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OKIDATA[®]

Service Manual

OL400 / 800 / 820 / 830 / 840 LED Page Printers

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09/17/97

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Service Guide OL400

Chapter 0 About This Manual

Note: The OL400 Service Training course is part of the OL-Series Training Course and can not be purchased separately.

THE OL400/800/820/830/840 VIDEO TRAINING KIT covers the following products:

- OL400
- OL800
- OL820
- OL830
- OL840

The following items are included in the kit:

- OL400 Service Handbook
- OL800/820 Service Handbook
- OL830 Service Handbook
- OL840 Service Handbook
- Service Training Video
- OL400/800/820 User's Documentation
- OL830 User's Documentation
- OL840 User's Documentation

Price: \$95.00 (\$124.00 Canadian)

P/N 58226902

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1.1 OVERVIEW

1.1.01 General Information

The OL400 is a desktop, page printer, using a stationary LED head and dry electrophotography as its exposure and development method. The printer has a resolution of 300 x 300 dots per inch and a continuous print speed of 4 letter-sized sheets per minute.

A 512K page memory is standard on the OL400; this can be expanded to 1.5 or 2.5 megabyte with an optional RAM printed circuit board and a memory expansion chip set. Twenty-five resident fonts are included in the OL400 and five optional font cards are currently available. Downloadable fonts can also be used with this printer.

The printer can be purchased with either a Centronics parallel interface or an RS-232C serial interface.

The OL400's consumables consist of the toner kit, which include a toner cartridge, lens cleaner, and a fuser cleaner pad and the image drum kit which includes the drum cartridge and ozone filter.

A letter-size paper tray is included with the printer, and legal, and envelope trays are also available. Paper feeding can be done automatically or manually.

The printer will print on a variety of paper types, labels, envelopes, and transparencies.



1.2 PHYSICAL SPECIFICATIONS

1.2.01 Outside Dimensions

Width: 17.72"

Height: 5.24"

Length: 17.72"

1.2.02 Printer Weight

24 lbs.

1.2.03 LED Array

Number of LED Elements - 2560

1.3 PRINT SPECIFICATIONS

1.3.01 Print Specifications

Development method: Dry electrophotography
Exposure method: LED stationary head

1.3.02 Print Speed

First print: 28 seconds maximum (letter size)
Continuous print: 4 sheets/minute. (letter size)
Warm-up time: 40 seconds maximum [at room temperature 77oF (25oC) and rated voltage (120 VAC)]

1.3.03 Symbol Sets

Thirty-nine symbol sets are available with the OL400.

1.3.04 Available Fonts

There are twenty-five resident fonts in the OL400.

1.3.05 Paper Feed Method

Automatic feed
Manual Feed

1.3.06 Paper Delivery Method

Face down/face up

1.3.07 Resolution

300 x 300 dots/inch

1.4 PAPER SPECIFICATIONS

1.4.01 Paper Types

Letter

Size: 8.5" x 11"

Feed: Automatic or Manual

Weight: Minimum 16 lbs

Maximum 24 lbs

Recommended 20 lbs

Legal

Size: 8.5" x 14"

Feed: Automatic (with optional paper tray) or Manual

Weight: Minimum 16 lbs

Maximum 24 lbs

Recommended 20 lbs

Envelope

Size: Minimum 3.5" x 7.5"

Maximum 7.2" x 10.1"

Feed: Automatic (with optional paper tray) or Manual

Weight: Minimum 16 lbs

Maximum 24 lbs

Recommended 20 lbs

Labels

Manual feed / Face up delivery only

Use labels designed specifically for laser/page printers.

Transparencies

Manual feed / Face up delivery only

Must be able to withstand the heat of the fusing process.

1.5 POWER REQUIREMENTS

1.5.01 Input Power

120 VAC +5.5%, -15%
220/240 VAC +/-10%

1.5.02 Power Consumption

Approximately 800 W maximum during operation

1.6 ENVIRONMENTAL CONDITIONS

1.6.01 Ambient Temperature and Relative Humidity

While operating:

50° to 89° F
10° to 32° C
20 to 80% Relative Humidity

While in storage:

14° to 122° F
10° to 50° C

1.6.02 Printer Noise Level

During operation: 50 dB maximum

At standby: 43 dB maximum

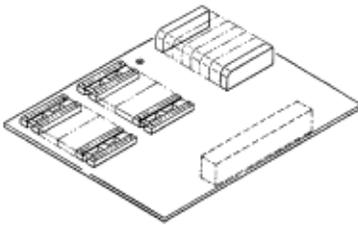
1.7 AGENCY APPROVALS

FCC Class B
UL 478 Ver.5
CSA 22.2 220

1.8 OPTIONS**1.8.01 RAM Expansion Board**

1 megabyte (expands printer memory to 1.5 megabyte)

Technician installed

**1.8.02 RAM Expansion Chip Set**

Technician installed

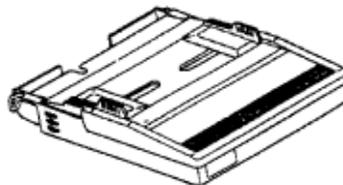
1 megabyte memory expansion chip set used in conjunction with the RAM Expansion Board option. (expands printer memory to 2.5 megabyte)

1.8.03 Font ROM Cards

Tax
Courier
Roman
Prestige Elite
Letter Gothic

**1.8.04 Paper Trays**

Letter size
Legal size
Envelope



1.8.05 Interface Boards

RS-232C Serial Interface Board

Centronics Parallel Interface Board

Technician installed

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1.9 CONSUMABLES

Toner Cartridge Kit **(P/N 52104201)**

One Toner Cartridge

One Fuser Cleaner Pad

One LED Head Cleaning Kit

Image Drum Cartridge **(P/N 56106601)**

One Image Drum Cartridge

One Ozone Filter

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1.10 RELIABILITY DATA

1.10.01 Printer Mean Time Between Failure (MTBF)

Approximately 18,000 pages

1.10.02 Printer Mean Time To Repair (MTTR)

Approximately 20 minutes

1.10.03 Estimated Printer Life

Approximately 180,000 pages (5 years)

1.10.04 Printer Duty Cycle

Approximately 3,000 pages @ 5% print density

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2.1 PRINTER OVERVIEW**2.1.01 General Information**

This section describes the operation of the printer in the order listed below.

- Main Control Function 
 - Printer Control Function 
 - Mechanical Operation 
 - Sensors and Switches 
-

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2.2 MAIN CONTROL FUNCTION

2.2.01 General Information

The main control function controls the reception of data from the host interface, processes command signals, processes the image signals, controls the printer unit, outputs data, and controls the operation panel.

The main control function consists of the items listed below.

- CPU 80186-8
- Font ROM (512 kbytes)
- Page buffer (512 kbytes)
- DRAM controller chip (MSM73V007)
- Print controller chip (MSM75HJ014)
- Font controller chip (MSM60791)
- Programmable I/O (82C55A-2GS)
- Interface Control
- Centronics Parallel Interface Board
- RS-232C Serial Interface Board
- Optional Font Card
- Optional RAM

2.2.02 Centronics Parallel Interface

The following operations are carried out during **SELECT** mode once the STB-N signal is received from the host interface.

The BUSY-P signal is sent to the host interface.

Simultaneously with fetching data to the Q4 IC at the last transition of the STB signal, the RXIPT-P signal is sent to the CPU to inform it of receipt of data.

The CPU reads data received from the Q4 IC by the RD-N signal, and turns off the BUSY signal to the host interface.

Upon turning off the BUSY signal, the ACK-N signal is sent to the host interface to acknowledge reception processing.

2.2.03 RS-232C Serial Interface

The 8251 Universal Synchronous/Asynchronous Receiver Transmitter is used as a controller. This serial I/F converts serial data received from the host I/F into parallel data for use by the CPU. It also converts parallel data from the CPU into serial data to be sent to the Host I/F.

READY/BUSY or X-ON/X-OFF are used as the communication protocol between the Host I/F and OL400. These can be selected through the Menu.

The baud rate, character length, parity check, stop bit, etc., are automatically written into the 82C51 from the menu, so hardware switches are not required.

2.2.04 Optional Font Card

In addition to the twenty-five resident fonts, an optional font IC card is available.

The CD-N signal detects the option font card.

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2.2.05 Optional RAM Board / IC Set

The expansion RAM board contains 1 Mbyte of memory and sockets for an additional 1 Mbyte. This RAM is in addition to the 512 Kbyte on the Main Control Board.

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2.3 PRINTER CONTROL FUNCTION

2.3.01 General Information

The principle hardware components of the printer unit consist of the items listed below.

- Operation Panel
- Engine Board
- Power Supply Unit
- Fuser Unit
- Main Motor
- LED Head
- Resist Motor
- DC Fan

2.3.02 Operation Panel

The following components make up the operation panel.

- 4-bit MPU (LC6543C)
- LCD control driver (MSM6222B or HD44780)
- LCD display (16 characters per line)
- Operation panel sheet
- LEDs (for online mode indication)
- Operation buttons

The LCD control driver (MSM6222B or HD44780) converts 4-bit character codes received from the MPU into 8-bit character codes and retrieves the character pattern data (font) associated with the 8-bit character codes from the internal character generator for display on the LCD.

Operation Panel Interface

The operation panel is controlled by the operation panel interface located on the Main Control Board via the Engine Board.

2.3.03 Engine Board

The Engine Board is composed of the items listed below.

MPU80C51, or MPU83C154 (8-bit CPU)
LLAB Revision 11

The MPU 83C154 contains the printer control program in its internal ROM.

Therefore, the external ROM (Q1) is not required on Revision 11.

MSM73H019GS (80 pin LSI)
EPROM (Printer Control Program)
EPROM

This 1-Kbit electrically erasable PROM (EEPROM) is loaded with the following data:

Total number of sheets printed after installation
Total number of sheets printed with the current drum
Total number of sheets printed with the current fuser
Setting of time required from the completion of printing to Stand-by
Feed length needed to feed the paper to a printable position.
Print starting line on paper (Top margin)
LED head drive time.

NOTE:

The EEPROM preserves the above data while the supply voltage is off.
The count of the total number of sheets printed after installation cannot be reset.
The count of the total number of sheets printed with the drum currently in use should be taken as a rough measure of the useful life of the drum.
It is reset to zero when the drum is replaced by holding down the RESET button and applying power to the printer.

2.3.04 Power Supply Unit

The power supply unit generates the following voltages from the AC input voltage.

Voltage	Purpose
+5vdc	Logic Levels, LED Head Drive Voltage
+12vdc	Interface Line Voltage
-12vdc	Interface Line Voltage
+38vdc	Motor/Fan Drive Voltage: High Voltage Source
+5Kvdc	Transfer Charge Voltage
-6Kvdc	Drum Charge Voltage
-600vdc	Charge Grid Voltage
-550, -400vdc	Developer Bias Voltages

High Voltage Drive

The high voltage circuit provides a charge voltage (about -6Kvdc), a transfer voltage (about +5 Kvdc), a grid voltage (about -600 vdc), and a developer bias voltages (about -550vdc and -400vdc). Of these voltages, the first two are generated from a high voltage power supply. The grid connects to the ground via a varistor on the medium-voltage generation circuit (LLAB-PCB). It is kept at about -680 vdc during charging.



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2.3.05 Fuser Unit

The fuser unit heater is controlled by a thermistor, a comparator, an LSI, and a CPU to keep the heat roller surface temperature within a predetermined range (about 150 degrees). A thermostat within the fuser unit prevents abnormal temperature rises in the fuser unit if the thermistor fails.

NOTE:

The CPU checks for a blown or shorted wire in the thermistor at power-on , setting a fuser alarm if an error is detected.

The CPU also sets a fuser alarm if the proper temperature is not attained within a specified period of time after power-on.

Upon detecting a fuser alarm, the CPU will halt (after printing the current page).

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Chapter 2 Principles of Operation

2.3.06 Main Motor (Drum Motor)

The main motor is driven by the motor drive IC (M54646). It is a two-phase motor, driven by the DM-PH1 and DM-PH2 signals.

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2.3.07 LED Head

Data on the 2,560 LEDs in the LED head is set in the shift register by the HD CLK signal. The data is loaded in the latch circuit by the HD LD signal.

The on/off states of the LEDs are controlled by the signals STB1- STB4; 640 bits are turned on or off at a time.

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2.3.08 Resist Motor

The resist motor is driven clockwise (Hopping), then counterclockwise (Paper Feed) by the motor drive IC (LB1731). It is four-phase motor, driven according to the RM-H1, RM-H2, and RM ON-P signals.

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2.3.09 DC Fan

The fan is controlled by the FAN ON-P signal from the LSI (MSM73H019). In order for the fan to operate, the signal FAN SENSE-N must be active.

NOTE:

The fuser and the fan are not driven when the cover is open (reset).

If the fan fails to run, the fuser will turn off and an alarm is set. This prevents the next printout. If the signal Fan Sense-N becomes inactive while printing, both the heater and the fan come to a halt after the end of printout of the current page.

A fan alarm is generated when the fan is not sensed at power-on time.

The fan is driven for 1 minute after the fuser has been turned off. The fan speed is reduced if the next PRINT signal is not received within 1 minute.

2.4 MECHANICAL OPERATION DESCRIPTION

2.4.01 Basic Principles of Electrophotography

The printer turns on the LED head according to the data received from the controller. A charged photoconductive material is exposed to light, forming a latent image on the material. This latent image is developed by toner, with the resultant toner image being transferred to paper and fused for printing.

The electrophotographic technology used in this printer is similar to that embodied in general copying machines. The technology comprises the following processes:

Charging

The surface of the photoconductive material is uniformly charged.

Exposure

The charged photoconductive material is exposed to light, forming a latent image associated with the print image on the photoconductive material.

Developing

Charged toner is attracted to the latent image by static electricity, making the image visible.

Transfer

The toner is attracted to the paper by a static charge.

Cleaning

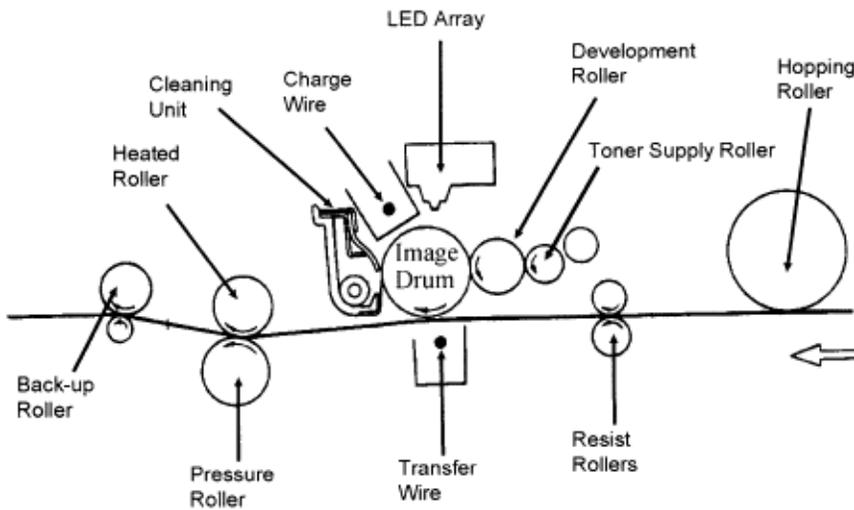
Toner that remains on the photoconductive material is returned to the developer.

Fusing

The toner is fused to the paper using heat and pressure.

2.4.02 OL400 Printing Process

The layout of the electrostatic printing process hardware is shown below.

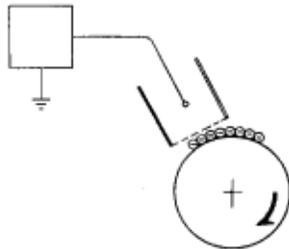


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2.4.03 Process Descriptions

Hopping and Feeding

Hopping and feeding are accomplished by the resist motor, hopping roller, and resist rollers. Turning the resist motor in the clockwise direction drives the hopping roller. Turning the resist motor in the counter-clockwise direction drives the feed rollers.



