Color Bubble Jet™ Printer

# BJC-6000
# Series

# BJC-6000

# SERVICE MANUAL

## REVISION 0

**Canon**

0199 SE 0.30-0

# BJC-6000

## SERVICE
## MANUAL

Canon

**Target Readers**

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# I. ABOUT THIS MANUAL

This manual is divided into five parts containing the information required for servicing the BJC-6000 printer.

*Part 1: Safety and Precautions*
>   This part contains information on how to service the unit safety. It is very important, and must be read.

*Part 2: Product Specifications*
>   This part outlines the product and its specifications.

*Part 3: Operating Instructions*
>   This part explains how to operate the unit properly, how it is installed, and how to use the service mode.

*Part 4: Technical Reference*
>   This part outlines the unit operation giving a technically.

*Part 5: Maintenance*
>   This part explains maintenance of the unit. It includes details of disassembly / assembly, adjustments required when assembling, troubleshooting procedures, and wiring / circuit diagrams, etc.

**REF.** This manual does not contain complete information required for disassembling and assembling the BJC-6000 printer. Please also refer to the separate Parts Catalog.

# II. TABLE OF CONTENTS

# III. ILLUSTRATION INDEX

# IV. TABLE INDEX

# *Part 1*

# SAFETY AND PRECAUTIONS

# 1. SAFETY PRECAUTIONS

## 1.1 Moving Parts

Be careful not to get your fingers, hair, clothing, or accessories caught in the moving parts of the printer.

The moving parts are driven either by the carriage motor or paper feed motor. The carriage motor-related moving parts include the carriage, carriage belt, and carriage ribbon-cable. The paper feed motor-related moving parts include the paper feed gears, paper feed rollers, pinch rollers, eject roller gears, spurs, and pick-up rollers.

To prevent injuries, the printer will stop after moving the carriage to the cartridge replacement position if the cover is opened.
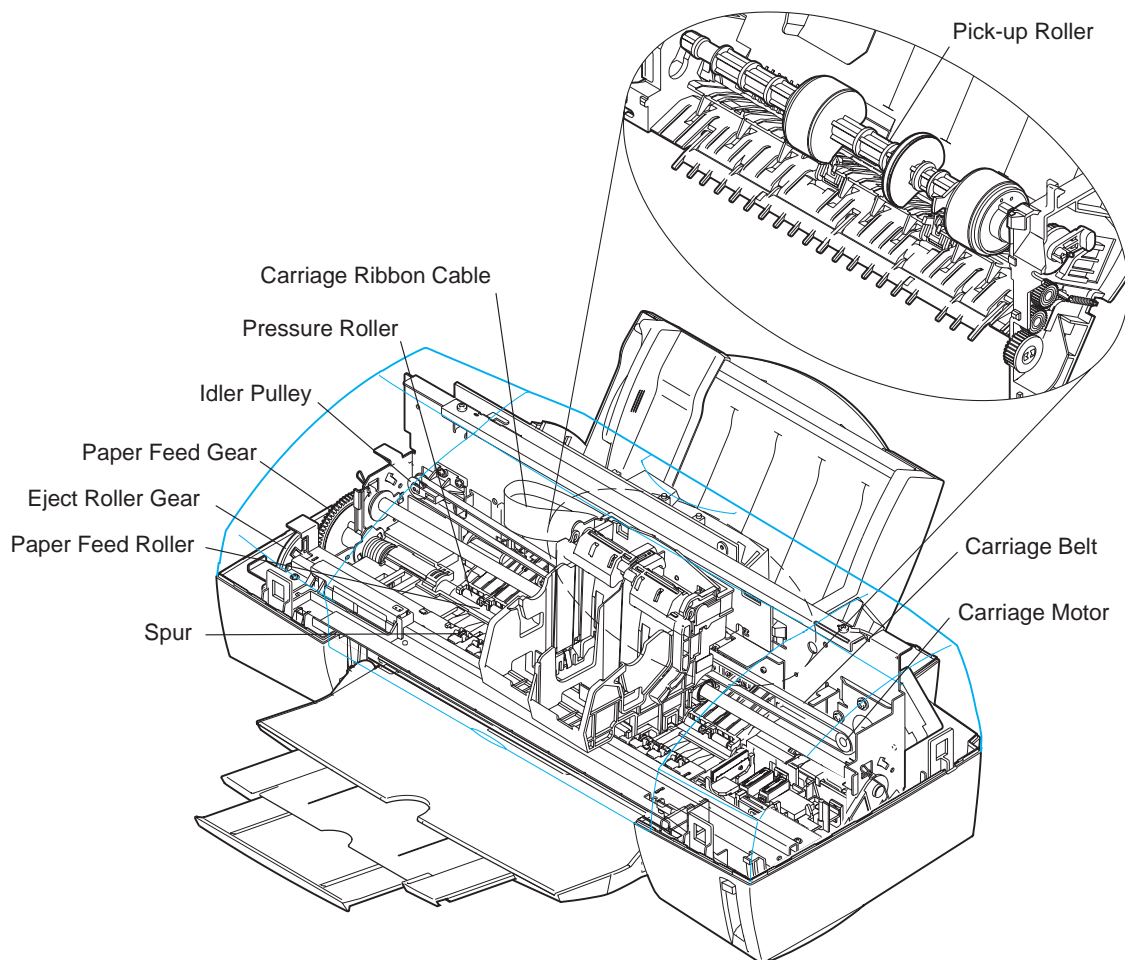
**Figure 1-1 The Printer's Moving Parts**

## 1.2 Ink Stains
### 1.2.1 Ink paths

Be careful not to touch the ink paths.  Ink on hands could stain the printer, work table, or clothes.  The ink paths include the BJ cartridge ink tank outlet, the BJ cartridge ink filters and nozzles, the maintenance jet receiving section, the head caps, the wipers, and the waste ink absorber.

| CAUTION | The ink is not harmful to the human body, but contains some organic solvents:<br>The black ink  contains glycerin 56-81-5 and diethylene glycol 111-46-6.<br>The yellow ink contains glycerin 56-81-5 and isopropyl alcohol 67-63-0.<br>The cyan, magenta, photo-cyan, photo-magenta and photo-black ink contain glycerin 56-81-5, isopropyl alcohol 67-63-0, ethylene glycol 107-21-1, and diethylene glycol 111-46-6.<br>Be careful not to get the ink into your mouth or eyes.  If the ink gets into your eyes, wash with plenty of water and consult a doctor.  In case you have swallowed a large amount of ink, consult a doctor immediately.<br>The ink contains dyes.  If clothing is stained with the ink, the ink may not be removed completely. |
|---|---|
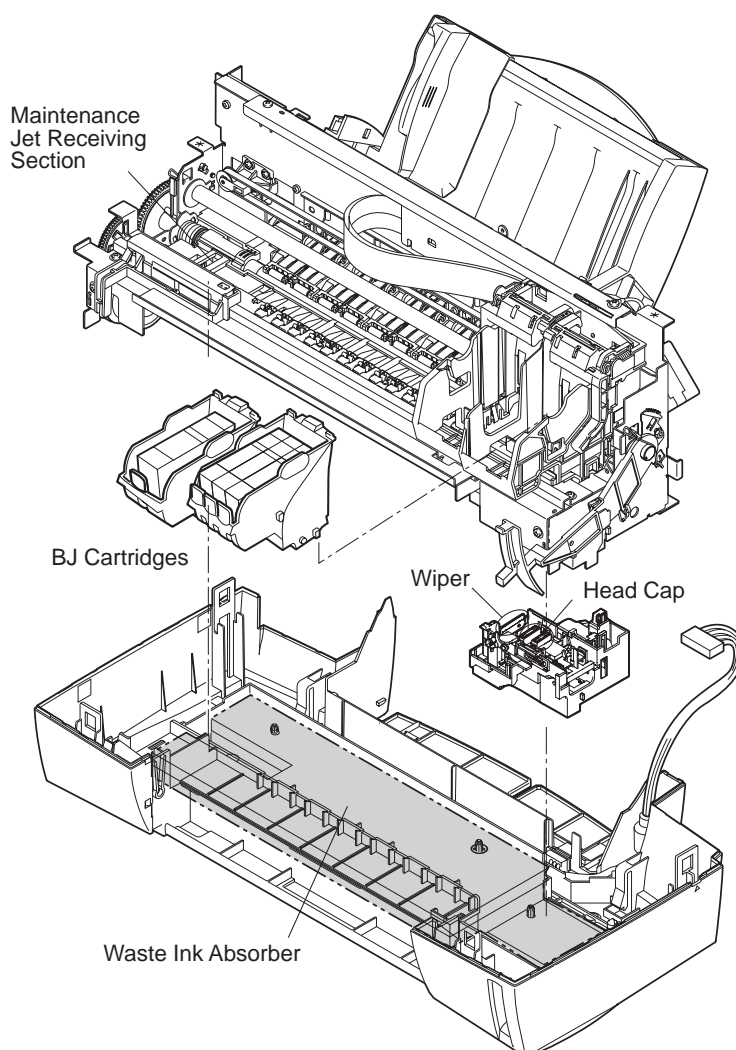


**Figure 1-2 Ink Paths**

### 1.2.2 Ink mist

The BJ cartridge ejects ink onto the paper during printing. After the printer is used for a long period or used heavily, part of the ink ejected from the nozzles, or ink mist bouncing back from the paper could accumulate and contaminate the platen, front cover, as well as the periphery of the purge unit. Carefully wipe off the ink mist with a dampened soft cloth so that hands or clothing will not be stained by contaminated parts during servicing.
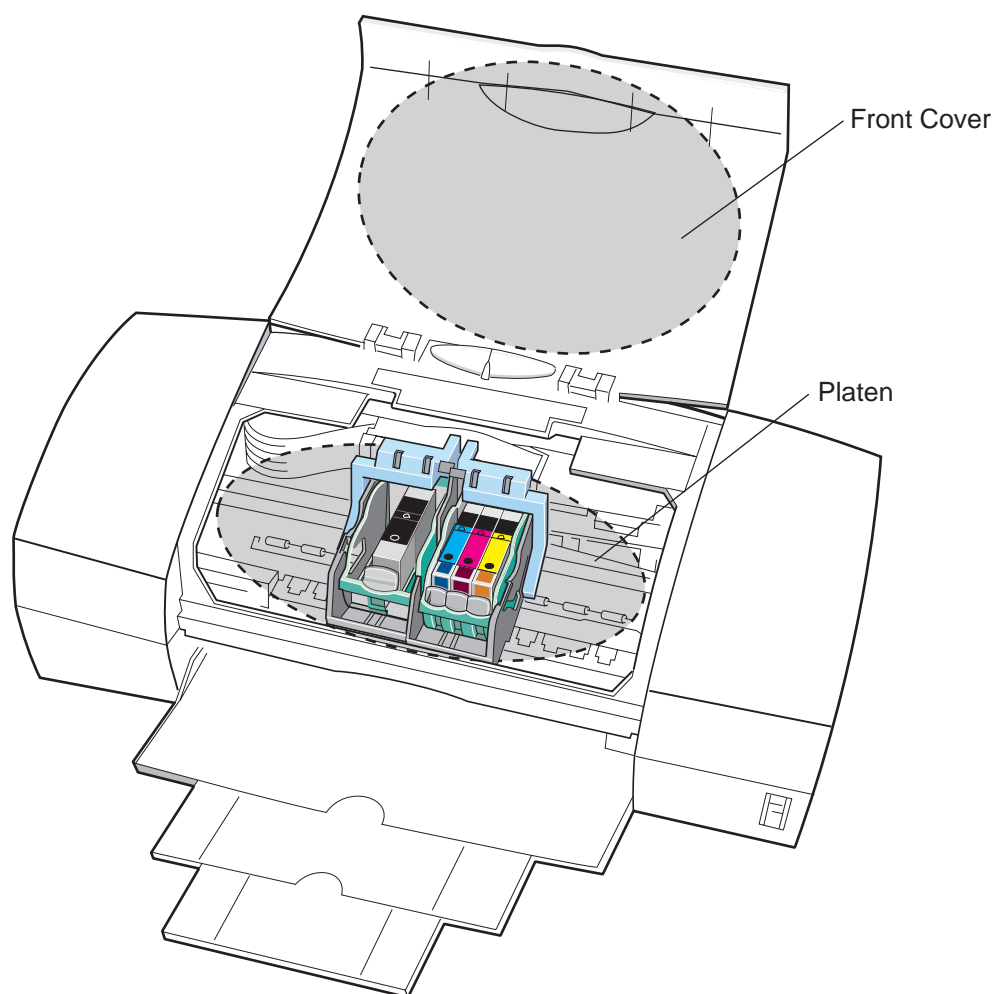


**Figure 1-3 Ink Mist**

### 1.3 Live Electrical Parts

When the printer is plugged into a wall outlet, the power supply unit of the printer is live, even if the power is switched off with the *POWER* button.  Be careful not to get an electric shock or damage sensitive elements if you are checking a live printer with the cover removed.



Control Board
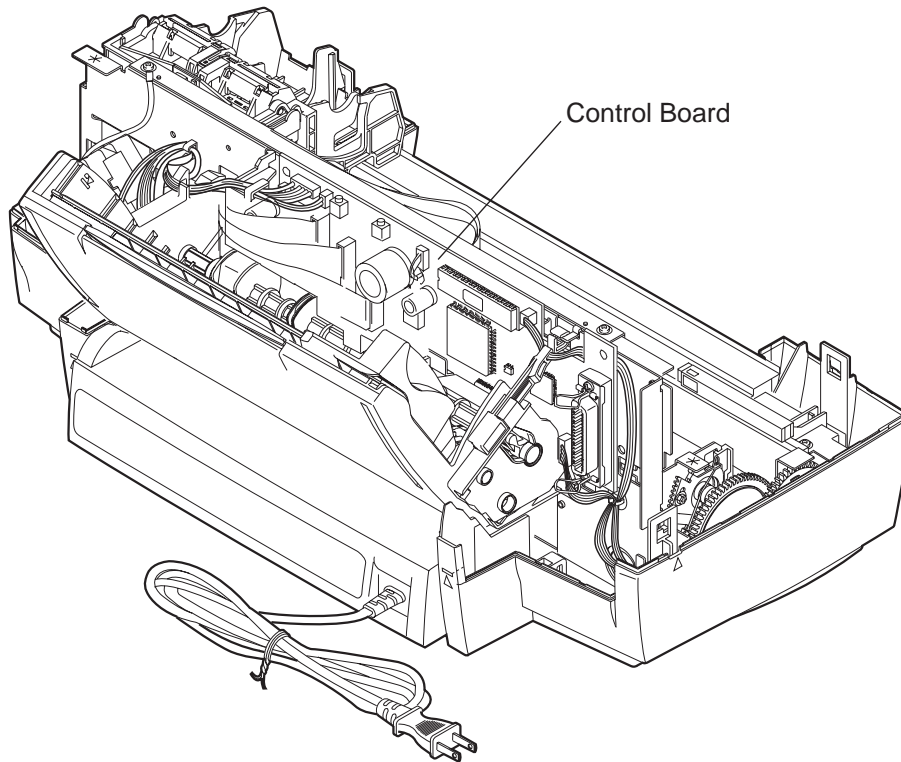
**Figure 1-4 Live Electrical Parts**

# 2. MACHINE PRECAUTIONS

## 2.1 BJ Cartridges
### 2.1.1 BJ cartridge handling

Do not unpack the BJ cartridge until you are ready to use it.  Before installing the BJ cartridge in the printer, carefully remove the head cap which protects the nozzles, the protective tape, and the protective tank.  To prevent the nozzles or other ink paths from clogging, never touch or wipe the nozzles or other ink outlets with your bare hands or tissue paper.  After removing the head cap, the protective tape, and the protective tank from a BJ cartridge, promptly install the cartridge in the printer or store it in the cartridge container.  Do not reuse head caps or protective tapes which have been removed.  The BJ cartridge must be installed in the printer or stored in the cartridge container with its ink tanks installed.  If the BJ cartridge is installed or stored with its ink tanks removed, the nozzles could clog due to foreign matter or dried ink.  Do not attempt to disassemble or wash the BJ cartridge.

**NOTE**  If a nozzle clogs, or ink fails to be fed normally, print quality degrades, and typically a fine horizontal blank line appears in printed images.  If cleaning operations do not solve the problem, replace the BJ cartridge with a new one.

Protective Tape

Head Cap
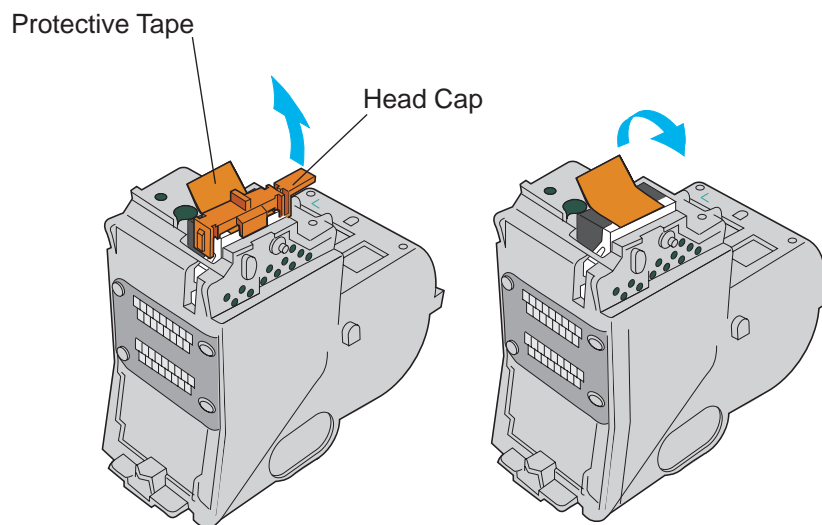


**Figure 1-5 BJ Cartridges**

### 2.1.2 Automatic capping

When the printer is turned off with the *POWER* button, it automatically caps the BJ cartridge's nozzles to protect them as well as to prevent ink leakage. If the AC cable is unplugged from a wall outlet before the printer is turned off with the *POWER* button, the nozzles will not be automatically capped. In this case, plug in the AC cable again, turn on the printer, and then turn it off with the *POWER* button. The nozzles will be automatically capped.

> **CAUTION** If the nozzles are not capped, ink may dry out and clog the nozzles or leak from the cartridge.

### 2.1.3 When not using the printer

The BJ cartridge may be either left installed in the printer or stored in the cartridge container. This also applies when carrying, transporting, or storing the printer.

> **CAUTION** If the BJ cartridge is left in open air, out of the printer or cartridge container, foreign matter or dried ink may clog the nozzles, resulting in poor print quality.

### 2.1.4 Ink's electroconductivity

The ink in the BJ cartridge conducts electricity. If ink is spilt in the printer's mechanical parts, use a dampened paper towel to wipe clean. If ink is spilt onto the printer's electrical components, use tissue paper to wipe clean. If ink gets under an IC chip on the control board and cannot be removed thoroughly, replace the control board with a new one.

> **CAUTION** Never plug in the printer if its' electric circuitry is in contact with spilt ink. Otherwise the electric circuitry could be damaged.

## 2.2 Ink Tanks
### 2.2.1 Unpacking the ink tank

Do not unpack the ink tank until you are ready to use it.  When installing it in the BJ cartridge, unpack the ink tank, peel off the vinyl lamination, and remove the cap from the ink outlets.
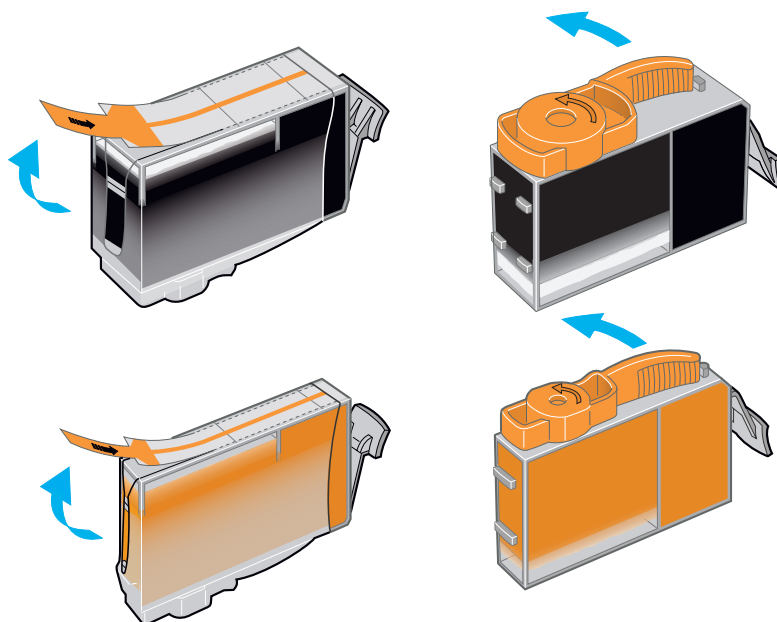


**Figure 1-6 Unpacking the Ink Tank**

### 2.2.2 Ink tank handling

If the joint of the BJ cartridge connecting to the ink tank supply piece is contaminated, suction of ink into the BJ cartridge could fail.  Therefore, never touch the ink tank's ink supply piece.  After removing the cap from the ink tank supply piece, promptly install the ink tank in the BJ cartridge to prevent the nozzles from clogging due to dried-ink.  Do not remove the ink tank from the BJ cartridge unless you are replacing it.
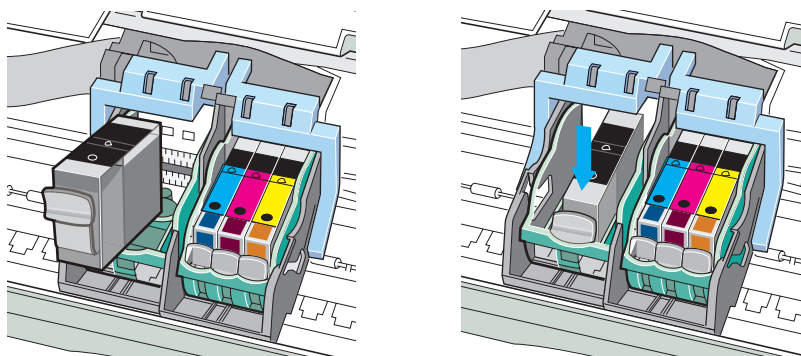


**Figure 1-7 Installing the Ink Tank**

**NOTE**  If a nozzle clogs, or otherwise ink fails to be fed normally, print quality degrades, and typically a fine horizontal blank line appears in printed images.  If cleaning operations do not solve the problem, replace the BJ cartridge with a new one.

### 2.3 Printer Handling
#### 2.3.1 Spurs

Take care not to bend the tips of the spurs. The tips of the spurs make contact with printed paper and are contaminated with ink, but due to their small surface contact area, the tips, cleaned by the spur cleaners, will not stain the printed paper. However, if the tips are bent and their surface contact area increases, they collect more ink and are not easily cleaned by the spur cleaners, and thereby stain the printed paper by making dotted lines on it.
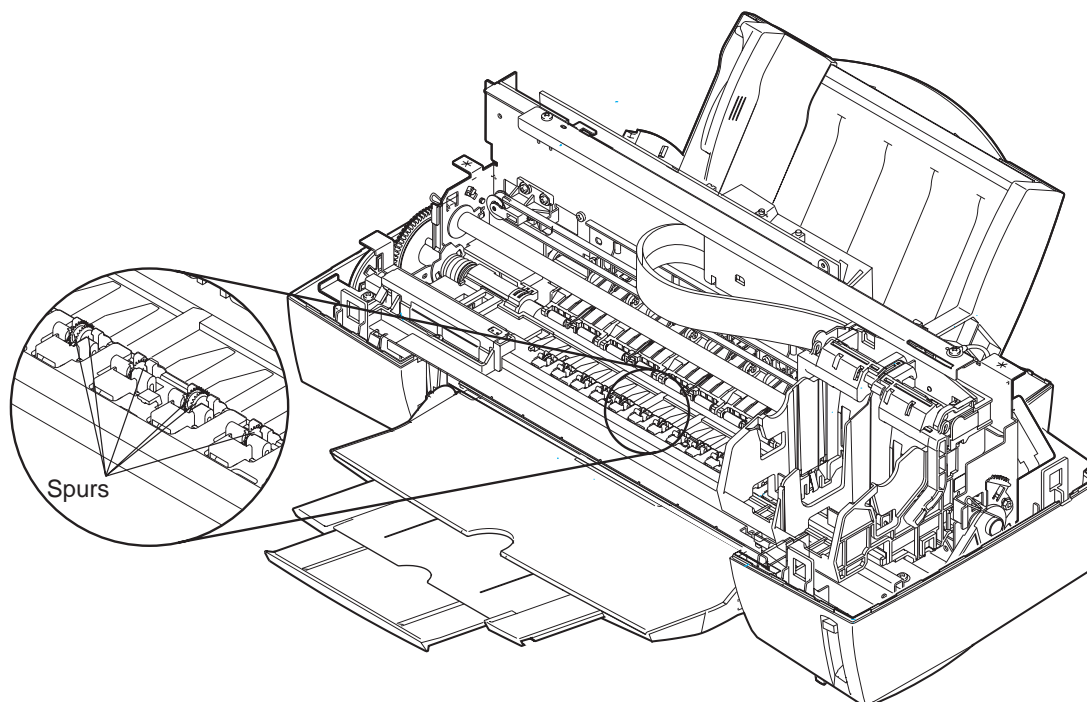


**Figure 1-8 Spurs**

### 2.3.2 Damage due to static electricity

Static electricity may be generated by your clothes rubbing against each other and may accumulate in your body.  If you touch electrical elements, the discharge of static electricity could damage them or change their electrical characteristics.  For this reason, never touch the sensor contacts or the printer's BJ cartridge contacts.



Ink Sensor

Contact Points

Contact Points
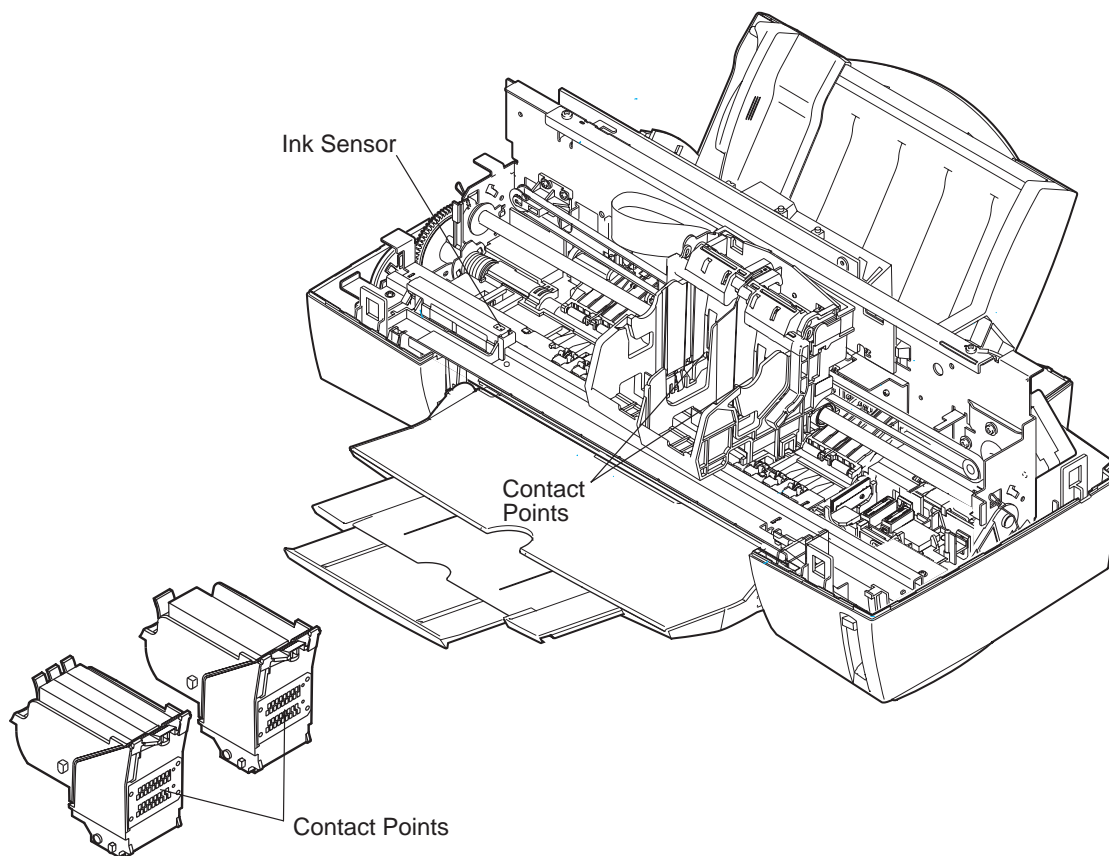
**Figure 1-9 Damage Due to Static Electricity**

### 2.3.3 Ink leakage prevention

When you turn off the printer using the *POWER* button, the printer moves the carriage to the capping position, caps the nozzles, and locks the carriage in position with the lock arm. If electric power is not available to the printer, during transportation for example, this automatic capping and locking is not available. In this case, manually move the carriage to the capping position and secure it with tape to ready the printer for transportation.

Tape
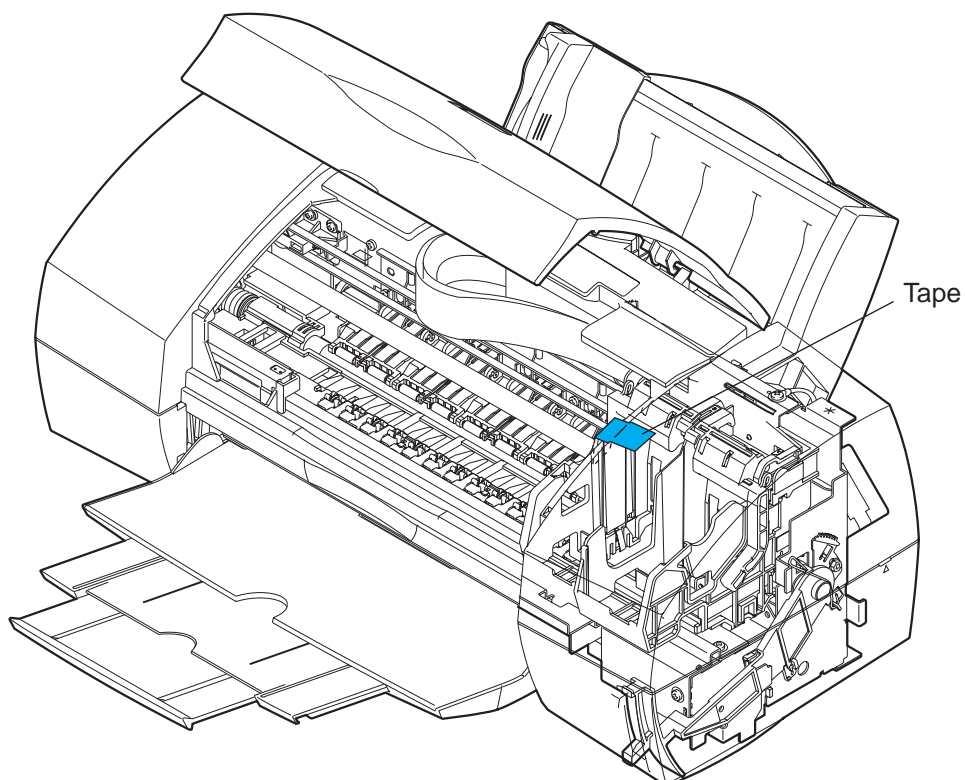
**Figure 1-10 Capping Position**

**1-10**

# 3. NOTES ON SERVICING

## 3.1 EEPROM Data

The printer keeps track of the total sheets printed by each BJ cartridge configuration (Black/Color and Photo/Color) and the total waste ink amount and stores that information in the EEPROM (IC 602) on the logic board. Observe the following precautions during servicing:

**1) Before servicing**

You can check the EEPROM data with a test print. The total sheets printed by each configuration can provide important information on how much the printer has been used.

**2) If the control board (EEPROM) is replaced (or if stored data is cleared by mistake)**

Check the waste ink absorber, and replace it with a new one if necessary. If you fail to replace the waste ink absorber in time, the waste ink full alarm might not be issued in time and waste ink could leak (depending on the current ink absorbing capacity of the waste ink absorber). When replacing the logic board (EEPROM) with a new one, be sure to clear the data on the new EEPROM, because the data is not defined.

**3) After the waste ink absorber is replaced**

After replacing the waste ink absorber, as prompted by the waste ink full alarm, clear the data on the EEPROM.

| CAUTION | Once cleared, the EEPROM data cannot be restored (cannot be checked with a test print). Always check the EEPROM data with a test print before clearing it. The data includes information on the user settings, the total sheets of printed paper and the total amount of waste ink absorbed. Note that you cannot edit the data from the operator panel. |
|---|---|

| REF. | The printer calculates the total amount of waste ink absorbed based on the estimated usage of the printer. To prevent the capacity of the waste ink absorber from being exceeded, the waste ink full alarm is issued when the waste ink absorber gets full, suspending the operation of the printer. Refer to *Part 3: 3.6.4 Resetting EEPROM* (Page 3-21) for the procedures for checking the EEPROM data with a test print or for clearing the data. Refer to *Part 5: 6. TROUBLESHOOTING* (Page 5-13) for the troubleshooting procedures to be followed when the waste ink full alarm is issued. |
|---|---|

### 3.2 Static Electricity

Static electricity may be generated by your clothes rubbing against each other and may accumulate in your body. If you touch electrical elements, the discharge of the static electricity could damage them or change their electrical characteristics. To prevent damage due to such electrostatic discharge, ground yourself by touching a metal fitting which is grounded before disassembling or otherwise servicing the printer.
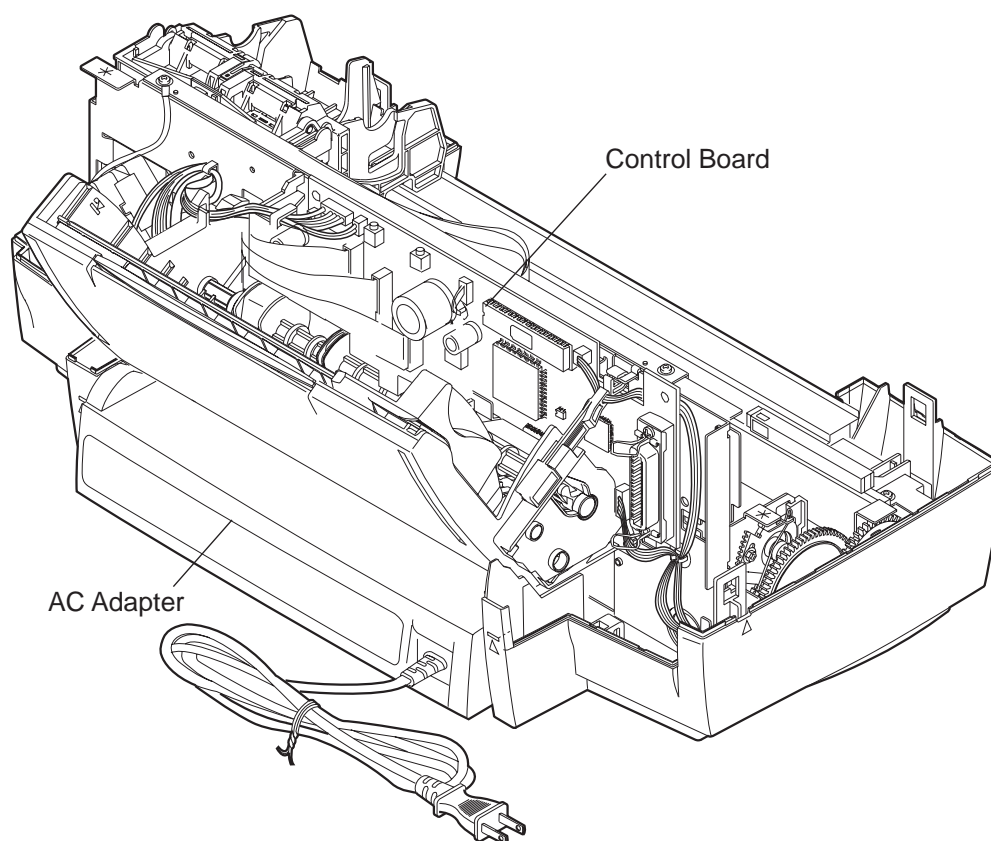


**Figure 1-11 Control Board and Other Electrical Components**

### 3.3 Disassembly and Reassembly

Disassembly and reassembly must be done according to the relevant parts catalog, which illustrates the step-by-step procedures to be followed.  Additional notes are provided in *Part5: 4. DISASSEMBLY AND REASSEMBLY* (Page 5-4).

The printer uses many plastic parts.  Do not apply excessive force to them. In particular, take care not to break or deform plastic hooks during disassembly.

Hook

Never apply excessive force when releasing a hook.
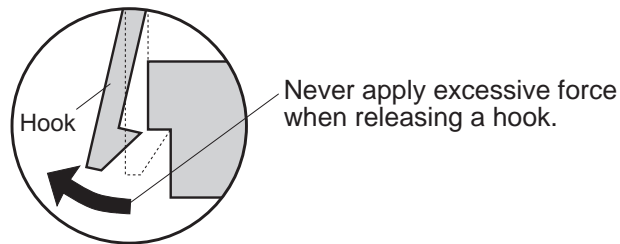
**Figure 1-12 How to Disengage a Plastic Hook**

| CAUTION | Some plastic parts contain glass fibers to conform to tight dimensional tolerances.  Plastic hooks are among such parts, lacking flexibility, and are easily broken.  Do not forcibly disengage them using a screwdriver. |
| --- | --- |

### 3.4 Self Diagnosis

The printer has self-diagnosis features to detect hardware defects.  The results of the diagnosis are indicated by the *indicator* and *power lamp (flashing)* on the operator panel as well as by the buzzer.  For details, refer to *Part 3: 3.1 Error Indications* (Page 3-12).

# *Part 2*
# PRODUCT SPECIFICATIONS

# 1. PRODUCT OUTLINE

## 1.1 Outline

This printer is a desktop business/personal color bubble-jet printer for high speed/high quality use. It accommodates two "drop-modulation" BJ cartridges on its carriage. For high speed use, a pigment-Black BJ cartridge and a Color BJ cartridge combination achieves four-color printing for quality equal to a laser printer. For high quality use, a Color BJ cartridge and Photo BJ cartridge combination achieves six-color printing whose quality is as good as a color photograph. The BJ cartridges use ink tanks which can be replaced individually, and whose tank material is translucent for easier ink level checking, contributing to lower running cost.
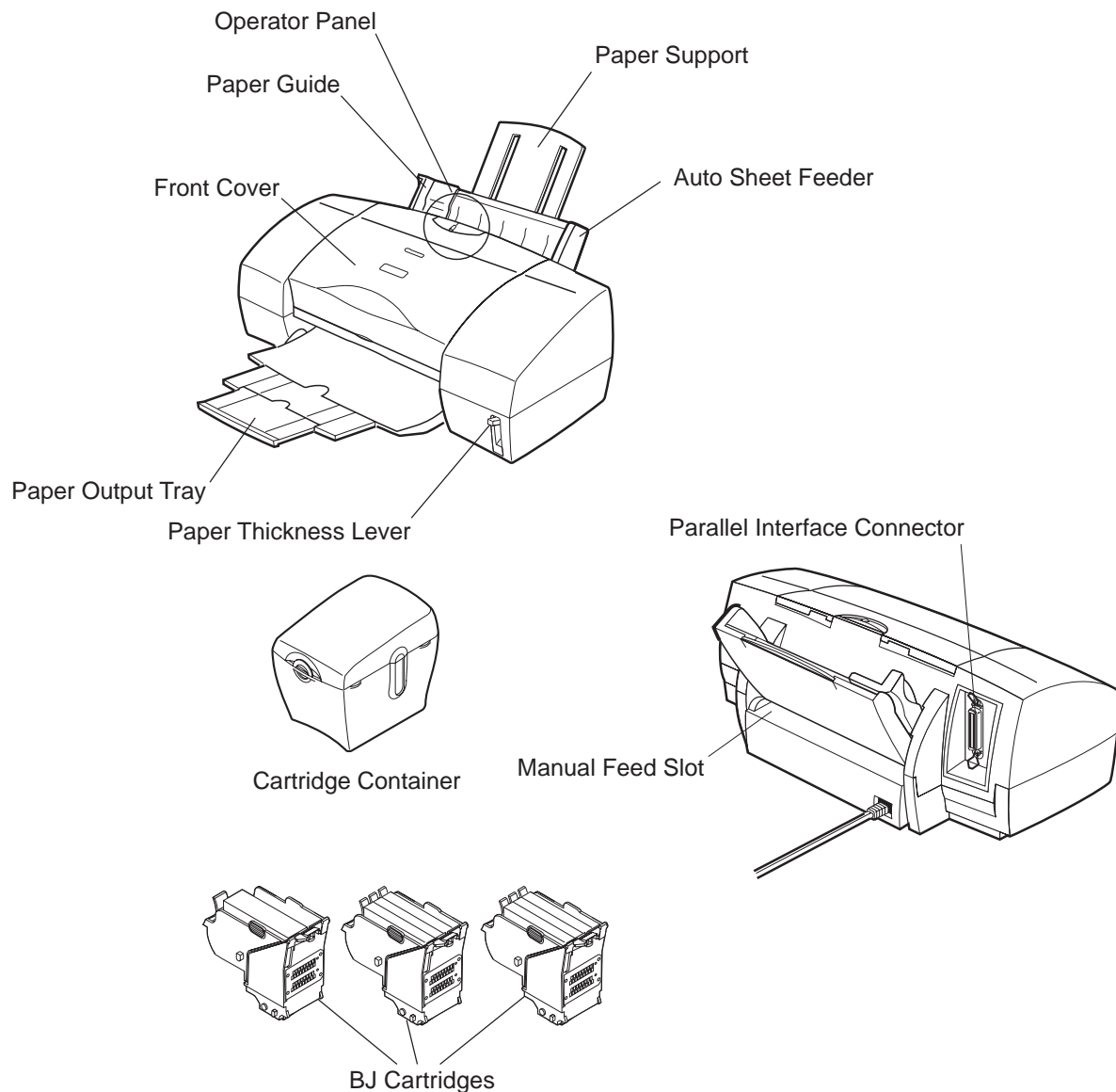


**Figure 2-1 Printer Appearance**

### 1.2 Features

· Laser-printer quality using pigment black ink
· Dual-cartridge system
  High quality printing at high speed from a combination of the Black and Color
  cartridges or the Color and Photo cartridges
  Black BJ cartridge: Drop modulation, replaceable ink tank (pigment black), 160 nozzle
                       head
  Color BJ cartridge: Drop modulation, individually replaceable ink tanks (yellow,
                       magenta and cyan), 144 in-line nozzle head (48 nozzles for each of
                       three colors)
  Photo BJ cartridge: Drop modulation, individually replaceable ink tanks (dye black,
                       photo-magenta and photo-cyan), 144 in-line nozzle head (48
                       nozzles for each of three colors)
· Individually replaceable ink tanks for high cost performance
  Black ink tanks: Pigment black ink tank
  Color ink tanks: Yellow, magenta, and cyan ink tanks
  Photo ink tanks: Dye black, magenta, and cyan ink tanks
· Ink-out detection, and translucent ink tanks for easier ink level checking
· High speed printing (8.0 PPM black printing or 5.0 PPM color printing in HS mode)
· 1440 x 720 dpi high resolution printing
· Automatic printing position adjustment
  Ensures accurate printing position regardless of cartridges being used or carriage
  movement direction
· Supports a wide variety of print media
· Up to A4/Letter full-bleed size paper and banner paper can be used
· Blue Angel compliant

## 1.3 BJ Cartridge
### 1.3.1 Black BJ cartridge

The Black BJ cartridge is to be mounted on the left side of the carriage for high speed color/monochrome printing.  It is a disposable print head.  It has 160 nozzles and accommodates a replaceable ink tank.  It uses drop modulation technology for high speed, high quality printing, where smaller ink-droplets are discharged for low density images and larger ink-droplets for denser images.  The pigment black ink is water resistant and allows for dense and sharp text printing.

Replace the ink tank and/or the Black BJ cartridge if the ink-out error is issued or if satisfactory printing cannot be achieved even after the stipulated cleaning and head refreshing operations have been performed.  It is recommended to replace any cartridge which is at least six months old, i.e., unpacked at least six months prior.  The Black BJ cartridge has a life of approximately 5000 pages, and a new black ink tank provides for approximately 500 pages of a standard 1500 character print pattern in HQ mode.
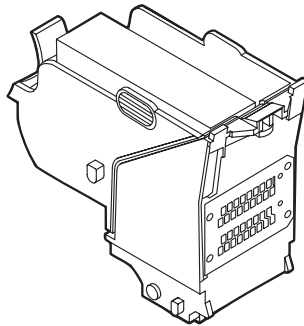
**Figure 2-2 Black BJ Cartridge**

### 1.3.2 Color BJ cartridge

The Color BJ cartridge, mounted on the right side of the carriage, is a disposable print head with 144 in-line nozzles, and accommodates replaceable yellow, magenta and cyan ink tanks.  It has 144 nozzles (48 nozzles for each of the three colors), aligned vertically.  It uses drop modulation technology for high speed, high quality printing, where smaller ink-droplets are discharged for low density images and larger ink-droplets for denser images.  Each color ink is a dye-type.

Replace the relevant ink tank and/or the Color BJ cartridge if the ink-out error is issued or if satisfactory printing cannot be achieved even after the stipulated cleaning and head refreshing operations have been performed.  It is recommended to replace any cartridge which is at least six months old, i.e., unpacked at least six months prior.  The Color BJ cartridge has a life of approximately 3000 pages and a new color ink tank provides for approximately 280 pages of a 7.5% duty pattern.
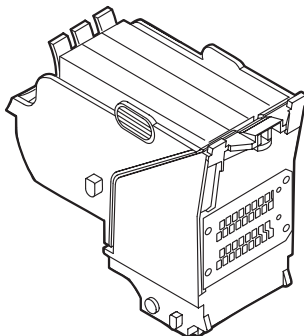
**Figure 2-3 Color BJ Cartridge**

### 1.3.3 Photo BJ cartridge

The Photo BJ cartridge, mounted on the left side of the carriage for photo printing, is a disposable print head with 144 in-line nozzles, and accommodates replaceable photo-black, photo-magenta and photo-cyan ink tanks. It has 144 nozzles (48 nozzles for each of the three colors), aligned vertically. It uses drop modulation technology for high speed, high quality printing, where smaller ink-droplets are discharged for low density images and larger ink-droplets for denser images. The black ink is a dye-type and the photo-cyan and photo-magenta inks are three times lighter in color density than normal color inks.

Replace the relevant ink tank and/or Photo BJ cartridge if the ink-out error is issued or if satisfactory printing cannot be achieved even after the stipulated cleaning and head refreshing operations have been performed. It is recommended to replace any cartridge which is at least six months old, i.e., unpacked at least six months earlier. The Photo BJ cartridge has a life of approximately 3000 pages and a new color ink tank provides for approximately 280 pages of a 7.5% duty pattern.
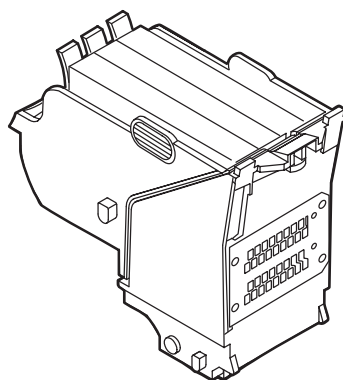


**Figure 2-4 Photo BJ Cartridge**

### 1.4 BJ Cartridge Container

The BJ cartridge container is used to store non-installed BJ cartridges. The lid of the container must be closed fully to prevent the ink in the nozzles of the BJ cartridge from drying out. Each BJ cartridge container can store one Black, Color, or Photo BJ cartridge. Always store a BJ cartridge with its ink tanks installed. The BJ cartridge containers can be connected together.
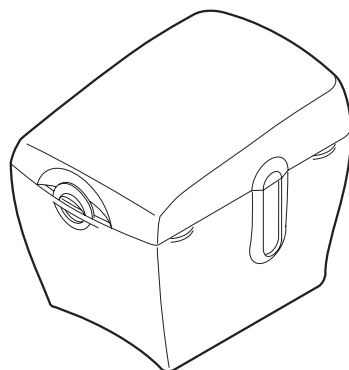


**Figure 2-5 BJ Cartridge Container**

## 1.5 Consumables
### 1.5.1 Black, color, and photo BJ cartridges

The Black, Color and Photo BJ cartridges for this printer are consumables. The BJ cartridges that come with your printer are identical to the BJ cartridges that are commercially available as consumables, except for the packaging.
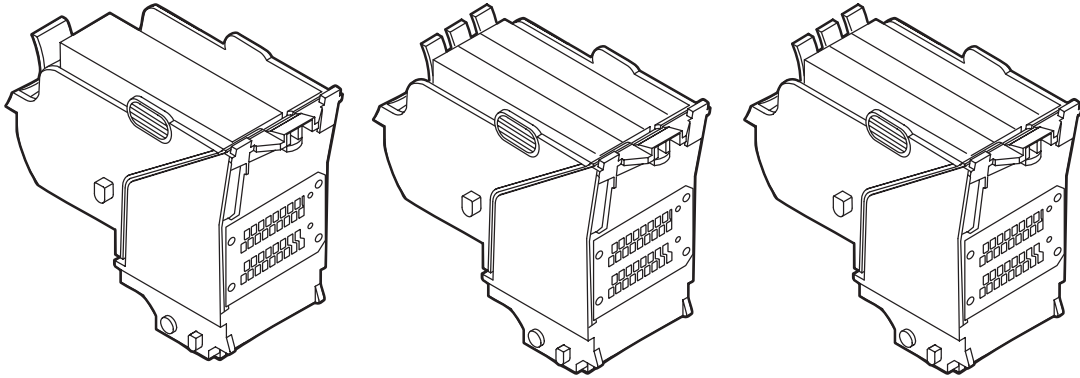
**Figure 2-6 BJ Cartridges**

### 1.5.2 Ink tanks

The consumable ink tanks include the black ink tanks for the Black BJ cartridge; yellow, magenta and cyan ink tanks for the Color BJ cartridge; and photo-black, photo-magenta and photo-cyan ink tanks for the Photo BJ cartridge. The ink tanks are usable for six months after they are unpacked.

A black ink tank provides for approximately 500 pages of a standard 1500-character text pattern in HQ mode.

A color ink tank provides for approximately 280 pages of a 7.5% duty pattern in HQ mode.

A photo-color ink tank provides for approximately 280 pages of a 7.5% duty pattern in HQ mode.
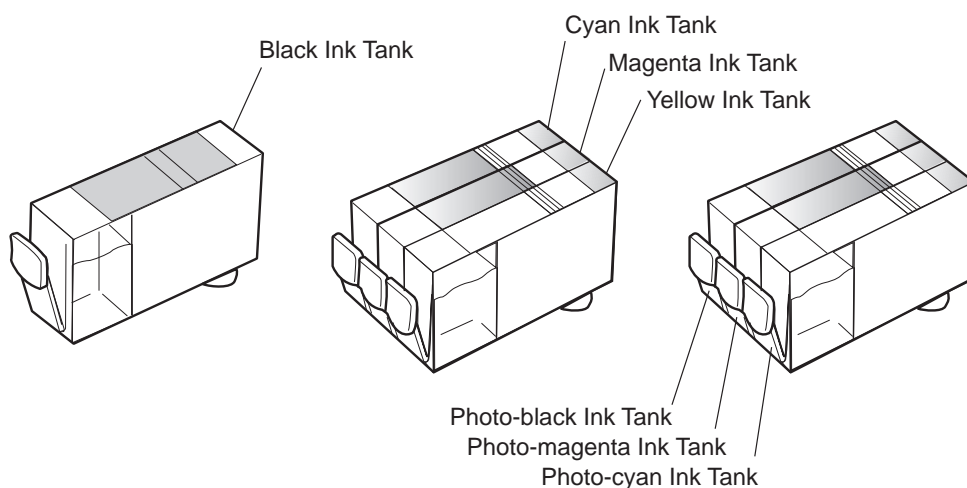
**Figure 2-7 Ink Tanks**

# 2. SPECIFICATIONS

## 2.1 General Specifications

**1. Type**                          Desktop serial color bubble-jet printer

**2. Paper feeding method**          Automatic sheet feeder and manual sheet feed

**3. Automatic sheet feeder capacity**

| | |
|---|---|
| Plain paper: | 13 mm max. stacking height (about 130 sheets of 64 g/m² paper) |
| High-resolution paper: | 10 mm max. stacking height (about 100 sheets of 64 g/m² paper) |
| Envelopes (fed longitudinally): | 15 envelopes max. (max. 13mm stacking height) |
| Transparencies: | 30 sheets max. |
| Back print film: | 10 sheets max. |
| Government postcard: | 40 sheets max. |
| Glossy photo paper: | 10 sheets max. |
| Gloss photo film: | 1 sheet |
| Fabric sheets: | 1 sheet |
| T-shirts transfer: | 1 sheet |

**4. Printing speed**

| | |
|---|---|
| Black printing: | 788 cps in high speed mode, 567 cps in standard speed mode |
| Color printing: | About 1.6 ppm in high speed mode, 1.2 ppm in standard speed mode |
| Photo printing: | 0.18 ppm in high quality mode |

**5. Printing direction**

| | |
|---|---|
| HS mode: | Bi-directional |
| HQ mode: | Bi-directional for 360 x 360 dpi. Uni-directional for 720 x 720 dpi |
| Fine mode: | Uni-directional |

**6. Printing width**                218 mm max.

**7. Line feed speed**               Approx. 118 ms

**8. Internal print control mode**
  Canon extended mode (available when the Canon printer driver is used), no emulation mode available

**9. Printable characters (for test printing)**

| | |
|---|---|
| Font: | Courier |
| Character set: | Code page 850 |

**10. Buffer size**                  128 KB

**11. Interface**                    IEEE 1284-compatible 8-bit parallel (ECP)

## 12. BJ cartridges
### Black BJ cartridge
| | |
|---|---|
| Construction: | Separate ink tank type |
| Print head: | 160 nozzles, in-line |
| Ink: | Pigment black |
| Cartridge service life: | Approx. 5000 pages (1500-character, HQ mode) |
| Ink tank: | Black |
| Ink tank service life: | Approx. 500 pages (1500-character, HQ mode) |
| Cartridge weight: | Approx. 60 g (without ink tank) |

### Color BJ cartridge
| | |
|---|---|
| Construction: | Separate ink tank type |
| Print head: | 144 nozzles, in-line (48 nozzles x 3) |
| Inks: | Cyan, magenta and yellow |
| Cartridge service life: | Approx. 3000 pages (7.5% duty, HQ mode) |
| Ink tanks: | Yellow, magenta and cyan |
| Ink tank service life: | Approx. 280 pages (7.5% duty, HQ mode) |
| Cartridge weight: | Approx. 60 g (without ink tanks) |

### Photo BJ cartridge
| | |
|---|---|
| Construction: | Separate ink tank type |
| Print head: | 144 nozzles in line (48 nozzles x 3) |
| Inks: | Photo-black, photo-cyan and photo-magenta |
| Cartridge service life: | Approx. 3000 pages (7.5% duty, HQ mode) |
| Ink tanks: | Photo-black, photo-cyan and photo-magenta |
| Ink tank service life: | Approx. 280 pages (7.5% duty, HQ mode) |
| Cartridge weight: | Approx. 60 g (without ink tanks) |

## 13. Detection functions
| | | | |
|---|---|---|---|
| Cover open: | Yes | Paper detection: | Yes |
| BJ cartridge installed: | Yes | Ink-out : | Yes |
| Print position detection: | Yes | Waste ink amount: | Yes |
| BJ cartridge identification: | Yes | Paper width detection: | No |

## 14. Acoustic noise during operation
Approx. 48 dB (A) or lower/ (HQ/HS mode)
(Sound pressure level: compliant with ISO9296)

## 15. Environmental conditions
| | |
|---|---|
| Operating: | 5 to 35°C (41 to 95° F), 10 to 90% RH (no condensation) |
| Storage: | 0 to 35°C (32 to 95° F), 5 to 95% RH (no condensation) |

## 16. Power consumption
100-120 Vac, 50/60 Hz, approx. 35 W max.,  approx. 4 W max. in standby mode

## 17. External dimensions        475 (W) x 280 (D) x 200 (H) mm

## 18. Weight        5.9 kg, including BJ cartridges

## 2.2 Paper Specifications

### 1. Paper sizes

A5 (148 x 210 mm)
A4 (210 x 297 mm)
A4+ (223 x 356 mm)
B5 (182 x 257 mm)
Letter (216 x 279 mm)
Letter+ (229 x 338 mm)
Legal (216 x 356 mm)
Government postcard (100 x 148 mm)
Envelope
  Commercial number 10 envelope (9.5" x 4.1")
  European DL-size (220 x 110 mm)
Banner paper (203 x 1673 mm to 203 x 1779 mm)
Free (100 x 100 mm to 216 x 584 mm)

### 2. Paper types

Plain paper
  Weight: 64 to 105 $g/m^2$ for auto sheet feeder, 64 to 500 $g/m^2$ for manual feed
  Thickness: max. 0.6 mm thick, max. 297 mm long
Government Postcard
  weight:  max. 190 $g/m^2$, max. 0.23 mm thick
Canon BJ printer High-resolution paper
Glossy photo paper
Glossy photo film
Transparencies
Back print film
Banner paper (long type)
Note: Fan-fold paper or label paper cannot be used.

**3. Printable Area**

A4, A5, and B5 sizes

3mm
(1) 18.5mm
(2) 26.5mm

(2) 27.0mm
(1) 22.5mm
7.0mm

3.4mm 3.4mm

Letter (LTR) and legal (LGL) sizes

3mm
(1) 18.5mm
(2) 26.5mm

(2) 27.0mm
(1) 22.5mm
7.0mm

6.4mm 6.3mm

A4+ and letter+ (LTR+) sizes

28.0mm

29.2mm

29.2mm

5.1mm A4+ 5.9mm
Letter+ 5.1mm

Postcard size

3.0mm
(1) 12.0mm
(2) 21.0mm

(1) 22.6mm
7.0mm
(2) 21.6mm

3.4mm 3.4mm

Note: The printable area for thick paper is equa
to that for postcards.

Envelope

3.0mm
21.0mm

7.0mm
22.6mm

6.4mm

Com #10: 31.4 mm
DL-size: 10.4 mm

: Recommended printing area (1) Monochrome printing
: Printable area (2) Color or photo printing

**Figure 2-8 Printable Area**

**2-9**

## 2.3 Interface Specifications

### 1) Interface type
IEEE1284-compatible parallel interface

### 2) Data transfer method
8-bit parallel (supporting nibble/ECP mode)

### 3) Signal level
Low level: +0.0 to +0.8 V
High level: +2.4 to +5.0 V

### 4) I/O
Each signal pulled up with +5 V.

### 5) Interface cable
Type:　　　Shielded twisted-pair cable
Wire size: AWG 28 or larger
Length:　　2.0 m max.

### 6) Interface connectors
Printer connector: Amphenol 57-40360 or equivalent
Cable connector:　 Amphenol 57-30360 or equivalent

### 7) I/O signals and pin assignment

**Compatible mode**

| No. | Signal | I/O | No. | Signal | I/O |
|---|---|---|---|---|---|
| 1 | $\overline{\text{STROBE}}$ | IN | 19 | $\overline{\text{STROBE}}$-RET[1] | … |
| 2 | DATA1 | IN | 20 | DATA1-RET | … |
| 3 | DATA2 | IN | 21 | DATA2-RET | … |
| 4 | DATA3 | IN | 22 | DATA3-RET | … |
| 5 | DATA4 | IN | 23 | DATA4-RET | … |
| 6 | DATA5 | IN | 24 | DATA5-RET | … |
| 7 | DATA6 | IN | 25 | DATA6-RET | … |
| 8 | DATA7 | IN | 26 | DATA7-RET | … |
| 9 | DATA8 | IN | 27 | DATA8-RET | … |
| 10 | $\overline{\text{ACKNLG}}$ | OUT | 28 | $\overline{\text{ACKNLG}}$-RET | … |
| 11 | BUSY | OUT | 29 | BUSY-RET | … |
| 12 | P.E. | OUT | 30 | P.E.-RET | … |
| 13 | SELECT | OUT | 31 | $\overline{\text{INIT}}$ | IN |
| 14 | $\overline{\text{AUTO FEED XT}}$[4] | IN | 32 | $\overline{\text{ERROR}}$ | OUT |
| 15 | N.C[2] | … | 33 | GND | … |
| 16 | INIT | IN | 34 | N.C.[2] | … |
| 17 | GND | … | 35 | +5.0V[3] | … |
| 18 | +5.0V[4] | … | 36 | $\overline{\text{SELECT IN}}$ | IN |

*1: All RETs are connected to GND.

*2: N.C. means no connection.

*3: The level is pulled up with +5.0 V through a 3.3 k resistor.

*4: The level is pulled up with +5.0 V through a 390 resistor.

**Nibble mode**

| No. | Signal | I/O | No. | Signal | I/O |
|---|---|---|---|---|---|
| 1 | HostClk | IN | 19 | Signal Gnd | ... |
| 2 | Data1 | IN/OUT | 20 | Signal Gnd | ... |
| 3 | Data2 | IN/OUT | 21 | Signal Gnd | ... |
| 4 | Data3 | IN/OUT | 22 | Signal Gnd | ... |
| 5 | Data4 | IN/OUT | 23 | Signal Gnd | ... |
| 6 | Data5 | IN/OUT | 24 | Signal Gnd | ... |
| 7 | Data6 | IN/OUT | 25 | Signal Gnd | ... |
| 8 | Data7 | IN/OUT | 26 | Signal Gnd | ... |
| 9 | Data8 | IN/OUT | 27 | Signal Gnd | ... |
| 10 | PtrClk | OUT | 28 | Signal Gnd | ... |
| 11 | PtrBusy | OUT | 29 | Signal Gnd | ... |
| 12 | AckDataReq | OUT | 30 | Signal Gnd | ... |
| 13 | Xflag | OUT | 31 | $\overline{\text{INIT}}$ | IN |
| 14 | HostBusy | IN | 32 | $\overline{\text{DataAvail}}$ | OUT |
| 15 | N.C.[1] | ... | 33 | N.C.[1] | ... |
| 16 | Gnd | ... | 34 | N.C.[1] | ... |
| 17 | Gnd | ... | 35 | N.C.[1] | ... |
| 18 | Vcc | ... | 36 | 1284Active | IN |

[1]: N.C. means no connection.

**ECP mode**

| No. | Signal | I/O | No. | Signal | I/O |
|---|---|---|---|---|---|
| 1 | HostClk | IN | 19 | Signal Gnd | ... |
| 2 | Data1 | IN/OUT | 20 | Signal Gnd | ... |
| 3 | Data2 | IN/OUT | 21 | Signal Gnd | ... |
| 4 | Data3 | IN/OUT | 22 | Signal Gnd | ... |
| 5 | Data4 | IN/OUT | 23 | Signal Gnd | ... |
| 6 | Data5 | IN/OUT | 24 | Signal Gnd | ... |
| 7 | Data6 | IN/OUT | 25 | Signal Gnd | ... |
| 8 | Data7 | IN/OUT | 26 | Signal Gnd | ... |
| 9 | Data8 | IN/OUT | 27 | Signal Gnd | ... |
| 10 | PeriphClk | OUT | 28 | Signal Gnd | ... |
| 11 | PeriphAck | OUT | 29 | Signal Gnd | ... |
| 12 | $\overline{\text{AckReverse}}$ | OUT | 30 | Signal Gnd | ... |
| 13 | Xflag | OUT | 31 | $\overline{\text{ReverceReq}}$ | IN |
| 14 | HostAck | IN | 32 | $\overline{\text{PeriphReq}}$ | OUT |
| 15 | N.C.[1] | ... | 33 | N.C.[1] | ... |
| 16 | Gnd | ... | 34 | N.C.[1] | ... |
| 17 | Gnd | ... | 35 | N.C.[1] | ... |
| 18 | Vcc | ... | 36 | 1284Active | IN |

[1]: N.C. means no connection.

**8) I/O signals**
  **Compatible Mode:**
   $\overline{\text{STROBE}}$ **(Input)**

   This signal asks the printer to read Data 1 to Data 8. This signal becomes valid
   after the BUSY signal goes "L" and the printer outputs $\overline{\text{ACKNLG}}$. This signal is
   normally "H," and the printer receives data after this signal goes "L." This signal
   must be turned "H" before the printer can start printing.

   **Data 1-8 (Input)**

   The printer receives data in synchronization with $\overline{\text{STROBE}}$. Each bit of data must
   be maintained for at least 0.5 µs after the rising edge of $\overline{\text{STROBE}}$.

   $\overline{\text{ACKNLG}}$ **(Output)**

   This signal is returned in response to $\overline{\text{STROBE}}$. The host computer can output
   another $\overline{\text{STROBE}}$ only after this signal is returned to the host computer. This
   signal is output regardless of $\overline{\text{STROBE}}$ when the printer is powered up or when
   BUSY goes "L" in response to the INIT signal input from the host computer.

   **BUSY (Output)**

   The printer is BUSY when this signal is "H," and READY when this signal is "L."
   This signal goes "H" when the printer is receiving data or detects an error (paper
   out, paper jam, etc.).

   $\overline{\text{P.E.}}$ **(Output)**

   This signal goes "H" if the paper feeding operation of the printer fails to feed paper.
   As this signal goes "H," BUSY goes "H," and SELECT and $\overline{\text{ERROR}}$ go "L." This
   signal goes "L" when paper is set and fed. At this time both $\overline{\text{ERROR}}$ and SELECT
   go "H." If the paper eject operation fails to eject paper (paper jam), this signal also
   goes "H," BUSY goes "H," SELECT goes "L," and $\overline{\text{ERROR}}$ goes "L." Simply removing
   jammed paper from the printer does not automatically reset this signal.

   **SELECT (Output)**

   The printer makes this signal "H" when it is READY. If an error occurs (paper out,
   paper jam, etc.), this signal goes "L."

   $\overline{\text{AUTO FEED XT}}$ **(Input)**

   When this signal is "L," the printer is set to the automatic line feed mode
   (CR=CR+LF). The printer reads this signal only at the time of power-up or
   initialization in response to the INIT signal.

   **INIT (Input)**

   When this signal goes "L," the printer is forced to BUSY, and this signal's "L"-to-"H"
   edge resets the printer. The pulse width of this signal must be at least 50 µs as
   measured at the printer. After the initializing process, the printer moves its
   carriage to the home position, enters the 10 cpi mode, and is set in the condition
   specified by the function settings.

   $\overline{\text{ERROR}}$ **(Output)**

   When the printer detects an error (paper out, paper jam, etc.), this signal goes "L"
   to notify the host computer that the printer is in error.

### $\overline{\text{SELECT IN}}$ (Input)

When this signal is "H," the DC1/DC3 code is enabled; and when this signal is "L," the DC1/DC3 code is disabled. The printer reads this signal only at the time of power-up or initialization in response to the $\overline{\text{INIT}}$ signal.

## Nibble Mode:

### $\overline{\text{Host Clk}}$ (Input)

This is a $\overline{\text{STROBE}}$ signal for reading Data 1-8. During negotiation, this is the trigger signal for sending the protocol confirmation to the printer.

### Data 1-8 (Input)

The printer receives data in synchronization with $\overline{\text{Host Clk}}$. Each bit of data must be maintained for at least 0.5 µs after the rising edge of $\overline{\text{Host Clk}}$.

### Ptr Clk (Output)

In the reverse data transmission phase, the printer asks the host computer to read data it has sent by making this signal "L." When the host computer has read the data, it acknowledges the receipt of the data by making Host Busy "H."

### Ptr Busy (Output)

In the reverse data transmission phase, this signal serves as bit 3 and bit 7 of data to be sent.

### Ack Data Req (Output)

In the reverse data transmission phase, this signal serves as bit 2 and bit 6 of data to be sent. During negotiation, this is the trigger signal for notifying the host computer of the printer's mode settings (whether nibble mode is supported, reverse transmission data is available, etc.).

### Xflag (Output)

In the reverse data transmission phase, this signal serves as bit 1 and bit 5 of data to be sent. During negotiation, this signal tells the host computer whether or not the printer supports the nibble mode. When the printer supports the nibble mode, it makes this signal "L" in synchronization with the rising edge of Ack Data Req.

### Host Busy (Input)

In the reverse data transmission phase, the host computer tells the printer that it has already received data by making this signal "L." When the Ptr Clk signal in the received data goes "L," this signal goes "L" in response. In the reverse transmission idle phase, when Ptr Clk goes "L," this signal goes "H" in response, returning to the reverse data transmission phase.

### $\overline{\text{INIT}}$ (Input)

When this signal goes "L," the printer is forced to BUSY, and this signal's "L"-to-"H" edge resets the printer. This signal is normally "H," and the pulse width of this signal must be at least 50 µs as measured at the printer.

#### $\overline{\text{Data Avail}}$ (Output)

In the reverse data transmission phase, this signal serves as bit 0 and bit 4 of data to be sent. During negotiation, this signal tells the host computer whether or not reverse transmission data is available. This signal is output in synchronization with the "H"-to-"L" falling edge of Ack Data Req, which defines the timing for notifying the availability of reverse transmission data.

#### 1284 Active (Input)

This signal is used to confirm if the printer is 1284-compatible. Check is done when this signal is "H" and Host Busy is "L." This signal goes "L" in the termination phase.

