Service and Maintenance Manual

Paper Feeder for Laser Printer PF-2

KYOCERA

laser printer

Notice

The information in this manual is subject to change without notification. Additional pages may be inserted in future editions. The user is asked to excuse any technical inaccuracies or typographical errors in the present edition. No responsibility is assumed if accidents occur while the user is following the instructions in this manual.

Federal Communications Commission (U.S.A.) and D.O.C. (Canada) Requirements

This equipment generates and uses radio frequency energy and if not installed and used properly, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of part 15 of the FCC rules, and Canadian Department of Communications radio interference regulations, which are designed to provide reasonable protection against such interference in residential installations.

There is no guarantee, however, that interference will not occur in a particular installation.

If this paper feeder does cause interference to radio or television reception, which can be determined by turning the paper feeder off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- ☐ Reorient the receiving antenna.
- ☐ Relocate the equipment with respect to the receiver.
- ☐ Move the equipment away from the receiver.

If necessary, consult your dealer or an experienced radio/television technician for additional suggestions.

You may find the following booklet prepared by the Federal Communications Commission helpful: *How to Identify and Resolve Radio-TV Interference Problems.*

This booklet is available from the U.S. Government Printing Office, Washington, D.C., Stock No. 004-000-00345-4.

⇒ **Warning – This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of the FCC Rules. Only the associated equipment certified to comply with the Class B limits may be attached to this equipment. Operation with non-certified equipment is likely to result in interference to radio and TV reception.**

Important Notice to Service Person:

Before attempting service on the paper feeder, including disassembling, re-assembling, troubleshooting, and adjustment, read this manual carefully. While performing service, use extreme care to avoid possible electric shock hazard, burn, exposure to laser, and injury. Make sure the paper feeder is not provided with any safety facilities other than those primarily intended for the safety of users.

Preface

This manual contains information pertaining to service and maintenance of the Kyocera paper feeder. The information in this manual contains the following chapters:

Chapter 1 – General Information

Chapter 2 – Maintenance

Chapter 3 – Paper Specifications

Chapter 4 – Parts Catalog

Chapter 5 – Hardware Notes

Chapter 6 – Circuit Diagram

Organization of This Manual

This manual is organized as follows:

Chapter 1 General Information

Explains points that require special attention when servicing the PF-2.

Chapter 2 Maintenance

Explains the procedure for disassembling the PF-2 when replacing parts.

Chapter 3 Paper Specifications

Describes the types of paper that can be used with the PF-2 and its printer.

Chapter 4 Parts Catalog

Provides an exploded view of the PF-2 and a corresponding parts list.

Chapter 5 Hardware Notes

Describes the principles of operation for the electrical circuits in the PF-2; also provides troubleshooting information.

Chapter 6 Circuit Diagrams

Contains a compilation of circuit diagrams for the PF-2.

Chapter 1: General Information

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1.1 Preface, 1-3
1.2 Precautions Concerning Maintenance and Inspection, 1-3
1.3 Notes Concerning Paper Storage, 1-4

1.1 Preface

This chapter explains basic considerations and precautions to be observed when repairing, maintaining and inspecting the PF-2 paper feeder. The precautions are fairly extensive; however, to prevent accidents, it is very important that you read the precautions carefully, and then observe them at all times.

1.2 Precautions Concerning Maintenance and Inspection

Always observe the following precautions when maintaining or inspecting the PF-2.

⇒ **IMPORTANT**

- ☐ **Power for the paper feeder must always be provided through connection with the printer in the proper manner. Direct connection to a battery or other power source can result in an accident.**
- ☐ **Make sure that the printer power is turned off before replacing circuit boards or electrical components.**
- ☐ **To prevent electrostatic discharge damage to electrical circuits, be sure to wear an antistatic band when handling the PF-2's circuit boards.**
- ☐ **Be sure to use only Kyocera-recommended supplies and components. Kyocera will assume no responsibility in the event of damage resulting from the use of unauthorized components.**
- ☐ Maintenance and inspection of the PF-2 should be performed only by personnel who have both passed an official Kyocera-sponsored training course and also have a full understanding of proper safety precautions.
- ☐ When performing any maintenance or inspection procedure, first unplug the power cord of the printer to which the PF-2 is connected.

- ☐ Be particularly careful when reconnecting the power after having repaired or replaced a component that has the potential for causing an electric shock.
- ☐ If the PF-2 is to be transported or stored for a lengthy period of time, the unit should be packed in its original packaging.
- ☐ If packed in their original packaging, these units can be stacked five high for up to six months. They should not be stacked sideways or upside down, however.
- ☐ Store the PF-2 in a cool, dark, dry area. Avoid storage in dusty areas.
- ☐ Ship units out on a first in, first out basis.

1.3 Notes Concerning Paper Storage

Use of paper with a high moisture content in the PF-2 can adversely affect printing quality through the occurrence of paper jams, wrinkling, and other difficulties. Observe the following paper handling guidelines.

- ☐ Store paper in a dry place. Do not place paper directly on a damp floor.
- ☐ Do not stand paper on end for storage. Stack paper horizontally on a flat surface.
- ☐ After loading paper in the paper cassette, store any leftover paper in the original wrapping or a plastic bag.

Refer to Chapter 3 for specifications concerning the type of paper that can be used with the PF-2 paper feeder and its printer.

Chapter 2: Maintenance

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2.1 Introduction

This chapter explains the following subjects:

2.2 Disassembly Procedures

Explains (with photos) the disassembly procedures required to replace parts.

2.3 Cleaning Procedures

Explains the procedure for cleaning those parts which require periodic cleaning.

2.4 Lubrication Procedures

Explains procedures for lubricating those parts inside the PF-2 which require periodic lubrication.

2.2 Disassembly Procedures

This section describes the disassembly procedures to be used when replacing the parts listed below.

☐ **Parts requiring periodic replacement during long-term use**

1. Paper feed roller
2. Separator

☐ **Parts which may need to be replaced due to malfunction**

3. Paper size detection board
4. Out-of-paper sensor
5. Control board
6. Motor
7. Indicator board
8. Printer connection cable

Since it is necessary to disassemble each paper tray, for example, when replacing the parts listed above, it is important to correctly follow the procedures described in this section.

When replacing parts for which there is no specific procedure described, refer to the exploded view shown in Chapter 5.

Before beginning any disassembly procedure, be sure to read the notes concerning disassembly in section **2.2.1**.

2.2.1 Notes on Disassembly

- ☐ If the paper feeder is not mounted with a printer, it is possible that it will fall forwards if the upper and lower paper trays are both pulled out at the same time. Do not pull both trays out at the same time.
- ☐ Before disassembling the PF-2, be sure to turn off the printer power and disconnect the connecting cable between the paper feeder and the printer.
- ☐ Be sure to use the correct screws when installing a component. Using incorrect screws can result in the threads of the screws being stripped, which may lead in turn to other problems. Frequent insertion and removal of self-tapping screws can cause damage to screw holes. Do not tighten screws excessively.
- ☐ When removing or installing circuit boards, wear a grounded wrist strap to protect against damage due to discharge of static electricity.

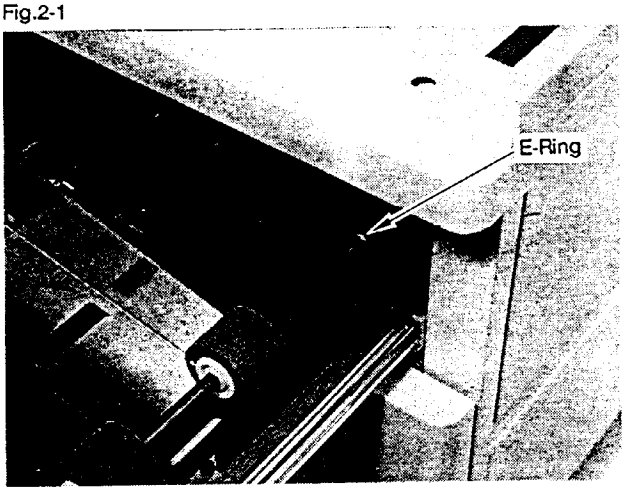
2.2.2 Paper Feed Roller Replacement

Each paper tray has three paper feed rollers. These rollers need to be replaced every 300,000 sheets. All three rollers should be replaced at the same time. The paper feed rollers can be replaced just by pulling out the paper tray. The same procedure is used for both trays.

Required Tools: E-ring pliers

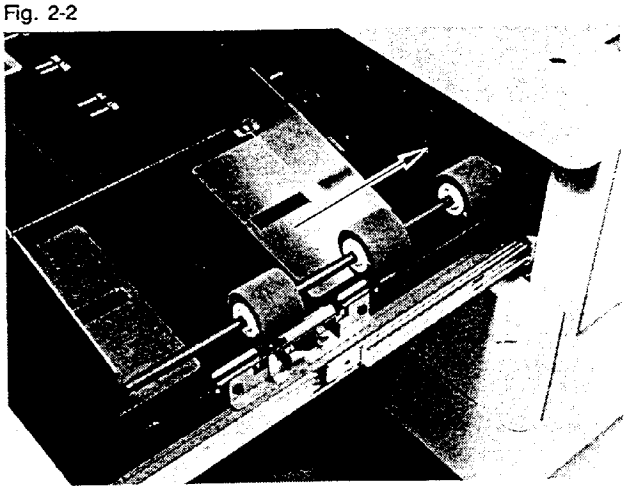
1. Pull out the paper tray.
2. Remove the E-ring (Fig. 2-1) with the E-ring pliers.

Fig.2-1



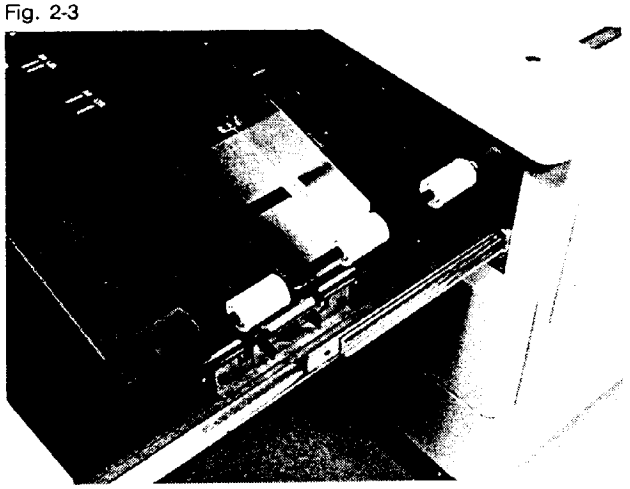
3. Push the paper feed roller shaft in the direction of the rear panel of the PF-2 as shown in Fig. 2-2.

Fig. 2-2



4. Remove all of the rollers from the shaft (Fig. 2-3).

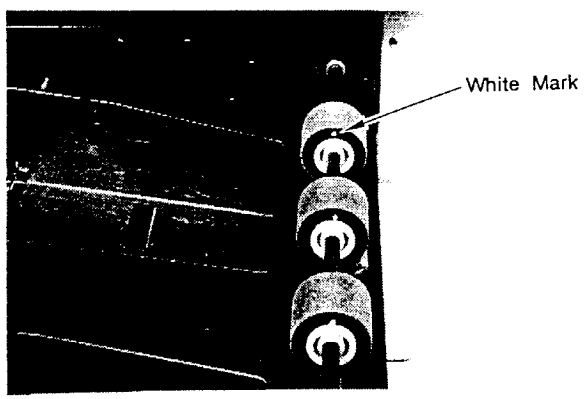
Fig. 2-3



5. Mount the new rollers on the shaft. Note that the white mark on the rollers should face the front of the tray, and each roller should be positioned so that the white marks are in a straight line (Fig. 2-4).

