

BJ-230

USER'S MANUAL

Canon

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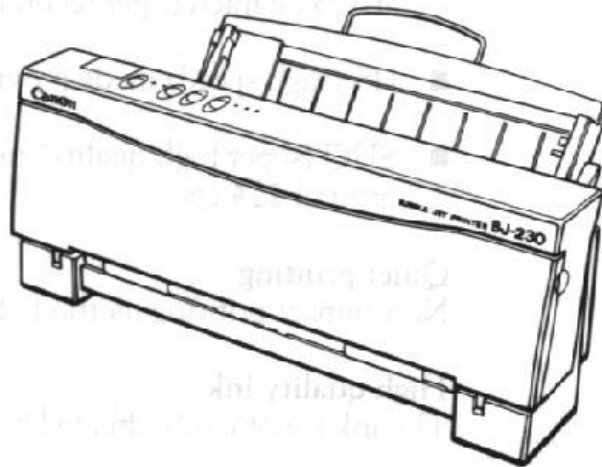
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Chapter 1

Introduction

Congratulations on your purchase of the Canon Bubble Jet Printer BJ-230. We appreciate you choosing this printer to meet your printing needs. It offers exceptional print quality, flexible paper handling, fast printing speeds, and trouble-free operation.



This chapter introduces you to the features of your new printer and describes how to use this User's Manual.

Features and Benefits

The Bubble Jet Printer BJ-230 produces high-quality printing by incorporating many useful features.

Excellent print quality

High-performance print head offers 360X360 dots per inch (dpi) for high resolution graphics

Convenient paper handling

An automatic sheet feeder holds up to 100 sheets of letter or legal-size paper, 50 sheets of ledger-size paper, 10 envelopes, or 10 transparencies

Software Compatibility

Two resident printer control modes:

- BJ-10 mode emulates the IBM Proprinter X24E printer
- Epson LQ mode emulates the Epson LQ-510 printer

Three print modes/speeds

The print modes allow you to choose between print quality, speed, and

quietness:

- HQ (high quality) mode provides high quality and high speed at 173 characters per second (cps)
- HS (high speed) mode provides draft quality at 248 cps
- SHQ(super high quality) mode provides the highest quality print at 124 cps

Quiet printing

Non-impact printing method offer quiet operation

Simple maintenance

The replacement ink cartridge contains both the ink and the print head; when it runs out of ink, you simply replace it

Compact desktop design

Lightweight (7.7 lb/3.5 kg)

Using This Manual

This section describes the contents and conventions of this manual.

Contents

This manual includes all the information you need to set up and operate your printer in several easy-to-read chapters.

Chapter 1, Introduction

Introduces you to the features of the printer, and describes how this manual is organized.

Chapter 2, Setting Up the Printer

Describes how to select a location for your printer, and how to unpack and assemble it.

Chapter 3, Loading Paper

Describes how to select paper and how to load it in the printer. It also shows you how to print on envelopes and thick paper.

Chapter 4, Using the Operator Panel

Explains how to control your printer using the buttons on the operator panel.

Chapter 5, Using the Printer With Software

Describes how to install a printer driver and select a printer control mode. It also describes how to use the printer with Windows.

Chapter 6, Maintaining the Printer

Describes how to clean the printer and replace the ink cartridge.

Chapter 7, Troubleshooting

Provides procedures to help you solve problems that may occur with the printer.

Chapter 8, Customizing the Printer

Describes the printer's DIP switches and explains how you can customize the factory default settings of the printer by changing the DIP switches.

The appendices include printer specifications, interface specifications, and summary tables of the BJ-10 mode and Epson LQ mode printer commands and character sets.

The Canon Bubble Jet Printer BJ-200/BJ-230 Programmer's Manual is available for software designers, advanced programmers, and users interested in using a programming language to send commands to the printer. To obtain a copy of this manual, call the Canon Special Offers Group at 1-800-385-2155.

Conventions

This User's Manual uses the following conventions to help you operate the printer correctly and safely:



NOTE: Notes provide advice or suggestions regarding the use of the printer.



CAUTION: Cautions alert you to operations that could cause damage to your hardware or software.

Distinctive typefaces identify the printer buttons you press, the lights on the operator panel, and any commands you enter at your computer. For example, the buttons you press appear in this typeface: **POWER**. The lights you see appear in this typeface: **HQ**. When you type something on your computer, it appears in this typeface: DIR /P.

Customer Support

Canon provides customer support and service for all Canon printer products. If you have any questions regarding your new printer, call the Canon Computer Systems, Inc. (CCSI) help desk at 757-413-2848 (request Technical Support). This number is available Monday through

Friday from 8 am to 10 pm Eastern Standard Time(EST), except on holidays.

If you seem to have an operational problem, try to solve it by referring to the information in Chapter 7, Troubleshooting. If you cannot quickly resume normal operation, contact CCSI's experienced support personnel at the help desk.

Canon also provides a bulletin board service (BBS). Call the help desk to obtain the number for the BBS.

If you use CompuServe, you can access the Canon Peripherals Forum. Just type GO CANON at any CompuServe prompt.

Customer support for Canadian residents is available at 416-795-2083 from 9 am to 7 pm EST (except holidays). In other countries, please contact your Canon dealer.

Servicing the Printer

The Canon Bubble Jet Printer BJ-230 is designed with the latest technology to help you realize years of trouble-free operation. The blue warranty card that came with your printer describes CCSI's limited two year warranty for its Bubble Jet Printers. Be sure to read the warranty information and save the blue card. Also, save your original invoice or receipt to verify the date of purchase. If you feel your Bubble Jet Printer BJ-230 needs servicing, call the Canon referral service at 1-800-848-4123 to locate the CCSI Authorized Service Facility (ASF) nearest you.

If you are interested in service after your CCSI warranty expires, contact the nearest CCSI Authorized Service Facility about the options it makes available to its customers.



Chapter 2

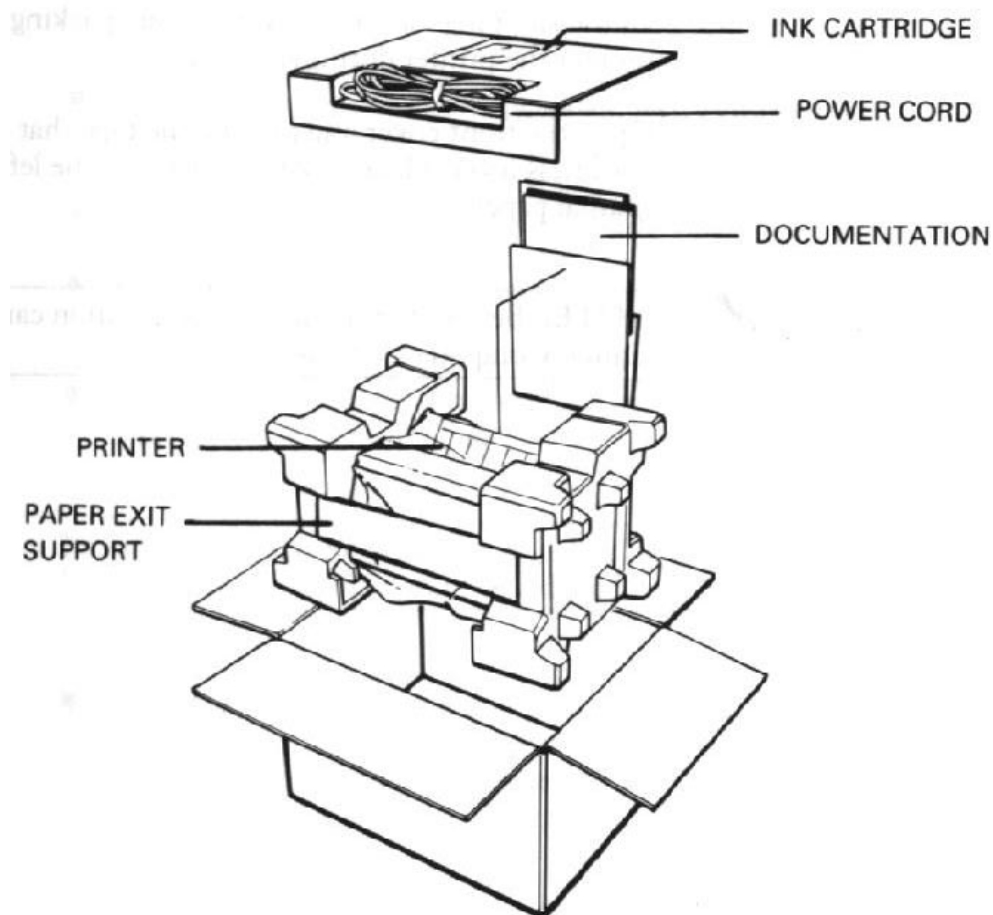
Setting Up the Printer

This chapter describes the steps you follow to unpack and set up your printer. It offers guidelines for finding a suitable location for the printer, explains how to install the ink cartridge, and describes how to connect the power and interface cable.

If you have already set up your printer using the Quick Start Guide, you may want to scan this chapter for the additional information it supplies.

Unpacking the Printer

Carefully remove all items from the box. Ask someone to hold the box while you pull the printer and its protective packaging from the carton.



In addition to this User's Manual, you will find these items in the box:

- Canon Bubble Jet Printer BJ-230
- BC-02 ink cartridge
- Paper exit support
- AC power cord
- Quick Start Guide
- Windows driver diskette (in envelope)
- Product Warranty card
- Registration Card

If your printer was damaged in shipping, or if any items are missing, notify your dealer immediately.



NOTE: In addition to the items shipped with your printer, you need a Centronic®-compatible, parallel interface cable, which you can purchase from your dealer.

As you unpack the printer, save the carton and packing materials in case you want to move or ship the printer in the future. Remove all the shipping tape and any Styrofoam packing material used to protect the printer during shipping.

Open the front cover and remove the tape that secures the ink cartridge holder. Make sure the paper thickness lever is to the left for printing on normal paper.



NOTE: Be sure to fill out your Registration card and send it to Canon Computer Systems, Inc.

Choosing a Location for Your Printer

Whether at home or in the office, you need to find a comfortable and convenient location for the printer. Follow the guidelines in this section to make sure the location is right for your printer.

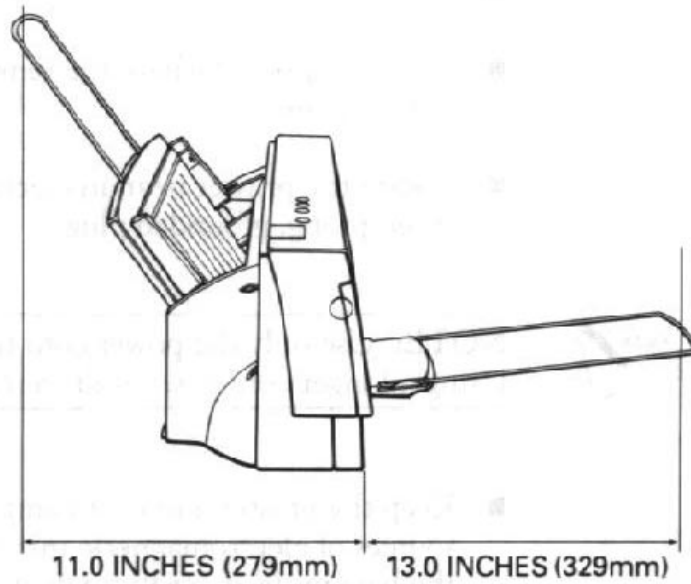
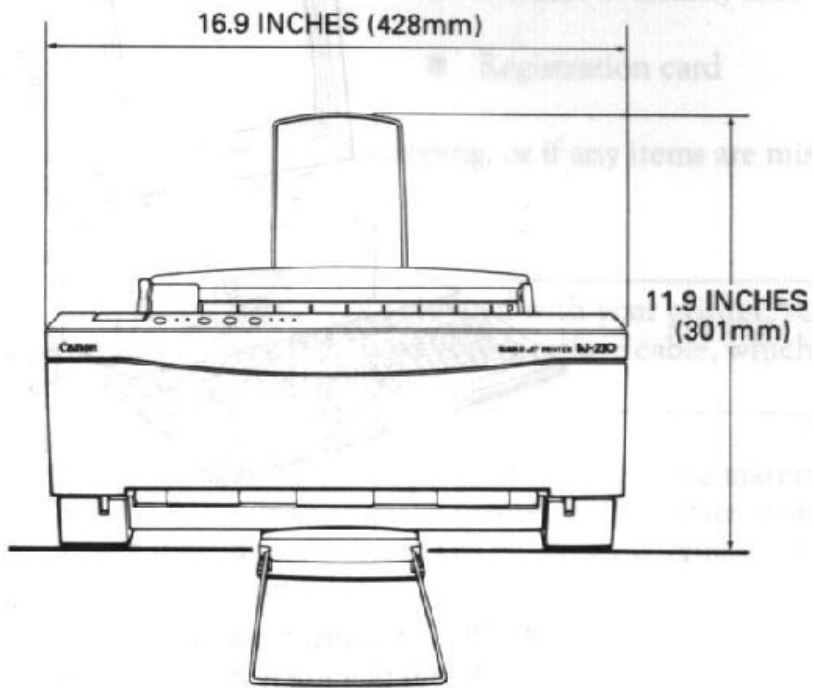


- Place the printer in a cool, dry, clean, well ventilated area. Avoid placing it in direct sunlight.
- Set the printer on a sturdy, level surface. Do not set the printer on an angled printer stand.
- Place the printer where the temperature is stable and set for human comfort.
- Locate the printer near an electrical wall outlet that accepts a three-prong, grounded plug.



NOTE: Use only the power cord that came with your printer. Using a longer cord or an extension cord may result in reduced voltage or malfunctions.

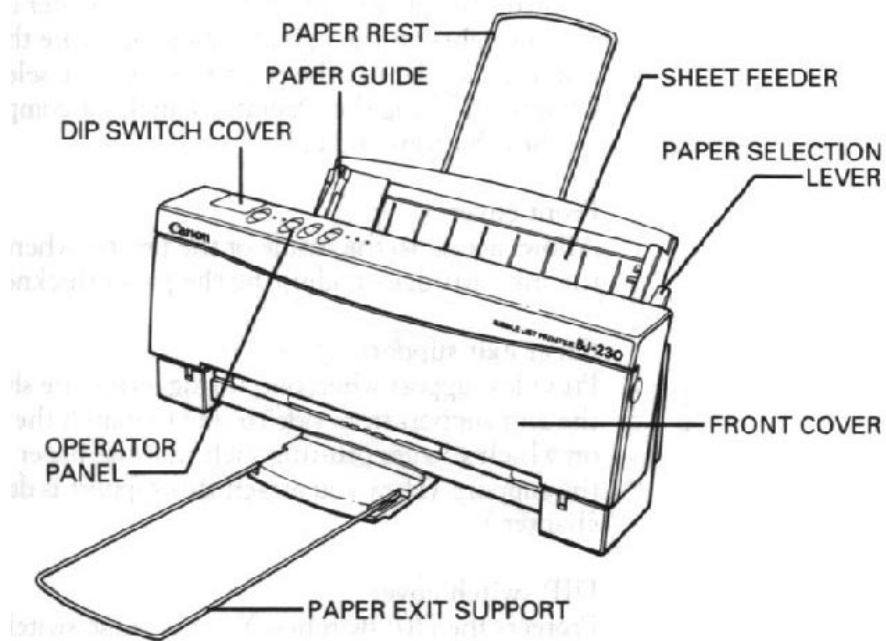
- Keep the printer and your computer away from potential sources of electromagnetic interference such as loudspeakers or the base units of cordless telephones.
- Make sure there is enough room around the printer for storing and feeding paper.
- Keep the paper exit area clear from objects that may block paper from exiting the printer.
- Make sure there is enough room to fully extend the paper rest and use the paper exit support. The printer requires this much space:



Examining the Printer

Before setting up your printer, you should become familiar with its components and understand their functions.

From the Front



Sheet feeder

Stacks up to 100 sheets of letter- or legal size paper or 50 sheets of ledger-size paper for automatic feeding. You can also manually feed a single sheet, such as a transparency or card stock.

Paper guide

Aligns paper in the sheet feeder. You can adjust the guide for paper widths of up to 11 inches (279 mm).

Paper rest

Keeps the paper straight in the sheet feeder and helps prevent misfeeds. Extend this support before loading a stack of paper in the sheet feeder.

Paper selection feeder

Selects the appropriate paper setting. For loading multiple sheets of normal-weight paper, set this lever to the back position. For envelopes or thick paper, set this lever to the front position. (Leave this lever in the back position when loading stacks of normal paper.)

Operator Panel

Controls the printer and defines basic printer operations. The various lights on the operator panel indicate status of the printer, and identify the print mode you've selected. See Chapter 4, Using the Operator Panel, for complete information on these buttons and lights.

Front cover

Allows access to the inside of the printer when you are installing the ink cartridge or adjusting the paper thickness lever.

Paper exit support

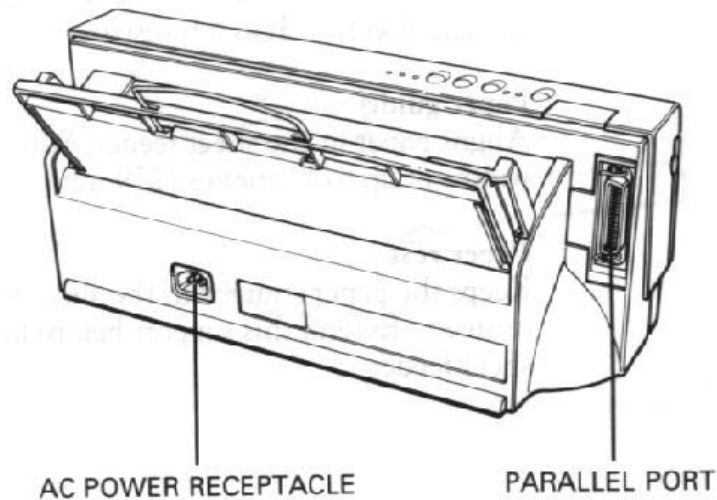
Provides support when outputting letter-size sheets of paper. Slide the

exit support from side to side to match the width of the paper on which you are printing such that the paper will be centered on the support. (How you attach this support is describe later in this chapter.)

Dip switch cover

Protects the DIP switches. You use these switches to change the printer's factory default settings. For information about changing the default settings, see Chapter 8, Customizing the Printer.

From the Back



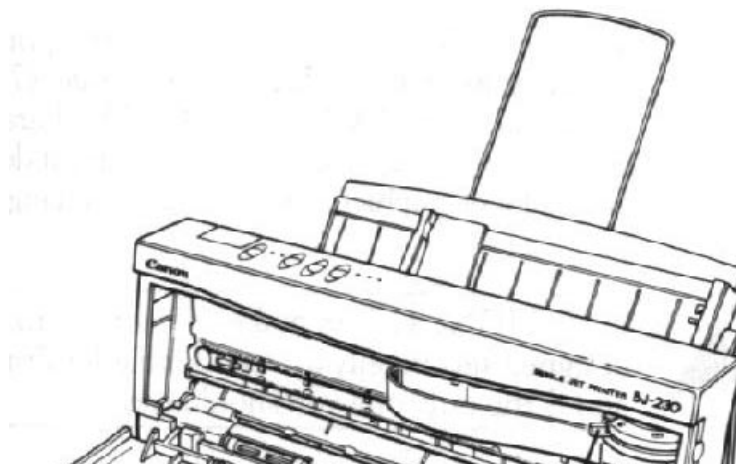
Parallel interface port

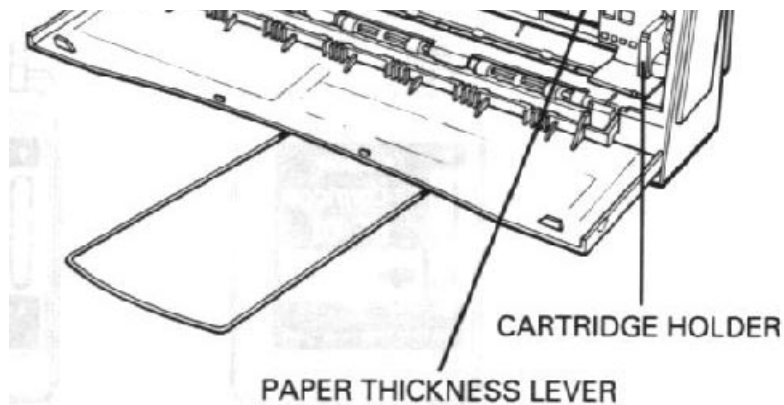
Allows you to attach the printer's interface cable.

