CANOSCAN D1230/D2400 SERIES

SERVICE MANUAL

REVISION 0

Canon

MARCH 2001 JY8-1319-000

Printed in Japan
Imprimè au Japon

Use of this manual should be strictly supervised to avoid disclosure of confidential information.

Serial Number List

CanoScan D1230U	**6683A001AA**	**AZQ000000-**
	6683A003AA	**DZQ000000-**
	6683A004AA	**EZQ000000-**
	6683A005AA	**FZQ000000-**
	6683A006AA	**LZQ000000-**
	6683A007AA	**JZQ000000-**
CanoScan D1230UF	**6684A002AA**	**CZR000000-**
	6684A003AA	**DZR000000-**
	6684A004AA	**EZR000000-**
	6684A008AA	**MZR000000-**
	6684A009AA	**KZR000000-**
	6684A010AA	**LZR000000-**
FAU-S12	**6687A001AA**	**AZS000000-**
	6687A002AA	**BZS000000-**
CanoScan D2400U	**6785A001AA**	**AZT000000-**
	6685A002AA	**DZT000000-**
	6685A003AA	**EZT000000-**
CanoScan D2400UF	**6685A001AA**	**AZU000000-**
	6685A002AA	**CZU000000-**
	6685A003AA	**DZU000000-**
	6685A004AA	**EZU000000-**
	6685A005AA	**FZU000000-**
	6685A006AA	**LZU000000-**
	6685A007AA	**JZU000000-**
	6685A008AA	**MZU000000-**
FAU-S13	**6774A001AA**	**AZV000000-**
	6774A002AA	**BZV000000-**

 CANOSCAN D1230U/D2400U REV.0 MARCH 2001 PRINTED IN JAPAN (IMPRIME AU JAPON)

CONTENTS

CHAPTER 1 : GENERAL DESCRIPTIONS

CHAPTER 2 : OPERATION AND TIMING

CHAPTER 3 : MECHANICAL SYSTEM

CHAPTER 4 : MAINTENANCE AND SERVICING

CHAPTER 5 : TROUBLESHOOTING

CHAPTER 6 : PARTS CATALOG

APPENDIX

CHAPTER 1

GENERAL DESCRIPTIONS

I. SPECIFICATIONS

■ CanoScan D1230U

Scanner Main Unit

Type	: Flatbed image scanner

Scanning Part

Image sensor	: 10,550-pixel 3-line CCD
Light source	: Cold cathode fluorescent lamp
Document type	: Sheet, Book
Document alignment position	: Right-end corner
Max. document size	: A4/Letter size (216 x 297mm)
Image output mode	: Color14-bit for RGB each (16-bit input) Grayscale (256 gradations) Binary (black and white)
Optical resolution	: 1200 dpi x 2400 dpi
Scanning time	: 3.60ms/line (600 dpi or lower) 7.20ms/line (601 dpi or higher)
Cropping of scan area	: One rectangular area only

FAU-S12 Scanning Part

Film type	: Color and monochrome, negative and positive
Film size	: 35mm sleeve (preview : 3 frames, scan : 1 frame) 35mm slide mount Brownie (Max. 120x60mm) 4x5 inches
Light source	: Cold cathode fluorescent lamp
Power source	: Supplied from CanoScan D1230U
Scanning time	: 3.38 to 101.2ms/line (automatically selected depending on films)
Cropping of scan area	: One rectangular area only

Interface Part

Interface	: USB connector (Universal Serial Bus 1.1) FAU connector (8-pin) Power connector (for AC adapter)

Operating Part

Start button	: 1 each on D1230U and FAU-S12

Others

Operating environment	: Temperature : 10 to 35 degrees Relative humidity : 10 to 90%RH Air pressure : 613 to 1013 hPa
(When using FAU)	: Temperature : 10 to 35 degrees Relative humidity : 10 to 85%RH Air pressure : 613 to 1013 hPa
Power source	: 100V to 120V 220V to 240V
Power consumption	: 17W max. (during operation) 8W (during standby)
(When using FAU)	: 20W max. (during operation) 8W (during standby)
Dimensions (Scanner)	: 286.0 (Width) x 461.0 (Depth) x 92.5 (Height) mm
(FAU)	: 285.0 (Width) x 410.0 (Depth) x 31.0 (Height) mm
Weight (Scanner)	: 3.4kg
(FAU)	: 1.1kg

■ CanoScan D2400U

Scanner Main Unit

Type	: Flatbed image scanner

Scanning Part

Image sensor	: 10,680-pixel 6-line CCD
Light source	: Cold cathode fluorescent lamp
Document type	: Sheet, Book
Document alignment position	: Right-end corner
Max. document size	: A4/Letter size (216 x 297mm)
Image output mode	: Color16-bit for RGB each Grayscale (256 gradations) Binary (black and white)
Optical resolution	: 2400 dpi x 4800 dpi
Scanning time	: 4.5ms/line (600 dpi or lower) 9.0ms/line (601 dpi or higher)
Cropping of scan area	: One rectangular area only

FAU-S13 Scanning Part

Film type	: Color and monochrome, negative and positive
Film size	: 35mm sleeve (preview : 3 frames, scan : 1 frame) 35mm slide mount Brownie (Max. 120x60mm) 4x5 inches
Light source	: Cold cathode fluorescent lamp
Power source	: Supplied from CanoScan D2400U
Scanning time	: 4.5 to 162.0ms/line (automatically selected depending on films)
Cropping of scan area	: One rectangular area only

Interface Part

Interface	: USB connector (Universal Serial Bus 1.1) FAU connector (8-pin) Power connector (for AC adapter)

Operating Part

Start button	: 1 each on D2400U and FAU-S13

Others

Operating environment	: Temperature : 10 to 35 degrees Relative humidity : 10 to 90%RH Air pressure : 613 to 1013 hPa
(When using FAU)	: Temperature : 10 to 35 degrees Relative humidity : 10 to 85%RH Air pressure : 613 to 1013 hPa
Power source	: 100V to 120V 220V to 240V
Power consumption	: 17W max. (during operation) 8W (during standby)
(When using FAU)	: 20W max. (during operation) 8W (during standby)
Dimensions (Scanner)	: 286.0 (Width) x 461.0 (Depth) x 92.5 (Height) mm
(FAU)	: 285.0 (Width) x 410.0 (Depth) x 31.0 (Height) mm
Weight (Scanner)	: 3.4kg
(FAU)	: 1.1kg

Specifications are subject to change without prior notice.

