BJC-2000

SERVICE MANUAL

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BJC-2000

SERVICE MANUAL

Canon

Application

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Corrections

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This manual was produced on an Apple Macintosh™ Power Mac 8500/180 personal computer and Apple LaserWriter™ 16/600PS-J laser beam printer; final pages were printed on Varityper™ 5300 with 4000-J RIP. All graphics were produced with MACROMEDIA® FREEHAND® 7.0J.
All documents and all page layouts were created with QuarkXPress™ 3.3J.

I. ABOUT THIS MANUAL

This manual is divided into four sections, and contains information required for servicing the unit.

Part 1: Safety and Precautions

This section tells you how to service the unit safely. It is very important, so please read it.

Part 2: Product Specifications

This section outlines and specification.

Part 3: Operating Instructions

This section explains how to operate the unit properly. Information required about installation and service made.

Part 4: Technical Reference

This section outlines the way the unit operates so you can understand it technically.

Part 5: Maintenance

This section explains how to maintain the unit. Descriptions of assembly/disassembly, adjustment for assembly, troubleshooting procedures, and wiring/circuit diagrams are given.

Procedures for assembly/disassembly are not given in this manual.
See the illustrations in the separate Parts Catalog.

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Part 1

SAFETY AND PRECAUTIONS

1. SAFETY PRECAUTIONS

1.1 Moving Parts

The moving parts of the printer are shown below. They include the carriage belt, idler roller, carriage, slow down gear, paper feed roller, pressure roller, eject roller, spurs, and pick-up roller. The first three parts above are driven by the carriage motor while the latter are driven by the paper feed motor. Avoid getting hair, clothing, jewelry, etc., caught in these moving parts.

Also note that the spurs are made of metal and have sharp edges. Avoid touching the spurs with bare hands.

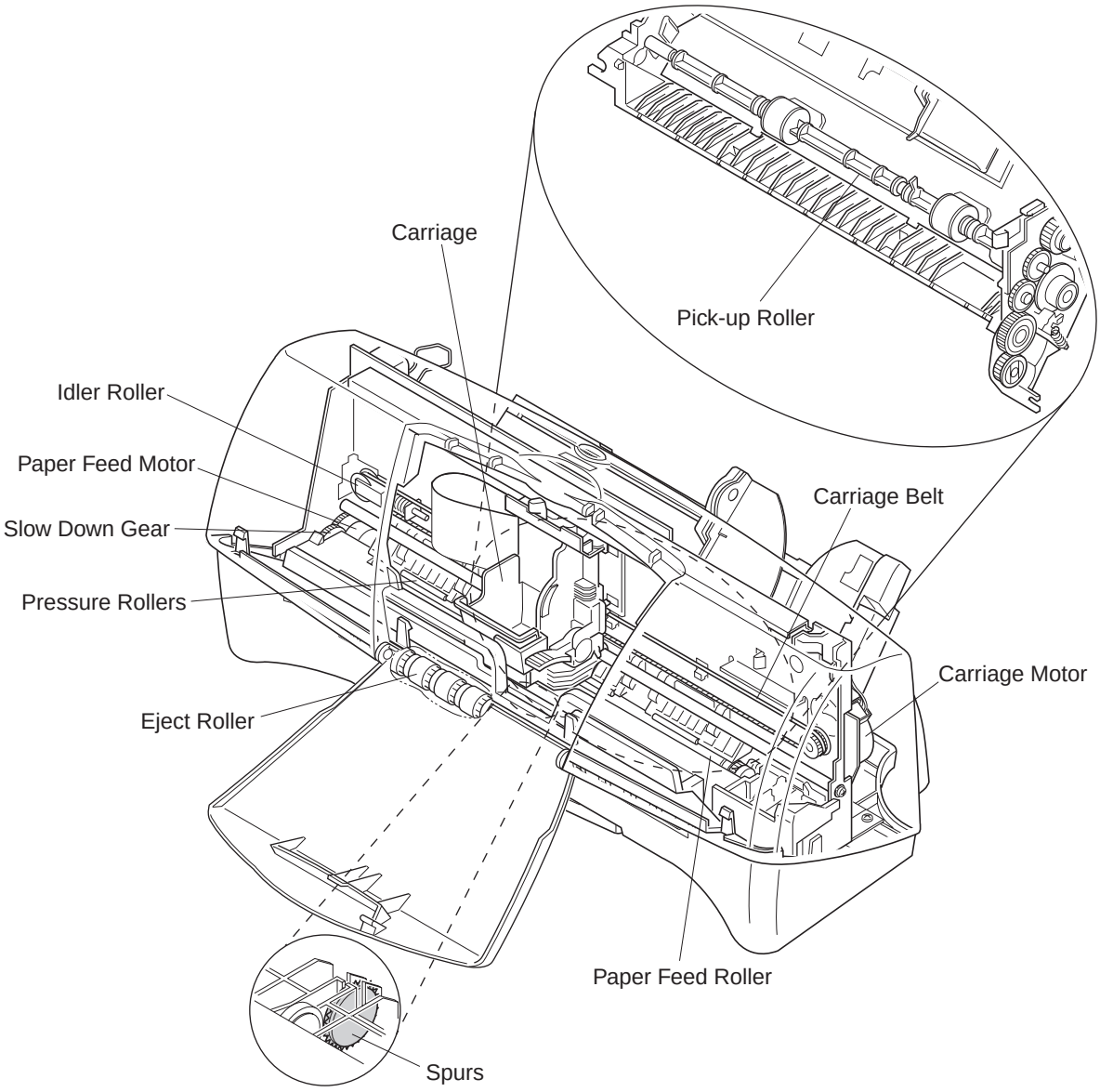


Figure 1-1 Moving Parts of the Printer

1.2 Ink Stains

1.2.1 Ink path

Do not touch the ink path while servicing as the ink can stain hands, work table, clothing, etc.