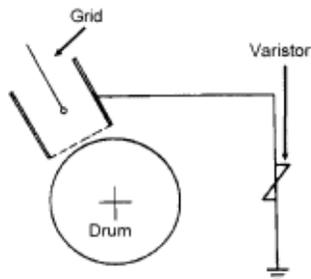
Hopping

Hopping is loading paper from the tray. The resist motor turns the hopping roller to advance the paper until the inlet sensor turns on. After the paper has turned on the inlet sensor, the hopping roller advances the paper until it contacts the feed roller (a predetermined length).

Feeding

Feeding is transporting the paper through the printer

After the end of hopping, the resist motor reverses and the resist rollers transport the paper through the printer.



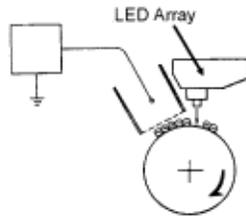
Charging

-6 Kvdc is applied to the charge wire. This causes negative ions to be generated in the vicinity of the charge wire (corona discharge). The negative ions are discharged to the grid plate and the image drum surface. Since the drum surface is not conductive (in the dark), the negative charge (approximately -700 vdc) remains on the drum. To ensure that the drum surface is not charged with more than -700 vdc, a varistor is connected between the grid and ground. If the grid voltage

exceeds -700 vdc, the varistor shunts this excess voltage to ground.

Exposure

Light emitted from the LED head is radiated to the image drum surface which is charged with negative ions. The areas of the drum that light is directed to become conductive. This allows the surface potential in these areas to drop from -700 vdc to approximately -100 vdc, thereby forming a latent image associated with the image signals.

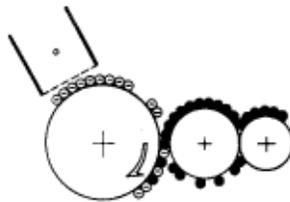


Developing

The toner supply roller and the development roller are supplied with bias voltages required during the developing process. -550 vdc is supplied to the toner supply roller, -400 vdc to the development roller. The toner supply roller is constructed of a porous material which absorbs toner. Since the development roller charge is more positive than the toner supply roller charge, toner is attracted from the toner supply roller to the development roller.

The toner attracted to the development roller is scraped off by the doctor blade, forming a thin coat of toner on the development roller surface.

Since the areas of the drum exposed to light (-100vdc) are charged more positive than the toner (-400 vdc), the toner is attracted to the exposed areas of the Image drum surface, making the latent image visible.



Transfer

As paper passes by the image drum surface, a positive charge (+5Kvdc), is applied to the charge wire causing the paper to be charged positively through corona discharge. Since the paper is charged more positive than the toner (-100 vdc), the toner is attracted to the paper.

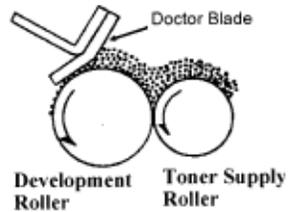
#####

Cleaning

Upon completion of transfer, residual toner on the image drum is scraped off by the cleaning blade. The residual toner is returned from the toner recovery unit to the developer unit for reuse.

Fusing

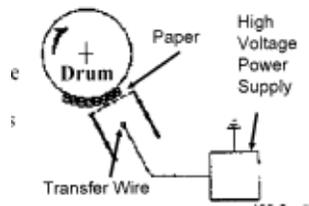
The toner image is fused on the paper by passing it between the heated roller and the back-up roller. The heated roller is teflon coated and contains a 600 watt quartz lamp. The back-up roller and springs provides a pressure of 3 kg.



A thermistor regulates the heated roller temperature at a predetermined temperature (about 150° C). A thermostat cuts off voltage supply to the heater in the event of abnormal temperature rise.

Paper Ejection

Paper is ejected from the fuser unit by the back-up roller. If the face-up stacker is closed, paper is routed to the top of the printer for face-down delivery.





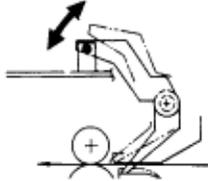
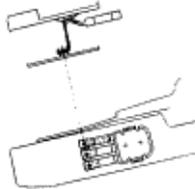
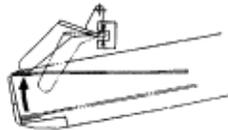
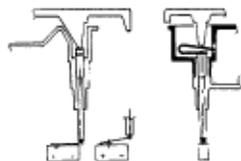
Service Guide OL400

Chapter 2 Principles of Operation

2.5 SENSORS AND SWITCHES

- Sensors & Switches 
 - Sensor Functions 
-

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2.5.01 Sensors and Switches**Inlet Sensor (Photosensor)****Outlet Sensor (Photosensor)****Paper Tray Identification Switches****Paper End Sensor (Photosensor)****Cover Open Switch**

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2.5.02 Sensor Functions

At Power-On

The inlet and outlet sensors are checked for their on and off states at power on.

Inlet sensor ON: Inlet jam error (Paper supply jam)

Outlet sensor ON: Outlet jam error (Paper eject jam)

The thermistor sensor circuit detects if the temperature of the fusing unit reaches the normal temperature within the specified time. When it does not reach the normal temperature within the specified time, the thermistor sensor turns OFF the heater and generates an alarm.

During Hopping

Whenever the inlet sensor fails to detect paper within a predetermined period of time after a feed command has been issued to the paper supply system (tray), the failure is counted. A hopping operation is then attempted up to three times, and if the paper still fails to feed properly, an inlet jam error is established.

During Feeding

If the leading part of the paper does not reach the outlet sensor within a predetermined period of time after the start of feeding by the resist motor, a feed jam error is established.

Detection of Form Length Errors by the Inlet Sensor

Any form length other than 11 or 14 inches will generate a form length error, causing an alarm to be set. To detect the form length, the processor counts the time from when the inlet sensor turns on until it turns off (after the start of the resist motor in the forward direction). Form length detection is not enabled for manually inserted paper or envelopes.

Detection of Outlet Jams by the Outlet Sensor

Since paper is fed through the printer at a fixed speed, the outlet sensor must remain on for a predetermined length of time. If the sensor remains on in excess of this time, the controller assumes that an exit jam has occurred and an alarm is generated.



Service Guide OL400

Chapter 3 Maintenance & Disassembly

3.1 MAINTENANCE

3.1.01 General Information

This section lists the parts replacement, adjustment, cleaning, and lubrication procedures.

Disassembly should not be performed unless absolutely necessary. NEVER perform disassembly on a malfunctioning unit until you have followed the failure analysis procedures in Section Four of this Service Handbook.

Follow the procedures listed in Adjustments and Service Settings. Adjustments may be required when either consumables or parts are replaced. Failure to perform these procedures could result in unnecessary service calls.

Cleaning procedures must be performed correctly if high print quality is to be achieved.

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3.1.02 Maintenance Tools

The following tools are required to service the unit.

- #2 Phillips Screwdriver (with magnetic tip)
 - Straight-slot Screwdriver
 - Needle Nose Pliers (4 Inch)
 - Digital Multimeter
 - Shop Vacuum (with filter for toner)
 - Cloth (soft and lint-free)
 - All-purpose Cleaner
 - Grease (Dow Corning BR2 or equivalent)
-

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3.1.03 Maintenance Precautions

DO NOT disassemble the unit if it is operating normally.

Before starting disassembly and assembly, always power OFF the unit and detach the power cord.

Detach the interface cable, if installed.

Do not remove parts unnecessarily. Try to keep disassembly to a minimum.

Use the recommended maintenance tools.

When disassembling, follow the listed sequence. Failure to follow the correct sequence may result in damaged parts.

Screws, collars and other small parts are easily lost. Temporarily attach these parts to their original positions.

When handling circuit boards use extreme care. Integrated circuits (microprocessors, ROM, and RAM) can be destroyed by static electricity.

Do not place printed circuit boards directly on conductive surfaces.

Follow the recommended procedures when replacing assemblies and units.

Clear the drum counter when a new drum cartridge is installed.

1. Power OFF the unit.
2. Press and hold RESET while powering ON the unit.
3. The drum counter will reset.

Clear the fuser counter when a new fusing unit is installed. Refer to Section 3.3, Adjustments in this Service Handbook. 

3.2 DISASSEMBLY/ASSEMBLY PROCEDURES

General Information

This section contains the printer disassembly procedures. Only the removal procedures are explained. Reverse the procedure for the installation.

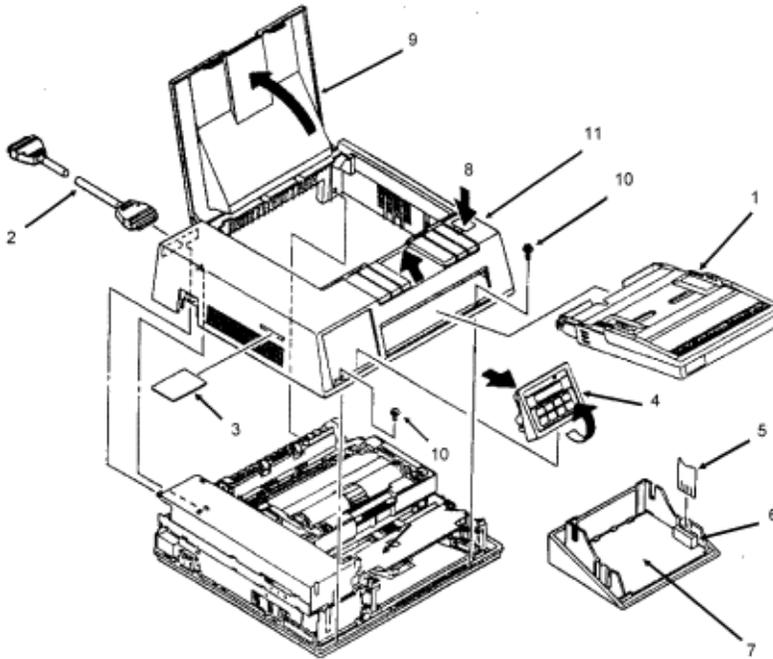
This Service Handbook lists the disassembly procedures for major components of the unit. Okidata does **NOT** recommend disassembling a unit which is operating normally. If you decide to perform disassembly during this training, Okidata recommends that you perform only the disassembly procedures for RSPL items. All other procedures are provided to assist you in identifying parts. It is not likely that you will perform these procedures while servicing the product.

Read all notes, cautions, and warnings. They contain important information regarding assembly/disassembly.

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3.2.01 Upper Cover

1. Turn the power switch **OFF** and unplug the AC power cord from the outlet and the printer power receptacle at the rear of the printer.
2. Remove the paper tray (1), interface cable (2), and font card (3) (if installed).
3. Lift the operator panel assembly (4) at its bottom and detach it.
4. Pull on the locking collar and then detach the connecting cable (5) from connector J1 (6) of the operator panel PCB (7).

**NOTE:**

5. Please note that when assembling the operator panel board, you must install the connecting cable with the blue strip to the left.
6. Press the "OPEN" button (8) and raise the stacker cover (9).
7. Remove the two screws (10) and lift the front side of the upper cover (11). As you lift, you will disengage the upper cover from the lower cover at the back of the printer.

NOTE:

Installation

Open the stacker cover.

Align the square slots of the upper cover with the claws of the lower cover. The claws are located on the back of the lower cover, at the left and right sides.

Lower the upper cover into position.

If the cover is not installed properly, paper jams will result.

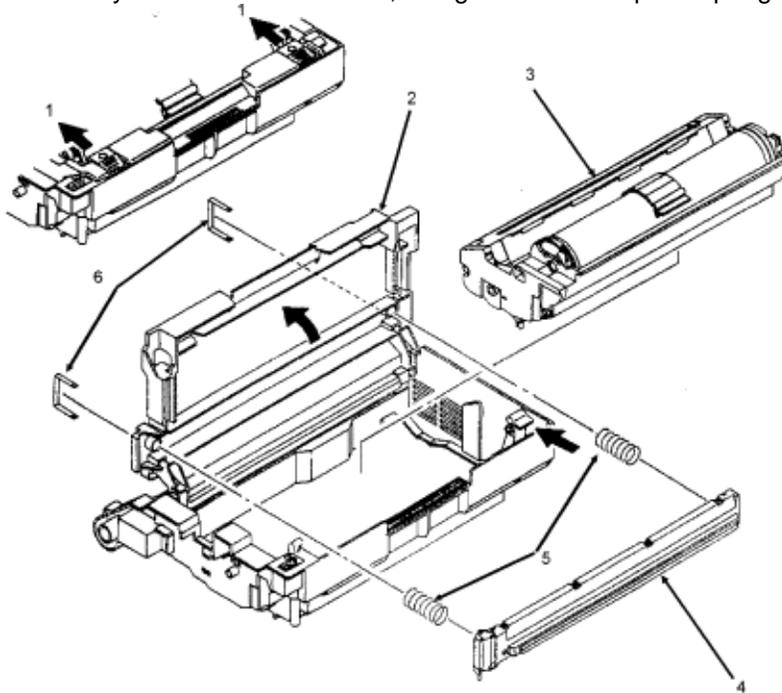
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3.2.02 LED Head

1. Perform this procedure:

3.2.01 

2. Push the two blue lock levers (1) toward the rear of the printer and open the LED holder (2).
3. Lift and remove the image drum cartridge (3). To protect the image drum cartridge, please place it back in the styrofoam shipping package.
4. Squeeze the LED head (4) and the LED holder together to ease the tension on the springs (5). Use a screwdriver to remove the two clamps (6) from the claws of the LED head. The claws are located on the top and bottom of the left and right sides of the holder.
5. Gradually remove the LED head, being careful to keep the springs in place.

**NOTE:****LED Head Replacement**

After replacing the LED head, set the LED head drive time as described in Section 3.3 of this Service Handbook. { }

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Chapter 3 Maintenance & Disassembly

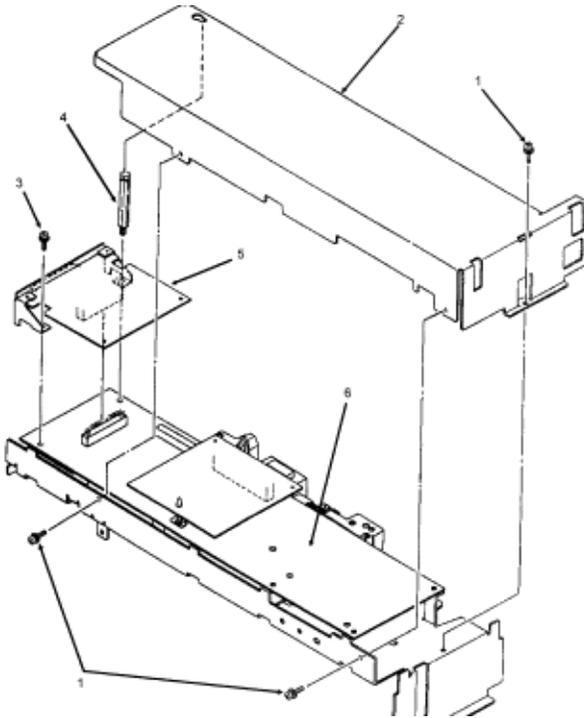
3.2.03 Interface Board

This procedure may be used to remove both the parallel and serial interface boards.

1. Perform this procedure:

3.2.01 

2. Remove the three shield cover mounting screws (1) and detach the shield cover (2) by sliding it forward and lifting it.
3. Remove the interface board mounting screw (3) and the post (4).
4. Lift the interface board (5) to disconnect it from the control board (6) for removal.

