

2x500 sheet PAPER DECK PD-82K

SERVICE MANUAL

REVISION 0

Canon

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PREFACE

This Service Manual contains basic information required for after-sales service of 2x500 sheet paper deck PD-82K. This information is vital to the service technician in maintaining the high print quality and performance of the paper deck.

This manual consists of the following chapters:

- Chapter 1: Product information
Specifications, parts of the deck, and installation
- Chapter 2: Operation and Timing
A description of the operating principles and timing sequences of the electrical and mechanical systems.
- Chapter 3: The Mechanical System
Explanation of mechanical operation, disassembly, reassembly, and adjustment procedures
- Chapter 4: Troubleshooting
Maintenance and servicing, reference values and adjustments, troubleshooting procedures, lubricants, and solvents
- Appendix: General circuit diagram, etc.

Information in this manual is subject to change as the product is improved or redesigned. All relevant information in such cases will be supplied in Service Information Bulletins. A thorough understanding of this paper deck, based on information in this Manual and Service Information Bulletins is required for maintaining its performance and for locating and repairing malfunctions.

DTP system

This manual was produced on an Apple PowerMacintosh 9500/233 personal computer and output by an Apple LaserWriter 16/600 PS laser beam printer; final pages were printed on DAINIPPON SCREEN MFG CO. LTD DT-R3100.

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CHAPTER 1

PRODUCT INFORMATION

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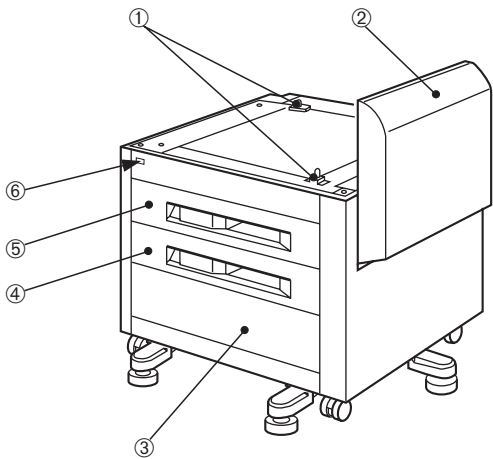
I. SPECIFICATIONS

| | |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| 1) Paper type | Plain paper, colored paper, and thick paper |
| 2) Paper size | |
| Upper cassette | B4, A4, Legal, and Letter sized plain paper (64g/m ² to 105g/m ² recommended paper) |
| Lower cassette | A3, B4, A4, Ledger, Legal, and Letter sized plain paper (64g/m ² to 105g/m ² recommended paper) |
| 3) Cassette type | |
| Upper cassette | Universal (accommodates B4, Legal, Letter, and A4 size) |
| Lower cassette | Universal (accommodates Ledger, A3, B4, Legal, Letter, and A4 size) |
| 4) Capacity | Depth 50mm (About 500 sheets of paper (75g/m ²) can be stacked.) |
| 5) Environment | |
| Temperature | 10 to 32.5°C |
| Humidity | 20 to 80%RH |
| Pressure | 746 to 1013hPa (560 to 760mmHg) |
| 6) Maximum power consumption | About 48.9W or less (Room temperature 20°C, Rated power supply voltage) |
| 7) Dimensions | 629 (width) x 520 (depth) x 651 (height) mm |
| 8) Weight | About 30kg |
| 9) Line voltage requirements | 100-127V-10%, +6% (50/60Hz±2Hz) 220-240V-10%, +6% (50/60Hz±2Hz) |

Specifications are subject to change with product modification.

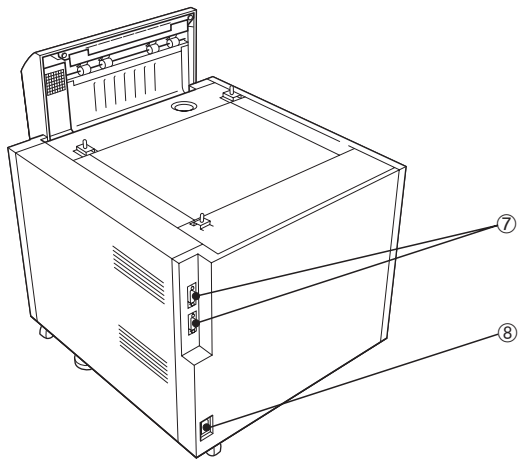
II. PARTS OF THE PAPER DECK

A. External Views



- 1: Positioning pins
- 2: Paper feed unit
- 3: Housing unit
- 4: Lower cassette
- 5: Upper cassette
- 6: Status LED

Figure 1-2-1



- 7: Option interface connectors
- 8: Power receptacle

Figure 1-2-2

B. Cross Sectional Views

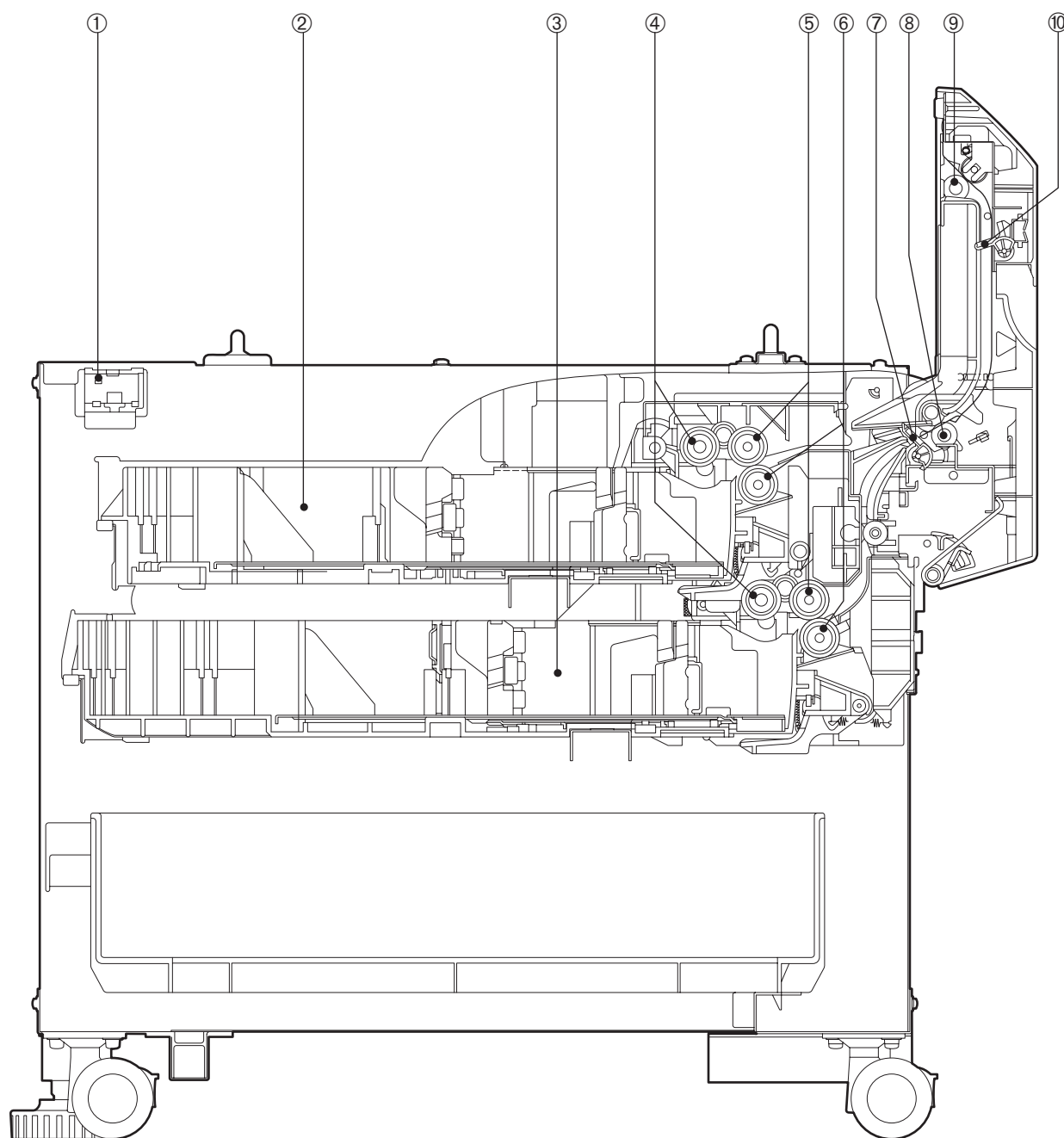


Figure 1-2-3

- | | |
|-------------------|------------------------------------|
| 1: Status LED | 6: Separation roller |
| 2: Upper cassette | 7: Registration paper sensor lever |
| 3: Lower cassette | 8: Registration roller |
| 4: Pick-up roller | 9: Feed roller 2 |
| 5: Feed roller 1 | 10: Paper jam sensor lever |

III. INSTALLATION

A. Notes

Use the following power supplies;

- Line voltage (AC): -10%, +6% rated voltage
- Power frequency: 50/60Hz \pm 2Hz

B. Unpacking and Installation

Condensation will form on the metal surfaces when brought into a warm room from the cold. Therefore, when moving the unit into a warm environment, leave it packed in its box for at least an hour to acclimatize to room temperature.

1. Opening the paper deck packaging

- 1) Undo the paper deck packaging, and remove the box.
- 2) Take out the accessories. Confirm that the option interface cable and manual are included.
- 3) Remove the top pads (left/right) and remove the paper deck from the box.
- 4) Take the plastic bag off from around the deck and peel off the tape holding the various parts. Check that none of the covers were scratched or deformed during shipment.
- 5) Open the feed unit and remove the spacer.
- 6) Pull out the cassettes and remove the spacer.

2. Connecting to the printer

- 1) Carry to the installation location and lock the casters.
- 2) Rotate the adjusters to install on the floor.
- 3) Open the feed unit.
- 4) Line up the printer and paper deck in the same direction, and have 4 people lift the printer. Lower the printer onto the paper deck while aligning the 3 positioning pins on the paper deck.
- 5) Close the feed unit.
- 6) Connect the 15-pin-connector of the interface cable with the paper deck, and the 14-pin-connector with the printer.
- 7) Plug the power cord into the paper deck and the outlet.

Note: When connecting the interface cable with the printer and the paper deck, note that the connectors at the ends of the interface cable contain different number of pin, 15 pins and 14 pins.

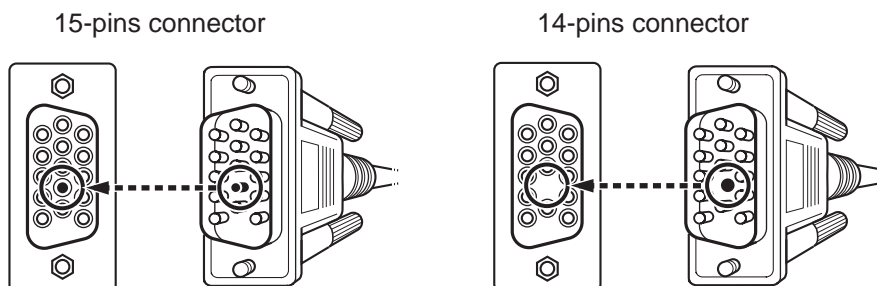





Figure 1-3-1

CHAPTER 2

OPERATION AND TIMING

1. This chapter describes the paper deck functions, the relationships between mechanisms and circuits, and the timing of operations. Mechanical linkages are indicated by black and white lines (), the flow of control signals by solid arrows (), and the flow of groups of signals by outline arrows ().
2. An active-high signal is indicated by "H" or by a signal name without a slash in front of it, such as "PSNS." An active-low signal is indicated by "L" or by a signal name with a slash in front of, such as "/SCNON."

A signal that is "H" or has a name without a slash is active at the supply voltage level (indicating that the signal is being output), and inactive at ground level (indicating that the signal is not being output).

A signal that is "L" or has a slash in front of its name is active at ground level, and inactive at the supply voltage level.

There is a microcomputer in this printer. But as the internal operation of the microcomputer cannot be checked, an explanation of the operation of the microcomputer has been left out.

As it is assumed that no repair will be made to customer circuit boards, the explanation of board circuits is limited to an outline using block diagrams. So there are two types of circuit explanations; (1) everything from the sensor to the input sections of the major circuit boards, (2) everything from the output sections of the major circuit boards to the loads. These are explained with block diagrams according to the function.

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| III. POWER SUPPLIES | 2-20 |
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I. BASIC OPERATION

A. Outline

The paper deck feeds print paper to the printer.

The sequence of paper deck operations is controlled by the paper deck driver PCB. This PCB contains an eight-bit microcomputer (IC201) to control the sequence of operations and serial communication with the option controller PCB.

The paper deck driver drives the solenoids and motors according to various commands coming from the option controller through the serial communication line. The paper deck driver sends sensor and switch data to the option controller through the serial communication line.