   The roller replacement procedure is now complete. Re-attach the E-ring in its original position.

Fig. 2-4

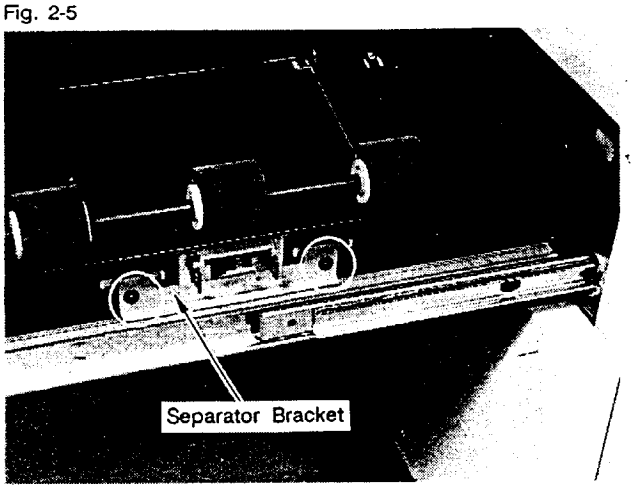


2.2.3 Separator Replacement

The separator needs to be replaced every 300,000 sheets. Each paper tray has one separator. The separator can be replaced just by pulling out the paper tray in the same manner as the paper feed rollers.

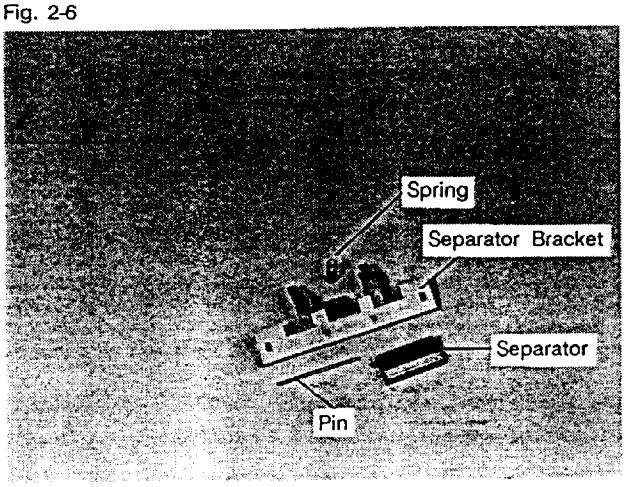
1. Pull out the paper tray.
2. Remove the two screws and washers indicated in Fig. 2-5.

Fig. 2-5



3. Pull out the pin and remove the separator from the separator bracket (Fig. 2-6). Attach a new separator by reversing the procedure. Reattach the separator bracket in its original position using the two screws and washers.

Fig. 2-6

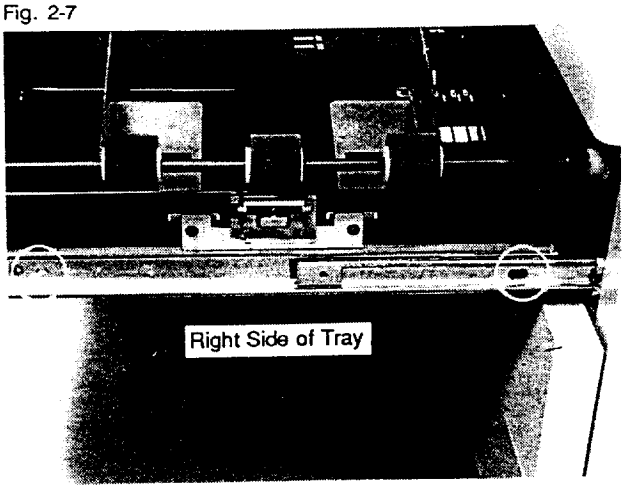


2.2.4 Paper Tray Removal

The paper size detection board and other devices are built into the bottom of each paper tray. To remove any of these devices, it is first necessary to remove the paper tray from the paper feeder.

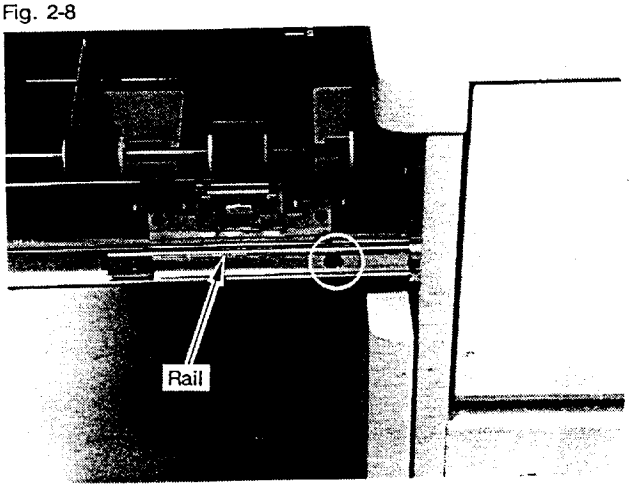
1. Pull the tray out as far as it will go.
2. The tray is attached to rails on the paper feeder by three screws on the right and two screws on the left (when facing the paper feeder). With the tray pulled out as far as possible, first remove the two screws on the right side of the tray as shown in Fig. 2-7.

Fig. 2-7



3. Next, while holding the rail in place with your right hand, slowly push the tray back into the paper feeder. When a screw becomes visible through the hole in the rail, remove that screw (Fig. 2-8).

Fig. 2-8

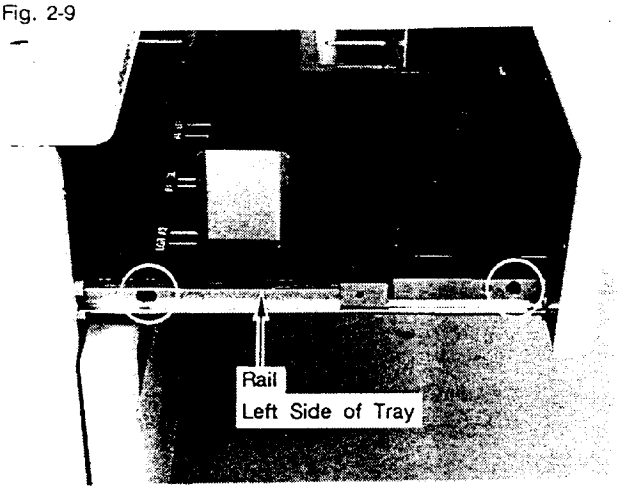


4. Next, remove the screws on the left side of the tray. Leaving the tray in the position it was in at the end of Step 3 above, two screws on the left hand side should be visible. Remove these screws (Fig. 2-9).

   (Note that on the right side of the tray there is a black screw. Do not remove this screw.)

5. After all five screws have been removed, pull the tray out all of the way once again. The tray can now be pulled forward farther than normal, and the spring panel will pop up.

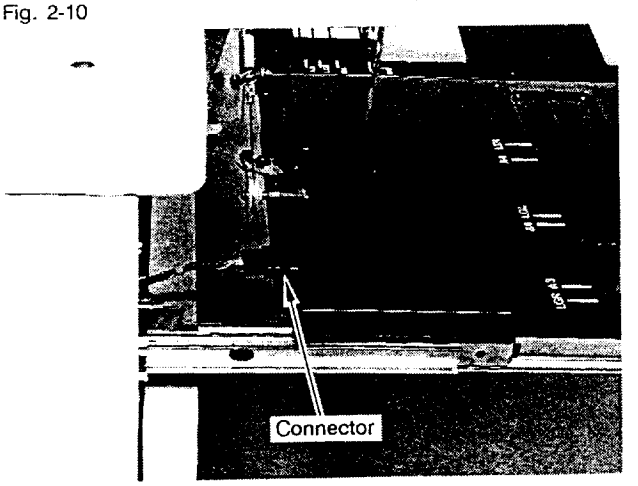
Fig. 2-9



6. Disconnect the connector on the left-hand side of the rear of the paper tray (Fig. 2-10).

7. Holding the front of the tray, it is now possible to pull the tray completely out of the paper feeder.

Fig. 2-10

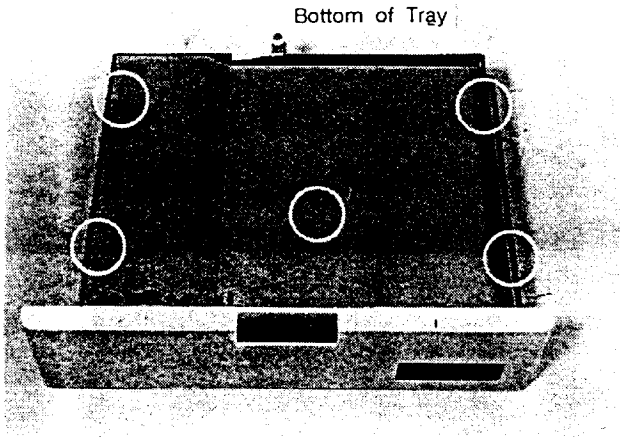


2.2.5 Paper Size Detection Board and Out-of-Paper Sensor Replacement

First remove the paper tray according to the procedure described in section 2.2.4.

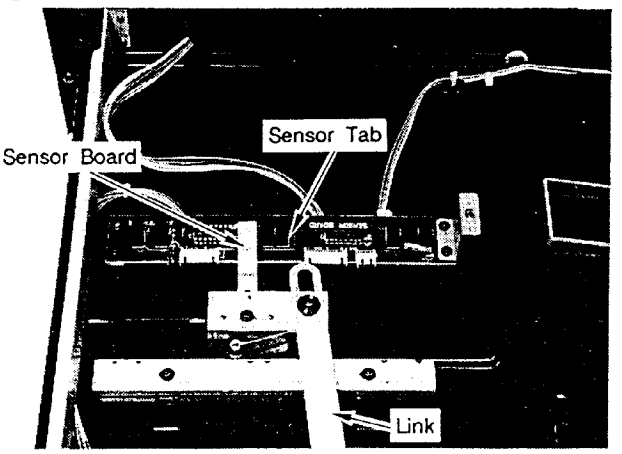
1. Place the tray upside down on a flat surface.
2. Remove the five screws on the bottom of the tray and then remove the bottom panel (Fig. 2-11).

Fig. 2-11



3. Moving the link by hand, set the size setting sensor board to the position indicated in Fig. 2-12. **Be extremely careful, since bending the link or sensor board can cause the unit to malfunction. In addition, do not loosen the screws that hold the sensor components in place.**

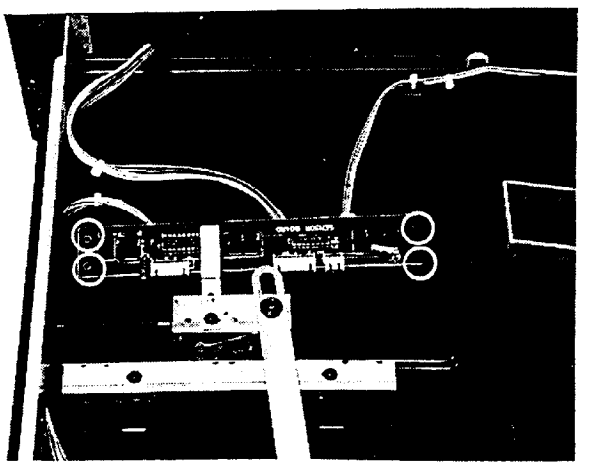
Fig. 2-12



4. Remove the four screws that hold the sensor board in place (Fig. 2-13).
5. Disconnect the three connectors from the sensor board
6. Remove the sensor board while keeping clear of the sensor tab.

