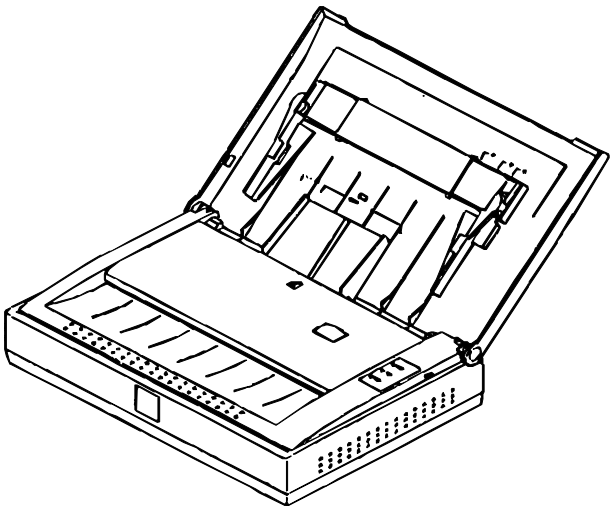
EPSON IMAGE SCANNER

GT-300/ES-300GS

SERVICE MANUAL



EPSON

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PREFACE

This manual describes functions, theory of electronical and mechanical operations, maintenance, and repair of GT-300/ES-300GS.
The instructions and procedures included herein are intended for the experience repair technician, and attention should be given to the precautions on the preceding page. The chapters are organized as follows:

CHAPTER 1. PRODUCT DESCRIPTION

Provides a general product overview, lists specifications, and illustrates the main components of the scanner.

CHAPTER 2. OPERATING PRINCIPLES

Describes the theory of scanner operation.

CHAPTER 3. DISASSEMBLY AND ASSEMBLY

Includes a step-by-step guide for product disassembly and assembly

CHAPTER 4. ADJUSTMENTS

This scanner is not needed any adjustments.

CHAPTER 5. TROUBLE SHOOTING

Provides Epson-approved techniques for service.

CHAPTER 6. MAINTENANCE

Describes preventive maintenance techniques and lists lubricant required to service the equipment.

APPENDIX

Describes connector pin assignments, circuit diagrams, circuit board component layout and exploded diagram.

The contents of this manual are subject to change without notice.

CHAPTER 1 General Description

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1.1 FEATURES

The GT-300/ES-300GS is a sheetfed, high resolution (300 dpi), monochrome image scanner for use with A4, letter, U.S. legal, or business card paper. Its main features are as follows:

❏ Small desktop size

❏ 300 dpi resolution

❏ 256 gray levels

❏ Text Enhanced Technology (TET)

Automatic background removal for text scanning by optimized threshold technology

❏ Automatic segmentation

Automatic separation of photo and text areas

❏ Halftone technology

Error diffusion and dither

❏ Scaling by interpolation technology

Resolution:	50 - 600 dpi
Zoom:	50 - 200 %

❏ New command level [ESC/I-A5]

TET (Text Enhanced Technology)	[ESC B 03h]
Automatic area segmentation	[ESC si]
Data order (mirror image)	[ESC Ki]

❏ Bi-Directional I/F Model and SCSI I/F Model

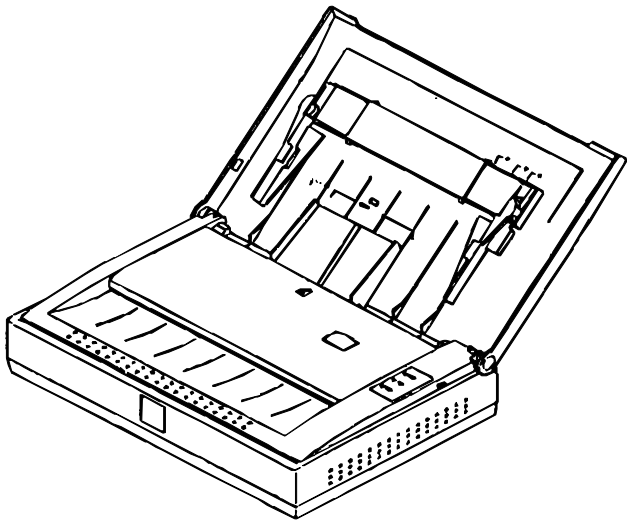

Figure 1-1. GT-300/ES-300GS Exterior View

1.2 SCANNER SPECIFICATIONS

This section describes the specifications for the GT-300/ES-300GS scanner.

1.2.1 General Specifications

Product type:	Sheetfed image scanner
Scanning mode:	Monochrome
Photoelectric device:	CCD line sensor
Maximum document size:	8.5 inches × 14 inches (U.S. legal) (216 × 356 mm)
Minimum document size:	Business card (55 × 90 mm) (2.17 × 3.54 in.) with attachment part
Document capacity:	10 sheets (60 - 90 g/m^2, plain paper)
Optical resolution:	300 dpi
Interface Bi-D model:	Bidirectional (Bi-D) parallel interface
SCSI model:	Small Computer System Interface (SCSI)
Scanning speed:	4 ppm (A4, 300 dpi, B&W)
A/D converter:	8 bits
Light source:	White fluorescent lamp
Output modes:	Error diffusion: 3 modes Dither: 4 resident modes and 1 user-defined mode
Gray scale levels:	256 levels
Output resolution:	50 - 600 dpi
Scaling:	50 - 200%
Text enhancement:	Background elimination technology
Brightness:	7 levels
Contrast:	256 levels
Gamma correction:	5 resident tables (linear, analog monitor, 3 printers) User-defined table
Sharpness:	5 levels

1.2.2 Electrical Specifications

Supply voltage:	AC 100 - 120V ± 10% AC 220 - 240V ± 10%
Frequency:	49.5 - 60.5 Hz
Power consumption:	Approximately 35 W

1.2.3 Environmental Conditions

Temperature:	Operating: 5 - 35 ° C (41 - 95 ° F) Storage: -25 - 60 ° C (-13 - 140 ° F)
Humidity:	Operating: 10 - 80% Storage: 10 - 85%

1.2.4 Reliability

Main unit:	Mean Cycles Between Failures (MCBF): 50,000 pages
Lamp life:	2000 hours

1.2.5 Operating Conditions

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

1.3 INTERFACE SPECIFICATIONS

This scanner is equipped with a bidirectional parallel interface (Bi-D model) or a SCSI (SCSI model). This section presents the specifications for each interface type.

1.3.1 Bi-D Parallel Interface

Data format: 8-bit parallel

Synchronization: $\overline{\text{STROBE}}$ pulse

Handshaking: $\overline{\text{ACKNLG}}$ and BUSY signals

Logic level: TTL-level compatible

Connector type: Amphenol 57-30360 36-pin plug or equivalent

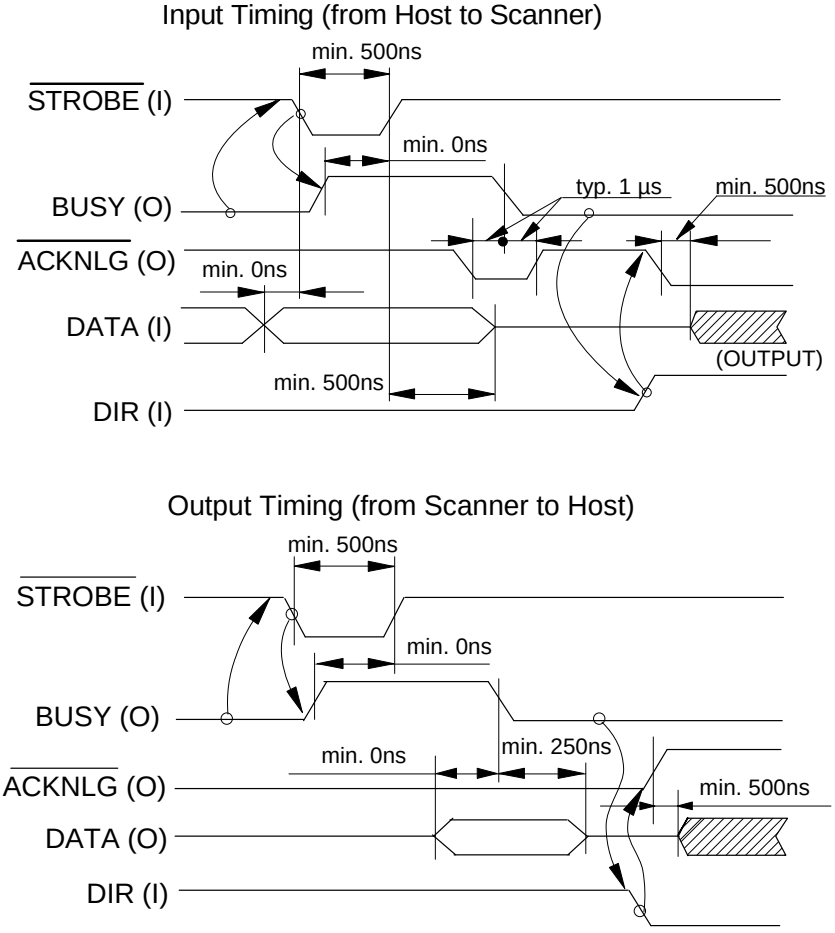

Figure 1-2. Data Transmission Timing

Data transmission timing is illustrated in Figure 1-2.

Table 1-1 presents pin assignments for the Bi-D parallel interface.

Table 1-1. Bidirectional Parallel Interface Pin Assignments

Pin No.	Return Pin	Signal	In/Out	Description
1	19	$\overline{\text{STROBE}}$	I/O	$\overline{\text{STROBE}}$ pulse to read in or send out data. Pulse width at receiving terminal must exceed 0.5 ms.
2 - 9	20 - 27	DATA 0 - 7	I/O	These signals convey the 1st to 8th data bits. HIGH level indicates 1. LOW level indicates logical 0.
10	28	$\overline{\text{ACKNLG}}$	O	LOW level indicates that data has been received and the scanner is ready to accept more data.
11	29	BUSY	O	When the signal is HIGH, the scanner cannot receive data. The cause of BUSY becomes HIGH: 1) During data entry. 2) During scanning. 3) When the scanner is not ready. 4) During a scanner error.
12 - 15	-	NC	-	-
16	-	GND	-	Logic ground level.
17	-	C-GND	-	Scanner chassis ground.
18	-	NC	-	-
19 - 30	-	GND	-	Twisted pair return signal ground level.
31	-	$\overline{\text{INIT}}$	I	When this signal becomes LOW, the scanner is in hardware reset condition. This level is usually HIGH.
32	-	NC	-	-
33	-	GND	-	Twisted pair return signal ground level.
34 - 35	-	NC	-	-
36	-	DIR	I	Direction of data transfer: LOW is data input from PC to scanner. HIGH is data output from scanner to PC.

Note: NC above means “not connected”.

1.3.2 SCSI Interface

1. Basic Specifications

Any items not included in these specifications should conform to ANSI standard X3.131-1986.

1. Functions

The following functions included in ANSI standard X3.131-1986 are supported:

1) Bus-free phase
2) Arbitration phase
3) Selection/reselection 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 phase

8) Attention condition
9) Reset condition

2. Logic level: TTL compatible

3. Electrical specifications: Conform to ANSI standard X3.131-1986.

4. Connector: One 25-pin D-sub connector

5. Terminator: Internal terminator (TBD)

Controls active or inactive status via a switch.

6. SCSI ID: Set with a rotary switch.

Switch numbers correspond to the available addresses and can be set from 0 to 7. When set to "9", the switch is in {ESC-I/B4} emulation mode. The SCSI ID is fixed to "2".

2. Commands

The SCSI interface uses the group "0" processor commands shown in Table 1-2.

Table 1-2. Commands

Command	Code	Description
Test Unit Ready	00h	Confirm for operation.
Request Sense	03h	Request sense data. *1
Receive	08h	Data transmission from target to initiator.
Send	0Ah	Data transmission from initiator to target.
Inquiry	12h	Request information about SCSI device. *2

*Note *1: Only the extension sense data format is supported for sense data returned by the Request Sense command.*

*Note *2: The data returned by the Inquiry command is as follows:*

Peripheral device type: 03h (processor)

RMB: 00h (non-removable media)

ISO version: 00h

ECMA version: 00h

ANSI version: 01h (current version)

Additional length: 23h

*Vendor unique parameter byte: [00h, 00h, 'EPSON', 20h, 20h, 20h, 'SCANNER', 20h, 'GT-xxxx', 20h, "****', 00h, 00h, 00h, FFh]*

Note above that: 'GT-xxxx' is the product name.
*'****' is the ROM version.*

3. Status Values

Status values for the SCSI interface are shown in Table 1-3.

Table 1-3. Status Values

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: All other codes are received. 'R' means reserved bit.

4. Messages

Messages for the SCSI interface are shown in Table 1-4.

Table 1-4. Messages

Message	Code	Direction	Completion of ATN
Command complete	00h	In	-
Disconnect	04h	In	-
Bus device reset	06h	Out	Yes
Message reject	07h	In/Out	Yes
Identify	80h - FFh	In/Out	No

5. SCSI Interface Pin Assignments

Pin assignments are presented in Table 1-5.

Table 1-5. SCSI Pin Assignments

Pin No.	Signal	In/Out	Description
1	REQ	O	Request
2	MSG	O	Message
3	I/O	O	Input/Output
4	RST	I	Reset
5	ACK	I	Acknowledge
6	BSY	I/O	Busy
7	GND	-	Ground
8	DB0	I/O	Data bus 0
9	GND	-	Ground
10	DB3	I/O	Data bus 3
11	DB5	I/O	Data bus 5
12	DB6	I/O	Data bus 6
13	DB7	I/O	Data bus 7
14	GND	-	Ground
15	C/D	O	Control/Data
16	GND	-	Ground
17	ATN	I	Attention
18	GND	-	Ground
19	SEL	I/O	Select
20	DBP	I/O	Data bus parity
21	DB1	I/O	Data bus 1
22	DB2	I/O	Data bus 2
23	DB4	I/O	Data bus 4
24	GND	-	Ground
25	TERMPWR	-	Termination power (+5 V)

1.4 FUNCTIONS

This section describes the scanner functions.

1.4.1 Control Code Handshaking Procedures

This section describes the control code handshaking procedures.

(1) Control Code Without Parameters

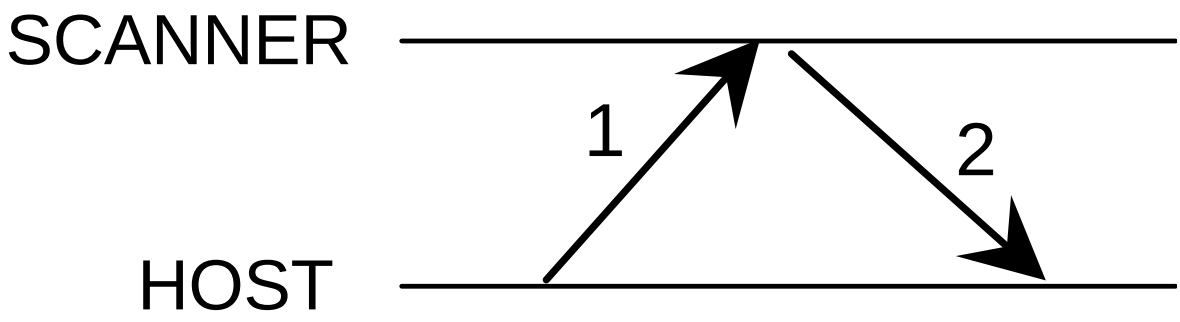

Figure 1-3. Control Code Handshaking (1)

Step 1: Control code sent from host computer.

Step 2: Response received from scanner:

ACK (06h): Legal control code received.
(The scanner accepts the control code.)

NACK (15h): Illegal control code received.
(The scanner does not accept the control code.)

(2) Control Code With Parameters

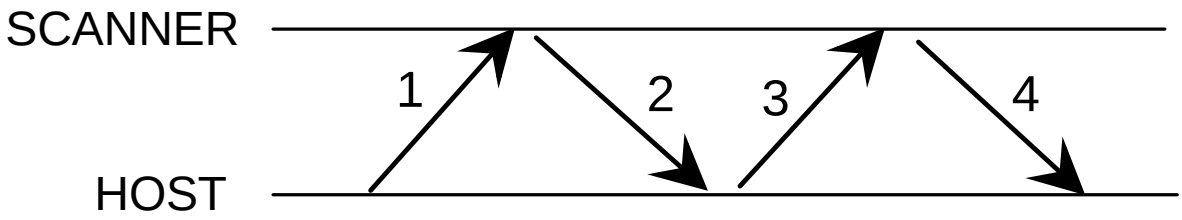

Figure 1-4. Control Code Handshaking (2)

Step 1: Control code sent from host computer.

Step 2: Response received from scanner:

ACK (06h): Legal control code received.
(The scanner accepts the control code.)

NACK (15h): Illegal control code received.
(The scanner does not accept the control code.)

Step 3: When the host receives ACK, it sends parameters.

Step 4: Response received from scanner:

ACK (06h): Legal control code received.
(The scanner accepts the control code.)

NACK (15h): Illegal control code received.
(The scanner does not accept the control code.)

1.4.2 Data Handshaking Procedures

This section describes the data handshaking procedures.

(1) Inquiry Data

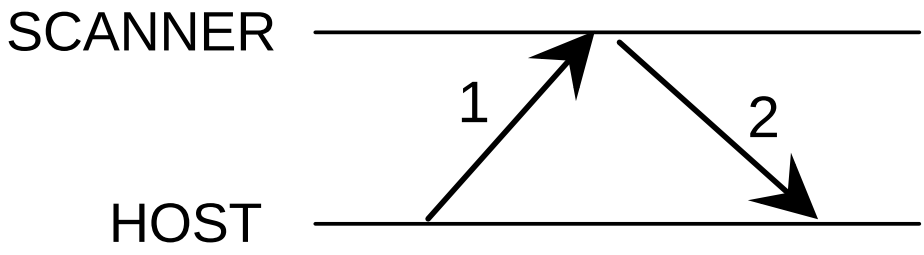

Figure 1-5. Data Handshaking (1)

The type of data is determined by the control code (scanner ID, scanner status, etc.).

Step 1: Control code sent from host computer.

Step 2: Data received from scanner.

(2) Image Data

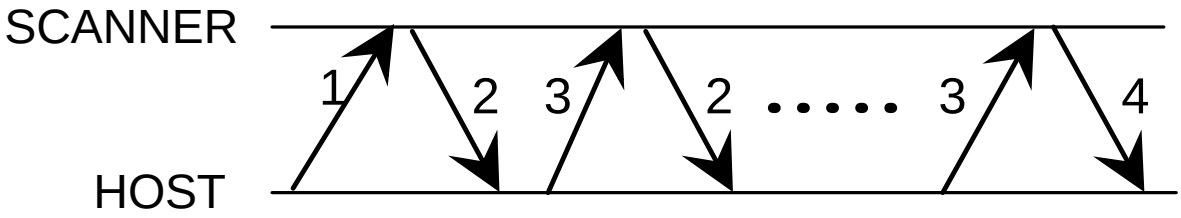

Figure 1-6. Data Handshaking (2)

Image data is sent as a raster or a block of data. (Refer to Section 1.4.3, Data Structure.)

Step 1: Control code (ESC G) sent from host computer.

Step 2: Image data received from scanner.

Step 3: Response sent from host computer:
ACK (06h): Continue and send next data.
CAN (18h): Abort.

Step 4: Last image data received from scanner.

Note: The host computer should not send an ACK (06h) code after receiving the last image data.

1.4.3 Data Structure

This section describes two types of data structures: line data and block data.

1. Line Data Structure

This data consists of a 4-byte information area and a line data area.

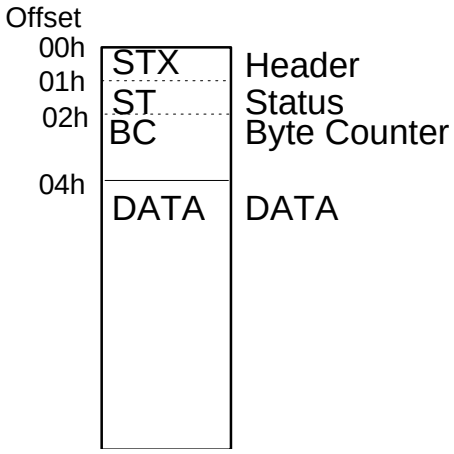

Figure 1-7. Line Data Structure

(1) Information Area

The information area contains the following:

Header: STX code (02h).

The header indicates the beginning of the data.

Status: The status indicates the status of the scanner. (Refer to Section 1.4.4, Status Byte Format.)

Byte Counter:

The byte counter indicates the number of data bytes that follow the information area.

The byte counter consists of 2 bytes, and the lower bytes precede the higher bytes.

(2) Data Area

The data area contains inquiry data or a raster of image data that corresponds to a control code such as ESC I, ESC G, etc. The number of the data is indicated in the byte counter.

2. Block Data Structure

This data consists of a 6-byte information area and an n-line image data area (where 'n' is the line counter value).

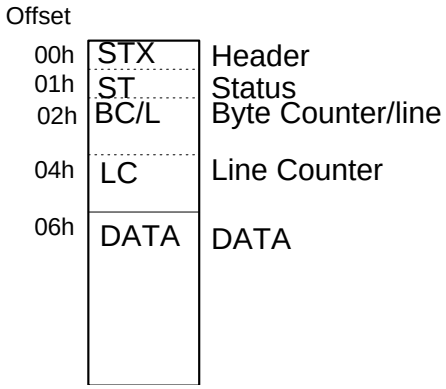

Figure 1-8. Block Data Structure

Note: If no data follows the information area, the byte counter and line counter are set to 0000h.

(1) Information Area

The information area contains the following:

Header: STX code (02h).

The header indicates the beginning of the data.

Status: The status indicates the status of the scanner. (Refer to Section 1.4.4, Status Byte Format.)

Byte Counter:

The byte counter/line indicates the number of bytes included in a raster of the image.

Line Counter:

The line counter indicates the number of rasters of the image.

(2) Data Area

The data area contains a plural raster of image data indicated in the byte counter/line and the line counter (by the value of the parameter 'n').

Note 1: The block data structure is available when executing the Set Line Counter command. (Refer to ESC d.)

Note 2: The byte counter/line and the line counter consist of 2 bytes, and the lower bytes precede the higher bytes.

1.4.4 Status Byte Format

This section describes the status byte format. The status indicates the current condition of the scanner and image data.

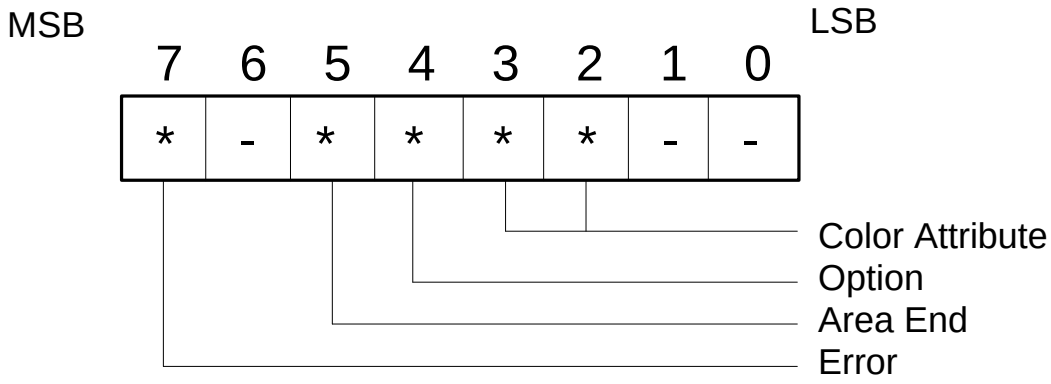

Figure 1-9. Status Bit Details

Bit 7:	**Error flag**	**Set when a system error occurs.**
Bit 6:	**(reserved)**	**Always “0"**
Bit 5:	**Area end flag**	**Set to “1" in the last data block.**
Bit 4:	**Option flag**	**Always “1"**
Bit 3:	**Color attribute**	**Always “0"**
Bit 2:	**Color attribute**	**Always “0"**
Bit 1:	**(reserved)**	**Always “0"**
Bit 0:	**(reserved)**	**Always “0"**

1.5 OPERATION

This section describes the switches and indicators used to operate the scanner.

1.5.1 Switches

1. POWER switch

Turns the scanner on and off.

When the power is turned on, the scanner is initialized.

2. DIP switch (Bi-D model only)

No. 1 Emulation switch ([ESC/I-B4] scanner emulation)

ON:Emulation mode

OFF: Domestic mode

3. ID switch (SCSI model only)

“0" - ”7"SCSI address

“8"Reserved

“9" [ESC/I-B4] scanner emulation SCSI ID is fixed to ”2".

4. Terminator switch (SCSI model only)

ON: **Internal terminator active**

OFF: **Internal terminator off**

1.5.2 Indicators

POWER (green)	**Indicates the power is on.**
READY (green)	**Turns on when the scanner is ready to receive data. Flashes in combination with the ERROR light when an error is detected.**
ERROR (red)	**Turns on or flashes when the scanner detects an error. (Refer to Section 1.5.3, Errors.)**

1.5.3 Errors

When an error occurs, the scanner indicates the type of error by using the ERROR and READY indicators.

1. Command Error

Cause:	**Unidentified command or incorrect parameter is received.**
Disposition:	**The scanner ignores the wrong command or parameter. (Therefore, the current settings or the default values remain effective.)**
	The scanner sends a NACK signal and then waits for the next command or parameter.
Indicator:	**READY comes on.**
	ERROR comes on.
Remedy:	**The error condition is cleared when the scanner receives a correct code.**

2. Interface Error

Cause:	**Incorrect communication procedure is detected.**
	A SCSI transmission is frozen for more than 30 seconds (excluding the BUS FREE phase).
Disposition:	**The lamp goes off and the scanner stops operation.**
Acceptable command:	**None.**
Indicator:	**READY goes off**
	ERROR blinks.
Remedy:	**Turn off the scanner and then turn it on.**
	INIT signal in the SCSI interface becomes active.
	SCSI is reset.

3. Fatal Error

Cause:	**Paper jam.**
	Paper out.
	One of the lamps is broken.
	System breakdown.
Disposition:	**The scanner stops operation.**
	Bit 7 of the status byte is set.
	The responding bit is set in the extended status data.
	Acceptable commands: ESC F, ESC f, ESC @.
Indicator:	**READY blinks.**
	ERROR blinks.
Remedy:	**Turn the scanner off and remove the cause of the error.**
	Send ESC @ codes to the scanner.
	INIT signal in the parallel interface becomes active.
	SCSI reset signal becomes active.
	SCSI is reset.

1.6 MAIN COMPONENTS

For fast maintenance and repair, the components of the GT-300/ES-300GS have been designed for easy removal and replacement. The main components are as follows;

- ❑ **MAIN Board Assembly**
- ❑ **Power Supply Board Assembly**
- ❑ **Document Feeding Mechanism**
- ❑ **Scanning Unit**
- ❑ **Housing Assembly**

(1) MAIN Board Assembly

The MAIN Board Assembly consists of the CPU board and the AD board. These boards are connected to each other.

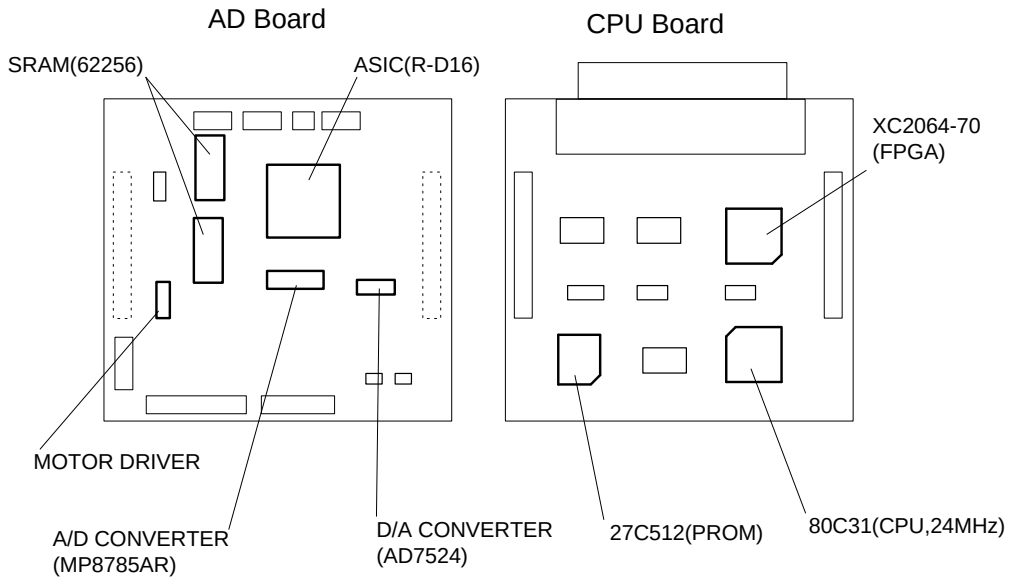

Figure 1-10. MAIN Board Assembly (Bi-D Model)

The MAIN Board of SCSI Model has the SCSI IC on CPU Board.

(2) Power Supply Board Assembly

The Power Supply Board Assembly converts the input AC voltage to the DC voltages (+5 V, +12 V, -12 V, and +24 V) required by the scanner.

(3) Document Feeding Mechanism

The Document Feeding Mechanism consists of the Scanning Plate Assembly, SP Roller, PF Roller, and Stepping Motor.

(4) Scanning Unit

The Scanning Unit consists of the Lamp Assembly, Lens Holder Assembly, and Scanning Window Plate Assembly.

(5) Housing Assembly

The Housing Assembly consists of the Tray Cover Assembly, Cabinet Assembly, and Chassis.