II. PARTS CONFIGURATION

A. Front View

① Document Cover
② Document Glass
③ Start Button

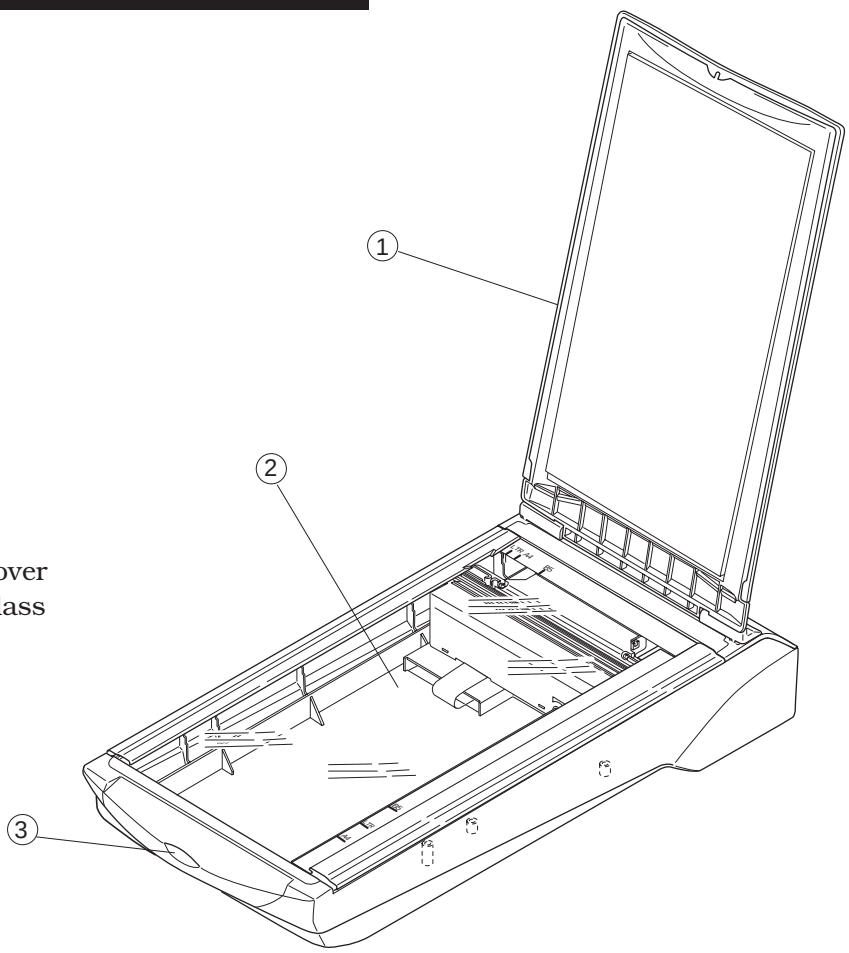


Figure 1-1

B. Rear View

① USB Connector
② FAU Connector
③ Power Connector

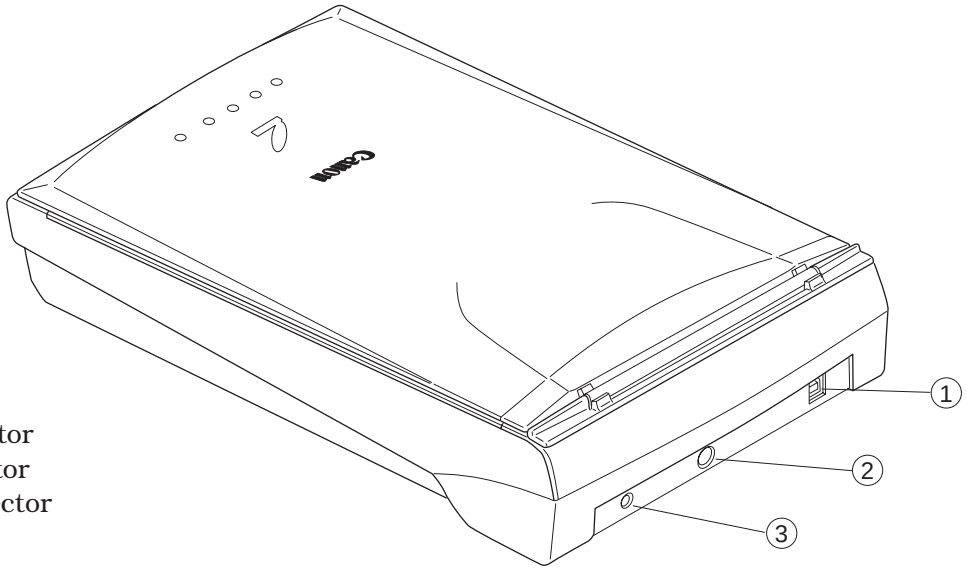
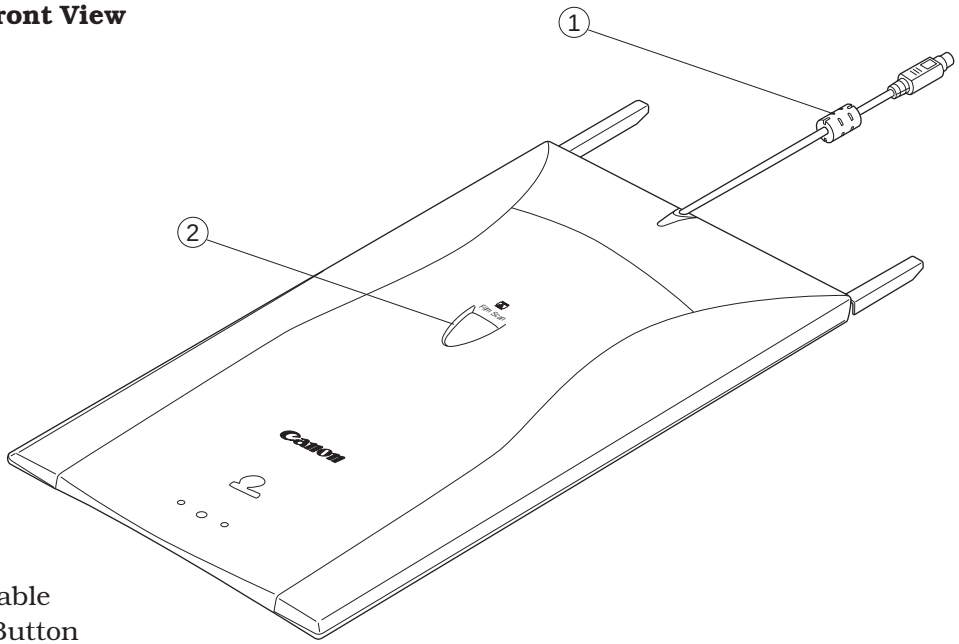


