

# **Software Developer's Manual**

## **Raster Command Reference**

**RJ-4250WB/4230B/3050/3150/2030/2050/2140/2150**

**Version 1.03**

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# 1. Introduction

This material provides the necessary information for directly controlling the Brother printer RJ-XXXX (where “XXXX” is the model name).

This information is provided assuming that the user has full understanding of the operating system being used and basic mastery of USB and networks in a developer's environment.

Details concerning the USB interface are not described in this material. If a USB interface is being used, refer to “[Appendix A: USB Specifications](#)” to prepare the interface.

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Read the model names that appear in the screens in this manual as the name of your printer.

## 2. About Raster Commands

Using raster commands an RJ-XXXX printer (where “XXXX” is the model name) can be used to print without using our printer driver.

This operation is useful in the following situations.

- When printing from an operating system other than Windows  
(Example: When printing from a Linux computer or mobile terminal)
- When adding print functions to an existing system

In addition, printing can be performed with advanced settings.

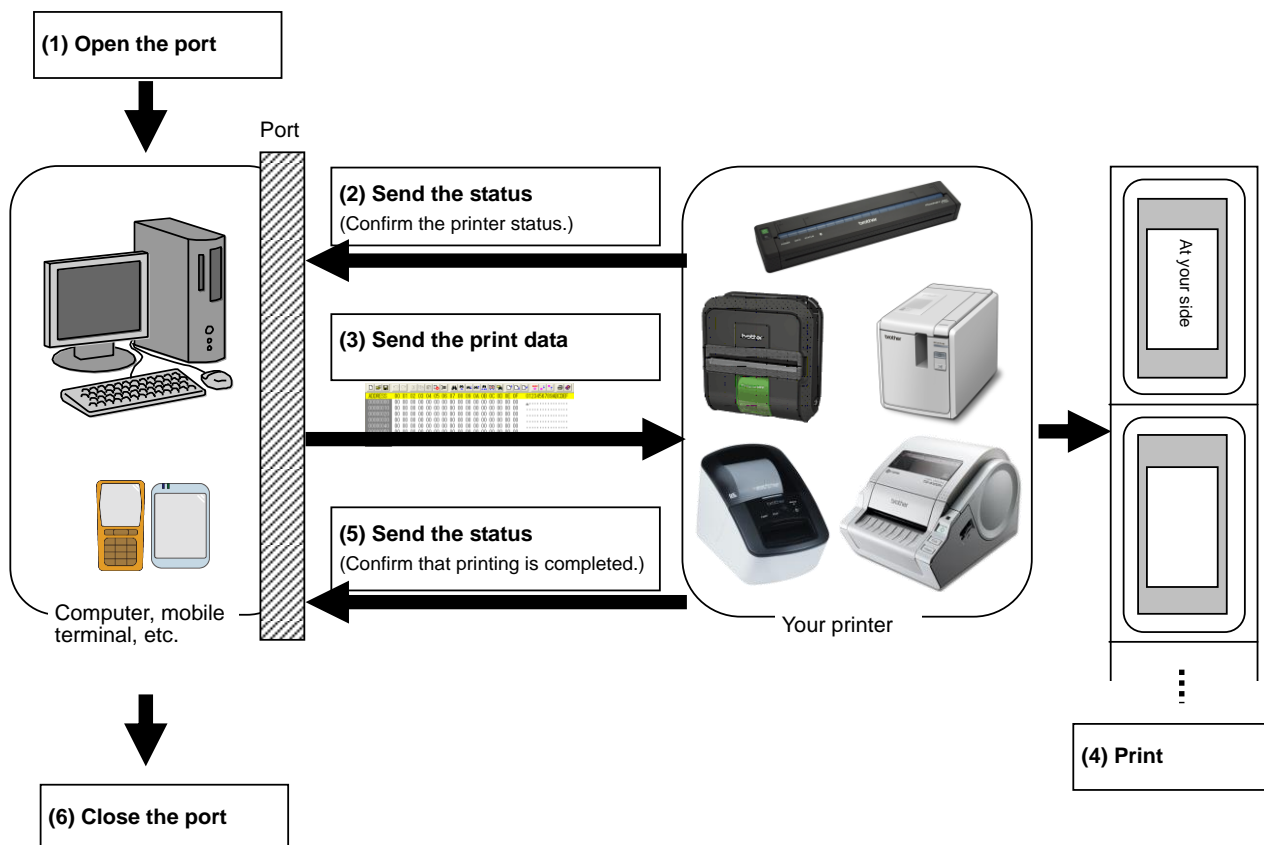
In this material, “raster” refers to binary bitmap data (collection of dots).

Refer to this material to print by sending initialization commands and control codes together with raster data to the RJ-XXXX printer (hereafter, referred to as “printer”).

This manual describes the procedure for adding these codes and sending the data.

### 3. Printing Using Raster Commands

The printing procedure is described below. For detailed flow charts, refer to [“8. Flow Charts”](#). For details on each command, refer to [“7. Printing Command Details”](#).





(1) Open the USB/network port

Open the USB/network port in the operating environment. The procedure for opening the USB/network port is not described in this material.

(2) Confirm the printer status sent from the printer

The “status information request” command is sent to the printer, the status information received from the printer is analyzed, and then the status of the printer is determined.

For details on the “status information request” command and on the definitions of “status”, refer to “Status information request” in [“7. Printing Command Details”](#).

(3) Send the print data

If the status analysis confirms that media compatible with the print data is loaded into the printer and that no error has occurred, the print data is sent.

The structure of the print data is explained in the next section, [“4. Print Data”](#).

**Note:**

**No command can be sent to the printer after the print data is transmitted and until the completion of printing is confirmed.**

**Even the “status information request” command cannot be sent during printing.**

(4) Print the data

(5) Confirm that printing is completed

When printing is completed, the status is received from the printer.

If this status is analyzed to confirm that printing is completed, printing one page is considered finished.

If the print job has multiple pages, (2) through (4) are repeated.

(6) Close the USB/network port

After all printing is finished, close the USB/network port.

## 4. Print Data

### 4.1 Print data overview

The print data is constructed of the following: (1) initialization commands, (2) control codes, (3) raster data, and (4) print commands. If the print job consists of multiple pages, (2) through (4) are repeated.

#### (1) Initialization commands

Specified only once at the beginning of the job.

Sequence	Command Name	Description/Example
1	Invalidate	Sends a 350-byte invalidate command with the RJ-4250WB/4230B/3050/3150 or a 200-byte invalidate command with the RJ-2030/2050/2140/2150, and then resets the printer to the receiving state.
2	Initialize	Initializes for printing. 1Bh, 40h (Fixed)

#### (2) Control codes

Added at the beginning of each page and sent for each page.

Sequence	Command Name	Description/Example
1	Switch dynamic command mode	Switches the command mode of the printer to raster mode. 1Bh, 69h, 61h, 01h
2	Switch automatic status notification mode	Dynamically switches whether an automatic status notification is given during printing. 1Bh, 69h, 21h, 00h *The RJ-3000 / RJ-2000 does not support this command.
3	Additional media information command	1Bh, 69h, 55h, 77h, 01h, 127 bytes of media information <b>Note</b> <b>If the media information is the same as when printing was last performed, it is unnecessary to send the additional media information command.</b>
4	Print information command	Sets the print information for the printer. For a length setting of 100 mm for 80-mm-wide continuous length tape: 1Bh, 69h, 7Ah, 00h, 0Ah, 50h, 64h, F0h, 02h, 00h, 00h, 00h, 00h
5	Various mode	To select "Mirror Printing" 1Bh, 69h, 4Dh, 40h
6	Specify margin amount	Specifies the amount of the margins. For 3 mm margins: 1Bh, 69h, 64h, 18h, 00h
7	Select compression mode	Selects the compression mode for raster graphics. To send the data compressed to TIFF format: 4Dh, 02h

(3) Raster data

Repeated for each page in the print job.

Sequence	Command Name	Description/Example
-	Raster graphics transfer	Sends a raster line that contains data with pixels set to "ON".
-	Zero raster graphics	Sends a raster line with all pixels set to "0". 5Ah (Fixed)

(4) Print commands

Specified at the end of the page.

Sequence	Command Name	Description/Example
-	Print command	Specifies at the end of a page that is not the last page. 0Ch
-	Print command with feeding	Specifies at the end of the last page. 1Ah (Fixed)

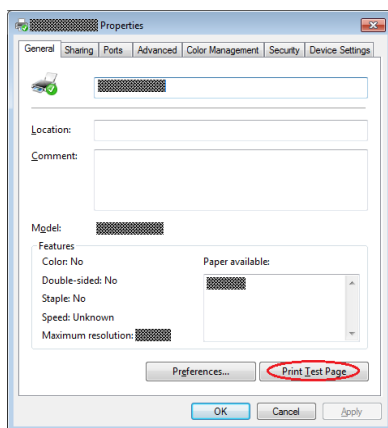
## 4.2 Sample (analyzing the print data of the test page)

The print data created by the printer driver is described here.

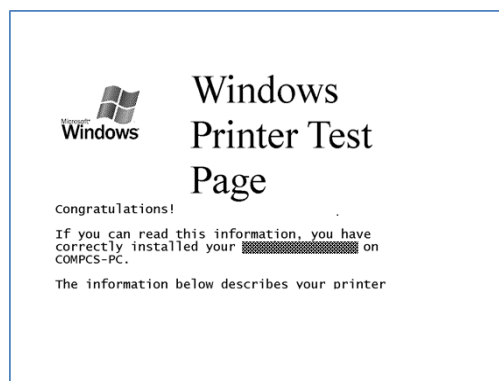
As an example, we will check the print data created when the **[Print Test Page]** button in the printer Properties dialog box is clicked to print the test page.

Since the print data differs depending on the print settings of the printer, refer to this procedure and try creating print data with various print settings.

Furthermore, this procedure is for the Windows® 7 operating environment. A similar procedure can be performed if you are using a different operating system.



Printer Properties



Test page

### 4.2.1 Preparation

Install the two listed below.

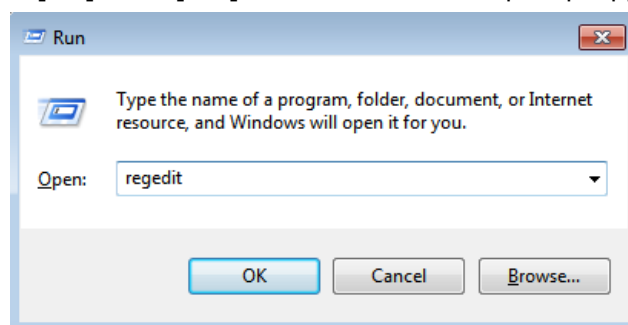
- Printer driver of the Brother RJ-XXXX
- Binary file editor

The data that we will analyze in this sample is a binary file.

Therefore, use a binary file editor to display and check the contents of the binary file.

**\*If you are using RJ-4250WB/4230B, please follow the steps below to set registry:**

- 1: Open the **[Run]** box (keyboard shortcut [Windows Key] + [R])
- 2: Type **“regedit”** and click **[OK]**. Click **[Yes]** to confirm when UAC prompt appears.



