FS-1500/A
User's Manual

We shall have no liability or responsibility to customers or any other person or entity with respect to any liability, loss or damage caused or alleged to be caused directly or indirectly by equipment sold or furnished by us, including but not limited to, any interruption of service, loss of business or anticipatory profits, or consequential damages resulting from the use or operation of the equipment or software.

Caution

NO LIABILITY IS ASSUMED FOR ANY DAMAGE CAUSED BY IMPROPER INSTALLATION.

SOFTWARE USED WITH THIS PRINTER MUST SUPPORT THE PRINTER'S EMULATION MODE. The printer is factory-set to emulate the HP LaserJet III. The emulation mode can be changed by following the procedures described in section 2.2.

Notice

The information in this manual is subject to change without notification. Additional pages may be inserted in future editions. The user is asked to excuse any technical inaccuracies or typographical errors in the present edition.

No responsibility is assumed if accidents occur while the user is following the instructions in this manual. No responsibility is assumed for defects in the printer's firmware (contents of its read-only memory).

Regarding Tradenames:

PRESCRIBE is a registered trademark of Kyocera Corporation.
PRESCRIBE II, KIR (Kyocera Image Refinement), Ecosys, and Ecotone are trademarks of Kyocera Corporation.

Diablo 630 is a product of Xerox Corporation. IBM Proprinter X-24E is a product of International Business Machines Corporation. Epson LQ-850 is a product of Seiko Epson Corporation. HP LaserJet III and HP 7475A are products of Hewlett-Packard Company. Hewlett-Packard, PCL, and HP-GL are registered trademarks of Hewlett-Packard Company. Centronics is a trade name of Centronics Data Computer Corp. PostScript is a registered trademark of Adobe Systems Incorporated. AppleTalk is a trademark of Apple Computer, Inc.

Typeface Trademark Acknowledgement

Dutch801 and Swiss742 are trademarks of Bitstream Inc.

This Kyocera page printer uses PeerlessPrint5 to provide the HP LaserJet III compatible PCL5 language emulation. PeerlessPrint5 is a trademark of The Peerless Group, Redondo Beach, CA 90278, U.S.A.

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

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

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

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

- Reorient the receiving antenna.
- Relocate the printer or computer with respect to the receiver.
- Move the printer or computer away from the receiver.
- Plug the printer into a different outlet so that the printer and receiver are on different branch circuits.
- Connect the printer to the computer with a grounded, shielded interface cable.

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

You may find the following booklet prepared by the Federal Communications Commission helpful:

How to Identify and Resolve Radio-TV Interference Problems

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

Interface cable

Either of the following interface cables meets the FCC requirements:

- Parallel interface: IBM Printer cable type 1525612
- Serial interface: IBM communication adapter cable type 1502067 (See *Appendix E.*)

Ozone Concentration

The printers generate ozone gas (O_3) which may concentrate in the place of installation and cause unpleasant smell.

To minimize concentration of ozone gas, we recommend you not to install the printer in a confined area where ventilation is blocked.

IMPORTANT SAFEGUARDS

1. Read all of these instructions and save these instructions for later use.

2. Unplug this product from the wall outlet before cleaning.

3. Do not use this product near water.

4. Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.

5. Slots and openings in the cabinet and the back are provided for ventilation to ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.

6. This product is equipped with a 3-wire grounding type plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.

7. Do not allow anything to rest on the power cord. Do not locate this product where persons will walk on the cord.

8. If an extension cord is used with this product, make sure that the total of the ampere ratings on the products plugged into the extension cord do not exceed the extension cord ampere rating.

9. Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind on the product.

10. Except as explained elsewhere in *USER'S MANUAL*, do not attempt to service this product yourself. Removing covers may expose you to dangerous voltage points or other risks. Refer all servicing in those compartments to service personnel.

11. Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

A – When the power cord or plug is damaged or frayed.

B – If liquid has been spilled into the product.

C – If the product has been exposed to rain or water.

D – If the product does not operate normally when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions since improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.

E – If the product has been dropped or the cabinet has been damaged.

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Introduction

This Kyocera page printer gives you one of the newest and best computer printing technologies. If you are used to a dot matrix printer or daisywheel printer, you are in for a pleasant surprise. You will find that this printer prints faster, quieter, and much more versatile, and you will like the near-typeset print quality and excellent graphics.

The Kyocera printer has many extremely desirable features. It was designed to make a contribution to a cleaner environment in mind as well as to represent the latest generation of page printer technology. Other features include:

Maintenance Features

- **Compact design** – Thanks to the inboard paper cassette configuration, the printer installation requires a space as small as a computer display does.

- **Ultra long life modules** – The main modules for developing image and printing, such as the drum, developer, and the fuser, are specifically designed for extraordinarily long life and need no periodic replacement. The drum is made of amorphous silicon which is environmentally transparent and is designed as a permanent component in the printer. The only maintenance regularly needed is to replenish the toner supply in the developer every 5,000 pages (A4 size, 5%) and to clean some parts inside the printer.

- **Minimized ozone gas emission** – The printer employs no intense negative corona charge that is found in many laser printers and generates ozone gas. Therefore, the amount of ozone gas that the printer generates is extraordinarily low.

- **Amorphous silicon drum** – Kyocera's own and unique ceramics technology brought an extremely hard and tough drum with extraordinarily long service life. Also, the drum has prominent photoconductive properties, such as stability and reliability against varying temperatures, resistance to heat and solvent, etc., which offer high resolution and fine image with surprising fidelity.

- **Safe and clean waste** – The toner supply container and the waste toner bottle are made of a burnable material which generates no harmful gas when burning.

Print Engine Features

- **High speed** – A4-size pages typically print at the rate of 10 pages per minute. (Actual time required varies according to page complexity.)

- **Large paper capacity** – The printer accommodates the paper feed cassette with a capacity of 250 sheets (75 g/m^2 [20 lbs/ream] basis weight, 0.1 mm thickness). It also provides a face-down output tray and a face-up output tray.

- **Wide print media variety** – In addition to standard paper, the printer prints on special media of a wide range of types and sizes, including envelopes, labels and OHP film.

- **Superb print quality** – The printer's combination of the Kyocara's state-of-the art technologies, such as the amorphous silicon drum and micro fine ceramics toner (Ecotone), dynamically driven micro LED printing head, multiple component developing system, and KIR [Kyocera Image Refinement], provides sharpness and consistency that is unmatched by other printer maker.

Software Features

- **Bitmapped and scalable typefaces** – In addition to its 79 internal bitmap fonts, the printer provides 13 fully-scalable resident typefaces. The scalable typefaces can be used at any size desired up to 999.75 points, in 0.25-point increments.

- **A new printer control language, PRESCRIBE II, with features including** – advanced graphics capabilities that allow you to print any conceivable outline shape or solid form. Also provided are a variety of special effects, such as patterned fills, gray-scale shading, a user-accessible print image model, and multiple page orientations and print directions within the same page.

- **Automatic rotation of fonts and graphics** – Images and scalable fonts are automatically rotated to match the page orientation.

- **A wide variety of internal symbol sets** – The printer supports most Hewlett-Packard LaserJet III compatible symbol sets for both bitmap and scalable fonts.

- **Display of printer messages in any of seven languages** – English, French, German, Spanish, Italian, Danish, or Swedish.

- **Two IC card slots for option fonts, macros, forms, etc.** – Data in the IC cards can be selectively reread from the printer's control panel.

- **Large memory** – 1MB of base memory, expandable with optional SIMMs to a maximum capacity of 5 megabytes.

- **Multiple interface**—Standard serial, Centronics, and an option interface for simultaneous use of the printer by different computers.

Options

The following options are available for the printer.

PC-7 Paper cassette for the printer (A5, B5, A4, Letter, and Letter/Legal sizes)
PF-5 Paper Feeder
PC-8 Paper cassette for PF-5 (A5 to Legal sizes)
EF-1 Envelope Feeder
PA-1 Paper Path Adaptor (for PF-5)
PK-2 PostScript Upgrade Kit
FR-1 PCL Font ROM (bitmap and scalable fonts)
IB-3 AppleTalk Interface Board

Guide to the Printer Manuals

Three manuals are supplied with the printer:

User's Manual (this manual)

The main topics covered in this manual are:

- Installation
- Control panel operations
- Maintenance and troubleshooting

The *USER'S MANUAL* guides you through the installation procedure and explains the basic printing operations. It contains the basic information you need to use the printer with word-processing and graphics software.

FS-SERIES TECHNICAL REFERENCE manual

The main topics covered in this manual are:

- PRESCRIBE II command language (tutorial)
- Emulation features

The *TECHNICAL REFERENCE* manual explains how to place PRESCRIBE II commands in document files for formatting, to change type styles "on the fly," to add graphic designs, etc. Read *TECHNICAL REFERENCE* manual when you want to go beyond the capabilities of software designed for other printers.

PRESCRIBE II COMMAND REFERENCE manual

This manual gives a full list of the PRESCRIBE II commands and their parameters in detail for experienced users. Many practical examples of the PRESCRIBE II commands are also provided in this manual.

Chapter 1:
Installing the Printer

This chapter explains how to unpack and install the printer. The topics covered are:

- Names and functions of parts
- Choosing a location
- Unpacking and inspection
- Setup and interfacing

1.1. Names of Parts

This section takes you on a guided tour of the printer, pointing out its major parts and giving a brief description of the function of each. The tour starts with the main outer parts and concludes with what you will see when you open the printer up for maintenance. The part names introduced in this section will be used throughout this manual.

Main Parts

Main switch – turns the printer's power on and off.

Control panel – contains the printer's switches and indicators.

IC card slots – for inserting IC cards to obtain additional fonts, macros, forms, etc.

Top cover release lever – opens the printer's top cover.

Manual feed tray – used to feed paper of sizes different from the cassette size by hand. The paper guides adjust to the size of manually fed paper, to center the paper. This tray is not necessary when cassette paper is used for most of your printing jobs.

Paper feed unit release lever – draws out the paper feed unit.

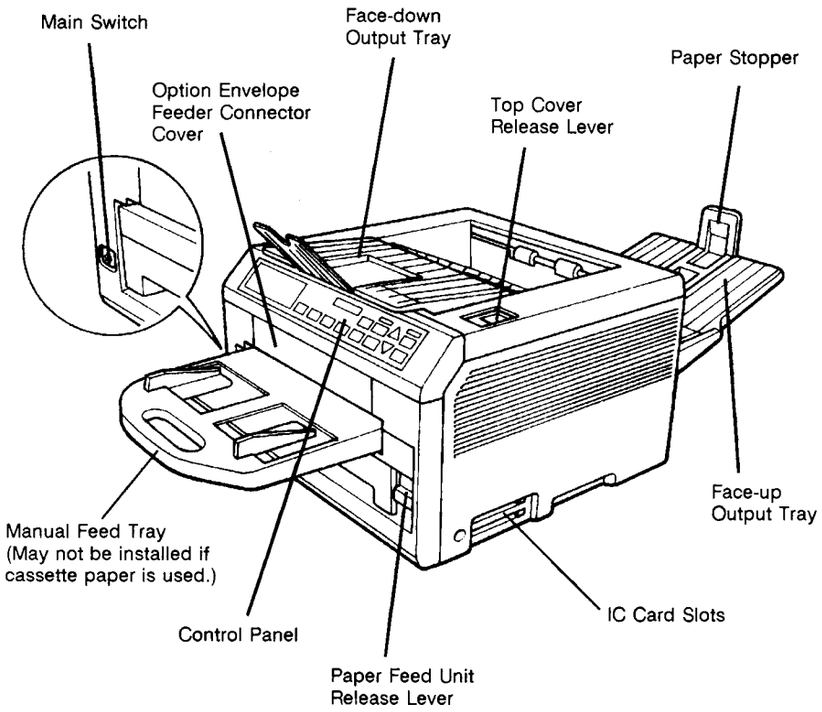
Option envelope feeder connector cover – must be removed when installing an optional envelope feeder, to connect the feeder to the printer's connector located behind this cover.

Face-down output tray – receives the printed pages face-down.

Face-up output tray – receives the printed pages face-up.

Paper stopper – keeps printed pages in the paper output tray.

Figure 1.1 Main Parts



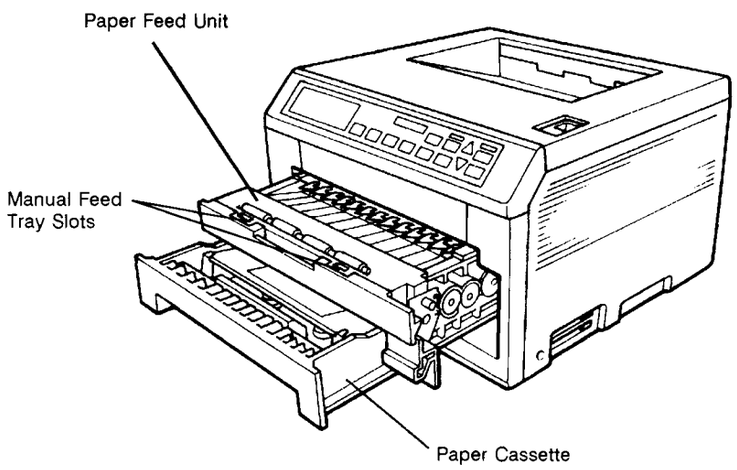
Paper Feed Unit and Paper Cassette

Paper feed unit – picks up paper in the paper cassette and feeds it forward for printing.

Paper cassette – holds paper for automatic feeding.

Manual feed tray slots – used to mount the manual feed tray on the printer.

Figure 1.2 Paper Feed Unit and Paper Cassette



Rear Panel

Parallel interface connector and RS-232C connector – for connecting the printer to the computer.

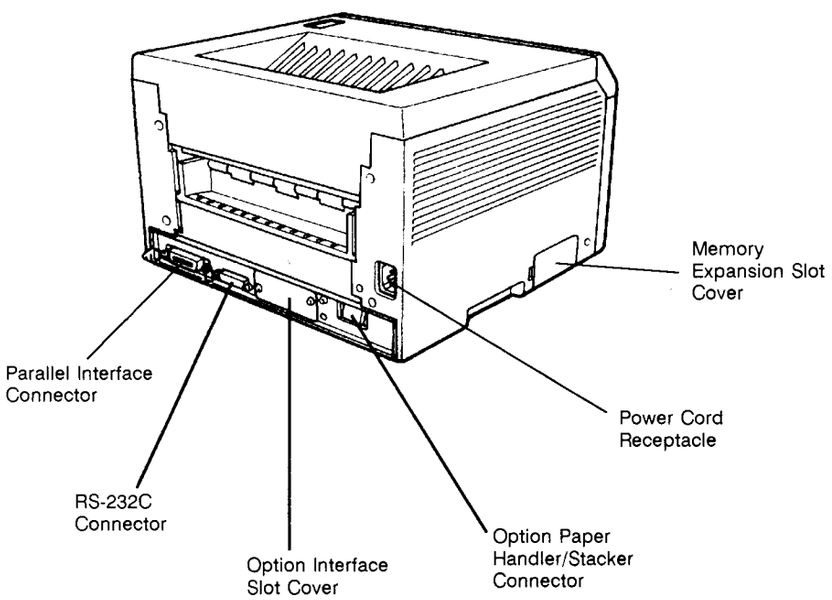
Option interface slot cover – for installation of an option interface kit. The cover must be removed when the kit is installed.

Option paper handler/stacker connector – for connecting the paper handler/stacker's connector.

Power cord receptacle – for the power cord.

Memory expansion slot cover – must be removed when installing an optional memory. See *Appendix G*.

Figure 1.3 Rear Panel



Interior Parts of the Printer

Developer unit – transfers toner to the drum, to develop the image written by the LED light.

Drum unit – contains the LED head, amorphous silicon photoconductive drum, and the main charger.

Drum unit cover open button – opens the drum unit cover for cleaning the main charger and the LED head with the MH cleaner.

Print density control – adjusts the print density.

Fuser unit – fuses the toner onto the paper.

Fuser cleaning pad – lubricates and cleans the heat roller in the fuser.

Waste toner bottle – collects toner that does not adhere to the paper.

Waste toner bottle release button – pressed when removing the waste toner bottle.

MH (main charger and head) cleaner – used for cleaning the transfer charger wire and the LED head. The MH cleaner can be stowed inside the printer when not in use as shown in Figure 1.4.

Drum Unit

LED head – emits parallel beam to write the invisible electrical image on the drum.

Amorphous silicon drum – develops the electrical image as scanned by the LED head. The image is transferred to the paper by applying toner to the drum.

Made of extremely hard and tough amorphous silicon material, the drum is a permanent component of the printer.

Main charger wire – gives an electrical charge to the surface of the drum.

Figure 1.5 Drum Unit

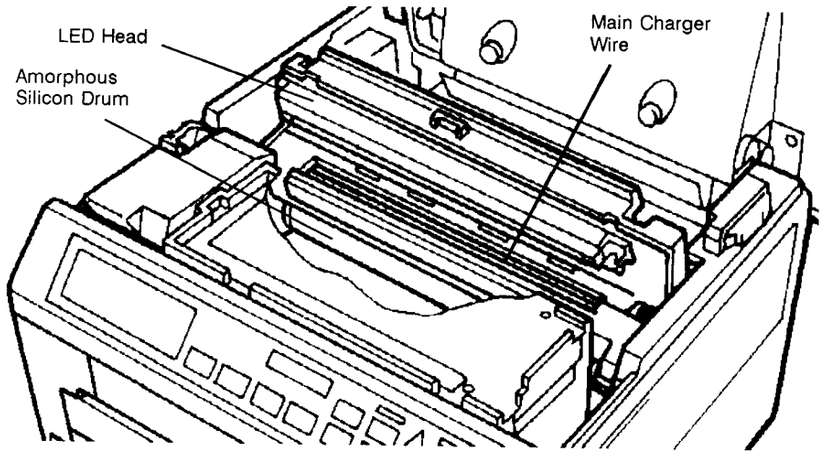
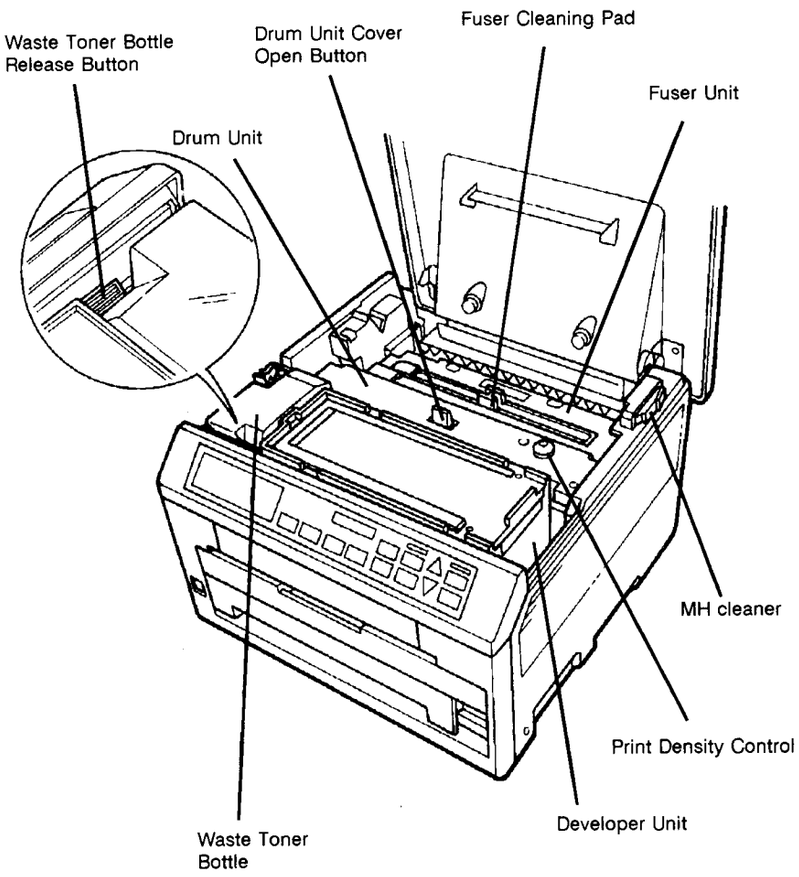


Figure 1.4 Interior Parts of the Printer



1.2. Choosing a Location

Basic Requirements

The printer will work best if it is installed in a location that is:

- Near the computer

The connecting cable should not be longer than 3 meters (10 feet).

- Level and well supported

Place the printer on a sturdy table or desk. Do not place the printer on an unstable cart, stand, or table. The printer may fall, causing serious damage to the printer.

- Near an AC wall outlet, preferably one that can be used for the printer alone (See the *Note on Power* on page 1-11.).

Power requirements:

Voltage	120 V (FS-1500A), 220 V to 240 V (FS-1500), ±10% at each voltage
Frequency	50 Hz or 60 Hz, ±2%
Current capacity	Max. 5 A at 120 V, or Max. 2.5 A at 220 V to 240 V

The outlet should have a ground slot, or you should use an adapter.

If you use an extension cord, the total length of the power cord plus extension cord should be 5 meters (17 feet) or less.

- Well ventilated, not too hot or cold, and not too damp or dry

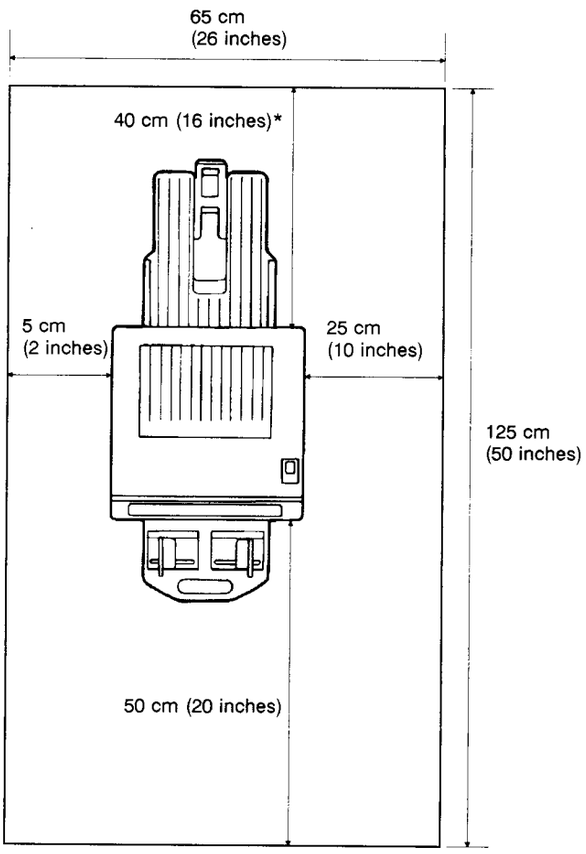
Temperature	10°C to 32.5°C, ideally about 20°C (50°F to 90.5°F, ideally about 68°F)
Humidity	20% to 80%, ideally 65%

If you install the printer where the temperature or humidity is outside the above ranges, you may not get the best print quality, and there will be increased chance of paper jam.

Clearance

Allow the necessary minimum clearances on all sides of the printer. See below.
A total space of 65 cm by 125 cm (26 by 50 inches) is needed.

Figure 1.6 Minimum Clearance



* 20 cm (8 inches) when the face-up output tray is not installed.

Places to Avoid

Avoid installing the printer in locations exposed to:

- Direct drafts of hot or cold air
- Direct drafts of outside air (Avoid locations next to outside doors.)
- Sudden temperature or humidity changes
- Any source of high heat, such as a radiator or stove
- Excessive dust
- Vibration
- Ammonia fumes or other harmful fumes (If you are going to fumigate the room or saturate it with insecticide, move the printer out first!)
- Avoid greenhouse-like rooms (because of sunlight and humidity).
- Avoid enclosed spaces that block ventilation.
- Avoid sites more than 2000 meters (6500 feet) above sea level.

Note on Power

The printer should not be on the same power circuit as an air conditioner, fluorescent light, copier, or shredder, because these devices generate electrical noise on the power line. If it must share a power circuit with equipment like this, a high-frequency noise filter or isolation transformer is advisable. (Filters and transformers are available commercially.)

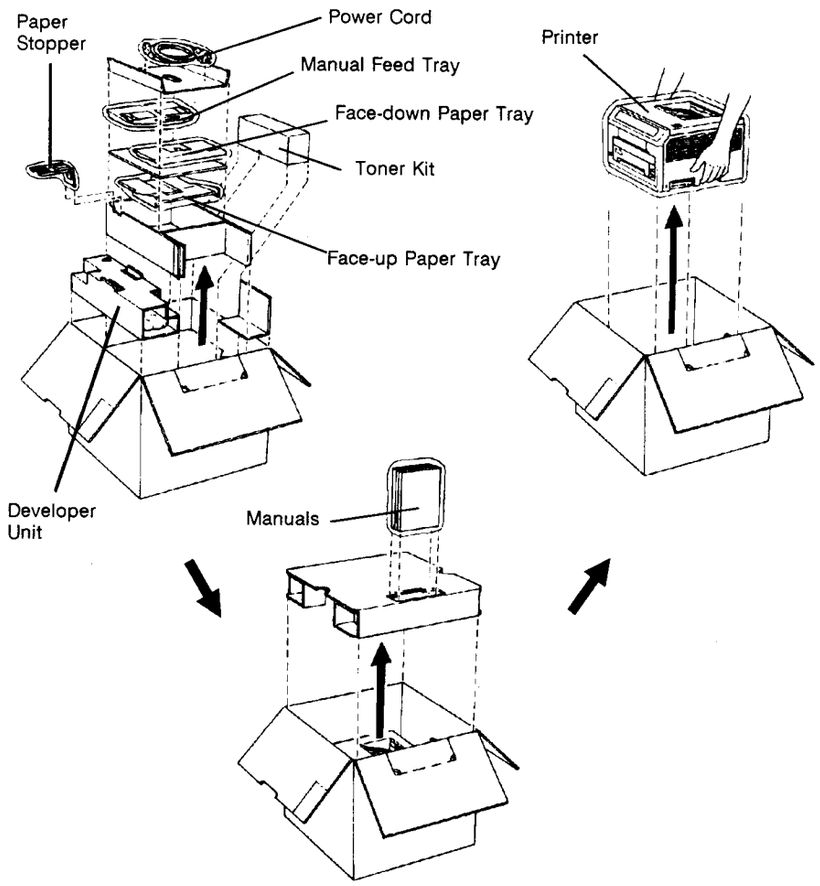
Avoid using plug multipliers to connect a large number of devices on the same circuit as the printer.

If the power from the outlet itself appears to be unstable, a line stabilizer should be used. In places where the voltage tends to fluctuate, it may be necessary to install a voltage regulator.

1.3. Unpacking and Inspection

The printer is packed as shown below. When you unpack it, check that the listed parts are all present.