### ECP Mode:

#### Host Clk (Input)

When data is sent from the host computer to the printer, this signal and Periph Ack perform handshaking. The host computer makes this signal "L" to notify that it has output data onto the data bus (Data 1-8). This signal goes "H" in response to the rising edge of Periph Ack. This signal is always "H" in the reverse data transmission phase.

#### Data 1-8 (Input/Output)

These signals are input signals when data is sent from the host computer to the printer. In the reverse data transmission phase, these signals are output signals send data from the printer to the host computer over this data bus.

#### Periph Clk (Output)

This signal is always "H" when data is sent from the host computer to the printer. In the reverse data transmission phase, this signal goes "L" to notify that data has been output to the host computer. This signal goes "H" in response to the "L"-to-"H" rising edge of Host Ack from the host computer.

#### Periph Ack (Output)

When data is to be sent from the host computer to the printer, the printer makes this signal "L" if it is ready to receive data. The printer makes this signal "H" after it has received the data. In the reverse data transmission phase, this signal is used to tell whether the data the printer has output on the data bus is command or data ("L" means command and "H," data).

#### $\overline{\text{Ack Reverse}}$ (Output)

This signal is always "H" when data is sent from the host computer to the printer. In the reverse data transmission phase, this signal is always "L." When the host computer notifies the printer that the forward data transmission phase is to change to the reverse data transmission phase by making $\overline{\text{Reverse Req}}$ "L," the printer acknowledges the notification by making this signal "L." Likewise, when the host computer notifies the printer that the reverse data transmission phase is to change to the forward data transmission phase by making $\overline{\text{Reverse Req}}$ "H," the printer acknowledges the notification by making this signal "H."

#### X flag (Output)

This signal is always "H" in ECP mode.

**Host Ack (Input)**

When data is to be sent from the host computer to the printer, this signal is used to tell whether the data the host computer has output on the data bus is command or data ("L" means command and "H," data). In the reverse data transmission phase, this signal and Periph Clk perform handshaking. The host computer notifies the printer that it is ready to receive data by making this signal "L," and makes this signal "H" to notify that it has received the data.

**$\overline{\text{Reverse Req}}$ (Input)**

The host computer makes this signal "L" during a recovery process (re-sending data) in the forward data transmission phase. This signal goes "H" in response to the falling edge of $\overline{\text{Ack Reverse}}$. The host computer also makes this signal "L" to notify the printer that the forward data transmission idle phase is to change to the reverse data transmission phase (data is to be sent from the printer to the host computer).

**$\overline{\text{Periph Req}}$ (Output)**

The printer makes this signal "L" to ask the host computer to change the forward data transmission phase to the reverse data transmission phase. When the host computer notifies the printer that the forward data transmission phase is to change to the reverse data transmission phase by making $\overline{\text{Reverse Req}}$ "L," the printer acknowledges by making both this signal and $\overline{\text{Ack Reverse}}$ "H."

**1284 Active (Input)**

This signal goes "H" at the start of negotiation and is always "H" in ECP mode to indicate that bi-directional operation is in effect. When ECP mode is to be terminated, this signal goes "L" and termination phase is entered.

**9) Timing charts**
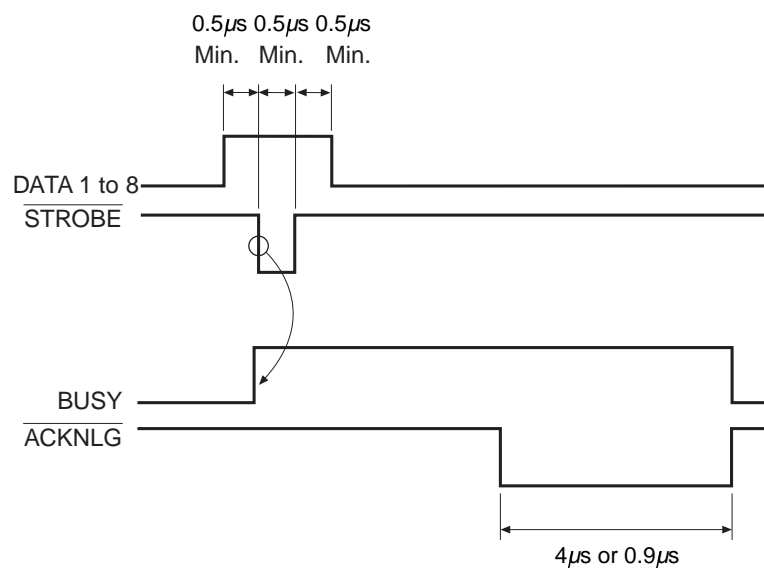


**Figure 2-9 Timing Chart (Compatible mode)**
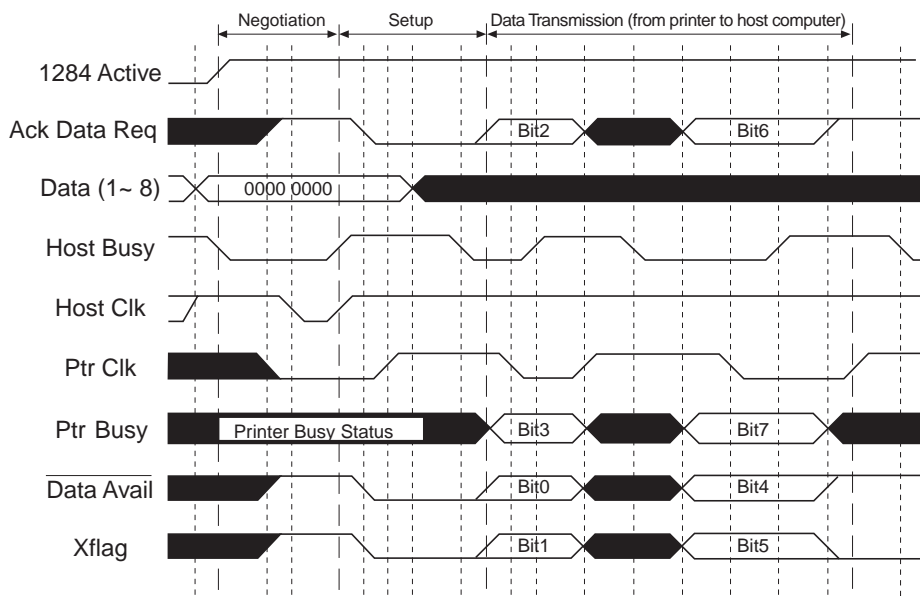
**Figure 2-10 Timing Chart (Nibble mode)**
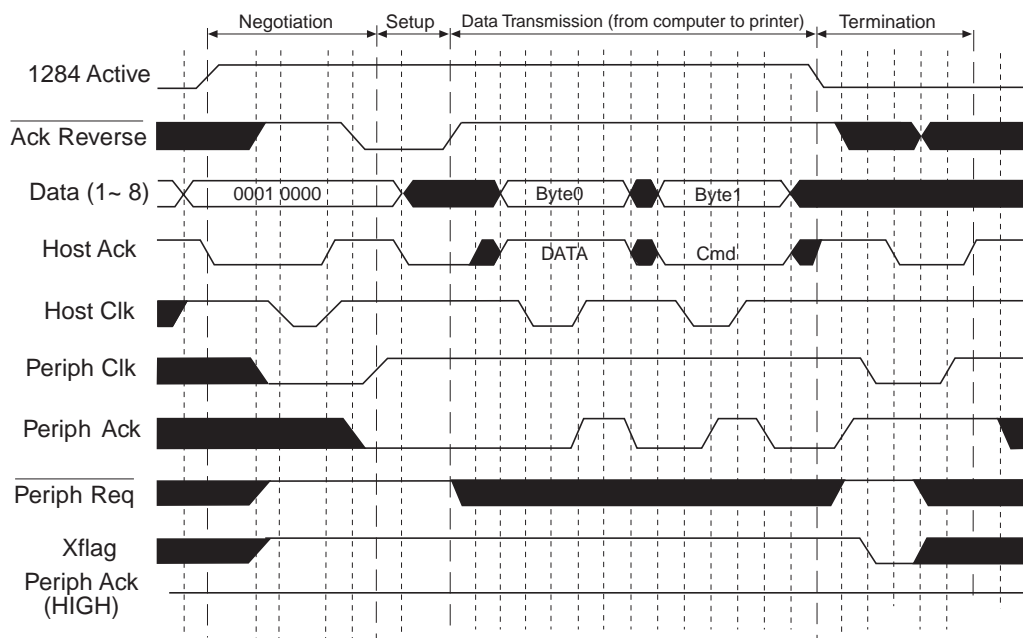


**Figure 2-11 Timing Chart (ECP mode)**

# Part 3

## OPERATING INSTRUCTIONS

# 1. PRINTER SETUP

## 1.1 Unpacking

After unpacking, make sure the items below are included:
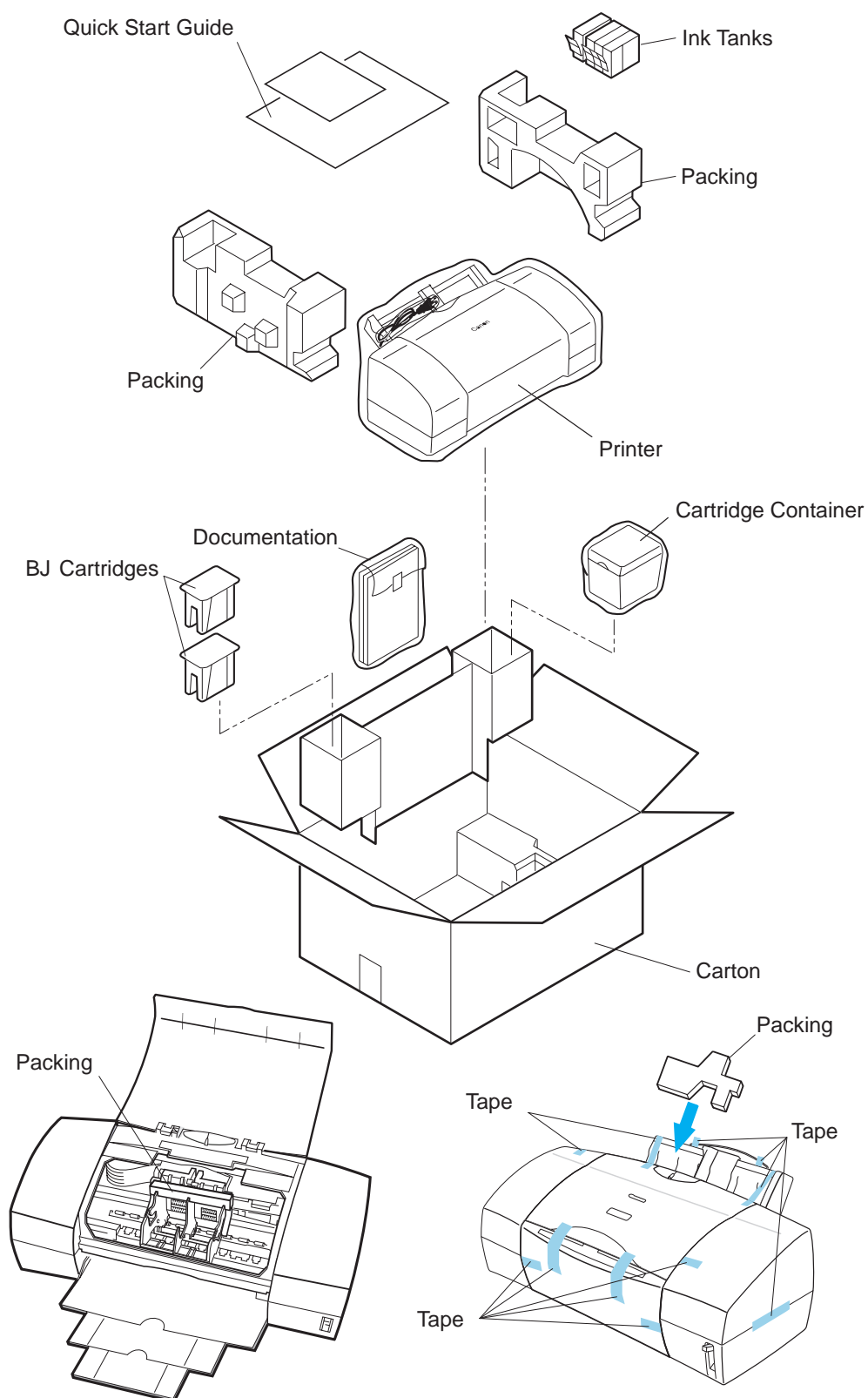


**Figure 3-1 Packaging**

## 1.2 Installation Location

To ensure optimum performance, install the printer where there is adequate space. The figure below illustrates the printer's outside dimensions.



Approx. 275 mm

Approx. 270 mm

Approx. 470 mm

Approx. 195 mm
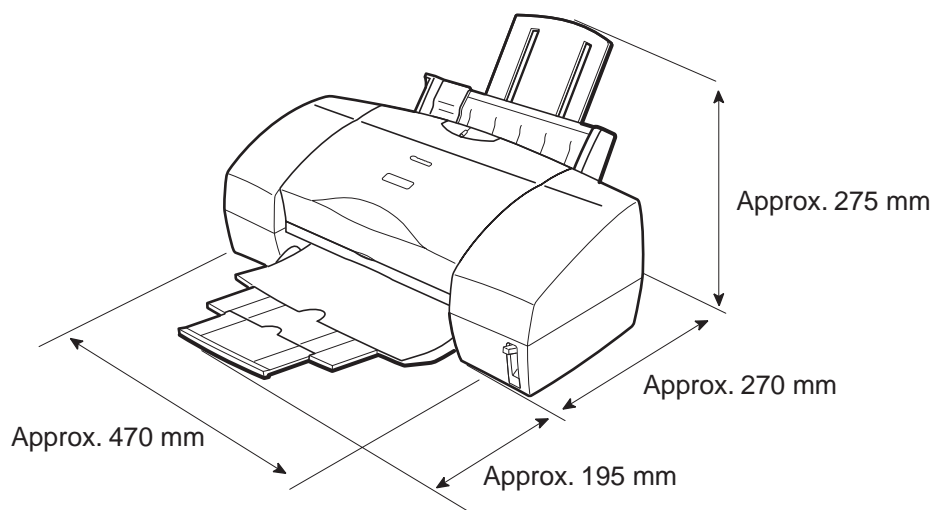
**Figure 3-2 Printer Dimensions**

NOTE

Use the printer where the ambient temperature is between 5°C and 35°C, and the ambient humidity is between 10% and 90% (no condensation). Install the printer on a stable and horizontal surface free of vibration. Do not install the printer where it is subject to direct sunlight or where it may be subject to rapid fluctuations in temperature, such as close to air conditioners.  Also, do not leave the printer in a car where it may be subject to a rapid rise in temperature.
Do not install the printer where it may be subject to excessive amounts of dust, or subject to sea breezes or other sources of salinity.
Do not install close to a TV set, loudspeaker, or other sources of strong magnetism.

### 1.3 Installation

Set up the printer as follows.

### 1.3.1 Connecting the interface cable

1) Make sure both the printer and the computer are switched OFF.
2) Connect the interface cable to the interface connector on the printer. Lock the connector clips.
3) Connect the other end of the interface cable to the computer.
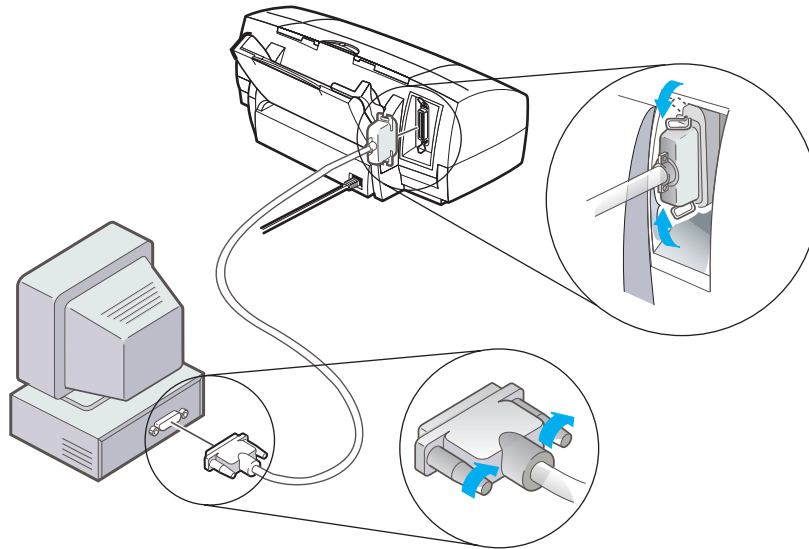


**Figure 3-3 Connecting the Interface Cable**

### 1.3.2 Connecting the power cord

1) Connect the plug of the power cord to a wall outlet.

2) Press the printer's *POWER* button. The buzzer sounds and the *POWER* lamp blinks in green indicating that the printer is in the initialization process. After initialization, the *POWER* lamp lights in green. If BJ cartridges are not installed, the *POWER* lamp lights in orange, the buzzer sounds six times, and the carriage moves to the cartridge replacement position.
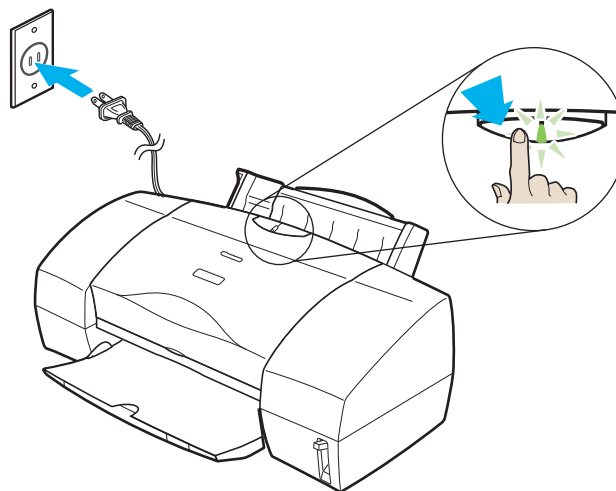


**Figure 3-4 Connecting the Power Cord**

### 1.3.3 Installing the BJ cartridges

This printer can be used with the Black, Color, and Photo BJ cartridges, in the following combinations : Black/Color BJ cartridges or Photo/Color BJ cartridges.

**a) Removing head protection from the BJ cartridges**

Remove the BJ cartridge from its package, and remove the head cap that protects the nozzles, and the protective tape from the cartridge, as shown in the figure below.
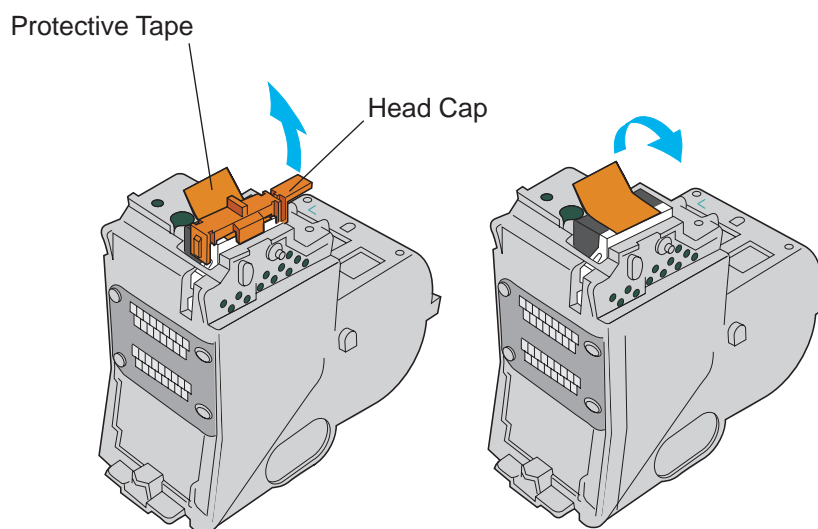


**Figure 3-5 Removing Head Cap and Tape from BJ Cartridge**

| | |
|---|---|
| **CAUTION** | Do not reuse head caps or the protective tape that has been removed from a BJ cartridge.  It may cause of nozzle clogging or mixing of inks.  Be careful not to touch the nozzles when removing the tape, otherwise the nozzles may be damaged or collect dirt, resulting in poor printing.  Do not shake the BJ cartridge after removing the head cap and tape, as ink may scatter. |

**b) Installing the BJ cartridges**

Open the printer cover to install the BJ cartridges on the carriage.  Install the Color BJ cartridge on the right side of the carriage.  Install either the Black or Photo BJ cartridge on the left side of the carriage.  After installing the BJ cartridges, secure them by lowering the cartridge lock lever.  Remove the protective tanks from the BJ cartridges.
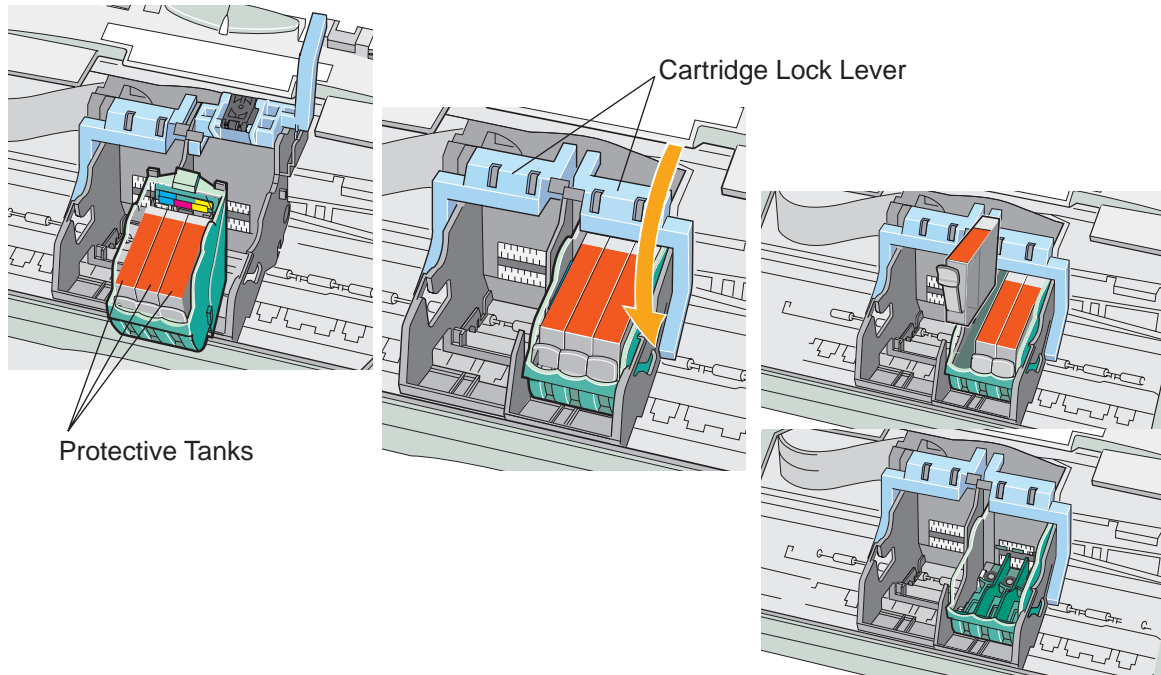


**Figure 3-6 Installing BJ Cartridges**

| CAUTION | If both the left and right BJ cartridges are not installed correctly, the carriage may fail to return to its home position when the cover is closed.  In this case, ensure that the BJ cartridges are installed firmly in the correct position.  If the carriage does not return to the home position, refer to *Part 5: 6 TROUBLESHOOTING* (Page 5-13). |
|---|---|

| NOTE | If the front cover is left open for ten minutes with both BJ cartridges installed, the buzzer sounds for 30 seconds, and the carriage moves to the capping position to protect the BJ cartridges' nozzles. |
|---|---|

**c) Installing the ink tanks**

Peel off the protective film from the ink tank, and slowly turn the protective cap off. Install the ink tanks in the BJ cartridges in the correct positions as indicated by the label affixed inside the printer. When the cover is closed, the printer undergoes the ink tank initializing process (approx. 30 seconds), and the carriage moves to the home position.
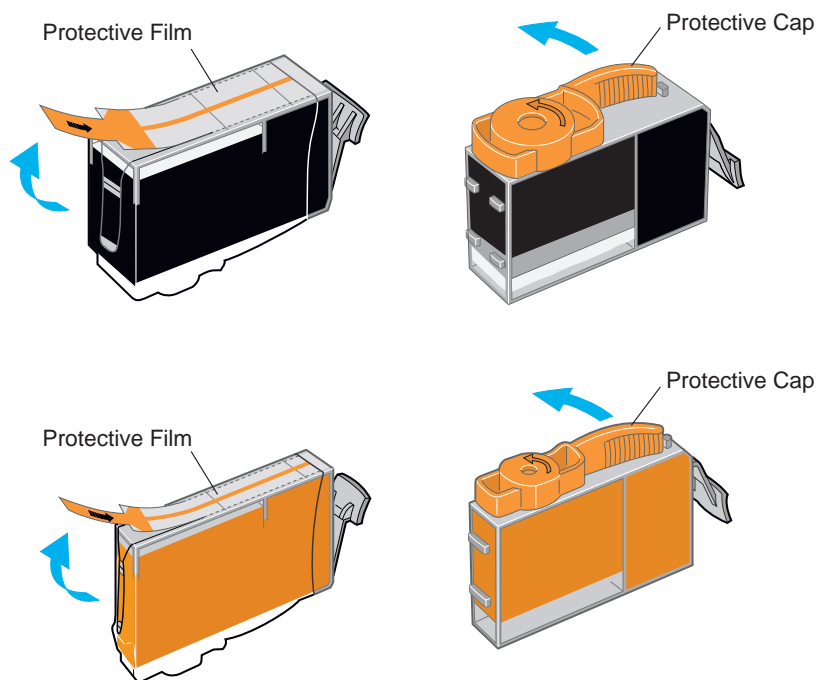


**Figure 3-7 Installing the Ink Tanks**

> **CAUTION**
> The ink tanks other than the black ink tanks are identical in shape and size. Paying attention to the colors of the ink tanks, install them in their correct positions as indicated by the label affixed inside the printer.

**d) Replacing the BJ cartridges**

When the printer's front cover is opened, the carriage moves to the cartridge replacement position. Raise the cartridge lock lever to remove the BJ cartridge. Replace the cartridge with another one and lower the cartridge lock lever to secure it. When the front cover is closed, the printer starts the BJ cartridge initializing process (approx. 30 seconds). Store the removed cartridge in the cartridge container.

> **CAUTION**
> When switched OFF, the printer moves the carriage to the capping position so that it is locked in place by the carriage locking mechanism. Never pull the carriage's ribbon cable to move the carriage. When the buzzer sounds four times and the carriage does not return to the replacement position, even though the front cover is open, the BJ cartridges may have overheated. Close the front cover and wait for a while to let the BJ cartridges cool down naturally before reopening the front cover.

**e) Replacing the ink tanks**

For the Black, Color and Photo BJ cartridges, each ink tank can be individually replaced.

**1) When to replace the ink tank**

Replace the ink tank with a new one if no ink can be seen inside, or as indicated by the ink-out alarm, or if it was unpackaged for more than six months and printing quality does not improve even after several cleanings.

> **NOTE**  If printing quality still does not improve, even with a new ink tank installed, perform cleaning operations 1-5 times.  If this does not solve the problem, replace the BJ cartridge.

**2) Removing an ink tank**

Open the printer's front cover to have the carriage move to the cartridge replacement position.  Press the unlock tab of the ink tank, and remove the ink tank.



Unlock Tab
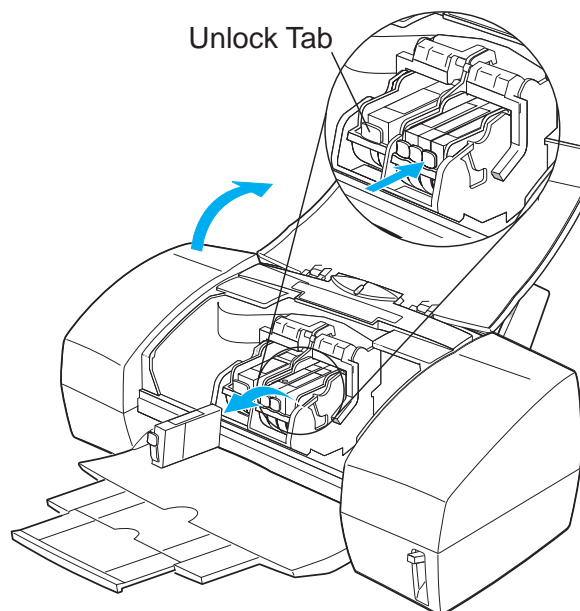
**Figure 3-8 Replacing an Ink Tank**

> **CAUTION**  The ink supply pieces and nearby areas of the ink tank may be stained with ink.  Be careful not to get your hands or clothing stained with ink when replacing the ink tank.

**f) Cartridge container**

This printer comes with a BJ cartridge container to store BJ cartridges. Once you have removed a BJ cartridge from the printer, store it in this cartridge container, ink tanks installed in place. If the BJ cartridge is left in open air, its nozzles may be damaged or clogged by dried ink. The cartridge container can hold one Black, Color or Photo BJ cartridge.

Color or Photo BJ Cartridge          Black BJ Cartridge
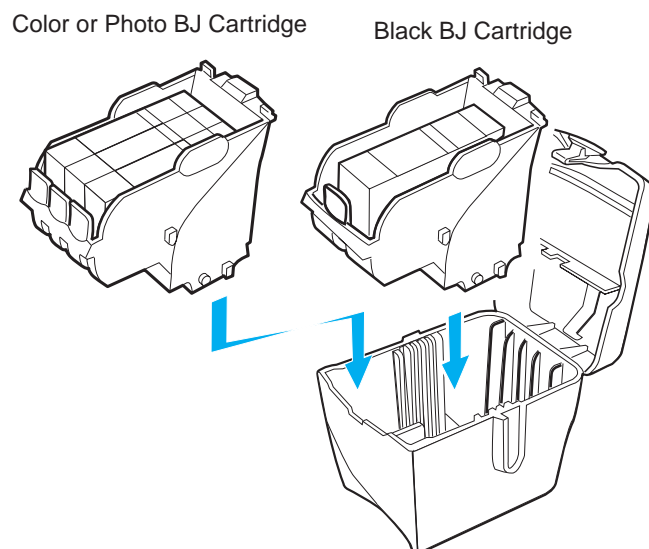
**Figure 3-9 Cartridge Container**

| CAUTION | Always store a BJ cartridge in the cartridge container with ink tanks installed in place, otherwise, ink may leak or dry up. Do not shake or drop the cartridge container containing a BJ cartridge, otherwise, ink may leak, or the BJ cartridge or the cartridge container may be damaged. |
|---|---|

### 1.3.4 Aligning the print heads

As there are two BJ cartridges installed in this printer, even a slight difference in size or seating position between them may result in inaccurate dot placement, and thereby poor printing. To correct this, after installing the BJ cartridges, perform the automatic head position adjustment, one of the utilities the printer driver package provides. If a computer is not available, you can still perform the head position adjustment in service mode. For the procedures, refer to *Part 3: 3.6.1 Service mode operations* (Page 3-18). Set at least one sheet of B5 (or larger) plain paper in the ASF, and select the head position alignment pattern in the test print area of the printer driver's Utility sheet.



LED calibration

360-dpi vertical alignment adjustment

360-dpi bi-directional rough adjustment

360-dpi bi-directional fine adjustment

180-dpi bi-directional rough adjustment

180-dpi bi-directional fine adjustment

360-dpi horizontal alignment forward rough adjustment

360-dpi horizontal alignment forward fine adjustment

360-dpi horizontal alignment reverse rough adjustment

360-dpi horizontal alignment reverse fine adjustment

180-dpi horizontal alignment forward rough adjustment

180-dpi horizontal alignment forward fine adjustment

180-dpi horizontal alignment reverse rough adjustment

180-dpi horizontal alignment reverse fine adjustment

720-dpi horizontal alignment forward rough adjustment

720-dpi horizontal alignment forward fine adjustment

1440-dpi horizontal alignment forward rough adjustment

1440-dpi horizontal alignment forward fine adjustment

Printing position check pattern

**Figure 3-10 Print Position Adjustment Pattern**

**CAUTION**   Use paper of B5 size or larger for the automatic head position adjustment, otherwise, the platen may be smeared with ink.

**3-9**

## 1.4 Names of Parts and Their Functions

The main parts of the printer and their functions are illustrated below.

**Paper Guide**
Lightly press this guide against the left side of paper sheets to align them.

**Paper Support**
Extend this paper rest to support larger size paper.

**Front Cover**
Open this cover when replacing BJ cartridges, clearing paper-jams.

**Auto Sheet Feeder**
Set sheets of paper here. This feeder automatically feed them into the printer one by one.

**POWER button**
Press this button to power on or off the printer.

**RESUME button**
After correcting a problem, and then press this button to make the printer ready.

**Paper Output Tray**

**Indicator**
Not lit when powered off.
When lit in green, the printer is ready to print.
When lit or blinking in orange, an error has occurred, and the print cannot print.

**Paper Thickness Selector**
Use this selector to adjust the gap between the print head and the paper for different paper types. Set it to the uppermost position for normal plain paper.

**Operator Panel**

**Cartridge Lock Lever**
Use this lever to secure the BJ cartridges to the carriage. Raise it to remove the BJ cartridge.

**Manual Feed Slot**
Use this slot to manually feed a single sheet at a time.

**Parallel Interface Connector**
Connects to the interface cable from the computer.

**Carriage**
The left side of the carriage holds the Black or Photo BJ cartridge, and the right side holds the Color BJ cartridge.

**Figure 3-11 Names of Parts and Their Functions**

# 2. TRANSPORTING THE PRINTER

When carrying or transporting the printer, keep BJ cartridges installed in the printer, or stored in the cartridge container. This prevents the ink from leaking or drying out in the nozzles during transportation. To prevent ink leakage, transport the printer with the ink tanks installed in the BJ cartridge.

## 2.1 Transporting the Printer

When transporting the printer, follow the procedures below:

1) Press the *POWER* button to turn off the printer. The *POWER* indicator will go out.
2) Disconnect the interface cable.
3) Unplug the power cord from the wall outlet.
4) Open the front cover and check that the carriage is locked in the capping position (on the right side of printer). If the carriage is not in the capping position, move it manually to the capping position, and secure it there with tape.
5) Close the cover.
6) Pack the printer in its' original packing in its' original carton. If the original packing materials are not available, wrap the printer with sufficient shock absorbing material.

| CAUTION | Do not unplug the printer before switching off the printer with the *POWER* button, otherwise, the BJ cartridges' nozzles will not be capped, which may result in ink may leak or dry-out. Do not carry a BJ cartridge and its ink tanks separately. |
|---------|---|

# 3. PRINTER SERVICE FUNCTIONS

## 3.1 Error Indications

This printer displays errors with the indicator lamp and buzzer. Also, when an error occurs during printing, an error code is displayed on the status monitor to indicate the type of the error.
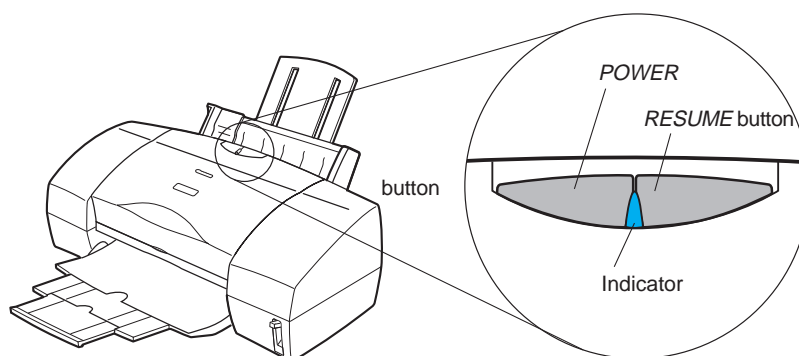


**Figure 3-12 Operator Panel**

For troubleshooting procedures, refer to *Part 5: 6 TROUBLESHOOTING* (Page 5-13).

### TABLE 3-1 ERROR INDICATIONS

| Errors | Indicator | Beeps | Error code | Reference page |
|---|---|---|---|---|
| **[Recoverable by user]** | | | | |
| Paper feed error | Lights in Orange | 2 times | | Page 5-25 |
| Paper jam | Lights in Orange | 3 times | | Page 5-25 |
| Ink out | Lights in Orange | 4 times | | Page 5-27 |
| BJ cartridge mis-installed | Lights in Orange | 5 times | | Page 5-28 |
| No BJ cartridge | Lights in Orange | 6 times | | Page 5-28 |
| BJ cartridge error | Lights in Orange | 7 times | | Page 5-28 |
| Waste ink warning | Lights in Orange | 8 times | | |
| Auto head adjustment error | Lights in Orange | 9 times | | Page 5-29 |
| | | | | |
| **[Unrecoverable by user]** | | | | |
| ROM error | Blinks in Orange 1 time | 10 times | | Page 5-18 |
| RAM error | Blinks in Orange 2 times | 10 times | | Page 5-18 |
| EEPROM error | Blinks in Orange 3 times | 10 times | 6800 | Page 5-18 |
| Home position error | Blinks in Orange 4 times | 10 times | 5100 | Page 5-19 |
| Temperature sensor error | Blinks in Orange 5 times | 10 times | 5400 | Page 5-22 |
| Waste ink full error | Blinks in Orange 6 times | 10 times | 5B00 | Page 5-22 |
| Head temperature error | Blinks in Orange 7 times | 10 times | 5200 | Page 5-23 |
| Head temperature sensor error | Blinks in Orange 8 times | 10 times | 5200 | Page 5-23 |
| Cartridge displaced error | Blinks in Orange 9 times | 10 times | 5600 | Page 5-24 |
| **[Internal errors]** | | | | |
| Ink sensor error | No indication | None | 5910 | |
| Pump sensor error | No indication | None | 5C00 | |

Note: Internal errors are not displayed, but can be checked by printing the EEPROM information (see Page 3-20).

## 3.2 Description of Error Indications

**Errors recoverable by users:**

**1) Paper feed error**

Paper feed operation fails to feed paper.

**2) Paper jam error**

Paper eject operation of 23 inches still fails to eject the paper.

**3) Ink out error**

The indicated ink tank is out of ink (ink chamber and sponge).

**4) BJ cartridge mis-installed error**

The BJ cartridges are not installed in their correct positions.

**5) No BJ cartridge error**

One or both of the BJ cartridges are not installed.

**6) BJ cartridge error**

One or both of the BJ cartridges are defective.

**7) Waste ink warning**

The calculated (and stored in EEPROM) amount of waste ink absorbed has reached 95% of the defined absorbing capacity.

**8) Auto head adjustment error**

The automatic head position adjustment has failed.

**Errors unrecoverable by users:**

**9) ROM error**

ROM checking during initialization is NG.

**10) RAM error**

RAM checking during initialization is NG.

**11) EEPROM error**

Writing to EEPROM has failed.

**12) Home position error**

The home position sensor is defective (broken circuit) or otherwise fails to detect home position.

**13) Temperature sensor error**

The thermal sensor (TH201) on the logic board is defective (broken circuit).

**14) Waste ink full error**

The calculated (and stored in EEPROM) amount of waste ink absorbed has reached the 100% of defined absorbing capacity.

**15) Head temperature error**

The inside temperature of the BJ cartridge is too high. This error should occur earlier than the head temperature sensor error.

**16) Head temperature sensor error**

The thermal sensor in the BJ cartridge is defective.

**17) Cartridge displaced error**

The printer cannot detect the BJ cartridge when the carriage is out of the cartridge replacement position.

**18) Ink sensor error**

Ink sensor checking during initialization is NG. If this error occurs, no indication is made, but the printer will not check ink level and assumes that the level is normal until the printer is switched off. You can confirm the error by printing the EEPROM information.

**19) Pump sensor error**

Pump sensor checking during initialization is NG. No indication is made for this error, but it can be confirmed by printing the EEPROM information.

### 3.3 BJ Status Monitor

The BJ status monitor window shows the printer's conditions and print-job progress.
You can stop the print-job from this window.

#### 3.3.1 Main functions of the BJ status monitor

1) Show the printer's conditions and progress in real-time by means of graphics and messages.
2) Display error types and show recommended recovery methods.
3) Show the types of the BJ cartridges installed and the ink-out warnings of ink tanks by icon and name.
4) Can be used to abort the current print-job.

#### 3.3.2 Items displayed on the BJ status monitor

1) Printer designation
2) Document name
3) Printer conditions (including error codes and recommended recovery methods)
4) Date and time of print start
5) Progress status
6) Number of pages printed
7) Print-job abortion
8) BJ cartridge identification (icons graphically display the types and positions of installed BJ cartridges, and the ink-out warnings of ink tanks )
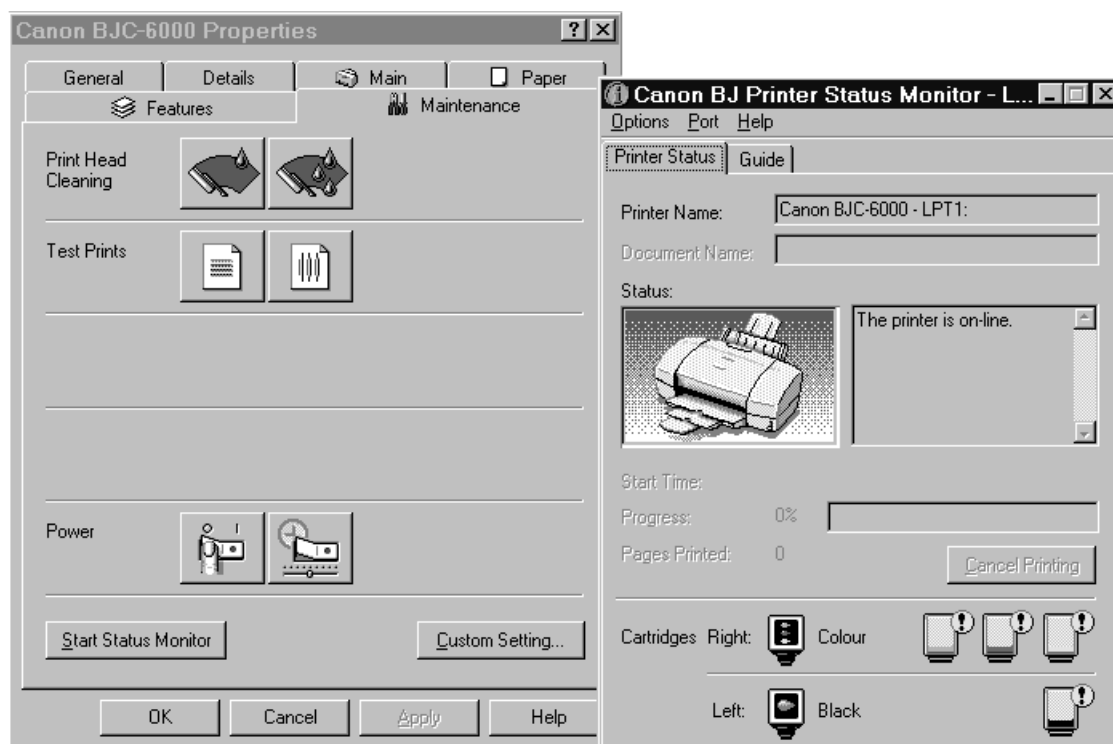


**Figure 3-13 BJ Status Monitor (Sample)**

**3-14**

### 3.4 Function Settings

As this printer has no physical function selectors, function settings can be set by using the Canon printer driver.

### 3.4.1 Function settings using the printer driver

The printer driver's utility menu allows such operations and function settings as listed below.  In the menu, you can also invoke a special custom menu by, while pressing the shift key, selecting Custom Settings.

1) Cleaning
2) Head refreshing
3) Nozzle check pattern printing
4) Head position adjustment
5) Printer power off
6) Automatic power supply setting
7) Launching the status monitor
8) Custom settings
   · Enable ECP mode (disabled by default)
   · Enable high speed printing (enabled by default): Printer's response time ($\overline{ACKNLG}$) is changed from 4 to 0.9 ms.
   · Enable pause-between-pages (disabled by default): See Page 4-16.
   · Enable pause-between-scanning (disabled by default): See Page 4-16.
   · Enable automatic head position adjustment following BJ cartridge replacement (disabled by default)
   · Enable manual head position adjustment (disabled by default)
   <In the special custom menu (special-custom/service mode)>
   · Economic cleaning (disabled by default): Cleaning operation at power up is omitted if the printer has been switched off for less than 72 hours.  Enabling this function is useful for saving ink, especially when the printer's power is provided through the computer (possibility of nozzle clogging increases).
   · Smear control (enabled by default): When the smear control (see Page 4-16) is enabled, ink smearing of ink on paper due to paper-to-paper contact is prevented.  Smear control is especially useful for high duty printing on normal plain paper or post cards.  When smear control is disabled (and printed sheets are collected directly following printing), throughput increases.
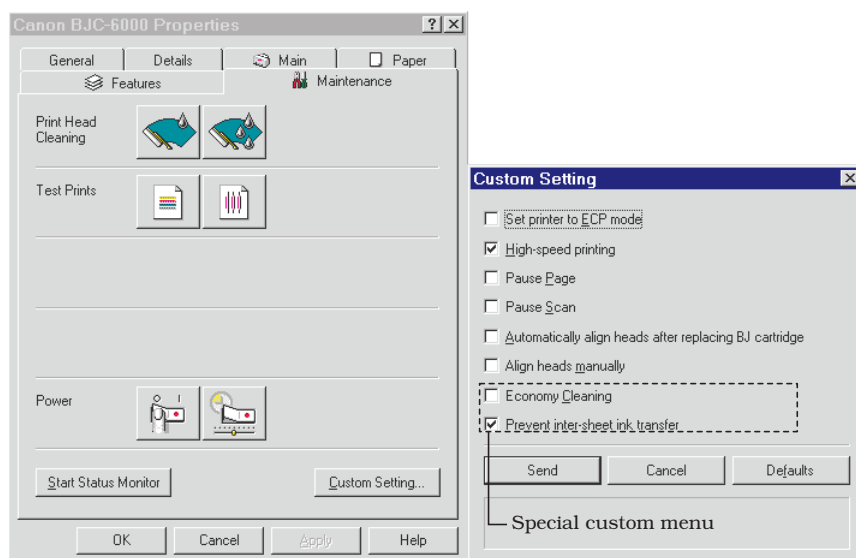


**Figure 3-14 Printer Driver Utility (Sample)**

**3-15**

### 3.5 Off-line Operations

This printer has three operations which can be performed independent of the computer: To select these operations, while holding down the *RESUME* button, power on the printer by pressing the *POWER* button, confirm the specified number of beeps, and then release the *RESUME* button.

| Operations | Number of beeps | Remarks |
|---|---|---|
| Cleaning | 1 time | |
| Nozzle check pattern printing | 2 times | Printer prints one sheet and powers down. |
| Roller cleaning | 3 times | One cleaning sheet is fed and ejected to clean the rollers. |

### 3.5.1 Cleaning

With the printer powered on, hold down the *RESUME* button and after confirming one beep, release the *RESUME* button.  The cleaning operation will start, cleaning both (right and left) print heads.  If you want to clean only one print head, connect the printer to the computer, and perform the print-head cleaning from the computer using the printer driver utility.

### 3.5.2 Nozzle check pattern printing

With the printer powered on, hold down the *RESUME* button and after confirming two beeps, release the *RESUME* button.  The nozzle check pattern printing will start, feeding a sheet, which must be of B5 size or larger, from either the auto sheet feeder or the manual feed slot, and print a standard pattern using all nozzles of both installed BJ cartridges.  If print defects are detected in the test print, perform print-head cleaning.  If five or more cleaning operations fail to solve the problem, replace the BJ cartridge with a new one.

| | |
|---|---|
| **CAUTION** | Use paper of B5 size or larger for the nozzle check pattern printing.  If you use smaller paper, the platen may be smeared with ink. |

| | |
|---|---|
| **NOTE** | To abort the nozzle check pattern printing, press the *POWER* button.  The printer will switch itself off after ejecting the paper. |

Black BJ Cartridge                    Color BJ Cartridge

Large dot printing

Black 160 nozzles

Printed with the first nozzle          Printed with the first nozzle

Yellow    48 nozzles
Cyan      48 nozzles
Magenta  48 nozzles

Printed with the 160th nozzle          Printed with the 48th nozzle

Small-dot printing

Printed with the first nozzle          Printed with the first nozzle

Printed with the 160th nozzle          Printed with the 48th nozzle

360-dpi vertical                (Y)

180-dpi horizontal forward      (X1)

180-dpi horizontal reverse      (X2)

360-dpi horizontal forward      (X3)

360-dpi horizontal reverse      (X4)

720-dpi horizontal forward      (X5)

720-dpi horizontal reverse      (X6)

180-dpi bi-directional          (B1)

360-dpi bi-directional          (B2)

**Figure 3-15 Nozzle Check Pattern Print (Sample for Black/Color Cartridge)**

### 3.5.3 Roller cleaning

With the printer powered on, hold down the *RESUME* button and after confirming three
beeps, release the *RESUME* button.  The roller cleaning will start, feeding a cleaning
sheet from the auto sheet feeder and ejecting it without printing so that paper dust is
removed it from the pick-up rollers and paper feed rollers.

**3-17**

### 3.6 Service Mode

This printer has a service mode for service-related settings or performing test printing. The operator panel buttons are used to enter service mode.

### 3.6.1 Service mode operations

1) With the printer powered off, while pressing the *RESUME* button, press the *POWER* button.  The buzzer will sound once.

2) While holding down the *POWER* button, release the *RESUME* button.  Press the *RESUME* button twice in succession, and then release the *POWER* button.  (Each time the *RESUME* button is pushed, the buzzer will sound once.)  The indicator will blink in green, and then light in green.

3) Select one of the following service mode functions by pressing the *RESUME* button the specified number of times.

| Press | Indicator | Functions |
|---|---|---|
| Zero times | Green | Service/factory test print |
| 1 time | Orange | EEPROM information printing |
| 2 times | Green | EEPROM initializing (reset to default settings, but model setting is not cleared) |
| 3 times | Orange | Waste ink counter clear |
| 4 times | Green | Model setting |
| 5 times | Orange | Automatic head position adjustment operations |
| 6 times or more | Green | Power off |

4) Execute the function you have selected (except for model setting) by pressing the *POWER* button.  The buzzer will sound once.  The printer will switch off itself after performing the function.

For the model setting function, select BJF600 or BJC-6000 by pressing the *RESUME* button zero or one time respectively.  (The buzzer will sound each time the *RESUME* button is pressed.)

| Press | Indicator | Model |
|---|---|---|
| Zero times | Green | BJ F600 |
| 1 time | Orange | BJC-6000 |
| 2 times | ... | Reserve |

Validate the model you have selected by pressing the *POWER* button.  The buzzer will sound once.  (The printer will switch off itself after performing the operation.)

**CAUTION**
Use the Black and Color BJ cartridges for the service/factory test printing. It is not possible to enter Service Mode without cartridges installed.  (Also, the Photo and Color BJ cartridges cannot be used for service/factory test printing.)  If you have changed the model setting, perform the service/factory test printing for confirmation.

### 3.6.2 Service/factory test print

The service/factory test print displays, in the header portion, such information as the control ROM version, model setting, total sheets passed, and total waste ink absorbed.
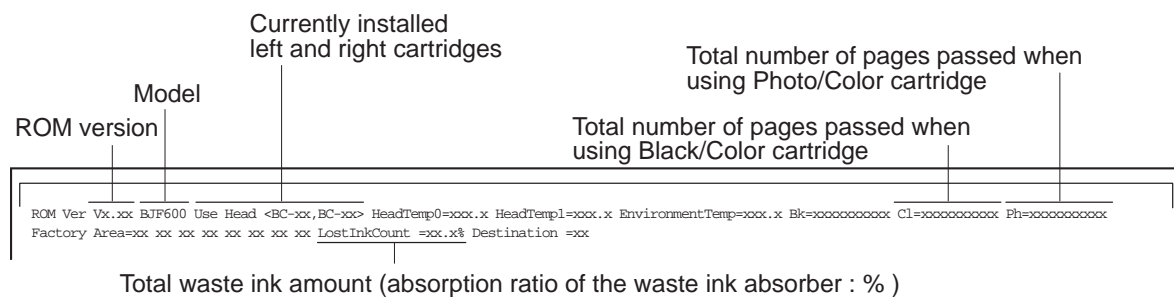


**Figure 3-16 Service/Factory Test Print**

### 3.6.3 EEPROM information print

The EEPROM stores such information as function settings, total sheets passed with the Black/Color or Photo/Color cartridges, total waste ink absorbed, and records the last three errors recoverable only by service personnel.  The information stored in the EEPROM is printed out as a hexadecimal dump in the EEPROM information print. The EEPROM information is useful especially for knowing how heavily the printer has been used.

```
- EEPROM Information <Hex.> -
Address       +0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +A +B +C +D +E +F
00000000      05 20 00 0A 00 00 B8 83 00 0C 9F 40 09 35 1C 28
00000010      00 00 00 00 2A 6A 51 A1 38 54 AA A0 1E 16 DA 3C
00000020      35 6C B7 AB 33 BC E9 71 32 DD 02 0C 00 00 00 00
00000030      14 00 0A 07 04 02 02 02 00 00 00 00 0A 80 00 00
00000040      04 90 00 08 00 00 00 44 00 00 00 44 00 00 00 44
00000050      00 00 00 00 00 00 04 44 00 00 00 00 00 00 02 B9
00000060      00 00 00 1D 00 58 00 1B 00 01 00 2F 00 06 00 00
00000070      00 00 00 00 00 00 00 08 00 00 00 08 00 00 00 08
00000080      00 00 00 72 00 00 00 2E 00 00 00 30 83 00 00 00
00000090      3C 00 00 10 10 0C 0C 08 0C 10 0C 0C 0C 10 0C 0C
000000A0      0C 04 00 08 00 0C 0C 00 FD 07 00 00 04 04 00 00
000000B0      00 00 00 00 04 04 00 00 00 00 00 00 00 00 00 00
000000C0      00 00 00 00 15 0B BB 19 35 1A D5 C6 13 0A 46 61
000000D0      04 19 57 AB 98 1A 72 13 00 45 93 6B 46 34 63 E3
000000E0      35 36 30 30 35 36 30 30 35 36 30 30 FF FF FF F0
000000F0      00 00 00 D6 67 7C 73 FF 01 FF FF FF FF FF FF FF

              Last error record   Second error record  Third error record
                                  from the last        from the last
```

Error records are printed, in error code, for the last three errors which are recoverable only by service personnel except for ROM/RAM errors in the order that the latest error first and the oldest error last.

| Errors | Error code | ASCII code representation |
|---|---|---|
| EEPROM error | 6800 | 36  38 30 30 |
| Home position error | 5100 | 35 31 30 30 |
| Temperature sensor error | 5400 | 35 34 30 30 |
| Waste ink full error | 5B00 | 35 42 30 30 |
| Head temperature error | 5200 | 35 32 30 30 |
| Head temperature sensor error | 5200 | 35 32 30 30 |
| Cartridge displaced error | 5600 | 35 36 30 30 |
| Ink sensor error | 5900 | 35 39  31 30 |
| Pump sensor error | 5C00 | 35 43 30 30 |

**Figure 3-17 EEPROM Information Print (Sample)**

### 3.6.4 Resetting EEPROM

The EEPROM stores such information as function settings, total sheets passed with the Black/Color or Photo/Color cartridge, total waste ink absorbed, and the last three errors recoverable only by service personnel.  Because the waste ink full error is based on the data of the total waste ink absorbed as stored in the EEPROM, the Waste Ink Counter must be cleared whenever the waste ink absorber has been replaced.  If the control board has been replaced, the new EEPROM must also be initialized.  In this case, the waste ink absorber must also be replaced with a new one.  For the EEPROM initializing procedure, refer to *Part 3: 3.6.1 Service mode operations* (Page 3-18).

### 3.6.5 Model setting

The control board of this printer is a common component for different printers.  If you have replaced the control board, it is necessary to set the mode setting as initial information.  For model setting procedures, refer to *Part 3: 3.6.1 Service mode operations* (Page 3-18).  After setting the model setting, perform the service/factory test printing for confirmation.

### 3.6.6 Automatic head position adjustment

The automatic head position adjustment can be performed off-line (without being connected to a computer).  The printer will perform the automatic adjustment in the same way as if the user initiated the adjustment from the computer via the printer driver utility.  For details, refer to *Part 3: 1.3.4 Aligning the print heads* (Page 3-9).

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# Part 4
## TECHNICAL REFERENCE

# 1. OVERVIEW

## 1.1 Printer Block Diagram
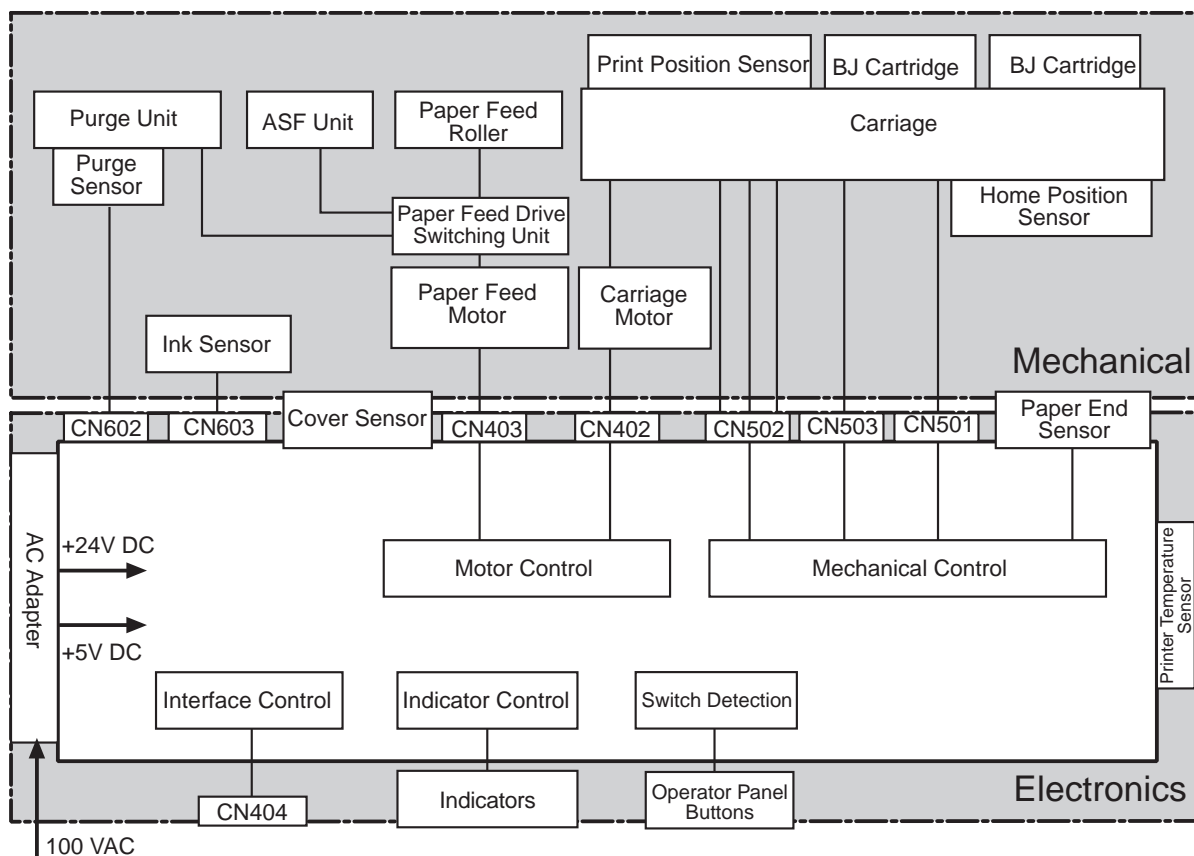


**Figure 4-1 Printer Block Diagram**

4-1

### 1.2 Power On Sequence Flowchart

This flowchart shows the initial sequence this printer goes through from power-on to on-line.

| | |
|---|---|
| AC Connection | • Printer plugged In. |
| Software initialization | • MPU/printer controller initialized<br>• ROM/RAM check<br>• Ink sensor check<br>• Waste ink full error check<br>• Printer temperature sensor (TH201) check<br>• EEPROM read |
| Press *POWER* button | • Printer switched on |
| Beeper sounds once | |
| Indicator blinks (green) | |
| Error check | |
| I/F busy set | • EEPROM error<br>• ROM error<br>• RAM error<br>• Waste ink full error<br>• Temperature sensor error<br>• Head temperature error<br>• Head temperature sensor error |
| Home position detection | Error indication |
| Paper ejection | • Paper left in the printer will be ejected. |
| Self-cleaning | Cleaning does not take place if:<br>• Wrong BJ cartridge configuration is installed<br>• BJ cartridge is faulty<br>• Printer is set to Economy Cleaning mode |
| Ink detection | |
| Cover open check | • Carriage will move to the cartridge replacement position if the cover is open. |
| Indicator lights (green) | |
| I/F busy reset | |
| Ready to print | |

**Figure 4-2 Initial Sequence Flowchart**

**4-2**

## 1.3  Flow of Print Signals

The following outlines the flow of signals as the printer receives data from the host computer and prints it.

a) The data from the host computer that contains control commands will be fed into the printer controller via the parallel interface, which is controlled by the printer controller, on the control board.  The printer controller sends this data on the dedicated bus to store it in the receive buffer in the DRAM.

b) The data saved in the receive buffer will be sent to the MPU, where it is separated into control commands and print data according to the data stored in the control ROM.  The control commands will be processed in the MPU.

c) The print data will be extracted into the DRAM's print buffer.

d) The printer controller, on receiving the Print Start Request, allows the DMA to transfer the print data from the print buffer into the printer controller.

e) The printer controller then converts the print data into serial data and sends it as print signal to the BJ head.  The serial print signal will be converted into one column of parallel print data inside the BJ head.  The data, as the print control signal, will be output under the control of the printer controller.

f) The MPU, while controlling the printer controller, control ROM, and motor driver, and monitoring the status of the BJ head and printer, controls the entire printing operation.
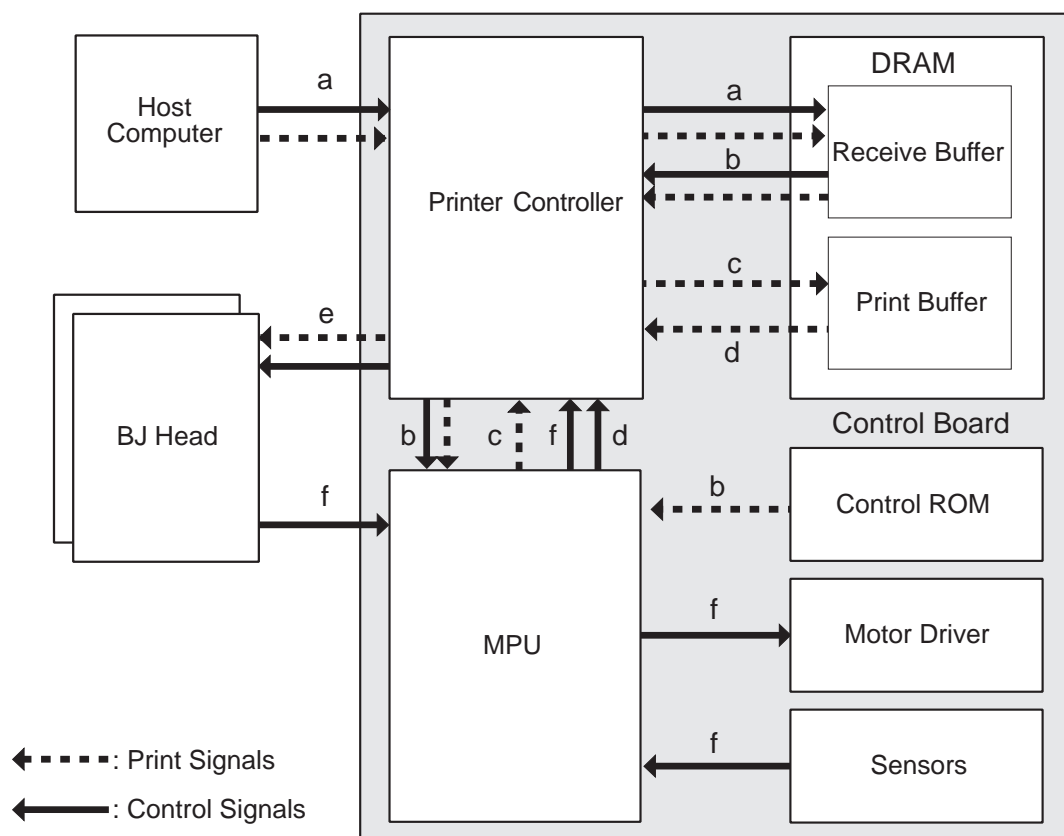


**Figure 4-3 Flow of Print Signals**

## 1.4 Print Driving

The printer sends the control signals to the head in order to allow the head to discharge ink for printing. These signals consist of the drive control signals that cause ink to be discharged from the head nozzles, and the thermal control signal that controls the head temperature to ensure constant ink discharge.

Both control signals are optimized by the printer controller and sent via the carriage ribbon cable contact section to the head for optimal printing.

### 1.4.1 Print drive control

#### a) Black BJ cartridge control

The Black BJ cartridge has 160 nozzles. Each nozzle has two heater boards in an array, large and small, one in front, the other in the rear. The front and rear heaters will be controlled to provide multi-drop driving, with both driven simultaneously to discharge a large drop, or with only the small one driven to discharge a small drop. The head's 160 nozzles are divided into 10 blocks (16 nozzles per block), with all blocks driven simultaneously, one nozzle per block in High Speed/Standard mode, or 20 nozzles per block in all other cases.

The Heat ENABLE signals (HENB 0, 1, 2, 3) are the heater board's drive control signals. These signals are always fed to the head during printing, using the Block ENABLE signals (BENB 0,1), Even/Odd ENABLE signal (Even/Odd ENB), and the Heat Select signals (HSEL1A0, 1A1, 1B0, 1B1, 2A0, 2A1, 2B0, 2B1) to select the heaters to turn on. Turning HENB 0 and 2 on drives the Black BJ cartridge's large heater while HENB 1 and 3 drive the small heater. A Heat ENABLE signal consists of a pre-pulse and main pulse so that heater drive pulse width can be adjusted according to the monitored head rank and internal temperature, etc., to always ensure optimum ink discharge.
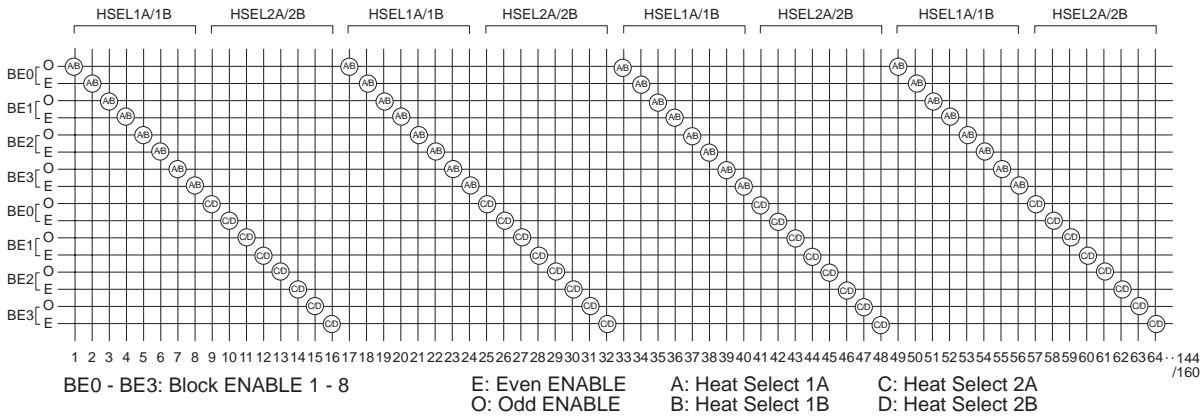


**Figure4-4  Printing Sequence (Black BJ cartridge, HQ mode)**

**b) Color/Photo BJ cartridge control**

The Color/Photo BJ cartridge has 144 (48 x 3) nozzles.  Each nozzle has two heater boards in an array, large and small, one in front, the other in the rear.  The front and rear two heaters will be controlled to provide multi-drop driving, with both driven simultaneously to discharge a large drop, or with only the small one driven to discharge a small drop.  The head's 144 nozzles are divided into 9 blocks (16 nozzles per block), with all blocks driven simultaneously, with one nozzle per block in the High Speed/Standard mode (for speed), or 18 nozzles per block in all other cases.

The Heat ENABLE signals (HENB 0, 1, 2, 3) are the heater board's drive control signals.  These signals are always fed to the head during printing, using the Block ENABLE signals (BENB 0, 1), Even/Odd ENABLE signal (Even/Odd ENB), and the Heat Select signals (HSEL1A0, 1A1, 1B0, 1B1, 2A0, 2A1, 2B0, 2B1) to select the heaters to turn on.  HENB 0 and 2 drive the Photo BJ cartridge's rear heater while HENB 1 and 3 drive its' front heater.  HENB4 drives the Color BJ cartridge's rear heater, and HENB 3 drives its' front heater.  A Heat ENABLE signal consists of a pre-pulse and main pulse so that heater drive pulse width can be adjusted according to the monitored head rank and internal temperature, etc., to always ensure optimum ink discharge.

### 1.4.2 Print drive method

The head can be driven in one of the following six drive methods: 180 x 180 dpi (large dot), 360 x 360 dpi (large dot), 360 x 360 dpi (multi-drop drive), 360 x 360 dpi (large-large dot), 720 x 720 dpi (small dot), and 1440 x 720 dpi (small dot) with the drive method differing depending on whether printing is in the forward or reverse direction. The Block ENABLE, Even/Odd ENABLE, and Heat Select signals are used to select the heater(s) to turn on in the head nozzles.

