CANOSCAN N650U/N656U/N1220U

SERVICE MANUAL

REVISION 0

Canon

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 CANOSCAN N650U/N656U/N1220U REV.0 JUNE 2000 PRINTED IN JAPAN (IMPRIME AU JAPON)

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

LIST OF SERIAL NUMBER

CanoScan N650U	**F91-4611-200**	**AZJ000001-**
	F91-4631-200	**CZJ000001-**
	F91-4641-200	**DZJ000001-**
	F91-4661-200	**FZJ000001-**
	F91-4671-200	**LZJ000001-**
	F91-4681-200	**JZJ000001-**
	F91-4691-200	**KZJ000001-**
CanoScan N656U	**F91-4612-200**	**AZK000001-**
	F91-4622-200	**MZK000001-**
	F91-4632-200	**CZK000001-**
	F91-4642-200	**DZK000001-**
	F91-4662-200	**FZK000001-**
	F91-4672-200	**LZK000001-**
	F91-4682-200	**JZK000001-**
	F91-4692-200	**KZK000001-**
CanoScan N1220U	**F91-4712-200**	**AZL000001-**
	F91-4722-200	**MZL000001-**
	F91-4732-200	**CZL000001-**
	F91-4742-200	**DZL000001-**
	F91-4762-200	**FZL000001-**
	F91-4772-200	**LZL000001-**
	F91-4782-200	**JZL000001-**
	F91-4792-200	**KZL000001-**

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PREFACE

This service manual contains the basic information necessary for servicing the N650U/N656U/N1220U image scanners.

The service manual consists of the following chapters.

Chapter 1: General Descriptions
Features, specifications, exterior features, installation, customer's daily maintenance

Chapter 2: Operation and Timing
Basic operation, optical system, image processing system, control system, power supply

Chapter 3: Mechanical System
Externals, drive system, optical system, electrical system

Chapter 4: Maintenance and Servicing
Periodical replacement parts, consumable parts durability, periodical servicing, special tools, solvents and lubricants

Chapter 5: Troubleshooting
Introduction, troubleshooting, location of electrical parts, canon scanner test

Chapter 6: Parts Catalog

Appendix: General Circuit Diagram, Main PCB Circuit Diagram, USB Connector PCB Circuit Diagram

The information in this service manual is subject to change as the product is improved.
All relevant information in such cases will be provided by the service information bulletins.

A thorough understanding of the N650U/N656U/N1220U, based on the service manual and service information bulletins, is vital to the serviceman in maintaining the product quality and performance, and in locating and repairing the cause of malfunctions.

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CHAPTER 2 : OPERATION AND TIMING

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CHAPTER 5 : TROUBLESHOOTING

CHAPTER 6 : PARTS CATALOG

APPENDIX

 CANOSCAN N650U/N656U/N1220U REV.0 JUNE 2000 PRINTED IN JAPAN (IMPRIME AU JAPON)

CHAPTER 1

GENERAL DESCRIPTIONS

 CANOSCAN N650U/N656U/N1220U REV.0 JUNE 2000 PRINTED IN JAPAN (IMPRIME AU JAPON)

I. FEATURES

CanoScan N650U/N656U with 600 x 1200 dpi resolution, CanoScan N1220U with 1200 x 2400 dpi resolution are flatbed image scanners incorporating the following features.

1. High gradation and high image quality are achieved by employing a highly sensitive contact image sensor with LIDE (LED Indirect Exposure) technology for the scanning unit, and by reading each RGB color by 14 bits and outputting by 8 bits.

2. The scanner is a small size of 256.0(W) x 372.5(D) x 34.0(H) mm, and a light weight of 1.5 kg by using a downsized scanning unit.

3. The scanner can easily be connected to the host computer through a USB interface.

4. Double hinge structure (Z-lid) enables the document cover to hold a thick document.

5. The scanner can be placed vertically to scan by using an optional stand.

6. The scanner draws its power from USB port on the host computer requiring no AC adapter.

II. SPECIFICATIONS

CanoScan N650U/N656U

MAIN UNIT

· Type	: Flat bed image scanner

READING UNIT

· Image sensor	: 5104 pixels contact image sensor
· Light source	: LED indirect exposure (RGB each)
· Max. document size	: A4 or Letter (216 x 297 mm)
· Image output	: RGB 8 bits per channel (input 14 bits)
· Resolution	: 600 x 1200 dpi
· Scan time	: 112 sec. (color, A4, 600 dpi) 37 sec. (grayscale, A4, 600 dpi) 16 sec. (preview)

INTERFACE

· Interface	: USB 1.1 (B plug) x 1

OTHERS

· Operating environment	: Temperature range, 5 to 35°C Humidity range, 10 to 90% Air pressure range, 613 to 1013 hPa
· Power consumption	: 2.5W (during operation)
· Dimensions	: 256.0(W) x 372.5(D) x 34.0(H) mm
· Weight	: 1.4 kg

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CanoScan N1220U

MAIN UNIT

· Type	: Flat bed image scanner

READING UNIT

· Image sensor	: 10208 pixels contact image sensor
· Light source	: LED indirect exposure (RGB each)
· Max. document size	: A4 or Letter (216 x 297 mm)
· Image output	: RGB 8 bits per channel (input 14 bits)
· Resolution	: 1200 x 2400 dpi
· Scan time	: 449 sec. (color, A4, 1200 dpi) 149 sec. (grayscale, A4, 1200 dpi) 16 sec. (preview)

