Service and Maintenance Manual

DU-1

Duplexer
for FS-1500[A]/FS-3500[A]
Revision 1.1

Revision 1.00 May, 1993
Revision 1.10 Aug., 1993 (at KEI, Irving)

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. No responsibility is assumed for defects in the printer's firmware.

INFORMATION

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmfuil interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures.

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the manufacturer for compliance could void the user's authority to operate the equipment.

IMPORTANT NOTICE TO SERVICE PERSON

Before attempting service on the printer, including disassembling, re-assembling, troubleshooting, and adjustment, read this manual carefully. During performing service, use extreme care to avoid possible electric shock hazard, burn, and human injuries. Make sure the printer 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 sorter/stacker. 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

Appendix: Schematic diagrams

Legend

Throughout the chapters, **Warning** denotes the precaution which, if ignored, could result in personal injury, and/or irrevocable damage to the priner. **Note** denotes precautions which, if ignored, could result in damage to the printer.

Chapter 1: General information

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1.1. General

This chapter begins with descriptions of the product's profile, then explains basic considerations, and precautions to be observed when repairing, maintaining and inspecting the duplexer DU-1. The precautions are fairly extensive; however, to prevent accidents, it is very important that the service person read the precautions carefully, and observe them at all times.

At the end of this chapter, specifications of the product are also provided.

1.2. Product description

The DU-1 is an auxiliary unit designed for use with Kyocera model

FS-1500/A and model FS-3500/A page printer. Using the duplexer, the printer automatically prints on both sides of the paper.

Topics covering the installation and operations of the printer are fully detailed in the duplexer's *User's Manual.*

1.2.1. Original packing list

When first purchased, the duplexer package contains the following

items in the indicated quantities.

- ❖ DU-1 duplexer, 1
- ❖ Cable holders, 2
- ❖ Instruction manual (English/German/French/Italian/Spanish), 1
- ❖ Anti-paper-smudge fixture, 1

1.2.2. Names of parts

The duplexer has the following parts. See figure on next page.

«Connector» This connector plugs into a connector located

inside the bottom of the printer (or of the optional paper feeder, if used together with the duplexer).

«Positioning pins» These pins fit into two holes in the bottom of the printer (or of the optional paper feeder, if used together with the duplexer).

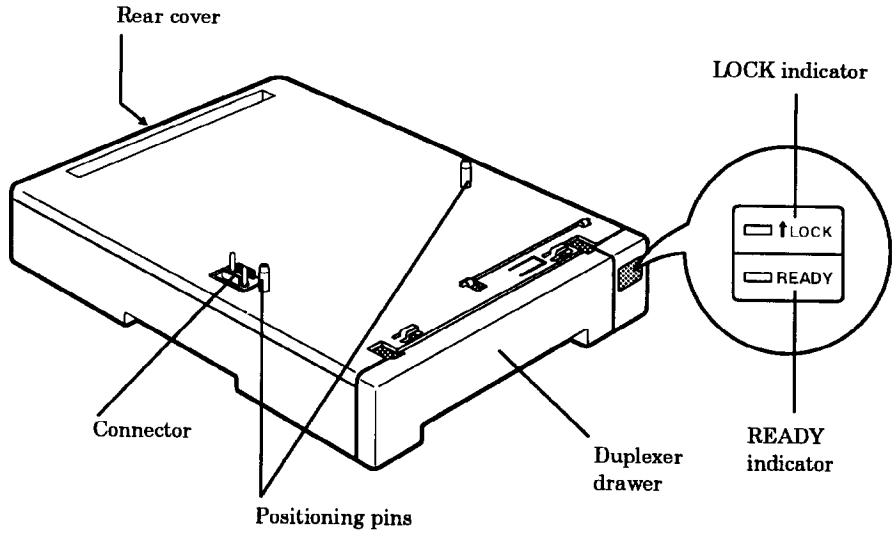
«LOCK indicator» When this indicator is lit the printer's cassette or the cassette(s) of any paper feeders installed is locked to prevent paper jam.

«READY indicator» Lights when the duplexer is ready. Flashes when a jam occurs in the duplexer.

«Duplexer drawer» Open to install the paper path adaptor,or to clear paper jams.

«Rear cover» Opens to allow cleaning paper jams.

FIG. 1.1. DUPLEXER PARTS



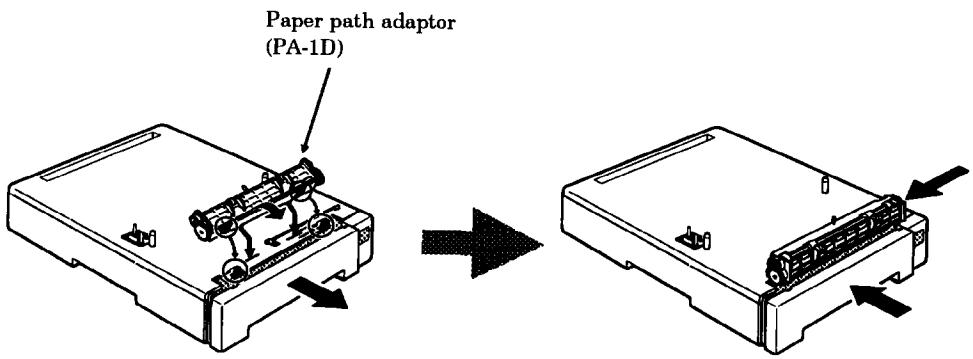
1.2.3. Installing the paper path adaptor

The paper path adaptor is required in order to use the duplexer. The paper path adaptor is an optional accessory, and is sold separately from the DU-1 duplexer.

The paper path adaptor is installed onto the duplexer as shown below. The PA-1D paper path adaptor is shown as an example. Use the same manner for installing the PA-2 paper path adaptor if printer is an FS-3500/A.

If the printer is installed with two paper feeders, the paper path adaptor is installed only on the top feeder. The paper feeder with the paper path adaptor installed is automatically recognized by the printer as the *top* feeder.

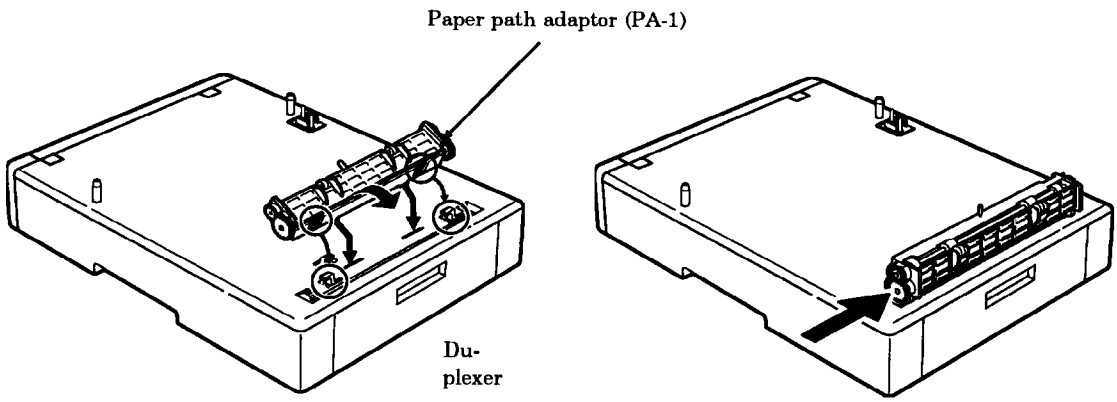
FIG. 1.2. INSTALLING THE PAPER PATH ADAPTOR



NOTE The PA-1D is not compatible with the PA-1 as having longer ribs for guiding paper. Do not use the PA-1D in place of the PA-1 (See below.) or vice versa.

If the duplexer is used together with a PF-5 paper feeder, the PA-1 paper path adaptor must be installed on the rear of the duplexer.

FIG. 1.3. INSTALLING THE PAPER PATH ADAPTOR (REAR)

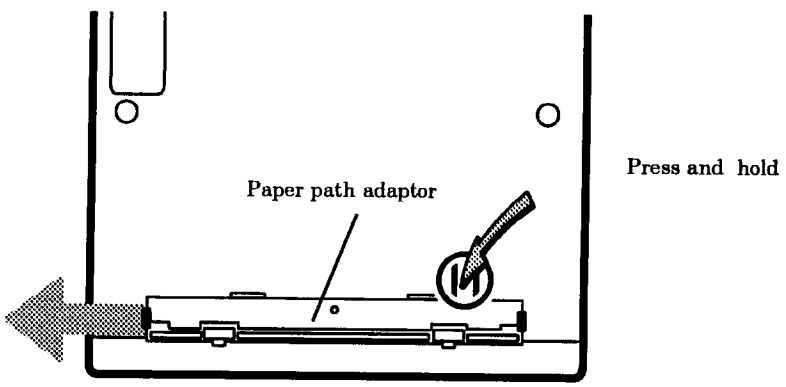


Align the tabs with the slots. After fitting the tabs to the slots, slide the paper path adaptor in the direction indicated by the arrow to lock it.

1.2.4. Removing the PA-1 paper path adaptor

To remove the paper path adaptor at the duplexer rear, press at the point indicated in the figure below while sliding the paper path adaptor to the right.

FIG. 1.4. REMOVING THE PAPER PATH ADAPTOR



1.3. Precautions concerning service and maintenance

Only qualified technician should perform service on the equipment, who is familiar with fundamental safety countermeasures as dictated for all electronics technicians. Observe the following precautions during service and maintenance of the equipment. These are to prevent possible personal injuries to the technician and the damage to the equipment.

1.3.1. Precautions

Always observe the following precautions when maintaining or inspecting the duplexer.

- When performing any maintenance or inspection procedure, first unplug the power cord. Make sure that the printer power is turned off before replacing circuit boards or electrical components in the duplexer.
- To prevent electrostatic discharge damage to electrical circuits, be sure to wear an antistatic band when handling the circuit boards.
- 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 duplxer 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 duplexer in a cool, dark, dry area. Avoid storage in dusty areas.
- Ship units out on a first in, first out basis.

1.3.2. Replacement parts

Be sure to use only Kyocera-recommended supplies and components. Kyocera assume no liability in the event of damage resulting from the use of unauthorized components.

1.4. Specifications

ITEM	SPECIFICATION
Applicable printers	Kyocera FS-1500/A and FS-3500/A
Paper size	Letter (8.5 x 11 inches) ISO A4 (21 x 29.7 cm) Legal (8.5 x 14 inches) JIS B5 (12.8 x 25.7 cm) JIS A5 (14.8 x 21 cm)
Environmental requirements	Temperature: 10°C to 35°C Humidity: 20% to 80% RH *Ideal conditions are 20°C and 65% RH.* Altitude: 2000 m
Dimensions	9.5 cm (3.7") x 34.5 cm (13.6") x 48 cm (18.9")
Weight	6 kg (13.2 lbs)
Power supply	Supplied from printer

Chapter 2: Maintenance

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2.1. Introduction

This chapter explains the following subjects:

Section 2.2. explains with illustrations the disassembly procedures required to replace parts in the duplexer. Section 2.3. explains procedures for cleaning those parts which require periodic cleaning. Note that the duplexer requires no lubrication at any of its parts.

2.2. Disassembly procedures

This section provides procedures for disassemblying of the duplexer. When replacing parts for which there is no specific procedure described, refer to the exploded view shown in chapter 4. Before beginning any disassembly procedure, be sure to read the notes below.

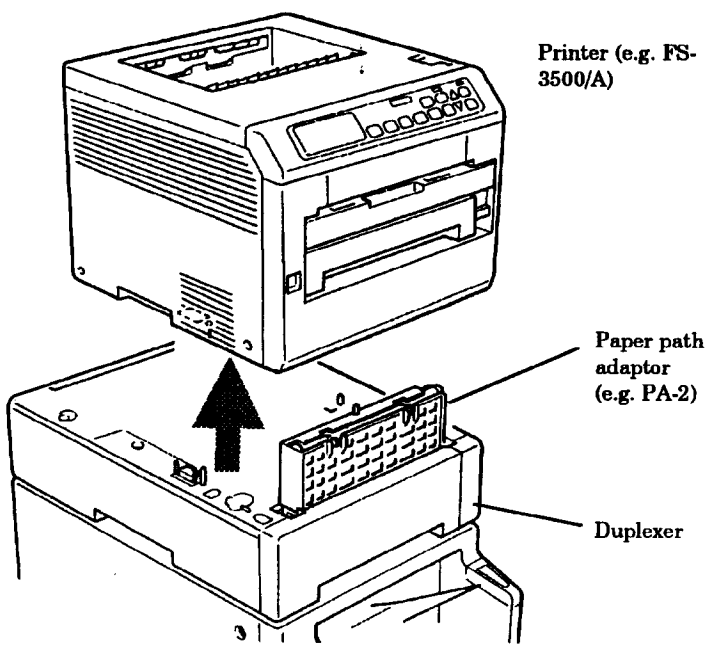
- ❖ Before removing the duplexer from the printer, be sure to turn off printer power.
- ❖ Besure to use the correct screws when installing a component. Using incorrect screws can result in the threads of the screws being stripped, which may lead in turn to other problems. Frequent insertion and removal of self-tapping screws can cause damage to screw holes. Do not tighten screws excessively.
- ❖ When removing or installing circuit boards, wear a ground wrist strap to protect against damage due to discharge of static electricity.

2.2.1. Removing the duplexer from the printer

CAUTION: Before proceeding, turn printer power off and disconnect the AC power cord from the printer.

To remove the duplexer from the printer, slowly and carefully raise the printer (or the paper feeder, if installed together with the duplexer to the printer) from the duplexer. This automatically disconnects the connector on the duplexer from the corresponding conector in the base of the printer (or the paper feed, if installed together with the duplexer to the printer).

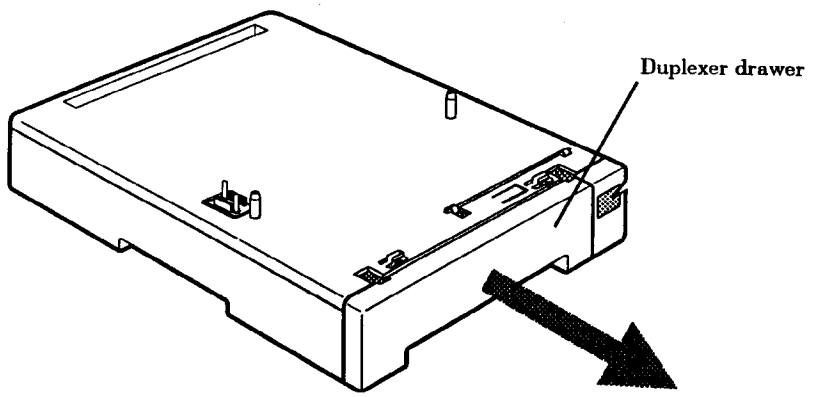
FIG. 2.1. REMOVING THE DUPLEXER FROM PRINTER



2.2.2. Removing the duplexer drawer

Remove two screws and remove the drawer from the duplexer by simply drawing it out.

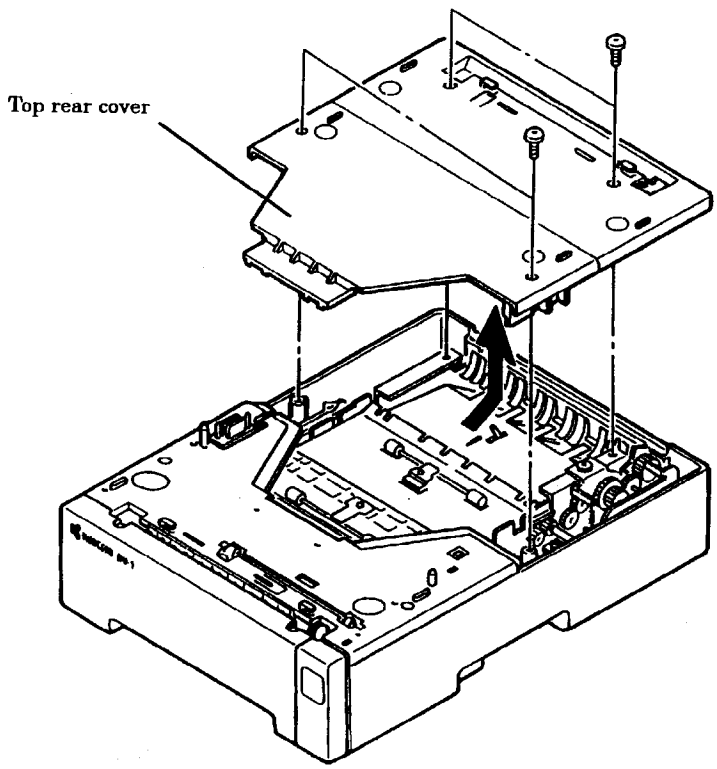
FIG. 2.2. REMOVING THE DRAWER



2.2.3. Removing the top rear cover

To disassemble the duplexer, begin by removing the top rear cover. Remove four screws as shown in Figure 2.3.

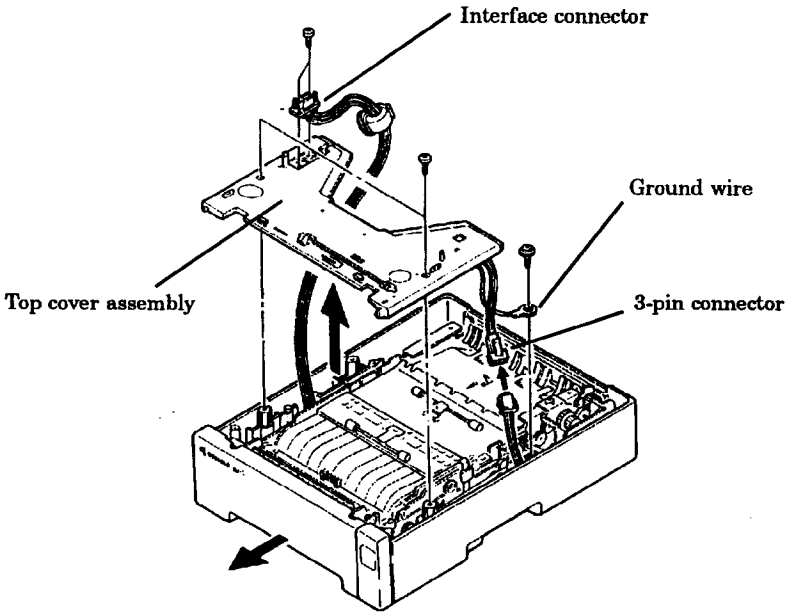
FIG. 2.3. REMOVING THE TOP REAR COVER



2.2.4. Removing the top cover assembly

To remove the top cover assembly, remove two screws, detach the 3-pin connector, detach the ground wire, and remove the interface connector as show below.

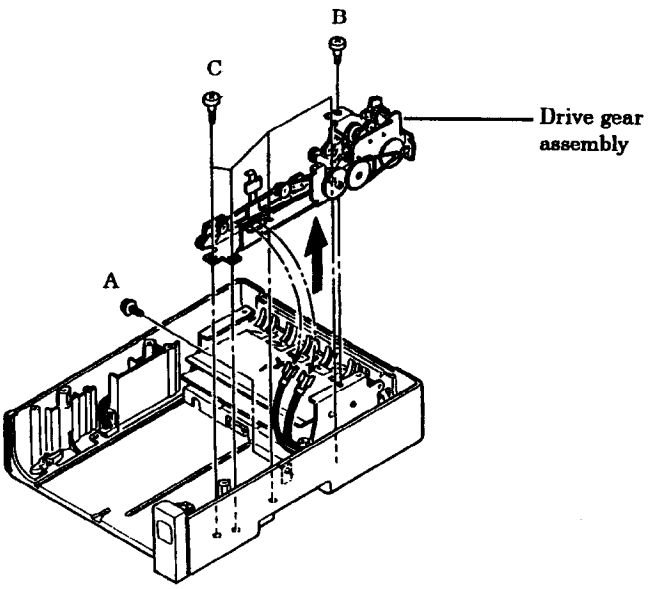
FIG. 2.4. REMOVING THE TOP REAR COVER



2.2.5. Removing the drive gear assembly

To remove the drive gear assembly, remove screw A, screw B, and four of screws C. Detach two connectors. Lift the drive gear assembly up.

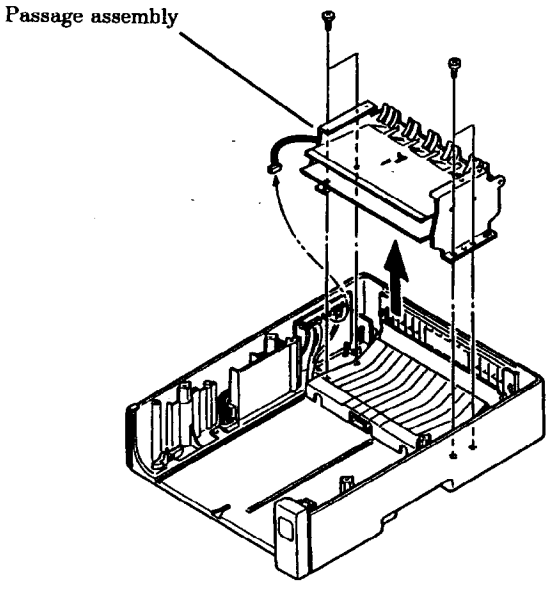
FIG. 2.5. REMOVING THE DRIVE GEAR ASSEMBLY



2.2.6. Removing the passage assembly

To remove the passage assembly, first remove the drive gears assembly (section 2.2.5.). Then, remove four screws that secure the passage assembly to the passage base. Lift the passage assembly out, disconnecting connectors from the adjacent board.

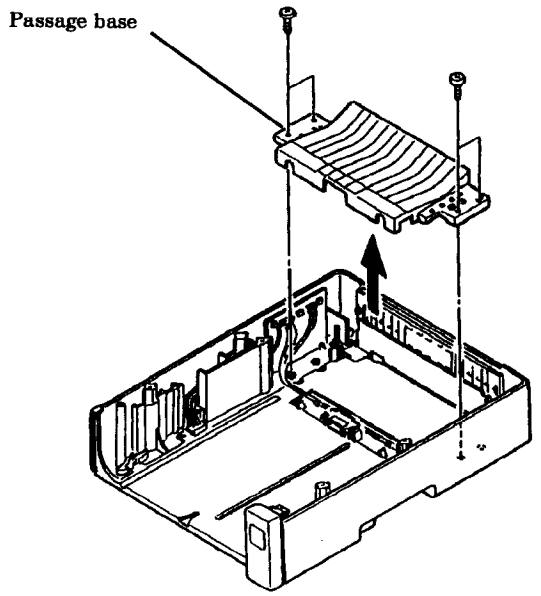
FIG. 2.6. REMOVING THE PASSAGE ASSEMBLY



2.2.7. Removing the passage base

To remove the passage base, remove four screws as shown below.

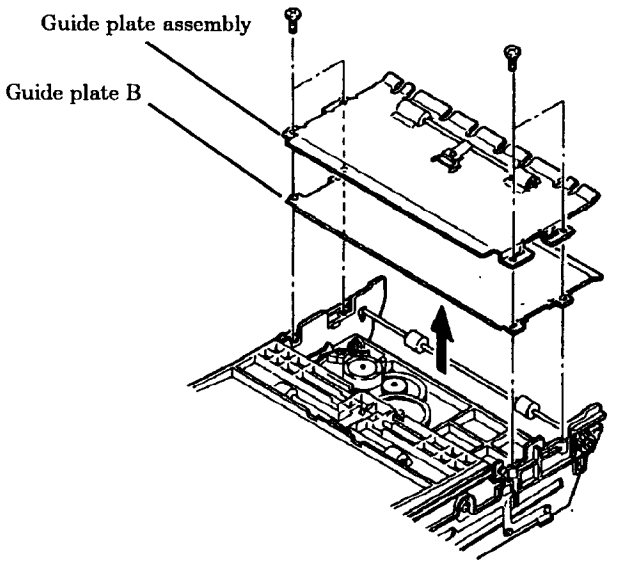
FIG. 2.7. REMOVING THE PASSAGE ASSEMBLY



2.2.8. Removing the guide plate assembly and guide plate B

Remove four screws to simultaneously remove the guide plate assembly (upper) and guide plate B (lower).

