# BJC-8500

# SERVICE MANUAL

**REVISION 0**

Canon

0399 AB 0.30-0

# BJC-8500

## SERVICE
## MANUAL

Canon

# I. ABOUT THIS MANUAL

This manual is divided into five parts containing the information required for servicing the BJC-8500 printer.

## Part 1: Safety and Precautions

This part contains information on how to service the unit safely. 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 to set it up properly, 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-8500 printer. Please also refer to the separate Parts Catalog.

**NOTE** This printer prints various ink and plain paper ink optimizer (except in the draft mode when plain paper, envelope or thick paper is selected). This plain paper ink optimizer is an almost transparent, colorless liquid.
For convenience, this manual sometimes refers to the plain paper ink optimizer simply as "ink optimizer" and the combination of ink and plain paper ink optimizer as "ink."
This manual also refers to the BJ cartridge and print head (head) as the one and same thing.

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# IV. TABLE INDEX

# *Part 1*

# SAFETY AND PRECAUTIONS

# 1. PERSONAL SAFETY PRECAUTIONS

## 1.1 Moving Sections of the Printer

Be careful not to let your hands or fingers, hair, clothes, accessories, etc., become caught in any moving sections of the printer. The moving sections of the printer are driven by the carriage motor, paper feed motor, or the purge motor.

**Moving sections driven by the carriage motor:**

Carriage belt, idle pulley, carriage, etc.

**Moving sections driven by the paper feed motor:**

Paper feed rollers, pinch roller, cleaning unit, eject roller, spur unit, transmission gear, flapper unit, etc.

**Moving sections driven by the purge motor:**

Purge unit, pick-up roller of the sheet feeder unit, pick-up rollers in the upper and lower cassettes, paper feed roller, etc.

During operation close the top cover (except when checking operation), and take care not to touch the above moving parts. Also note that the spurs are made of metal and have sharp edges. Avoid touching these inadvertently with bare hands.
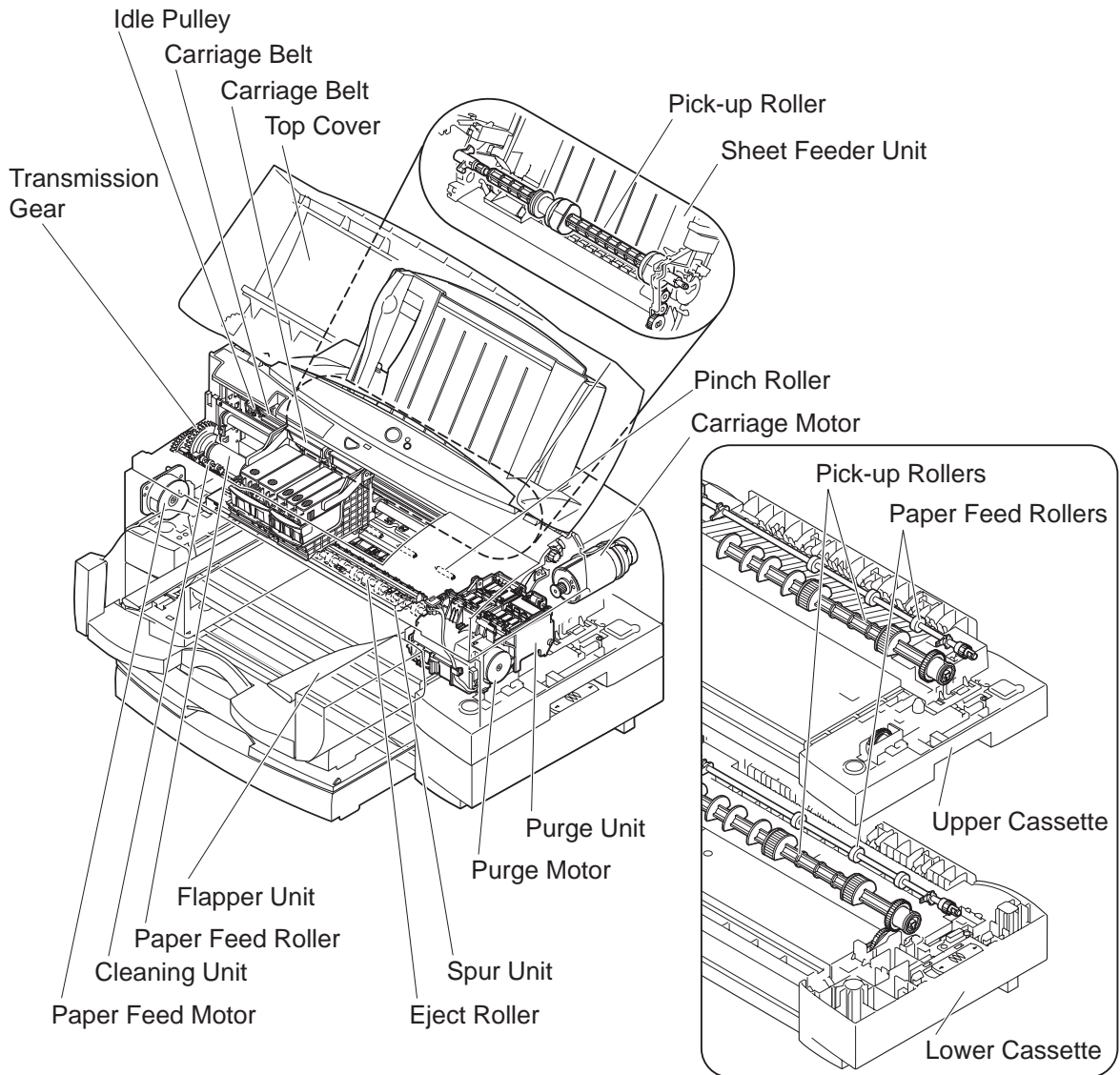


**Figure 1-1 Moving Sections of the Printer**

### 1.2 Ink Stains
#### 1.2.1 Ink path

Be careful not to touch the ink path on the printer, or get ink stains on your hands or fingers, clothing, printer while it is operating and on the work table.

The ink path is comprised of the nozzle section of BJ cartridges, suction caps, waste ink tubes, wiper section, wiper cleaner, maintenance jet section, wiper unit, wiper unit transfer pad and waste ink absorber.

# ⚠ CAUTION

The ink and plain paper ink optimizer are not substances harmful to the human body. They do, however, contain organic solvents (Ink: isopropyl alcohol 67-63-0, glycerin 56-81-5, Plain Paper Ink optimizer: ethleneglycol 111-46-6, glycerin 56-81-5). Be careful not to get any ink in your mouth or eyes. Also, keep ink and plain paper ink optimizer out of the reach of small children.

If you do get any into your eyes, wash it out immediately with plenty of water. If you inadvertently swallow a large amount of ink, consult a doctor immediately.

Since ink contains dyes, if it gets on your clothes, etc., it will not come out even through washing.
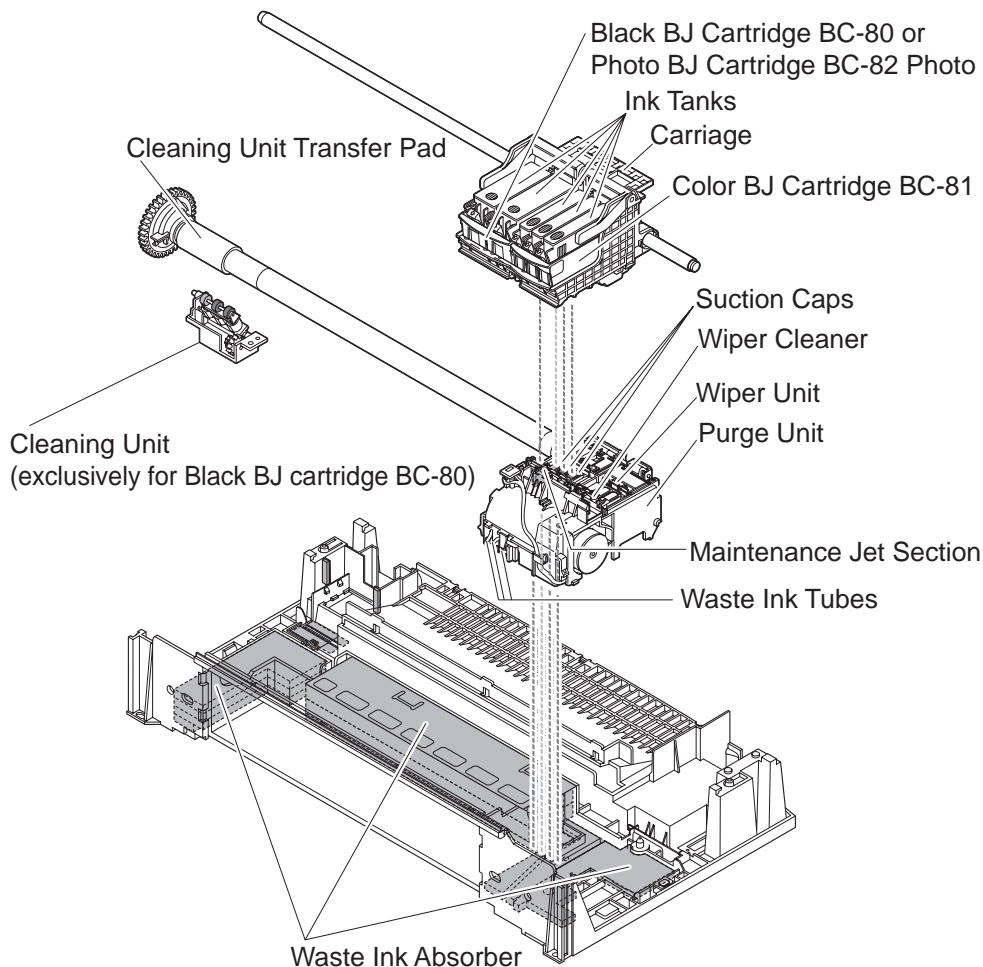
**Figure 1-2 Ink Path**

The ink path includes the filters of the Black BJ cartridge [BC-80], Color BJ cartridge [BC-81] and Photo BJ cartridge [BC-82 photo], and each ink outlet of the ink tanks. Take care of the ink path when handling BJ cartridges and ink tanks.
Never unnecessarily remove ink tanks from BJ cartridges. When an ink tank is removed from a BJ cartridge, air can enter the ink path and may adversely affect printing. If an ink tank is removed from a BJ cartridge, carry out cleaning. (Cleaning is automatically carried out when the ink tank is attached after a no ink tank error is detected. For details, see *"Part 4: TABLE 4-7 CLEANING EXECUTION CONDITIONS, CLEANING TIME AND INK SUCTION AMOUNTS." (page 4-25)*)
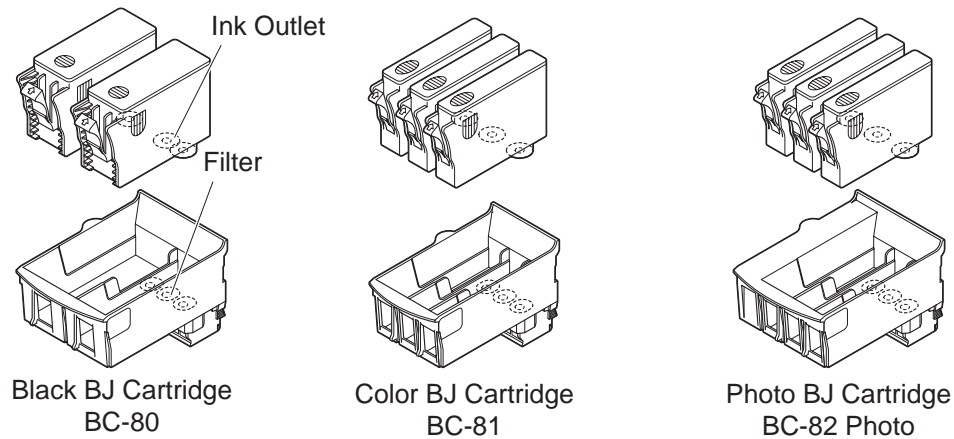


**Figure 1-3 BC-80, BC-81, and BC-82 Photo**

## 1.2.2 Ink mist

With the BJ cartridges used on this printer, minute ink droplets rise up and bounce back from the paper during printing as "ink mist." This printer generates a much larger amount of ink mist than conventional Canon printers. As a countermeasure, two fans, A and B, are provided to create an air path to draw the ink mist behind fan B into the ink mist absorber. Fan A pulls in air, while fan B sucks in this blown air. When servicing or disassembling this printer, wear gloves. Hands, fingers or clothes may become soiled by this ink mist. If necessary, wipe off ink mist using a soft cloth moistened with water.
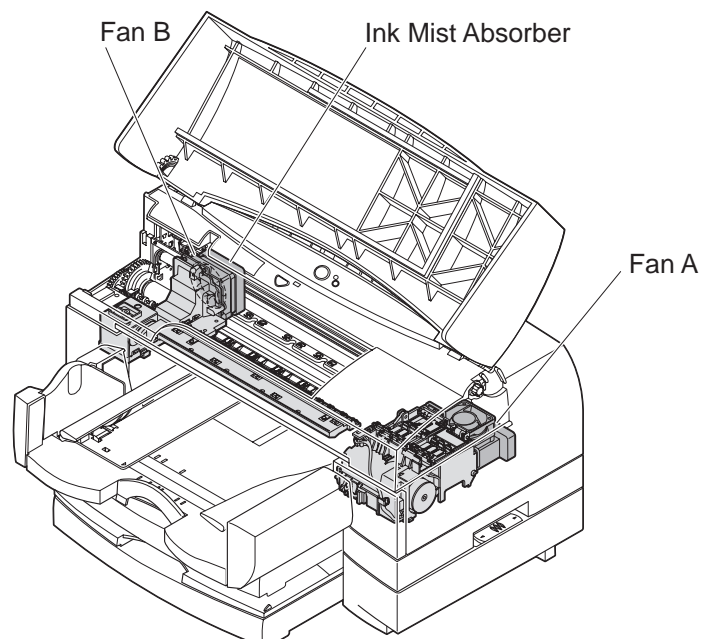


**Figure 1-4 Ink Mist**

### 1.3 Electrically Live Sections of the Printer

All electrical sections of the printer supplied with AC power are electrically live when the power cord is connected whether the printer is turned ON or OFF using the *POWER* button.

Be careful of electric shock when checking printer operation with the covers removed during servicing.  For this reason, be sure to unplug the power cord from the power outlet during servicing.

# ⚠ CAUTION

As the AC main voltage is supplied to the primary side of the power supply unit, there is always the danger of an electric shock.

Always unplug the AC power cord before disassembling for service.
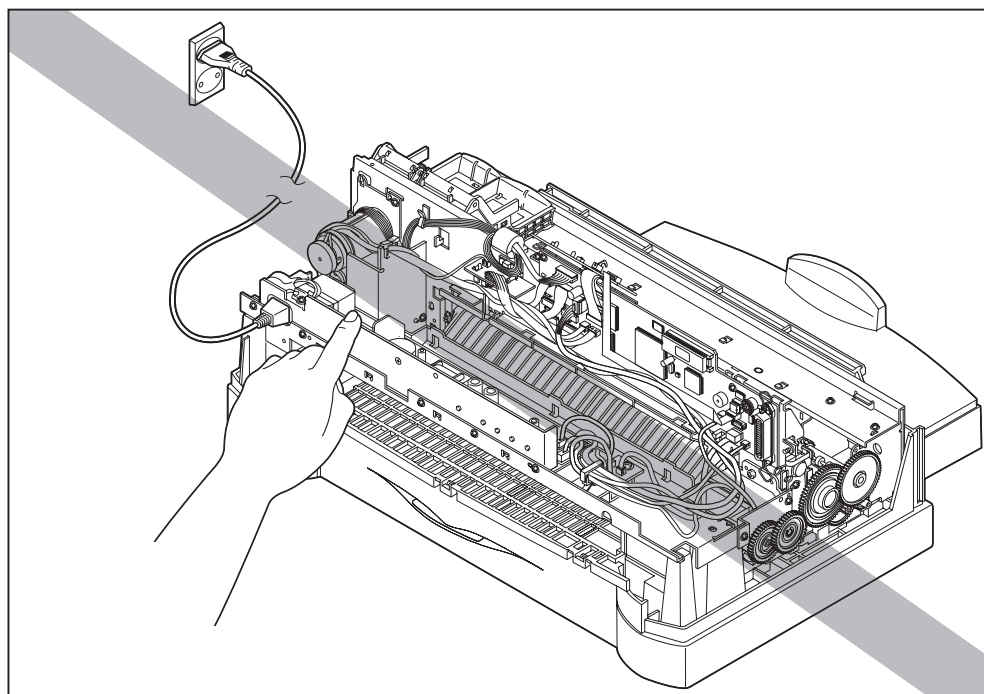


**Figure 1-5 Power Supply Unit**

# 2. MACHINE PRECAUTIONS

## 2.1 Handling BJ Cartridges

### 2.1.1 Unpacking BJ cartridges

Do not unpack the BJ cartridges until they are ready to be used.  Before installing the BJ cartridge in the printer, gently remove the cap protecting the nozzles as shown in *Figure 1-6 Removing the Protective Cap*.

Black BJ Cartridge
BC-80

Color BJ Cartridge
BC-81

Photo BJ Cartridge
BC-82 Photo

Protective Cap
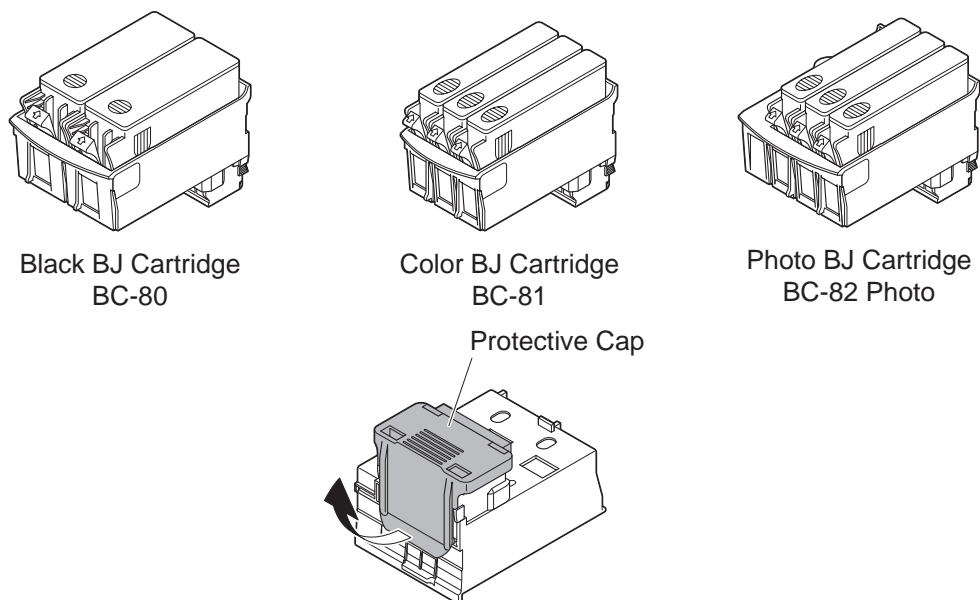
**Figure 1-6 Removing the Protective Cap**

> **CAUTION**
>
> Never re-use a protective cap once it has been removed.  Re-using a protective cap may cause defective printing.  Also, be sure to use BJ cartridge container SB-80 for storing BJ cartridges.  If the protective cap is re-attached to the BJ cartridge, the film or tape on the cap may form an ink path with other inks.  This, in turn, may cause inks of different colors to mix or cause the nozzles to clog.

### 2.1.2 Protecting BJ cartridges

To prevent clogging of the nozzles due to foreign matter, never touch the nozzle section of the BJ cartridge, filters, and ink outlets on the ink tanks, or wipe off foreign matter or clogged ink with tissue paper or the like.

Once you have removed the protective cap from a BJ cartridge, either install the BJ cartridge in the printer or store it in the cartridge container (SB-80) to prevent clogging of the nozzles due to ink drying or foreign matter.

Do not re-attach a protective cap once it has been removed.

Also, never leave a BJ cartridge exposed with the ink tank removed. (Doing so may allow the ink outlets to dry and cause defective printing.)

Do not disassemble or assemble BJ cartridges, and do not wash the heads with water as this may cause the nozzles to clog.

> **NOTE** Clogging of the nozzles causes defective printing. If cleaning does not restore proper printing, you must replace the BJ cartridge.

Nozzle Section

Black BJ Cartridge
BC-80

Color BJ Cartridge
BC-81

Photo BJ Cartridge
BC-82 Photo

Ink Outlets

Filters
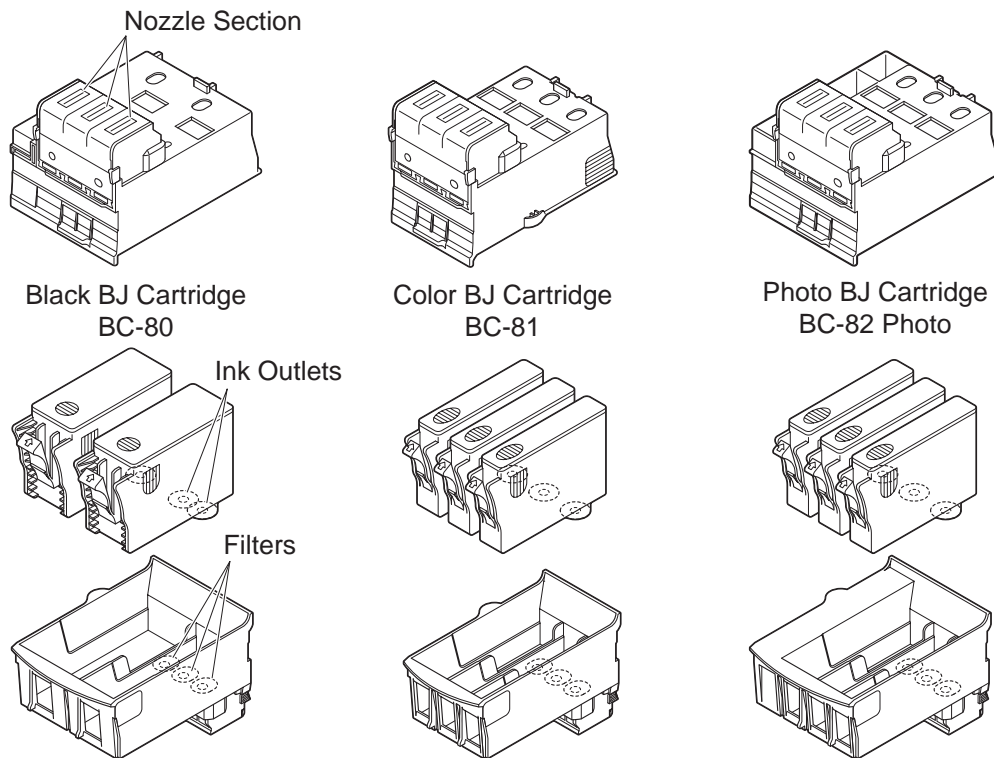
**Figure 1-7 BJ Cartridges**

### 2.1.3 Turning the printer ON/OFF

When the power is switched OFF with the *POWER* button, the printer automatically caps the nozzle section of the BJ cartridge to protect it and prevent ink leakage. If you unplug the power cord before the printer is turned OFF with *POWER* button, the printer may stop without capping the nozzles, depending on the position of the carriage. If this happens, reconnect the power cord, start up the printer as usual, turn the power OFF with the *POWER* button, make sure that the carriage returns to the home position and that the nozzles are capped before disconnecting the power cord.

| | |
|---|---|
| **CAUTION** | If the nozzle section is not capped, ink may leak or dry, causing the nozzles on the BJ cartridges to clog. |

### 2.1.4 When not using the printer

Keep the Color BJ cartridge BC-81 installed in the printer even when the printer is not in use to ensure the quality of the BJ cartridge. Install either the Black BJ cartridge BC-80 or Photo BJ cartridge BC-82 photo in the printer, and store the other in BJ cartridge container SB-80.

| | |
|---|---|
| **CAUTION** | If the BJ cartridge is removed from the printer and left unprotected, foreign matter may stick or dry ink may clog the nozzles, making it impossible to use the BJ cartridge.<br>Ink may also leak from the caps if cleaning is not performed after the BJ cartridge is removed and the printer is carried or transported. |

### 2.1.5 Ink electroconductivity

The ink in the BJ cartridge is electrically conductive. If it leaks onto a mechanical section, wipe it up with a damp paper towel or the like. If it leaks onto an electrical circuit, wipe it up completely with tissue paper or the like. If ink leaks onto the logic board or into the power supply unit and gets into the electrical components and PCB, and is difficult to clean, replace the logic board or other electrical components with new ones.

| | |
|---|---|
| **CAUTION** | If the power cord is connected to the printer with ink leaked, this may damage the electrical section. Never switch the power on if there has been a leak. |

## 2.2 Handling the Ink Tanks
### 2.2.1 Unpacking the ink tanks

Do not unpack the ink tank from its package until it is ready to be used. Before installing the ink tank in the BJ cartridge, unpack the ink tank and remove the protective cap protecting the ink outlets.
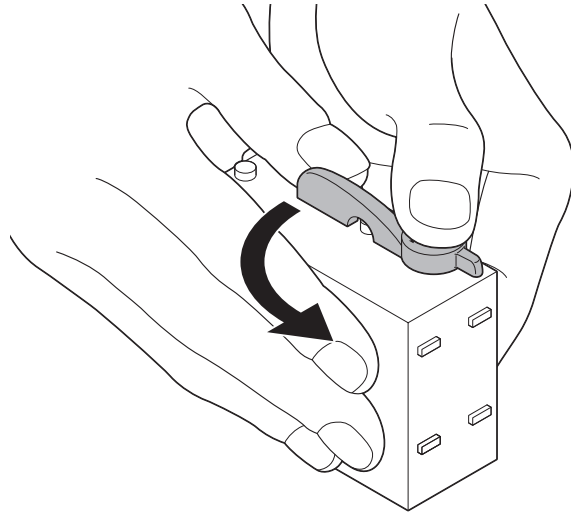


**Figure 1-8 Removing the Ink Tank Protective Cap**

### 2.2.2 Protecting the ink tanks

To prevent poor ink suction due to foreign matter on the joints with the BJ cartridge, never touch the ink outlets of the ink tank with your hands or fingers. After removing the protective cap from the ink tank, immediately install the ink tank in the BJ cartridge to prevent the nozzles from clogging due to ink drying. Do not remove ink tanks from BJ cartridges unless replacing them. (When not using an ink tank, place them, installed in the BJ cartridge, in BJ cartridge container SB-80.
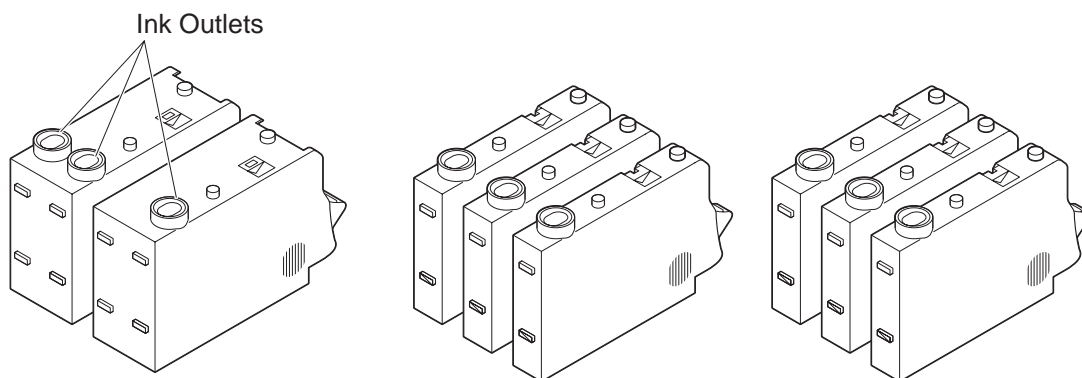


**Figure 1-9 Ink Outlets**

## 2.3 Handling the Printer
### 2.3.1 Spurs

Metal spurs are used for feeding and outputting paper after printing.  The tips of the spurs are also sharp and pointed.  They are small and easily deformed.  Take care not to deform them.  Take care to prevent injury when handling them.

If the tips of the spurs become deformed or worn, and their surface contact area with the paper increases, a minute line of dots may appear on the paper.  If this happens, replace the spurs. (refer to *"Part 5:  1.1 Periodically-replaced Parts" (page 5-1)*)
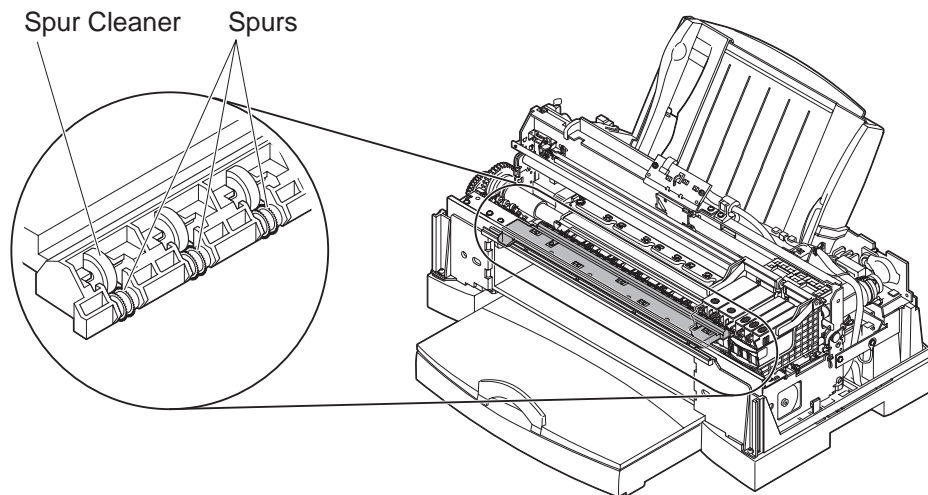
**Figure 1-10 Spurs**

### 2.3.2 Encoder

The BJ cartridge used on this printer generates a lot of ink mist as described in *"Part 1: 1.2.2 Ink mist" (page 1-3)*.  So, the encoder film and encoder head may become coated with ink mist.

To clean the encoder film, wipe with lint-free paper or a dry cloth.  Do not wipe with a wet cloth.  Replace the encoder film if wiping does not clean it.  When replacing the encoder film, make sure that it is installed facing the correct way. (The top of the encoder film is marked as shown in *Figure 1-11 Encoder Film and Carriage Board*.)

Do not wipe off ink mist on the encoder head.  Replace with a new head (mounted on the carriage board.) (refer to *"Part 5:  1.1 Periodically-replaced Parts" (page 5-1)*)
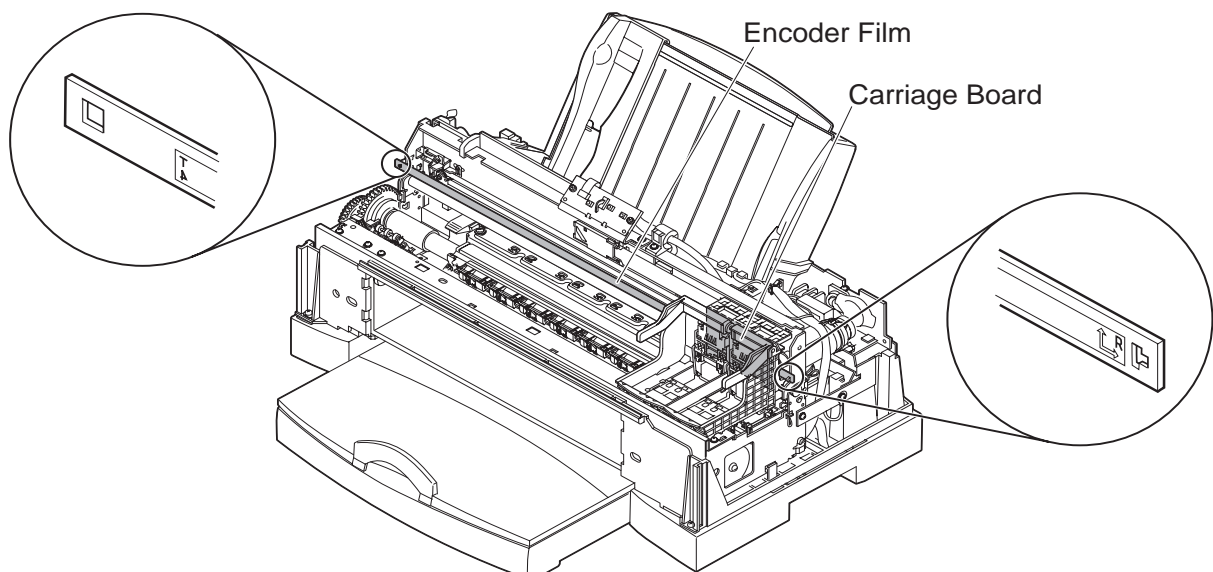
**Figure 1-11 Encoder Film and Carriage Board**

### 2.3.3 Paper feed roller unit

The surface of the paper feed roller is blast-finished to ensure a maximum resolution of $1200 \times 1200$ dpi. Take care not to scratch the surface of this roller.

The drive gear used on the paper feed roller is also finished to high precision to feed the paper in small increments for 1/1200 inch feeding. Take special care not to leave any knock marks on this gear.

Drive Gear    Paper Feed Roller
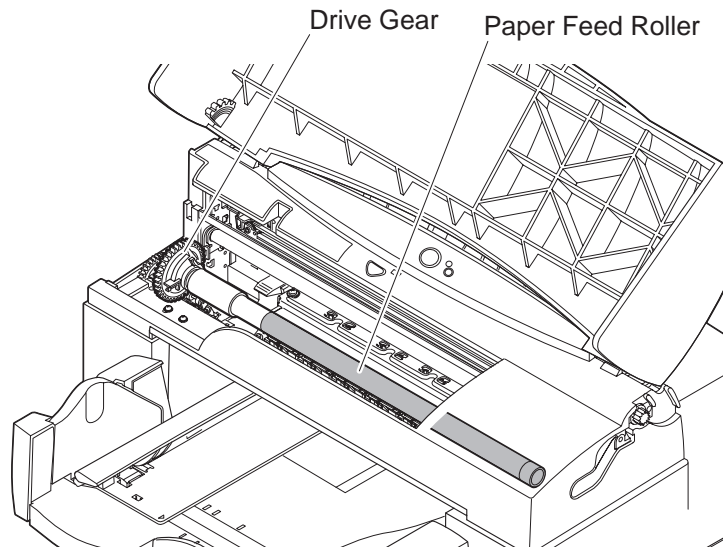
**Figure 1-12 Paper Feed Roller**

### 2.3.4 Purge motor

The purge motor is very hot immediately after repeated printing or cleaning. Take care not to touch the purge motor directly with bare hands after these operations.

Danger! High Temperature!
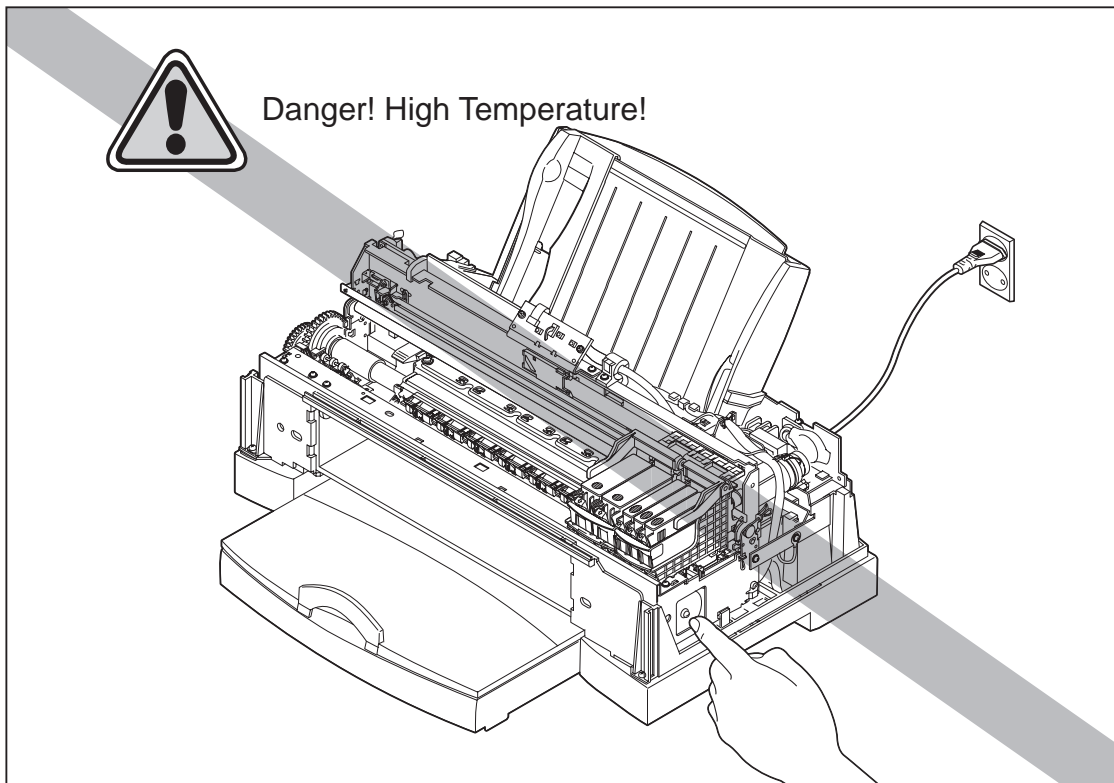
**Figure 1-13 Purge Motor**

**1-10**

### 2.3.5 Precautions to prevent damage from static electricity

The electrical charge accumulated on a person when clothes rub can damage electric elements or change their electrical characteristics.  Never touch the contact section on carriage top or the contact section on BJ cartridges.

Attention! Static Electricity!

Contact Section on Carriage Top

Contact Section on BJ Cartridges
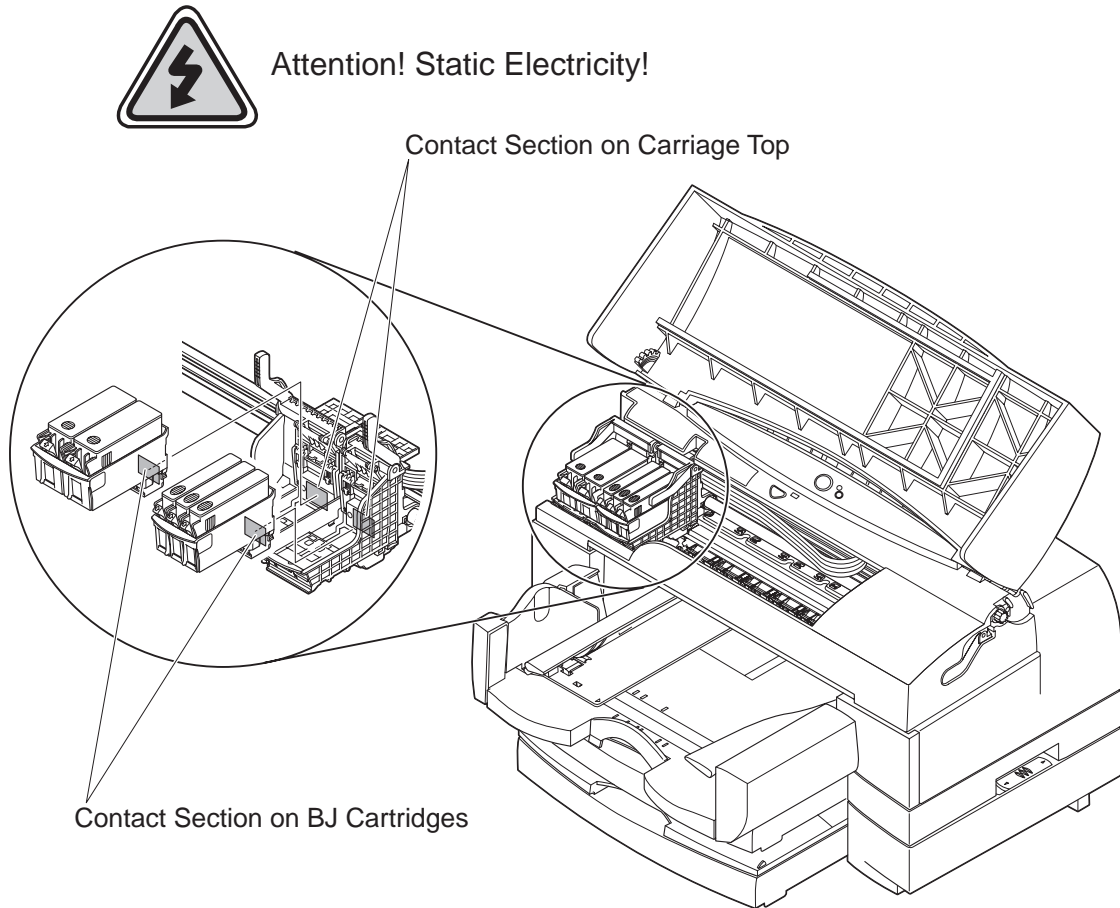
**Figure 1-14 Contact Sections**

### 2.3.6 Ink leakage/ink dry-up precautions

Always turn the printer OFF by the *POWER* button with the BJ cartridges installed. The following operation is automatically carried out when powering OFF with the *POWER* button.

**Capping**

The head cap covers and secures the nozzle section to prevent the nozzles on the BJ cartridge from drying. If the power cord is unplugged from the power outlet by mistake without turning the printer OFF by the *POWER* button, reconnect the power cord to the power outlet, turn the power ON, then OFF again, by the *POWER* button, and make sure that the nozzles are capped before unplugging the power cord.

If the power is turned OFF with the BJ cartridge removed or the power is turned OFF after unplugging the power cord from the power outlet, the nozzles are not capped. This may cause ink to leak or dry up.

BJ Cartridge

Head Cap
(enlarged view of indicated section)
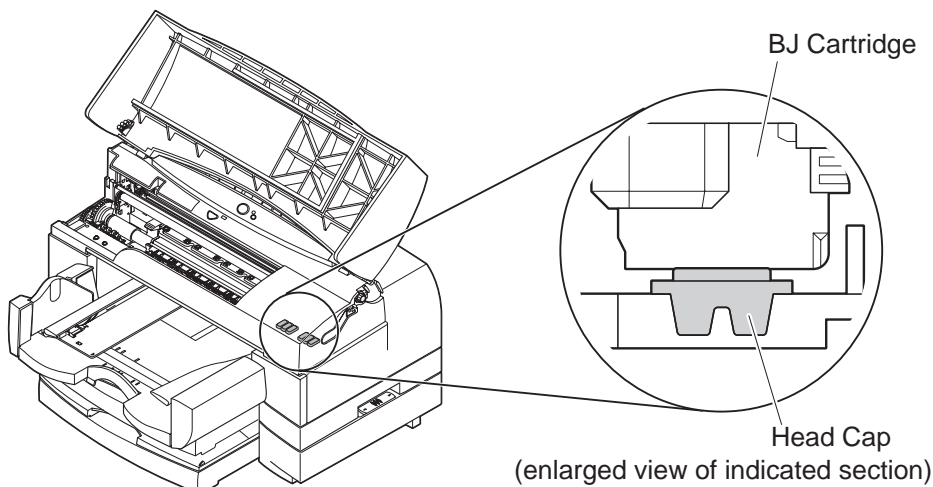
**Figure 1-15 Capping**

> **CAUTION**  If the power cannot be turned ON due to printer trouble, manually lock the nozzle cap. For details, see *"Part 3: 2.2 Capping Lock/Unlock" (page 3-16)*.

### 2.3.7 Precautions when carrying the printer

The printer weighs 25 kg. It should be carried by two personnel, holding it on both sides as shown in *Figure 1-16 Precautions when Carrying the Printer*.
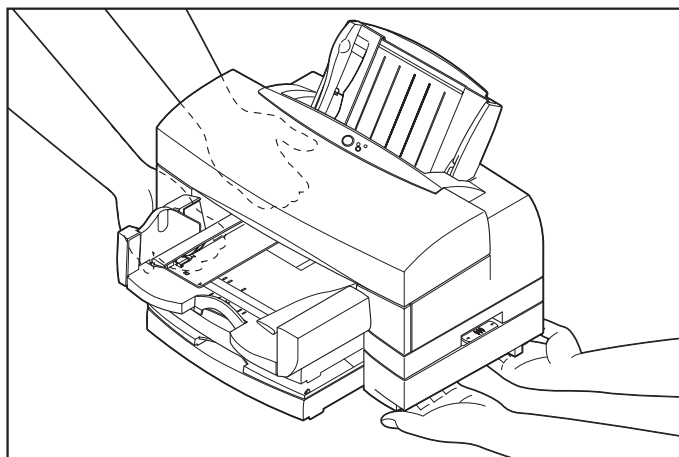
**Figure 1-16 Precautions when Carrying the Printer**

# 3. PRECAUTIONS FOR SERVICE

## 3.1 Precautions Concerning Memory Data

This printer counts the number of BJ cartridge attachments/removals, number of sheets fed, waste ink amount, head position adjustment values, and cleaning count, and stores this data in the EEPROM on the logic board.

Observe the following precautions during servicing.

**1) Before servicing:**

Check the EEPROM with a test print in the service mode. For details, see *"Part 3: 3.4.2 Service mode" (page 3-24)*.

**2) When replacing the logic board:**

If the EEPROM is not defective, remove the EEPROM from its socket and attach it to the new logic board. All data settings stored to EEPROM can be used on the new logic board as they are. To check the EEPROM data settings, make a test printout.

If the EEPROM is not attached to the new logic board, the amount of waste ink in the waste ink absorber will not match the waste ink amount (stored in EEPROM), and ink may leak without the waste ink error being displayed.

**3) EEPROM defect (replacement of EEPROM or logic board):**

When you replace the EEPROM, also replace all of the waste ink absorbers with new ones.

If you do not replace the waste ink absorbers, the amount of waste ink in the waste ink absorber will not match the waste ink amount (stored in EEPROM), and ink may leak without the waste ink error being displayed.

The data in a replacement EEPROM is not defined. So, the EEPROM cannot be used as it is. Initialize the EEPROM when you replace the waste ink absorbers. (For details, see *"Part 3: 3.4.2 Service mode" (page 3-24)*). Then make a test printout, and make sure that the EEPROM data has been defined.

For details on how to handle the EEPROM, see *"Part 3: 3.6 EEPROM" (page 3-27)*.

**4) After replacing a full waste ink absorber:**

After you have replaced the waste ink absorber, reset the total waste ink amount by clearing the EEPROM's waste ink level (for details, see *"Part 3: 3.4.2 Service mode" (page 3-24)*). Then make a test printout, and make sure that the waste ink amount has been reset to zero. (For details, see *"Part 3: 3.6.3 EEPROM list print" (page 3-28)*)

**5) If the total waste ink amount is reset to zero, or the EEPROM is initialized by mistake:**

Take care when you clear or initialize the EEPROM. Data settings stored in EEPROM cannot be restored once the EEPROM is cleared. If you have cleared EEPROM by mistake, carry out the same process and settings for a defective EEPROM described in 3) above.

> **CAUTION**
>
> After the EEPROM is reset, the data it held cannot be printed out with a test printout. If you want to check the stored data, be sure to execute a test printout before resetting the EEPROM. Data in EEPROM also cannot be rewritten via computer.
>
> When the EEPROM is initialized, all data that was held in EEPROM is lost. When you return the printer after servicing, reset the various function settings (e.g. head position adjustment values) that were set by the user.

NOTE

When the printer is turned OFF, the printer updates the waste ink amount in EEPROM.  To prevent ink leakage when the waste ink amount exceeds the capacity of the waste ink absorber, the printer stops printing and displays a "waste ink full" error.  If this happens, remedy the error by following the instructions in *"Part 5: 6.2.2 Error recovery 5. Waste Ink Warning / Waste Ink Full Error" (page 5-21)*.

For details on checking the EEPROM data with a test printout, see *"Part 3: 3.6.3 EEPROM list print" (page 3-28)*.

When you clear EPPROM data, you can choose either to "clear the waste ink amount" or to "initialize EEPROM." For details, see *"Part 3: 3.6.2 Resetting the EEPROM" (page 3-27)*.

## 3.2 Special Settings

The printer driver has a special settings dialog box.  This dialog box is only for servicing and dealing with claims on the market.  It is not disclosed to the user.

**(1) Operation Procedure**

**In Windows:**

• Select the [Custom Setting] button in Maintenance on the printer driver.  You can select the **"Set printer to ECP mode"** and **"Pause page"** setup items. → not disclosed to the user

• If you select the [Custom Setting] button with the [Shift] key held down, you can select all five setup items in (2) below.

**On a Macintosh:**

• Select the [Settings] button in Utility on the printer driver.  You can select the **"Pause Between Pages"** setup item.→ not disclosed to the user

• If you select the [Settings] button with the [Shift] key held down, you can select four setup items (excluding **"Set printer to ECP mode"**) in (2) below.

**(2) Setup Items (underline indicates default ON= ☑, OFF= ☐ )**

• **Set printer to ECP mode** (OFF/ON)

Sets the printer interface to ECP.

• **Pause Page** (OFF/ON)

When pages containing high-density images are printed continuously, the preceding page may become smudged by the following page if you do not allow enough time for it to dry.  In such circumstances, set whether or not to pause before outputting pages.

• **Cleaning after cartridge replacement** (OFF/ON)

To prevent ink consumption, set not to perform cleaning when the head (BJ cartridge) is replaced.

• **Economy Cleaning** (OFF/ON)

To prevent ink consumption, set not to perform cleaning at the first software ON after a hardware ON and not to perform timer cleaning.

• **Display low ink warning** (OFF/ON)

Set not to display low ink warning (Disabling "ink-out" detection) to prevent the ink sensors from malfunctioning.

### 3.3 Precautions to Prevent Damage from Static Electricity

The electrical charge accumulated on a person when clothes rub can damage electric elements or change their electrical characteristics.

In order to prevent static electricity discharge, be sure to touch some metallic part that is grounded by using a wrist strap, for example, to release the static electricity accumulated on your body before disassembling the printer for service.

Do not touch these parts before discharging static electricity:

• Power Supply Unit
• Logic Board, Carriage Board, Carriage Driver Board, Panel Board, Fan Board
• Connector and Contact for Each Cable
• Signal Contact Section on BJ Cartridges
• Signal Contact Section on Carriage
• Connector for Connection to Upper Cassette on Lower Cassette
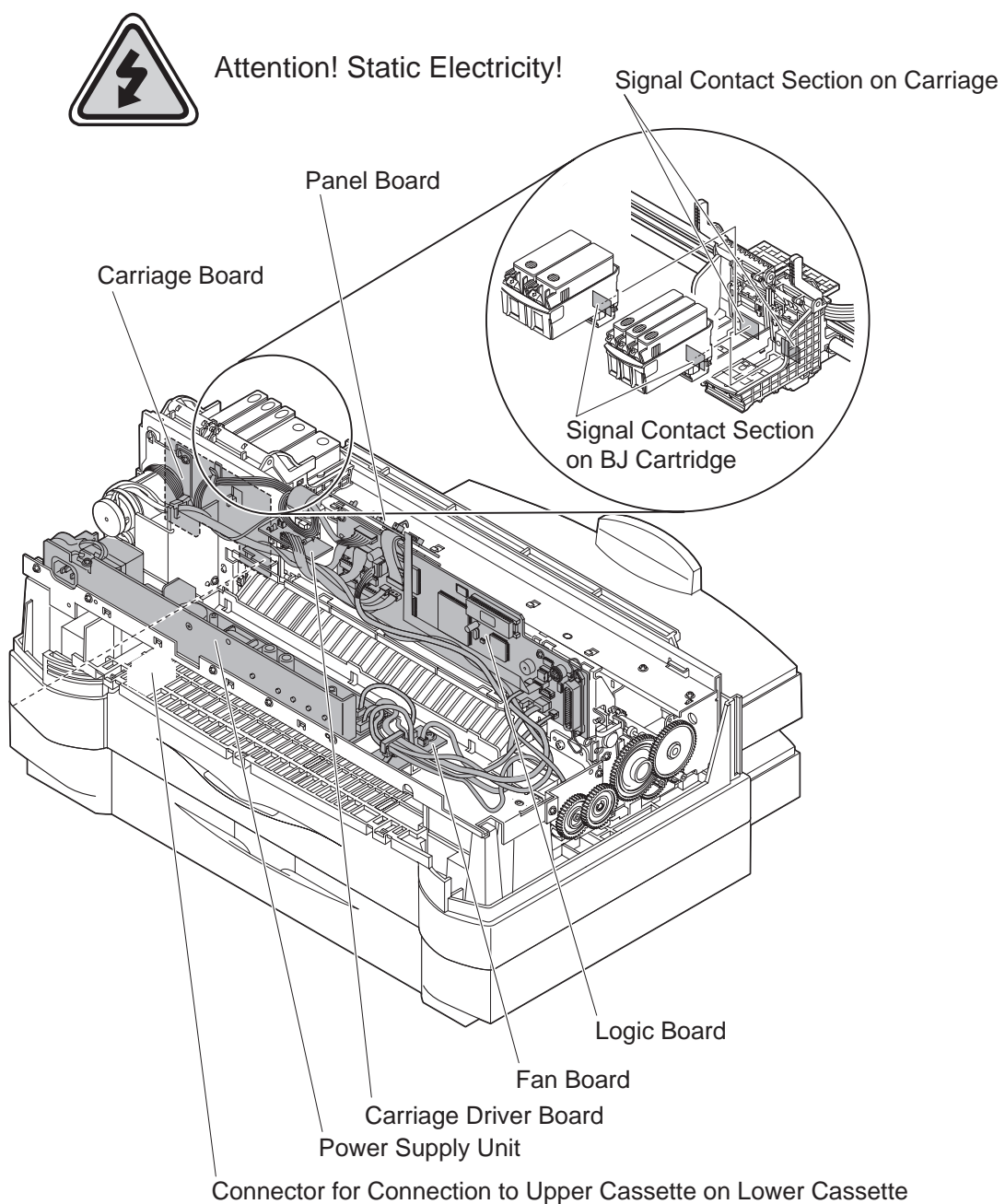
**Figure 1-17 Electronic System**

**1-15**

## 3.4 Precautions for Disassembly/Assembly
### 3.4.1 Disassembly prohibited parts

Never loosen the red screws on the printer's mechanical sections.
Two red screws are used for fixing the adjustment plate. This plate determines the distance between the nozzles on the BJ cartridge and the platen. This distance is called the "head gap." Ten red screws are used for fixing the carriage rail and chassis. These screws are adjusted to their optimum positions before the printer is shipped from the factory, and cannot be re-adjusted.
Also, do not disassemble BJ cartridges and ink tanks.
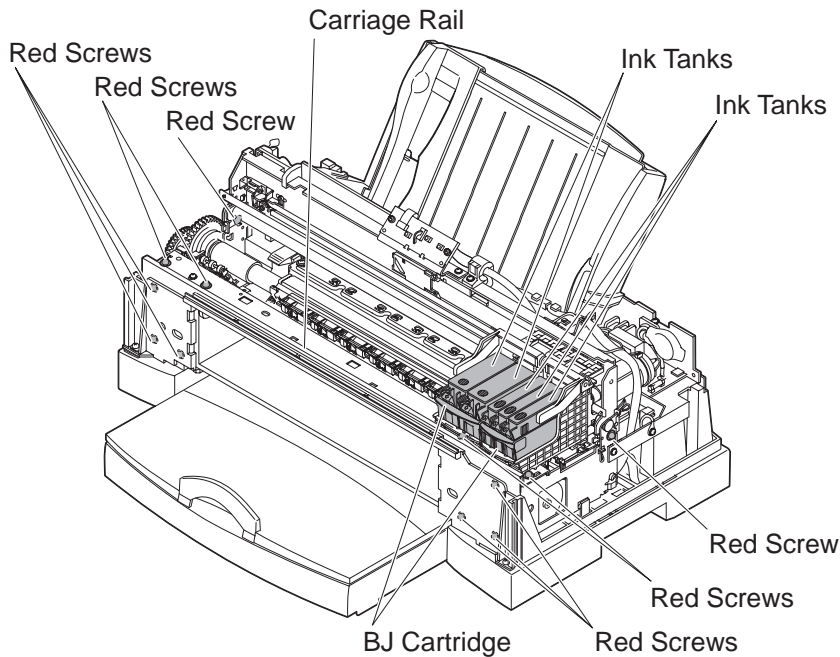
**Figure 1-18 Disassembly Prohibited Parts**

| | CAUTION | Do not disassemble parts on the printer down to components smaller than those indicated in the exploded views in the Parts Catalog. Doing so might impair their original functions after they are re-assembled. |
|---|---|---|

### 3.4.2 Precautions for disassembly/assembly

Before you start disassembly/assembly, be sure to read *"Part 5: 4. Disassembly/Assembly" (page 5-6)* for details on parts that require special caution during disassembly/assembly. The printer comprises combining many plastic parts. When disassembling the printer, be careful not to break or bend these plastic hooks.
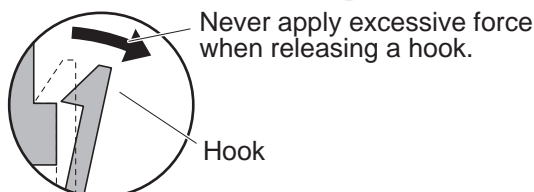
**Figure 1-19 How to Release Plastic Hooks**

| | CAUTION | Some of the plastic parts contain glass fibers for improving the strength of the part. However, since their viscosity is low, plastic hooks break easily. Do not apply excessive force when releasing a hook. |
|---|---|---|

### 3.5 Self-diagnostic Functions

The printer has built-in self-diagnostic functions to analyze hardware defects.  The results of self-diagnosis are indicated by the indicators on operational panel and the beeper.  For details, see *"Part 3: 3.1 Error Indications" (Page 3-17)*.

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# Part 2

# PRODUCT SPECIFICATIONS

# 1. PRODUCT OUTLINE

## 1.1 Product Outline

The BJC-8500 is a printer targeted for the corporate and professional use market. It incorporates next-generation BJ cartridges, and is capable of printing 1200 dpi resolution full-color and black-and-white on a par with LBP printing.

It has the following four main features:

1. Next-generation BJ cartridges ensure real $1200 \times 1200$ dpi printing in either black-and-white or color.
2. The Photo Kit (BJ cartridge: BC-82 Photo, Ink tank: BCI-8PC photo, BCI-8PM photo, BCI-8PBK photo) ensures photo-grade printing quality.
3. Printing up to A3+ size ($329 \times 483$) and A4+ full-bleed ($223.5 \times 355.6$)
4. Large-capacity paper cassette. 600 sheets of plain paper can be stacked if the lower cassette and auto sheet feeder are also attached.
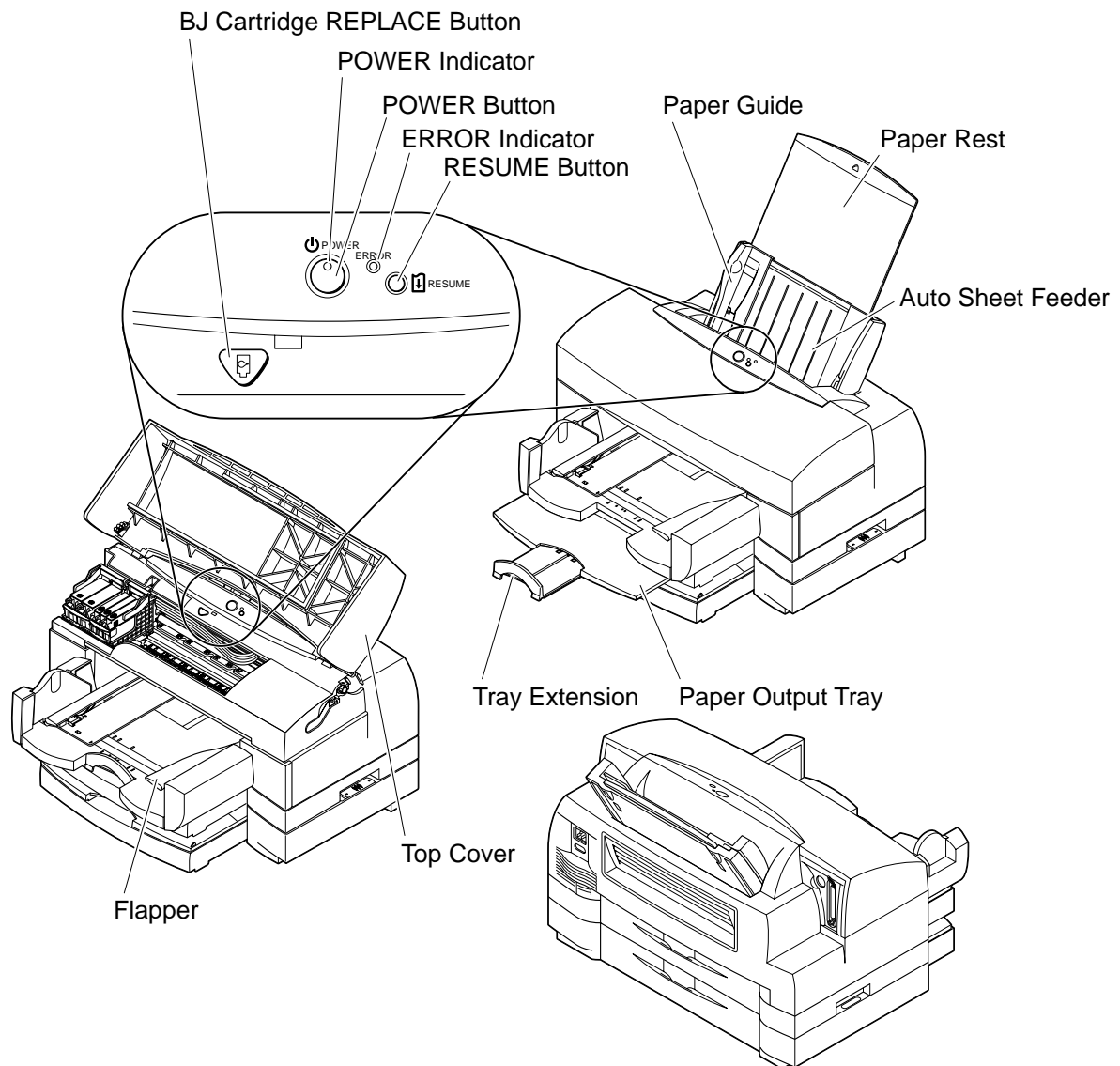


**Figure 2-1 External View of Printer**

## 1.2 Features

1. High-definition printing up to 1200 (H) × 1200 (V) (when the Canon printer driver is used) using the new BJ cartridge type (600 dpi resolution).
   Three types of BJ cartridges are available: Black BJ cartridge "BC-80", Color BJ cartridge "BC-81", and Photo BJ cartridge "BC-82 photo."