AC power receptacle

Allows you to attach the printer's power cord.

Inside the Printer





Ink cartridge holder

Allows you to install the ink cartridge (as described later in this chapter).

Paper thickness lever

Identifies the thickness of your paper. The setting you choose adjusts the distance between the print head and the paper. There are two settings: left for normal paper and right for thick paper or envelopes. (After you remove the tape that protects this lever during shipping, slide the lever to the left.)

Assembling the Printer

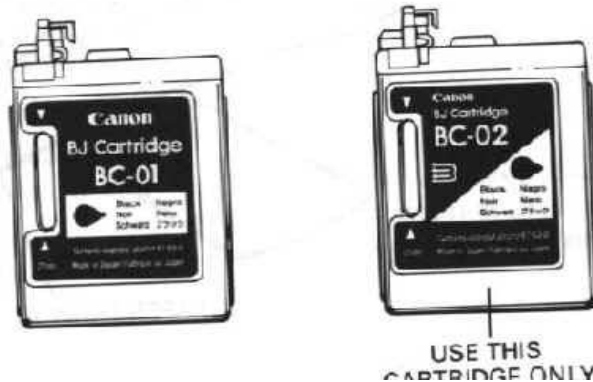
Now that you are familiar with the components of your printer, you are ready to install the printer and connect it to your computer. The first step is to install the ink cartridge.

Installing the Ink Cartridge

You use the BC-02 ink cartridge with this printer. Each ink cartridge can print about 400 to 500 letter-size pages (700,000 characters) in HQ mode and 800 to 1000 pages (1,400,000 characters) in HS mode. The actual amount varies according to the print density of a page. If you print a lot of graphics, you may need to change cartridges more often.



CAUTION: Canon makes numerous ink cartridges; the BC-02 is designed specifically for the Bubble Jet Printers BJ-200 and BJ-230 and is the only one you should use.



To avoid spilling ink, follow these precautions:

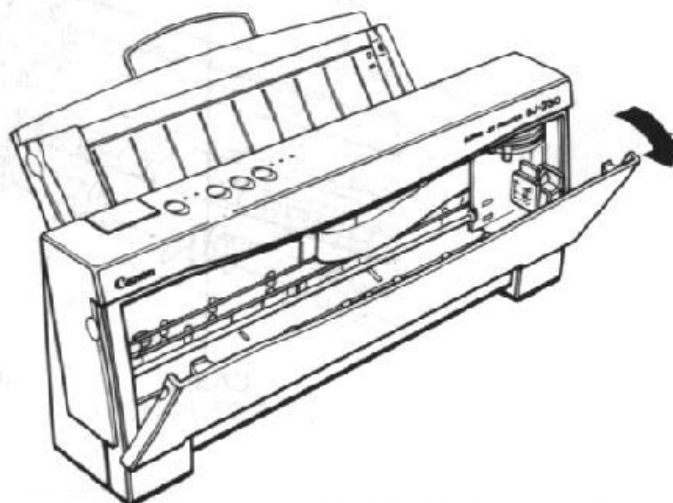
- Do not touch the print head on the ink cartridge or the sharp edges around it.
- Do not hold the ink cartridge, or place it on your table, with the print head facing down, except when you are installing it.
- Do not attempt to disassemble the cartridge.
- Do not vigorously shake the ink cartridge while handling it.



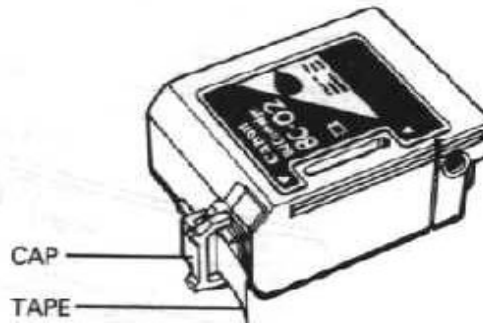
CAUTION: Keep the ink cartridge out of children's reach; the ink contains isopropyl alcohol 67-63-0.

To install the ink cartridge, follow these steps:

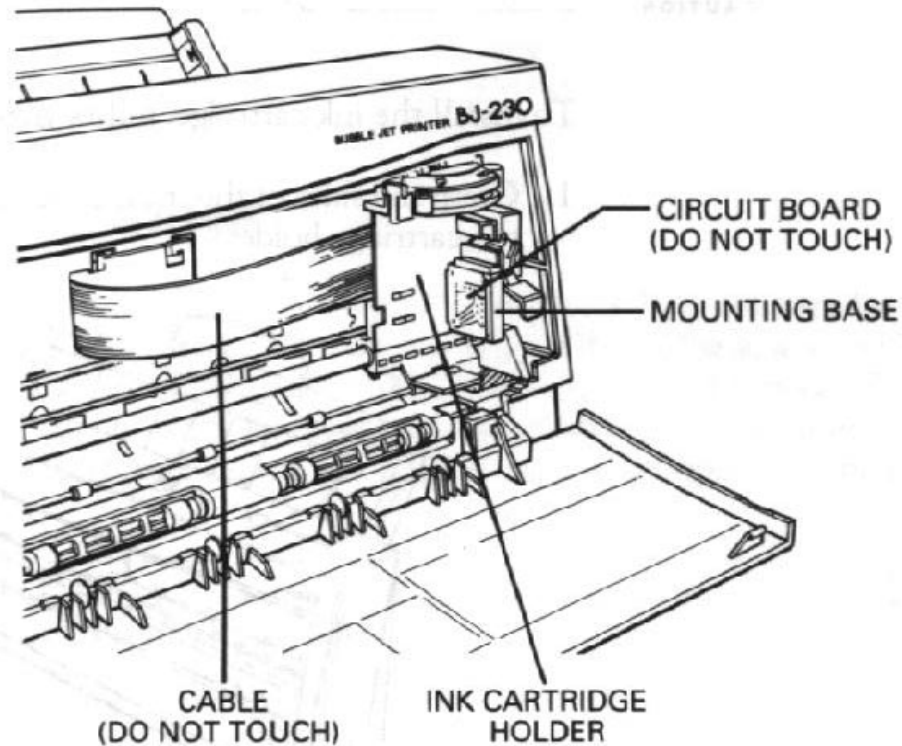
1. Grasp the sides of the front cover and open it so you can access the cartridge holder.



2. Take the ink cartridge out of its protective packaging.
3. Slide off the orange protective cap from the print head and

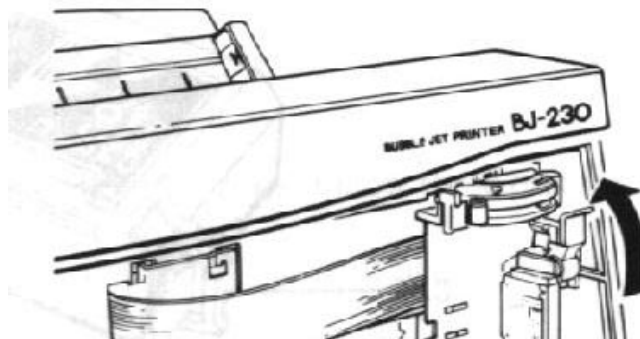


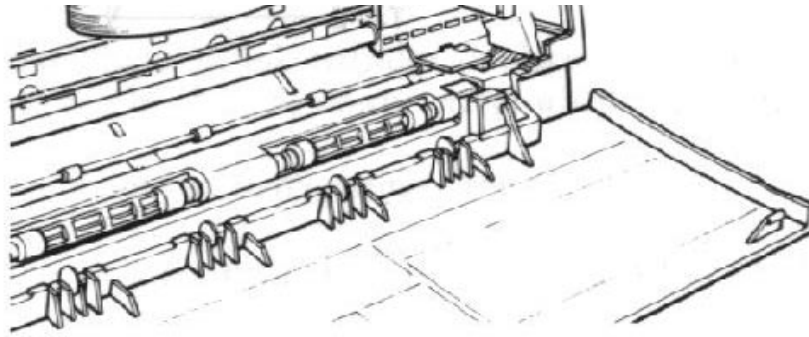
- remove the orange tape.
4. Locate the cartridge holder on the right side of the printer.



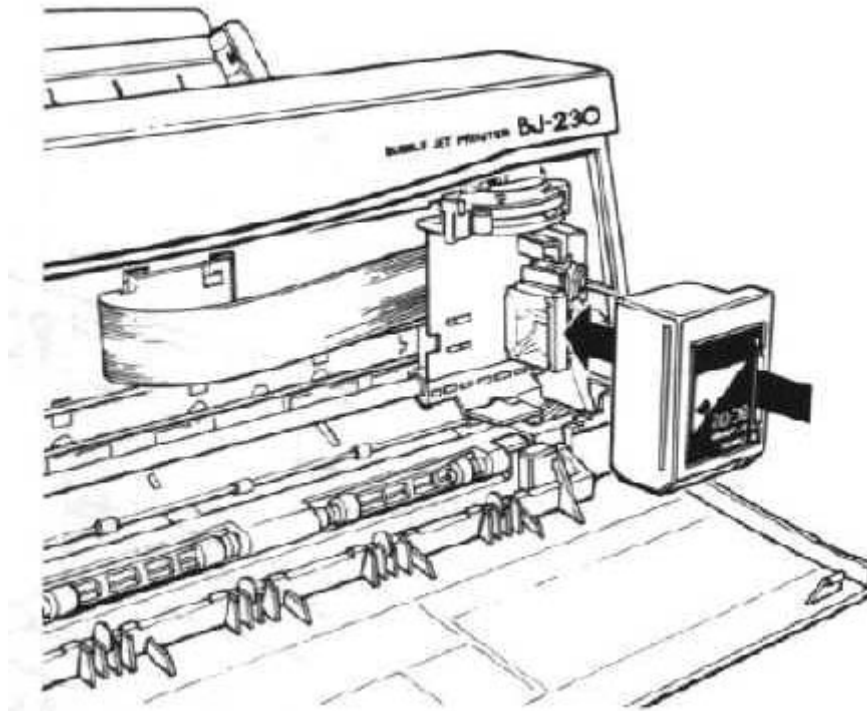
CAUTION: Avoid touching the yellow mounting base on which you place the cartridge -- especially the circuit board on the side of the mounting base and the film cable that extends from the cartridge holder.

5. Lift the green lock lever on the cartridge holder.

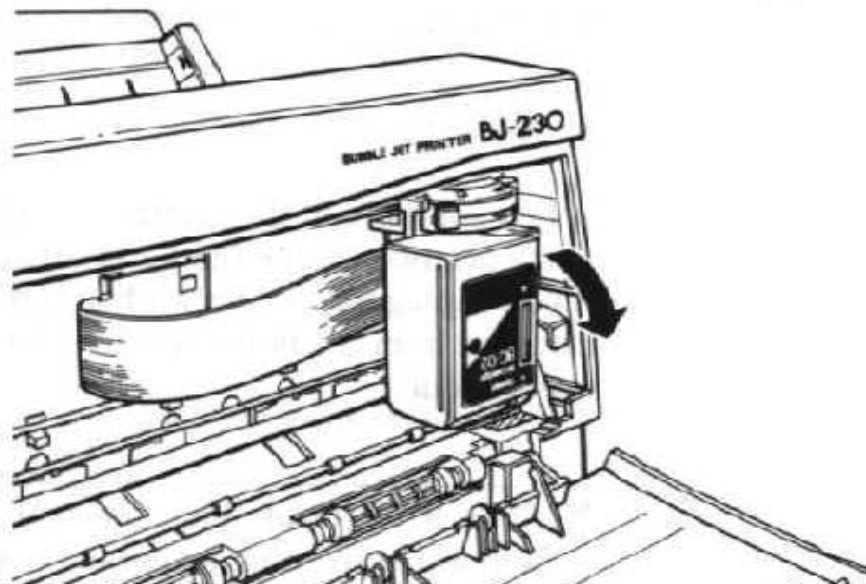




6. Fit the ink cartridge over the yellow mounting base with the print head facing down. (When installed correctly, the label on the cartridge will appear upside down.)

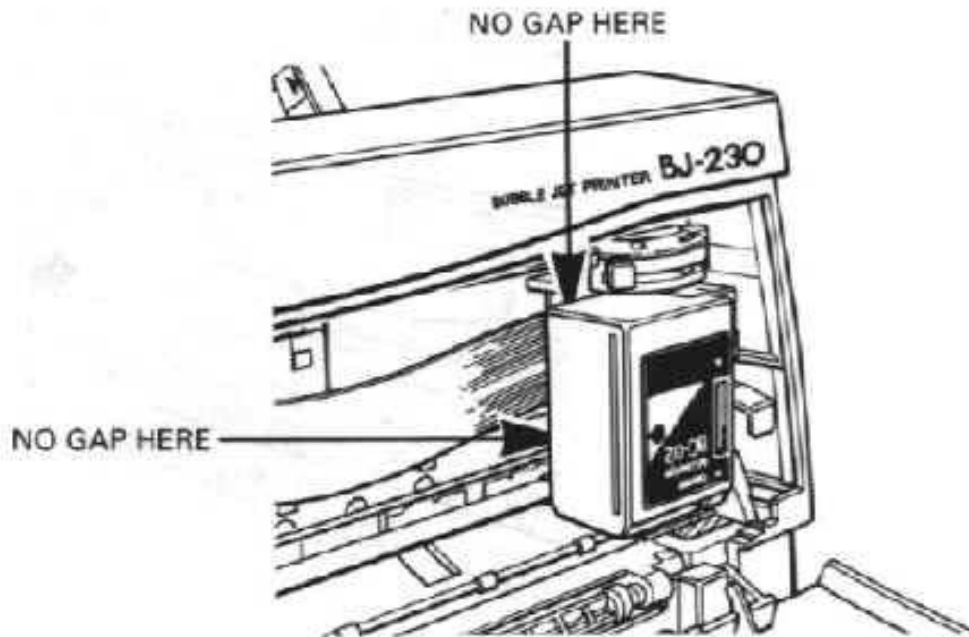


7. Push the lock lever down until it snaps into place.





Make sure there is no resistance when you press on the lock lever, and be sure no gap exists between the ink cartridge and cartridge holder. When secure, the ink cartridge makes contact with the circuit board inside the cartridge holder.



CAUTION: Do not move the ink cartridge after installing it. Moving the ink cartridge to the left and leaving it there may uncap the print head and cause it to dry out.

8. Close the front cover.

When you turn off the printer, the ink cartridge moves to the home position on the right and caps itself to keep from drying out. If you unplug the printer while it is printing, or if you move the ink cartridge from the home position, the cartridge is not capped and may dry out.



NOTE: If, after installing a new ink cartridge, the printer seems to be printing but no ink appears, stop the print operation. Remove and replace the ink cartridge making sure it is secure.

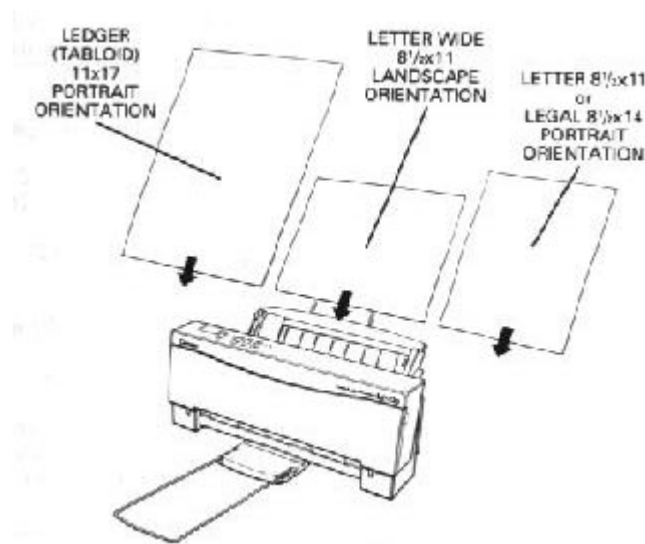


Chapter 3

Loading Paper

This chapter describes how to load paper, envelopes, thick paper, and transparencies in the printer. To ensure the best performance of your printer, you want to select the best paper and load it correctly.

The wide-carriage capabilities of your printer allow you to load letter-size paper in either portrait or landscape orientation and legal- or ledger-size paper in portrait orientation.



You can stack paper in the sheet feeder to load it automatically, or you can manually feed one sheet at a time. The path that the paper travels through the printer is the same for automatic and manual feeding.



CAUTION: Make sure the width of the paper on which you are printing matches the width defined by your software so there is always paper between the print head and the platen. The print head may be damaged if it prints directly on the platen.

Automatically Feeding Paper

Your printer produces letter-quality print on most plain bond papers, including cotton bond papers and photocopying papers. This printer does not require special ink-jet papers.

Purchase a small amount of paper and test it to see if it meets your printing requirements.



NOTE: Attempting to print on damp, curled, wrinkled, or torn paper can cause paper jams and poor print quality.

You can automatically feed single sheets of plain papers:

Size: Letter -- 8.5 x 11 inches (210 x 279 mm)
Legal -- 8.5 x 14.0 inches (216 x 356 mm),
portrait orientation only
Ledger -- 11 x 17 inches (279 x 420 mm),
portrait orientation only

Thickness: Less than 0.008 inches (0.2 mm)

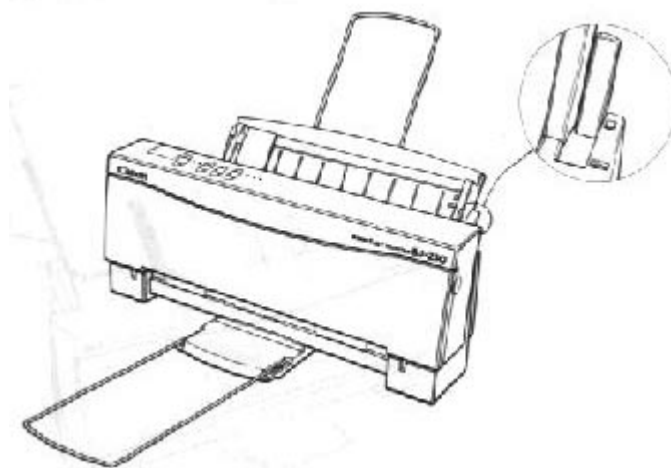
Weight: 17 to 24 lbs (64 to 90 g/m²)

You can stack up to 100 sheets of plain letter-size or legal-size paper (20lbs or 75 g/m), and up to 50 sheets of plain ledger-size paper (20lbs or 75 g/m), in the sheet feeder.



NOTE: Make sure the paper size you select within your printer driver matches the orientation in which you load the paper in the printer. See Chapter 5, Using the Printer With Software, for information on printer drivers.

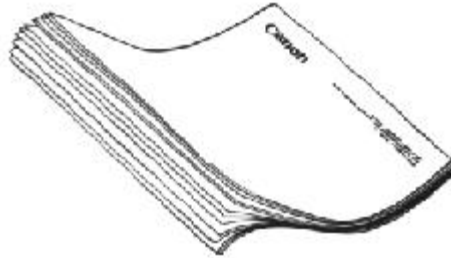
1. Set the paper selection lever to the back position.



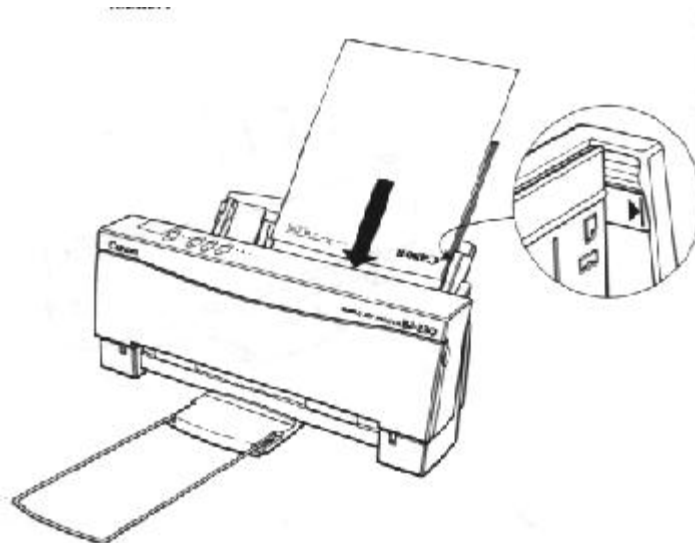


NOTE: You set the paper selection lever to the front position only when loading envelopes or manually feeding paper. If it is set to the front position when you are automatically feeding stacks of normal paper, the printer may feed multiple sheets or jam.