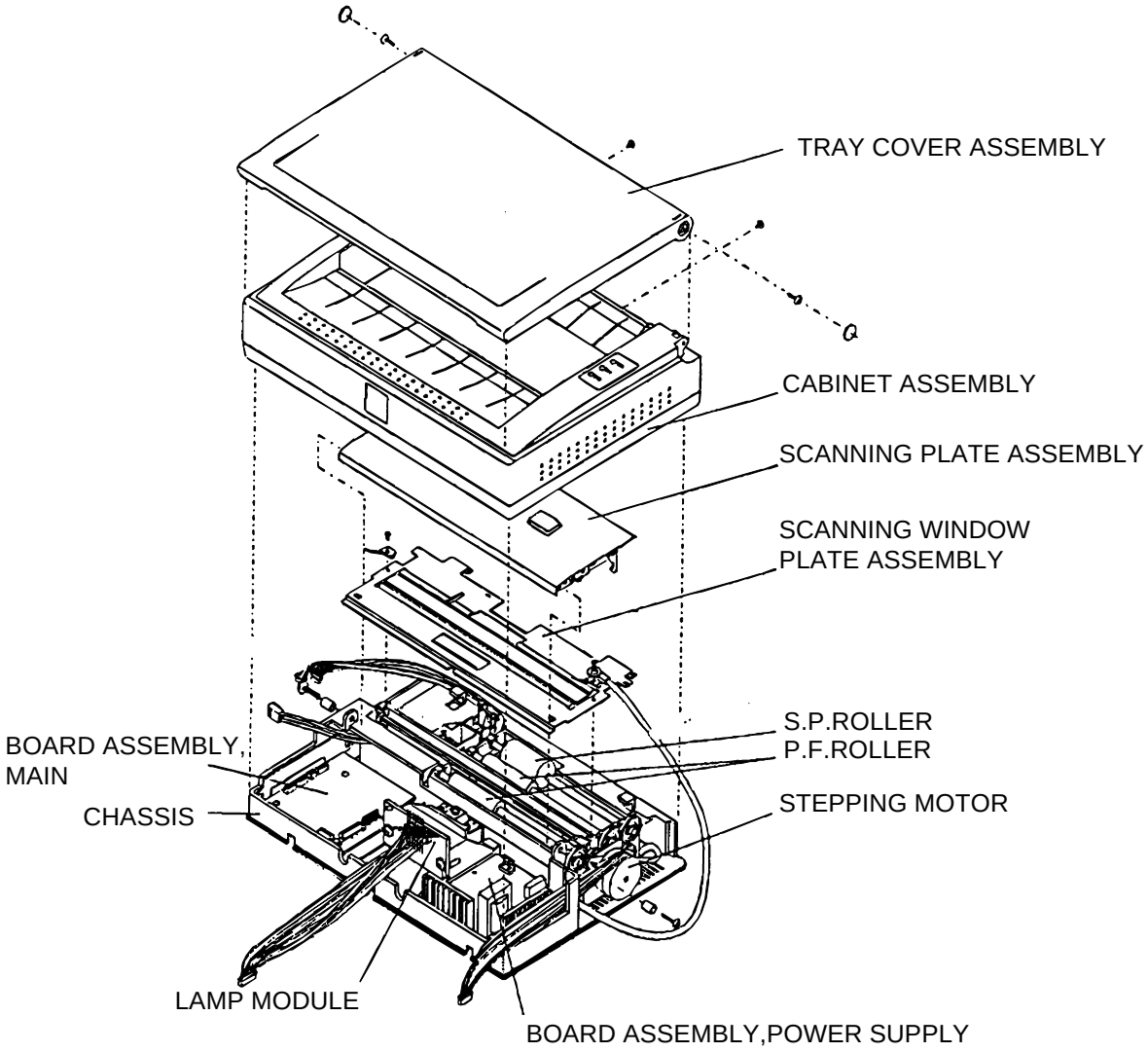

Figure 1-11. Main Components

CHAPTER 2 Operation Principles

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2.1 OPTICAL PATH

At the start of a scan, the lamp is turned on and the PF Roller rotates and travels the length of the document.

Intense light from the cold cathode fluorescent lamp is reflected to the surface of the document from the scanning window and then, via two front-surface mirrors, to the lens and to the photo-sensitive Charge-Coupled Device (CCD).

The SP Roller also rotates during scanning, but at a lesser rate than the PF Roller because of the pulley arrangement. This allows enough space to separate the documents and scan them one-by-one past the PF Roller to the scanning window.

This scanner has two photo-interrupters: the Paper-Out Sensor and the Paper-In Sensor. The Paper-Out Sensor detects the document on the Tray Cover. The Paper-In Sensor detects the front edge of the document. This sensor determines the first scanning position on the document.

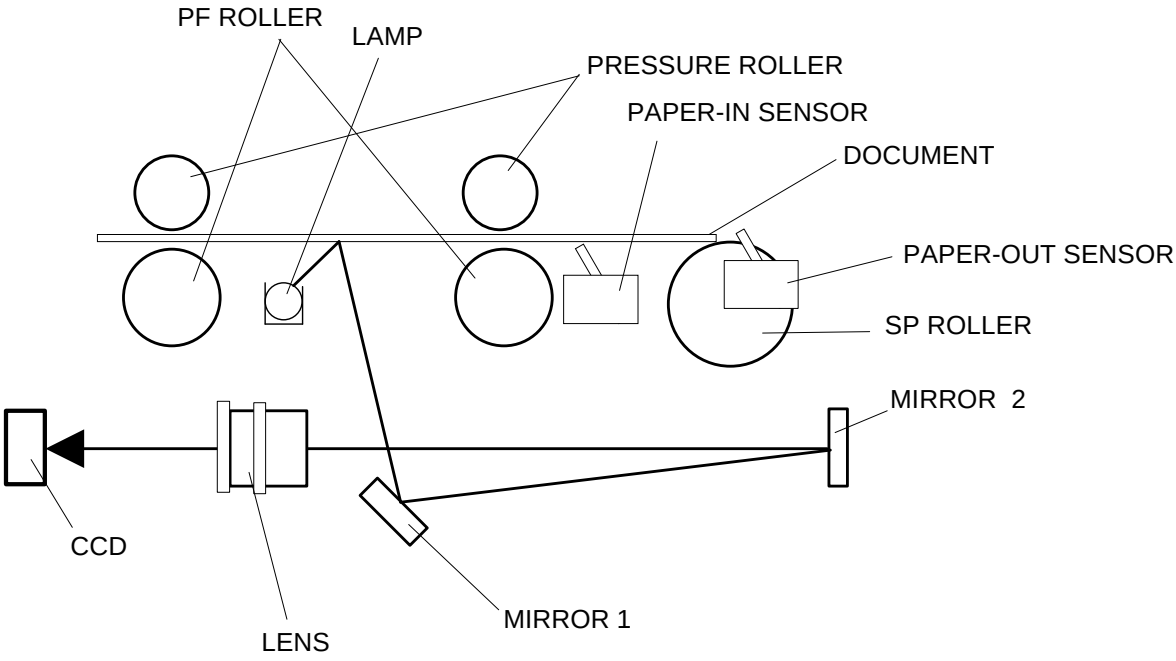

Figure 2-1. Optical Path

2.2 SCANNING SYSTEM

The lens produces a thin image of a section of the document 1/300th of an inch high and as wide as the document. The image is focused on a long, linear array of photo-sensitive cells. At 300 dpi resolution, 2,552 cells are required in the CCD for the width of a standard page.

Each CCD cell is an analog device whose voltage output (the video output) is proportional to the light falling on it, from 0 volts if the "dot" or picture element is black to 2 volts if the picture element is white. While the lamp is paused, the CCD cells are scanned electronically. Scanning consists of converting the cell outputs from analog to digital signals, one cell at a time for a picture element. The digital signals are processed according to the instructions received about image type, etc. and are combined into bytes for transmission on the interface. For a bilevel image, eight picture elements are combined into one byte. For a gray scale image, one picture element is put into one byte.

Because the processing of an image takes a variable amount of time, the scanner CPU controls the drive and steps it 1/300th of an inch to the next position only when processing of the current position is complete. Therefore, the driver motor does not rotate at a constant rate.

2.2.1 Image Scanning

Image mode scans drawings, photographs, and so forth. It can also be used to enter handwriting and typed text.

Based on the type of documents to be scanned or on the type of data the user wants, the scanner converts the CCD analog video signal to single-bit bilevel data, signal-bit halftone data, or eight-bit gray scale data.

2.2.2 Bilevel Scanning

Bilevel mode converts the analog video data from each CCD cell into black or white, determined by the average value of the video signal and thus adaptable to the background color and clarity of the input document.

2.2.3 Halftone Scanning or Dithering

Halftone scanning creates patterns of black and white dots (picture elements) that represent levels of gray in a photograph. When the scanner halftones a photograph, it examines a group of cell outputs relative to the picture elements surrounding them. The scanner examines an 8×8 quadrant of picture elements. By determining the levels of gray to be represented by this quadrant, each individual picture element is assigned a value of either black or white, which used together optically create the desired shade of gray. Halftone scanning trades off resolution, or image sharpness, for shading and tone information.

2.2.4 Gray Scale Scanning

Gray scaling is the process by which the scanner measures the true value of a picture element and assigns it a tone of gray between 0 and 255.

That is, the gray value is expressed as a digital value between 0 and 255. Gray scale imaging preserves tone and shading information, encoded as an 8-bit data value.

The tone of gray assigned to a picture element is based on the analog voltage output of its CCD cell, and thus on the amount of light reflected by the corresponding element of the document.

Unlike the bilevel and halftone modes that derive their threshold values from the image, the gray scale mode is absolute. The reference for the gray scale conversion process is fixed and is not dependent on or related to the image being scanned. In this way, the absolute value of a gray tone is preserved from image to image.

2.2.5 Resolution

The resolution in the length and width dimensions of a document is 300 lpi.

2.2.6 Text Scanning

Text mode is available with the optional adapter for text scanning.

2.2.7 Cropping

Cropping is the process of scanning one specific rectangular area indicated by your computer.

2.3 POWER SUPPLY

The scanner can be powered by either of two power supply boards: a 220-240V board or a 100-120V board. The function of these two boards is the same, except for a difference in primary circuits. The power supply board outputs the DC current necessary to drive the scanner control circuits and the scanning mechanism. Table 2-1 shows the input voltages and fuse ratings for these boards.

Table 2-1. Power Supply Boards

Board	Input Voltage	Fuse F1 Rating
220-240V	220-240V AC	2 AH / 250V
100-120V	100-120V AC	2 A / 250V

2.3.1 Power Supply Overview

The power supply board has four power outputs for use with the various control circuits and the scanning mechanism. Table 2-2 lists the circuitry and the units driven by the four DC output supply voltages.

Table 2-2. Power Supply Output Voltages and Applications

Output Supply Voltage (DC)	Applications
+24 V	Stepping Motor
+12 V	OP. AMP
	Inverter Lamp
	CCD
-12 V	OP. AMP
+ 5 V	Logic Circuit
	Key Panel LED

2.3.2 Power Supply Operation

Figure 2-2 shows a block diagram of the power supply circuit. This circuit employs the Ringing Choke Converter (RCC) switching control system. When AC power is supplied from an external power source to the scanner, a thermistor protects the circuit from power-on rash current and a filter circuit removes the line noise. The AC voltage then undergoes full-wave rectification and is smoothed to produce the direct current supply voltage. This voltage is fed through a switching circuit and secondary smoothing circuits stepped down to +24 V, ±12 V, and +5 V.

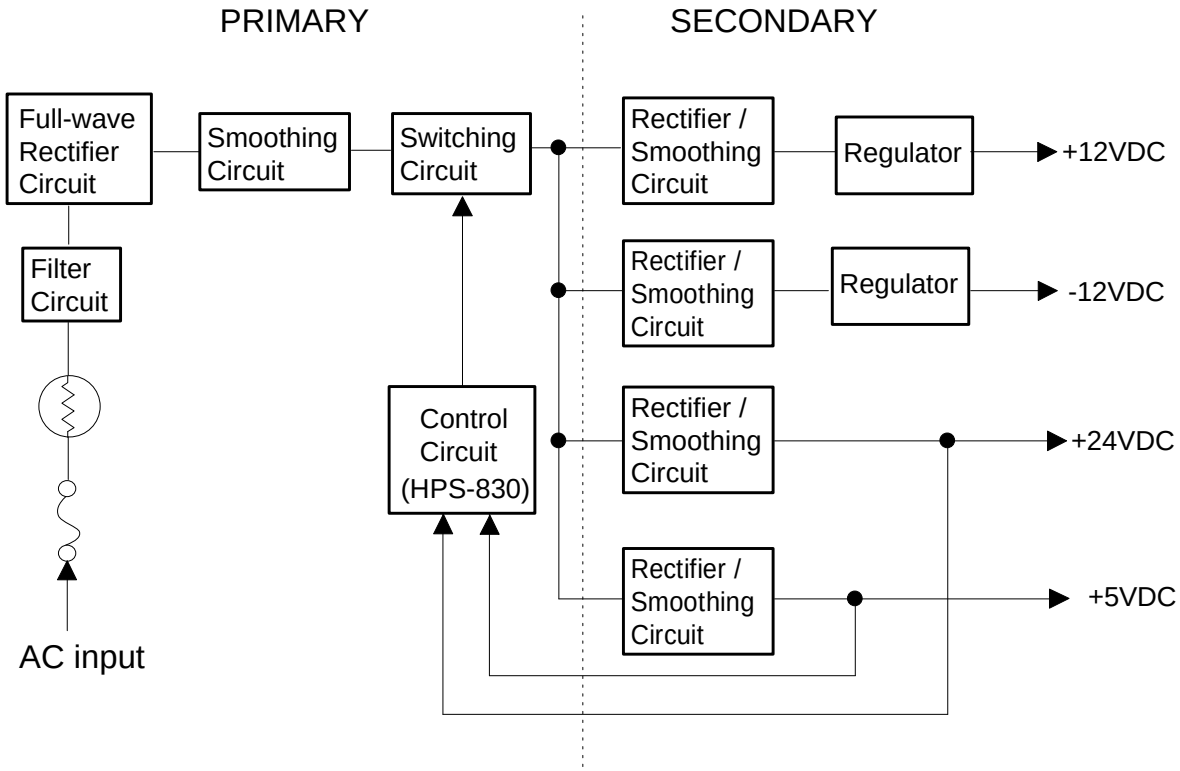

Figure 2-2. Power Supply Circuit

A +24 VDC line voltage detector circuit connects to the primary switching circuit via Control Circuit HPS-830. This feedback control arrangement ensures that the secondary voltages are kept stabilized.

2.4 CONTROL CIRCUIT

2.4.1 Control Circuit Overview

Figure 2-3 shows a block diagram of the control circuitry. The scanner's CPU is an 8-bit 80C31 CPU that runs at 18 MHz. It oversees control of all the components in the scanner.

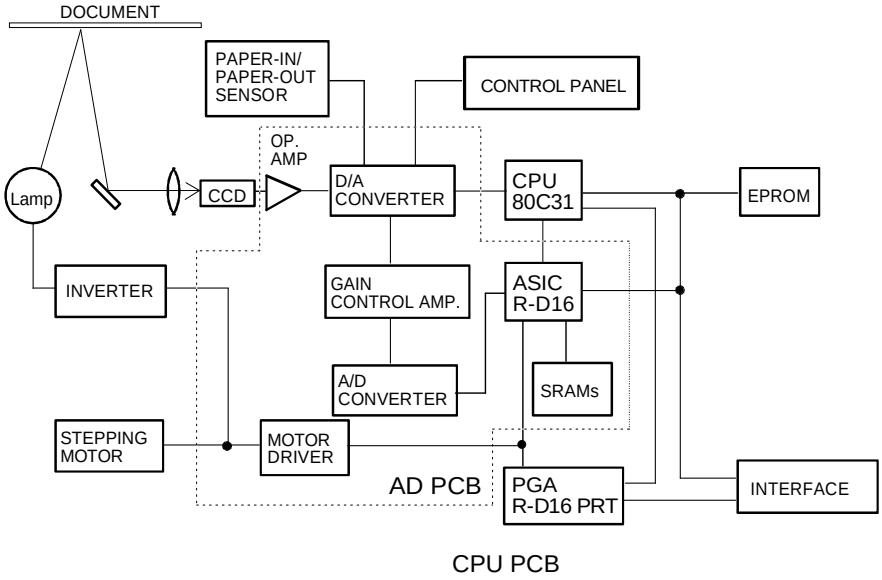

Figure 2-3. Control Circuit Block Diagram

2.4.2 Control Circuit Operation

The control circuit consists of the AD PCB and the CPU PCB. Table 2-3 presents the functions of the main IC and the circuits.

Table 2-3. Main IC and Circuit Functions (Bi-D parallel I/F Model)

Board	IC or Circuit	Location	Function
CPU PCB (Bi-D I/F)	27C512	U3	64K × 8 PROM, contains the scanner control program.
	R-D16PRT	U7	PGA, converts signals to the print port.
	80C31	U9	Receives data from the host computer and controls the scanner.
CPU PCB (SCSI I/F)	53C80	U6	SCSI LSI
AD	UL2003	U2	Motor/lamp driver
	62256	U3,U4	32K × 8 SRAM, local memory
	R-D16	U5	ASIC • Shading correction • Address decoding • Memory manager for SRAMs • Bit manipulation • CCD SHIFT generation, CCD control, etc.
	MP8785	U6	A/D converter
	PM7523	U7	D/A converter
	AD847	U8	OP. AMP
	AD847	U9	OP. AMP, gain control

2.4.2.1 CPU PCB Operation

Figure 2-4 shows a block diagram of the CPU PCB. The CPU PCB controls the dither type selection, EPROM address counter, signal converter to the print port via R-D16PRT (PGA), document feed motor, and panel LEDs by sensor signal detection.

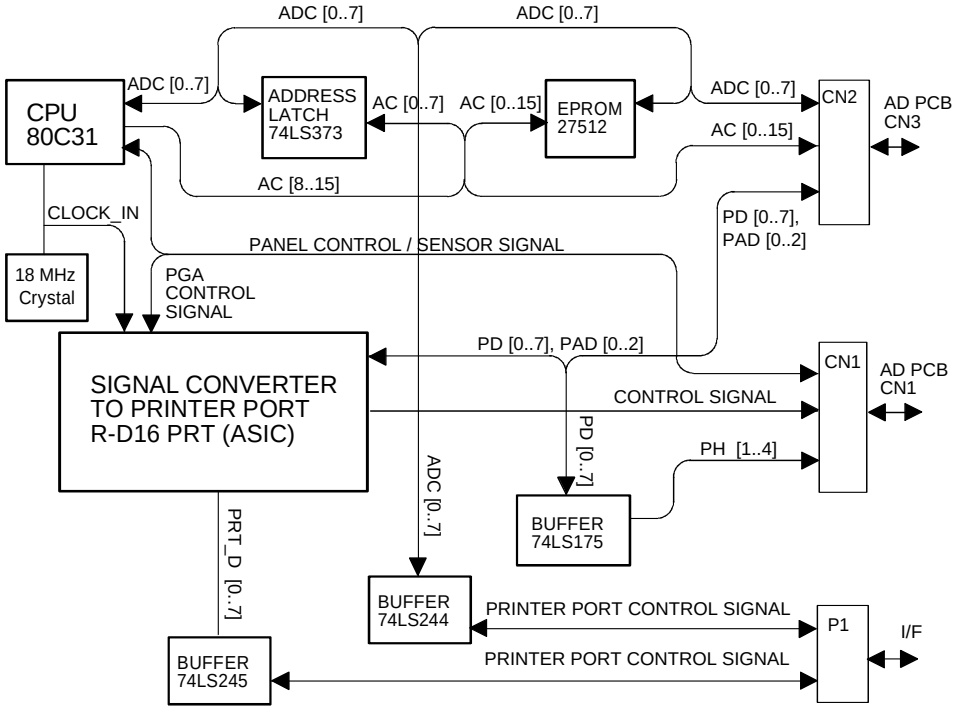

Figure 2-4. CPU PCB Block Diagram

2.4.2.2 AD PCB Operation

Figure 2-5 shows a block diagram of the AD PCB. The AD PCB consists of the A/D converter, D/A converter, ASIC R-D16 (scanning data processing), 32 KB SRAMs (local memory), and motor driver. The motor control signal from the CPU controls the document feed motor via the motor driver. The lamp control signal from the CPU controls the lamp and inverter via the motor driver. The A/D converter changes the analog signal (OS, DOS) from CCD into digital data (ADC). The D/A converter changes the signal of the A/D converter into GRAY [0..7]; then shading is corrected in the ASIC (R-D16). The R-D16 controls the CCD and processes the scanning signal.

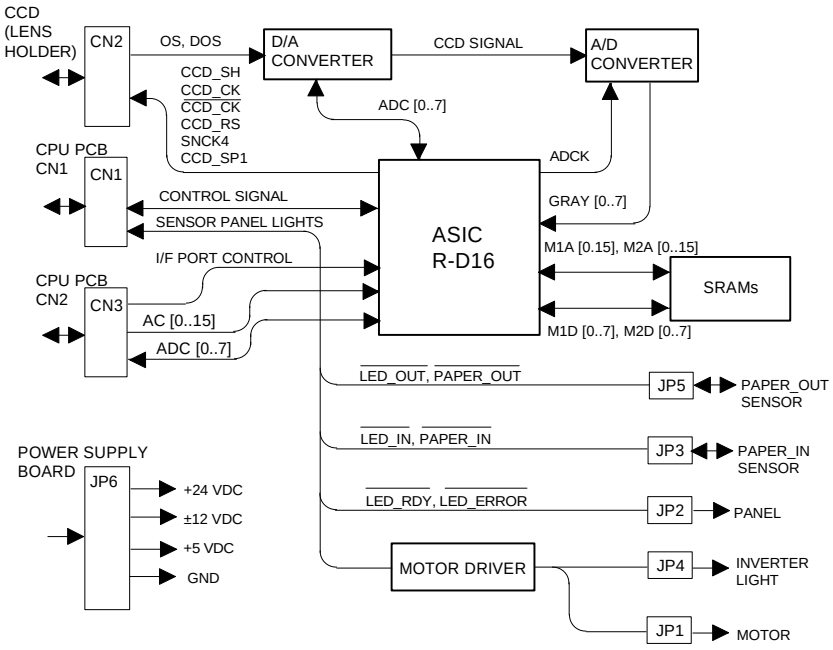

Figure 2-5. AD PCB Block Diagram

CHAPTER 3 Disassembly and Assembly

Table of Contents

LIST OF FIGURES

LIST OF TABLES

3.1 OVERVIEW

This chapter describes the disassembly and assembly procedures to be used for replacing the main assemblies of the GT-300/ES-300GS scanner.

3.1.1 Precautions

Read this chapter before disassembling or assembling the scanner.

WARNING

■ Be ***sure to remove the power cord from the scanner before performing any of the removal and replacement procedures.***

CAUTION

■ ***Do not disassemble the Optical Frame Assembly and the Lens Holder Assembly.***
■ ***To prevent damage from static electricity, do not touch the ICs on the circuit board or the terminals of peripheral electronic components with bare hands.***
■ ***To prevent damage, do not touch the optical units on the scanner with bare hands.***
■ ***Use the recommended tools to ensure safe and efficient maintenance work. Inappropriate tools may damage the scanner.***

3.1.2 Tools

Use the tools listed in Table 3-1 for disassembly, assembly, and troubleshooting.

Table 3-1. Tools

Name	Commercially Available	Part Number
Phillips screwdriver No. 1	Yes	B743800100
Phillips screwdriver No. 2	Yes	B743800200
Normal (flat) screwdriver	Yes	B743000100
Tweezers	Yes	B641000100
Soldering Iron	Yes	B740200100
Round-nose pliers	Yes	B740400100
Torque driver, max 26kg-cm	Yes	B740100102
Torque driver, max 3kg-cm	Yes	B740101900

CAUTION

Do not touch any parts on the circuit board with magnetic screwdrivers, as they can damage ROM chips.

NOTE: Many scanner screws are tight; their heads can be damaged if the screwdriver fits loosely. Please select the correct screwdriver.

3.1.3 Service Shipping Standards

Before returning the unit to a customer, be sure to check the mechanism and operation of the unit according to the items listed in Table 3-2.

Table 3-2. Service Shipping Standards

Main Category	Subcategory	Contents	Check
Operation	Lamp Assembly	Dose the fluorescent lamp switch on normally?	❑ Check ❑ Unnecessary
	Document Feed Mechanism	Is the movement smooth?	❑ Check ❑ Unnecessary
	Self-test	Does any error occur?	❑ Check ❑ Unnecessary
	Image	Is image feeding performed normally by the utility software? (❑ SCSI I/F, ❑ Parallel I/F)	❑ Check ❑ Unnecessary
Function	ROM Version	ROM Version _____	❑ Check ❑ Unnecessary
Cleaning		Is the Scanning Window Plate Assembly clean?	❑ Check ❑ Unnecessary
		Is the anti-dust cover clean?	❑ Check ❑ Unnecessary
		Is the surface of the lamp clean?	❑ Check ❑ Unnecessary
Return shipping condition		Is the scanning cover closed correctly?	❑ Check ❑ Unnecessary
		Are the customer's scanner accessories packaged with the scanner?	❑ Check ❑ Unnecessary

3.1.4 Small Parts

In this manual, abbreviations are used for small parts such as screws and washers. Table 3-3 lists these abbreviations and their descriptions.

Table 3-3. Small Part Abbreviations

Abbreviation	Description
CP screw	Cross-recessed Pan head
CPSP screw	Cross-recessed Pan head S-tight with a Spring lock washer and a Plain washer
CB screw	Cross-recessed Bind head
CBB screw	Cross-recessed Bind head B-tight
CF screw	Cross-recessed Countersunk head
E-ring	Type-E retaining ring
IW	In-lock washer

3.2 DISASSEMBLY AND ASSEMBLY

This section describes the procedures for disassembling and assembling the main components of the scanner. When the procedure for installing a component is simply the reverse of the procedure for removing the component, no description of the installation is given. Any points of special concern follow the description of the procedure. Refer to the diagrams in the Appendix to see how all of the components fit together.

CAUTION

■ ***Before disassembling any part of the scanner, note the warning in Section 3.1.***
■ ***Before disassembling any part of the scanner, remove the accessories from the unit.***
■ ***Before disassembling any part of the scanner, remove the two wire clips of the I/F connector. (Refer to Section 3.2.2.)***

The procedure flowchart for disassembling the scanner is shown in Figure 3-1 below.

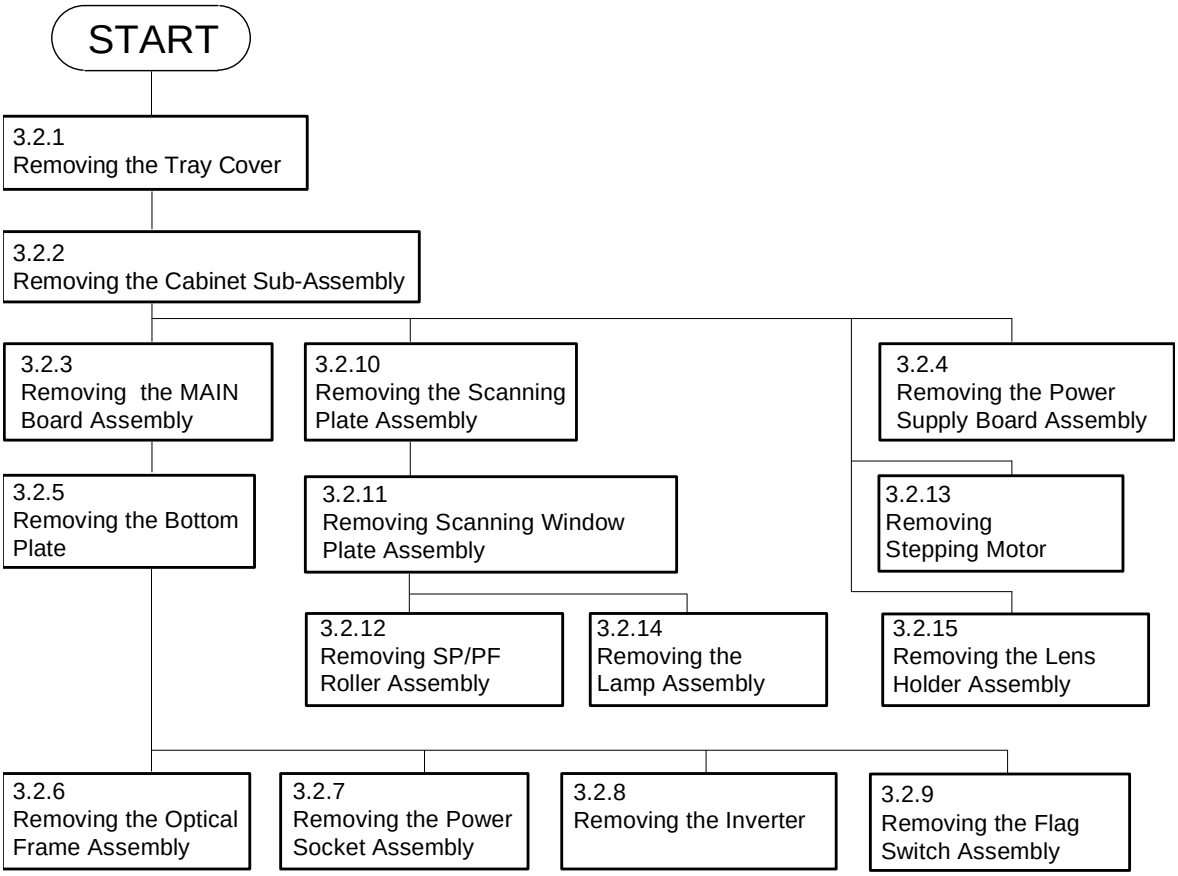

Figure 3-1. Scanner Disassembly Procedures

3.2.1. Removing the Tray Cover Assembly

1. Remove the two Hinge Covers from the Tray Cover.
2. Remove the two CB (M3x10) screws to release the Tray Cover Assembly.

   Note: The tightening torque of the CB (M3x10) screws is 4 kgf-cm.