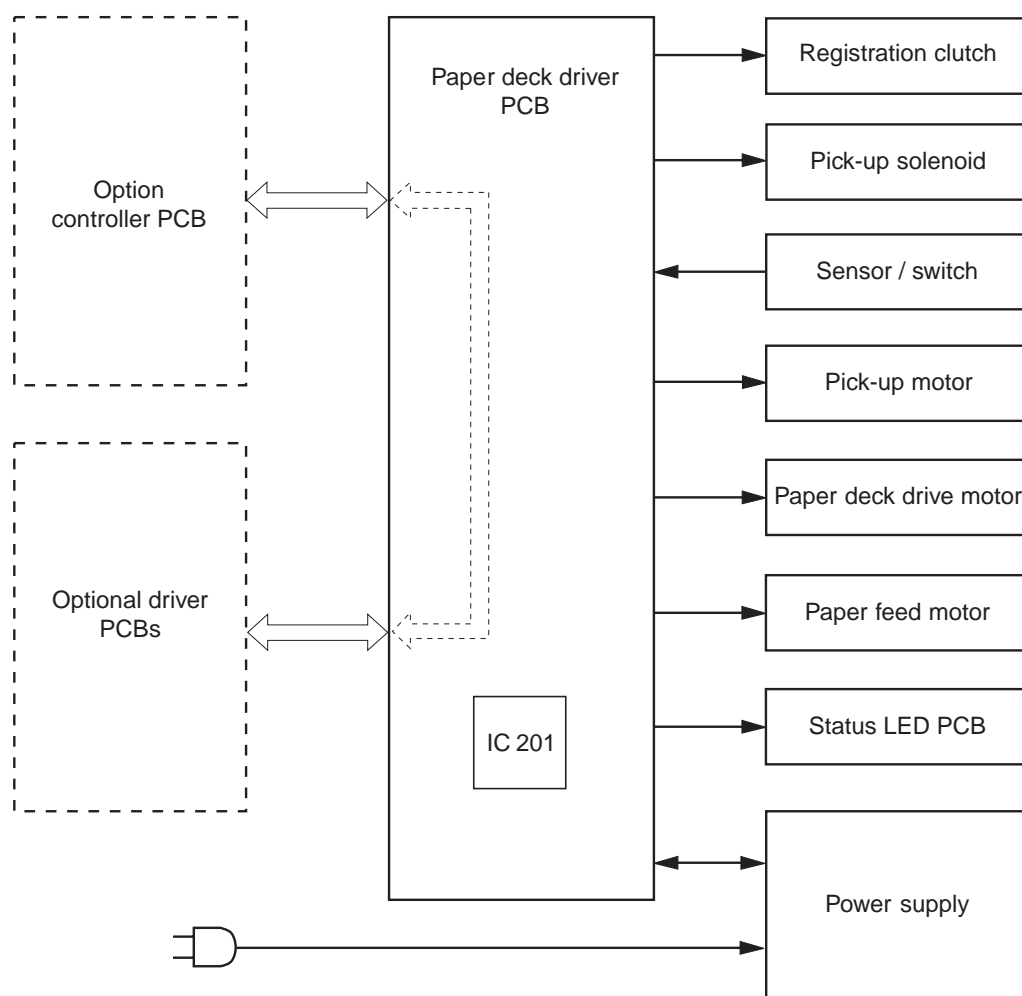


Figure 2-1-1

B. Input/Output of Paper Deck Driver PCB

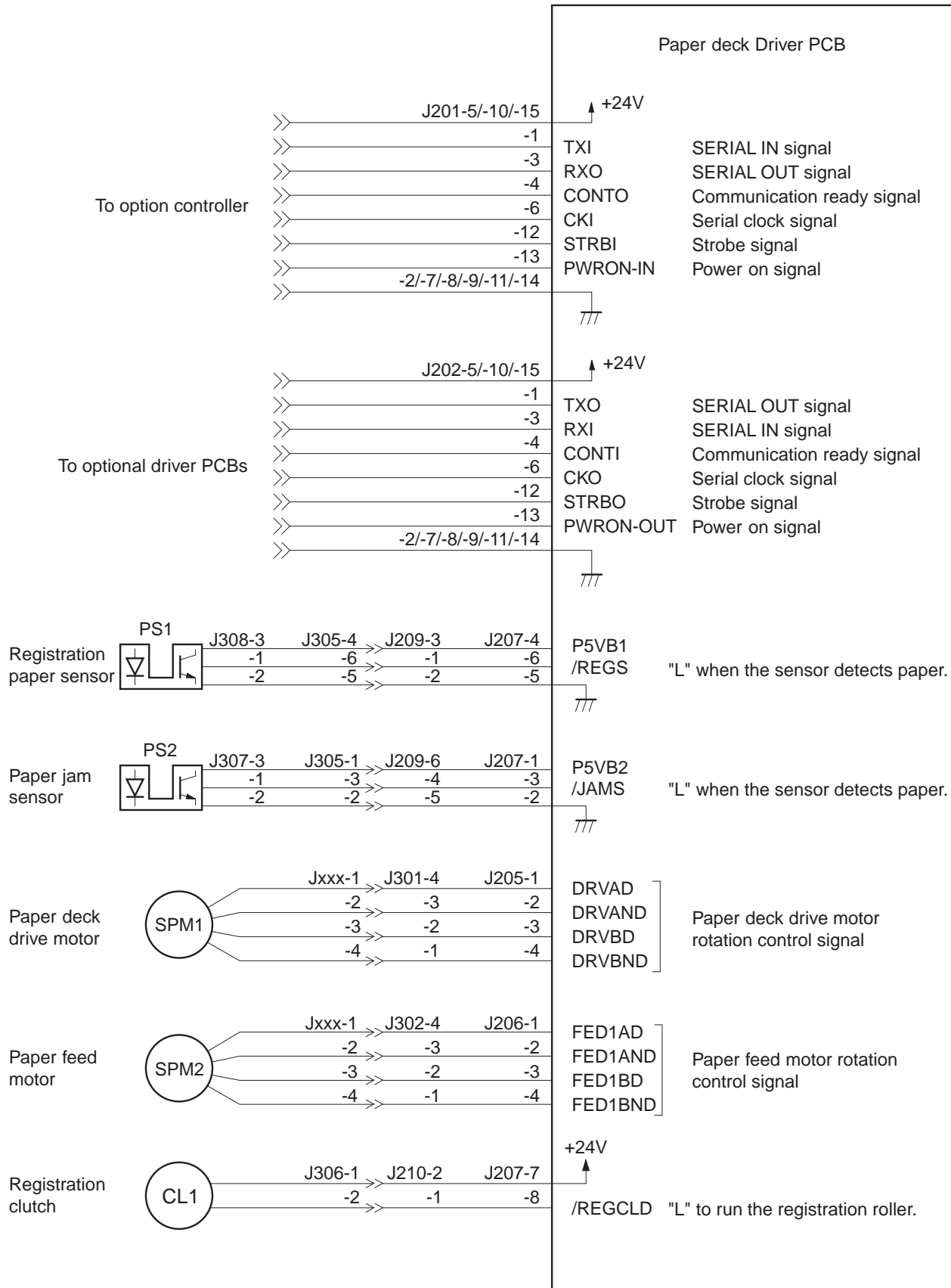


Figure 2-1-2

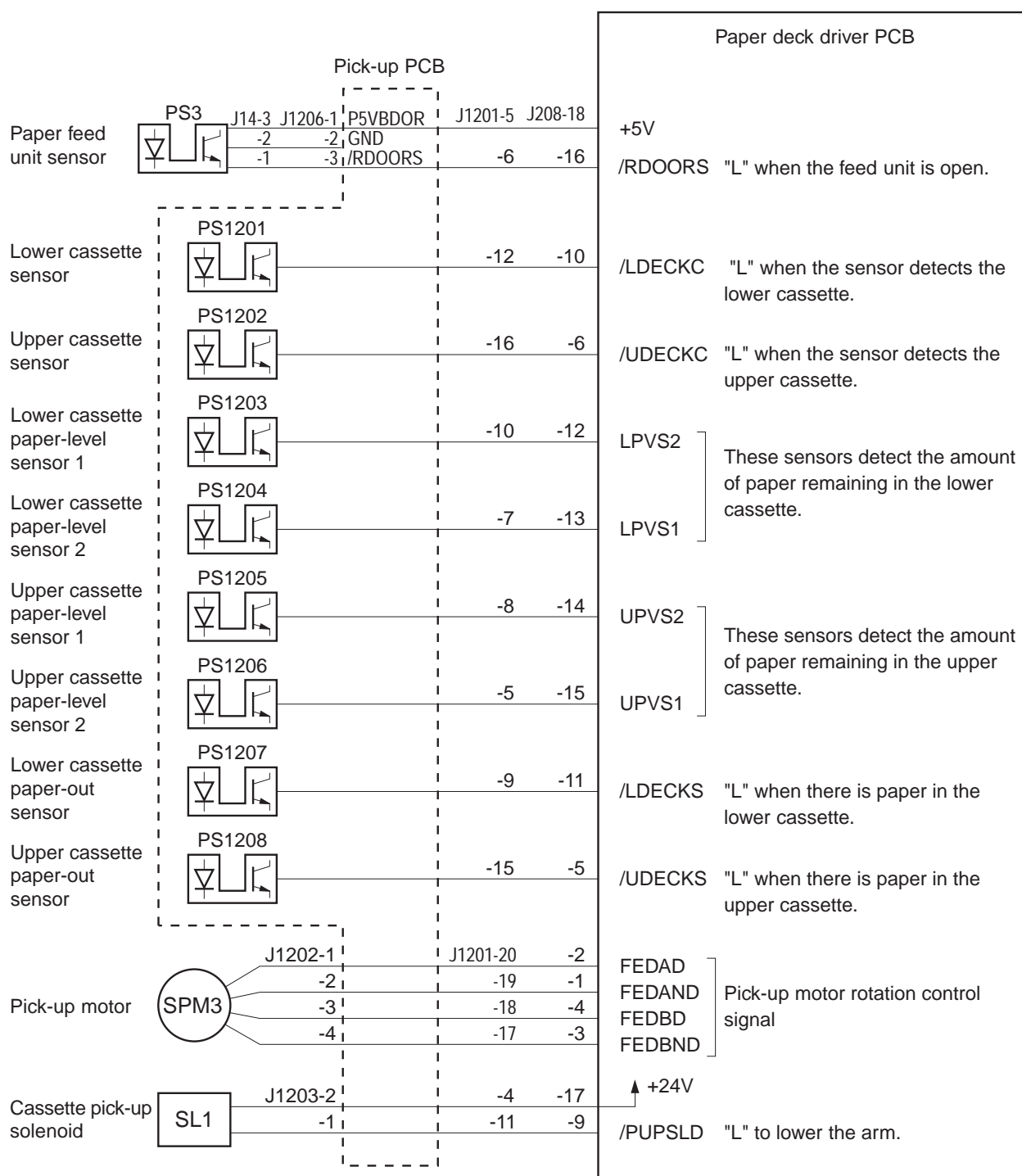


Figure 2-1-3

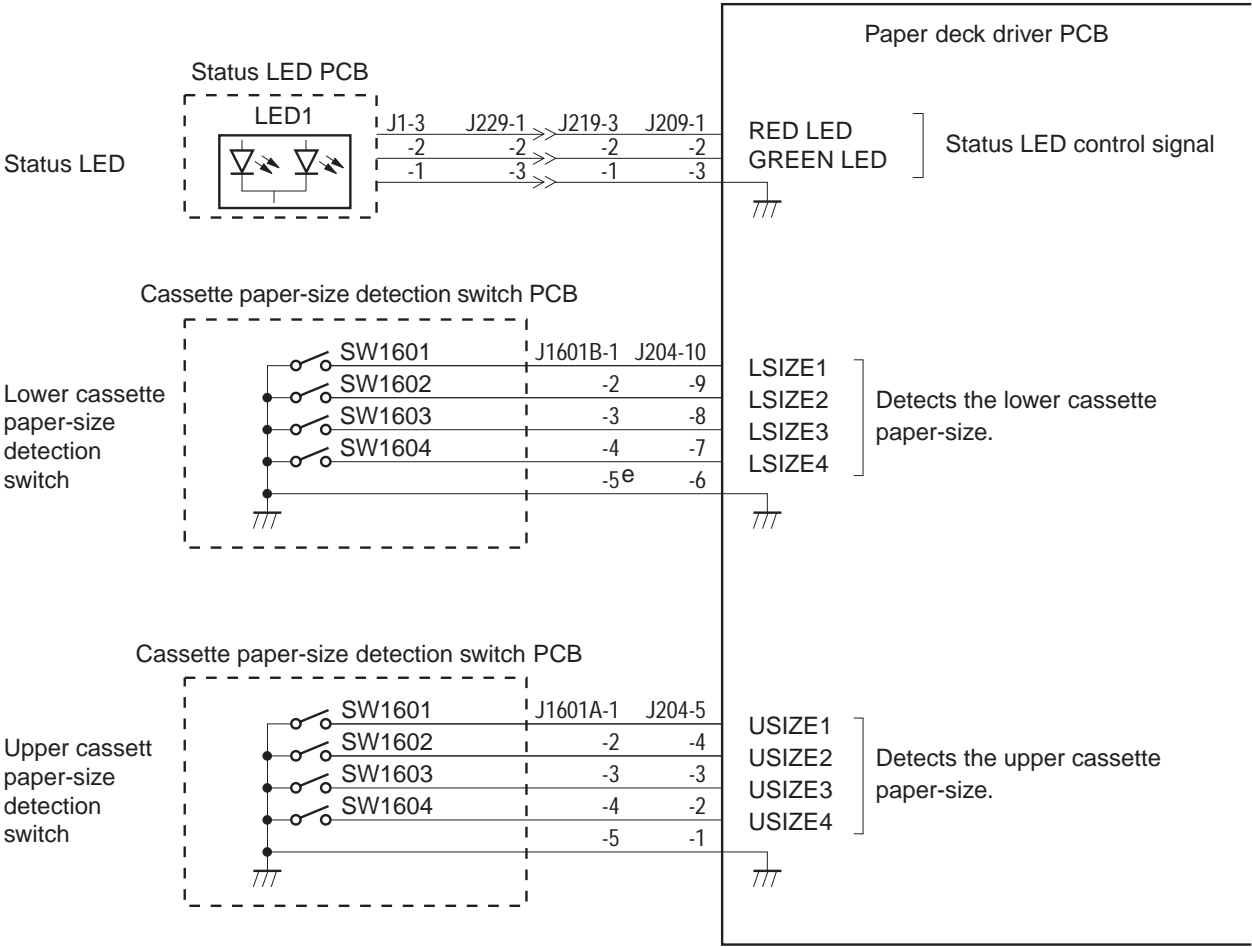


Figure 2-1-4

II. PICK-UP/FEED SYSTEM

A. Outline

On receiving the pick-up command from the option controller, the paper deck driver starts paper-pick up operation. The paper is picked up by the pick-up roller and fed into the feed unit by the feed roller 1 and the separation roller. The paper stops after its skew is corrected by the registration roller.

The paper deck driver runs the pick-up motor (SPM3). The pick-up roller, feed roller 1, and separation roller are rotated by the rotational force of the pick-up motor.

At the same time, the paper deck driver runs the paper deck drive motor (SPM1) and turns ON the pick-up solenoid (SL1). As a result, the pick-up roller is lowered to the paper level, and the paper is sent to the feed unit by the rotating pick-up roller.

The paper sent to the feed unit is stopped when it reaches the registration roller after passing through the registration paper sensor (PS1). On receiving the feed command, the paper deck driver rotates the pick-up motor (SPM3) and the feed motor (SPM2). At the same time, it turns ON the registration clutch (CL1). As a result, the feed roller 1, registration roller, and feed roller 2 are rotated, and the paper is fed into the printer.

There are two photointerrupters (PS1 and PS2) in the paper path to detect arrival or passing of the paper.

If the paper does not reach or pass each sensor within the specified period of time, the paper deck driver assesses a paper jam, stops operation, and notifies the option controller of the jam.

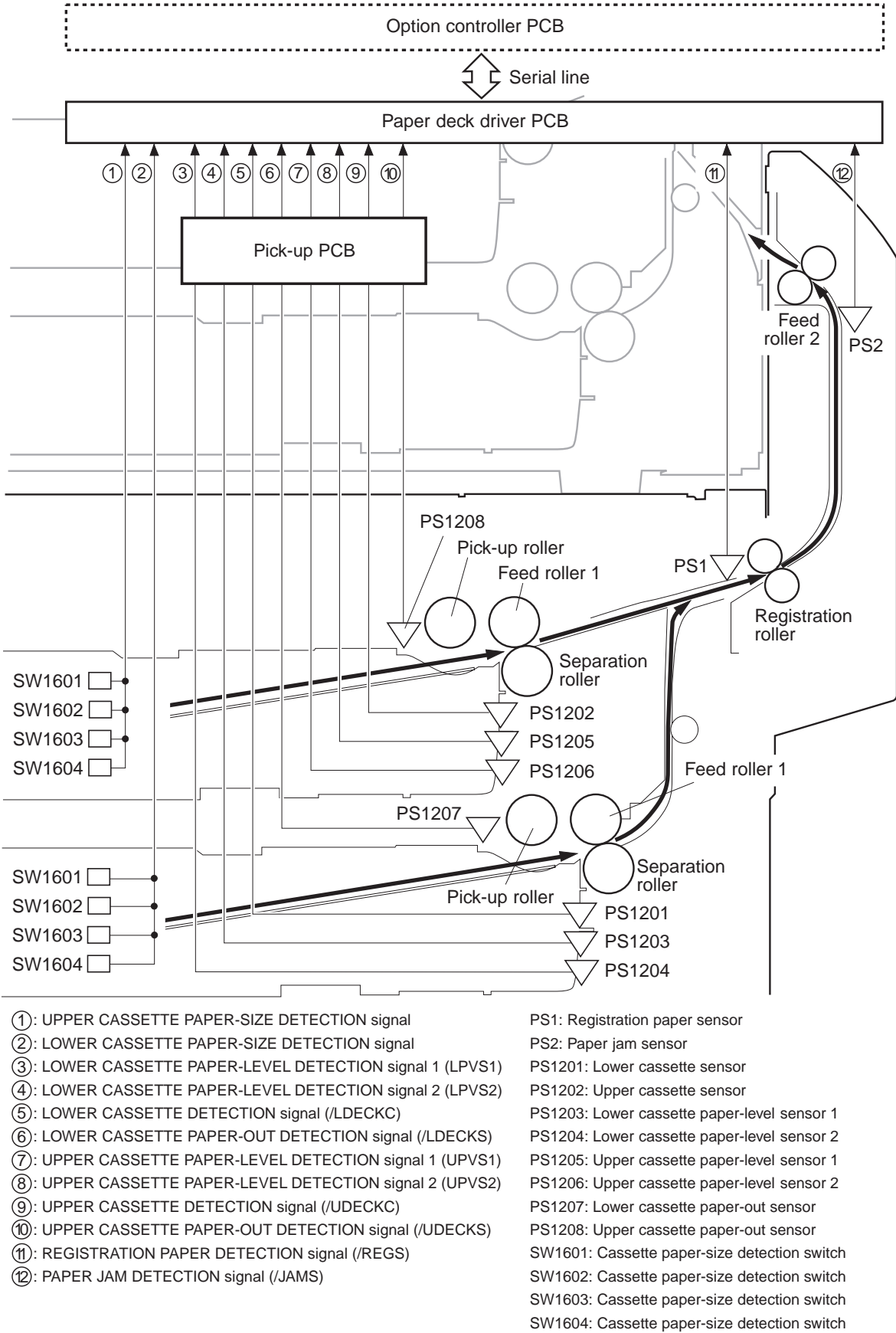


Figure 2-2-1

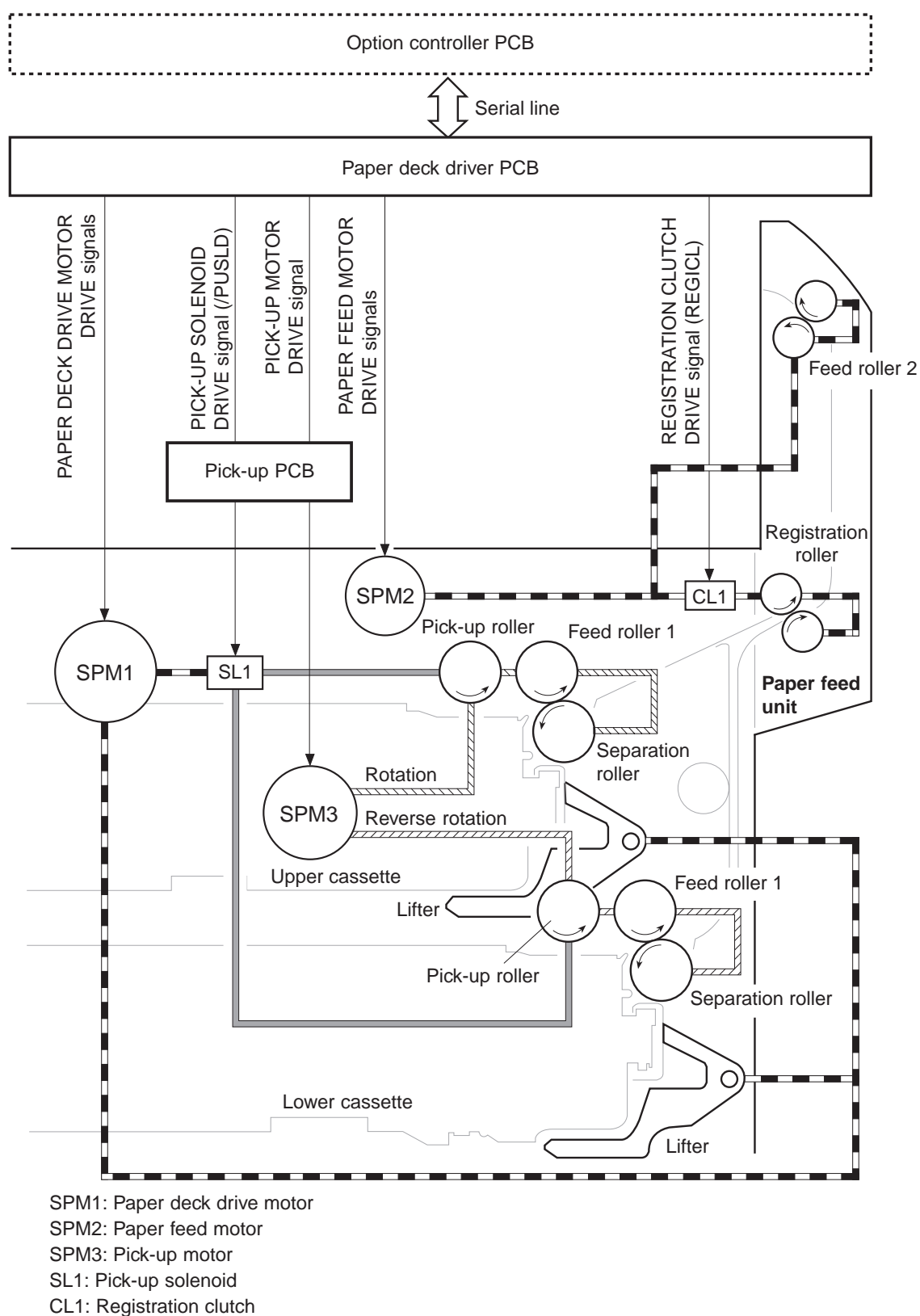


Figure 2-2-2

B. Paper pick-up

1. Pick-up operation

This paper deck conducts paper pick-up operation by lifting the paper to the paper pick-up position with the lifter and lowering the rotating cassette pick-up roller to the paper level.

Paper pick-up operation is conducted only when the paper deck driver receives the pick-up command from the option controller. The pick-up roller is lowered to the paper level by the rotational force of the paper deck drive motor (SPM1). At the same time, the pick-up roller is rotated by the rotational force of the pick-up motor.

Paper pick-up operation is conducted as follows.

On receiving the pick-up command from the option controller, the paper deck driver runs the paper deck drive motor (SPM1) and the pick-up motor (SPM3). When the cassette pick-up solenoid (SL1) is turned ON, the paper deck drive motor rotates the cassette pick-up cam via the gear to drive the shaft drive arm.

At the same time, the rotational force of the pick-up motor is transmitted to the cassette pick-up roller via the feed roller gear. As a result, the rotating cassette pick-up roller goes down to the paper level, picks up a sheet of paper, goes up to the paper pick-up standby position, and stops rotation.

When the pick-up motor rotates clockwise, the paper is picked up from the upper cassette by rotating the cassette pick-up roller, feed roller 1 and separation roller of the upper cassette. When the pick-up motor rotates counterclockwise, the paper is picked up from the lower cassette by driving the cassette pick-up roller, feed roller 1 and separation roller of the lower cassette.

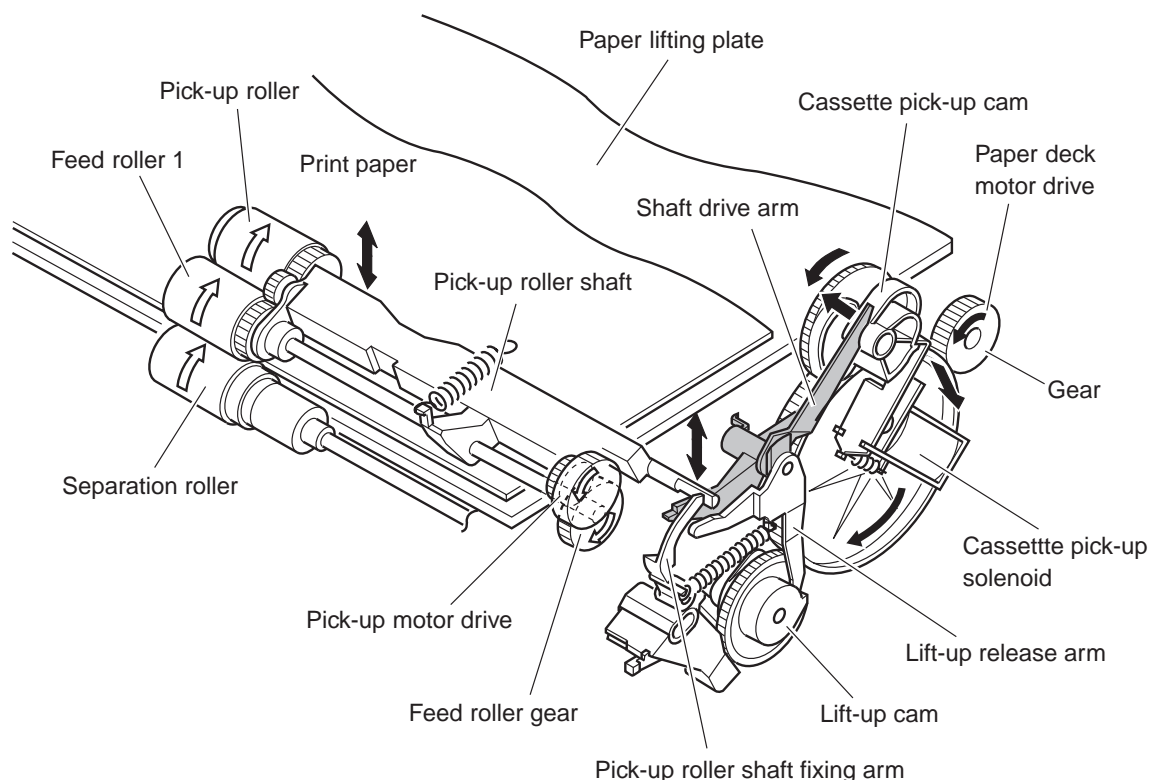


Figure 2-2-3

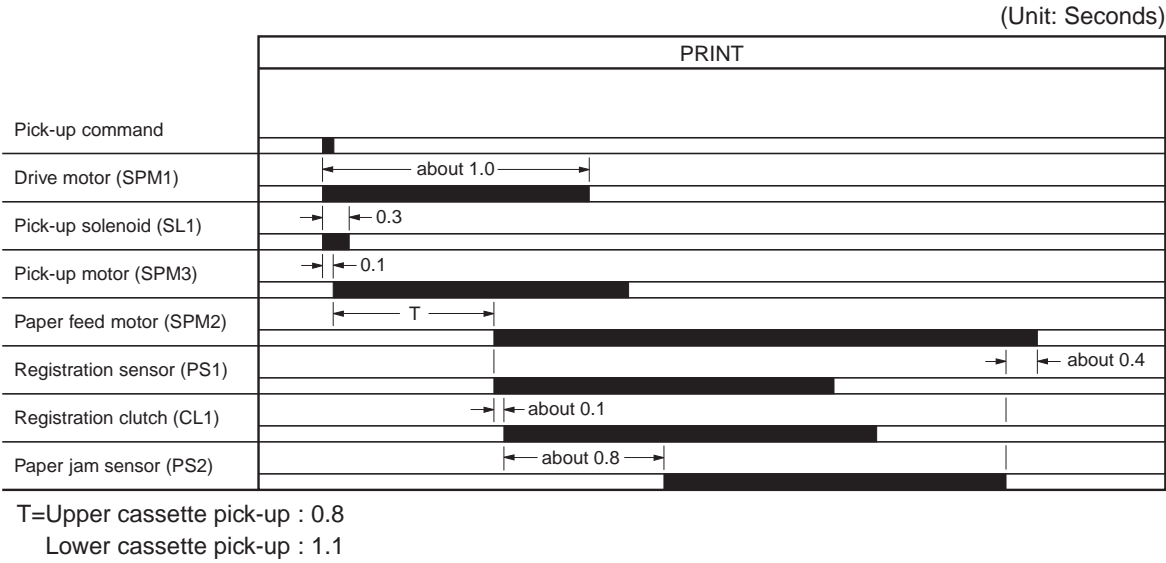


Figure 2-2-4

a. Cassette detection/cassette paper size detection/cassette paper level detection

The upper and lower cassettes detection is executed by the upper cassette sensor (PS1202) and the lower cassette sensor (PS1201). The paper detection in the upper and lower cassettes is executed by the upper cassette paper out sensor (PS1208) and the lower cassette paper out sensor (PS1207). The paper size detection is executed by the upper and lower cassette paper size detection switches (SW1601 to SW1604) installed to each cassette. Each cassette has the four switches. The combinations of the cassette paper size detection switches are shown in Table 2-2-1.

Table 2-2-1

| Paper size | Cassette paper size detection switches | | | |
|------------|----------------------------------------|--------|--------|--------|
| | SW1601 | SW1602 | SW1603 | SW1604 |
| Ledger | OFF | OFF | OFF | OFF |
| A 3 | OFF | ON | OFF | OFF |
| B 4 | ON | OFF | OFF | OFF |
| Legal | ON | ON | OFF | OFF |
| Letter | OFF | OFF | OFF | ON |
| A4 | OFF | OFF | ON | OFF |
| Executive | OFF | ON | ON | OFF |

The remaining paper level in the cassette is detected according to the lifter position. The lifter contains a light blocking plate which blocks two sensors on the pick-up PCB. The lifter position is detected by these sensors. And, as a result, the remaining paper level in the cassette is detected.

The remaining paper level in the upper cassette is detected by the combination of outputs from the upper cassette paper level sensor 1 (PS1205) and the upper cassette paper level sensor 2 (PS1206). The paper level in the lower cassette is detected by the combination of outputs from the lower cassette paper level sensor 1 (PS1203) and the lower cassette paper level sensor 2 (PS1204). Figure 2-2-5 shows the combinations of PS1205/PS1203 and PS1206/PS1204.

