PIXUS 470PD
i470D
SERVICE MANUAL

Revision 0

QY8-1387-000

Scope

This manual has been issued by Canon Inc., to provide the service technicians of this product with the information necessary for qualified persons to learn technical theory, maintenance, and repair of products. The manual covers information applicable in all regions where the product is sold. For this reason, it may contain information that is not applicable to your region.

Revision

This manual could include technical inaccuracies or typographical errors due to improvements or changes made to the product. When changes are made to the contents of the manual, Canon will release technical information when necessary. When substantial changes are made to the contents of the manual, Canon will issue a revised edition.

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I. MANUAL OUTLINE

This manual consists of the following three parts to provide information necessary to service the i470D:

Part 1: Maintenance
Information on maintenance and repair of the i470D

Part 2: Technical Reference
New technology and technical information such as FAQ's (Frequently Asked Questions) of the i470D

Part 3: Appendix
Block diagrams and pin layouts of the i470D

Reference:
This manual does not provide sufficient information of disassembly and reassembly procedures. Refer to the graphics in the separate Parts Catalog.

II. TABLE OF CONTENTS

Part 1
MAINTENANCE

1. MAINTENANCE

1.1 Adjustment, Periodic Maintenance, Periodic Replacement Parts, and Replacement Consumables by Service Engineer

(1) Adjustment

Adjustment	Timing	Purpose	Tool	Approx. time
EEPROM initialization	At logic board ass'y replacement	To initialize settings other than the following: - USB serial number - Destination setting - On-arrival cleaning flag - Waste ink counter	None	1 min.
Destination settings	At logic board ass'y replacement	To set the destination.	None	1 min.
Waste ink counter resetting	At ink absorber replacement	To reset the waste ink counter.	None-	1 min.
Print head alignment	At print head or logic board ass'y replacement	To ensure accurate dot placement.	Computer (settings via the printer driver)	2 min.

(2) Periodic maintenance

No periodic maintenance is necessary.

(3) Periodic replacement parts

There are no parts in this printer that require periodic replacement by a service engineer.

(4) Replacement consumables

There are no consumables that require replacement by a service engineer.

1.2 Customer Maintenance

Adjustment	Timing	Purpose	Tool	Approx. time
Print head alignment	At print head replacement.	To ensure accurate dot placement.	Printer, or computer (settings via the printer driver)	5 min.
Print head cleaning	When print quality is not satisfying.	To improve nozzle conditions.	Printer, or computer (settings via the printer driver)	30 sec. to 1 min.
Print head deep cleaning	When print quality is not satisfying, and not improved by print head cleaning.	To improve nozzle conditions.	Printer, or computer (settings via the printer driver)	1.5 to 2.5 min.
Ink tank replacement	When an ink tank becomes empty.	-----	-----	2 min.
Paper feed roller cleaning	When paper does not feed properly.	To clean the paper feed rollers.	None.	2 min.

1.3 Product Life

(1) Printer

The value (i) or (ii), whichever comes first.

(i) 4,000 pages of printing

- Black: 1,200 pages (A4, 1,500 character pattern)
- Color: 2,800 pages (A4, 7.5% duty per color pattern: 1,300 pages
  A4, 30% duty per color pattern: 500 pages
  100 x 148 mm, 30% duty per color pattern: 700 pages
  89 x 127 mm size, 30% duty per color pattern: 300 pages)

(ii) 5 years of use

(2) Print head

4,000 pages of printing (in the above print mode)

(3) Ink tank

BCI-24Black: 300 pages (1,500 character pattern in black printing, plain paper, standard mode)
580 pages (ISO JIS-SCID No. 5 pattern, plain paper, standard mode)
BCI-24Color: 160 pages (ISO JIS-SCID No. 5 pattern, plain paper, standard mode)

1.4 Special Tools

Name	Tool No.	Purpose	Remarks
FLOIL KG107A	QY9-0057-000	To improve the sliding property of the carriage shaft (QC1-2196)	
MOLYKOTE 7508	CK-0562-000	To improve the sliding property of the LF gear	
ELECTRICITY IF-20	CK-8006-000	To improve the sliding property between the grounding spring (QA4-1372) and the feed roller (QF4-0212)	

1.5 Serial Number Location

On the right side with the access cover opened (on the carriage cable holder)

2. LIST OF ERROR DISPLAY / INDICATION

Errors and warnings are indicated by the following methods:

(1) Errors are displayed by the number of times the LED blinks.
(2) Errors are displayed by the number displayed on the operation panel.
(3) Warnings are displayed via the printer driver status monitor.

2.1 Errors by LED Blinking in Orange

User recoverable errors

LED blinking in orange	Panel display	Error Code	Error	Solution
2 times	301	1000	No paper.	Set the paper, and press the Resume/Cancel button.
3 times	302	1300	Paper jam.	Remove the jammed paper, and press the Resume/Cancel button. If the error is not resolved, check that no foreign material is inside the printer.
6 times	402	1401	The print head is not installed.	Install the print head, and close the access cover.
7 times	403	1405	The print head is not installed properly. (EEPROM data of the print head is faulty.)	Re-install the print head, or with the print head installed, turn the printer off and on. If the error is not resolved, replace the print head.
8 times	202	1700	Warning: The waste ink absorber becomes almost full (to approx. 95% to 100% of the maximum capacity).	Pressing the Resume/Cancel button will exit the error. (The waste ink absorber full error occurs at 100% capacity, making it impossible to perform printing.
11 times	611	2001	Digital camera transmission time-out error (When the printer cannot communicate with a digital camera, the time-out error occurs.)	Disconnect the USB cable to the digital camera, and press the Resume/Cancel button.
	612	2001	Digital camera non-supporting device error (When a digital camera or device other than a digital camera, not supporting Direct Printing is connected to the printer with the USB cable, the error occurs.)	Disconnect the USB cable, and press the Resume/Cancel button.

*1:The error code is stored in the operator / service call history of the EEPROM information.

2.2 Errors by LED Blinking in Orange and Green Alternately, or Lit in Orange

User unrecoverable errors

LED alternate blinking in orange and green	Panel display	Error Code	Error	Solution
2 times	802	5100	Carriage error	1. Check that no foreign material is inside the printer. 2. Replace the timing slit strip film. 3. Replace the purge unit. 4. Replace the logic board ass'y.
4 times	804	5C00	Purge unit error	1. Check that no foreign material is inside the printer. 2. Replace the purge unit. 3. Replace the logic board ass'y.
6 times	806	5400	Internal temperature error	1. Turn the printer off, and after a short period of time, turn the printer on again. 2. Replace the logic board ass'y.
7 times	807	5B00	Waste ink absorber full error	1. Replace the ink absorber. 2. Replace the logic board ass'y.
8 times	808	5200	Print head temperature rise error	1. Turn the printer off, and after a short period of time, turn the printer on again. 2. Replace the print head. 3. Replace the logic board ass'y.
9 times	809	6800	EEPROM error	Replace the logic board ass'y.
Lights in orange	No display	6800	RAM error	Replace the logic board ass'y.

*1:The error code is stored in the operator / service call history of the EEPROM information.

2.3 Warnings

Printer (no LED indications)

Displayed warning	Remarks
Low black ink warning 1 (About half of the full amount remains.)	The status is displayed on the BJ printer driver status monitor.*[1]
Low color ink warning 1 (About half of the full amount remains.)	
Low black ink warning 2 (Little ink remains. "!")	
Low color ink warning 2 (Little ink remains. "!")	
Low black ink warning 3 (An unknown amount remains. "?")	
Low color ink warning 3 (An unknown amount remains. "?")	
Print head temperature rise warning	If the print head temperature is high when the access cover is opened, the warning is displayed.*[2] When the print head temperature falls, the warning is released.
Protection at excess rise of the print head temperature	If the print head temperature exceeds the specified limit, a Wait is inserted during printing. When the print head temperature falls, printing will resume automatically.

*[1]: Only when the remaining ink amount detection function is enabled. (When disabled, there is no status display.)

