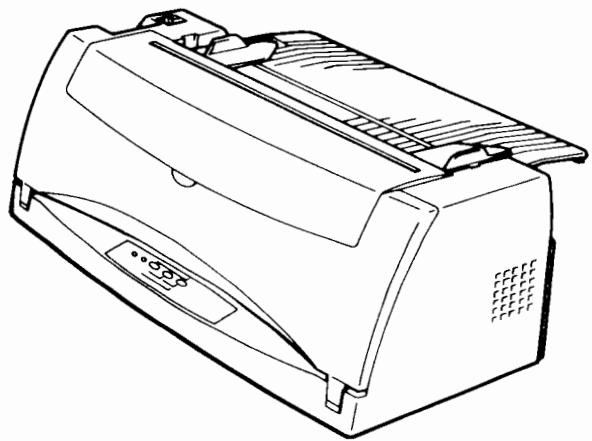
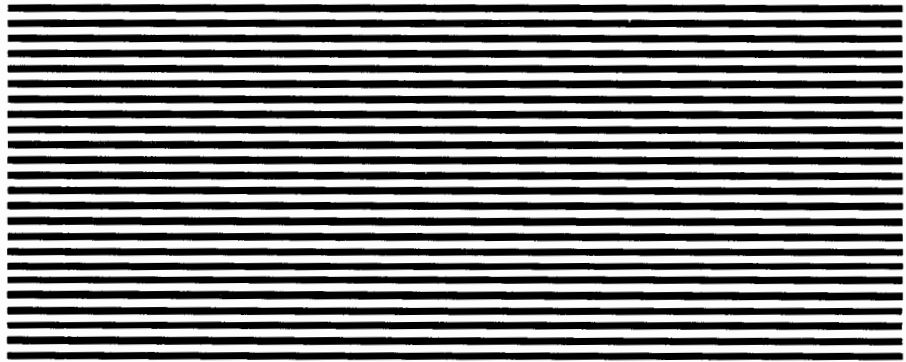


FUJITSU

USER'S MANUAL



24-pin dot matrix printer

FUJITSU
PRINT

The contents of this manual may be revised without prior notice, and without obligation, to incorporate changes and improvements into units already shipped.

Every effort has been made to ensure that the information included here is complete and accurate, but Fujitsu will not be held responsible for any errors and/or omissions.

Printer model specifications differ with the power supply input voltage.

C147-E017-01EN June 1994

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Other product names mentioned in this manual may also be trademarks used here for identification only.

Notice to Users in the United States

Federal Communications Commission Radio Frequency Interference Statement

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

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC WARNING: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

(This equipment was tested as model number M3393A.)

NOTES

1. The use of a non-shielded interface cable with the referenced device is prohibited. The length of the parallel interface cable must not exceed 3 meters (10 feet). The length of the serial interface cable must not exceed 15 meters (50 feet).
2. The length of the power cord must not exceed 3 meters (10 feet).

Notice to Users in Canada

This digital apparatus does not exceed the class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe B prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

Bescheinigung des Herstellers/Importeurs

Notice to Users in Germany

Hiermit wird bescheinigt, daß der/die/das

- M3393B in Übereinstimmung mit den Bestimmungen der
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SAFETY INSTRUCTIONS

- For your safety and for the safety of others, read over this section and remember these instructions for the correct operation of your printer.
 - Whenever you will not be using the printer for a week or more, disconnect the power cord from the power outlet.
 - Disconnect the power cord from the power outlet whenever a thunder storm is in the vicinity (to protect against power surges).
 - Use the correct Fujitsu ribbon cartridge. Other ribbon cartridges may cause operating problems or damage the print head. Fujitsu takes no responsibility for print head problems caused by such ribbon cartridges.
 - Do not place the printer in direct sunlight.
-

ABOUT THIS MANUAL

Thank you for choosing this printer. You can expect years of reliable service from it with very little maintenance. This manual explains how to use your printer to full advantage. It is written for both new and experienced users.

This manual explains how to set up and use your printer. It also explains how to keep the printer in top working condition and what to do if something goes wrong. Detailed procedures are provided for first-time users. Experienced users may want to skip some of the details, using the table of contents and chapter introductions to locate needed information.

This manual has several appendixes, a glossary, and an index. Appendix A lists printer specifications, paper specifications, and ordering information on supplies, options, and publications available from your dealer or authorized Fujitsu representative. The other appendixes contain additional technical information. Fujitsu offices are listed at the end of the manual.

CONVENTIONS

Special information, such as warnings, cautions, and notes, is indicated as follows:

WARNING

A WARNING indicates that personal injury may result if you do not follow a procedure correctly.

CAUTION

A CAUTION indicates that damage to the printer may result if you do not follow a procedure correctly.

NOTE

A NOTE provides "how-to" tips or suggestions to help you perform a procedure correctly. NOTES are particularly useful for first-time users.

For Experienced Users:

If you are familiar with this printer or with dot matrix printers in general, the NOTES will help you use the manual effectively.

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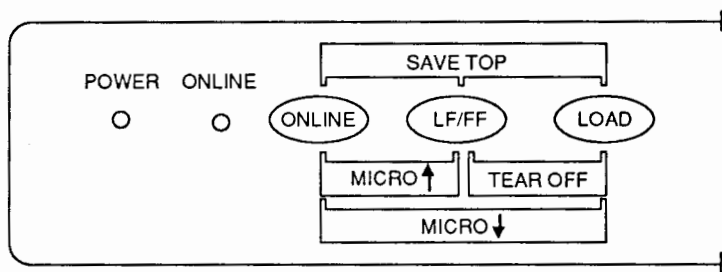
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QUICK REFERENCE

This section is written for experienced users — those who are familiar with how the printer works, but who may need to refresh their memories occasionally.

The operations explained here include everyday operations that mainly use the control panel, such as handling paper and starting the self-test.



Control panel

The next table lists the basic printer operations with the required online/offline conditions and what buttons to press.

Note that printer setup operations are controlled by DLMENU, a software utility supplied with this printer. For details, refer to the "README.DOC" file on the DLMENU disk.

Printer Operations

✓ : Operation can be performed when the printer is in this state.

— : Operation cannot be performed when the printer is in this state.

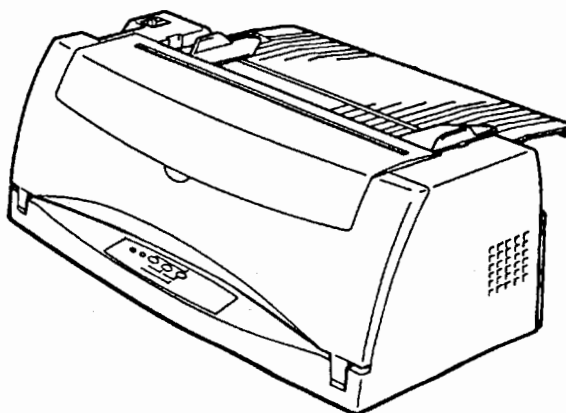
N/A : Does not apply.

Operation	Online	Offline	What You Do
Clear print buffer	✓	✓	Turn printer off. (Press 0 on the power switch.)
Eject single sheets	✓	✓	Press LF/FF.
Form feed (forward)	✓	✓	Press and hold LF/FF until the operation starts.
Line feed (forward)	✓	✓	Press LF/FF within three seconds.
Load paper	✓	✓	Press LOAD.
Micro feed 1/180 inch forward	—	✓	Press ONLINE and LF/FF.
Micro feed 1/180 inch backward	—	✓	Press ONLINE and LOAD.
Override paper-out	—	✓	Press ONLINE to print a line while the ONLINE indicator is blinking.
Place printer offline	✓	—	Press ONLINE.
Place printer online	—	✓	Press ONLINE.
Reset power-on defaults	✓	✓	Turn printer off, then on.
Save top-of-form after adjustment	—	✓	Press ONLINE, LF/FF, and LOAD.
Self-test printing	✓	✓	Start: Turn printer off. Press LF/FF while turning printer on. Pause/resume: Press LF/FF. Exit: Press ONLINE.
Start/stop/resume printing	✓	—	Start: Send print command. Stop/resume: Press ONLINE.
Tear off forms	✓	✓	Press LF/FF and LOAD. Tear off forms, press any button to retract forms.
Unload paper to park position (continuous forms only)	✓	✓	Press LOAD.

INTRODUCTION

Thank you for choosing this printer. You'll find this printer to be ideal for those who require compactness, versatility, and maximum compatibility with today's software packages and personal computers.

The printer's 24-wire print head provides crisp, clear printing for both business and home environments, and it is easy to install and use.



Dot matrix printer

FEATURES

The primary features and options of the printer are listed in the next two sections.

- **Software compatibility.** This printer, which operates primarily with the Fujitsu DPL24C PLUS command set, emulates printers that use the IBM Proprinter XL24E command set and the Epson ESC/P2 command set (LQ1170 equivalent).
- **Character sets.** IBM PC character sets 1 and 2 are available for the Fujitsu DPL24C PLUS command set and the IBM Proprinter XL24E emulation. The Epson italic character set and graphics character sets 1 and 2 are available for the Epson ESC/P2 emulation. Various national character sets are available for each emulation, such as IBM PS/2 code pages, ISO 8859-1/ECMA 94, and other language-specific character sets.

- **Multiple fonts.** The printer has ten resident fonts: Courier 10, Pica 10, OCR-B 10, Prestige Elite 12, Boldface PS, Nimbus Sans normal PS, Timeless normal PS, Correspondence, Compressed, and Draft. Up to 24K bytes are available for downloaded fonts.
- **High-speed printing.** At 10 cpi, print speed ranges from 60 cps for letter-quality printing to 180 cps for draft-quality printing.
- **Large print buffer.** The print buffer, 24K bytes maximum, enables the sending of files to the printer while you return to work in your application.
- **114-column print line.** 114-column printers enable 136-column printing at the elite pitch (12 cpi).
- **Superior paper handling.** Paper “parking” for continuous forms makes it easy to switch between continuous forms and single sheets. An optional cut sheet feeder enables automatic feeding of single sheets.
- **Maintenance-free.** Periodic cleaning and ribbon changes are all that’s required.
- **Auto tearoff.** Continuous forms are automatically fed to the tear-off point at the end of each job.
- **Remote setup utility (DLMENU).** The printer operating conditions are easily set from the host computer using DLMENU, a utility on the floppy disk supplied with this printer. This disk also includes printer drivers for MS-Windows.

OPTIONS

Printer options are listed below.

- **Cut sheet feeder.** To complement your feeder, a single-bin cut sheet feeder is available.
- **Fujitsu Creative Faces™.** For MS-Windows, this is a font-scaling and -smoothing software utility for Microsoft Windows.

2

SETTING UP

Your new printer is easy to install and set up. This chapter tells you how to set up the printer so that you can get started printing right away. If this is your first printer, you should read the entire chapter before attempting to use the printer. This chapter will teach you how to:

- Position, unpack, and assemble the printer
- Identify the printer's major components
- Connect the power and interface cables
- Test the printer before connecting your computer
- Select a printer driver and an emulation and print using your software

If you have a problem setting up the printer, review the problems and solutions listed in Chapter 6, "Problem solving". If the problem persists, contact your dealer.

SELECTING A GOOD LOCATION

This printer is suitable for most business and home environments. To obtain peak performance from the printer, select a location that meets the following guidelines:

- ✓ Place the printer on a sturdy, level surface.
- ✓ Place the printer near a well-grounded AC power outlet.
- ✓ To ensure easy access to the front and rear of the printer, leave several inches of space around the printer. Do not block the air vents on the sides and rear of the printer.
- ✓ Do not place the printer in direct sunlight or near heaters.
- ✓ Make sure that the room is well-ventilated and free of excessive dust.
- ✓ Do not expose the printer to extremes of temperature and/or humidity.
- ✓ Do not use an extension power cord.

- ✓ Do not plug the printer into a power outlet that is shared with heavy industrial equipment (such as motors) or appliances (such as copiers or coffee makers). Such equipment often emits electrical noise or causes power degradation.

UNPACKING

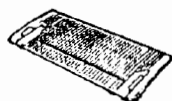
Unpack the printer as follows:

1. Open the carton and remove the printer and its components. Make sure that you have all of the items pictured below.

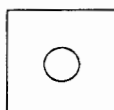
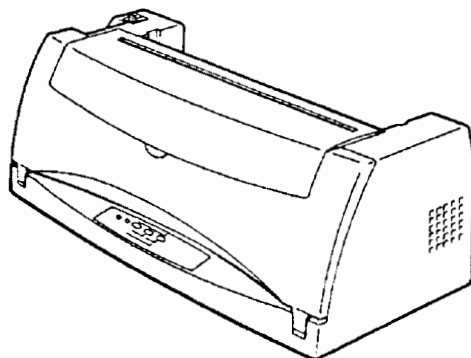
Checking items received

Cut sheet stand

Ribbon cartridge



Printer



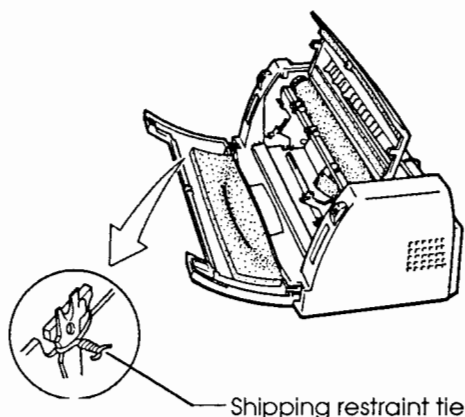
DLMENU disk



User's manual (this document)

2. Carefully examine each item for possible damage. Report any problems to your dealer or shipping agent.
3. Place the printer where you plan to use it.

4. Remove the tape securing the top and front covers. Open the covers and remove the shipping restraint tie holding the print head carriage in place (shown below).



Shipping restraint tie

Removing the shipping restraint tie

5. Save the original shipping carton and packaging materials for future use. The original packaging is ideal for moving or shipping your printer to another location.

NOTE

The interface cable is not included with the printer. You must supply one. Cable selection is described later in this chapter.

Checking Options and Supplies

If ordered, the following options and supplies are shipped in separate packages:

- Cut sheet feeder
- Extra ribbon cartridges

Make sure that you have received all the options you ordered. Once you are sure you have everything, you're ready to assemble the printer.

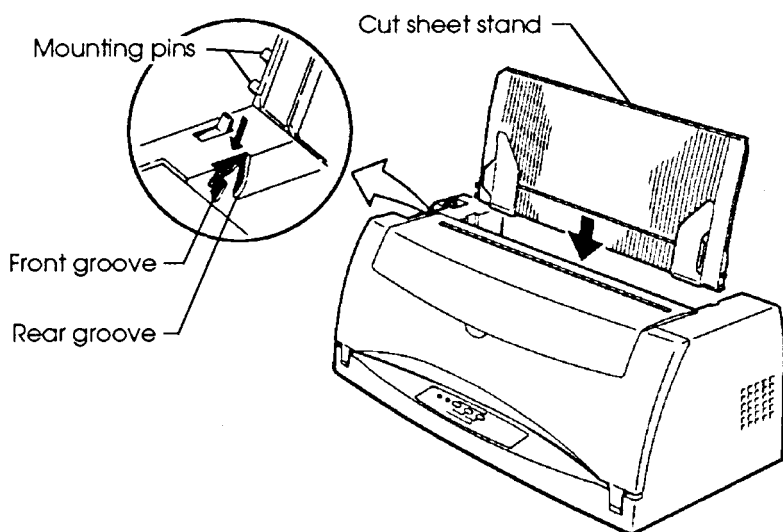
ASSEMBLING THE PRINTER

This section explains how to install the cut sheet stand and ribbon cartridge.

Installing the Cut Sheet Stand

The cut sheet stand enables smooth feeding of both single sheets and continuous forms. To install the cut sheet stand:

1. Referring to the following figure, locate the two grooved notches on the top of the printer, behind the top cover. Note that each notch has a front groove and a rear groove.



Installing the cut sheet stand

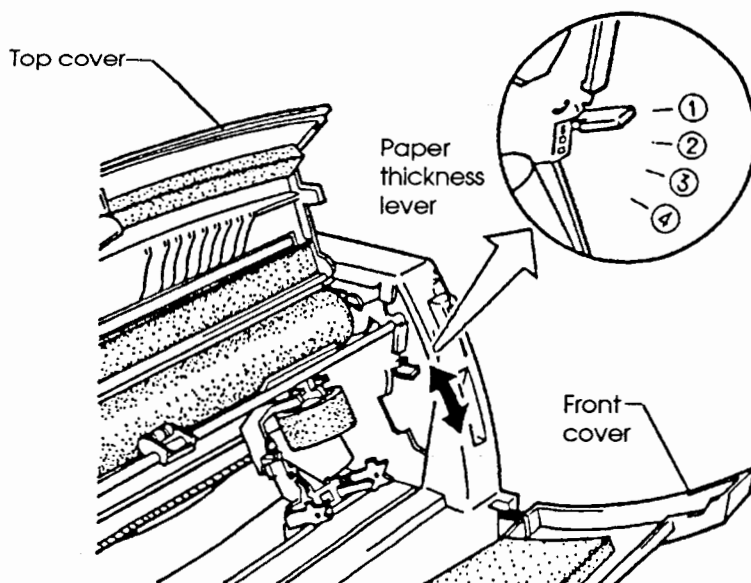
2. Locate the two mounting pins on each side of the cut sheet stand.
3. Tilt the cut sheet stand forward at an angle over the top of the printer. Slide the mounting pins into the long front grooves in the notches. This is the cut sheet stand's *up* position, used for printing single sheets.

To move the cut sheet stand to its *down* position, grasp it by the sides and lift up until the two upper mounting pins fall into the rear grooves in the notches. This position is used for printing on most continuous forms.

Installing the Ribbon Cartridge

The printer uses a ribbon cartridge. To install the ribbon cartridge:

1. Open the top and front covers of the printer. For best access, slide the print head carriage about three quarters of the way to the right side of the platen.
2. The paper thickness lever (shown below) is inside the printer, on the right. It has the four positions. Before you install the ribbon cartridge, move this lever to ③ or ④.

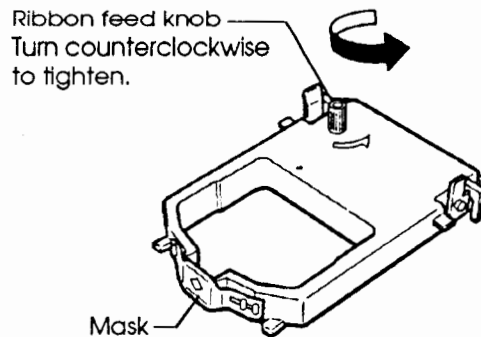


Preparing to install the ribbon cartridge

3. Remove the ribbon cartridge from its package. Turn the ribbon feed knob counterclockwise to be sure the ribbon feeds properly.

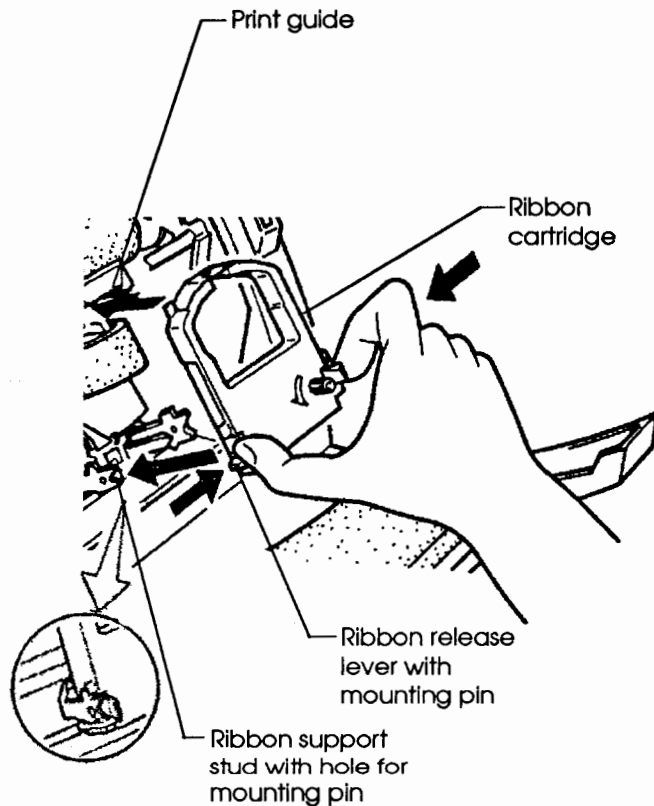
NOTE

Do not remove the plastic ribbon mask that protects the ribbon.



Preparing the ribbon cartridge

4. On each side of the ribbon cartridge, locate the ribbon release levers, each of which has a mounting pin on the side. Referring to the following figure, place the mounting pins onto the ribbon support studs inside the printer. Rotate the cartridge so the ribbon falls between the nose of the print head and the plastic print guide.



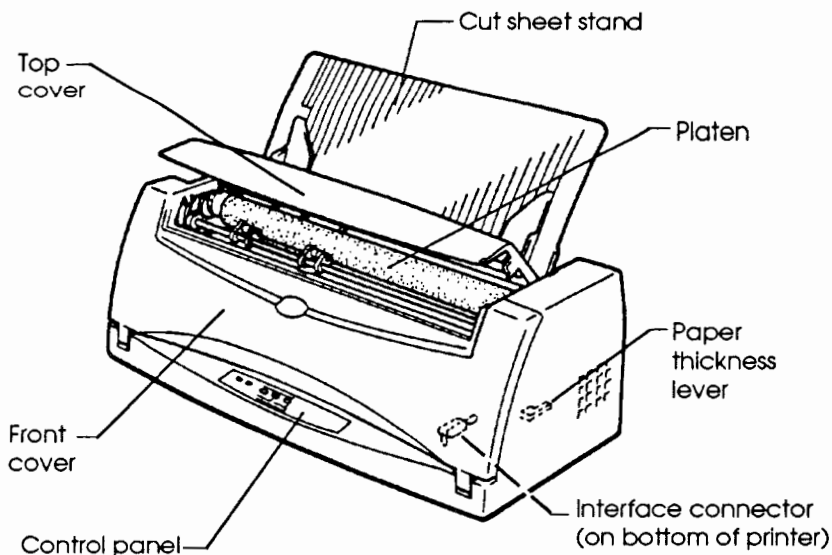
Installing the ribbon cartridge

5. Press in on the ribbon release levers until the mounting pins snap into the holes on the ribbon support studs. Gently pull on the cartridge to be sure that the pins are securely mounted in the holes.
6. Turn the ribbon feed knob counterclockwise to take up any slack in the ribbon.
7. Move the paper thickness lever back to position ① (uppermost). This is the correct setting for printing most single-ply forms.
8. Close the front and top covers.