FIG. 2.8. REMOVING THE GUIDE PLATES

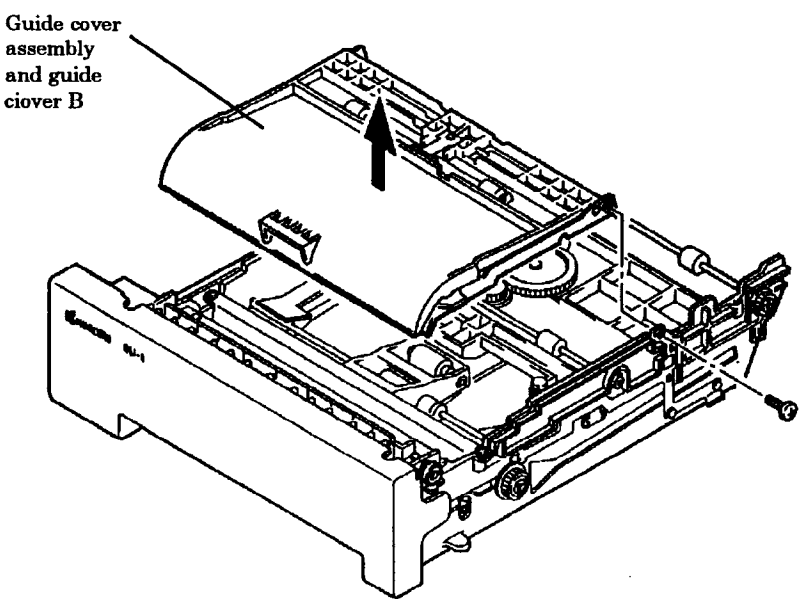


Note. Set the left and right grounding tabs placed on top the guide plate when re-assembly.

2.2.9. Removing the guide cover assembly and guide cover B

To simultaneously remove the guide cover (upper, transparent) and guide cover B (lower), remove screw A as shown below.

FIG. 2.9. REMOVING THE GUIDE COVERS

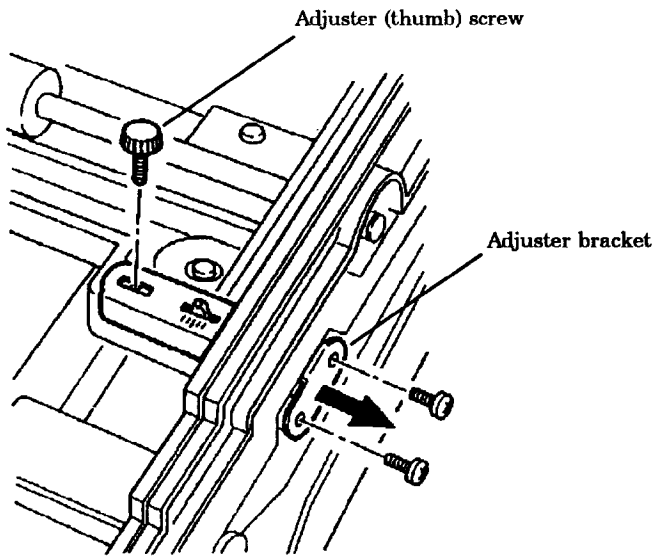


2.2.10. Removing the adjuster assembly

To remove the adjuster assembly, the guide plates and guide covers must be removed first. Refer to sections 2.2.9. and 2.2.10.

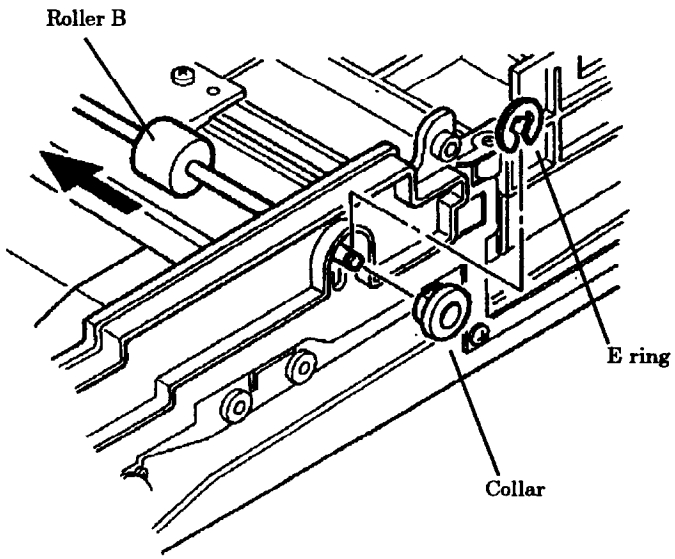
1. Remove the adjuster (thumb) screw by turning it counterlcockwise. Then remove the adjuster bracket by removing two screws.

FIG. 2.10. REMOVING THE ADJUSTER SCREW AND BRACKET



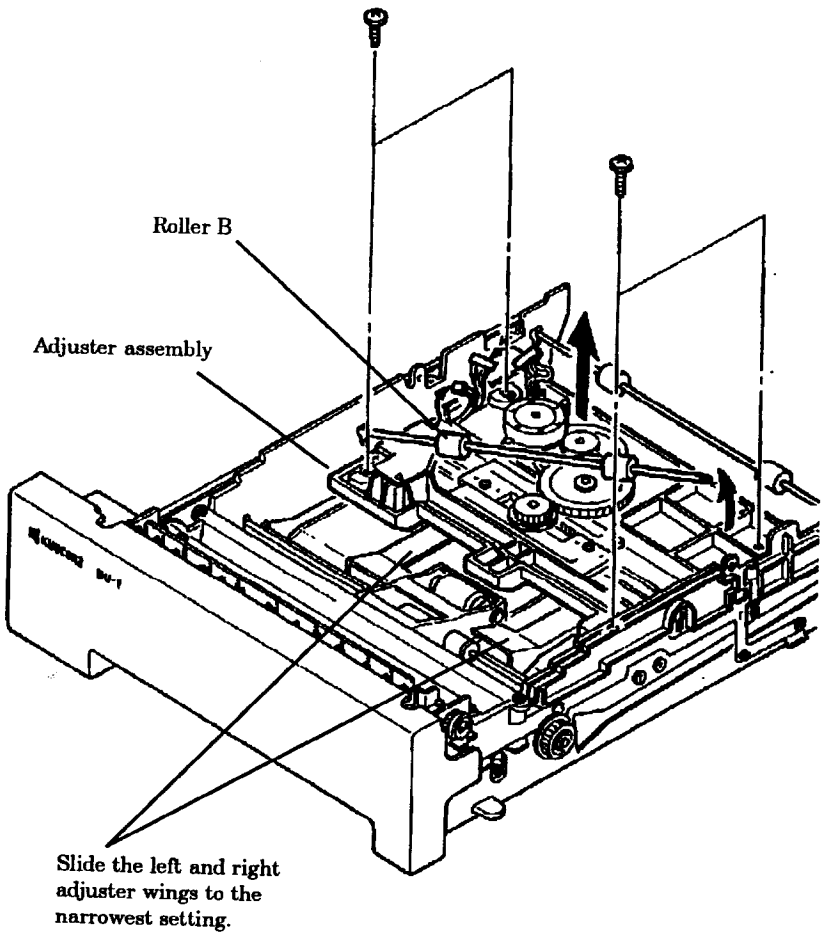
2. Remove the stopper ring from the end of roller B. Retain the ring and the collar for later reassembly.

FIG. 2.11. REMOVING STOPPER FROM ROLLER B



3. Remove four screws that secure the adjuster assembly to the base. Slide the left and right adjuster wings to the narrowest width setting. Then, dressing roller B away above the adjuster assembly, remove the adjuster assembly. Disconnect connectors as required.

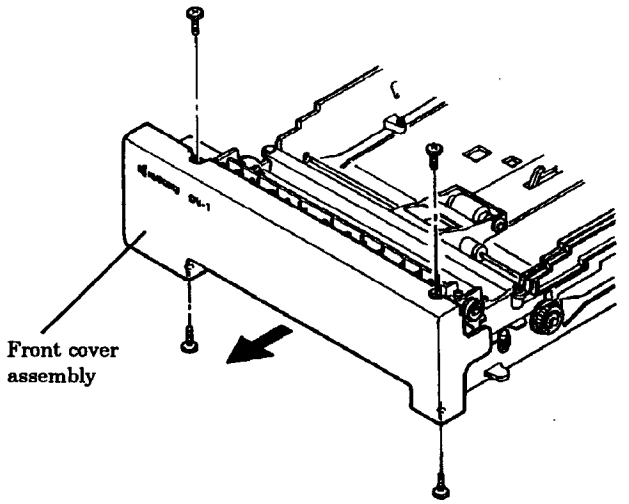
FIG. 2.12. REMOVING SCREWS FROM THE ADJUSTER ASSEMBLY



2.2.11. Removing the front cover assembly

To remove the front cover assembly, remove four screws (two on the top and two on the bottom side) as shown.

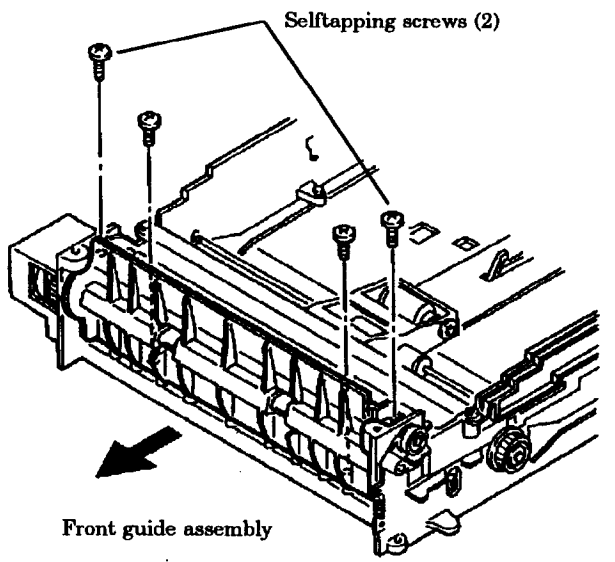
FIG. 2.13. REMOVING SCREWS FROM THE ADJUSTER ASSEMBLY



2.2.12. Removing the front guide assembly

To remove the front guide assembly, remove four screws as shown.

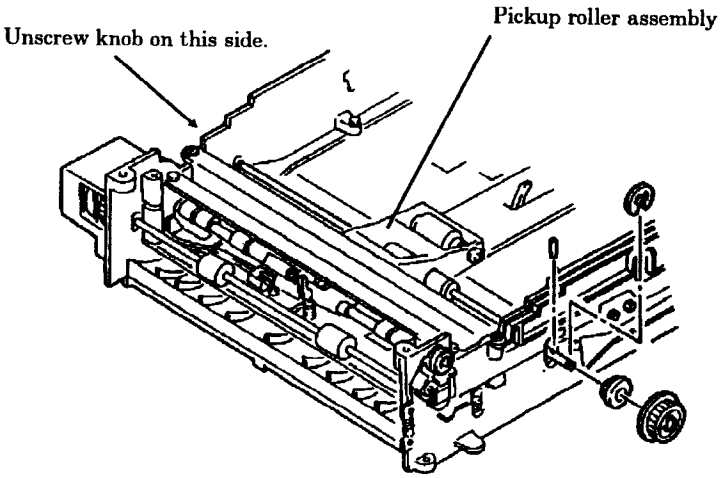
FIG. 2.14. REMOVING SCREWS FROM THE FRONT GUIDE ASS'Y



2.2.13. Removing the pickup roller assembly

To remove the pickup roller assembly, remove the stopper ring on the right side of the unit as shown below. Remove (and retain until reassembly) the gear, parallel pin, and the collar. Then remove the stopper ring on the other side by removing the knob.

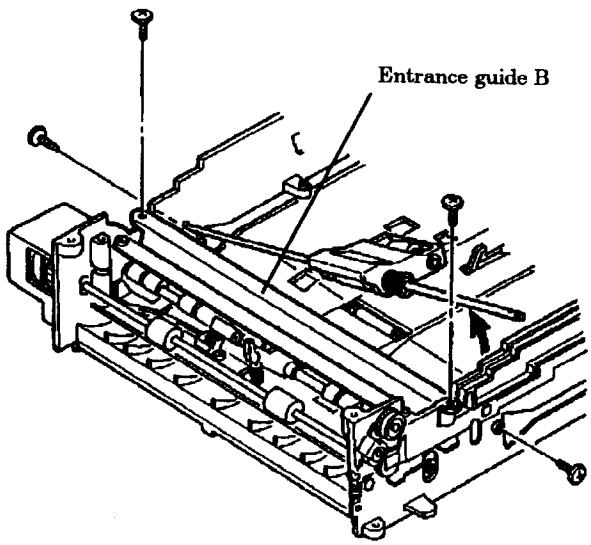
FIG. 2.15. REMOVING THE PUCKUP ROLLER ASSEMBLY



2.2.14. Removing the entrance guide B

To remove the entrance guide B, first remove the pickup roller assembly as instructed in the section above. Then, remove four screws as shown below.

FIG. 2.16. REMOVING THE ENTRANCE GUIDE B

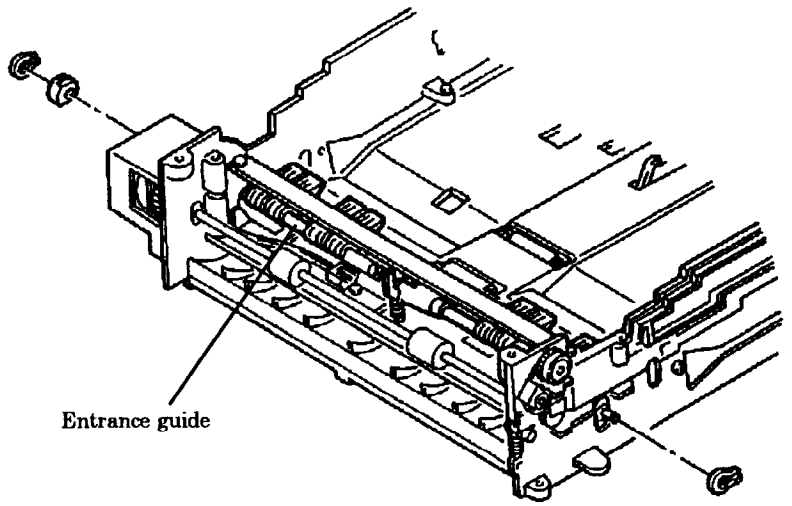


2.2.15. Removing the entrance guide assembly

To remove the entrance guide assembly, remove the pickup roller assembly and the entrance guide B first. Refer to previous sections.

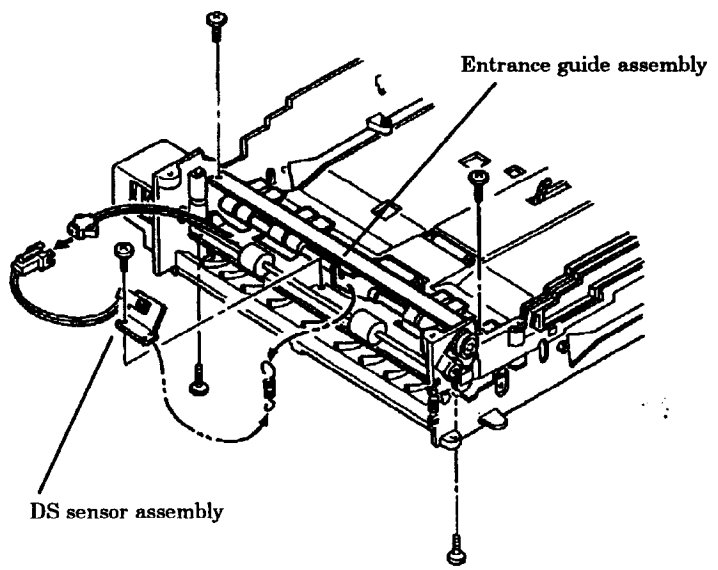
1. Remove the stopper ring from the left and right end of the entrance gate. Remove the coil spring. Remove the front guide.

FIG. 2.17. REMOVING THE ENTRANCE GUIDE ASSEMBLY



2. Remove four screws to remove the entrace guide assembly (two on the top and two on the bottom side). Remove the DS sensor assembly.

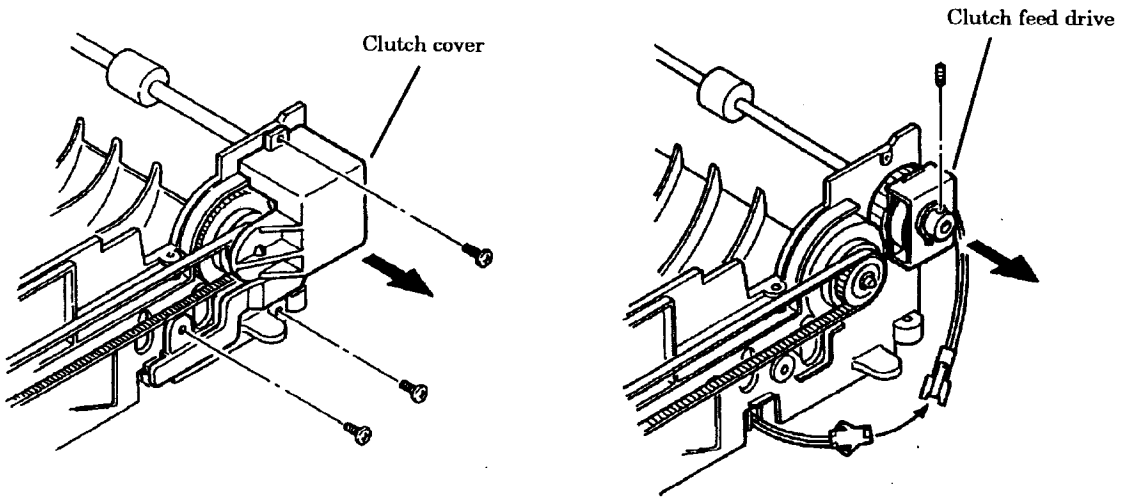
FIG. 2.18. REMOVING THE CLUTCH FEED DRIVE



2.2.16. Removing the clutch feed drive

Remove three screws and remove the clutch cover. Loosen the screw on the clutch feed drive. Pull the clutch feed drive out.

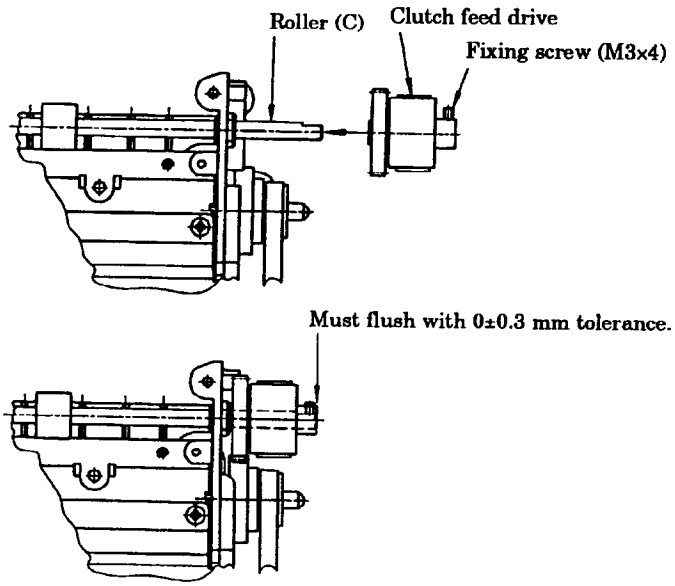
FIG. 2.19. REMOVING THE ENTRANCE GUIDE ASSEMBLY



NOTE ON REASSEMBLY OF THE CLUTCH FEED DRIVE

When replacing the clutch feed drive back to the roller, the small end of the clutch feed drive must be flush with the free end of the roller. Also, the fixing screw of the drive must be tightened to the *D*-cut part of the roller. See figure below.

FIG. 2.20. REPLACING THE CLUTCH FEED DRIVE

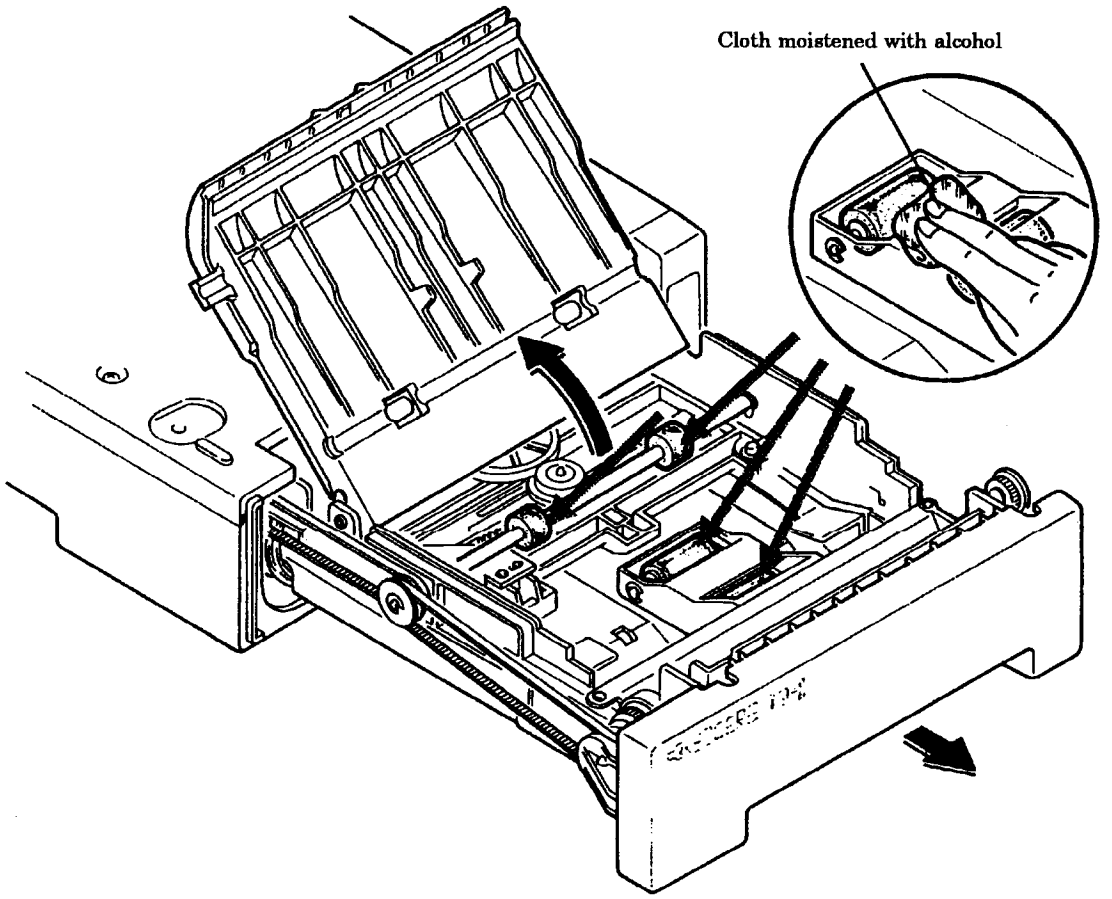


2.3. Cleaning procedure

After the duplexer has been used for a certain period of time, tiny paper scraps and dust will begin to accumulate on the rollers. Because these scraps and dust will hamper paper feeding within the duplexer, periodic cleaning is necessary using the procedure explained below.