Reverse the procedure to install a new sensor board. After installing the new board, move the link by hand to make sure that it moves freely with no interference from the components on the sensor board.

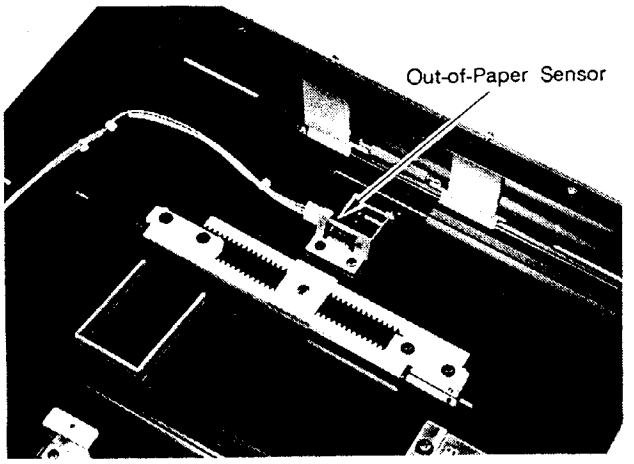
Fig. 2-13



To replace the out-of-paper sensor, press in the four tabs, remove the sensor from the bracket, and disconnect the connector, as shown in Fig. 2-14. Reverse the procedure and install a new sensor.

Once the replacement of components in the bottom of the paper tray has been completed, re-attach the bottom panel with the five original screws. (Refer to Fig. 2-11.)

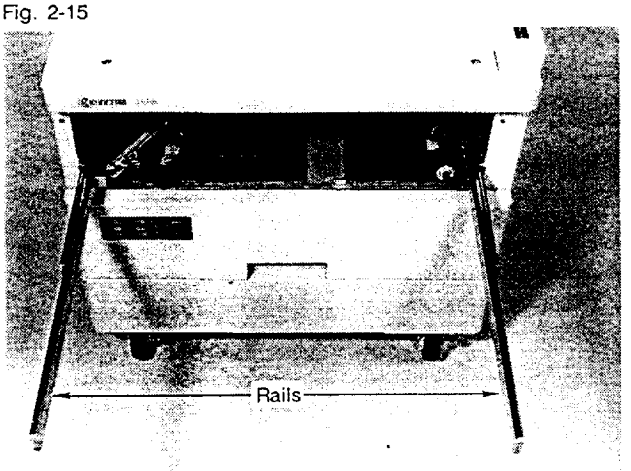
Fig. 2-14



Re-install the paper tray in the paper feeder as follows:

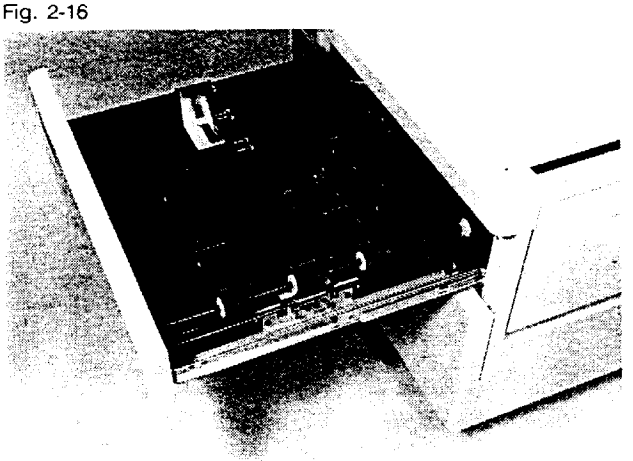
1. Pull the rails out of the paper feeder as far as they will go (Fig. 2-15).

Fig. 2-15



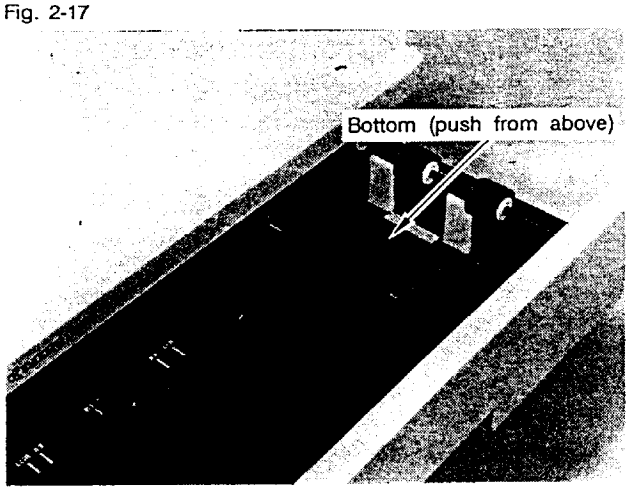
2. Mount the paper tray on the rails (starting with the right side) as shown in Fig. 2-16. If the tray does not seat properly on the rails, spread the rails apart slightly.
3. Attach the connector on the left rear panel of the tray with the connector's stopper facing up. (Refer to Fig. 2-10.)

Fig. 2-16



4. While pressing the bottom down, push the tray halfway into the paper feeder. The bottom will now stay down on its own (Fig. 2-17).

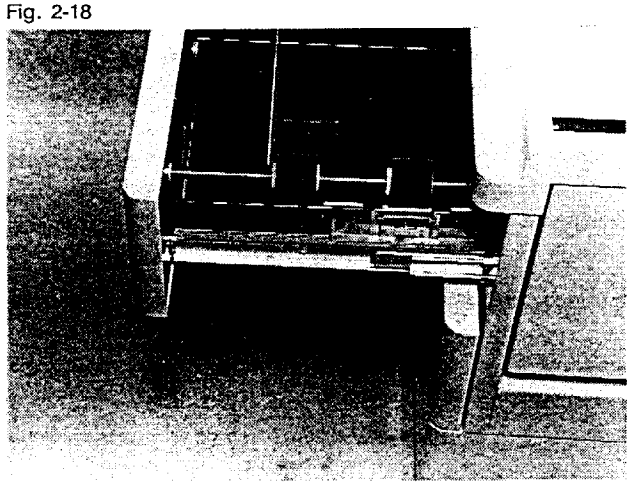
Fig. 2-17



5. While holding the tray in place, pull the left and right rails all of the way out until they touch the front panel of the tray (Fig. 2-18).
6. Pull the tray all of the way out and replace the three screws on the right-hand side and the two screws on the left-hand side. (Refer to Figs. 2-7 to 2-9.)

Remounting of the tray is now complete. Pull the tray in and out, making sure that the bottom panel moves up and down smoothly and that the tray makes no unusual noises.

Fig. 2-18

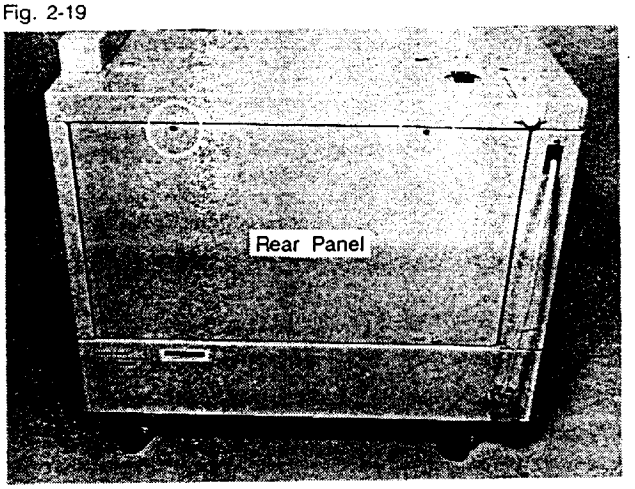


2.2.6 Control Board, Motor, and Transport Roller Replacement

The control board and motor are located inside the rear of the paper feeder. To remove these components, it is first necessary to remove the rear panel.

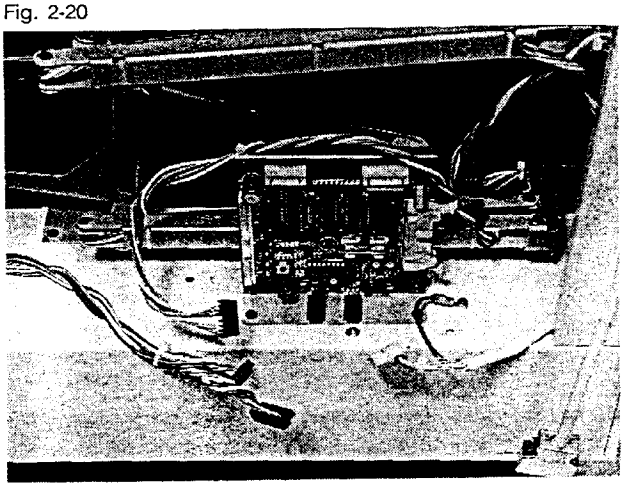
1. Remove the two screws and remove the back panel (Fig. 2-19).

Fig. 2-19



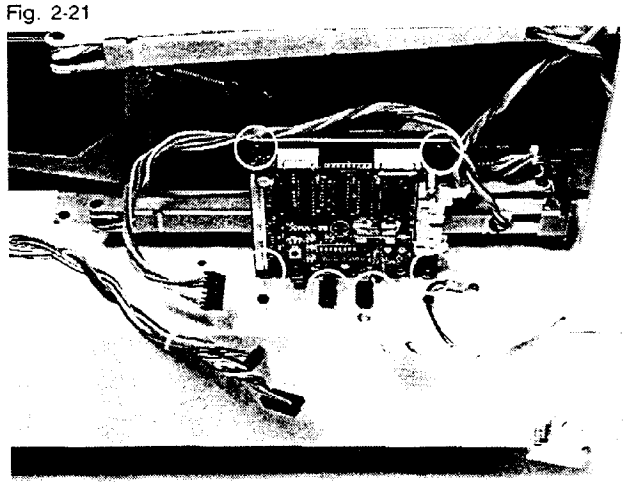
2. Disconnect all connectors from the control board; note that CN6 is an open connector (Fig. 2-20).

Fig. 2-20



3. Remove the two screws holding the power transistors (TR1 and TR3) in place (Fig. 2-21).
4. Remove the four screws shown in Fig. 2-21 and remove the board from its bracket. Be careful not to lose the four collars between the board and the bracket.