Run

3: Open the path below in TreeView on the left-side of the Registry Editor.

RJ-4250WB:

\HKEY\_LOCAL\_MACHINE\SOFTWARE\Brother Industries, Ltd.\P-touch\Driver\3.0\Brother RJ-4250WB

RJ-4230B:

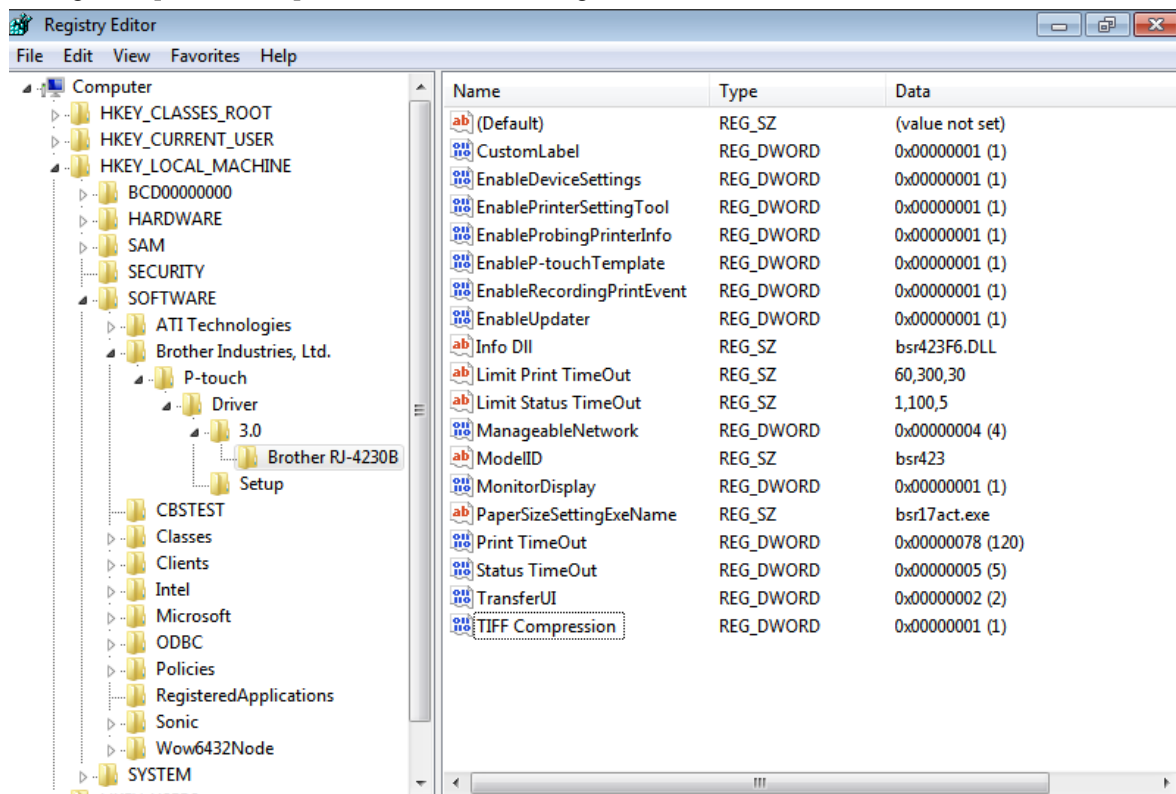
\HKEY\_LOCAL\_MACHINE\SOFTWARE\Brother Industries, Ltd.\P-touch\Driver\3.0\Brother RJ-4230B

4: Right-click on the right pane and select **[New] → [DWORD (32-bit) Value]**

5: Rename the added key to **[TIFF Compression]**

6: Right-click the added key and select **[Modify]**

7: Change the **[Value data]** to “1” on the edit dialogue



Registry Editor (After [TIFF Compression] registry key added)

#### 4.2.2 Checking the print data

The procedure for checking the print data is provided below.

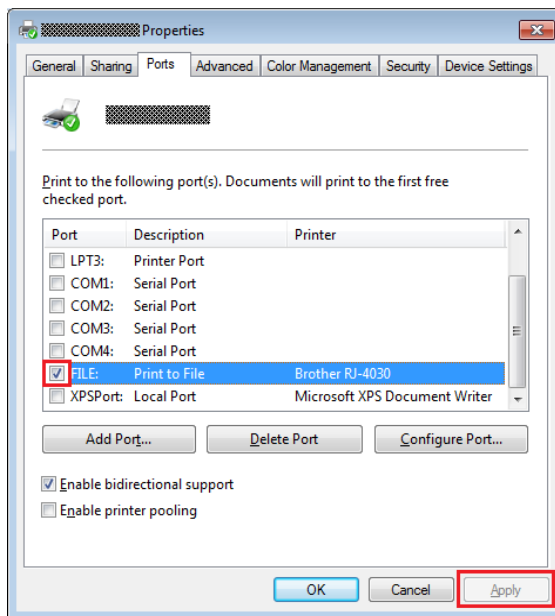
Step 1: Change the port of the printer to “FILE:”.

Step 2: Print the desired item (in this case, the test page), and then specify the file name.

Step 3: Open the created file in the binary file editor to check it.

**Step 1: Change the port of the printer to “FILE:”.**

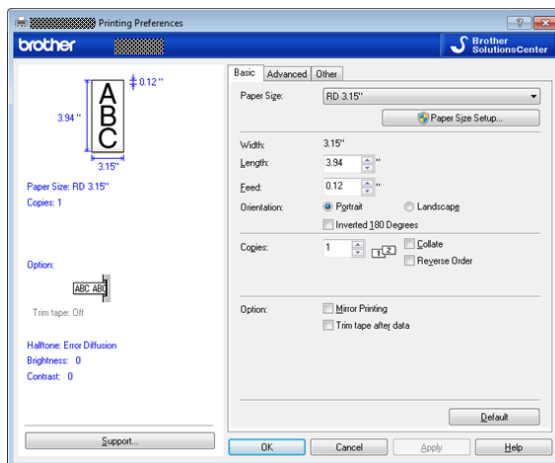
Open the **[Devices and Printers]** window, right-click the printer, and then display the printer's Properties dialog box. Click the **[Ports]** tab in the printer's Properties dialog box, select the “FILE:” check box, and then click the **[Apply]** button.



[Ports] tab of the printer Properties dialog box

**Step 2: Print the item (in this case, the test page), and then specify the file name.**

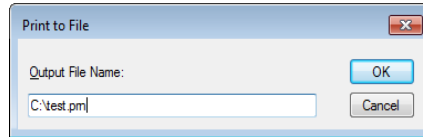
For this sample, print the test page with the default print settings, which were specified immediately after the printer driver was installed.



Default settings immediately after installation of the printer driver

When the test page is printed with the printer, a dialog box appears so that the file name can be specified. (Refer to the illustration below.)

After a file name is typed in and the **[OK]** button is clicked, the printer driver creates the print data and saves it in a file with the specified name.



Dialog box for specifying the file name

### Step 3: Open the print data in the binary file editor.

Open the saved file in the binary file editor. The rows of numbers that appear are the print data. (Refer to the illustration below.)

The print data is constructed of the following: (1) initialization commands, (2) control codes, (3) raster data and (4) print commands, which were described in [“4.1 Print data overview”](#). For details on the print data, refer to [“4.2.3 Explanation of print data for the test page”](#).

The diagram illustrates the data layout for a 1024x1024 pixel image. The data is organized into three main sections, indicated by red brackets on the right:

- (1) Initialization commands:** This section contains the first 1024 rows of data, which are used to initialize the image.
- (2) Control codes:** This section contains the next 1024 rows of data, which are used to control the image processing.
- (3) Raster data:** This section contains the remaining data, which is the actual image content. It is further divided into four sub-sections, each containing 1024 rows of data:
  - (a) Print commands:** This sub-section contains the first 1024 rows of raster data, which are used to print the image.
  - (b) Print commands:** This sub-section contains the next 1024 rows of raster data, which are used to print the image.
  - (c) Print commands:** This sub-section contains the next 1024 rows of raster data, which are used to print the image.
  - (d) Print commands:** This sub-section contains the final 1024 rows of raster data, which are used to print the image.

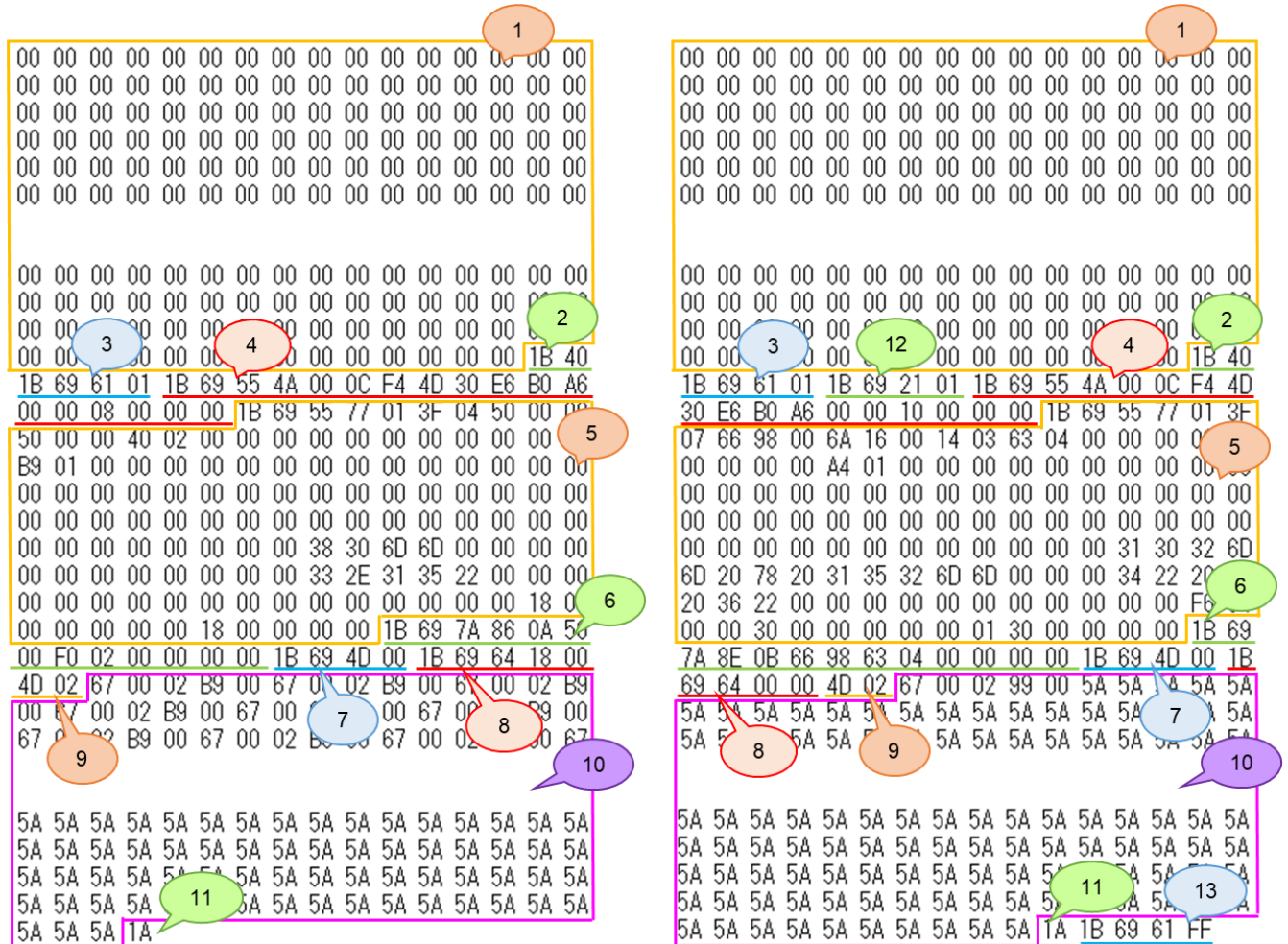
The diagram shows the sequence of data from the top-left corner to the bottom-right corner, with the raster data section being the largest and most complex.