Clean the rollers with a cloth moistened with alcohol as indicated below.

FIG. 2.21. REMOVING THE ENTRANCE GUIDE ASSEMBLY



2.4. Adjustment

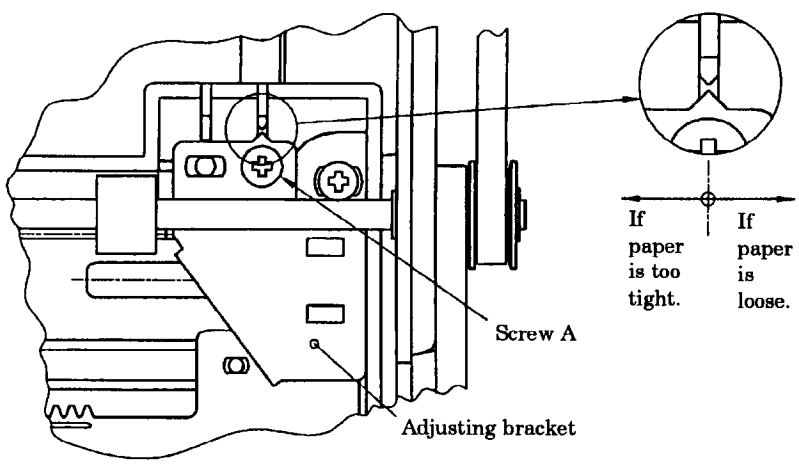
This section explains the procedures for adjustment that may be needed to maintain proper registration of duplex printing. The following jig is required:

JIG TO BE USED Extension cable (also usable with the option sorter and the option paper feeder)

To adjust the duplex registration, proceed as follows.

1. Turn printer power off.
2. Remove the duplexer from the printer. (See section 2.2.1.)
3. With the duplexer and the printer seprated from each other, connect the duplexer's connector to the printer's connector using the extension cable jig.
4. Remove the pickup roller assembly. (See section 2.2.13.)
5. Turn printer power on. This moves the left and right adjusters to the home position.
6. Obtain paper of 225.9 mm (±0.2 mm) wide. Insert it to the adjusters. If the paper is not held tight or is held loose between the adjusters, proceed to step 7. below.
7. Loosen screw A shown in Figure 2.22. below. This frees the adjusting bracket to move back and forth for adjustment. If the paper is loose between the adjusters, move the adjusting bracket to the right (as seen in the figure); and if the paper is too tight between the adjusters, move the adjusting bracket to the left.

FIG. 2.22. ADJUSTING REGISTRATION



8. Repeat step 7. several times. When the bracket is adjusted properly, tighten the screw.

9. Replace the pickup roller assembly.

Chapter 3: Paper specifications

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3.1. General guidelines

The duplexer may not be used to print on paper not satisfying the requirements below. Also, special types of print media such as overhead projection (OHP) film, envelopes, adhesive-backed labels, and paper containing watermarks must not be used with duplex printing. These types can result in jams, misfeeds, and paper waste, and in extreme cases can damage the duplexer.

NOTE: The manufacturer assumes no liability for problems that occur when paper not satisfying these requirements is used with the duplexer.

Selection of the right paper is important. The wrong paper can result in jams, misfeeds, curl, poor print quality, and paper waste, and in extreme cases can damage the duplexer and the printer. The guidelines given below will increase the productivity of your office by ensuring efficient, trouble-free printing and reducing wear and tear on the duplexer and the printer.

3.1.1. Paper availability

Most types of paper are compatible with a variety of machines. Paper intended for xerographic copiers can also be used with the duplexer and the printer.

There are three general grades of paper: economy, standard, and premium. The most significant difference between grades is the ease with which they pass through the printer. This is affected by the smoothness, size, and moisture content of the paper, and the way in which the paper is cut. The higher the grade of paper you use, the less risk there will be of paper jam and other problems, and the higher the level of quality your printed output will reflect.

Differences between paper from different suppliers can also affect the duplexer's performance. A high-quality printer cannot produce high-quality results when the wrong paper is used. Low-priced paper is not economical in the long run if it causes printing problems.

Paper in each grade is available in a range of basis weights (defined later). The traditional standard weights are 19, 20, and 24 pounds (70 g/m^2 to 90 g/m^2).

3.2. Paper Specifications

The following table summarizes the basic paper specifications. Details are given on the following table.

TABLE 3.1. SPECIFICATIONS FOR WHITE BOND PAPER

ITEM	SPECIFICATION
Weight	70 to 90 g/m^2 (19 to 24 lbs/ream)
Thickness	0.086 to 0.110 mm (3.4 to 4.3 mils)
Dimensional accuracy	±0.7 mm (±0.0276 inches)
Squareness of corners	90° ± 0.2°
Moisture content	4% to 6%
Direction of grain	Long grain
Pulp content	80% or more

3.2.1. Selecting the right paper

Printer printing is a process involving LED light, electrostatic discharge, toner, and heat. In addition, as the paper passes through the printer it undergoes considerable sliding, bending, and twisting motions. A high-quality printing paper matching the requirements withstands all these stresses, enabling the duplexer and the printer to turn out clean, crisp printed copy consistently.

Remember that all paper is *not* the same. Some of the factors to consider when selecting paper for duplex printing are as follows:

3.2.2. Condition of the paper

Avoid using paper that is bent at the edges, curled, dirty, torn, or contaminated with lint, clay, or paper shreds.

Use of paper in these conditions can lead to illegible printing, misfeeding, and paper jams, and can shorten the life of the duplexer and the printer. In particular, avoid using paper with a surface coating or other surface treatment. The paper should have as smooth and even a surface as possible.

3.2.3. Composition

Do not use paper that has been coated or surface-treated and contains plastic or carbon. The heat of fusing can cause such paper to give off harmful fumes.

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

3.2.4. Paper size

Printer's cassettes are available for the paper sizes listed in Table 2. The dimensional tolerances are ±0.7 mm (±0.0276 inches) for the length and width. The angle at the corners must be 90° ±0.2°.

TABLE 3.2. PRINTER'S CASSETTE SIZES

PRINTER'S CASSETTE	SIZE
Legal	8.5 x 14 in
Letter	8.5 x 11 in
ISO A4	210 x 297 mm
JIS B5	182 x 257 mm
JIS A5	148 x 210 mm

3.2.5. Smoothness

The paper should have a smooth, uncoated surface. Paper with a rough or sandy surface can cause voids in the printed output. Paper that is too smooth, however, can cause multiple feeding and fogging problems. (Fogging is a gray background effect.)

3.2.6. Basis weight

Basis weight is the weight of a standard quantity of paper. In the traditional system the standard quantity is a ream consisting of 500 sheets measuring 17 x 22 inches each. In the metric system the standard quantity is 1 square meter.

Paper that is too light or too heavy can cause misfeeding, jams, and premature wear of the duplexer and the printer. Uneven paper weight can cause multiple feeds, print defects, poor toner fusing, blurring, and other print quality problems. The proper weight is 70 to 90 g/m^2 (19 to 24 lbs/ream).

Important: Although the printer can print on lighter paper with the basis weight of as low as 60 g/m^2 in simplex printing, duplex printing is not possible with the paper weight of less than 70 g/m^2.

3.2.7. Thickness (Caliper)

Thick paper is referred to as high-caliper paper and thin paper as low-caliper paper. The paper used with the printer in duplex mode should be neither extremely thick nor extremely thin. If you are having problems with paper jams, multiple feeds, and faint printing, the paper may be too thin. If you are having problems with paper jams, and blurred printing the paper may be too thick. The proper thickness is 0.086 to 0.110 mm (3.4 to 4.3 mils).

3.2.8. Moisture content

Moisture content is defined as the percent ratio of moisture to the dry mass of the paper. Moisture can affect the paper's appearance, feedability, curl, electrostatic properties, and toner fusing characteristics.

The moisture content of the paper varies with the relative humidity in the room. When the relative humidity is high and the paper absorbs moisture, the paper edges expand, becoming wavy in appearance. When the relative humidity is low and paper loses moisture, the edges shrink and tighten, and print contrast may suffer.

Wavy or tight edges can cause misfeeding and alignment anomalies. The moisture content of the paper should be 4% to 6%.

To ensure the proper moisture content it is important to store the paper in a controlled environment. Some tips on moisture control are:

- Store paper in a cool, dry location.
- Keep the paper in its wrapping as long as possible. Rewrap paper that is not in use.
- Store paper in its original carton. Place a pallet etc. under the carton to separate it from the floor.
- After removing paper from storage, let it stand in the same room as the printer for 48 hours before use.
- Avoid leaving paper where it is exposed to heat, sunlight, or damp.

3.2.9. Paper grain

When paper is manufactured, it is cut into sheets with the grain running parallel to the length (long grain) or parallel to the width (short grain). Short grain paper can cause feeding problems in the duplexer and the printer. All paper used in the duplexer and the printer should be long grain.

3.2.10. Other paper properties

Porosity: Refers to the density of the paper structure; that is, to how openly or compactly the fibers are bonded.

Stiffness: Limp paper can buckle inside the duplexer and the printer, while paper that is too stiff may bind. Either way the result is a paper jam.

Curl: Most paper has a natural tendency to curl in one direction. The paper should be loaded so that the natural curl is downward, to counteract the upward curl imparted by the printer. 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 the paper is electrostatically charged to attract the toner. The paper must be able to release this charge so that printed sheets do not cling together in the output tray.

Whiteness: The contrast of the printed page depends on the whiteness of the paper. Whiter paper provides a sharper, brighter appearance.

Quality control: Uneven sheet size, corners that are not square, ragged edges, welded (uncut) sheets, and crushed edges and corners can cause the duplexer and the printer to malfunction in various ways. A quality paper supplier should take considerable care to ensure that these problems do not occur.

Packaging: Paper should be packed in a sturdy carton to protect it from damage during transport. Quality paper obtained from a reputable supplier is usually properly packaged.

3.2.11. Special paper

The following types of special paper can be used:

- ❖ Colored paper
- ❖ Preprinted paper

Use paper that is sold specifically for use with copiers (heat-fusing type).

Since the composition and quality of special paper vary considerably, special paper is more likely than white bond paper to give trouble during printing. No liability will be assumed if moisture etc. given off in printing on special paper causes harm to the machine or operator.

> **Note.** Before purchasing any type of special paper, test a sample on the duplxer and the printer and check that printing quality is satisfactory.

Specifications for each type of special paper are given below.

Colored paper: Colored paper should satisfy the same conditions as white bond paper, listed in Table 1. In addition, the pigments used in the paper must be able to withstand the heat of fusing during the printing process (up to 200°C or 392°F).

Preprinted paper: Preprinted paper should have a bond paper base. The preprinted ink must be able to withstand the heat of fusing during the printing process, and must not be affected by silicone oil.

Do not use paper with any kind of surface treatment, such as the type of paper commonly used for calendars.

Chapter 4: Parts catalog

Table of Contents

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4.1. Introduction

This chapter lists the main parts of the duplexer and shows exploded view of the major assemblies.

The headings in the parts tables are explained below.

REF.: The reference number that corresponds to the part in the exploded view.

PART CODE: The part code of the part.

DESCRIPTION: The name and model of the part.

QTY: The quantity of that particular part used in the product.

Recommended parts: A recommended part is indicated in the **REMARKS** column.

4.1.1. Ordering

Recommended parts are those parts remarked specifically as Recommended in the REMARKS column. Part codes for other parts are shown only for reference purposes. To avoid errors in parts orders, always specify the following information:

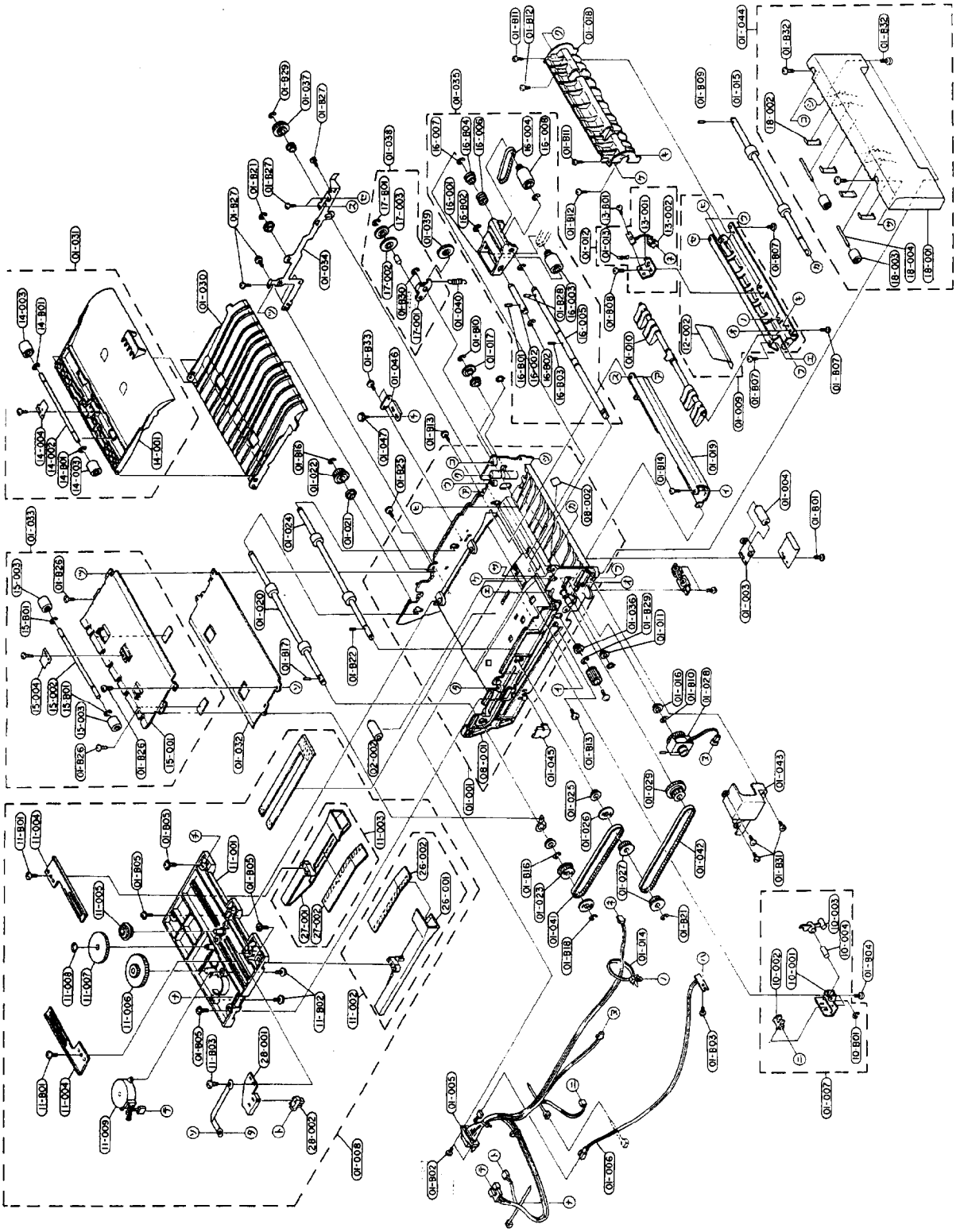
Part description

Part code

Quantity required

Reference number in the exploded view

4.2. Stacker assembly (50-002)



REF.	PART CODE	DESCRIPTION	QTY	REMARKS
01-001	5SNSP0008871	BASE STACKER ASSY	1	
01-002	5SNSP0008909	ROLLER PINCH	1	
01-003	5SNSP0008940	BRACKET ROLLER	1	
01-004	5SNSP0008909	ROLLER PINCH	1	
01-005	5SNSP0008884	CONN. CORD S00750	1	Recommended
01-006	5SNSP0008868	SNESOR ASSY	1	
01-007	5SNSP0008850	EPS ASSY	1	
01-008	5SNSP0008847	ADJUST ASSY	1	
01-009	5SNSP0008872	GUIDE ENT ASSY	1	
01-010	5SNSP0008973	GATE ENT	1	
01-011	5SNSP0009009	BUSHING 4	1	
01-012	5SNSP0008852	DS SENSOR ASSY	1	
01-013	5SNSP0008982	SPRING GATE B	1	
01-014	5MVX717NN005	SNAP BAND	1	Recommended
01-015	5SNSP9998976	ROLLER C	1	
01-016	5SNSP0009016	BUSH DS	2	
01-017	5SNSP0008912	GEAR Z16	1	
01-018	5SNSP0008918	GUIDE FRONT	1	
01-019	5SNSP0008944	GUIDE ENT B	1	
01-020	5SNSP0008974	ROLLER A	1	
01-021	5SNSP0009016	BUSH DS	2	
01-022	5SNSP0008901	GEAR Z16	1	
01-023	5SNSP0008917	PULLEY T20	1	
01-024	5SNSP0008975	ROLLER B	1	
01-025	5SNSP0009016	BUSH DS	2	
01-026	5SNSP0008932	FLANGE	1	
01-027	5SNSP0008917	PULLEY T20	2	
01-028	5SNSP0008721	CLUTCH FEED DRIVE	1	Recommended
01-029	5SNSP0008906	GEAR Z28-T20	1	
01-030	5SNSP0008919	GUIDE COVER B	1	
01-031	5SNSP0008873	GUIDE COVER ASSY	1	
01-032	5SNSP0008943	GUIDE PLATE B	1	
01-033	5SNSP0008874	GUIDE PLATE ASSY	1	
01-034	5SNSP0008953	SPRING EARTH	1	
01-035	5SNSP0008848	PU ROLLER ASSY	1	
01-036	5SNSP0009016	BUSH DS	2	
01-037	5SNSP0008902	GEAR Z20	1	
01-038	5SNSP0008851	JOINT C ASSY	1	
01-039	5SNSP0008912	GEAR Z16	1	
01-040	5SNSP0008983	SPRING JOINT C	1	
01-041	5SNSP0008978	BELT T106	1	
01-042	5SNSP0008979	BELT T113	1	
01-043	5SNSP0008927	COVER CLT	1	
01-044	5SNSP0008846	FRONT COVER ASSY	1	
01-045	5SNSP0008933	COVER HARNESS	1	

REF.	PART CODE	DESCRIPTION	QTY	REMARKS
01-046	5SNSP0008959	BRACKET ADJUSTER	1	
01-047	5SNSP0009000	SCREW ADJUSTER	1	
01-B01	5MBTPB4008WZ	BIND T.T. SCREW (+)	1	
01-B02	5MBTPB3010WZ	BIND T.T. SCREW (+)	2	
01-B03	5MBTPB3006WZ	BIND TAP SCREW (+)	1	
01-B04	5MBTPB3008WZ	BIND T.T. SCREW (+)	2	
01-B05	5MBTPB3008WZ	BIND T.T. SCREW (+)	4	
01-B06	5MBCE3060XSW	E STOP RING	2	
01-B07	5MBTPB3008WZ	BIND T.T. SCREW (+)	3	
01-B08	5MBSPP3006NZ	PAN HEAD SCREW (+)	1	
01-B09	5MBP2010PXLJ	PARALLEL PIN H7	1	
01-B10	5MBCE5060XSW	E STOP RING	2	
01-B11	5MBTPB3008WZ	BIND T.T. SCREW (+)	2	
01-B12	5MBSPP3006NZ	PAN HEAD SCREW (+)	2	
01-B13	5MBTPB3010WN	BIND TAP SCREW (+)	2	
01-B14	5MBTPB3008WZ	BIND T.T. SCREW (+)	1	
01-B16	5MBCE5060XSW	E STOP RING	2	
01-B17	5MBP2010PXLJ	PARALLEL PIN H7	1	
01-B18	5MBCE5060XSW	E STOP RING	2	
01-B20	5MBCE4060XSW	E STOP RING	1	
01-B21	5MBCE5060XSW	E STOP RING	2	
01-B22	5MBP2010PXLJ	PARALLEL PIN H7	1	
01-B23	5MBCE5060XSW	E STOP RING	1	
01-B24	5MBCE5060XSW	E STOP RING	1	
01-B25	5MBTPB4010WZ	BIND T.T. SCREW (+)	1	
01-B26	5MBTPB3008WZ	BIND T.T. SCREW (+)	3	
01-B27	5MBTPB3008WZ	BIND T.T. SCREW (+)	5	
01-B28	5MBP2010PXLJ	PARALLEL PIN H7	1	
01-B29	5MBCE5060XSW	E STOP RING	2	
01-B30	5MBCE5060XSW	E STOP RING	1	
01-B31	5MBTPB3008WZ	BIND T.T. SCREW (+)	3	
01-B32	5MBTPR4010WZ	BIND T.T. SCREW (+)	4	
01-B33	5MBTPB3008WZ	BIND T.T. SCREW (+)	2	
08-001	5SNSP0008928	BASE STACKER	1	
08-002	5SNSP0008996	FILM SENSOR	1	
10-001	5SNSP0008936	BRACKET EPS	1	
10-002	5SNSP0008715	SENSOR	1	Recommended
10-003	5SNSP0008907	LEVER EPS	1	
10-004	5SNSP0008964	SHAFT EPS	1	
10-B01	5MBCE2040XSW	E STOP RING	1	
11-001	5SNSP0008921	BASE ADJUST	1	
11-002	5SNSP0008865	ADJUSTER-L ASSY	1	
11-003	5SNSP0008866	ADJUSTER-R ASSY	1	
11-004	5SNSP0008915	RACK ADJUSTER	2	
11-005	5SNSP0008911	PINION ADJUSTER	1	

REF.	PART CODE	DESCRIPTION	QTY	REMARKS
11-006	5SNSP0008905	GEAR Z18-67	1	
11-007	5SNSP0008908	GEAR Z148	1	
11-008	5SNSP0008999	FASTENER 4	1	Recommended
11-009	5SNSP0009007	MOTOR ADJUSTER	1	Recommended
11-010	5SNSP0008849	HPS ASSY	1	
11-B01	5MBTPB3008WZ	BIND T.T. SCREW (+)	2	
11-B02	5MBSPP3006NZ	PAN HEAD SCREW (+)	1	
11-B03	5MBTPB4008WZ	BIND T.T. SCREW (+)	1	
12-001	5SNSP0008942	GUIDE ENT A	1	
12-002	5SNSP0009005	SHEET ENT	1	
13-001	5SNSP0008937	BRACKET DS SENSOR	1	
13-002	5SNSP0008879	PWB DS SENSOR	1	Recommended
13-B01	5MBSPB3005NZ	BIND HEAD SCREW (+)	1	
14-001	5SNSP0008920	GUIDE COVER T	1	
14-002	5SNSP0008967	SHAFT PINCH	1	
14-003	5SNSP0008923	ROLLER PINCH	2	
14-004	5SNSP0008939	SPRING PINCH F	1	Recommended
14-B01	5MBCE3060XSW	E STOP RING	2	
14-B02	5MBTPQ3006WF	IT T.T. SCREW (+)	1	
15-001	5SNSP0008945	GUIDE PLATE A	1	
15-002	5SNSP0008967	SHAFT PINCH	1	
15-003	5SNSP0008923	ROLLER PINCH	2	
15-004	5SNSP0008938	SPRING PINCH R	1	Recommended
15-B01	5MBCE3060XSW	E STOP RING	2	
15-B02	5MBSPB3005NZ	BIND HEAD SCREW (+)	1	
16-001	5SNSP0008916	FRAME PU	1	
16-002	5SNSP0008965	PIN PU	1	
16-003	5SNSP0008972	ROLLER PU	1	
16-004	5SNSP0008980	BELT T59	1	
16-005	5SNSP0008966	SHAFT PU	1	
16-006	5SNSP0008981	SPRING CLT	1	Recommended
16-007	5SNSP0008970	CLT-PU	1	Recommended
16-008	5SNSP0008972	ROLLER PU	1	Recommended
16-B01	5MBP2010PXLJ	PARALLEL PIN H7	1	
16-B02	5MBCE5060XSW	E STOP RING	2	
16-B03	5MBP2008QPLJ	PARALLEL PIN	1	
16-B04	5MBCE5060XSW	E STOP RING	3	
17-001	5SNSP0008941	BRACKET JOINT C	1	Recommended
17-002	5SNSP0008912	GEAR Z16	1	
17-003	5SNSP0008910	COLLAR B	1	
17-B01	5MBCE5060XSW	E STOP RING	1	
18-001	5SNSP0008922	COVER FRONT	1	
18-002	5SNSP0008772	SPRING TENSION	4	
18-003	5SNSP0008924	ROLLER EXIT	2	Recommended
18-004	5SNSP0008774	SHAFT ROLLER PINCH	2	

