NP-1015/1215S

SERVICE MANUAL

REVISION 0

TONER
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Canon

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FOREWORD

This service manual provides basic information required for after-sales servicing of the NP-1015/1215S.

The contents of each chapter are as follows:

CHAPTER 1 INTRODUCTION
Features, specifications, and operation

CHAPTER 2 COPYING PROCESS
Explanation of the steps in making a copy

CHAPTER 3 OPERATIONS AND TIMING
Explanation of the principle of operation of the electrical and mechanical systems and their timing

CHAPTER 4 MECHANICAL SYSTEM
Description of the mechanical system, its disassembly, assembly and adjustment

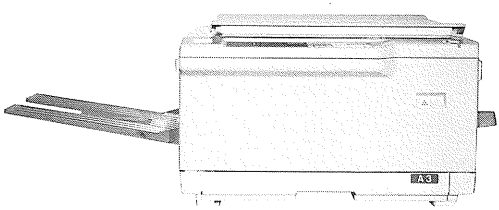
CHAPTER 5 INSTALLATION
Installation conditions and procedure

CHAPTER 6 MAINTENANCE AND INSPECTION
Periodically replaced parts, consumables, periodic servicing, storing cartridges, and handling precautions

APPENDIX General timing chart, general circuit diagram, PCB diagrams, wiring diagrams, etc.

Troubleshooting information is subject to change as the copier is improved. All relevant information in such cases will be supplied in Service Information Bulletins.

A thorough understanding of this copier, based on information contained in this manual, the separate Service Handbook, and the Service Information Bulletins, is required to maintain the reliable performance of the copier and to quickly locate the causes of malfunctions.



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CHAPTER 1

INTRODUCTION

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I. FEATURES

1. Originals and copy papers up to A3, and fixed copyboard

- Compact design with the reduction feature of A3 to A4.
- Fixed copyboard which facilitates making copies from thick originals such as books.

2. Space-saving front loading system in replenishing copy papers

- Employment of front-loading system for ease in replenishing copy papers.

3. High quality image with extra-fine particle-size mono-component toners

- For ever superior image quality, extra-fine particle-size (in comparison with previous Canon toners) toner has been employed in association with mono-component "jumping" toner development system.

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II. SPECIFICATIONS

Type	
Copier	Desktop
Copyboard	Fixed
Light source	Tungsten-halogen lamp (300 W)
Lens	Lens
Photosensitive material	OPC
Method	
Copying	Indirect electrostatic method
Charging	Corona
Exposure	Slit (moving light source)
Copy density adjustment	Automatic or manual
Developing	Dry
Paper pick-up	
Automatic	Dedicated cassette
Manual	Manual feed
Transfer	Corona
Separation	Tangential Curvature separation
Cleaning	Blade
Fixing	Heated roller (900W)
Type of original	Sheets, books, 3-dimensional objects (up to 2 kg)
Maximum document size	A3 (11″ × 17″)
Function	
Reproduction ratio	1:1 (±0.5%)
WAIT time	90 seconds (20°C)
First copy	10 seconds (A4)
Continuous copying	99 copies
Copy size	Max: A3; (11″ × 17″) Min: A6 (Post Card)
Kind of copy paper	Ordinary paper 64 to 80g/m², tracing paper (SM1,
Cassette feed	*GNT-80), colored paper
Manual feed	Ordinary paper 64 to 128g/m², tracing paper (SM1, *GNT-80), colored paper, OHP film, postcards, labels
Two-sided copies	Ordinary paper 64 to 80g/m²
Manual feed	Ordinary paper 64 to 128g/m², postcards, colored paper
Overlay copies	Ordinary paper 64 to 80g/m²
Manual feed	Ordinary paper 64 to 128g/m², postcards, colored paper
Cassette specifications Claw	Provided
General	Depth 27mm (1.0″) (equivalent to approx. 250 sheets of 80g/m² paper)
Universal	Not provided
Tray capacity	Approx. 100 sheets (A4 size, 80g/m²)

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Function

Non-image width (1st side)	
Leading edge	2.0±1.0mm (0.08"±0.03") max
Left and right	2.5±1.5mm (0.1"±0.03") max
AUTO CLEAR	Possible (standard 2 minutes)
AUTO SHUT-OFF	None
Options	DF/ADF, CT unit, Sorter, Control card unit
Operating environment	
Temperature range	7.5 ~ 32.5°C
Humidity range	10 ~ 85%
Atmospheric pressure range	0.6 to 1 atmospheres
Power source	Copier No.
115V 60Hz	CPE xxxxx CPF xxxxx CRD xxxxx
220V 50Hz	DPE xxxxx DPF xxxxx DRD xxxxx
240V 50Hz	EPE xxxxx EPF xxxxx EPG xxxxx
240V 50Hz	FPE xxxxx FPF xxxxx FRD xxxxx
220V 50Hz	KPE xxxxx KPF xxxxx KPG xxxxx
Power consumption	
Max	1.5kw max
During STANDBY	0.14 Kwh
During continuous copying	0.68 Kwh
Noise	
During copying	55dB max (at 1m from copier)
During STANDBY	40dB max (at 1m from copier)
Ozone (average for 8 hours)	0.1ppm max
Dimensions	
Width	610mm (24")
Depth	574mm (22")
Height	344mm (13")
Weight	47kg
Storing consumables	
Copy paper	Store copy paper in its wrapping and protect it from humidity
Toner	Store toner at a temperature and humidity of no more than 40° and 85%, and away from direct sunlight
Developing unit	Store the developing in a storage box or in the pedestal of the copier at a temperature and humidity of no more than 30°C and 85%, and away from direct sunlight

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Reproduction ratio	Size	Cassette	Number of copies per minute
DIRECT	A3 (297 × 420 mm) (11″ × 16″)	A3	9
	A4 (210 × 297 mm) (8.3″ × 11.7″)	A4	15
	B4 (257 × 364 mm) (10.1″ × 14.3″)	B4	10
	B5 (182 × 257 mm) (7.2″ × 10.1″)	B5	15
	LTR (216 × 279 mm) (8.5″ × 11″)	LTR	15
	STMT (139.5 × 216 mm) (5.4″ × 8.5″)	STMT	16
	LGL (216 × 356 mm) (8.5″ × 14″)	LGL	10
	11″ × 17″ (297 × 432 mm) (11″ × 17″)	11″ × 17	9

The above specifications are subject to change with improvement or redesign of the copier.

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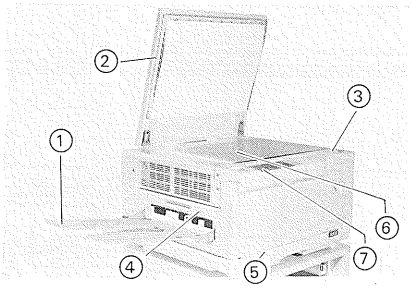
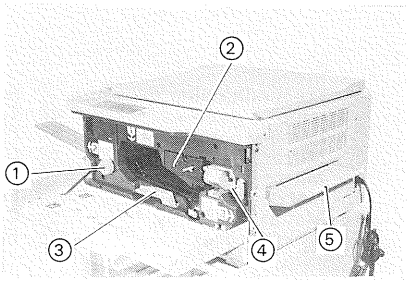
III. NAMES OF PARTS

A. External View



① Copy delivery tray
② Copyboard cover
③ Power switch
④ Copy delivery cover
⑤ Cassette
⑥ Copyboard glass
⑦ Control panel

Figure 1-1



① Fixing roller knob
② Cartridge
③ Feeder release lever
④ Developing unit release lever
⑤ Manual feed tray

Figure 1-2

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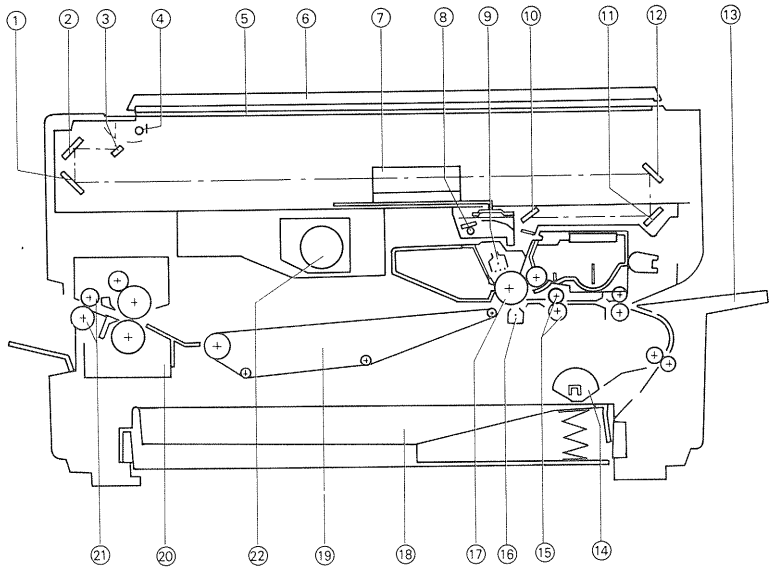
B. Cross-sectional View



① Mirror 3
② Mirror 2
③ Mirror 1
④ Scanning lamp
⑤ Copyboard glass
⑥ Copyboard cover
⑦ Lens
⑧ Preconditioning exposure lamp
⑨ Primary corona unit
⑩ Mirror 6
⑪ Mirror 5
⑫ Mirror 4
⑬ Manual feed tray
⑭ Pick-up roller
⑮ Registration rollers
⑯ Transfer corona unit
⑰ Photosensitive drum
⑱ Cassette
⑲ Feeder
⑳ Fixing unit
㉑ Copy delivery roller
㉒ Exhaust fan

Figure 1-3

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IV. OPERATION

A. CONTROL PANEL

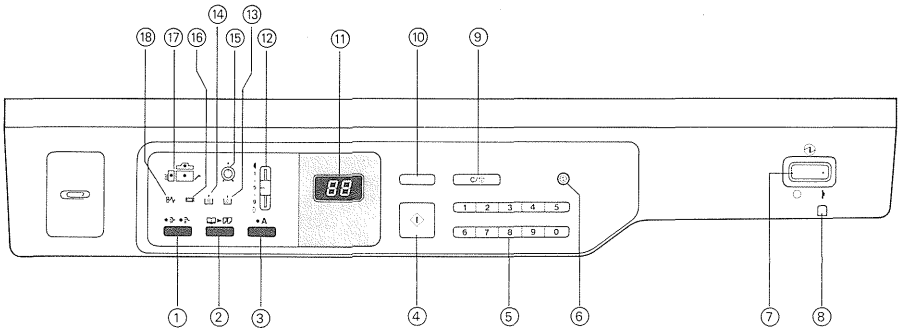

Figure 1-4

① SORT/GROUP key
This key is used to select the SORT, GROUP, or NON-SORT mode.
When the indicator is not lit, the copier is in the NON-SORT mode.
SORT indication
GROUP indication

Note:
"SORT" gives a true "collate" function; "GROUP" gives a true "sort" function.

② TWO-PAGE SEPARATION key
This key is used to select the TWO-PAGE SEPARATION mode.
③ AE key (automatic density adjustment select key)
④ COPY START key
- Copying cannot take place when the key is lighting red.
- Copying can take place when the key is glowing green.

⑤ Number keys
⑥ PREHEAT key
⑦ Power switch
⑧ POWER indicator
ON when the POWER switch is ON.

⑨ CLEAR/STOP key
⑩ STANDARD MODE key
This key is used to return the copier to the STANDARD mode.
Standard mode: COPY NUMBER indicator "1"
AE
⑪ COPY NUMBER indicator
- Shows the number of copies to be made (decremented with each copy).

⑫ COPY DENSITY cursor
⑬ TONER OUT indicator
⑭ PAPER OUT indicator
⑮ COPY DENSITY RECALIBRATION knob
This knob is used to adjust the copy density system when copies are too dark or too faint for a given cursor setting.
(Turning it clockwise will cause the density to become fainter.)
⑯ Control card checking indicator
⑰ Paper feed position indicator
⑱ JAM indicator

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B. Basic Copying Operation

1) Set the power switch to ON (I).
   (1) If the temperature of the fixing roller is too low for copying, the indicator of the COPY START key will glow red.
   (2) When the temperature of the fixing roller becomes high enough for copying, the indicator will glow green.
   (3) The normal waiting time at room temperature (20°C) is about 70 seconds.
2) Raise the copyboard cover, place an original on the copyboard with the side to be copied facing downward, and align it with the size indication.
3) To adjust the copy density manually, the A key indicator should be OFF; press the key once if it is ON. Set the COPY DENSITY cursor to suit the original.
4) Check the size of paper in the cassette.
   (1) If the cassette does not have the desired size of paper, remove it and install a cassette with the desired size.
5) Set the required number of copies (1 to 99) using the number keys and confirm that the correct number appears on the COPY NUMBER indicator.
   (1) If an error was made in inputting the number of copies, press the CLEAR/STOP key and reset the number of copies.
6) Press the COPY START key.
   (1) To stop a continuous copying operation, press the CLEAR/STOP key. The copier will complete the copy in progress, then stop.
   The COPY NUMBER indicator will display the initially set copy quantity.
   (2) It is possible to switch from automatic exposure control to manual density adjustment at any time from the start of copying to the completion of the final copy. However, it is not possible to switch in the other direction from manual density adjustment to automatic.

Example:
If the copy is too dark or too faint using AE, cancel AE and vary the copy density with the COPY DENSITY cursor.

   (3) If the PAPER OUT indicator goes ON during copying, the copier will stop. Refill the cassette and press the COPY START key. The remaining number of copies will be made automatically.
   (4) If the copier has a DF, place a document (original) on the document tray. The document will be fed automatically and copying will start.
   (5) If no other operation is performed, the copier will return to the STANDARD mode approximately 2 minutes after it completes a copy or after the last key operation.

C. MANUAL FEED PICK-UP OPERATION

1) Place an original on the copyboard.
2) Select manual or AE density control.
3) Feed one sheet of copy paper into the copier along the guides of the manual feed tray.
   (1) When the copier senses the paper, copying will start automatically.
   (2) When performing continuous manual feed copying, keep the sheets at least 50 mm separate from each other.

Note:
Manual feed copying is possible when the PAPER OUT indicator is ON and the COPY START key is glowing red.

D. TWO-SIDED COPYING

Copy one side of a 2-sided original. Invert the original so that the same edge faces the front. Invert the copy in the same way (front edge facing front ward) and feed it into the copier.

(1) Use dry, uncurled paper.
(2) Use paper in the weight range 60 128g/m².
(3) When making two-sided copies, only one image can be made on each side of the copy paper.
(4) Overlay and two-sided copies cannot be made on the same sheet of copy paper.

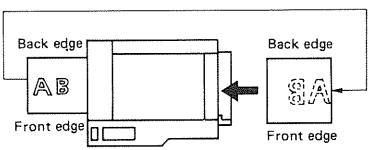

Figure 1-5

E. OVERLAY COPY OPERATION

By changing the developing unit, a 2-color copy can be made on the same side of the copy paper.

(1) Use paper in the range of 60 to 128g/m².
(2) When making an overlay copy a maximum of two images can be made on one side of the copy paper.
(3) Overlay and two-sided copies cannot be made on the same sheet of copy paper.

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F. REPLACING THE CT UNIT

1) Open the front door.
2) Swing the developing unit release lever counterclockwise.
3) Pull the developing unit forward.
4) Grasp the handle of the developing unit, and gently raise it.

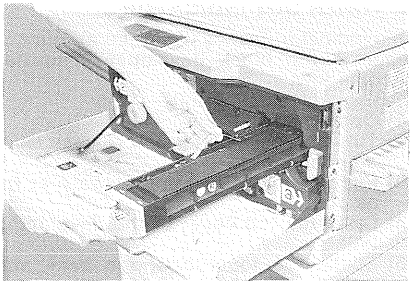


Figure 1-6

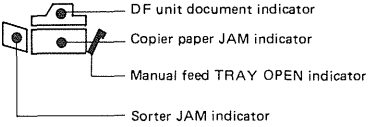
6) Place the CT unit gently on the developing unit guide rails and push it into the copier.
7) Swing the developing unit release lever clockwise.
8) Close the front door.

Note:
1. Do not tilt or handle the developing unit or the CT unit roughly.
2. Do not place the developing unit or the CT unit on the floor. Be sure to place them in their storage box or in the pedestal of the copier.

V. WARNING INDICATOR AND REQUIRED ACTION

A. JAM INDICATOR

If an area of this indicator flashes while copying is taking place, it is likely that the paper has jammed at the position represented by the part that is flashing. Check and take action as follows.



When clearing a paper jam which ahs occurred in an option unit (sorter or DF), refer to the Service Manual for the option unit.
1. DF unit document JAM indicator
2. Copier paper JAM indicator
3. Manual feed TRAY OPEN indicator
4. Sorter JAM indicator

If paper jams inside the copier, check the paper pick-up area; separation feeder area, fixing/copy delivery area, and cartridge area, and remove all jammed paper.
1) Open the front door.
2) Remove the copies from the copy tray.
3) Operate the release and open the copy delivery unit.
4) Check if there is copy paper jammed in the fixing unit. If there is paper jammed in it, turn the knob of the fixing rollers clockwise to remove the jammed paper.

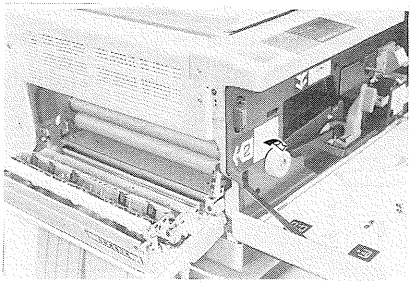


Figure 1-7

5) Close the copy delivery unit.
6) Check if there is paper jammed in the separation/feeder area. If there is, swing the feeder release lever counterclockwise to open the feeder, then remove the jammed paper. Be careful not to tear it.

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Note:
When removing jammed paper from the separation area be very careful not to touch the photosensitive drum.

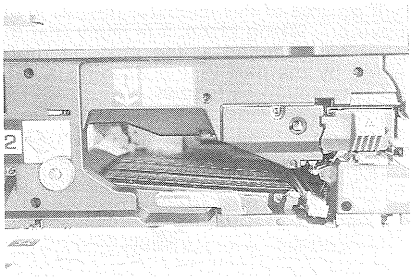

Figure 1-8

7) Open the manual feed tray, and check if there is any jammed copy paper.
   If there is any jammed copy paper, remove it.

Figure 1-9

8) Open the manual feed tray and check if there is any jammed copy paper.
   If any copy paper is protruding from the cassette, remove it.
9) Close the front door.

B. PAPER OUT indicator

This indicator lights if there is no cassette in the cassette holder or if there is no paper in the cassette.
1) Remove the cassette.
2) Place copy paper into the cassette.
3) Put the cassette into the copier.

C. TONER OUT INDICATOR

This indicator flashes when the amount of toner in the black developing unit has become low.

1. Black developing unit
   1) Open the front door.
   2) Turn the developing unit release lever counterclockwise.
   3) Pull the developing unit forward as far as possible.
   4) Open the top cover of the developing unit.
   5) Shake the toner cartridge back and forth vigorously about 10 times.
   6) Place the toner cartridge on the developing unit.
   7) While holding the toner cartridge in place, remove the seal slowly to allow the toner to flow out.

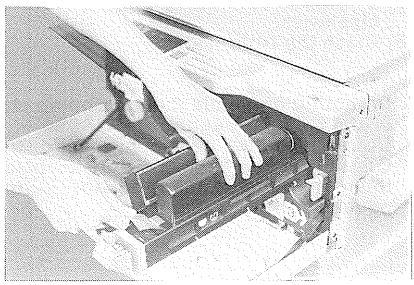

Figure 1-10

   8) Strike the top of the toner cartridge to remove any toner remaining in the cartridge.
   9) Carefully remove the toner cartridge.
   10) Close the top cover of the developing unit.
   11) Put the developing unit back into the copier.
   12) Swing the developing unit release lever clockwise.
   13) Close the front door.

2. CT Unit (color developing unit)
   If copy images become faint, the color toner has probably run out. In this case, replace the CT unit. The copy image can sometimes be temporarily restored by placing the CT unit in its storage box and agitating it.

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Note:
The CT unit is a discardable type. When the color toner has been used up, toner is not added to the CT unit; rather, the entire unit is replaced.

D. CONTROL CARD INDICATOR

The control card indicator operates on a copier with a control card unit. It flashes in the following cases.

(1) When there is no control card in the control card unit.
(2) When there is a control card in the control card unit but the indication on the control card unit is "P" or "EE"

VI. DAILY INSPECTION TO BE PERFORMED BY THE CUSTOMER

Carefully instruct the customer to be sure to clean the following parts of the copier once a week.

1) Primary corona unit
   Push and pull the wire cleaner to clean the corona wires.
2) Copyboard glass
   Clean the copyboard glass with a damp cloth, then wipe it dry.
3) Copyboard cover
   Clean the copyboard cover with a mild detergent solution, then wipe it dry.
4) Transfer corona
   Remove the transfer corona unit from the copier, then slide the knob (wire cleaner) at the bottom of the transfer corona unit back and forth to clean the corona wires.

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CHAPTER 2

COPYING PROCESS

I. IMAGE FORMATION PROCESS 2-1

II. AUXILIARY PROCESSES 2-5

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I. IMAGE FORMATION PROCESS

A. OUTLINE

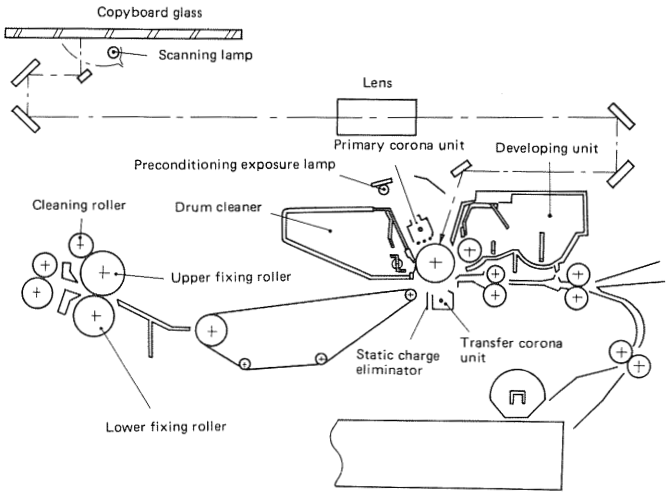

Figure 2-1

This copier consists of the units shown in Figure 2-1.

The image forming process is divided into the eight steps shown below.

Step 1: Preconditioning exposure
Step 2: Primary corona (negative DC)
Step 3: Image exposure
Step 4: Developing (positive plus AC)
Step 5: Transfer (negative DC)
Step 6: Separation
Step 7: Fixing
Step 8: Drum cleaning

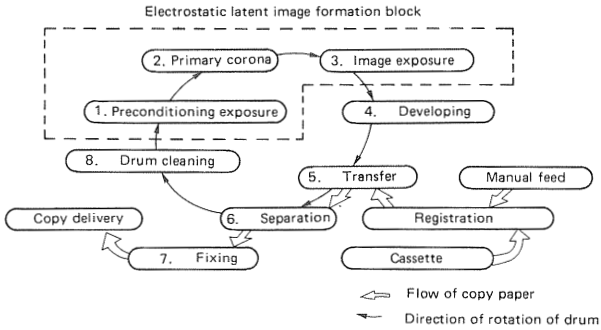

Figure 2-2

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The outer surface of the photosensitive drum is a layer of organic photoconductor (OPC). The base is an aluminum (conductive) cylinder.

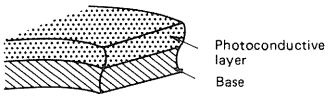

Figure 2-3

2. Electrostatic Latent Image Formation Block

This stage consists of three steps. At the end of the stage, the drum has a pattern of negative electrical charges on its surface corresponding to the dark parts of the document image. The light areas of the document image are represented on the drum by an absence of charges.

The pattern of negative charges cannot be seen by eye, hence it is called an electrostatic latent image.

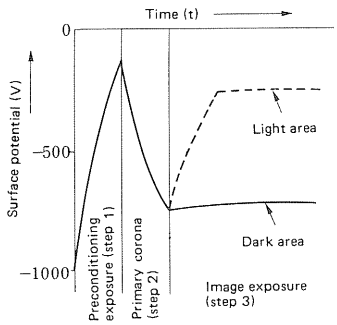

Figure 2-4

3. Step 1 Preconditioning Exposure

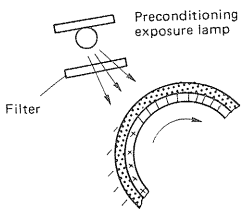

Figure 2-5

Before the primary corona step, light from the preconditioning exposure lamps is shone onto the surface of the drum (preconditioning exposure). This process eliminates residual charges and helps to make the density of the copy even.

4. Step 2 Primary Corona

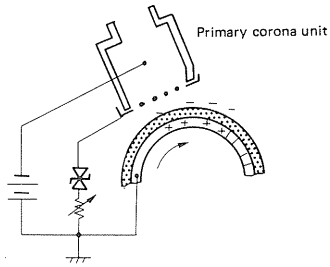

Figure 2-6

The primary corona (negative) applies a uniform layer of negative charges over the drum surface.

The drum surface potential is determined by the grid potential. The grid is connected to ground through a varistor, which holds the drum potential constant at the varistor break-down voltage.

5. Step 3 Scanning Exposure

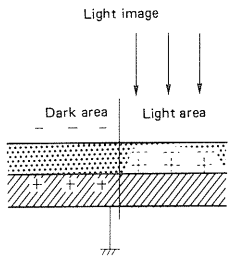

Figure 2-7

Light from the original is projected onto the drum surface. Charges in these light areas on the drum are neutralized by drum photoresistive effects.

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6. Step 4 Developing

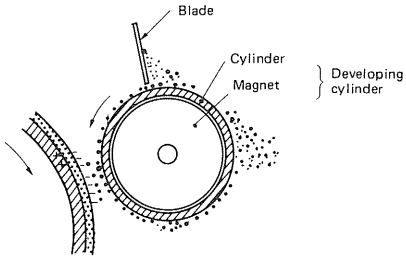

Figure 2-8

As shown in Figure 2-8, the developing unit consists of a developing cylinder (a stationary magnet surrounded by a rotating sleeve) and a blade made of magnetic material. Black toner is a single component type consisting of a fine powder of mixed magnetite and resin binder. The toner has insulating properties and is charged to a positive potential by friction with the rotating cylinder.

Color developer is a two-component type consisting of iron powder (carrier) and toner mixed together in a fixed ratio. The main component of the toner is resin. The toner is charged to a positive potential and the iron powder to a negative potential by friction with the rotating cylinder.

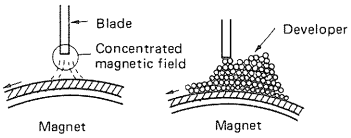

Figure 2-9

A concentrated magnetic field develops between the magnet and the edge of the blade. This field attracts the charged developer.

The developer is held virtually immobile by the magnetic field, forming a curtain along the edge of the blade. As the cylinder rotates, this curtain skims the toner particles on its surface to a thin uniform layer.

An AC bias plus a negative DC bias are applied simultaneously to the developing cylinder so that the waveform of the developing bias has a larger negative excursion than positive.

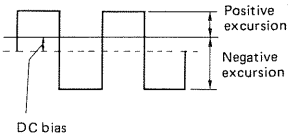

Figure 2-10

During copying toner is attracted to the drum by the charges on the drum surface and by repulsion due to the developing bias (during the positive excursion), transforming the latent electrostatic image into a visible image. Excess toner particles are attracted back to the cylinder from the drum due to the charges on the drum surface and the developing bias (during the negative excursion).

The DC bias affects copy density and fogging: As the DC bias becomes less negative (approaches 0V), the density and degree of fogging both increase.

7. Step 5 Transfer

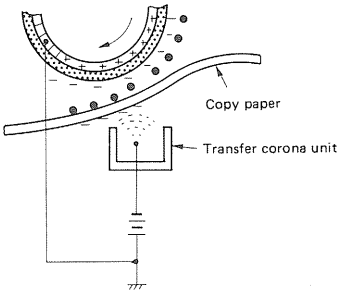

Figure 2-11

In this step, a negative corona is applied to the back of the copy paper, attracting the toner from the surface of the drum to the copy paper.

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8. Step 6 Separation

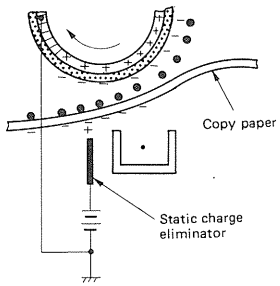

Figure 2-12

The copy paper is separated from the drum by utilizing its stiffness. Thin paper, however, is not stiff, and may wrap around the drum instead of separating from it. To prevent this, a positive voltage is applied to the separation static charge eliminator, weakening the attraction between the drum and the copy paper. This enables the paper to separate easily from the drum.

9. Step 7 Fixing

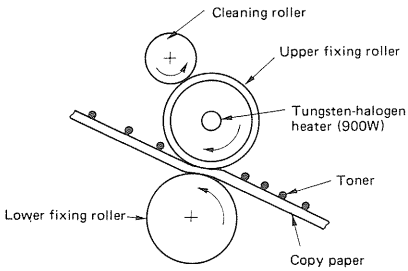

Figure 2-13

In this step, the copy paper is pressed between two heated rollers to make the toner image permanent.

To prevent the copy paper from wrapping around the roller and toner offsetting (adhesion of toner to the roller and transfer of the toner to the next copy), the surface of the upper fixing roller is cleaned with the cleaning roller.

10. Step 8 Drum Cleaning

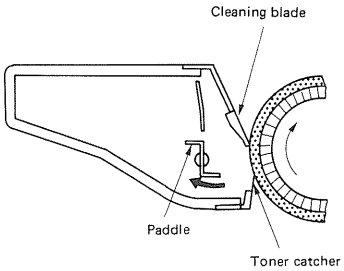

Figure 2-14

This step prepares the drum surface for the next copying operation. Any residual toner scraped off the drum by the cleaning blade and picked up by the toner catcher. It is then pushed to the back by the paddle.

TONER
www.tonerplus.com.ua

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II. AUXILIARY PROCESSES

1. Blank Exposure

In the non-image area on the drum between successive sheets of copy paper, the grid bias of the primary corona is reduced to prevent adhesion of toner. For these areas, there is no blank exposure for removal of the surface charges.

2. Ozone Filter

A catalytic ozone filter in the exhaust fan prevents ozone (generated by the coronas) from escaping to the atmosphere by converting the ozone to oxygen.

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CHAPTER 3

OPERATIONS AND TIMING

1. This chapter describes the various functions of the copier, the relationship between the electrical and mechanical systems, and the timing of operations of the various components. In outline diagrams, mechanical drive paths are represented by (▮▮▮), and electrical signal paths are indicated by an arrow (⟶) accompanied by a signal name.
2. The signals in digital circuits are identified as "1" for HIGH and "0" for LOW. The voltage for LOW is very close to 0V; the voltage for HIGH depends on the circuit. If a signal name has no bar over it (e.g., PDP), "1" is a "TRUE" signal. If a signal name has a bar over it (e.g., $\overline{PDP}$), "0" is a "TRUE" signal. (A "TRUE" signal will usually cause an action to occur, etc; a "FALSE" signal will normally prevent the operation.)
   Microprocessors are used in the copier. The internal operations of the microprocessors cannot be checked by the service technician, so no description is given here. Because PCBs are not normally repaired on the customer's premises, operation of circuits is explained using block diagrams rather than detailed circuit diagrams.
   Descriptions of circuits are divided into the following sections: from the sensors to the input section of the main PCBs, and from the output section of the main PCBs to the various loads.

