error	05h	Out	Yes
Abort	06h	Out	Yes
Message Reject	07h	In/Out	Yes(Out)
No Operation	08h	Out	Yes
Message Parity Error	09h	Out	Yes
Bus Device Reset	0Ch	Out	Yes
Identify	80h-FFh	In/Out	No(Out)

**NOTE:** Out: Target → Initiator  
In: Initiator → Target

Table 1-5. Extended Message

Extended Message Code	Message length (Byte)	Message	Direction	Completion of ATN
01H	5	Synchronous Data Transfer Request	In/Out	Yes(out)
03H	4	Write Data Transfer Request	In/Out	Yes(out)

**NOTE:** Out: Target → Initiator  
In: Initiator → Target

## 1.4 Switch and Lamps

Since the basic components of this scanner is same as the GT-9500, only changed parts are explained here.

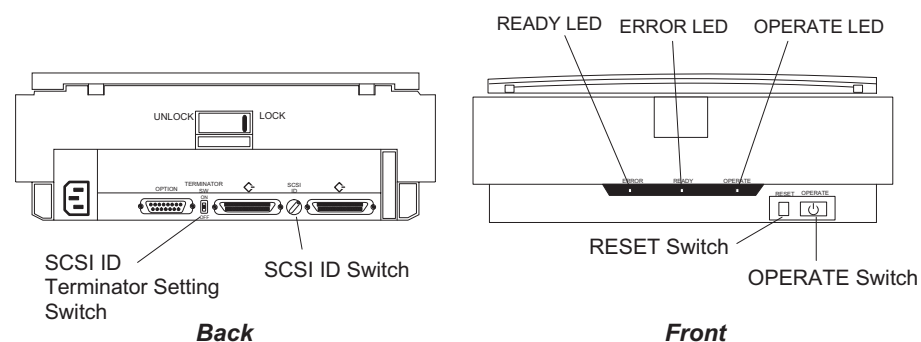


Figure 1-2. Switch and LED Lamps

### 1.4.1 Switch

SCSI ID rotary switch:

0-7: SCSI-ID (factory setting 2)

\*: The carriage moves to carriage lock position when power is turned on.

Other:Reserved

## 1.4.2 Error

### 1.4.2.1 Cause and Remedy when errors happen

Fatal Errors

[Remedy]

Remove the causes and turn back on the power.

Send ESC @ code.

Send Bus Device Reset Message of SCSI.

Assert RST signal of SCSI.

## 1.5 Command Specification

Refer to the Service Manual of GT-9500.

## 1.6 Control Code

Since the basic components of this scanner is same as the GT-9500, only newly added or changed codes are listed here.

### 1.6.1 Control Code

**Table 1-6. Newly Added Codes**

Classification	Function	Code
Image Processing	Download color correction	ESC m d1...d9
	Set Threshold	ESC t i
Support, other	Set Film Type	ESC N i

### 1.6.2 Function of Control Codes

#### 1.6.2.1 Resolution Setting

By this command, the resolution can be set from 50 dpi to 400dpi.

#### 1.6.2.2 Download color correction

By this command, color correction can be set.

#### 1.6.2.3 Set Threshold

Controls the threshold values

#### 1.6.2.4 Set Film Type

Sets the color balance when reading the target by using TPU.

## 1.7 Main Components

---

- ☐ B077 Main Board: Main Control Board
- ☐ B077 ISN Board: Sensor Circuit Board
- ☐ B035 PSB Board: Power Supply Board
- ☐ Scanner Head (Carriage Assembly)
- ☐ Carriage Mechanism
- ☐ Housing
- ☐ Document Cover

Since the basic components of this scanner is same as the GT-9500, only changed parts are explained here.

### 1.7.1 B077 Main Board

The main control circuit, B077 Main Board controls various parts by 16-bit CPU M8S/2350 Clock Frequency 20 MHz. Also, gate array and memory for image processing and motor drive circuit for moving the scanner head are also mounted on this board.

### 1.7.2 B077 ISN Board

This board converts the signal(Analog signal) read by Color CCD sensor into the digital and sends it to the Main Board.

**CHAPTER**

**2**

## **OPERATING PRINCIPLES**



## 2.1 Control Circuit

Since the basic component of GT-9600 is same as GT-9500, only particular items exclusively for GT-9600 are explained here.

### 2.1.1 Overview of Main Control Circuit

B077MAIN Control Circuit in this scanner uses “16-bit one chip CPU H8S/2350” as CPU by clock frequency 20Mhz and all the image data processing functions are built in the custom gate-array: MERCURY.

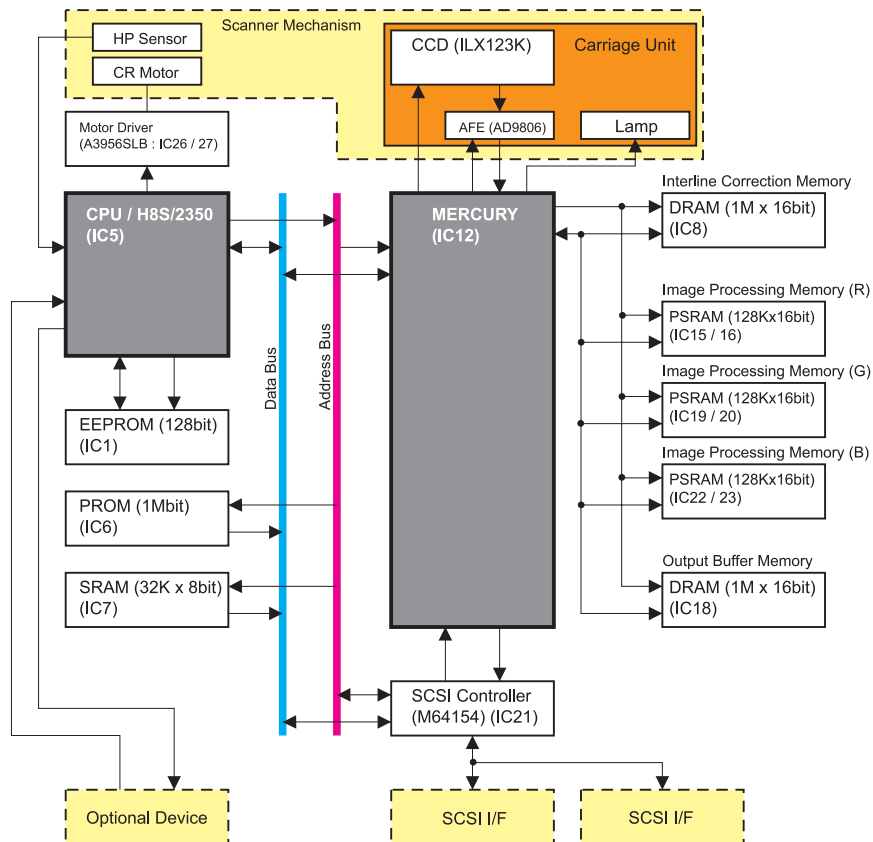


Figure 2-1. Block Diagram of B077MAIN Board

Table 2-1. Functions of Major Elements

Elements	Location	Function
H8S/2350 CPU	IC5	This CPU controls this scanner and is driven by clock frequency 20 MHz. Also, CPU control light source and timing for motor drive. EEPROM and EPROM are connected to CPU.
MERCURY GA	IC12	This gate array has following functions. <ul style="list-style-type: none"> <li>• Shading Correction</li> <li>• Gamma Correction</li> <li>• CCD Sensor Control</li> <li>• A/D Converter Control</li> <li>• Color Correction</li> <li>• Zoom</li> <li>• Set Digital Half -Toning</li> <li>• AAS (Auto area segmentation)</li> <li>• CPU Support</li> <li>• Memory Control</li> <li>• Light quantity Control</li> <li>• Generates Power On, Reset signals</li> <li>• Generates Clock signal</li> </ul>
DRAM	IC8 / IC18	Used as work buffer memory.
PS-RAM	IC15/16 IC19/20 IC22/23	Used as an image processing memory for each colors.
A64154FP	IC6	SCSI Controller
A3956SLB	IC26, 27	Carriage Motor Driver

### 2.1.1.1 Reset Circuit

Immediately after power on and off, the +5VDC line voltage drops, and the reset IC (IC2) outputs the reset signal from pin 6. This reset signal is then input to pin 61 (/RES) of the CPU (IC5), and it supplies the reset signal to the gate-array: MERCURY (IC12) at pin 183. A reset signal sent through the SCSI I/F (SCSI\_RST), and a reset signal generated by the reset switch operation, are also input to the CPU to generate the system reset signal.

