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CANOSCAN FB1210U

SERVICE MANUAL

REVISION 0

Canon

APR. 2000 JY8-1316-00Z

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LIST OF SERIAL NUMBER

CanoScan FB1210U	**F91-4411**	**AZG000000-**
	F91-4431	**CZG000000-**
	F91-4441	**DZG000000-**
	F91-4451	**EZG000000-**
	F91-4461	**FZG000000-**
	F91-4471	**LZG000000-**
	F91-4421	**MZG000000-**
	F91-4491	**JZG000000-**

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CONTENTS

CHAPTER 1 : GENERAL DESCRIPTIONS

CHAPTER 2 : OPERATION AND TIMING

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CHAPTER 3 : MECHANICAL SYSTEM

CHAPTER 4 : MAINTENANCE AND SERVICING

CHAPTER 5 : TROUBLESHOOTING

CHAPTER 6 : PARTS CATALOG

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APPENDIX

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CHAPTER 1

GENERAL DESCRIPTIONS

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I. SPECIFICATIONS

Main Unit

Type	: Flatbed image scanner

Reading Unit

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	: Color 14-bit for RGB each Grayscale (256 gradations) Binary (black and white)
Optical resolution	: 1200 dpi x 2400 dpi
Scanning time	: 7 min. and 10 sec. (color, A4, 1200 dpi) 3 min. (grayscale, A4, 1200 dpi) 7 sec. (binary, A4, 1200 dpi)
Cropping of scan area	: One rectangular area only

Interface

Interface	: USB (Universal Serial Bus) 1.1

Others

Operating environment	: Temperature : 10 to 35 degrees Relative humidity : 20 to 80%RH Air pressure : 608 to 1013 hPa
Power consumption	: 15 W or less (during operation) 8 W (during standby)
Dimensions	: 286.0 (Width) x 461.0 (Depth) x 92.5 (Height) mm
Weight	: Approx. 3.8 kg
Option	: Film Adapter Unit FAU-S11

Specifications are subject to change without prior notice.

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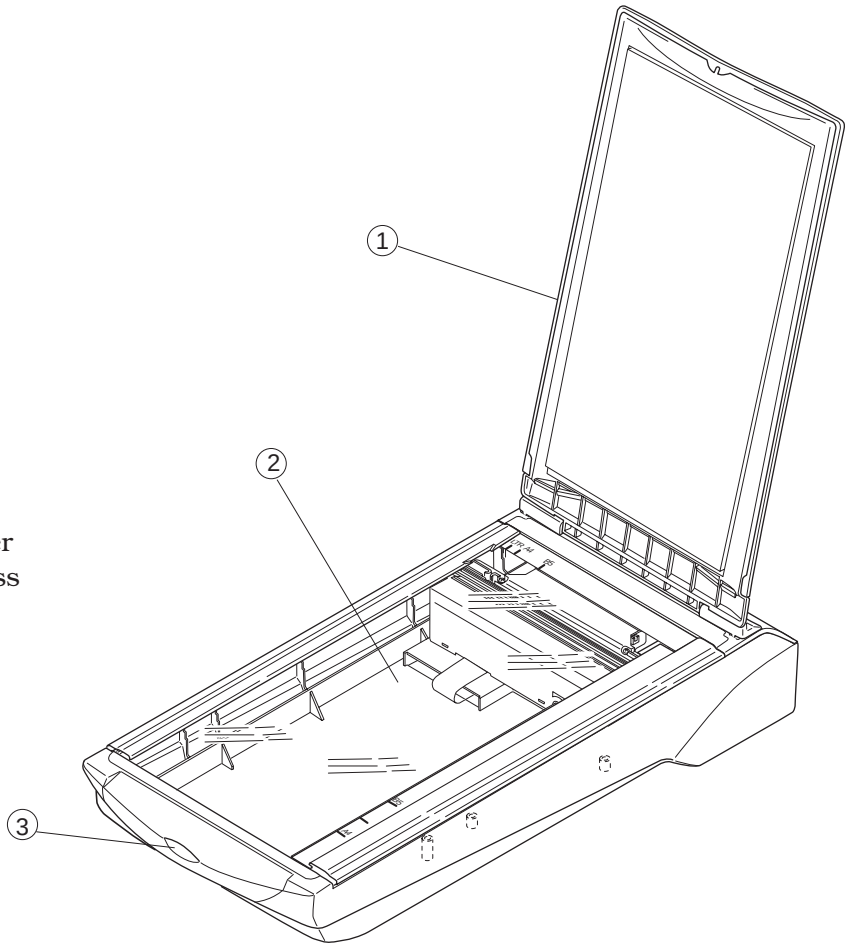
II. PARTS CONFIGURATION

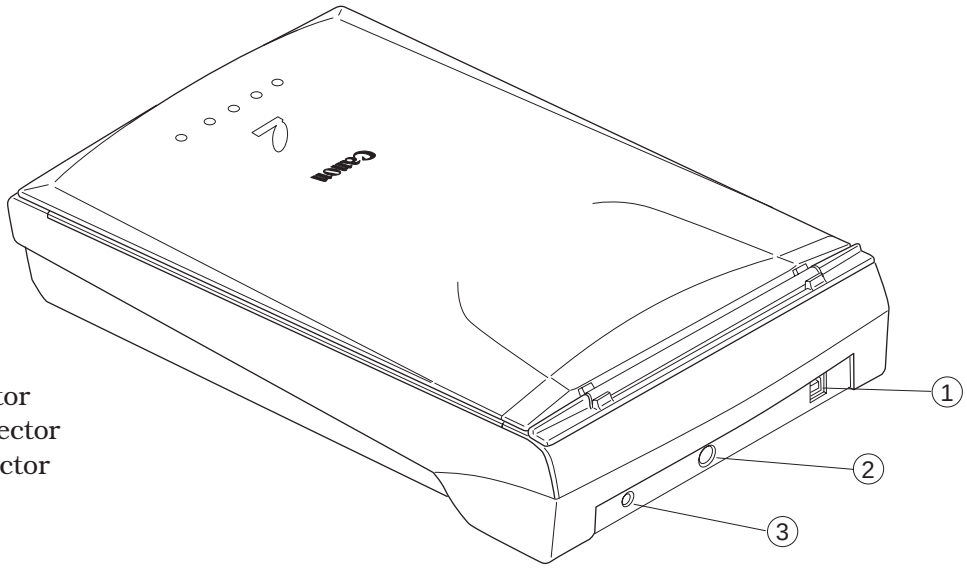
A. Front View



① DocumentCover
② Document Glass
③ Start Button

Figure 1-1

B. Rear View



① USB Connector
② Option Connector
③ Power Connector

Figure 1-2

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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.