Figure 1.7 Printer Packing



List of Shipped Components

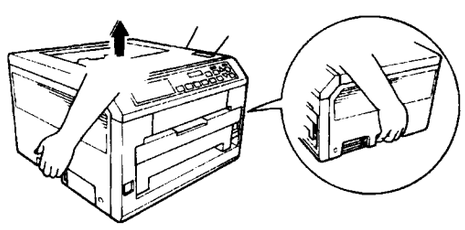
- Printer
- Paper feed cassette
- Manual feed tray
- Face-down output tray
- Face-up output tray
- Paper stopper
- Power cord
- Toner kit including a toner container, a fuser cleaning pad, a wiper cloth, and a waste toner bottle
- Developer unit
- USER'S MANUAL
- Printer TECHNICAL REFERENCE manual
- PRESCRIBE II COMMAND REFERENCE manual

Save the box and other packing materials in case you ever have to repack the printer for transportation.

Lifting the Printer

When lifting the printer for moving, it must be held in the manner as shown. No other parts of the printer may be used for lifting purpose.

Figure 1.8 Lifting the Printer



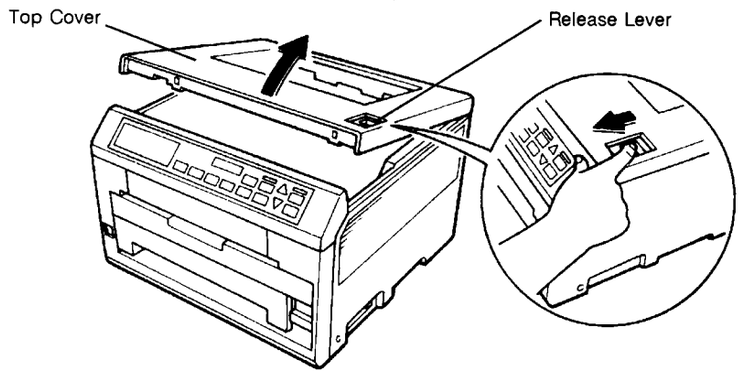
1.4. Setup and Interfacing

The steps in setting the printer up are:

1. Open the top cover.
2. Install the developer unit.
3. Supply toner into the developer.
4. Install the waste toner bottle.
5. Install the fuser cleaning pad.
6. Close the printer's top cover
7. Set paper
8. Install the manual feed tray (if necessary).
9. Install the face-down output tray
10. Mount the paper stopper.
11. Install the face-up output tray (if necessary).
12. Attach the power cord.
13. Connect the printer to the computer.
14. Test the printer.
15. Test the interface with the computer.
16. Set the emulation mode.

1—Open the Top Cover

Remove any paper or other objects lying on top of the printer (so they will not fall down).

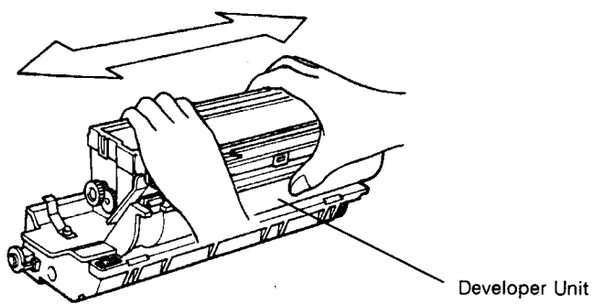


Lift the release lever on the top of the printer and raise the top cover all the way.

2—Install the Developer Unit

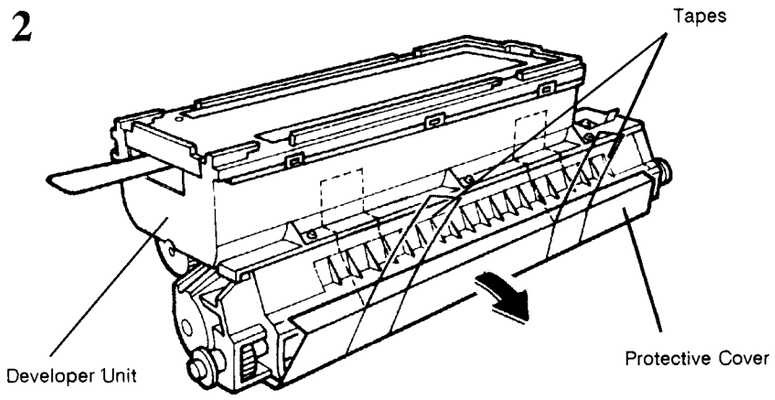
Take out the developer from the protective bag and install as follows.

1



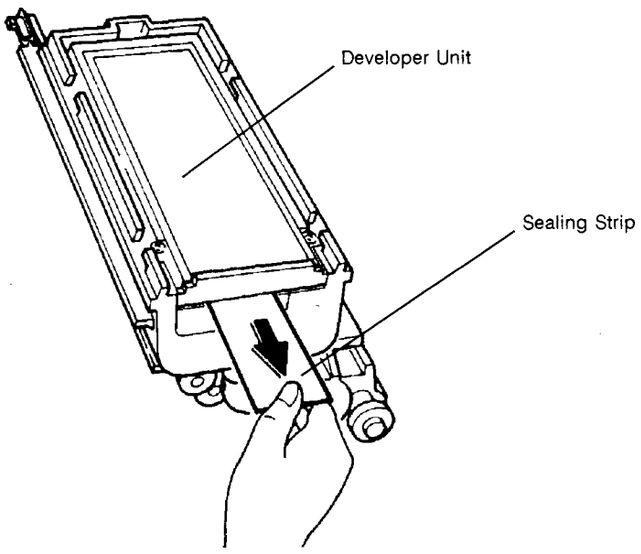
Give the developer unit a horizontal shake of several times.

2



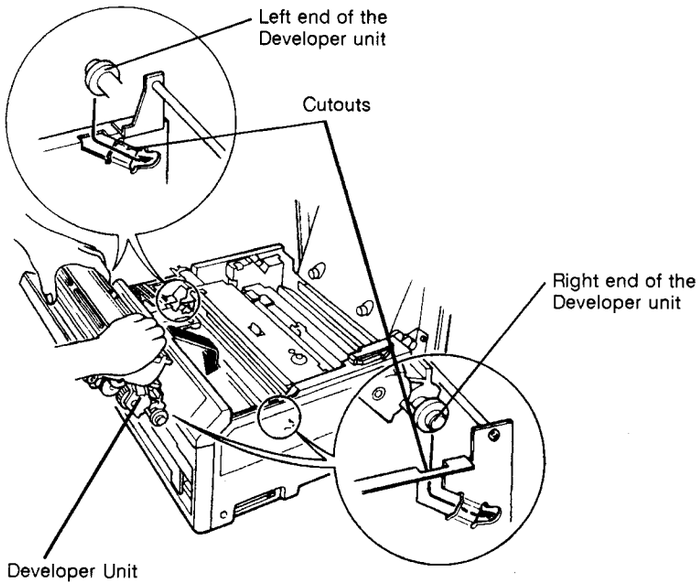
Peel off the tapes, and remove the protective cover from the developer unit.

3



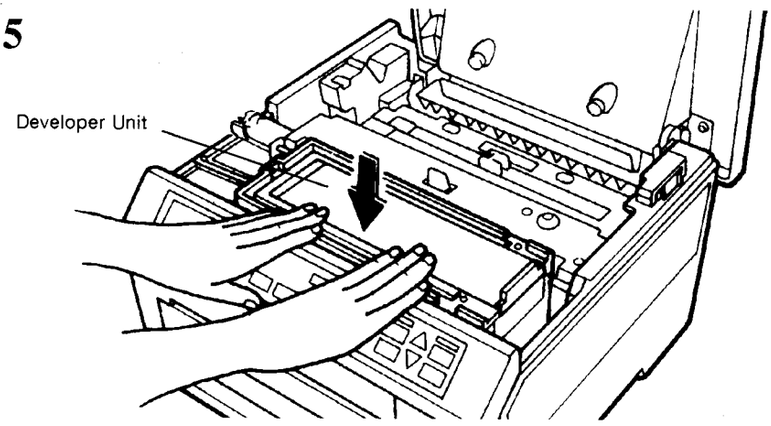
Carefully pull the sealing strip off. Dispose of the sealing strip.

4



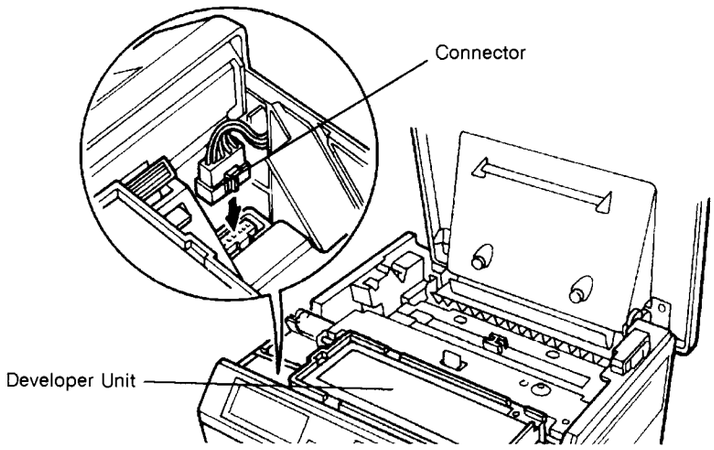
Install the developer unit in the printer, with its rear side inclined sightly as shown above. Align the left and right ends of the developer unit with the guiding cutouts in the printer.

5



When the developer ends are placed correctly in the cutouts, push the developer unit lightly on top.

5



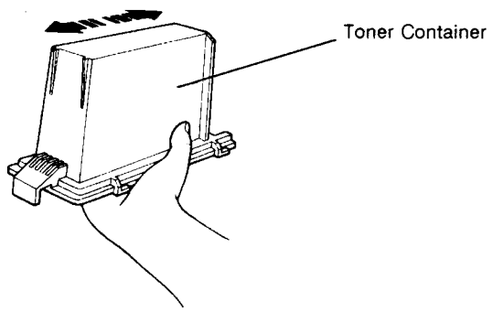
Connect the connector in the printer to the matching one on the developer unit.

3 – Supply Toner into the Developer

This section follows *2 – Install the Developer Unit*. Before proceeding, make sure you have followed all necessary steps in the previous section.

Note: **The toner can not be supplied in the developer unit if the waste toner bottle is installed first.**

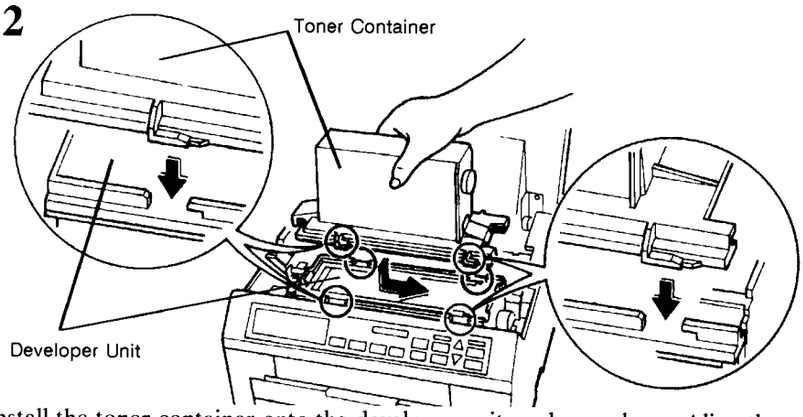
1



Take the toner container from the toner kit. Give it a good shake (Shake it 5 or 6 times) to loosen and mix the toner inside.

Note: **Do not pull the shutter on the toner container before the toner container is fitted to the developer unit.**

2

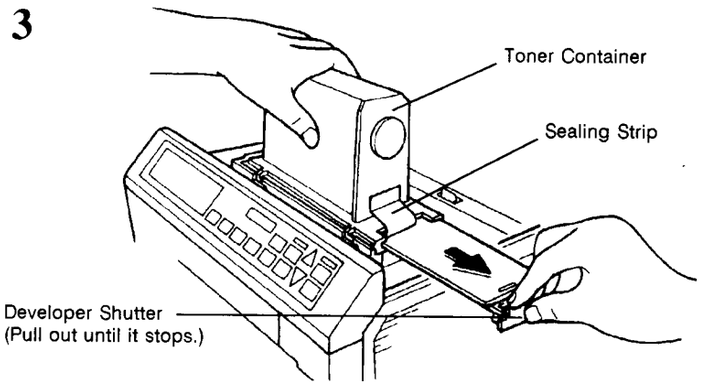


Install the toner container onto the developer unit as shown above. Align the toner container so that its bottom is held by the four notches of the developer unit.

Then, slide the toner container to the right so that it locks in.

Note: **Make sure that the toner container is properly locked on the developer unit.**

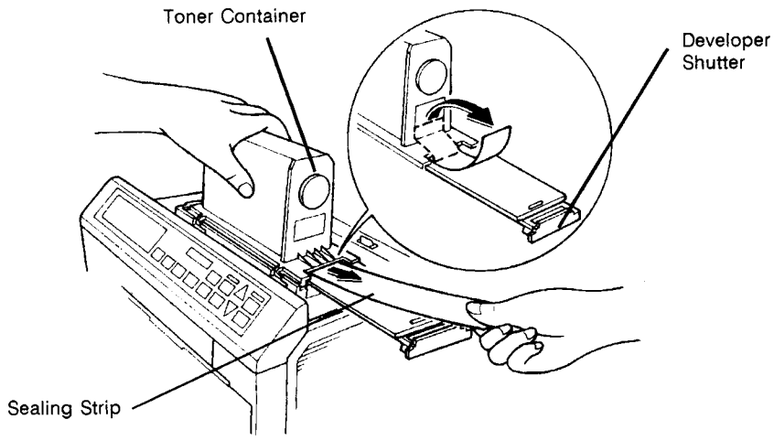
3



While holding the toner container locked in place, pull the developer shutter slowly towards the right side of the printer all the way until it stops.

Note: **If the shutter does not slide easily, check if the toner container is properly fitted on the developer unit.**

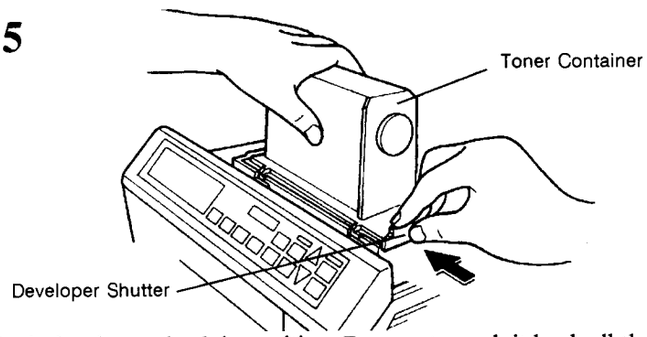
4



The bottom of the toner container is sealed with a plastic strip. Peel off the seal on the toner container and carefully pull the sealing strip off. Dispose of the sealing strip. The toner container is now open at the bottom.

Tap lightly several times on top of the toner container to knock off toner adhering to the sides.

5



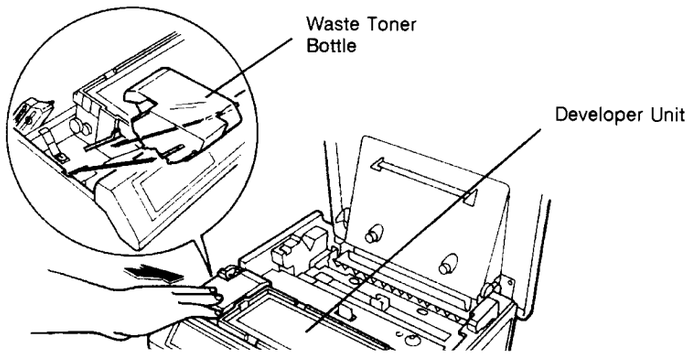
Push the shutter back in position. Be sure to push it back all the way to fully close the bottom of the toner container. If the shutter is not properly closed, the toner adhering to the sides in the container may be scattered outside when the container is removed.

Remove the toner container using the reverse manner of step 2 and dispose it. (The toner container is made of a burnable material which generates no harmful gas when burning.)

4 – Install the Waste Toner Bottle

The waste toner bottle is in the toner kit supplied with the printer. The waste toner bottle must be installed in the printer.

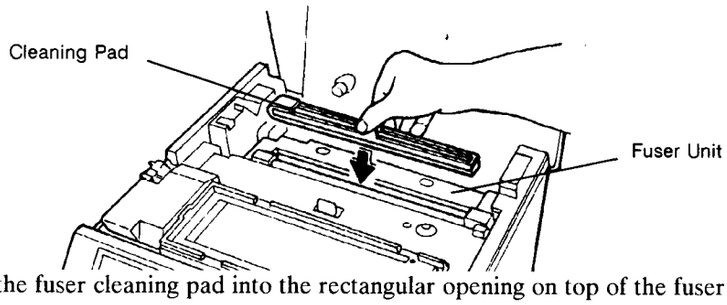
Install the waste toner bottle in the printer as shown below. Align the tabs on the bottle with the guiding slots in the printer and the developer unit.



Push the waste toner bottle lightly on top to lock it in place, until a click is heard.

5 – Install the Fuser Cleaning Pad

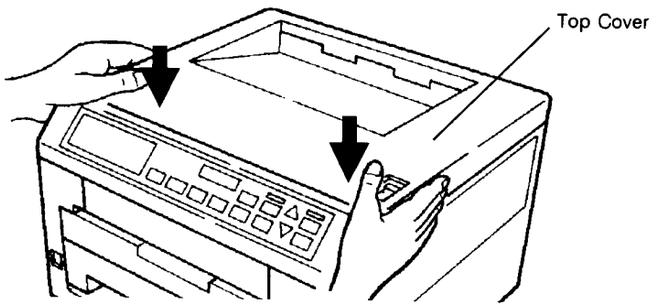
The fuser cleaning pad in the toner kit. The cleaning pad must be installed in the fuser unit.



Install the fuser cleaning pad into the rectangular opening on top of the fuser unit.

6—Close the printer's top cover

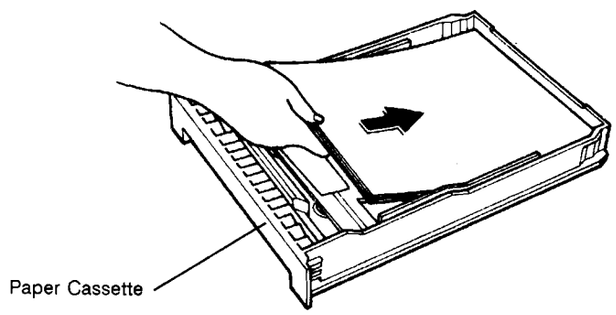
Close the top cover by pressing the front left and right sides.



7—Set Paper

Note: **Read the paper manufacture's instructions concerning handling of the paper.**

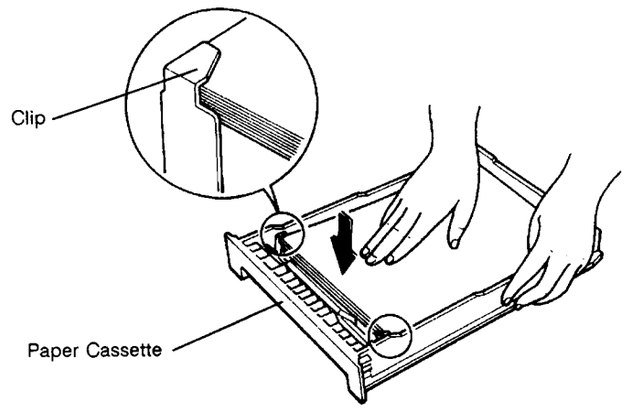
1



Set paper in the cassette. The side of paper that faces downward in the cassette is the one on which printing is done. The paper size must match the cassette size. Tap the edges of the paper to align them neatly, as shown above.

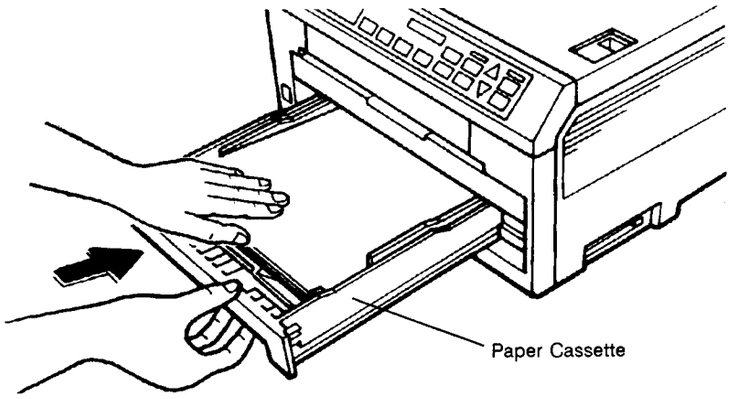
Don't put in more paper than the limit indicated on the cassette. (The cassette should hold approximately 250 sheets of paper with 75 g/m^2 [20 lbs/ream] basis weight, 0.1 mm thickness.)

2



Push the paper under the clips at the two corners as shown above.

3

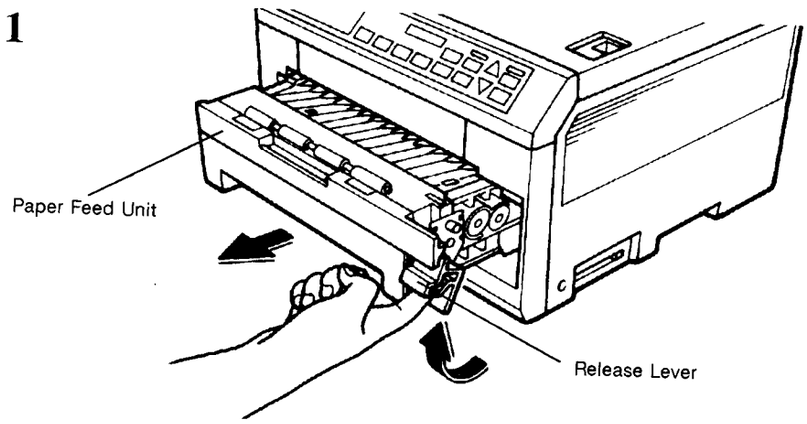


While pushing the paper down in the cassette, insert the paper cassette into the cassette slot in the printer. Push it straight as far as it will go.

8—Install The Manual Feed Tray

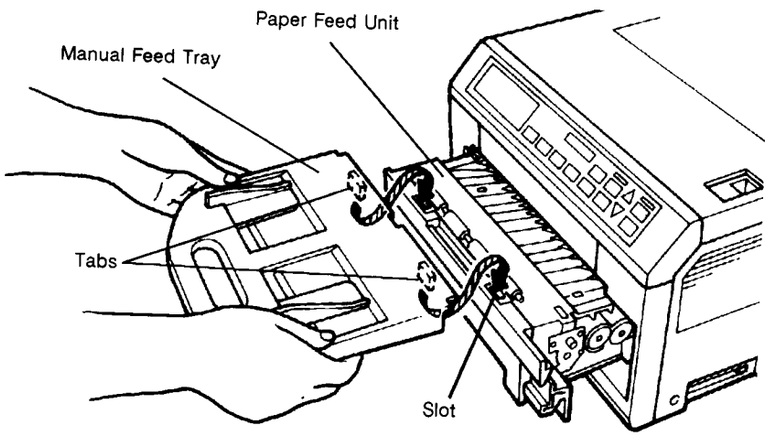
The installation of the manual feed tray is optional. With the paper tray installed, you can manually feed paper of a wide variety of sizes without reloading the paper cassette.

1



Pull the release lever as shown and draw out the paper feed unit half way out.

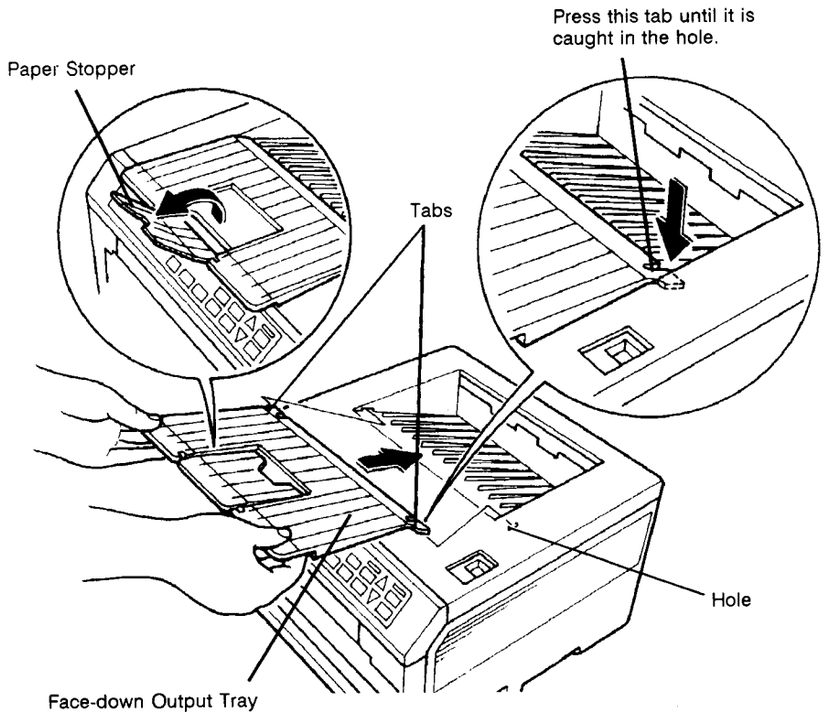
2



Insert the tabs on the manual feed tray into the slots in the paper feed unit.

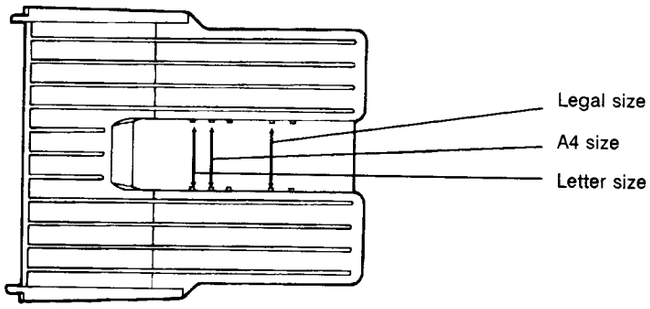
9—Install the Face-down Output Tray

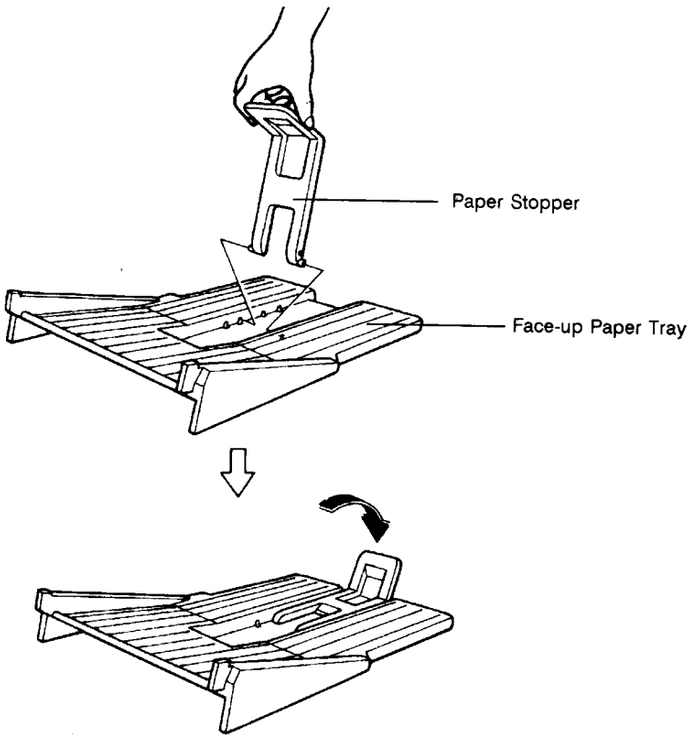
Mount the face-down output tray as shown below. Press the tabs on the tray into the holes on top of the printer. Open the paper stopper as shown if you use legal size paper.