Fig. 2-21



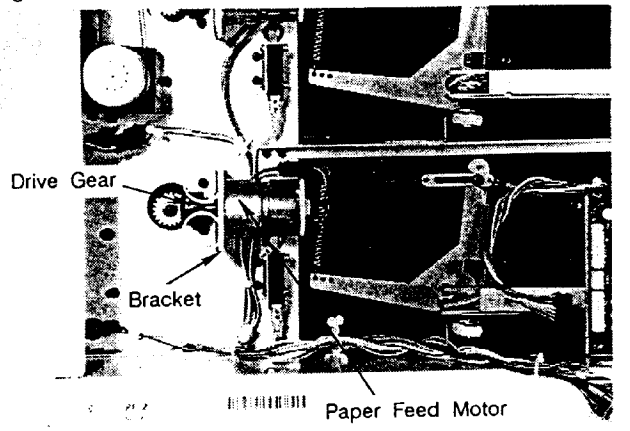
To mount the new board, first attach the power transistors and then replace the collar and screw at each of the four corners of the board. Finally, reconnect all of the connectors in their original positions.

Paper Feed Motor Replacement

1. After removing the two screws and washers, remove the paper feed motor with its bracket (Fig. 2-22).
2. Remove the four screws and remove the motor from its bracket.
3. Using a 3mm hexagonal wrench, remove the drive gear from the motor shaft.

Reverse the procedure to install a new motor.

Fig. 2-22

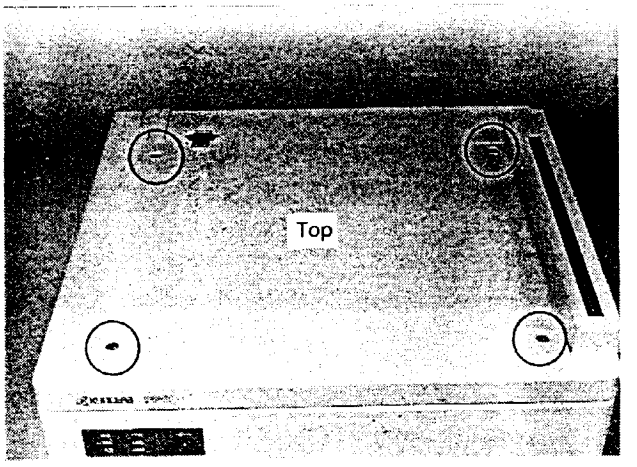


Transport Motor Replacement

To replace the transport motor it is necessary to remove the top and side panels. It is also necessary to remove the top and side panels when replacing the transport rollers or the transport belt.

1. After removing the four screws on the top of the paper feeder, remove the top panel. It is easiest to first lift up the transport roller side while pressing down on the opposite side (Fig. 2-23).

Fig. 2-23



7. Open the upper and lower paper trays two or three centimeters and remove the side panel.
8. After removing the two screws and washers, remove the transport motor. Set aside the belt at the same time (Fig. 2-27).
9. Using a 3mm hexagonal wrench, remove the gear from the transport motor shaft.
10. Attach the gear to the new transport motor. Locate the gear as far down the shaft as possible.
11. After first placing the belt on the transport roller gear and the transport motor gear, attach the transport motor to the chassis. Do not tighten the screws yet, since the belt tension needs to be adjusted.
12. Adjust the belt tension, referring to Fig. 2-28. Ideally, when pinched between two fingers as shown in the diagram, the belt should not become perfectly parallel, but should bulge outwards at the end near the transport motor.

After attaching the belt, confirm that the belt will not come into contact with the harness.

Fig. 2-27

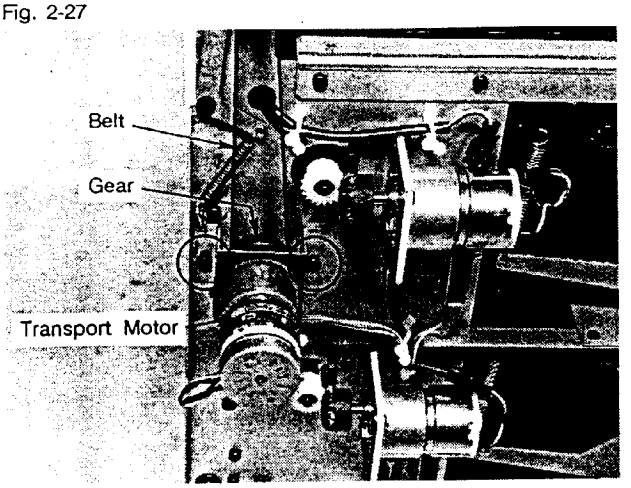
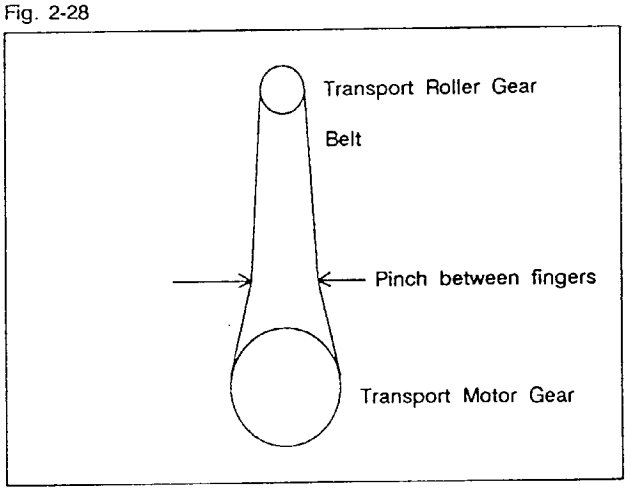


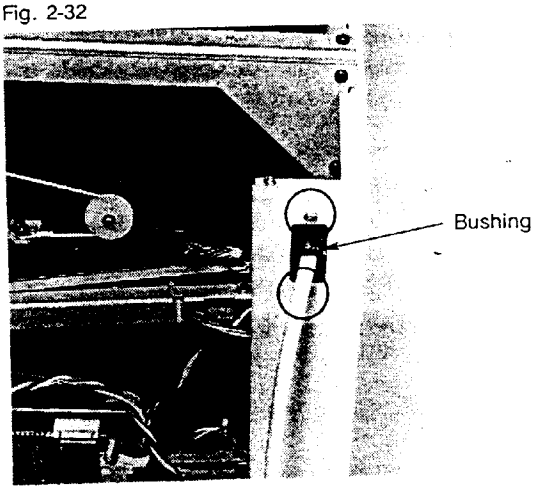
Fig. 2-28



5. With the transport metal roller still pulled away, remove the transport roller.

Reverse this procedure to install a new roller. **Be careful about the direction in which the clutch is attached, and be sure to properly install the washers and spacer.**

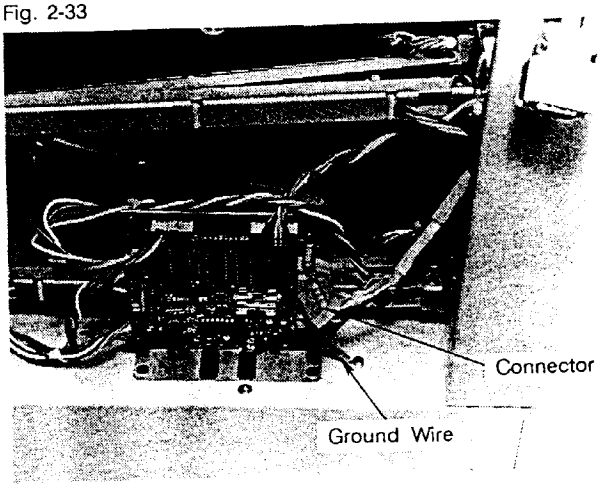
Fig. 2-32



Connector Cable Replacement

1. Remove the rear panel (Fig. 2-18).
2. Remove the two screws indicated in Fig. 2-32 and remove the bushing attachment board.
3. Remove the bushing from the attachment board with a pair of pliers and then detach both the bushing and the attachment board from the cable.
4. Detach the connector from the control board. Remove the screw that holds the ground wire and detach the ground wire (Fig. 2-33).

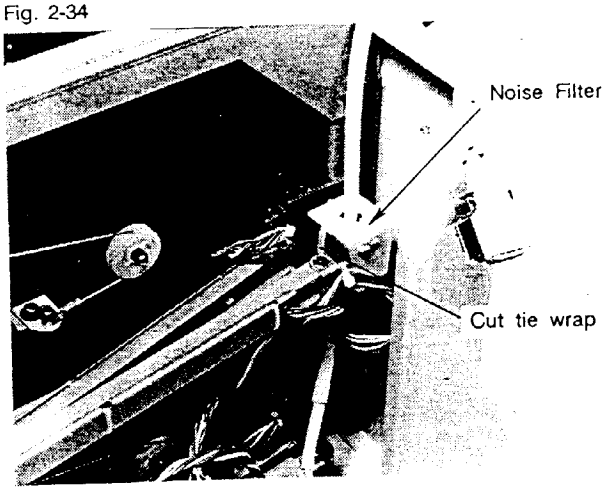
Fig. 2-33



5. Cut the tie wrap holding the noise filter in place and detach the cable (Fig. 2-34).

   Attach a new cable by reversing the procedure. Attach the bushing to the cable in its original position, and then attach the bushing to the rear panel with the attachment board. Pass the cable through the noise filter and then fix the noise filter in place with a new tie wrap.

Fig. 2-34

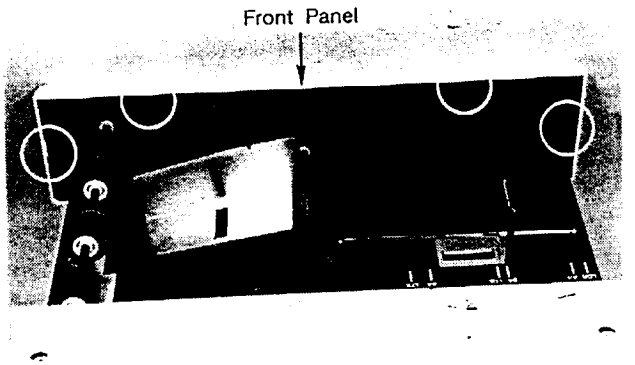


Indicator Board Replacement

To replace the indicator board, it is only necessary to pull out the paper tray; it is not necessary to remove the paper tray from the paper feeder.

1. Pull out the paper tray.
   Caution: Pulling out the lower tray and the upper tray at the same time can cause the paper feeder to fall over. Do not pull out both trays at the same time.
2. Remove the four tapping screws shown in Fig. 2-35.
3. Slowly remove the front panel of the paper tray. Be careful not to pull on the panel too hard, since it is still attached to the paper feeder harness.

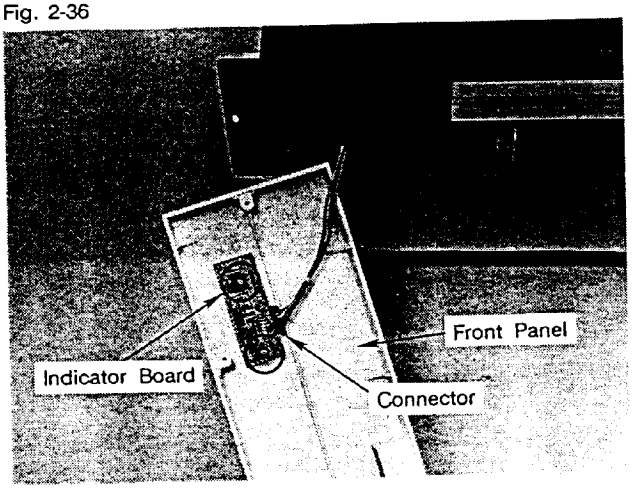
Fig. 2-35



4. After removing the two screws indicated in Fig. 2-36, remove the indicator board from the front panel. Next, disconnect the connector (Fig. 2-36).