Figure 1-2

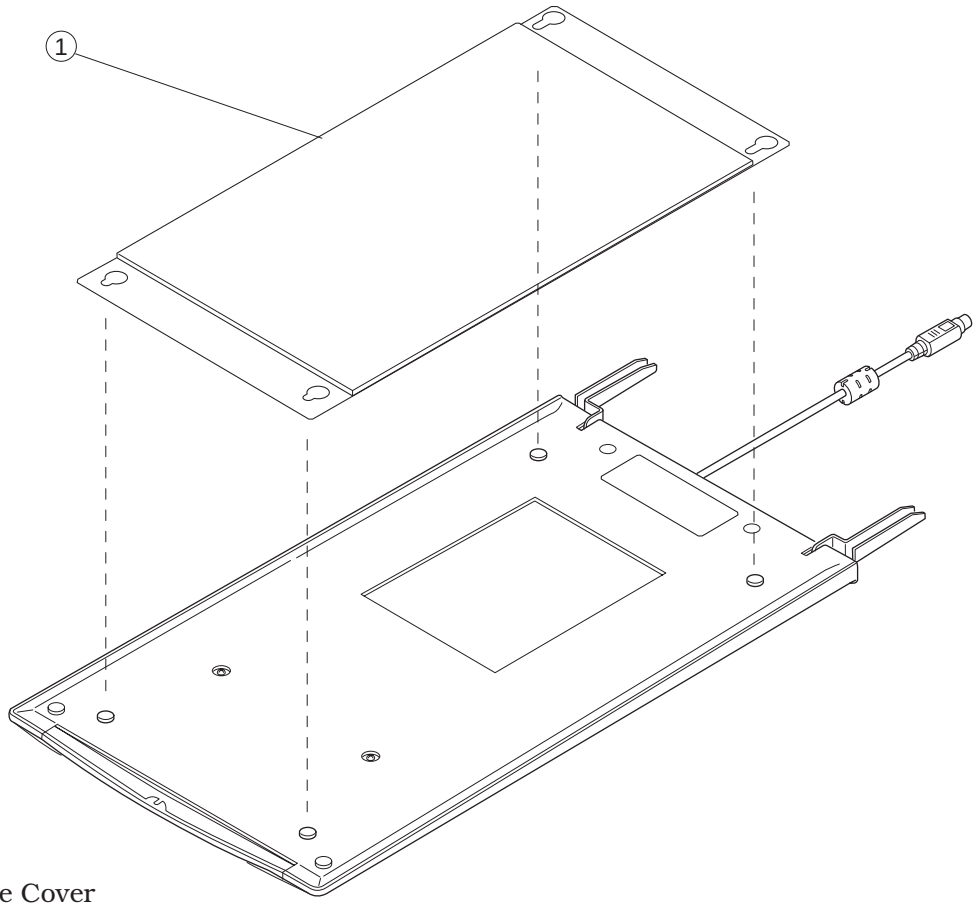
C. FAU Front View



① FAU Cable
② Start Button

Figure 1-3

D. FAU Rear View



① Protective Cover

Figure 1-4

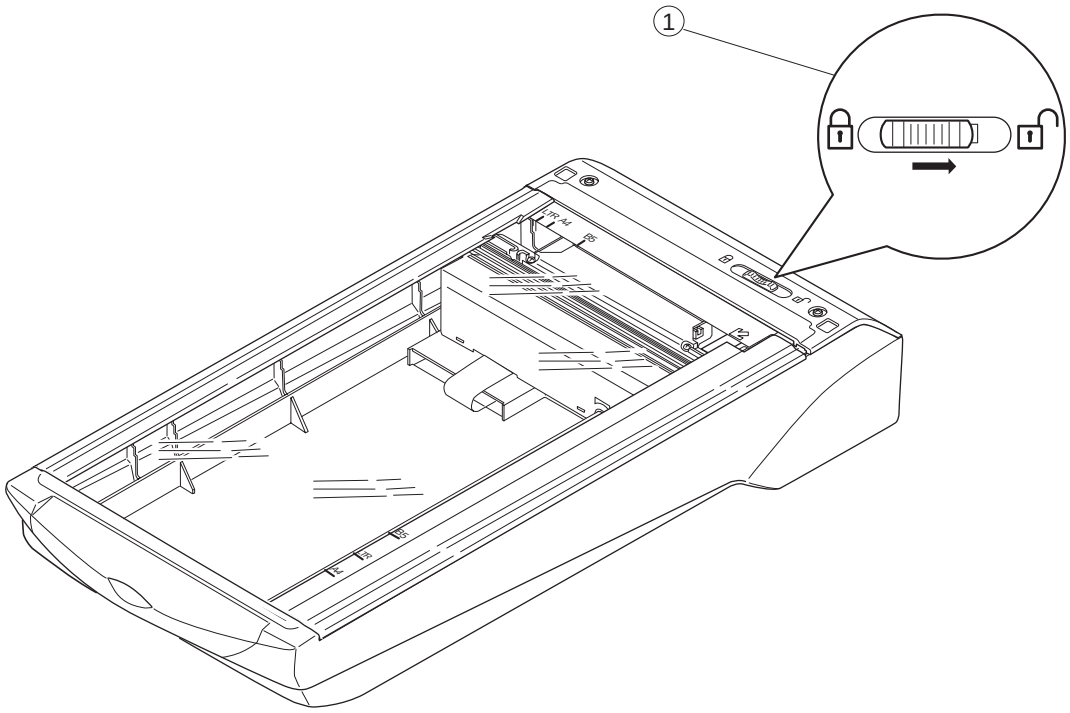
III. SETTING UP THE SCANNER

A. Precautions

* Keep the scanner out of direct sunlight. Direct exposure to the sun or excessive heat may cause damage to the scanner.
* Do not install the scanner in a humid or dusty environment.
* Use the supplied AC adapter only.
* Place the scanner securely on an even, flat surface. Tilted or uneven surface may cause a mechanical problem.
* Keep the outer carton and packing material in case you may ship the scanner in the future.

B. Unlocking the Carriage Lock

Scanning unit is locked by the carriage lock to prevent a damage during transport. Unlock the carriage lock by pushing toward the “unlock” mark to use the scanner.



① Carriage Lock

Figure 1-5

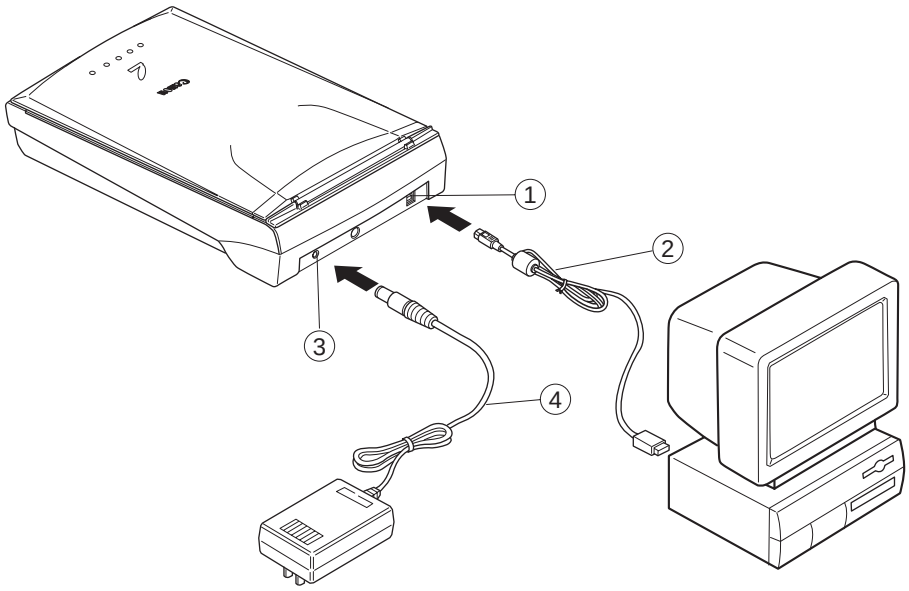
Note : Ensure to lock the carriage lock during transport.

C. Connecting the Cables

D1230U/D2400U is connected to the USB port on the host computer. Refer to the "Getting Started" guide supplied with the product for details. For connecting the host computer's cables, refer to the manuals for the host computer.

1. Connecting the AC Adapter Cable and USB Cable

1) Connect the AC adapter cable to the power connector on the scanner.
2) Connect the square plug (B type) of the USB cable to the USB connector on the scanner, and connect the flat plug (A type) of the USB cable to the USB port on the host computer.