Note that the head type (Black BJ cartridge, Color BJ cartridge or Photo BJ cartridge) does not influence the type of print drive method.

#### a) 360 x 360 dpi (multi-drop drive, forward direction) control mode

In the multi-drop control mode, two nozzles 8 nozzles apart are driven (one large drop driven and the other small drop driven) to print the large and small dots at 1/360-inch intervals.

1) Depending on the Odd/Even and Block ENABLE signals, nozzles No. 8 and No. 16, 8 nozzles apart, selected, using the Heat Select signals, nozzle No. 8 will be heated by the large heater, and No. 16 by the small heater.

2) The nozzles next to No. 16 and No. 8, No. 15 and No. 7, will be heated similarly.

3) After nozzles No. 8 through No.1 have been heated by the large heater and nozzles No. 16 through No. 9 by the small heater, No. 8 through No. 1 will be heated by small heater and No. 16 through No. 9 by the large heater.
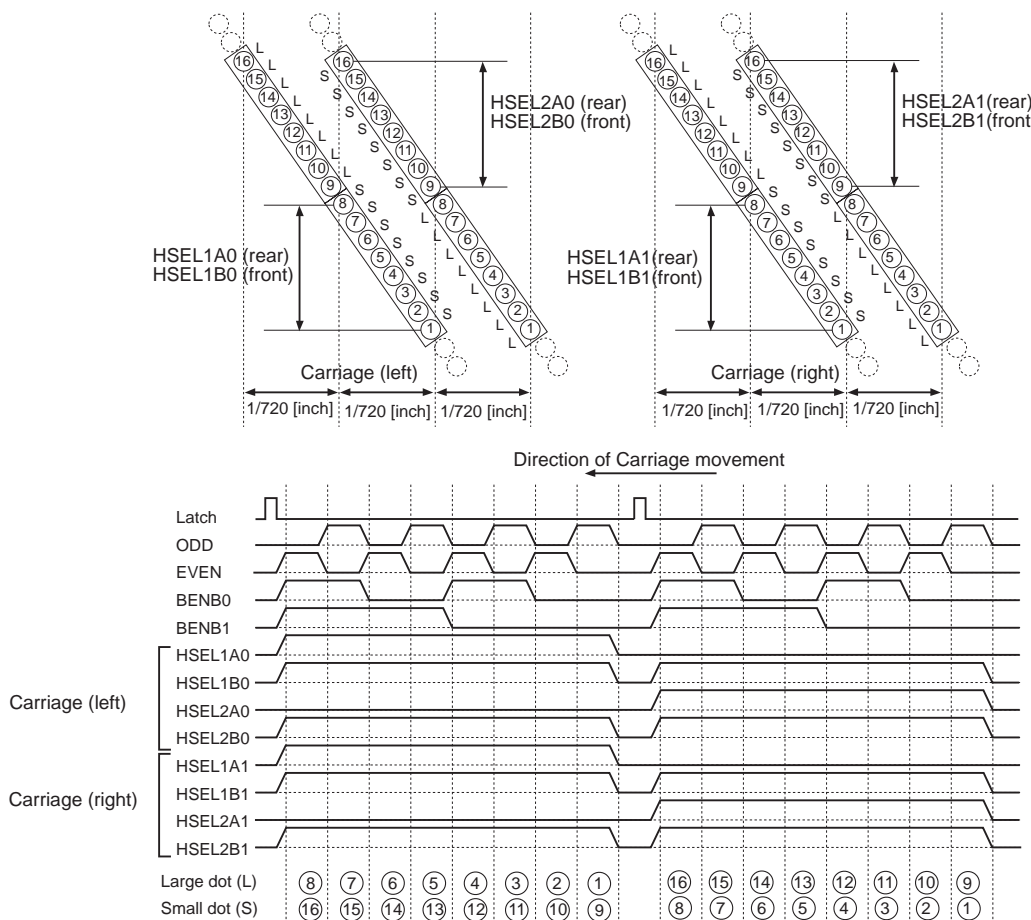


**Figure 4-5  Print Drive Method (Multi-drop, forward direction)**

### b) 180 x180 dpi (large dot, forward direction) control mode
In this mode, only 8 out of 16 nozzles in one block will be heated.  This allows the carriage to travel faster than it would if all 16 nozzles were heated, resulting in faster printing.

### c) 360 x 360 dpi (large dot, forward direction) control mode
In this mode, the nozzles that would have been heated simultaneously in a) multi-drop drive will be heated sequentially one at a time from No.16 through No.1.

### d) 720 x 720 dpi (small dot, forward direction) control mode
In this mode, two nozzles 8 nozzles, apart from the other, will be heated simultaneously, exactly the same way as in a) multi-drop drive mode, except that the two nozzles print with small dots.

### e) 360 x 360 dpi (large-large dot, forward direction) control mode
In this mode, two nozzles, 8 nozzles apart from the other, will be heated simultaneously, exactly the same way as in a) multi-drop drive mode, except that the two nozzles print with large dots to increase the printing density.

### f) 1440 x 720 dpi (small-drop drive, forward direction) control mode
This mode allows nozzles 4 nozzles apart from the other to be driven two at a time, separately, to print small dots at 1/360 intervals.
1) Odd/Even and Block ENABLE signals cause nozzles No. 16, 12, 8, 4, 4 nozzles apart one from one another to be heated separately, with No. 16 and No. 8 heated first, and then No. 12 and No. 4 next.
2) Then nozzles No. 15, 11, 7, and 3 those next to No. 16, 12, 8, 4, will be heated the same way.
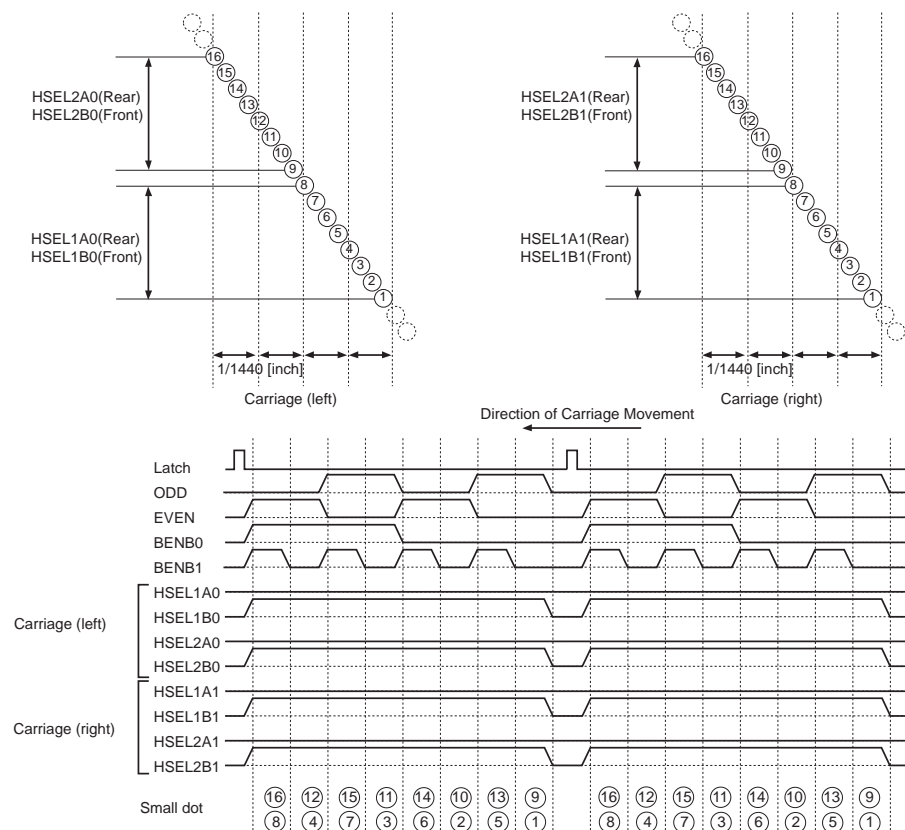


**Figure 4-6 Print Drive Method (1440 x 720 dpi, forward direction)**

### g) Reverse direction print mode

In the reverse direction print mode, printing takes place similarly, except that the nozzles are heated in the reverse order. As such, the signals (ODD/EVEN, BENB) that determine the heating order are driven with timing reversed from that used in forward direction printing.
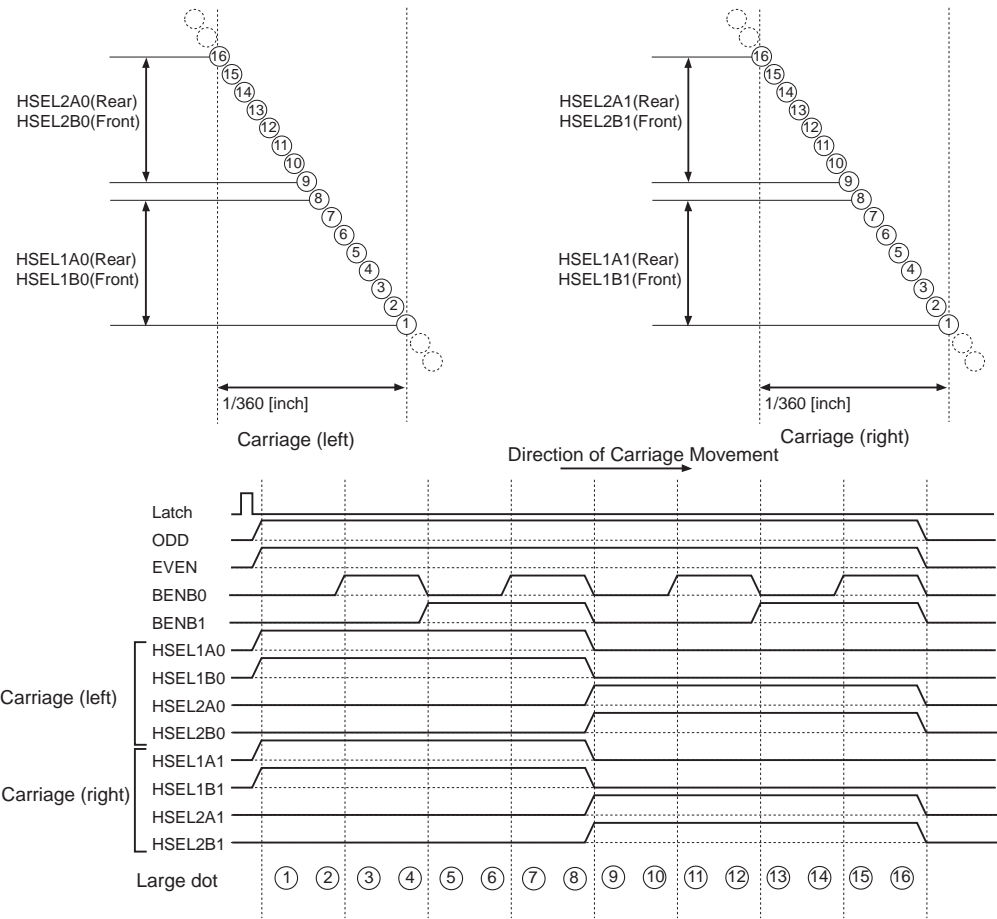


**Figure 4-7 Print Drive Method (Reverse direction)**

### 1.5  Power-Off Sequence Flowchart



Beeper sounds once

I/F busy set

Indicator blinks

Error reset

When BJ cartridge or ink tank is replaced while replacing cartridge

• No cartridge
• Capping in progress
• While replacing cartridges, neither of the two cartridges is in place.

Cleaning operation

Ink detection

Paper ejection

Capping

Sensor/BJ head drive power off

MPU/Printer controller initialization

EEPROM write

Indicator off

I/F busy reset

END

**Figure 4-8  Power-Off Sequence Flowchart**

**CAUTION**

Unplugging the power cord to turn off the printer causes the printer to shut off immediately, possibly stopping the capping process before the capping operation is completed.  If the printer has been turned off by unplugging the power cord, plug the power cord back in and turn the printer on again, then use the *POWER* button to turn off the printer before unplugging the printer.

# 2.  FIRMWARE

## 2.1 Interface

This printer's interface supports compatible mode, nibble mode, and ECP mode in compliance with the IEEE 1284 Parallel Interface Standards.  The compatible mode is a uni-directional data transfer protocol similar to the Centronics interface conventional protocol.  The nibble mode and ECP mode are bi-directional data transfer protocols used to transfer to the host computer the status data, including the device ID, printer status, etc.  The printer uses the compatible mode or the ECP mode (forward transfer) when transferring print data.  It should be noted, however, that the computer must be set to ECP mode for the printer to operate in ECP mode.

### 2.1.1 Compatible mode

In compatible mode, data is transferred in 8 bit units.  Data gets transferred by the handshake between the STROBE, BUSY, and ACKNLG signals.  When data (Data 1-8) and the STROBE signal are received from the host computer, the printer controller controlling the parallel interface outputs BUSY and latches the data on the falling edge of the STROBE signal.  After outputting BUSY, the printer controller transfers the latched data into the receive buffer inside the DRAM through the DRAM dedicated bus.  When the printer controller is finished writing data into the receive buffer inside the DRAM, it generates the ACKNLG signal and turns BUSY "Low" to indicate it is ready for the next data input.  This printer has a short default ACKNLG to reduce the length of BUSY "High," making the printer response time shorter, thus making high speed printing possible.
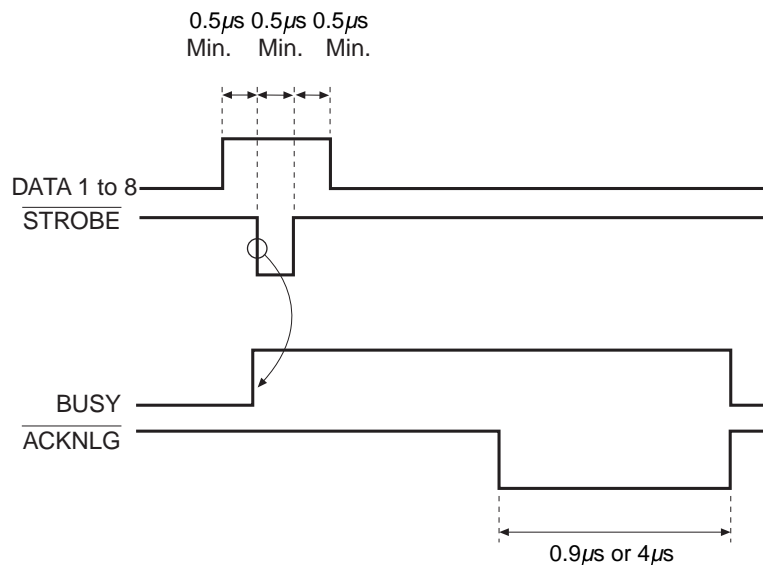


**Figure 4-9 Interfacing Timing (Compatible Mode)**

## 2.1.2 Nibble mode

The Nibble mode is used to transfer data to the host computer.  It is in this mode that the printer sends the printer status data to the host computer.  Four input control signals are used for data transfer with handshake between the PtrClk and HostBusy signals.

1) The host computer, ready to receive data, causes HostBusy to go low.
2) After acknowledging that HostBusy is low, the printer sends the first four bits of data out on the control signal lines, then makes PtrClk low to indicate that the data is valid.
3) The host computer receives data after PtrClk has fallen, and causes HostBusy to go high when the data has been received.
4) The printer repeats the above process to send the remaining four bits of data out to the host computer.
   (A signal going high or low means it rises or falls.)
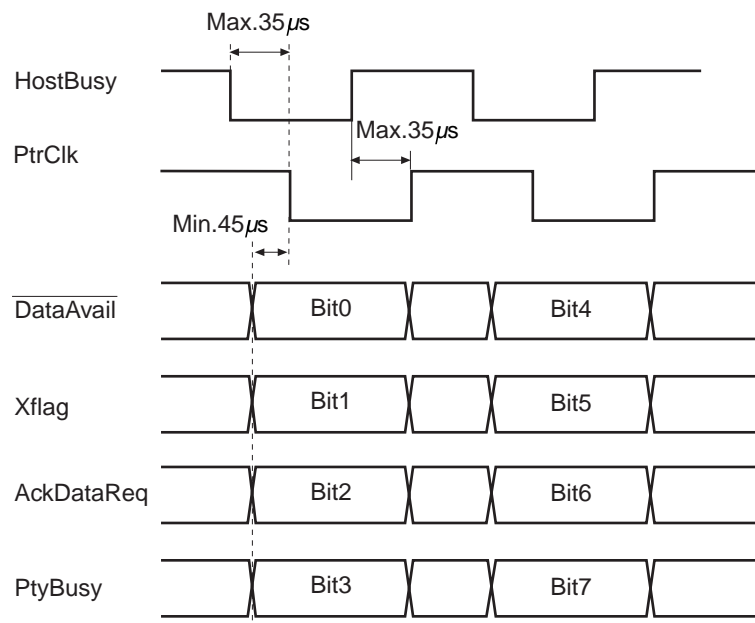


**Figure 4-10 Interface Timing (Nibble Mode)**

### 2.1.3 ECP mode

The ECP mode allows data to be transferred bi-directionally between the printer and host computer. This mode also allows 2 byte data transfer to provide faster data transmission and reception. It is for this reason that ECP mode is suitable for transferring large amounts of data.

In response to the fall of the $\overline{\text{ReverseRequest}}$ signal, the direction of the data bus switches from forward data transfer mode to reverse data transfer mode. The forward data transfer mode allows data to be transferred from the host computer to the printer, whereas the reverse data transfer mode allows data to be transferred from the printer to the host computer.

(1) The host computer causes $\overline{\text{AckReverse}}$ to go low to request reverse data transfer (data transfer from printer to host computer).
(2) After confirming $\overline{\text{AckReverse}}$ is low, the printer causes $\overline{\text{AckReverse}}$ to go low to indicate that that reverse transfer is possible.
(3) The printer sends 1 byte of data out on the data lines and causes PeriphAck to go high to tell that this data is not command but data. The printer then causes PeriphClk to go low to tell that this data is valid.
(4) After confirming the signal in (3) is received, the host computer causes HostAck to go high.
(5) The printer causes $\overline{\text{AckReverse}}$ to go high to have the data recorded in the host computer.
(6) The host computer causes HostAck to go high to get ready for the next one byte of data.
(7) The printer repeats the process above to send the next one byte of data.
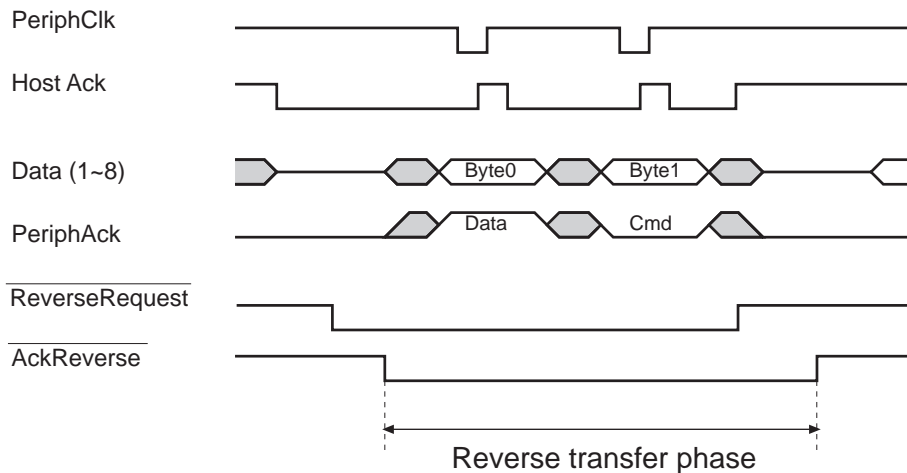


**Figure 4-11 Interface Timing (ECP mode, reverse transfer)**

## 2.2 Print Control
### 2.2.1 Print mode

The printer adjusts the carriage action and paper feed action according to the installed cartridges, selected print media, printing quality, print data, etc. to ensure high quality printing free from diffusion and density variations. Multiple passes are used to provide staggered print timing with multiple nozzles used to print one luster, so that the quantities of discharge that vary from nozzle to nozzle will be smoothed out to minimize density variations. It is smear-free because it is not until the ink for the last pass printed is fused on the paper that the next pass is printed. Printing can be divided up to a maximum 8 passes, depending on the print media.

### 2.2.2 Multi-drop print

The BJ cartridges used in this printer incorporate drop-modulation technology, allowing two ink drop sizes, large and small, to be ejected. This allows small dots to be selectively used for printing in low-density areas to lessen granularity, while large dots can be used in high-density areas to offer high speed printing. In the 720 dpi and 1440 dpi print modes, only small dots are used continuously to provide highly detailed printing.

### 2.2.3 Photo-print

The photo-print uses both the Photo BJ cartridge, which uses low density ink, and the Color BJ cartridge to provide printing with up to 6 colors of ink. By printing in low-density image areas with ink of 1/3 normal ink density (photo-cyan and photo magenta), printing with rich gradation and suppressed graininess is possible.
In the photo-print mode, each pixel is converted into a maximum of 4 values (expressed by two bits), so that for each 360 dpi pixel, up to 4 gradations of each color can be printed in a combination of large and small dots. The 6 ink colors of the Photo BJ cartridge and Color BJ cartridge allow a more dynamic range of printing colors, thus providing higher printing density using less ink than would have been possible with 4 low-density ink colors.

### 2.2.4 Automatic switching control of printing nozzles

When the printer is set to the normal (for speed) plain paper mode (1 path) with the Black BJ cartridge (160-nozzle) installed, the number of nozzles to be used for printing will be automatically set within the nozzle range 48 - 160 during printing according to the image data to be printed. Continuous printing with black will be performed with 160 nozzles, but, in areas with color data, 48 nozzles will be used for printing to prevent running.

## TABLE 4-1  PRINT MODE LIST

### Regular Color Ink System (Black/Color BJ Cartridge)

| Paper | High speed | Standard (for speed) | Standard (for quality) | | High quality | Highest quality | Printing mode |
|---|---|---|---|---|---|---|---|
| | 180 x 180 (L) | 360 x 360 (L) | 360 x 360 (L) | 360 x 360 (L/S) | 720 x 720 (S) | 1440 x 720 (S) | Resolution (dpi)*1 |
| | 2 | 2 | 2 | 4 | 2 | 2 | Gradation (/dot) |
| Plain paper | 1 pass/Bi | 1 pass/Bi | ... | 2 pass/Bi | 4 pass/Uni | ... | *2 |
| Transparencies | ... | 2 pass/Uni (4 pass) | ... | 4 pass/Uni (*3) | ... | ... | |
| BPF | ... | ... | 6 pass/Uni (4 pass) | 6 pass/Uni (*3) | ... | ... | |
| Fabric sheet | ... | ... | ... | ... | ... | ... | |
| Glossy paper | ... | ... | ... | 4 pass/Uni | 6 pass/Uni (8 pass) | 6 pass/Uni (8 pass) | |
| Glossy film | ... | ... | ... | 4 pass/Uni | 6 pass/Uni (8 pass) | ... | |
| High-resolution paper | ... | 2 pass/Bi | ... | 3 pass/Bi (4 pass) | 4 pass/Uni | 4 pass/Uni | |
| Postcard | ... | 1 pass/Uni | ... | 3 pass/Bi (4 pass) | 4 pass/Uni | ... | |

(L = large dot, S = small dot ; Bi = bi-directional   Uni = uni-directional

### Photo-color Ink System (Photo/Color BJ Cartridge)

| Paper | High speed | Standard (for speed) | Standard (for quality) | | High quality | Highest quality | Printing mode |
|---|---|---|---|---|---|---|---|
| | 180 x 180 (L) | 360 x 360 (L) | 360 x 360 (L) | 360 x 360 (L/L) | 360 x 360 (L/S) | 720 x 720 (S) | Resolution (dpi)*1 |
| | 2 | 2 | 2 | 4 | 4 | 2 | Gradation (/dot) |
| Plain paper | 1 pass/Bi | 1 pass/Bi | ... | ... | 2 pass/Uni | 2 pass/Uni | *2 |
| Transparencies | ... | 2 pass/Uni | ... | 4 pass/Uni | ... | ... | |
| BPF | ... | ... | ... | 6 pass/Uni | ... | ... | |
| Fabric sheet | ... | ... | 6 pass/Uni | ... | ... | ... | |
| Glossy paper | ... | ... | ... | ... | 4 pass/Uni | 6 pass/Uni | |
| Glossy film | ... | ... | ... | ... | 4 pass/Uni | 6 pass/Uni | |
| High-resolution paper | ... | 2 pass/Bi | ... | ... | 3 pass/Uni | 4 pass/Uni | |
| Postcard | ... | 1 pass/Uni | ... | ... | 3 pass/Uni | 4 pass/Uni | |

(L = large dot, S = small dot ; Bi = bi-directional   Uni = uni-directional

*1 (large)-printed with large drops; (small)-printed with small drops; (large/small)-printed with large and small drops

*2 Number of printing passes/Printing direction:
The bracketed numbers indicate the number of passes in gray-scale mode if different.

*3 Printed in 4 pass large/large mode

**4-14**

## 2.3 Automatic Printing Position Alignment Function

This printer features the automatic printing position alignment function so that the difference between the installed left and right BJ cartridges in vertical/horizontal printing position and bi-directional printing position will be automatically adjusted. After the automatic printing position adjustment patterns are printed, each under slightly different conditions, Automatic Printing Position Alignment is performed through the reflection of the patterns by the print position sensor, comprised of a red LED and a photosensor, which is installed on the carriage.  The variations in the photosensor output are used to calculate the optimum printing position compensation value.  Based on the compensation value obtained, the printer corrects for the difference in vertical/horizontal printing position and bi-directional printing position between the right and left cartridges.

The Auto Printing Position Alignment starts with the calibration of LED and photosensor sensitivity to correct variations between them.  Then the difference in vertical printing position between the left and right cartridges will be compensated for, followed by the adjustment of bi-directional printing position for each printing mode, and then the adjustment of the horizontal printing position to the accuracy of ±1 pixel, after which finer adjustments will automatically be conducted.  The adjustment patterns will be printed in both black and cyan, as a red LED is used as the light source.

For automatic printing position alignment, you must use B5 or larger paper.
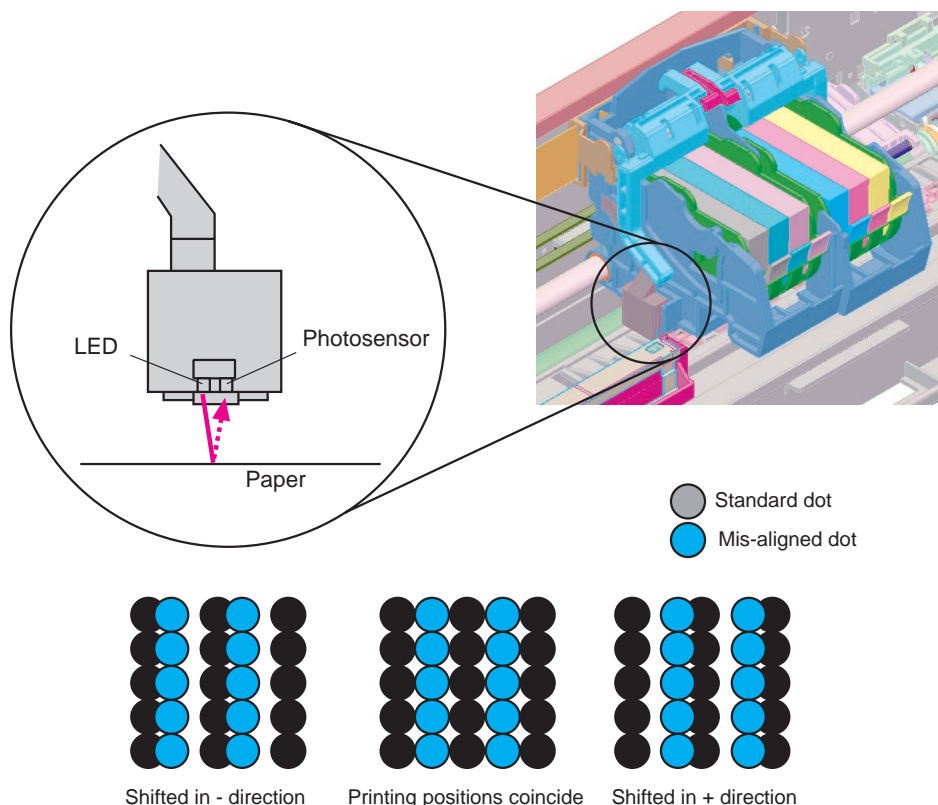


**Figure 4-12 Automatic Printing Position Alignment**

> **CAUTION**
>
> Do not perform automatic printing position alignment with the front cover open, as external light may make accurate measurements impossible.  For this reason, during servicing, do not perform automatic printing position adjustment with the front cover open or upper cover removed.

**4-15**

## 2.4 Pause Between Scanning

This printer features pause between-scanning to prevent bleeding and white clouding be caused by differences in characteristics between color ink and black ink. This function allows the border between the color ink and black ink to be detected during internal print data processing so that, when detected, an appropriate pause will be imposed on each print mode and color to prevent bleeding. Since this function decreases the printer's throughput, it will only be activated when enabled by the user and when printing on plain paper, for which this type of bleeding occurs easily.

## 2.5 Pause Between Pages

Immediately after ejection, printed paper is left to dry on the paper eject tray naturally. If the next paper is ejected before the previous page has dried completely, ink-smearing may occur. To prevent this, 1-minute pause will be imposed on for all pages before printing starts, to delay paper ejection so the preceding page can dry. This is particularly useful for slow-drying print media such as transparencies.

## 2.6 Smear Control

Immediately after being ejection, printed paper is left to dry on the paper eject tray naturally. The next paper is ejected before the previous page has dried completely, ink-smearing may occur. To prevent this, wait-time is added into the printing process, delaying paper ejection so the preceding page can dry. After printing at high speed with the Black BJ cartridge at high duty on plain paper or postcards, this printer automatically determines both the high duty printing position and time elapsed after printing, to control smearing ( default setting is ENABLE.).

## 2.7 Auto Power ON/OFF

This printer can switch itself on in response to print signals from the host computer and switch itself off if left for a certain period of time without incoming print signals. These settings can be made with the printer driver. When Auto Power ON is enabled, the printer powers on if more than 3 bytes of data are received consecutively. Thus, the interface unit is enabled, even if the printer is switched off. When Auto Power OFF is enabled, the printer powers off if a certain period of time has elapsed without receiving print data from the host computer. If, however, an error exists, paper is in the manual feed slot, or the front cover is open, the printer will not power off.

## 2.8 Head Overheat Protection

If the printer continues to print after ink has run-out, the bubble jet head will overheat. To prevent this, when the head temperature sensor inside the bubble jet head detects a temperature higher than the specified range, overheat protection is performed.
**Protection level 1:**  Prevents the user from touching the hot aluminum plate of the head when replacing the bubble jet head by preventing the carriage from moving to the cartridge replacement position for fixed time, even if the front cover is open.
**Protection level 2:** If a further rise in temperature is detected, after printing 1 line of text, the carriage returns to the home position for 3.5 seconds to allow cooling before continuing printing. This protection continues for more than 20 seconds.
**Protection level 3:** If an even higher rise in temperature is detected, the printer sees this as head temperature error and stops printing. If the problem persists, the printer sees it as a head temperature sensor failure and displays the head temperature error message. The ENABLE TIME can be 5 min., 10 min., 15 min., 30 min., or 60 min.

# 3. PRINTER'S MECHANICAL SYSTEM

## 3.1 Overview

The printer's mechanical system is comprised of the BJ cartridges, carriage unit, purge unit, paper-feed unit, and drive switching unit. The following describes each of these units:
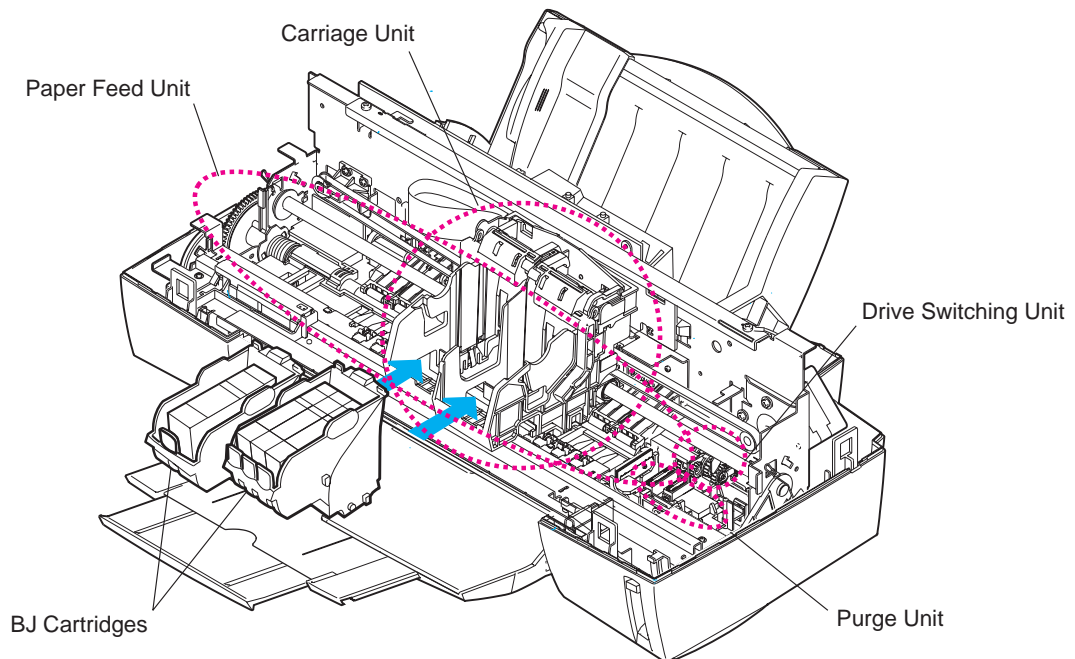


**Figure 4-13  Printer's Mechanical System**

## 3.1.1  BJ cartridge unit

There are 3 types of BJ cartridges: the Black BJ cartridge with 160 nozzles and a 360 dpi nozzle pitch, the Color BJ cartridge with 48 nozzles and a 360 dpi pitch per color (yellow, magenta, and cyan), and the Photo BJ cartridge with 48 nozzles and a 360dpi nozzle pitch per color (photo-black, photo-magenta, and photo-cyan). The user can install the cartridges in accordance to his/her printing needs. Always install the Color BJ cartridge on the right side of the carriage. The left side of the carriage is for either the Black BJ cartridge or Photo BJ cartridge, depending on the specific printing requirements. Each BJ cartridge has detachable ink tanks, making it possible to replace only the ink tank.

## 3.1.2  Carriage unit

The carriage, with two BJ cartridges installed in it, moves back and forth, along the horizontal width of the paper, by the carriage belt driven by the carriage motor. The carriage position is controlled by the carriage motor drive pulses after its initial position is detected by the home position sensor mounted on the carriage board. The print signals from the control board will be transmitted via the carriage ribbon cable to the BJ cartridges installed in the carriage. The carriage controls the paper feed motor drive switching unit, driving of the paper feed and purge unit, and switching of the auto-sheet feeder drive. The carriage also controls the position for which capping, wiping, or pumping is performed by the purge unit for BJ cartridge maintenance.

### 3.1.3 Purge unit

The purge unit, driven by the paper feed motor, is comprised of the wiper, pump, cap, and carriage lock unit.  The wiper unit keeps the BJ cartridge head face in good condition to ensure high quality printing while the suction function ensures that the ink in the nozzle can be easily discharged.  When not in use, the unit protects the BJ cartridge with its cap and secures the carriage by locking it in place.

### 3.1.4 Paper feed unit

The mechanical portion of the paper feed unit is comprised of the pick-up unit, paper feed unit, and paper ejection unit.

**Pick-up unit**

Paper is supplied either from the auto-sheet feeder in auto paper feed mode, or from the manual feed slot in manual paper feed mode.  The auto-sheet feeder, driven by the paper feed motor, can be loaded with various sizes of paper up to legal size and automatically supplies paper (picks up and delivers the paper to the paper feed unit).

**Paper feed unit**

The paper feed unit, driven by the paper feed motor, turns the feed roller to horizontally move the paper beneath the BJ cartridge print head while keeping the paper level on the platen without cockling.  To manually feed paper through this printer, use the *RESUME* button, as there is no paper feed knob.

**Paper ejection unit**

The printed paper is ejected by the eject rollers into the paper eject tray.

## 3.2. BJ Cartridge
### 3.2.1 Construction of the Black BJ cartridge

The Black BJ cartridge has a 160-nozzle multi-drop bubble jet head and a detachable black ink tank.

**a) Air path**

Keeps the pressure inside the ink tank constant with the external atmospheric pressure.

**b) Ink chamber**

Loaded with black ink. The ink in the ink chamber will be supplied via the sponge to the BJ head. A sensor is used to check for ink.

**c) Ink sponge**

Saturated with black ink.

**d) Ink supply piece**

Supplies constant quantity of ink to the joint between the bubble jet head and ink tank.

**e) Ink filter**

Keeps foreign matter from entering the bubble jet head.

**f) Bubble jet head**

Consists of 160 nozzles and signal contacts. It discharges the ink supplied from the ink tank according to the print signals it receives via the signal contacts. Each nozzle has two heater boards inside, one large and one small, for discharging ink. By controlling the driving of the heater boards, multi-drop driving is conducted.
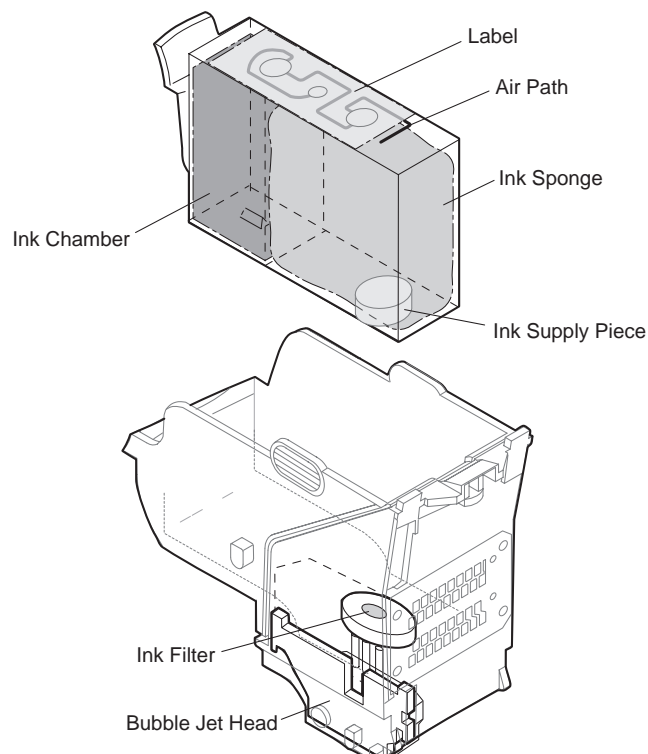


**Figure4-14 Black BJ Cartridge**

### 3.2.2 Construction of the Color and Photo BJ cartridges

Color and Photo BJ Cartridges come equipped with a multi-drop bubble jet head comprised of 48 nozzles for each of the three colors, for a total of 144 nozzles, and have separate, detachable ink tanks, one for each color.

**a) Air path**

Keeps the pressure inside the ink tank constant with the external atmospheric pressure.

**b) Ink chamber**

Loaded with ink. The ink in the ink chamber will be supplied via the sponge to the BJ head. A sensor is used to check for ink.

**c) Ink sponge**

Saturated with the ink of that color.

**d) Ink supply pieces**

Supplies constant quantity of ink to the joint between bubble jet head and ink tank.

**e) Ink filter**

Keeps foreign matter from entering the bubble jet head.

**f) Bubble jet head**

Consists of 144 nozzles and signal contacts. It discharges the ink supplied color by color from the ink tanks according to the print signals it receives via the signal contacts. Each nozzle has two heater boards inside, one large and one small, for discharging ink. By controlling the driving of the heater boards, multi-drop driving is conducted.
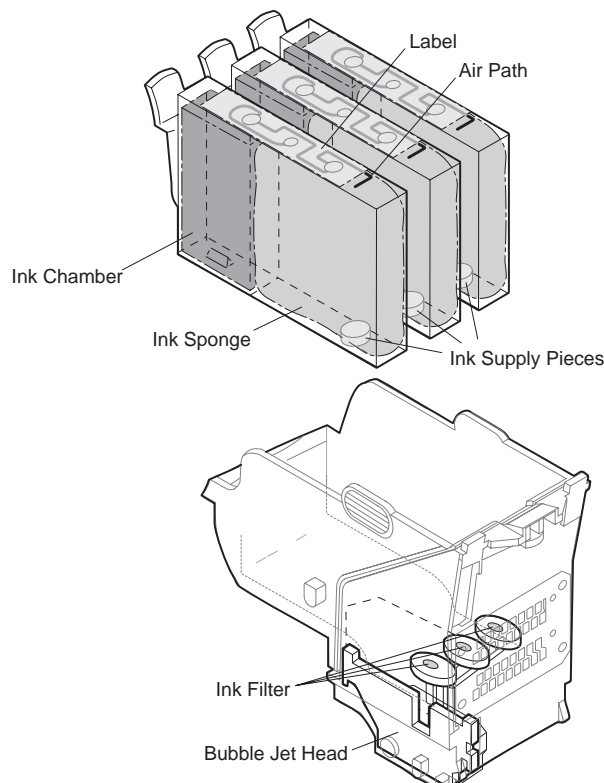
**Figure4-15 Color/Photo BJ Cartridge**

### 3.2.3 Construction of the bubble jet head unit
#### a) Bubble jet nozzle

Ink absorbed in the ink sponge will be filtered through the mesh ink filter, then fed
to the bubble jet nozzles via ink pipes.  When the head drive current passes through
a heater board in a nozzle, the ink will boil, producing bubbles.  These small bubbles
eventually coalesce into one large bubble.  The head drive current will be turned off
before the ink drop is discharged from the nozzle, but the after-heat of the heater
causes the bubble to grow larger and be discharged from the nozzle tip as an ink
drop.  The nozzle is replenished with ink after the ink has been ejected.

**NOTE** The print head uses semiconductor technology, in which the heaters and
I/C circuits are mounted on a silicon plate.  This silicon plate with
electrical circuitry is bonded to an aluminum base which is then attached
to a molded plastic cover with nozzles.
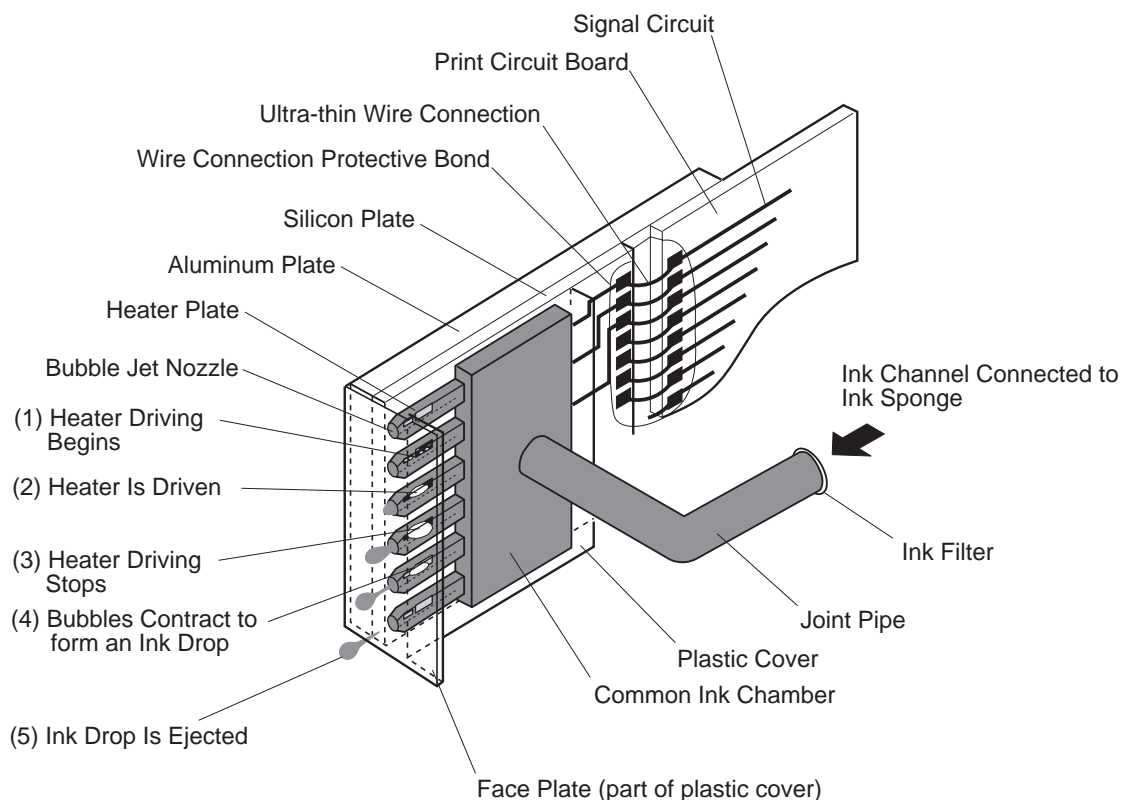


**Figure 4-16  Bubble Jet Nozzle (part)**

**b) Nozzle arrangement**

The bubble jet nozzles are lined up vertically at 1/360 inch pitch in one column. Color and Photo BJ cartridge have 8 dummy nozzles separating the nozzles of each color.
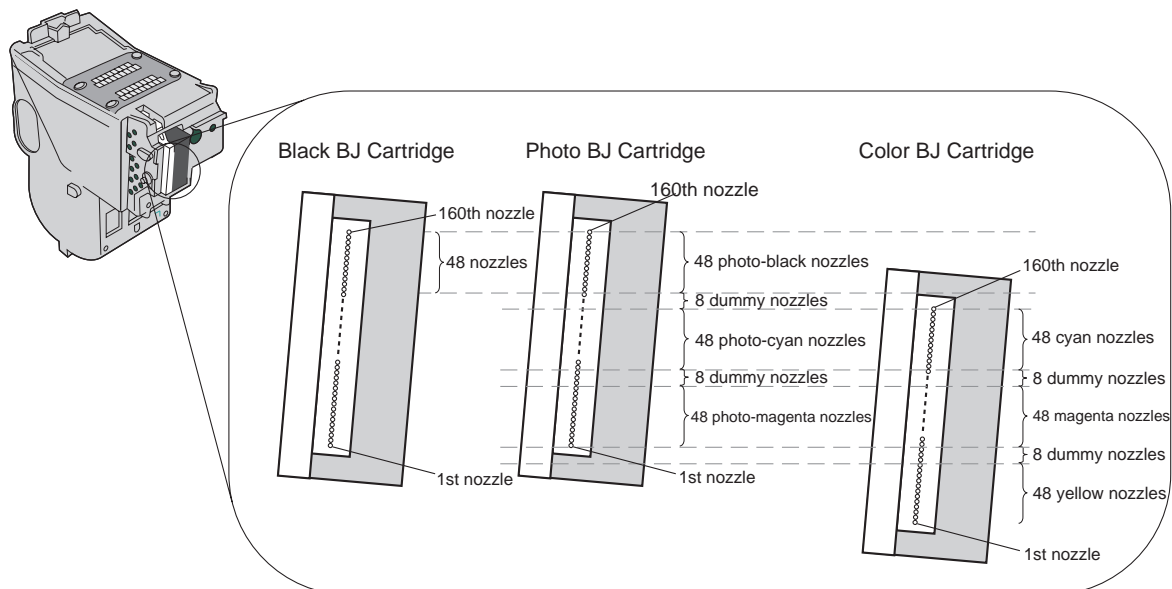


**Figure 4-17 Nozzle Arrangement**

**c) Signal contacts**

The bubble jet head signal contacts, in touch with the carriage contacts, transmit control signals such as print signals to the bubble jet nozzles.
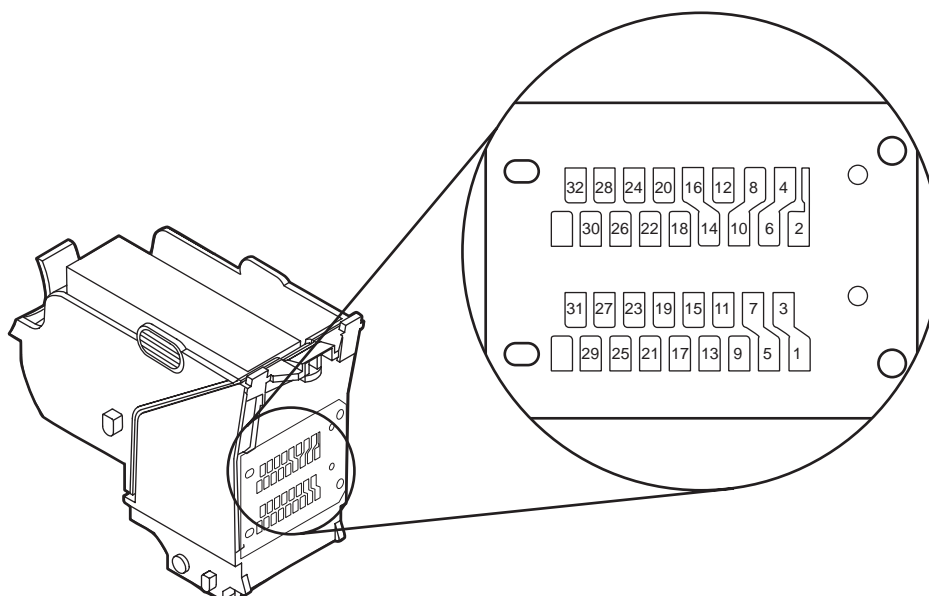


**Figure 4-18 Signal Contacts**

**TABLE 4-2 SIGNAL CONTACTS**

| Pin No | Signal | IN/OUT | Function |
|---|---|---|---|
| 1, 2, 3 | HVH | OUT | Head drive voltage (VH) |
| 4, 6 | SUBH0 (SUBH1) | OUT | Sub-heater drive signal |
| 5 ,7, 8, 10 | VHG | ... | GND for Head drive voltage (VHGND) |
| 9 | HDATA0 (HDATA1) | IN/OUT | Serial data (including head identification and rank resistance) sent in synchronization with the clock signal (H_CLK) |
| 11 | HSEL1B0 (HSEL1B1) | OUT | Rear nozzle heater select signal for upper nozzles (1-8, 17-24, ..., 145-152) |
| 12 | HVDD | OUT | Head logic drive voltage (+5 V) |
| 13 | HCLOCK0 (HCLOCK1) | IN/OUT | Clock signal for serial data transmission |
| 14, 16 | LGND | OUT | GND for head logic drive voltage (HVDD) |
| 15 | HSEL1A0 (HSEL1A1) | OUT | Front nozzle heater select signal for upper nozzles (1-8, 17-24, ..., 145-152) |
| 17 | HSEL2A0 (HSEL2A1) | OUT | Front nozzle heater select signal for lower nozzles (9-16, 25-32, ..., 153-160) |
| 18 | HSEL2B0 (HSEL2B1) | OUT | Rear nozzle heater select signal for lower nozzles (9-16, 25-32, ..., 153-160) |
| 19 | HLAH | OUT | Serial data latch timing signal |
| 20 | ODD | OUT | Odd-number nozzles select signal |
| 21 | EVEN | OUT | Even-number nozzles select signal |
| 22 | BENB0 | OUT | Signal to generate heater enable decoder outputs |
| 23 | BENB1 | OUT | Signal to generate heater enable decoder outputs |
| 24 | HENB0 (HENB4) | OUT | Rear heater drive signal for nozzles 1-112 (or 1-144) Front heater drive signal for nozzles 1-112 (or 1-144) |
| 25 | HENB1 (HENB5) | OUT | Rear heater drive signal for nozzles 1-112 (or 1-144) Front heater drive signal for nozzles 1-112 (or 1-144) |
| 26 | HENB2 (HENB4) | OUT | Rear heater drive signal for nozzles 113-160 |
| 27 | HENB3 (HENB5) | | Front heater drive signal for nozzles 113-160 |
| 28 | DIR | OUT | Serial data input/output direction control signal |
| 29 | HRSTX | OUT | Reset signal |
| 30 | DIA0 (DIA1) | IN | Head temperature (diode) sensor's anode line |
| 31 | DIK0 (DIK1) | IN | Head temperature (diode) sensor's cathode line |
| 32 | ... | ... | Not used |

The bracketed signal name (.....) is the name used for Color/Photo BJ cartridge if different from that used for Black BJ cartridge.

**d) Cartridge identification**

This printer uses 5 signals, HCLOCK (Pin 13), HDATA (Pin 9), HLAT (Pin 19), HRSTX (Pin 29), and DIR (Pin 28) to communicate serially with the bubble jet head to identify the installed BJ cartridge and the head rank. Bubble jet head heater characteristics are classified into 24 types according to the variations associated with the manufacturing process. The printer compensates for these variations to provide optimum control of ink discharge.

Switching the printer on with either an unrecognizable BJ cartridge installed, or with one BJ cartridge not installed, will cause the carriage to move automatically to the cartridge replacement position. Also, removing a BJ cartridge when the carriage is not in the cartridge replacement position while the printer is switched on will result in a NO BJ CARTRIDGE error.

### 3.3  Purge Unit
### 3.3.1 Function of the purge unit

The purge unit keeps the BJ cartridge nozzles in good working condition to ensure high printing quality.  The unit is designed to provide both capping and cleaning functions.

#### a) Capping

The capping function presses the purge unit's cap against the print head face to prevent the nozzles from drying and becoming contaminated.  During capping, a cam is actuated to lock the carriage in place.  During printing, capping starts 30 seconds or so after data stops.  When printing is not performed, capping takes place after a certain period of time (20 minutes in paper feeding mode, or 30 seconds in other conditions) has elapsed since the last data was received, or when the *POWER* button is used to switch the printer off.

#### b) Cleaning

The cleaning function includes the wiping action to wipe paper fibers or waste ink off the head face plate, and the suction action to suck out ink from the head to refresh the insides of nozzles with new ink, and the maintenance jet action to discharge the ink from the nozzles into the maintenance jet splash guard for removing bubbles from the head or dust around the outlet.  The cleaning mechanism becomes activated in the following cases to help maintain high quality printing.

| Printer Status | | Reference Ink Consumption (mg) | | |
|---|---|---|---|---|
| | | **Black** | **Color** | **Photo** |
| Power ON | Initial power on (1 time only) | 0.49 | 0.75 | 0.75 |
| | Switched on for the 1st time since connecting to AC (capped) | 0.19 | 0.27 | 0.27 |
| | Switched on for the 1st time since connecting to AC (not capped) | 0.34 | 0.53 | 0.53 |
| | 72 hours or more elapsed since previous cleaning | 0.19 | 0.27 | 0.27 |
| Cleaning | | 0.19 | 0.27 | 0.27 |
| Refreshing | | 0.34 | 0.53 | 0.53 |
| Changing BJ cartridge/Ink tank | | 0.34 | 0.53 | 0.53 |
| 72 hours or more elapsed since previous cleaning | | 0.19 | 0.27 | 0.27 |
| Before printing banner paper | | 0.19 | 0.27 | 0.27 |
| (Specified number or more of dots or time elapsed since previous cleaning) | | | | |
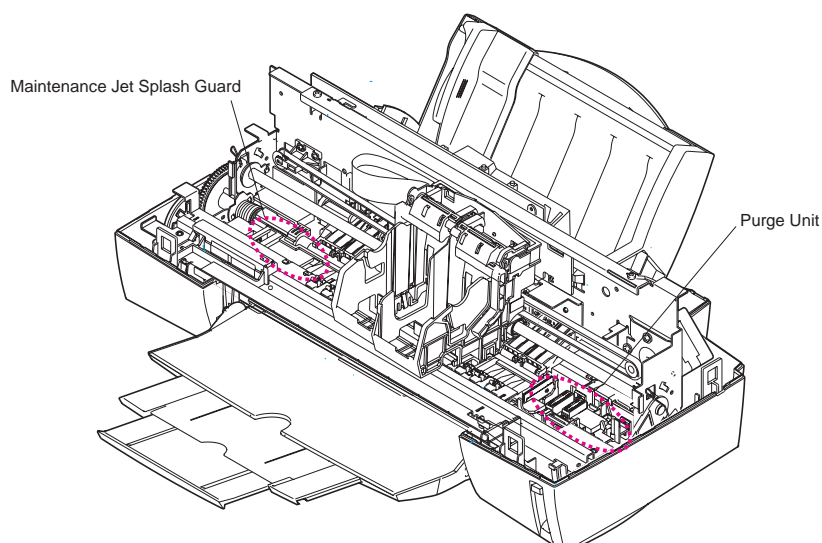


**Figure 4-19 Purge Unit**

### 3.3.2  Construction of the purge unit
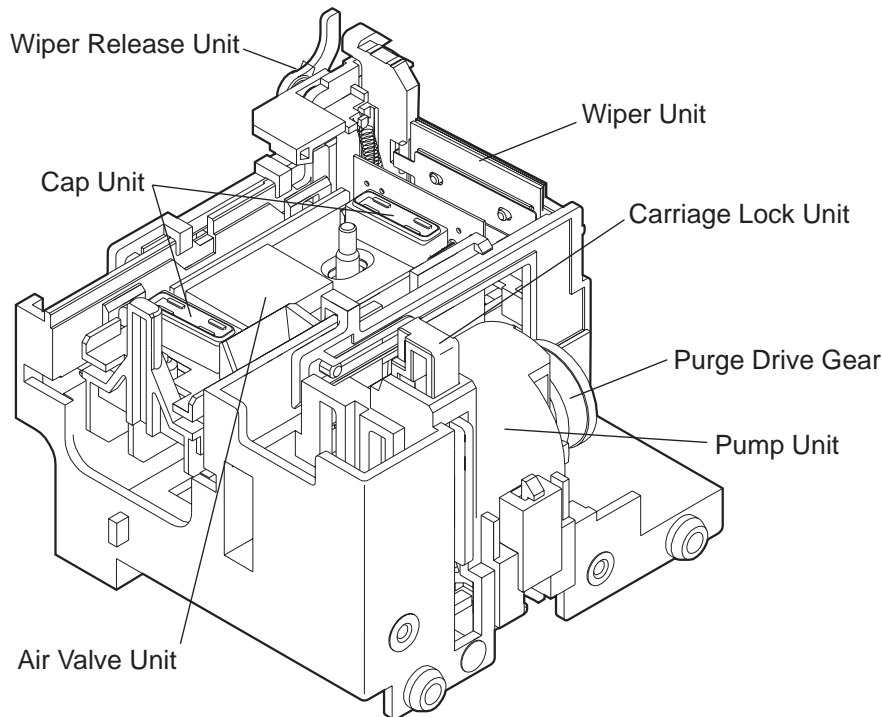


**Figure 4-20 Purge Unit**

**a) Purge drive gear**

  Receives the power of the feed roller driven by the paper feed motor via the drive switching unit to drive the pump.  The pump roller's position is detected by the pump sensor.

**b) Wiper unit**

  Operates when the carriage travels back and forth.  It wipes off surplus ink from the head face plate as the carriage moves right to left at the completion of cleaning.   It is constructed of two rubber wipers to enhance wiping performance,.

**c) Cap unit**

  Uses the same rubber cap for both the capping action to protect the head, and for the pumping action to suck ink.  There are two rubber caps, one per BJ cartridge installed on the carriage.  Capping occurs by pressing the cap against the head's face plate when the carriage moves to the capping position.   The rubber caps in the cap unit are connected to the pump unit and the air valve via the ink tube.  During cleaning, the unit sucks ink from the head using the pump.  The sucked ink will be sent to the waste ink absorber.  After ink suction is completed, the carriage will be moved to the position that opens the air valve and pumping will be performed to suck out waste ink collected in the rubber cap.

**d) Pump**

The pump is a tube pump type that applies the pressure of turning rollers to the ink tube to create negative pressure for sucking ink. Applying the pressure of two turning rollers alternately allows greater control over the amount of ink to be sucked, and helps to reduce the size of the pump unit. With two similar pumps set to turn in opposite directions, changing the rotational direction of the drive gear allows the individual BJ cartridges installed in the carriage to be cleaned separately. The amount of roller turning and the timing of turning are detected and controlled by the pump sensor.
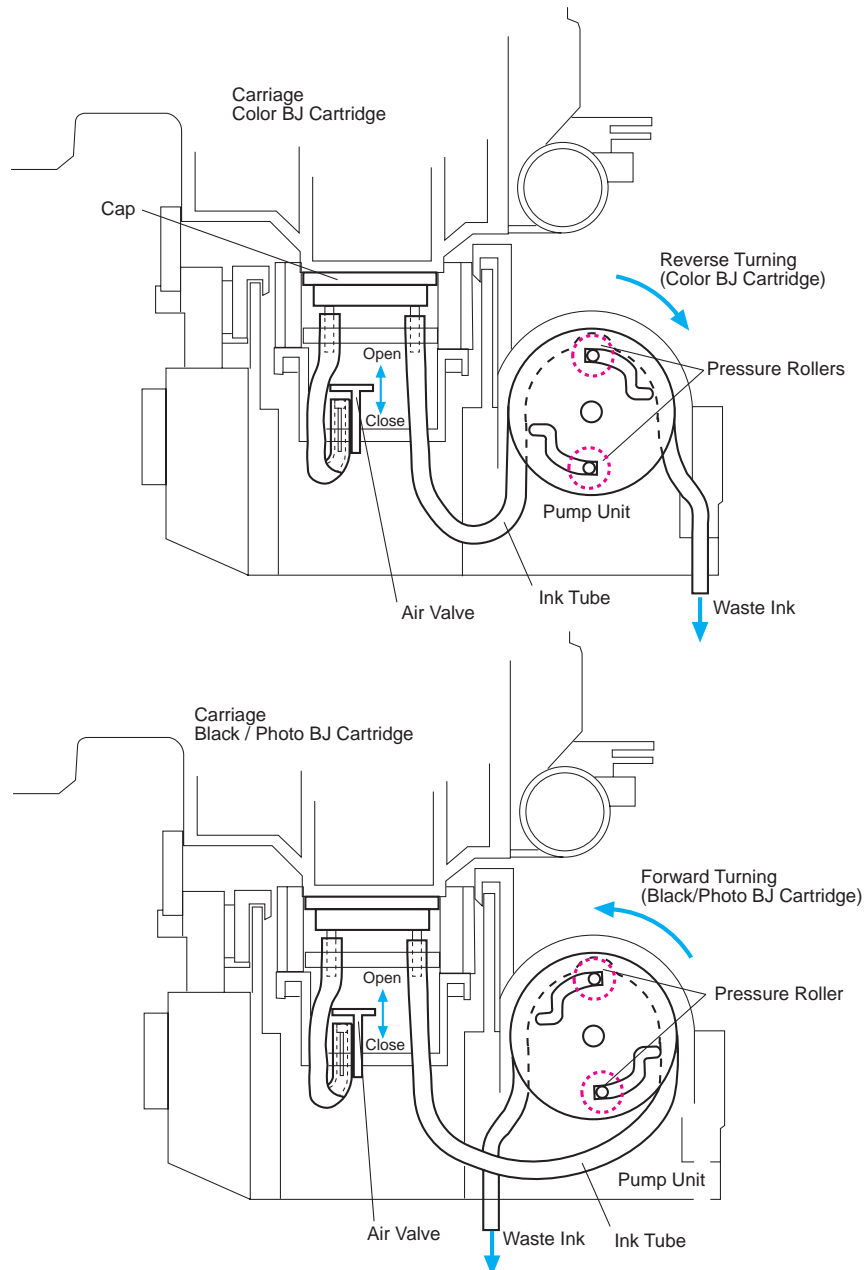
**Figure 4-21  Pumping Operations**

**e) Maintenance jet splash guard**

The maintenance jet splash guard receives the maintenance jet ink (test discharge to maintain the nozzle) directly into the waste ink absorber through the hole by the side of the platen.

### 3.4 Paper Feed Unit
#### 3.4.1  Functions of the paper feed unit
##### a) Paper feed function

This printer has two paper supply methods, using the auto-sheet feeder in automatic paper feed mode, or the manual feed slot.  The built-in auto-sheet feeder, driven by the paper feed motor and loaded with paper, supplies paper into the printer automatically.  Also, feeding of postcards and envelopes can be performed automatically without operating a mechanical paper selection lever.  Manual paper feeding also can be performed, even if paper is set in the auto-sheet feeder.  When paper is detected by the paper end sensor (photointerruptor-type), it will be fed automatically to the print start position on the platen.  Paper feeding action during printing is controlled by the control of the paper feed rollers.  The printed paper will be ejected from the printer by the paper eject rollers.
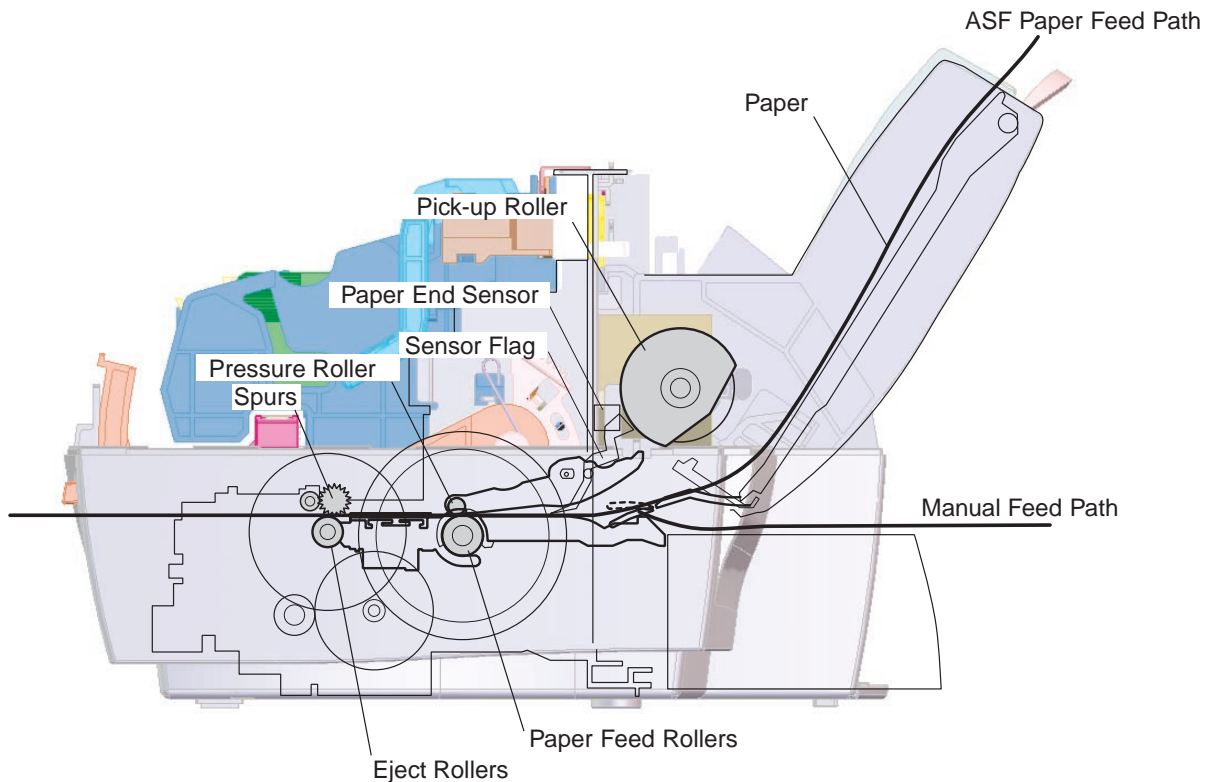


**Figure 4-22 Paper Feed Path**

## b) **Paper thickness adjustment**

The clearance between the head face of the BJ cartridge and the paper varies with the thickness of the paper.  Smaller clearance improves the printing quality however, paper contacting the head face risks spoiling print quality or damaging the BJ cartridge head face.  This printer is equipped with a 2-position paper thickness selector to provide constant paper clearance.  The carriage shaft is supported by means of an eccentric bearing.  The paper thickness selector turns this eccentric bearing to move the carriage up and down in order to adjust the head-to-paper distance.
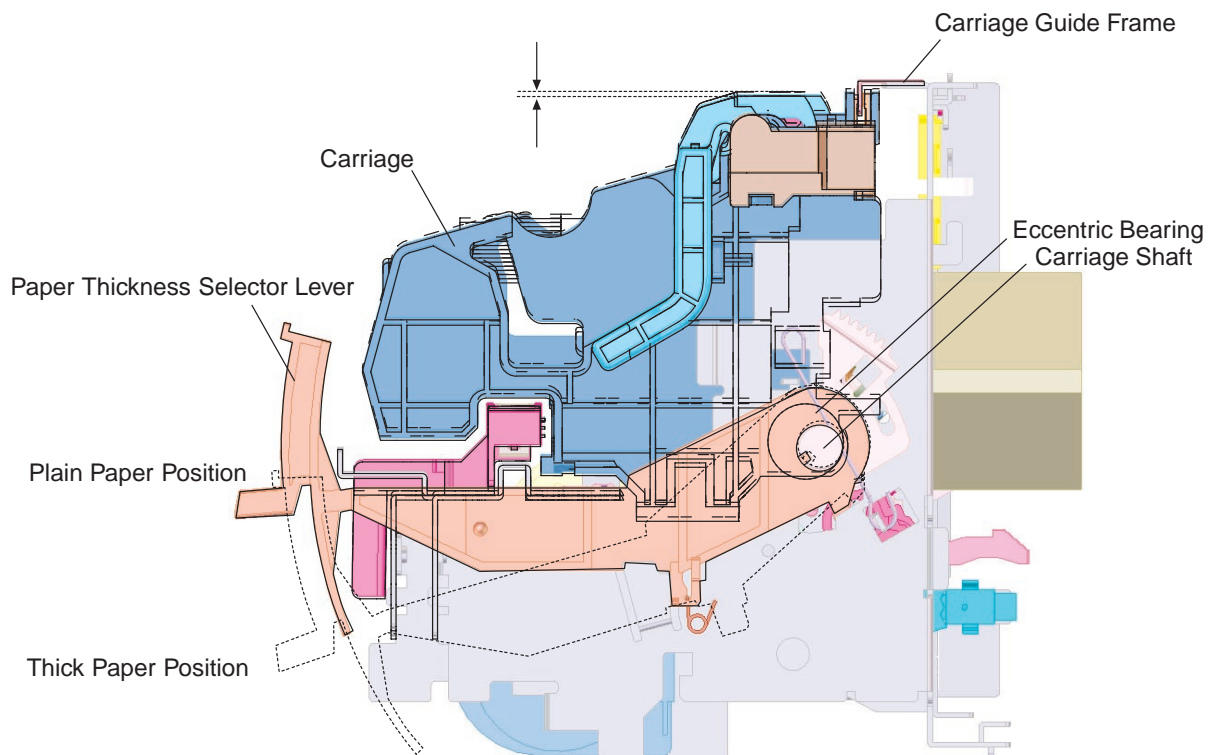
**Figure 4-23 Paper Thickness Adjustment Mechanism**

### 3.4.2 Construction of the paper feed unit

This printer's paper feed unit is mechanically comprised of the pick-up unit, paper feed unit, and the paper eject unit.