2. Two types of BJ cartridges are installed on the printer.
   Color BJ cartridge "BC-81" is installed at all times, with either the Black BJ cartridge "BC-81" or the Photo BJ cartridge "BC-82 photo" installed to meet the particular printing requirements.

3. A new printing process using ink optimizer achieves high waterproofing properties when printing on plain paper (including envelopes and thick paper).
   During color printing, this new process prints after coating the surface of the paper with ink optimizer for promoting waterproofing properties.  During black-and-white printing, printing is carried out by one of two methods.  Either black ink, then ink optimizer and then black ink again are discharged, or black ink followed by ink optimizer is discharged.  The ink optimizer is discharged from Black BJ cartridge "BC-80."

4. HQ mode: 213 cps (10 kHz discharge, bi-directional printing), HS mode: 683 cps (8 kHz discharge, bi-directional printing)

5. There is no paper thickness selection lever due to the automatic paper thickness adjustment mechanism (moving platen).

6. Flapper unit prevents contact between paper currently being printed and printed paper on the paper output tray.

7. IEEE1284-compatible bi-directional parallel interface (ECP mode, nibble mode, compatibility mode: Default is nibble mode and RS-422 interface for the Macintosh. The parallel interface and the interface for the Macintosh can be automatically switched.)

8. "Ink out" and "no ink tank" are detected by optical ink sensor.

9. Ink tanks can be removed from the installed BJ cartridges on the carriage, allowing empty ink tanks to be replaced.

10. Canon's first bubble jet printer to have a built-in cassette (1st cassette) ;  an optional 2nd cassette can be attached.

11. There is only one built-in printer control mode, the Canon extended mode (native mode).  In this mode, print signals are sent from the host computer after they have been converted to Canon extended mode by the Canon printer driver.  Emulation mode is not supported.

**NOTE**
Printing processes using the ink optimizer are applied in both black-and-white and color printing in printing modes other than draft mode when the paper type is set to plain paper, envelope, or thick paper on the printer driver.  The ink optimizer is not discharged when the paper type is set to special paper or film on the printer driver.

**CAUTION**
The "ink out detection" function detects running out of ink and displays an error before printing becomes defective (e.g. faint printing) due to lack of ink.

## 1.3 BJ Cartridges
### 1.3.1 Black BJ cartridge [BC-80]

Black BJ cartridge "BC-80" is used for black-and-white printing and printing using the ink optimizer.

It has three BJ heads, each having 256 nozzles (two staggered 128-nozzle rows), arranged in parallel.  The heads are used for discharging black ink, ink optimizer, and black ink.

If ideal print quality cannot be obtained by repeated cleaning, replace the BJ cartridge with a new one.  The recommended replacement cycle is one year after unpacking.

The ink tank section contains two tanks, one each for the black ink and ink optimizer.  Replace each individual ink tank as it runs out of ink or ink optimizer.  One ink tank holds enough ink to print about 940 sheets by continuous printing of the 1500-character standard pattern on plain paper in HQ mode.

The recommended replacement cycle for ink tanks is six months after unpacking.
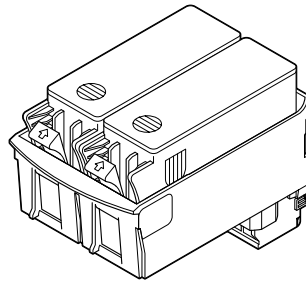


**Figure 2-2 Black BJ Cartridge [BC-80]**

### 1.3.2 Color BJ cartridge [BC-81]

Color BJ cartridge "BC-81" is used for printing of cyan, magenta and yellow.

It has three BJ heads, each having 256 nozzles (two staggered 128-nozzle rows), arranged in parallel.  The heads are used for discharging cyan, magenta, and yellow ink.

If ideal print quality cannot be obtained by repeated cleaning, replace the BJ cartridge with a new one.  The recommended replacement cycle is one year after unpacking.

The ink tank section contains three ink tanks, one each for the cyan, magenta and yellow inks.  Replace each individual ink tank as it runs out of ink.  One ink tank holds enough ink to print about 450 sheets by continuous printing of the standard pattern  at 7.5% duty on plain paper in HQ mode.  The recommended replacement cycle is 6 months after unpacking.
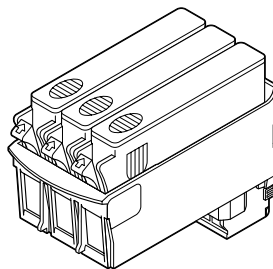


**Figure 2-3 Color BJ Cartridge [BC-81]**

### 1.3.3 Photo BJ cartridge [BC-82 Photo]

Photo BJ cartridge "BC-82 photo" supports photo-realism (super photo mode, printing of natural images containing lots of light color and midtones), and is used for printing photo black, photo cyan and photo magenta.

It has three BJ heads, each having 256 nozzles (two staggered 128-nozzle rows), arranged in parallel.  The heads are used for discharging photo black, photo cyan and photo magenta ink.

If ideal print quality cannot be obtained by repeated cleaning, replace the BJ cartridge with a new one.  The recommended replacement cycle is one year after unpacking. The ink tank section contains three ink tanks, one each for photo black, photo cyan and photo magenta inks.  Replace each individual ink tank as it runs out of ink.  One ink tank holds enough ink to print about 390 sheets by continuous printing of the photo printing standard pattern.  The recommended replacement cycle is 6 months after unpacking.
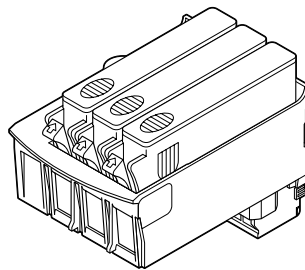


**Figure 2-4 Photo BJ Cartridge [BC-82 Photo]**

NOTE

Ink Path between BJ Cartridges and Ink Tanks

The three BJ heads of Black BJ cartridge BC-80 are arranged in order from the left: black, ink optimizer, and black.  The ink tanks are arranged in order from the left: ink optimizer and black.

So, the three ink paths inside the BJ cartridge cross each other at one point.  As all BJ cartridges are structured the same, the three ink paths in color BJ cartridge BC-81 and photo BJ cartridge BC-82 photo also cross each other at one point.  When you install the ink tanks on the BJ cartridges, make sure that they are installed at the correct locations by checking the seal affixed on the main case.
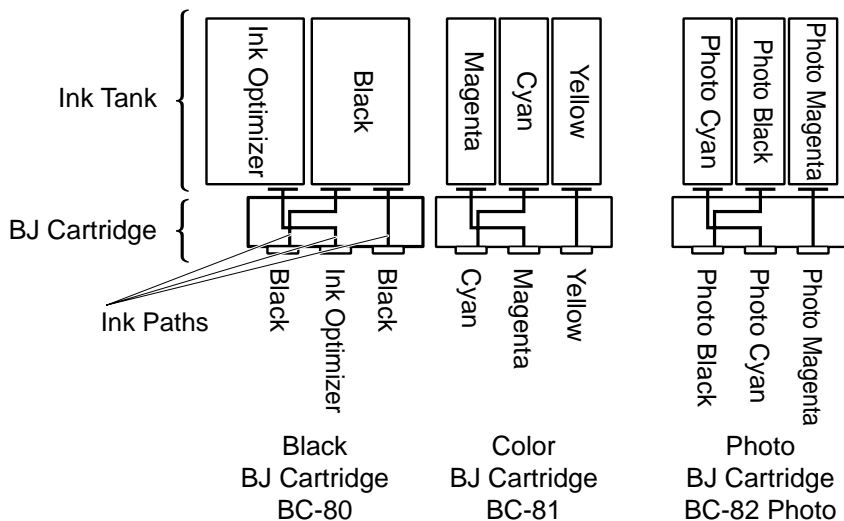


**Figure 2-5 Path of Ink Tank and BJ Cartridge (Front View)**

### 1.3.4 Relationship between BJ cartridges and printing mode

The following table shows which inks are used in each printing mode.

**TABLE 2-1 CARTRIDGE AND PRINTING MODES**

| Printing Modes | | Black BJ Cartridge BC-80 | | Color BJ Cartridge BC-81 | Photo BJ Cartridge BC-82 Photo |
|---|---|---|---|---|---|
| | | Black Ink | Ink Optimizer | Color Ink | Photo Ink |
| Black-and-white | Plain paper, envelope, thick paper (print quality: other than high-speed) | ○ | ○ | | |
| | Plain paper, envelope, thick paper (print quality: high-speed)/special media | ○ | | | |
| Color | Plain paper, envelope, thick paper (print quality: other than high-speed) | ○ | ○ | ○ | |
| | Plain paper, envelope, thick paper (print quality: high-speed)/ special media | ○ | | ○ | |
| Super Photo | Special paper | | | ○ | ○ |

○: Used      Blank: Unused

Note that Color BJ Cartridge BC-81 is installed at all times.

| CAUTION | When handling BJ cartridges and ink tanks, observe the precautions described in *"Part 1: 2.1 Handling BJ Cartridges" (page 1-5)*. |
|---|---|

### 1.4 BJ Cartridge Container SB-80

This container is for storing either the Black BJ cartridge "BC-80" or Photo BJ cartridge "BC-82 photo" that is removed from the printer when selectively using these cartridges for printing.

This container is packaged together with the printer, and is also available from stores as an option.

When storing a BJ cartridge inside the container, close the lid securely.  If you leave the lid open, the ink may dry and clog the nozzles.

One container can be shared between each of Black BJ cartridge "BC-80", Color BJ cartridge "BC-81", or Photo BJ cartridge "BC-82 photo."  One container holds two BJ cartridges.  (For details, see *"Part 3: 1.3.5 BJ cartridge container SB-80" (page 3-9)*. Store each of these BJ cartridges with the protective cap removed and the ink tanks attached (except when transporting the printer: see *"Part 3: 2.1 Transporting the Printer" (page 3-15).*
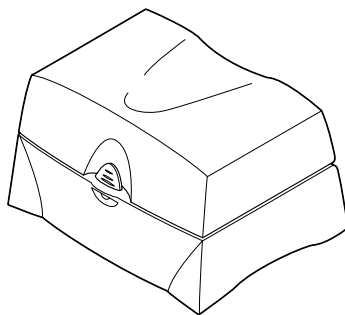
**Figure 2-6 BJ Cartridge Container [SB-80]**

## 1.5 Consumables
### 1.5.1 BJ cartridge

Each of the BJ cartridges (Black BJ cartridge "BC-80," Color BJ cartridge "BC-81", or Photo BJ cartridge "BC-82 photo") used on this printer are supplied as consumables (sold as BJ cartridge + ink tanks).

### 1.5.2 Ink tank

The ink tanks below are supplied as consumables (sold as individual ink tank):
   BCI-8BK, BCI-8WF for Black BJ cartridge "BC-80"
   BCI-8 C, BCI-8 M, BCI-8 Y for Color BJ cartridge "BC-81"
   BCI-82PBK photo, BCI-82PC photo, BCI-82PM photo for Photo BJ cartridge "BC-82 photo"

If any of the ink tanks run out of ink, or ideal print quality cannot be obtained by repeated cleaning, replace the ink tank with a new one.  (The recommended replacement cycle is 6 months after unpacking.) If ideal print quality still cannot be obtained after replacing the ink tank, replace the BJ cartridge.

The number of pages that can be printed out by each ink tank is as follows:

BCI-8BK:
   About 940 sheets by continuous printing of the 1500-character standard pattern
BCI-8WF:
   About 1870 sheets by continuous printing of the 1500-character standard pattern
   (about 380 sheets by continuous printing of the color printing standard pattern)
BCI-8 C, BCI-8 M, BCI-8 Y:
   About 450 sheets by continuous printing of the color printing standard pattern
BCI-82PBK photo, BCI-82PC photo, BCI-82PM photo:
   About 390 sheets by continuous printing of the color printing standard pattern
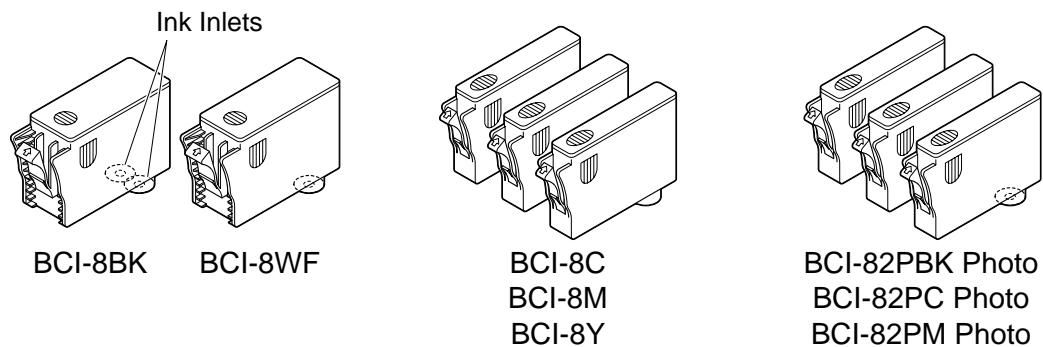


**Figure 2-7 Ink Tanks**

# 2. SPECIFICATIONS

## 2.1 General Specifications

### 1. Type
Serial color bubble jet printer for corporate use

### 2. Paper feeding method
Auto sheet feed (sheet feeder, cassette) and manual feed

### 3. Resolution
$300 \times 300/600 \times 600/1200 \times 600/1200 \times 1200$ dpi (black/color)
$1200 \times 600/1200 \times 1200$ dpi (photo)

### 4. Printing speed
**Burst**
  HQ mode: 213 cps (10 kHz discharge)
  HS mode: 683 cps (8 kHz discharge, 25% printing)
**Throughput**
  Black printing    HQ: 2.7 ppm ($600 \times 600$ dpi, bi-directional, 1 pass)
                    HS: 4.3 ppm ($300 \times 300$ dpi, bi-directional, 1 pass)
  Color printing    HQ: 0.9 ppm ($600 \times 600$ dpi, uni-directional, 2 passes)
                    HS: 2.1 ppm ($300 \times 300$ dpi, uni-directional, 1 pass)

### 5. Print width
Max. 322.2 mm (max. print width when A3+ is selected)

### 6. Line feed speed
Approx. 180ms/line (256/600 inch line feed)

### 7. Line feed pitch
n/600 inch (Canon extended mode n: programmable)

### 8. Printing direction
Color: Uni-directional, Black: Bi-directional, Uni-directional

### 9. Control mode
Canon extended (Native) mode

### 10. Built-in character
Courier (94 character, 300 dpi)

### 11. Buffer
Receive buffer Approx. 1 MB

### 12. Interface
IEEE 1284 compatible bi-directional parallel interface (for Compatibility, Nibble and ECP modes)
RS422 (for Macintosh)

### 13. Interface cable
Material:  AWG28 or larger
Type:      Twisted-pair shielded cable
Length:    Up to 2.0 meters (6.6 feet)

### 14. Interface connector

Printer side:   Amphenol 57-40360 (or equivalent)
Cable side:     Amphenol 57-30360 (or equivalent)

### 15. Paper feed method

Cassette/sheet feeder/manual feed
   Plain paper, color plain paper, high-resolution paper
Sheet feeder/manual feed
   Envelopes, OHP film, glossy photo paper, BJ cloth, high-gloss photo film, T-shirt
   transfer, banner paper
Manual feed only
   Thick paper, BJ cloth

### 16-1. Cassette stack amounts

| | |
|---|---|
| Plain paper, color plain paper | Max. 250 sheets |
| High-resolution paper | Max. 200 sheets |

### 16-2. Sheet feeder stack amounts

| | |
|---|---|
| Plain paper | Max. 100 sheets |
| High-resolution paper | Max. 80 sheets |
| Envelopes | Max. 15 sheets |
| OHP film | Max. 50 sheets |
| Glossy photo paper | 20 sheets |
| High-gloss photo film | 1 sheet |
| Banner paper | 1 sheet |

### 17. Available paper

| | | | |
|---|---|---|---|
| Standard paper | Size: | A3+, A3, A4+, A4, A5 | |
| | Weight: | 64 g/m$^2$ to 105 g/m$^2$ (sheet deer/cassette) | |
| | Thickness: | 0.25 mm max. (manual feed) | |
| Envelopes | | | COM#10, DL |
| Color plain paper | Canon bubble jet paper | | LC-301 |
| High-resolution paper | Color BJ high-resolution paper | | HR-101 |
| Glossy photo paper | Color BJ glossy photo paper | | GP-301 |
| High-gloss photo film | Color BJ high-gloss photo film | | HG-201 |
| OHP film | Color BJ OHP film | | CF-102 |
| Cloth | Color BJ cloth | | FS-101 |
| T-shirt transfers | | | TR-201 |
| Banner paper | | | BP-101 |

### 18. BJ Cartridge

**Black BJ Cartridge BC-80**

| | |
|---|---|
| Nozzle | 128 nozzles × 2 rows × 3 heads |
| Ink color | Black, ink optimizer (translucent) |
| Ink amount | Black: 54ml   Ink optimizer: 55ml |
| Weight | Approx. 164g (Including ink tanks) |

Number of pages printable per ink tank

| | |
|---|---|
| Black | Approx. 940 sheets (continuous printing of 1500-character standard pattern) |
| Ink optimizer | Approx. 1870 sheets (continuous printing of 1500-character standard pattern) |
| Head life | Approx. 7500 sheets (continuous printing of 1500-character standard pattern) |
| | Approx. 5000 sheets (continuous printing of color printing standard pattern at 7.5% duty per color) |

**Color BJ Cartridge BC-81**

| | |
|---|---|
| Nozzle | 128 nozzles × 2 rows × 3 heads |
| Ink color | Cyan, magenta, yellow |
| Ink amount | 23.5ml for each color |
| Weight | Approx. 103g (including ink tanks) |

Number of pages printable per ink tank

Approx. 450 sheets (continuous printing of color printing standard pattern at 7.5% duty per color)

Head life      Approx. 5000 sheets (continuous printing of color printing standard pattern at 7.5% duty per color)

**Photo BJ Cartridge BC-82 Photo**

| | |
|---|---|
| Nozzle | 128 nozzles × 2 rows × 3 heads |
| Ink color | Photo black, photo cyan, photo magenta |
| Ink amount | 23.5ml for each color |
| Weight | Approx. 112g (including ink tanks) |

Number of pages printable per ink tank

Approx. 390 sheets (continuous printing of color printing standard pattern at 7.5% duty per color)

Head life      Approx. 5000 sheets (continuous printing of color printing standard pattern at 7.5% duty per color)

## 19. Acoustic noise level

Approx. 50 dB (sound pressure level according to ISO 9296)

## 20. Environmental requirements

| | |
|---|---|
| During operation | Temperature 5 to 35°C |
| | Humidity 10 to 90% (no condensation) |
| During storage | Temperature 0 to 35°C |
| | Humidity 5 to 90% (no condensation) |

## 21. Power supply

AC 120V/60 Hz, 230V/50 Hz

## 22. Power consumption

| | |
|---|---|
| At software power OFF | Max. 8 W |
| During standby | Max. 9 W |
| During printing | Max. 67 W |

## 23. External dimensions

604 mm (W) × 584 mm (D) × 440 mm (H)
(with lower cassette attached)

## 24. Weight

Body      Approx. 25 kg (including lower cassette, BJ cartridges, Ink Tanks)

## 25. Detection functions

| | |
|---|---|
| Paper-out/Paper jam | Available |
| BJ cartridge presence | Available |
| Waste ink amount | Available |
| Paper size (cassette) | Available |
| BJ cartridge identification | Available |
| Ink tank presence | Available |
| Cover open | Available |
| Home position | Available* |
| Ink out | Available |

\* Though the printer does not have home position sensor, the home position is detected by the encoder when carriage contacts the right end of the chassis.

## 2.2 Paper Specifications
### 2.2.1 Paper types

### TABLE 2-2 PAPER SPECIFICATIONS

**Plain Paper**

| Type | Paper | Size | Cassette | Sheet Feeder | Manual Feed |
|---|---|---|---|---|---|
| Class 1 | Canon PB (NSK) | A3, A4, *¹A5 | ○ | ○ | ○ |
| | Canon PB (NDK) | A3, A4, *¹A5 | ○ | ○ | ○ |
| | Canon NP (Kangas) | A3, A4 | ○ | ○ | ○ |
| | Canon NP (Neusiedler) | A3, A4 | ○ | ○ | ○ |
| | Canon NP (BoiseCascade) | LTR, LGL | ○ | ○ | ○ |
| | Canon BJ paper LC-301 | A3, LDR, A4, LTR | ○ | ○ | ○ |
| Class 2 | Xerox 4024 (75g/m²) | LDR, LGL, LTR | ○ | ○ | ○ |
| | Xerox 4024 (95g/m²) | LDR, LGL, LTR | ○ | ○ | ○ |
| | Plover Bond | LTR | ○ | ○ | ○ |

**Special Paper**

| Type | Paper | Size | Cassette | Sheet Feeder | Manual Feed |
|---|---|---|---|---|---|
| High-resolution paper | HR-101 | *²A3+, A3, LDR, A4, LTR | ○ | ○ | ○ |
| OHP film | CF-102 | A4, LTR | ✕ | ○ | ○ |
| Glossy photo paper | GP-301 | *²A3+, A3, LDR, *²A4+, A4, *²LTR+, LTR | ✕ | ○ | ○ |
| High-gloss photo film | HG-201 | A3, LDR, A4, LTR | ✕ | *³○ | ○ |
| Envelopes | COM#10 No. 582 | 241 × 105mm | ✕ | ○ | ✕ |
| | DL, PLUS | 220 ×110mm | ✕ | ○ | ✕ |
| BJ cloth | FS-101 | 241 × 356mm | ✕ | ✕ | ○ |
| Banner paper | | 210 × 297mm, 216 × 279mm | ✕ | ○ | ✕ |
| Thick paper | | | ✕ | ✕ | ○ |

○: Usable     ✕: Not usable

*¹: A5 (vertical):      sheet feeder/manual feed
    A5 (horizontal):   sheet feeder only

*²: A3+ size is a Canon original size slightly larger (329 × 483 mm) than regular A3 size
    Using A3+ size allows you to print out an A3-size page with register marks.
    The same applies to LTR+ (228.6 × 337.8 mm) and A4+ size (223.5 × 355.6 mm).

*³: When HG-201 is fed from the sheet feeder, make sure that the cut corner of the HG-201 is at the top right during vertical feed and at the top left during horizontal feed.

## 2.2.2 Printing area

A3+, LDR, A3, LTR (horizontal), A4, A5

LTR (vertical), LGL size

A4+, LTR+ size

BJ cloth

Envelope

: Print Quality Assurance Area

: Printable Area
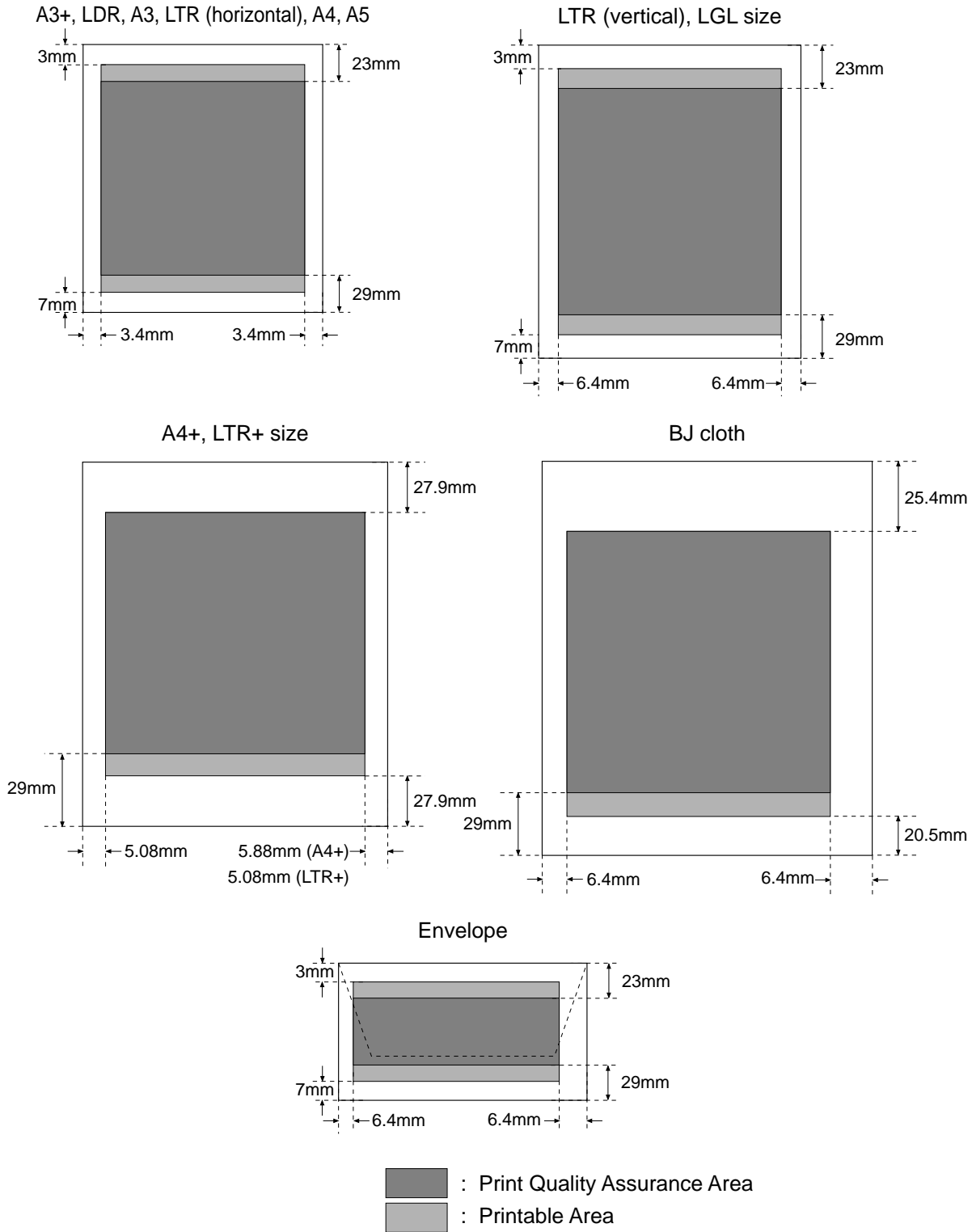
**Figure 2-8 Printing Area**

## 2.3 Interface Specifications
### 2.3.1 Parallel interface

#### 1. Data Transmission Method

8-bit parallel interface (IEEE1284 compatible)

Bi-directional protocol (supports Compatibility mode/Nibble mode/ECP mode)

Note: The handshake transmission method of $\overline{\text{DATA STROBE}}$ from the host computer, with $\overline{\text{ACKNLG}}$ signal and BUSY signal from the printer. Reverse transmission by Nibble and ECP modes.

#### 2. Signal Levels

Input:  High +2.0 to +5.25V
        Low  -0.3 to +0.8V
Output: High +2.4 to +5.25V
        Low  -0.3 to +0.4V

#### 3. Input/Output Circuits
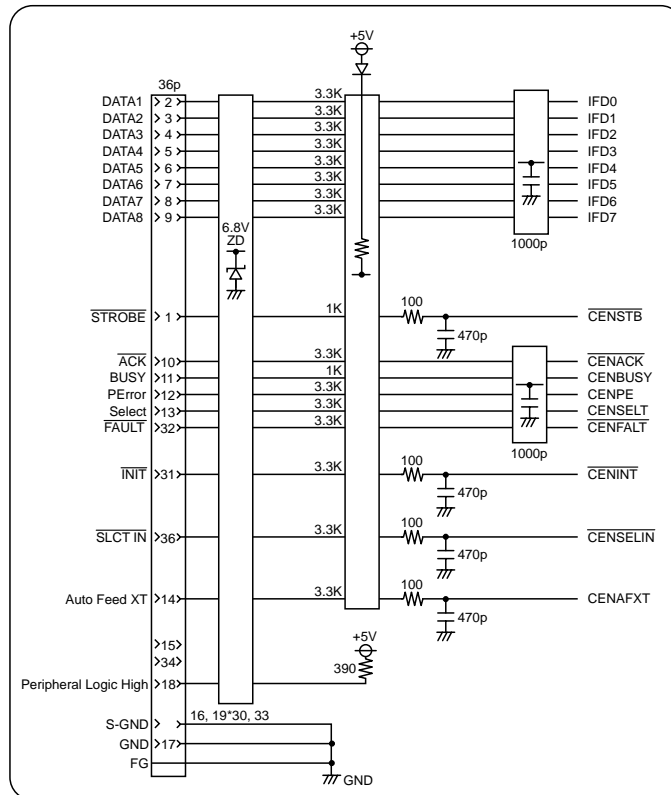


#### 4. Interface Cable

Type    Twisted-pair shielded cable
        Material      AWG No. 28 or more
        Length        Up to 2.0m (6.6 feet)

#### 5. Interface Connectors

        Printer side    Amphenol 57-40360 or the equivalent
        Cable side      Amphenol 57-30360 or the equivalent

### 6. Pin Assignments

| No. | Signal | Circuit Diagram *⁵ | IN/OUT | No. | Signal | Circuit Diagram *⁵ | IN/OUT |
|-----|--------|--------------------|--------|-----|--------|--------------------|--------|
| 1 | DATA STROBE | STROBE | IN | 19 | DATA STROBE -RET *¹ | GND | |
| 2 | DATA1 | DATA1 | IN/OUT | 20 | DATA1 -RET *¹ | GND | |
| 3 | DATA2 | DATA2 | IN/OUT | 21 | DATA2 -RET *¹ | GND | |
| 4 | DATA3 | DATA3 | IN/OUT | 22 | DATA3 -RET *¹ | GND | |
| 5 | DATA4 | DATA4 | IN/OUT | 23 | DATA4 -RET *¹ | GND | |
| 6 | DATA5 | DATA5 | IN/OUT | 24 | DATA5 -RET *¹ | GND | |
| 7 | DATA6 | DATA6 | IN/OUT | 25 | DATA6 -RET *¹ | GND | |
| 8 | DATA7 | DATA7 | IN/OUT | 26 | DATA7 -RET *¹ | GND | |
| 9 | DATA8 | DATA8 | IN/OUT | 27 | DATA8 -RET *¹ | GND | |
| 10 | ACKNLG | ACK | OUT | 28 | ACKNLG -RET *¹ | GND | |
| 11 | BUSY | BUSY | OUT | 29 | BUSY -RET *¹ | GND | |
| 12 | P.E. | PError | OUT | 30 | P.E. -RET *¹ | GND | |
| 13 | SELECT | Select | OUT | 31 | INIT | INIT | IN |
| 14 | AUTO FEED XT *⁴ | Auto Feed XT | IN | 32 | FAULT | FAULT | OUT |
| 15 | N.C. *² | N.C. | | 33 | GND | GND | |
| 16 | GND | GND | | 34 | N.C.*² | N.C. | |
| 17 | GND | GND | | 35 | Peripheral Logic High *³ | — | |
| 18 | Peripheral Logic High *³ | Peripheral Logic High | | 36 | SELECT INX *⁴ | SLCT IN | IN |

Note:

*¹· All -RET signals are connected to signal ground (0V).

*²· N.C. means non-connection.

*³· For No. 18 and 35 (Peripheral Logic High), the level is connected to +5.0V at 390Ω.

*⁴· For No. 14/No. 36, the level is connected to +5.0V at 3.3kW.

*⁵ Refer to *"Part 5: 8.2 Circuit Diagrams LOGIC BOARD 12" (page 5-64)*.

### 7. Signals (Compatibility Mode)

**Input signals:**

**1) DATA STROBE**

This signal is a strobe signal for reading DATA1 to DATA8.

This signal is high in normal condition, and the signal goes low when the printer receives data.

The BUSY signal is kept high until this signal changes from low to high.

**2) DATA1 to 8**

The printer receives data by the DATA STROBE signal.

Each bit of DATA1 to DATA8 must not change until 0.5 µs or more passes after the DATA STROBE signal's rising edge.

**3) INIT**

When the specified period of time has passed after the signal changes from high to low and the signal becomes high again, the printer considers the signal as a input prime and performs the following:

a) Initialization is performed when the parallel port is selected.

b) Ignores the input prime when the serial port is selected.

**4) AUTO FEED XT**

In the BJC-8500, this signal is used only as a transmission signal from the Compatible mode to negotiation mode.

**5) $\overline{\text{SELECT INX}}$**

In the BJC-8500, this signal is used only as a transmission signal from the Compatible mode to negotiation mode.

**Output Signals:**

**1) $\overline{\text{ACKNLG}}$**

This signal is a response signal to the $\overline{\text{DATA STROBE}}$ signal.

This signal becomes high when the next $\overline{\text{DATA STROBE}}$ signal is output during the output of this signal.

**2) BUSY**

When this signal is high, it means the printer cannot receive data. When it is low, it means the printer can receive data.

This signal goes high in the following conditions.

• When receiving data
• When receiving buffer is full.
• During initialization
• When replacing BJ cartridge and ink tanks
• During cleaning operation by user
• When in error
• During software on and off
• During the period when the serial port is selected.

**3) P.E.**

If paper is not fed following paper feeding operation, this signal goes high. The signal goes low after the *RESUME* button is pressed.

In the BJC-8500, when the automatic feeding slot select function is valid, the paper feed operations will be performed from the possible feeding slots, one by one. This signal goes high when the paper is not fed if this function is set.

**4) SELECT**

This signal goes high when the parallel port is selected and the printer is ready to receive data.

**5) $\overline{\text{FAULT}}$**

When the error occurs in this printer, this signal goes low. When no error has occurred in the printer, the signal is high.

In the BJC-8500, this signal goes low when the printer is in error or when the specific status response is required.

**8. Signals (Nibble Mode)**

**Input signals:**

**1) $\overline{\text{DATA STROBE}}$ (Host Clk)**

In Nibble mode, this signal is always high. The printer does not receive data in this state.

**2) DATA1 to 8 (Data 1 to 8)**

Because of the IEEE1284 interface specifications, these signals are not used in Nibble mode.

**3) $\overline{\text{INIT}}$**

Because of the IEEE1284 interface specifications, this signal is not used in Nibble mode.

**4) $\overline{\text{AUTO FEED XT}}$ (Host Busy)**

The host computer makes this signal low to show it can receive data from the printer. When the computer receives data from the printer, this signal becomes high to tell the printer data is being received.

**5) $\overline{\text{SELECT INX}}$ (1284 Active)**

This signal is high at the beginning of negotiation phase, and is always high in Nibble mode. This indicates that the printer is operating in bi-directional mode. After completing Nibble mode, this signal becomes low and shifts to the termination phase.

**Output Signals:**

**1) $\overline{\text{ACKNLG}}$ (Ptr Clk)**

By lowering this signal, the printer tells the computer that data has been output. When $\overline{\text{AUTO FEED XT}}$ (Host Busy) signal from the host computer indicating data is being received is raised to high, $\overline{\text{ACKNLG}}$ signal responds by becoming high. This signal becomes low twice in order to transmit 1 byte data.

**2) BUSY (Ptr Busy)**

This signal outputs data to the host computer. For byte data, the third bit of data is output first, followed by the seventh bit of data.

**3) P.E. (Ack Data Req)**

This signal outputs data to the host computer. For byte data, the second bit of data is output first, followed by the sixth bit of data.

**4) SELECT (Xflag)**

This signal outputs data to the host computer. For byte data, the first bit of data is output first, followed by the fifth bit of data.

**5) $\overline{\text{FAULT}}$ (DataAvail)**

This signal outputs data to the host computer. For byte data, the 0 bit of data is output first, followed by the fourth bit of data.

**9. Signals (ECP Mode)**

**Input signals:**

**1) $\overline{\text{DATA STROBE}}$ (Host Clk)**

This signal handshakes with the BUSY (PeriphAck) signal to transmit data from the computer to the printer during the forward phase. When this signal is low, it indicates that data has been sent to DATA1 to 8 (Data 1 to 8). When BUSY (PeriphAck) signal is raised, $\overline{\text{DATA STROBE}}$ signal responds by becoming high. In reverse phase, this signal is always high.

**2) DATA1 to 8 (Data 1 to 8)**

When the host computer outputs data during forward phase, DATA signal is an input signal. When the printer outputs data to the host computer during reverse phase, DATA signal is an output signal.

**3) $\overline{\text{INIT}}$ (ReverseRequest)**

This signal is set to low to perform a recovery process of the data sent from the host computer during the forward phase. When this happens, $\overline{\text{INIT}}$ signal becomes high, responding to the falling edge of the P.E. (Ack Reverse) signal. $\overline{\text{INIT}}$ signal is lowered when the forward phase idle is switched to the reverse phase (data to be sent from the printer to the host computer). The low signal indicates that it is in reverse phase. When the reverse phase is switched to forward phase, $\overline{\text{INIT}}$ signal is raised to high.

**4) $\overline{\text{AUTO FEED XT}}$ (Host Ack)**

During the forward phase, the data on the data bus is received as data. This signal handshakes with th $\overline{\text{ACKNLG}}$ (PeriphClk) signal to receive data from the printer to the computer during the reverse phase.
This signal is lowered if data can be received from the printer.
This signal is raised to high when data is received.

**5) $\overline{\text{SELECT INX}}$ (1284 Active)**

This signal is high at the beginning of negotiation phase and is always high in ECP mode, indicating that the printer is operating in bi-directional mode. After completing the ECP mode, $\overline{\text{SELECT INX}}$ signal goes low, moving to termination phase.

**Output Signals:**

**1) $\overline{\text{ACKNLG}}$ (Periph Clk)**

This signal is always high during the forward phase. During the reverse phase, $\overline{\text{ACKNLG}}$ signal is low to tell the host computer that data has been output on the data bus. The $\overline{\text{ACKNLG}}$ signal goes high in response to the host computer's high $\overline{\text{AUTO FEED XT}}$ (Host Ack) signal to indicate data reception from the host.

**2) BUSY (Periph Ack)**

During the forward phase, BUSY signal is low if the printer can receive data. Once the data has been received, BUSY becomes high. During the reverse phase in the BJC-8500, this signal is always high as it only supports the data sent from the printer to the host computer.

**3) P.E. $\overline{\text{(Ack Reverse)}}$**

This signal is always high during the forward phase, and is always low during the reverse phase.
P.E. signal is lowered in response to the host computer's low $\overline{\text{INIT}}$ ($\overline{\text{Reverse Request}}$) signal to confirm the request to transfer from forward phase to reverse phase.
P.E. signal is raised in response to the host computer's high $\overline{\text{INIT}}$ ($\overline{\text{Reverse Request}}$) signal to confirm the request to transfer from reverse phase to forward phase.

**4) SELECT (Xflag)**

This signal is always high during ECP mode.

**5) $\overline{\text{FAULT}}$ (PeriphRequest)**

In the BJC-8500, if there is still data to be transferred to the host computer during the forward phase, this signal is lowered to request reverse phase.
In the BJC-8500, $\overline{\text{FAULT}}$ signal is raised high in response to the $\overline{\text{AUTO FEED XT}}$'s (Host Ack) low signal after completing all necessary data transmission.
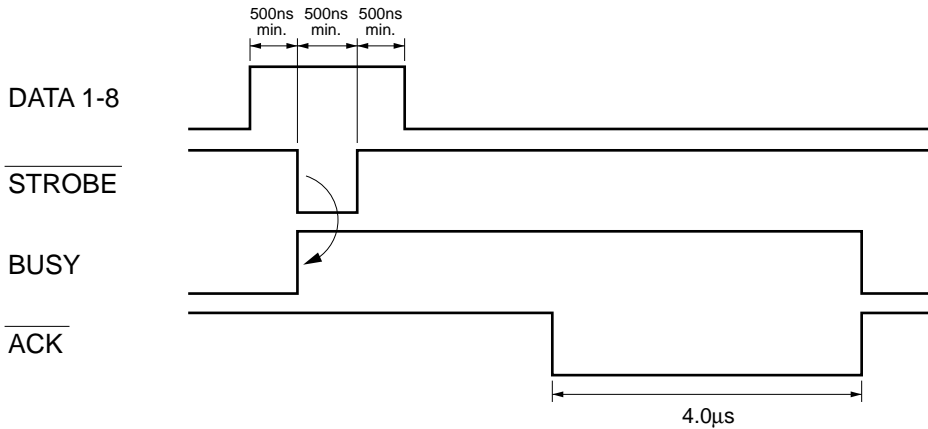
**Figure 2-9 Compatibility Mode Timing Chart**



*TP of the BJC-8500: 0.5μsec
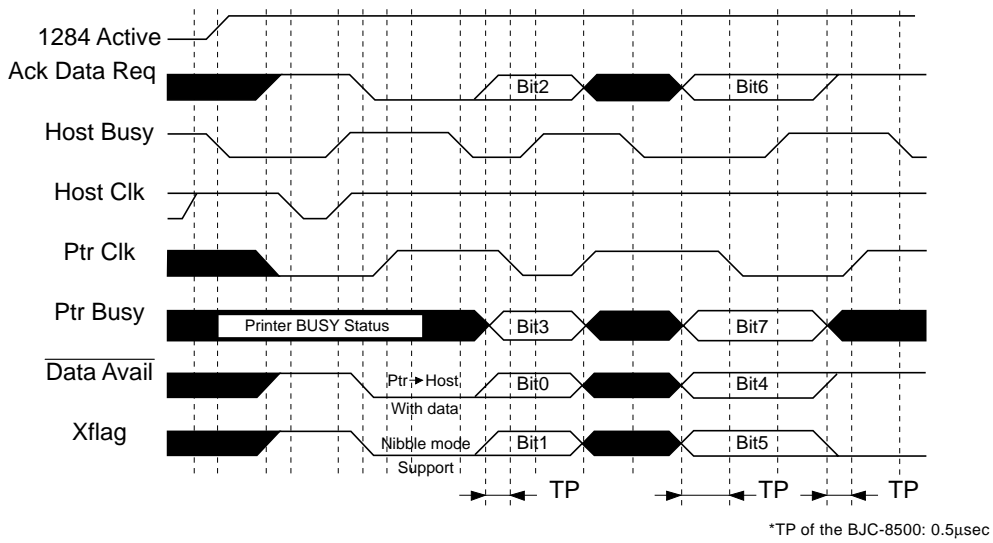
**Figure 2-10 Nibble Mode Timing Chart**



*TP of the BJC-8500: 0.5μsec
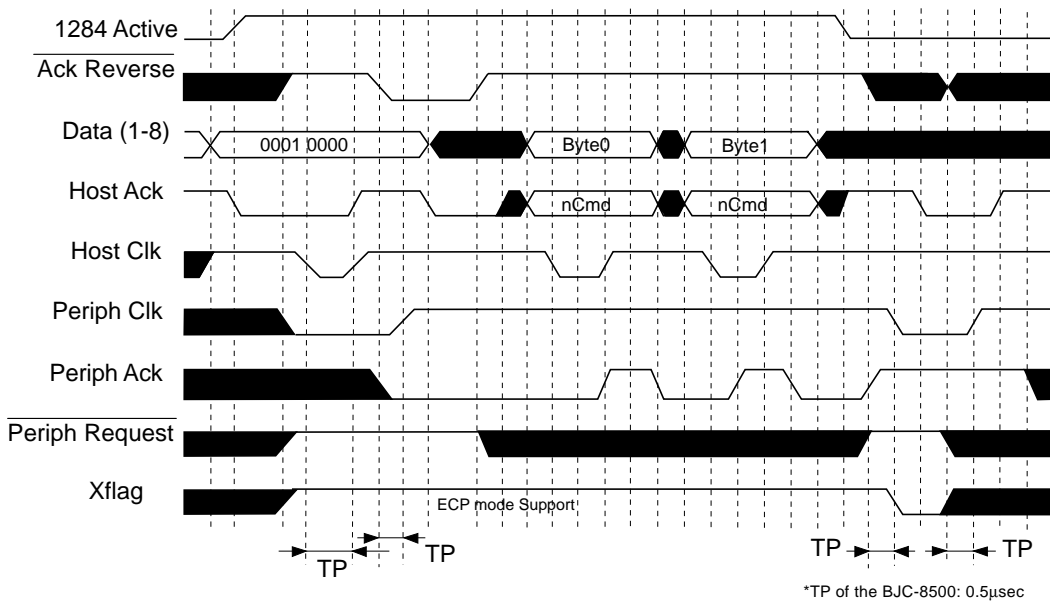
**Figure 2-11 ECP Mode Timing Chart**

## 2.3.2 Serial interface

**1. Interface**                     RS-422-compatible serial interface.

**2. Data transfer speed**           57.6 (default), 444, 888 kbit/s

**3. Data format**                   Start bit:  1 bit
                                     Data:  8 bits
                                     Stop bit:  1 bit
                                     Parity:  None

**4. Signal polarity**               MARK (logical "1"):  -3V to -12V
                                     SPACE (logical "0"):  +3V to +12V

**5. Interface connectors**          On printer:  Female 8-pin mini-DIN connector
                                     On cable:  Male 8-pin mini-DIN connector

**6. Input/output signals and pin layout**
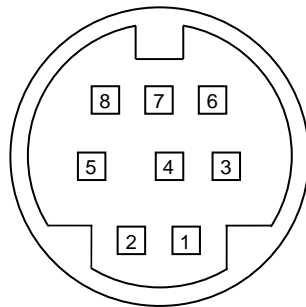
| Pin No. | Signal | I/O |
|---------|--------|-----|
| 1 | SCLK | OUT |
| 2 | N.C.[1] | |
| 3 | TXD- | OUT |
| 4 | S-GND | |
| 5 | RXD- | IN |
| 6 | TXD+ | OUT |
| 7 | N.C. | |
| 8 | RXD+ | IN |
| Shield | PG | |

*1. N.C. means no connection

**7. Description of signals**

**SCLK (signal clock)**
This pin outputs a sync clock when data transfer speed is set to 442.2 and 884.4 kbit/s.

**TXD-/TXD+ (transmitted data)**
Output signals TXD- and TXD+ are the differential signals for sending data from the printer.  TXD- is in the MARK state (logical "1") when no data is being sent; TXD+ is in the SPACE state (logical "0").  These signals are used to send the printer status, etc., to the host computer.
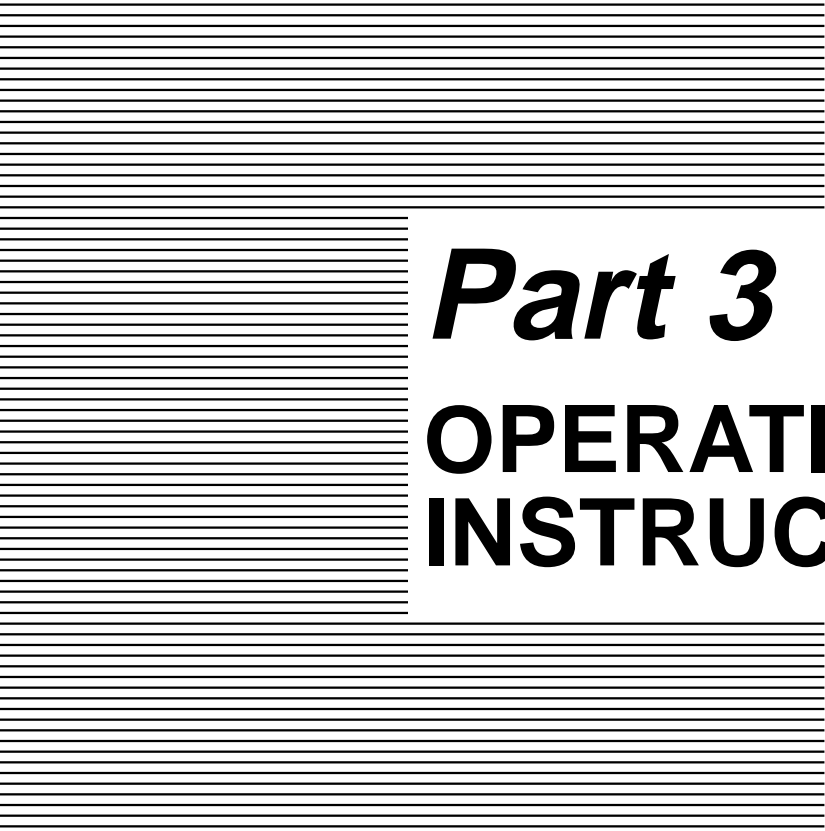
**RXD-/RXD+ (received data)**
Input signals RXD- and RXD+ are the differential signals for the printer to receive data.  RXD- is in the MARK state (logical "1") when no data is being sent; RXD+ is in the SPACE state (logical "0").  These signals are used to receive the control commands and print data sent from the host computer to the printer.

**PG (protection ground)**
PG is a low-impedance ground for the interface cable shielding.

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# Part 3

# OPERATING INSTRUCTIONS

# 1. PRINTER SETUP

## 1.1 Unpacking

After unpacking the printer, check that you have the following:
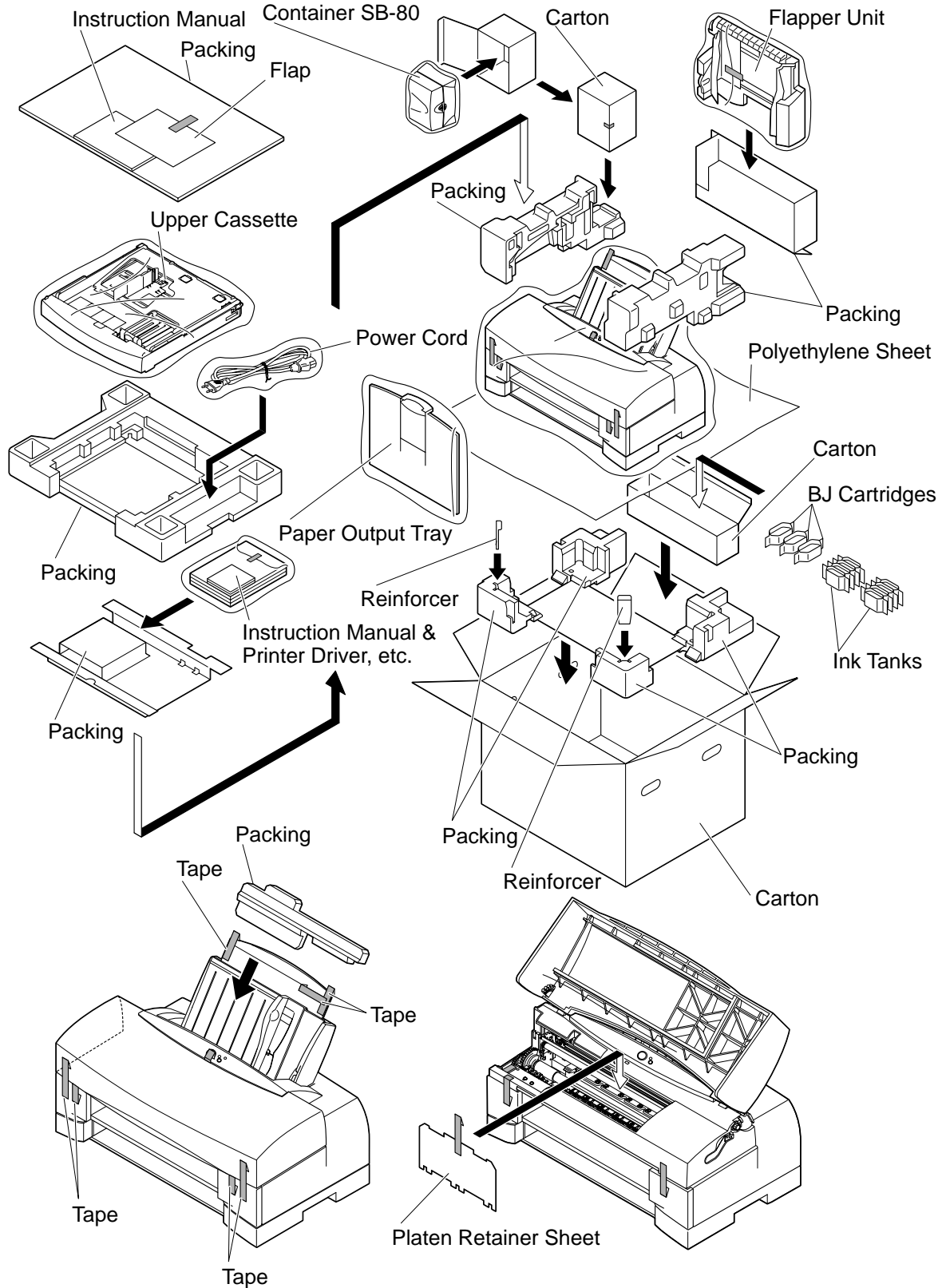


**Figure 3-1 Packing (1)**
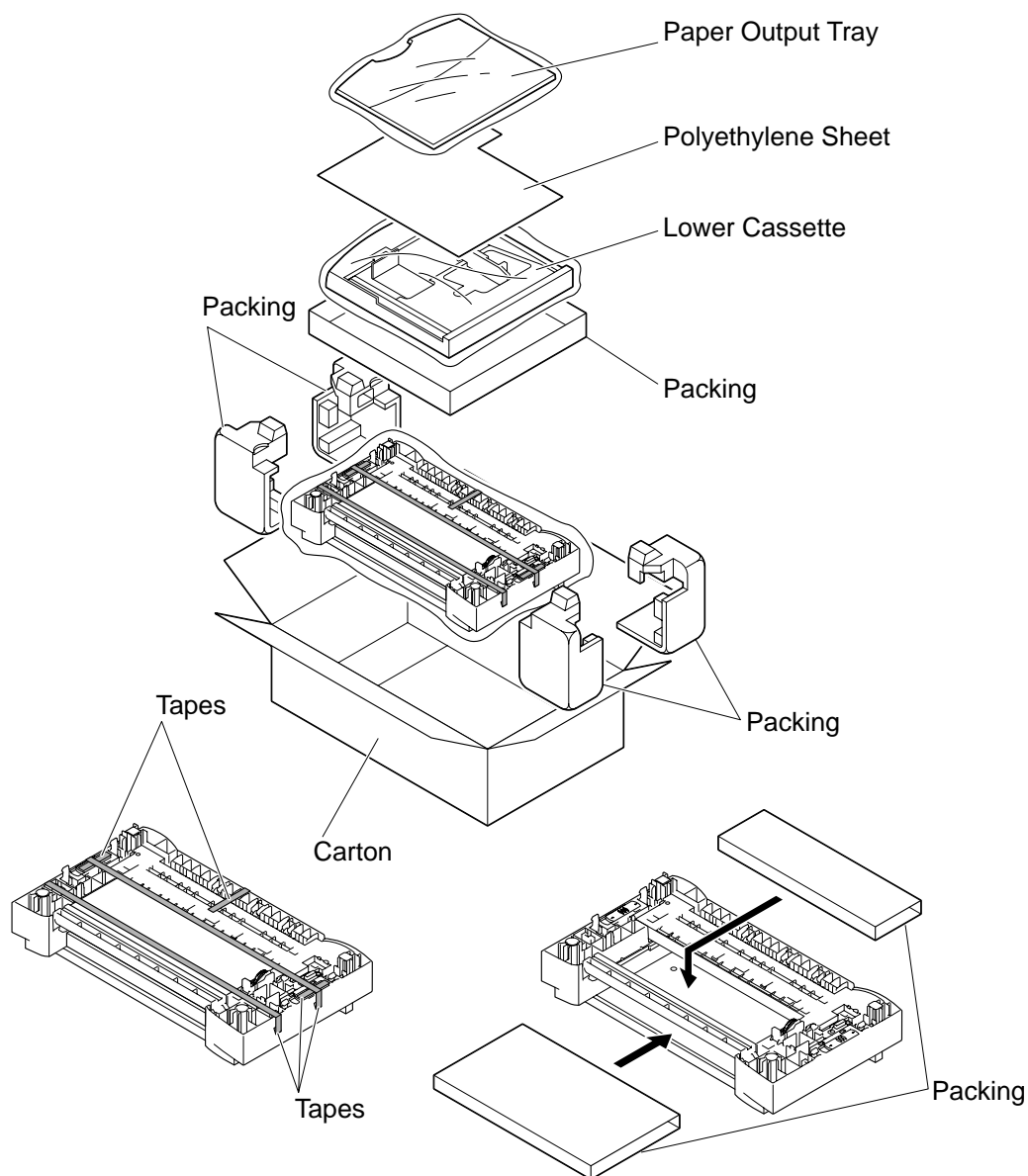
**Figure 3-2 Packing (2): Lower Cassette**

### 1.2 Installation Space

Install the printer with the clearances given below for the printer to be operated efficiently.

When the carriage moves to the left and right, the printer may generate substantial vibration. Do not install the printer at a location where it is easily affected by vibration. The minimum amount of space required when installing the printer is shown below.

Approx. 588 mm

Approx. 603 mm

Approx. 767 mm
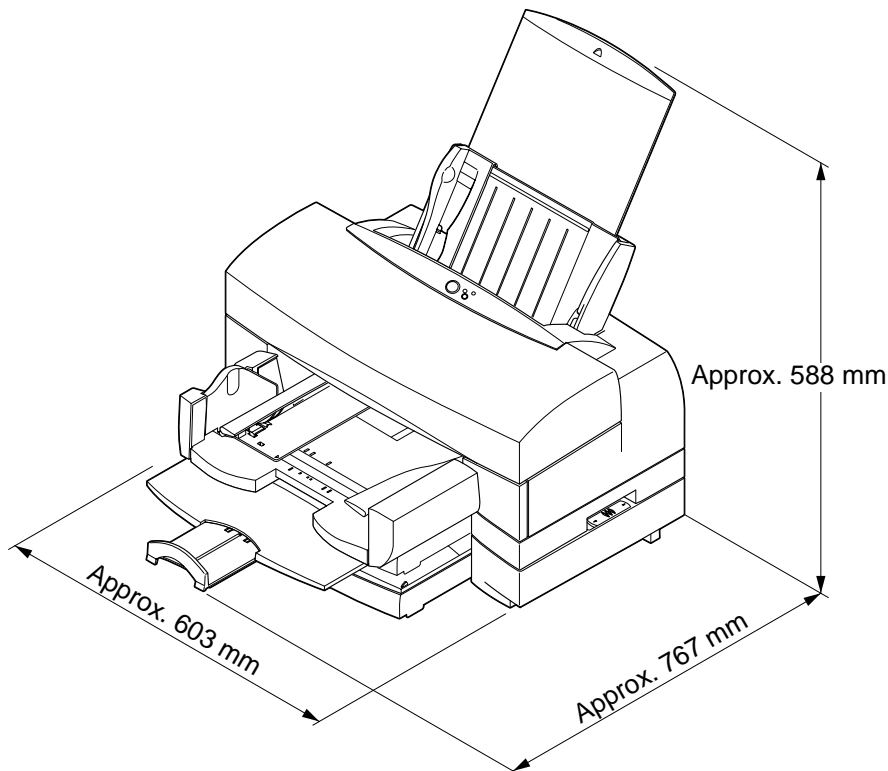
**Figure 3-3 Installation Space**

NOTE

Use the printer within the following temperature and humidity ranges:
Ambient temperature: 5°C to 35°C
Relative humidity: 10% to 90% (no condensation)
Do not install the printer in places where it is exposed to direct sunlight or near a heater, air conditioner, or in a car where the temperature rises suddenly.
Do not install the printer in dusty places or where it is subjected to salty wind.
Do not place it near a television set, speaker, or other devices which generate magnetic fields.
Install the printer on a flat sturdy surface.

CAUTION

The printer is heavy. It weights about 25 kg. Make sure that the surface where the printer is installed can bear its weight.