The ink path consists of the BJ cartridge nozzles, head cap, head wiper, maintenance jet receiving section, and waste ink absorber.

In the case of color BJ cartridges, the cartridge's ink outlets and joint pipes are also part of the ink path.

Caution!

Although the ink is non-toxic, it contains organic solvents.
Isopropyl alcohol 67-63-0, glycerin 56-81-5, and ethyleneglycol 107-21-1 in black ink and isopropyl alcohol 67-63-0 in color inks. Do not get ink in your eyes and mouth. If any ink should get into your eyes, wash with plenty of water and consult a doctor. If a large amount of the ink is consumed, consult a doctor immediately.
Give the doctor the information on the BJ cartridge label. Since the ink contains dyes, any ink stains on clothing, etc., are permanent.

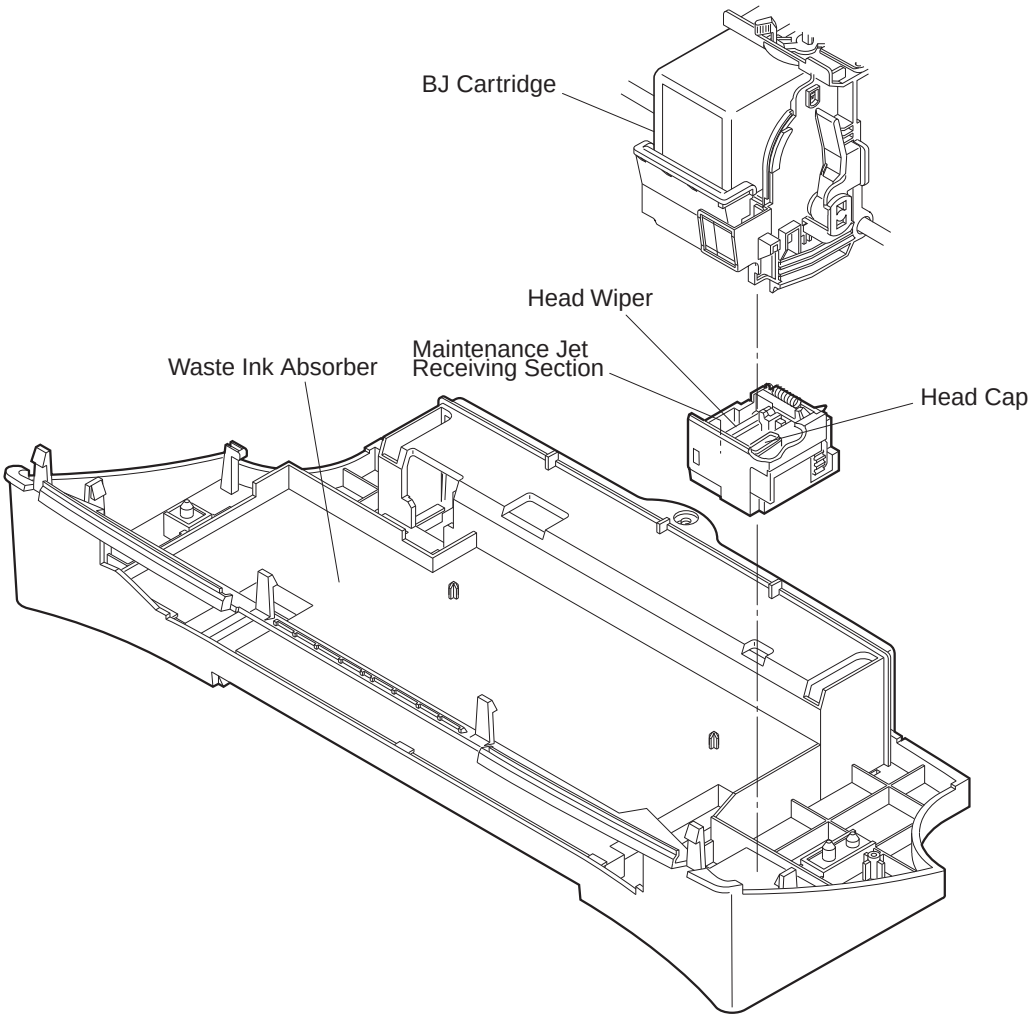


Figure 1-2 Ink Path

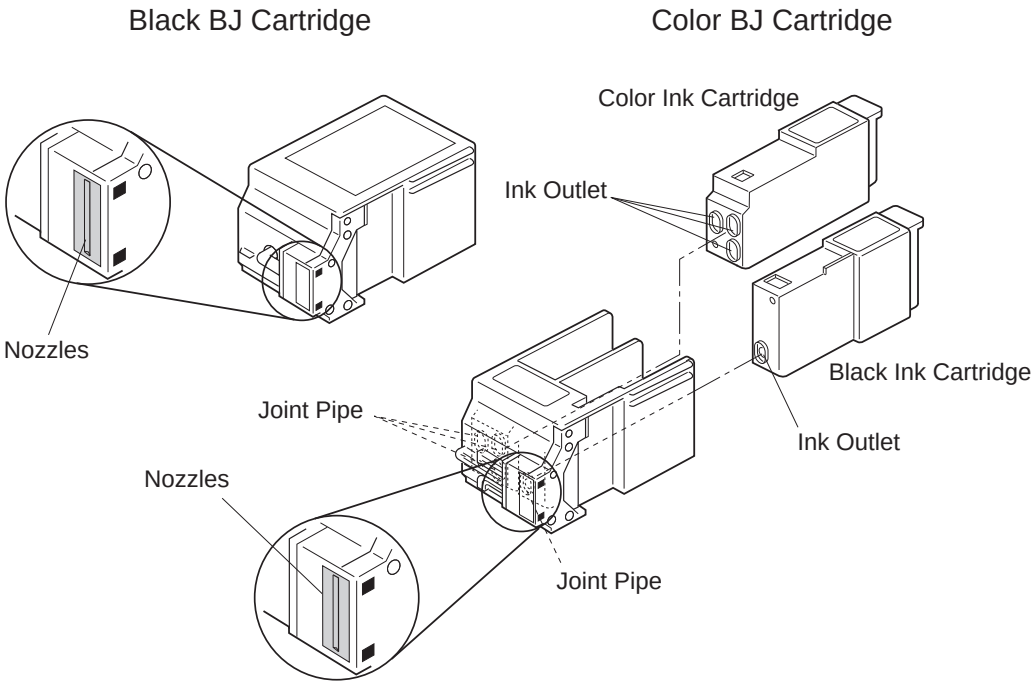


Figure 1-3 Ink Path of the BJ Cartridge

1.2.2 Ink mist

The BJ cartridge ejects ink onto the paper. During prolonged or heavy-duty use of the printer, small amounts of ink mist which splatter off paper during printing can contaminate the inside of the front cover and platen.
Clean any contaminated parts with a soft moist cloth. Ink in such areas can contaminate the back of the paper and dirty hands and clothing while servicing.

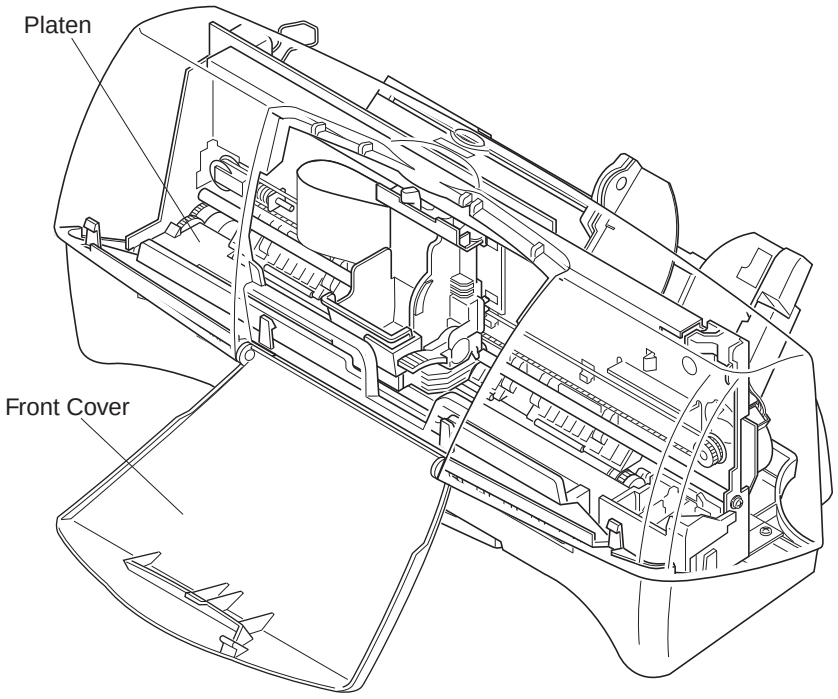


Figure 1-4 Ink Mist

1.3 BJ Cartridge Heat-Up

Do not touch the BJ cartridge's aluminum plate. The aluminum plate heats up during printing and becomes particularly hot during prolonged and continuous printing. It can overheat also if printing is continued even after the cartridge has run out of ink.