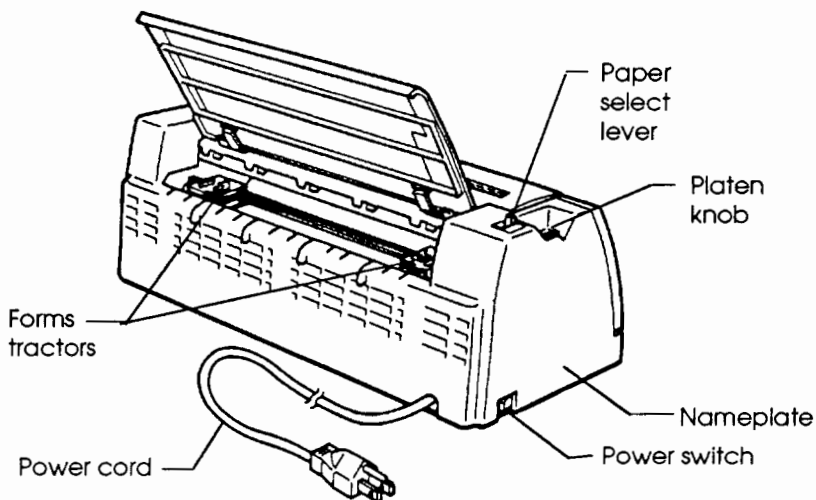
GETTING ACQUAINTED WITH YOUR PRINTER

Now that your printer is assembled, take a moment to become familiar with its major components.

Looking at the printer from the front and right side and from the back, you can see the components shown in the figures below. The control panel is described in Chapter 3.



Components on front and side of printer



Components on back of printer

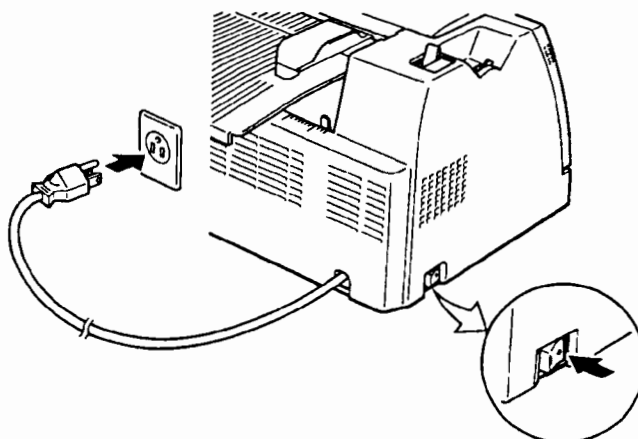
CONNECTING THE POWER CORD

Before you plug in the printer:

- ✓ Be sure that the printer power switch is switched off. The O on the rear of the power switch should be visible.
- ✓ Be sure the power outlet is properly grounded.

To plug in the power cord:

1. Plug the power cord into the power outlet.



Connecting the power cord

2. Be sure that the power cord is connected securely.
3. To turn on the power, press the "I" on the power switch. Within a few seconds, the POWER indicator on the printer control panel lights, the print head moves to its home position, and (normally) the ONLINE indicator lights green.

NOTE

If no forms are loaded, the ONLINE indicator flashes if the paper select lever is set forward to continuous forms. When you move the paper select lever back to the single sheet position (as described in the next section), the ONLINE indicator will stop flashing. This condition poses no problem.

TESTING THE PRINTER OFFLINE

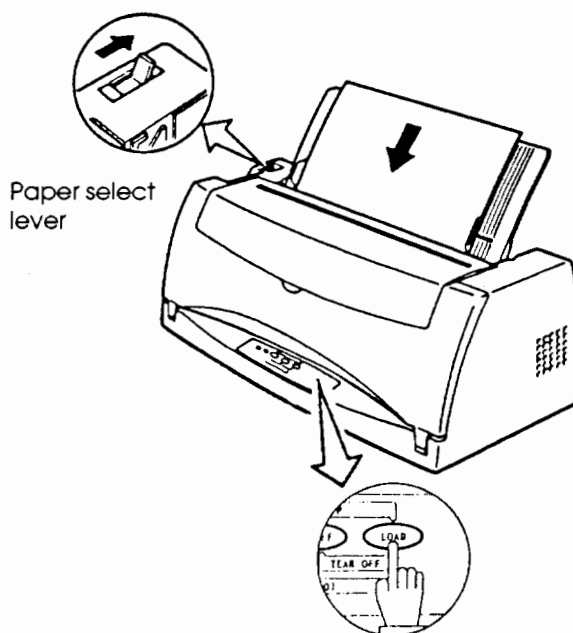
At this point, you can load paper and run the printer's self-test. You can use either cut sheets or continuous forms (see Chapter 3). The self-test checks printer performance and print quality before you connect the printer to the computer.

Loading Paper for the Self-Test

For the self-test, use paper greater than 215.9 mm (8.5 inches) in width to avoid printing on the platen. Standard letter-size or A4-size paper can be used if it is inserted *lengthwise*.

Before loading the paper, be sure that the printer is on. Then, do the following:

1. Move the paper thickness lever (inside the right side of the printer) to position ①. Move the paper select lever (on the top left side of the printer) to the back.



Loading a sheet of paper

2. Raise the cut sheet stand. Move the left paper guide all the way to the right. Insert a piece of paper into the cut sheet stand. If using letter-size or A4-size paper, insert the paper *lengthwise* to avoid printing on the platen.

CAUTION

Printing directly on the platen may damage the platen and print head.

Adjust the right paper guide so that the paper lies flat on the cut sheet stand.

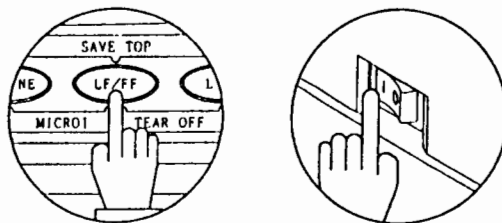
3. Press the LOAD button. The paper will be loaded to the top-of-form position. See Chapter 3 for more information about the top-of-form position.

Printing the Self-Test

The printer has a built-in self-test program. This program prints the firmware version, the names of the printer's resident emulations, and all of the characters available in the emulations. The self-test prints 80 characters per line.

Be sure that a piece of paper is loaded as instructed. Then follow these steps to print a self-test page.

1. Turn off the printer.
2. While pressing the LF/FF button, turn the printer back on. Continue pressing the LF/FF button until self-test printing starts.



Starting the self-test

3. Allow the printing to continue for about 15 seconds. Then stop the printing by pressing the LF/FF button. Manually turn the platen knob toward you to remove the test page.
4. The self-test page should look similar to the sample shown below.

```
*** Self test printing ***
```

BUTTON	ACTION
<ONLINE>	Exit to normal mode
<LF/FF>	Pause/resume printing

1. Software specification

CA02538-J101 (01A)

2. Emulations

DPL24C+	---	FUJITSU DPL24C PLUS	Ver. 2.01
IBMXL24E	---	IBM Proprinter XL24E	Ver. 1.01
ESC/P-2	---	EPSON ESC/P-2	Ver. 1.01

3. Repeat printing

[illegible]

Sample self-test page

Check that the printing is uniform, without light, dark, or smudged areas. If the print quality is good, go on to step 5. Otherwise, try to correct the problem by doing the following:

- Make sure that the ribbon is installed correctly.
- Make sure that the paper thickness lever is set to position ①.
- Insert a new sheet of paper into the cut sheet stand. Turn the platen knob to manually advance the paper until the top edge has moved past the paper bail rollers.
- Press the LF/FF button to restart printing. If the print quality is still poor, turn off the printer and contact your dealer for assistance.

5. To exit the self-test mode, press ONLINE. The printer will return online.

CONNECTING THE PRINTER TO YOUR COMPUTER

Your printer has a Centronics parallel interface, which is used to connect the printer to your computer. The interface cable is available from dealers, cable manufacturers, and other suppliers. For detailed interface specifications, see Appendix D.

Selecting an Interface Cable

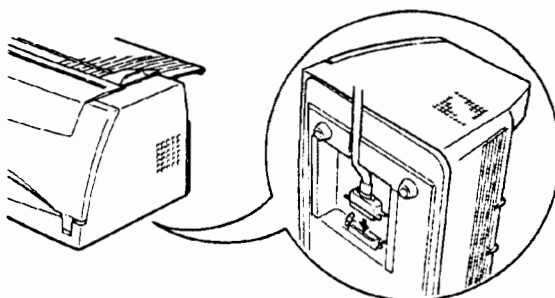
For the parallel interface, use a cable that meets the following specifications:

- ✓ At the printer end, use a shielded male Centronics connector such as an Amphenol DDK 57FE-30360 or its equivalent. To prevent RFI (radio frequency interference), the connector cover must be connected to the cable shield.
- ✓ At the computer end, most computers (including IBM PCs) require a male DB-25P connector, but some computers require a Centronics connector. To determine the type of connector your computer uses, refer to your computer's user manual.
- ✓ Make sure that the cable length does not exceed 3 meters (10 feet).

Connecting the Interface Cable

To connect the interface cable:

1. Turn off both the printer and the computer.
2. Tip up the printer and attach the interface cable to the connector on the bottom of the printer. See the following figure.



Connecting the interface cable

3. To secure the parallel interface cable, flip the fastener clips on the printer into the notches on the cable connector.
4. Attach the other end of the interface cable to your computer. Gently pull on the cable to verify that the plug is not loose.

SELECTING A PRINTER DRIVER AND AN EMULATION

Before printing with your software, you must verify that the correct printer driver and correct emulation are selected for your printer. This section explains what printer drivers are and how to select the correct emulation.

Selecting a Printer Driver

When you use a printer with commercial application software, you must specify the proper printer driver before attempting to print. The printer driver receives print data from the application software,

converts the data into commands that the printer executes, and sends the commands to the printer. So, the printer driver must match the printer. The following shows which printer driver to use in order of resulting performance. As to how to select the driver, refer to the documentation for each driver.

Case 1: Select a printer driver for this printer (Fujitsu DL700)

The following driver is included in the DLMENU disk supplied with this printer:

- Printer Driver for MS-Windows 3.X

The following four drivers are available from your dealer. Contact your dealer to obtain these drivers and the latest information on currently available drivers.

- Printer Driver for MS-Windows NT
- Printer Driver for OS/2
- Printer Driver for WordPerfect
- Printer Driver for MS-Word

This selection enables the highest performance of the printer. That is, it enables using unique features of this printer, such as printing 114 columns and selecting scalable fonts. You do not need to change the emulation or any other settings to use the printer (plug and play architecture).

Case 2: Select a printer driver for one of the following Fujitsu printers:

- DL3800, DL6400, and DL6600

This selection is not as ideal as in case 1. The performance is almost the same with the case 1 selection, however, these printers do not support Courier scalable fonts. No change in emulation is necessary. Note that this printer is a 114-column printer but the selected printer is a 136-column printer. Since the printer driver is not aware of the difference of print columns, you must allow for it.

Case 3: Select a printer driver for one of the following Fujitsu printers:

- DL1250, DL3400, DL3450, DL3600, DL4400, DL4600, DL5600, and DL5800
- DL2400, DL2600, DPL24C, and DPL24I

Only select this if the drivers in cases 1 and 2 are not available. No scalable fonts can be printed. Allow for the number of print columns as in case 2. No change in emulation is necessary.

Case 4: Select one of the following printer driver:

- Printer Driver for Epson LQ1070, LQ1170, etc. (ESC/P2)
- Printer Driver for Epson LQ1050, LQ2550, etc. (ESC/P)

Make this selection when cases 1 to 3 are not available or if you want to use the Epson ESC/P2 or ESC/P emulation. The emulation must be changed to Epson ESC/P2, and can be changed from the host using the DLMENU (see the next section). Be sure to select a driver for 136-column printers. Selecting a printer driver for 80-column printers disables printing beyond column 80.

Case 5: Select the following printer driver:

- Printer Driver for IBM Proprinter XL24E or XL24

Make this selection when cases 1 to 4 are not available or if you want to use the IBM XL24E or XL24 emulation. The emulation must be changed to IBM XL24E, and can be changed from the host using the DLMENU (see the next section).

Case 6: Try printing or contact your dealer

Cases 1 to 5 should cover most situations. If you cannot find the proper printer driver, try printing with a printer driver listed in cases 1 to 5, or contact your dealer.

Selecting an Emulation

The printer's preselected factory setting is the Fujitsu DPL24C PLUS emulation. If this is the emulation you require, you may skip this section.

An emulation is a set of commands used by your software to communicate with the printer. There are many different emulations available for printers. Each emulation has its own unique features and capabilities. This printer offers three resident emulations:

- Fujitsu DPL24C PLUS (for Fujitsu DL-series printers)
- IBM Proprinter XL24E
- Epson ESC/P2 (for Epson LQ1170 printers or equivalent)

The emulation selected depends on the printer driver that was selected.

USING THE DLMENU

This printer has a "setup function," which changes the printer default information on the operating conditions to make the printer fit various user environments. In the following cases, the default information must be changed:

- To match the printer to the basic requirements of the printer driver
A typical example is changing the emulation.
- To select an item which cannot be controlled by application software
Typical examples are selecting a language and page length.
- To change paper control
Typical examples are specifying auto tearoff and changing the TOF position.

A list of items that can be set up in this printer is given in Appendix C.

The DLMENU is a software utility, supplied with this printer, which remotely controls the "setup function" from the host CPU. With DLMENU, all settings can easily be changed on the host CRT.

Not all printer users need DLMENU. For example, a printer driver controls almost all printing conditions. In general, you do not need to change any settings (plug and play architecture).

DLMENU is on the 3.5-inch 1.44-MB floppy disk supplied with this printer. Instructions for using DLMENU are in the "README.DOC" file on the same disk.

This disk also includes printer drivers for MS-Windows which are especially provided for this printer. Use this driver when you are using MS-Windows applications. For details, read the "README.DOC" file.

PRINTING A SAMPLE PAGE ONLINE

Once the self-test verifies that the printer is functioning correctly, try printing using one of your software applications. This will ensure that the printer is correctly connected to your computer.

With a parallel interface, the printer usually prints the correct characters. You may need to adjust the page layout or various print features using your application or DLMENU.

To test the interface between the printer and computer, follow these steps.

1. Load a piece of paper into the printer.
2. Check that the printer is online. The ONLINE indicator should be green. If it isn't, press the ONLINE button.
3. Try to print using your word processor, a programming language, or other software.
4. If the page layout or other print features are wrong, use your application's printer selection menus or DLMENU to make the changes you require.

If the printer does not print or prints the wrong characters, do the following:

- Make sure that the interface cable is connected properly.
- Make sure that the printer emulation selected in your application software is the same as the emulation selected on the printer.

You are now finished setting up and testing the printer. To familiarize yourself with everyday printer operations such as loading paper and printing, see Chapters 3 and 4.

LOADING AND HANDLING PAPER

This chapter explains how your printer handles paper. Topics covered are:

- Selecting paper
- Overview of paper handling
- Adjusting for paper thickness
- Using single sheets
- Using continuous forms
- Changing and saving top-of-form
- Switching paper types

Tips for handling paper are given at the end of this chapter. If you are using multipart forms, envelopes, or labels, be sure to read this section.

SELECTING PAPER

The printer can handle either single sheets or continuous forms. Single sheets, also called cut sheets, include envelopes and noncontinuous multipart forms. Continuous forms include labels and multipart forms fed into the printer using the rear forms tractors.

For best results, be sure that your paper meets the specifications listed below. See Appendix A for detailed specifications. If you are not sure of the specifications of your paper, try printing the paper as is or consult your dealer.

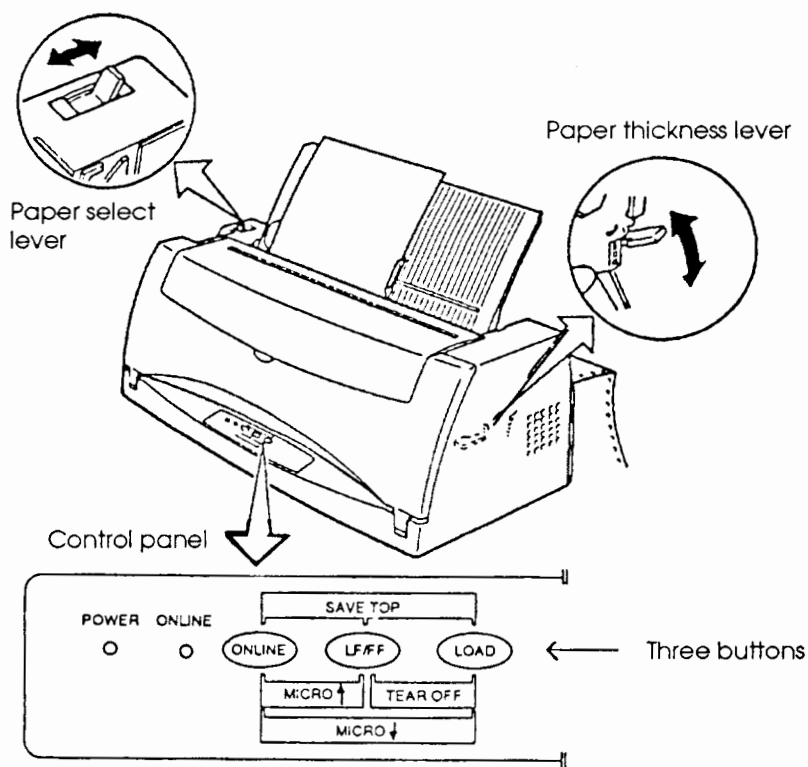
Length	Single sheets: 76 to 364 mm (3 to 14.3 inches) Continuous forms: 102 mm (4 inches) or longer
Width	Single sheets: 102 to 330 mm (4 to 13 inches) Continuous forms: 102 to 330 mm (4 to 13 inches)
Thickness	0.23 mm (0.009 inch) maximum total thickness.
Copies	1 to 3 copies, including the original. For carbon-interleaved paper, the carbon counts as a copy.

**OVERVIEW OF
PAPER HANDLING**

The following levers and buttons are used to handle paper in the printer:

- Paper select lever, located on the top left corner of the printer
- Paper thickness lever, located inside the front cover on the right side of the printer
- ONLINE, LF/FF, and LOAD buttons on the control panel

The following figure shows the location of each lever and button.



Printer levers and buttons

Table 3.1 summarizes how the levers and buttons affect paper handling. More detailed information is provided later in this chapter.

Table 3.1 Paper Handling Levers and Buttons

Lever/Button	Purpose	What You Do
LF/FF	Form feed	Press and hold LF/FF to execute a form feed. Continuous forms are fed forward by one page. Single sheets are ejected.
	Line feed	Press LF/FF for less than three seconds to feed the paper forward by one line.
LF/FF and LOAD	Advance forms for tear-off	Press LF/FF and LOAD together to advance the forms to the tear-off edge. Tear off the forms, then press any button to retract the forms.
LOAD	Load/unload paper	Press LOAD to load paper, or to unload (retract) the continuous forms to the "park position."
ONLINE and LF/FF *	Micro feed (forward)	Press ONLINE and LF/FF together to advance the forms in 1/180-inch increments.
ONLINE and LOAD *	Micro feed (backward)	Press ONLINE and LOAD together to move the forms back in 1/180-inch increments.
ONLINE, LF/FF, and LOAD *	Save top-of-form	Press all three buttons together to save the current position of paper as the top-of-form. This is valid for the first adjustment by micro feed immediately after loading the paper.
Paper select lever	Select the paper path	Move the paper select lever backward for single sheets (cut sheet stand or feeder). Move the paper select lever forward for continuous forms.
Paper thickness lever	Adjust for paper thickness or number of parts	Move the paper thickness lever to position ① to ④. For example, use ① for one-part forms copy. For details, see Table 3.2.

* Valid for offline only.

ADJUSTING FOR PAPER THICKNESS

The printer can handle paper of different thicknesses. This includes multi-part forms with up to three parts (original plus two copies). For detailed paper thickness specifications, see Appendix A.

The paper thickness lever, located inside the front cover on the right side of the printer, allows you to adjust the printer for different paper thicknesses. Be sure to adjust the paper thickness lever whenever you change the number of copies being printed.

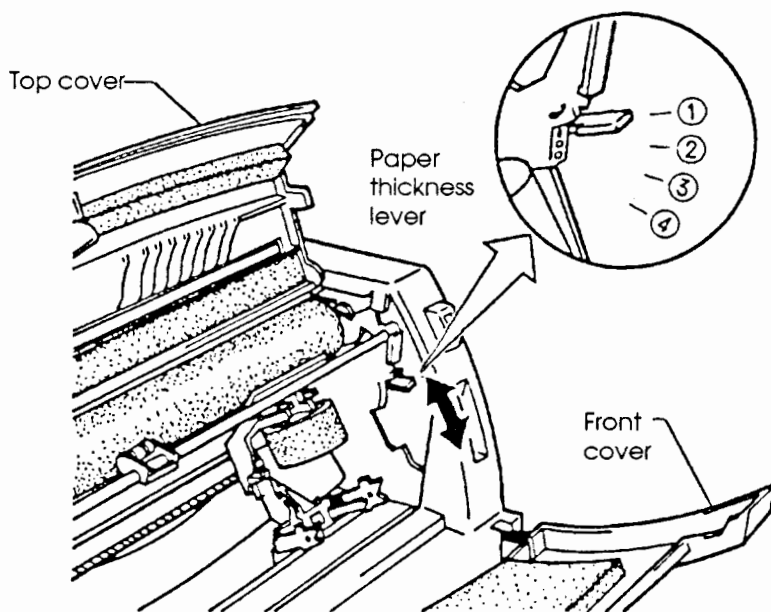
To adjust the paper thickness lever:

1. Open the top and front covers of the printer.

CAUTION

The print head may be hot if you've been printing recently.

2. Locate the paper thickness lever, shown in the figure below.



Adjusting the paper thickness lever

3. The paper thickness lever has four positions: ①, ②, ③, and ④. Use the following table to determine the appropriate setting for the paper you are using. Then move the paper thickness lever to that position.

Table 3.2 Paper Thickness Lever Settings

Number of Copies (Including original)*	Position
1	①
2	① or ②
3	②
Labels, envelopes	③
Ribbon replacement	④

* For carbon-interleaved paper, the carbon counts as one copy.

NOTE

If printing is messy, the ribbon misfeeds, or the paper jams, move the lever one notch higher.

USING SINGLE SHEETS

This section explains how to load paper in the cut sheet stand or cut sheet feeder. The cut sheet stand lets you load paper manually, one sheet at a time. A cut sheet feeder loads paper automatically from a stack.

Loading a Single Sheet of Paper

To load a sheet of paper into the cut sheet stand:

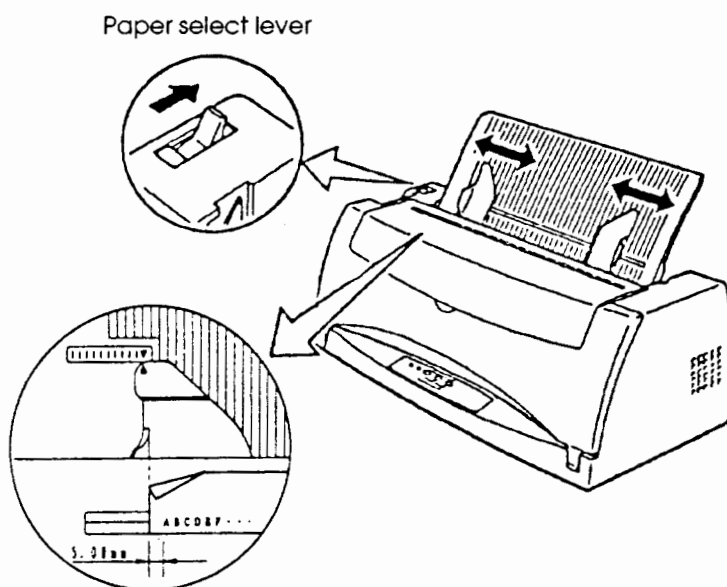
1. Make sure that the printer is turned on. Check that the continuous forms are retracted to the park position (see **Unloading Continuous Forms** later in this chapter for details).
2. If necessary, readjust the paper thickness lever (see **Adjusting for Paper Thickness** earlier in this chapter).

