

# **Software Developer's Manual**

**Raster Command Reference**

**QL-710W/720NW**

**Version 1.0**

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## Introduction

This material provides the necessary information for directly controlling the Brother printer QL-XXX (where “XXX” 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.

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

## About Raster Commands

Using raster commands a QL-XXX printer (where “XXX” 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.

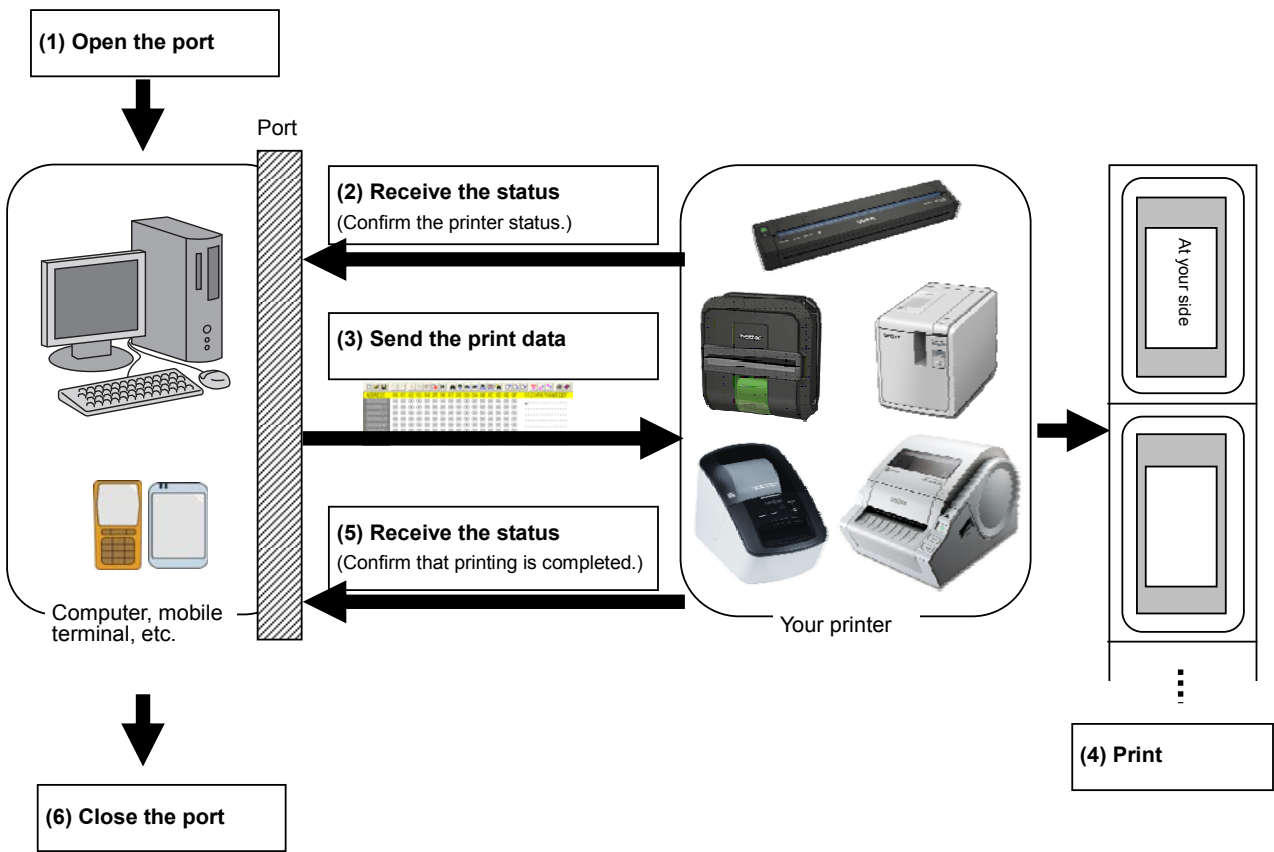
In this material, “raster” refers to binary bitmap data (collection of dots).

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

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

# 1. Printing Using Raster Commands

The printing procedure is described below. For detailed flow charts, refer to “[5. Flow Charts](#)”. For details on each command, refer to “[4. Printing Command Details](#)”.



(1) Open the USB/serial/network port

Open the USB/serial/network port in the operating environment. The procedure for opening the USB/serial/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 [“4. 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, [“2. 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/serial/network port

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

**Note:**

**In order to print at high speed when a USB port is used to send uncompressed raster data, the Brother QL-XXX starts printing when it starts to receive print data, instead of waiting for a print command (concurrent printing).**

**For the processing flow, for example when managing errors, refer to [“5. Flow Charts”](#).**

## 2. Print Data

### 2.1 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 200-byte invalidate command, and then resets the printer to the receiving state. |
| 2        | Initialize   | Initializes for printing.<br>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 to raster mode.<br>1Bh, 69h, 61h, 01h                                                                                                            |
| 2        | Print information command                      | Sets the print information for the printer.<br>For 102-mm-wide continuous length tape:<br>1Bh, 69h, 7Ah, 86h, 0Ah, 66h, 00h, 09h, 07h, 00h, 00h, 00h, 00h |
| 3        | Various mode                                   | To select "Auto Cut"<br>1Bh, 69h, 4Dh, 40h                                                                                                                |
| 4        | Specify the page number in "cut each * labels" | When an auto cut setting is effective, specify the number of sheets for auto cut.<br>For each sheets,<br>1Bh, 69h, 41h, 01h                               |
| 5        | Expanded mode                                  | To select "Cut at End" flag<br>1Bh, 69h, 4Bh, 08h                                                                                                         |
| 6        | Specify margin amount                          | Specifies the amount of the margins.<br>For 3 mm margins:<br>1Bh, 69h, 64h, 23h, 00h                                                                      |
| 7        | Select compression mode                        | Selects the compression mode for raster graphics.<br>To send the data compressed to TIFF format:<br>4Dh, 02h                                              |

## (3) Raster data

Repeated for each page in the print job.

| Sequence | Command Name             | Description/Example                                                                                                                      |
|----------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| -        | Raster graphics transfer | Sends image data as commands.                                                                                                            |
| -        | Zero raster graphics     | Sends image data for 1 blank line as a compression command.<br>(Valid only when TIFF is selected as the compression mode)<br>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.<br>0Ch |
| -        | Print command with feeding | Specifies at the end of the last page.<br>1Ah (Fixed)            |

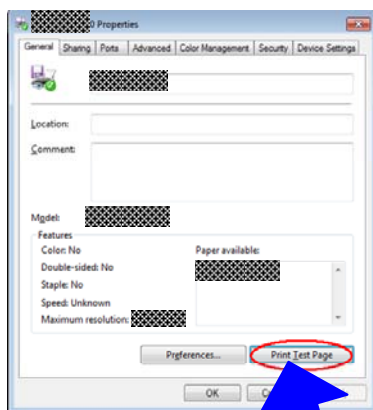
## 2.2 Sample (analyzing the print data of the test page)

Based on print data created by the printer driver, descriptions of the commands introduced in the previous chapter are provided here.

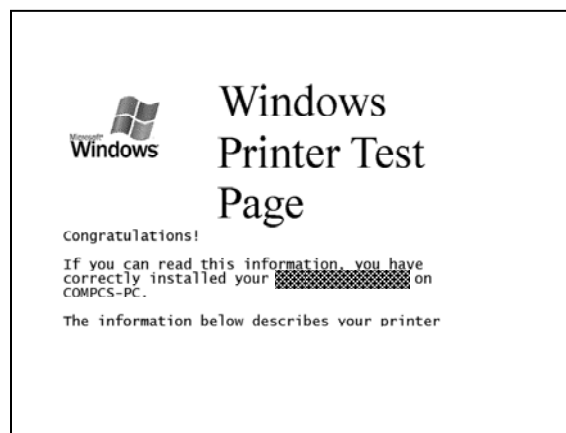
As an example, we will check the print data created when the **[Print Test Page]** button in the printer Properties dialog box is clicked to print the test page.

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**

### 2.2.1 Preparation

Install the two listed below.

- Printer driver of the Brother QL-XXX
- 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.

### 2.2.2 Checking the print data

The procedure for checking the print data is provided below.