### 1.3 Installation Procedure

Install the printer as follows.

### 1.3.1 Connecting the interface cable

1) Make sure that the printer and host computer are OFF.
2) Plug the interface cable into the printer interface connector. Secure the cable with connector clips.
3) Connect the other end of the interface cable to the host computer and fix it securely.

1. Connect the interface cable to the printer.    2. Connect the interface cable to the computer.

Macintosh    Windows Machine    Macintosh    Windows Machine
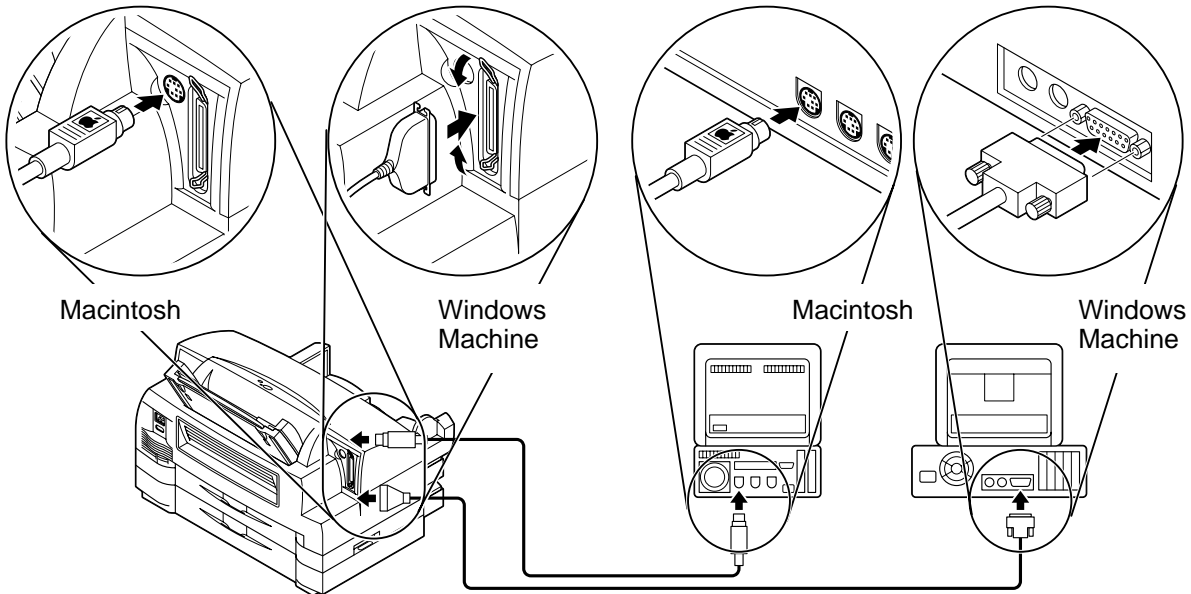
**Figure 3-4 Connecting the Interface Cable**

### 1.3.2 Connecting the power supply

1) Connect the power cord plug to the printer, and then the other end of the power cord to the power outlet. (① and ② in Figure 3-5 below)
2) Press the printer *POWER* button (③ in Figure 3-5 below). The printer buzzer sounds four times, and the *POWER* indicator and *ERROR* indicator light.
3) Open the printer's top cover. The carriage moves to the left edge, allowing you to install the BJ cartridges.

② Connect the other end of the power cord to the power outlet.    ③ Press the *POWER* button.

① Connect the power cord plug to the printer.
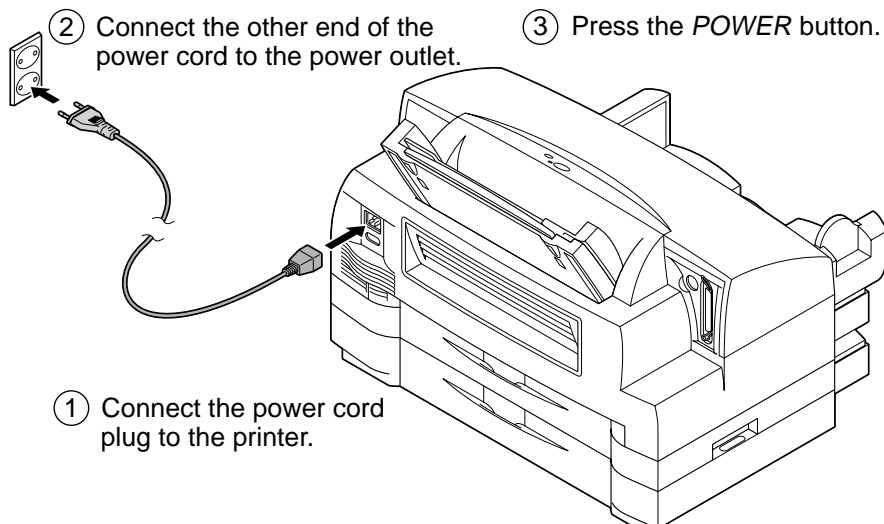
**Figure 3-5 Connecting the Power Supply**

### 1.3.3 Installing BJ cartridges

#### 1) Removing the protective cap from the BJ cartridge

Remove the BJ cartridge from the aluminum bag, and remove the protective cap from the nozzles.
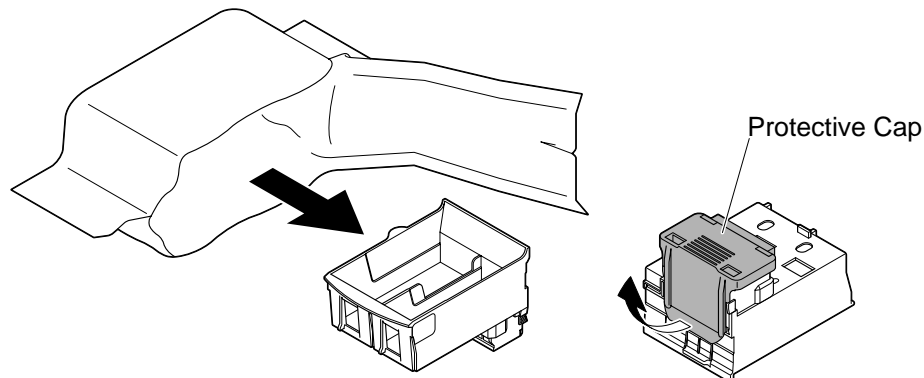


Protective Cap

**Figure 3-6 Removing the Protective Cap**

> **CAUTION**
>
> Do not reuse head caps that have been removed once. If they are reused, the head may become clogged with foreign matter, or colors of ink may be mixed.
>
> Gently remove the protective cap from the print head, taking care not to touch the print head directly with your hand or fingers.
>
> Poor printing may be caused by scratches on the print head or any foreign matter adhered to it.
>
> After removing the cap, do not shake the BJ cartridge. Ink could splatter out if you do.

#### 2) Installing the BJ cartridge

Open the printer's top cover, and press the *BJ cartridge REPLACE* button. The buzzer sounds once, and the carriage moves to the BJ cartridge replacement position. Install the BJ cartridge on the carriage. Install Color BJ cartridge BC-81 on the holder on the right, and install Black BJ cartridge BC-80 (or Photo BJ cartridge BC-82 Photo) on the holder on the left.

After installing the BJ cartridges, either press the *BJ cartridge REPLACE* button, or close the top cover. The buzzer sounds once, and after warming up for about 40 seconds, the carriage returns to the capping position (right edge of printer body).



Black BJ Cartridge
BC-80 or
Photo BJ Cartridge
BC-82 Photo

Color BJ Cartridge BC-81

*BJ Cartridge REPLACE* Button
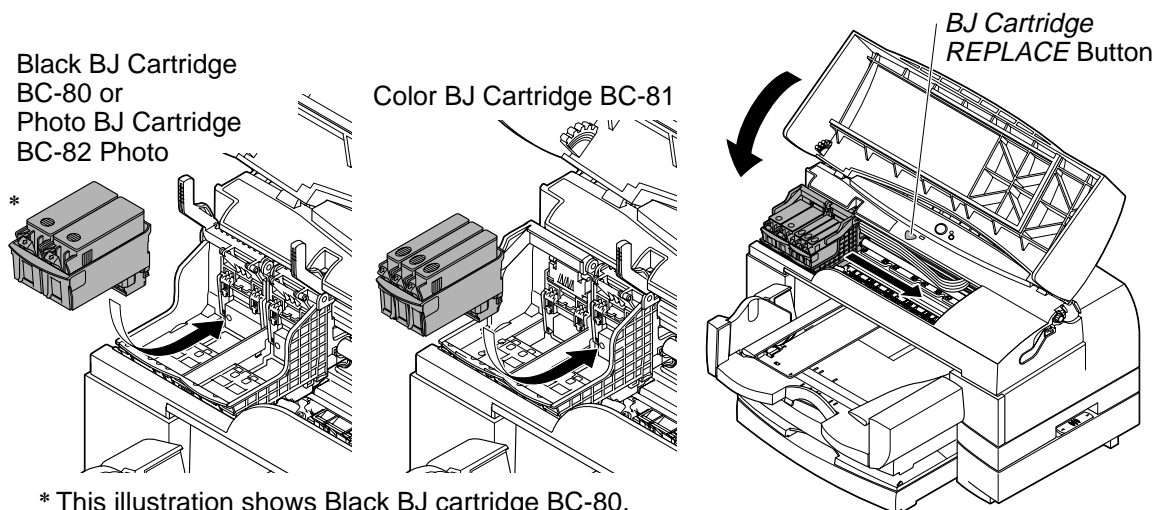
\* This illustration shows Black BJ cartridge BC-80.

**Figure 3-7 Installing BJ Cartridges**

**3-5**

### 3) Adjusting the print head position

As two print heads are installed on the printer, differences sometimes occur in the dot placement of ejected ink, and high-grade printing sometimes cannot be obtained depending on the individual characteristics specific to each print head and installation state. To eliminate these differences, the mutual positions of the print heads must be adjusted as follows after the Canon printer driver has been installed.

**Procedure**

1) Load two or more sheets of A4-size plain paper in the sheet feeder.
2) Select "Test Prints" under Maintenance Sheet in the printer driver, and print the head position adjustment pattern (*Figure 3-8 Checking the Position of the Print Head (1)*).
3) Visually check the printed pattern, and select the optimum pattern at each of A (vertical direction between two heads -1 to +1; one unit = 1/600 inch), B (horizontal direction between two heads -7 to +7; one unit = 1/600 inch) and C (bi-direction of one head -7 to +7; one unit = 1/1200 inch).
4) Follow the instructions on Maintenance Sheet in the printer driver, and print the high-resolution adjustment pattern (*Figure 3-9 Checking the Position of the Print Head (2) (page 3-7)*) .
5) Visually check the printed patterns, and select the optimum pattern at D (horizontal direction between two heads -1 to +1; one unit = 1/1200 inch).
6) Follow the instructions on Maintenance Sheet in the printer driver, and end the print head position adjustment.
7) The dot placement of the ink after adjustment can be checked by outputting a test print (nozzle check pattern).

**Figure 3-8 Checking the Position of the Print Head (1)**

(A)
0

(B)
+3

(C)
0
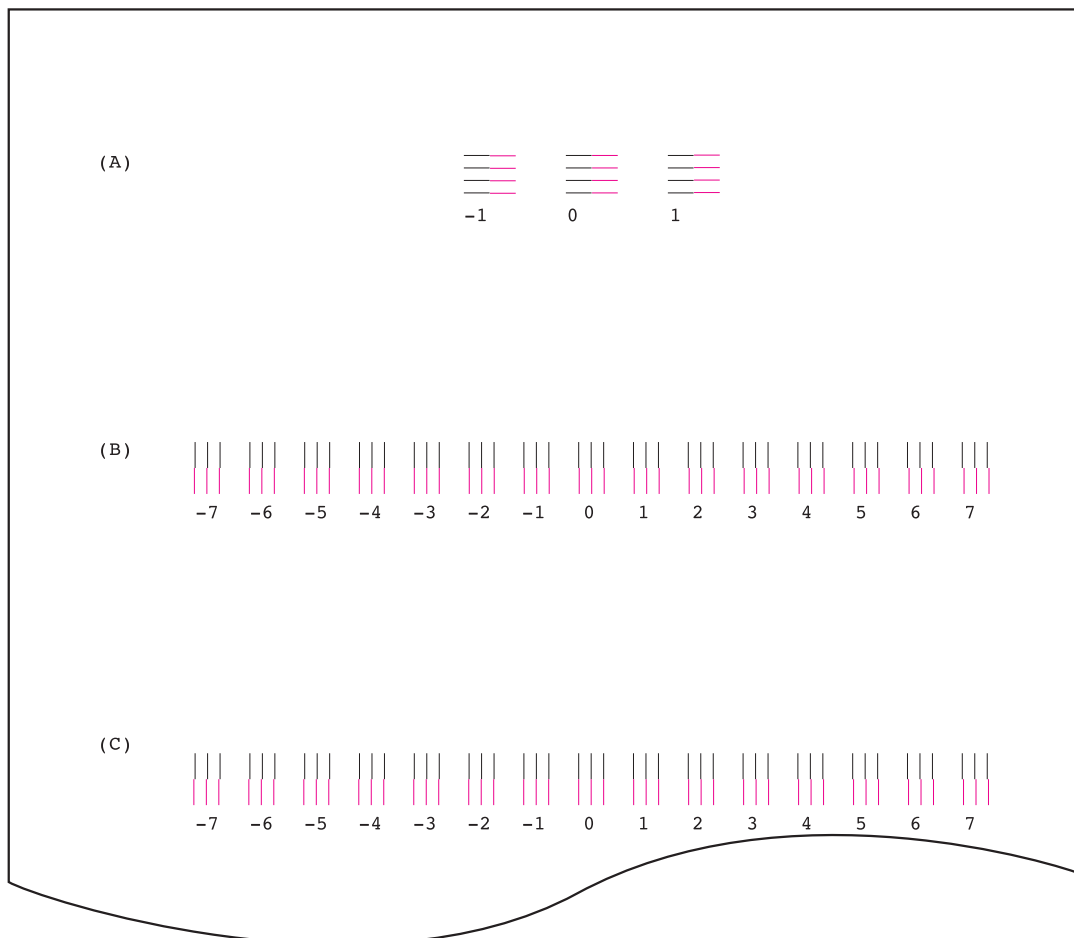
(D)    -1    0    1
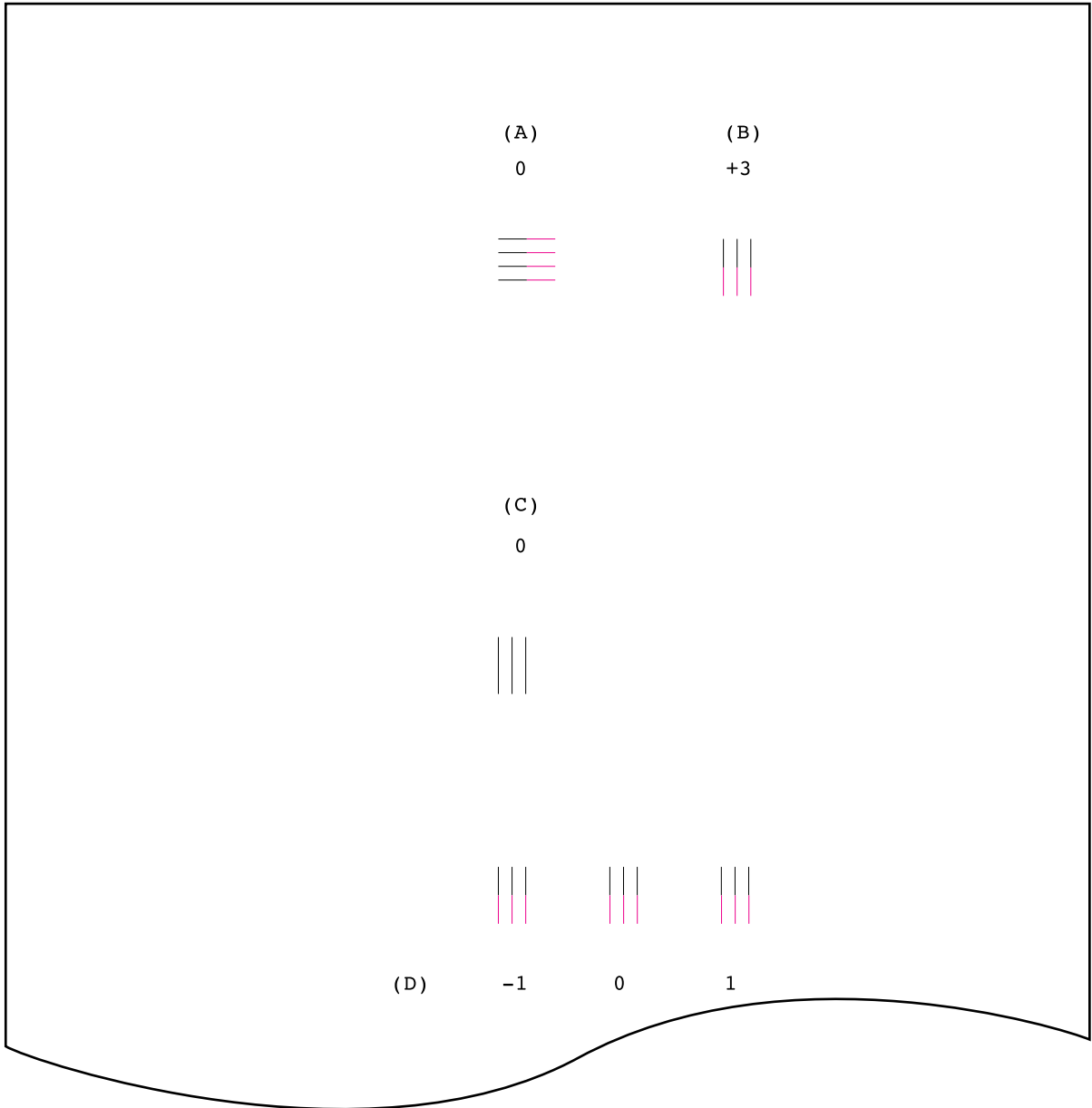
**Figure 3-9 Checking the Position of the Print Head (2)**

### 1.3.4 Replacing ink tanks

Replace the ink tank as follows.

**1) Ink tank replacement criteria**

Replace the ink tank in any of the following cases: "ink-out" detection indicates that the ink tank has run out of ink, or when cleaning does not improve print quality. (Generally, the ink tank should be replaced about six months after it is removed from its package.)

**2) Removing the ink tank**

Press the *BJ cartridge REPLACE* button to move the carriage to the BJ cartridge replacement position (left edge of printer).

As shown in *Figure 3-10 Replacing Ink Tanks*, lift up the section marked with the arrow at the front of the ink tank, and remove the ink tank from the BJ cartridge. Ink adheres to and around the ink tank's ink outlet, so handle the ink tank carefully.

**3) Installing the ink tank**

Take out the ink tank from its box and open the package. Remove the ink outlet's protective cap as shown in *Figure 3-11 How to Remove the Ink Tank Protective Cap*, and install the ink tank in the printer by following the removal procedure in reverse.



*BJ Cartridge REPLACE Button*
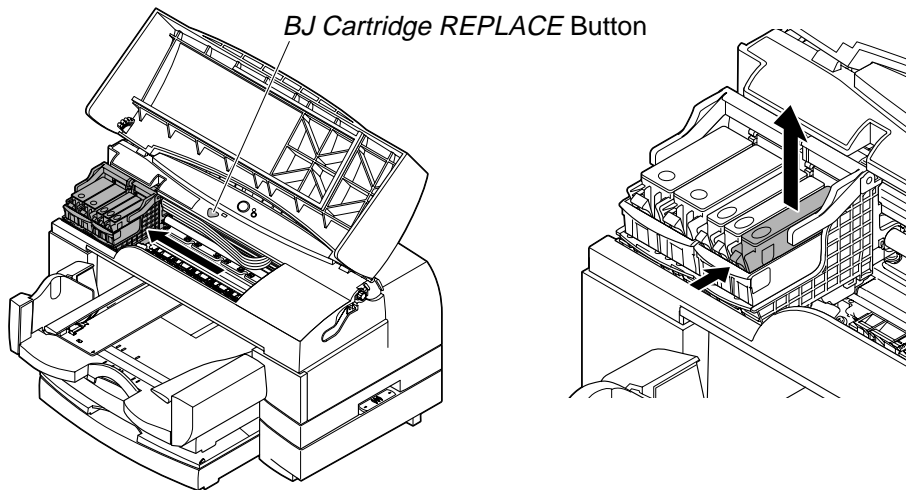
**Figure 3-10 Replacing Ink Tanks**

After installing the ink tank, press the *BJ cartridge REPLACE* button or close the top cover to return the carriage to the capping position (right edge of printer). Then, cleaning C is performed automatically. (See *"TABLE 4-7 CLEANING EXECUTION CONDITIONS, CLEANING TIME AND INK SUCTION AMOUNTS" (page 4-25)*.)
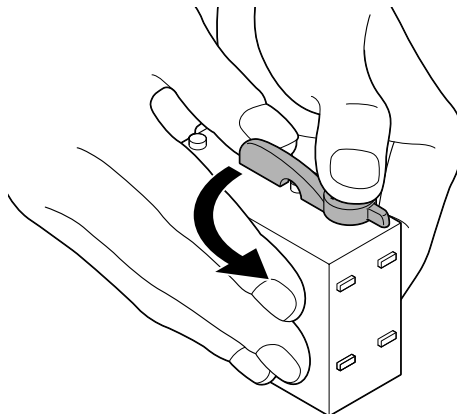


**Figure 3-11 How to Remove the Ink Tank Protective Cap**

### 1.3.5 BJ cartridge container SB-80

The printer is supplied with BJ cartridge container SB-80 for storing Black BJ
cartridge BC-80, Color BJ cartridge BC-81 or Photo BJ cartridge BC-82 Photo.
When Black BJ cartridge BC-80 is installed in the printer, store the Photo BJ
cartridge BC-82 Photo in the BJ cartridge container.  Alternately, when Photo BJ
cartridge BC-82 Photo is installed in the printer, store Black BJ cartridge BC-80 in
the BJ cartridge container.

NOTE

When you store the Black BJ cartridge BC-80 or the Photo BJ cartridge
BC-82 Photo in the BJ cartridge container, store the cartridges with the
ink tanks installed (except when transporting the printer: see *"Part 3: 2.1
Transporting the Printer" (page 3-15)*).
Also take care when inserting BJ cartridges, making sure that they are
inserted in the correct direction.
Do not shake or drop the container.  Otherwise, ink may leak.



Press here.

Container SB-80

Contains either
Photo BJ cartridge BC-82 Photo
or Color BJ cartridge BC-81.

Contains only
Black BJ cartridge BC-80.
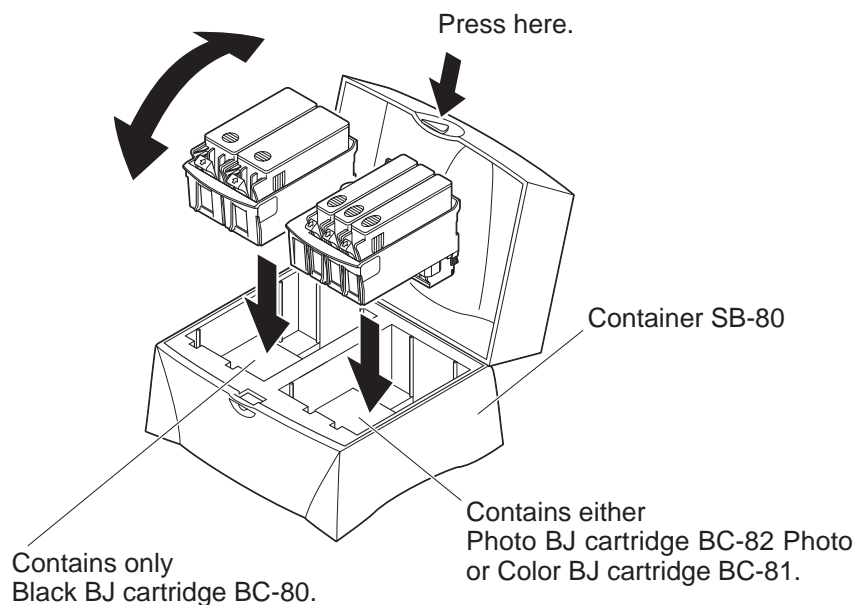
**Figure 3-12 BJ Cartridge Container SB-80**

## 1.4 Turning the Printer ON/OFF
### 1.4.1 Turning the printer on

With the printer connected to a power source, press the *POWER* button to turn ON the printer. When the printer turns ON, the beeper sounds once and initializing operations are executed.

If a BJ cartridge is not installed, the "No BJ cartridge" error occurs (*"Part 3: 3.1.1 Operator call" (page 3-17)*).

If a BJ cartridge is installed, the *POWER* indicator will light to indicate that the printer is ready.

When the power is first turned ON from a hardware ON state, the printer checks for ink-out; if "ink-out" is judged cleaning A is automatically carried out (for details, see *"Part 4: TABLE 4-7 CLEANING EXECUTION CONDITIONS, CLEANING TIME AND INK SUCTION AMOUNTS" (page 4-25)*). Cleaning A takes about two minutes. During cleaning, the *POWER* indicator flashes to indicate that cleaning is in progress.

### 1.4.2 Turning the printer off

To turn the printer OFF, press the *POWER* button.

When the print is turned OFF, the power OFF sequence for capping the BJ cartridges is executed, and the *POWER* indicator blinks to indicate that this sequence is being executed. When this sequence ends, the *POWER* indicator goes out.

Make sure that the *POWER* indicator is OFF before disconnecting the power cord.

> **CAUTION** Never turn OFF the printer by disconnecting the power cord without first pressing the *POWER* button. Otherwise, the printer turns OFF before it can cap the BJ cartridges. If the BJ cartridges are not capped, the ink may leak or dry in the nozzles, causing defective printing later on.

If the *POWER* button is pressed to the turn the printer OFF during printing, printing is immediately interrupted and printer operation ends.

If the *POWER* button is pressed to turn the printer OFF during replacement of a BJ cartridge or ink tank, the carriage returns to the home position, and printer operation ends.

If the *POWER* button is pressed to turn the printer OFF during cleaning, cleaning is interrupted and printer operation ends.

If the POWER button is pressed to turn the printer OFF while the cover is open, printer operation ends immediately.
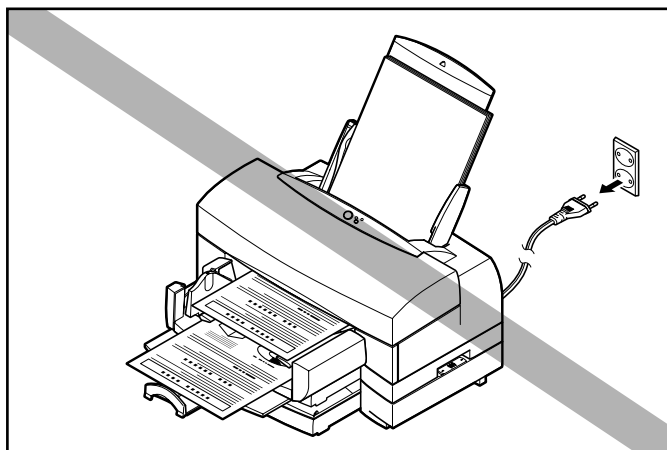


**Figure 3-13 Precautions When Turning the Printer OFF**

## 1.5 Paper Settings

For optimum printing, selectively use the automatic pick-up mechanism using the cassette and sheet feeder, and manual feed for feeding paper from the rear of the printer according to the type of printing paper you are using.  This printer does not have a paper thickness adjustment lever as the distance between sheets is automatically adjusted to suit the type of paper.  Paper support is performed by sliding/drawing out the cassette's paper output tray and tray extension, and the sheet feeder's paper guide and paper rest.
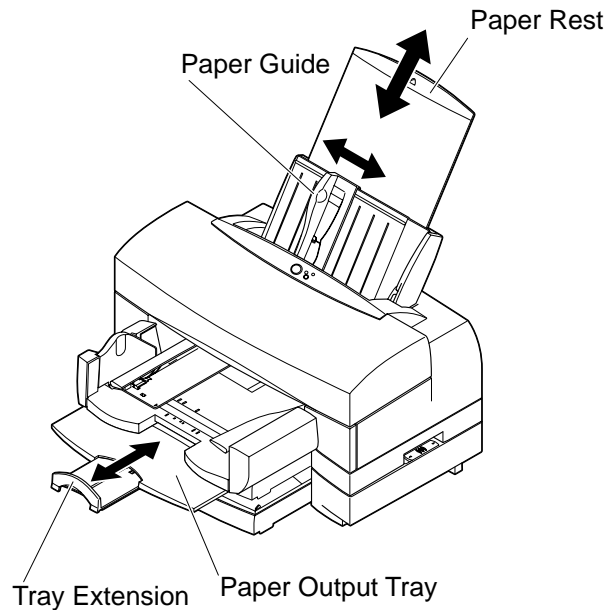
**Figure 3-14 Paper Settings**

**TABLE 3-1 PRINTER PAPER SETTINGS**

| Media | Paper Name | Size | Feed Method | Stack Amounts | |
|---|---|---|---|---|---|
| | | | | Sheet Feeder | Cassette |
| Plain Paper | Ream weight 64 to 90g/m² | A3/A4/A5 Vertical | Auto | 10 mm (100 sheets) | 25 mm (250 sheets) |
| Color BJ Plain Paper | LC-301 | A3/A4 | Auto | 10 mm (100 sheets) | 25 mm (250 sheets) |
| Color BJ High-Resolution Paper | HR-101 | A3+/A3/A4 | Auto | 10 mm (80 sheets) | 25 mm (200 sheets) |
| Glossy Photo Paper | GP-301 | A3+/A3/A4+/A4 | Auto | 20 sheets | — |
| High-Gloss Photo Film | HG-201 | A3/A4 | Auto | *1 1 sheet | — |
| Color BJ Transparencies | CF-102 | A4 | Auto *4 | 50 sheets | — |
| Fabric Sheets | FS-101 | 241×356mm | Manual | — | — |
| Envelopes | COM# 10 No.582 | 241 (H)×105 (V) mm | Auto | 15 sheets | — |
| Envelopes | DL PLUS | 220 (H)×110 (V) mm | Auto | 15 sheets | — |
| Thick paper | — | 91 to 105g/m² | Manual | — | — |
| Banner paper*2 | Banner paper BP-101 | 210×297/216×279 | Auto | *3 | — |
| T-shirt Transfer | TR-201 | | Auto | 1 sheet | — |

*1 When HG-201 is fed from the sheet feeder, make sure that the cut corner of the HG-201 is at the top right during vertical feed and at the top left during horizontal feed.

*2 When banner paper is used, adjust the paper size on the flapper unit to B5, and draw out the paper output tray.

*3 Load only the leading edge on the sheet feeder.

*4 Place a sheet of plain paper at the bottom.

Paper sizes:

  Automatic: Vertical 100 to 355.6mm × Horizontal 100 to 241.3 mm.

  Manual: Vertical 150 to 297mm × Horizontal 150 to 241.3 mm.

Ream weight:

  Automatic pick-up: 64 to 90 g/m².

  Manual: 0.25 mm thick or less.

## 1.6 Names and Functions of Parts
This section describes the names of the parts of the printer and their functions.

Front of Printer

Control Panel Section
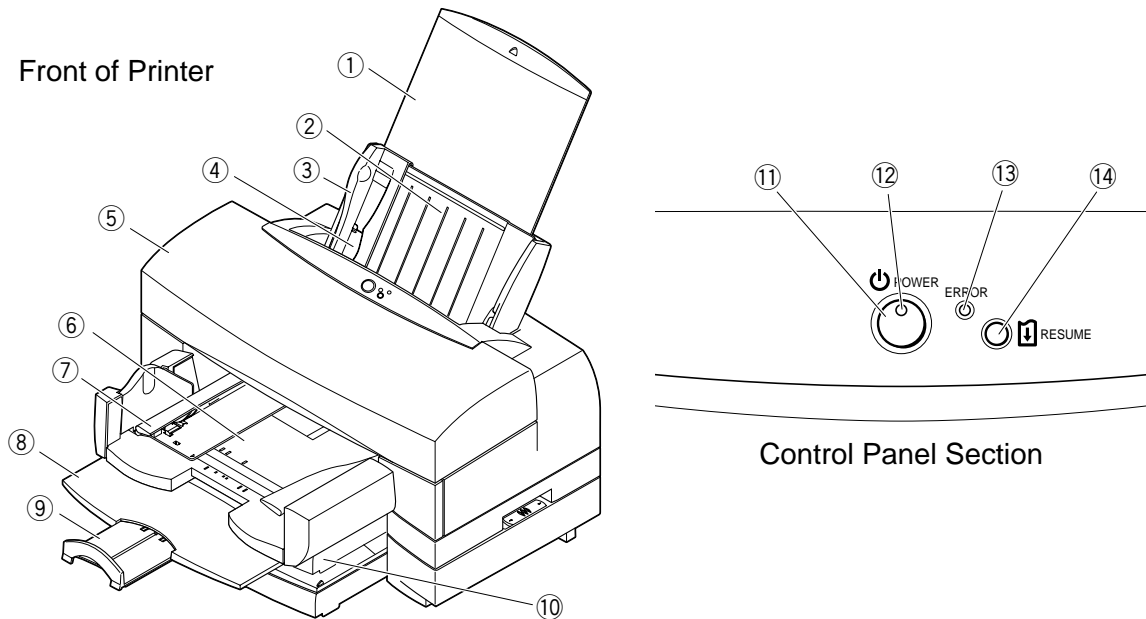
**Figure 3-15 Names and Functions of Parts (1)**

**Front of Printer**

① **Paper Rest:**       Supports the paper straight in the sheet feeder.  Pull out this support for use.

② **Sheet Feeder:**    Load sheets of paper into the feeder.  The number of sheets that can be loaded varies according to the type of printing paper used.

③ **Paper Guide:**     Adjust the paper guide to the left edge of paper by lightly pulling it across.  This keeps the paper feeding straight.

④ **Guide:**             Set this guide upright when printing on envelopes.

⑤ **Top Cover:**       Open this cover to replace the BJ cartridges or ink tanks, or to remove jammed paper.

⑥ **Flapper Unit:**     This unit sends printed paper to the paper output tray.  This unit prevents ink smearing caused by output of printed paper before the ink on the previous paper has dried.

⑦ **Flapper:**         This part receives paper that is currently being printed.  It holds the paper until printing is finished, and ejects the paper onto the paper output tray.  Slide the left side of the flapper to adjust the width of the flapper to the width of the paper being printed (B5 to A3+).

⑧ **Paper Output Tray/**⑨ **Tray Extension:**  Printed paper is output here.  If necessary, draw out these trays for use.

⑩ **Cassette:**       This cassette accommodates up to 250 sheets of plain paper or up to 200 sheets of high-resolution paper for printing.
An optional cassette (lower cassette) can also be attached.

**Control Panel Section**

⑪ *POWER* **Button:** Turns the printer ON and OFF.

⑫ *POWER* **Indicator:** Indicates whether the printer is ON or OFF. This indicator blinks when print data is received, when the cover is open, or when cleaning is in progress.

⑬ *ERROR* **Indicator:** When an error occurs, the buzzer sounds, and the ERROR indicator either lights or blinks. In the case of a service call, the number of times that this indicator blinks indicates the type of error.

⑭ *RESUME* **Button:** When a paper jam or other trouble occurs, press this button to reset the printer. This button is also used for manual cleaning. To start manual cleaning, hold this button down until the buzzer sounds once then release the button.
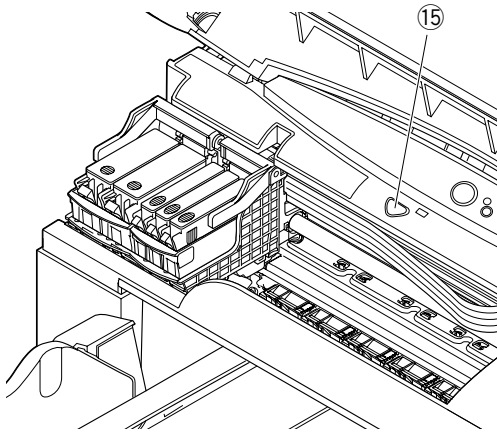
Inside of Printer                    Rear of Printer
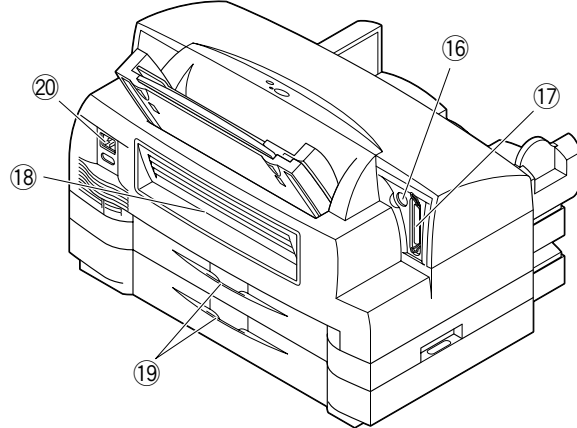


**Figure 3-16 Names and Functions of Parts (2)**

**Inside of Printer**

⑮ *BJ Cartridge REPLACE* **Button:** Pressing this button moves the carriage to the home position (right edge of printer) from the cartridge replacement position (left edge of printer), or the opposite operation is carried out.

**Rear of Printer**

⑯ **Serial Interface Connector:** For connecting the printer to the serial port on a Macintosh via the serial interface cable.

⑰ **Parallel Interface Connector:** For connecting the printer to the parallel port on a Windows machine via the parallel interface cable.

⑱ **Manual Feed Inlet:** Feed paper here when manually printing paper. When manually inserting paper, make sure that you hold it lightly and that it is inserted straight.

⑲ **Back Cover:** Open this cover to remove jammed paper if a paper jam occurs during printing of paper picked up from the cassette.

⑳ **Power Cord Connector:** Connect the power cord (supplied) to this connector.

# 2. TRANSPORTING THE PRINTER

Before service personnel or users carry or transport the printer, remove the ink tanks from the printer, and perform cleaning and capping.  This prevents defective printing caused by ink leakage and ink drying in the BJ cartridge nozzles.
When Black BJ cartridge BC-80 and Photo BJ cartridge BC-82 Photo are used selectively, store the BJ cartridge that is not installed in the printer in BJ cartridge container SB-80.

## 2.1 Transporting the Printer

(The following description assumes that Black BJ cartridge BC-80 and Color BJ cartridge BC-81 are installed.)
Follow the procedure below to pack the printer to prevent ink leakage and protect the BJ cartridges.



Container SB-80
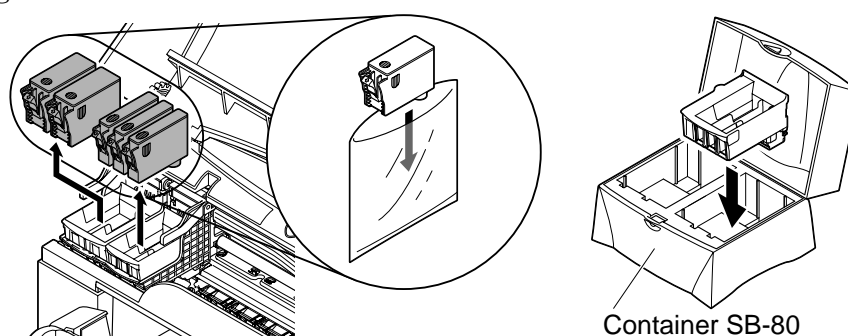
**Figure 3-17 Transporting the Printer**

1) Open the top cover with the printer turned ON, and press the *BJ Cartridge REPLACE* button to move the carriage to the BJ cartridge replacement position (left edge of printer).
2) Remove all ink tanks.
3) Wrap each ink tank individually in cling-wrap film, and insert them all in a vinyl bag.
4) Close the top cover. (Pressing the *BJ Cartridge REPLACE* button is also possible.)
5) The "no ink tank" error is displayed. (See *"Part 3: TABLE 3-2 OPERATOR CALL" (page 3-17)*.)
6) Turn the printer OFF. (Note below)
7) The carriage moves to the right edge of the printer, and any ink remaining in the nozzles is sucked out (cleaning E is executed). (For details, see *"Part 4: TABLE 4-7 CLEANING EXECUTION CONDITIONS, CLEANING TIME AND INK SUCTION AMOUNTS" (page 4-25)*.)
8) Disconnect the power cord and interface cable.
9) Close the top cover if open, and pack the printer with the packing materials that it was originally packed in.  If these packing materials are no longer available, pack the printer using a sufficient amount of packing.
10) Remove the cassette, paper output tray, and flapper unit, and pack them with the packing materials that they were originally packed in.  If these packing materials are no longer available, pack the printer using a sufficient amount of packing.
    If the lower cassette is used, pack it separately from the printer body.
11) Insert Photo BJ cartridge BC-82 Photo in storage container SB-80. (Also, carry out step 3) above for the ink tank.)
*(Note)* Never turn OFF the printer by disconnecting the power cord without first pressing the *POWER* button.  Otherwise, the printer turns OFF before it can cap the BJ cartridges. If the BJ cartridges are not capped, ink may leak or dry in the nozzles, causing defective printing later on. (The same applies when the power cord for a power supply shared with the personal computer is disconnected. Refer to *"Part 1: 2.3.6 Ink leakage/ink dry-up precautions" (page 1-12)*.)

## 2.2 Capping Lock/Unlock

When packing the printer, open the top cover, and make sure that the carriage is locked (the carriage does not move from the home position by moving to the left or right) by the carriage lock pin on the purge unit at the home position (right edge of printer).



Top Cover
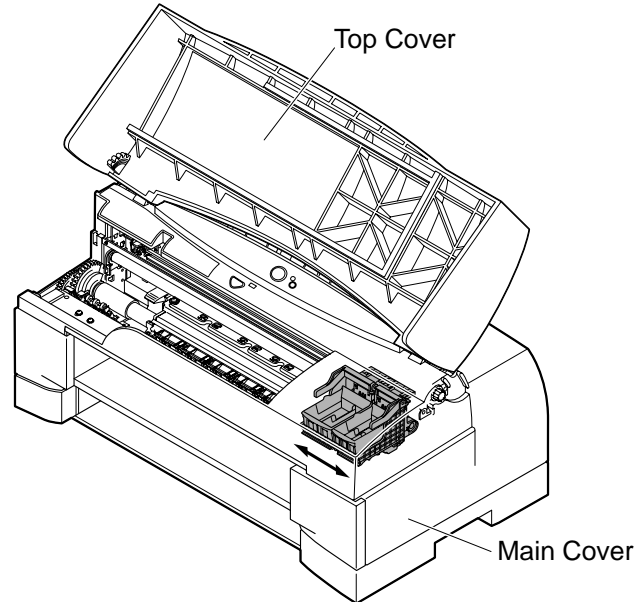
Main Cover

**Figure 3-18 Capping Lock**

If the carriage is not locked, you can perform capping as follows. Remove the main cover (refer to *Figure 3-18 Capping Lock*), insert a regular screwdriver into the groove on the purge motor shaft and turn it clockwise to raise the carriage lock pin. If the screwdriver is further turned clockwise, the carriage lock pin is lowered to unlock capping.
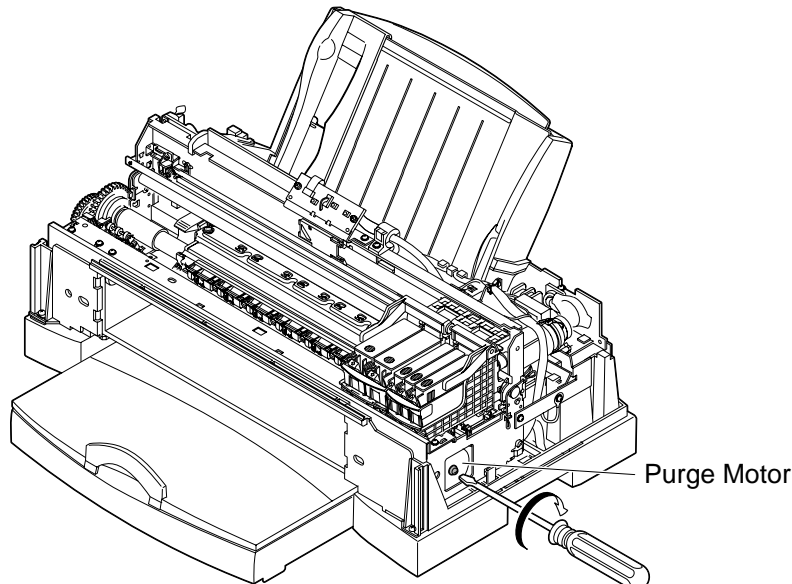


Purge Motor

**Figure 3-19 Capping Lock/Unlock**

| ⚠ CAUTION | The purge motor is very hot immediately after repeated printing or cleaning. Take care not to touch the purge motor directly with bare hands after these operations (refer to *"Part 1: 2.3.4 Purge motor" (page 1-10)*). |
|---|---|

# 3. PRINTER SERVICING FUNCTIONS

## 3.1 Error Indications

The printer informs the operator of an error status by the *ERROR* indicator and sounding of a buzzer.

There are two types of error status: operator calls which are recoverable by the user, and service calls which are unrecoverable by the user.  In either case, the error status is judged by the number of times that the buzzer sounds and the state of the *ERROR* indicator.  For an operator call, the *ERROR* indicator lights, and for a service call, the *ERROR* indicator blinks repeatedly for a fixed number of times depending on the cause of the error.
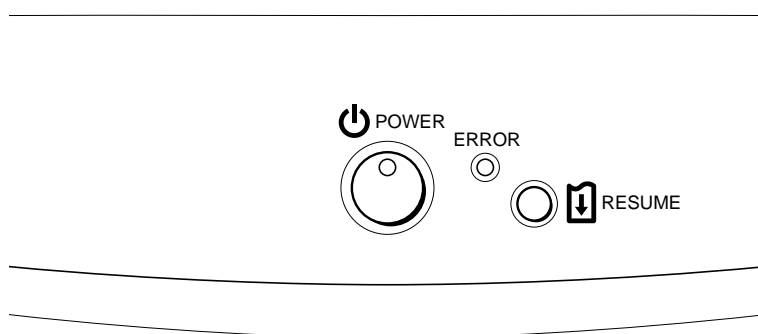


**Figure 3-20 Control Panel**

## 3.1.1 Operator call

**TABLE 3-2 OPERATOR CALL**

*[Recoverable by users]*

| Error Condition | ERROR Indicator | Beeper | User Remedy |
|---|---|---|---|
| Paper pick-up error/paper jam error | Lights | 2 times | Load paper.  Remove jammed paper. |
| "Ink-out" error*¹/"No ink tank" error | ↓ | 3 times | Replace (install) ink tank. |
| "(No) BJ cartridge" error | ↓ | 4 times | Replace (install) BJ cartridge. |
| Waste ink warning*² | ↓ | 5 times | Press the *RESUME* button. |

*¹: The status reply display on the host computer differs depending on the type of ink used.

*²: If you continue to use the printer after pressing the *RESUME* button to cancel the error, the waste ink full error (service call) is generated.

When the bi-directional interface (nibble mode or ECP mode) is enabled, an "operator call message in ECP mode (except for paper pick-up error/paper jam error)" is displayed on the screen of the host computer via the BJC-8500 printer driver.  If the error is not recovered by following the remedy displayed on screen, an error other than that displayed on screen may have occurred.  If this happens, remedy the trouble by following the description in *"Part 5: 6 TROUBLESHOOTING" (page 5-12)*.

### 3.1.2 Service call

**TABLE 3-3 SERVICE CALL**

*[Unrecoverable by users]*

| Error Condition | ERROR Indicator | Beeper | Description |
|---|---|---|---|
| Carriage error | 2 blinks repeated | 6 times | Carriage cannot be controlled. |
| HP sense error | 3 blinks repeated | ↓ | Home position cannot be detected. |
| Purge error | 4 blinks repeated | ↓ | The purge unit cannot be initialized. |
| Sheet feeder error | 5 blinks repeated | ↓ | The sheet feed roller cannot be initialized. |
| Waste ink full error | 7 blinks repeated | ↓ | The waste ink level has exceeded the preset level. |
| BJ cartridge temperature rise error | 8 blinks repeated | ↓ | The BJ cartridge has risen above the preset temperature. |
| EEPROM error | 9 blinks repeated | ↓ | An error occurred during EEPROM writing. |
| (*1) Other hardware errors | 13 blinks repeated | ↓ | An error other than the above occurred. |

*1: Sometimes errors are not displayed normally.

When the bi-directional interface (nibble mode or ECP mode) is enabled, a "service call message" is displayed on the screen of the host computer via the BJC-8500 Canon printer driver.
When a service call occurs, remedy the trouble by following the description in *"Part 5: 6 TROUBLESHOOTING" (page 5-12)*.

## 3.2 Warning Display

The printer notifies the operator of warning states on the host computer's screen (not on the control panel).

**BJ Cartridges do not match warning**

In the following cases the status monitor displays a warning, cancels printing, and prompts the user to replace the BJ cartridge or change the printer driver settings:
When Black BJ cartridge BC-80 is installed, and printing is started with the BJ Cartridge selected to Photo/Color in the printer driver dialog box "Main."
When the Photo BJ cartridge BC-82 Photo is installed, and printing is started with the BJ Cartridge selected to Black/Color in the printer driver dialog box "Main."
(For details, see *Figure 3-21 BJ Cartridges do not Match Warning (Sample)*)
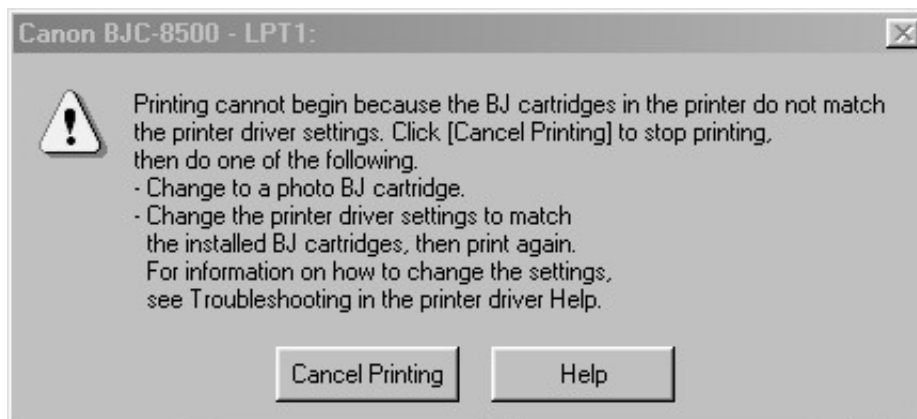


**Figure 3-21 BJ Cartridges do not Match Warning (Sample)**

**3-18**

### 3.3 Function Settings

This printer does not have a function selector for setting functions.  The printer drivers for Macintosh/Windows machines are used to set the various functions.

### 3.3.1 Maintenance settable items

The printer driver "Maintenance" can be used to set the following items:

**1) Print Head Cleaning**

Specifies cleaning (all colors, black, color), head refreshing and ink tank.

**2) Test Prints**

Sets and checks printing of nozzle check pattern and head position adjustment.

**3) Power (OFF)**

**4) Custom Setting**

**5) Start Status monitor**

In Windows, when you select the [Custom Setting] button ([Settings] on the Macintosh), you can select the "Set printer to ECP mode" (Only in Windows) and "Pause Page" setup items.
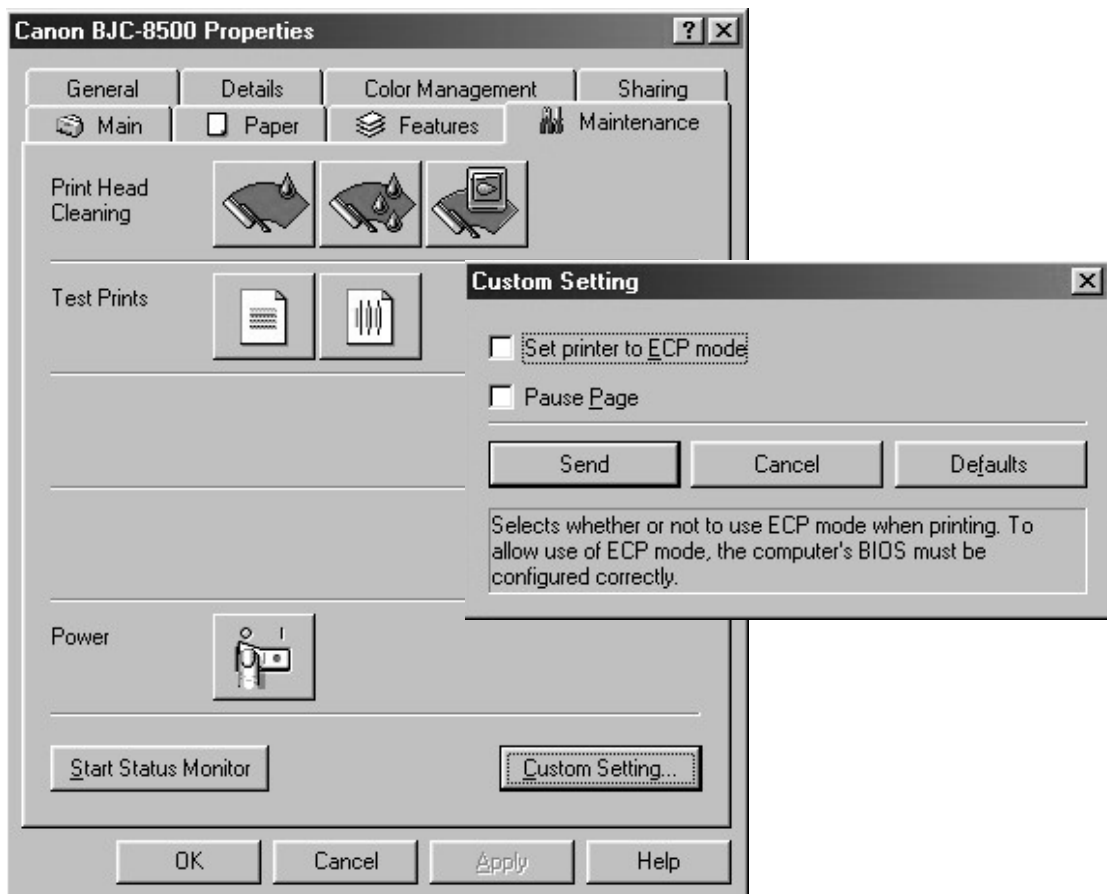


**Figure 3-22 Windows 95/98 Printer Driver Maintenance Sheet (Sample)**
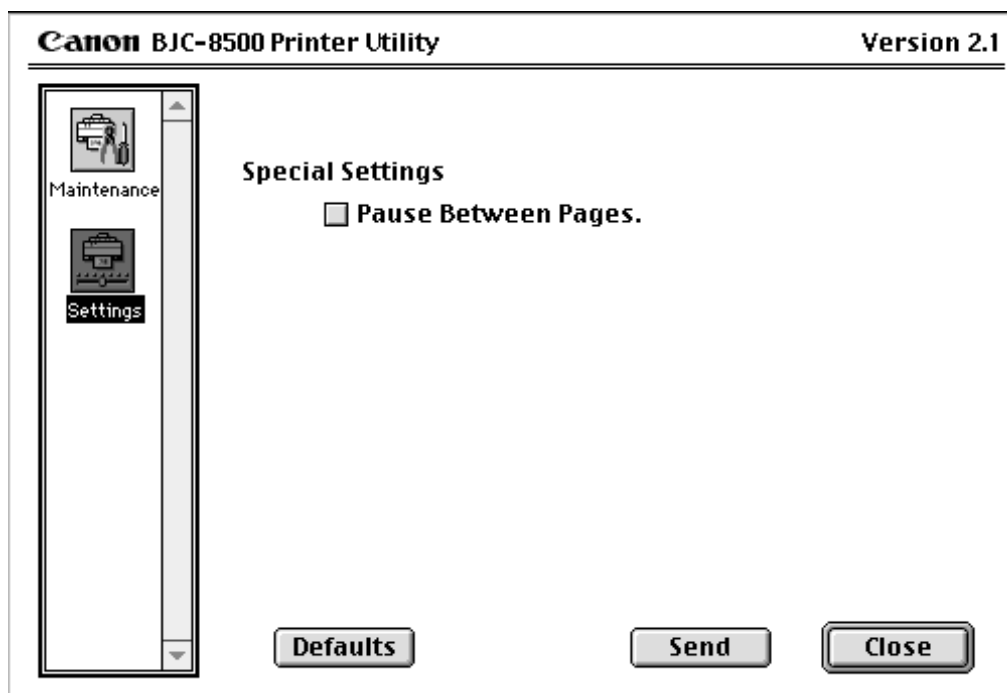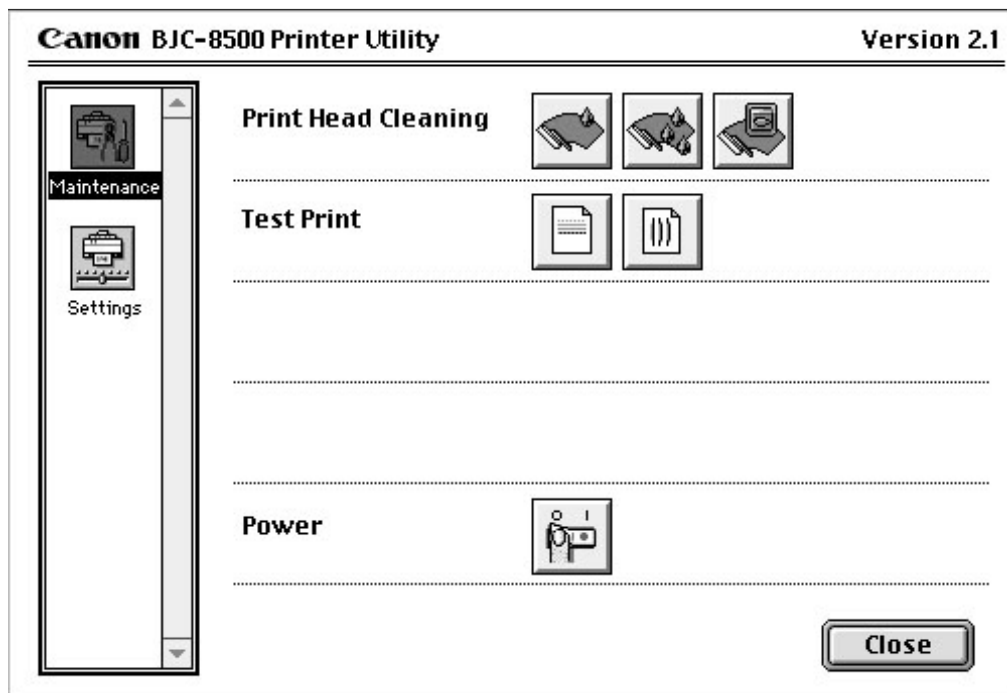
**Figure 3-23 Macintosh Printer Driver Utility Sheet (Sample)**

### 3.3.2 Custom setting

The printer driver has a custom setting dialog box for hidden utility functions.  This dialog box is for servicing only and dealing with claims on the market.  It is not disclosed the user.

**(1) Operation Procedure**

In Windows:
- Select the [Custom Setting] button in Maintenance on the printer driver.  You can select the "Set printer to ECP mode" and "Pause page" setup items → disclosed the user.
- If you select the [Custom Setting] button with the [Shift] key held down, you can select all five setup items in (2) below.

On a Macintosh:
- Select the [Settings] button in Utility on the printer driver.  You can select the "Pause Between Pages" setup item→ disclosed the user.
- If you select the [Settings] button with the [Shift] key held down, you can select four setup items (excluding "Set printer to ECP mode") in (2) below.

**(2) Setup Items (underline indicates default; ON= ☑, OFF= ☐ )**

- **Set printer to ECP mode (ON/OFF)**

  Sets the printer interface to ECP.

- **Pause Page (ON/OFF)**

  When pages containing high-density images are printed continuously, the preceding page may become smudged by the following page if sufficient drying time is not allowed.  In such circumstances, set whether or not to pause before outputting pages.

- **Cleaning after cartridge replacement (ON/OFF)**

  To reduce ink consumption, set not to perform cleaning when the head (BJ cartridge) is replaced.

- **Economy Cleaning (ON/OFF)**

  To reduce ink consumption, set not to perform cleaning at the first software ON after a hardware ON and not to perform timer cleaning.