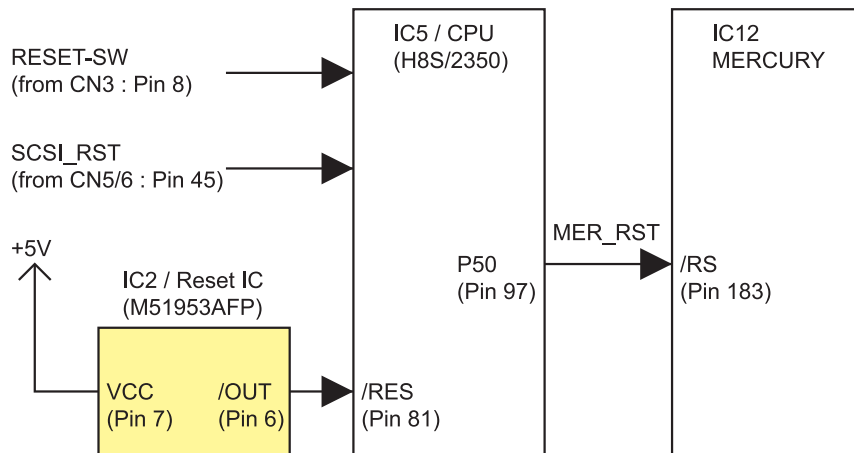


Figure 2-2. Block Diagram of Reset Circuit

### 2.1.1.2 Home Position Sensor Circuit

The home-position sensor detects whether the carriage (scanner head) is in the home position or not. This sensor establishes the reference position for carriage drive control. When the carriage is in the home position, the sensor outputs a HIGH level signal to pin 45 (H.P.) of the CPU (IC5).

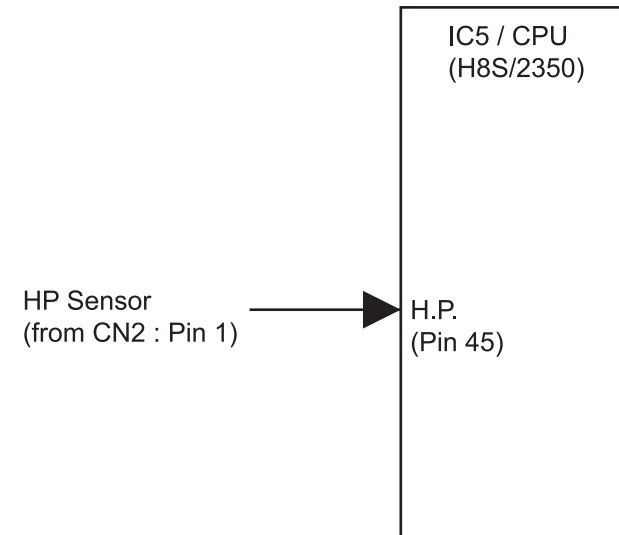
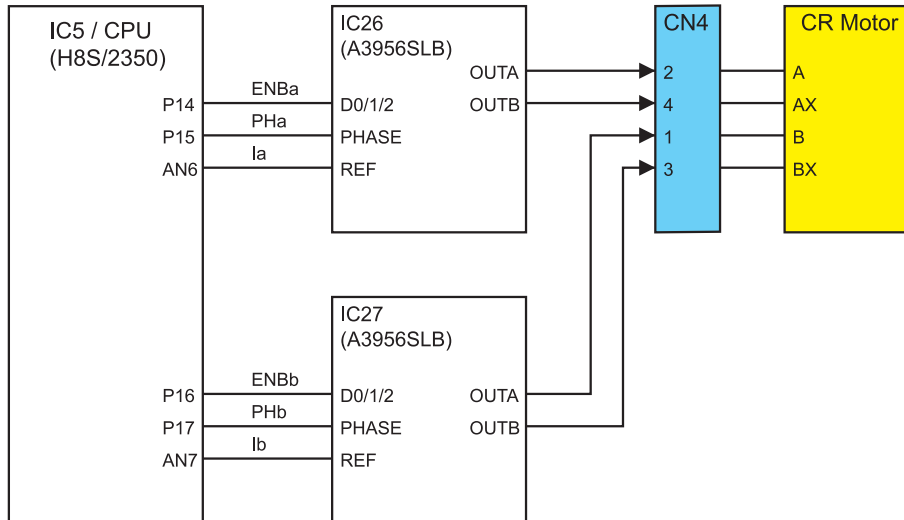


Figure 2-3. Block Diagram of Home Position Sensor Circuit

### 2.1.1.3 Carriage Motor Drive Circuit

The carriage motor driver IC; A3956SLB (IC26/27) outputs a constant current to drive the carriage motor. The CPU (IC5) generates the motor drive pulses to the stepping motor, which requires changes in the excitation phase to generate rotation via the motor driver ICs.

The Ia and Ib signals from the CPU (pin 111/112) specify the reference drive current level and the ENBa and ENBb signals (pin 118/116) determine the drive current level. The PHa and PHb signals (pin 117/115) switching the excited phase to make rotation.



**Figure 2-4. Block Diagram of Carriage Motor Drive Circuit**

### 2.1.1.4 Color CCD Control Circuit

The CPU (IC5) and the gate-array; MERCURY (IC12) control the color CCD and light source operations. The gate-array outputs the following signals to the CCD sensor module on the carriage assembly:

- ❑ SH (CCD / electrode shift signal)
- ❑ SNCK1 (CCD / transmission clock pulse)
- ❑ SNCK2 (CCD / reset signal)
- ❑ SHR/SHG/SHB (CCD / electric shutter control signal for RGB)

The analog output from the CCD sensor is processed by the amplifying circuits and a 12-bit A/D converter built in the AFE (Analog Front End); AD9816 (IC2) on the B077ISN board. The CPU and the gate-array output the following signals to the AFE, and the AFE outputs 12-bit digital image data to the gate-array for subsequent image processing.

- ❑ SCLK\_AFE (AFE / serial clock)
- ❑ SDAT\_AFE (AFE / serial data, for gain and offset control)
- ❑ LOAD\_AFE (AFE / load pulse)
- ❑ SNCK4 (AFE / CDS (Correlated Double Sampler) reset level sampling clock)
- ❑ SNCK5 (AFE / CDS data level sampling clock)

The analog image data for R, G, B are input to VINR, VING, VINB of the AFE.

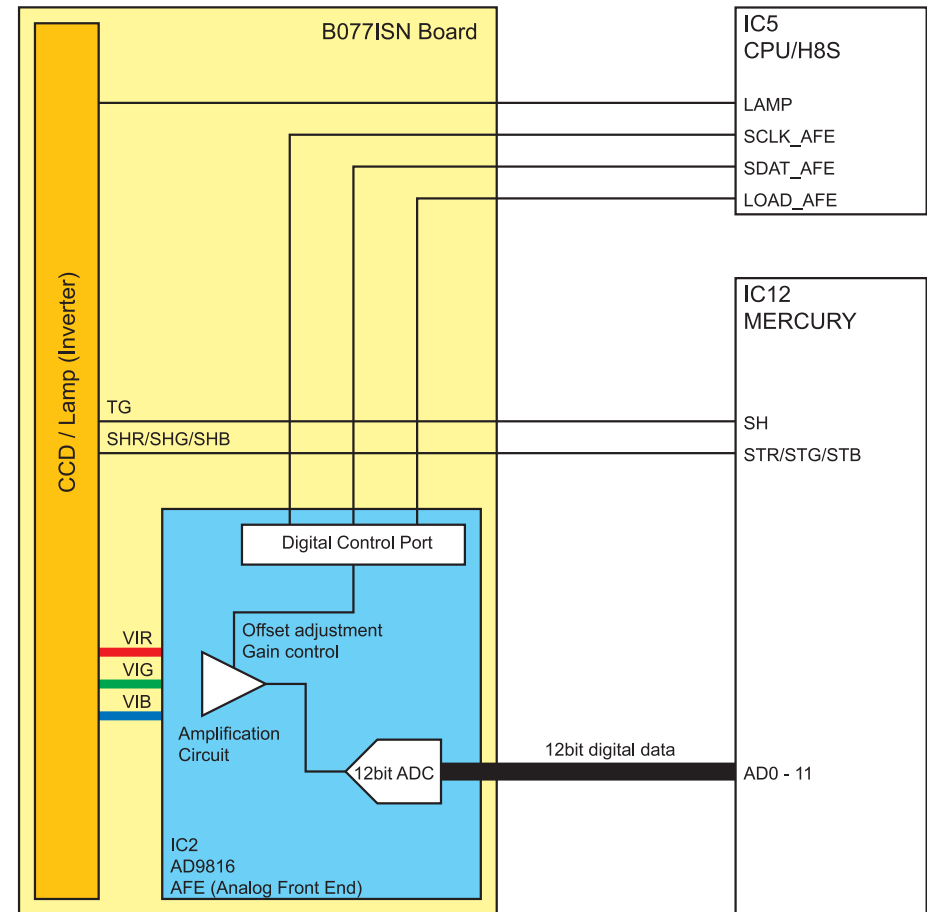


Figure 2-5. Block Diagram of CCD control circuit

**CHAPTER**

**3**

# **DISASSEMBLY AND ASSEMBLY**

## 3.1 Disassembly and Assembly

This section explains disassembly procedure of GT-9600. Since the components of GT-9500 and GT-9600 are basically same, items only for GT-9600 are explained here.