10—Mount the Paper Stopper

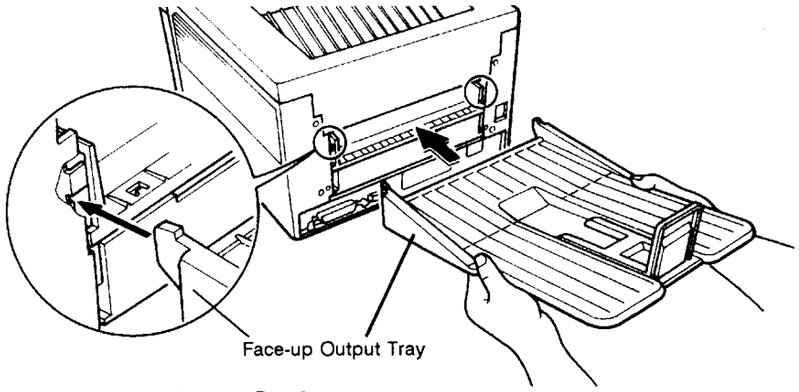
Depending on the size of the paper you will use, mount the paper stopper on face-up output tray as shown below.





11—Install the Face-up Output Tray

If you want the printed pages stacked face-up (in reverse order), mount the face-up output tray as shown below. Printed pages are delivered into this tray face-up.



12—Attach the Power Cord

1. Check that the main switch is off.

2. Plug one end of the power cord into the receptacle at the back of the printer.

3. Plug the other end into a wall outlet.

13—Connect the Printer to the Computer

The printer has two computer cable connectors and a slot for installing an option interface. The one marked *Parallel* is for a parallel (Centronics standard) interface. The one marked *RS-232C* is for a serial interface. You may use whichever is convenient for your computer including the option interface, if you have already have one installed. All interface connectors can be used simultaneously with different computers. For information on multi-computer environment, refer to *Appendix E* section E.4.

For details on the pin assignments of the cables, see *Appendix E*. Parallel cables usually have the standard pin assignment, so there should be no problem. RS-232C cables tend to vary, however, so if you use an RS-232C cable you may have to resolder its internal wiring.

Parallel interface

Plug one end of the cable into the connector marked *Parallel* on the printer. Close the clips on both sides to hold it in place.

Plug the other end into a parallel (Centronics) interface connector on your computer. This connector is usually marked *PRINTER*.

Serial interface

Follow the instructions in *Appendix F*.

Note: **Connect or disconnect cables to the connectors while the printer is switched off.**

14—Test the Printer

Test that the printer works by printing out a status page as follows.

1. Switch on the printer's power (It does not matter whether the computer is on or off). The message display should indicate Self test, and after a while, the O (ready) indicator should begin flashing.

2. Wait until the printer's O (ready) indicator stops flashing and stays lit. Check that the ON LINE indicator is also lit and the message display indicates Ready.

3. Press the STATUS key. The printer should print a page listing the positions of margins, memory allocations, and other information.

A sample status printout is shown in *Appendix A*.

15—Test the Interface with the Computer

To test that the printer and computer are correctly connected, have the computer command the printer to print a couple of lines of text. If you have connected the printer and computer with a parallel interface cable, follow the procedure given next. If you are using an RS-232C cable, the procedure is similar, and is given in *Appendix F* together with the cabling instructions.

1. Check that the printer's message display indicates Ready and that the ○ (ready) and ON LINE indicators are on.

2. Power up the computer in DOS mode.

3. At the DOS prompt, type the following.

```
C>ECHO !R! STAT; PAGE;>PRN
```

If the printer prints a status page, the computer and printer are connected correctly. For details on the status page, refer to *Appendix A*.

If you do not get this result, check that the cable is securely plugged in at both ends and repeat the test. If you still do not get the right result, you may have a defective or improperly-wired cable. Try using a different cable.

16—Set the Emulation Mode

The printer emulates the operation of any of six other printers. It is factory-set to emulate the HP LaserJet III at power-up. If you intend to use mainly software that supports LaserJet III or that supports the printer itself, the factory setting is the one you want, so you do not have to do anything. If you intend to use mainly software that supports another printer, it is convenient to change the printer's power-up emulation mode.

The emulation mode can be changed by the printer control panel. To change the emulation mode, refer to page 2-25, *Changing the Emulation*.

1.5. Prolonged Non-Use and Moving the Printer

Prolonged Non-Use

If you ever leave the printer unused for a long period of time, remove the power cord from the wall outlet. We recommend you consult with your dealer about the additional actions you should take to avoid possible damages that may occur when the printer is used next time.

Moving the Printer

When you move the printer:

- Move it gently.
- Keep it as level as possible, to avoid spilling toner inside the printer.

Note: **Consult a serviceman before attempting long-distance transportation of the printer.**

Chapter 2: Operating the Page Printer

This chapter explains the printer's control panel and operating procedures. It covers the fundamental information you will need to know to use the page printer.

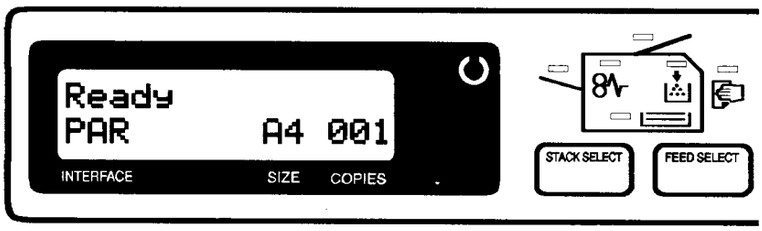
Section 2.1 describes the printer's control panel. Tables list the functions of the keys and indicators.

Section 2.2 gives detailed operating procedures.

Sections 2.5 to 2.7 cover manual paper feed, print density adjustment, and IC card.

2.1. Control Panel

The printer control panel has a message display, keys, and indicators, as shown below.

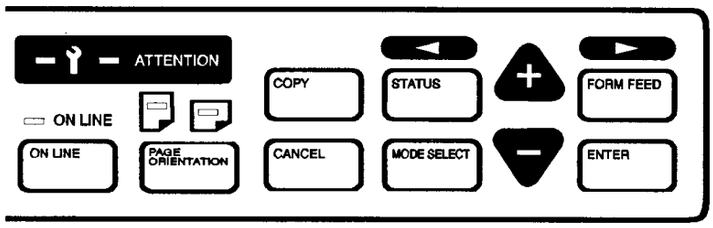


Message Display

The message display gives information in the form of short messages as explained below, in a language you can select yourself (English, French, German, Danish, Swedish, Italian, or Spanish). To change the message language, refer to *Selecting the Message Language*, page 2-46.

The six messages listed below are displayed during normal warm-up and printing. Other messages appear during mode selecting (MODE SELECT) procedures and when the printer needs attention (See *Chapter 4, Troubleshooting*).

Message	Meaning
Self test	The printer is self-testing after power-up.
Not ready	The printer is warming up and is not ready.
Ready	The printer is ready to print.
Processing	The printer is receiving data, generating graphics, rereading an IC card, or printing.
Waiting	The printer is waiting a command that the job is over before printing the last page. Pressing the FORMFEED key allows you to obtain the last page immediately.
Form Feed Time Out	The printer is printing the last page after the waiting times out.



The message display also shows information about the currently active interface, size of paper, and the number of copies to print.

The message display has three indicators in its bottom row—INTERFACE, SIZE, and COPIES.

INTERFACE Indicator

The printer has a parallel interface, a serial interface, and an open slot for installation of an option interface for simultaneous use of different computers. The INTERFACE indicator indicates the current interface which is receiving data from the computer and being used exclusively. It flashes when the printer finished receiving data until the interface times out. After timing out, it then reverts to steady indication of the interface, meaning that the interface was previously in use.

PAR	Standard parallel interface
SER	RS-232C serial interface
OPT	Optional interface (if installed)

The control panel keys affect only the current interface which is indicated in the INTERFACE display. If you want to change settings on the different interfaces while the printer is Ready, you can manually switch the interface to the other by following the procedures described in *Selecting the Interface for Control Panel*, page 2-23.

SIZE Indicator

This is the paper SIZE indicator. While the printer is Ready, it indicates:

- the size of the current paper cassette (letter size for the U.S.A. and A4 for European countries), or
- the legal size if paper is fed manually.

The following abbreviation is used on the SIZE indicator to indicate various paper sizes besides A4, A5, and B5.

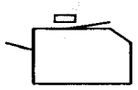
LT	Letter (8-1/2 × 11 inches)	C5	International C5 (16.2 × 22.9 cm)*
LG	Legal (8-1/2 × 14 inches)	EX	Executive (7-1/4 × 10-1/2 inches)
MO	Monarch (3-7/8 × 7-1/2 inches)*	#9	Commercial 9 (3-7/8 × 8-7/8 inches)*
BU	Business (4-1/8 × 9-1/2 inches)*	#6	Commercial 6-3/4 (3-5/8 × 6-1/2 inches)*
DL	International DL (11 × 22 cm)*		

* Only if the optional envelope feeder is installed.

During the printer is Processing data to print, the SIZE indicator indicates the size of paper which is formatted by the paper size command in the data to be printed.

Symbolic Indicators

The symbolic indicators light during normal operation and when the printer needs attention.

Indicator	Name	Description
	Ready indicator	Flashes when the printer is warming up. Lights when the printer is ready to print, or is printing. Goes off when power is switched off, or an error occurs.
	Face-down stack indicator	Lights to indicate when printed pages are delivered to the face-down tray.

Indicator	Name	Description
	Face-up stack indicator	Lights to indicate when printed pages are delivered to the face-up tray.
	Toner indicator	Flashes when the toner supply is low, to request replenishing the toner supply. See section 3.2.
	Cassette feed indicator	Lights to indicate when paper is fed from the paper feed cassette.
	Manual feed indicator	Lights to indicate when paper is fed from the manual feed tray or the option envelope feeder, if installed.
	Service indicator	Lights when an engine or controller error occurs. The printer stops printing. Call a service person for repair.
ON LINE	On-line indicator	Lights when the printer is on-line. The printer prints received data. Goes off when the printer is off-line. The printer stores but does not print received data.
ATTENTION	Attention indicator	Lights when a problem or an error occurs which may be cleared by user. (For example, the paper feed cassette is empty.) Read the message in the message display and consult chapter 4. Flashes when the printer needs maintenance attention. Read the message on the message display and consult chapter 4.
	Portrait indicator	Lights when the printer is set to print in portrait orientation.
	Landscape indicator	Lights when the printer is set to print in landscape orientation.

Control Keys

The table below summarizes the functions of the control panel keys. Most of these keys are used when the message display indicates Ready and affect on only the current interface. The FORMFEED key, however, operates only while the message display indicates Waiting.

Key	Function
STACK SELECT	Selects whether printed pages are delivered to the face-down or face-up tray.
FEED SELECT	Selects the cassette feed or manual feed.
ON LINE	Switches the printer on-line and off-line.
PAGE ORIENTATION	Switches between portrait and landscape page orientations.
COPY	Displays the current copy count setting. A new copy count can be entered.
CANCEL	Abandons a printing job, resets numeric values, or cancels a setting procedure.
STATUS (◄)	Prints a page of status information on all interfaces together (The printer must be on-line.). Used as the ◄ key in the mode selection function.
FORMFEED (►)	Prints and feeds out one page. Used as the ► key in the mode selection function.
▲ and ▼	Let you access the desired item or enter numeric values. In some of the control procedures, the ◄ (STATUS) and ► (FORMFEED) keys are used to enter or exit the sub menus.
MODE SELECT	Used to select the interface for making settings on the control panel, set the number of copies to print, to select the emulation, font, character code set, to re-read an IC card, to select the automatic cassette mode, and others (See page 2-36).
ENTER	Finalizes numeric values and other selections.

Most of the panel functions can also be controlled by PRESCRIBE II commands or commands generated by application software. The printer obeys panel settings or commands whichever accepted most recently.

Some of the panel settings are also made on a permanent basis with the PRESCRIBE II FRPO (Firmware RePrOgram) command.

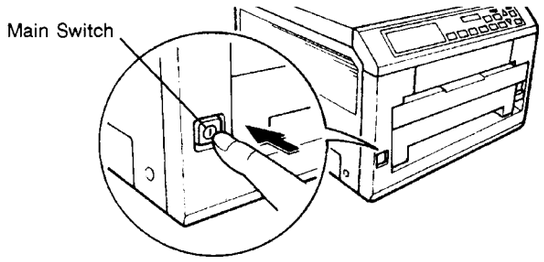
2.2. Operating Procedures

Switching Power On

Check that the power cord is securely plugged in at both ends.

Check that the printer is connected to the computer. In switching power on, the general rule is to switch on printer power first, computer power second.

1. Push in the main switch.



2. Wait for the printer to warm up. During warm-up the ○ (ready) indicator flashes and the message display indicates Self test.

At the end of the warm-up period, the ○ (ready) indicator stops flashing, the ON LINE indicator lights, and the message display indicates Ready.

If the ON LINE indicator does not light, press the ONLINE key to set the printer on-line.

The printer is now ready to print.

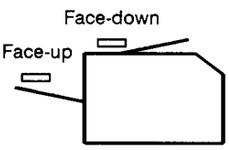
Stack Selection

The STACK SELECT key selects the tray to which the printed pages are delivered.

The STACK SELECT key can be used whenever the message display indicates Ready.

Press the STACK SELECT key. The selection cycles and is displayed in the message display in the following order:

Face-up tray
Face-down tray



The current selection is indicated by a green light on the printer symbol above the key.

The stack selection is interface-dependent and does not affect the other interface(s).

Feed Selection

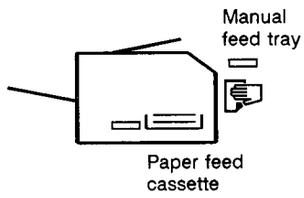
The (FEED SELECT) key selects the paper feed cassette or manual feed tray (or the option paper feeders, if installed) as the paper source.

The (FEED SELECT) key can be used whenever the message display indicates `Ready`. It can also be used when the message display indicates `Add paper` during printing.

Press the (FEED SELECT) key. The selection cycles and is displayed in the message display in the following order:

`Cassette`
`Manual feed`

The current selection is indicated by a green light on the printer symbol above the key.



or;

`Cassette 1`
`Cassette 2` (if the option paper feeder is installed.)
`Cassette 3` (if the second option paper feeder is installed.)
`Envelope feeder` (if the envelope feeder is installed.)
`Manual feed`

The READY indicator on the corresponding option paper feeder also lights if the feeder is selected. The manual feed (⍐) indicator also lights when the envelope feeder is selected.

The feed selection is interface-dependent and does not affect the other interface(s).

On-line/Off-line Setting

By pressing the ONLINE key you can change the printer between the on-line state, in which it prints the data it receives from the computer, and the off-line state, in which it stores the data for printing later.

1. Make sure that the message display indicates Ready.

2. Press the ONLINE key.

If the printer is on-line, it changes to off-line.

If the printer is off-line, it changes back to on-line.

The ON LINE indicator lights when the printer is on-line.

Going off-line may or may not halt communication between the printer and computer, depending on details of the current interface. While off-line, the printer continues to accept any data that arrive until the current interface buffer is full, at which point it instructs the computer to stop sending data. Data stored while off-line are printed when the printer is returned to the on-line state.

Temporary Print Pause

The printer can be stopped temporarily during a printing job. For example, you can pause near the beginning of a long job to check that the output is correctly formatted before proceeding.

This procedure can be used while the printer is Processing.

1. Press the ONLINE key. The ON LINE indicator goes off.

The printer stops printing after finishing the current page.

2. To continue printing, press the ONLINE key again. The ON LINE indicator goes on. The printer resumes printing from the point at which it stopped.

If you would abandon the current printing job, first halt the computer to send printing data, then press the CANCEL key.

Depending on the interface, the computer may continue to send data while the printer is in its temporary pause. These data are stored in the printer's buffer without being printed. When the printer's buffer becomes full, the printer sends a signal instructing the computer to wait before sending more data. No data are lost.

Changing the Page Orientation

By pressing the (PAGE ORIENTATION) key you can switch between the portrait (upright) and landscape (sideways) page orientations.

The page orientation can be set whenever the message display indicates Ready.

Press the (PAGE ORIENTATION) key.

If the page orientation is portrait, it changes to landscape.

If the page orientation is landscape, it changes to portrait.

The ▯ (portrait) or ▭ (landscape) indicator lights to indicate the current orientation.

Note: **In most cases the printer automatically adjusts the page orientation each time the font is changed. In particular, this is normally done in the IBM and HP LaserJet III emulations. For details, see the PRESCRIBE II FTMD (FonT MoDe) command in the *TECHNICAL REFERENCE* manual.**

Setting the Copy Count

With the [COPY] key you can set the number of copies to be printed of each page for the current interface. The copy count can be set from 1 to 999.

The copy count can be set whenever the message display indicates Ready.

1. Press the [COPY] key. The message display shows the current copy count and a cursor (_) blinking under the copy count.

2. To increase the copy count, press the ▲ key; to decrease the copy count, press the ▼ key, as many times as desired.

   You can use the illuminated ◄ ([STATUS]) and ► ([FORMFEED]) keys to move the cursor back and forth through the figures to rapidly set a large copy count.

   If you enter the wrong count, clear it by pressing the [CANCEL] key, then enter the count again.

   If you want to abandon the copy count setting procedure, press the [CANCEL] key now. The old copy count remains unchanged.

3. Press the [ENTER] key to set the new copy count. The message display returns to Ready.

Abandoning a Printing Job

You can abandon a printing job before it is completed. If the printer is simultaneously receiving data on more than one interface, you can selectively cancel the printing job on a particular interface.

This procedure can be used while the message display indicates `Processing` or `Waiting`.

1. Halt the printing program on the computer. The printer continues to print the data it has already received. It is a good idea to set the printer to off-line first of all.

2. Press the (CANCEL) key. The message display indicates `Print Cancel ?` and also the interface on which data are arriving by the one of the following messages.

   `Parallel`
   `Serial`
   `Option` (if installed)

3. Press the (ENTER) key. This clears the printing job on the interface indicated on the message display.

Note: **If the printer is receiving data simultaneously on its interfaces, you must be sure which interface the job you wish to abandon is on. With `Print Cancel` indicated on the message display, press the ▲ key repeatedly until the interface is displayed on the message display. Then, press the (ENTER) key to abandon the job.**

When a few pages have been printed out, the printer stops, ready to begin the next job.

Note: **If you do not stop the computer program first, after the printer executes the printing halt, it immediately starts printing again as it continues to receive data from the computer.**

Status Printout

If you want to check the printer's current status, including available memory space, and option settings, you can find the information you need on the status page. To print out a status page, the printer must be on-line. Proceed as follows.

1. Make sure the message display indicates Ready.

2. Press the [STATUS] key. The printer prints a page of status information.

The message display indicates Processing during printing of the status page, then returns to Ready.

You can abandon printing the status page by the following manner.

1. When the message display shows Processing, press the [CANCEL] key. The message display shows Print Cancel/? Current Job.

2. To cancel printing the status page, press the [ENTER] key. The message display returns to Ready.

For a full description of the status page, see *Appendix A, Status Page*.

If a status page jams while being printed, open the printer's top cover, or the paper feed unit, clear the jam, close the printer's top cover, or the paper feed unit, then press the [ONLINE] key to set the printer back on-line. The status page will be printed automatically.

A status page covers information on all interfaces. You may not switch the interface to the other even in case you need information on the other interface.

Form Feed

Depending on your software, there is sometimes a delay before the printer prints the last page of a job. This occurs when the printer is not informed by a code or command that the job is over.

If you wait a while, the printer will eventually time out and print the last page. If you do not want to wait, you can obtain the page immediately by pressing the FORMFEED key.

The FORMFEED key can be used when the printer is on-line and the message display indicates Waiting.

The FORMFEED key does not operate while the printer is off-line. Form feed affects only the current interface. It will not feed out a page that may be in the other interface's buffer.

2.3. Using the Mode Select Menus

This section explains how to use the mode select menu. The [MODE SELECT] key on the control panel allows you to use the mode select menus to set or change the printer environment such as the number of copies to make, emulation, code set, etc., to your specific needs.

Unless otherwise noted, any change made to the menu items does not affect the environment on the other interfaces.

The following items can be selected by using the [MODE SELECT], ▲ and ▼, and [ENTER] keys. Also, the diagram on page 2-21 gives quick reference to the full menu options and the sequence of selection.

Mode Select Menu

Item	Function	Default Setting
Interface	Selects the interface on which the control panel settings affect.	Parallel
Emulation >	Changes the emulation mode on the current interface. The ► key allows access to submenu >Code set or >Pen width.	HP LaserJet III
Font >	Selects the font for the current interface. Submenus allow selection of whether the font is bit-mapped or scalable. Refer to Font submenu on next page.	Bitmap
Read IC-CARD >	Rereads information from the IC card(s) installed in the IC card slots.	–
Envelope size	Selects the size of envelope for the optional envelope feeder. Available only when the printer is installed with the optional envelope feeder (EF-1).	International DL (FS-1500) Business (FS-1500A)
Auto cassette	Selects one of the automatic paper cassette switching modes. Available only when the printer is installed with the optional paper feeder (PF-5).	None
Others >	By pressing the ► (FORMFEED) key and ▲ and ▼ keys, the following items can be selected: To set the formfeed time-out time; to print in hexadecimal dump mode; to print a list of resident fonts; to reset the printer; to set the RS-232C parameters, linefeed and carriage-return action, panel keep mode, and the message language; to read the total pages printed, and to optimize the KIR level.	–

For items with the > mark on the message display, the ► (FORMFEED) key lets you go down to the sub menus which give access to more items relevant to the main item. Following tables show all submenus achieved in the Emulation, Font, Read IC-CARD, and Others menus.

Emulation Submenu

Item	Function	Default Setting
>Code set	Selects the code set for the current font. The available code sets differ depending on the current emulation. The Code set submenu is unavailable in KC-GL.	ISO-6 ASCII (HP LaserJet III)
>Pen width	Sets the thickness for eight pens in the KC-GL emulation.	01 dot(s)

Font Submenu

Item	Function	Default Setting
>Bitmap font	Selects a bitmap font for the current font.	00001
> [font name]	Selects a scalable font for the current font.	Dutch801SWC-Bold
>Size	Sets the size of the scalable font in points.	12.00

IC-Card Submenu

Item	Function	Default Setting
>Read fonts	Reads font information from IC card for downloading.	–
>Read data	Reads information of macros, fonts, etc., in a partition from IC card.	–
>List of Partitions	Prints a list of partitions in IC card.	–

"Others" Submenu

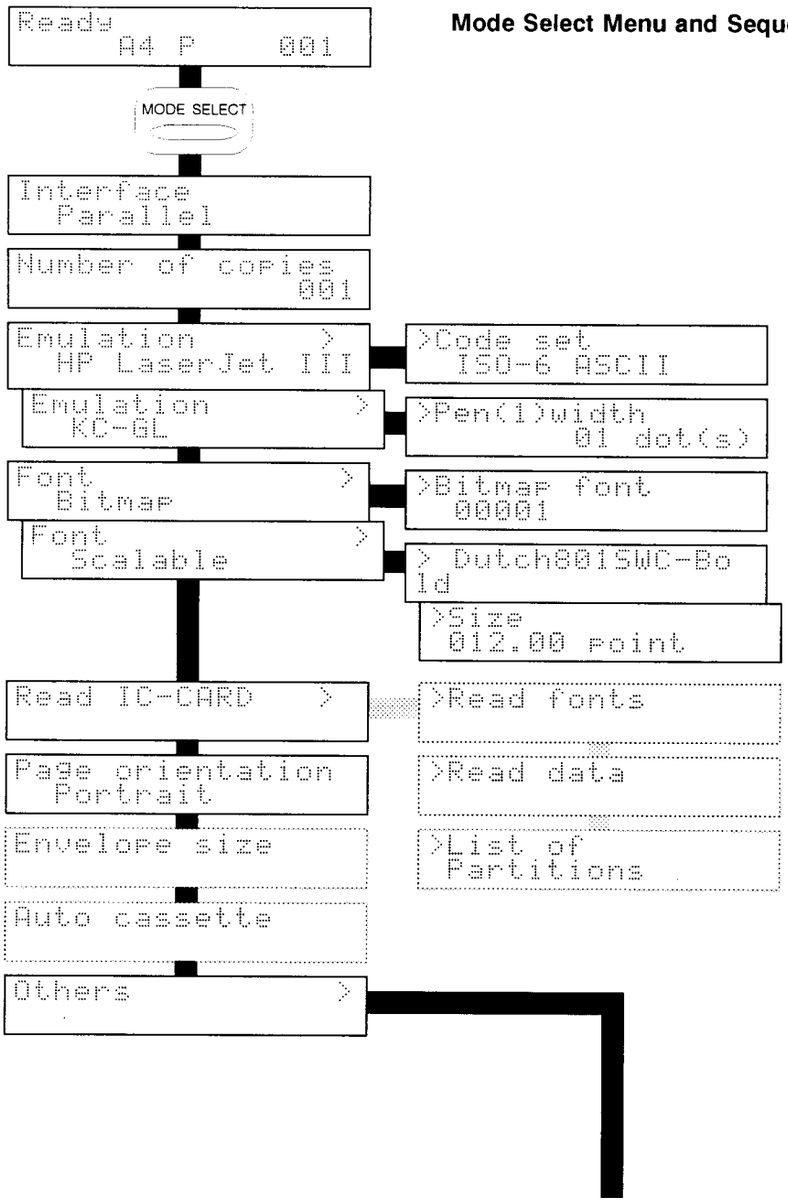
Item	Function	Default Setting
>Form Feed Time out	Adjusts the time-out time, absence of data for which causes a form feed.	30 seconds
>Print HEX-DUMP	Prints formatted hexadecimal data codes for debugging programs and files.	–

Item	Function	Default Setting
>List of resident Fonts	Prints a list of all resident bitmap and scalable fonts in the printer.	–
>Printer Reset	Resets the printer's temporary conditions, such as font and margins, to the default state.	–
>RS-232C >	By pressing the ► (FORMFEED) key, sets the following RS-232C parameters: Baud rate Data bits Stop bits Parity Protocol	 9600 8 1 None DTR(pos.)&XON
>LF action	Selects the linefeed action among LF only, CR and LF, and Ignore LF.	LF only
>CR action	Selects the carriage-return action among CR only, CR and LF, and Ignore CR.	CR only
>Panel keep mode	Determines whether to keep settings made on the control panel permanently.	On
>MSG language	Selects the language of the messages on the message display.	English
>Number of pages printed	Displays the total number of pages printed.	–
>KIR mode >	Selects the KIR mode level from None, Light, Medium, and Dark. Also allows to print a test pattern for optimization of the effect.	None

These items are explained in detail on the following pages.