- **Display ink low warning (ON/OFF)**

  Set not to display the ink low warning (Disabling "ink-out" detection) to prevent the ink sensors from malfunctioning.
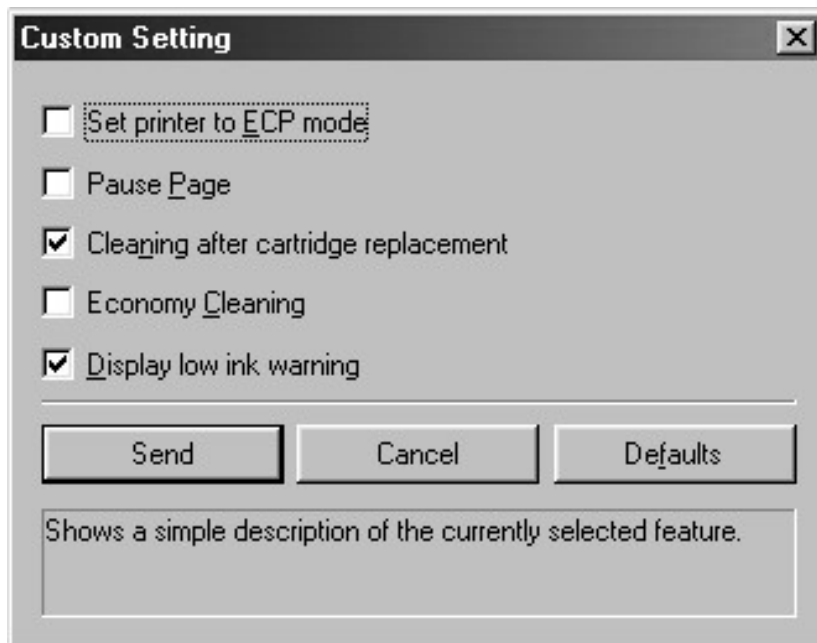
Windows 95/98
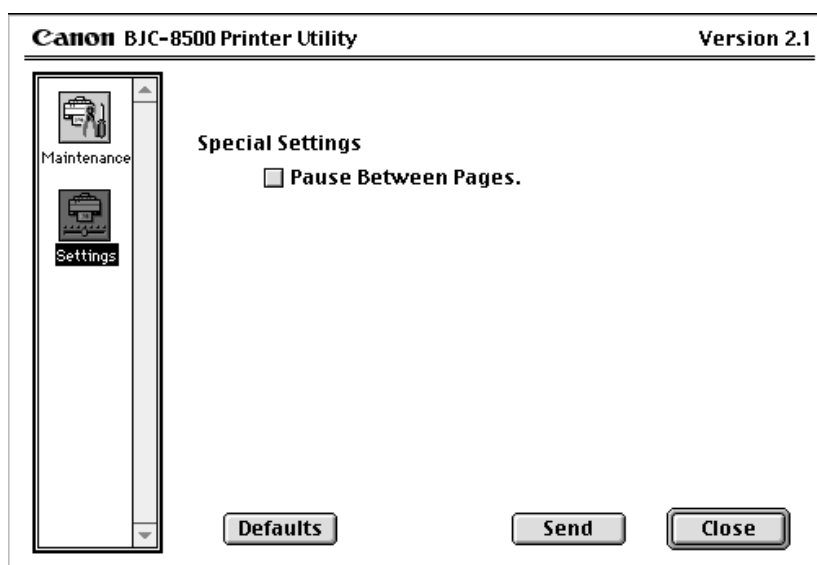


Macintosh

**Figure 3-24 Special Settings (Sample)**

## 3.4 Control Buttons

This printer has two control buttons, the *RESUME* button and *POWER* button.  These control buttons are used to perform cleaning the BJ cartridges or for setting service mode items.

### 3.4.1 Cleaning the BJ cartridges

If the printer image is blurred or a print defect occurs, such as a white streak, print a test pattern to see whether or not the BJ cartridge is clogged with ink.  If nozzles are clogged with ink, carry out the procedure below to clean the BJ cartridge and clear the nozzles.

In addition to cleaning by online operation from the printer driver, this printer also supports manual cleaning by pressing the *RESUME* button on the control panel. Note, however, that when manual cleaning on the control panel is performed, both of the BJ cartridges installed on the printer are cleaned. (Cleaning of only one head or cleaning of each individual color head is possible only from the printer driver's maintenance window.  For details, see *"Part 4: TABLE 4-7 CLEANING EXECUTION CONDITIONS, CLEANING TIME AND INK SUCTION AMOUNTS" (page 4-25)*.

**Manual cleaning on the control panel**

1) When the printer is turned ON, hold down the *RESUME* button until the beeper sounds once.
2) The *POWER* indicator blinks. (Paper is ejected when the printer contains paper.)
3) The two BJ cartridges installed on the printer are cleaned.
4) When cleaning is finished, the *POWER* indicator lights.

Manual cleaning is performed cyclically in order F, B, D, F, B, D and so forth. (However, note that if 10 minutes has elapsed since the previous cleaning operation, manual cleaning is canceled, and the next manual cleaning operation is started from F.)

### 3.4.2 Service mode

Operating the control buttons (*RESUME* button and *POWER* button) set the printer to the service mode.

The following table shows the functions available in the service mode. (print in the service mode can be executed only when paper is fed in the sheet feeder. The service mode when connecting to the host computer is not guaranteed.)

① Press the *RESUME* button five times in a software power OFF state at an interval of less than 3 seconds, and immediately hold down the *POWER* button. The *POWER* indicator starts to blink.

② When the buzzer has sounded six times, release the *POWER* button. (You may keep the *POWER* button held down as the buzzer sounds only six times.) This sets the service mode, initialization is executed. (This is the service mode selection standby state.)

③ When initialization ends (*POWER* indicator stops blinking and lights), select the desired service mode by pressing the *RESUME* button for the necessary number of times (see *Table 3-4 SERVICE MODE*). The buzzer sounds each time you press the *RESUME* button.

④ Press the *POWER* button. The buzzer sounds, and the operation of the selected service mode is executed. After the operation has been executed, the printer returns to the service mode selection standby state.

### TABLE 3-4 SERVICE MODE

| Mode | Function | *RESUME* button *2 | *POWER* indicator | *ERROR* indicator |
|------|----------|--------------------|-------------------|-------------------|
| Nozzle check print | Test print for checking ejecting from the head nozzles | Press once. | ON | ON |
| EEPROM list print | Prints EEPROM data. | Press twice. | ON | OFF |
| Initialize EEPROM | Resets the EEPROM data to defaults. | Press 3 times. | ON | ON |
| Clear waste ink level | Resets EEPROM data related to waste ink level to "0" (zero). | Press 4 times. | ON | OFF |
| Set overseas version *1 | Sets device IDs in EEPROM data to the overseas version. | Press 5 times. | ON | ON |
| Set Japanese version *1 | Sets device IDs in EEPROM data to the Japanese version. | Press 6 times. | ON | OFF |

*1 To enable this setting, disconnect and re-connect the power cord after executing the service mode. Do not use "Set Japanese version" on this printer.

*2 To return the printer to the service mode selection standby state (state ② in the above procedure), press the *RESUME* button seven times. The buzzer sounds for a long time.

### 3.5 Self Test Print (Nozzle Check Pattern)

This printer has the self test print function which can be executed without connection to a computer.

If you press the *POWER* button with the power OFF, the buzzer sounds once.  If you keep the *POWER* button held down, the buzzer sounds once again.  Release the *POWER* button.  This starts execution of the self test print.
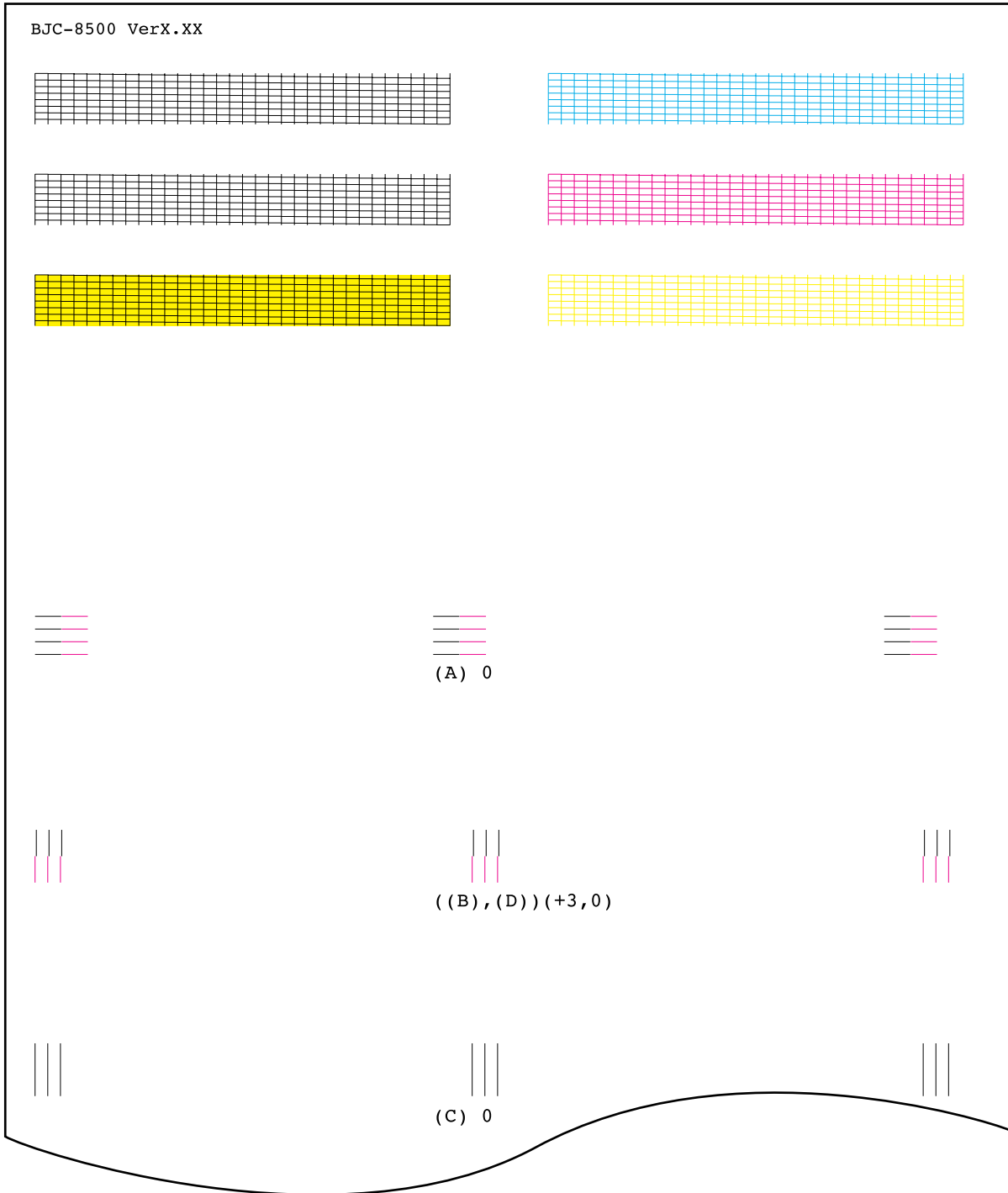


**Figure 3-25 Nozzle Check Pattern**
**(Sample using Black BJ cartridge BC-80+ Color BJ cartridge BC-81)**

> **CAUTION**
>
> When the nozzle check pattern is printed on plain paper, the area printed with ink optimizer cannot be visually checked, as the ink optimizer is translucent.
> In this case, you can check the overall ejection state of the ink optimizer by checking for ink smears in the pattern (black grid on yellow background) at the bottom left of the nozzle check pattern. (Ink smears if ink optimizer is not ejected.)
> To check the ink ejection state of the ink optimizer from each nozzle, print the nozzle check pattern on BJ OHP film (CF-102), and reflect light against the pattern.
> If it is difficult to check the ink ejection state, either fill in the rear side of the printed area with ink from a black felt-tip pen, or place the printed area on top of black paper.
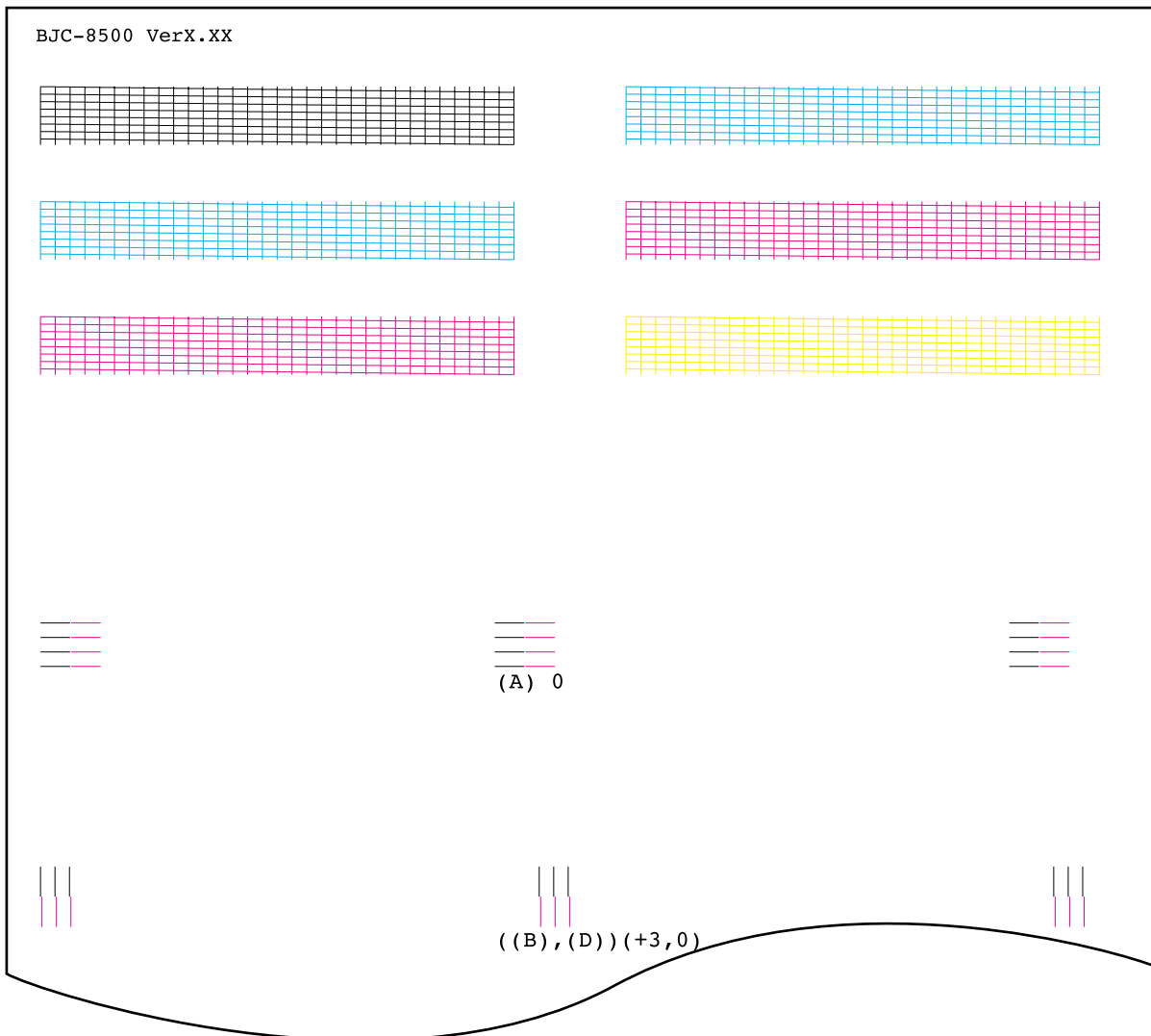


**Figure 3-26 Nozzle Check Pattern**
**(Sample using Color BJ cartridge BC-81+ Photo BJ cartridge BC-82 Photo)**

### 3.6 EEPROM

The EEPROM stores various settings such as the total number of sheets passed, BJ cartridge installation count, and the total waste ink absorption amount. The total numbers of sheets passed and total waste ink absorption amount can serve as a reference for how much the printer has been used.

The EEPROM must be initialized or the waste ink level must be cleared when the logic board, EEPROM, or the waste ink absorbers are replaced.

For details, see *"Part 5: 4.4 Waste Ink Absorber" (page 5-10)*.

### 3.6.1 Continued use of EEPROM memory data

When the logic board has been replaced, continued use of the EEPROM memory data is possible by attaching the old EEPROM on the new logic board. The EEPROM is attached by socket, so only the EEPROM can be removed and attached.

### 3.6.2 Resetting the EEPROM

"Waste ink full" is detected based upon the total waste ink absorption amount stored in EEPROM. When the waste ink absorber is replaced, the total waste ink absorption amount in the EEPROM must be reset. (For details on how to clear waste ink level in the service mode, see *"Part 3: 3.4.2 Service mode" (page 3-24)*.)

Furthermore, when the logic board is replaced, the service data in the new logic board's EEPROM must be reset, and all waste ink absorbers must also be replaced at the same time. (For details on how to initialize the EEPROM in the service mode, see *"Part 3: 3.4.2 Service mode" (page 3-24)*.)

EEPROM initialization involves the following operations (the waste ink level clear setting is only set to "0" (zero).):

(1) The device ID is set to the overseas destination. (BJC-8500)

(2) The total number of sheets passed (Black BJ cartridge BC-80 + Color BJ cartridge BC-81) is set to "0" (zero).

(3) The total number of sheets passed (Color BJ cartridge BC-81 + Photo BJ cartridge BC-82 Photo) is set to "0" (zero).

(4) The Black BJ cartridge BC-80 installation count is set to "0" (zero).

(5) The Color BJ cartridge BC-81 installation count is set to "0" (zero).

(6) The Photo BJ cartridge BC-82 Photo installation count is set to "0" (zero).

(7) The waste ink level is set to "0" (zero).

(8) The waste ink optimizer level is set to "0" (zero).

(9) The cleaning count is set to "0" (zero).

(10) The software ON time is set to "0" (zero).

(11) The head position adjustment value (bi-directional of one BJ cartridge; 1 unit = 1/1200 inch) is set to "0" (zero).

(12) The head position adjustment value (vertical direction between two BJ cartridges; 1 unit = 1/600 inch) is set to "0" (zero).

(13) The head position adjustment value (horizontal direction between two BJ cartridges; 1 unit = 1/600 inch, 1/1200 inch) is set to "0" (zero).

(14) The heater resistance value is set to "0" (zero) (undefined value).

(15) The head temperature sensor resistance value is set to "0" (zero) (undefined value).

(16) The LED duty for detection of ink-out is set to 50,000.

(17) The amount of ink used after the no ink error is displayed is set to "0" (zero).

(18) The wiping count is set to "0" (zero).

(19) The pumping count is set to "0" (zero).

(20) The dot count for judging ink-out is set to "0" (zero).

**CAUTION** | If the EEPROM is initialized, data is permanently lost and cannot be recovered.  Exercise care when initializing the EEPROM.

### 3.6.3 EEPROM list print

EEPROM list print is printed out in decimal.

```
(1)  BJC-8500
(2)  1912
(3)  25
(4)  27
(5)  7
(6)  11
(7)  135632
(8)  31087
(9)  37,9,26,0,0,2
(10) 4971467
(11)  0
(12)  0
(13) (+3,  0)
(14) (3,7) (3,7) (3,7) (3,5) (3,5) (3,5)
(15) 0,0,0,134,135,135
(16) 50000,50000,50000,50000,50000,50000
(17) 0,0,0,0,0,
     0,0,0,
(18) 1378
(19) 294
(20) 790,864,787,89,89,137
```

**Figure 3-27 EEPROM List Print (Sample)**

(1) Device ID

(2) Total number of sheets passed (Black BJ cartridge BC-80 + Color BJ Cartridge BC-81)

(3) Total number of sheets passed (Color BJ cartridge BC-81 + Photo BJ Cartridge BC-82 Photo)

(4) Black BJ cartridge BC-80 installation count

(5) Photo BJ cartridge BC-82 Photo installation count

(6) Color BJ cartridge BC-81 installation count

(7) Waste ink level (1 unit: 65,536 dots)

(8) Ink optimizer (1 unit: 65,536 dots)

(9) Cleaning count (A, B, C, D, E, F)

(10) Software ON time (seconds)

(11) Head position adjustment value (bi-directional of one BJ cartridge; 1 unit = 1/1200 inch)

(12) Head position adjustment value (vertical direction between two BJ cartridges: 1 unit = 1/600 inch)

(13) Head position adjustment value (horizontal direction between two BJ cartridges: 1 unit = 1/600 inch, 1/1200 inch)

(14) Heater transistor rank (for 6 heads)

(15) Head temperature sensor rank (for 6 heads)

(16) LED duty for ink-out detection (for 6 heads, default=50,000)

(17) Amount of ink used after the no ink error is displayed (BCI-8BK, BCI-8WF, BCI-8PBK PHOTO, BCI-8PC PHOTO, BCI-9PM PHOTO, BCI-8C, BCI-8M, BCI-8Y)

(18) Wiping count

(19) Pumping count

(20) Dot count for judging ink-out (for 6 heads)

### 3.6.4 Destination setting

The control ROM used on this printer has both the functions of Japanese model (BJ F8500) and overseas model (BJC-8500). The printer specifications are set by the device ID stored in EEPROM.

When the EEPROM is initialized, the device ID is set to BJC-8500, and the printer specifications are set for the overseas model. As this printer is destined for the overseas market, leave it as it is. For details, see *"Part 3: 3.4.2 Service mode" (page 3-24)*.
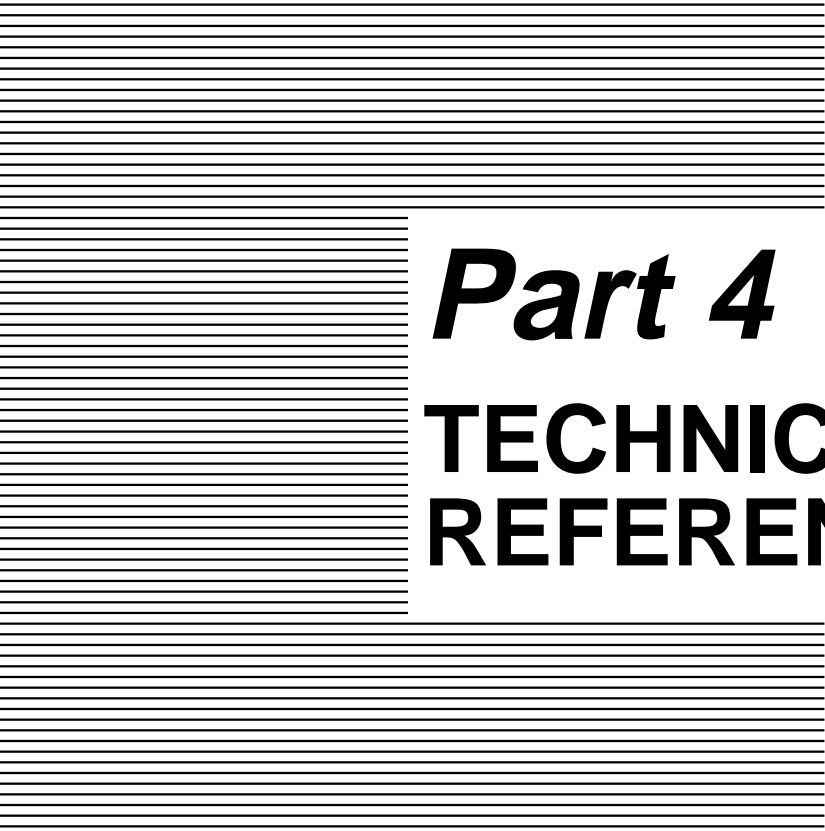
Check the destination setting in the nozzle check print that is printed out in the service mode or the user mode.

Make sure that "BJC-8500 Vx.xx" is indicated at the top left of the printed pattern. When the Japanese version has been set, "BJ F8500 Vx.xx" is indicated.

| | |
|---|---|
| **CAUTION** | After initializing the EEPROM, clearing the waste ink level, or setting to overseas version, be sure to make a self test print in the service mode (*"Part 3: 3.4.2 Service mode" (page 3-24)*) to check the EEPROM data settings. |

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# *Part 4*

# TECHNICAL REFERENCE

# 1. OVERVIEW

## 1.1 Printer Block Diagram
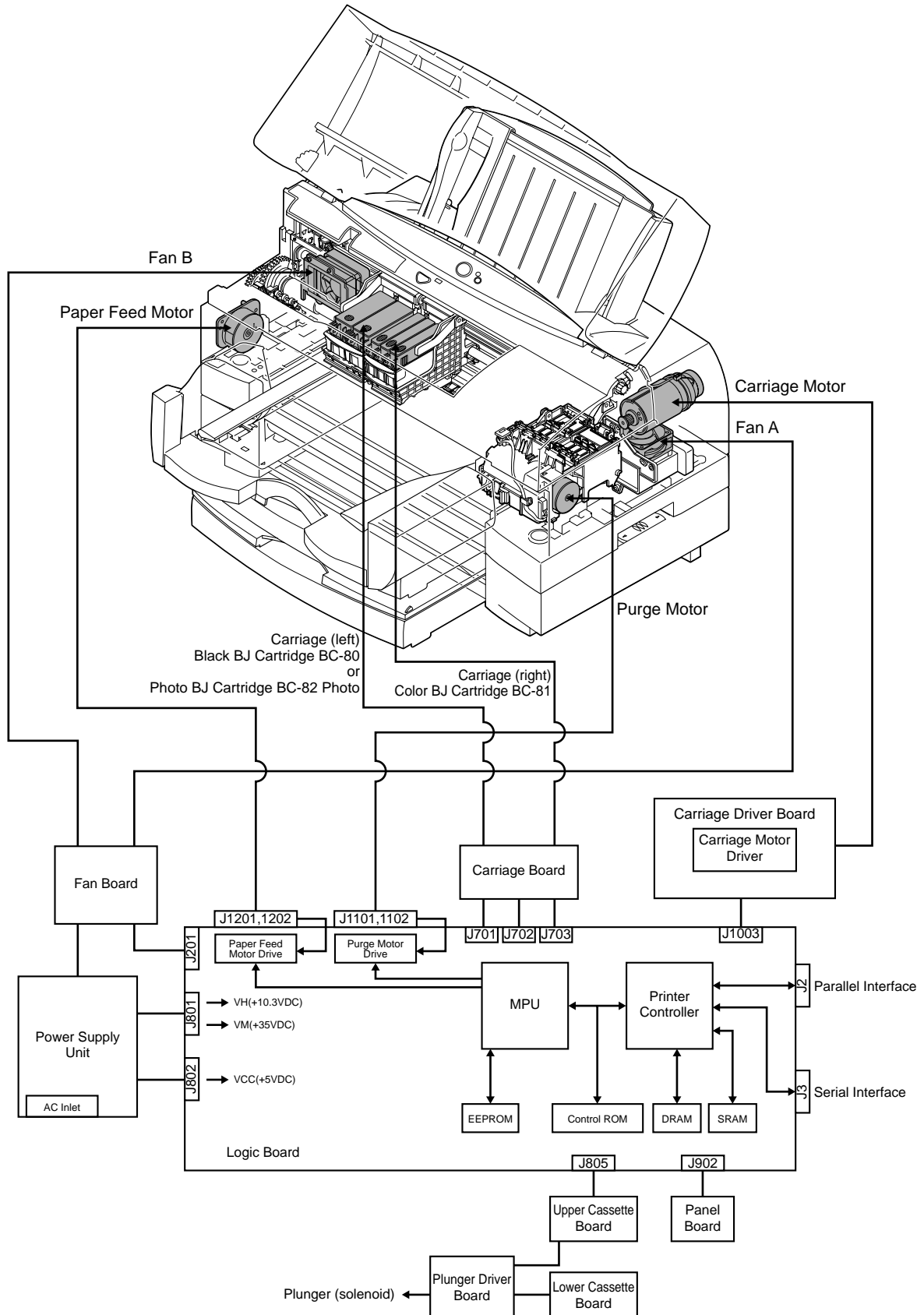


**Figure 4-1 Printer Block Diagram**

## 1.2 Initial Flowchart

The initial flowchart below shows the process from when the printer is turned ON to when it goes online.

(1) Hardware Power ON

```
                    ┌─────────────────┐
                    │     START       │
                    └─────────────────┘
                            │
                            ▼
              ┌──────────────────────────┐
              │ Connect the AC power cord │
              │   (hardware power ON)     │
              └──────────────────────────┘
                            │
                            ▼
              ┌──────────────────────────┐
              │     EEPROM check         │
              └──────────────────────────┘
                            │
                            ▼
                        ◇ OK? ◇ ──No──────────────┐
                            │                      ▼
                           Yes           ┌──────────────────┐
                            │            │   EEPROM error   │
                            ▼            └──────────────────┘
              ┌──────────────────────────┐
              │  Check logic IC (IC1)     │
              │  of carriage board.       │
              └──────────────────────────┘
                            │
                            ▼
                        ◇ OK? ◇ ──No──────────────┐
                            │                      ▼
                           Yes           ┌──────────────────────┐
                            │            │ Other hardware error │
                            ▼            └──────────────────────┘
              ┌──────────────────────────┐
              │  Measure rank resistance  │
              │   value of BJ cartridge   │
              └──────────────────────────┘
                            │
                            ▼
                        ◇ OK? ◇ ──No──────────────┐
                            │                      ▼
                           Yes           ┌──────────────────┐
                            │            │ BJ cartridge error│
                            ▼            └──────────────────┘
              ┌──────────────────────────┐
              │   Measure voltage         │
              │   compensation value of   │
              │ head temperature sensor.  │
              └──────────────────────────┘
                            │
                            ▼
                        ◇ OK? ◇ ──No──────────────┐
                            │                      ▼
                           Yes           ┌──────────────────┐
                            │            │ BJ cartridge error│
                            ▼            └──────────────────┘
                    ┌─────────────────┐
                    │      END        │
                    └─────────────────┘
```
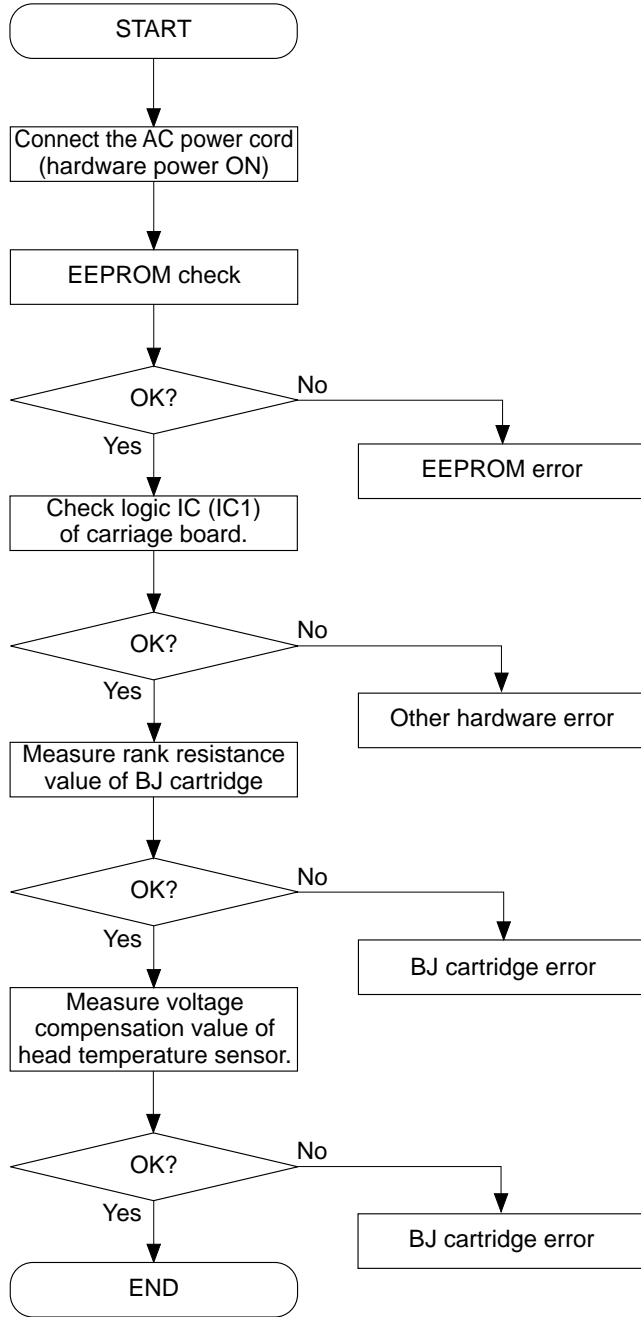
**Figure 4-2 Initial Flowchart (1)**

(2) Software Power ON

```
        ┌─────────────────────┐
        │     Power ON        │
        │ (software power ON) │
        └─────────────────────┘
                  │
                  ▼
          ╱───────────────╲        Yes
         ╱  EEPROM error?  ╲──────────────────┐
         ╲                 ╱                   │
          ╲───────────────╱                    ▼
                  │ No              ┌─────────────────────┐
                  ▼                 │    EEPROM error     │
        ┌─────────────────────┐     └─────────────────────┘
        │ Check carriage and  │
        │    purge unit.      │
        └─────────────────────┘
                  │
                  ▼
          ╱───────────────╲        No
         ╱      OK?         ╲──────────────────┐
         ╲                 ╱                   │
          ╲───────────────╱                    ▼
                  │ Yes             ┌─────────────────────┐
                  ▼                 │   HP sense error    │
        ┌─────────────────────┐     ├─────────────────────┤
        │ Check sheet feeder  │     │   Carriage error    │
        │  for paper jam.     │     ├─────────────────────┤
        └─────────────────────┘     │    Purge error      │
                  │                 └─────────────────────┘
                  ▼
          ╱───────────────╲        No
         ╱      OK?         ╲──────────────────┐
         ╲                 ╱                   │
          ╲───────────────╱                    ▼
                  │ Yes             ┌─────────────────────┐
                  ▼                 │  Sheet feeder error │
          ╱───────────────╲         ├─────────────────────┤
         ╱ BJ cartridge error╲ Yes  │   Paper jam error   │
         ╲                 ╱──────── └─────────────────────┘
          ╲───────────────╱    │
                  │ No         ▼
                  │   ┌─────────────────────┐
                  │   │  BJ cartridge error │
                  │   ├─────────────────────┤
                  │   │ Other hardware error│
                  ▼   └─────────────────────┘
          ╱───────────────╲       Yes
         ╱  Initial state of ╲─────────────┐
         ╲ mechanisms OK?   ╱              │
          ╲───────────────╱                ▼
                  │ No        ┌─────────────────────┐
                  ▼           │ Check waste ink level.│
        ╭─────────────────╮   └─────────────────────┘
        │       END       │            │
        ╰─────────────────╯            ▼
                            ╱───────────────╲     No
                           ╱      OK?         ╲────────────┐
                           ╲                 ╱             │
                            ╲───────────────╱              ▼
                                   │ Yes      ┌─────────────────────┐
                                   ▼          │  Waste ink full error│
                                ╱──────╲      └─────────────────────┘
                               │ Next  │
                               │ page  │
                                ╲────╱
```

**Figure 4-3 Initial Flowchart (2)**

```
                    Previous
                     page

              All BJ cartridges        No
                installed?                              No BJ cartridge error

                   Yes

              All ink tanks            No
                installed?                              No ink tank error

                   Yes

        Check remaining ink level.

                   OK?                 No
                                                        Ink-out error
                   Yes

        Check waste ink level.

                   OK?                 No
                                                        Waste ink warning
                   Yes

                  END
```
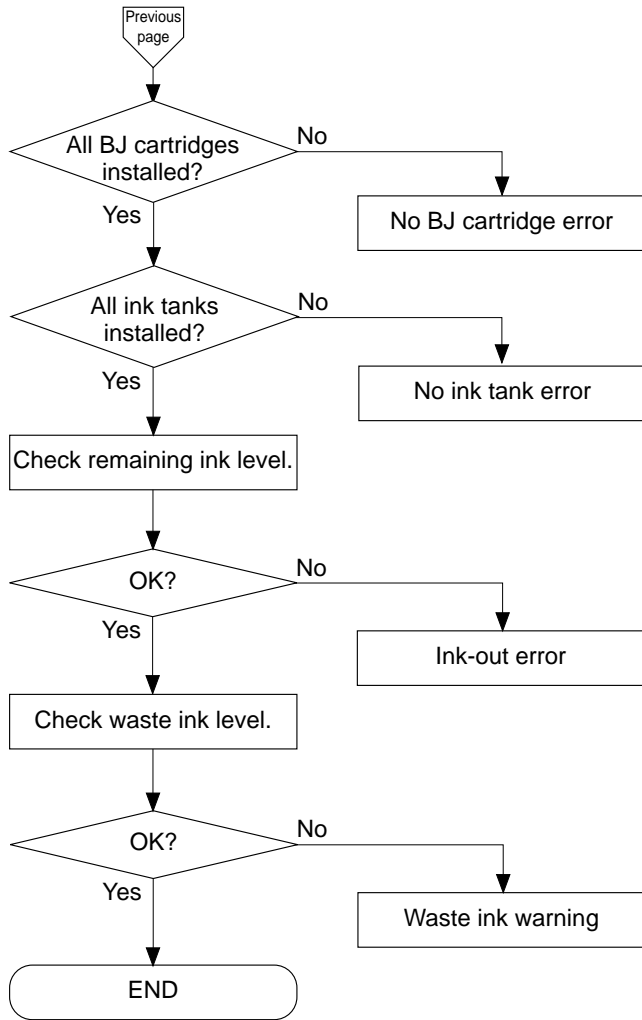
**Figure 4-4 Initial Flowchart (3)**

**4-4**

### 1.3 Power OFF Operation Flow

The printer flowchart below shows the process from software power OFF to when the printer is stopped.
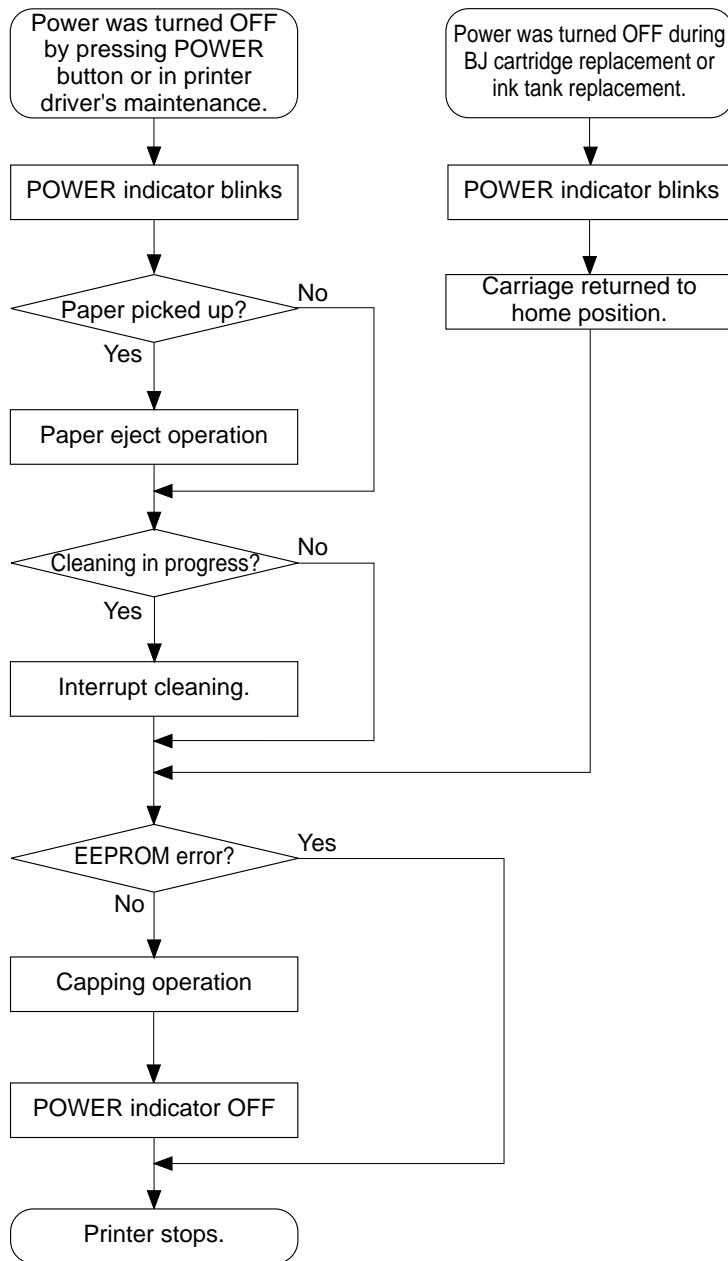


**Figure 4-5 Power OFF Operation Flow**

**CAUTION**

When the printer is turned OFF by unplugging the AC power cord, the power OFF operation is interrupted and the printer is stopped. For this reason, head capping might not be completed. In this case, turn ON the printer and turn it OFF using the *POWER* button, and then unplug the AC power cord.

## 1.4 Print Signal Flow

The following describes an outline of the print signal flow from when the printer receives the print signals sent from the host computer up to when printing is executed.

a) When the host computer sends the print signals (print data and control commands) to the printer, the print signals are received by the printer controller from the interface, which is controlled by the printer controller.

b) The printer controller stores the print signals in the DRAM's receive buffer via the special bus.

c) The MPU reads the print signals from the DRAM's receive buffer, and separates the print signals into print data and control commands based upon the program in control ROM. The MPU then processes the control commands based upon the program in control ROM.

d) The MPU expands the print data in the DRAM's print buffer.

e) The printer controller converts the print data to serial data for each of the BJ cartridges, and outputs the serial data to the BJ cartridges together with the control commands. The drive circuits in the BJ cartridges convert the serial data to parallel data, and control ink ejection based upon the control signals.

f) The MPU and the printer controller control the entire printing process by detecting BJ cartridge and printer states, and controlling the motor drivers.
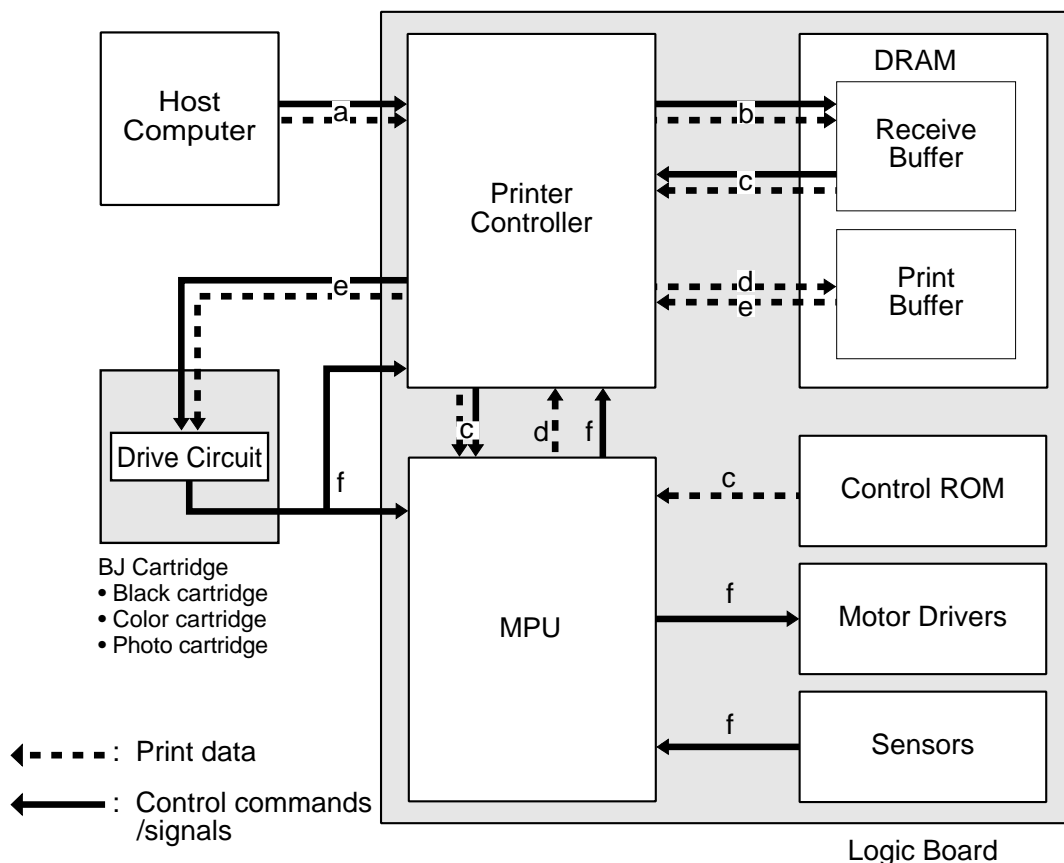


**Figure 4-6 Print Signal Flow**

NOTE

Printing control on this printer is compatible with Canon extended (native) mode. The emulation and soft emulation modes are not supported. For this reason, print signals converted to Canon extended mode by the printer driver are sent from the host computer.

**4-6**

## 1.5 BJ Cartridge Drive

The printer controller drives the BJ cartridges in accordance with print data and control signals that are output from the logic board.

The control signals perform three functions.  They determine the ink ejection timing and ink amounts ejected from the nozzles of the BJ cartridges, maintain the BJ cartridges at the optimum temperature, and stabilize the ink ejection amounts.

### 1.5.1 Printing drive control

Printing drive control on this printer is executed by dividing the heads nozzles into 16 blocks and simultaneously driving these blocks.  This is to reduce the number of simultaneous ink ejections from adjacent nozzles.  This method of drive control is applied simultaneously to two BJ cartridges (Black BJ cartridge BC-80 + Color BJ cartridge BC-81, or Color BJ cartridge BC-81 + Photo BJ cartridge BC-82 Photo).  The heat enable signals are the heater drive control signals for ejecting the ink, and are comprised of a pre-pulse and main pulse.  To constantly achieve optimum ink ejection, internal conditions such as the head's rank, printer temperature, and head temperature are monitored, and the heater drive pulse width is varied before the pulse is output.
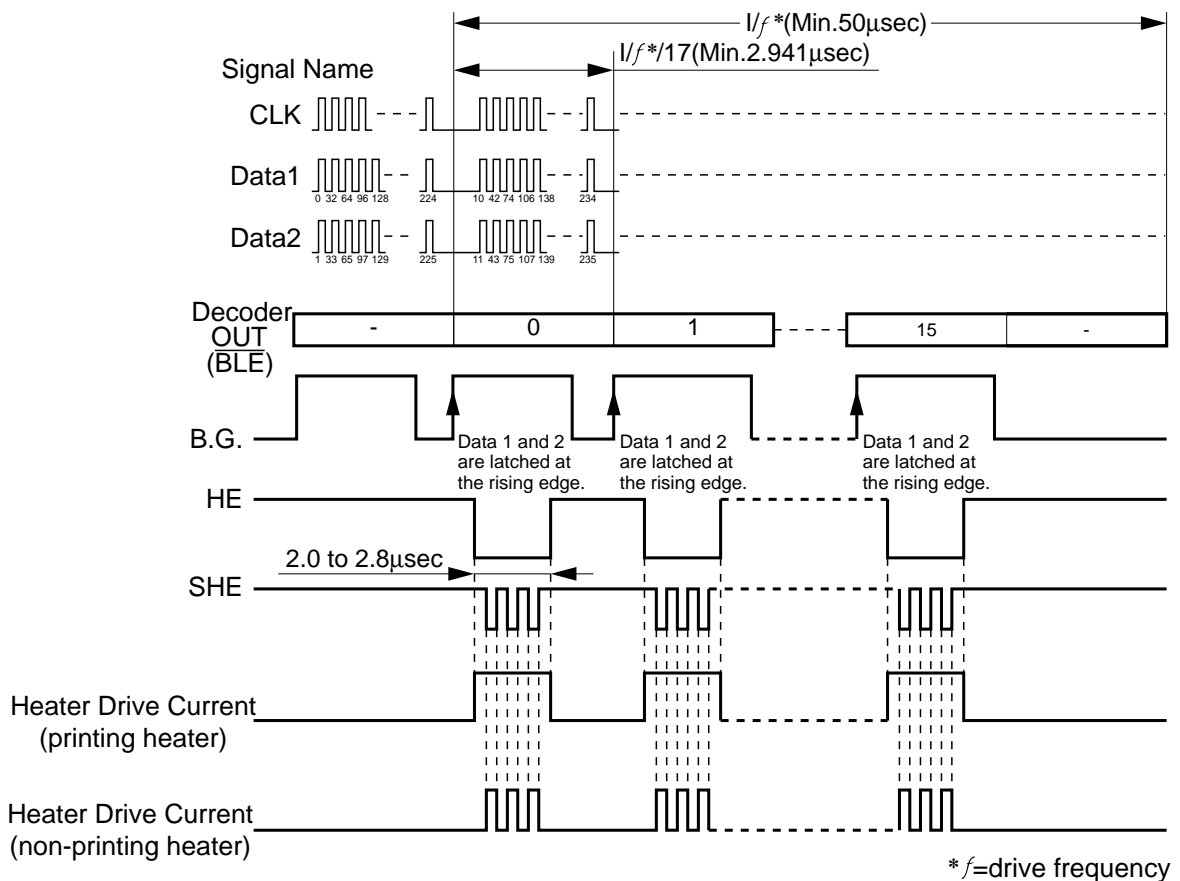


**Figure 4-7 Printing Drive Control**

# 2. FIRMWARE

## 2.1 Interface

This printer supports a nibble mode and ECP mode that are both compliant with bi-directional Centronics interface standard (IEEE 1284).

### 2.1.1 Nibble mode

In nibble mode, the printer transfers 8 bits of data to the host computer divided into two 4-bit blocks..

After the printer negotiates with the host computer, the printer lowers the $\overline{\text{DataAvail}}$ signal.

After confirming the falling edge of the HostBusy signal, the printer sets 8-bit data, and lowers the PtrClk signal to output the lower 4 bits of data onto the control signal line.

The host computer receives the data after the falling edge of the PtrClk signal, and raises the HostBusy and PtrClk signals.

After the printer confirms that the HostBusy signal is low for a second time, it outputs the upper 4 bits of data onto the control signal line.

When the host computer raises the HostBusy signal, if there is no data to be sent to the host computer, the $\overline{\text{DataAvail}}$ signal becomes high and the printer stands by for the next data transfer.
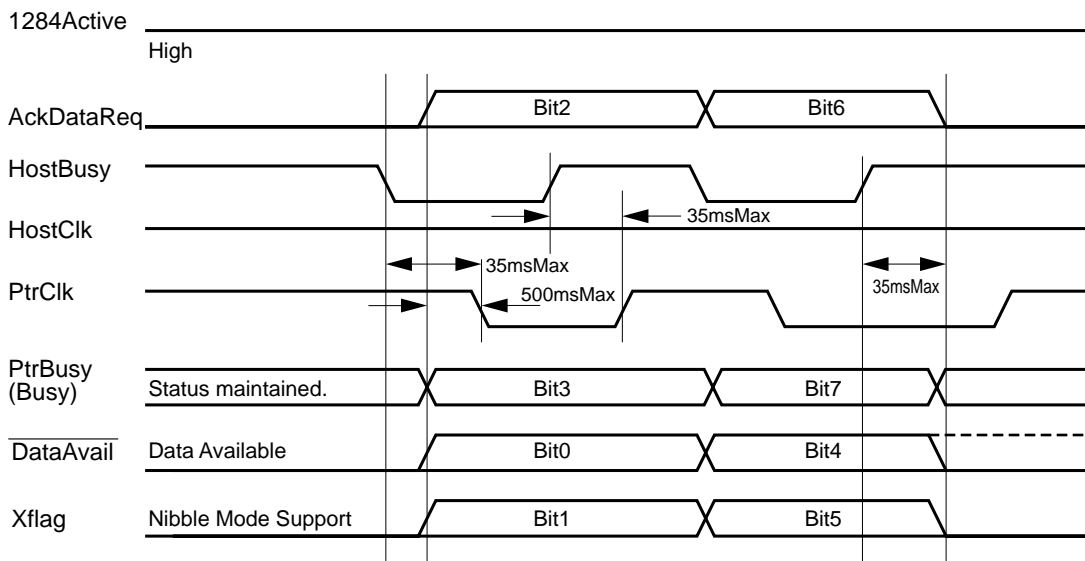


**Figure 4-8 Interface Timing (Nibble Mode)**

### 2.1.2 ECP mode

In the ECP mode, data can be received at high speed as data transactions are carried out on a bi-directional data bus.  As data and commands are differentiated by control signals, and bi-directional communications can be carried out, switching to another mode is not necessary when the data transfer direction is switched.

The data bus direction changes from forward data transfer to reverse data transfer in response to the falling edge of the $\overline{\text{AckReverse}}$ signal from the printer. Alternatively, the data bus direction changes from reverse data transfer to forward data transfer in response to the rising edge of the $\overline{\text{ReverseRequest}}$ signal from the printer.
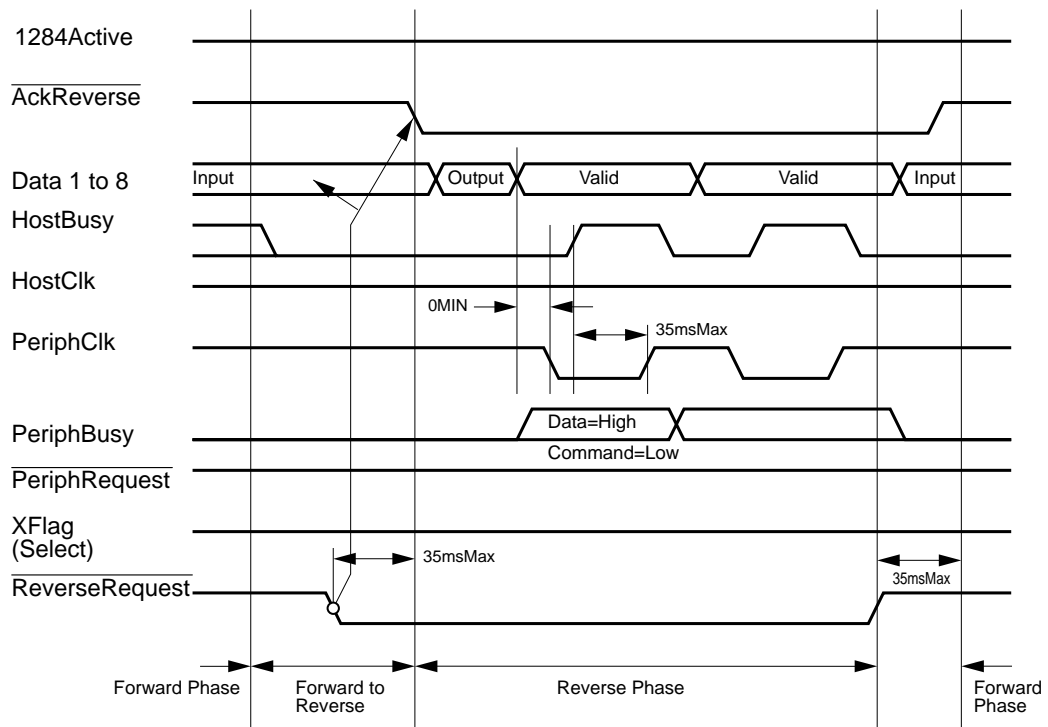


**Figure 4-9 Interface Timing (ECP Mode)**

## 2.2 Printing Modes

The printer varies carriage movement and the BJ cartridge drive method according to the paper type and print quality selected in the printer driver, print data sent from the host computer, etc. to attain high-quality printing without bleeding or shifting in the printout.

To improve image quality, the printer reciprocally feeds the carriage to print the data spread over two or more passes. Increasing the number of passes used to print the entire data ensures more time for fixing the ink and improves ink adhesion.

The printer determines the optimum printing mode according to the type of BJ cartridges installed on the printer and ink system in use, and the paper type and print quality settings selected on the printer driver.

### TABLE 4-1 PRINTER DOT PITCH NUMBER OF PASSES, NUMBER OF EJECTION NOZZLES

| BJ Cartridge | Print Quality / Paper Type | Draft | Standard (HS) | Standard (HQ) | HQ | Fine |
|---|---|---|---|---|---|---|
| Black + Color (Dithering: pattern/ pattern (high-speed)) | Plain Paper | 300×300dpi 1 pass 254 nozzle*1 | 600×600dpi 2 passes 254 nozzles*2 | 600×600dpi 4 passes 244 nozzles*3 | 600×600dpi 6 passes 246 nozzles*6 | 1200×600dpi 8 passes 248 nozzles*7 |
| | Transparencies | | | 600×600dpi 6 passes 246 nozzles | 600×600dpi 8 passes 248 nozzles*8 | 1200×600dpi 12 passes 252 nozzles*7 |
| | T-shirt Transfer Paper | | | 600×600dpi 6 passes 246 nozzles | 600×600dpi 8 passes 248 nozzles*6 | 1200×600dpi 12 passes 252 nozzles*7 |
| | Fabric Sheets | | | 600×600dpi 6 passes 246 nozzles | 600×600dpi 8 passes 248 nozzles*8 | 1200×600dpi 12 passes 252 nozzles*7 |
| | Glossy Photo Paper | | | 600×600dpi 6 passes 246 nozzles | 600×600dpi 8 passes 248 nozzles*8 | 1200×600dpi 12 passes 252 nozzles*7 |
| | High Gloss Photo Film | | | 600×600dpi 8 passes 248 nozzles | 600×600dpi 12 passes 252 nozzles*8 | 1200×600dpi 12 passes 252 nozzles*7 |
| | High Resolution Paper | | | 600×600dpi 6 passes 246 nozzles | 600×600dpi 8 passes 248 nozzles*8 | 1200×600dpi 12 passes 252 nozzles*7 |
| | Envelopes, Thick Paper | | | 600×600dpi 4 passes 244 nozzles*5 | 600×600dpi 6 passes 246 nozzles*8 | 1200×600dpi 8 passes 248 nozzles*7 |
| Photo + Color | Plain Paper | | | | | |
| | Transparencies | | | 1200×600dpi 6 passes 240 nozzles | 1200×600dpi 12 passes 240 nozzles | 1200×1200dpi 12 passes 120 nozzles |
| | T-shirt Transfer Paper | | | 1200×600dpi 6 passes 240 nozzles | 1200×600dpi 12 passes 240 nozzles | 1200×1200dpi 12 passes 120 nozzles |
| | Fabric Sheets | | | 1200×600dpi 6 passes 240 nozzles | 1200×600dpi 12 passes 240 nozzles | 1200×1200dpi 12 passes 120 nozzles |
| | Glossy Photo Paper | | | 1200×600dpi 6 passes 240 nozzles | 1200×600dpi 12 passes 240 nozzles | 1200×1200dpi 12 passes 120 nozzles |
| | High Gloss Photo Film | | | 1200×600dpi 8 passes 240 nozzles | 1200×600dpi 12 passes 240 nozzles | 1200×1200dpi 12 passes 120 nozzles |
| | High Resolution Paper | | | 1200×600dpi 6 passes 240 nozzles | 1200×600dpi 12 passes 240 nozzles | 1200×1200dpi 12 passes 120 nozzles |
| | Envelopes, Thick Paper | | | | | |

(Note) When only black ink is used:

  *1 1 pass, 256 nozzles        *2 1 pass, 256 nozzles        *3 2 passes, 254 nozzles
  *4 2 passes, 242 nozzles      *5 2 passes, 254 nozzles

When dithering is carried out by error diffusion:

  *6 $1200 \times 600$ dpi 6 passes, 240 nozzles        *7 $1200 \times 1200$ dpi 12 passes, 120 nozzles
  *8 $1200 \times 600$ dpi 12 passes, 240 nozzles

### 2.2.1 P-POP (Plain Paper Optimized Printing) mode

This printer ejects ink optimizer from Black BJ cartridge BC-80 only when plain paper, envelope, or thick paper modes (except when print quality is set to high speed) are selected on the printer driver. During color printing, the printer ejects ink on the ink optimizer. Waterproofing properties are improved during black printing, either by ejecting black ink, then ink optimizer and then black ink or by ejecting black ink and then ink optimizer.
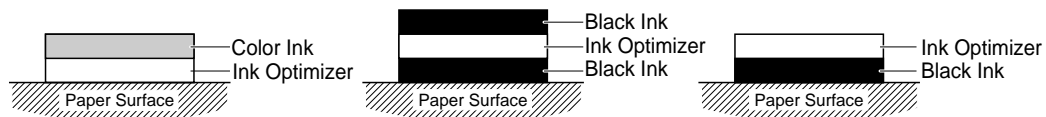


**Figure 4-10 Ink Layering with the Ink Optimizer**

### 2.2.2 Draft mode (Print Quality: High Speed)

The draft mode is the fastest printing mode on this printer. In this mode, ink is printed by one pass in the uni-directional mode (254 nozzles used) when color ink is printed, and in one pass in the bi-directional mode (256 nozzles used) when only black ink is used.

In this mode, the amount of ink used is reduced with the ink ejection rate on the paper at 50%. So, images are printed faint.

### 2.2.3 Photo printing mode

In this printing mode, the Photo BJ cartridge BC-82 Photo containing lower density ink and Color BJ cartridge BC-81 can be used to print halftone and high-contrast areas with less graininess.

Combining color ink and photo ink allows 17 gradations of expression. This achieves both high-contrast rendering and subtle coloring in the midtones. Also, graininess is reduced in low-density areas.

### 2.2.4 Carriage Speed

The carriage speed varies due to printer driver image processing resolution

**TABLE 4-2 CARRIAGE SPEED**

| Printer driver image processing resolution (dpi) | Carriage speed (inch/sec) |
|---|---|
| $300 \times 300$ (print quality: draft) | 26.7 |
| $300 \times 300$ (other than the above) | 16.7 |
| $600 \times 600$ (print quality: standard (HS)) | 8.3 |
| $600 \times 600$ (other than the above) | 16.7 |

### 2.2.5 Advanced settings

The following table shows the Print Mode defaults on the printer driver. To change these settings, select "Advanced Detailed Setting."