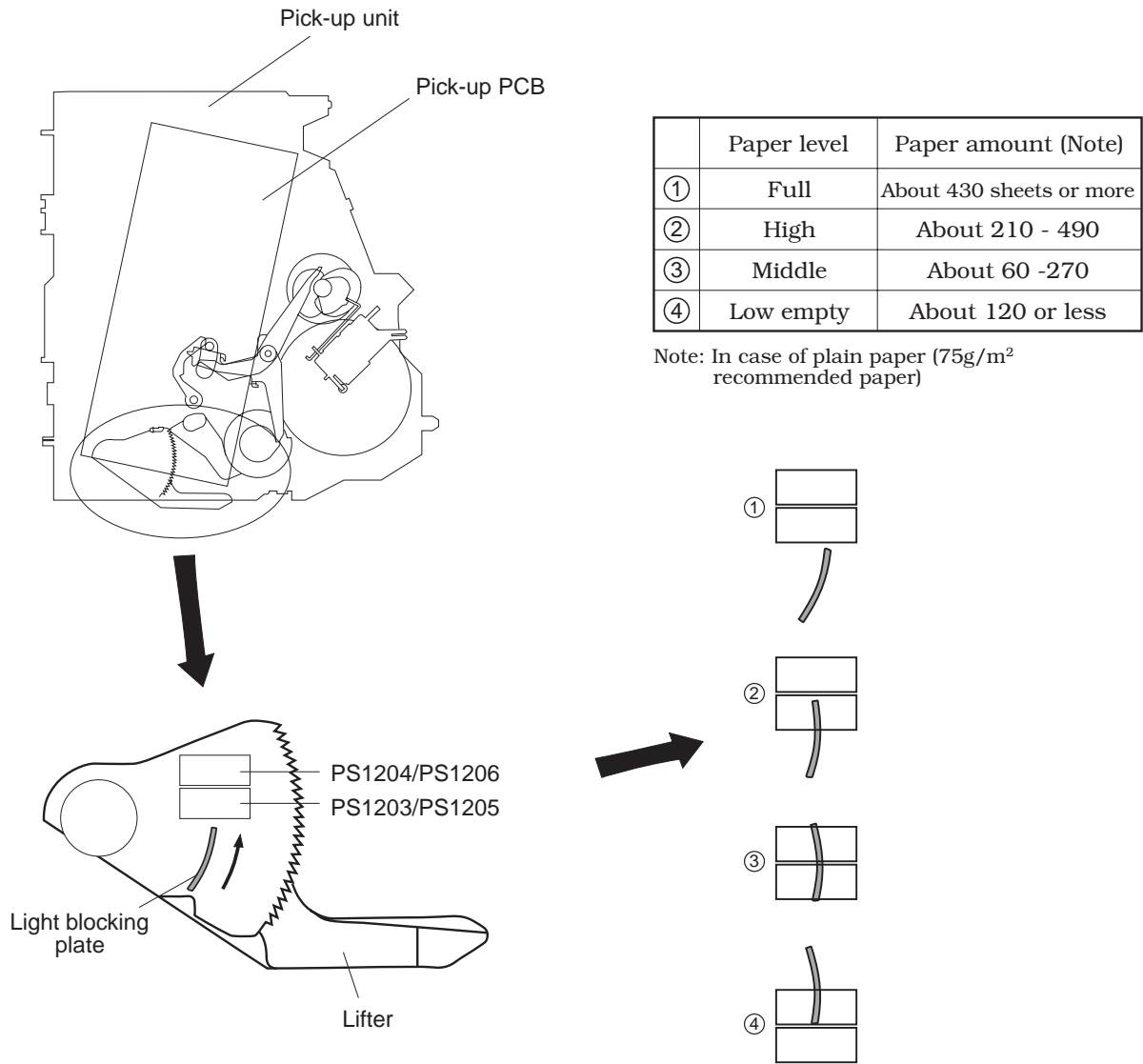


Figure 2-2-5

b. Lift-up operation

The lift-up operation is executed by the paper deck drive motor when a cassette is installed or the pick-up roller shaft is set lower than certain level due to the paper reduce.

The two cases for the lift-up operation are as follows.

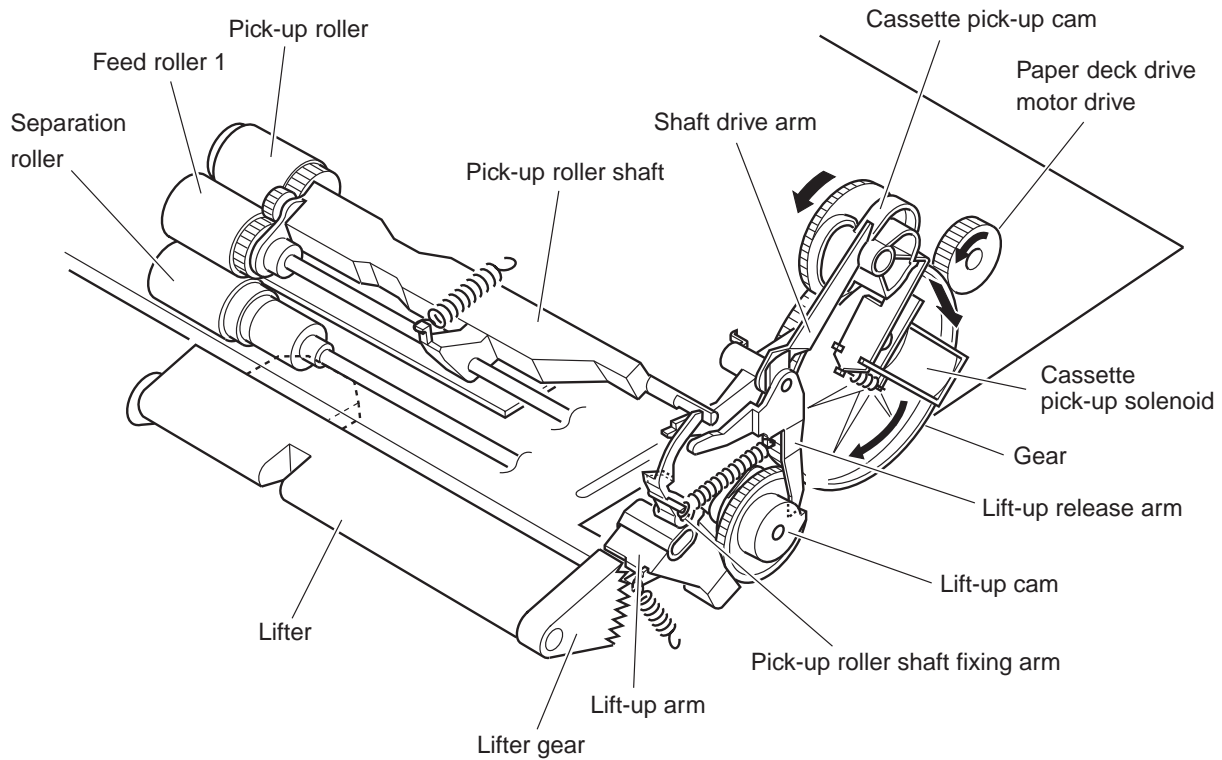


Figure 2-2-6

1) Cassette is installed

- ① When a cassette is installed, the paper deck drive motor rotates, and the cassette paper pick-up solenoid (SL3) is turned ON. Then, the shaft drive arm is driven by the cassette paper pick-up cam rotation through the gear.

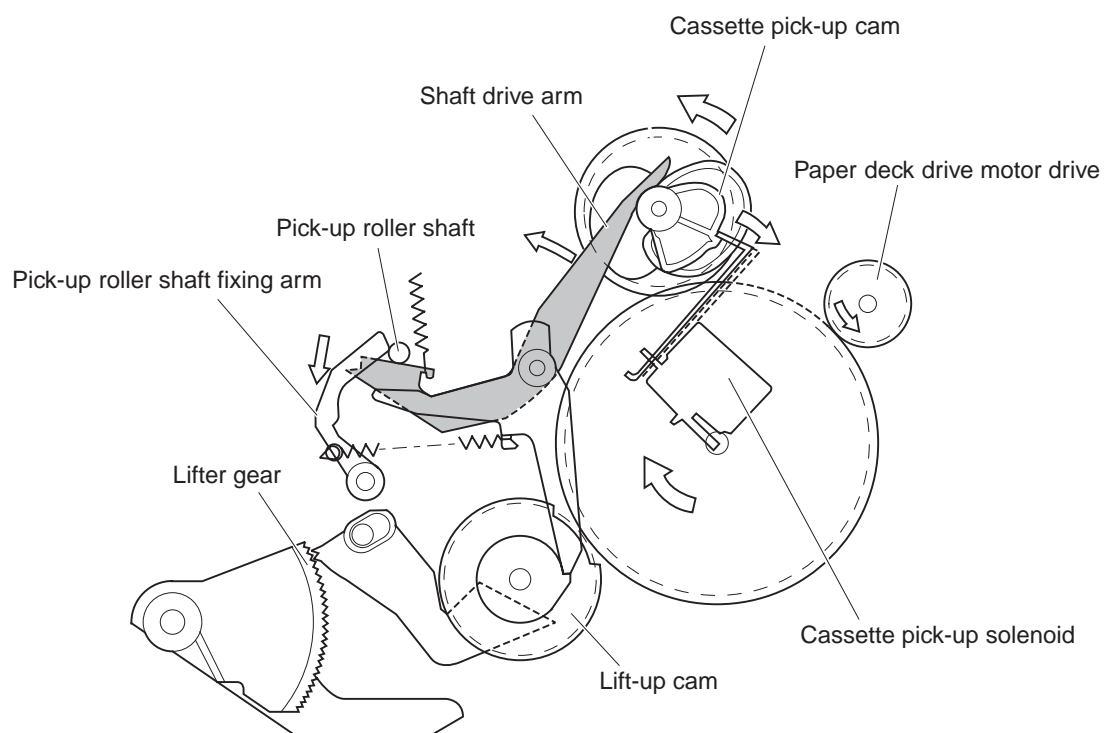


Figure 2-2-7

- ② As the shaft drive arm goes down, the pick-up roller shaft goes down. Then, the lift-up release arm is pushed, and the lift-up cam is unfixed. At the same time, the shaft drive arm is fixed to the pick-up roller shaft fixing arm, and the pick-up roller shaft is stopped in the designated position.

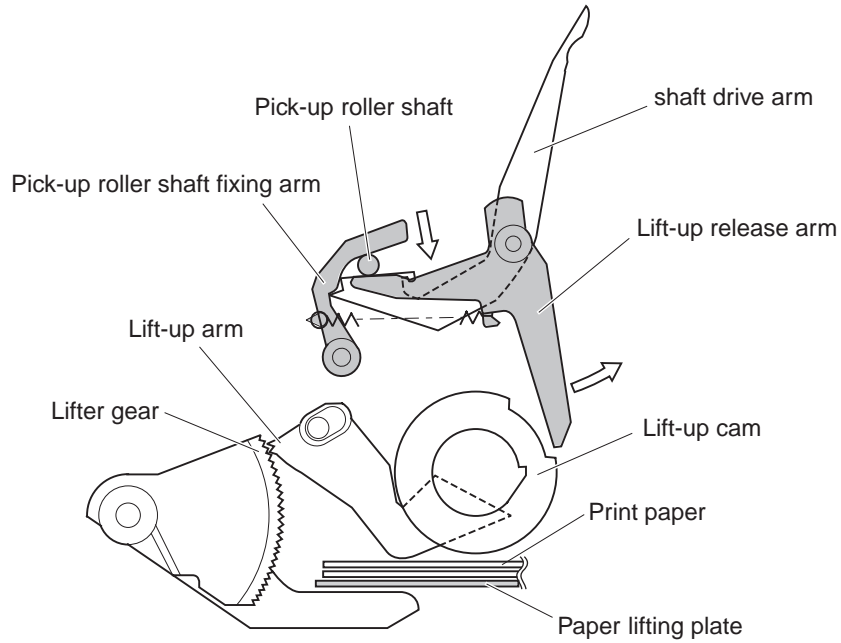


Figure 2-2-8

- ③ The lift up cam starts rotating when unfixed, and the lift up arm pushes up the lifter gear by one tooth. The paper lifting plate is lifted by repeating this operation.

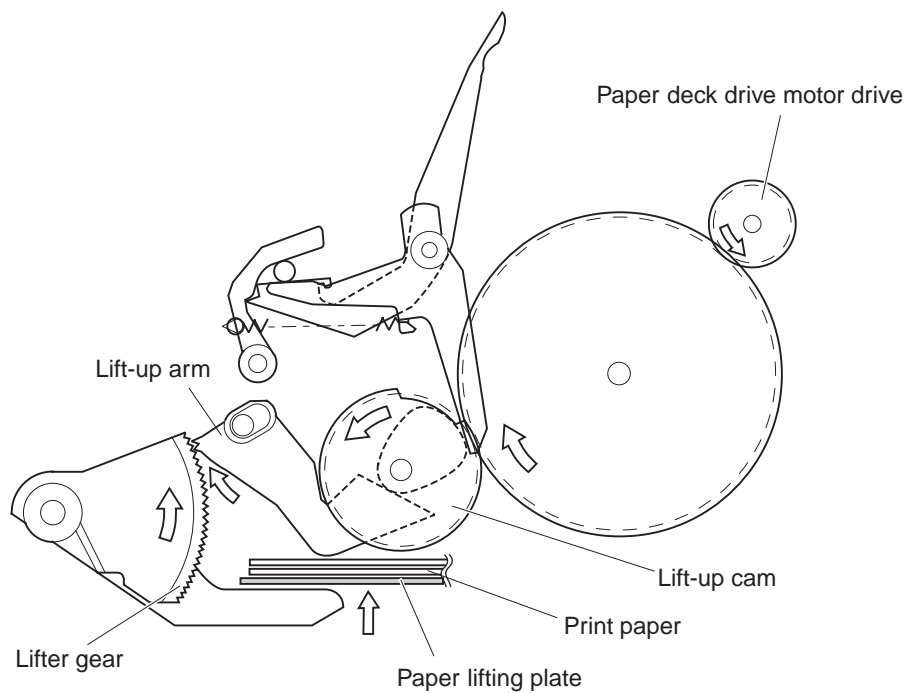
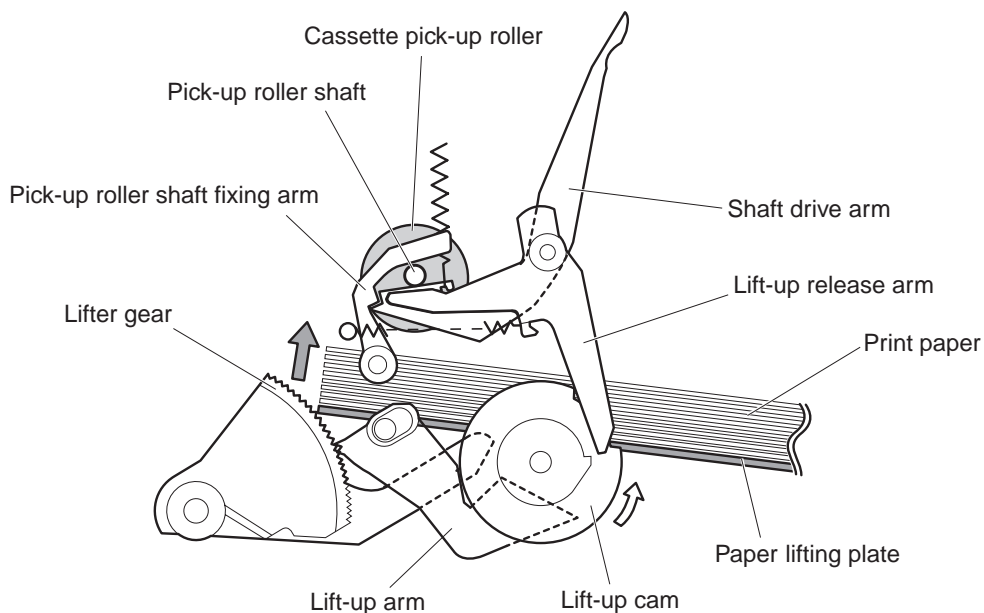


Figure 2-2-9

- ④ The pick-up roller shaft is lifted up when the paper on the paper lifting plate touches the pick-up roller. Then, the fixing arm is released, and the lift-up release arm lifts up the pick-up roller shaft to the waiting position by force of the spring. At the same time, the lift-up cam is fixed by driving the pick-up roller shaft fixing arm and the lift-up release arm. Then, the lift-up arm is stopped, and the lift-up operation is completed.

• Lift-up operation



• Completion of lift-up operation

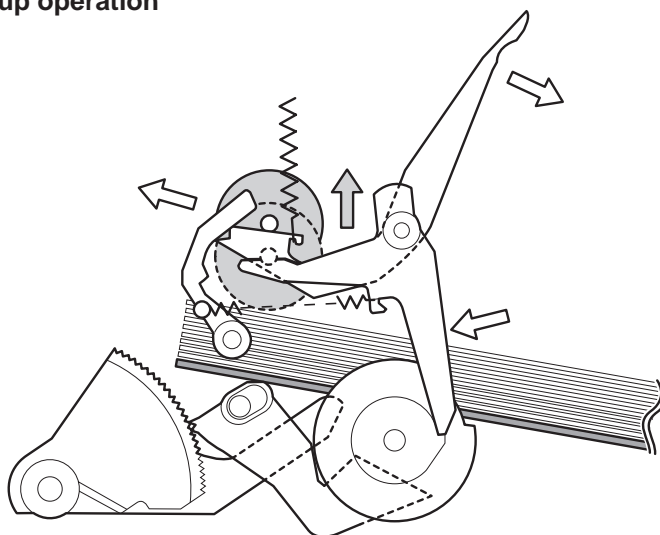
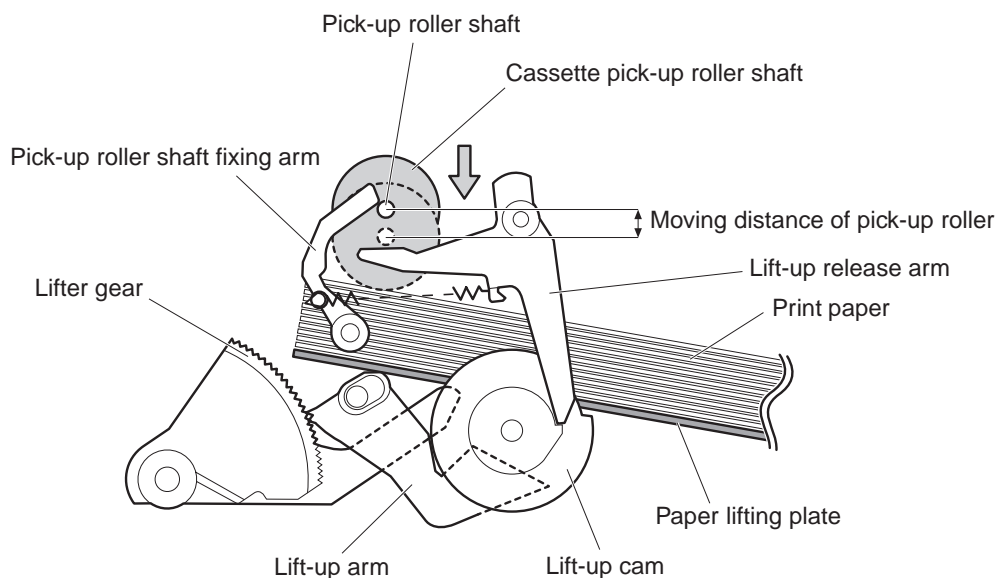


Figure 2-2-10

2) Paper level is lower than certain level

- ① As the paper level lowers, the moving distance of the pick-up roller increases. When the moving distance reaches the specified value, the pick-up roller shaft pushes the lift up release arm, and the lift up cam is unfixed.

• Certain paper level



• Less than certain paper level

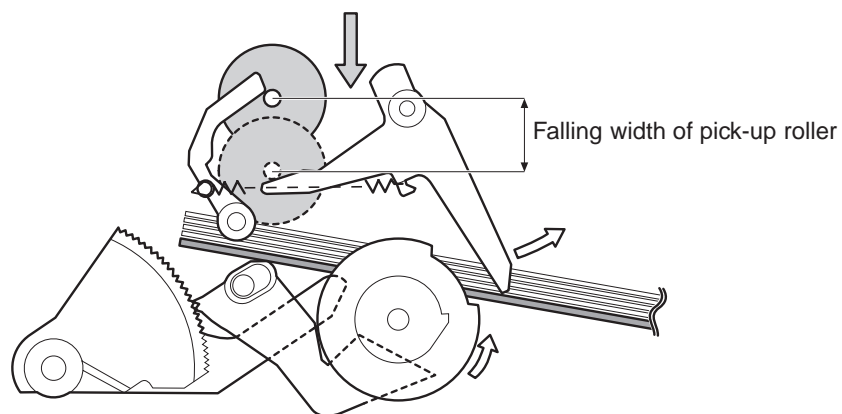


Figure 2-2-11

- ② When the lift-up cam is unfixed, the lift-up arm lifts up the lifter gear one tooth by the rotation of the lift-up cam. The paper lifting plate is lifted up by repeating the operation. (See Figure 2-2-9)
- ③ When the paper on the paper lifting plate touches the pick-up roller, the pick-up roller shaft is lifted up. Then, the fixing arm is released, and the lift-up release arm lifts up the pick-up roller shaft to the waiting position by force of the spring. At the same time, the pick-up roller shaft fixing arm and the lift up release arm are driven to fix the lift up cam. As a result, the lift up arm is stopped and lift up operation is competed.

c. Multi-feed prevention mechanism

The paper deck utilizes the separation roller to prevent feeding multiple sheets of paper. Normally the separation roller is imparted with the rotational force in the same direction as that of the feed roller. However, since the separation roller has a torque limiter, it is rotated in the opposite direction by the rotational force transmitted from the feed roller 1 via the picked up paper. However, when multiple sheets of paper are fed, the low friction between the papers results in weak rotational force being transmitted to the separation roller from the feed roller. As a result, the separation roller rotates with its own rotational force and removes excessive sheets of paper.

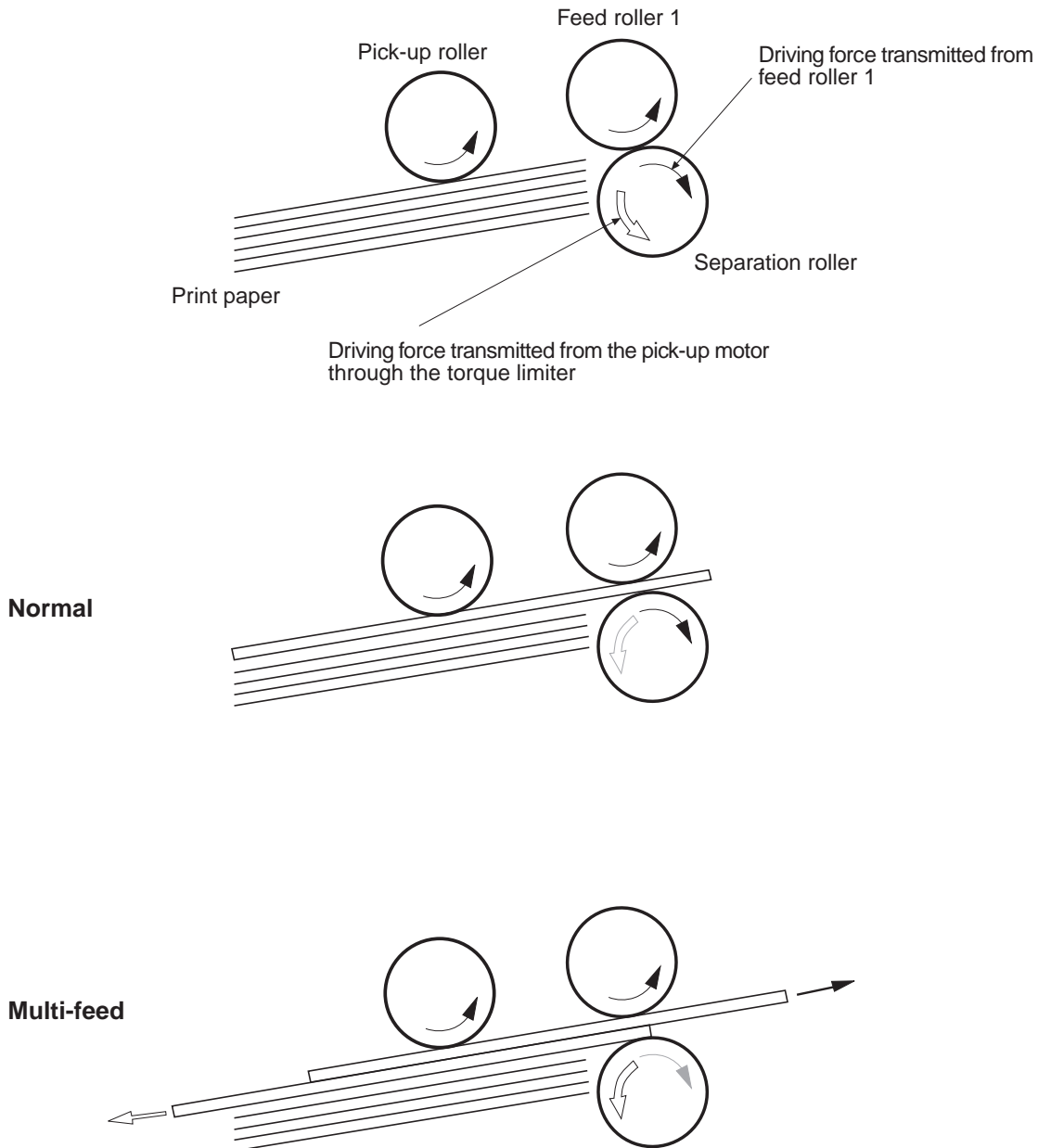


Figure 2-2-12

C. Paper Jam Detection

The following paper sensors are installed to detect the presence of paper and ensure that the paper is fed correctly.