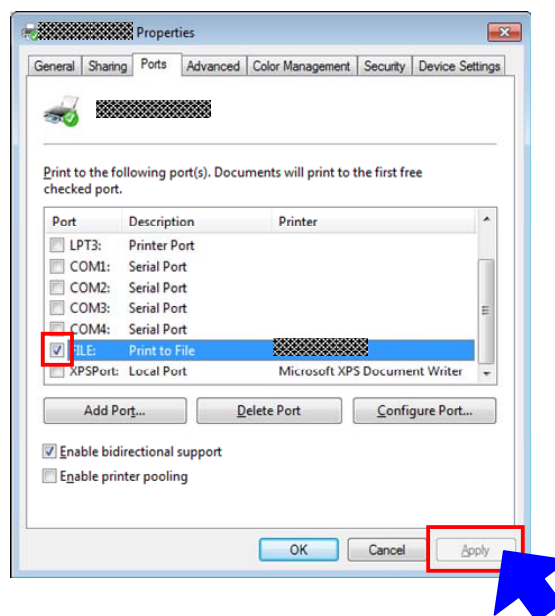
Step 1: Change the port of the printer to "FILE:".

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:”.**

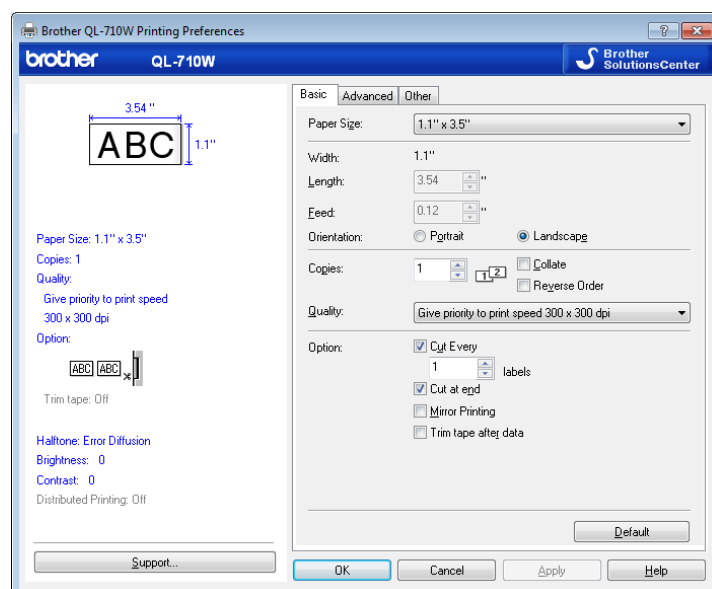
Open the **Printers and Faxes** folder, and then right-click the printer to display the Properties dialog box. In the Properties dialog box, click the **[Ports]** tab, select the “**FILE:**” check box, and then click the **[Apply]** button.



[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.

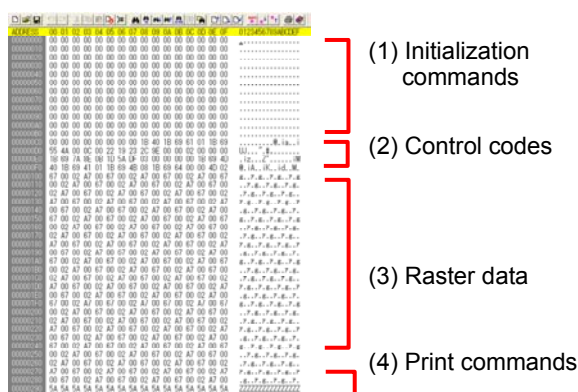


Dialog box for specifying the file name

### 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 “[2.1 Print data overview](#)”. For details on the print data, refer to “[2.2.3 Explanation of print data for the test page](#)”.



Print data

### 2.2.3 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 “[2.2.1 Preparation](#)” opened in the binary file editor.

| ADDRESS  | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 0A | 0B | 0C | 0D | 0E | 0F | 0123456789ABCDEF     |
|----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----------------------|
| 00000000 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | .....                |
| 00000010 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | .....                |
| 00000020 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | .....                |
| 00000030 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | .....                |
| 00000040 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | .....                |
| 00000050 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | .....                |
| 00000060 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | .....                |
| 00000070 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | .....                |
| 00000080 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | .....                |
| 00000090 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | .....                |
| 000000A0 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | .....                |
| 000000B0 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | .....                |
| 000000C0 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | .....@.ia..i         |
| 000000D0 | 7A | 8E | 0B | 1D | 5A | DE | 03 | 00 | 00 | 00 | 00 | 1B | 69 | 4D | 40 | 1B | z...Z°.....iM@.      |
| 000000E0 | 69 | 41 | 01 | 1B | 69 | 4B | 08 | 1B | 69 | 64 | 00 | 00 | 4D | 02 | 67 | 00 | iA..iK..id..M.g.     |
| 000000F0 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | .7.g..7.g..7.g..     |
| 00000100 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | .7.g..7.g..7.g..     |
| 00000110 | 00 | 67 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | .g..7.g..7.g..7.g.   |
| 00000120 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | g..7.g..7.g..7.g.    |
| 00000130 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | ..7.g..7.g..7.g..    |
| 00000140 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | .7.g..7.g..7.g..     |
| 00000150 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | .7.g..7.g..7.g..7.g. |
| 00000160 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | .g..7.g..7.g..7.g.   |
| 00000170 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | g..7.g..7.g..7.g.    |
| 00000180 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | ..7.g..7.g..7.g..    |
| 00000190 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | .7.g..7.g..7.g..     |
| 000001A0 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | .7.g..7.g..7.g..7.g. |
| 000001B0 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | .g..7.g..7.g..7.g.   |
| 000001C0 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | g..7.g..7.g..7.g.    |
| 000001D0 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | ..7.g..7.g..7.g..    |
| 000001E0 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | .7.g..7.g..7.g..     |
| 000001F0 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | .7.g..7.g..7.g..7.g. |
| 00000200 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | .g..7.g..7.g..7.g.   |
| 00000210 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | g..7.g..7.g..7.g.    |
| 00000220 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | ..7.g..7.g..7.g..    |
| 00000230 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | .7.g..7.g..7.g..     |
| 00000240 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | .7.g..7.g..7.g..7.g. |
| 00000250 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | .g..7.g..7.g..7.g.   |
| 00000260 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | g..7.g..7.g..7.g.    |
| 00000270 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 67 | 00 | 02 | A7 | 00 | 5A | 5A | ..7.g..7.g..7.ZZ     |
| 00000280 | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | ZZZZZZZZZZZZZZZZ     |
| 00000290 | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | ZZZZZZZZZZZZZZZZ     |
| 00000E70 | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | ZZZZZZZZZZZZZZZZ     |
| 00000E80 | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | ZZZZZZZZZZZZZZZZ     |
| 00000E90 | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | ZZZZZZZZZZZZZZZZ     |
| 00000EA0 | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | ZZZZZZZZZZZZZZZZ     |
| 00000EB0 | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | 5A | ZZZZZZZZ.            |

Print data

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 [“4. Printing Command Details”](#).

| No.   | Command Name                                   | Description                                                                                                                 |
|-------|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| 1     | Invalidate                                     | 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.<br>Send this command before sending raster data to the printer.                     |
| 4     | Print information command                      | Media size information for the print data is sent.<br>This is the command for “1.1” × 3.5” (29 mm × 90 mm)” die-cut labels. |
| 5     | Various mode<br>(1Bh+69h+4Dh+00H)              | This is the command for specifying settings such as cut options.<br>Here, “auto cut” is specified.                          |
| 6     | Specify the page number in “cut each * labels” | The number of pages printed before automatically cutting is specified.                                                      |
| 7     | Expanded mode                                  | This is the command for specifying expanded functions.<br>Here, “cut at end” is specified.                                  |
| 8     | Specify margin amount                          | Since a margin amount cannot be specified with die-cut labels, this command is sent with a margin amount of 0.              |
| 9     | Select compression mode                        | TIFF compression mode is selected.                                                                                          |
| 10 on | 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.                                                  |