*[2]: At the warning, the carriage does not move to the ink tank replacement position when the access cover is opened.

2.4 Troubleshooting by Symptom

	Symptom	Solution	Part No.
Faulty operation	The power does not turn on. The power turns off immediately after power-on.	1. Replace the AC adapter. 2. Replace the logic board ass'y. 3. Replace the operation panel unit.	QH3-3615 QM2-0483 QH8-1267
	The print head is not recognized. The print head does not move to the home position.	1. Remove and re-install the print head. 2. Replace the print head. 3. Replace the logic board ass'y.	 QY6-0047 QM2-0483
	A strange noise occurs.	1. Check that no foreign material is inside the printer. 2. Attach a removed part if any. 3. Apply oil to the grounding spring.	 QA4-1372
Paper feed problems	Paper does not feed.	1. Remove foreign material if any. 2. Replace the sheet feeder unit.	 QG4-0374
	Paper feeds at an angle.	1. Remove foreign material if any. 2. Adjust the paper guide position.	
Unsatisfactory print quality	No printing, or no color ejected.	1. Check whether ink remains or not. 2. Perform print head deep cleaning. 3. Replace the print head. 4. Replace the logic board ass'y.	 QY6-0047 QM2-0483
	Printing is faint, or white lines appear on printouts even after print head cleaning. Line(s) not included in the print data appears on printouts.	1. Remove and re-install the print head. 2. Check whether ink remains or not. 3. Perform print head deep cleaning. 4. Replace the print head. 5. Replace the logic board ass'y.	 QY6-0047 QM2-0483
	Paper gets smeared.	1. Feed several sheets of paper. 2. Clean the paper path with cotton swab or cloth, 3. Replace the platen unit.	 QG4-0380
	A part of a line is missing on printouts.	1. Replace the ink tank. 2. Replace the print head.	 QY6-0047
	Color hue is incorrect.	1. Check whether ink remains or not. 2. Perform print head deep cleaning. 3. Replace the print head. 4. Replace the logic board ass'y.	 QY6-0047 QM2-0483
	No ejection of black ink.	1. Check whether ink remains or not. 2. Perform Refreshing. 3. Replace the print head.	 QY6-0047
	Graphic or text is extended on printouts.	1. Clean the timing slit strip film with alcohol. 2. Replace the timing slit strip film. 3. Replace the logic board ass'y. 4. Replace the carriage unit.	 QA4-0918 QM2-0483 QG4-0348
Direct Printing-related problems	Card is not recognized.	1. Confirm the card installation status. 2. Release the maintenance mode. 3. Format the card on the digital camera.*[1] 4. Replace the logic board ass'y.	 QM2-0483
	Image data is not recognized.	1. Check that images exist in the card. 2. Check the data volume in the card, and format type. 3. Replace the logic board ass'y. 4. Replace the operation panel.	 QM2-0483 QH8-1267
	Digital Camera Direct Printing cannot be performed.	1. Check that the printer supports Digital Camera Direct Printing. 2. Check that no errors occur in the printer. 3. Replace the logic board ass'y.	 QM2-0483

*[1]: If image data is in the card, move the data to the host computer before formatting.

3. REPAIR

3.1 Notes on Service Part Replacement (and Disassembling/Reassembling)

Service part	Notes on replacement[*1]	Adjustment/settings[*2]	Operation check
Logic board ass'y (QM2-0483)	- Do not bend the 4 in 1 connector pin.	After replacement: 1. Initialize the EEPROM. 2. Set the destination in the EEPROM. 3. Perform the print head alignment in the user mode. 4. Perform the print head cleaning 1 time.	- Service test print
Ink absorber (QA4-0212/0213)		After replacement: - Reset the waste ink counter.	- Service test print
Timing slit strip film (QA4-0918)	- Upon contact with the film, wipe the film with alcohol. - Confirm no grease is on the film. (Wipe off any grease thoroughly with ethanol.) - Do not bend the film.	After replacement: - Perform the print head alignment in the user mode.	- Service test print
Purge unit	Remove the carriage shaft (QC1-2196), and then the purge unit.		
Print head (QY6-0047)		After replacement: - Perform the print head alignment in the user mode.	- Service test print

*1: General notes:

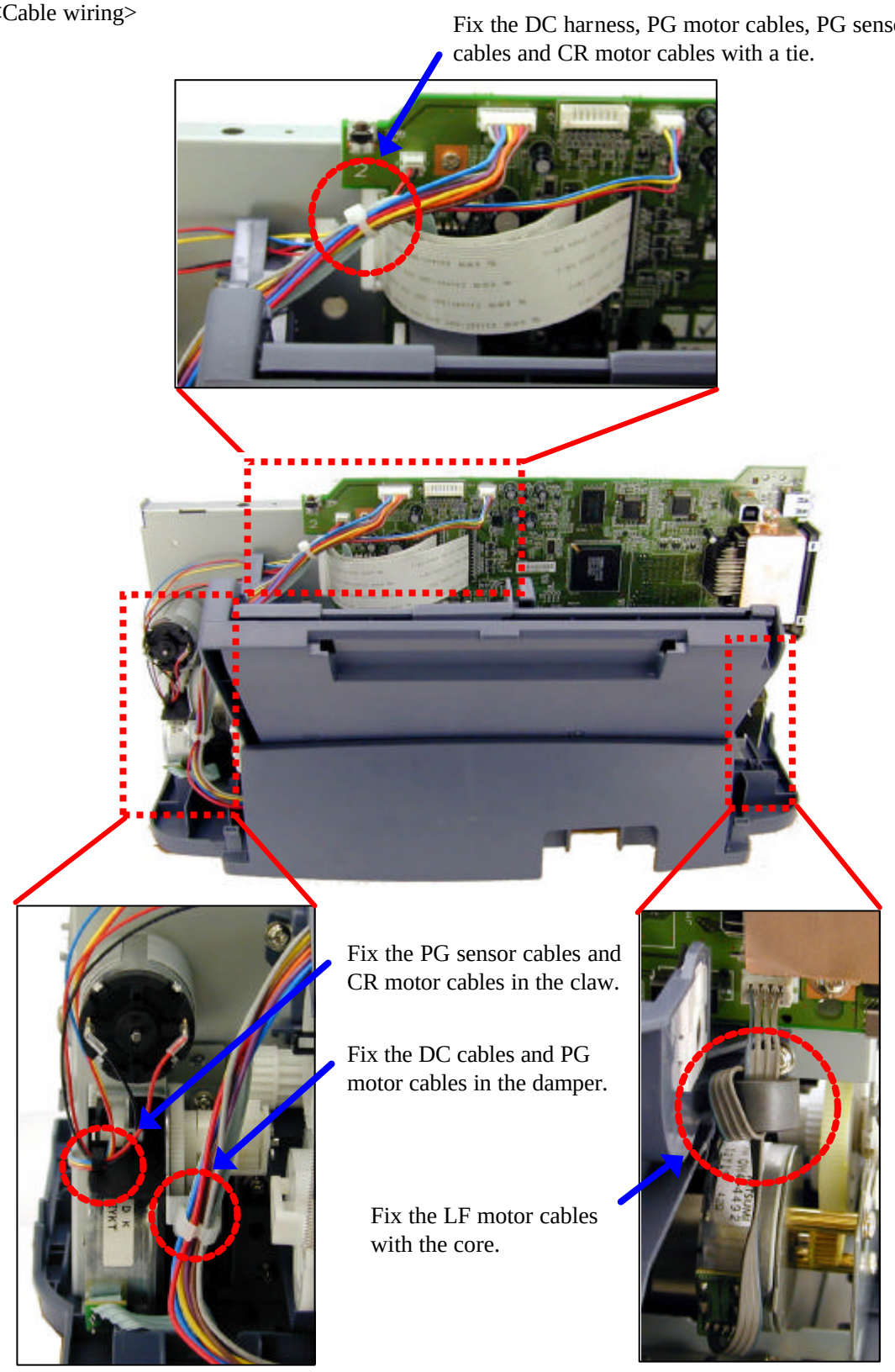
- Make sure that the flexible cables and wires in the harness are in the proper position and connected correctly. See page 1-7 (1), for details.
- Do not drop the ferrite core, which may damage it.
- Protect electrical parts from damage due to static electricity.
- Do not touch the timing slit strip film. No grease or abrasion is allowed.
- Protect the units from ink contamination.
- Do not loosen red screws.