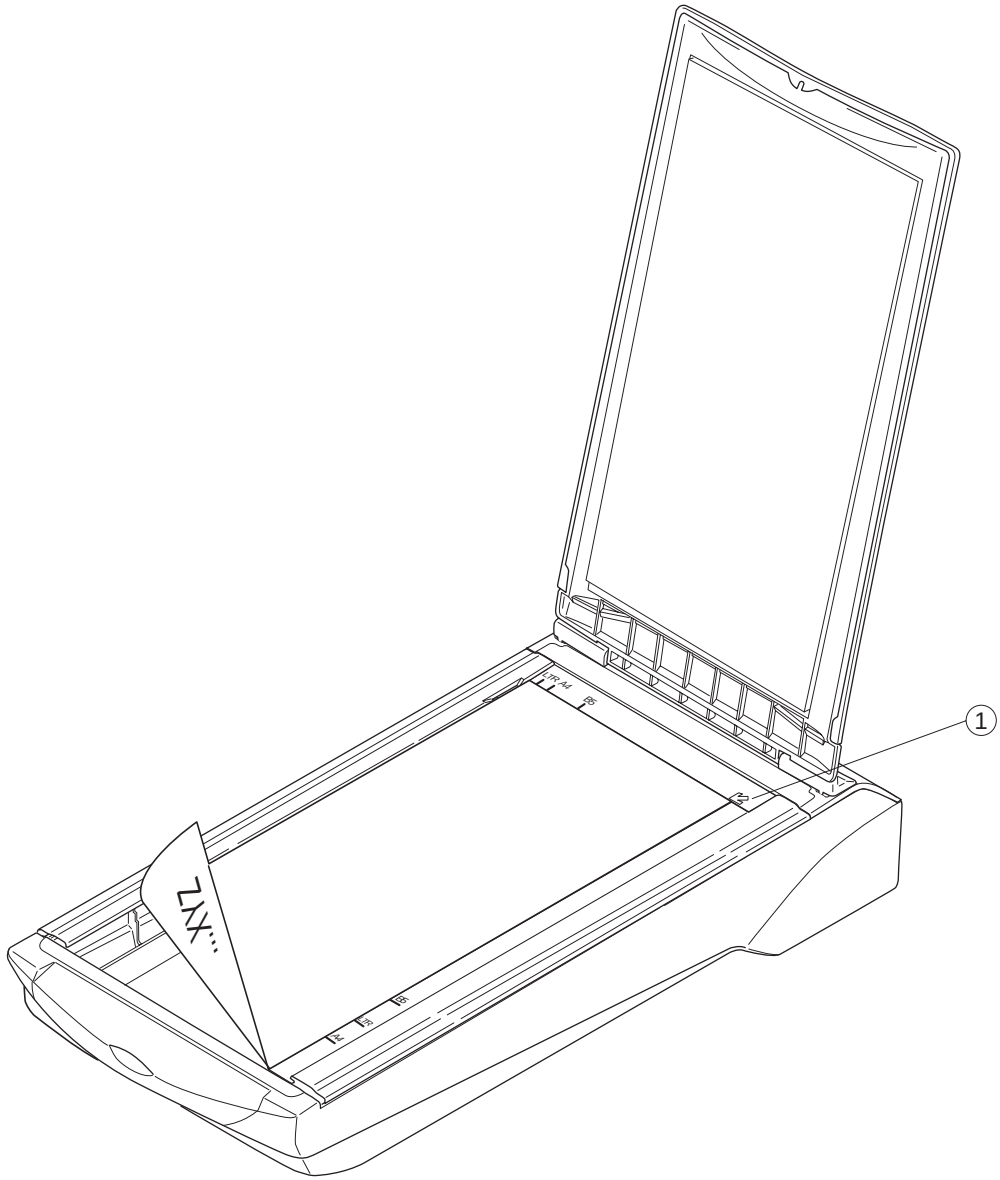


① USB Connector
② USB Cable
③ Power Connector
④ AC Adapter

Figure 1-6

D. Scanning a Document

1) Open the document cover.
2) Place a document on the document glass, facing the image side down and aligning the upper corner with the alignment mark.



① Alignment Mark

Figure 1-7

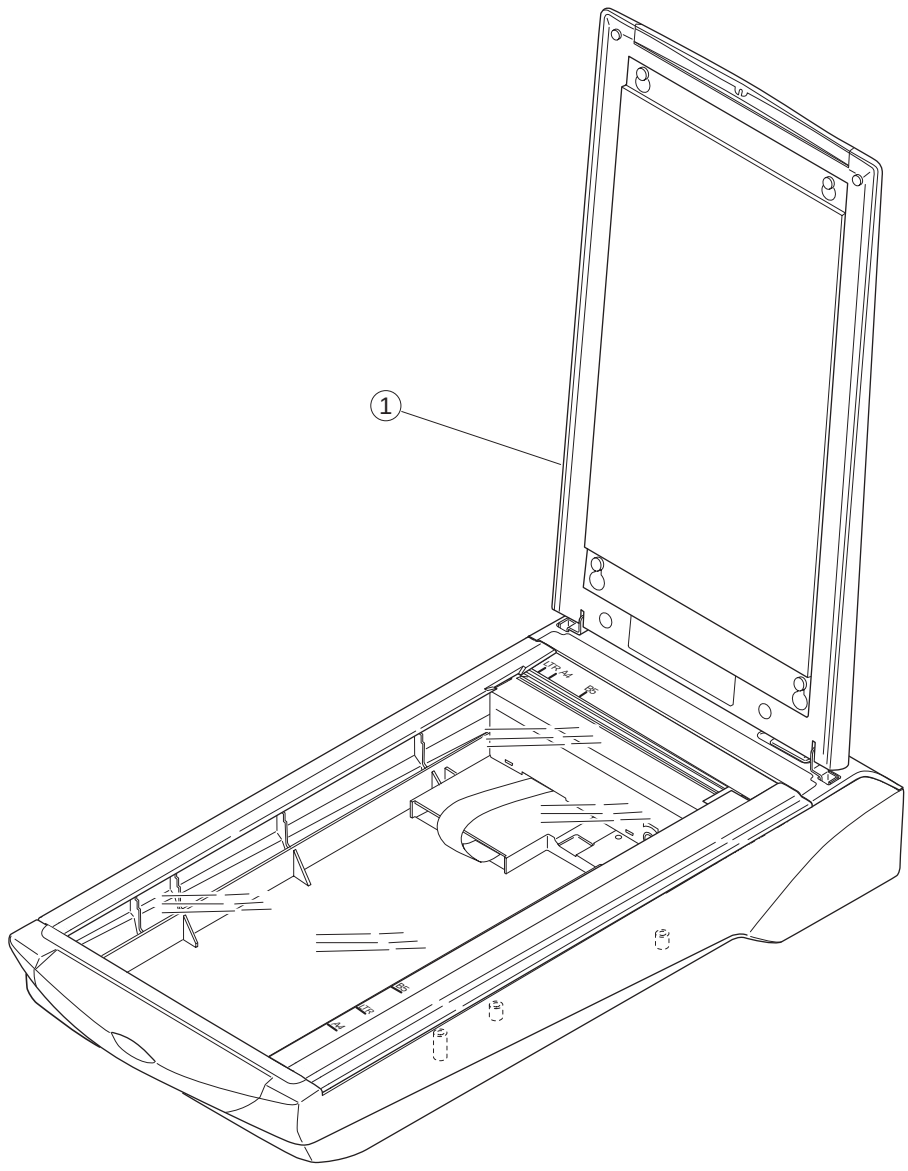
3) Close the document cover, caring not to dislodge the document.
4) Send “SCAN” command from the host computer to scan.