Print data

### 4.2.3 Explanation of print data for the test page

The print data for the test page outputted in the previous section is described below.

The following illustration shows the print data created in section “[4.2.1 Preparation](#)” opened in the binary file editor.



Print data (Left: RJ-3000 and RJ-2000, Right: RJ-4200)



Descriptions for the numbers in the print data on the previous page are provided in the following table.

For details on each command, refer to [“7. Printing Command Details”](#).

No.	Command Name	Description
1	Invalidate	A 350-byte invalidate command is sent. (With the RJ-2000, a 200-byte invalidate command is sent.)
2	Initialize	The “initialize” command is sent.
3	Switch dynamic command mode	The printer is switched to raster mode. Send this command before sending raster data to the printer.
4	Job ID setting commands	Internal specification commands. Since this is a command for outputting with the commercial version of the driver, it is unnecessary for the user to send this command.
5	Additional media information command	Additional media information on the media size is sent. This is the command for “3.15” (80 mm)”.
6	Print information command	Media size information for the print data is sent. This is the command for “3.15” (80 mm)” continuous length tape.
7	Various mode settings (1Bh+69h+4Dh+00H)	This command specifies the settings such as mirror printing. Normally no settings required here.
8	Specify margin amount	This command specifies the amount of margins.
9	Select compression mode	TIFF compression mode is selected.
10	Raster data	Raster data continues.
11	Print command with feeding	Since one page will be printed, this is sent at the end of the first page.
12	Switch automatic status notification mode	Dynamically switches whether an automatic status notification is given during printing.
13	Switch dynamic command mode	This command resets to default mode that is switched by No.3. Send this command after [Print command with feeding] is sent.

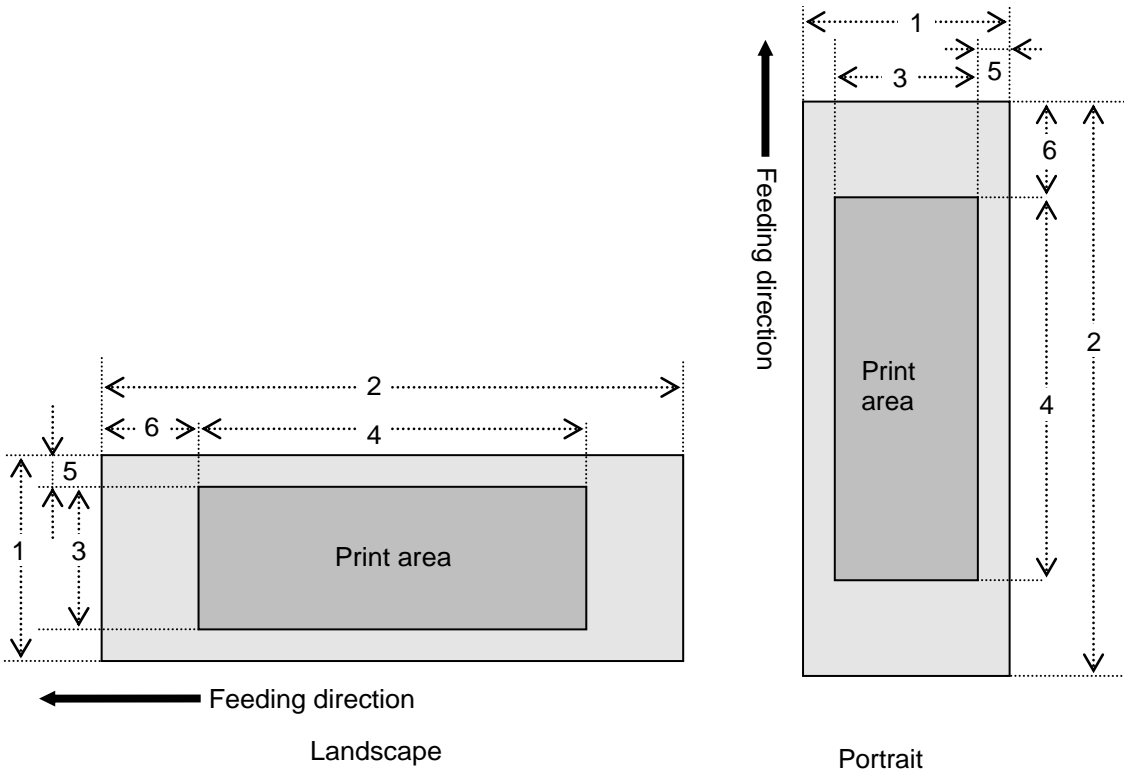
4.3 Page data details

4.3.1 Resolution

Resolution	Height-to-Width Proportion
203 dpi high, 203 dpi wide	1:1

4.3.2 Page size

(a) Continuous length tape



- Number

1 Width

3 Print area width (maximum printing width)

5 Width offset
- 2 Length

4 Print area length

6 Length offset

RJ-2000

ID	Tape Size	1	2	3	4	5	6
442	RD 50 mm RD 1.9"	50.0 mm 400 dots	→ <a href="#">4.3.4</a>	47.8 mm 382 dots	→ <a href="#">4.3.5</a>	1.5 mm 12 dots	→ <a href="#">4.3.3</a>
426	RD 58 mm RD 2.2"	58.0 mm 464 dots	→ <a href="#">4.3.4</a>	54.1 mm 432 dots	→ <a href="#">4.3.5</a>	2.0 mm 16 dots	→ <a href="#">4.3.3</a>

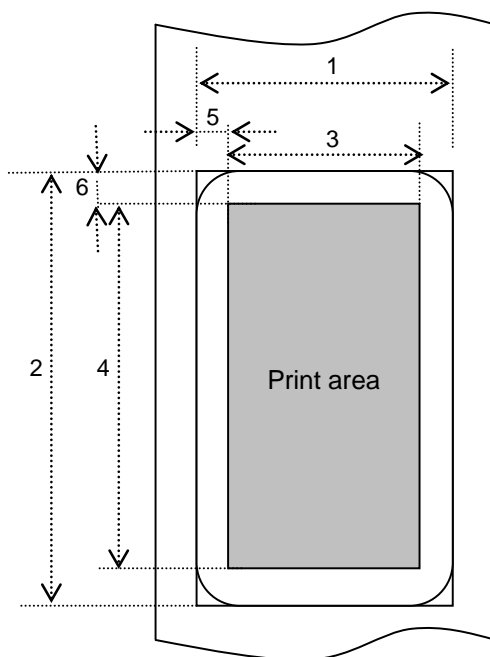
**RJ-3000**

ID	Tape Size	1	2	3	4	5	6
442	RD 50 mm RD 1.9"	50.0 mm 400 dots	→ <a href="#">4.3.4</a>	47.0 mm 376 dots	→ <a href="#">4.3.5</a>	1.5 mm 12 dots	→ <a href="#">4.3.3</a>
426	RD 58 mm RD 2.2"	58.0 mm 464 dots	→ <a href="#">4.3.4</a>	55.1 mm 440 dots	→ <a href="#">4.3.5</a>	1.5 mm 12 dots	→ <a href="#">4.3.3</a>
439	RD 76 mm RD 3.0"	76.2 mm 610 dots	→ <a href="#">4.3.4</a>	72.1 mm 576 dots	→ <a href="#">4.3.5</a>	2.1 mm 17 dots	→ <a href="#">4.3.3</a>
441	RD 80 mm RD 3.15"	80.0 mm 640 dots	→ <a href="#">4.3.4</a>	72.1 mm 576 dots	→ <a href="#">4.3.5</a>	4.0 mm 32 dots	→ <a href="#">4.3.3</a>

**RJ-4200**

ID	Tape Size	1	2	3	4	5	6
442	RD 50 mm RD 1.9"	50.0 mm 400 dots	→ <a href="#">4.3.4</a>	47.0 mm 376 dots	→ <a href="#">4.3.5</a>	1.5 mm 12 dots	→ <a href="#">4.3.3</a>
415	RD 102 mm RD 4"	101.6 mm 812 dots	→ <a href="#">4.3.4</a>	98.6 mm 788 dots	→ <a href="#">4.3.5</a>	1.5 mm 12 dots	→ <a href="#">4.3.3</a>

(b) Die-cut labels



Number	1 Width	2 Length
	3 Print area width (maximum printing width)	4 Print area length
	5 Width offset	6 Length offset

**RJ-2000**

ID	Label Size	1	2	3	4	5	6
427	RD 50 mm x 85 mm RD 1.9" x 3.3"	50.0 mm 400 dots	85.0 mm 679 dots	47.0 mm 376 dots	79.0 mm 632 dots	1.5 mm 12 dots	3.0 mm 24 dots
422	RD 51 mm x 26 mm RD 2.0" x 1.0"	50.8 mm 406 dots	25.6 mm 205 dots	47.8 mm 382 dots	19.6 mm 157 dots	1.5 mm 12 dots	3.0 mm 24 dots
446	RD 55 mm x 40 mm RD 2.1" x 1.5"	55.0 mm 440 dots	40.0 mm 320 dots	52.0 mm 416 dots	34.0 mm 272 dots	1.5 mm 12 dots	3.0 mm 24 dots

**RJ-3000**

ID	Label Size	1	2	3	4	5	6
427	RD 50 mm x 85 mm RD 1.9" x 3.3"	50.0 mm 400 dots	85.0 mm 680 dots	47.0 mm 376 dots	79.0 mm 632 dots	1.5 mm 12 dots	3.0 mm 24 dots
428	RD 60 mm x 92 mm RD 2.3" x 3.6"	60.0 mm 480 dots	92.0 mm 736 dots	57.1 mm 456 dots	86.1 mm 688 dots	1.5 mm 12 dots	3.0 mm 24 dots
443	RD 76 mm x 44 mm RD 3.0" x 1.75"	76.2 mm 610 dots	44.4 mm 355 dots	72.1 mm 576 dots	38.4 mm 307 dots	2.1 mm 17 dots	3.0 mm 24 dots