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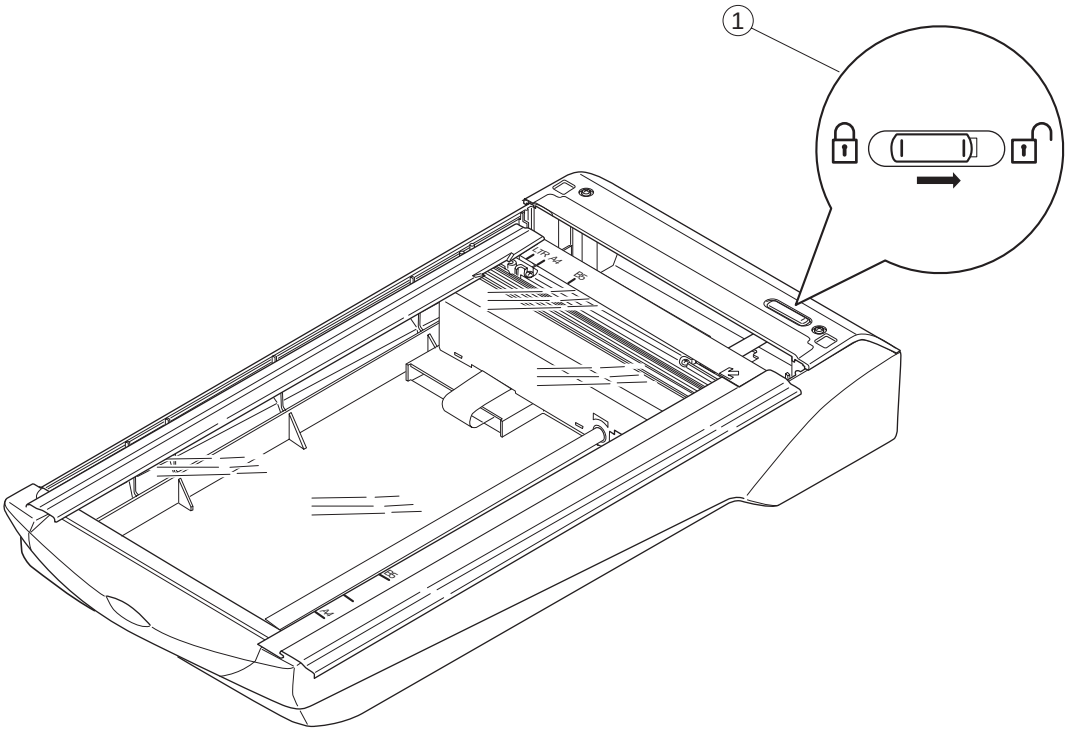
B. Unlocking the Scanning Unit

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



① Carriage Lock

Figure 1-3

Note : Ensure to lock the scanning unit during transport.

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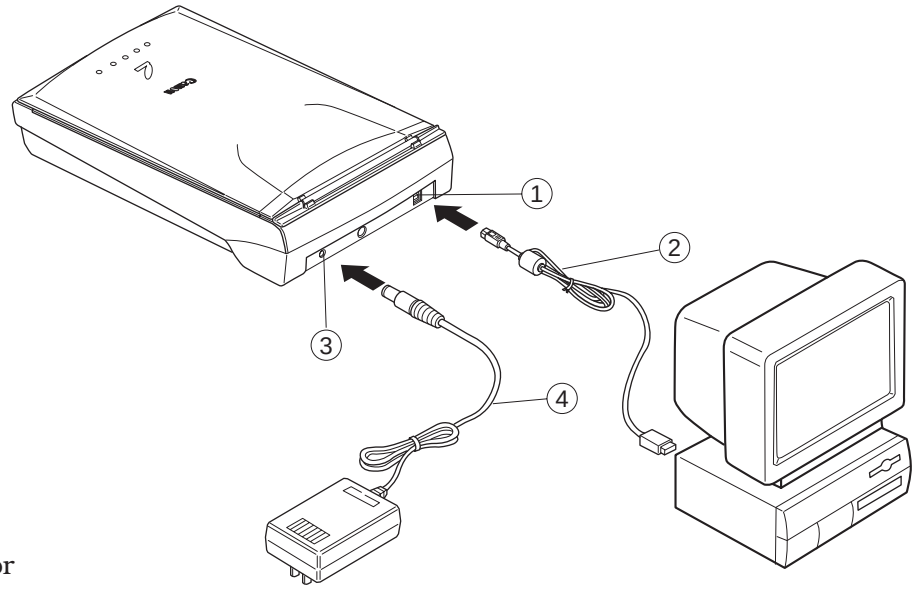
C. Connecting the Cables

FB1210U is connected to the USB port on the host computer. Refer to the "Getting Started" bundled with the product for details. For connecting the host computer's cables, refer to the manuals for the host computer.