REF.	PART CODE	DESCRIPTION	QTY	REMARKS
19-001	5SNSP0008926	BRACKET SOLENOID	1	
19-002	5SNSP0008727	SOLENOID	1	Recommended
19-B01	5MBSPJ2605NZ	W-CEMS SCREW (+)	2	
26-001	5SNSP0008913	ADJUSTER L	1	
26-002	5SNSP0008971	FILM ADJUSTER	1	
27-001	5SNSP0008914	ADJUSTER R	1	
27-002	5SNSP0008971	FILM ADJUSTER	1	

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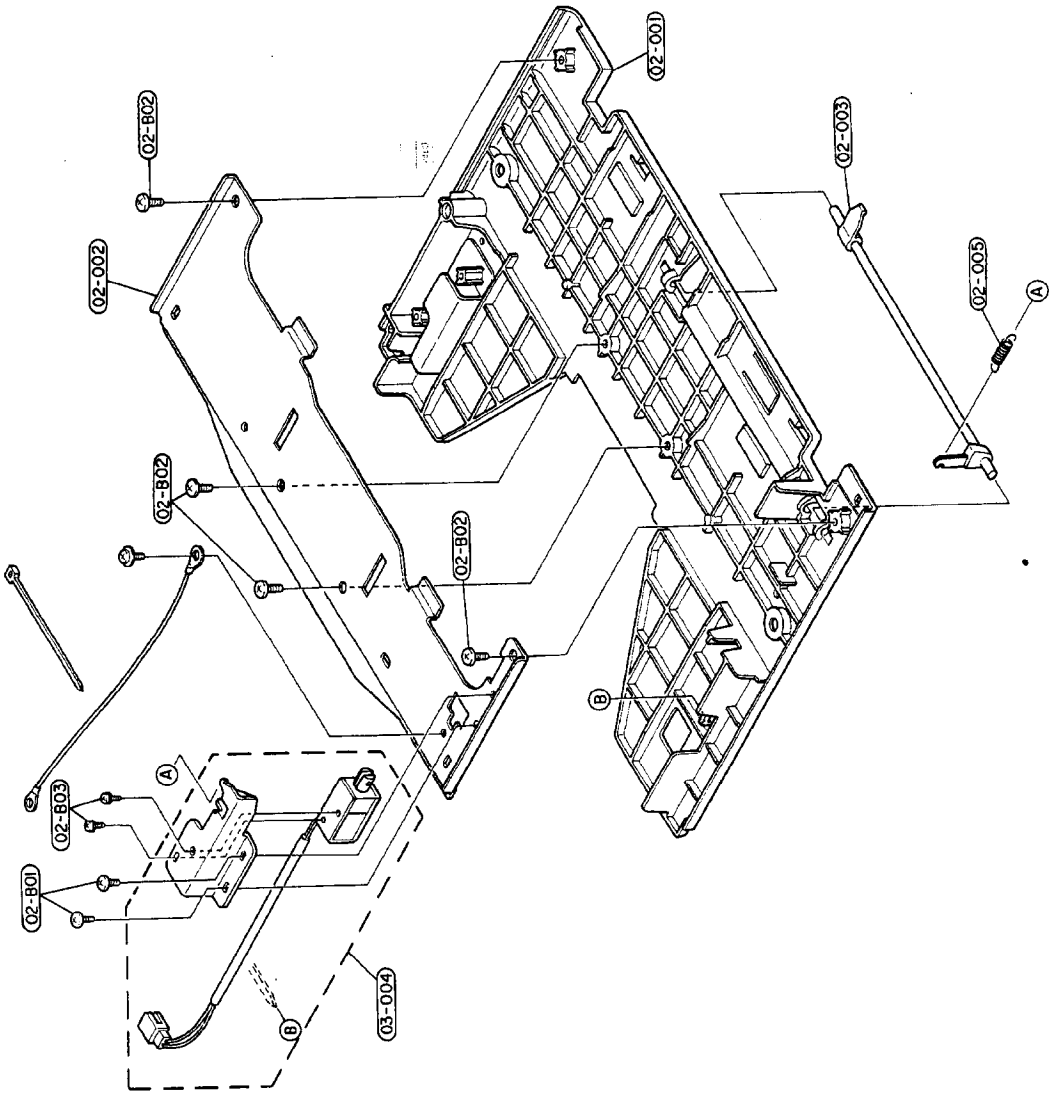
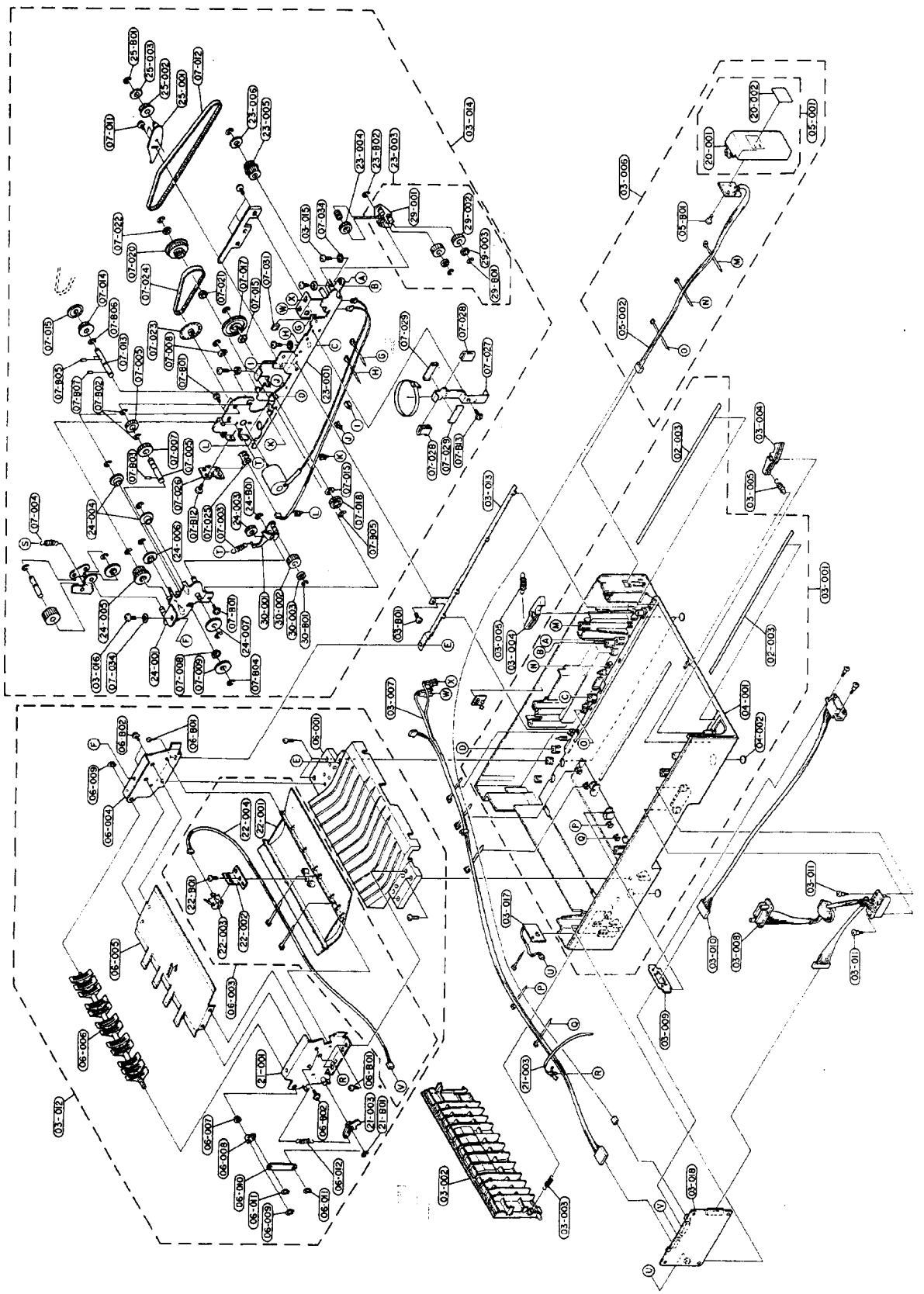
4.3. Top cover assembly (50-0003)



REF.	PART CODE	DESCRIPTION	QTY	REMARKS
02-001	5SNSP0008887	COVER TOP F	1	
02-002	5SNSP0008960	PLATE TOP	1	
02-003	5SNSP0008977	ARM	1	
02-004	5SNSP0008858	SOLENOID ASSY	1	
02-005	5SNSP0008989	SPRING LOCK	1	
02-B01	5MBTPB3006WZ	BIND TAP SCREW (+)	2	
02-B02	5MBTPB4006WZ	BIND TAP SCREW (+)	2	
02-B03	5MBTPQ3006WF	IT T.T. SCREW (+)	2	

4.4. Base assembly (50-001)

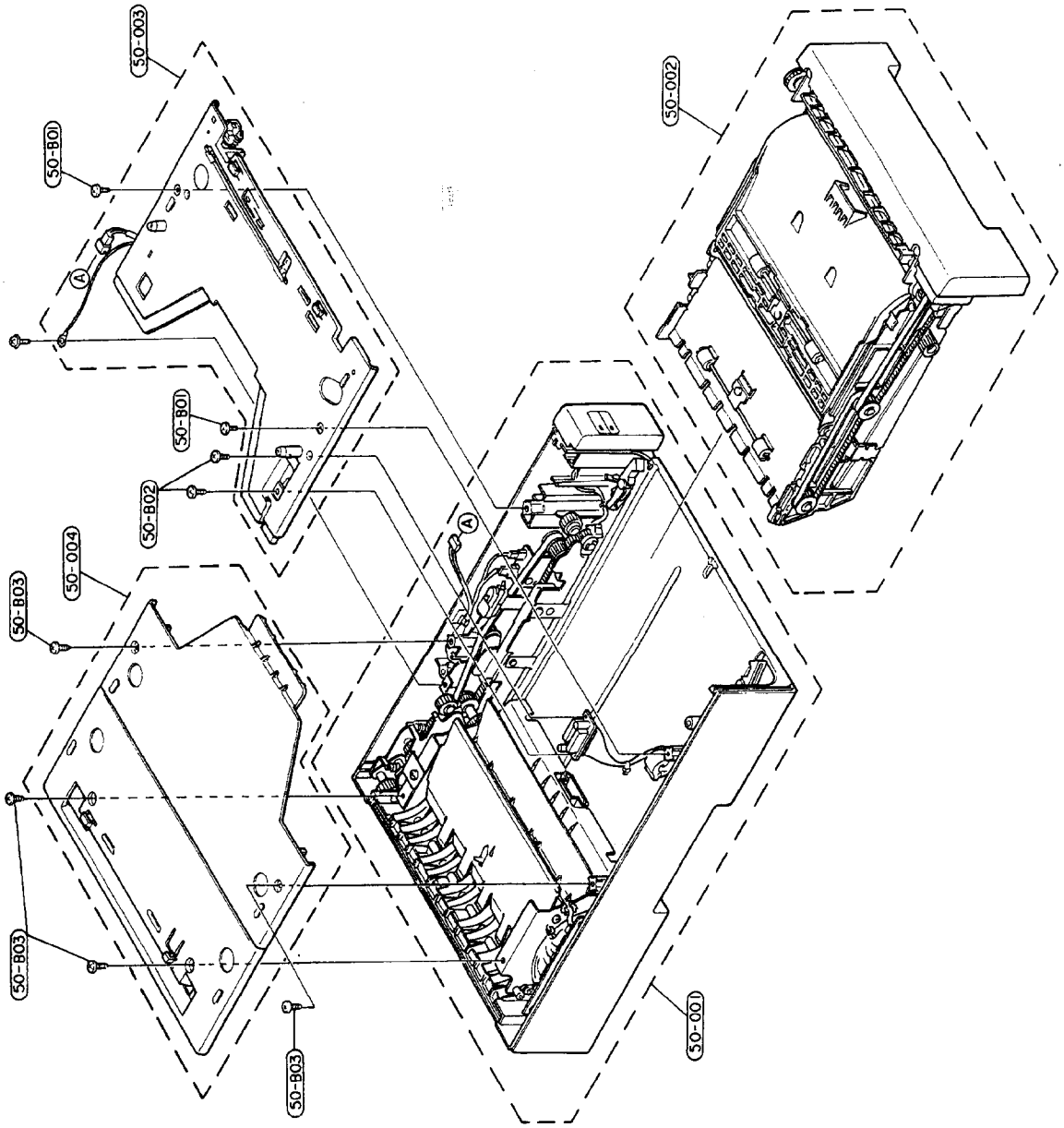


REF.	PART CODE	DESCRIPTION	QTY	REMARKS
03-001	5SNSP0008869	BASE SUB ASSY	1	
03-002	5SNSP0008889	COVER REAR	1	
03-003	5SNSP0008987	SPRING R COVER	1	
03-004	5SNSP0008904	LEVER LOCK	2	
03-005	5SNSP0008988	SPRING LOCK DS	2	
03-006	5SNSP0008855	LED ASSY	1	
03-007	5SNSP0008885	CONN. CORD S00751	1	Recommended
03-008	5SNSP0008880	CONN. CORD S00716	1	Recommended
03-009	5SNSP0008949	BRACKET DB CONNECTOR	1	
03-010	5SNSP0008883	CONN. CORD S00719	1	Recommended
03-011	5SNSP0008997	STUD CONNECTOR	2	
03-012	5SNSP0008856	PASSAGE ASSY	1	
03-013	5SNSP0008951	PLATE EARTH	1	
03-014	5SNSP0008857	DRIVE ASSY	1	
03-015	5SNSP0009003	TAPPING SCREW	4	Recommended
03-016	5SNSP0009004	STUD FRAME	1	Recommended
03-017	5SNSP0008876	PWB REAR ASSY	1	Recommended
03-018	5SNSP0008875	PWB MAIN	1	Recommended
03-B01	5MBTPQ3006WF	IT T.T. SCREW (+)	1	
04-001	5SNSP0008886	BASE	1	
04-002	5SNSP0008688	FOOT	4	Recommended
04-003	5SNSP0008993	SEAT RAIL	2	
05-001	5SNSP0008870	LED COVER ASSY	1	
05-002	5SNSP0008877	PWB LED	1	Recommended
05-B01	5MBTPB3008WZ	BIND TAP SCREW (+)	1	
06-001	5SNSP0008891	BASE PASSAGE	1	
06-002	5SNSP0008860	FRAME L ASSY	1	
06-003	5SNSP0008859	PASSAGE GUIDE ASSY	1	
06-004	5SNSP0008957	FRAME R	1	
06-005	5SNSP0008946	GUIDE PASSAGE A	1	
06-006	5SNSP0008929	GATE DB	1	
06-007	5SNSP0009009	BUSHING 4	1	
06-008	5SNSP0008931	LEVER GATE B	1	Recommended
06-009	5SNSP0009010	FASTENER 1	2	Recommended
06-010	5SNSP0008958	LINK GATE	1	
06-011	5SNSP0009011	FASTENER 2	2	Recommended
06-012	5SNSP0008990	SPRING GATE A	1	
06-B01	5MBTPB4012WZ	BIND TAP SCREW (+)	3	
06-B02	5MBTPQ3006WF	IT T.T. SCREW (+)	4	
07-001	5SNSP0008861	DRIVE SUB ASSY A	1	
07-002	5SNSP0008862	DRIVE SUB ASSY B	1	
07-003	5SNSP0008985	SPRING JOINT A	1	
07-004	5SNSP0008992	SPRING JOINT C	1	
07-005	5SNSP0008963	SHAFT CLT	1	Recommended
07-006	5SNSP0008896	GEAR CLT Z18	1	Recommended

REF.	PART CODE	DESCRIPTION	QTY	REMARKS
07-007	5SNSP0008895	GEAR CLT Z24	1	Recommeded
07-008	5SNSP0009012	BUSHING 6	2	
07-009	5SNSP0008894	GEAR Z24	1	
07-010	5SNSP0008867	TENSION ASSY	1	
07-011	5SNSP0008998	STUD TENSION	1	
07-012	5SNSP0008969	BELT T158	1	
07-013	5SNSP0008962	SHAFT B	1	
07-014	5SNSP0008917	PULLEY T20	1	
07-015	5SNSP0008932	FLANGE	1	
07-016	5SNSP0009012	BUSHING 6	2	
07-017	5SNSP0008893	GEAR H44	1	
07-018	5SNSP0008738	GEAR FEED Z16	1	
07-020	5SNSP0008892	GEAR H16-T56	1	
07-021	5SNSP0009001	BEARING 6	1	
07-022	5SNSP0009002	BUSHING SLEEVE	1	
07-023	5SNSP0008711	PULLEY ENCODER P16	1	
07-024	5SNSP0008968	BELT T95	1	
07-025	5SNSP0008715	SENSOR	1	Recommended
07-026	5SNSP0008714	BRACKET ENCODER	1	
07-027	5SNSP0008952	PIECE EARTH	1	Recommended
07-028	5SNSP0009013	PIECE EMC	1	
07-029	5SNSP0009014	CAP EMC	1	
07-030	5SNSP0008882	CONN. CORD S00718	1	Recommended
07-031	5MVK121NB002	EDGING SADDLE	1	
07-032	5MVK121NB003	EDGING SADDLE	7	Recommended
07-033	5MVX717NN005	SNAP BAND	2	Recommended
07-034	5SNSP0008994	RUBBER	5	Recommended
07-B01	5MBSPN3006NZ	W-CEMS SCREW (+)	3	
07-B02	5MBCE5060XSW	E STOP RING	2	
07-B03	5MBP2010PXLJ	PARALLEL PIN H7	1	
07-B04	5MBCE5060XSW	E STOP RING	2	
07-B05	5MBP2010PXLJ	PARALLEL PIN H7	1	
07-B06	5MBCE5060XSW	E STOP RING	1	
07-B07	5MBP2010PXLJ	PARALLEL PIN H7	1	
07-B08	5MBCE4060XSW	E STOP RING	1	
07-B09	5MBP2010PXLJ	PARALLEL PIN H7	1	
07-B10	5MBCE5060XSW	E STOP RING	1	
07-B11	5MBCE5060XSW	E STOP RING	2	
07-B12	5MBTPQ3006WF	IT T.T. SCREW (+)	1	
07-B13	5MBTPQ3006WF	IT T.T. SCREW (+)	1	
11-001	5SNSP0008921	BASE ADJUST	1	
11-002	5SNSP0008865	ADJUSTER-L ASSY	1	
11-003	5SNSP0008866	ADJUSTER-R ASSY	1	
11-004	5SNSP0008915	RACK ADJUSTER	2	
11-005	5SNSP0008911	PINION ADJUSTER	1	

REF.	PART CODE	DESCRIPTION	QTY	REMARKS
11-006	5SNSP0008905	GEAR Z18-67	1	
11-007	5SNSP0008908	GEAR Z148	1	
11-008	5SNSP0008999	FASTENER 4	1	
11-009	5SNSP0009007	MOTOR ADJUSTER	1	
11-010	5SNSP0008849	HPS ASSY	1	
11-B01	5MBTPB3008WZ	BIND T.T. SCREW (+)	2	
11-B02	5MBSPP3006NZ	PAN HEAD SCREW (+)	2	
11-B03	5MBTPB4008WZ	BIND T.T. SCREW (+)	1	
20-001	5SNSP0008890	COVER PANEL	1	
20-002	5SNSP0008991	SHEET PANEL	1	
21-001	5SNSP0008956	FRAME L	1	
21-002	5MVK121NB002	EDGING SADDLE	1	
21-003	5SNSP0008930	LEVER GATE A	1	
21-B01	5MBCE4060XSW	E STOP RING	1	
22-001	5SNSP0008925	GUIDE PASSAGE B	1	
22-002	5SNSP0008950	BRACKET DB SEBSOR	1	
22-003	5SNSP0009008	SENSOR	1	Recommended
22-004	5SNSP0008881	CONN. CORD S00717	1	Recommended
22-B01	5MBTPB3008WZ	BIND T.T. SCREW (+)	1	
23-001	5SNSP0008954	FRAME DRIVE A	1	
23-002	5SNSP0009006	MOTOR MAIN	1	Recommended
23-003	5SNSP0008863	JOINT B ASSY	1	
23-004	5SNSP0008738	GEAR FEED Z16	1	
23-005	5SNSP0008900	GEAR Z16-T20	1	
23-006	5SNSP0008932	FLANGE	1	
23-B01	5MBSPN3006NZ	W-CEMS SCREW (+)	2	
23-B02	5MBCE5060XSW	E STOP RING	1	
23-B03	5MBCE5060XSW	E STOP RING	1	
23-B04	5MBCE5060XSW	E STOP RING	1	
25-001	5SNSP0008961	BRACKET TENSION	1	
25-002	5SNSP0008917	PULLEY T20	1	
25-003	5SNSP0008932	FLANGE	1	
25-B01	5MBCE5060XSW	E STOP RING	1	
28-001	5SNSP0008935	BRACKET HPS	1	
28-002	5SNSP0008715	SENSOR	1	Recommended
29-001	5SNSP0008948	BRACKET JOINT B	1	
29-002	5SNSP0008899	GEAR Z16	2	
29-003	5SNSP0008903	COLLAR A	2	
29-B01	5MBCE4060XSW	E STOP RING	1	
30-001	5SNSP0008947	BRACKET JOINT A	1	
30-002	5SNSP0008899	GEAR Z16	1	
30-003	5SNSP0008903	COLLAR A	1	
30-B01	5MBCE4060XSW	E STOP RING	1	

4.5. Overall


50-003
50-B01
50-002
50-B01
50-B02
50-004
50-B03
50-B03
50-B03
50-001

REF.	PART CODE	DESCRIPTION	QTY	REMARKS
50-001	5SNSP0008853	BASE ASSY	1	
50-002	5SNSP0009018	STACKER ASSY	1	
50-003	5SNSP0008854	TOP COVER ASSY	1	
50-004	5SNSP0008888	COVER TOP R	1	
50-005	5MVVSDU1***1	LABEL SERIAL	1	
50-B01	5MBTPB4012WN	BIND TAP SCREW	2	
50-B02	5MBTPB3010WN	BIND TAP SCREW	2	
50-B03	5MBSPB4004NN	BIND HEAD SCREW	2	

Chapter 5: Hardware notes

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5.1. Introduction

This chapter explains the operation of the electrical circuits in the duplexer. Procedures for hardware troubleshooting are also included in this chapter. Schematic diagrams are provided in Appendix. The schematic diagram should be referred to along with the explaination in the following pages.