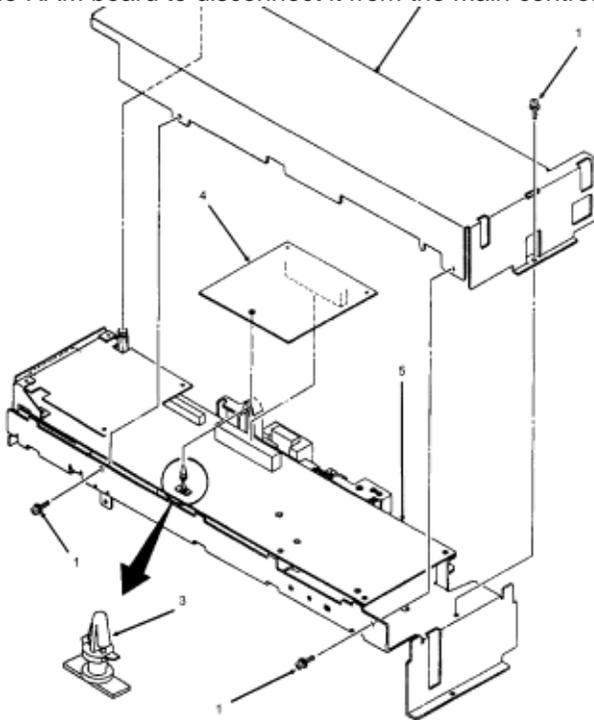


3.2.04 RAM Board (Option)

1. Perform this procedures:

3.2.01 

2. Remove the three shield cover mounting screws (1) and detach the shield cover (2) by sliding it forward and lifting it.
3. Press the hook of the locking circuit board support (3) to unlock the RAM board (4).
4. Lift the RAM board to disconnect it from the main controller board (5) for removal.



3.2.05 Main Controller Board

1. Perform these procedures:

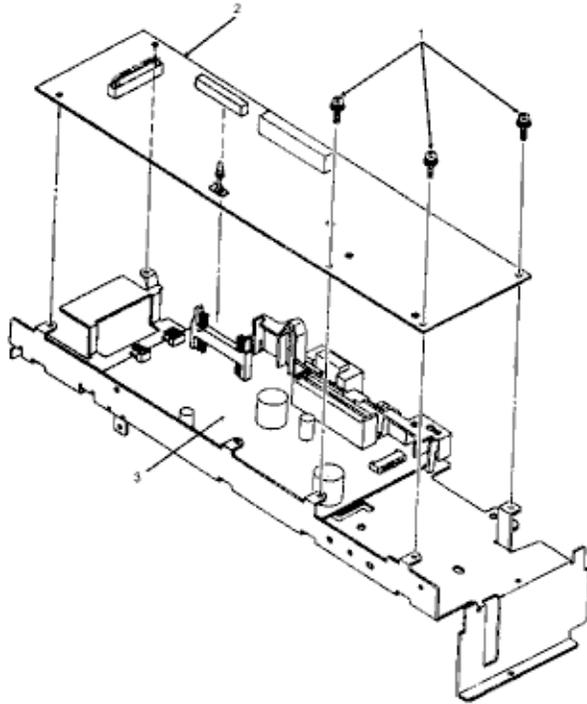
3.2.01 

3.2.03 

3.2.04 

2. Remove the three controller board mounting screws (1).

3. Lift the main controller board (2) to disconnect it from the engine control circuit board (3) and remove the main controller board.



3.2.06 Engine Controller Circuit Board (LLAB)

1. Perform these procedures:

3.2.01{

3.2.03{

3.2.04{

3.2.05{

2. Disconnect the cables (1) from connectors J1, J2, and J5.

3. Open the LED holder to allow access to the engine board mounting screw (2) and remove the mounting screw.

4. Close the LED holder and raise the upper unit.

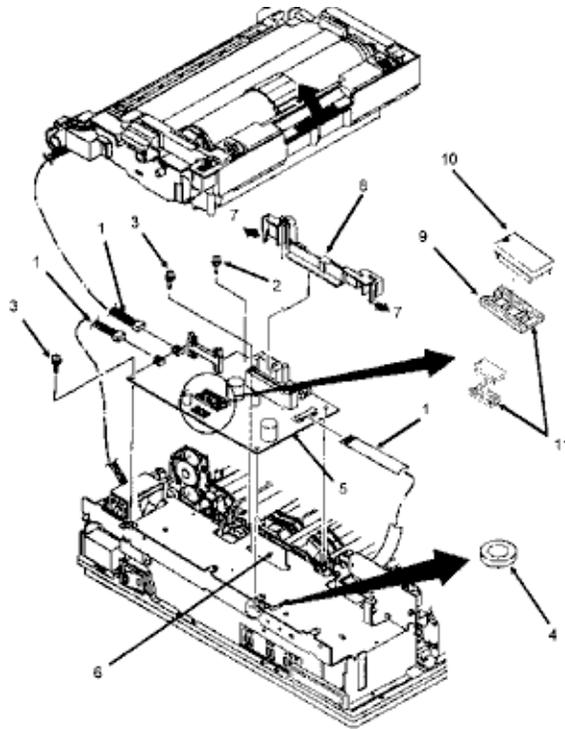
5. Remove the two remaining mounting screws (3).

CAUTION:

Be careful not to lose the plastic spacer (4) located between the shield frame and the engine controller board. When installing the engine controller board, be sure that the spacer is in place or the engine controller board will short against the shield frame.

6. Lift the engine controller board (5) to disconnect it from the interconnect board (6).

7. On the engine controller board, press the pawls (7) to unlock and remove the print board cover (8).



NOTE:

Replacement

When replacing an engine controller board, remove the EEPROM IC2 (9) and the Program PROM Q1 (10) from the old board and mount them on the new board. With LLAB Revision 11, Q1 is not installed because the program is masked in the CPU.

3.2.07 Main Motor

1. Perform these procedures:

- 3.2.01{

- 3.2.03{

- 3.2.04{

- 3.2.05{

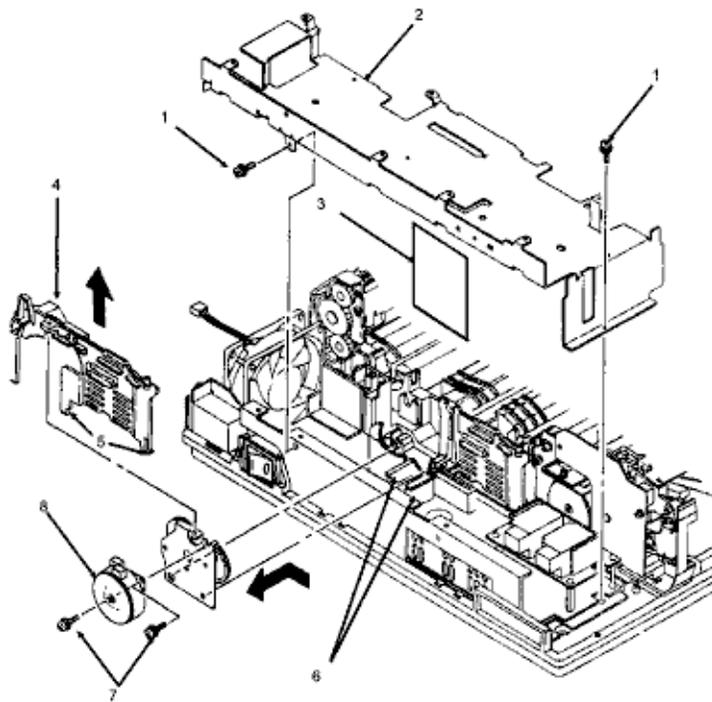
- 3.2.06{

2. Remove the three mounting screws (1) and detach the shield frame (2).
3. Detach the interconnect board (3).

NOTE:

The traces which run the entire length of the board are to the front of the printer when the board is installed.

4. Working from the bottom of the printer, remove the motor cover (4) by releasing the two black claws (5).
5. Remove the two high voltage wires from the motor cover.
6. Shift the motor assembly to the left to remove it from the claws (6) of the lower unit.
7. Working on the motor assembly, remove the two mounting screws (7) to remove the main motor (8) from the motor assembly.



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3.2.08 DC Fan Assembly

1. Perform these procedures:

3.2.01{}

3.2.03{}

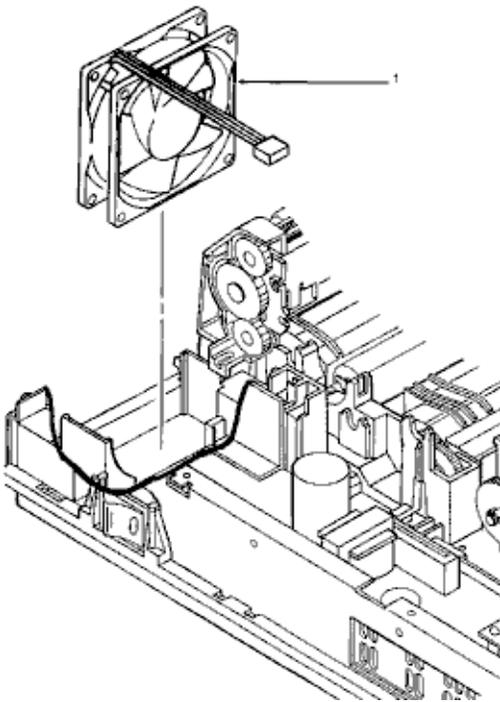
3.2.04{}

3.2.05{}

3.2.06{}

2. Detach the shield frame (3.2.07 step 6).

3. Remove the DC fan assembly (1).



3.2.09 Idle Gears "A" and "B", and the Reduction Gear

1. Perform these procedures:

3.2.01{}

3.2.03{}

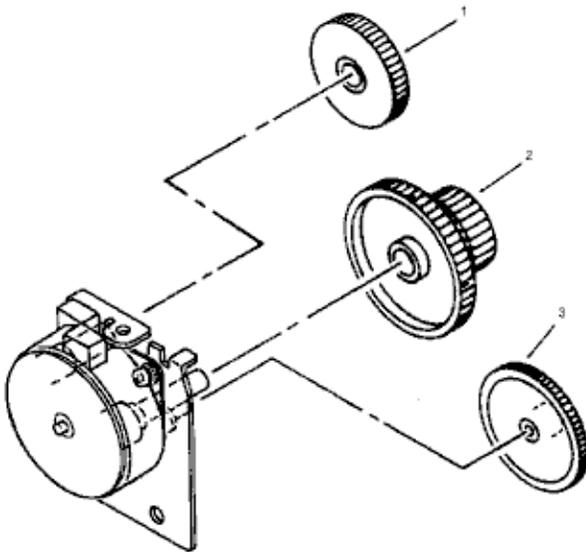
3.2.04{}

3.2.05{}

3.2.06{}

3.2.07{}

2. Detach the gears in the following order: idle gear "B" (1), reduction gear (2) and idle gear "A" (3).



3.2.10 Power Supply Unit

1. Perform these procedures:

3.2.01{

3.2.03{

3.2.04{

3.2.05{

3.2.06{

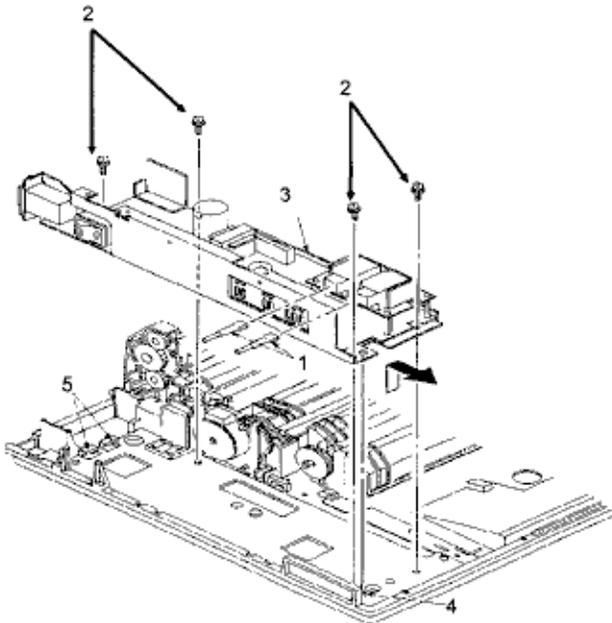
3.2.07{

2. Disconnect the two high-voltage cables (1).

NOTE:

When installing, the cables are keyed for correct placement. The larger connector is to the front of the printer.

3. Remove the four mounting screws (2).
4. Raise the upper unit.
5. Slide the power supply unit (3) towards the front until it comes off the guide (4) of the lower unit.
6. Lift the power supply unit towards you to detach it from the rear claws (5) for removal.



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3.2.11 Upper Unit

1. Perform these procedures:

3.2.01{}

3.2.02{}

3.2.03{}

3.2.04{}

3.2.05{}

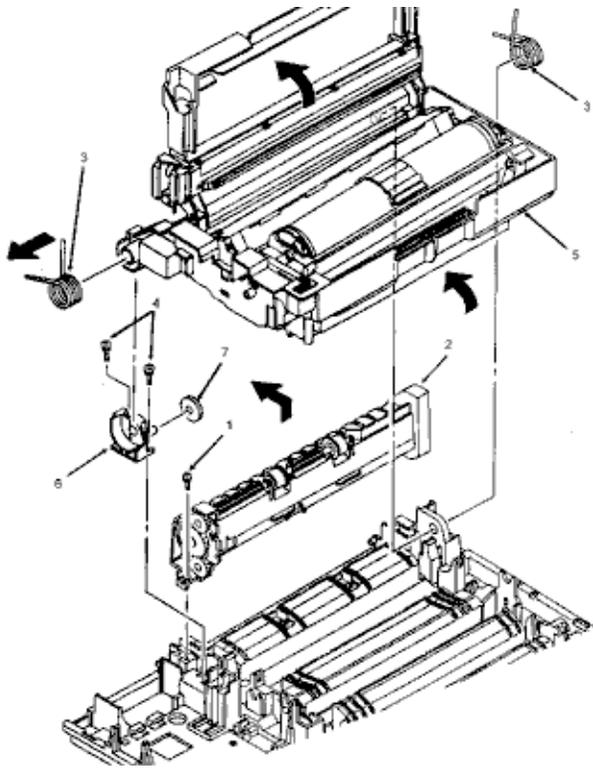
3.2.06{}

3.2.07{}

3.2.08{}

3.2.10{}

2. Place the face-up stacker assembly, located at the rear of the printer, down. Then, lift the upper unit.
3. Remove the paper eject roller assembly mounting screw (1). Slightly lift the paper eject roller assembly (2) at its left end and slide the left end backward using the right end as a pivot. Remove the assembly.
4. Remove the tension springs (3) using a needle nose pliers.
5. Loosen the two mounting screws (4). Lift the upper unit (5).
6. Slide the upper unit to the right and work it free of the right slot to remove it.



CAUTION:

Be careful not to drop the fulcrum block (6) and the idle gear (7) when removing the upper unit.

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3.2.12 Fusing Unit

WARNING:

Allow the printer to cool before servicing the fusing unit.

1. Perform these procedures:

3.2.01 

3.2.02 

3.2.03 

3.2.04 

3.2.05 

3.2.06 

3.2.07 

3.2.08 

3.2.10 

3.2.11 

2. Working on the upper unit, remove fuser cleaner pad (1) and the fulcrum block with idle gear (2).

3. Detach the cable (3) from the cable guide (4) of the upper unit.

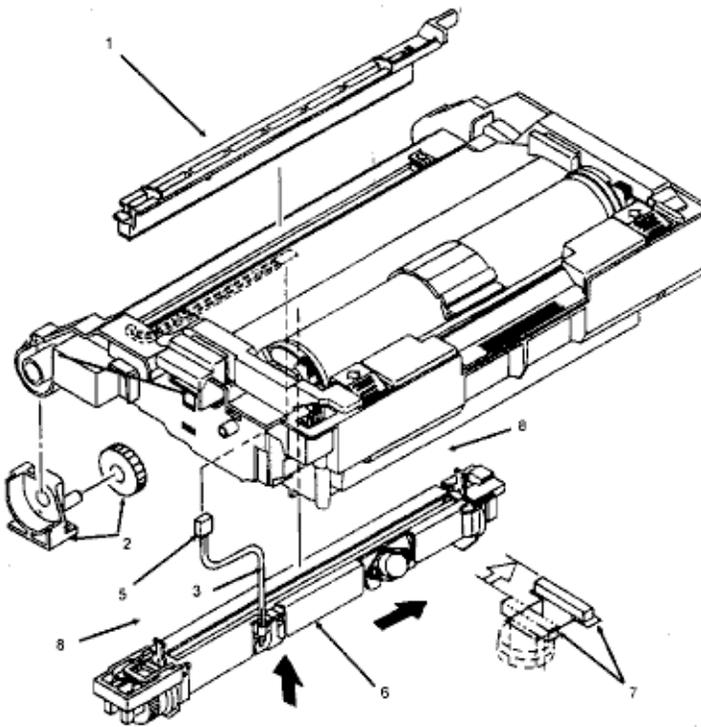
4. Pass the connector (5) through the slot in the upper unit and work the cable from the upper unit guides.