The diagram on next page gives quick reference to the full menu options and the sequence of selection. The vertical transition of selection in the diagram is achieved by the ▲ and ▼ keys; and the horizontal transition is achieved by the ◄ and ► keys.

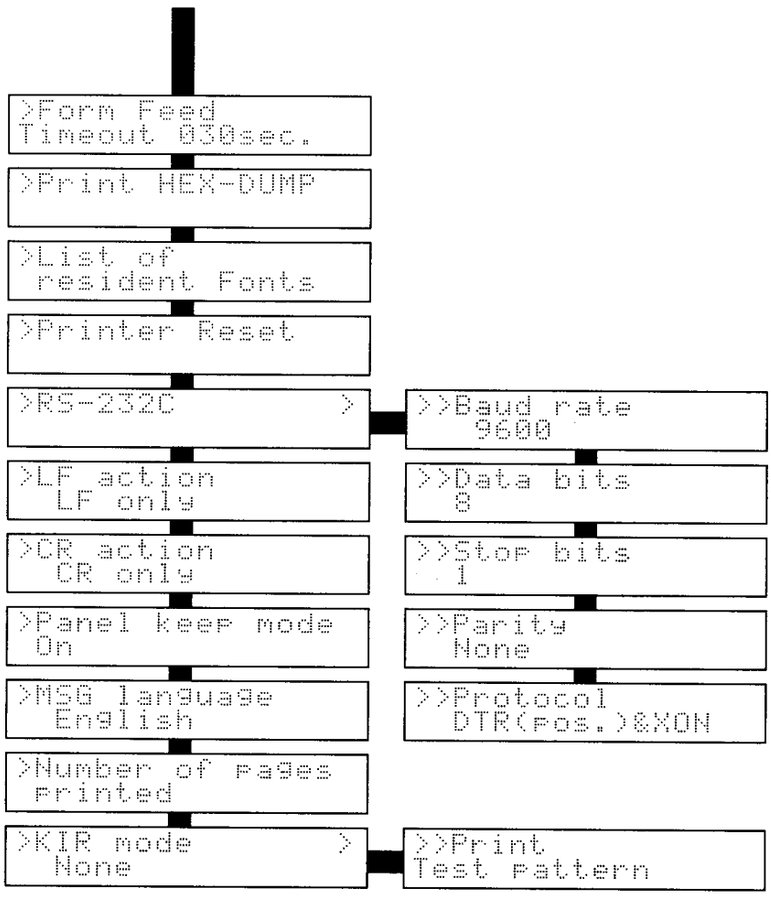
Mode Select Menu and Sequence



(To be continued on next page)

(Continued)

("Others" submenu)



Selecting the Interface for Control Panel

The printer has a parallel interface, a serial interface, and an open slot for installation of an option interface for the simultaneous use of different computers.

Because most control panel settings are interface-dependent (they affect the currently active interface only), it is sometimes convenient to switch the interface from the control panel. This can be done as follows.

1. Press the [MODE SELECT] key whenever the message display indicates `Ready`.

2. Press the ▲ or ▼ key repeatedly until the message display indicates `Interface`. The current interface will be indicated by one of the following messages:

   `Parallel`
   `Serial`
   `Option` (if installed)

3. Press the [ENTER] key. The message display shows a blinking question mark (`?`).

4. Press the ▲ or ▼ key repeatedly until the desired interface is displayed.

   If you want to abandon the interface selection procedure, press the [CANCEL] key now. The interface remains unchanged.

5. Press the [ENTER] key.

6. Press the [MODE SELECT] key and the message display returns to `Ready`.

Selecting an interface in the above manner does not mean that the printer is fixed to receive data from the computer through that interface only. The printer automatically selects whichever interface data are arriving subsequently and uses that interface exclusively until it times out.

Setting the Copy Count (using MODE SELECT)

By selecting Number of copies in the mode select menu, you can set the number of copies to be printed of each page. The copy count can be set from 1 to 999.

The copy count can also be changed by using the [COPY] key. The procedure explained below may be used when you would change the copy count on the other interface. (You must first select the interface to change the copy count by following the procedures given in page 2-23.)

1. Press the [MODE SELECT] key whenever the message display indicates Ready.

2. Press the ▲ or ▼ key repeatedly until the message display indicates Number of copies.

   The current copy count is also indicated in the display.

3. To change the copy count, press the [ENTER] key. The message display shows a cursor (_) blinking under the copy count.

4. To increase the copy count, press the ▲ key; to decrease the copy count, press the ▼ key, as many times as desired.

   You can use the illuminated ◄ ([STATUS]) and ► ([FORM FEED]) keys to move the cursor back and forth through the figures to rapidly set a large copy count.

   If you enter the wrong count, clear it by pressing the [CANCEL] key, then enter the count again.

   If you want to abandon the copy count setting procedure, press the [CANCEL] key now. The old copy count remains unchanged.

5. Press the [ENTER] key to set the new copy count.

6. Press the [MODE SELECT] key and the message display returns to Ready.

Changing the Emulation

The printer's current emulation mode on the current interface can be changed by using the mode select menu.

1. Press the (MODE SELECT) key when the message display indicates Ready.

2. Press the ▲ or ▼ key repeatedly until the message display indicates Emulation. The current emulation is indicated by one of the following messages:

   ```
   HP LaserJet III
   KC-GL
   Line Printer
   IBM Proprinter
   DIABLO 630
   EPSON LQ-850
   ```

3. To change the emulation, press the (ENTER) key. The message display shows a blinking question mark (?).

4. Press the ▲ or ▼ key repeatedly until the desired emulation mode is indicated.

   If you want to abandon the emulation change procedure, press the (CANCEL) key now. The emulation remains unchanged.

5. Press the (ENTER) key.

6. Press the (MODE SELECT) key and the message display returns to Ready.

After changing the emulation, you have the option to change the character code set. The available character code sets vary depending on the current emulation. Procedures are given below.

Changing the Character Code Set

The emulation changing menu has submenus for selection of the character code set. The Code set submenu can be entered while the message display indicates Emulation (and the current emulation setting).

This submenu is not available when the current emulation is KC-GL.

1. First refer to *Changing the Emulation* above and let the message display indicate Emulation.

2. Press the ► key. The message display will indicate > Code set and the current code set.

   Depending on the current emulation, the code set will be indicated by one of the following messages:

HP LaserJet III	IBM Proprinter X-24E or Line Printer	DIABLO 630	EPSON LQ-850
Bitmap and Scalable Fonts			
ISO-6 ASCII	IBM US	DIABLO US	LQ US
ISO-10 Sweden	IBM D/N	DIABLO France	LQ France
ISO-11 Sweden	IBM PC-850	DIABLO Germany	LQ Germany
ISO-14 Japan	IBM PC-860	DIABLO U.K.	LQ U.K.
ISO-15 Italian	IBM PC-863	DIABLO Denmark	LQ Denmark
ISO-16 Portugal	IBM PC-865	DIABLO Sweden	LQ Sweden
ISO-17 Spain	US Legal	DIABLO Italy	LQ Italy
ISO-21 Germany		DIABLO Spain	LQ Spain
ISO-25 France		DIABLO Japan	LQ Japan
ISO-57 China		US Legal	LQ Norway
ISO-60 Norway			LQ Denmark 2
ISO-61 Norway			LQ Spain 2
ISO-69 France			Latin America
ISO-84 Portugal			IBM US
ISO-85 Spain			IBM D/N
HP Roman-8			IBM PC-850
HP Extension			IBM PC-860
HP German			IBM PC-863
HP Spanish			IBM PC-865
ECMA-94 Latin1			
US Legal			
IBM PC-8			
IBM PC-8(D/N)			
IBM PC-850			
ISO-2 IRV			
ISO-4 U.K.			

HP LaserJet III	IBM Proprinter X-24E or Line Printer	DIABLO 630	EPSON LQ-850
Scalable Fonts Only			
Ventura math Ventura int'l Ventura US PS math PS text Math8 Pi font MS publishing Windows Desktop Ventura Ding* PS Ding* Dingbat 100* Dingbat 200* Dingbat 300*			
* Available only when the current font is ZapfDingbats.			

3. Press the [ENTER] key. The message display shows a blinking question mark (?).

4. Press the ▲ or ▼ key repeatedly until the desired code set is displayed.

   If you want to abandon the code set changing procedure, press the [CANCEL] key now. The current code set remains unchanged.

5. Press the [ENTER] key.

6. Press the [MODE SELECT] key and message display returns to Ready.

Setting the KC-GL Pen Width

The emulation changing menu has the submenu for setting the KC-GL pen widths. This submenu can be entered while the message display indicates Emulation and the current emulation setting is KC-GL.

1. First refer to *Changing the Emulation* above and let the message display indicate Emulation > and KC-GL.

2. Press the ► key. The message display will indicate > Pen (1) width.

3. Press the ENTER key. The message display shows a cursor (_) blinking under the unit's digit of the current pen width of *pen 1.*

4. To enter the new pen width, press the ▲ key to increase the width; and press the ▼ key to decrease the width one dot by one dot.

5. Press the ◄ or ► key to move the cursor to ten's digit.

   The maximum pen width is 99 dots. If you set the wrong width, press the CANCEL key. Try entering the correct width.

6. Perform the same procedure as step 4 to enter the ten's digit of the desired width.

7. When the desired pen width is displayed, press the ENTER key.

   This completes setting the pen width for pen 1.

8. Press the ▲ key. The message display now indicates the thickness of pen 2. Follow the same procedure to set the pen width.

9. Continue in the same way up to pen 8. When you have finished, press the ENTER key.

Note: **An extremely large pen width may cause dashed or dotted lines to become solid.**

Font Selection

The Font menu allows you to select the font. The font can be a resident font or a nonresident font which has been downloaded from the IC card or the computer. You can select a bitmap font by its font number and a scalable font by its name or identification code if the scalable font is nonresident.

If you would select a nonresident font, it must be downloaded from the computer or the IC cards into the printer's memory before performing the font selection. See *Rereading the IC Cards* section, later in this chapter for details on how to download fonts from IC cards.

The names of the resident scalable fonts appear on the message display exactly the same as listed in the font lists in the printer's *TECHNICAL REFERENCE* manual. Nonresident scalable fonts will be shown on the message display with each own identification code designated internally when they were downloaded. To identify the name and type of the downloaded scalable fonts represented by the identification code, you will need to refer to the documentation accompanying the font downloading software.

A quick reference of all resident bitmap and scalable fonts is given in the printer's *TECHNICAL REFERENCE* manual. Also, a list of resident fonts can be printed by following the instructions on page 2-39.

The font selection procedure takes the following steps:

- tell the printer whether the desired font is a bitmap font or a scalable font, and
- select the font by its number or its name, and
- if the font is a scalable font, size its height (4.00 to 999.75 points).

To select a font, proceed as follows.

Selecting a Bitmap Font

1. Press the MODE SELECT key when the printer's message display indicates Ready.
2. Press the ▲ or ▼ key repeatedly until the massage display indicates Font >. The message display also indicates whether the current font is a bitmap font (Bitmap) or a scalable font (Scalable).

3. If the message display is:

```
Font          >
  Scalable
```

   Press the ENTER key. The message display will indicate a blinking question mark (?) as `?Scalable`.

4. Press the ▲ or ▼ key.

   The massage display changes to `Bitmap`.

5. Press the ENTER key. The question mark goes out.

6. Press the ► key. The message display indicates the current bitmap font by its *number*. For example:

```
>Bitmap font
  00001
```

7. To change the font, press the ENTER key. The message display will indicate a blinking question mark as `? 00001`.

8. Press the ▲ key until the desired font number is displayed. (Generally, HP bitmap soft fonts have font number of 50000 and up.)

   Press the ▼ key to change the font number in the reverse order.

9. When the desired bitmap font is displayed, press the ENTER key. The question mark goes out.

10. Press the MODE SELECT key and the message display returns to `Ready`.

    This completes selecting a bitmap font.

Selecting a Scalable Font

1. Press the [MODE SELECT] key when the printer's message display indicates `Ready`.

2. Press the ▲ or ▼ key repeatedly until the massage display indicates `Font >`. The message display also indicates whether the current font is a bitmap font (`Bitmap`) or a scalable font (`Scalable`).

3. If the message display is:

   ```
   Font          >
     Bitmap
   ```

   Press the [ENTER] key. The message display will indicate a blinking question mark (`?`) as `? Bitmap`.

4. Press the ▲ or ▼ key.

   The massage display changes to `Scalable`.

5. Press the [ENTER] key. The question mark goes out.

6. Press the ► key. The message display indicates the first scalable font in the printer's memory. For example:

   ```
   > Dutch801SWC-Bo
   ld
   ```

7. To change the font, press the [ENTER] key. The message display will indicate a blinking question mark as `? Dutch801` ..., for example.

8. Press the ▲ key until the desired font is displayed. The scalable fonts that were loaded from an IC card or from the computer are selected by its own identification code.

   Press the ▼ key to change the font in the reverse order.

9. When the desired font is displayed, press the [ENTER] key. The question mark goes out.

   Next, we size the selected scalable font. Proceed as follows.

10. Press the ▲ key. The message display changes to `>Size` and the current size setting in unit of point. For example,

```
>Size
 012.00 point(s)
```

11. Press the ENTER key. The message display indicates a blinking cursor (_) as `012.00 point(s).`

12. To enter the new font size, press the ▲ key to increase and press the ▼ key to decrease the size in 0.25 point increments.

    You can use the illuminated ◄ (STATUS) or ► (FORMFEED) key to move the cursor back and forth through the figures to rapidly set a large font size.

    The minimum font size is 4.00 point and the maximum is 999.75 points. If you set the wrong size, press the CANCEL key. Try entering the correct size.

13. When the desired size is indicated, press the ENTER key.

14. Press the MODE SELECT key and the message display returns to `Ready`.

Rereading an IC Card

Although information is read from IC cards into the printer's memory at power-up, if necessary, deleted information can be reread from IC cards into memory by the procedure below.

1. Press the (MODE SELECT) key when the message display indicates Ready.

2. Press the ▲ or ▼ key repeatedly until the message display indicates Read IC-CARD.

3. Press the ► ((FORMFEED)) key. The message display indicates >Read fonts.

4. Pressing the ▲ or ▼ key repeatedly toggles the message display with the following messages.

   Read fonts
   Read data
   List of Partitions

   Read fonts reads fonts from the IC card containing font information.

   Read data should be used if the IC card has information of macros, forms, etc., which are usually stored in different segments separated with partitions each given a name in the IC card.

   If you selected Read data in step 4, the name of the partition from which the information is read is also displayed.

   If you want to read the information from other partition, press the (ENTER) key. Then press the ▲ or ▼ key until the desired partition name is displayed. When the desired partition name is displayed, press the (ENTER) key again.

   List of Partitions prints a list of all partition names stored in the IC card(s) for your quick reference.

   Press the ▲ or ▼ key repeatedly until the desired message is displayed.

5. Press the ENTER key. The message display shows a blinking question mark (?).

   If you want to abandon the IC card rereading procedure, press the CANCEL key. The message display returns to Ready.

   If you want to abandon printing the list of partitions, proceed as follows.

   (1.) When the message display shows Processing, press the CANCEL key. The message display shows Print Cancel? Current Job.

   (2.) To cancel printing the list of partition, press the ENTER key. The message display returns to Ready.

6. To read the IC card, press the ENTER key again. The printer begins rereading the IC card. The message display indicates Processing while the IC card is being read, then returns to Ready (Read fonts when having reread fonts).

   If you selected List of Partitions in above, the printer prints out the list of partitions for the IC card.

Changing the Page Orientation (using MODE SELECT)

By selecting Page orientation in the mode select menu, you can switch between the portrait (upright) and landscape (sideways) page orientations.

The page orientation can also be changed by using the (PAGE ORIENTATION) key. The procedure explained below may be used when you would change the page orientation on the other interface. (You must first select the interface to change the page orientation by following the procedures given in page 2-23.)

1. Press the (MODE SELECT) key when the message display indicates Ready.

2. Press the ▲ or ▼ key repeatedly until the message display indicates Page orientation. The message display also indicates the current page orientation by one of the following messages:

   Portrait
   Landscape

3. To change the page orientation, press the (ENTER) key. The message display shows a blinking question mark (?).

4. Press the ▲ or ▼ key.

   If the page orientation is portrait, it changes to landscape. If the page orientation is landscape, it changes to portrait.

5. Press the (ENTER) key. The page orientation is changed.

6. Press the (MODE SELECT) key and the message display returns to Ready.

Note: **In most cases the printer automatically adjusts the page orientation each time the font is changed. In particular, this is normally done in the IBM and HP LaserJet III emulations. For details, see the PRESCRIBE II FTMD (font mode) command in the *TECHNICAL REFERENCE* MANUAL.**

"Others" Mode Selection Menus

The mode selection items described in the following pages can be accessed in the Others sub menu. To enter the Others sub menu, press the ► (FORMFEED) key while the message display indicates Others >.

1. To select the Others menus, press the MODE SELECT key when the message display indicates Ready.

2. Press the ▲ or ▼ key repeatedly until the message display indicates Others>.

   If you want to abandon entering the Others > submenu, press the MODE SELECT key. The message display returns to Ready.

3. Press the ► (FORMFEED) key to enter into the submenu. To go back to the main menu, press the ◄ (STATUS) key.

Others/Time-Out Setting

If the printer receives no data for a certain time, it times out and releases the current interface: it prints whatever data it has in its buffer and feeds out the page. You can adjust the time-out time as follows:

1. First, follow the procedure described on page 2-36 so that the message display indicates `Others >`.

2. Press the ► (FORMFEED) key.

3. Press the ▲ or ▼ key repeatedly until the message display indicates `>Form Feed Time Out`.

4. Press the ENTER key. The message display shows a cursor (_) blinking under the current time-out time value.

5. To increase the time-out time, press the ▲ key; to decrease the time-out time, press the ▼ key as many times as desired. Any value from 0 to 495 can be entered in 5-second increments.

   If you set the time-out time to 0, the printer *never* times out. The current interface is then fixed for use continuously.

   You can use the illuminated ◄ or ► key to move the cursor back and forth through the figures to rapidly set a large time-out time value.

   If you enter the wrong number, clear it by pressing the CANCEL key, then enter the number again.

   If you want to abandon the time-out setting procedure at any point, press the MODE SELECT key. The original time setting remains unchanged.

6. Press the ENTER key. The new time-out time is set.

7. Press the MODE SELECT key. The message display returns to `Ready`.

Others/Hexadecimal Dump

When you are debugging programs and files, it is sometimes helpful to see the actual data codes received by the printer. A formatted hexadecimal printout of the data codes can be obtained as follows.

1. Follow the procedure described in page 2-36 so that the message display indicates Others >.

2. Press the ► (FORMFEED) key.

3. Press the ▲ or ▼ key repeatedly until the message display indicates >Print HEX-DUMP.

4. Press the ENTER key again. The message display indicates a question mark (?).

   If you want to abandon the start of the hexadecimal dump, press the CANCEL key.

5. Press the ENTER key. The message display indicates Processing, then Waiting.

6. Start printing. The data codes received from the computer are printed in hexadecimal form. (Printable codes are also given in character form to the right.)

   Be sure to start printing promptly. Otherwise the printer will time out and exit hexadecimal dump mode.

   The hexadecimal dump ends when the data ends (causing a time-out) or when the PRESCRIBE II ENDD command is encountered in the file.

   The FORMFEED key does not operate in the hexadecimal dump mode.

Others/Font Sample

To help in selecting fonts, you can have the printer print a list of the resident fonts.

1. Follow the procedure described on page 2-36 so that the message display indicates `Others >`.

2. Press the ► (FORMFEED) key.

3. Press the ▲ or ▼ key until the message display indicates `>List of resident Fonts`.

4. Press the ENTER key. The message display indicates a question mark (`?`).

   If you want to abandon printing the list of resident fonts, proceed as follows.

   (1.) When the message display shows `Processing`, press the CANCEL key. The message display shows `Print Cancel/? Current Job`.

   (2.) To cancel printing the list of resident fonts, press the ENTER key. The message display returns to `Ready`.

5. Press the ENTER key again. The message display indicates `Processing`, then `Ready`. The printer prints a list of all its resident fonts with a short sample of each.

   The font list includes the typeface names and short samples of all bitmap and scalable fonts.

Others/Resetting the Printer

The procedure described below resets the printer's temporary conditions, such as the current unit of measurement, page orientation, font, character code set, margins, etc., set by commands to their default values.

1. Follow the procedure described on page 2-36 so that the message display indicates `Others >`.

2. Press the ► (FORMFEED) key.

3. Press the ▲ or ▼ key repeatedly until the message display indicates `>Printer Reset`.

4. Press the ENTER key. The message display indicates a question mark (`?`).

   If you want to abandon the printer resetting procedure, press the CANCEL key.

5. Press the ENTER key again. The message display will indicate `Self test` while the printer is resetting itself, then `Ready`.

Unlike the PRESCRIBE II RES command, which also resets the temporary changes made by other commands in a program or file, the printer resetting procedure deletes macros and fonts from memory; deletes positions and fonts stored by the SCP and SCF command; and resets font attributes set by the SFA command.

The printer resetting procedure does not reset the changes made by the FRPO command to the printer's default parameters and stored in the permanent memory. To reset those parameters to the factory-set values, use the FRPO INIT command.

Others/Changing RS-232C Parameters

If you experience trouble with RS-232C communications, you can change the RS-232C parameters by following the procedure below.

1. Follow the procedure described in page 2-36 so that the message display indicates `Others >`.

2. Press the ► (FORMFEED) key.

3. Press the ▲ or ▼ key repeatedly until the message display indicates `>RS-232C>`.

4. Press the ► (FORMFEED) key again. The message display indicates `>>Baud rate` and the current baud rate setting.

5. Press the ENTER key. The message display now indicates a blinking question mark (`?`).

6. Press the ▲ or ▼ key repeatedly until the desired baud rate is displayed. The message display will show a selection of baud rates in the following sequence. (The ▼ key cycles in the reverse order.):

   ```
   300
   600
   1200
   2400
   4800
   9600
   19200
   ```

7. Press the ENTER key. The baud rate is changed and the question mark disappears.

8. To continue setting RS-232C parameters, press the ▲ key. The message display indicates `>>Data bits`.

9. Press the ENTER key. The message display now indicates a blinking question mark (`?`).

10. Press the ▲ or ▼ key. If the number of data bits is `7`, it changes to `8`, or vice versa.

11. Then press the ENTER key. The new data bit setting is set and the question mark disappears.

    Similarly, you can set the number of stop bits. Press the ▲ key. The message display now indicates the current stop bits. Press the ENTER and ▲ keys until the desired number of stop bits ("1" or "2") is displayed, then press ENTER key.

    You can then set the parity. Press the ▲ key. The message display now indicates the current parity selection. Press the ENTER and ▲ keys to select the parity. The parity selections are:

    None
    Odd
    Even
    Ignore

    When the desired parity is displayed, press the ENTER key.

    Finally, you can set the protocol. Press the ▲ key. The message display indicates the current protocol selection. Press the ENTER and ▲ keys to select the protocol. The protocol selections are:

    DTR(pos.)&XON
    DTR(positive)
    DTR(negative)
    XON/XOFF
    ETX/ACK

    The DTR (pos.)&XON selects both the DTR(positive) and XON/XOFF, simultaneously. When the desired protocol is selected, press the ENTER key.

12. Press the MODE SELECT key to complete the RS-232C parameter setting procedure.

The selected parameters remain in effect even when the printer's power is switched off.

Set your computer to the same parameter values by using the computer's DIP switches or an appropriate command.

Others/Setting the Linefeed Action

This procedure instructs the printer what to do when it receives a linefeed code (character code 0AH).

1. Follow the procedure described in page 2-36 so that the message display indicates `Others >`.

2. Press the ► ([FORMFEED]) key.

3. Press the ▲ or ▼ key repeatedly until the message display indicates `>LF action` and the current linefeed action.

4. To change the linefeed action, press the [ENTER] key. The message display indicates a blinking question mark (`?`).

5. Press the ▲ or ▼ key repeatedly until the desired linefeed action is displayed.

`LF ONLY`	A linefeed is performed.
`CR and LF`	A linefeed and carriage return are performed.
`Ignore LF`	The linefeed is ignored.

   If you want to abandon the linefeed setting procedure, press the [CANCEL] key. The original linefeed action remains unchanged.

6. When the desired action is displayed, press the [ENTER] key to select it.

7. Press the [MODE SELECT] key. The message display returns to `Ready`.

   The standard selection is `LF only`. Some software that supports the IBM and LQ-850 printers requires CR and LF.

Others/Setting the Carriage-Return

This procedure instructs the printer what to do when it receives a carriage-return code (character code 0DH).

1. Follow the procedure described in page 2-36 so that the message display indicates `Others >`.

2. Press the ► (FORMFEED) key.

3. Press the ▲ or ▼ key repeatedly until the message display indicates `>CR action` and the current carriage-return action.

4. To change the carriage-return action, press the (ENTER) key again. The message display now indicates a blinking question mark as follows:

5. Press the ▲ or ▼ key repeatedly until the desired carriage-return action is displayed.

`CR ONLY`	A carriage return is performed.
`CR and LF`	A carriage return and linefeed are performed.
`Ignore CR`	The carriage-return code is ignored.

   The standard selection is `CR only`.

   If you want to abandon the carriage-return setting procedure, press the (CANCEL) key. The original carriage-return action remains unchanged.

6. When the desired action is displayed, press the (ENTER) key to select it.

7. Press the (MODE SELECT) key. The message display turns to `Ready`.

Others/Changing Panel Keep Setting

The following changes made with panel keys are kept in permanent memory, so that they are not lost when power is switched off, when the panel keep mode is on.

Page orientation
Copy count
Emulation
Code set
Font
Formfeed time-out time
Linefeed action
Carriadge-return action
KIR mode

The factory-setting for the panel keep mode is on. If you want to change the panel keep mode, proceed as follows.

1. Follow the procedure described in page 2-36 so that message display indicates `Others >`.

2. Press the ► ([FORMFEED]) key.

3. Press the ▲ or ▼ key until the message display indicates `>Panel keep mode`.

4. Press the [ENTER] key. The message display indicates a blinking question mark (`?`).

5. Press the ▲ or ▼ key. If the panel keep mode is `Off`, it changes to `On`. If the panel keep mode is `On`, it changes to `Off`.

   If you want to abandon the procedure, press the [CANCEL] key.

6. Press the [ENTER] key. The panel keep setting is changed.

7. Press the [MODE SELECT] key. The message display returns to `Ready`.

Settings for RS-232C parameters, panel keep mode itself, and the message display language are always kept in memory even when power is switched off.

Others/Selecting the Message Language

You can select the language of the messages on the message display by using the Others menu.