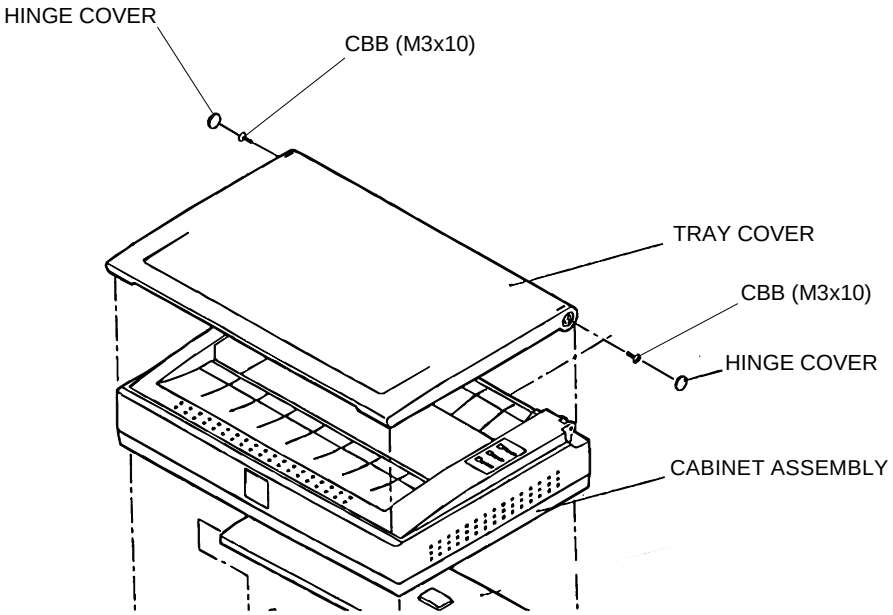

Figure 3-2. Removing the Tray Cover Assembly

3.2.1.1 Disassembling the Tray Cover Assembly

1. Carefully bend the Guide Cover to remove it from the Tray Cover.
2. Remove the Rear Guides and Rack Gear from the Tray Cover.

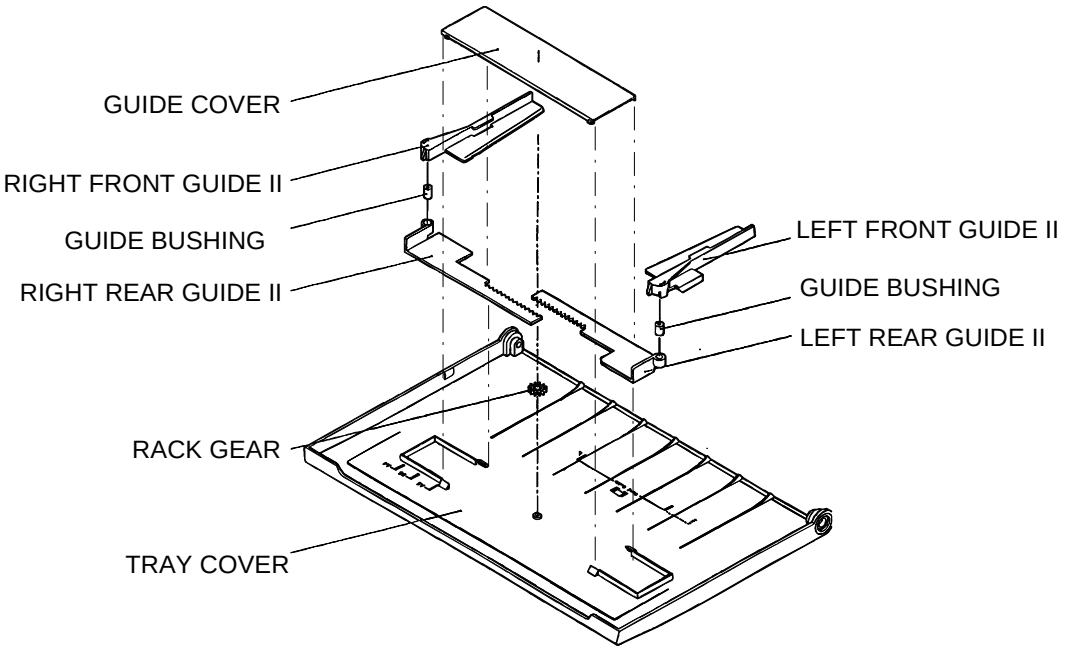

Figure 3-3. Disassembling the Tray Cover Assembly

3.2.2 Removing the Cabinet Assembly

1. Loosen the two screws attaching the connector plate to the I/F connector frame (Refer to Figure 3-8) and remove the two wire clips from the connector. Then tighten the two screws.

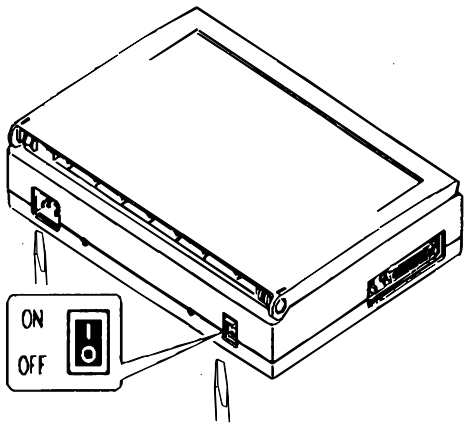

Figure 3-4. Disengaging Cabinet Assembly from Chassis

2. Remove the two CF (M3x6) screws attaching the Cabinet Assembly to the Chassis.
3. Insert the point of a flat edge screwdriver between the Cabinet Assembly and the Chassis at the rear bottom of the scanner. Then disengage the Cabinet Assembly from the Chassis.
4. Push the button on the Scanning Cover and open it.
5. Disengage the three hooks of the Cabinet Assembly from the front of the Chassis.
6. Lift up the front of the Cabinet Assembly and disconnect the JP2 (LED Panel) connector.
7. Slide the Cabinet Assembly back and remove it by lifting it up.

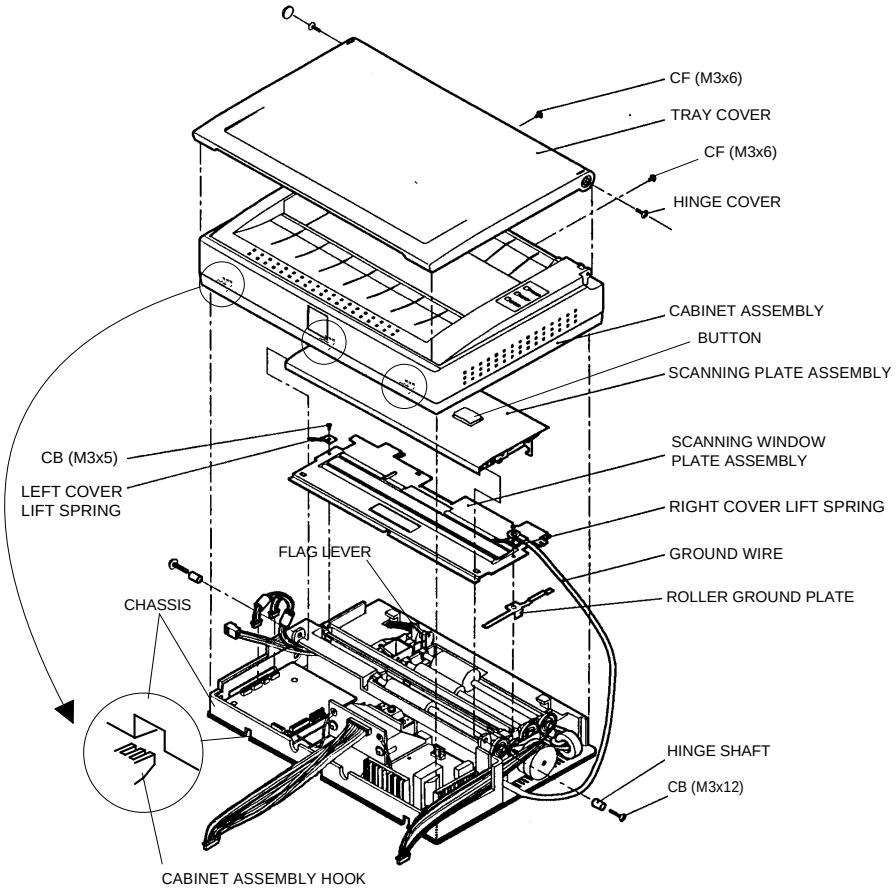

Figure 3-5. Removing the Cabinet Assembly

ASSEMBLY POINT

■ ***When installing the Cabinet Assembly, make sure to insert the lever of the Flag Switch Assembly in the corresponding slot in the Cabinet Assembly. See Figure 3-6.***
■ ***When installing the Cabinet Assembly, connect the wire harness of the Key Panel to connector JP2 on the MAIN Board Assembly.***
■ ***The tightening torque of the CF (M3x6) screws is 5 kgf-cm.***

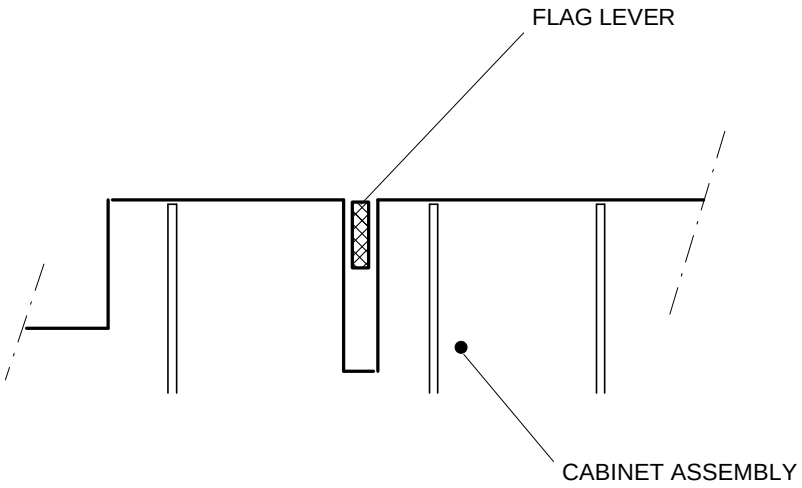

Figure 3-6. Flag Lever in the Cabinet Assembly

3.2.3 Removing the MAIN Board Assembly

1. Remove the Tray Cover Assembly. (Refer to Section 3.2.1.)
2. Remove the Cabinet Assembly. (Refer to Section 3.2.2.)
3. Remove all connectors from the MAIN Board Assembly.
4. Remove the two CF (M3x6) screws attaching the I/F to the Chassis and the four CP (M3x25) screws attaching the MAIN Board Assembly to the Bottom Plate.
5. Lift up the MAIN Board Assembly from the Bottom Plate.

3.2.4 Removing the Power Supply Board Assembly

1. Remove the Tray Cover Assembly. (Refer to Section 3.2.1.)
2. Remove the Cabinet Assembly. (Refer to Section 3.2.2.)
3. Remove all connectors from the Power Supply Board Assembly.
4. Remove the four CB (M3x5) screws and IW washers attaching the Power Supply Board Assembly to the Bottom Plate.
5. Remove the Power Supply Board Assembly and the PVC Insulator from the Bottom Plate.

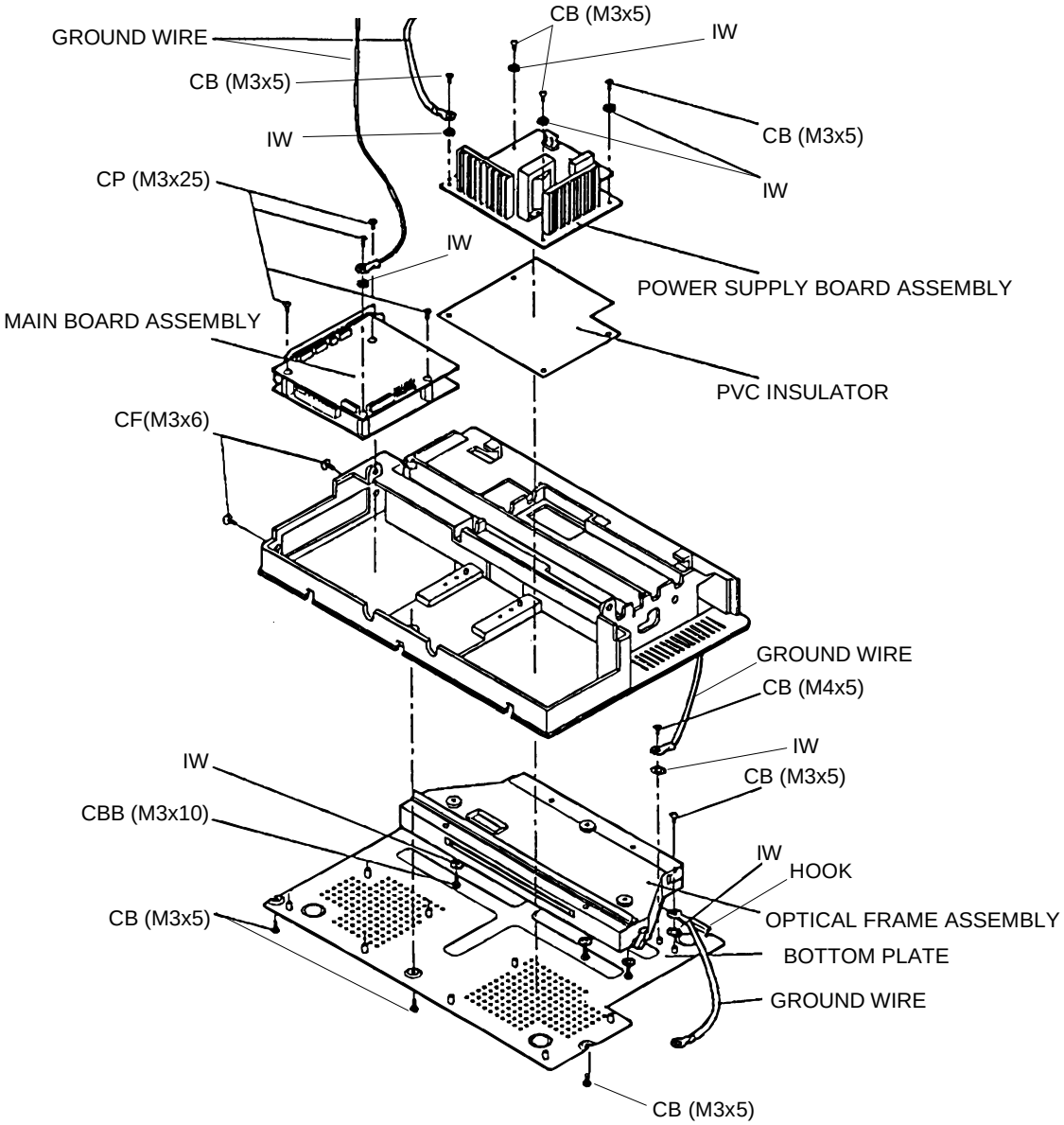

Figure 3-7. Removing MAIN Board Assembly and Power Supply

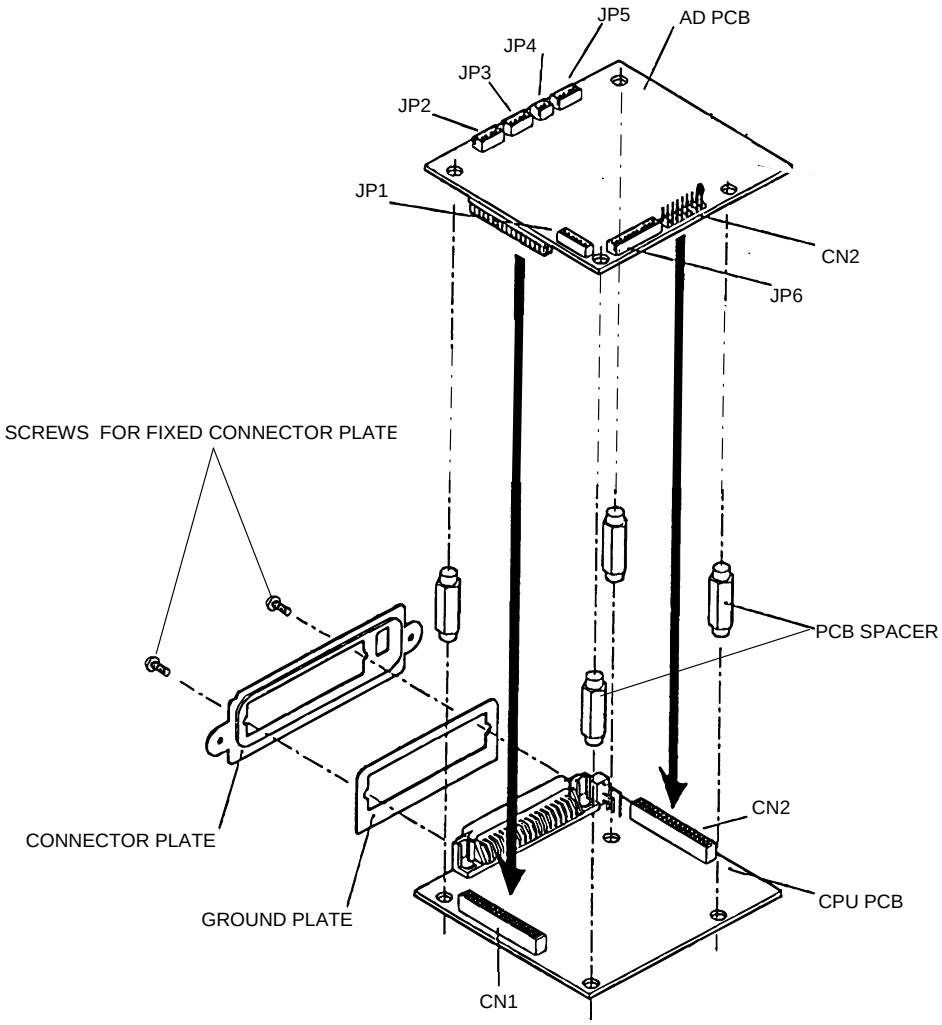

Figure 3-8. Installing the MAIN Board Assembly

Assembly Notes

■ ***Make sure to connect wire harnesses JP2 - JP5 to their correct sockets on the AD Board.***
■ ***In connecting the wire harness to CN2, be sure mark ▼ is on the inside of the AD PCB. (See Figure 3-9.)***
■ ***The tightening torque of the CF (M3x6) screws is 10 kgf-cm. For the CP (M3x25) screws, it is 7 kgf-cm; for the CB (M3x5) screws, it is 7 kgf-cm.***

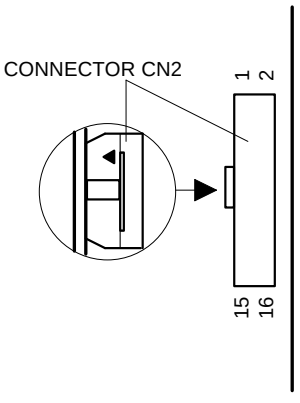

Figure 3-9. Connecting the Wire Harness to CN2

3.2.5 Removing the Bottom Plate

1. Remove the Tray Cover Assembly. (Refer to Section 3.2.1.)
2. Remove the Cabinet Assembly. (Refer to Section 3.2.2.)
3. Remove the MAIN Board Assembly. (Refer to Section 3.2.3.)
4. Remove the Power Supply Board Assembly. (Refer to Section 3.2.4.)
5. Remove the three CB (M3x5) screws attaching the Bottom Plate to the Chassis. (See Figure 3-7.)
6. Open the Bottom Plate and remove the CB (M3x5) screws, CB (M4x5) screws, and IW washers attaching the ground wires of the Power Socket Assembly and Stepping Motor Frame to the Bottom Plate. (See Figure 3-7.)
7. Remove the Bottom Plate from the Chassis. (See Figure 3-7.)

Assembly Notes

■ ***When attaching the Bottom Plate to the Chassis, insert the three hooks into the three holes in the Chassis.***
■ The tightening torque of the CB (M4x5) screws is 10 kgf-cm. For the CB (M3x5) screws, it is 7 kgf-cm.

3.2.6 Removing the Optical Frame Assembly

1. Remove the Tray Cover Assembly. (Refer to Section 3.2.1.)
2. Remove the Cabinet Assembly. (Refer to Section 3.2.2.)
3. Remove the MAIN Board Assembly. (Refer to Section 3.2.3.)
4. Remove the Bottom Plate. (Refer to Section 3.2.5.)
5. Remove the three CBB (M3x10) screws and three spring washers attaching the Optical Frame Assembly to the Chassis. (See Figure 3-7.)
6. Remove the Optical Frame Assembly from the Chassis. (See Figure 3-7.)

Assembly Notes

■***Do not disassemble the Optical Frame Assembly, to prevent dust or dirt from getting inside.***
■The tightening torque of the CBB (M3x10) screws is 10 kgf-cm.

3.2.7 Removing the Power Socket Assembly

1. Remove the Tray Cover Assembly. (Refer to Section 3.2.1.)
2. Remove the Cabinet Assembly. (Refer to Section 3.2.2.)
3. Remove the MAIN Board Assembly. (Refer to Section 3.2.3.)
4. Remove the Bottom Plate. (Refer to Section 3.2.5.)
5. Disconnect the two terminals of the Power Socket Assembly from the Power Switch. (See Figure 3-10.)
6. Remove the two CFB (M3x6) screws attaching the Power Socket Inlet to the Chassis. (See Figure 3-10.)
7. Remove the Power Socket Inlet from the Chassis. (See Figure 3-10.)

Assembly Notes

The tightening torque of the CFB (M3x6) screws is 4 kgf-cm.

3.2.8 Removing the Inverter

1. Remove the Tray Cover Assembly. (Refer to Section 3.2.1.)
2. Remove the Cabinet Assembly. (Refer to Section 3.2.2.)
3. Remove the Bottom Plate. (Refer to Section 3.2.5.)
4. Remove the connector from the Inverter to the Lamp Assembly. (See Figure 3-11.)
5. Disengage the Inverter from the hooks of the PCB Spacer, and remove the Inverter. (See Figure 3-10.)

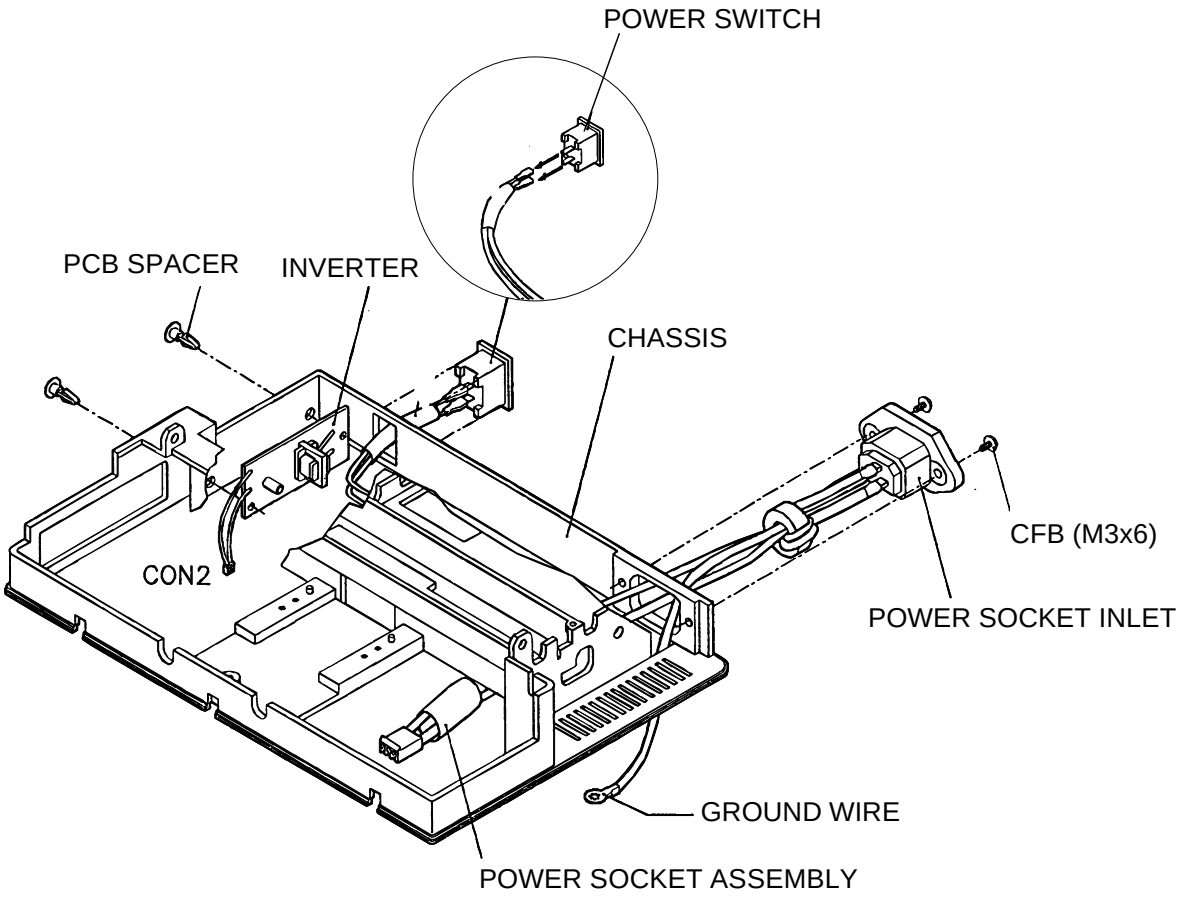

Figure 3-10. Removing the Power Socket Assembly

3.2.9 Removing the Flag Switch Assembly

1. Remove the Tray Cover Assembly. (Refer to Section 3.2.1.)
2. Remove the Cabinet Assembly. (Refer to Section 3.2.2.)
3. Remove the MAIN Board Assembly. (Refer to Section 3.2.3.)
4. Remove the Scanning Plate Assembly. (Refer to Section 3.2.10.)
5. Remove the Scanning Window Plate Assembly. (Refer to Section 3.2.11.)
6. Remove the CBB (M3x6) screw attaching the Flag Switch Assembly to the Chassis.
7. Remove the Flag Switch Assembly from the Chassis.

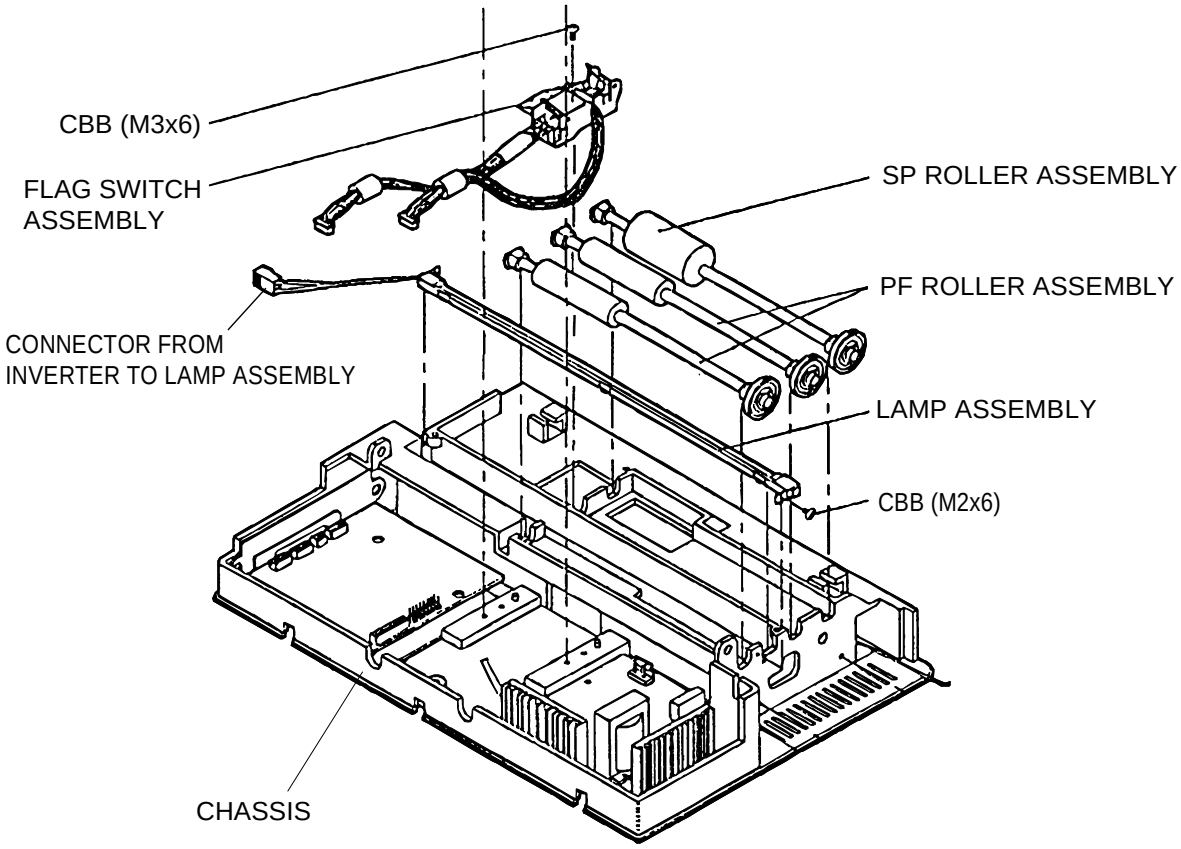

Figure 3-11. Removing the Flag Switch Assembly

3.2.10 Removing the Scanning Plate Assembly

1. Remove the Tray Cover Assembly. (Refer to Section 3.2.1.)
2. Remove the Cabinet Assembly. (Refer to Section 3.2.2.)
3. On each side of the Scanning Plate, remove the CB (M3x12) screw and the CB (M3x5) screw attaching the Hinge Plate. (See Figures 3-5 and 3-12.)
4. Remove the Scanning Plate Assembly from the the Chassis.