I. BASIC OPERATION 3-1
II. EXPOSURE SYSTEM 3-9
III. IMAGE FORMATION SYSTEM 3-13
IV. PAPER TRANSPORT SYSTEM 3-23
V. POWER SUPPLY 3-32
VI. LIST OF PCBS/VRS/LEDS /CHECK PINS 3-33
VII. SELF DIAGNOSIS 3-34

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I. BASIC OPERATION

A. FUNCTIONS

The copier can be divided into four functional sections: paper pick-up and feed system, exposure system, image formation system, and control system.

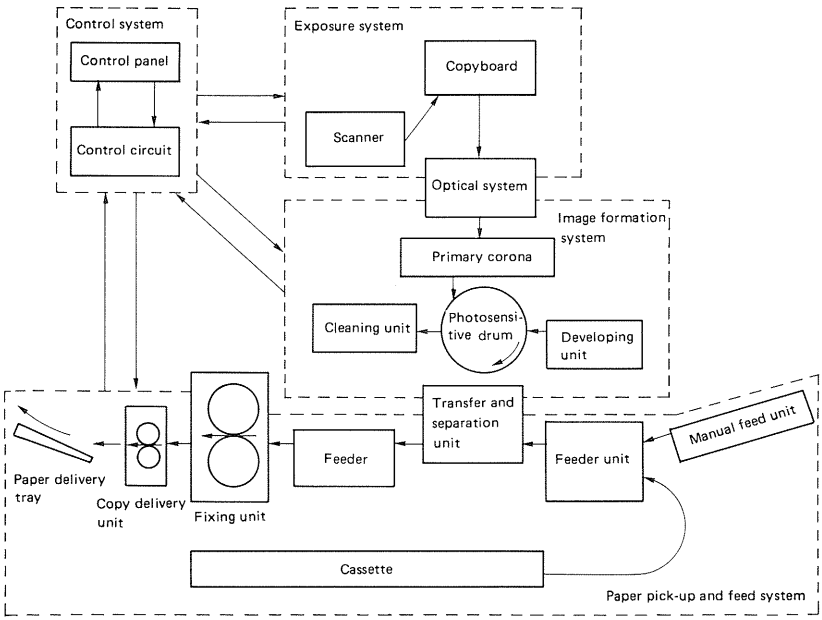

Figure 3-1

B. OUTLINE OF ELECTRICAL CIRCUITS

The major electrical operations of the copier are controlled by the microprocessor on the DC controller PCB. This microprocessor is programmed to read input signals from the sensors and control panel keys, and to send commands to drive loads (motors, solenoids, lamps, and other devices) in response at the necessary times.

For reference:
The microprocessor used in this copier incorporates an A/D converter enabling it to read analog signals as well as digital signals. Signals marked by (A) in Figure 3-2 are analog signals. Main motor M1 is a synchronous type and runs at a speed determined by the AC line frequency. Scanner drive motor M2 is a stepping type, and runs at a frequency determined by a crystal controlled oscillator in the DC controller. Any variation of the AC line frequency will affect only the main motor; this could result in compressed or elongated images.

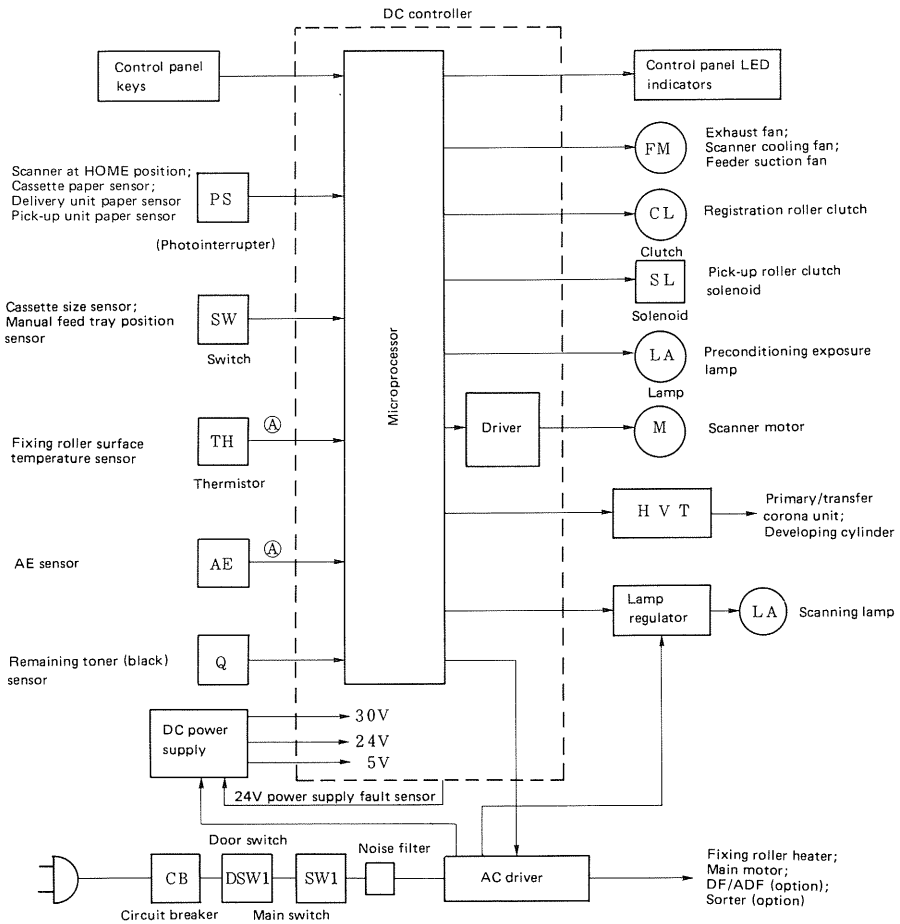

Figure 3-2

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C. DC CONTROLLER INPUTS (1/2)

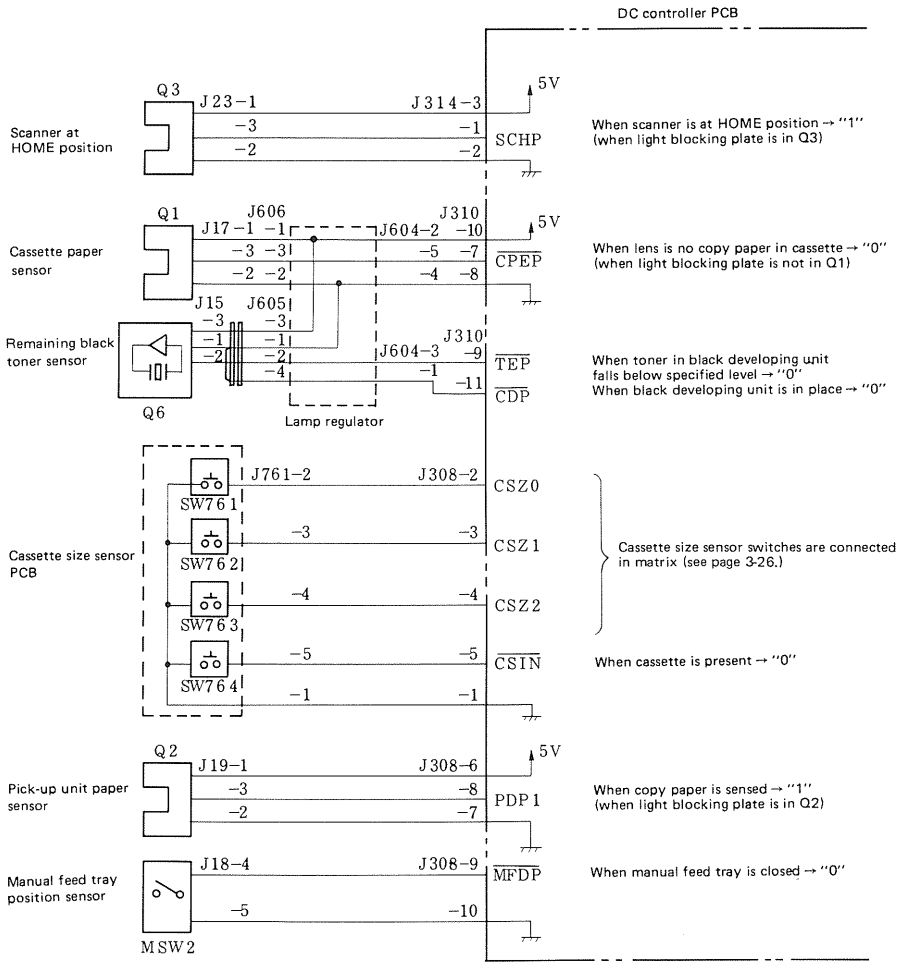

Figure 3-3

DC CONTROLLER INPUTS (2/2)

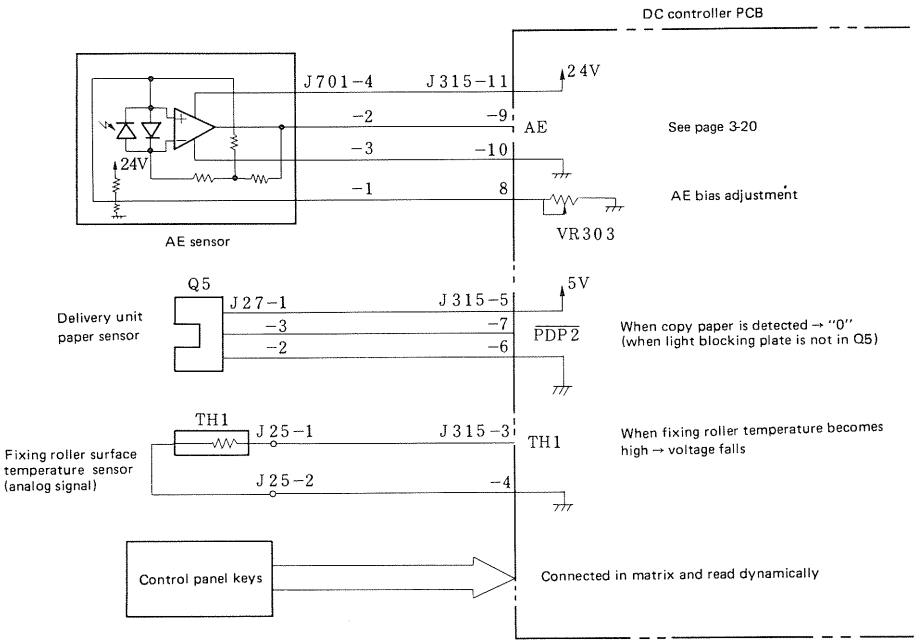

Figure 3-4

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D. DC CONTROLLER OUTPUTS (1/2)

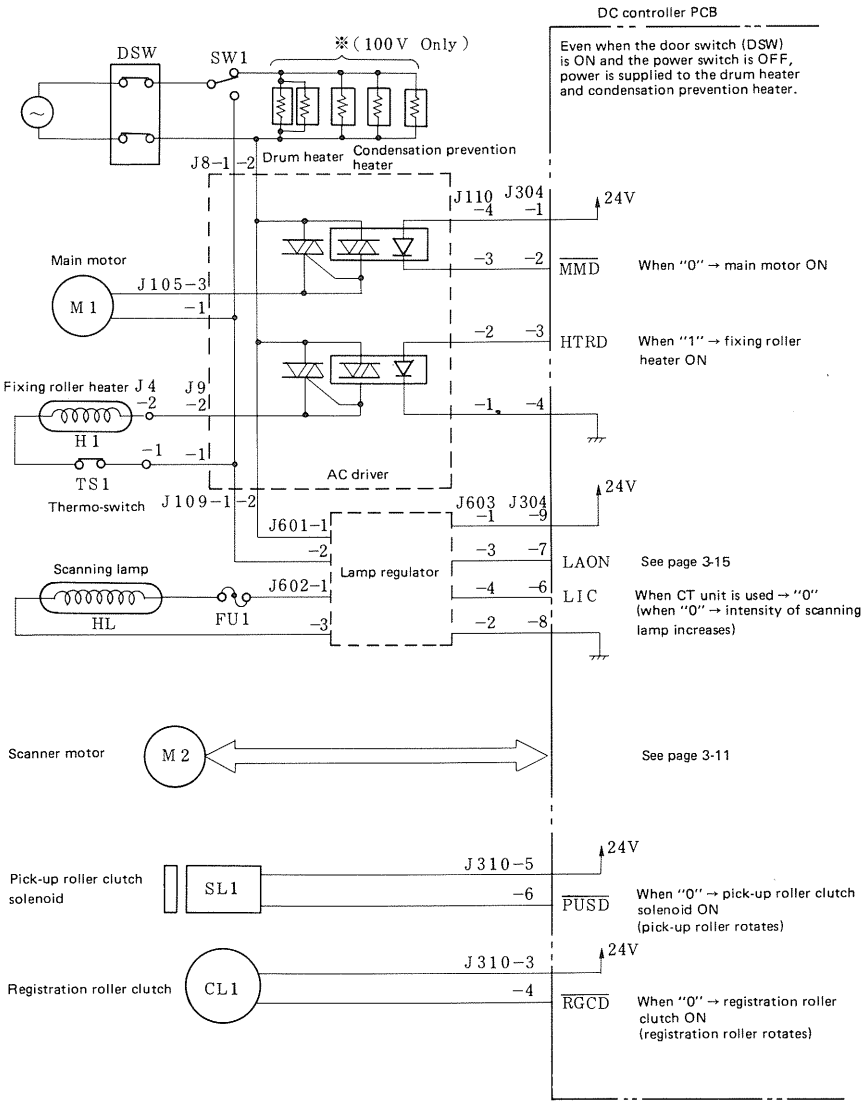

Figure 3-5

DC CONTROLLER OUTPUT (2/2)

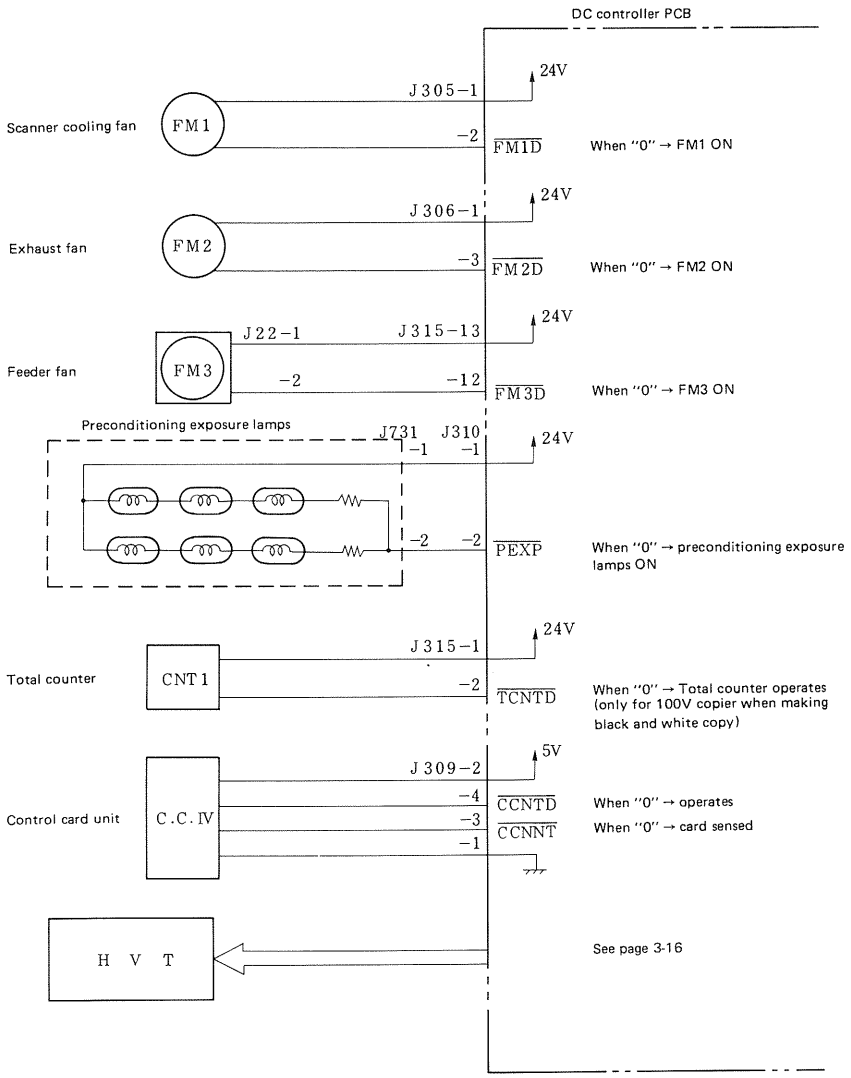

Figure 3-6

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E. BASIC SEQUENCE OF OPERATIONS (DIRECT, CONTINUOUS COPYING (TOWSHETS))

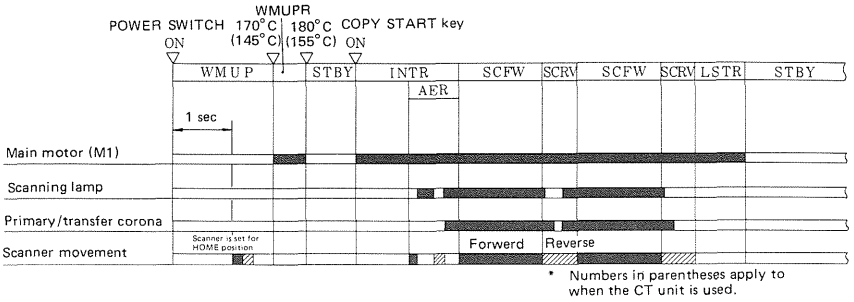

Figure 3-7

Period		Purpose	Remarks
WMUP (Warm-Up)	From switch on until the fixing roller temperature reaches 170°C for the black developer or 145°C for the CT unit. (About 70 seconds at an ambient temperature of 20°C)	Allows time for fixing roller to warm up	Warm-Up time varies with fixing roller temperature at power on. When the start key is lighting green.
WMUPR (Warm-Up rotation)	Until the fixing roller temperature reaches 170 to 180°C for the black developer or 145 to 155°C for the CT unit.	Keeps fixing roller temperature uniform	● After the WMUPR period ends, the READY/WAIT indicator changes from red to green. ● Even when the fixing Zroller has warmed up, it rotates for at least 3 seconds.
INTR (INITIAL rotation)	About 3.2sec(Note), after COPY START key is pressed	Stabilizes drum sensitiuity to prepare for copying	A PAPER FEED signal is generated to feed first sheet of copy paper Note AE mode: About 3.2 seconds Non-AE mode: About 2.2 seconds

Table 3-1 (a)

Period		Purpose	Remarks
AER (AE rotation)	From when the scanner moves forward about 70 mm from the end of the image unit it returns to its home position.	Move the scanner forward about 70 mm from the end of the image and measure the document density.	In the non-AE mode, the scanner does not move forward or in reverse.
SCFW (Scanner Forward)	When Scanner moving forward ● Travel distance changes with copy paper size.	Scanning lamp illuminates original, and retlected optical image is tramitted to photogensitive drum through mirrors and lens arry	● A REGISTRATION signal is generated, and copy paper is fed to transfer area ● A PAPER FEED signal is generated to feed next sheet of copy paper
SCRV (Scanner reverse)	While the scanner is moving in reverse ● The speed of the reverse movement is 2.5 times that of the forward movement.	Scanner is moved back to HOME position to prepare for next copy	
LSTR (SAST ratation)	Untill the main motor stop after SCRV for last copy ends.	Ensures full ejection of last copy	
STBY (STANDBY)		Waits until COPY START key is pressed	

Table 3-1 (b)

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II. EXPOSURE SYSTEM

A. SCANNER DRIVE SYSTEM

1. Outline

The scanner is driven by the scanner motor (M2). The direction of rotation of the scanner motor determines whether the scanner moves forward or backward.

The reverse speed is 2.5 times the forward speed.

The distance that the scanner moves varies to suit the size of copy paper.

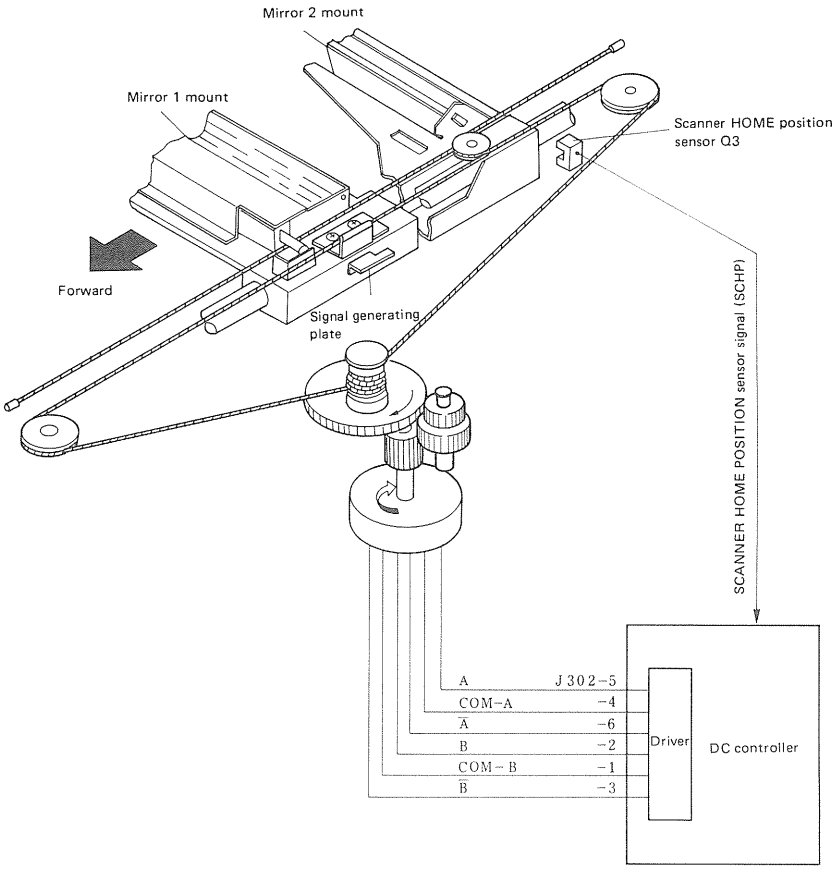

Figure 3-9

2. Relation Between Scanner Sensor and Signals

Scanner sensor	Signal name	Scanner		Meaning
		Forward	Reverse	
Scanner HOME position sensor (PS1)	SCHP	↓		* Registration roller clutch ON * Grid bias
			↑	* After 0.1 seconds, scanner stops advancing

Table 3-2

3. Basic Scanner Operation

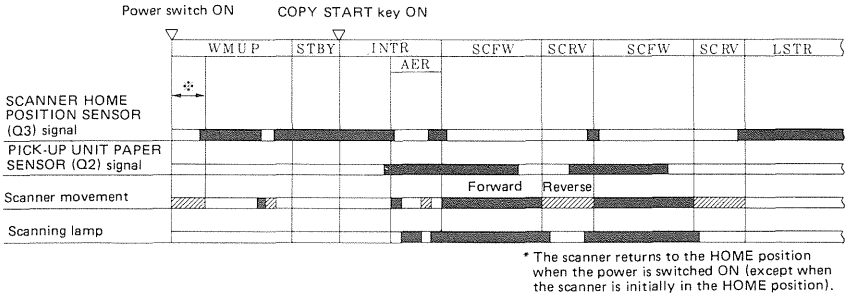

Figure 3-10

* The scanner returns to the HOME position when the power is switched ON (except when the scanner is initially in the HOME position).

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4. Scanner Motor Drive System

Operation

(1) Clockwise rotation

The scanner motor driver outputs pulses as shown in Figure 3-11, and the motor rotates CW.

(2) Counterclockwise rotation

The scanner motor is driven CCW by pulses of phase relationship opposite to that used to drive it CW.

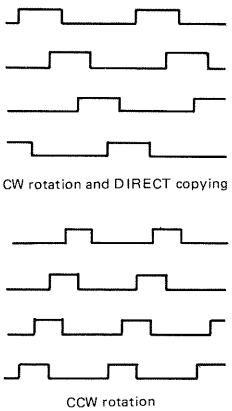

Figure 3-11

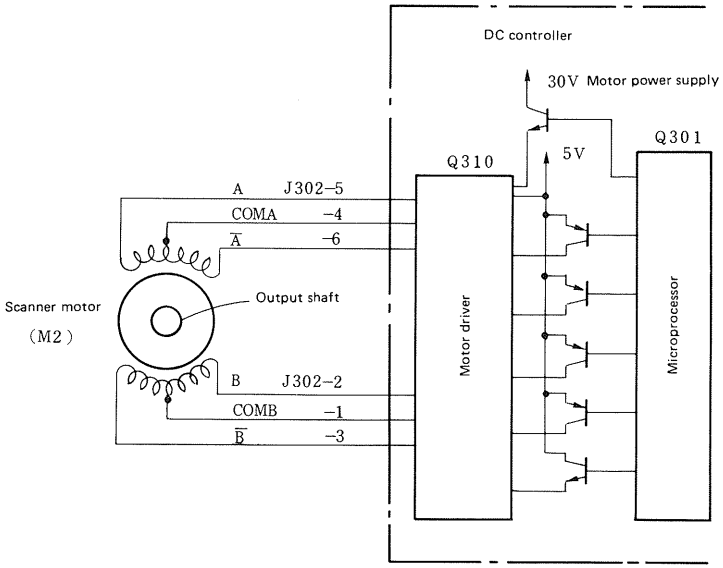

Figure 3-12

5. Scanner Movement for Two-page Separation Mode (copy number "2")

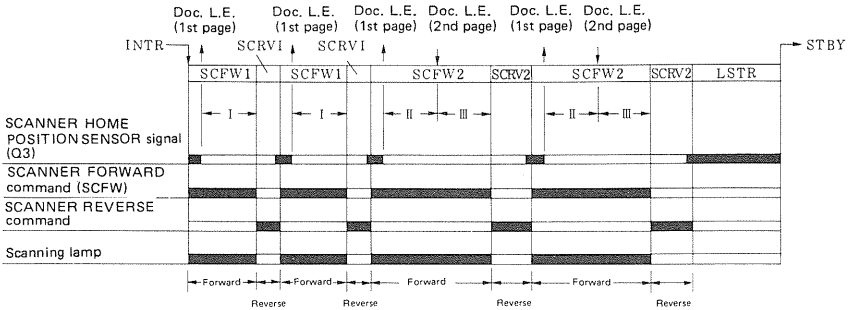

Figure 3-13

Timing of operations I, II, and III shown in Figure 3-13 is with reference to the leading edge of the first page of the document (fall of Q3 signal).

I: The distance moved by the scanner form the leading edge of the original is determined by the copy paper size, just as for a normal copy.

II: This is roughly the same as I. If the distance moved forward by the scanner is greater than 210mm (100V, 220V, or 240V copier)/216mm (115V copier), the DC controller will judge that 210mm/216mm is the leading edge of the original. If the distance that the scanner moves forward is less than 210mm/216mm, the point at which the scanner reverses in I will be the leading edge of the second page of the document.

III: Same as I.

For reference:
The distance that the scanner moves from the leading edge of the image (point to which the scanner moves 10mm after the fall of Q3) cannot exceed 432mm.

Note:
Distance traveled by the scanner varies to suit the size of copy paper.

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III. IMAGE FORMATION SYSTEM

A. OUTLINE

The basic structure of the image formation system is as shown below.

* Scanning lamp control system
* Primary/transfer corona current and grid bias voltage control system
* Controlling developing bias
* Document density measurement system
* Developing unit/Drum cleaner
* Blanking

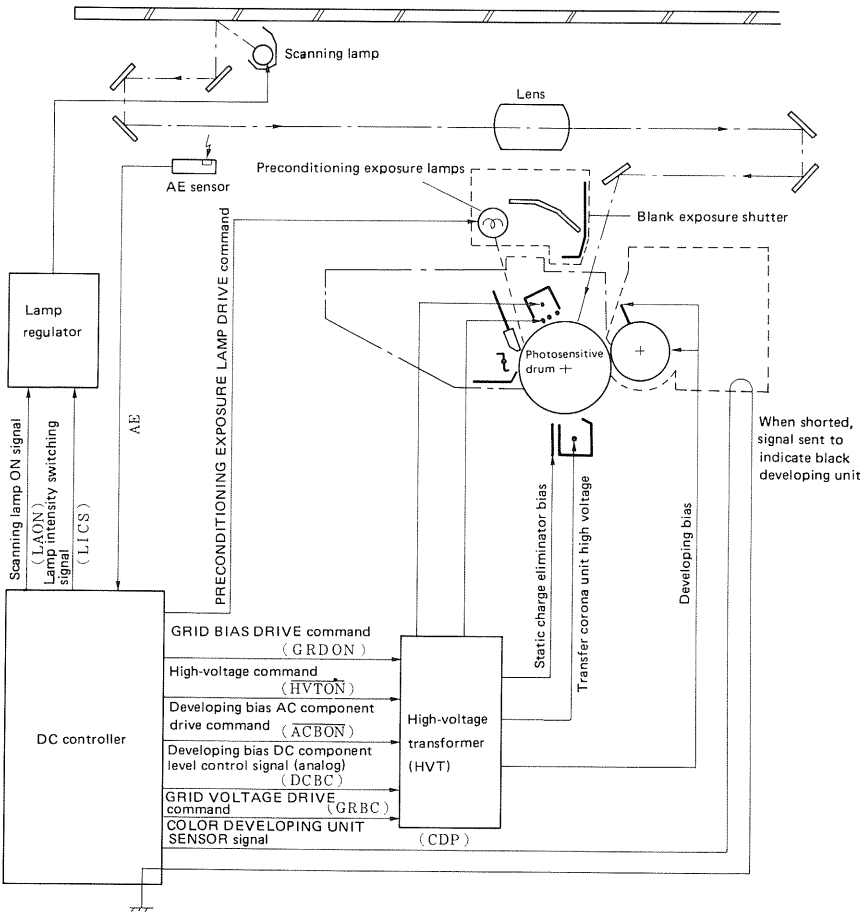

Figure 3-14

B. BASIC OPERATION OF IMAGE FORMATION SYSTEM (black developing unit, 2 copies)

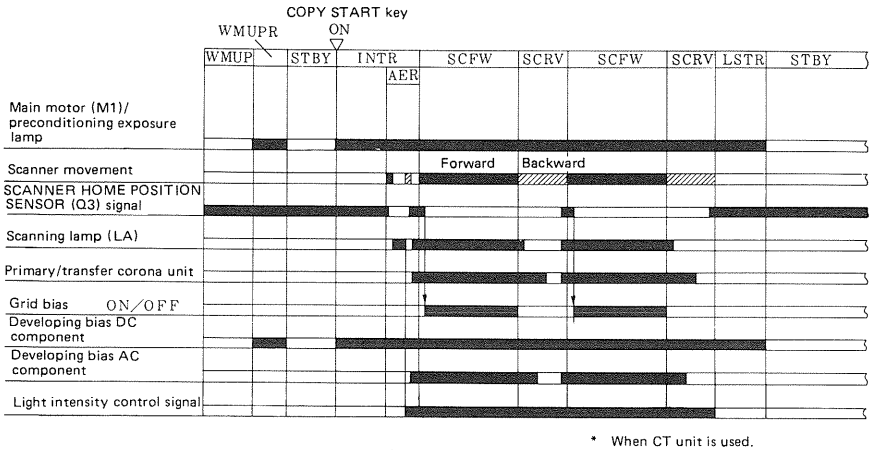

Figure 3-15

When a color developing (CT) unit is used, the AC component of the bias operates when the main motor (M1) is operating.

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C. SCANNING LAMP CONTROL SYSTEM

The scanning lamp is controlled by the DC controller PCB (see Figure 3-16).
The main functions of the DC controller PCB are shown below.

* Switching scanning lamp ON/OFF
* Switching scanning lamp intensity

a. Switching the scanning lamp ON/OFF

(1) To switch scanning lamp ON

The output from the microprocessor turns Q360 ON. (The output from Q305 will be "L", so Q321 will be OFF.)

→The scanning lamp ON signal (LAON) becomes "1".

→The scanning lamp goes ON.