5. Position the upper unit so its underside is facing you, with the fusing unit (6) at the top.

6. Push the fusing unit against the upper unit until the two lock plates (7) protrude from their slots.

7. Slide the fusing unit to the right until the lock plates disengage from the grooves of the upper unit.

8. Remove the fusing unit, being careful not to lose the springs (8).



CAUTION:

Installation

The four separator claws must move freely within their grooves or paper jams will result.

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3.2.13 Backup Roller

1. Perform these procedures:

3.2.01{}

3.2.02{}

3.2.03{}

3.2.04{}

3.2.05{}

3.2.06{}

3.2.07{}

3.2.08{}

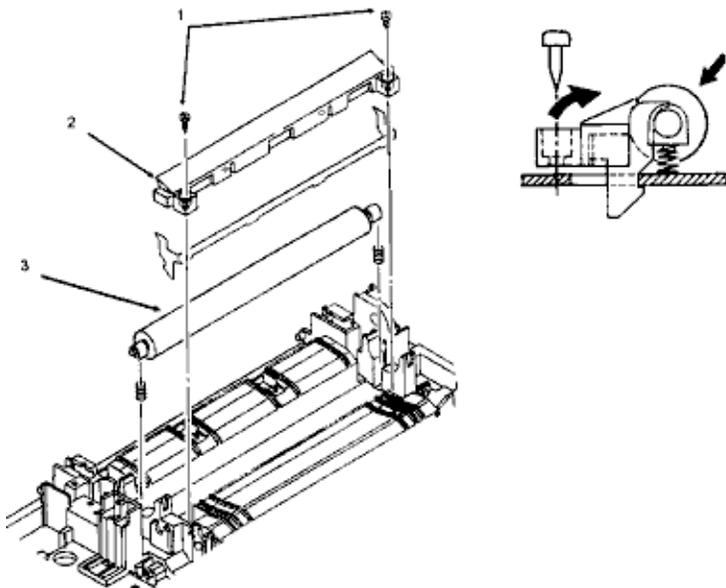
3.2.10{}

3.2.11{}

2. Remove the two mounting screws (1).

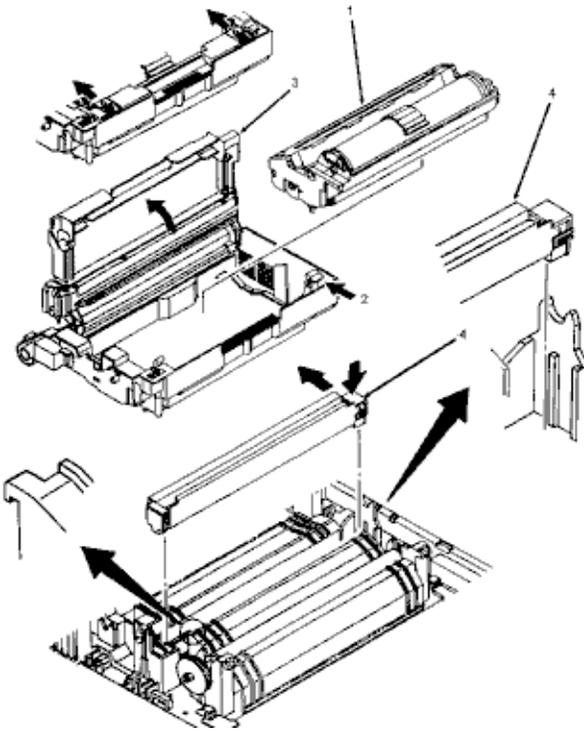
3. Use a straight slot screwdriver to detach the sheet guide (2).

4. Remove the backup roller (3).



3.2.14 Transfer Charger Assembly

1. Turn the power switch OFF and unplug the AC power cord from the outlet.
2. Press the OPEN button and raise the stacker cover.
3. Remove the image drum cartridge (1). (See 3.2.2)
4. Push the lock lever (2) towards the back of the printer to raise the upper unit (3).
5. Firmly push down and back on the sides of the transfer charger assembly (4) until the lower cover claws are disengaged from the square holes on each end of the transfer charger assembly.
6. Lift and remove the transfer charger assembly.



3.2.15 Resist Roller Assembly

1. Perform these procedures:

3.2.01 

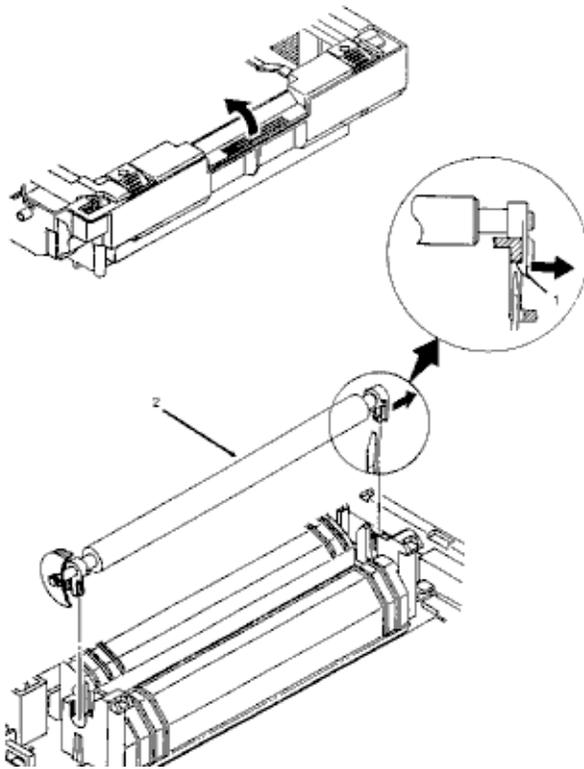
3.2.02 

2. Using a standard screwdriver, release the claws (1) from both sides of the resist roller assembly (2).

NOTE:

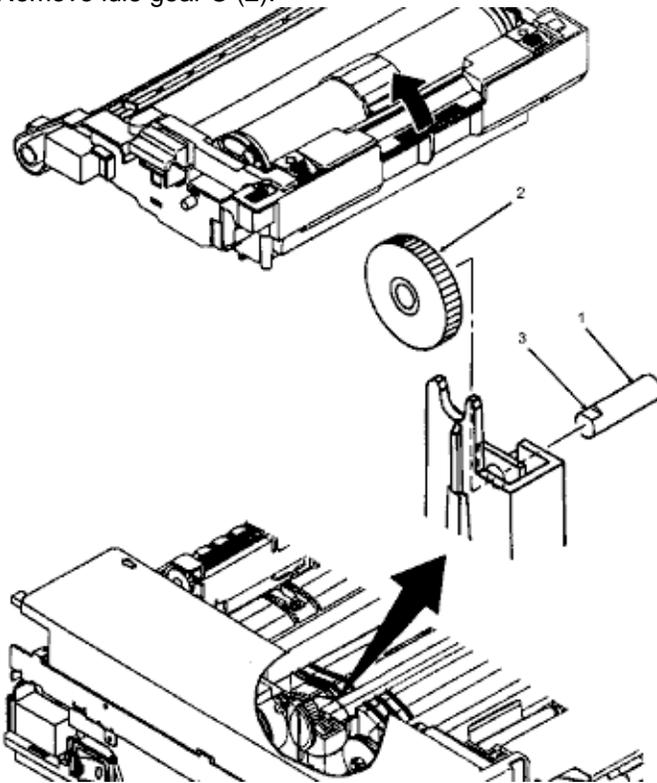
The left claw can be accessed from the bottom of the printer.

3. Lift the resist roller assembly from the printer.



3.2.16 Idle Gear C

1. Perform this procedure:
3.2.01
2. Push the lock lever towards the back of the printer to raise the upper unit.
3. Using a needle nose pliers and working from the left side of the printer, push the post (1) to the right.
4. Remove the post.
5. Remove idle gear C (2).

**NOTE:**

The cutout (3) on the post should be positioned to the left side of the printer and on the top when installing.

3.2.17 Paper Supply Unit

1. Perform these procedures:

- 3.2.01 

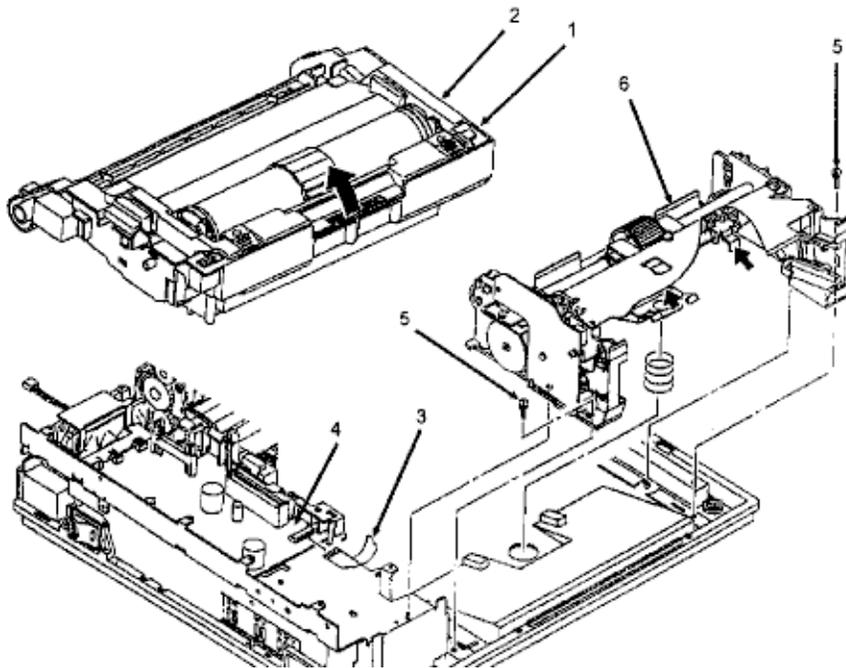
- 3.2.02 

- 3.2.03 

- 3.2.04 

- 3.2.05 

2. Press the lock lever (1) backward and lift the upper unit (2).
3. Disconnect the cable (3) from connector J5 on the engine controller circuit board (4).
4. Remove the two mounting screws (5).
5. Lift the paper supply assembly (6) at its front until the frame of the unit comes off the guide pins, then move the unit towards you for removal.



3.2.18 Resist Motor

1. Perform these procedures:

3.2.01{

3.2.02{

3.2.03{

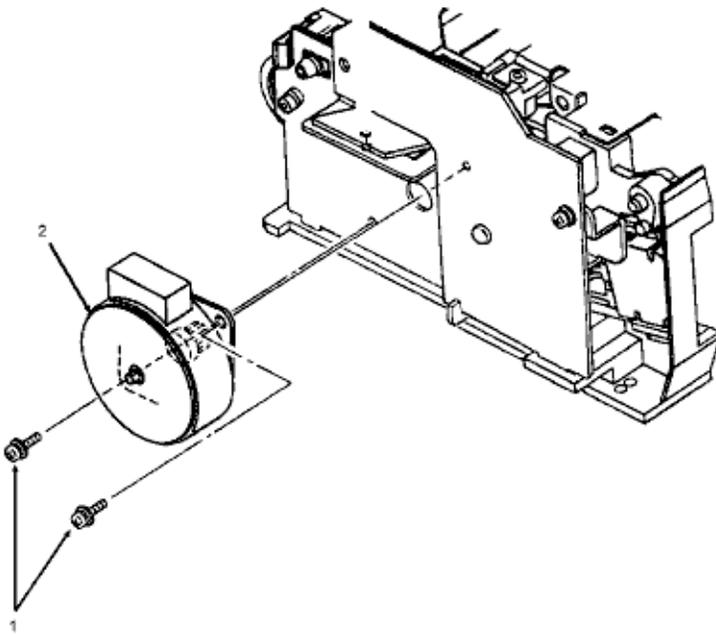
3.2.04{

3.2.05{

3.2.17{

2. Remove the two mounting screws (1).

3. Detach the resist motor (2).



3.2.19 Engine Connection Board

1. Perform these procedures:

3.2.01 {

3.2.02 {

3.2.03 {

3.2.04 {

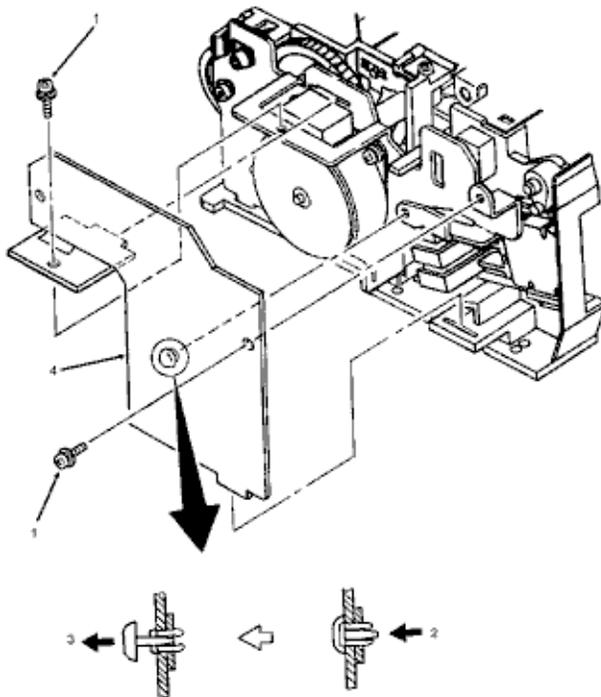
3.2.05 {

3.2.17 {

2. Remove the two mounting screws. (1)

3. On the paper supply unit, press the pointed end of the nylon latch (2), push out the head (3), and remove the latch.

4. Detach the engine connection board (4).



3.2.20 Hopping Roller

1. Perform these procedures:

3.2.01

3.2.02

3.2.03

3.2.04

3.2.05

3.2.15

3.2.17

2. Remove the two screws (1) and slide the upper plate assembly (2) until the claws (3) are unlocked.

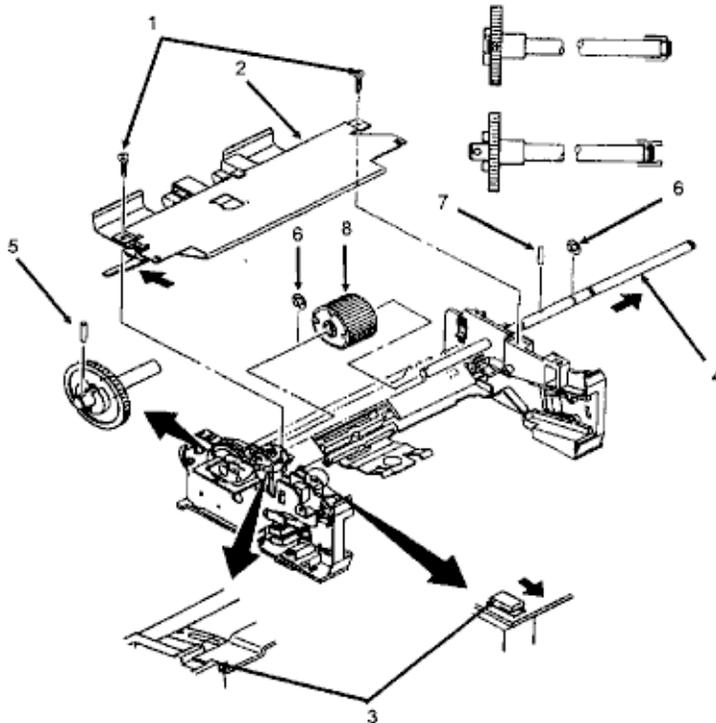
3. Push the hopping roller shaft (4) to the left to unlock it.