When installing a new board, be certain to first attach the connector to the new board and then attach the new board to the front panel.

Fig. 2-36



2.3 Cleaning Procedures

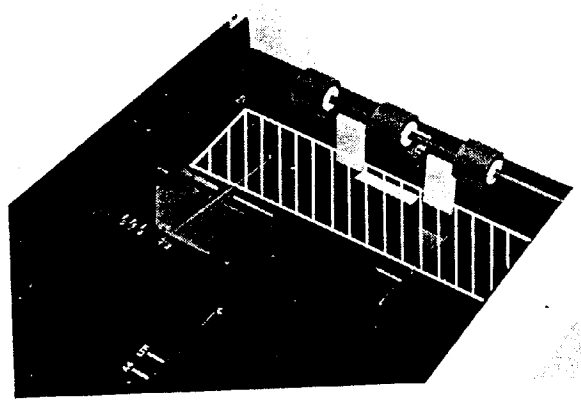
After the paper feeder has been used for a certain period of time, tiny paper scraps will begin to accumulate in the paper tray, especially under the paper feed rollers. Because these scraps of paper will not only hamper paper feeding but will also cause problems in the printing system in the printer, periodic cleaning is necessary. The following procedure should be performed whenever new paper is loaded in the paper tray.

Wipe the area shown in Fig. 2-37 with a Kyocera-specified cleaning cloth. Clean both the upper and lower trays.

If an excessive amount of paper scraps accumulate, change the type of paper being used in the feeder.

Using the same cloth, wipe the surface of the paper feed rollers and the separator.

Fig. 2-37



2.4 Lubrication Procedures

The drive gears of each of the paper feed motors in the paper feeder require periodic lubrication.

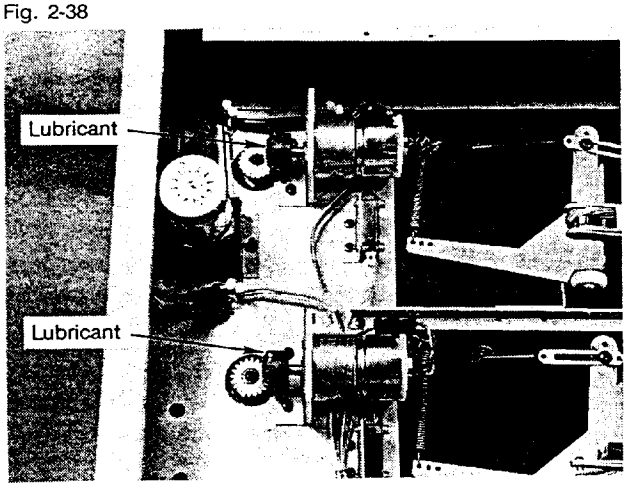
Lubrication interval: Every 600,000 sheets

Lubricant: Kyocera CO-2

1. After turning off the printer power, disconnect the cable connecting the printer with the paper feeder.
2. Remove the rear panel of the feeder (Fig. 2-18).
3. Apply an appropriate amount of the lubricant indicated above to the paper feed motor drive gears (Fig. 2-38).

Do not apply any lubricant to the transport motor gear or transport belt. Be careful not to apply lubricant to any surface where it is not required.

Fig. 2-38



Chapter 3: Paper Specifications

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3.2 Selecting Suitable Paper, 3-4
3.3 Special Paper, 3-7

3.1 Paper Specifications

This feeder and its printer are designed to use paper like that used in plain paper copier machines. However, a variety of other types of paper can be used within the limits specified in this chapter. Selection of suitable paper is important. Use of the wrong paper can result in jams, wrinkles and poor print quality. Use of low-quality paper results not only in poor print quality and wasted paper, but can also damage the paper feeder and printer. Selecting paper according to the guidelines in this chapter will result in efficient and trouble-free printing and in reduced wear and tear on the feeder and printer.

3.1.1 Suitable Types of Paper

Use ordinary plain paper copier paper. Paper from different manufacturers will differ in grade, which in turn will affect printing. Satisfactory results can not be expected with low-quality paper. Low-priced paper is not economical in the long run if it is not suitable for use with a laser printer.

The following table shows the basic specifications for paper that can be used with this feeder and its printer. For details, refer to the following pages.

Table 3-1. Basic Paper Specifications

Item	Specifications
Weight	60 to 90g/m^2
Thickness	0.086 to 0.110mm
Dimensional Accuracy	±0.7cm
Squareness of Corners	90° ±2°
Moisture Content	4% to 6%
Direction of Grain	Long
Pulp Content	80% or more

Kyocera assumes no liability for problems that occur when paper not satisfying these requirements is used.

3.2 Selecting Suitable Paper

When selecting paper, the following factors must be taken into consideration.

Condition of Paper

Avoid the following types of paper:

- ☐ Paper bent at the edges
- ☐ Curled paper
- ☐ Dirty paper
- ☐ Torn paper
- ☐ Paper with loose fibers
- ☐ Paper with a rough surface; paper that shreds easily

Use of such paper leads not only to poor print quality but also to misfeeds, jams, and shortened feeder and printer life. The paper should have as smooth and even a surface as possible. Do not, however, use paper with a surface coating or other surface treatment.

Composition

Do not use paper that has been coated or surface-treated, or which contains plastic or carbon. The heat of fusing can cause such paper to give off harmful fumes. Such paper can also damage the printer drum.

Bond paper should contain at least 80% pulp. Not more than 20% of the total paper content should consist of cotton or other fibers.

Paper Size

The table at right shows the paper sizes that can be used with the PF-2 paper feeder trays. While B5 paper can not be used with the feeder, a B5-size cassette is available as optional equipment for the printer.

Other paper sizes can be fed using the printer's manual feed feature.

Table 3-2. Paper Sizes

Cassette	Size
A4	21.0×29.7cm
A3	29.7×42cm
B4	25.7×36.4cm
Letter	8.5"×11"
Ledger	11"×17"
Legal	8.5"×14"

Smoothness

Although the paper should have a smooth, even surface, coated paper can not be used. Note that if the paper is too smooth, the printer may feed multiple sheets at one time.

Basis Weight/Thickness

Basis weight is the weight of a square meter of a single sheet of paper. Paper that is too light or too heavy can cause misfeeding, jams, and excessive feeder and printer wear. Uneven weight or thickness can cause incomplete toner fusing, blurring, and other print quality problems.

The range of appropriate paper weights is **60 to 90 g/m^2**.

Paper that is extremely thick or extremely thin can not be used in the feeder. Paper that is too thin will cause multiple feeding, and jams will occur with paper that is too thick or too thin.

The appropriate range of thickness is **0.086 to 0.110 mm**.

Moisture Content

Moisture content is defined as the percentage ratio of moisture to the dry mass of the paper. Moisture can affect the smoothness of paper feeding, the paper's electrostatic properties, and toner fusing characteristics. The moisture content of paper varies with the relative humidity of the room in which it is kept, affecting the paper's elasticity. When the relative humidity is high, the edges of the paper may expand and become wavy. If the humidity is too low, however, the edges shrink and tighten, and print contrast may suffer. Waviness and dryness can also cause misfeeding and alignment problems.

The appropriate moisture content for paper is **4% to 6%**. To ensure proper moisture content, it is important to store paper in a controlled environment. Necessary conditions are as follows:

- ☐ Store paper in a cool, well-ventilated location.
- ☐ Store paper that is not in use unopened and horizontally. When storing a package of paper that has been opened once, reseal it.
- ☐ When placing paper in storage, store it in its original carton. Place the carton on a pallet or shelf to keep it away from the floor. If the floor is made of wood planking, it is particularly important to keep the paper off of the floor during wet weather.
- ☐ Avoid leaving paper where it may be exposed to heat, sunlight or moisture.

Direction of Grain

When paper is manufactured, it is cut into sheets with the grain running either parallel to the length (long grain) or parallel to the width (short grain). All paper used in this feeder should be **long grain**; if the package is not marked, check with your paper supplier.

Other Paper Properties

Stiffness: Paper that is too limp or too stiff can buckle in the feeder or printer, causing a paper jam.

Curl: Most paper has a natural tendency to curl in one direction. As paper passes through under the drum, the printer tends to impart an upward curl. To counteract this, the paper should be loaded into the cassette with the curl facing downward. Printed sheets will then come out flat. Most paper also has a top and bottom surface; loading instructions are usually given on the paper package.

Electrostatic properties: During the printing process, an electrostatic charge is imparted to the paper in order to attract toner. The paper must be able to release this charge quickly so that printed sheets do not cling together in the output tray.

Squareness: Proper printing is not possible with paper that is raggedly cut or whose corners are crushed. Particular attention should be given to paper that is cut by the user.

Packing: Paper should be packaged in reams, and packaged reams should be packed in sturdy cartons. The inside of the paper wrapping should be treated with a moisture-proof coating.

3.3 Special Paper

The following types of special paper can be used in laser printers. Except for colored paper, none of these special papers can be used with the paper feeder; instead, the manual feed feature of the printer should be used.

- ☐ Overhead projector (OHP) film
- ☐ Labels
- ☐ Envelopes
- ☐ Colored paper
- ☐ Postcards

Colored paper must meet the basic paper specifications listed in Table 3-1. In addition, the pigment used in colored paper must be able to withstand the heat of fusing.

Chapter 5: Hardware Notes

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5.1 Introduction

The PF-2 paper feeder is linked to the feeder buffer in the engine section of the F-5000/5000A laser printer. The following signals are input and output:

1. Power supply (+5V) input
2. Power supply (+24V) input
3. Upper and lower cassette paper size information output
4. Upper and lower cassette paper supply (present/not present) information output
5. Jam sensor status output
6. Upper and lower cassette cover status (open/closed) output
7. Upper and lower cassette READY display ON signal input
8. Upper and lower cassette paper feed motor rotation control signal input
9. Transport motor rotation control signal input

   (*Input* means from the printer to the paper feeder; *output* means from the paper feeder to the printer.)

The exchange of these signals between the printer and the paper feeder make it possible to operate the printer as if it had two more paper cassettes in addition to its own.

5.1.1 Feeder Configuration

The feeder hardware can be grouped into three basic types of boards: the main (control) board, the sensor boards (one for each cassette), and the LED display board. A general description of each of these boards is provided below:

Main (Control) Board

This board, using power and signals supplied from the printer, performs the following control functions:

1. Upper and lower cassette paper size information control

   The paper size information output by the sensor board in the bottom of both the upper cassette and the lower cassette is time-division multiplexed and converted to interface signals for the printer.

2. READY display LED driver

   The READY display signals sent from the printer through the interface are used to drive the LEDs on the front panel of the cassettes.

3. Motor drive voltage control

The main board generates the voltage used to drive the transport motor and the cassette paper feed motors in the paper feeder using the +24V power from the printer. Although there is a semi-fixed resistor for drive voltage adjustment on the main board for each of the motors, all necessary adjustment was completed at the factory prior to shipment.