1. Follow the procedure described in page 2-36 so that the message display indicates Others >.

2. Press the ► (FORM FEED) key.

3. Press the ▲ or ▼ key repeatedly until the message display indicates >MSG Language and the current language selection.

4. To change the language, press the ENTER key. The message display now indicates a blinking question mark (?).

5. Press the ▲ key. The display cycles through the available selections in the following order (The ▼ key cycles in the reverse order):

   English→French→German→Danish→Swedish→
   Italian→Spanish→English

   If you want to abandon the language selection procedure, press the CANCEL key. The original language selection remains unchanged.

6. When the desired language is displayed, press the ENTER key. Subsequent messages are displayed in the selected language.

7. Press the MODE SELECT key. The message display returns to Ready.

Others/Reading Total Number of Pages Printed

The printer keeps track of the total number of pages printed. If you want to have this number displayed, use the following procedure.

1. Follow the procedure described on page 2-36 so that the message display indicates `Others >`.

2. Press the ► (FORMFEED) key.

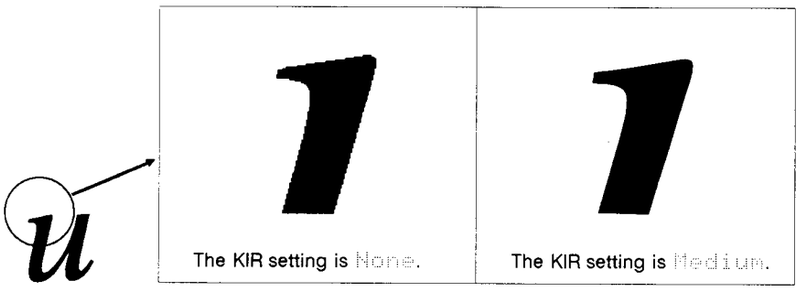
3. Press the ▲ or ▼ key repeatedly until the message display indicates `>Number of pages printed`.

The latest total number of pages printed is displayed.

Others/Optimizing KIR (Kyocera Image Refinement) Level

The printer is equipped with the Kyocera Image Refinement (KIR) feature which was designed to refine the resolution of the 300 dpi page printer. To obtain the optimal KIR result, you can select from among three different levels of magnitude.

Figure 2.1 KIR Examples



Note: **To ensure the optimum KIR setting, the printer's density control must be set to its center ("5") position. The location of the density control knob in the printer is described in section 2.6. in this chapter.**

To change the KIR setting:

1. Follow the procedure described on page 2-36 so that the message display indicates `Others >`.
2. Press the ► ([FORMFEED]) key.
3. Press the ▲ or ▼ key repeatedly until the message display indicates `> KIR mode >`.
4. The current KIR mode is indicated by one of the following messages:

   ```
   None
   Light
   Medium
   Dark
   ```

5. To change the KIR setting, press the [ENTER] key. The message display now indicates a blinking question mark (`?`).

6. Press the ▲ or ▼ key until the desired KIR mode is displayed in the message display.

7. Press the (ENTER) key to select the KIR mode.

8. Press the (MODE SELECT) key. The message display returns to Ready.

You can print a KIR test pattern to see how the current KIR setting works. See next page.

To print a test pattern:

Follow the same steps 1, 2, and 3 as changing the KIR setting above.

1. The message display should show >KIR mode >. To print a KIR test pattern, press the ► ((FORMFEED)) key. The message display indicates >>Print Test pattern.

2. Press the (ENTER) key. The message display indicates a question mark (?).

3. Press the (ENTER) key again. The message display displays Processing and prints a test pattern, then returns to Ready.

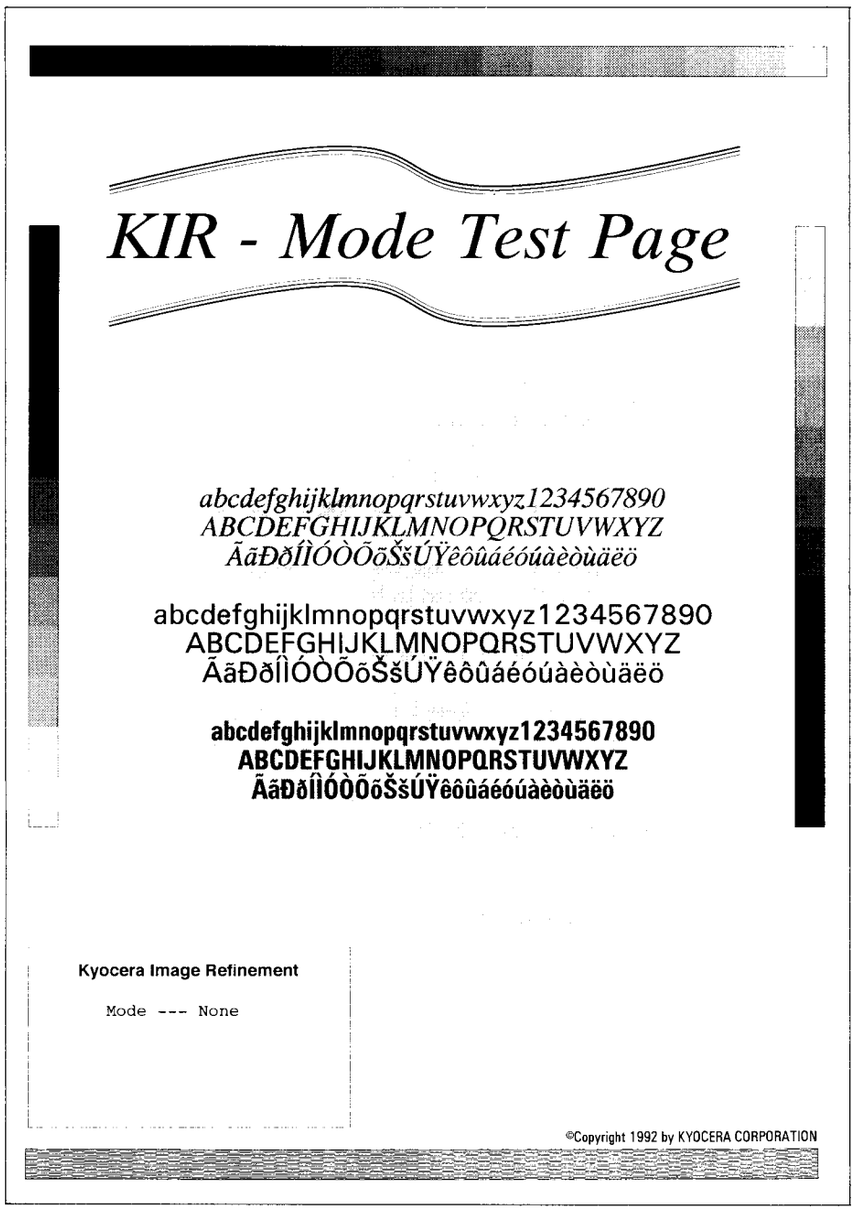
   If you want to abandon printing the test pattern, proceed as follows.

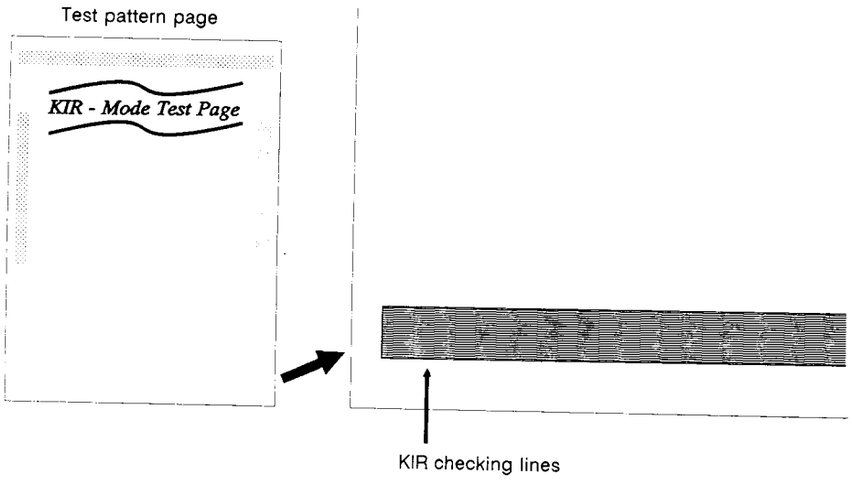
   (1.) When the message display shows Processing, press the (CANCEL) key. The message display shows Print Cancel/? Current Job.

   (2.) To cancel printing the test pattern, press the (ENTER) key. The message display returns to Ready.

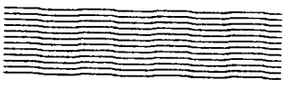
Examine the lines at the bottom of the test pattern page closely. See page 2-51.

Figure 2.2 KIR Test Patterns





Optimal test pattern



The current KIR setting is optimal.

Dark vertical stripes

Set the KIR mode to `Light` or `Medium`. Try printing the test pattern again. If you still get dark vertical stripes, adjust the print density control to a lighter setting (page 2-57).

White vertical stripes

Set the KIR mode to `Medium` or `Dark`. Try printing the test pattern again. If you still get white vertical stripes, adjust the print density control to a darker setting (page 2-57).

2.4. Page Formatting

When printing with word-processing or graphics software, you can rely on your software's page and text formatting functions. Provided the emulation mode matches the software, the printer will correctly execute the software's formatting commands.

If you need to do your own formatting without software assistance, you can use the printer's PRESCRIBE II command language. The formatting sequence can be prepared as a document file, as shown below. Printing this file causes the printer to select a font and set the line spacing and margins. The commands are not printed on paper.

```
!R! RES;
    FTMD 13;
    FONT 8;
    STM  1;
    SLM  1;
    SLPI 5;
    SLPP 45;
    EXIT, E;
```

This formatting sequence selects the printer's 12-point LetterGothicBM12-Roman bitmap font (font 8). It sets 1-inch top and left margins. The line spacing is 5 lines per inch, with 45 lines per page.

The STM and SLM commands set the margins in relation to the printer's edge limits, which are located about 5 mm inside the actual edges of the paper. The actual margins are therefore 5 mm larger than the specified values.

More information on page formatting is given in the *TECHNICAL REFERENCE* manual, section 1.2.

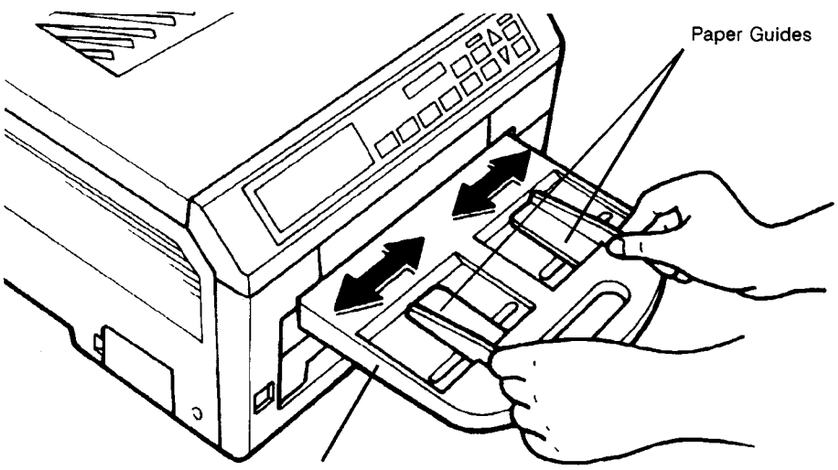
2.5. Manual Paper Feeding

If you have not done so, install the manual feed tray to the printer in the manner described in *Chapter 1, Install the manual feed tray* in this manual.

Manual paper feeding enables you to print occasionally on special paper without having to reload the paper feed cassette. *Appendix D* lists the usable types of paper.

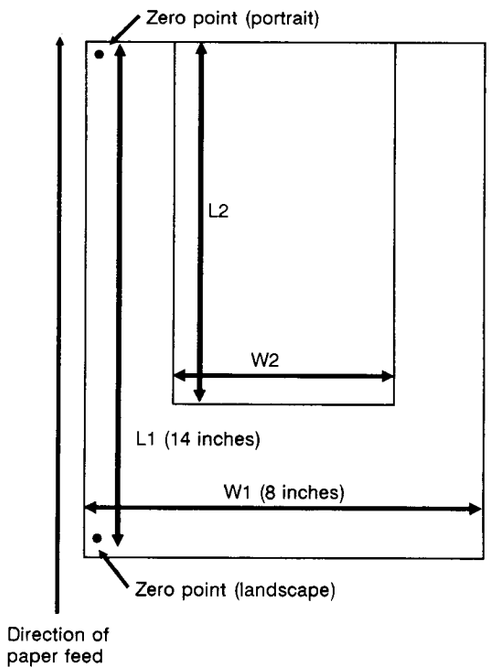
Begin adjusting the paper guides to the size of the manually fed paper. See Figure 2.3.

Figure 2.3 Adjusting the Paper Guides



The guides feed the paper in straight and accurately centered. Since the printer does not sense the position of the paper guides, the printer assumes that all manually fed paper have the legal size (8-1/2 × 14 inches).

To print text in the desired position, you must therefore allow extra margins. Extra left margin is required in the portrait orientation. Extra top and left margins are required in the landscape orientation. The drawing below shows how the actual and assumed dimensions are related and indicates how to calculate the margin offsets.



W1/L1 = Dimensions of paper assumed by printer
W2/L2 = Actual dimensions of manually-fed paper

Portrait orientation:
Left margin offset = 1/2 × (W1-W2)

Landscape orientation:
Left margin offset = L1-L2
Top margin offset = 1/2 × (W1-W2)

Note: **You can use the PRESCRIBE II SPSZ (Set Paper SiZe) command to tell the printer the size of manual fed paper or envelope, thus eliminating the need for calculating the extra margin offsets explained above. Refer to the printer's *PRESCRIBE II COMMAND REFERENCE* manual.**

Manual Feeding Procedure

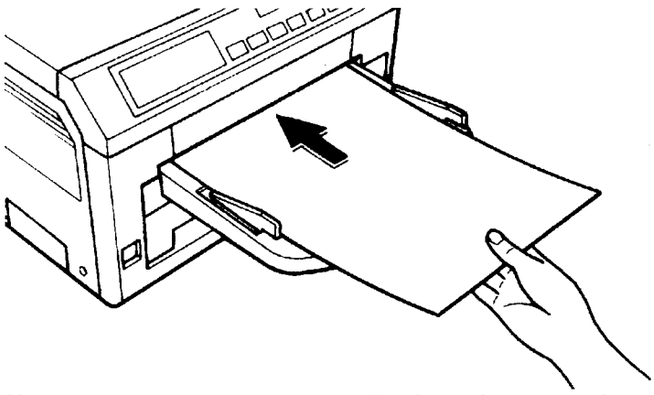
1. Check that the printer is Ready.

2. Press the [FEED SELECT] key until the message display indicates Manual feed and the manual feed (🖐) indicator on the printer symbol lights up.

   Unless you have already placed paper on the manual feed tray, the ▭ (paper) indicator will light, the ○ (ready) indicator will go out, and the message display will indicate Add paper.

3. Place one sheet of paper on the manual feed tray and insert it as far as it will go. See Figure 2.4. The ▭ indicator will go out and the ○ (ready) indicator will come on.

Figure 2.4 Manual Paper Feeding



Note: **Be sure to insert the sheet of paper on the manual feed tray as far as it will go.**

4. Send printing commands and data from the computer. The printer indicates Processing and prints the page.

   If you want to abandon the manual feeding procedure, press the [CANCEL] key. The message display indicates Print Cancel ?. Press the [ENTER] key. The printer return to Ready.

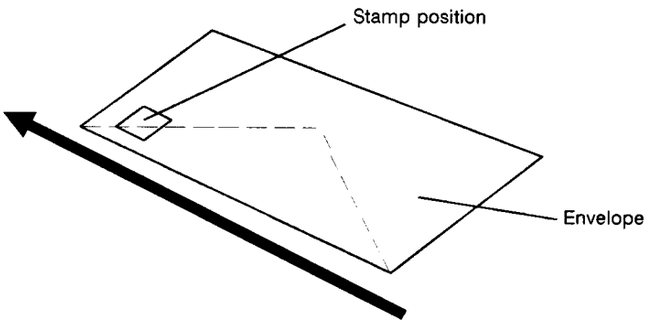
5. Feed more paper by hand when the printer's ▭ indicator comes on.

To exit manual feed, press the [FEED SELECT] key and select automatic feeding (▭).

Feeding Envelopes

Envelopes should be fed in the face up, right edge first, as shown below.

Figure 2.5 Direction of Feeding Envelope



Set the printer to print in the landscape page orientation.

Note: **To avoid trouble, we recommend that envelopes are delivered face-up.**

Large extra top and left margins must be allowed as explained on page 2-54. If no extra margin is allowed, the printing may miss the envelope completely. The margin values depend on the envelope size. See *Appendix D*. If the size of the envelope is any of Monarch, Business, International DL, International C5, and Executive, you can use the SPSZ command to simplify this procedure. Refer to the *COMMAND REFERENCE* manual.

Not all envelopes print well. See *Appendix D* for details on suitable types of envelopes.

If the printer has the option envelope feeder (EF-1) installed, you can select the size of envelopes on the printer's control panel (MODE SELECT key). No extra margins and SPSZ commands are then needed. Details are given on page 2-4.

Overhead Projection (OHP) Film

To avoid a trouble, OHP film must be fed manually by the manner described above.

Requirements regarding OHP film are also given in *Appendix D*.

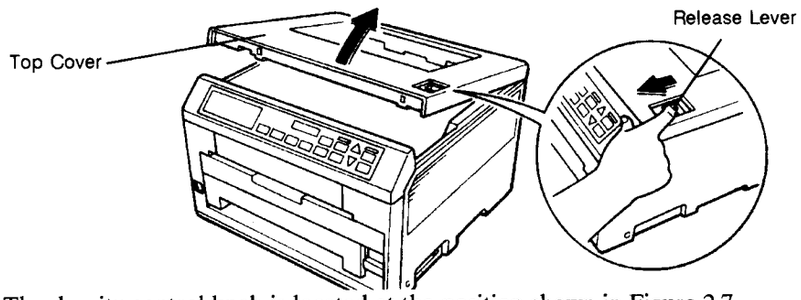
2.6. Adjusting the Print Density

The print density knob controls the relative darkness of printing. If printing is too dark or light, you can adjust the density by the following manner.

1. Remove any paper or other objects lying on top of the printer.

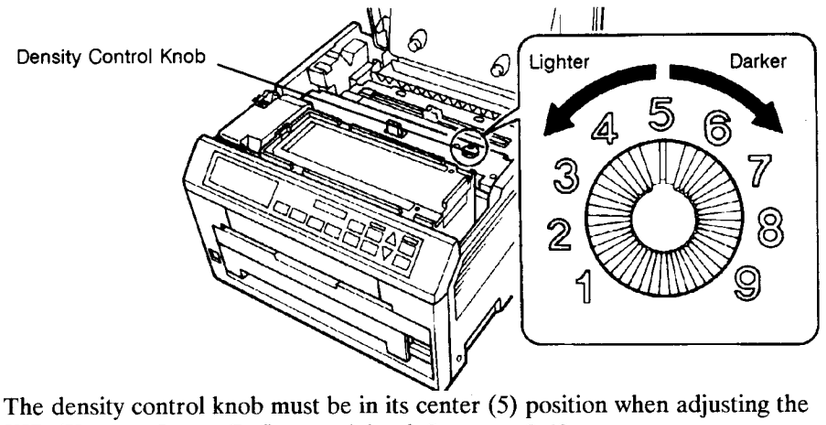
2. Lift the release lever on the top of the printer and raise the top cover all the way.

Figure 2.6 Open the Top Cover



3. The density control knob is located at the position shown in Figure 2.7. Rotate the knob clockwise to make the printing darker, or rotate the knob counterclockwise to make the printing lighter.

Figure 2.7 Adjusting the Density Control Knob



The density control knob must be in its center (5) position when adjusting the KIR (Kyocera Image Refinement) level. See page 2-48.

2.7. IC Card

IC cards are microchip memory cards containing, for example, nonresident fonts and/or macros, forms, etc. The printer reads the contents of the card into its internal memory when power is switched on. Their presence in memory can be confirmed on the status printout.

Two IC card slots are located at the bottom right of the printer.

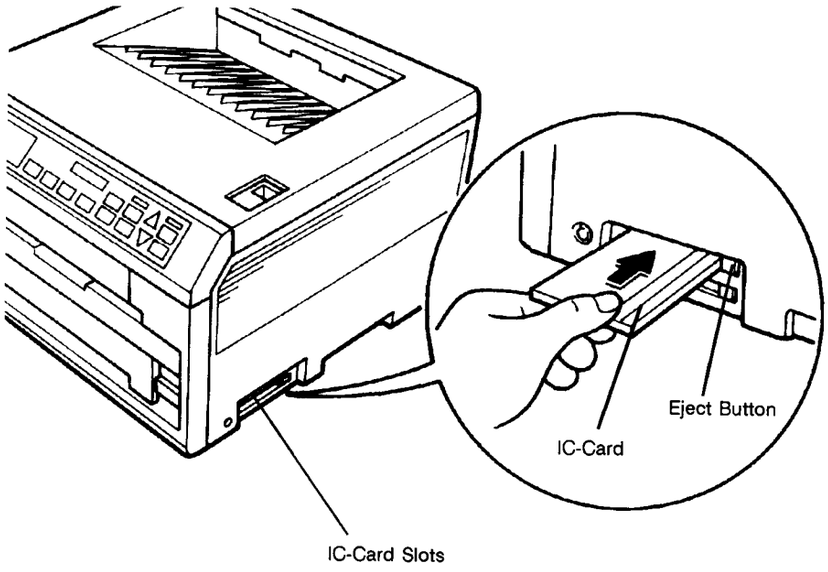
To insert and use an IC card:

1. Switch printer power off.

Note: **We recommend that you do not insert or remove an IC card while power is on. If the IC card is removed while the printer is Ready, the fonts read from the IC card will be immediately lost.**

2. Insert the IC card in either slot. Insert it face up, connector end first. Push it in all the way. When the IC card is fully inserted, the eject button pops out.

Figure 2.8 Inserting an IC Card



3. Switch printer power on. The printer reads the contents of the IC card during its power-up sequence. The information (nonresident fonts, etc.) on the IC card is now available for use.

If the IC card information is deleted from the printer's memory during the printing process, it can be reread by using the mode selection function explained in page 2-33.

To remove the IC card:

1. Switch the power off.

2. Press the eject button firmly. The IC card is ejected from the slot.

Note: **IC card contain sensitive electronic circuits. Treat them with appropriate care.**

- Never attempt to force an IC card into its slot.
- Never bend an IC card.
- Avoid impact. Do not drop an IC card.
- Do not touch the terminal of the IC card.
- Do not spill water or other liquids on an IC card.
- Keep IC cards away from open flames and other sources of heat.
- Do not leave IC cards lying in direct sunlight.
- Do not use a non-Kyocera IC card.

Chapter 3:
Maintenance

This printer is designed to provide years of trouble-free service without needing to replace any modules in the printer. However, you must add toner in the developer unit from the container in a new toner kit. The toner kit also contains a fuser cleaner pad and a waste toner bottle which must be replaced with the one in the printer. Also, to ensure good print quality, clean various parts inside the printer at regular intervals.

Note: **We strongly recommend you use only the original Kyocera micro fine ceramic toner kit. The use of the original Kyocera toner assures the intended long term reliability of the printer.**

Section 3.1. gives the step-by-step procedures for supplying toner in the developer unit, and section 3.2. explains how to clean various parts inside the printer. Section 3.3. gives instructions on how to remove the developer unit from the printer in case you need to move or ship the printer.

3.1. Supplying Toner in the Developer Unit

When the printer begins to run low on toner, the message display displays Warning Ecotone TK-9. At the earliest convenient opportunity after this message is shown, you should replenish the toner supply in the developer unit.

If you continue to use the printer, eventually the toner supply will be exhausted and the Add Ecotone TK-9 message will be displayed. At this point, to avoid damaging the developer unit, the printer stops printing. To continue printing, you must supply toner using a new toner kit.

Toner Supply Interval

Approximate toner supply interval – Every 5,000 pages (A4 size, 5%)

Toner Kit

The type of the toner kit to be used and the contents are as follows.

Table 3.1 Toner Kit Contents

Toner kit	Contents
Kyocera Ecotone TK-9	Toner container Waste toner bottle and cap Fuser cleaning pad Wiper (lint-free) cloth Instruction

Supplying Toner

Always replace the waste toner bottle and fuser cleaning pad in the toner kit at the same time of replenishing toner. In particular, if you do not replace the waste toner bottle, it may overflow later, and consequently cause damage to the printer.

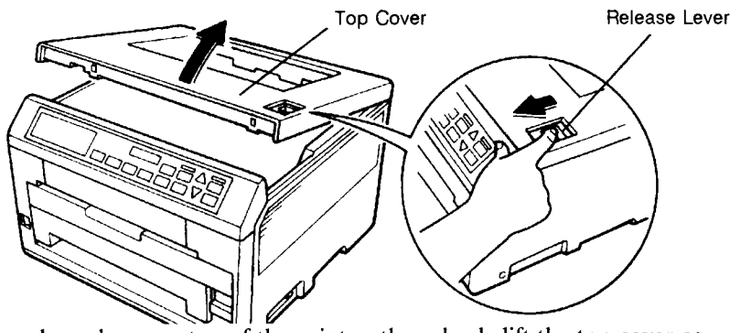
Note: **Before proceeding, keep the following in mind:**

- Do not leave floppy disks etc. lying around while performing this maintenance procedure. This procedure tends to raise a little toner dust which can harm magnetic recording media.

- Do not attempt to reuse the toner in the waste toner bottle.
- Replace the waste toner bottle to a new one only with the new toner supply.
- **Use only the toner kit exclusively designed for the printer. Use of toner kit intended for other printer models may damage the printer and void the warranty.**

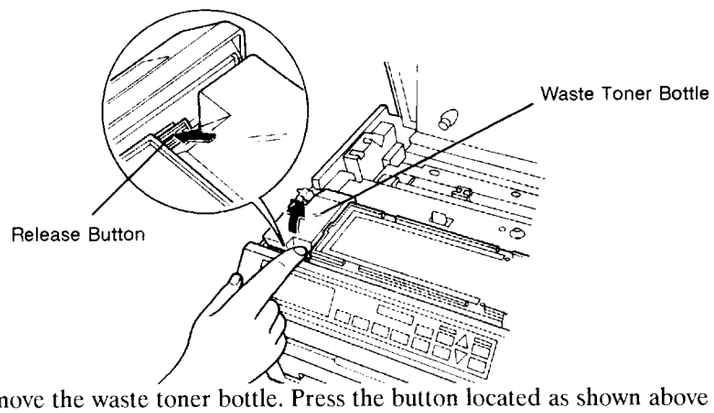
Remove any paper or other objects lying on top of the printer.

1



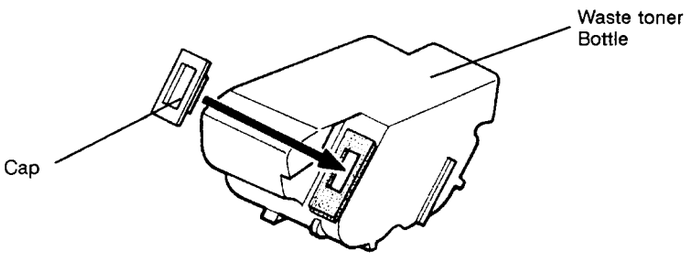
Pull the release lever on top of the printer, then slowly lift the top cover as shown above.