1. Connect the AC Adapter Cable and USB Cable

1) Connect the AC adapter plug 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 1-4

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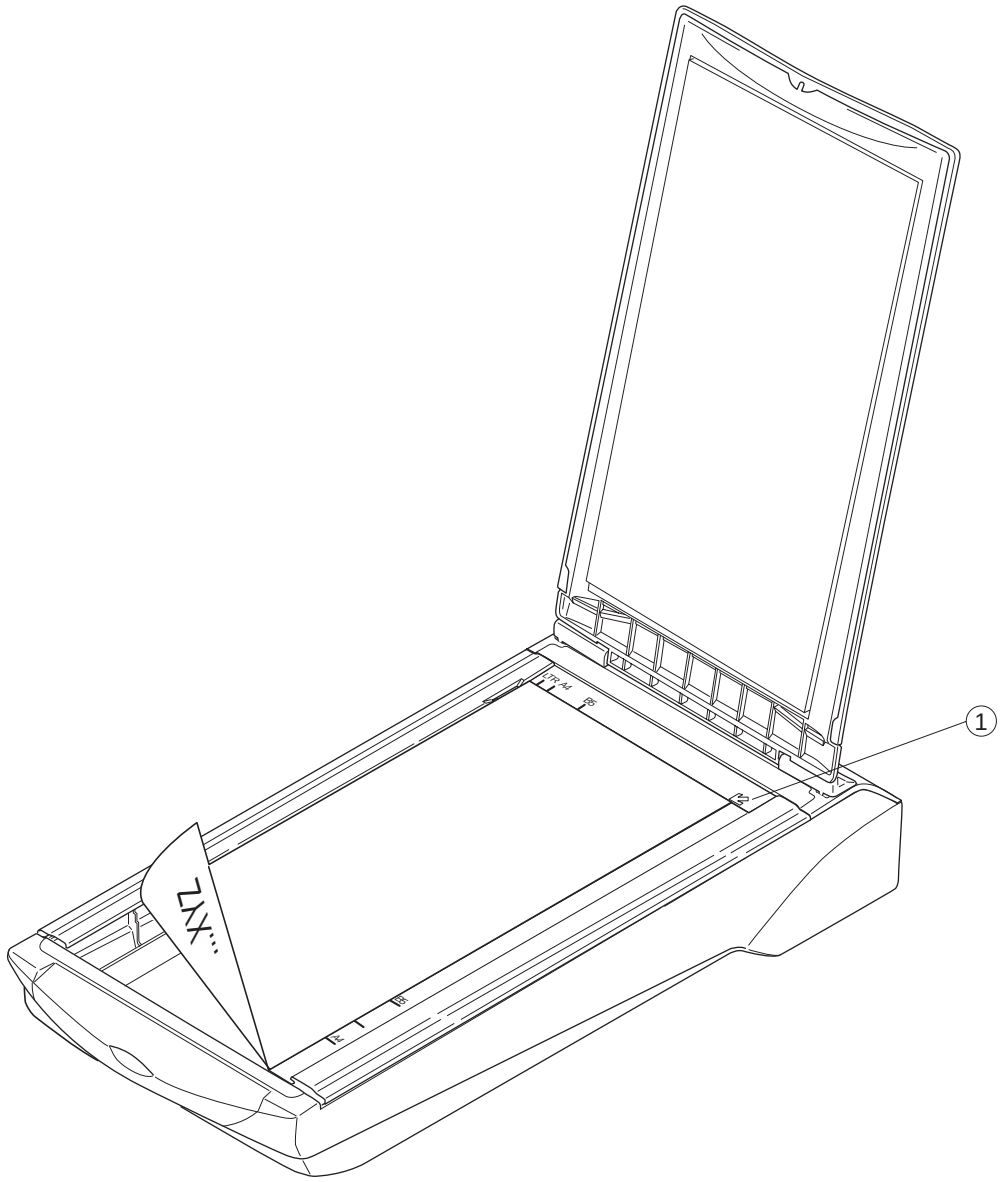
D. Scanning a Document

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 1-5

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

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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 procedures.

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.

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CHAPTER 2

OPERATION AND TIMING

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I. BASIC OPERATION

A. Functions

The scanner functions are divided into the following three main systems.

1. Optical System

The optical system consists of the scanning lamp, lens and mirrors. It exposes a document, then the reflected light from the document is collected onto a light-sensitive device CCD (charge-coupled device) via the lens and mirrors.

2. Image Processing System

The image processing system consists mainly of the CCD, analog IC, and ASIC. It converts analog signals from the CCD into digital signals, which is read by the host computer.

3. Control System

The control system consists mainly of ASIC, USB controller, CPU, and motor driver. The CPU controls the whole scanning operation. The USB controller controls the interface between the CPU and ASIC, while the CPU interprets all commands from the host computer.