- Registration paper sensor (PS1)
- Paper jam sensor (PS2)

The CPU on the paper deck driver PCB determines whether or not a paper jam has occurred by monitoring the paper at each sensor according to the pre-set 'check timing' in the memory. When the CPU assesses that a jam has occurred, the feed operation to the printer is stopped, and notification of the jam is sent to the option controller.

1. Registration paper sensor delay jam

The CPU assesses a registration paper sensor delay jam, if the paper does not reach the registration paper sensor (PS1) within the specified period of time after paper pick-up operation is started.

When paper is picked up from the upper cassette: about 1.06 seconds

When paper is picked up from the lower cassette: about 1.39 seconds

2. Paper jam sensor delay jam

The CPU assesses a paper jam sensor delay jam if the leading edge of the paper does not reach the paper jam sensor (PS2) within the specified period of time (about 0.80 seconds) after the registration clutch (CL1) is driven.

3. Paper jam sensor stationary jam

The CPU assesses a paper jam sensor stationary jam, if the trailing edge of the paper does not pass the paper jam sensor (PS2) within the specified period of time (about 0.50 seconds) after the leading edge of the paper is detected by the sensor.

4. Residual paper jam

The CPU assesses a residual paper jam if the registration paper sensor (PS1) or the paper jam sensor (PS2) detects the presence of paper at the beginning of the initial rotation period.

5. Retry control

Retry function redresses the pick-up delay jam caused by paper pick-up error by conducting paper pick-up operation twice. If the registration paper sensor (PS1) does not detect the leading edge of the paper within the specified period of time after the first pick-up operation is started, it conducts the same pick-up operation as the first operation one more time.

III. POWER SUPPLIES

A. Outline

The power supply unit of this paper deck employs the remote switch method.

When the printer is turned ON, it outputs a command to the option controller via the video controller. Based on this command, the option controller outputs the POWER-ON signal (PWRON-IN) to the power supply unit via the paper deck driver. The power supply unit supplies +24V and +5V to the paper deck driver when the PWRON-IN signal is "H."

+24V is used to drive the paper deck drive motor, feed motor, pick-up motor, registration clutch, and pick-up solenoid. +5V is used for the sensors and ICs on the paper deck driver PCB.

The power supply unit contains a power supply switch (SW1) which allows the paper deck to be turned ON without turning ON the printer.

A block diagram of the power supply unit is shown below.

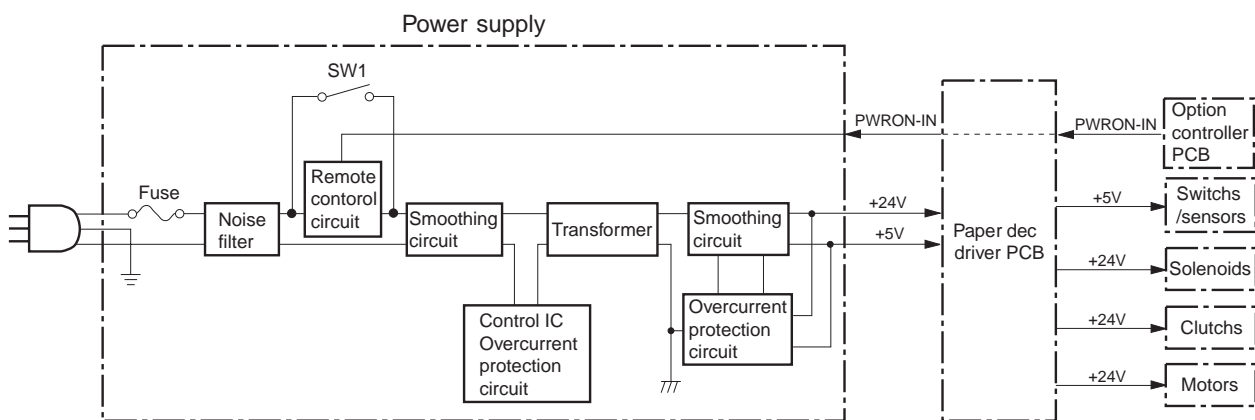


Figure 2-3-1

B. Protective Function

The +24V and the +5V power supply circuits each have the overcurrent and overvoltage protective functions that automatically interrupt the output voltage to prevent failure of the power supply circuits if troubles, such as a short-circuit in the load, cause overcurrent or abnormal voltage to be generated.

If the overcurrent or overvoltage protective function is activated and the DC voltage is not output from the power supply circuit, turn the printer OFF, rectify the trouble on the load, and then turn the printer back ON.

CHAPTER 3

THE MECHANICAL SYSTEM

| | | | |
|------------------------------|------------|----------------------------------|-------------|
| I. PREFACE | 3-1 | V. SENSORS | 3-10 |
| II. EXTERNALS | 3-2 | VI. SOLENOID/CLUTCH | 3-13 |
| III. MAIN UNITS | 3-5 | VII. MOTORS | 3-16 |
| IV. MAIN PARTS | 3-8 | VIII. PCBs | 3-19 |

I. PREFACE

A. Outline

This chapter describes disassembly and reassembly procedures of the paper deck.

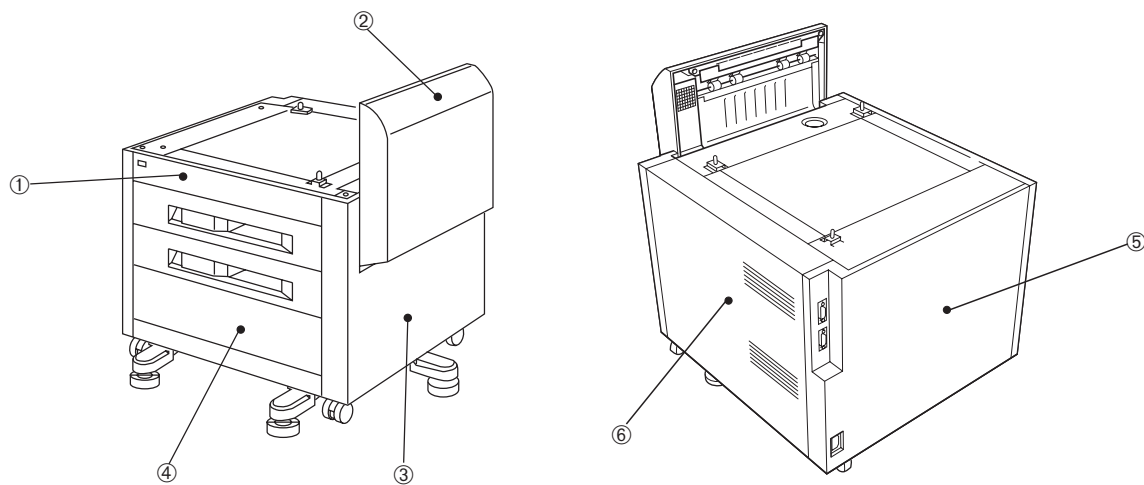
The service technician is to find the cause of the failure according to the "Chapter 4 Troubleshooting" and to follow the disassembly procedures in this chapter to replace the defective part(s). Replacement of consumable part(s) is also to be conducted according to the procedures described in this chapter.

Note the following precautions during disassembly or reassembly.

1. At disassembly, reassembly, or transportation of the paper deck, remove the cassettes.
2. **CAUTION:** Before servicing the paper deck, disconnect its power cord from the electrical outlet.
3. Assembly is the reverse of disassembly unless otherwise specified.
4. Note the lengths, diameters, and locations of screws as you remove them. When reassembling the paper deck, be sure to use them in their original locations.
5. As a general rule, do not operate the paper deck with any parts removed.
6. Discharge electrical static from your body by touching the metal frame of the paper deck prior to handling the PCBs in order to avoid causing damage by the difference in static charge at that time.

II. EXTERNALS

A. Locations



- ① Front sub cover
- ② Feed cover
- ③ Right cover
- ④ Housing unit
- ⑤ Left cover
- ⑥ Rear cover

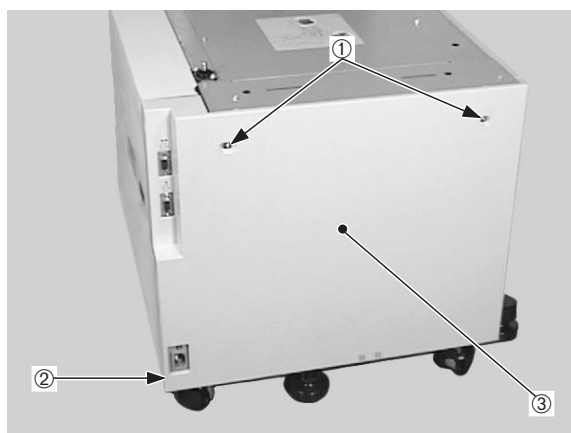
Figure 3-2-1

Follow the procedures below to remove the cover(s) when cleaning, inspecting, or repairing inside the paper deck.

The procedures for the covers, which can be removed simply by removing screws without taking out other parts, are omitted.

1. Left cover

- 1) Remove the 2 screws.
- 2) Remove the claw and the left cover.

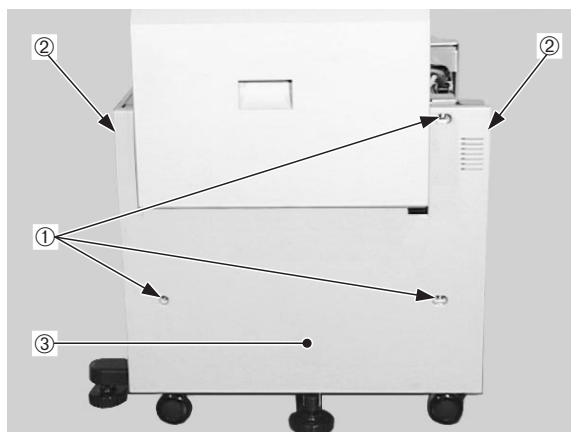


- ① Screws ② Claw
③ Left cover

Figure 3-2-2

2. Right cover

- 1) Remove the rear cover.
- 2) Remove the 3 screws.
- 3) Remove the 2 claws and the right cover.

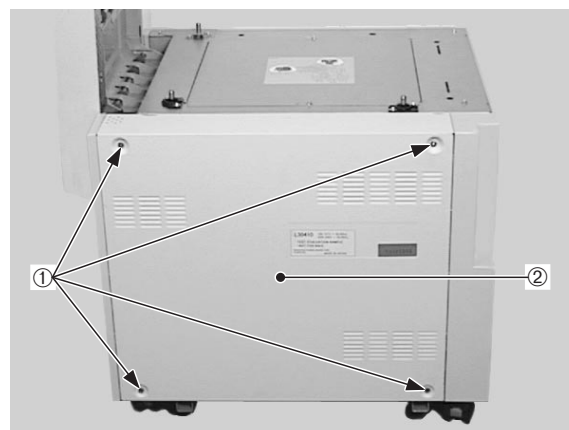


- ① Screws ② Claws
③ Right cover

Figure 3-2-3

3. Rear cover

- 1) Remove the 4 screws and the rear cover.

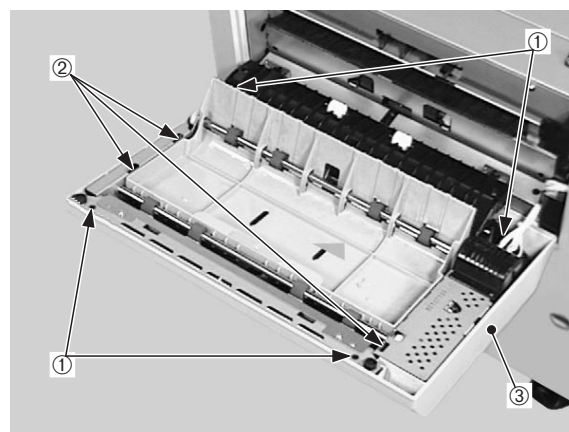


- ① Screws ② Rear cover

Figure 3-2-4

4. Feed cover

- 1) Remove the 4 screws, the 3 hooks, and then the feed cover.

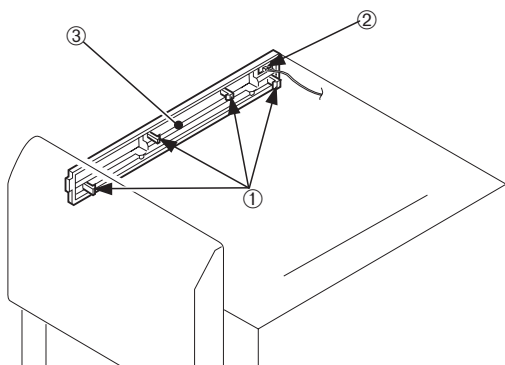


- ① Screws ② Hooks
③ Feed cover

Figure 3-2-5

5. Front sub cover

- 1) Remove the rear cover, left cover and right cover.
- 2) Unhook the 4 hooks and slide the front sub cover with the status LED PCB toward you.

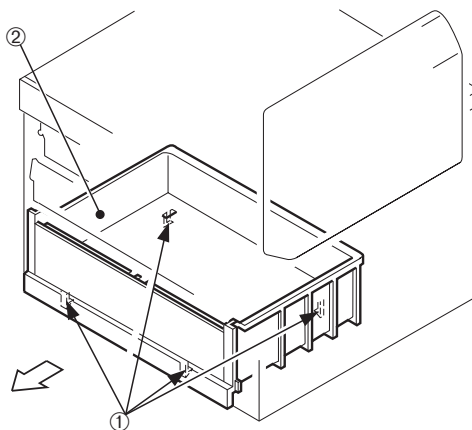


- ① Hooks
- ② Status LED PCB
- ③ Front sub cover

Figure 3-2-6

6. Housing unit

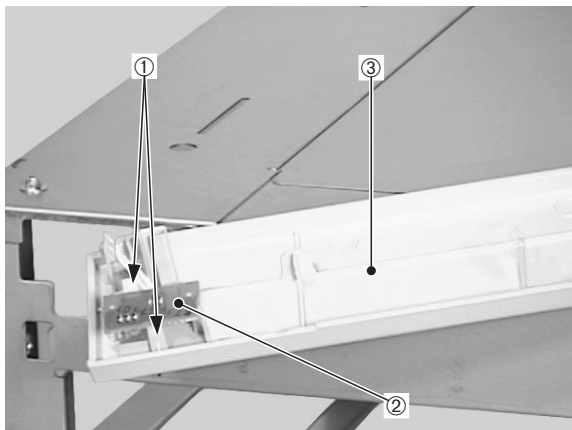
- 1) Remove the rear cover, left cover and right cover.
- 2) Remove the 4 hooks, then slide the housing unit in the direction of the arrow to remove it.



- ① Hooks
- ② Housing unit

Figure 3-2-8

- 3) Remove the 2 claws and the front sub cover.



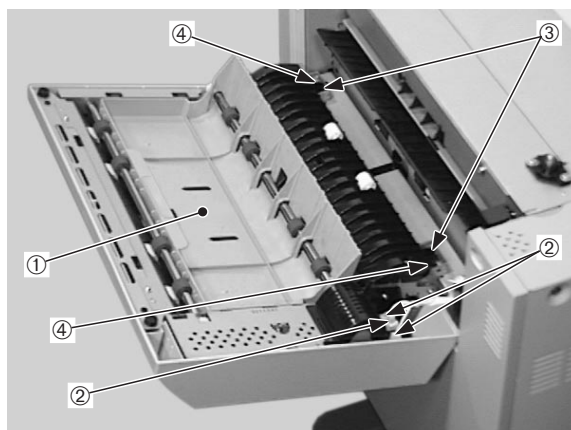
- ① Claws
- ② Front sub cover

Figure 3-2-7

III. MAIN UNITS

A. Feed unit

- 1) Open the feed unit.
- 2) Disconnect the 3 connectors
- 3) Slide the 2 feed spacers in the direction of the arrow.
- 4) Remove the 2 screws and the feed unit.

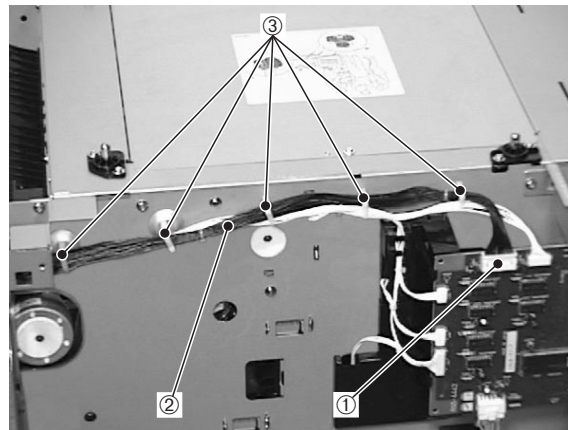


- ① Feed unit
- ② Connectors
- ③ Screws
- ④ Feed spacers

Figure 3-3-1

B. Pick-up unit

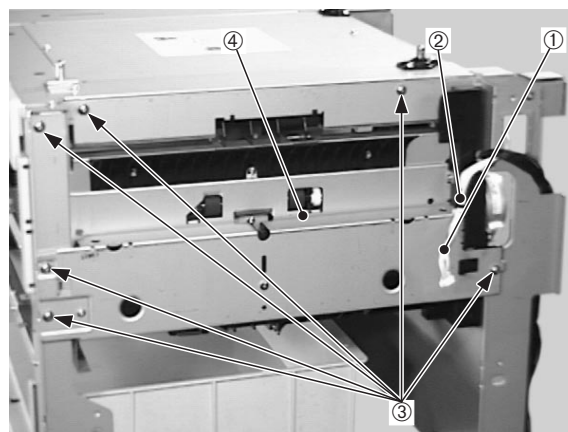
- 1) Remove the rear cover and the right cover.
- 2) Remove the feed unit according to the feed unit removal procedures on page 3-5.
- 3) Disconnect the connector and then remove the cable from the cable guide.



- ① Connector
- ② Cable
- ③ Cable guide

Figure 3-3-2

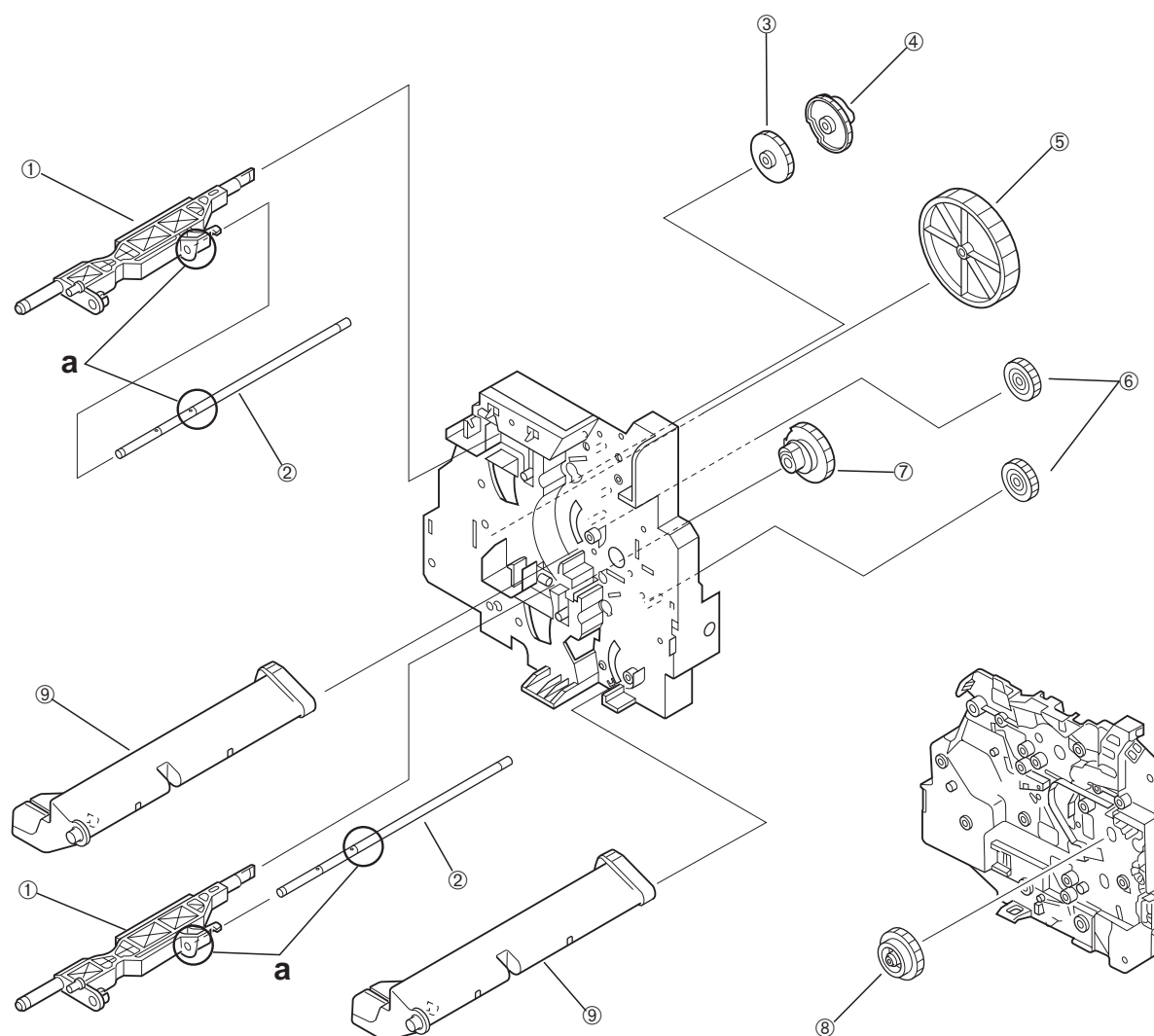
- 4) Remove the cable from the cable guide, remove the 6 screws, and then pull out the pick-up unit toward you.