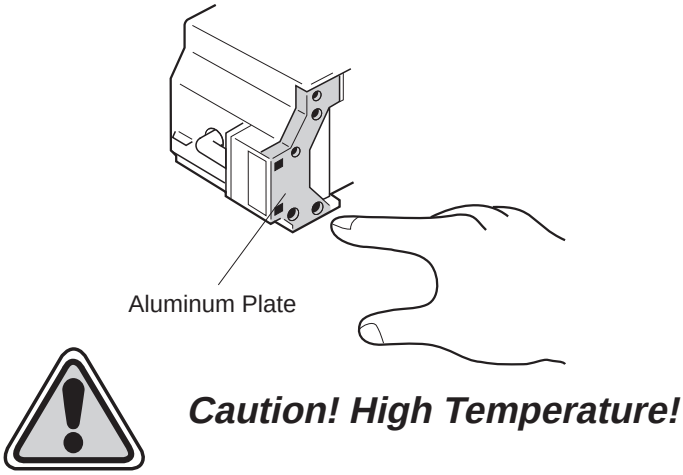


Figure 1-5 BJ Cartridge Aluminum Plate

NOTE

The printer has a protective mechanism when the BJ cartridge heats up. The protective mechanism is activated when the head temperature (diode) sensor in the BJ cartridge senses a certain temperature.

Protection level 1:

This level prevents the user from touching the bubble jet head's hot aluminum plate when the bubble jet head is replaced. For this purpose, when the front cover is opened, the carriage will not move to the cartridge replacement position. Close the front cover, leave the printer inactive for a few minutes to allow it to cool, and then open the front cover again to perform the required operation.

Protection level 2:

If a high temperature is still detected, the carriage is returned to the home position for 3.5 seconds to bring down the temperature. After the resting period, printing will resume. This continues for over 20 seconds to lower the bubble jet head's temperature.

Protection level 3:

If the temperature continues to increase, a head temperature error occurs. This stops the printing operation.

REF.

When printing is stopped by a head temperature error or a head temperature sensor error, follow the troubleshooting procedures in *Part 5: 5.TROUBLESHOOTING (page 5-6).*

2. MACHINE PRECAUTIONS

2.1 Precautions for Handling BJ Cartridges

2.1.1 Turning the printer ON/OFF

The printer will automatically cap the cartridge heads one minute after printing operations are completed, to prevent the ink from leaking and drying out.
When unplugging the power cord, wait at least one minute after completing an operation such as printing, feeding paper, cleaning the print head, etc.
If the power cord is accidentally unplugged before one minute has passed, replug the AC adapter, and wait for more than one minute before unplugging the power cord.

If the nozzles are not capped, the ink may leak and dry out causing the nozzles to clog.

2.1.2 When the printer is not in use

BJ cartridges should be stored either installed in the printer or in the BJ cartridge container.

If the BJ cartridge is removed from the printer or BJ Cartridge Container, the ink may leak and dry out causing the nozzles to clog.

2.1.3 Transportation Precautions

When carrying or transporting the printer, keep the BJ cartridge stored in the BJ cartridge container.
This prevents the ink from leaking and drying out in the nozzles.

2.1.4 Ink electroconductivity

The ink in the BJ cartridge is electroconductive. If ink leaks into the printer's mechanical parts, use a damp paper towel, etc., to wipe clean. If it leaks into the printer's electrical components, use tissue paper, etc., to wipe clean completely. If ink gets into the IC chips on the PCB and it is difficult to clean, replace the PCB.

If ink has leaked inside the printer, do not plug in the power cord. It may damage the circuitry.

2.2 Printer Precautions

2.2.1 Spur deformation prevention

Do not deform the tips of the spurs.

The spurs come into contact with the paper after printing. As the actual contact surface is small, any ink adhering to the spurs is minute and wiped off by the spur cleaners. Therefore any ink on the spurs is not enough to contaminate the paper as it passes. However, if the spurs become deformed, their contact surface with the paper increases, causing more ink to adhere to each spur. Since the spur cleaner is unable to wipe off all the ink, a line of dotted ink may mask the printed paper.

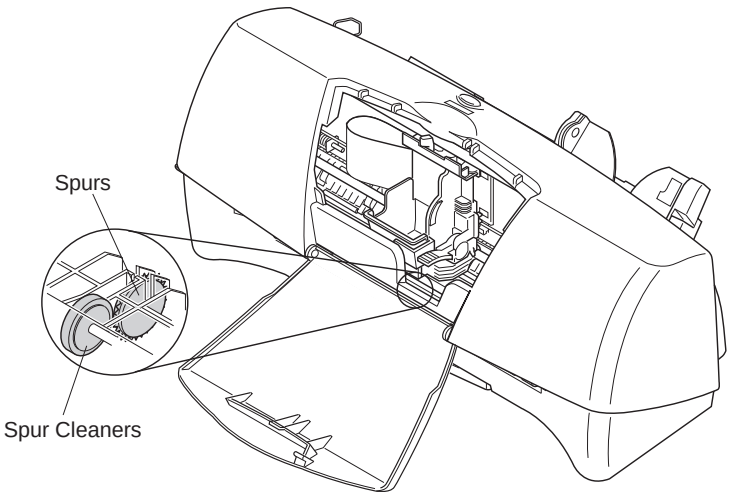


Figure 1-6 Spurs and Spur Cleaners

2.2.2 Static electricity damage prevention

The static charge that accumulates from clothing, etc., can damage electrical components. Therefore, never touch the electrical contacts of the carriage ribbon cable and BJ cartridge.

Electrostatic Discharge!