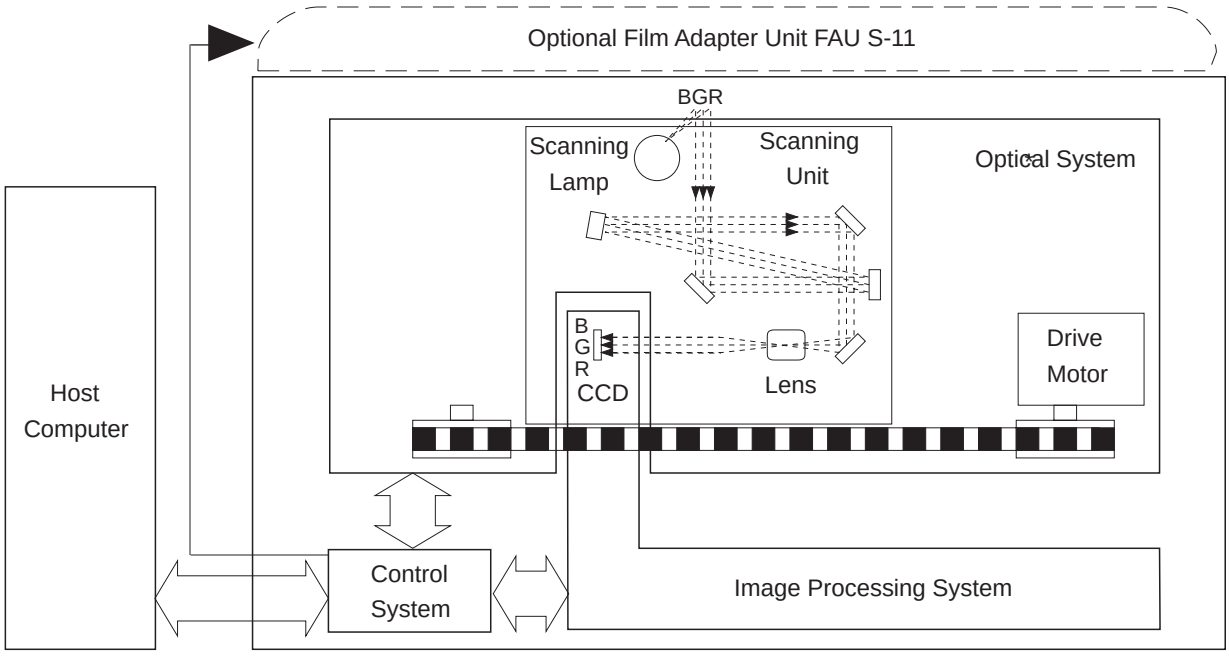

Figure 2-1

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B. Electrical System

1. Outline

The scanner is equipped with CPU and USB controller. Host computer sends a command to the ASIC via the USB controller and CPU, the CPU 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 are then processed by the ASIC and output to the host computer via USB interface.

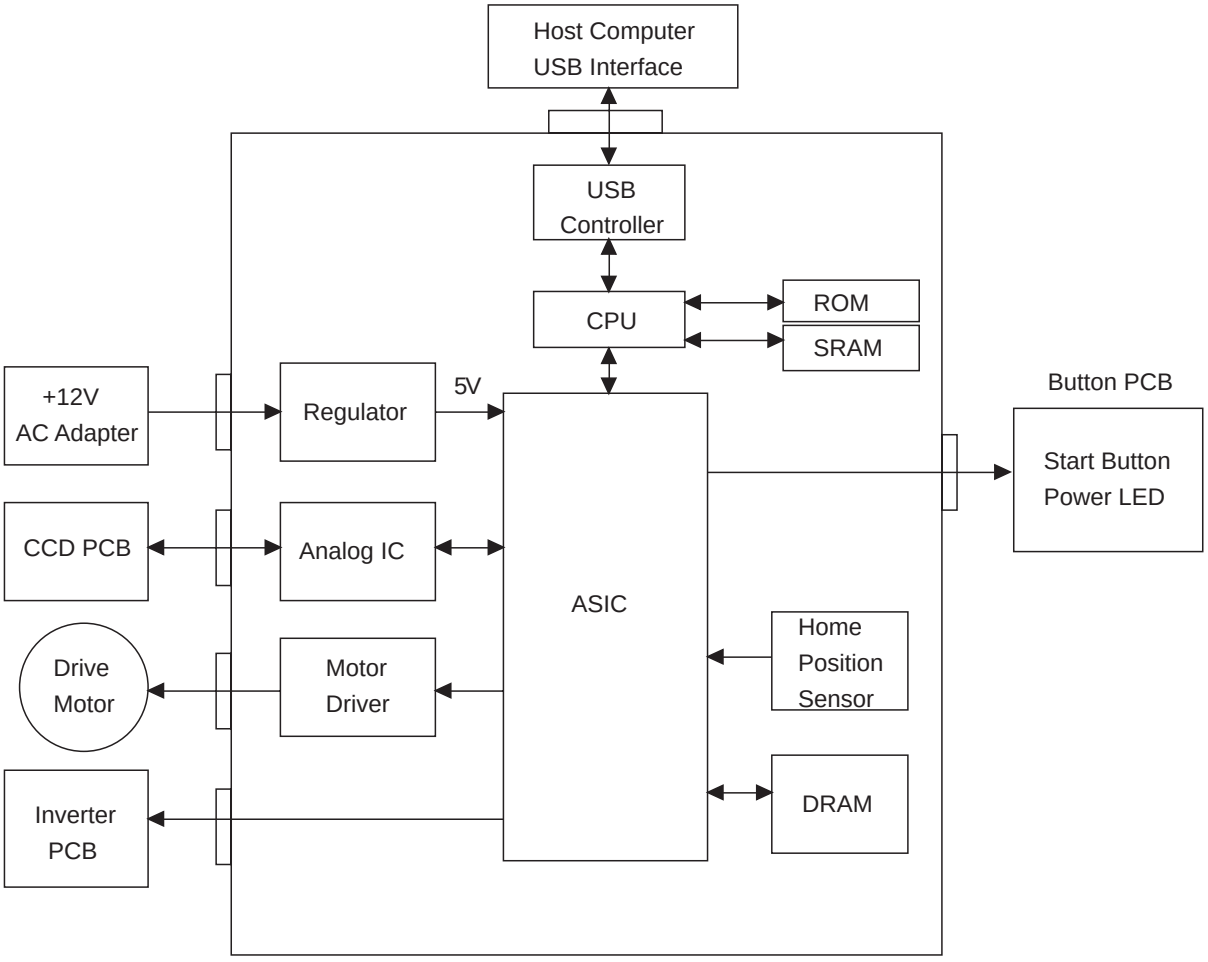

Figure 2-2

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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)
- 14-bit A/D converter (Analog-to-Digital Converter)

2) ASIC

Performs various processing:

- 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

A monolithic microstep motor driver supplies power to the drive motor.

5) USB Controller

Transmits data between the host computer and ASIC.

6) CPU

Interprets commands from the host computer to generate parameter for the ASIC to perform various processing.