## RJ-4200

ID	Label Size	1	2	3	4	5	6
427	RD 50 mm x 85 mm RD 1.9" x 3.3"	50.0 mm 400 dots	85.0 mm 679 dots	47.0 mm 376 dots	79.0 mm 632 dots	1.5 mm 12 dots	3.0 mm 24 dots
428	RD 60 mm x 92 mm RD 2.3" x 3.6"	60.0 mm 480 dots	92.0 mm 736 dots	57.1 mm 456 dots	86.1 mm 688 dots	1.5 mm 12 dots	3.0 mm 24 dots
429	RD 80 mm x 115 mm RD 3.1" x 4.5"	80.0 mm 639 dots	115.0 mm 919 dots	77.1 mm 616 dots	108.1 mm 864 dots	1.5 mm 12 dots	3.5 mm 28 dots
423	RD 102 mm x 26 mm RD 4" x 1"	101.6 mm 812 dots	25.6 mm 205 dots	98.6 mm 788 dots	19.5 mm 156 dots	1.5 mm 12 dots	3.0 mm 24 dots
419	RD 102 mm x 50 mm RD 4" x 2"	101.6 mm 812 dots	49.9 mm 399 dots	98.6 mm 788 dots	43.9 mm 351 dots	1.5 mm 12 dots	3.0 mm 24 dots
424	RD 102 mm x 76 mm RD 4" x 3"	101.6 mm 812 dots	76.2 mm 609 dots	98.6 mm 788 dots	70.2 mm 561 dots	1.5 mm 12 dots	3.0 mm 24 dots
425	RD 102 mm x 102 mm RD 4" x 4"	101.6 mm 812 dots	101.6 mm 812 dots	98.6 mm 788 dots	95.6 mm 764 dots	1.5 mm 12 dots	3.0 mm 24 dots
420	RD 102 mm x 152 mm RD 4" x 6"	101.6 mm 812 dots	152.4 mm 1218 dots	98.6 mm 788 dots	140.5 mm 1123 dots	1.5 mm 12 dots	6.0 mm 48 dots

### 4.3.3 Feed amount

The feed amount (left and right margins) is defined below.

Type	Minimum Margin Setting	Maximum Margin Setting
Continuous length tape	3.0 mm 0.12" 24 dots	127.0 mm 5" 1015 dots
Die-cut labels	The length offset indicated in “(b) Die-cut labels” of <a href="#">“4.3.2 Page size”</a> is used. However, set “0” as the value of the “specify margin amount” command.	

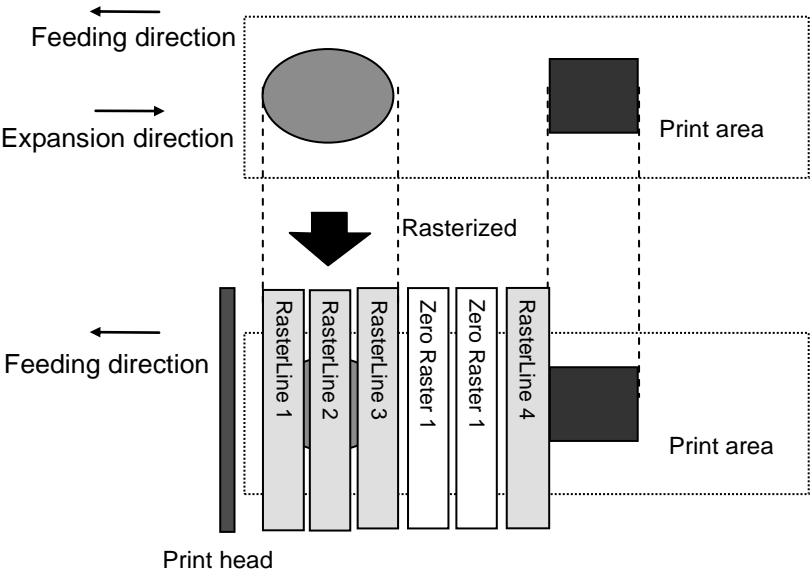
### 4.3.4 Maximum and minimum lengths

The maximum and minimum lengths are defined below.

Type	Minimum Length	Maximum Length	
Continuous length tape	12.0 mm 0.47" 96 dots	RJ-2000 / RJ-3000	RJ-4200
		1000.0 mm 39.37" 7992 dots	3000.0 mm 118.11" 23977 dots
Die-cut labels	Fixed	Fixed	

**4.3.5 Raster line**

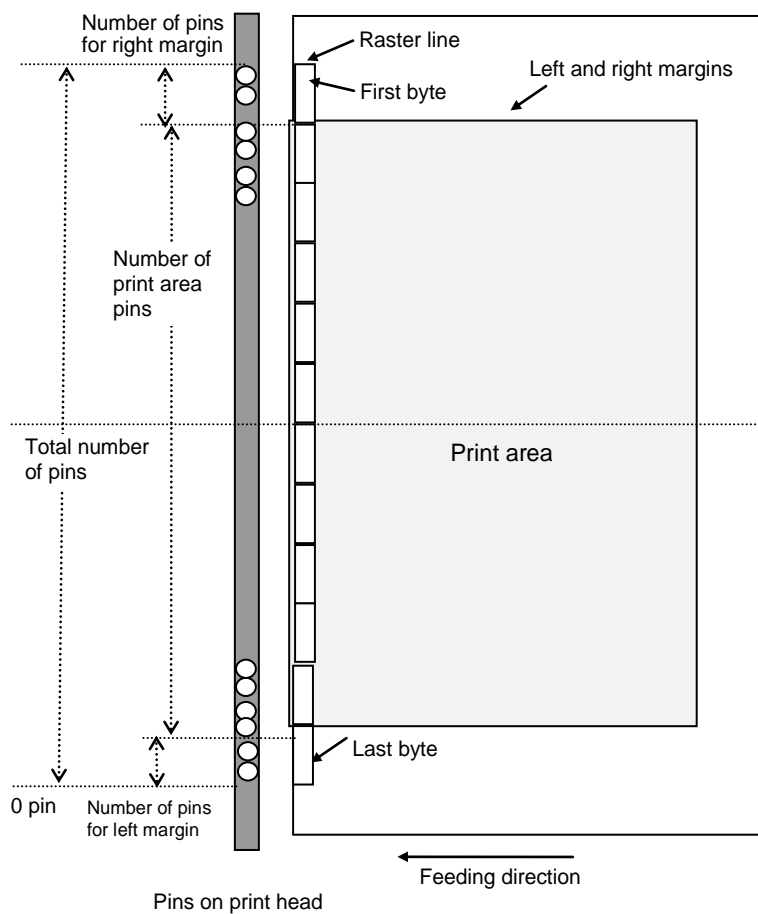
As shown below, the parts with data to be printed are converted with “raster graphics transfer”, and the parts with no data are converted with “zero raster graphics”. On the actual tape, margins (feed) are added specified with “various mode settings” at the beginning and the end.



The following shows the relationship between the raster graphics parameters and the pixels.



# RJ-2000 Total number of pins: 432 pins



Continuous length tape:

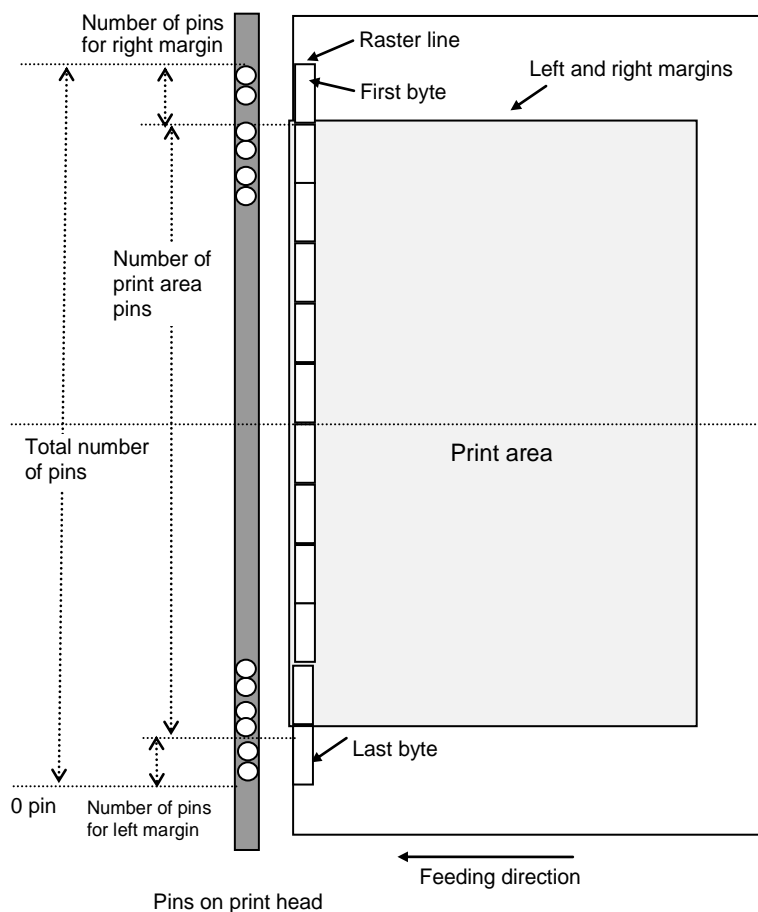
Tape Size	Number of Pins for Left Margin	Number of Print Area Pins	Number of Pins for Right Margin	Number of Bytes for Raster Graphics Transfer
50 mm	25	382	25	54
58 mm	0	432	0	54

Die-cut labels:

Label Size	Number of Pins for Left Margin	Number of Print Area Pins	Number of Pins for Right Margin	Number of Bytes for Raster Graphics Transfer
50 mm x 85 mm	28	376	28	54
51 mm x 26 mm	25	382	25	54
55 mm x 40 mm	8	416	8	54



# **RJ-3000 Total number of pins: 576 pins**



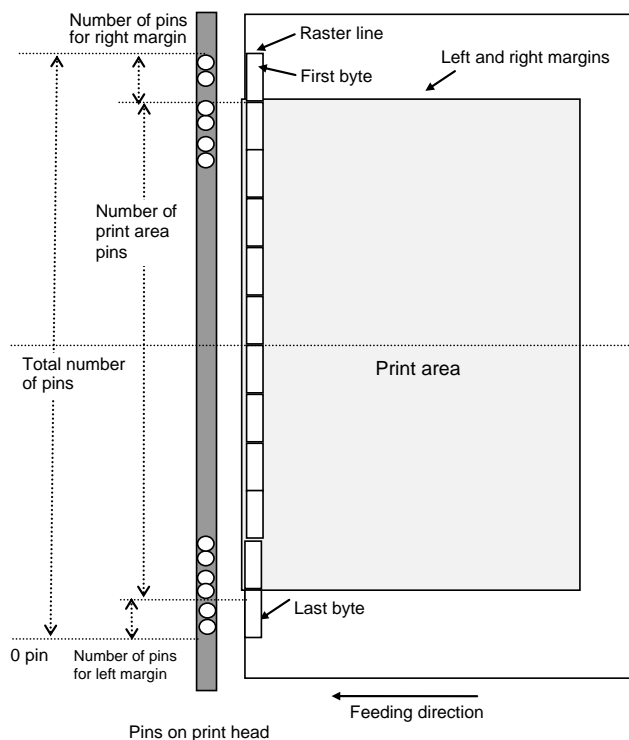
## Continuous length tape:

Tape Size	Number of Pins for Left Margin	Number of Print Area Pins	Number of Pins for Right Margin	Number of Bytes for Raster Graphics Transfer
50 mm	100	376	100	72
58 mm	68	440	68	72
76 mm	0	576	0	72
80 mm	0	576	0	72

## Die-cut labels:

Label Size	Number of Pins for Left Margin	Number of Print Area Pins	Number of Pins for Right Margin	Number of Bytes for Raster Graphics Transfer
50 mm x 85 mm	100	376	100	72
60 mm x 92 mm	60	456	60	72
76 mm x 44 mm	0	576	0	72

# RJ-4200 Total number of pins: 832 pins



## Continuous length tape:

Tape Size	Number of Pins for Left Margin	Number of Print Area Pins	Number of Pins for Right Margin	Number of Bytes for Raster Graphics Transfer
50 mm	196	440	196	104
102 mm	22	788	22	104

## Die-cut labels:

Label Size	Number of Pins for Left Margin	Number of Print Area Pins	Number of Pins for Right Margin	Number of Bytes for Raster Graphics Transfer
50 mm x 85 mm	228	376	228	104
60 mm x 92 mm	188	456	188	104
80 mm x 115 mm	108	616	108	104
102 mm x 26 mm	22	788	22	104
102 mm x 50 mm	22	788	22	104
102 mm x 76 mm	22	788	22	104
102 mm x 102 mm	22	788	22	104
102 mm x 152 mm	22	788	22	104

## 5. Status

### 5.1 Status overview

The status is sent from the printer to the computer as a reply to the “status information request” command or as an error message. The size is fixed at 32 bytes.

Number	Offset	Size	Name	Value/Reference
1	0	1	Print head mark	Fixed at 80h
2	1	1	Size	Fixed at 20h
3	2	1	Brother code	Fixed at “B” (42h)
4	3	1	Series code	Refer to <a href="#">5.2.1 Series/model</a>
5	4	1	Model code	Refer to <a href="#">5.2.1 Series/model</a>
6	5	1	Country code	Fixed at “0” (30h)
7	6	1	Battery level	Refer to <a href="#">5.2.9 Battery level</a>
8	7	1	Reserved	Fixed at “00h”
9	8	1	Error information 1	Refer to <a href="#">5.2.2 Error information 1</a>
10	9	1	Error information 2	Refer to <a href="#">5.2.3 Error information 2</a>
11	10	1	Media width	Refer to <a href="#">5.2.4 Media width and length</a>
12	11	1	Media type	Refer to <a href="#">5.2.5 Media type</a>
13	12	1	Number of colors	Fixed at 00h
14	13	1	Media length (higher order bytes)	Fixed at 00h
15	14	1	Media sensor value	Fixed at 3Fh
16	15	1	Mode	RJ-3000: 00h RJ-4200/RJ-2000: 01h
17	16	1	Density	Fixed at 00h
18	17	1	Media length (lower order bytes)	Refer to <a href="#">5.2.4 Media width and length</a>
19	18	1	Status type	Refer to <a href="#">5.2.6 Status type</a>
20	19	1	Phase type	Refer to <a href="#">5.2.7 Phase type and phase number</a>
21	20	1	Phase number (higher order bytes)	
22	21	1	Phase number (lower order bytes)	
23	22	1	Notification number	Refer to <a href="#">5.2.8 Notification number</a>

24	23	1	Expansion area (number of bytes)	Fixed at 00h
25	24	8	Reserved	Fixed at 00h

## 5.2 Definitions of each part

### 5.2.1 Series/model

Model name	Status code	
	Series	Model
RJ-2030	"7" (37h)	"6" (36h)
RJ-2050	"7" (37h)	"7" (37h)
RJ-2140	"7" (37h)	"8" (38h)
RJ-2150	"7" (37h)	"9" (39h)
RJ-3050	"7" (37h)	"3" (33h)
RJ-3150	"7" (37h)	"4" (34h)
RJ-4230B	"7" (37h)	"C" (43h)
RJ-4250WB	"7" (37h)	"D" (44h)

### 5.2.2 Error information 1

Flag	Mask	Definition
Bit 0	01h	(Not used)
Bit 1	02h	Media empty
Bit 2	04h	(Not used)
Bit 3	08h	Battery weak (empty)
Bit 4	10h	(Not used)
Bit 5	20h	Printer turned off
Bit 6	40h	(Not used)
Bit 7	80h	(Not used)

**5.2.3 Error information 2**

Flag	Mask	Definition
Bit 0	01h	(Not used)
Bit 1	02h	“Expansion buffer full” error
Bit 2	04h	Communication error
Bit 3	08h	(Not used)
Bit 4	10h	“Cover open” error
Bit 5	20h	Overheating error
Bit 6	40h	Media cannot be fed (also when the media end is detected)
Bit 7	80h	(Not used)

### 5.2.4 Media width and length

The media width and length is described in millimeters. 0 ~ 255 (0 to FFh)

(a) Continuous length tape

\* Media Width: The tape width is indicated in millimeters.

\* Media Length: Fixed at 00h

#### RJ-2000

Media	Media Width	Media Length
50 mm	32h	00h
58 mm	3Ah	00h

#### RJ-3000

Media	Media Width	Media Length
50 mm	32h	00h
58 mm	3Ah	00h
76 mm	4Ch	00h
80 mm	50h	00h

#### RJ-4200

Media	Media Width	Media Length
58 mm	3Ah	00h
102 mm	66h	00h

(b) Die-cut labels

\* Media Width: The width of the die-cut section is indicated.

\* Media Length: The length of the die-cut section is indicated.

#### RJ-2000

Media	Media Width	Media Length
50 mm x 85 mm	32h	55h
51 mm x 26 mm	33h	1Ah
55 mm x 40 mm	37h	28h

**RJ-3000**

Media	Media Width	Media Length
50 mm x 85 mm	32h	55h
60 mm x 92 mm	3Ch	5Ch
76 mm x 44 mm	4Ch	2Ch

**RJ-4200**

Media	Media Width	Media Length
50 mm x 85 mm	32h	55h
60 mm x 92 mm	3Ch	5Ch
80 mm x 115 mm	50h	73h
102 mm x 26 mm	66h	1Ah
102 mm x 50 mm	66h	32h
102 mm x 76 mm	66h	4Ch
102 mm x 102 mm	66h	66h
102 mm x 152 mm	66h	98h

**5.2.5 Media type**

Media type	Value	Description
No media	00h	Used as print information when the media type is not indicated.
Continuous length tape	4Ah	Used for both paper and film.
Die-cut labels	4Bh	Used for both paper and film.



### 5.2.6 Status type

Status Type	Value
Reply to status request	00h
Printing completed	01h
Error occurred	02h
Exit IF mode	03h(Not used)
Turned off	04h
Notification	05h
Phase change	06h
(Not used)	08h ~ 20h
(Reserved)	21h ~ FFh

### 5.2.7 Phase type and phase number

If the phase number is not used, both are fixed at 00h.

Phase type	Value
Receiving state	00h
Printing state	01h

Receiving state

Phase	Value (Dec.)	Higher Order Bytes	Lower Order Bytes
Waiting to receive	0	00h	00h

Printing state

Phase	Value (Dec.)	Higher Order Bytes	Lower Order Bytes
Printing	0	00h	00h

- When the printer is turned on, it is in the receiving state. When printing begins, the printer changes to the “printing” phase (phase type: printing state; phase number: printing) and sends that phase status to the computer. When printing has finished, the printer sends the “printing completed” status to the computer. When the “printing completed” status is sent, the printer changes to the “receiving state” phase status (phase type: receiving state; phase number: waiting to receive) and sends that phase status to the computer.

Unless an error occurs during printing, the printer sends the “printing completed” status.

**5.2.8 Notification number**

Notification	Value
Not available	00h
Cooling (started)	03h
Cooling (finished)	04h
Waiting for peeling	05h

### 5.2.9 Battery level

Battery Level format varies from protocols

Bit	7	6	5	4	3	2	1	0
Definition	Protocol							

Protocol: “0b000” (RJ-2000, RJ-3000)

Bit	7	6	5	4	3	2	1	0
Definition	Protocol			Battery Level				

Battery level	Value
Full	0b00000 (0)
Half	0b00001 (1)
Low	0b00010 (2)
Need to be charged	0b00011 (3)
Using AC adaptor	0b00100 (4)

Protocol: “0b001” (RJ-4200)

Bit	7	6	5	4	3	2	1	0
Definition	Protocol			AC adaptor	Reserved	Battery Level		

AC adaptor	Value
AC adaptor connected	1
AC adaptor not connected	0

Battery level	Value
Full	0b000 (0)
Overcharged	0b001 (1)
Half	0b010 (2)
Low	0b011 (3)
Need to be charged	0b100 (4)
Battery not installed	0b111 (7)

## 6. Print Command List

ASCII Code	Binary Code	Description
NULL	00	Invalidate
ESC @	1B 40	Initialize
ESC i S	1B 69 53	Status information request
ESC i a	1B 69 61	Switch dynamic command mode
ESC i !	1B 69 21	Switch automatic status notification mode
ESC i U w	1B 69 55 77	Additional media information command
ESC i z	1B 69 7A	Print information command
ESC i d	1B 69 64	Specify margin amount (feed amount)
M	4D	Select compression mode
g	67	Raster graphics transfer
Z	5A	Zero raster graphics
FF	0C	Print command
Control-Z	1A	Print command with feeding
ESC i CAN	1B 69 18	Cancel

## 7. Printing Command Details

### **NULL      Invalidate**

ASCII:	NULL
Hexadecimal:	00

#### Description

- Skipped
- The specified number of bytes depending on the model will be sent.  
(RJ-4200 / RJ-3000: 350 bytes, RJ-2000: 200 bytes)

### **ESC @      Initialize**

ASCII:	ESC	@
Hexadecimal:	1B	40

#### Description

- Initializes mode settings.
- Also used to cancel printing. For details, refer to [“ESC i CAN Cancel”](#)

### **ESC i S      Status information request**

ASCII:	ESC	i	S
Hexadecimal:	1B	69	53

#### Description

- Send a request to the printer for status information. For details on the status, refer to the previous section.
- The size is fixed at 32 bytes.