### 3.1.1 Bottom Plate Removal

1. Remove 17 screws(CBB, 3x12) and 2 screws(CBS, 3x6) securing "Bottom Plate" to "Housing, Lower".
2. Remove "Bottom Plate" from "Housing, Lower".

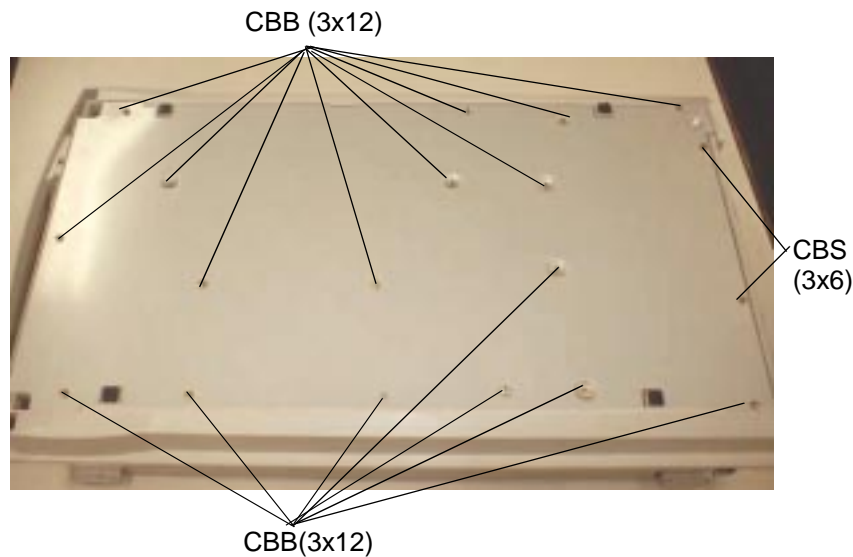


Figure 3-1. Bottom Plate Removal

### 3.1.2 B035 Power Supply Board Removal

1. Remove "Bottom Plate". (See "Bottom Plate Removal" on page -17)
2. Disconnect harness from the connectors on the B035 power supply board.
3. Remove 5 screws (CBB, 3x12) securing B035 power supply board to "Housing, Lower".
4. Remove B035 power supply board from "Housing, Lower".

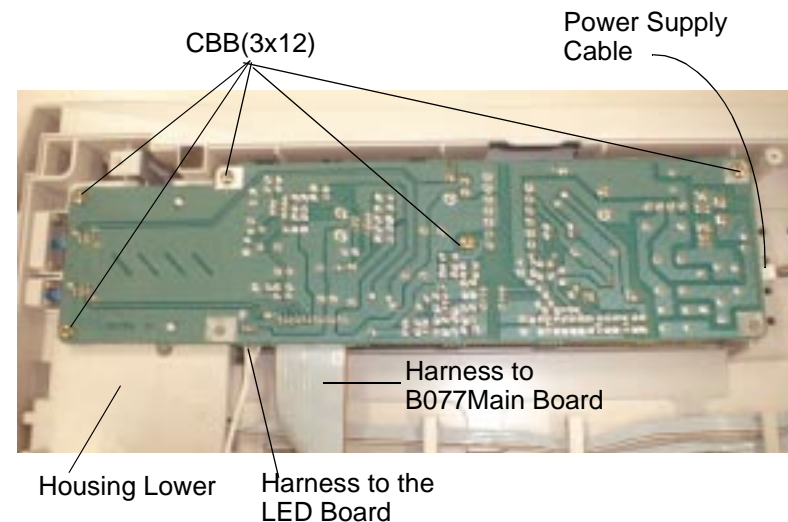


Figure 3-2. B035 Power Supply Board Removal

### 3.1.3 B077 MAIN Board Removal

1. Remove Bottom plate. ( See “Bottom Plate Removal” on page -17)
2. Remove one screw(CBB, 3x12) securing FFC earth plate to “Housing, Lower”, and remove FFC earth plate.
3. Remove harness from the connectors(CN1, CN2, CN3 and CN4) on the B077 Main Board.
4. Remove 2 screws(CBS, M 3x6) securing “B077 Main Board” to “Shield Plate, Rear”.
5. Remove “B077 Main Board”.
6. Remove 4 screws (CP, M2.5 X 8) securing “Interface Cover” and “B077 Main Board”.
7. Remove “Interface Cover” from B077 Main Board.

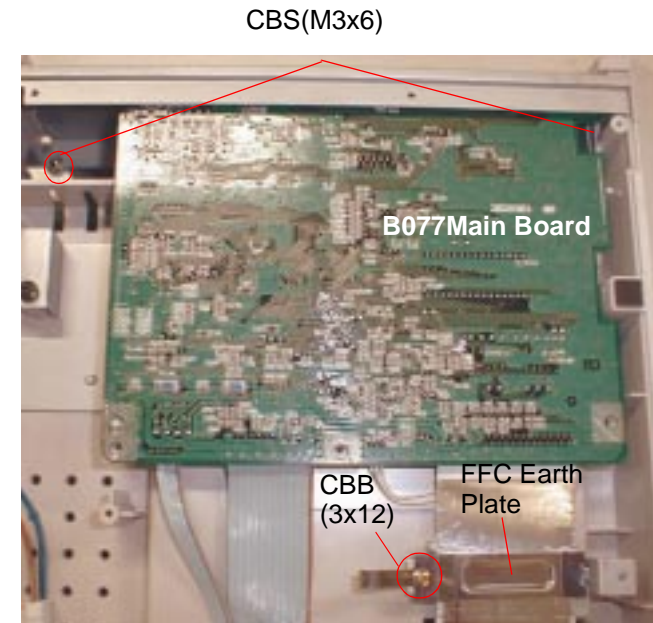


Figure 3-3. B077Main Board Removal

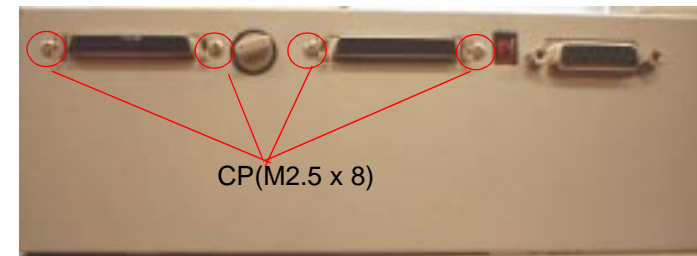
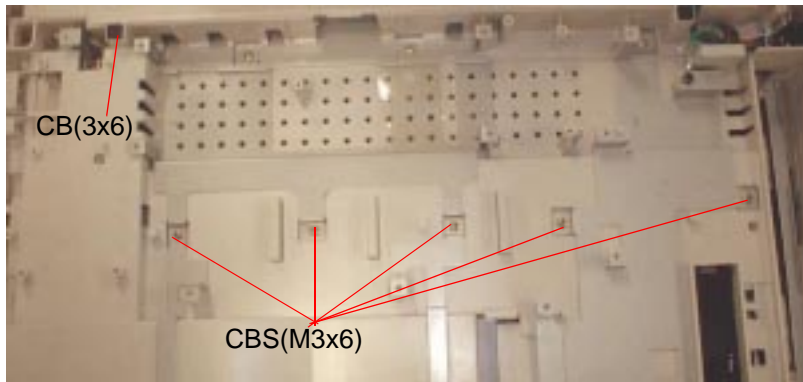


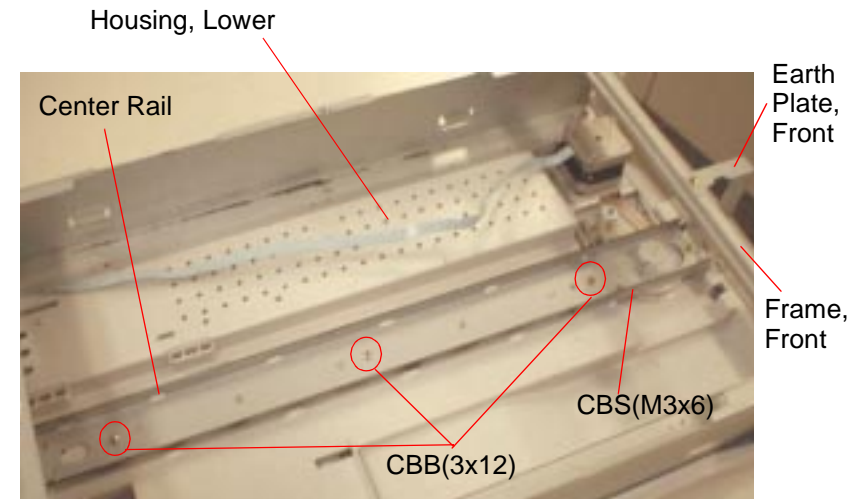
Figure 3-4. Interface Cover Removal

### 3.1.4 CR Motor Removal

1. Remove "Housing, Upper". (Refer to Service Manual of GT-9500)
2. Remove Bottom plate. (See "Bottom Plate Removal" on page -17)
3. Remove B077 Main Board. (See "B077 MAIN Board Removal" on page -18)
4. Remove 5 screws(CBS, M3x6) securing "Center Rail" and "Shield Board" from the back of scanner. Also, remove one screw(CB, 3x6) securing "CR Motor Assembly", earth plate, and motor from the back of scanner.
5. Remove carriage assembly. (Refer to Service Manual of GT-9500)
6. Remove 3 screws(CBB, 3x12) securing "Center Rail" to "Housing, Lower", and one screw (CBS, M3x6) securing "Center Rail" to "CR Motor Frame".
7. Remove 2 screws(CBS, M3x6) securing "Earth Plate, Front" and "Frame, Front", and remove "Center Rail".