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C. Main PCB Input and Output

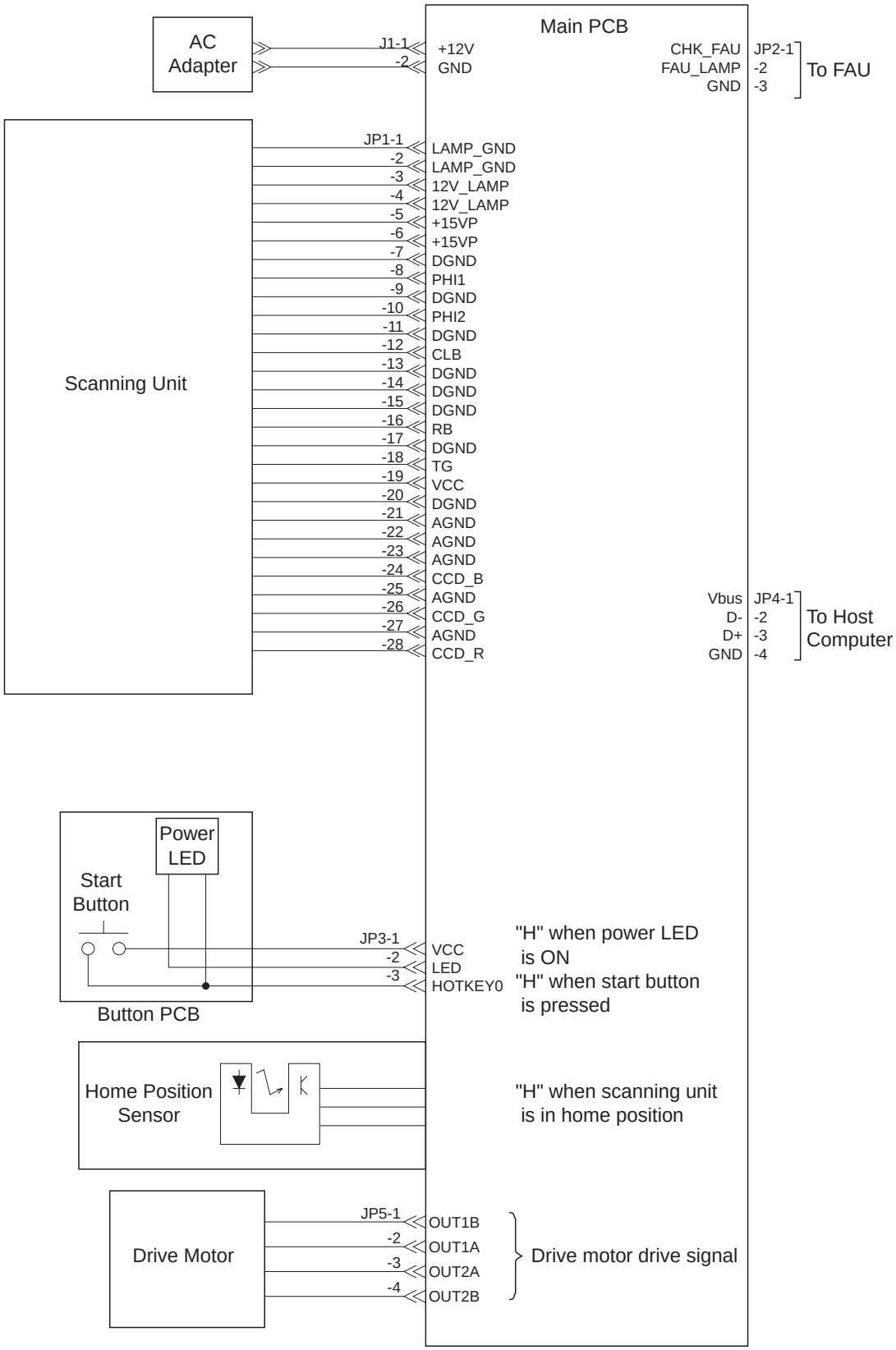

Figure 2-3

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D. Basic Sequences of Operations

The basic sequences of operations of CanoScan FB1210U is divided into the power ON sequence and the document scanning sequence.