4. Remove the hopping gear pin (5).

5. Remove the E-clips (6).

6. Remove the hopping roller pin (7).

7. Slide the hopping roller shaft to the right and remove the hopping roller (8).



NOTE:

When installing, always mount the hopping roller shaft above the ground plate, which is on the left side of the printer.

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3.2.21 Separator

1. Perform these procedures:

3.2.01{

3.2.02{

3.2.03{

3.2.04{

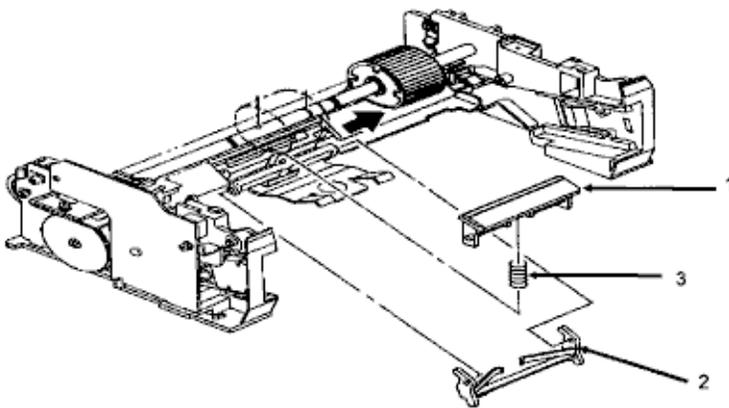
3.2.05{

3.2.15{

3.2.17{

3.2.20{

2. Hold the separator (1) down and remove the escape lever (2) from the pins on the paper supply unit. Be careful not to lose the separator spring (3).



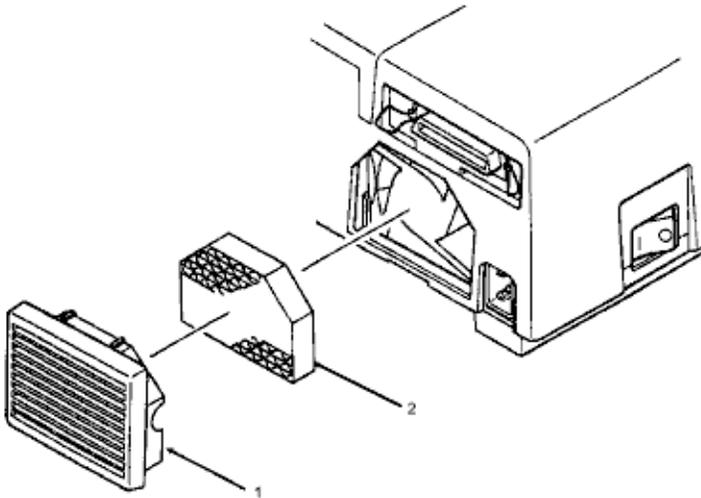
3.2.22 Ozone Filter

NOTE:

An ozone filter is provided with the image drum cartridge kit. The filter should be replaced when the image drum cartridge is replaced.

Using a screwdriver, insert the blade under the lower portion of the fan cover (1) and twist the screwdriver to remove the fan cover.

Remove the ozone filter (2) from the fan cover.



3.3 ADJUSTMENTS AND SERVICE CHECKS

3.3.01 General Information

The first four adjustments (Actual Page Count, Modified Page Count, Vertical Print Start Position and LED Head Drive Time) are performed by changing addresses on the EEPROM located on the Engine Controller printed circuit board.

Before performing these adjustments, setup the printer as listed below.

1. Remove the upper cover.
2. Raise the upper unit.
3. Remove the image drum cartridge.
4. Override the cover open interlock switch.

3.3.02 Actual Page Count

General Information

The actual page counter counts the number of sheets printed by the printer.

Procedure

To display the value of the actual page counter, follow this procedure.

1. Power ON the printer while pressing Switch 1 on the Engine Controller Board. The LED (located on the Engine Controller Board) will flash once - then pause (the LED will continuously flash once - then pause) indicating that the printer is in Parameter 1 of the maintenance mode.
2. Press Switch 1 for five seconds. The LED will display the contents of the Parameter1 (Actual Page Counter) register as follows:
 - a. The long flash indicates start of count.
 - b. Short flashes indicate counter contents (most significant digit first). There will be a pause between digits.
 - c. Upon completion of the count, a long flash will indicate start of count.
 - d. This process will loop until you press Switch 1 for five seconds. This will cause the modified page count to be displayed. (refer to 3.3.02)

Example

Actual Page Counter = 235 pages



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3.3.03 Modified Page Count

General Information

The modified page counter combines the main motor revolution time and the number of printed sheets. Drum replacement is determined by the modified page count.

Procedure

To check the modified page count, follow this procedure.

NOTE:

To access the Modified Page Count, you must first view the Actual Page Count.

1. After viewing the Actual Page Count, press Switch 1 for five seconds. The LED will display the contents of the Parameter 1 (Modified Page Count) register.
2. To end this procedure, press Switch 1 for 1 second. The LED will perform one short flash to indicate Parameter 1 is selected.

Example

Modified Page Counter = 142

The next step in this table is also the last step in the Actual Page Counter Table

<u>Switch 1 Action</u>	<u>LED Display</u>	<u>Description</u>
Press for 5 seconds	Long Flash	Start of Modified Page Count
None	On-Off-Pause	1st Digit = 1
None	On-Off-On-Off-On-Off-On-Pause	2nd Digit = 4
None	On-Off-On-Off-Pause	3rd Digit = 2
None	Long Flash	Start of Count
Press for 1 second	Flashes ON/OFF	Parameter #1 - Selected

NOTE:

The number "0" is represented by 10 flashes

The Actual and Modified Page Counters CANNOT be changed.

3.3.04 Vertical Print Start Position Adjustment

General Information

The Vertical Print Start Position Adjustment is used to set the top of form position. Use this adjustment to correct print start variations between different OL400 printers, or to achieve a 4.6 mm vertical start position, the default value.

A chart of the EEPROM addresses and print start positions is shown below.

The Vertical Print Start Position is Parameter 9.

Procedure

1. To change the Vertical Print Start Position, follow this procedure.
2. Power ON the printer while pressing Switch 1 on the Engine Control board. The LED will flash continuously, indicating that the printer is in Parameter 1 of the maintenance mode.
3. Press Switch 1 eight times to access Parameter 9. The LED will flash 9 times, indicating Parameter 9 has been selected.
4. Press Switch 1 once for 5 seconds. The contents of the Parameter 9 register will be displayed.
5. To modify the contents of the Parameter 9 register, press Switch 1 (momentarily) to step through the addresses (in accordance with the chart shown below).
6. To end the adjustment, press Switch 1 once for 5 seconds. The LED will flash 9 times, indicating Parameter 9.

NOTE:

Ten flashes represent the number zero.
On the table below, Address 0 comes after Address 15

EEPROM Address / Print Start Position Table

EEPROM Address	Print Start Position (in mm)	EEPROM Address	Print Start Position (in mm)
0 DEFAULT	0	8	-4.0
1	+5	9	-3.5

2	+1.0	10	-3.0
3	+1.5	11	-2.5
4	+2.0	12	-2.0
5	+2.5	13	-1.5
6	+3.0	14	-1.0
7	+3.5	15	-0.5

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3.3.05 Setting the LED Head Drive Time

General Information

This adjustment is necessary only when replacing the LED head. However, if the luminous energy ratings of the new and original LED heads are the same, adjustment is not necessary. The luminous energy rating is on the label on the LED head. Digits three and two (reading from the right) are the drive time rating.

The LED Head Drive Time is Parameter 13.

Procedure

To change the LED Head Drive Time, follow this procedure.

1. Power ON the printer while pressing Switch 1 on the Engine Control board. The LED will flash continuously, indicating that the printer is in Parameter 1 of the maintenance mode.
2. Press Switch 1, twelve times to access Parameter 13. The LED will flash thirteen times, indicating Parameter 13 has been selected.
3. Press Switch 1 once for five seconds. The contents of the Parameter 13 register will be displayed.
4. To modify the contents of the Parameter 13 register, press Switch 1 (momentarily) to step through the addresses (in accordance with the chart shown below).
5. To end the adjustment, press Switch 1 once for five seconds. The LED will flash thirteen times, indicating Parameter 13.

LED Drive Time Rating / Drive Time Setting Table

Drive Time Rating displayed on LED Head	Drive Time Setting Value (Address)
08	5
09	4
10	3
11 12	2
13 14	1

15 16 17	0
18 19 20	15
21 22 23 24	14
25 26 27 28 29	13
30 31 32 33 34 35 36	12

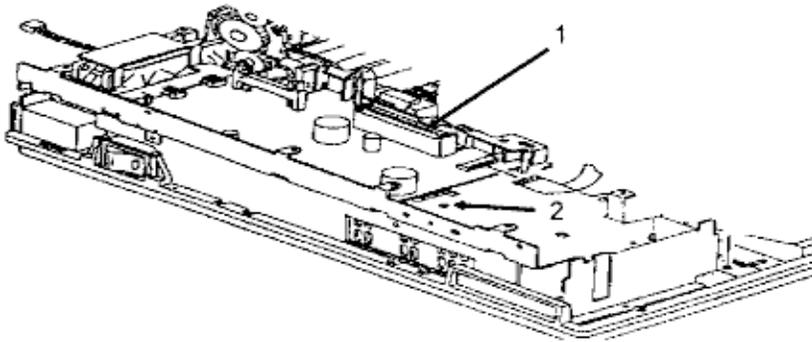
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3.3.06 Voltage Adjustment (+5 vdc)**Procedure**

1. Remove the upper cover.
2. Remove the shield cover.
3. Remove the main controller board.
4. Use a digital voltmeter which has an input impedance of 10M Ohms and is capable of displaying to the second decimal place or farther.
5. Check the voltage at CN1 of the interconnect board (1) between Pin 31, 5 vdc and Pin27, 0 vdc .

The value should be +5.0 vdc (+/-0.1).

6. If adjustment is required, remove the font guide.
7. Change the output voltage by adjusting potentiometer RV1 on the power supply board (2).



3.3.07 Darkness Control

General Information

The Darkness Control is adjusted from the Level 2 Menu. This adjustment changes the degree of character density.

Procedure

1. Place the printer off-line.
2. Press and hold **MENU** more than 2 seconds. The first menu category will appear on the display.
3. Press **MENU** until "Darkness" appears on the display.
4. Press "+" to toggle through the values until the desired setting is reached.
5. Press **ENTER/MENU RESET** to store the new setting.

3.4 CLEANING

3.4.01 General Information

Remove any dropped toner and dust. Clean inside and around the printer with a vacuum cleaner when necessary.

CAUTION:

Do not touch the image drum, the LED head, or the LED head connector block.

3.4.02 Cleaning the Static Charge Wire

1. Turn OFF the power supply switch, and press the "OPEN" button and raise the stacker cover.
2. Push the two lock levers backward and lift the LED holder.
3. Clean the static charge wire by moving the blue wire cleaner of the image drum cartridge to the left and right.
4. Place the blue wire cleaner in its original position (to the right).

3.4.03 Cleaning the Transfer Charge Wire

CAUTION:

Do not press strongly when cleaning or you will break the transfer wire.

1. Push the two lock levers backward to lift the LED holder, and take out the wire cleaner.
2. Close the LED holder.
3. Raise the upper unit.
4. Clean the transfer charger by pressing the wire cleaner to the transfer charger assembly. Slide it several times to the left and right, and clean the transfer wire.
5. Return the wire cleaner to its original position.

3.4.04 LED Lens Array

1. Clean the LED lens array when vertical white lines or "blank" spots appear on the output.
2. Place the LED lens cleaner pad against the LED lens array.
3. Slide the cleaner pad horizontally several times to clean the head. Use a clean area of the pad on each pass.
4. Discard the pad.

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4.1 OVERVIEW

4.1.01 Introduction

This section is used to isolate problems to the assembly level. Application problems and detection of faulty components on the printed circuit boards are not addressed.

When troubleshooting a defective unit, refer first to Section 4.4 of this Service Handbook. This section contains tips on preventing problems as well as a list of common problems.

Next, refer to Section 4.5. This section lists the operator panel messages and sample output problems.

Finally, refer to Section 4.6. Repair Analysis Procedures (RAPs) will ask you questions or require you to make observations. The answers to these questions and the results of your observations determine your next course of action. Use the RAP Index to identify which RAP should be used to resolve the problem with the machine.

If you encounter a situation that is not addressed by the documentation in this kit, please report the problem to Okidata. Refer to the Service Center Reference Guide for information on contacting Okidata.

The following information is provided to detect and analyze failures.

- Okilink II, Faxable Facts, Technical Service Bulletins
- Troubleshooting Tips / Common Problems
- Fault Alarms
- Output Samples
- Repair Analysis Procedures*
- Tests
- Continuous Print
- Print Fonts
- Menu Print
- Serial Interface Loop
- Engine

4.2 TROUBLESHOOTING UPDATES

4.2.01 General Information

Okidata distributes updated troubleshooting information in three ways.

- Okilink II
- Faxable Facts
- Technical Service Bulletins

4.2.02 Okilink II

Okilink II is Okidata's Bulletin Board Service. This service is available to all Okidata Certified Service Technicians. Okilink II provides troubleshooting and service information. Technicians can download files, ask questions of Okidata's technical support personnel, and participate in round table discussions about Okidata products and services. Technical Service Bulletins, Recommended Spare Parts Lists, Printer Drivers, Product Specifications, and Service Training Information are also available.

Refer to the [Service Center Reference Guide { }](#) for information on accessing Okilink II.

4.2.03 Faxable Facts

Okidata's Faxable Facts is an automated fax document retrieval system. It is maintained by Okidata's Customer Information Center. Answers to common questions about Okidata products are available through Faxable Facts.

Refer to the [Service Center Reference Guide{ }](#) for information on accessing Faxable Facts.

4.2.04 Technical Service Bulletins

Okidata's Technical Service Bulletins (TSBs) contain technical information developed after product release. Firmware updates, part number changes, and procedural changes are some of the subjects covered by these bulletins. The TSBs are distributed through Okilink II.

Refer to the [Service Center Reference Guide { }](#) for information on accessing Okilink II.

4.3 REPORTING PROBLEMS

4.3.01 General Information

Okidata strives to provide accurate and detailed service information through its training materials. The Technical Training Group realizes that service technicians have valuable experience, knowledge, and opinions. Okidata strongly encourages you to report any problems you may encounter when using the materials of this training kit. Please be as specific and detailed as possible. Your comments, suggestions, and criticisms are used to update and revise training kits.

You should reference the training materials when servicing Okidata products. Most problems can be solved by using the information provided in the training materials. If you encounter a situation that cannot be solved, please let Okidata know.

Refer to the [Service Center Reference Guide { }](#) for information on contacting Okidata.

4.3.02 Problem Lists

Technicians frequently request a list of common problems specific to a product. Technical Training Kits are written before a product is shipped to customers. Therefore, such information is not available when a product is first released.

However, Okidata wants to respond to these requests. Okilink II provides round-table discussions on technical problems. Errors and corrections in the training materials are listed in the Training Section of Okilink II. The Technical Service Bulletins (also known as Okidata's Monthly Mail) are available via Okilink II. Situations that are not addressed in the reference documentation, technical service bulletins, or round tables may be reported to the Dealer Service and Support Engineers (DSSEs) or the Technical Training Group. You will receive a response to your message within one business day.