(2) To switch scanning lamp OFF

When Q360 goes ON, LAON becomes "0" regardless of whether Q321 is ON or OFF.

(3) If the scanning lamp remains ON for an abnormally long period

If the scanning lamp remains ON for at least 15 seconds

→C310 charges (voltage at (+) input of Q305) rises to threshold of Q305.

→Q305 output → "1".

→Q321 goes ON.

→LAON becomes "0" regardless of whether Q360 is ON or OFF.

→The scanning lamp goes OFF.

b. Switching scanning lap intensity

The intensity of the scanning lamp is automatically switched to the correct level for a black developing unit or a CT unit.
When a CT unit is used, the DC controller makes the LIGHT INTENSITY signal (LICS) "0", and the lamp drive voltage is raised by about 3.5V over that used when a black developing unit is being used, thus increasing the light intensity.

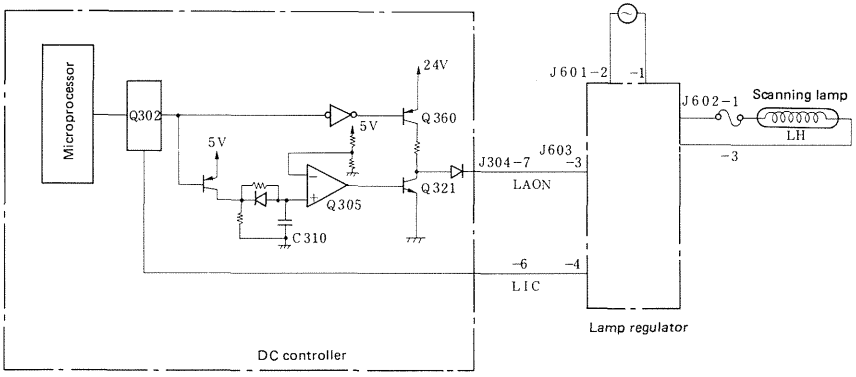

Figure 3-16

D. PRIMARY/TRANSFER CORONA CURRENT AND GRID BIAS VOLTAGE CONTROL SYSTEM

1. Outline

The circuit shown in Figure 3-17 controls the primary/transfer coronal current and the bias voltage of the grid of the primary corona. Main functions are as follows.

(1) Switching primary/transfer corona current ON/OFF
(2) Maintaining primary/transfer corona current constant
(3) Switching primary corona grid bias voltage
(4) Switching primary corona grid bias ON/OFF

In order to eliminate the influence of changes in atmospheric conditions on the effectiveness of the corona discharge, the current to the primary corona wire is maintained constant.

The primary corona and transfer corona current are switched ON and OFF by the HIGH VOLTAGE ON command (HVTON).

The grid bias voltage is switched by the GRID BIAS CONTROL signal (GRDON).

2. Switching Primary/Transfer Corona Current ON/OFF

(1) When $\overline{\text{HVTON}}$ = 1
→ Differential amplifier goes OFF.
→ Variable pulse width oscillator goes OFF.
→ High-voltage transformer goes OFF.

(2) When $\overline{\text{HVTON}}$ = 0
→ Differential amplifier goes ON.
→ Variable pulse width oscillator goes ON.
→ High-voltage transformer goes ON.

3. Maintaining Primary/Transfer Corona Current Constant

If the primary corona current is greater than the correct value due to changes in the environment, the level (analog) of the feedback signal to the differential amplifier circuit will increase and the output form the differential amplifier circuit will fall. As a result, the primary/transfer coronal current will fall. Similarly, if the primary corona current is too low, it will be increased.

If the output side of the high-voltage transformer supplying the primary corona unit is ever overloaded, the current will be limited to a certain maximum.

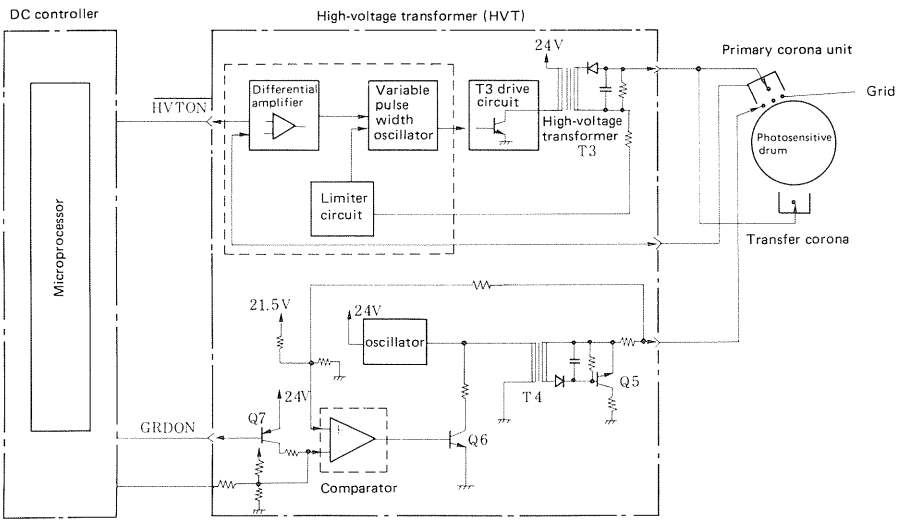

Figure 3-17

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4. Controlling Grid Bias Voltage

(1) During scanning, the DC controller PCB outputs GRDON = "1".

→ Q7 goes OFF and the comparator output is "H".

→ Q6 goes ON.

→ Current does not flow into transformer T4 and Q5 goes OFF.

→ Bias is applied to the grid.

→ The surface of the drum is charged.

The voltage applied to the grid is fed back to the comparator which functions to maintain the grid voltage constant.

(2) When scanning is not taking place, the DC controller PCB outputs GRDON = "0".

→ Q7 goes ON and comparator circuit output is "L".

→ Q6 goes OFF and current flows into T4.

→ Bias is not applied to the grid.

In the above way, the surface of the drum is not charged, hence toner does not adhere to it (blanking).

E. CONTROLLING DEVELOPING BIAS

1. Outline

The circuit shown in Figure 3-18 controls the developing bias. Its main functions are as follows.

(1) Switching AC component of the developing bias ON/OFF.
(2) Regulating voltage of the DC component of the developing bias.

The copy density can be controlled by varying the voltage of the developing bias to suit the following variables.

(1) Settings of copy density cursor and recalibration dial
(2) AE sensor output
(3) Type of developing unit

When there is a black developing unit in the copier, J605-1 and J605-4 are connected electrically to inform the copier that a black developing unit is in place.

The photosensitive drum gradually deteriorates with use, causing the potential (V_L) of light areas of the drum to increase, so that copy density is not correct for a given setting of the density control cursor. To compensate for this, a COPY DENSITY RECALIBRATION knob, which can be turned to raise the DC bias by exactly the increase in V_L, and thus produce clear copies again.

2. Operation

a. Switching AC component of the developing bias ON/OFF

The square wave generator operates continuously when the copier is switched ON.

(1) When ACBON = 1

→ AC bias switch circuit goes ON.

→ Output from the square wave generator is cut off.

So AC bias is not supplied to the developing cylinder.

(2) When $\overline{\text{ACBON}}$ = 0

→ The AC bias switch circuit goes OFF.

So the output of the square wave oscillator goes to the T1 drive circuit. This causes the AC high-voltage transformer to generate a 1300VAC AC bias, which is supplied to the developing cylinder.

Also, the output of the AC high-voltage transformer is rectified and supplied to the

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static charge eliminator (approx. 3.2kV).

b. Controlling DC bias

The differential amplifier of Figure 3-18 operates when DCBC is 16V or below. (The range of DCBC (analog) is 6 to 16V, as set by the copy density cursor or the AE system.)

→Differential amplifier goes ON.

→Variable pulse-width oscillator goes ON.

→DC high-voltage transformer goes ON.

The DC bias is applied to the developing cylinder.

DCBC	6V~16V
DC component of developing bias	-500V~-0V

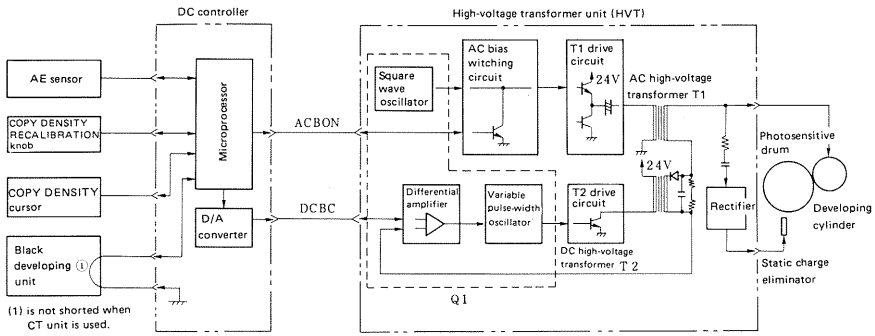

Figure 3-18

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3. Developing Bias Operation

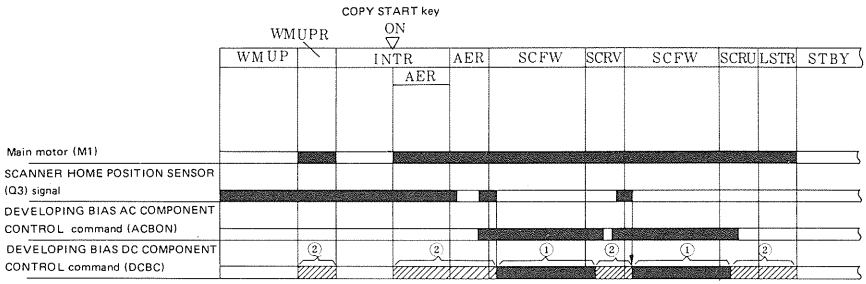

Figure 3-19

(1) The value of the DEVELOPING BIAS DC COMPONENT CONTROL signal and the DC bias are determined by (1) the settings of the COPY DENSITY cursor and recalibration knob, (2) the AE sensor output, and (3) the type of developing unit installed.
(2) The DC bias used at times other than during scanning depends on the type of developing unit installed.
Black developing unit: Approx. – 320 V
CT unit: Approx. – 220 V

Note:
The AC component is added to the developing bias for a CT unit when the main motor is operating.

F. Document Density Measurement System

1. Outline

There is an automatic density adjustment (AE) system which adjusts the DC component of the developing bias to suit the density of the original. If the density of the original is more or less uniform, the AE function varies the DC component of the developing bias to suit the density of the original, so that copies of the correct density will be made.

2. Operation

The scanner moves forward approximately 70mm past the leading edge of the original and stops momentarily. The scanning lamp goes ON for approximately one second, the image density is read by the AE sensor, and the sensor output is interpreted by the DC controller. The DC controller then adjusts the DC component of the developing bias accordingly.

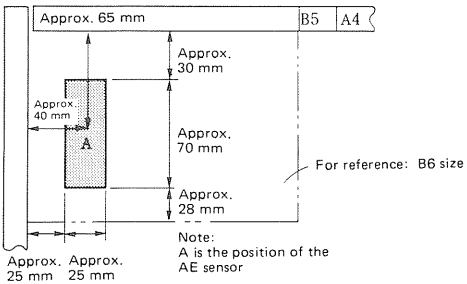

Figure 3-20

3. Reading Output of AE Sensor

The AE sensor consists of a photodiode (Q702) and an operational amplifier (Q701). If the strength of light striking the photodiode is high, the output voltage (AE) of the amplifier will be small. If the amount of light is small, the output voltage will be large.

The DC controller reads the output at a certain time after the zero-cross signal (ZXDP) is received from the DC power supply.

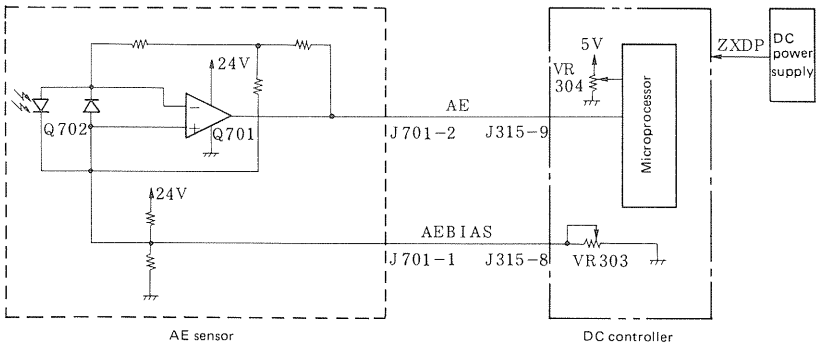

Figure 3-21

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4. Adjustments to AE System

■ The AE system must be adjusted in the following cases.

(1) After replacing the AE sensor or DC controller PCB.

(2) After installing a DF/ADF go through step 6).

1) Remove the potentiometer cover at the back of the left cover.
2) Set the power switch ON.
   * Wait until the WAIT period has ended.
3) Place an NB-3 or NA-2 test sheet on the copyboard, and lower the copyboard cover.
4) Press switch SW301 on the DC controller PCB.
   * "[0" will appear on the COPY NUMBER indicator on the control panel.
   * If "[0" does not appear, press the "0" number key on the control panel so that "[0" appears.
5) Press the SORT/GROUP key on the control panel.
   * The scanner will move forward to the AE measuring position, then the scanning lamp will go ON. (Note)
6) Adjust VR303 on the DC controller so that "22" appears on the COPY NUMBER indicator.
7) Press the SORT/GROUP key.
   * The scanning lamp will go OFF, and the scanner will return to the HOME position.
8) Remove the test sheet, place a sheet of newspaper on the copyboard, and lower the copyboard cover.
9) Press the SORT/GROUP key.
   * The copier will perform the same operations as described in step 5).
10) Make a note of the numerical value displayed on the COPY NUMBER indicator.
11) Press the SORT/GROUP key.
   * "[0" will appear on the COPY NUMBER indicator.
12) Press the "1" number key.
   * "1" will appear on the COPY NUMBER indicator.
13) Press the SORT/GROUP key.
14) Adjust VR304 on the DC controller PCB so that the number displayed on the COPY NUMBER indicator becomes the value noted in step 10).
15) Press the SORT/GROUP key.
16) Press switch SW301 on the DC controller PCB.

Note:
The scanning lamp will go ON for approximately eight seconds. To turn it ON once again, press the SORT/GROUP key, and after operation has stopped press the SORT /GROUP key once again.

For reference:

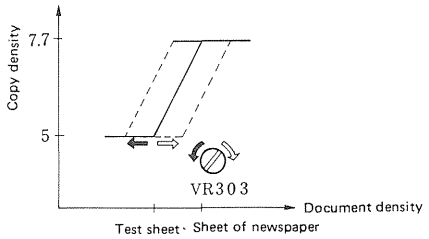

Figure 3-22

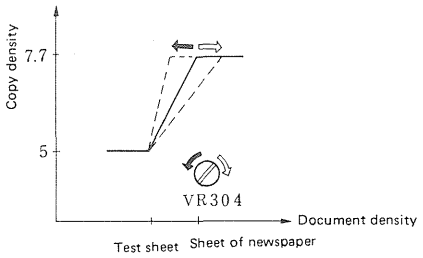

Figure 3-23

G. DEVELOPING UNIT/DRUM CLEANER

1. Outline

The paddle inside the drum cleaning unit and also the developing cylinder are rotated by the main motor.

The amount of toner in the developing unit is sensed by the toner sensor (Q6). When the amount of toner falls below the required quantity, the TONER OUT indicator on the control panel will flash.

When the toner in the CT unit is used up, the entire CT unit should be replaced.

The toner collected by the cleaning blade is stored in the drum cleaning unit.

The developing unit is pressed against the drum by a cam that presses against the developing unit rail. (The cam is operated by the developing unit release lever.)

2. Remaining toner sensor

The black developing unit has a piezo-electric type sensor (Q6) which senses if the toner remaining in the hopper of the developing unit is above or below the required level.

When the amount of toner in the hopper is sufficient, the sensor output is "1". When it is below the specified level, the output is "0".

The DC controller checks for 5 seconds after copying is completed if the TONER OUT signal is being outputted. If the signal is outputted continuously for 5 seconds, it is regarded as "TONER OUT-First time". If another TONER OUT signal is received in the same way after the next copying operation is completed, it is regarded as "TONER OUT-Second time", and the DC controller makes the TONER OUT indicator flash.

The CT unit for this copier does not have a remaining toner sensor or waste toner sensor.

3. Torque Limiter

There is a torque limiter in the drive train between the main motor and the drum so the drum can stop if it is jammed.

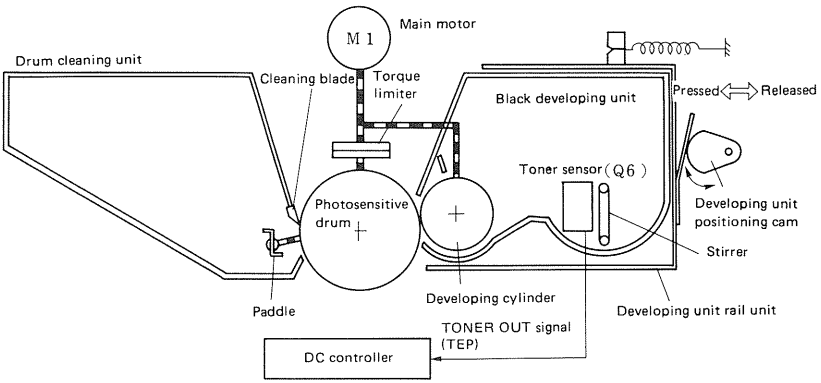

Figure 3-24

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IV. PAPER TRANSPORT SYSTEM

A. PAPER PICK-UP UNIT AND FEEDER

1. Outline

When the pick-up roller clutch solenoid (SL1) engages, main motor M1 turns the roller, feeding a sheet of copy paper to the registration rollers. The number of rotations of the pick-up roller varies with the length of the copy paper. (See Table 3-4)

The copy paper is fed by the registration rollers so that its leading edge is in line with the leading edge of the toner image on the photosensitive drum. It then passes through the transfer, separation, feed, fixing and delivery stages to the copy tray.

The copy paper is sensed by phototransistors (Q2 and Q5). If it does not reach or pass the sensors within the specified period, the DC controller PCB judges that a jam has occurred and causes the PAPER JAM indicator on the control panel to flash.

Phototransistor (Q1) senses whether there is paper in the cassette. If there is not, the CASSETTE PAPER OUT signal ($\overline{CPEP}$) becomes "0", causing the PAPER OUT indicator on the control panel to go ON.

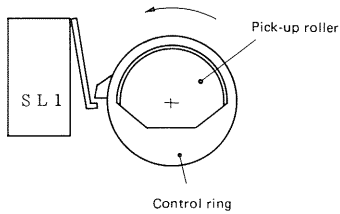

Figure 3-25

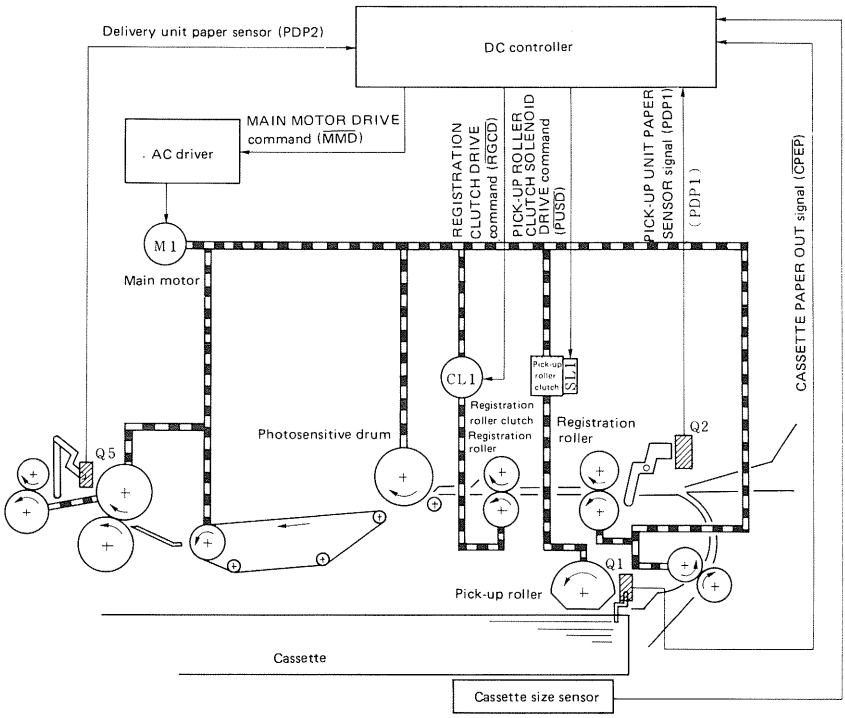

Figure 3-26

2. Pick-up and Feeder Operation

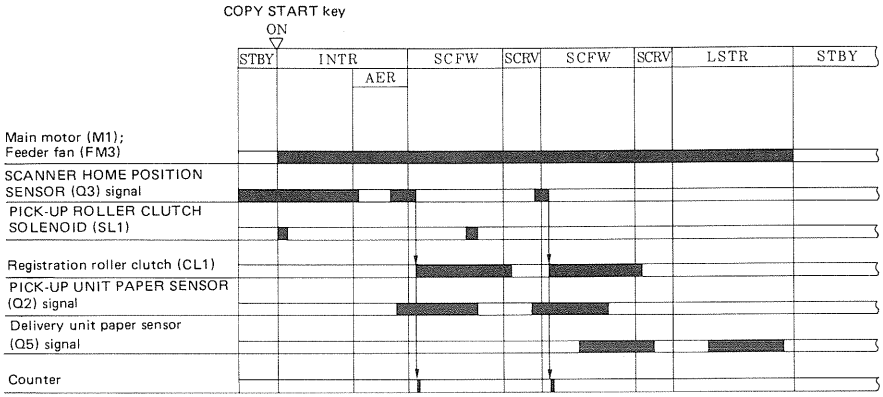

Figure 3-27

The ON period of the pick-up roller clutch solenoid varies with the paper (cassette) size. (See Table 3-4.)

Copy paper (cassette) size	Number of pick-up roller rotations	Pick-up roller clutch solenoid ON period (seconds)
B5/STMT A4/Letter Government-LTR, Korean Legal Papger	1	0.4
B4/Leagal A3/11 × 17 B5R A4R/LetterR Argentine-LTR Argentine-LGL, Government-LGL, Argentine-LTR-R, Government-LTR-R, Foolscap Folio, Aus Foolscap, Korean Legal-R, OFICIO/Ecuador, OFICIO/Bolivia. OFICIO	2	1.7

Table 3-4

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3. Manual Feed Paper Pick-up

If the COPY START key has not been pressed and the paper sensor (Q2) in the paper pick-up unit senses copy paper, the main motor (M1) will rotate, driving the manual pick-up rollers. These rollers feed the sheet of paper into the copier.

Manual feed paper pick-up operation

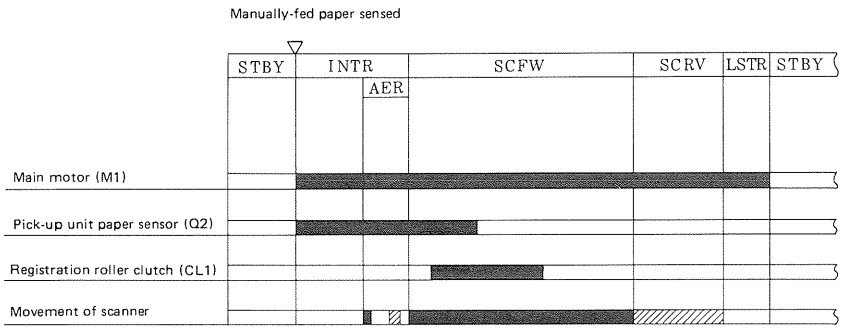
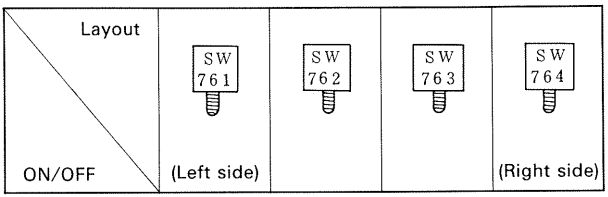


Figure 3-28

4. Cassette Size Sensor

When a cassette is in the cassette holder, cams on the cassette operate one or more switches that identify the presence and size of the cassette, as shown in Table 3-5.



No.	Cassette	Cassette size sensing PCB.			
		SW761	SW762	SW763	SW764
1	A3/11'×17'	OFF	OFF	OFF	ON
2	A4/Letter Government-LTR, Korean Legal Paper	ON	OFF	OFF	ON
3	B4/Legal	OFF	ON	OFF	ON
4	B5/STMT	ON	ON	OFF	ON
5	Argentine-LTR	OFF	OFF	ON	ON
6	*	ON	OFF	ON	ON
7	A4R/LetterR	OFF	ON	ON	ON
8	B5R	ON	ON	ON	ON
9	No cassette	OFF	OFF	OFF	OFF

Table 3-5

* Argentine-LGL, Government-LGL, Argentine-LTR-R, Government-LTR-R, Foolscap Folio, Aus Foolscap, Korean Legal-R, OFICIO/Ecuador, OFICIO/Bolivia. OFICIO

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C. FIXING AND PAPER DELIVERY UNITS

1. Outline

The upper and lower rollers of the fixing assembly are driven by the main motor (M1).

The upper roller is heated by a single heater (H1:900W). When the surface temperature of the roller rises, the resistance of the thermistor (TH) falls, so the voltage of the signal that it produces FIXING ROLLER TEMPERATURE signal; TH1 also falls.

Whether the voltage of TH1 (analog) is above or below a certain level at a given time determines if the microprocessor of the DC controller makes the FIXING ROLLER DRIVE command (HTRD) "1" or "0".

The target temperature of the fixing roller depends on the cassette size and the type of developing unit.

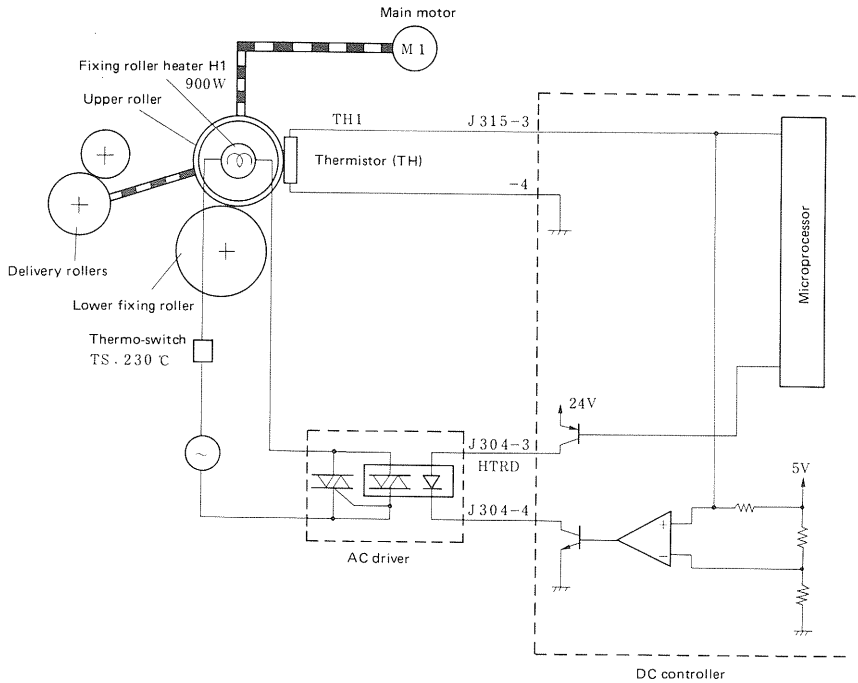

Figure 3-29

2. Operation of Fixing Unit Temperature Control System (when A3, A4, B4, and B5 cassettes are used)

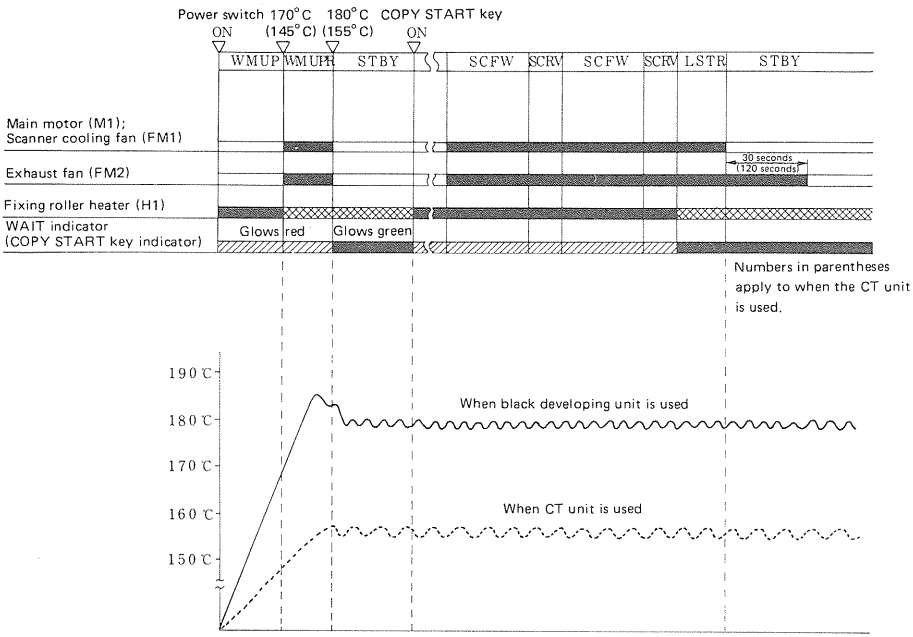

Figure 3-30

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D. JAM DETECTION

The copier has two sensors to sense whether copy paper is being fed normally.

* Pick-up unit paper sensor (Q2)
* Delivery unit paper sensor (Q5)

Paper jams can be identified by the microprocessor by reading signals from the sensors at predetermined times to check if paper is at or not at a sensor at that time, and thus identify if the paper is moving through the copier correctly.

If a jam occurs, the copier memorizes the number of copies that have not yet been made and also the copier settings. This information is stored in the copier for about 10 minutes, even if the power is cut off by opening the front door in order to reset the copier.

The microprocessor identifies a jam in any of the following four cases. Also, the microprocessor judges that there is a jam if one of the sensors detects paper when the power is switched ON.

(1) Pick-up unit stationary jam

If the copy paper does not pass the paper sensor (Q2) in the pick-up unit within the specified period after paper pick-up starts, the microprocessor will judge that a stationary jam has occurred and immediately stop the operation of the copier. Also, the JAM indicator on the control panel will flash and a segment of the JAM POSITION indicator will go ON.

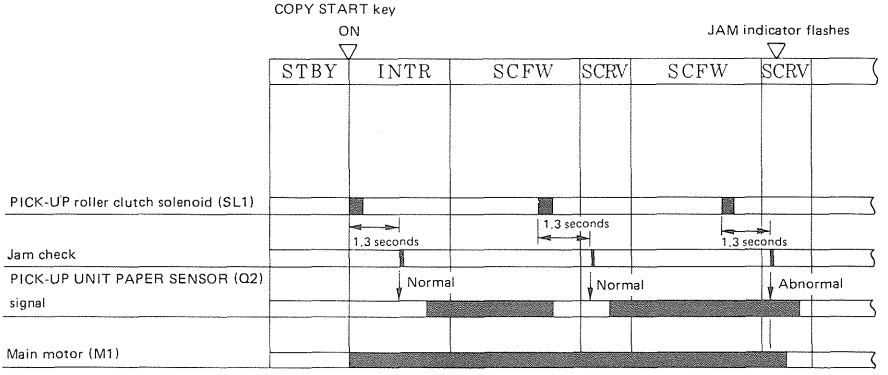

Figure 3-31 Pick-up unit stationary jam

(2) Pick-up unit delay jam

If the copy paper does not reach the paper sensor of the pick-up unit within a specified period after paper pick-up-starts, the microprocessor will judge that a pick-up delay jam has occurred, and immediately stop the operation of the copier. Also, the JAM indicator on the control panel will flash and a segment of the JAM POSITION indicator will go ON.