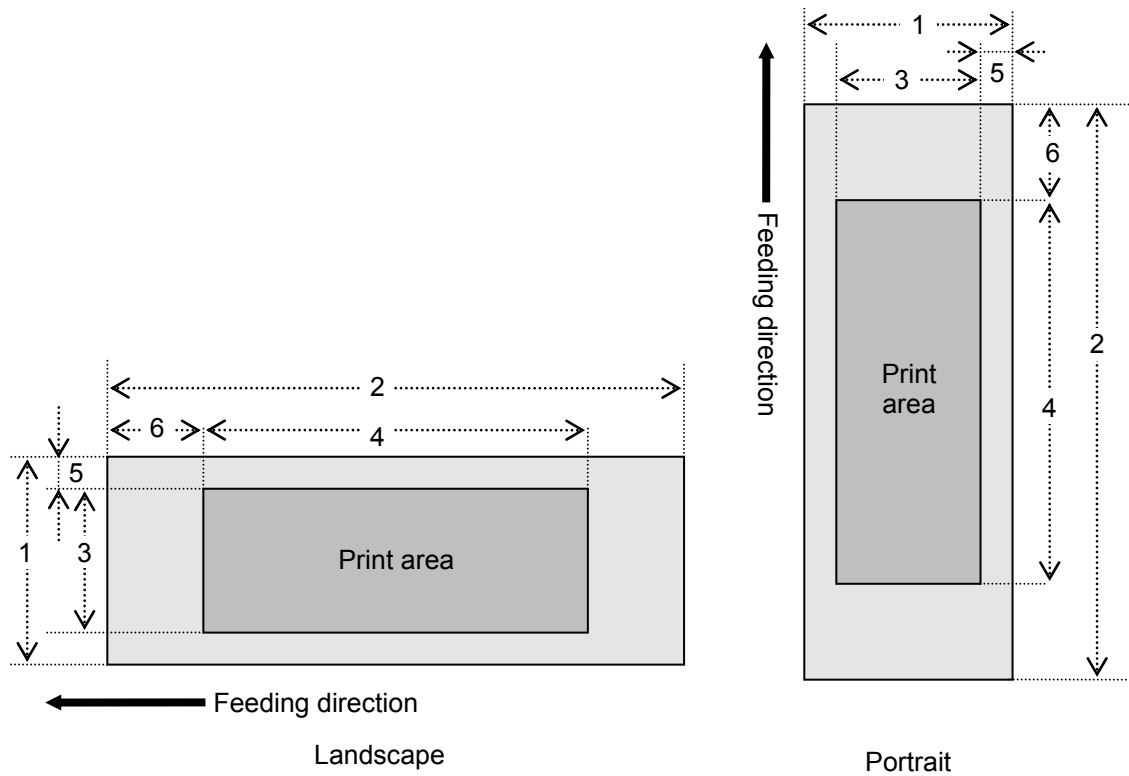
2.3 Page data details

2.3.1 Resolution

| Resolution                 | Height-to-Width Proportion |
|----------------------------|----------------------------|
| 300 dpi high, 300 dpi wide | 1:1                        |
| 600 dpi high, 300 dpi wide | 2:1                        |

2.3.2 Page size

(a) Continuous length tape



- Number

1 Width

3 Print area width (maximum printing width)

5 Width offset
- 2 Length

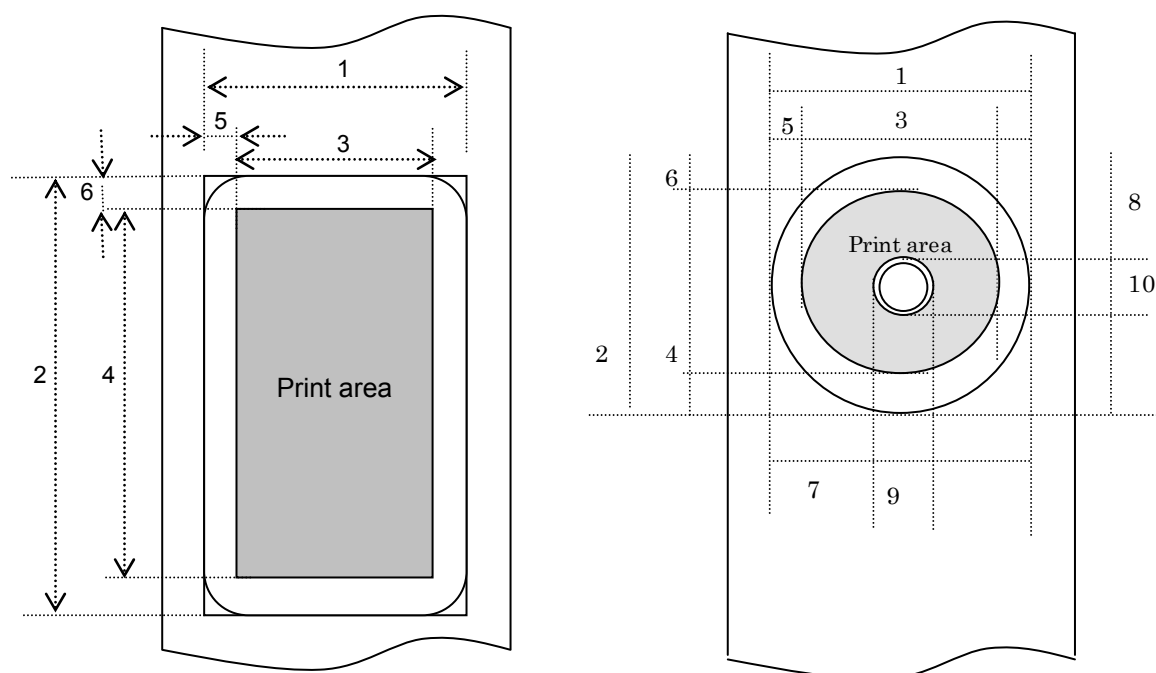
4 Print area length

6 Length offset

| ID  | Tape Size | Designation    | 1                   | 2      | 3                   | 4      | 5                 | 6      |
|-----|-----------|----------------|---------------------|--------|---------------------|--------|-------------------|--------|
| 257 | 12 mm     | 12 mm<br>0.47" | 12.0 mm<br>142 dots | →2.3.4 | 9.0 mm<br>106 dots  | →2.3.4 | 1.5 mm<br>18 dots | →2.3.3 |
| 258 | 29 mm     | 29 mm<br>1.1"  | 29.0 mm<br>342 dots | →2.3.4 | 25.9 mm<br>306 dots | →2.3.4 | 1.5 mm<br>18 dots | →2.3.3 |

|     |       |               |                     |                         |                     |                         |                   |                         |
|-----|-------|---------------|---------------------|-------------------------|---------------------|-------------------------|-------------------|-------------------------|
| 264 | 38mm  | 38 mm<br>1.4" | 38.0 mm<br>449 dots | → <a href="#">2.3.4</a> | 35.0 mm<br>413 dots | → <a href="#">2.3.4</a> | 1.5 mm<br>18 dots | → <a href="#">2.3.3</a> |
| 262 | 50 mm | 50 mm<br>1.9" | 50.0 mm<br>590 dots | → <a href="#">2.3.4</a> | 46.9 mm<br>554 dots | → <a href="#">2.3.4</a> | 1.5 mm<br>18 dots | → <a href="#">2.3.3</a> |
| 261 | 54 mm | 54 mm<br>2.1" | 53.8 mm<br>636 dots | → <a href="#">2.3.4</a> | 50.0 mm<br>590 dots | → <a href="#">2.3.4</a> | 1.9 mm<br>23 dots | → <a href="#">2.3.3</a> |
| 259 | 62 mm | 62 mm<br>2.4" | 62.0 mm<br>732 dots | → <a href="#">2.3.4</a> | 58.9 mm<br>696 dots | → <a href="#">2.3.4</a> | 1.5 mm<br>18 dots | → <a href="#">2.3.3</a> |

## (b) Die-cut labels



Number 1 Width

3 Print area width (maximum printing width)

5 Width offset

7 Width offset of masked area

9 Width of masked area

2 Length

4 Print area length

6 Length offset

8 Length offset of masked area

10 Length of masked area

| ID  | Label Size                    | 1                   | 2                    | 3                   | 4                   | 5                 | 6                 |
|-----|-------------------------------|---------------------|----------------------|---------------------|---------------------|-------------------|-------------------|
| 269 | 17 mm x 54 mm<br>0.66" x 2.1" | 17.0 mm<br>201 dots | 53.9 mm<br>636 dots  | 14.0 mm<br>165 dots | 47.9 mm<br>566 dots | 1.5 mm<br>18 dots | 3.0 mm<br>35 dots |
| 270 | 17 mm x 87 mm<br>0.66" x 3.4" | 17.0 mm<br>201 dots | 86.9 mm<br>1026 dots | 14.0 mm<br>165 dots | 80.9 mm<br>956 dots | 1.5 mm<br>18 dots | 3.0 mm<br>35 dots |
| 370 | 23 mm x 23 mm<br>0.9" x 0.9"  | 23.0 mm<br>272 dots | 23.0 mm<br>272 dots  | 20.0 mm<br>236 dots | 17.1 mm<br>202 dots | 1.5 mm<br>18 dots | 3.0 mm<br>35 dots |
| 358 | 29 mm x 42 mm<br>1.1" x 1.6"  | 29.0 mm<br>342 dots | 41.9 mm<br>495 dots  | 25.9 mm<br>306 dots | 36.0 mm<br>425 dots | 1.5 mm<br>18 dots | 3.0 mm<br>35 dots |
| 271 | 29 mm x 90 mm<br>1.1" x 3.5"  | 29.0 mm<br>342 dots | 89.8 mm<br>1061 dots | 25.9 mm<br>306 dots | 83.9 mm<br>991 dots | 1.5 mm<br>18 dots | 3.0 mm<br>35 dots |
| 272 | 38 mm x 90 mm<br>1.4" x 3.5"  | 38.0 mm<br>449 dots | 89.8 mm<br>1061 dots | 35.0 mm<br>413 dots | 83.9 mm<br>991 dots | 1.5 mm<br>18 dots | 3.0 mm<br>35 dots |
| 367 | 39 mm x 48 mm<br>1.5" x 1.8"  | 39.0 mm<br>461 dots | 47.8 mm<br>565 dots  | 36.0 mm<br>425 dots | 41.9 mm<br>495 dots | 1.5 mm<br>18 dots | 3.0 mm<br>35 dots |
| 374 | 52 mm x 29 mm<br>2" x 1.1"    | 52.0 mm<br>614 dots | 28.9 mm<br>341 dots  | 48.9 mm<br>578 dots | 22.9 mm<br>271 dots | 1.5 mm<br>18 dots | 3.0 mm<br>35 dots |