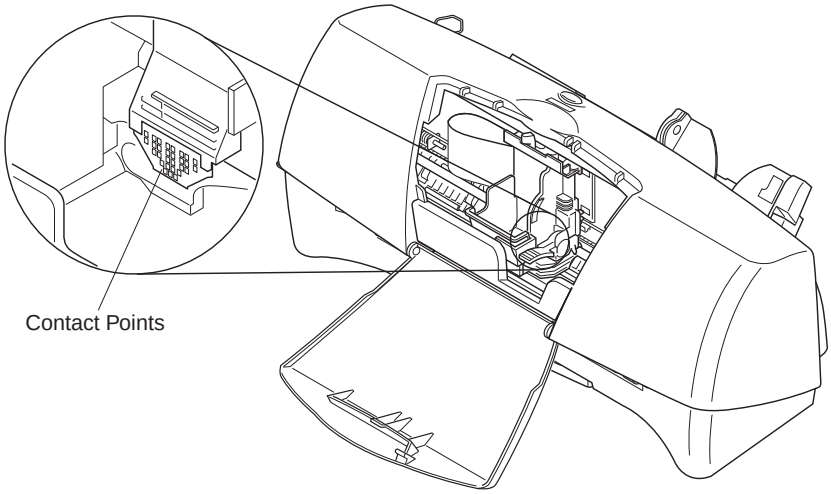


Figure 1-7 Carriage Ribbon Cable's Electrical Contacts

3. PRECAUTIONS FOR SERVICE

3.1 EEPROM Data Precautions

The printer keeps track of various settings, the total waste ink amount, and the total sheets printed with the black, color and photo BJ cartridges. This data is stored in the EEPROM on the logic board. Note the following precautions during servicing:

1) Before servicing

Check the EEPROM data with a test print. The total sheets printed can give you an idea of how much the printer has been used.

2) During logic board (EEPROM) replacement

Always visually check the waste ink amount absorbed by the waste ink absorbers and replace them when necessary as explained in *Part 5: 4.3 Logic Board and Bottom Cover Replacement Cautions (page 5-5).*

If the waste ink absorbers are not visually checked regularly, they may reach or exceed their full capacity before "waste ink full" is detected. The waste ink may therefore start leaking.

The memory data for the replacement logic board (EEPROM) is not defined. Therefore, after replacing the logic board (and EEPROM), reset the total waste ink amount to zero by clearing the data.

3) After waste ink absorber replacement

After replacing the waste ink absorbers, reset the total waste ink amount to zero by clearing the EEPROM data.

After the EEPROM is reset, the data it contained cannot be printed out with a test printout. If you want to check the stored data, be sure to execute test printout before resetting the EEPROM.
When the stored data is reset, the various settings, the total count of printed sheets, and the total waste ink amount will all be reset. The total sheets printed and waste ink amount cannot be input using the operation panel.

Immediately after the printer is turned on, it keeps track of the estimated waste ink amount based on the usage conditions. To prevent ink leakage when the waste ink amount exceeds the waste ink absorption capacity, the printer stops printing and indicates an error when the waste ink absorption capacity is close to being full.
For details on checking the EEPROM data with a test printout and for clearing the data, see *Part 3: 2.4 EEPROM Reset (page 3-19).*
If the printer stops operating in the case of a waste ink full error, follow the countermeasures described in *Part 5: 5.1 Troubleshooting (page 5-6).*

3.2 Static Electricity Precautions

The static charge accumulated from clothing, etc., can damage electrical components. To discharge any built-up static electricity, touch a metallic object that is grounded. Be sure to do this before disassembling the printer for servicing. Before discharging the static charge, do not touch the electrical contacts on the logic board and on the carriage ribbon cable (see *Figure 1-7*) while the carriage ribbon cable is connected to the logic board.

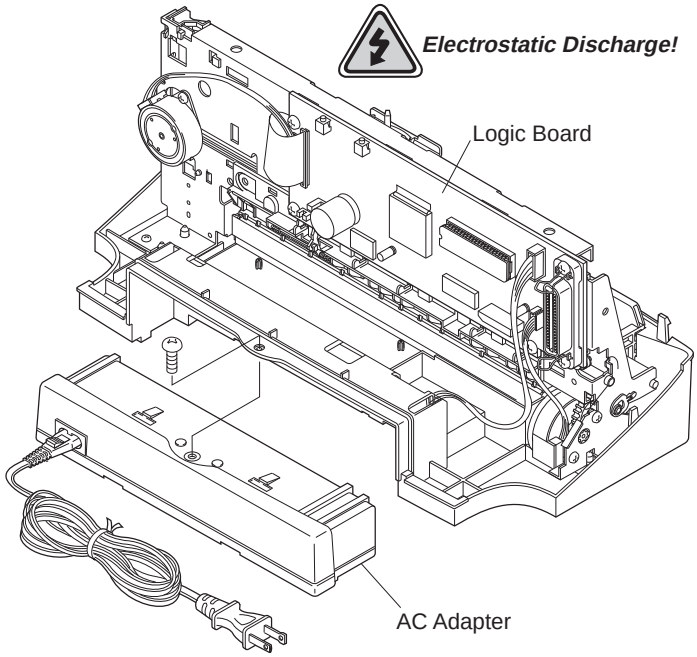


Figure 1-8 Electrical System of Printer

3.3 Disassembly and Reassembly Precautions

The printer is comprised of a large number of plastic parts. When disassembling the printer, take care not to break or bend plastic hooks.