INTERFACE

· Interface	: USB 1.1 (B plug) x 1

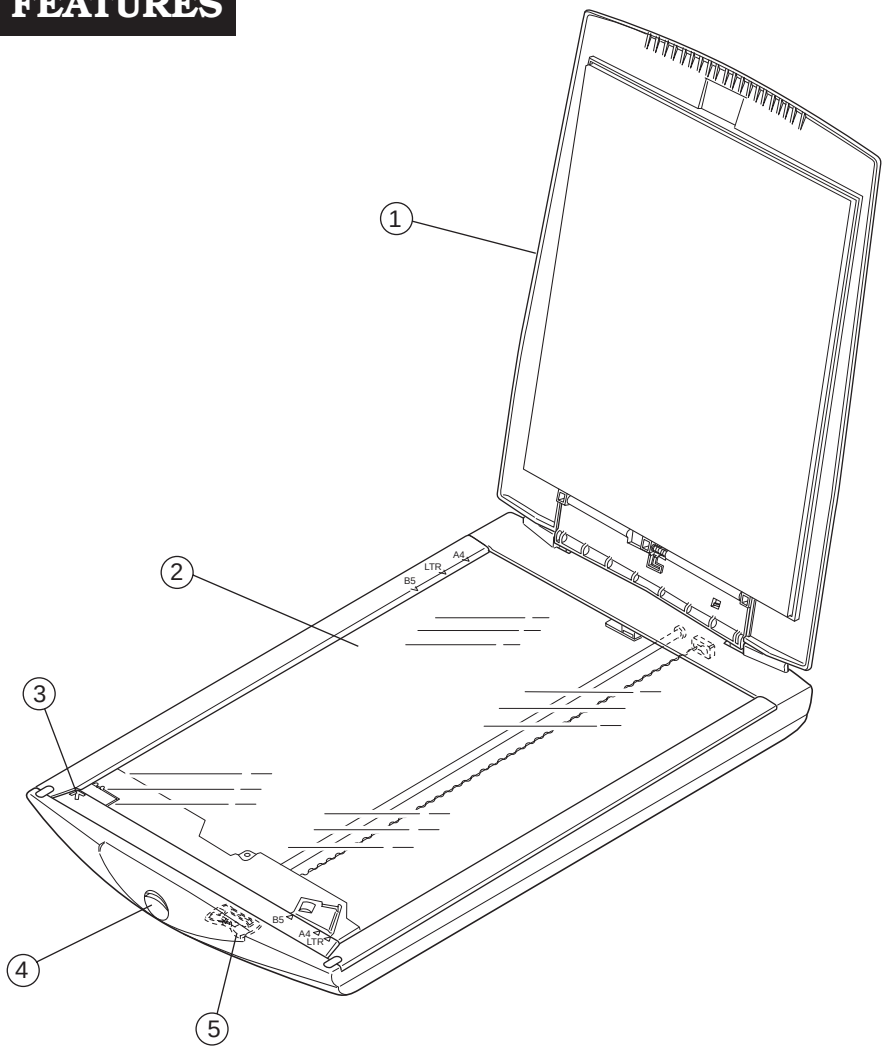
OTHERS

· Operating environment	: Temperature range, 5 to 35°C Humidity range, 10 to 90% Air pressure range, 613 to 1013 hPa
· Power consumption	: 2.5W (during operation)
· Dimensions	: 256.0(W) x 372.5(D) x 34.0(H) mm
· Weight	: 1.4 kg

Specifications are subject to change with product improvement.

III. EXTERIOR FEATURES

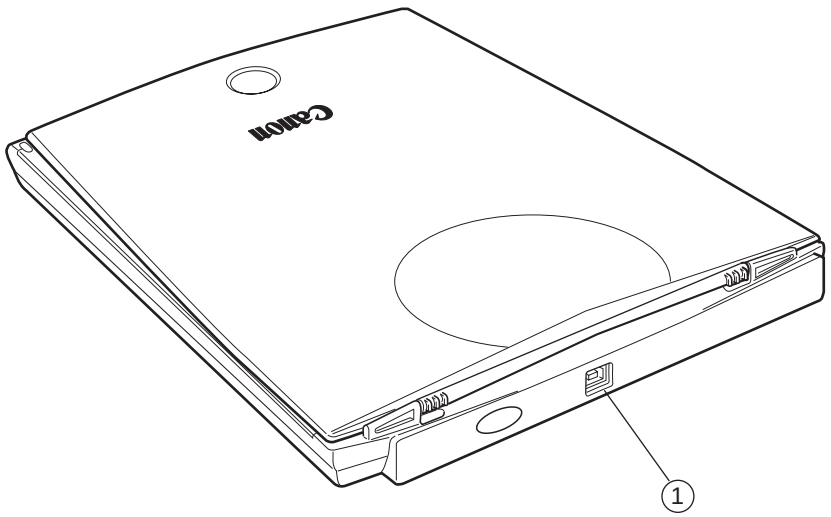
A. Front View



① Document Cover
② Document Glass
③ Alignment Mark
④ Start Button
⑤ Carriage Lock

Figure 1-1

B. Rear View



① USB Port

Figure 1-2

IV. INSTALLATION

A. Preface

The following installation conditions are required.

1. Ambient temperature should be between 5°C and 35°C, and humidity between 10% and 90%. Avoid locations near water faucets, boilers, humidifiers, or refrigerators.

2. Avoid locations subject to open flame, dust, or direct sunlight. If it is installed near a window, hang a curtain to block direct sunlight.

3. The room should be well ventilated.

4. Install on a sturdy and level desk, etc.

5. Moving a scanner from a cold place to a warm place can cause condensation on the metal parts, resulting in a faulty operation. Give the scanner at least one hour to adjust to the room temperature before unpacking.

B. Installation

1. Unlocking the carriage lock

The scanner is shipped with the scanning unit locked by the carriage lock to prevent damage during transport. Unlock the scanning unit to use the scanner.

1) Turn the scanner over.