#### **Note**

**Before sending print data to the printer, this command should be sent once.**

**Do not send this command while printing.**

## **ESC i a      Switch dynamic command mode**

ASCII:	ESC	i	a	{n1}
Hexadecimal:	1B	69	61	{n1}

### **Parameters**

Definitions of {n}:

- 0: ESC/P mode
- 1: Raster mode (Be sure to switch to this mode.)
- 3: P-touch Template mode (default)
- 4: CPCL Page Mode
- 5: CPCL Line Mode
- FF: Mode set as default

### **Description**

- Dynamically switches between the printer's command modes. A printer that receives this command operates in the specified command mode until the printer is turned off.
- The printer must be switched to raster mode before raster data is sent to it. Therefore, send this command to switch the printer to raster mode.

## **ESC i !      Switch automatic status notification mode**

ASCII:	ESC	i	!	{n1}
Hexadecimal:	1B	69	21	{n1}

### **Parameters**

Definitions of {n1}

- 0: Notify. (default)
- 1: Do not notify.

### **Description**

- Dynamically switches whether the automatic status notification is given during printing. A printer that receives this command operates in the specified command mode until the printer is turned off.
- Use this command when building a system where the status is not obtained.

## **ESC i U w Additional media information command**

ASCII:	ESC	i	U	w	1	{d1...d127}
Hexadecimal:	1B	69	55	77	01	{d1...d127}

### **Description**

- Updates the media information for the printer.
- Send to the printer the commands outputted with the “Save Paper Size Commands” function of Paper Size Setup.

### **Note**

If the media information is the same as when printing was last performed, it is unnecessary to send the additional media information command.

### **“Save Paper Size Commands” function of Paper Size Setup**

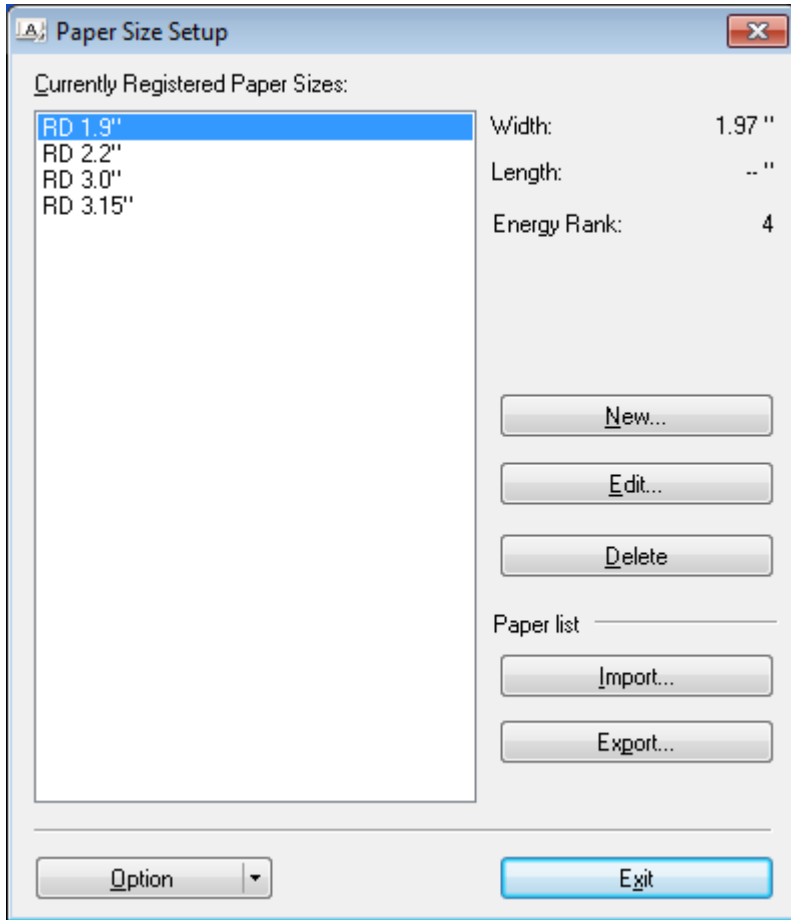
#### **1. Preparation**

Install the two listed below.

- Printer driver of the Brother RJ-XXXX
- Binary file editor.

The data outputted with the “Save Paper Size Commands” function of Paper Size Setup will be a binary file. Therefore, use a binary file editor to display and check the contents of the binary file.

- Open the [Devices and Printers] window, right-click the printer, and then display the Printing Preferences dialog box. Click the [Paper Size Setup] button on the [Basic] tab to display the Paper Size Setup dialog box. (Refer to the illustration below.)  
Click [Save Paper Size Commands] from the [Option] button to display a dialog box for creating a file for saving the paper size commands, and then save them in a file with the specified name.



- Open the saved file in the binary file editor. The rows of numbers that appear are the command data. (Refer to the illustration below.)  
In the command data that appeared, the part marked with the red box is the additional media information command.  
Of this, the 127 bytes underlined in orange are the media information.  
Use this when adding media information.

1B 69 61 01 1B 69 55 4F 10 37 33 00 84 00 00 00	.ia..iU0.73.....
00 00 00 00 1B 69 55 77 01 3F 04 50 00 00 50 00	.....iUw?.P..P.
00 40 02 00 00 00 00 00 00 00 00 00 00 00 B9 01	.@.....ㄥ.
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
00 00 00 00 00 00 00 38 30 6D 6D 00 00 00 00 00 00	.....80mm.....
00 00 00 00 00 00 00 33 2E 31 35 22 00 00 00 00 00	.....3.15".....
00 00 00 00 00 00 00 00 00 00 00 00 00 18 00 00 00	.....
00 00 00 18 00 00 00 00	.....



**ESC i z      Print information command**

ASCII:	ESC	i	z	{n1}	{n2}	{n3}	{n4}	{n5}	{n6}	{n7}	{n8}	{n9}	{n10}
Hexadecimal:	1B	69	7A	{n1}	{n2}	{n3}	{n4}	{n5}	{n6}	{n7}	{n8}	{n9}	{n10}

Description

- Specifies the print information.
- Definitions of {n1} through {n10}

{n1}:	Valid flag; Specifies which values are valid #define PI_KIND 0x02      // Media type #define PI_WIDTH 0x04      // Media width #define PI_LENGTH 0x08      // Media length #define PI_RECOVER 0x80      // Printer recovery always on
{n2}:	Media type Continuous length tape: 0Ah Die-cut labels: 0Bh
{n3}:	{n3}: Media width (mm)
{n4}:	{n4}: Media length (mm) For the media of width 80 mm, specify as n3 = 50h and n4 = 00h.
{n5-n8}:	Raster number = $n8 \times 256 \times 256 \times 256 + n7 \times 256 \times 256 + n6 \times 256 + n5$
{n9}:	Starting page: 0 Other pages: 1
{n10}:	Fixed at 0

- If the media is not correctly loaded into the printer when the valid flag for PI\_KIND, PI\_WIDTH and PI\_LENGTH are set to "ON", an error status is returned (Bit 0 of "[5.2.3 Error information 2](#)" is set to "ON".)
- RJ-4200 will not send the statuses ("Printing", "Printing completed", "Phase change", "Cooling") in printing when PL\_RECOVER is set to "ON".

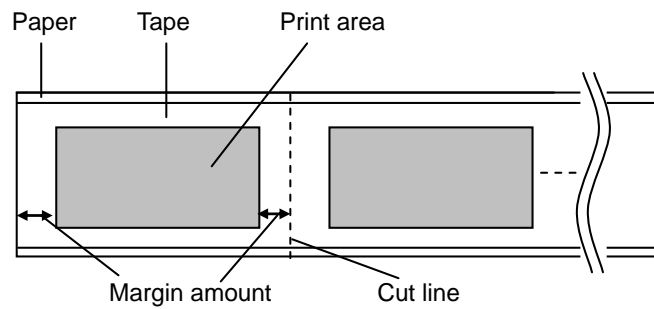
**ESC i d     Specify margin amount (feed amount)**

ASCII:	ESC	i	d	{n1}	{n2}
Hexadecimal:	1B	69	64	{n1}	{n2}

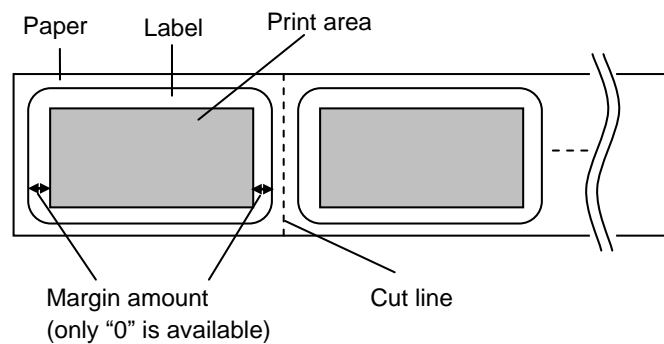
Description

- Specifies the amount of the margins.
- Margin amount (dots) =  $n1 + n2 \times 256$
- With die-cut labels, the margin amount at the ends of the printed area is 0.

## (a) Continuous length tape



## (b) Die-cut labels

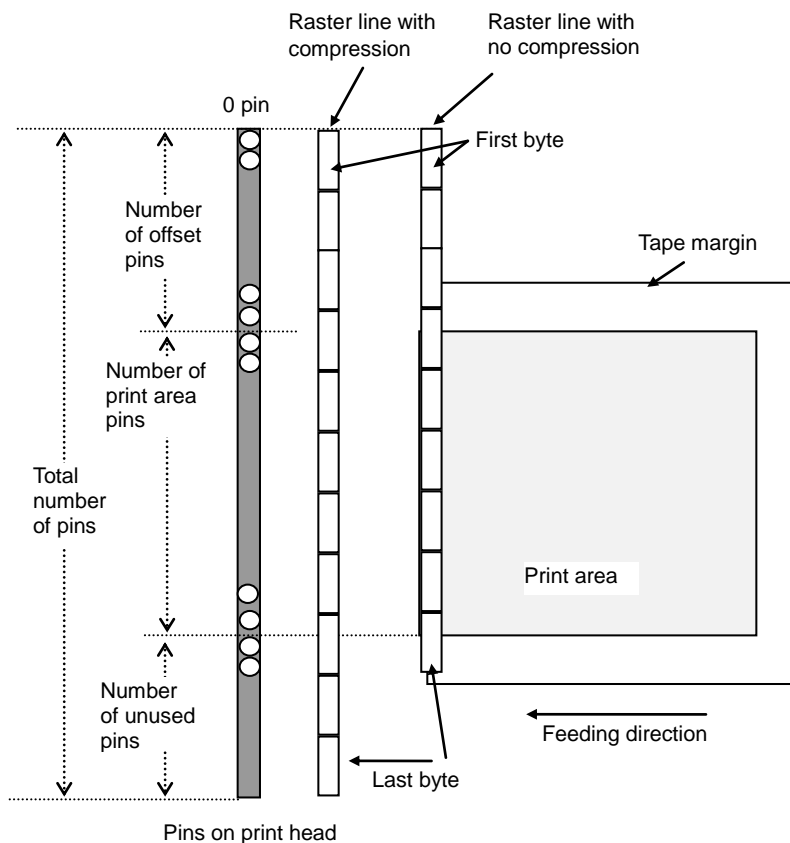




Continue for the remaining number of bytes for the uncompressed data. Even if 00h continues until the end, it cannot be omitted.