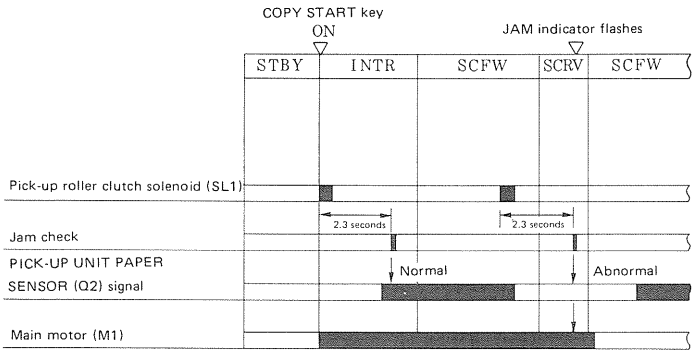

Figure 3-32 Pick-Up unit delay jam

(3) Delivery unit stationary jam

If the copy does not pass the delivery unit paper sensor within the specified period after the registration roller clutch operates, the microprocessor will judge that a delivery unit stationary jam has occurred, and immediately stop the operation of the copier. Also, the JAM indicator on the control panel will flash and a segment of the JAM POSITION indicator will go ON.

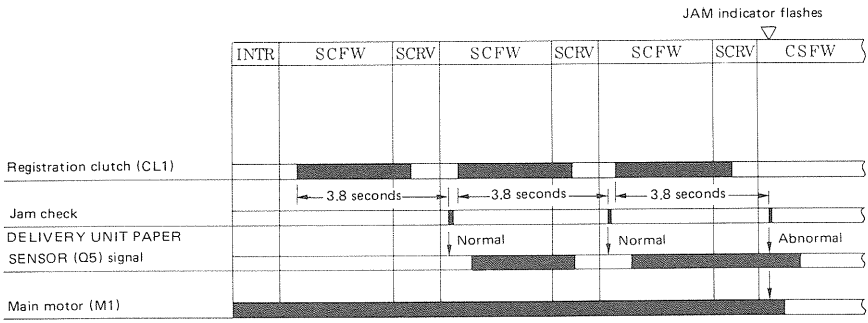

Figure 3-33 Delivery unit stationary jam

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(4) Delivery unit delay jam

If the copy does not reach the delivery unit paper sensor within the specified period after the registration roller clutch has operated, the microprocessor will judge that a delivery unit delay jam has occurred, and immediately stop the operation of the copier. Also, the JAM indicator on the control panel will flash and a segment of the JAM POSITION indicator will light.

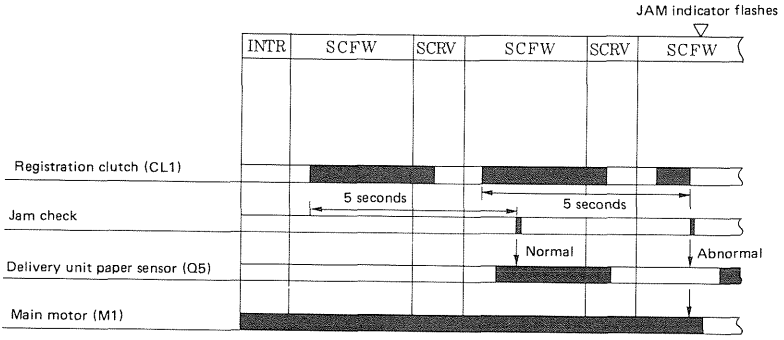

Figure 3-34 Delivery unit delay jam

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V. POWER SUPPLY

A. DC POWER SUPPLY

1. Outline

When the door switch (DSW) and power switch (SW1) are ON, the AC power lines are connected to the DC power supply PCB, which supplies 30VDC, 24VDC, and 5VDC to the copier.

The 30VDC supply drives the scanner fan motor (M2), and the 24VDC supply is used for fans, solenoids, etc., and also powers the HVT. The 5VDC supply is used for the sensors and also the ICs and other devices on the DC controller PCB.

B. DC POWER SUPPLY CIRCUITS

The AC supply voltage is reduced to 29VAC, 23VAC, and 10VAC by circuits (A), (B), and (C) of transformer T1. These voltages are rectified by the DC power supply PCB, to provide, respectively, 24VDC, 30VDC, and 5VDC.

If the output voltages of the 24VDC and 5VDC power supplies fluctuate, the copier may misoperate. Consequently, regulators are used in both of these supplies to prevent voltage fluctuations.

The 24VDC circuit has an overcurrent detection circuit. If excessive current is drawn, the transistor in the detection circuit will go ON, causing the 24VDC output to stop. Also, the DC controller monitors the 24VDC voltage continuously. If this voltage fluctuates due to an abnormality, the DC controller will output a 24V-OFF signal (DCOFF) to stop the 24V output.

When the 24V output stops, the copier will stop operating.

To reset the 24V output, open the front door, remove the cause of the stoppage, then close the door. If the door is opened and closed repeatedly without clearing the problem, the fuse on the DC power supply PCB may blow.

The DC power supply PCB generates a continual zero-cross signal which is outputted to the DC controller. It is used as a timing signal for AE operations.

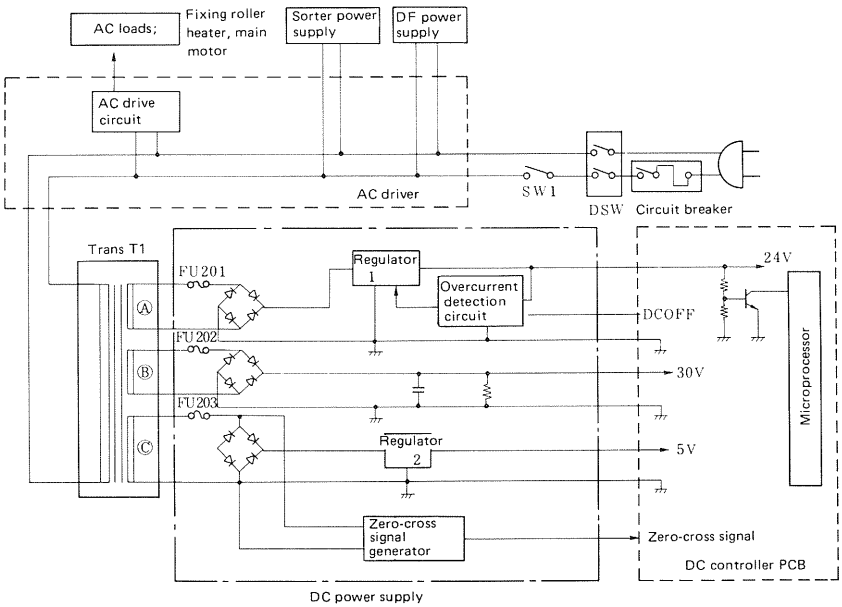

Figure 3-35

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VI. LIST OF PCBS/VRS/LEDS /CHECK PINS

Variable resistors, LEDs and check pins which are used for adjustments in the field are listed below.

VRs and check pins not listed here are used only for factory adjustments which require special tools and measuring instruments, as well as great care and precision. Do not attempt to adjust such parts.

Note:

1. Leakage current may flow through some LEDs and cause them to glow dimly even though they are supposed to be OFF.
2. VRs which can be adjusted in the field .....
3. VRs which should not be adjusted in the field .....

1. DC Controller PCB

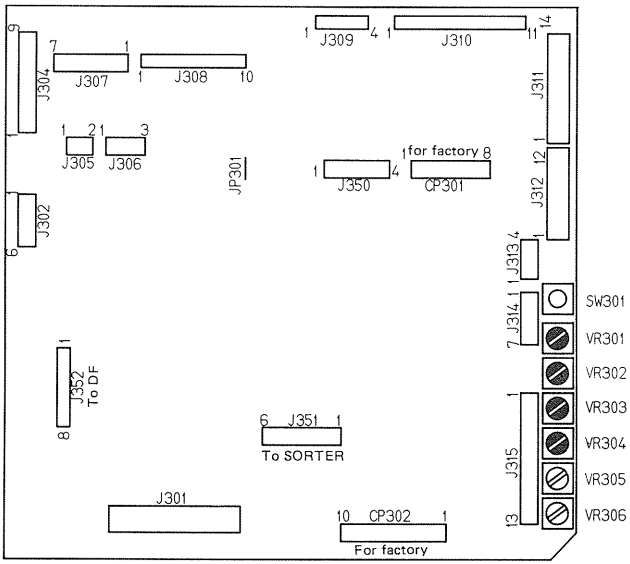

Figure 3-36

VR No.	Prupose	
VR301	leading edge registration	
VR302	leading edge blank width	
VR303	AE reference point	For details of the method of adjustment, see the subsection "AE adjustment".
VR304	AE gain	

Table 3-7

SW No.	Prupose
SW301	Press to enter or leave the SERVICE mode

Table 3-8

- When non-AE mode is selected in a standard mode, cut off the jumper wire JP301.
- When removing the connector J350 in case the DC controller is replaced and so on, be sure to connect the connector J350 at the time of installation.

VII. SELF-DIAGNOSIS

The DC controller PCB has a microprocessor that diagnoses the functions of the copier (particularly the sensors) at appropriate intervals. If this microprocessor detects an abnormality, it will display the type of the abnormality on the COPY NUMBER indicator on the control panel. The table below shows the various fault codes, their meaning, and the corresponding detection timing. Example of E000 code indication: E0 ⟺ 00 light alternately

Code displayed	Main cause	Fault criteria
E000	Thermistor (TH1), heater (H1), AC driver PCB, DC controller PCB, operation of thermoswitch	• If the temperature of the fixing rollers after 30 seconds is virtually the same as when the copier is turned ON. (This indication does not appear if warm-up is completed within 30 seconds.) • If the temperature of the fixing roller drops below 100°C for 2 seconds or longer after warm-up is completed.
E001	Defective thermistor (TH1), AC driver PCB, or DC controller PCB	If the temperature remains 300°C or higher for 2 seconds or longer
E030	Counter, DC controller PCB	If the break signal is emitted continuously for 2 seconds or more the counter is not being driven
E202	Scanner HOME position sensor (Q3), scanner motor (M2), motor controller PCB, or DC controller PCB	1. If the scanner is not at the HOME position (SCHP = 0) when the power is switched ON or the COPY START key is pressed. If the scanner does not return to the HOME position (SCHP remains 0) within 8 seconds after it starts to reverse 2. If the scanner is in the HOME position (SCHP = 1) when the power is switched ON or the COPY START key is pressed • If the scanner does not leave the HOME position (SCHP remains 1) within 1 second after it starts to advance • If the scanner does not return to the HOME position (SCHP remains 0) within 1 second after it leaves the HOME position (SCHP = 0) 3. If the scanner does not return to the HOME position (SCHP remains 0) within 5 seconds after it advances and passes the leading edge of the original (SCHP = 1), the DC controller PCB outputs a REVERSE signal once again. If it still does not return to the home position within 2 seconds (SCHP remains 0), this indication will be displayed.
E221	Lamp regulator or DC controller PCB	If ZXDP remains 0 continuously for 2 seconds
E400	DF controller PCB, DF power supply, or DC controller PCB	If DF remains 0 for 2 seconds or longer
E500	Sorter controller PCB or DC controller PCB	• If the copier communicates with the sorter for at least 2 seconds • If the SORTER STANDBY signal does not return within 5 seconds after the BCR signal is outputted

For reference:
In the event that the self-diagnostic function detects an abnormality, the copier can be reset by turning it OFF and the ON again. If E000 is displayed, however, the copier cannot be reset. This is to prevent the fixing roller from overheating which could occur if the user were able to easily reset the copier, particularly in the event of a thermistor burnout. The method of clearing an E000 condition is as follows:

1) Remove the variable resistor cover.
2) Switch the power ON.
3) Press switch SW301 of the DC controller PCB.
4) Switch the power OFF and the ON again.

Note:
A capacitor on the DC controller PCB provides retains the E000 indication when the power is turned OFF; E000 will be cleared after a period of between 5 and 10 minutes (period of self-discharge of the capacitor).

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CHAPTER 4

MECHANICAL SYSTEM

This chapter describes the mechanical features, operation, disassembly and assembly procedures of the copier. Pay attention to the following during disassembly and assembly.

1. After removing the cartridge from the copier during disassembly work, place it in its storage box, cover it, or place it in a dark location, to prevent it from being affected by light.
2. Always remove the copy delivery tray before working on the copier.
3. Always unplug the copier before working on it.
4. Unless noted, assembly is the reverse of disassembly.
5. Always ensure that the screws (length and diameter) are replaced in the correct locations.
6. As a general rule, the copier should not be operated with any parts removed.
7. When working on the copier, take care not to bend contact springs or allow contacts to become dirty. If they do become dirty, clean them with alcohol.

I EXTERNALS 4-1
A. COVERS, PANELS, AND DOORS 4-1
B. FANS 4-2
II. DRIVE SYSTEM 4-4
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B. MAIN MOTOR ASSEMBLY 4-6
III. PAPER TRANSPORT SYSTEM 4-7
A. PAPER PICK-UP ASSEMBLY 4-7
B. FEEDER 4-10
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A. DEVELOPING ASSEMBLY 4-17
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A. FIXING UNIT 4-20

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I. EXTERNALS

A. COVERS, PANELS, AND DOORS

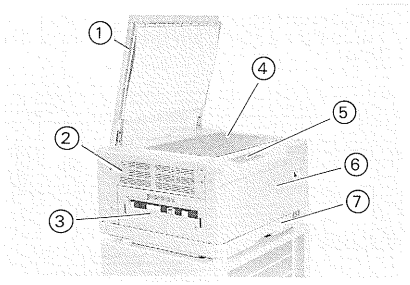
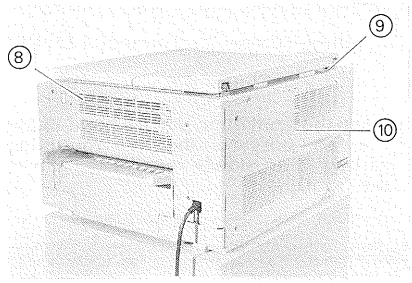


Figure 4-1



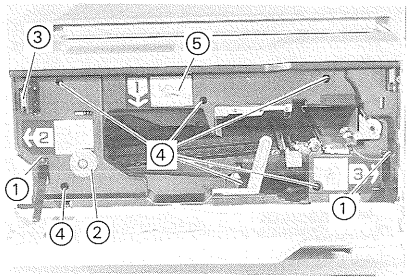
① Copyboard cover
② Left cover
③ Paper delivery door
④ Copyboard glass
⑤ Control panel
⑥ Front door
⑦ Cassette
⑧ Right cover
⑨ Upper rear cover
⑩ Rear cover

Figure 4-2

For cleaning, inspecting, or repairing inside the copier, remove covers and panels using the following procedure.
No description is given of the procedure for removing covers that can be removed by simply unscrewing the screws, securing them.

Note:
Before removing the copyboard glass, be sure that the copier is closed. If it is necessary to use solvent to clean the copyboard glass, use alcohol. Do not use MEK, because it may dissolve the white paint along the left edge of the glass.

1) Unscrew the two screws holding the front door strap, and open the front door fully.
2) Unscrew the screw, then remove the knob.
3) Unscrew the screw, then remove the magnet catch.
4) Unscrew the six screws, then remove the inner cover.



① Mounting screws
② Knob
③ Magnet catch
④ Mounting screws
⑤ Inner cover

Figure 4-3

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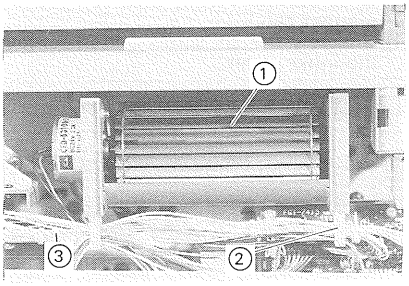
B. FANS

1. Removing the Scanner Cooling Fan

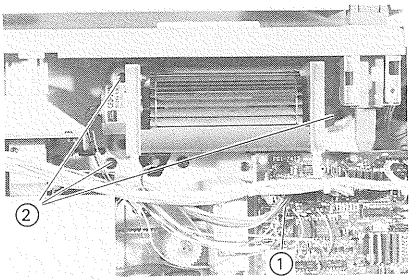
1) Remove the rear cover.
2) Remove the wiring from the wiring band of the scanner cooling fan.



① Scanner cooling fan
② Wiring band
③ Wiring

Figure 4-4

3) Disconnect connector J305 from the DC controller PCB, unscrew the three mounting screws, then remove the scanner cooling fan.

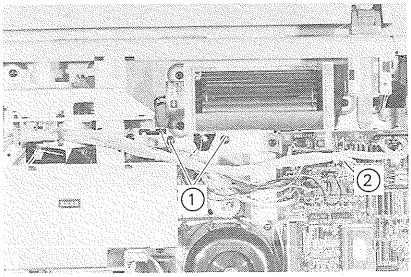


① Connector (J305) ② Mounting screws

Figure 4-5

2. Removing the Exhaust Fan

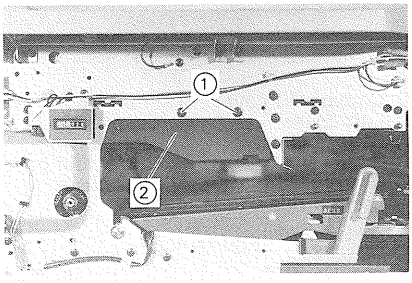
1) Remove the rear cover.
2) Remove the rear cover, unscrew the two mounting screws, then disconnect connector J306 from the DC controller PCB.



① Mounting screws ② Connector (J306)

Figure 4-6

3) Open the front door, place a hand under the fan, unscrew the two mounting screws, then slowly remove the fan to the front.



① Mounting screws ② Exhaust fan ass'y

Figure 4-7

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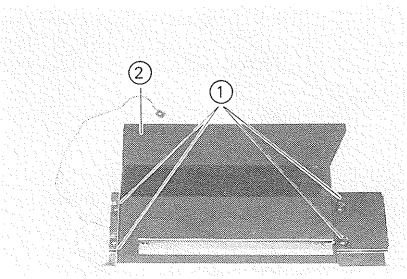
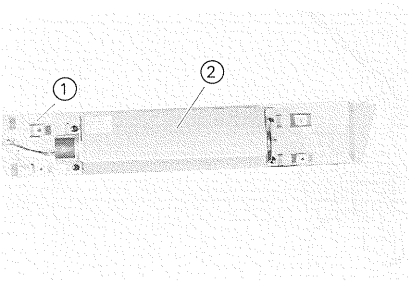
4) Unscrew the four mounting screws and remove the fan duct.



① Mounting screws ② Fan duct

Figure 4-8

5) Unscrew the four mounting screws, then remove the exhaust fan from the fan mount.



① Fan mount ② Exhaust fan

Figure 4-9

II. DRIVE SYSTEM

A. SCANNER DRIVE UNIT

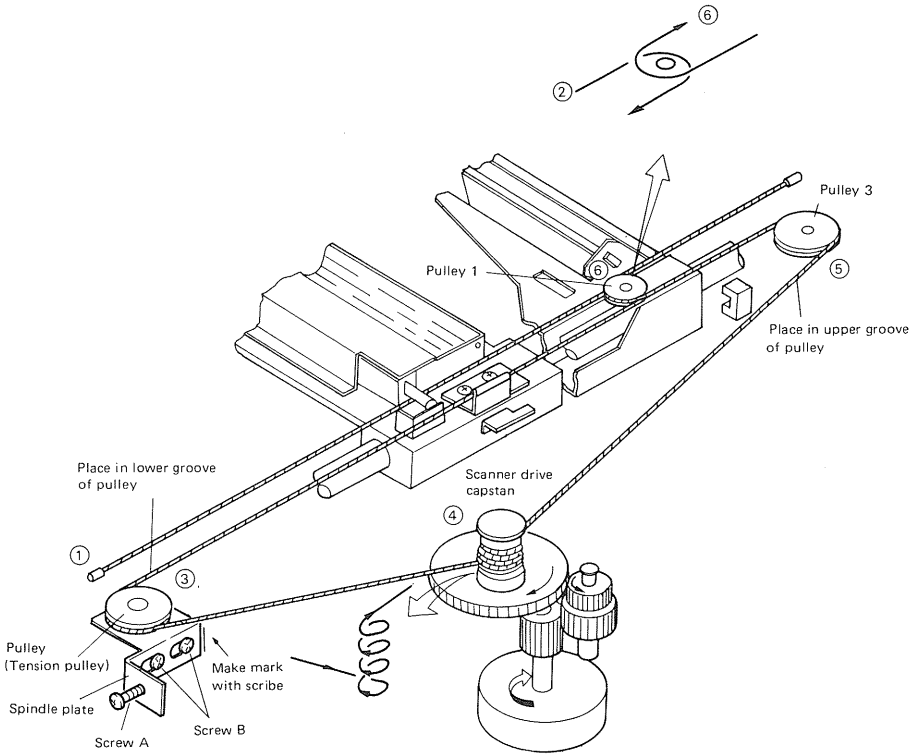


Figure 4-10

1. Removing the Scanner Drive Cable

1) Make a mark on the tension pulley spindle plate with a scribe, then loosen screws B (two) securing the plate.
2) Slacken off screw A enough to remove the scanner drive cable.

2. Installing the Scanner Drive Cable

1) String the scanner drive cable in the order shown in Figure 4-10.
2) Using screw A, move the spindle plate to the position of the scribed line.
3) Tighten screws B.

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3. How to use the mirror cleaning tool

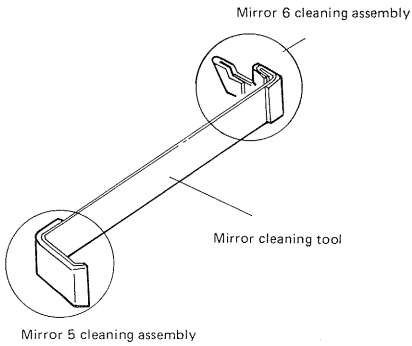

Figure 4-11

1. Cleaning method tor mirror 5 assembly.

1) Remove the copyboard glass, the lens cover and the mirror cleaning tool on the lens mount. (one screw)
2) Remove the lens cover and install the mirror cleaning tool as shown in Figure 4-12.

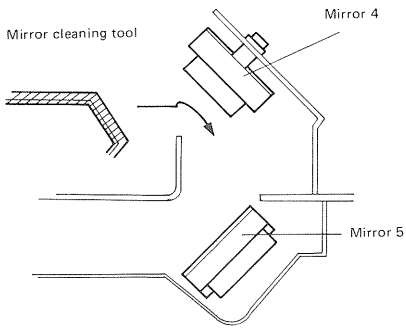

Figure 4-12

3) As shown in Figure 4-13, press the mirror cleaning tool against the mirrors and slide the tool for cleaning.

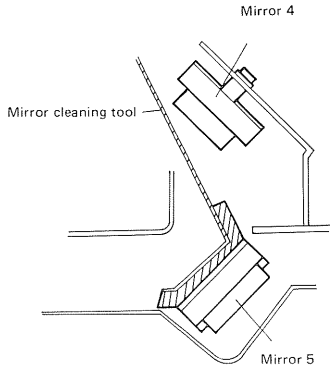

Figure 4-13

2. Cleaning method for mirror 6 assembly

1) Remove the drum cartridge, the developing assembly and the dustproofing glass.
2) As shown in Figure 4-14, press the mirror cleaning tool against the mirror 6 and slide the tool for cleaning.

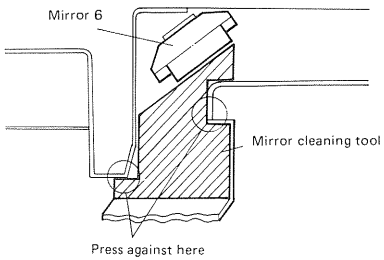

Figure 4-14

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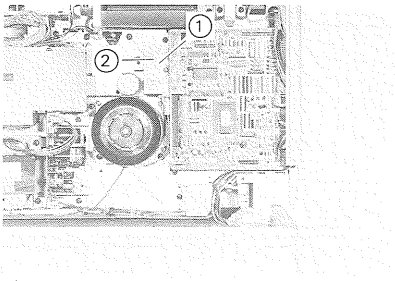
B. MAIN MOTOR ASSEMBLY

1. Removing the Main Motor

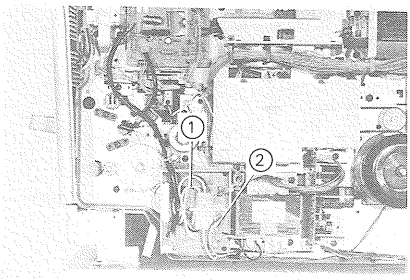
1) Remove the rear cover, then remove the screw and remove the capacitor and capacitor cover.



① Screw ② Capacitor cover

Figure 4-15

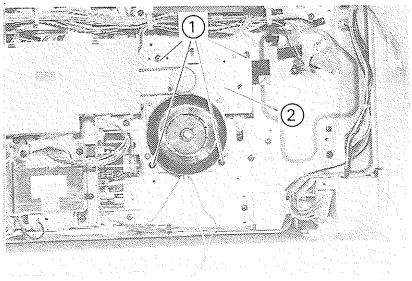
2) Disconnect all connectors from the DC controller PCB, then remove the DC controller PCB.
3) Disconnect connector J105 from the AC driver PCB.



① AC driver PCB ② Connector (J105)

Figure 4-16

4) Unscrew the four screws, then lift the main motor and remove it from the front.



① Mounting screws ② Main motor

Figure 4-17

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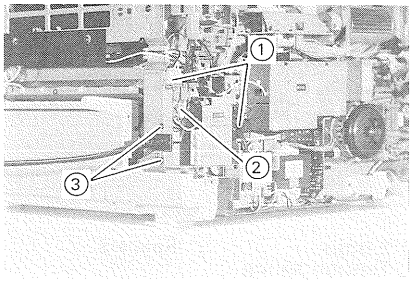
III. PAPER TRANSPORT SYSTEM

A. PAPER PICK-UP ASSEMBLY

1. Removing the U Guide Plate

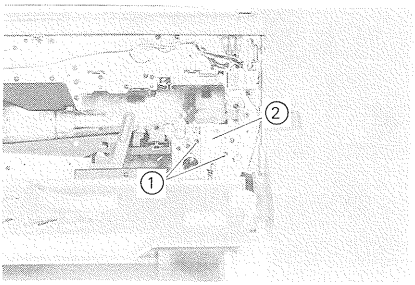
1) Remove the inner cover, right cover, and rear cover, then open the manual feed tray.
2) Disconnect the two connectors and the Faston, unscrew the two screws, then remove the power cord mount.



① Connectors ③ Mounting screws
② Faston

Figure 4-18

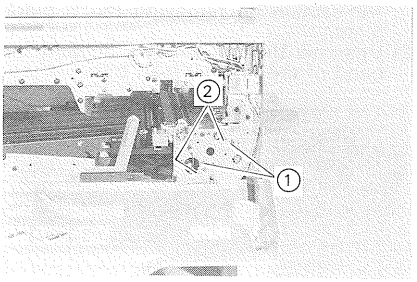
3) Remove the developing unit rail mount. (two screws)



① Mounting screws ② Developing unit rail mount

Figure 4-19

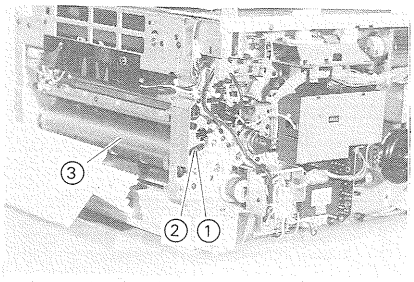
4) Unscrew the screw and remove the two pins.



① Mounting screws ② Pins

Figure 4-20

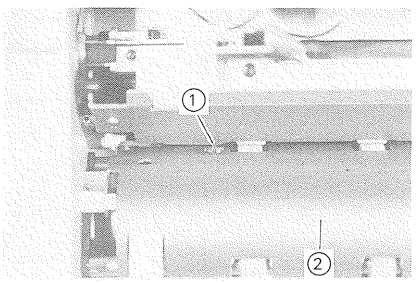
5) Unscrew the screw and remove the rear pin.



① Mounting screw ③ U Guide plate
② Pin

Figure 4-21

6) Remove the U guide, being careful of the arm of the pick-up paper sensor.

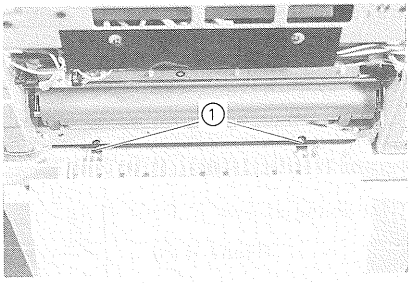


① Arm of the pick-up paper sensor
② U Guide plate

Figure 4-22

2. Removing the Pick-up Rollers

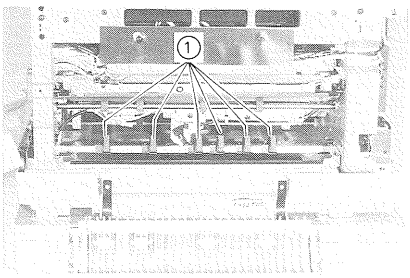
1) Remove the U guide plate. (Refer to the sub-section on removing the U guide plate.)
2) Unscrew the two screws holding the band of the manual feed tray.



① Mounting screws

Figure 4-23

3) Remove the screws shown in the figure, then remove each mounting screw.

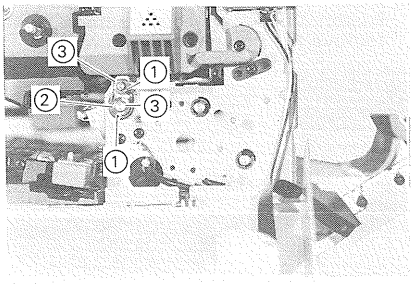


① Mounting screw

Figure 4-24

3. Removing the Registration Rollers

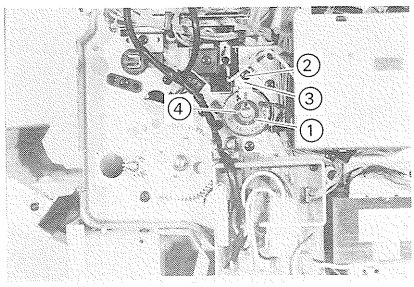
1) Open the front door and remove the developing unit and the drum unit.
2) Remove the U guide plate. (Refer to the sub-section on removing the U guide plate.)
3) Remove the two E rings, the tension spring, and the two spacers.



① E rings
② Tension spring
③ Spacers

Figure 4-25

4) Remove the rear cover.
5) Remove the clip retaining ring, then unscrew the screw, and finally remove the mounting clutch.



① Clip retaining ring
② Screw
③ Mounting clutch
④ Registration roller clutch

Figure 4-26

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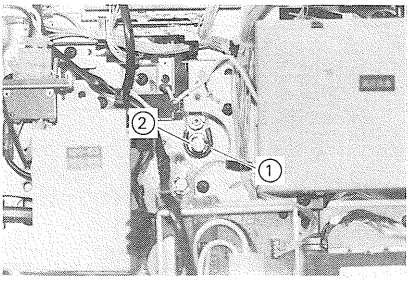
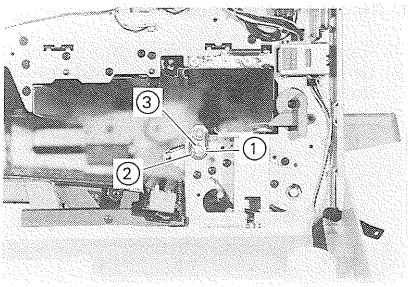
6) Pull out the registration roller clutch (See Figure 4-26), then remove the spacer.