- ① Cable
- ② Cable guide
- ③ Screws
- ④ Pick-up unit

Figure 3-3-3

-
- Notes:**
1. While replacing parts in the pick-up unit, to prevent grease from getting on the pick-up, feed and separation rollers, be sure to remove them before working on the unit. Take care not to get grease on the paper feed guide.
 2. Be sure to grease the parts shown in figure 3-3-4 when exchanging, to prevent noise.
The type of grease (do not use grease other than the specified type) and the method of application is explained below:
Apply about one drop (1mm diameter) of CK-8009 to the contact surface (a) of the roller holder (1) and shaft (2).
Apply a few drops (total:5mm diameter) of CK-8009 to 3 or more continuous cogs of the parts 3 to 8.
Apply CK-8009 to the whole cog surface of the lifter (9) thinly.
-



① Roller holder

③ Upper lift-up cam

⑤ 100T gear

⑦ Lower lift-up cam

⑨ Lifter

② Shaft

④ Pick-up cam

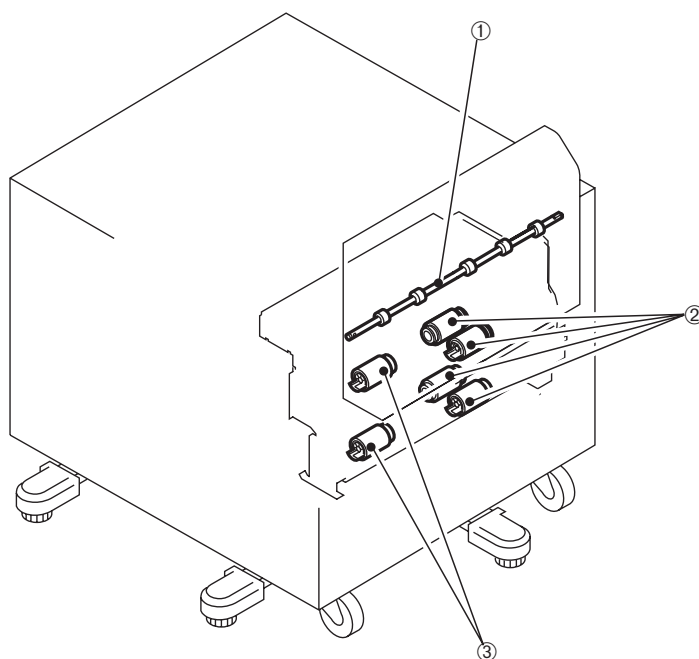
⑥ 20T/41T gear

⑧ 31T/47T gear

Figure 3-3-4

IV. MAIN PARTS

A. Locations

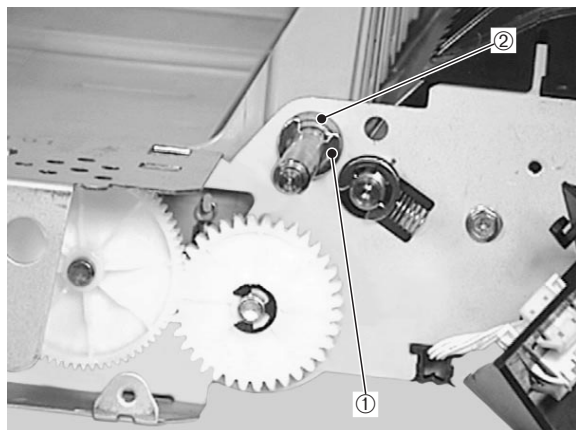


- ① Registration rollers
- ② Pick-up rollers
- ③ Feed rollers 1 / Separation rollers

Figure 3-4-1

B. Registration roller

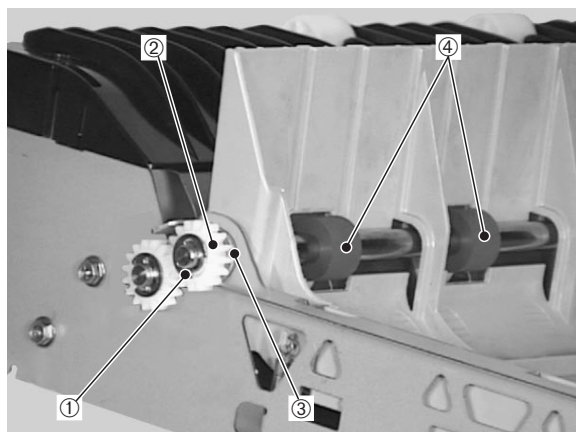
- 1) Remove the registration clutch according to the registration clutch removal procedures on page 3-14.
- 2) Remove the E-ring and the Bushing.



- ① E-ring
- ② Bushing

Figure 3-4-2

- 3) Remove the E-ring, gear, pin, bushing, and then the registration roller

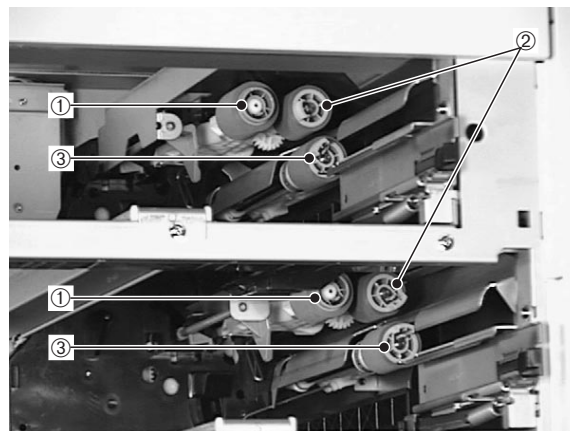


- ① E-ring
- ② Gear
- ③ Bushing
- ④ Registration roller

Figure 3-4-3

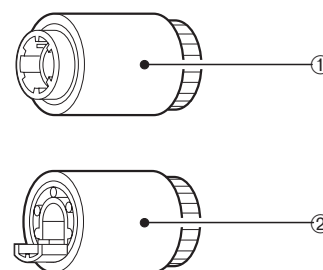
C. Pick-up roller / Feed roller 1 / Separation roller

- 1) Grasp the knobs of each roller and pull the rollers out of the printer.



- ① Pick-up roller
- ② Feed roller 1
- ③ Separation roller

Figure 3-4-4



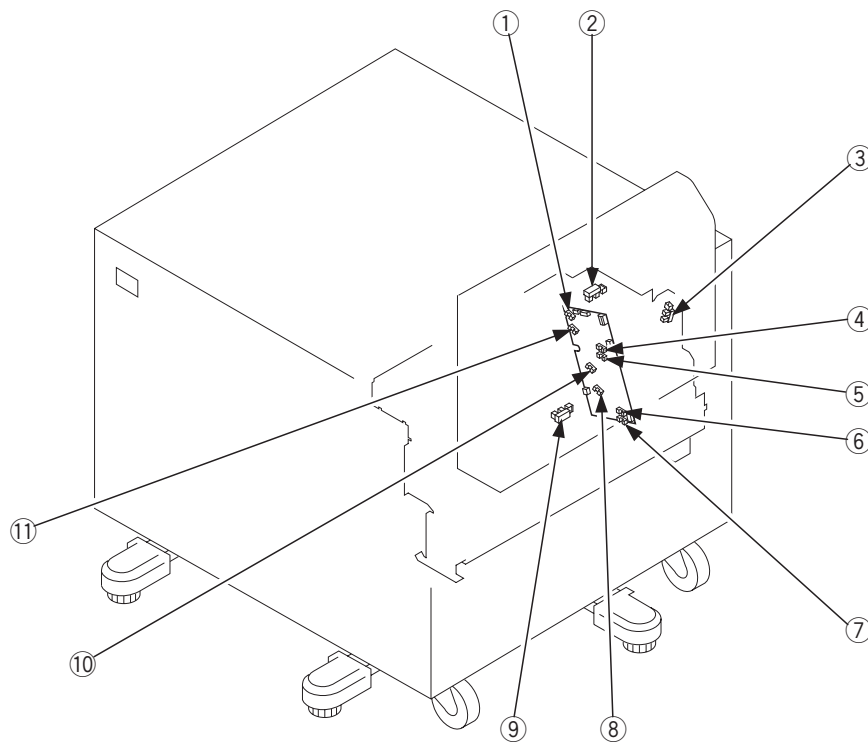
- ① Pick-up roller
- ② Feed roller / Separation roller

Figure 3-4-5

Note: Be sure to replace the feed roller 1 and the separation roller together.

V. SENSORS

A. Locations

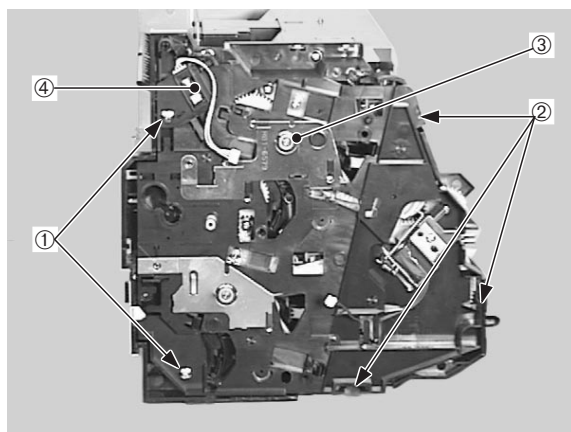


- 1: Registration paper sensor
- 2: Paper feed unit sensor
- 3: Upper cassette paper-level sensor 2
- 4: Upper cassette paper-level sensor 1
- 5: Lower cassette paper-level sensor 2
- 6: Lower cassette paper-level sensor 1
- 7: Lower cassette sensor
- 8: Paper jam sensor
- 9: Lower cassette paper-out sensor
- 10: Upper cassette paper-out sensor
- 11: Upper cassette sensor

Figure 3-5-1

B. Paper feed unit sensor

- 1) Remove the pick-up motor according to the pick-up motor removal procedures on page 3-18.
- 2) Remove the pick-up PCB according to step 2) in the pick-up PCB removal procedures on page 3-20.
- 3) Remove the 2 screws, 3 claws, and then the gear cover.



- ① Screws
- ② Claws
- ③ Gear cover
- ④ Paper feed unit sensor

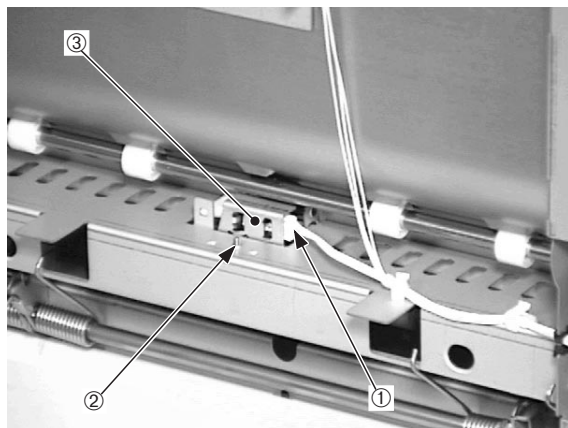
Figure 3-5-2**C. Upper cassette sensor / Lower cassette sensor / Upper cassette paper-level sensor 1, 2 / Lower cassette paper-level sensor 1, 2 / Upper cassette paper-out sensor / Lower cassette paper-out sensor**

- 1) Remove the pick-up PCB according to the pick-up PCB removal procedures on page 3-19.

- 4) Remove the connector, the 4 claws, and then the paper feed unit sensor.

D. Registration paper sensor

- 1) Remove the feed cover.
- 2) Remove the connector.
- 3) Remove the screw from the bottom, and take out the sensor holder and then the registration paper sensor.

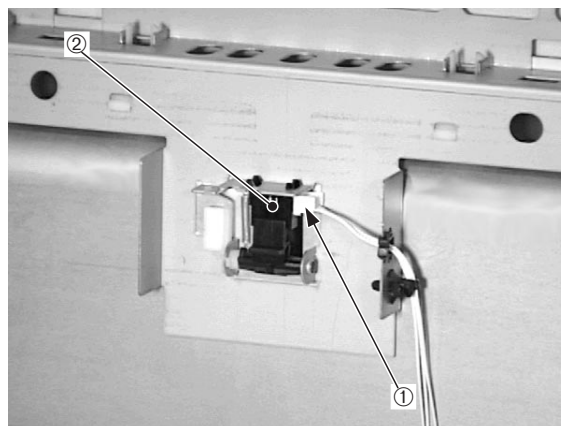


- ① Connector
- ② Screw
- ③ Sensor holder
- ④ Registration paper sensor

Figure 3-5-3

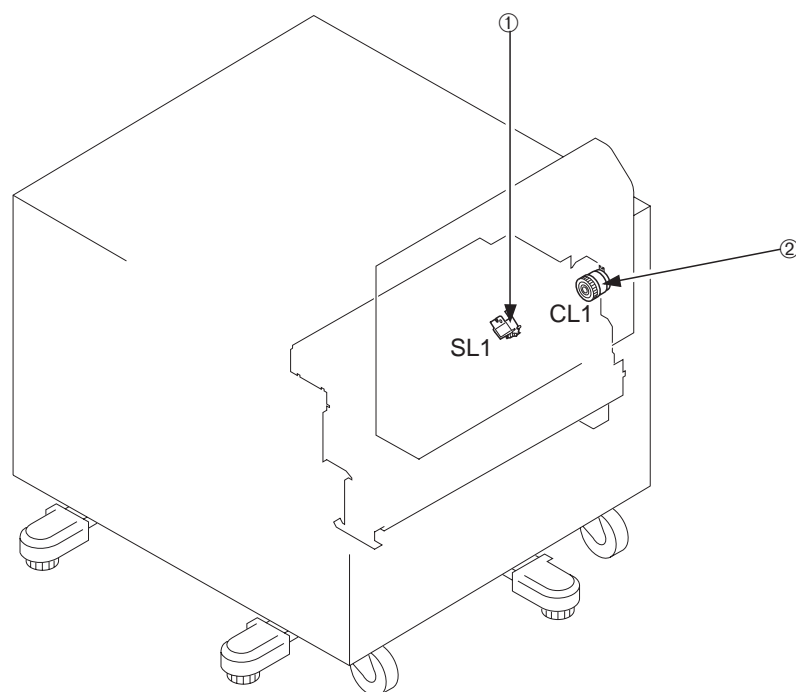
E. Paper jam sensor

- 1) Remove the feed cover.
- 2) Remove the connector.
- 3) Remove the paper jam sensor.



- ① Connector
- ② Paper jam sensor

Figure 3-5-4

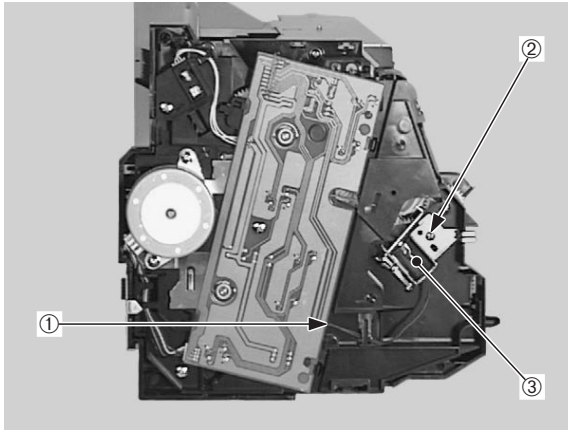
VI. SOLENOID / CLUTCH**A. Locations**

- ① Pick-up solenoid
- ② Registration clutch

Figure 3-6-1

B. Pick-up solenoid

- 1) Remove the pick-up unit according to the pick-up unit removal procedures on page 3-5.
- 2) Remove the screw, connector, and then the solenoid.

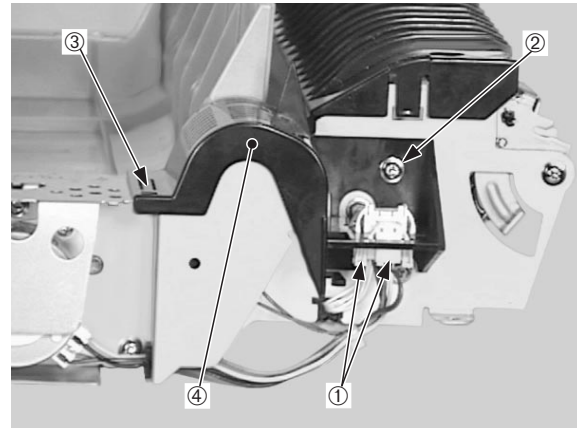


- ① Screws
- ② Connector
- ③ Pick-up solenoid

Figure 3-6-2

C. Registration clutch

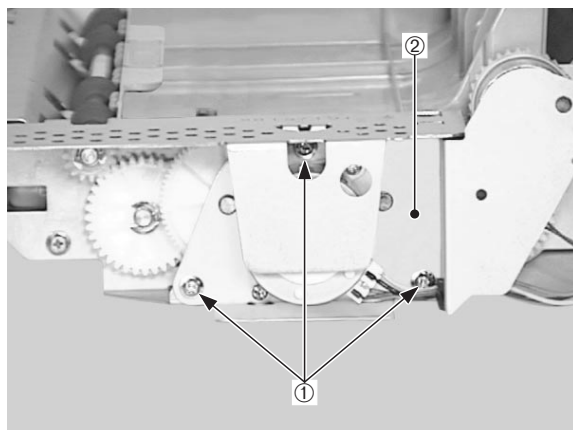
- 1) Remove the feed unit according to the feed unit removal procedures on page 3-5.
- 2) Remove the feed cover.
- 3) Remove the screw, claw, 2 connectors, and then the clutch cover.



- ① Connectors
- ② Screw
- ③ Claw
- ④ Clutch cover

Figure 3-6-3

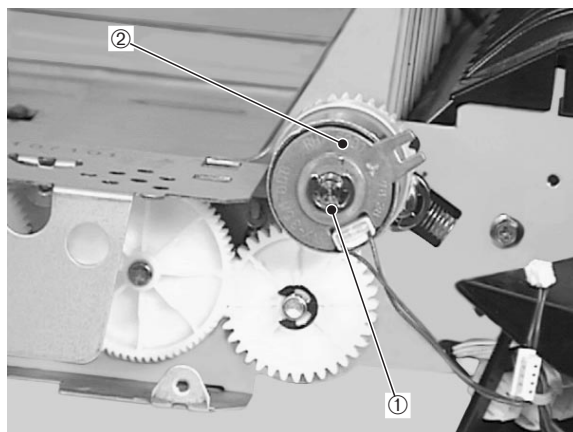
- 4) Remove the 3 screws and the feed motor mount plate.



- ① Screws
② Feed motor mount plate

Figure 3-6-4

- 5) Remove the E-ring and the registration clutch.

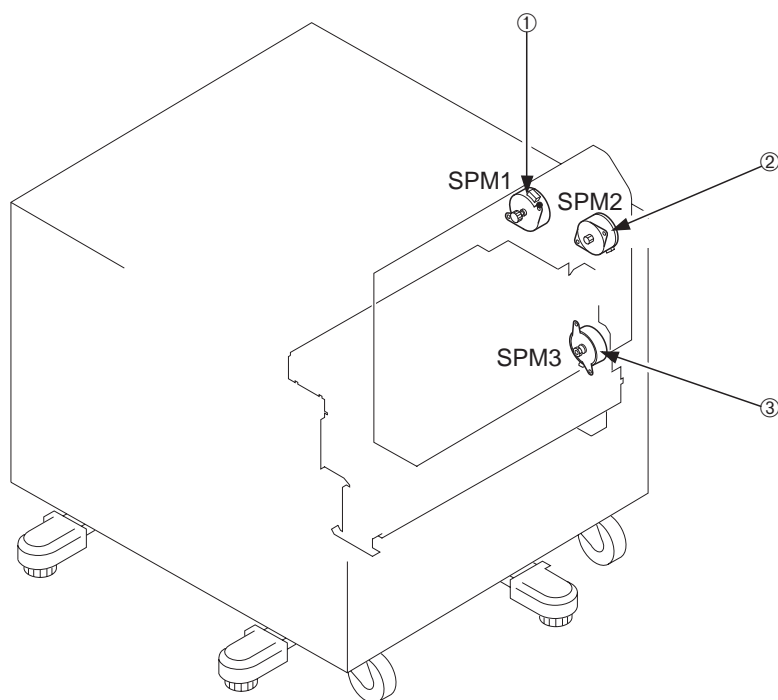


- ① E-ring
② Registration clutch

Figure 3-6-5

VII. MOTORS

A. Locations

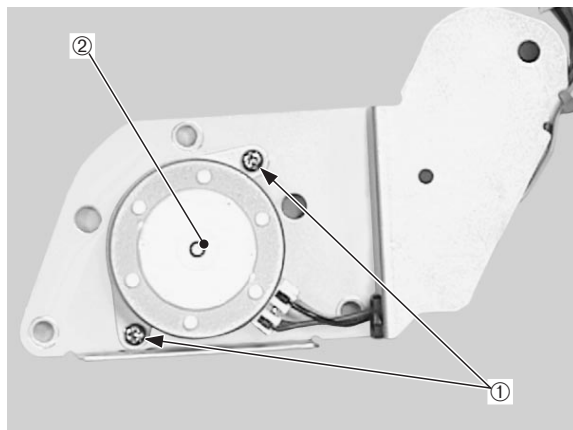


- ① Paper deck drive motor
- ② Paper feed motor
- ③ Pick-up motor

Figure 3-7-1

B. Paper feed motor

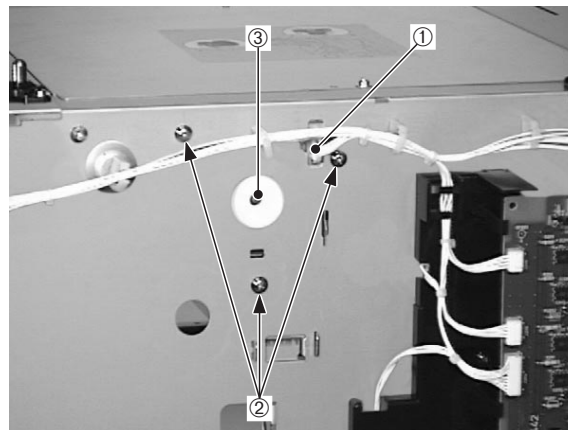
- 1) Remove the feed motor mount plate according to step 1) to 4) in the registration clutch removal procedures on page 3-14.
- 2) Remove the 2 screws and feed motor.