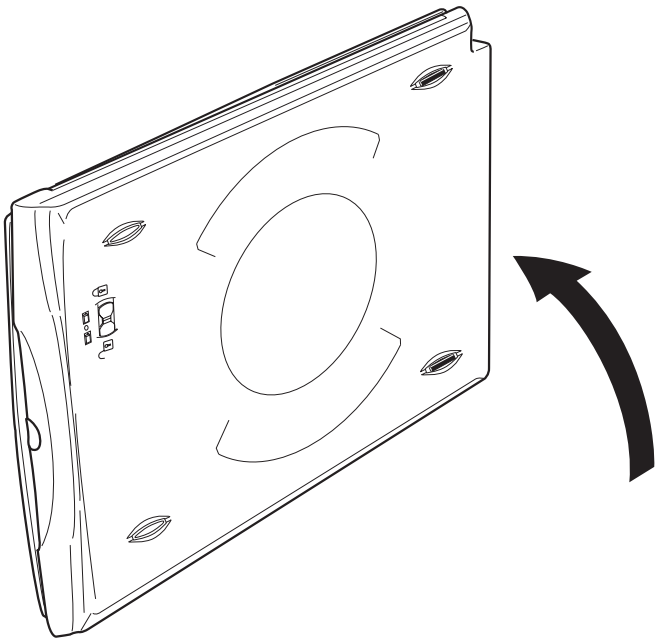
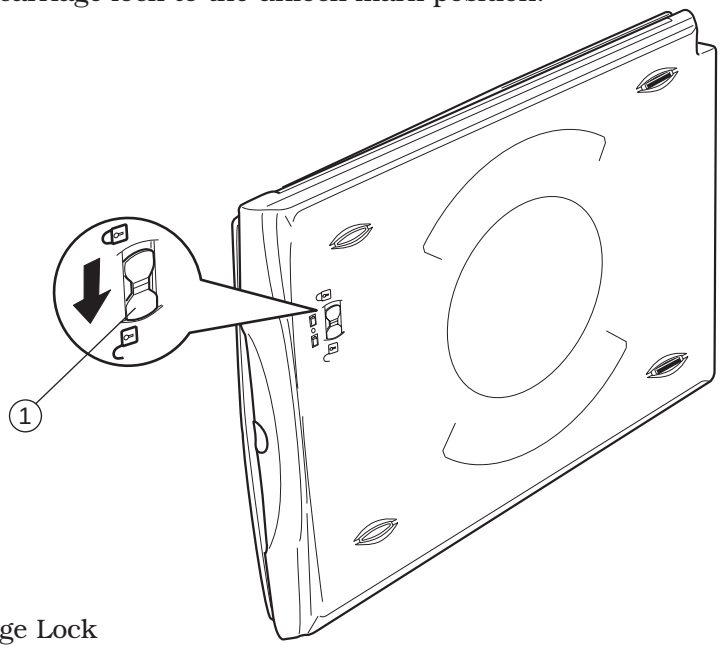


Figure 1-3

2) Push the carriage lock to the unlock mark position.



① Carriage Lock

Figure 1-4

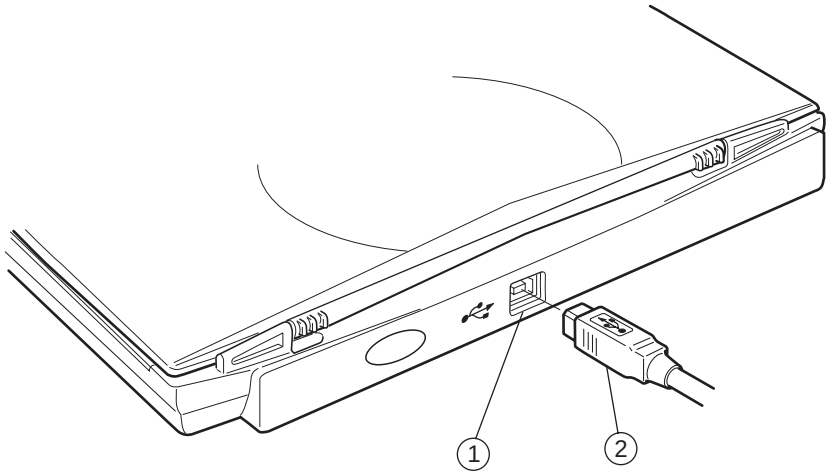
3) Return the scanner to its standard position.

Note: Always lock the scanning unit during transport.

C. Connecting to the Host Computer

The scanner is connected to the USB port on the host computer using a supplied USB cable. Refer to "Getting Started" for details. For connecting/disconnecting the host computer's cables, refer to the manual supplied with the host computer.

1) Connect the flat connector (A plug) of the USB cable to the USB port on the host computer.
2) Connect the square connector (B plug) of the USB cable to the USB port on the scanner.

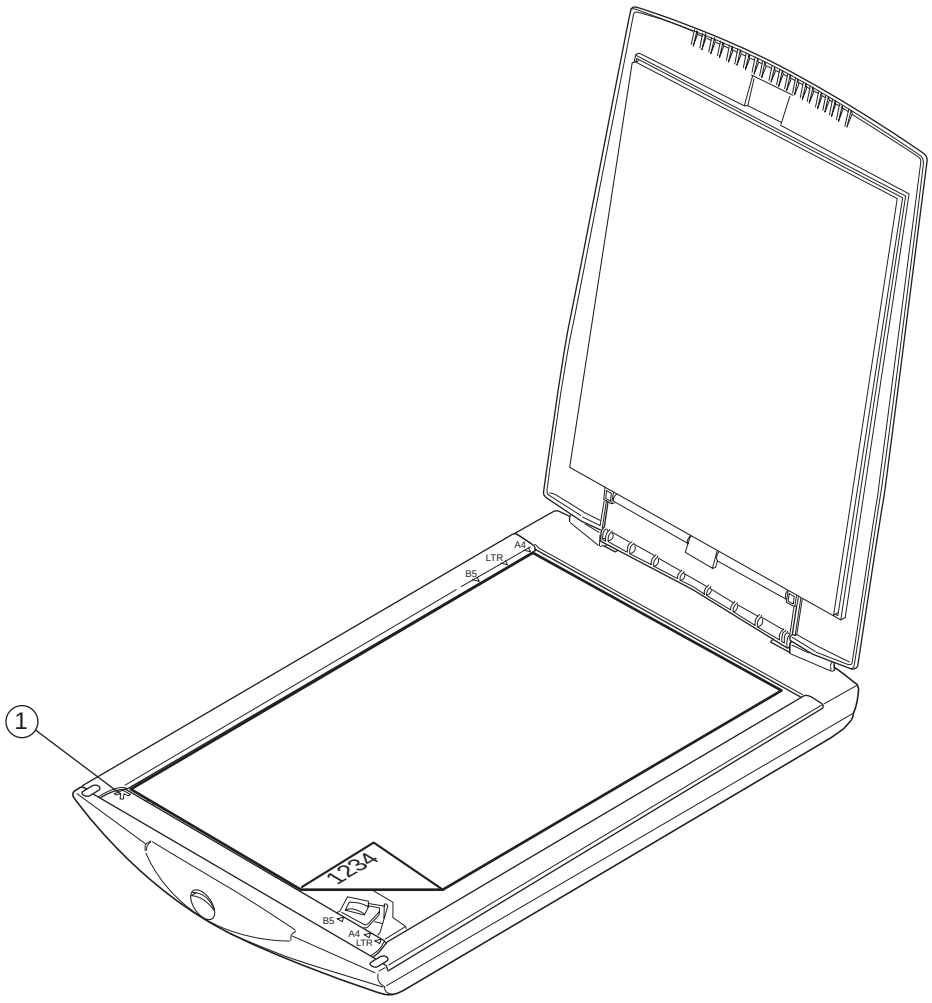


① USB Port
② USB Cable

Figure 1-5

D. Scanning a Document

1) Open the document cover.
2) Place a document on the document glass, orienting the image face down and aligning its top edge with the alignment mark.