3. Move the paper select lever (on the top left side of the printer) to the rear.

4. Raise the cut sheet stand. Position the left paper guide.

NOTE

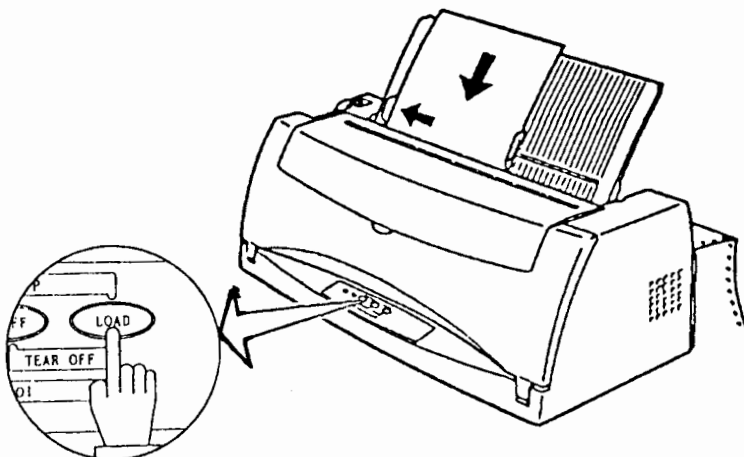
When the left paper guide is positioned to its rightmost position, you will obtain a left margin of 5 mm (0.2 inch) plus the left margin specified using your application software or DLMENU. To help align the paper, use the ruler on the cut sheet stand. The gradations on the ruler indicate 10 columns per inch.



Preparing to load a sheet of paper

5. Insert a sheet of paper into the cut sheet stand. Make sure that the bottom edge of the paper snugly engages with the platen. Adjust the right paper guide to fit the paper.

6. Press the LOAD button. The paper will advance to the top-of-form position, the first line on which printing can start. To adjust the loading position of the paper slightly, see **Changing and Saving Top-of-Form** later in this chapter.



Loading a sheet of paper

7. Place the printer online. Print a sample page and check the margins. If necessary, adjust the following:

- Horizontal alignment of the paper. Readjust the paper guides if required.
- Margin settings. Use your software application or DLMENU.

Loading Paper in the Cut Sheet Feeder (Option)

A cut sheet feeder lets you automatically print on single sheets without inserting the sheets one by one. This saves lots of time when printing long files on cut sheets. For installation and operation of the cut sheet feeder, refer to the user manual that comes with the cut sheet feeder.

When the feeder is installed, you must use DLMENU and specify SINGLE as the feeder type. Otherwise, the feeder will not work.

When paper is loaded from the cut sheet feeder, the top-of-form position can be adjusted by the control panel or DLMENU in the same way as loading paper from the cut sheet stand.

Ejecting Single Sheets

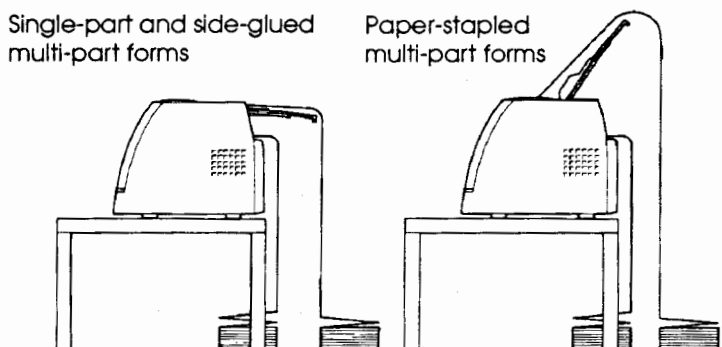
If you use an application for printing, each sheet is automatically ejected when the end of the printed page is reached. To manually eject sheets of paper, press and hold down LF/FF to execute a forward form feed.

USING CONTINUOUS FORMS

Continuous forms, fanfolded at the horizontal perforations, are fed into the printer using the rear forms tractors. Continuous forms paper is ideal for printing rough drafts and long files.

Positioning the Paper Stack

Place the forms paper directly below the rear of the printer. After the paper is installed in the printer, the paper path will look like this.



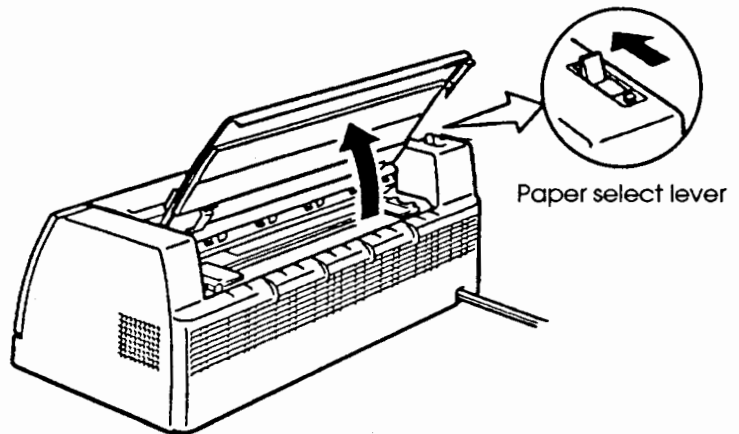
Placement of continuous forms

Loading Continuous forms

To load continuous forms:

1. Make sure that the printer is turned on. Remove any single sheet paper from the printer.
2. If necessary, readjust the paper thickness lever for continuous forms (see **Adjusting for Paper Thickness** earlier in this chapter).

3. Move the paper select lever (shown below) forward.

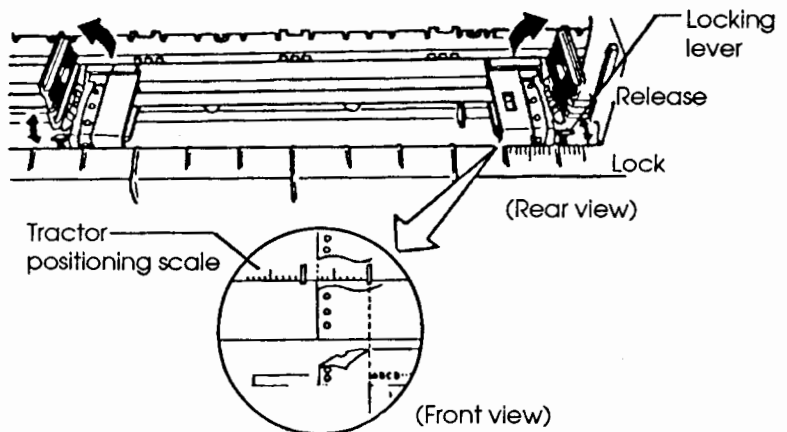


Preparing to load forms paper

4. Raise the cut sheet stand, if installed.
5. Release the tractor locking levers by pushing them toward the front of the printer, as shown in the following figure.

CAUTION

Be careful to release the locking levers before moving the tractors. Otherwise, you may damage the levers.



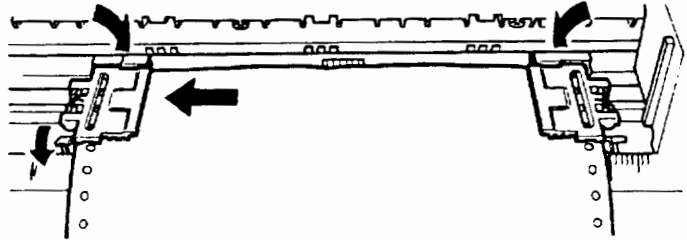
Positioning the tractors

6. Position the right tractor (as seen from the rear of the printer). Pull the right locking lever toward the rear of the printer to secure the tractor.

NOTE

Below the right tractor, as seen from the back, there is a short inch-based ruler with 10 columns per inch. The leftmost graduation indicates the left edge of the first character as shown above.

7. Open the tractor paper holders and fit the form's feed holes onto the left and right tractor pins. Adjust the left tractor (as seen from the rear of the printer) to the width of the form. Close the paper holders.



Installing continuous forms (rear view)

8. Pull the left tractor (as seen from the rear) to stretch the paper taut. Pull the left locking lever to the rear to secure the tractor in place.
9. For paper-stapled (crimped) multipart forms, raise the cut sheet stand to its upright position. For other types of forms, lower the cut sheet stand to its down position.
10. Press the LOAD button to advance the paper to the top-of-form position, the first line on which printing can start. To adjust the loading position of the paper slightly, see **Changing and Saving Top-of-Form** later in this chapter.

11. Press the ONLINE button to place the printer online. Print a sample page and check the margins. If necessary, adjust the following:

- Horizontal alignment of the paper. Move the forms tractors as required.
- Margin settings. Use your software application or DLMENU.

Unloading Continuous Forms

To unload continuous forms:

1. Make sure that the paper select lever is set to the forward position.
2. Press the LOAD button. The continuous forms are then retracted to the park position. If forms cannot be retracted in one operation, continue to press LOAD until the paper is parked.

NOTE

The printer can retract forms a maximum of 55.8 cm (22 inches) per operation.

3. To remove the forms, raise the tractor paper holders and lift out the paper.

Tearing Off Forms

Your printer has a special "tear-offedge" that allows you to remove printed pages without wasting paper. The tear-off edge is located on the top cover.

To tear off continuous forms using the tear-off edge:

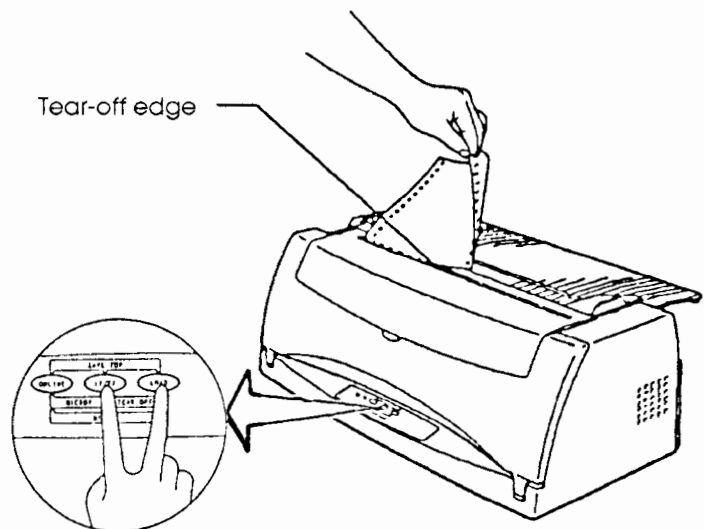
1. Press the LF/FF and LOAD buttons. The paper advances to the tear-off edge.

You do not need to press the LF/FF and LOAD buttons if you specified TEAR OFF: AUTO in DLMENU. The paper automatically advances to the tear-off edge at the end of each job (or when the printer has printed all the data received).

NOTE

If the bottom perforation of the form is not positioned at the tear-off edge, it may indicate that the length of your paper is not correctly specified in your application software or DLMENU. Check that the paper length is specified correctly.

2. Tear the paper off at the perforation.



Tearing off continuous forms

3. Press any button to retract the forms to the top-of-form position.

CHANGING AND SAVING TOP-OF-FORM

The top edge of paper is the *physical* top of the page. The *logical* top of page, as “understood” by the printer when paper is loaded, is called the top-of-form position. The printer starts printing on the basis of this position.

You can change or adjust the top-of-form position from 1/6 to 66/6 inch in increments of 1/180 inch by using “micro feed” on the control panel. This function is identical with the ADJUST function in DLMENU, but is valid immediately after the forms are loaded. The printer controls the top-of-form position for both single sheets and continuous forms.

Any new top-of-form setting is lost when the printer is turned off. If you want to use the new position when the printer is turned on again, save it by using “Save Top-of-Form” from the control panel before turning off the printer.

Actually, printing starts at the position obtained from the total of the following values:

- The top-of-form offset specified by the control panel or DLMENU. (The default is 1 inch.)
- The top margin specified by your software
- The TOP-MRG (top margin) specified by DLMENU

To change and save the top-of-form:

1. Press the LOAD button to load the paper and print a page to check the offset of the printed characters against ruled lines or other marks on the paper.
2. Reload the paper.
3. Based on the offset, press the ONLINE and LF/FF buttons to advance the paper or press the ONLINE and LOAD buttons to move the paper backward while referring to ruled lines or other marks.
4. Press the ONLINE, LF/FF, and LOAD buttons to save the current position of the paper.

SWITCHING PAPER TYPES

If you have more than one type of job, it is often convenient to switch between using continuous forms and single sheets. This section explains how to switch back and forth between the two types of paper. It is not necessary to remove the continuous forms paper from the printer to use single sheets.

Switching to Single Sheets

To switch from continuous forms to single sheets:

1. Tear off any pages that have already been printed.
2. Retract the forms to the park position (press LOAD). The ONLINE indicator flashes to indicate paper-out.

CAUTION

Failure to retract the forms will cause a paper jam.

3. Move the paper select lever to the rear (single sheet) position.
4. Mount the cut sheet stand or cut sheet feeder. See **Using Single Sheets** earlier in this chapter for details. If you are using the cut sheet stand, press the LOAD button to advance the paper to the top-of-form position. If you are using the cut sheet feeder, the paper advances to the top-of-form position by a command from the computer. In this case, you don't need to use the control panel to advance the paper.

You are now ready to print on single sheets.

Switching to Continuous Forms

To switch from single sheets to continuous forms:

1. If a sheet of paper is loaded, turn the platen knob or press and hold down the LF/FF button to eject it.

CAUTION

Failure to remove the paper may cause a paper jam.

2. Move the paper select lever to the forward (continuous forms) position.
3. Press the LOAD button. The continuous forms paper advances to the top-of-form position.

You are now ready to print on continuous forms.

TIPS ON HANDLING PAPER

General Tips

- Use high-quality paper. Do not use paper that is wrinkled, folded, or curled.
- Do not use paper with metal staples or clips.
- Do not use paper with unpredictable variations in thickness, e.g., partially multiple-part paper, paper with embossed printing, and labels with an exposed backing sheet.
- Store paper in a clean, dry environment.
- When manually loading paper using the platen knob, press the ONLINE button to move the print head to the home position. This prevents the paper from being caught by the bail rollers.
- Check paper placement and alignment each time you use the printer. For long print jobs using continuous forms, periodically make sure that the forms are stacked correctly.
- Do not attempt to print at the extreme corners of a form because the ribbon mask may snag the corner. This may occur in printing with a no-margin setting or if the paper-out condition is disabled.

Multipart Forms

- Do not attempt to print on multipart forms of more than three parts (original plus two copies). For carbon-interleaved forms, count the carbon as one copy.
- Avoid using carbon-interleaved single sheets that are not glued or crimped together. Printing tends to become misaligned on the bottom sheet.
- To ensure smoother feeding of paper-stapled (crimped)

multipart forms, raise the cut sheet stand as a support behind the forms.

Envelopes

To print on envelopes, use the cut sheet stand or the manual feed slot of the cut sheet feeder. Note the following:

- Set the paper thickness lever to position ③.
- Load the envelopes with the flaps folded closed. Otherwise, jamming may occur.
- Make sure that the print area specified by your application software is within the printable area of the envelope. Printing past the edge of the envelope will damage the print head and platen. Print a sample address on a regular sheet of paper to be sure the address will be printed in the correct area.

Labels

- Use labels under normal operating conditions. Labels are especially sensitive to temperature and humidity.
- Only use labels mounted on continuous forms backing sheets. Do not attempt to print labels mounted on single backing sheet. Labels mounted on a single backing sheet tend to slip, resulting in crooked printing.
- Set the paper thickness lever to position ③.
- Do not feed the labels backwards using unload (pressing the LOAD button) from the control panel. Jamming may occur.
- Do not use the printer's tear-off feature. When the labels are retracted, they may peel off the backing sheet and jam.
- Do not leave labels loaded in the printer for any length of time that would cause them to curl around the platen. Jamming may occur when printing resumes.
- Test-print labels before using them. If a jam occurs, set the paper thickness lever to position ④. If jamming problems continue, try a different type of label.

PRINTING

This chapter describes everyday printing operations. The instructions for loading paper into the printer are in Chapter 3. Use the procedures in this chapter to:

- Select print features
- Start, stop, or resume printing
- Resume from the paper-out condition
- Remove printed pages
- Clear the print buffer

SELECTING PRINT FEATURES

The print features you select determine how your printed pages will look. Print features include the following:

- Print quality
- Fonts
- Pitch (number of characters per inch)
- Page length and width
- Line spacing (number of lines per inch)

To select print features, you can use either commercial software or DLMENU. Which method you use depends on the capabilities of your software. If your software has most of the features you require, you may rarely — if ever — have to use DLMENU. *In fact, your software often overrides the printer's settings.*

If your software has limited options, you can use DLMENU to select print features. Sometimes DLMENU enables you to select features not selectable by software. For example, you can select downloaded fonts not supported by your software.

Using Commercial Software

Many of today's commercial software packages offer a wide variety of print features, including some features that cannot be done with this

printer. For example, software often provides a wider range of font sizes than the printer. Software also lets you specify multiple fonts on a page. To determine which features your software supports and how to select them, refer to the documentation that accompanied your software.

Using DLMENU

DLMENU is a software utility, supplied with this printer. It remotely controls print features from the host CPU. With DLMENU, all features can easily be changed from the host CRT. The items that can be changed in this printer are listed in Appendix C.

DLMENU is stored on the 3.5-inch 1.44-MB floppy disk supplied with this printer. To use DLMENU, read the "README.DOC" file on the same disk.

PRINTING

Start Printing

Before you start to print, make sure that the printer is loaded with paper. Also, verify that the paper thickness lever is set to the appropriate position (①, ②, or ③). Position ④ is usually only used for ribbon replacement.

To start printing, start your software or send printer commands and data from the computer to the printer.

Stop and Resume Printing

To stop printing immediately, press the ONLINE button to place the printer offline. You can also use your software to stop printing, but there will be a slight delay before printing stops. In either case, any data sent to the print buffer but not yet printed is stored until you resume printing. Data in the print buffer is lost if you turn the printer off.

To resume printing, press the ONLINE button again. To cancel printing, use the cancel commands provided by your software or

computer. To clear the print buffer, turn the printer off. Any data in the print buffer before you canceled will be lost.

RESUMING FROM PAPER-OUT

The printer can “sense” when paper runs out. Depending upon how PPR-OUT (paper-out detection control) is set in DLMENU, the printer either:

- Stops printing and flashes the ONLINE indicator, or
- Ignores the paper-out condition and continues printing until no more data remains in the printer

The factory default is to stop printing when the continuous forms run out, and to continue printing when the cut sheet stand is empty.

CAUTION

When printing with the paper-out condition ignored, be careful not to print on the bare platen. Printing on the platen without paper will damage the platen and print head.

If the cut sheet feeder runs out of paper, the printer always stops printing, regardless of the PPR-OUT setting.

Resuming after Replacing Paper

To resume printing when paper runs out:

1. Load more paper on the forms tractors or in the cut sheet feeder bin. See Chapter 3 for details.
2. To load the first sheet of paper, press LOAD. The ONLINE indicator will stop flashing.
3. Press the ONLINE button to place the printer online. Printing resumes automatically.

NOTE

For continuous forms, the page where printing stopped and the page where printing resumes will probably be incorrectly printed. Print the rest of the job. Then re-print these pages.

Overriding the Paper-out Condition

You can continue printing on the bottom margin even while paper-out is detected. Press the ONLINE button when the printer stops printing because of paper-out. The printer ignores paper-out, prints one line, then detects paper-out again. Repeat this operation for the required lines. This function is not valid for a paper-out condition in the cut sheet feeder.

REMOVING PRINTED PAGES

This section describes the best methods for removing single sheets or continuous forms paper after printing.

Removing Single Sheets

When you print using software, the printer automatically ejects each sheet of paper when the bottom of the page is reached. To eject sheets manually, use one of the following methods:

- Press and hold down the LF/FF button to execute a form feed
- Turn the platen knob toward you

Removing Continuous Forms

To avoid wasting paper, use the printer's tear-off edge to remove any printed continuous forms. Press the LF/FF and LOAD buttons to advance the perforation to the tear-off edge. Tear the paper off, then press any button to retract the paper to the top-of-form position. See Chapter 3 for more detailed instructions.

CLEARING THE PRINT BUFFER

Turning the printer off clears all data from the print buffer. This is useful when you cancel a print operation and do not want to continue printing data already sent to the printer. When you turn the printer on again, it resets to its power-on default values.

MAINTENANCE

Your printer requires very little care. Occasional cleaning and replacement of the ribbon cartridge are all that is required.

Lubrication of the printer is not usually necessary. If the print head carriage does not move back and forth smoothly, clean the printer using the procedures in this chapter. If the problem continues, contact your dealer to determine whether lubrication might be needed.

CLEANING

The front and top covers of the printer help protect it from dust, dirt, and other contaminants. Paper produces small particles that accumulate inside the printer. This section explains how to clean and vacuum the printer and how to clean the platen and paper bail rollers.

Cleaning and Vacuuming the Printer

WARNING

To avoid any possibility of injury, turn off the power to both the printer and the computer, and unplug the printer before cleaning.

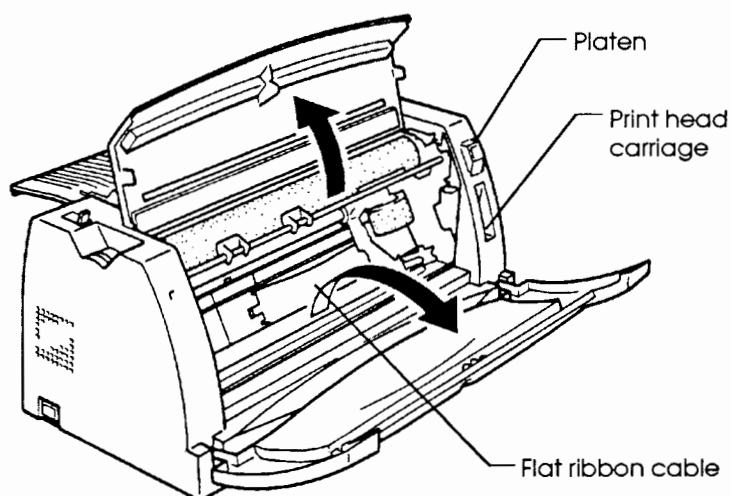
Use the following procedure to clean and vacuum the printer as required.

1. Remove any paper from the printer. Make sure that the power is off, then unplug the printer power cord.
2. Using a soft vacuum brush, vacuum the exterior of the printer. Be sure to vacuum the air vents at the sides and rear of the printer. Also vacuum the cut sheet stand or feeder.
3. Using a soft, damp cloth, gently wipe the exterior of the printer, including the front and top covers. A mild detergent may be used.

CAUTION

Do not use solvents, kerosene, or abrasive cleaning materials that may damage the printer.