- ① Screws
② Feed motor

Figure 3-7-2**C. Paper deck drive motor**

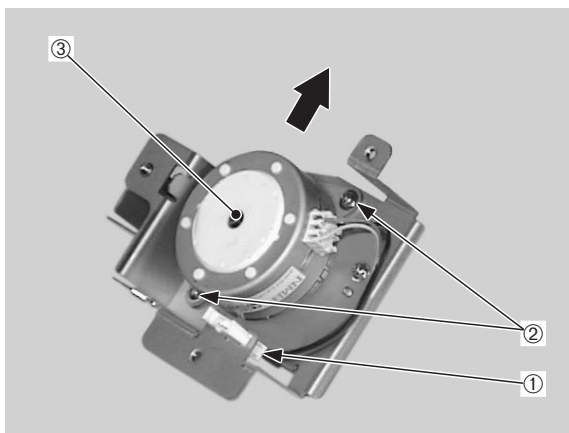
- 1) Remove the pick-up unit according to the pick-up unit removal procedures on page 3-5.
- 2) Remove the 3 screws, disconnect the connector, and then take out the paper deck drive motor unit by sliding it upward.



- ① Screws
② Connector
③ Paper deck drive motor unit

Figure 3-7-3

- 3) Remove the 2 screws and the connector, and then slide the paper deck drive motor in the direction of the arrow to it.

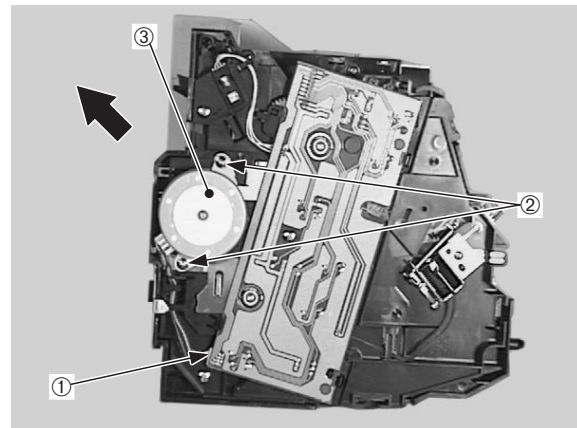


- ① Connector
- ② Screws
- ③ Paper deck drive motor

Figure 3-7-4

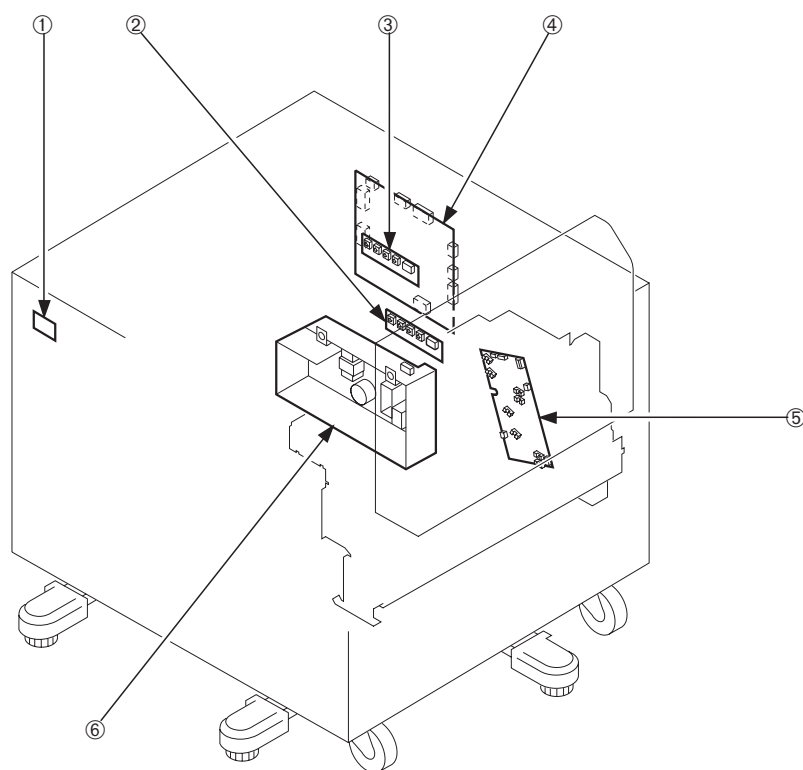
D. Pick-up motor

- 1) Remove the pick-up unit according to the pick-up unit removal procedures on page 3-5.
- 2) Remove the 2 screws and the connector, and then slide the pick-up motor in the direction of the arrow to remove it.



- ① Connector
- ② Screws
- ③ Pick-up motor

Figure 3-7-5

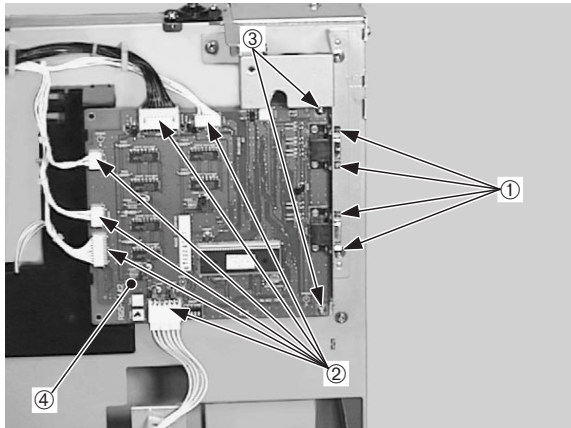
VIII. PCBs**A. Locations**

- ① Paper deck drive PCB
- ② Pick-up PCB
- ③ Power supply unit
- ④ Status LED PCB
- ⑤ Upper cassette paper-size detection switch PCB
- ⑥ Lower cassette paper-size detection switch PCB

Figure 3-8-1

B. Paper deck driver PCB

- 1) Remove the rear cover and left cover.
- 2) Remove the 4 nuts.
- 3) Remove the 6 connectors, and 2 screws, and then the paper deck driver PCB.

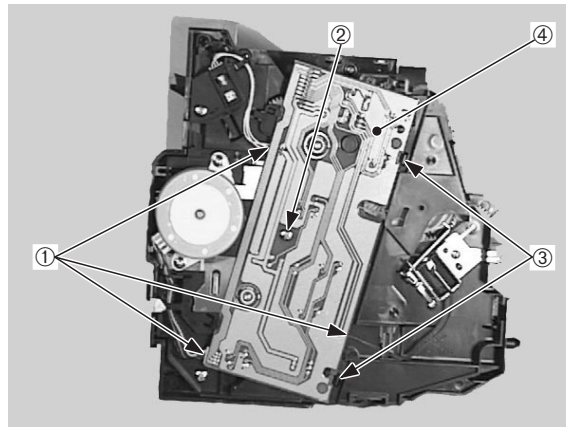


- ① Nuts
- ② Connectors
- ③ Screws
- ④ Paper deck driver PCB

Figure 3-8-2

C. Pick-up PCB

- 1) Remove the pick-up unit according to the pick-up unit removal procedures on page 3-5.
- 2) Remove the screw, 2 claws, and 3 connectors, and then the pick-up PCB.

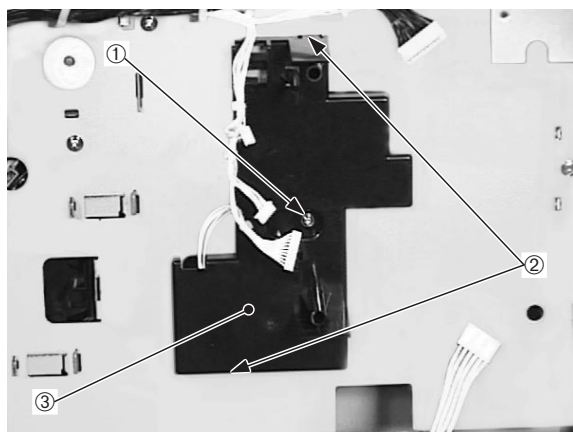


- ① Screw
- ② Claws
- ③ Connectors
- ④ Pick-up PCB

Figure 3-8-3

D. Upper cassette paper-size detection switch PCB

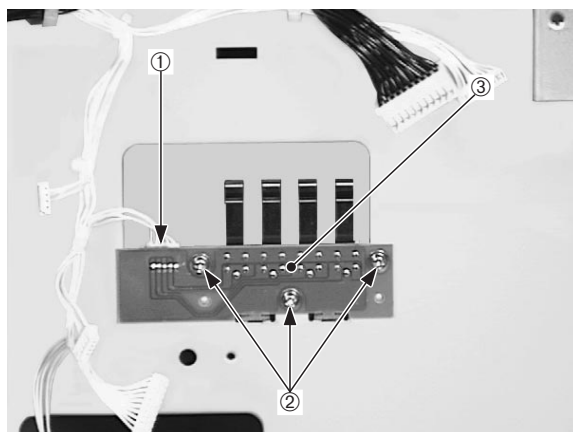
- 1) Remove the paper deck driver PCB according to the paper deck driver PCB removal procedures on page 3-20.
- 2) Remove the screw, 2 claws, and then the mount plate.



- ① Screw
- ② Claws
- ③ Mount plate

Figure 3-8-4

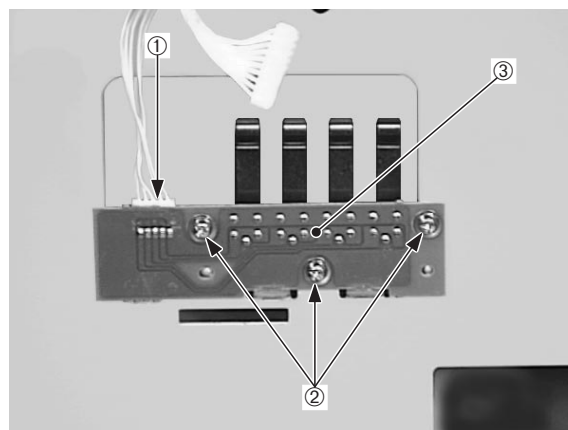
- 3) Remove the 3 screws, connector, and then the upper cassette paper-size detection switch PCB.



- ① Screws
- ② Connector
- ③ Upper cassette paper-size detection switch PCB

Figure 3-8-5**E. Lower cassette paper-size detection switch PCB**

- 1) Remove the paper deck driver PCB and the mount plate according to step 1) to 2) in the upper cassette paper-size detection switch PCB removal procedures on page 3-21.
- 2) Remove the 3 screws, connector, and then the lower cassette paper-size detection switch PCB.

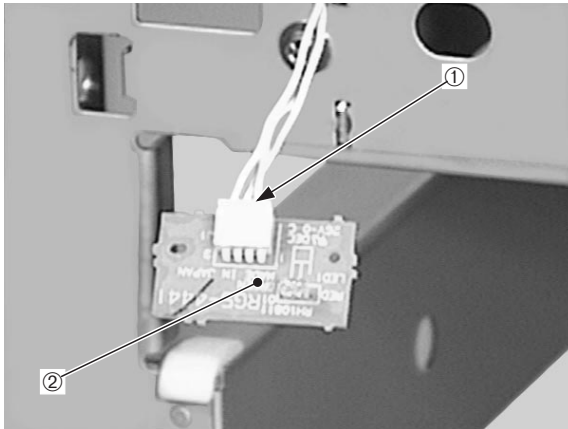


- ① Screws
- ② Connector
- ③ Lower cassette paper-size detection switch PCB

Figure 3-8-6

F. Status LED PCB

- 1) Remove the front sub cover.
- 2) Remove the connector and status LED PCB.

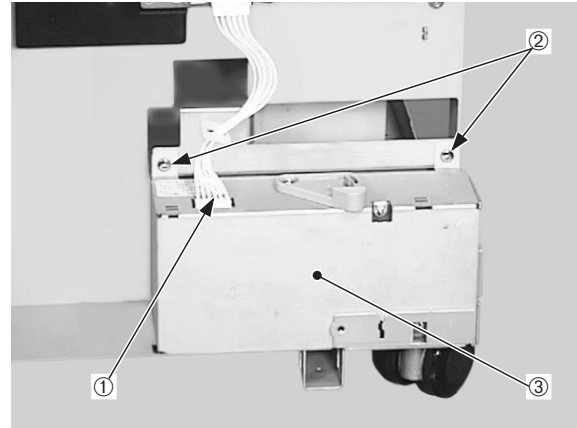


- ① Connector
② Status LED PCB

Figure 3-8-7

G. Power supply unit

- 1) Remove the rear cover and the left cover.
- 2) Remove the 2 screws, connector, and then the power supply unit.



- ① Screws
② Connector
③ Power supply unit

Figure 3-8-8

CHAPTER 4

TROUBLESHOOTING

| | | | |
|----------------------------------|-------------|---------------------------------------|-------------|
| I. PREFACE | 4-1 | VI. MEASUREMENT AND | |
| II. PAPER JAMS | 4-9 | ADJUSTMENT | 4-16 |
| III. PAPER FEEDING | | VII. MAINTENANCE AND | |
| TROUBLESHOOTING | 4-12 | SERVICING | 4-18 |
| IV. MALFUNCTION | | VIII. LOCATION OF CONNECTORS . | 4-22 |
| TROUBLESHOOTING | 4-13 | | |
| V. MALFUNCTION STATUS | | | |
| TROUBLESHOOTING | 4-15 | | |

I. PREFACE

A. Malfunction Diagnosis Flowchart

The malfunctions that occur in the paper deck are classified into four types; "paper jams", "paper transport malfunction", "operation malfunction", and "malfunction status".

If a malfunction occurred in the paper deck, the service technician is to find which type the malfunction falls into using the malfunction diagnosis flowchart and to clear the problem according to the troubleshooting procedures for each malfunction type.

Make sure the following points at the execution of troubleshooting.

- Be sure that the connector has no poor contact when measuring the voltage at the specified terminal of the connector.
- Before handling PCBs, be sure to touch a metal part of the printer to discharge static electricity, as it can cause damage to the PCBs.

Since the Video controller has different specification according to each maker, the cause of a malfunction cannot be distinguished between the paper deck failure and the video controller failure. Therefore, the printer is subject to have normal video controller in this chapter.

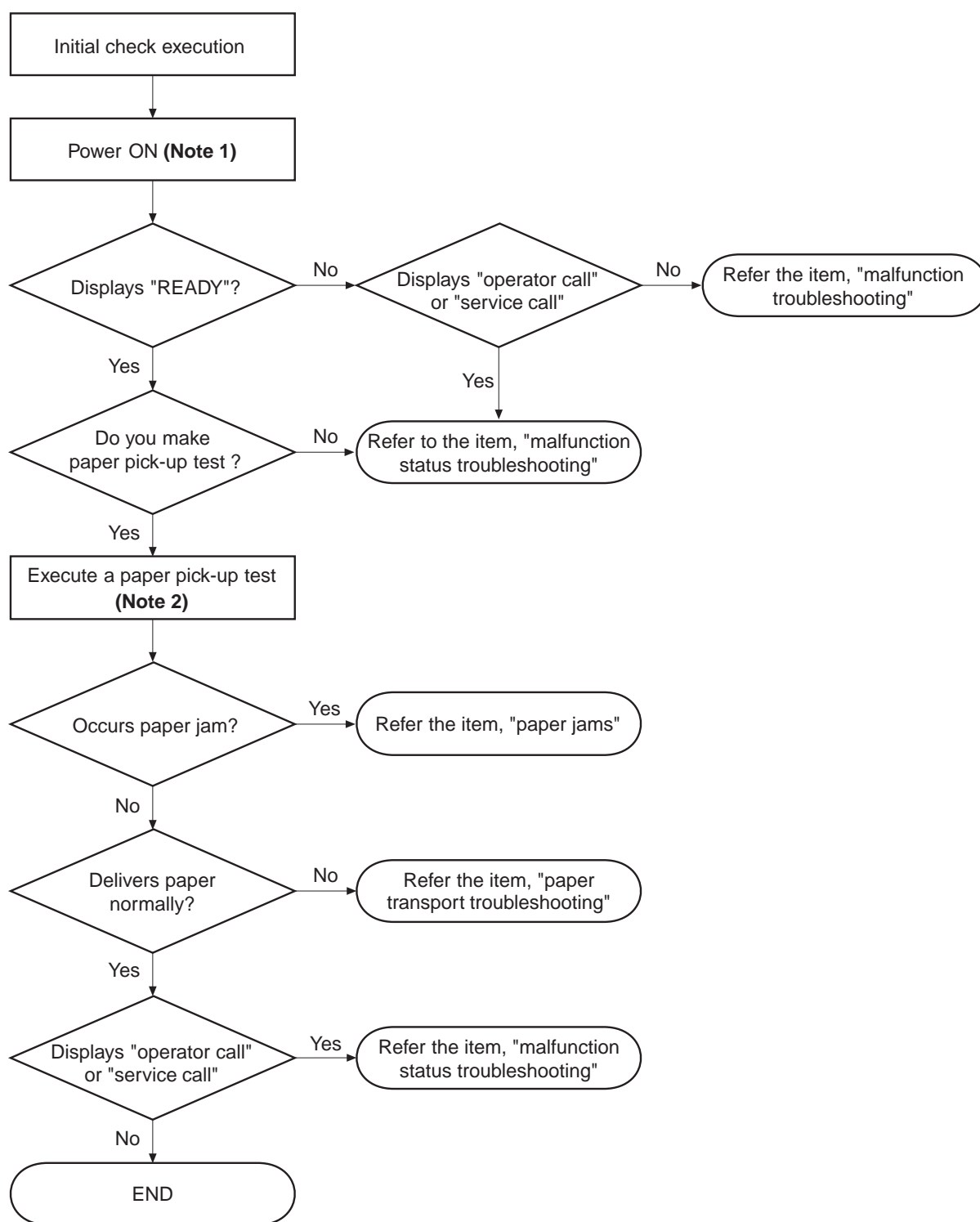


Figure 4-1-1

- Notes:**
1. Turn ON the printer or the stand alone mode switch. (To turn ON the stand alone mode switch, disconnect the power code of the paper deck and remove the rear cover. Connect the power code again after turning ON the switch.)
 2. Select the paper deck pick-up from the external device, or perform the paper pick-up test described on page 4-7.

B. Initial Checks**1. Installation environment**

The same as that of the printer.

2. Paper checks

- a. The paper recommended for the paper deck is used.
- b. The paper is not damp.

3. Condensation

During winter, particularly when moving the paper deck into a warm room from a cold location such as warehouse, condensation can appear in the paper deck. The condensation can cause various problems.

If condensation appeared, wipe each unit with dry-cloth or leave the paper deck with power ON for 10 to 20 minutes.

C. Service Checkpoints

1. Pick-up roller, separation roller, and feed roller

Clean the rollers with a lint-free paper or a cloth moistened with ethyl or isopropyl alcohol.

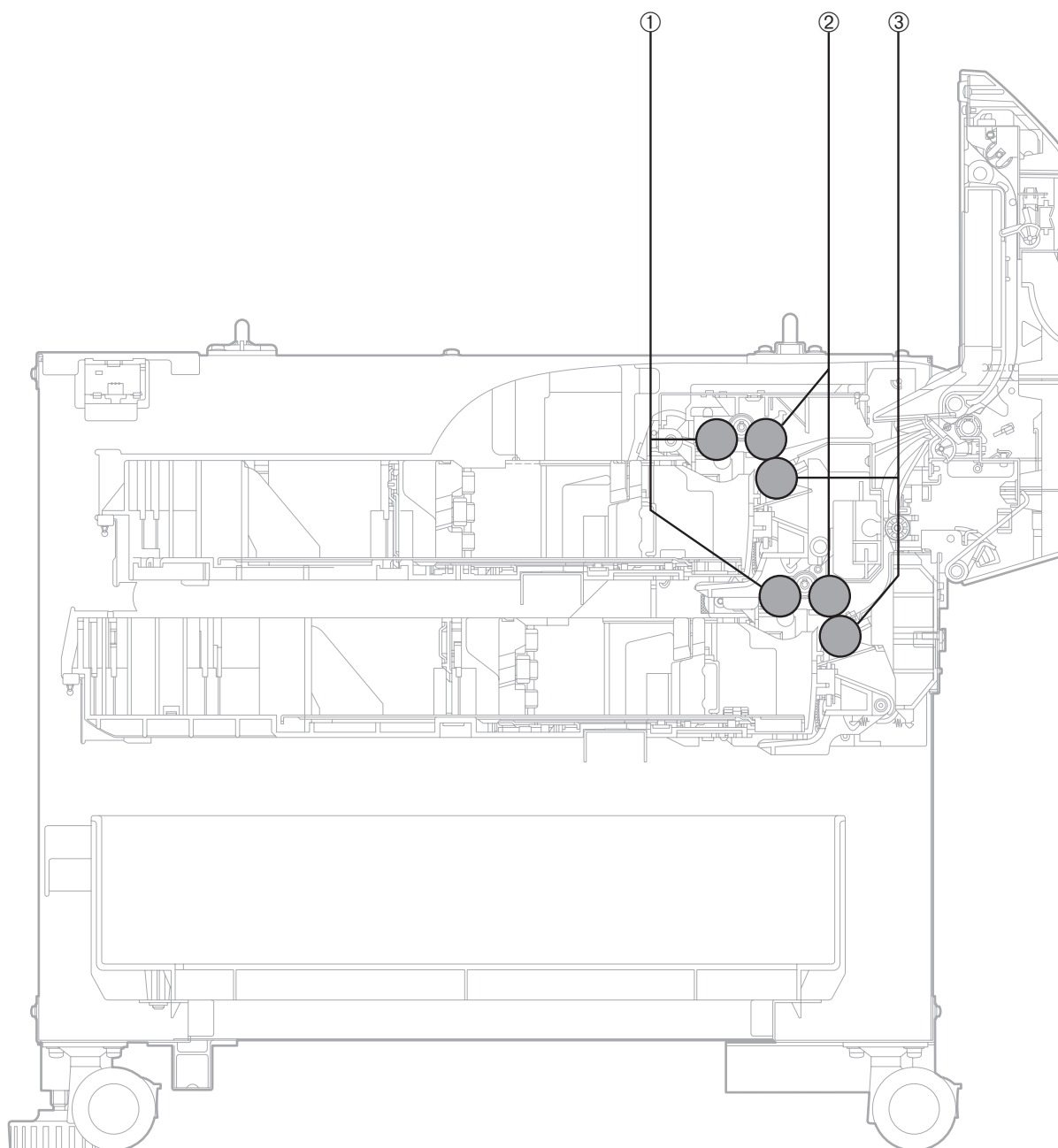


Figure 4-1-2

- 1: Pick-up roller
- 2: Feed roller 1
- 3: Separation roller

D. Service Mode

1. Outline

If malfunction or paper jam occurs in this paper deck, the condition of the paper deck can be checked by ① Status LED on the status LED PCB (LED1: LED with two-color display of Green and Orange) and ② Service LED on the paper deck driver PCB. (LED201: LED with red display)

Also, the contents of malfunction or error can be checked by the combination of ③ DIP switches (SW201) on the paper deck driver PCB.