① Spacer ② E-ring

Figure 4-27

7) Remove the two E-rings, tension spring, and two spacers, then remove the registration rollers.

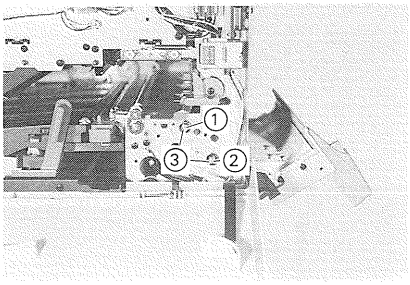


① E-ring ③ Spacers
② Tension spring

Figure 4-28

4. Removing the Feed Roller and Preregistration Roller

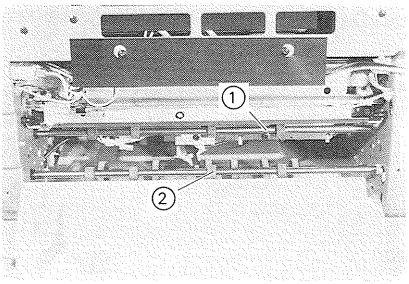
1) Remove the U guide
2) Remove the two E-rings, remove the gear of the feed roller and the Pre registration roller.
3) Remove the two E-rings, then remove the bearings of the feed roller and the manual feed pick-up roller.



① Manual feed pick-up roller bearing ③ E-ring
② Feed roller bearing

Figure 4-29

4) Open the manual feed unit and remove the feed roller and manual feed pick-up roller



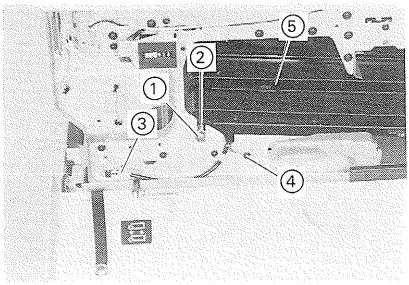
① Feed roller ② Manual feed pick-up roller

Figure 4-30

B. FEEDER

1. Removing the Feeder

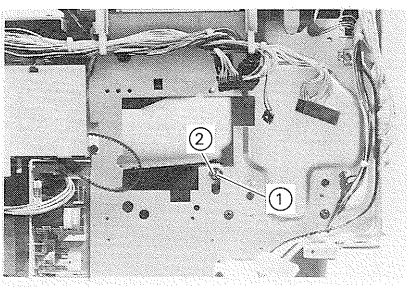
1) Remove the drum cartridge, rear cover, and fixing unit.
2) Unscrew the two screws holding the front door strap, and open the front door fully.
3) Remove the E-ring, bearing, and screw, then remove the connector.



① E-ring
② Bearing
③ Connector
④ Screws
⑤ Feeder

Figure 4-31

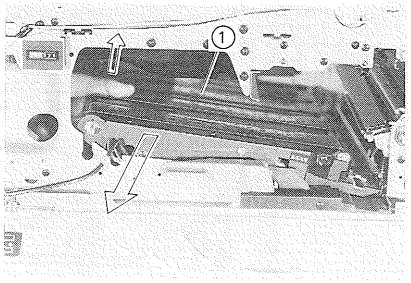
4) Remove the DC controller PCB and the main motor. (See Page 4-6.)
5) Remove the E-ring and the bearing.



① E-ring ② Bearing

Figure 4-32

6) Raise the closer to the end of the feeder fixing assembly slightly, then slowly remove the feeder from the front.



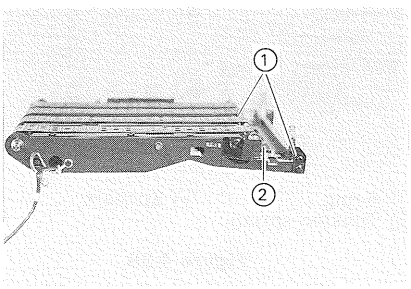
① Feeder

Figure 4-33

Note:
When removing the feeder, take care not to damage the developing cylinder.

2. Removing the Feeder Belt

1) Remove the feeder from the copier.
2) Unscrew the two screws and remove the cover.



① Screw ② cover

Figure 4-34

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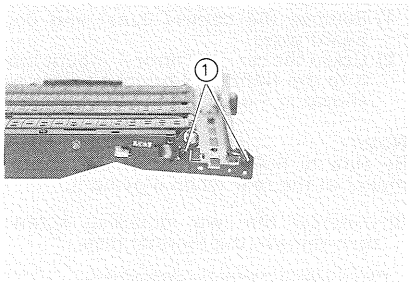
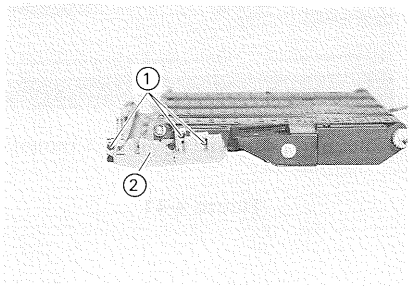
3) Unscrew the two screws.



① Screws

Figure 4-35

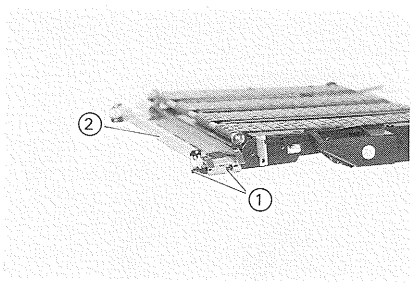
4) Unscrew the three screws then remove the cover.



① Screws ② cover

Figure 4-36

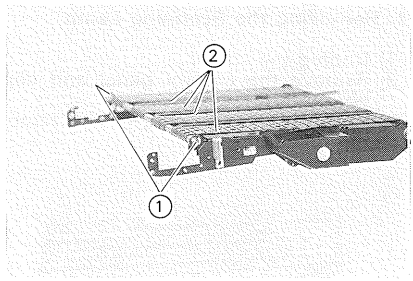
5) Unscrew the two screws then remove the stay.



① Mounting screws ② stay

Figure 4-37

6) Remove the two E-rings, then remove the shaft, and finally remove the feeder belt.



① E-rings ② Feeder belt

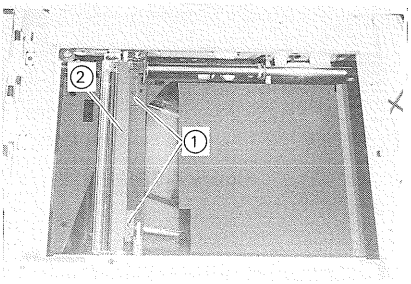
Figure 4-38

IV. EXPOSURE SYSTEM

A. SCANNER

1. Removing the Scanning Lamp

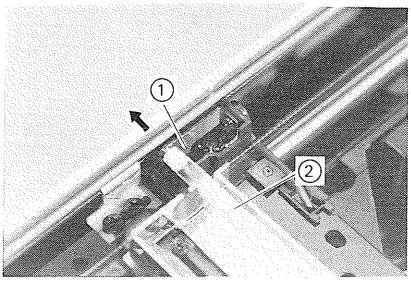
1) Unplug the copier.
2) Remove the control panel and copy-board glass.
3) Unscrew the two screws and remove the reflector.



① Screws ② Reflector

Figure 4-39

4) Push the contact (rear) in the direction of the arrow and remove the scanning lamp.



① Lamp contact ② Scanning lamp

Figure 4-40

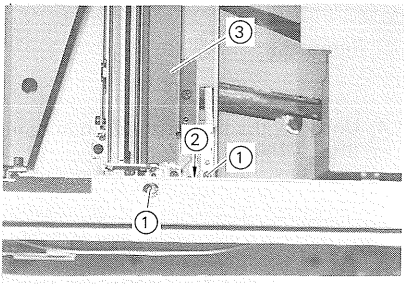
Note:
1. The scanning lamp will be hot, if it has been operating recently.
2. Never touch the surface of the scanning lamp, with bare hands.
3. If the scanning lamp is dirty, wipe it with a dry cloth. If there are any fingerprints or skin oil on it, clean them off with solvent.

2. Removing the Thermal Fuse

1) Remove the control panel and copy-board glass.
2) Grasp the rear of mirror 1 mount move it to the right, and bring it to the part shown in Figure 4-41.

Note:
Be sure to hold the rear of the mirror 1 mount at the rear when moving it.

3) Unscrew the two mounting screws, then remove the thermal fuse.



① Mounting screws ③ Mirror 1 mount
② Thermal fuse

Fiugre 4-41

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B. BLANK EXPOSURE UNIT

1. Configuration

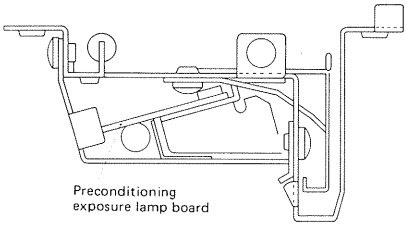


Figure 4-42

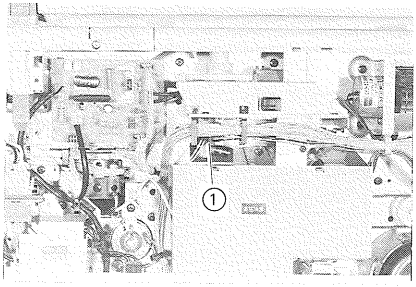
2. Preconditioning Exposure Lampboard

1) Remove the rear cover.
2) Disconnect connector J731 on the preconditioning exposure lampboard.
3) Grasp the lampboard with pliers, and pull it straight out.

Note:
Take care not to damage the board.

3. Blank Exposure Unit.

1) Remove the copyboard glass, lens cover, rear cover, and drum unit.
2) Remove connector J731 on the preconditioning exposure lampboard.

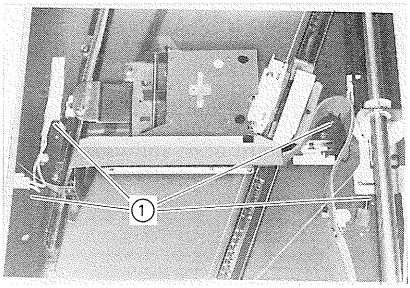


① Connector (J731)

Figure 4-43

3) Place a hand under the blank exposure unit, unscrew the four screws, then slowly remove the preconditioning exposure unit from the front.

Note:
Take care not to damage the developing cylinder.



① Screws

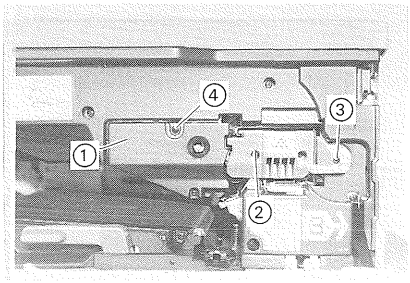
Figure 4-44

V. CHARGING/CLEANING

A. DRUM CARTRIDGE

1. Removing the Drum Cartridge

1) Open the front door and unscrew the screw.



① Drum cartridge
② Developing unit
③ Developing unit release lever
④ Screw

Figure 4-45

2) Swing the developing unit release lever counterclockwise.
3) Slowly pull the drum cartridge to the front.

Note:
Take care not to damage the drum.

The photosensitive drum is adversely affected by strong light, so blank areas or black bands may occur if the drum is exposed to strong light for a long period. After removing the drum cartridge from the copier, wrap the photosensitive drum in a light blocking sheet (or a few sheets of blank copy paper) and put it in a dark place.

For reference:
The OPC drum used in the copier is sensitive to light. Exposure even to room light can result in poor transfer or black strips. Be sure to wrap the OPC drum with a light blocking sheet (copy paper if not available) and place it in the dark on a flat surface whenever it is removed from the copier.

As a general rule, do not switch the copier ON with the drum cartridge removed or with the covers and doors open. If the copier is switched ON with the drum cartridge removed, the trouble described in 1. below with occur. If it is switched ON while it is open, the trouble described in 2. will occur.

1. The registration rollers and transfer guide will be touching each other. If the registration rollers rotate (as in WMUPR), they will be damaged.

Note:
Do not press the COPY START key.

2. Cleaning

If the photosensitive drum is dirty, wipe it with a flannel cloth sprinkled with toner. Do not use lintfree paper.
Never clean the photosensitive drum with a dry cloth.
Never clean the drum with drum cleaning powder or solvent.

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B. PRIMARY/TRANSFER CORONA ASSEMBLY

1. Outline

The primary and transfer corona assemblies are located around the photosensitive drum. The primary corona assembly has a grid.

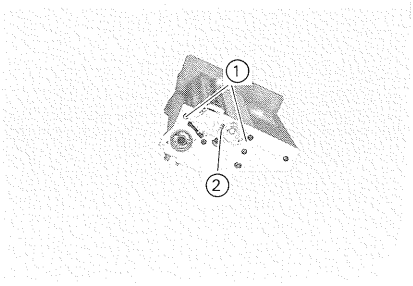
2. Disassembly/Reassembly

a. Removing the primary corona assembly grid plate.

1) Remove the drum CARTRIDGE.

Note:
The photosensitive drum is adversely affected by strong light, so blank areas or black bands may occur if the drum is exposed to strong light for a long period. Do not, therefore, expose the drum to light.

2) Unscrew the two screws, then remove the primary corona assembly from the photosensitive drum.

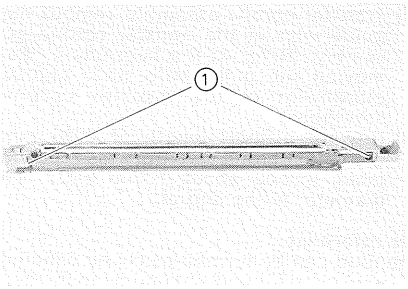


① Screws ② Primary corona unit

Figure 4-46

b. Removing the guide wire/static charge eliminator of the transfer corona assembly.

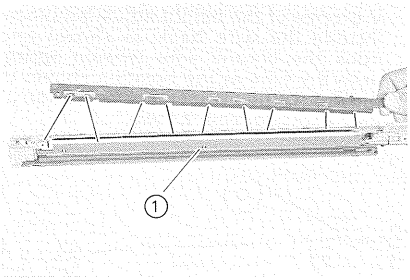
1) Remove the transfer corona assembly from the copier.
2) Unscrew the two screws, then pull the static charge eliminator to separate it from the guide wire.



① Mounting screws

Figure 4-47

3) Remove the static charge eliminator.

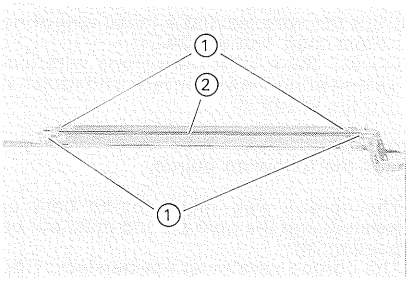


① Static charge eliminator

Figure 4-48

C. Attaching the corona wires of the primary/transfer corona assembly.

1) Primary corona unit, remove the four tension springs then remove the grid plate, as shown in the figure.



① Grid wire tension
② Grid plate

Figure 4-49

2) Transfer corona assembly: remove the guide wire of the transfer corona assembly. (Refer to the subsection "Removing the guide wire/static charge eliminator of the transfer corona assembly.)
3) Unwind a short length of 0.06 mm diameter corona wire from the reel and make a loop about 2 mm (0.07 ″)in diameter at the end of.

For reference:
The loop can be formed easily by winding the wire once around an allen wrench, then twisting the wrench four of five times.

4) Cut the loose end of the loop to less than 1mm.
5) Attach the loop as shown in Figure 4-50, and unreel the wire to the other end of the frame, leading the wire in the V groove of the height adjusting piece. Double the wire back as shown and hook the corona wire tension spring onto the wire at the position shown in the figure, then twist the spring three or four times to from a loop.

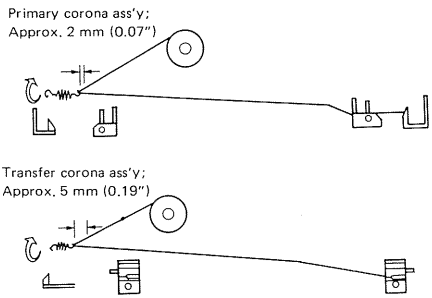


Figure 4-50

6) Cut the wire leaving a loose end of no more than 1mm.(0.04 ″)
7) Grasp the end of the corona wire tension spring with tweezers, and attach it to the terminal.

Note:
Check the following points.

- The corona wire must not be bent or twisted, and the gold plating must not be peeling off.
- The corona wire must not be slack. (The length of the corona wire tension spring should be about 12 mm (0.5 ″).)
- The corona wire must be in the V groove of the height adjusting piece.

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VI. DEVELOPING SYSTEM

A. DEVELOPING ASSEMBLY

1. Configuration

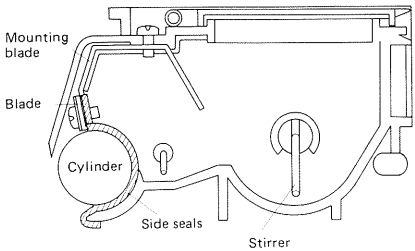
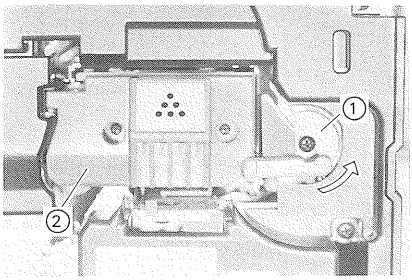


Figure 4-51

2. Removing the Developing Assembly from the Copier

1) Swing the developing assembly release lever counterclockwise.
2) Gently pull out the developing assembly carrier.
3) Grasp the handle of the developing assembly, and remove it from the copier.

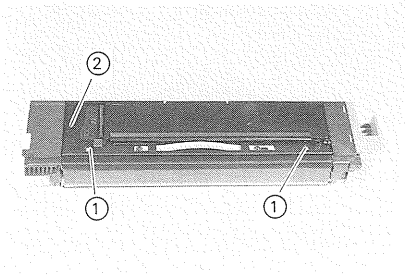


① Developing assembly release lever ② Developing assembly

Figure 4-52

3. Removing the Blade/Developing Cylinder/Side Seals

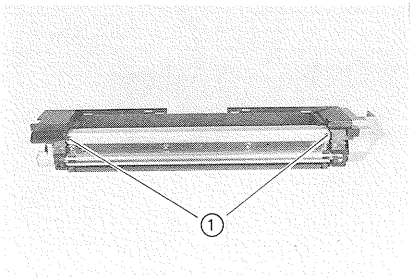
1) Remove the developing assembly from the copier.
2) Unscrew the screw, then remove the upper cover fixing plate.
3) Remove the upper cover.



① Screw ② Upper cover

Figure 4-53

4) Unscrew the two screws, then remove the upper cover of the developing assembly.



① Screws

Figure 4-54

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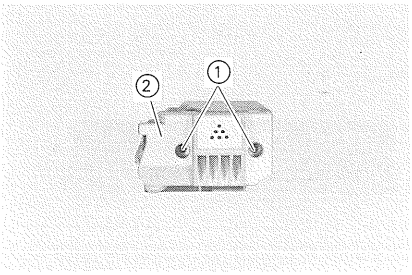
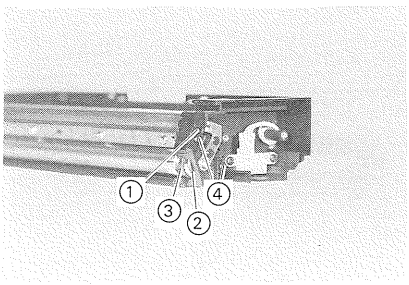
5) Spread newspapers on the floor, then open the toner in the developing unit.
6) Unscrew the screws and remove the mounting blade with blade. (see Figure 4-54).
7) Unscrew the two screws and remove the handle.



① Screws ② Handle

Figure 4-55

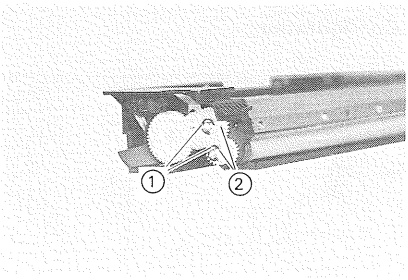
8) Unscrew the four screws, then remove the developing cylinder holder (front), ball bearing, and developing cylinder.



① Developing cylinder holder ③ Developing cylinder
② Ball bearing ④ Screws

Figure 4-56

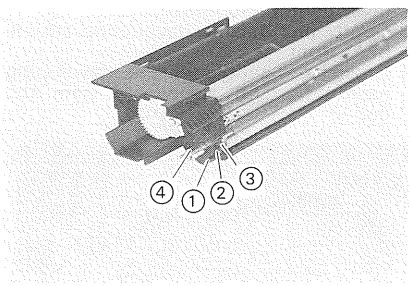
9) Remove the two E-rings, then remove the two gears.



① E-rings ② Gears

Figure 4-57

10) Unscrew the two screws, then remove the developing cylinder holder (rear), the ball bearing, and the developing cylinder.



① Developing cylinder holder (rear) ③ Developing cylinder
② Ball bearing ④ Screws

Figure 4-58

11) Remove the developing cylinder and side seals.

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4. Installing the Side Seals/Blade

1) Clean with alcohol the surface to which the side seal is to be applied.
2) Apply the side seal to the position shown in Figure 4-59.

Align the oblong hole in the end seal with the oblong hole in the developing and the edge of the seal with the inner face of the hopper (see Figure 4-59) then press the seal down firmly.

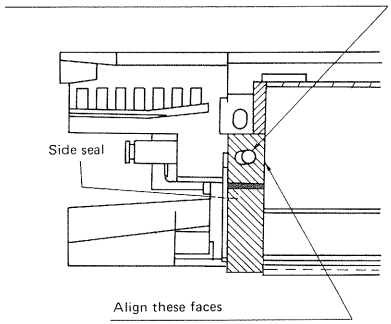


Figure 4-59

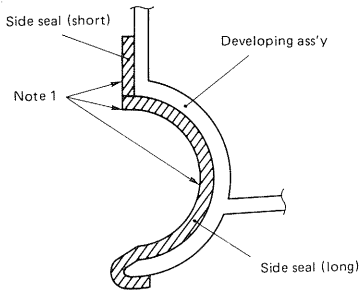


Figure 4-60 Cross-sectional view

Note 1:
Stick the side seals on the developer so that the short side seal is aligned with the end of the long side seal.

3) Install all parts other than the blade. When installing the gear, however, assemble it as shown below.

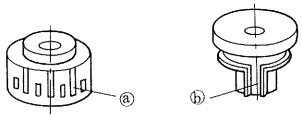
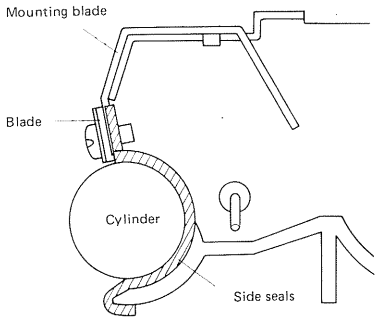


Figure 4-61

4) Push the blade mount against the developer in the direction of the arrow and tighten the two screws.



Fiugre 4-62

5) Loosen the four screws that hold the blade to the blade mount (note 2) and retighten the screws.

Note 2:
Be careful not to remove the blade from the center alignment pin by loosening the screws too much.

VII. FIXING SYSTEM

A. FIXING UNIT

1. Configuration

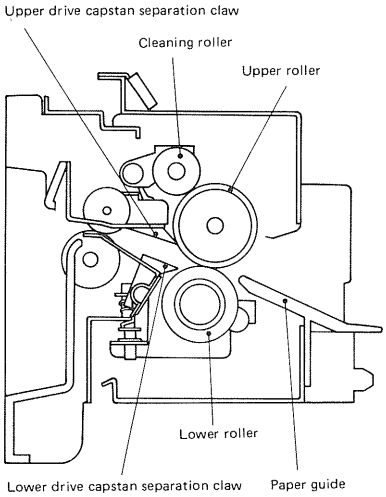
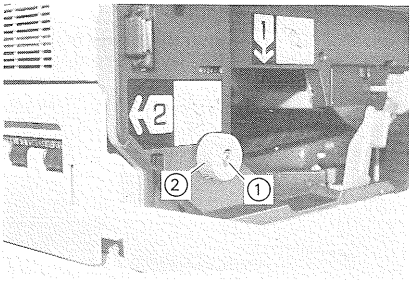


Figure 4-63

2. Removing the Fixing Unit.

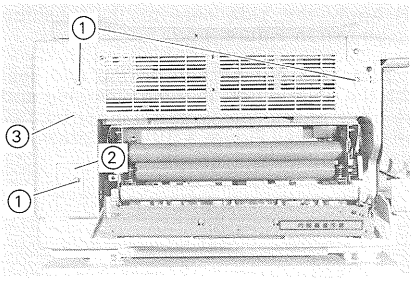
1) Unscrew the screw, then remove the knob.



① Screw ② Knob

Figure 4-64

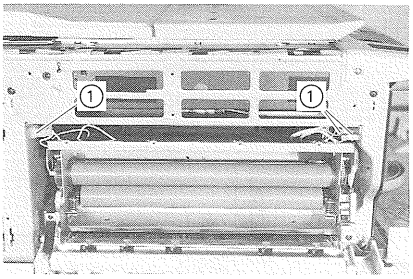
2) Remove the left cover, then unscrew the xx screws and remove the blanking plate.



① Screws ② Blanking plate

Figure 4-65

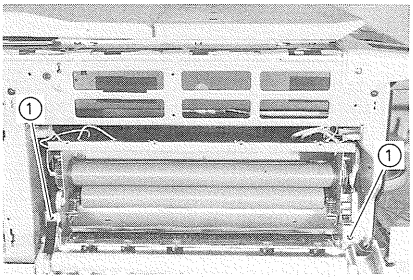
3) Disconnect the three connectors.



① Connectors

Figure 4-66

4) Unscrew the two screws, then remove the fixing unit.



① Screws

Figure 4-67

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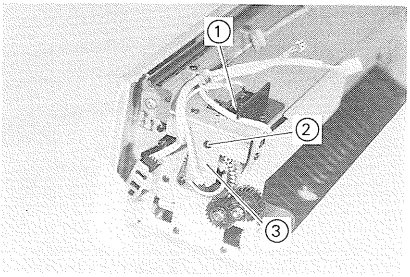
3. Removing the Upper Fixing Roller, Heater, and Lower Fixing Roller.

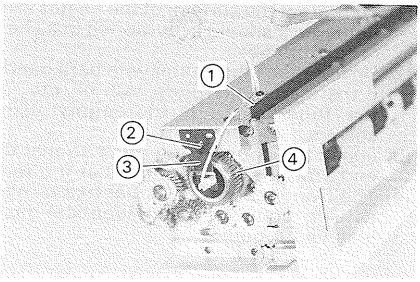
1) Remove the fixing unit from the copier
2) Remove the Faston and unscrew the screw to free the heater plate (front).



① Faston
② Screw
③ Heater mounting plate (front)

Figure 4-68

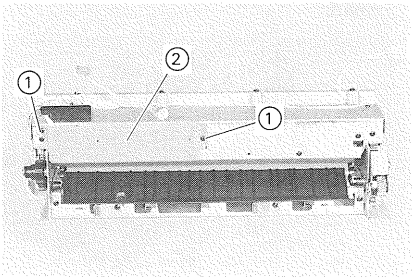
3) Remove the Faston, then unscrew the screw.
4) Slowly remove the heater mounting plate (rear) and the heater.



① Faston
② Screws
③ Heater mounting plate (rear)
④ Heater

Figure 4-69

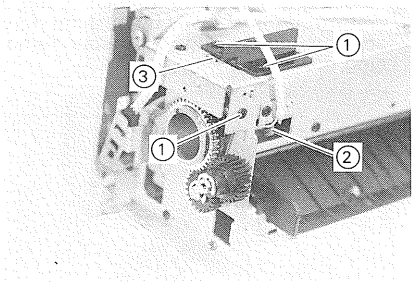
5) Unscrew the two screws, and remove the thermistor cover plate.



① Screws
② Thermistor cover plate

Figure 4-70

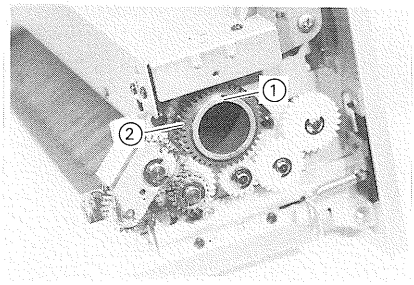
6) Unscrew the screw, and remove the thermistor.
7) Unscrew the screw, and remove the thermoswitch.



① Screw
② Thermistor
③ Themoswitch

Figure 4-71

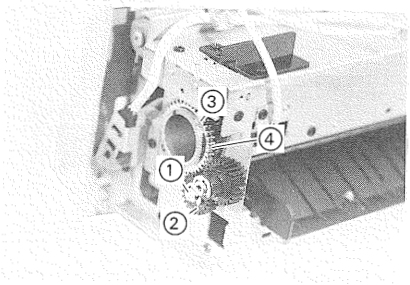
8) Remove the C-ring at the rear, then remove the gear.



① C-ring
② Gear

Figure 4-72

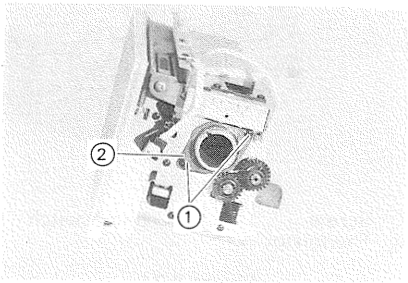
9) Remove the E-ring, and remove the gear.
10) Remove the C-ring, and remove the two gears.



① E-ring ③ C-ring
② Gear ④ Gear

Figure 4-73

11) Unscrew the two screws, and remove the bearing. Note that the bearing is being pressed by the lower fixing roller, making it difficult to remove. It can be removed more easily by pushing down on the upper fixing roller when removing it.



① Screws ② Bearing

Figure 4-74

12) While compressing the pressure spring of the lower fixing roller with a screwdriver, remove the upper fixing roller.

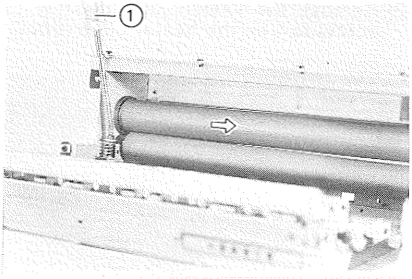


Figure 4-75

13) Remove the lower fixing roller.

4. Installing the Upper Fixing Heater

Installing the upper fixing heater is the reverse of removing it. Be careful of the following points, however.

a. Handling the heater

(1) To protect the surface of the heater from damage, it should be wrapped in a sheet of copy paper.
(2) Do not touch the heater with bare hands. If there are fingerpints, skin oil, etc., on the tube, clean it thoroughly using solvent.
(3) Install the upper fixing roller so that the end with the two C-rings is at the rear.
(4) The front gear of the upper fixing roller actually consists of two identical gears installed together.

5. Adjusting the Nip Width (tightening the pressure adjustment nuts)

The nip width must be no more than the dimension indicated in Table 4-1. If it exceeds this value, adjust it with the nuts.

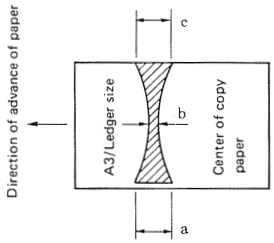


Figure 4-76

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Note:
a and c are the dimensions 15mm (0.6") from each edge.

Dimension	Measure after the upper and lower rollers have heated up.
b	4.0±0.5mm (0.16"±0.008")
|a – c|	0.5mm or less

Table 4-1

a. Measuring the nip width
If the rollers are cool, wait 15 minutes beyond when the copy START indicator begins glowing green, make 20 copies, then measure the nip width.

b. Measuring procedure
1) Raise the copyboard cover and make an A3 Ledger size solid black copy.
2) When the leading edge of the copy paper first appears at the delivery port, set the power switch OFF, and open the front door and the paper delivery unit.
3) Turn the fixing unit knob very slightly counterclockwise stop it in that position for 15 seconds, then turn the knob again to deliver the paper completely.
4) Measure the width of the toner area with a glossy surface, as shown in Figure 4-76.