**a) Pick-up unit**



Stacked Paper

Manual Paper Feeding

Plain Paper Feeding

Envelope/Postcard Feeding
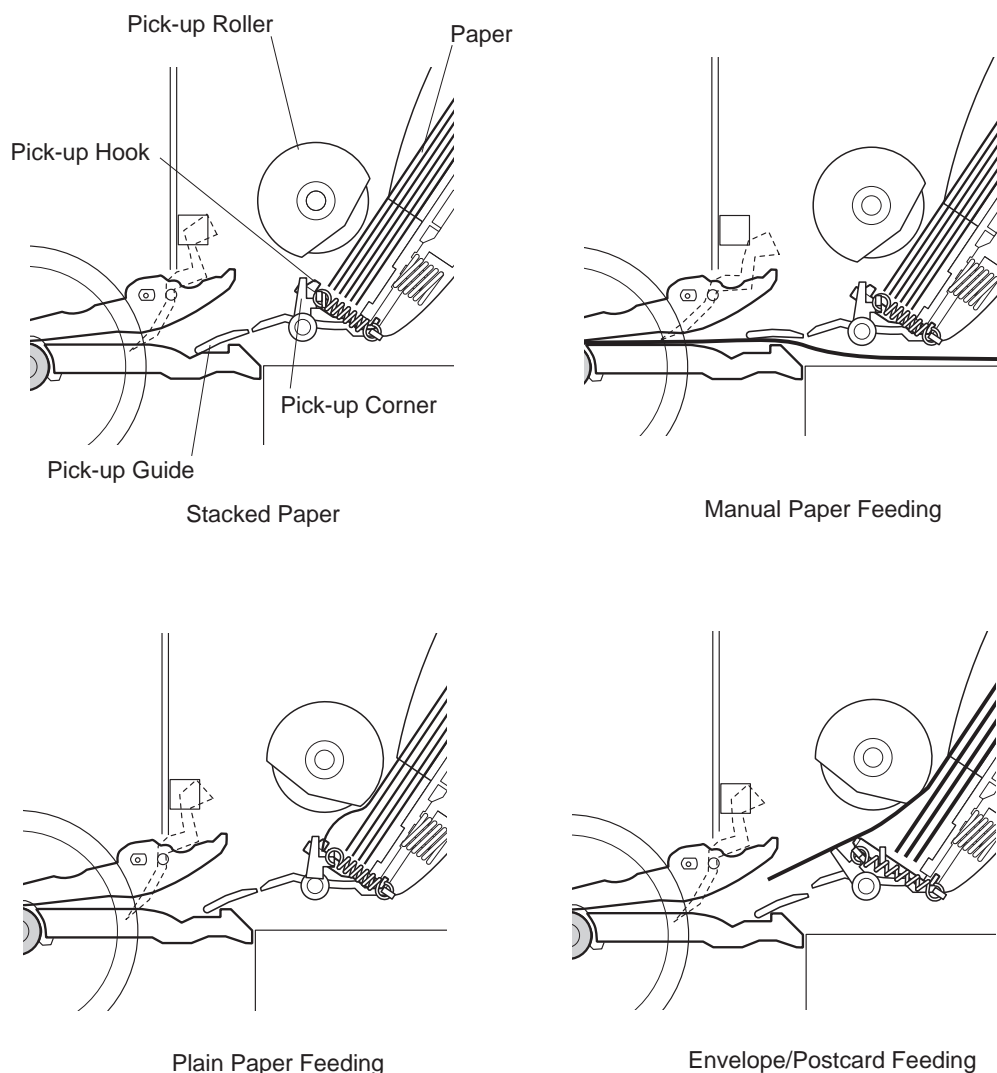
**Figure 4-24 Paper Feed Unit**

The auto-sheet feeder for this printer eliminates the need for a mechanical paper-type selector provided the paper satisfies the specifications. As a result, no mechanical selector lever is in the auto-sheet feeder unit. The stacked papers are locked in two places with hooks at the paper's leading edge to prevent paper from skewing or warpage that could cause misfeeding.

Paper feed operation starts when, driven by the paper feed motor, the pick-up roller starts turning. The two hooks at the paper's leading edge will be unlocked, allowing the paper to be loaded onto the sheet feeder and hooked on the separator by one corner. When the pick-up roller starts turning, the paper, with one corner suppressed by the paper separator, will be separated and fed one sheet at a time to the paper feed roller.

If the paper is a resilient type such as an envelope/thick paper (postcards, etc.,), it pushes the paper separator over as it gets fed because the paper's resilience is greater than the paper separator spring's return force.

To manually feed paper, the user must insert the paper into the manual feed slot until the paper end sensor detects it.  In the manual paper feed mode, the pick-up guide changes its position for the paper to pass through a different path from that in which the auto-sheet feeder is used.  As a result, manual paper feed mode is possible even when the auto-sheet feeder is loaded with paper.  When the paper pushed in to the paper feed section is detected by the paper end sensor, it will be fed to the print start position.

### b) Paper feed unit

The printing unit clamps the paper on the platen between the pressure roller/paper feed roller and the spurs/eject roller to provide a constant clearance between the head and the paper.  Control of paper feeding during printing is performed by controlling the turning of the high precision ceramic-coated metal paper feed roller. Paper is fed in steps of 1/720 inch.

### c) Paper eject unit

The printed paper is ejected by the eject roller with its face clamped on the roller by sharp toothed spurs.  The paper eject unit consists of the eject roller and the spurs. A cut sheet fed to the print start position will be printed at the platen.  The cut sheet is fed by the turning of the paper feed roller and pinch roller, and, after being printed, will be ejected by the eject roller and spurs.

### 3.5 Carriage Unit
#### 3.5.1 Functions of carriage unit

**a) Mounting BJ cartridges**

The carriage secures BJ cartridges mechanically in place and connects them via the carriage ribbon cable to the control board. When the printer is powered off, the carriage will be locked in the capping position.

**b) Driving the carriage**

The carriage, driven by the carriage motor, travels along the horizontal width of the paper using the carriage belt.

**c) Maintaining BJ cartridges**

By controlling the position of the carriage, this printer performs wiping and capping operations on the BJ cartridges.

**d) Paper feed motor drive switching**

By controlling the carriage position, the switching arm of the drive switching unit will be actuated so that the paper feed motor driving paper feed during printing will switch over to driving the purge section or auto-sheet feeder.
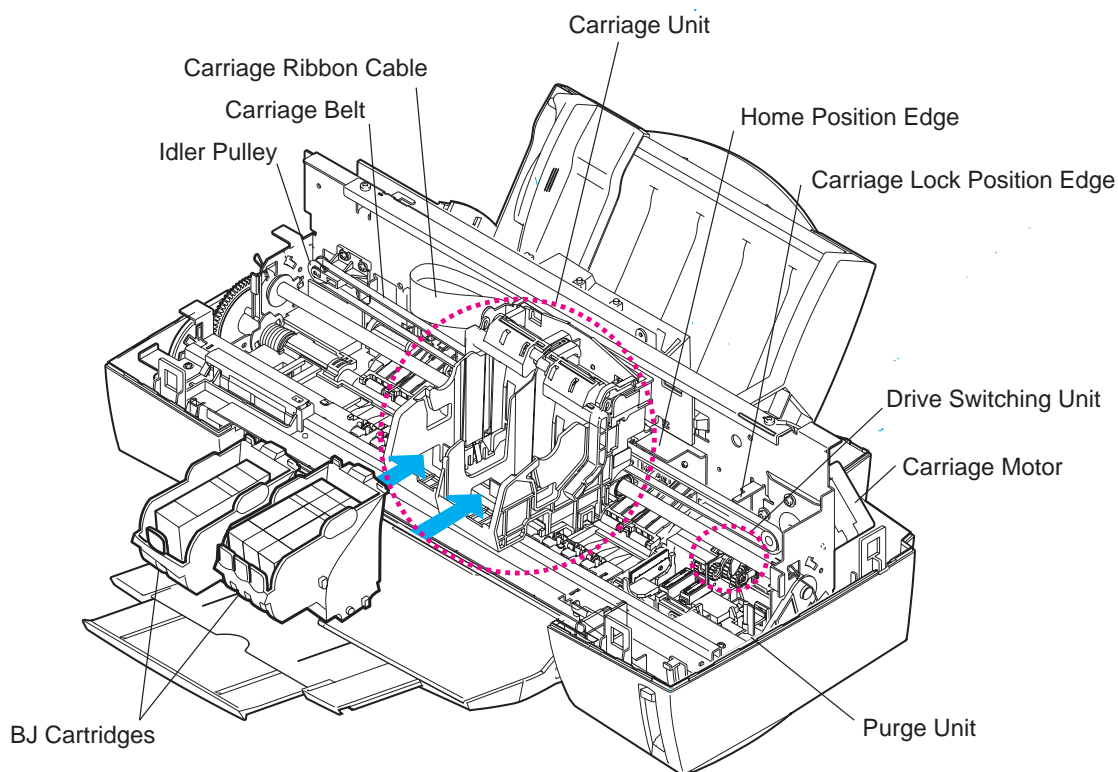


**Figure 4-25 Carriage Unit**

### 3.5.2 Construction of the carriage unit

Carriage Ribbon Cable       BJ Cartridge Mount
                            Home Position Edge
                            Carriage Lock Position Edge

Signal Contacts

Carriage Belt
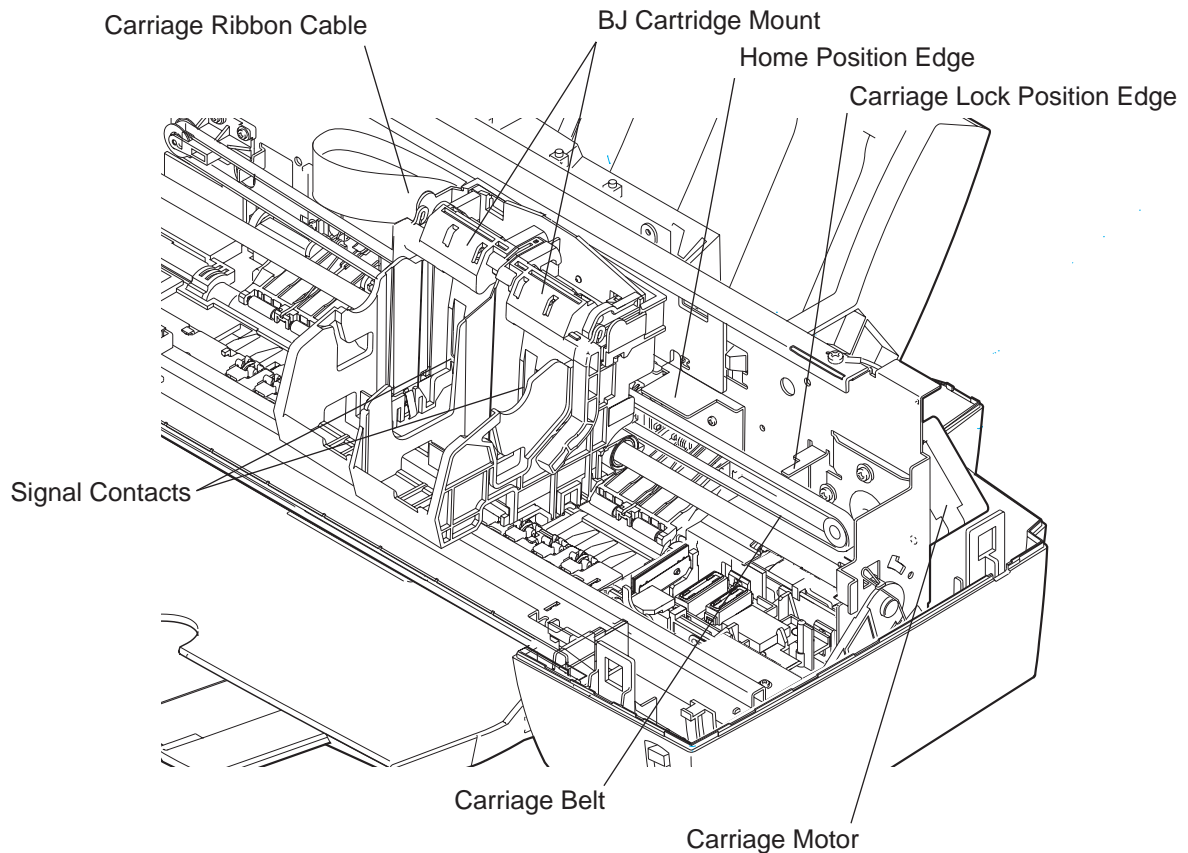
Carriage Motor

**Figure 4-26 Carriage Unit**

#### a) BJ cartridge mount

BJ cartridges are secured to the carriage with the BJ cartridge lock lever.  When a BJ cartridge is secured in place to the carriage, the carriage board signal contact pad contacts the BJ cartridge signal contacts, allowing print signals to be transmitted from the control board.  The home position edge is provided to interrupt the light from the home position sensor on the chassis.

#### b) Carriage drive unit

Mechanical variances between the left and right BJ cartridges in vertical/horizontal and bi-directional printing can be corrected automatically or manually by adjusting printing timing.  The carriage motor is a stepping motor that drives the carriage via the carriage belt to travel along the horizontal width of the paper.  The carriage will be unlocked when the carriage lock position is detected by the home position sensor (photointerruptor type) located on the rear of the carriage.  The carriage is controlled and driven by the stepping pulses fed to the carriage motor once the home position edge is detected as the reference for subsequent position control.  The carriage motor is driven by the steady current generated by the motor driver, reducing drive loss and operating noise.

## c) BJ cartridge maintenance

By controlling the carriage position, wiping and cleaning operations will be performed on the BJ cartridge. During capping, as the carriage travels left to right, the notch on the carriage causes the purge section wiper flag to move, raising the wiper and capping the cartridge. When the carriage travels right to left, the cartridge is wiped clean, after which the hook unit on the carriage unlocks the wiper latch, lowering wiper.

Hook

Notch

Wiper Latch

Wiper Flag
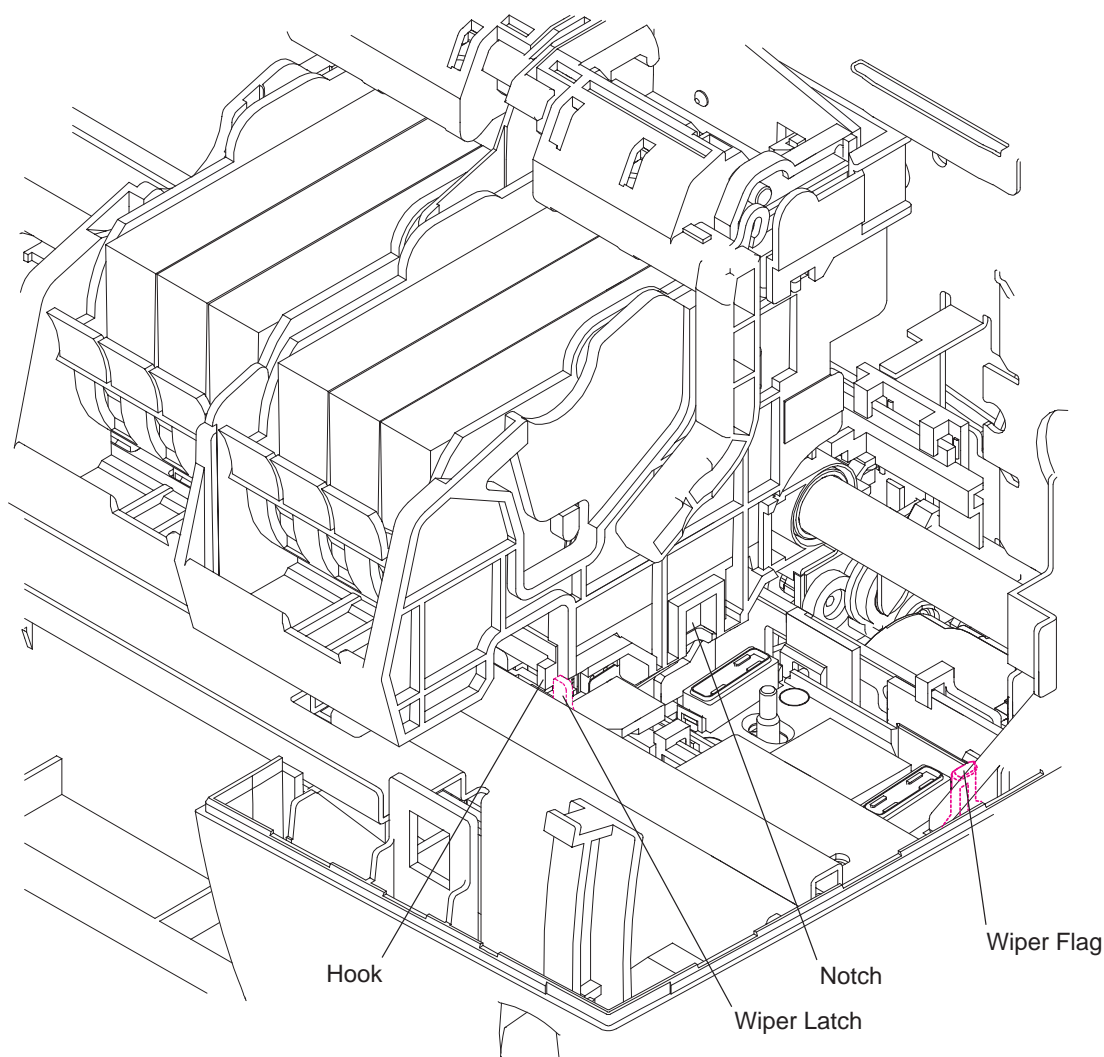
**Figure 4-27 BJ Cartridge Maintenance**

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### d) **Paper feed motor drive switching unit**

Depending on the carriage position, the drive switching unit switches the paper feed motor's drive power over to drive the purge unit or the auto-sheet feeder. The slide arm that travels in sync with the carriage action controls the operation of the selector flag.
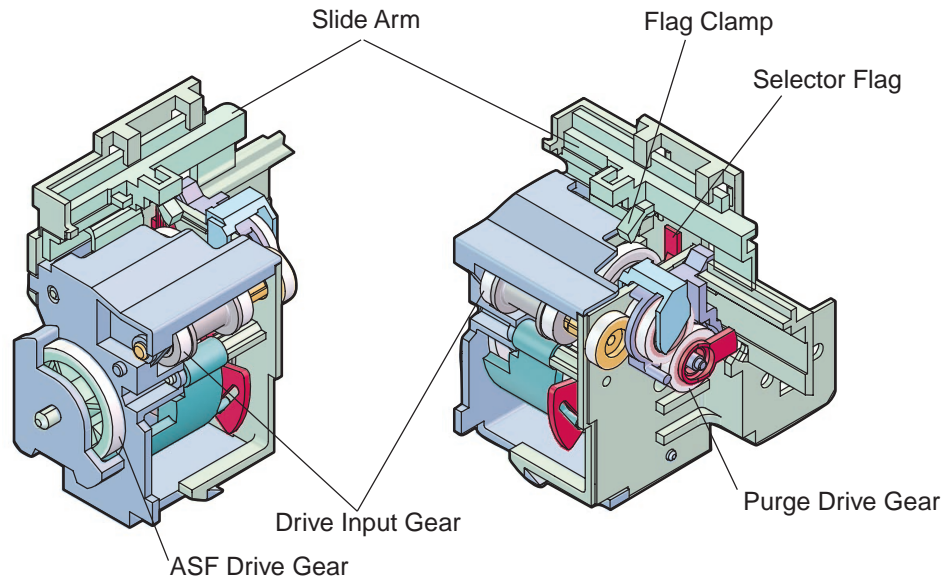


**Figure 4-28 Drive Switching Unit**

When the purge unit is driven, the flag clamp on the slide arm secures the selector flag. Turning the paper feed roller in the direction of paper feed transmits the driving power to the purge unit's drive gear without causing the ASF drive gear to turn. When the auto-sheet feeder is driven, the paper feed unit will be turned in the opposite direction of paper feed once to allow the flag to move toward the slide arm as the selector arm moves to the position where it supports the selector flag. With the selector flag supported, turning the paper feed unit in the direction of paper feed causes the ASF drive gear to start turning, and with it, pick-up operations commence. When the slide arm moves out of the position where it supports the flag, the ASF drive gear automatically stops turning when the pick-up action is complete.
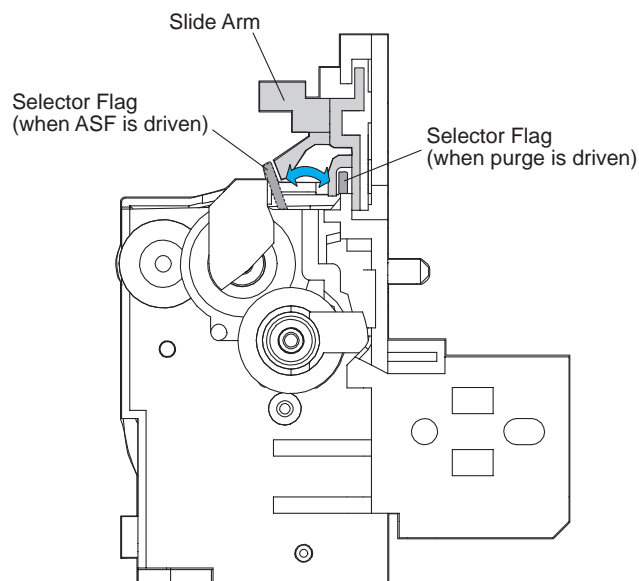


**Figure 4-29 Operation of the Drive Switching Unit**

**4-35**

# 4 PRINTER'S ELECTRICAL SYSTEM

## 4.1 Overview

The electronics of this printer can be functionally divided into the control unit and the power supply unit. The control section converts the input data from the host computer into print signals or printer control signals, and drives the BJ cartridges and motors while monitoring all the sensors. The power supply unit converts the AC power into DC power, and has the control board convert this DC power into each specific voltage supplied to drive motors, ICs, BJ cartridges, etc.
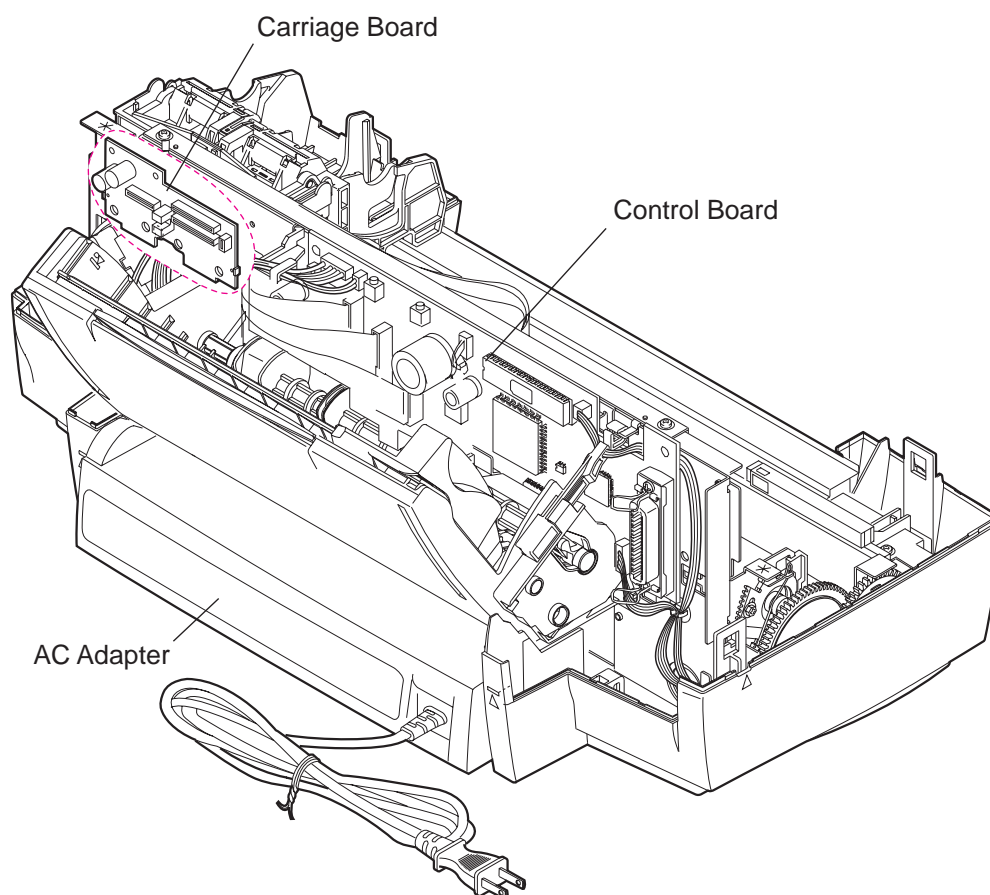


**Figure 4-30  Printer's Electrical System**

## 4.2 Control Unit
### 4.2.1 Control unit block diagram
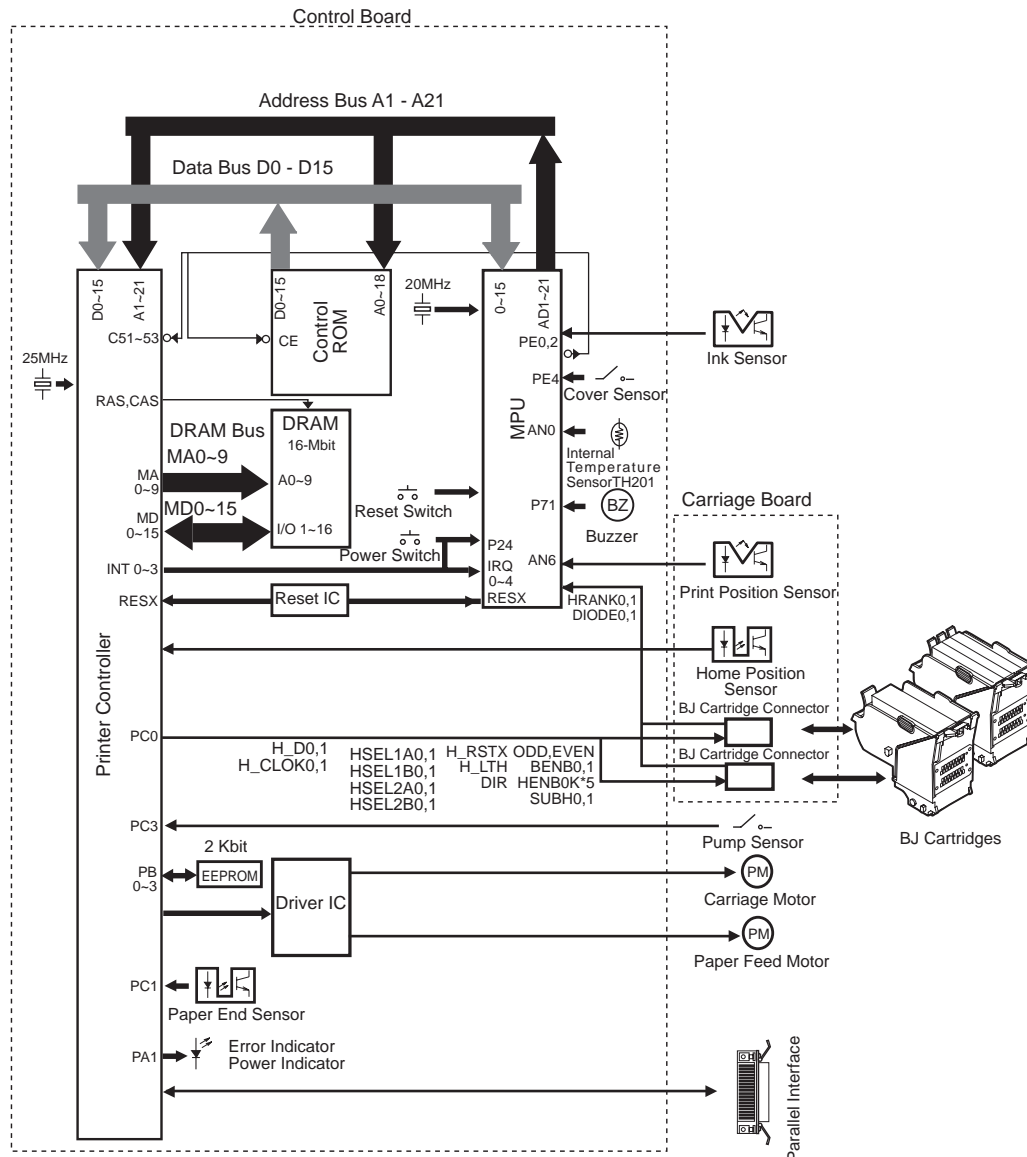


**Figure 4-31 Control Unit Block Diagram**
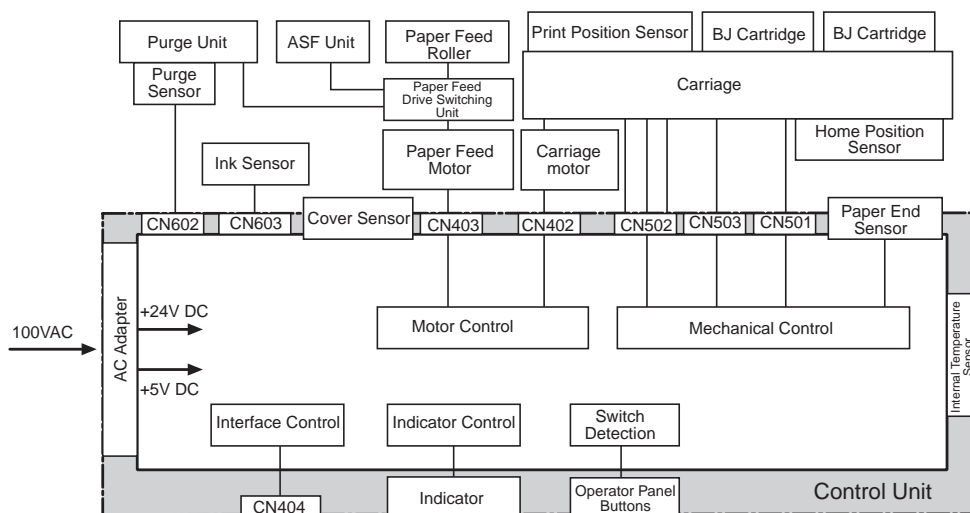


**Figure 4-32 Control Unit Function Diagram**

### 4.2.2 Logic Components
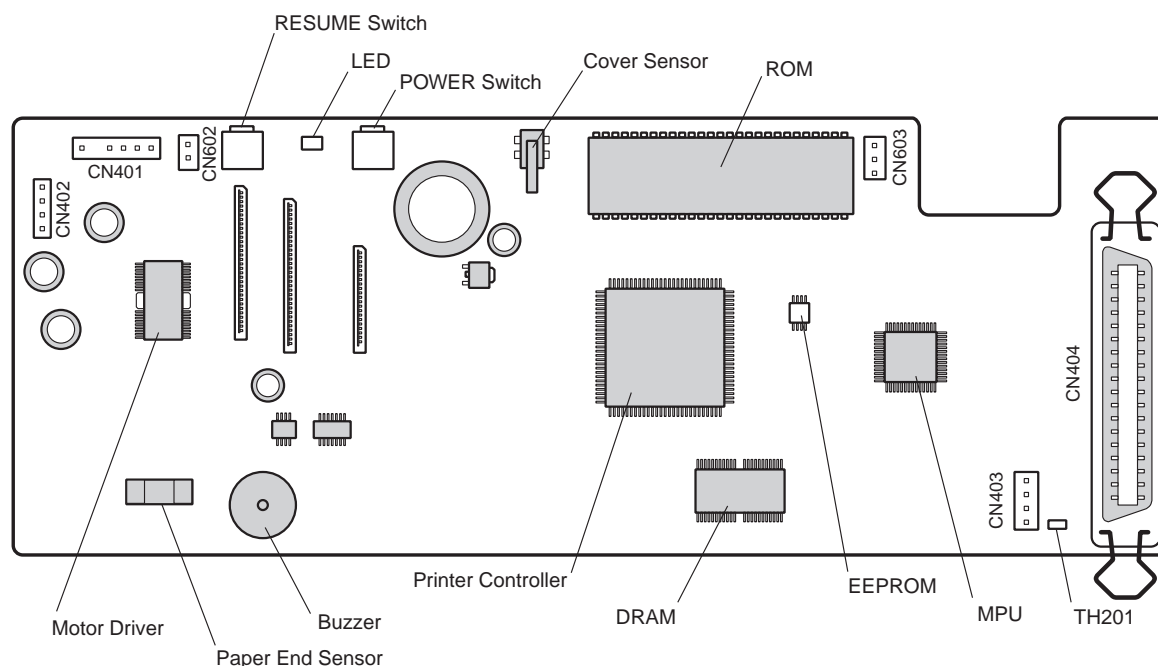


**Figure 4-33  Control Board**

**a) Printer controller**

The printer controller incorporates the interface controller, print head controller, buffer controller, DRAM controller, stepping motor controller and I/O ports and operates in sync with the 25MHz external clock input.

**Interface controller**

Receives 8-bit parallel data sent from the host computer in sync with the data strobe pulse (STROBE) through BUSY/ACKNLG handshake.  Data received from the interface will be stored in the receive buffer in the DRAM and analyzed by the printer controller.

**Print head controller**

Reads the print data from the DRAM's print buffer and converts this parallel data into serial data to send to the print head.  At the same time, it counts the printing dots needed to control the variable pulse width of the Heat ENABLE signal (Pre/Main pulse width).

The printer controller's head drive signals include the Odd/Even ENABLE signal, Block ENABLE signal, Heat Select signal, and Heat ENABLE signal.  The printer controller uses the Odd/Even ENABLE signal, Block ENABLE signal, and Heat Select signal to select the discharge heaters inside the nozzle by time sharing, and varies the pulse width of the Heat ENABLE signal to determine how long the discharge heater to be heated should remain driven.  When the head drive voltage is on, the printer controller also uses the HDATA signal to send the head ID, rank resistor value as 6-bit serial input data from BJ cartridges.

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**Buffer controller**

Writes the received data into the DRAM's receive buffer automatically, controls the remaining receive buffer capacity, reads the print buffer automatically, and clears the data that has been read.  The print buffer manages two separate areas for the 2 heads.

**DRAM controller**

Performs control of the 16Mbit-DRAM's 16-bit data bus and 10-bit address bus, READ/WRITE control,  RAS/CAS control,  and REFRESH control, using the bus dedicated to DRAM which is separate from the MPU bus inside the printer controller.

**Stepping motor controller**

Transfers to the driver IC the steady current drive waveforms needed to drive motors.  As the motor is sinuously driven, the data to be transferred to the IC is 16-bit/step drive waveform serial data that consists of motor drive current, motor torque setting, phase information, etc.

**Interrupt controller**

The printer controller has 4 interrupt pins on it.  The interrupt controller generates parallel I/F, motor drive, and head drive interrupt requests to MPU(IC201).  Also, it accepts an interrupt signal from the reset IC.

**I/O port**

Sends indicator lighting and the power supply voltage output control signals as output signals, receives sensor signals from the home position sensor, pump sensor, and paper end sensor as input signals, controls the EEPROM data I/O, and sends the motor driver reset signal as output.

**b) MPU (IC201)**

Incorporates a 32-bit CPU, 6Kbit work RAM, 21-bit address bus port, 16-bit data bus port, interrupt controller, A/D converter, and I/O port.  The MPU selects the control ROM, printer controller, or DRAM according to the chip select signal.

**Built-in CPU**

32-bit CPU operates in sync with the 20MHz external clock input.

**Address bus/Data bus**

The 21-bit address bus and 16-bit data bus operate in sync with the 20MHz external clock input.

**Interrupt controller**

Allows the MPU to receive the power on/off interrupt signal, as well as interrupt signals from the printer controller.

### A/D converter
Detects the following analog signals:
Internal temperature analog signal from the thermistor on the control board.
Head temperature analog signal from the temperature sensors inside the BJ cartridge.
Ink chamber ink detection analog signal from the ink sensor.
Density detection signal from the print position sensor for printing position compensation.

### I/O Port
Receives the cover sensor signal as input, and sends the lighting signal for the LED inside the print position sensor as output.

### c) DRAM (IC302)
Controlled by the printer controller, the 16Mbit-DRAM is used as a receive buffer, download buffer, print buffer, and working area.

### d) Motor driver IC (IC401)
Drives carriage motor and paper feed motor with steady currents generated according to the drive current signal data (serial data) it receives from the printer controller.

### e) EEPROM (IC602)
Controlled by printer controller, the 2Kbit EEPROM stores in memory the quantity of absorbed waste ink, paper feed count, and BJ cartridge mount/demount count.  The contents will be read when the printer is powered on, and written when powered off.

### f) Control ROM (IC202)
8Mbit ROM containing the programs for controlling this printer.

### 4.3 Power Supply Unit
#### 4.3.1 Power Supply Unit Block Diagram
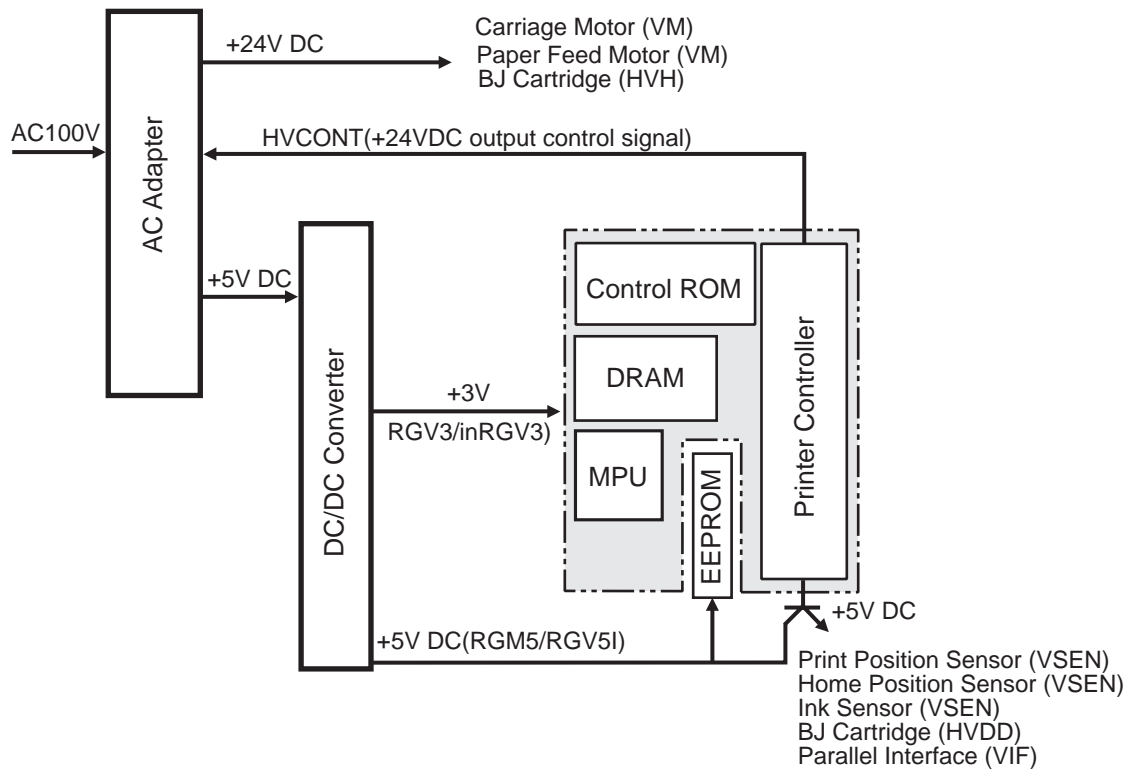


**Figure 4-34  Power Supply Unit Block Diagram**

### 4.3.2  Construction of Power Supply Unit
The power supply unit converts AC power line voltage into DC voltages that drive motors, ICs, BJ cartridges, etc.

**a) AC adapter**

Converts the AC line voltage into 2 groups of DC voltages, +24 VDC, and +5 VDC. The output of +24 VDC is controlled by the output signal (HVCONT)  from the printer controller. The +24 VDC is used to drive the head, and carriage motor/paper feed motor as HVH, and VM, respectively.  Note that there is no output of HVH if the head is at the replacement position or at home position.  The +5 VDC is always output by the adapter.  Except for sensors, driver ICs, and BJ cartridges, all hardware components are active while AC power is supplied.

**b) DC/DC converter**

Located on the control board to convert +5V to RGV5/RGV5I(+5 VDC) and RGV3/inRGV3(+3.3 VDC) and output them.  RGV5/RGV5I is used as the drive power for EEPROM and reset, and power voltages for HVDD, VIF, and VSEN. Note that the output of power voltages of HVDD, VIF, and VSEN are controlled by printer controller.  RGV3/inRGV3 is used as power for the printer controller, MPU, DRAM, and control ROM, and as pull-up for switches.
The +3.3VDC is intended to reduce power consumption when the printer is switched off as compared with +5 VDC.

# 5. DETECTION FUNCTIONS

## 5.1 Detection with Sensors

This printer has the following sensors detect the printer's status.
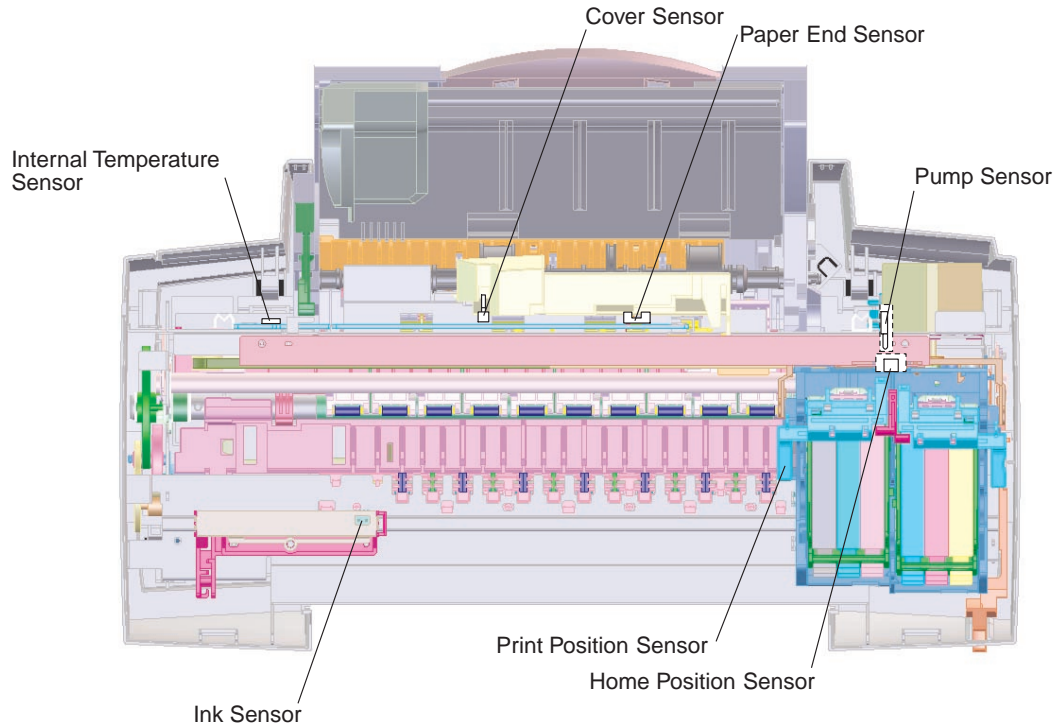


**Figure 4-35 Sensor Positions**

## 5.1.1 Home position sensor

This photointerruptor-type sensor detects the chassis' home position edge and capping position edge to find the carriage's position. When the carriage finds the capping position edge, the printer confirms capping and locks the carriage. The carriage uses the position detected by the home position edge as the reference to determine its home position.

## 5.1.2 Paper end sensor

This photointerruptor-type sensor uses its flag to check for the end of the paper passed through the paper feed unit to determine if there is paper. If there is no paper, the paper sensor arm closes the sensor; if there is paper, it opens indicating that there is paper.

## 5.1.3 Print position sensor

Consists of a red LED and photosensor, and sees the reflection density of the printing patterns, each printed slightly displaced from one another vertically and horizontally for each printing mode. The voltage varying with the reflection density is fed into the MPU as an analog input which is converted into a digital value by the built-in A/D converter. Based on the calculated compensation value, the printer performs optimum printing position correction for both heads and for bi-directional printing. Be careful not to open the front cover during measurement, as external light may make accurate measurement impossible. For more on automatic printing position compensation, refer to *Part 4: 2.3 Automatic Printing Position Alignment Function* (page 4-15).

### 5.1.4  Ink sensor

Consists of an LED and photosensor to optically check for ink in the ink chamber part of the ink tank.  At the ink chamber bottom is a protrusion that acts as a prism.  If ink is present in the chamber, the refraction rates of ink and the prism resin are nearly equal, producing less reflection.  If there little ink left, the difference in refraction rate between the ink and the resin increases so that more incident light to the sensor will be reflected, thus increasing the intensity of reflected light.  The printer decides whether there is any ink in the ink chamber or not based on the difference in the amount of reflection.  The MPU, then, detects the voltage varying with reflection, and the the A/D converter converts this analog voltage to a digital value.  When the printer decides that there is no ink left in the ink chamber, it generates a message on the status monitor telling that ink is running low in the relevant ink chamber.  After the printer has decided that no ink is left, it starts counting the number of dots equivalent to the amount of ink absorbed in the sponge (20% of the ink) to detect "ink-out."

This detection takes place when the power is on, the front cover is closed, after pumping operations are completed, or after a specified number of dots have been printed.  Do not open the front cover while measurement is going on, as external light can make accurate measurement impossible. Note that ink tank presence cannot be detected.  If no ink tank is installed, the printer will determine that ink is present.
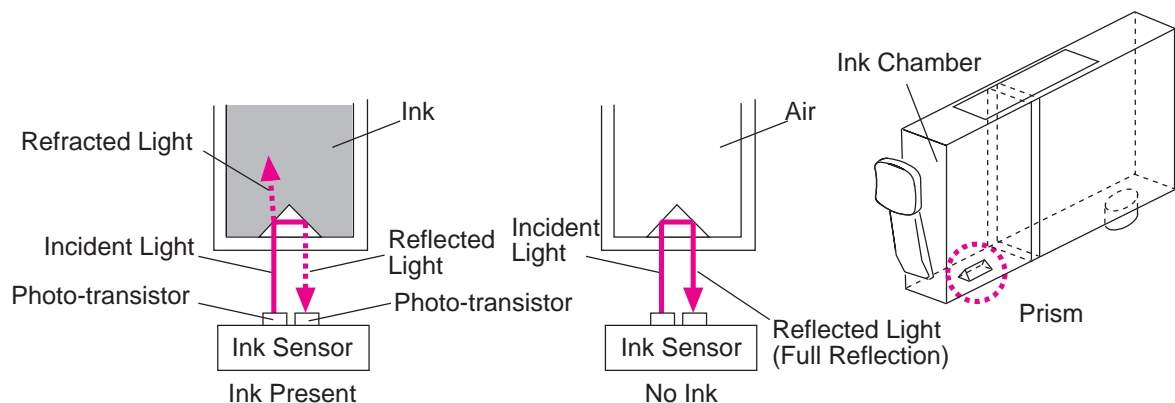


**Figure 4-36 Ink Sensor**

### 5.1.5  Cover sensor

Detects whether the front cover is open or closed.  If the printer detects the cover is open, the carriage is moved to the replacement position.

### 5.1.6  Pump sensor

Switch-type sensor that detects the rotational position of the tube type pump.  The printer controls the pumping operation based on the detected rotational position of the pump.

### 5.1.7  Printer temperature sensor (TH201)

Located on the control board, this sensor detects the temperature inside the printer to control the print head drive.  The thermistor resistance varying with the temperature inside the printer is detected by the MPU as a varying voltage, so the incoming analog values are converted into digital values by the built-in A/D converter.

### 5.1.8  Head temperature sensor

Located inside the print head in the BJ cartridge, this sensor detects the head temperature so that the printer can stop printing when this sensor detects an abnormal temperature rise in the head as a head temperature abnormal error.  The diode sensor output varying with the head temperature is detected as a varying voltage, so the incoming analog values are converted into digital values by the built-in A/D converter.

## 5.2  Other Detection Functions

This printer features other detection capabilities as follows:

### 5.2.1  Waste ink amount detection

Discharged ink from maintenance jetting to keep the print head in good working condition, and sucked ink as a result of cleaning is absorbed into the waste ink absorber.  If more ink has been discharged than can be absorbed into the absorber, the ink may leak inside the printer.  This waste ink amount detection function is provided to prevent ink leakage by estimating the waste ink absorber's capacity to absorb so that it can detect the ink-full condition.  The printer calculates the amount of waste ink discharged by maintenance jetting and cleaning, based on the ink dot counter reading for the discharged ink, so that when the estimated waste ink volume reaches 95% of the waste ink absorber's capacity, allowing for evaporated ink, a waste ink warning will be issued on power-up.  If this condition continues until the estimated waste ink amount reaches 100%, a "Waste Ink Full" error will be issued.

### 5.2.2  BJ cartridge detection

The detection signals from the index unit, built into the print head heater board, detect the installed BY cartridges.  For more, refer to *Part 4: 3.2.3 d) Cartridge identification* (Page 4-24).

# Part 5

# MAINTENANCE

# 1. MAINTENANCE

## 1.1 Parts for Periodic Replacement

| Level | Parts for periodic replacement |
|---|---|
| User | None |
| Service personnel | None |

## 1.2 List of Consumables (for details, see *Part 2: 1-5  Consumables* (page 2-5)

| Level | Consumable |
|---|---|
| User | Black BJ cartridge |
| | Color BJ cartridge |
| | Photo BJ cartridge |
| | Black ink tank for the Black BJ cartridge |
| | Cyan, magenta, and yellow ink tanks for the Color BJ cartridge |
| | Photo cyan, photo magenta, and black ink tanks for the Photo BJ cartridge |
| Service personnel | None |

## 1.3 List of Periodic Maintenance

| Level | Location |
|---|---|
| User | None |
| Service personnel | None |

# 2. SERVICE TOOLS

## 2.1 List of Tools

| Ordinary Tools | Note |
|---|---|
| Phillips screwdriver | For removing and replacing screws |
| Phillips screwdriver (about 38 mm long) | For removing and replacing screws for the control board |
| Blade screwdriver | For removing plastic parts |
| Long-nose pliers | For removing and replacing springs |
| Tweezers | For removing and installing flexible cables |
| Flat brush | For applying grease (one per grease type) |
| Oil applicator | For applying FLOIL 946P |
| Multimeter | For troubleshooting |

| Special Tools (part No.) | Note |
|---|---|
| 1.9-mm gap gauge (QY9-0038-000) | One for head gap adjustment (see Page 5-11) |
| 0.5-mm gap gauge (QY9-0001-000) | One for head gap adjustment (see Page 5-11) |
| Tension spring (QY9-0043-000) | For carriage belt tension adjustment (see Page 5-9) |
| Gear key (QY9-0044-000) | For adjusting ASF driving gear position (see Page 5-10) |
| MOLYKOTE PG-641 grease (CK-0562-000) | For application to specified locations (see Page 5-3) |
| FLOIL 946P grease (QY9-0045-000) | For application to specified locations (see Page 5-3) |

# 3. APPLYING GREASE

Apply greases at the points shown below.
Apply a thin film of grease using the flat brush.  For the Carriage Oil Pad, do not use a brush but apply directly.
For disassembly and reassembly procedures, refer to the parts catalog.

> **CAUTION**   Be careful not to contaminate wipers or caps with grease.

Cam Sliding Surface
Approx. 24 mg (Molykote PG-641)

Grease Pad
Approx. 0.7 cc (Floil 946P)

Cam Sliding Surface
Approx. 24 mg
(Molykote PG-641)

Eject Roller Gear Teeth (apply to all teeth evenly)
Approx. 60 mg (Molykote PG-641)

Carriage Guide Frame Sliding Surface
(apply the proper amount of grease so as not to  drip)
(Floil 946P)

Feed Roller Gear Teeth
(apply to all teeth evenly)
Approx. 96 mg (Molykote PG-641)

Carriage Guide Frame Back Surface (apply
a thin coat of grease over the entire surface)
Approx. 48 mg (Molykote PG-641)

Paper Thickness Lever Sliding
Surface
Approx. 12 mg (Molykote PG-641)

Slow-Down Gear Teeth
(apply to all teeth evenly)
Approx. 72 mg (Molykote PG-641)

Feed Roller Sliding Surface
Approx. 12 mg (Molykote PG-641)

Feed Roller Sliding Surface
Approx. 12 mg (Molykote PG-641)

Paper Thickness Lever Spring Sliding Surface
Approx. 12 mg (Molykote PG-641)

**Figure 5-1 Grease Points**

# 4. DISASSEMBLY AND REASSEMBLY

## 4.1 Disassembly and Reassembly

When disassembling or reassembling the printer, refer to the parts catalog. The numbers in the parts catalog illustrations indicate the disassembly sequence. The parts catalog also contains close-up diagrams for parts requiring special care during disassembly or reassembly.

## 4.2 Notes on Disassembly and Reassembly

Note the following when disassembling or reassembling the printer (also refer to the parts catalog for additional information).

### 4.2.1 Unlocking the carriage

When the printer is shipped from the factory (or when the cartridges are installed and the power has been turned off normally), the carriage is locked in the capping position to secure the cartridges during transportation. When the printer is powered on properly, the carriage locking is disabled automatically. If the printer cannot be powered on normally, it will be necessary to manually unlock the carriage. This can be done by turning the paper eject roller gear half a turn (5 indented notches) in the direction of arrow 2 with a flat-blade screwdriver while gently pressing the carriage in the direction of arrow 1. You can also use the carriage key to turn the paper eject roller gear.



Paper Eject Roller Gear
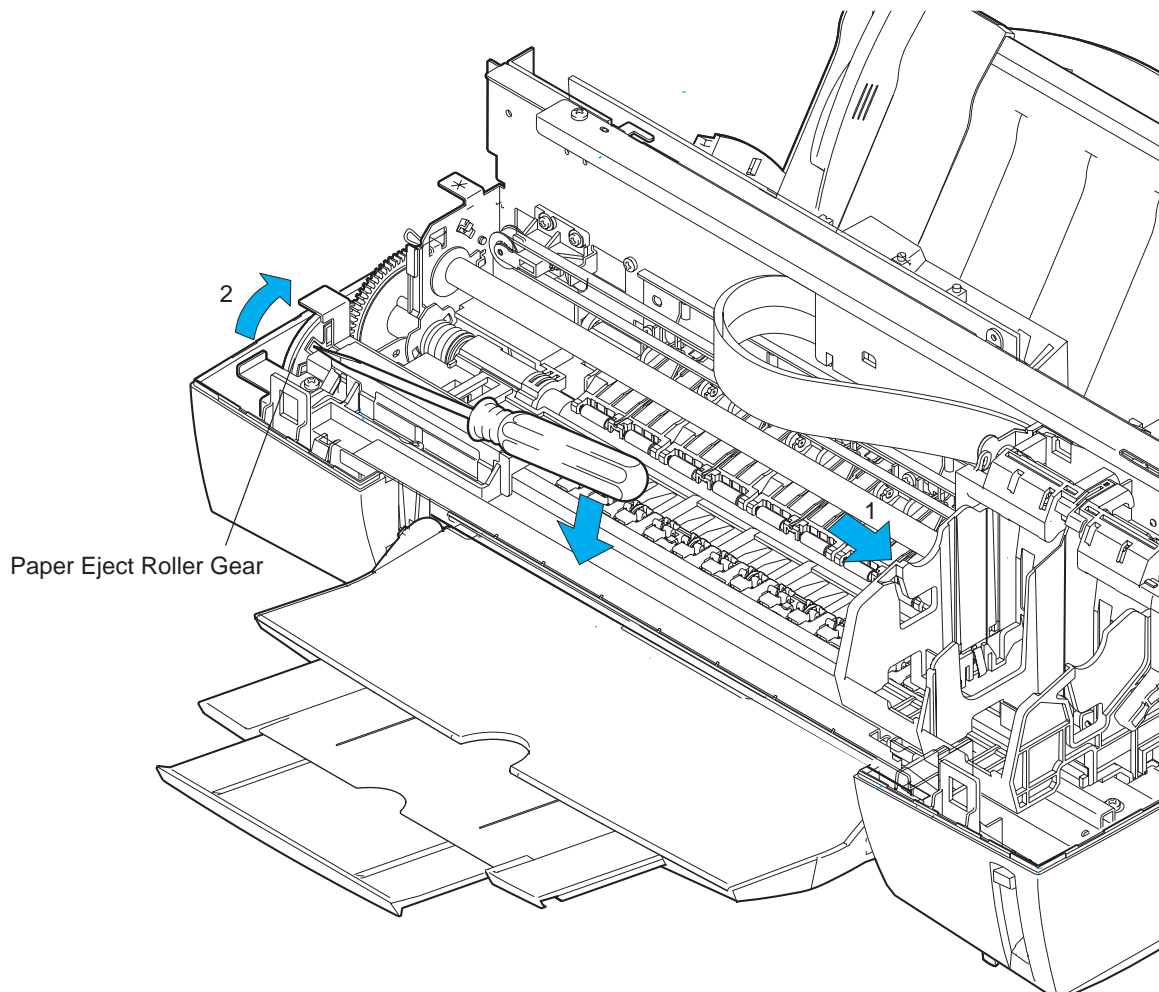
**Figure 5-2 Unlocking the Carriage**

### 4.2.2 Removing the printer unit

Refer to Figure 5 (page B-9) of the parts catalog.

1) Set the paper thickness lever to its lowest position (envelope position).
2) Press the locking tab on the right side of the printer in the direction of arrow 1 and slightly lift the right side of the printer unit in the direction of arrow 2, resting it on the boss.
3) Likewise press the locking tab on the left side of the printer and slightly lift the left side of the printer unit.
4) Holding the printer unit by its front part and the ASF part as illustrated below, first push back the printer unit and then lift it straight up as shown by arrow 3.
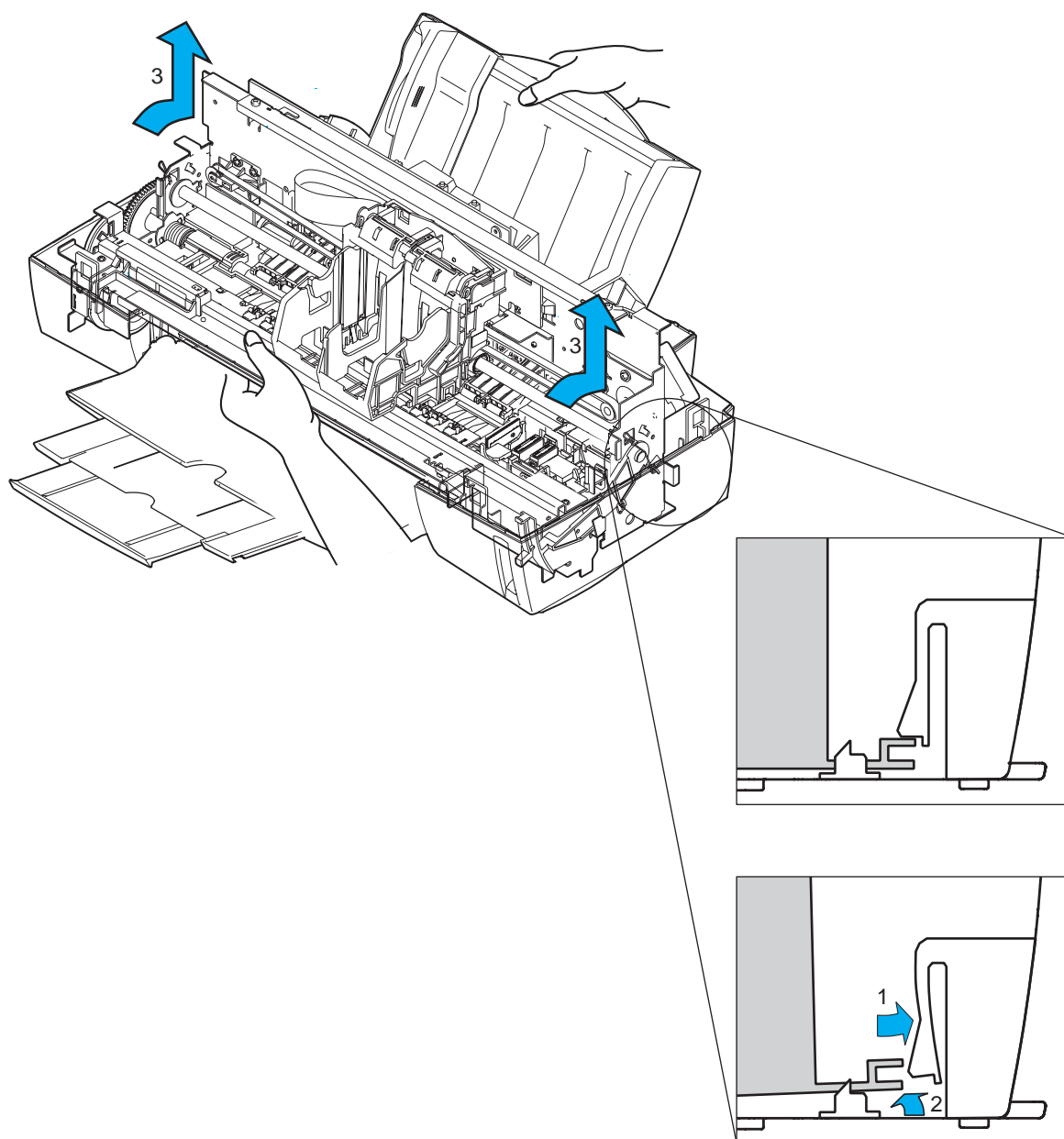
**Figure 5-3 Removing the Printer Unit**

**5-5**

### 4.2.3 Removing the ASF unit

The ASF unit is attached to the printer unit such that the ASF driving gear and the pick-up roller are matched in phase. Once you removed the assembly screws, painted red to protect against careless removal, which fasten the ASF unit to the printer frame, you must readjust the position of the ASF gear with respect to that of the pick-up roller. For the procedure of the ASF gear position adjustment, refer to *Part 5: 5.2.3 ASF gear position adjustment* (page 5-10).
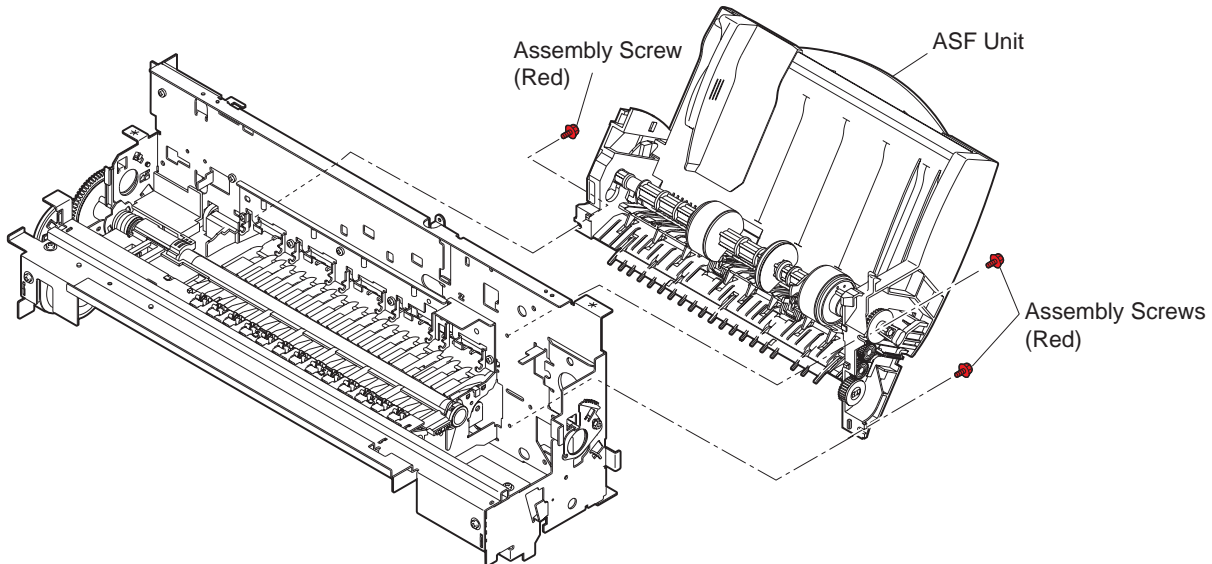


**Figure 5-4 Removing the ASF Unit**

### 4.2.4 Removing the adjustable bearings supporting the carriage shaft

The adjustable bearings supporting the carriage shaft are adjusted and secured to the printer frame so that the ideal head-to-paper gap is maintained for best print quality. Once you have loosened the screws, painted red to protect against careless removal, which fasten the adjustable bearings to the printer frame, you must readjust the position of the bearings for head gap adjustment. For the procedure of the head gap adjustment, refer to *Part 5: 5.2.4 Head gap adjustment* (page 5-11).
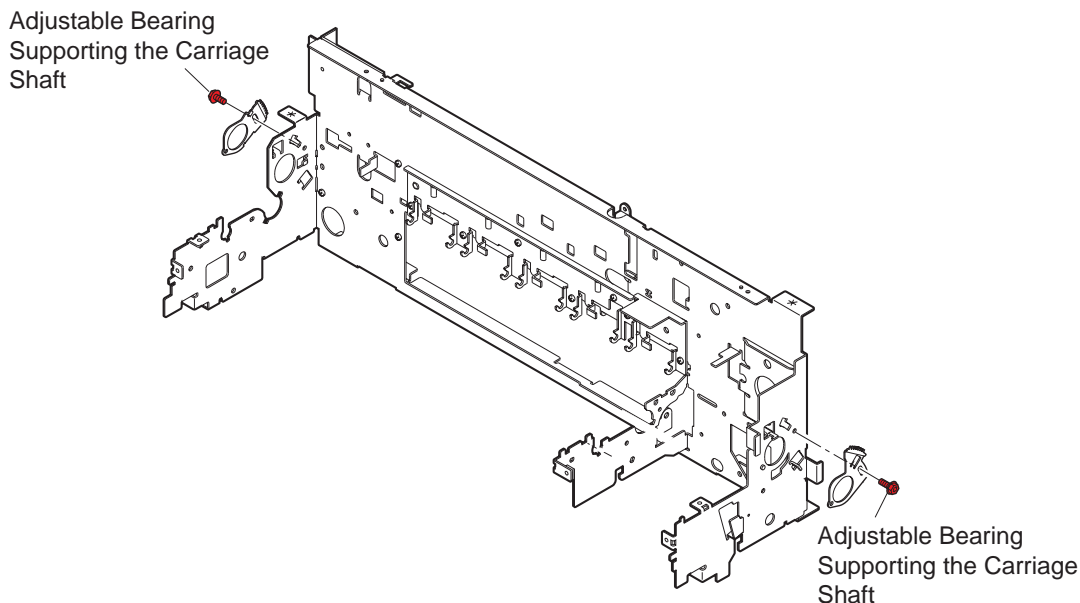


**Figure 5-5 Adjustable Bearings Supporting the Carriage Shaft**

### 4.2.5 Paper feed gears

Be careful not to touch the gears in the paper feed unit, especially the paper feed gear, during disassembly or reassembly, because even slight damage to it could affect paper feeding when printing at high resolution.