① Alignment Mark

Figure 1-6

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

V. CUSTOMER'S DAILY MAINTENANCE

Dirt on a document glass or a document cover may cause an unclear image or lines on an image. Clean the document glass and the document cover using the following procedures.

1) Disconnect the USB cable from the scanner.
2) Wipe the dirt or dust off the document cover with a soft clean cloth dampened with water and well wrung, then thoroughly wipe water off with a dry cloth.
3) Wipe the document glass with a dry cloth caring not to leave wiper marks.

CHAPTER 2

OPERATION AND TIMING

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I. BASIC OPERATION

A. Functions

The scanner functions are divided into the three main blocks of optical system, image processing system, and control system.

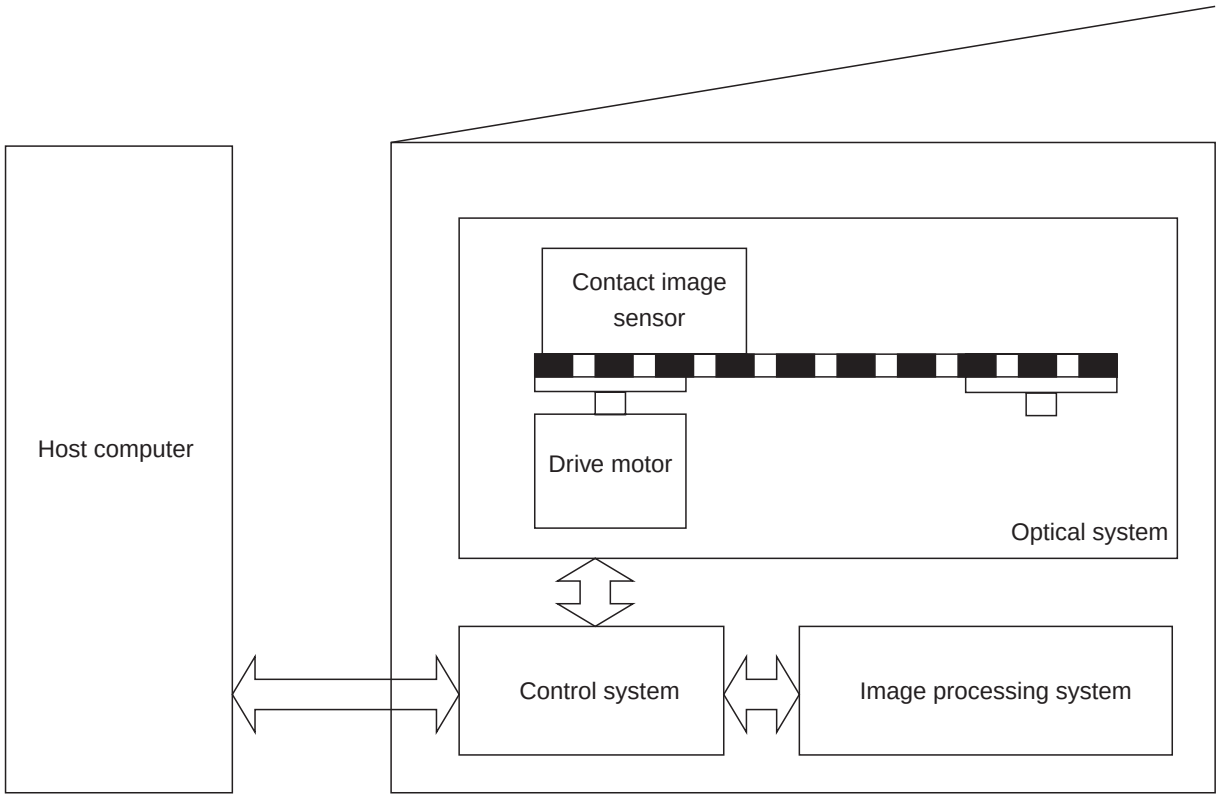

Figure 2-1

B. Outline of Electrical System

Figure 2-2 shows the outline of electrical system. CPU is not equipped in the main PCB. The device driver installed in the host computer includes a control program, which functions as CPU.

Image signals read by the contact image sensor are converted into digital data by the A/D converter in the gate array. The converted image data are image-processed by the gate array, then output to the host computer via USB port.