6. Installing the Thermistor
Confirm that the sensor surface of the thermistor is touching the surface of the upper fixing roller evenly.

For reference:
There is no need to adjust the position of the thermistor.
If the thermistor is not touching the upper fixing roller evenly, check if the thermistor spring is deformed.

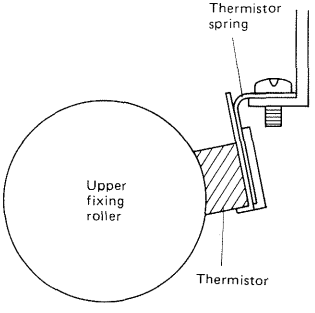


Figure 4-77

7. Installing the Thermoswitch
Confirm that the sensor surface of the thermoswitch is touching the surface of the upper fixing roller evenly.

For reference:
There is no need to adjust the position of the thermoswitch. If the thermistor is not touching the upper fixing roller evenly, check if the thermoswitch spring is deformed.

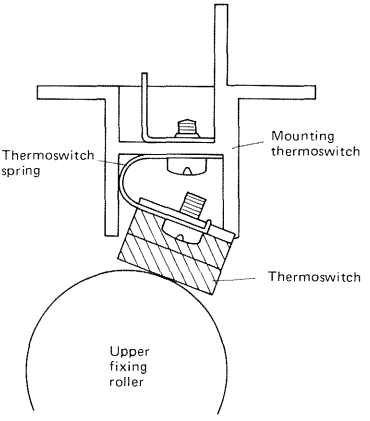


Figure 4-78

8. Paper Guide Position

The position of the paper guide is adjusted by the paper guide mount. Consequently, when installing the paper guide, there is no need to adjust its position.

Note:
If the paper guide mount is removed, it then becomes necessary to adjust the position of the paper guide. Do not, therefore, loosen the screws of the paper guide mount. If it is necessary to loosen the screws for some reason, first mark the position of the mount with a scribe.

For reference:
Adjust the position of the paper guide by placing the fixing unit on a desk, then positioning the paper guide mount as shown in Figure 4-79.

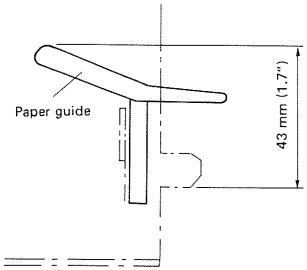
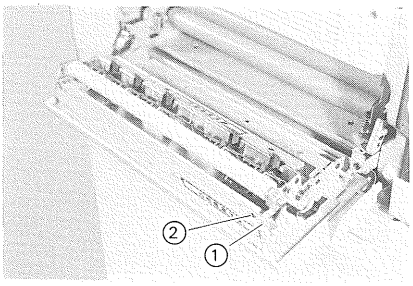


Figure 4-79

9. Removing the oil-applying roller

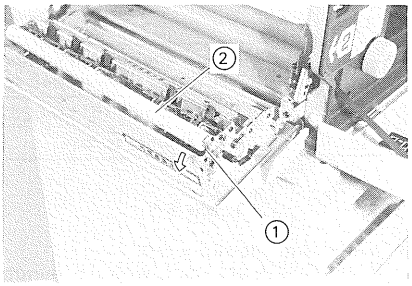
1) Open the paper delivery door.
2) Unscrew the screw and remove the holding plate.



① Screw ② Holding plate

Fiugre 4-80

3) Open the lever and remove the oil-applying roller.



① Lever ② Oil-applying roller

Figure 4-81

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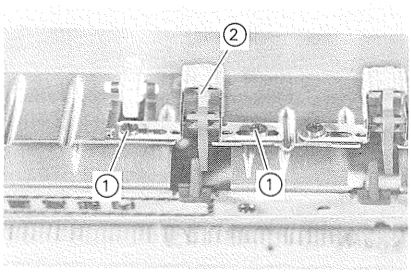
10. Removing the Upper Separation Claw

1) Open the paper delivery door.
2) Remove the oil-applying roller.
3) Unscrew the two screws and remove the upper separation claw assembly.
4) Remove the spring of the upper separation claw.



① Screw ② Upper separation claw

Figure 4-82

11. Installing the Upper

Mount the upper separation claw by reversing order of operations for removal. Note the following:

a. The projections of the upper separation claws must touch the mount in the way shown in figure 4-83.

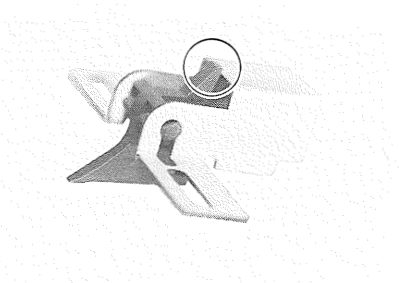


Figure 4-83

b. Install the entire upper separation claw unit to the rear.
If the upper fixing roller is damaged by the upper separation claw, move the upper fixing claw about 4 mm (0.16″) toward the front.

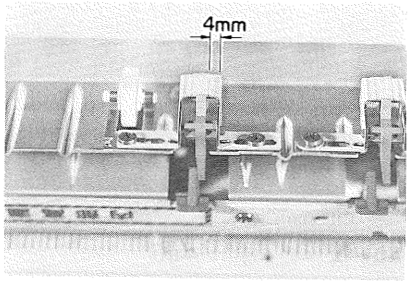
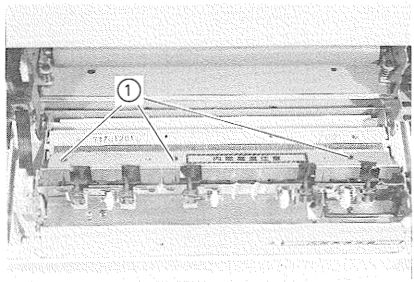


Figure 4-84

12. Removing the Lower Separation Claw

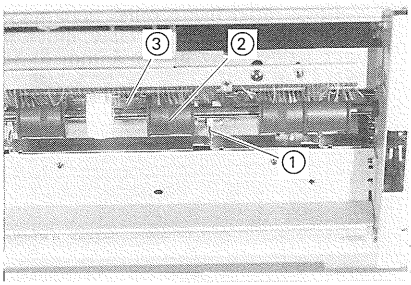
1) Remove the cover of the copy delivery unit. Open the paper delivery cover and remove the lower separation claw.



① Screw

Figure 4-85

2) Remove the spring of the lower separation claw.



① Spring

Figure 4-86

13. Lubrication

Periodically apply heat resistant grease (CK-0227) to the following areas.

- Gear teeth (rear)
- Gears driven by fixing knob

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CHAPTER 5

INSTALLATION

Each copier is carefully adjusted and strictly inspected before it leaves the factory. It is important to install and set up the copier properly in order to maintain its performance at the same high level.

The service technician should fully understand the function of the copier, install it properly in a suitable location and carry out the necessary checks before it is used by the customer.

I. SELECTION OF INSTALLATION LOCATION 5-1
II. UNPACKING AND INSTALLING THE COPIER 5-2
III. PREPARATION REQUIRED FOR MOVING THE COPIER 5-7
IV. INSTALLATION OF THE CONTROL CARD 5-8
V. PROCEDURE FOR CHANGING OVER THE CASSETTE SIZE .. 5-10
VI. PROCEDURE FOR INSTALLING THE DOCUMENT REST TRAY . 5-13

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I. SELECTION OF INSTALLATION LOCATION

The copier should be installed in a location that meets the following requirements. It is recommended that the service technician personally inspect the customer's premises before installing the copier.

A. The location should have an electric outlet capable of supplying the voltage shown on the rating plate (±10%) and a current of at least 15A. The copier must be grounded. (A3-pin plug must be used.)
B. The ambient temperature should be within the range 7.5 to 32.5°C (45 to 90°F) and the relative humidity between 10 and 85%. The copier should not be installed near water faucets, space heaters, humidifiers, or refrigerators.
C. The copier should not be installed close to a naked flame or in a dusty area, or where it will be exposed to ammonia fumes or direct sunlight. If it must unavoidably be installed beside a sunlit window, place protective curtains across the window to block the light.
D. The room should be well ventilated.
E. Make sure that the copier is installed on a level surface with all of its feet in contact with the floor.
F. The rear of the copier should be at least 100mm (4") away from the wall, with enough space at the ends to permit unrestricted operation.

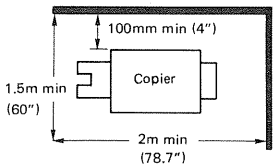

Figure 5-1

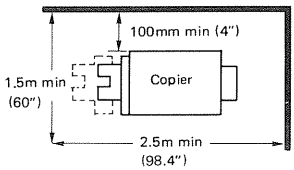

Figure 5-2 Copier with sorter installed

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II. UNPACKING AND INSTALLING THE COPIER

If the copier (in its shipping container) is moved from storage in a cold place to a warm place, let it warm up for at least one hour before unpacking it. This aboids condensation inside the copier that would affect the copy image.

No.	Procedure	Check	Remarks
1.	Unpack the copier.		
2.	Place the hands beneath the front and rear of the base plate of the copier (on skids), then raise the copier and place it on a pedestal or a desk.		When placing the copier on a pedestal, ensure that the two pins on the pedestal fit into the front and rear legs on the left side of the copier.
3.	Open the cardboard box accompanying the copier, and remove the contents.	Confirm that it contains the following. ● Paper delivery tray ● Advice book ● Advice book holder ● Cartridge ● Black toner ● Samples of paper that can be used	
4.	Remove the plastic cover, peel off the outer tape, and remove the packing material from the cassette.	Confirm that the covers are not dented, scratched, or otherwise damaged.	
5.	Unscrew the two screws of the scanner locking plate from the outside of the left cover, slide the plate to the right, then pull it forward and remove it.		See Figure 5-3
6.	Open the front cover, release the developing unit, then remove it.	Confirm that the developing cylinder is not scratched.	
7.	Remove the tape securing the transfer corona unit and remove the shock absorbing material from the feeder and the inlet of the fixing unit.		
8.	Release the feeder, remove the dummy drum from the copier.		
9.	Open the paper delivery door, then remove the left spacers (two) of the fixing rollers.		See Figure 5-4

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No.	Procedure	Check	Remarks
10.	Unpack the cartridge and remove the light blocking sheet.	When unpacking the cartridge, take care not to damage the surface of the drum.	
11.	Install the cartridge, peel off the tape from the inside cover, then secure the cartridge with the screw provided.		
12.	Move the drum cartridge cleaning lever back and forth two or three times to clean the primary corona wire.		
13.	Install the developing unit.		
14.	Remove the rear cover, and confirm that gears, sprockets, pulleys, and connectors are installed normally.		
15.	Install the ground cord below the power cord of the copier, and connect it to ground.	Objects which can be used as grounds 1) Ground pin (terminal) of power outlet 2) Copper rod buried to a depth of at least 65cm 3) Water pipe approved by the Water Board for use as a ground (Never use a gas pipe as a ground).	
16.	Change over the cassette size as desired.		See the sub-section "Changing the cassette size"
17.	Plug in the power cord and set the power switch to "I".	Confirm that the PAPER OUT/NO CASSETTE indicator is ON.	
18.	Put a loaded cassette into the copier.	● Confirm that the PAPER OUT indicator goes OFF. ● Press various combinations of copy NUMBER SELECT keys and the CLEAR key to ensure that inputs are correct.	
19.	Install the copy tray.		
20.	Raise the copyboard cover, and remove the paper and also the protective paper from the document index plate.		

No.	Procedure	Check	Remarks
21.	When the COPY START key glows green, make two copies of a single sheet document. Before making the second copy, wait for at least five seconds after the drum has completely stopped.	● There should be no unusual noise. ● The TONER OUT indicator should flash five seconds after the end of the second copying operation.	
22.	Open the front door. Pull out the developing unit to the stop.		
23.	Shake the toner cartridge vigorously.		
24.	Raise the cover of the developing unit hopper, invert the toner cartridge and insert the two tabs at the end of the cartridge into the holes at the rear of the developing unit, lay the toner cartridge flat, and pull it forward slightly until it touches the protrusion.		
25.	Hold the toner cartridge securely and slowly pull off the seal toward the front.		
26.	Strike the top of the toner cartridge to remove any toner remaining in the toner cartridge.		
27.	Remove the toner cartridge, then place it in an empty box and discard it.		
28.	Close the hopper cover, then push in the developing unit to the rear.		
29	Swing the developing unit positioning lever clockwise.		
30.	Close the front door.		
31.	Set the power switch ON.		
32.	After the COPY START key glows green, manually feed six to ten sheets of blank A3/Ledger size paper through the copier.		
33.	Place a test sheet on the copyboard, make a copy, then check the copy image.	Copying operation should be normal. If it is not normal, make any required adjustments.	

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No.	Procedure	Check	Remarks
34.	Make copies using manual feed.	Make two-sided and overlay copies. Copying operation should be normal. If it is not, make any required adjustment.	
35.	Install all covers.		
36.	Install the advice book holder on the rear cover.		
37.	Place the advice book in the advice book holder.		
38.	Clean the outside of the copier and around it, record the necessary items on the service sheet.		

Precautions for handling the photosensitive drum after installing the copier

The photosensitive drum is adversely affected by strong light, so blank areas or black bands may occur if the drum is exposed to strong light for a long period. If this happens, stop the copier.

* Try to install or remove the CT unit within one minute so as to minimize exposure to light.
* Try to clear a jam within five minutes.
* When removing the drum from the copier for servicing, wrap it in a light blocking sheet (or several sheets of copy paper if a light blocking sheet is not available), and place the drum in a dark location.

Note:
The OPC drum used in the copier is sensitive to light. Exposure even to room light can result in poor transfer or black strips. Be sure to wrap the OPC drum with a light blocking sheet (copy paper if not available) and place it in the dark on a flat surface whenever it is removed from the copier.

Do not touch the surface of the drum with bare hands. If the surface of the drum is touched or soiled, wipe it clean with a soft cloth to which toner has been applied. (Do not use lint-free paper.) Do not dry-wipe the drum nor use an organic solvent on it.

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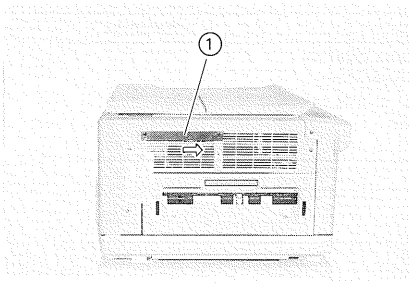
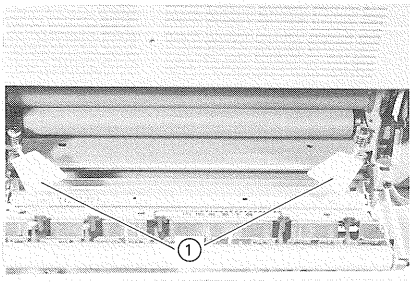


① Scanner locking plate

Figure 5-3



① Spacers

Figure 5-4

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III. PREPARATION REQUIRED FOR MOVING THE COPIER

If it is necessary to relocate the copier after it has been installed, prepare it as follows.

No.	Procedure	Check	Remarks
1.	Remove the cartridge.	Place the cartridge in its box.	
2.	Secure the scanner.		
3.	Secure the transfer corona unit and the feeder release lever with tape.		
4.	Secure the front door and feeder with tape.		
5.	Place seven sheets of A3/Ledger size copy paper on the copyboard glass and secure the copyboard cover with tape.		

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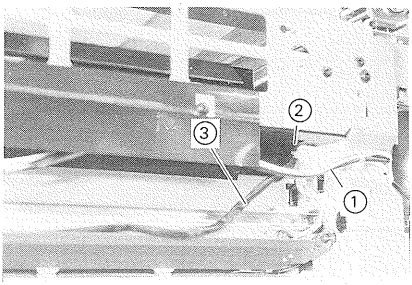
IV. INSTALLATION OF THE CONTROL CARD

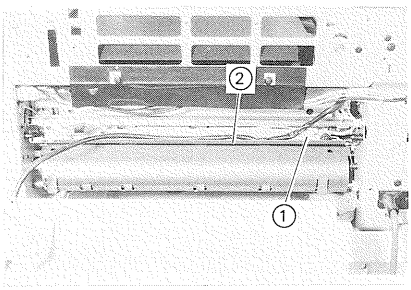
1) Turn the power switch off.
2) Remove the right cover and open the manual feed tray.
3) Insert the connector (5P) of the connector cable on the rear panel in the connector (4P) in the far side.



① Connector (5P) ③ Connector (4P)
② Connector Cable

Figure 5-5

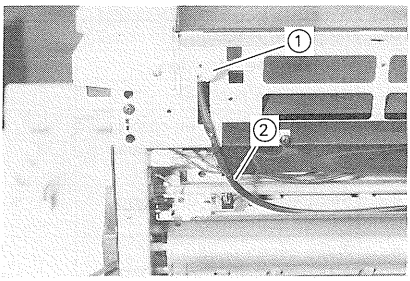
4) Fasten the relay harness to the paper guide panel with a harness band.



① Guide Panel ② Connector Cable

Figure 5-6

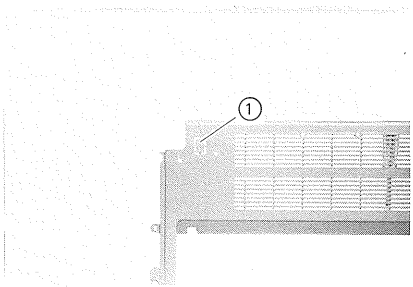
5) Remove the blanking plate on the left side panel, then set the connector as shown in Figure 5-7.



① Connector ② Connector Cable

Figure 5-7

6) Cut out the blank cover on the right cover with wire cutters, etc.



① Blank cover

Figure 5-8

7) Install the right cover on the copy machine.
8) Connect the connector on the connection cable and the connector on the control card unit.

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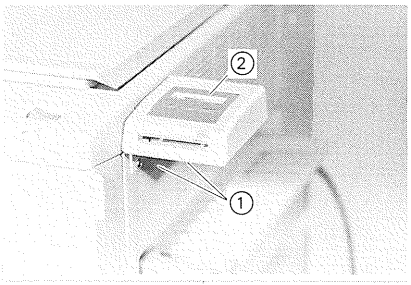
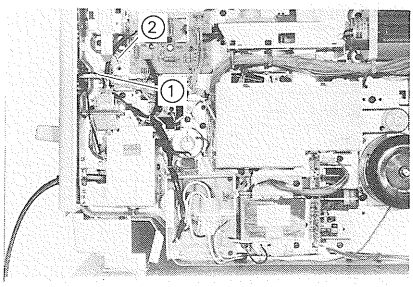
9) Mount the control card unit on the right side panel of the copy machine with 2 screws.



① Screws ② Control Card Unit

Figure 5-9

10) Cut the jumper cable.



① Connector ② Jumper Cable

Figure 5-10

11) Turn the copy machine's power switch on and check the control card unit.

V. PROCEDURE FOR CHANGING OVER THE CASSETTE SIZE

The cassette can be configured to suite the size of the paper; to do so, move the spring, end plate and blanking plate of the cassette paper lifting plate as shown in the table below.

Paper	Paper size	Symbol	Spring color	Cassette paper lifting plate and blanking plates fitting position	Cassette size sensor fitting position
A3	297 mm × 420 mm (11.7" × 16.5")	A3	Blue	ⓐⓑⓒⓓ	
11 × 17	297 mm × 432 mm (11" × 17")	11 × 17	Blue	ⓐⓑⓒⓓ	
A4	297 mm × 210 mm (11.7" × 8.3")	A4	Blue	ⓐⓑⓒⓓ	
LETTER	279 mm × 216 mm (11.0" × 8.5")	LTR	Blue	ⓐⓑⓒⓓ	
Government-LETTER	267 mm × 203 mm (10.5" × 8.0")	G.	Blue	ⓐⓑⓒ	
Korean Legal Paper	265 mm × 190 mm (10.4" × 7.5")	K.	Blue	ⓐⓑⓒ	
B4	257 mm × 364 mm (10.1" × 14.3")	B4	Blue	ⓐⓑⓒ	
LEGAL	216 mm × 356 mm (8.5" × 14.0")	LGL	Yellow	ⓐⓑ	
B5	257 mm × 182 mm (10.1" × 7.2")	B5	Yellow	ⓐⓑⓒ	
Argentine-LETTER	280 mm × 220 mm (11.0" × 8.7")	Arg.	Blue	ⓐⓑⓒⓓ	
A4-R	210 mm × 297 mm (8.3" × 11.7")	A4 R	Yellow	ⓐⓑ	
LETTER-R	216 mm × 279 mm (8.5" × 11.0")	LTR R	Yellow	ⓐⓑ	
B5R	182 mm × 257 mm (7.2" × 10.1")	B5 R	Yellow	ⓐ	
Argentine-LEGAL	220 mm × 340 mm (8.7" × 13.4")	Arg. LGL	Yellow	ⓐⓑ	
Government-LETTER-R	203 mm × 267 mm (8.0" × 10.5")	G. R	Yellow	ⓐⓑ	
Government-LEGAL	203 mm × 330 mm (13.0" × 8.0")	G. LGL	Yellow	ⓐⓑ	
Argentine-LETTER-R	220 mm × 280 mm (8.7" × 11.0")	Arg. R	Yellow	ⓐⓑ	
Foolscap	216 mm × 330 mm (8.5" × 13")	FLS	Yellow	ⓐⓑ	
Folio	210 mm × 330 mm (8.3" × 13")	FOLIO	Yellow	ⓐⓑ	
Aus. Foolscap	206 mm × 337 mm (8.1" × 13.3")	Aus. FLS	Yellow	ⓐⓑ	
Korean Legal Paper R	190 mm × 265 mm (7.5" × 10.4")	K. R	Yellow	ⓐ	
OFFICIO	216 mm × 317 mm (8.5" × 12.5")	OFC	Yellow	ⓐⓑ	
Ecuadr OFICIO	220 mm × 320 mm (8.7" × 12.6")	E.	Yellow	ⓐⓑ	
Bolivia OFICIO	216 mm × 355 mm (8.5" × 14.0")	BLV	Yellow	ⓐⓑ	

Table 5-1

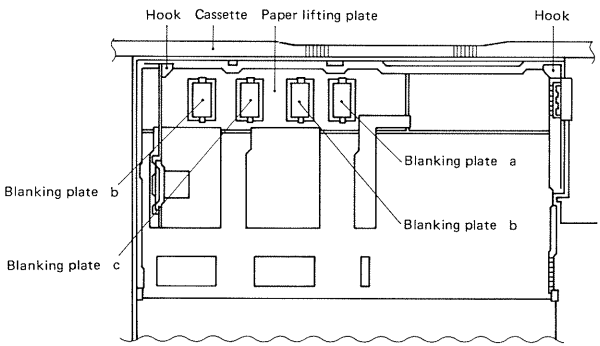


Figure 5-11 Cassette top view

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Size Change Procedure

1) Remove the screw fastening the rear control plate on the back end of the cassette.

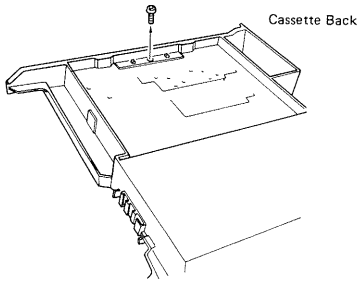

Figure 5-12

2) Position the rear control plate at the desired paper size (see Table 5-2) in accordance with the markings on the back side of the cassette.
BA/A4-R/LGL./ARG.R/FLS/G.R/FOIO G,LGL/AUS.FLS/BLV./ARG,LGL/ E.OFC
The above types of paper require the use of 2 rear control plates. Setting positions should be according to the markings on the back of the cassette.

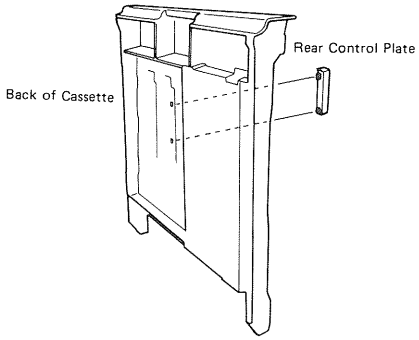

Figure 5-13

3) Fasten the control plate with 2 screws (M4 × 6).

Follow the procedure from step 7 when changing the type of springs used.

4) Remove the 2 screws holding the paper size dividing plate.

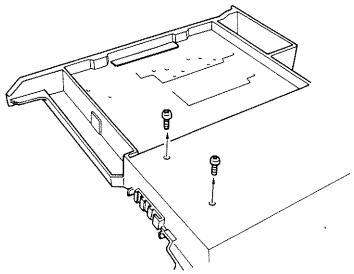

Figure 5-14

5) Slide the paper size dividing plate, together with the springs, to the position indicated by the markings on the back of the cassette for the desired paper size.

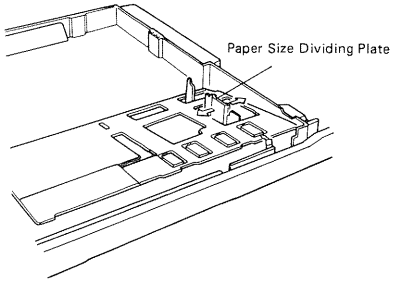

Figure 5-15

6) Fasten the paper size dividing plate with the 2 screws removed in procedure 4.
Proceed to step 13) after the above operation.
7) Remove the 2 pieces of stopper rubber on the center plate.

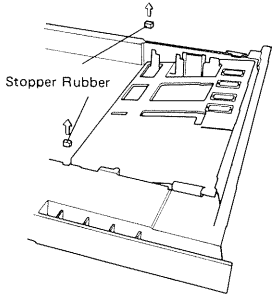

Figure 5-16

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8) Remove the center plate and springs.

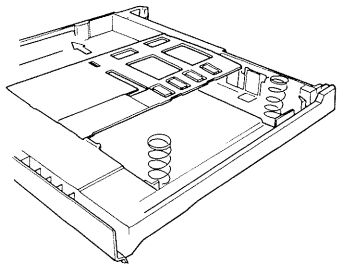

Figure 5-17

9) Remove the 2 screws holding the paper size dividing plate from the back of the cassette.

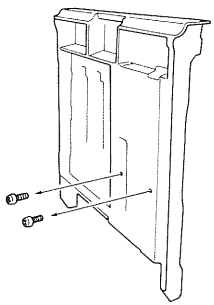

Figure 5-18

10) Slide the paper size dividing plate to the position indicated by the markings on the back of the cassette for the desired paper size, then fasten it in place with the 2 screws removed in step 9).
11) Change the springs according to the specifications in the Table 5-1.

12) Set the center plate and install the pieces of stopper rubber.

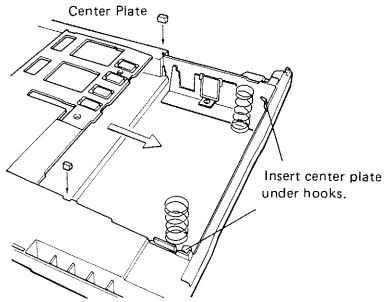

Figure 5-19

Check
- Are the pieces of stopper rubber installed correctly
- Is the spring on the far side set correctly in the spring seat on the bottom of the center plate

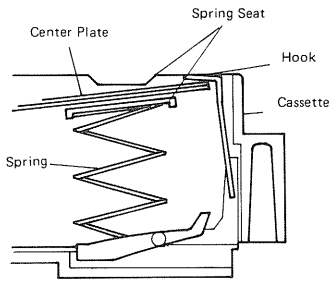

Figure 5-20

13) Set cassette size sensor fittings as shown in Table 5-1.
14)

15) Government LTR/Korean Legal, Korean Legal R
Follow the procedure below when setting cassettes with the above paper sizes.
For paper sizes other than those above, proceed to step 18).
16) Open the manual feed tray, remove the 2 front pins, then remove the V guide. (See Chapter 4.)

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17) Remove the paper feed roller as shown below.
- In the case of Government LTR and Korean Legal, remove paper feed roller 1 shown in Figure 5-20.
- In the case of Korean Legal-R, remove paper feed roller 3 in Figure 5-20.

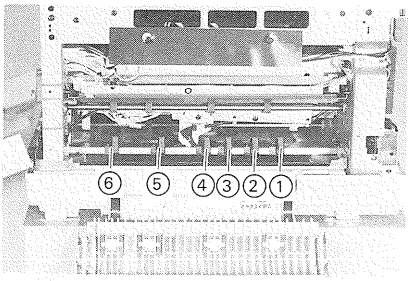
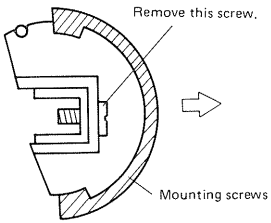


Figure 5-21



Note:
Removing the paper feed roller.
Remove this screw.

Figure 5-22

18) Install the U-guide and inner cover following the reverse order of the procedure for removal.
19) Affix the size label to the cassette.
* If a size label for the paper size used is not available, write the correct paper size on a blank label using a magic marker and affix it.

VI. PROCEDURE FOR INSTALLING THE DOCUMENT REST TRAY

1) Install the two stepped screws (M4 × 5) in the right side plate of the copier.

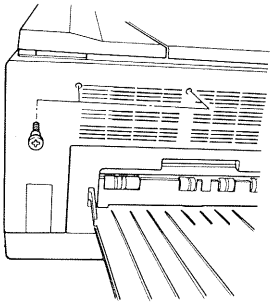


Figure 5-23

2) Hook the document rest tray onto the stepped screws.

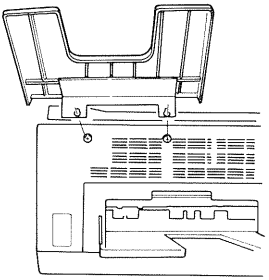


Figure 5-24

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CHAPTER 6

MAINTENANCE AND INSPECTION

I. PARTS TO BE REPLACED PERIODICALLY 6-1
II. EXPECTED SERVICE LIVES OF PARTS AND CONSUMABLES . 6-2
III. BASIC PROCEDURE FOR PERIODIC SERVICING 6-3
IV. PERIODIC SERVICING SCHEDULE 6-4

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I. PARTS TO BE REPLACED PERIODICALLY

To maintain the copier at its peak performance, the parts listed in the following chart must be replaced periodically. Although the deterioration of a part may not be visible, it can seriously hamper the performance of the copier if not replaced on schedule.

Parts should be replaced during the regular service visit that is closest to the end of the service life of the part.

No.	Description	Part No.	Quantity	Replacement	Remarks
1	Ozone filter	FA5-1748-000	1	–	1 year
2	Static charge eliminator	FF1-9438-000	1	50,000	
3	Transfer corona wire	FY3-0030-000	1	50,000	100V
		FY3-0040-000	1	50,000	115/220/240V
4	Side seal, upper (short) (developing unit)	FA5-1790-000	2	100,000	
	Side seal, lower (long) (developing unit)	FA5-1769-000	2	100,000	
5	Front developing cylinder spacer roller	FA5-1766-000	1	100,000	
6	Rear developing cylinder spacer roller	FA5-1767-000	1	100,000	

Note:
The above values are estimates and are subject to change depending on experience.

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II. EXPECTED SERVICE LIVES OF PARTS AND CONSUMABLES

The values shown in the table below indicate the expected average life (number of copies) of parts which may require replacement at least once during the warranty period due to deterioration or damage but which can be simply replaced to restore the performance of the copier.