Eject Roller Gear

Feed Roller Gear
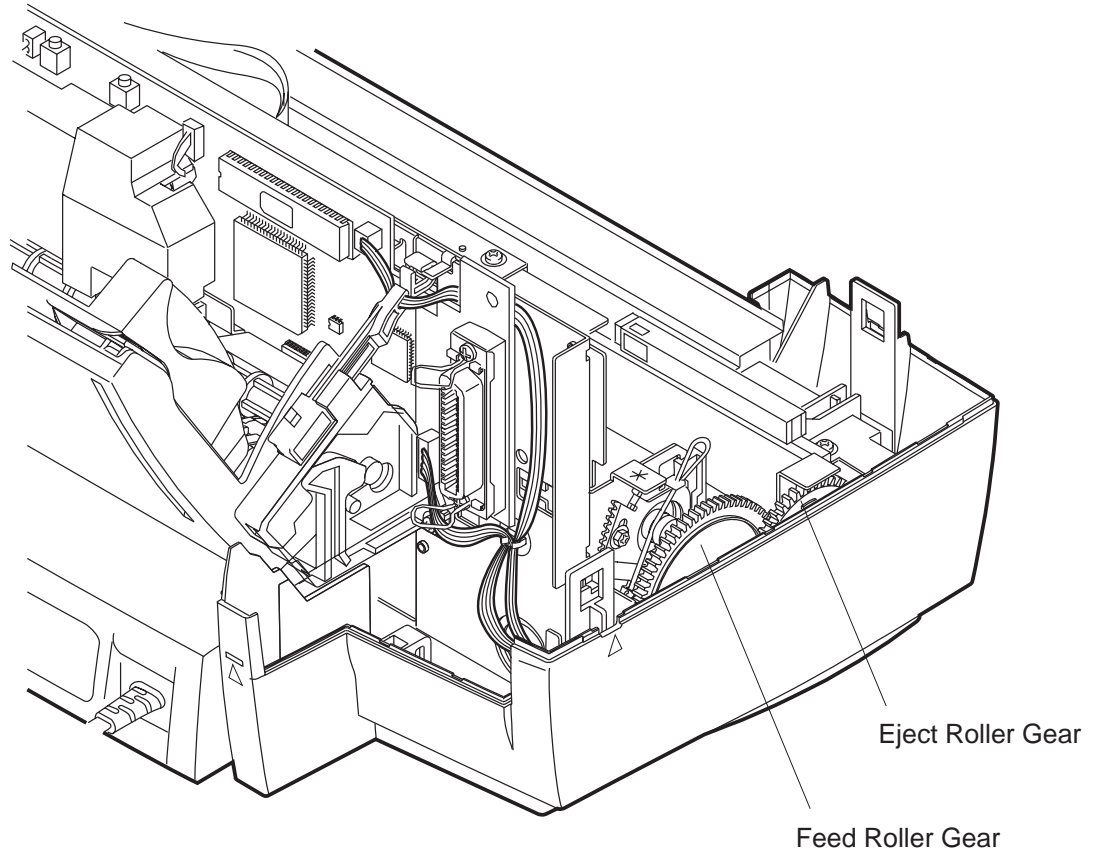
**Figure 5-6 Feed Gear Unit Precautions**

# 5. ADJUSTMENTS AND SETTINGS

## 5.1 Adjustments and Settings

### 5.1.1 EEPROM setting

1) When the control board is replaced (see Figure 4 of the parts catalog).

2) When the waste ink absorber is replaced (see Figure 6 of the parts catalog).

### 5.1.2 Carriage belt tension adjustment

When the carriage belt is loosened (see Figure 8 of the parts catalog).

### 5.1.3 ASF gear position adjustment

When the ASF unit is detached (when screws painted red are loosened)(see Figure 10 of the parts catalog).

### 5.1.4 Head gap adjustment

When the screws securing the adjustable bearings (painted red) that support the carriage shaft are loosened (see Figure 12 of the parts catalog).

## 5.2 Adjustment/ Setting Procedures
### 5.2.1 EEPROM setting

The EEPROM (IC602) on the control board stores total amount of waste ink absorbed, function settings, and other information specific to the printer. If you have replaced the control board, you must initialize the EEPROM of the new control board and change its data as necessary. Since the content of the EEPROM of a replacement control board is not defined, you must always initialize the new EEPROM before use. For the initializing procedure, refer to *Part 3: 3.6.1 Service mode operations (*page 3-18). If you have replaced the control board, you must visually check the waste ink absorber for ink level and replace it if necessary. If the waste ink level is considerably high but the waste ink absorber was not replaced, the waste ink could leak before the printer issues the waste ink full warning.

There is no way to write the total amount of waste ink absorbed, function settings, and other printer-specific information as stored in the old EEPROM into the new EEPROM. The total amount of waste ink absorbed may be reset to 0% but not to any other value.

When you have replaced the waste ink absorber, you must clear the waste ink counter of the EEPROM or initialize the EEPROM. For the procedures, refer to *Part 3: 3.6.1 Service mode* operations (page 3-18).

---

**NOTE**    The waste ink full error should not normally occur before the printer's designed life expires (as counted by printed sheets). The error may occur, however, if the printer has been switched on and off very often, the BJ cartridges have been replaced very often, or the printer has been used in unfavorable conditions.

---

### 5.2.2 Carriage belt tension adjustment

When the carriage belt has been loosened to replace the carriage, or for other reasons, the tension of the carriage belt must be readjusted. Insert the tension spring (QY9-0043-000) in the correct position to adjust the belt tension, and fix the pulley assembly by tightening the fixing screws, and then remove the tension spring.
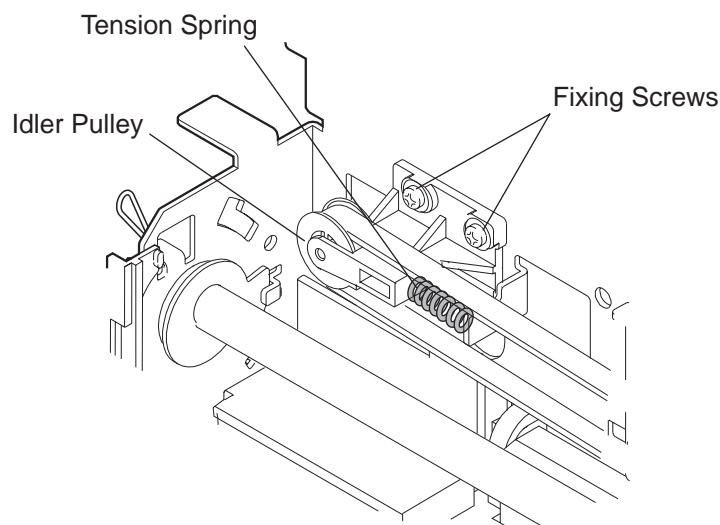


**Figure 5-7 Carriage Belt Tension Adjustment**

### 5.2.3 ASF gear position adjustment

**Preparation:**

   1) Reassemble the ASF unit components to the level as when the ASF unit was detached.

**Adjustment procedure:**

   1) Set the gear key special tool (QY9-0038-000) to the paper eject roller gear.

   2) Turn the gear key half a turn in the direction of arrow 1.

   3) Turn the gear key at least a full turn in the direction of arrow 2. Confirm that the ASF drive gear will no longer move. If not, return to step 2) above.

   4) Turn the pick-up roller shaft until the cam of the ASF unit comes into the position as shown in the figure below.

   5) Without changing the position of the gears, fix the ASF unit to the printer chassis by tightly screwing the assembly screws (The toothed portion of the paper eject roller gear may be held). Note that you can turn the paper eject roller gear by holding and turning the notches.
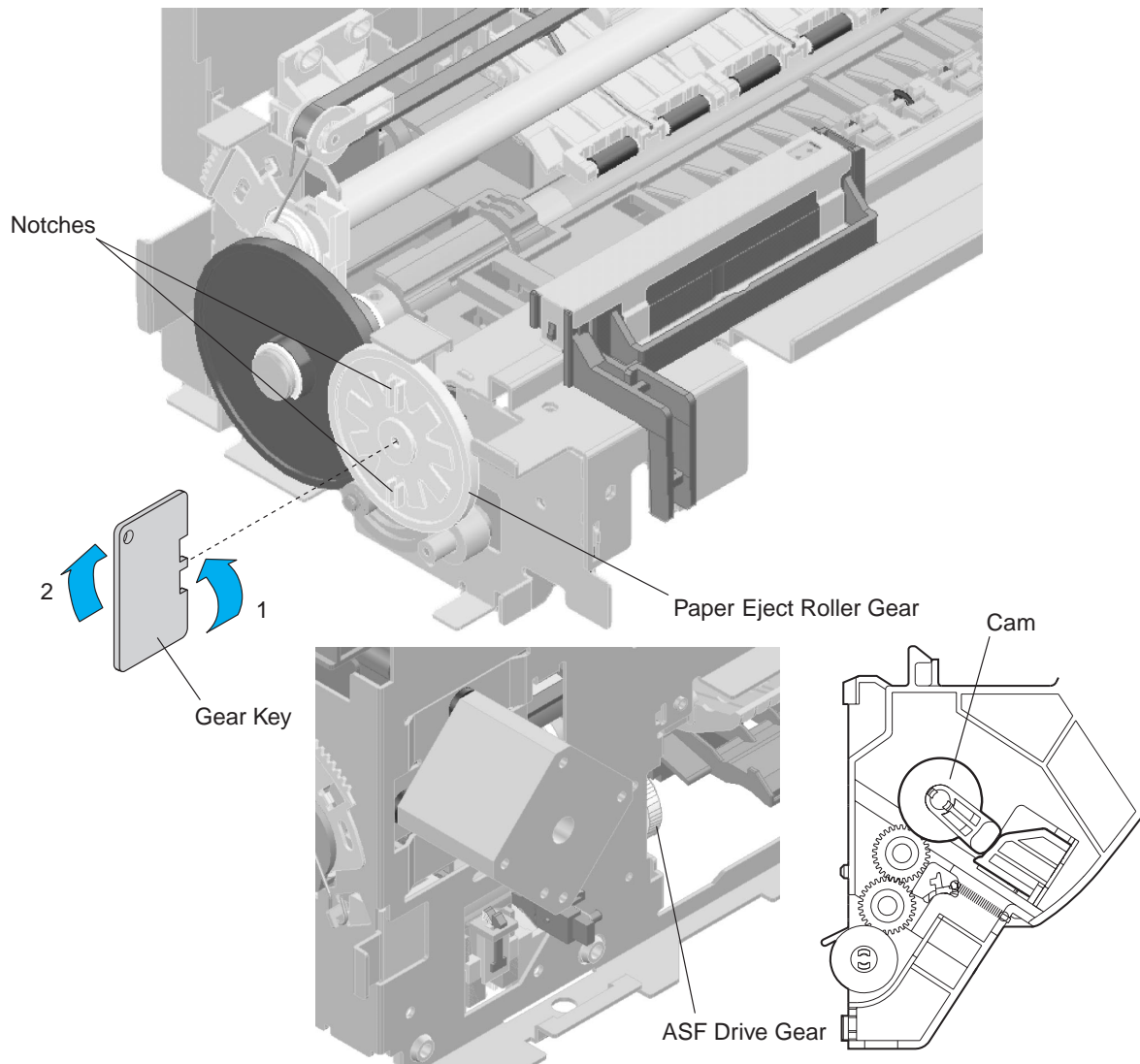
**Figure 5-8 ASF Gear Position Adjustment**

### 5.2.4 Head gap adjustment

**Preparation:**

1) Reassemble to the level the top cover is to be put on next.
2) Raise both the right and left adjustable bearings supporting the carriage shaft in the direction of arrow 1, and temporarily fix the bearings in that position using the fixing screws (red).
3) Remove the right and left shaft clips from the carriage shaft.
4) Set the paper thickness selector to the lowest position (thick paper position).

> **CAUTION** Ensure that the gap gauge is clean and not deformed.  Also ensure that the platen is clean.
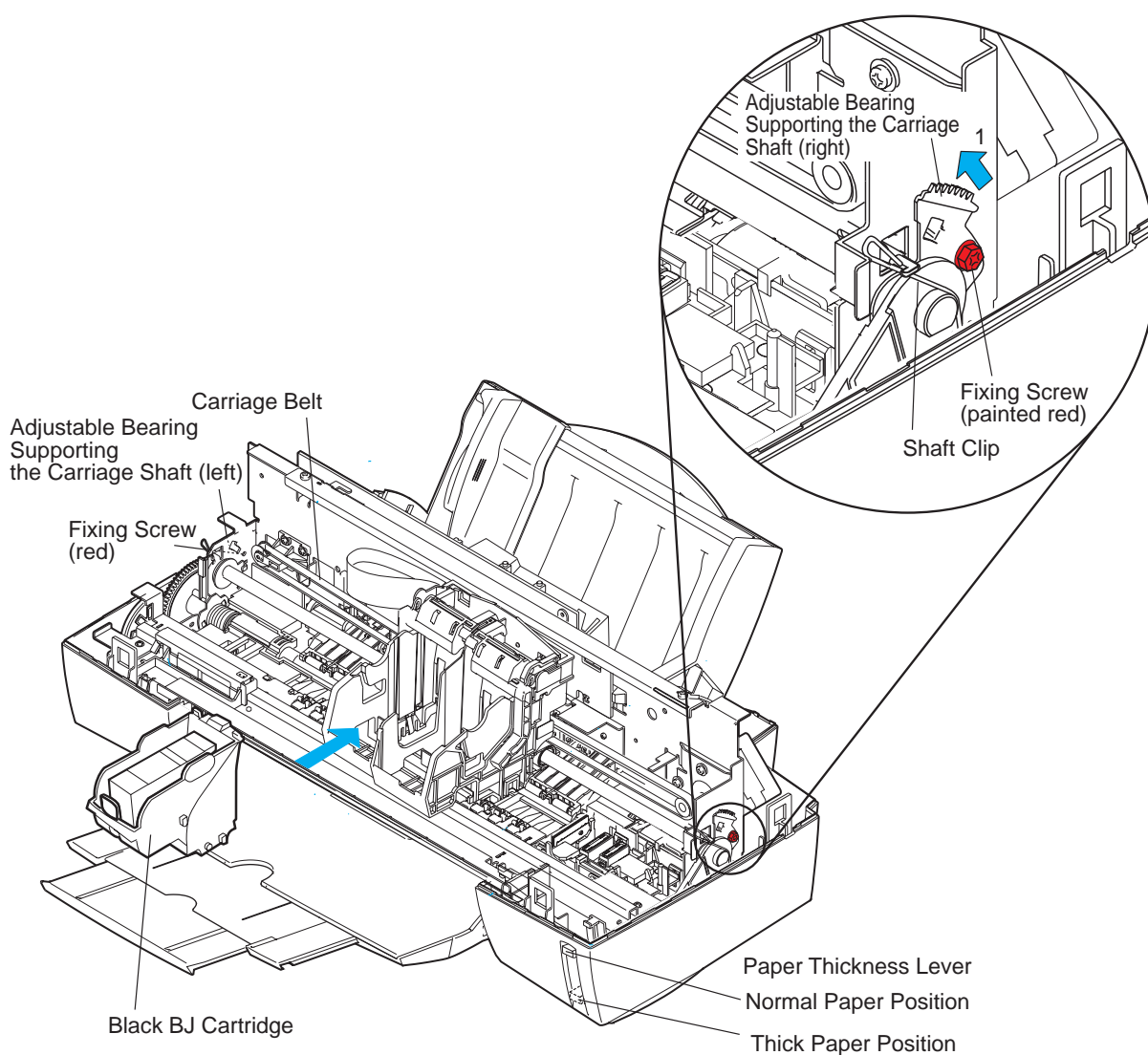


**Figure 5-9 Head Gap Adjustment (1)**

**Adjustment procedure:**

1) Set the 1.9-mm gap gauge (QY9-0038) in position A.
2) Move the carriage into position C by moving the carriage belt by hand.
3) Install the Black BJ cartridge on the left side of the carriage.
4) Slowly loosen, by half a turn, the fixing screw that secures the left adjustable bearing supporting the carriage shaft, and move the paper thickness lever up and down two or three times, and tighten the fixing screw.
5) Remove the Black BJ cartridge.
6) Put the 0.5mm gap gauge (QY9-0001) and the 1.9mm gap gauge (QY9-0038) stacked together in position B.
7) Set the paper thickness lever to the lowest position (thick paper position).
8) Move the carriage into position D by moving the carriage belt by hand.
9) Install the Black BJ cartridge on the left side of the carriage.
10) Slowly loosen, by half a turn, the fixing screw that secures the right adjustable bearing supporting the carriage shaft, and move the paper thickness selector up and down two or three times, and tighten the fixing screw.
11) Remove the Black BJ cartridge.
12) Repeat steps 1) to 11) again.
13) Firmly tighten the right and left fixing screws.
14) Reinstall the right and left shaft clips in place.
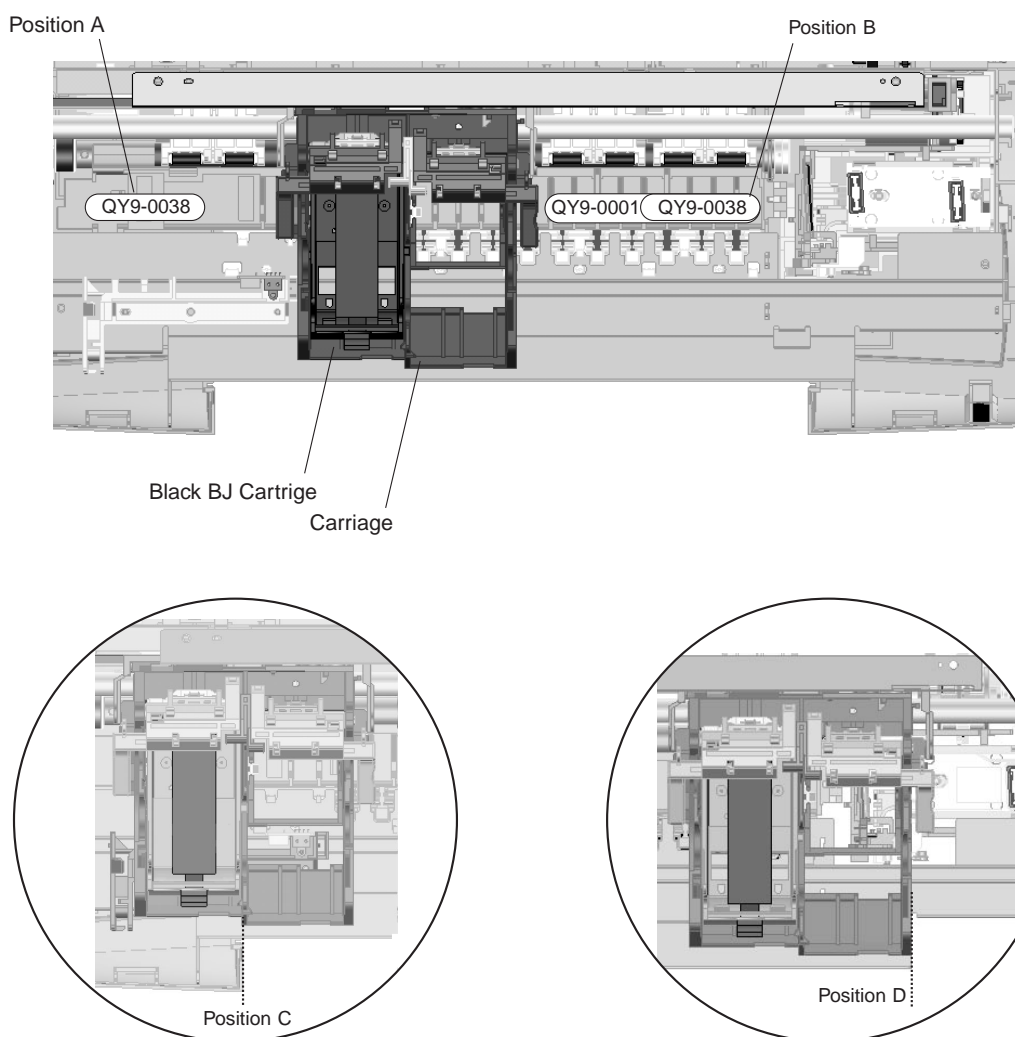


**Figure 5-10 Head Gap Adjustment (2)**

**5-12**

# 6. TROUBLESHOOTING

## 6.1 Troubleshooting Overview

### 6.1.1 Overview

This chapter consists of two sections: diagnosis and action.  If you do not know the possible cause of the problem, consult the diagnosis section first.  If you know the possible cause of the problem, skip to the action section.

### 6.1.2 Notes on troubleshooting

1. Before starting diagnostic procedures, ensure that all connectors and ribbon cables are correctly connected.
2. If you are diagnosing the problem with the printer's covers removed and with power supplied, be careful not to get an electric shock from the power supply or short-circuit the PC boards.
3. The flowcharts use the following symbols:

| Start/End | Operation | Judgement | Action/Replace | Jump | Stop |
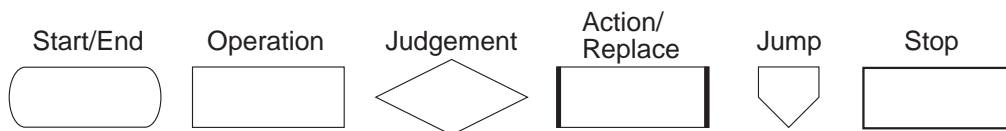
4. If you have replaced or repaired a part, be sure to make a test print to check that the problem is corrected.  If the indicated measures of a specific step still fail to correct the trouble, try again, skipping to the next step.

**Example 1**
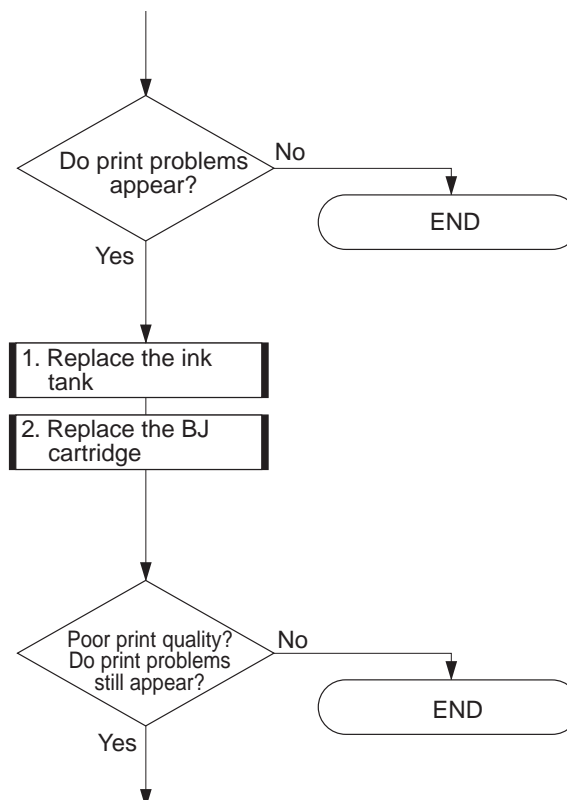
5. A step in the flowcharts may indicate more than one possible measure you can take.  Make a test print for each measure you have taken to check that the problem is corrected.  If the measure still fails to correct the problem, proceed to the next measure.

**Example 2**
Replace the ink tank with a new one as measure 1, and make a test print to see if the problem is corrected.  If not, replace the whole BJ cartridge as measure 2.

Do print problems appear?

No → END

Yes

1. Replace the ink tank

2. Replace the BJ cartridge
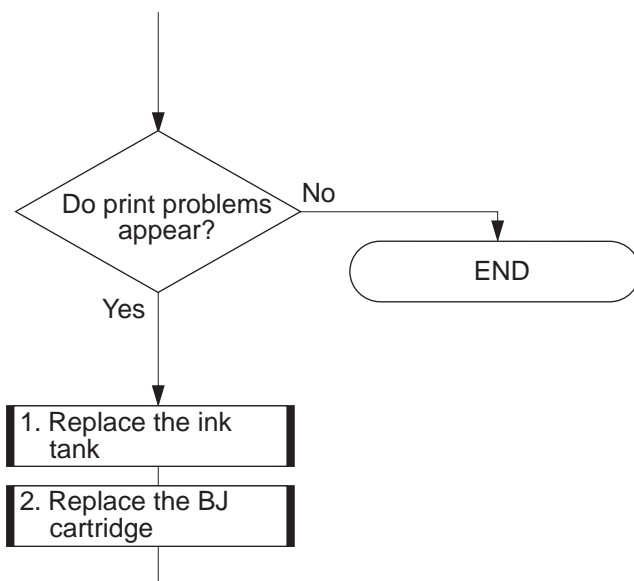
6. After concluding troubleshooting, ensure that all connectors and screws are fixed in place.

**CAUTION**

If you have replaced the EEPROM or the whole control board, you must perform EEPROM initialization and function settings.  For details, refer to *Part 3: 3.6.1 Service mode* operations (page 3-18).

## 6.2 Diagnosis
### 6.2.1  Initial flowchart

```
┌─────────────────────────┐
│   Plug in the AC cord   │        • The printer is supplied with AC power.
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│  MPU/printer controller │
│      initialization     │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│       ROM check         │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│       DRAM check        │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│    Ink sensor/waste ink │
│  full/printer temperature│
│  sensor (TH201) check   │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│      Read EEPROM        │
└─────────────────────────┘
             │
 — · — · — · — · — · — · — · — · — · — · — · —
             │
             ▼
┌─────────────────────────┐
│     Turn power on       │        • The *POWER* button is pressed.
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│        One beep         │
└─────────────────────────┘
             │
             ▼
┌─────────────────────────┐
│     Indicator blinks    │
└─────────────────────────┘
             │
             ▼
          ┌──────────┐
          │ To next  │
          │  page    │
          └──────────┘
```

**5-15**

From previous page

↓

Error check

↓

OK? —— No ——→

EEPROM error — • 10 beeps, indicator blinks in orange 3 times (See page 5-18)

ROM error — • 10 beeps, indicator blinks in orange 1 time (See page 5-18)

RAM error — • 10 beeps, indicator blinks in orange 2 times (See page 5-18)

Waste ink full error — • 10 beeps, indicator blinks in orange 6 times (See page 5-22)

Printer temperature sensor error — • 10 beeps, indicator blinks in orange 5 times (See page 5-22)

Yes ↓

Diode sensor check

↓

OK? —— No ——→

Head temperature error — • 10 beeps, indicator blinks in orange 7 times (See page 5-23)

Haet temperature sensor error — • 10 beeps, indicator blinks in orange 8 times (See page 5-23)

Yes ↓

Carriage unlocked

↓

Home position check

↓

OK? —— No ——→

Home position error — • 10 beeps, indicator blinks in orange 4 times (See page 5-19)

Yes ↓

Check for paper

↓

OK? —— No ——→ • Check for paper

Paper ejected

↓

Check for paper —— OK ——→

Paper jam

• 3 beeps, indicator blinks in orange (See page 5-25)

Yes ↓

To next page

**5-16**

From previous page

↓

BJ cartridge check

↓

OK? — No →

Yes ↓

Cleaning

↓

Check for open cover   • Is the cover open?

↓

Open/closed — Open →

Carriage moves to cartridge replacement position

Closed ↓

• Cartridge installed
• Cartridge not detected
• Cartridge not installed correctly

| | |
|---|---|
| BJ cartridge not installed correctly | • 5 beeps, indicator lights in orange (See page 5-28) |
| BJ cartridge not installed | • 6 beeps, indicator lights in orange (See page 5-28) |
| BJ cartridge displaced | • 7 beeps, indicator lights in orange (See page 5-24) |

↓

I/F busy disabled

↓

END

### 6.2.2 Action
#### a) Error indications

| 1. ROM Error |
|---|

**\<Cause\>** ROM cannot be read during initialization.
**\<Suspected parts\>** Control ROM
**\<Measure\>** Replace the ROM or control board.

| 2. RAM Error |
|---|

**\<Cause\>** RAM cannot be read or written.
**\<Suspected parts\>** DRAM, print controller
**\<Measure\>** Replace the control board.

| 3. EEPROM Error |
|---|

**\<Cause\>** EEPROM cannot be written.
**\<Suspected parts\>** EEPROM, print controller
**\<Measure\>** Replace the control board.

**CAUTION** | Error indications may fail if the ROM or RAM error occurs.

| 4. Home Position Error |
|---|

**&lt;Cause&gt;** The home position sensor fails to detect the home position.

**&lt;Suspected parts&gt;** Home position sensor, carriage motor, paper feed motor, control board, carriage ribbon cable, and carriage board

**&lt;Measure&gt;**
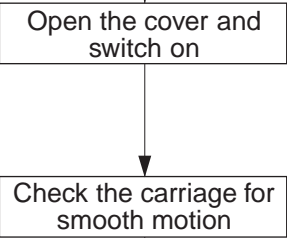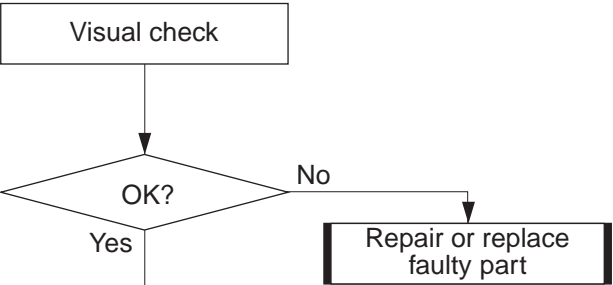
```
┌──────────────────┐
│  Visual check    │
└──────────────────┘
         │
         ▼
      ◇ OK? ◇ ──No──▶ ┌──────────────────┐
         │            │ Repair or replace│
        Yes           │   faulty part    │
         │            └──────────────────┘
         ▼
┌──────────────────┐
│ Open the cover and│
│   switch on       │
└──────────────────┘
         │
         ▼
┌──────────────────┐
│ Check the carriage│   Visually check the carriage's motion.
│ for smooth motion │
└──────────────────┘
         │
         ▼
      ◇ OK? ◇ ──No──▶ ┌──────────────────┐
         │            │ Check the carriage│
        Yes           │      motor        │
         │            └──────────────────┘
```
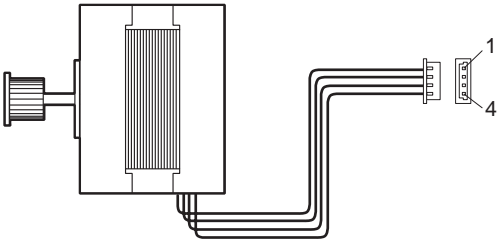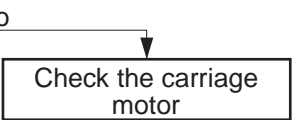
| Measurement points | | Normal value |
|---|---|---|
| CN402 Pin No. | 1-3<br>2-4 | Approx. 3 Ω |

Disconnect the carriage motor cable from the control board before checking.

```
      ◇ OK? ◇ ──No──▶ ┌──────────────────┐
         │            │ Replace the       │
        Yes           │ carriage motor    │
         │            └──────────────────┘
         ▼
    ⬡ To page
      5-21 (1)
```

⬡ To next page

**5-19**

From previous page

↓

Visually check operation of paper feed unit

↓

OK?

— No → Check the paper feed motor

Yes ↓



| Measurement points | | Normal value |
|---|---|---|
| CN403 Pin | 1-3 2-4 | Approx.3Ω |

Disconnect the paper feed motor cable from the control board before checking.

OK? — No → Replace the paper feed motor

Yes ↓

To page 5-21 (1)

Visually check that carriage is unlocked     Visually check that carriage is unlocked.

↓

Unlocked? — No → 1. Replace the ASF drive gear unit

2. Replace the purge unit

Yes ↓

1. Replace the carriage board

2. Replace the carriage ribbon cable

(1)

HVCONT check | HVCONT (+24 VDC output control signal) for output (CN401).



+5VDC
HVCONT
GND
+24VDC
GND

OK? — No → Replace the control board

Yes

+24 VDC output check | • Check for +24 VDC during operation (CN401).
• No +24 VDC is output when the carriage is at the cartridge replacement position or if an error occurs.

OK? — No → Replace the AC adapter

Yes

Replace the control board

| 5. Temperature Sensor Error |
|---|

**<Cause>** The thermistor is defective.
**<Suspected parts>** Thermistor
**<Measure>** Replace the control board.

| 6. Waste Ink Full Error |
|---|

**<Cause>** The calculated amount of waste ink absorbed has exceeded the capacity of the waste ink absorber.
**<Suspected parts>** Waste ink absorber, control board
**<Measure>** 1. Reset the EEPROM/replace the waste ink absorber.
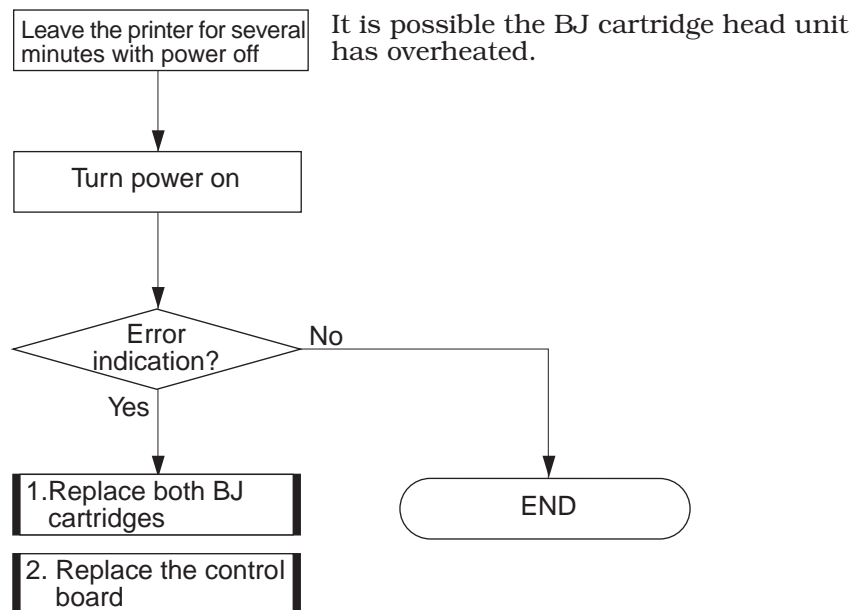2. Replace the control board.

## 7. Head Temperature Error/Head Temperature Sensor Error

**\<Cause\>** The print head is too hot.
**\<Suspected parts\>** BJ cartridge, control board

**\<Measure\>**

```
┌─────────────────────────┐
│ Leave the printer for     │     It is possible the BJ cartridge head unit
│ several minutes with      │     has overheated.
│ power off                 │
└─────────────────────────┘
            │
            ▼
┌─────────────────────────┐
│     Turn power on         │
└─────────────────────────┘
            │
            ▼
        ◇ Error          No
        indication? ──────────────┐
            │                      │
          Yes                      ▼
            │                  ( END )
            ▼
┌─────────────────────────┐
│ 1.Replace both BJ         │
│   cartridges              │
└─────────────────────────┘
┌─────────────────────────┐
│ 2. Replace the control    │
│    board                  │
└─────────────────────────┘
```
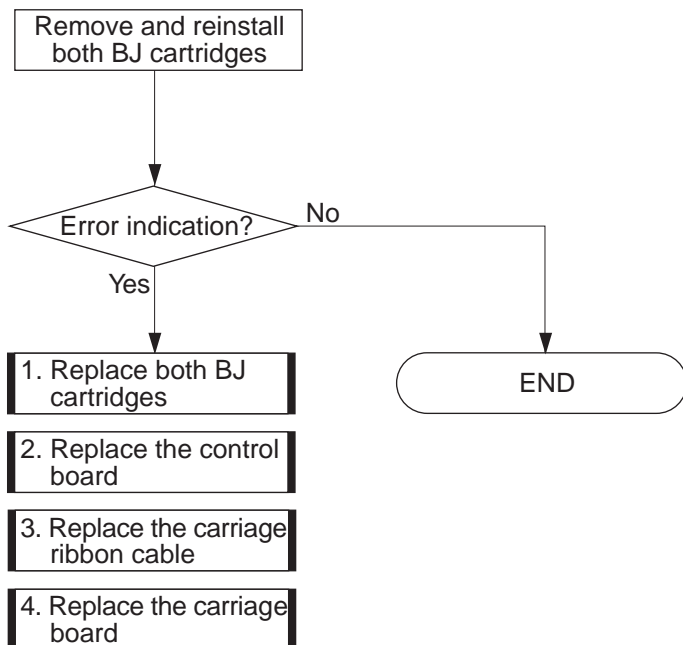
## 8. Cartridge Displaced Error

**<Cause>** The BJ cartridge is out of position at other than the cartridge replacement position.
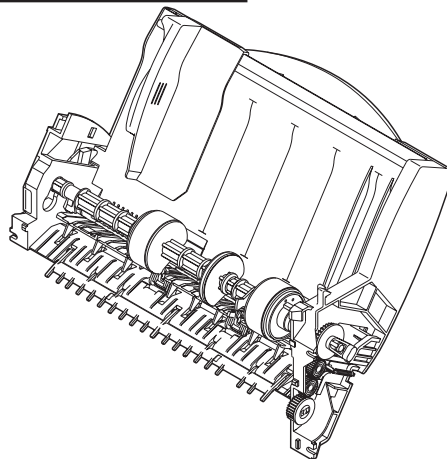**<Suspected parts>** BJ cartridge, control board, carriage board, carriage ribbon cable
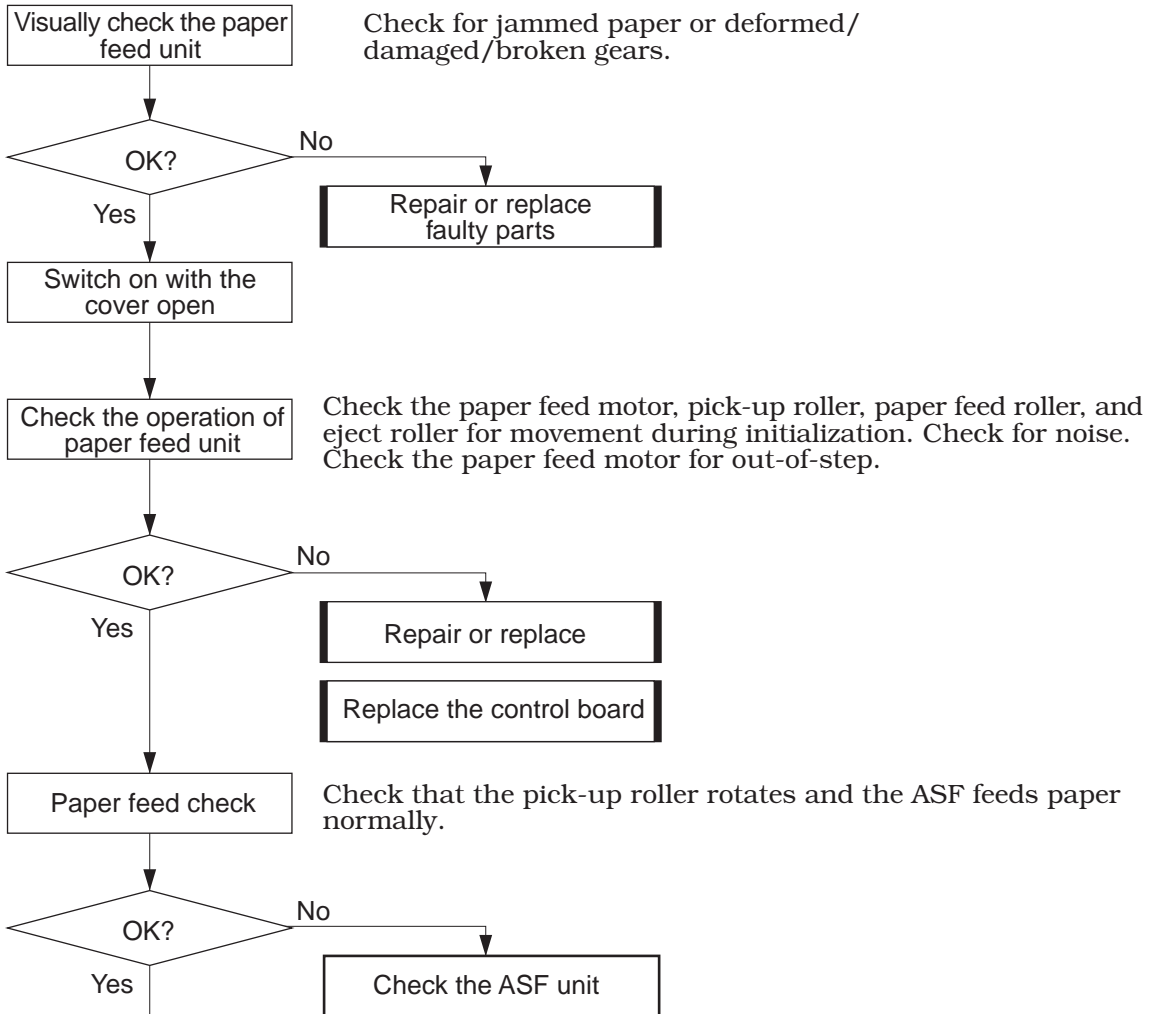
**<Measure>**

Remove and reinstall both BJ cartridges

Error indication?

No → END

Yes ↓

1. Replace both BJ cartridges

2. Replace the control board

3. Replace the carriage ribbon cable

4. Replace the carriage board

| 9. Paper Feed Error |
|---|

<Cause> • Paper feed operation fails to feed paper.
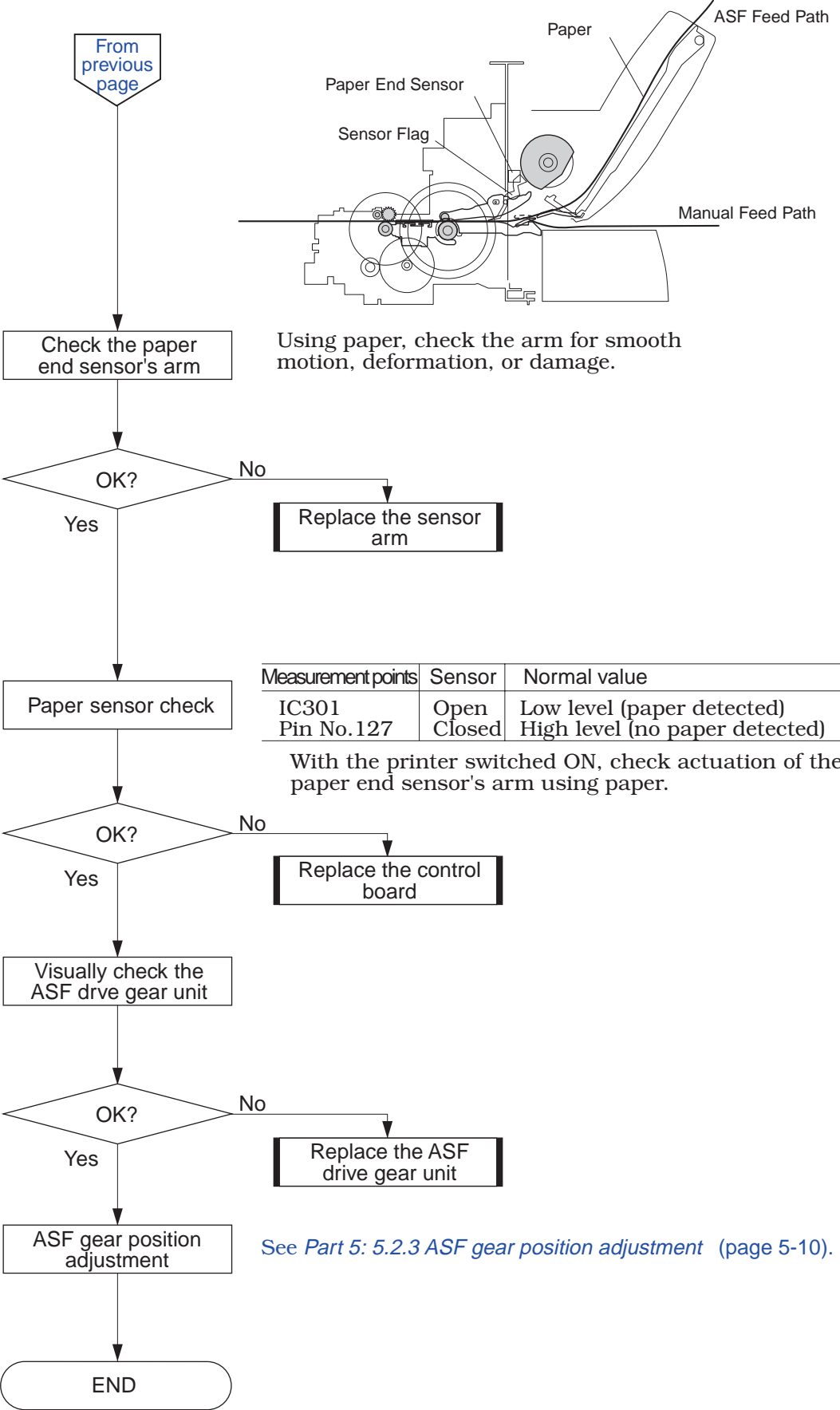          • Paper eject operation fails to eject paper.
<Suspected parts> Paper feed section, paper end sensor, control board

**<Measure>**

| Visually check the paper feed unit |
|---|

Check for jammed paper or deformed/damaged/broken gears.

OK?  — No → 

| Repair or replace faulty parts |
|---|

Yes

| Switch on with the cover open |
|---|

| Check the operation of paper feed unit |
|---|

Check the paper feed motor, pick-up roller, paper feed roller, and eject roller for movement during initialization. Check for noise. Check the paper feed motor for out-of-step.

OK? — No →

| Repair or replace |
|---|

| Replace the control board |
|---|

Yes

| Paper feed check |
|---|

Check that the pick-up roller rotates and the ASF feeds paper normally.

OK? — No →

| Check the ASF unit |
|---|

Yes



| To next page |
|---|

Check the pick-up roller's rubber rings and the separation sheet for cleanliness, wear, or degradation. Check the rod cam for engagement. Check the gears for deformation, damage, and phase.
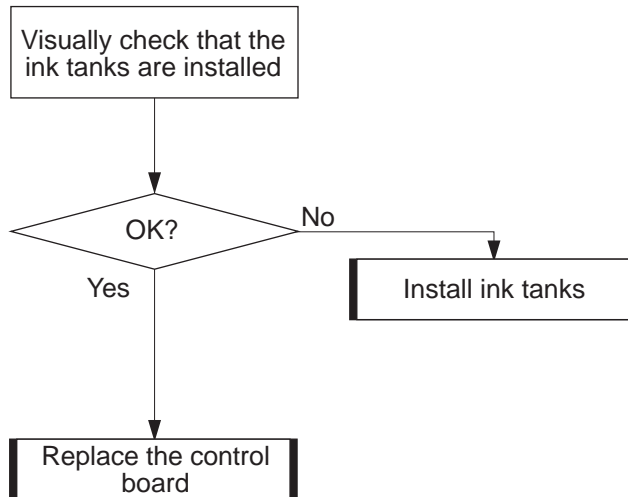
**5-25**

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ASF Feed Path

Paper

Paper End Sensor

Sensor Flag

Manual Feed Path

Check the paper end sensor's arm

Using paper, check the arm for smooth motion, deformation, or damage.

OK?

No → Replace the sensor arm

Yes

Paper sensor check

| Measurement points | Sensor | Normal value |
|---|---|---|
| IC301 Pin No.127 | Open | Low level (paper detected) |
| | Closed | High level (no paper detected) |

With the printer switched ON, check actuation of the paper end sensor's arm using paper.

OK?

No → Replace the control board

Yes

Visually check the ASF drve gear unit

OK?

No → Replace the ASF drive gear unit

Yes

ASF gear position adjustment

END

## 10. Ink Out Error

**<Cause>** • The ink tank is empty.
         • EEPROM is defective.
**<Suspected parts>** Ink tank, EEPROM

**<Measure>**

```
┌─────────────────────┐
│ Visually check that the │
│ ink tanks are installed │
└─────────────────────┘
           │
           ▼
        ◇ OK? ◇ ──No──▶ ┌──────────────────┐
           │             │ Install ink tanks │
          Yes            └──────────────────┘
           │
           ▼
┌─────────────────────┐
│ Replace the control  │
│        board         │
└─────────────────────┘
```

## 11. BJ Cartridge Error/BJ Cartridge Mis-installed Error/No BJ Cartridge Error

**<Cause>** • BJ cartridge not detected.
• BJ cartridge not installed.
• BJ cartridge combination wrong.

**<Suspected parts>** BJ cartridges, carriage board, control board, carriage ribbon cable, contacts between BJ cartridge and carriage

**<Measure>**

Visually check that BJ cartridges are installed

• Check that the Black or Photo BJ cartridge is on the left and the Color BJ cartridge is on the right side of the carriage.
• Check if the cartridge lock lever is locked.
• Check the carriage ribbon cable for folds or other damage.

OK? — No → Repair or replace faulty parts

Yes ↓

Remove and replace the BJ cartridges — Remove both the left and right BJ cartridge.

Error indication? — No → END

Yes ↓

Reinstall the BJ cartridges — Reinstall both the right and left BJ cartridges.

Error indication? — No → END

Yes ↓

1. Replace the control board

2. Replace the carriage ribbon cable

3. Replace the carriage board.

**5-28**

## 12. Automatic Head Position Adjustment Error

**\<Cause\>** The automatic head position adjustment has failed.
**\<Suspected parts\>** BJ cartridge, ink tank, print position sensor, control board

**\<Measure\>**

Is the automatic head position adjustment pattern correctly printed?

OK? — No →

Yes ↓

1. Cleaning

2. Replace the ink tank     • Black/cyan ink tank

3. Replace the BJ cartridge     • Black/Color BJ cartridge

Print position sensor check



| Measurement points | Sensor | Normal value |
|---|---|---|
| Pin No. 1- 2 | … | Approx. 2.0V |
| Pin No. 2- 3 | … | Approx. 2.0V |

OK? — No →

Yes ↓

Replace the print position sensor.

1. Replace the carriage

2. Replace the control board.

**b) Phenomena**

```
┌─────────────────────┐
│  1.  Power Does     │
│      Not Turn On.   │
└─────────────────────┘
```

**<Symptoms>** • Pressing the *POWER* button fails to switch on the printer.
• Pressing the *POWER* button does not start initialization.

**<Cause>** The AC adapter or the control board is defective.

**<Measure>**



**5-30**
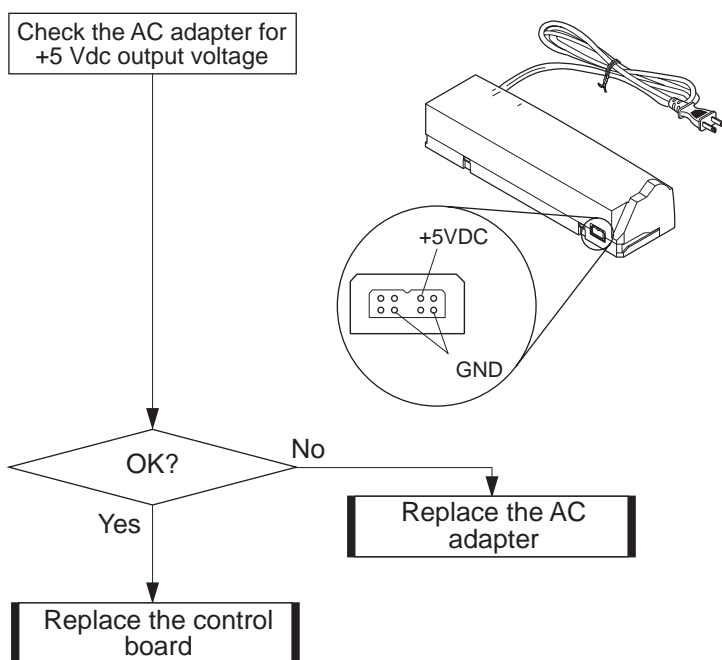
<table>
<tr><td>2.  Faulty Printing: No Printing</td></tr>
</table>

**\<Symptoms\>** • No prints
                  • Partial prints
                  • No prints for some colors
**\<Cause\>**  The ink tank, BJ cartridge, or purge unit is defective.

**\<Measure\>**

| Cleaning operation | Perform the cleaning operation 5 times. |

| Nozzle check pattern |

See *Part 3: 3.5.2 Nozzle check pattern printing* (page 3-16)

**Do print problems appear ?**  — No → END
↓ Yes

1. Replace the relevant ink tank
2. Replace the relevant BJ cartridge

**Do print problems still appear ?**  — No → END
↓ Yes

Replace the purge unit
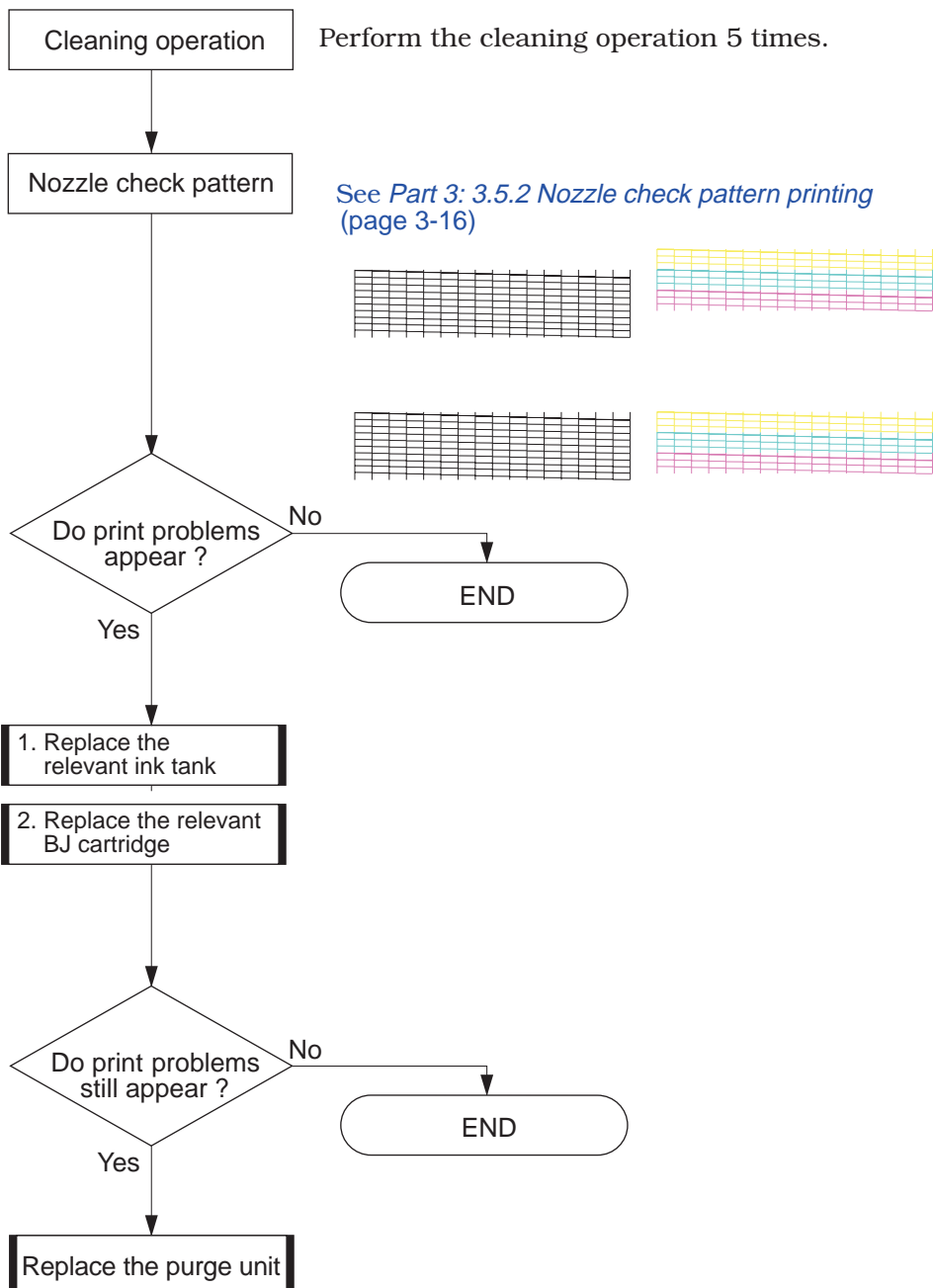
## 3. Faulty Printing: Blank Lines Appear

**\<Symptoms\>**
- Blurred prints
- Blank lines
- Specific dot missing

**\<Cause\>** The BJ cartridge(s), BJ cartridge contact(s), carriage ribbon cable, purge unit, control board or carriage board is defective.

**\<Measure\>**

| Cleaning operation | Perform the cleaning operation 5 times. |

| Nozzle check pattern |

See *Part 3: 3.5.2 Nozzle check pattern printing* (page 3-16)



Do print problems appear? — No → END

Yes ↓

1. Replace the relevant ink tank

2. Replace the relevant BJ cartridge

Do print problems still appear? — No → END

Yes ↓

To next page

From
previous
page

1. Replace the carriage
   ribbon cable

2. Replace the carriage
   board

3. Replace the control
   board

OK? ——No——→ Replace the purge
                        unit

Yes

END

# 4. Faulty Printing: Other

| Symptoms | Check to see if | Measure |
|---|---|---|
| Paper gets dirty | The platen is contaminated with ink mist. | Wipe clean with a damp cloth. |
| | The paper feed unit is contaminated with ink (paper is contaminated before reaching the platen). | Disassemble the paper feed unit and wipe clean with damp a cloth. Perform test paper feeding several times. |
| Spur marks appear | The tips of the spurs are deformed. | Replace the spur unit. |
| Vertical misalignment | The paper thickness selector is wrongly set (positioned). | Correct the setting. |
| | The printed nozzle check pattern has mis-alignment. | Readjust printing position. |

### 5. Ink Out Resulting in no Error

**\<Symptoms\>** Ink out results in no error.
**\<Cause\>** The ink tank is empty, or the control board or ink sensor is defective.

**\<Measure\>**

Visually check the ink tanks → No ink tank? Any loose ink tank? Ink chamber empty?

OK? — No → Replace or re-install the ink tank

Yes ↓

Replace the BJ cartridge → Replace the left and right BJ cartridges with new ones.

OK? — No → END

Yes ↓

Ink sensor check
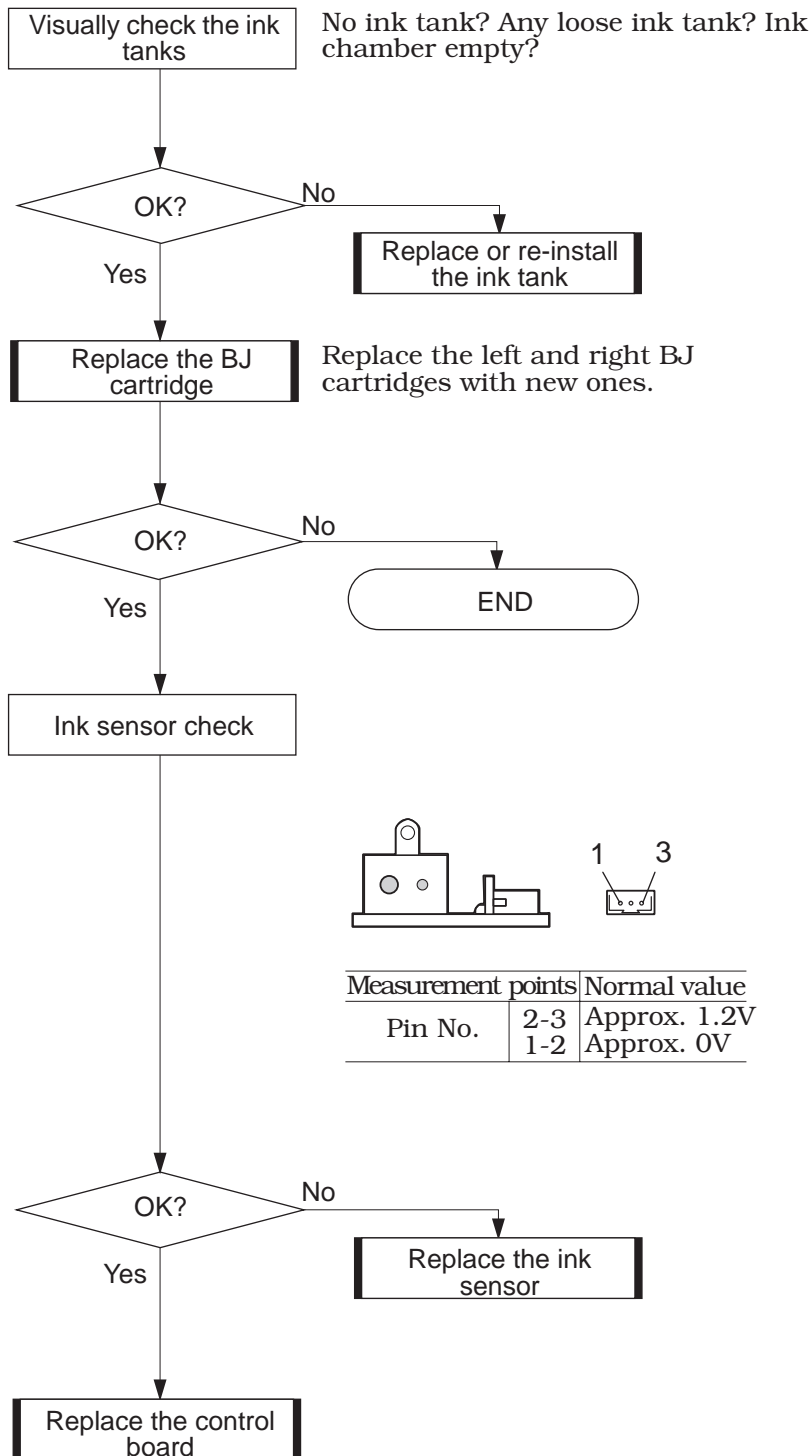
| Measurement points | | Normal value |
|---|---|---|
| Pin No. | 2-3 | Approx. 1.2V |
| | 1-2 | Approx. 0V |

OK? — No → Replace the ink sensor

Yes ↓

Replace the control board

**5-35**

# 7. CONNECTOR POSITIONS AND PIN ASSIGNMENT

## 7.1 Control Board
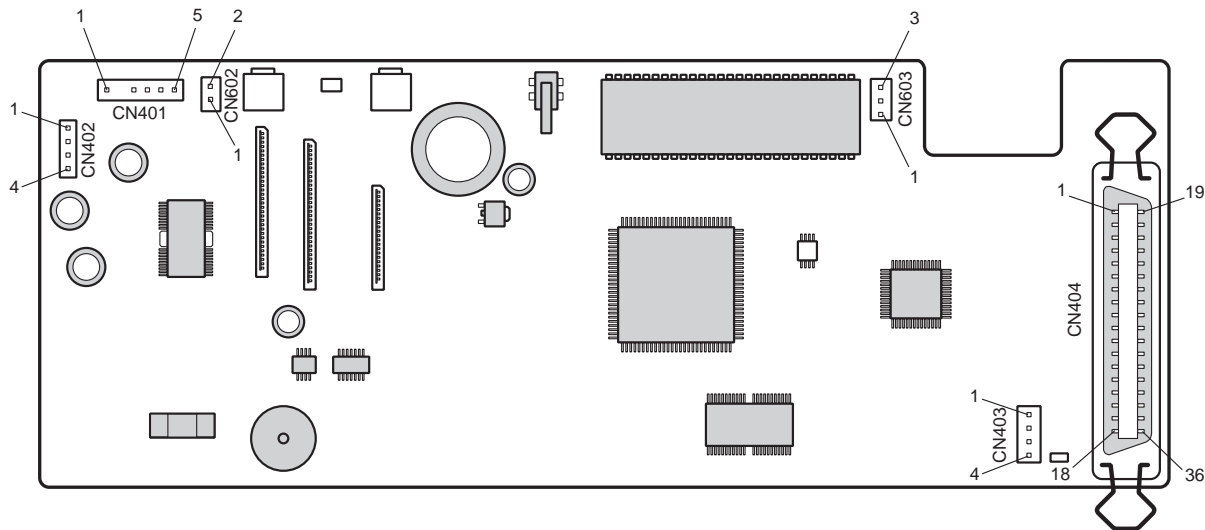


**Figure 5-11 Control Board**

### CN404 (parallel interface connector)

| Pin No | Signal | IN/OUT | Function |
|--------|--------|--------|----------|
| 1 | $\overline{\text{STROBE}}$ | IN | See *Part 2: 2.3 Interface Specifications* (page 2-10). |
| 2 | DATA 1 | IN/OUT | |
| 3 | DATA 2 | IN/OUT | |
| 4 | DATA 3 | IN/OUT | |
| 5 | DATA 4 | IN/OUT | |
| 6 | DATA 5 | IN/OUT | |
| 7 | DATA 6 | IN/OUT | |
| 8 | DATA 7 | IN/OUT | |
| 9 | DATA 8 | IN/OUT | |
| 10 | $\overline{\text{ACKNLG}}$ | OUT | |
| 11 | BUSY | OUT | |
| 12 | P.E. | | |
| 13 | GND | | |
| 14 | GND | | |
| 15 | SELECT | OUT | |
| 16 | $\overline{\text{AUTO FEED XT}}$ | IN | |
| 17 | +5.0V | | |
| 18 | $\overline{\text{INIT}}$ | IN | |
| 19 | $\overline{\text{ERROR}}$ | OUT | |
| 20 | +5.0V | | |
| 21 | $\overline{\text{SELECT IN}}$ | IN | |
| 22 | GND | | |
| 23 | N.C. | | |
| 24 | GND | | |
| 25 | GND | | |
| 26 | N.C. | | |

### CN401 (DC power connector)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | ... | IN | +5V DC |
| 2 | HVCONT | OUT | +24 VDC output control signal |
| 3 | GND | ... | GND |
| 4 | ... | IN | +24V DC |
| 5 | GND | ... | GND |

### CN402 (Carriage motor connector)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | CRA | OUT | Carriage motor phase A |
| 2 | CRB | OUT | Carriage motor phase B |
| 3 | $\overline{\text{CRA}}$ | OUT | Carriage motor phase $\overline{\text{A}}$ |
| 4 | $\overline{\text{CRB}}$ | OUT | Carriage motor phase $\overline{\text{B}}$ |

### CN403 (Paper feed motor connector)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | LFA | OUT | Paper feed motor phase A |
| 2 | LFB | OUT | Paper feed motor phase B |
| 3 | $\overline{\text{LFA}}$ | OUT | Paper feed motor phase $\overline{\text{A}}$ |
| 4 | $\overline{\text{LFB}}$ | OUT | Paper feed motor phase $\overline{\text{B}}$ |

### CN501 (Carriage ribbon cable connector)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1~8 | HVH | OUT | Head drive voltage (VH) |
| 9, 10, 11 | SUBH0 | OUT | Sub-heater drive voltage (for left cartridge) |
| 12, 13, 14 | SUBH1 | OUT | Sub-heater drive voltage (for right cartridge) |
| 15~22 | ... | ... | GND |
| 23, 24, 25 | HVDD | OUT | Head logic drive voltage |
| 26~28 | | | GND |

### CN502 (Carriage ribbon cable connector)

| Pin No. | Signal | IN/OUT | Function |
| --- | --- | --- | --- |
| 1 | HCLOCK0 | IN/OUT | Clock signal for serial data transmission |
| 2, 4, 9, | ... | ... | GND |
| 3 | HDATA0 | IN/OUT | Serial data (left cartridge) sent in sync. with the clock signal |
| 5 | HSEL1A0 | OUT | Rear nozzle heater select signal for upper nozzles (1-8, 17-24, ..., 145-152) |
| 6 | HSEL1B0 | OUT | Front nozzle heater select signal for lower nozzles (9-16, 25-32, ..., 153-160) |
| 7 | HSEL2A0 | OUT | Rear nozzle heater select signal for lower nozzles (9-16, 25-32, ..., 153-160) |
| 8 | HSEL2B0 | OUT | Front nozzle heater select signal for lower nozzles (9-16, 25-32, ..., 153-160) |
| 10 | HALT | OUT | Serial data latch timing signal |
| 11 | ODD | OUT | Odd-number nozzles select signal |
| 12 | EVEN | OUT | Even-number nozzles select signal |
| 13 | BENB0 | OUT | Signal to generate heater enable decoder outputs |
| 14 | BENB1 | OUT | Signal to generate heater enable decoder outputs |
| 15 | HENB0 | OUT | Rear heater drive signal for nozzles 1-112 |
| 16 | HENB1 | OUT | Front heater drive signal for nozzles 1-112 |
| 17 | HENB2 | OUT | Rear heater drive signal for nozzles 113-160 |
| 18 | HENB3 | OUT | Front heater drive signal for nozzles 113-160 |
| 19 | DIR | OUT | Serial data input/output direction control signal |
| 20 | HRSTX | OUT | Reset signal |
| 21 | SNSG | ... | GND |
| 22 | DIA0 | IN | Head temperature (diode) sensor's anode line |
| 23 | DIAK | IN | Head temperature (diode) sensor's cathode line |
| 24 | HPA | OUT | Home position sensor pull-up voltage |
| 25 | HPC | IN | Home position sensor sense signal |
| 26 | REGA | OUT | Print position sensor's LED drive voltage |
| 27 | REGC | IN | Voltage input from the print position sensor |
| 28 | ... | ... | Not used. |

### CN503 (Carriage ribbon cable connector)

| Pin No. | Signal | IN/OUT | Function |
| --- | --- | --- | --- |
| 1 | HCLOCK1 | IN/OUT | Clock signal for serial data transmission |
| 2, 4, 9, | ... | ... | GND |
| 3 | HDATA1 | IN/OUT | Serial data (right cartridge) sent in sync. with the clock signal |
| 5 | HSEL1A1 | OUT | Rear nozzle heater select signal for upper nozzles (1-8, 17-24, ..., 145-152) |
| 6 | HSEL1B1 | OUT | Front nozzle heater select signal for lower nozzles (9-16, 25-32, ..., 153-160) |
| 7 | HSEL2A1 | OUT | Rear nozzle heater select signal for lower nozzles (9-16, 25-32, ..., 153-160) |
| 8 | HSEL2B1 | OUT | Front nozzle heater select signal for lower nozzles (9-16, 25-32, ..., 153-160) |
| 10, 12 | HENB4 | OUT | Rear heater drive signal for nozzles 1-160 |
| 11, 13 | HENB5 | OUT | Front heater drive signal for nozzles 1-160 |
| 14 | SNSG | ... | GND |
| 15 | DIA1 | IN | Head temperature (diode) sensor's anode line |
| 16 | DIK1 | IN | Head temperature (diode) sensor's cathode line |
| 17 | ... | ... | N.C. |
| 18 | ... | ... | Not used. |