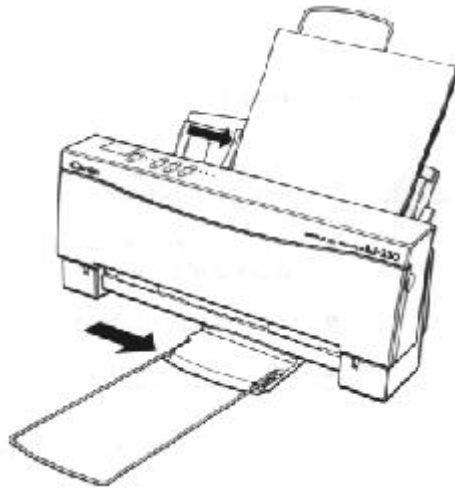
2. Fan the paper before stacking it in the sheet feeder.



3. Align the stack of paper with the right edge of the sheet feeder and slide in the stack until it stops. Do not force the paper into the printer. Make sure the stack of paper does not exceed the paper limit mark or the tab on the right side of the sheet feeder.



4. Insert the paper so that the side you want to print on is facing you. If you are using a preprinted stock, such as letterhead, insert the top of the paper into the sheet feeder first.
5. Adjust the paper guide to the stack of paper, and adjust the paper exit support to match the width of your paper so that the paper will be centered on the support.



6. Make sure the printer is on-line and start your print operation.



NOTE: Do not leave paper stacked in the printer for long periods of time; longer sheets of paper may become bent or curled over time. This may cause multiple sheets to feed or the paper may jam.

Remove paper from the paper exit support before the count reaches 20 sheets.

Printing On Envelopes

You can stack up to 10 envelopes in the sheet feeder. Before printing on envelopes, you need to turn on the envelope mode.

Use only commercial, number 10 envelopes, which are 9.5 x 4.1 inches (241 x 104 mm). (Other envelope sizes are not supported by this printer.)

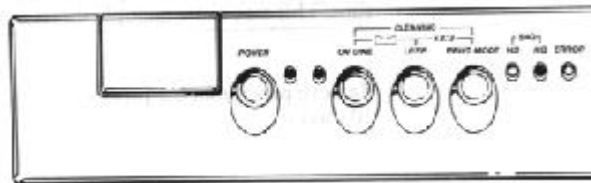


CAUTION: Some envelopes are not recommended because they may cause jams or smears or may damage your printer:

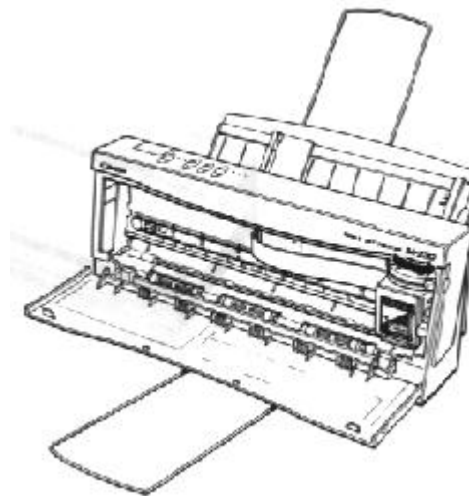
- Envelopes with windows, metal clasps, holes, perforations, cutouts, double flaps, or peel-off sealing strips.
 - Envelopes that are specially coated or deeply embossed.
 - Envelopes with letters enclosed.
-

When you are ready to load envelopes, follow these steps:

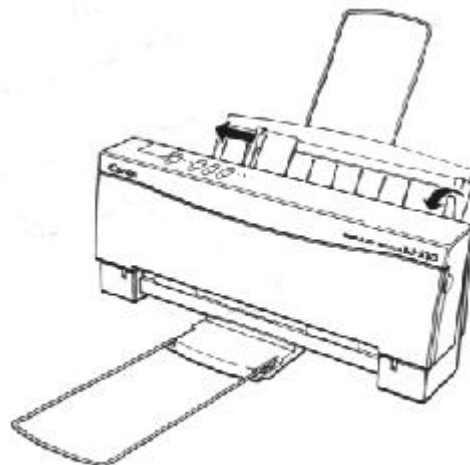
1. Make sure the printer is turned on and on-line.
2. Turn on the envelope mode by pressing and holding the **LF/FF** button, and then pressing the **ON LINE** button. The beeper sounds once and the indicator light for the current print mode blinks quickly. Press **ON LINE** to set the printer back on-line.



3. Set the green paper thickness lever on the inside of the printer to the right.



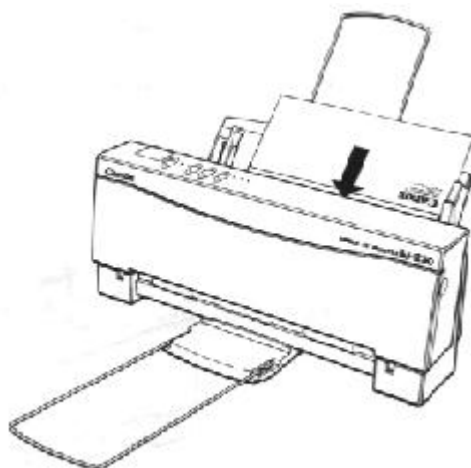
4. Set the paper selection lever to the forward position, and move the paper guide to the left to match the width of the envelopes.



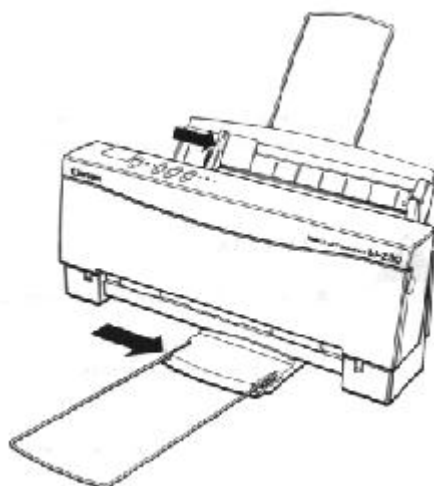
5. Arrange the stack of envelopes on a firm surface and press down firmly on the edges to make the folds crisp. Press all the way around the envelopes to remove any curls and expel air from inside the envelopes.



6. Align the stack of envelopes with the right edge of the sheet feeder and slide in the stack until it stops.



7. Adjust the paper guide to the stack of envelopes, and adjust the paper exit support to match the width of the envelopes.



8. Start your print operation.

After printing on envelopes, follow these steps before printing on normal paper again:

1. Set the paper selection lever (on the right side of the sheet feeder) to the back position.
2. Set the green paper thickness lever (inside the printer) to the left position.
3. Disable the envelope mode: make sure the printer is on-line; then press and hold the **LF/FF** button and press the **ON LINE** button.

Use the envelope mode only when you are loading envelopes; do not use this mode when loading regular or thick paper.

Manually Feeding Thick Paper or Transparencies

You use the manual feed feature when printing on paper that is a heavier weight (up to 28lb or 105 g/m²) or a transparency stock.

Use transparencies that are intended for use with ink jet printers. For best results, use Canon's BJ transparency film #Q07-0001-M1. You can also use 3M's CG3480 transparency film.

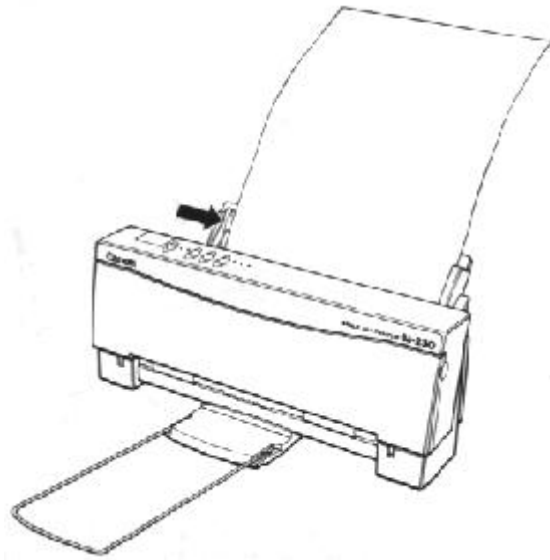


CAUTION:

- Always feed transparencies manually.
 - Use transparencies only in a normal operating environment. High temperatures may damage a transparency.
-

To manually feed a single sheet, follow these steps:

1. Make sure the printer is turned on and on-line.
2. Set the paper selection lever (on the right side of the sheet feeder) to the forward position.
3. If you are printing on thick paper, open the front cover and make sure the green paper thickness lever (inside the printer) is set to the right.
4. Align the sheet of paper or transparency with the right edge of the sheet feeder, and adjust the paper guide to the sheet.



NOTE: When printing on a transparency, insert the sheet so the transparency side is facing you and the backing is toward the sheet feeder. Insert the top of the transparency (where it is attached to its backing) into the sheet feeder first.

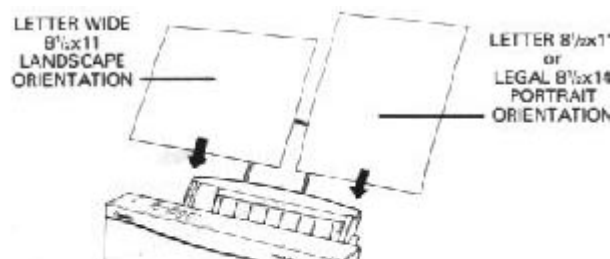
5. Slide in the sheet until it stops, and hold it for about two seconds. The printer will automatically load the paper into position.
 6. Start your print operation.
-

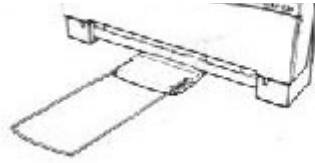


NOTE: After printing on thick paper or envelopes, set the paper thickness lever (inside the printer) back to the left position before printing on normal paper.

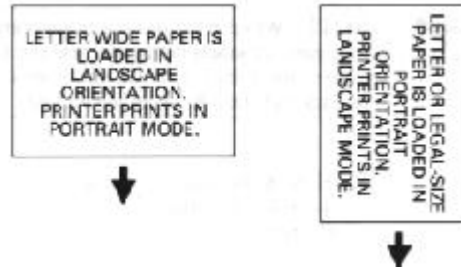
Loading Paper in Landscape Orientation

You can stack up to 100 sheets of plain letter-size paper in landscape orientation in the sheet feeder.





The printer prints faster on letter-size paper loaded in landscape orientation than it does when actually printing in landscape mode.



When you load paper in landscape orientation, you can use reduction mode to fit even more text on next page. (See Chapter 4, Using the Operator Panel, for details on using reduction mode.)



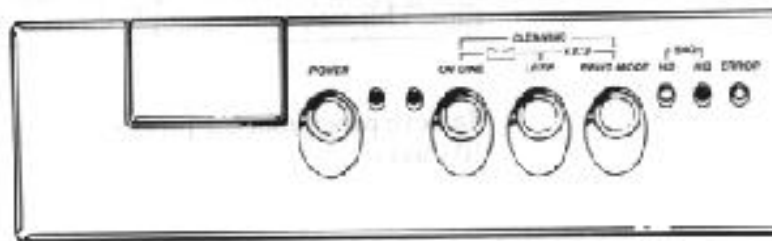
Chapter 4

Using the Operator Panel

You can control basic printer operations through the operator panel. The indicator lights reflect the current status and modes of the printer.

Most software applications, such as word processing, spreadsheet, and database programs, automatically handle the printer control operations. For example, your word processing program tells the printer what typeface to use and when to perform a line feed or form feed.

If your application program does not perform these basic functions, you can control them using the operator panel. You can also select printer-specific functions, such as the print mode, and you can start the self tests.



The following sections of this chapter describe how you use the operator panel to select printer functions.

Turning On the Printer

Press the **POWER** button to turn on the printer. The **POWER** light will come on. When the printer is ready to print, the **ON LINE** light will come on.

Pausing a Print Operation

When the **ON LINE** light is on, the printer is on-line and ready to receive data from your computer. At this time, you can send print data from your computer to the printer.

If you want to pause a print operation, press the **ON LINE** button again to set the printer off-line. The **ON LINE** light will go off and the printer

will stop. To start printing again, press the **ON LINE** button.

Feeding Paper

When the printer is off-line, you can use the **LF/FF** button to advance the paper in the printer. You can perform a line feed or a form feed, or you can eject a sheet of paper.

Line feeding

When a sheet of paper is loaded and the printer is off-line, press the **LF/FF** button to advance the paper one line. Press the button repeatedly to feed as many lines as you want.

Form feeding

When you are loading paper, make sure the printer is off-line and press the **LF/FF** button to load the first sheet of paper to its top of form. Set the printer back on-line to print. (If you are running a software application, you don't need to perform this step. The application the printer when to load paper.)

Ejecting paper

When you want to eject a sheet of paper, make sure the printer is off-line and press the **LF/FF** button for one second. The printer ejects the current sheet of paper.

Selecting a Print Mode

Your printer incorporates two print modes that allow you to choose between print speed and print quality:

<u>Print Mode</u>	<u>Function</u>	<u>Speed at 10 cpi</u>	<u>Noise level in decibels</u>
HS	High speed and draft quality printing	248 cps	Approx. 42
HQ	High quality printing	173 cps	Approx. 42
SHQ	Super high quality and silent printing	124 cps	Approx. 40

You use the **PRINT MODE** button to select the current print mode when the printer is off-line. Pressing this button once selects HQ mode, pressing it again selects SHQ mode, and pressing it again selects HS mode. The HS and HQ lights indicate which mode is selected. (When both the HS and HQ lights are on, the printer is in SHQ mode.)

Select your printer modes as follow:

- Use HQ mode for most of your printing needs. The printer automatically prints in HQ mode unless you change the mode with the **PRINT MODE** button.
- Use the SHQ mode when you want extremely high quality print or you want the printer to be very quiet. In this mode, the printer uses a higher quality print density and consumes more ink than in HQ mode. Your printer text may appear bolder than in HQ mode.
- Use the HS mode when you are printing draft documents. Your document prints faster but the print density is less than HQ mode. HS mode uses half the amount of ink as HQ mode.



NOTE: Normally, the default print mode is HQ. If you are in Epson LQ mode (DIP switch 12 is ON), and you select the Draft typeface with DIP switches 9 to 11, the default print mode is HS mode. (You can learn about DIP switches in Chapter 8, Customizing the Printer.)

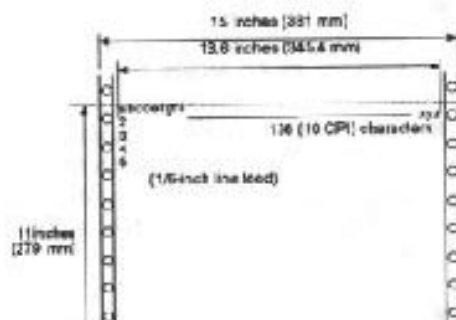
Selecting Reduction Modes

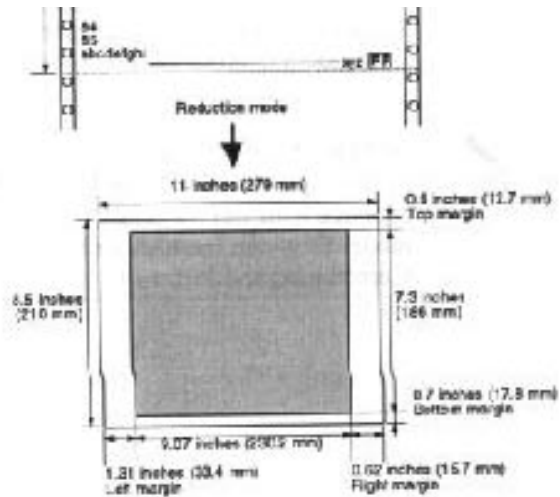
The printer supports a reduction mode for printing spreadsheets and other wide documents on regular paper. In reduction mode, the printer reduces the output to two-thirds of its full size. Therefore, a spreadsheet that is 13.6-inches wide will be 9.07-inches wide when printed in reduction mode.

Using reduction mode, you can print spreadsheet data (that you normally print on 15 x 11-inch continuous-form paper) on 8.5 x 11-inch paper in landscape orientation.

In reduction mode, the printer automatically sets the printer dimension as follows:

<i>Top margin:</i>	0.32 inch
<i>Left margin:</i>	0.35 inch
<i>Print width (max.):</i>	7.8 inch





NOTE: Use reduction mode only when you are printing on letter wide paper in landscape orientation or you are using ledger-size paper in portrait orientation.

It is recommended that you use the reduction mode with MS-DOS applications only (not Windows applications). Windows applications have a fit-to-page feature that is not compatible with reduction mode.

In reduction mode, the printer ignores the page length command and the perforation skip command. Before using reduction mode, make sure the following conditions are set:

- Set the page length to 66 lines or less.
- Place a form feed (FF) code at the end of each page.

To select the reduction mode, follow these steps:

1. Make sure the printer is on-line.
2. Press and hold the **LF/FF** button.
3. Press the **PRINT MODE** button. The printer beeps twice and the indicator lights for the current print mode blink slowly.
4. Load paper and begin your print operation.



NOTE: This mode may be overridden by your software.

To disable reduction mode, press and hold the **LF/FF** button and press the **PRINT MODE** button. You can also turn off the printer.



NOTE: When the printer is in the envelope mode, it ignores the reduction mode setting.

Printing the Test Prints

The printer includes two tests prints: the self test and the font list. Use these test prints to check the operation of the printer.

To print the self tests, you must be automatically feeding paper. The self tests are not available when you are manually feeding paper.

Self Test

You can print the self test in both printer control modes: BJ-10 mode or Epson LQ mode. The printer prints a repeating pattern of characters in the default print mode and pitch.

In BJ-mode, the pattern is printed in Courier typeface at 10 characters per inch (cpi); the print mode is HQ. In Epson LQ mode, the pattern is printed in Roman typeface at 10 cpi; the print mode is HQ.

Starting

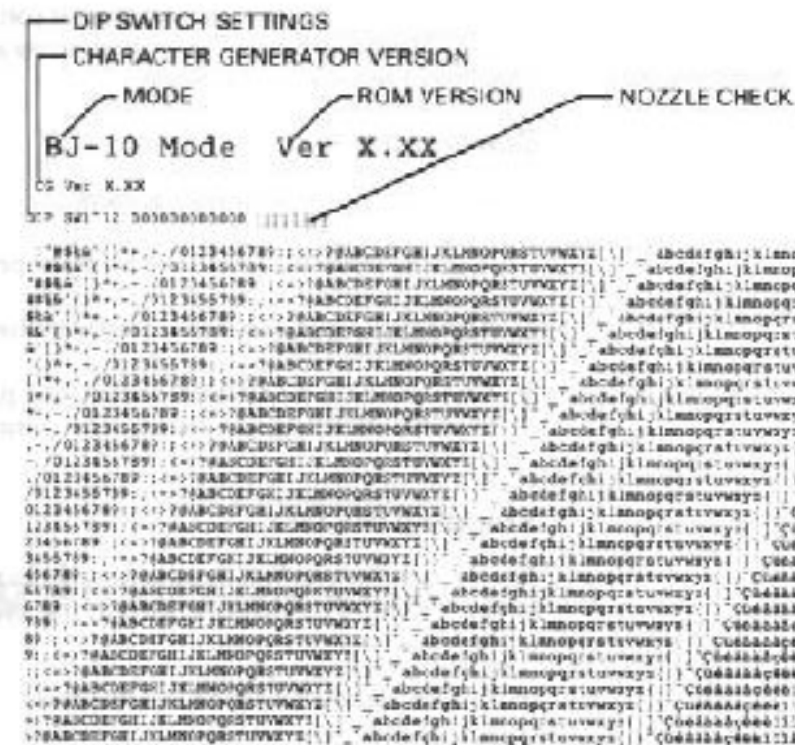
To start the self test, follow these steps:

1. Press the **POWER** button to turn off the printer
2. Make sure paper is loaded correctly in the sheet feeder.
3. Press and hold the **ON LINE** and **PRINT MODE** buttons, and press the **POWER** button until the beeper sounds. The printer starts to print the self test.