The electrical circuits of the duplexer are mounteed on three boards of main, display, and rear-switch. For the easy understanding, we explain the duplexer electrical system dividing it into the following two blocks:

- ❖ Printer interface block
- ❖ Driver block

Details on each block will be discussed on the following pages.

5.2. Printer interface

This section provides information regarding the duplexer's interface to the printer. Basic operation of the interface used in the duplexer resembles that of the option sorter, paper feeder, etc.

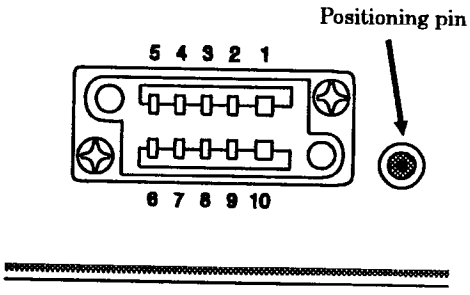
Simplified interface circuit diagram is shown in Figure 5.2. on next page.

5.2.1. Connector configuration

The duplexer and the printer exchange signals between each other through connector CN100 which is mounted on top of the duplexer. CN100 is paralleled to CN101 on the other (bottom) side of the duplexer for connection with the sorter (if installed together with the duplexer to the printer).

The names and the descriptions of the signals handled by the sorter are as follows.

FIG. 5.1. DUPLEXER CONNECTOR AND PIN ASSIGNMENT

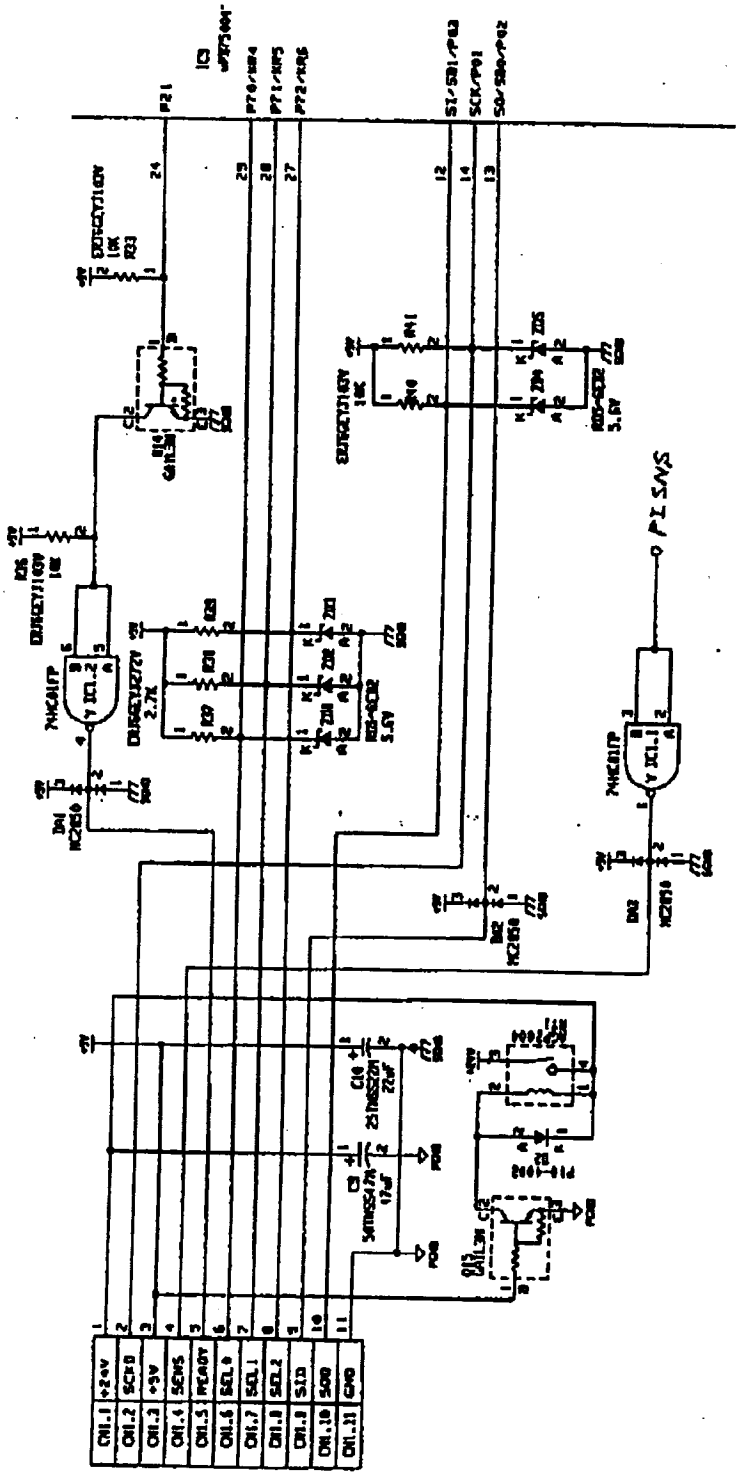


PIN	SIGNAL	DESCRIPTION
1	+24V	+24 V power
2	$\overline{\text{SCKD}}$	Serial clock
3	+5V (IN) $\overline{\text{SENS}}$ (OUT)	In: +5V power; Out: Paper feeding path sensor output (also used with SO-6 sorter)
4	$\overline{\text{READY}}$	Hand shake signal
5	SEL0	Select bit 0
6	SEL1	Select bit 1
7	SEL2	Select bit 2
8	SID	Duplexer output data
9	SOD	Duplexer input data
10	GND	Ground

Signals SEL0, SEL1, and SEL2 are used by the printer to select and deselect the duplexer. The duplexer is selected for duplex printing when SEL0 is "0," SEL1 is "0," and SEL2 is "1."

All levels are of C-MOS level. Pulled-up for input and open-circuited for output. The clock-synchronous serial interface configuration is used with the maximum synchronization clock of 200 kHz.

FIG. 5.2. DUPLEXER INTERFACE CIRCUIT



5.2.2. Duplexer CPU I/O interface

Table 5.1. below shows signals used by the duplexer's CPU (μPD75004) for its I/O interface.

TABLE 5.1. SORTER CPU I/O SIGNALS

CPU PIN	SIGNAL	DESCRIPTION	LOGIC (MEANING)	INPUT/OUTPUT
0	$\overline{\text{PISNS}}$	Sensing of paper feeding	Paper detected	Input
1	$\overline{\text{PHSNS}}$	Sensing of paper pausing inside the reversing bay	Paper detected	
2	$\overline{\text{POSNS}}$	Sensing of feeding of paper in the bay	Paper detected	
3	$\overline{\text{GHOME}}$	Alignment guide home position	Home position	
4	$\overline{\text{FCOPN}}$	Front cover status	Cover open	
5	$\overline{\text{RCOPN}}$	Rear cover status	Cover open	
6—8	SEL0—SEL2	Duplexer activation bits		
9, 10	DIPSW1—DIPSW2	Duplexer mode selection bits; "1" for both bits (at power on)		
11	MCLK	Transport. motor encoder clock		
0	$\overline{\text{RDYLED}}$	READY indicator drive	Lit	Output
1	$\overline{\text{LOCLED}}$	LOCK indicator drive	Lit	
2	$\overline{\text{CLON}}$	Re-feeding roller clutch	Closed	
3	$\overline{\text{HVER}}$	Host printer accommodation	FS-3500/A	
4	$\overline{\text{FEED0}}$	Transport. motor control bit0	(See below.)	
5	$\overline{\text{FEED1}}$	Transport. motor control bit1		
6	$\overline{\text{FEEDL}}$	Transport. motor speed	Slow	
7	$\overline{\text{LOCON}}$	Lock solenoid lock	On (Locked)	
8	$\overline{\text{LOCOFF}}$	Lock solenoid unlock	On (Unlocked)	
9	$\overline{\text{PA}}$	Alignment motor pulse phase A	On	
10	$\overline{\text{PB}}$	Alignment motor pulse phase B	On	
11	$\overline{\text{PA-}}$	Alignment motor pulse phase A-	On	
12	$\overline{\text{PB-}}$	Alignment motor pulse phase B-	On	
13	$\overline{\text{READY}}$	Status send ready	Ready	

TRANSPORT. MOTOR CONTROL BITS

These bits control the motor revolution in the following combinations.

SIGNAL		TRANSPORT. MOTOR OPERATION
FEED1	FEED0	
0	0	Stop (Brake)
0	1	Reverse revolution
1	0	Forward revolution
1	1	Stop

The following table shows port assignment for the sorter's CPU (μPD75004).

TABLE 5.2. DUPLEXER CPU I/O SIGNALS

PORT	BIT 3	2	1	0
Port0	SI	SO	SCK	—
Port1	$\overline{\text{GHOME}}$	$\overline{\text{POSNS}}$	$\overline{\text{PHSNS}}$	$\overline{\text{PISNS}}$
Port2	$\overline{\text{HVER}}$	—	$\overline{\text{READY}}$	$\overline{\text{FEEDL}}$
Port3	$\overline{\text{LOCLED}}$	$\overline{\text{RDYLED}}$	$\overline{\text{FEED1}}$	$\overline{\text{FEED0}}$
Port4	$\overline{\text{LOCOFF}}$	$\overline{\text{LOCON}}$	$\overline{\text{CLON}}$	—
Port5	$\overline{\text{PB-}}$	$\overline{\text{PA-}}$	$\overline{\text{PB}}$	$\overline{\text{PA}}$
Port6	—	—	$\overline{\text{RCOPN}}$	FCOPN
Port7	MCLK	SEL2	SEL1	SEL0
Port8	—	—	DIPSW2	DIPSW1

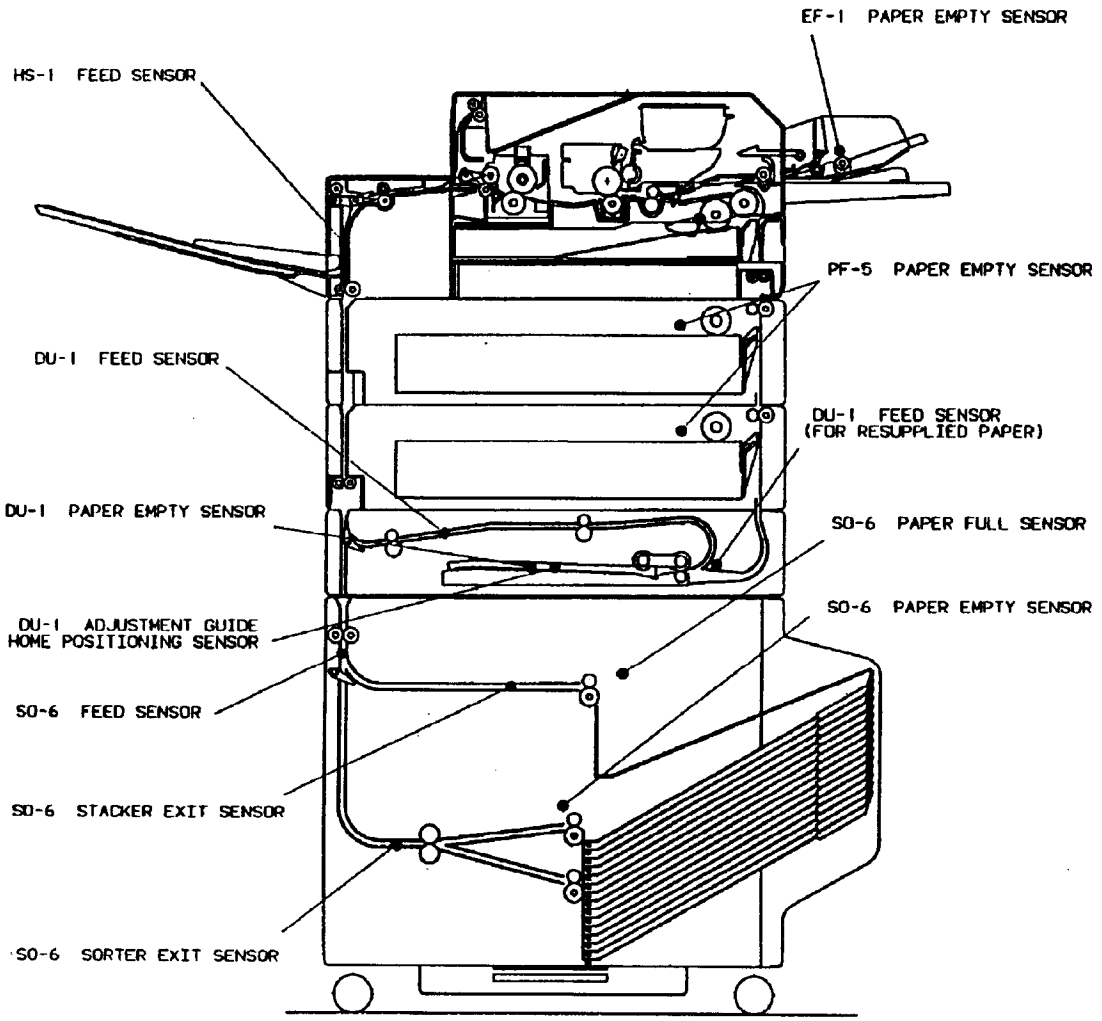
5.2.3. Sensors

The sorter has four sensors provided for controlling paper transportation and detection of paper jam. The following sensors are used. (Logic for each sensor signal is shown in the table on the previous page.) Figure 5.3. shows the location of the sensors in the duplexer and other associated option units. A more detailed diagram for duplexer sensors can be referred in chapter 6, section 6.2.14.

TABLE 5.3. SENSOR AND THE SIGNALS

SENSOR (REF POSITION IN FIG. 5.3.)	SENSOR SIGNAL	FUNCTION	TYPE OF SENSOR
Paper feed sensor (A)	$\overline{\text{PISNS}}$	Detects the paper entering the duplexer. Provides timings for various paper transportations and detects paper jam.	Photo interrupter
Revferse bay sensor (B)	$\overline{\text{PHSNS}}$	Detects the paper in the reversing bay. Also detects paper jam in the reversing bay.	Photo interrupter
Home position sensor (C)	$\overline{\text{GHOME}}$	Detects home position for the registration guide.	Photo interrupter
Re-feeding sensor (D)	$\overline{\text{POSNSP}}$	Detects the paper in the reversing bay; supplements the registration guide; and provides various timings for paper transportation and detects paper jam.	Photo interrupter

FIG. 5.3. LOCATION OF SENSORS



5.3. Drivers

The duplexer has the following driver circuits:

- ❖ Registration motor driver (IC6)
- ❖ Clutch and locking solenoid driver (IC3)
- ❖ Transportation motor driver

Operation of each driver circuit is discussed on the following pages.

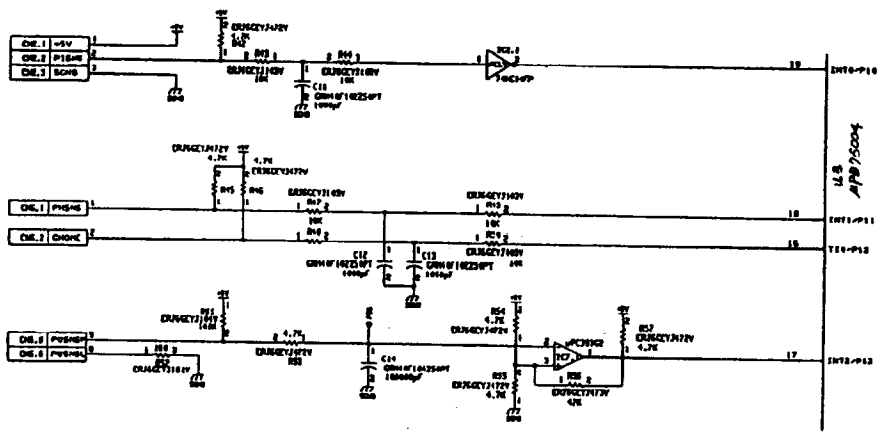
5.3.1. Registration motor driver and clutch/locking solenoid driver

The registration motor drives gears to move the adjuster assemblies back and forth in accordance with the paper size command the printer sends to the duplexer. The duplexer CPU sends the registration motor driver IC6 (transistor array) four pulse signals through its ports P50 through P53, which in turn drives the motor.

Transistor array IC3 is the driver which activates and deactivates the clutch for re-feeding the paper in the reversing bay and the cassette locking solenoid (connected to CN7). The cassette locking solenoid is necessary to forcedly lock in the cassette of the printer (or of the paper feeder, if installed with the duplexer to the printer) mounted on the duplexer during the paper is being re-fed from the duplexer to the printer as the paper is passed through the printer's cassette.

The re-feeding clutch is normally open and energized for re-feeding paper when $\overline{\text{CLON}}$ is at low level. The cassette locking solenoid turns on and is kept intact to lock the cassette when the duplexer CPU sends IC3 a pulse signal of several hundreds wide. It locks in the cassette when $\overline{\text{LOCON}}$ is low; and unlocks the cassette when $\overline{\text{LOCOFF}}$ is low.

FIG. 5.4. DRIVERS CIRCUIT



5.3.2. Transportation motor driver

For simplicity, we discuss on the explanation of the transportation motor driver circuit dividing it in two parts—A and B in the following simplified diagram. Part A in the circuit is the motor speed controller; part B is the circuit for changing the revolving direction in forward and reverse. Each part is explained as follows.

Motor speed controller: This controls the speed for the transportation motor. The transportation motor feeds and transports paper in the duplexer. The transportation speed is switched in three ways for accommodation of the host printers of different printing speeds (10 ppm and 18 ppm). The motor speed controller IC5 obtains commands at ports 20 (pin #25) and 23 (pin #22) of IC9. The encoding disc mounted at the motor axis generates the PIMCLK signal which the controller reads out and uses as the reference for the speed control. The truth table for ports 20 and 23 is as follows:

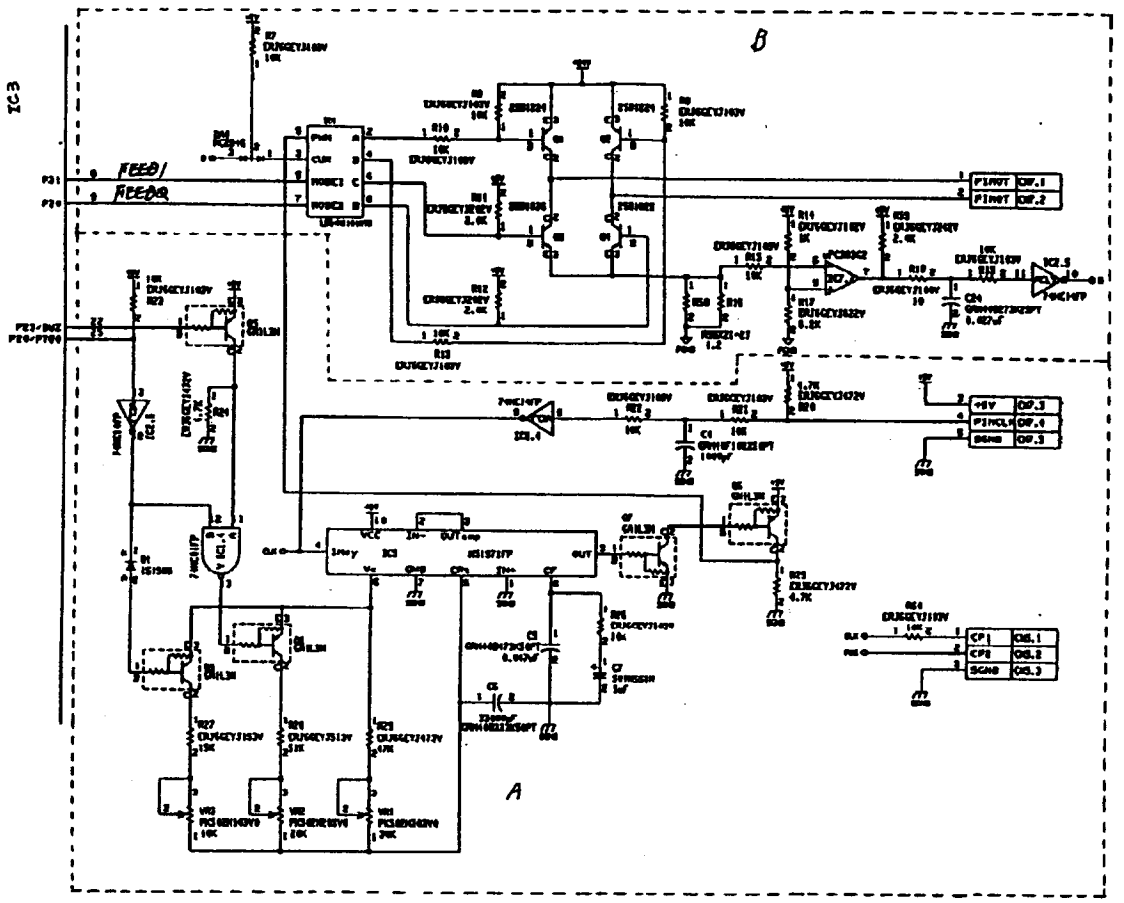
	LEVEL	
	H	L
P20	Normal transportation speed	Depends on P23 value
P23	10 ppm	18 ppm

Motor driver: The motor driver changes the direction of the motor revolution according to the paper feeding required for duplex printing. IC4 receives driver commands from IC5 and drives the motor to revolve forward, reverse, or stop, according to the CPU IC9 outputs (FEED0, FEED1). The truth table for FEED0 and FEED1 is as follows:

FEED1	FEED0	TRANSPORT. MOTOR REVOLUTION
0	0	Stop (Brake)
0	1	Reverse
1	0	Forward
1	1	Stop

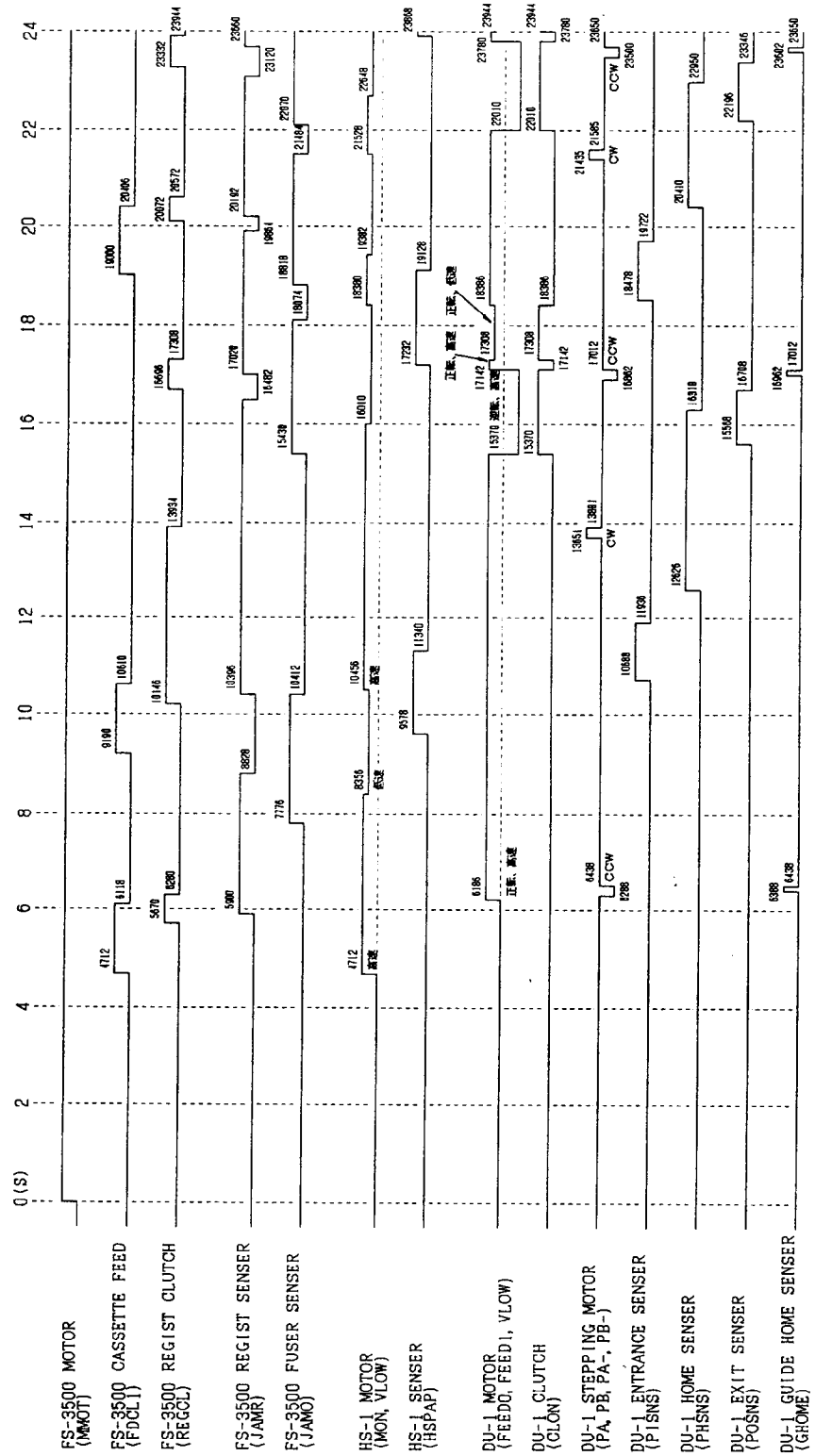
IC7 is for monitoring the current flowing through the transportation motor. It stops the motor forcedly in case the current value exceeds 1.8A.