No.	Description	Part No.	Quantity	Service life (number of copies)	Remarks
1	Oil-applying roller (fixing unit)	FA5-1952-000	1	20,000	
2	Scanner drive cable	FA5-2073-000	1	100,000	
3	Scanning lamp (scanner)	FH7-3113-000	1	100,000	100/115V
		FH7-3114-000	1	100,000	220/240V
4	Paper pick-up roller (pick-up unit)	FF2-0017-000	6	100,000	
5	Side scraper (developing unit)	FA5-1768-000	2	100,000	
6	Upper fixing roller bearing (fixing unit)	FS1-1240-000	2	100,000	
7	Preconditioning exposure lamp	FG1-7416-000	1	200,000	
8	Upper fixing roller (fixing unit)	FA5-1916-000	1	200,000	
9	Lower fixing roller (fixing unit)	FA5-1917-000	1	200,000	
10	Upper separation claw (fixing unit)	FB1-0301-000	5	200,000	
11	Lower separation claw (fixing unit)	FA2-9037-000	5	200,000	

Note:
The above values are estimates and are subject to change depending on experience.

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III. BASIC PROCEDURE FOR PERIODIC SERVICING

Notes:
1. Perform periodic servicing after every 10,000 copies, as a general rule.
2. Before making a service call, check the service log and take along any replacement parts that are likely to be needed.

No.	Procedure	Check	Remarks
1	Note the operator's comments.	Condition of the copier	
2	Record the counter reading	Number of miscopies	
3	Make DIRECT and two-page overlay test copies.	a. Image density b. Dirty background c. Clarity of letters d. Leading edge blank area e. Left and right margins f. Fixing, synchronizing, and soiling of back g. Unusual noise h. Operation of counter	Standard: 2.0±1.5mm (DIRECT) Standard: 10.0±2.0mm (DIRECT), front side
4	Clean the corona units.		Wipe dry using lint-free paper then clean using alcohol.
5	Clean separation and feeder units.		
6	Clean fixing and delivery units. * Paper guide plate * Separation claws (upper and lower)		Alcohol
7	Perform the periodic servicing appropriate to the number of copies (see page 6-4).		
8	Clean the copyboard cover and the copyboard glass.		
9	Check the amount of waste toner.		
10	Make test copies.		
11	Make sample copies.		
12	Select sample copies to keep for the customer record. Clean up around the copier.		
13	Record the final counter value.		
14	Fill in the service sheet and check out with the person in charge.		

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IV. PERIODIC SERVICING SCHEDULE

Note:
Do not use solvents or oils other than those specified.

△: Clean ●: Replace ×: Lubricate □: Adjust ◎: Check

Unit	Description	Periodic servicing				Remarks
		Every 10,000 copies	Every 20,000 copies	Every 50,000 copies	Every 100,000 copies	
Externals	Copyboard glass	△				Clean with alcohol.
	Ozone filter					Replace every year.
Scanner drive unit	Scanner rails		×			Clean with alcohol then apply high-viscosity lubricating oil
Feeder	Transfer guide	△				Damp cloth
	Feeder belt	△				
	Feeder frame	△				
Optical path	Scanning lamp reflector		△			Clean with a blower brush. If very dirty, clean with alcohol. Clean mirrors 5 and 6 with mirror cleaning tool.
	Scanning lamp side reflector		△			
	Mirrors 1 to 6		△			
	Lens		△			
	Dustproofing glass		△			
Corona units	Primary corona wire	△				Dry wipe using lint-free paper, then clean using alcohol.
	Transfer corona wire	△		●		
	Static charge eliminator	△		●		Damp cloth
Developing unit	Developing rollers (front and rear)		△		●	Clean with alcohol.
	Side seals (front and rear)				●	
Fixing unit	Upper fixing roller		△			Clean with cleaning oil.
	Lower fixing roller		△			
	Paper guide plate	△				Clean with MEK.
	Separation claws (upper and lower)	△				

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APPENDIX

I. GENERAL TIMING CHART A-1
II. LIST OF SIGNALS/ COMMANDS A-3
III. GENERAL CIRCUIT DIAGRAM A-5
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V. DC CONTROLLER PCB A-7
VI. AC DRIVER A-12
VII. DC POWER SUPPLY PCB A-13
VIII. PRECONDITIONING EXPOSURE LAMP A-14
IX. AE SENSOR A-15
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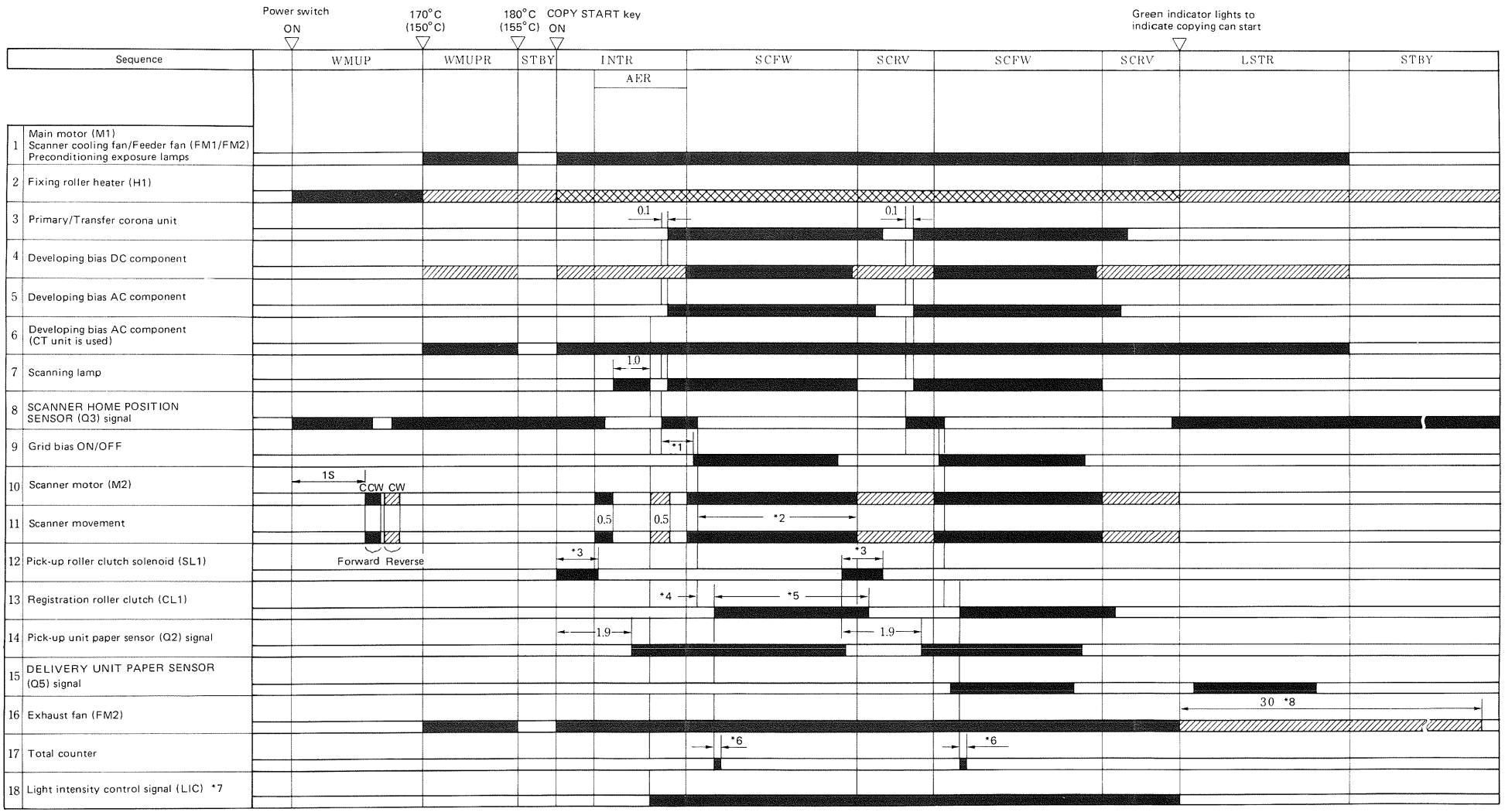
I. GENERAL TIMING CHART

Continnous run of two copies



*1. Approx. 0.58 sec.
*2. Differs according to the cassette size.
*3. Differs according to the cassette size (see Chapter 3, pages 3 to 27).
*4. Differs according to VR301 adjustment.
*5. Differs according to the cassette size.
*6. Counter does not function during the use of CT unit with 100 V machines.
*7. The signal is generated only during the use of CT unit and increases the intensity of scanning lamp.
*8. 120 sec. during the use of CT unit.

Figures in the parentheses are applicable when the CT unit is used.
CCW stands for counter-clockwise
CW stands for clockwise

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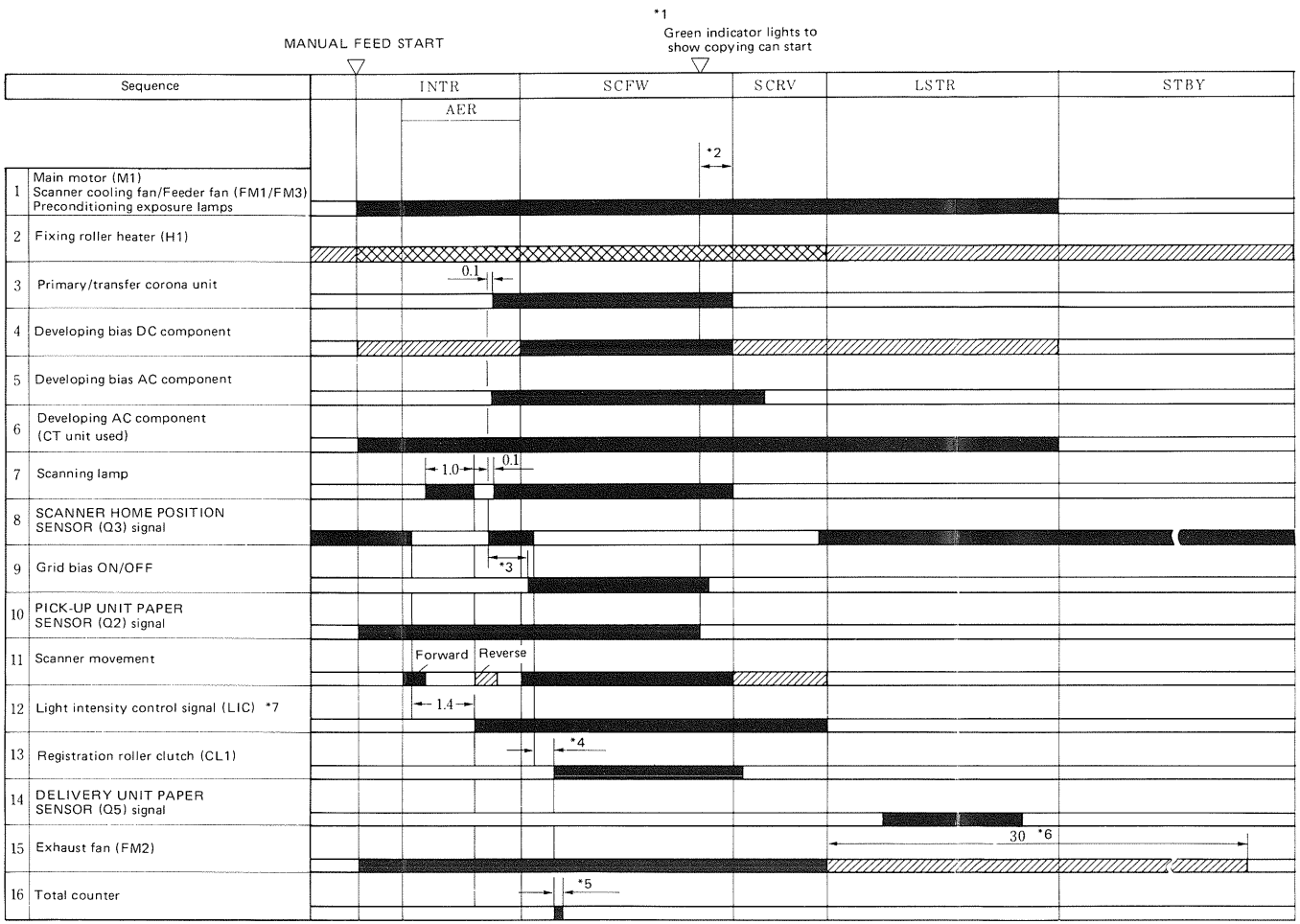
MANUAL FEED



*1. Red light remains lit when there is no copy paper in the cassette.
*2. Approx. 0.58 sec.
*3. Differs according to VR302 adjustment.
*4. Differs according to VR301 adjustment.
*5. Counter does not function during the use of CT unit with 100 V machines.
*6. 120 sec. during the use of CT unit.
*7. The signal is generated only during the use of CT unit and increases the intensity of scanning lamp.

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II. LIST OF SIGNALS/COMMANDS

SIGNALS/COMMANDS

ACBON	AC BIAS ON command
AE	AE SENSOR OUTPUT signal (analog)
AE-BIAS	AE SENSOR BIAS signal (analog)
CCNTD	CONTROL COUNTER DRIVE command
CCNNT	CONTROL CARD CONNECT signal
CDP	COLOR CARTRIDGE DETECTION signal
CPEP	CASSETTE PAPER EMPTY signal
CSIN	CASSETTE IN signal
CSZ0	CASSETTE SIZE signal 0
CSZ1	CASSETTE SIZE signal 1
CSZ2	CASSETTE SIZE signal 2
DCBC	DC BIAS CONTROL command
DCOFF	DC 24V OFF command
FM1D	FAN MOTOR 1 DRIVE command
FM2D	FAN MOTOR 2 DRIVE command
FM3D	FAN MOTOR 3 DRIVE command
GRBC	GRID BIAS CONTROL signal
GRDON	GRID ON signal
HTRD	HEATER DRIVE command
HVTON	HVTON command
LAON	LAMP ON command
LIC	LIGHT INTENSITY CONTROL command
PDP1	PAPER DETECTION signal 1 (Q2)
PDP2	PAPER DETECTION signal 2 (Q5)
PEXP	PRE-CONDITIONING EXPOSURE LAMP LINT command
PUSD	PICK-UP ROLLER CLUTCH SOLENOID DRIVE command
RGCD	REGISTRATION ROLLER CLUTCH SOLENOID DRIVE command
SCHP	SCANNER HOME POSITION signal
TCNTD	TOTAL COUNTER DRIVE command
TEP	TONER EMPTY signal
TH1	FIXING ROLLER SURFACE TEMPERATURE signal (analog)
ZXDP	ZERO CROSS DETECTION signal

ABBREVIATIONS

AER	AE ROTATION
INTR	INITIAL ROTATION
LSTR	LAST ROTATION
SCFW	SCANNER FORWARD
SCRV	SCANNER REVERSE
STBY	STANDBY
WMUP	WARM UP
WMUPR	WARM UP ROTATION

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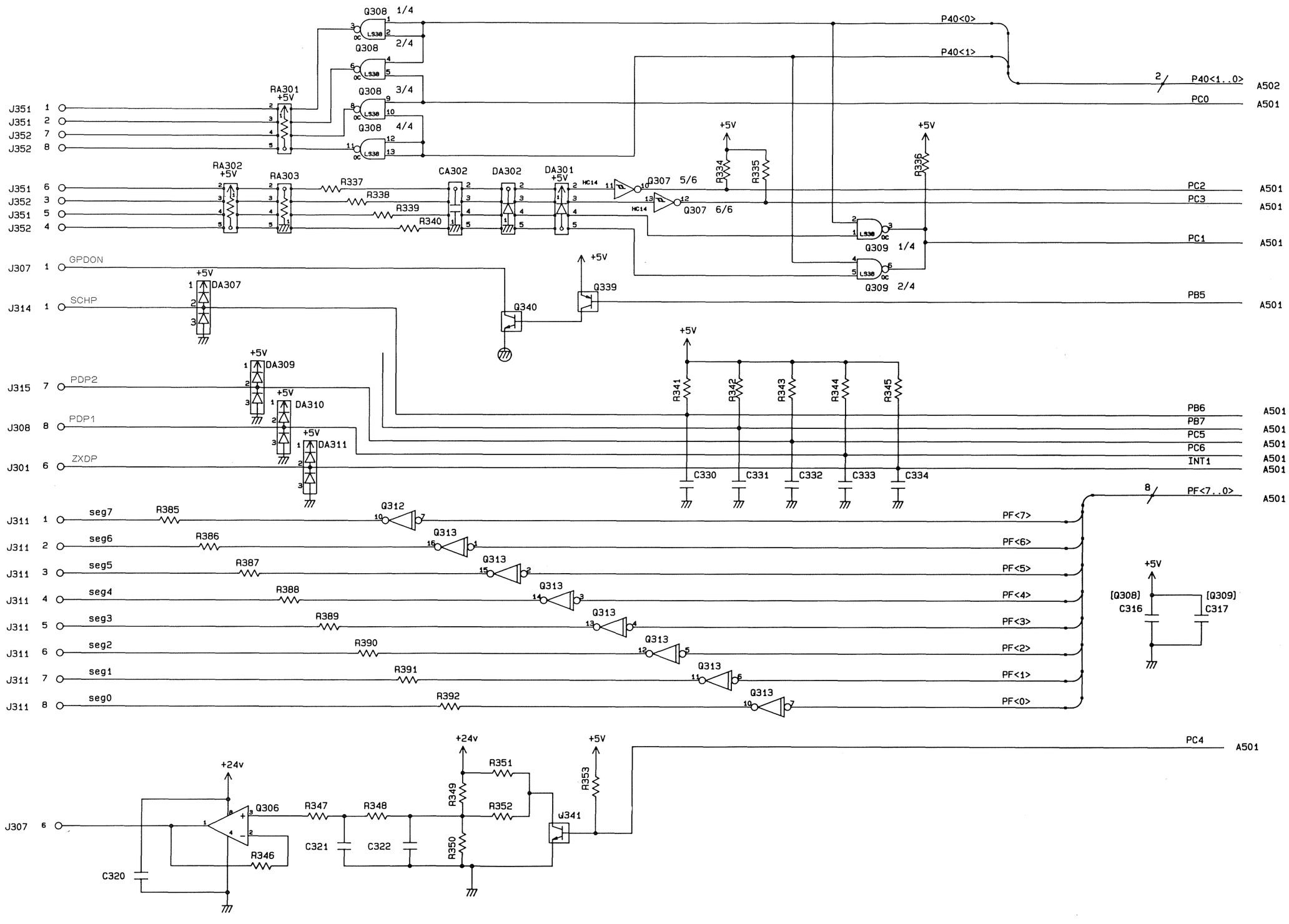
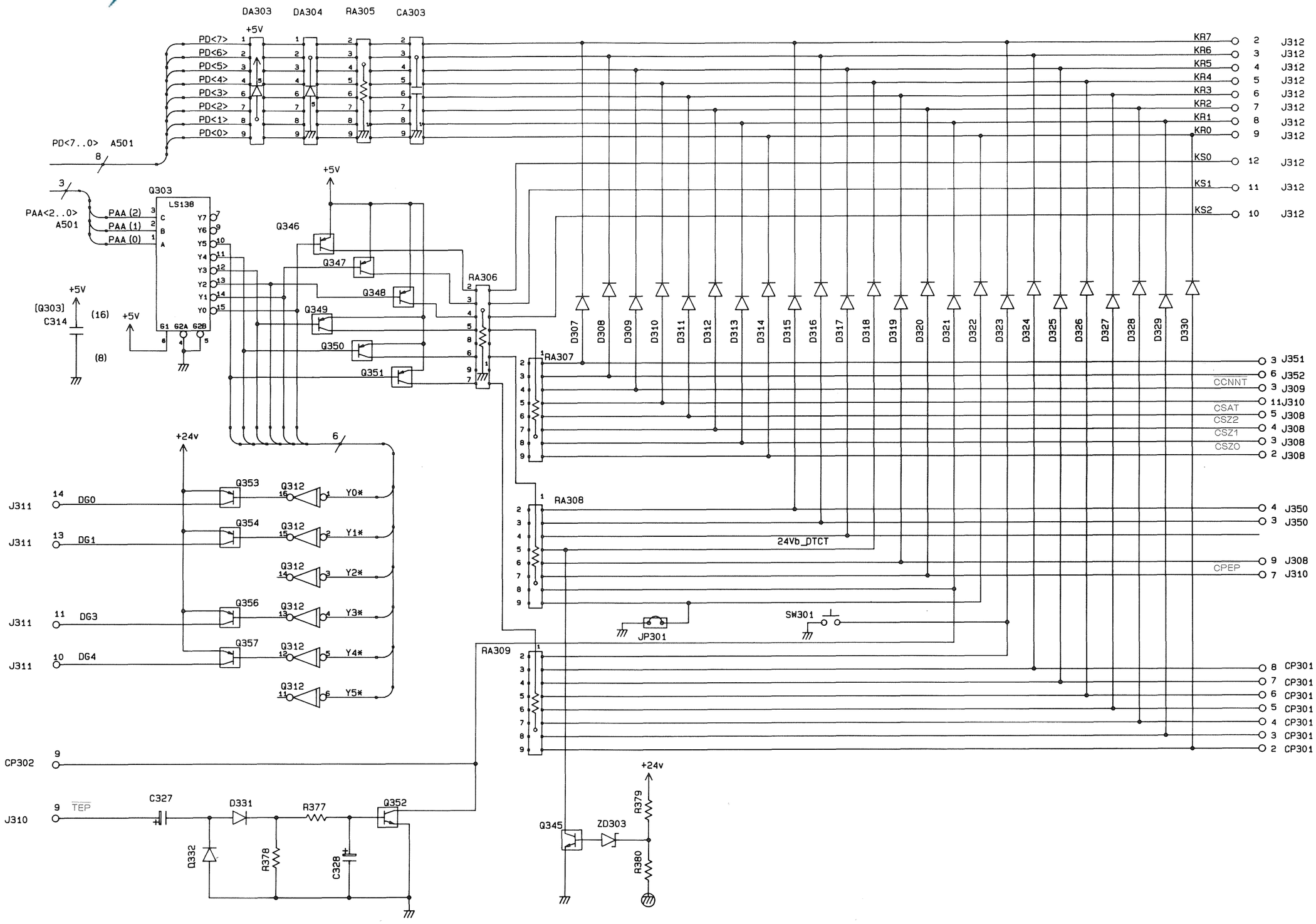
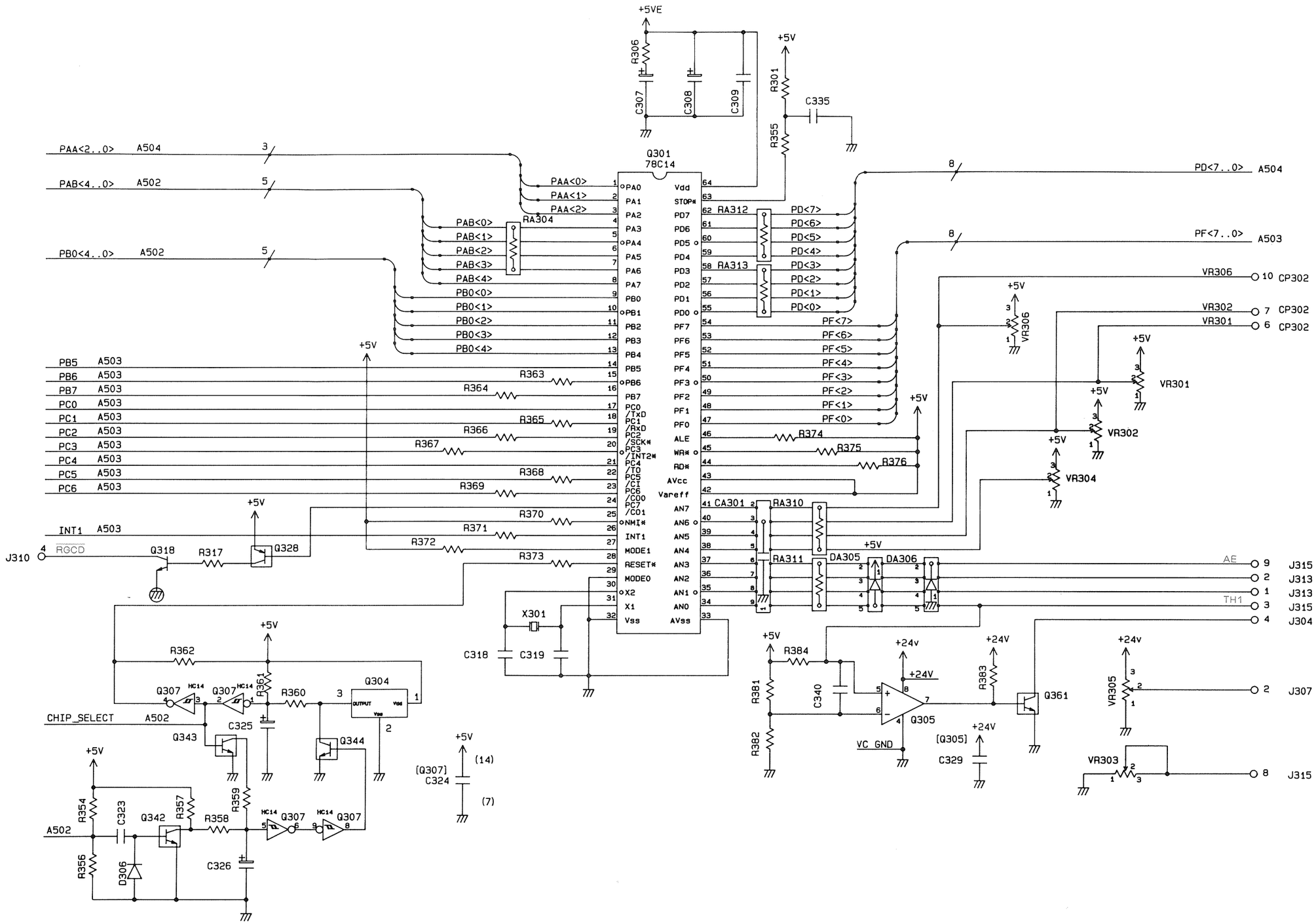

Q308 1/4
Q308 2/4
Q308 3/4
Q308 4/4
LS38
P40<0>
P40<1>
P40<1..0>
A502
PC0
A501
RA301
+5V
J351 1
J351 2
J352 7
J352 8
RA302
RA303
R337
R338
R339
R340
CA302
DA302
DA301
HC14
Q307 5/6
Q307 6/6
R334
R335
R336
J351 6
J352 3
J351 5
J352 4
PC2
PC3
PC1
Q309 1/4
Q309 2/4
J307 1
GPDON
J314 1
SCHP
DA307
Q339
Q340
PB5
DA309
DA310
DA311
J315 7
PDP2
J308 8
PDP1
J301 6
ZXDP
R341
R342
R343
R344
R345
C330
C331
C332
C333
C334
PB6
PB7
PC5
PC6
INT1
PF<7..0>
J311 1
seg7
R385
Q312
PF<7>
J311 2
seg6
R386
Q313
PF<6>
J311 3
seg5
R387
PF<5>
J311 4
seg4
R388
PF<4>
J311 5
seg3
R389
PF<3>
J311 6
seg2
R390
PF<2>
J311 7
seg1
R391
PF<1>
J311 8
seg0
R392
PF<0>
[Q308]
[Q309]
C316
C317
PC4
+24v
J307 6
Q306
R347
R348
R349
R350
R351
R352
R353
C320
C321
C322
R346
U341