### CN602 (Pump sensor connector)

| Pin No. | Signal | IN/OUT | Function |
| --- | --- | --- | --- |
| 1 | POMP | IN | Pump sensor sense signal High (sense) /Low |
| 2 | ... | ... | GND |

### CN603 (Ink sensor connector)

| Pin No. | Signal | IN/OUT | Function |
| --- | --- | --- | --- |
| 1 | INKS01 | OUT | Voltage output from the ink sensor |
| 2 | ... | ... | GND |
| 3 | INKS | IN | Ink sensor's LED drive signal |

**7.2 Carriage Board**
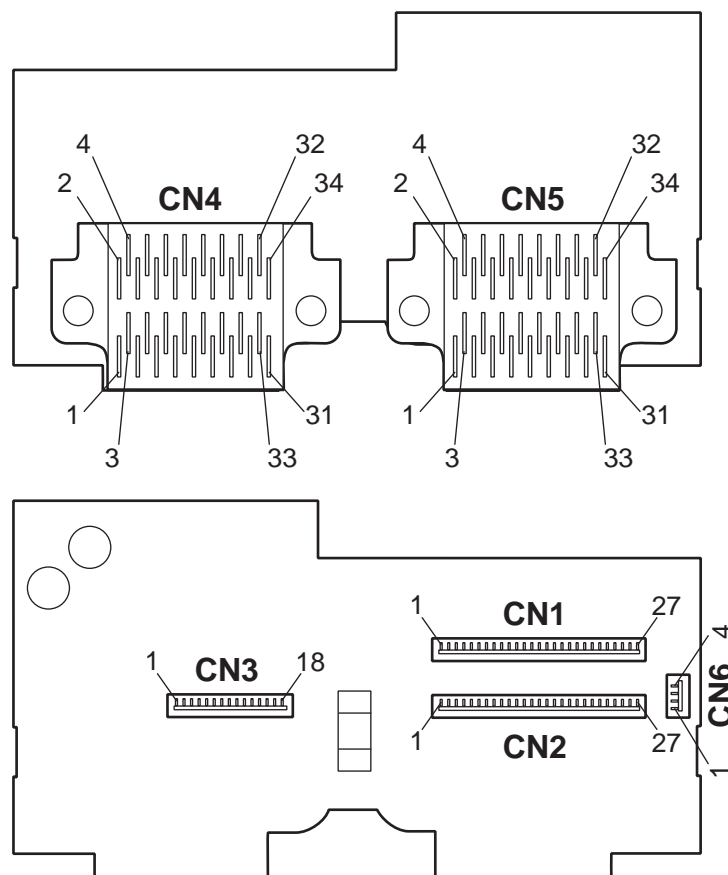


**Figure 5-12 Carriage Board**

**CN1 (Carriage ribbon cable connector)**

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1, 2, 3 | LGND | ... | GND for logic power supply. |
| 4, 5, 6 | HVDD | IN | Head logic drive voltage |
| 7~14 | HGND | ... | GND for head drive voltage (VH) |
| 15, 16, 17 | SUBH1 | IN | Sub-heater drive voltage (for right cartridge) |
| 18, 19, 20 | SUBH0 | IN | Sub-heater drive voltage (for left cartridge) |
| 21~28 | HVH | IN | Head drive voltage (VH) |

### CN2 (Carriage ribbon cable connector)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | ... | ... | Not used. |
| 2 | REGC | OUT | Voltage output from the print position sensor |
| 3 | REGA | IN | Print position sensor's LED drive voltage |
| 4 | HPC | OUT | Home position sensor sense signal |
| 5 | HPA | IN | Home position sensor pull-up voltage |
| 6 | DIK0 | OUT | Head temperature (diode) sensor's cathode line |
| 7 | DIA0 | OUT | Head temperature (diode) sensor's anode line |
| 8 | SNSG | IN | GND |
| 9 | HRSTX | IN | Reset signal |
| 10 | DIR | IN | Serial data input/output direction control signal |
| 11 | HENB3 | IN | Front heater drive signal for nozzles 113-160 |
| 12 | HENB2 | IN | Rear heater drive signal for nozzles 113-160 |
| 13 | HENB1 | IN | Front heater drive signal for nozzles 1-112 |
| 14 | HENB0 | IN | Rear heater drive signal for nozzles 1-112 |
| 15 | BENB1 | IN | Signal to generate heater enable decoder outputs |
| 16 | BENB0 | IN | Signal to generate heater enable decoder outputs |
| 17 | EVEN | IN | Even-number nozzles select signal |
| 18 | ODD | IN | Odd-number nozzles select signal |
| 19 | HALT | IN | Serial data latch timing signal |
| 20, 25, 27 | LGND | ... | GND for the logic power supply |
| 21 | HSEL2B0 | IN | Front nozzle heater select signal for lower nozzles (9-16, 25-32, ..., 153-160) |
| 22 | HSEL2A0 | IN | Rear nozzle heater select signal for lower nozzles (9-16, 25-32, ..., 153-160) |
| 23 | HSEL1B0 | IN | Front nozzle heater select signal for lower nozzles (9-16, 25-32, ..., 153-160) |
| 24 | HSEL1A0 | IN | Rear nozzle heater select signal for upper nozzles (1-8, 17-24, ..., 145-152) |
| 26 | HDATA0 | OUT | Serial data (for right carriage) sent in synchronization with the clock signal |
| 28 | HCLOCK0 | IN/OUT | Clock signal for serial data transmission |

### CN3 (Carriage ribbon cable connector)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | ... | ... | Not used |
| 2 | N.C. | ... | N.C. |
| 3 | DIK1 | IN | Head temperature (diode) sensor's cathode line |
| 4 | DIA1 | IN | Head temperature (diode) sensor's anode line |
| 5 | SNSG | ... | GND |
| 6, 8 | HENB5 | IN | Front heater drive signal for nozzles 1-160 |
| 7, 9 | HENB4 | IN | Rear heater drive signal for nozzles 1-160 |
| 10, 15, 17 | LGND | ... | GND |
| 11 | HSEL2B1 | OUT | Front nozzle heater select signal for lower nozzles (9-16, 25-32, ..., 153-160) |
| 12 | HSEL2A1 | OUT | Rear nozzle heater select signal for lower nozzles (9-16, 25-32, ..., 153-160) |
| 13 | HSEL1B1 | OUT | Front nozzle heater select signal for lower nozzles (9-16, 25-32, ..., 153-160) |
| 14 | HSEL1A1 | OUT | Rear nozzle heater select signal for upper nozzles (1-8, 17-24, ..., 145-152) |
| 16 | HDATA1 | OUT | Serial data (for right cartridge) sent in synchronization with the clock signal |
| 18 | HCLOCK1 | IN/OUT | Clock signal for serial data transmission |

### CN4 (BJ cartridge, left)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1~32 | | | See Page 4-23. |
| 33, 34 | ... | ... | N.C. |

### CN5 (BJ cartridge, right)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1~32 | | | See Page 4-23. |
| 33, 34 | ... | ... | N.C. |

### CN6 (Print position sensor connector)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | REGA | IN | Print position sensor's LED drive voltage |
| 2 | SNSG | ... | GND |
| 3 | REGC | IN | Voltage input from the print position sensor |
| 4 | LGND | ... | GND |

## 7.3 BJ Cartridge
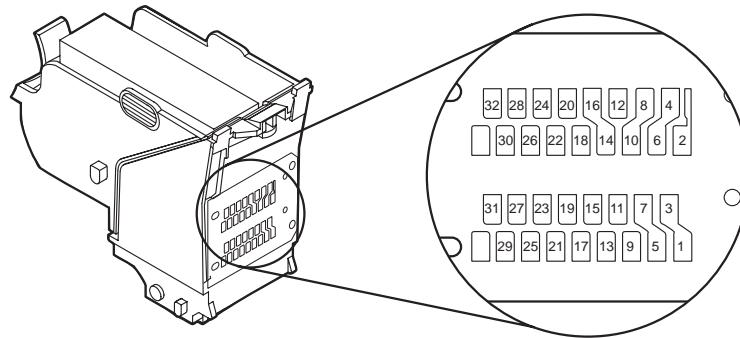


**Figure 5-13 BJ Cartridge**

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1, 2, 3 | HVH | OUT | Head drive voltage (VH) |
| 4, 6 | SUBH0 (SUBH1) | OUT | Sub-heater drive signal |
| 5 ,7, 8, | VHG | ... | GND for Head drive voltage (VHGND) |
| 10 9 | HDATA0 (HDATA1) | IN/OUT | Serial data (including head identification and rank resistance) sent in synchronization with the clock signal (H_CLK) |
| 11 | HSEL1B0 (HSEL1B1) | OUT | Rear nozzle heater select signal for upper nozzles (1-8, 17-24, ..., 145-152) |
| 12 | HVDD | OUT | Head logic drive voltage (+5 V) |
| 13 | HCLOCK0 (HCLOCK1) | IN/OUT | Clock signal for serial data transmission |
| 14, 16 | LGND | OUT | GND for head logic drive voltage (HVDD) |
| 15 | HSEL1A0 (HSEL1A1) | OUT | Front nozzle heater select signal for upper nozzles (1-8, 17-24, ..., 145-152) |
| 17 | HSEL2A0 (HSEL2A1) | OUT | Front nozzle heater select signal for lower nozzles (9-16, 25-32, ..., 153-160) |
| 18 | HSEL2B0 (HSEL2B1) | OUT | Rear nozzle heater select signal for lower nozzles (9-16, 25-32, ..., 153-160) |
| 19 | HLAH | OUT | Serial data latch timing signal |
| 20 | ODD | OUT | Odd-number nozzles select signal |
| 21 | EVEN | OUT | Even-number nozzles select signal |
| 22 | BENB0 | OUT | Signal to generate heater enable decoder outputs |
| 23 | BENB1 | OUT | Signal to generate heater enable decoder outputs |
| 24 | HENB0 (HENB4) | OUT | Rear heater drive signal for nozzles 1-112 (or 1-144) |
| 25 | HENB1 (HENB5) | OUT | Front heater drive signal for nozzles 1-112 (or 1-144) |
| 26 | HENB2 (HENB4) | OUT | Rear heater drive signal for nozzles 113-160 |
| 27 | HENB3 (HENB5) | OUT | Front heater drive signal for nozzles 113-160 |
| 28 | DIR | OUT | Serial data input/output direction control signal |
| 29 | HRSTX | OUT | Reset signal |
| 30 | DIA0 (DIA1) | IN | Head temperature (diode) sensor's anode line |
| 31 | DIK0 (DIK1) | IN | Head temperature (diode) sensor's cathode line |
| 32 | ... | ... | Not used. |

### 7.4 AC Adapter
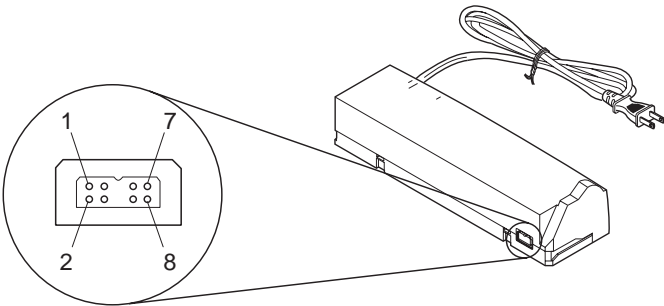


**Figure 5-14 AC Adapter**

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | … | … | N.C |
| 2 | … | … | N.C |
| 3 | … | … | +24V DC |
| 4 | GND | … | GND |
| 5 | … | OUT | +5V DC |
| 6 | … | … | N.C |
| 7 | HVCONT | IN | +24 V control signal |
| 8 | GND | … | GND |

### 7.5 DC Power Supply Cable
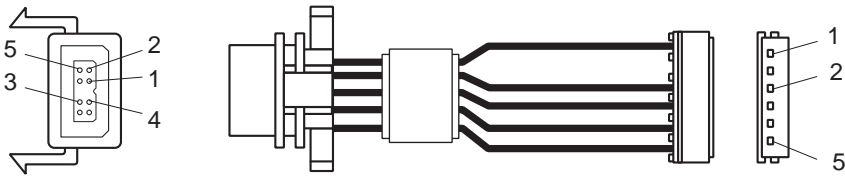


**Figure 5-15 DC Power Supply Cable**

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | … | OUT | +5V DC |
| 2 | HVCONT | IN | +24 V DC output control signal |
| 3 | GND | … | GND |
| 4 | … | OUT | +24V DC |
| 5 | GND | … | GND |

## 7.6 Carriage Motor
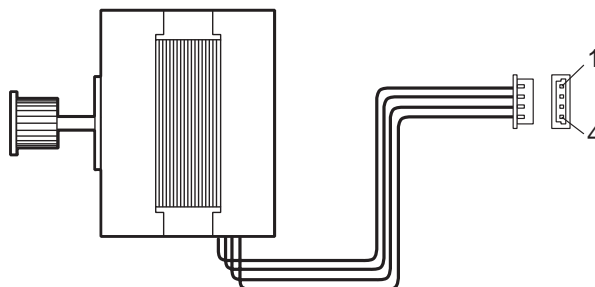


**Figure 5-16 Carriage Motor**

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | CRA | IN | Carriage motor phase A |
| 2 | CRB | IN | Carriage motor phase B |
| 3 | $\overline{\text{CRA}}$ | IN | Carriage motor phase $\overline{\text{A}}$ |
| 4 | $\overline{\text{CRB}}$ | IN | Carriage motor phase $\overline{\text{B}}$ |

## 7.7 Paper Feed Motor
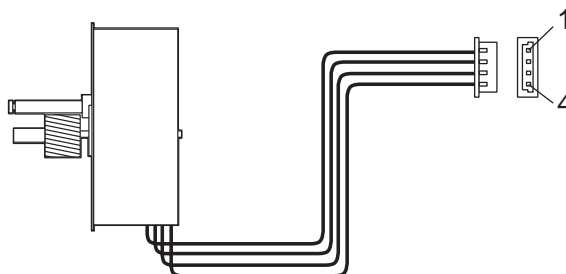


**Figure 5-17 Paper Feed Motor**

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | LFA | IN | Paper feed motor phase A |
| 2 | LFB | IN | Paper feed motor phase B |
| 3 | $\overline{\text{LFA}}$ | IN | Paper feed motor phase $\overline{\text{A}}$ |
| 4 | $\overline{\text{LFB}}$ | IN | Paper feed motor phase $\overline{\text{B}}$ |

## 7.8 Ink Sensor
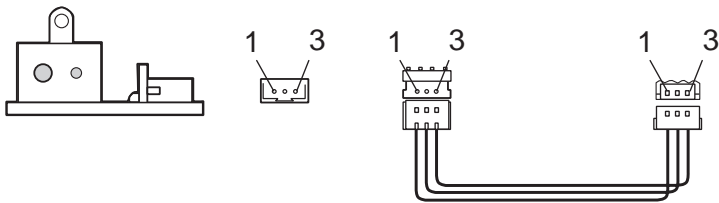


**Figure 5-18 Ink Sensor**

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | INKS01 | OUT | Voltage output from the ink sensor |
| 2 | ... | ... | GND |
| 3 | ... | ... | N.C. |

## 7.9 Print Position Sensor
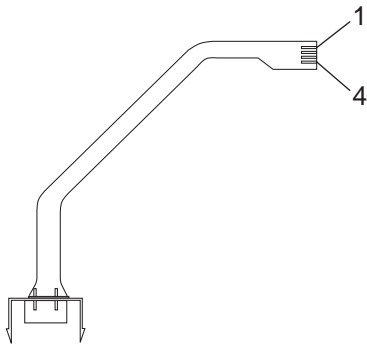


**Figure 5-19 Print Position Sensor**

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | REGA | OUT | Print position sensor's LED drive voltage |
| 2 | SNSG | ... | GND |
| 3 | REGC | OUT | Voltage output from the print position sensor |
| 4 | LGND | ... | GND |

## 7.10 Pump Sensor
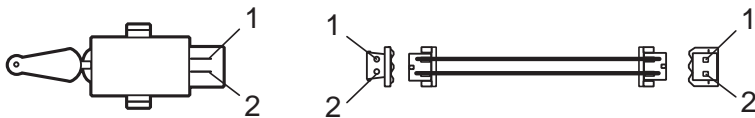


**Figure 5-20 Pump Sensor**

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | POMP | OUT | Pump sensor's sense signal High (sense) /Low |
| 2 | ... | ... | GND |

**5-46**

# 8. CIRCUIT DIAGRAMS

## 8.1 Parts Layout
### 8.1.1 Control board
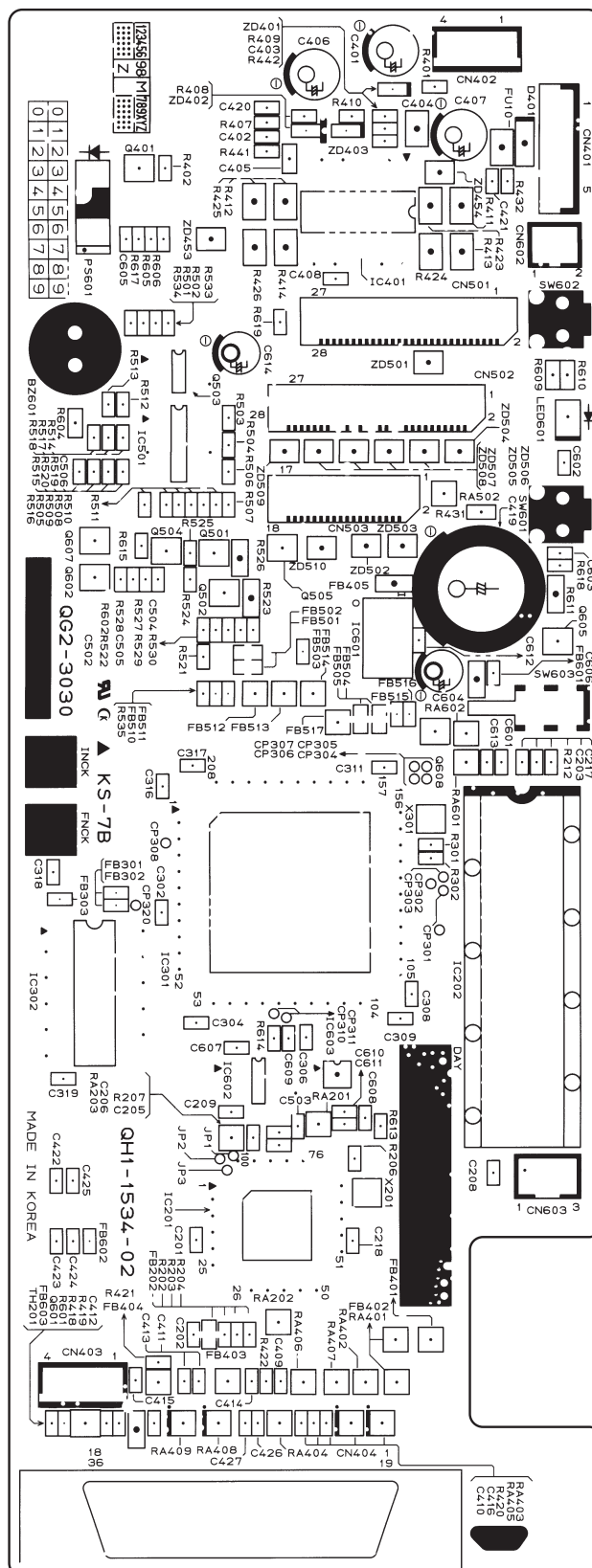


**Figure 5-21 Control Board**

### 8.1.2 Carriage board
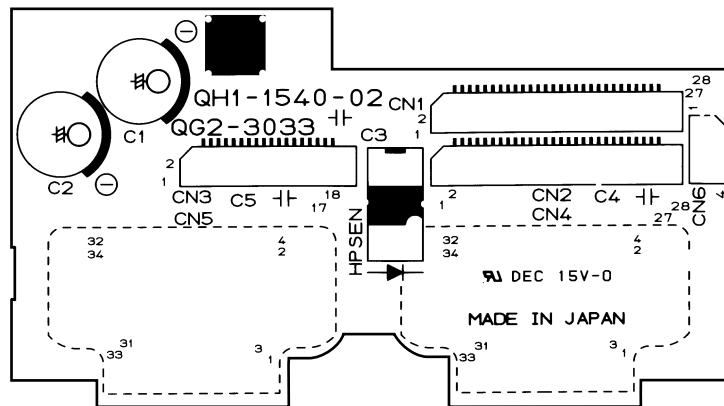
**Figure 5-22 Carriage Board**

## 8.2 Circuit Diagrams

**CONTROL BOARD 03**

CONTROL BOARD 04

CARRIAGE BOARD 05

8   7   6   5   4   3   2   1

F   E   D   C   B   A

**CN1**
28, 27, 26, 25, 24, 23, 22, 21, 20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1

HVH
SUBH1
HGND
HUDD
LGND

C1 220m,35V
C2 220m,35V
C3 0.1m,50V

**CN2**
28 HCLOCK0
27 LGND
26 HDATA0
25 LGND
24 HSEL1A0
23 HSEL1B0
22 HSEL2A0
21 HSEL2B0
20 LGND
19 HLAT
18 ODD
17 EVEN
16 BENB0
15 BENB1
14 HENB0
13 HENB1
12 HENB2
11 HENB3
10 DIR
9 HRSTX
8 SNSG
7 DIA0
6 DIK0
5 HPA
4 HPC
3 REGA
2 REGC
1 RANK0

HPSEN OP1SOO5C
1 3 2 4

**Home Position Sensor**

**CN4**
1 HVH
2 HVH
3 HVH
4 SUBH0
5 LGND
6 SUBH0
7 LGND
8 LGND
9 HDATA0
10 HGND
11 HSEL1B0
12 HVDD
13 HCLOCK0
14 LGND
15 HSEL1A0
16 LGND
17 HSEL2A0
18 HSEL2B0
19 HLAT
20 ODD
21 EVEN
22 BENB0
23 BENB1
24 HENB0
25 HENB1
26 HENB2
27 HENB3
28 DIR
29 HRSTX
30 DIA0
31 DIK0
32 RANK0
33 N.C.
34 N.C

C4 0.1m,50V

**05**

**Print Position Sensor**
1 2
3,4

**CN6**
1 REGA
2 SNSG
3 REGC
4 LGND

**CN3**
18 HCLOCK1
17 LGND
16 HDATA1
15 LGND
14 HSEL1A1
13 HSEL1B1
12 HSEL2A1
11 HSEL2B1
10 LGND
9 HENB4
8 HENB5
7 HENB4
6 HENB5
5 SNSG
4 DIA1
3 DIK1
2 N.C.
1 RNAK1

C5 0.1m,50V

**CN5**
1 HVH
2 HVH
3 HVH
4 SUBH1
5 HGND
6 SUBH1
7 HGND
8 HGND
9 HDATA1
10 HGND
11 HSEL1B1
12 HVDD
13 HCLOCK1
14 LGND
15 HSEL1A1
16 LGND
17 HSEL2A1
18 HSEL2B1
19 HLAT
20 ODD
21 EVEN
22 BENB0
23 BENB1
24 HENB4
25 HENB5
26 HENB4
27 HENB5
28 DIR
29 HRSTX
30 DIA1
31 DIK1
32 RANK1
33 N.C.
34 N.C.

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Canon

# BJC-6000

# PARTS
# CATALOG

REVISION 0

| | |
|---|---|
| Q30-2810-220,225,720,820,820 | 120V(CCSI) |
| Q30-2810-221,721,821 | 120V(CAN) |
| Q30-2810-220,722 | 120V(LATIN LV) |
| Q30-2810-223,723 | 220V-240V(LATIN HV) |
| Q30-2810-230,235,630,635,730 | 220V-240V(EUR) |
| Q30-2810-231,236,631,636,731 | 220V-240V(GER) |
| Q30-2810-232,237,632,637,732 | 220V-240V(FRN) |
| Q30-2810-233,733 | 220V-240V(HV) |
| Q30-2810-240,740 | 220V-240V(AUST) |
| Q30-2810-260,760 | 220V-240V(KRN) |
| Q30-2810-280,285,680,685,780 | 220V-240V(UK) |
| Q30-2812-223 | 120V(TWN) |
| Q30-2812-250 | 220V-240V(HK) |

# Canon

JAN. 1999    QY8-31A3-000

**0199 SE 0.35-0**

# BJC-6000

# PARTS
# CATALOG

**Canon**

DTP System
  This manual was produced on an Apple® Power Macintosh®
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  with mo-502M™ Magneto-Optical Storage Disk Cartridge
  and mo-IF2™ Machitosh® interface kit were used for storing
  large volumes of page layout, graphic and parts list data for
  this manual.
  Parts layout illustrations and Logotypes were created using
  MACROMEDIA® FreeHand® 7J.
  Pattern drawing were scaned by CanoScan 600 scanner with
  Adobe® photoshop®.
  Documents and page layouts were created using
  QuarkXpress® 3.3J.
  Parts lists were created using Helix Tecnologies® Herix
  Xpress® and converted to EPS files.

# I. CONTENTS

## A. PARTS LAYOUT & PARTS LIST

### Parts layout illustration

#### a) Parts search

Find a part from the parts layout illustration and find its key number from the parts list to identify the part number and name. For screws, nuts, washers, lock washers, pins, spacers, see SCREWS &WASHERS LIST.

**Note:** If parts have the same or similar shape but different specifications, their key number is assigned to several part numbers and names in the parts list.

#### b) Parts replacement procedure

To replace parts, the parts layout illustrations have figure numbers according to the disassembly procedure of the product. The parts that require careful work are shown the illustration.

#### c) TOOL LIST

This is a list of tools used for servicing products.

### Parts list

#### a) FIGURE & KEY No.

The FIGURE & KEY No. column corresponds to the key numbers assigned to the parts in the parts layout illustration.
It also corresponds to the part locations printed on the PC board.

#### b) PART NUMBER

The PART NUMBER column gives the part numbers corresponding to the key numbers. To order a part, indicate the part number clearly.

**Note:** Parts marked NPN are not service parts.

#### c) RANK

The service parts with N in the RANK column are order parts.

#### d) QTY

The QTY column gives the number of parts in the corresponding components layout illustration.

#### e) DESCRIPTION

The DESCRIPTION column gives the part names in English.
To order a part, indicate the part name, too.

## B. SCREWS & WASHERS LIST

This is a list of screws, nuts, washers, lock washers, pins, and spacers. The QTY column does not give the number of parts used.

## C. NUMERICAL INDEX

All the parts listed in this parts catalog are arranged in order of part number. You can identify part locations and names from the NUMERICAL INDEX.

# A. PARTS LAYOUT & PARTS LIST

## FIGURE 1 — PRINTER & ACCESSORIES
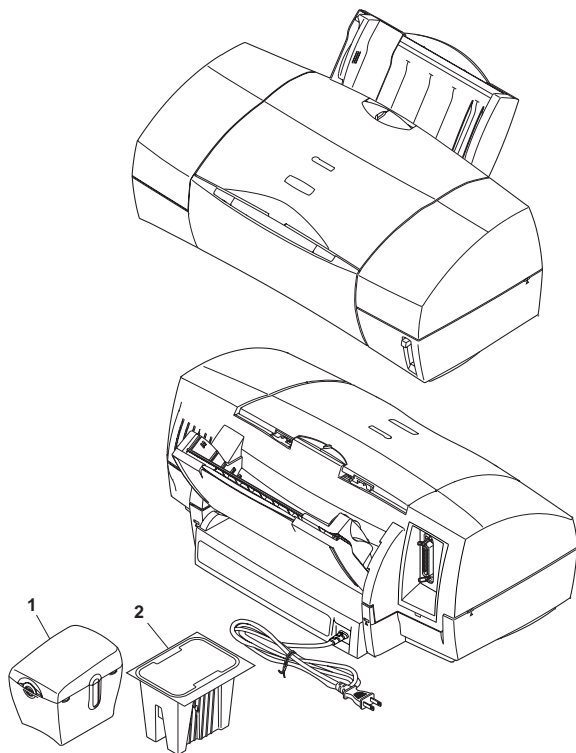


## FIGURE 2 — FRONT COVER
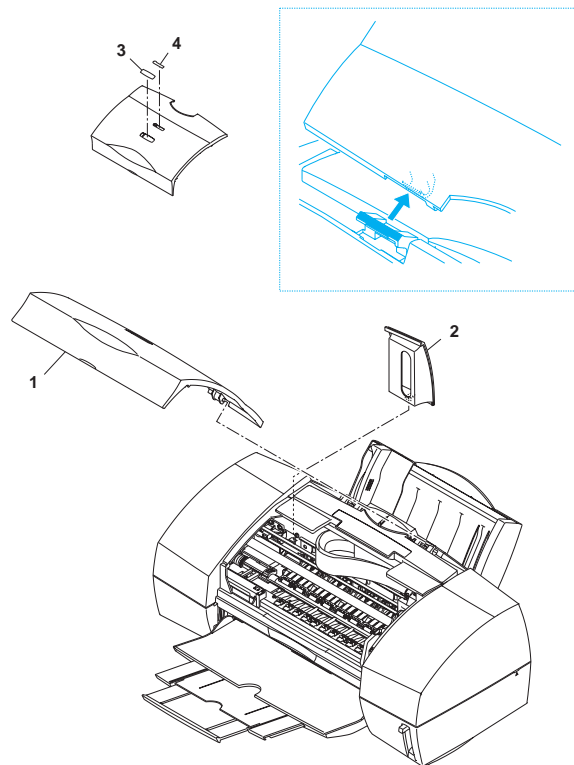


## FIGURE 3 — UPPER COVER
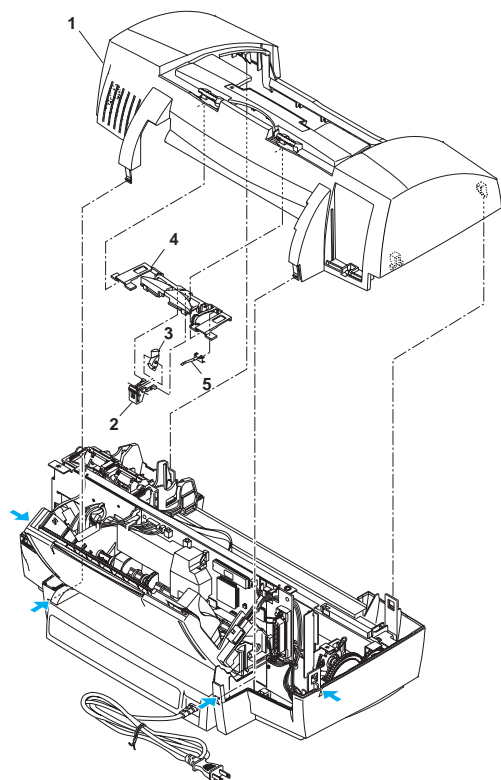


## FIGURE 4 — LOGIC BOARD
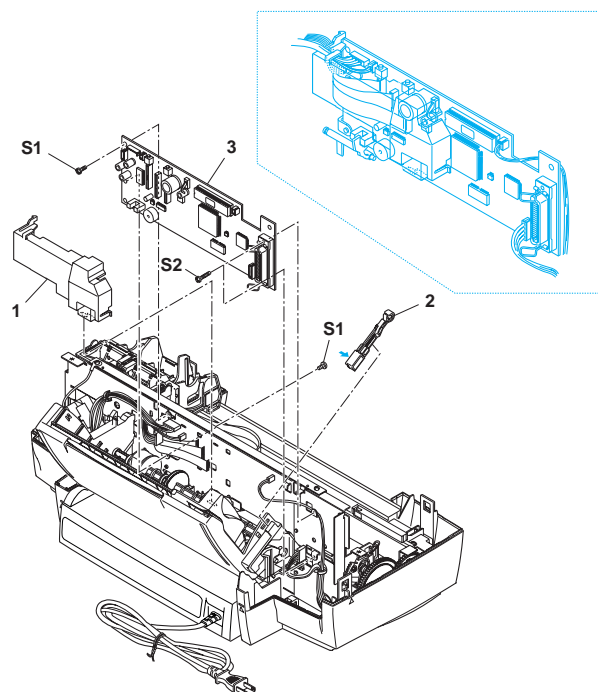
| FIGURE & KEY NO. | PART NUMBER | RANK | QTY | DESCRIPTION | REMARKS |
|---|---|---|---|---|---|
| 1 - 1 | NPN | | 1 | BJ CARTRIDGE CONTAINER | OPTION |
| 2 | NPN | | 1 | COLOR BJ CARTRIDGE | CONSUMABLES |
| | NPN | | 1 | BLACK BJ CARTRIDGE | CONSUMABLES |
| 2 - 1 | QF5-0456-000 | | 1 | FRONT COVER ASS'Y | |
| 2 | QB1-3589-000 | | 1 | COVER, I/F | |
| 3 | QB1-3654-000 | | 1 | PLATE, MODEL NAME | |
| 4 | QS5-8260-000 | | 1 | PLATE, LOGO | |
| 3 - 1 | QG5-1247-000 | | 1 | UPPER COVER UNIT | |
| 2 | QB1-3592-000 | | 1 | HOLDER, INDICATOR | |
| 3 | QB1-3591-000 | | 1 | GUIDE, INDICATOR | |
| 4 | QB1-3590-000 | | 1 | BUTTON, PUSH | |
| 5 | QB1-3600-000 | | 1 | LEAF SPRING, BUTTON | |
| 4 - 1 | QB1-3613-000 | | 1 | COVER, LOGIC BOARD | |
| 2 | QB1-3610-000 | | 1 | HOLDER, SHEET FEEDER | |
| 3 | QG2-3039-000 | | 1 | LOGIC BOARD ASS'Y | |
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| FIGURE 5 | BOTTOM CASE | FIGURE 6 | WASTE INK ABSORBER |
|---|---|---|---|



| FIGURE 7 | PURGE UNIT | FIGURE 8 | CARRIAGE UNIT |
|---|---|---|---|

| FIGURE & KEY NO. | PART NUMBER | RANK | QTY | DESCRIPTION | REMARKS |
|---|---|---|---|---|---|
| 5 - 1 | QG5-1249-000 | | 1 | BOTTOM CASE UNIT | (WITH FOOT) |
| 2 | QG5-1250-000 | | 1 | OUTPUT TRAY UNIT | |
| 3 | QH3-3329-000 | | 1 | AC ADAPTER | 100/120V 50/60HZ |
| | QH3-3332-000 | | 1 | AC ADAPTER | 220/240V 50/60HZ W/O CORD |
| 4 | WT3-5069-000 | | 1 | CORD, POWER | 220V-240V |
| 5 | WT3-5090-000 | | 1 | CORD, POWER | 220V-240V (UK) |
| 6 | WT3-5060-000 | | 1 | CORD, POWER | 220V-240V (AUS) |
| 6 - 1 | QG2-3032-000 | | 1 | DC CONNECTOR ASS'Y | (WITH CABLE) |
| 2 | QB1-3594-000 | | 1 | HOLDER, INK ABSORBER | |
| 3 | QB1-3596-000 | | 1 | ABSORBER, INK | |
| 4 | QB1-3595-000 | | 1 | ABSORBER, INK | |
| 5 | QB1-3597-000 | | 1 | ABSORBER, INK | |
| 7 - 1 | QG5-1256-000 | | 1 | PURGE UNIT | |
| 2 | QH2-2279-000 | | 1 | CABLE, EXTENTION | |
| 3 | QB1-3685-000 | | 1 | CLIP, SHAFT | |
| 4 | QB1-3672-000 | | 1 | LEVER, FORMS THICKNESS | |
| 5 | QB1-3683-000 | | 1 | SPRING, TORSION | |
| 8 - 1 | QG2-3038-000 | | 1 | INK SENSOR ASS'Y | |
| 2 | QB1-3677-000 | N | 1 | FRAME, CARRIAGE GUIDE | |
| 3 | QF5-0451-000 | | 1 | IDLER ROLLER ASS'Y | |
| 4 | QB1-3685-000 | | 1 | CLIP, SHAFT | |
| 5 | QG5-1252-000 | | 1 | CARRIAGE UNIT | (WITH BELT) |
| 6 | QB1-3675-000 | | 1 | BUSHING | |
| 7 | QB1-3676-000 | N | 1 | SHAFT, CARRIAGE | |
| 8 | QB1-3684-000 | | 1 | PAD, GRAESE | |
| | | | | | |
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| FIGURE 9 | CARRIAGE PART | FIGURE 10 | ASF UNIT |
|---|---|---|---|



| FIGURE 11 | PAPER FEED UNIT (1) | FIGURE 12 | PAPER FEED UNIT (2) |
|---|---|---|---|

| FIGURE & KEY NO. | PART NUMBER | R A N K | Q T Y | DESCRIPTION | REMARKS |
|---|---|---|---|---|---|
| 9 - 1 | QS5-2147-000 | | 2 | SPRING, HOOK END COIL | |
| 2 | QB1-3673-000 | | 1 | HOLDER, SENSOR | |
| 3 | QG2-3037-000 | | 1 | REGISTRATION SENSOR ASS'Y | |
| 4 | QB1-3668-000 | | 1 | GUIDE, RIBBON CABLE | |
| 5 | QH2-2272-000 | | 1 | CARRIAGE RIBBON CABLE | |
| 6 | QH2-2273-000 | | 1 | CARRIAGE RIBBON CABLE | |
| 7 | QH2-2274-000 | | 1 | CARRIAGE RIBBON CABLE | |
| 8 | QB1-3674-000 | | 1 | HOLDER, CARRIAGE RIBBON CABLE | |
| 9 | QG2-3033-000 | | 1 | CARRIAGE BOARD ASS'Y | |
| 10 - 1 | QH4-4212-020 | | 1 | MOTOR, CARRIAGE | |
| 2 | QB1-2441-000 | | 4 | DAMPER | |
| 3 | QB1-2442-000 | | 3 | SLEEVE, SCREW | |
| 4 | QG5-0826-100 | | 1 | SHEET FEEDER UNIT | |
| 5 | QG5-1259-000 | | 1 | TRANSMISSION GEAR UNIT | |
| 6 | QB1-3633-000 | | 5 | SPRING, TORSION | |
| 7 | QG5-1254-000 | | 5 | PRESSURE ROLLER ASS'Y | |
| 11 - 1 | QH4-4208-000 | | 1 | MOTOR, PAPER FEED | |
| 2 | QS5-0115-000 | | 1 | GEAR, SLOW DOWN | |
| 3 | QG5-1265-000 | | 1 | SPUR HOLDER ASS'Y | |
| 4 | QB1-3623-000 | | 1 | PLATEN | |
| 5 | QB1-3643-000 | | 1 | GUARD, SPLASH | |
| 6 | QB1-3644-000 | | 1 | PLATE, PAPER GUIDE | |
| 7 | QB1-3639-000 | | 1 | ARM, PAPER SENSOR | |
| 8 | QB1-3634-000 | | 1 | SPRING, TORSION | |
| 9 | QB1-3637-000 | | 1 | PLATE, PAPER FEED | |
| 12 - 1 | QB1-3628-000 | | 1 | BUSHING | |
| 2 | QF5-0485-000 | | 1 | EJECT ROLLER ASS'Y | |
| 3 | QF5-0484-000 | | 1 | FEED ROLLER ASS'Y | |
| 4 | WT2-0256-000 | | 1 | BUSHING, CORD | |
| 5 | WT2-0387-000 | | 2 | CLAMP | |
| 6 | QB1-3682-000 | N | 1 | BUSHING, FORMS THICKNESS (R) | |
| 7 | QB1-3681-000 | N | 1 | BUSHING, FORMS THICKNESS (L) | |
| 8 | NPN | | 1 | FRAME UNIT | |
| | | | | | |
| | | | | | |

| FIGURE 13 | ASF PART | FIGURE 14 | LOGIC BOARD COMPONENT |
|---|---|---|---|
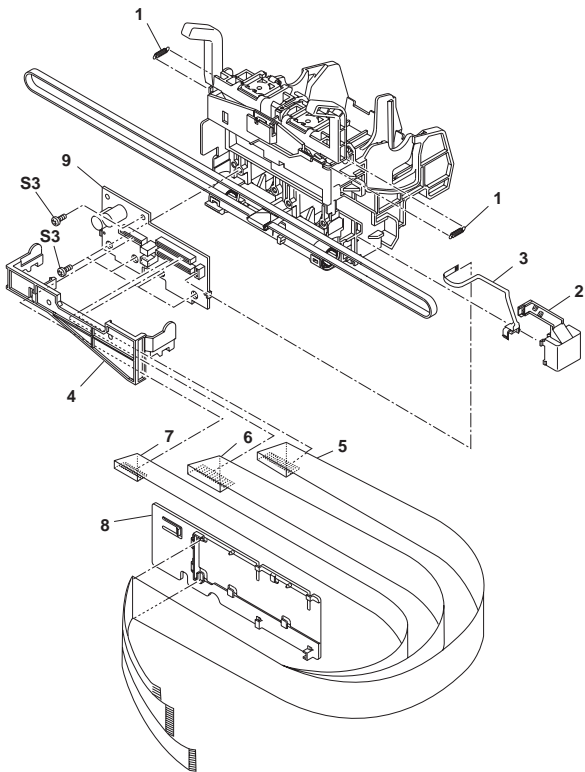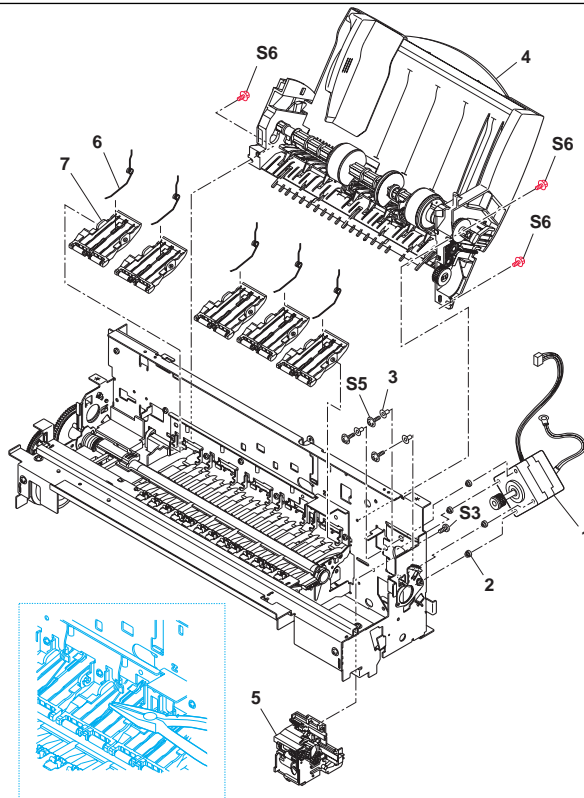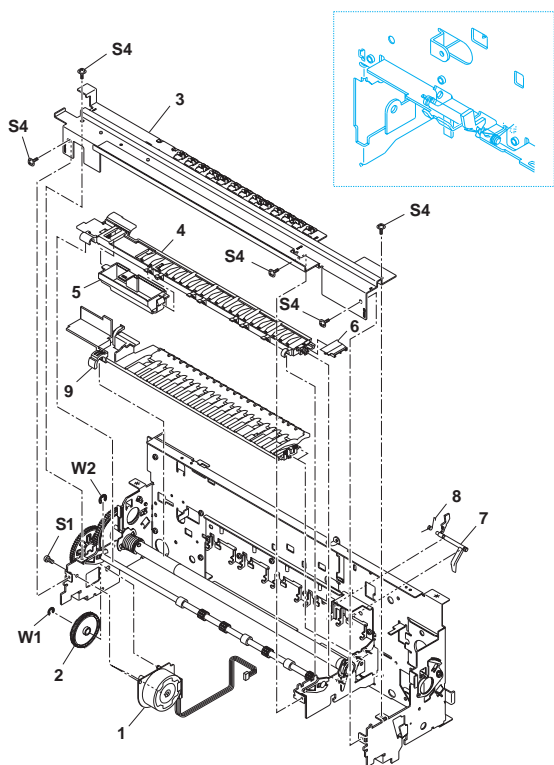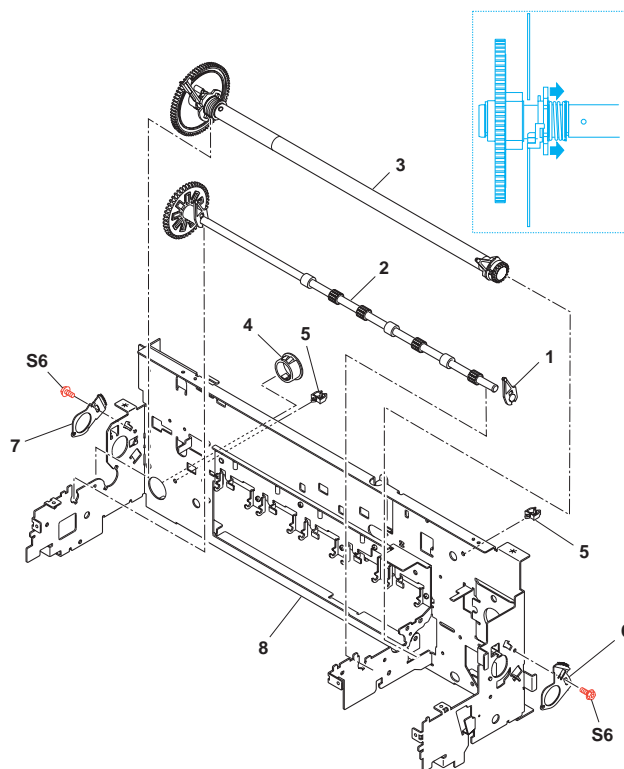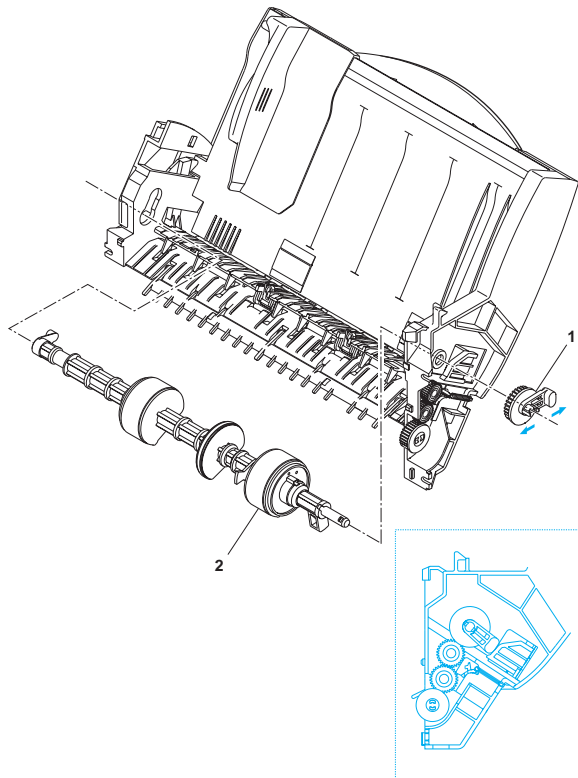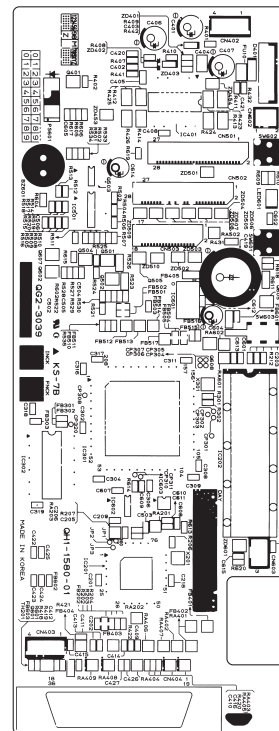


FIGURE 15  TOOL
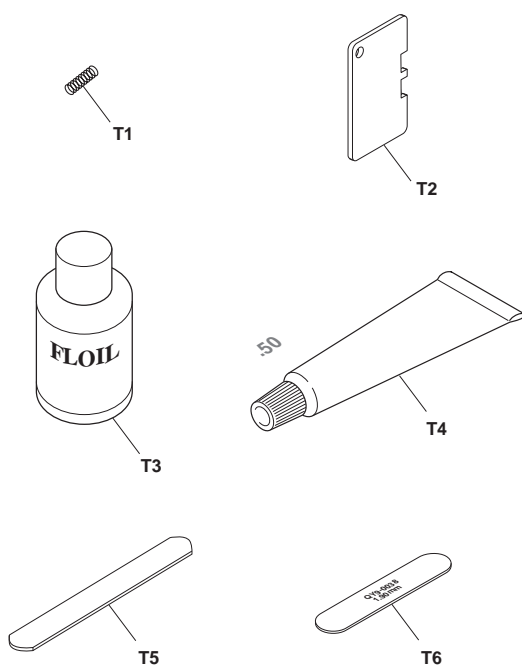
| FIGURE & KEY NO. | PART NUMBER | RANK | QTY | DESCRIPTION | REMARKS |
|---|---|---|---|---|---|
| 13- 1 | QB1-2489-020 | | 1 | GEAR, CAM | |
| 2 | QG5-0828-020 | | 1 | PICK-UP ROLLER UNIT | |
| 14- BZ601 | WR1-5059-000 | N | 1 | BEEPER: CD11PA-Z | |
| FU 10 | WD1-5059-000 | | 1 | FUSE: FCC3220202 | |
| IC201 | WA7-0443-000 | N | 1 | IC, HD6417092VTE20, MPU | |
| IC202 | QH7-0648-000 | | 1 | IC, MSM538032E-16RS, MASKED-ROM | |
| IC301 | QH7-0644-000 | | 1 | IC, PRINTER CONTROLLER | |
| IC302 | WA7-0702-000 | N | 1 | IC, KM416V1204CT-6, DRAM | |
| IC401 | WA4-7061-000 | | 1 | IC, TB62200F, DRIVER | |
| IC602 | WA7-0639-000 | N | 1 | IC, S-29220AFJA, EEP-ROM | |
| IC603 | WA4-7150-000 | N | 1 | IC, IC-PST597ENR, RESET | |
| LED601 | WG2-5157-000 | N | 1 | LED: SEC2494C | |
| PS601 | WG8-5356-000 | N | 1 | IC, TLP831(CANO), PHOTO INTERRUPTER | |
| SW601 | WC2-5349-000 | N | 1 | SWITCH, PUSH: EVQPC3 | |
| SW602 | WC2-5349-000 | N | 1 | SWITCH, PUSH: EVQPC3 | |
| SW603 | WC2-5292-000 | N | 1 | PUSH SWITCH: MPU10321ML0 | |
| TH201 | WP2-5104-000 | N | 1 | THERMISTOR: TBPS1473J475H5Q | |
| X201 | WK2-5921-000 | N | 1 | OSCILLATOR, CERAMIC: 20MHZ | |
| X301 | WK2-5922-000 | N | 1 | OSCILLATOR, CERAMIC: 25MHZ | |
| T- 1 | QY9-0043-000 | | 1 | SPRING, TENSION | |
| 2 | QY9-0044-000 | | 1 | GEAR, KEY | |
| 3 | QY9-0045-000 | | 1 | LUBE, FLOIL 946P, OIL | |
| 4 | CK-0562-000 | | 1 | GREASE, MOLYKOTE PG-641 | |
| 5 | QY9-0001-000 | | 2 | GAUGE, GAP: 0.50 MM | |
| 6 | QY9-0038-000 | | 1 | GUAGE, GAP: 1.9MM | |
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# B. SCREWS & WASHERS LIST

| FIGURE & KEY NO. | PART NUMBER | RANK | QTY | DESCRIPTION | REMARKS |
|---|---|---|---|---|---|
| S - 1 | XB1-2300-407 | | | SCREW, M3x4 | |
| 2 | XB1-2301-207 | | | SCREW, M3x12 | |
| 3 | XB4-7300-609 | | | SCREW, TAP, BINDING HEAD, M3x6 | |
| 4 | XB6-7300-607 | | | SCREW, TP: M3 x 6 MM | |
| 5 | XB6-7300-807 | | | SCREW, MACHINE, WASHER HEAD, M3x8 | |
| 6 | XA9-1083-000 | | | SCREW, RS, M3X6 | |
| W - 1 | XD2-1100-282 | | | RETAINING RING (E-TYPE) | |
| 2 | XD2-1100-422 | | | RETAINING RING (E-TYPE) | |
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| PART NUMBER | FIGURE & KEY NO. | DESCRIPTION | PART NUMBER | FIGURE & KEY NO. | DESCRIPTION |
|---|---|---|---|---|---|
| CK-0562-000 | T - 4 | GREASE, MOLYKOTE PG-641 | QH2-2274-000 | 9 - 7 | CARRIAGE RIBBON CABLE |
| QB1-2441-000 | 10 - 2 | DAMPER | QH2-2279-000 | 7 - 2 | CABLE, EXTENTION |
| QB1-2442-000 | 10 - 3 | SLEEVE, SCREW | QH3-3329-000 | 5 - 3 | AC ADAPTER |
| QB1-2489-020 | 13 - 1 | GEAR, CAM | QH3-3332-000 | 5 - 3 | AC ADAPTER |
| QB1-3589-000 | 2 - 2 | COVER, I/F | QH4-4208-000 | 11 - 1 | MOTOR, PAPER FEED |
| QB1-3590-000 | 3 - 4 | BUTTON, PUSH | QH4-4212-020 | 10 - 1 | MOTOR, CARRIAGE |
| QB1-3591-000 | 3 - 3 | GUIDE, INDICATOR | QH7-0644-000 | 14 - IC301 | IC, PRINTER CONTROLLER |
| QB1-3592-000 | 3 - 2 | HOLDER, INDICATOR | QH7-0648-000 | 14 - IC202 | IC, MSM538032E-16RS, MASKED-ROM |
| QB1-3594-000 | 6 - 2 | HOLDER, INK ABSORBER | QS5-0115-000 | 11 - 2 | GEAR, SLOW DOWN |
| QB1-3595-000 | 6 - 4 | ABSORBER, INK | QS5-2147-000 | 9 - 1 | SPRING, HOOK END COIL |
| QB1-3596-000 | 6 - 3 | ABSORBER, INK | QS5-8260-000 | 2 - 4 | PLATE, LOGO |
| QB1-3597-000 | 6 - 5 | ABSORBER, INK | QY9-0001-000 | T - 5 | GAUGE, GAP: 0.50 MM |
| QB1-3600-000 | 3 - 5 | LEAF SPRING, BUTTON | QY9-0038-000 | T - 6 | GUAGE, GAP: 1.9MM |
| QB1-3610-000 | 4 - 2 | HOLDER, SHEET FEEDER | QY9-0043-000 | T - 1 | SPRING, TENSION |
| QB1-3613-000 | 4 - 1 | COVER, LOGIC BOARD | QY9-0044-000 | T - 2 | GEAR, KEY |
| QB1-3623-000 | 11 - 4 | PLATEN | QY9-0045-000 | T - 3 | LUBE, FLOIL 946P, OIL |
| QB1-3628-000 | 12 - 1 | BUSHING | WA4-7061-000 | 14 - IC401 | IC, TB62200F, DRIVER |
| QB1-3633-000 | 10 - 6 | SPRING, TORSION | WA4-7150-000 | 14 - IC603 | IC, IC-PST597ENR, RESET |
| QB1-3634-000 | 11 - 8 | SPRING, TORSION | WA7-0443-000 | 14 - IC201 | IC, HD6417092VTE20, MPU |
| QB1-3637-000 | 11 - 9 | PLATE, PAPER FEED | WA7-0639-000 | 14 - IC602 | IC, S-29220AFJA, EEP-ROM |
| QB1-3639-000 | 11 - 7 | ARM, PAPER SENSOR | WA7-0702-000 | 14 - IC302 | IC, KM416V1204CT-6, DRAM |
| QB1-3643-000 | 11 - 5 | GUARD, SPLASH | WC2-5292-000 | 14 - SW603 | PUSH SWITCH: MPU10321ML0 |
| QB1-3644-000 | 11 - 6 | PLATE, PAPER GUIDE | WC2-5349-000 | 14 - SW601 | SWITCH, PUSH: EVQPC3 |
| QB1-3654-000 | 2 - 3 | PLATE, MODEL NAME | | 14 - SW602 | |
| QB1-3668-000 | 9 - 4 | GUIDE, RIBBON CABLE | WD1-5059-000 | 14 - FU 10 | FUSE: FCC3220202 |
| QB1-3672-000 | 7 - 4 | LEVER, FORMS THICKNESS | WG2-5157-000 | 14 - LED601 | LED: SEC2494C |
| QB1-3673-000 | 9 - 2 | HOLDER, SENSOR | WG8-5356-000 | 14 - PS601 | IC, TLP831(CANO), PHOTO INTERRUPTER |
| QB1-3674-000 | 9 - 8 | HOLDER, CARRIAGE RIBBON CABLE | WK2-5921-000 | 14 - X201 | OSCILLATOR, CERAMIC: 20MHZ |
| QB1-3675-000 | 8 - 6 | BUSHING | WK2-5922-000 | 14 - X301 | OSCILLATOR, CERAMIC: 25MHZ |
| QB1-3676-000 | 8 - 7 | SHAFT, CARRIAGE | WP2-5104-000 | 14 - TH201 | THERMISTOR: TBPS1473J475H5Q |
| QB1-3677-000 | 8 - 2 | FRAME, CARRIAGE GUIDE | WR1-5059-000 | 14 - BZ601 | BEEPER: CD11PA-Z |
| QB1-3681-000 | 12 - 7 | BUSHING, FORMS THICKNESS (L) | WT2-0256-000 | 12 - 4 | BUSHING, CORD |
| QB1-3682-000 | 12 - 6 | BUSHING, FORMS THICKNESS (R) | WT2-0387-000 | 12 - 5 | CLAMP |
| QB1-3683-000 | 7 - 5 | SPRING, TORSION | WT3-5060-000 | 5 - 6 | CORD, POWER |
| QB1-3684-000 | 8 - 8 | PAD, GRAESE | WT3-5069-000 | 5 - 4 | CORD, POWER |
| QB1-3685-000 | 7 - 3 | CLIP, SHAFT | WT3-5090-000 | 5 - 5 | CORD, POWER |
| | 8 - 4 | | XA9-1083-000 | S - 6 | SCREW, RS, M3X6 |
| QF5-0451-000 | 8 - 3 | IDLER ROLLER ASS'Y | XB1-2300-407 | S - 1 | SCREW, M3x4 |
| QF5-0456-000 | 2 - 1 | FRONT COVER ASS'Y | XB1-2301-207 | S - 2 | SCREW, M3x12 |
| QF5-0484-000 | 12 - 3 | FEED ROLLER ASS'Y | XB4-7300-609 | S - 3 | SCREW, TAP, BINDING HEAD, M3x6 |
| QF5-0485-000 | 12 - 2 | EJECT ROLLER ASS'Y | XB6-7300-607 | S - 4 | SCREW, TP: M3 x 6 MM |
| QG2-3032-000 | 6 - 1 | DC CONNECTOR ASS'Y | XB6-7300-807 | S - 5 | SCREW, MACHINE, WASHER HEAD, M3x8 |
| QG2-3033-000 | 9 - 9 | CARRIAGE BOARD ASS'Y | XD2-1100-282 | W - 1 | RETAINING RING (E-TYPE) |
| QG2-3037-000 | 9 - 3 | REGISTRATION SENSOR ASS'Y | XD2-1100-422 | W - 2 | RETAINING RING (E-TYPE) |
| QG2-3038-000 | 8 - 1 | INK SENSOR ASS'Y | | | |
| QG2-3039-000 | 4 - 3 | LOGIC BOARD ASS'Y | | | |
| QG5-0826-100 | 10 - 4 | SHEET FEEDER UNIT | | | |
| QG5-0828-020 | 13 - 2 | PICK-UP ROLLER UNIT | | | |
| QG5-1247-000 | 3 - 1 | UPPER COVER UNIT | | | |
| QG5-1249-000 | 5 - 1 | BOTTOM CASE UNIT | | | |
| QG5-1250-000 | 5 - 2 | OUTPUT TRAY UNIT | | | |
| QG5-1252-000 | 8 - 5 | CARRIAGE UNIT | | | |
| QG5-1254-000 | 10 - 7 | PRESSURE ROLLER ASS'Y | | | |
| QG5-1256-000 | 7 - 1 | PURGE UNIT | | | |
| QG5-1259-000 | 10 - 5 | TRANSMISSION GEAR UNIT | | | |
| QG5-1265-000 | 11 - 3 | SPUR HOLDER ASS'Y | | | |
| QH2-2272-000 | 9 - 5 | CARRIAGE RIBBON CABLE | | | |
| QH2-2273-000 | 9 - 6 | CARRIAGE RIBBON CABLE | | | |

The printing paper contains
70% waste paper.

Canon

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## Trademarks

# Using Your Documentation

The following documentation is supplied with the Canon BJC-6000 Series Color Bubble Jet™ Printer to help you efficiently use your new printer.

## Quick Start Guide
This sheet describes the steps you follow to unpack and set up your printer, and install the BJ Printer Driver that allows your printer to communicate with your computer. You can follow the steps illustrated in the booklet to start printing in minutes.

## User's Manual
This manual offers detailed information on how to operate your printer. It includes printing operations, maintenance, troubleshooting, and specifications. Read this manual to master basic operations and when you need to know the specifications of the printer.

## Conventions

This *User's Manual* uses the following conventions to alert you to information that will help you operate the printer correctly and safely.

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

Cautions alert you to operations that could cause damage to your hardware or software, or cause injury to yourself.

Distinctive typefaces identify the printer buttons you press, the lights on the operator panel, and any commands you enter at your computer.

■ The buttons you press appear in this typeface: **POWER** button.

■ The lights on your printer appear in this typeface: POWER light.

■ When you type something on your computer, it appears in this typeface: `DIR/P`.

■ When you press a Windows button, it appears in bold: Click **OK**.

# Contents

Congratulations on your purchase of the Canon BJC-6000 Series Color Bubble Jet Printer. We appreciate your choosing this printer to meet your printing needs.

The BJC-6000 Series printers offer excellent print quality and fast print speed using both color and black inks. We are certain you will be satisfied with this advanced Bubble Jet technology.

This chapter:

- ■ Lists the supplies and accessories you can purchase for the printer

- ■ Describes Canon's customer support services

## Supplies and Accessories

Your BJC-6000 Series printer supports excellent and unique print media options that will allow you to produce dazzling, professional, and fun presentations. All of these print media are specially designed and manufactured to work with your Canon color printer so you can produce the finest output possible.

Canon has an extensive dealer network equipped to offer you supplies as you need them. To find a dealer near you, call the Canon Referral Service at **1-800-848-4123**.

If supplies are not available from your local dealer, you can order directly from Canon by calling **1-800-385-2155**.

# BJ® Cartridges and BJ Tanks

You can use the following BJ cartridges with the BJC-6000 Series printers:

- BC-30 Black BJ Cartridge
- BC-31 Color BJ Cartridge
- BC-32 Photo BJ Cartridge

You can purchase the following BJ tanks for use in the BJ cartridges:

- For the BC-30 Black BJ Cartridge
  - BCI-3BK Black BJ Tank
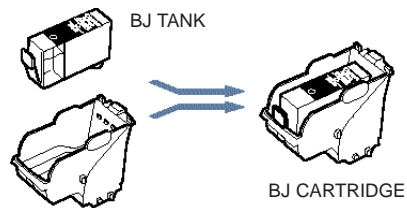
- For the BC-31 Color BJ Cartridge
  - BCI-3C Cyan BJ Tank
  - BCI-3M Magenta BJ Tank
  - BCI-3Y Yellow BJ Tank
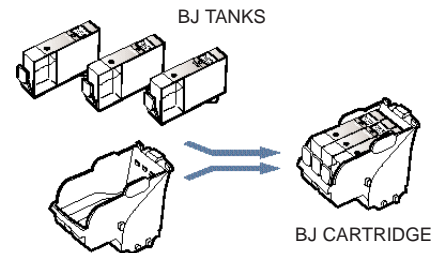
- For the BC-32 Photo BJ Cartridge
  - BCI-3PBK Photo Black BJ Tank
  - BCI-3PC Photo Cyan BJ Tank
  - BCI-3PM Photo Magenta BJ Tank
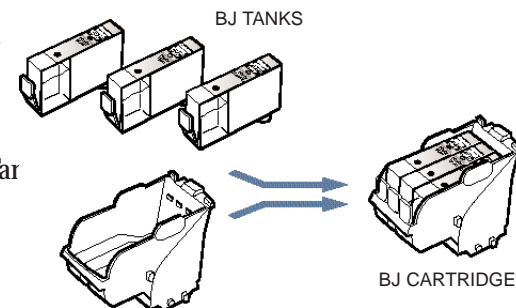
The BJ cartridges for this printer contain the Bubble Jet print head only. You install the BJ tanks into the BJ cartridges after you install the cartridge print head unit in the printer.

The BJ tanks contain ink only.

The BJ cartridges that come with your printer depend on the model.

Canon has more engineers dedicated to creating quality ink for providing the best results for output on Bubble Jet printers than any other organization. Canon does not prohibit the use of third-party inks and the use of third-party inks does not invalidate the product's limited warranty. However, Canon cannot guarantee the quality or performance of your printer when you are using inks from other suppliers.

Canon's limited warranty does not cover damage caused to Canon's Bubble Jet products that is attributable to the use of third party parts or supplies, including inks. The limited warranty remains in effect for its life once that particular damage has been properly repaired.

For optimum printing results, Canon recommends that you use Canon BJ cartridges.

## Canon Specialty Papers

Canon manufactures numerous specialty papers, including:

- Bubble Jet Paper

- Brilliant White Paper

- Banner Paper

- High Gloss Photo Film

- Glossy Photo Paper

- Glossy Photo Cards

- High Resolution Paper

- T-Shirt Transfers

- Greeting Cards

- LetterPlus Letterhead Paper

- Fabric Sheet

- Back Print Film

- Transparencies

See Chapter 3, *Paper Handling*, for details on Canon's Specialty Papers.

# Customer Care Center

Canon Computer Systems, Inc. offers a full range of customer technical support* options including:

■ 24-hour, 7-day-a-week, toll-free automated support for troubleshooting issues on most current products (**1-800-423-2366**)

■ Speak to a technician free of service charge (currently Monday– Friday, 8:00 a.m.–10:00 p.m. EST, excluding holidays) for products still under warranty** (**1-757-413-2848**)

■ Speak to a technician (currently $24.99) during holidays and days/hours not listed above regarding urgent product questions or for products no longer under warranty (**1-800-423-2366**)

   Or for a charge of $2.50 per minute, to a maximum of $25.00 per call (**1-900-246-1200**)

■ To find out about all Canon products and accessories, to download the latest drivers, and to explore all your technical support options including e-mail support, visit the Canon Computer Systems, Inc. Web site (**www.ccsi.canon.com**)

■ 24-hour, toll-free Fax Retrieval System (**1-800-526-4345**)

■ To download the latest printer driver using your modem, 24-hour Bulletin Board Service (**1-757-420-2000**)

Canon Canada
 Within Canada, 24 hours a day, 7 days a week* (**1-800-263-1121**).

   *Support program specifics subject to change without notice.
**Refer to individual product information for warranty details.

In other countries, please contact your Canon dealer.

# Servicing the Printer

The Canon BJC-6000 Series Color Bubble Jet Printer is designed with the latest technology to provide trouble-free operation. The Warranty Card that comes with the printer describes Canon's limited warranty for your Bubble Jet printer. Be sure to read the warranty information to find out about the different service options available to you.

**Save your sales receipt for proof of purchase**. In the event that your printer needs service, you will need your proof of purchase to obtain warranty service.

If you feel your BJC-6000 Series Color Bubble Jet Printer needs servicing, contact Canon on the World Wide Web (www.ccsi.canon.com) to locate the Canon Authorized Service Facility (ASF) nearest you. If you do not have access to the Web, you can call Canon (see page 1-4).

# Using the Printer With Windows  2

This chapter describes how to use the printer with your Windows® applications. It includes:

- Using a printer driver

- Printing a document

- Printer setup within Windows 98 and Windows 95

- Printer setup within Windows 3.1

- The Windows tabs

- Recommended Print Mode settings

- Customizing the Print Mode

- Using the BJ Printer Status Monitor

- Printing speed versus color

## Using a Printer Driver

Before you can use any type of printer with your computer, you must install software that allows the printer and computer to communicate; this software is called a **printer driver**. The printer driver tells the computer what kind of a printer you are using. The printer driver also controls the various settings, such as print quality and paper type. You define these settings within the printer driver, and the printer driver then communicates the settings to both the computer and the printer.

> You must install the BJC-6000 Series Printer Driver for Windows before you can use the printer with your computer. See your *Quick Start Guide* for instructions.

# Printing a Document

This procedure describes the general steps required for printing from various Windows applications. The exact steps for printing a document may vary depending on the application program you are using. Refer to your software application's documentation for the exact printing procedure.

**1** Start your application.

Start the program you are using to create the document, and open the document you want to print.