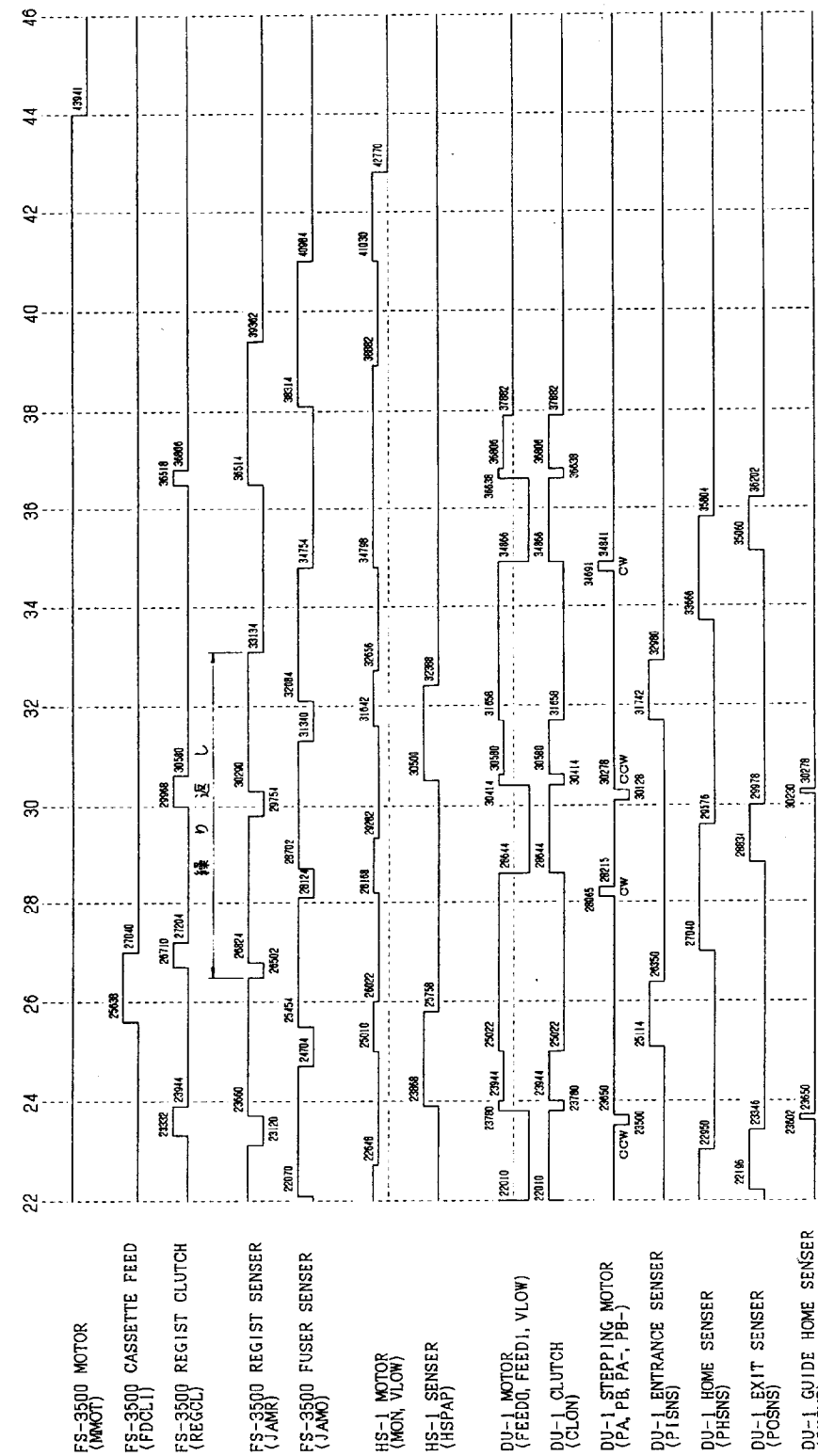
TABLE 5.4. MOTOR DRIVER CIRCUIT



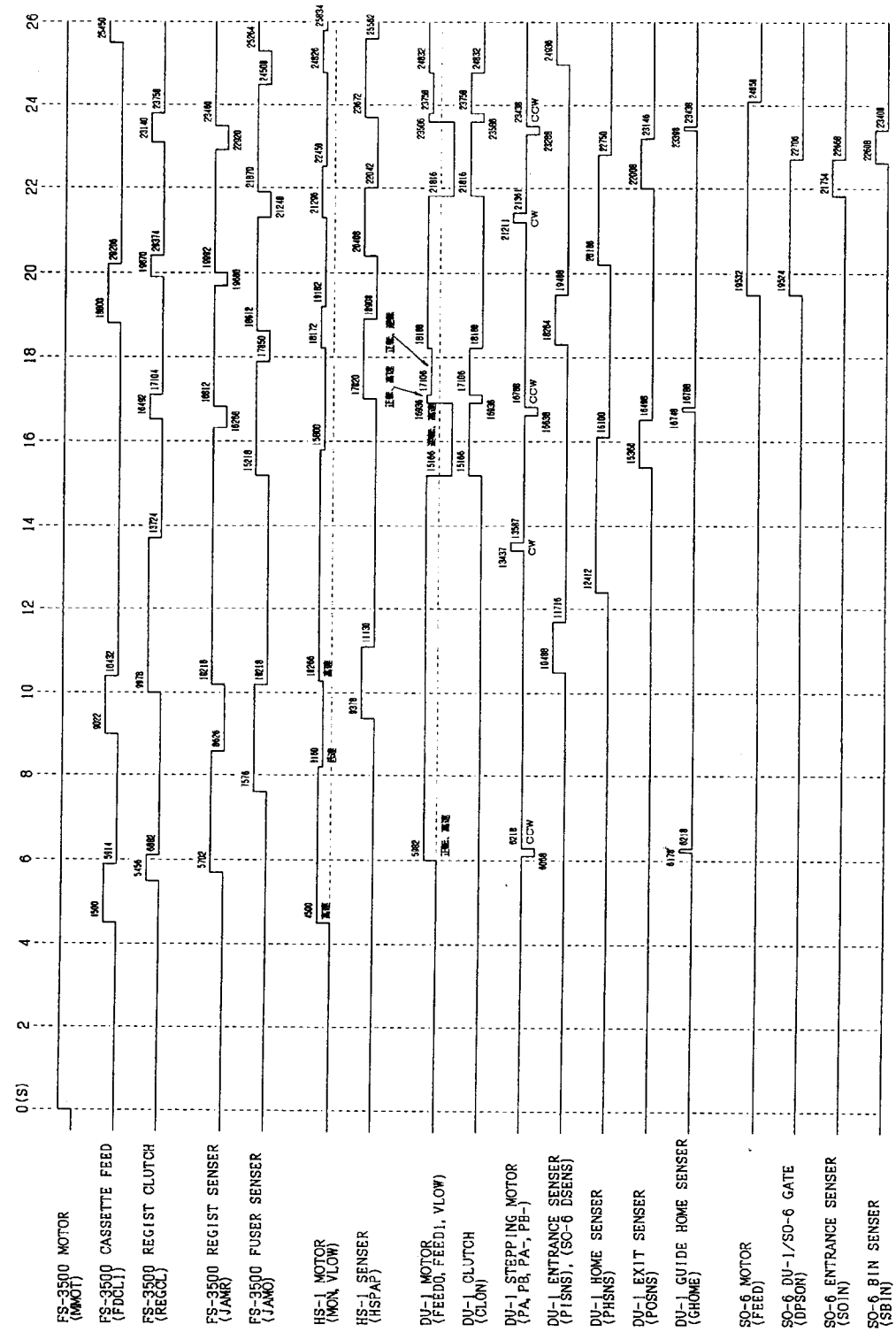
5.4. Printing timing charts

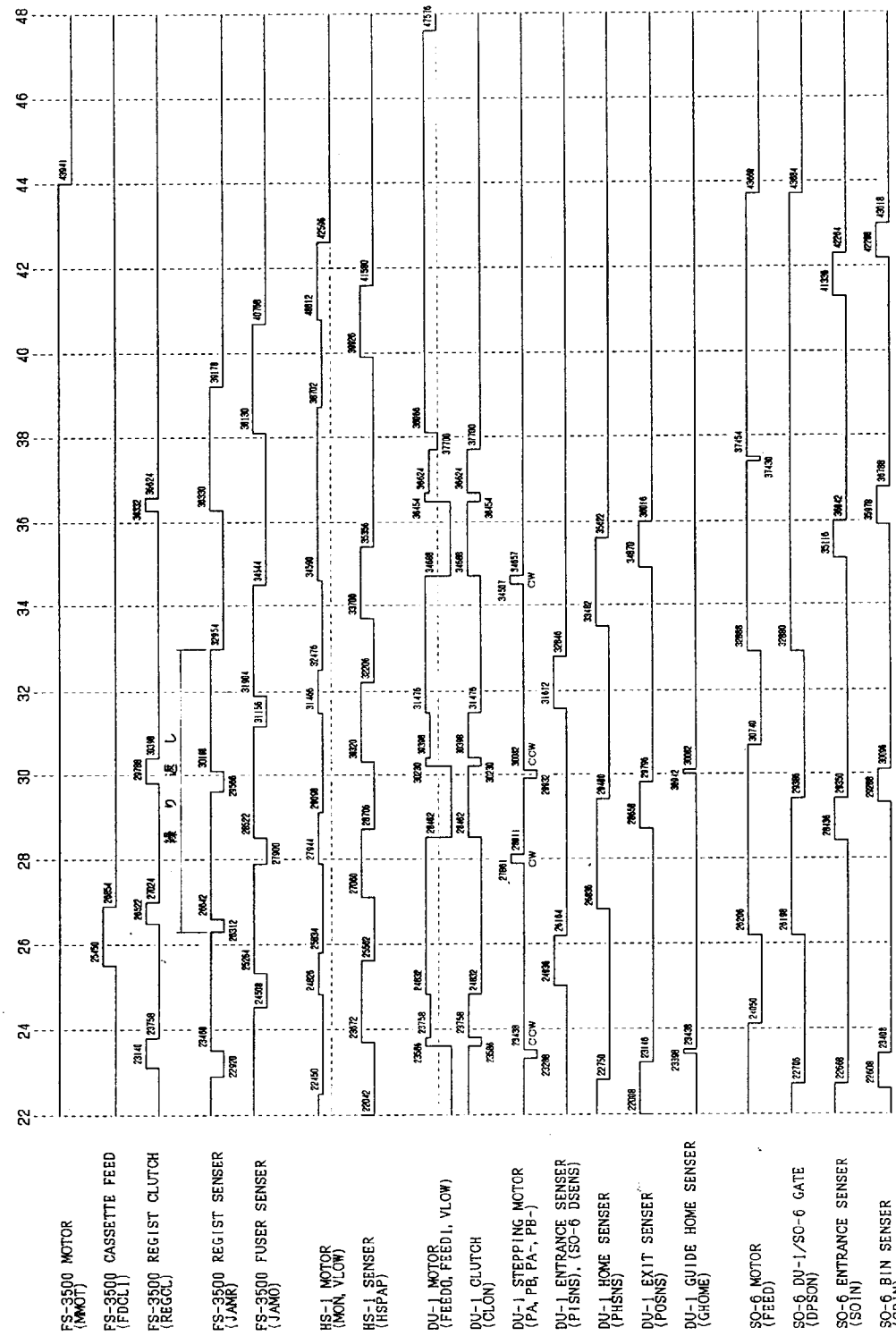
FS-3500/DU-1, A4 (TO BE CONTINUED)




FS-3500 MOTOR (MMOT)
FS-3500 CASSETTE FEED (FDCLT)
FS-3500 REGIST CLUTCH (REGCL)
FS-3500 REGIST SENSER (JAMR)
FS-3500 FUSER SENSER (JAMO)
HS-1 MOTOR (MON, VLOW)
HS-1 SENSER (HSPAP)
DU-1 MOTOR (FEEDO, FEEDI, VLOW)
DU-1 CLUTCH (CLON)
DU-1 STEPPING MOTOR (PA, PB, PA-, PB-)
DU-1 ENTRANCE SENSER (PISNS)
DU-1 HOME SENSER (PHSNS)
DU-1 EXIT SENSER (POSNS)
DU-1 GUIDE HOME SENSER (GHOME)
22
24
26
28
30
32
34
36
38
40
42
44
46
CW
CCW

FS-3500/DU-1/SO-6, A4 (TO BE CONTINUED)




FS-3500 MOTOR (MMOT)
FS-3500 CASSETTE FEED (FDCL1)
FS-3500 REGIST CLUTCH (REGCL)
FS-3500 REGIST SENSER (JAMR)
FS-3500 FUSER SENSER (JAMO)
HS-1 MOTOR (MON, VLOW)
HS-1 SENSER (HSPAP)
DU-1 MOTOR (FEEDO, FEED1, VLOW)
DU-1 CLUTCH (CLON)
DU-1 STEPPING MOTOR (PA, PB, PA-, PB-)
DU-1 ENTRANCE SENSER (PISNS), (SO-6 DSENS)
DU-1 HOME SENSER (PHSNS)
DU-1 EXIT SENSER (POSNS)
DU-1 GUIDE HOME SENSER (GHOME)
SO-6 MOTOR (FEED)
SO-6 DU-1/SO-6 GATE (DPSON)
SO-6 ENTRANCE SENSER (SOIN)
SO-6 BIN SENSER (SBIN)
22
24
26
28
30
32
34
36
38
40
42
44
46
48
CW
CCW

Chapter 6: Troubleshooting

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6.1. Introduction

This chapter explains procedures for identifying and correcting duplexer problems (troubleshooting) of both electrical and mechanical. Most of problems concerning the duplexer electrical may arise from defects in the interface with the printer as the duplexer is controlled by the printer itself. The *Analyzing basic symptoms* section (6.2.1.) on next page allows to detemine whether the problem is caused by a defect in the duplexer interface or in its power supply.

Problems concerning paper handling, such as paper skew and paper jam are explained in separate section (section 6.3.).

Diagram indicating the locations of major components referred to in this section is attached at the end of section 6.2.

6.1.1. Setup for troubleshooting

Where instructed to do so in the following sections, the duplexer must be removed from the printer and its connector must be connected to the printer's connector using the extension cable jig.

CAUTION Before removing the duplexer from the printer or before connecting the duplexer's connector to the printer's connector using the extension cable jig, be sure to turn off printer power.

Unless otherwise noted, the printer must be connected only to the duplexer during troubleshooting. No other option units (sorter, paper feeder[s]) may not be connected to the printer.

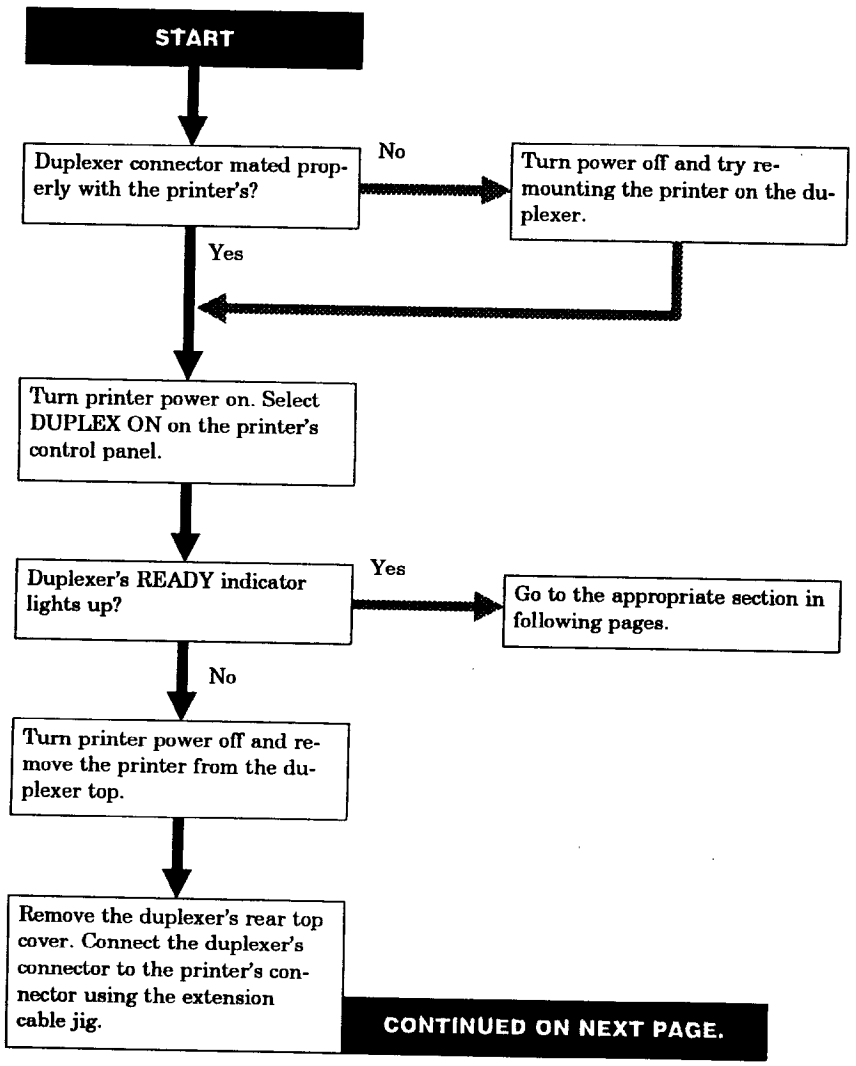
6.2. Electrical troubleshooting

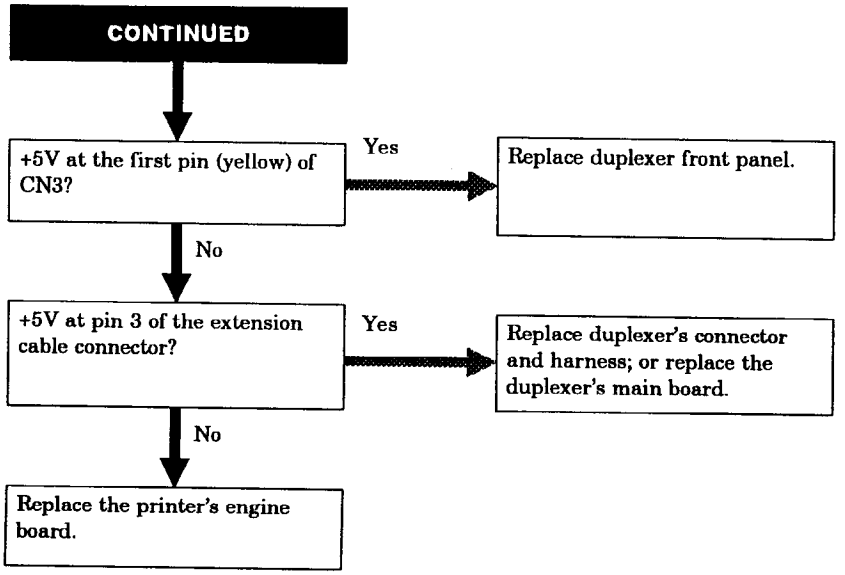
When a duplexer malfunction occurs, begin troubleshooting by going through the following flowchart.

6.2.1. Analyzing basic symptoms (electrical)

Following this chart will allow to detemine whether the problem is caused by a defect in the duplexer interface or in its power supply. This chart must be followed first of all following procedures.

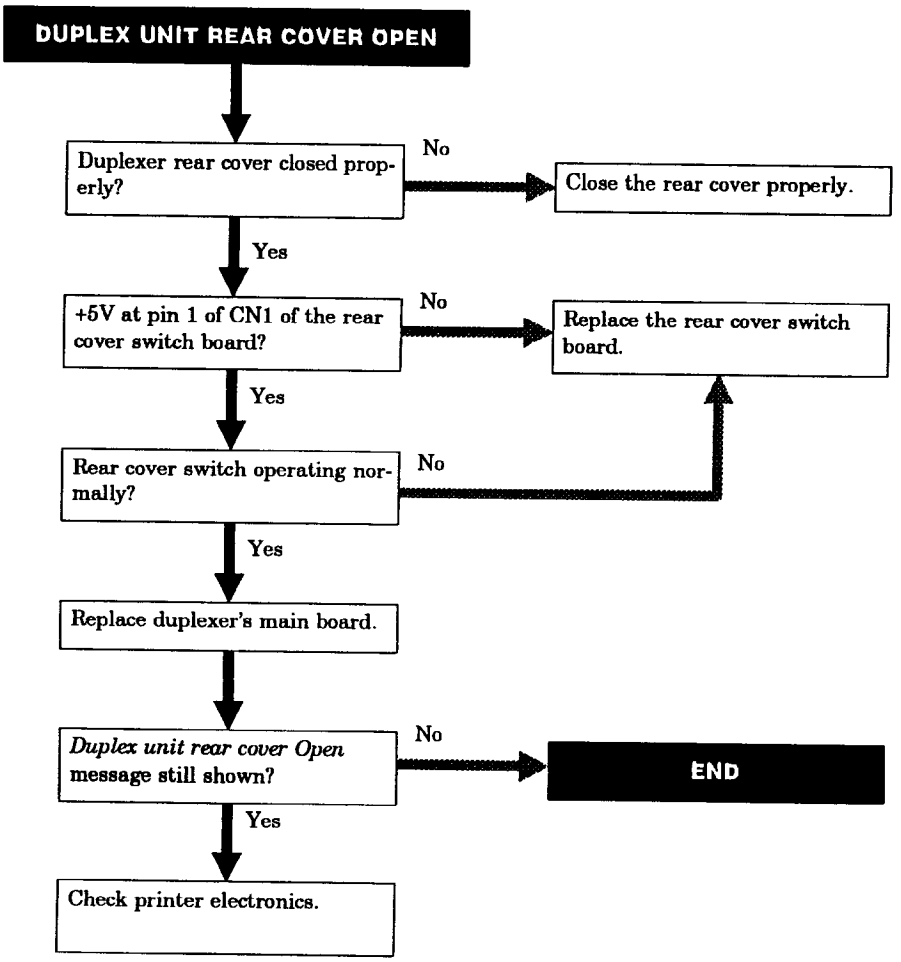
In following the flowchart below, the duplexer should be left installed to the printer in normal manner.