|     |                               |                     |                      |                     |                      |                   |                   |
|-----|-------------------------------|---------------------|----------------------|---------------------|----------------------|-------------------|-------------------|
| 274 | 62 mm x 29 mm<br>2.4" x 1.1"  | 62.0 mm<br>732 dots | 28.9 mm<br>341 dots  | 58.9 mm<br>696 dots | 22.9 mm<br>271 dots  | 1.5 mm<br>18 dots | 3.0 mm<br>35 dots |
| 275 | 62 mm x 100 mm<br>2.4" x 3.9" | 62.0 mm<br>732 dots | 99.8 mm<br>1179 dots | 58.9 mm<br>696 dots | 93.9 mm<br>1109 dots | 1.5 mm<br>18 dots | 3.0 mm<br>35 dots |
| 362 | 12 mm Dia<br>0.47" Dia        | 12.0 mm<br>142 dots | 12.0 mm<br>142 dots  | 8.0 mm<br>94 dots   | 8.0 mm<br>94 dots    | 2.0 mm<br>24 dots | 2.0 mm<br>24 dots |
| 363 | 24 mm Dia<br>0.94" Dia        | 24.0 mm<br>284 dots | 24.0 mm<br>284 dots  | 20.0 mm<br>236 dots | 20.0 mm<br>236 dots  | 2.0 mm<br>24 dots | 2.0 mm<br>24 dots |
| 273 | 58 mm Dia<br>2.2" Dia         | 58.3 mm<br>688 dots | 58.3 mm<br>688 dots  | 52.3 mm<br>618 dots | 52.3 mm<br>618 dots  | 3.0 mm<br>35 dots | 3.0 mm<br>35 dots |

| ID  | 7                    | 8                   | 9                   | 10                  |
|-----|----------------------|---------------------|---------------------|---------------------|
| 273 | 19.64 mm<br>201 dots | 53.9 mm<br>636 dots | 14.0 mm<br>165 dots | 47.9 mm<br>566 dots |

\*1 The number of dots in the table is for 300 dpi; it is difference in the high-resolution mode.

\*2 Margins of 3 mm (1.5 mm × 2) horizontally and 3 mm (1.5 mm × 2) vertically are added to a diameter of 16 mm.

### 2.3.3 Feed amount

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

| Type                   | Minimum Margin Setting                                                                                                                                                     | Maximum Margin Setting    |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| Continuous length tape | 3 mm<br>0.12"<br>35 dots                                                                                                                                                   | 127 mm<br>5"<br>1500 dots |
| Die-cut labels         | The length offset indicated in "(b) Die-cut labels" of <a href="#">"2.3.2 Page size"</a> is used.<br>However, set "0" as the value of the "specify margin amount" command. |                           |

\*1 The number of dots in the table is for 300 dpi; it is difference in the high-resolution mode.

### 2.3.4 Maximum and minimum lengths

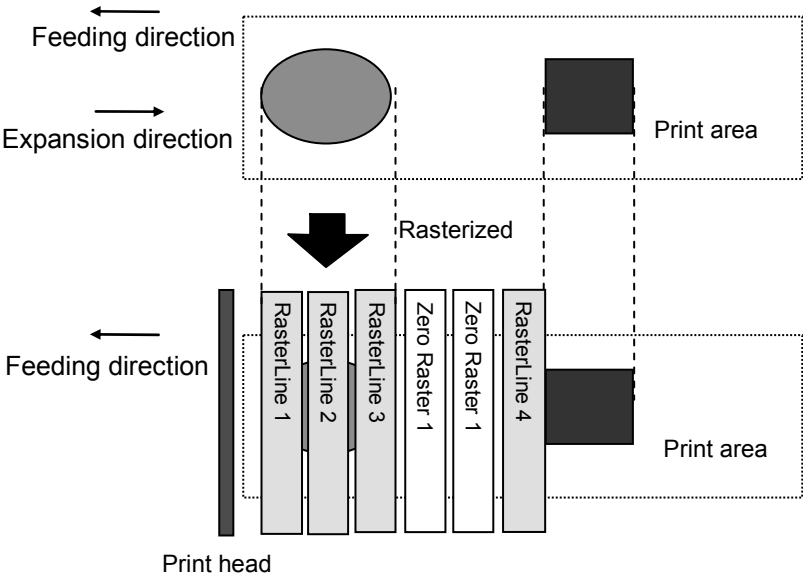
The maximum and minimum lengths are defined below.

| Type                   | Minimum Length      | Maximum Length        |
|------------------------|---------------------|-----------------------|
| Continuous length tape | 12.7 mm<br>150 dots | 1000 mm<br>11811 dots |
| Die-cut labels         | Fixed               | Fixed                 |

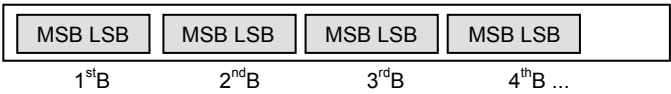
\*1 The number of dots in the table is for 300 dpi; it is difference in the high-resolution mode.

**2.3.5 Raster line**

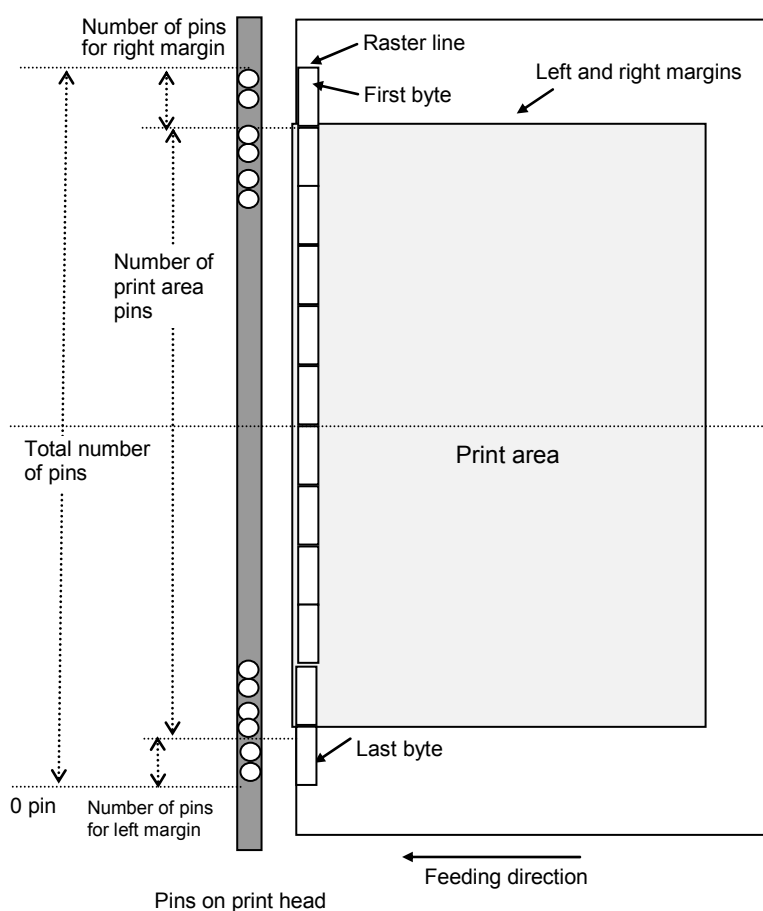
As shown below, the parts with data to be printed are converted with “raster graphics transfer”, and the parts with no data are converted with “zero raster graphics”. On the actual tape, margins (feed) are added specified with “various mode” at the beginning and the end.