1. Power ON Sequence

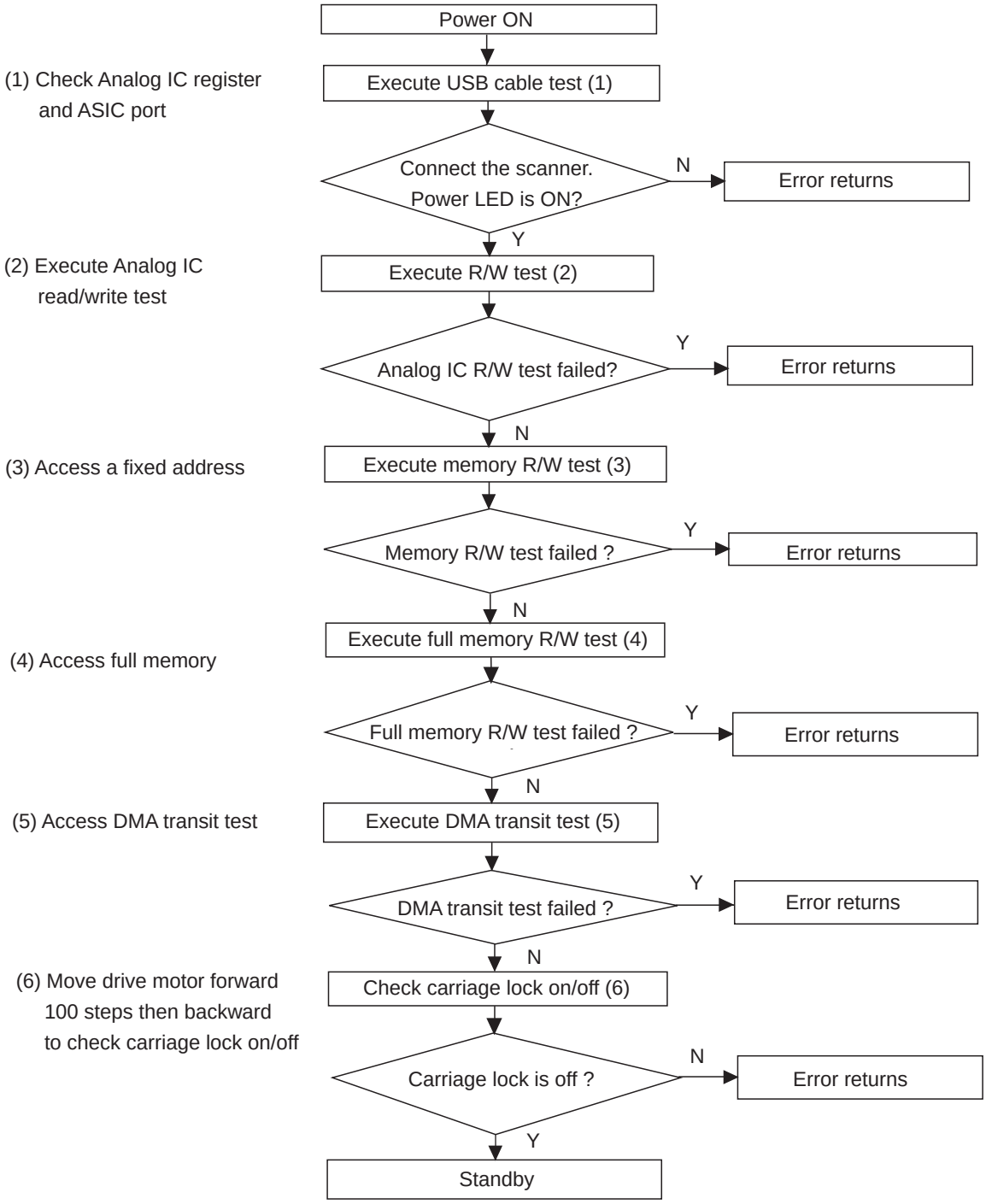

Figure 2-4

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2. Document Scanning Sequence

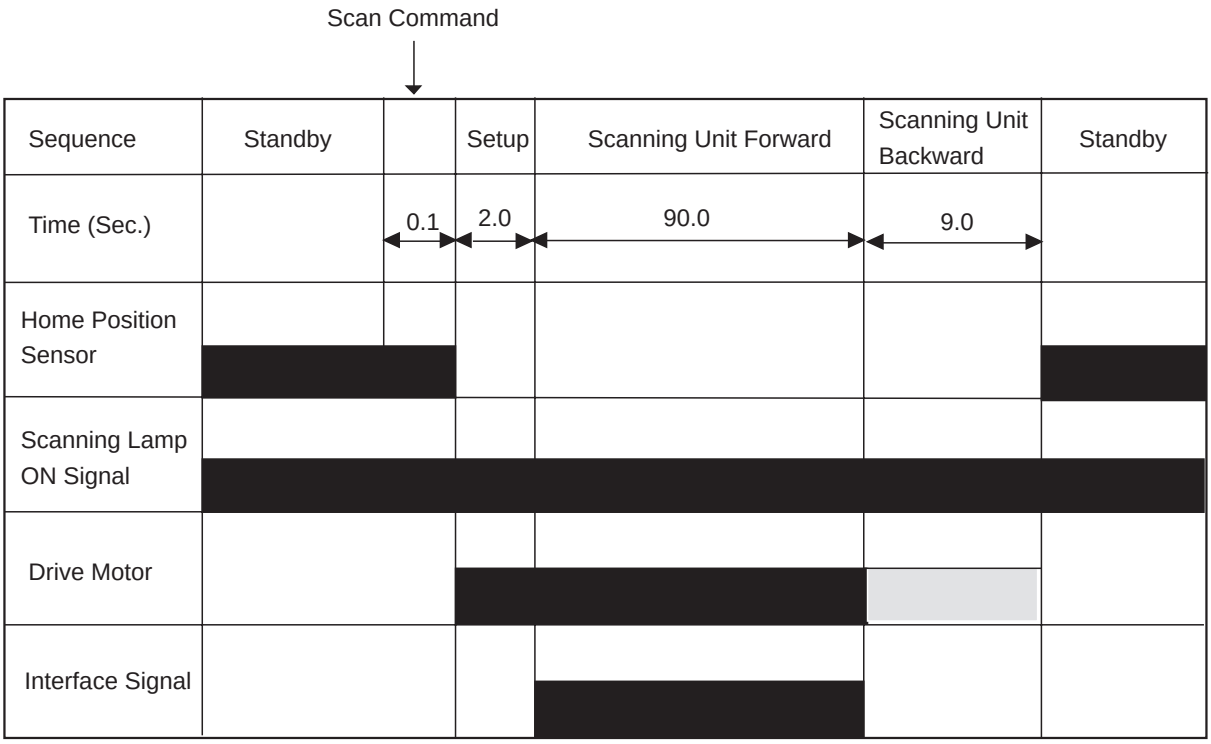

Figure 2-5

Sequence	Operation	Purpose	Remarks
Standby	After the power ON sequence 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 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 are scanned	To execute image processing according to the command from the host computer and send image data to the host computer while scanning	
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

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II. OPTICAL SYSTEM

The optical system has functions from exposing a document by the scanning lamp to collecting the reflected light to the CCD. The system employs a 3-line CCD to recognize colors of the document.