2



Remove the waste toner bottle. Press the button located as shown above to release the waste toner bottle from the printer. Remove the waste toner bottle as gently as possible so as not to scatter the waste toner inside. Do not let the opening of the waste toner bottle face downward.

3

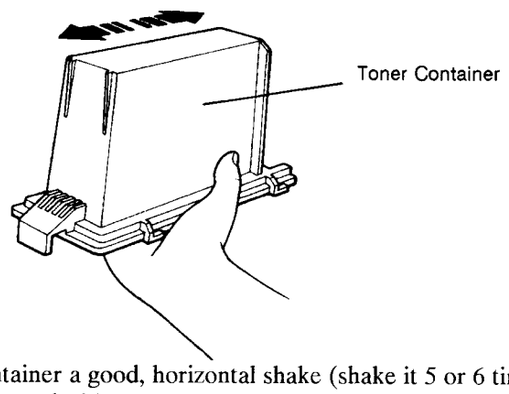


Cap the waste toner bottle taken out from the printer with the cap in the new toner kit and dispose of it. The waste toner bottle and the waste toner inside are disposable without risking generating harmful gas when burning.

Note: **Do not install the new waste toner bottle yet.**

Take out the new toner container from the toner kit.

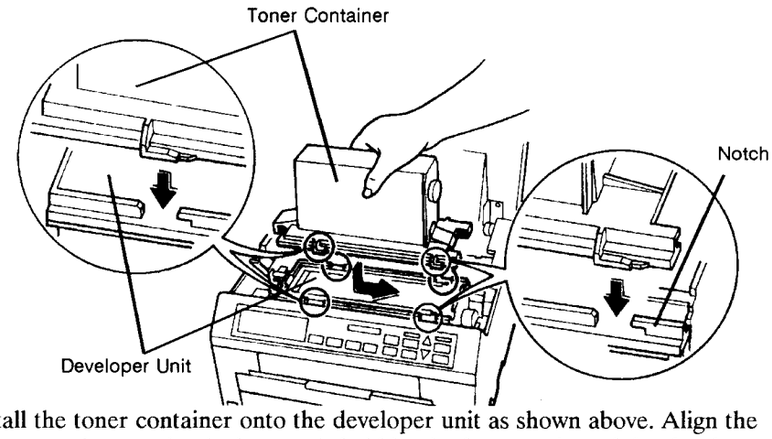
4



Give the new toner container a good, horizontal shake (shake it 5 or 6 times.) to loosen and mix the toner inside

Note: **Do not pull the shutter on the toner container before the toner container is fitted to the developer unit.**

5

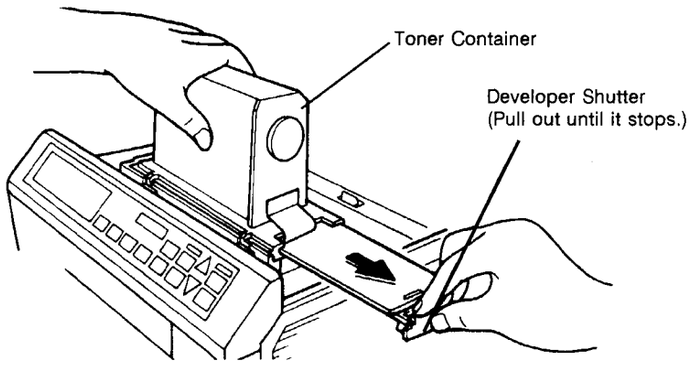


Install the toner container onto the developer unit as shown above. Align the toner container so that its bottom is held by the four notches of the developer unit.

Then, slide the toner container as shown above so that it locks in completely.

Note: **Make sure that the toner container is properly locked on the developer unit.**

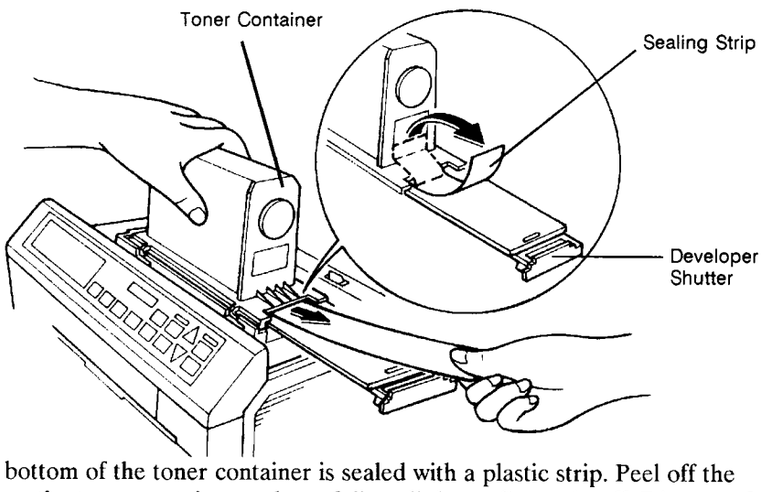
6



While holding the toner container locked in place, pull the developer shutter slowly towards the right side of the printer all the way until it stops.

Note: **If the shutter does not slide easily, check if the toner container is properly fitted on the developer unit.**

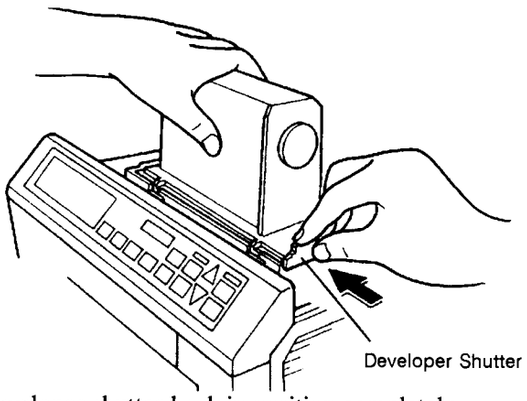
7



The bottom of the toner container is sealed with a plastic strip. Peel off the seal on the toner container and carefully pull the sealing strip off. Dispose of the sealing strip. The toner container is now open at the bottom.

Tap lightly several times on top of the toner container to knock off toner adhering to the sides.

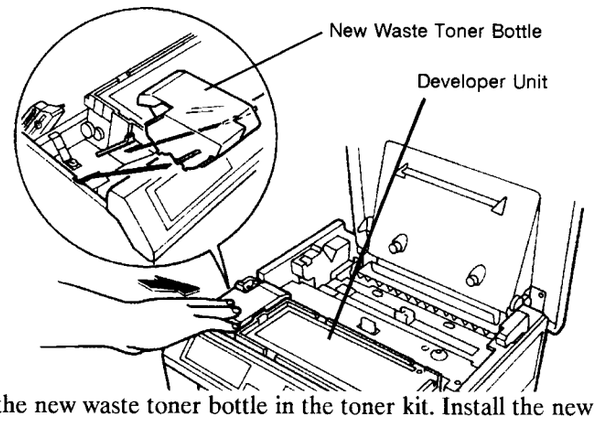
8



Slide the developer shutter back in position completely.

Remove the toner container using the reverse manner of step 2 and dispose it. (The toner container is made of a burnable material which generates no harmful gas when burning.)

9

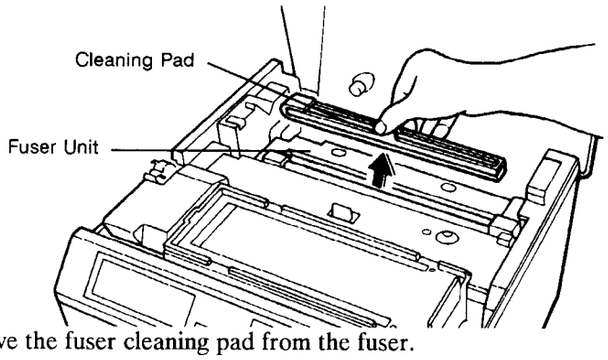


Locate the new waste toner bottle in the toner kit. Install the new waste toner bottle in the printer as shown above.

Align the tabs on the bottle with the guiding slots in the printer and the developer unit. Push the waste toner bottle lightly on top to lock it in place.

Note: **Be sure to install the new waste toner bottle with every new toner supply. The printer will not work until the new waste toner bottle is installed in place. Also, to avoid damaging the printer, do not attempt to use the old waste toner bottle.**

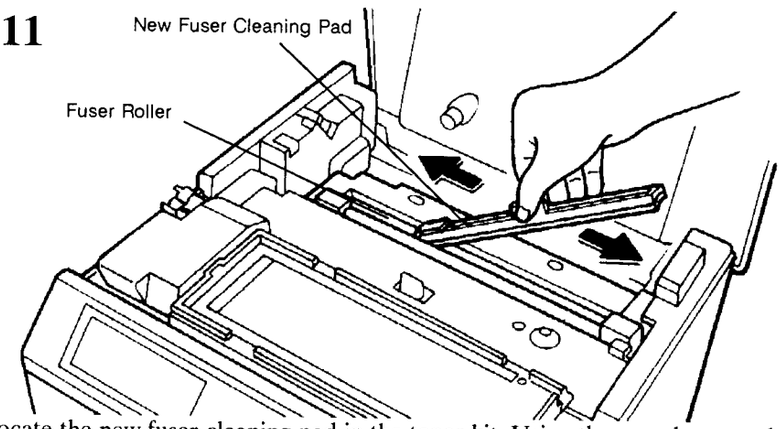
10



Remove the fuser cleaning pad from the fuser.

Caution: **The fuser cleaning pad and the fuser roller below it are hot immediately after the printer is used. When removing the cleaning pad, handle it only by its handle as shown in the figure above.**

11

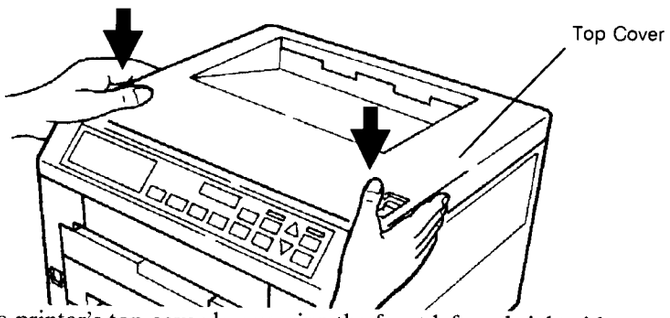


Locate the new fuser cleaning pad in the toner kit. Using the round, covered end of the cleaning pad, wipe the fuser roller through the opening in the fuser where the cleaning pad is to be placed. (The roller may not necessarily be cleaned through its entire surface.)

Install the new fuser cleaning pad using the reverse manner of step 10.

Note: **Be sure the fuser cleaning pad has been completely fit in the fuser.**

12



Close the printer's top cover by pressing the front left and right sides.

3.2. Cleaning

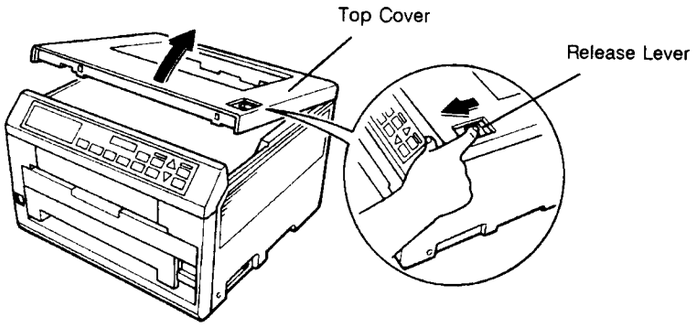
To avoid print quality problems, the following parts of the printer must be cleaned after supplying toner. Cleaning may be done from time to time to avoid print quality problems.

LED Head and Charger Wire

Note: **Before cleaning LED head and charger wire, switch printer power off.**

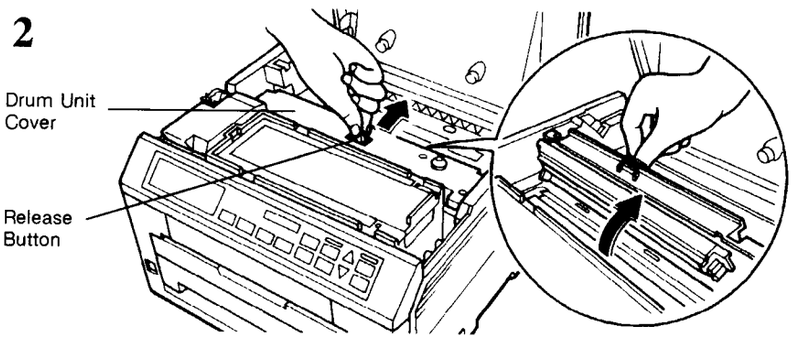
The LED head and the charger wire are located sideways behind the drum unit cover. Clean them using the MH cleaner supplied with the printer in the manner described below.

1



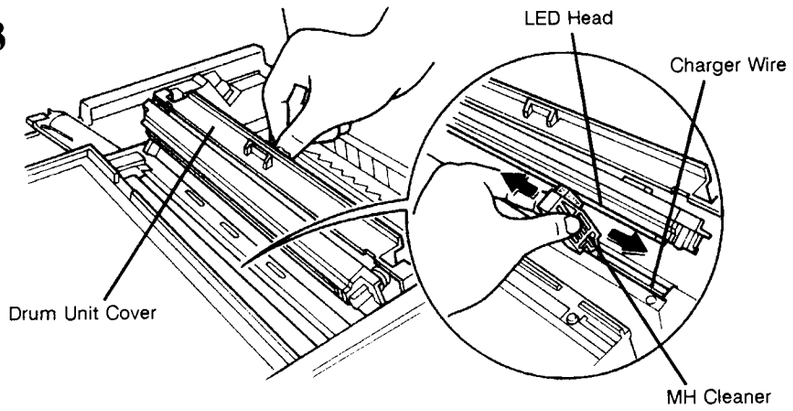
Open the printer top cover by pulling the release lever on top of the printer.

2



Push the release button on the drum unit cover as shown above.

3



Take out the MH cleaner from the printer, and fit the MH cleaner to the LED head and the charger wire as shown above. Move the MH cleaner to the left and right over the charger wire several times to clean the head and the charger wire.

After cleaning these parts, close the drum unit cover firmly by pressing on top.

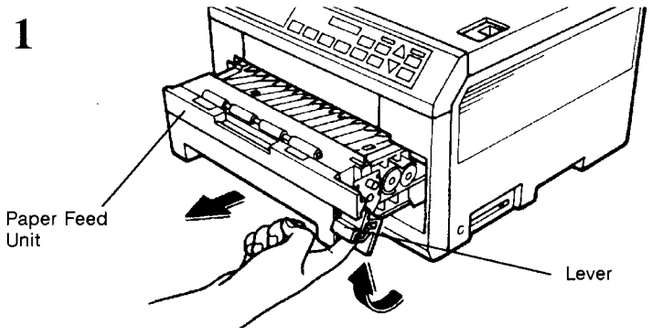
Note: **The LED head is one of the most sensitive and fragile parts in the printer. Use only the MH cleaner supplied to clean the head. The same applies to the charger wire. Use only the MH cleaner, setting it in the correct position as shown above.**

Paper Feed Unit

Note: **Before cleaning paper feed unit, switch printer power off.**

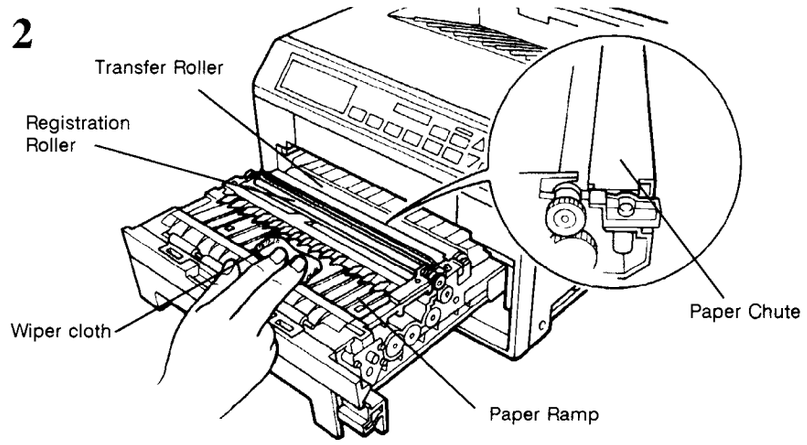
To avoid print quality problems due to dirt on the back of paper, clean the paper feed unit in the following manner.

1



Press the lever up and draw out the paper feed unit all the way out until it stops.

2



Wipe the registration roller and paper chute using the wiper cloth (lint-free) included in the toner kit.

Note: **Do not touch the transfer roller when wiping the paper chute.**

Chapter 4:
Troubleshooting

This chapter explains how to handle any problems that may arise with the printer. The procedures are easy to follow. Follow them carefully, and if they fail to fix the problem, call for serviceman assistance.

Section 4.1 is a general guide to the troubleshooting procedures, which are given in detail in Sections 4.2 to 4.6 .

4.1. General Guide

If the printer does not print –

Is the ○ (ready) indicator lit?

- If the ○ (ready) indicator is not lit, you have a power problem. See Section 4.2.
- If the ○ (ready) indicator is on, proceed as for an abnormal printing problem. See below.

If the printing is abnormal –

With the printer on-line and ready, press the STATUS key to print a status page. You can print a KIR test pattern page for more precise printing criterion. To print a KIR test pattern page, refer to chapter 2.

- If the result is normal, you have an interface problem. See Section 4.3.
- If the result is not normal, you have a print quality problem. See Section 4.4.

If a maintenance message is displayed on the message display:

- See Section 4.5. (For a paper jam, see Section 4.6.)

If the printer does not print the entire page or indicate `Memory overflow` on its message display, try adding an option memory. To add the option memory, see *Appendix G*.

4.2. Power Problems

Note: **The printer power rating must be within the voltage range of your country. If in doubt, consult your dealer.**

If nothing happens when you switch the printer's power on, you have a power problem. The symptoms are a dark control panel, no printing, and no fan sound. Proceed as follows.

Check the power switch.

Check the power cord.

If the cord is loose at either end, switch power off, plug the power cord in securely, then switch power on again.

Call for serviceman assistance.

If the above checks do not solve the problem, call for serviceman assistance.

4.3. Interface Problems

If the printer prints a status page correctly but does not print data from the computer correctly (or at all), there is an interface problem.

Check the interface cable.

Make sure the cable is plugged in securely at both ends.

Check your file and software.

Try printing a different file, or using a different print command.

If you are using an RS-232C cable, reset the RS-232C parameters.

Set the computer's RS-232C parameters to the same values as the printer so that the printer and computer can communicate. The default RS-232C parameters of the printer are as follows:

Baud rate	9600 bits per second (H1 = 96 on the status page)
Data length	8 bits per character (H2 = 8 on the status page)
Stop bits	1 (H3 = 1 on the status page)
Parity	None (H4 = 0 on the status page)
Protocol	XON/XOFF, DTR (positive logic) and ETX/ACK (H5 = 0 on the status page)

To change the printer's RS-232C parameters, refer to *Chapter 2.*

Try using a different cable.

Compare the pin assignments listed in *Appendix E* with the specifications of your cable.

Call for serviceman assistance.

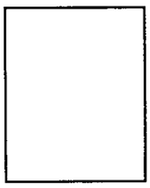
If the above checks do not solve the problem, call for serviceman assistance.

4.4. Print Quality Problems

Print quality problems range from uneven tone to completely blank output. The troubleshooting procedure for each type of problem is given below.

If the checks explained in this section do not solve the problem, call for serviceman assistance.

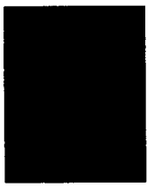
Completely blank printout



Check the message display.

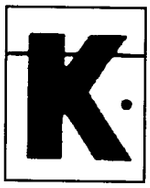
If the `Developer unit connection error` message is displayed, install the developer unit or check that the developer's connector is connected properly. See Section 3.1.

All-black printout



Call for serviceman assistance.

Dropouts, horizontal black streaks, stray dots



Clean the LED head and the change wire.

Open the printer's top cover. Open the drum unit cover. Clean the LED head and the charger wire using the MH cleaner. (See page 3-9.)

Note the spacing of the defects.

If the defects occur at regular intervals of 60.6 mm (2.4 inches), the problem is a dirty transfer roller. Call for serviceman assistance.

If the defects occur at regular intervals of 94 mm (3.7 inches), the problem is the damaged fuser roller. Call for serviceman assistance.

White or black vertical streaks

Check the control panel.

If the Warning Ecotone TK-9 message is displayed and indicator is blinking, supply toner into the developer unit. See Section 3.1.

Clean the LED head and the charger wire.

Open the printer's top cover. Open the drum unit cover. Clean the LED head and the charger wire. (See page 3-9.)

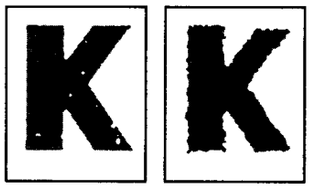
Check the drum.

If the drum has scratches, call for serviceman assistance.

Check the fuser roller.

Remove the fuser cleaning pad. If the fuser roller has scratches, call for serviceman assistance.

Faint or blurred printing



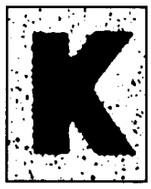
Check the control panel.

If the Warning Ecotone TK-9 message is displayed and indicator is blinking, supply toner into the developer unit. See Section 3.1.

Set the print density knob to a darker setting.

See page 2-57.

Grey background



Check the control panel.

If the Warning Ecotone TK-9 message is displayed and indicator is blinking, supplying toner into the developer unit. See Section 3.1.

Check the developer unit.

Open the printer's top cover and check that the developer unit is inserted straight and locked correctly.

Dirt on the back of the paper

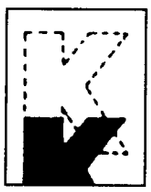
Check the transfer roller.

If the transfer roller is dirty with toner, try printing several pages.

Check the paper chute and the ramp.

Draw out the paper feed unit and check for toner on the paper chute and the ramp. Clean the paper chute and ramp using the wiper supplied or a soft, dry, lint-free cloth. See section 3.1.

Characters out of position



Check the file or program.

See if the problem is caused by incorrect PRESCRIBE II commands. If the problem occurs with only one file or program, the most likely cause is a command error.

4.5. Indicators and Messages

The tables on the following pages indicate how to respond to problems indicated by the control panel symbolic indicators and messages.

Indicators

Table 4.1 Symbolic Indicators

Indicator	Corrective Action
(Ready)	If this indicator does not come on even though power is on: Check the other control panel indicators and message display. Turn power off, wait a few seconds, then turn power on again. Call for service person assistance.
(Paper jam)	Open the printer and correct the paper jam. See section 4.6.
(Toner empty)	Supply toner using a new toner kit. See section 3.1.
(Service)	Note the message and code indicated on the message display and call for service person assistance.
ATTENTION	Note the maintenance message on the message display and consult Table 4.2 on next page.

Maintenance Messages

Table 4.2 Maintenance Messages

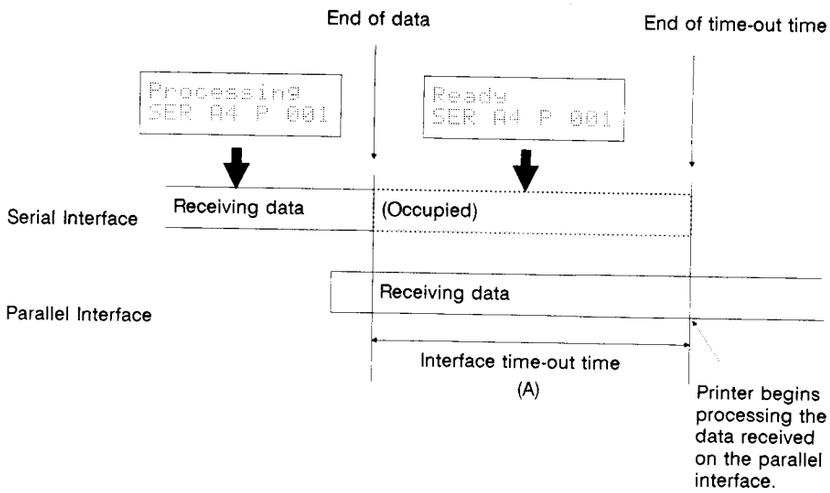
Message	Corrective Action
Developer unit connection error	Turn the printer power off. Install the developer unit, connect the developer's connector to the printer, or have the connector repaired. See section 1.4.
Top cover Open	Open the top cover, then close tightly.
Paper feed unit Open	Open the paper feed unit, then close tightly.
Add Paper	Add paper to the paper cassette or add a sheet of paper to the manual feed tray.
Paper jam	Open the top cover or the paper feed unit and correct the paper jam. See section 4.6.
Warning Short memory	The printer's internal memory is running out due to too many fonts and macros downloaded. Print a status page to see how much user memory is left and try deleting unnecessary fonts and macros.
Warning Ecotone TK-9	Replenish the toner supply using a new toner kit. See section 3.1.
Add Ecotone TK-9	Replenish the toner supply using a new toner kit. See section 3.1. The printer does not operate when this message is displayed.
Missing Waste-toner bottle	Install the waste toner bottle. See section 1.4. The printer does not operate when this message is displayed.
Replace Waste-toner bottle	Replace the old waste toner bottle with the new one. See section 3.1.
Call service Person En:123456	Mechanical error (n = 1, 2, ...) – Call a service person. The printer does not operate when a message beginning with E is displayed. The total number of pages printed is also indicated.
Call service Person Fn:123456	Controller error (n = 1, 2, ...) – Call a service person. The printer does not operate when a message beginning with F is displayed. The total number of pages printed is also indicated.

Error Messages

Message	Corrective Action
Memory overflow .. Press ON LINE	The total amount of the data received by the printer exceeds the printer's internal memory. Try adding more memory (expansion RAM). Press the ONLINE key to resume printing. You can abandon printing by the CANCEL key.
Print overrun .. Press ON LINE	The data transferred to the printer was too complex to print on a page. Press the ONLINE key to resume printing. (The page may break in some pages.) You can abandon printing by the CANCEL key.
IC-CARD error Insert again	The IC card is accidentally removed from the printer's IC card slot during rereading. If you continue rereading the IC card, insert the same IC card into the slot again. The printer again rereads it from the beginning of the data. **Note:** We recommend that you follow the rereading procedure from the beginning to ensure correct rereading of the IC card.
Insert the same IC-CARD	You have inserted the wrong IC card when the Insert again message was displayed. Remove the wrong IC card from the printer's IC card slot and insert the correct IC card. The printer again rereads it from the beginning of the data.
>Read fonts Failed	The amount of memory available for fonts are too small to load more fonts. Try deleting unnecessary fonts and macros.
I/F Occupied	This message is displayed when you attempt to use the printer's control panel to change the environmental settings on the interface on which data are presently being received. (See **Note** on next page.)