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



**Total number of pins: 720 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 |
|-----------|--------------------------------|---------------------------|---------------------------------|----------------------------------------------|
| 12 mm     | 585                            | 106                       | 29                              | 90                                           |
| 29 mm     | 408                            | 306                       | 6                               | 90                                           |
| 38 mm     | 295                            | 413                       | 12                              | 90                                           |
| 50 mm     | 154                            | 554                       | 12                              | 90                                           |
| 54 mm     | 130                            | 590                       | 0                               | 90                                           |
| 62 mm     | 12                             | 696                       | 12                              | 90                                           |

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 |
|-------------|--------------------------------|---------------------------|---------------------------------|----------------------------------------------|
| 17mm x 54mm | 555                            | 165                       | 0                               | 90                                           |
| 17mm x 87mm | 555                            | 165                       | 0                               | 90                                           |

|              |     |     |     |    |
|--------------|-----|-----|-----|----|
| 23mm x 23mm  | 442 | 236 | 42  | 90 |
| 29mm x 42mm  | 408 | 306 | 6   | 90 |
| 29mm x 90mm  | 408 | 306 | 6   | 90 |
| 38mm x 90mm  | 295 | 413 | 12  | 90 |
| 39mm x 48mm  | 289 | 425 | 6   | 90 |
| 52mm x 29mm  | 142 | 578 | 0   | 90 |
| 62mm x 29mm  | 12  | 696 | 12  | 90 |
| 62mm x 100mm | 12  | 696 | 12  | 90 |
| 12mm Dia     | 513 | 94  | 113 | 90 |
| 24mm Dia     | 442 | 236 | 42  | 90 |
| 58mm Dia     | 51  | 618 | 51  | 90 |

### 3. Print Command List

| ASCII Code    | Binary Code    | Description                                    |
|---------------|----------------|------------------------------------------------|
| NULL          | 00             | Invalidate                                     |
| ESC i S       | 1B 69 53       | Status information request                     |
| ESC @         | 1B 40          | Initialize                                     |
| ESC i U 119 1 | 1B 69 55 77 01 | Additional media information command           |
| ESC i d       | 1B 69 64       | Specify margin amount (feed amount)            |
| ESC i a       | 1B 69 61       | Switch dynamic command mode                    |
| g             | 67             | Raster graphics transfer                       |
| ESC i B       | 1B 69 42       | Specify baud rate                              |
| Z             | 5A             | Zero raster graphics                           |
| FF            | 0C             | Print command                                  |
| Control-Z     | 1A             | Print command with feeding                     |
| ESC i z       | 1B 69 7A       | Print information command                      |
| M             | 4D             | Select compression mode                        |
| ESC i A       | 1B 69 41       | Specify the page number in “cut each * labels” |
| ESC i M       | 1B 69 4D       | Various mode                                   |
| ESC i K       | 1B 69 4B       | Expanded mode                                  |

## 4. Printing Command Details

### **NULL      Invalidate**

|              |      |
|--------------|------|
| ASCII:       | NULL |
| Hexadecimal: | 00   |

#### Description

- Skipped
- If data transmission is to be stopped midway, send the “initialize” command after sending the “invalidate” command for the appropriate number of bytes to return to the receiving state, where the print buffer is cleared.

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

|              |     |    |    |
|--------------|-----|----|----|
| ASCII:       | ESC | i  | S  |
| Hexadecimal: | 1B  | 69 | 53 |

#### Description

- When a status information request is sent to the printer, a fixed size of 32 bytes is returned as a response from the printer. For details on these 32 bytes, refer to the following page.

#### **Note**

**Before sending print data to the printer, this command should be sent once. Since error information is automatically sent by the printer during printing, do not send this command while printing.**

**For details on transmission of the status, refer to “[5. Flow Charts](#)”.**

| 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    | Reserved                             | Fixed at "B" (42h)                                                       |
| 4      | 3      | 1    | Reserved                             | Fixed at "4" (34h)                                                       |
| 5      | 4      | 1    | Reserved                             | QL-710W: Fixed at "6" (36h)<br>QL-720NW: Fixed at "7" (37h)              |
| 6      | 5      | 1    | Reserved                             | Fixed at "0" (30h)                                                       |
| 7      | 6      | 1    | Reserved                             | Fixed at "0" (30h)                                                       |
| 8      | 7      | 1    | Reserved                             | Fixed at "00h"                                                           |
| 9      | 8      | 1    | Error information 1                  | Refer to table (1) below.                                                |
| 10     | 9      | 1    | Error information 2                  | Refer to table (2) below.                                                |
| 11     | 10     | 1    | Media width                          | Refer to table (3) below.                                                |
| 12     | 11     | 1    | Media type                           | Refer to table (4) below.                                                |
| 13     | 12     | 1    | Reserved                             | Fixed at 00h                                                             |
| 14     | 13     | 1    | Reserved                             | Fixed at 00h                                                             |
| 15     | 14     | 1    | Reserved                             | Fixed at 3Fh                                                             |
| 16     | 15     | 1    | Mode                                 | Value specified where the "various mode" command<br>00h if not specified |
| 17     | 16     | 1    | Reserved                             | Fixed at 00h                                                             |
| 18     | 17     | 1    | Media length                         | Refer to table (3) below.                                                |
| 19     | 18     | 1    | Status type                          | Refer to table (5) below.                                                |
| 20     | 19     | 1    | Phase type                           | Refer to table (6) below.                                                |
| 21     | 20     | 1    | Phase number<br>(higher order bytes) |                                                                          |
| 22     | 21     | 1    | Phase number<br>(lower order bytes)  |                                                                          |
| 23     | 22     | 1    | Notification number                  | Refer to table (7) below.                                                |
| 24     | 23     | 1    | Reserved                             | Fixed at 00h                                                             |
| 25     | 24     | 8    | Reserved                             | Fixed at 00h                                                             |

**(1) Error information 1**

| Flag  | Mask | Definition                                     |
|-------|------|------------------------------------------------|
| Bit 0 | 01h  | “No media” error                               |
| Bit 1 | 02h  | “End of media” error (only for die-cut labels) |
| Bit 2 | 04h  | Cutter jam                                     |
| Bit 3 | 08h  | (Not used)                                     |
| Bit 4 | 10h  | Printer in use                                 |
| Bit 5 | 20h  | Printer turned off                             |
| Bit 6 | 40h  | High-voltage adapter (not used)                |
| Bit 7 | 80h  | Fan motor error (not used)                     |

**(2) Error information 2**

| Flag  | Mask | Definition                                                   |
|-------|------|--------------------------------------------------------------|
| Bit 0 | 01h  | “Replace media” error                                        |
| Bit 1 | 02h  | “Expansion buffer full” error                                |
| Bit 2 | 04h  | Communication error                                          |
| Bit 3 | 08h  | “Communication buffer full” error (not used)                 |
| Bit 4 | 10h  | “Cover open” error                                           |
| Bit 5 | 20h  | Cancel key (not used)                                        |
| Bit 6 | 40h  | Media cannot be fed<br>(also when the media end is detected) |
| Bit 7 | 80h  | System error                                                 |

**(3) 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

| Media | Media Width | Media Length |
|-------|-------------|--------------|
| 12 mm | 12          | 0            |
| 29 mm | 29          | 0            |
| 38 mm | 38          | 0            |
| 50 mm | 50          | 0            |
| 54 mm | 54          | 0            |
| 62 mm | 62          | 0            |

**(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.

| Media          | Media Width | Media Length |
|----------------|-------------|--------------|
| 17 mm x 54 mm  | 17          | 54           |
| 17 mm x 87 mm  | 17          | 87           |
| 23 mm x 23 mm  | 23          | 23           |
| 29 mm x 42 mm  | 29          | 42           |
| 29 mm x 90 mm  | 29          | 90           |
| 38 mm x 90 mm  | 38          | 90           |
| 39 mm x 48 mm  | 39          | 48           |
| 52 mm x 29 mm  | 52          | 29           |
| 62 mm x 29 mm  | 62          | 29           |
| 62 mm x 100 mm | 62          | 100          |
| 12 mm Dia      | 12          | 12           |
| 24 mm Dia      | 24          | 24           |
| 58 mm Dia      | 58          | 58           |

**(4) 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) Status type**

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

If an error occurred during printing, the printer returns the error status.

**(6) Phase type and phase number**

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

| Phase State     | Phase Type |
|-----------------|------------|
| 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, it changes to the “printing” phase (phase type: printing state; phase number: printing), and the printer sends that phase status to the computer. When printing has finished, the printer sends the “receiving state” phase status (phase type: receiving state; phase number: waiting to receive) to the computer. Unless an error occurs during printing, the printer sends the “printing completed” status.
- With concurrent printing, printing starts even if a print command has not been sent from the computer in order to print at high speed. At this time, care should be taken since the “printing” and “waiting to receive” phase statuses will be sent. (Refer to “[5. Flow Charts](#)”.)