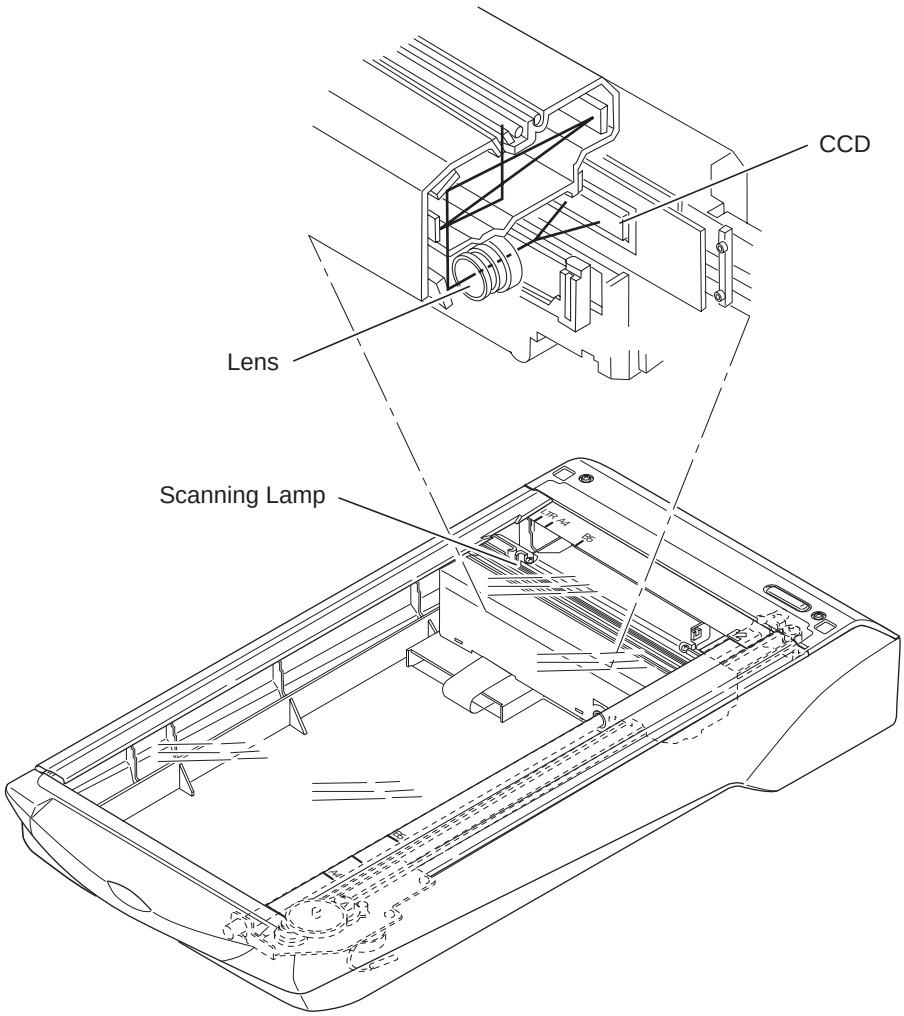

Figure 2-6

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A. Scanning Lamp

When the scanner is powered on, the scanning lamp lights to standby. The scanner is provided with an energy saving setting which is made in the Scanner Utilities Dialog. For example, if it is set for 30 minutes, then no scan command is sent for 30 minutes, ASIC sends the scanning lamp off signal to turn off the lamp.

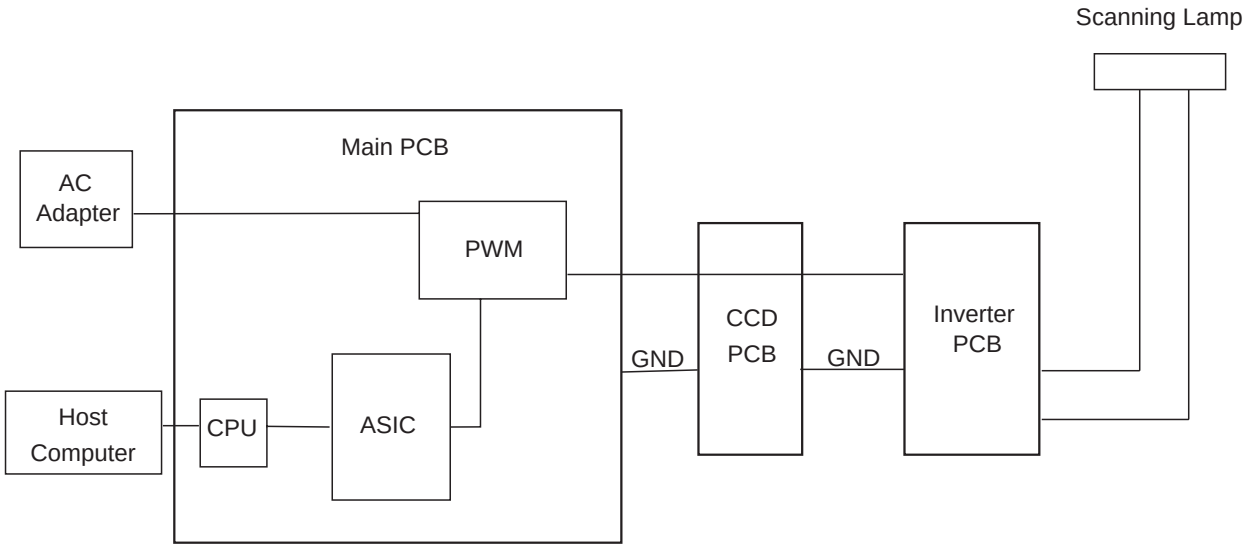

Figure 2-7

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B. Motor Control

When the host computer sends a command to change scaling/resolution, the motor driver current control signals [PA+, PA-, PB+, PB-] are changed to generate a torque for the rotating speed. Yet, the reverse speed of the scanning unit is always constant.

The ASIC receives each command sent from the host computer via the USB interface to control the motor by four-phase motor driver pulse signals [OUT1B, OUT1A, OUT2A, OUT2B].

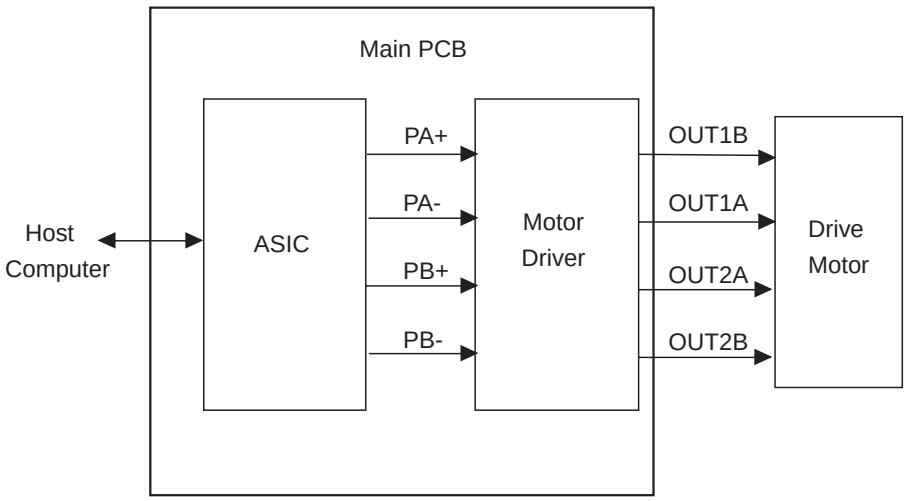

Figure 2-8

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III. IMAGE PROCESSING

A. Outline

The image processing system converts light signals read by the CCD to electric signals, then outputs the image data to the host computer via the USB interface upon various image processing.