CAUTION

Some plastic parts contain glass fibers for extra rigidity and precision, but since their viscosity is low, plastic hooks can break easily when excessive force is used. Use a precision screwdriver, and do not pull plastic hooks with excessive force while unhooking them.

3.4 Self-Diagnosis

The printer has a self-diagnosis feature to detect hardware defects. The results of the self-diagnosis is indicated on the host computer's screen as an error. (The host computer should be set in ECP or nibble mode, and uses the BJ status monitor under Windows95/98.) For details, see *Part 3: 2.1 Error Indications (page 3-15).*

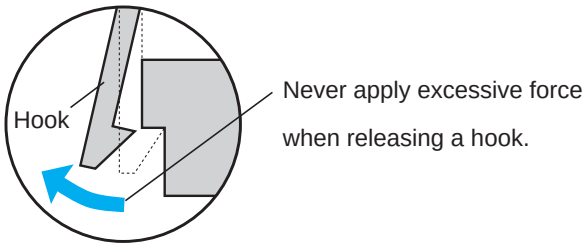


Figure 1-9 How to Release Plastic Hooks

Part 2

PRODUCT SPECIFICATIONS

1. PRODUCT OUTLINE

1.1 Product Outline

This printer is a value-added, Windows-based, full-color bubble jet desktop printer that has realized high-quality image printing through the implementation of the PhotoRealism concept.

The printer has achieved high-quality printing by using color BJ cartridges/photo BJ cartridges in which "drop modulation technology" has been adopted. It also features banner printing capability to expand its printing environment. If an optional scanner cartridge is installed in the carriage, the printer can also be used as a compact color scanner.

This is a high-performance, personal color printer, which has achieved small size and light weight as well.