### Explanation of “TIFF compression mode”

With compression, the data for the “raster graphics transfer” command is based on 104bytes (RJ-4200), 72 bytes (RJ-3000) or 54 bytes (RJ-2000) of the total number of pins (RJ-4200: 832, RJ-3000: 576 and RJ-2000: 432). As shown below, with no compression, the sum of the number of offset pins and the number of pins within the print area is the byte data. However, with compression, the number of unused pins is also added to the data. In other words, with compression, this becomes 104 bytes with RJ-4200, 72 bytes with RJ-3000 or 54 bytes with RJ-2000 when it is expanded by the machine, regardless of the tape width.



**g Raster graphics transfer**

ASCII:	g	{s}	{n}	{d1}	...	{dn}
Hexadecimal:	67	{s}	{n}	{d1}	...	{dn}

**Parameters**

{s} 00h

{n} Number of bytes of raster data (d1 to dh)

However, use the following value if no compression is specified as the compression mode.

(RJ-4200: n = 104, RJ-3000: n = 72, RJ-2000: n = 54)

{d1~dn} Raster data.

**Z Zero raster graphics**

ASCII:	Z
Hexadecimal:	5A

**Description**

- Fills raster line with 0 data.

**FF Print command**

ASCII:	FF
Hexadecimal:	0C

**Description**

- Used as a print command at the end of pages other than the last page when multiple pages are printed.

**Control-Z Print command with feeding**

ASCII:	Control-Z
Hexadecimal:	1A

**Description**

- Used as a print command at the end of the last page.

**ESC i CAN Cancel**

RJ-4200:

ASCII:	ESC	i	CAN
Hexadecimal:	1B	69	18

RJ-3000 / RJ-2000:

ASCII:	ESC	@
Hexadecimal:	1B	40

**Description**

- Cancel sending data while sending printing data. For no-compression mode, may cancel printing previous page depending on the cancel timing.
- Printing will not be cancelled after receiving the “[Control-Z Print command with feeding](#)”.
- Used to initialize mode settings for RJ-3000 and RJ-2000. For details, refer to “[ESC @ Initialize](#)”.

## 8. Flow Charts

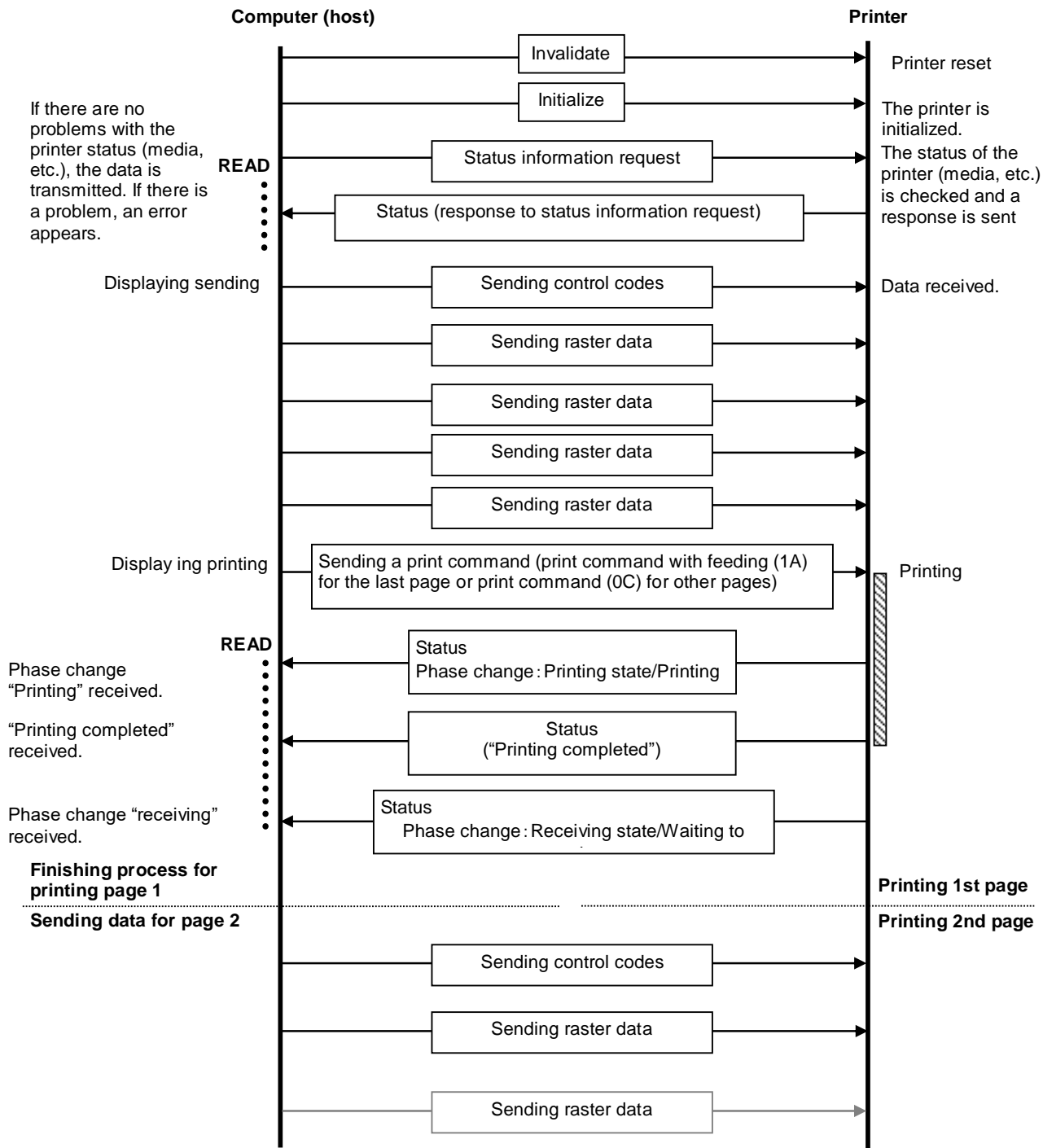
RJ-XXXX printers perform as buffered printing.

Buffered printing is a method that a print starts after one page of print data is received.

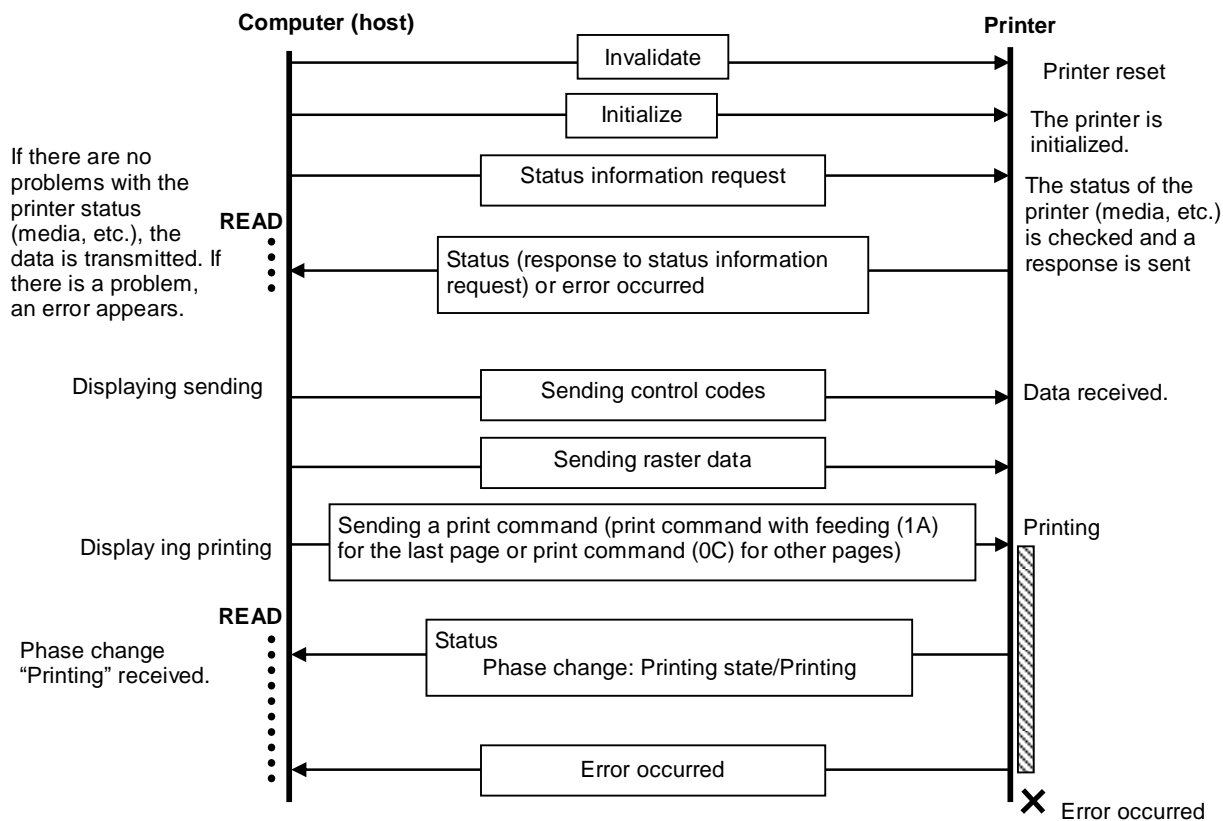
.