Assembly Notes

■ The tightening torque of the CB (M3x12) screws is 10 kgf-cm.
■ The tightening torque of the CB (M3x5) screws is 10 kgf-cm.
■ ***When tightening the CF (M3x6) screw holding the Front Fixing Plate, use 1 kgf-cm torque to avoid distorting the ADF Rubber.***
■ ***When tightening the CBB (M3x6) screws holding the Scanning Cover, use 3 kgf-cm torque to avoid breaking the Cover.***
■ ***When assembling the ADF Mylar, place the sharp-edged side of the Mylar towards the ADF Rubber.***

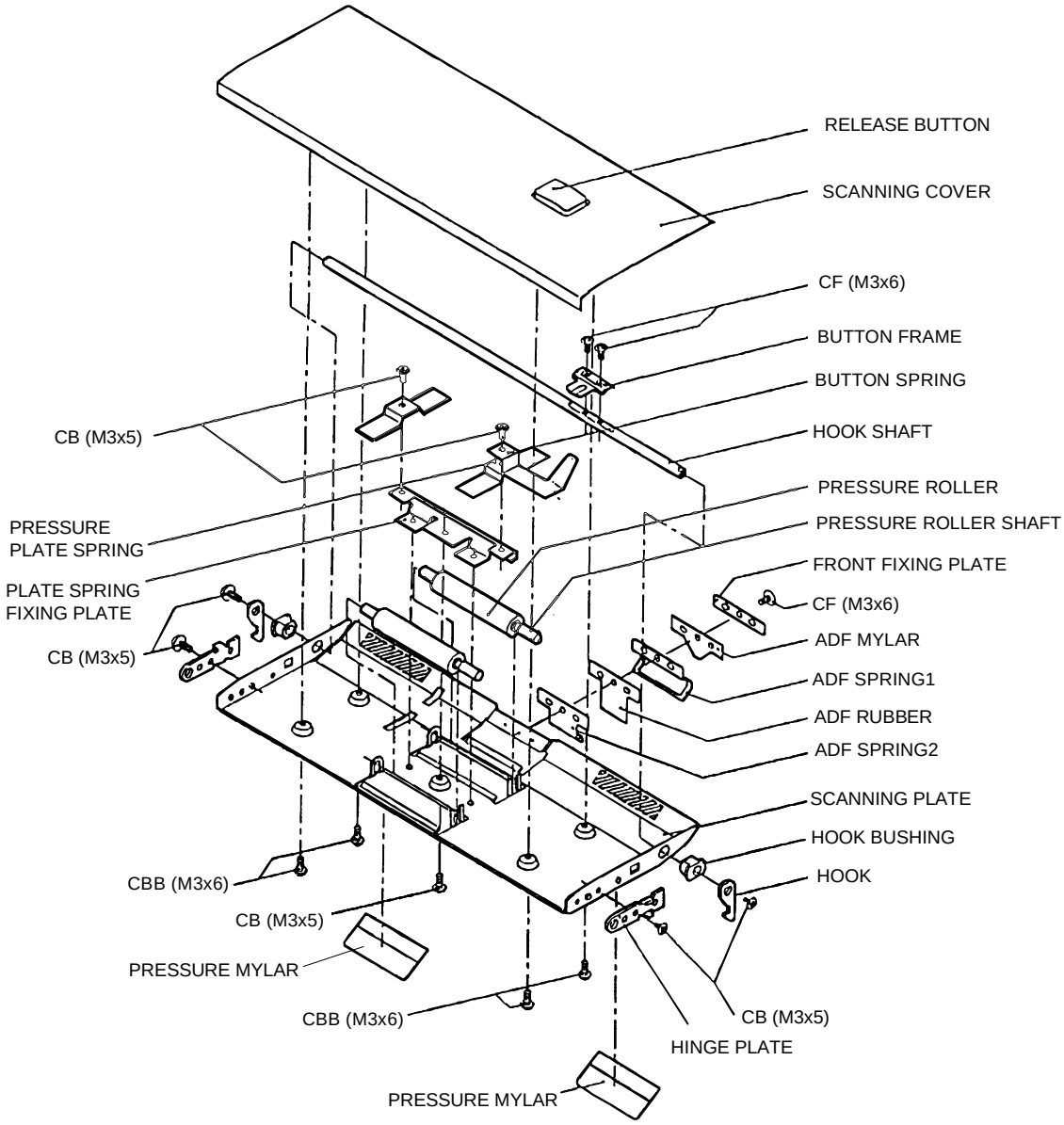

Figure 3-12. Removing the Scanning Plate Assembly

3.2.11 Removing the Scanning Window Plate Assembly

1. Remove the Tray Cover Assembly. (Refer to Section 3.2.1.)
2. Remove the Cabinet Assembly. (Refer to Section 3.2.2.)
3. Remove the Scanning Plate Assembly. (Refer to Section 3.2.10.)
4. Remove the two CB (M3x5) screws attaching the Scanning Window Plate Assembly and the Left and Right Cover Lift Springs to the Chassis. (See Figures 3-5 and 3-13.)
5. Remove the Scanning Window Plate Assembly and the Left and Right Cover Lift Springs.

Assembly Notes

■ ***Do not stain the surface of the glass. If you need to clean the glass, wipe it in one direction only using a clean cloth dampened with denatured alcohol.***
■ ***Attach the Ground Wire between the Stepping Motor Frame and the Scanning Window Plate Assembly.***
■ The tightening torque of the CB (M3x5) screws is 10 kgf-cm.

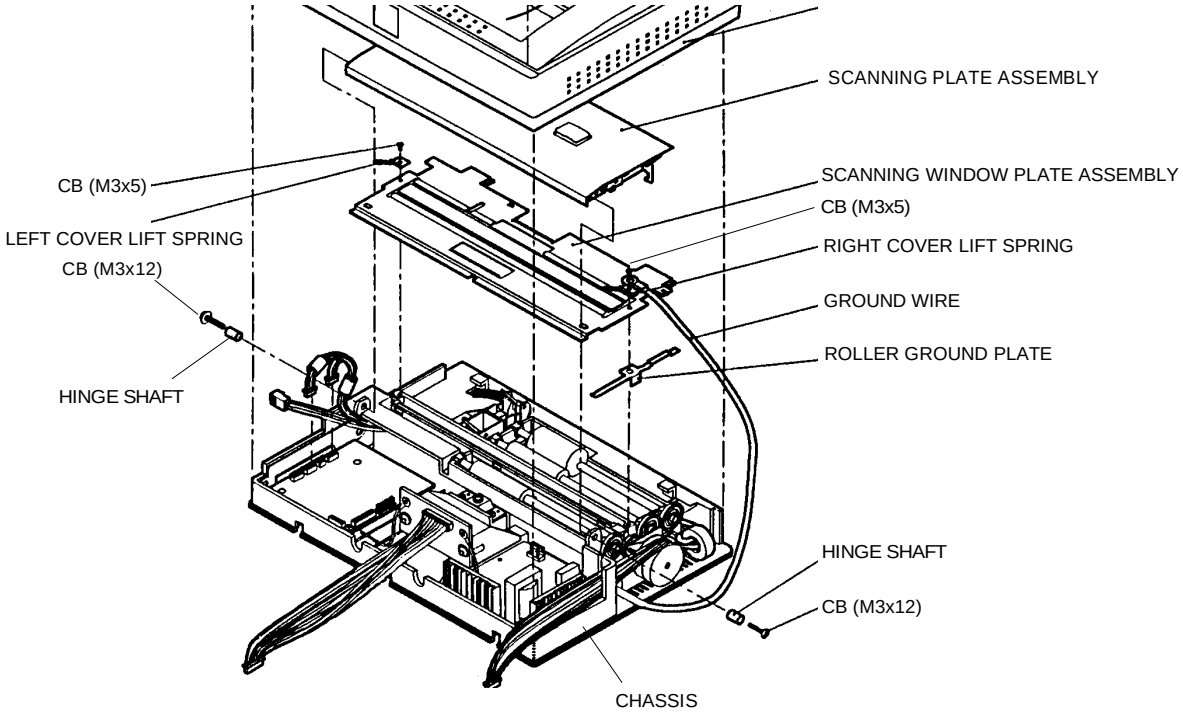

Figure 3-13. Removing the Scanning Window Plate Assembly

3.2.12 Removing the SP/PF Roller Assembly

1. Remove the Tray Cover Assembly. (Refer to Section 3.2.1.)
2. Remove the Cabinet Assembly. (Refer to Section 3.2.2.)
3. Remove the Scanning Plate Assembly. (Refer to Section 3.2.10.)
4. Remove the Scanning Window Plate Assembly. (Refer to Section 3.2.11.)
5. Remove the SP/PF Roller Assembly by lifting it up. (See Figure 3-11.)

3.2.12.1 Disassembling the SP Roller Assembly

1. Remove the #3 E-ring from each end of the SP Roller. (See Figure 3-14.)
2. Remove the SP Roller Gear and the One-way Clutch Bearing from the SP Roller.
3. Remove the Roller Bushing from each end of the SP Roller.

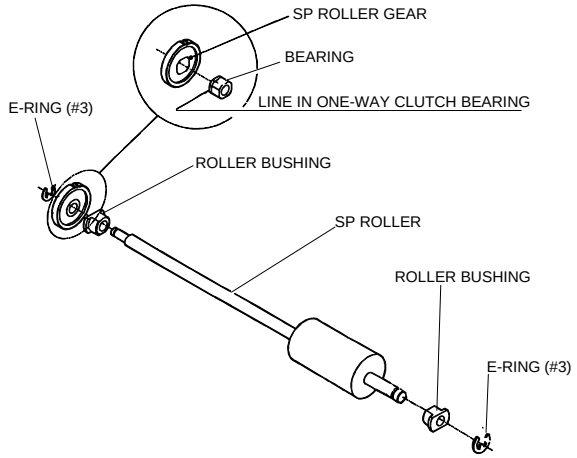

Figure 3-14. Disassembling the SP Roller Assembly

Assembly Notes

■ ***When attaching the One-way Clutch Bearing to the SP Roller, place the line side of the Bearing away from the Roller. (See Figure 3-14.)***

3.2.12.2 Disassembling the PF Roller Assembly

1. Remove the #3 E-ring from each end of the PF Roller. (See Figure 3-15.)
2. Remove Roller Gear 42T from the PF Roller.
3. Remove the Roller Bushing from each end of the PF Roller.

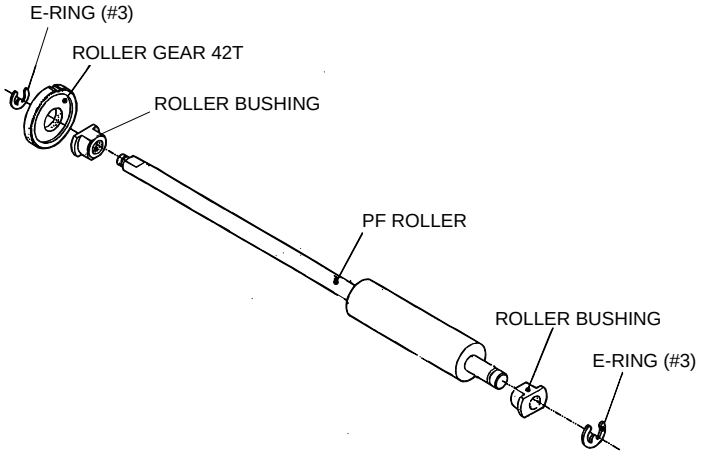

Figure 3-15. Disassembling the PF Roller Assembly

3.2.13 Removing the Stepping Motor

1. Remove the Tray Cover Assembly. (Refer to Section 3.2.1.)
2. Remove the Cabinet Assembly. (Refer to Section 3.2.2.)
3. Remove the three CPSP (M3x8) screws attaching the Stepping Motor Assembly to the Chassis.
4. Remove the Stepping Motor Assembly. (See Figure 3-16.)

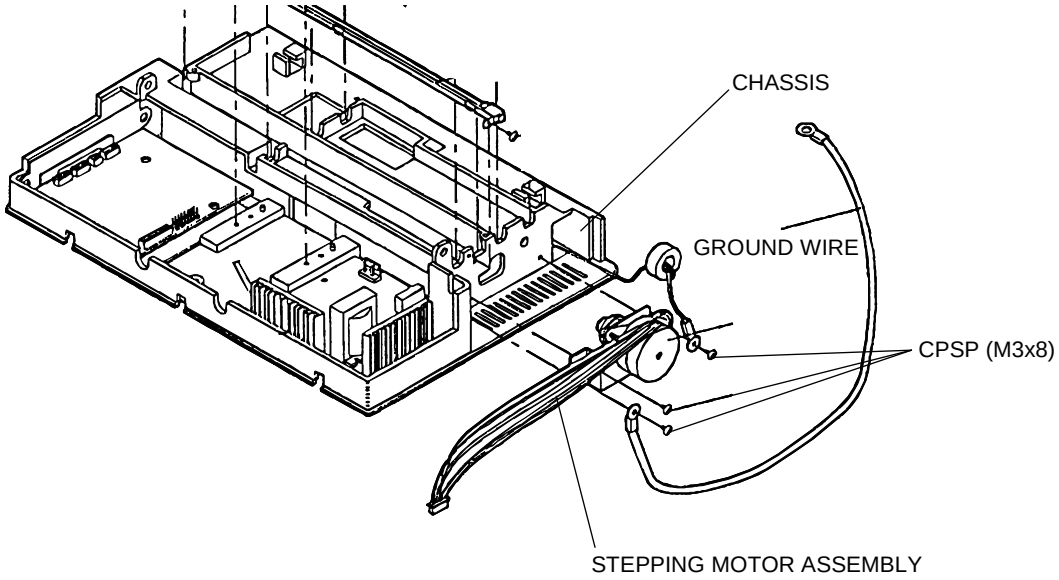

Figure 3-16. Removing the Stepping Motor Assembly

5. Remove the #2.5 E-ring from Idle Gear 42T, and the #3 E-rings from Idle Gears 18/29T and 17/36T.
6. Remove the two CBB (M3x5) screws attaching the Stepping Motor to the Motor Frame.
7. Remove the Stepping Motor. (See Figure 3-17.)

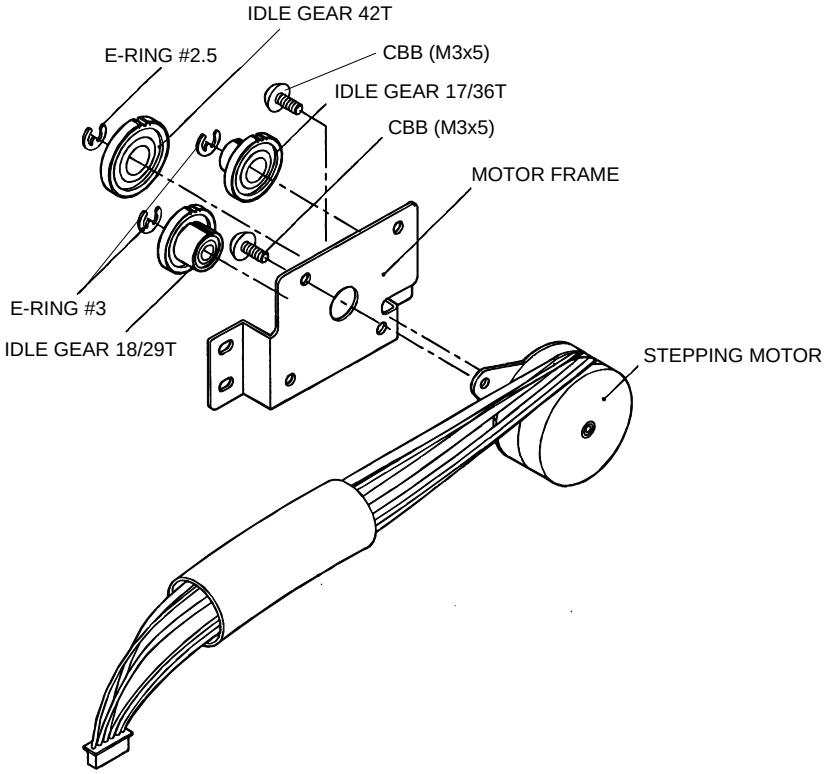

Figure 3-17. Removing the Stepping Motor

3.2.14 Removing the Lamp Assembly

1. Remove the Tray Cover Assembly. (Refer to Section 3.2.1.)
2. Remove the Cabinet Assembly. (Refer to Section 3.2.2.)
3. Remove the Scanning Plate Assembly. (Refer to Section 3.2.10.)
4. Remove the Scanning Window Plate Assembly. (Refer to Section 3.2.11.)
5. Remove the Stepping Motor Assembly. (Refer to Section 3.2.13.)
6. Remove the connector from the Inverter to the Lamp Assembly. (See Figure 3-11.)
7. Remove the CBB (M2x6) screw attaching the Lamp Assembly to the Chassis. (See Figure 3-11.)
8. Remove the Lamp Assembly from the Chassis. (See Figure 3-11.)

3.2.15 Removing the Lens Holder Assembly

1. Remove the Tray Cover Assembly. (Refer to Section 3.2.1.)
2. Remove the Cabinet Assembly. (Refer to Section 3.2.2.)
3. Remove connector CN2 from the Lens Holder Assembly to MAIN Board Assembly, and ground the wires between the MAIN Board Assembly and the Power Supply Board Assembly.
4. Remove the two CBB (M3x10) screws attaching the Lens Holder Assembly to the Chassis. (See Figure 3-18.)
5. Remove the Lens Holder Assembly from the Chassis.

Assembly Notes

- The tightening torque of the CBB (M2x6) screws is 4 kgf-cm.
- The tightening torque of the CBB (M3x10) screws is 10 kgf-cm.

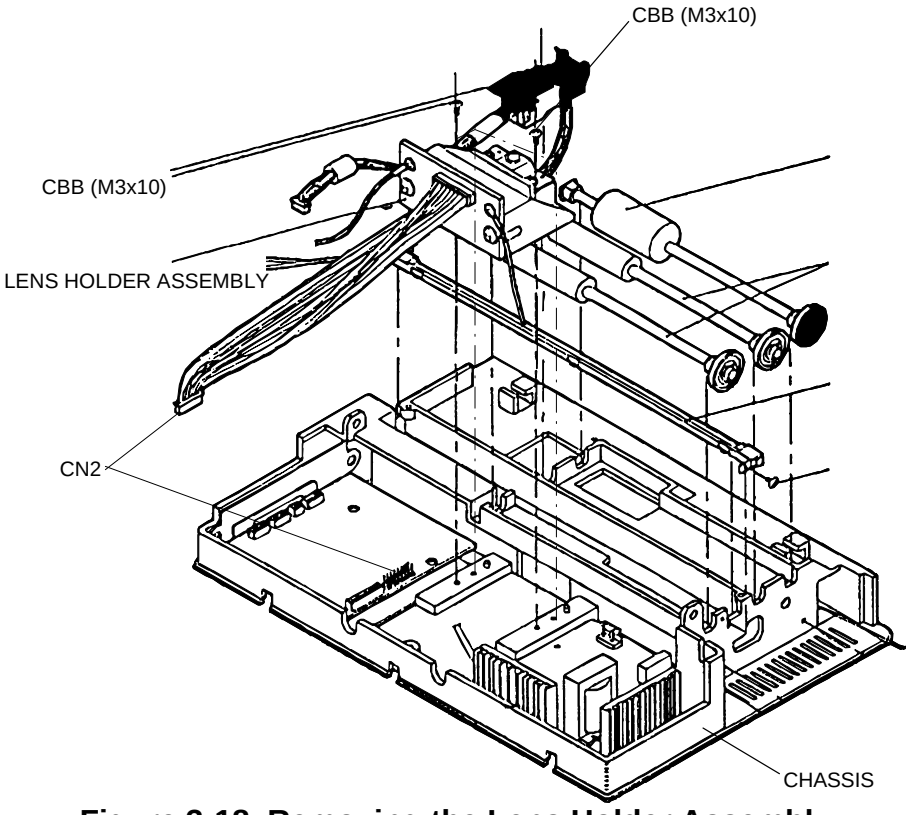

Figure 3-18. Removing the Lens Holder Assembly

CHAPTER 4 Adjustments

This scanner does not need any adjustments.

CHAPTER 5 Troubleshooting

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5.1 SCANNER OPERATION SUMMARY AND TROUBLESHOOTING

The section below provides a summary of scanner operation and a list of possible problems and their solutions.

At Power On

Table 5-1. System Status at Power On

System Status	Indicators		Comments or Actions to Take
	POWER	READY	
POWER OFF	OFF	OFF	————
POWER ON	ON	OFF	The motor runs for 6 seconds, and the system proceeds with self-testing.
WARM UP	ON	Blinking	The READY LED flashes for 45 seconds.
READY TO SCAN	ON	ON	The scanner is ready for scanning.

Coil Resistance

The following table provides the coil resistance for the stepping motor. Check whether the motor is OK or not by verifying this resistance.

Table 5-2. Stepping Motor Coil Resistance

Common Pin	Test Pin	Test Method (Set Meter to ohms. Disconnect Motor from Main Board and check it with Printer Power Off.)	Coil Resistance
Brown	Red, White, Blue, Orange	Place one lead on Brown wire and the other lead on each of the test pins to check the two motor phases.	95 ± 6.65 Ω at 25 ° C (77 ° F)

Error Messages

The table below provides error messages that may be displayed during operation:

Table 5-3. Error Messages

Error Status	Cause(s)	Scanner Action	LEDs	Remedies
Command Error	The scanner received an unspecified command or parameter.	The scanner ignores the incorrect command or parameter and sends a NACK code to the host.	READY: ON ERROR: ON	The error is cleared when the scanner receives a correct code.
Interface Error	An incorrect procedure was detected by the interface during communication. For a SCSI I/F, a transmission was frozen for more than 30 seconds, except in bus-free phase.	The lamp goes OFF and the scanner stops operating. Acceptable commands: None.	READY: OFF ERROR: Blinking	• Turn the scanner off and on. • Send an INIT signal when using the parallel interface. • Send a reset signal for the SCSI interface. • Send a complete bus device reset message for the SCSI interface.
Fatal Error	Paper jam. Paper empty. Lamp is broken. System breakdown.	The scanner stops operating. Bit 7 of the status byte is set. The bit corresponding to the error is set in the extended status data. Acceptable commands: ESC F, ESC f, ESC @	READY: Blinking ERROR: Blinking	• Turn the scanner off and on. • Send an ESC@ code to the scanner. • Send an INIT signal for the parallel I/F. • Send a reset signal for the SCSI I/F. • Send a complete bus device reset message for SCSI I/F.

5.2 SYMPTOM TABLE

This section provides detailed troubleshooting methods to isolate failed components in the power supply or on the main board. This information is for use only by servicers who repair to the component level.

The tables below provide causes, checkpoints, and solutions for each symptom. Refer to these checkpoints to determine the defective components.

5.2.1 At Power On

Table 5-4. Symptoms at Power On

Symptom	Cause	Checkpoint	Solution
Power is not supplied. (Power indicator is not on.)	AC input power is abnormal.	• Check whether the AC switch turns on and off. • Check that AC input power is normal.	Use the correct AC voltage.
	The power supply board assembly is bad.	• Check that the AC power connector is firmly connected to CON1 on the power supply board assembly. • Check that fuse F1 has not blown. • Check that the AC power connector is firmly connected to JP6 on AD board.	If F1 blows again after replacement, replace the power supply board assembly.
Neither the POWER nor READY LED lights.	The LEDs are bad.	• Check that the wire harness for the key panel is firmly connected to JP2 on the AD board.	Connect JP2 firmly; otherwise replace the AD board or key panel.
Either the POWER or the READY LED does not light.	POWER or READY LED is bad.	• Check the LEDs.	Replace the LEDs. Otherwise, replace the key panel.

5.2.2 During Scanning

Table 5-5. Symptoms During Scanning

Symptom	Cause	Checkpoint	Solution
The scanner does not feed pages.	The AD board is bad.	• Check that connector JP1 on the AD board is firmly connected.	Replace motor driver IC U2 on the AD board. Otherwise, replace the AD board.
	The stepping motor is bad.	• Check the coil resistance of the stepping motor. • Turn the motor shaft manually to check that rotation is smooth.	Replace the stepping motor.
The stepping motor does not stop.	The DOC sensor or RD sensor is bad.	• Check that connectors JP3 and JP5 on the AD board are firmly connected. • Check that connectors JP3 and JP5 on the AD BOARD are correctly connected. • Check that the flag for each sensor is not damaged.	Replace the DOC sensor or RD sensor. Otherwise, replace the AD board.
The stepping motor can be heard running continuously.	The stepping motor is bad.	• Check that connector JP1 on the AD board is firmly connected. • Check that the paper thickness is within document specifications.	• Replace the stepping motor. • Replace motor driver IC U2 on the AD board. Otherwise, replace the AD board.
	Mechanism failure.	Check the mechanism.	Replace bad part.
The scanner is noisy.	ADF rubber problem.	Check whether the rubber on the ADF scrapes against the SP roller.	• Wipe the ADF rubber or SP roller using a soft, clean cloth and denatured alcohol. • Replace the ADF spring.
	The SP/PF roller needs lubrication.	The SP/PF roller shaft scrapes against the roller bushing.	Add lubricant to shaft and bushing. (See Chapter 6.)
	The scanning window plate has been misassembled.	The roller scrapes against the scanning window plate.	Change the position of the plate to fit the roller position.
	The motor gear train needs lubrication.	The motor gear train is noisy.	Add lubricant to shaft and bushing. (See Chapter 6.)

Table 5-5. Symptoms During Scanning (continued)

Symptom	Cause	Checkpoint	Solution
READY and ERROR LEDs blink (Fatal Error)	Paper jam.	Check whether paper is jammed.	Remove jammed paper.
	The lamp is broken.	Check that the lamp is turned on.	Replace the lamp assembly or inverter.
	System breakdown.	Check system.	Replace abnormal part.
Host cannot read data from the scanner.	Communica-tion failure.	Check that the I/F cable is firmly connected from scanner to host.	Replace interface card or CPU board in scanner.
Shadows or white lines occur in an image.	The scanning window is not clean	See if the scanning window is stained.	Wipe the scanning window and scanning plate with a soft, clean cloth and denatured alcohol.
	The optical frame assembly is not clear	See if optical frame assembly is stained.	Wipe the optical frame assembly glass with a soft, clean cloth and denatured alcohol.
	The lens holder assembly (CCD) is not clear.	See if lens holder assembly is stained.	Wipe the lens holder assembly with a soft, clean cloth and denatured alcohol.
Displayed data from the host is not clear.	The scanning window glass is not clean.	See is the scanning window glass is clear.	Wipe the scanning window glass with a soft, clean cloth and denatured alcohol.

Table 5-5. Symptoms During Scanning (continued)

Symptom	Cause	Checkpoint	Solution
Displayed data from the host is not clear.	The optical frame assembly is not clear.	See if the optical frame assembly is stained.	Wipe the optical frame assembly glass with a soft, clean cloth and denatured alcohol.
	The lens holder assembly is not clear.	See if lens holder assembly is stained.	Wipe lens holder assembly with a soft, clean cloth and denatured alcohol.
	The lamp illumination is too high or too low.	_____	Replace inverter or lamp assembly.
	Lens holder assembly (CCD) failure.	_____	Wipe the lens holder assembly with a soft, clean cloth and denatured alcohol.
	AD board failure.	_____	Replace AD board.

CHAPTER 6 Maintenance and Lubrication

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6.1 PREVENTIVE MAINTENANCE

To keep the scanner in good condition, regularly clean the case exterior(using denatured alcohol) and vacuum the machanism's inverter to remove dust and paper debris. After cleaning the scanner, check that it is adequately lubricated, as described in Section 6.2, below. Before returning the printer to the customer, inspect the springs and document feeder rollers and check that the scanner operates properly.

WARNINGS

■***Disconnect the scanner from the external AC power source before performing maintenance.***
■***Do not use thinner, trichlorethylene, or ketone-based solvents on the plastic components, of the scanner.***

Note:

Clean the glass in the optical path with a soft cloth and denatured alcohol. Wipe in one direction only to prevent wiping unevenness.

6.2 LUBRICATION

EPSON recommends that the scanner be lublicated at the points illustrated in figure that follows. Refer t oTable 6-1 for information on the lubricant. Table 6-2 lists the appropriate lubrication points. Make sure the parts to be lubricated are clean before applying lubricant. Also avoid applying too much lubricant, because it may damage related parts.

Table 6-1. Lubricant

Classification	Description	Amount	Availability	Part No.
Grease	KF96H 300,000	——	SHIN ETSU	——

Table 6-2. Lubrication Points

Ref. No.	Lubrication Points
(1)	Points at which the pressure plate spring contacts the pressure roller shaft
(2)	The contact points of the SP roller shaft to roller bushings
(3)	The contact points of the PF roller shaft to roller bushings
(4)	The contact points of gears to the motor frame shafts
(5)	The gear teeth

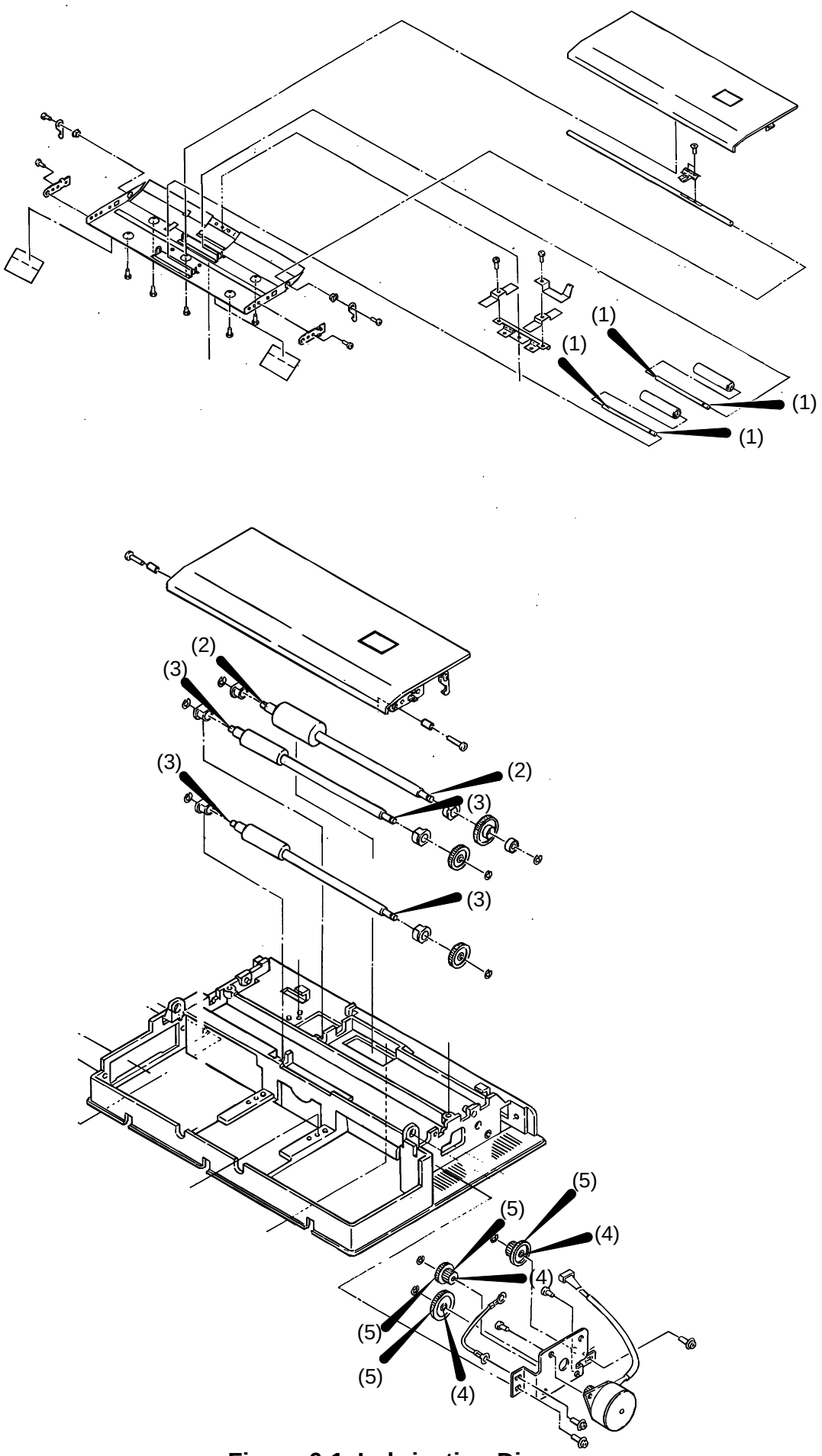

Figure 6-1. Lubrication Diagram

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A.1 CONNECTOR SUMMARY

Figure A-1 illustrates the interconnection of the primary components, and Table A-1 summarizes the functions and size of the connectors.