E. Connecting FAU

FAU cable is connected to the FAU connector on the scanner. Refer to the "Getting Started" guide supplied with the product for details. For connecting the host computer's cables, refer to the manuals for the host computer.

1. Setting Up FAU

1) Remove the document cover and unlock the carriage lock.
2) Attach FAU to the scanner.

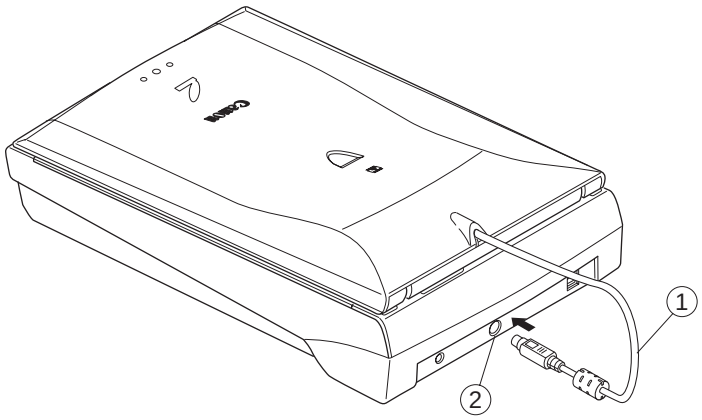


① FAU

Figure 1-8

2. Connecting FAU Cable to FAU Connector on the Scanner

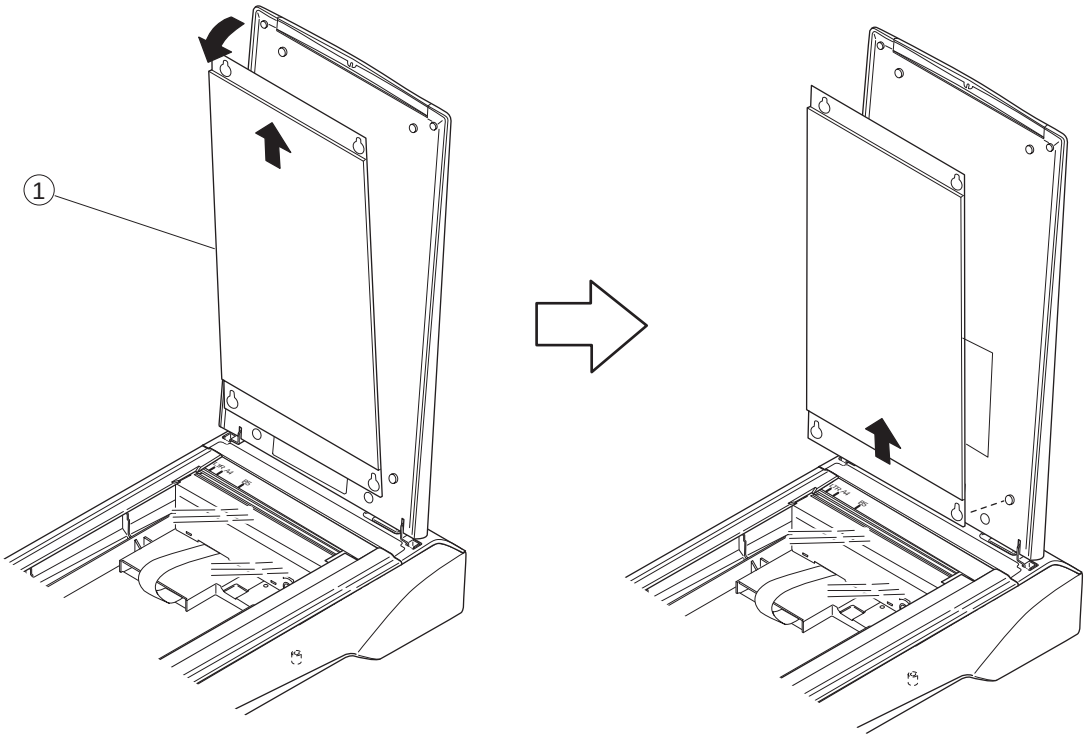
1) Connect the AC adapter cable to the power connector on the scanner.
2) Connect the FAU cable to the FAU connector on the scanner.



① FAU Cable
② FAU Connector

Figure 1-9

3) Remove the protective cover.



① Protective Cover

Figure 1-10

IV. CUSTOMER'S DAILY MAINTENANCE

Dirt on the document glass may cause an unclear image or lines on an image. Clean the document glass using the following steps.

1) Disconnect all cables from the scanner.
2) Wipe a dirt off the document glass with a soft clean cloth dampened with water and well wrung.
3) Thoroughly wipe water off the document glass with a dry cloth.

CHAPTER 2

OPERATION AND TIMING

I. BASIC OPERATION

A. Functions

The scanner functions are divided into optical system, image processing system, and control system.