3.2 Special Notes on Repair Servicing

(1) Cable wiring

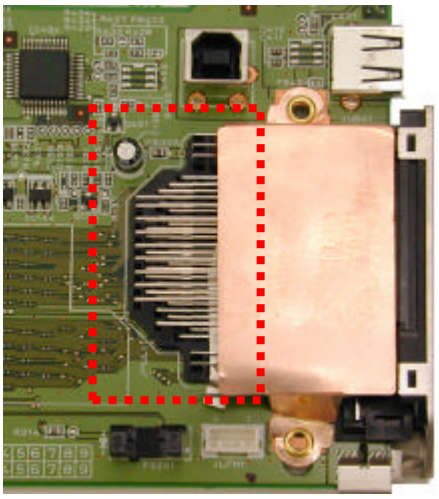
Exercise caution when handling the DC connector and motor cable wiring. For wiring, be sure to use ties, cores and dampers. Improper wiring or wiring without any ties, cores and dampers may cause printer malfunction due to noise or electrostatic discharge.

<Cable wiring>



(2) Handling of logic board

As the 4 in 1 connector pin functions on the logic board ass'y can be easily bent, exercise care to avoid bending the pins when removing or installing the connector on the logic board. If pins are bent, a card non-recognition failure or a Direct Printing failure may occur.



(3) Removing the purge unit

When removing the purge unit, the carriage shaft must be removed in advance.
The purge unit cannot be removed without first removing the carriage shaft. If the purge unit is removed forcibly, it may be damaged, or the carriage shaft may be damaged, causing uneven print density in printouts.

3.3 Adjustment / Settings

(1) User mode

The printer is operated through the Resume/Cancel button or operation panel.

<Operation via the Resume/Cancel button>

1) Turn on the printer.
2) Press and hold the Resume/Cancel button until the LED blinks in green the specified number of times listed in the table below, and release the button. The operation will start.

LED blinking	Operation	Remarks
1 time	Manual cleaning	Cleaning both black and color simultaneously. The operation can also be performed from the printer driver utility.
2 times	Nozzle check pattern printing	
3 times	Paper feed roller cleaning	
4 times or more	No operation	

<Operation via the operation panel>

1) Press the Maintenance button.
2) Using the Left/Right cursor buttons, change the number displayed in the operation panel for the desired function listed in the table below, and press the Set button to execute the function.

Panel Display	Function	Remarks
01	Nozzle check pattern printing	
02	Print head manual cleaning	- Cleans black and color simultaneously.
03	Print head deep cleaning	- Cleans black and color simultaneously.
04	Print head alignment	Using the printout, set the optimum values.
05	Ink counter reset	Set the ink remaining counter to 100%.
06	Ink remaining display setting	Ink remaining icon is displayed or not displayed on the operation panel.
07	Date order setting in date print	The following three date orders are possible. 1. Year, month, date 2. Month, date, year 3. Date, month, year

(2) Service mode

Function	Procedures	Remarks
Service test print	See "Service mode operation procedures" below.	Set a sheet of A4/LTR- or larger-sized paper. For print sample, see page 1-12.
EEPROM information print	See "Service mode operation procedures" below.	Set a sheet of A4/LTR- or larger-sized paper. For print sample, see page 1-13.
EEPROM initialization	See "Service mode operation procedures" below.	The following items are not initialized: - USB serial number - Destination settings (Japan / Overseas) - Cleaning flag on arrival - Waste ink counter
Waste ink counter reset	See "Service mode operation procedures" below.	Both the main and the borderless print waste ink counters are reset at the same time.
Destination settings	See "Service mode operation procedures" below.	Overseas: i470D Japan: PIXUS 470PD
Print head deep cleaning		Cleans black and color, simultaneously.
Operation panel display confirmation	See "Operation panel operation confirmation procedures" below.	Confirm the operations of operation panel display and operation buttons. Perform the confirmation at operation panel replacement.

<Service mode operation procedures>

1) Close the access cover, and turn off the printer. While pressing the Resume/Cancel button, press and hold the Power button. (The LED lights in green to indicate that a function is selectable.)
2) While holding the Power button, release the Resume/Cancel button.
3) While holding the Power button, press the Resume/Cancel button 2 times, and then release the Power and Resume/Cancel buttons. (In the operation panel, "02" will be displayed. Each time the Resume/Cancel button is pressed, the LED lights alternately in either orange or green. During initialization, the LED blinks in green.)
4) When the LED stops blinking and lights in green, press the Resume/Cancel button the specified number of time(s) according to the function listed in the table below. (Each time the Resume/Cancel button is pressed, the LED lights alternately in either orange or green.)

Time(s)	LED	Function	Remarks
0 times	Green	Power off	When the print head is not installed, the carriage returns and locks in the home position.
1 time	Orange	Service test print	When the Power button is pressed during printing, printing stops, and the mode returns to step 4) above.
2 times	Green	EEPROM information print	When the Power button is pressed during printing, printing stops, and the mode returns to step 4) above.
3 times	Orange	EEPROM initialization	
4 times	Green	Waste ink counter resetting	
5 times	Orange	Destination settings	Proceed to the following steps 5) and then 6) to set the destination.
6 times	Green	Print head deep cleaning	Cleans black and color, simultaneously.
7 times	Orange	Not used in servicing	
8 times or more	Green	Return to the menu selection	Return to step 4) above.

5) After the function (menu) is selected, press the Power button. The LED lights in green, and the selected function is performed. (When the operation completes, the printer returns to step 4) above.)

<Destination setting>

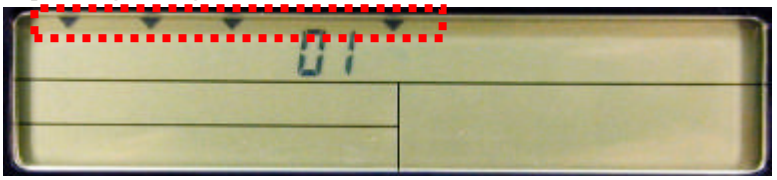
6) Press the Resume/Cancel button the specified number of time(s) according to the destination listed in the table below, and then the Power button.

Time(s)	LED	Destination
1 time	Orange	Overseas: i470D
2 times	Green	Japan: PIXUS 470PD

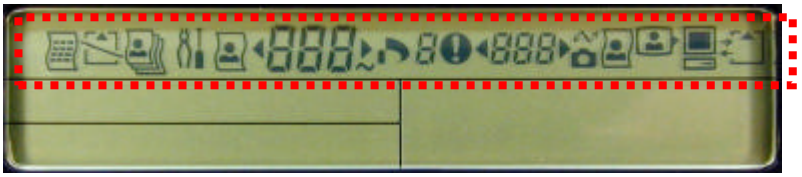
<Operation panel operation verification procedures>
After performing the above service mode operation procedures up to step 3) (with “02” indication in the operation panel), press the specified operation button. Icons are displayed on the LCD as shown below to verify the operation buttons and panel displays.