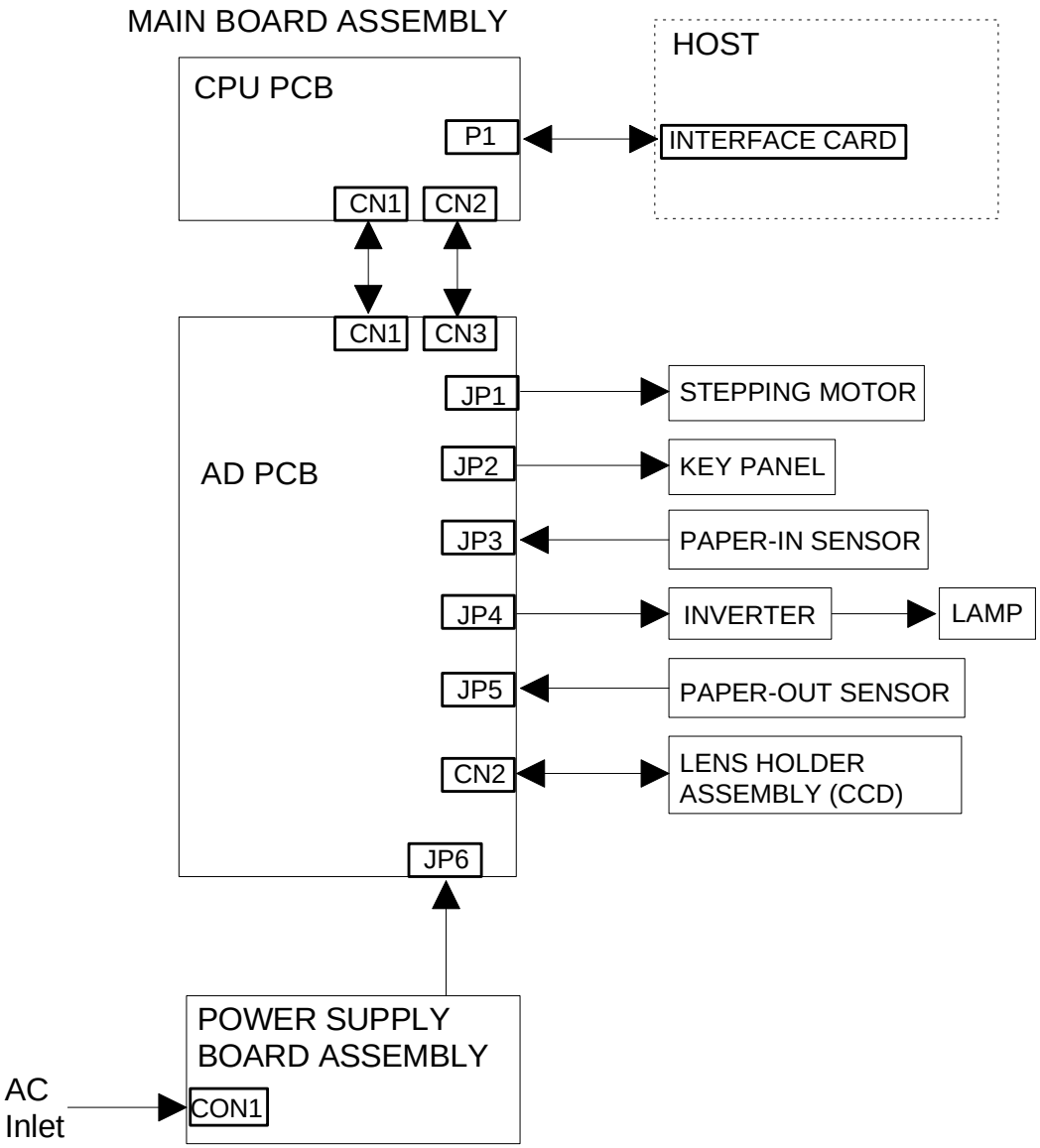

Figure A-1. GT-300/ES-300GS Cable Connection

Table A-1. Connector Summary

Unit	Connector	Description	Pins	Reference Table
CPU PCB	CN1	Connector from CN1 of AD PCB	32	A-2
	CN2	Connector from CN2 of AD PCB	32	A-3
	P1	Connector for bidirectional parallel interface	36	A-4
AD PCB	CN1	Connector from CN1 of CPU PCB	32	A-5
	CN2	Connector for the signal from CCD (lens holder assembly)	16	A-6
	CN3	Connector from CN2 of CPU PCB	32	A-7
	JP1	Connector for stepping motor	6	A-8
	JP2	Connector for key panel	4	A-9
	JP3	Connector for paper-in sensor	4	A-10
	JP4	Connector for lamp via inverter	2	A-11
	JP5	Connector for paper-out sensor	4	A-12
	JP6	Receives + 24 VDC, ± 12 VDC and + 5 VDC voltages from power supply board assembly	10	A-13
Power Supply Board Assembly	CON1	AC power input	2	—

Table A-2. CN1, CPU PCB (Bi-D Model)

Pin No.	I/O	Name	Description
1	O	LED_ERROR	ERROR LED drive signal
2	O	LED_RDY	READY LED drive signal
3	O	LED_OUT	Paper-out sensor LED drive signal
4	I	PAPER_OUT	Paper-out sensor signal
5	O	LED_IN	Paper-in sensor LED drive signal
6	I	PAPER_IN	Paper-in sensor signal
7	O	RESET	Reset signal
8	O	LAMP_ON	Lamp ON signal
9	O	PRT_BUSY	BUSY signal
10	I	SYS_INT	System interrupt signal
11	O	RD	Read signal
12	O	WR	Write signal
13	O	PAGE_STR	Page start signal
14	I	PCS	I/F port chip select signal
15	I	PWR	I/F port write signal
16	I	PRD	I/F port read
17	I	PDACK	DMA acknowledge to I/F port
18	O	PDRQ	DMA request from the external I/F port
19	—	+5 V	+5 VDC
20	—	+5 V	+5 VDC
21	—	GND	Ground
22	I	EOP	End of process signal
23	—	GND	Ground
24	—	GND	Ground
25	—	+12 V	+12 VDC
26	—	–12 V	–12 VDC
27	—	+12 V	+12 VDC
28	—	–12 V	–12 VDC
29	O	PH3	Motor drive signal
30	O	PH4	Motor drive signal
31	O	PH1	Motor drive signal
32	O	PH2	Motor drive signal

Table A-3. CN2, CPU PCB (Bi-D Model)

Pin No.	I/O	Name	Description
1	I	PAD1	Address for I/F port
2	I	PAD2	Address for I/F port
3	I/O	PD7	Data for I/F port
4	I	PAD0	Address for I/F port
5	I/O	PD5	Data for I/F port
6	I/O	PD6	Data for I/F port
7	I/O	PD3	Data for I/F port
8	I/O	PD4	Data for I/F port
9	I/O	PD1	Data for I/F port
10	I/O	PD2	Data for I/F port
11	O	AC5	Control signal
12	O	AC0	Control signal
13	O	AC3	Control signal
14	O	AC4	Control signal
15	O	AC1	Control signal
16	O	AC2	Control signal
17	I/O	ADC7	ADC (analog digital converter) data bus line
18	O	AC0	Control signal
19	I/O	ADC5	ADC (analog digital converter) data bus line
20	I/O	ADC6	ADC (analog digital converter) data bus line
21	I/O	ADC3	ADC (analog digital converter) data bus line
22	I/O	ADC4	ADC (analog digital converter) data bus line
23	I/O	ADC1	ADC (analog digital converter) data bus line
24	I/O	ADC2	ADC (analog digital converter) data bus line
25	—	VCC	+5 VDC
26	I/O	ADC0	ADC (analog digital converter) data bus line
27	O	AC15	Control signal
28	—	VCC	+5 VDC
29	—	GND	Ground
30	O	CS_GADC	AD converter chip select signal
31	O	SYS_CLK	System clock
32	—	GND	Ground

Table A-4. P1, CPU PCB (Bi-D Model)

Pin No.	I/O	Name	Description
1	I/O	PSTB	Strobe signal
2 - 9	I/O	PD 0 - 7	Data signal
10	O	PACK	Acknowledge signal output
11	O	PBUSY	Busy signal output
12 - 15	—	NC	———
16	—	GND	Ground
17	—	C_GND	Scanner chassis ground
18	—	NC	———
19 - 30	—	GND	Ground
31	I	PINIT	Scanner initialization
32	—	NC	———
33	—	GND	Ground
34 - 35	—	NC	———
36	I	PDIR	Direction of the data transfer

Table A-5. CN1, AD PCB (Bi-D Model)

Pin No.	I/O	Name	Description
1	I	LED_ERROR	ERROR LED drive signal
2	I	LED_RDY	READY LED drive signal
3	I	LED_OUT	Paper-out sensor LED drive signal
4	O	PAPER_OUT	Paper-out sensor signal
5	I	LED_IN	Paper-in sensor LED drive signal
6	O	PAPER_IN	Paper-in sensor signal
7	I	RESET	Reset signal
8	I	LAMP_ON	Lamp ON signal
9	I	PRT_BUSY	BUSY signal
10	O	SYS_INT	System interrupt signal
11	I	RD	Read signal
12	I	WR	Write signal
13	I	PAGE_STR	Page start signal
14	O	PCS	I/F port chip select signal
15	O	PWR	I/F port write signal
16	O	PRD	I/F port read
17	O	PDACK	DMA acknowledge to I/F port
18	I	PDRQ	DMA request from the external I/F port
19	—	+5 V	+5 VDC
20	—	+5 V	+5 VDC
21	—	GND	Ground
22	O	EOP	End of process signal
23	—	GND	Ground
24	—	GND	Ground
25	—	+12 V	+12 VDC
26	—	–12 V	–12 VDC
27	—	+12 V	+12 VDC
28	—	–12 V	–12 VDC
29	I	PH3	Motor drive signal
30	I	PH4	Motor drive signal
31	I	PH1	Motor drive signal
32	I	PH2	Motor drive signal

Table A-6. CN2, AD PCB (Bi-D Model)

Pin No.	I/O	Name	Description
1, 3, 11, 13, 15	—	AGND	Analog ground
2	O	CCD_SH	Shift gate signal for CCD
4	O	CCD_CK	CCD clock signal 1
5	—	+12 V	+12 VDC
6	O	CCD_CK	CCD clock signal 2
7	—	+12 V	+12 VDC
8	O	CCD_RS	CCD output buffer
9	—	VCC	+5 VDC
10	—	SNCK4	———
12	I	DOS	CCD output signal
14	I	OS	CCD output signal
16	—	CCD_SP1	Ground

Table A-7. CN3, AD PCB (Bi-D Model)

Pin No.	I/O	Name	Description
1	O	PAD1	Address for I/F port
2	O	PAD2	Address for I/F port
3	I/O	PD7	Data for I/F port
4	O	PAD0	Address for I/F port
5	I/O	PD5	Data for I/F port
6	I/O	PD6	Data for I/F port
7	I/O	PD3	Data for I/F port
8	I/O	PD4	Data for I/F port
9	I/O	PD1	Data for I/F port
10	I/O	PD2	Data for I/F port
11	I	AC5	Control signal
12	I	AC0	Control signal
13	I	AC3	Control signal
14	I	AC4	Control signal
15	I	AC1	Control signal
16	I	AC2	Control signal
17	I/O	ADC7	ADC (analog digital converter) data bus line
18	I	AC0	Control signal
19	I/O	ADC5	ADC (analog digital converter) data bus line
20	I/O	ADC6	ADC (analog digital converter) data bus line
21	I/O	ADC3	ADC (analog digital converter) data bus line
22	I/O	ADC4	ADC (analog digital converter) data bus line
23	I/O	ADC1	ADC (analog digital converter) data bus line
24	I/O	ADC2	ADC (analog digital converter) data bus line
25	—	VCC	+5 VDC
26	I/O	ADC0	ADC (analog digital converter) data bus line
27	I	AC15	Control signal
28	—	VCC	+5 VDC
29	—	GND	Ground
30	I	CS_GADC	AD converter chip select signal
31	I	SYS_CLK	System clock
32	-	GND	Ground

Table A-8. JP1, AD PCB

Pin No.	I/O	Name	Description
1 - 4	O	—	Motor drive signal
5, 6	—	+24	+24 VDC

Table A-9. JP2, AD PCB (Bi-D Model)

Pin No.	I/O	Name	Description
1	—	VCC	+5 VDC
2	O	LED_IN	Ground (POWER LED)
3	O	LED_RDY	Ready LED ON signal (READY LED)
4	O	LED_ERROR	Error LED ON signal (ERROR LED)

Table A-10. JP3, AD PCB (Bi-D Model)

Pin No.	I/O	Name	Description
1	—	VCC	+5 VDC
2	O	LED_IN	Paper_in sensor LED ON signal
3	I	PAPER_IN	Paper_in sensor output signal
4	—	GND	Ground

Table A-11. JP4, AD PCB (Bi-D Model)

Pin No.	I/O	Name	Description
1	—	+12 V	+12 VDC (Lamp ON signal)
2	—	GND	Ground

Table A-12. JP5, AD PCB (Bi-D Model)

Pin No.	I/O	Name	Description
1	—	VCC	+5VDC
2	O	LED_OUT	Paper_out sensor LED ON signal
3	I	PAPER_OUT	Paper_out sensor output signal
4	—	GND	Ground

Table A-13. JP6, AD PCB (Bi-D Model)

Pin No.	I/O	Name	Description
1	—	+12 V	+12 VDC
2	—	AGND	Analog ground
3	—	–12 V	–12 VDC
4	—	AGND	Analog ground
5, 6	—	+5	+5 VDC
7	—	GND	Ground
8	—	+24	+24 VDC
9	—	GND	Ground
10	—	NC	———

Table A-14. Connector Summary (SCSI Model)

Unit	Connector	Description	Pins	Reference Table
CPU PCB	CN1	Connector from CN1 of AD PCB	32	A-15
	CN2	Connector from CN2 of AD PCB	32	A-16
	P1	Connector for SCSI interface	25	A-17
AD PCB	CN1	Connector from CN1 of CPU PCB	32	A-18
	CN2	Connector for the signal from CCD (lens holder assembly)	16	A-19
	CN3	Connector from CN2 of CPU PCB	32	A-20
	JP1	Connector for stepping motor	6	A-21
	JP2	Connector for key panel	4	A-22
	JP3	Connector for paper-in sensor	4	A-23
	JP4	Connector for lamp via inverter	2	A-24
	JP5	Connector for paper-out sensor	4	A-25
	JP6	Receives + 24 VDC, ± 12 VDC and + 5 VDC voltages from power supply board assembly	10	A-26
Power Supply Board Assembly	CON1	AC power input	2	—

Table A-15. CN1, CPU PCB (SCSI Model)

Pin No.	I/O	Name	Description
1	O	LED_ERROR	ERROR LED drive signal
2	O	LED_RDY	READY LED drive signal
3	O	LED_OUT	Paper-out sensor LED drive signal
4	I	PAPER_OUT	Paper-out sensor signal
5	O	LED_IN	Paper-in sensor LED drive signal
6	I	PAPER_IN	Paper-in sensor signal
7	O	RESET	Reset signal
8	O	LAMP_ON	Lamp ON signal
9	O	PIRQ	BUSY signal
10	I	SYS_INT	System interrupt signal
11	O	RD	Read signal
12	O	WR	Write signal
13	O	PAGE_STR	Page start signal
14	I	PCS	I/F port chip select signal
15	I	PWR	I/F port write signal
16	I	PRD	I/F port read
17	I	PDACK	DMA acknowledge to I/F port
18	O	PDRQ	DMA request from the external I/F port
19	—	+5 V	+5 VDC
20	—	+5 V	+5 VDC
21	—	GND	Ground
22	I	EOP	End of process signal
23	—	GND	Ground
24	—	GND	Ground
25	—	+12 V	+12 VDC
26	—	–12 V	–12 VDC
27	—	+12 V	+12 VDC
28	—	–12 V	–12 VDC
29	O	PH3	Motor drive signal
30	O	PH4	Motor drive signal
31	O	PH1	Motor drive signal
32	O	PH2	Motor drive signal

Table A-16. CN2, CPU PCB (SCSI Model)

Pin No.	I/O	Name	Description
1	I	PAD1	Address for I/F port
2	I	PAD2	Address for I/F port
3	I/O	PD7	Data for I/F port
4	I	PAD0	Address for I/F port
5	I/O	PD5	Data for I/F port
6	I/O	PD6	Data for I/F port
7	I/O	PD3	Data for I/F port
8	I/O	PD4	Data for I/F port
9	I/O	PD1	Data for I/F port
10	I/O	PD2	Data for I/F port
11	O	AC5	Control signal
12	O	AC0	Control signal
13	O	AC3	Control signal
14	O	AC4	Control signal
15	O	AC1	Control signal
16	O	AC2	Control signal
17	I/O	ADC7	ADC (analog digital converter) data bus line
18	O	AC0	Control signal
19	I/O	ADC5	ADC (analog digital converter) data bus line
20	I/O	ADC6	ADC (analog digital converter) data bus line
21	I/O	ADC3	ADC (analog digital converter) data bus line
22	I/O	ADC4	ADC (analog digital converter) data bus line
23	I/O	ADC1	ADC (analog digital converter) data bus line
24	I/O	ADC2	ADC (analog digital converter) data bus line
25	—	VCC	+5 VDC
26	I/O	ADC0	ADC (analog digital converter) data bus line
27	O	AC15	Control signal
28	—	VCC	+5 VDC
29	—	GND	Ground
30	O	CS_GADC	AD converter chip select signal
31	O	SYS_CLK	System clock
32	—	GND	Ground

Table A-17. P1, CPU PCB (SCSI Model)

Pin No.	I/O	Name	Description
1	O	REQ	Request
2	O	MSG	Message
3	O	I/O	Input/Output
4	I	RST	signal output
5	I	ACK	Acknowledge
6	I/O	BSY	Busy
7	-	GND	Ground
8	I/O	DB0	Data bus 0
9	-	GND	Ground
10	I/O	DB3	Data bus 3
11	I/O	DB5	Data bus 5
12	I/O	DB6	Data bus 6
13	I/O	DB7	Data bus 7
14	-	GND	Ground
15	O	C/D	Comtrol/Data
16	-	GND	Ground
17	I	ATN	Attention
18	-	GND	Ground
19	I/O	SEL	Select
20	I/O	DBP	Data bus parity
21	I/O	DB1	Data bus 1
22	I/O	DB2	Data bus 2
23	I/O	DB4	Data bus 4
24	-	GND	Ground
25	-	TERMPWR	Termination power (+5V)

Table A-18. CN1, AD PCB (SCSI Model)

Pin No.	I/O	Name	Description
1	I	LED_ERROR	ERROR LED drive signal
2	I	LED_RDY	READY LED drive signal
3	I	LED_OUT	Paper-out sensor LED drive signal
4	O	PAPER_OUT	Paper-out sensor signal
5	I	LED_IN	Paper-in sensor LED drive signal
6	O	PAPER_IN	Paper-in sensor signal
7	I	RESET	Reset signal
8	I	LAMP_ON	Lamp ON signal
9	I	PRT_BUSY	BUSY signal
10	O	SYS_INT	System interrupt signal
11	I	RD	Read signal
12	I	WR	Write signal
13	I	PAGE_STR	Page start signal
14	O	PCS	I/F port chip select signal
15	O	PWR	I/F port write signal
16	O	PRD	I/F port read
17	O	PDACK	DMA acknowledge to I/F port
18	I	PDRQ	DMA request from the external I/F port
19	—	+5 V	+5 VDC
20	—	+5 V	+5 VDC
21	—	GND	Ground
22	O	EOP	End of process signal
23	—	GND	Ground
24	—	GND	Ground
25	—	+12 V	+12 VDC
26	—	–12 V	–12 VDC
27	—	+12 V	+12 VDC
28	—	–12 V	–12 VDC
29	I	PH3	Motor drive signal
30	I	PH4	Motor drive signal
31	I	PH1	Motor drive signal
32	I	PH2	Motor drive signal

Table A-19. CN2, AD PCB (SCSI Model)

Pin No.	I/O	Name	Description
1, 3, 11, 13, 15	—	AGND	Analog ground
2	O	CCD_SH	Shift gate signal for CCD
4	O	CCD_CK	CCD clock signal 1
5	—	+12 V	+12 VDC
6	O	CCD_CK	CCD clock signal 2
7	—	+12 V	+12 VDC
8	O	CCD_RS	CCD output buffer
9	—	VCC	+5 VDC
10	—	SNCK4	———
12	I	DOS	CCD output signal
14	I	OS	CCD output signal
16	—	CCD_SP1	Ground

Table A-20. CN3, AD PCB (SCSI Model)

Pin No.	I/O	Name	Description
1	O	PAD1	Address for I/F port
2	O	PAD2	Address for I/F port
3	I/O	PD7	Data for I/F port
4	O	PAD0	Address for I/F port
5	I/O	PD5	Data for I/F port
6	I/O	PD6	Data for I/F port
7	I/O	PD3	Data for I/F port
8	I/O	PD4	Data for I/F port
9	I/O	PD1	Data for I/F port
10	I/O	PD2	Data for I/F port
11	I	AC5	Control signal
12	I	AC0	Control signal
13	I	AC3	Control signal
14	I	AC4	Control signal
15	I	AC1	Control signal
16	I	AC2	Control signal
17	I/O	ADC7	ADC (analog digital converter) data bus line
18	I	AC0	Control signal
19	I/O	ADC5	ADC (analog digital converter) data bus line
20	I/O	ADC6	ADC (analog digital converter) data bus line
21	I/O	ADC3	ADC (analog digital converter) data bus line
22	I/O	ADC4	ADC (analog digital converter) data bus line
23	I/O	ADC1	ADC (analog digital converter) data bus line
24	I/O	ADC2	ADC (analog digital converter) data bus line
25	—	VCC	+5 VDC
26	I/O	ADC0	ADC (analog digital converter) data bus line
27	I	AC15	Control signal
28	—	VCC	+5 VDC
29	—	GND	Ground
30	I	CS_GADC	AD converter chip select signal
31	I	SYS_CLK	System clock
32	-	GND	Ground

Table A-21. JP1, AD PCB (SCSI Model)

Pin No.	I/O	Name	Description
1 - 4	O	—	Motor drive signal
5, 6	—	+24	+24 VDC

Table A-22. JP2, AD PCB (SCSI Model)

Pin No.	I/O	Name	Description
1	—	VCC	+5 VDC
2	O	LED_IN	Ground (POWER LED)
3	O	LED_RDY	Ready LED ON signal (READY LED)
4	O	LED_ERROR	Error LED ON signal (ERROR LED)

Table A-23. JP3, AD PCB (SCSI Model)

Pin No.	I/O	Name	Description
1	—	VCC	+5 VDC
2	O	LED_IN	Paper_in sensor LED ON signal
3	I	PAPER_IN	Paper_in sensor output signal
4	—	GND	Ground

Table A-24. JP4, AD PCB (SCSI Model)

Pin No.	I/O	Name	Description
1	—	+12 V	+12 VDC (Lamp ON signal)
2	—	GND	Ground

Table A-25. JP5, AD PCB (SCSI Model)

Pin No.	I/O	Name	Description
1	—	VCC	+5VDC
2	O	LED_OUT	Paper_out sensor LED ON signal
3	I	PAPER_OUT	Paper_out sensor output signal
4	—	GND	Ground

Table A-26. JP6, AD PCB (SCSI Model)

Pin No.	I/O	Name	Description
1	—	+12 V	+12 VDC
2	—	AGND	Analog ground
3	—	–12 V	–12 VDC
4	—	AGND	Analog ground
5, 6	—	+5	+5 VDC
7	—	GND	Ground
8	—	+24	+24 VDC
9	—	GND	Ground
10	—	NC	———

A.2 CIRCUIT DIAGRAMS

1. Bi-Directoinal I/F

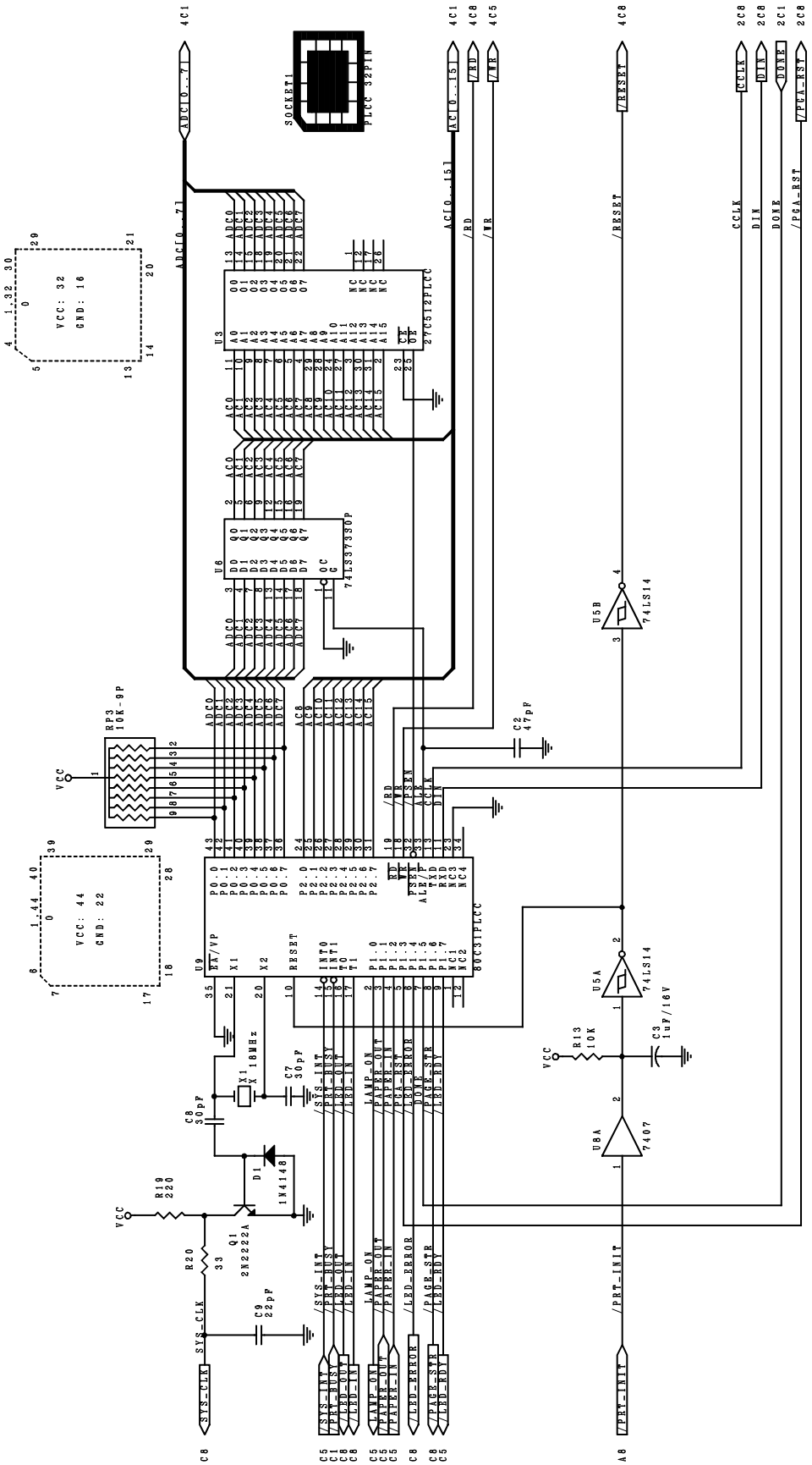

Figure A-2. CPU Circuit (Bi-D Model)