CONTINUED
+5V at the first pin (yellow) of CN3?
Yes
Replace duplexer front panel.
No
+5V at pin 3 of the extension cable connector?
Yes
Replace duplexer's connector and harness; or replace the duplexer's main board.
No
Replace the printer's engine board.

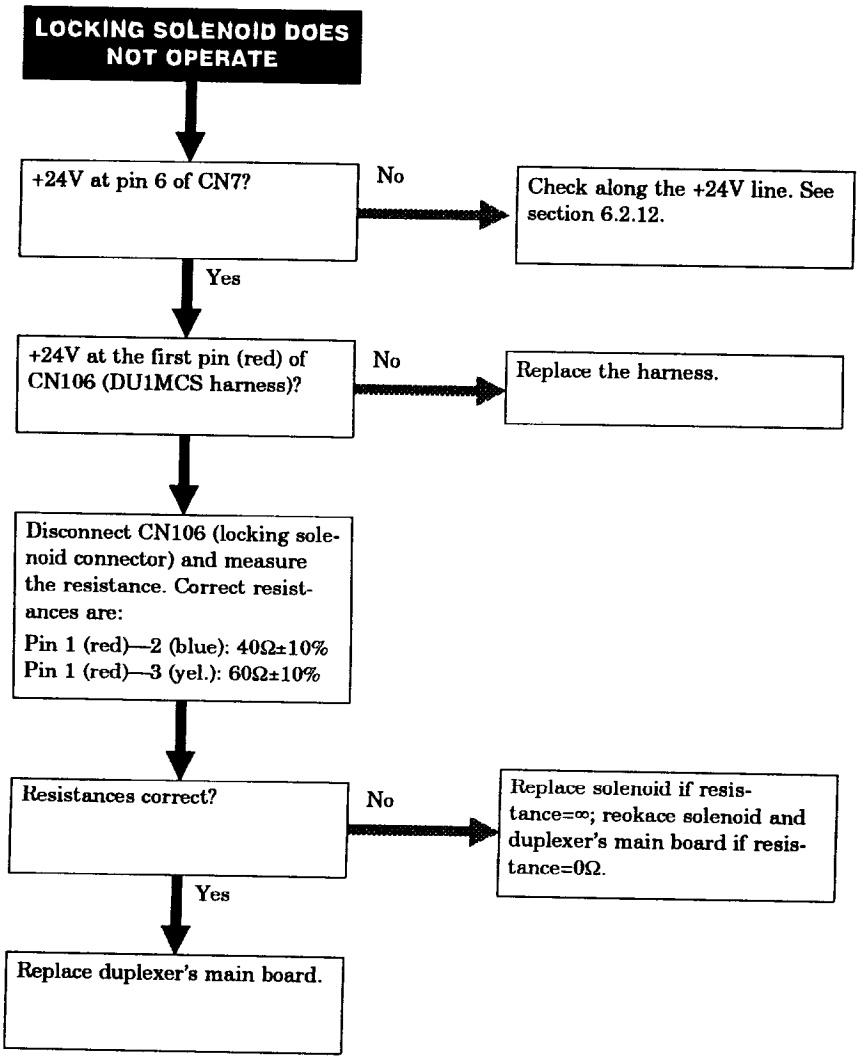
6.2.2. Rear cover open message *does not go out*

Follow this chart when the *Duplex unit rear cover Open* message is shown on the printer's message display.



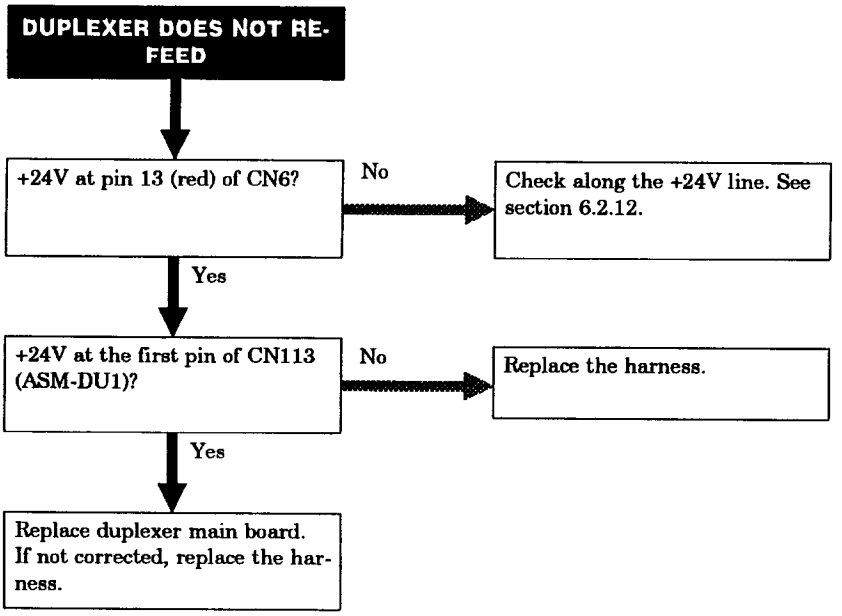
6.2.3. *Locking solenoid does not operate*

The locking solenoid locks in the printer's cassette (or the cassette of the option paper feeder, if installed together with the duplexer) so that the cassette is not accidentally drawn out during paper transportation through the duplexer. Follow this chart in case the locking solenoid does not operate during duplex printing.



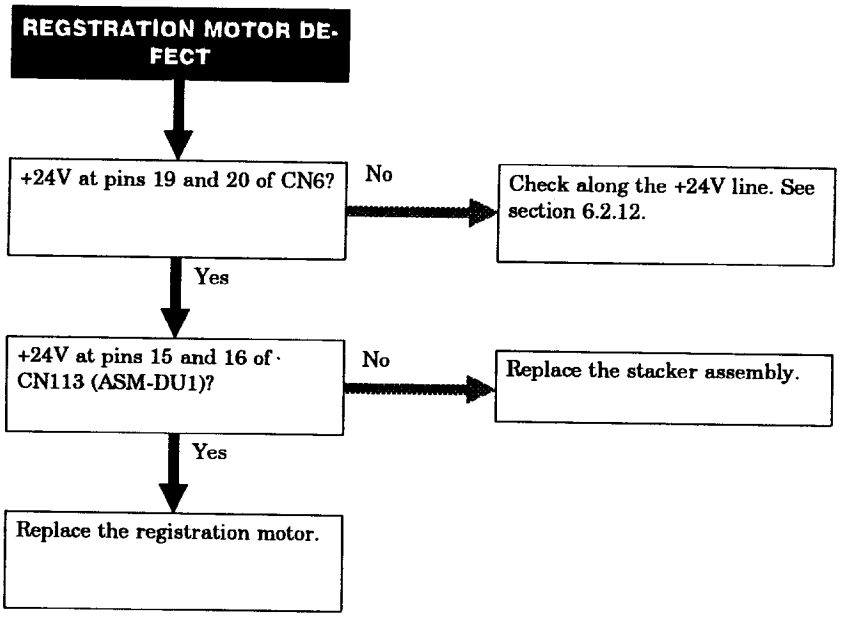
6.2.4. *Duplexer does not re-feed*

Follow this chart if the duplexer does not re-feed the paper in the reversing bay. This will happen most often when the re-feeding clutch is defective (signal=CLON).



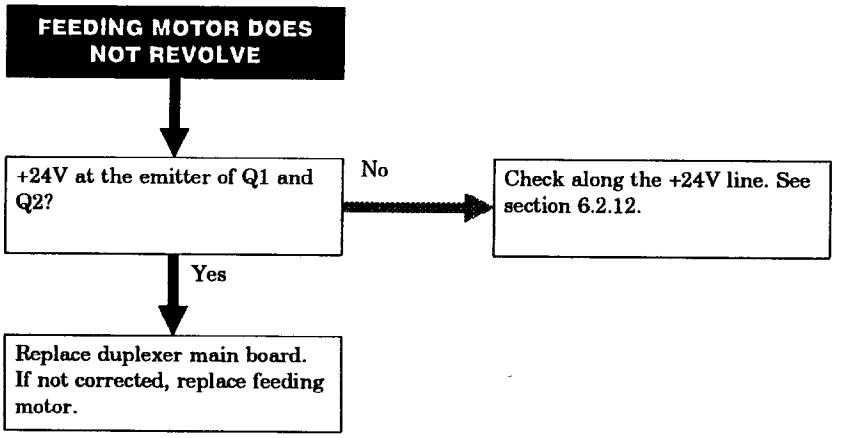
6.2.5. Registration motor defect

The registration motor drives the adjuster wings according to paper size commands.



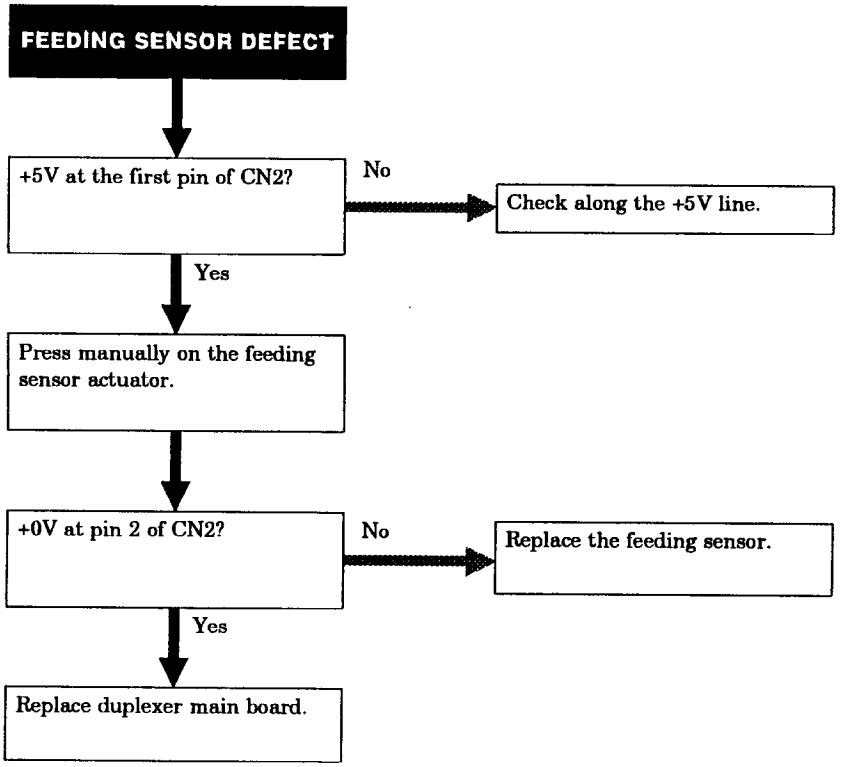
6.2.6. *Feeding motor does not revolve*

The feeding motor is driven by PI MOT command.



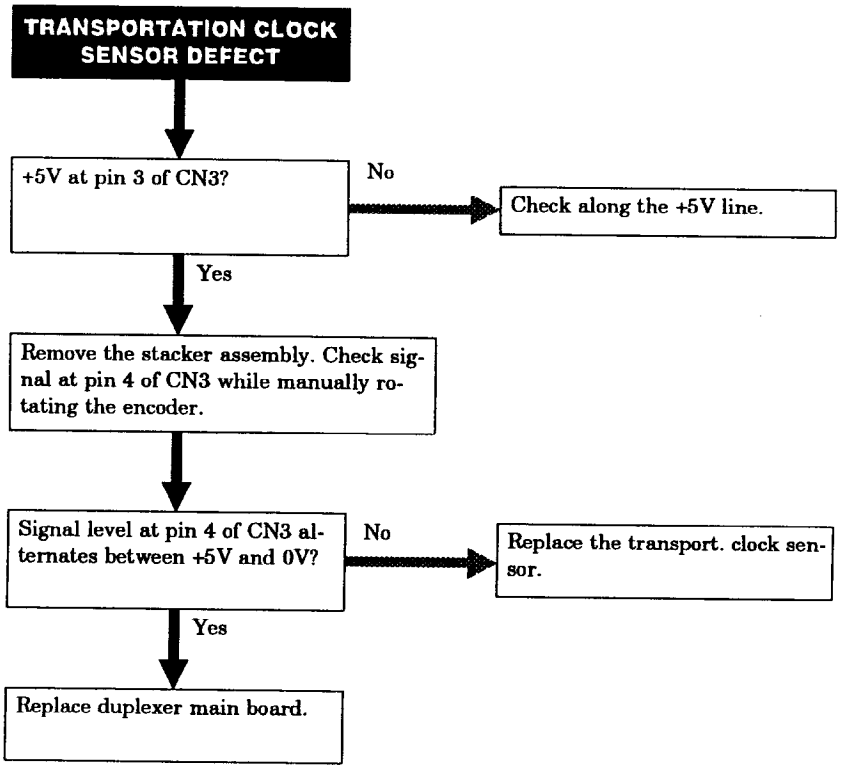
6.2.7. Feeding sensor defect

The feeding sensor uses the PISNS command.



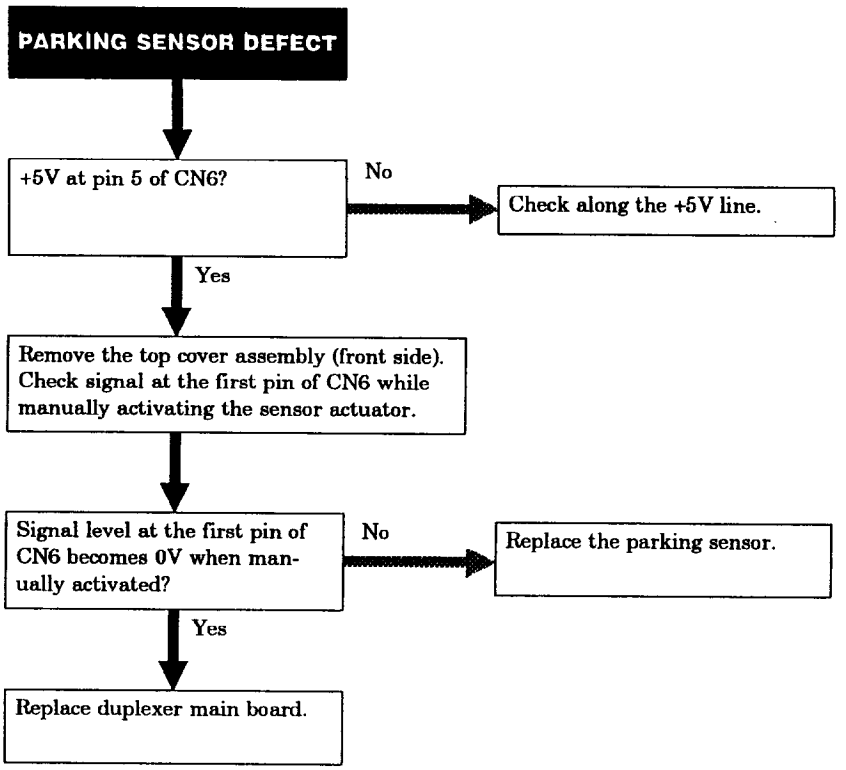
6.2.8. Transportation clock sensor defect

The transportation clock sensor uses the PIMCLK command which the encoding disc generates.



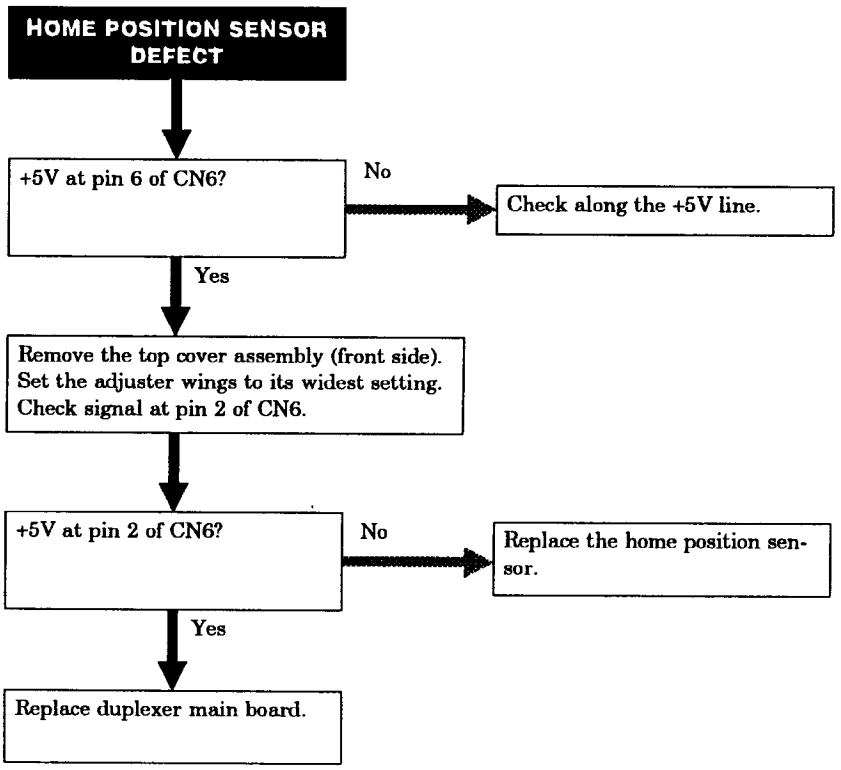
6.2.9. Parking sensor defect

The parking sensor detects the paper (with the reverse side printed) parking in the reversing bay using the PHSNS command.



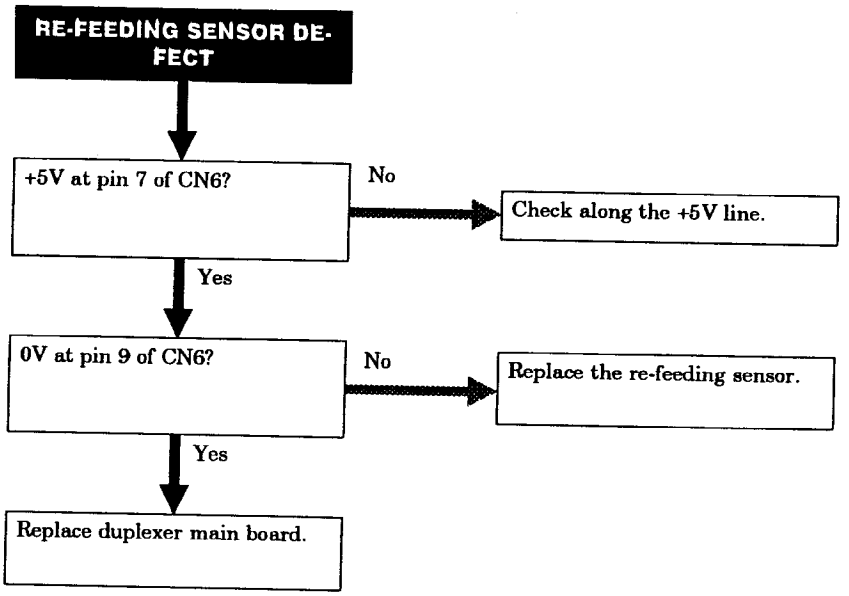
6.2.10. Home position sensor defect

The home position sensor detects the home positon for the adjuster wings using the GHOME signal.



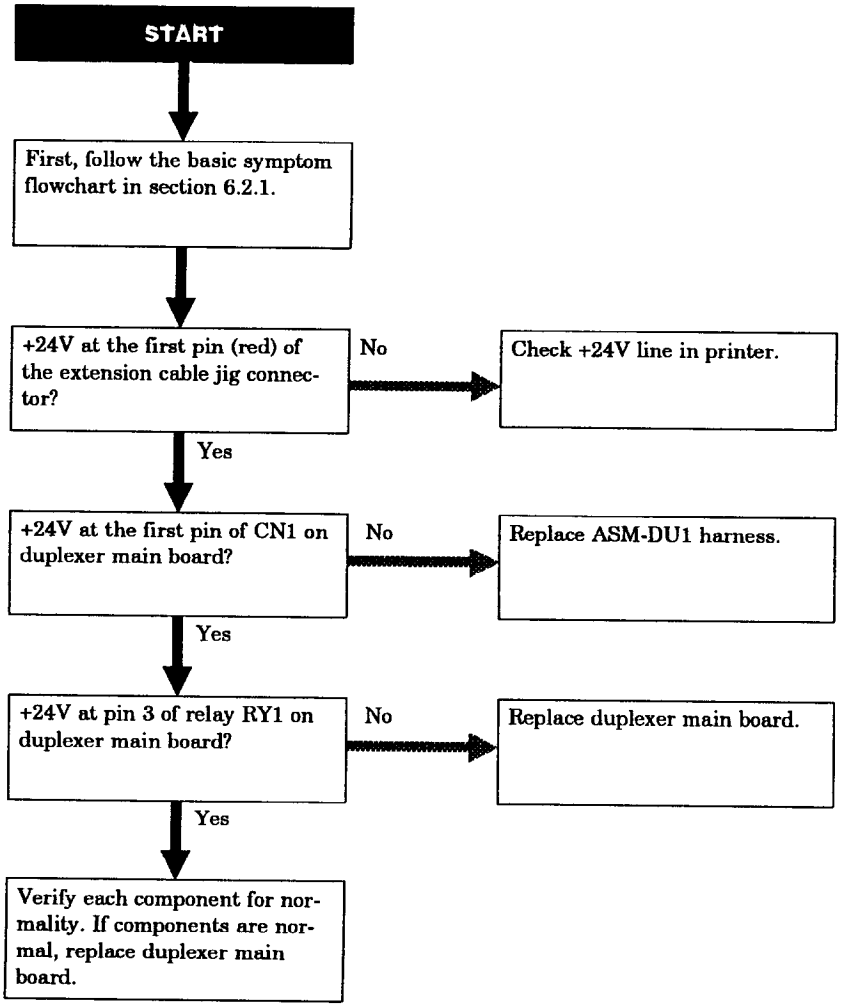
6.2.11. Re-feeding sensor defect

The re-feeding sensor uses the POSNL and POSNSP signals to start re-feeding the paper in the reversing bay.



6.2.12. Check on +24V line

This section provides steps for checking along the +24V line in the duplexer.



6.2.13. Error messages

The printer looks after itself and other option units installed and shows various error messages. Error messages start with the *Call Service person* message followed by an error code which is a combination of letter E, F, or C and a number. Errors pertaining to the duplexer include the following and the meaning.