**(7) Notification number**

| Notification       | Value |
|--------------------|-------|
| Not available      | 00h   |
| Cooling (started)  | 03h   |
| Cooling (finished) | 04h   |

**ESC @      Initialize**

|              |     |    |
|--------------|-----|----|
| ASCII:       | ESC | @  |
| Hexadecimal: | 1B  | 40 |

Description

- Initializes mode settings.
- Also used to cancel printing.

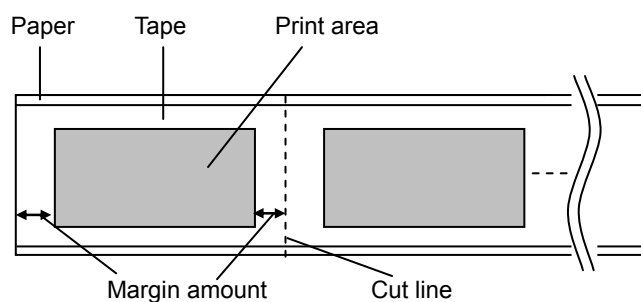
**ESC i d      Specify margin amount (feed amount)**

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

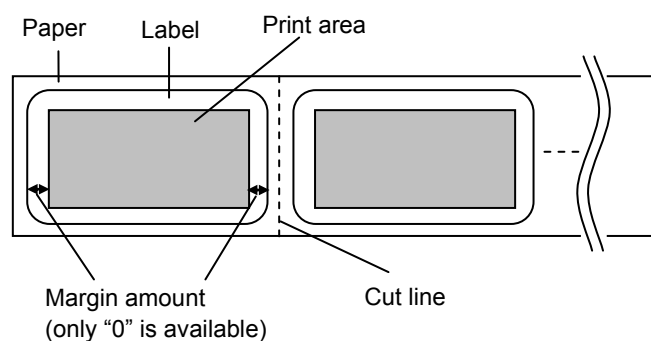
Description

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

## (a) Continuous length tape



## (b) Die-cut labels



**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 (default)

1: Raster mode (Be sure to switch to this mode.)

3: P-touch Template mode

**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.

**g      Raster graphics transfer**

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

**Parameters**

{s} The definitions of raster information s are as follows.

00h: Data transfer

01h~FEh: Not used

FFh: Indicates that data transfer should be stopped.

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

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

n=104

{d1~dn} Raster data.

**ESC i B      Specify baud rate**

|              |     |    |    |      |      |
|--------------|-----|----|----|------|------|
| ASCII:       | ESC | i  | B  | {n1} | {n2} |
| Hexadecimal: | 1B  | 69 | 42 | {n1} | {n2} |

**Parameters**

Setting= $n1+n2*256$

Setting: 96=9600 bps, 576=57600 bps, 1152=115200 bps

**Description**

- Changes the communications baud rate for the printer. The manufacturer's default setting is 9600 bps.

**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 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

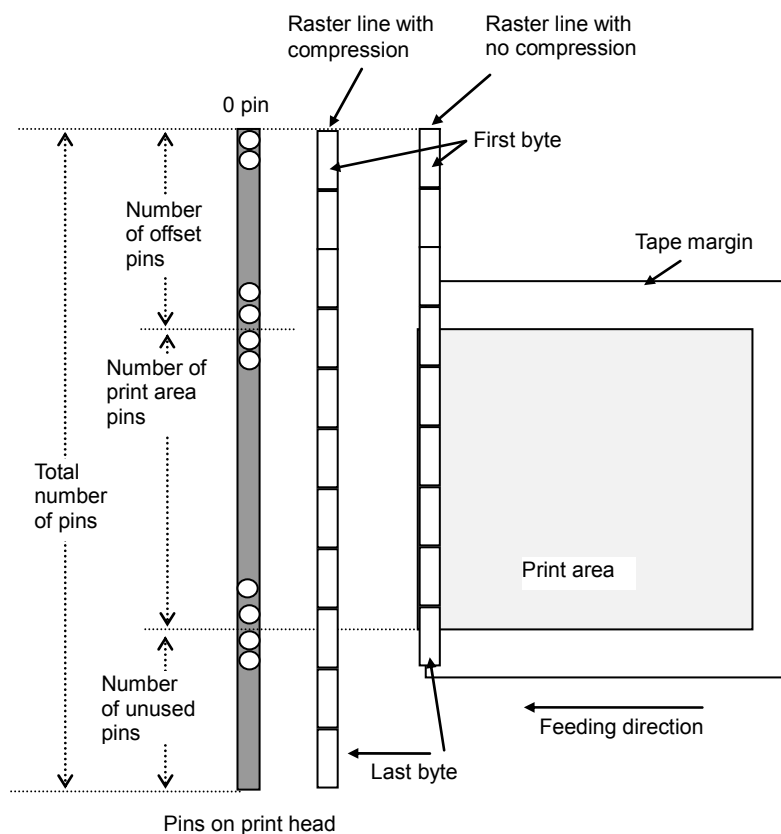
- Specifies the print information.
- Definitions of {n1} through {n10}

|          |                                                                                                                                                                                                                                                                                                                                                          |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| {n1}:    | Valid flag; Specifies which values are valid<br>0x02: Media type<br>0x04: Media width<br>0x08: Media length<br>0x40: Priority given to print quality<br>0x80: Printer recovery always on                                                                                                                                                                 |
| {n2}:    | Media type<br>Continuous length tape: 0Ah<br>Die-cut labels: 0Bh                                                                                                                                                                                                                                                                                         |
| {n3}:    | {n3}: Media width (mm)                                                                                                                                                                                                                                                                                                                                   |
| {n4}:    | {n4}: Media length (mm)<br>For the media of width 62 mm × length 100 mm, specify as n3=3Eh and n4=64h.                                                                                                                                                                                                                                                   |
| {n5-n8}: | Raster number = $n8 \times 256 \times 256 \times 256 + n7 \times 256 \times 256 + n6 \times 256 + n5$<br>If the media is not correctly loaded into the printer when the media type, media width and media length of valid flag {n1} are set to “ON”, an error status is returned. (Bit 0 of “ <a href="#">(2) Error information 2</a> ” is set to “ON”.) |
| {n9}:    | Starting page: 0<br>Other pages: 1                                                                                                                                                                                                                                                                                                                       |
| {n10}:   | Fixed at 0                                                                                                                                                                                                                                                                                                                                               |



### Explanation of “TIFF compression mode”

With compression, the data for the “raster graphics transfer” command is based on 90 bytes of the total number of pins (720). 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 90 bytes when it is expanded by the printer, regardless of the tape width.



### **ESC i A      Specify the page number in “cut each \* labels”**

|              |     |    |    |     |
|--------------|-----|----|----|-----|
| ASCII:       | ESC | i  | A  | {n} |
| Hexadecimal: | 1B  | 69 | 41 | {n} |

#### Parameters

Definitions of {n}

Page number = n1 (1 - 255)

Default is 1 (cut each label).

#### Description

When “auto cut” is specified, you can specify page number (1 - 255) in “cut each \* labels”.

**ESC i M      Various mode**

|              |     |    |    |     |
|--------------|-----|----|----|-----|
| ASCII:       | ESC | i  | M  | {n} |
| Hexadecimal: | 1B  | 69 | 4D | {n} |

**Parameters**

Definitions of {n}

The meaning of each bit in a 1-byte parameter is described below.

1 ~ 6bit: Not used

7bit: Auto cut    1: Auto cut    0:No auto cut

8bit: Not used

**ESC i K      Expanded mode**

|              |     |    |    |     |
|--------------|-----|----|----|-----|
| ASCII:       | ESC | i  | K  | {n} |
| Hexadecimal: | 1B  | 69 | 4B | {n} |

**Parameters**

Definitions of {n}

The meaning of each bit in a 1-byte parameter is described below.