**TABLE 4-3 MAIN AUTO PALETTE DEFAULTS (Windows 95/98)**

| Palette Auto | BJ Cartridge | Print Quality | Dithering | Paper Type | Ink Optimizer | Printing Direction |
|---|---|---|---|---|---|---|
| Text | Black/Color | Standard (HS) | Fine (fast) | Plain Paper | Used | Black: bi-directional Color: uni-directional |
| Super Photo | Photo/Color | Standard (HQ) Smoothing | Diffusion | High-resolution paper | — | Uni-directional for both black and color |
| Auto | Black/Color | Standard (HQ) | Auto | Plain Paper | Used | Uni-directional for both black and color |
| Draft | Black/Color | Draft | Fine (fast) | Plain paper | Unused | Uni-directional for both black and color |
| Photo | Black/Color | HQ Smoothing | Diffusion | High-resolution paper | Unused | Uni-directional for both black and color |
| Graphics | Black/Color | Standard (HQ) | Fine | High-resolution paper | Unused | Black: bi-directional, Color: uni-directional |
| Camera | Photo/Color | Standard (HQ) Smoothing | Diffusion | High-resolution paper | — | Uni-directional for both black and color |
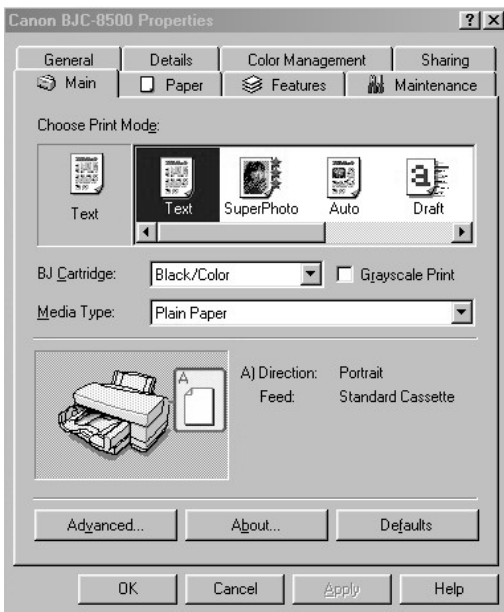


Windows 95/98
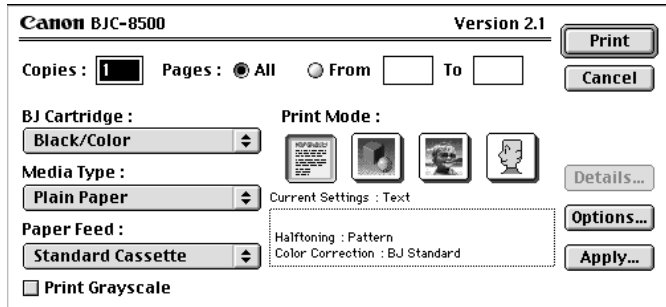


Macintosh

**Figure 4-11 Main Sheet (Sample)**
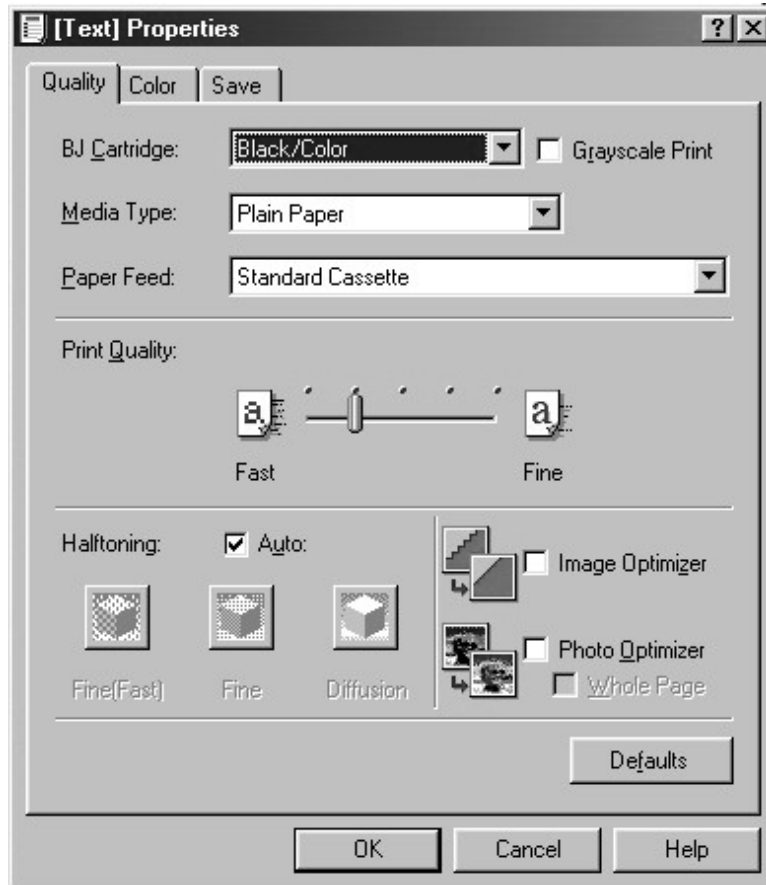
Windows 95/98
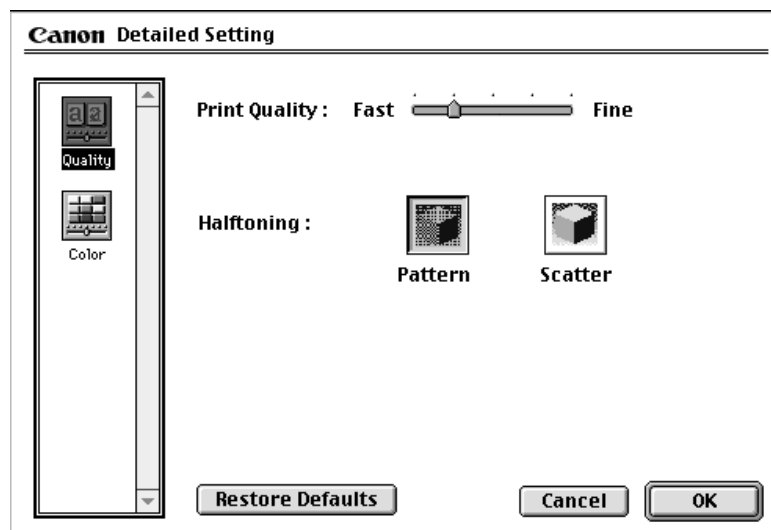
Macintosh

**Figure 4-12 Advanced Detailed Setting (Sample)**

**4-13**

## 2.3 Optimum Printing Control
### 2.3.1 Power monitor

The power monitor functions to prevent defects caused by lower print density that occur when the sum of the head drive power supply exceeds the power supply capacity during heavy duty printing. To be more precise, the number of nozzles on the BJ cartridge that are simultaneously heated is reduced to reduce power consumption. However, note that a disadvantage of this feature is that it increases the number of carriage passes, lowering the printing speed.

### 2.3.2 Ink-smear control

Immediately after the printed sheet is ejected from the printer, it will dry naturally on the flapper unit. If the next printed sheet is ejected before the ink dries on the preceding sheet on the flapper unit, ink may smear when the sheet slides over the preceding sheet, depending on the printing duty and ink type.

If you select "Pause Page" under [Custom Setting] button in Maintenance on the printer driver, printed paper is held for a preset time by the flapper after printing, when ink optimizer has been used on the preceding sheet, in order to prevent ink smearing (refer to *"Part 4: 3.5.4 Flapper unit structure" (page 4-34)*).
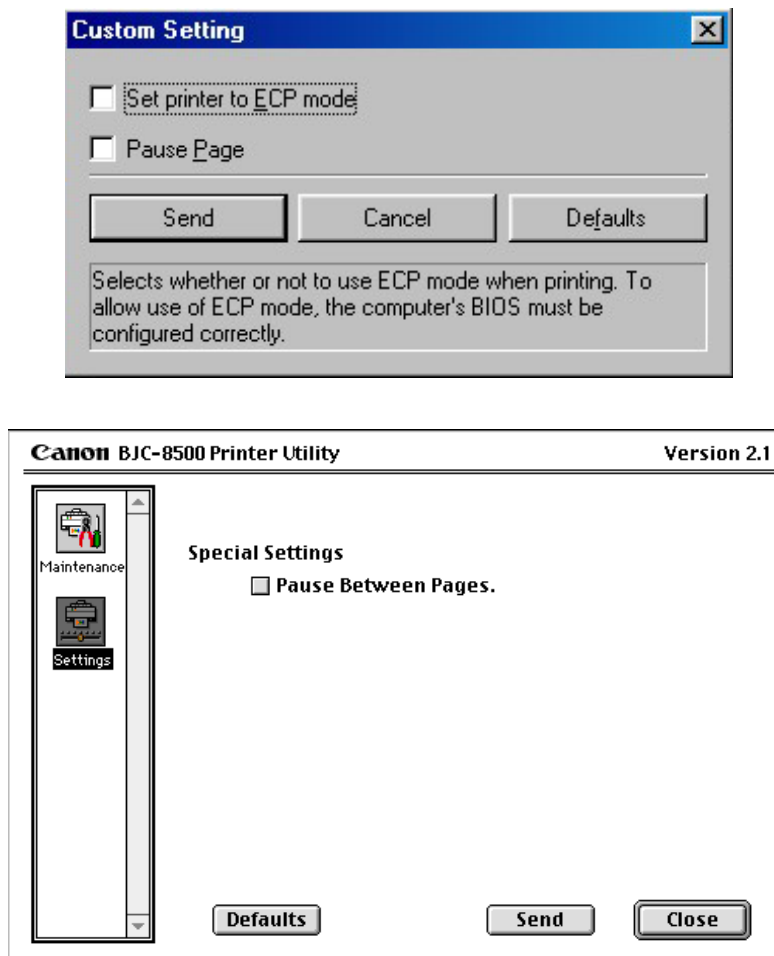


**Figure 4-13 Custom Setting**

# 3. PRINTER MECHANISM

## 3.1 Overview of the Mechanical System

This section describes an overview of the printer mechanical system.
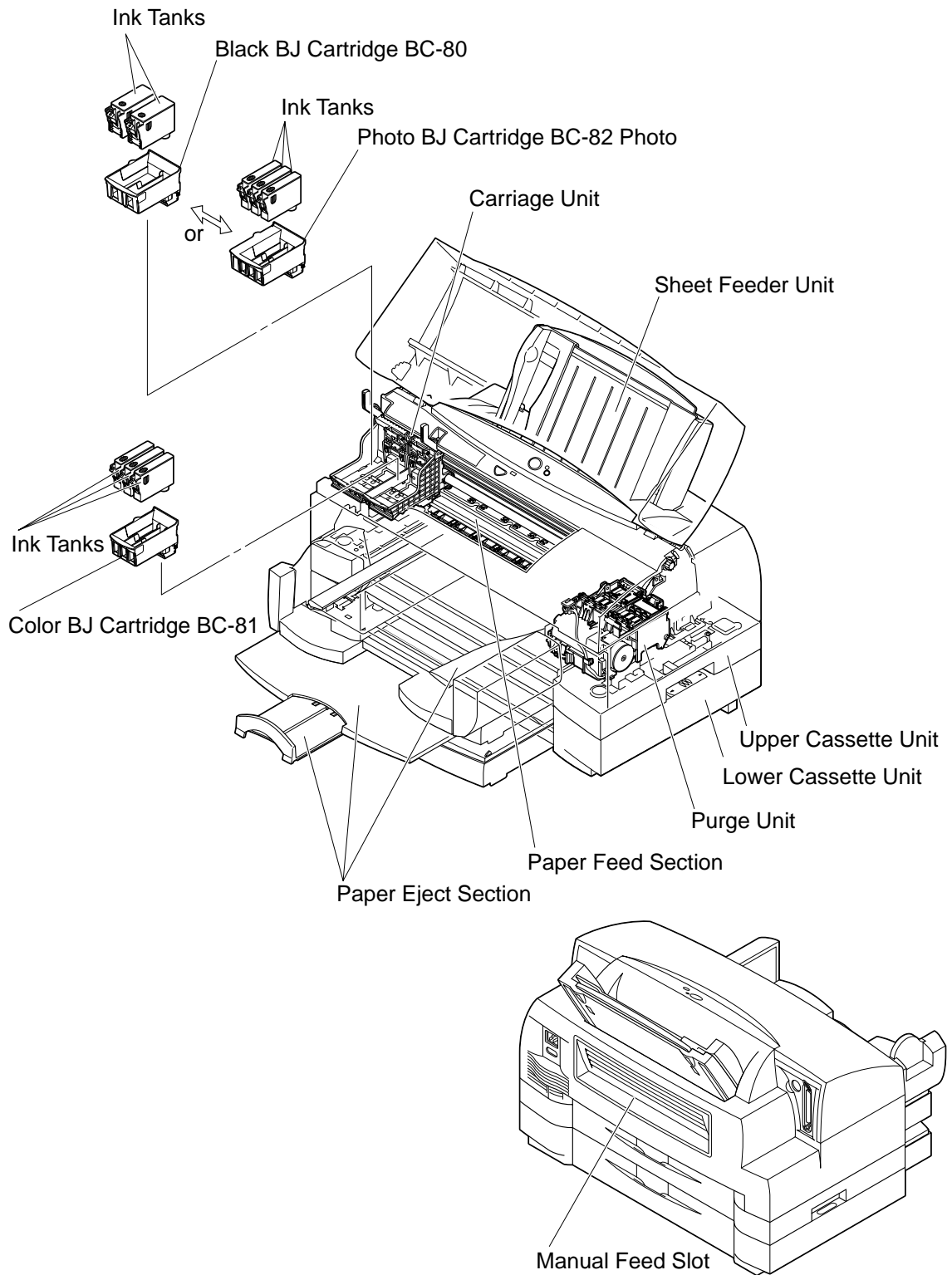


**Figure 4-14 Printer Mechanism**

### 3.1.1 Mechanical system configuration

#### 1) BJ cartridge/ink tank

Three types of BJ cartridges can be used on the printer: Black BJ cartridge BC-80, Color BJ cartridge BC-81 and Photo BJ cartridge BC-82 Photo.  The ink tanks of each of these BJ cartridges can be removed from the BJ cartridge for replacement. The user can selectively use the following two combinations of BJ cartridges to suit his or her particular printing requirements:
Combination 1: Black BJ cartridge BC-80 and Color BJ cartridge BC-81
Combination 2: Photo BJ cartridge BC-82 Photo and Color BJ cartridge BC-81
In combination 1, Black BJ cartridge BC-80 is installed in the left slot, and Color BJ cartridge BC-81 is installed in the right slot.  In combination 2, Photo BJ cartridge BC-82 Photo is installed in the left slot, and Color BJ cartridge BC-81 is installed in the right slot.  Though Color BJ cartridge BC-81 can be installed in the left slot, be sure to install it in the carriage's right slot.

#### 2) Purge unit

Driven by the purge motor, the purge unit helps maintain high-quality printing by wiping the print head face plate of the BJ cartridge and capping the BJ cartridges' nozzles.  This unit ensures that the ink in the nozzles is ejected easily during printing. The purge unit is comprised of the pump section and wiper section.
The pump section sucks ink from inside the BJ cartridges and removes ink inside the cap.  The wiper section wipes the print head face plate of the BJ cartridge. When the printer is not in use, the purge unit caps the BJ cartridges' nozzles for protection.

#### 3) Carriage unit

The carriage is moved horizontally backwards and forwards by the carriage motor and the drive belt.  The print signals sent from the logic board are transferred to the two BJ cartridges on the carriage through the ribbon cable.

#### 4) Sheet feeder unit/paper feed section

The built-in sheet feeder is driven by the purge motor to feed printing paper stacked in the sheet feeder up to the paper feed section.
Driven by the paper feed motor, the paper feed section rotates the paper feed roller to move the printing paper in the vertical direction.

#### 5) Paper eject section

Paper feed motor power is transferred to the flappers by the flapper drive gear of the flapper unit engaging the relay gear of the eject roller.  The flappers open and close each time printing of a single sheet is completed, and feed the printing paper to the flapper unit.
This prevents just printed paper from being ejected on top of the previously printed paper before the ink on the previously printed paper has dried.

#### 6) Manual feed slot

Paper can be fed manually from the manual feed slot on the rear of the printer.  Manual feed takes precedence, even if printing paper is stacked in the sheet feeder unit.

#### 7) Upper cassette/lower cassette unit

The gear in each cassette transfers drive from the purge motor to move the cassette pick-up roller.  This roller picks up and feeds the paper to the paper feed section.

## 3.2 BJ Cartridge
### 3.2.1 BJ cartridge structure

The structure of the BJ cartridge is the same for Black BJ cartridge BC-80, Color BJ cartridge BC-81, and Photo BJ cartridge BC-82 Photo.



BJ Cartridge Body

BJ Head Unit

PCB

Nozzle Chip with TAB*

*Tape Automated Bonding
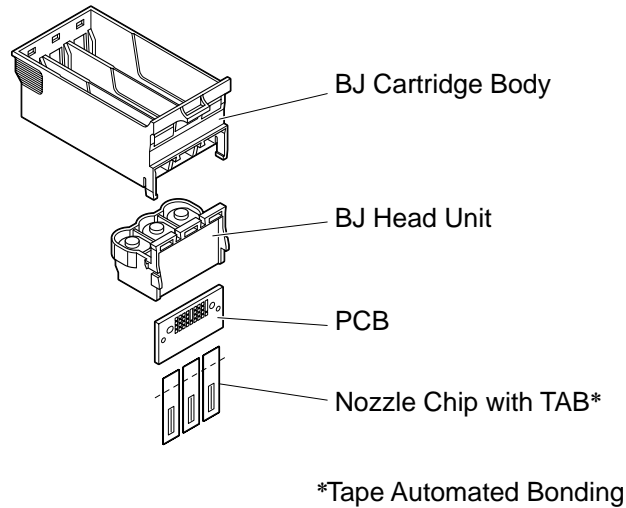
**Figure 4-15 BJ Cartridge Structure**

**BJ cartridge body**
The BJ head unit is mounted on this body.

**BJ head unit**
This unit accepts the supply of ink from the ink tanks, and supplies the ink to the nozzle chip in accordance with print signals from the signal contact part on the PCB.

**PCB**
This PCB has an electrode pad for transferring electrical signals to the BJ cartridge from the printer body.

**Nozzle chip with TAB***
This chip integrates the nozzle chip and the PCB (BJ cartridge drive circuit) for transferring electrical signals to the nozzle chip. (For details, refer to *"Part 4: Figure 4-17 Nozzle Arrangement" (page 4-19)*.)
  * Tape Automated Bonding

### 3.2.2 BJ head unit structure

**Rubber seal**

This seal prevents evaporation of ink inside the ink tank.

**Filter**

This filter prevents the entry of dirt into the ejection chip.
It also ensures and connects the ink path with the ink tank.

**Chip tank**

This is integrated with the head, and provides an ink path.

**Chip plate**

This plates functions to radiate heat from the heater inside the nozzle chip and forms the ink path.

**Aluminum plate**

This plate radiates heat from the heater inside the nozzle chip.



Rubber Seal

Filter

Chip Tank

Chip plate

Aluminum plate
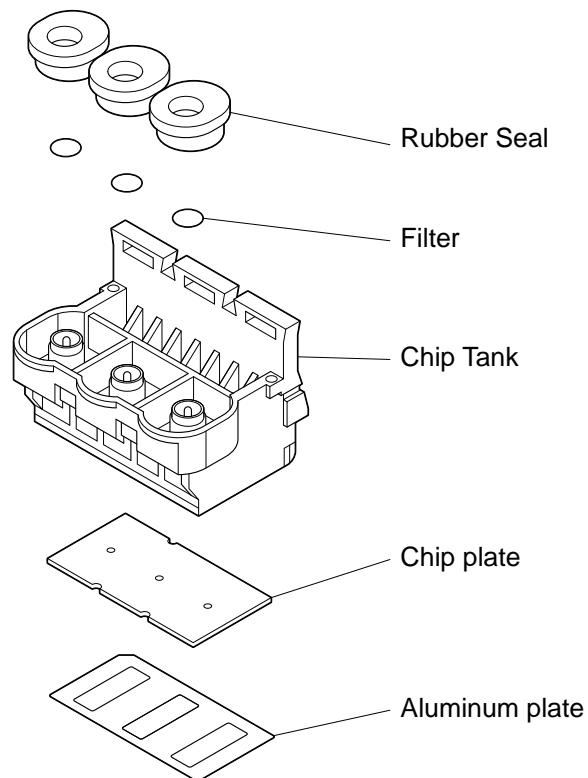
**Figure 4-16 Exploded View of BJ Head Unit**

### 3.2.3 Nozzle arrangement

The nozzles on each BJ cartridge are arranged 1/300 inch apart, in parallel, in a vertical, staggered array of two rows, each with 128 nozzles.

The structure of the BJ cartridge is the same for Black BJ cartridge BC-80, Color BJ cartridge BC-81, and Photo BJ cartridge BC-82 Photo.
For details on print head position adjustment, refer to *"Part 3: 1.3.3-3 Installing the BJ Cartridges; Adjusting the print head position" (page 3-6)*.
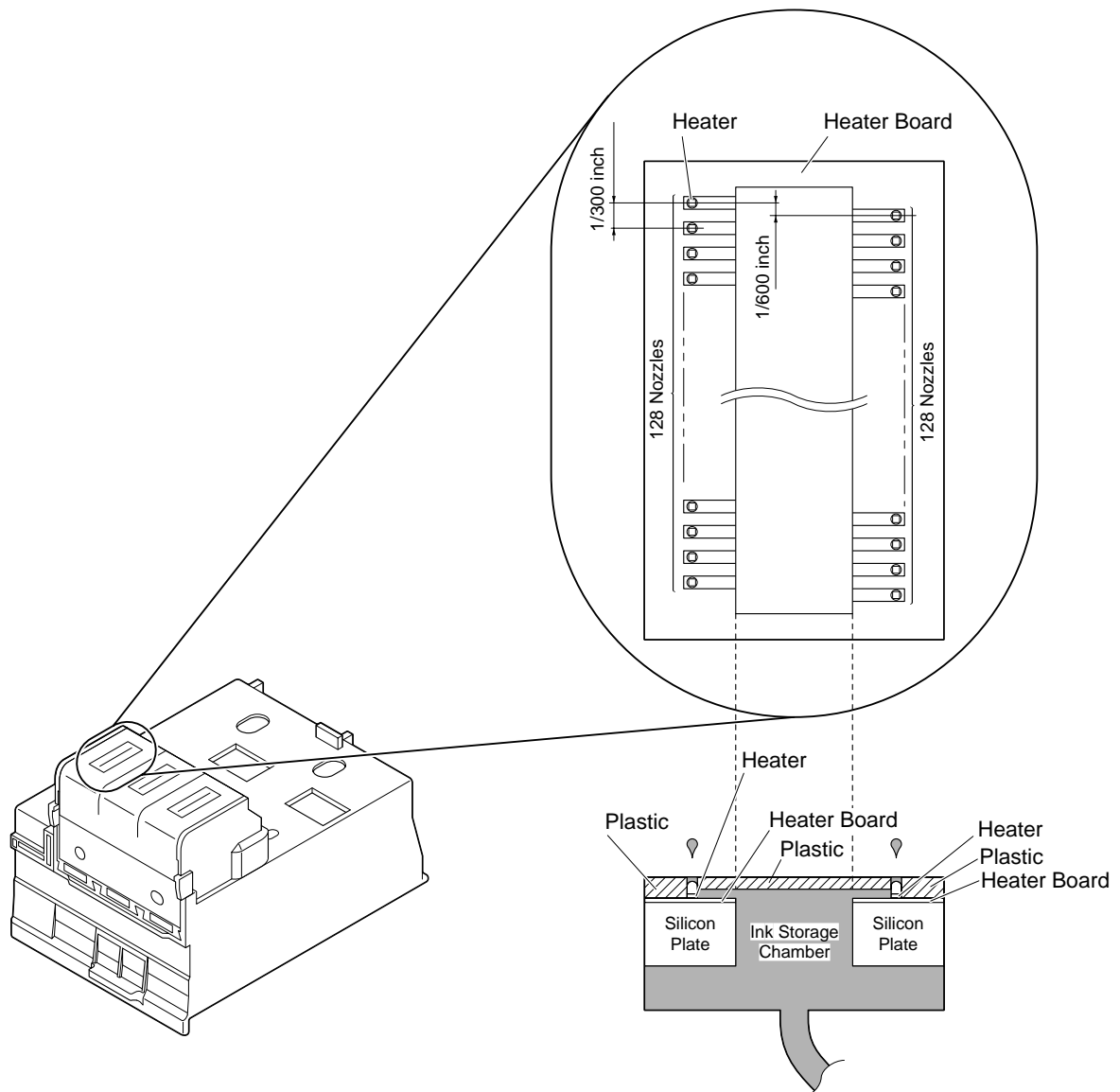


**Figure 4-17 Nozzle Arrangement**

> **NOTE**  Semiconductor production technology is used to form the heater board on a silicon plate.  The heater drive circuits are built into this board.  When heater drive is started, the ink inside the nozzles is heated up to form ink bubbles.  These ink bubbles finally form one large bubble, and the heater drive is cut off before an ink droplet is ejected from the nozzle tip.  Nevertheless, bubbling continues due to residual heat in the heater, and the ink droplet is ejected from the nozzle tip.  After the ink droplet is ejected, the nozzle is refilled with ink.

### 3.2.4 Signal contact part

The signal contact part of the BJ cartridge PCB contacts the signal contact part of the carriage ribbon cable to transfer print signals and detection signals between the printer and the BJ cartridge.

The following signals are transferred with the BJ cartridges.
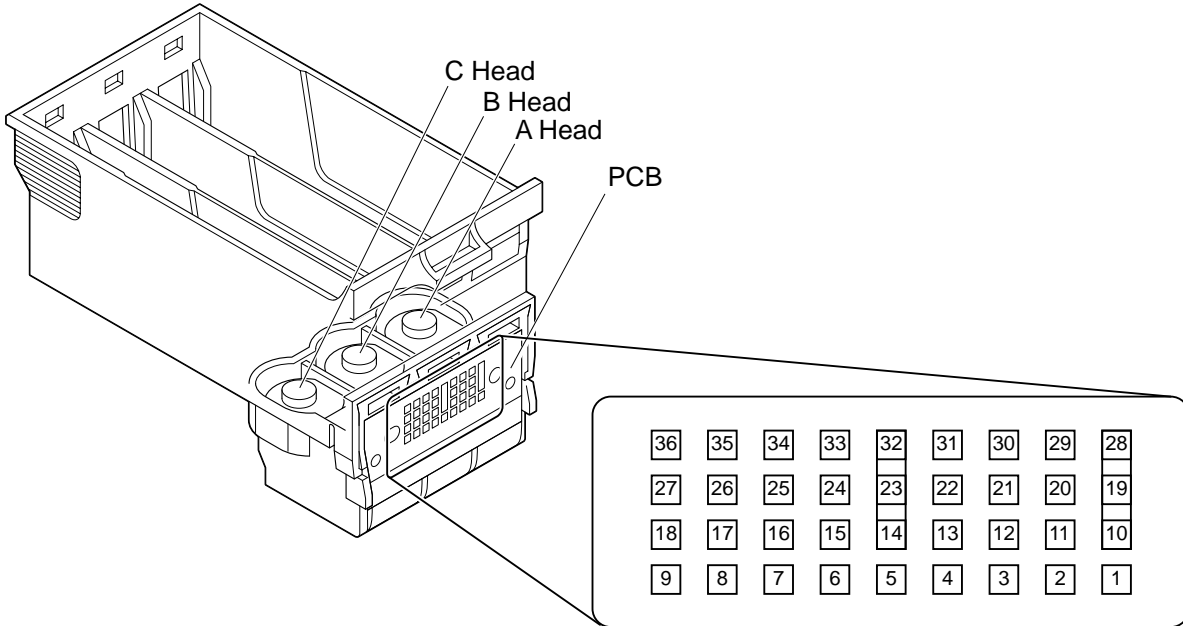


**Figure 4-18 BJ Cartridge I/O Signals**

**TABLE 4-4 INK TYPE EJECTED FROM BJ CARTRIDGES**

| Head | Black BJ cartridge BC-80 | Color BJ cartridge BC-81 | Photo BJ cartridge BC-82 Photo |
|------|--------------------------|--------------------------|--------------------------------|
| A | Black | Cyan | Photo Black |
| B | Ink Optimizer | Magenta | Photo Cyan |
| C | Black | Yellow | Photo Magenta |

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## TABLE 4-5 BJ CARTRIDGE I/O SIGNALS

| Pin No. | Head | Signal Name | IN/OUT | Function |
|---|---|---|---|---|
| 1 | ALL (A, B, C) | BE0 | IN | Head block enable |
| 2 | A | A-Data1 | IN | A head serial data (even-numbered) |
| 3 | A | A-Data2 | IN | A head serial data (odd-numbered) |
| 4 | B | B-HE | IN | B head heat enable |
| 5 | B | B-Di2A | OUT | B head diode anode |
| 6 | ALL (A, B, C) | CLK | IN | Head data transfer clock |
| 7 | ALL (A, B, C) | Vdd | | Head 5V power |
| 8 | C | C-Di2A | OUT | C head diode anode |
| 9 | ALL (A, B, C) | BE3 | IN | Head block enable |
| 10 | ALL (A, B, C) | VH | | Head drive voltage (10.3±0.1VDC) |
| 11 | A | A-HE | IN | A head heat enable |
| 12 | A | A-SHE | IN | A head short heat enable |
| 13 | B | B-Data1 | IN | B head serial data (even-numbered) |
| 14 | ALL (A, B, C) | GND | | Ground |
| 15 | B | B-Data2 | IN | B head serial data (odd-numbered) |
| 16 | B | B-Di1A | OUT | B head diode anode |
| 17 | C | C-Data1 | IN | C head serial data (even-numbered) |
| 18 | ALL (A, B, C) | BE2 | IN | Head block enable |
| 19 | ALL (A, B, C) | VH | | Head drive voltage (10.3±0.1VDC) |
| 20 | ALL (A, B, C) | B.G. | IN | Head data latch |
| 21 | ALL (A, B, C) | Dik | OUT | Head diode cathode |
| 22 | A | A-Di1A | OUT | A head diode anode |
| 23 | ALL (A, B, C) | GND | | Ground |
| 24 | B | B-SHE | IN | B head short heat enable |
| 25 | C | C-HE | IN | C head heat enable |
| 26 | C | C-SHE | IN | C head short heat enable |
| 27 | C | C-Di1A | OUT | C head diode anode |
| 28 | ALL (A, B, C) | VH | | Head drive voltage (10.3±0.1VDC) |
| 29 | ALL (A, B, C) | BE1 | IN | Head block enable |
| 30 | A | A-Di2A | OUT | A head diode anode |
| 31 | A | A-Rank | OUT | A head rank |
| 32 | ALL (A, B, C) | GND | | Ground |
| 33 | B | B-Rank | OUT | B head rank |
| 34 | — | ID* | OUT | Head ID number |
| 35 | C | C-Data2 | IN | C head serial data (even-numbered) |
| 36 | C | C-Rank | OUT | C head rank |

\*: Details of ID Pad Wiring

Black BJ cartridge BC-80: float

Color BJ cartridge BC-81/Photo BJ cartridge BC-82 Photo: ground

### 3.2.5 BJ cartridge drive circuit

Ink ejection is controlled by the BJ cartridge drive circuit on the heater board. The BJ cartridge drive circuit is the same for all three types of BJ cartridges (Black BJ cartridge BC-80, Color BJ cartridge BC-81 and Photo BJ cartridge BC-82 Photo).
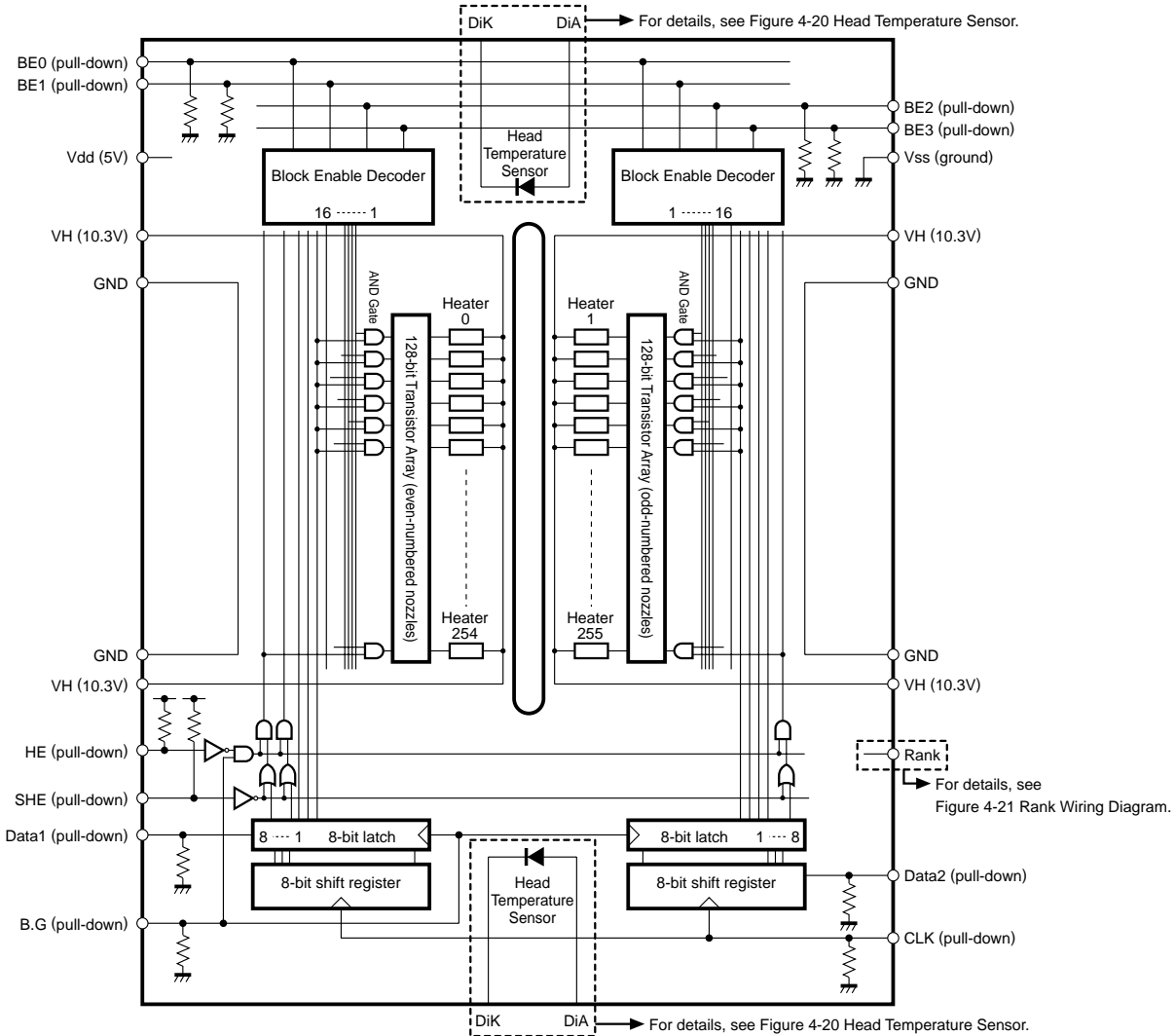


**Figure 4-19 BJ Cartridge Drive Circuit Block Diagram**
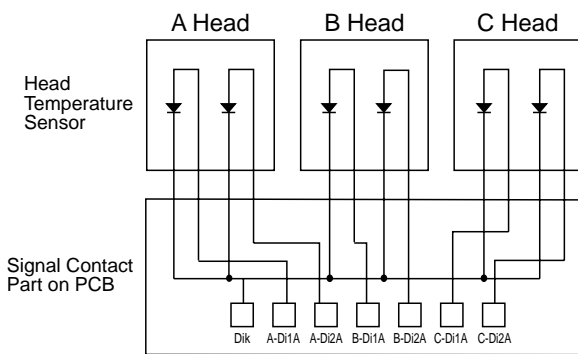


**Figure 4-20 Head Temperature Sensor**          **Figure 4-21 Rank Wiring Diagram**
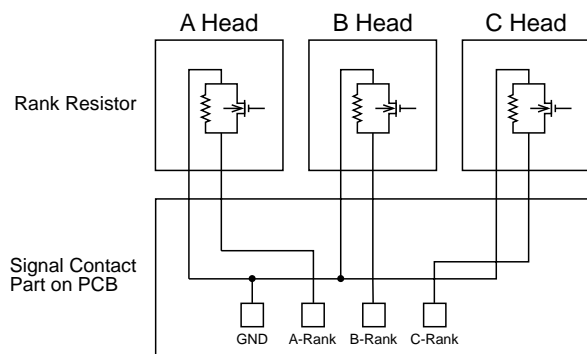
**4-22**

**8-bit shift register (1 to 8, 8 to 1)**
These registers convert and store in parallel the serial print data (Data 1, Data 2) that is transferred from the logic board, in timing with CLK.

**8-bit latch (1 to 8, 8 to 1)**
This latch latches the print data (Data 1, Data 2) that is transferred from the 8-bit shift registers.

**AND gate**
This gate outputs the parallel print data, specified by block enable decoders 1 to 16 and 16 to 1, to the 128-bit transistor array.

**128-bit transistor array**
This transistor array energizes the heater in accordance with the print data from the AND gate.
The heater pulled up by VH is energized by setting the heater interface to Low.

**Heaters 0 to 254 (even-numbered nozzles)/1 to 255 (odd-numbered nozzles)**
The heaters are heated by energization, and perform pre-heating and main heating of the nozzle sections.
Heaters are arranged aligned with the nozzle arrangement at positions relative to the nozzle sections on the head holders.

**Rank resistor**
Production-related deviation in the BJ cartridges is classified into "ranks." These ranks are determined by measuring and calculating the resistance values of the heaters and transistors.  These resistance values are detected by the printer during operation.  The printer reads the resistance value as the voltage value on the MPU A/D port, and A/D-converts this voltage to detect the rank.  Optimum printing control is carried out based upon this rank.

**Head temperature sensor (diode sensor)**
The temperature of the heater board is detected by the printer.  The printer reads the output voltage from the head temperature sensor as the voltage value on the MPU A/D port, and A/D-converts this voltage to detect the temperature.  Optimum printing control and overheating protection are carried out based upon this temperature.

## 3.2.6 BJ cartridge detection

MPU (IC1) on the logic board detects whether or not a BJ cartridge is installed and its type (head ID) based upon detection signals from the BJ cartridge PCB.
The detection signal detects the type of BJ cartridge as shown in the table below according to the output level of the RANKOUT terminal of the analog IC (IC1) on the carriage board.

**TABLE 4-6 HEAD ID AND RANKOUT OUTPUT LEVEL**

| Head ID | RANKOUT |
|---|---|
| Black BJ cartridge BC-80 | High |
| Color BJ cartridge BC-81 | —* |
| Photo BJ cartridge BC-82 Photo | Low |

*: There is no ID signal lead for Color BJ cartridge BC-81.

### 3.3 Purge Unit
#### 3.3.1 Purge unit functions
##### 1) Capping function

The purge unit's cap is pressed against the print head face plate of the BJ cartridge to prevent the nozzles from drying or ink from leaking.

When the printer is standing by for print data with the cap open, the BJ cartridge is capped if data is not received within a preset time. The BJ cartridge is also capped when the printer is turned OFF by pressing the *POWER* button.

##### 2) Cleaning function

Cleaning is executed to maintain the print quality of the print head according to the conditions listed in *"Part 4: TABLE 4-7 CLEANING EXECUTION CONDITIONS, CLEANING TIME AND INK SUCTION AMOUNTS" (page 4-25)*.

Cleaning combines wiping, suction, and maintenance jet operations. Wiping involves wiping paper fiber, coagulated ink residue, ink optimizer, and ink from the print head face plate. Suction involves sucking out ink from the BJ cartridge and refilling the inside of the nozzles with fresh ink. Maintenance jet operation removes increased viscosity ink, air bubbles, mixed color ink, and dirt from inside the nozzles to prevent uneven printing caused by clogged nozzles.

Carriage Lock Pin
Maintenance Jet Absorber
Cleaning/Capping Cap
When Black BJ cartridge BC-80 is installed:
Cleaning/capping cap
When Photo BJ cartridge BC-82 Photo is installed:
Capping cap
Wiper Section
Capping Cap
Wiper Cleaner Section
Cap Unit B
Purge Motor
Cap Unit A
Ink Sensor Unit
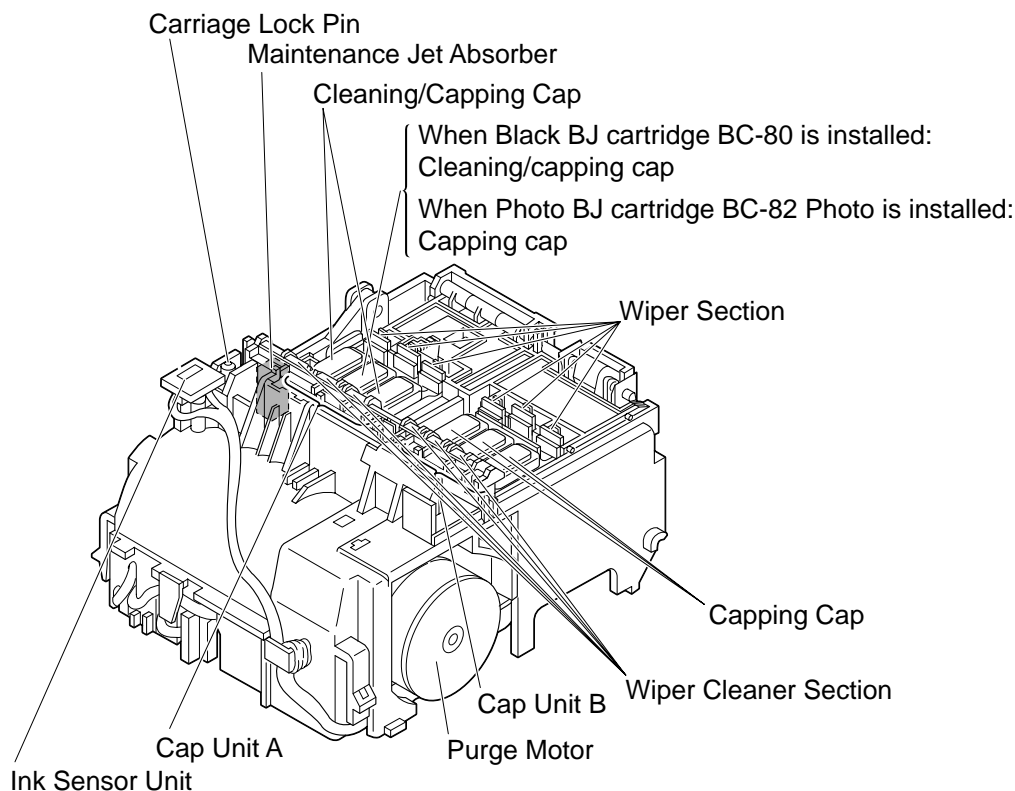
**Figure 4-22 Purge Unit**

## TABLE 4-7 CLEANING EXECUTION CONDITIONS, CLEANING TIME AND INK SUCTION AMOUNTS

| Cleaning | Execution Condition | Target BJ Cartridge | Automatic Cleaning | Manual Cleaning Control Panel | Manual Cleaning Printer Driver | Cleaning Time (all heads) | Ink Suction Amount (per color) |
|---|---|---|---|---|---|---|---|
| A (normal cleaning) | • When low ink chamber level is detected • When the preset number of dots is counted • 240 hours (ink) or 200 hours (ink optimizer) or more elapsed since previous cleaning or software ON | Relevant BJ cartridge | ○ | | | Approx. 2 min. | Approx. 0.16 g |
| B (ink tank replacement cleaning) | • When cleaning operation (2nd) is carried out on the control panel | All BJ cartridges | | ○ | | Approx 4 min. | Approx. 0.32 g |
| | • When cleaning operation (2nd) is carried out by the printer driver | Specified BJ cartridge | | | ○ | | |
| | • When ink tank is replaced (when "ink-out" changes to "ink present") | When "ink present" is detected | ○ | | | | |
| | • When ink tank is replaced without "ink-out" changes to "ink present" detected | Specified BJ cartridge | | | ○ | | |
| C (BJ cartridge replacement cleaning) | • When the BJ cartridge is replaced | BJ cartridge whose replacement is detected | ○ | | | Approx. 4 min. | Approx. 0.32 g |
| | • When operation is carried out by the printer driver (refreshing) | All BJ cartridges | | | ○ | | |
| D (wiping + user cleaning) | • When cleaning operation (3rd) is carried out on the control panel | All BJ cartridges | | ○ | | Approx. 5 min. | Approx. 0.39 g |
| | • When cleaning operation (3rd) is carried out by the printer driver | Specified BJ cartridge | | | ○ | | |
| E (adhesion prevention) | • When "BJ cartridge present" and "no ink tank" are detected after BJ cartridge is replaced | Relevant BJ cartridge where "no ink tank" is detected | ○ | | | Approx. 4 min. | Approx. 0.32 g |
| F (user cleaning) | • When cleaning operation (1st) is carried out on the control panel | All BJ cartridges | | ○ | | Approx. 2 min. | Approx. 0.07 g |
| | • When cleaning operation (1st) is carried out by the printer driver | Specified BJ cartridge | | | ○ | | |

### TABLE 4-7 CLEANING EXECUTION CONDITIONS, CLEANING TIME AND INK SUCTION AMOUNTS

| Cleaning | Execution Condition | Target BJ Cartridge | Automatic Cleaning | Manual Cleaning | | Cleaning Time (all heads) | Ink Suction Amount (per color) |
|---|---|---|---|---|---|---|---|
| | | | | Control Panel | Printer Driver | | |
| A (normal cleaning) | • When low ink chamber level is detected<br>• When the preset number of dots is counted<br>• 240 hours (ink) or 200 hours (ink optimizer) or more elapsed since previous cleaning or software ON | Relevant BJ cartridge | ○ | | | Approx.2 min. | Approx.0.16g |
| B (ink tank replacement cleaning) | • When cleaning operation (2nd) is carried out on the control panel | All BJ cartridges | | ○ | | Approx 4 min. | Approx.0.32g |
| | • When cleaning operation (2nd) is carried out by the printer driver | Specified BJ cartridge | | | ○ | | |
| | • When ink tank is replaced (when "ink-out" changes to "ink present") | When "ink present" is detected | ○ | | | | |
| | • When ink tank is replaced without "ink-out" changes to "ink present" detected | Specified BJ cartridge | | | ○ | | |
| C (BJ cartridge replacement cleaning) | • When the BJ cartridge is replaced | BJ cartridge whose replacement is detected | ○ | | | Approx.4 min. | Approx.0.32g |
| | • When operation is carried out by the printer driver (refreshing) | All BJ cartridges | | | ○ | | |
| D (wiping + user cleaning) | • When cleaning operation (3rd) is carried out on the control panel | All BJ cartridges | | ○ | | Approx.5 min. | Approx.0.39g |
| | • When cleaning operation (3rd) is carried out by the printer driver | Specified BJ cartridge | | | ○ | | |
| E (adhesion prevention) | • When "BJ cartridge present" and "no ink tank" are detected after BJ cartridge is replaced | Relevant BJ cartridge where "no ink tank" is detected | ○ | | | Approx.4 min. | Approx.0.32g |
| F (user cleaning) | • When cleaning operation (1st) is carried out on the control panel | All BJ cartridges | | ○ | | Approx.2 min. | Approx.0.07g |
| | • When cleaning operation (1st) is carried out by the printer driver | Specified BJ cartridge | | | ○ | | |

### 3.3.2 Purge unit structure

**1) Purge drive gear**

The purge drive gear is driven by the purge motor (stepping motor). The direction of rotation of the purge drive gear switches between pump operations and wiping operations. To be precise, when the motor shaft rotates clockwise when viewed from the gear side, the roller rotates to start pump operations; when the motor shaft rotates counterclockwise, the roller rotates to activate the cam and drive wiping, cap raising/lowering, and carriage lock pin raising/lowering operations. The cam position is detected by the purge sensor.

**2) Wiper section**

Wiping is carried out when the direction of rotation of the purge drive gear is switched after suction operations and the cap is lowered. Two wipers (total 12) are installed on the purge unit for each of the print heads, and move in the direction of the nozzle row to wipe off ink from the print head face plate.
Ink wiped off by the wiper is absorbed by the wiper cleaner section.

**3) Cap section**

The cap section on this printer comprises a total of six caps, three caps (cap unit A) that carry out both ink suction and capping, and three caps (cap unit B) that are used exclusively for capping.
The cap in the center of cap unit A is exclusively for the ink optimizer head when Black BJ cartridge BC-80 is installed, and carries out cleaning and capping. This is to avoid cleaning on the same cap, preventing adhesion of ink optimizer and ink. A wiper is also provided exclusively for the ink optimizer head.
When the Photo BJ cartridge BC-82 Photo is installed, this cap rotates by drive from the purge unit, and changes to a capping-only cap.
The maintenance jet absorbers are provided on the left side of cap unit A for the ink optimizer and ink. A partition is provided in between to prevent adhesion of ink optimizer and ink.
Ink that is sucked in is fed to the waste ink absorber on the bottom cover unit. After ink is sucked in, the carriage is moved to the left from the capping position to suck out the waste ink accumulated in the cap. The waste ink absorber is provided with a wall for preventing mixing of ink and ink optimizer so that the ink that is sucked out does not coagulate with the ink optimizer in the waste ink absorber.

**4) Pump section**

The pump section adopts a tube pump system that generates negative pressure by de-pressurizing the ink tube by a rotary roller to suck in ink. Each of the two ink tubes for the inks and tube for the ink optimizer are connected to caps. (The ink tubes for the inks are blue/yellow, and the tube for the ink optimizer is transparent.)

**5) Carriage lock pin**

The carriage lock pin is integrated with the purge unit. This lock pin is secured from below so that the carriage does not move from the capping position (right edge of printer body) when the cap is pressed against the print head face plate.

#### 6) Wiper unit

The wiper unit driven by the paper feed motor is located on the left side of the printer body.  This unit is provided exclusively for Black BJ cartridge BC-80.  It presses an ink absorber against the print head face plate each time the preset dot count is reached to absorb ink, and the ink absorber takes up ink by transferring the ink to the rubber wound around the paper feed roller.  The wiper unit removes any dirt on the print head face plate that cannot be removed solely by wiping by the purge unit.
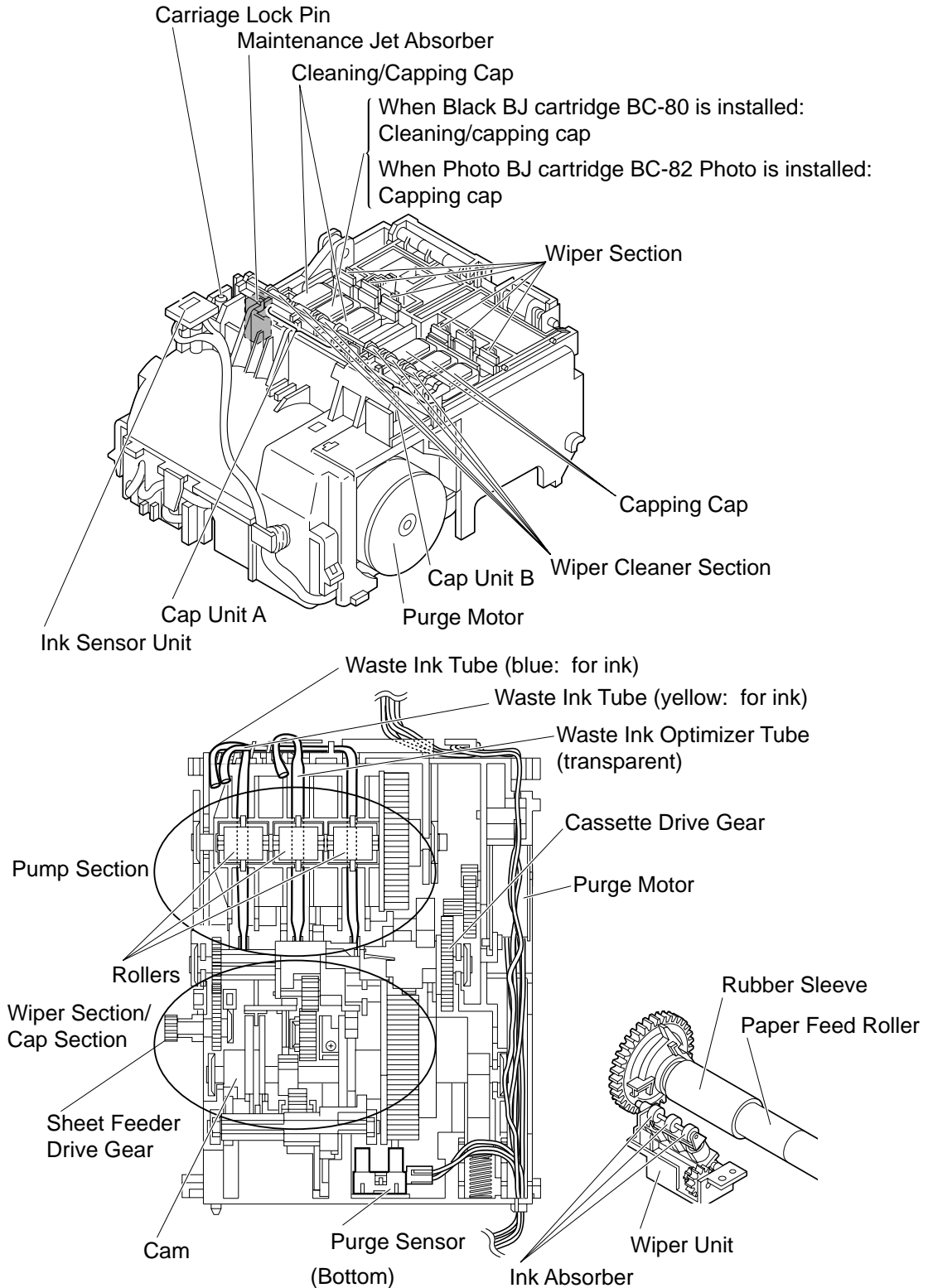


**Figure 4-23 Purge Unit**

## 3.4 Carriage Unit
### 3.4.1 Carriage unit functions

**1) BJ cartridge mounting function**

BJ cartridges are installed on the carriage, and are connected to the logic board by the carriage ribbon cable.

**2) Carriage drive function**

The carriage moves horizontally by the carriage belt, which is driven by the carriage motor.

**3) Home position detection function**

This printer is not provided with a home position sensor. However, the home position is detected by the encoder head identifying the position where the carriage contacts the chassis on the right end.
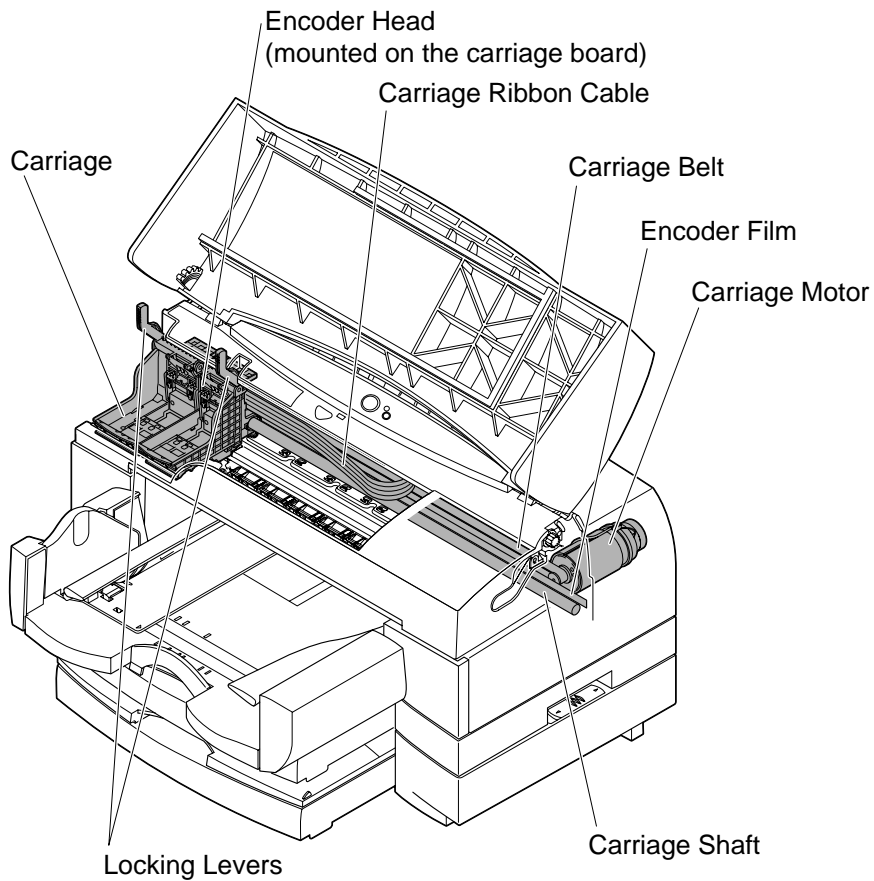
**Figure 4-24 Carriage Unit**

### 3.4.2 Carriage unit structure

#### 1) BJ cartridge mounting section

The lock lever is lowered at the BJ cartridge replacement position (left side of printer body) to secure BJ cartridges to the carriage.

When BJ cartridges are secured to the carriage, the signal contact part of the carriage ribbon cable is pressed against the signal contact part of the BJ cartridge to enable transfer of print signals from the logic board to the BJ cartridges.

#### 2) Carriage drive section

The DC motor type carriage motor drives the carriage horizontally across the printing paper by the carriage belt. After the encoder head mounted on the carriage board detects the position where the carriage contacts the chassis on the right side of the printer body as the initial position, the carriage is controlled by the signal sent to the carriage motor.

The carriage motor is driven by a motor drive control from the carriage motor driver on the carriage driver board.