V. DC CONTROLLER PCB (A-504)





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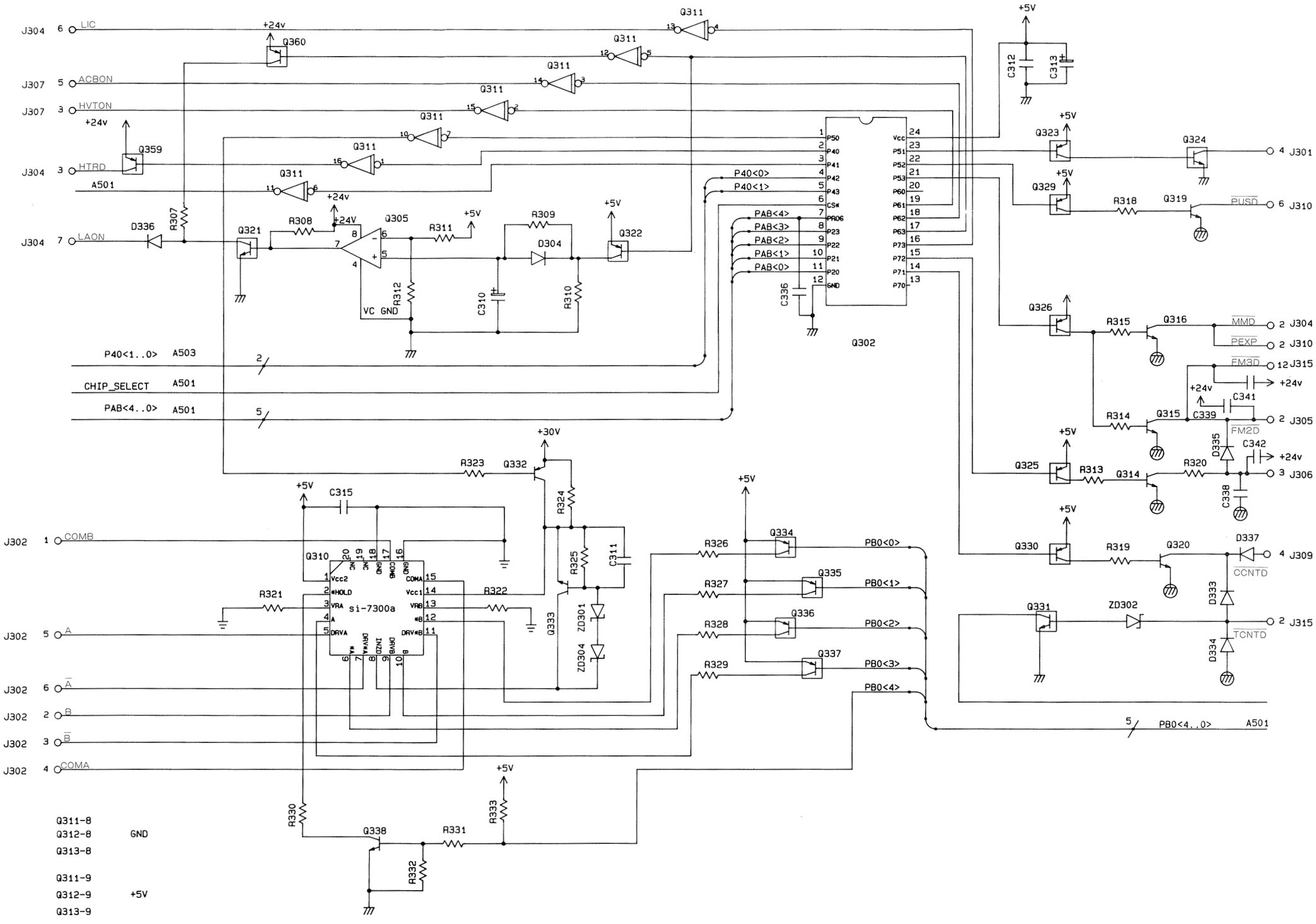
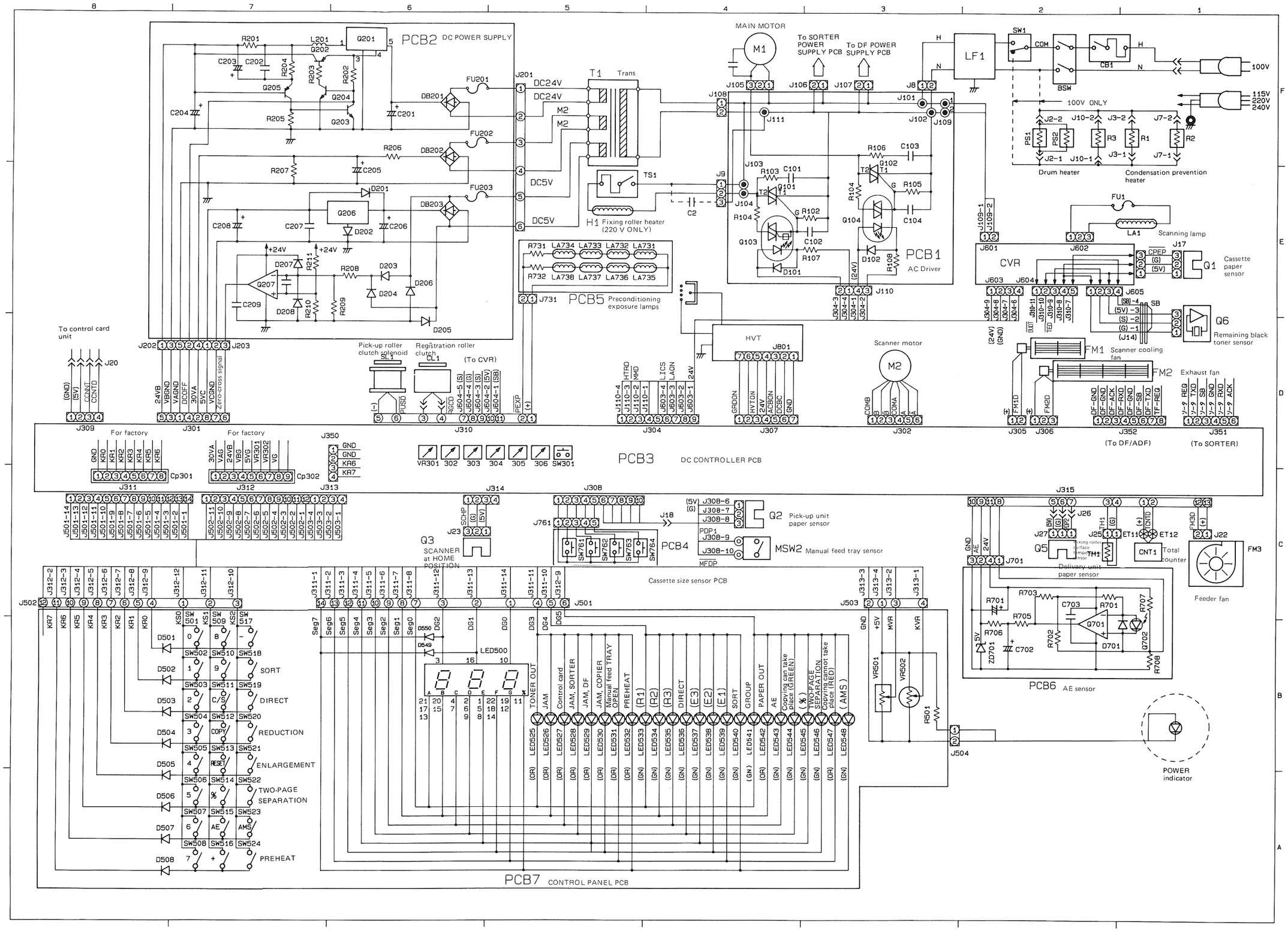
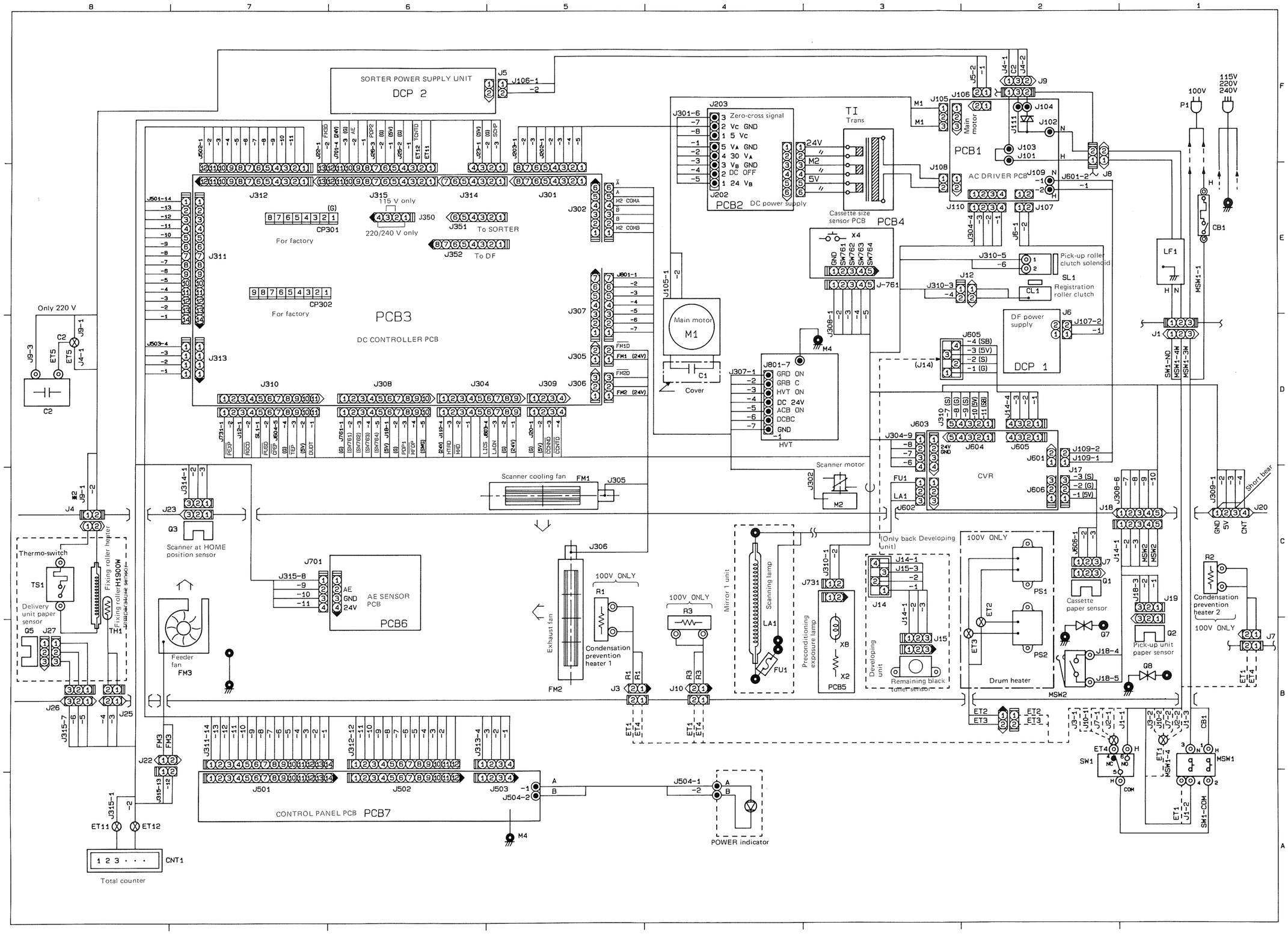
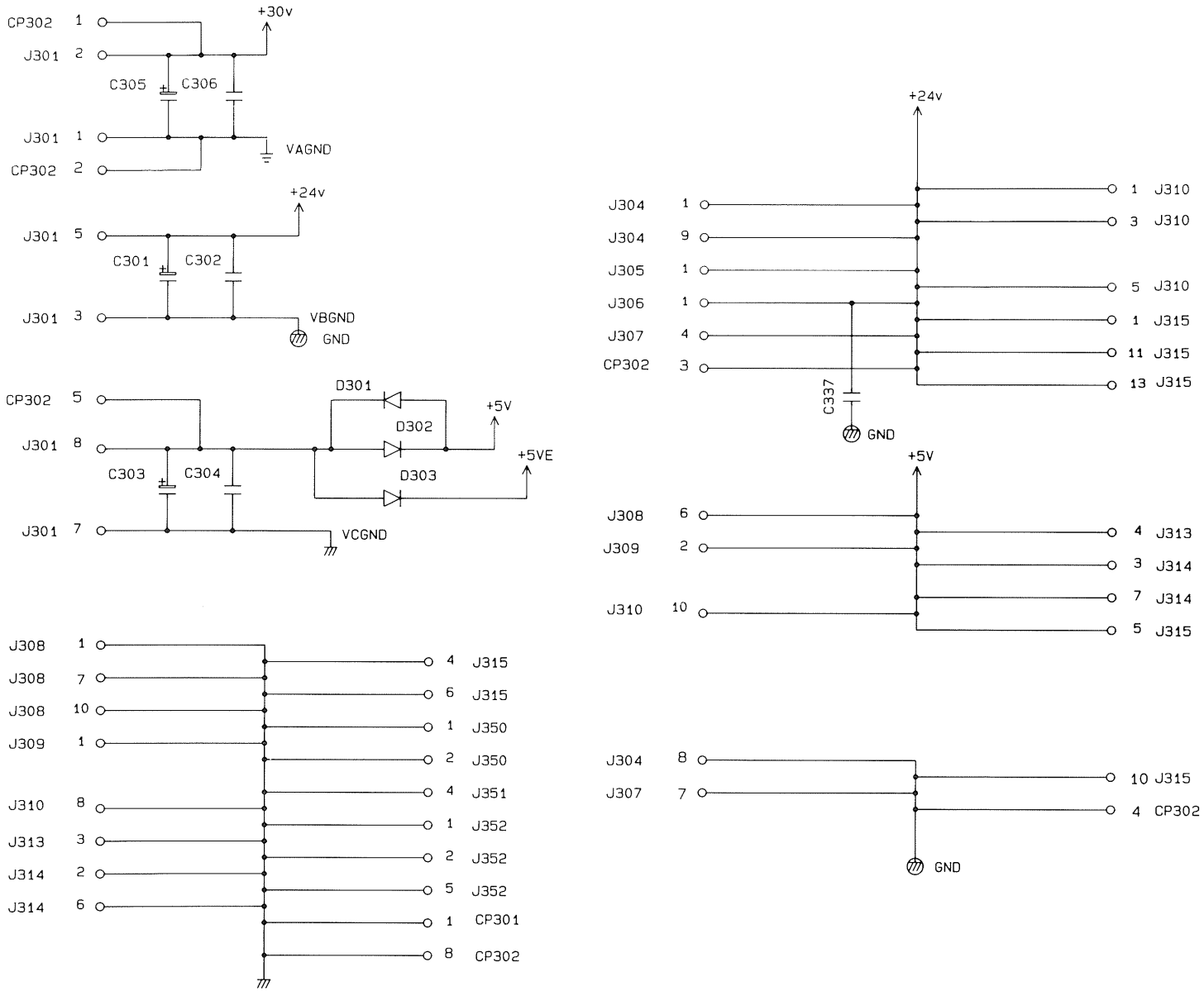
V. DC CONTROLLER PCB (A-502)




PCB2 DC POWER SUPPLY
MAIN MOTOR
M1
To SORTER POWER SUPPLY PCB
To DF POWER SUPPLY PCB
LF1
SW1
CB1
BSW
100V
115V 220V 240V
100V ONLY
Drum heater
Condensation prevention heater
T1 Trans
DC24V
DC5V
M2
TS1
H1 Fixing roller heater (220 V ONLY)
PCB1 AC Driver
PCB5 Preconditioning exposure lamps
FU1
LA1 Scanning lamp
CVR
Cassette paper sensor
Q6 Remaining black toner sensor
FM1 Scanner cooling fan
FM2 Exhaust fan
To control card unit
Pick-up roller clutch solenoid
Registration roller clutch
(To CVR)
HVT
Scanner motor
For factory
PCB3 DC CONTROLLER PCB
(To DF/ADF)
(To SORTER)
Q3 SCANNER at HOME POSITION
PCB4
Q2 Pick-up unit paper sensor
MSW2 Manual feed tray sensor
Cassette size sensor PCB
Q5 Delivery unit paper sensor
CNT1 Total counter
FM3 Feeder fan
PCB6 AE sensor
POWER indicator
PCB7 CONTROL PANEL PCB
SORT
DIRECT
REDUCTION
ENLARGEMENT
TWO-PAGE SEPARATION
PREHEAT
TONER OUT
JAM
Control card
JAM, SORTER
JAM, DF
JAM, COPIER
Manual feed TRAY OPEN
PREHEAT
SORT
GROUP
PAPER OUT
AE
Copying can take place (GREEN)
TWO-PAGE SEPARATION
Copying cannot take place (RED)
(AMS)

IV. WIRING DIAGRAM





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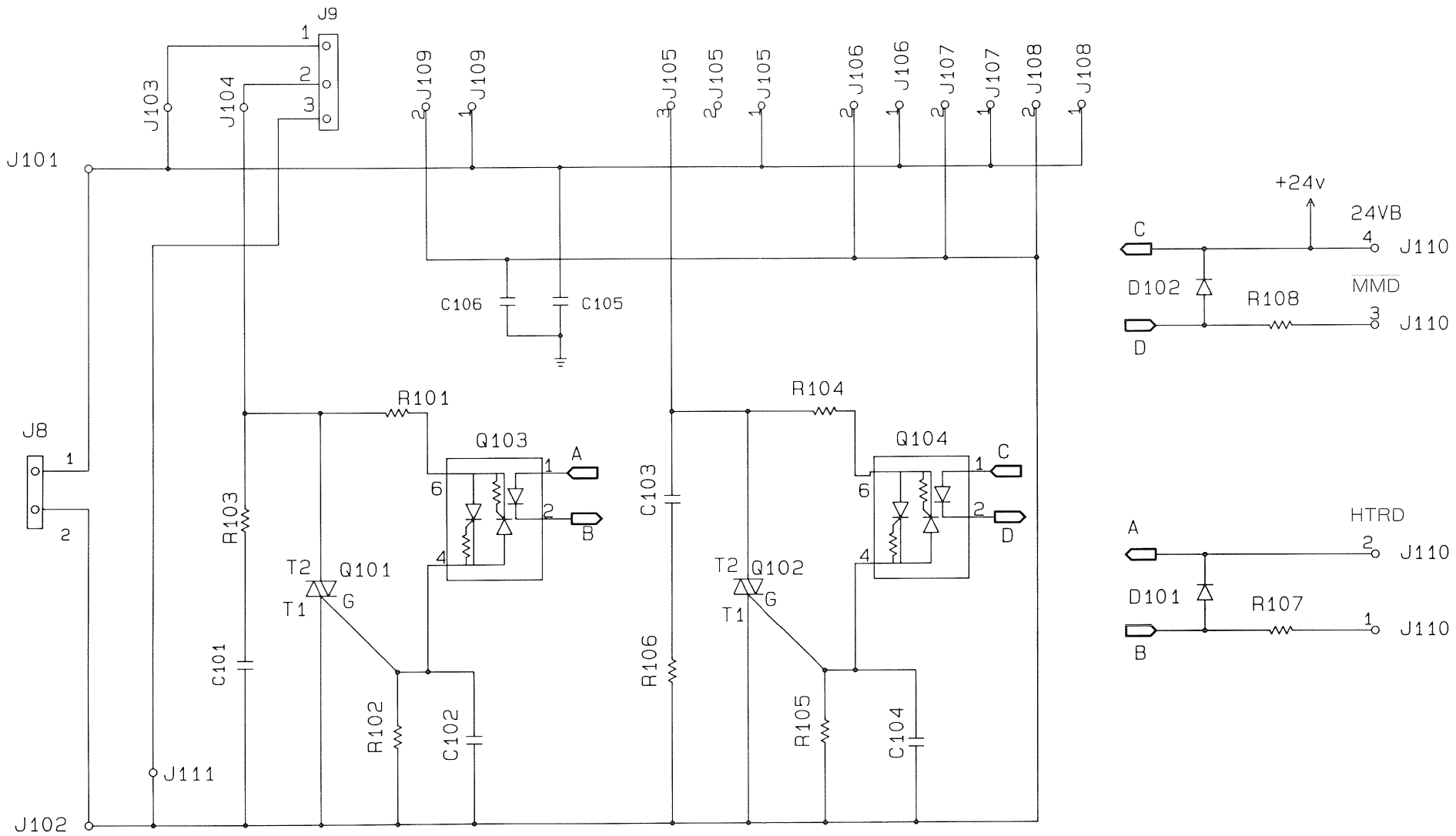
VI. AC DRIVER



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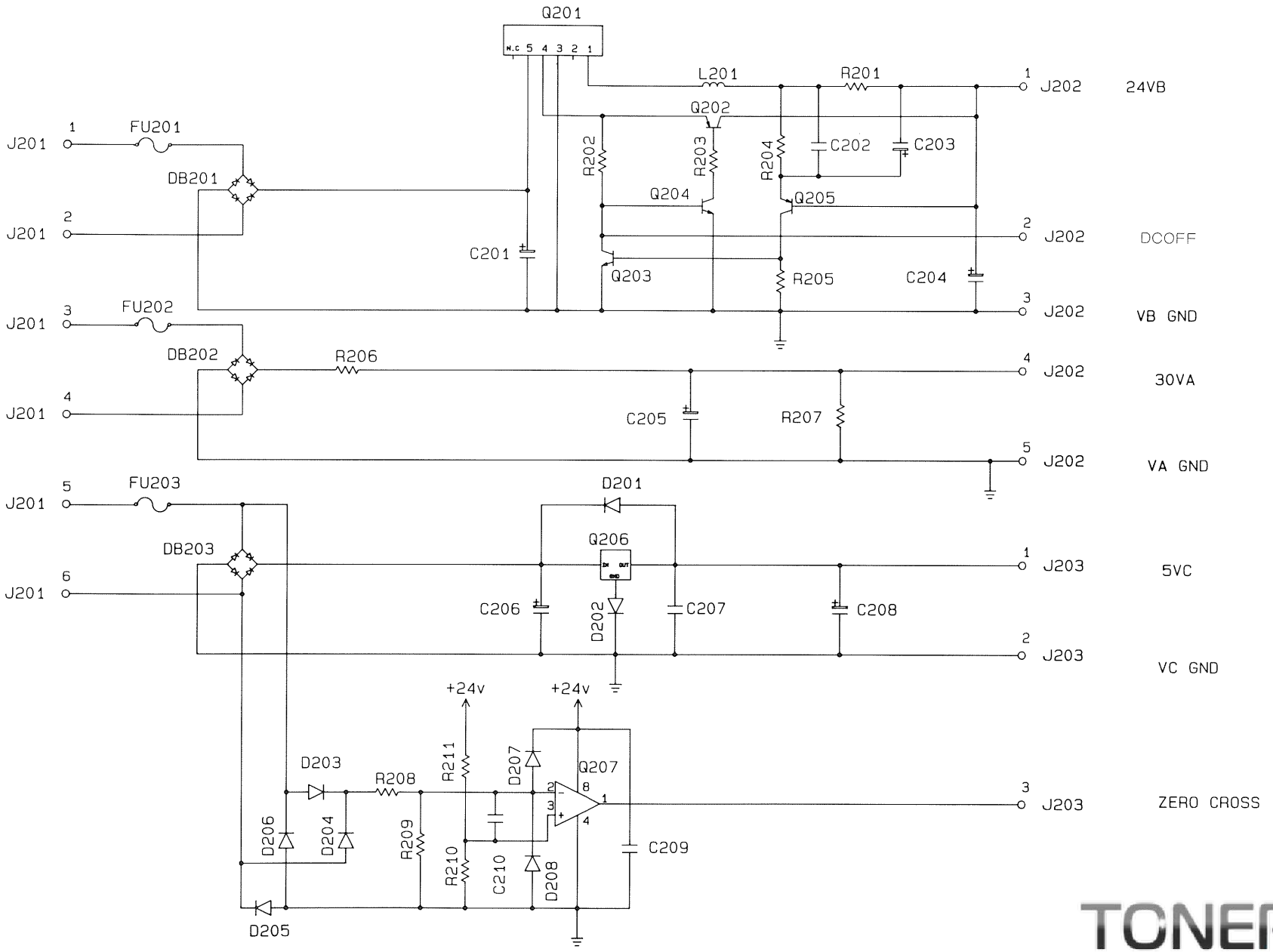

TONER
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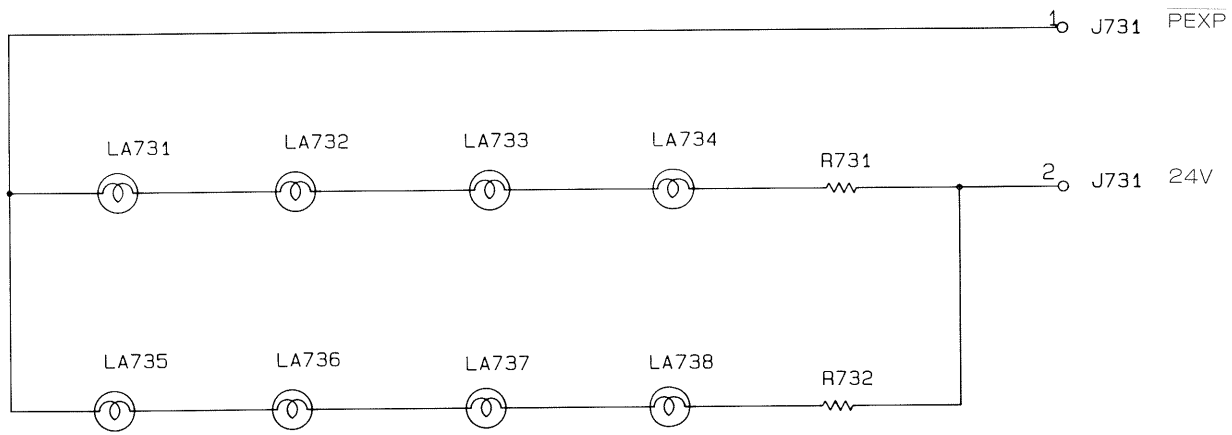
VIII. PRECONDITIONING EXPOSURE LAMPS



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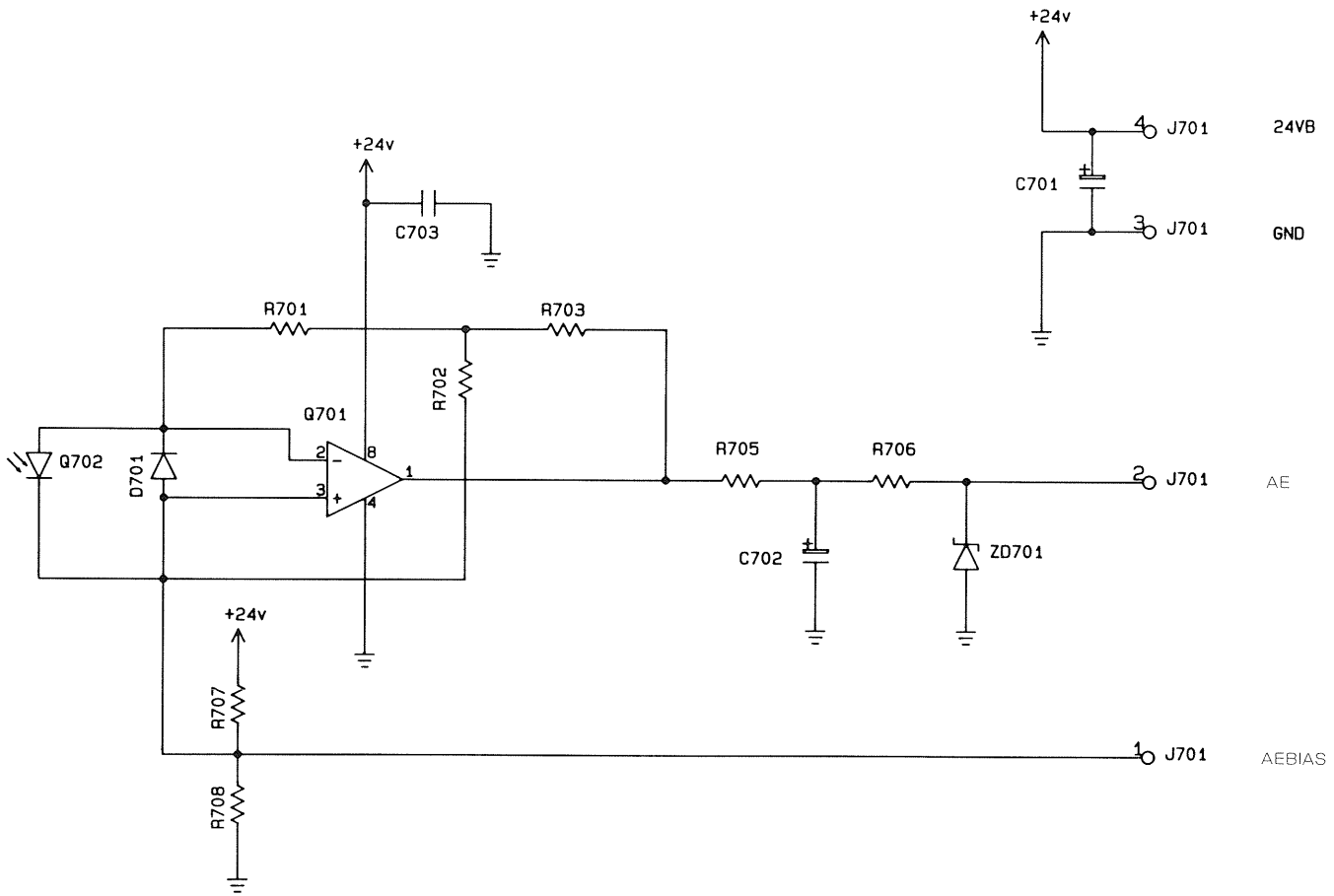

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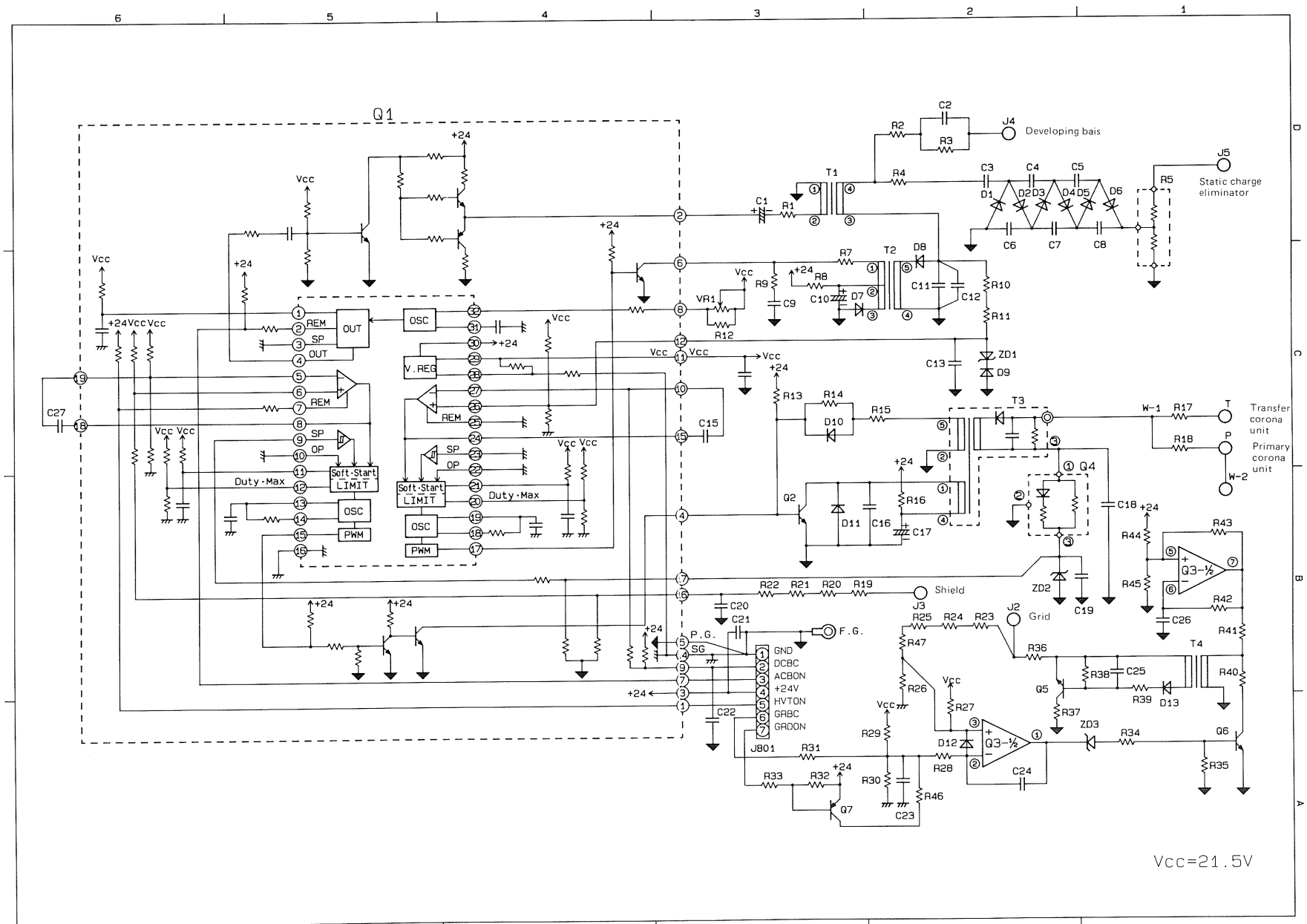
X. HVT



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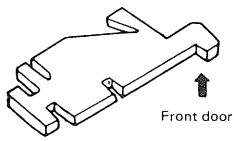
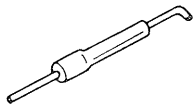
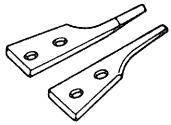
XI. LIST OF SPECIAL TOOLS

Special tools which are required for servicing this copier (in addition to the standard tool set) are listed below.

No.	Tool name	Tool No.	Shape	Code	Application/remarks
1	Door switch actuator	TKN-0093		A	
2	Spring scale (compression)	CK-0054		B	● Measuring strength of cassette springs ● Adjust scanner drive cable tension
3	Extension blades for pliers	CK-0426		B	For removing grip rings: 4 – 9 mm
4	Cleaning oil	TKN-0464		A	

Note: Rank
- A: Each service technician should carry one with him.
- B: A group of five service technicians should share one.
- C: Each workshop should keep one.

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XII. LIST OF SOLVENTS AND MATERIALS

No.	Material name	Use	Chemical formula, mixture ratio, etc.	Source	Remarks
1.	Ethyl alcohol (Ethanol) Isopropyl alcohol (Isopropanol)	Cleaning: copyboard, glass, mirror, etc.	C_2H_5OH $(CHZ_3)_2$ CHOH	Locally	Flammable. Use in a well-ventilated area. Avoid breathing concentrated vapor.
2.	MEK	Removing toner or oil stains	$CH_3 \cdot CO \cdot C_2H_5$ Methylethyl ketone	Locally	Flammable. Use in a well-ventilated area and avoid breathing concentrated vapor. Avoid contact with eyes of skin. Do not use of cleaning the drum, plastic molded parts, or corona wires.
3.	Heat-resistant grease	Lubricating the drive mechanisms, e.g., copyboard driving gear, fixing drive gear, fixing ass'y, etc.		CANON	Tool No.: CK-0427 (500g can) (Equivalent grease can be used, but should be able to with-stand 200°C for extended periods of time.)
4.	Lubricating oil (low viscosity)	Lubrication points: Scanner rail, etc.	ISO VG 68 oil ESSO Febis K68 MOBIL Vactraoil No. 2 SHELL Tonna oil T68	Locally	Equivalent oil can be used. Tool No.: CK-0451 (100cc)
5.	Lubricating oil (low viscosity)	Lubrication point: One-way clutch in pick-up control unit	ISO VG 220 oil ESSO Febis K220 MOBIL Vactraoil No. 4	Locally	Equivalent oil can be used. Tool No.: CK-0524 (100cc)
6.	Detergent	Cleaning covers and panels of the machine	Mild detergent solution	Locally	Dish-washing detergent is acceptable.
7.	Trichloroethlene	Cleaning oil-stained parts during over-haul	CH_3CC1_3	Locally	Use in well-ventilated area. Avoid breathing vapor. Avoid contact with eyes, or excess contact with skin.

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