1) When pressing the left Cursor button

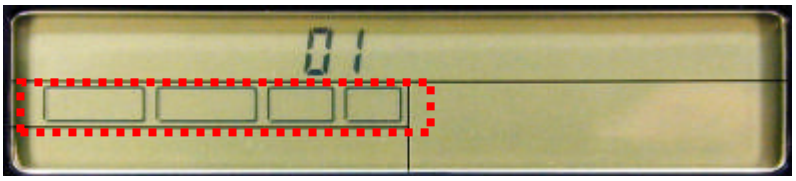
2) When pressing the right Cursor button



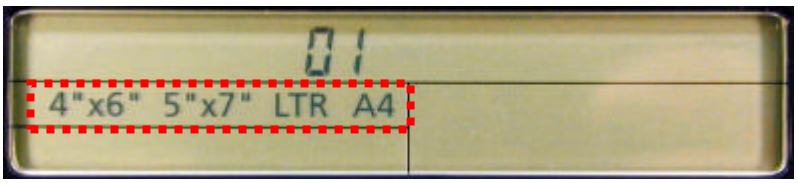
3) When pressing the Set button



4) When pressing the Maintenance button



5) When pressing the Photo Viewer button



6) When pressing the Print button

7) When pressing the Cancel button

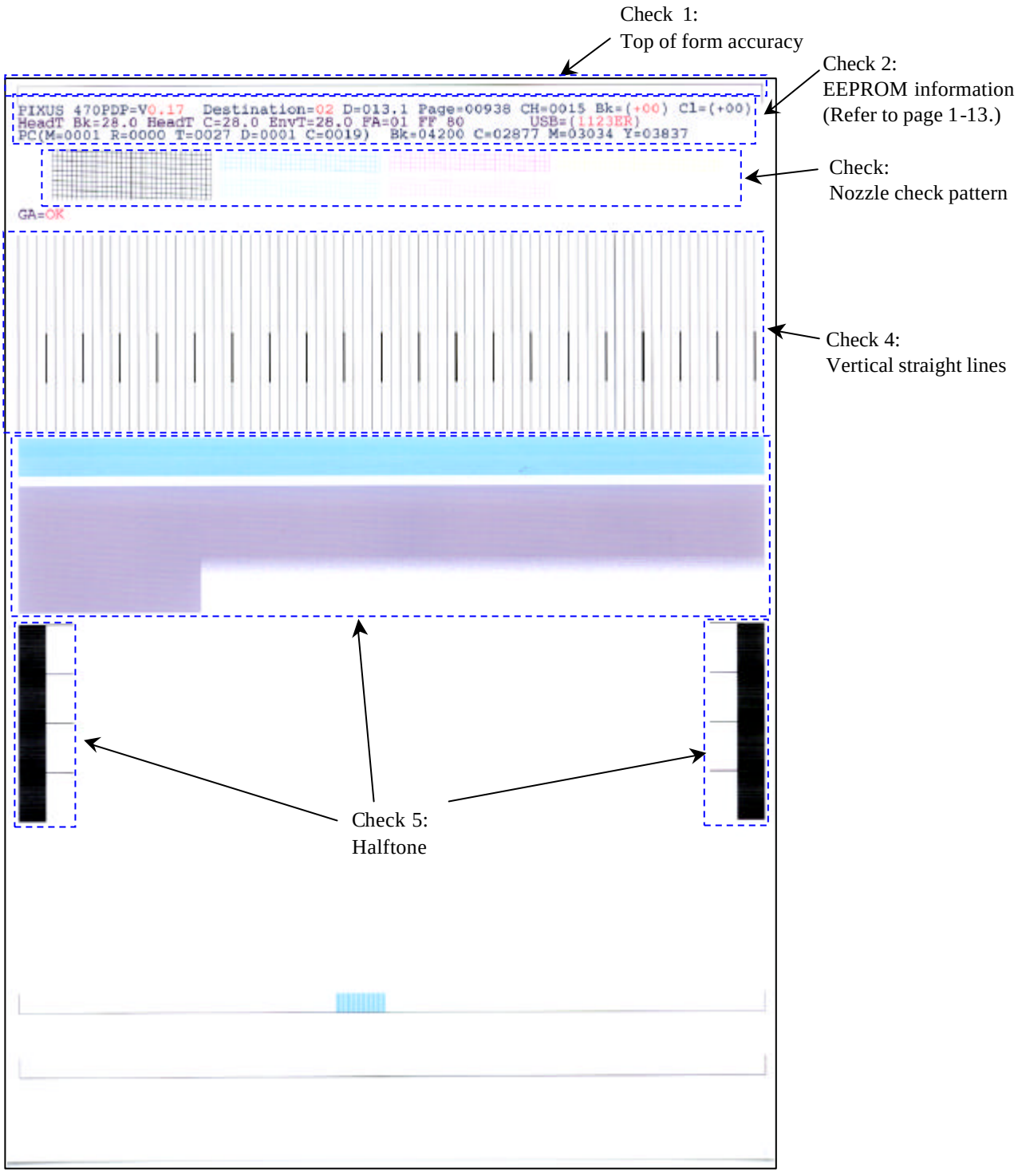
3.4 Verification Items

(1) Service test print

After repair, print the service test print, and confirm the following items:

<Print quality items>

- Check 1, top of form accuracy: The line shall be within the paper.
- Check 2, EEPROM information: Destination and waste ink counter shall be checked.
- Check 3, nozzle check pattern: Ink shall be ejected from all nozzles.
- Check 4, vertical straight lines: The lines shall not be broken.
- Check 5, halftone: There shall be no remarkable streaks or unevenness.



(2) EEPROM information contents

On the EEPROM information print, the printer usage conditions can be confirmed. Refer to the sample print given below.

```
1  PIXUS 470PDP=V1.00 Destination=02 D=004.8 Page=00562 CH=0002  Bk(00) Cl(00)
2  HeadT Bk=25.5 HeadT C=25.0 EnvT=30.0 FA=01 87 80 USB(1000AQ)
3  PC(M=0000 R=0000 T=0000 D=0000 C=0000) Bk=00000 C=00000 M=00000 Y=00000
4  ER(TIME=2002/10/21-21:48 ER0=5100 ER1=5C00 ER2=1000 ER3=1401)
5  TotalINK(Bk=00057098 C=00008108 M=00006992 Y=00007666)
6  CLTime=2002/10/15-15:36 PC(M=0028 R=0015 T=0000 D=0020 C=0009)
7  IC(Bk=1 C=1 M=1 Y=1) WP=0025 SetUsrReg=NONE
8  UR1(A:Bkeo=000 B:Ce0=000 C:Meo=000(Yeo=000) D:Lceo=000 E:Lmeo=000(Lyeo=000)
9  UR2(F:BkBi=000 G:ClBi=000 H:BkCl=000 I:LCBi=000 J:C_LC=000 K:M_LM=000)
10 ST=2002/9/15-20:15 PW(ON=0009 OFF=00005) BORDERLESS=00000
11 PAGE(ALL=00562 PP=00025 PC=0000 PR=00050 MP=0000 SP=0258)
12 CAMERA(BORDERLESS=0030 NORMAL=0028)

13 Card(CF=0035 MS=0000 SM=0005 SD=0004) PC=1
14 CP(PR=00017,00068 SP=00025,00039 MP=00465,00643 PP=00025)
   HDEEPROM
15 V0000
16 SN=0318-A43D
17 LN(04 05 01 06 00 00 03)
18 DI(Bk=+001 CL=+001)
19 IL=(Bk=-08 C=-08 M=-08 Y=-08)
20 WLA=-08 WLB=-08
21 NGBk=000 NGC=000 NGM=000 NGY=000
```

*1: The information surrounded by a blue border is printed in the service test print, also.

1 Model name, ROM version, destination, waste ink amount, number of pages printed, number of times the head was installed, bi-directional registration (black, color)
2 Head temperature (black, color), internal temperature, process inspection information, USB serial number
3 Number of times cleaning was performed (manual, deep cleaning, timer, dot count, head/ink tank replacement), dot count of each color
4 Operator/ service call history (occurrence time*2, ER0, 1, 2, 3)
5 Total ink consumption (Bk=00000000mg, C=00000000mg, M=00000000mg, Y=00000000mg)
6 Cleaning time, number of times cleaning was performed (manual, deep cleaning, timer, dot count, head/ink tank replacement), dot count of each color
7 Ink sponge recognition flag, number of times wiping was performed
8 User's print head alignment values
9 User's print head alignment values
10 Installation date, number of times printer was turned on/off, number of borderless printing pages
11 Number of pages fed (all, plain paper, postcard, Photo Paper Pro, Matte Photo Paper, Photo Paper Plus Glossy)
12 Number of pages in Digital Camera Direct Printing (borderless, bordered)
13 Number of times memory card was inserted (CF, MS, SM, SD), Connection to PC (0=not connected, 1=connected)
14 Number of pages in Memory Card Direct Printing (Photo Paper Pro [borderless, bordered], Photo Paper Plus Glossy [borderless, bordered], Matte Photo Paper [borderless, bordered], plain paper)

HEAD EEPROM

15 Version
16 Serial number
17 Lot number
18 DI sensor adjustment value
19 Ink ejection level
20 Overlay level
21 Number of unusable nozzles (Bk, C, M, Y)

*2: The time the user last performed printing before the error occurred.