4. Open the front and top covers of the printer and remove the ribbon cartridge. Using a soft vacuum brush, gently vacuum the platen, print head carriage, paper-out sensor (under the left end of the platen), and surrounding areas. You can easily move the print head back and forth with the power off. Be careful not to press too hard on the flat ribbon cable extending from the print head carriage (see the following figure).



Printer interior

5. Reinstall the ribbon cartridge. Close the front and top covers.
6. Raise the cut sheet stand. Vacuum the rear forms tractors and surrounding areas.

Cleaning the Platen and Paper Bail Rollers

To remove any ink from the platen and paper bail rollers, clean them about once a month. Use the platen cleaner recommended by your supplier and follow these steps:

1. Apply a small amount of platen cleaning fluid to a soft cloth. Avoid spilling the platen cleaning fluid inside the printer.

CAUTION

Do not use alcohol to clean the platen. Alcohol may cause the rubber to harden.

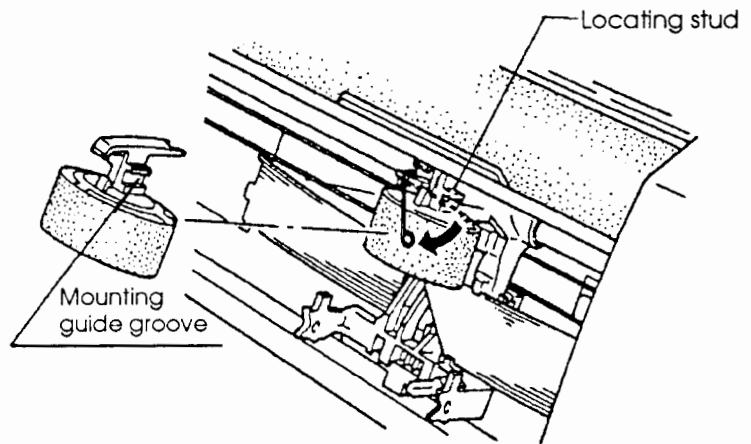
2. Place the cloth against the platen and manually turn the platen knob.
3. Dry the platen with a dry cloth and manually turn the platen knob.
4. Gently wipe the paper bail rollers using the cloth dampened with the platen cleaning fluid. Dry the rollers with a dry cloth.

REPLACING THE PRINT HEAD

The print head is easy to replace.

To remove the print head:

1. Turn off the printer.
2. Open the top and front covers of the printer.
3. Press the right end of the wire down to release it from the hook at the right. Then raise the wire to release it from the other hook.
4. Remove the print head from the connector on the carriage as shown in the figure.



Replacing the print head

To install the print head:

1. Carefully fit the mounting guide grooves of the print head onto the location studs on the carriage.
2. Push the print head into the connector, and hook the wire into place.

6

PROBLEM SOLVING

Your printer is extremely reliable, but occasional problems may occur. You can solve most of these problems yourself by following the instructions in this chapter. For help with problems you cannot resolve, contact your dealer for assistance. This chapter is organized as follows:

- Problems and solutions
- Diagnostic functions
- Getting help

PROBLEMS AND SOLUTIONS

The tables in this section list common printer problems and their solutions. The following types of problems are listed:

- Printing problems
- Paper handling problems
- Operational problems
- Printer failures

Printing Problems

Poor print quality or other printing problems are often caused by incorrect printer setup or incorrect software settings. A gradual decrease in print quality usually indicates a worn ribbon. Table 6.1 lists common printing problems and their solutions.

Table 6.1 Printing Problems and Solutions

Problems	Solutions
Printing is too light or too dark.	<p>Make sure that the ribbon cartridge is properly installed and that the ribbon feeds smoothly.</p> <p>Make sure that the paper thickness lever is set appropriately to match the thickness of the paper. See Table 3.2 in Chapter 3.</p> <p>The ribbon may be worn. Replace the ribbon.</p>
The page is stained or smudged.	<p>Make sure that the paper thickness lever is set appropriately to match the thickness of the paper. See Table 3.2 in Chapter 3.</p> <p>The ribbon may be worn. Replace the ribbon.</p> <p>The tip of the print head may be dirty. Clean it with a soft cloth.</p>
The page is blank (nothing was printed).	<p>Make sure that the ribbon cartridge is properly installed.</p>
Printing is erratic or characters are printed incorrectly.	<p>Make sure that the interface cable is securely connected to both the printer and the computer.</p> <p>Make sure that the printer emulation selected in your software is the same as the emulation selected on the printer. See the section Selecting a Printer Driver and an Emulation in Chapter 2.</p>
Printing is vertically misaligned (jagged).	<p>Use the printer's V-ALMNT function to check the vertical print alignment. If necessary, adjust the print alignment. See the section Diagnostic Functions later in this chapter.</p>

Table 6.1 Printing Problems and Solutions (Cont.)

Problems	Solutions
The top margin is incorrect.	<p>The top margin is the sum of the top-of-form setting, the software-specified top margin, and the printer's TOP-MRG setting. Check the following:</p> <ul style="list-style-type: none"> • Check the top-of-form setting. See the section Changing and Saving Top-of-Form in Chapter 3. Also refer to Changing ADJUST Options in DLMENU. • Check the software-specified top margin. Refer to your software documentation. • Check the printer's TOP-MRG setting. Refer to Changing MENU1 and MENU2 Options in DLMENU.
Lines are double-spaced instead of single-spaced.	<p>Check the line spacing setting in your software.</p> <p>Change the CR-CODE setting in DLMENU to CR ONLY. Refer to Changing MENU1 and MENU2 Options in DLMENU.</p>
The printer keeps printing on the same line.	<p>Change the CR-CODE setting in DLMENU to CR & LF. Refer to Changing MENU1 and MENU2 Options in DLMENU.</p>
The next print line continues at the end of the previous line instead of at the left margin of the next line.	<p>Change the LF-CODE setting in DLMENU to LF & CR. Refer to Changing MENU1 and MENU2 Options in DLMENU.</p>

Paper Handling Problems

Table 6.2 lists common paper handling problems and their solutions. See Chapter 3 for detailed procedures on loading and handling paper.

Table 6.2 Paper Handling Problems and Solutions

Problems	Solutions
Paper cannot be loaded.	<p>Make sure that the paper select lever is set correctly. Move the lever forward for continuous forms and backward for single sheets.</p> <p>Make sure that the paper covers the paper-out sensor (under the left end of the platen).</p> <p>If you are using the cut sheet feeder, make sure that the rear tabs of the paper holders are set down to the "CLOSED" position.</p> <p>If you are using the cut sheet feeder, make sure that SINGLE is specified for FEEDER in DLMENU. Refer to Changing Hardware Options in DLMENU.</p>
Paper jams while loading.	<p>Turn off the printer and remove the jammed paper. Remove any obstructions from the paper path.</p> <p>Make sure that the paper thickness lever is set appropriately to match the thickness of the paper. See Table 3.2 in Chapter 3.</p> <p>If you are using the cut sheet feeder, make sure that the rear tabs of the paper holders are set down to the "CLOSED" position.</p> <p>Make sure that the paper is not folded, creased, or torn.</p> <p>Reload the paper.</p>

Table 6.2 Paper Handling Problems and Solutions (Cont.)

Problems	Solutions
Paper jams while printing.	<p>Turn off the printer and remove the jammed paper. Remove any obstructions from the paper path.</p> <p>Make sure that the paper thickness lever is set appropriately to match the thickness of your paper. See Table 3.2 in Chapter 3.</p> <p>If you are using continuous forms, make sure that the paper is stacked correctly. Paper should feed in a straight line.</p> <p>If you are using the cut sheet feeder, make sure that the rear tabs of the paper holders are set down to the "CLOSED" position.</p> <p>Reload the paper.</p>
Paper slips off the forms tractors or the holes of the carrier strips are torn during printing.	<p>Make sure that the forms tractors are correctly positioned for the width of the paper and that the holes of the carrier strips fit directly over the tractor sprockets.</p>

Operational Problems

Table 6.3 lists common operational problems and their solutions. If you cannot resolve a problem, contact your dealer for assistance.

Table 6.3 Operational Problems and Solutions

Problems	Solutions
The power does not turn on.	<p>Make sure that the "I" on the power switch is pushed.</p> <p>Make sure that the power cord is securely connected to the outlet. Make sure that the power outlet is functional.</p> <p>Turn the power off. Wait a few minutes and turn the printer on again. If the printer still has no power, contact your dealer.</p>
The printer is on, but it will not print.	<p>Make sure that the printer is online.</p> <p>Make sure that the interface cable is securely connected to both the printer and the computer.</p> <p>Check whether the ONLINE indicator flashes. If so, load the printer with paper.</p> <p>Run the printer self-test (see Chapter 2). If the self-test runs normally, the problem is caused by a defective interface cable or computer or incorrect settings of the printer or software.</p> <p>Make sure that the printer driver selected in your software is appropriate for the emulation selected on the printer. See the section Selecting a Printer Driver and an Emulation in Chapter 2.</p>

Table 6.3 Operational Problems and Solutions (Cont.)

Problems	Solutions
The cut sheet feeder does not operate.	<p>Make sure that the cut sheet feeder is securely mounted on the printer.</p> <p>Make sure that SINGLE is specified for FEEDER in DLMENU. Refer to Changing Hardware Options in DLMENU.</p>

Printer Failures

You usually cannot solve problems caused by defective printer hardware. On detecting a hardware problem, the printer does the following:

- Stops printing
- Places the printer offline
- Flashes the ONLINE indicator rapidly
- Does not accept any commands

The following are possible causes:

- Power alarm (low voltage)
- Left end sensor alarm
- Overload printing alarm
- RAM alarm
- ROM alarm

If the printer detects any of the following hardware problems, it is forcibly turned off:

- Power alarm (high voltage)
- Print head alarm
- Space motor alarm
- Line feed motor alarm

Turn the power switch off, wait a few minutes, then turn the power switch back on. Run the same job to check if the alarm was transient. If the problem occurs again, contact your dealer.

DIAGNOSTIC FUNCTIONS

The printer has three diagnostic functions: SELF-TST, HEX-DUMP, and V-ALMNT.

- SELF-TST tells you whether the printer hardware is functioning correctly. If the printer hardware is functional, any problems you are having are probably caused by incorrect printer settings, incorrect software settings, a defective interface, or a defective computer.
- HEX-DUMP lets you determine whether the computer is sending the correct commands to the printer, and whether the printer is executing the commands correctly. This function is useful for programmers and those who understand how to interpret hex dumps.
- V-ALMNT lets you to check and correct the printer's vertical print alignment.

These functions can be started by using the printer control panel. This section describes how to use the diagnostic functions from the control panel.

Printing the Self-Test

The SELF-TST function prints test pages to check how the printer operates, independent of your computer. The self-test does not check the interface between the computer and the printer.

The self-test prints information about the printer, including the firmware version, its resident emulations, and all characters available in the currently selected character set. The self-test is printed according to the settings currently assigned to MENU1. For example, if Prestige Elite 12 and italics are selected, the self-test will print using Prestige Elite 12 and italics. This is a convenient way to see how printing from MENU1 will look.

To print the self-test, see the section **Testing the Printer (Offline)** in Chapter 2.

Printing Hex Dumps

The HEX-DUMP function prints data and commands in hexadecimal characters and abbreviated control codes. The character set used for printing is IBM character set 2 (see Appendix E). This is useful for checking whether your computer is sending the correct commands to the printer and whether the printer is executing the commands correctly. It is also useful for debugging software programs.

To print hex dumps, load plain continuous forms into the printer. Then follow these steps.

1. Enter HEX-DUMP mode.

Turn the printer off, then turn the printer back on while pressing the LOAD button. Wait for the printer to go *online* and print a header and a short help menu.

2. Print the hex dump.

To start hex dump printing, send your file or program to the printer. To pause hex dump printing, press the LF/FF button. To resume hex dump printing, press the LF/FF button again.

```

*** Hex dump printing ***

BUTTON      ACTION
<ONLINE>    Exit to normal mode
<LF/FF >    Pause/resume printing

0 1 2 3 4 5 6 7 8 9 A B C D E F      0123456789ABCDEF
48 65 78 20 64 75 6D 70 20 70 72 69 6E 74 69 6E      Hex dump printin
67 2E 0D 0A 0D 0A 1B 70 01 41 42 43 44 45 46 47      g.#####ABCDEF
48 49 4A 4B 4C 4D 4E 4F 50 51 52 53 54 55 56 57      HIJKLMNPQRSTUW
58 59 5A 0D 0A 61 62 63 64 65 66 67 68 69 6A 6B      XYZ###abcdefghijk
6C 6D 6E 6F 70 71 72 73 74 75 76 77 78 79 7A 0D      lmnopqrstuvwxyzz
0A 30 31 32 33 34 35 36 37 38 39 0D 0A 1B 40      #012345678901234
  
```

Sample hex dump

NOTE

When hex dump printing stops, the printer remains online in hex dump mode. To print another hex dump, send another file to the printer.

3. Exit HEX-DUMP mode.

Press the ONLINE button. The printer goes online in normal mode. If you press the ONLINE button while the hex dump is printing, printing continues but the printer switches from hexadecimal format to standard format characters.

Checking Vertical Print Alignment

The V-ALMNT function corrects the vertical character displacement that sometimes occurs with bidirectional printing. Characters printed from left to right are not aligned with the characters printed from right to left. An example of vertical displacement is:

```

{ This example shows how printing looks
  when characters are vertically
  misaligned. Note that the left
  margin is not straight.

```

If you notice misaligned printing, use the following procedure to check and correct the vertical print alignment.

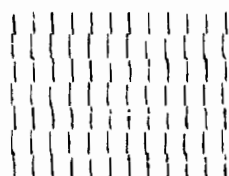
Make sure that continuous forms are loaded into the printer. If possible, use forms at least 305 mm (12 inches) wide to avoid printing on the platen. Follow these steps to check and correct the vertical print alignment.

1. Enter V-ALMNT mode.

While pressing the ONLINE and LF/FF buttons, turn the printer on. The printer starts printing rows of vertical bars at letter-quality speed.

2. Adjust the vertical print alignment.

Look at the vertical bars. If the bars are aligned (not jagged), go to step 3. If the bars are offset to the left, repeatedly press the LOAD button until the bars are aligned. If the bars are offset to the right, repeatedly press the LF/FF button until the bars are aligned. See the following figure for details.



Bars offset to the left



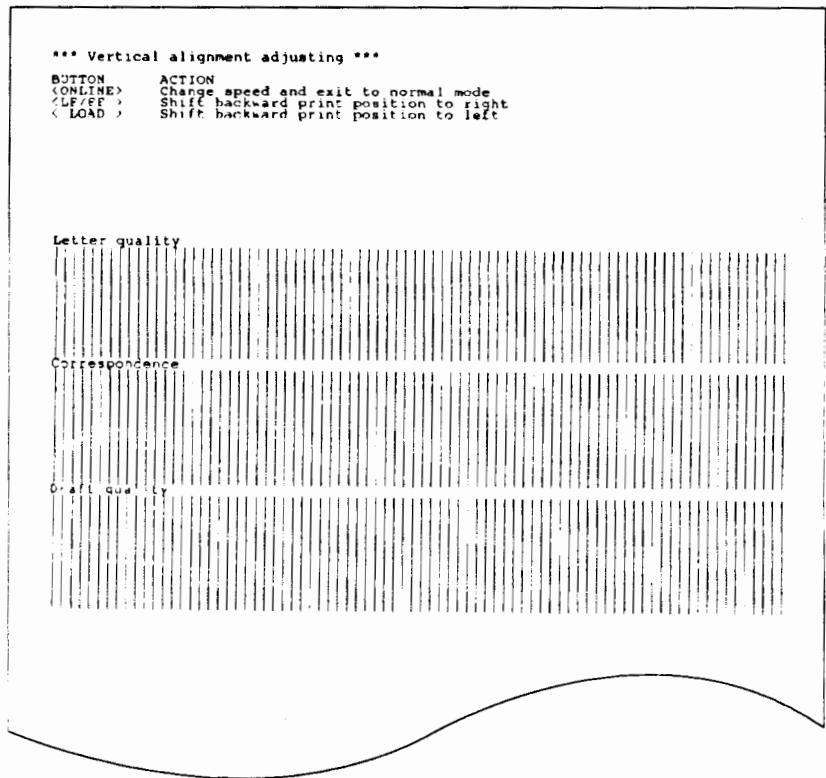
Bars offset to the right

3. Change the printing speed.

Press the ONLINE button to change the printing speed (change from letter to correspondence or from correspondence to draft). Adjust the vertical alignment for both the correspondence and draft speeds, as described in step 2, above.

4. Exit V-ALMNT mode.

Press the ONLINE button during draft speed printing. The printer stops printing, saves adjustments, and goes online.



Correct vertical print alignment

GETTING HELP

If you are not able to correct a problem, contact your dealer for assistance. Please have the following information ready:

- Your printer's model number, serial number, and date of manufacture. Look for this information on the nameplate at the back of the printer.
- Description of the problem
- Names of any software packages installed
- List of the printer default settings. Use DLMENU to print the default settings.

SPECIFICATIONS AND SUPPLIES

This appendix lists physical, functional, and performance specifications for the printer, including detailed paper specifications. It also gives information on ordering supplies, options, and publications.



PHYSICAL SPECIFICATIONS

Dimensions

Height: 188 mm (7.4 in.)
Width: 484 mm (19.1 in.)
Depth: 243 mm (9.6 in.)

Weight 6.2 kg (13.7 lb.)

AC power requirements

M3393A: 100 to 120 VAC $\pm 10\%$; 50/60 Hz $+2\%$, -4%
M3393B: 220 to 240 VAC -10% , $+6\%$; 50/60 Hz $+2\%$, -4%

Power consumption

M3393A: Average 80 VA and maximum 120 VA
M3393B: Average 85 VA and maximum 130 VA

Heat generation Average 45 kcal/h or less

Interface Centronics parallel

Data buffer size 0, 256, 2K, 8K, or 24K bytes

Download buffer Maximum 24K bytes
(24K minus data buffer size)

Operating environment 5 to 38°C (41 to 100°F)
30% to 80% RH (no condensation)
Wet bulb temperature, less than 29°C (84°F)

Storage environment -25 to 60°C (-13 to 140°F)
10% to 90% RH (no condensation)

Acoustic noise Average 48 dBA when printing in letter quality
ISO 7779 (Bystander Position Front)

**FUNCTIONAL
SPECIFICATIONS**

Print method Impact dot matrix with a 0.2 mm, 24-wire head

Print direction Bidirectional, unidirectional, or logic seeking

Character cell Horizontal x vertical

Letter (10 cpi): 36 x 24 dots

Letter (12 cpi): 30 x 24 dots

Report: 18 x 24 dots

Draft: 12 x 24 dots

Paper handling

Standard: Friction-feed platen (cut sheets)
 Rear push tractors (continuous forms)
 Paper loading by LOAD button
 Paper positioning at the tear-off edge by
 TEAR OFF function
 Parking of continuous forms while using cut
 sheets

Optional: Single-bin cut sheet feeder

Paper type 1- to 3-part side-glued or paper-stapled fan-
 folded continuous forms or label sheets with
 sprocket holes
 1- to 3-part top-glued single sheets and
 envelopes

Paper size

Continuous Width: 102-330 mm (4-13 in.)

Length: 102 mm (4 in.) or greater

Cut sheets Width: 102-330 mm (4-13 in.)

Length: 76-364 mm (3-14.3 in.)

Paper thickness Up to 0.23 mm (0.009 inch)

Page length

Software Programmable in one-line or one-inch incre-
 ments in all emulations

DLMENU Depends upon emulations. Default is 11 inches
 in all emulations

DPL24C+/XL24E: 3, 3.5, 4, 5, 5.5, 6, 7, 8, 8.5, 11, 11.6, 12, 14, or 18 inches

ESC/P2: 4, 4.5, 5, 5.5, ..., 11, 11.5, ..., 22 inches

Number of copies Up to 3, including the original

Command sets (emulations)

Resident Fujitsu DPL24C PLUS
IBM Proprinter XL24E
Epson ESC/P2 (LQ1170 equivalent)

Character sets

DPL24C+/XL24E:

- IBM PC character sets 1 and 2 (code page 437)
- IBM PS/2 character sets (code pages) and other national character sets (48 languages in total)
- Fujitsu character sets (664 characters)

ESC/P2:

- Italic character set
- Graphics character sets 1 and 2
- IBM PS/2 character sets (code pages) and other national character sets (50 languages in total)

Fonts

Resident Ten fonts available

Letter quality: Courier 10, Pica 10, OCR-B 10, Prestige Elite 12, Boldface PS, Nimbus Sans normal PS, and Timeless normal PS

Others: Correspondence, Compressed, and Draft

Download Available from independent vendors

Line spacing 1, 2, 3, 4, 5, 6, 7, or 8 lines per inch.
Programmable in 1/360 inch or various increments for image graphics.

Character pitch 2.5, 3, 5, 6, 10, 12, 15, 17.1, 18, or 20 cpi, or proportional spacing.
Programmable in 1/360 inch or various increments for image graphics.