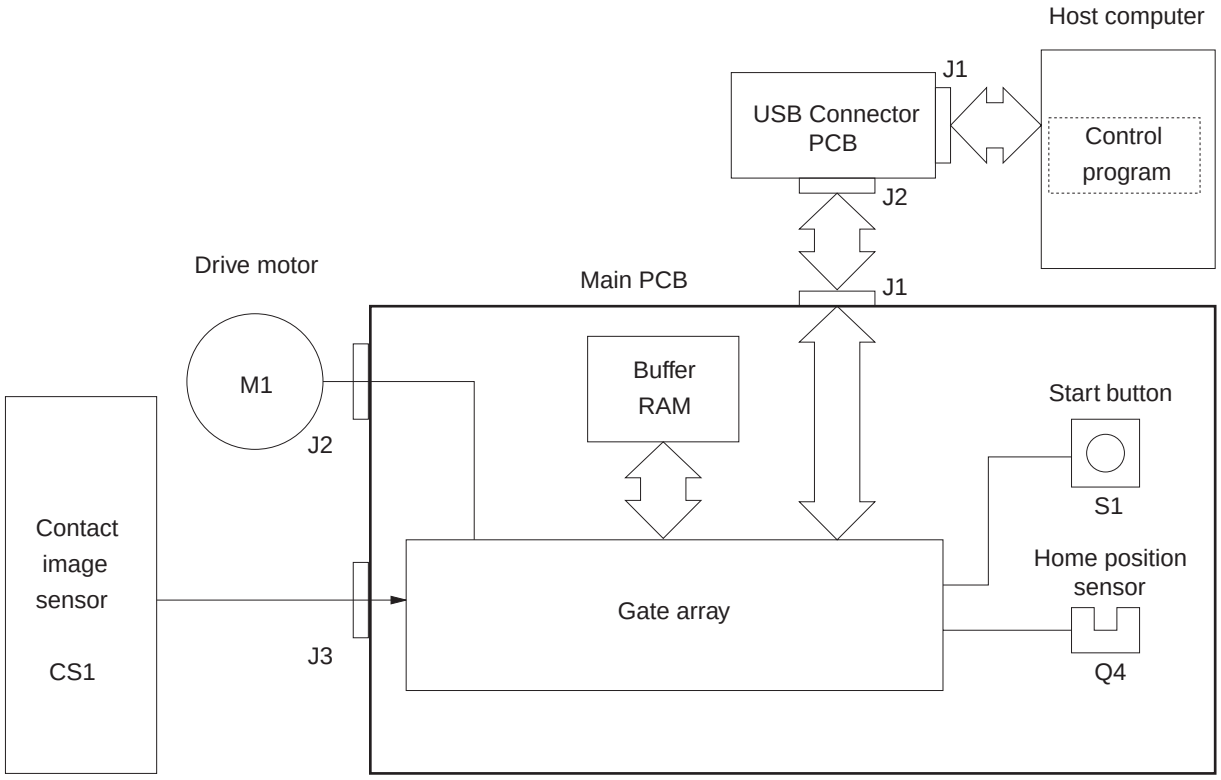

Figure 2-2

C. Main PCB Input and Output

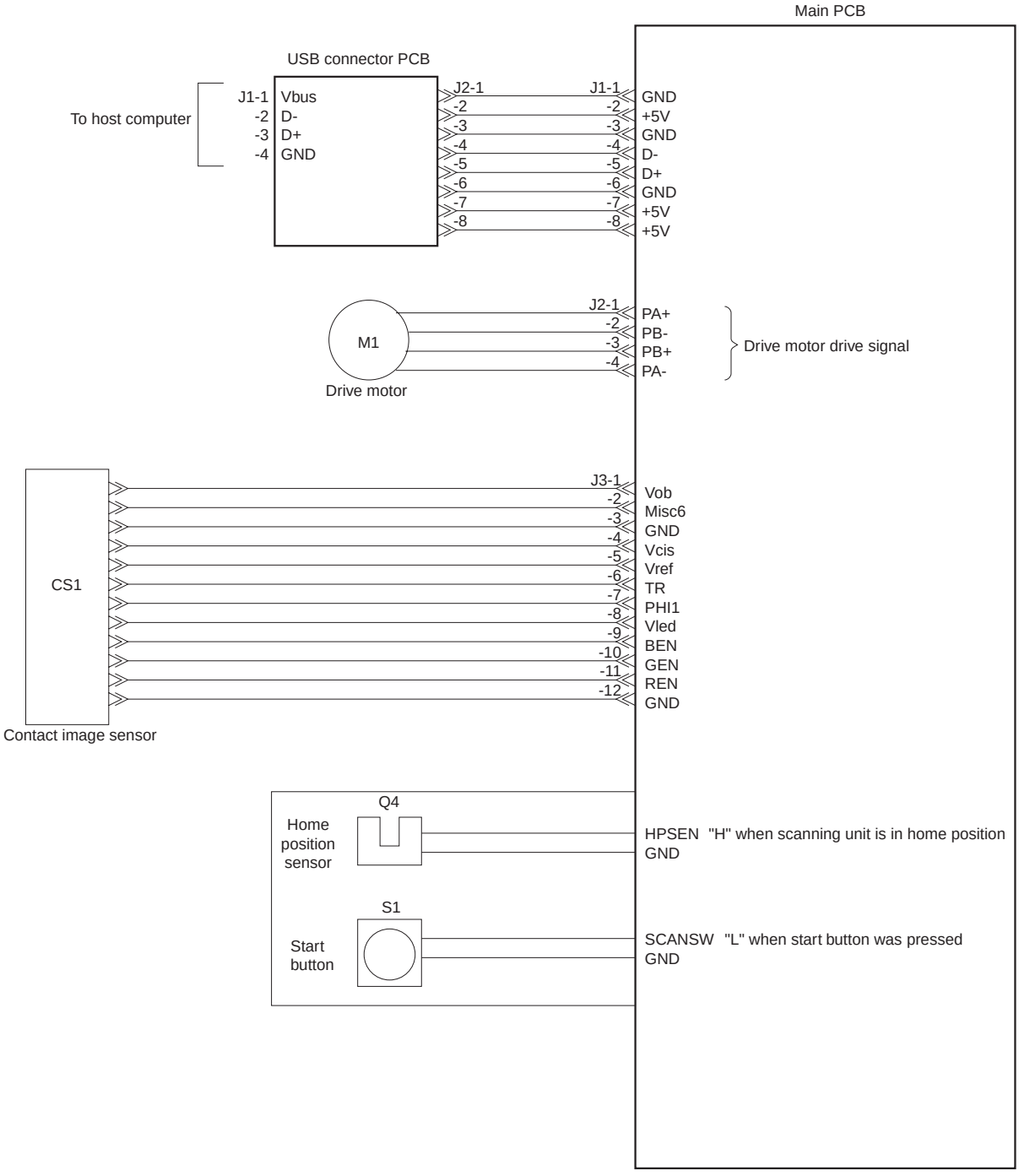

Figure 2-3

D. Basic Sequences

The basic sequences of the scanner are divided into power ON sequence, calibration sequence, and document scanning sequence.