Stopping the test

To stop the self test, press and hold the ON LINE and PRINT MODE buttons for one second. The printer stops printing, ejects the current sheet of paper, and goes on-line.

In BJ-10 mode, the self test looks like this:



In Epson LQ mode, the self test looks like this:



Font List

You can print this sample in both printer control modes: BJ-10 mode or Epson LQ mode. The printer prints all characters in the available print styles and pitches.

Starting the test

To start the font list, follow these steps:

1. Press the **POWER** button to turn off the printer.
2. Make sure paper is loaded correctly in the sheet feeder.
3. Press and hold the **ON LINE** button, and press the **POWER** button until the beeper sounds.

Stopping the test

To stop printing the font list, press and hold the **ON LINE** button for one second. The printer stops printing, ejects the current sheet of paper, and goes on-line.

In BJ-10 mode, the font list looks like this:



In Epson LQ mode, the pattern looks like this:





Performing Automatic Line Feeds

You can set the printer so that it performs an automatic line feed each time it receives a carriage return. Then, when the printer receives a carriage return code from the computer, it moves to the beginning of the next line.

You only need to set this function if you are using an application program that does not include a carriage return with a line feed.

To set the automatic line feed function, follow these steps:

1. Make sure the printer is turned off.
2. Press and hold the **ON LINE**, **LF/FF**, and **PRINT MODE** buttons, and then press the **POWER** button until the beeper sounds.

If you notice an extra blank line between each line printed, turn off the printer to cancel this function.



Chapter 5

Using the Printer With Software

Your printer will work with a wide variety of applications, such as spreadsheet, word processing, and graphics programs. This chapter describes how to set up your software application for your printer.

Setting Up Windows for Your Printer

This sections contains the procedures you perform to install the Bubble Jet Printer BJ-230 driver for the Microsoft Windows operating system environment, versions 3.1 and 3.0. Before you begin these procedures, make sure you are familiar with the basic operation of Windows including its terms and use of the mouse. If necessary, refer to your Microsoft Windows 3.1 (or 3.0) User's Guide for help.

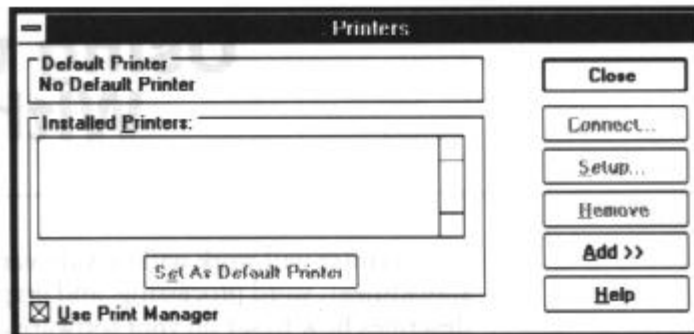
Installing the Printer Driver

1. Make sure your computer is turned on.
2. Make a backup copy of the diskette containing the Canon BJ-230 printer driver for Windows.
3. Start Windows and follow the steps that are specific to the version of Windows you are using.

Windows 3.1

If you are using Windows 3.1, follow these steps to install the printer driver:

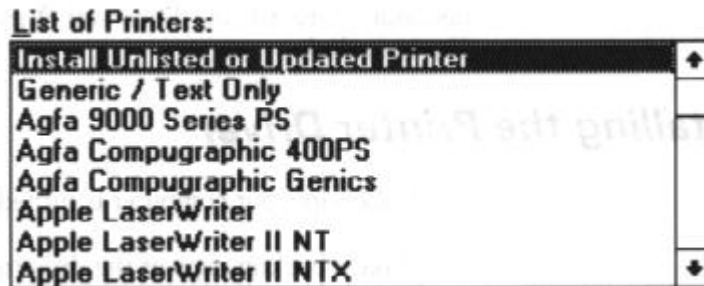
1. Choose Control Panel from the Main Group window in the Program Manager.
2. Open the Printers icon. The Printer dialog box appears.



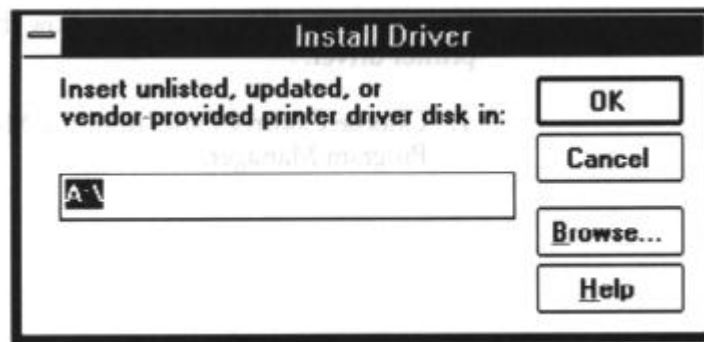


NOTE: Your screen may show printers in the Installed Printers box. This means other printers have been installed for your system; this should not cause any problems.

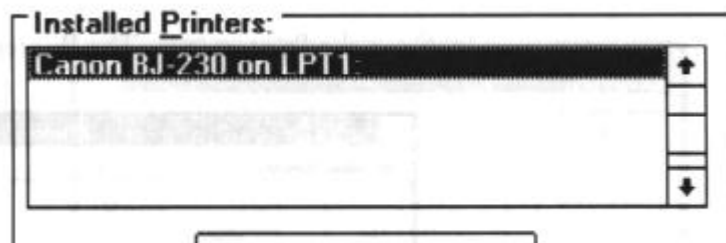
3. Choose the Add button to display all the List of Printers box.



4. Select Install Unlisted or Updated Printer from the beginning of the List of Printers, and then choose Install. A dialog box appears instructing you to insert the diskette that contains the printer driver.

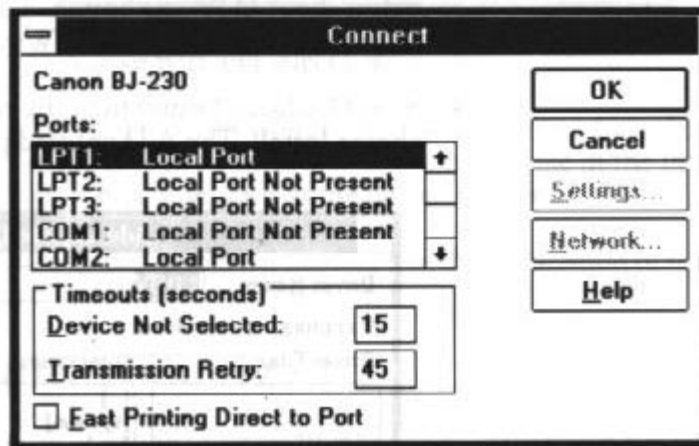


5. Insert the diskette containing the Canon BJ-230 Windows printer driver into disk drive A: and select OK. (If you are not using drive A:, you can enter the pathname that identifies the drive you are using or use Browse to locate the drive.)
6. Choose Canon BJ-230 from the List of Printers and select OK. The Control Panel installs the BJ-230.DRV file on your hard disk. The printers dialog box appears with the Canon BJ-230 listed in the Installed Printers box.



Set As Default Printer

7. If you need to change the port designation, make sure the Canon BJ-230 is selected in the installed Printers box. Then select the Connect button to display the Connect dialog box.

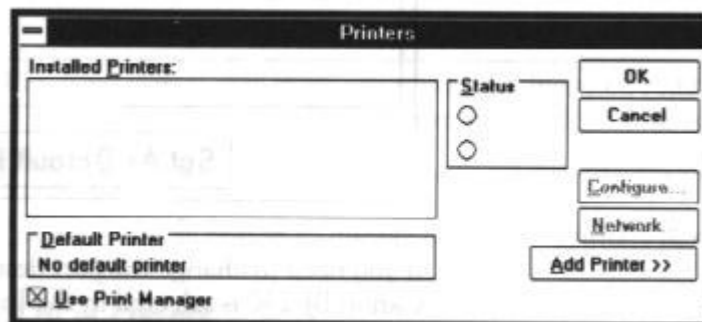


8. Choose your port and select OK.
9. If you want to use the Bubble Jet Printer BJ-230 for all of your work, make sure Canon BJ-230 is highlighted and select the Set As Default Printer button from the Printers dialog box.
10. Select the Close button to complete the installation of the Canon BJ-230 Windows driver.

Windows 3.0

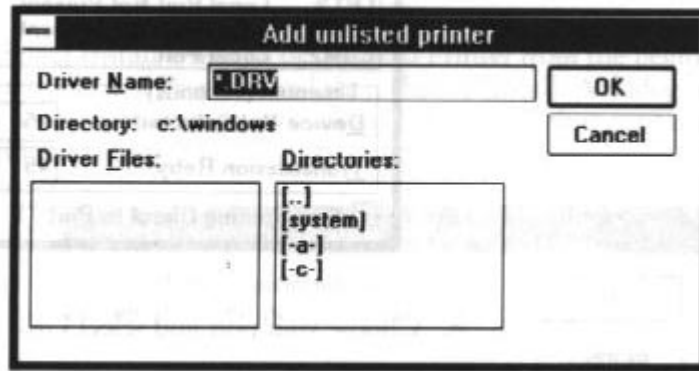
If you are using Windows 3.0, follow these steps to install the printer driver:

1. Choose Control Panel from the Main Group window in the Program Manager.
2. Open the Printers icon. The Printers dialog box appears.

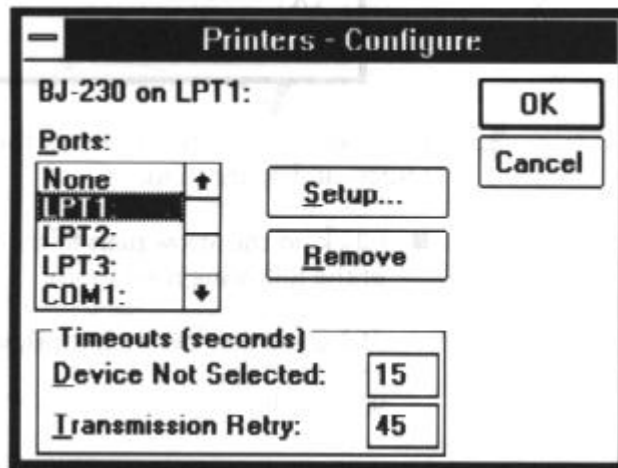


3. Select the Add Printer button. The List of Printers identifies all printer drivers supplied by Windows.
4. Select Unlisted Printer from the end of the List of Printers, and

choose Install. The Add unlisted printer window appears.



5. Insert the diskette containing the Canon BJ-230 Windows printer driver into disk drive A: (or any other available drive).
6. In the directories box, select A: (or the name of the drive you are using). The BJ-230.DRV filename appears in the Driver Files box.
7. Select BJ-230.DRV and select OK. BJ-230 appears in the Installed Printers box.
8. To change the port designation, make sure the BJ-230 is selected in the Installed Printers box. Then select the Configure button to display the Configure dialog box.



9. Choose your port and select OK.
10. Select Active for the status of the BJ-230. If you intended to use it for all of your work, double-click on its name in the Installed Printers box to select it as the default printer.
11. Choose the OK button to complete the installation of the Canon BJ-230 Windows driver.

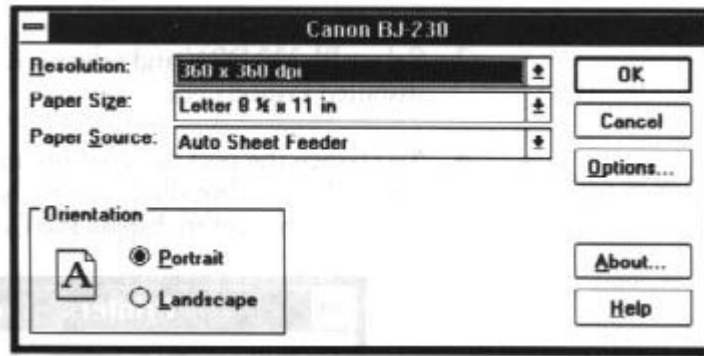
Printer Setup Within Windows

After you install the Canon BJ-230 printer driver, you can run the Setup program. This is located in the Printers Control Panel.

If you are using Windows 3.1, select the Setup button from the Printers dialog box.

If you are using Windows 3.0, select the Configure button and then the Setup button.

When you start the Setup program, Windows displays the main dialog box for your printer:



From this screen, you can select the paper size, media type, paper source, print selection, print quality, and orientation.

- Click on the arrow next to the Resolution setting to select one of the following resolutions:

360 x 360 dots per inch (dpi), which is the default resolution

180 x 180 dpi

90 x 90 dpi

A resolution of 360 x 360 dpi offers the best print quality.

- Click on the arrow next to the Paper Size setting to select one of the following paper sizes:

Letter 8 1/2 x 11 in, which is the default

A4 210 x 297 mm

A4 Wide 297 x 210 mm

Legal 8 1/2 x 14 in

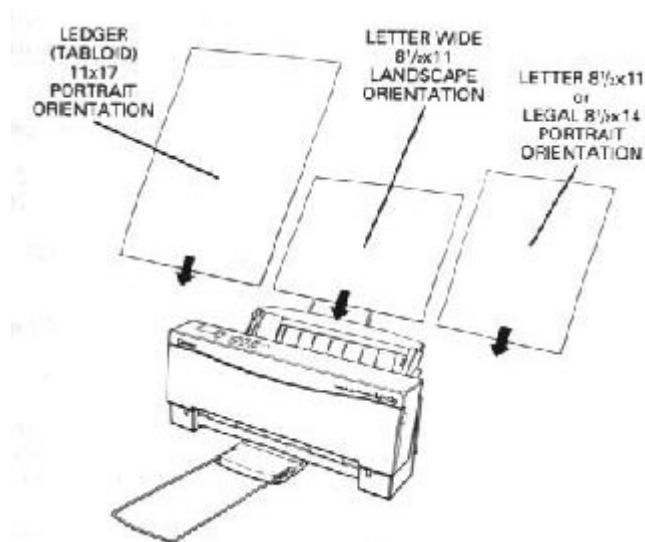
Tabloid 11 x 17 in

A3 297 x 420 mm

Envelope #10 9.5 x 4.1 in

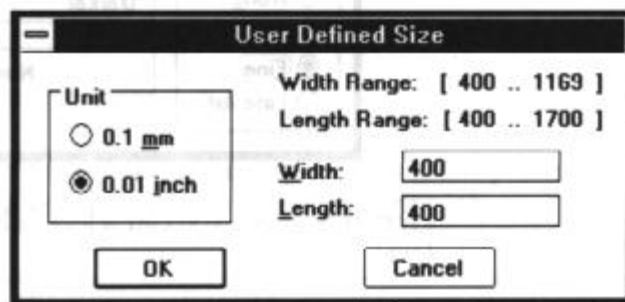
User Defined Size ...

Make sure the paper size you select here matches the orientation in which you load the paper in the printer:



NOTE: When you load letter-wide paper in landscape orientation, the printer actually prints in portrait mode. So make sure you select portrait for your printing orientation in the printer driver.

If you select User Defined Size, the Setup program displays the following dialog box:



First select the unit of measurement you are using (inches or millimeters), and then specify the width and length of your paper.

- Click on the arrow next to the Paper Source setting to select one of the following paper sources:

Auto Sheet Feeder, which is the default
Manual Feed

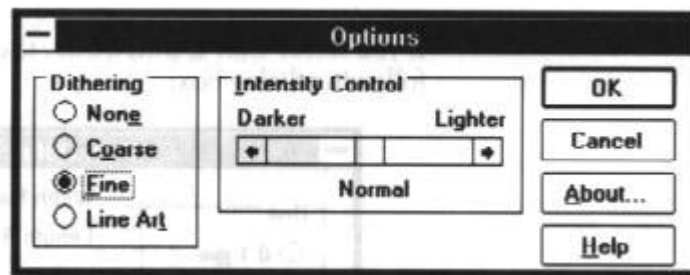


NOTE: When using manual feed, make sure the Print Manager is turned off, in the Printers dialog box.

- You can select either Portrait or Landscape orientation by clicking on the appropriate selection in the Orientation box. The default is portrait orientation.
- Click on About in the main dialog box to display copyright information regarding the Windows driver and its version number.
- Click on Help in the main dialog box to enter Microsoft's Universal Driver Help program. The Printer Setup screen displays information that will help you specify your printer settings.

Options

As part of your printer setup, you can specify certain options that control the darkness and fineness of your printed graphics and text. Click on Options in the main dialog box to display the Options dialog box:



From this screen you can select dithering options and an intensity level.

- You can select one of four dithering options: None, Course, Fine or Line Art. The dithering option you select changes the quality of a gray-scale or color image. None causes all color values to appear either black or white; no in-between colors are represented. The default dithering option is Fine.
- You can control the intensity with which text is printed using the Intensity Control box. This controls the threshold at which a pixel value is turned on or off. Setting the slide bar to the left results in darker print and setting it to the right results in lighter print. This control affects all dithering options. The default is the value represented at the center of the slide bar. (In some applications, setting the slide bar all the way to the right causes nothing to print.)

Printing a Document

This procedure provides general steps for printing from the various applications you may run in the Windows environment. The exact steps for printing a document may vary depending on the application program you are using. Refer to your program's user's manual for the exact

printing procedure.

1. Start the program you used to create the document, and open the document you want to print.
2. Choose Printer Setup from the File menu.
3. Select the Canon BJ-230 as your printer, and select Setup.
4. Make any adjustments as appropriate for printing your document, and select OK.
5. Select OK to close the Printer Setup Window.
6. Choose Print from the File menu.
7. After making any necessary changes to the printing parameters, select OK to start the print job.



NOTE: Turn off the Print Manager if you are feeding paper manually. To do so, clear the Use Print Manager check box in the Printers dialog box within the Control Panel.

Setting Up Other Software Applications

If you are not using Windows, follow the guidelines in this section for setting up your applications for use with the Bubble Jet Printer BJ-230. If you installed the Canon BJ-230 Windows printer driver as described in the previous section and will be printing only under Windows, you can ignore this information.

Software applications are designed to work with specific hardware setups. Most application programs include an installation program or routine that you run to identify the type of hardware you are using, such as your computer and printer.

Application programs include a group of programs, called printer drivers, that support different printers. Before using the printer with your application program, you need to tell the application what type of printer you are using by selecting the printer driver that corresponds to your printer.

Selecting a Printer Driver

The installation programs for most applications offer a list of printer drivers from which to choose. If you find Canon BJ-230, BJ-200, BJ-10e, or BJ-10ex on the list, select it. This will give you the fullest range of features.

If you do not find one of these printers on the list, you can select a printer that will have nearly the same operating capabilities as the Bubble

Jet Printer BJ-230.



NOTE: Software developers continuously create printer drivers. If your application software does not list a Canon BJ-230 drivers, call your software application's technical support line and ask if a BJ-230 driver is available. If they are unable to assist you, call the Canon help desk at 1-800-423-2366 to see if the driver is available.

To use the printer in BJ-10 mode, select one of the following printers (they are listed in order of preference):

- Canon BJ-230 (X24E)
- Canon BJ-200 (X24E)
- Canon BJ-10e/BJ-10ex/BJ-20 (X24E)
- IBM Proprinter X24E/XL24
- IBM Proprinter X24/XL24E
- Canon BJ-130e
- IBM Proprinter

To use the printer in Epson LQ mode, select one of the following printers (they are listed in order of preference):

- Canon BJ-230 (LQ)
- Canon BJ-200 (LQ)
- Canon BJ-20 (LQ)
- Canon BJ-10e/BJ-10ex (LQ)
- Epson LQ-510
- Epson LQ-850
- Epson LQ-500
- Epson LQ-1050
- Epson LQ printer



NOTE: To use the wide-carriage capabilities of your printer, select the Canon BJ-230 printer only.

After selecting a printer, you can use software commands for all standard printer functions through the application program. This includes bold or double-strike printing, underlining, subscripts, margin control, line-spacing control, and graphics.

Selecting a Printer Control Mode

Your printer has two resident printer control modes: BJ-10 mode and Epson LQ mode. BJ-10 mode is the default.