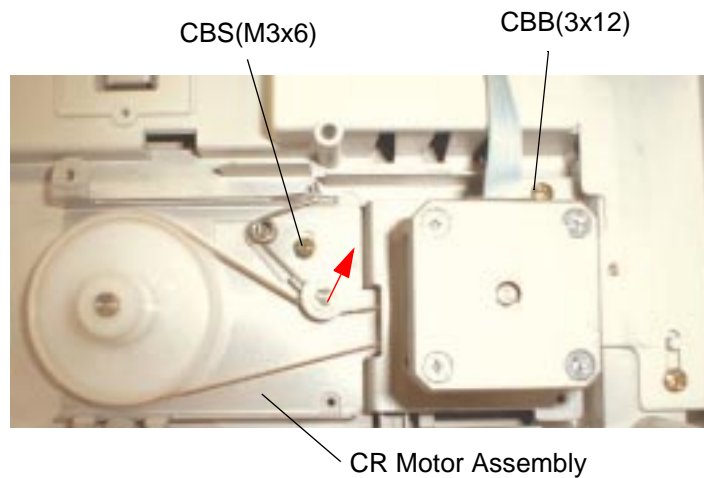
**Figure 3-5. Screws at the Circuit Board Side Removal**



**Figure 3-6. Center Rail Removal**



8. Remove one screw(CBB, 3x12) securing the motor, and remove the motor.
9. Loosen a screw(CBS, M3x6) securing the "Tension Lever Assembly" to "Motor Frame", move "Lever Assembly, Tension" to the arrowed direction, releasing the tension of the timing belt of CR motor. Then, remove "Timing Belt B".
10. Remove 3 "Shaft, Damper, CR" and remove "CR Motor" from "Motor Frame".



**Figure 3-7. CR Motor Assembly Removal**

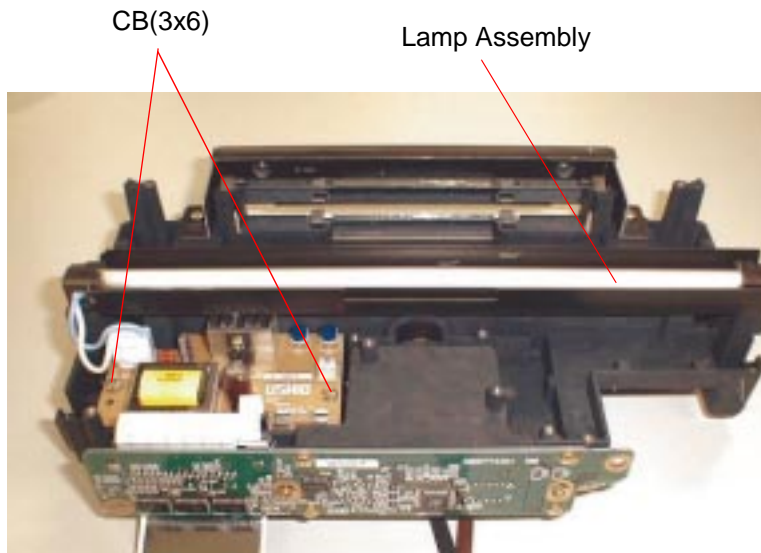
### 3.1.5 Lamp Assembly Removal

1. Remove carriage assembly. (Refer to Service Manual of GT-9500)
2. Remove 2 screws(CB, M3x6) securing "Cover, Rear, Carriage" to "Carriage Assembly", and remove "Cover, Rear, Carriage".
3. Remove 3 screws (CB, M 3x6) securing "Cover, Carriage" to "Carriage Assembly", and remove "Cover, Carriage".



**Figure 3-8. Carriage Cover Removal**

4. Remove 2 screws(CB, 3x6) securing "Invertor Board" to "Carriage Assembly". Lift up "Invertor Board" and remove the harness of "Lamp Assembly" from the connector on the "Invertor Board".
5. Remove "Lamp Assembly".



**Figure 3-9. Lamp Assembly Removal**

**CHAPTER**

**4**

# **ADJUSTMENT**

## 4.1 Adjustment

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Origin Adjustment required for GT-9500 is not necessary for GT-9600.

**CHAPTER**

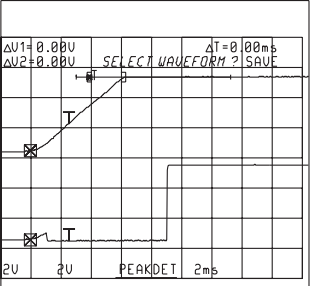
**5**

# **TROUBLESHOOTING**

## 5.1 Repair of the Main Control Board

This section provides instructions to repair a defective main board. Services who do not repair the component level can ignore this section. The table below describes various problems, likely causes, checkpoints, and solutions. The checkpoint column provides proper waveforms, resistance values, and other values to check to evaluate the operation of any components that might be defective. Check these value and take the appropriate action. Since GT-9500 uses the same B035 power supply circuit board, refer to the Service Manual of GT-9500 for the troubleshooting about B035 circuit board.

**Table 5-1. Repair of the B077Main Board**

Problem	Condition	Cause	Checkpoint	Action
No operation at all	CPU does not operate.	Reset circuit does not operate.	<p>Check the +5 VDC voltage and the reset signal of IC2 (pin 6) at power on. Waveform-1:</p> 	Replace IC5. Otherwise, replace B077 Main board.

**Table 5-2. Repair of the B077Main Board**

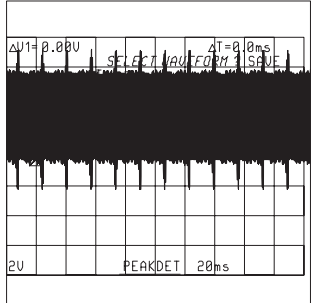
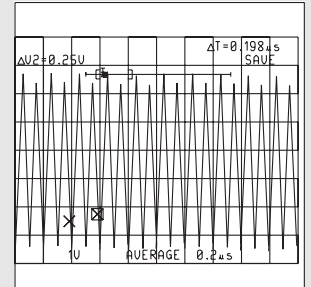
Problem	Condition	Cause	Checkpoint	Action
No operation at all	CPU does not operate.	ROM selection is not carried out correctly.	<p>Is pin 2 of IC5 (CPU) correctly changing from HIGH/LOW? Waveform-2:</p> 	Replace IC5. Otherwise, replace B077 Main board.
		CPU is defective.	<p>Check the waveform at pin 85 of IC5 (CPU). Waveform-3:</p> 	Replace B077 Main board.

Table 5-3. Repair of the B077Main Board

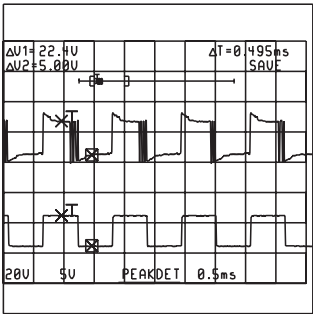
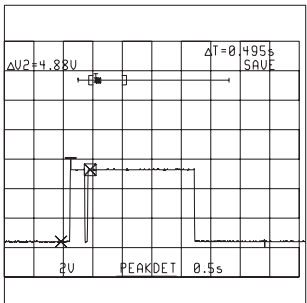
Problem	Condition	Cause	Checkpoint	Action
Fatal error is displayed.	CR motor does not move.	IC26/27 are defective.	<p>Check the input for pin 7 (Input) and pin 10 and 15 (output) of IC26 and IC27. Waveform-4:</p> 	Replace IC26 or IC27. Otherwise, replace B077 Main board.
	Carriage does not stop at home position.	IC5 (CPU) or HP sensor is defective.	Does the input for pin 45 of IC5 go from LOW to HIGH when the carriage is in the home-position?	Replace the B077 Main board. Otherwise, replace HP sensor.
	The lamp does not light.	IC1 is defective.	<p>Check pin 61 of IC5. Waveform-5:</p> 	Replace IC5. Otherwise, replace the B077 Main board.

Table 5-4. Repair of the B077Main Board

Problem	Condition	Cause	Checkpoint	Action
Fatal error is displayed.	The lamp does not light.	Inverter circuit board is defective.	Does Q1 output (pin 3 of CN1) change according to the output of pin 61 of IC5?	Replace inverter circuit board.
	White standard can not be read.	IC1 is defective.	Does IC12 output CCD sensor drive signal (pin 149 of IC1)?	Replace IC12. Otherwise, replace B077 Main board.
The scanner does not read the image.		Image processing gate arrays defective.	----	Replace IC12. Otherwise, replace B077 Main board.
Interface error is displayed.	SCSI	IC21 is defective.	----	Replace IC21. Otherwise, replace main board.