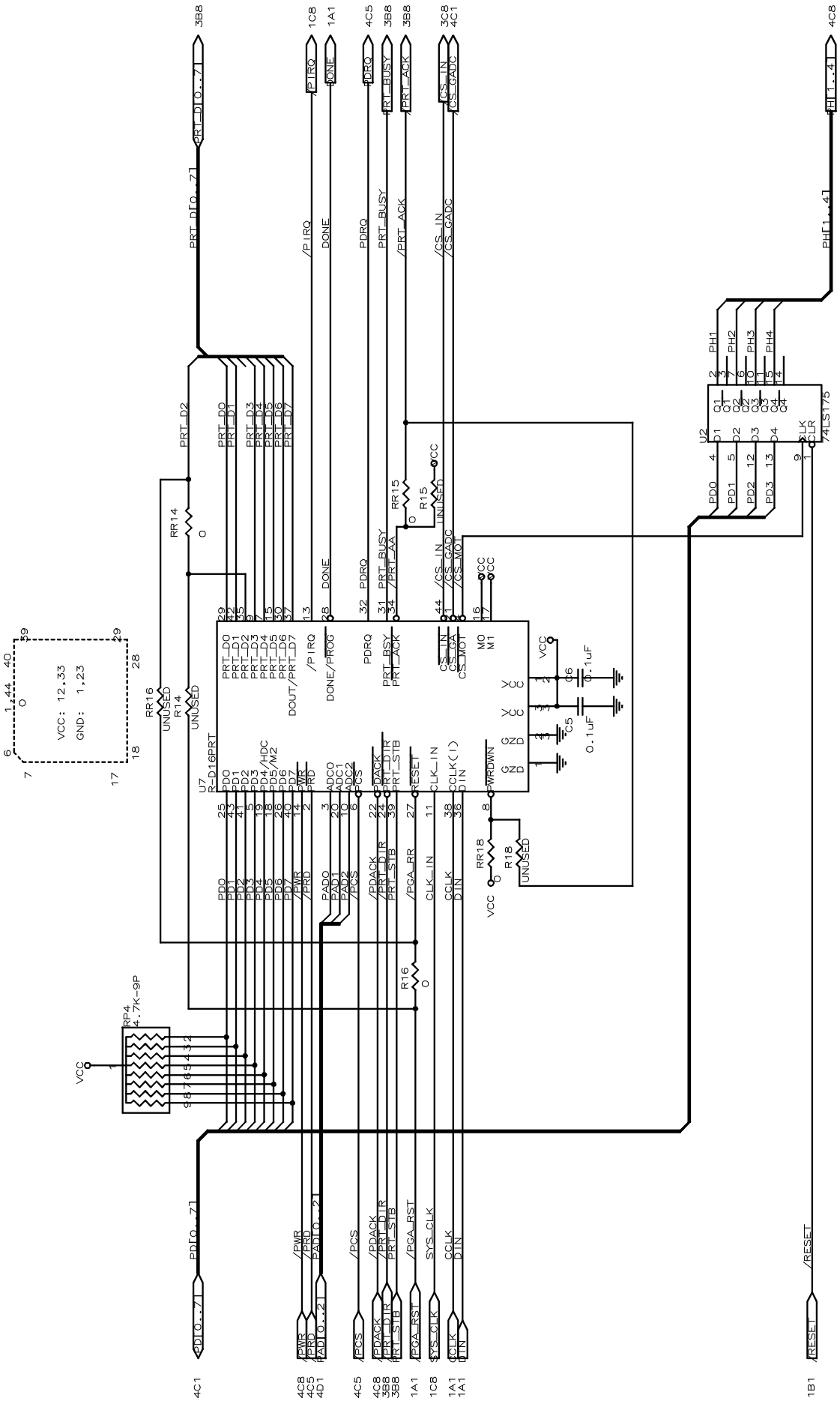

Figure A-3. Printer Port Interface Circuit (Bi-D Model)

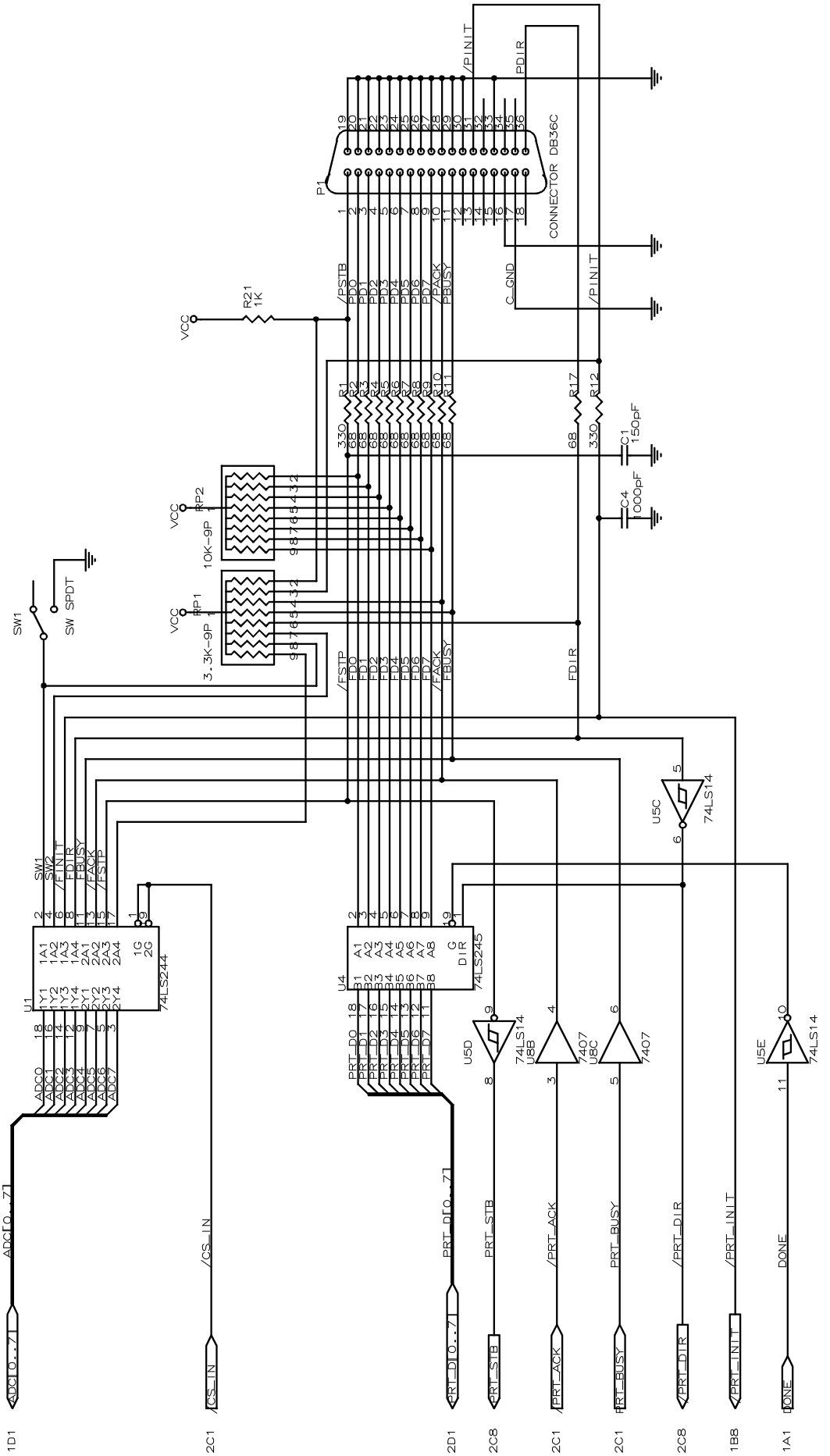

Figure A-4. PC Interface Circuit (Bi-D Model)

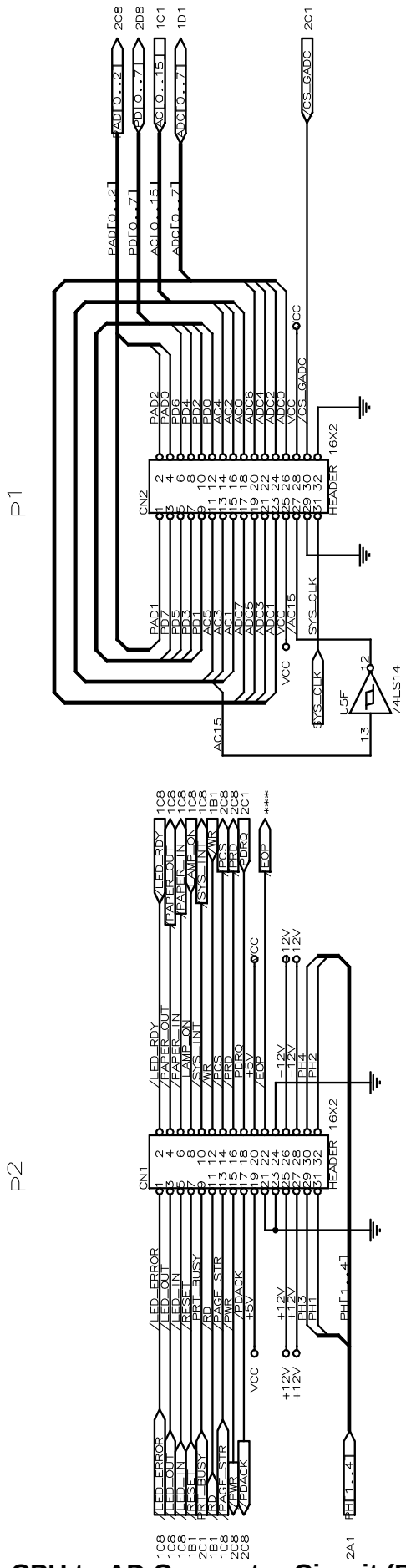

Figure A-5. CPU to AD Connector Circuit (Bi-D Model)

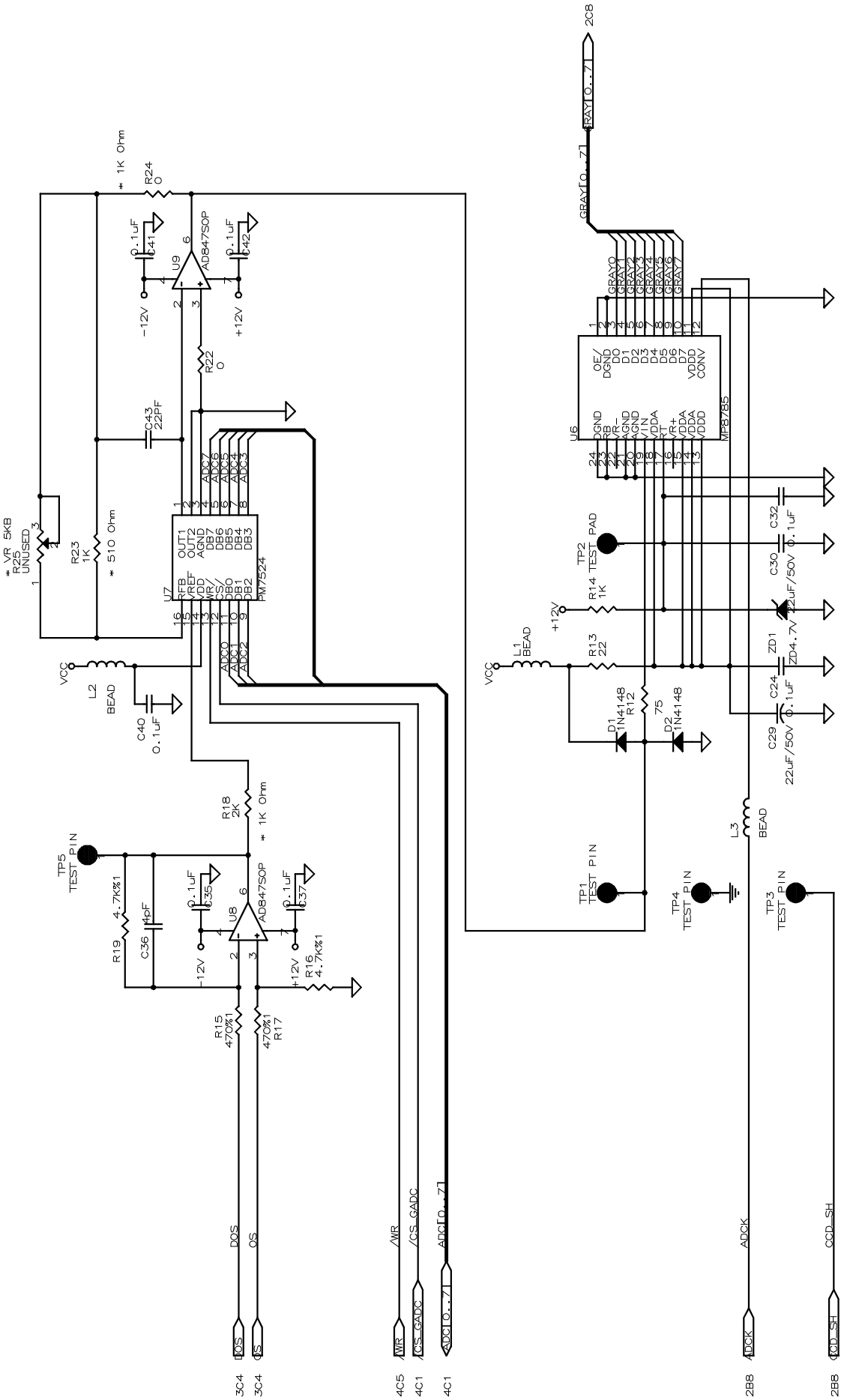

Figure A-6. A/D and D/A Circuit (Bi-D Model)

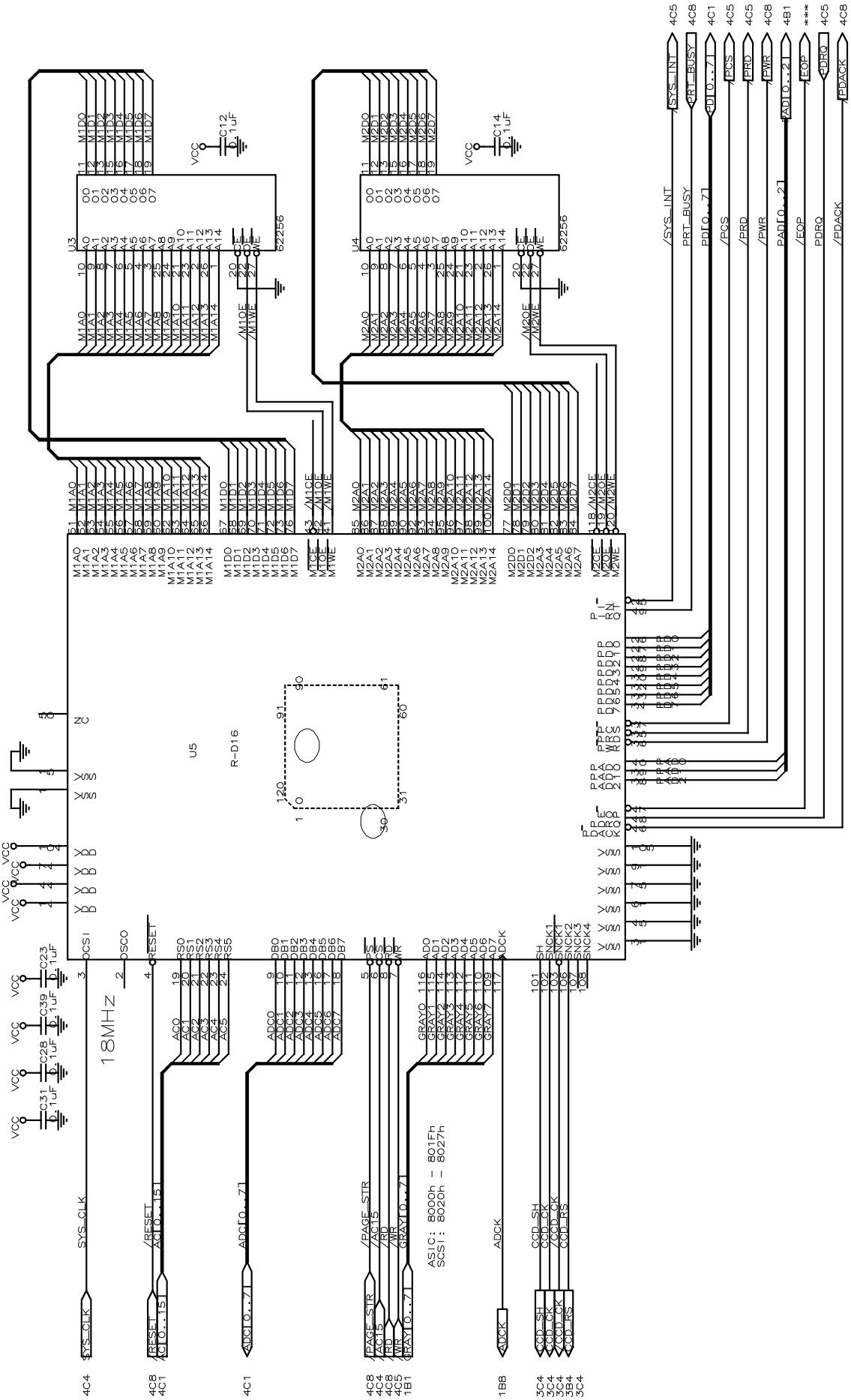

Figure A-7. R-D16 ASIC Circuit (Bi-D Model)

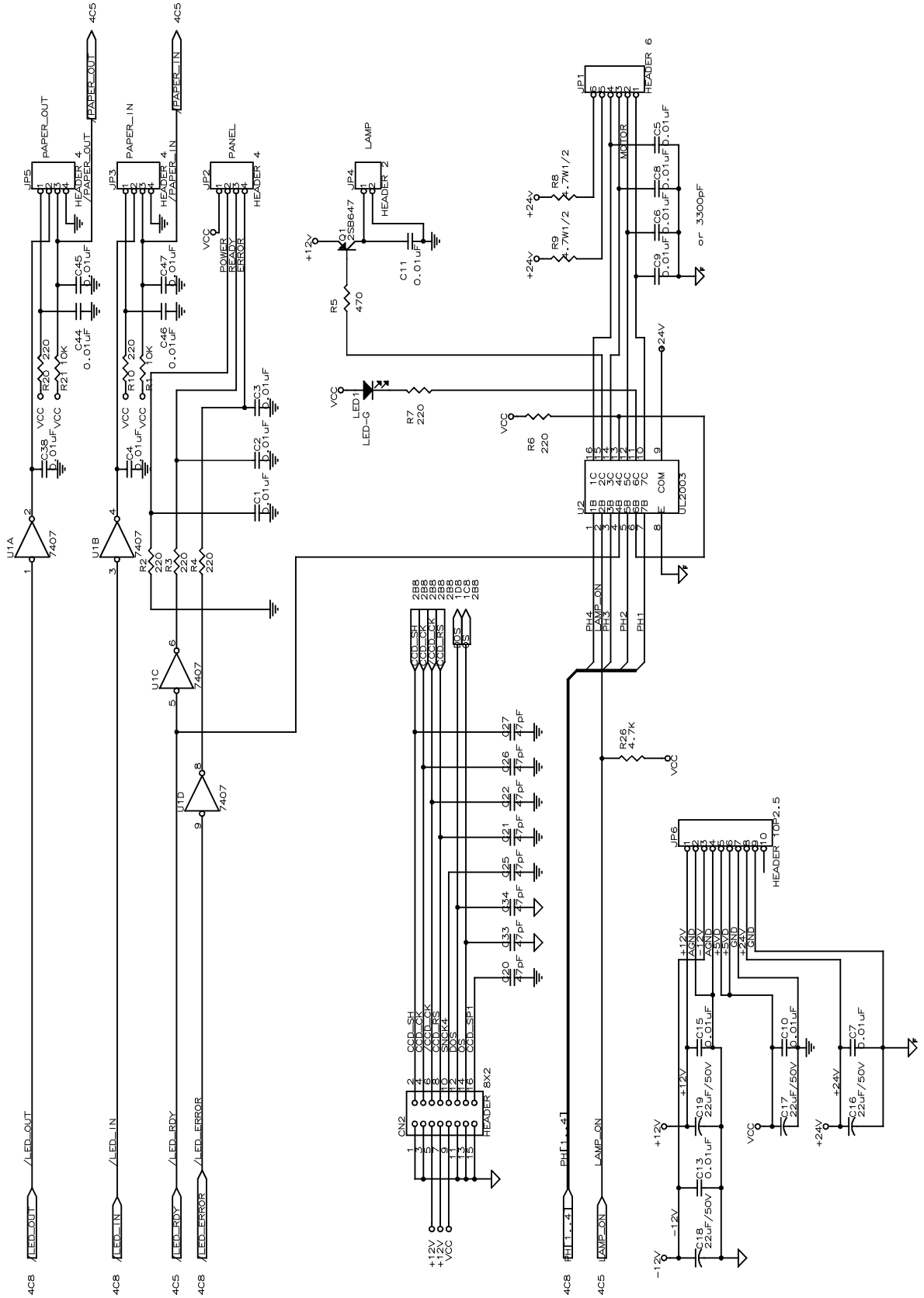

Figure A-8. Motor and I/O Circuit (Bi-D Model)

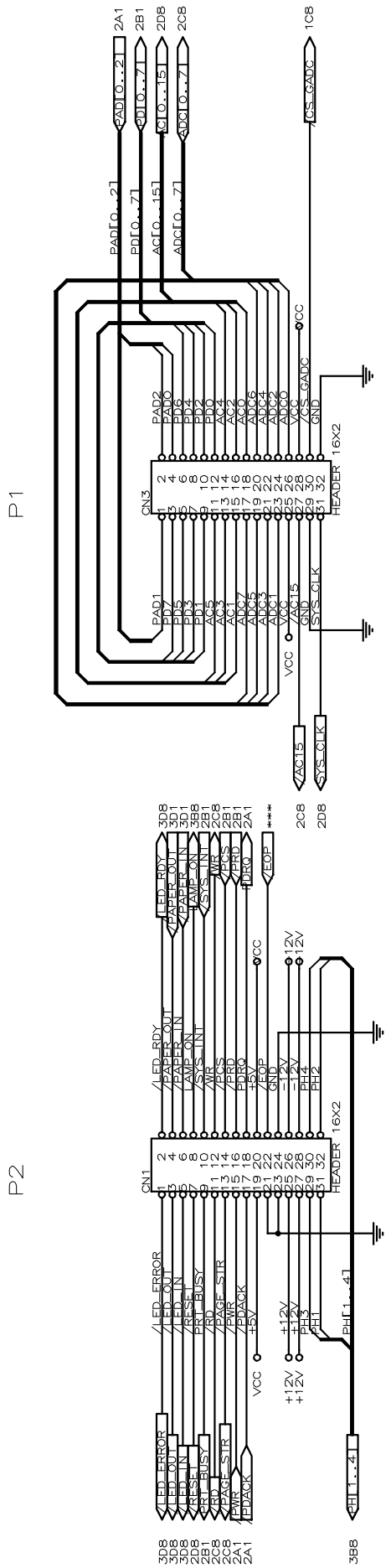

Figure A-9. AD to CPU Connector Circuit (Bi-D Model)

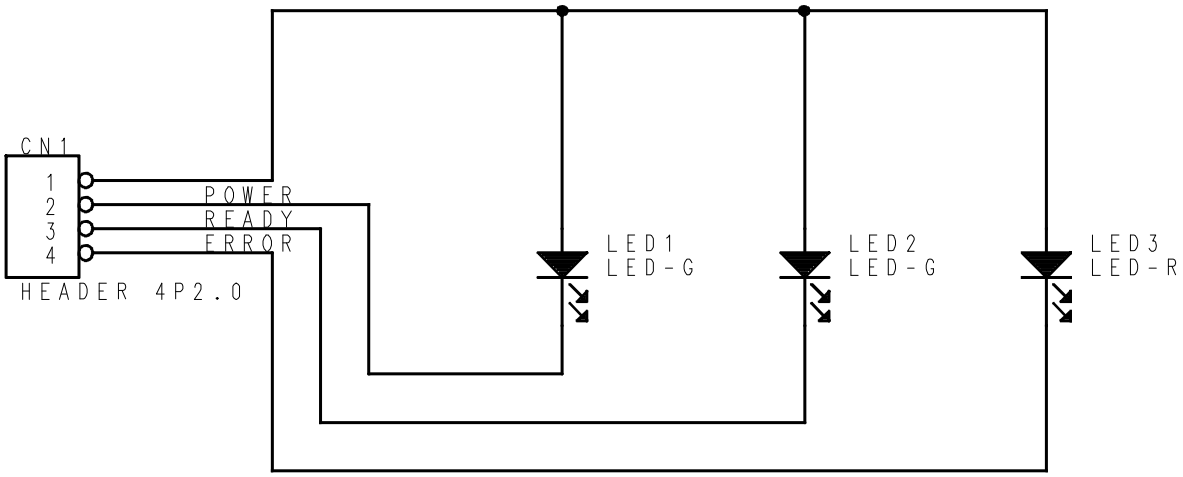

Figure A-10. Panel Board Circuit (Bi-D Model)

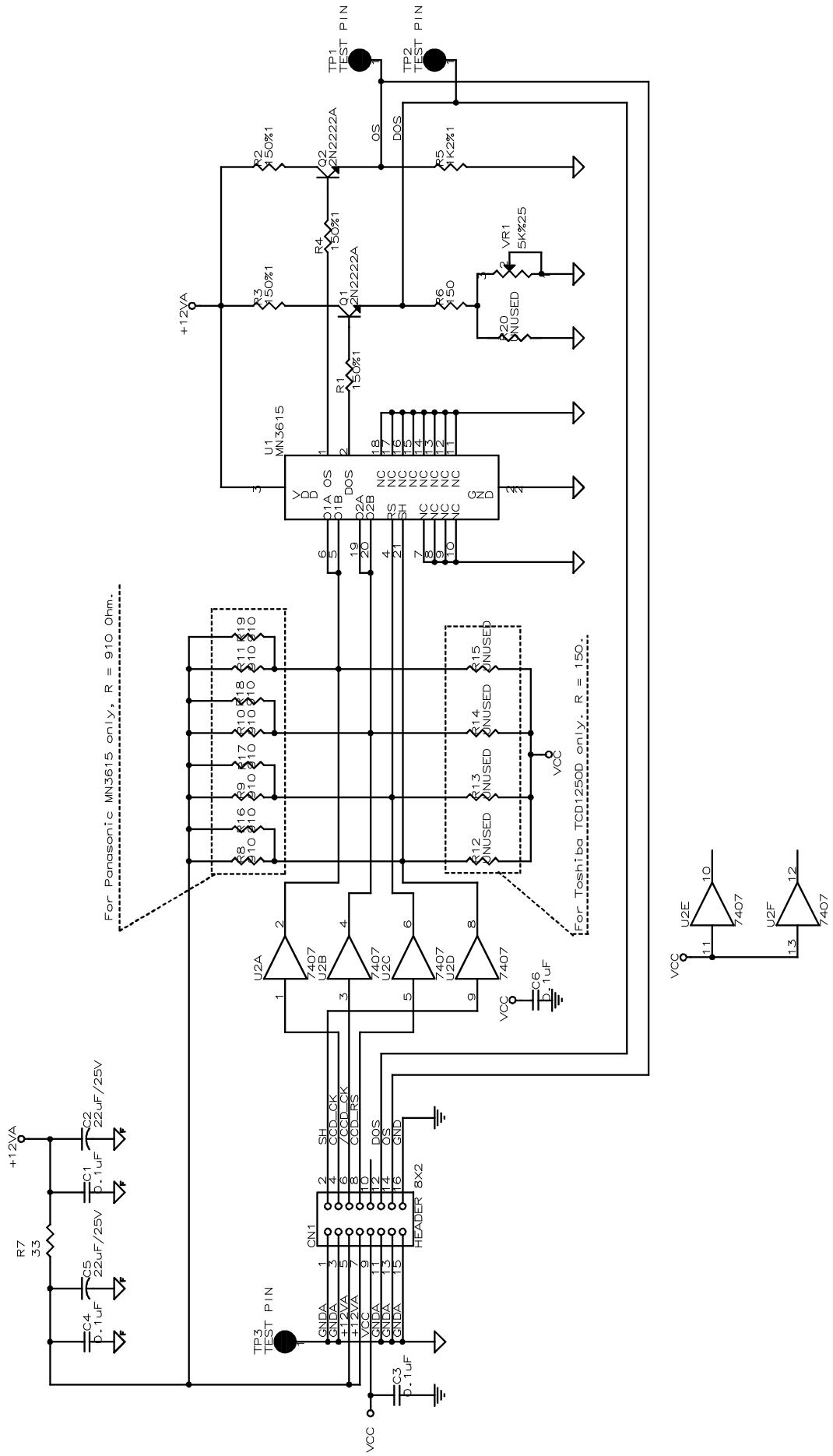

Figure A-11. CCD Board Circuit (Bi-D Model)

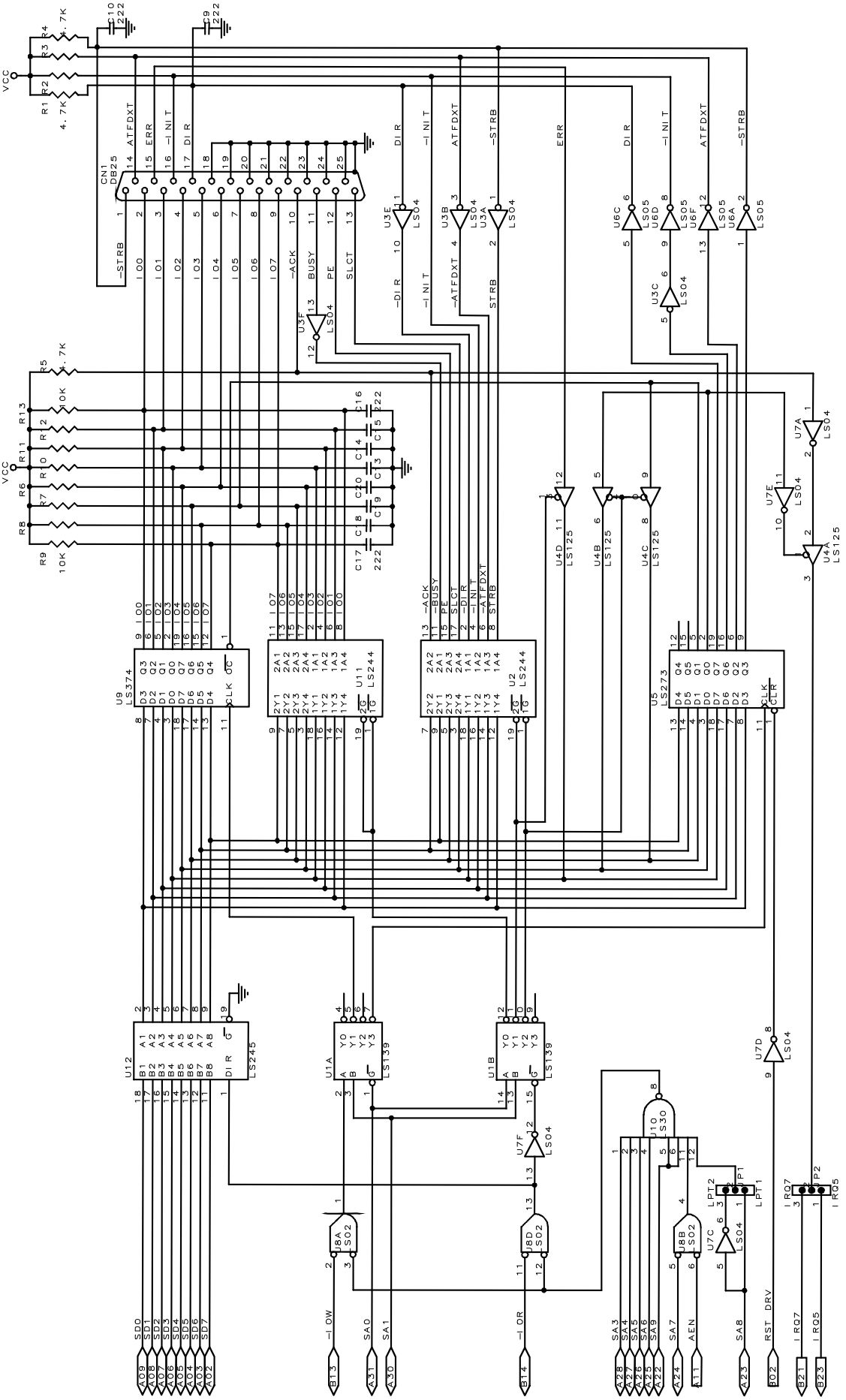

Figure A-12. Interface Card Circuit (Bi-D Model)