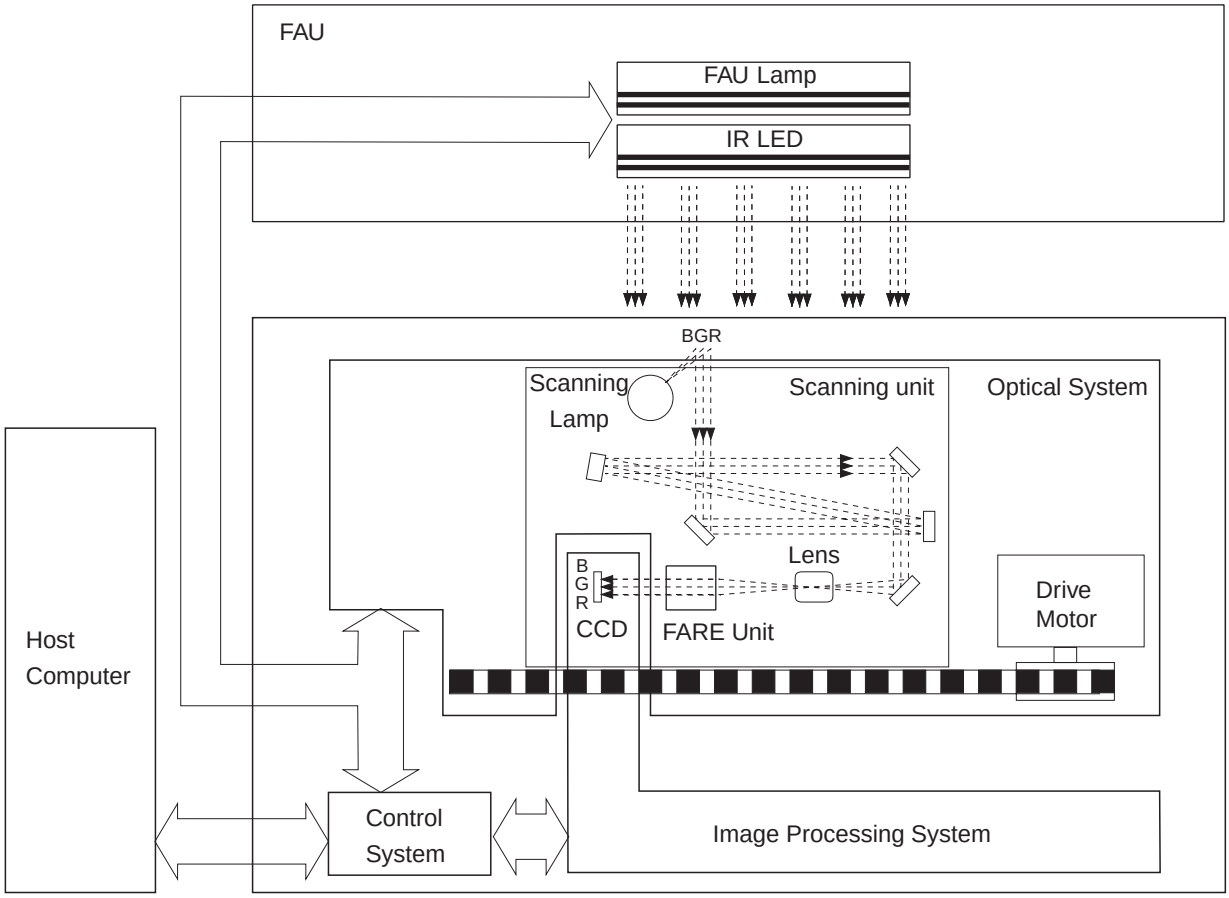


Figure 2-1

B. Electrical System

1. Outline

The scanner is not equipped with CPU. The device driver installed in the host computer includes a control program, which functions as CPU. Host computer sends a command to the ASIC via the USB controller, the ASIC controls the whole electrical circuits and image processing of the scanner. The image signals read by the CCD are converted into digital data by analog IC. The digital data is then processed by the ASIC and output to the host computer via USB interface.

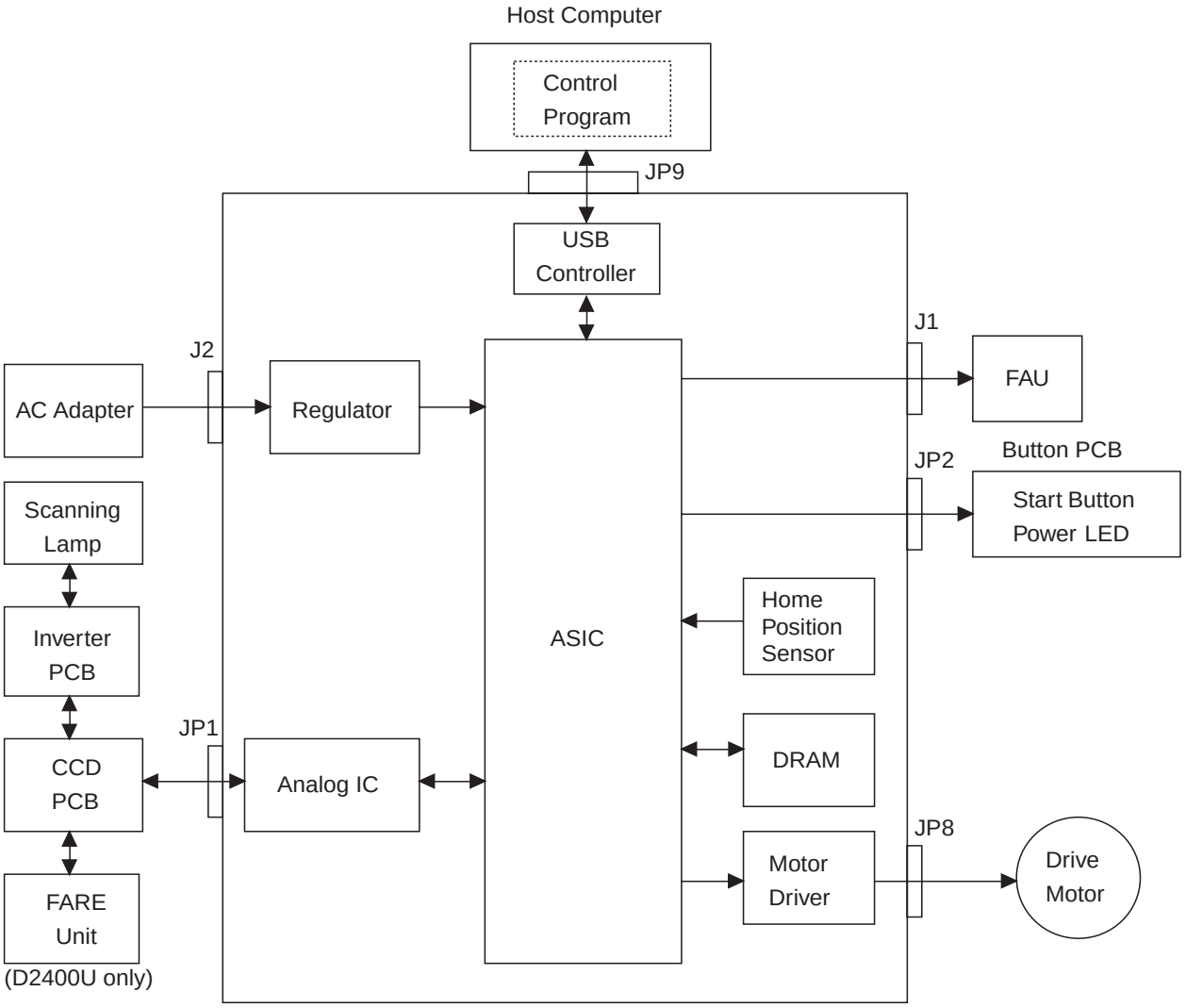


Figure 2-2

2. Functions of the Main PCB

1) Analog IC

Converts the image signals (analog signals) read by the CCD into digital data.

- CDS (Correlated Double Sampling)
- AGC (Auto Gain Control)
- 16-bit A/D converter (Analog-to-Digital Converter)

2) ASIC

Performs various processings:

- DRAM control
- CCD timing clock creation
- Line buffer control
- CCD output line difference adjustment
- Image processing (Binary processing, Image inversion)
- Shading correction
- Motor driver control

3) DRAM

Stores the shading correction data when performing shading correction, and the image data when scanning.

4) Motor Driver

Supplies power to the drive motor.

5) USB Controller

Controls data transfer between the host computer and ASIC.