The information on Okilink II is the most accurate and up-to-date technical information available from Okidata. This is only possible with your assistance. By reporting your suggestions, concerns, and problems, Okidata can provide the best possible information.

Your cooperation is greatly appreciated. Thank you for your help!

4.3.03 Reporting Methods

Okilink II

You may use Okilink II to report your findings. Refer to the Service Center Reference Guide for information on using Okilink II.

Course Critique

Use the Course Critique to report any problems you find as you are completing the self-paced training.

Fax Number

If you wish to fax your response, please use the numbers listed in the Service Center Reference Guide.

Mailing Address

If you respond by mail, please use the appropriate address listed in the Service Center Reference Guide.

Information Provided

Please provide the following information when reporting problems.

Okidata Dealer Number
Technician's Name
Company Name
Company's Address (Street, City, State/Province, ZIP / Postal Code, Country)
Telephone and Fax Numbers (with area / country access codes)
Product Name
Unit's Serial Number
Firmware Revision Level
Description of Problem
Document Name (with page number or procedure) with error or problem.

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4.4 TROUBLESHOOTING TIPS

4.4.01 Preliminary Checks

Is the product being operated under the proper ambient conditions?

Does the paper being used meet the specifications for this product?

Have the consumables been replaced as recommended?

Have the consumables been installed properly?

Are Okidata consumables being used?

Is the LED Head Drive Time correctly set?

Check the contacts and connections of the power supply board. If good contact is not made at all connections and ground points, false diagnosis will occur.

Examine the basic check points as directed in the Solutions manual.

Gather as much information on the problem from the customer as possible.

Perform inspections in conditions which resemble those in which the problem occurred.

4.4.02 Tips For Preventing Image Problems

1. Do not let anything touch the surface of the image drum.

2. NEVER expose the image drum to direct sunlight.

3. Do not touch the fuser unit. It is heated during operation. Oil from your skin may cause uneven fusing temperature.

4. Do not expose the image drum to light for more than 5 minutes.

4.5 FAULT ALARMS

4.5.01 General Information

The operator panel is used to display printer modes and error conditions. The table below shows the operator panel display and the mode or condition it matches.

Failure To Initialize At Power-On

If the printer fails to go ON-LINE at Power-On, refer to RAP 01.

LCD Error Message

The failure status of this printer is displayed on the liquid crystal display (LCD) in the operator panel. The Error Messages Table lists the problems that may be indicated by messages on the LCD. The first and the second lines of each LCD message are displayed alternately at 1 second intervals. The messages are displayed until the associated error(s) is removed.

Image Problems

If the printer output is faulty, refer to the Output Samples and determine which example resembles the problem. Proceed to the Repair Analysis Procedure (RAP) referred to by the example.

4.5.02 Error Messages Table

LCD Error Message	Message Description	Recommended Action
ON-LINE	Ready to receive data in on-line mode	Normal Operation
OFF-LINE	Printer idling in off-line mode	Normal Operation
DATA PRESENT	There is data to be received in on-line mode	Normal Operation
PRINT FONTS	Font samples are being printed	Normal Operation
PRINT MENU	Menu is being printed	Normal Operation
CONTINUOUS PRINT	Repeated self testing	Normal Operation
LOOP TEST	Testing serial interface circuit loop	Normal Operation
RESET	Printer is being reset	Normal Operation
MENU RESET	Menu reset to factory default	Normal Operation
ERROR RECEIVE BUFFER OVERFLOW	Receive buffer overflow	Possible handshaking problem
ERROR PAGE BUFFER OVERFLOW	Page buffer overflow	Page layout too complex. More memory may help.
ERROR DLL BUFFER OVERFLOW	DLL buffer overflow	Too many DLL Fonts. More memory may help.

FONT CARD FONT NOT FOUND	The font card is not recognized by the printer	Install card properly or replace main controller
ERROR FONT CARD REMOVED ON-LINE	Font card taken out during on-line	Printer must be OFF-LINE when changing font card
ERROR PRINT OVERRUN	Printing overrun	Page layout too complex. More memory may help.
ERROR PROGRAM ROM CHECK	Program ROM error	Replace Program ROM on main controller PCB
ERROR FONT CARD CHECK	Font card error	Replace defective card
ERROR FONT ROM CHECK	Font ROM error	Replace Font ROM on main controller PCB
ERROR EEPROM	EEPROM error	Press RECOVER . Replace EEPROM
ERROR RESIDENT RAM CHECK	Resident RAM error	Replace main controller
ERROR OPTION RAM CHECK	Option RAM error	Replace optional RAM
ERROR LOOP TEST	Error occurred during serial I/F loop test	Replace Serial I/F PCB
ERROR PRINTER I/F TIMEOUT	Error occurred during main controller board and engine controller board interfacing.	Replace main controller or engine controller
ERROR OP-PANEL I/F TIMEOUT	Error occurred during operator panel and engine control board interfacing.	Replace operator panel or engine controller
ERROR ENGINE FUSING PROBLEM	Fusing temperature is higher or lower than the required value.	Refer to RAP 05

ERROR ENGINE FAN PROBLEM	Engine fan motor error	Replace DC Fan or engine controller
ERROR ENGINE	Engine error other than the above two	Refer to RAP 06
WARMING UP	Power has been turned on and now warming up.	Normal Operation
PAPER OUT TRAY	Paper cassette has run out of paper.	Add paper to cassette
PAPER FEED JAM	Paper jammed during feeding.	Refer to RAP 02
PAPER JAM	Paper jammed during conveying.	Refer to RAP 03
COVER OPEN	Upper cover is open.	Close cover or check cover interlock switch
EXECUTIVE TRAY REQUEST	Request to set executive size paper cassette	Normal Operation
LETTER TRAY REQUEST	Request to set letter size paper cassette	Normal Operation
LEGAL TRAY REQUEST	Request to set legal size paper cassette	Normal Operation
ENVELOPE TRAY REQUEST	Request to set envelope cassette	Normal Operation
EXECUTIVE PAPER MANUAL REQUEST	Request to manually feed executive size paper	Load paper. Press FORM FEED
LETTER PAPER MANUAL REQUEST	Request to manually feed letter size paper	Load paper. Press FORM FEED
LEGAL 14 INCH MANUAL REQUEST<_>	Request to manually feed 14" legal size paper	Load paper. Press FORM FEED

LEGAL 13 INCH MANUAL REQUEST	Request to manually feed 13" legal size paper	Load paper. Press FORM FEED
Monarch ENVELOPE MANUAL REQUEST	Request to manually feed monarch 7.314 envelope	Load paper. Press FORM FEED
COM-10 ENVELOPE MANUAL REQUEST	Request to manually feed commercial 10 envelope	Load paper. Press FORM FEED
DL ENVELOPE MANUAL REQUEST	Request to manually feed Int'l DL envelope	Load paper. Press FORM FEED
C5 ENVELOPE MANUAL REQUEST	Request to manually feed Int'l C5 envelope	Load paper Press FORM FEED.
SIZE TRAY ERROR	Printer on paper of non-requested size	Refer to RAP 04
CHANGE DRUM	Drum life has been attained	Replace Drum Kit. Press RECOVER when turning the printer ON

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Service Guide OL400
Chapter 4 Failure & Repair Analysis

4.5.03 Output Samples

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4.6 REPAIR ANALYSIS PROCEDURES

4.6.01 Using the RAPs

When using the Repair Analysis Procedures, follow these steps.

1. Use the RAP INDEX to find the RAP associated with the printer's problem.
 2. Go to the appropriate RAP.
 3. All of the RAPs will begin with a START Statement, followed by questions or another type of statement.
 4. If the RAPs do not lead you to the cause of a problem, please report this to Okidata.
Refer to Section 4.3 for further details.
-



Service Guide OL400

Chapter 4 Failure & Repair Analysis

4.6.02 RAP Index

RAP #	RAP Description
01	Printer Does Not Initialize 
02	Paper Feed Jam Alarm 
03	Paper Jam Alarm 
04	Size Tray Error Alarm 
05	Engine Error- Fusing Problem Alarm 
06	Engine Error Alarm 
07*	Light or Blurred Image 
08*	Dark Background ()
09*	Blank Output 
10*	Vertical Black Stripes 
11*	Repeating Marks 
12*	Blank Spots 
13*	Vertical White Stripes 
14*	Black Page 
15*	Poor Fusing 

* Refer to the Output Samples, 4.5.03 .

CAUTION:

In some of the RAPs, you will be asked to replace the image drum cartridge and then told to reset the drum counter by turning the printer ON while pressing the RECOVER switch.

DO NOT RESET THE DRUM COUNTER unless you replace the image drum cartridge.

RAP 01Printer Does Not Initialize**START**

Turn the power OFF, then ON.

Is the WARMING UP message displayed?

YES Go to B

NO Check the AC cable connection.

Verify that +5V output is generated. Check the connection at the main controller circuit board CN1-1 (+5V) and CN1-3 (0V)

YES Go to A

NO Is the power fuse open?

YES Check for shorts between AC and replace the fuse

NO Is power generated when the engine controller circuit board is detached (from the power supply unit) and AC power is turned ON?

YES Is there a short between +38V and 0V? Is there a short between +5V and 0V when the engine controller board is installed. (Make this check on the engine controller board.) Be sure that the circuit side of the engine controller board is not touching the shield frame.

NO Replace the power supply unit.

YES Install Engine Controller Board correctly.

A

Is the Block Character displayed on the operator panel 16 seconds after the power is turned ON?

YES Replace the main controller circuit board or the engine controller circuit board.

NO Is the operator panel cable disconnected?

YES Connect the cable.

NO Replace the operator panel board.

B

Is an alarm displayed?

YES Take suggested action for the alarm (Refer to the Error Messages Table, 4.5.02).

NO Is the fan rotating?

YES Allow the unit to warm up and go ON-LINE.

NO Replace the engine controller circuit board

END

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RAP 02:Paper Feed Jam Alarm**START**

Does a JAM alarm occur when the power is turned ON?

NO Go to A

YES Is the paper at the resist sensor?

YES Remove the paper.

NO Is the JAM alarm cleared by overriding the resist sensor on the engine controller circuit board?

YES Check the resist sensor lever for normal operation.

NO Replace the engine controller circuit board.

A

Is the paper actuating the resist sensor lever?

YES Run the Engine Drive Test. Does the resist roller turn?

NO Replace the paper feed assembly.

NO Replace the engine controller board.

END

RAP 03:Paper Jam Alarm**START**

Does the paper jam occur when the power is turned ON?

- NO Go to A
- YES Is the paper at the resist or exit sensor?
 - YES Remove the paper.
 - NO Will the exit sensor on the engine controller circuit board toggle ON and OFF (check on the engine controller circuit board IC3 pin 3)?
 - YES Check the outlet sensor lever for normal operation.
 - NO Replace the engine controller circuit board.

A

Is the resist roller rotating?

- NO Check the planetary gearing of the paper feed assembly (replace paper feed assembly, if necessary).
- YES Has the paper reached the exit sensor?
 - YES Go to B
 - NO Is the main motor rotating?
 - NO Are the main motor contacts touching the engine controller circuit board?
 - NO Ensure good contact.
 - YES Replace the engine controller circuit board or the main motor.

Is the fuser unit rotating?

- NO Check the gearing.
- YES Go to B

B

Does the exit sensor on the engine controller circuit board toggle ON and OFF? Check at engine controller circuit board IC3 pin 3.

NO Replace the engine controller circuit board.

YES Is the paper ejected normally?

 YES Check the exit sensor lever for normal operation.

 NO Check the paper path for obstructions or replace the engine controller circuit board.

END

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RAP 04:Size Tray Error Alarm**START**

Does the paper size differ from the tray size?

YES Use paper of the specified length.

NO Is the tray set properly?

NO Set the tray properly.

YES Has the paper been fed through the printer?

YES Replace the engine connection board.

NO Is the tray identified correctly?

YES END

NO Replace the engine connection board or the engine controller circuit board.

END

RAP 05:Engine Error - Fusing Problem Alarm**START**

Turn the power OFF, then ON. Does a fuser unit alarm occur immediately?

NO Go to A

YES Is the thermistor open (the normal resistance should be about 100k ohms at room temperature)? Measure between pins 1 and 2 of the cable connected to engine controller circuit board J2.

YES Replace the fuser assembly.

NO Is the thermistor shorted? (See above)

YES Replace the fuser assembly.

NO Replace the engine controller circuit board.

END**A**

Power OFF, then ON.

Does the fuser lamp glow? (Check this from the rear vents of the printer.)

YES Is the thermistor open? (See above)

NO Replace the engine controller circuit board.

YES Replace the fuser assembly.

NO Is the fuser lamp open? (With the upper cover open, lift the upper unit and measure the resistance between the heater AC connections.) (0 ohms is normal. Infinite resistance is open.) Check for proper contact between the fuser's AC contacts and the power supply.

YES Replace the fuser assembly.

NO Is the HEAT signal turned on? (HEAT signal at engine controller circuit board IC3 pin 75.)

NO Replace the engine controller circuit board.

YES Replace the power supply unit.

END

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RAP 06:Engine Error Alarm**START**

Replace the ROM (Q1) on the engine controller circuit board.

Has the trouble been resolved?

YES END

NO Replace the engine controller circuit board.

END

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RAP 07:Light or Blurred Images

START

Does the printer contain sufficient toner?

NO Add Toner

YES Is the paper recommended for use in a laser printer?

NO Use paper recommended for a laser printer.

YES Print the MENU. Raise the stacker cover to stop the print cycle just as the bottom of the paper goes under the hopping roller. Lift the upper unit, remove the paper and look at the image drum.

Is there a dark toner image on the drum?

YES Replace the transfer charger assembly.

NO Clean the LED Head.

Is the problem removed?

YES END

NO Replace the Image Drum Cartridge.

Power ON the printer power while pressing the **RECOVER** switch to clear the drum counter.

Is the problem removed?

YES END

NO Replace the Engine Controller Board.

Is the problem resolved?

YES END

NO Replace the High Voltage Power Supply Unit.

END

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RAP 09:Blank Output**START**

Is the transfer wire broken?

YES Replace the transfer wire

NO Replace the high voltage power supply unit.

If the problem still exists, run the Engine Test (See Section 4.7 of the Service Handbook) .

Are horizontal ruled lines output?

YES Replace the main controller circuit board.

NO Is the LED head connected properly? (Check for good contact.)

NO Connect the LED head properly.

YES Is the image drum cartridge connected to the ground?

NO Clean the ground contact of the image drum cartridge.

YES Replace the engine controller circuit board.

Has the trouble been removed?

YES END

NO Replace the LED head.

Has the trouble been removed?

YES END

NO Replace the image drum cartridge.

END

RAP 10:Vertical Black Stripes

START

Is the charge wire dirty?

YES Clean the charge wire.

NO Replace the image drum cartridge. Power ON while pressing the **RECOVER** switch to clear the drum counter.

Has the trouble been removed?

YES END

NO Replace the LED head.

Has the trouble been removed?

YES END

NO Replace the engine controller board.

END

RAP 11:Repeating Marks

Measure the distance between the marks.

Find the measurement below and take the suggested corrective action.

2.5"

Check/replace the fuser assembly or backup roller.

3.7"

Check/replace the image drum cartridge.

4.75"

Check/replace the hopping roller.

All others

Check/replace the resist rollers.

RAP 12:Blank Spots**START**

Does the printer contain sufficient toner?

NO Add Toner

YES Is the paper recommended for use in a laser printer?

NO Use paper recommended for a laser printer and make sure the print side is up.

YES Make sure the print side is up.

Has the trouble been resolved?

YES END

NO Is the transfer wire broken or nicked?

YES Replace the transfer wire assembly.

NO Clean the transfer wire.

Has the trouble been resolved?

YES END

NO Replace the image drum cartridge. Power ON while pressing the **RECOVER** switch to clear the drum counter.