Sensor Board

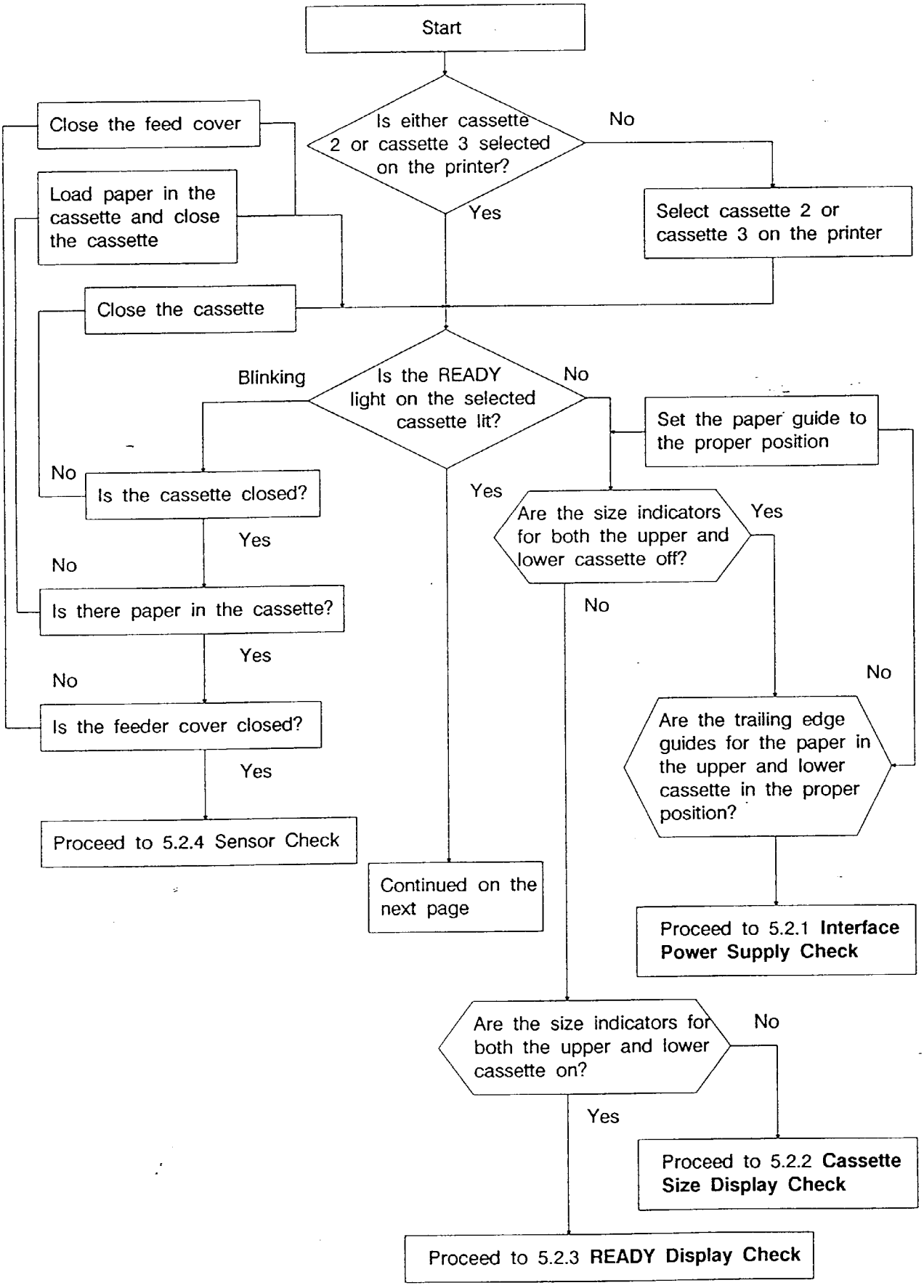
In each cassette there is a trailing edge guide that is set at the trailing edge of the paper in accordance with the paper size; the position of the trailing edge is detected by a photo-interrupter. This position information is the paper size information. The photo-interrupter output is encoded and sent to the main board; in addition, it is also used to light the LED indicating the paper size on the front panel of the cassette. In addition, the sensor board is connected to the paper supply sensor and relays the paper supply (present/not present) signal.

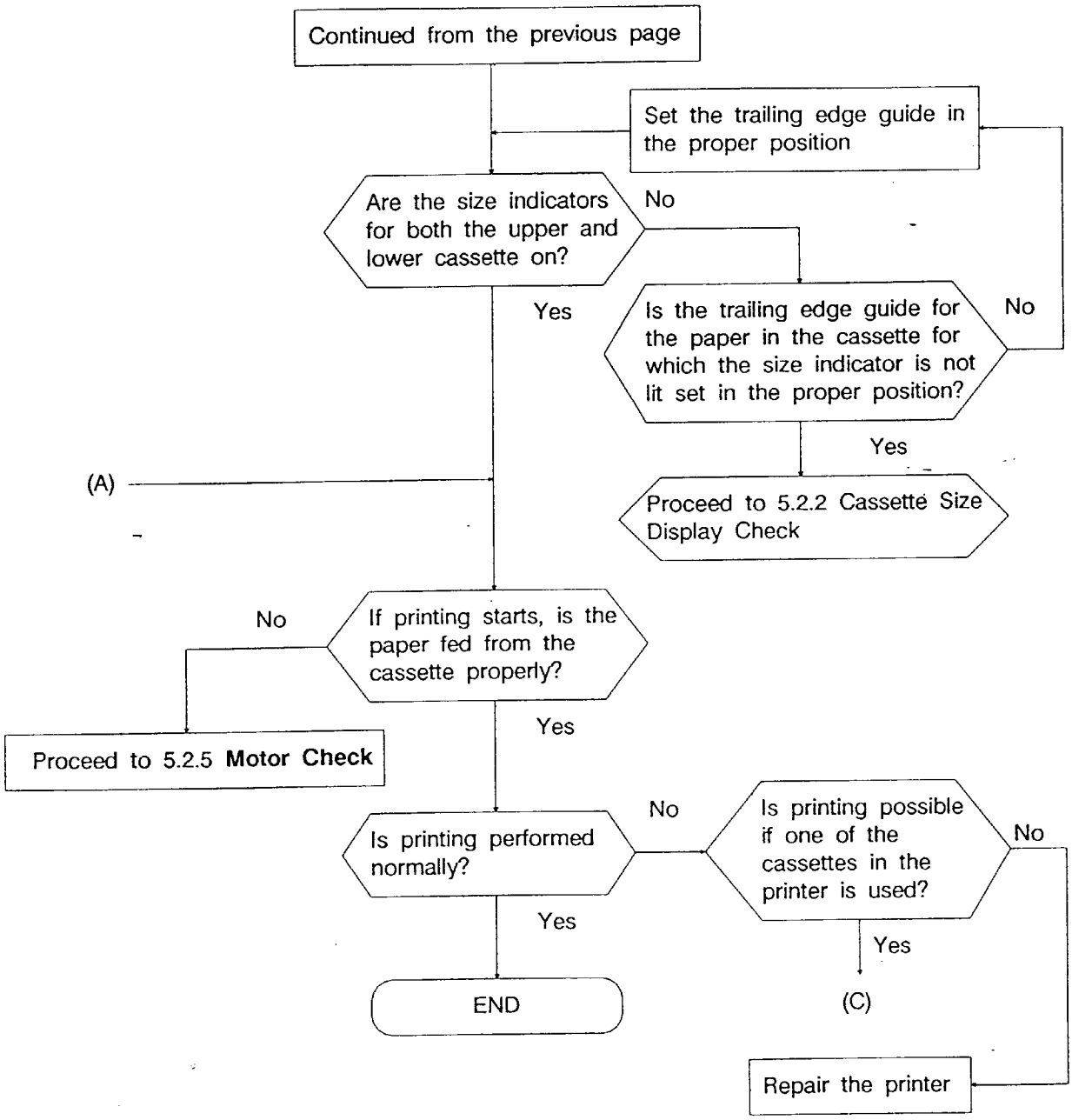
LED Display Board

Signals sent by the sensor board drive LEDs on this board, which is used for displaying the paper size and the READY indication.

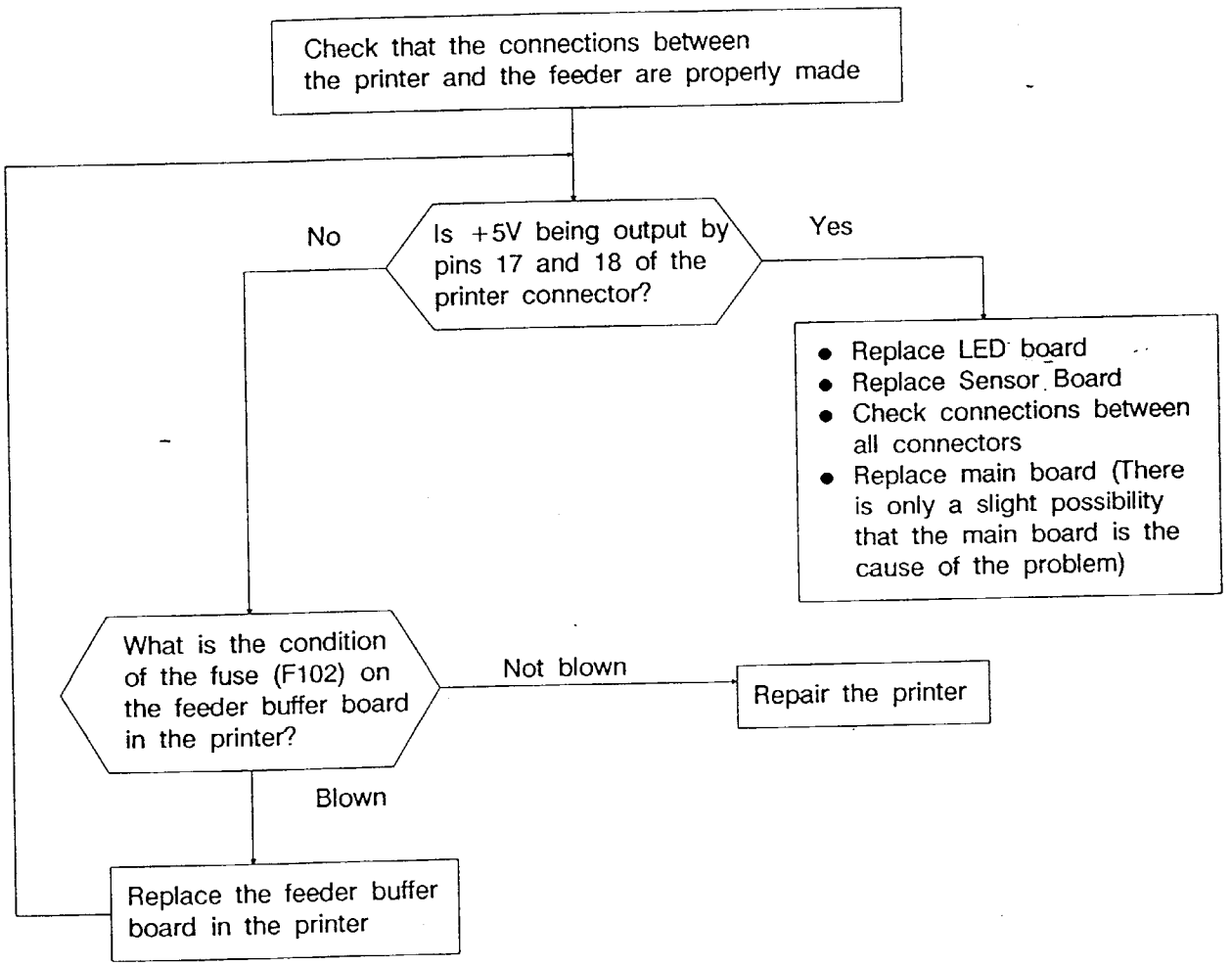
5.2 Electrical System Troubleshooting

The flowcharts on the following pages explain the procedure for diagnosing difficulties with the PF-2 paper feeder. All diagnostics procedures should start with the main flowchart on next page.