1. Power ON sequence

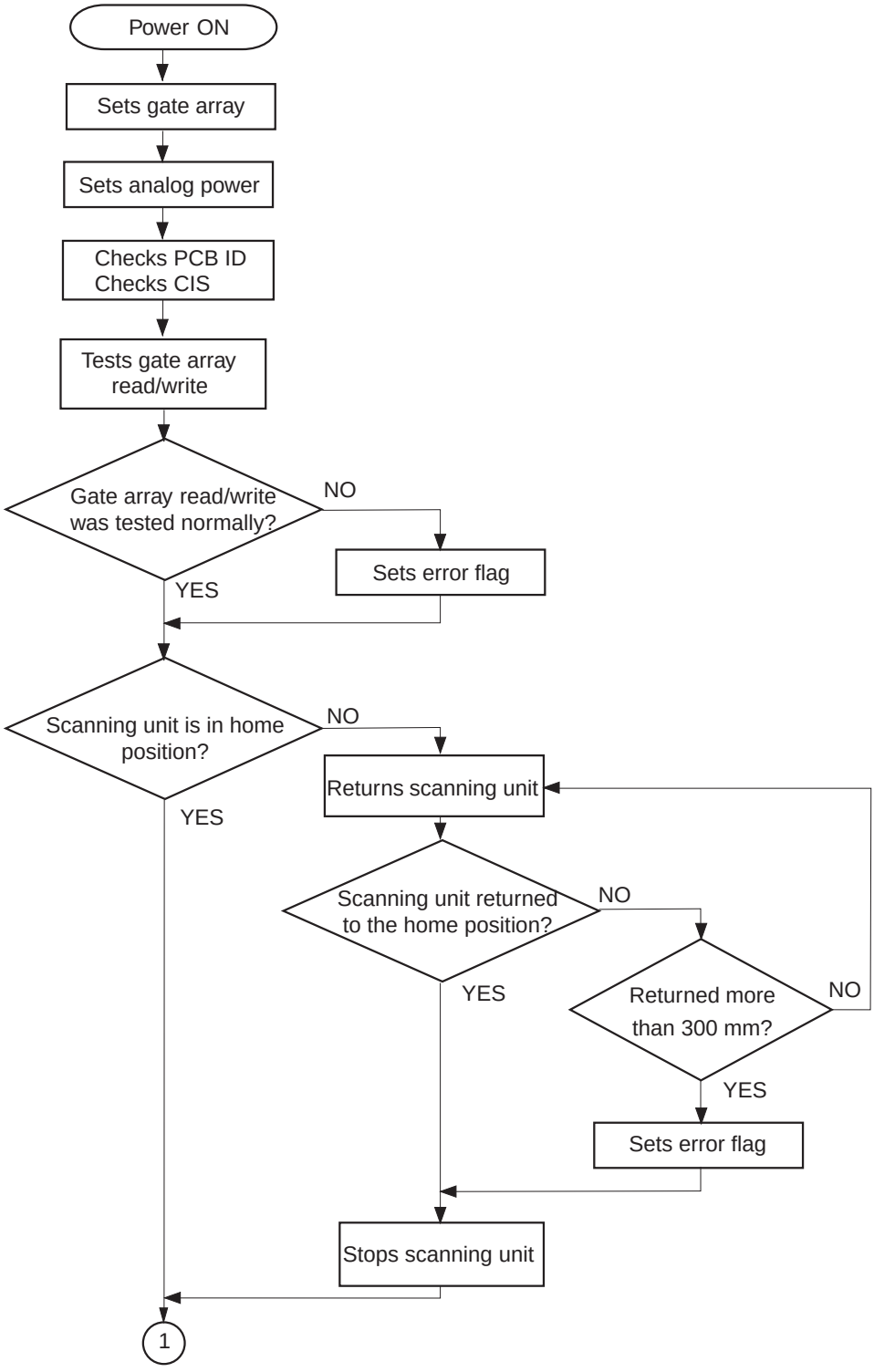

Figure 2-4-1

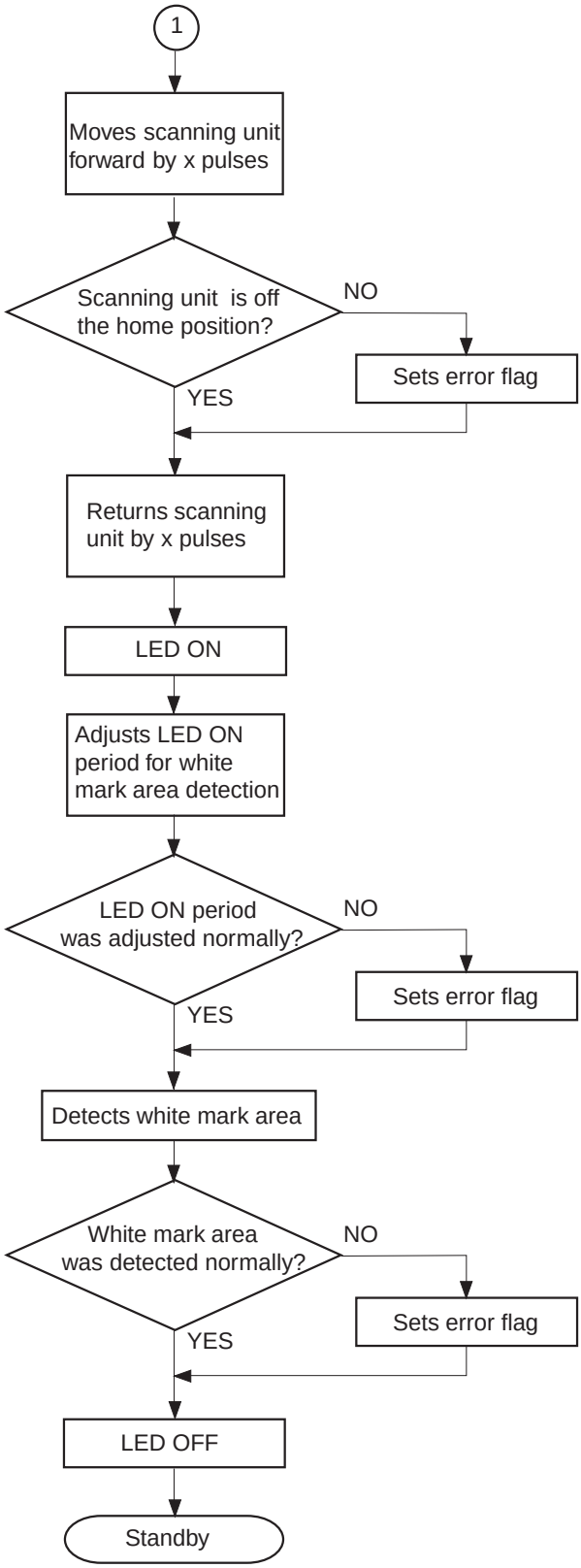
1
Moves scanning unit forward by x pulses
Scanning unit is off the home position?
NO
Sets error flag
YES
Returns scanning unit by x pulses
LED ON
Adjusts LED ON period for white mark area detection
LED ON period was adjusted normally?
NO
Sets error flag
YES
Detects white mark area
White mark area was detected normally?
NO
Sets error flag
YES
LED OFF
Standby

Figure 2-4-2

When the scanner is powered ON, it performs hardware setting, home position detection, and border detection between black and white according to the flowchart shown in Figure 2-4.