TABLE 6.1. DUPLEXER ERROR CODES ON PRINTER

ERROR CODE	MEANING	SUGGESTED CAUSE OF ERROR	CORRECTIVE TROUBLE-SHOOTING ACTION
C1	Communication error, between the duplexer and the printer engine.	Defective printer engine board. Defective connector of duplexer.	Follow instruction in section 6.2.1., Analyzing basic symptoms.
C2	Duplex registration error	Defective duplexer regist. motor. Defective duplexer main board.	Check all mechanisms for correct duplex registration. Follow instruction in sections 6.2.5., Registration motor defect and 6.2.10., Home position sensor.
C3	Communication error, at power-up, between the duplexer and the printer engine.	Defective printer engine board. Defective connector of duplexer.	Follow instructions in section 6.2.1., Analyzing basic symptoms.

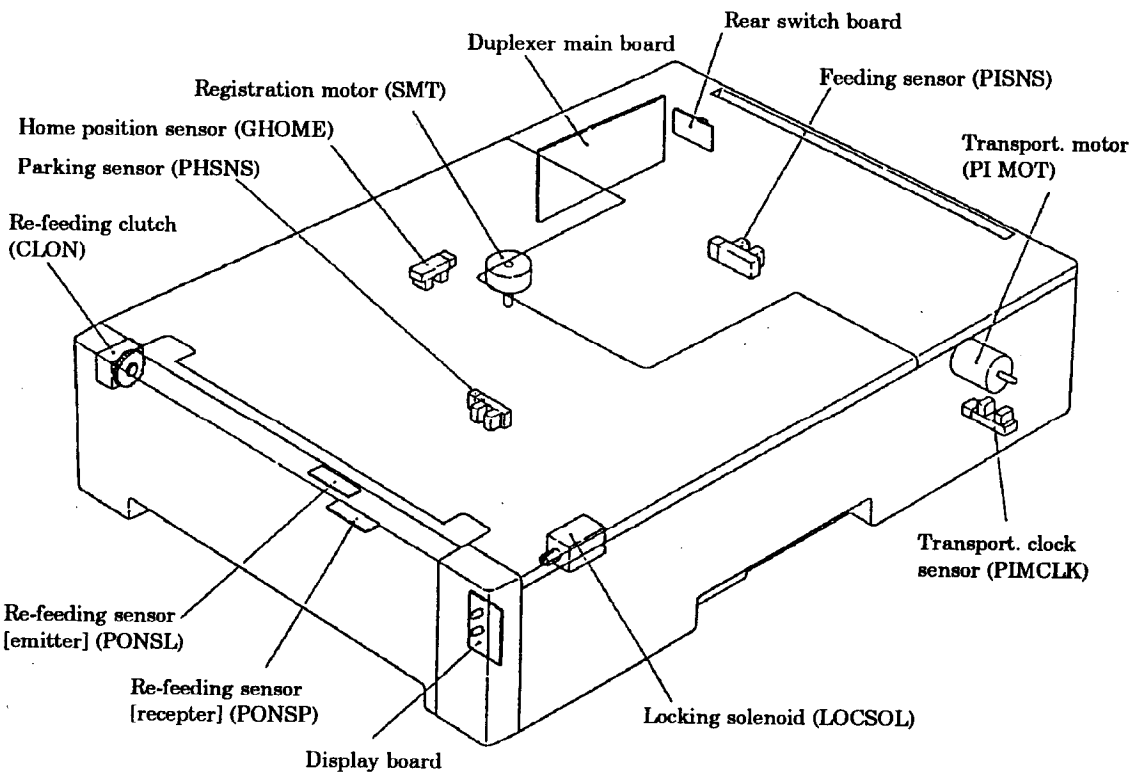
NOTE For error C2, also see Mechanical troubleshooting section.

For other error codes, refer to the printer's SERVICE MANUAL.

6.2.14. Location of components for troubleshooting

Figure below indicates locations of sensors, switches, motors, etc. that will be used in troubleshooting. The letters in brackets that follow each component refer the name of the signal handled by the component.

FIG. 6.1. LOCATIONS OF SENSORS, ETC.

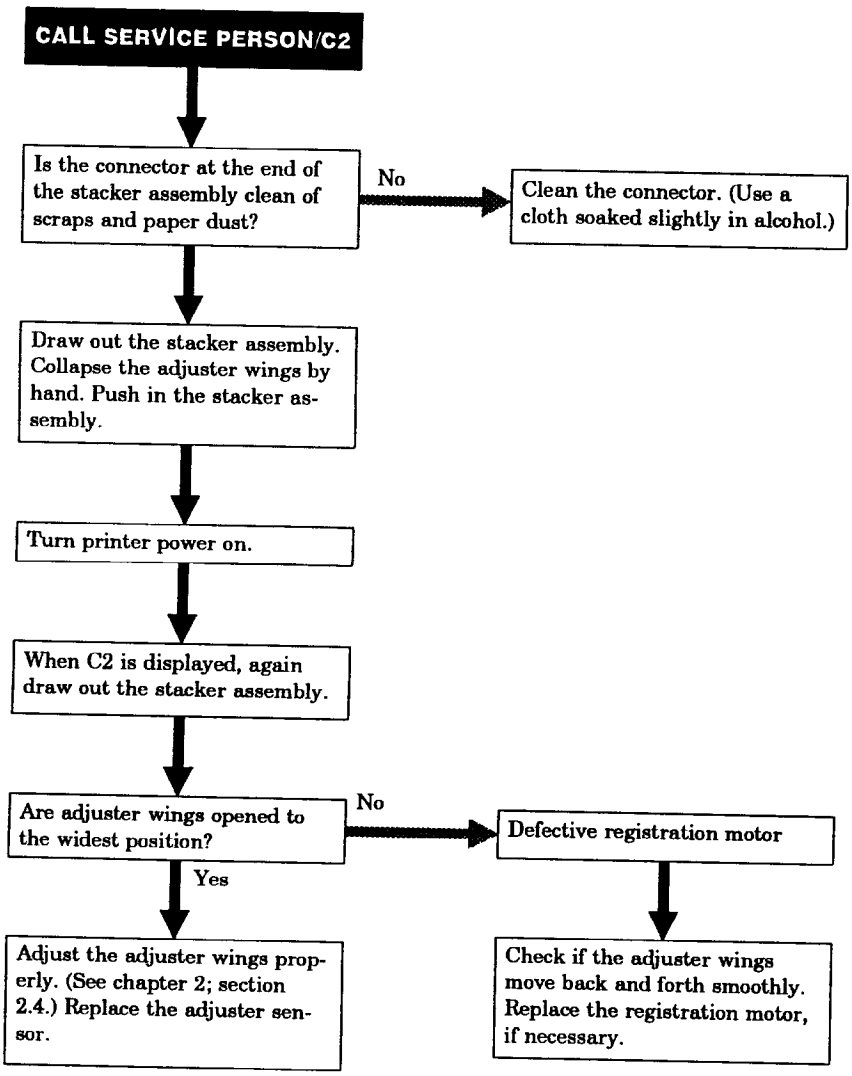


6.3. Mechanical troubleshooting

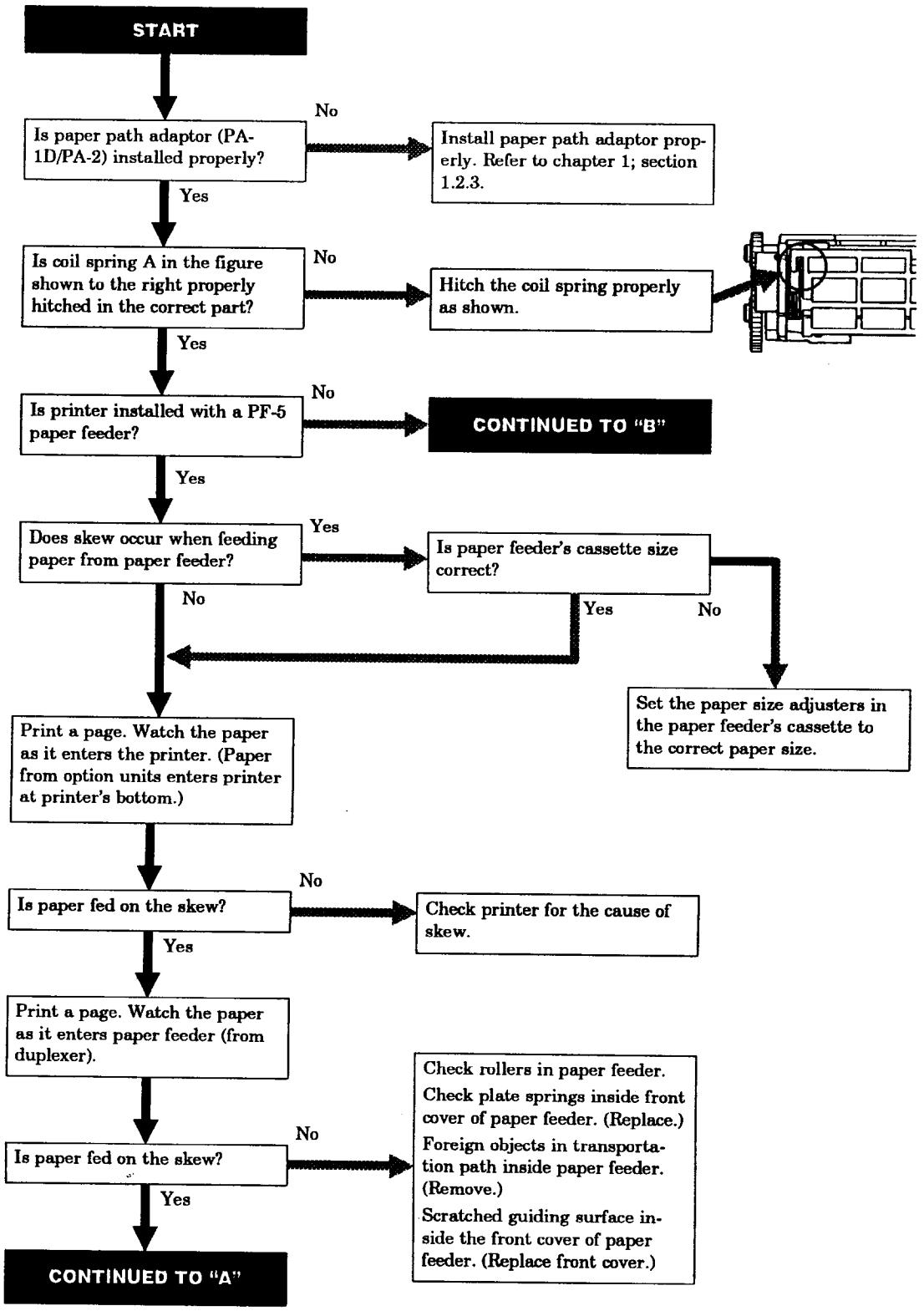
This section mainly concerns with paper handling problems such as paper skew, jam, and dog-ear. These are most likely to be caused by defect in mechanical component. Also, error code C2 can be often caused by mechanical reason as explained in section 6.3.1. below.

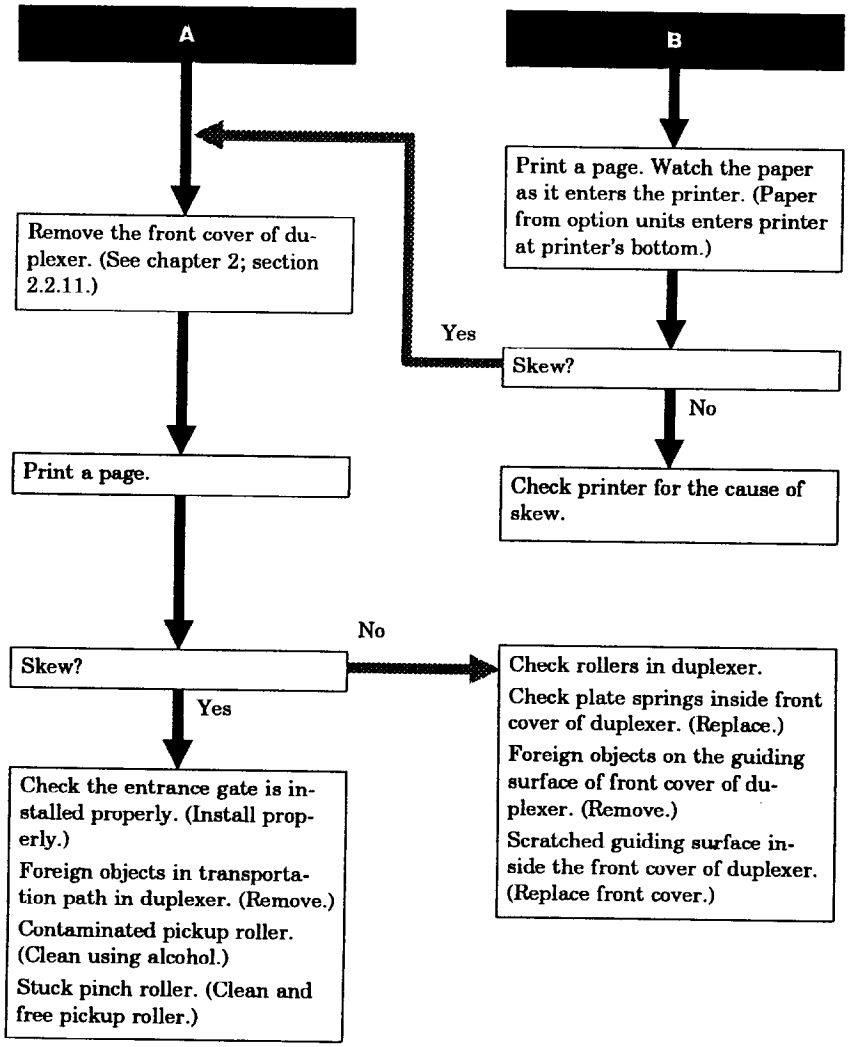
6.3.1. C2 error (mechanical)

Error C2 implies the duplex registration error.



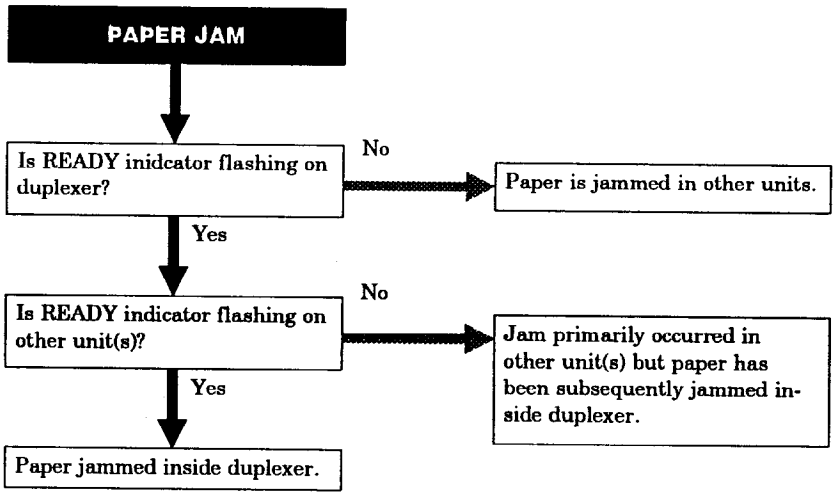
6.3.2. Paper skew




A
B
Print a page. Watch the paper as it enters the printer. (Paper from option units enters printer at printer's bottom.)
Remove the front cover of duplexer. (See chapter 2; section 2.2.11.)
Yes
Skew?
No
Print a page.
Check printer for the cause of skew.
No
Skew?
Check rollers in duplexer.
Check plate springs inside front cover of duplexer. (Replace.)
Foreign objects on the guiding surface of front cover of duplexer. (Remove.)
Scratched guiding surface inside the front cover of duplexer. (Replace front cover.)
Yes
Check the entrance gate is installed properly. (Install properly.)
Foreign objects in transportation path in duplexer. (Remove.)
Contaminated pickup roller. (Clean using alcohol.)
Stuck pinch roller. (Clean and free pickup roller.)

6.3.3. Paper jam

The first flowchart in this section allows to locate the unit in which paper is jammed.

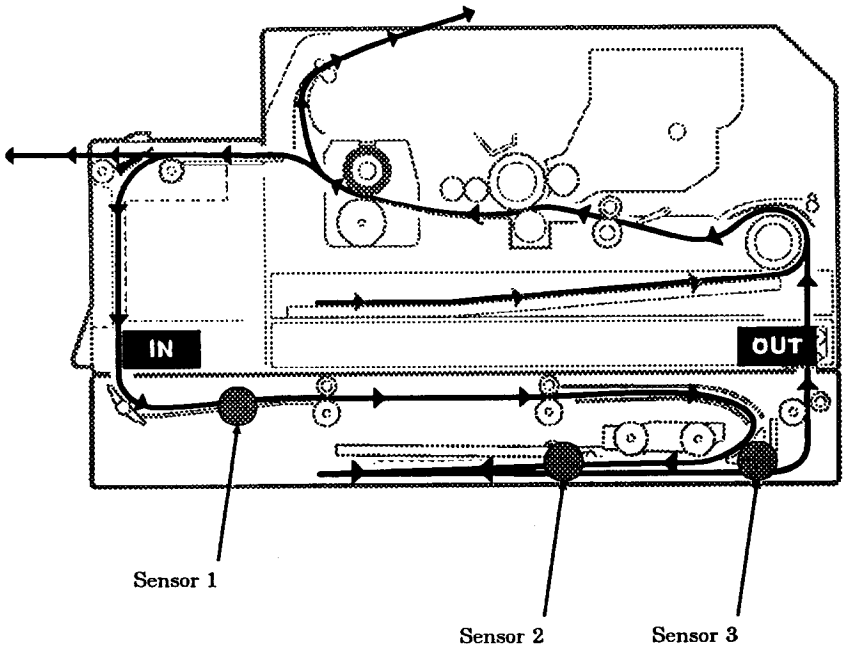


The READY indicator on the duplexer can flash in one of the following occasions.

- ❖ Paper does not enter the duplexer.
- ❖ Paper jammed inside the duplexer.
- ❖ Paper that exited the duplexer does not enter the printer.
- ❖ The duplexer accidentally recognized the occurrence of paper jam at power up.

The suggested remedy for each of above is detailed in the following pages. Figure 6.2. provides positioning information of sensors that will be referred to in the procedures.

FIG. 6.2. SENSOR POSITIONS



PAPER DOES NOT ENTER THE DUPLEXER

If sensor 1 does not detect paper entering the duplexer, the duplexer regards it as paper jam.

LOCATION OF JAM	SYMPTOM	CAUSE	SUGGESTED REMEDY
At paper path adaptor	Paper path adaptor does not work.	Gears do not transfer power from duplexer to paper path adaptor.	Check joint spring on paper path adaptor. (See figure in section 6.3.2.)
	Paper hits the center roller of paper path adaptor.	Paper with excessive curl used.	Replace paper.
At gate DB of duplexer	Gate DB of duplexer positioned incorrectly.	Defective side frame.	Replace the side frame.

PAPER JAMMED INSIDE THE DUPLEXER

If sensor 2 and sensor 3 do not recognize paper, the duplexer regards it as paper jam. Paper jam is likely to be located at the paper path adaptor or at the inlet gate of the duplexer.

LOCATION OF JAM	SYMPTOM	CAUSE	SUGGESTED REMEDY
Sensor 2	Top edge of paper trapped	Worn out plate springs of roller A	Replace plate springs.
Sensor 2 (at adjuster wings)	Paper hits the adjuster wings.	Worn out plate springs of roller B	Replace plate spring.
		Non-uniformly adjusted left and right balance of entrance gate	Replace entrance gate.
		Curved bracket roller	Replace bracket roller
		Contaminated pickup roller	Clean pickup roller using alcohol.
Sensor 3	Paper not laying over two pickup rollers	Defect in elevation of pickup rollers	Replace clutch springs.
	Motor appears to start revolving in reverse direction but paper does not exit from duplexer.	Defective operation of joint B assembly (This can be confirmed easily when front cover is removed.)	Replace joint B assembly.
		Contaminated pickup rollers	Clean pickup rollers using alcohol.

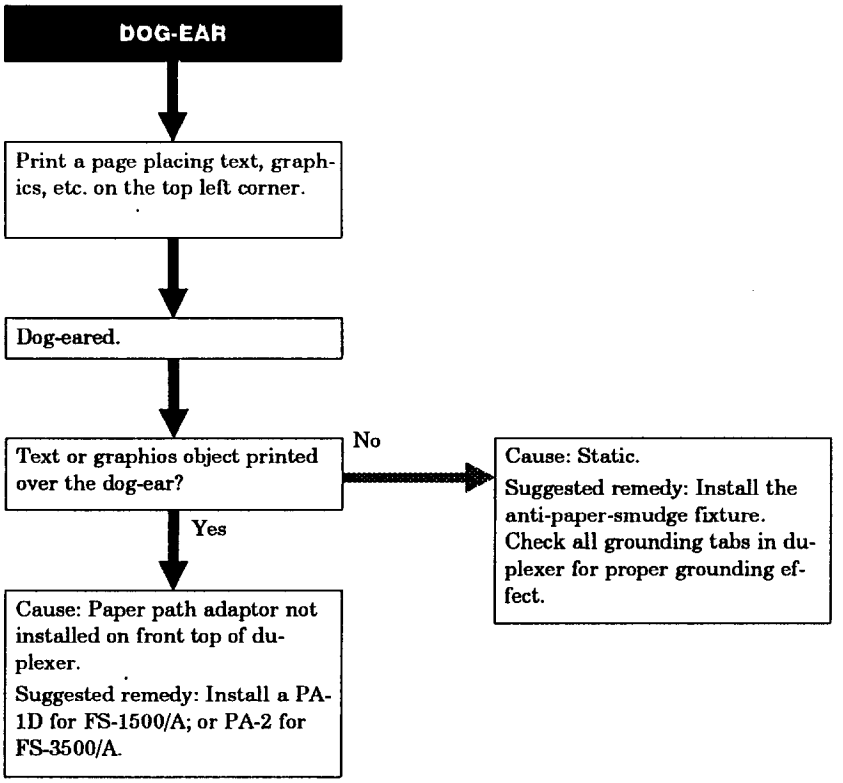
PAPER THAT EXITED THE DUPLEXER DOES NOT ENTER THE PRINTER

LOCATION OF JAM	SYMPTOM	CAUSE	SUGGESTED REMEDY
Roller C	Paper trapped before roller C	Defective clutch	Replace clutch.
Paper path adaptor (no paper feeder installed above)	Paper path adaptor does not work.	Defective operation of joint C assembly	Check springs in paper path adaptor. Replace joint C assembly.
	Paper jams at the entrance of printer (bottom front side).	Paper path adaptor model PA-1 is used (if printer model is FS-1500/A).	Replace PA-1 with PA-1D.

DUPLEXER ACCIDENTALLY RECOGNIZED THE OCCURRENCE OF PAPER JAM AT POWER UP

LOCATION OF JAM	SYMPTOM	CAUSE	SUGGESTED REMEDY
—		Sensors may be contaminated.	Clean sensors using alcohol.
		Defective connection of the stacker assembly's connector to the base assembly.	Remove paper scraps, dust, etc., if found. Clean the connector pins.

6.3.4. Dog-ear


DOG-EAR
Print a page placing text, graphics, etc. on the top left corner.
Dog-eared.
Text or graphios object printed over the dog-ear?
No
Cause: Static.
Suggested remedy: Install the anti-paper-smudge fixture.
Check all grounding tabs in duplexer for proper grounding effect.
Yes
Cause: Paper path adaptor not installed on front top of duplexer.
Suggested remedy: Install a PA-1D for FS-1500/A; or PA-2 for FS-3500/A.