Start
Is either cassette 2 or cassette 3 selected on the printer?
No
Yes
Select cassette 2 or cassette 3 on the printer
Close the feed cover
Load paper in the cassette and close the cassette
Close the cassette
Is the READY light on the selected cassette lit?
Blinking
No
Yes
Set the paper guide to the proper position
Is the cassette closed?
No
Yes
Are the size indicators for both the upper and lower cassette off?
Yes
No
Is there paper in the cassette?
No
Yes
Are the trailing edge guides for the paper in the upper and lower cassette in the proper position?
No
Is the feeder cover closed?
No
Yes
Proceed to 5.2.4 Sensor Check
Continued on the next page
Proceed to 5.2.1 Interface Power Supply Check
Are the size indicators for both the upper and lower cassette on?
No
Yes
Proceed to 5.2.2 Cassette Size Display Check
Proceed to 5.2.3 READY Display Check


Continued from the previous page
Set the trailing edge guide in the proper position
Are the size indicators for both the upper and lower cassette on?
No
Yes
Is the trailing edge guide for the paper in the cassette for which the size indicator is not lit set in the proper position?
No
Yes
Proceed to 5.2.2 Cassette Size Display Check
(A)
If printing starts, is the paper fed from the cassette properly?
No
Yes
Proceed to 5.2.5 Motor Check
Is printing performed normally?
No
Yes
Is printing possible if one of the cassettes in the printer is used?
No
Yes
(C)
END
Repair the printer

5.2.1 Interface Power Supply Check



5.2.2 Cassette Size Display Check

- Replace LED board
- Replace sensor board
- Check connections between all connectors
- Replace main board

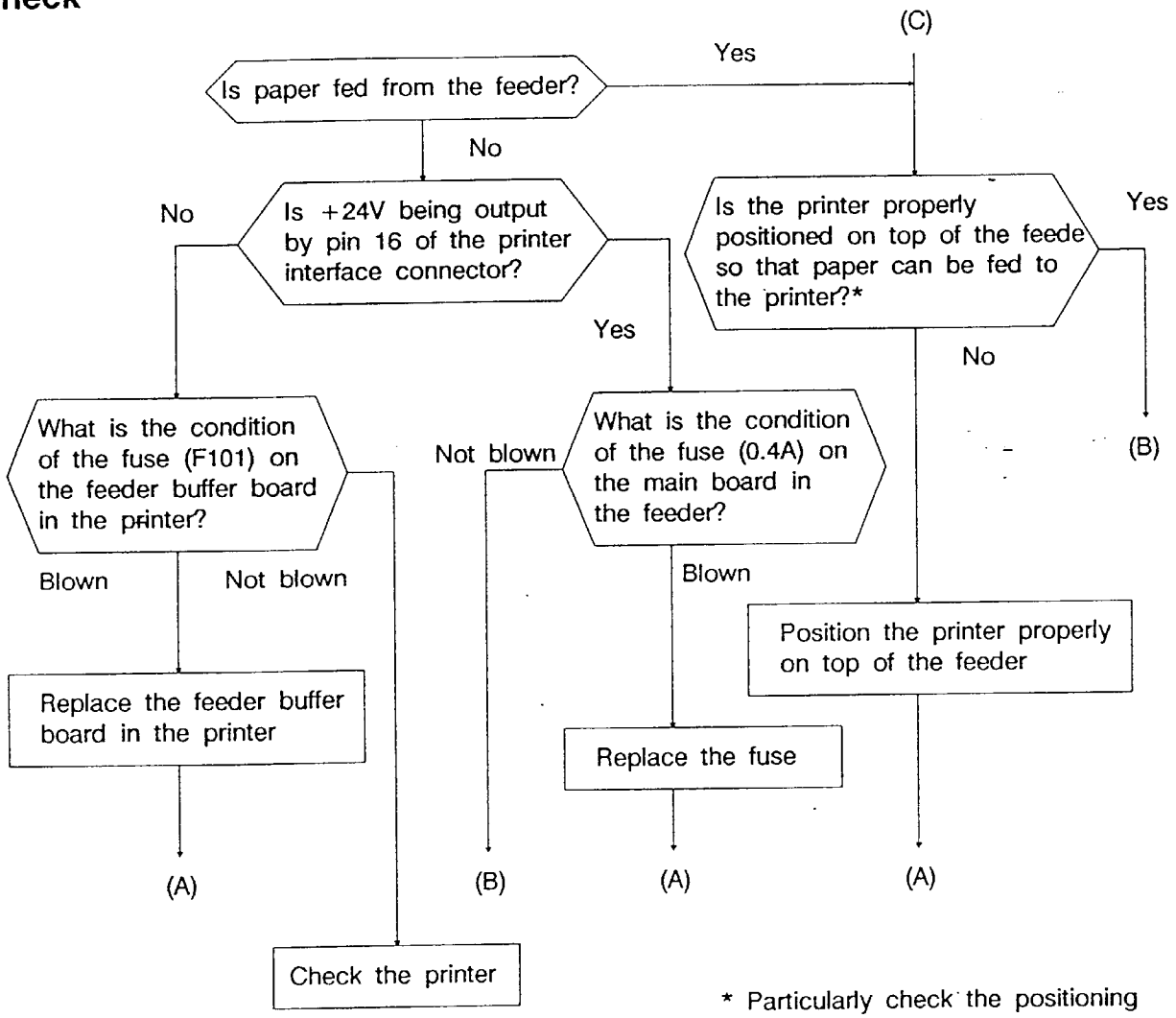
5.2.3 READY Display Check

- Replace LED board
- Replace sensor board
- Replace main board
- Check connections between all connectors
- Check the printer

5.2.4 Sensor Check

- Bad paper supply photosensor in the cassettes
- Bad feed cover open sensing switch
- Replace main board
- Check connections between all connectors and all contacts