**2** Make sure the Canon BJC-6000 is selected as your default printer.

Choose Print or Print Setup from the File menu. You will see a screen similar to this:

Click on the **Properties** (or **Setup**) button if you want to make any adjustments as appropriate for printing your document. (See *Printer Setup Within Windows 98 and Windows 95* or *Printer Setup Within Windows 3.1* for details.)

After making any necessary changes to the printing options, select **OK** to start the print job.

CLICK HERE TO CHANGE YOUR PRINT SETTINGS

### Print Setup

Printer
Name: Canon BJC-6000 — Properties
Status: Default printer; Ready
Type: Canon BJC-6000
Where: LPT1:
Comment:

Paper
Size: Letter 8.50 x 11.00 in
Source: Auto Feeder

Orientation
• Portrait
○ Landscape

OK    Cancel

CLICK HERE TO START PRINTING
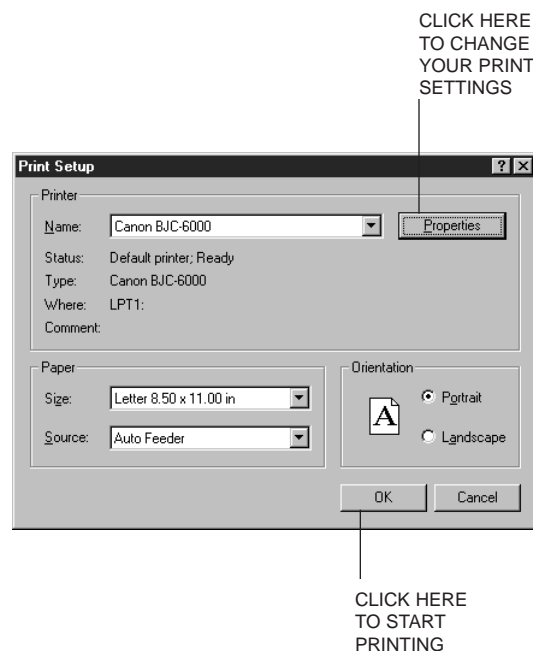
# Printer Setup Within Windows 98 and Windows 95

You can use the printer with all your Windows 98 and Windows 95 applications.

## Opening the Printer Properties Dialog Box in Windows 98 and Windows 95

You can open the Properties dialog box in one of the following ways:

■ From within any Windows application, you can select the **Print** or **Print Setup** command.

■ From the Printers folder, you can select the printer and then select the **Properties** command from the File menu.

■ From the Printers folder, you can select the printer, click the right mouse button, and then select **Properties** from the drop down list.

## Using the Printer Driver in Windows 98 and Windows 95

The printing options are displayed on the following Windows 98 and Windows 95 tabs: General, Details, Main, Paper, Features, and Maintenance. See *The Windows Tabs* section (page 2-5) for details. (You may also see a Sharing tab if your printer is being shared by a Network.)

For detailed information on any of the printing options, you can use the Windows 98 and Windows 95 online Help:

■ Use the right mouse button to click an item on the screen; then click the **What's This?** command.

■ Click **?** and then click an item.

■ Press **F1**.

# Printer Setup Within Windows 3.1

You can use the printer with all your Windows 3.1 applications.

## Accessing the Printing Options

You can access the printing options from the Printers dialog box in the Control
Panel, or you can select the Print Setup option available from the File menu of
most applications that run in Windows.

If the **Print Setup** option does not appear in the File menu for your application,
refer to the user's manual supplied with the application. It should provide
information about changing the printer setup parameters.

In Windows 3.1, the printing options are displayed on these tabs: Main, Paper,
Features, and Maintenance. See the next section, *The Windows Tabs*, for details.

# The Windows Tabs

The BJC-6000 Series Printer Driver for Windows has several tabs from which you can select your printing options. Be sure to use the Windows help features to learn more about using these settings.

## The General Tab

This tab allows you to add comments regarding the printer driver and print a test page or a separator page. (You see this tab in Windows 98 and Windows 95 only and only when you open the Properties dialog box from the Printers folder, not from within a Windows application.)



ADD COMMENTS HERE

PRINT A SEPARATOR PAGE

PRINT A TEST PAGE
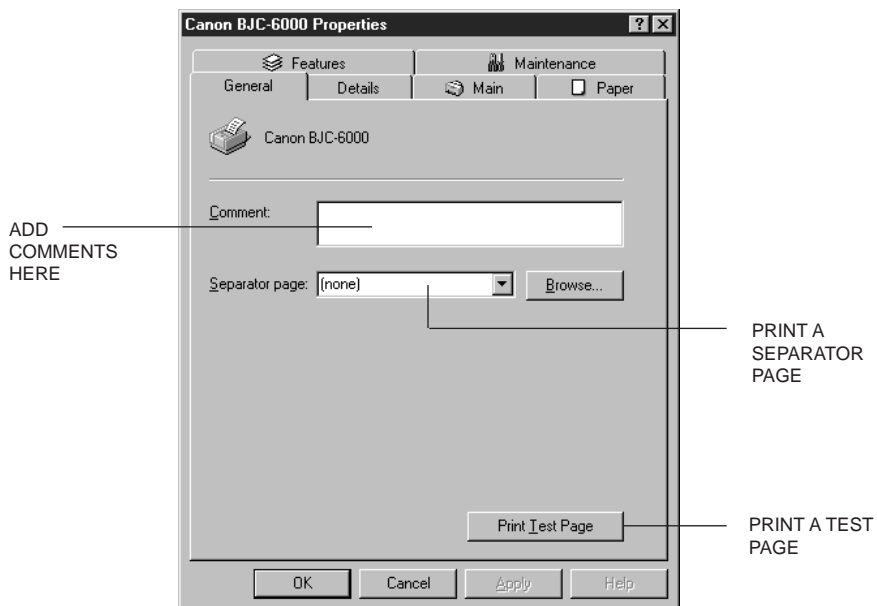
# The Details Tab

This tab allows you to specify printer port settings, spool settings, and time-out settings. (You see this tab in Windows 98 and Windows 95 only and only when you open the Properties dialog box from the Printers folder, not from within a Windows application.)
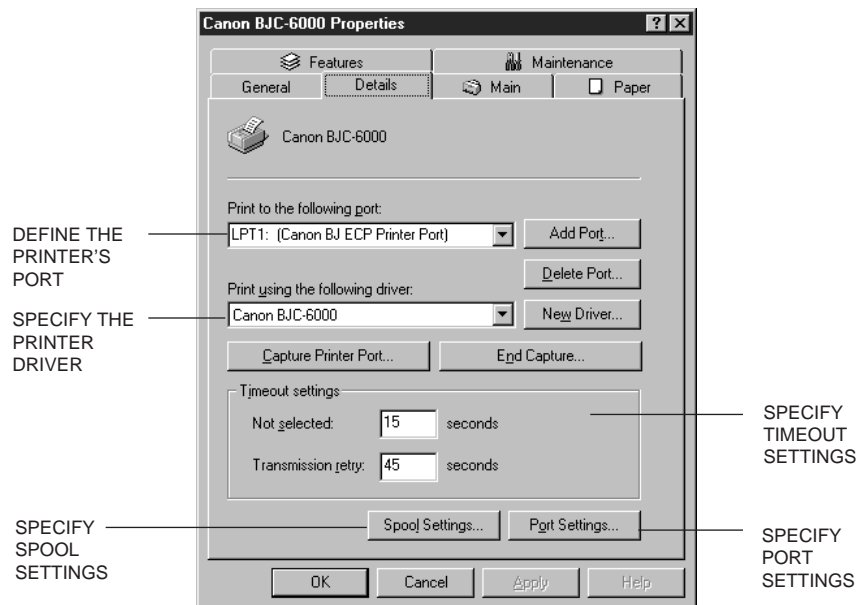
# The Main Tab

This tab allows you to select your Print Mode and specify your Media Type. (The printing options on this tab are the same for Windows 98, Windows 95, and Windows 3.1.)

SELECT YOUR PRINT MODE, WHICH INCLUDES PRINT QUALITY AND COLOR SETTINGS

**Canon BJC-6000 Properties**

Features | Maintenance
General | Details | Main | Paper

Choose Print Mode:

Text | Text | SuperPhoto | Auto | Draft

SPECIFY THE TYPE OF BJ CARTRIDGES INSTALLED

BJ Cartridge: Black/Color

Grayscale Print

Media Type: Plain Paper

SELECT YOUR MEDIA TYPE

ILLUSTRATES THE CURRENT PAPER SETTINGS

A) Direction: Portrait
Feed: Auto Feeder

C) Thickness Lever: Up

Advanced... | About... | Defaults

RESTORE DEFAULT SETTINGS

OK | Cancel | Apply | Help

CLICK HERE TO CREATE A CUSTOMIZED PRINT MODE SETTING. (SEE PAGE 2-13 FOR DETAILS)

CLICK HERE TO PRINT COLOR DATA AS GRAYSCALE

Using the Printer With Windows

# The Paper Tab

This tab allows you to specify paper size and page orientation. (The printing options on this tab are the same for Windows 98, Windows 95, and Windows 3.1.)

SPECIFY YOUR PAPER SIZE

SPECIAL PRINTING FEATURES:
- SCALED—TURN ON TO ENLARGE OR REDUCE PRINTING
- PAGE LAYOUT—TURN ON TO PRINT 2 OR 4 PAGES ON A SINGLE SHEET
- BANNER—TURN ON FOR BANNER PRINTING

SPECIFY PAGE ORIENTATION (HOW DOCUMENT PRINTS ON A PAGE)

RESTORE DEFAULT SETTINGS

FOR SCALED OR PAGE LAYOUT PRINTING, SPECIFY SIZE OF PAPER IN PRINTER
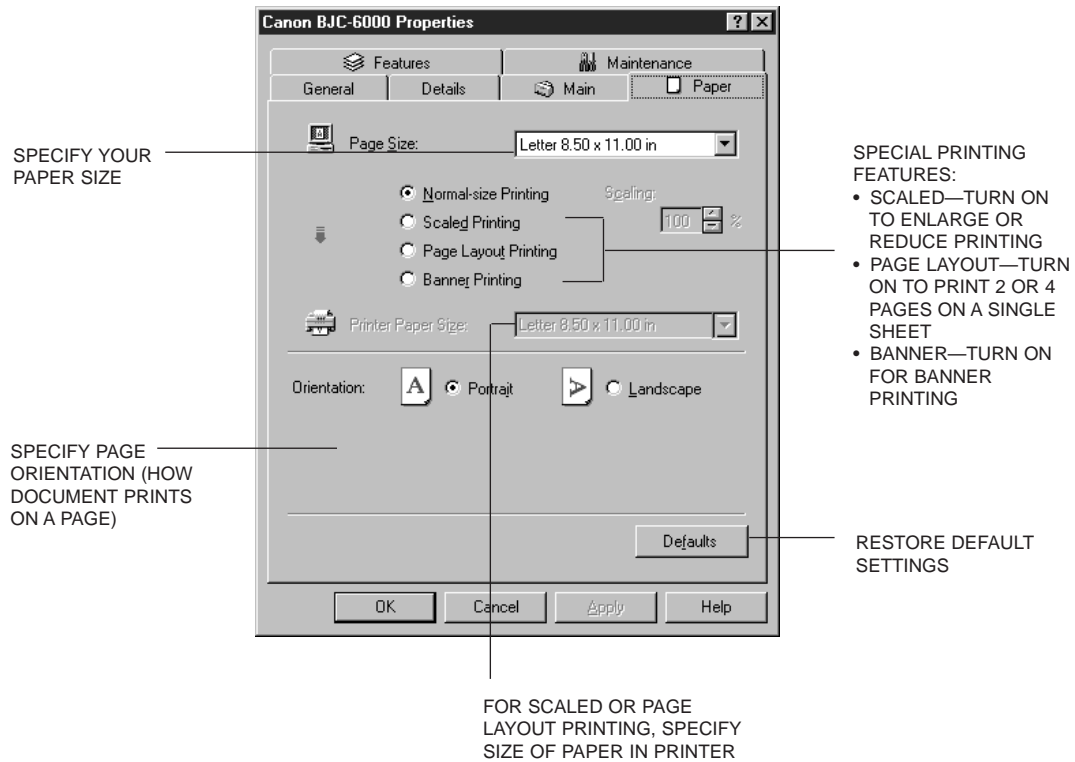
# The Features Tab

This tab allows you to specify background printing features, which include multiple copies and page layout. (The printing options on this tab are the same for Windows 98, Windows 95, and Windows 3.1.)

ENABLE OR DISABLE BACKGROUND PRINTING FEATURES

SPECIFY NUMBER OF COPIES TO PRINT

ENABLE PRINTING IN REVERSE ORDER (LAST PAGE TO FRONT PAGE)

ENABLE COLLATING FOR MULTIPLE COPIES

PRINT BORDERS TO SEPARATE PAGES

SPECIFY A GRAPHIC STAMP TO BE PRINTED ON YOUR DOCUMENT (DRAFT, CONFIDENTIAL, URGENT, ETC.)

ENABLE TO PRINT 2 OR 4 PAGES ON A SINGLE SHEET

CLICK TO VIEW OR CHANGE THE STAMP SETTINGS

RESTORE DEFAULT SETTINGS
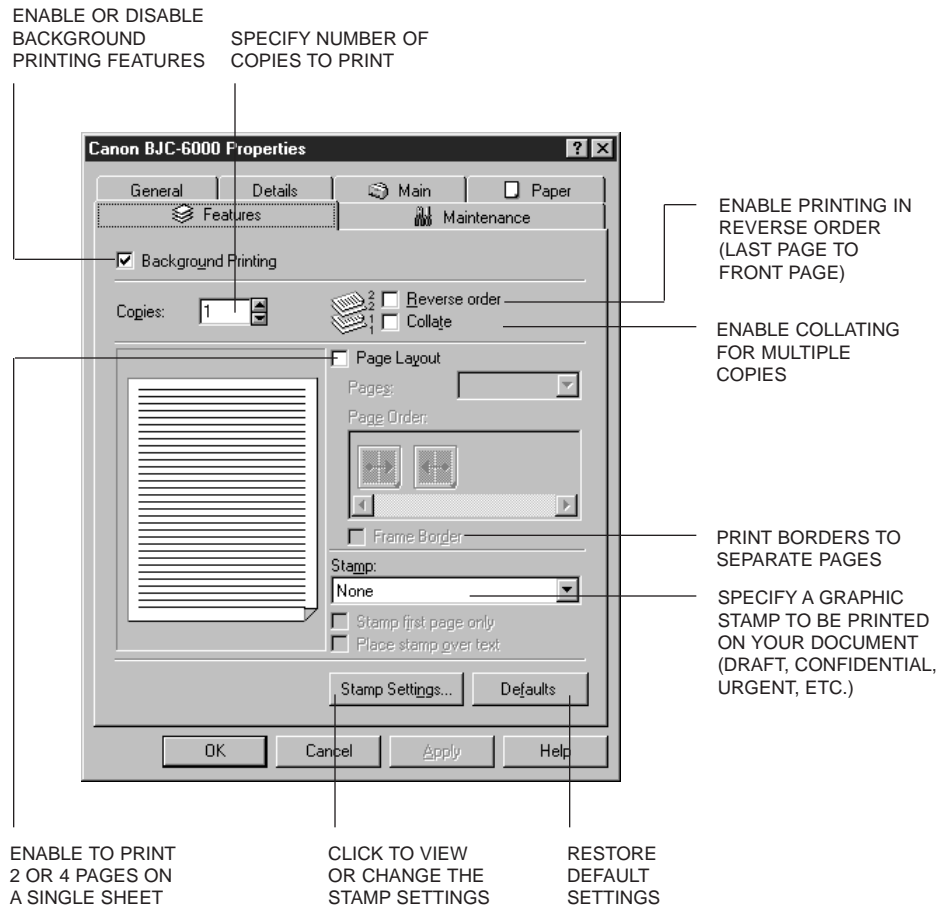
# The Maintenance Tab

This tab allows you to initiate print head cleaning, roller cleaning, and test prints. You can also turn the printer on or off and start the BJ Printer Status Monitor. (The printing options on this tab are the same for Windows 98, Windows 95, and Windows 3.1.)

CLEAN THE PRINT HEAD
• CUSTOM CLEANING
• DEEP CLEANING

PERFORM TEST PRINTS
• NOZZLE CHECK PATTERN
• PRINT HEAD ALIGNMENT

POWER THE PRINTER
ON OR OFF

ALLOWS YOU TO SELECT
SPECIAL FEATURES
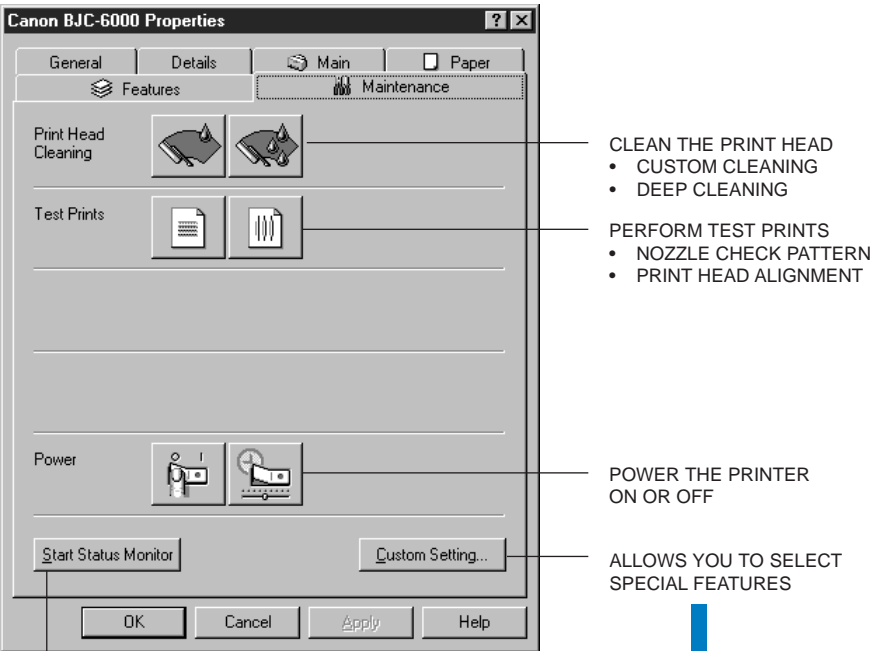
START THE
BJ PRINTER
STATUS MONITOR
(SEE PAGE 2-16)

CLICK ON THE BOX NEXT TO THE
SETTING TO ENABLE (CHECK) OR
DISABLE (NO CHECK) THE SETTING.
WHEN THE CURSOR IS OVER THE
SETTING, A DESCRIPTION OF THE
SETTING IS DISPLAYED AT THE
BOTTOM OF THE SCREEN.
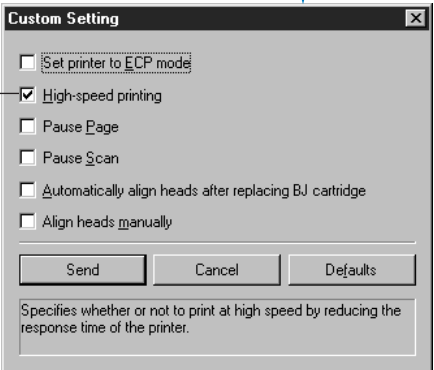
## Specifying Your Printing Options on the Windows Tabs

Be sure to use your online help to find out about the settings available for each printing option.

■  To move between the Windows tabs, click on any of the tabs.

■  To save the settings and exit, click the **OK** button.

■  To cancel your setting selections on a tab, click the **Cancel** button.

■  To save your settings without exiting, click the **Apply** button.

■  To access helpful information about the printer and the printer driver, click on the **Help** button.

■  To find out about a setting, click the question mark **?** in the upper right corner. Move the larger question mark to the setting you are interested in and click again.

# Recommended Print Mode Settings

You select the Print Mode options on the Main tab to achieve the specified results.

The Print Mode you select optimizes the printer's settings for print quality, media, paper feed method, and color adjustment.

Select one of the following Print Modes on the Main tab:

**Text**
Optimum setting for printing text. Use the BC-30 Black and BC-31 Color BJ Cartridges with this setting.

**SuperPhoto**
Optimum settings for natural color in photos. Use the BC-31 Color and BC-32 Photo BJ Cartridges with this setting.

**Auto**
Optimum setting for combined text, illustrations, tables, graphs, and photos. Use the BC-30 Black and BC-31 Color BJ Cartridges with this setting.

**Draft**
Optimum setting for test printing; emphasizes speed rather than quality. Use the BC-30 Black and BC-31 Color BJ Cartridges with this setting.

**Photo**
Optimum setting for printing photographs. Use the BC-30 Black and BC-31 Color BJ Cartridges with this setting.

**Graphics**
Optimum setting for printing graphic images. Use the BC-30 Black and BC-31 Color BJ Cartridges with this setting.

**Camera**
Optimum setting for digital camera images. Use the BC-31 Color and BC-32 Photo BJ Cartridges with this setting.

Click on the **Advanced** button to customize any of these settings. (See the next section for details.)

# Customizing the Print Mode

On the Main tab, you can click the **Advanced** button to customize the selected Print Mode. You see the following three tabs.

## The Quality Tab

On the Quality tab, you specify the settings for your customized print mode.

SPECIFY MEDIA TYPE

SELECT THE
TYPE OF
CARTRIDGE
INSTALLED

SPECIFIES PAPER FEED
METHOD OF AUTO FEED

SPECIFIES THE
BALANCE BETWEEN
PRINT QUALITY AND
PRINT SPEED

ENABLES THE IMAGE
DATA CORRECTION
FEATURE TO SMOOTH
LOW-RESOLUTION
IMAGE DATA FOR
PRINTING

ADJUSTS THE COLOR
BALANCE OF A DIGITAL
CAMERA IMAGE WHEN
PRINTING IT OUT

RESTORES THE
DEFAULT SETTINGS

SPECIFY HALFTONING

- **AUTO**—ALLOWS THE PRINTER TO DETERMINE THE
  TYPE OF IMAGE DATA AND APPLY THE APPROPRIATE
  DITHERING METHOD
- **FINE (FAST)**—USE FOR HIGH SPEED PRINTING OF
  CHARACTERS OR TABLES
- **FINE**—USE FOR PRINTING GRAPHICS OR CHARTS
  WITH CLEARLY DEFINED COLOR BOUNDARIES
- **DIFFUSION**—USE FOR PRINTING NATURAL COLOR
  IMAGES SUCH AS PHOTOGRAPHS

# The Color Tab

On the Color tab, you can adjust the color and intensity settings for your customized print mode.

ENABLE OR DISABLE COLOR ADJUSTMENT (USING COLOR ADJUSTMENT REDUCES PRINTING SPEED)

ADJUSTS THE CONTRAST AMONG INTERMEDIATE TONES THAT FALL BETWEEN BLACK AND WHITE

SPECIFIES HOW TO PROCESS COLOR VALUES SO THEY BEST APPROXIMATE THE ORIGINAL

ADJUSTS THE LUMINOSITY OF THE FOUR COLOR INKS

SPECIFIES WHETHER PRINTED OUTPUT EMPHASIZES INTER-MEDIATE TONES OR BRIGHT, SHARP BASIC COLORS

ADJUSTS THE PRINT INTENSITY TO MAKE THE OVERALL PRINTED OUTPUT DARKER OR LIGHTER

RESTORES THE DEFAULT SETTINGS

---

# The Save Tab

You use the Save tab to save your customized print mode.

CHANGES THE ORDER OF
THE ICONS; MOVES THE
SELECTED ICON

DISPLAYS CURRENT
PRINT MODES

SPECIFY A NEW ICON
FOR THIS PRINT
MODE SETTING

SPECIFY A NEW
NAME FOR THIS
PRINT MODE

DESCRIBES THE
NEW PRINT MODE

SAVE THE NEW
PRINT MODE
SETTING
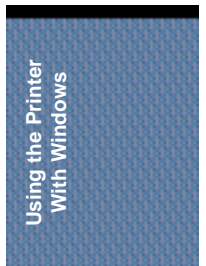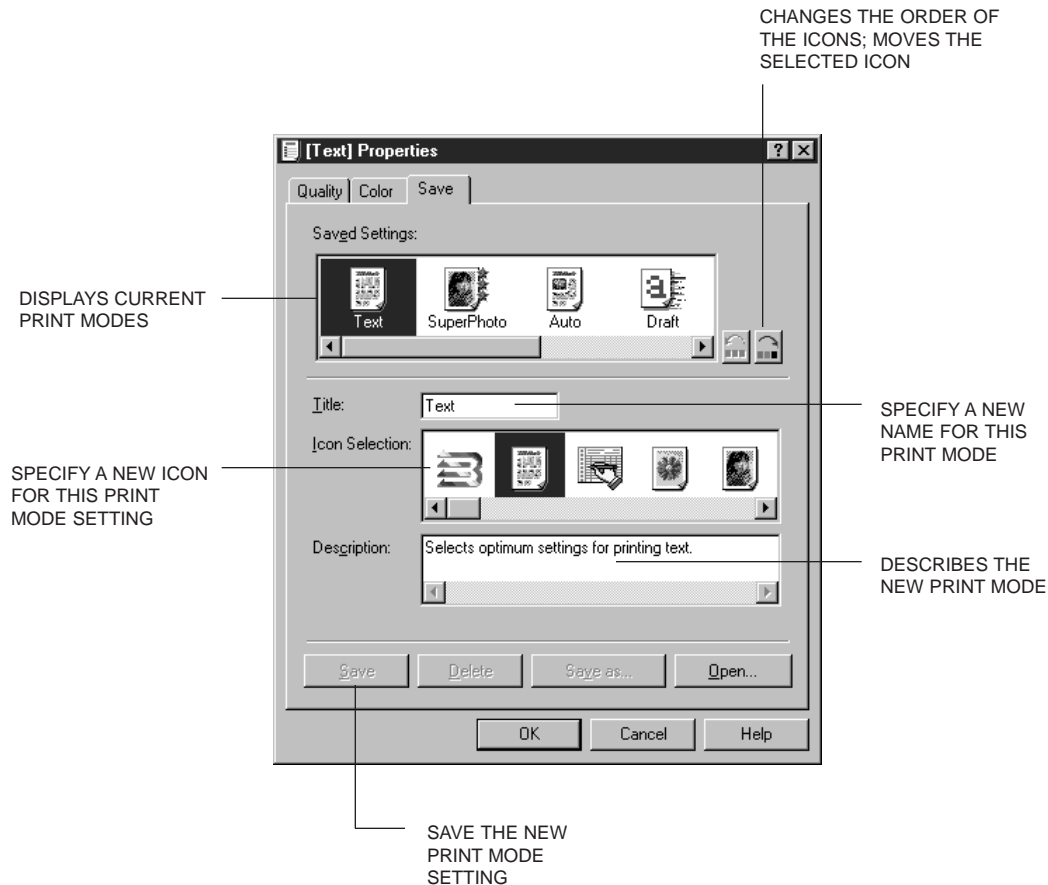
Be sure to save your new setting if you want to use it in the future.

Using the Printer
With Windows

# Using the BJ Printer Status Monitor

The BJ Printer Status Monitor shows the printer status and the progress of documents printing in Windows.

The BJ Printer Status Monitor is automatically enabled; therefore, you will see the following screen whenever you initiate a print operation. You can also start the BJ Printer Status Monitor by clicking the **Start Status Monitor** button on the Maintenance tab (see page 2-10).
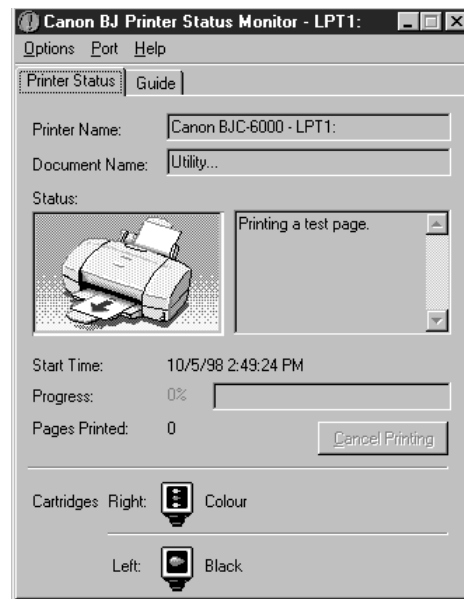
# Printing Speed Versus Color

The BJC-6000 Series Printer Driver for Windows can interpret and translate the full spectrum of colors, up to 16.7 million colors. When printing in color, there is a significant increase in the amount of information that the driver has to interpret and translate. When printing black ink only, the driver has only one color to interpret.

By decreasing the amount of colors that the printer driver has to interpret, you can significantly decrease the time needed to translate the information. This will speed up the overall printing process.

## Ways to Improve Print Speed in Windows

To improve printing speed, you can try the following:

- Turn off the Print Manager in the Windows Control Panel
  (Windows 3.1 only)
  This avoids the extra step of sending the print file to the Print Manager and may increase your printing speed by as much as 25%, depending on the computer you are using.

- Add a permanent swap file in Windows 3.1
  Under the 386 Enhanced icon in the Windows Control Panel, add or create a permanent swap file that is from 4 MB to 9 MB. The computer will be able to prepare the print file faster. See your Windows documentation for instructions.

- Avoid diffusion halftones
  Choose Diffusion for Halftoning only when printing final output or photographic images. To specify Halftoning, click the **Advanced** button on the Main tab in the printer driver and then click the Quality tab. Choosing a Halftoning setting of Fine/Fast allows documents to print as much as 20% faster because the computer does not need to compute to "best possible position" for each dot.

- Avoid color adjustment
  In the Color tab, disable the Color Adjustment option. This feature takes longer to process in the computer because it requires special information. (To disable Color Adjustment, click the **Advanced** button on the Main tab in the printer driver and then click the Color tab.)

- **Free up your memory**
  Use only one software program at a time and unload any screen saving utilities or programs stored in Windows background; this frees up more memory for Windows processing.

- **Use the Draft setting for Print Mode**
  If you will be printing text in black ink only, choose a Print Mode of Draft or Text. Use Draft mode to emphasize speed rather than quality. In Draft mode, the printer will need to disperse fewer dots.

- **Limit the number of colors on each page**
  The computer will need to calculate and transmit fewer dots. Too many colors can make the image confusing and less effective as well as cause the print speed to slow down.

- **Use primary colors when printing presentation graphics**
  Use black, yellow, blue, green, and red when possible. The computer will need to calculate and transfer less dot information.

- **Use Plain Paper as the Media Type**
  The print head will make one or two passes for each printed line.

- **Use smaller graphics and more white space in your documents**
  The computer will be able to prepare the print file faster.

- **Add RAM to your computer**
  The computer will be able to prepare the print file faster.

- **Use a computer with a faster processor**
  The computer will be able to prepare the print file faster.

# Paper Handling 3

This chapter describes how to use the printer for all your printing operations. It includes:

- Selecting paper types

- Printer settings for various print media

- Loading paper

- Printing on envelopes

- Using Canon Specialty Papers

To ensure the best performance of your printer, you'll want to select the best paper and load it correctly. You can stack paper in the sheet feeder to load it automatically, or you can manually feed one sheet at a time.

## Selecting Paper Types

One of the most important things you can do to assure the best possible performance of your Bubble Jet printer is to select the correct paper. Your printer produces letter quality print on most plain bond papers, including cotton bond and photocopying papers; it does not require special ink jet papers. However, the print quality varies with different paper types. Be sure to test a type of paper before you purchase a large quantity.

Plain Paper
The printer supports paper sizes of letter, letter plus, legal, A4, and A4 plus in portrait orientation. You can use regular copier paper, cotton bond papers, and typical letterhead. Always use paper without curls, folds, staples, or damaged edges. Copier paper has a preferred side for printing. Look at the label on the package to see which side to print on first.

High Gloss Photo Film
The Canon High Gloss Photo Film features a bright white finish that lends striking visual power to charts, graphs, and photographic images. Use this film to make your presentation materials and graphics look professional. When printing on this film, use the BC-32 Photo and BC-31 Color BJ Cartridges. In the printer driver, select the appropriate Print Mode and select High Gloss Photo Film for the Media Type.

### Glossy Photo Paper

Canon Glossy Photo Paper is a high gloss, thicker paper that produces the look and feel of a photograph. Use this paper with the BC-32 Photo and BC-31 Color BJ Cartridges to produce photo-quality prints from your printer. In the printer driver, select Super Photo for the Print Mode and select Glossy Photo Paper for the Media Type.

### Glossy Photo Cards

Use Canon's Glossy Photo Card media when printing a 4" × 6" image. These cards are the same stock as Canon's Glossy Photo Paper and have perforations around the printable area. You can print beyond the perforation and then tear off the margins; this allows you to fill the entire card with an image or color. In the printer driver, select Glossy Photo Cards for the Media Type. Be sure to read the instructions that come with the Glossy Photo Cards.

### Banner Paper

Canon's Banner Paper is specifically designed for printing one continuous sheet in a banner format. The connected sheets are divided by a perforation. You can print from two to six sheets at one time. In the printer driver, you select Banner Printing on the Paper tab.

### Brilliant White Paper

Canon's unique paper formulation gives you a bright white printing surface that produces incredibly brilliant colors and dark, crisp black text. This paper works great for everyday use, as well as proposals, color presentations, color charts and graphs, flyers, and newsletters. You can print on both sides of the sheet. In the printer driver, select Plain Paper for the Media Type when you load this paper.

### High Resolution Paper

Canon's High Resolution Paper is designed to produce photo-realistic quality output with sharp and vivid graphics. For best results, use the BC-32 Photo and BC-31 Color BJ Cartridges to produce images comparable to your favorite photographs. In the printer driver, be sure to select High Resolution Paper for the Media Type.

### T-Shirt Transfers

Use Canon's popular T-Shirt Transfers to create and personalize T-shirts, sweatshirts, aprons, tablecloths, napkins, tote bags, and anything else your imagination allows! Use on any cotton or cotton/poly blend fabric. Your image is printed in mirror image (when you select T-Shirt Transfer for the Media Type in the printer driver) so when you iron it onto the T-shirt, the image is viewed correctly. Be sure to use the BC-30 Black and BC-31 Color BJ Cartridges when printing T-Shirt Transfers.

## Bubble Jet Paper (water resistant)

The Canon Bubble Jet Paper has been developed for high quality printing with minimal or no smearing or running when in contact with water or damp surfaces, making it a good choice for damp or rainy environments. The paper is specially coated and printable on both sides. (In the printer driver, select Plain Paper for the Media Type when you load this paper.)

## Greeting Cards

Get the most out of your Canon Creative or other card making software with Canon Greeting Cards. These cards give your unique, personalized cards the look and feel of professional cards. You can create cards, invitations, announcements, and more. These cards come in regular size and half-fold. In the printer driver, select Other Paper for the Media Type.

## LetterPlus Letterhead Paper

This paper is $9 \times 13.3$ inches so you can print edge to edge and catch all your creativity on the page. Design your document to $8.5 \times 11$ inches with edge-to-edge color; then just remove the perforated margins for beautiful graphics and crisp, dark text. This paper is perfect for company letterhead, proposal covers, or any full-bleed design. (In your printer driver, select Plain Paper for the Media Type and Letter+ for Page Size when you load this paper. Make sure the settings in your software application match these settings.)

## Fabric Sheets

Use Fabric Sheets for Canon Bubble Jet printers to print banners, pillow covers, scarves, flags, and other textile items. Use these sheets for appliqués and other craft and sewing projects. Fabric sheets are $9.5 \times 14$ inches. In the printer driver, select the appropriate Print Mode and select Fabric Sheet for the Media Type.

## Transparencies

Canon Transparencies are recommended. These transparencies produce excellent contrast, sharpness, and color. In the printer driver, select Transparency for the Media Type.

## Back Print Film

Canon Back Print Film has been specially developed for Canon Color Bubble Jet printers. The film is designed to deliver brilliant, high-intensity color images suitable for business presentations, design work, or professional reports. Back print film is printed on the back (matte nonglossy) side of the film in mirror image and then viewed from the front or glossy side using a backlighting device. Be sure to select Back Print Film as your Media Type in the printer driver. For more details, ask a Canon Authorized Dealer for information or refer to the manual supplied with the film.
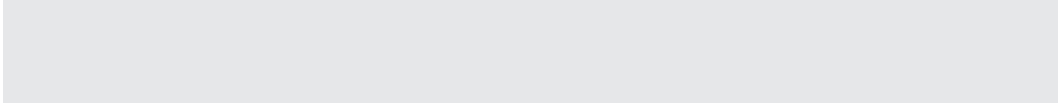
Assorted Paper Starter Kit
If you would like to try some of the papers described above, look for Canon's Starter Kit. It contains an assortment of five paper types.

If you are printing in an application outside Windows, your software application or printer driver must support mirror image printing in order to use Back Print Film or T-Shirt Transfers.

## Paper Guidelines

When selecting or loading paper, please remember the following:

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

■ Use cut-sheet paper only. You cannot use multipart paper.

■ Whenever possible, hold the paper by the edges and avoid touching the print side. Any scratching or soiling of the print side will adversely affect the print quality.

■ When storing paper, put the paper back in its original package and avoid locations that are exposed to direct sunlight or that are subject to high temperatures or humidity. To avoid bending or wrinkling the paper, store the package on a flat surface.

■ After printing, do not touch the print side until the ink is dry. If water gets on the printed media, do not touch the print side until the media is dry.

■ When using graph paper, the lines may not match because the 1/6-inch line spacing of the printer is slightly less than that of graph paper.

■ If the print density of your page is very high, light paper stock may curl slightly due to the large amount of ink. If you need to print dense graphics, try printing on thicker paper.

■ Do not use thick papers that do not meet the specifications for this printer. Printing with a paper that is thick enough to come in contact with the print head nozzles may damage the BJ cartridges.

# Printer Settings for Various Print Media

| Media | Paper thickness lever | Paper Feed Method | Limit (Sheets) |
|---|---|---|---|
| Plain paper | Up | Auto | Approx. 130 |
| High Gloss Film | Up | Auto | 1 |
| Glossy Photo Paper | Up | Auto | 10 (with Loading Support Sheet A) |
| Glossy Photo Cards | Up | Auto | 10 |
| Banner Paper | Up | Auto | 1 (2 to 6 sheets in length) |
| Brilliant White Paper | Up | Auto | Approx. 130 |
| High Resolution Paper | Up | Auto | Approx. 100 |
| T-Shirt Transfers | Down | Auto | 1 |
| Bubble Jet Paper | Up | Auto | Approx. 130 |
| Greeting Cards | Down | Auto | 1 |
| LetterPlus Letterhead Paper | Up | Auto | 1 |
| Fabric Sheets | Down | Auto | 1 |
| Transparencies | Up | Auto | 30 |
| Back Print Film | Up | Auto | 10 |
| Other heavier-weight print media | Down | Manual | 1 (max. thickness-0.6 mm) |
| Envelopes | | | |
|   Single | Down | Auto | 1 |
|   Stack | Down | Auto | 15 |

PAPER SUPPORT

PAPER THICKNESS LEVER

PAPER OUTPUT TRAY AND EXTENSION

# Loading Paper

You can stack paper in the sheet feeder to load it automatically, or you can manually feed one sheet at a time through the manual feed slot.

You can place approximately 130 sheets of plain paper (20 lb or 64 g/m$^2$) in the sheet feeder at a time.

You can stack approximately 30 sheets of transparency film or 10 sheets of glossy photo paper in the sheet feeder. However, these special media may not advance correctly under unusual environmental conditions (such as extreme temperatures or humidity). If you have trouble with special papers becoming skewed or feeding multiple sheets, do not stack them in the sheet feeder. Manually feed them one sheet at a time.

## Automatically Feeding Paper

**1** Prepare the printer.

Make sure the printer is turned on.

Pull the paper support up until it stops.

Lower the paper output tray and pull out its extension.

Make sure the paper thickness lever is in the up position
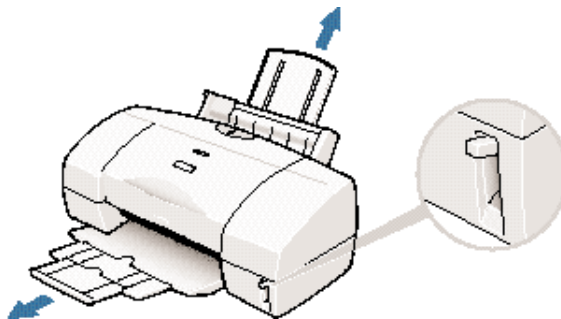
**2** Fan the paper.

For best results, fan the paper before loading it.

Always fan a stack of paper along the edge that will feed into the printer first.

Paper Handling
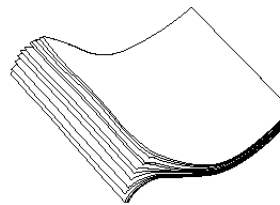
**3** Load the stack of paper.

Slide the stack of paper into the sheet feeder until it stops.

Align the edge of the paper with the right edge of the sheet feeder.

Secure the stack with the paper guide.

Make sure the stack does not exceed the limit mark.
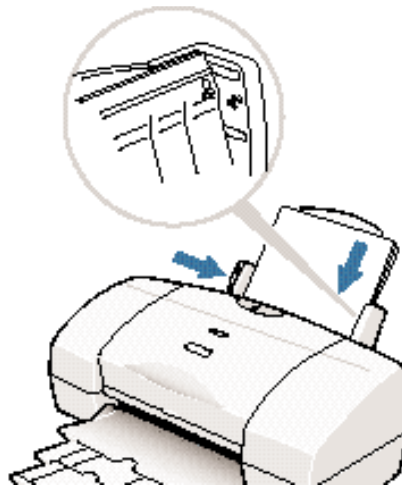


**4** Start your print operation.

Make sure that the printer is turned on.

Use the printer driver to set any necessary print properties; for example, you need to change the settings in the printer driver if you are printing photos or using special paper.

## Auto Feed Guidelines

When automatically feeding stacks of paper, follow these guidelines:

■ Do not open the front cover while printing. This will cause the printer to pause.

■ 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 the paper to misfeed or jam.

■ If your printed page contains lots of graphics, the ink on the page may be damp due to the print density. Remove the page right away and allow the ink to dry.

■ The capacity of the paper output tray is 130 sheets of paper. To reduce paper jams, remove paper from the output tray before the count reaches 130.

- If paper curls after printing, remove it immediately; otherwise, paper jams may occur.

- Depending on the density of your printed pages, the ink may need time to dry. Within two to three seconds, the ink becomes smudge resistant. After drying for several minutes, the ink becomes water resistant.

- Do not try to load paper into the sheet feeder beyond the paper limit mark ( ) or the tab on the right side of the sheet feeder; stacking too much paper may cause paper feeding or printing problems.

- Make sure there are no gaps between the stack of paper and the paper guide nor the right edge of the sheet feeder.

## Manually Feeding Paper

You use the manual feed function when printing on heavier-weight print media (17 lb to 143 lb, 64 g/m$^2$ to 500 g/m$^2$, or paper thickness up to 0.6 mm).

**1** Prepare the printer.

Make sure the printer is turned on.

Press the paper thickness lever down to the envelopes position ✉.
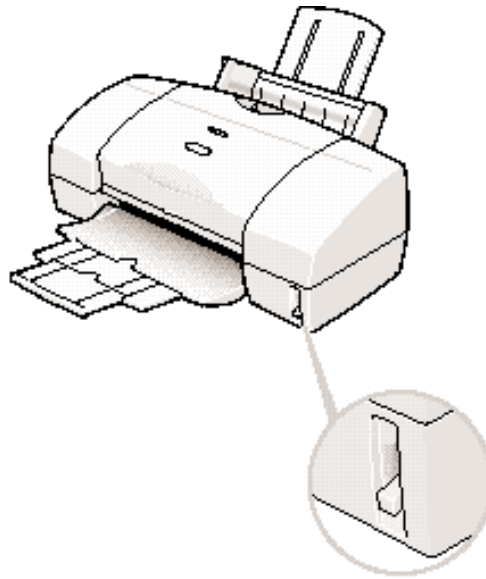
**2** Set up your print operation.

If you are using Windows, you must select Manual Feed in the printer driver for the printer to accept manually fed paper.

On the Main tab, click on the **Advanced** button. Then in the Quality tab, select **Manual Feed** for the Paper Feed type.
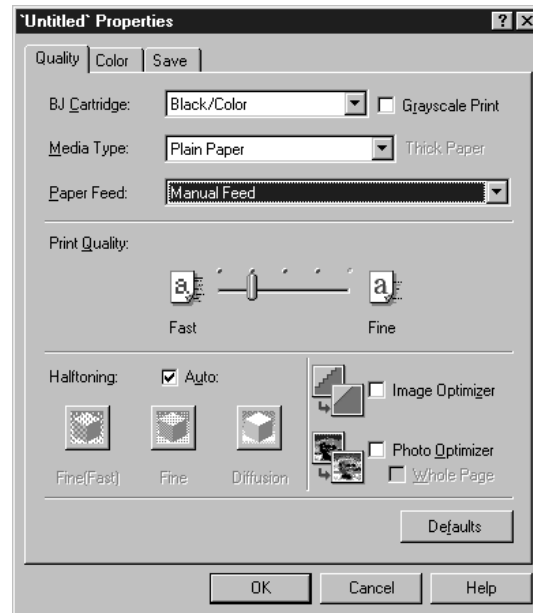


**3** Insert the single sheet.

With the print side up, align the left edge of the sheet with the left side of the manual feed slot on the back of the printer.

Insert the sheet into the manual feed slot until it stops and hold it in place for about one second until it feeds partially into the printer.
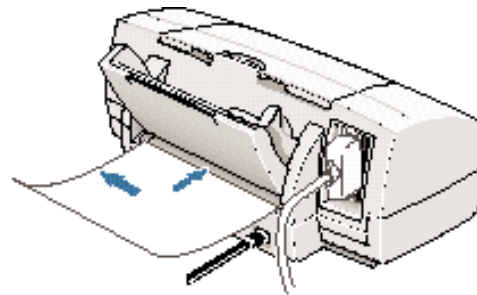
# Printing on Envelopes

You can stack up to 15 envelopes in the sheet feeder or you can manually feed envelopes one at a time.

U.S. Commercial number 10 (COM10) envelopes, and European DL envelopes are recommended. You may be able to stack envelopes of other sizes in the sheet feeder; however, Canon cannot guarantee consistent performance on envelope sizes other than COM10 and DL.

PRESS DOWN FIRMLY ON THE EDGES OF THE FLAP

The following envelopes are not recommended  smears, or may damage your printer.

- Envelopes with windows, holes, pe

- Envelopes made with special coated paper or deeply embossed paper.

- Envelopes using peel-off sealing stri

- Envelopes in which letters have been

When you are ready to print on envelopes, f sheet feeder. (You can also manually feed envelopes one at a time.)
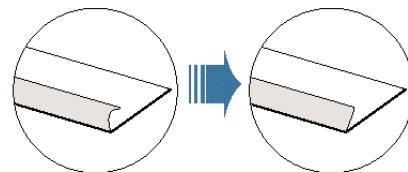
**1** Prepare the printer.

Make sure the printer is turned on.

Make sure the paper thickness lever is pressed down to the position for envelopes ✉.

Pull out the paper output tray and extension.

PRINT SIDE (ADDRESS SIDE)
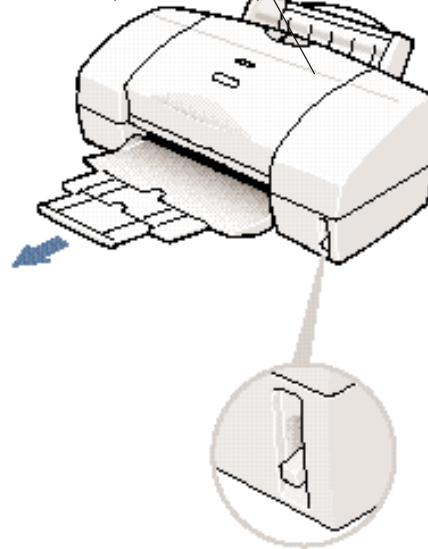
PAPER OUTPUT TRAY
AND EXTENSION

**2** Prepare the envelopes.

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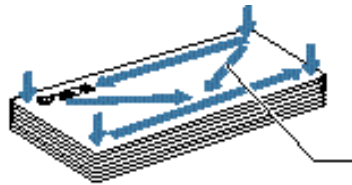
Press all the way around the envelopes to remove any curls and to expel air from inside the envelopes.

To remove curling from envelopes, hold the edges of the envelopes diagonally and bend gently.

Make sure any curls are removed from the flap of each envelope.

Use a pen or similar object to flatten the flaps.

Paper Handling

**3** Load the envelopes.

Load the top edge of the
address side (flap side down)
into the sheet feeder.

Align the stack with the right
side of the sheet feeder.

Insert the stack of envelopes
into the sheet feeder until it
stops.

Align the edge of the paper
guide with the left edge of the
stack of envelopes.

**4** Start your print operation.

Make sure the printer is turned on.

Set the envelope properties in the printer driver if necessary.

Normally you specify the envelope settings in your software application.

**5** Remove each envelope.

Remove each printed envelope
as it is ejected from the printer.

# Using Canon's Specialty Papers

This section provides guidelines for printing on some of Canon's Specialty Papers.

## Specialty Paper Guidelines

Be sure to read any instructions that come with your Canon specialty paper. These instructions provide important information regarding how to achieve the highest print quality with these papers.

Follow these guidelines:

■ When automatically feeding transparencies or back print film, it is a good idea to remove each sheet after it is delivered. You may not want film sheets to stack up.

■ Let the printed sheets of film or paper dry completely before storing them.

| Paper type | Drying time (approx.) |
| --- | --- |
| Canon High Gloss Photo Film | 10 minutes |
| Canon Glossy Photo Paper or Cards | 2 minutes |
| Canon Fabric Sheet | 1 hour |
| Canon Back Print Film | 15 minutes |
| Canon Transparencies | 15 minutes |

■ When a sheet of film has dried completely, cover its printed side with a sheet of plain (not coated) paper before storing it; this is recommended even if you place the sheets of film in a clear file or plastic holder.
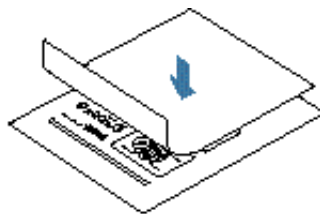
■ Before loading transparencies or back print film, insert one sheet of plain paper as the last sheet in the stack.

■ Do not leave the film in the sheet feeder for long periods of time. Dust and dirt may accumulate on the film resulting in spotty printing.

Paper Handling

- To avoid smudging caused by fingerprints, handle film by holding the edges only.

- To avoid fading, do not expose the printed film to prolonged sunlight.

- Store unused papers and films flat. Do not remove papers from their protective packaging until you are ready to use them.

- Store unused film at temperatures between 59°F to 86°F (15°C to 30°C). The relative humidity should be between 10% and 70%.

## Printing and Uncurling Back Print Film

Be sure to print on the back (matte nonglossy) side of the film. Your data is printed in mirror image so it can be viewed from the front or glossy side using a back lighting device.

If Back Print Film becomes curled, follow these steps to uncurl it:

**1** Cover the non-glossy side of the film with a sheet of plain paper.

PAPER SUPPORT
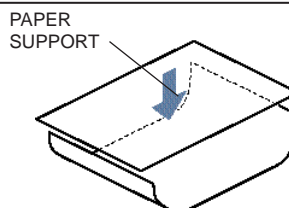
**2** Roll the film and paper up in the direction opposite the curl.

Do not roll the film too tight.

The film and paper rolled together should be about one inch (2.5 cm) in diameter.

PAPER OUTPUT TRAY AND EXTENSION

**3** Keep the film rolled up for about five minutes.

You may want to fasten the roll with a small piece of tape.

PAPER THICKNESS LEVER
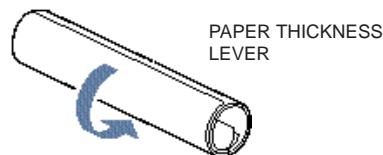
# Using the Cleaning Sheet for High Resolution Paper

Canon's High Resolution Paper is designed for high quality printing. This paper is specially coated to produce delicate color output.

After using a package of High Resolution Paper (100 sheets), you need to use the cleaning sheet enclosed with the paper to remove paper dust from the printer's rollers; this will help prevent paper feed problems.

---

**1** Set up the printer.

Make sure the paper support and paper output trays are extended.

---

**2** Insert the cleaning sheet.

Remove the two pieces of tape from the sheet.

Insert the sheet with the sticky side out (toward you) and down (going into the sheet feeder).

Adjust the paper guide to the edge of the cleaning sheet.



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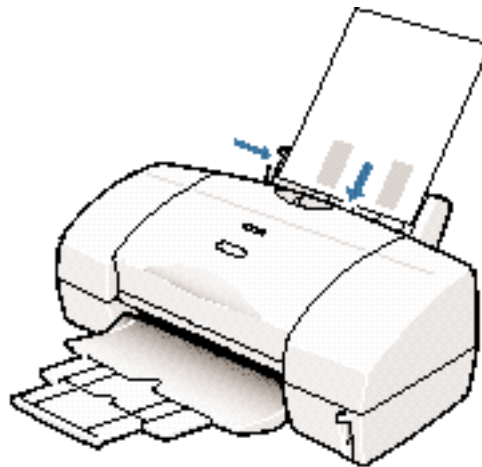
**3** Feed the sheet.

Make sure the printer is on.

Press and hold the **RESUME** button.

The printer beeps once slowly. Continue to hold down the **RESUME** button until you hear two more beeps. Then release the button.

The printer feeds the sheet and then ejects it.

Use a cleaning sheet once only.

# Printing on Fabric Sheets

The Fabric Sheets for Canon printers come with a booklet that describes special handling procedures. Be sure to look through this booklet for special information regarding the Fabric Sheets. This section describes specific steps for using Fabric Sheets with the printer.

Be sure to follow these guidelines:

■ To avoid paper jams, smearing, and other problems, do not open the printer's cover during printing.

■ Use the fixing agent that comes with the Fabric Sheet.

■ Do not touch newly printed fabric sheets until the ink is completely dry. This takes about one hour.

■ Do not remove the film from the back of the sheet until after printing.

---

**1** Set up the printer.

Make sure the printer is turned on.

Make sure the paper support and paper output tray are extended.

Press the paper thickness lever down to the envelopes position ✉.

---
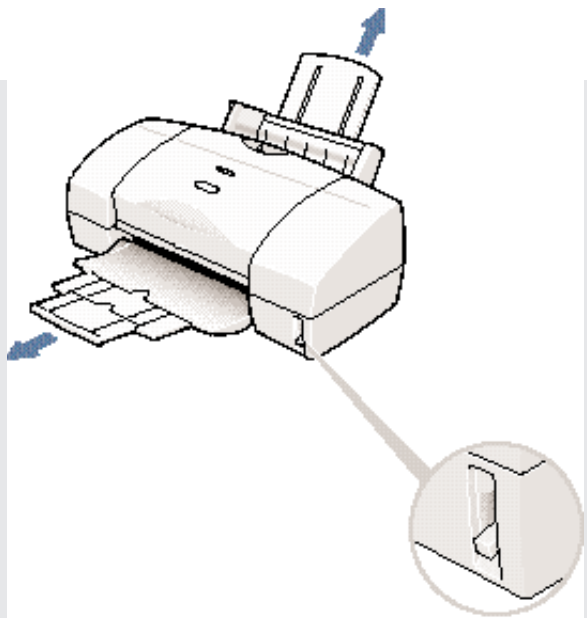
**2** Load the fabric sheet.

Insert the sheet with the cloth side out (toward you) and the open end up (away from the sheet feeder).

Align the right edge of the sheet with the right side of the sheet feeder.

Adjust the paper guide to the edge of the fabric sheet.

PAPER THICKNESS LEVER

PAPER OUTPUT TRAY AND EXTENSION
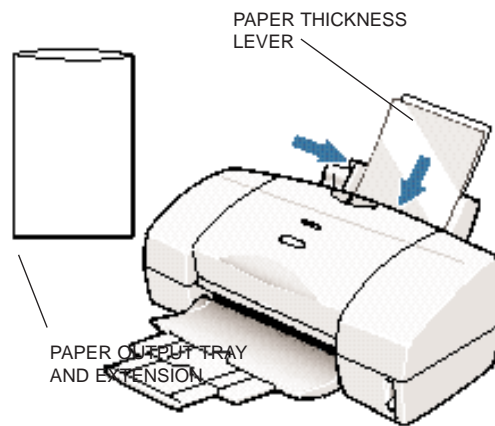
**3** Set up the printer driver.

In the Main tab, select **Fabric Sheet** for Media Type.

In the Paper tab, select **Letter** or **A4** for the Page Size.

Close the printer driver and start the print operation from your Windows application.

**4** Dry and then wash the fabric sheet.

Remove the fabric sheet as it is ejected from the printer.

Let the printed fabric sheet set for about one hour to allow the ink to completely dry.

PRINT SIDE UP

Do not touch the printed side until the ink is completely dry.

When dry, peel the film backing from the printed fabric sheet.

Wash the printed fabric sheet for about three minutes under lukewarm running water to remove extra ink.

Hang the fabric sheet up to dry it again.

Iron the dried fabric sheet with a clothes iron.

See the booklet that comes with the fabric sheets for details on drying and washing.

## Printing on Banner Paper

For best results, use Canon Banner Paper.
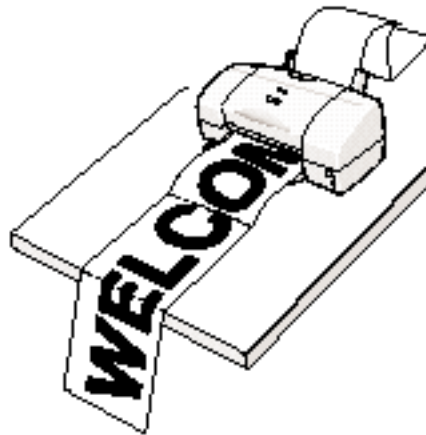
To set up a print job on banner paper, you must decide on the number of sheets you need. You can print banners from 2 to 6 sheets in length.

Always leave an extra sheet at the end of the banner—just in case the type/graphic runs over to the next page.

Printing on banner paper requires quite a bit of ink. Check the BJ tanks in your BJ cartridges to make sure they have enough ink before you start the print operation.

For best print results on banner paper, use light design patterns.

To prevent ink from running over the edges of the sheet, print within the specified margins. (See page A-5 for details.)

To prevent the ink from smearing, do not allow the printed sheets to fold and stack on one another after they are ejected from the printer.

See Appendix A, *Specifications*, for the recommended printing area of banner paper.

**1** Prepare the printer.

Make sure the printer is turned on.

Make sure the paper support is not extended.

Make sure the paper thickness lever is pressed to the up position

Pull out the paper output tray and its extension.

**2** Prepare the banner paper.

Cut the banner at a crease according to the length you need.

The minimum length is two sheets.

The maximum length you can use is six sheets (66 inches or 1676 mm).

Always leave an extra sheet at the end of the banner—just in case the type runs over.

**3** Load the first sheet.

Align the first sheet of the paper with the right edge of the sheet feeder and slide it into the printer until it stops.

Adjust the paper guide to the left side of the sheet.
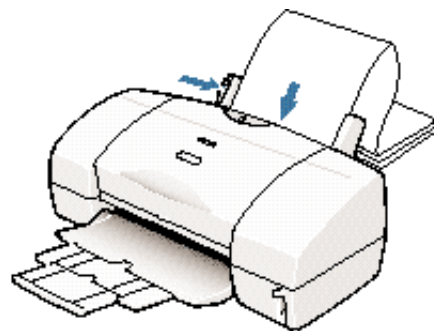
**4** Fold the banner paper.

Gently fold the paper at the perforations between the first and second sheet.

Neatly fold the paper behind the printer; don't allow it to hang over the edge of the table.
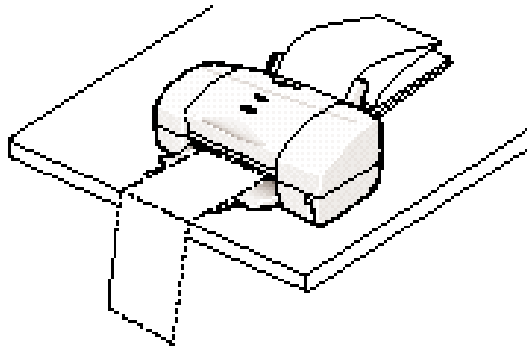
**5** Adjust the printer location.

Make sure there is enough space in front of the printer so each sheet is supported as it comes out of the printer and then allowed to hang over the edge of the table.

A dense print will require more time to dry so make sure that wet ink does not stain the desk or the floor.

**6** Set up the Printer Driver.

Open the Windows application you are going to use to print. From the File menu, select **Print**. Then select your print options using the BJC-6000 Series Printer Driver for Windows.

- For Media Type, select **Plain Paper**.

- For the Page size, select **Letter** or **A4**.

- On the Paper tab, select **Banner Printing**.

- See your application software instructions for other options.

**7** Start printing.

Click **OK** or **Print** to start the print job.

Clear enough space in front of the printer for at least one sheet of paper to rest after printing.

As the sheets print, allow the printed sheets to hang over the edge of the desk or work table.

WHITER GLOSSY SIDE UP
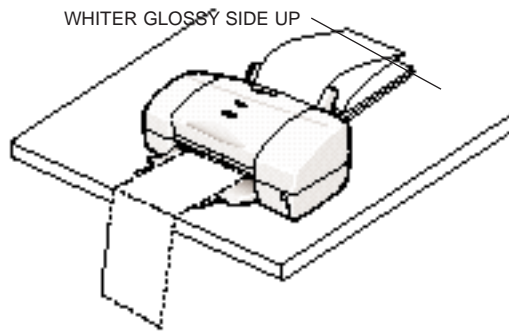
## Loading Glossy Photo Paper

When you load Glossy Photo Paper in the printer, always use the Loading Support Sheet A provided with the package.

**1** Prepare the sheets.

Hold the sheets of Glossy Photo Paper with the whiter sides (print sides) up and place them on top of the Loading Support Sheet.

You can load up to 10 sheets of Glossy Photo Paper in the sheet feeder.

**2** Stack the sheets.

Tap the stack against a flat surface to align the edges of the Glossy Photo Paper and the Loading Support Sheet A.

Paper Handling

Paper Handling
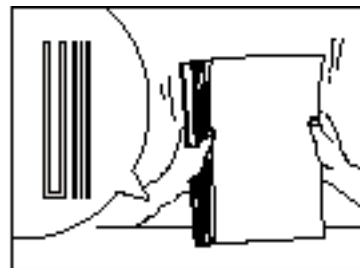
# Maintaining the Printer 4

This chapter covers the care required for your printer. It includes:

- Printer guidelines

- Cleaning the printer

- Performing maintenance

- Printing the Nozzle Check Pattern

- Cleaning the print heads

- Deep cleaning the print heads

- BJ cartridge guidelines

- Replacing a BJ tank in a BJ cartridge

- Replacing a BJ cartridge

- Aligning the print heads

- Storing a BJ cartridge

- Transporting the printer

**Maintaining the Printer**

# Printer Guidelines

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

- Set the printer on a stable surface. Do not use an angled printer stand. Avoid setting the printer in direct sunlight.

- Keep the front cover closed when printing.

- Do not set anything on top of the printer.

- Make sure the power is off any time you connect or disconnect the power cord or interface cable.

- Do not unplug the power cord unnecessarily.

- When you unplug the power cord, grasp the plug itself. Do not pull on the cord.

- Do not place the printer too close to a fluorescent lamp. Allow at least six inches (15 cm) clearance between the printer and any fluorescent lamp. Fluorescent lamps generate electrical noise that may cause printer malfunctions.

- Do not unplug the printer or turn off a power strip to which the printer is attached when the printer's power is turned on. This may prevent the print head units from returning to the home position on the right and being capped, which may cause the print heads to dry out. This is critical. If left uncapped, the print head units may clog and may need to be replaced.

- Do not move the mechanism that holds the BJ cartridges. Attempting to move the BJ cartridge holders may damage delicate mechanical parts.

- It's a good idea to use a power surge protector. However, never turn off the printer using the power strip. Always use the **POWER** button on the printer.

# Cleaning the Printer

Your printer requires little routine maintenance. Perform the following maintenance, as necessary, to keep your printer in good operating condition.

⚠ **Caution**

Before cleaning the printer, be sure to turn off the printer and unplug the power cord.

Do not clean the exterior of the printer with volatile liquids such as thinners, benzene, or any spray-type or chemical cleaners; doing so will damage the surface of the printer.

When cleaning the printer, avoid the area near the print head on the BJ cartridges. Do not touch the print heads. Ink may leak out and cause stains.

Clean the printer regularly to avoid printing problems. Remove any ink mist or paper debris from the interior of the printer using a soft cloth moistened with water.

Clean the exterior of the printer with a soft cloth moistened with water. Clean away smudges and dust.

Do not use paper products (such as paper towels or tissues) to clean the inside of the printer.

# Performing Maintenance

If your printed output appears streaked or blurred, open the printer's front cover and visually check the level of the ink in all the BJ tanks. If a BJ tank is low or has run out of ink, replace it.

> When a BJ tank runs out of ink, the printer beeps four times and the BJ Printer Status Monitor opens and displays a message to warn you that a BJ tank has run out of ink.

After you replace the BJ tank(s), if there are still signs of poor quality in your printing, follow these procedures.

```
┌─────────────────────────────────────┐
│   PRINT A NOZZLE CHECK PATTERN       │
└─────────────────────────────────────┘
               │  NOZZLE CHECK PATTERN POOR
               ▼
┌─────────────────────────────────────┐
│      CLEAN THE PRINT HEADS           │
└─────────────────────────────────────┘
               │
               ▼
┌─────────────────────────────────────┐
│   PRINT A NOZZLE CHECK PATTERN       │
└─────────────────────────────────────┘
               │  NOZZLE CHECK PATTERN POOR
               ▼
┌─────────────────────────────────────┐
│      EXECUTE DEEP CLEANING           │
└─────────────────────────────────────┘
               │
               ▼
┌─────────────────────────────────────┐
│   PRINT A NOZZLE CHECK PATTERN       │
└─────────────────────────────────────┘
               │  NOZZLE CHECK PATTERN POOR
               ▼
┌─────────────────────────────────────┐
│        REPLACE BJ CARTRIDGE          │
│                AND                   │
│     EXECUTE PRINT HEAD ALIGNMENT     │
└─────────────────────────────────────┘
```
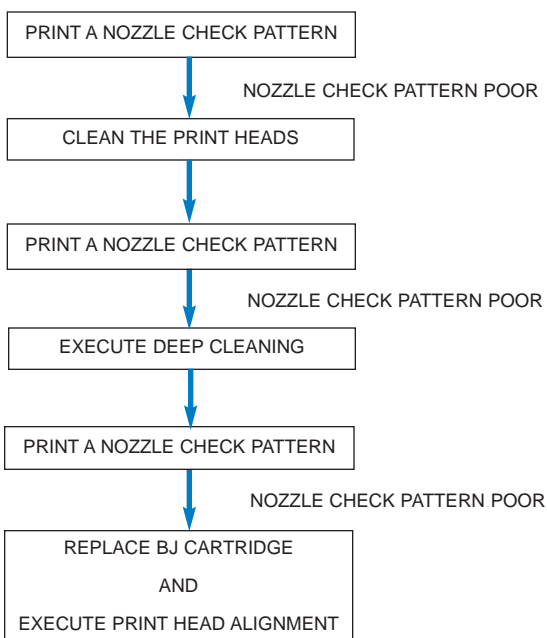
# Printing the Nozzle Check Pattern

The Nozzle Check Pattern confirms whether the inks are being correctly ejected from the print head nozzles and whether the print heads on the two BJ cartridges are correctly aligned. Perform a Nozzle Check Pattern when your printouts are streaked or the color tones on your printout are not correct.

You use the Test Prints option on the Maintenance tab in your BJC-6000 Series Printer Driver to print a Nozzle Check Pattern. Before selecting the Test Prints option, make sure paper is properly loaded in the sheet feeder (see *Automatically Feeding Paper* starting on page 3-6) and the printer is turned on.

**1** Start the printer driver.

In Windows 98 and Windows 95—Click the Start button, select Settings, and then click **Printers**. Right click **Canon BJC-6000** and then select **Properties**.

In Windows 3.1—Click the **Main** group in the Program Manager. Then click the **Control Panel**, and click **Printers**. Make sure **Canon BJC-6000** is highlighted and click Setup.

**2** Click on the Maintenance tab.

Then click the Test Prints icon on the left.

CLICK HERE
TO PRINT
THE NOZZLE
CHECK
PATTERN

Maintaining
the Printer
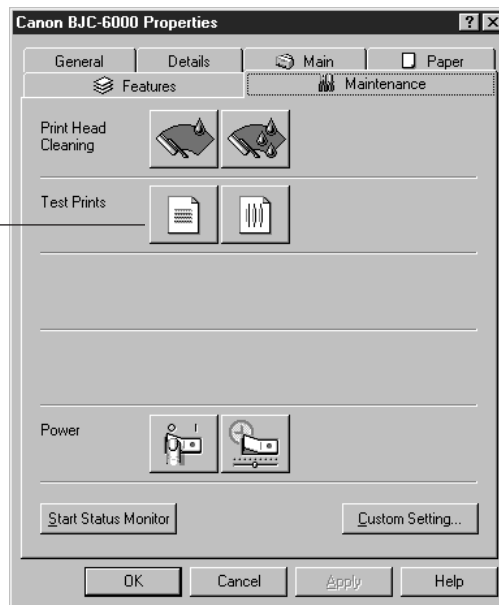
**3** Click OK to print the Nozzle Check Pattern.