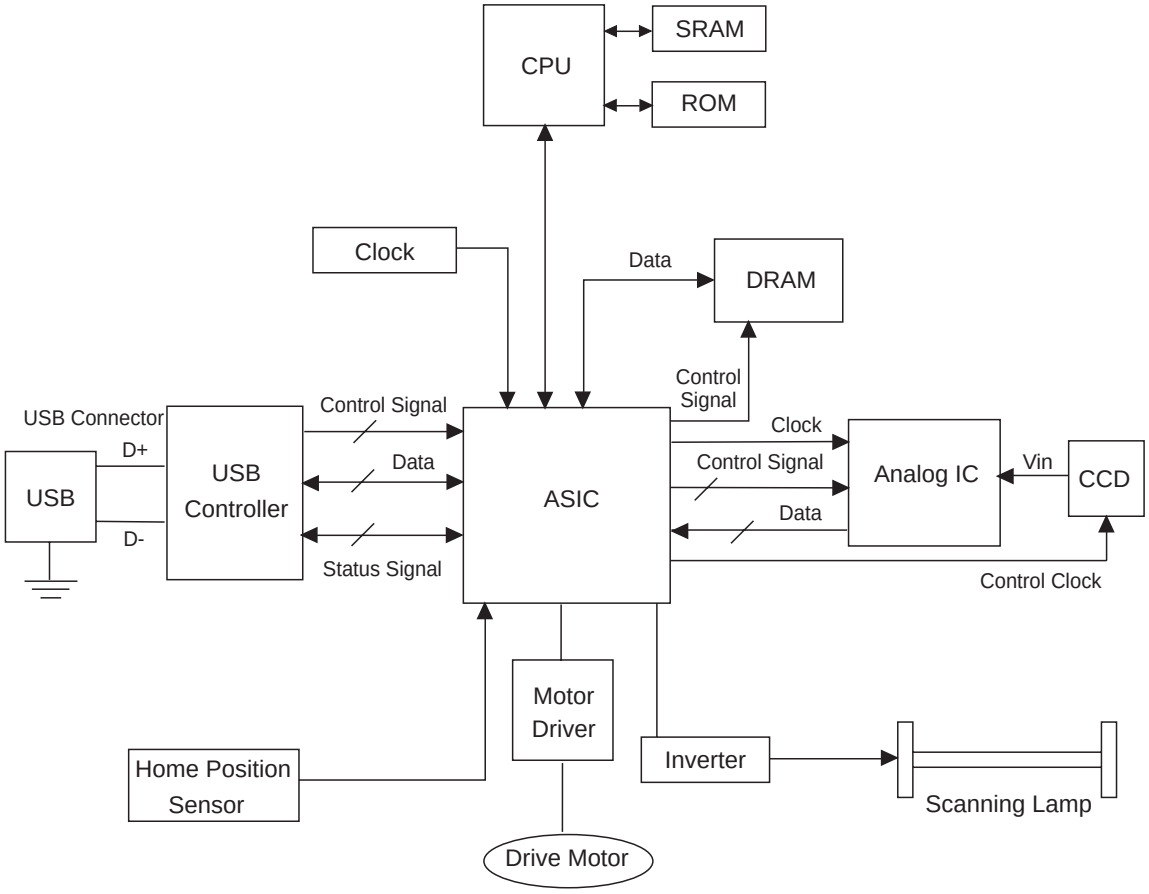

Figure 2-9

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B. Image Processing

1. Analog IC

Output signal from the CCD is an analog signal which cannot be used as image data. So RGB output signal from the CCD is amplified by analog amplifier to generate analog data. The generated data is converted into averaged analog signal by D/A converter, then got feedback to the A/D converter to output constant digital data to the ASIC.

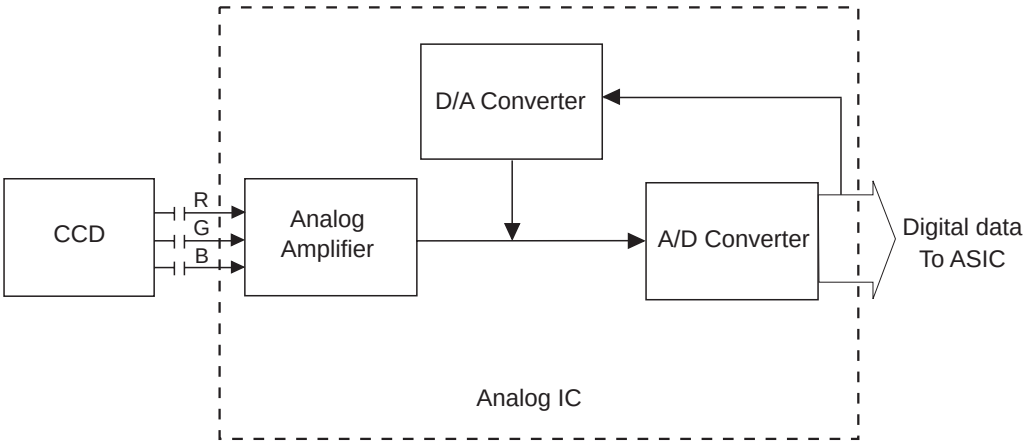

Figure 2-10

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