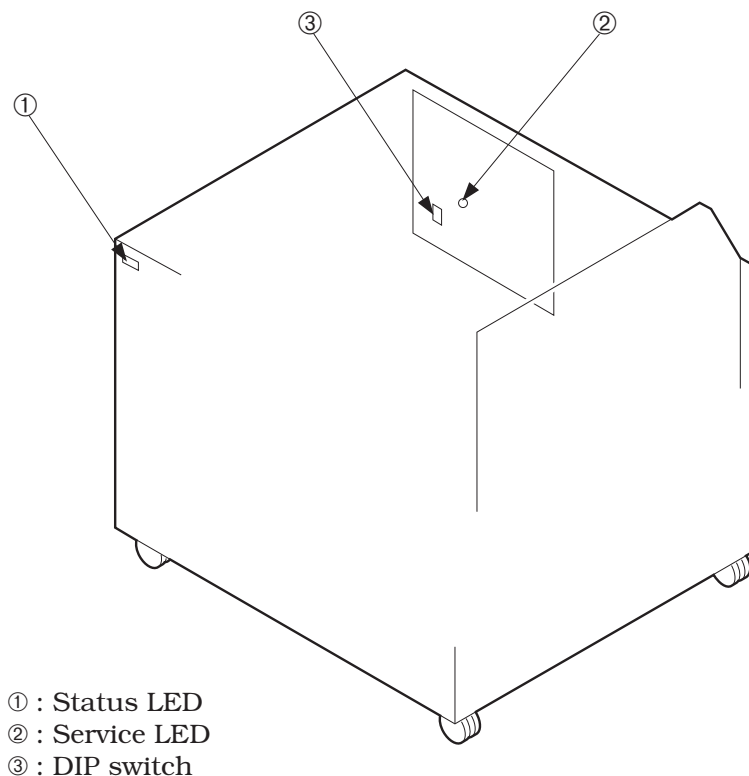


Figure 4-1-3

2. Printer condition check by user

User can check the paper deck condition according to the display of the status LED (LED1) stated below.

- 1) Green light:
The paper deck and the printer are on normal communication.
- 2) Orange flash:
The paper is jammed or the door is open etc. The paper deck needs the operator assistance.
- 3) Orange light:
Malfunction occurred.

The status LED is effective only when the DIP switches are under the conditions below (the conditions set at the time of shipping from the factory).

SW201-1: OFF, SW201-2: OFF, SW201-3: OFF, SW201-4: OFF

3. Condition check by service technician

Service technician can check the paper deck condition by combination of the DIP switches and the display of the service LED (LED201).

a. Normal condition

Normal condition of the DIP switches are as follows.

SW201-1: OFF, SW201-2: OFF, SW201-3: OFF, SW201-4: OFF

The service LED flashes by repeating light-ON for 0.5 seconds and light-OFF for 0.3 seconds while the paper deck is executing normal operation.

If a failure occurs, the service LED flashes the cycle shown below. This cycle is constituted by ① Header (light-ON for 1.0 second and light-OFF for 0.2 seconds), ② Detection contents (light-ON for 0.3 seconds and light-OFF for 0.2 seconds), and ③ Interval (light-OFF for 2.0 seconds).

• Normal operation



• Operation error

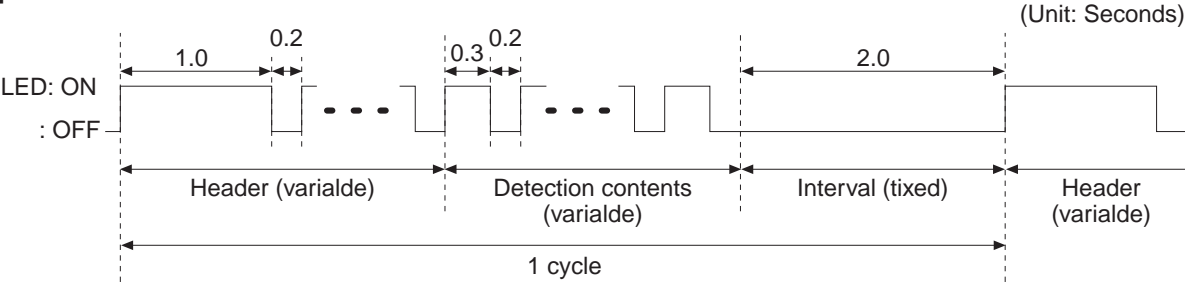


Figure 4-1-4

The factor of the error can be determined according to the flashing condition of the service LED listed in table 4-1-1.

Example: If the service LED flashes twice in the ① Header period and then three times in the ② detection contents period, the factor of the error is "Paper jam sensor delay jam".

Table 4-1-1

| Header | Sense contents | The factor of the error |
|--------|----------------|-------------------------------------------------|
| 2 | 1 | Registration paper sensor delay jam |
| | 2 | Registration paper sensor initial jam |
| | 3 | Paper jam sensor delay jam |
| | 4 | Paper jam sensor stationary jam |
| | 4 | Paper jam sensor initial jam |
| 1 | 1 | Door open |
| | 2 | No cassette, or the cassette is being lifted up |
| | 3 | No paper |

b. Sensor checks

Set the DIP switches to the following condition and turn the power ON to enter the sensor check mode.

SW201-1: OFF, SW201-2: OFF, SW201-3: ON, SW201-4: ON

Conditions of the sensors (total number: 11) and switches (total number: 8) listed below can be checked when the paper deck is in the sensor check mode.

Registration paper sensor (PS1)

Paper jam sensor (PS2)

Feed unit sensor (PS3)

Lower cassette paper level sensor (PS1203, PS1204)

Lower cassette sensor (PS1201)

Lower cassette paper out sensor (PS1207)

Upper cassette paper level sensor (PS1205, PS1206)

Upper cassette sensor (PS1202)

Upper cassette paper out sensor (PS1208)

Upper/lower cassette paper size detection switch (SW1601, SW1602, SW1603, SW1604)

The checking procedure is as follows.

- 1) Turn OFF the printer.
- 2) Remove the rear cover.
- 3) Make the DIP switches condition as follows.
SW201-1: OFF, SW201-2: OFF, SW201-3: ON, SW201-4: ON
- 4) According to the sensor or the switch to be checked, choose the checking method from the following two cases.
 - a. Open the feed cover, and then turn ON the power.
Registration paper sensor (PS1)
Paper jam sensor (PS2)
Feed unit sensor (PS3)
 - b. Remove the upper or lower cassette, and then turn ON the power.
Lower cassette paper level sensor (PS1203, PS1204)
Lower cassette sensor (PS1201)

Lower cassette paper out sensor (PS1207)

Upper cassette paper level sensor (PS1205, PS1206)

Upper cassette sensor (PS1202)

Upper cassette paper out sensor (PS1208)

Upper/lower cassette paper size detection switch (SW1601, SW1602, SW1603, SW1604)

- 5) Check if the LED flashes by moving the sensor levers or the switches.

Do not move more than one sensor lever at the same time. Move them one by one to find which lever is faulty. Also, be sure not to touch the switches with hand directly.

- 6) If the LED does not light, the sensor or the switch is faulty.

c. Paper pick-up test

Make the condition of the DIP switches as follows and turn ON the power to start the paper pick-up test.

SW201-1: ON, SW201-2: OFF, SW201-3: OFF, SW201-4: ON

Once the paper pick-up is started, the test is continued till the paper runs out.

When the SW201-1 is switched OFF, the paper pick-up mode is canceled and the paper pick-up test is interrupted. The test is re-started by switching SW201-1: ON again.

Notes: 1. Set only one sheet of paper into the tray.

When the paper deck enters the paper pick-up mode and executes the paper pick-up operation, the printer does not operate. The paper picked up and fed into the printer causes a jam. Since the paper pick-up operation is continued until the paper runs out, placing plural sheets causes the paper jam one after another.

2. Make sure to set all DIP switches OFF at the end of the paper pick-up test.

II. PAPER JAMS

Execute the following procedure if the paper jam occurs in the paper deck.

The feed path is mainly classified into two units: ① Pick-up unit and ② Feed unit. Refer to the unit in which the paper jam occurred and find out the defect parts.

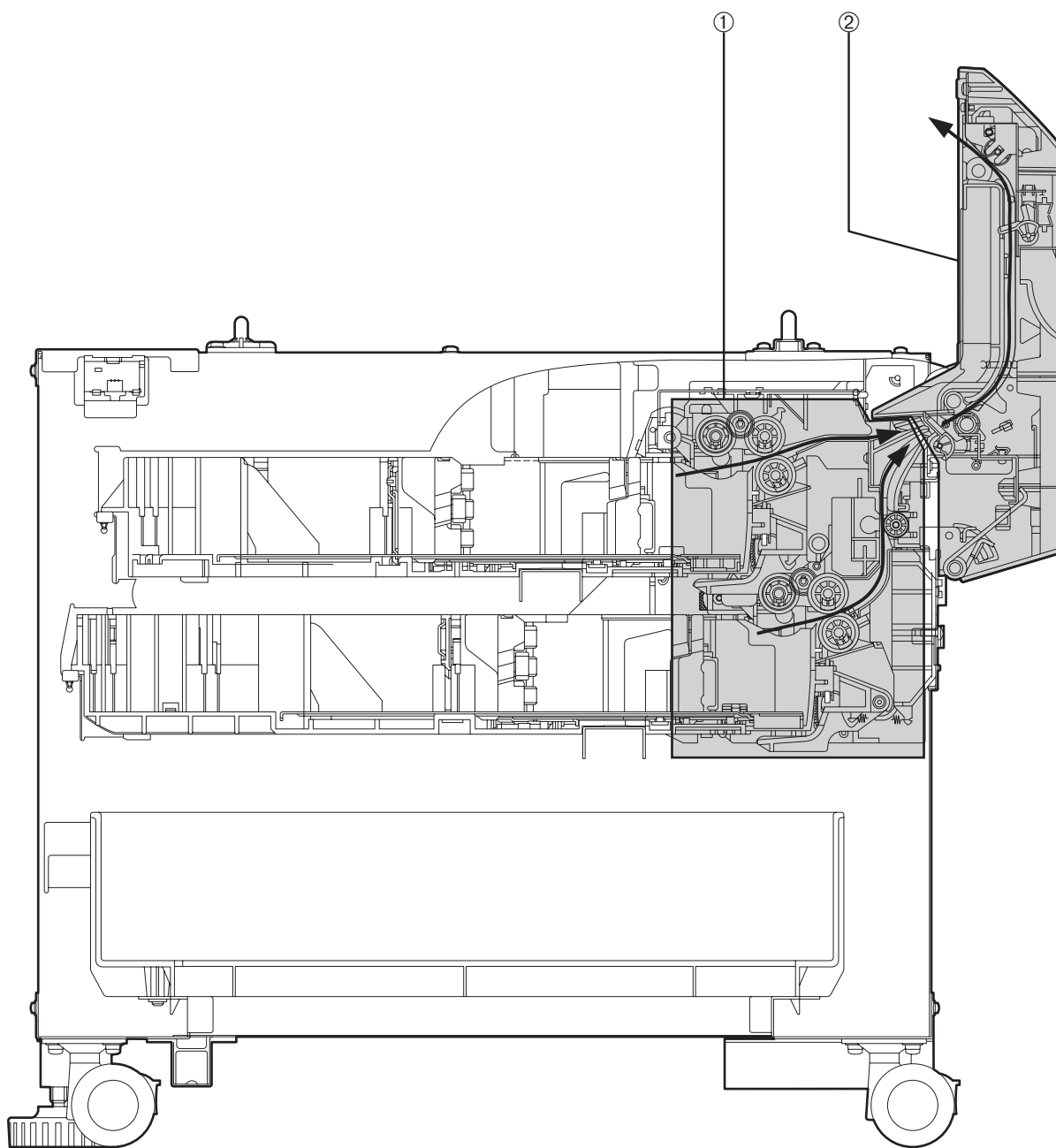


Figure 4-2-1

II-1: Pick-up unit

II-2: Paper feed unit

II-1 Pick-up unit

< possible causes >

1. Cassette pick-up roller or feed roller 1 is worn or deformed.
Action: Replace any worn or deformed roller. The feed roller and the separation roller are to be replaced together.
2. Damaged gears
Action: Remove the pick-up unit and check the drive gears and springs. Replace any damaged or worn part(s). If the spring is off, set it in the right position.
3. Poor contact in the PICK-UP MOTOR DRIVE signal line connector.
Action: Reconnect the connector J208 on the paper deck driver PCB and the connector J1201 and J1202 on the pick-up PCB.
4. Pick-up motor failure
Action: Replace the pick-up motor.
5. Pick-up PCB failure.
Action: Replace the Pick-up PCB.
6. Paper deck driver PCB failure.
Action: Replace the paper deck driver PCB.

II-2 Paper feed unit

< possible causes >

1. Open the feed unit after paper pick-up test. Go to step 10) if the leading edge of the paper reached the paper jam sensor.
2. The registration paper sensor lever is damaged/deformed or the spring is out of place.
Action: Replace the registration paper sensor lever if damaged/deformed. Set the spring in the right position, if it is off.
3. Registration paper sensor failure.
Action: Replace the registration paper sensor.
4. Worn/deformed/dirty registration roller.
Action: Clean the roller if dirty. Replace it if worn or deformed.
5. Damaged gears
Action: Remove the feed unit and check drive gears and the spring. Replace any damaged or worn part(s). If the spring is off, set it in the right position.
6. Poor contact in the FEED MOTOR DRIVE signal line connector.
Action: Reconnect the connector J205 on the paper deck driver PCB and the intermediate connector J302.
7. Feed motor failure
Action: Replace the feed motor.
8. Poor contact in the REGISTRATION CLUTCH DRIVE signal line connector.

Action: Reconnect the registration clutch connector J306, intermediate connector J210, and connector J207 on the paper deck driver PCB.

9. Registration clutch failure

Action: Disconnect the registration clutch connector J306. Measure the resistance between the connector J306-1 (/REGCLD) and J306-2 (+24V) of the cable. Replace the registration clutch if the resistance is not about xx Ohm.

10. The paper jam sensor lever is damaged/deformed or the spring is out of place.

Action: Replace the paper jam sensor lever if damaged or deformed. If the sensor lever spring is out of place, set it in the right position.

11. Paper jam sensor failure

Action: Replace the paper jam sensor.

12. Worn/deformed/dirty feed roller 2

Action: Clean the feed roller 2 if dirty. Replace the roller if worn or deformed.

13. Paper deck driver PCB

Action: Replace the paper deck driver PCB.

III. PAPER FEEDING TROUBLESHOOTING

III-1 Multiple feed

< possible causes >

1. Separation roller is worn or deformed

Action: Replace it.

2. Separation roller spring failure

Action: Re-set it correctly, or replace it if deformed.

III-2 Wrinkles

< possible causes >

1. Worn or deformed rollers

Action: Replace any worn or deformed roller of the pick-up unit and the feed unit.

III-3 Leading edge bent

< possible causes >

1. Feed guide is cracked or deformed

Action: Check the paper feed path, and replace the feed guide if cracked or deformed.

T-4 Skews

< possible causes >

1. Paper particles or dust is on the feed path.

Action: Clean the dirty place.

2. Worn or deformed roller

Action: Replace any worn or damaged roller of the pick-up unit and the feed unit.

IV. MALFUNCTION TROUBLESHOOTING

IV-1 No AC power

< possible causes >

1. The POWER ON signal is not input because of the poor contact in the interface connector.
Action: Reconnect the interface connector correctly.
2. Power switch failure
Action: Remove the power supply unit, and put the tester between the power switch terminals. Replace the power supply unit, if it is not 0V when the switch is turned ON or it is not infinity Ohm when the switch is turned OFF.
3. Bown fuse
Action: Remove the power supply unit and replace the fuse.
4. Over-current/over-voltage detection circuit triggers
Action: Disconnect the power connector and reconnect it. If the problem persists, investigate the factor that activates the over-current/over-voltage detection circuit. Turn the power switch ON at least two minutes after the power switch is turned OFF.
5. Power supply unit failure
Action: Turn OFF the printer. Disconnect the connector J203 on the paper deck driver PCB.
Turn ON the paper deck, and measure the DC power supply output of the connector J203 on the cable.
Make sure not to short the connector.
Replace the power supply unit, if the specified value is not output.
6. Wiring, DC load, and paper deck driver PCB
Action: Turn the printer OFF, and check the wires and DC loads connected between the paper deck driver PCB and other units. Replace the paper deck driver PCB if the wires and DC loads have no problem.

IV-2 Paper deck drive motor failure

< possible causes >

1. Poor contact in the DRIVE MOTOR DRIVE signal line connector.
Action: Reconnect the connector J205 on the paper deck driver and the drive motor connector J301.
2. Paper deck drive motor failure
Action: Replace the paper deck drive motor.
3. Paper deck driver PCB failure.
Action: Replace the paper deck driver PCB.

IV-3 Paper feed motor failure

< possible causes >

1. Poor contact in the FEED MOTOR DRIVE signal line connector.
Action: Reconnect the feed motor connector J302 and the connector J206 on the paper

deck driver PCB correctly.

2. Feed motor failure

Action: Replace it.

3. Paper deck driver PCB failure

Action: Replace it.

IV-4 Pick-up motor failure

< possible causes >

1. Poor contact in the PICK-UP MOTOR DRIVE signal line connector.

Action: Reconnect the connector J208 on the paper deck driver PCB and the connector J1201 and J1202 on the pick-up PCB.

2. Pick-up motor failure

Action: Replace the pick-up motor.

3. Pick-up PCB failure

Action: Replace the pick-up PCB.

4. Paper deck driver PCB failure

Action: Replace the paper deck driver PCB.

V. MALFUNCTION STATUS TROUBLESHOOTING

V-1 Printer cannot become READY because "Paper out status" is output when the specified cassette is loaded with paper.

< possible causes >

1. Pull out the upper and lower cassettes. Then, set the specified cassette in the printer. If the lifter does not go up at this point, perform step 5 onward.
2. Damaged paper detection lever
Action: Replace any defective lever.
3. Upper cassette paper sensor/lower cassette paper sensor failure
Action: Replace the pick-up PCB.
4. Paper deck driver PCB failure
Action: Replace the paper deck driver PCB.
5. Parts in the drive unit of the pick-up unit are damaged.
Action: Remove the pick-up unit and replace any damaged parts.
6. Cassette pick-up solenoid failure
Action: Remove the pick-up unit. Disconnect the cassette pick-up solenoid connector J1203 from the pick-up PCB. Measure the resistance between the connector J1203-1 and J1203-2 on the cable side. If it is not about 160 Ohms, replace the cassette pick-up solenoid.
7. Pick-up PCB failure
Action: Replace the pick-up PCB.
8. Paper deck driver PCB failure
Action: Replace the paper deck driver PCB.

V-2 Printer cannot become READY because "Paper jam status" is output when paper is not jammed.

< possible causes >

1. Registration sensor lever does not move smoothly or is damaged.
Action: Reset the lever correctly. Replace it if damaged.
2. Paper jam sensor lever does not move smoothly or is damaged.
Action: Reset the lever correctly. Replace it if damaged.
3. Sensor failure
Action: Perform the sensor checks in the service mode. If the Service LED of the tester does not light up when you move a sensor lever, replace the sensor.

VI. MEASUREMENT AND ADJUSTMENT

A. Mechanical Adjustment

1. Side registration adjustment of the cassette

When the side registration of the cassette is not aligned, this adjustment needs to be made.

The side registration adjustment levers (see Figure 4-6-1) in the upper and lower cassettes are adjusted in the factory. Therefore, there is no need to make any adjustments when installing the printer. However, when either upper or lower cassette is replaced in the field, re-adjustment of the left margin is necessary. This procedure is outlined below.

- 1) Load 20 to 30 sheets of paper into the cassette. Then, using the printer driver tester, print several pages of all-black or horizontal line test prints.
- 2) Measure the distance (a) between the left edge of the page to the edge of the printed pattern (see Figure 4-6-1). Measure several test prints to find the average distance.
- 3) Move the side registration adjustment lever based on Figure 4-6-1 so that the distance measured in step 2) become 3.0mm. (one notch alters length (a) by 0.5mm.)
For example, if the average length of step 2) is 2.0mm, by moving the lever 2 steps clockwise the necessary adjustment of 1.0mm can be made.
- 4) Make several more test prints. Make sure that the left margin is 3.0mm by repeating step 2) above.

If the margin needs further adjustment, repeat steps 1) to 3) again.

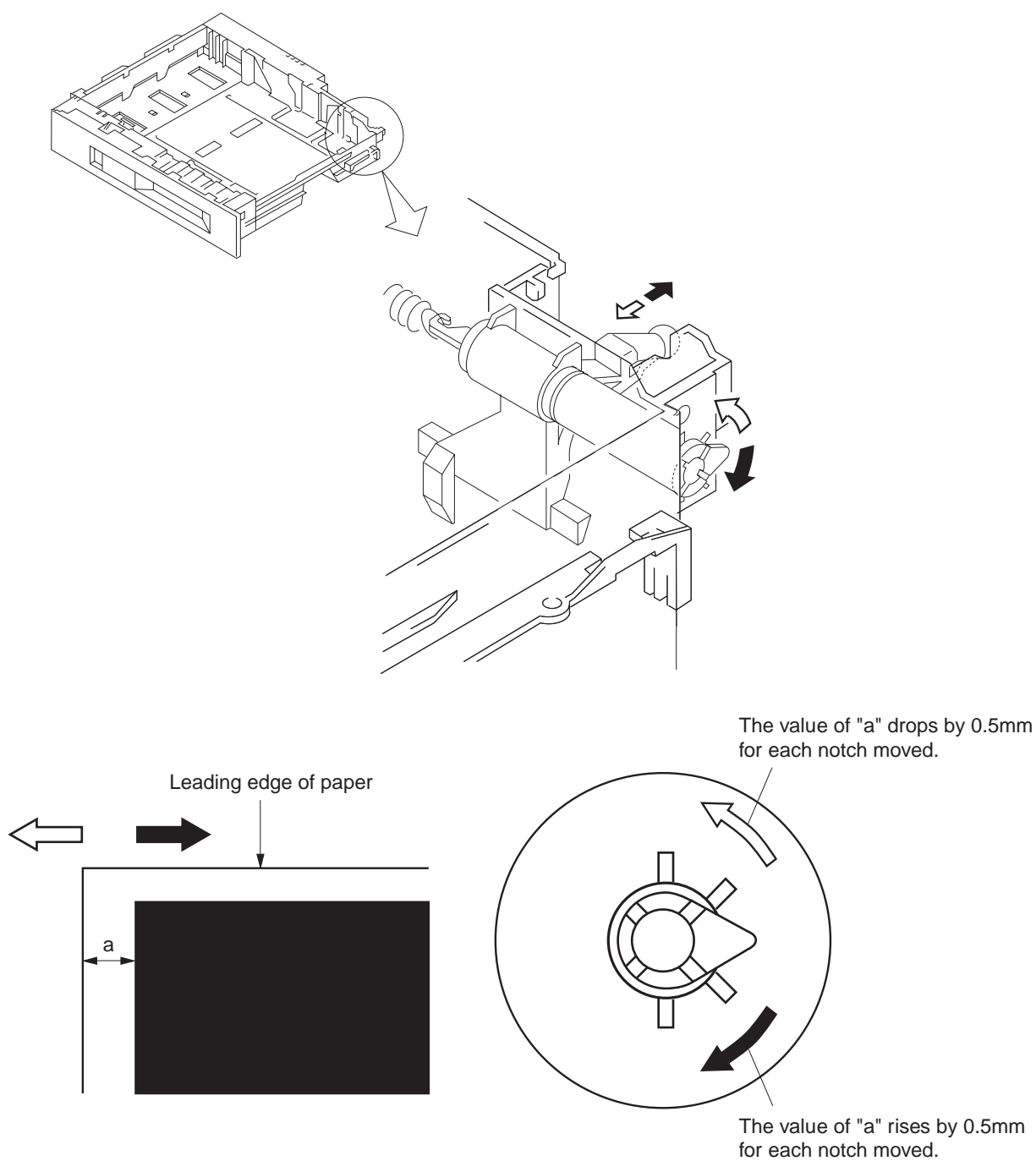


Figure 4-6-1

B. Electrical Adjustment

This paper deck has no item for electrical adjustment.