C. Main PCB Input and Output

1. CanoScan D1230U

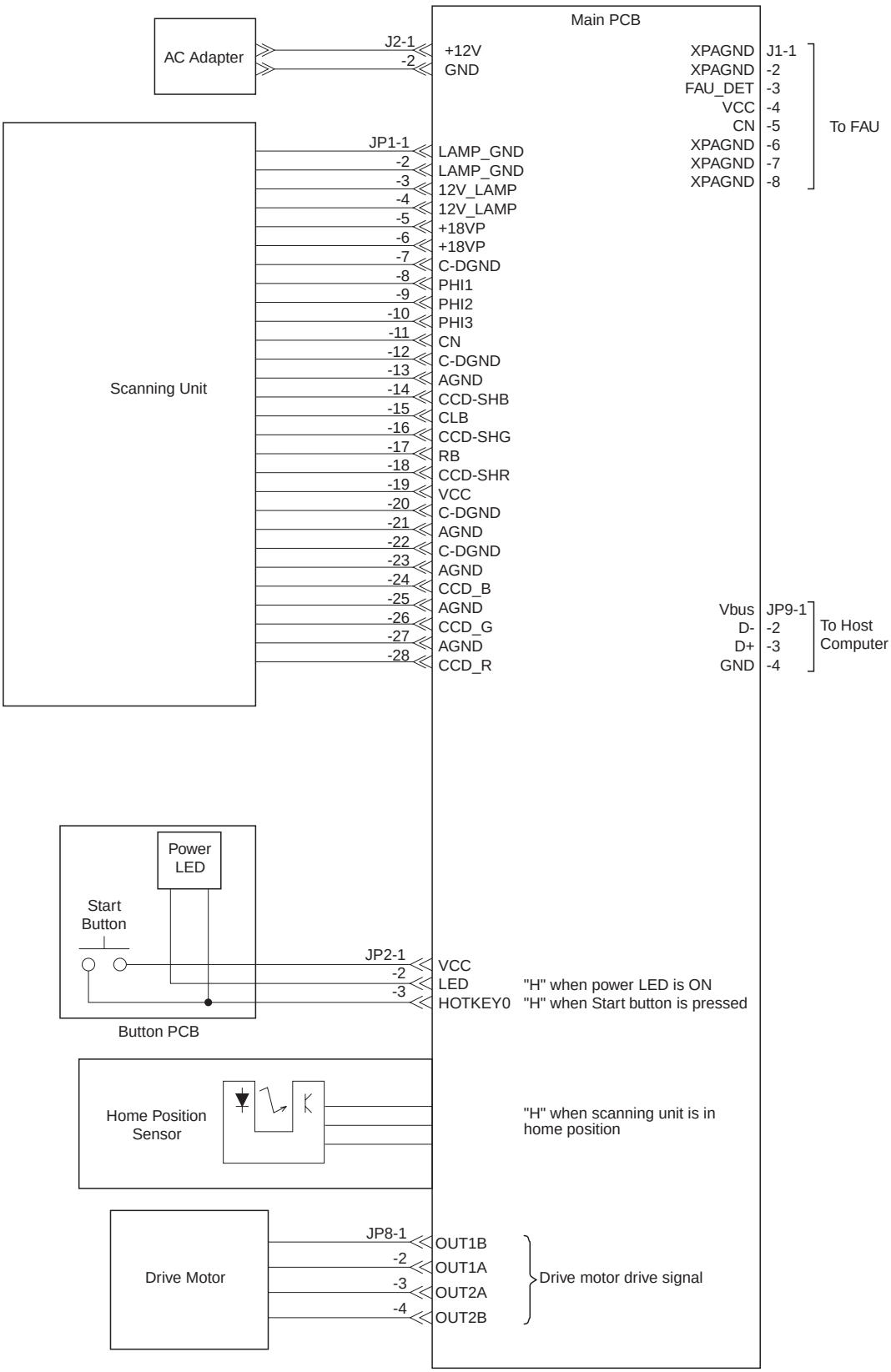


Figure 2-3

2. CanoScan D2400U

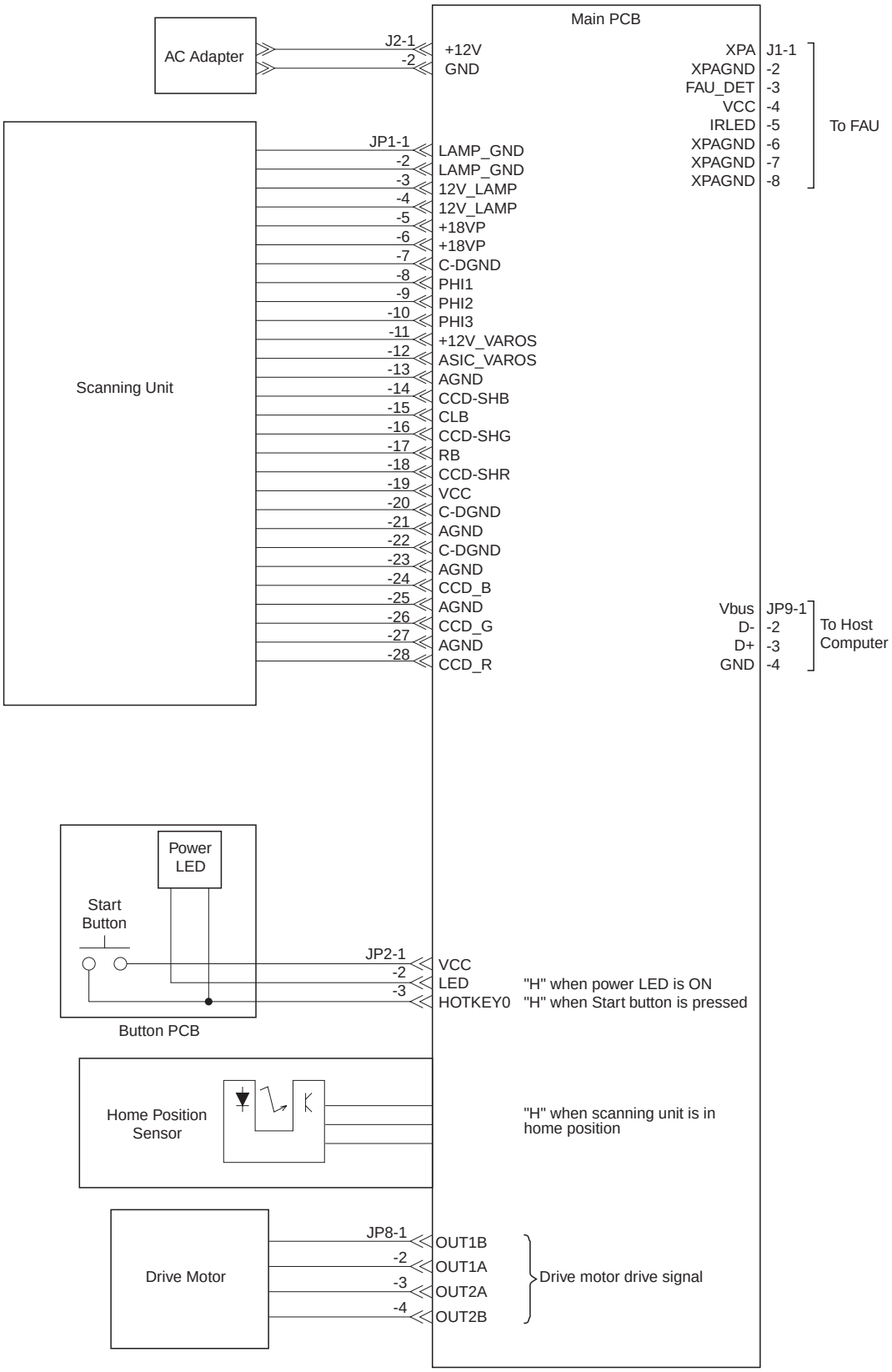


Figure 2-4

D. Document Scanning Sequence

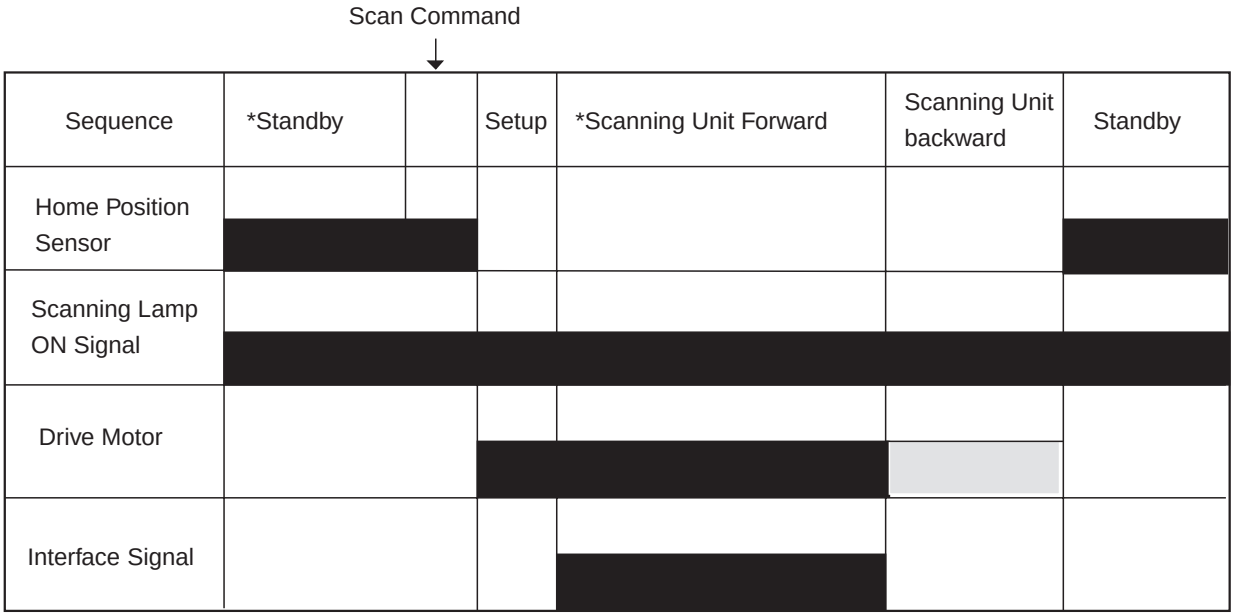


Figure 2-5

Seqence	Operation	Purpose	Remarks
Standby	After the scanner self test is completed until the scanner receives a scan command from the host computer	To maintain the scanner ready for scan	
Setup	From the scanner receives a scan command until it starts scanning	To execute calibration for setting light exposure time, gain data and shading data	The data is stored in DRAM
Scanning Unit Forward	After the scanner starts scanning until whole scan area specified by the host computer is scanned	To execute image processing according to the command from the host computer while scanning and send imada data to the host computer	