Characters per line

10 cpi: 114 cpl
12 cpi: 136 cpl
15 cpi: 171 cpl
17.1 cpi: 194 cpl
18 cpi: 205 cpl
20 cpi: 228 cpl

cpi: characters per inch, cpl: characters per line

**PERFORMANCE
SPECIFICATIONS**

Print speed 10 cpi 12 cpi
 Letter: 60 cps 72 cps
 Report: 120 cps 144 cps
 Correspondence: 120 cps 144 cps
 Draft: 180 cps 216 cps
 cpi: characters per inch
 cps: characters per second

Line feed speed 110 ms per line at 6 lines per inch

Form feed speed 2 inches per second

Ribbon life
 Up to 4.0 million characters

Certification

Safety:

Model	Applied Regulation	Applied Area
M3393A	UL 1950 (for 100-120 VAC)	United States
	CSA C22.2 /950 (for 100-120 VAC)	Canada
M3393B	TÜV EN 60 950 (for 220-240 VAC)	Germany

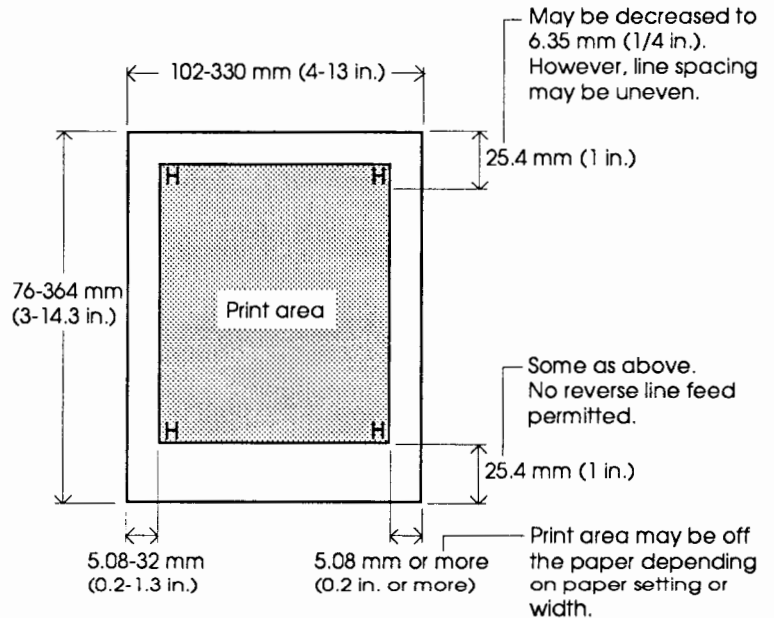
RFI regulation:

Model	Applied Regulation	Applied Area
M3393A	Class B of FCC Part 15B (for 100 to 120 VAC)	United States

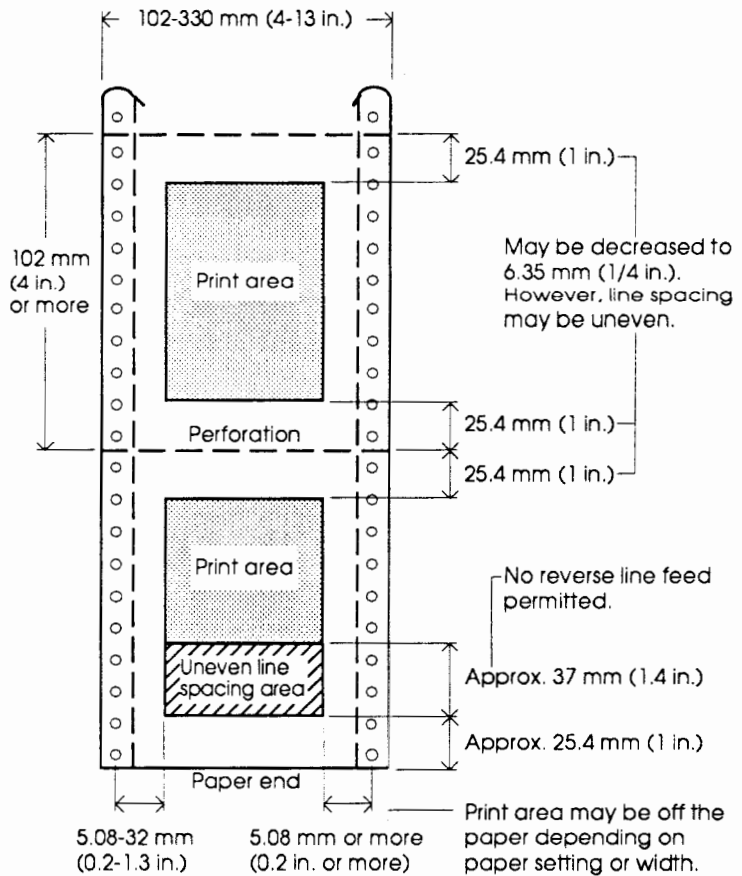
PAPER SPECIFICATIONS

Print Area

This section illustrates the recommended print area for both single sheets and continuous forms.



Print area for single sheets

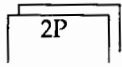
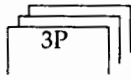
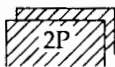
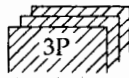
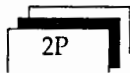


Print area for continuous forms

Paper Thickness

Paper thickness is indicated by the weight of the paper in either grams per square meter (g/m^2) or in pounds per bond (lbs/bond). The following table shows the allowable paper thickness for one-part paper or for each sheet of multipart paper. The total thickness must not exceed 0.23 mm (0.009 inch).

For NCR (no carbon required) forms or carbon-backed paper, the weight may vary, depending upon the paper manufacturer. When using paper of borderline thickness, test the paper before actual use.

Type of Paper	Part	Thickness
One-part	Single	52-81 g/m ² (45-70 kg or 14-22 lb)
Carbonless  	Top	50-64 g/m ² (43-55 kg or 13-17 lb)
	Bottom	50-81 g/m ² (43-70 kg or 13-22 lb)
	Top	40-50 g/m ² (34-43 kg or 11-13 lb)
	Middle Bottom	40-50 g/m ² (34-43 kg or 11-13 lb) 40-64 g/m ² (34-55 kg or 11-17 lb)
Carbon-backed  	Top	52-64 g/m ² (45-55 kg or 14-17 lb)
	Bottom	52-81 g/m ² (45-70 kg or 14-22 lb)
	Top	40-52 g/m ² (34-45 kg or 11-14 lb)
	Middle Bottom	40-52 g/m ² (34-45 kg or 11-14 lb) 40-64 g/m ² (34-55 kg or 11-17 lb)
Carbon-interleaved 	Top Carbon Bottom	34-53 g/m ² (30-45 kg or 9-14 lb) Counted as one sheet 35-64 g/m ² (30-55 kg or 9-17 lb) <i>Avoid using carbon-interleaved single sheets.</i>

kg: Kilogram weight of 1000 sheets of 788 x 1091 mm paper (1.16 g/m²)lb: Pound weight of 500 sheets of 17 x 22 inch paper (3.76 g/m²)

The following lists the supplies, options, and programmer's manuals available for the printer. Contact your dealer for information on ordering any of these items.

SUPPLIES

Supplies	Order Numbers
Ribbon cartridge Black ribbon	CA02538-D810
Print head	D86B-1171-C242

OPTIONS

Options	Order Numbers	Description
Cut sheet feeder	ASF100-FJ0701	Single bin feeder (not capable of mounting double bin adapter)
Fujitsu Creative Faces™	D05B-9011-C100	Font-scaling software utility for Microsoft® Windows™; giving text smooth, well formed characters, virtually free of jagged edges.

PUBLICATIONS

Publications	Order Numbers
Programmer's Manual (DPL24C PLUS Command Set)	B-69518

B

COMMAND SETS

This appendix describes printer commands and their parameters.

This printer has three resident command sets:

- Fujitsu DPL24C PLUS (native command set for Fujitsu DL series printers)
- IBM Proprinter XL24E
- Epson ESC/P2 (for Epson LQ1170 printers or equivalent)

Separate programmer's manuals are available for these emulations. See Appendix A for order information.

Select the same emulation on the printer and in your software. If your software emulations include DPL24C PLUS, select DPL24C PLUS for optimum performance.

FUJITSU DPL24C PLUS

This section gives the printer commands for the DPL24C PLUS command set, which is the native command set of this printer. See the *Programmer's Manual (DPL24C PLUS)* for detailed information on using these commands.

Function	Command
Print Mode Control	
Double-strike (bold) printing on	ESC G
Double-strike (bold) printing off	ESC H
Emphasized (shadow) printing on	ESC E
Emphasized (shadow) printing off	ESC F
Italic printing on	ESC 4
Italic printing off	ESC 5
Select character style and screening	ESC e S (n_1) (n_2)
$n_1 = 0$: Normal	
1: Outline	
2: Shaded	
3: Outline and shaded	
4: Thin outline	
5: Thin shaded	
6: Thin outline and shaded	
$n_2 = 0$: Transparent	
1: Light dot matrix	
2: Heavy dot matrix	
3: Vertical bars	
4: Horizontal bars	
5: Slants	
6: Back slants	
7: Lattice	
One-line double width characters on	SO or ESC SO
One-line double width characters off	DC 4
Double width characters on/off (on: $n = 1$, off: $n = 0$)	ESC W (n)

Function	Command
Double-height characters on/off (on: $n = 1$, off: $n = 0$) This command does not adjust the line spacing.	ESC V (n)
Multiwidth and height printing $n = 0$: Not adjusted 1: Character pitch multiplied 2: Line spacing multiplied 3: Character pitch and line spacing multiplied h_1 : Tens digit of horizontal multiple h_2 : Units digit of horizontal multiple v_1 : Tens digit of vertical multiple v_2 : Units digit of vertical multiple ($0 \leq h_1, h_2$ or $v_1, v_2 \leq 11$)	ESC u (n) (h_1) (h_2) (v_1) (v_2)
Condensed characters on	SI or ESC SI
Condensed characters off	DC2
Subscript or superscript printing on (subscript: $n=1$, superscript: $n=0$)	ESC S (n)
Subscript and superscript printing off	ESC T
Select underline type $n = 0$: Single line 1: Bold single line 2: Extremely bold single line 3: Double line 4: Bold double line 5: Extremely bold double line	ESC e U (n)
Underline on/off (on: $n=1$, off: $n=0$)	ESC ~ (n)
Overline on/off (on: $n=1$, off: $n=0$)	ESC e o (n)

Function	Command
<p>Select printing style</p> <p>This command allows you to combine various printing styles. The value of n is the sum of the values of the styles you want to combine.</p> <p>$n = 0$: Pica pitch 1: Elite pitch 4: Condensed 8: Shadow 16: Bold 32: Double width 64: Proportional</p>	ESC ! (n)
<p>Select image overlay type</p> <p>This command allows you to overlay a pattern on characters.</p> <p>$n = 1$: Light dot matrix 2: Heavy dot matrix 3: Vertical bars 4: Horizontal bars 5: Slants 6: Back slants 7: Lattice</p>	ESC e I (n)
<p>Image overlay printing on/off (on: $n=1$, off: $n=0$)</p>	ESC e L (n)
<p>Horizontal Control</p> <p>Space Backspace Carriage return Elite pitch (12 cpi) Pica pitch (10 cpi) Proportionally spaced characters on/off (on: $n=1$, off: $n=0$) Set character pitch to $(n-1)/120$ inch ($1 \leq n \leq 127$) Set character pitch to $n/180$ inch ($0 \leq n \leq 255$)</p>	<p>SP BS CR ESC M ESC P ESC p (n) ESC US (n) ESC h (n)</p>

Function	Command
Set character offset to $n/120$ inch Cancelled by CR or ESC x. ($0 \leq n \leq 63$) ($64 \leq n \leq 127$)	ESC DC1 (n)
Set character pitch to $n/360$ inch ($0 \leq n_1, n_2, n_3 \leq 999$) n_1, n_2 , and n_3 are the hundreds, tens, and units digits.	ESC e H (n_1) (n_2) (n_3)
Vertical Control	
Line feed	LF
Reverse line feed	ESC LF
Form feed	FF
Advance paper $n/180$ inch ($0 \leq n \leq 255$)	ESC J (n)
Reverse paper $n/180$ inch ($0 \leq n \leq 255$)	ESC j (n)
Advance paper $n/360$ inch ($0 \leq n_1, n_2, n_3 \leq 999$) n_1, n_2 , and n_3 are the hundreds, tens, and units digits.	ESC e J (n_1) (n_2) (n_3)
Reverse paper $n/360$ inch ($0 \leq n_1, n_2, n_3 \leq 999$) n_1, n_2 , and n_3 are the hundreds, tens, and units digits.	ESC e j (n_1) (n_2) (n_3)
Set line spacing to $1/8$ inch (8 lpi)	ESC 0
Set line spacing to $n/180$ inch ($0 \leq n \leq 255$)	ESC 3 (n)
Set line spacing to $7/60$ inch	ESC 1
Set line spacing to $n/60$ inch ($0 \leq n \leq 127$)	ESC A (n)
Set line spacing to $1/6$ inch (6 lpi) or to the value set with the ESC A command. The preset line spacing command is ESC A (n).	ESC 2
Set line spacing to $n/360$ inch ($0 \leq n_1, n_2, n_3 \leq 999$) n_1, n_2 , and n_3 are the hundreds, tens, and units digits.	ESC e V (n_1) (n_2) (n_3)
Set line spacing to $n/360$ inch ($1 \leq n \leq 255$)	FS 3 (n)

Function	Command
Tabulation Horizontal tab execution Set horizontal tabs The values of n_1 to n_k in this command are the ASCII values of the print columns (at the current character width) at which tabs are to be set. $(1 \leq n \leq 255) (1 \leq k \leq 255)$ Move to print column n ($1 \leq n \leq 255$) Move dot column $n/360$ inch $(n = n_1 + n_2 \times 256)$ The value below is for 114-column printers. $(0 \leq n_1 \leq 255) (0 \leq n_2 \leq 16)$ $(0 \leq n_2 \times 256 + n_1 \leq 4103)$ Horizontal relative move by $n/360$ inch $(-999 \leq n_1 n_2 n_3 \leq +999)$ $n_1, n_2,$ and n_3 are the hundreds, tens, and units digits of the distance. s is a plus or minus (+ or -) sign. Vertical tab execution Set vertical tabs The values of n_1 to n_k in this command are the ASCII values of the lines (at the current line spacing) at which tabs are to be set. $(1 \leq n \leq 255) (1 \leq k \leq 64)$ Move to line n ($1 \leq n \leq 255$)	HT ESC D (n_1) ... (n_k) NUL ESC HT (n) ESC S (n_1) (n_2) ESC e R (s) (n_1) (n_2) (n_3) VT ESC B (n_1) ... (n_k) NUL ESC VT (n)
Page Formatting Set right margin ($0 \leq n \leq 255$) Set left margin ($0 \leq n \leq 255$) Set perforation skip by n lines $(1 \leq n \leq 127)$ Perforation skip off Set page length to n lines $(1 \leq n \leq 127)$	ESC Q (n) ESC l (n) ESC N (n) ESC O ESC C (n) or ESC e c (n) or ESC FF (n)

Function	Command
Set page length to n inches ($1 \leq n \leq 22$)	ESC C NUL (n) or ESC e c NUL (n) or ESC FF NUL (n)
Set page length to $n/360$ inch ($n = n_1 \times 256 + n_2$) ($0 \leq n_1, n_2 \leq 255$) ($1 \leq n_1 \times 256 + n_2 \leq 7920$)	ESC e f (n_1) (n_2)
Character Set Control	
Select character set 1 See Appendix E for character sets	ESC 7
Select character set 2 See Appendix E for character sets.	ESC 6
Select international character set $n = 0$: USA 1: France 2: Germany 3: United Kingdom 4: Denmark 1/Norway 5: Sweden/Finland 6: Italy 7: Spain 8: Denmark 2	ESC R (n)
Clear print buffer	CAN
Select printer	DC1
Deselect printer (ignore input)	DC3
Force most significant bit to 1	ESC >
Force most significant bit to 0	ESC =
Cancel control over most significant bit	ESC #
Select code table $n = 0$: Code page 437 1: Code page 850 2: Code page 860 3: Code page 863 4: Code page 865 5: ISO 8859-1/ECMA 94	ESC e C (n)

Function	Command																								
Select extended character by character number $(0 \leq n_1 n_2 n_3 \leq 664)$ $n_1, n_2,$ and n_3 are the hundreds, tens, and units digits.	ESC e E (n_1) (n_2) (n_3)																								
Word Processing Justify lines Automatically center printing Reset word processing features	ESC m ESC c ESC x																								
Font Selection and Downloading Select font m with source and style set by n • m (bits 0 and 1: Font device selection)	ESC % (m) (n)																								
<table><tr><th>Bit 1</th><th>Bit 0</th><th>Selection of font</th></tr><tr><td>0</td><td>0</td><td>Resident font</td></tr><tr><td>0</td><td>1</td><td>Downloaded font</td></tr><tr><td>1</td><td>0</td><td>Resident font</td></tr></table>	Bit 1	Bit 0	Selection of font	0	0	Resident font	0	1	Downloaded font	1	0	Resident font													
Bit 1	Bit 0	Selection of font																							
0	0	Resident font																							
0	1	Downloaded font																							
1	0	Resident font																							
• m (bits 2 and 3: Print quality specification)																									
<table><tr><th>Bit 3</th><th>Bit 2</th><th>Print quality</th></tr><tr><td>0</td><td>0</td><td>Original quality of font</td></tr><tr><td>0</td><td>1</td><td>Letter quality (360 dpi)</td></tr><tr><td>1</td><td>0</td><td>Correspondence quality (180 dpi)</td></tr><tr><td>1</td><td>1</td><td>Draft quality (120 dpi)</td></tr></table>	Bit 3	Bit 2	Print quality	0	0	Original quality of font	0	1	Letter quality (360 dpi)	1	0	Correspondence quality (180 dpi)	1	1	Draft quality (120 dpi)										
Bit 3	Bit 2	Print quality																							
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• n (bit 0 to 2: Specification of font number)																									
(1) Resident fonts																									
<table><tr><th>n</th><th>$m = 0, 0$</th><th>$m = 1, 0$</th></tr><tr><td>0</td><td>Courier 10</td><td>OCR-B</td></tr><tr><td>1</td><td>Prestige elite 12</td><td></td></tr><tr><td>2</td><td>Draft</td><td></td></tr><tr><td>3</td><td>Compressed</td><td></td></tr><tr><td>4</td><td>Boldface PS</td><td></td></tr><tr><td>5</td><td>Pica 10</td><td></td></tr><tr><td>6</td><td>Correspondence</td><td></td></tr></table>	n	$m = 0, 0$	$m = 1, 0$	0	Courier 10	OCR-B	1	Prestige elite 12		2	Draft		3	Compressed		4	Boldface PS		5	Pica 10		6	Correspondence		
n	$m = 0, 0$	$m = 1, 0$																							
0	Courier 10	OCR-B																							
1	Prestige elite 12																								
2	Draft																								
3	Compressed																								
4	Boldface PS																								
5	Pica 10																								
6	Correspondence																								

Function	Command
(2) Downloaded fonts $n = 0$: Downloaded font 0 $n = 1$: Downloaded font 1	
Select print quality (font attributes) $n = 0$: Letter (360 × 180 dpi) $n = 1$: Correspondence (180 × 180 dpi) $n = 2$: Draft (120 × 180 dpi) $n = 3$: High-speed Draft (90 × 180 dpi)	ESC e q (n)
Select spacing mode (font attributes) $n = 0$: Fixed pitch font $n = 1$: Proportional spacing font	ESC e s (n)
Select character pitch ($n/360$ inch, font attributes) $(0 \leq n_1 \leq 255) (1 \leq n_2 \leq 255)$ $(n = n_1 \times 256 + n_2)$ Ex. $n = 36$: 10 pitch $n = 30$: 12 pitch $n = 24$: 15 pitch $n = 21$: 17 pitch	ESC e p (n_1) (n_2)
Condense/enlarge vertically (font attributes) $n = 1$: Executed $n = 0$: Not executed	ESC e A (n)
Select point size ($n/1200$ inch, font attributes) $(0 \leq n_1 \leq 255) (0 \leq n_2 \leq 255)$ $(n = n_1 \times 256 + n_2)$ Ex. $n = 166$: 10 point	ESC e v (n_1) (n_2)
Select character style (font attributes) $n = 0$: Upright $n = 1$: Italic	ESC e i (n)
Select stroke weight (font attributes) $n = 249$: -7 (reserved) $n = 251$: -5 (reserved) $n = 253$: -3 (light) $n = 0$: 0 (medium) $n = 3$: 3 (bold) $n = 5$: 5 (black) $n = 7$: 7 (ultrablack)	ESC e w (n)

Function					Command
Select typeface (font attributes) <i>n</i> = 1: Pica 3: Courier 4: Nimbus Sans ® 5: Timeless 8: Prestige 23: Boldface 131: OCR-B					ESC e t (<i>n</i>)
Select font by I.D. (font attributes)					ESC e F (<i>n</i>)

<i>n</i>	Quality	Spacing	Pitch	Point	Typeface
1	LQ	Fixed	10 cpi	12 pt	Courier
2	LQ	Fixed	12 cpi	10 pt	Prestige
3	LQ	PS	–	12 pt	Boldface
4	LQ	Fixed	10 cpi	12 pt	Pica
10	LQ	Fixed	10 cpi	12 pt	OCR-B
32	CQ	Fixed	10 cpi	12 pt	Courier
34	DQ	Fixed	12 cpi	11 pt	Gothic
128	LQ	PS	–	10 pt	Timeless
132	LQ	PS	–	10 pt	Nimbus Sans ®

Copy resident font to download area <i>m</i> = 0: Courier 10 1: Prestige Elite 12 2: Draft 3: Compressed 4: Boldface PS 5: Pica 10 6: Correspondence <i>n</i> = 0: Downloaded font 0 1: Downloaded font 1					ESC : NUL (<i>m</i>) (<i>n</i>)
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Function			Command													
Create download font			ESC & (<i>m</i>) (<i>Cs</i>) (<i>Ce</i>) (<i>data</i>)													
<ul style="list-style-type: none"><i>m</i> (bits 4 and 5: Specifies the quality of characters to be registered) <table border="1"><thead><tr><th>Bit 5</th><th>Bit 4</th><th>Font quality selection</th></tr></thead><tbody><tr><td>0</td><td>1</td><td>Letter (360 dpi)</td></tr><tr><td>1</td><td>0</td><td>Correspondence (180 dpi)</td></tr><tr><td>1</td><td>1</td><td>Draft (120 dpi)</td></tr></tbody></table> <ul style="list-style-type: none"><i>m</i> (bit 0: Specifies external font number to be registered)				Bit 5	Bit 4	Font quality selection	0	1	Letter (360 dpi)	1	0	Correspondence (180 dpi)	1	1	Draft (120 dpi)	
Bit 5	Bit 4	Font quality selection														
0	1	Letter (360 dpi)														
1	0	Correspondence (180 dpi)														
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<table border="1"><thead><tr><th>Bit 0</th><th>Font number selection</th><th>Remarks</th></tr></thead><tbody><tr><td>0</td><td>Downloaded font 0</td><td>Resident font 0 is automatically downloaded when the printer is turned on.</td></tr><tr><td>1</td><td>Downloaded font 1</td><td>Resident font 1 is automatically downloaded when the printer is turned on.</td></tr></tbody></table> <ul style="list-style-type: none"><i>m</i> (bits 1, 2, 3, 6, 7) Not used (don't care)<i>Cs</i> (Download start character, ASCII code)<i>Ce</i> (Download end character, ASCII code) <table border="1"><thead><tr><td>Decimal</td><td>$0 \leq Cs, Ce < 255$</td></tr><tr><td>Hex</td><td>$00 \leq Cs, Ce \leq FF$</td></tr></thead></table> <p>Precaution: $Ce \geq Cs$</p> <ul style="list-style-type: none"><i>data</i> (More than one byte of data containing bit map data) <p>(Reserved)</p>				Bit 0	Font number selection	Remarks	0	Downloaded font 0	Resident font 0 is automatically downloaded when the printer is turned on.	1	Downloaded font 1	Resident font 1 is automatically downloaded when the printer is turned on.	Decimal	$0 \leq Cs, Ce < 255$	Hex	$00 \leq Cs, Ce \leq FF$
Bit 0	Font number selection	Remarks														
0	Downloaded font 0	Resident font 0 is automatically downloaded when the printer is turned on.														
1	Downloaded font 1	Resident font 1 is automatically downloaded when the printer is turned on.														
Decimal	$0 \leq Cs, Ce < 255$															
Hex	$00 \leq Cs, Ce \leq FF$															
			ESC e D (<i>data</i>);													

Function	Command
Bitmapped Graphics Images	
Graphics type m graphics	ESC * (m) (n ₁) (n ₂) (data)
Graphics type m graphics	ESC e b (m) (n ₁) (n ₂) (data) or ESC e B (m) (n ₁) (n ₂) (data)
Single-density graphics	ESC K (n ₁) (n ₂) (data)
Double-density graphics	ESC L (n ₁) (n ₂) (data)
High-speed double-density graphics	ESC Y (n ₁) (n ₂) (data)
Quadruple-density graphics	ESC Z (n ₁) (n ₂) (data)
360 dot per inch 24-pin graphics	FS Z (n ₁) (n ₂) (data)
Cut Sheet Feeder Control	
Feed a sheet from bin 1	ESC EM 1
Feed a sheet from bin 2	ESC EM 2
Feed a sheet from bin 3	ESC EM E
Eject a page from the printer	ESC EM R
Select bin 1 for following pages	// 1 //
Select bin 2 for following pages	// 2 //
Select bin 3 for following pages	// E //
Eject sheet at end of current page	// R //
Change bins at next page	// C //
Initialize Printer	
Reset printer	ESC @
Reset printer	ESC CR P
Initialize printer	ESC SUB I
Bar Code Printing	
Print bar code	ESC DC4 (b) R (c) (w) (h) (a) (ch ₁) ... (ch _n)

Function	Command
Miscellaneous	
Enable paper-out sensor	ESC 9
Ignore paper-out sensor	ESC 8
Typewriter mode on/off (on: $n=1$, off: $n=0$)	ESC i (n)
Move print head to home position	ESC <
Unidirectional printing on/off (on: $n=1$, off: $n=0$)	ESC U (n)
Select CR code definition $n = 0$: CR = CR only 1 : CR = CR + LF	ESC e r (n)
Select LF code definition $n = 0$: LF = LF only 1 : LF = LF + CR	ESC e l (n)
Enter online setup mode	ESC e ONLINE (data)
Move print head (unit: 1/180 inch) ($0 \leq n_1 \leq 255$) ($0 \leq n_2 \leq 255$)	ESC e h (n_1) (n_2)

IBM PROPRINTER XL24E EMULATION

This section gives the printer commands for the IBM Proprinter XL24E emulation. Asterisks in the "Function" column indicate extended commands that are not supported by the original IBM printer. See the *Programmer's Manual (IBM XL24E Emulation)* for detailed information on using these commands.