1) Hardware setting
Gate array and buffer RAM in the main PCB are checked if they function normally.

2) Home position detection/Border detection between black and white
The scanner detects the home position by the home position sensor by using a black mark area and white mark area in the rear of the document glass.
Firstly the home position sensor defines the home position, where the scanning unit reads a black mark area.
Secondly, the border between a white mark area and black mark area is detected. The scanning unit moves forward reading image signals with the LED of the contact image sensor turned ON. When the scanning unit has reached the white mark area, and the peak value of the light intensity to the scanning unit has reached a white level, the scanning unit stops to define there as the border between a black mark area and white mark area. The number of steps of the drive motor is calculated to define the distance from the home position to the white mark area.

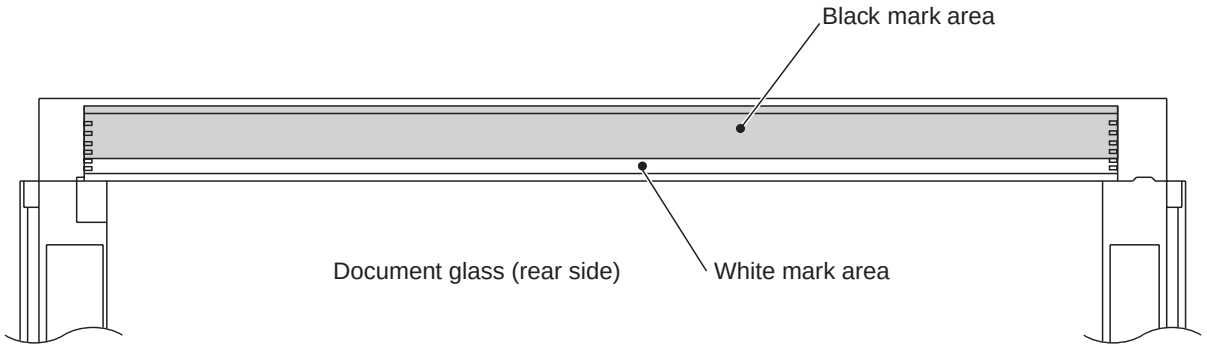

Figure 2-5

When the hardware setting, home position detection and border detection between black and white have completed, the scanner is on standby to wait for a command from the host computer.