2. SCSI I/F

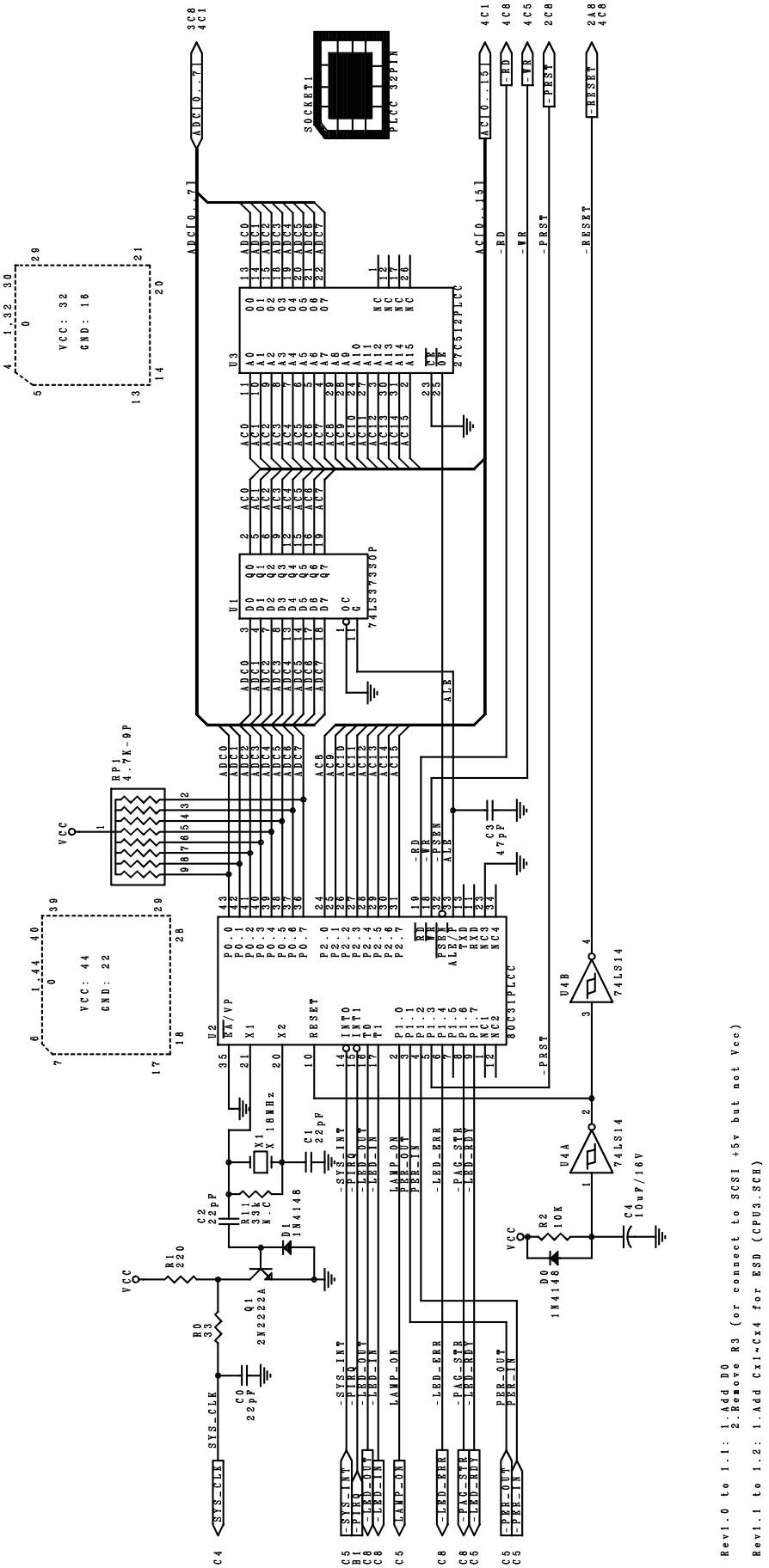

Figure A-13. CPU Circuit (SCSI Model)

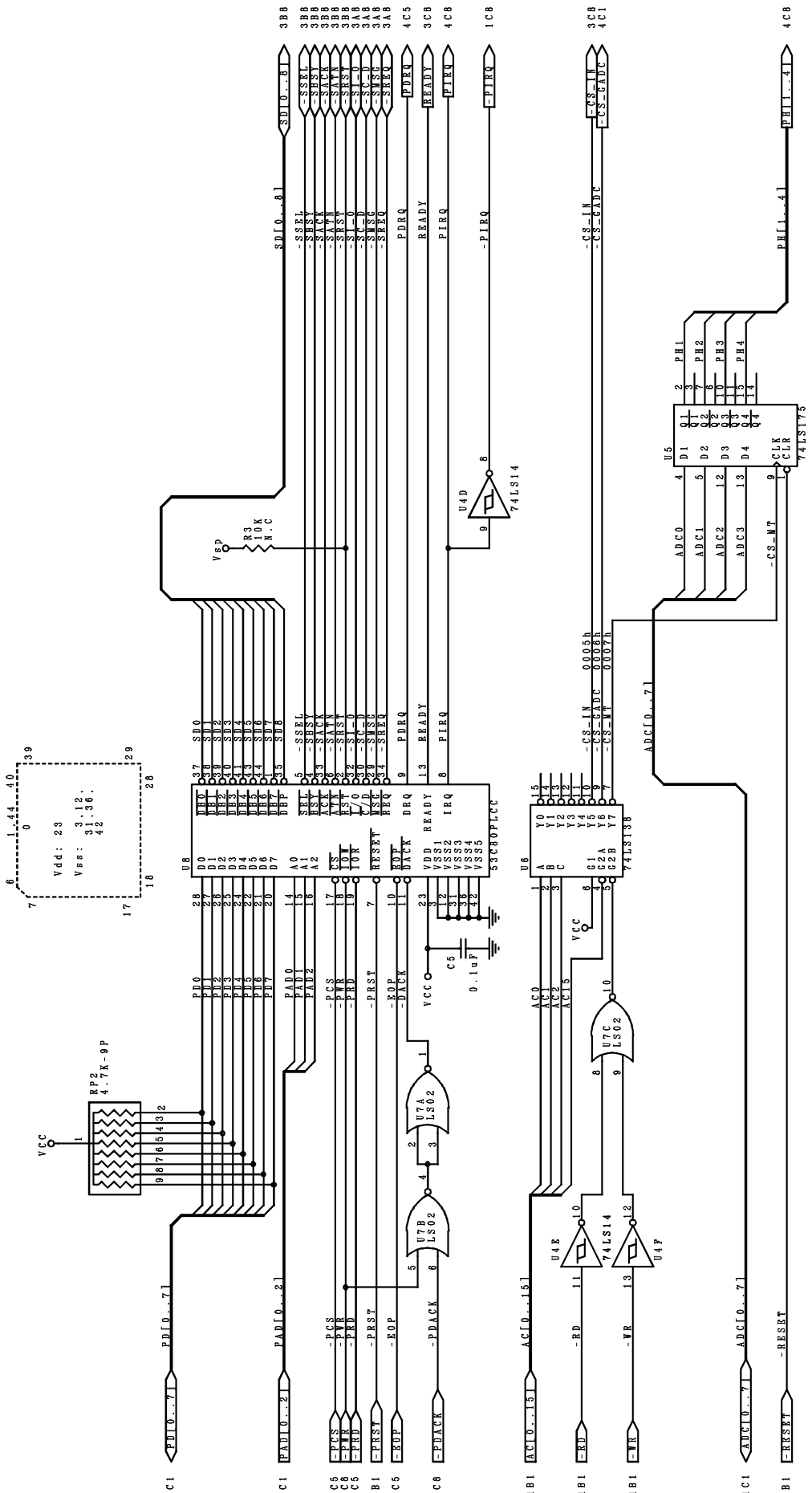

Figure A-14. Printer Port Interface Circuit (SCSI Model)

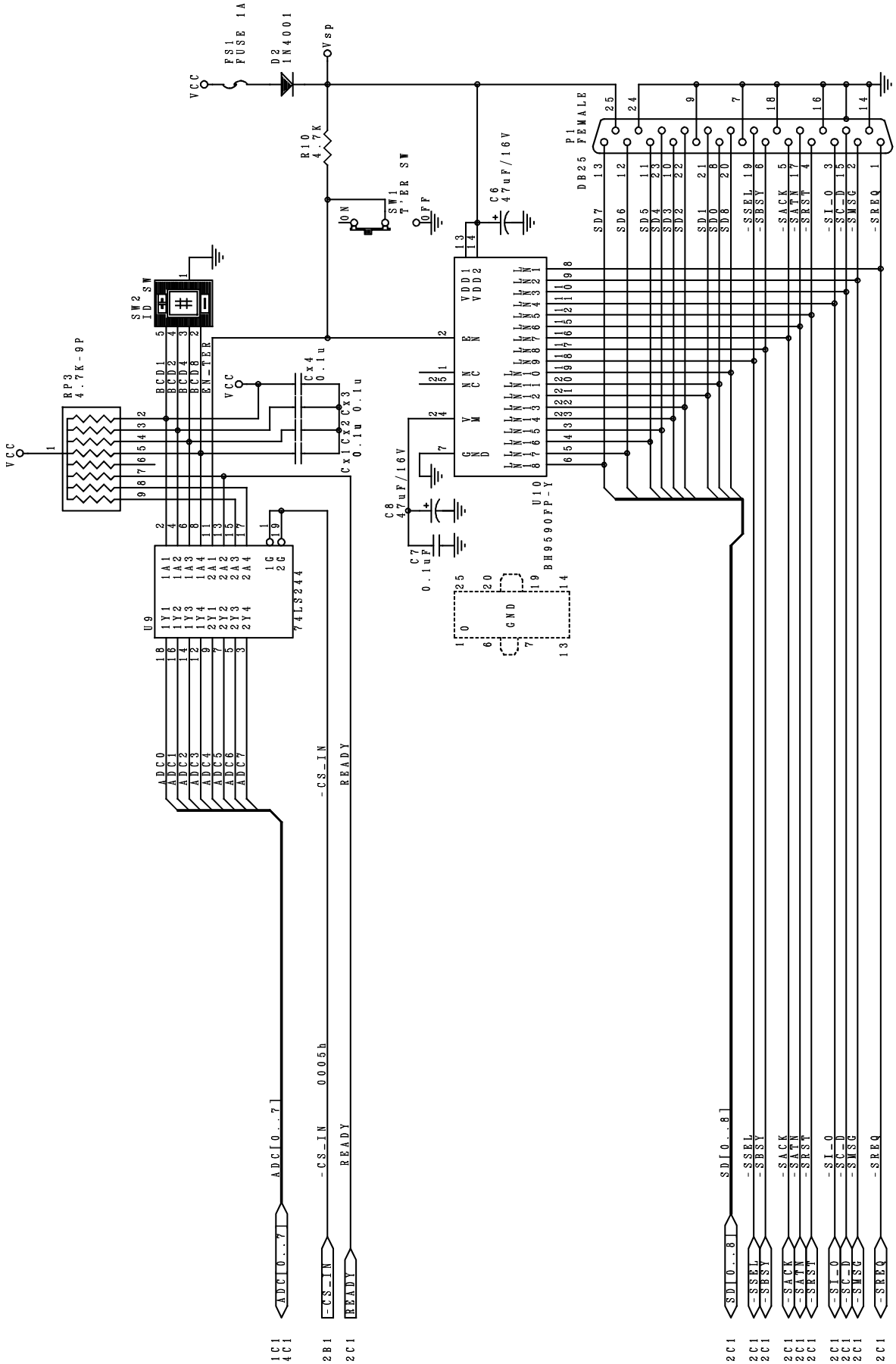

Figure A-15. PC Interface Circuit (SCSI Model)

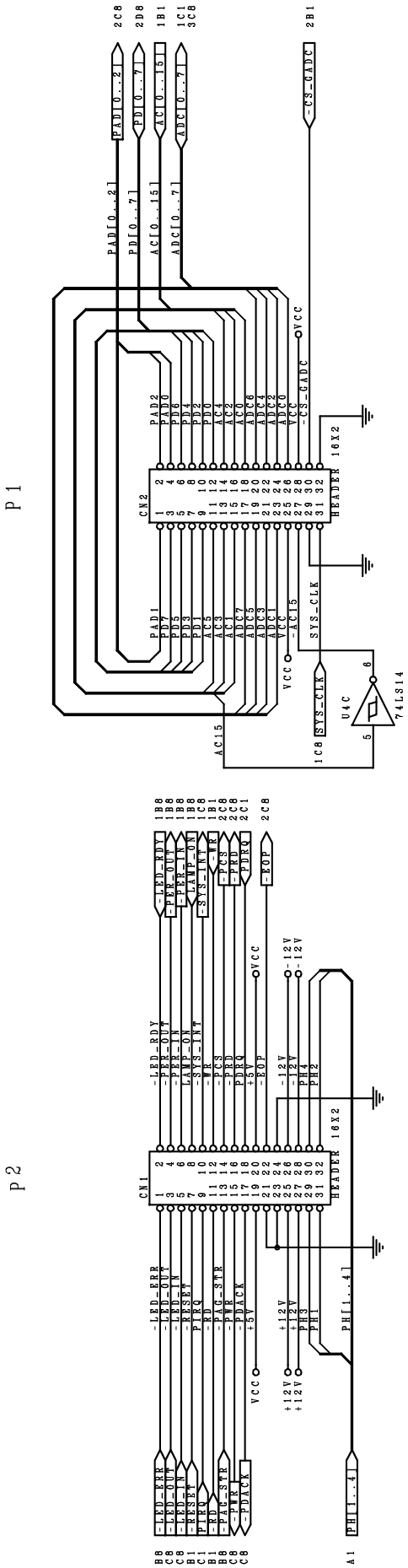

Figure A-16. CPU to AD Connector Circuit (SCSI Model)

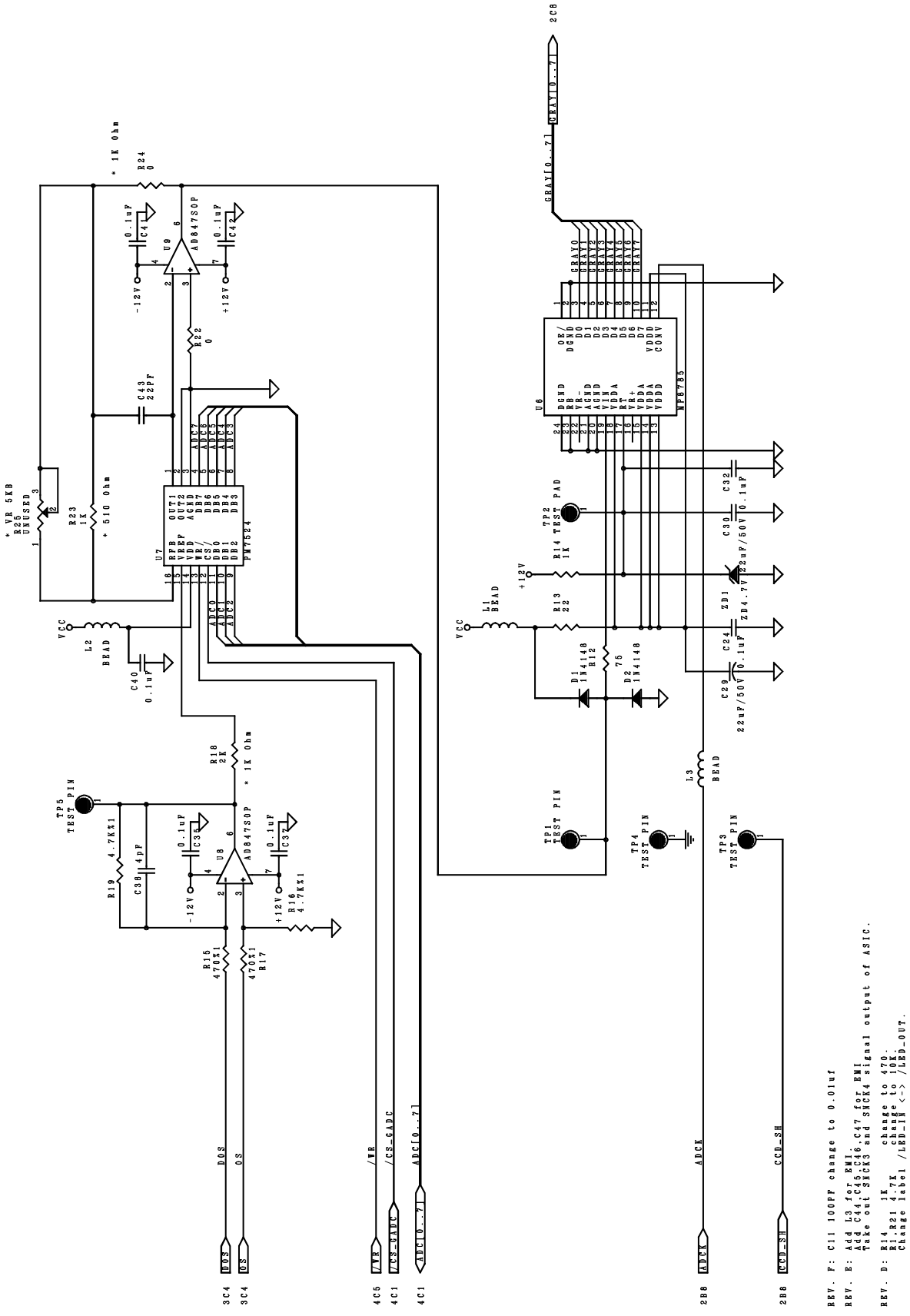

Figure A-17. A/D and D/A Circuit (SCSI Model)

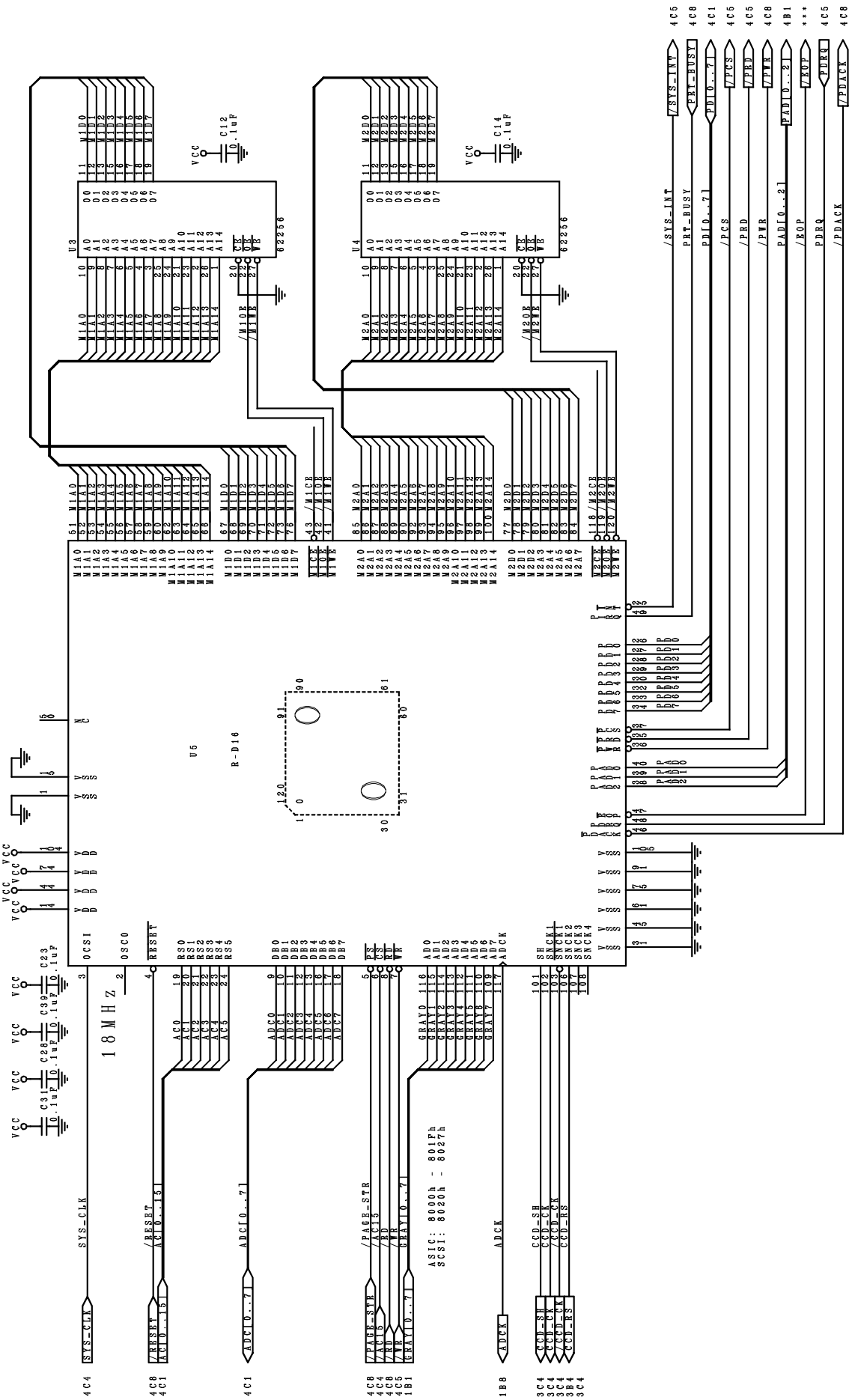

Figure A-18. R-D16 ASIC Circuit (SCSI Model)

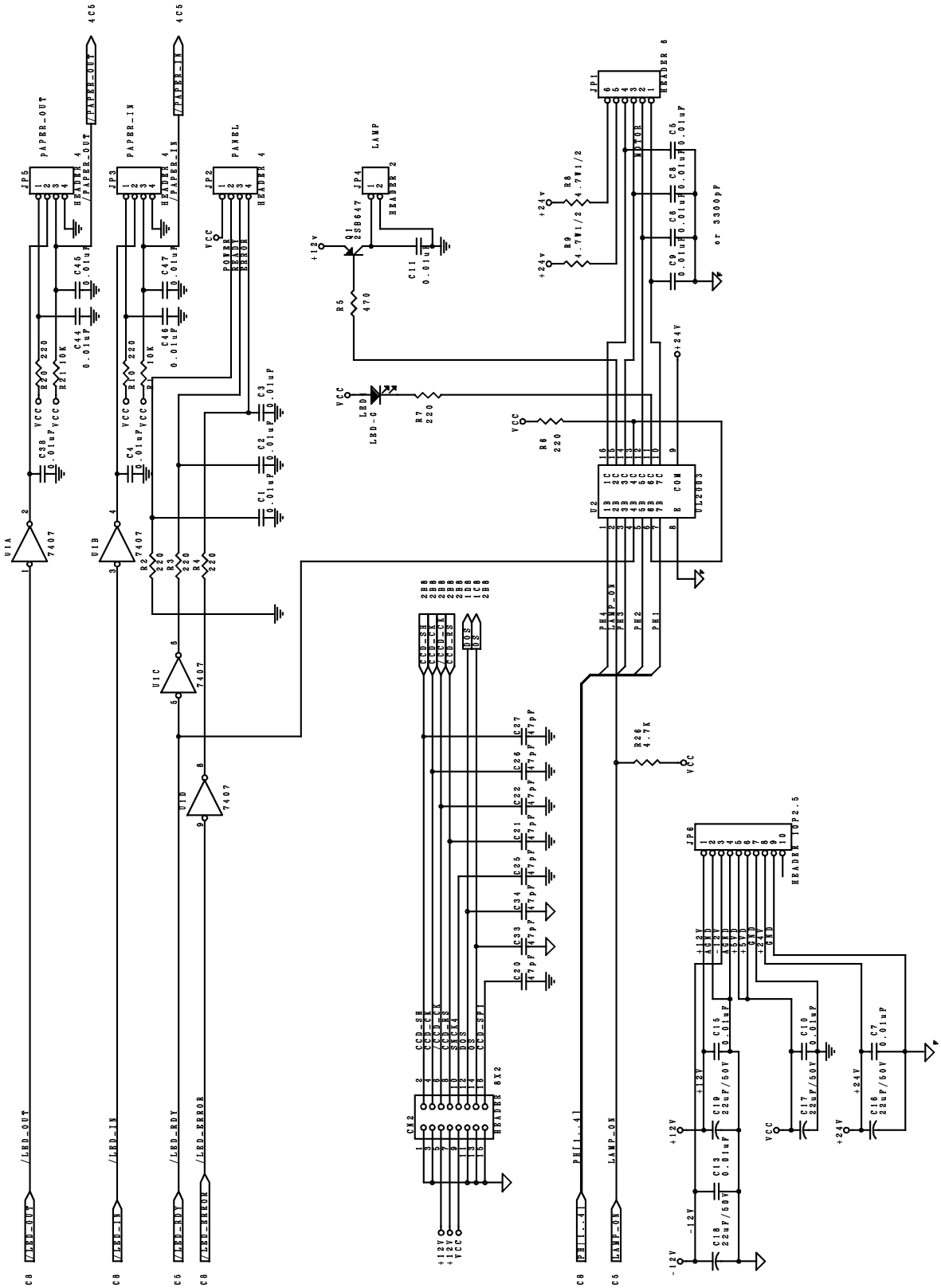

Figure A-19. Motor and I/O Circuit (SCSI Model)

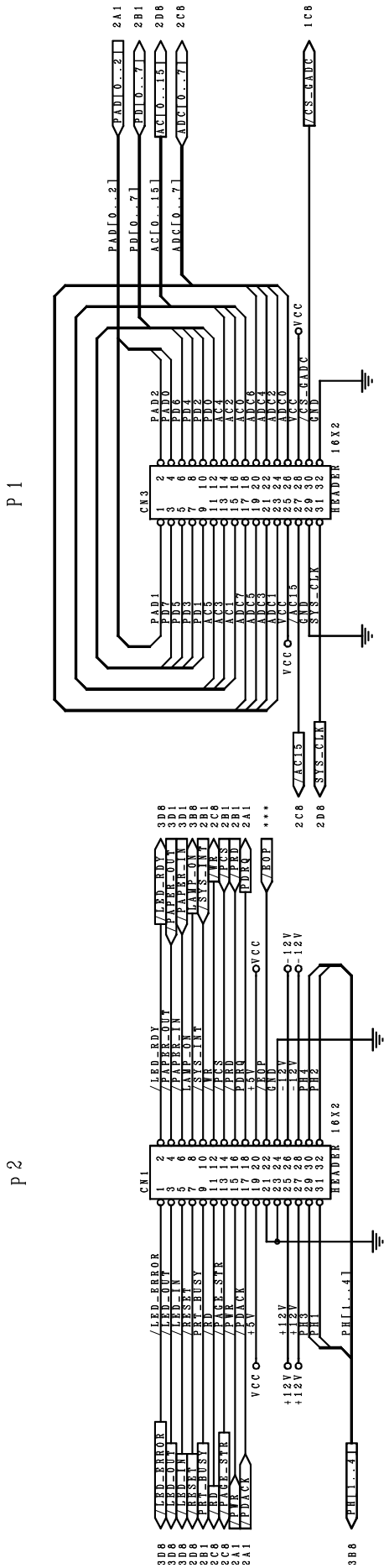

Figure A-20. AD to CPU Connector Circuit (SCSI Model)

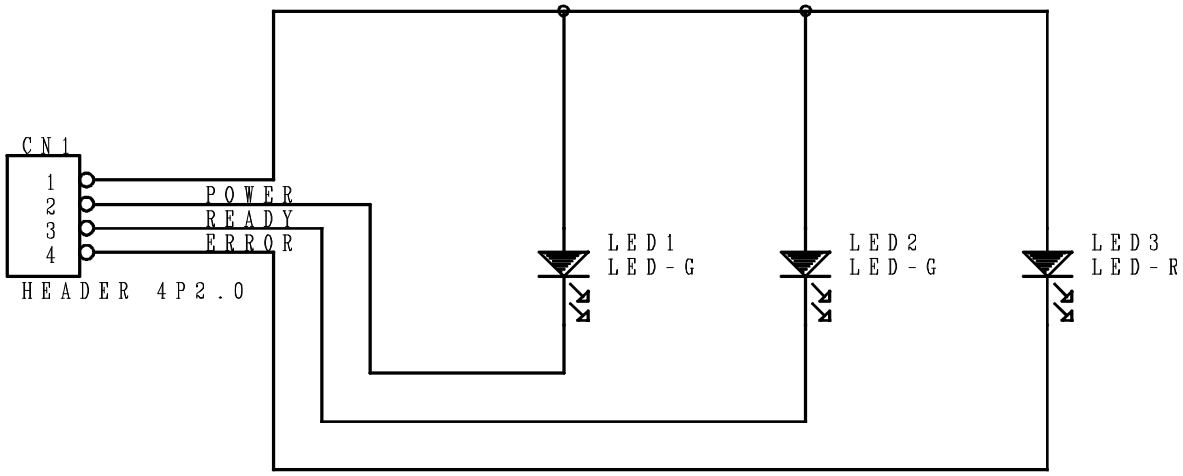

Figure A-21. Panel Board Circuit (SCSI Model)