4. PRINTER TRANSPORTATION METHOD

This section describes the procedures for transporting the printer (for returning after repair, etc.).

1. Keep the print head and ink tanks installed in the carriage.
2. Turn off the printer, and secure the carriage, locked in home position. (When the printer is turned off, the lock pin automatically locks the carriage in place.)

Caution:

If the print head is removed from the printer and left unprotected, ink (in particular, the pigment black ink) is likely to dry. For this reason, keep the print head installed in the printer, even during transportation. Also, securely lock the carriage in the home position to prevent the carriage from moving and applying stress to the carriage flexible cable, or causing ink leakage, during transportation.

Note:

If the print head must be removed from the printer and transported alone, perform the following:

1. Install both the black and color ink tanks (to prevent the nozzles from drying).
2. Attach the protective cap (to protect new packaged print heads) to the print head (to protect the print head face from damage due to shocks).

Part 2
TECHNICAL REFERENCE

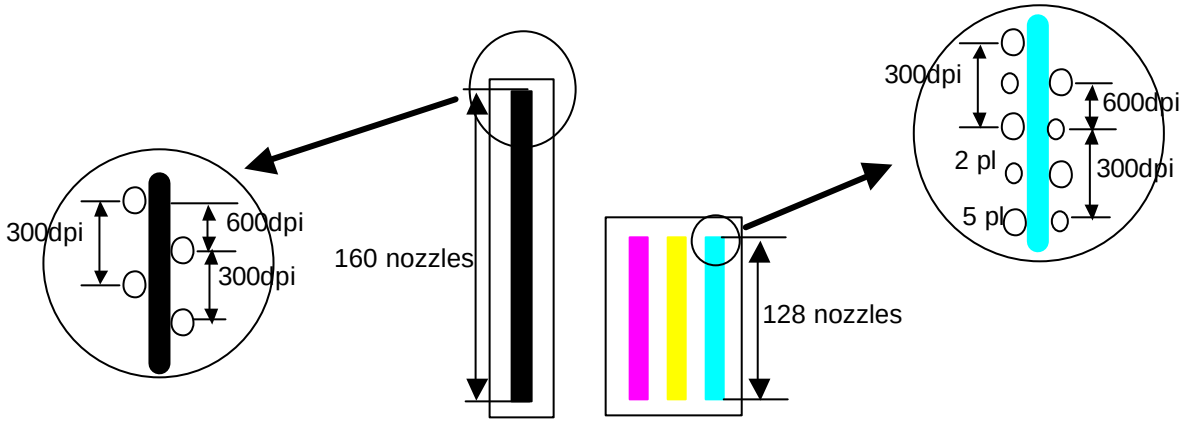
1. NEW TECHNOLOGIES

1.1 4-in-1 Slot

For memory card direct printing, a 4-in-1 card slot is adopted, and the memory card direct printing can be performed without the PCMCIA card adapter.
Supported media are as follows:
Compact Flash, MicroDrive, Memory Stick, SD Card, Multi Media Card, SmartMedia, XD Card*[1]
Sliding the card slot up and down prevents two cards from being inserted simultaneously.
*[1]: For the XD Card, a Compact Flash type adapter is necessary.

1.2 2 pl Print Mode

For the print head, staggered color nozzle arrays of 5 pl and 2 pl are adopted, enabling high quality printing.
For the 2 pl print mode, refer to 3. RESOLUTION BY PRINT MODE on page 2-3.
Black: 160 nozzles x 2 lines
Color: 128 nozzles x 2 lines x 3 colors (M,Y,C)



1.3 Photo Viewer

It is not possible to install the Image Viewer. To see images on the memory card, it is necessary to use Photo Viewer. Photo Viewer is automatically installed at printer driver installation, and pressing the Photo Viewer button in the operation panel will start the Photo Viewer on the computer.
This application is used only to see the images on the memory card, and printing operations are performed via the operation panel.

2. CLEANING MODE AND AMOUNT OF INK PURGED

To prevent printing problems due to bubbles, dust, or ink clogging, print head cleaning is performed before the start of printing, except in the following cases:

- Cleaning on arrival: Performed when the access cover is closed.
- Cleaning by dot count: Performed after ejection of paper.
- Manual cleaning / deep cleaning: Performed manually.

<Cleaning mode list>

Condition	Details	Amount of ink used (g)	Est. required time (sec.)
On arrival of the printer (both black and color)	First cleaning after shipped from the plant.	0.36 (black) 0.52 (color)	110
Dot count cleaning (black/color)	When the specified number of dots are printed from the previous black/color cleaning. (Dots are counted by black and color separately.)	0.12 (black) 0.14 (color)	35 (black) 35 (color)
Timer cleaning - 0[*1] (black only)	If 24 to 180 hours have elapsed since the previous black cleaning till the start of the next printing.		
Timer cleaning - 1[*2] (black/color)	If 180 to 336 hours have elapsed since the previous black/color cleaning till the start of the next printing. (Time is counted by black and color separately.)		
Manual cleaning (black/color/both)	- Via the operation panel (both black and color) - Via the printer driver (black, color, or both selectable)		
Timer cleaning - 2 (black/color)	If 336 to 1,080 hours have elapsed since the previous black/color cleaning till the start of the next printing.	0.36 (black) 0.28 (color)	50 (black) 55 (color)
Timer cleaning - 3 (both black and color)	If 1,080 to 2,160 hours have elapsed since the previous black/color cleaning till the start of the next printing.	0.75 (black) 0.28 (color)	75
Timer cleaning - 4 (both black and color)	If longer than 2,160 hours have elapsed since the previous black/color cleaning till the start of the next printing.	1.50 (black) 0.28 (color)	130
If the print head has not been capped for 1 hour or longer before power-on (both black and color)		0.24 (black) 0.52 (color)	80 (both black and color) 45 (black) 45 (color)
At ink tank replacement (black/color)			
At print head replacement (both black and color)	When the print head is removed and installed.	0.36 (black) 0.52 (color)	110
Deep cleaning (black/color/both)	- Via the operation panel (both black and color) - Via the printer driver (black, color, or both selectable)	1.50 (black) 0.52 (color)	140 (both black and color) 85 (black) 70 (color)

*1: When 24 to 60 hours have elapsed since the previous black cleaning, this cleaning is performed. However, the cleaning will be conducted up to 5 times from the printer installation. After that, when 60 to 180 hours have elapsed, the cleaning will be performed.

*2: The period of time from the previous cleaning is counted by black and color separately. For this reason, the cleaning mode may differ for black or color.