#### 3) Encoder section

The encoder head is mounted on the carriage board, and is comprised of the LED, convex lens, concave mirror, and photosensor as shown in *Figure 4-24 Structure of Encoder Film and Encoder Head*. When the carriage moves, the light emitted from the LED passes through the convex lens and strikes the encoder film. The encoder film is a diffraction grating containing V-shaped grooves, and diffracts the light into three separate components (A, B and C in *Figure 4-24 Structure of Encoder Film and Encoder Head*). These three light fluxes reflected by the concave mirror pass back through the Encoder Film, and are sensed by the three photosensors. The three light fluxes reflected from the concave mirror become an interference fringe on the encoder film surface of the same pitch as the diffraction grating. However, as the diffraction grating is the direction opposite to the carriage's displacement direction, the relative displacement is twice the pitch (1/600 inch) of the diffraction grating, and ultimately a resolution of 1200 dpi is obtained. The light sensed by the three photosensors is processed as the sum of the signals after conversion to voltage (signals A, B and C). So, performance more stable than that of a single signal can be maintained even if contaminants (e.g. ink mist) on the lens or mirror reduces the intensity of light arriving at the photosensors.
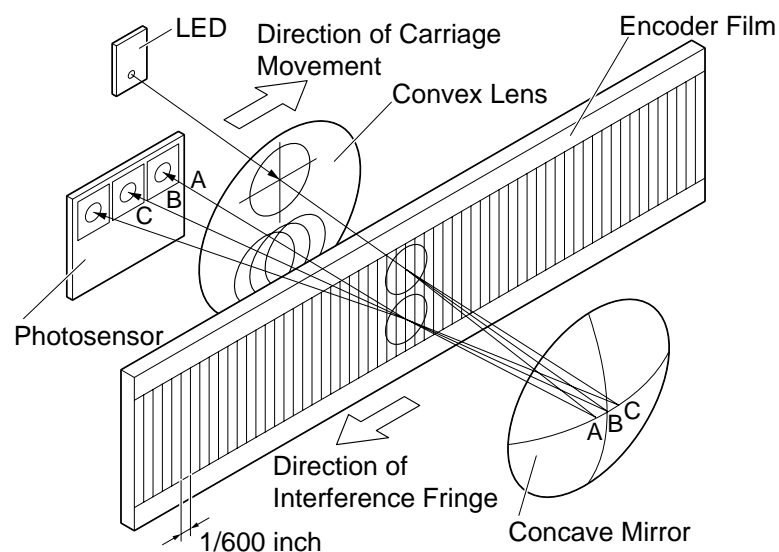


**Figure 4-25 Structure of Encoder Film and Encoder Head**

### 3.5 Paper Feed Section/Sheet Feeder Unit/Cassette Units
#### 3.5.1 Paper feed/sheet feeder/cassette functions
##### 1) 4 pick-up paths

This printer has the following 4 pick-up paths: automatic pick-up from the sheet feeder unit/upper cassette unit/lower cassette unit, and manual feed from the manual feed slot. The built-in sheet feeder/upper cassette/lower cassette are driven by power from the purge motor to automatically stack and pick up printing paper.
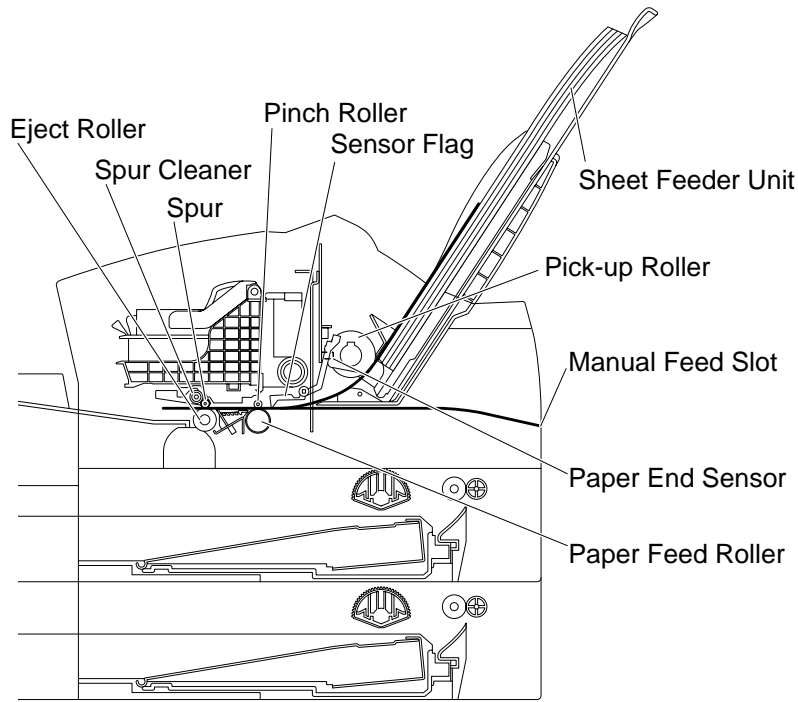


**Figure 4-26 Pick-up Path from Sheet Feeder Unit/Manual Feed Slot**
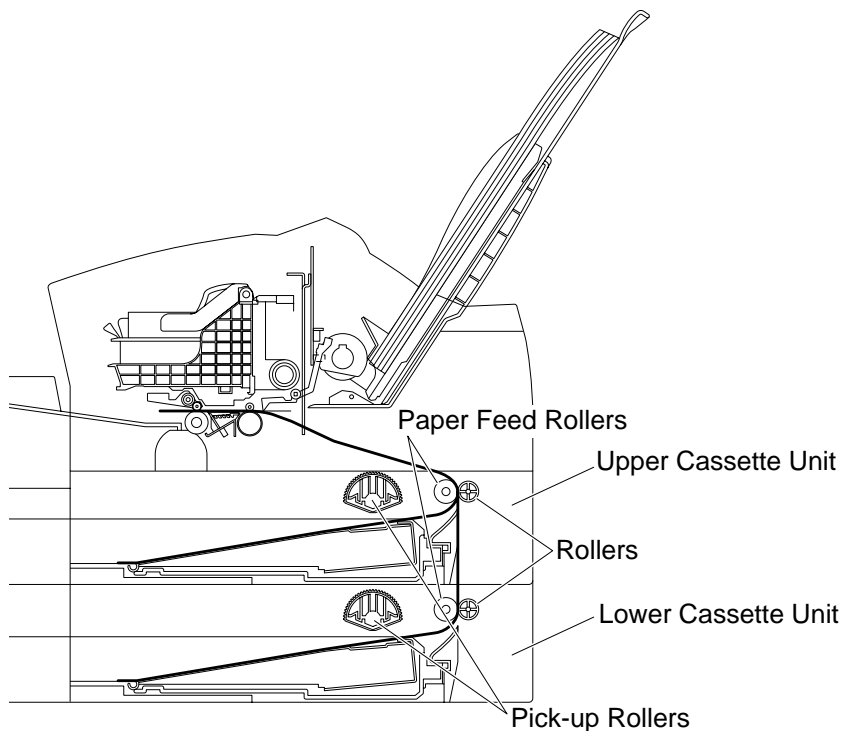


**Figure 4-27 Pick-up Path from Upper Cassette/Lower Cassette Units**

**2) Paper feed section**

When print paper is detected by the paper end sensor (photo-interrupter), it is automatically fed to the printing start position on the platen by the paper feed roller driven by the paper feed motor gear.

Paper feed control during printing is carried out by controlling the rotation of the paper feed roller. After the paper is printed, it is ejected by the eject roller.

**3 ) Automatic head gap adjustment mechanism (moving platen)**

This printer can print without switching the carriage position according to the thickness of the printing paper. The platen is fixed on the platen rest by springs. Elongation and contraction of this spring caused by the varying printing paper thickness is used to maintain a fixed gap between the print head face plate of the BJ cartridge and the printing paper regardless of the printing paper thickness. This eliminates the need for a head gap adjustment lever.

**4) Cockling control**

"Cockling" (uneven wrinkling of the paper during printing) often occurs on this printer when printing is carried out at high duty, with the photo cartridge, and also because A3+ size paper is supported. Cockling that occurs perpendicular to the paper feed direction is controlled by dividing the platen into seven sections, and providing each platen section with two ribs and a paper suppressor.
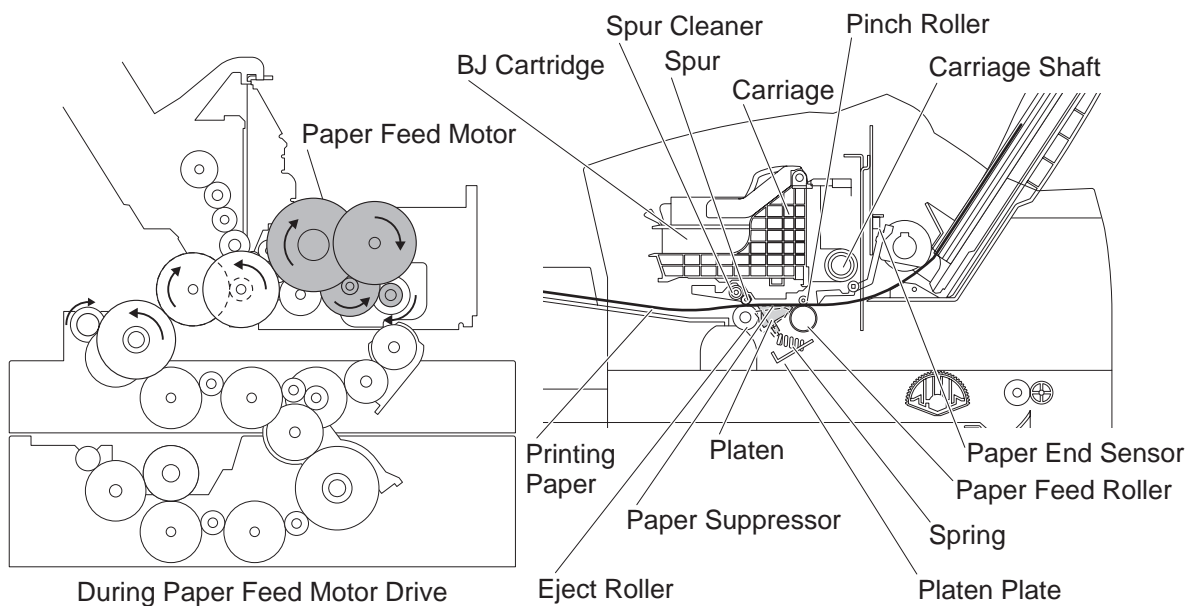


**Figure 4-28 Paper Feed Section**
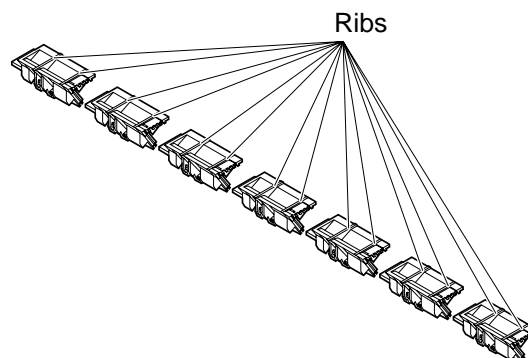


**Figure 4-29 Platen Ribs**

**4-31**

### 3.5.2 Sheet feeder unit structure

The printing paper is stacked on the sheet feeder hooked by the claws at the left and right corners of the sheet feeder. The loading claw is provided for improving the paper loading performance. The left and loading claw follows sliding movement of the side guide.

When purge motor drive is transferred to the sheet feeder gear via the sheet feeder drive gear, the pick-up roller rotates, and the printer starts printing operations. Printing paper such as plain paper is held by the claws on both sides, picked up one sheet at a time, and pushed into the paper feed section. When thicker printing paper such as envelopes are picked up, raise the left and right guides so that the printing paper is picked up without being hooked by the left and right claws. When photo glossy papers GP-301 are picked up, raise the left guide only.

The initial position of the pick-up roller is detected by the photo-interrupter pick-up roller sensor on the carriage board, and is determined by the number of pulses output from the paper feed motor.

When the paper end sensor detects the printing paper, the number of paper feed motor (stepping feed) pulses is managed to prevent skew feed, and the printing paper is automatically fed to the printing start position. If the printing paper is not detected by the paper end sensor, a paper pick-up error is generated.

During manual feed, the user must insert the printing paper into the manual feed slot until the paper end sensor detects the printing paper. Also, the printing paper passes along a pick-up path different to that during automatic pick-up by the sheet feeder. So, printing paper can be fed manually even if printing paper is stacked in the sheet feeder.

When the printing paper pushed into the paper feed section is detected by the paper end sensor within the preset time, paper is picked up from the printing start position.
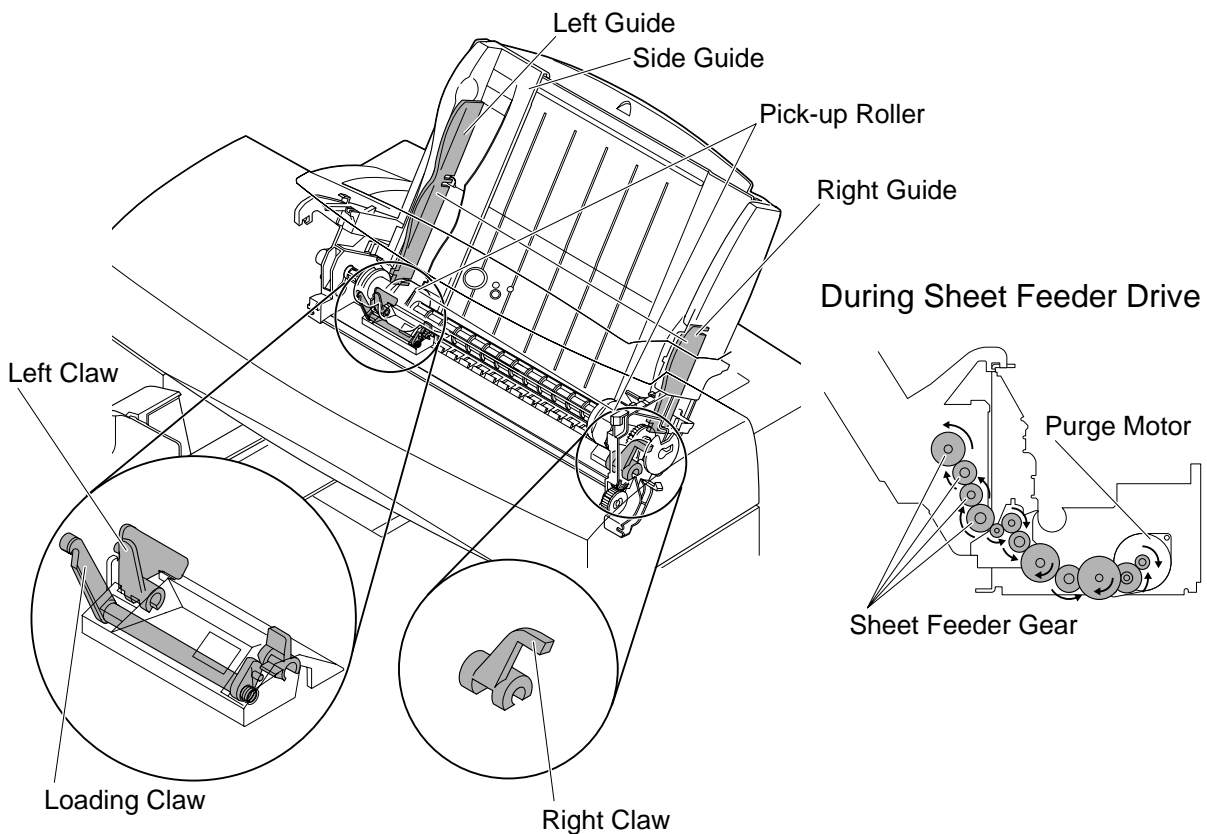


**Figure 4-30 Structure of Sheet Feeder Unit**

### 3.5.3 Cassette unit structure

In the cassette unit of this printer, printing paper is stacked in the cassette body hooked by the left and right claws. (The left claw follows sliding movement of the side guide.)

On the upper cassette drive, when the purge motor is operated, the pendulum gear on the upper cassette is interlocked with cassette drive gear, and the pick-up roller in the cassette unit rotates once to pick-up a sheet of paper. A mechanical clutch is fixed to this pick-up roller. When the pick-up roller rotates one turn, drive is automatically cut. The paper is then pushed in up to the paper feed section from between the paper feed roller and the roller by purge motor drive.

On the lower cassette drive, the solenoid is activated (energization is cut immediately to stop drive) after the purge motor's operation, the pendulum gears of the upper and lower cassettes are interlocked with cassette drive gear, and the paper is picked up by a single rotation of the pick-up roller of the lower cassette. The paper is then pushed in up to the paper feed section from between the paper feed roller and the roller by purge motor drive.
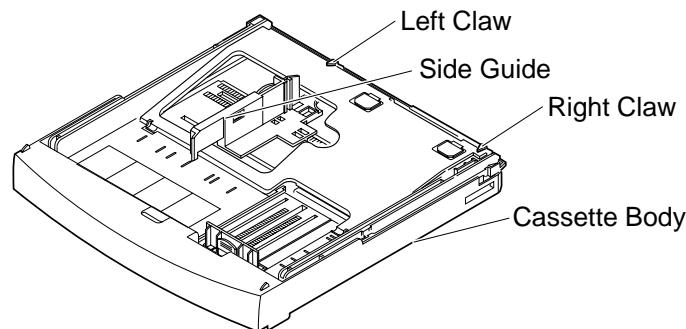
**Figure 4-31 Cassette Body and Claws**
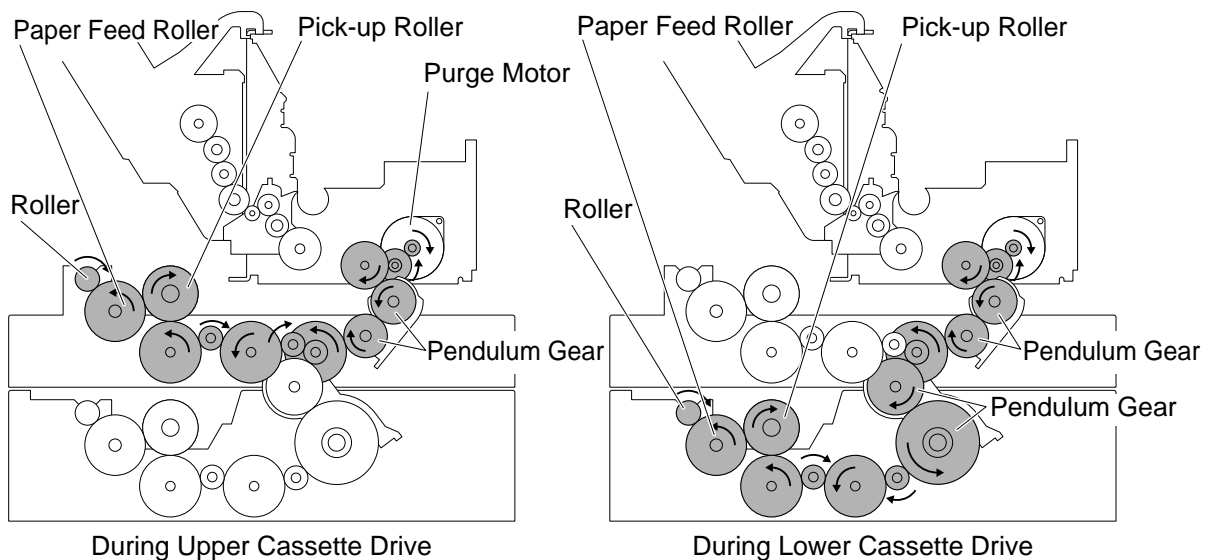
**Figure 4-32 Structure of Cassette Unit**
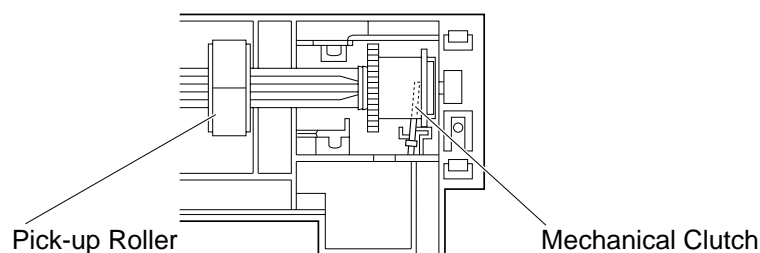
**Figure 4-33 Mechanical Clutch of Upper Cassette**

### 3.5.4 Flapper unit structure

The user slides the side guide on the flapper unit to match the size of the paper each time that paper is changed. When the paper feed motor operates, the flapper drive gear couples to the relay gear of the eject roller unit to open and close the left and right flappers.

When printing two or more sheets, the flappers close during printing of the 2nd sheet onwards. The paper is held by the left and right flappers, and does not contact the printed paper that is stacked on the paper output tray.

After printing is completed, the flappers open, and the paper is stacked on the printed paper on the paper output tray (See *Figure 4-33 Structure of Flapper Unit*). Provision of a time lag in this way prevents contact between the currently printing paper and printed paper, and prevents ink from smearing during high-duty or ink optimizer printing.

(If this time lag does not prevent ink smears from occurring, enable the "Pause Between Pages" setup item under the [Custom Setting] button in the printer driver (For details, see *"Part 3: 3.3.2 Custom setting" (page 3-21)*). This setting opens the flappers when a preset time has elapsed after printing is completed. Note, however, that this function is effective only when the ink optimizer has been used in printing the preceding page.)
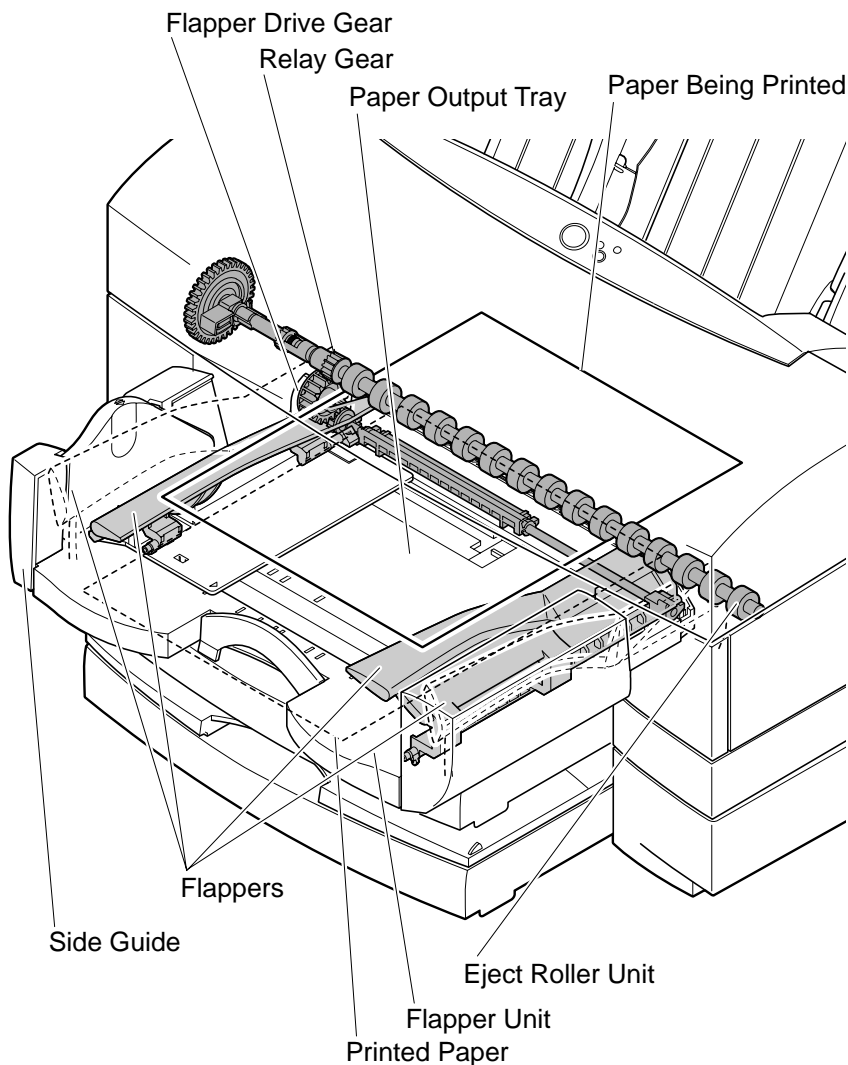


**Figure 4-34 Structure of Flapper Unit**

### 3.5.5 Path of fan air flow

This printer generates a large amount of ink mist, so, two fans that operate during printing and cleaning are installed on the printer to collect ink mist and prevent soiling by ink mist.  The following describes the air flow generated by these fans.
Air is blown in upwards from blow fan (fan A).  This air enters the hollow section of the spur unit from the opening on the spur unit, and enters the duct unit via the duct cap.  The duct unit is connected to the suction fan (fan B), and the collected ink mist is absorbed by the two ink mist absorbers behind fan B.
Extra ink mist absorbers are also installed in the spur unit, duct unit, fan B, base plate of the upper cassette and the carriage cover to absorb ink mist.
As this printer does not have a means for detecting fan malfunction even if they were to malfunction, an error is not generated.  If the two fans malfunction, the ink mist is not collected, and trouble caused by large amounts of ink mist flowing inside and outside the printer may occur.
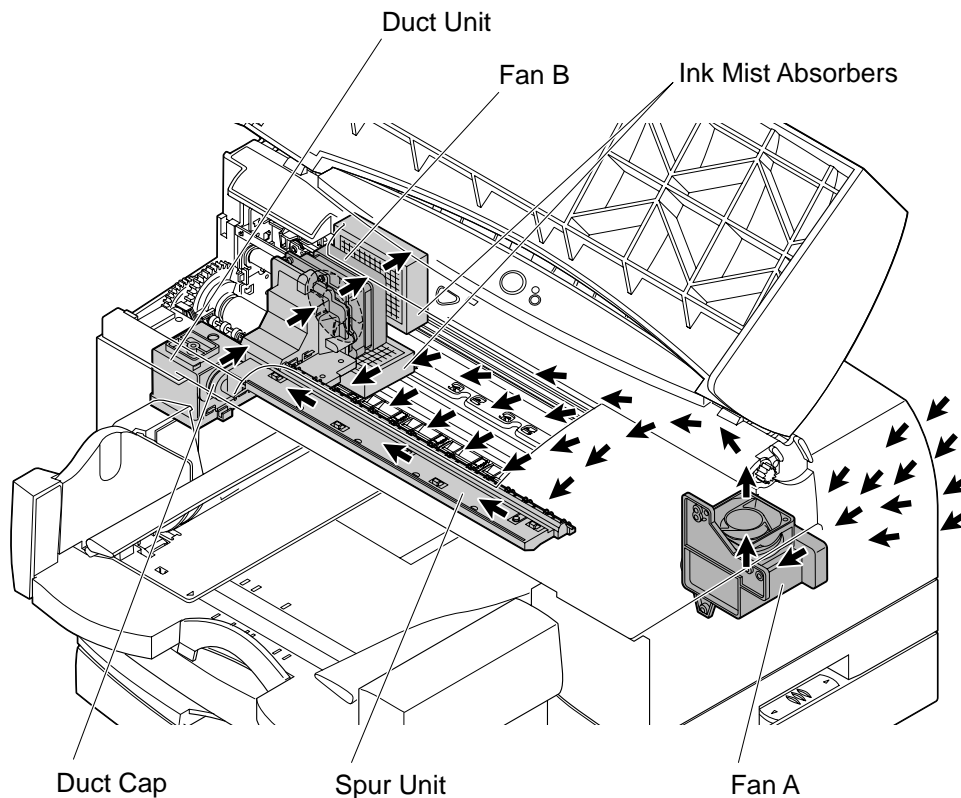


**Figure 4-35 Path of Fan Air Flow**

# 4. PRINTER ELECTRICAL SYSTEM

## 4.1 Overview

The electrical system functions are handled by the logic section (logic board, carriage board, carriage driver board, etc.) and the power supply section (power supply unit). The logic section converts the data from the interface into print signals and printer operation signals, and drives the BJ cartridges and all the motors while monitoring the status of the sensors.

The power supply section converts the DC input power from the power supply unit into drive power for the logic board, motors, BJ cartridges, etc.

When DC power is input from the power supply unit, all of the hardware components are active except for the following which are inactive:

 • all buttons except the *POWER* button
 • photo-interrupter's sensor
 • interface input signals.
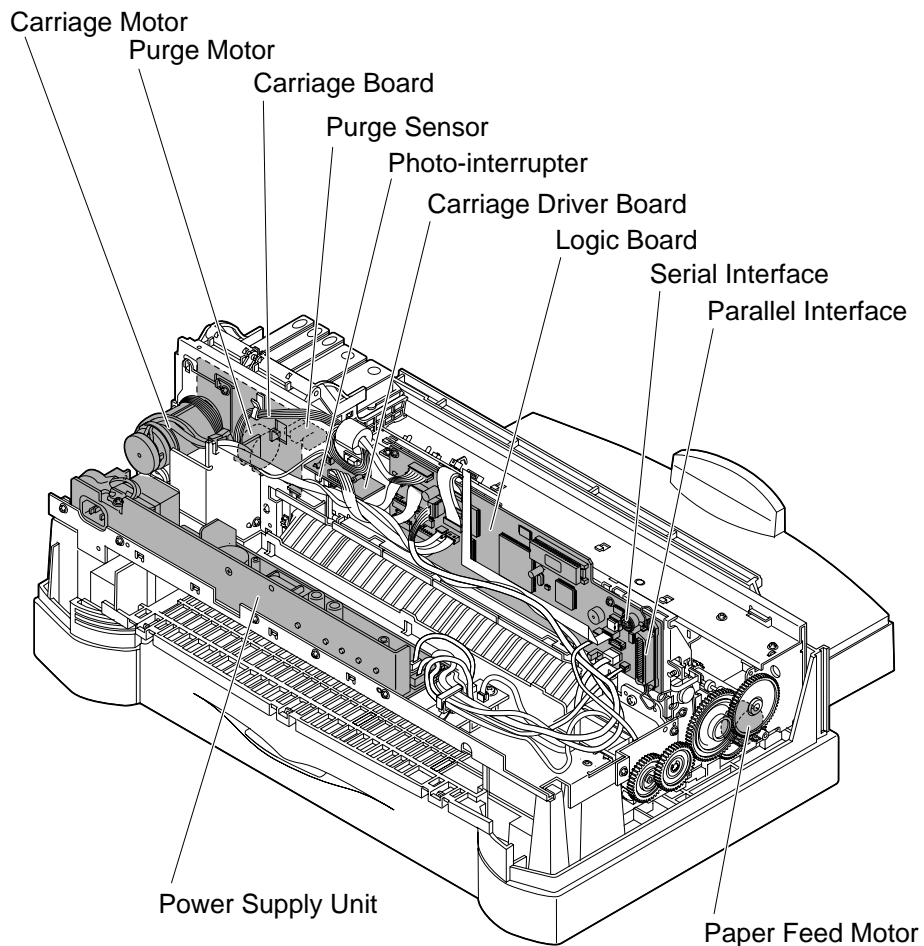


**Figure 4-36 Printer Electrical Section**

## 4.2 Logic Section
### 4.2.1 Logic section block diagram
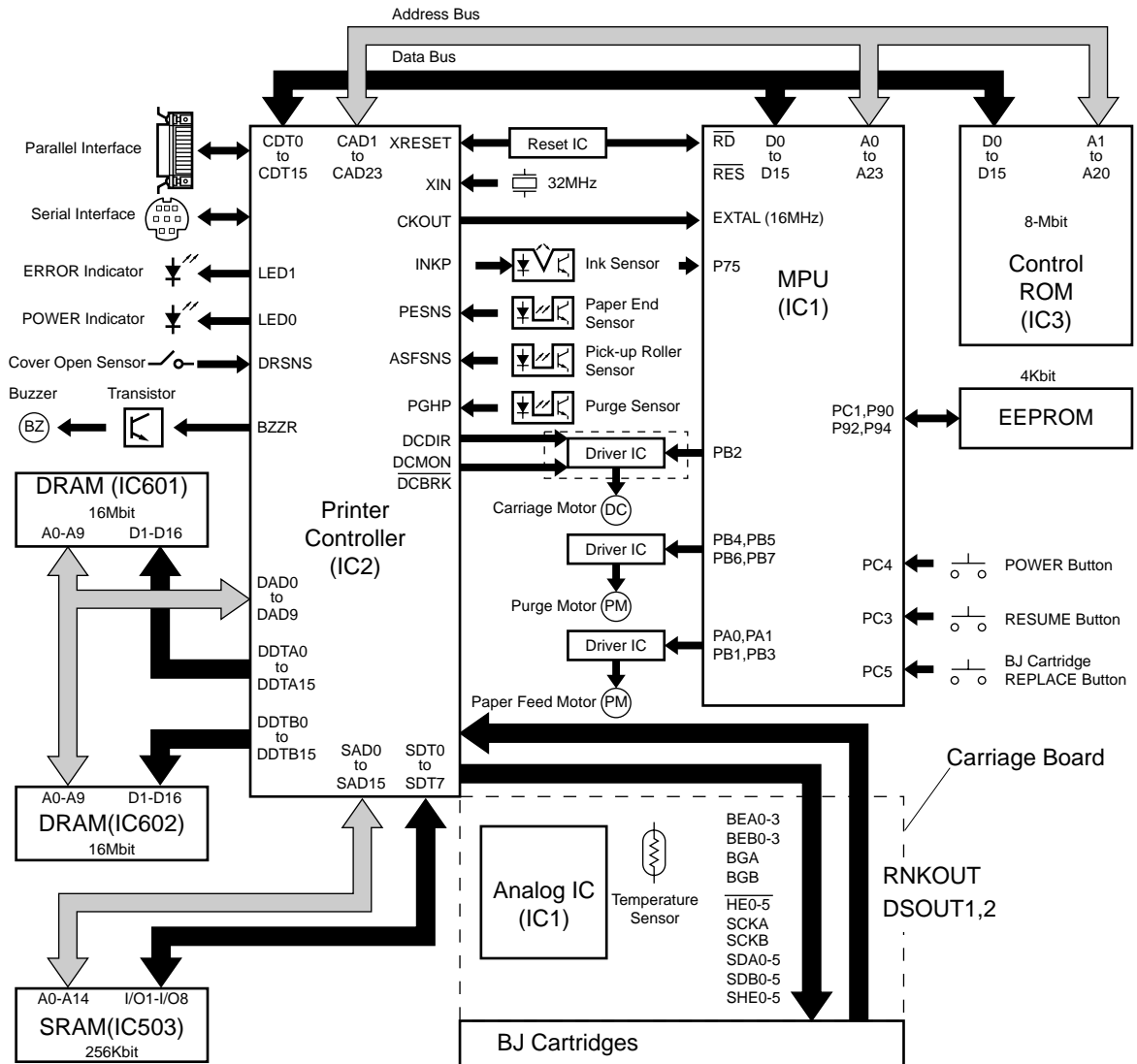
**Figure 4-37 Logic Board Block Diagram**
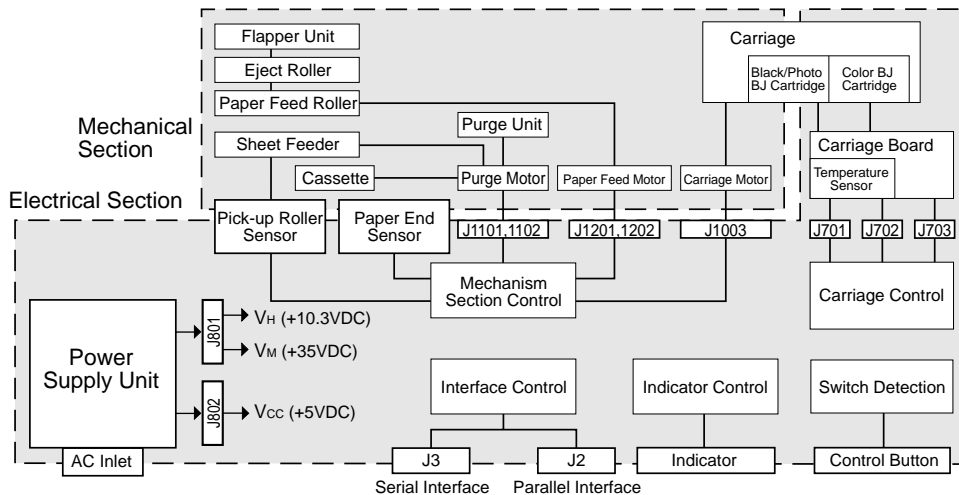
**Figure 4-38 Printer Block Diagram**

**4-37**

## 4.2.2 Logic section components

### 1) MPU (IC1)

The MPU contains a 16-bit CPU, 24-bit address bus, 512-byte work RAM and 9 peripheral I/O ports (interrupt controller, DMAC, timer, I/O ports, A/D converter, DRAM controller, chip select controller, monitor timer, clock and power manager).

**Built-in CPU**

32-bit wide general-purpose registers are built into the 16-bit CPU.  This CPU operates in synchronization with a 16 MHz external clock input.

**Address bus**

24-bit address bus port is connected to the printer controller.

**Data bus**

The 16-bit data bus port for external devices is connected to the 8 Mbit control ROM and printer controller.

**Built-in RAM**

512-byte RAM is accessed in 16-bit units.

**Interrupt controller**

34 internal interrupt causes and 9 external interrupt causes are input to the MPU, and interrupt processing is carried out on each of these causes.

**DMA (Direct Memory Access) controller**

This MPU has four built-in DMA controllers supporting 16 Mbyte space.

**Timer/timing pattern controller/monitoring timer**

Five built-in 16-bit integrated timer units are connected to the timing pattern controller and carriage motor driver.  The timing pattern controller outputs carriage motor PWM signals, and 2-phase excitation drive signals for the paper feed motor and purge motor.

**I/O port**

The I/O ports are connected to switches on the panel board, etc.

**A/D converter**

Detects the following analog signals via the built-in A/D converter:

AN0: Detects the head rank in BJ cartridge.
AN1: Detects the Black head/Photo head temperature from the head temperature sensor in BJ cartridge.
AN2: Detects the Color head temperature from the head temperature sensor in BJ cartridge.
AN3: Unused
AN4: Unused
AN5: Detects ink-out.

**2) Printer controller (IC2)**
The printer controller contains the CPU interface controller, DRAM controller, SRAM controller, parallel/serial interface controller, print head controller, data processing controller and I/O port controller.

**CPU interface controller**
The CPU interface controller controls read/write from the CPU.

**DRAM controller**
The DRAM controller is a DRAM-specific bus independent of the MPU bus. It controls the 32 Mbit DRAM (16 Mbit DRAM × 2), 10-bit address/32-bit data bus, and executes read/write control, RAS/CAS control, and refresh control.

**SRAM controller**
The SRAM controller is an SRAM-specific bus independent of the MPU bus. It controls the 256 Kbit SRAM, the 15-bit address/8-bit data bus, and executes read/write control.

**Parallel/serial interface controller**
The parallel interface controller functions to receive the 8-bit parallel data that arrives from the host computer synchronized with the strobe ($\overline{\text{STROBE}}$) signal by handshaking the BUSY and $\overline{\text{ACKNLG}}$ signals. This controller also controls serial interface signals.
The data received over the parallel and serial interfaces is stored in the DRAM's receive buffer, is parsed by the MPU and is processed by DMA (direct memory access) if the MPU judges the data to be print data.

**Print head controller**
This controller performs two simultaneous operations, serial transfer of print data read from the DRAM's print buffer to the print heads, and output of the block signals and heat enable signals to drive the print heads.
With transfer of print data, print data for each of the print heads is transferred synchronized with the 8 MHz clock CLK signal. With print head drive, block signals Data 1 and Data 2 and the pulse signals (HE and SHE) are output.

**Data processing controller**
This controller processes print data in the DRAM's print buffer by DMA (direct memory access). Processing includes palette conversion for printing out photos, 1200 dpi smoothing and vertical-horizontal conversion for preparing raster-direction print data to column-direction print data.

**I/O port**
Signals from the sensors are input to the input port. Signals for controlling lighting of the POWER and ERROR indicators are output from the output port.

### 3) Control ROM (IC502)
This 1 MByte control ROM contains the program for printer control.

### 4) DRAM (IC601/IC602)
This 32 Mbyte (2 × 16 Mbyte) DRAM is controlled by the printer controller, and is used as the receiver buffer, print buffer, and working area.

### 5) SRAM (IC503)
This 256 kbit SRAM is controlled by the printer controller, and is used as the buffer for providing a time difference in heating the even-numbered nozzles and the odd-numbered nozzles on the BJ cartridge, and as the random mask pattern buffer.

### 6) Reset IC (IC201)
This reset IC detects the power voltage when the power is turned ON or when the power is interrupted, and resets the MPU and the printer controller.

### 7) EEPROM (IC501)
This 4 kbit EEPROM is controlled by the MPU, and stores the various function settings, total waste ink absorption amount, total number of sheets printed, BJ cartridge installation count, number of recoveries, and other data.

### 8) Paper feed motor driver (IC1201, 1202)
This paper feed motor driver is controlled by the MPU, and drives the paper feed motor to be controlled by 2-phase excitation by a fixed current bipolar drive. One drive circuit is built into the IC.

### 9) Carriage motor driver (IC1 on carriage driver board)
This carriage motor driver is controlled by the MPU and printer controller, and the DC 5-pole carriage motor is driven by a unipolar drive.
Two drive circuits are built into the IC.

### 10) Purge motor driver (IC1101, IC1102)
This purge motor driver is controlled by the MPU, and drives the purge motor to be controlled by 2-phase excitation by a fixed current bipolar drive. One drive circuit is built into the IC.

## 4.3 Power Supply Section

The power supply section is a switching regulator that converts the input AC to the various DC voltages to be used on the printer, and supplies these DC voltages to the logic board.

### 4.3.1 Block diagram of power supply section
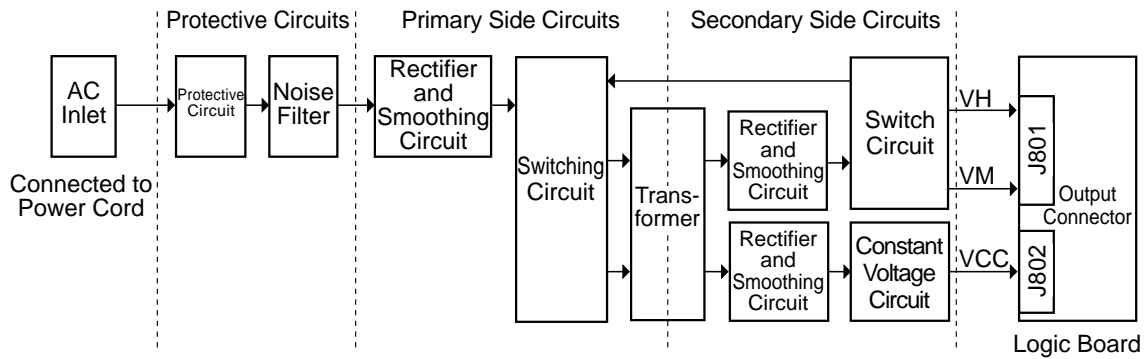


**Figure 4-39 Block Diagram of Power Supply Section**

### 4.3.2 Power supply section structure

#### 1) AC inlet

The AC inlet incorporates a GND terminal.  The input voltages are as follows:
102V (120V $_{-15\%}$) to 264V (240V $_{+10\%}$)

#### 2) Internal circuits

Protective circuits
The protective circuits protect the internal circuits from overvoltage input and eliminate electrical noise.
The protective circuits are provided with a fuse.  This fuse blows to protect the internal circuits in the event of an overvoltage input.
The fuse is installed in a fuse holder, and can be replaced if it blows due to overvoltage.

**Primary side circuits**
The primary side circuits rectify and smooth the input AC voltage.  This voltage is then converted by the DC/DC converter, and supplied through the switching circuit to the primary side of the transformer.

**Secondary side circuits**
The respective voltages are generated from the voltage at the transformer's secondary voltage.  VH and VM are generated by the switching circuit, and VCC is generated by the constant voltage circuit.

**3) Output connectors**

The following voltages are output by the secondary side output connectors of the power supply circuit:

VCC: Voltage for driving ICs and LSIs: +5.0V±0.2V

VH: Voltage for driving head: +10.3V±0.1V

VM: Voltage for driving motors: +35.0V±0.5V
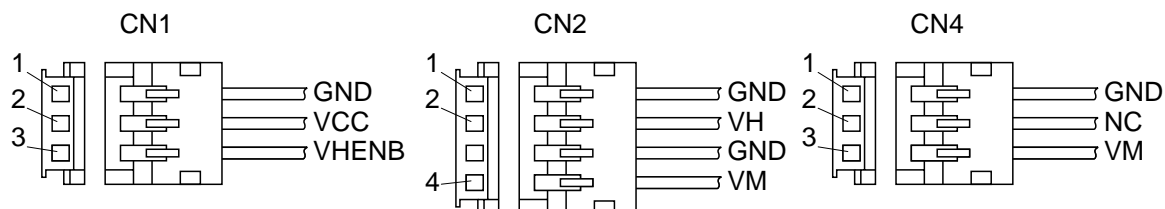


**Figure 4-40 Output Connectors**

# 5. DETECTION FUNCTIONS

## 5.1 Sensor Functions

This printer is provided with the following sensors.  These sensors detect the printer's state.
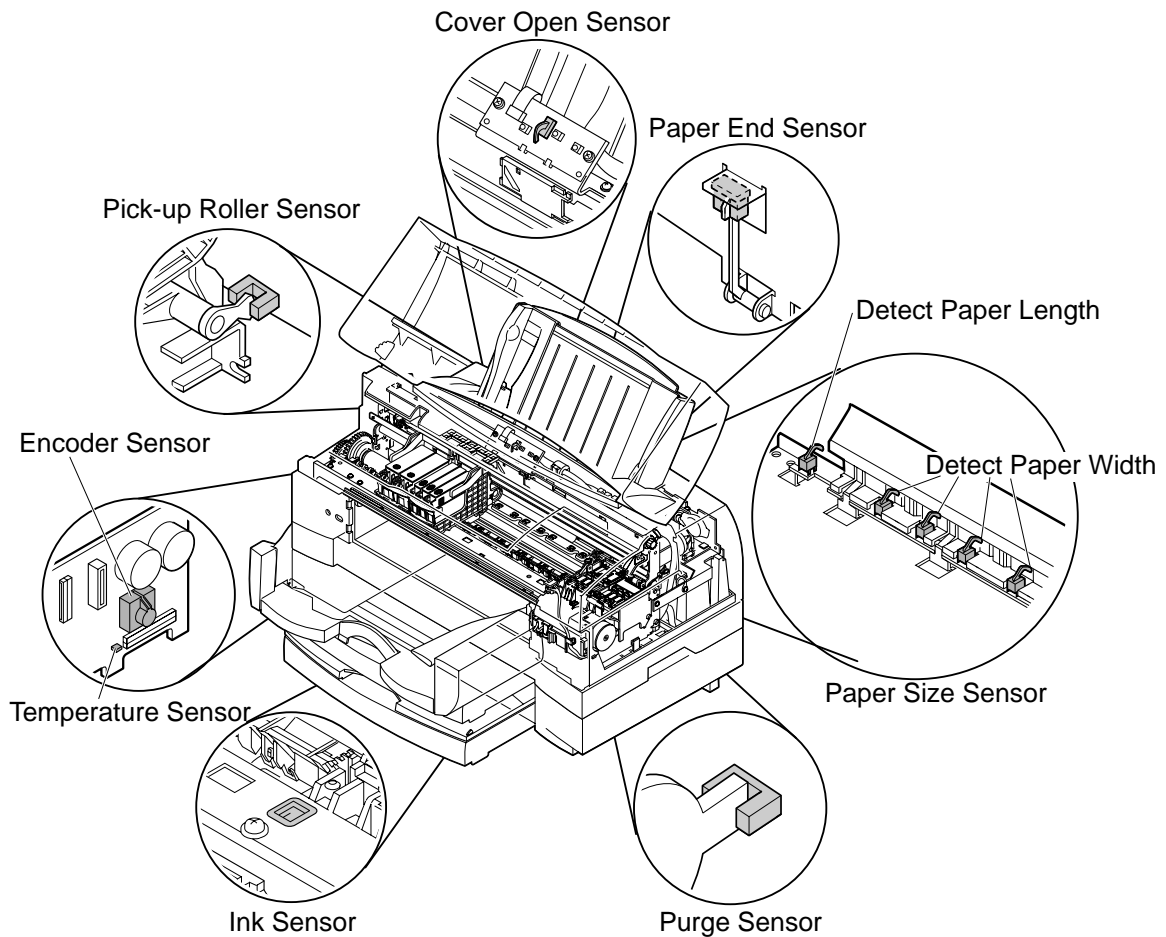


**Figure 4-41 Sensor Locations**

**Purge sensor**

This photo-interrupter-type sensor detects the capping position of the purge unit. Detection of the module phase at the capping position is performed by interruption of the purge sensor by the cam gear flag inside the purge unit.

**Paper end sensor**

This photo-interrupter-type sensor detects the presence of paper on the paper feed section. Interruption of the paper end sensor and feeding of paper on the paper feed section are detected by the paper end sensor arm being pressed by the paper.

**Pick-up roller sensor**

This photo-interrupter-type sensor detects the initial position of the pick-up roller on the sheet feeder. Pick-up roller at the initial position is detected by the pick-up roller flag interrupting the pick-up roller sensor.

**Encoder sensor**

Refer to *Part 4: 3.4.2 Carriage unit structure  3) Encoder section (page 4-29)*.

**Temperature sensor**

This temperature sensor is a thermistor on the carriage board, and detects the temperature inside the printer.
The printer reads the output voltage of the temperature sensor which changes according to changes in the temperature at the A/D port of the MPU, and A/D-converts this output voltage to detect the temperature. Optimum printing control and overheating protection is performed based upon this temperature and the temperature detected by the head temperature sensor.

**Cover open sensor**

When the top cover is closed, a protrusion on the top cover presses a switch on the panel board. When the top cover is open, the switch on the panel board is not pressed, and "cover open" is detected.

**Paper size sensor**

This sensor comprises a logic board and five switches located on the upper and lower cassette units. When the printer is viewed from the front, the left end switch is not pressed when the cassette body is drawn out, and is pressed when the cassette receptacle is not drawn out.
The paper width is detected by the other four switches being pressed by the side guides on the cassette body.
The paper size is detected is by the length and width of the paper.

> **NOTE**
> The head temperature sensor is built into the heater board on each print head. For details, see *"Part 4: 3.2.5 BJ cartridge drive circuit" (page 4-22)*.
> The purge sensor, paper end sensor and pick-up roller sensor judge whether or not an error has occurred by the detection states of the sensors. (Errors are not displayed by the detection state of the temperature sensor inside the printer.) For details of error indication, see *"Part 3: 3. PRINTER SERVICING FUNCTIONS" (page 3-17)*.
> The states of the purge sensor, paper end sensor and pick-up roller sensor are detected at the input port of the printer controller. Detection signals are inverted by opening and closing the sensors.

## 5.2 Other Detection Functions

This printer is also provided with the following detection functions in addition to the sensors.

### 5.2.1 Waste ink level detection

The printer has a function for managing the waste ink level (including the waste ink optimizer level) of the waste ink absorbers.

The printer stores the total waste ink level (including the waste ink optimizer level) absorbed by the waste ink absorbers through cleaning and the maintenance jet to EEPROM on the logic board taking into consideration the amount of ink consumed and evaporated after waste ink absorption. The printer updates this total waste ink level (including the waste ink optimizer level) when the printer is turned OFF. If this level approaches the capacity of the waste ink absorbers, print operations on the printer are stopped.

> NOTE  When the total waste ink level (including the waste ink optimizer level) reaches 95% of the capacity of the waste ink absorbers, the waste ink warning (operator call) is generated. If this happens, the warning can be canceled and printing continued by pressing the *RESUME* button. From here on, the total waste ink level (including the waste ink optimizer level) increases. When it reaches 100% of the capacity of the waste ink absorbers, the printer generates the "waste ink full" error (service call) to prevent ink leakage (Refer to *"6.2.2 Error recovery 5. Waste Ink Warning/Waste Ink Full Error" (page 5-21)*).

### 5.2.2 BJ cartridge sensor

Which BJ cartridge (Black BJ cartridge BC-80, Color BJ cartridge BC-81, Photo BJ cartridge BC-82 Photo) is installed is detected by the detection signal from the ID pad wiring on the contact pad on the BJ cartridge.

For details, see *"Part 4: 3.2.6 BJ cartridge detection" (page 4-23)*.

### 5.2.3 Ink-out detection

#### 1) Operation

The ink sensor unit installed on the purge unit comprises an LED and photo-transistor. The light emitted from the LED enters the prism formed on the base of the ink tank at an angle of incidence of 45°. When the ink tank's ink compartment contains ink, the incident light is partially refracted due to the slight difference between the refractive indices of the ink tank (plastic) and the ink, and the amount of light entering the photo-transistor decreases. Whereas, when the ink tank's ink compartment runs out of ink, incident light is totally reflected at the angle of incidence of 45° due to the large difference between the refractive indices of the ink tank (plastic) and the air, and the amount of light entering the photo-transistor increases. The presence of ink in the ink tank's ink compartment is detected by the strength of this incident light (voltage value after photo-voltaic conversion by the photo-transistor) to this photo-transistor.
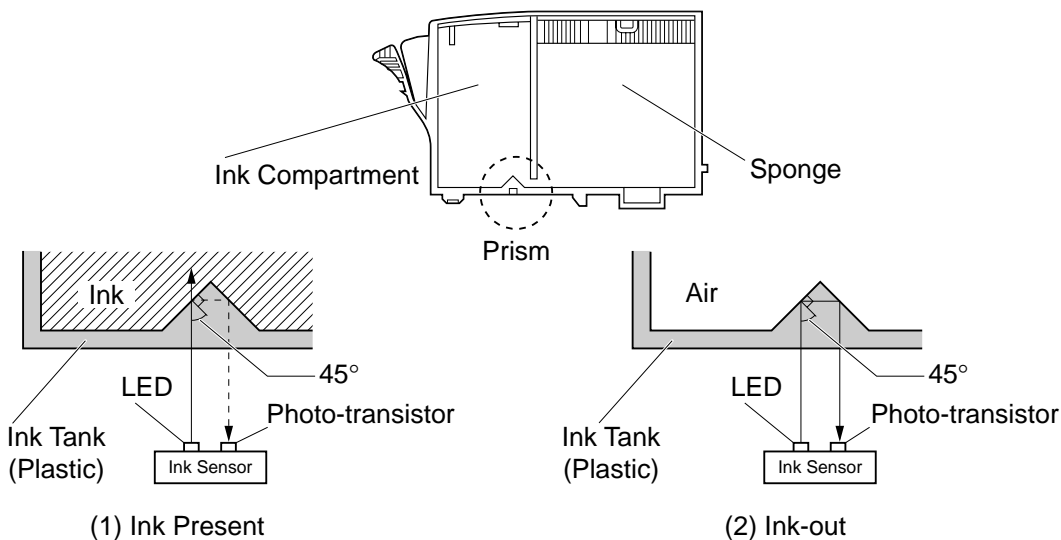
**Figure 4-42 Principle of Ink-out Detection**

#### 2) Ink-out warning/ink-out error

When the printer has detected that the ink tank's ink compartment has run out of ink, the "ink-out" warning is displayed on the status monitor of the printer driver. The dot counter then starts counting the number of dots ejected. After the preset dot count is exceeded, the "ink-out" error (operator call) is generated and the printer stops printing. At this time, follow the instructions displayed on the host computer, and replace the ink tank with a new tank.

You can, however, ignore this error and continue printing by pressing the *RESUME* button to reset the dot counter. After you have pressed the *RESUME* button, the dot counter then starts counting the number of dots ejected. After the preset dot count is exceeded, the "ink-out" error (operator call) will again be generated and the printer stops printing.

**3) Replacing the ink tank when the "ink-out" error is displayed**

The following describes the ink tank replacement procedure on the printer:

1) The printer lights the ERROR indicator, and sounds the buzzer three times to notify the operator of an "ink-out error."

2) Press the *BJ Cartridge REPLACE* button, and the carriage moves to the BJ cartridge replacement position (left edge of printer) so that the relevant ink tank can be replaced.

The "ink-out" error message is displayed on the status monitor of the printer driver to notify the operator that the ink has run out.

From here on, follow the message displayed on screen to replace the ink tank.

| | |
|---|---|
| **CAUTION** | "Ink-out detection" is a function for automatically stopping printing before printing trouble caused by absence of ink in ink compartment occurs. To prevent erroneous detection by the ink sensor due to irregular reflection, an anti-reflection sheet is attached to the rear of the main cover located above the ink sensor. The printer driver custom setting dialog box has a function for disabling "ink-out" detection.  For details, see *"Part 3: 3.3.2 Custom setting" (page 3-21)*. |
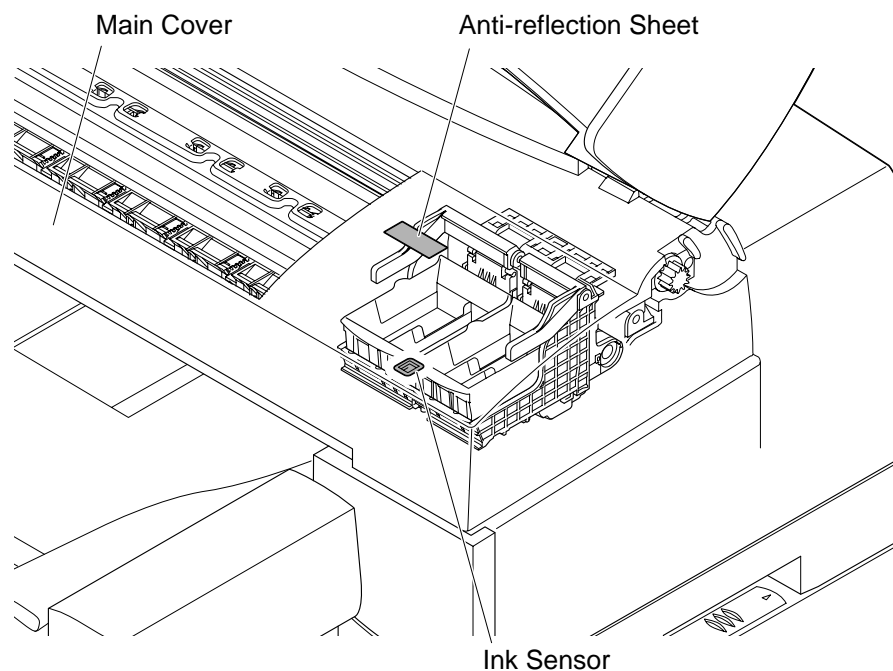


**Figure 4-43 Ink Sensor and Anti-reflection Sheet**

### 5.2.4 No ink tank detection

**Operation**

When the ink tank is installed, light emitted from the LED is reflected by the concave mirror formed on the base of the ink tank, and is returned to the phototransistor. Whereas, if the ink tank is not installed, the light emitted from the LED is not returned to the phototransistor. Presence of the ink tank can be detected by the strength (voltage value after photovoltaic conversion by the phototransistor) of the light reflected back to this phototransistor.

Ink Tank

Concave Mirror

LED          Photo-transistor          LED          Photo-transistor

Ink Sensor                              Ink Sensor

(1) Ink Tank Present                    (2) No Ink Tank
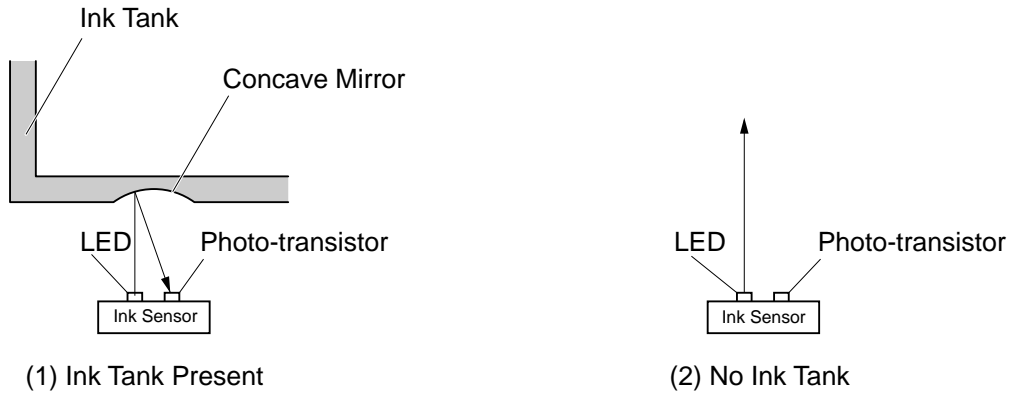
**Figure 4-44 Principle of No Ink Tank Detection**

# Part 5

# MAINTENANCE

# 1. MAINTENANCE

## 1.1 Periodically-replaced Parts

| Level | Part |
|---|---|
| User | None |
| Service personnel | See *TABLE 5-1 PERIODICALLY-REPLACED PARTS* |

### TABLE 5-1 PERIODICALLY-REPLACED PARTS *1

| Periodically-replaced Parts | | Spur unit | Waste ink absorber *2 | Encoder head*3/ film, ink mist absorbers |
|---|---|---|---|---|
| Condition for replacement | | Conspicuous spur marks on prints | Waste ink full error | Carriage error, sheet feeder error, or No ink tank error (print image shift) |
| No. of Pages Printed | 1500 character pattern | — | 50,000 | — |
| | 7.5% duty per color pattern | 25,000 | 23,000 | 25,000 |

*1. After replacing periodically-replaced parts, cleaning top cover, main cover, flapper unit with a damp cloth.

*2. Refer to *Part 5: 4.4 Waste Ink Absorber Replacement (page 5-10)*

*3. Refer to *Part 5: 4.2.4 Screw fastening of idle pulley ass'y (page 5-8)*

## 1.2 Worn Parts

| Level | Consumable | Replacement Guide |
|---|---|---|
| User | None | |
| Service personnel | None | |

## 1.3 Consumables

| Level | Consumable *1 |
|---|---|
| User | Black BJ cartridge BC-80 |
| | Color BJ cartridge BC-81 |
| | Photo BJ cartridge BC-82 Photo |
| | Ink tank for Black BJ cartridge BC-80 |
| | Ink optimizer for Black BJ cartridge BC-80 |
| | Ink tanks for Color BJ cartridge BC-81 |
| | Ink tanks for Photo BJ cartridge BC-82 Photo |
| Service personnel | None |

## 1.4 Periodic Maintenance

| Level | Location |
|---|---|
| User | Cleaning of pick-up roller in sheet feeder *2 |
| Service personnel | None *3 |

*1. For details, refer to *Part 2 : 1.5 Consumables (page 2-7)*.

*2. For details, refer to "BJC-8500 User's Manual."

*3. On-site servicing on an on-claim basis is recommended.