**CHAPTER**

**6**

# **MAINTENANCE**



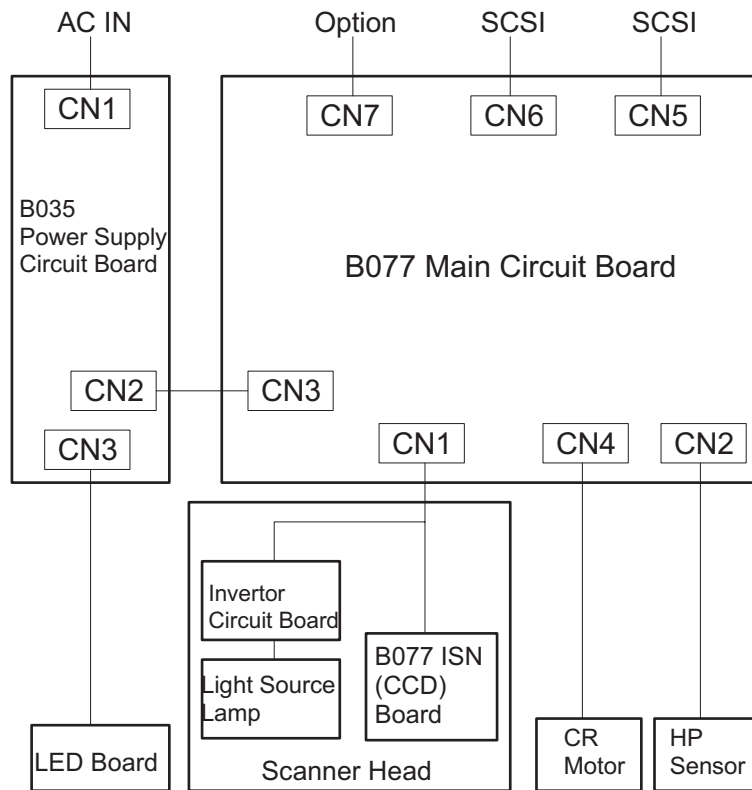
Refer to Service Manual of GT-9500.

**CHAPTER**

**7**

**APPENDIX**

## 7.1 Scanner Connection



**Figure 7-1. Internal Connection**

## 7.2 Connector

This section explains the connectors connected to the circuit boards and their locations. Table 7-2 and 7-3 show signal name of each connector and its description. Also, since the basic component of GT-9500 and GT-9600 are same, items only for GT-9600 are explained here.

**Table 7-1. Connector**

Board Name	Connector	Pin Number	Content	Note
B077 Main Board	CN 1	39	Scanner Head	See Table-7-2
	CN 2	3	HP Sensor	Refer to Table A-4 (CN3 pin assignments) in the "Appendix" of GT-9500 Service Manual.
	CN 3	12	B035 PSB power supply circuit board	Refer to Table A-3 (CN2 pin assignments) in the "Appendix" of GT-9500 Service Manual.
	CN 4	4	CR Motor	Refer to Table A-6 (CN6 pin assignments) in the "Appendix" of GT-9500 Service Manual.
	CN 5	50	SCSI	See Table7-3
	CN 6	50	SCSI	See Table7-3
	CN 7	15	Option	See Table7-4

Table 7-2. Connector CN1 Pin Assignments

Pin. No.	Signal Name	I/O	Description
1-2	+24	--	+24 VDC
3	LAMP	O	Lamp Control Signal
4-5	PGND	---	GND
6	--	O	Not Used
7	GND	O	GND
8-9	+12	O	+12 VDC
10	GND	O	GND
11-12	+5	O	+5VDC
13	SHB	O	Shutter control for CCD blue sensor
14	SHG	O	Shutter control for CCD green sensor
15	SHR	O	Shutter control for CCD red sensor
16	RST	O	Reset
17	CK1	O	Clock 1
18	TG	O	CCD Shift Pulse
19	ADCK	O	ADC Clock
20-21	CDS1-2	O	ADC CDS signal
22	CLP	O	ADC CLP Signal
23	WR	O	ADC Serial Data Latch Signal
24	SD	O	ADC Serial Data
25	SCK	O	ADC Serial Data Clock
26	GND	---	GND
27-38	AD 0-11	I	Video Data Bit 0-11
39	GND	--	GND

Table 7-3. Connector CN5 and CN6 Pin Assignments

Pin. No.	Signal Name	I/O	Description
1-12	GND	--	GND
13	--	--	Not Used
14-25	GND	---	GND
26-33	SD0-7	I/O	SCSI Data Line 0-7
34	SDP	I/O	Parity Line for SCSI Data
35-37	GND	--	GND
38	TERMPWR	I/O	Terminal Power Supply (+5VDC)
39-40	GND	--	GND
41	/ATN	I	Attention Signal of SCSI
42	GND	--	GND
43	/BSY	I/O	BUSY signal of SCSI
44	/ACK	I	ACKNOWLEDGE signal of SCSI
45	/RST	I	RESET signal of SCSI
46	/MSG	O	MESSAGE signal of SCSI
47	/SEL	I/O	SELECT signal of SCSI
48	/CD	O	CONTROL DATA signal of SCSI
49	/REQ	O	REQUEST signal of SCSI
50	/IO	O	INPUT/OUTPUT signal of SCSI

Table 7-4. Connector CN7 Pin Assignments

Pin. No.	Signal Name	I/O	Description
1-5	OP 1-5	O	Option Control Signal
6	+5V	--	+5V (Logic Power)
7,13,14	GND	---	GND
8,15	+24V	---	+24V (Drive Power)
9	SDAT_OP	O	Data
10	SLCK_OP	O	Clock Signal
11	LOAD_OP	O	Option Control Signal
12	OP_SEL	O	Option Select Signal

## 7.3 Board Component Layout

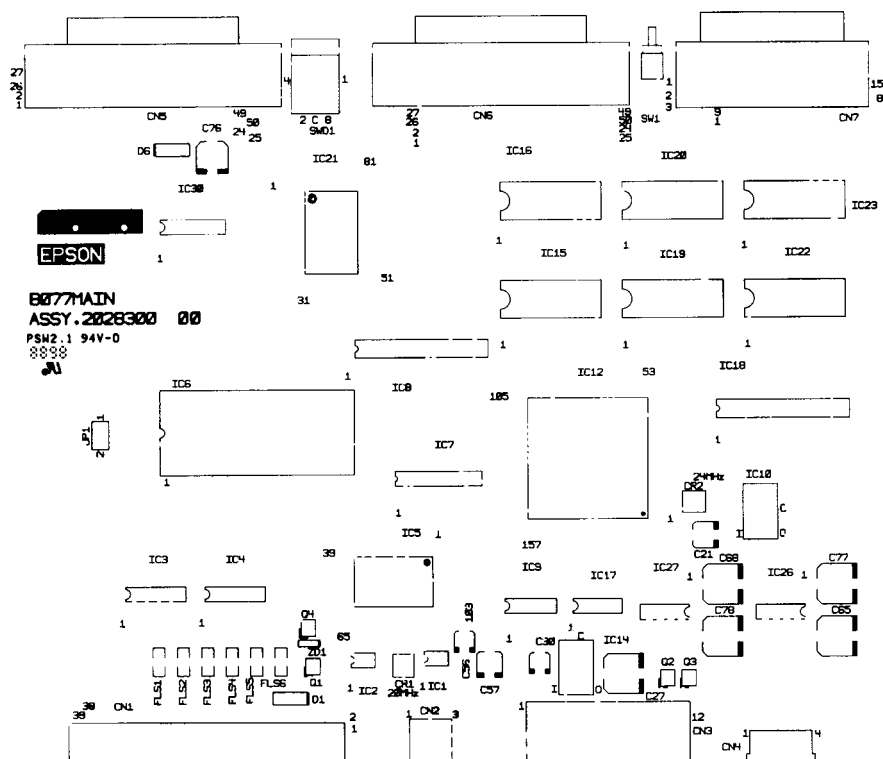


Figure 7-2. B077 Main Board Component Layout

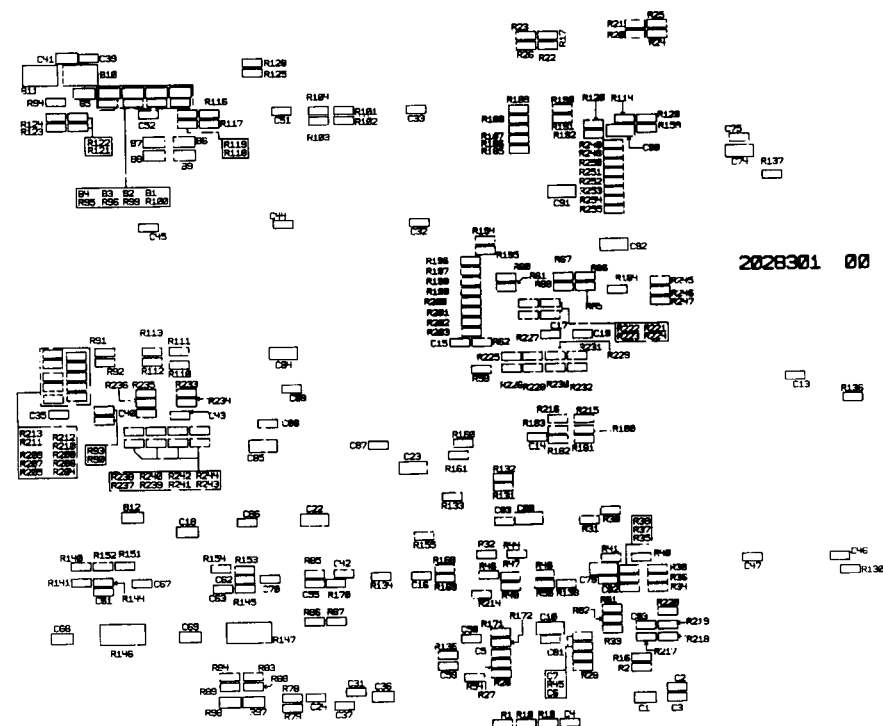


Figure 7-3. B077 Main Board Component Layout(Soldered Side)