Scanning Unit backward	After the scanning unit starts moving backward until it returns to the home position	To return the scanning unit to the home position to ready for the next scan	Home position is detected by the home position sensor

Table 2-1

II. OPTICAL SYSTEM

A. Outline

The optical system consists of the scanning lamp, lens and mirrors. When scanning a reflective document, the scanning lamp in the scanning unit exposes the document and focuses the reflected light from the document on the light-sensitive device CCD (charge-coupled device) via the lens and mirrors.

When scanning a film, FAU lamp in the Film Adapter Unit transmits the film and focuses the transmitted light on the CCD.

When using FARE system, infrared LED transmits a film after FAU lamp does, and FARE unit operates to scan the film.

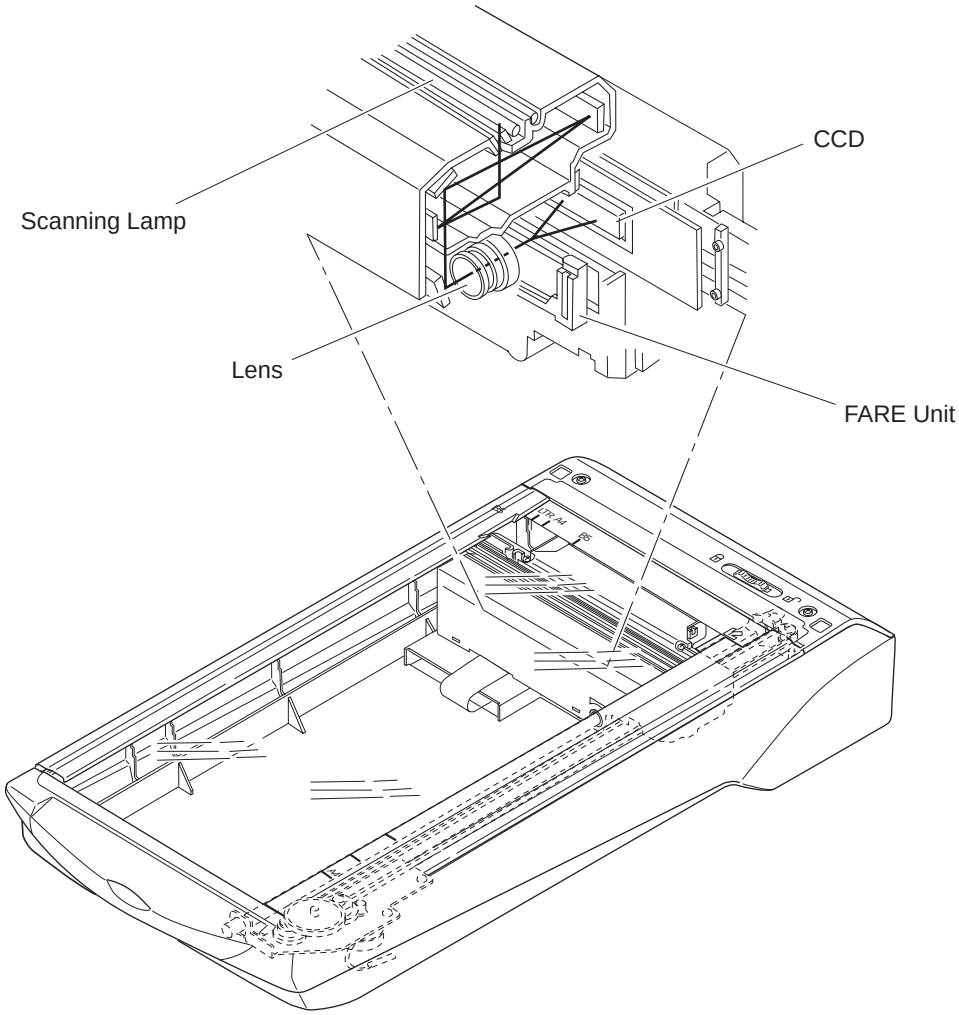


Figure 2-6