2. Calibration sequence

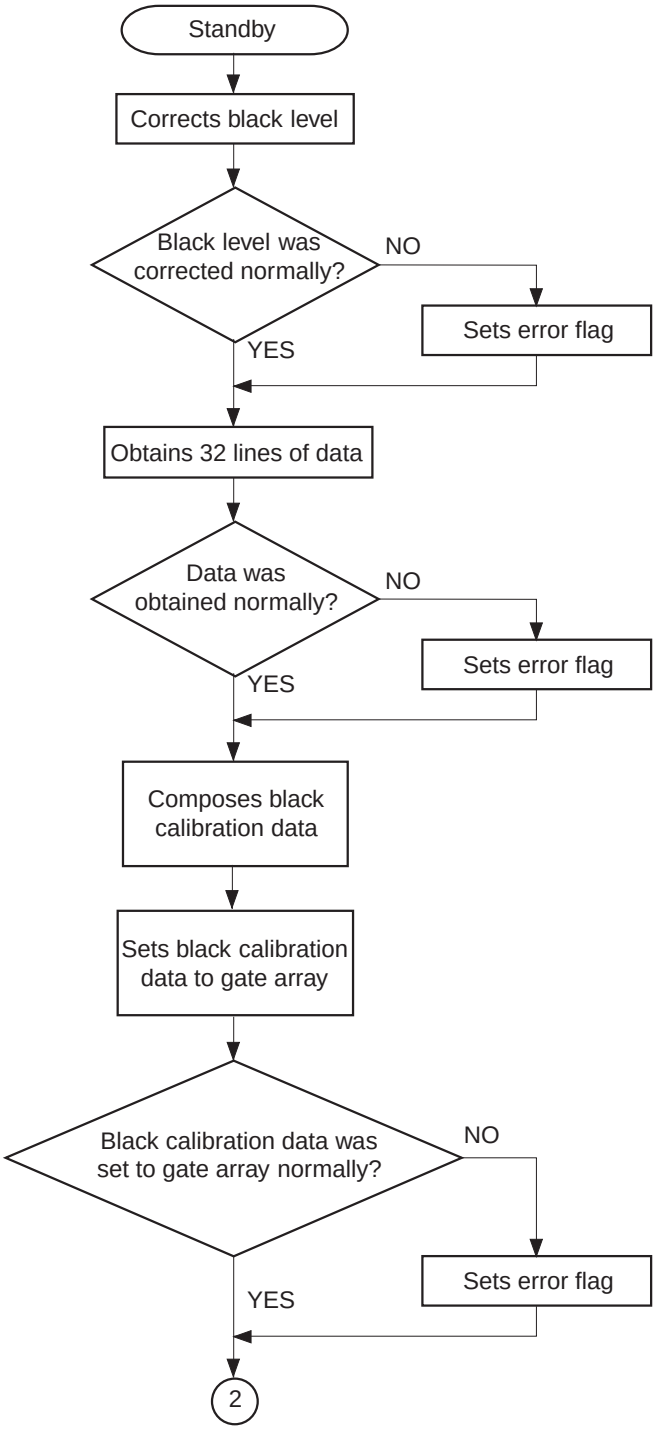

Figure 2-6-1

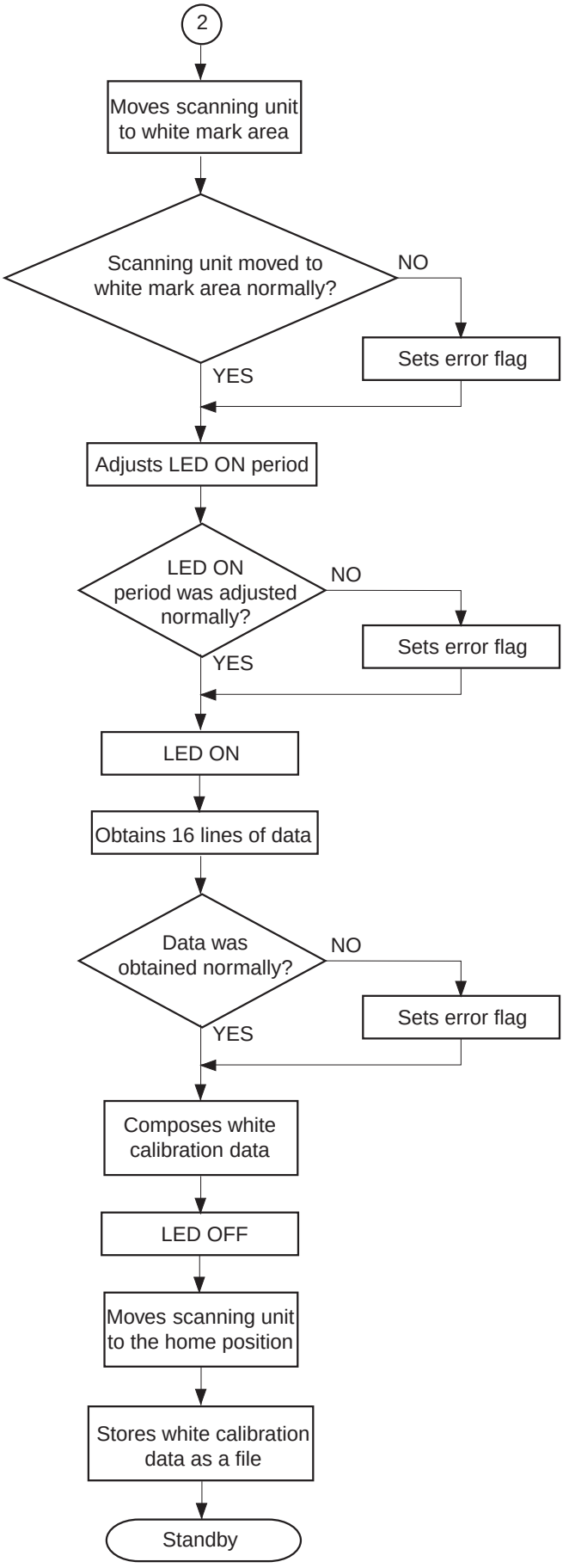

Figure 2-6-2

When the host computer sends a calibration command, the scanner performs the calibration. Calibration is to compose black calibration data and white calibration data by reading the black mark and white mark in the rear of the document glass as color references for the proper color reading.

1) Black calibration data composition

Black calibration data is composed by reading and averaging 32 lines of output from the scanning unit with the LED turned OFF.

2) White calibration data composition

White calibration data is composed by reading 16 lines of each red, green and blue of the white mark, and averaging the highest 8 lines of output.

Above procedure is performed at high image quality color 600 dpi, color 600/300 dpi, and grayscale 600/300 dpi and the data is stored as a file in the host computer. For grayscale 600/300 dpi, only green data is processed.

3. Document scanning sequence

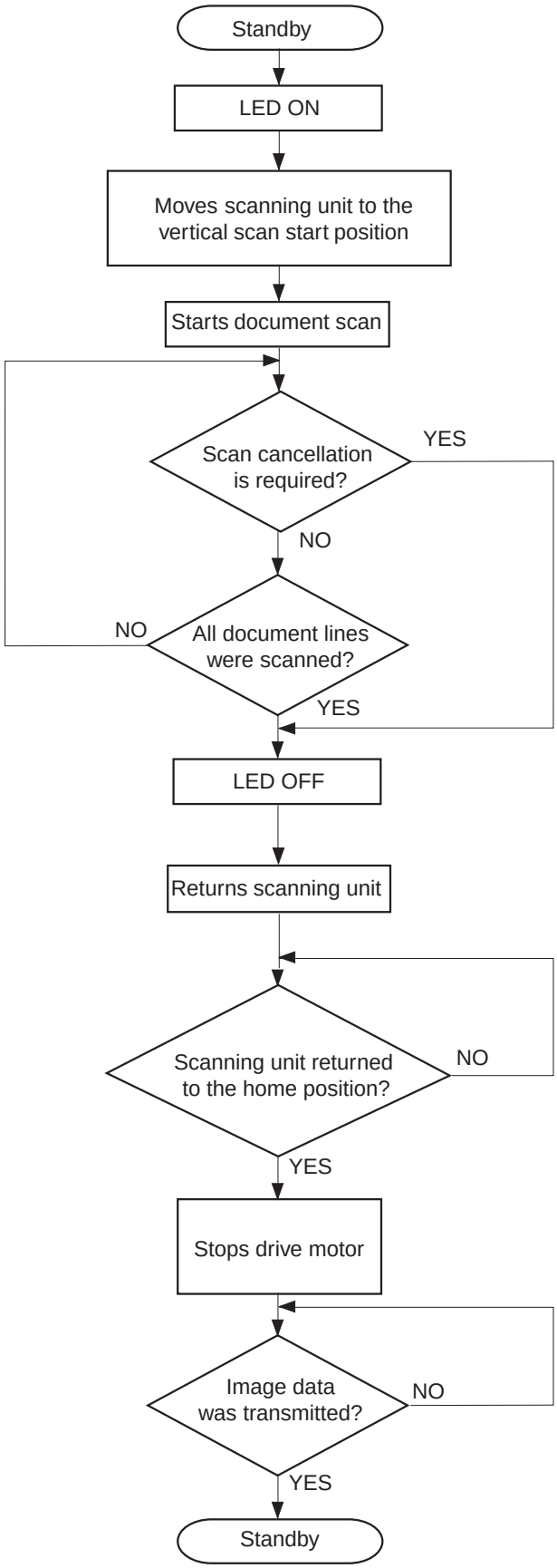

Figure 2-7