5.2.5 Motor Check

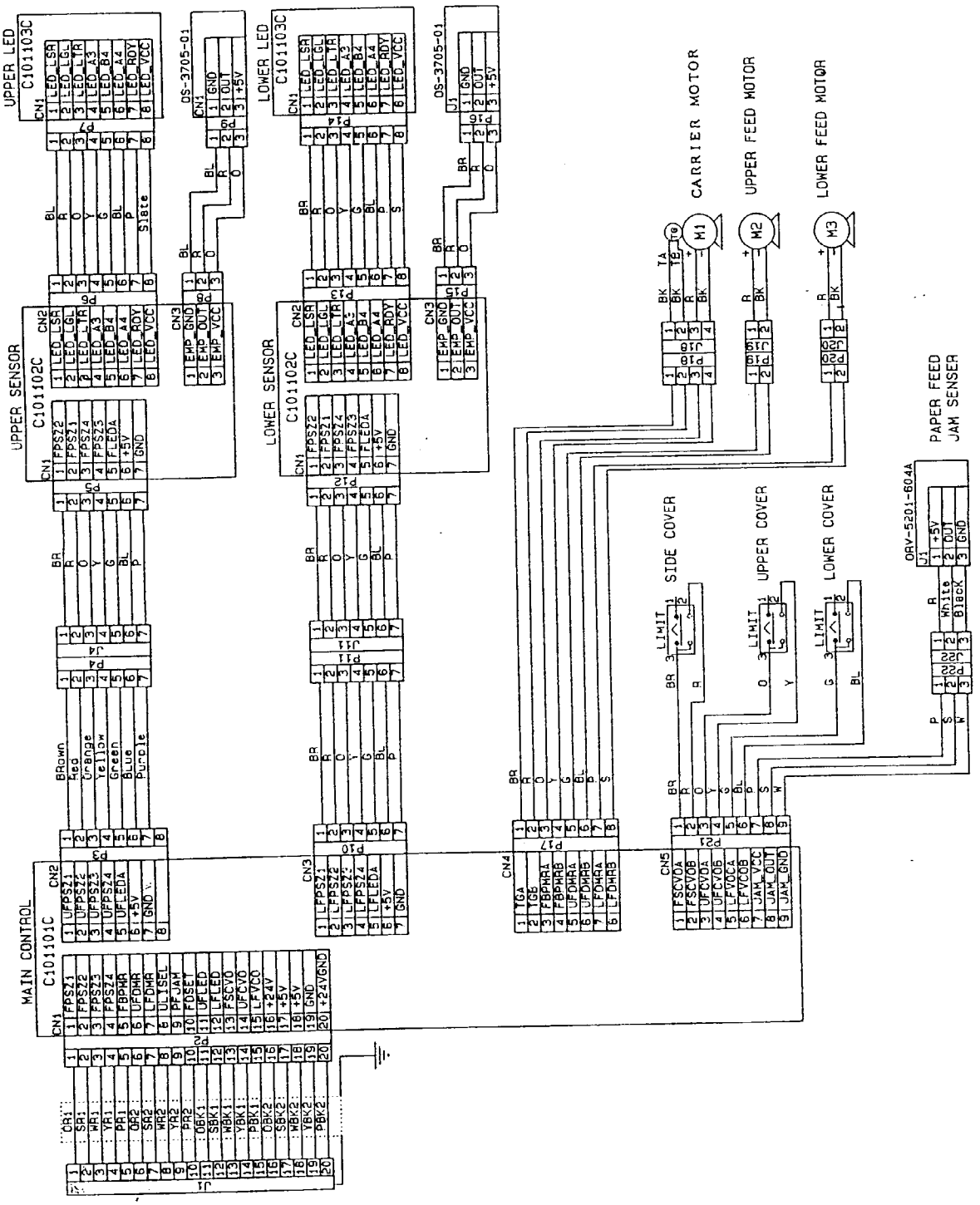


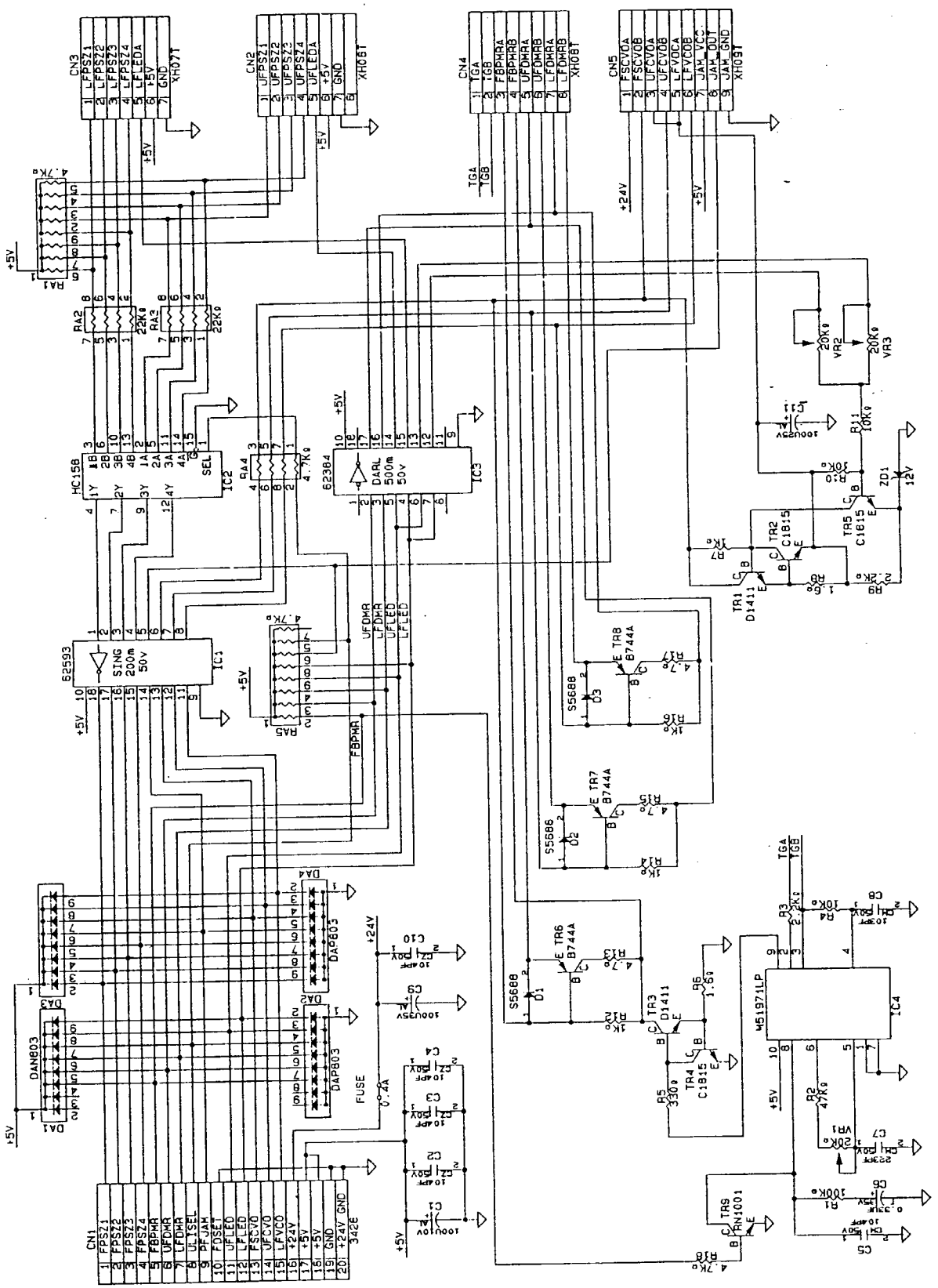
* Particularly check the positioning of the areas that the paper passes through.

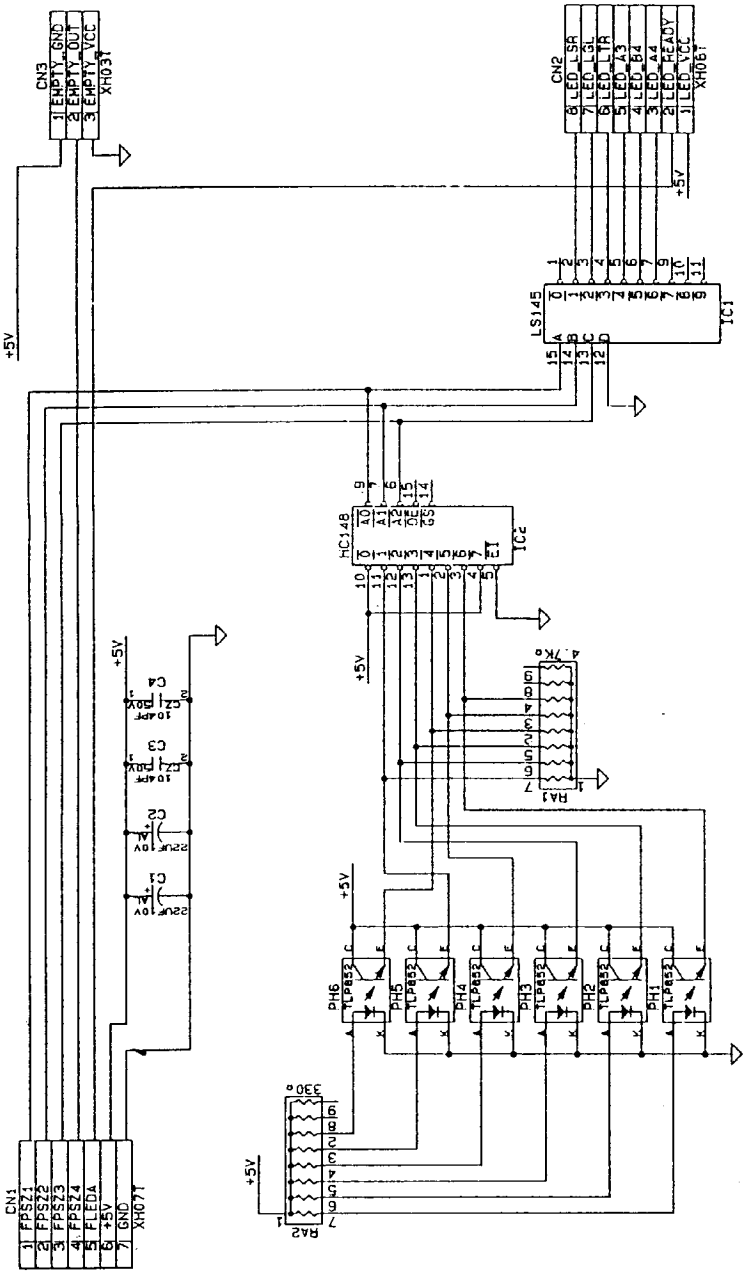
(B)

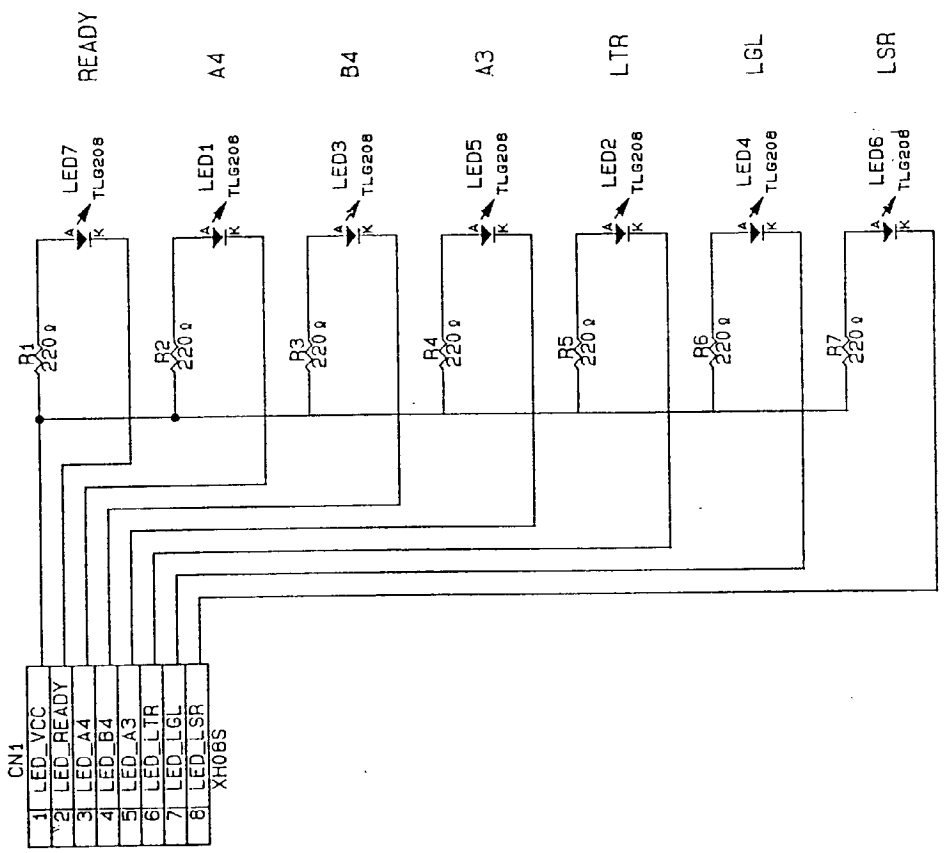
- Replace main board
- Bad transport motor
- Bad paper feed motor
- Bad connection between connectors
- Motor is locked up due to a mechanical difficulty
- Misfeeding is occurring for mechanical reasons

Chapter 6:
Circuit Diagrams


UPPER LED
C101103C
LOWER LED
C101103C
OS-3705-01
OS-3705-01
UPPER SENSOR
C101102C
LOWER SENSOR
C101102C
MAIN CONTROL
C101101C
CARRIER MOTOR
UPPER FEED MOTOR
LOWER FEED MOTOR
SIDE COVER
UPPER COVER
LOWER COVER
LIMIT
PAPER FEED
JAM SENSER
ORV-5201-604A


CN3
CN2
CN4
CN5
XH06T
XH09T
LFPSZ1
LFPSZ2
LFPSZ3
LFPSZ4
LFCEDA
UFPSZ1
UFPSZ2
UFPSZ3
UFPSZ4
UFCEDA
TGA
TGB
FBPMRA
FBPMRB
UFDMRA
UFDMRB
LFDMRA
LFDMRB
FSCVOA
FSCVOB
UFCVOA
UFCVOB
LFVOCA
LFVOCB
JAM_VCC
JAM_OUT
JAM_GND
+5V
+24V
GND
RA1
RA2
RA3
RA4
RA5
4.7KΩ
22KΩ
IC1
IC2
IC3
IC4
62593
SING
200m
50v
HC158
SEL
62364
DAAL
500m
50v
M51971LP
VR1
VR2
VR3
20KΩ
10KΩ
TR1
TR2
TR3
TR4
TR5
TR6
TR7
TR8
D1411
C1815
B744A
S5688
S5686
ZD1
12V
DA1
DA2
DA3
DA4
DAN803
DAP803
FUSE
0.4A
CN1
342E
UFDMR
LFDMR
UFLED
LFLED
FBPMR


CN3
1 EMPTY_GND
2 EMPTY_OUT
3 EMPTY_VCC
XH03T
CN2
6 LED_SA
7 LED_SAL
8 LED_LTR
5 LED_A3
4 LED_A4
3 LED_READY
2 LED_VCC
1 LED_VCC
XH06T
+5V
LS145
IC1
HC148
IC2
4.7K
RA1
330
RA2
PH6
PH5
PH4
PH3
PH2
PH1
TLP832
CN1
1 FPSZ1
2 FPSZ2
3 FPSZ3
4 FPSZ4
5 FLEDA
6 +5V
7 GND
XH07T


READY
A4
B4
A3
LTR
LGL
LSR
LED7
LED1
LED3
LED5
LED2
LED4
LED6
TLG208
R1 220Ω
R2 220Ω
R3 220Ω
R4 220Ω
R5 220Ω
R6 220Ω
R7 220Ω
CN1
1 LED_VCC
2 LED_READY
3 LED_A4
4 LED_B4
5 LED_A3
6 LED_LTR
7 LED_LGL
8 LED_LSR
XH08S