Note:

I/F Occupied: This is possible in some situations because the printer can be Ready on one interface while it is actually receiving data on the other interface(s). The most likely case, for example, is that the printer has finished receiving data on its serial interface and waiting for the interface time-out time (A, below)(the message display indicates Ready and the INTERFACE indicator indicates SER), while on its parallel interface data are actually arriving (though these data are not processed until the serial interface is released). Then, if you switch the control panel to the parallel interface, attempt to change some interface parameters, and press the ENTER key to finish the setting, the message display will indicate I/F Occupied to report you that the interface is presently occupied and the control panel settings are abandoned for the parallel interface. This message is also given when you are using the control panel to reread the IC card while data are arriving on one of the interfaces. Another situation that may be subject to this message is when you adjust the RS-232C parameters. For example, if the serial interface is occupied with data while the parallel interface is waiting to time-out, you can switch the control panel to affect the serial interface (by the mode select function), however, the message display indicates I/F Occupied and the changes made are abandoned when you press the ENTER key at last.



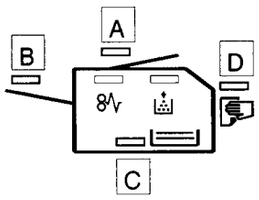
4.6. Correcting a Paper Jam

The Paper Jam message is displayed on the message display when paper becomes stuck in the paper transport system, the paper feed timing is incorrect, or paper fails to feed at all. The jam can be corrected by removing the paper.

The printer goes off-line, the O (ready) indicator flashes, and the paper jam (⚠) indicator lights on the control panel, when the Paper Jam message is displayed.

Depending on the indicator of the printer symbol on the front panel that is flashing, check the following:

Figure 4.1 Printer Symbol



A	Check the face-down output tray.	If paper is partially fed out into the tray, pull the paper out the rest of the way by hand, then open and close the printer's top cover or the paper feed unit.
	Check the fuser unit and the face-down paper path.	Open the printer's top cover. Draw out the paper feed unit. Pull out the paper as shown in Figure 4.2. Close the printer's top cover.
B	Check the face-up output tray	Refer to A, above.
C	Check the paper feed cassette.	If paper is stacked in the paper cassette, not reaching the registration rollers, remove the paper cassette and draw out the paper feed unit. Remove the jammed paper. See Figure 4.3. Close the paper feed unit and install the paper cassette in the printer. Push it straight as far as it will go.
	Check the registration roller.	If the paper is caught by the registration rollers, draw out the paper feed unit half way out and remove the jammed paper. See Figure 4.4. Close the paper feed unit in the printer. Push it straight as far as it will go.
D	Check the manual feed tray.	If the paper is stacked in the manual feed tray, remove the paper by pulling it out. Open and close the printer's top cover or the paper feed unit.

When the paper jam is removed, open and close the printer's top cover or the paper feed unit; press the [ONLINE] key to continue printing.

If paper jams occur frequently, try using a different type of paper, replace with paper from another ream, turn the stack of paper over, or turn the paper the other way around. Also, read the information in *Appendix D*.

If you cannot solve the problem by changing the paper, there may be a problem with the printer. Call a serviceman.

Notes: **The fuser is hot. Do not touch it.**

Figure 4.2 Fuser Unit

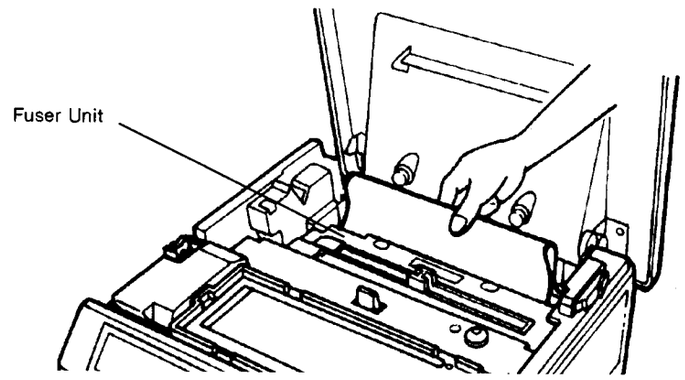


Figure 4.3 Paper Feed Cassette

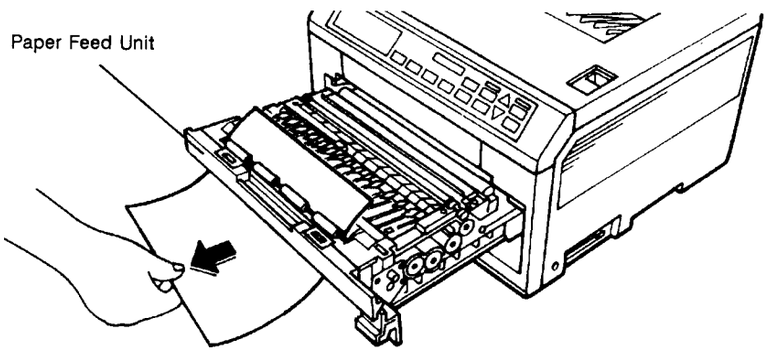
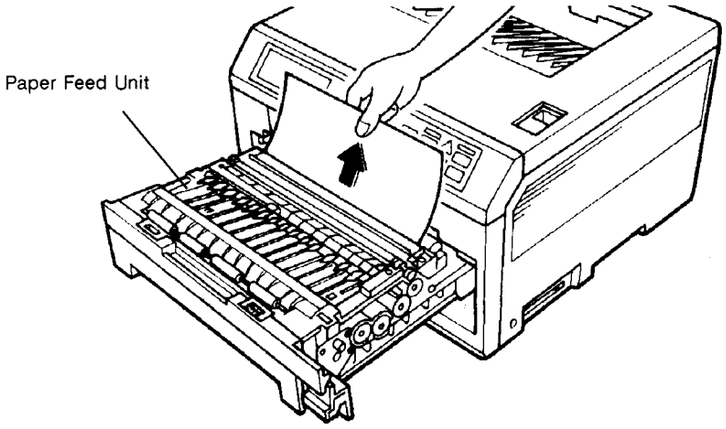


Figure 4.4 Paper Feed Unit



Appendix A:
Status Page

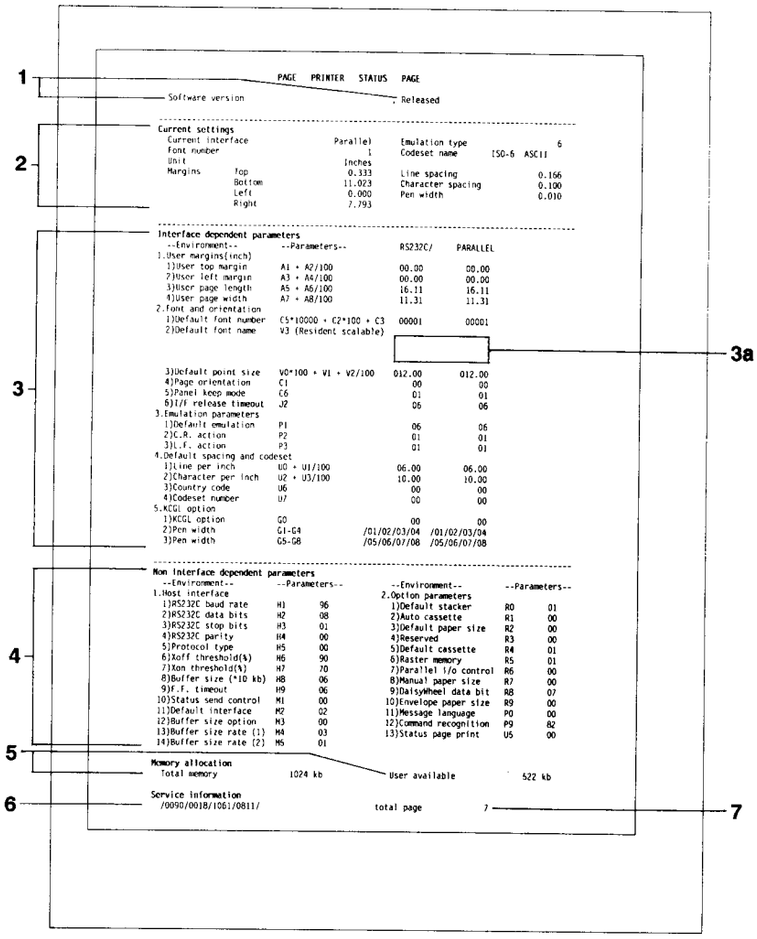
A status page can be obtained by pressing the printer's STATUS key at any time when the printer is Ready. The printer can also be set to print a status page automatically when its power is switched on by the FRPO U5 command.

A.1. Status Page

Figure A.1. shows an example of the status page. The following information is given. (The numbers refer to Figure A.1.)

The printer prints a second status page if it has nonresident fonts (including scalable fonts with a font number assigned by SFNT) in its memory. See item 8 below.

Figure A.1 Sample Status Page



1 – Firmware version information

The printer's firmware version number and release date.

2 – Current status information

These information give the printer's temporary settings which are made by PRESCRIBE II commands or software's embedded commands. Note that these information pertain to the current interface only.

Emulation type is indicated by the one of the following numbers.

0-Line printer
1-IBM Proprinter X-24E
2-Diablo 630
5-Epson LQ-850
6-HP LaserJet series III
8-HP 7475A

3 – Interface-dependent information

The printer has a parallel Centronics interface, a serial RS-232C interface, and an open slot for installing an option interface for different computers. These parameters are interface-dependent, therefore affect the environment on the current interface only. Any changes made with these parameters on one interface do not interfere with the other interface(s). You can learn details regarding these parameters in section 6.2. in the *Printer Technical Reference* manual.

3a – Default font name (V3)

The power-up scalable fonts (if specified) for the serial, parallel, and option (if installed) interfaces are listed here, from top to bottom. The example which follows indicates that the power-up scalable font is Dutch801SWC-Roman on the serial interface, and Swiss742SWC-Roman on the parallel interface.

```
2.Font and orientation
  1)Default font number   C5*10000 + C2*100 + C3   00000          00000
  2)Default font name     V3 (Resident scalable)
                                                   Dutch801SWC-Roman ┐
                                                   Swiss742SWC-Roman ┘ ——3a
```

4 – Non interface-dependent information

These parameters are non interface-dependent and affect all interfaces simultaneously. If the printer is shared with other users, you must remember that any changes made with these parameters may interfere with other user's job. Also see section 6.2. in the *FS-SERIES TECHNICAL REFERENCE* manual.

5 – Memory allocation status

Total memory shows the total amount of the memory installed in the printer, including the expanded memory, if installed. **User memory** shows how much memory is available for storing information to be printed.

6 – Service information

These information are for service purpose.

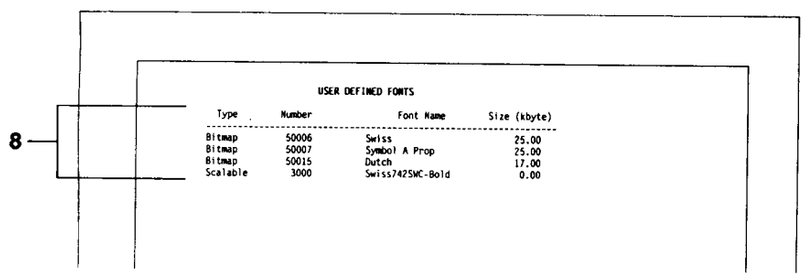
7 – Cumulative page count

The total number of pages the printer has printed.

8 – User defined font list

A list of fonts (if any) that have been downloaded from the computer and font numbers that have been assigned by the SFNT command.

In the example below, first three lines represent the numbers, font names (typefaces), and the sizes in kilobytes of three downloaded bitmap fonts. In line 4, you can see the result of a SFNT command which assigned the Swiss742SWC-Bold font with font number 3000. (In this case, the size is zero.)



Appendix B: How the Page Printer Works

B.1. How the Printer Works

This section is optional reading, for those interested in knowing how the printer works. You will not need this information in order to operate the printer.

There are three main steps in printing a page:

1 – Receive and process the data

2 – Write the image on the drum

3 – Transfer the image from the drum to the paper

Step (1), receiving and processing the data, is performed on the main logic board in the bottom of the printer. From the data sent by the computer, the printer constructs a bit map indicating whether each dot on the page is to be printed black or left white. This bit map is stored in the printer's raster memory.

Step (2), writing the image on the drum, is performed by the LED optical system, drum, and the developer. As the drum turns, first its surface is given a uniform, positive electrical charge by a corona discharge from the main charger wire, which runs parallel to the length of the drum. The LED optical head, also running parallel to the length of the drum, has 2,560 pieces of tiny LED chips, each corresponding to one printer's dot. A LED chip is switched on for each black dot and off for each white dot under control of the bit map in the printer's raster memory.

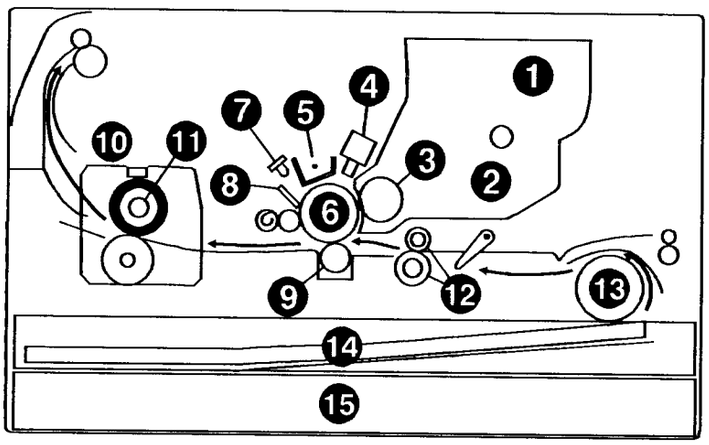
The drum is photosensitive: it conducts electricity when illuminated by light. Wherever it is illuminated by the light, the charge on its surface escapes to ground level through the drum shaft. After scanning, the drum carries an invisible electrical image: the areas to be left white retain their electric charge, while the areas to be printed black are electrically neutral.

The invisible image is now developed by applying toner to the drum. The toner is carried to the drum by *carrier* powder which is magnetized by the magnetic roller in the developer, and adheres to the electrically neutral areas on the drum to be printed black. The charge on the drum prevents toner from adhering to the areas to be left white.

Step (3), transferring the image to the paper, is performed by the transfer roller. As the paper is pinched by the transfer roller and the drum, it is electrically charged by a negative discharge. This charge attracts the toner particles from the drum to the paper. The paper is then passed between a heat roller and a pressure roller in the fuser, and heat from the heat roller fuses the toner permanently onto the paper.

Steps (2) and (3) are performed continuously as the drum rotates and the paper feeds through the printer. During the process, toner that fails to transfer to the paper is routed into the waste toner bottle. At the end, the cleaner blade removes any toner remaining on the drum, and an eraser LED array illuminates the drum to remove its remaining electric change and prepare for the next image.

Figure B.1 How the Printer Works



1. Toner reservoir
2. Developer unit
3. Developer magnet roller
4. LED optical head
5. Main charger (+)
6. Drum
7. Eraser LED array
8. Cleaner blade
9. Transfer roller (-)
10. Fuser
11. Fuser heater
12. Registration rollers
13. Paper pickup roller
14. Paper cassette
15. Main logic board

Appendix C:
Printer Specifications

C.1. Printer Specifications

Item	Description
Printing method	Electrophotography, LED direct scan.
Printing speed	10 pages/minute (A4 or letter-size paper, when printing multiple copies of the same page).
Resolution	300 dots/inch (vertical and horizontal) with KIR (Kyocera Image Refinement)
First print	Approx. 20 seconds (A4 or letter size), depends on input data.
Warm-up time	120 seconds or less (at 20° C)
Controller	16-bit microprocessor
Main memory*[1]	1 MB
Raster memory*[2]	128 kB
IC card slots	Two
Self test	Performed at power-up
Scanning system	LED optical head
Duty cycle	25,000 pages/month
Drum	Amorphous silicon drum
Developer	Multi-component dry developer
Main charger	Scorotron charger
Transferring	Charger roller
Separation	Curvature separation
Drum cleaning	Blade cleaner
Drum discharging	Illumination by eraser lamp
Fuser	Heat roller and pressure roller
Paper	Plain paper. See Appendix D.
Paper feed tray	A4 or letter size. Holds 250 sheets of weight 75 g/cm^2, thickness 0.1 mm.
Capacity of output trays	Face-down tray—250 sheets of thickness 0.1 mm. Face-up tray—250 sheets of thickness 0.1 mm.

Item	Description
Ambient conditions	Temperature: 10°C to 32.5°C (50°F to 90.5°F) Humidity: 20% to 80% RH Optimum conditions: 20°C, 65% RH. Altitude: Max. 2000m (6500 feet) Illumination: Max. 1500 lux
Power requirements	120 V, 60 Hz, max. 5 A (FS-1500A) 220 – 240 V, 50Hz/60Hz, max. 2.5 A (FS-1500) Max. allowable voltage fluctuation: ±10 % Max. allowable frequency fluctuation: ±2 %
Power consumption	Max. 515 W
Noise	Max. 48 dB (A) when printing (excl. peak values) Max. 35 dB (A) when idling (excl. peak values) (Measured 1 m from the outside of the printer, main unit only)
Dimensions	220 mm high × 345 mm wide × 350 mm deep (Excl. the paper tray)
Weight	13.5 kg

*1 Including the raster memory (video-RAM). Extendable to 2, 3, 4, or 5MB with optional memory.
*2 Depending on the available memory, selectable to 128, 256, 512, 1024 (A4/Letter), or 2048 kB (Legal). Factory setting is 128 kB for all countries.

Appendix D:
Paper Selection

D.1. General Guidelines

The printer is designed to print on high-quality copier bond paper (the kind used in ordinary dry copier machines), but it can accept a variety of other types of paper as well within the limits specified below.

Note: **The manufacturer assumes no liability for problems that occur when paper not satisfying these requirements is used.**

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

Paper Availability

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

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

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

Paper in each grade is available in a range of basis weights (defined later). The traditional standard weights are 16, 20, and 24 pounds ($60g/m^2$ to $90g/m^2$).

Paper Specifications

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

Table D.1 Specification for White Bond Paper

Item	Specification
Weight	60 to 90 g/m^2 (16 to 24 lbs/ream)
Thickness	0.086 to 0.110 mm (3.4 to 4.3 mils)
Dimensional accuracy	±0.7 mm (±0.0276 inches)
Squareness of corners	90° ± 0.2°
Moisture content	4% to 6%
Direction of grain	Long grain
Pulp content	80% or more

D.2. Selecting the Right Paper

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

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

Condition of the Paper

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

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

Composition

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

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

Paper Size

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

Table D.2 Paper Sizes for Cassette Paper Feed

Cassette	Size
Legal	8.5 × 14 in
Letter	8.5 × 11 in
ISO A4	210 × 297 mm
JIS B5	182 × 257 mm
JIS A5	148 × 210 mm

Other sizes of paper can be fed manually. The minimum size of manually fed paper is 80 × 148 mm (3.1 × 5.8 inches), fed lengthwise. The maximum size is 216 × 356 mm (8.5 × 14 inches).

Smoothness

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

Basis Weight

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

Paper that is too light or too heavy can cause misfeeding, jams, and premature wear of the printer. Uneven paper weight can cause multiple feeds, print defects, poor toner fusing, blurring, and other print quality problems. The proper weight is 60 to 90 g/m^2 (16 to 24 lbs/ream).

Thickness (Caliper)

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

Moisture Content

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

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

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

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

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

Paper Grain

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

Other Paper Properties

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

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

Curl: Most paper has a natural tendency to curl in one direction. The paper should be loaded so that the natural curl is downward, to counteract the upward curl imparted by the printer. Printed sheets will then come out flat. Most paper also has a top and bottom surface. Loading instructions are usually given on the paper package.

Electrostatic properties: During the printing process the paper is electrostatically charged to attract the toner. The paper must be able to release this charge so that printed sheets do not cling together in the output tray.

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

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

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

D.3. Special Paper

The following types of special paper can be used:

- Overhead projection (OHP) film
- Adhesive-backed label paper
- Envelopes
- Colored paper
- Preprinted paper

Use paper that is sold specifically for use with copiers (heat-fusing type). OHP film, label paper, and envelopes should not be placed in the cassette; they must be fed manually and delivered in the face up stack.

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

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

Specifications for each type of special paper are given below.

Overhead Projection (OHP) Film

The following type of OHP film is recommended:

- FOLEX BG-60

OHP film must be able to withstand the heat of fusing during the printing process. It should satisfy the conditions in Table D.3.

Table D.3 OHP Film Specifications

Item	Specification
Tolerance of heat	Must tolerate at least 190°C (374°F)
Thickness	0.100 to 0.110 mm (3.9 to 4.3 mils)
Dimensional accuracy	±0.7 mm (±0.0276 in)
Squareness of corners	90° ±0.2°

To avoid trouble, OHP film must be delivered face-up.

If OHP film jams frequently, pull the top of the sheet very gently as it leaves the printer.

Adhesive-Backed Labels

The basic rule for printing on adhesive labels is that the adhesive must never come into contact with any part of the printer. Adhesive paper sticking to the drum or rollers will damage the printer.

Label paper must be manually fed.

Label paper has a structure consisting of three layers, as shown in Figure D.1. The top sheet is printed on. The adhesive layer consists of pressure-sensitive adhesives. The carrier sheet (also called the linear or backing sheet) holds the labels until use. Due to the complexity of its composition, adhesive-backed label paper is particularly likely to give trouble in printing.

Figure D.1 Adhesive-backed label

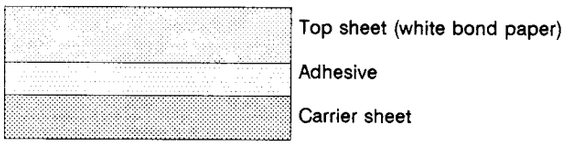
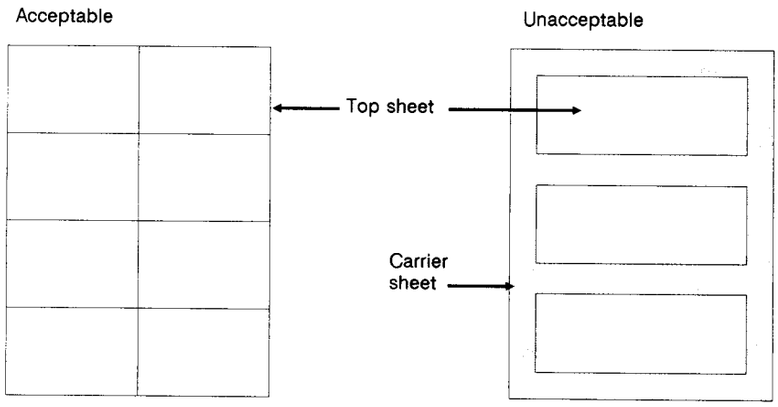


Figure D.2 Label arrangement



Adhesive label paper must be entirely covered by its top sheet, with no spaces between the individual labels. Labels with spaces in between are apt to peel off, causing serious jam problems.

Some label paper is manufactured with an extra margin of top sheet around the edge. Do not remove the extra top sheet from the carrier sheet until after printing is finished.

Table D.4 lists the specifications for adhesive label paper.

Table D.4 Adhesive Label Specifications

Item	Specification
Weight of top sheet	44 to 74 g/m^2 (12 to 20 lbs/ream)
Composite weight	104 to 151 g/m^2 (28 to 40 lbs/ream)
Thickness of top sheet	0.086 to 0.107 mm (3.9 to 4.2 mils)
Composite thickness	0.115 to 0.145 mm (4.5 to 5.7 mils)
Moisture content	4% to 6% (composite)

Envelopes

The printer can print on envelopes using paper with a basis weight of 60 to 79 g/m^2 (16 to 21 lbs/ream). Envelopes must be manually fed.

An envelope is a more complex object than a single sheet of paper. For this reason, it may not be possible to obtain consistent printing quality over the entire envelope surface.

Many envelopes have a diagonal grain orientation. (See *Paper Grain* above.) This orientation is more likely to wrinkle and crease on its way through the printer. Before purchasing envelopes for use with the printer, test a sample to verify the envelope's suitability.

Do not use envelopes having an encapsulated liquid adhesive.

Avoid long printing runs consisting of envelopes only. Extensive envelope printing can cause premature printer wear.

To avoid jam due to curled envelopes, do not leave more than approximately 10 printed envelopes stacked in the paper trays during multiple printing of the envelopes.

Colored Paper

Colored paper should satisfy the same conditions as white bond paper, listed in Table D.1. In addition, the pigments used in the paper must be able to withstand the heat of fusing during the printing process (up to 190°C or 374°F).

Preprinted Paper

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

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

Appendix E:
Host Computer Interface

This appendix describes the signals used in the printer's parallel and RS-232C interfaces. It lists pin assignments, signal functions, timings, connector specifications, and voltage levels. The RS-232C protocols are also covered. Finally, it explains the use of the printer in a multi-computer environment.

E.1. Parallel Interface

Interface Signals

The printer has a Centronics-type parallel interface. The pins of the parallel interface connector carry the signals listed in Table E.1. Asterisks in the table indicate signals that are active low. The table also indicates whether each signal is incoming or outgoing with respect to the printer.

Table E.1 Parallel Connector Pin Assignments

Pin	In/out	Description
1	In	Strobe*
2	In	Data 0
3	In	Data 1
4	In	Data 2
5	In	Data 3
6	In	Data 4
7	In	Data 5
8	In	Data 6
9	In	Data 7
10	Out	Acknowledge*
11	Out	Busy
12	Out	Paper Empty
13	In	On-Line (Select)
14	In	Ignored
15	–	Not connected
16	–	0V DC
17	–	Chassis GND
18	–	+5V DC
19	–	Ground return
20	–	Ground return
21	–	Ground return
22	–	Ground return
23	–	Ground return
24	–	Ground return

Pin	In/out	Description
25	–	Ground return
26	–	Ground return
27	–	Ground return
28	–	Ground return
29	–	Ground return
30	–	Ground return
31	In	Ignored
32	Out	No output
33	Out	Aux out 1
34	–	Not connected
35	Out	Power Ready
36	In	Ignored

Detailed descriptions of the signals follow.

Strobe* (Pin 1)

A negative-going Strobe* pulse causes the printer to read and latch the data on the Data 0 to Data 7 signal lines.

Data 0 to Data 7 (Pins 2 to 9)

These eight signals form the data byte sent from the host computer to the printer. Data 7 is the most significant bit.

Acknowledge* (Pin 10)

This negative-going pulse acknowledges the previous character received by the printer. Acknowledge* pulses are sent only when Busy is low.

Busy (Pin 11)

This signal is high when the printer is busy and low when it is able to accept more data. Every high-to-low transition is followed by an Acknowledge* pulse.

Paper Empty (Pin 12)

This signal goes high when the printer runs out of paper.

On-Line (Pin 13)

This signal is high when the printer is on-line and low when the printer is off-line. It goes low when the upper unit is raised, or when the ONLINE key is pressed to set the printer off-line.