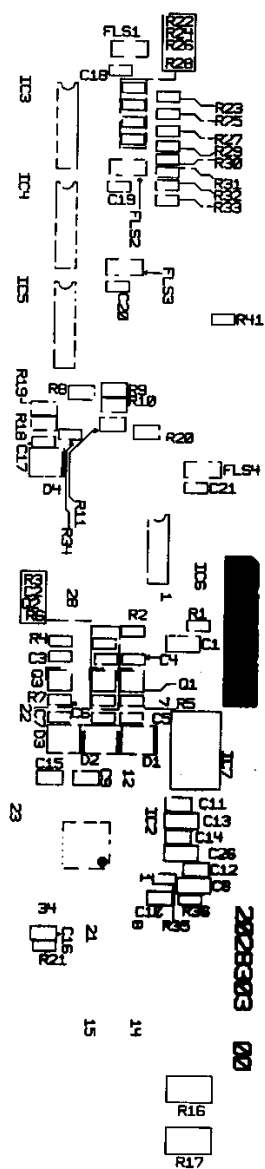


Figure 7-4. B077ISN Board 1

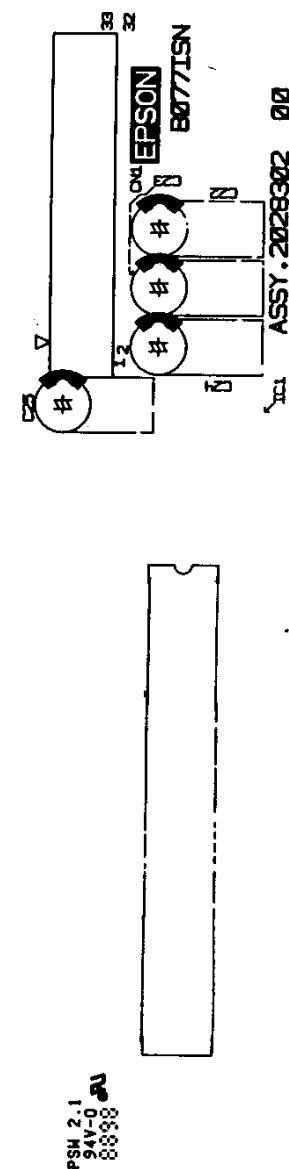


Figure 7-5. B077ISN Board 2

## 7.4 Exploded Diagram

Following pages show exploded diagram of GT-9600.

- ☐ Exploded Diagram 1
- ☐ Exploded Diagram 2
- ☐ Exploded Diagram 3

### 7.4.1 Parts List

**Table 7-5. Parts List**

No.in the figure	Parts Name	No. in the figure	Parts Name
100	Housing Assy.,Upper	101	Housing, Lower
102	Plate, Assy., Bottom	103	Cover, Assy., Document
104	Glass, Assy.,Large	105	Frame, Front
106	Frame, Rear	107	Frame, Assy.,Side, L
108	Frame, Assy., Side, R	109	Pail Center
110	Logo Plate	111	Torsion Spring, 17100
112	Plain Washer, 3x0.5x8, F/ ZN	113	Connector Lock Nut
114	Damper, CR	115	Shaft, Damper,CR;B
116	Holder, Pulley, Driven	117	Shaft, Pulley Driven
118	Lever, Assy.,Tension	119	Pulley, Drive
120	Timing Belt;B	121	Roller,Tension
122	Shield Plate, Power Supply	123	Shield Plate, Rear
124	Grounding Plate, Front	125	Grounding Plate, Power Supply
127	Grounding Plate, FFC	128	Grounding Plate, Motor

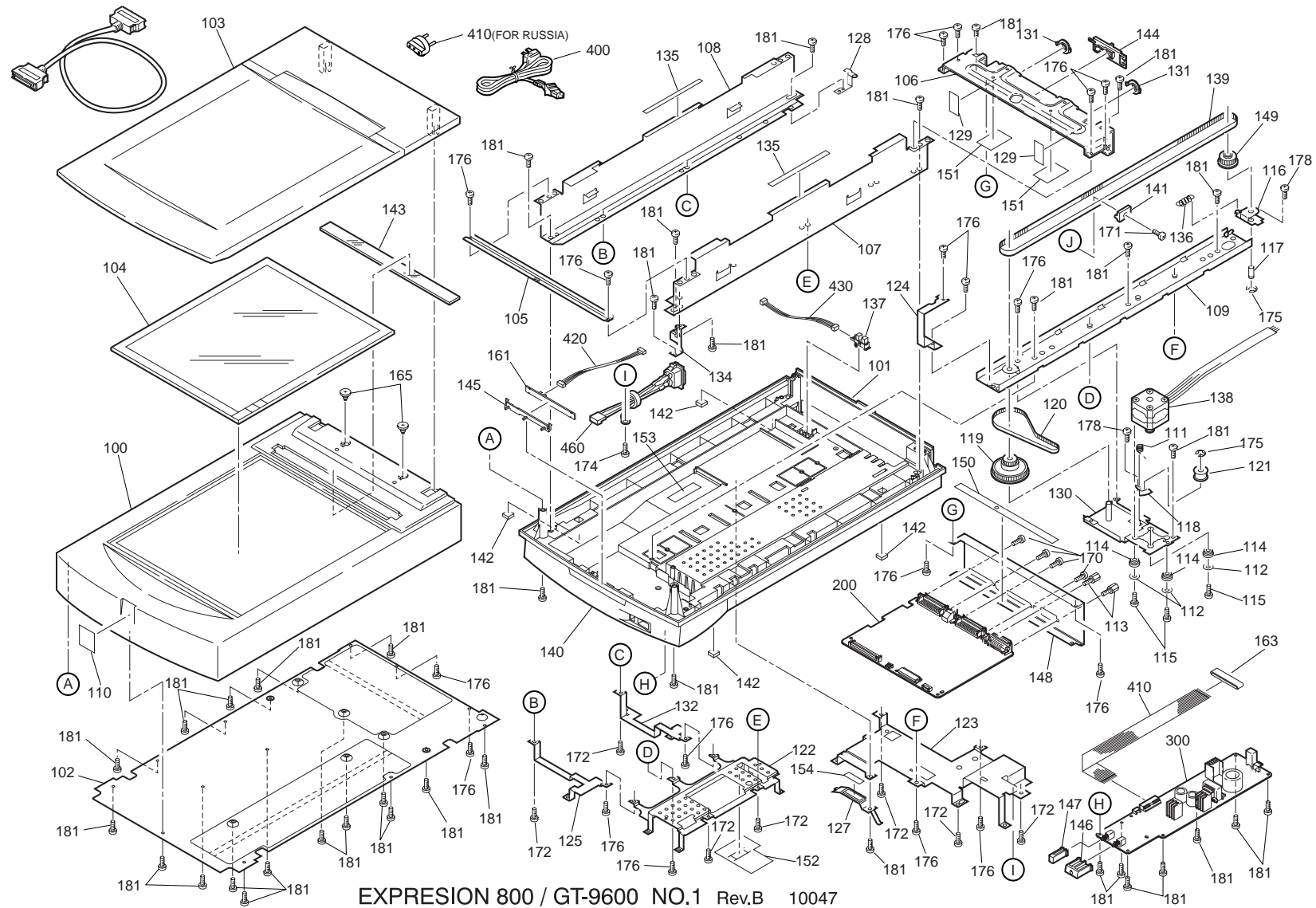
**Table 7-6. Parts List**

No.in the figure	Parts Name	No. in the figure	Parts Name
129	Sheet, Frame, Rear	130	Frame, Assy., Motor
131	Sleeve, Frame, Rear	132	Grounding Plate, Power Supply;B
134	Grounding Plate, Frame	135	Sheet, Frame, Protect
136	Extension Spring, 600	137	Detector HP, 4V, 50MA, 100MW
138	Motor Assy.,CR	139	Timing Belt
140	Cover, Optical Plate	141	Clamp, Belt
142	Foot	143	Glass, Small
144	Lever, Lock	145	Optical, Plate
146	Keytop, Power Switch	147	Keytop, Reset, Switch
148	Cover, If, Plate	149	Pulley, Driven
150	Sheet, Shield, Main;B	151	Sheet, Frame, Rear;B
152	Sheet, Shield, Condenser	153	Double Side, Tape, 75x20
154	Block, Hold, FFC	161	Board, Assy.,LED
163	Ferrite Core, Large	165	Metal Fitting Cover Document
170	C.P.Screw, 2.5x8, F/NI	171	C.B.Screw M3x6
172	C.B.Screw M3x3	174	C.B.(O) Screw M4x8 F/ZG
175	Retaining Ring, Type-E(3)	176	C.B.S. Screw M3x6
178	C.P.S.P.S. Screw M3x6	180	C.B.B. Screw M3x10
181	C.B.B. Screw M3x12	184	Retaining Ring Type-E(2.3)
200	Board Assy., Main	--	----