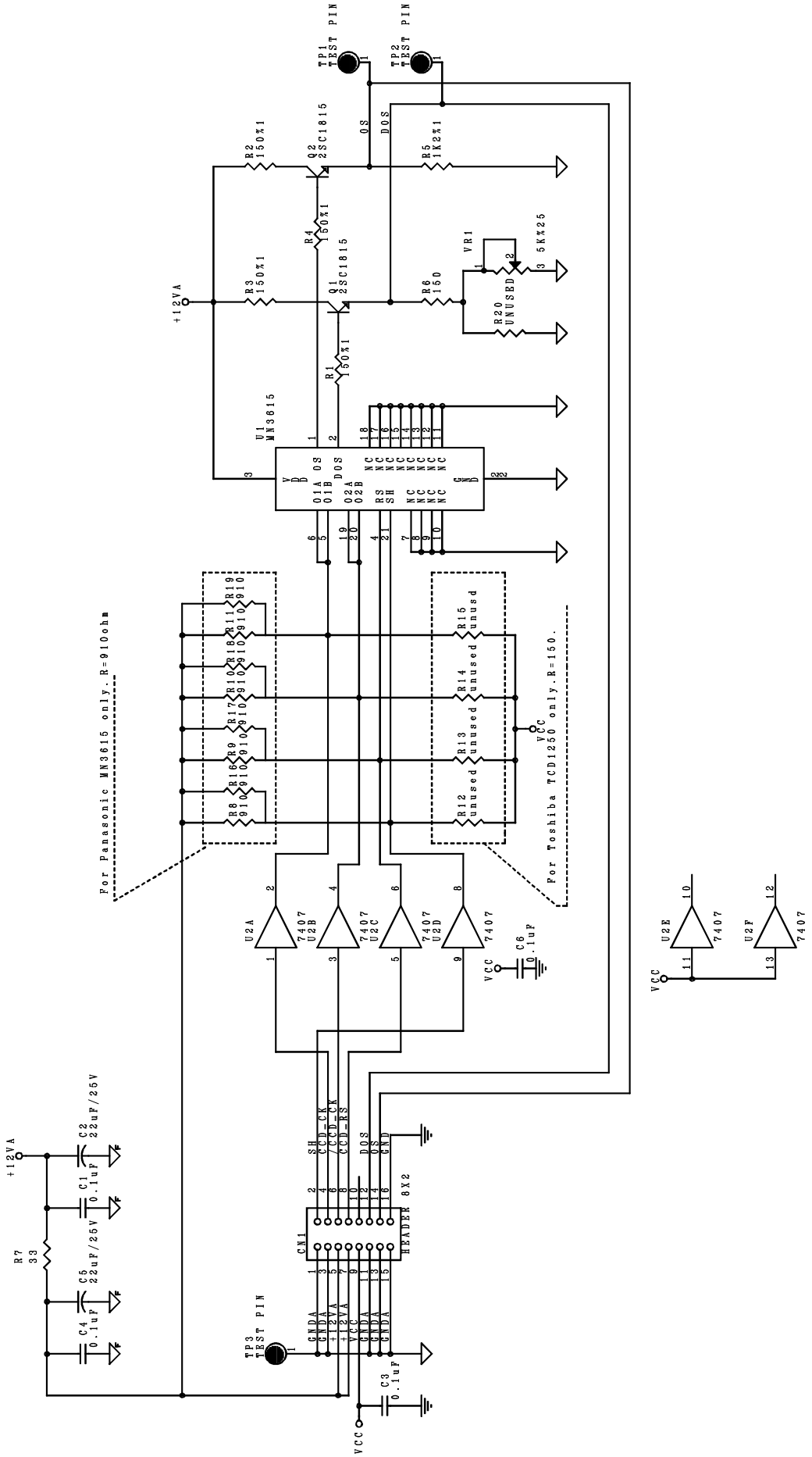

Figure A-22. CCD Board Circuit (SCSI Model)

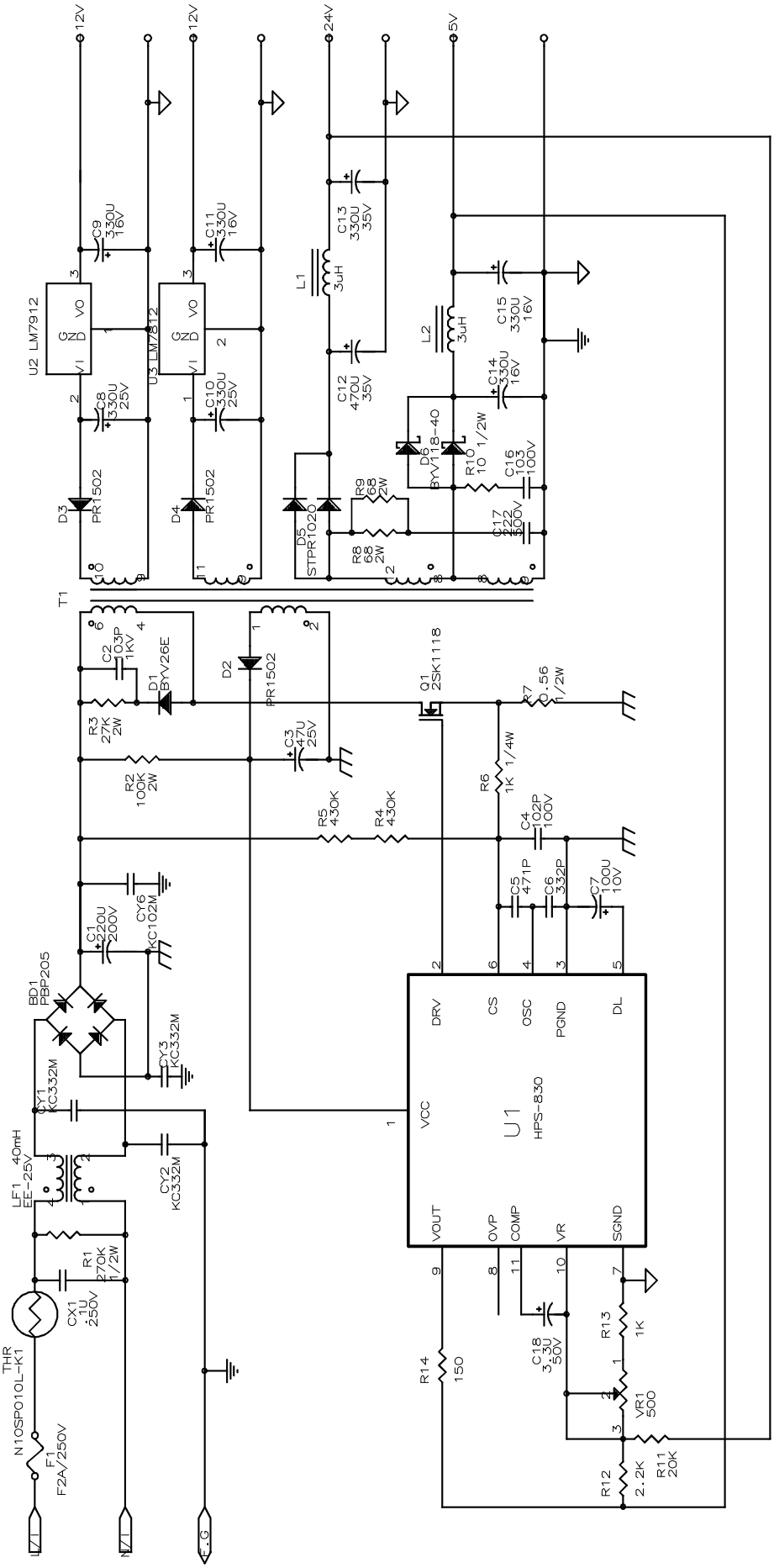

Figure A-23. P6730B Power Supply Circuit (100-120 VAC)

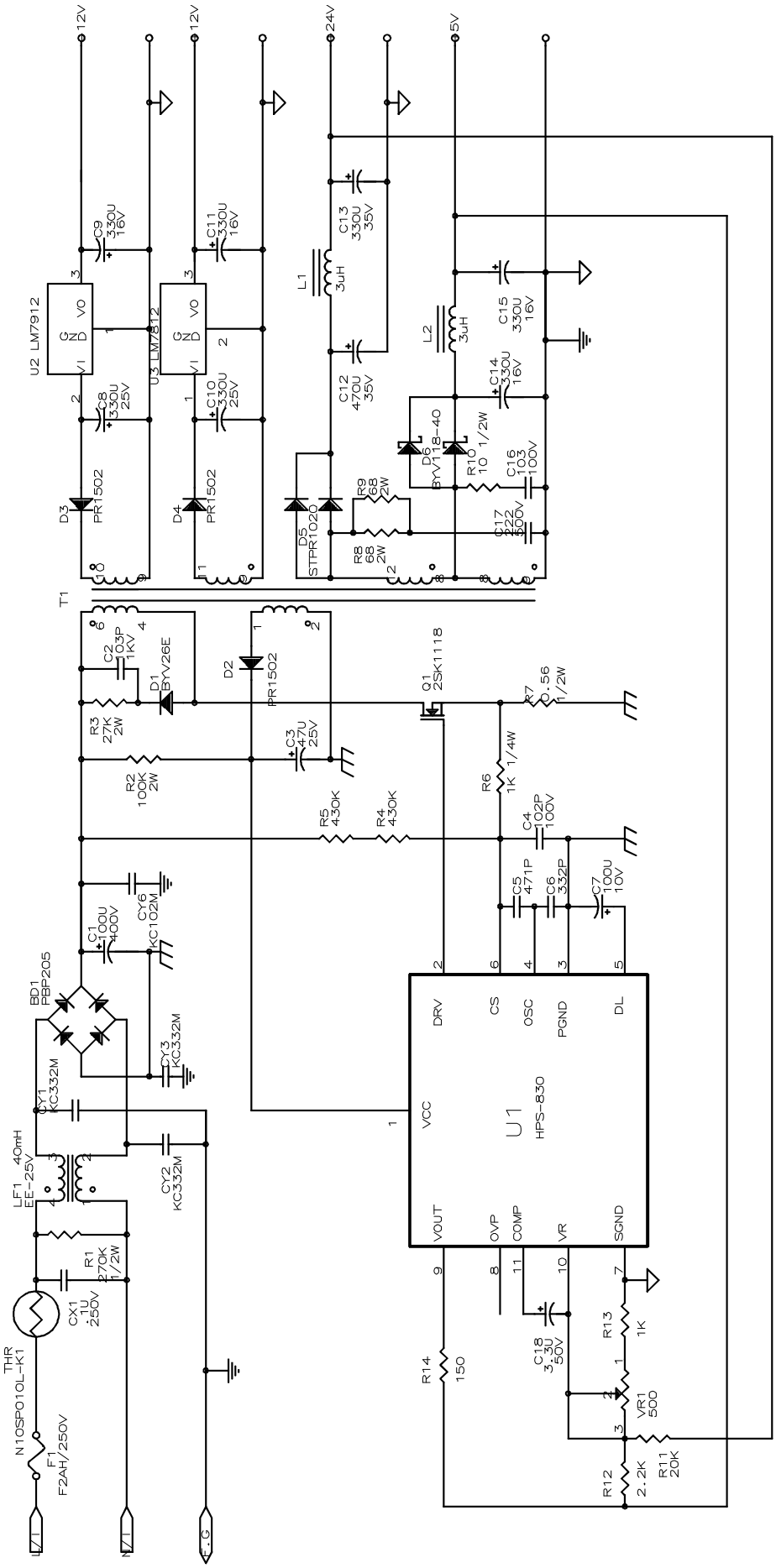

Figure A-24. P6730C Power Supply Circuit (220-240 VAC)

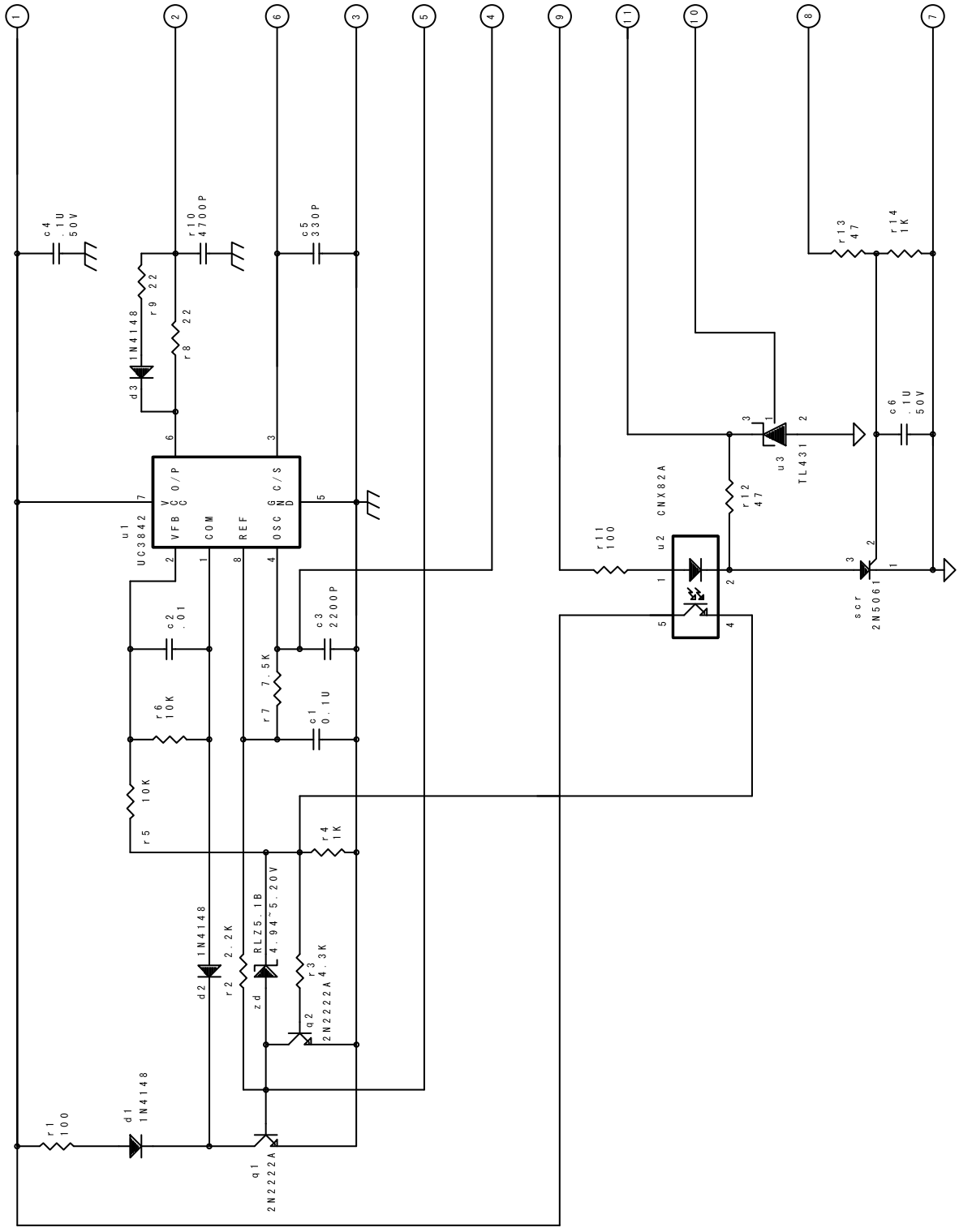

Figure A-25. HPS-830 Circuit

A.3 EXPLODED DIAGRAM

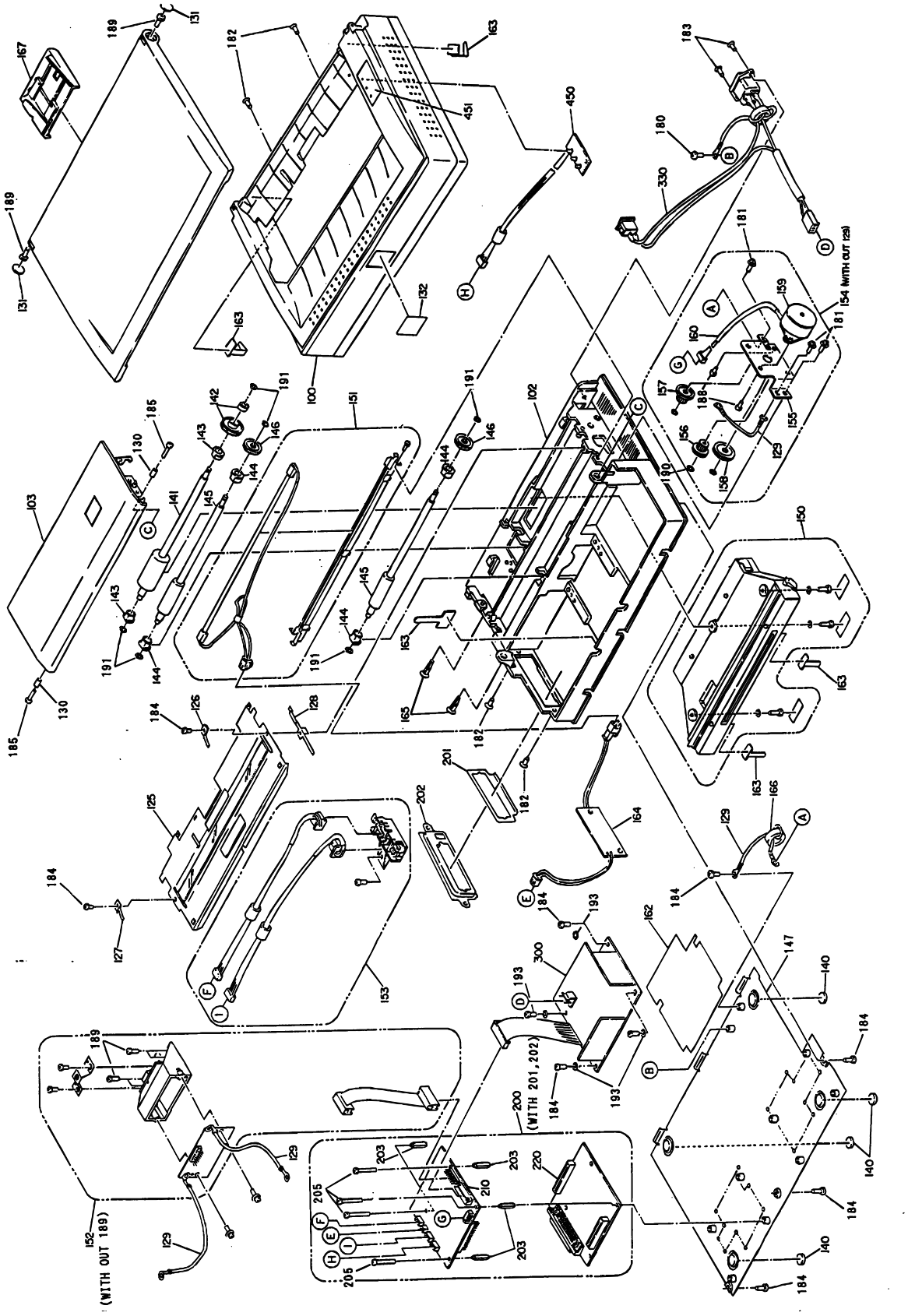

Figure A-26. Exploded Diagram - 1

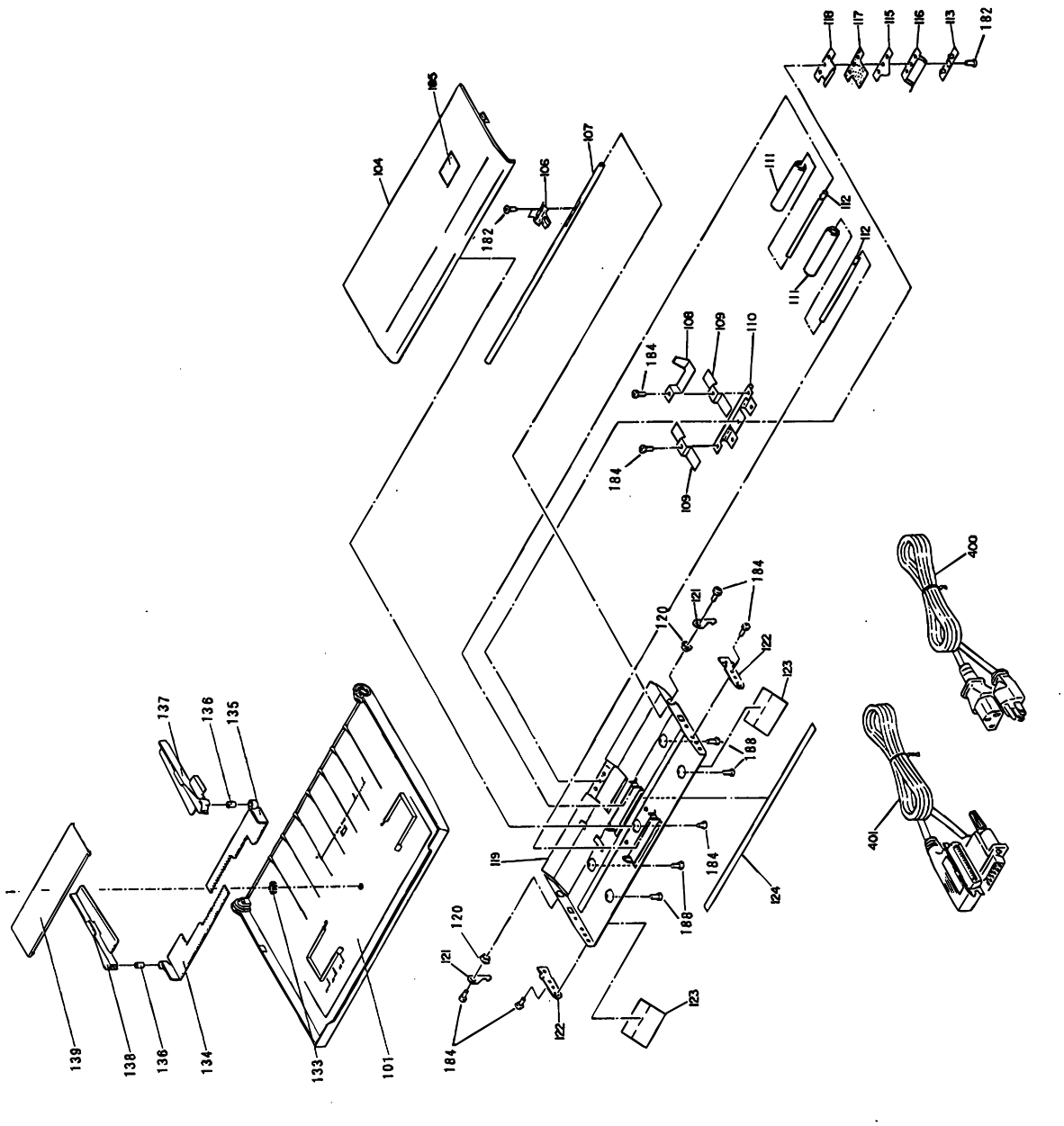

Figure A-27. Exploded Diagram - 2

Table A-14. Part No. Reference Table

Ref. No.	Description	PPL Name
100	Upper Case	CABINET BTC6530
101	Tray Cover	TRAY COVER BTC6530
102	Lower Case	CHASSIS NORYLE BTC6530
103	Scanning Subassembly	SCANNING PLATE SUB-ASSEMBLY
104	Scanning Cover	SCANNING COVER BTC6530
105	Release Button	RELEASE BUTTON BTC6530
106	Button Frame	BUTTON FRAME BTC6700
107	Hook Shaft	HOOK SHAFT BTC6700
108	Button Spring	BUTTON SPRING BTC6700
109	Pressure Plate Spring	PRESSURE PLATE SPRING
110	Plate Spring Fixind Plate	PLATE SPRING FIX PLATE
111	Pressure Roller	PRESSURE ROLLER BTC6700
112	Pressure Roller Shaft	PRESSURE ROLLER SHAFT
113	Front Fixing Plate	FRONT FIX PLATE BTC6700
115	ADF Mylar	ADF MYLAR BTC6530
116	ADF Spring 1	ADF SPRING 1
117	ADF Rubber	RUBBER ADF BTC6700
118	ADF Spring 2	ADF SPRING 2
119	Scanning Plate 2	SCANNING PLATE 2 BTC6700
120	Hook Bushing	HOOK BUSHING BTC6700
121	Hook	HOOK BTC6700
122	Hinge Plate	HINGE PLATE BTC6530
123	Pressure Mylar	PRESSURE MYLAR BTC6530
124	White Scanning Plate	SCANNING PLATE WHITE
125	Window Plate Subassembly	WINDOW PLATE SUB-ASSEMBLY
126	Right Cover Lift Spring	COVER LIFT SPRING(R)
127	Cover Lift Spring 2	COVER LIFT SPRING(L)
128	Roller Ground Plate	ROLLER GROUND PLATE
129	80 mm black Ground Line	GROUND LINE 80MM BLACK
130	Hinge Shaft	HINGE SHAFT BTC6700
131	Hinge Cover	HINGE COVER BTC6700
132	Logo Plate	LOGO PLATE
133	Rack Gear	RACK GEAR BTC6700
134	Right Rear Guide	REAR GUIDE II (R)
135	Left Rear Guide	REAR GUIDE II(L)
136	Guide Bushing	GUIDE BUSHING BTC6700
137	Left Front Guide	FRONT GUIDE II(L)
138	Right Front Guide	FRONT GUIDE II(R)
139	Guide Cover	GUIDE COVER BTC6730
140	Foot (9.5 x 2.5 mm)	FOOT DIA=9.5mm T=2.5mm

Table A-14. Part No. Reference Table (continue)

Ref. No.	Description	PPL Name
141	SP Roller	S.P.ROLLER
142	SP Roller	S.P. ROLLER BTC6700
143	Roller Bushing	ROLLER BUSHING BTC6700
144	Roller Bushing	ROLLER BUSHING BTC6700
145	PF Roller	PF ROLLER BTC6700
146	Roller Gear	ROLLER GEAR 42T BTC6700
147	Bottom Plate	BOTTOM PLATE BTC6530
150	Optical Frame Subassembly	OPTICAL FRAME SUB-ASSEMBLY
151	Lamp Subassembly	LAMP TOTAL SUB-ASSEMBLY
152	Lens Holder Assembly	LENS HOLDER ASSEMBLY BTC6530
153	Flag Switch Subassembly	FLAG SWITCH SUB-ASSEMBLY
154	Stepping Motor Subassembly	STEPPING MOTOR SUB-ASSEMBLY
155	300 dpi Motor Frame	MOTOR FRAME 300 DPI
156	Idle Gear	IDLE GEAR 18/29T BTC6700
157	Idle Gear	IDLE GEAR 17/36T BTC6700
158	Idle Gear	IDLE GEAR 42T BTC6700
159	EPSON Stepping Motor	MOTOR STEPPING EPSON
160	Heat-Shrinkable Tube	HEAT SHRINKABLE TUBE L180
162	Insulator PVC	INSULATOR P.V.C. 103x115mm
163	Wire Clip	WIRE CLIP JFW-7
164	Inverter	INV-121 INVERTER NO PACKING
165	PCB Spacer	PCB SPACER P5L BTC6700
166	Ferrite Core	FERRITE CORE T20.5x10.3x8
167	ATG Guide Subassembly	ATG GUIDE SUB-ASSEMBLY
168	I/F PCB	HAND INSERT PCB ASSEMBLY,I/F
180	Oval Head Screw	SCREW ISO 4x5 OVALHEAD NI
181	Spring Washer Screw	SCREW ISO M3x8 +SPRING WASHER
182	Big Flat Screw	SCREW ISO M3x6 BIG FLAT
183	Flat Head Screw	SCREW ISO T3x6 FLAT HEAD
184	Bind Head Screw	ISO SCREW M3x5 BIND HEAD
185	Bind Head Screw	SCREW ISO M3x120 BIND HEAD
186	Bind Head Screw	SCREW ISO M3.5x5 BIND HEAD
187	Bind Head Screw	SCREW BIND HEAD T2x6mm
188	Bind Head Screw	SCREW ISO T3x10 BIND HEAD
189	Bind Head Screw	SCREW ISO T3x10 BIND HEAD
190	2.5 mm E-ring	E-RING DIA=2.5mm
191	3 mm E-ring	E-RING DIA=3mm NI
193	Lock-in Washer	WASHER IN LOCK 3x6.5x0.45
200	MAIN BOARD	MAIN BOARD SUB-ASSEMBLY
201	GROUNDING PLATE	GROUND PLATE BTC6530
202	CONNECTOR PLATE	CONNECTOR PLATE BTC6530
203	PCB SPACER	PCB SPACER (CU 16L)
205	C.P.(M3x25)	SCREW ISO PAN HEAD M3x25 NI
210	AD BOARD	HAND INSERT PCB ASSEMBLY
220	CPU BOARD	HAND INSER PCB ASSEMBLY CPU
300	POWER SUPPLY BOARD(100-120V)	P6730B POWER NO PACKING(100-120v)
300	POWER SUPPLY BOARD(220-240V)	P6730C POWER NO PACKING(220-240V)
330	INLET SOCKET SUB-ASSEMBLY	INLET SOCKET SUB-ASSEMBLY
400	AC POWER CABLE	AC POWER CABLE
401	INTERFACE CONNECTOR	CABLE CENTRONICS 36-25P D-SUB
450	PANEL BOARD	HAND INSERT PCB ASSEMBLY PNL
451	PANEL PLATE	NAME PLATE"POWER READY ERROR"