3. RESOLUTION BY PRINT MODE

3.1 Resolution by Print Mode during Printing via Computer

Media Type		Quality Level 5	Quality Level 4	Quality Level 3	Quality Level 2	Quality Level 1
Plain Paper Monochrome	No. of passes Black composition Resolution (dpi)	1 pass Pigment Bk 300x600	1 pass Pigment Bk 300x600	1 pass Pigment Bk 600x600	4 passes Pigment Bk 600x600	
Plain Paper Color	No. of passes (Bk) No. of passes (Color) Black composition Resolution (dpi)	1 pass 1 pass Pigment Bk+MYC Bk: 300x600 MYC: 600x600	1 pass 1 pass Pigment Bk+MYC Bk: 300x600 MYC: 600x600	1 pass 3 passes Pigment Bk+MYC Bk: 600x600 MYC: 1200x600	6 passes 6 passes Pigment Bk+MYC Bk: 600x600 MYC: 1200x600	
High Resolution Paper (HR-101) Monochrome	No. of passes Black composition Resolution (dpi)			4 passes Pigment Bk 600x600	4 passes (unidirectional) Pigment Bk 600x600	
High Resolution Paper (HR-101) Color	No. of passes Black composition Resolution (dpi)			6 passes MYC 1200x600	12 passes MYC 1200x600	
Photo Paper Pro (PR-101/PC-101/ PH-101)	No. of passes Black composition Resolution (dpi)			6 passes MYC 1200x600	12 passes MYC 1200x600	16 passes MYC 4800x1200
Glossy Paper (GP-301/KH-201)	No. of passes Black composition Resolution (dpi)			6 passes MYC 1200x600	12 passes MYC 1200x600	
Photo Paper Plus Glossy (PP-101)	No. of passes Black composition Resolution (dpi)		4 passes MYC 1200x600	6 passes MYC 1200x600	12 passes MYC 1200x600	
Matte Photo Paper (MP-101)	No. of passes Black composition Resolution (dpi)			6 passes MYC 1200x600	12 passes MYC 1200x600	
Postcard for ink jet printers Monochrome	No. of passes Black composition Resolution (dpi)			4 passes Pigment Bk 600x600	6 passes Pigment Bk 600x600	
Postcard for ink jet printers Color	No. of passes Black composition Resolution (dpi)			6 passes MYC 1200x600	12 passes MYC 1200x600	
Postcard Monochrome	No. of passes Black composition Resolution (dpi)		1 pass (unidirectional) Pigment Bk 600x600	4 passes Pigment Bk 600x600	6 passes Pigment Bk 600x600	
Postcard Color	No. of passes Black composition Resolution (dpi)		3 passes Pigment Bk+MYC Bk: 600x600 MYC: 1200x600	4 passes Pigment Bk+MYC Bk: 600x600 MYC: 1200x600	6 passes Pigment Bk+MYC Bk: 600x600 MYC: 1200x600	
T-Shirt Transfers (TR-101)	No. of passes Black composition Resolution (dpi)			6 passes MYC 1200x600		
Transparencies (CF-102)	No. of passes Black composition Resolution (dpi)		3 passes Pigment Bk+MYC Bk: 600x600 MYC: 1200x600		6 passes Pigment Bk+MYC 1200x600	

Yellow background: Printing with 5 pl and 2 pl
Blue background: Printing with 2 pl

3.2 Resolution in Borderless Printing

Media Type		Quality Level 5	Quality Level 4	Quality Level 3	Quality Level 2	Quality Level 1
Plain Paper	No. of passes Black composition Resolution (dpi)			3 passes MYC 600x600		
Photo Paper Pro (PR-101/PC-101/ PH-101)	No. of passes Black composition Resolution (dpi)			6 passes MYC 1200x600	12 passes MYC 1200x600	16 passes MYC 4800x1200
Glossy Paper (GP-301/KH-201)	No. of passes Black composition Resolution (dpi)			6 passes MYC 1200x600	12 passes MYC 1200x600	
Photo Paper Plus Glossy (PP-101)	No. of passes Black composition Resolution (dpi)		4 passes MYC 1200x600	6 passes MYC 1200x600	12 passes MYC 1200x600	
Matte Photo Paper (MP-101)	No. of passes Black composition Resolution (dpi)			6 passes MYC 1200x600	12 passes MYC 1200x600	
Postcard for ink jet printers	No. of passes Black composition Resolution (dpi)			6 passes MYC 1200x600	12 passes MYC 1200x600	
Postcard			3 passes MYC 600x600	4 passes MYC 1200x600	6 passes MYC 1200x600	

3.3 Resolution in Duplex Printing

Media Type		Quality Level 5	Quality Level 4	Quality Level 3	Quality Level 2	Quality Level 1
Plain Paper Monochrome	No. of passes Black composition Resolution (dpi)	1 pass Pigment Bk 300x600	1 pass Pigment Bk 300x600	1 pass Pigment Bk 600x600	4 passes Pigment Bk 600x600	
Plain Paper Color	No. of passes (Bk) No. of passes (Color) Black composition Resolution (dpi)	1 pass 1 pass Pigment Bk+MYC Bk: 300x600 MYC: 600x600	1 pass 1 pass Pigment Bk+MYC Bk: 300x600 MYC: 600x600	1 pass 3 passes Pigment Bk+MYC Bk: 600x600 MYC: 1200x600	6 passes 6 passes Pigment Bk+MYC Bk: 600x600 MYC: 1200x600	

3.4 Resolution in Direct Printing

The printed resolution is the same for both Card Direct Printing and Camera Direct Printing.

Passes: 9 passes
Black composition: M, Y, C
Resolution (dpi): 1200 x 600
Dot size: 5 pl and 2 pl

4. FAQ (Specific Problems and Solutions)

No.	Occurrence level*	Function	Symptom	Condition	Cause	Solution	Possible call or complaint
1.	B	Paper feeding	Paper not feeding	When the plain paper (flexible paper such as SK paper) is cut into 100mmx148mm size, and is fed.	As the paper is flexible and the paper size is small, it winds around the paper feed roller.	When plain paper is used, be sure to use B5 size or larger.	- Paper jam - Paper not feeding
2.	C	Writing to memory card	SD card not written to	With the SD card is inserted into the card slot.	Depending on the method of inserting the SD card, write protection is Locked in rare cases.	Insert the card with care not to “Lock” the write protection switch.	- Writing to the SD card is not possible

* Occurrence level:

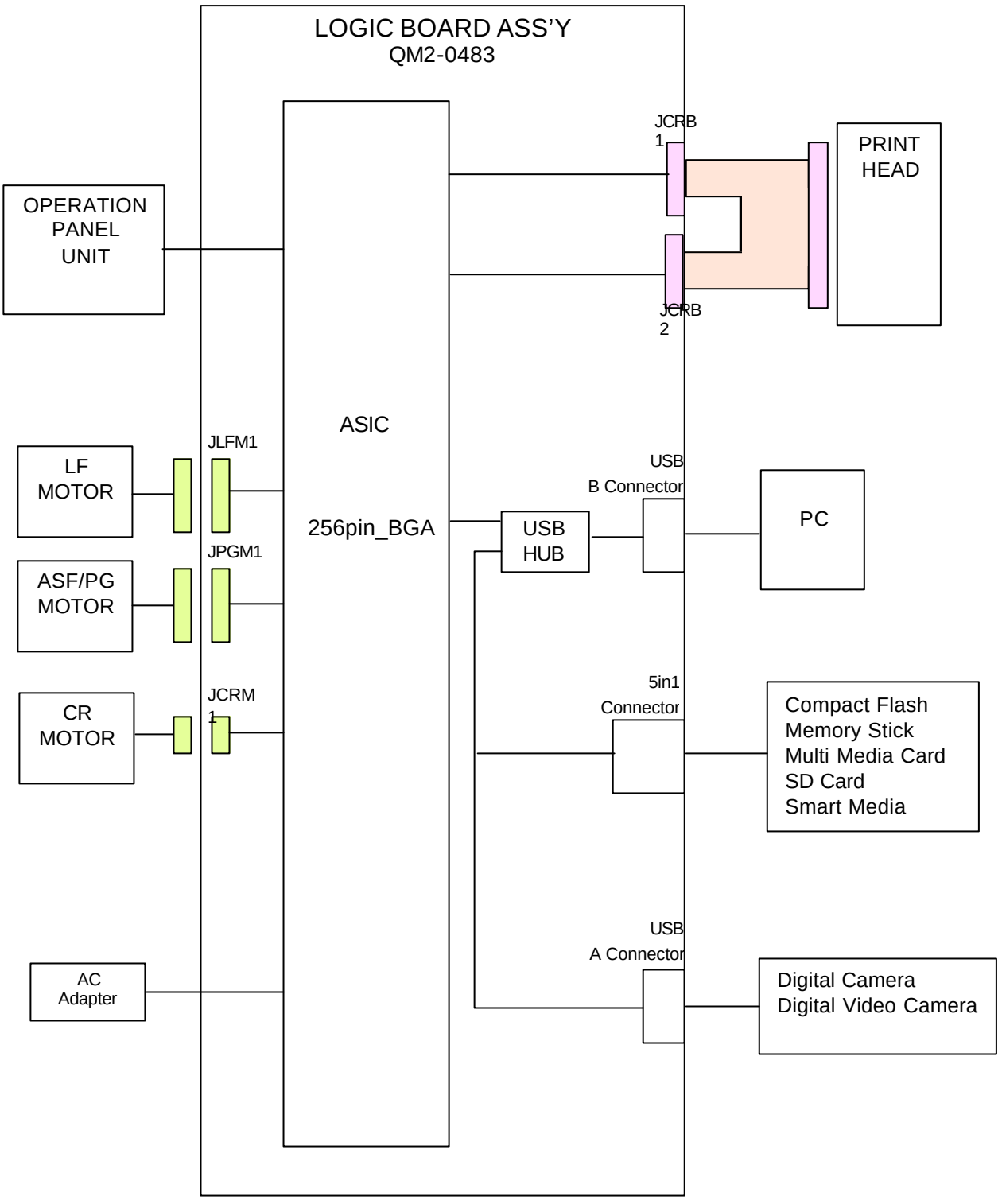
A: The symptom is likely to occur frequently.