Function	Command
Print Mode Control	
Double-strike (bold) printing on	ESC G
Double-strike (bold) printing off	ESC H
Emphasized (shadow) printing on	ESC E
Emphasized (shadow) printing off	ESC F
One-line double-width characters on	SO or ESC SO
One-line double-width characters off	DC4
Double-width characters on/off (on: $n = 1$, off: $n = 0$)	ESC W (n)
Double-height/double-width characters $n_1 = 4, n_2 = 0, m_1 = 0, m_2 = 0$ m_3 controls character height and line spacing:	ESC [@ (n_1) (n_2) (m_1) ... (m_4)

m_3	Height	Spacing
0	Unchanged	Unchanged
1	Normal	Unchanged
2	Double	Unchanged
16	Unchanged	Single
17	Normal	Single
18	Double	Single
32	Unchanged	Double
33	Normal	Double
34	Double	Double

m_4 controls character width:

m_4	Width
0	Unchanged
1	Normal
2	Double

Function	Command
Condensed characters on	SI or ESC SI
Condensed and elite characters off	DC2
Subscript or superscript printing on (subscript: $n = 1$, superscript: $n = 0$)	ESC S (n)
Subscript and superscript printing off	ESC T
Underline on/off (on: $n = 1$, off: $n = 0$)	ESC - (n)
Overline on/off (on: $n = 1$, off: $n = 0$)	ESC _ (n)
Horizontal Control	
Space	SP
Backspace	BS
Carriage return	CR
Elite characters on	ESC :
Proportionally spaced characters on/off (on: $n = 1$, off: $n = 0$)	ESC P (n)
Vertical Control	
Line feed	LF
Form feed	FF
Advance paper $n/216$ inch ($1 \leq n \leq 255$)	ESC J (n)
Advance paper $n/180$ inch (in AG mode) ($1 \leq n \leq 255$)	ESC J (n)
Set line spacing to $1/8$ lines	ESC 0
Set line spacing to $7/72$ inch	ESC 1
Set line spacing to $n/216$ inch ($0 \leq n \leq 255$)	ESC 3 (n)
Set line spacing to $n/180$ inch (in AG mode) ($0 \leq n \leq 255$)	ESC 3 (n)
Preset line spacing to $n/72$ inch ($1 \leq n \leq 255$)	ESC A (n)
Preset line spacing to $n/60$ inch (in AG mode) ($1 \leq n \leq 255$)	ESC A (n)
Set line spacing to $1/6$ inch or to the value preset by line spacing command ESC A (n)	ESC 2

Function	Command
Change graphics line spacing base to 1/216 or 1/180 inch (for ESC J and ESC 3) $m_1 = 4, m_2 = 0$ $0 \leq t_1 \leq 255, 0 \leq t_2 \leq 255, t_3 = 0$ $t_4 = 180 \text{ or } 216$	ESC [\ (m_1) (m_2) (t_1) ... (t_4)
Tabulation Horizontal tab execution Set horizontal tabs The values of n_1 to n_k in this command are the ASCII values of the print columns (at the current character width) at which tabs are to be set. ($1 \leq n \leq 255$) ($1 \leq k \leq 28$) Clear all horizontal tabs Move print position right by $n/120$ inch ($0 \leq n, n_2 \leq 255$) ($n = n_1 + n_2 \times 256$) Vertical tab execution Set vertical tabs The values of n_1 to n_k in this command are the ASCII values of the lines (at the current line spacing) at which tabs are to be set. ($1 \leq n \leq 255$) ($1 \leq k \leq 64$) Clear all vertical tabs Reset tabs to default values	HT ESC D (n_1) ... (n_k) NUL ESC D NUL ESC d (n_1) (n_2) VT ESC B (n_1) ... (n_k) NUL ESC B NUL ESC R
Page Formatting Set left margin at column n and right margin at column m ($0 \leq n, m \leq 255$) Set perforation skip by n lines ($1 \leq n \leq 255$) Perforation skip off Set page length to n lines ($1 \leq n \leq 255$) Set page length to n inches ($1 \leq n \leq 22$) Set top of form	ESC X (n) (m) ESC N (n) ESC O ESC C (n) ESC C NUL (n) ESC 4

Function	Command																					
Color Selection* Select print color* $n = 0$: Black 1: Magenta (red) 2: Cyan (blue) 3: Violet 4: Yellow 5: Orange 6: Green	ESC r (n)																					
Character Set Control Select character set 1 Select character set 2 Print $n_1 + n_2 \times 256$ characters from all-character set (<i>chars.</i> : codes of characters to print, $0 \leq \text{chars.} \leq 255$) Print a character from all-character set (<i>char.</i> : a code of character to print, $0 \leq \text{char.} \leq 255$) Select code page table n ($0 \leq n_1, n_2 \leq 255$) ($n = n_1 + n_2 \times 256$) <table border="1"><thead><tr><th>c_1</th><th>c_2</th><th>Code page ID</th></tr></thead><tbody><tr><td>0</td><td>0</td><td>Ignore command</td></tr><tr><td>1</td><td>181</td><td>Code page 437</td></tr><tr><td>3</td><td>82</td><td>Code page 850</td></tr><tr><td>3</td><td>92</td><td>Code page 860</td></tr><tr><td>3</td><td>95</td><td>Code page 863</td></tr><tr><td>3</td><td>97</td><td>Code page 865</td></tr></tbody></table> Clear input buffer Select printer Deselect printer (ignore input)	c_1	c_2	Code page ID	0	0	Ignore command	1	181	Code page 437	3	82	Code page 850	3	92	Code page 860	3	95	Code page 863	3	97	Code page 865	ESC 7 ESC 6 ESC \ (n_1) (n_2) (<i>chars.</i>) ESC ^ (<i>char.</i>) ESC [T (n_1) (n_2) 0 0 (c_1) (c_2) CAN DC1 ESC Q #
c_1	c_2	Code page ID																				
0	0	Ignore command																				
1	181	Code page 437																				
3	82	Code page 850																				
3	92	Code page 860																				
3	95	Code page 863																				
3	97	Code page 865																				

Function	Command
Downloading Select resident or downloaded font Ex. $n = 0$: Resident Draft 2: Resident Courier 4: Downloaded Draft 6: Downloaded Courier Create download font	ESC I (n) ESC = (n_1) (n_2) ID (m_1) (m_2) ($data$)
Bitmapped Graphics Images Single-density graphics Double-density graphics High-speed double-density graphics Quadruple-density graphics High-resolution graphics Select graphics mode (in AG mode only)	ESC K (n_1) (n_2) ($data$) ESC L (n_1) (n_2) ($data$) ESC Y (n_1) (n_2) ($data$) ESC Z (n_1) (n_2) ($data$) ESC [g (n_1) (n_2) (m) ($data$) ESC * (m) (c_1) (c_2) ($data$)
Cut Sheet Feeder Control* Feed a sheet from bin 1* Feed a sheet from bin 2* Feed a sheet from bin 3* Eject a page from the printer* Select bin 1 for following pages* Select bin 2 for following pages* Select bin 3 for following pages* Eject sheet at end of current page* Change bins at next page*	ESC EM 1 ESC EM 2 ESC EM E ESC EM R //1// //2// //E// //R// //C//
Miscellaneous Unidirectional printing on/off (on: $n = 1$, off: $n = 0$) Add a carriage return to all line feeds (on: $n = 1$, off: $n = 0$) Printer offline Enter online setup mode Select default settings	ESC U (n) ESC 5 (n) ESC j ESC e ONLINE ($data$) ESC [K (n_1) (n_2) (i) (ID) (p_1) (p_2)

EPSON ESC/P2 EMULATION (LQ1170 EQUIVALENT)

This section gives the printer commands for the Epson ESC/P2 emulation (for LQ1170 printers or equivalent). Asterisks in the "Function" column indicate extended commands that are not supported by the original Epson printer. See the *Programmer's Manual (Epson ESC/P2 Emulation)* for detailed information on using these commands.

Function	Command
Print Mode Control	
Double-strike (bold) printing on	ESC G
Double-strike (bold) printing off	ESC H
Emphasized (shadow) printing on	ESC E
Emphasized (shadow) printing off	ESC F
Italic printing on	ESC 4
Italic printing off	ESC 5
Select character style	ESC q (n)
n = 0: Normal	
1: Outlined	
2: Shaded	
3: Outlined and shadowed	
One-line double-width characters on	SO or ESC SO
One-line double-width characters off	DC4
Double-width characters on/off	ESC W (n)
(on: n = 1, off: n = 0)	
Double-height characters on/off	ESC w (n)
(on: n = 1, off: n = 0)	
Condensed characters on	SI or ESC SI
Condensed characters off	DC2
Subscript or superscript printing on	ESC S (n)
(subscript: n = 1, superscript: n = 0)	
Subscript and superscript printing off	ESC T
Underline on/off	ESC - (n)
(on: n = 1, off: n = 0)	

Function	Command
Set character pitch to $(n_1 + n_2 \times 256)/360$ inch ($0 \leq n_1 \leq 255$) ($0 \leq n_2 \leq 4$)	ESC c (n_1) (n_2)
Select character pitch (specify unit o pitch) $n_1 = 1, n_2 = 0$ $d = 10$ to 19: $10/3600$ inch = $1/360$ inch $d = 20$ to 29: $20/3600$ inch = $1/180$ inch $d = 30$ to 39: $30/3600$ inch = $1/120$ inch $d = 40$ to 49: $40/3600$ inch = $1/90$ inch $d = 50$ to 59: $50/3600$ inch = $1/72$ inch $d = 60$ to 69: $60/3600$ inch = $1/60$ inch	ESC (U (n_1) (n_2) (d)
Vertical Control Line feed Form feed Advance paper $n/180$ inch ($1 \leq n \leq 255$) Set line spacing to $1/8$ inch Set line spacing to $n/180$ inch ($0 \leq n \leq 255$) Set line spacing to $n/60$ inch ($0 \leq n \leq 127$) Set line spacing to $1/6$ inch Set line spacing to $n/360$ inch ($0 \leq n \leq 255$)	LF FF ESC J (n) ESC 0 ESC 3 (n) ESC A (n) ESC 2 ESC + (n)
Tabulation Horizontal tab execution Set horizontal tabs The values of n_1 to n_k in this command are the ASCII values of the print columns (at the current character width) at which tabs are to be set. ($1 \leq n \leq 255$) ($1 \leq k \leq 32$) Move print position $n/180^{(*)}$ inch right from left margin ($n = n_1 + n_2 \times 256$) Move print position $n/120^{(*)}$ inch (for draft) or $n/180^{(*)}$ inch (for letter) left or right from the current position ($n = n_1 + n_2 \times 256$) Vertical tab execution	HT ESC D (n_1) ... (n_k) NUL ESC \$ (n_1) (n_2) ESC \ (n_1) (n_2) VT

^{*)} The value depends on the pitch set by the ESC (U command.

Function	Command
<p>Set vertical tabs</p> <p>The values of n_1 to n_k in this command are the ASCII values of the lines (at the current line spacing) at which tabs are to be set.</p> <p>$(1 \leq n \leq 255) (1 \leq k \leq 16)$</p> <p>Move to dot line $(d_1 + d_2 \times 256)/360^{(*)}$ inch</p> <p>$n_1 = 2, n_2 = 0$</p> <p>$(0 \leq d_1 \leq 255) (0 \leq d_2 \leq 127)$</p> <p>Vertical relative move by $(d_1 + d_2 \times 256)/360^{(*)}$ inch</p> <p>$n_1 = 2, n_2 = 0$</p> <p>$(0 \leq d_1 \leq 255) (0 \leq d_2 \leq 127)$</p> <p>$-32768 \leq d_1 + d_2 \times 256 \leq 32768$</p>	<p>ESC B (n_1) ... (n_k) NUL</p> <p>ESC (V (n_1) (n_2) (d_1) (d_2)</p> <p>ESC (v (n_1) (n_2) (d_1) (d_2)</p>
<p>Page Formatting</p> <p>Set right margin to column n</p> <p>$(1 \leq n \leq 255)$</p> <p>Set left margin to column n</p> <p>$(0 \leq n \leq 255)$</p> <p>Set top and bottom margins from top of page</p> <p>$n_1 = 4, n_2 = 0$</p> <ul style="list-style-type: none"> Top margin $= (t_1 + t_2 \times 256)/360^{(*)}$ inch $(0 \leq t_1 \leq 255) (0 \leq t_2 \leq 127)$ Bottom margin $= (b_1 + b_2 \times 256)/360^{(*)}$ inch $(0 \leq b_1 \leq 255)$ $(0 \leq b_2 \leq 127)$ <p>Set perforation skip by n lines</p> <p>$(1 \leq n \leq 127)$</p> <p>Perforation skip off</p> <p>Set page length to n lines $(1 \leq n \leq 127)$</p> <p>Set page length to n inches $(1 \leq n \leq 22)$</p> <p>Set page length to $(d_1 + d_2 \times 256)/360^{(*)}$ inch</p> <p>$n_1 = 2, n_2 = 0$</p> <p>$(0 \leq d_1 \leq 255) (0 \leq d_2 \leq 127)$</p>	<p>ESC Q (n)</p> <p>ESC l (n)</p> <p>ESC (c (n_1) (n_2) (t_1) (t_2) (b_1) (b_2)</p> <p>ESC N (n)</p> <p>ESC O</p> <p>ESC C (n)</p> <p>ESC C NUL (n)</p> <p>ESC (C (n_1) (n_2) (d_1) (d_2)</p>

^{*)} The value depends on the pitch set by the ESC (U command).
The default is 1/360 inch.

Function	Command
Color Selection Select print color $n = 0$: Black 1: Magenta (red) 2: Cyan (blue) 3: Violet 4: Yellow 5: Orange 6: Green	ESC r (n)
Character Set Control Select character set 1 Select character set 2 Select character set table $n = 0$: Italics character set 1: Graphics character set 2: Downloaded character set 3: Graphics character set Select international character set $n = 0$: USA 1: France 2: Germany 3: United Kingdom 4: Denmark 1 5: Sweden 6: Italy 7: Spanish 1 8: Japan 9: Norway 10: Denmark 2 11: Spanish 2 12: Latin America	ESC 7 ESC 6 ESC t (n) ESC R (n)

Function	Command
Assign a character set to active character set number 0 to 3 $n_1 = 3, n_2 = 0$ $d_1 = 0$: Active character set number 0 1: Active character set number 1 2: Active character set number 2 3: Active character set number 3 $d_2 = 0$: Italic 1: PC 437 (USA) 3: PC 850 (Multilingual) 7: PC 860 (Portugal) 8: PC 863 (Canada-French) 9: PC 865 (Norway) $d_3 = 0$	ESC (t (n_1) (n_2) (d_1) (d_2) (d_3)
Print $n_1 + n_2 \times 256$ characters from all-character set ($0 \leq n_1 \leq 255$) ($0 \leq n_2 \leq 127$) ($0 \leq n_1 + n_2 \times 256 \leq 255$) ($0 \leq \text{character codes} \leq 254$)	ESC (^ (n_1) (n_2) (character codes)
Clear input buffer	CAN
Delete a character	DEL
Force most significant bit to 1	ESC >
Force most significant bit to 0	ESC =
Cancel control over most significant bit	ESC #
Font Selection and Downloading	
Select font	ESC % (n)
$n = 0$: Resident character set 1: Downloaded character set	
Select letter or draft quality	ESC x (n)
$n = 0$: Draft 1: Letter	

Function	Command
Select type style <ul style="list-style-type: none"> • Bitmap font:: <ul style="list-style-type: none"> $n = 0$: Courier 1: Courier 2: Courier 3: Prestige 4: Courier 5: OCR-B 7: Courier 8: Courier 9: Courier • Scalable font: <ul style="list-style-type: none"> $n = 0$: Timeless 1: Nimbus Sans ® 2: Courier 3: Timeless 4: Timeless 5: Timeless 7: Timeless 8: Timeless 9: Timeless 	ESC k (n)
Set scalable font mode <ul style="list-style-type: none"> • m sets character pitch. <ul style="list-style-type: none"> $m = 0$: Keep previous pitch 1: Set proportional space mode $m \geq 5$: Select character pitch ($m/360$ inch) (Reset proportional space mode) • n_1 and n_2 set point size of font. Point size = $(n_1 + n_2 \times 256) \times 0.5$ point ($0 \leq n_1 \leq 255$) ($0 \leq n_2 \leq 127$) 	ESC X m (n_1) (n_2)
Copy resident character set to download area	ESC : NUL (n) (s)
Create download font	ESC & NUL (n_1) (n_2) (d_0) (d_1) (d_2) ($data$)

Function	Command
Bitmapped Graphics Images	
Graphics type m graphics	ESC * (m) (n ₁) (n ₂) (data)
Bit image mode definition	ESC ? (s) (n)
Single-density graphics	ESC K (n ₁) (n ₂) (data)
Double-density graphics	ESC L (n ₁) (n ₂) (data)
High-speed double-density graphics	ESC Y (n ₁) (n ₂) (data)
Quadruple-density graphics	ESC Z (n ₁) (n ₂) (data)
Select raster image graphics	ESC (G (n ₁) (n ₂) (d)
n ₁ = 1, n ₂ = 0	
d = 1: Raster image graphics mode	
Print raster image graphics	ESC . (c) (v) (h) (m) (n ₁) (n ₂) (data)
Cut Sheet Feeder Control	
Feed a sheet from bin 1	ESC EM 1
Feed a sheet from bin 2	ESC EM 2
Feed a sheet from bin 3 *	ESC EM E
Eject a page from the printer	ESC EM R
Select bin 1 for following pages *	//1//
Select bin 2 for following pages *	//2//
Select bin 3 for following pages *	//E//
Eject sheet at end of current page *	//R//
Change bins at next page *	//C//
Miscellaneous	
Move print head to home position	ESC <
Unidirectional printing on/off (on: n = 1, off: n = 0)	ESC U (n)
Initialize printer	ESC @
Enter online setup mode *	ESC e ONLINE (data)

* Indicates extended commands not supported by the original printer.



DLMENU ITEMS

This appendix is a reference to the items you can select from DLMENU. It also describes the options you can select for each item.

This appendix does not explain how to select items and options using DLMENU. For details, refer to the "README.DOC" file on the DLMENU disk.

SETUP FUNCTIONS

The table below briefly describes the functions available in DLMENU.

Table C.1 Setup Functions in DLMENU

Function	Purpose
MENU1 and MENU2	Assign print features to MENU1 and MENU2 in the printer's setup memory.
HARDWRE	Change the printer's hardware options.
ADJUST	Adjust printing positions such as top-of-form.
CONFIG	Change the printer's basic options.
SAVE	Save any changes.
LIST	Print a list of all currently selected options.
DEFAULT	Reset factory defaults in MENU1 and MENU2.
EXIT	Exit setup mode.

PRINTING A LIST OF SELECTED OPTIONS

The LIST function prints a list of all the printer's currently selected options. This function is useful for checking the printer's settings. You must load paper in the printer to print a list of options.

*** Setup Parameters ***

<< Menu 1 settings >>

Func.	Item	Option
MENU1	EMULATE	DPL24C
MENU1	FONT	COUR 10
MENU1	QUALITY	LETTER
MENU1	PITCH	10 CPI
MENU1	LINE SP	6 LPI
MENU1	CHAR-W	NORMAL
MENU1	CHAR-H	NORMAL
MENU1	ATTRIB	NONE
MENU1	PAGE LG	11.0 IN
MENU1	LFT-END	1 COLM
MENU1	TOP-MRG	1 LINE
MENU1	LANGUAGE	PAGE437
MENU1	CHR-SET	SET2
MENU1	PRF-SKP	NO-SKIP
MENU1	WIDTH	11.4 IN
MENU1	ZEROFNT	NO-SLSH
MENU1	DC3-CODE	ENABLE
MENU1	CR-CODE	CR ONLY
MENU1	LF-CODE	LF & CR
MENU1	RGHTEND	WRAP
MENU1	==END==	

<< Menu 2 settings >>

Func.	Item	Option
MENU2	EMULATE	DPL24C
MENU2	FONT	COUR 10
MENU2	QUALITY	LETTER
MENU2	PITCH	10 CPI
MENU2	LINE SP	6 LPI
MENU2	CHAR-W	NORMAL
MENU2	CHAR-H	NORMAL
MENU2	ATTRIB	NONE
MENU2	PAGE LG	11.0 IN
MENU2	LFT-END	1 COLM
MENU2	TOP-MRG	1 LINE
MENU2	LANGUAGE	PAGE437
MENU2	CHR-SET	SET2
MENU2	PRF-SKP	NO-SKIP
MENU2	WIDTH	11.4 IN
MENU2	ZEROFNT	NO-SLSH
MENU2	DC3-CODE	ENABLE
MENU2	CR-CODE	CR ONLY
MENU2	LF-CODE	LF & CR
MENU2	RGHTEND	WRAP
MENU2	==END==	

<< Hardware settings >>

Func.	Item	Option
HARDWRE	PPR-OUT	CNTOONLY
HARDWRE	PRI-DIR	BI-DIR
HARDWRE	WORD-LG	8 BIT
HARDWRE	BUFFER	8KBYTE
HARDWRE	FEEDER	REAR
HARDWRE	==END==	

<< Adjust settings >>

Func.	Item	Option
ADJUST	CNT-ORG	6 / 5 IN
ADJUST	CNT-FINE	0 / 180
ADJUST	CUT-ORG	6 / 6 IN
ADJUST	CUT-FINE	0 / 180
ADJUST	CNT-LFT	0 / 90
ADJUST	CUT-LFT	0 / 90
ADJUST	CUT-ADJ	0 / 360
ADJUST	==END==	

<< Config settings >>

Func.	Item	Option
CONFIG	TEAROFF	AUTO
CONFIG	TEARPOS	VISIBLE
CONFIG	TEAR-EN	1 SEC(*1)
CONFIG	DECODE	DIRECT
CONFIG	==END==	

*1 Listed when AUTO option is set for TEAROFF item.