C. LEDs, test pins, jumpers, and switches on PCB

The following LEDs, test pins, jumpers, and switches on PCB only are for after-sales service use.

The test pins or the other components excluded from the list are exclusively for factory use. Do not touch these components in the field since the adjustment of those components requires special tools, adjuster, and high precision.

Note: Some LEDs receive leakage current during normal operation and emit light dimly even when they are OFF.

1. Paper deck driver PCB

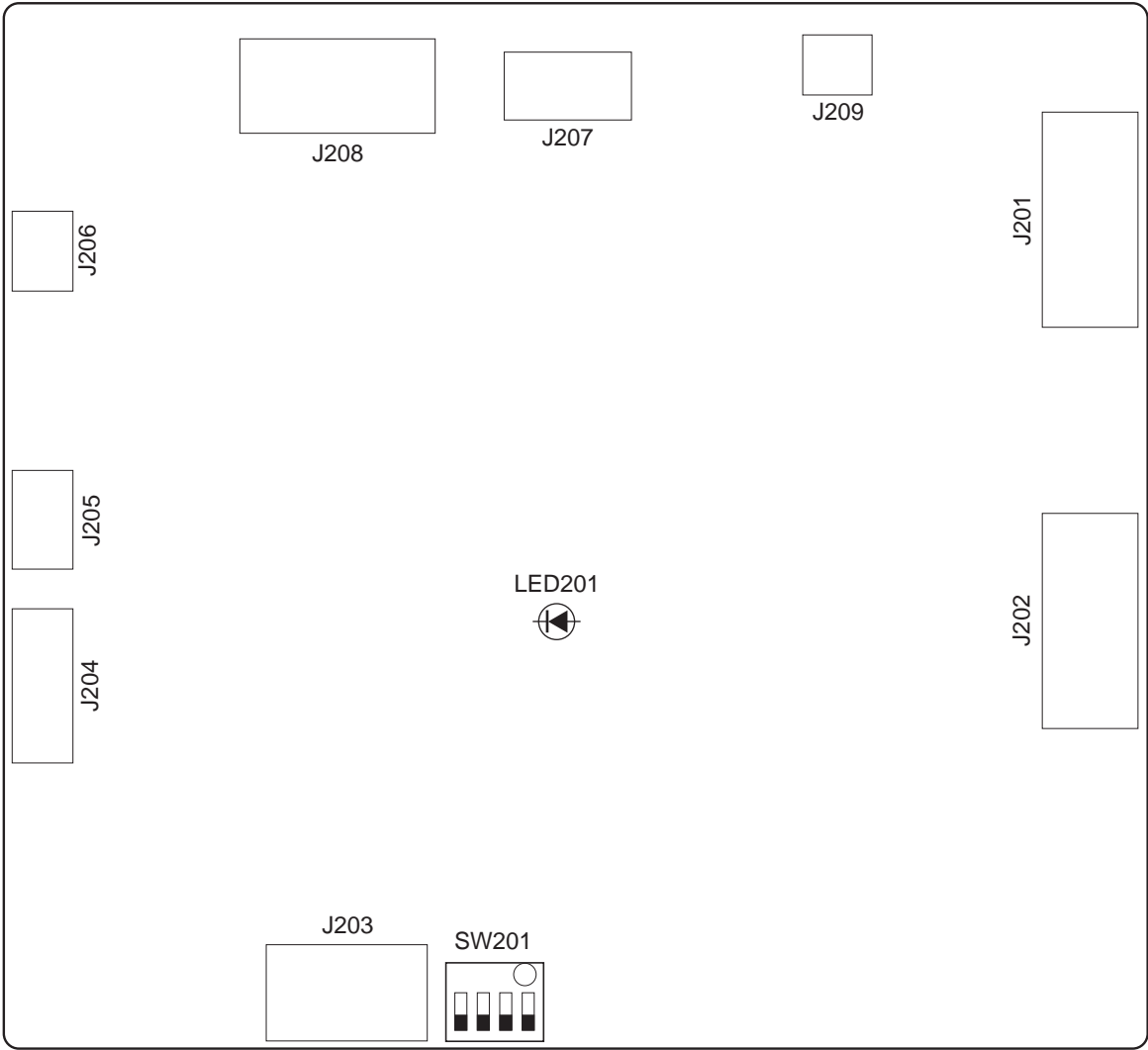


Figure 4-6-2

Table 4-6-1

| No. | Function |
|--------|----------------------------------|
| SW 201 | 1 |
| | 2 |
| | 3 |
| | 4 |
| LED201 | Check LED for service technician |

2. Paper-level detection switch PCB

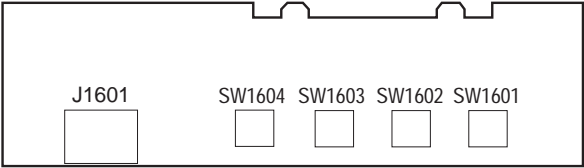


Figure 4-6-3

Table 4-6-2

| SW No. | Function |
|--------|---------------------------------------------------------------------------|
| SW1601 | Cassette paper-size detection switches (See table 2-2-1 on page 2-10.) |
| SW1602 | |
| SW1603 | |
| SW1604 | |

3. Status LED PCB

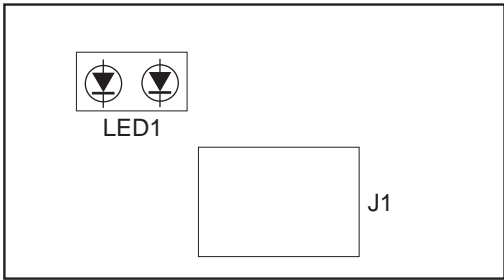


Figure 4-6-4

Table 4-6-3

| LED No. | Function |
|---------|---------------------|
| LED1 | Status LED for user |

VII. MAINTENANCE AND SERVICING

A. Periodic Replacement Parts

This paper deck has no periodic replacement parts.

Note: Periodic replacement parts are the parts that must be replaced at regular intervals, even if they are functioning properly and show no signs of wear. (Failure of these parts can seriously affect printer performance.) These parts should be replaced during a regular service visit closest to the end of the parts expected life.

B. Expected Lives of Consumable Parts

Consumable parts are the parts that have possibility of requiring replacement due to the deterioration or damages at least once during the warranty period and that can be used until failures occur. The expected life of the consumable parts are shown in Table 4-7-1.

Table 4-7-1

As of December, 1998

| No. | Part name | Part No. | Qt'y | Expected life | Remarks |
|-----|-----------------------------------|--------------|------|----------------|-----------------------------------------------------------|
| 1 | Feed roller and separation roller | RF5-1834-000 | 4 | 350,000 prints | Replace the feed rollers and separation rollers together. |

Note: The expected life in the above table is an estimated value and is subject to change according to the experiential data.

C. Regular Servicing Schedule

No parts need regular service.

D. Standard Tools

Required standard tools for the paper deck service are the same as for the printer.

E. Special Tools

This paper deck has no special tools for service.

F. List of Lubricants and Cleaners**Table 4-7-2**

| No. | Material name | Use | Components | Remarks |
|-----|---------------------------------------------------------------------|---------------------------------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| 1 | Alcohol: ethyl (pure or denatured) or isopropyl (pure or denatured) | Cleaning: plastic, rubber | C_2H_5OH , $(CH_3)_2CHOH$ | <ul style="list-style-type: none"> • Purchase locally • Flammable: keep away from flame |
| 2 | Lubricating oil | Apply between gear and shaft | Petroleum mineral oil | • Tool No. CK-8003 (100 ml bottle) |
| 3 | Lubricating agent | Apply to gears | Lithium oil | • Tool No. CK-8005 (40 g bottle) |
| 4 | Lubricating agent | Apply to gears of the pick-up unit (Refer to Chapter 3) | Poly α olefin oil Lithium soap | • Tool No. CK-8009 (20 g tube) |

VIII. LOCATION OF CONNECTORS

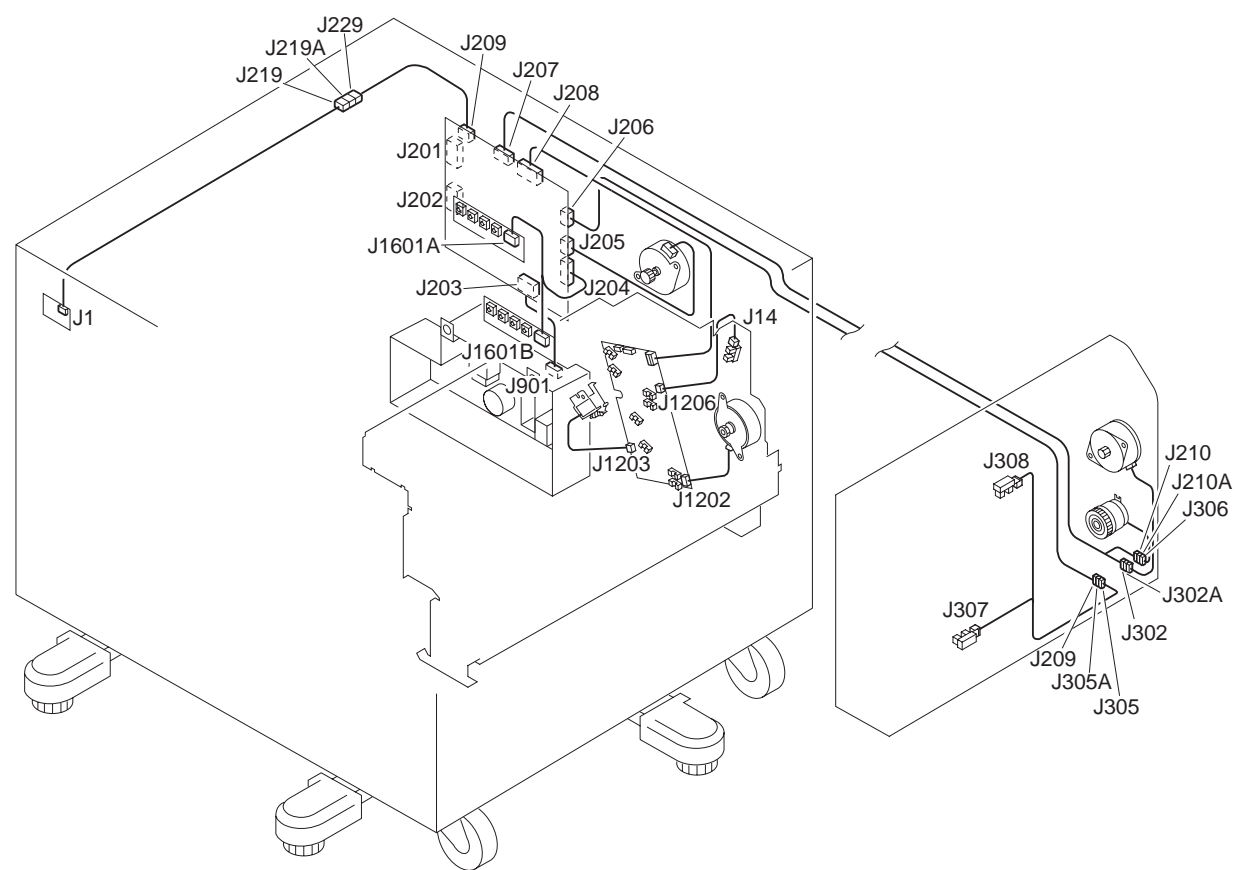


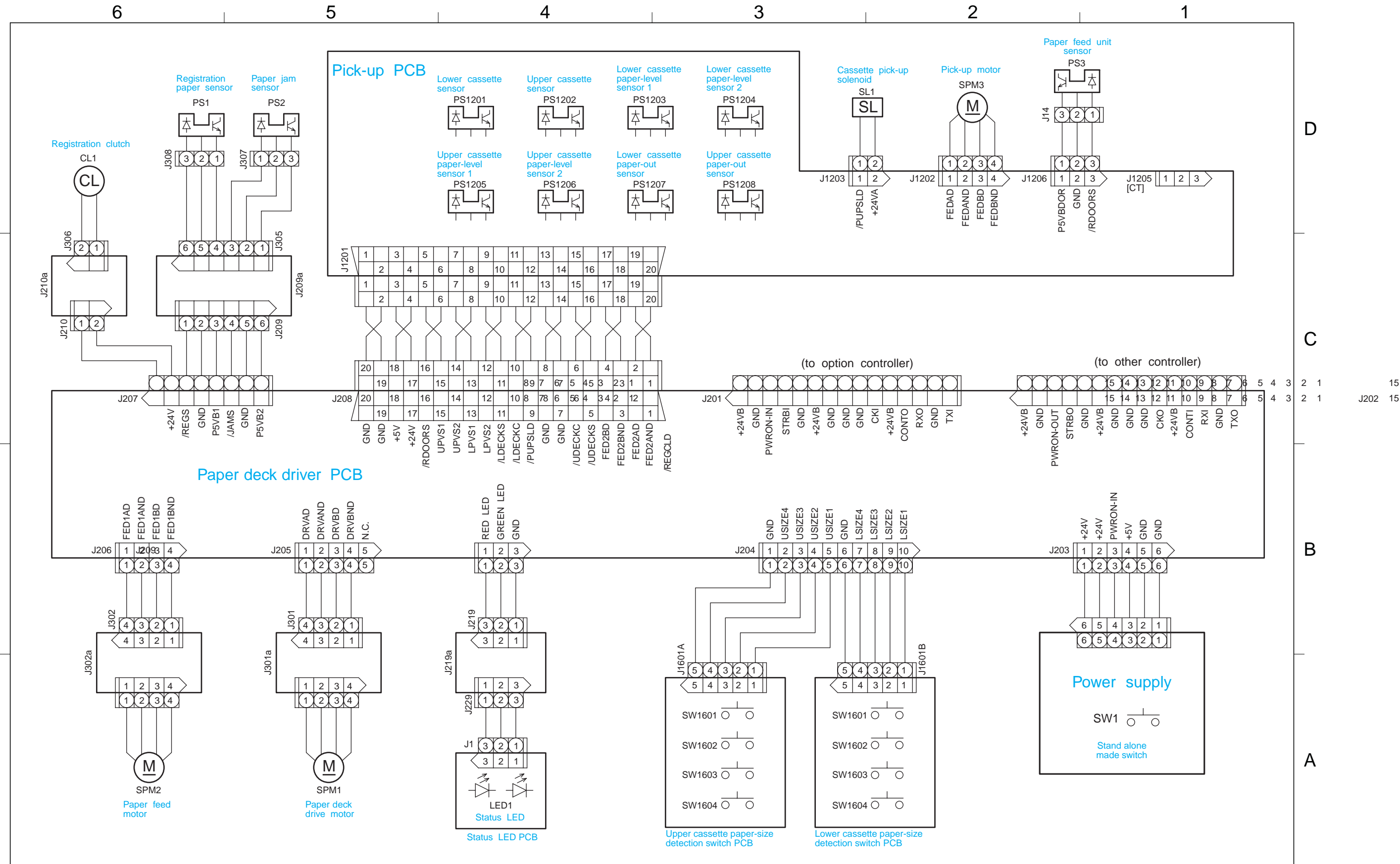
Figure 4-8-1

APPENDIX

I. GENERAL CIRCUIT DIAGRAM. A-1

II. LIST OF SIGNALS A-3

I. GENERAL CIRCUIT DIAGRAM



II. LIST OF SIGNALS

A. Input/output signals to/from Paper deck tray driver PCB

| Connector | Pin | Abbreviation | I/O | Logic | Signal name |
|-----------|-----|--------------|-----|-------|----------------------------------------|
| J201 | 1 | TXI | I | L | SERIAL IN signal |
| | 2 | GND | | | |
| | 3 | R XO | O | L | SERIAL OUT signal |
| | 4 | CONTO | O | L | Communication ready signal |
| | 5 | +24V | | | |
| | 6 | CKI | I | L | Serial clock signal |
| | 7 | GND | | | |
| | 8 | GND | | | |
| | 9 | GND | | | |
| | 10 | +24V | | | |
| | 11 | GND | | | |
| | 12 | STRBI | I | L | Strobe signal |
| | 13 | PWRON-IN | I | H | Power on signal |
| | 14 | GND | | | |
| | 15 | +24V | | | |
| J202 | 1 | TXO | O | L | SERIAL OUT signal |
| | 2 | GND | | | |
| | 3 | R XI | I | L | SERIAL IN signal |
| | 4 | CONTI | I | L | Communication ready signal |
| | 5 | +24V | | | |
| | 6 | CKO | O | L | Serial clock signal |
| | 7 | GND | | | |
| | 8 | GND | | | |
| | 9 | GND | | | |
| | 10 | +24V | | | |
| | 11 | GND | | | |
| | 12 | STRBO | O | L | Strobe signal |
| | 13 | PWRON-OUT | O | H | Power on signal |
| | 14 | GND | | | |
| | 15 | +24V | | | |
| J203 | 1 | +24V | I | | Power on signal |
| | 2 | +24V | I | | |
| | 3 | PWRON-IN | O | H | |
| | 4 | +5V | I | | |
| | 5 | GND | | | |
| | 6 | GND | | | |
| J204 | 1 | GND | | | |
| | 2 | USIZE4 | I | L | UPPER CASSETTE PAPER SIZE SENSE signal |
| | 3 | USIZE3 | I | L | UPPER CASSETTE PAPER SIZE SENSE signal |
| | 4 | USIZE2 | I | L | UPPER CASSETTE PAPER SIZE SENSE signal |
| | 5 | USIZE1 | I | L | UPPER CASSETTE PAPER SIZE SENSE signal |
| | 6 | GND | | | |
| | 7 | LSIZE4 | I | L | LOWER CASSETTE PAPER SIZE SENSE signal |
| | 8 | LSIZE3 | I | L | LOWER CASSETTE PAPER SIZE SENSE signal |

| Connector | Pin | Abbreviation | I/O | Logic | Signal name |
|-----------|-----|--------------|-----|-------|-----------------------------------------|
| | 8 | LSIZE3 | I | L | LOWER CASSETTE PAPER SIZE SENSE signal |
| | 9 | LSIZE2 | I | L | LOWER CASSETTE PAPER SIZE SENSE signal |
| | 10 | LSIZE1 | I | L | LOWER CASSETTE PAPER SIZE SENSE signal |
| J205 | 1 | DRVAD | O | | PAPER DECK DRIVE MOTOR DRIVE signal |
| | 2 | DRVAND | O | | PAPER DECK DRIVE MOTOR DRIVE signal |
| | 3 | DRVBD | O | | PAPER DECK DRIVE MOTOR DRIVE signal |
| | 4 | DRVBND | O | | PAPER DECK DRIVE MOTOR DRIVE signal |
| | 5 | N.C. | | | |
| J206 | 1 | FED1AD | O | | PAPER FEED MOTOR DRIVE signal |
| | 2 | FED1AND | O | | PAPER FEED MOTOR DRIVE signal |
| | 3 | FED1BD | O | | PAPER FEED MOTOR DRIVE signal |
| | 4 | FED1BND | O | | PAPER FEED MOTOR DRIVE signal |
| J207 | 1 | P5VB2 (+5V) | O | | PAPER JAM SENSE signal |
| | 2 | GND | | | |
| | 3 | /JAMS | I | L | |
| | 4 | P5VB1 (+5V) | O | | REGISTRATION PAPER SENSE signal |
| | 5 | GND | | | |
| | 6 | /REGS | I | L | |
| | 7 | +24V | O | | REGISTRATION CLUTCH DRIVE signal |
| | 8 | /REGCLD | O | L | |
| J208 | 1 | FED2AD | O | | PICK-UP MOTOR DRIVE signal |
| | 2 | FED2AND | O | | PICK-UP MOTOR DRIVE signal |
| | 3 | FED2BD | O | | PICK-UP MOTOR DRIVE signal |
| | 4 | FED2BND | O | | PICK-UP MOTOR DRIVE signal |
| | 5 | /UDECKS | I | L | UPPER CASSETTE PAPER-OUT SENSE signal |
| | 6 | /UDECKC | I | L | UPPER CASSETTE SENSE signal |
| | 7 | GND | | | |
| | 8 | GND | | | |
| | 9 | /PUPSLD | I | L | PICK-UP SOLENOID DRIVE signal |
| | 10 | /LDECKS | I | L | LOWER CASSETTE PAPER-OUT SENSE signal |
| | 11 | /LDECKC | I | L | LOWER CASSETTE PAPER-OUT SENSE signal |
| | 12 | LPVS2 | I | | LOWER CASSETTE PAPER-LEVEL SENSE signal |
| | 13 | LPVS1 | I | | LOWER CASSETTE PAPER-LEVEL SENSE signal |
| | 14 | UPVS2 | I | | UPPER CASSETTE PAPER-LEVEL SENSE signal |
| | 15 | UPVS1 | I | | UPPER CASSETTE PAPER-LEVEL SENSE signal |
| | 16 | /RDOORS | I | L | PAPER FEED UNIT SENSE signal |
| | 17 | +24V | | | |
| | 18 | +24V | | | |
| | 19 | GND | | | |
| | 20 | GND | | | |
| J209 | 1 | RED LED | O | | RED LED ON signal |
| | 2 | GREEN LED | O | | GREEN LED ON signal |
| | 3 | GND | | | |
| | | | | | |

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