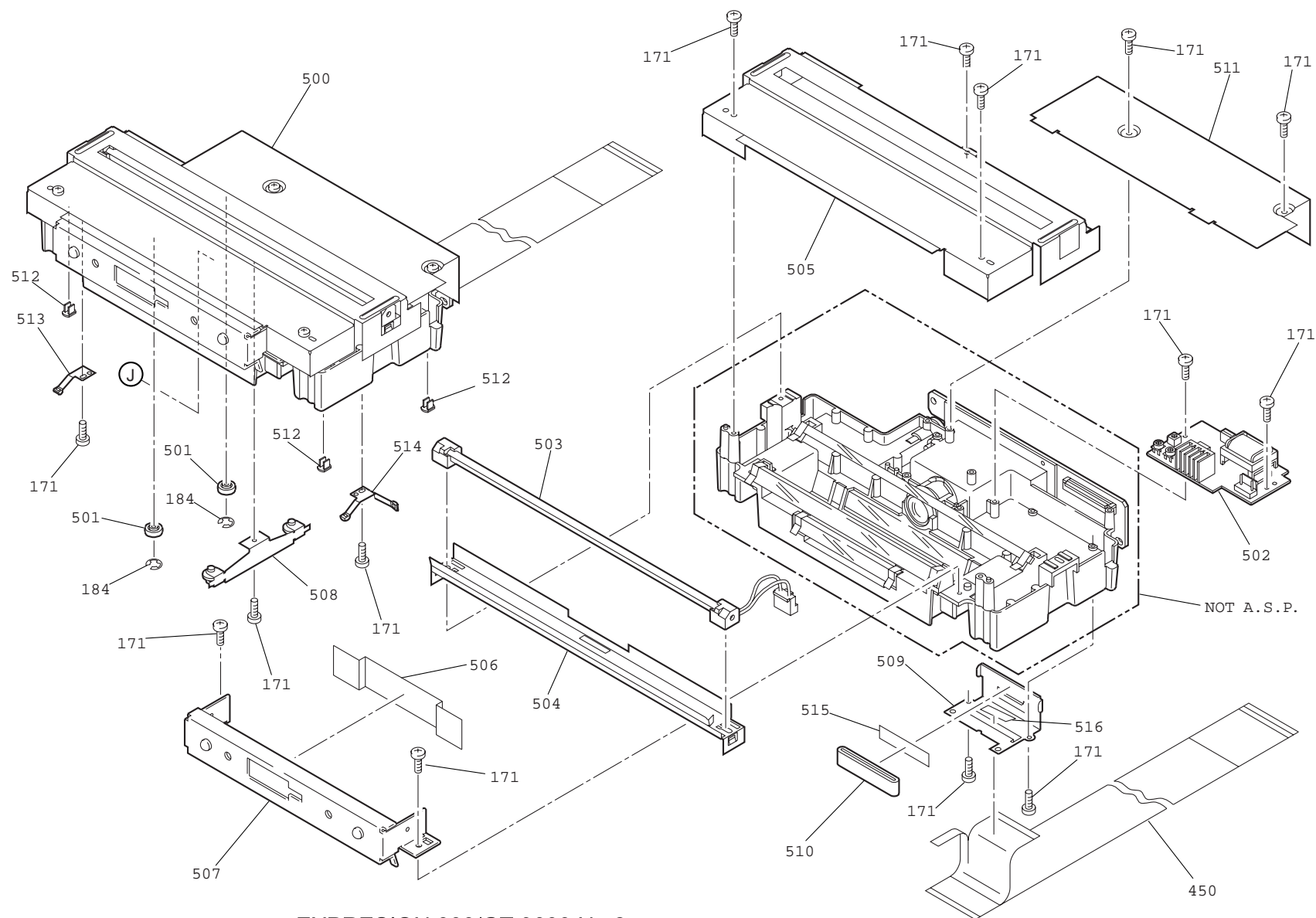


Table 7-7. Parts List

No.in the figure	Parts Name	No. in the figure	Parts Name
300	Board Assy.,Power Supply, B035 PSH	400	AC Cable/Power Cable
410	Harness	420	Harness
430	Harness	450	Harness, CR
460	Harness Acinlet	500	Carriage Assy.
501	Roller, Carriage;C	502	Board Assy., Inverter
503	Lamp, Assy.	504	Cover, Lamp
505	Cover, CR	506	Cover, Mount Plate
507	Mount Plate, Main	508	Holder Assy., Roller
509	Clamp, Ferrite Core	510	Ferrite Core
511	Cover, Rear, CR	512	Slider, Carriage
513	Brush, CR	514	Brush, CR;B
515	Double Side Tape, 8x17	01	Individual Carton Box
02	Radset, Scanner	03	Pad, Accessory
04	Plastic Protective Bag/ 730x640x0.04T	05	Plastic 370x250x0.03T