Printout of factory defaults using LIST

DECIDING WHICH OPTIONS TO CHANGE

The previous page shows a printout of the printer's factory default settings. In this printout, options are listed by functional group:

- Menu 1 settings (MENU1 function)
- Menu 2 settings (MENU2 function)
- Hardware settings (HARDWRE function)
- Print position settings (ADJUST function)
- Basic settings (CONFIG function)

Most selectable options only alter print features such as the typestyle and page format. However, some options must be selected correctly for the printer to work properly with your hardware and software. For each function, Table C.2 lists those items whose options must be selected correctly for system and printer accessory compatibility.

Table C.2 Required Options

Function	Item	Required Options
MENU1 or MENU2	EMULATE	<i>The emulation selected on the printer must correspond to the printer driver selected in your software. If the emulation is incorrectly selected, the printer will not work correctly with your software. If you selected an emulation when you set up the printer (Chapter 2), you do not need to change the EMULATE option unless you want to switch to a different emulation. The emulation assigned to MENU1 is the default when you turn the printer on.</i>
HARDWRE	FEEDER	Change the FEEDER option if you install a cut sheet feeder. If the single bin option is not specified, the feeder will not work.
ADJUST	CNT-ORG and CUT-ORG	If your software cannot change the top margin of the page, set the printer's default top-of-form settings to proper margins. The default margins are 1 inch.

CHANGING MENU1 AND MENU2 OPTIONS

The MENU1 and MENU2 functions allow you to change the print options assigned to MENU1 and MENU2 in the printer's setup memory.

The MENU1 and MENU2 items and options are listed in Table C.3. Both functions offer the same items and options. Depending on the emulation you are using, some items may not be defined and some options may differ.

MENU1 is active when you first turn the printer on.

If you plan to use two different emulations on a regular basis, assign the most frequently used emulation to MENU1. Assign the other emulation to MENU2. Change the other items, if necessary.

To determine which items and options your software supports, refer to your software documentation.

NOTES:

- In Table C.3, underlined options are the factory defaults.
- Asterisks show items and options that differ for the IBM XL24E and Epson ESC/P2 emulations. See the end of the table for the meanings.

Table C.3 MENU1 and MENU2 Items and Options

MENU1 and MENU2 Items	Options	Description
<EMULATE>		Select the emulation that corresponds to the printer driver selected in your software.
	<u>DPL24C+</u>	Fujitsu DL-series printers (DPL24C PLUS command set)
	XL24E	IBM Proprinter XL24E printers
	ESC/P2	Epson LQ1170 printers or equivalent
NOTE: When you select a new emulation, all MENU1 or MENU2 options are reset to the factory defaults for that emulation.		

Table C.3 MENU1 and MENU2 Items and Options

MENU1 and MENU2 Items	Options	Description
		For each font below, the printer follows the recommended pitch settings. When you change the font, be sure to also change the pitch, if required. Courier, 10cpi Prestige Elite, 12cpi Compressed font, 15,17,and 18cpi Boldface, Proportional Pica, 10cpi Correspondence, 10cpi OCR-B, 10cpi Nimbus Sans Normal, Prop. Timeless Normal, Prop.
	<u>COUR 10</u> PRSTG12 COMPRSD BOLDFCE PICA 10 CORRESP OCR-B N.SANS-N TIMLS-N DOWNLD#	Font 0 or font 1 in the printer's download RAM See Appendix F for font examples.
<QUALITY>		Select the print quality that meets your needs most of the time.
	<u>LETTER</u>	Provides the highest resolution. This is the slowest print speed.
	REPORT	Provides lower resolution than letter quality at twice the speed. If you want only the double speed regardless of fonts, use the correspondence font because its quality is higher than that of report.
	DRAFT	Provides lower resolution than report quality at three times letter speed.

Table C.3 MENU1 and MENU2 Items and Options (Cont.)

MENU1 and MENU2 Items	Options	Description
<PITCH>	## CPI	2.5, 3, 5, 6, <u>10</u> , 12, 15, 17, 18, or 20 cpi (characters per horizontal inch)
	PROP SP	Proportional spacing (1/12 inch for a space)
<LINE SP>	## LPI	1, 2, 3, 4, 5, <u>6</u> , 7, or 8 lpi (lines per vertical inch)
<CHAR-W>		If necessary, also change the pitch when 2 TIMES or 4 TIMES is selected.
	<u>NORMAL</u>	Standard character width A B C D
	2 TIMES	Double character width A B C D
	4 TIMES (*1)	Quadruple character width A B C D
<CHAR-H>		If necessary, also change the line spacing when 2 TIMES or 4 TIMES is selected.
	<u>NORMAL</u>	Standard character height A B C D a b c d
	2 TIMES	Double character height A B C D a b c d
	4 TIMES (*1)	Quadruple character height A B C D a b c d

Table C.3 MENU1 and MENU2 Items and Options (Cont.)

MENU1 and MENU2 Items	Options	Description
<ATTRIB>		Selects an attribute to add emphasis to your documents.
	<u>NONE</u>	Standard characters (no attributes)
	ITALICS	<i>Italic printing</i>
	CONDNSD (*1)	Condensed printing
	SHADOW	Double printing with a slight horizontal offset
	BOLD	Double printing at the same position
<PAGE LG>		Specifies the length of the page in inches.
	# IN	For DPL24C PLUS and IBM XL24E emulations: 3.0, 3.5, 4.0, 5.0, 5.5, 6.0, 7.0, 8.0, 8.5, <u>11.0</u> (letter size), 11.6 (A4 size), 12.0, 14.0, or 18.0 inches For Epson ESC/P2 emulation: 4.0, 4.5, 5.0, ..., <u>11.0</u> , 11.5, ..., 22.0 inches

Table C.3 MENU1 and MENU2 Items and Options (Cont.)

MENU1 and MENU2 Items	Options	Description
<LFT-END>	## COLM	<p>Specifies the starting column of the left margin. Your left margin equals ## COLM plus your software-specified left margin.</p> <p>Column 1, 2, 3, ..., 41</p>
<TOP-MRG>	## LINE	<p>Specifies the top margin in lines, actually the first print line. The blank space is ## LINE minus one line.</p> <p><i>The total size of your top margin is the sum of these three settings:</i></p> <ul style="list-style-type: none"> • Top-of-form setting • <TOP-MRG> setting • Software-specified top margin <p>1, 2, 3, 4, 5, 6, 7, 8, 9, or 10 lines.</p>
<LANGUAGE>		<p>Selects a language (character set name) that fits your language.</p> <p>The hyphenated-T of a character set name stands for "two-pass" printing, in which diacritical marks are printed separately from their letters without any reduction.</p> <p>The first listing is common to all emulations. For languages specific to each emulation, see the subsequent listings (*3) and (*4).</p>

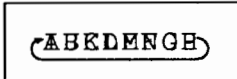
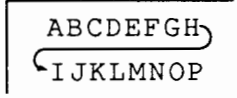
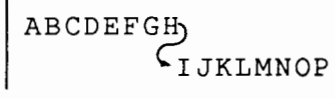
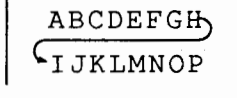
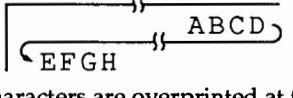

Table C.3 MENU1 and MENU2 Items and Options (Cont.)

MENU1 and MENU2 Items	Options	Description
<LANGUGE> (continued)	USA UK GERMAN SWEDISH <u>PAGE437</u> PAGE850 PAGE860 : : : : : LATIN-P ISO-LTN LITHUA1 LITHUA2 MIK MACEDON	American English (same as code page 437), British English, German, Swedish, code page 437, code page 850, code page 860, code page 863, code page 865, ECMA 94, ISO 8859-1, code page 852, code page 852 two-pass, code page 855, code page 866, Hungarian, Hungarian two-pass, Slovenian, Slovenian two-pass, Polish, Polish two-pass, Mazowian, Mazowian two-pass, Latin 7, Latin 2, Latin 2 two-pass, Kamenicky, Kamenicky two-pass, Turkish, Turkish two-pass, Cyrillic, IBM 437, IBM 851, ELOT 928, DHN, Latin Polish, ISO Latin, Lithuanian 1, Lithuanian 2, MIK, Macedonian
	(*3) FRENCH : NORWEGN	French, Italian, Spanish, Danish I, Danish II, Finnish, Norwegian
	(*4) DANISH1 : DANISH2	Danish I, Italian, Spanish I, Spanish II, Japanese, Norwegian, Latin American, French, Danish II
<CHR-SET>	SET 1 <u>SET 2</u>	IBM character set 1 IBM character set 2 If a download (soft) font is used, the character set for that font overrides the <CHR-SET> setting.
	(*4) <u>ITALIC</u> GRAPHIC	Italic characters available Graphics characters (ruled lines) available

Table C.3 MENU1 and MENU2 Items and Options (Cont.)

MENU1 and MENU2 Items	Options	Description
<AGM> (*2)		Specifies the alternate graphics mode (AGM).
	<u>OFF</u>	The base of line spacing is 1/72 or 1/216 inch.
	ON	The base of line spacing is 1/60 or 1/180 inch.
<PRF-SKP>		For continuous forms, specifies whether an inch is skipped over the perforation.
	SKIP	One inch is skipped over the perforation. If your software cannot specify a bottom margin, select SKIP, especially when using thicker multi-part forms.
	<u>NO-SKIP</u>	Printing continues over the perforation if no bottom margin is specified.
<WIDTH>	<u>11.4 IN</u>	11.4-inch page width
	11.0 IN	11-inch page width
	8.0 IN	8-inch page width
<ZEROFNT> (*3)		Specifies whether to print the number zero with a slash. Invalid for some soft fonts.
	<u>NO-SLSH</u>	0
	SLASH	Ø
<DC3-CDE> (*1, *3)	<u>ENABLE</u>	Enables the DC1 and DC3 codes. Any data received between DC3 and the next DC1 is ignored.
	DISABLE	Disables the DC1 and DC3 codes. These codes are then ignored.

Table C.3 MENU1 and MENU2 Items and Options (Cont.)

MENU1 and MENU2 Items	Options	Description
<CR-CODE>	<u>CR ONLY</u>	No line feed is added to a carriage return. 
	CR & LF	A line feed is added to each carriage return. 
<LF-CODE> (*3)	LF ONLY	No carriage return is added to a line feed. 
	<u>LF & CR</u>	A carriage return is added to each line feed. 
<RGHTEND>	<u>WRAP</u>	End-of-line wrap. Causes a carriage return plus a line feed. 
	OVR-PRT	Characters are overprinted at the end of a line. 

*1 Unavailable for the IBM XL24E emulation

*2 Available *only* for the IBM XL24E emulation

*3 Unavailable for the Epson ESC/P2 emulation

*4 Available *only* for the Epson ESC/P2 emulation

CHANGING HARDWARE OPTIONS

The HARDWRE function defines the printer's hardware conditions. The option SINGLE must be set for the <FEEDER> item if the cut sheet feeder is installed.

The HARDWRE items and options are listed in Table C.4.

NOTE:

Underlined options are the factory defaults.

Table C.4 HARDWRE Items and Options

HARDWRE Items	Options	Description
<PPR-OUT>		Specifies how the printer responds when it runs out of paper. With detection enabled, printing stops and the ONLINE indicator flashes when paper-out occurs. With detection disabled, printing continues until no more data remains. The ONLINE indicator does not flash.
	<u>CN</u> ONLY	Enabled for continuous forms only.
	DETECT	Enabled for both continuous forms and single sheets.
	IGNORE	Disabled for both continuous forms and single sheets.
		NOTE: For cut sheet feeders, detection is enabled, regardless of the <PPR-OUT> setting.
<PRT-DIR>	<u>BI-DIR</u> UNI-DIR	Bidirectional printing. Unidirectional printing is useful for printing vertical lines in tables. It is slower than bidirectional printing.

Table C.4 HARDWARE Items and Options (Cont.)

HARDWARE Items	Options	Description
<WORD-LG>		To determine the required word length, refer to your computer documentation. Select 8-BIT when you print bitmapped graphics images.
	<u>8 BIT</u>	8-bit word length. Used by most computers.
	7 BIT	7-bit word length (MSB = 0)
<BUFFER>		Print buffer temporarily stores input data. Select NONE when printing image data only to speed processing.
		Print buffer Download buffer
	NONE	0 byte 24K bytes
	256BYTE	256 bytes 23.75K bytes
	2KBYTE	2K bytes 22K bytes
	<u>8KBYTE</u>	8K bytes 16K bytes
	24KBYTE	24K bytes 0 byte
<FEEDER>		Tells the printer whether a cut sheet feeder is installed.
	<u>REAR</u>	No cut sheet feeder is installed.
	SINGLE	A single bin cut sheet feeder is installed.

CHANGING ADJUST OPTIONS

When you print using ruled paper, you may want to adjust the print position so that the print sits properly on the ruled lines. The ADJUST function allows you to:

- Set top-of-form position
- Fine-tune top-of-form position
- Fine-tune left print start column (left margin)
- Adjust for an accumulative line spacing error in a page

The first three items are provided separately for single sheets and continuous forms. The last item is available for single sheets only.

Table C.5 describes the ADJUST items and options.

NOTE:

Underlined options are the factory defaults.

Table C.5 ADJUST Items and Options

ADJUST Items	Options	Description
<CNT-ORG>	1/6 IN - 66/6 IN	Sets the top-of-form for continuous forms in increments of 1/6 inch (4.2 mm) from the top of the physical page. The default is 1 inch (25.4 mm).
<CNTFINE>	<u>0/180</u> - 29/180	Fine-tunes the top-of-form for continuous forms in increments of 1/180 inch (0.14 mm). The default is 0 inch (0 mm).

Table C.5 ADJUST Items and Options (Cont.)

ADJUST Items	Options	Description
<CUT-ORG>	1/6 IN ... 66/6 IN	Sets the top-of-form for single sheets in increments of 1/6 inch (4.2 mm) from the top of the physical page. The default is 1 inch (25.4 mm).
<CUTFINE>	0/180 ... 29/180	Fine-tunes the top-of-form for single sheets in increments of 1/180 inch (0.14 mm). The default is 0 inch (0 mm).
<CNT-LFT>	-10/90 ... 10/90	Fine-tunes the left print start position for continuous forms in decrements or increments of 1/90 inch (0.28 mm). The default is 0 inch (0 mm).
<CUT-LFT>	-10/90 ... 10/90	Fine-tunes the left print start position for single sheets in decrements or increments of 1/90 inch (0.28 mm). The default is 0 inch (0 mm).
<CUT-ADJ>	-22/360 +22/360	The line spacing of single sheets is compensated in decrements or increments of 1/360 inch. Specify a value that corresponds to the spacing error accumulated while feeding 10 inches.

CHANGING CONFIG OPTIONS

The CONFIG function defines the following options to ensure that the printer meets your requirements:

- Tearing off of continuous forms
- Direct decoding of certain commands

Table C.6 describes the CONFIG items and options.

NOTE:

Underlined options are the factory defaults.

Table C.6 CONFIG Items and Options

CONFIG Items	Options	Description
<TEAROFF>	<u>MANUAL</u>	Tearoff feed advances continuous forms to the perforation.
	AUTO	Tearoff feed must be done manually, using the control panel. Tearoff feed is done automatically. You may also use control panel.
<TEARPOS>	<u>VISIBLE</u>	This setting depends on whether application software positions continuous forms at the top-of-form at the end of each job.
	ALWAYS	The printer performs tearoff feed without adding a form feed when the host has stopped data transfer. The printer performs tearoff feed after adding a form feed when the host has stopped data transfer. Note: For both settings, tearoff positioning fails if the page length selected does not match the actual perforation spacing.

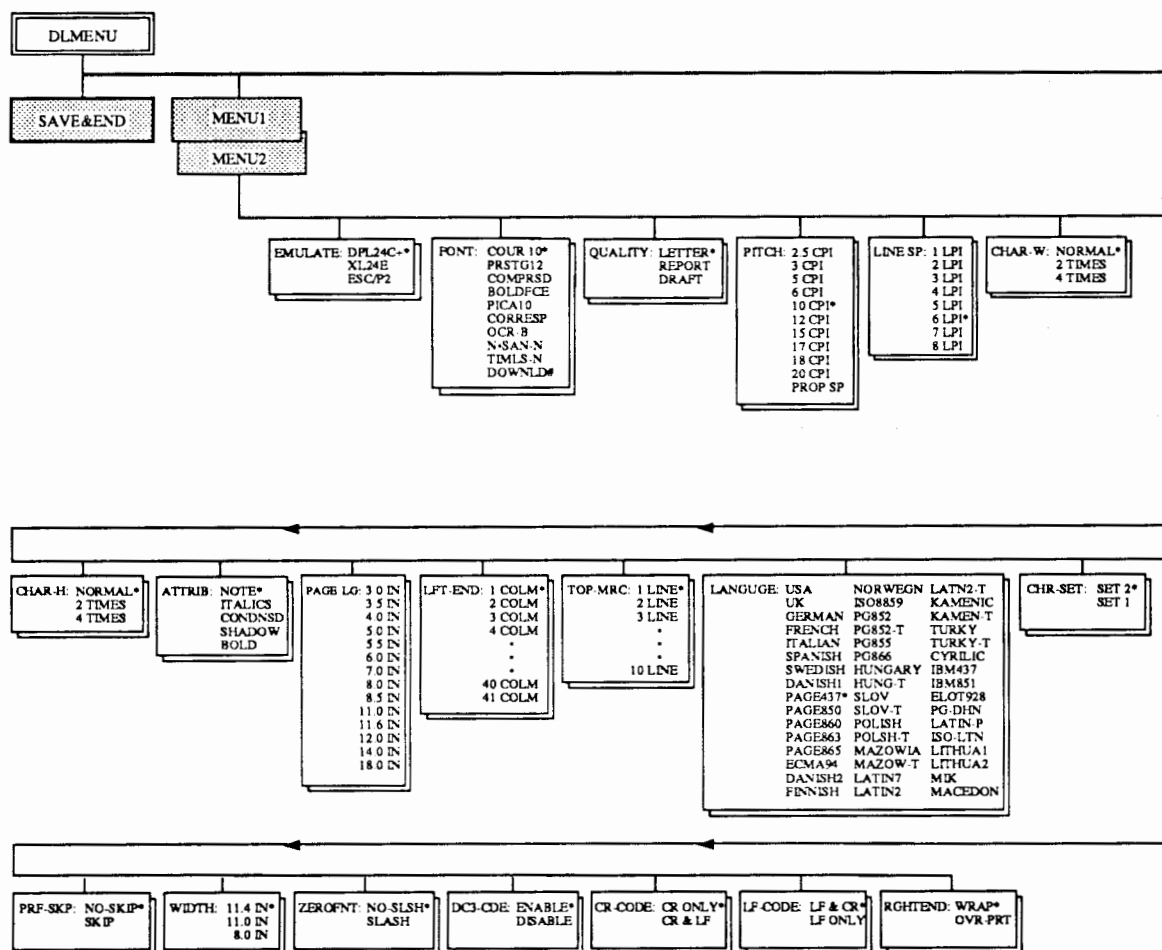
Table C.6 CONFIG Items and Options (Cont.)

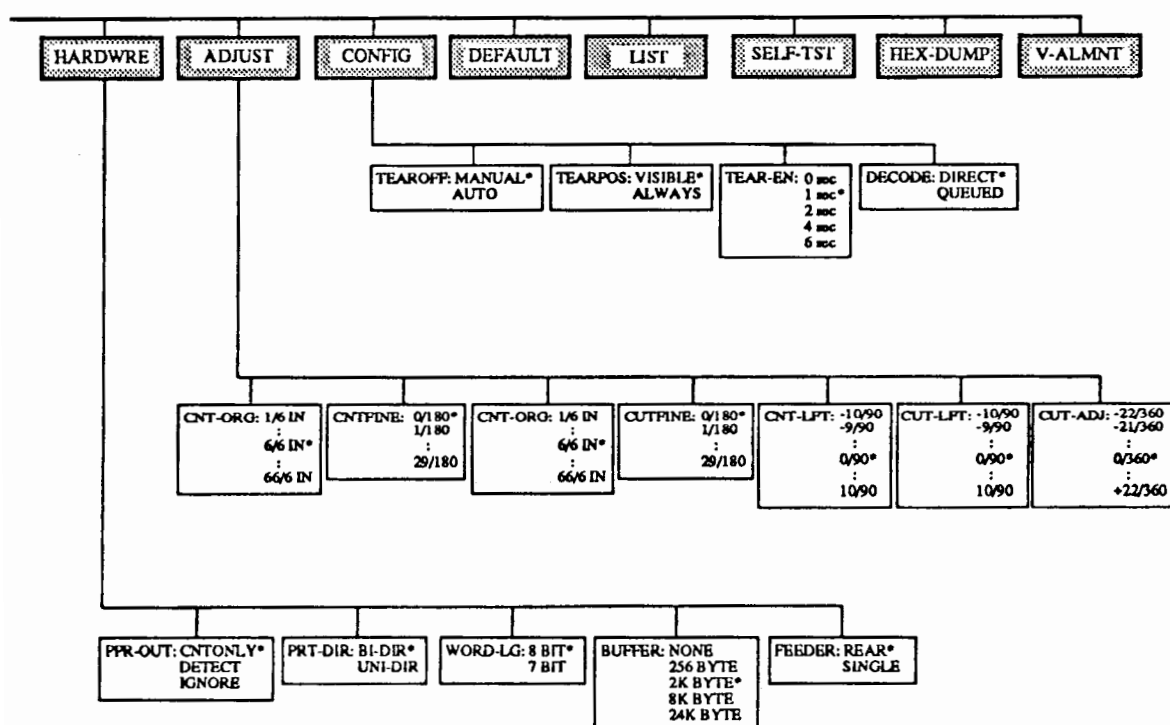
CONFIG Items	Options	Description
The following <TEAR-EN> item is displayed when the AUTO option is specified for the above <TEAROFF> item.		
<TEAR-EN>		This setting prevents the printer from automatically feeding paper to the tearoff line when your application software temporarily stops data transfer due to internal processing.
	0 sec <u>1 sec</u> 2 sec 4 sec 6 sec	Specifies the delay time from when the host stops data transfer to when the printer performs automatic tearoff feed. Within the delay time, the printer will not perform automatic tearoff feed even if data transfer resumes.
<DECODE>		This setting specifies the decode timing of certain commands and influences the time of data transfer.
	<u>DIRECT</u> QUEUED	Decodes some commands without receiving them into print buffer. Receives all commands into the print buffer before decoding. This setting reduces the time of data transfer because no time is spent decoding during data receiving.

DLMENU REFERENCE

Fujitsu DPL24C Plus Emulation

The following flowchart shows how DLMENU is organized for Fujitsu DPL24C PLUS emulation. Following the flowchart, differences are listed for the IBM Proprinter XL24E and Epson ESC/P2 emulations.