If you were able to select a Canon BJ printer or the IBM Proprinter X24E through your application program, you will want to use the printer in BJ-10 mode. This mode gives you the fullest range of features.

If your application program does not support the Canon BJ or the IBM Proprinter X24E printers, but does support an Epson LQ printer, you can use the printer in LQ mode.

You can also select a printer control mode based on specific text features you want to use in your document. If you will be printing only text (no graphics), select LQ mode if Epson drivers are available. If you plan to print both text and graphics, select BJ-10 mode.

The following table lists the fonts and pitches that are available in each printer control mode.

Font design/typeface	<u>Printer Control Mode</u>	
	<u>BJ-10</u>	<u>Epson LQ</u>
Prestige	12 characters per inch (cpi) in HQ mode only	10 cpi, 12 cpi, 15 cpi, 17 cpi, 20 cpi, PS
Courier	10 cpi, 12 cpi*, 17 cpi, proportional spacing (PS)**	10 cpi, 12 cpi, 15 cpi, 17 cpi, 20 cpi, PS
Sans Serif	Not available	10 cpi, 12 cpi, 15 cpi, 17 cpi, 20 cpi, PS
Draft (available in HS mode only)	Not available	10 cpi, 12 cpi, 15 cpi, 17 cpi, 20 cpi, PS
Roman	Not available	10 cpi, 12 cpi, 15 cpi, 17 cpi, 20 cpi, PS
Script	Not available	10 cpi, 12 cpi, 15 cpi, 17 cpi, 20 cpi, PS
Orator	Not available	10 cpi, 12 cpi, 15 cpi, 17 cpi, 20 cpi, PS
Orator-S	Not available	10 cpi, 12 cpi, 15 cpi, 17 cpi, 20 cpi, PS

* In BJ-10 mode, Courier 12 cpi is available in HS mode only.

** In BJ-10 mode, proportional spacing is not available in HS mode.

The following table lists the print styles that are available in each printer control mode.

	<u>Printer Control Mode</u>	
<u>Print Style</u>	<u>BJ-10</u>	<u>Epson LQ</u>
Italic	No	Yes
Emphasized	Yes (via ESC E sequence)	Yes (via ESC E sequence)
Double-high	Yes (via ESC [@ sequence)	Yes (via ESC w sequence)
Double-wide	Yes (via ESC W sequence)	Yes (via ESC W sequence)
Slashed zero	Yes (via ESC [K sequence)	No

You use DIP switch 12 to select the printer control mode. When DIP switch 12 is OFF, which is the default, the printer uses BJ-10 mode. Set DIP switch 12 to ON to select LQ mode. See Chapter 8, Customizing the Printer, for more information on DIP switches.

Software and Printer Compatibility

You use software to send information and instructions to the printer over the cable that connects the printer to the computer. In addition to data, the instructions you send may include special sequences. The command sequences tell the printer such things as how many lines to skip and where to start printing.

Some control codes are standard throughout the microcomputer industry and are recognized by all printers. Two examples of these are form feed (FF) and line feed (LF).

ESCape sequences are unique to each printer emulation. ESCape sequences begin with the ESCape character (ESC) followed by one or more other characters.

The ESCape character tells the printer not to print the next character(s), but to use the information to perform a printing control task, such as print in bold or underlining.

Appendix C lists the control codes and ESCape sequences the printer recognizes in both BJ-10 mode and Epson LQ mode. The printer recognizes control sequences in ASCII, decimal, and hexadecimal format.

Chapter 6

Maintaining the Printer

This chapter covers the care and maintenance of your Canon Bubble Jet Printer BJ-230. This includes cautions, cleaning the printer, replacing the ink cartridge, and transporting the printer.

Cautions



Follow these guidelines to avoid damage to your printer and harm to you or others:

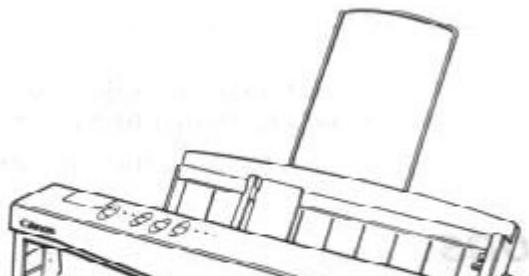
- Set the printer on a stable surface.
- Keep the front cover closed when printing.
- Do not set anything on top of the printer.
- Always use a three-wire, grounded power receptacle (electrical wall outlet with three holes) for your printer's power cord. Do not modify the cord to remove the ground pin.
- Make sure the power is off any time you connect or disconnect the power cord or interface cable.
- Do not move the mechanism that holds the ink cartridge. You may damage delicate mechanical parts.
- Do not touch the print head area on the ink cartridge. Ink may leak out and cause stains.

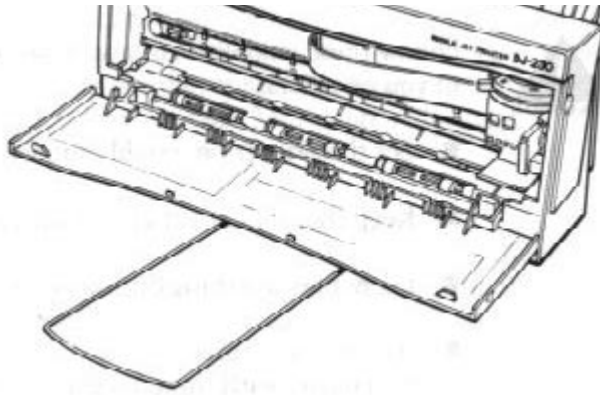
Cleaning the Printer

To achieve the maximum performance from your printer, clean it regularly.

Be very careful when cleaning the printer. Follow these steps:

1. Clean the inside of the printer using compressed air pressure or a soft cloth to remove any ink mist or paper debris. Clean especially well around the platen area.





2. Clean the exterior of the printer with a soft cloth moistened with water. Clean any smudges or dust.



CAUTION:

- Make sure the printer is turned off before cleaning it, and unplug the power cord.
 - When cleaning inside the printer, avoid the area near the print head on the ink cartridge. Do not touch the print head. Ink may leak out and cause stains.
 - Do not use any oil or cleanser inside the printer.
 - Use a soft cloth to clean the printer; do not use paper towels or tissues.
 - Do not clean the exterior of the printer with volatile liquids, such as thinners or benzine, or any other spray spray-type or chemical cleaners. Chemicals may damage the surface of the printer.
 - Do not submerge the printer in water.
-


Replacing the Ink Cartridge

You use the BC-02 ink cartridge with this printer. Each ink cartridge can print about 400 to 500 letter-size pages (700,000 characters) in HQ mode and 800 to 1000 pages (1,400,000 characters) in HS mode. The actual amount varies according to the print density of a page. If you print a lot of graphics, you may need to change cartridges more often.

You may need to replace the ink cartridge when either of the following conditions exist:

- You have been using the cartridge for using the cartridge for over one year.
- Your printed output is not crisp and clear, or there are gaps in the characters (missing dots).

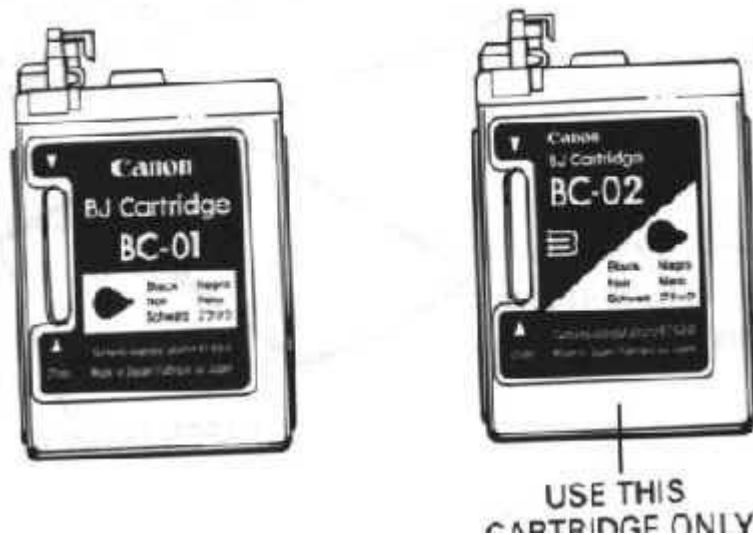
If your print quality is not crisp and clear, see Chapter 7, Troubleshooting, for possible solutions. If the problem seems to be your ink cartridge, be sure to clean the print head before determining that you need to replace the cartridge. If you clean the print head five times and your print quality does not improve, you need to replace the cartridge. (The print head cleaning procedure is described in Chapter 2, Setting Up the Printer, and later in this chapter.)

 **NOTE:** Print head cleaning is not a routine maintenance procedure. Only clean the print head if your print quality is inadequate.

Installing the Ink Cartridge



CAUTION: Canon makes numerous ink cartridges; the BC-02 is designed specifically for the Bubble Jet Printers BJ-200 and BJ-230 and is the only one you should use.



To avoid spilling ink, follow these precautions:

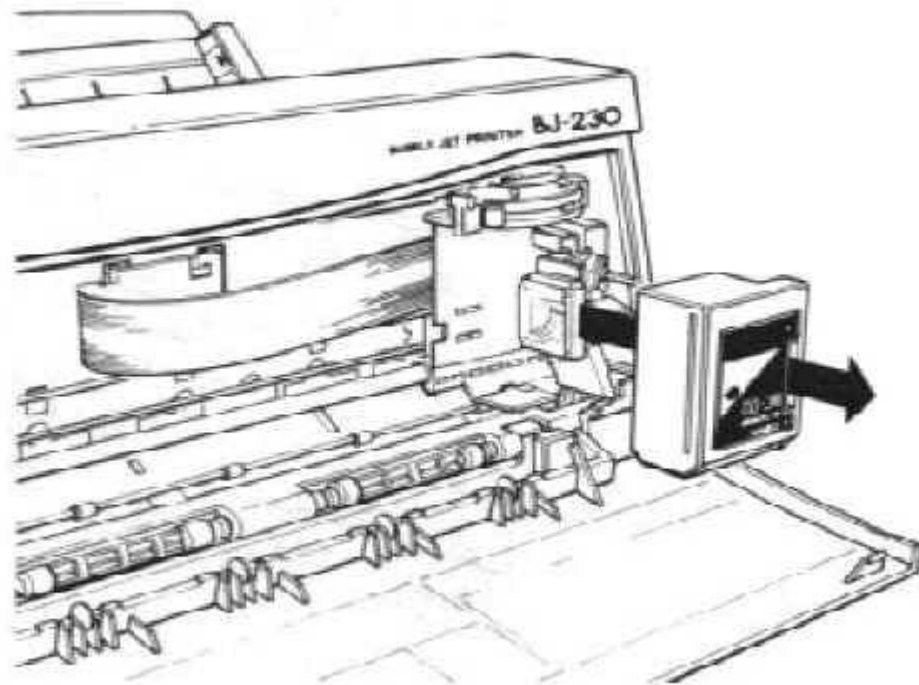
- Do not touch the print head on the ink cartridge or the sharp edges around it.
- Do not hold the ink cartridge, or place it on a table, with the print head facing down, except when you are installing it.
- Do not attempt to disassemble the cartridge.
- Do not vigorously shake the cartridge while handling it.
- Remove the ink cartridge from the printer only when necessary.



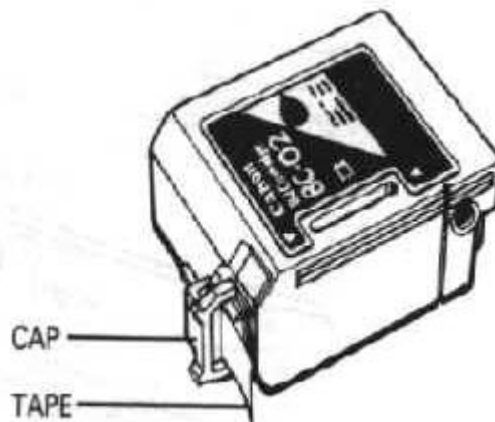
CAUTION: Keep the ink cartridge out of children's reach; the ink contains isopropyl alcohol 67-63-0.

To install a new ink cartridge, follow these steps:

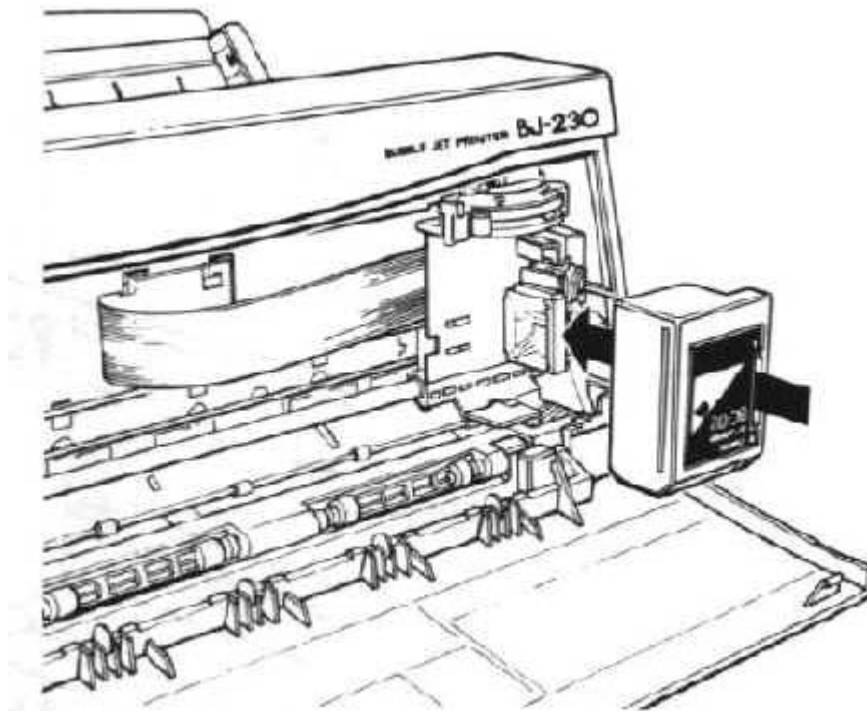
1. Make sure the printer is turned off.
2. Open the front cover.
3. Lift the green lock lever on the cartridge holder. Slide the old ink cartridge out of the holder and dispose of it properly.



4. Take the new ink cartridge out of its protective packaging. Slide off the orange protective cap from the print head and then remove the orange tape.

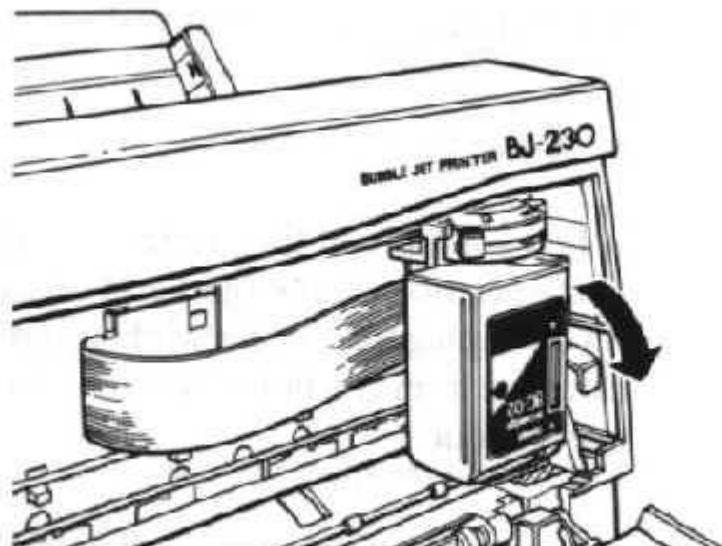


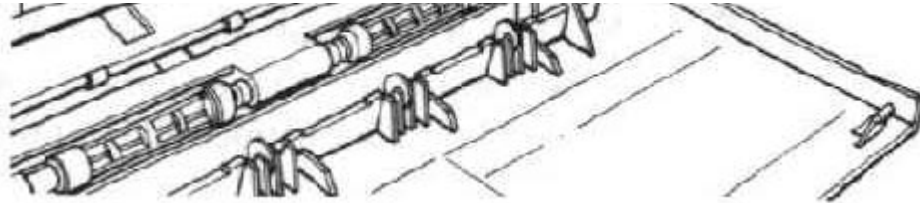
5. Fit the ink cartridge over the yellow mounting base with the print head facing down. (When installed correctly, the label on the cartridge will be upside down.)



CAUTION: Avoid touching the yellow mounting base on which you place the cartridge--especially the circuit board on the side of the mounting base and the film cable that extends from the cartridge holder.

6. Push the lock lever down until it snaps into place.





CAUTION: Do not move the ink cartridge after installing it. Moving the ink cartridge to the left and leaving it there may uncap the print head and cause it to dry out.

7. Close the front cover.

When you are not using the printer, make sure the ink cartridge is in its home position, which is on the right side of the printer.

Cleaning the Print Head

The print head on a new ink cartridge needs to be cleaned to ensure the best possible print quality. The printer automatically cleans the print head when you follow these steps:

1. Make sure the printer is turned on and on-line.
2. Press the **ON LINE** and **PRINT MODE** buttons at the same time.

The **ON LINE** indicator will blink for about 12 seconds while the printer cleans the print head. When complete, the **ON LINE** indicator stops blinking and goes off. Press **ON LINE** to resume printing.



NOTE: Cleaning the print head consumes a small amount of ink. Repeating this procedure unnecessarily reduces the life of the cartridge.

Storing Ink Cartridges

Follow these guidelines when storing your ink cartridges:

- Keep a new ink cartridge in its sealed container until you are ready to use it.
- Store the ink cartridge at room temperature.
- Install the ink cartridge in the printer immediately after you open the sealed container.
- After installing the ink cartridge, perform the print head cleaning

procedure.

Transporting the Printer

If you plan to move the printer from one location to another, or if you want to store it, follow these steps:

1. Press the **POWER** button to turn off the printer. This moves the print head to the home position.
2. Remove any paper from the sheet feeder.
3. Detach the interface cable and the power cord.
4. Close the front cover (if necessary).
5. Return the paper rest and paper exit support to their original positions.
6. Repack the printer in its original packing materials.



NOTE: Do not remove the ink cartridge from the printer or ship an ink cartridge from which you have removed the protective cap. An opened ink cartridge that is not installed in the printer may leak, and the print head may dry out.



Chapter 7

Troubleshooting

This chapter contains information to help you solve printer problems. A problem may have one or a combination of causes, including a malfunction in your computer, software, the printer cable, or the printer. Many printing problems are related to how your software interacts with the printer.

If your printer is not operating properly, try the suggestions in this chapter. The following list shows the problems covered here.

Operational Problems

- [The Printer Does Not Turn On](#)
- [Indicators Light, Printer Does Not Print](#)
- [Print Head Moves, Ink Does Not Appear](#)
- [ON LINE, HS, and HQ Indicators Are Blinking](#)
- [ERROR Light Is On](#)

Paper Loading Problems

- [Paper Does Not Load Into the Printer](#)
- [Multiple Sheets Load Into the Printer](#)
- [Paper Is Loaded Skewed \(Printing Is Skewed\)](#)
- [Envelopes Do Not Load](#)
- [Paper Does Not Eject After Printing](#)
- [Paper Jams Occur](#)

Print Quality Problems

- [Print Density is Low](#)
- [Print Is Not Clear](#)
- [Characters Are Blurred or Smudged](#)
- [Smudges On Back of Printed Page](#)
- [Characters Appear Jagged](#)
- [Irregular Print Quality](#)
- [Ink-stained Areas](#)
- [Print Head Needs Cleaning](#)
- [Ink Cartridges Continually Run Out of Ink](#)

Printing Problems

- [Printout Is Wrong](#)
- [Characters on Screen Do Not Match the Printed Characters](#)
- [Printing Beyond Edge of Page](#)
- [Printout Does Not Match Paper Size](#)
- [Printing Incorrect Number of Lines on Page](#)
- [Printer Is Not Using Font You Selected With DIP Switches](#)
- [Computer Indicates a Device Time-out](#)

Windows Problems

Printer Prints Garbage or Does Not Print
Large Gaps Appear Between Text or Graphics
Envelopes Do Not Print Correctly in Word for Windows



NOTE: If you have a problem with your printer and you cannot resolve it by referring to the information in this chapter, contact the Canon help desk at 1-800-423-2366. Attempting to repair the printer yourself may void the warranty.