You can also start the Nozzle Check Pattern with the **RESUME** button. Press and hold the **RESUME** button until you hear two beeps, and then release it.
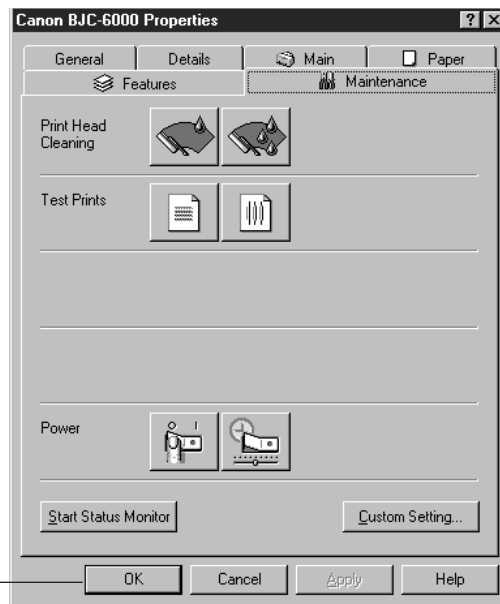
CLICK HERE

**4** Check the results of the Nozzle Check Pattern.

BC-30 BLACK BJ CARTRIDGE

BC-31 COLOR BJ CARTRIDGE

NOZZLE CHECK PATTERN

ALIGNMENT CHECK PATTERN FOR BOTH BJ CARTRIDGES

The Nozzle Check Pattern looks like this when the BC-30 Black and BC-31 Color BJ Cartridges are installed.

Look at the Nozzle Check Pattern for each BJ cartridge. If any colors are missing or if any horizontal lines are broken or missing, perform print head cleaning procedure (see the next section for details).

In the alignment head pattern, if the lines are not perfectly overlapped, align the print heads (see page 4-20).
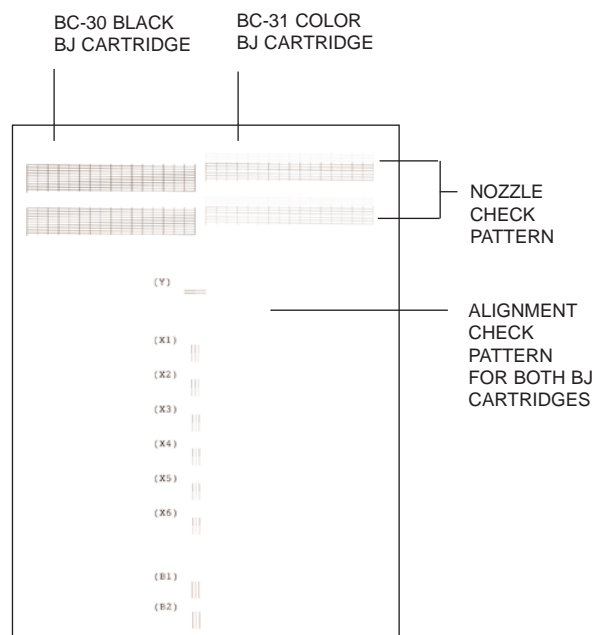
# Cleaning the Print Heads

Your printer is equipped with two print head cleaning functions to ensure constant high quality printing. Always execute normal print head cleaning first. If this does not correct the problem, execute deep print head cleaning.

The printer automatically performs normal print head cleaning each time you turn it on.

> Cleaning the print heads consumes ink, so clean the print heads only when necessary.

## Normal Print Head Cleaning

If you are using Windows, you can execute print head cleaning from the Maintenance tab in the BJC-6000 Series Printer Driver.

**1** Start the printer driver and click the Maintenance tab.

Now click the first Print Head Cleaning icon.

CLICK HERE
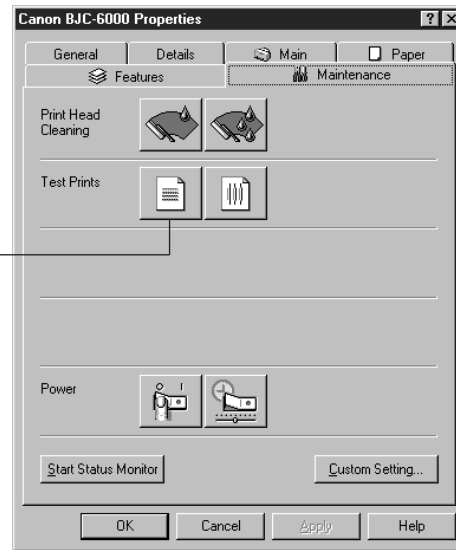
**2** Click one of the option buttons.

To clean the print heads on both BJ cartridges, select **All Colors**.

To clean only the print heads of the Black BJ Cartridge, choose **Black**.

To clean only the print heads of the Color BJ Cartridge, select **Color**.

**Print Head Cleaning** ? X
Select print head for cleaning.
⊙ All Colors
○ Black
○ Color
Execute Cancel
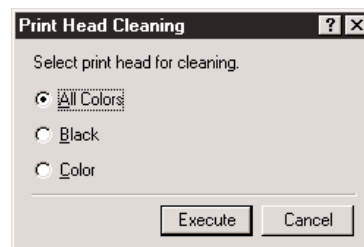
**3** Click Execute and follow the instructions on the screen.

When print head cleaning begins, the POWER light starts flashing. Print head cleaning requires about 30 seconds to complete. Wait for the POWER light to stop flashing before you resume normal operation.

**Print Head Cleaning** ? X
Select print head for cleaning.
⊙ All Colors
○ Black
○ Color
CLICK HERE ———— Execute Cancel
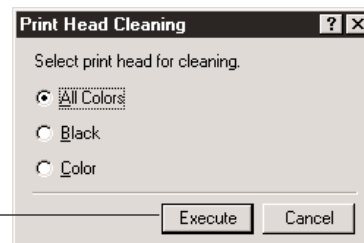
To check the print head performance, print the Nozzle Check Pattern (see page 4-5).

If the results of the Nozzle Check Pattern are not satisfactory, check the BJ Printer Status Monitor for a low ink warning or remove the BJ tanks and visually check the ink levels in the tanks. If there is ink in all of the BJ tanks, execute print head deep cleaning (see page 4-9).

You can also start print head cleaning with the **RESUME** button on the printer. Press and hold the **RESUME** button until you hear one beep and then release it. This cleans the print heads of all colors at one time.

Perform the print head cleaning only when you encounter a print quality problem. Unnecessary and repetitious cleaning will waste ink.

If you execute the print head cleaning while paper is manually loaded, the printer will eject the paper and then perform the cleaning.

**2** Follow the instructions on the screen.

A message appears warning you **NOT** to start another operation until deep print head cleaning is finished. Click the **OK** button.

The BJ Printer Status Monitor displays a message during deep print head cleaning.

The POWER light flashes during print head deep cleaning and then lights again when deep cleaning is complete.

Deep print head cleaning takes about one to two minutes.

To check the print heads, print the Nozzle Check Pattern (see page 4-5).

If the problem has not been corrected after deep cleaning the print head four or five times, it's time to replace the BJ cartridge.

# BJ Cartridge Guidelines

The printer's cartridge holder holds two BJ cartridges. The BC-31 Color BJ Cartridge is installed on the right side at all times. In the left slot, you can install the BC-30 Black BJ Cartridge or a BC-32 Photo BJ Cartridge.

## BJ Cartridge and BJ Tank Maintenance

The most important thing you can do to extend the life of your printer and to ensure optimum print quality is take care of the BJ cartridges.

⚠ Caution Spilled ink can stain any surface. Open BJ cartridges and BJ tanks carefully, and follow the guidelines presented here to protect against spilled ink.

- When a BJ tank runs out of ink, replace it immediately. Do not leave an empty BJ tank in a BJ cartridge installed in the printer.

- Protect all surrounding surfaces (such as floors, furniture, and clothing) before opening any BJ cartridge or BJ tank.

- To avoid spilling ink, do not drop or shake BJ cartridges or BJ tanks.

- Make sure you store any opened BJ cartridge (that is not being used in the printer) in the SB-30 Ink Cartridge Storage Box.

- Keep BJ cartridges and BJ tanks in their sealed containers until you are ready to use them.

- Do not remove the BJ tank(s) from the BJ cartridge unnecessarily. This may cause the ink to clog.

- If spilled, the ink is difficult to remove. Therefore, it's a good idea to keep the BJ cartridges and BJ tanks out of the reach of children.

- Do not touch the print head area on the BJ cartridges. Ink may leak out and cause stains.

- Use the SB-30 Ink Cartridge Storage Box for the BJ cartridges.

> ⚠ **Caution** Hold the BJ cartridges on the sides only. Do not touch the print head area on the bottom of a BJ cartridge or the circuit area on the side. The print head area may become hot during printing.



HOLD HERE

## Replacing BJ Tanks and BJ Cartridges

The actual amount of ink that you use will vary depending on the print density of a page. If the majority of your output is graphics, you may need to change cartridges or tanks more often than when you are printing text only. See Appendix A, *Specifications*, for details on the life expectancy of the BJ cartridges and BJ tanks.

You may need to replace the BJ cartridge or a BJ tank if you are experiencing poor print quality. If you notice a deterioration in the quality of printed pages, perform a test print and clean the print heads before you decide to replace the BJ cartridge.

It's a good idea to replace the BC-30 Black BJ Cartridge if it has been in use for more than one year.

# Replacing a BJ Tank in a BJ Cartridge

When a BJ tank runs out of ink, the printer will beep four times and the POWER light will flash orange.

When you purchase extra BJ tanks, make sure you get the correct BJ tanks for each BJ cartridge.

- **For BC-30 Black BJ Cartridge**
  BCI-3BK Black BJ Tank

- **For BC-31 Color BJ Cartridge**
  BCI-3C Cyan BJ Tank
  BCI-3M Magenta BJ Tank
  BCI-3Y Yellow BJ Tank

- **For BC-32 Photo Color BJ Cartridge**
  BCI-3PBK Photo Black BJ Tank
  BCI-3PC Photo Cyan BJ Tank
  BCI-3PM Photo Magenta BJ Tank

> If you need to replace more than one ink tank, remove and replace one BJ tank at a time to ensure that each new BJ tank is inserted in the correct slot. Colors will not print correctly if you insert a BJ tank in the wrong slot.
>
> To avoid interfering with the ink supply, do not touch the opening on a BJ tank.

Leave the BJ cartridge in the printer when replacing a BJ tank. Make sure the printer's power is on.

Make sure you insert the BJ tank in the correct slot. The key below shows the correct order of BJ tanks in the BJ cartridges.
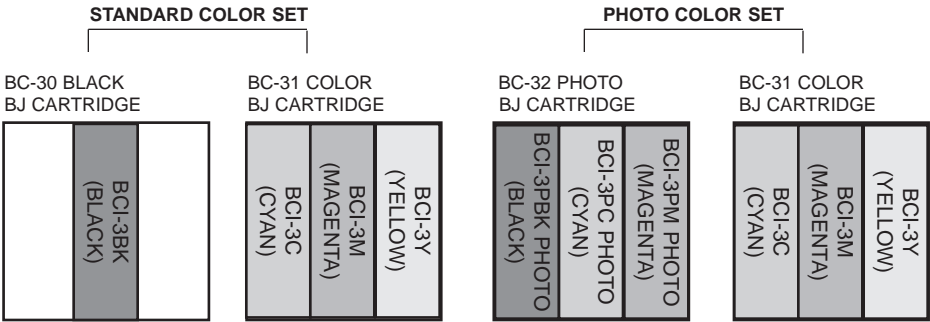
**1** Open the front cover.

The printer beeps and moves the cartridge holder to the center of the printer.

The POWER light blinks while the cartridge holder is positioned to the center of the printer.
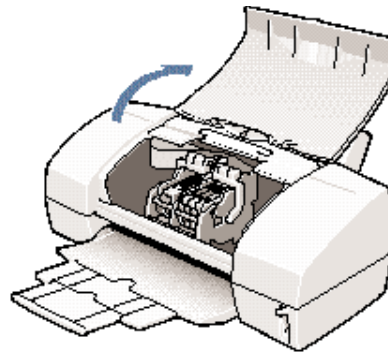
**2** Remove the empty BJ tank.

The color cartridge is on the right.

Press in on the release tab and then lift the BJ tank up and out of its slot.

Dispose of the BJ tank properly. You may want to place it in a plastic bag to keep from spilling any residual ink.

Handle the used BJ tank with care to avoid spilling ink on your hands, floor, furniture, or clothing. Empty color BJ tanks cannot be refilled. Always discard them immediately.

**Maintaining the Printer**

**3** Prepare the new BJ tank.

Remove the new BJ tank from its package.

Pull the orange tape up and against the perforations to open the package film.

Remove the film carefully so you do not remove the label from the BJ tank. You will need the label to match the BJ tank with the correct slot of the BJ cartridge. (Also, if the label is removed, air can get into the BJ tank, which will cause the ink to evaporate very quickly.)

Remove the film by pulling on the orange tape. Do not attempt to remove the film before you remove the orange tape.
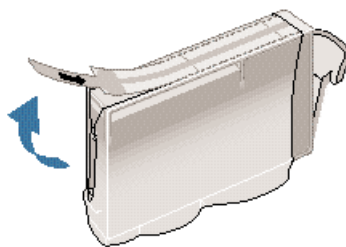
**4** Twist the orange protective cap in the direction shown by the arrow and remove it.

Never attempt to reattach a protective cap to a BJ tank.

Discard the protective cap and protective tape according to the local laws and regulations regarding disposal of consumables.

PROTECTIVE CAP
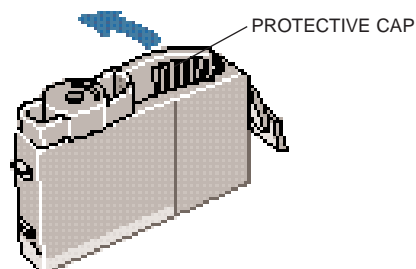
**5** Insert the BJ tank.

Hold the new ink tank
at a slight angle, align
it with the correct slot,
then press down gently
on top of the ink tank
until it locks in place.
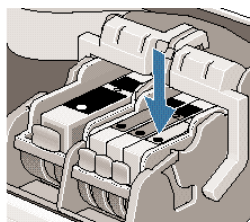
To lock the ink tank in place,
press down on the circle mark
on top of the ink tank.

Press down until you hear the
ink tank lock in place.

**6** Close the printer cover.

The printer automatically starts
cleaning the print heads and
the POWER light blinks. This
will take about two minutes.
After print head cleaning is
finished, the POWER light stays
on and the printer is ready for
operation.

Perform another test print
to make sure the new color
BJ tanks are functioning
normally.

Maintaining
the Printer
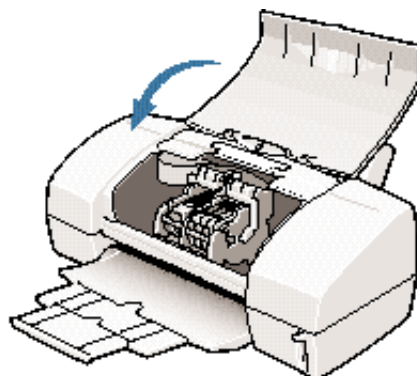
# Replacing a BJ Cartridge

If the print quality of your output remains poor even after replacing the BJ tanks and cleaning the print heads, the print heads are worn out and you must replace the BJ cartridge.

The following procedure describes how to replace a BJ cartridge.

> When switching from the BC-30 Black BJ Cartridge to the BC-32 Photo BJ Cartridge (or vice versa), be sure to replace the entire unit. Also, be sure to place the BJ cartridge you are removing in the Ink Cartridge Storage Box. See page 4-25 for details.

The BC-31 Color BJ Cartridge must be installed in the right slot of the cartridge holder. The BC-30 Black or BC-32 Photo BJ Cartridge must be installed in the left slot of the cartridge holder.

Before starting, make sure the printer is turned on.

---

**1** Open the front cover.

The printer beeps and moves the cartridge holder to the center of the printer.
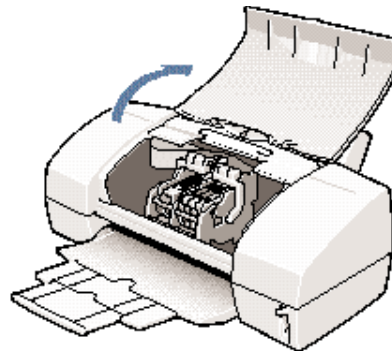
> If the print head is hot, it may not move until it has cooled down. Never attempt to force the cartridge holder manually. Wait a few minutes for the print head to cool down; the cartridge holder will then move to the center of the printer.

---

**2** Unlock the BJ cartridge.

Raise the cartridge lock lever to unlock the BJ cartridge.

If you are replacing the BC-30 Black BJ Cartridge or BC-32 Photo BJ Cartridge, raise the left cartridge lock lever. If you are replacing the BC-31 Color BJ Cartridge, raise the right cartridge lock lever.

Make sure you raise the lever all the way up.

The illustrations here show how to replace the BC-30 Black BJ Cartridge.
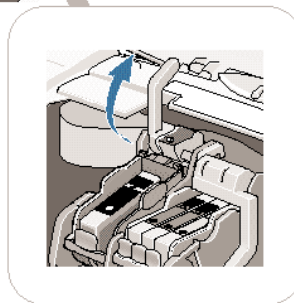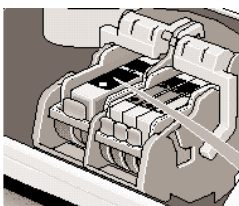
**3** Remove the BJ cartridge.

Remove the entire BJ cartridge with the ink tank in place.

If you are removing a partially used BJ cartridge, store it in the SB-30 Ink Cartridge Storage Box. (See page 4-25 for details.)
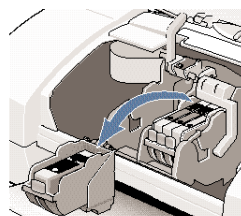
Always hold a BJ cartridge by the circles embossed on the left and right sides of the BJ cartridge. Never touch the metal contacts or the print head on a BJ cartridge.

If you are discarding a used BJ cartridge, do so immediately.

Handle the used BJ cartridge with care to avoid spilling ink on your hands or clothing.

**4** Remove the new BJ cartridge from its package.

Remove the orange protective cap then slowly remove the orange protective tape.

Do not attempt to reattach the tape or cap to a BJ cartridge.

To avoid poor print quality, do not touch the print head on a BJ cartridge.

PROTECTIVE TAPE    PROTECTIVE CAP
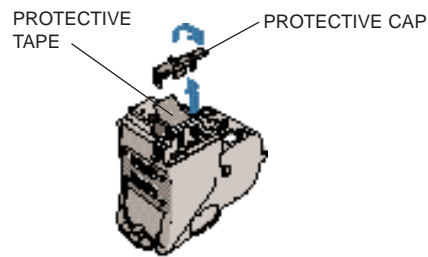


**5** Insert the new BJ cartridge.

Set the BJ cartridge into the cartridge holder then lower the blue cartridge lock lever until it locks in place.
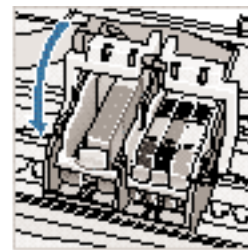


**6** Remove the protective tank inside the new BJ cartridge.

Press the tab on the protective tank and remove it.

PROTECTIVE TANK

TAB
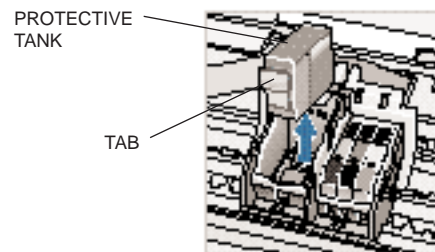


The protective tank protects the BJ cartridge and cannot be used for printing. Discard this tank as soon as you remove it; do not attempt to re-attach it to the BJ cartridge.

**7** Insert the BJ tank(s) into the new BJ cartridge.

You can use new BJ tanks or you can use the BJ tanks that were in the worn BJ cartridge.

Install a BJ tank immediately after removing it from the worn BJ cartridge or from its package. If a BJ tank remains exposed for a long period, it may run out of ink quickly after it is installed.
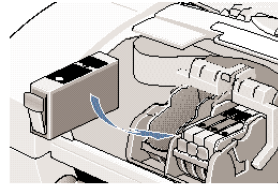
**8** Close the front cover.

The cartridge holder returns to the home position and print head cleaning starts automatically.

Do not open the front cover during print head cleaning.

After you replace a BJ cartridge, always align the print heads to ensure optimum print quality.

Do not attempt to start any other operation until the POWER light stops flashing.

Be sure to align the print heads after replacing or switching BJ cartridges. See the next section for details.
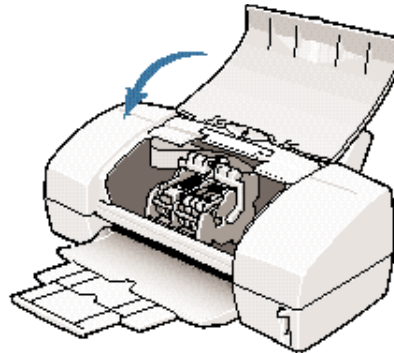
# Aligning the Print Heads

**Important!** Every time you replace a BJ cartridge or switch BJ cartridges for a special print job, you must align the print heads to ensure optimum printing.

---

**1** Make sure paper is loaded and start the printer driver.

Windows 98 and Windows 95:

Click **Start**, point to **Settings**, and click **Printers**.

Right click the **Canon BJC-6000** icon and then choose Properties from the pop-up window.

Click the **Maintenance** tab.

Windows 3.1:

In the Program Manager double-click in this order: the Main group, Control Panel, and Printers icon.

Click the **Control** button.

---

**2** In the printer driver, click the Maintenance tab.

Then click the second icon to the right of the Test Prints.

CLICK HERE
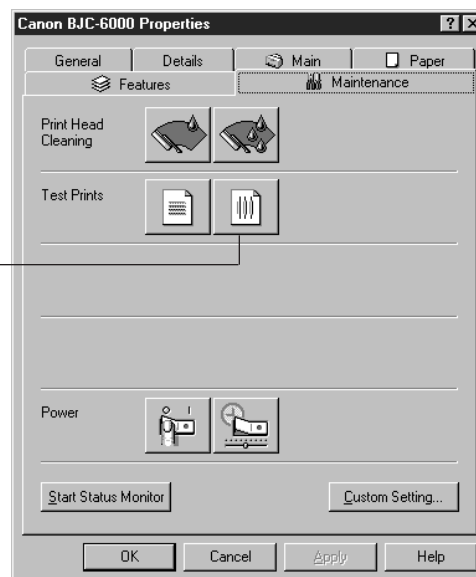
**3** Simply follow the instructions on the screens.

The driver performs either an automatic or manual print head alignment. The default setting is to automatically align the print heads. However, you can request that the driver align the print heads manually through the Custom Setting option on the Maintenance tab (see page 2-10 for details).

## Aligning the Print Heads Automatically

If your printer driver is set up to align the print heads automatically (this is the default), you simply start print head alignment from the Maintenance tab.

■ A confirmation screen will ask you if you want to perform automatic print head alignment. Read the screen and click **OK**.

■ Another screen warns you not to start any other operation until the alignment is complete; again simply click **OK.**

The BJ Printer Status Monitor displays the Printer Status. The driver automatically aligns the print heads and displays this alignment pattern. (This pattern prints shades of blue and black only.)
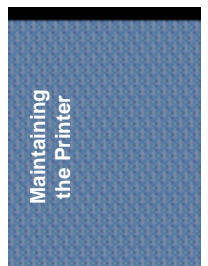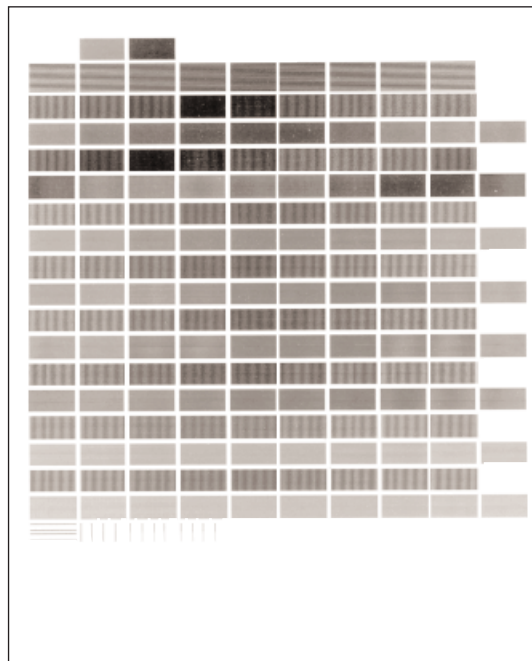
# Aligning the Print Heads Manually

If your printer driver is set up to align the print heads manually, follow these steps.

---

**1** Follow the instructions on each screen.

Read each screen and click **OK** as needed to continue.

Check the line patterns on the test print. For each pattern, note the number where the lines perfectly overlap and appear as one line.



---
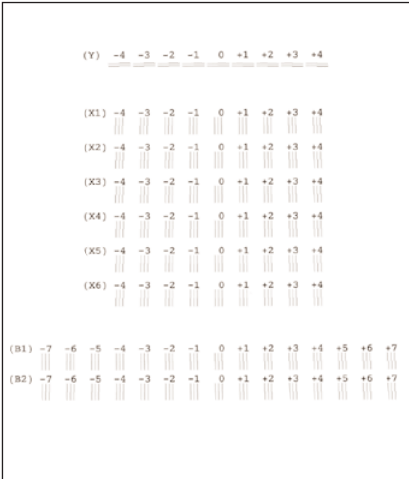
**2** Enter the necessary adjustments.

In the Print Head Alignment box, click the arrows on the boxes to enter the numbers for each alignment.

When you are finished, click the **OK** button.



---

**3** Follow the instructions on each screen.

Read each screen and click **OK** as needed to continue.

Check the line patterns again and note the number of the pattern where the lines perfectly overlap and appear as one line.
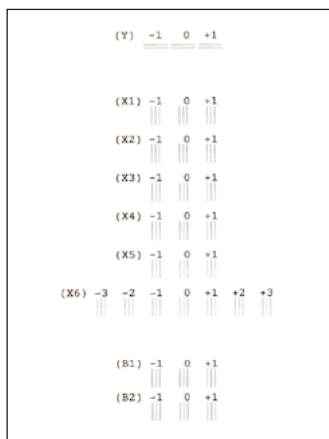


**4** Enter the necessary adjustments.

Click the arrows on the boxes to enter the numbers for each alignment.

When you are finished, click the **OK** button.
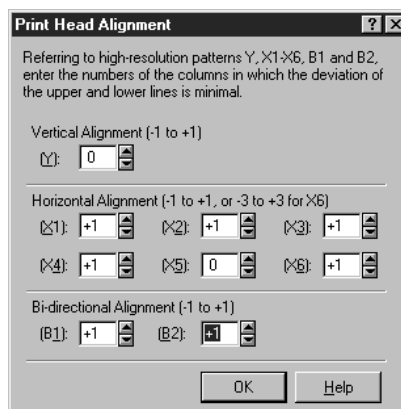


**5** Complete the alignment.

**6** Print the Nozzle Check Pattern.

On the Maintenance tab, click the first icon next to Test Prints.

CLICK THIS ICON
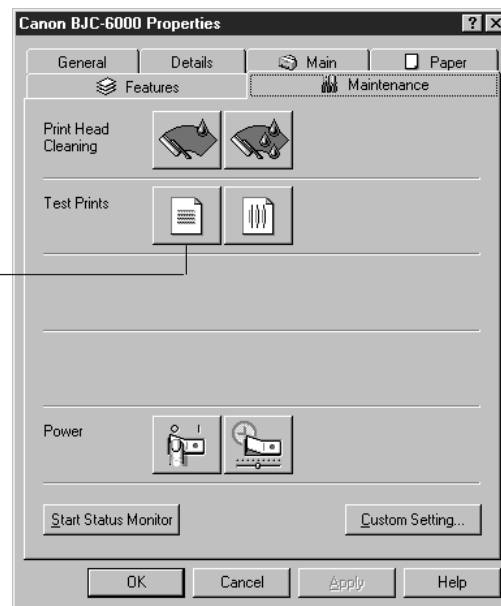


The Nozzle Check Pattern looks like this (see page 4-6 for details).
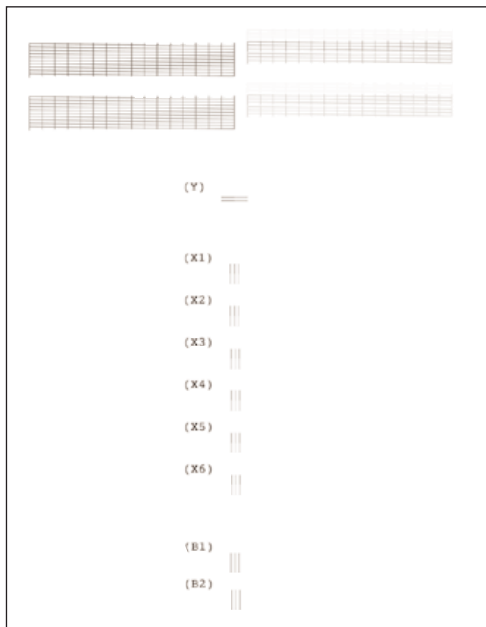
# Storing a BJ Cartridge

Whenever you unwrap a BJ cartridge, you must either install it in the printer or store it in the SB-30 Ink Cartridge Storage Box to prevent the print head from drying and clogging.

The storage box is for the BC-30 Black BJ Cartridge or BC-32 Photo BJ Cartridge only. The BC-31 Color BJ Cartridge is always in the printer.

**1** Open the Ink Cartridge Storage Box.

When opening the Ink Cartridge Storage Box, press in on the release tab that locks the cover in place.

**2** Carefully set the cartridge in the storage box.

You must insert the cartridge correctly or the storage box will not close.

The protective cap must be removed from the cartridge before you set it in the storage box.
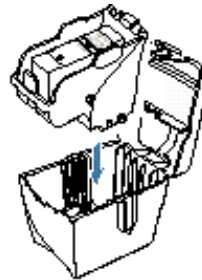
**3** Close the storage box.

Be sure the lid snaps closed.

Whenever you remove a BJ cartridge from the printer, store the cartridge in the storage box (unless you are disposing it).

# 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** Turn off the printer.

Make sure the print head is in the home position on the right side of the printer.
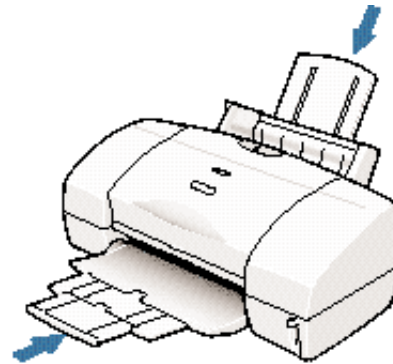
Remove any paper from the sheet feeder.

Detach the interface cable and power cord.

**2** Close the paper support and output tray.

Press down the paper support.

Press in the paper output tray extension and push the paper output tray up against the front of the printer.

**3** Tape the printer.

Reattach the packing materials to the paper feed slot of the sheet feeder and the paper output slot on the front of the printer.

Insert the printer into its plastic bag.

PACKING MATERIAL
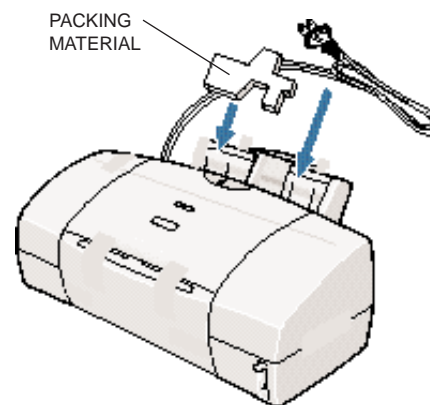
**4** Pack the printer.

Pack the printer in its original box with the packing supports.

Make sure the box is marked FRAGILE or HANDLE WITH CARE.
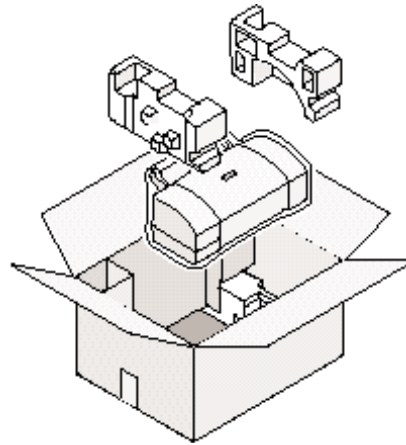
**Do not remove the BJ cartridges from the printer or ship a BJ cartridge or a BJ tank from which you have removed the protective cap.** An opened BJ cartridge or BJ tank that is not installed in the printer (or in the Ink Cartridge Storage Box) may leak, and the print head may dry out.

Maintaining
the Printer

# Troubleshooting 5

Due to today's rapidly changing computer environment, we have placed troubleshooting information in a variety of places to ensure that the most accurate information possible is available. The best way to find current information is through our online support services and through our Fax Retrieval System. Online services include the World Wide Web and our BBS.

This chapter also contains information to help you solve printer problems. It covers a few basic problems and describes how to clear a paper jam. For complete problem solving information, be sure to use our support services.

See *Canon Customer Care Center* in Chapter 1 (page 1-4) for details on Canon's customer technical support options.

## Identifying Your Printer Problem

Before contacting Canon, identify your printer problem and make sure you have the following information:

- Product name—BJC-6000

- Serial number

- Place of purchase

- Nature of problem

- Steps you have taken to solve the problem and the results

The serial number is located on the label on the back of the printer:

```
                                      RSS-8658
CANON INC (DA1)              MADE IN JAPAN

NO. X X X X X X X X
                              SERIAL
                              NUMBER
```

> Attempting to repair the printer yourself may void the limited warranty as to that repair. See the limited warranty information that came with your printer for details.

# Basic Problems

This section describes these basic problems:

■ Cannot install the printer driver

■ Paper does not feed from the sheet feeder

■ An error message appears

■ Printing halts

■ Printout is unsatisfactory

■ Printer beeps and the POWER light flashes orange

For all other problems, be sure to use Canon's support services described on page 1-4.

The BJ Printer Status Monitor uses messages and pictures to display the printing progress and the status of the printer while it is printing. When the ink or paper runs out or a paper jam occurs, the BJ Printer Status Monitor automatically appears.
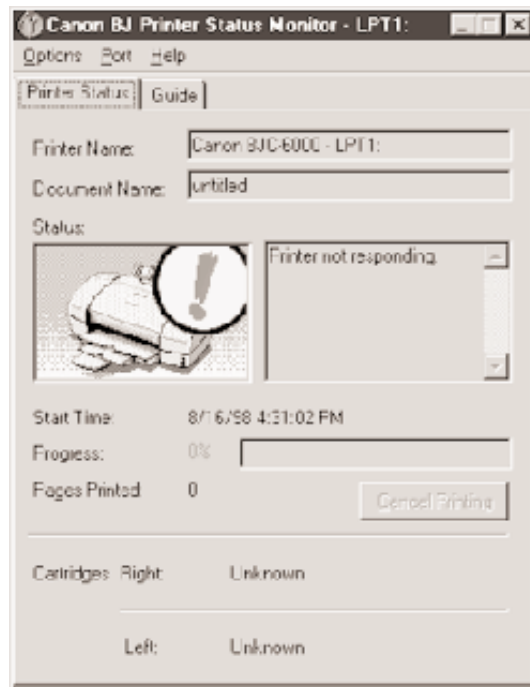


■ Look at the messages and pictures to determine what type of error has occurred.

■ Click the Guide tab and proceed as directed by the messages shown. Printing resumes once you resolve the error.

# Cannot Install the Printer Driver

| Cause | Solution |
|---|---|
| | |

**Installation was interrupted**

**Install the printer driver**
Refer to the *Quick Start Guide* and install the printer driver using the correct procedure. If you are reinstalling the printer driver, remove the installed BJ printer driver and then install the printer driver again.

To uninstall the printer driver, select **Programs** from the Windows Start menu. Then select **BJ Printer** and click **Uninstall**. Follow the on-screen instructions. For details about installing the printer driver, see the *Quick Start Guide*.

**Other application programs are running**

**Quit other programs**
Quit any other application programs that are running and start the installation again.

**The CD ROM drive is not specified correctly**

**Check your CD ROM drive**
Windows 98 or Windows 95:
Double-click **My Computer** and then double-click the CD ROM icon in the new window. Refer to the *Quick Start Guide* and proceed with the installation.

Windows 3.1:
Follow the installation instructions in the *Quick Start Guide*.

**Problem with the CD ROM**

**Verify your CD ROM drive**
You may need to reduce the speed of your CD ROM. To lower the speed/cache for the CD ROM drive, follow these steps: Right-click on the **My Computer** icon on the desktop, and click on **Properties**. Select the Device Manager tab; double-click on CD ROM, and note the type of CD ROM driver that is being used. Select the Performance tab. Click on the **File System** button at the bottom left of the dialog box. Select the CD-ROM tab. Change "Supplemental Cache Size" to Small and "Optimize access pattern for" to Double Speed Drive. Click on **OK**, and **OK** again. Click on **Start** and **Shut Down**. Restart the Computer. Install Canon Creative. Install applications individually.

Check that the Windows Explorer can successfully read the CD. If the CD is unreadable, call the Canon Customer Care Center (see page 1-4).

# Paper Does Not Feed From Sheet Feeder

| Cause | Solution |
|---|---|
| Paper is too thick | **Feed manually** <br> Paper within the range of 17 to 24 lb (64 to 105 $g/m^2$) can be loaded in the sheet feeder. Thicker paper must be fed manually one at a time from the back of the printer. The printer does not support paper thicker than 0.6 mm. |
| Sheet feeder overloaded | **Check sheet feeder capacity** <br> Check that you do not exceed the sheet feeder capacity. Paper will not feed correctly if you exceed the specified number of sheets. (See page 3-5.) |
| Paper support not raised | **Raise the paper support** <br> The paper support should be raised unless you are loading envelopes. If the paper support is not raised, the media will not slide fully into the paper feed slot and will not feed into the printer correctly. |
| Paper wrinkled or curled | **Check that you are using appropriate media** <br> Paper that is folded, curled, or crumpled will not feed into the printer correctly, and may also cause paper jams. |
| Auto Feeder not selected in the printer driver | **Select Auto Feeder** <br> Open the Printer Properties dialog box. On the Main tab, click the **Advanced** button. On the Quality tab, click the Paper Feed down-arrow and select Auto Feeder from the pull-down list. |

See page 5-16 for details on clearing a paper jam.

**Troubleshooting**

# An Error Message Appears

**Printing does not start due to an error writing to LPT1**



```
Printers Folder                                    [×]

  ?    There was an error writing to LPT1: for the printer (Canon EJC-6000).
       There was a problem sending your document to the printer.
       Make sure the printer cable is connected and that the printer is online.
       To continue printing, click retry.
       Windows will automatically retry after 5 seconds.

              [    Retry    ]    [   Cancel   ]
```

| Cause | Solution |
|-------|----------|
| Printer is not on | **Check the POWER light** <br> The POWER light should be green. If the POWER light is flashing, the printer is warming up. |
| Printer cable not connected correctly | **Check the parallel cable** <br> Make sure the parallel cable is securely fastened to the computer and the printer. See the *Quick Start Guide* for details. |
| Printer cable fault | **Try to use another printer cable** <br> Make sure the cable is an IEEE 1284-compatible parallel interface cable. |
| Another device is connected to LPT1 | **Check the LPT1 port** <br> Make sure the printer is connected to LPT1. |
| Switching device or external buffer fault | **Check the switching device or external buffer** <br> Disconnect the switching device or external buffer and print with the printer connected directly to the computer. If you can then print normally, the fault is probably in the switching device or external buffer. Consult the switching device or external buffer supplier. |

| Cause | Solution |
|---|---|
| Print spool is not operating correctly | **Change the spool setting** Open the printer Properties dialog box. On the Details tab, click **Spool Settings** and then select "Print data directly to the printer." |
| Printer port LPT1: fault | **Check the status of the printer port LPT1** Click on **Start**, **Settings**, and **Control Panel**. Double-click on the System icon. On the Device Manager tab, double-click **Ports (COM & LPT1)**. Double-click **Canon BJ ECP Printer Port (LPT1)**. The Device status should read "This device is working properly." |
| Installed printer driver not operating correctly | **Remove the installed BJ printer driver and then install the printer driver again** To uninstall the printer driver, select **Programs** from the Windows Start menu. Then select **BJ Printer** and click **Uninstall**. Follow the on-screen instructions. For details about installing the printer driver, see the *Quick Start Guide.* |
| A Windows Printing System (WPS) driver is installed on the computer | **Change the WPS driver port setting to FILE or delete the WPS driver** To change the port setting, open the WPS Driver Properties window. In the Details tab, select **FILE** in the "Print to Port" setting. To delete the WPS driver, select **Programs** from the Windows Start menu. Then select **Windows Printing System** and click **Uninstaller**. Follow the on-screen instructions. To continue using the WPS printer, install a second parallel port. |

Troubleshooting

**Printing does not start due to an application error or General Protection Fault**
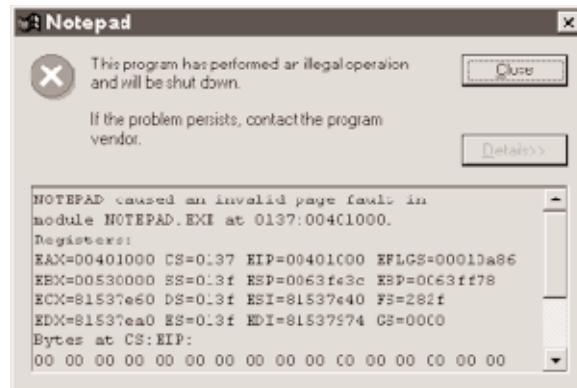


 Cause

 Solution

| Printing from a Windows 3.1 application | Change applications<br>A Windows 3.1 application installed on a Windows 98 or Windows 95 system may cause this problem. Print from a Windows 98 or Windows 95 software application. |
|---|---|
| Multiple software applications running | Quit other programs<br>Quit any other application programs you are running and try printing again. |
| Sufficient memory not available for the software application | Check your memory<br>Refer to the manual for your software application and check that the required amount of memory is allocated to the application.<br><br>If there is not enough memory installed, install more memory. Refer to the documentation for your computer for information on installing additional memory. |
| Sufficient space not available on hard disk | Clean up your hard disk<br>Delete any unnecessary files to make more space available. |

| Cause | Solution |
|---|---|
| Internal file or application software problem | **Rebuild the document and print it again** If there is no problem with the new document, the original file was probably faulty. If the same problem occurs with the new file, visit Canon's Web site or call the Canon Customer Care Center for help (see page 1-4). |
| Installed printer driver not operating correctly | **Reinstall the printer driver** Remove the installed BJ printer driver and then install the printer driver again. To uninstall the printer driver, select **Programs** from the Windows Start menu. Then select **BJ Printer** and click **Uninstall**. Follow the on-screen instructions. |

## Printing Halts

| Cause | Solution |
|---|---|
| The print job may be a finely detailed photograph or illustration | **Check the POWER light** If the POWER light is slowly flashing, then the printer is operating normally. The printer requires more time to process a finely detailed illustration or photograph. |
| Printer has been operating for a long time | **Allow the printer to cool down** Interrupt printing at a convenient point, turn the printer off and wait for at least 15 minutes for the printer to cool. The print heads may occasionally overheat during a long print job. If the print heads overheat, printing will pause at the end of a pass across the page to allow time for the print heads to cool and then will re-start after a brief interval. |

To avoid minor burns, do not touch the print heads or the surrounding area.

Troubleshooting

# Printout Is Unsatisfactory

## Meaningless characters or symbols are printing

NORMAL PRINTOUT                    MEANINGLESS CHARACTERS
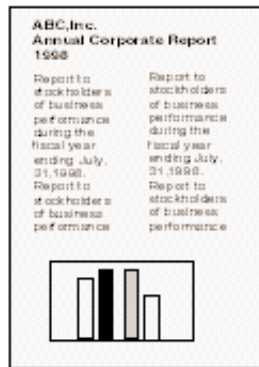


| Cause | Solution |
|---|---|
| Previous print job was cancelled before it was finished | **Restart print operation**<br>Turn off the printer and computer, turn them on again, and try printing again. |
| Not using the correct printer driver | **Restart print operation**<br>Start the print procedure again and make sure Canon BJC-6000 is the selected printer driver. |
| Parallel cable not connected correctly | Check parallel cable<br>Make sure the parallel cable is securely fastened to the computer and printer. See *Quick Start Guide* for details. |
| Parallel cable fault | Try to use another printer cable<br>Make sure you are using an IEEE 1284-compatible parallel interface cable. |
| Switching device or external buffer fault | Disconnect the switching device or external buffer<br>Try printing with the printer directly connected to the computer. If you can then print normally, the fault is probably in the switching device or external buffer. Consult the switching device or external buffer supplier. |
| Internal file or application software problem | Rebuild the document and print it again<br>If there is no problem with the new document, the original file was probably faulty. If the same problem recurs with the new file, call the Canon Customer Care Center for help (see page 1-4). |

## Printout faint or colors are wrong

| 🔄 Cause | ⬤ Solution |
|---|---|
| Print head nozzles in one of the BJ cartridges are clogged or one of the inks has run out | **Print a Nozzle Check Pattern**<br>Check the status of the print heads (see page 4-5). Clean the print heads (see page 4-7). Replace the BJ tanks as necessary (see page 4-12). |
| Protective cap or tape have been reattached to the BJ cartridge | **Remove the protective cap and tape**<br>Install the BJ cartridge again (see page 4-16) and clean the print heads (see page 4-7). |
| Not printing on correct side of the media | **Reload the print media**<br>Make sure that you load the media with the correct print side up. |

## The last part of print job is not printing

| 🔄 Cause | ⬤ Solution |
|---|---|
| Paper used for printing differs from the paper size specified in the software application and printer driver | **Specify the paper size you are using in the driver Page Size setting**<br>If your software application allows you to specify the paper size in the page setup, ensure that the Page Size settings in the software application and the printer driver are the same. |
| Parallel cable not connected correctly | **Check the parallel cable**<br>Make sure the parallel cable is securely fastened to the computer and printer. See the *Quick Start Guide* for details. |
| Printer cable fault | **Try to use another printer cable**<br>Make sure you are using an IEEE 1284-compatible parallel interface cable. |
| Switching device or external buffer fault | **Disconnect the switching device or external buffer**<br>Print with the printer directly connected to the computer. If you can then print normally, the fault is probably in the switching device or external buffer. Consult the switching device or external buffer supplier. |

Troubleshooting

|  Cause  |  Solution  |
|---|---|

| Cause | Solution |
|---|---|
| Windows Printing System (WPS) driver is installed on the computer. You may not be able to print correctly with a WPS printer driver installed on your computer. | **Change the WPS driver port setting to FILE or delete the WPS driver**<br>To change the port setting, open the WPS Driver Properties window. In the Details tab, select **FILE** in the "Print to Port" setting.<br><br>To delete the WPS driver, select **Programs** from the Windows Start menu. Then select **Windows Printing System** and click **Uninstaller**. Follow the on-screen instructions. |

## Printed and on-screen colors do not match

The color reproduction methods used by monitors differ from those used by printers. In addition, the printed color tones may not perfectly match those on the monitor because the colors vary depending on the circumstances in which the monitor is viewed and the monitor's color calibration settings. For example, objects that appear blue on the screen are printed purple, and objects that appear pale green on the screen are printed dark green. However, if the differences are extreme, check the items below.

|  Cause  |  Solution  |
|---|---|

| Cause | Solution |
|---|---|
| Print head nozzles in the BJ cartridges are clogged or ink has run out | **Print a Nozzle Check Pattern**<br>Check the status of the print heads (see page 4-5). Clean the print heads (see page 4-7). Replace the BJ tanks as necessary (see page 4-12). |
| Printer driver settings are not correct | **Check the printer driver settings**<br>To print a photo, select the correct print media icon for the document you are printing (such as SuperPhoto). Check also that the BJ Cartridge and Media Type settings match the BJ cartridge and media you are actually using. See page 2-7. |

**Printed pages curled/warped/wrinkled**

| ⟲ Cause | ◯ Solution |
|---|---|
| Excess ink is being absorbed by the paper | **Check your media type**<br>If you are printing on very thin paper, try a different paper type. Print on special print media such as High Resolution Paper or Glossy Photo Paper. |
| Print density is set too high | **Reduce the print intensity in the printer driver**<br>To change this setting, open the Printer Properties dialog box. On the Main tab, click the **Advanced** button and then click the **Color** tab. Move the intensity slider to the left to lower the print intensity. |

## Printer Beeps and the POWER Light Flashes Orange

When certain errors occur, the POWER light will light or flash and the printer will beep. Count the number of beeps and identify the problem below.

| Beeps | ⟲ Cause | ◯ Solution |
|---|---|---|
| 2 | Paper out, paper jam, or paper feed error | **Set the paper correctly**<br>If paper has jammed in the printer, remove the jam and press the **RESUME** button. See page 5-16. |
| 3 | Paper jam | **Remove the jammed paper**<br>If paper has jammed in the printer, remove the jam and press the **RESUME** button. See page 5-16. |
| 4 | BJ cartridge out of ink | **Replace the empty ink tank**<br>See page 4-12. |
| 5 | BJ cartridge not installed correctly | **Make sure each BJ cartridge is installed in the correct location**<br>The BC-30 Black BJ Cartridge or the BC-32 Photo BJ Cartridge must be installed in the left slot of the cartridge holder; the BC-31 Color BJ Cartridge must be installed in the right slot. |

Troubleshooting

| Beeps | Cause | Solution |
|-------|-------|----------|
| 6 | BJ cartridge not installed | **Install two BJ cartridges** Make sure each BJ cartridge is installed in the correct location. The BC-30 Black BJ Cartridge or the BC-32 Photo BJ Cartridge must be installed in the left slot of the cartridge holder; the BC-31 Color BJ Cartridge must be installed in the right slot. |
| 7 | BJ cartridge defective | **Check each BJ cartridge** Remove each BJ cartridge and make sure the contacts on the BJ cartridge and cartridge holder are clean. Make sure the orange protective tape has been removed from the print head then install the BJ cartridge again. See page 4-16. |
| 8 | Waste ink tank nearly full<br><br>The printer has a built-in waste ink tank that holds the ink used by print head cleaning. When you hear the printer beep eight times, the waste ink tank is nearly full. | **Continue printing and call Canon** Press the **RESUME** button to skip the error so you can continue printing. Call the Canon Customer Care Center to find out how to have the waste ink tank replaced immediately.<br><br>When the waste ink tank becomes full, the printer will beep 10 times, the POWER light will flash six times, and printing will no longer be possible. |
| 9 | Automatic print head alignment failed | **Change the position of the printer and try again** A BJ tank has run out of ink, the print head nozzles are clogged, or strong light has entered the paper output slot and prevented correct print head alignment.<br><br>If print head alignment fails again, manually align the print heads. For details on aligning the print heads manually, see page 4-22. |

| Beeps | | Cause | | Solution |
|-------|---|-------|---|----------|
| 10 | | Service error | | **Turn off the printer** Switch the printer off, unplug the power cord from the power outlet, and wait a few minutes. Plug the power in again, turn the printer on and try again. |

If the error occurs again, count the number of times the POWER light flashes. If the light flashes seven or nine times, remove the BJ cartridges. Re-insert the BJ cartridges and try your print operation again. If necessary, replace the BJ cartridges.

If the error continues to occur, count the number of beeps and flashes and call the Canon Customer Care Center (see page 1-4). You may be asked for this information.

Troubleshooting

# Clearing Paper Jams

When a paper jam occurs, the POWER light flashes orange and the printer beeps two or three times. If possible, remove the jammed sheet. Slowly pull the paper out either from the paper feed side or the paper output side, whichever is easier. Now press **RESUME**.
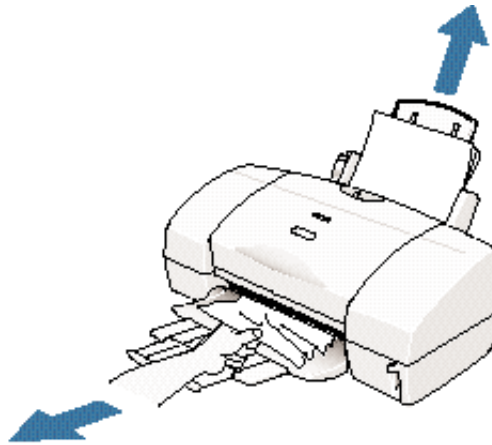
If the paper tears off inside the printer, turn off the printer. Open the printer's cover, and remove the paper left inside the printer.

If you cannot remove the jammed paper, press the **POWER** button twice for one second to eject the jammed paper automatically. Start the print job and try again.

> If you are printing high density graphics when a paper jam occurs, feed at least two sheets of paper through the printer to clean the rollers.

# Using the Operator Panel



OPERATOR PANEL · POWER LIGHT · POWER BUTTON · RESUME BUTTON
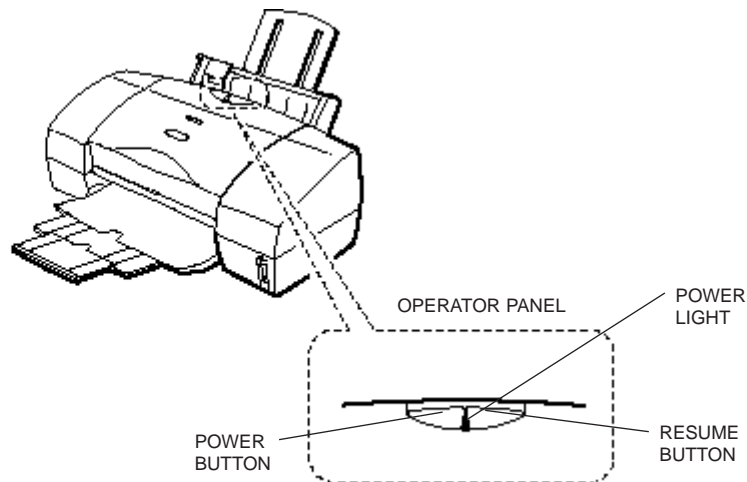
■ **POWER button**
Press to switch the printer on and off.

■ **POWER light**
Indicates the status of the printer:

- • Off—Printer power off
- • On—Standby and ready for operation
- • Flashes green—Print job in progress
- • Flashes orange—Error; remove cause of error before you resume printing

■ **RESUME button**
After you have removed the cause of a printer error, press to resume printing.

Press and hold the **RESUME** button for the required number of beeps and then release to perform these special tasks:

- • 1 Beep—Print head cleaning
- • 2 Beeps—Printing Nozzle Check Pattern
- • 3 Beeps—Cleaning the feed rollers

You can also initiate these tasks using the printer driver.

Troubleshooting

# Specifications **A**

## Printing Specifications

**Printing Method**
Bubble Jet ink on-demand

**Print Resolution**
$1440 \times 720$ (horizontal $\times$ vertical) dpi
  on Canon Specialty Paper

**Print Speed**
BC-30 Black BJ Cartridge: 8 ppm*
BC-31 Color BJ Cartridge: 5 ppm*
  *High Speed Draft Mode—Print
  speed will vary depending on system
  configuration, software, document
  complexity, print mode, and page
  coverage.

**Print Direction**
Bi-directional

**Receive Buffer**
128KB

**Print Width**
Maximum: 8.5 inches (218 mm)

**Line Feed Speed**
4 inches/second

**Paper Handling**
Automatic feed
Manual feed

**Paper Weight**
Automatic feed
  17 to 24 lb (64 to 105 g/m$^2$)
Manual feed
  17 to 143 lb (64 to 500 g/m$^2$)
  Up to 0.6 mm thick

**Sheet Feeder Capacity—auto feed only**
Maximum thickness of stacked paper: 0.5 inches (13 mm)

| | |
|---|---|
| Plain paper (20 lb or 64 g/m$^2$) | Approx. 130 sheets (0.5" stack) |
| High gloss photo film | 1 sheet |
| Glossy photo paper | 10 sheets (with Loading Support Sheet A) |
| Glossy photo cards | 10 cards |
| Banner paper | 1 (2 to 6 sheets) |
| Brilliant White paper | Approx. 130 sheets |
| High resolution paper | Approx. 100 sheets (0.5" stack) |
| T-shirt transfers | 1 sheet |
| Bubble Jet Paper | Approx. 130 sheets |
| Greeting Cards | 1 card |
| LetterPlus Letterhead paper | 1 sheet |
| Fabric sheets | 1 sheet |
| Back print film | 10 sheets |
| Transparencies | 30 sheets |
| Envelopes | 15 envelopes (U.S. Com #10 or European DL) |

## Manual feed
Thick paper 0.2 in (0.6 mm) max.

## Paper Size

| | |
|---|---|
| Letter | 8.5 in. × 11 in. |
| Letter+ (Full Bleed) | 9 in. × 13.3 in. |
| Legal | 8.5 in. × 14 in. |
| A4 | 210 mm × 297 mm |
| A5 | 148 mm × 210 mm |
| B5 | 182 mm × 257 mm |
| A4+ | 223.5 mm × 355.6 mm |
| Glossy photo cards | 119.6 mm × 215.9 mm (with borders) |
| | 101.6 mm × 152.4 mm (final size without borders) |
| U.S. Commercial | |
| number 10 envelope | 9.5 in. × 4.1 in. |
| European DL envelope | 220 mm × 110 mm |
| Canon envelope | 4 in. × 6 in. |
| Custom | |
| Minimum (W×H) | 3.94 in. × 3.94 in. (100 mm × 100 mm) |
| Maximum (W×H) | 9.5 in. × 23.9 in. (241.3 mm × 584.2 mm) |

## Canon Specialty Papers
Canon High Gloss Photo Film
Canon Glossy Photo Paper
Canon Glossy Photo Cards
Canon High Resolution Paper
Canon T-Shirt Transfers
Fabric Sheet for Canon Bubble Jet printers
Canon Greeting Cards
Canon LetterPlus Letterhead Paper
Canon Back Print Film
Canon Transparencies
Canon Banner Paper
Envelopes: U.S. Commercial number 10, Canon, or European DL

# Printable Area

The printable area includes the recommended printing area and the actual printable area.

## Recommended Printing Area
Canon recommends that you print within this area.

## Printable Area
The area in which it is possible to print. However, printing in this area can adversely affect the print quality or the paper feed precision.

### A4, A5, B5
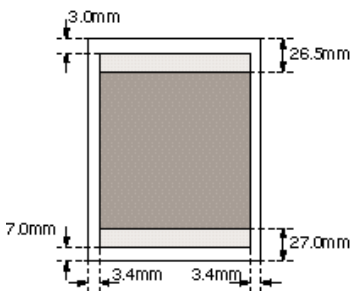
**Printable Area (width x length)**

| | |
|---|---|
| A4 | 203.2 mm × 287.0 mm |
| A5 | 141.2 mm × 200.0 mm |
| B5 | 175.2 mm × 247.0 mm |

Dimensions shown in diagram: 3.0mm, 26.5mm, 7.0mm, 27.0mm, 3.4mm, 3.4mm
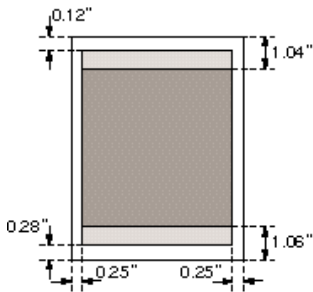
### Letter, Legal

**Printable Area (width x length)**

| | |
|---|---|
| Letter | 8" × 10.6" |
| Legal | 8" × 13.6" |

Dimensions shown in diagram: 0.12", 1.04", 0.28", 1.06", 0.25", 0.25"

### Glossy Photo Cards, LetterPlus
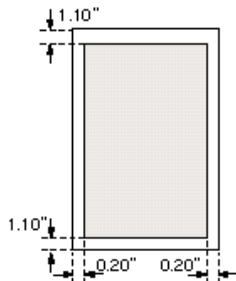
**Printable Area (width x length)**

| | |
|---|---|
| Glossy Photo Cards | 4.3" × 6.3" |
| LetterPlus paper | 8.6" × 11.1" |

Dimensions shown in diagram: 1.10", 1.10", 0.20", 0.20"
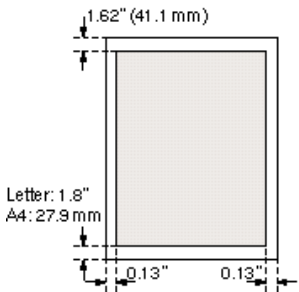
## Fabric Sheets



### Printable Area (width x length)

| | |
|---|---|
| Fabric Sheet | Letter: 8" × 10.6"<br>A4:    203.2 mm × 287.0 mm |

## U.S. Commercial No. 10 Envelope
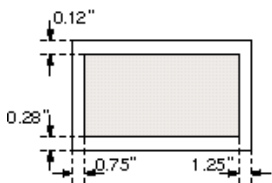


### Printable Area (width x length)

| | |
|---|---|
| U.S. Commercial #10 | 8" × 3.6" |

## European DL Envelope
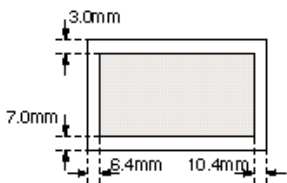


### Printable Area (width x length)

| | |
|---|---|
| European DL | 220 mm × 110 mm |

## Banner Paper
When you print on Banner Paper, the maximum length is 6 sheets.
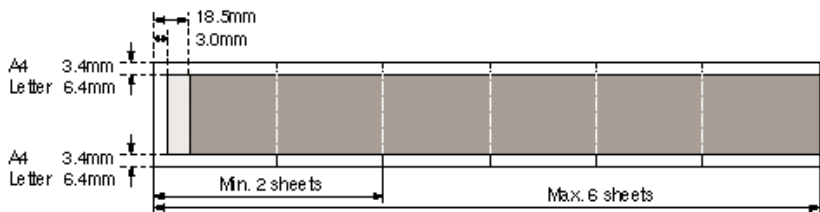


### Printable Area (width x length)

| | |
|---|---|
| Banner Paper | 203.2 mm × 1779.0 mm (A4)<br>8" × 65.9" (Letter) |

# BJ Cartridges

### BC-30 Black BJ Cartridge
| | |
|---|---|
| Print head | 160 nozzles |
| Ink | Black |
| Yield* | Approx. 500 sheets |
| | (1500 characters per page, normal text) |
| Print head life | Approx. 5000 pages |

### BC-31 Color BJ Cartridge

| | |
|---|---|
| Print head | 48 nozzles per color |
| Ink | Cyan, Magenta, Yellow |
| Yield* | Approx. 280 pages (at 7.5% coverage per page) |
| Print head life | Approx. 3000 pages |

### BC-32 Photo BJ Cartridge
| | |
|---|---|
| Print head | 48 nozzles per color |
| Ink | Photo Black, Photo Cyan, Photo Magenta |
| Yield* | Approx. 280 pages (at 7.5% coverage per page) |
| Print head life | Approx. 3000 pages |

* Based on the number of pages per BJ tank over the printable area.

# General

### Interface
IEEE 1284-compatible parallel interface

### Acoustic Noise Level
Approx. 48 dB(A) per ISO 9296

### 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 (0° C to 35° C) |
| Humidity | 5% to 90% RH (no condensation) |

Power Source
USA/Canada                          AC 120 V, 60 Hz, 0.65 A

Power Consumption
Standby                             Approx. 5.5 watts
Printing                            Approx. 35 watts
Off                                 Approx. 3.2 watts

Dimensions
18.7 in. (475 mm) W × 12.8 in. (325 mm) D × 8.1 in. (205 mm) H
Paper support and paper output trays closed

 Weight
Approx. 13.0 lb (5.9 kg)

# Hardware and Software Requirements

These are the minimum requirements for the computer setup.

■ IBM® PC or compatible computer with a 486 PC processor or better (Pentium® processor recommended)

■ Microsoft® Windows® 98, Windows 95, Windows 3.1, or Windows NT

■ 8 megabytes (MB) of RAM
(16 MB or more recommended for high resolution printing)

■ 40 MB hard disk space

■ Bi-directional Centronics®-compatible parallel cable (IEEE 1284-compliant); a cable less than 6.6 feet in length is recommended

■ CD ROM drive (2x or better)
(If you do not have a CD ROM drive, you can download the printer driver from Canon's Web site or BBS, or call the Canon Customer Care Center to order the Printer Setup on diskettes for a small shipping and handling fee. See the Canon Customer Care Center information on page 1-4 for numbers.)

■ Canon Creative Pro has additional requirements
(See the Canon Creative Pro *Quick Start Guide* for details.)

### Automatic feed
Refers to one way in which paper can be fed into the printer when the sheet feeder is used.

### BJ cartridge
The printing mechanism that contains the print head unit and BJ tanks.

### Bubble Jet printing
An ink jet type of printing that heats the ink to a boiling point in a nozzle to form a bubble. When the bubble expands, there is no room left in the nozzle for the ink and the ink is projected onto paper.

### CMYK
Acronym for cyan, magenta, yellow, and black; the four colors used in the standard color model of the printing industry. Refers to a method of specifying color using CMYK color values. (K is used for black because B is used to represent blue in RGB.)

### cpi
Characters per inch. A unit of measurement relevant to a fixed-space font. Because all characters have the same width, you can calculate the number of characters printed per inch.

### cpl
Characters per line. A unit of measurement that indicates the number of characters printed per line.

### cps
Characters per second. A unit of measurement that indicates the printer's speed.

### dB(A)
Stands for decibel level (a decibel being a unit of measurement for the intensity of the sound coming from the printer), adjusted for background noise.

### dpi
Dots per inch. A unit of measurement for indicating a printer's resolution. Your printer can produce a resolution up to 1440 dpi (horizontal) depending on the Media Type setting in your printer driver and the media you are using.

### Font
A complete set of characters of the same size and style; a particular implementation of a typeface. For example, 12-point, Courier bold.

### Form feed
A printer function that automatically ejects the current page and advances the printer to the top of the next page.

### Grayscale
Representing color in black and white as a result of different intensities of color. Different colors and intensities of colors appear as different shades of gray.

### Halftone
Using this method, the printer produces shades of gray or of colors by mapping dots to be printed. For color printing, different colored dots of ink are placed closely together to create illusions of other colors.

### Hue
A color in the color spectrum. Examples are red, green, and violet.

### Ink Cartridge Storage Box
A box for storing a BJ cartridge. A BJ cartridge removed from the printer must be stored inside this container to prevent the print head of the cartridge from drying and clogging.

### Intensity
The amount of color. More intense or more saturated colors are more pure. Less intense or less saturated colors are less vivid.

### Interface
The connection between two devices that makes it possible for them to communicate with each other. This printer features a parallel interface, which makes it compatible with IBM and similar personal computers.

### Landscape orientation
Refers to printing across the length of the page (as opposed to portrait orientation printing across the width of the page). The term landscape is derived from pictures of the landscape, which are usually horizontal in format.

### Manual feed
A method of feeding paper to the printer one sheet at a time.

### Noise level
*See* dB(A).

### Page orientation
Refers to the direction of print on the page. Printing across the width of a page is called portrait orientation. Printing across the length of a page is called landscape orientation.

### Parallel interface
An interface that transmits multiple bits simultaneously (usually in one-byte segments). Your printer has a built-in, Centronics-type parallel interface with bi-directional capability. *See also* Interface.

### Pitch
Refers to the number of characters per inch that can be composed using a fixed space font.

### Platen
Printer component that holds the paper in position during ink transfer.

### Point size
Character height is defined in points; one point is 1/72 inch. For instance, this text is printed using a 10-point font.

### Portrait orientation
Refers to printing across the width of the page (letter style). This is the opposite of landscape orientation, which is printing across the length of the page.

### Print head
The printing mechanism that contains print nozzles and ejects the ink for printing.

### Print head capping
An automatic protection function that prevents the print head unit and ink cartridges from drying out or becoming clogged with dust.

### Printable area
The area of a sheet of paper on which a printer can reproduce text or graphics (the printing area is smaller than the paper). On this printer, the printing area varies depending on the type of paper being used.

### Printer driver
Software that sends printing instructions to a printer. The printer driver keeps track of the attributes of a printer and the codes the program must send to access those attributes.

### RAM
Random Access Memory. Printer memory that is used for temporary storage of information you want to print and downloaded fonts.

### Resolution

The density of dots for any given output device. Expressed in terms of dots per inch (dpi). Low resolution causes font characters and graphics to have a jagged appearance. Higher resolution means smoother curves and angles as well as a better match to traditional typeface designs. Resolution values are represented by horizontal data and vertical data, for example, $360 \times 360$ dpi. This printer can produce output with resolutions up to $1440 \times 720$ dpi precision on specialty paper.

### RGB

An acronym for Red, Green, and Blue; the three primary colors used in the additive process to form a wide spectrum of colors.

### TrueType font

The scalable font technology built into Microsoft Windows. It offers you the same font images both on computer displays and printer outputs.

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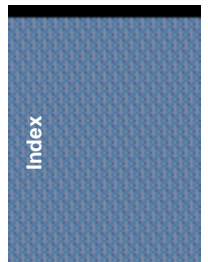
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# FCC Regulations

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

■ Reorient or relocate the receiving antenna.

■ Increase the separation between the equipment and receiver.

■ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

■ Consult the dealer or an experienced radio/TV technician for help.

Do not make any changes or modifications to the equipment unless otherwise specified in the manual. If such changes or modifications should be made, you could be required to stop operation of the equipment.

Use of shielded cable is required to comply with Class B limits in Subpart B of Part 15 of FCC Rules.

# Canadian Radio Interference Regulations

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of the Industry and Science Canada.

Cet appareil numérique respecte les limites de bruits radio électriques applicables aux appareils numériques de Classe B prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques," NMB-003 édictée par l'Industrie et Sciences Canada.