# 2. SERVICE TOOLS

## 2.1 List of Tools

| Ordinary Tools | Note |
|---|---|
| Phillips screwdriver | For removing and replacing screws |
| Blade screwdriver | For removing plastic parts |
| Long-nose pliers | For removing and replacing springs |
| Tweezers | For installing coil springs |
| Flat brush | For applying grease (one per grease type) |
| Multimeter | For troubleshooting |
| Wrist strap | For discharging static electricity when contacting the logic board and other electrical components |
| IC extractor | For extracting socket type ICs (control ROM, EEPROM) |

| Special Tools (part No.) | Note |
|---|---|
| Grease (MOLYKOTE PG-662) (QY9-0034-000) | For application to specified locations (see *Figure 5-2 Grease Application Sections (2) (page 5-4)*, *Figure 5-3 Grease Application Sections (3) (page 5-5)*.) |
| Grease (MOLYKOTE HP-300) (QY9-0035-000) | For application to specified locations (see *Figure 5-1 Grease Application Sections (1) (page 5-3)*.) |
| Grease (HANARL FLX-2) (QY9-0036-000) | For application to specified locations (see *Figure 5-1 Grease Application Sections (1) (page 5-3)*.) |
| Grease (EU-1) (QY9-0037-000) | For application to specified locations (see *Figure 5-1 Grease Application Sections (1) (page 5-3)*.) |
| Spring scale (CK-0055-000) | For fixing the idle pulley (see *Figure 5-8 Screw Fastening of Idle Pulley Ass'y (page 5-8)*.) |

# 3. APPLYING GREASE

When service parts are replaced, apply a coating of grease "MOLYKOTE HP-300," "HANARL FLX2," "EU-1" or "MOLYKOTE PG-662" at the specified locations. Apply a sufficient amount of grease to form a thin and even coating to the specified locations.

**CAUTION**

Do not apply grease to locations other than the specified locations. Also, make sure that no grease is transferred from the specified locations onto the surrounding parts.

★ When inserting the carriage shaft into the carriage, remove the grease applied to the carriage shaft holder unit, and insert the carriage shaft making sure that it is not rotated.

Carriage

Carriage Shaft Holder Unit

EU-1

Total Periphery Approx. 80 to 180mg

100mm

HANARL FLX2

Apply grease so that a light film is formed.

Approx. 12mg each

Gear Teeth Surface, 4 Locations, Approx. 12mg each

MOLYKOTE HP-300

Approx. 3mg each per bushing seat

**Figure 5-1 Grease Application Sections (1)**

PG-662 (except cassette unit)

Approx. 12mg

Approx. 12mg

Approx. 24mg

2 Locations, Approx. 12mg each

2 Locations, Approx. 3mg each

Entire Inside Periphery, Approx. 3mg

Gear Teeth Surface, 4 Locations, Approx. 12mg each

Rib, 4 Locations, Approx. 6mg each

Paper Feed Motor Shaft Approx. 12mg

Gear Teeth Surface 4 Locations, Approx. 12mg each

Approx. 150mg

7mm

50mm

50mm

Approx. 24mg

Outside Periphery Approx. 24mg

Inside Periphery Approx. 24mg

Approx. 12mg

Approx. 12mg

**Figure 5-2 Grease Application Sections (2)**

PG-662 (cassette unit)

❋24 Locations,
Approx. 3mg each

Grease Application Points

(enlargement)

Approx. 3mg

❋20 Locations,
Approx. 3mg each

**Figure 5-3 Grease Application Sections (3)**

# 4. DISASSEMBLY/ASSEMBLY

## 4.1 About Disassembly/Assembly

When disassembling and assembling the printer, refer to the parts catalog.  In the parts catalog, Figure Nos. are presented in the order of disassembly.  Close-up diagrams are also provided for additional detail.

## 4.2 Precautions for Disassembly/Assembly

### 4.2.1 Unlocking the carriage

When the BJ cartridge is installed, and the power is OFF, the carriage is normally locked at the capping position (right edge of printer body).  The purge unit has a mechanism for locking the carriage to prevent the following:

- carriage movement from the capping position caused by vibration, drop during transportation or by manual movement
- ink leakage from the BJ cartridges
- drying of the print head face plate

When servicing this printer, unlock the carriage by inserting a regular screwdriver into the groove on the purge motor shaft and turn it clockwise to lower the carriage lock pin.

When the carriage has been unlocked manually, insert the regular screwdriver into the groove on the purge motor shaft, and turn it further clockwise, to return to the "locked" position and then turn the power ON.  If the printer is turned ON with the carriage unlocked, an unrecoverable error sometimes occurs.



Purge Motor Shaft
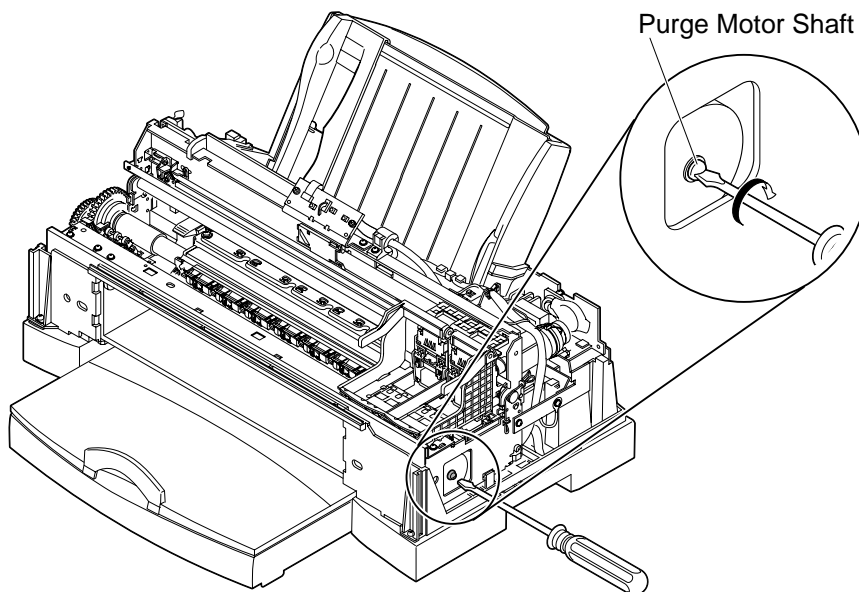
**Figure 5-4 Unlocking the Carriage**

The BJ cartridge contact section on the carriage unit is positioned before it is fixed in place. The position of this contact section cannot be adjusted during servicing. Do not disassemble this contact section.
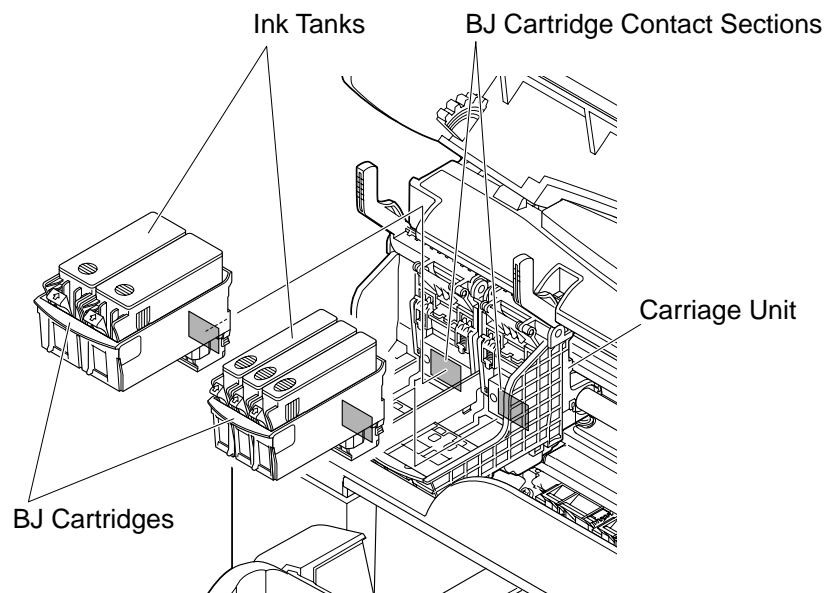


**Figure 5-5 BJ Cartridge Contact Section on Carriage Unit**

## 4.2.2 Disassembly prohibited parts

The carriage shaft bearings (2 on both sides of the printer) that support the carriage, and contact sections (total 10 locations) between the carriage rail and chassis are positioned during the production process and fixed in place before the printer is shipped. The positions of these parts cannot be adjusted during servicing. Do not disassemble these parts. Red screws are used as the fastening screws to differentiate them from other regular screws.
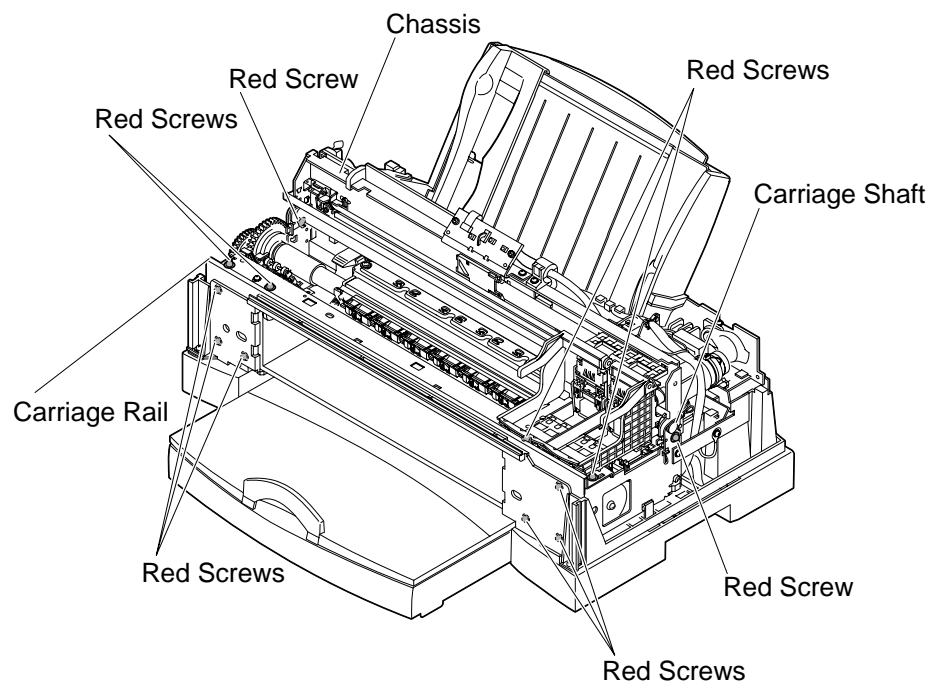


**Figure 5-6 Disassembly Prohibited Locations**

**5-7**

### 4.2.3 Purge unit tubes

When ink and ink optimizer react, they harden, so, separate absorbers are used for absorbing waste ink and ink optimizer. Be sure to check that the three tubes on the purge unit (blue and yellow for ink, transparent for ink optimizer) are at the locations specified in *Figure 5-7 Purge Unit Tubes*. When the tube tips are blocked, ink may harden on the tube tips, and cause defective suction. Pay special attention to this when assembling the purge unit.
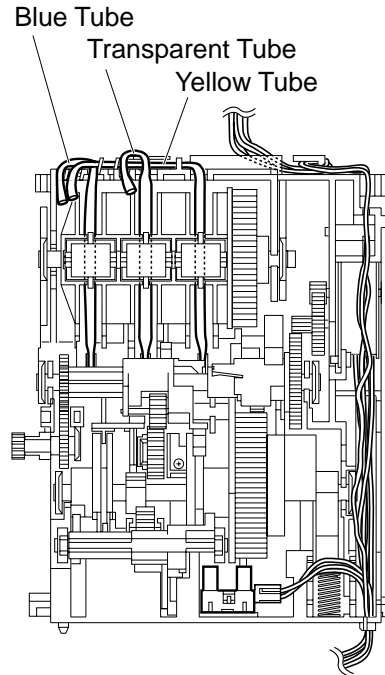
**Figure 5-7 Purge Unit Tubes**

### 4.2.4 Screw fastening of idle pulley ass'y

Use the spring scale (special tool: CK-0055-000) to fasten the idle pulley ass'y screw when it has been loosened, for example, to remove the carriage. Tighten the screw by applying a tension of 1760±100gf read on the spring scale. Before you fasten the screw, move the carriage a few times to the left and right to provide constant belt tension.
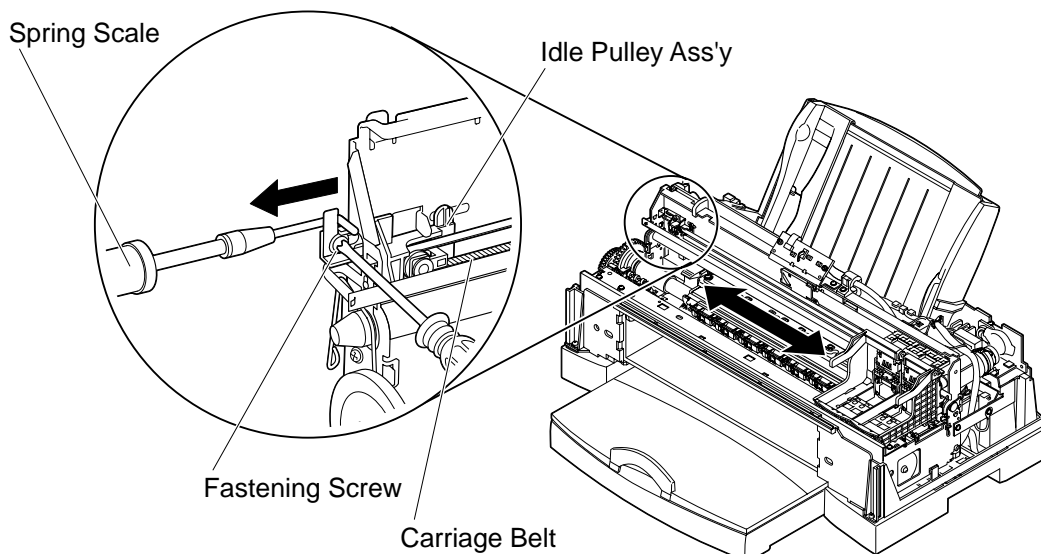
**Figure 5-8 Screw Fastening of ldle Pulley Ass'y**

### 4.3 Logic Board Replacement
#### 4.3.1 Except for EEPROM replacement

Various settings, waste ink level, number of sheets fed and other printer data are stored to the EEPROM (IC501) on the logic board. When the board has been replaced with a new one during servicing, operation using the same printer settings is possible by removing the EEPROM from the logic board before it is replaced, and attaching it to the new logic board. (refer to *Part 3:  3.6.1 Continued use of EEPROM memory data (page 3-27)*. In this case, you need not replace the waste ink absorbers.)

The EEPROM is attached onto the logic board by a socket, which makes replacement relatively simple. When replacing the EEPROM, though, do not bend or deform the EEPROM pins or subject the EEPROM to static electricity. We recommend wearing wrist straps to discharge static electricity and using the ROM extractor to remove the EEPROM.

After you have replaced the logic board, perform EEPROM list print (refer to *"Part 3: 3.4.2 Service mode" (page 3-24)*) to check the EEPROM data settings. (That is, check that there is no major discrepancy between the waste ink level, waste ink optimizer level, device IDs, information for detecting remaining ink level, number of sheets fed, and other printing data compared with the actual state of the absorbers and conditions of use.

#### 4.3.2 EEPROM replacement

We recommend replacing the logic board if the printer is used frequently, or you doubt the integrity of EEPROM data settings. However, in this case, you must replace the waste ink absorbers (refer to *"Part 5: 4.4 Waste Ink Absorber" (page 5-10)*) and initialize the EEPROM. For details, see *"Part 3: 3.4.2 Service mode" (page 3-24)*. After that, perform EEPROM list print and confirm the contents of EEPROM data.
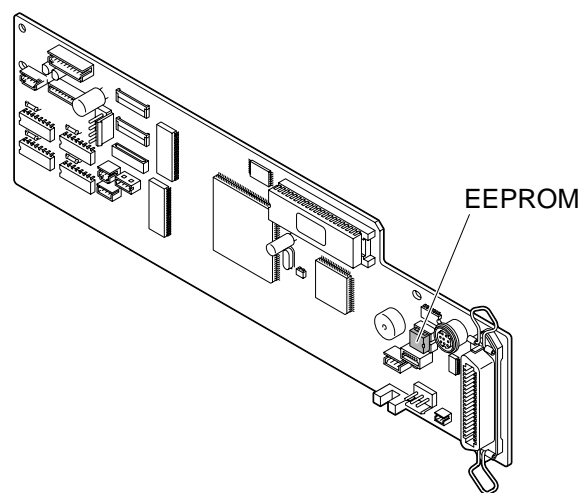


EEPROM

**Figure 5-9 EEPROM**

## 4.4 Waste Ink Absorber Replacement

When the waste ink warning/waste ink tank full error occurs, and the waste ink absorbers (waste ink optimizer absorber) are replaced, be sure to replace all eight absorbers at the same time. (If the ink absorbers are particularly dirty, we recommend replacing the entire lower case unit.) Even if the rate of waste ink absorption is relatively low, replace all eight absorbers at the same time.

Take the appropriate action for the absorber cover depending on how dirty it is.

After replacing the waste ink absorbers, be sure to reset the total waste ink level by clearing waste ink level (refer to *"Part 3: 3.4.2 Service mode" (page 3-24)*).  Otherwise, the waste ink warning/waste ink full error is not canceled.

After that, perform EEPROM list print (refer to *"Part 3: 3.4.2 Service mode" (page 3-24)*) and confirm the contents of EEPROM data.
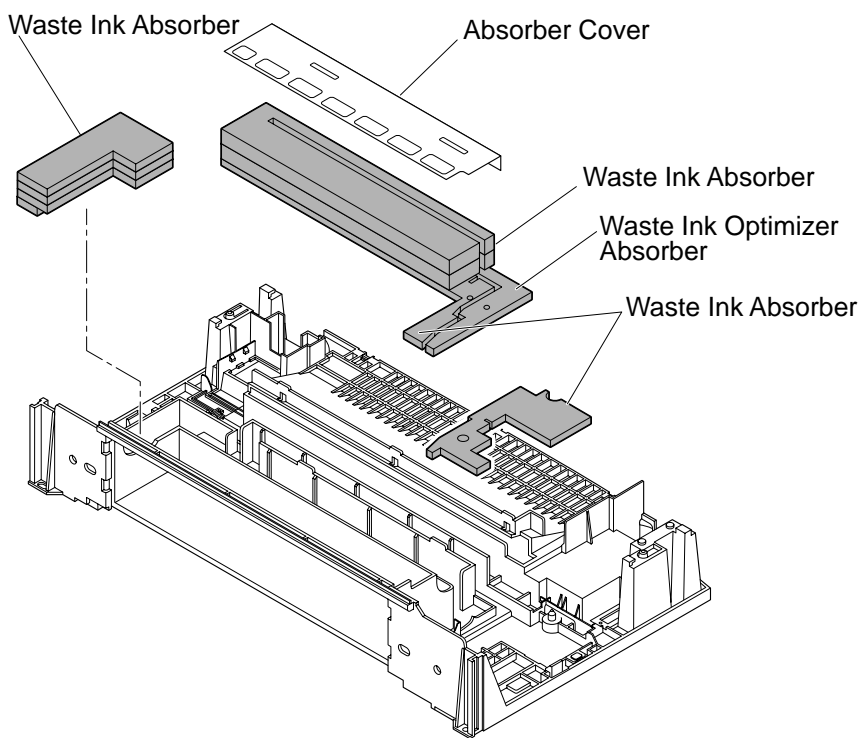


**Figure 5-10 Waste Ink Absorber**

# 5. ADJUSTMENT

## 5.1 Adjustment Locations

### 5.1.1 EEPROM (IC501) and waste ink absorber

When the logic board is replaced, and the EEPROM (IC501) is attached to the new logic board, perform a test print to check the EEPROM data settings. (For details on outputting a self test print, see _"Part 3: 3.6.3 EEPROM list print" (page 3-28)_.
(After the waste ink tank full error has occurred, you cannot check the EEPROM data settings unless the total waste ink level is reset.)
The actual total waste ink level of the waste ink absorbers is compared with the EEPROM data setting to check for a major discrepancy between the waste ink levels. When there is a remarkable discrepancy, the data may be corrupted. If this is the case, replace the EEPROM with a new one. As values have not yet been defined for the EEPROM data settings, initialize the EEPROM after it is attached on the logic board. Also, check the destination setting and replace the waste ink absorbers.
For details of initialize the EEPROM, see _"Part 3: 3.4.2 Service mode" (page 3-24)_.

### 5.1.2 Adjusting the printing position of BJ cartridges

Adjust the printing position of the BJ cartridges in both the horizontal and vertical directions using the printer driver. This adjustment is the same as the adjustment that is carried out when the user installs the printer or replaces the BJ cartridge. For details, see _"Part 3: 1.3.3-3 Installing the BJ cartridge; Adjusting the print head position" (page 3-6)_.

### 5.1.3 Carriage belt tension adjustment

For details, see _"Part 5: 4.2.4 Screw fastening of idle pulley ass'y" (page 5-8)_.

# 6. TROUBLESHOOTING

## 6.1 Overview of Troubleshooting

### 6.1.1 Definition

Troubleshooting involves "error condition diagnosis" and "error recovery."  Error condition diagnosis is required if the cause of an error is unknown, and error recovery is performed if the cause of an error is known.

If the cause of an error is unknown, perform error condition diagnosis, and if it is known, perform error recovery.

### 6.1.2 Precautions for troubleshooting

1. Before starting error condition diagnosis, make sure that all the connectors and ribbon cables are connected.  If the problem occurs at random, be sure to check the connections.
2. If you repair the printer with its case removed and the power cord connected, take special care to prevent electric shock from the power supply unit and shorting on the PC board.
3. Troubleshooting procedures are given in the flowcharts.  The following symbols are used in these flowcharts:

| START/END | Operation | Judgement | Action/Replace | Jump | Stop |
|-----------|-----------|-----------|----------------|------|------|
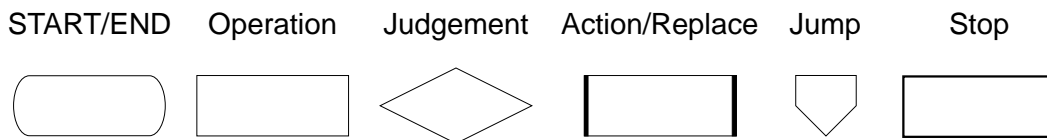
4. If there is a problem with printing quality or paper feed, first check that the printer's installation location and paper meet the required specifications.  Also, check that the printer driver settings are appropriate.
5. After replacement or repair, perform a test print to make sure that the problem has been solved.
6. Several measures may be described in error condition diagnosis and error recovery.  They are shown in each step to be performed to solve the problem.
   perform a test print after completing each step to make sure that the problem has been solved.  If the problem still persists, proceed to the next step.

**Example 1.**

Measure 1: After replacing the carriage ribbon cable, perform a test print to check that the problem has been solved.  If the problem still persists, execute the next measure step 2. which requires replacement of the carriage unit.  If the problem still persists, execute the next measure step 3. which requires replacement of the logic board.

| 1. Check/replace the carriage ribbon cable. |
|---|
| 2. Replace the Carriage unit. |
| 3. Replace the logic board |
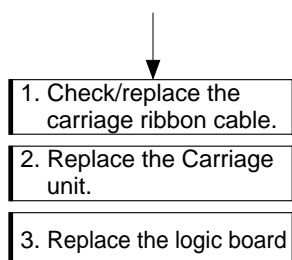
7. After completing troubleshooting, make sure that all connectors have been re-connected correctly, and that all the screws are tight.

## 6.2 Error Condition Diagnosis
### 6.2.1 Diagnosis flowchart
#### (1) Hard Power ON

```
                    ┌──────────────────┐
                    │      START       │
                    └──────────────────┘
                             │
                             ▼
          ┌──────────────────────────────┐
          │ Connect the AC power cord.    │
          │    (hard power ON)            │
          └──────────────────────────────┘
                             │
                             ▼
          ┌──────────────────────────────┐
          │       EEPROM check           │
          └──────────────────────────────┘
                             │
                             ▼
                         ◇ OK? ◇──── No ────┐
                          Yes               ▼
                             │     ┌──────────────────┐
                             │     │  EEPROM error    │
                             ▼     └──────────────────┘
          ┌──────────────────────────────┐
          │  Check analog IC (IC1)        │
          │     of carriage board.        │
          └──────────────────────────────┘
                             │
                             ▼
                         ◇ OK? ◇──── No ────┐
                          Yes               ▼
                             │     ┌──────────────────────┐
                             │     │ Other hardware error │
                             ▼     └──────────────────────┘
          ┌──────────────────────────────┐
          │  Measure rank resistance      │
          │    value of BJ cartridge.     │
          └──────────────────────────────┘
                             │
                             ▼
                         ◇ OK? ◇──── No ────┐
                          Yes               ▼
                             │     ┌──────────────────┐
                             │     │ BJ cartridge error│
                             ▼     └──────────────────┘
          ┌──────────────────────────────┐
          │     Measure voltage           │
          │  compensation value of        │
          │ head temperature sensor.      │
          └──────────────────────────────┘
                             │
                             ▼
                         ◇ OK? ◇──── No ────┐
                          Yes               ▼
                             │     ┌──────────────────┐
                             │     │ BJ cartridge error│
                             ▼     └──────────────────┘
                    ┌──────────────────┐
                    │       END        │
                    └──────────────────┘
```

**(2) Soft Power ON**

Power ON
(soft power ON)

EEPROM error? — Yes → EEPROM error

Beeper: 6 times
ERROR indicator: Repeatedly blinks 9 times.
(See page 5-22)

No

Check carriage
and purge unit.

OK? — No

Yes

Check the sheet feeder
for paper jam

HP sense error

Beeper: 6 times
ERROR indicator: Repeatedly blinks 3 times.
(See page 5-18.)

Carriage error

Beeper: 6 times
ERROR indicator: Repeatedly blinks twice.
(See page 5-16.)

Purge error

Beeper: 6 tmes
ERROR indicator: Repeatedly blinks 4 times.
(See page 5-19.)

OK? — No

Yes

Sheet feeder error

Beeper: 6 times
ERROR indicator: Repeatedly blinks 5 times.
(See page 5-20.)

Paper jam error

Beeper: Twice
ERROR indicator: Lights.
POWER indicator: Blinks.
(See page 5-23.)

BJ cartridge error? — Yes

No

BJ cartridge error

Beeper: 5 times
ERROR indicator: Lights.
POWER indicator: Blinks.
(See page 5-28.)

Other hardware error

Beeper: 8 times
ERROR indicator: Repeatedly blinks 13 times.
(See page 5-22.)

Initial state of
mechanisms OK? — Yes

No

Check waste ink level.

END

OK? — No

Yes

Waste ink full error

Beeper: 6 times
ERROR indicator:
    Repeatedly blinks.
(See page 5-21.)

Next
Page

All BJ Cartridges installed? — No → BJ cartridge error
Beeper: 5 times
ERROR indicator: Lights.
POWER indicator: Blinks.
(See page 5-28.)

All ink tanks installed? — No → No ink tank error
Beeper: 3 times
ERROR indicator: Lights.
POWER indicator: Blinks.
(See page 5-25.)

Check remaining ink level.

OK? — No → Ink-out error
Beeper: 3 times
ERROR indicator: Lights.
POWER indicator: Blinks.
(See page 5-25.)

Check waste ink level.

OK? — No → Waste ink warning
Beeper: 5 times
ERROR indicator: Lights.
(See page 5-21.)

END

**5-15**

### 6.2.2 Error recovery
#### a) Error types

| 1. Carriage Error |
| :--- |

Buzzer: 6 times
*ERROR* indicator: Repeatedly
                         blinks twice.

**\<Cause\>** Carriage position and speed cannot be controlled.
**\<Suspected parts\>** Carriage unit, carriage belt,
carriage cable, carriage shaft, idle pulley,
logic board, carriage driver board,
carriage motor, encoder head
(carriage board), encoder film

**\<Measure\>**

| Visually check carriage drive section. |
| :--- |

- Paper jam, carriage belt wear/deterioration/disconnection
- Defective operation of idle pulley ass'y
- Manually move carriage. Does carriage move smoothly?
- For details on unlocking the carriage and precautions, see *"4.2.1 Unlocking the carriage" (page 5-6)*.

| Check operation of carriage drive section. |
| :--- |

- Is there rotation during initial operation?
- Are the carriage belt and idle pulley abnormal?
- Are there abnormal sounds?

OK? — No → Next Page

Yes ↓

| Wipe encoder film dry, and turn power back ON. |
| :--- |

OK? — Yes → END

No ↓

| **Replace encoder film.** |
| :--- |

OK? — Yes → END

No ↓

| **Replace encoder head (carriage board).** |
| :--- |

OK? — Yes → END

No ↓

| **Replace carriage ribbon cable.** |
| :--- |

**5-16**

Previous Page

Check voltage of carriage motor.

| Measurement Point | Std. Value |
|---|---|
| Logic board J801 Pin No. 1 | DC35 ±1.5V |

OK?

No → Replace power cord.

Yes

OK?

No → Replace power supply unit.

Yes

END

1

J801

Logic Board

Check carriage motor.

| Measurement Point | | Std. Value |
|---|---|---|
| Carriage driver board | Pin No. | Approx. 19 Ω |
| J2 | 1-2 | |

OK?

No → Replace logic board.

Yes

END

J2

Carriage Driver Board

OK?

No → Replace carriage driver board.

Yes

END

## 2. HP Sense Error

Buzzer: 6 times
*ERROR* indicator: Repeatedly
          blinks 3 times.

**<Cause>** Home position cannot be detected.

**<Suspected parts>** Carriage unit, carriage belt, carriage cable, carriage shaft, idle pulley, logic board, carriage driver board, carriage motor, encoder head (carriage board), encoder film

**<Measure>** See ⌐1. Carriage Error⌐ *(page 5-16).*

## 3. Purge Error

Buzzer: 6 times
*ERROR* indicator: Repeatedly
blinks 4 times.

**<Cause>** Purge sensor cannot be initialized.
**<Suspected parts>** Purge unit, purge motor,
purge motor drive transmission gear,
logic board, power supply unit

**<Measure>**

Check purge sensor

| Measurement Point | Sensor | Std. Value |
|---|---|---|
| Logic board J903 Pin No. 1 | Open | Low level |
| | Close | High level |

or

| Measurement Point | Sensor | Std. Value |
|---|---|---|
| Logic board IC2 (printer controller) Pin No. 259 | Open | Low level |
| | Close | High level |

• Remove the purge unit, and manually turn the drive gear with the power ON to open and close the sensor, and check the measurement points.

OK?

No → Replace purge unit.

Yes

Check purge unit operation.

• Remove the purge unit, manually rotate the drive transmission gear sufficiently, and check that the gear moves smoothly.

OK?

No → Replace the purge unit.

Yes

Check purge motor.

J1101

Logic Board

| Measurement Point | | Std. Value |
|---|---|---|
| J1101 | 1-2 | Approx. 11 Ω |
| | 3-4 | |

Red — 1 — B
Orange — 2 — B̄
Black — 3 — A
Brown — 4 — Ā

Approx. 11 Ω/phase

Purge Motor

Drive Transmission Gear

Purge Unit

OK?

No → Replace purge motor.

Yes

Replace logic board.

OK?

Yes → END

No

Replace power supply unit.

## 4. Sheet Feeder Error

Buzzer: 6 times
*ERROR* indicator: Repeatedly
blinks 5 times.

**<Cause>** The sheet feeder cannot be initialized.
**<Suspected parts>** Sheet feeder unit, pick-up roller,
sheet feeder drive gear, purge motor,
purge motor drive gear,
pick-up roller sensor, logic board,
encoder head (carriage board),
encoder film

**<Measure>**

Power ON

Visually check rotation
of the sheet feeder
pick-up roller.

OK? — Yes → END

No ↓

Check operation of
sheet feeder unit.
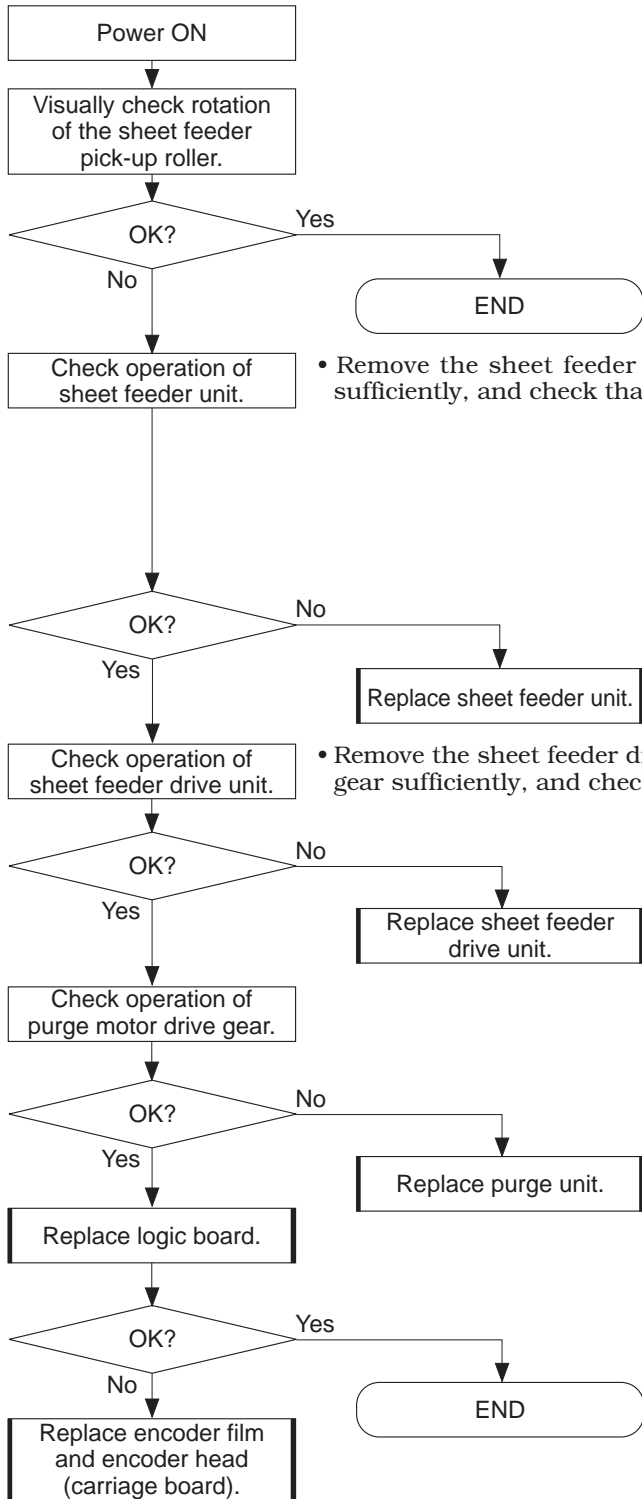
• Remove the sheet feeder unit, manually rotate the drive gear
sufficiently, and check that the pick-up roller moves smoothly.

OK? — No → Replace sheet feeder unit.

Yes ↓

Drive Gear — Sheet Feeder Unit

Check operation of
sheet feeder drive unit.
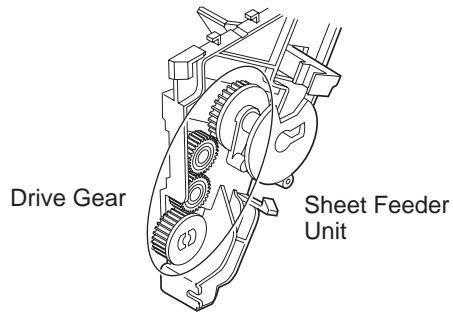
• Remove the sheet feeder drive unit, and manally rotate the drive
gear sufficiently, and check that the gear moves smoothly.

OK? — No → Replace sheet feeder drive unit.

Yes ↓

Sheet Feeder Drive Unit.

Check operation of
purge motor drive gear.

Drive Gear

OK? — No → Replace purge unit.

Yes ↓

Replace logic board.

OK? — Yes → END

No ↓

Replace encoder film
and encoder head
(carriage board).

Drive Gear

Purge Unit

**5-20**
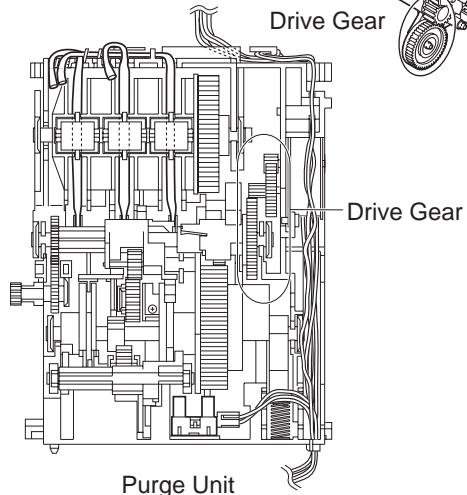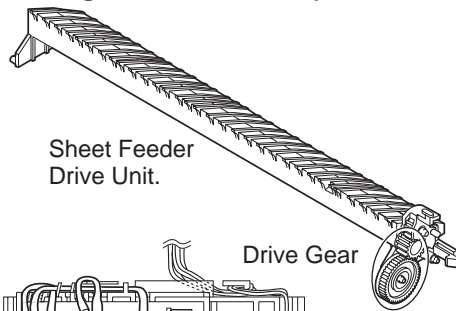
<table>
<tr><td>

## 5. Waste Ink Warning/Waste Ink Full Error

</td></tr>
</table>

Buzzer: 5 times
*ERROR* indicator: Lights. (waste Ink warning)
Buzzer: 6 times
*ERROR* indicator: Repeatedly blinks 7 times.
　　　　　　　　　(waste ink full error)

**<Cause>** The sum of waste ink level in the ink absorber and the waste ink optimizer level in the ink optimizer absorber has reached 95% (waste ink warning) or 100% (waste ink full error)*[1].

**<Suspected parts>** Waste ink absorber,
　　　　　　　　　Waste ink optimizer absorber,
　　　　　　　　　EEPROM (socket type), logic board

**<Measure>**

```
        ┌─────────────────────┐
        │ Visually check waste │
        │   ink absorber.      │
        └──────────┬──────────┘
                   │
                   ▼
              ◇ Full? ◇──── No ────┐
             Yes │                 │
                 │                 ▼
                 │      ┌─────────────────────────┐
                 │      │   Replace EEPROM or      │
                 ▼      │     logic board.         │
   ┌────────────────────────┐  │        +            │
   │ Replace waste ink      │  │ *2 Initialize EEPROM │
   │ absorber,              │  │        +            │
   │   +                    │  │ Replace waste ink    │
   │ *2 clear waste ink     │  │ absorber.           │
   │    level.              │  └─────────────────────┘
   └────────────────────────┘
```
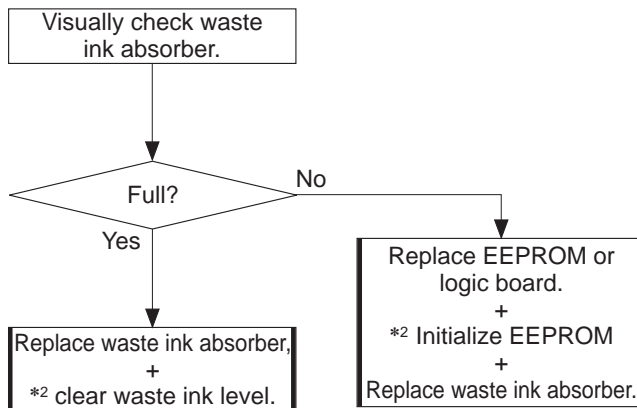
*[1] Perform the EEPROM list print in the service mode (For details, see *"Part 3: 3.4.2 Service mode" (page 3-24)*.
Check if the sum of EEPROM Data's (7) and (8) (See *"Part 3: 3.6.3 EEPROM list print" (page 3-28)*))
is $\left\{ \begin{array}{l} 1,705,250 \text{ (Waste Ink Warning)} \\ 1,795,000 \text{ (Waste Ink Full Error)} \end{array} \right.$

*[2] For details on how to clear waste ink level and initialize EEPROM, see *"Part 3: 3.4.2 Service mode" (page 3-24)*.

## 6. BJ Cartridge Temperature Rise Error

**<Cause>** The potential difference calculated by the head temperature sensor inside the BJ cartridge is at or higher than the preset temperature.

**<Suspected parts>** BJ cartridge

Buzzer: 6 times
*ERROR* indicator: Repeatedly blinks 8 times.

**<Measure>** Turn the printer OFF, leave for several minutes to allow it to cool down, and turn the power back ON.
If the error is redisplayed, see the Measure in 11. BJ Cartridge Error *(page 5-28).*

## 7. EEPROM Error

**<Cause>** An error occurred during the EEPROM check.

**<Suspected parts>** EEPROM (socket type), logic board

Buzzer: 6 times
*ERROR* indicator: Repeatedly blinks 9 times.

**<Measure>** Replace the EEPROM or logic board, and replace the waste ink absorber, and *initialize EEPROM.
For details on how to initialize EEPROM, see *"Part 3: 3.4.2 Service mode" (page 3-24)*.

## 8. Other Hardware Error

**<Cause>** (1) The BJ cartridge reference voltage (VH) is outside the specified range.
(2) The analog IC (IC1) on the carriage board is malfunctioning.
(3) An error occurred during the printer controller (IC2) read/write check.

Buzzer: 6 times
*ERROR* indicator: Repeatedly blinks 13 times.

**<Suspected parts>** BJ cartridge, carriage board, logic board

**<Measure>**



**5-22**

<div style="border:1px solid black">

## 9. Paper Pick-up Error/ Paper Jam Error

</div>

Beeper: Twice
*ERROR* indicator: Lights.

**&lt;Cause&gt;** (1) Printing paper is not picked up even if the pick-up operation is carried out.

(2) Printing paper is not ejected even if the paper eject operation is carried out.

**&lt;Suspected parts&gt;** Sheet feeder unit, cassette unit, paper end sensor, paper end sensor arm, pinch roller, paper feed roller, eject roller

**&lt;Measure&gt;** (1) When paper is picked up from the sheet feeder unit

Turn on the power again and print the nozzle check pattern.

OK? — Yes → END

No ↓

Check operation of paper feed section.

• Do the paper feed motor, paper feed roller and eject rollers, etc., rotate during initial operation?
• Are there abnormal sounds?
• Is the paper feed motor out of phase?

OK? — No → Repair or replace defective part.

Yes ↓

Check pick-up.

• Is paper picked up normally from the sheet feeder when the pick-up roller rotates?

OK? — No → Check sheet feeder unit.

• Rubber sleeve of pick-up roller
• Abnormal dirtying/wear/deterioration of separation sheet
• Deformed or broken gears
• Check that paper is under the yellow claw.

Yes ↓

Check pick-up roller sensor.

OK? — No → Replace pick-up roller shaft.

Yes ↓

Check operation of pick-up roller sensor

OK? — No → Replace logic board.

Yes ↓

Check paper end sensor arm.

OK? — No → Replace paper end sensor arm.

Yes ↓

Replace paper end sensor.

(2) When paper is picked up from cassette unit

Turn power ON again, and print nozzle check pattern.

OK? — Yes → END

No

Check operation of paper feed section.

• Do the paper feed motor, paper feed roller and eject rollers rotate during initial operation?
• Are there abnormal sounds?
• Is the paper feed motor out of phase?

OK? — No → Repair or replace defective part.

Yes

Check pick-up.

• Is paper picked up normally from the cassette when the cassette pick-up roller rotates?

OK? — No → Check cassette unit.

Yes

• Rubber sleeve of pick-up roller
• Abnormal dirtying/wear/deterioration of separation sheet
• Deformed or broken gears
• Mechanical clutch section (upper cassette)
• Check that paper is under the cassette claw.

Check paper end sensor arm.

OK? — No → Replace paper end sensor arm.

Yes

Replace paper end sensor.

**5-24**

## 10. Ink-out Error/ No Ink Tank Error

Buzzer: 3 times
*ERROR* indicator: Lights.

**\<Cause\>** (1) The ink tank has run out of ink.
(2) The ink tank is not installed.

**\<Suspected parts\>** Ink tank, ink sensor unit, logic board, anti-reflection sheet (fixed on inner side of main cover), encoder head (carriage board), encoder film

**\<Measure\>** (1) Ink-out error

```
        ┌─────────────────────────┐
        │ Printer in environment  │
        │ subject to external     │
        │ light?                  │
        └─────────────────────────┘
                    │
                    ▼
              ◇ OK? ◇ ──── No ──────┐
            Yes │                    ▼
                │           ┌──────────────────────────┐
                │           │ Use printer in environment│
                │           │ not subject to external   │
                │           │ light.                    │
                │           └──────────────────────────┘
                ▼
        ┌─────────────────────┐
        │ Visually check ink  │
        │ level in ink tank.  │
        └─────────────────────┘
                    │
                    ▼
            ◇ Sufficient? ◇ ── No ──┐
            Yes │                    ▼
                │           ┌──────────────────────────┐
                │           │ Replace with new ink tank.│
                ▼           └──────────────────────────┘
            ▽ Next
              Page
```

**5-25**

Previous
Page

Check anti-reflection sheet.

• Dirty anti-reflection sheet
• External light disturbance?

Main Cover        Anti-reflection Sheet

Ink Sensor

OK? — No → Replace anti-reflection sheet.

Yes

Check ink sensor unit.

1    J901

Ink Sensor Unit

| Measurement Point | Ink Sensor | Std. Value |
|---|---|---|
| J901 | Interrupted | Approx. 0V |
| Pin No. 1 | Not interupted | Approx. 4V |

Logic Board

OK? — Yes → END

No

Replace ink sensor unit.

**5-26**

(2) "No ink tank" error

```
┌─────────────────────┐
│ Check installation of│
│     ink tank.        │
└─────────────────────┘
          │
          ▼
      ╱─────────╲          No      ┌──────────────────┐
     ╱ Installed? ╲────────────────│  Install ink tank.│
      ╲─────────╱                  └──────────────────┘
          │ Yes
          ▼
┌─────────────────────┐
│ Check ink sensor unit.│
└─────────────────────┘
```

```
                    1    J901

                            Ink Sensor Unit




                            Logic Board
```

| Measurement Point | Ink Sensor | Std. Value |
|---|---|---|
| J901 | Interrupted | Approx. 0V |
| Pin No. 1 | Not interrupted | Approx. 4V |

```
      ╱─────────╲          Yes
     ╱    OK?     ╲────────────────┐
      ╲─────────╱                  ▼
          │ No                 ╭─────────╮
          ▼                    │   END   │
┌─────────────────────┐        ╰─────────╯
│ Replace ink sensor unit.│
└─────────────────────┘
          │
          ▼
      ╱─────────╲          Yes
     ╱    OK?     ╲────────────────┐
      ╲─────────╱                  ▼
          │ No                 ╭─────────╮
          ▼                    │   END   │
┌─────────────────────┐        ╰─────────╯
│  Replace encoder film│
│   and encoder head   │
│   (carriage board)   │
└─────────────────────┘
```

**5-27**
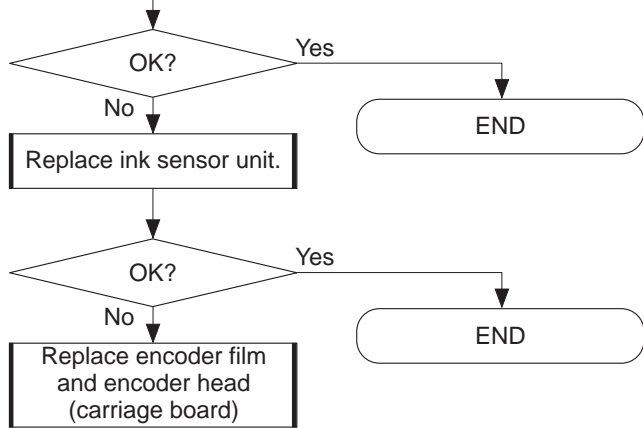
## 11. BJ Cartridge Error

Buzzer: 4 times
*ERROR* indicator: Lights.

**<Cause>** (1) An error in the rank resistance of the BJ cartridge has been detected.
(2) An error in the voltage value of the temperature sensor in the BJ cartridge has been detected.
(3) The connection between the contact sections of the BJ cartridge and the carriage ribbon cable is defective.

**<Suspected parts>** BJ cartridge, carriage unit, carriage board, carriage ribbon cable, logic board

**<Measure>**

```
        Install BJ Cartridge.
                |
            Power ON
                |
         Error display? ──No──→ END
                |
               Yes
                |
    Visually check contact        • Is ink or foreign matter adhesed?
    sections of BJ cartridge      • Is contact section deformed or shifted?
    and carriage ribbon cable.
                |
              OK? ──No──→ Clean contact sections.
                |                      |
               Yes                     |
                |                       |
    Replace BJ cartridge.      Re-install BJ cartridge.
                |                      |
                └───────┬──────────────┘
                        |
                      OK? ──No──→ END
                        |
                       Yes
                        |
         1. Check and replace
            carriage ribbon cable.
         2. Replace carriage
            board.
         3. Replace logic board.
```

**5-28**

**b) Developer unit**

| 1. Printer does not power ON | **<Example>** • Pressing the *POWER* button does not turn the power ON. |
|---|---|

**<Suspected parts>** Power supply unit, logic board, panel board, power cord

**<Measure>**

Check connection between power cord outlet and printer

OK? — No → Re-connect.

Yes ↓

Check output voltage of power supply unit

CN4
CN1
CN2

| | CN1 |
|---|---|
| Measurement Point | Std. Value |
| Pin No. 2 | +5±0.2V |

| | | CN2 |
|---|---|---|
| Measurement Point | | Std. Value |
| Pin No. 2 | 2* | Approx. +10.4V |
| | 4 | +35±0.2V |

*During measurment, short across pins 1 and 3 of CN1.

OK? — No → Voltage output? — Partially → Replace power supply unit.

Yes ↓                              No ↓

Replace logic board.              Check fuse of power supply unit.

OK? — Yes → END                   OK? — Yes → Replace power supply unit.

No ↓                              No ↓

Check panel board switches.       Replace fuse of power supply unit.

OK? — Yes → END

No ↓

Replace panel board.

## 2. Defective Printing <1> Printing is not Executed

**<Example>** • All colors are not printed.
• Only specific colors are not printed.

**<Suspected parts>** BJ cartridge, ink tank, purge unit, carriage ribbon cable, carriage board, logic board

**<Measure>**

```
┌─────────────────────┐
│  Remove & install   │
│  the BJ cartridge.  │
└─────────────────────┘
          │
┌─────────────────────┐
│ Execute head cleaning│
│ and head refreshing, │
│    once each.*      │
└─────────────────────┘
          │
┌─────────────────────┐
│   Execute nozzle    │
│   check print.      │
└─────────────────────┘
          │
       ◇ OK? ◇ ──No──┐
          │          │
         Yes         ▼
          │    ┌──────────────────────┐
          ▼    │ 1. Replace ink tank. │
      ( END )  └──────────────────────┘
               ┌──────────────────────┐
               │ 2. Replace BJ cartridge. │
               └──────────────────────┘
                          │
                       ◇ OK? ◇ ──No──┐
                          │           │
                         Yes          ▼
                          │    ┌──────────────────────────┐
                          ▼    │ 1. Replace logic board.  │
                      ( END )  └──────────────────────────┘
                               ┌──────────────────────────┐
                               │ 2. Replace carriage board.│
                               └──────────────────────────┘
                               ┌──────────────────────────┐
                               │ 3. Replace carriage      │
                               │    ribbon cable.         │
                               └──────────────────────────┘
                               ┌──────────────────────────┐
                               │ 4. Replace purge unit.   │
                               └──────────────────────────┘
```
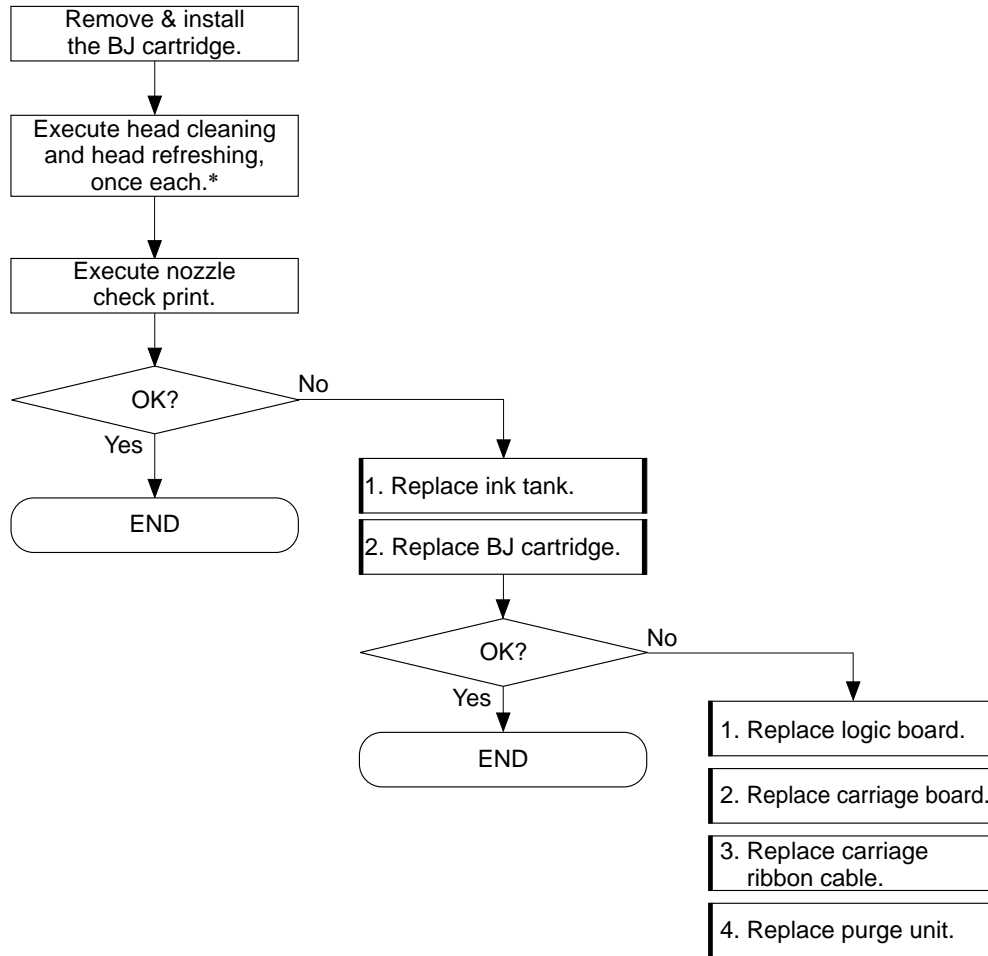
\* Refer to *Part 3: 3.3.1 Maintenance settable items (page 3-19)* or *Part 3: 3.4.1 Cleaning the BJ cartridge (page 3-23)*.

3. Defective
   Printing <2>
   Other Print
   Defect

| Symptoms | Cause | Measure |
|---|---|---|
| • Spur marks appear. | Spurs have deformed. | Replace the spurs. |
| • Corrupted characters | Print data still remaining. | Turn the printer and computer OFF then back ON again. |
| | Inappropriate printer driver settings | Select the printer driver for the BJC-8500. |
| • Density difference | Rubber scraps attached to the rubber sleeve of the pick-up roller on the sheet feeder unit. | Wipe the pick-up roller's rubber sleeves using a cotton cloth (e.g. handkerchief) moistened with water and firmly wrung. (For details, see BJC-8500 "User's Manual.") |
| • Smeared paper | Non-ejection of ink optimizer | Check ejection in the nozzle check pattern after executing cleaning. If ink optimizer is not ejected, replace the ink tank and BJ cartridge. |
| | | Change the paper setting in the printer driver. |
| • Misaligned vertical lines appear. | The dot accuracy position of ink ejected from the print head is not adjusted. | Adjust the print head position in the printer driver. (refer to page 3-6) |
| | Printing quality in the printer driver is low. | Set printing quality to higher grade in the printer driver. |
| • Dirty paper | Long ink optimizer fixing time | Check "Pause Page" in Maintenance on the printer driver. (refer to page 3-19) |

For details, refer to "BJC-8500 User's Manual."