Operational Problems

This section contains problems and solutions related to the operation of your hardware. Try the solutions in the order listed.

The Printer Does Not Turn On

If you turn on the printer and the indicator lights do not come on, the printer is probably not getting power. Turn off the printer and follow these steps:

1. Make sure the power cord is plugged securely into the AC power receptacle on the back of the printer.
2. Make sure the power cord is plugged securely into the wall outlet. If the power cord is connected to a power strip, make sure the power strip is connected to the outlet and turned on.
3. Turn on the printer. When the printer is connected properly, the **POWER**, **ON LINE**, and **HQ** (and/or **HS**) indicators light, and the print head is in the home position. If nothing happens, call the Canon help desk.

Indicators Light, Printer Does Not Print

If the printer is getting power, but still does not print, there may be a problem with the printer or its communication with your computer. Follow these steps to determine the problem:

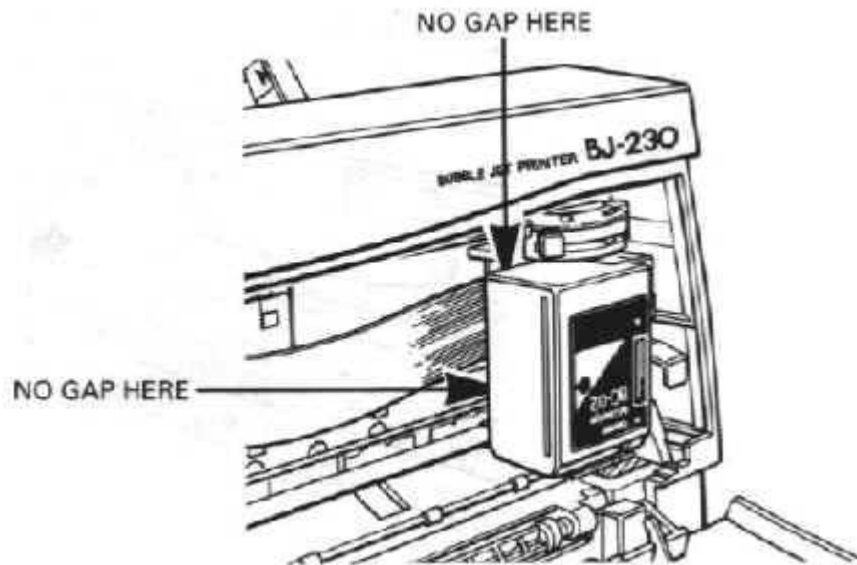
1. Make sure the printer is on-line. If the **ON LINE** indicator is not green, press the **ON LINE** button. Then try printing.
2. Check the interface cable connection. Make sure you have connected the correct interface cable to your computer and that the connections are secure.
3. Make sure paper is loaded properly in the sheet feeder.
4. Run one of the test prints described in Chapter 4, Using the Operator Panel. If this prints, the problem is in the communication between the printer and your computer.
5. Make sure the computer is set up correctly for your printer.

6. Print a screen dump from your computer. If it still does not print, there is a problem with your software or your interface port. Call the Canon help desk at 1-800-423-2366.

Print Head Moves, Ink Does Not Appear

If the print head is moving, but no ink comes out, the ink cartridge may not be installed properly.

1. Remove the ink cartridge and check that the film is removed from the cap.
2. Reinstall the ink cartridge checking that it is securely latched in place. Make sure there is no gap between the ink cartridge and the holder.



3. Perform the print head cleaning procedure described later in this chapter. (See the Print Head Needs Cleaning section.)

ON LINE, HS, and HQ Indicators Are Blinking

If you turn on the printer and the ON LINE, HS, and HQ indicators are blinking, a RAM/ROM error has probably occurred. Try these steps to clear the problem:

1. Press the **POWER** button to turn off the printer.
2. Wait 15 seconds, and press the **POWER** button again to turn on the printer. If the problem is cleared, the ON LINE indicator will blink for a few seconds and then lights steadily, and the print head will move to the home position. If the HS and HQ indicators continue to blink, call the Canon help desk at 1-800-423-2366.

ERROR Light Is On

If the **ERROR** indicator lights, follow these steps:

1. Check the sheet feeder. If the printer is out of paper, load paper into the sheet feeder and press **ON LINE** to continue printing.
2. Check the printer for a paper jam. If a paper jam has occurred, clear is as described later in this chapter. (See the Paper Jams Occur section.)

Paper Loading Problems

This section contains problems and solutions related to loading paper and envelopes into your printer. Locate the problem you are having, and follow the steps in the order listed.

Paper Does Not Load Into Printer

1. Make sure the paper selection lever (on the right side of the sheet feeder) is set to the correct position:
 - For normal weight paper, set it to the back position.
 - For envelopes or thick paper, set it to the front position.
 - For manually feeding paper, set it to the front position.
2. When manually feeding paper, make sure the printer is on-line. Then insert the single sheet of paper all the way into the sheet feeder and hold it for one second. If the paper is not inserted far enough, the printer cannot load it.
3. Make sure the paper rest is extended and the paper is not curled.

Multiple Sheets Load Into Printer

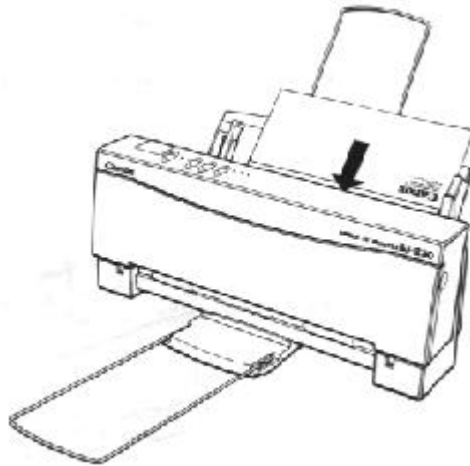
1. Make sure the paper is not sticking together. Fan the stack of paper before placing it in the sheet feeder.
2. Check that the paper rest is extended and the paper selection lever is in the back position for automatic loading of paper.
3. Do not stack too many sheets of paper in the sheet feeder. Try removing a few sheets of paper from the sheet feeder.
4. If the sheet feeder contains different types of paper, load just one type of paper.
5. Do not use curled or bent paper, which may fall into the manual feed slot and cause the paper to misfeed.

Paper Is Loaded Skewed (Printing Is Skewed)

1. Check that the paper rest is extended and the paper selection lever is back.
2. Make sure the stack of paper is straight in the sheet feeder.
3. Check that the right side of the stack of paper is aligned against the right side of the sheet feeder and the left side is aligned against the paper guide.

Envelopes Do Not Load

1. Set the paper selection lever to the front position.
2. Make sure the envelope is loaded properly:



- The flap is toward the sheet feeder.
 - The right side of the envelope is aligned against the right side of the sheet feeder.
 - The left side is aligned against the paper guide.
3. For manual loading, insert the envelope all the way into the sheet feeder.



NOTE: Use only commercial, number 10 envelopes, which are 9.5 x 4.1 inches (241 x 104 mm).

Paper Does Not Eject After Printing

Most software applications tell the printer to eject the paper after printing, however, some do not. If the printer does not automatically eject a sheet of paper after printing, follow these steps:

1. Press the **ON LINE** button to set the printer off-line.
2. Press and hold the **LF/FF** button for one second to eject the paper.

3. To resume printing, press the **ON LINE** button.

Paper Jams Occur

If a paper jam occurs, the **ERROR** indicator lights and the printer goes off-line. Follow these steps to clear the paper jam:

1. Press the **POWER** button to turn off the printer.
2. Gently pull out the sheet of paper with one hand while holding down the printer body with your other hand.



3. If the paper tears leaving part of the sheet inside the printer, open the front cover and remove the paper from inside the printer.
4. Press the **POWER** button to turn on the printer. the **POWER**, **ON LINE**, and **HQ** (or **HS**) indicators light and the print head moves to the home position. The printer is now ready for printing.

If you are having repeated paper jams, it may be due to the paper you are using:

- Fan the paper before stacking it in the sheet feeder. This keeps the sheet of paper from sticking together.
- Check that the paper you are using and your printing environment are within the specifications of the Canon Bubble Jet Printer BJ-230. See Appendix A, Printer Specifications, for details.

Print Quality Problems

If your print quality is not what you expect it to be, check the following list for your problem and a possible remedy, or try the suggestions in the sections below.

<u>Print Results</u>	<u>Most Probable Cause</u>	<u>Remedy</u>
Smudged	Paper type	Try a different paper type
Blurred	Paper type	Try a different paper type
Fading	Print head is clogged or out of ink	Clean the print head or replace the ink cartridge
White streaks	Print head is clogged	Clean the print head
Dots missing	Print head is clogged	Clean the print head
Irregular dots	Print head is clogged	Clean the print head

Print Density is Low

The printer has three print modes, and the print density of each mode is different. The density of the HS mode is low, the density of HQ mode is high, and the density of SHQ is very high. If you are using HS mode and not getting satisfactory darkness, try HQ or SHQ mode.

Print Is Not Clear

1. Paper has a right side for printing. If the print quality is not as clear as you would like it to be, try turning the paper over and printing on the other side.
2. Make sure the paper thickness lever (inside the printer) is set for your paper type.
3. Make sure you are using a BC-02 ink cartridge. If not, replace the ink cartridge with a BC-02.

Characters Are Blurred or Smudged

1. If the printed characters are blurred or smudged, make sure you are using the recommended paper.
2. Make sure the paper thickness lever (inside the printer) is set for your paper type.
3. Make sure you are using a BC-02 ink cartridge. If not, replace the ink cartridge with a BC-02.

Smudges on Back of Printed Page

If ink happens to get on the printer's platen, the back side of the printed

page will have smudge marks. If this occurs, clean the platen by feeding a few sheets of paper through the printer.

Characters Appear Jagged

Check your software application to see what resolution is selected. Printing at 180 dpi will give a jagged look to output. Changing the resolution to 360 dpi should correct this.

Irregular Print Quality

If white streaks appear on the printed page or dots are missing in the printed output, clean the print head as described later in this section.

Ink-stained Areas

If you are printing high density graphics in SHQ mode and black areas appear ink-stained, follow these steps:

1. Change to HQ mode or HS mode.
2. Set the paper thickness lever to the right (for thick paper) and try printing again.

If the printed pages include thin stains around double-high characters printed in BJ-10 mode, set the paper thickness lever to the right (for thick paper) and print it again.

Print Head Needs Cleaning

Paper dust or ink may get clogged in an ink nozzle in the ink cartridge. Performing the print head cleaning procedure should clear up this problem.

The printer will automatically clean the print head when you follow these steps:

1. Make sure the printer is turned on and on-line.
2. Press the **ON LINE** and **PRINT MODE** buttons at the same time.

The **ON LINE** indicator will blink for about 12 seconds while the printer cleans the print head. When complete, the **ON LINE** indicator stops blinking and goes off. Press **ON LINE** to resume printing.

You can print the self test or font list to check the print quality. See Chapter 4, Using the Operator Panel, for instructions on printing the test prints.

If the print quality is still not crisp and clear after cleaning the print head, try the head cleaning procedure again. If your output is not satisfactory after cleaning the print head several consecutive times, replace the ink

cartridge.

Ink Cartridges Continually Run Out of Ink

If your ink cartridges seem to run out of ink before you think they should, make sure you are following these guidelines:

1. Make sure you turn off the printer only when the ink cartridge is in the home position.
2. Only transport the printer when the ink cartridge is in the home position.
3. Never unplug the printer when the power is turned on.

When the print head is in the home position, it is capped; this prevents it from being damaged or drying out.

Printing Problems

This section contains problems and solutions related to your printer or the software you are using.

Printout is Wrong

If strange characters appear in your output, there may be a communications problem between the printer and your computer.

If your printed output does not appear as you expect, follow these steps:

1. Make sure your cable connections are secure.
2. Check that the printer control mode (BJ-10 or Epson LQ) matches the printer driver you selected. See Chapter 5, Using the Printer With Software, for details on selecting a printer driver and a printer control mode.

Characters on Screen Do Not Match Printed Characters

Many graphics characters and special symbols are produced by different ASCII code on each make of computer and printer. Compare the character set in your computer manual with those shown in Appendix C. Set the correct character table and printer control mode with the DIP switches.

Printing Beyond Edge of Page

If the printer is printing only part of each line, follow these steps:

1. Make sure the paper is aligned correctly in the sheet feeder.
2. Check the software setting for the right margin.
3. Check the setting of DIP switch 1. This DIP switch controls the

horizontal print position:

- For letter-size paper, set it to OFF.
- For envelopes, set it to OFF.
- For A4-size paper, set it to ON

Printout Does Not Match Paper Size

1. Make sure the paper size you select within your printer driver matches the orientation in which you load the paper in the printer. (See chapter 3, Loading Paper, for information on loading paper, and see Chapter 5, Using the Printer With Software, for information on printer drivers.)
2. Make sure the width of the paper on which you are printing matches the width defined by your software so there is always paper between the print head and the platen. The print head may be damaged if it prints directly on the platen.

If the print head does print on the platen, feed a few sheets of paper through the printer to clean the ink off the platen.

Printing Incorrect Number of Lines on Page

If the printer is not printing the number of lines you expect on a page, follow these steps.

1. Check the setting of DIP switch 4. This DIP switch determines the page length:
 - For letter-size paper, set it to OFF
 - For envelopes, set it to OFF.
 - For A4-size paper, set it to ON.
2. Check the top and bottom margin settings of your software.
3. Make sure your paper is loaded correctly.

Printer Is Not Using Font You Selected With DIP Switches

Your software is overriding the DIP switch setting. Change the initialization or setup string that your software sends. You may need to do this using a menu or screen provided by your application software. See your application user's manual for information about how your software works with your printer.

Computer Indicates a Device Time-out

A device time-out occurs when your computer sends data to the printer but the printer does not respond. The printer may be off, off-line, or not connected to the computer.

If your computer indicates a device time-out, follow these steps:

1. Make sure the printer is on and on-line.
2. Check that the printer's interface cable is securely attached to both the printer and the computer.
3. Make sure paper is properly loaded in the sheet feeder.
4. Try the print operation again.

Windows Problems

This section contains problems and solutions related to using your printer with Windows applications.

Printer Prints Garbage or Does Not Print

If you are using Windows and the printer prints garbage or does not print, you may see a dialog box that displays this message: Cannot print, check if printer is off-line. Follow these steps:

1. Make sure your cable connections are secure.
2. Choose Control Panel from the Main Group window in the Program Manager and open the Printers icon.
 - From the Printers dialog box, select Connect and disable the Fast Printing Direct to Port option.
 - Turn off the Print Manager in the Printers dialog box.

Large Gaps Appear Between Text of Graphics

1. Choose Control Panel from the Main Group window in the Program Manager and open the Windows Setup icon.
2. Check that the video driver is VGA. If the display driver is anything other than VGA, call the display manufacturer and request an updated display driver. In the meantime, install the standard VGA driver that came with Windows 3.1.

Envelopes Do Not Print Correctly

If you are using Microsoft Word for Windows and the Envelope Macro button does not work, follow these steps to print envelopes correctly. First create the SetPrinterHeuristic dialog box:

1. Start Word for Windows 2.0
2. From the top menu bar, select FILE and then OPEN.
3. In the Open File dialog box, choose the NEWMACRO.DOC and select OK.

Chapter 8

Customizing the Printer

This chapter describes the factory default settings of the printer and the steps you follow to customize these settings for your particular printing needs.

You will find that the factory default settings provide features to meet most of your printing needs. With these settings, your printer emulates any Canon BJ printer and the IBM Proprinter X24E. This means you can use the printer with any software application that supports these printers.

You want to make sure the printer's settings match the requirements of your software application. If you have a unique printing requirement, you can customize the printer by changing the DIP switches settings as described in this chapter.

Your printer is designed to be used in BJ-10 mode and provides numerous printing features in this mode. If your software application is designed to print only on an Epson LQ printer, you can use the DIP switches to change the printer control mode to Epson LQ.

Factory Default Settings

The following table shows the factory default settings of the printer:

<u>Function</u>	<u>Setting</u>
Character Pitch	10 characters per inch (cpi)
Line spacing	6 lines per inch (lpi)
Print quality	High quality (HQ) mode
Beeper	Enabled
Automatic carriage return (CR)	Disabled (no CR with line feed)
Slashed zero	Disabled (zero not slashed)
Vertical tab stops	No vertical tabs set
Horizontal tab stops	Column 9 then every 8th column
Vertical margins	Top margin = first print line Bottom margin = page length
Horizontal margins	Left margin = 0 Right margin = maximum print width
Print direction (text)	Bi-directional

Font typeface	Courier
Horizontal print position	Letter
Text scale mode	Disabled
Envelope mode	Disabled
Page length	11 inches
Character set	Character Set 1
Automatic line feed (LF)	Disabled (no automatic LF after CR)
Alternate Graphics Mode	Disabled
Code page	437 (IBM USA)
Buffer	Input = Approx. 41.2 KB Download = 0 KB
Printer control mode	BJ-10

This printer has two printer control modes: BJ-10 mode, which emulates the IBM Proprinter X24E, and Epson LQ mode, which emulates the Epson LQ-510. The default setting is BJ-10 mode. If you change this to Epson LQ mode, the default settings also change.

DIP Switch Settings

The DIP switch settings control various printer functions, such as the page length and character set you want to use. The DIP switches are located on the operator panel under a small cover.

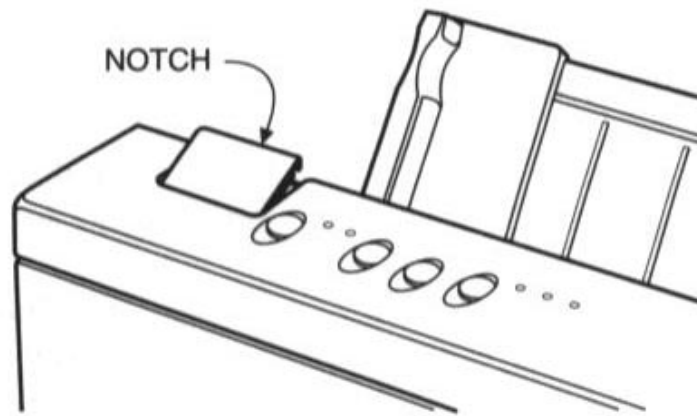
A DIP switch is OFF when it is up, and ON when it is down. The factory default setting for each DIP switch is OFF.

The printer functions defined by the DIP switches are determined by the printer control mode. DIP switch 12 selects the printer control mode. When DIP switch 12 is OFF, the printer is in BJ-10 mode; when DIP switch 12 is ON, the printer is in Epson LQ mode.

Changing a DIP Switch Setting

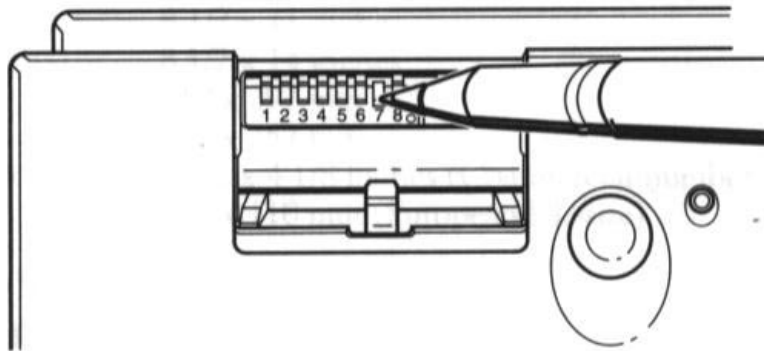
To change a DIP switch setting, follow these steps:

1. Make sure the printer is turned off.
2. Open the DIP switch cover on the top of the printer. Pull the cover toward you lifting from the notch at the top of the cover. You may need to use a thin object, such as a coin, to release the cover.



The cover slides down into the printer.

3. Use a pointed object, such as a ballpoint pen, to change the DIP switch settings. A DIP switch is OFF when it is up, and ON when it down.



4. Close the DIP switch cover after making your selections.

The new DIP switch settings take effect when you turn on the printer.

If you turn off or reset the printer, or if the printer receives the Set Initial Conditions command from a software program, the printer resets its functions to the settings defined by the DIP switches.