Note: **The Paper Empty and On-Line signals are not used unless enabled by the FRPO command (R6 parameter). See the *TECHNICAL REFERENCE* manual.**

Auto-Feed (Pin 14)

This signal is used in the Epson version of the Centronics interface to receive a carriage return. It is ignored by the printer.

+5V DC (pin 18)

This line is connected to the printer's +5V DC line through a 56Ω resistor.

Prime (Pin 31)

This signal is used in the standard Centronics interface to enable the computer to reset the printer. It is ignored by the printer.

Error (Pin 32)

This signal line is not used.

Auxiliary output 1 (Pin 33)

This signal is high when the printer's power is on.

Power Ready (Pin 35)

This signal is high when the printer's power is on.

Select In (Pin 36)

This signal is used in some versions of the Centronics interface to enable the computer to force the printer on-line. It is ignored by the printer.

Parallel Interface Theory of Operation

The computer sends the printer one byte at a time, by placing the data on the Data lines and sending a Strobe* pulse. When the printer detects the positive transition of the Strobe* signal, it latches the data and asserts the Busy signal. Then the printer reads the data into its input buffer and starts processing it. The Busy signal remains high until the buffer is ready to accept more data. Any Strobe* pulses arriving while Busy is high are ignored. When the printer is ready for more data, it makes Busy low and sends a negative Acknowledge* pulse, then waits for the next Strobe*.

When the printer's input buffer is full, time *t2* can be indefinitely long. The printer's microprocessor holds Busy high for as long as it takes to process the data in the input buffer.

Figure E.1 Parallel Interface Timing Diagram

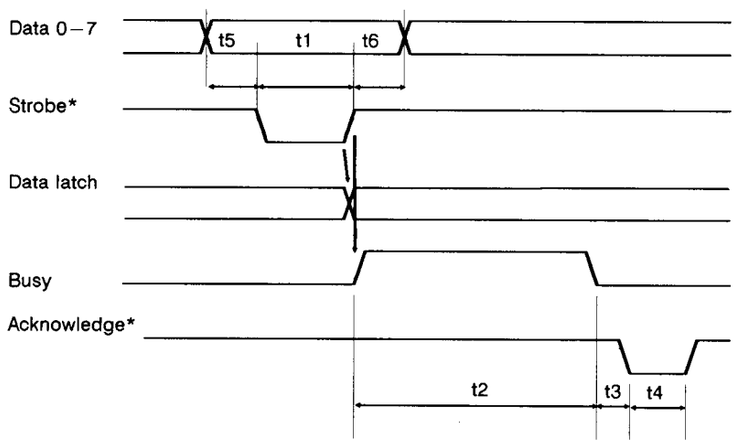


Table E.2 Parallel Interface Timing

Interval	Min. (μs)	Max. (μs)	Description
t1	1	–	Strobe* pulse width
t2	25	150	Strobe* high to Busy low
t3	–	2	Busy low to Acknowledge* low
t4	2.5	5	Acknowledge* pulse width
t5	0.5	–	Data setup time, to Strobe* high
t6	0.5	–	Data hold time, from Strobe* high

Parallel Connector

The connector marked *Parallel* on the rear panel is equivalent to the Amphenol 57-40360 with a quick-release wire bail lock. The mating connector on the cable should be an Amphenol 57-30360 or equivalent.

Parallel Interface Signal Levels

All input signals are alike, with a 1000-ohm pull-up to +5 volts. The receiver is a LS-type TTL chip. Any input voltage above 2.0 volts is considered high. Any input voltage below 0.8 volts is considered low.

E.2. RS-232C Interface

Interface Signals

The pins of the printer's RS-232C interface connector carry the signals listed in Table E.3. Asterisks in the table indicate signals that are active low. The table also indicates whether each signal is incoming or outgoing with respect to the printer.

Table E.3 RS-232C Signal Pin Assignments

Pin	In/out	Description
1	–	Ground
2	Out	Transmit Data
3	In	Receive Data
4	Out	Request To Send*
7	–	Ground
20	Out	Data Terminal Ready

Brief descriptions of the signals follow.

Transmit Data (Pin 2)

This output carries asynchronous data sent by the printer to the computer. It is used mainly in handshaking protocols.

Receive Data (Pin 3)

This input carries serial asynchronous data sent by the computer to the printer.

Request To Send* (Pin 4)

This output is always held high (above 3 volts).

Data Terminal Ready (Pin 20)

This output is used as a buffer nearly-full handshake line. It is held high (above 3 volts) when the buffer can accept more data.

RS-232C Connector

The connector marked RS-232C on the rear panel is a DB-25S. The mating connector on the cable should be a DB-25P or equivalent.

RS-232C Interface Voltage Levels

The voltage levels of the interface signals conform to EIA RS-232C specifications. False is from 3 volts to 15 volts. True is from -3 volts to -15 volts. Voltages between -3 volts and 3 volts are undefined.

E.3. RS-232C Protocols

A protocol is a set of rules the computer follows in sending data to the printer. The RS-232C parameters are stored in battery backed-up memory. They are indicated on the status printout. They can be changed by the FRPO (firmware reprogram) command described in the *TECHNICAL REFERENCE* manual. The parameters and their identification codes are given below.

H1: Baud rate

Parameter value	Baud rate
3	300
6	600
12	1200
24	2400
48	4800
96	9600
19	19200

The factory setting is 9600 baud (96 on the status printout).

H2: Data bits

7 or 8, factory-set to 8.

H3: Stop bits

1 or 2, factory-set to 1.

H4: Parity

Parameter value	Meaning
0	None
1	Odd
2	Even
3	Ignore

The factory setting is "None" (0 on the status printout).

H5: Protocol logic

Parameter value	Meaning
0	Combination of 1, 3, and 4 below
1	DTR, positive logic
2	DTR, negative logic
3	XON/XOFF
4	ETX/ACK
5	XON/XOFF recognized only as protocol

The factory setting is 0, giving all three protocols simultaneously.

H6: Buffer nearly-full threshold

This is a percentage from 0 to 99. The factory setting is 90.

H7: Buffer nearly-empty threshold

This is a percentage from 0 to 99. The factory setting is 70.

The factory settings of the buffer nearly-full and nearly-empty thresholds (H6 and H7) are subject to change without notification.

The gap between the nearly-full and nearly-empty thresholds allows the computer to send a fairly large amount of data in a continuous stream.

H8: Received-data buffer size

This is the size of the input buffer, specified in units of 10K bytes. The factory-set value is 6 meaning 60K bytes.

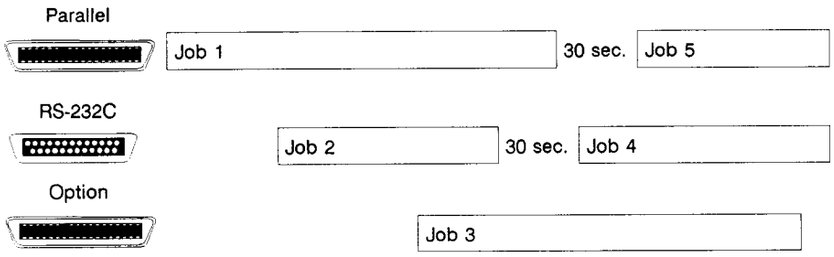
E.4. Using the Printer in a Multi-computer Environment

This section mainly concerns the simultaneous use of the printer by different computers.

Sequence of Jobs

The printer has independent input buffers (refer to Buffer Sizes which follows) for each of its interfaces and can receive data on all three interfaces simultaneously. Jobs on different interfaces are printed separately, so pages do not get intermixed. Figure below shows an example of how the printer prints a sequence of jobs received on its three (if an option interface is installed) different interfaces.

Figure E.2 Sequence of Jobs



As the figure illustrates, jobs are printed in their order of arrival. The printing sequence will be job 1, job 2, job 3, job 4, job 5. On all interfaces a gap is necessary between jobs to enable the printer to release the interface and start printing jobs on the other interface and this length of the gap is adjustable using the FRPO H9 parameter. The jobs printed via different interfaces in above are printed independently. Settings made by application software via one interface do not affect the other interfaces.

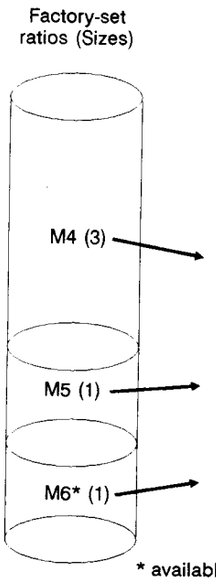
Buffer Sizes

Data arriving from the computer are temporarily buffered in the printer's host buffer area which is shared between two or three (if an option interface is installed) buffers (#1, #2, and #3 in figure E.3), so it can receive data separately on all interfaces at once.

The sizes of buffer #1, buffer #2, and buffer #3 are adjusted by the FRPO M4, M5, and M6 parameters in the ratio of proportionate shares for the buffers.

Values may be 0 to 9. The factory setting is M4:M5:M6 = 3:1:1. The total size of all buffers depends on the FRPO H8 (host buffer size) command setting. The minimum size is 1 kilobyte (even if the M4, M5, or M6 parameter is 0).

Figure E.3 Buffer Sizes



	Buffer Mode (See below.)	
	Automatic (M3 = 0)	Fixed (M3 = 1)
Buffer #1	Buffers the interface which receives data earlier than the other(s).	Fixed to receive data arriving on the serial interface.
Buffer #2	Buffers the interface which has received data later than the first.	Fixed to receive data arriving on the parallel interface.
Buffer #3*	Buffers the interface which has received data later than the second.	Fixed to receive data arriving on the option interface.

* available only when an option interface is installed.

The way each buffer selects the interface to receive data can be switched by the FRPO M3 (buffer mode) command between two modes – *automatic* or *fixed*:

If the M3 value is *0* (automatic), the first data arriving from the computer go into buffer #1, regardless of which interface they arrive on, and the printer begins printing these data. While buffer #1 is still in use, if data also begin to arrive on a second interface they are stored in buffer #2. The printer will print these data after it has finished printing the job received through buffer #1.

While buffer #3 is still in use, if data begin to arrive on the third interface (if installed as the option interface), they are stored in buffer #3 (if buffer #1 is still being used for the first interface), or buffer #1 (if buffer #1 has been released). The general rule is that data go to the lowest-numbered available buffer.

If the M3 value is *1* (fixed), buffer #1 is fixed to receive only the data arriving on the serial interface; buffer #2 is fixed on the parallel interface; and buffer #3 is fixed on the option interface (if installed). The first data arriving on one of the interfaces go into its fixed, *dedicated* buffer and the printer begins printing these data, and continues as above.

The factory setting of the total host buffer size is 60 kilobytes and can be changed by the FRPO H8 command.

Note: **If you alter the parameters for the buffer sizes, reset the printer by turning the power off and on again or by using the front panel keys.**

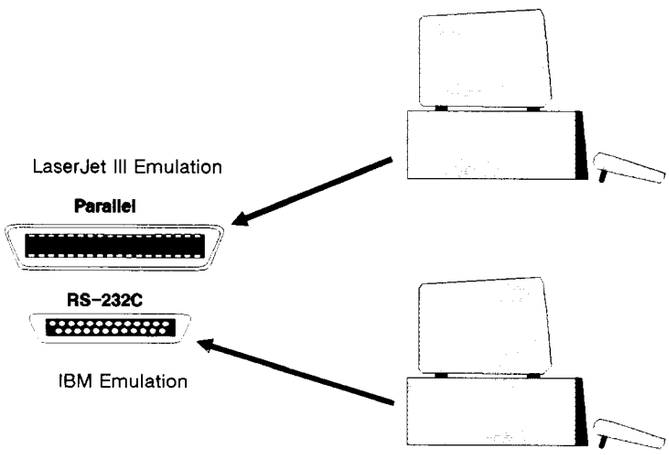
Independence of Printing Environments

The printer can be used by different computers connected to different interfaces as stated above. It can also be used by different computers connected to the same interface via a switching device or a local area network. It can furthermore be used by different application programs running on the same computer.

The printer maintains a separate printing environment on each interface, customized and preserved permanently by FRPO commands (See the *TECHNICAL REFERENCE* manual of Chapter 6). Two computers can use the LaserJet III emulation on the parallel and serial interfaces, for example, without mutual interference. Each computer will operate as if it had the printer to itself. The user on one of the interfaces can use the printer without worrying that in the meantime of his absence his printing environment has been altered by the user on the other interface.

The printer can also be used in different emulation modes on different interfaces without mutual interference. For example, as shown in the figure on next page, it can be used in the LaserJet III emulation mode on the parallel interface and in the IBM emulation mode on the RS-232C interface, and so on, without interference.

Figure E.4 Different Emulations on Interface



FRPO Parameters

If you use the FRPO commands to customize the printing environment, any changes you make on most of the environment parameters affect the printing environment on *that interface only*. In addition, the change will persist after power is switched off. Thus, you can change the printing environment on your *own* interface (generally, if you are the only user on that interface) without affecting the environment on the other interfaces. The printer's status page shows printing environment parameters on all three (if an option interface is installed) different interfaces. Details on the FRPO parameters are given in Chapter 6 of the *TECHNICAL REFERENCE* manual.

Appendix F: RS-232C Cable Connection

This appendix explains the procedure for connecting the printer to a computer by an RS-232C cable, setting up the RS-232C interface, and checking that the computer and printer can communicate.

F.1. RS-232C Cable Connection

Preparing an RS-232C Cable

After obtaining an RS-232C cable, check that it is wired correctly, referring to the pin assignment table in *Appendix E*. If you have an IBM communication adapter cable type 1502067, you will have to resolder the wiring at the printer end of the cable. The procedure is as follows.

1. Unscrew the plastic cover from the printer end of the cable.

2. Next to each of the wires inside the cable is a bare shield wire. Solder all these shield wires together into a single bundle.

3. Using a section of flat wire about 3 mm wide and 15 mm long, connect the bundle of shield wires to the metal facing of the connector. Check that the solder connections are secure.

4. Desolder wires 2 and 3, then resolder them in crossed configuration. Solder wire 2 to pin 3 and wire 3 to pin 2. Cover the solder joints with thermofit tube.

5. Cut wires 4, 5, 6, and 20.

6. Solder wires 5 and 6 together and connect them to pin 20. Cover the solder joints with thermofit tube. Leave wire 4 unconnected.

7. Tape all remaining loose ends, or seal them with thermofit tube.

8. Screw the plastic cover back on.

Connecting the Printer to the Computer

1. Check that the power of both the printer and computer is switched off.

2. Discharge yourself by touching a metal object such as a doorknob.

3. Remove the plastic cap from the printer's RS-232C interface connector.

4. Plug the printer end of the RS-232C interface cable into the printer's RS-232C connector and screw it in place.

5. Plug the other end of the cable into the computer's RS-232C interface connector.

6. Switch on the printer's power.

7. The printer's RS-232C parameters are factory-set to the following values:

   Baud rate = 9600 bps, Data bits (character length) = 8 bits,
   Stop bits = 1, Parity = None

   The three RS-232C protocols are XON/XOFF, DTR, and ETX/ACK. The printer performs all three of them simultaneously, using positive logic for DTR.

   If you are uncertain as to the printer's current parameter settings, you can reset them to the values listed above by following the manner described in chapter 2.2.

8. Set the computer to the same parameters as the printer. On many computers this can be done by setting DIP switches before power is turned on. Another method is as follows:

In DOS, enter the following commands:

```
C>MODE COM1:96,N,8,1,P
C>MODE LPT1:=COM1
```

To test the interface, then enter:

```
CTRL P
C>DIR
CTRL P
```

The software settings made by the procedures above are temporary. On most computers, permanent settings must be made with DIP switches.

If you want to use a different baud rate or change any of the other RS-232C parameters, you can use the printer's FRPO (firmware reprogram) command. See the *TECHNICAL REFERENCE* manual for details.

Appendix G: Memory Expansion Installation

Note: **This appendix primarily applies to model FS-1500 only. Model FS-1500A has no memory mother board installed at the factory. To install expansion memory in model FS-1500A, you must first obtain an option memory mother board (RM-105) from the dealer.**

This appendix explains how to expand the printer's memory. Expanded printer memory enables you to print more complex pages, download more fonts, and define more macros. It begins with how to remove the memory expansion board from the printer, and explains how to install SIMMs (single in-line memory module) on the memory expansion board.

G.1. Removing the Memory Expansion Board

This printer has been already installed with an empty memory expansion board. The memory expansion board must be removed from the printer before installing SIMM chips on the board. The slot for removing and installing the expansion board is located as shown in Figure G.1.

Warning: **You are about to remove the expansion board inside the printer. For your protection, make sure the power is off. Don't touch any electronic components inside the printer.**

Notes on Handling the Expansion Board and SIMMs

To protect the electronics, take these precautions:

- Before touching the expansion board, touch a pipe or other large metal object to discharge yourself of static electricity. It is recommended that you use an antistatic wrist strap.

- Hold the expansion board by its edge and handle it with care.

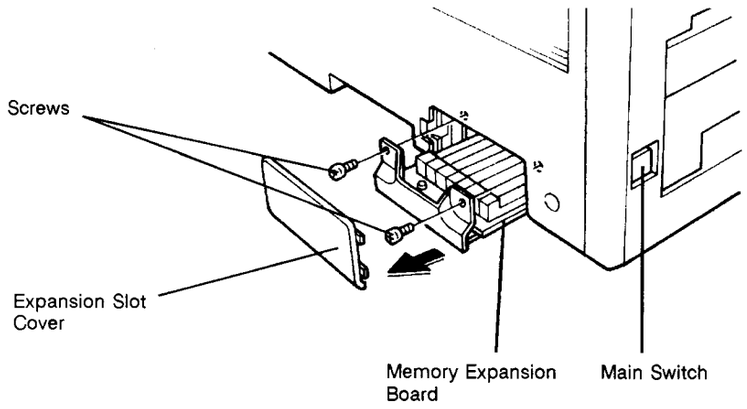
Removing the Expansion Board from the Printer

To remove the board from the printer, proceed as follows:

Turn the printer power off. Unplug the printer from power and the host computer.

Remove the expansion slot cover and remove two screws at the left side of the printer. Save these screws. Draw out the memory expansion board from the printer.

Figure G.1 Removeing the Memory Expansion Board



To install the memory expansion board to the printer after you have installed the SIMM chips, use the reverse manner of the above.

G.2. Installing Memory

Installing memory to the memory expansion board is simple because it uses SIMMs which are circuit boards fitted with (four) memory chips. One SIMM chip expands 0.5-MB memory. However, the SIMM chips must be used always in a pair (1-MB). No tools are needed to install SIMMs on the memory expansion board.

Valid SIMM Configurations

By installing up to four pairs of SIMMs on the memory expansion board, you can increase the board's memory to a maximum of 4 MB in 1-MB increment.

A pair of sockets on the memory expansion board is called a *bank*. The memory expansion board has four banks (eight sockets).

In order for the memory expansion board to work correctly, two rules must be observed when you install SIMMs in the board.

1. Fit matching SIMMs in both sockets of a bank. If you place a SIMM in one socket, you must place matching SIMM in the other socket of the *same* bank.

2. Install SIMMs in the lowest numbered bank first.

Table below shows the valid SIMM configurations for the memory expansion board. The memory expansion board will not work with any other configuration other than shown in this table.

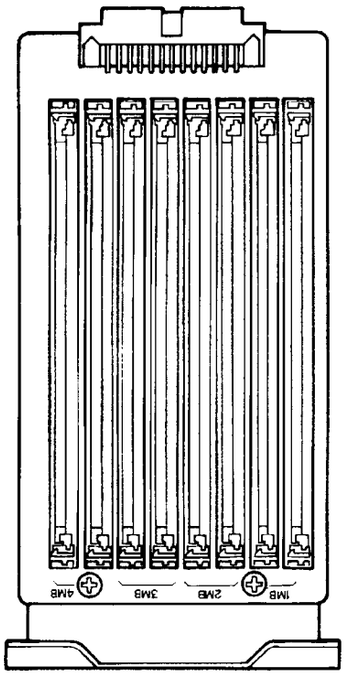
Table G.1 Memory Expansion Table

Total memory expanded (MB)	Bank							
	1MB		2MB		3MB		4MB	
	Socket		Socket		Socket		Socket	
	A	B	A	B	A	B	A	B
1	0.5	0.5	–	–	–	–	–	–
2	0.5	0.5	0.5	0.5	–	–	–	–
3	0.5	0.5	0.5	0.5	0.5	0.5	–	–
4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

For example, if you require 3MB total expansion memory, you must fill banks "1MB", "2MB", and "3MB" with six SIMMs.

Figure G.2 shows the top view of the memory expansion board.

Figure G.2 Memory Expansion Board Top View



Type of SIMM to be used

The following type of SIMM must be used with the memory expansion board.

Kyocera MM-100

The memory expansion board will not work with other SIMM types.

To install (or remove) SIMMs on the memory expansion board, go to the next section.

G.3. Installing and removing SIMMs

This section covers the instructions on how to install or remove SIMMs on the memory expansion board. Before proceeding, read the following cautions.

Cautions on handling SIMMs

To prevent damage to the memory expansion board and the printer:

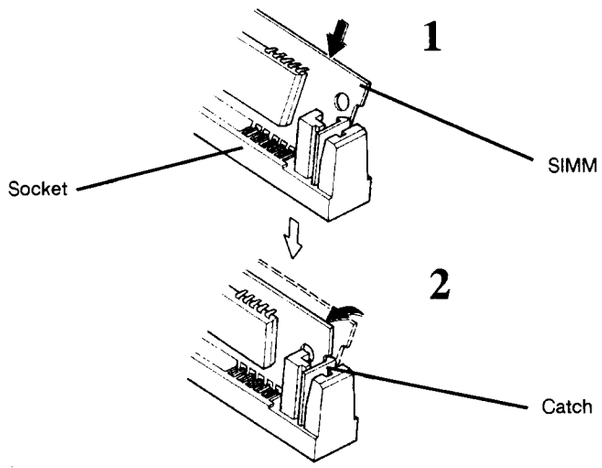
- Install SIMMs in the lowest bank first.
- Before handling SIMMs, ground yourself of static electricity by touching a large metal object.

Installing SIMMs

Insert the SIMM into the bank socket as shown below.

1. Insert the connector end of the SIMM into the socket.
2. Then push it on the back side until it snaps in place. Make sure the SIMM is securely held by the catches in the socket.

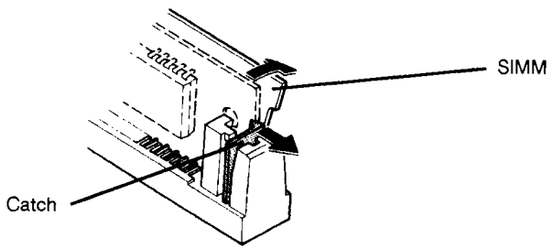
Figure G.3 Installing SIMMs



Removing SIMMs

To remove a SIMM, carefully pull the catch sideways slightly as shown and pull the SIMM up.

Figure G.4 Removing SIMMs



G.4. Testing the Expansion Board

After you have finished installing the memory expansion board in the printer, test the printer to see if the expansion memory has been successfully installed.

To test the expansion memory, proceed as follows.

1. Make sure the power switch is off. Plug the power cord into the printer and turn power on.

2. When the ○ (ready) indicator stops flashing and the printer gets on-line, press the STATUS key.

3. If the memory expansion has been successfully made, the *Total memory* (Memory Allocation) of the status page will show the expanded memory size depending on the amount of the memory added. (The factory installed memory size is 1024 kB.)

Appendix H:
Glossary

A4 size – 21.0 × 29.7 centimeters (ISO).

A5 size – 14.8 × 21.0 centimeters.

Amorphous silicon (photoreceptor) – A material used for photoreceptor (drum) in electrophotography. Kyocera is one of the largest manufactures and suppliers of the drum unit utilizing amorphous silicon. Amorphous silicon is extraordinarily resistant to scratches and light, and also known to be nonpollutant to the environment.

B5 size – 18.2 × 25.7 centimeters (JIS).

Bitmap font – A font made of a fixed bit pattern. Bitmap fonts have the fixed height (size) for each character.

Carrier – A kind of magnetic powder which resides within the developer unit and carries toner to the drum surface.

Centronics interface – A standard parallel interface often used to connect computers and printers.

Corona discharge – A weak in-air electric discharge.

Developing powder – A mixture of carrier and toner.

Developer unit – A unit located on top of the printer that holds developing powder and transfers toner to the drum with a magnetic roller.

Drum – A cylinder coated with a photoreceptor material that conducts electricity when hit by light.

Drum unit – A unit containing the drum, main charger, and a cleaning system.

Emulate – Operate in the same way as another device. The printer emulates other printers by imitating their responses to control codes and escape sequences.

Face-down output tray – The tray that receives printed pages face-down, stacked in the correct order.

Face-up output tray – The tray that receives printed pages face-up.

Fuser – A mechanism consisting of a heat roller and pressure roller, that fuses the toner to the paper just before it leaves the lower main unit.

Fuser heat roller – The upper roller in the fuser unit.

Interface cable – The cable connecting the printer to the computer.

Interlock – A switch that prevents the printer from operating when it is not properly closed. The printer has interlock switches for its upper unit, etc.

Isolation transformer – A device that can be used to isolate the printer from noise on the power line.

KIR (Kyocera Image Refinement) – Kyocera's advanced technology which was designed to *refine* the resolution of the 300 dpi page printer. To obtain the optimal result, the KIR level can be adjusted from the printer's control panel.

LED optical head – A device that lies parallel to the drum and emits parallel beam to write the image on it. It has 2,560 pieces of LEDs (light-emitting diodes) along the head which are switched on and off under control of the bit map in the printer's raster memory. A parallel beam is focused using selfoc lenses also mounted on the head.

Legal size – 8.5 × 14 inches.

Letter size – 8.5 × 11 inches.

Main charger – A unit inside the drum unit, that discharges electricity onto the surface of the drum.

Main logic board – The printed circuit board on which the printer's memory and logic control circuits are mounted.

Off-line – The state in which the printer does not print the data it receives.

On-line – The state in which the printer prints the data it receives.

Paper chute – The slot that guides paper to the transfer roller.

Parallel interface – An interface over which data are transmitted eight bits at a time.

Permanent memory – Memory that is backed up by an internal battery, so its contents are not lost when power is switched off.

Ramp – The plate located in the lower unit between the transfer roller and fuser.

RS-232C interface – A standard serial interface.

Scalable font – A font providing the outline of the characters. This outline is sized according to the sizing information from the computer and filled in for printing.

Serial interface – An interface over which data are transmitted one bit at a time.

Status information – A page of information obtained by pressing the printer's STATUS key, indicating: the software version number and release date, units and margins, line and character spacing, memory usage, parameter values held in permanent memory, and font numbers and sizes in memory.

Toner – A kind of powdered ink. The toner for this printer is specifically designed for use with the amorphous silicon drum. It contains powder of fine ceramics which continuously polishes the drum surface for refreshment.

Transfer roller – The roller located in the paper feed mechanism that charges the paper electrically to transfer toner to it. Unlike the high-voltage corotron charging system usually found in other printers, the transfer roller system scarcely generates ozone gas.

Toner kit – A maintenance kit containing a toner container.

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