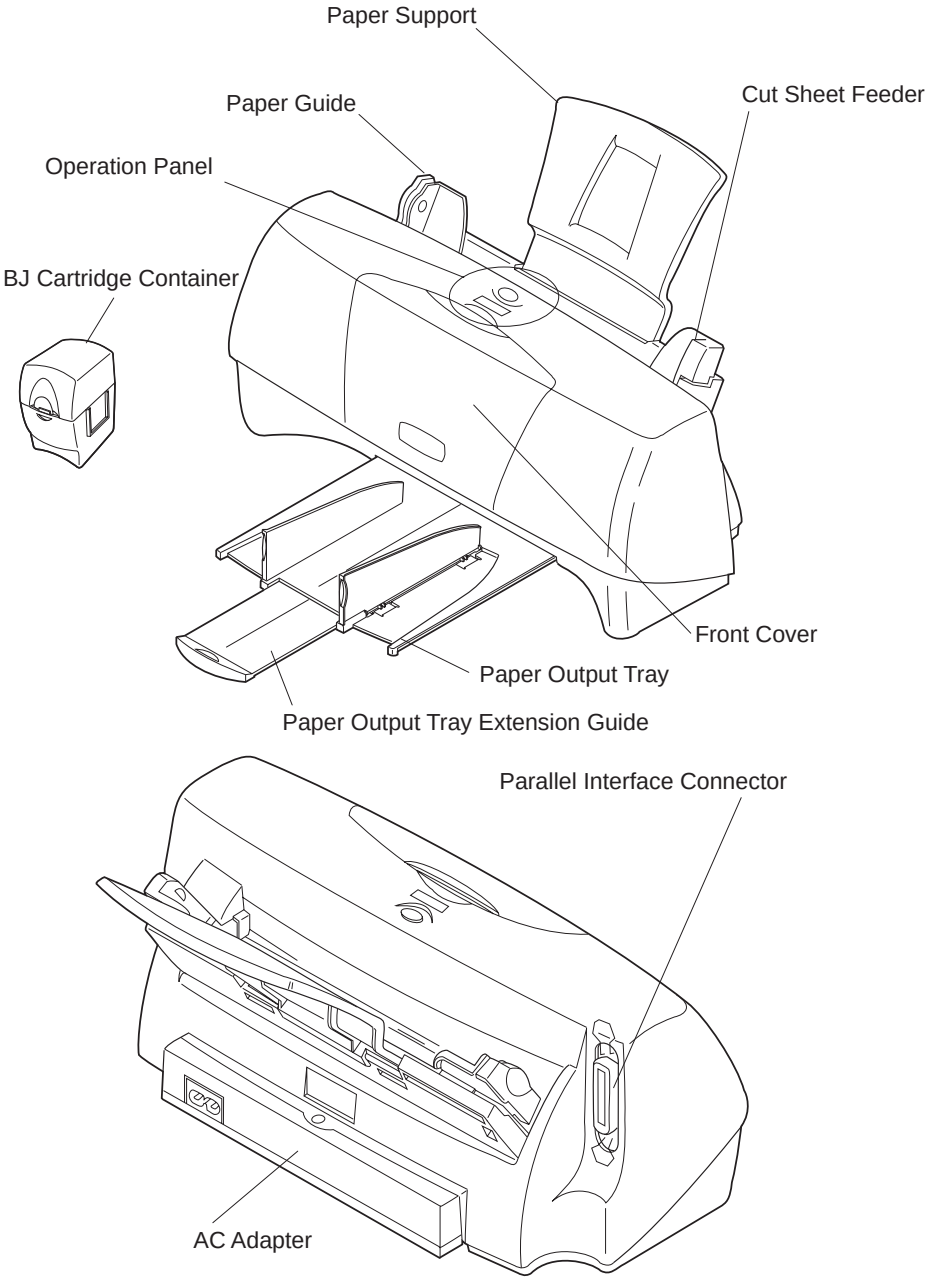


Figure 2-1 Printer Exterior

1.2 Features

1. Compact (desk-top size)
   External dimensions: 370 mm W × 191 mm D × 161 mm H
   Weight: Approx. 2.4 kg (5.3 lbs) (excluding BJ cartridge and option)
2. Only *RESET* button on the operation panel (No LED and buzzer)
   Errors will be displayed on the host computer monitor. (The host computer should be set to ECP or Nibble mode and use the BJ status monitor on Windows95/98.)
3. New AC adapter
4. High quality printing of 720 × 360 dpi (in both monochrome and color)
5. Windows exclusive printer (used with the Canon original printer driver)
6. Drop modulation technology adopted Color & Photo BJ cartridges
7. Banner printing capability
8. New image processing technology "Image Optimizer" supported by the driver.
   (Image optimizer: a function to reduce "jaggies" which occur when enlarging low resolution images.)
9. Improved printer driver color matching processing
10. Device ID and status response function compatible with Windows95 Plug & Play
    (Responds to the device ID/status of nibble mode)
11. New leverless sheet feeder
12. New carriage (Two-positioned paper thickness lever. Three positions for the BJC-4400.)
13. High quality scanning using the optional color scanner cartridge (IS-22)
14. Cartridge container SB-21 packed with the printer (for BC-20/BC-21e/BC-22e Photo)

1.3 BJ Cartridge

1.3.1 Color BJ cartridge (Multi-Drop)

The disposable color BJ cartridge is comprised of a print head and two replaceable ink cartridges (black and color).

When the ink runs out, or more than 6 months elapse after the cartridge has been removed from its package, or if the print quality does not improve even after cleaning the head over five times, replace the ink cartridge. Furthermore, if the print quality does not improve following replacement of the ink cartridge and after cleaning is performed over 5 times, replace the BJ cartridge. Since the three color inks are integrated, when one ink color runs out, the entire color ink cartridge must be replaced.