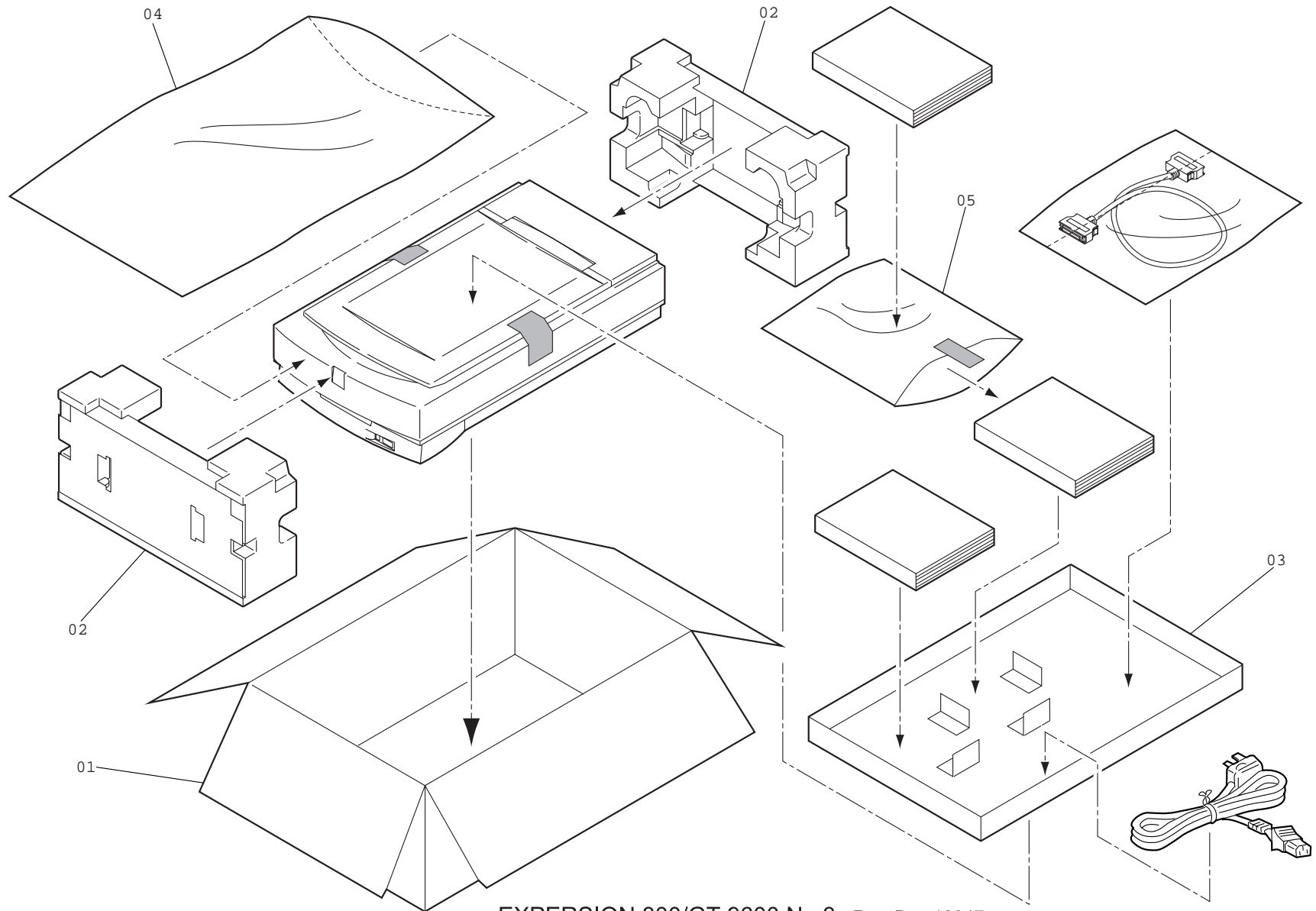


**Figure 7-6. Exploded Diagram 1**



EXPRESION 800/GT-9600 No.2 Rev.B 10047

Figure 7-7. Exploded Diagram 2



EXPERION 800/GT-9600 No.3 Rev. B 10047

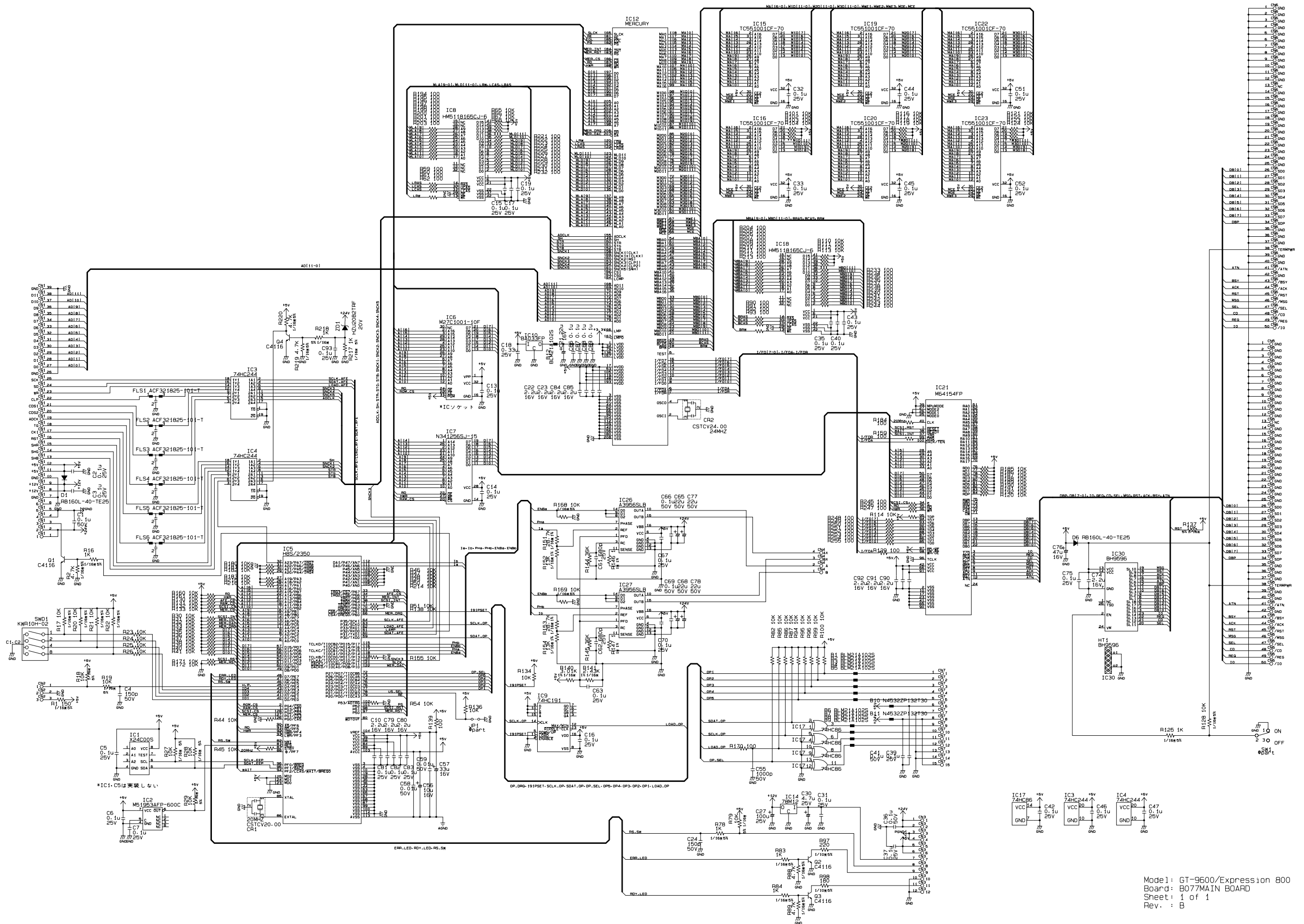
Figure 7-8. Exploded Diagram 3

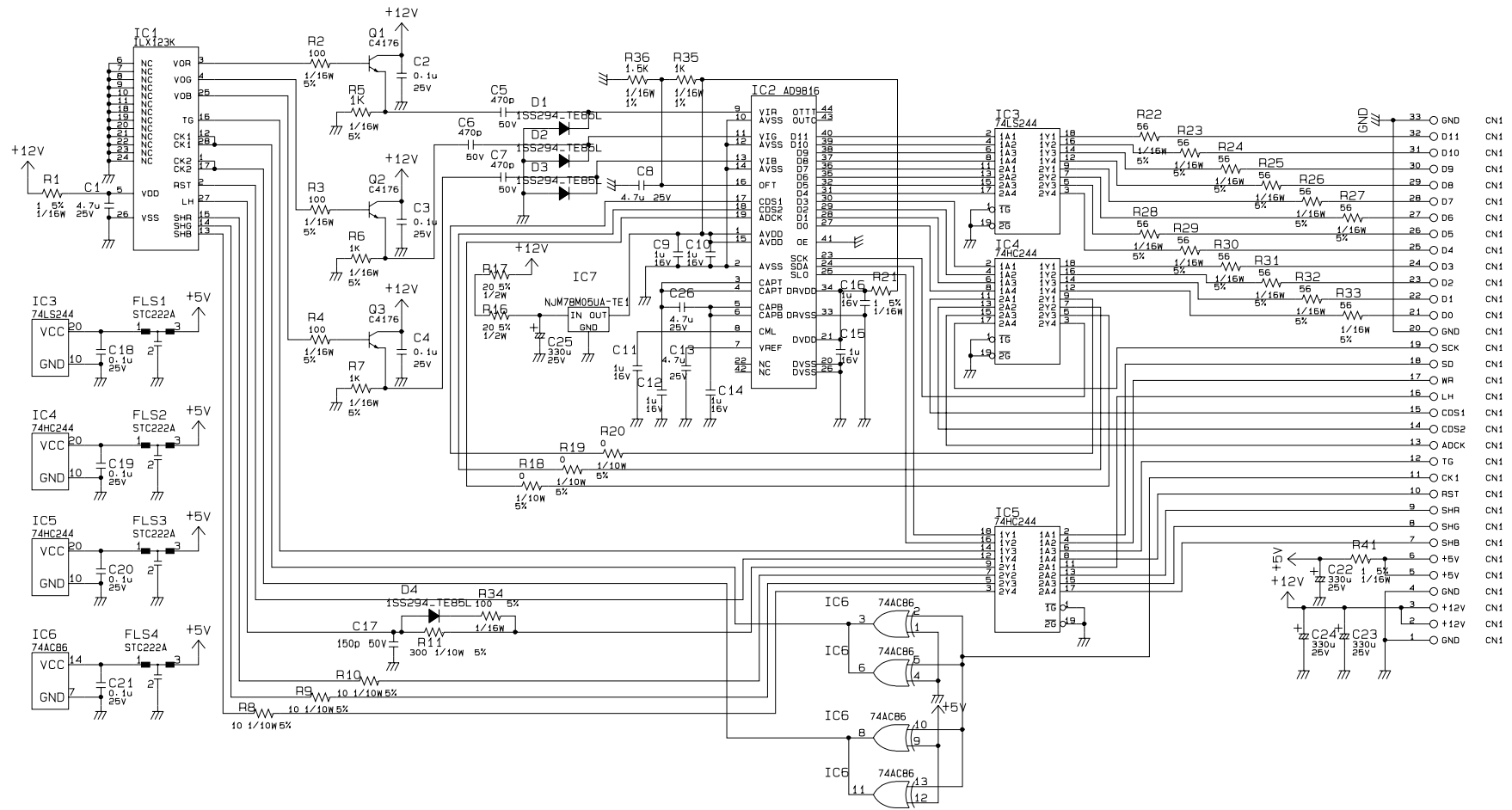
## 7.5 Circuit Schematics

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Following pages show the electric circuits of this scanner.

- ☐ B077 Main Board
- ☐ B077ISN Board





Model: GT-9600/Expression 800  
Board: B077ISN BOARD  
Sheet: 1 of 1  
Rev. : B