Has the trouble been resolved?

YES END

NO Replace the high voltage power supply unit.

END

RAP 13:Vertical White Stripes

START

Does the printer contain sufficient toner?

NO Add Toner

YES Clean the LED Head.

Has the trouble been resolved?

YES END

NO Is the transfer wire broken/nicked?

YES Replace the transfer wire assembly.

NO Clean the transfer wire.

Has the trouble been resolved?

YES END

NO Replace the LED head.

Has the trouble been resolved?

YES END

NO Replace the image drum cartridge. Power ON the printer power while pressing
the **RECOVER** switch to clear the drum counter.

END

RAP 14:Black Page

START

Is the charge wire broken?

- YES Replace the image drum cartridge. Power ON while pressing the **RECOVER** switch to clear the drum counter.
- NO Replace the high voltage power supply unit.

Is the problem resolved?

- YES END
- NO Replace the LED head.

Is the problem resolved?

- YES END
- NO Replace the engine controller board.

Is the problem resolved?

- YES END
- NO Replace the image drum cartridge. Power ON while pressing the **RECOVER** switch to clear the drum counter.

END

RAP 15:Poor Fusing**START**

Is the heater lamp turning ON?

NO Replace the engine controller board.

YES Replace the fuser assembly.

Has the problem been resolved?

YES END

NO Are the backup roller springs normal?

NO Replace the springs.

YES Replace the fuser assembly.

Has the trouble been removed?

YES END

NO Replace the engine controller circuit board.

END

4.7 SELF-TESTS

4.7.01 General Information

The following diagnostics are available for the OL400 Printer.

- Continuous Print Test
- Print Fonts
- Menu Print
- Serial Interface Loop Test
- Engine Test

4.7.02 Continuous Print Test

During the Continuous Print Test the OL400 will print a rolling ASCII character set. This test is helpful in determining the relative print quality of an entire page.

4.7.03 Print Fonts

Although Print Fonts is not usually considered a diagnostic, it is quite useful in determining if the OL400 is recognizing Font Cards and DLL Fonts.

4.7.04 Menu Print

Menu Print should be used to determine the status of the various Menu Items. This information is stored in the EEPROM.

4.7.05 Serial Interface Loop Test

The Serial Interface Loop Test is used to determine the status of the RS232-C Serial Interface Board. A loopback connector (as shown in the Solutions Manual) must be attached to the interface connector before running this test.

4.7.06 Engine Test

The Engine Test allows the technician to operate the printer with the Main Controller Board, Interface Board and Operator Panel detached. This can be very helpful when trying to isolate defective circuit boards.

To perform the Engine Test, follow this procedure.

1. Remove the upper cover.
2. Detach the Operator Panel, Interface Board, RAM Expansion Board and Main Controller Board.
3. Make sure that the paper cassette is installed.
4. Override the cover interlock switch.
5. Power ON the the printer while pressing Switch 1 on the Engine Controller

Board,

6. The printer will continually print pages of horizontal ruled lines.
7. To stop the test, press Switch 1.
8. The printer may print a few more pages before stopping the test.

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A.1 OVERVIEW

A.1.01 General Information

This section describes the characteristics of the printed circuit boards used in the printers. The following areas are covered.

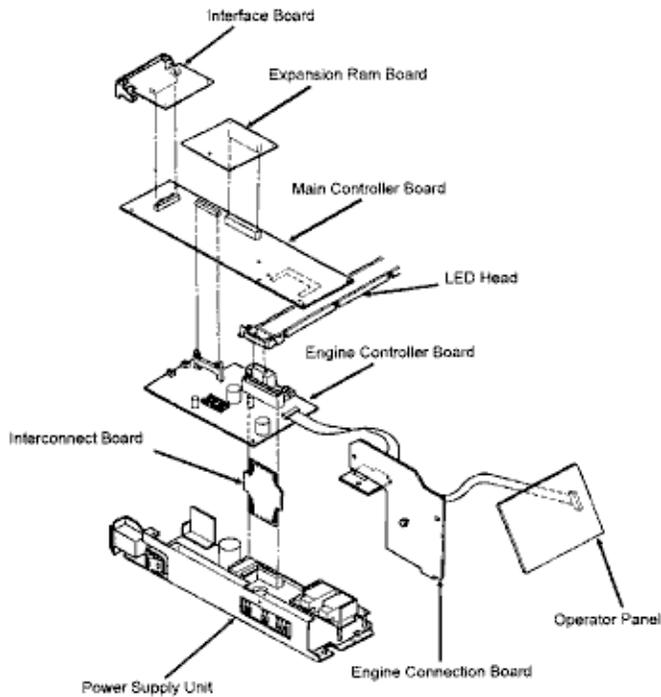
- Function
- Firmware
- Fuses
- Jumpers
- Switches
- Sensors
- Test Points

Where an item is not applicable, the word **NONE** will be listed.

A.2 CHARTS

Index to Charts

Description	Board Designation	Section
Main Controller	LBPE / LBPF	A.2.01 { 
Engine Controller	LLAB	A.2.02 { 
Operator Panel	LLDC	A.2.03 { 
Engine Connection	LLCC	A.2.04 { 
Centronics Parallel Interface	LLCP / LLCQ	A.2.05 { 
RS-232C Serial Interface	LLRS	A.2.06 { 
Expansion RAM	RAMK / RAMH	A.2.07 { 
Power Interconnect	LLIE	A.2.08 { 
Power Supply Unit	N/A	A.2.09 { 



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A.2.01 Main Controller Board (LBPE / LBPF)**Firmware**

O4B - PROM (512K) - Program

O5B - PROM (512K) - Program

07C-Masked ROM (4Mbit) - Resident Fonts

Fuses

NONE

Jumpers

NONE

Sensors

NONE

Switches

NONE

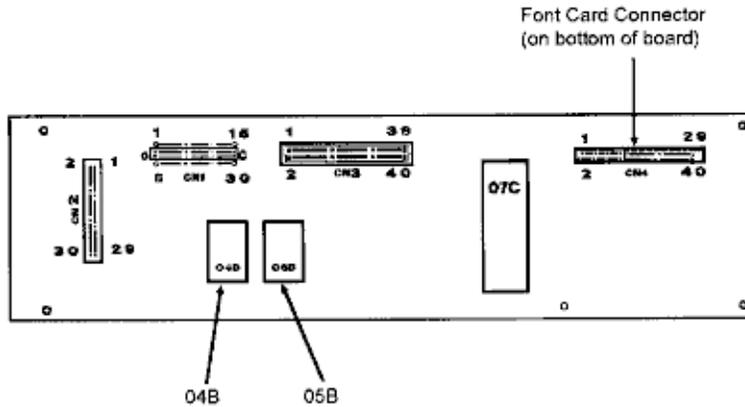
Test Points

+5vdc CN1-1

+12vdc CN1-8

-12vdc CN1-9

Ground - CN1-3



NOTES:

OL400 Revision B has been cut-in beginning with Serial #005B0010155. It includes the hardware listed below.

Main Controller Board LBPf (P/N 55053501)

Program ROMs 02B (P/N 31072201), 03B (P/N 31072301) Self-Test 3.10

Parallel I/F L LCQ P/N 55053601

Paper Delivery Unit P/N 50213801

The program ROMs for the LBPf and LBPE are not compatible. The LBPE and LBPf PCBs may be used in either Revision A or revision B, provided the proper program ROMs are used. The parallel interface boards and the Paper Deliver Units are interchangeable between both A and B revisions of the OL400. Revision A Program ROMs are 04B (PN31060501), 05B (PN31060601), Self-Test 2.22.

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A.2.02 Engine Controller Board (LLAB)**Firmware**

Q1 - EPROM (64Kbyte) - Engine Control

Beginning with LLAB Revision 11, Q1 is not needed. The Q1 ROM has been changed to
a Masked ROM internal to MPU 83C154, which replaces MPU 80C51.

IC2 - EEPROM (1,024 bit)

Fuses

NONE

Jumpers

NONE

Sensors

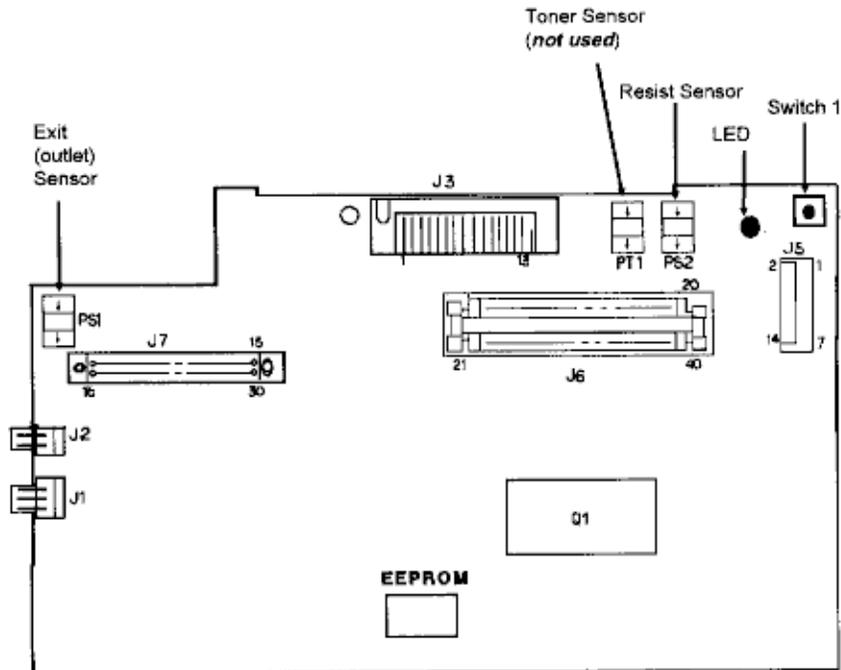
Resist Sensor

Outlet Sensor

Toner End Sensor (not used at this time)

Switches

NONE



Test Points

- +38vdc J1 pin 1 (Fan driving power supply)
- +5vdc J3 pins 12, 2 (Power source of LED Head Assembly)
- +5vdc J9 pin 7 (Power supply)
- +5vdc J5 pin 5 (Power Supply)
- +38vdc J5 pin 13 (Resist motor drive voltage)
- +38vdc J6 pin 15 (Power Supply)
- +5vdc J6 pins 13,31,32 (Power Supply)
- Ground - J6 pin 16

A.2.03 Operator Panel PCB (LLDC)

Firmware

NONE

Fuses

NONE

Jumpers

NONE

Sensors

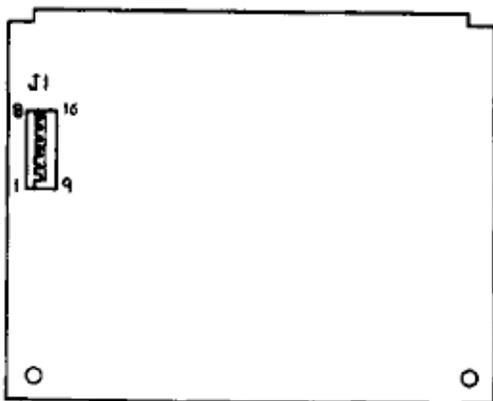
NONE

Switches

NONE

Test Points

NONE



A.2.04 Engine Connection PCB (LLCC)**Firmware**

NONE

Fuses

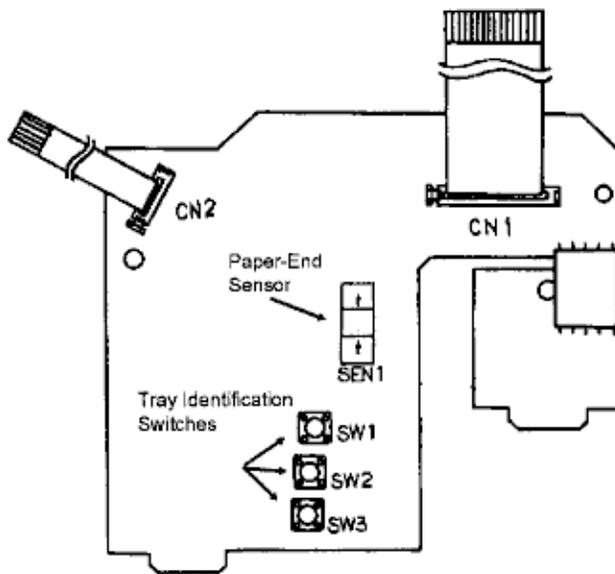
NONE

Jumpers

NONE

SensorsPaper-End Sensor
Switches
Paper Tray identification switches**Test Points**

NONE



Partner Exchange (BPX) for any updates to this material. (<http://bpx.okidata.com>)

A.2.05 Centronics Parallel Interface PCB (LLCP / LLCQ)

Firmware

NONE

Fuses

NONE

Jumpers

NONE

Sensors

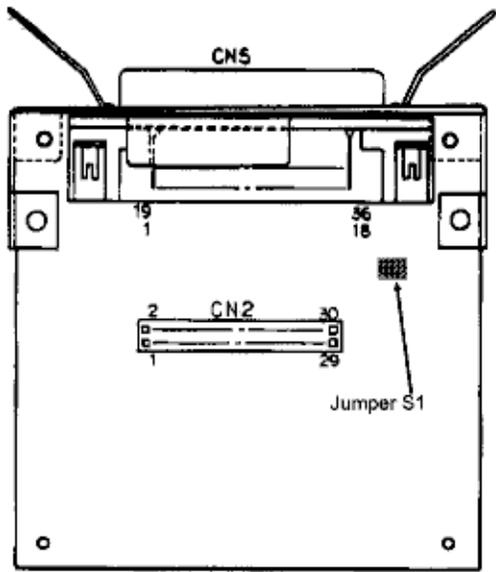
NONE

Switches

S1- Installed : +5vdc on CN5 Pin 18

Test Points

NONE



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A.2.06 RS-232C Interface PCB (LLRS)**Firmware**

NONE

Fuses

NONE

Jumpers

NONE

Sensors

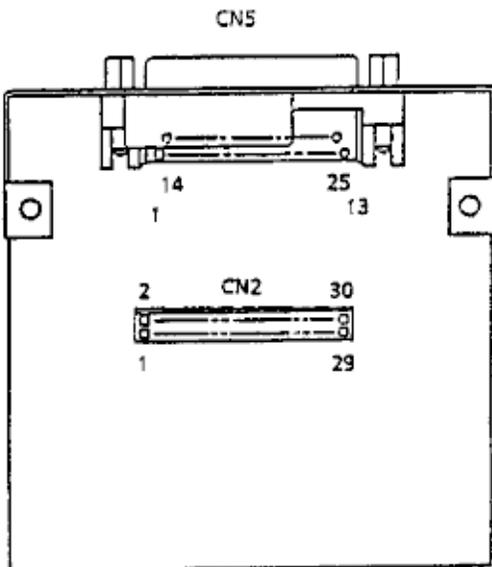
NONE

Switches

NONE

Test Points

NONE



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A.2.07 Expansion RAM Board (optional) (RAMK / RAMH)**Firmware**

NONE

Fuses

NONE

Jumpers

NONE

Sensors

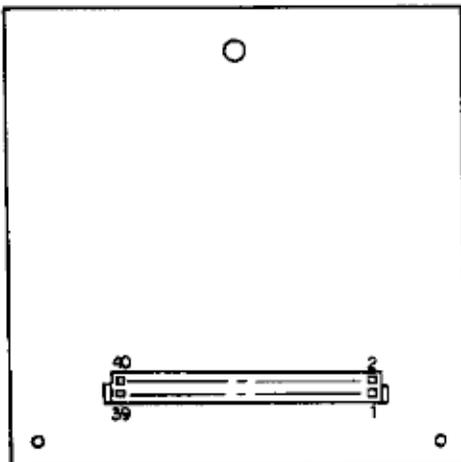
NONE

Switches

NONE

Test Points

NONE





Service Guide OL400

Chapter A Reference Charts

A.2.08 Power Interconnect Board (LLIE)

Firmware

NONE

Fuses

NONE

Jumpers

NONE

Sensors

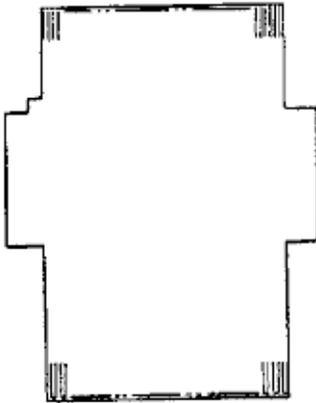
NONE

Jumpers

NONE

Testpoints

NONE



A.2.09 Power Supply Unit**Fuses**

F1: AC Line Fuse (125V 8A)

F2: +38 V Line Fuse (125V 2.5A)

Firmware

NONE

Jumpers

NONE

Sensors

NONE

Switches

Cover Interlock Switch

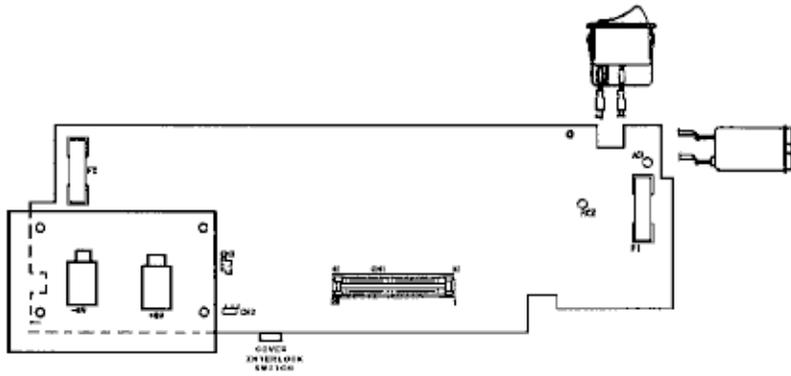
Testpoints:

+5V CN1 pins 13,31,32

+12V CN1 pin 12

-12V CN1 pin 11

+38V CN1 pin 15



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B.1 ILLUSTRATED PARTS LISTING

B.1.01 General Information

This appendix will assist you in identifying the assemblies and parts of the printers. Once you have used Section Four (Failure Analysis) to find a defective part, you can locate the part number in this section.