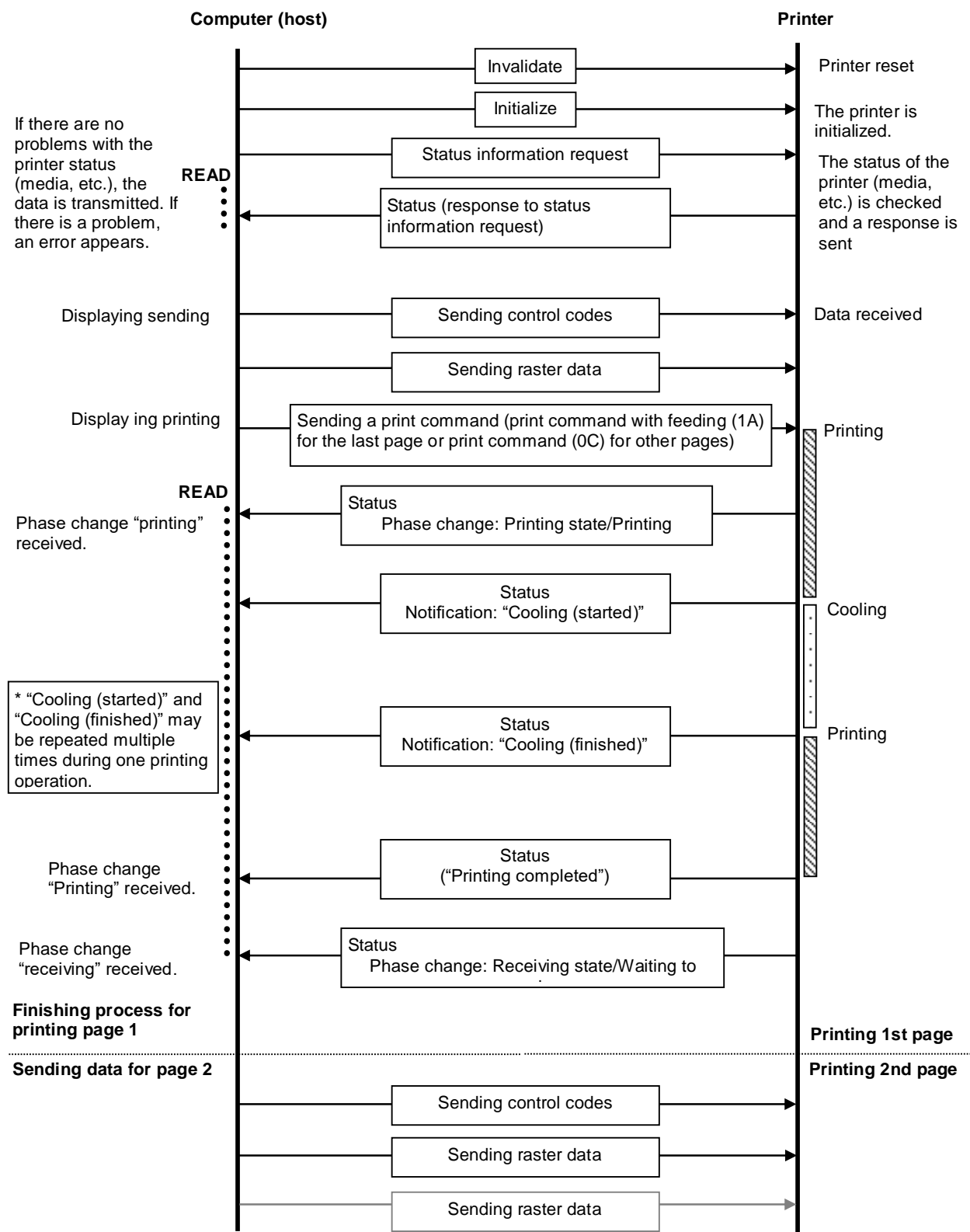
## 8.1 Buffered printing normal flow for USB connection



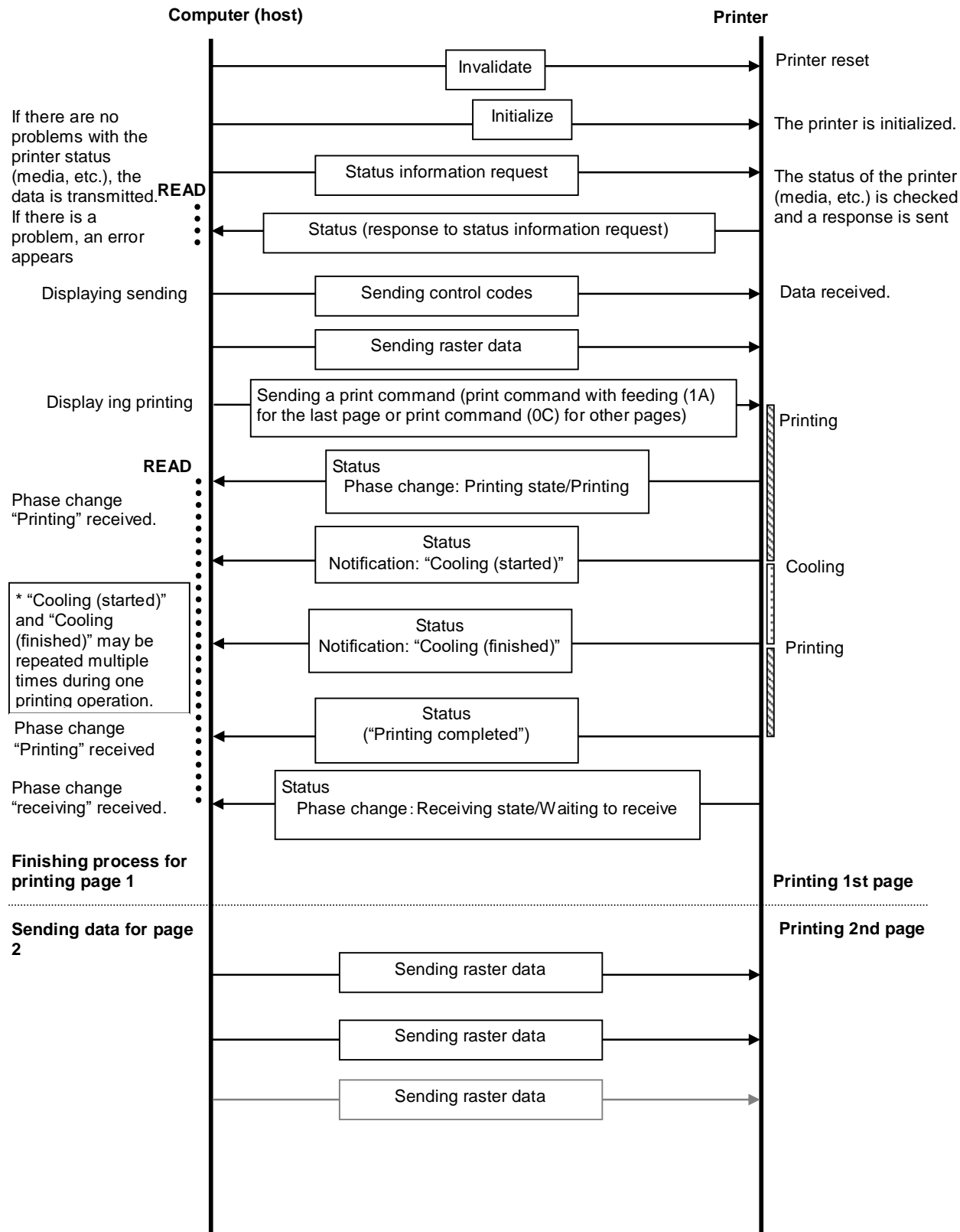
## 8.2 Buffered printing error flow for USB connection



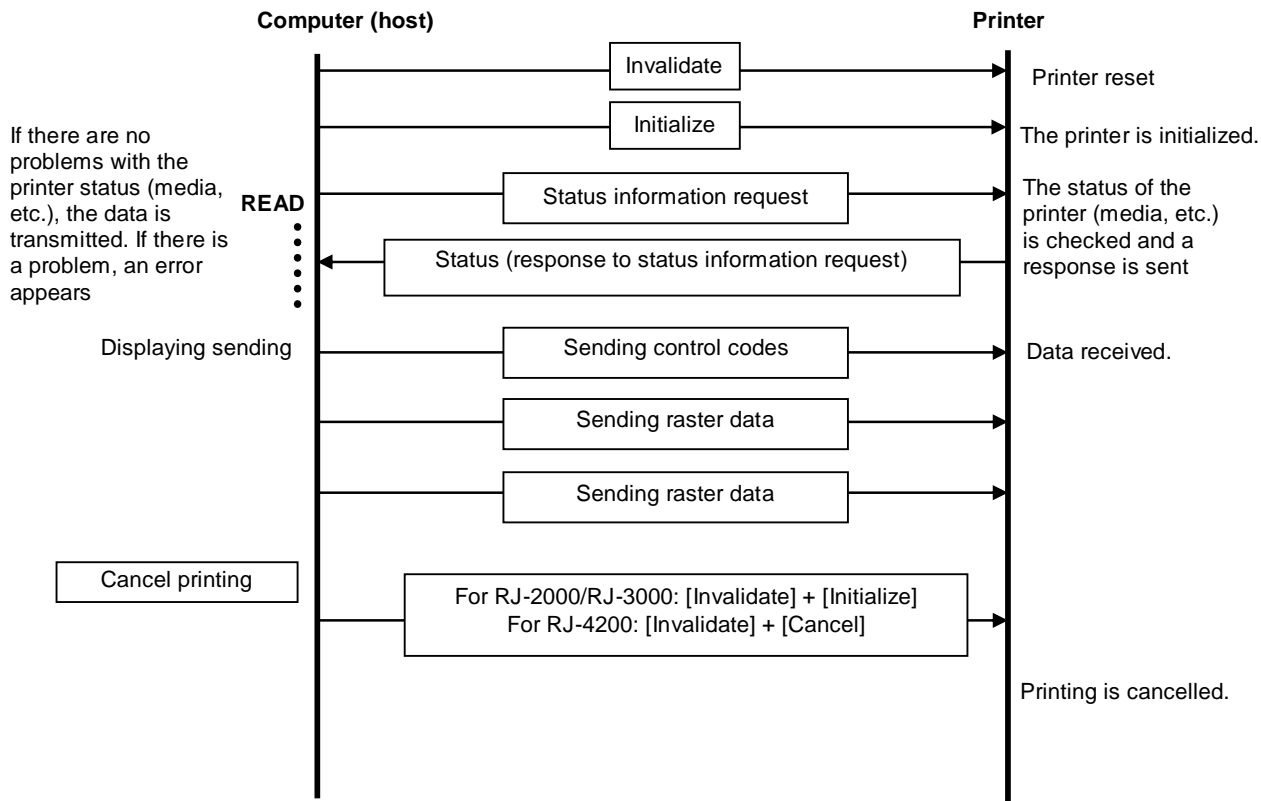
### 8.3 Buffered printing cooling flow for USB connection



# 8.4 Buffered printing waiting for peeling/resumed flow for USB connection



## 8.5 Buffered printing cancelling flow in USB connection



## Appendix A: USB Specifications

### USB specifications 1.1

Item	Description
Vendor ID	0x04F9
Product ID	RJ-4250WB: 20b2 RJ-4230B: 20b1 RJ-3050: 2068 RJ-3150: 2069 RJ-2030: 2091 RJ-2050: 2092 RJ-2140: 2093 RJ-2150: 2094
Class	Printer
Character string for manufacturer	Character string descriptor: 0x01 0x0409: "Brother"
Character string for product	Character string descriptor: 0x02 0x0409: "RJ-4250WB" 0x0409: "RJ-4230B" 0x0409: "RJ-3050" 0x0409: "RJ-3150" 0x0409: "RJ-2030" 0x0409: "RJ-2050" 0x0409: "RJ-2140" 0x0409: "RJ-2150"
Character string for serial number	Character string descriptor: 0x03 0x0409: "000[Last nine digits of the printer's serial number]"
Device speed	Full speed
Number of interfaces	1 (No alternate interfaces)
Power supply	Self-powered
End point 1	In bulk (Sends the status from the printer to the computer.) Maximum packet size: 64 bytes
End point 2	Out bulk (Sends print commands and data from the computer to the printer.) Maximum packet size: 64 bytes

## Appendix B: Introducing the Brother Developer Center

Useful information for developers, such as applications, tools, SDKs as well as FAQs, are provided in the Brother Developer Center.

<http://www.brother.com/product/dev/index.htm>

**brother**