Adopting drop modulation technology, small dots are printed in low density areas to minimize graininess and large dots are used for high density areas. Using this technology allows the printer to retain its printing speed and achieve high quality printing. On plain paper and transparencies, 360 dpi/720 dpi high-resolution printing is available.

1.3.2 Black BJ cartridge

The disposable BJ cartridge, is used for ultra-high-speed mono-chrome printing.

When the ink runs out, or more than 6 months elapse after the cartridge is removed from its package, or if the print quality does not improve even after cleaning the head over five times, replace the BJ cartridge. It allows printing at the same 360 dpi/720 dpi resolution as does the color BJ cartridge.

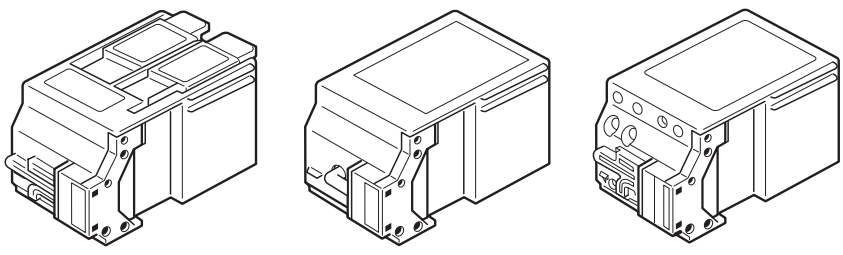
1.3.3 Photo BJ Cartridge (Multi-Drop)

The disposable photo BJ cartridge, used for printing color photographs, integrates a print head and four ink cartridges.

When the ink runs out, or more than 6 months elapse after the cartridge has been removed from its package, or if the print quality does not improve even after cleaning the head over five times, replace it with a new photo BJ cartridge. Since the four color inks are integrated, when one ink color runs out, the entire photo BJ cartridge must be replaced.

Adopting drop modulation technology, the photo BJ cartridge prints small dots in low density areas to minimize graininess and large dots in high density areas to retain its printing speed and achieve high quality printing.

Use high quality special paper for printing.



Color BJ Cartridge Black BJ Cartridge Photo BJ Cartridge

Figure 2-2 Color BJ Cartridges

1.4 BJ Cartridge Container

The cartridge container is for storing unused BJ cartridges black, color, and photo, to protect the head from damage. When storing a BJ cartridge in this container, be sure to close the cover. When storing a color BJ cartridge, do not remove the ink cartridges. The BJ cartridge containers can be linked together

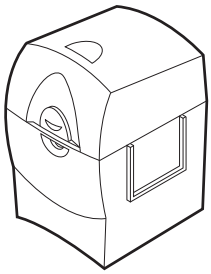


Figure 2-3 BJ Cartridge Container

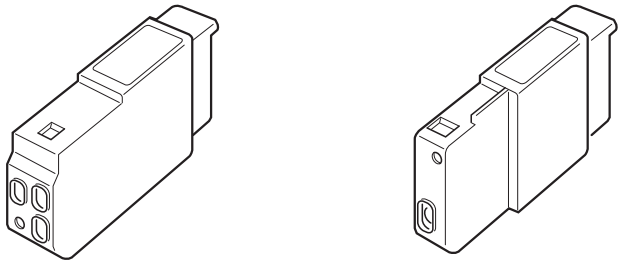
1.5 Consumables

1.5.1 BJ cartridges (Color, Black, Photo)

Replacement BJ cartridges are identical to those included with the printer. Only the packaging is different.