BJ-10 Mode

When the printer is in BJ-10 mode (DIP switch 12 is OFF), you can set the DIP switches to control the following functions:

<u>DIP switch</u>	<u>Function</u>	<u>OFF</u>	<u>ON</u>
1	Horizontal print position	Letter size or COM 10 envelope	A4 size or DL size envelope
2	Text scale mode	Disabled	Enabled
3	Reduction mode	Disabled	Enabled
4	Page length	11 inches	12 inches
-	-	-	-

5	Character set	Set 1	Set 2
6	Automatic carriage return (CR)	Normal line feed (LF)	LF with CR
7	Alternate Graphics Mode (AGM)	Disabled	Enabled
8	Not used		
9	Code page	437	850
10	Buffer size	Input: 41.2 KB Download: 0 KB	Input: 1.2 KB Download: 40 KB
11	Not used		
12	Printer control mode	BJ-10 mode	Epson LQ mode

DIP switch 1

Use this switch to change the horizontal print position according to the size of your paper. If you are using letter-size paper or envelopes, set this switch OFF; the left margin will be 0.25 inch (6.4 mm) and the maximum print width will be 10.5 inches. If you are using A4-size paper, set this switch ON; the left margin will be 0.13 inch (3.4 mm) and the maximum print width will be 11.4 inches.

DIP switch 2

If you are using a software application that assumes 66 lines will fit on each page, set this switch to ON. The printer will reduce the line spacing by a factor of 14/15 which is from 63 lines per page to 66 lines per page if line spacing is set to 6 lines per inch (lpi).

DIP switch 3

Use this switch to turn on reduction mode. In this mode, the printer reduces characters and graphics to two-thirds of their normal size. When the printer is in envelope mode, reduction mode is disabled.

DIP switch 4

If you are using letter-size paper, set this switch OFF; this sets the page length to 11 inches. If you are using A4-size paper, set this switch On; this sets the page length to 12 inches.

DIP switch 5

When this switch is OFF, the printer uses Character Set 1. When this switch is ON, the printer uses Character Set 2. See Appendix C for information on the character sets.

DIP switch 6

When this switch is OFF, the printer performs a normal line feed. Set this to On if you want the printer to perform a carriage return after each line feed.

DIP switch 7

Set this switch ON to enable Alternate Graphics Mode (AGM). In this mode, the printer accepts high-resolution, 24-dot, all-points-addressable (APA) graphics commands similar to those used with conventional 24-pin printers.

DIP switch 9

When this switch is OFF, the printer uses IBM USA code page 437. When this switch is ON, the printer uses IBM Multilingual code page 850. Each code page has three character sets: Set 1, Set 2, and All Characters Chart. See Appendix C for a sample of each character set.

DIP switch 10

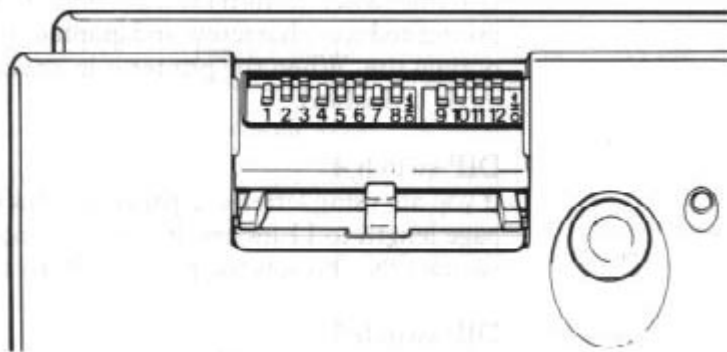
When this switch is OFF, the printer allocates the entire buffer space (approximately 41.2 KB) to the input buffer. When you are using downloaded fonts, change this switch to ON; the printer will allocate 40 KB to buffer space for downloaded fonts.

DIP switch 12

When this switch is Off, the printer is in the BJ-10 mode. When this switch is On, the printer is in Epson LQ mode.

Example

The following DIP switch settings select the specified printer functions as the defaults:



<u>DIP switch</u>	<u>Function</u>
12 OFF	BJ-10 printer control mode
1 ON	A4-size paper
4 ON	12-inch page length
7 ON	AGM mode enabled
9 ON	Code page 850

Epson LQ Mode

When the printer is in Epson LQ mode (DIP switch 12 is ON), you can set the DIP switches to control the following functions:

<u>DIP switch</u>	<u>Function</u>	<u>OFF</u>	<u>ON</u>
1	Horizontal print position	Letter size or envelope	A4 size
2	Text scale mode	Disabled	Enabled
3	Reduction mode	Disabled	Enabled
4	Page length	11 inches	12 inches
5	Character Set	Italics	Graphics
6, 7, 8	International character set	See below	
9, 10, 11	Typeface	See below	
12	Printer control mode	BJ-10 mode	Epson LQ mode

DIP switch 1

Use this switch to change the horizontal print position according to the size of your paper. If you are using letter size paper or envelopes, leave this switch set to OFF; the left margin will be 0.25 inch (6.4 mm) and the maximum print width will be 10.5 inches. If you are using A4 size paper, set this switch ON; the left margin will be 0.13 inch (3.4 mm) and the maximum print width will be 11.4 inches.

DIP switch 2

If you are using a software application that assumes 66 lines will fit on each page, set this switch to ON. The printer will reduce the line spacing by a factor of 14/15, which is from 63 lines per page to 66 lines per page if line spacing is set to 6 lines per inch (lpi).

DIP switch 3

Use this switch to turn on reduction mode. In this mode, the printer reduces characters and graphics to two-thirds of their normal size. When the printer is in envelope mode, reduction mode is disabled.

DIP switch 4

If you are using letter size paper, set this switch Off; this sets the page length to 11 inches. If you are using A4 size paper, set this switch ON; this sets the page length to 12 inches.

DIP switch 5

When this switch is OFF, the printer uses the Epson Italics character set, which includes italic characters. When this which is ON, the printer uses the Epson Graphics character set, which is the same as the MS-DOS code page 437 (this character set includes symbols, lines, corners, and European characters). See Appendix C for information on the character sets.

DIP switch 6, 7, 8

These switches allow you to select one of eight international character sets. These character sets provide you with the characters and symbols used in other languages. See Appendix C for information on the character sets.

<u>Character set</u>	<u>DIP switches</u>		
	<u>6</u>	<u>7</u>	<u>8</u>
USA	OFF	OFF	OFF
United Kingdom	OFF	OFF	ON
Germany	OFF	ON	OFF
France	OFF	ON	ON
Denmark	ON	OFF	OFF
Sweden	ON	OFF	ON
Italy	ON	ON	OFF
Spain	ON	ON	ON

DIP switches 9, 10, 11

These switches allow you to select one of eight font typefaces.

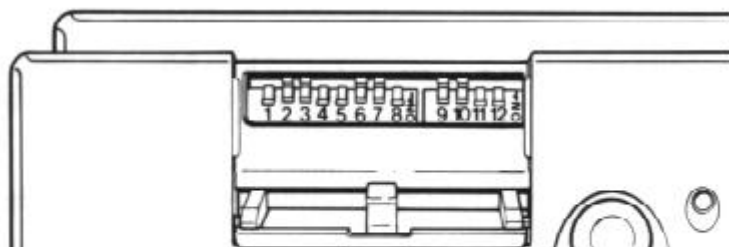
<u>Typeface</u>	<u>DIP switches</u>		
	<u>6</u>	<u>7</u>	<u>8</u>
Roman	OFF	OFF	OFF
Sans serif	OFF	OFF	ON
Draft	OFF	ON	OFF
Courier	OFF	ON	ON
Prestige	ON	OFF	OFF
Script	ON	OFF	ON
Orator	ON	ON	OFF
Orator-S	ON	ON	ON

DIP switch 12

When this switch is OFF, the printer is in BJ-10 mode. When this switch is ON, the printer is in Epson LQ mode.

Example

The following DIP switch settings select the specified printer functions as the defaults:





<u>DIP switch</u>	<u>Function</u>
--------------------------	------------------------

12 ON	Epson LQ printer control mode
1 ON	A4-size paper
4 ON	12-inch page length
5 ON	Graphics character set
8 ON	United Kingdom character set
11 ON	Sans serif typeface



NOTE: Unlike some previous Canon printers, internal fonts are available only through software commands. They cannot be selected through the operator panel nor the DIP switches. This is only an issue for some MS-DOS applications and some custom software.



Appendix A

Printer Specifications

This appendix lists the specifications of your printer.

Printing Method

Bubble jet ink on-demand

Paper Handling

Automatic feed

Manual feed

Sheet Feeder Capacity

Plain Paper: Maximum 100 sheets of letter, legal, A4, or B5
(20 lb or 75 g/m²); maximum thickness of stacked
paper = 0.39 inch (10 mm)
Maximum 50 sheets of ledger, A3 (20 lb or 75 g/m²);
maximum thickness of stacked paper = 0.19 inch (5 mm)

Envelope: 10 envelopes (commercial number 10)

Paper Size

Letter: 8.5 x 11 inches

Legal: 8.5 x 14 inches

Ledger: 11 x 17 inches

A4: 210 x 297 mm

A3: 297 x 420 mm

Envelope: 9.5 x 4.1 inches (commercial number 10)

Paper Type

Plain paper

Envelopes (Commercial number 10)

Transparency film (Canon #Q07-0001-M1) available with manual feed

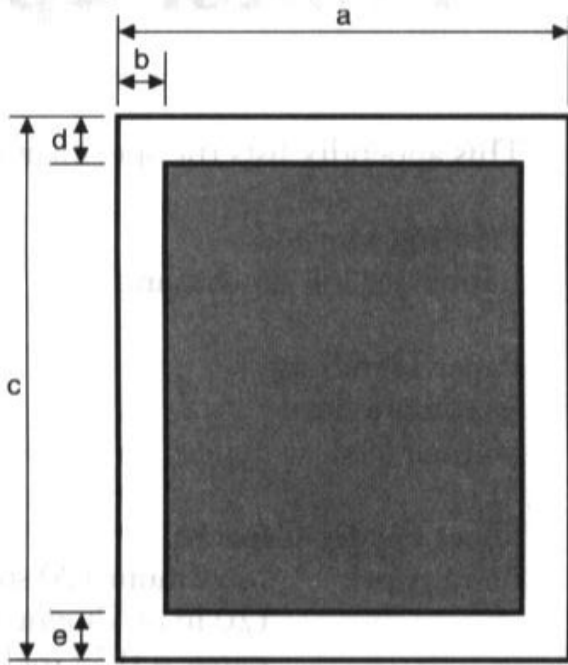
Paper Weight

17 to 24 lb (64 to 90 g/m²) with automatic feed

17 to 28 lb (64 to 105 g/m²) with manual feed

Printing Area

Paper:



Horizontal

a 8.3 to 11.7 inches (210 to 297 mm)

b 0.13 inch (3.4 mm)

A4 and A3-size paper

0.25 inch (6.4 mm)

Letter-, legal-, ledger-size paper

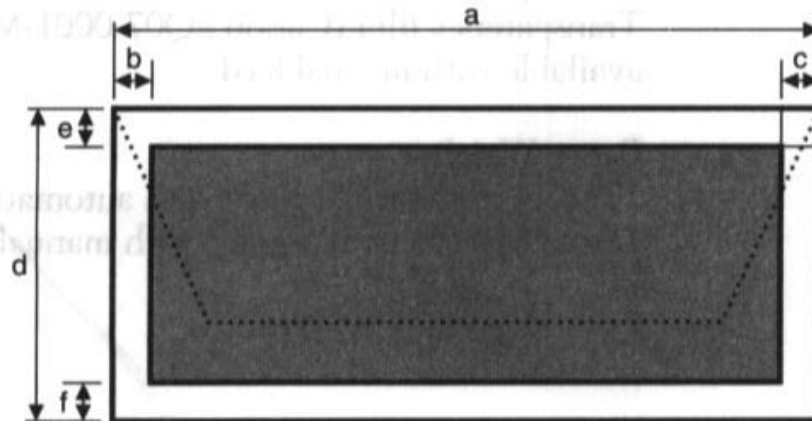
Vertical

c 8.3 to 17 inches (210 to 431 mm)

d 0.5 inch (12.7 mm)

e 0.3 inch (8 mm)

Envelopes:



Horizontal

a 9.5 inches (240mm)

b 0.25 inch (6.4mm)

c 0.25 inch (6.4mm)

Vertical

d 4.1 inches (104mm)

e 0.67 inch (17mm)

f 1.0 inch (25.4mm)

Printing Speed

HS mode: 248 cps in 10 cpi, 496 cps in 20 cpi

HQ mode: 173 cps in 10 cpi, 346 cps in 20 cpi

SHQ mode: 124 cps in 10 cpi, 248 cps in 20 cpi

Printing Direction

Bi-directional in text (both in MS-DOS and Windows)

Unidirectional in graphics

Printing Width

Maximum 10.5 inches (DIP switch 1 OFF) or 11.4 inches (DIP switch 1 ON)

Line Feed Speed

100 ms/line at 1/6-inch line in HQ, HS mode

190 ms/line at 1/6-inch line in SHQ mode

Resident Printer Control Modes

BJ-10 mode: IBM Proprinter X24E
emulation

Epson LQ mode: Epson LQ-510 emulation

Line Feed Pitch

BJ-10 mode: 1/6, 1/8, $n/60$, $n/72$, $n/180$,
 $n/216$, and
 $n/360$ inches (n : programmable)

Epson LQ mode: 1/6, 1/8, $n/180$, and $n/360$ inches
(n : programmable)

Printing Characters

Typeface:

BJ-10 mode Prestige and Courier

Epson LQ mode Roman, Sans serif, Courier, Prestige,
Script, Orator, Orator-S, and Draft

Pitch:

BJ-10 mode 10 cpi, 12 cpi, 17 cpi, and PS
Epson LQ mode 10 cpi, 12 cpi, 15 cpi, 17 cpi, 20 cpi, and PS

Cell Composition:

36 (h) x 48 (v) dot matrix in HQ mode

18 out of 36 (h) x 48 (v) dot matrix in HS mode

Character Set:

BJ-10 mode IBM Character Sets 1 and 2 and 3
 (Code Page 437, 850)

Epson LQ mode Italics character set and Graphics character set

Maximum Number of Characters per Line

BJ-10 mode

<u>Mode</u>	<u>Pitch</u>	<u>Characters per line</u>	
		<u>DIP Switch 1</u>	
		<u>OFF</u>	<u>ON</u>
10 cpi	10 cpi	105 cpl	114 cpl
10 cpi double-wide	5 cpi	52 cpl	57 cpl
10 cpi condensed	17 cpi	180 cpl	193 cpl
10 cpi condensed, double-wide	8.5 cpi	90 cpl	97 cpl
12 cpi	12 cpi	126 cpl	136 cpl
12 cpi double-wide	6 cpi	63 cpl	68 cpl
Proportional spacing	PS	Varies	Varies

Epson LQ mode

<u>Mode</u>	<u>Pitch</u>	<u>Characters per line</u>	
		<u>DIP Switch 1</u>	
		<u>OFF</u>	<u>ON</u>
10 cpi	10 cpi	105 cpl	114 cpl
10 cpi double-wide	5 cpi	52 cpl	57 cpl
10 cpi condensed	17 cpi	180 cpl	193 cpl
10 cpi condensed, double-wide	8.5 cpi	90 cpl	97 cpl
12 cpi	12 cpi	126 cpl	136 cpl
12 cpi double-wide	6 cpi	63 cpl	68 cpl
12 cpi condensed	20 cpi	210 cpl	228 cpl
12 cpi condensed, double-wide	10 cpi	105 cpl	114 cpl
15 cpi	15 cpi	157 cpl	171 cpl

--

15 cpi double-wide	7.5 cpi	78 cpl	85 cpl
Proportional spacing	PS	Varies	Varies

Graphic Image Print

Data format: Vertical 8, 24, and/or 48-dot format

Resolution: Horizontal 60, 120, 180, 240, or 360 dpi

Buffer

BJ-10 mode

Input buffer: Approx. 41.2 KB (or 1.2 KB)

Download buffer: 0 KB (or 40 KB)

Epson LQ mode

Input buffer: Approx. 3 KB

Download buffer: 39 KB

Interface

8-bit parallel

Ink Cartridge

Type: BC-02 (single cartridge ink supply)

Print head: 64 bubble jet nozzles

Ink color: Black

Number of characters printed: Approx. 700,000
characters/cartridge in HQ mode
Approx. 1,400,000
characters/cartridge in HS mode

Ink amount: Approx. 0.9 oz (28g)

Acoustic Noise Level

Approx. 40 dB(A) in SHQ mode

Approx. 42 dB(A) in HQ, HS mode

Operating Environment

Temperature: 41° F to 95° F (5° C to 35° C)

Humidity: 10% to 90% RH (no condensation)

Storing Environment

Temperature: 32° F to 95° F (5° C to 35° C)

Humidity: 5% to 95% RH (no condensation)

Power Source

USA/Canada AC 120V, 60Hz, 30W

Dimensions

16.9 inches (428 mm) W x 8.2 inches (209 mm) D x 7.9 inches (201.2 mm) H

Weight

Approx. 7.7 lbs (3.5 kg)



Appendix C

Printer Mode Command Summaries and Character Sets

This appendix lists the control codes and ESCape sequences you can use in BJ-10 mode and Epson LQ mode, and shows the character sets available in each mode. For a complete description of these programming commands, you can order the Canon Bubble Jet Printer BJ-200/BJ-230 Programmer's Manual. Call the Canon help desk at 1-800-423-2366 to order this manual.

Control codes and ESCape sequences tell the printer how to print a job. You send commands to the printer in one of two ways:

- You can use your application software to automatically embed certain commands (such as bold, underline, or indent) within a document. When the document prints, the embedded commands control the way the printer produces the printed page. Refer to your application software manual for instructions on sending commands.
- You can send specific commands directly to the printer, using either a BASIC programming statement or a printer command option in your software.

BJ-10 Command Summary

You can use the control codes and ESCape sequences listed in the following table when the printer is in BJ-10 mode; that is, when DIP switch 12 is set to OFF.



NOTE: Because of hardware differences, the revers feed code (ESC]) and the printer deselect code (DC3) are not supported by your printer. Also, the styles of block graphics characters at 12 cpi are different from normal IBM Proprinter X24e printing.