# 7. CONNECTOR POSITION & SIGNAL ASSIGNMENT

## 7.1 Logic Board
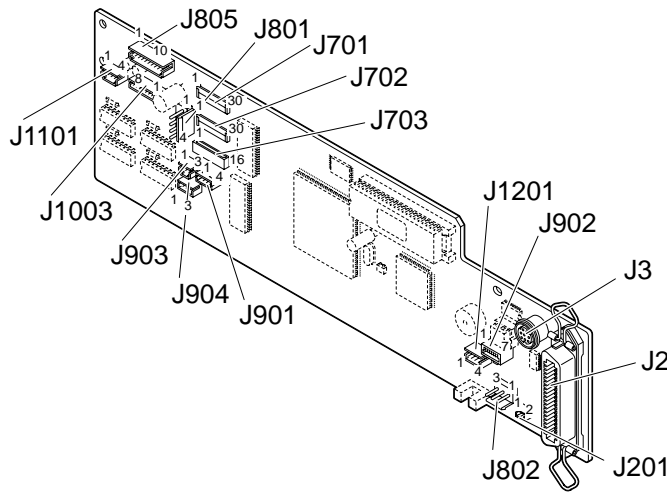


**Figure 5-11 Logic Board**

### J2 (Parallel interface connector)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | DATA STROBE | IN | See *"Part 2.3.1 Parallel interface" (page 2-13)*. |
| 2 | DATA1 | IN/OUT | |
| ≀ | ≀ | ≀ | |
| 9 | DATA8 | IN/OUT | |
| 10 | ACKNLG | OUT | |
| 11 | BUSY | OUT | |
| 12 | P.E. | OUT | |
| 13 | SELECT | OUT | |
| 14 | AUTO FEED XT | IN | |
| 15 | N.C. | … | |
| 16 | GND | … | |
| 17 | GND | … | |
| 18 | Peripheral Logic High | … | |
| 19 | DATA STROBE-RET | … | |
| 20 | DATA1-RET | … | |
| ≀ | ≀ | ≀ | |
| 27 | DATA8-RET | … | |
| 28 | ACKNLG-RET | … | |
| 29 | BUSY-RET | … | |
| 30 | P.E.-RET | … | |
| 31 | INIT | IN | |
| 32 | FAULT | OUT | |
| 33 | GND | … | |
| 34 | N.C. | … | |
| 35 | Peripheral Logic High | … | |
| 36 | SELECT INX | IN | |

### J3 (Serial interface connector)

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | SCLK | OUT | Signal lock |
| 2 | ... | ... | Unused |
| 3 | TXD- | OUT | Transmit data |
| 4 | S-GND | ... | Ground |
| 5 | RXD- | IN | Receive data |
| 6 | TXD+ | OUT | Transmit data |
| 7 | ... | ... | Unused |
| 8 | RXD+ | IN | Receive data |
| Shield | PG | ... | Shield ground of interface cable |

### J201 (Fan control signal cable connector)

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | $\overline{\text{FANON}}$ | OUT | Fan drive signal |
| 2 | GND | ... | Ground |

### J701 (Carriage cable connector)

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | VCC | ... | Logic drive voltage (5.0V±0.2VDC) |
| 2 | VCC | ... | Logic drive voltage (5.0V±0.2VDC) |
| 3 | VCC | ... | Logic drive voltage (5.0V±0.2VDC) |
| 4 | VCC | ... | Logic drive voltage (5.0V±0.2VDC) |
| 5 | SCKB | OUT | Color head data transfer clock |
| 6 | SDA<5> | OUT | Serial data A, bit 5: Color head serial data |
| 7 | SDA<4> | OUT | Serial data A, bit 4: Color head serial data |
| 8 | SDA<3> | OUT | Serial data A, bit 3: Color head serial data |
| 9 | SDB<5> | OUT | Serial data B, bit 5: Color head serial data |
| 10 | SDB<4> | OUT | Serial data B, bit 4: Color head serial data |
| 11 | SDB<3> | OUT | Serial data B, bit 3: Color head serial data |
| 12 | GND | ... | Ground |
| 13 | BGB | OUT | Block gate B: Color head data latch |
| 14 | GND | ... | Ground |
| 15 | BEB<3> | OUT | Block enable bit 3: Color head block enable |
| 16 | BEB<2> | OUT | Block enable bit 2: Color head block enable |
| 17 | BEB<1> | OUT | Block enable bit 1: Color head block enable |
| 18 | BEB<0> | OUT | Block enable bit 0: Color head block enable |
| 19 | HE<5> | OUT | Heat enable bit 5: Color head heat enable |
| 20 | HE<4> | OUT | Heat enable bit 4: Color head heat enable |
| 21 | HE<3> | OUT | Heat enable bit 3: Color head heat enable |
| 22 | SHE<5> | OUT | Short heat enable bit 5: Color head short heat enable |
| 23 | SHE<4> | OUT | Short heat enable bit 4: Color head short heat enable |
| 24 | SHE<3> | OUT | Short heat enable bit 3: Color head short heat enable |
| 25 | GND | ... | Ground |
| 26 | ENA | OUT | Encoder A: Linear encoder A phase |
| 27 | GND | ... | Ground |
| 28 | ENB | OUT | Encoder B: Linear encoder B phase |
| 29 | GND | ... | Ground |
| 30 | D5V | ... | Linear encoder drive voltage |

### J702 (Carriage cable connector)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | SCKA | OUT | Black head data transfer clock |
| 2 | SDA<2> | OUT | Serial data A, bit 2: Black head serial data |
| 3 | SDA<1> | OUT | Serial data A, bit 1: Black head serial data |
| 4 | SDA<0> | OUT | Serial data A, bit 0: Black head serial data |
| 5 | SDB<2> | OUT | Serial data B, bit 2: Black head serial data |
| 6 | SDB<1> | OUT | Serial data B, bit 1: Black head serial data |
| 7 | SDB<0> | OUT | Serial data B, bit 0: Black head serial data |
| 8 | GND | ... | Ground |
| 9 | BGA | OUT | Block gate A: Black head data latch |
| 10 | GND | ... | Ground |
| 11 | BEA<3> | OUT | Block enable A bit 3: Black head block enable |
| 12 | BEA<2> | OUT | Block enable A bit 2: Black head block enable |
| 13 | BEA<1> | OUT | Block enable A bit 1: Black head block enable |
| 14 | BEA<0> | OUT | Block enable A bit 0: Black head block enable |
| 15 | HE<2> | OUT | Heat enable bit 2: Black head heat enable |
| 16 | HE<1> | OUT | Heat enable bit 1: Black head heat enable |
| 17 | HE<0> | OUT | Heat enable bit 0: Black head heat enable |
| 18 | SHE<2> | OUT | Short heat enable bit 2: Black head short heat enable |
| 19 | SHE<1> | OUT | Short heat enable bit 1: Black head short heat enable |
| 20 | SHE<0> | OUT | Short heat enable bit 0: Black head short heat enable |
| 21 | HTEMPA | IN | Head temperature signal (analog) |
| 22 | HTEMPB | IN | Head temperature signal (analog) |
| 23 | DASH | OUT | Analog IC control (AC/DC sample hold signal) |
| 24 | DADT | OUT | Analog IC control (serial data signal) |
| 25 | DACK | OUT | Analog IC control (data transfer clock signal) |
| 26 | $\overline{\text{DLD}}$ | OUT | Analog IC control (data load signal) |
| 27 | HRANK | IN | Head rank signal (analog) |
| 28 | $\overline{\text{H5VON}}$ | OUT | Head 5V enable signal |
| 29 | GND | ... | Ground |
| 30 | GND | ... | Ground |

### J703 (Carriage cable connector)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 2 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 3 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 4 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 5 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 6 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 7 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 8 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 9 | GND | ... | Head drive voltage return |
| 10 | GND | ... | Head drive voltage return |
| 11 | GND | ... | Head drive voltage return |
| 12 | GND | ... | Head drive voltage return |
| 13 | GND | ... | Head drive voltage return |
| 14 | GND | ... | Head drive voltage return |
| 15 | GND | ... | Head drive voltage return |
| 16 | GND | ... | Head drive voltage return |

### J801 (Power supply unit connection)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | 35V | ... | Mechanism drive voltage (35V±0.2VDC) |
| 2 | GND | ... | Ground |
| 3 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 4 | GND | ... | Ground |

### J802 (Power supply unit connection)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | P11ON | OUT | Head drive voltage enable signal |
| 2 | 5V | ... | Logic drive voltage (5.0V±0.2VDC) |
| 3 | GND | ... | Ground |

### J805 (Lower cassette connection)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | VM | ... | Mechanism drive voltage |
| 2 | OPT | OUT | Plunger (solenoid) drive signal |
| 3 | GND | ... | Ground |
| 4 | CS02 | OUT | Cassette selection signal |
| 5 | CS01 | OUT | Cassette selection signal |
| 6 | CSENS5 | IN | Paper size detection signal |
| 7 | CSENS4 | IN | Paper size detection signal |
| 8 | CSENS3 | IN | Paper size detection signal |
| 9 | CSENS2 | IN | Paper size detection signal |
| 10 | CSENS1 | IN | Paper size detection signal |

### J901 (Ink sensor unit connection)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | IZSEN | IN | Ink/ink tank detection signal (analog) |
| 2 | GND | ... | Ground |
| 3 | VM | ... | Sensor drive voltage |
| 4 | INKP | OUT | Sensor drive signal |

### J902 (Panel board connection)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | LED0 | OUT | POWER indicator drive signal |
| 2 | LED1 | OUT | ERROR indicator drive signal |
| 3 | IRSNS | IN | Cover open detection signal |
| 4 | SW0 | IN | RESUME switch |
| 5 | SW1 | IN | POWER switch |
| 6 | SW2 | IN | BJ Cartridge Replacement switch |
| 7 | GND | ... | Ground |

### J903 (Purge sensor connector)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | PGHP | IN | PG sensor detection signal |
| 2 | GND | ... | Ground |
| 3 | D5V | ... | Sensor drive voltage |

### J904 (Paper end sensor connector)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | — | ... | Sensor drive voltage |
| 2 | GND | ... | Ground |
| 3 | PESEN | ... | Paper end sensor detection signal |

### J1003 (Carriage motor connector)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | $\overline{\text{CRPWM}}$ | OUT | Motor speed control signal |
| 2 | DCMON | OUT | Motor enable signal |
| 3 | DCDIR | OUT | Motor rotation direction control signal |
| 4 | $\overline{\text{DCBRK}}$ | OUT | Motor brake signal |
| 5 | GND | ... | 5V return |
| 6 | 5V | ... | Logic drive voltage (5.0V±0.2VDC) |
| 7 | 35V | ... | Motor drive voltage |
| 8 | GND | ... | Motor drive voltage return |

### J1101 (Purge motor connector)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | — | OUT | B phase+ |
| 2 | — | OUT | B phase- |
| 3 | — | OUT | A phase+ |
| 4 | — | OUT | A phase- |

### J1201 (Paper feed motor connector)

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | — | OUT | A phase+ |
| 2 | — | OUT | A phase- |
| 3 | — | OUT | B phase+ |
| 4 | — | OUT | B phase- |

### 7.2 Carriage Board
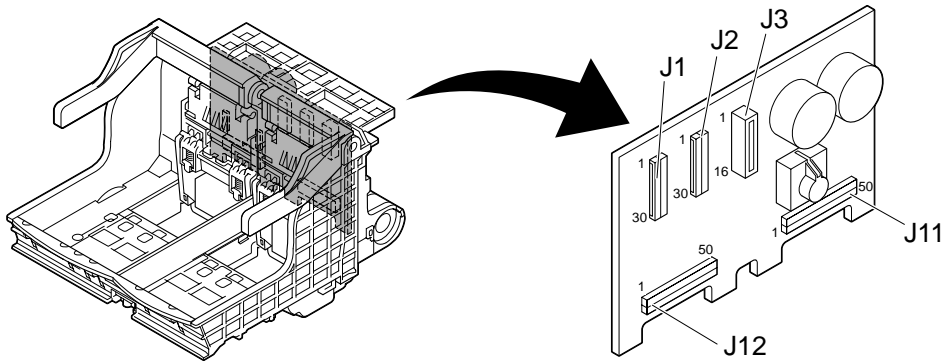


**Figure 5-12 Carriage Board**

#### J1 (Carriage cable connector)

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | D5V | ... | Linear encoder drive voltage |
| 2 | GND | ... | Ground |
| 3 | ENB | OUT | Encoder B: Linear encoder B phase |
| 4 | GND | ... | Ground |
| 5 | ENA | OUT | Encoder A: Linear encoder A phase |
| 6 | GND | ... | Ground |
| 7 | $\overline{SHE3}$ | IN | Short heat enable bit 3: Color head short heat enable bit |
| 8 | $\overline{SHE4}$ | IN | Short heat enable bit 4: Color head short heat enable bit |
| 9 | $\overline{SHE5}$ | IN | Short heat enable bit 5: Color head short heat enable bit |
| 10 | $\overline{HE3}$ | IN | Heat enable bit 3: Color head heat enable |
| 11 | $\overline{HE4}$ | IN | Heat enable bit 4: Color head heat enable |
| 12 | $\overline{HE5}$ | IN | Heat enable bit 5: Color head heat enable |
| 13 | BEB0 | IN | Block enable B bit 0: Color head block enable |
| 14 | BEB1 | IN | Block enable B bit 1: Color head block enable |
| 15 | BEB2 | IN | Block enable B bit 2: Color head block enable |
| 16 | BEB3 | IN | Block enable B bit 3: Color head block enable |
| 17 | GND | ... | Ground |
| 18 | BGB | IN | Block gate B: Color head data latch |
| 19 | GND | ... | Ground |
| 20 | SDB3 | IN | Serial data B bit 3: Color head serial data |
| 21 | SDB4 | IN | Serial data B bit 4: Color head serial data |
| 22 | SDB5 | IN | Serial data B bit 5: Color head serial data |
| 23 | SDA3 | IN | Serial data A bit 3: Color head serial data |
| 24 | SDA4 | IN | Serial data A bit 4: Color head serial data |
| 25 | SDA5 | IN | Serial data A bit 5: Color head serial data |
| 26 | SCKB | IN | Color head data transfer clock |
| 27 | 5V | ... | Logic drive voltage (5.0V±0.2VDC) |
| 28 | 5V | ... | Logic drive voltage (5.0V±0.2VDC) |
| 29 | 5V | ... | Logic drive voltage (5.0V±0.2VDC) |
| 30 | 5V | ... | Logic drive voltage (5.0V±0.2VDC) |

### J2 (Carriage cable connector)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | GND | ... | Ground |
| 2 | GND | ... | Ground |
| 3 | $\overline{\text{H5VON}}$ | IN | Head 5V enable signal |
| 4 | RNKOUT | OUT | Head rank signal (analog) |
| 5 | $\overline{\text{DLD}}$ | IN | Analog IC control (data load signal) |
| 6 | DASLK | IN | Analog IC control (data transfer clock signal) |
| 7 | DADT | IN | Analog IC control (serial data signal) |
| 8 | $\overline{\text{DASH}}$ | IN | Analog IC control (AC/DC sample hold signal) |
| 9 | DSOUT2 | OUT | Head temperature signal (analog) |
| 10 | DSOUT1 | OUT | Head temperature signal (analog) |
| 11 | $\overline{\text{SHE0}}$ | IN | Short heat enable bit 0: Black head short heat enable |
| 12 | $\overline{\text{SHE1}}$ | IN | Short heat enable bit 1: Black head short heat enable |
| 13 | $\overline{\text{SHE2}}$ | IN | Short heat enable bit 2: Black head short heat enable |
| 14 | $\overline{\text{HE0}}$ | IN | Heat enable bit 0: Black head heat enable |
| 15 | $\overline{\text{HE1}}$ | IN | Heat enable bit 1: Black head heat enable |
| 16 | $\overline{\text{HE2}}$ | IN | Heat enable bit 2: Black head heat enable |
| 17 | BEA0 | IN | Block enable A bit 0: Black head block enable |
| 18 | BEA1 | IN | Block enable A bit 1: Black head block enable |
| 19 | BEA2 | IN | Block enable A bit 2: Black head block enable |
| 20 | BEA3 | IN | Block enable A bit 3: Black head block enable |
| 21 | GND | ... | Ground |
| 22 | BGA | IN | Block gate A: Black head data latch |
| 23 | GND | ... | Ground |
| 24 | SDB0 | IN | Serial data B bit 0: Black head serial data |
| 25 | SDB1 | IN | Serial data B bit 1: Black head serial data |
| 26 | SDB2 | IN | Serial data B bit 2: Black head serial data |
| 27 | SDA0 | IN | Serial data A bit 0: Black head serial data |
| 28 | SDA1 | IN | Serial data A bit 1: Black head serial data |
| 29 | SDA2 | IN | Serial data A bit 2: Black head serial data |
| 30 | SCKA | IN | Black head data transfer clock |

### J3 (Carriage cable connector)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | GND | ... | Head drive voltage return |
| 2 | GND | ... | Head drive voltage return |
| 3 | GND | ... | Head drive voltage return |
| 4 | GND | ... | Head drive voltage return |
| 5 | GND | ... | Head drive voltage return |
| 6 | GND | ... | Head drive voltage return |
| 7 | GND | ... | Head drive voltage return |
| 8 | GND | ... | Head drive voltage return |
| 9 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 10 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 11 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 12 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 13 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 14 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 15 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 16 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |

### J11 (BJ Cartridge cable connector)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | DI2A (C-Di1A:Bk2) | IN | Black head diode anode |
| 2 | RNK2 (C-Rank:Bk2) | IN | Black head rank signal |
| 3 | BEA2 (BE2:Bk head) | OUT | Block enable A bit 2: Black head block enable |
| 4 | BEA3 (BE3:Bk head) | OUT | Block enable A bit 3: Black head block enable |
| 5 | $\overline{\text{SHE2}}$ (C-SHE:Bk2) | OUT | Short heat enable bit 2: Black head short heat enable |
| 6 | SDB2 (C-Data2:Bk2 odd) | OUT | Serial data B bit 2: Black head serial data |
| 7 | SDA2 (C-Data1:Bk even) | OUT | Serial data A bit 2: Black head serial data |
| 8 | DI2B (C-Di2A:Bk2) | IN | Black head diode anode |
| 9 | $\overline{\text{HE2}}$ (C-HE:Bk2) | OUT | Heat enable bit 2: Black head heat enable |
| 10 | ID (ID:Bk head) | IN | Black head ID signal |
| 11 | DI1A (B-Di1A:S) | IN | Black head diode anode |
| 12 |  | ... | Head 5V voltage |
| 13 | $\overline{\text{SHE1}}$ (B-SHE:S) | OUT | Short heat enable bit 1: Black head short heat enable |
| 14 | RNK1 (B-Rank:S) | IN | Black head rank signal |
| 15 | SDB1 (B-Data2:S odd) | OUT | Serial data B bit 1: Black head serial data |
| 16 | SCKA (CLK:Bk head) | OUT | Black head data transfer clock |
| 17 | DI1B (B-Di2A:S) | IN | Black head diode anode |
| 18 | GND | ... | Head drive voltage return |
| 19 | GND | ... | Head drive voltage return |
| 20 | GND | ... | Head drive voltage return |
| 21 | GND | ... | Head drive voltage return |
| 22 | GND | ... | Head drive voltage return |
| 23 | GND | ... | Head drive voltage return |
| 24 | GND | ... | Head drive voltage return |
| 25 | GND | ... | Head drive voltage return |
| 26 | DI0A (A-Di1A:Bk1) | IN | Black head diode anode |
| 27 | RNK0 (A-Rank:Bk1) | IN | Black head rank signal |
| 28 | SDA1 (B-Data1:S even) | OUT | Serial data A bit 1: Black head serial data |
| 29 | $\overline{\text{HE1}}$ (B-HE:S) | OUT | Heat enable bit 1: Black head heat enable |
| 30 | DIK (DiK:Bk head) | IN | Black head diode cathode |
| 31 | DI0B (A-Di2A:Bk1) | IN | Black head diode anode |
| 32 | $\overline{\text{SHE0}}$ (A-SHE:Bk1) | OUT | Short heat enable bit 0: Black head short heat enable |
| 33 | SDB0 (A-Data2:Bk1 odd) | OUT | Serial data B bit 0: Black head serial data |
| 34 | BGA (BG:Bk head) | OUT | Block gate A: Black head data latch |
| 35 | BEA1 (BE1:Bk head) | OUT | Block enable A bit 1: Black head block enable |
| 36 | $\overline{\text{HE0}}$ (A-HE:Bk1) | OUT | Heat enable bit 0: Black head heat enable |
| 37 | SDA0 (A-Data1:Bk1 even) | OUT | Serial data A bit 0: Black head serial data |
| 38 | BEA0 (BE0:Bk head) | OUT | Block enable A bit 0: Black head block enable |
| 39 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 40 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 41 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 42 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 43 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 44 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 45 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 46 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 47 | — | ... |  |
| 48 | — | ... |  |
| 49 | — | ... |  |
| 50 | — | ... |  |

### J12 (BJ Cartridge cable connector)

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | DI5A (C-Di1A:Y) | IN | Color head diode anode |
| 2 | RNK5 (C-Rank:Y) | IN | Color head rank signal |
| 3 | BEB2 (BE2:Color head) | OUT | Block enable B bit 2: Color head block enable |
| 4 | BEB3 (BE3:Color head) | OUT | Block enable B bit 3: Color head block enable |
| 5 | $\overline{\text{SHE5}}$ (C-SHE:Y) | OUT | Short heat enable bit 2: Color head short heat enable |
| 6 | SDB5 (C-Data2:Y odd) | OUT | Serial data B bit 2: Color head serial data |
| 7 | SDA5 (C-Data1:Y even) | OUT | Serial data A bit 2: Color head serial data |
| 8 | DI5B (C-Di2A:Y) | IN | Color head diode anode |
| 9 | $\overline{\text{HE5}}$ (C-HE:Y) | OUT | Heat enable bit 2: Color head heat enable |
| 10 | — | ... | |
| 11 | DI4A (B-Di1A:M) | IN | Color head diode anode |
| 12 | — | ... | Head 5V voltage |
| 13 | $\overline{\text{SHE4}}$ (B-SHE:M) | OUT | Short heat enable bit 1: Color head short heat enable |
| 14 | RNK4 (B-Rank:M) | IN | Color head rank signal |
| 15 | SDB4 (B-Data2:M odd) | OUT | Serial data B bit 1: Color head serial data |
| 16 | SCKB (CLK:Color head) | OUT | Color head data transfer clock |
| 17 | DI4B (B-Di2A:M) | IN | Color head diode anode |
| 18 | GND | ... | Head drive voltage return |
| 19 | GND | ... | Head drive voltage return |
| 20 | GND | ... | Head drive voltage return |
| 21 | GND | ... | Head drive voltage return |
| 22 | GND | ... | Head drive voltage return |
| 23 | GND | ... | Head drive voltage return |
| 24 | GND | ... | Head drive voltage return |
| 25 | GND | ... | Head drive voltage return |
| 26 | DI3A (A-Di1A:C) | IN | Color head diode anode |
| 27 | RNK3 (A-Rank:C) | IN | Color head rank signal |
| 28 | SDA4 (B-Data1:C) | OUT | Serial data A bit 1: Color head serial data |
| 29 | $\overline{\text{HE4}}$ (B-HE:M) | OUT | Heat enable bit 1: Color head heat enable |
| 30 | DIK (DiK:Color head) | IN | Color head diode cathode |
| 31 | DI3B (A-Di2A:C) | IN | Color head diode anode |
| 32 | $\overline{\text{SHE3}}$ (A-SHE:C) | OUT | Short heat enable bit 0: Color head short heat enable |
| 33 | SDB3 (A-Data2:C) | OUT | Serial data B bit 0: Color head serial data |
| 34 | BGB (BG:Color head) | OUT | Block gate B: Color head data latch |
| 35 | BEB1 (BE1:Color head) | OUT | Heat enable B bit 1: Color head block enable |
| 36 | $\overline{\text{HE3}}$ (A-HE:C) | OUT | Heat enable bit 0: Color head heat enable |
| 37 | SDA3 (A-Data1:C) | OUT | Serial data A bit 0: Color head serial data |
| 38 | BEB0 (BE0:Color head) | OUT | Block enable B bit 0: Color head block enable |
| 39 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 40 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 41 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 42 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 43 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 44 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 45 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 46 | 11V | ... | Head drive voltage (10.3V±0.1VDC) |
| 47 | — | ... | |
| 48 | — | ... | |
| 49 | — | ... | |
| 50 | — | ... | |

### 7.3 Panel Board
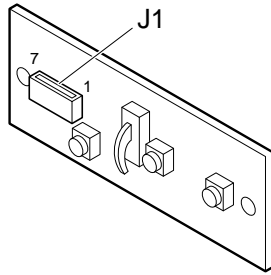


**Figure 5-13 Panel Board**

**J1**

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | GND | ... | Ground |
| 2 | SW3 | OUT | Ink/ink tank replacement switch |
| 3 | SW1 | OUT | POWER switch |
| 4 | SW2 | OUT | RESUME switch |
| 5 | DOOR | OUT | Cover open detection signal |
| 6 | ERROR | IN | ERROR indicator drive signal |
| 7 | POWER | IN | POWER indicator drive signal |

### 7.4 Carriage Driver Board
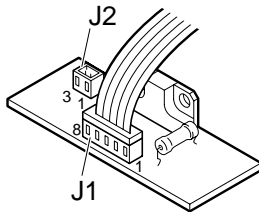


**Figure 5-14 Carriage Driver Board**

**J1 (Directly attached to carriage driver board)**

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | MG | ... | 35V return |
| 2 | 35V | ... | Carriage motor drive voltage |
| 3 | 5V | ... | Logic drive voltage (5V±0.2V) |
| 4 | DG | ... | 5V return |
| 5 | $\overline{\text{DCBRK}}$ | IN | Motor brake signal |
| 6 | DCDIR | IN | Motor rotation direction control signal |
| 7 | DCMON | IN | Motor enable signal |
| 8 | $\overline{\text{CRPWM}}$ | IN | Motor speed control signal |

**J2**

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | | OUT | DC motor+ |
| 2 | | OUT | DC motor- |
| 3 | | ... | |

### 7.5 Upper Cassette Board
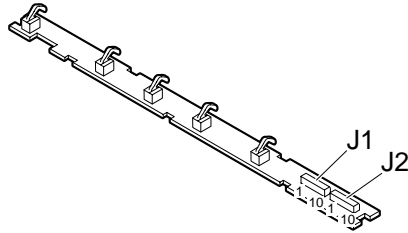


**Figure 5-15 Upper Cassette Board**

**J1**

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | CSENS1 | OUT | Paper size detection signal |
| 2 | CSENS2 | OUT | Paper size detection signal |
| 3 | CSENS3 | OUT | Paper size detection signal |
| 4 | CSENS4 | OUT | Paper size detection signal |
| 5 | CSENS5 | OUT | Paper size detection signal |
| 6 | CS01 | IN | Cassette selection signal |
| 7 | CS02 | IN | Cassette selection signal |
| 8 | GND | ... | Ground |
| 9 | OPT | IN | Lower cassette detection signal |
| 10 | VM | ... | Mechanism drive voltage 35V |

**J2**

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | VM | ... | Mechanism drive voltage 35V |
| 2 | OPT | OUT | Plunger (solenoid) drive signal |
| 3 | GND | ... | Ground |
| 4 | CS02 | OUT | Cassette selection signal |
| 5 | CS01 | OUT | Cassette selection signal |
| 6 | CSENS5 | IN | Paper size detection signal |
| 7 | CSENS4 | IN | Paper size detection signal |
| 8 | CSENS3 | IN | Paper size detection signal |
| 9 | CSENS2 | IN | Paper size detection signal |
| 10 | CSENS1 | IN | Paper size detection signal |

**7.6 Lower Cassette Board 1**
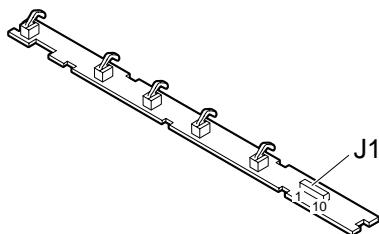


**Figure 5-16 Lower Cassette Board 1**

**J1**

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | CSENS1 | OUT | Paper size detection signal |
| 2 | CSENS2 | OUT | Paper size detection signal |
| 3 | CSENS3 | OUT | Paper size detection signal |
| 4 | CSENS4 | OUT | Paper size detection signal |
| 5 | CSENS5 | OUT | Paper size detection signal |
| 6 | CS01 | IN | Cassette selection signal |
| 7 | CS02 | IN | Cassette selection signal |
| 8 | GND | ... | Ground |
| 9 | OPT | IN | Lower cassette detection signal |
| 10 | VM | ... | Mechanism drive voltage 35V |

### 7.7 Lower Cassette Board 2
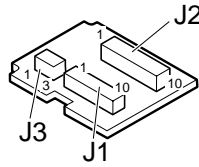


**Figure 5-17 Lower Cassette Board 2**

**J1**

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | VM | ... | Mechanism drive voltage 35V |
| 2 | OPT | IN | Plunger (solenoid) drive signal |
| 3 | GND | ... | Ground |
| 4 | CS02 | IN | Cassette selection signal |
| 5 | CS01 | IN | Cassette selection signal |
| 6 | CSENS5 | OUT | Paper size detection signal |
| 7 | CSENS4 | OUT | Paper size detection signal |
| 8 | CSENS3 | OUT | Paper size detection signal |
| 9 | CSENS2 | OUT | Paper size detection signal |
| 10 | CSENS1 | OUT | Paper size detection signal |

**J2**

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | VM | ... | Mechanism drive voltage 35V |
| 2 | OPT | OUT | Plunger (solenoid) drive signal |
| 3 | GND | ... | Ground |
| 4 | CS02 | OUT | Cassette selection signal |
| 5 | CS01 | OUT | Cassette selection signal |
| 6 | CSENS5 | IN | Paper size detection signal |
| 7 | CSENS4 | IN | Paper size detection signal |
| 8 | CSENS3 | IN | Paper size detection signal |
| 9 | CSENS2 | IN | Paper size detection signal |
| 10 | CSENS1 | IN | Paper size detection signal |

**J3**

| Pin No. | Signal | IN/OUT | Function |
|---|---|---|---|
| 1 | VM | ... | Mechanism drive voltage 35V |
| 2 | | ... | |
| 3 | OPT | ... | Plunger (solenoid) drive signal |

## 7.8 Fan Board
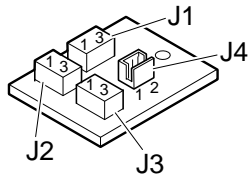


**Figure 5-18 Fan Board**

### J1

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | +35V | ... | Fan drive voltage |
| 2 | — | ... | |
| 3 | GND | ... | Ground |

### J2

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | — | ... | |
| 2 | GND | OUT | Fan drive voltage return |
| 3 | +35V | OUT | Fan drive voltage |

### J3

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | — | ... | |
| 2 | GND | OUT | Fan drive voltage return |
| 3 | +35V | OUT | Fan drive voltage |

### J4

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | $\overline{\text{FANON}}$ | IN | Fan enable signal |
| 2 | GND | ... | Ground |

**5-46**

### 7.9 Power Supply Unit
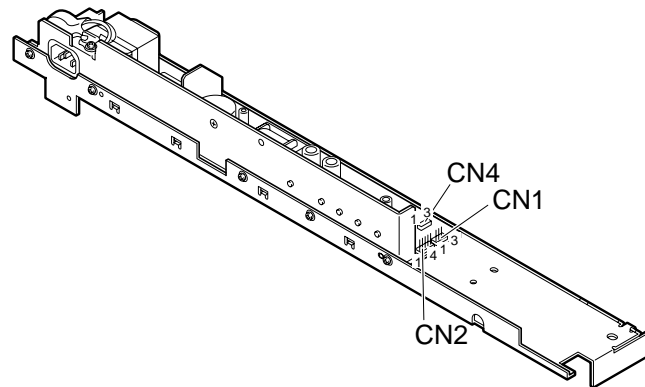


**Figure 5-19 Power Supply Unit**

#### CN1

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | 0V | ... | Logic drive voltage return |
| 2 | +5V | ... | Logic drive voltage (5V±0.2V) |
| 3 | VENB | ... | 10.3V enable signal |

#### CN2

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | 0V | ... | Head drive voltage return |
| 2 | +10.3V | ... | Head drive voltage (10.3V±0.2V) |
| 3 | 0V | ... | Mechanism drive voltage return |
| 4 | +35V | ... | Mechanism drive voltage (35V±0.2VDC) |

#### CN4

| Pin No. | Signal | IN/OUT | Function |
|---------|--------|--------|----------|
| 1 | 0V | ... | Ground |
| 2 | — | ... | |
| 3 | +35V | ... | Fan drive voltage |

# 8. CIRCUIT DIAGRAMS

## 8.1 Parts Layout
### 8.1.1 Logic board
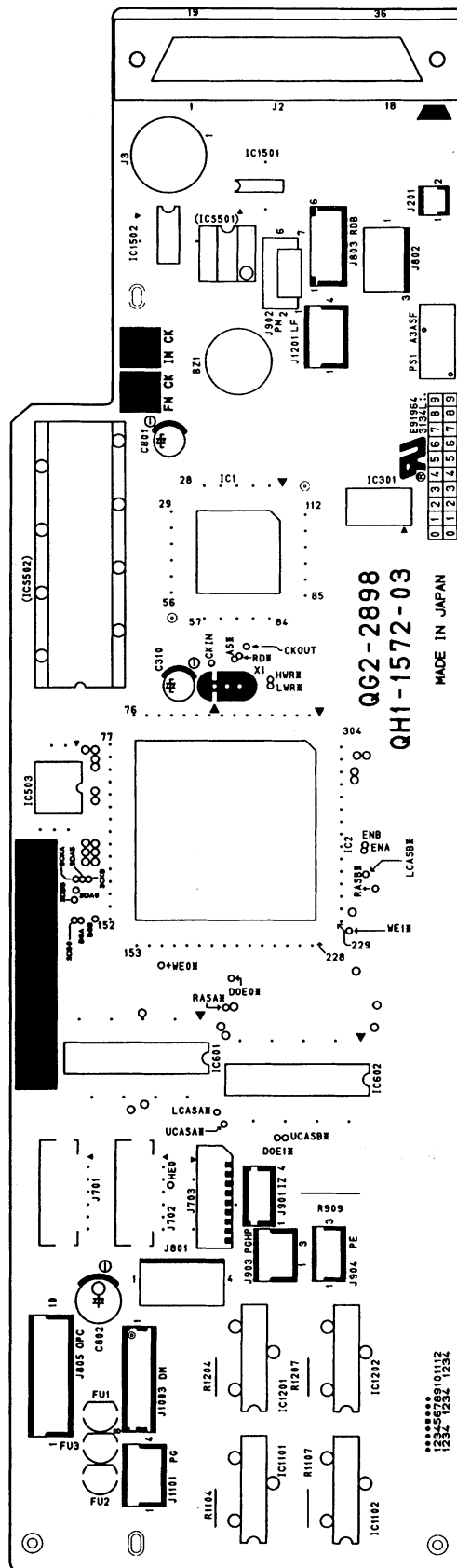


**Figure 5-20 Logic Board Front Surface**

(reduced to 90%)
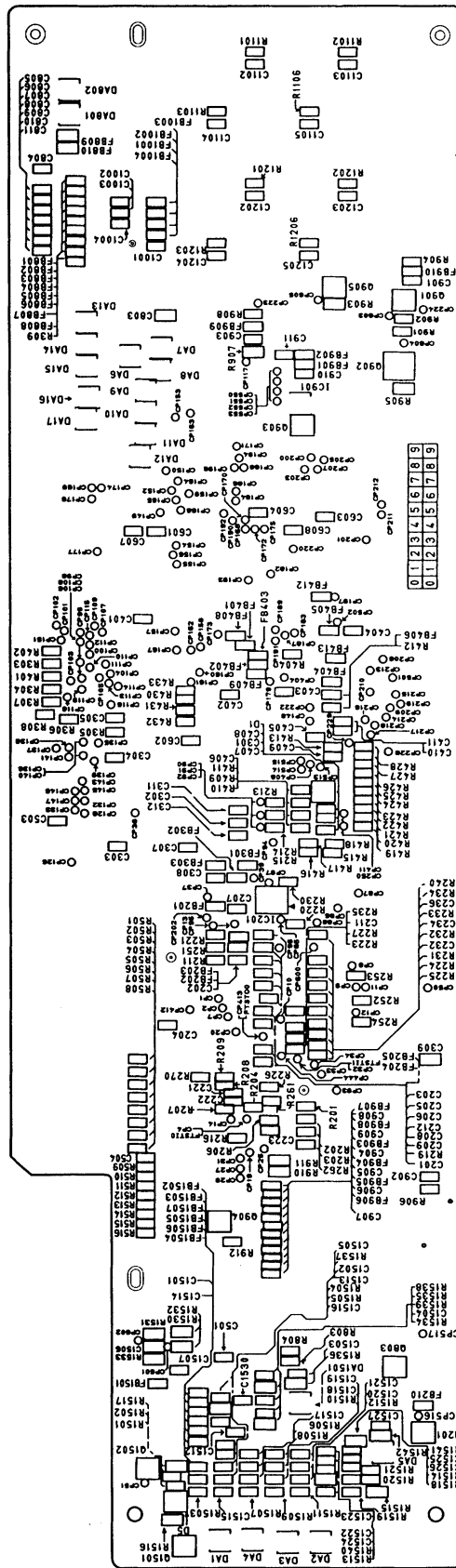
**Figure 5-21 Logic Board Rear Surface**

**(reduced to 90%)**

## 8.1.2 Carriage board



**Figure 5-22 Carriage Board Front Surface**



**Figure 5-23 Carriage Board Rear Surface**
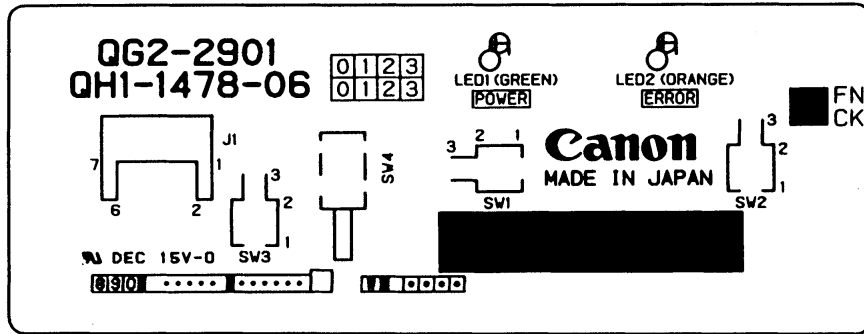
## 8.1.3 Panel board



**Figure 5-24 Panel Board Front Surface**

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## 8.2 Circuit Diagrams
### 8.2.1 Logic board



*No parts are inserted on ICS201

LOGIC BOARD 02

PRINTER CONTROLLER 1/2

PRINTER CONTROLLER 1/2
IC2
TC203G74CF-7006

REGULATOR
IC301
BA033FP

OSCILLATOR
X1

JXO-7
32.000MHZ

PRINTER CONTROLLER 2/2

LOGIC BOARD 03

PRINTER CONTROLLER 2/2
IC2
TC203G74CF-7006

CONTROL ROM & EEPROM & SRAM

LOGIC BOARD 04

**SRAM (256Kbit)**

**IC503**

**EEPROM (4Kbit)**

**IC501**

| CS | VCC |
| SK | NC |
| DI | TEST |
| DO | GND |

S29330ADP

ICS501
DILB8P-8J

<02-A10> SOE

<02-D10> SWE0

C501
0.1μ,25V

C503
0.1μ,25V

+5V

| OE | A10 |
| A11 | CE |
| A9 | I/O8 |
| A8 | I/O7 |
| A13 | I/O6 |
| R/W | I/O5 |
| VDD | I/O4 |
| A14 | GND |
| A12 | I/O3 |
| A7 | I/O2 |
| A6 | I/O1 |
| A5 | A0 |
| A4 | A1 |
| A3 | A2 |

TC55257DFTL-55L

SDT <7..0>  <02-B10>
SAD <15..0>  <02-E10>

<01-E1> EECS
<01-F3> EECK
<01-E3> EEDI
<01-F3> EEDO

<01-G10,02-G10> CAD <23..0>

**CONTROL ROM (8Mbit)**

**IC502**

| A18 | NC |
| A17 | A8 |
| A7 | A9 |
| A6 | A10 |
| A5 | A11 |
| A4 | A12 |
| A3 | A13 |
| A2 | A14 |
| A1 | A15 |
| A0 | A16 |
| CE | VPP |
| GND | GND |
| OE | O15 |
| O0 | O7 |
| O8 | O14 |
| O1 | O6 |
| O9 | O13 |
| O2 | O5 |
| O10 | O12 |
| O3 | O4 |
| O11 | VCC |

ICS502
DILB42P-8J

R501 10K, 1/16W
R502 10K, 1/16W
R503 10K, 1/16W
R504 10K, 1/16W
R505 10K, 1/16W
R506 10K, 1/16W
R507 10K, 1/16W
R508 10K, 1/16W

R509 10K, 1/16W
R510 10K, 1/16W
R511 10K, 1/16W
R512 10K, 1/16W
R513 10K, 1/16W
R514 10K, 1/16W
R515 10K, 1/16W
R516 10K, 1/16W

RESET  <01-E8,02-D2>

<02-E10> EPOE

C504
0.1μ,25V

<01-G10,02-G10> CDT <15..0>

LOGIC BOARD 06

BJ CARTRIDGE DRIVERS

LOGIC BOARD 07

LOWER CASSETTE & POWER SUPPLY



<LOWER CASSETTE>

<35V,11V POWER SUPPLY>

<5V POWER SUPPLY>

LOGIC BOARD 08

SENSORS & PANEL

**<INK SENSOR>**

**J901**

BK1608HS102
FB902

IZSEN   <01-A8>

C911
1000p,50V

R909
910,2W

BK1608HS102
FB901

<07-C4,11-B8>   VM

C910
1000p,50V

<03-C10>   INKP

**IC901**
TC7504F

Q903
RN1423

+5V

Q902
2SB1260

+5V     +5V       +5V         +5V

D5V   <06-F2>

R901
4.7K,1/16W

R904
18K,1/16W

R905
180,
1/8W

R906
18K,
1/16W

R907
180,1/8W

R908
18K,1/16W

**<PURGE SENSOR>**

**J903**

**<PANEL>**

**J902**

R902
1K,1/16W

BK1608HS102
FB910

PESEN   <03-C10>

ASF   <03-C10>

R910
180,1/8W

LED0   <02-A10>

FB907   BL1608LM252

POWER
Indicator   1

<03-C10>   DG5

C901
1000p,50V

C902
1000p,50V

BK1608HS102
FB909

PGHP   <03-C10>

R911
180,1/8W

LED1   <02-A10>

FB908   BL1608LM252

C908
1000p,50V

ERROR
Indicator   2

Q901
DTC143EKA

**PS1**
TLP832

C903
1000p,50V

IRSNS   <03-A10>

FB903   BL1608LM252

C909
1000p,50V

Cover Open
Button   3

**PICK UP ROLLER SENSOR**

SW0   <01-E1>

FB904   BL1608LM252

C904
1000p,50V

RESUME
Button   4

**<PAPER END SENSOR>**

+5V

SW1   <01-E1>

FB905   BL1608LM252

C905
1000p,50V

POWER
Button   5

Q905
DTA143EKA

**J904**

SW2   <01-E1>

FB906   BL1608LM252

C906
1000p,50V

BJ Cartridge
REPLACE
Button   6

<03-G10,12-A4>   CNTR5

R903
180,1/8W

+5V

C907
1000p,50V

7

R912
1.5K,1/16W

BZ   BZ1
CD11PA-Z

<03-C10>   BZZR

Q904
DTC143EKA

**BEEPER**

5-60

CARRIAGE MOTOR

LOGIC BOARD 09

A

B

+35V    +5V

FU1
ICP-N38

<CARRIAGE MOTOR>

J1003

6

7

<03-C10>   DCMON        FB1001   BK1608HS102                    2

<03-C10>   DCDIR        FB1002   BK1608HS102                    3

<03-C10>   DCBRK        FB1003   BK1608HS102                    4

<01-D1>    CRPWM        FB1004   BK1608HS102                    1

5

8

C1001        C1002        C1003        C1004
1000p,50V    1000p,50V    1000p,50V    1000p,50V

1          2          3          4          5          6          7          8          9          10

LOGIC BOARD 10

A

PURGE MOTOR

+35V

FU2
ICP-N25

B

<PURGE MOTOR>

J1101

4

PURGE MOTOR DRIVER
IC1101

C1102
820p,50V

R1104
0.82,0.5W

C

1  MB        E  16
2  T         MA 15
3  Vmm       Vmm 14
4  GND       GND 13
5  GND       GND 12
6  Vcc       VR 11
7  I1        C  10
8  Ph        I0 9

R1101
56K,1/16W

R1103
1K,1/16W

3

<01-D1> PGI1
<01-E3> PGA

C1104
820p,50V

TEA3718SDP

<01-D1> PGI0

+5V

D

2

PURGE MOTOR DRIVER
IC1102

C1103
820p,50V

R1107
0.82,0.5W

E

1  MB        E  16
2  T         MA 15
3  Vmm       Vmm 14
4  GND       GND 13
5  GND       GND 12
6  Vcc       VR 11
7  I1        C  10
8  Ph        I0 9

R1102
56K,1/16W

R1106
1K,1/16W

1

<01-E3> PGB

C1105
820p,50V

TEA3718SDP

F

G

1  2  3  4  5  6  7  8  9  10

LOGIC BOARD 11

A

PAPER FEED MOTOR

+35V

FU3
ICP-N25

VM  <07-C4,08-B3>

<PAPER FEED MOTOR>

J1201

B

○ 4

**PAPER FEED MOTOR DRIVER**
**IC1201**

C1202
820p,50V

R1204
0.75,0.5W

C

R1201
56K,1/16W

| 1 | MB | E | 16 |
| 2 | T | MA | 15 |
| 3 | Vmm | Vmm | 14 |
| 4 | GND | GND | 13 |
| 5 | GND | GND | 12 |
| 6 | Vcc | VR | 11 |
| 7 | I1 | C | 10 |
| 8 | Ph | I0 | 9 |

R1203
1K,1/16W

○ 3

<01-D1> LFI1
<01-B1> LFA

C1204
820p,50V

TEA3718SDP

D

<01-D1> LFI0

+5V

○ 2

**PAPER FEED MOTOR DRIVER**
**IC1202**

C1203
820p,50V

R1207
0.75,0.5W

E

R1202
56K,1/16W

| 1 | MB | E | 16 |
| 2 | T | MA | 15 |
| 3 | Vmm | Vmm | 14 |
| 4 | GND | GND | 13 |
| 5 | GND | GND | 12 |
| 6 | Vcc | VR | 11 |
| 7 | I1 | C | 10 |
| 8 | Ph | I0 | 9 |

R1206
1K,1/16W

○ 1

<01-B1> LFB

C1205
820p,50V

TEA3718SDP

F

G

INTERFACE

LOGIC BOARD 12

<IEEE 1284>

+5V

Q1501
DTB113EK

CNTR5 <03-G10,08-F1>

R1515
390,1/10W

R1516
100,1/10W    CP51

Q1502
DTC143EKA

R1501
1K,1/16W

D5
RB411D

R1517
100,1/10W

C1501
470p,50V

STRB <02-D2>

J2

STROBE 1

R1502
3.3K,1/16W

DA1
HZM6.8FA

DATA1 2

R1503
3.3K,1/16W

C1512
1000p,50V    0

DATA2 3

R1504
3.3K,1/16W

C1513
1000p,50V    1

DATA3 4

R1505
3.3K,1/16W

C1514
1000p,50V    2

DATA4 5

R1506
3.3K,1/16W

C1515
1000p,50V    3

DA4
HZM6.8FA

DATA5 6

R1507
3.3K,1/16W

C1516
1000p,50V    4

DATA6 7

R1508
3.3K,1/16W

C1517
1000p,50V    5

DATA7 8

R1509
3.3K,1/16W

C1518
1000p,50V    6

DATA8 9

R1510
3.3K,1/16W

C1519
1000p,50V    7

8    DT<7..0> <02-C2>

DA3
HZM6.8FA

ACK 10

R1511
1K,1/16W

C1520
1000p,50V

ACK <02-C2>

BUSY 11

R1512
3.3K,1/16W

C1521
1000p,50V

BUSY <02-C2>

PError 12

R1513
3.3K,1/16W

C1522
1000p,50V

PE <03-B1>

Select 13

R1514
3.3K,1/16W

C1523
1000p,50V

SLCT <03-A1>

Auto Feed XT 14

R1540
100,1/10W

C1524
470p,50V

ATFD <03-A1>

NC 15

DA2
HZM6.8FA

GND 16

GND 17

Peripheral Logic High 18

GND 19

GND 30

INIT 31

R1518
3.3K,1/16W

C1525
470p,50V

INIT <03-A1>

FAULT 32

R1541
100,1/10W

C1526
1000p,50V

FLT <03-B1>

GND 33

R1519
3.3K,1/16W

DA5
HZM6.8FA

NC 34

R1520
3.3K,1/16W

Peripheral Logic High 35

R1542
100,1/10W

SLCT IN 36

R1521
3.3K,1/16W

C1527
470p,50V

SLIN <03-A1>

IC1502
04

1    2

IC1502
04

3    4

IC1502
04

5    6

+5V

IC1502
04

VCC 14
GND 7

C1507
0.1µ,25V

<RS-422>

R1538
10K,1/16W    +5V

IC1502    IC1502
04            04

9    8    13    12

R1530
10,1/10W

C1506
0.47µ,15V

SCLK <02-D2>

SERIAL INTERFACE DRIVER

R1533 27,1/10W

FB1501

J3

1
2

11    10

R1532
10,1/10W

R1531
680,1/10W

+5V

IC1501

+5V

IC1502
04

SDI <02-D2>

1 NC    VCC 14
2 R     NC 13
3 REB   A 12
4 DE    B 11
5 D     Z 10
6 GND   Y 9
7 GND   NC 8

R1534 27,1/10W    FB1502    8
R1535 27,1/10W    FB1503    5
R1536 27,1/10W    FB1504    3
R1537 27,1/10W    FB1505    6

SDO <02-D2>

MAX491CSD

R1539
10K,1/16W

C1502    C1503    C1504    C1505    +5V
470p,    470p,    470p,    470p,
50V      50V      50V      50V

FB1506    7
FB1507    4

C1530
0.1µ,25V

DA1501
HZM6.8FA

FB1501 to FB1507
having short pattern

## 8.2.2 Carriage board

CARRIAGE BOARD 02

**J11**

| Pin | | Signal | Ref |
|---|---|---|---|
| 1 | | DI2A | <03-G5> |
| 2 | | RNK2 | <03-D2> |
| 3 | CP1 | BEA2 | <01-C7> |
| 4 | CP2 | BEA3 | <01-C7> |
| 5 | CP3 | SHE2 | <01-E7> |
| 6 | CP4 | SDB2 | <01-B7> |
| 7 | CP5 | SDA2 | <01-A7> |
| 8 | | DI2B | <03-E9> |
| 9 | CP6 | HE2 | <01-D7> |
| 10 | | ID | <03-D9> |
| 11 | | DI1A | <03-G5> |
| 12 | | | |
| 13 | CP7 | SHE1 | <01-E7> |
| 14 | | RNK1 | <03-D2> |
| 15 | CP8 | SDB1 | <01-B7> |
| 16 | CP9 | SCKA | <01-A7> |
| 17 | CP10 | DI1B | <03-G6> |
| 18 | | | |
| 19 | | | |
| 20 | | | |
| 21 | | | |
| 22 | | | |
| 23 | | | |
| 24 | | | |
| 25 | | | |
| 26 | JP1 | DI0A | <03-G5> |
| 27 | | RNK0 | <03-D2> |
| 28 | CP11 | SDA1 | <01-A7> |
| 29 | CP12 | HE1 | <01-D7> |
| 30 | | DIK | <02-E7,03-D9> |
| 31 | | DI0B | <03-G6> |
| 32 | CP13 | SHE0 | <01-E7> |
| 33 | CP14 | SDB0 | <01-B7> |
| 34 | CP15 | BGA | <01-C7> |
| 35 | CP16 | BEA1 | <01-C7> |
| 36 | CP17 | HE0 | <01-D7> |
| 37 | CP18 | SDA0 | <01-A7> |
| 38 | CP19 | BEA0 | <01-D7> |
| 39 | +11V | | |
| 40 | | | |
| 41 | | | |
| 42 | | | |
| 43 | | | |
| 44 | | | |
| 45 | | | |
| 46 | | | |
| 47 | C310 10μ,16V | | |
| 48 | | | |
| 49 | | | |
| 50 | | | |

**J12**

| Pin | | Signal | Ref |
|---|---|---|---|
| 1 | | DI5A | <03-G6> |
| 2 | | RNK5 | <03-E2> |
| 3 | CP21 | BEB2 | <01-D3> |
| 4 | CP22 | BEB3 | <01-D3> |
| 5 | CP23 | SHE5 | <01-F3> |
| 6 | CP24 | SDB5 | <01-C3> |
| 7 | CP25 | SDA5 | <01-B3> |
| 8 | | DI5B | <03-D9> |
| 9 | CP26 | HE5 | <01-E3> |
| 10 | | | |
| 11 | | DI4A | <03-G6> |
| 12 | | | |
| 13 | CP27 | SHE4 | <01-F3> |
| 14 | | RNK4 | <03-E2> |
| 15 | CP28 | SDB4 | <01-C3> |
| 16 | CP29 | SCKB | <01-B3> |
| 17 | | DI4B | <03-D9> |
| 18 | | | |
| 19 | | | |
| 20 | | | |
| 21 | | | |
| 22 | | | |
| 23 | | | |
| 24 | | | |
| 25 | | | |
| 26 | | DI3A | <03-G5> |
| 27 | | RNK3 | <03-D2> |
| 28 | CP30 | SDA4 | <01-B3> |
| 29 | CP31 | HE4 | <01-E3> |
| 30 | | DIK | <02-E4,03-D9> |
| 31 | CP32 | DI3B | <03-E9> |
| 32 | CP33 | SHE3 | <01-F3> |
| 33 | CP34 | SDB3 | <01-C3> |
| 34 | CP35 | BGB | <01-C3> |
| 35 | CP36 | BEB1 | <01-D3> |
| 36 | CP37 | HE3 | <01-E3> |
| 37 | CP38 | SDA3 | <01-B3> |
| 38 | CP39 | BEB0 | <01-E3> |
| 39 | +11V | | |
| 40 | | | |
| 41 | | | |
| 42 | | | |
| 43 | | | |
| 44 | | | |
| 45 | | | |
| 46 | | | |
| 47 | C311 10μ,16V | | |
| 48 | | | |
| 49 | | | |
| 50 | | | |

+5V

C320 0.1μF,50V

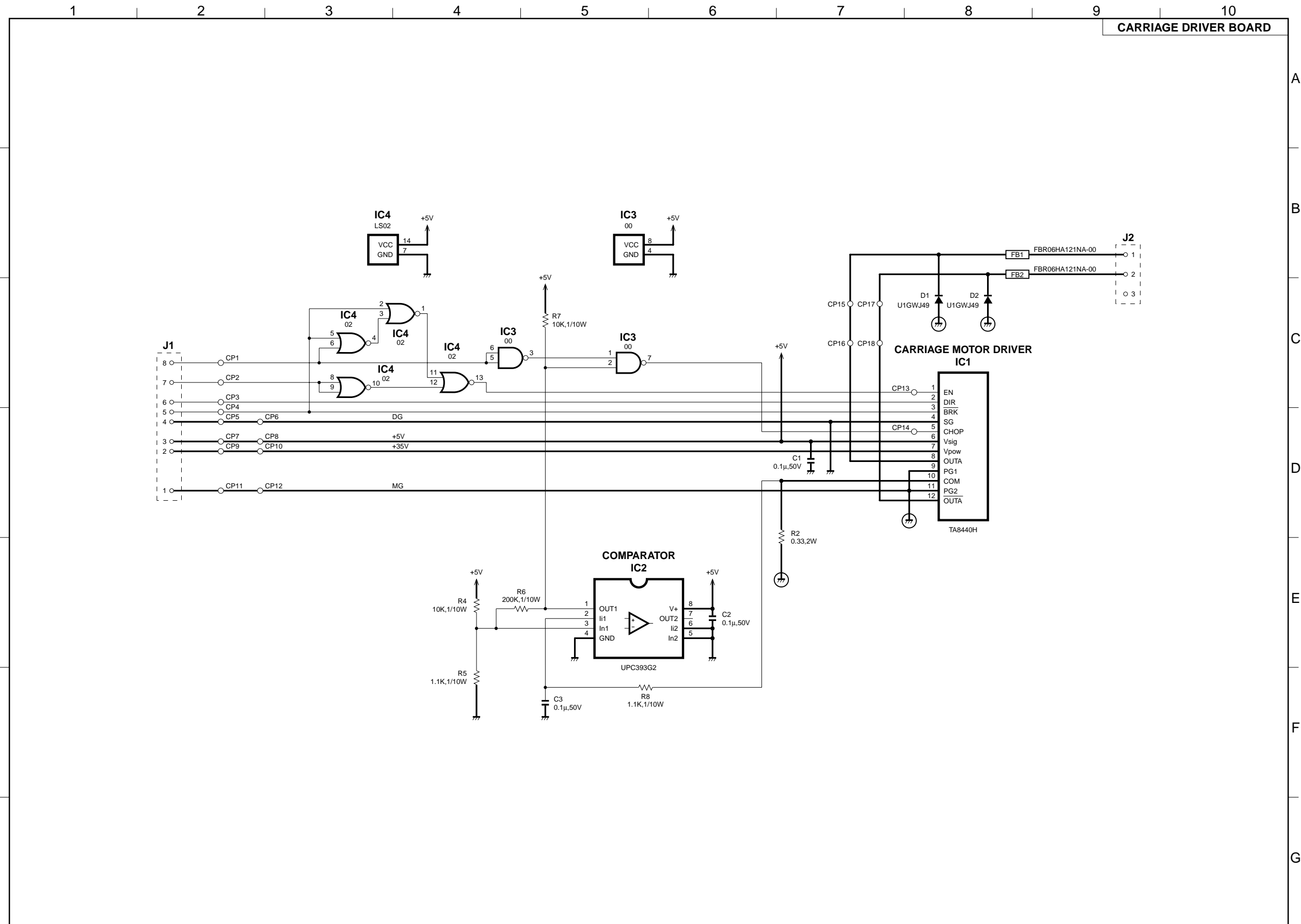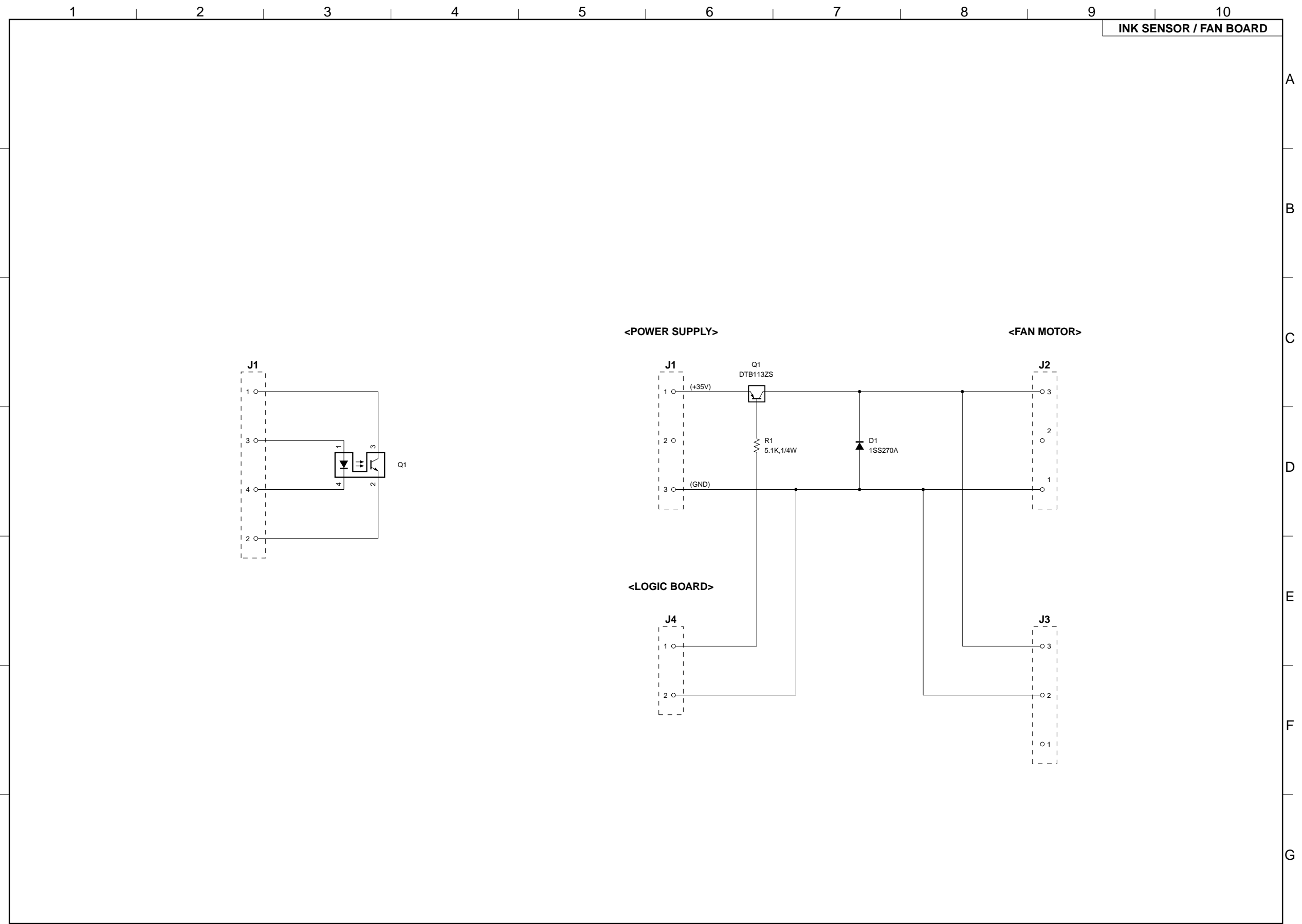CP40    H5VON    <01-G7>

Q2 RN2423

CP45    ZD2    <03-D9>

CARRIAGE BOARD 03

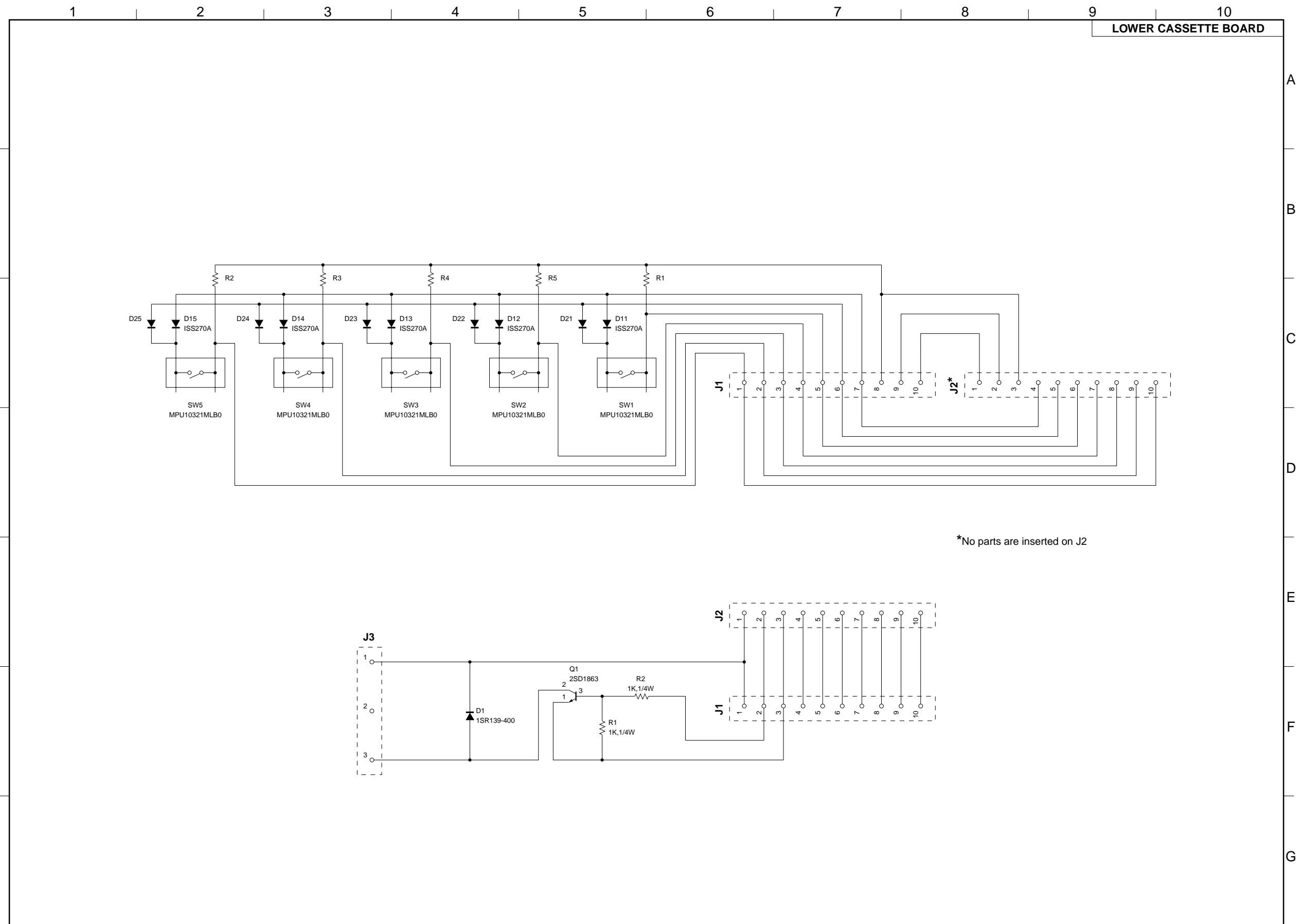## 8.2.3 Carriage driver board

## 8.2.4 Ink sensor/Fan board



**INK SENSOR / FAN BOARD**

<POWER SUPPLY>

<FAN MOTOR>

J1

J1
Q1
DTB113ZS

J2

1 (+35V)

R1
5.1K,1/4W

D1
1SS270A

3 (GND)

<LOGIC BOARD>

J4

J3

**8.2.5 Panel board**

## 8.2.6 Upper cassette board

## 8.2.7 Lower cassette board



*No parts are inserted on J2

The printing paper contains
70% waste paper.

Canon