1.5.2 Ink cartridge (Color BJ cartridge)

Replacement ink cartridges are the same as those installed in the color ink cartridge and black ink cartridge. Either cartridge can be used for half a year after the seal is opened.



Color Ink Cartridge Black Ink Cartridge

Figure 2-4 Ink Cartridges

1.6 Option

1.6.1 Color image scanner cartridge

This printer can be used as a color scanner when a scanner cartridge is installed. To help stabilize the output of the LED which provides the scanner cartridge with its light source, when the scanner cartridge is just installed or when it is not engaged in reading operation, the printer makes the LED lit to pre-heat the scanner cartridge or keep it warmed up.

Also, in order to establish the "value of white color," which provides a reference for scanning images, the scanner needs to perform white calibration correction, using the white calibration sheet.
The calibration data is retained unless there is an ambient temperature change of ±5°C or the cartridge is removed and reinstalled.
Also for monochrome printing, edge emphasis processing is performed.

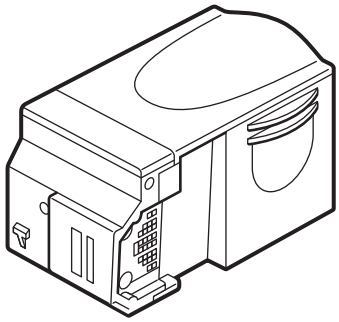


Figure 2-5 Scanner Cartridge

1.6.2 Scanning holder

The scanning holder protects the scanning document from the printer's sharp spurs that may damage the document during feeding. Small documents can also be scanned using the scanning holder. When the printer is used as a scanner, the scanning holder must be used at all times.

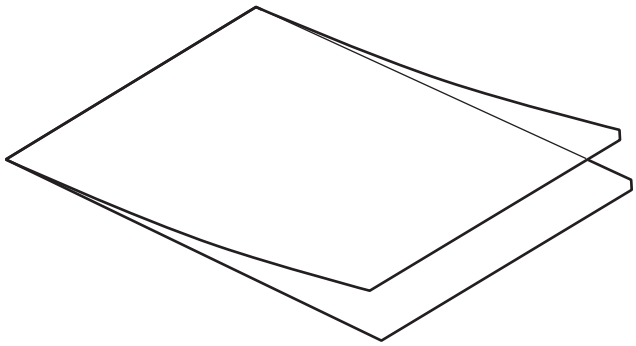


Figure 2-6 Scanning Holder

1.6.3 White calibration sheet

The printer uses a white calibration sheet to perform calibration. The white calibration sheet is set on the printer similar to the scanning holder. White calibration is performed in the initial setting of the printer driver. As the white calibration sheet is used to set the white standard value for scanning images, scanning input data may be affected if the sheet is dirty. Without damaging the sheet, use a soft moistened cloth to gently wipe off the dirt . If the sheet is still dirty, use a wet towel to wipe the sheet and dry it thoroughly before use.

2. SPECIFICATIONS

2.1 Printer Specifications

1. Type

Desktop serial color bubble jet printer

2. Paper feeding method

Auto sheet feed

3. Resolution

720 dpi × 360 dpi

4. Stacking capacity of sheet feeder

Plain paper	Max. 5 mm stack (approx. 50 pages with 75 g/m² paper)
	LGL size: Max. 10 sheets
Envelopes	5 envelopes (Commercial number 10, DL-size)
Transparencies	Max. 20 sheets
Back print film	Max. 10 sheets
Glossy photo paper	Max. 1 sheet
Fabric	Max. 1 sheet
T-shirt transfer	Max. 1 sheet
Banner paper	Max. 1 sheet
Scanning document	Max. 1 page in carrier sheet (ASF)

5. Paper size

Letter (8.5" × 11")
Legal (8.5" × 14")
A4 (210 mm × 297 mm)
Commercial number 10 envelopes (4.11" × 9.5")
European DL-size envelopes (220 mm × 110 mm)

6. Paper type

Plain paper
Envelopes (COM#10 or DL-size)
Transparencies (Canon Transparencies CF-102)
BPF (Canon Back Print Film BF-102)
Glossy paper (Canon Glossy Photo Paper GP-201)
Glossy film (Canon High Glossy Film HG-101)
Color Plain Paper (Canon High Resolution Paper HR-101)
Color Plain Paper (Canon Bubble Jet Paper LC-301)
Fabric (Canon Fabric Sheet FS-101)
Banner Paper (Canon Banner Paper BP-101)
T-shirt transfers (Canon T-Shirt Transfers TR-201)

7. Printing weight

Automatic feed	64 to 105 g/m² (17 lbs to 28 lbs)