B: The symptom may occur under certain conditions, but likeliness is assumed very low in practical usage.

C: The symptom is unlikely to be recognized by the user, and no practical issues are assumed.

Part 3
APPENDIX

1. BLOCK DIAGRAM



2. CONNECTOR LOCATION AND PIN LAYOUT

2.1 Logic Board Ass'y

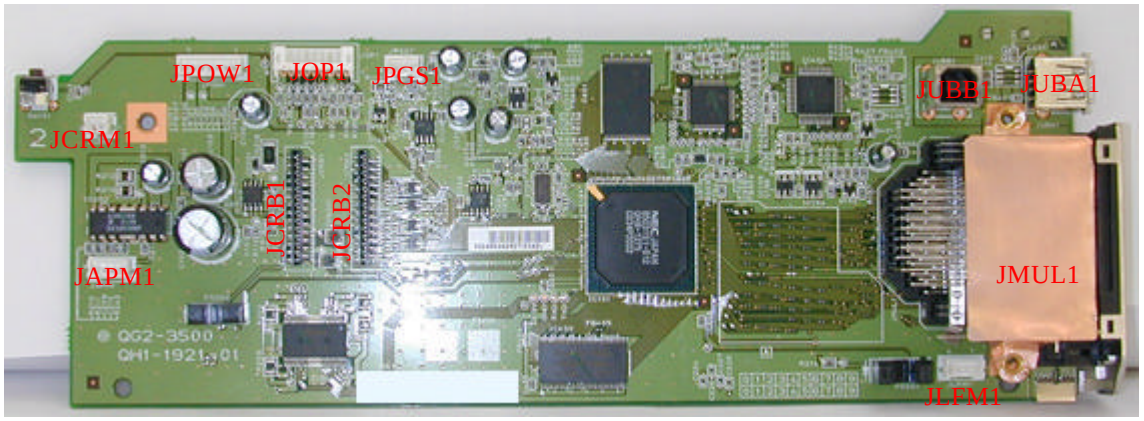


Figure 3-1: Logic Board

JCRB1 (Carriage ribbon cable connector)

Pin. No.	Signal Name	Function
1, 2, 3, 4	HVH	Head drive 24V power supply
5, 6, 7, 8	H_GND	Head drive GND
9, 10, 11, 12	HVH	Head drive 24V power supply
13, 14, 15, 16	H_GND	Head drive GND
17, 18	HVH	Head drive 24V power supply
19, 20	H_GND	Head drive GND
21	ENC_OUT0	Encoder output
22	ENC_OUT1	Encoder output
23	ENC_PWR	Encoder power supply
24, 25	HVDD	Head logic 3.3V power supply
26	HDATA2(C1)	C1 serial data
27	HDATA3(C2)	C1 serial data

JCRB2 (Carriage ribbon cable connector)

Pin No.	Signal Name	Function
1, 4, 9, 11, 14, 16, 23, 27	S_GND	Signal GND
2	DIK1	Temperature detection diode cathode (unused)
3	DIA0	Temperature detection diode anode
5	H_ENB0	Heat enable
6	HDATA1(BK2)	Black serial data
7	H_DIO	Head EEPROM serial data
8	E_DIO	Head EEPROM serial data
10	H_LATCH	Head data latch
12	DIA1	Temperature detection diode anode (unused)
13	DIK0	Temperature detection diode cathode
15	HDATA7(Y2)	Y2 serial data
17	H_CLK	Head clock
19	E_CS	Head EEPROM chip select
20	HDATA6(Y1)	Y1 serial data
21	E_SK	Head EEPROM serial clock
22	H_ENB1	Heat enable
24	HDATA5(M2)	M2 serial data
25	HDATA0(BK1)	BK1 serial data
26	HDATA4(M1)	M1 serial data

JUBA1 (USB-A interface connector (DSC))

Pin No.	Signal Name	Function
1	5V	Cable power supply
2	D+	Differential data signal
3	D-	Differential data signal
4	GND	GND

JUBB2 (USB-B interface connector (PC))

Pin No.	Signal Name	Function
1	PWR	Cable power supply
2	D-	Differential data signal
3	D+	Differential data signal
4	GND	GND

JPOW1 (DC power supply connector)

Pin No.	Signal Name	Function
1	Vpp	5V power supply
2, 3, 4	GND	GND
5	LOGIC	5V logic power supply
6	VM	24V motor power supply
7	VH	24V head power supply

JLFM1 (LF motor connector)

Pin No.	Signal Name	Function
1	LFA	LF motor phase A
2	LFB	LF motor phase $\overline{B}$
3	LFA*	LF motor phase $\overline{A}$
4	LFB*	LF motor phase B

JAPM1 (ASF/PG motor connector)

Pin No.	Signal Name	Function
1	APA	ASF/PG motor phase A
2	APB	ASF/PG motor phase B
3	APA*	ASF/PG motor phase $\overline{A}$
4	APB*	ASF/PG motor phase $\overline{B}$

JCRM1 (Carriage motor connector)

Pin No.	Signal Name	Function
1	CRB	Carriage motor phase B
2	CRA	Carriage motor phase A

JOP1 (OP panel connector)

Pin No.	Signal Name	Function
1	TXD	Serial sending data output
2	RXD	Serial sending data input
3	GND	GND
4	RESETX	Reset input signal
5	RESUME	Resume input signal
6	POWER	Power supply output
7	LED_RSM	LED resume output
8	LED_POW	LED power supply
9	O3.3v	Logic power supply 3.3V

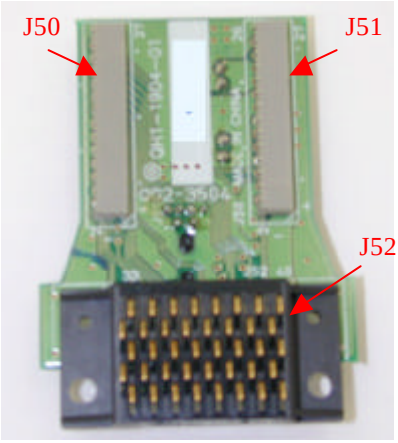
JMUL1 (Card connector: Compact Flash)