1 ~ 3bit: Not used

4bit: Cut at end    1:Cut at end (default)    0:Not cut at end

5,6bit: Not used

7bit: High resolution printing

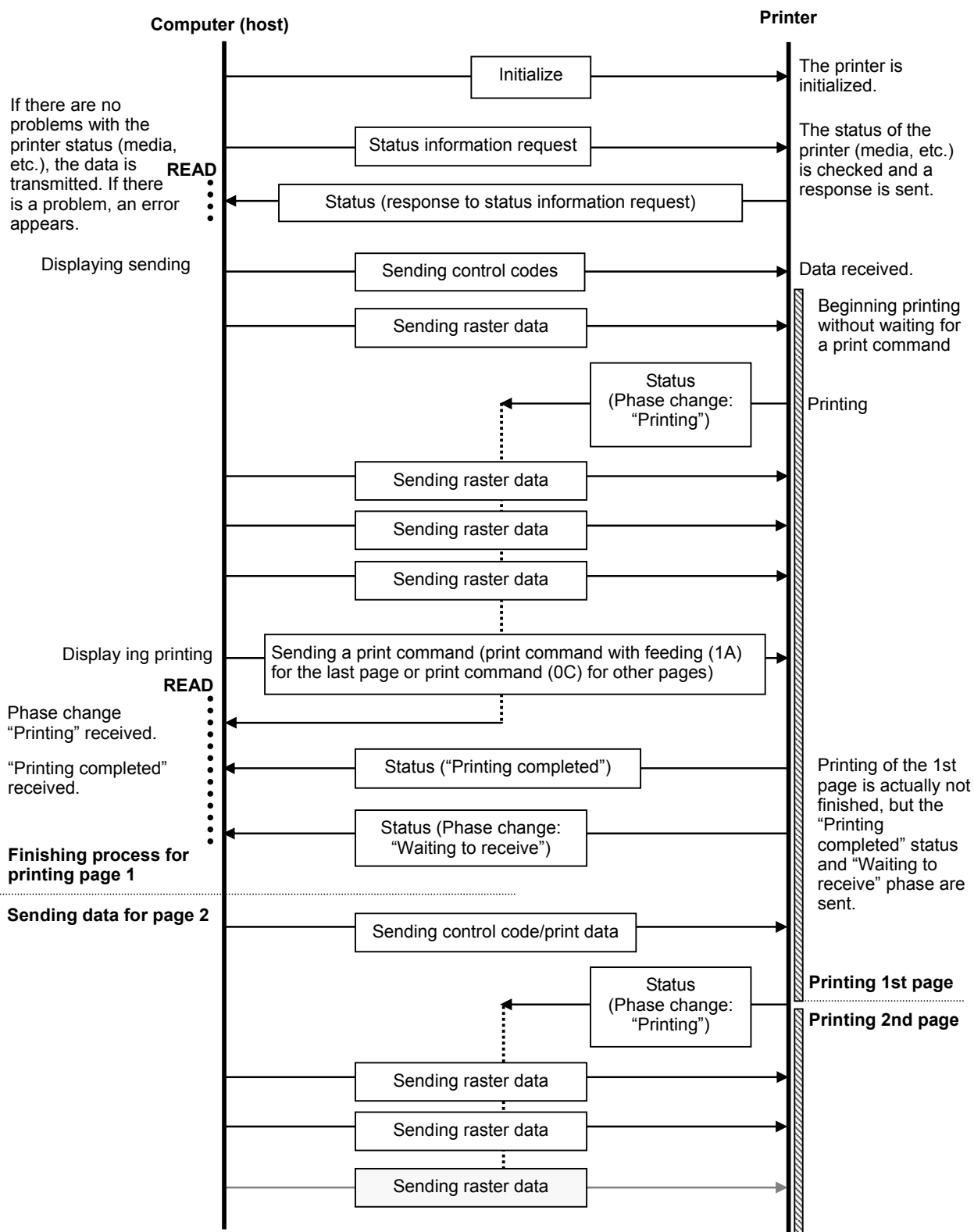
1: It prints at 600 dpi in the paper length direction

0: It prints at 300 dpi in the paper length direction. (default)