The format for this appendix is a series of tables with diagrams. The table contains the item reference number, the part description, and the Okidata part number. Also note that some items are only available as assemblies. Every effort has been made to clearly indicate which items are in assemblies and which are not.

Please read the Definition of Terms in the following section carefully. It is important that you understand the different types of parts classifications and their availability.

Please refer to the following resources for current part numbers and pricing.

Okidata's Bulletin Board (Okilink II) contains current part numbers, prices, and recommended stocking levels for each item listed as a recommended spare part. For instructions on accessing Okilink II, refer to the Service Center Reference Guide.

Okidata's Faxable Facts is an automated fax document retrieval system. Part numbers and pricing are available through Faxable Facts. For instructions on accessing Faxable Facts, refer to the Service Center Reference Guide.

Okidata's Technical Information Group is a telephone support line reserved for Authorized Dealers. Part numbers and pricing are available through Technical Information. For instructions on accessing Technical Information, refer to the Service Center Reference Guide.

REMEMBER

Current part numbers, recommended stocking levels, and pricing information are available through Okilink II, Faxable Facts, and Technical Information. Refer to the Service Center Reference Guide for information on accessing these resources.

B.1.02 Definitions of Terms

RSPL

Okidata recommends that this part/assembly be on hand for servicing.

Consumable

A consumable is a supply item which has a specified life and needs to be replaced periodically. It is purchased and installed by the end user. Okidata machines are designed to work exclusively with Okidata consumables. By using genuine Okidata consumable products, the investment made in the equipment will be protected.

Option

An option is a part/assembly which is added to a product and expands the product's functionality. An option may or may not be installed by the end-user. Instructions for installation accompany each option.

Option RSPL

Okidata recommends that this part/assembly be on hand for servicing installed options.

Document

A document is a printed item which supports the service and marketing of a product. Various documents are available from Okidata.

Blank

Okidata does not recommend stocking this item. This item should be purchased on an As Required Basis only. The availability of this item is NOT guaranteed by Okidata.

B.1.03 Parts Ordering Information

General Information

All authorized Okidata Dealers may order spare parts and consumables for Okidata products. Orders are placed through Okidata's Logistics Department.

When a technician has successfully completed a product certification course and the Dealer has become service authorized, an information package will be provided to the Dealer. The Okidata Service Center Reference Guide outlines the following.

Responsibilities of Okidata Service Centers

- Spare parts and consumables information
- Procedures for warranty repairs
- Product training, certification, and authorization
- Product support information
- Okidata depot information and services
- Third party service information
- Information about Okidata's Customer Information Center
- Okidata service and support telephone numbers.

The Service Center Reference Guide contains detailed procedures to follow when ordering parts. Please read, understand, and follow these procedures. Service authorization for a specific product must be obtained before a Dealer can submit warranty claims.

Questions regarding the Service Center Reference Guide should be directed to Okidata Dealer Service.

Placing a Parts Order

Please refer to the Service Center Reference Guide for details on ordering parts.

The following information **MUST** be available before an order is placed.

Okidata Dealer Authorization Number

Purchase Order number

Serial Number / Revision Level of the printer(s)

Okidata Part Number(s)

Use this Appendix, Okilink II, Faxable Facts, or Technical Information to find the correct part number. Refer to the Service Center Reference Guide for information on contacting Okidata.

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B.2 CHARTS

Below is an index to the illustrated parts breakdown charts.

Index to Charts

<u>Description</u>	<u>Section</u>
Items 1 - 7	B.2.01 
Items 8 - 16	B.2.02 
Items 17 - 27, and 41	B.2.03 
Items 28 - 35	B.2.04 
Items 36 - 40	B.2.05 

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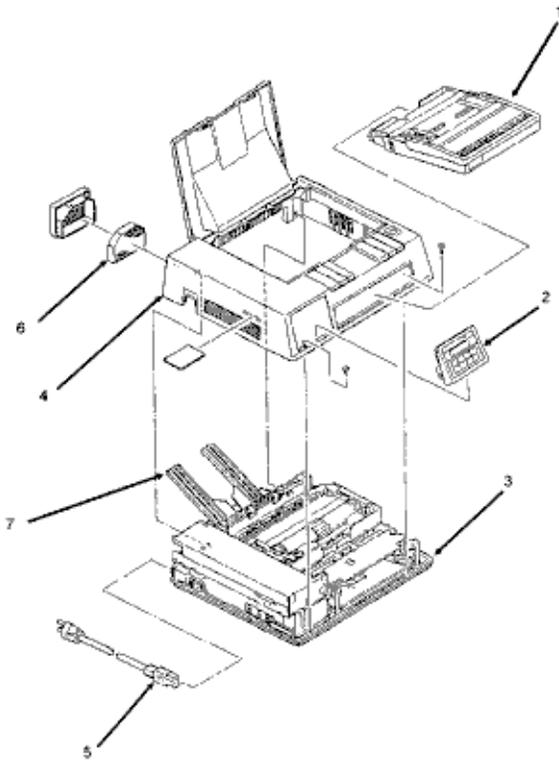


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Chapter B Illustrated Parts Listing

B.2.01 Items 1 - 7

Part numbers are subject to change. Refer to Section B.1.01  for finding current information.



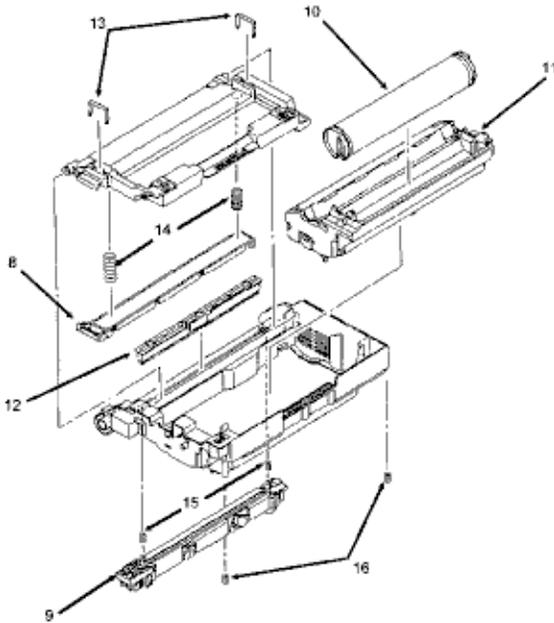
Item	Part Description	Okidata Part Number
1	Paper Cassette (Letter Size)	70013601
1	Paper Cassette (Legal Size)	70013701
2	Operator Panel Assembly	50213501
3	Lower Unit (Printer Base)	50213601
4	Upper Cover	50213901
5	AC Power Cord	56609701

6	Ozone Filter	55503501
7	Face-up Stacker Assembly	50066601

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B.2.02 Items 8 - 16

Part numbers are subject to change. Refer to Section B.1.01 for finding current information.



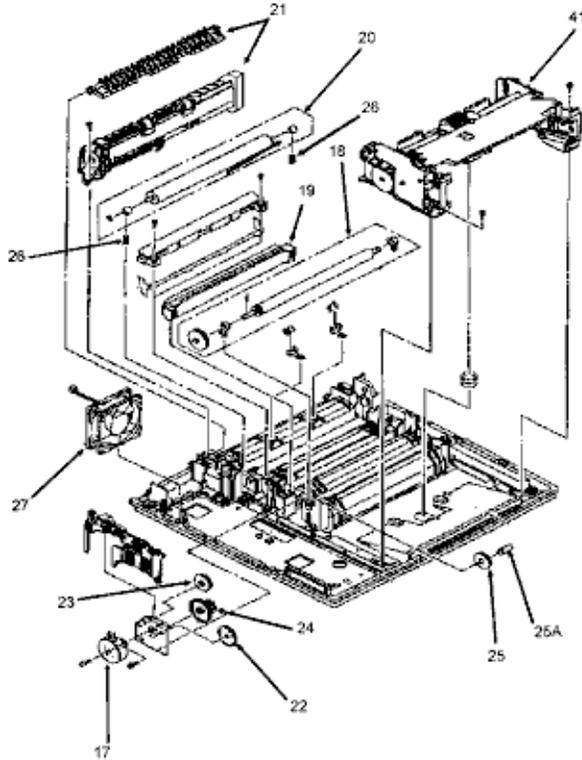
Item	Part Description	Okidata Part Number
8	LED Head	55619501
9	Fusing Unit (120 volts)	55044901
9	Fusing Unit (240 volts)	55044902
10	Toner Cartridge	52104201
11	Image Drum Cartridge	56106601
12	Fuser Cleaning Pad	53500901

13	LED Head Clamp Spring	50914301
14	LED Head Bias Spring	50914101
15	Fusing Unit Spring	50914601
16	Image Drum Tray Spring	50917205
**	120vac Upper Unit (includes #8 9 12 13 14 15 & 16)	50213701
**	240vac Upper Unit (includes #8 9 12 13 14 15 & 16)	50213702

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B.2.03 Items 17 - 27, and 41

Part numbers are subject to change. Refer to Section B.1.01 for finding current information.



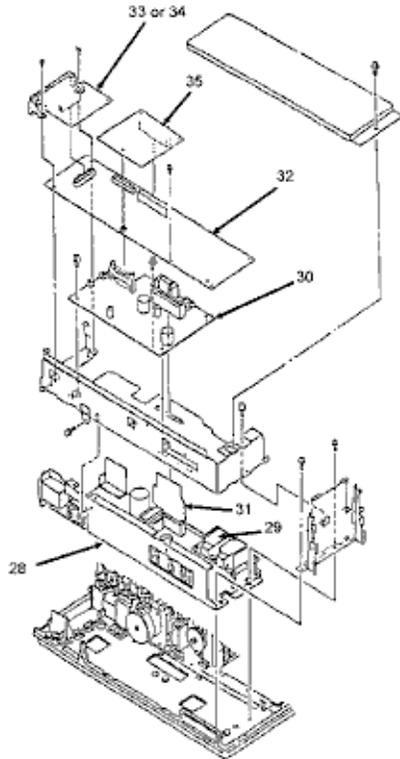
Item	Part Description	Okidata Part Number
17	Main Pulse Motor	56507301
18	Resist Roller Assembly	50079101
19	Transfer Charger Assembly	50087301
20	Backup Roller Assembly	50079001
21	Paper Exit Assembly	50066501

22	Idle Gear "A"	51218401
23	Idle Gear "B"	51218501
24	Reduction Gear	51218701
25	Idle Gear (in base)	51218601
25A	Post	53329501
26	Backup Roller Pressure Spring	50914801
27	DC Fan Assembly	56507601

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B.2.04 Items 28 - 35

Part numbers are subject to change. Refer to Section B.1.01 for finding current information.



Item	Part Description	Okidata Part Number
28	Power Supply Unit (120Volts)	56408703
28	Power Supply Unit (240Volts)	56408702
29	High Voltage Power Unit	55047301
30	Engine Controller Board (LLAB PCB) without ROM	55044401
31	Power Connection Board (LLIE PCB)	55044701

32 *	Main Controller Board (LBPE PCB) w/o ROM	55045901
32 *	Main Controller Board (LBPK PCB) w/o ROM	55053501
32 *	Main Controller Board (LBPK PCB) w/o ROM	55062701
33	Centronics Interface Board (LLCP PCB)	55044201
33	Centronics Interface Board (LLCQ PCB)	55053601
33	Centronics Interface Board (LLCR PCB)	Not available as a spare part
34	RS232-C Serial Interface Board (LLRS PCB)	55044301
35	RAM Expansion Board (w/ 1MB)	55040901

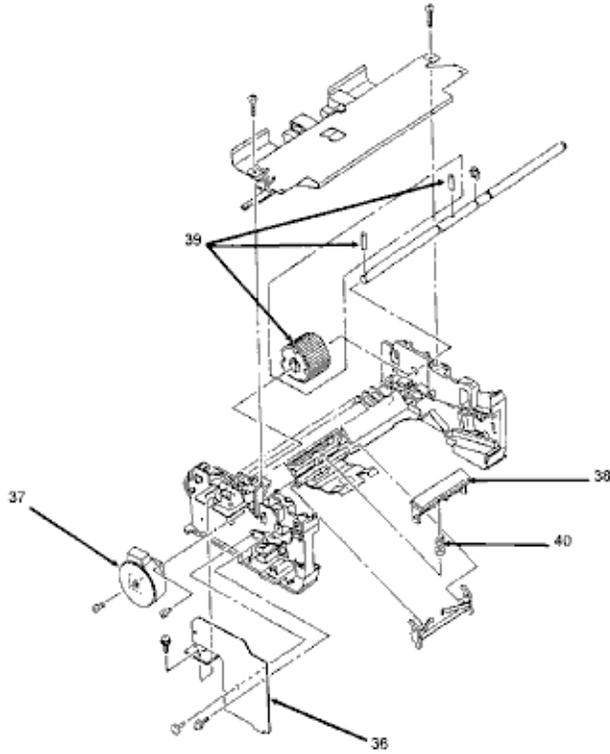
NOTE:

Three Main Controller Boards are available.

See Appendix A { } for information on installing the correct board.

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B.2.05 Items 36 - 40



Item	Part Description	Okidata Part Number
36	Engine Connection Board (LLCC PCB)	55044601
37	Resist Motor (70 Ohms)	56507401
37A	Resist Motor (79 Ohms)	56507402
38	Separator	53500501
39	Hopping Roller (includes 2 pins)	53500601
40	Separator Spring	50917101

41	Paper Feed Assembly<R>Includes all items shown on drawing	50213801
Not Shown	Paper Cassette Spring	50917001
Not Shown	Cover Open Switch<R>(mounted on the Power Supply Frame)	55050701

Part numbers are subject to change. Refer to Section B.1.01 { } for finding current information.

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