Pin No.	Signal Name	Function
1	GND	CF GND
2	CF_D3	16 bit data bus
3	CF_D4	16 bit data bus
4	CF_D5	16 bit data bus
5	CF_D6	16 bit data bus
6	CF_D7	16 bit data bus
7	CF_CE1X	Chip enable
8	CF_A10	24 bit address bus
9	CF_OEX	Memory read enable
10	CF_A9	24 bit address bus
11	CF_A8	24 bit address bus
12	CF_A7	24 bit address bus
13	VCC	CF logic power supply
14	CF_A6	24 bit address bus
15	CF_A5	24 bit address bus
16	CF_A4	24 bit address bus
17	CF_A3	24 bit address bus
18	CF_A2	24 bit address bus
19	CF_A1	24 bit address bus
20	CF_A0	24 bit address bus
21	CF_D0	16 bit data bus
22	CF_D1	16 bit data bus
23	CF_D2	16 bit data bus
24	CF_WP/IOIS16X	Write protect
25	CF_CD2X	Card detection
26	CF_CD1X	Card detection
27	CF_D11	16 bit data bus
28	CF_D12	16 bit data bus
29	CF_D13	16 bit data bus
30	CF_D14	16 bit data bus
31	CF_D15	16 bit data bus
32	CF_CE2X	Chip enable
33	CF_VS1X	Voltage detection
34	CF_IORDX	I/O read enable
35	CF_IOWRX	I/O write enable
36	CF_WEX	Memory write enable
37	CF_RDY/BSYX	Data ready output
38	VCC	CF logic GND
39	CSELX	Chip select signal
40	VS2X	Voltage detection
41	CF_RESET	Reset signal
42	CF_WAITX	Wait signal
43	CF_INPACKX	Card response
44	CF_REGX	REG
45	CF_BVD2	Data control output
46	CF_BVD1	Data control output
47	CF_D8	16 bit data bus
48	CF_D9	16 bit data bus
49	CF_D10	16 bit data bus
50	GND	CF logic GND

JMUL1 (Card connector: Smart Media, Memory Stick, SD (MMC))

Pin No.	Signal Name	Function
51	VCC(22)	SM logic power supply
52	GND(1)	SM GND
53	SM_CEX(21)	Chip enable
54	SM_CLE(2)	Command latch enable
55	SM_REX(20)	Output enable
56	SM_ALE(3)	Address latch enable
57	SM_RDY/BSYX(19)	READY/BUSY
58	SM_WEX(4)	Write enable
59	GND(18)	SM logic GND
60	SM_WPX(5)	Write protect
61	SM_LVD(17)	Low voltage detection
62	SM_D0(6)	16 bit data bus
63	SM_D7(16)	16 bit data bus
64	SM_D1(7)	16 bit data bus
65	SM_D6(15)	16 bit data bus
66	SM_D2(8)	16 bit data bus
67	SM_D5(14)	16 bit data bus
68	SM_D3(9)	16 bit data bus
69	SM_D4(13)	16 bit data bus
70	GND(10)	Logic GND
71	VCC(10)	SM logic power supply
72	SM_CDX(11)	Card detection
73	SM_CDSW	Card detection SW
74	SM_CDSW	Card detection SW
75	SM_WPSW	Write protect SW
76	SM_WPSW	Write protect SW
77	GND	MS logic GND
78	VCC	MS logic power supply
79	MS_SCLK	Serial clock
80	Reserve	For chip test (unusable)
81	MS_INS	Card detection
82	Reserve	For chip test (unusable)
83	MS_DIO	16 bit data bus
84	VCC	MS logic power supply
85	MS_BS	Bus state
86	GND	MS logic GND
87	SD_DAT2	16 bit data bus
88	SD_CD/DAT3	16 bit data bus
89	SD_CMD	16 bit data bus
90	GND	SD logic GND
91	VCC	SD logic power supply
92	SD_CLK	Clock data
93	GND	SD logic GND
94	SD_DAT0	16 bit data bus
95	SD_DAT1	16 bit data bus
96	SD_CDSW	Card detection SW
97	SD_WP/CDSW	Write protect / card detection SW
98	SD_WPSW	Write protect SW

2.2 Carriage Board



J50 (Carriage ribbon cable connector)
Refer to JCRB1 (Carriage ribbon cable connector) on page 3-2.

J51 (Carriage ribbon cable connector)
Refer to JCRB2 (Carriage ribbon cable connector) on page 3-2.

J52 (Print head contact)

Pin No.	Signal Name	Function
1 to 39		Refer to 2-3. Print head on page 3-8.

2.3 Print Head

Pin No.	Signal Name	Function
1, 2, 3	B_GNDH	Heater GND
4	B_DATA_Y2	Serial data input for Y2 heater
5, 6	VSS	Logic GND
7, 8	A_GNDH	Heater GND
9	B_DATA_M1	Serial data input for M1 heater
10	B_DATA_M2	Serial data input for M2 heater
11	B_DATA_Y1	Serial data input for Y1 heater
12	CLK	Clock signal
13	LT	Data latch enable signal
15	B_HE2	Heat enable signal
16	B_DIK	Head temperature sensor cathode side
17	VHT	Head power transistor drive power supply
18	B_HE1	Heat enable signal
19, 20	VDD	Logic power supply
21	E_DI	Head EEPROM serial data input signal
22	B_RANK(NC)	Unused
23	B_DATA_C1	Serial data input for C1 heater
24	B_DATA_C2	Serial data input for C2 heater
25, 26	B_VH	Heater power supply
27	E_SK	Head EEPROM serial data clock input signal
28	E_CS	Head EEPROM chip select input signal
29	B_DIA	Head temperature sensor anode side
30	E_DO	Head EEPROM serial data output signal
31	B_SH(NC)	Unused
32, 40	A_VH	Heater power supply
33	A_DATA_K1	Serial data input for BK1 heater
34	A_SH(NC)	Unused
35	A_RANK(NC)	Unused
36	A_DIK	Head temperature sensor cathode side
37	A_DIA	Head temperature sensor anode side
38	A_DATA_K2	Serial data input for BK2 heater
39	A_HE	Heat enable signal

2.4 i470D / PIXUS 470PD Specifications

<Printer>

Type	Desktop serial color bubble jet printer				
Paper feeding method	Auto sheet feed (no manual feeding)				
Resolution	4,800 dpi x 1,200 dpi (Max.)				
Throughput (Target value)		Draft	Standard	High	
	Black (New Black)	18 ppm	12 ppm	-----	
	Color (New Color)	12 ppm	4.9 ppm	0.8 ppm	
Printing direction	Bidirectional, uni-directional				
Print width	Max. 203.2 mm (220.4 mm in borderless printing)				
Interface	USB 2.0 Full Speed				
ASF stacking capacity	Plain paper (75 g/m^2): Max. 10 mm (Approx. 100 sheets)				
Paper weight	64 to 105 g/m^2				
Detection functions	- Cover open		- Presence of print head		
	- Distinction of print head		- Remaining ink amount (dot count)		
	- Printing position		- Paper out (Paper end sensor)		
	- Waste ink amount		- Internal temperature		
	- Pick-up roller		- Paper feed roller position		
	- Carriage position		- Head-to-paper distance		
Acoustic noise	46 dB				
Environmental requirements	During operation	Temperature	5C to 35C (41F to 95F)		
		Humidity	10%RH to 90% RH (no condensation)		
	Non operation	Temperature	0C to 40C(32F to 104F)		
		Humidity	5% RH to 95%RH (no condensation)		
Power supply	Input voltage	Frequency	Power consumption	Standby	Power-off
	AC 100 to 127 V	50/60 Hz	32 W	2.5 W	1.3 W
	AC 220 to 240 V	50/60 Hz	30 W	2.6 W	1.3 W
External dimensions	Approx. 393 (W) x 258 (D) x 218 (H) mm				
Weight	Approx. 4 kg, not including print head and optional device				
Related standards (Printer, Adapter)	Electromagnetic radiance: VCCI, FCC, IC, C-tick, Taiwan EMC, Korea EMC, CCIB, CCEE Electrical safety: Electrical Appliance and Material Control Law (DENTORI), UL, C-UL, CB Report, GS, CE Mark, FIMKO, CCIB (EMC), AS, CCEE, PSB, Electrical Safety Regulations of Korea, SASO Environmental regulations: Energy Star, Blue Angel, Environment label				
Serial number location	On the carriage ribbon cable holder (visible when the access cover is open).				
Remaining ink amount detection	Available (by dot count, reset by user operation, enabled at default)				
Print head alignment	Available (11 types)				

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