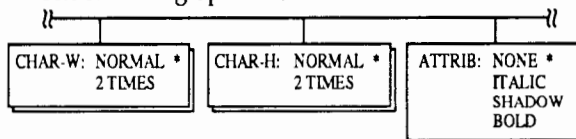




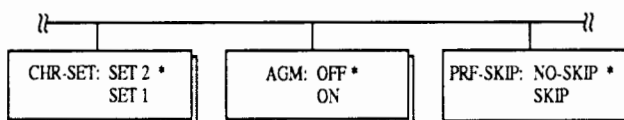
Differences under the IBM Proprinter XL24E Emulation

In the IBM Proprinter XL24E emulation, MENU1 and MENU2 differ from the DPL24C PLUS emulation in the following ways:

- The following options are different:



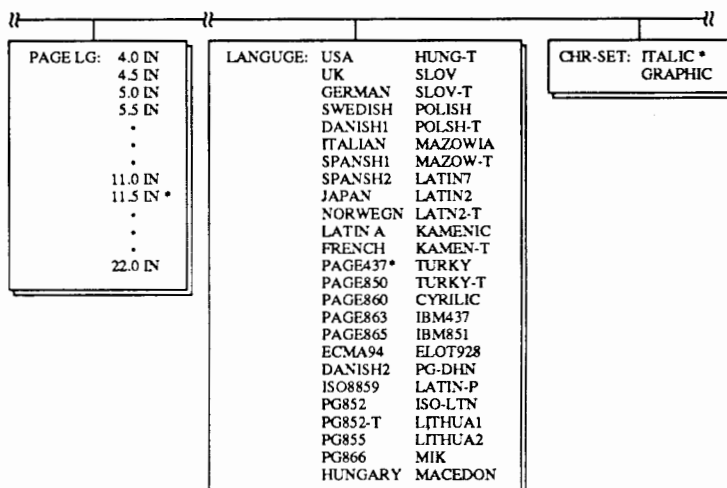
- The AGM item is added:



Differences under the Epson ESC/P2 Emulation

In the Epson ESC/P2 emulation, MENU1 and MENU2 differ from the DPL24C PLUS emulation in the following ways:

- The ZEROFONT and LF-CODE items are not defined.
- The following options are different:



INTERFACE INFORMATION

This printer communicates with a computer through a Centronics parallel interface.

This appendix provides information you may need if you are wiring your own interface cables or programming for computer-to-printer communications. Most users do not need to refer to this appendix. If you are simply trying to connect your printer to your computer, check the instructions in Chapter 2.

PARALLEL INTERFACE

The Centronics interface is the industry-standard parallel interface. The cable connector at the printer side should be a shielded Amphenol DDK 57FE-30360 or its equivalent.

The connector pin assignments are shown in the following table. In this table:

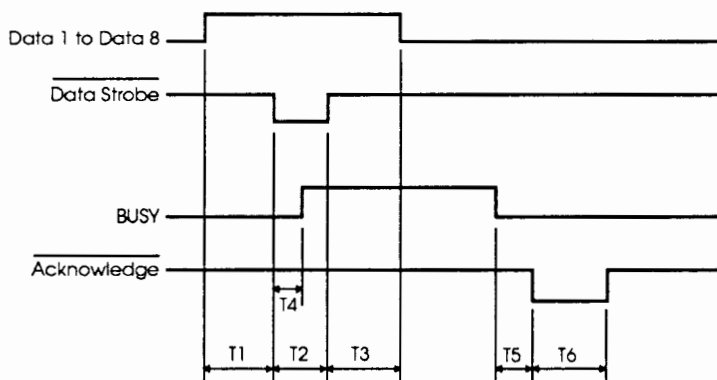
- "Input" indicates a signal input to the printer from the computer.
- "Output" indicates a signal output from the printer.
- The return lines specified in the second column represent twisted pairs, with one side connected to signal ground.
- The standard signal levels are 0.0 to +0.4 V for low, and +2.4 to +5.0 V for high.

Pin No.	Return Pin No.	Signal Name	Direction	Description
1	19	Data Strobe	Input	Strobe pulse for reading data. The printer reads data when this signal is low. The pulse width must be 1 μ s or more at the receiving terminal.
2-9	20-27	Data 1 to 8	Input	Data 8 (pin 9) is the most significant bit, but it is not used in 7-bit ASCII communications. All signals that indicate logical 1 is data should go high at least 1 μ s before the falling edge of the Data Strobe signal, and must stay high for at least 1 μ s after the rising edge.
10	28	Acknowledge	Output	Pulse signal indicating that the printer has received data and is ready to accept more data. This signal is also issued when the printer is switched from offline to online.
11	29	Busy	Output	Output data cannot be received when this signal is high. This signal goes high during data entry, when the printer is offline, when the buffer is full, or when an error occurs.
12	30	Paper Empty	Output	This signal goes high when the printer is out of paper.
13	—	Select	Output	This signal indicates the selected (online) state when high and the deselected (offline) state when low.

Pin No.	Return Pin No.	Signal Name	Direction	Description
14	–	Auto Feed XT	Input	Not used
15	–	–	–	No connection
16	–	Signal Ground	–	Logic ground level (0 V)
17	–	Frame Ground	–	Printer chassis ground line. FG and SG are connected.
18	–	–	–	No connection
19-30	–	Signal Ground	–	Twisted pair return lines
31	–	Input Prime	Input	If this signal is low for more than 50 μ s, the printer is reset to the initial condition and is placed online.
32	–	Fault	Output	This signal goes low when the printer is offline, paper is out, or when there is a printer error.
33	–	Signal Ground	–	Logic ground level (0V)
34	–	–	–	No connection
35	–	+5 VR	Output	Pulled up to +5 V through a 3.3 k Ω resistor.
36	–	SLCT-IN	Input	Not used

Data Transmission Timing

The Centronics interface of this printer guarantees the received data when the Data and Data Strobe signals from the computer are timed as follows with respect to the Busy and Acknowledge signals from the printer.



$$T1, T2, T3 > 1 \mu s$$

$$T4 < 1 \mu s$$

$$0 \mu s < T5 < 3 \mu s$$

$$2 \mu s < T6 < 6 \mu s$$



CHARACTER SETS

This appendix shows typical character sets available in the DPL24C PLUS command set.

For other character sets including those available in the IBM Proprinter XL24E and Epson ESC/P2 emulations, see the DLMENU floppy disk supplied with this printer.

STANDARD CHARACTER SETS

Below are character sets 1 and 2 of Code Page 437, the standard USA character sets. Characters enclosed in boxes differ for sets 1 and 2.

Code Page 437 Character Set 1

LVI	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL DLE SP	0	@	P	~	p	NUL DLE	a	1	o	u	n	t	a	b	e
1	SOH DC1	1	A	Q	a	q	SOH DC1	2	l	o	u	n	t	a	b	e
2	STX DC2	2	B	R	b	r	STX DC2	3	t	o	u	n	t	a	b	e
3	ETX DC3	3	C	S	c	s	ETX DC3	4	t	o	u	n	t	a	b	e
4	END DC4	4	D	T	d	t	END DC4	5	t	o	u	n	t	a	b	e
5	ENQ NAK	5	E	U	e	u	ENQ NAK	6	t	o	u	n	t	a	b	e
6	ACK SYN	6	F	V	f	v	ACK SYN	7	t	o	u	n	t	a	b	e
7	BEL ETB	7	G	W	g	w	BEL ETB	8	t	o	u	n	t	a	b	e
8	BS CAN	8	H	X	h	x	BS CAN	9	t	o	u	n	t	a	b	e
9	HT EM	9	I	Y	i	y	HT EM	A	t	o	u	n	t	a	b	e
A	LF SUB	A	J	Z	j	z	LF SUB	B	t	o	u	n	t	a	b	e
B	VT ESC	B	K	[	k	{	VT ESC	C	t	o	u	n	t	a	b	e
C	FF FS	C	L	\	l	|	FF FS	D	t	o	u	n	t	a	b	e
D	CR GS	D	M	^	m	~	CR GS	E	t	o	u	n	t	a	b	e
E	SO RS	E	N	~	n	-	SO RS	F	t	o	u	n	t	a	b	e
F	SI US	F	O	_	o	DEL	SI US		t	o	u	n	t	a	b	e

Code Page 437 Character Set 2

LVI	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL DLE SP	0	@	P	~	p	Q	B	a	1	o	u	n	t	a	b
1	SOH DC1	1	A	Q	a	q	u	e	2	l	o	u	n	t	a	b
2	STX DC2	2	B	R	b	r	e	3	t	o	u	n	t	a	b	e
3	ETX DC3	3	C	S	c	s	a	4	t	o	u	n	t	a	b	e
4	END DC4	4	D	T	d	t	a	5	t	o	u	n	t	a	b	e
5	ENQ NAK	5	E	U	e	u	a	6	t	o	u	n	t	a	b	e
6	ACK SYN	6	F	V	f	v	a	7	t	o	u	n	t	a	b	e
7	BEL ETB	7	G	W	g	w	a	8	t	o	u	n	t	a	b	e
8	BS CAN	8	H	X	h	x	e	9	t	o	u	n	t	a	b	e
9	HT EM	9	I	Y	i	y	e	A	t	o	u	n	t	a	b	e
A	LF SUB	A	J	Z	j	z	e	B	t	o	u	n	t	a	b	e
B	VT ESC	B	K	[	k	{	1	C	t	o	u	n	t	a	b	e
C	FF FS	C	L	\	l	|	2	D	t	o	u	n	t	a	b	e
D	CR GS	D	M	^	m	~	3	E	t	o	u	n	t	a	b	e
E	SO RS	E	N	~	n	-	4	F	t	o	u	n	t	a	b	e
F	SI US	F	O	_	o	DEL	5	G	t	o	u	n	t	a	b	e

Below is a multilingual character set (Code Page 850), one of the national character sets. National character sets include different characters and symbols from the standard character set 2 (Code Page 437). This printer provides 41 national character sets available in all emulations to support various languages. For the other national character sets available in all emulations and the national character sets available in each emulation, refer to the DLMENU floppy disk supplied with this printer. (Appendix C lists language names of the available national character sets.)

Code Page 850 Character Set (Multilingual)

L/H	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			0	@	P	~	p	ç	é	a		L	ø	O	-	
1		!	1	A	Q	a	q	u	æ	1		±	ð	ß	±	
2		"	2	B	R	b	r	e	æ	o	:	Y	é	ö	1	
3	♥	#	3	C	S	c	s	ä	ö	u		Y	é	ö	1	
4	♦	\$	4	D	T	d	t	a	o	ñ		A	±	1	ö	±
5	♦	%	5	E	U	e	u	a	o	ñ		A	±	1	ö	±
6	♦	&	6	F	V	f	v	á	ú	á		A	±	1	ö	±
7		'	7	G	W	g	w	ç	u	ç		A	±	1	ö	±
8		(	8	H	X	h	x	ê	y	ç		A	±	1	ö	±
9		)	9	I	Y	i	y	e	o	ç		A	±	1	ö	±
A		*		J	Z	j	z	e	u	ç		A	±	1	ö	±
B		+		K	[	k	[	i	ø	±		A	±	1	ö	±
C		,		L	\	l	\	i	ø	±		A	±	1	ö	±
D		-		=	M	i	m	i	ø	±		A	±	1	ö	±
E		.		>	N	~	n	A	±	»		A	±	1	ö	±
F		/		?	O	_	o	A	±	»		A	±	1	ö	±

NATIONAL CHARACTER SETS AND SUPPORTED FONTS (RESIDENT FONTS)

Note that some national character sets are missing certain characters and symbols depending on resident fonts you selected. See the table below to find what fonts are available for each national character set (language). This table shows national character sets available in all emulations.

Resident fonts		Counter	Elite 12	Compress	Draft	Bold PS	Pica 10	Nimbus S. N	Timeless N	Correspond	OCR-B
National character sets	Names in DLMENU										
USA *	USA	√	√	√	√	√	√	√	√	√	√
United Kingdom	UK	√	√	√	√	√	√	√	√	√	√
German	GERMAN	√	√	√	√	√	√	√	√	√	√
Swedish	SWEDISH	√	√	√	√	√	√	√	√	√	√
ISO 8859-1	ISO8859	√	√	√	√	√	√	√	√	√	√
ECMA 94	ECMA94	√	√	√	√	√	√	√	√	√	√
Code Page 437 *	PAGE437	√	√	√	√	√	√	√	√	√	√
Code Page 850	PAGE850	√	√	√	√	√	√	√	√	√	√
Code Page 852	PG852	√	√	√	√	√	√	√	√	√	√
" two-pass	PG852-T	√	√	√	√	√	√	√	√	√	√
Code Page 855	PG855	√	√	√	√		√	√			
Code Page 860	PAGE860	√	√	√	√	√	√	√	√	√	√
Code Page 863	PAGE863	√	√	√	√	√	√	√	√	√	√
Code Page 865	PAGE865	√	√	√	√	√	√	√	√	√	√
Code Page 866	PG866	√	√	√	√			√	√		

(Continued to the next page)

* USA is the same as Code Page 437.

√: Supported

N: normal

Correspond: correspondence

Resident fonts		Courier	Elite 12	Compress	Draft	Bold PS	Pica 10	Nimbus S. N	Timesless N	Correspond	OCR-B
National character sets	Names in DLMENU										
Hungarian	HUNGARY	√	√	√	√	√	√	√	√	√	
" two-pass	HUNG-T	√	√	√	√	√	√	√	√	√	
Slovenian	SLOV	√	√	√	√	√	√	√	√	√	√
" two-pass	SLOV-T	√	√	√	√	√	√	√	√	√	
Polish	POLISH	√	√	√	√	√	√	√	√	√	
" two-pass	POLISH-T	√	√	√	√	√	√	√	√	√	
Mazovian	MAZOWIA	√	√	√	√	√	√	*2	*2	√	
" two-pass	MAZOW-T	√	√	√	√	√	√	*2	*2	√	
Latin 7	LATIN7	√	√	√	√			√	√		
Latin 2	LATIN2	√	√	√	√	√	√	√	√	√	
" two-pass	LATN2-T	√	√	√	√	√	√	√	√	√	
Kamenicky	KAMENIC	√	√	√	√	√	√	√	√	√	
" two-pass	KAMEN-T	√	√	√	√	√	√	√	√	√	
Turkish	TURKY	√	√	√	√	√	√	√	√	√	
" Two-pass	TURKY-T	√	√	√	√	√	√	√	√	√	
Cyrillic	CYRILIC	√	√	√	√			√	√		
IBM 437	IBM437	√	√	√	√			√	√		
IBM 851	IBM851	√	√	√	√			√	√		
ELOT 928	ELOT928	√	√	√	√			*1	*1		
Code Page DHN	PG-DHN	√	√	√	√	√	√	*2	*2	√	
Latin Polish	LATIN-P	√	√	√	√	√	√	*2	*2	√	
ISO Latin	ISO-LTN	√	√	√	√	√	√	*1	*1	√	
Lithuanian 1	LITHUA1	√	√	√	√						
Lithuanian 2	LITHUA2	√	√	√	√						
MIK	MIK	√	√	√	√			√	√		
Macedonian	MACEDON	√	√	√	√			√	√		

√: Supported

*1: One character is not supported. Check the character set.

*2: Two characters are not supported. Check the character set.

N: normal

Correspond: correspondence

RESIDENT FONTS

A large, bold, white letter 'F' is centered within a black square. The 'F' is composed of thick, slightly irregular strokes, giving it a hand-drawn or stencil-like appearance.A black rectangular box containing the word 'Fonts' in white, oriented vertically. The text is centered within the box.

COURIER 10

The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.

PRESTIGE ELITE 12

The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.

DRAFT

The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.

COMPRESSION

The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.

PICA 10

The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.

CORRESPONDENCE

The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.

BOLDFACE PS

The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.

Nimbus Sans Normal PS

The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.

Timeless Normal PS

The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.

OCR-B

The 24-wire dot-matrix printer prints quality characters and symbols using a variety of sizes and fonts.

GLOSSARY OF TERMS

A4 size	A standard paper size used in Japan and other countries. A4 paper is 210 x 295 mm (8.25 x 11.6 inches).
Application software	Software programs such as word processors, database, and spreadsheets.
ASCII	The acronym for American Standard Code for Information Interchange. ASCII is a set of 256 codes (numbered 0 to 255) used to communicate information between a computer and another device such as a printer.
Bidirectional printing	Alternately prints lines from left to right and right to left. Bidirectional printing is faster than unidirectional printing because there are no carriage returns.
Bit	The smallest unit of information in computer memory. A bit is a single digit, either a 1 or a 0, in the binary numbering system. Eight bits equal one byte.
Buffer	A storage area for data in the printer or computer. The printer's buffer consists of a print buffer and a download buffer. The print buffer holds data to be printed. The download buffer holds downloaded data such as download (soft) fonts.
Byte	Eight bits that constitute one symbol. A byte represents a single character such as a number, a letter, or a special control character.
Carriage return (CR)	The return of the print head carriage to the beginning of the next line.
Centronics interface	A type of parallel interface. See Parallel interface .
Column	A vertical section on a printed page. This printer can print 114-column pages at 10-pitch (10 characters per inch).

Command set	A set of print and format commands used to control the printer. Each printer has its own resident command sets, embedded in the printer firmware, which are called by codes sent from the host computer.
Condensed print	Print that uses "condensed" characters, that is, narrower than normal. Using condensed print increases the number of characters per line.
Continuous forms	Connected fan-folded sheets of paper fed into the printer using forms tractors. The fan-folded sheets are separated by tearing them at their perforations.
Control panel	A panel containing the printer's indicators and buttons. The control panel is used to control printer operations such as loading paper and adjusting paper loading positions.
cpi	Characters per horizontal inch. Also referred to as pitch. For example, 12-pitch means 12 cpi.
cps	Characters per second.
Cut sheets	See Single sheets .
Cut sheet feeder	An option that replaces the cut sheet stand. It allows automatic loading from a stack of paper.
Defaults	Settings automatically selected by the printer when the power is turned on. By using the DLMENU, you can change the defaults to ensure compatibility with your system hardware and software.
DLMENU	A printer remote setup utility program used to select the printer's default font and page formatting.
Dot matrix	The grid used to print characters on a dot matrix printer. Each dot corresponds to a wire in the print head.
Downloading	Transferring soft fonts from the computer to the printer's memory. Downloading allows you to use fonts not resident in the computer.

dpi	Dots per inch.
Emulation	A command set that allows one printer to print like another printer. This printer has two resident emulations in addition to its native command set: IBM proprinter XL24E and Epson ESC/P2.
Font	A complete set of printable characters in the same typeface and size. For example, Courier 10 and Prestige Elite 12 are commonly used fonts.
Form feed (FF)	A signal to the printer to advance the paper forward one page. Form feeds can be executed either using software or by holding the LF/FF button down on the printer's control panel.
Graphics printing	Controlling the print head wires (dots) individually to produce a picture or an image on the page.
Hexadecimal	A base-16 numbering system (also commonly referred to as hex numbers). Since a base-16 system requires 16 digits, numbers 0 through 9 and letters A through F are used. It is convenient to express binary numbers in hexadecimal because fewer digits are required.
Hex dump	A hexadecimal printout of control codes and data. Hex dumps are used to debug computer programs and to troubleshoot printer malfunctions. To print a hex dump using the printer, you can use the HEX-DUMP function in DLMENU.
Interface	The connection that allows communication from one part of a system to another. For example, electrical signals are transferred between the computer and printer over an interface cable.
Kb	Kilobyte. 1 Kb equals 1024 bytes.
Letter size	A standard paper size used in the U.S.A. and other countries. Paper is 8-1/2 x 11 inches (215.9 x 279.4 mm).
Line feed (LF)	A signal to the printer that advances the paper forward one line. Line feeds can be executed either using software or by pressing the LF/FF button on the printer's control panel.

Line spacing	The vertical spacing between lines, measured in lines per inch.
lpi	Lines per inch. Used to measure line spacing.
Monospacing	Character spacing in which each printed character has the same width. Also called fixed pitch, monospacing is the opposite of proportional spacing. Typewriter or computer-printed text is typically monospaced.
Non-resident fonts	Fonts not built into the printer's permanent memory. This includes soft fonts.
Normal mode	One of the printer's two operating modes. In normal mode, the control panel can be used to perform everyday printer operations such as loading and unloading paper, feeding paper, and adjusting paper positions. See also Setup mode .
Offline	When the printer is offline, it receives commands from the printer's control panel instead of the computer. The opposite of "online".
Online	When the printer is online, it is ready to receive or is receiving commands from the computer. The printer must be online to print.
Parallel interface	A standard computer interface. Information is transferred between devices over separate wires, allowing all of the bits that make up the character to be transmitted simultaneously (in parallel).
Park position	The position in which continuous forms paper is retracted or "parked" on the rear forms tractors. When the forms paper is loaded, it moves forward from the park position onto the platen.
Permanent memory	Memory that retains information even if the power is turned off. The printer's permanent memory retains the default settings that are specified using DLMENU.
Pitch	Characters per horizontal inch (cpi).
Platen	A hard rubber cylinder that moves paper forward during printing.

Printer driver	Software program installed in the computer to control the printer. It receives print data from the application software, converts the data into commands which the printer can understand, and sends those commands to the printer.
Proportional spacing	Character spacing in which wide characters occupy more space than narrow characters. For example, characters such as "W" or "M" occupy more space than characters such as "i" or "l." Many soft fonts are proportionally spaced. Sometimes abbreviated PS, proportional spacing is the opposite of monospacing.
Resident fonts	Fonts built into in the printer's permanent memory. For this printer, the resident fonts are Courier 10, Prestige Elite 12, Compressed, Boldface PS, Pica 10, Correspondence, OCR-B 10, Nimbus Sans normal PS, Timeless normal PS, and Draft. Unlike soft fonts, resident fonts can always be accessed.
Self-test	A test to determine whether the printer is working correctly. Test pages are printed to show print quality and whether all characters print. The self-test only tests the printer. It does not test how the computer works with the printer.
Setup mode	One of the printer's two operating modes. When DLMENU is started, the printer enters setup mode and you can select the printer's default settings, such as print features, hardware options, and top-of-form. Setup mode also provides some diagnostic functions. See also Normal mode .
Shadow printing	Printing characters twice for emphasis. Characters printed the second time are shifted slightly to the right.
Single sheets	Sheets of paper, envelopes, and non-continuous multi-part forms fed into the printer using the cut sheet stand or optional cut sheet feeder. They are also sometimes called cut sheets.
Soft fonts	Fonts downloaded from a disk to the printer's memory. They are also referred to as download fonts. Unlike resident fonts, soft fonts are available only while in the printer's memory.

Software	Programs that use the computer and printer to perform various tasks such as word processing, database management, and preparation of spreadsheets. Software is sometimes referred to as application software.
Top margin	The total space at the top of the printed page. The top margin is the sum of all of the following: the top-of-form setting, the software-specified top margin, and the printer's TOP-MRG setting.
Top-of-form (TOF)	The logical top of the physical page, as "understood" by the printer when loading paper. The default TOF setting is 1 inch (25.4 mm).
Tractor feed	A method for feeding continuous forms forward for printing. Holes on the sides of the forms fit over sprockets on two tractors inside the printer.
Unidirectional printing	Printing in one direction only, left to right. Printing is slower than with bidirectional printing, but the vertical alignment is more accurate. Unidirectional printing is useful when precise vertical alignment is required, as in ruled tables.

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