Basic Control Codes

<u>Function</u>	<u>ASCII</u>	<u>Decimal</u>	<u>Hexadecimal</u>
End command	NUL	0	00
Sound beeper	BEL	7	07
Backspace one character	BS	8	08
Horizontal tab control; move to next tab	HT	9	09
Perform line feed	LF	10	0A
Vertical tab control; move to next tab	VT	11	0B
Perform form feed	FF	12	0C
Perform carriage return	CR	13	0D
Set double-wide mode by line	SO	14	0E
Set condensed mode (17 cpi); cancelled by DC2	SI	15	0F
Set printer on-line	DC1	17	11
Set 10 cpi mode	DC2	18	12
Cancel double-wide mode	DC4	20	14
Cancel data	CAN	24	18
Insert space	SP	32	20

ESCAPE Sequence Codes

<u>Function</u>	<u>ASCII</u>	<u>Decimal</u>	<u>Hexadecimal</u>
Set/cancel underscore mode n Setting 0 End underscore 1 Start under score	ESC - n	27 45 n	1B 2D n
Set 1/8-inch line spacing (8 ESC0 lpi)		27 48	1B 30
Set 7/72-inch line spacing (7/72 inch per line)	ESC 1	27 49	1B 31
Enable line spacing set by ESC A	ESC 2	27 50	1B 32
Set graphics line spacing in n/180-inch increments; n = 1 to 85	ESC 3 n	27 51 n	1B 33 n
Set top of form	ESC 4	27 52	1B 34
Set/cancel automatic LF n Setting 0 End automatic line feed 1 Start automatic line feed	ESC 5 n	27 53 n	1B 35 n
Select IBM Character Set 2	ESC 6	27 54	1B 36
Select IBM Character Set	ESC 7	27 55	1B 37

1			
Set 12-cpi, Prestige mode	ESC :	27 58	1B 3A
Download 24-dot, font image	ESC = n1 n2 #	27 61 n1 n2 35	1B 3D n1 n2 23
Download 48-dot, font image	ESC = n1 n2 %	27 61 n1 n2 37	1B 3D n1 n2 25
Set text line spacing to n/72 inch per line; n = 1 to 255	ESC A n	27 65 n	1B 41 n
Set vertical tab; n1 ... n64 = line numbers for tab stops	ESC B n1 ... n64 NUL	27 66 n1 ... n64 0	1B 42 n1 ... n64 0
Set page length in lines; n = 1 to 255	ESC C n	27 67 n	1B 43 n
Set page length in inches; n = 1 to 14	ESC C NUL n	27 67 0 n	1B 43 00 n
Set horizontal tabs; n1 ... n28 = columns for tab stops	ESC D n1...n28 NUL	27 68 n1...n28 0	1B 44 n1...n28 00
Set emphasized mode to start printing in twice the normal dot density	ESC E	27 69	1B 45
Cancel emphasized mode set by ESC E	ESC F	27 70	1B 46
Set double-strike mode	ESC G	27 71	1B 47
Cancel double-strike mode set by ESC G	ESC H	27 72	1B 48
Select font style	ESC I n	27 73 n	1B 49 n
Perform graphics line spacing; n = 0 to 255	ESC J n	27 74 n	1B 4A n
Set single-density image graphics	ESC K n1 n2	27 75 n1 n2	1B 4B n1 n2
Set double-density image graphics	ESC L n1 n2	27 76 n1 n2	1B 4C n1 n2
Set perforation skip; n = 0 to 255 lines	ESC N n	27 78 n	1B 4E n
Cancel perforation skip	ESC O	27 79	1B 4F
Set/cancel proportional spacing mode n Setting 0 End proportional spacing 1 Start proportional spacing	ESC P n	27 80 n	1B 50 n
Deselect printer	ESC Q n	27 81 n	1B 51 n
Set all tabs to default	ESC R	27 82	1B 52

settings			
Set super/subscript mode n Setting	ESC S n	27 83 n	1B 53 n
0 Select superscript mode			
1 Select subscript mode			
Cancel super/subscript mode set by ESC S	ESC T	27 84	1B 54
Select printer direction	ESC U n	27 85 n	1B 55 n
Set/cancel double-wide mode	ESC W n	27 87 n	1B 57 n
n Setting			
0 Cancel double-wide mode			
1 Start double-wide mode			
Set horizontal margins; n and m = 0 to 255	ESC X n m	27 88 n m	1B 58 n m
Set double-density image graphics mode	ESC Y n1 n2	27 89 n1 n2	1B 59 n1 n2
Set quadruple-density image graphics mode	ESC Z n1 n2	27 90 n1 n2	1B 5A n1 n2
Set/cancel presentation highlight (double-high mode)	ESC [@ n1 n2 m1 m2 m3 m4	27 91 64 n1 n2 m1 m2 m3 m4	1B 5B 40 n1 n2 m1 m2 m3 m4
Select global font	ESC [I	27 91 73	1B 5B 49
Set initial condition	ESC [K n1 n2	27 91 75 n1 n2	1B 5B 4B n1 n2
Set code page	ESC [T n1 n2	27 91 84 n1 n2	1B 5B 54 n1 n2
Change graphics line spacing	ESC [\ n1 n2	27 91 92 n1 n2	1B 5B 5C n1 n2
Select high resolution graphics mode	ESC [g n1 n2	27 91 103 n1 n2	1B 5B 67 n1 n2
Print continuously from All Characters Chart	ESC \ n1 n2	27 92 n1 n2	1B 5C n1 n2
Print single character from All Characters Chart	ESC ^	27 94	1B 5E
Set/cancel overscore mode n Setting	ESC _ n	27 95 n	1B 5F n
0 Cancel overscore mode			
1 Set overscore mode			
Relative move inline to the right	ESC d n1 n2	27 100 n1 n2	1B 64 n1 n2
Set printer off-line	ESC j	27 106	1B 6A

Alternate Graphics Mode Codes

<u>Function</u>	<u>ASCII</u>	<u>Decimal</u>	<u>Hexadecimal</u>
Select graphics mode (AGM)	ESC * m n1 n2	27 42 m n1 n2	1B 2A m n1 n2
Set graphics line spacing (AGM); n = 0 to 255	ESC 3 n	27 51 n	1B 33 n
Set text line spacing (AGM); n = 1 to 85	ESC A n	27 65 n	1B 41 n
Perform graphics line spacing (AGM); n = 0 to 255	ESC J n	27 74 n	1B 4A n

Miscellaneous Control Codes

<u>Function</u>	<u>ASCII</u>	<u>Decimal</u>	<u>Hexadecimal</u>
Set 360 dpi graphics	FS C B	28 67 66	1C 43 42
Set/perform 1/360-inch graphics line spacing	FS C J n m	28 67 74 n m	1C 43 4A n m

BJ-10 Character Sets

In BJ-10 mode, your printer supports two IBM code pages: USA code page 437 and Multilingual code page 850. Each code page has three character sets: Character Set 1, Character Set 2, and All Characters Chart.

You select the code page by setting DIP switch 9: OFF for code page 437, ON for 850. You select the character set by setting DIP switch 5: OFF for Character Set 1, ON for Character Set 2.

Each code page corresponds to an All Characters Chart. For the All Characters Chart, there are no control codes except for the space code at ASCII 32. All other ASCII characters are printable. The All Characters Chart is selected by the ESC ^ or the ESC \ code.

Character Set 1 has control codes in two places: one between ASCII 0 and ASCII 32 and the other between ASCII 128 and ASCII 159. Character Set 2 has control codes only between ASCII 0 and 32. All other ASCII characters are printable.

The three character sets for each code page are shown on following pages.



NOTE: A control code is an unprintable character that the printer uses for printer operations, such as line spacing or carriage return.

**USA Code
Page 437**

**Character
Set 1**

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E
0	NUL		SP	0	@	P		p	NUL		á		Ł	ł	α
1		DC1	!	1	A	Q	a	q		DC1	í		ł	ŧ	β
2		DC2	"	2	B	R	b	r		DC2	ó		ŧ	ŧ	Γ
3			#	3	C	S	c	s			ú		ł	ł	π
4		DC4	\$	4	D	T	d	t		DC4	ñ	ł	-	Ł	Σ
5		§	%	5	E	U	e	u			Ñ	ł	ł	F	σ
6			&	6	F	V	f	v			á	ł	ł	ł	μ
7	BEL		'	7	G	W	g	w	BEL		ó	ł	ł	ł	τ
8	BS	CAN	(	8	H	X	h	x	BS	CAN	ł	ł	ł	ł	Φ
9	HT		)	9	I	Y	i	y	HT		ł	ł	ł	ł	Θ
A	LF		*	:	J	Z	j	z	LF		ł	ł	ł	ł	Ω
B	VT	ESC	+	:	K	[	k	{	VT	ESC		ł	ł	ł	δ
C	FF	FS	-	<	L	\	l	|	FF	FS		ł	ł	ł	∞
D	CR		=	=	M	]	m	}	CR		ł	ł	=	ł	⊗
E	SO		>	>	N	^	n	~	SO		<<	ł	ł	ł	€
F	SI		/	?	O	_	o	~	SI		>>	ł	ł	ł	∩
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110

**USA Code
Page 437**

**Character
Set 2**

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E
0	NUL		SP	0	@	P		p	Ç	É	á		Ł	ł	α
1		DC1	!	1	A	Q	a	q	û	æ	í		ł	ŧ	β
2		DC2	"	2	B	R	b	r	é	Æ	ó		ŧ	ŧ	Γ
3	♥		#	3	C	S	c	s	â	ô	ú		ł	ł	π
4	♦	DC4	\$	4	D	T	d	t	ä	ö	ñ	ł	-	Ł	Σ
5	♣	§	%	5	E	U	e	u	à	ò	Ñ	ł	ł	F	σ
6	♠		&	6	F	V	f	v	â	û	á	ł	ł	ł	μ
7	BEL		'	7	G	W	g	w	ç	ù	ó	ł	ł	ł	τ
8	BS	CAN	(	8	H	X	h	x	ô	ÿ	ı	ł	ł	ł	Φ
9	HT		)	9	I	Y	i	y	ê	Û	ł	ł	ł	ł	Θ
A	LF		*	:	J	Z	j	z	è	Û	ł	ł	ł	ł	Ω

B	VT 11	ESC 27	+	;	K	[	k	{	i	e	½	¶	¶	■	δ
C	FF 12	FS 28	.	<	L	\	|	|	i	£	¼	¶	¶	■	∞
D	CR 13		-	=	M	J	m	}	i	¥	i	¶	=	■	∅
E	SO 14		.	>	N	^	n	~	Ä	Pts	<<	¶	¶	■	ε
F	SI 15		/	?	O	_	o	□	À	f	>>	¶	¶	■	∩
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110

**USA Code
Page 437**

**All
Characters
Chart**

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E
0	␣	▶	SP	0	@	P	.	p	Ç	É	á		L	l	α
1	☺	◀	!	1	A	Q	a	q	ü	æ	í		l	l	β
2	☹	∴	"	2	B	R	b	r	é	Æ	ó		l	l	Γ
3	♥	!!	#	3	C	S	c	s	â	ô	ú		l	l	π
4	♦	¶	\$	4	D	T	d	t	ä	ö	ñ		l	l	Σ
5	♣	§	%	5	E	U	e	u	à	ò	Ñ		l	l	σ
6	♠	—	&	6	F	V	f	v	â	û	a		l	l	μ
7	•	↓	'	7	G	W	g	w	ç	ù	ø		l	l	τ
8	■	1	(	8	H	X	h	x	ê	ÿ	¿		l	l	Φ
9	○	↓	)	9	I	Y	i	y	ë	Ö	Γ		l	l	Θ
A	☐	→	*	:	J	Z	j	z	è	Ü	¬		l	l	Ω
B	♂	—	+	;	K	[	k	{	ï	é	½		¶	¶	δ
C	♀	⌂	.	<	L	\	|	|	ï	£	¼		¶	¶	∞
D	♪	↔	-	=	M	J	m	}	i	¥	i		¶	=	■
E	♫	▲	.	>	N	^	n	~	Ä	Pts	<<		¶	¶	ε
F	⊙	▼	/	?	O	_	o	□	À	f	>>		¶	¶	∩
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110

**Multilingual
Code Page
850**

**Character
Set 1**

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E
0	NUL		SP	0	@	P	.	p	NUL		á		L	l	Ó
1		DC1	!	1	A	Q	a	q		DC1	í		l	Ð	β
2		DC2	"	2	B	R	b	r		DC2	ó		l	É	Ó
3			#	3	C	S	c	s			ú		l	l	Ö
4		DC4	\$	4	D	T	d	t		DC4	ñ		l	l	õ

	4	20	36	52	68	84	100	116	132	148	164	180	196	212	228
5			%	5	E	U	e	u			Ñ	Á	+	ı	Ô
	5	21	37	53	69	85	101	117	133	149	165	181	197	213	229
6			&	6	F	V	f	v			á	À	â	í	ı
	6	22	38	54	70	86	102	118	134	150	166	182	198	214	230
7	BEL		'	7	G	W	g	w	BEL		ø	À	Ã	î	þ
	7	23	39	55	71	87	103	119	135	151	167	183	199	215	231
8	BS CAN	(		8	H	X	h	x	BS CAN		ç	©	ł	ÿ	þ
	8	24	40	56	72	88	104	120	136	152	168	184	200	216	232
9	HT	)		9	I	Y	i	y	HT		®	¶	Œ	ı	Û
	9	25	41	57	73	89	105	121	137	153	169	185	201	217	233
A	LF	*	:	J	Z	j	z	LF		¬	||	š	ŕ	Û	
	10	26	42	58	74	90	106	122	138	154	170	186	202	218	234
B	VT ESC	+	:	K	[	k	{	VT ESC	½		¶	Œ	■	Û	
	11	27	43	59	75	91	107	123	139	155	171	187	203	219	235
C	FF FS	,	<	L	\	l	|	FF	¼		¶	Œ	■	Û	
	12	28	44	60	76	92	108	124	140	156	172	188	204	220	236
D	CR	-	=	M	]	m	}	CR		ı	ç	-	ı	Û	
	13	29	45	61	77	93	109	125	141	157	173	189	205	221	237
E	SO	.	>	N	^	n	~	SO	<<	¥	†	ı	-		
	14	30	46	62	78	94	110	126	142	158	174	190	206	222	238
F	SI	/	?	O	_	o		SI	>>	ı	□	■	.		
	15	31	47	63	79	95	111	127	143	159	175	191	207	223	239
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110

**Multilingual
Code Page
850**

**Character
Set 2**

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E
0	NUL		SP	0	@	P	`	p	Ç	É	à		L	š	Ó
	0	16	32	48	64	80	96	112	128	144	160	176	192	208	224
1		DC1	!	1	A	Q	a	q	ú	æ	ı		ı	Đ	ß
	1	17	33	49	65	81	97	113	129	145	161	177	193	209	225
2		DC2	"	2	B	R	b	r	é	Æ	ó		T	Ê	Ô
	2	18	34	50	66	82	98	114	130	146	162	178	194	210	226
3	♥		#	3	C	S	c	s	â	ô	ú	|	ı	Ë	Ò
	3	19	35	51	67	83	99	115	131	147	163	179	195	211	227
4	♦	DC4	\$	4	D	T	d	t	ä	ö	ñ	ı	-	È	ó
	4	20	36	52	68	84	100	116	132	148	164	180	196	212	228
5	♣	§	%	5	E	U	e	u	à	ô	N	Á	+	ı	Õ
	5	21	37	53	69	85	101	117	133	149	165	181	197	213	229
6	♠		&	6	F	V	f	v	á	û	ş	À	ã	í	ı
	6	22	38	54	70	86	102	118	134	150	166	182	198	214	230
7	BEL		'	7	G	W	g	w	ç	ù	ø	À	Ã	î	þ
	7	23	39	55	71	87	103	119	135	151	167	183	199	215	231
8	BS CAN	(		8	H	X	h	x	è	ý	ç	©	ł	ÿ	þ
	8	24	40	56	72	88	104	120	136	152	168	184	200	216	232
9	HT	)		9	I	Y	i	y	ê	ö	®	¶	Œ	ı	Û
	9	25	41	57	73	89	105	121	137	153	169	185	201	217	233
A	LF	*	:	J	Z	j	z	LF		¬	||	š	ŕ	Û	
	10	26	42	58	74	90	106	122	138	154	170	186	202	218	234
B	VT ESC	+	:	K	[	k	{	VT ESC	½		¶	Œ	■	Û	
	11	27	43	59	75	91	107	123	139	155	171	187	203	219	235
C	FF FS	,	<	L	\	l	|	FF	¼		¶	Œ	■	Û	
	12	28	44	60	76	92	108	124	140	156	172	188	204	220	236
D	CR	-	=	M	]	m	}	CR		ı	ç	-	ı	Û	
	13	29	45	61	77	93	109	125	141	157	173	189	205	221	237
E	SO	.	>	N	^	n	~	SO	<<	¥	†	ı	-		
	14	30	46	62	78	94	110	126	142	158	174	190	206	222	238
F	SI	/	?	O	_	o		SI	>>	ı	□	■	.		
	15	31	47	63	79	95	111	127	143	159	175	191	207	223	239
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110

Multilingual Code Page 850

All Characters Chart

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E
0	0	16	32	48	64	80	96	112	128	144	160	176	192	208	224
1	1	17	33	49	65	81	97	113	129	145	161	177	193	209	225
2	2	18	34	50	66	82	98	114	130	146	162	178	194	210	226
3	3	19	35	51	67	83	99	115	131	147	163	179	195	211	227
4	4	20	36	52	68	84	100	116	132	148	164	180	196	212	228
5	5	21	37	53	69	85	101	117	133	149	165	181	197	213	229
6	6	22	38	54	70	86	102	118	134	150	166	182	198	214	230
7	7	23	39	55	71	87	103	119	135	151	167	183	199	215	231
8	8	24	40	56	72	88	104	120	136	152	168	184	200	216	232
9	9	25	41	57	73	89	105	121	137	153	169	185	201	217	233
A	10	26	42	58	74	90	106	122	138	154	170	186	202	218	234
B	11	27	43	59	75	91	107	123	139	155	171	187	203	219	235
C	12	28	44	60	76	92	108	124	140	156	172	188	204	220	236
D	13	29	45	61	77	93	109	125	141	157	173	189	205	221	237
E	14	30	46	62	78	94	110	126	142	158	174	190	206	222	238
F	15	31	47	63	79	95	111	127	143	159	175	191	207	223	239
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110

Epson LQ Command Summary

You can use the control codes listed in the following tables when the printer is in LQ mode; that is, when DIP switch 12 is set to ON.



NOTE: Because of hardware differences, the justification code, ESC a, and the perforation skip codes, ESC M and ESC N, are not supported by your printer. Also, the styles of block graphics characters at 12 cpi are different from normal Epson LQ 510 printing.

Basic Control Codes

<u>Function</u>	<u>ASCII</u>	<u>Decimal</u>	<u>Hexadecimal</u>
End command	NUL	0	00
Sound beeper	BEL	7	07
Backspace one character	BS	8	08
Horizontal tab control; move to next tab	HT	9	09
Perform line feed	LF	10	0A
Vertical tab control; move to next tab	VT	11	0B
Perform form feed	FF	12	0C
Perform carriage return	CR	13	0D
Set double-wide mode by line	SO	14	0E
Set condensed mode (17 cpi); cancelled by DC2	SI	15	0F
Set printer on-line	DC1	17	11
Cancel condensed mode (17 cpi) set by SI	DC2	18	12
Set printer off-line	DC3	19	13
Cancel double-wide mode	DC4	20	14
Cancel data	CAN	24	18
Start escape sequence	ESC	27	1B
Insert space	SP	32	20
Delete character	DEL	127	74

ESCAPE Sequence Codes

<u>Function</u>	<u>ASCII</u>	<u>Decimal</u>	<u>Hexadecimal</u>
Set double-wide mode by line	ESC SO	27 14	1B 0E
Set condensed mode	ESC SI	27 15	1B 0F
Control sheet feeder n Setting R Eject paper	ESC EM n	27 25 n	1B 19 n
Set intercharacter space	ESC SP n	27 32 n	1B 20 n
Set/cancel various print modes (Master Select)	ESC ! n	27 33 n	1B 21 n
Cancel most significant bit (MSB) control	ESC #	27 35	1B 23
Set absolute print position	ESC \$ n1 n2	27 36 n1 n2	1B 24 n1 n2
Select download character	ESC % n	27 37 n	1B 25 n

set			
n Setting			
0 Use ROM character set			
1 Use RAM character set			
Define downloaded characters	ESC &	27 38	1B 26
Select score mode	ESC (- n1 n2 m d1 d2	27 40 45 n1 n2 m d1 d2	1B 28 2D n1 n2 m d1 d2
Select image graphics mode	ESC * m n1 n2	27 42 m n1 n2	1B 2A m n1 n2
Set line spacing increments of n/360 per line; n = 0 to 255	ESC + n	27 43 n	1B 2B n
Set/cancel underscore mode n Setting mode	ESC - n	27 45 n	1B 2D n
0 Start underscore			
1 End underscore			
Select vertical tab channel; n = 0 to 7	ESC / n	27 47 n	1B 2F n
Set 1/8-inch line spacing (8 lpi)	ESC 0	27 48	1B 30
Set 1/6-inch line spacing (6 lpi)	ESC 2	27 50	1B 32
Set line spacing in n/180-inch increments; n = 1 to 255	ESC 3 n	27 51 n	1B 33 n
Set italic mode	ESC 4	27 52	1B 34
Cancel italic mode	ESC 5	27 53	1B 35
Enable printable range	ESC 6	27 54	1B 36
Cancel printable range expansion	ESC 7	27 55	1B 37
Copy ROM font to RAM	ESC :	27 58	1B 3A
Set unidirectional print by line	ESC	27 60	1B 3C
Set most significant bit (MSB) to 0	ESC =	27 61	1B 3D
Set most significant bit (MSB) to 1	ESC	27 62	1B 3E
Reassign image graphics mode	ESC ? n m	27 63 n m	1B 3F n m
Reset printer settings to the default values that were set when you turned on the printer	ESC @	27 64	1B 40
Set n/60-inch line spacing; n = 0 to 127	ESC A n	27 65 n	1B 41 n
Set vertical tabs;	ESC B n1 n2	27 66 n1 n2	1B 42 n1 n2

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