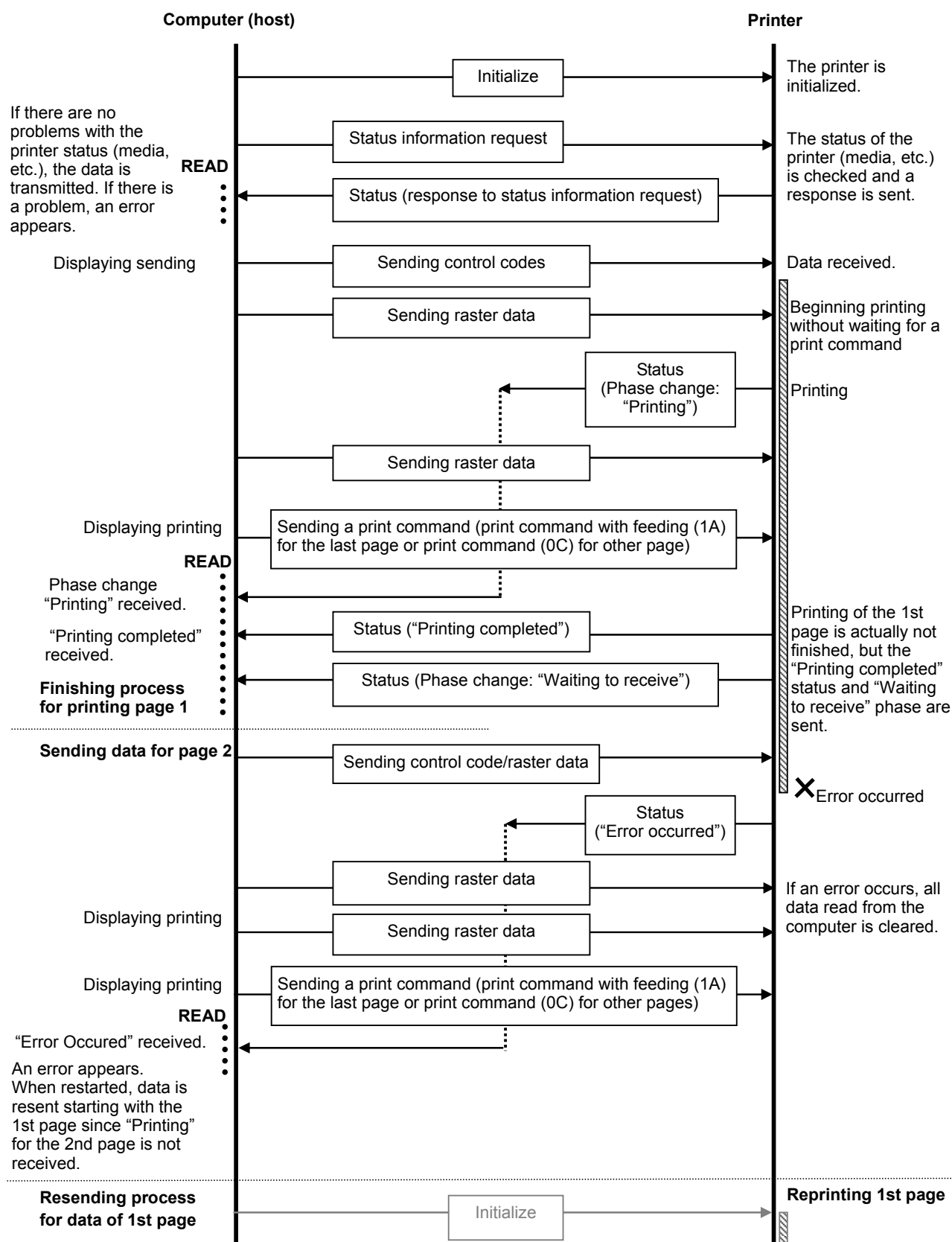
8bit: Not used

## 5. Flow Charts

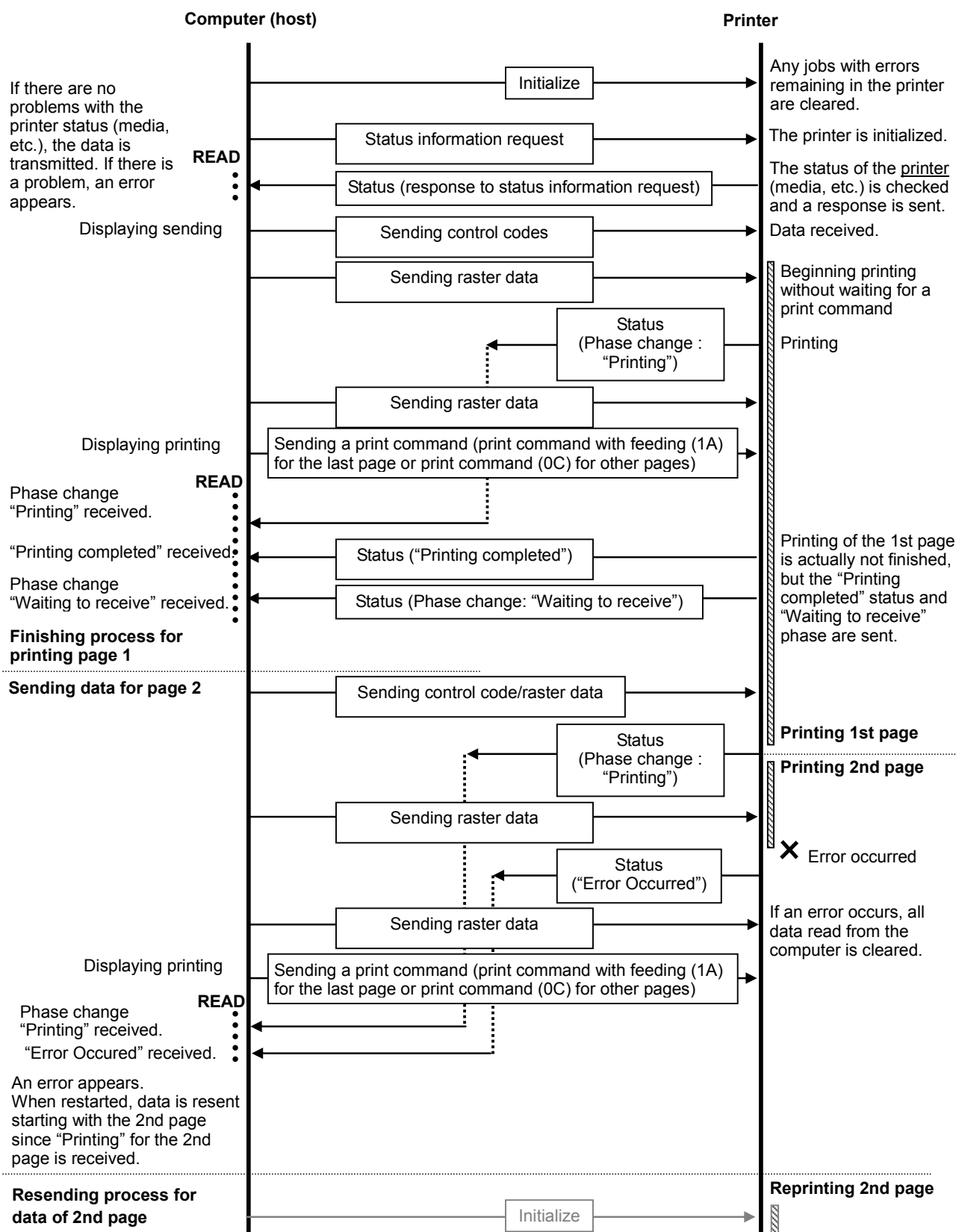
### 5.1 Normal flow for USB connection



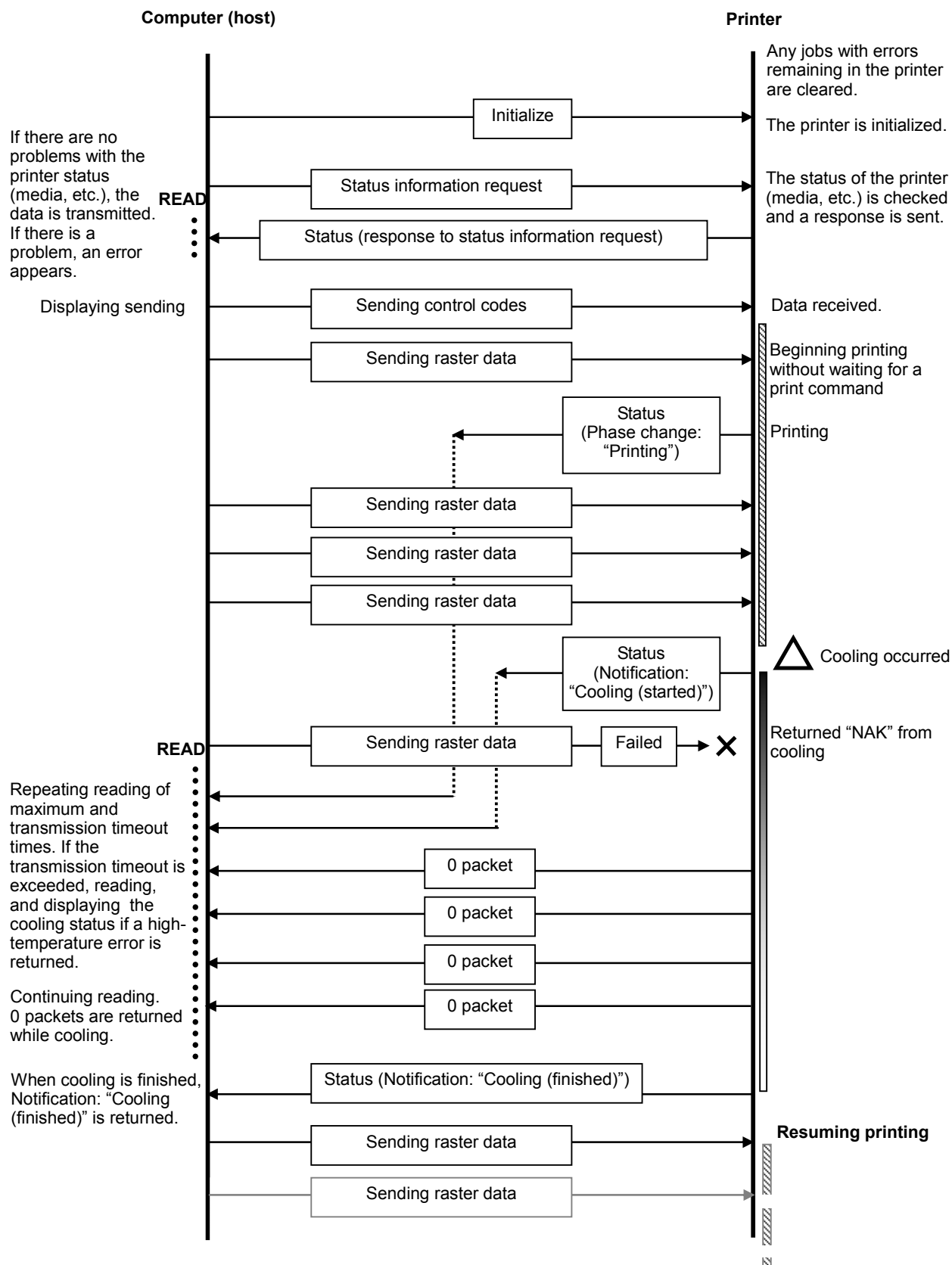
## 5.2 Error flow for USB connection (when feeding at the end of the page)



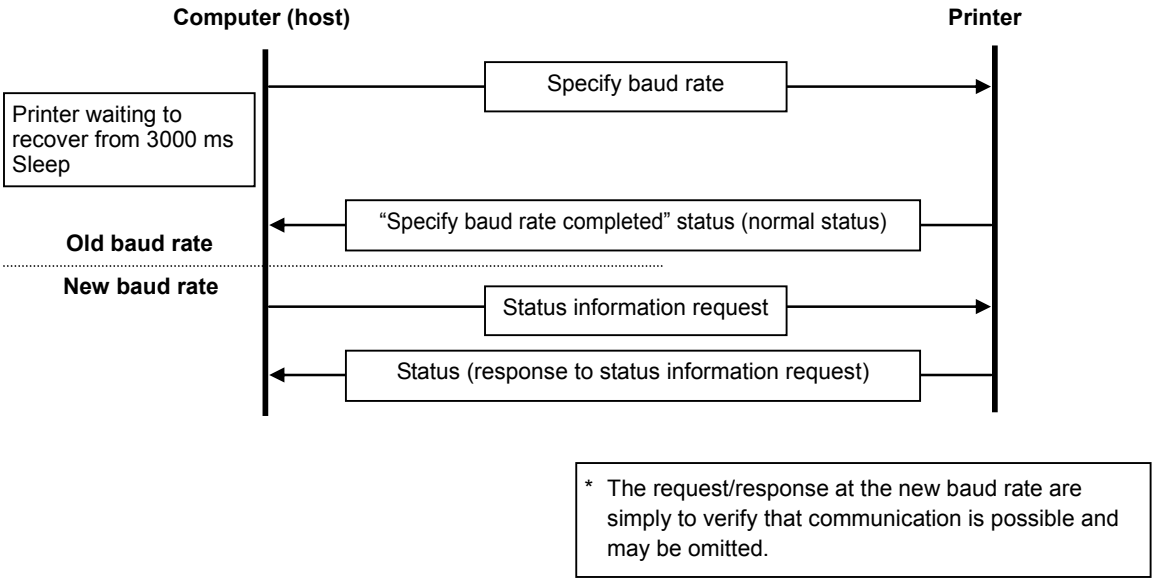
### 5.3 Error flow for USB connection (with a concurrent printing error such as end of tape)



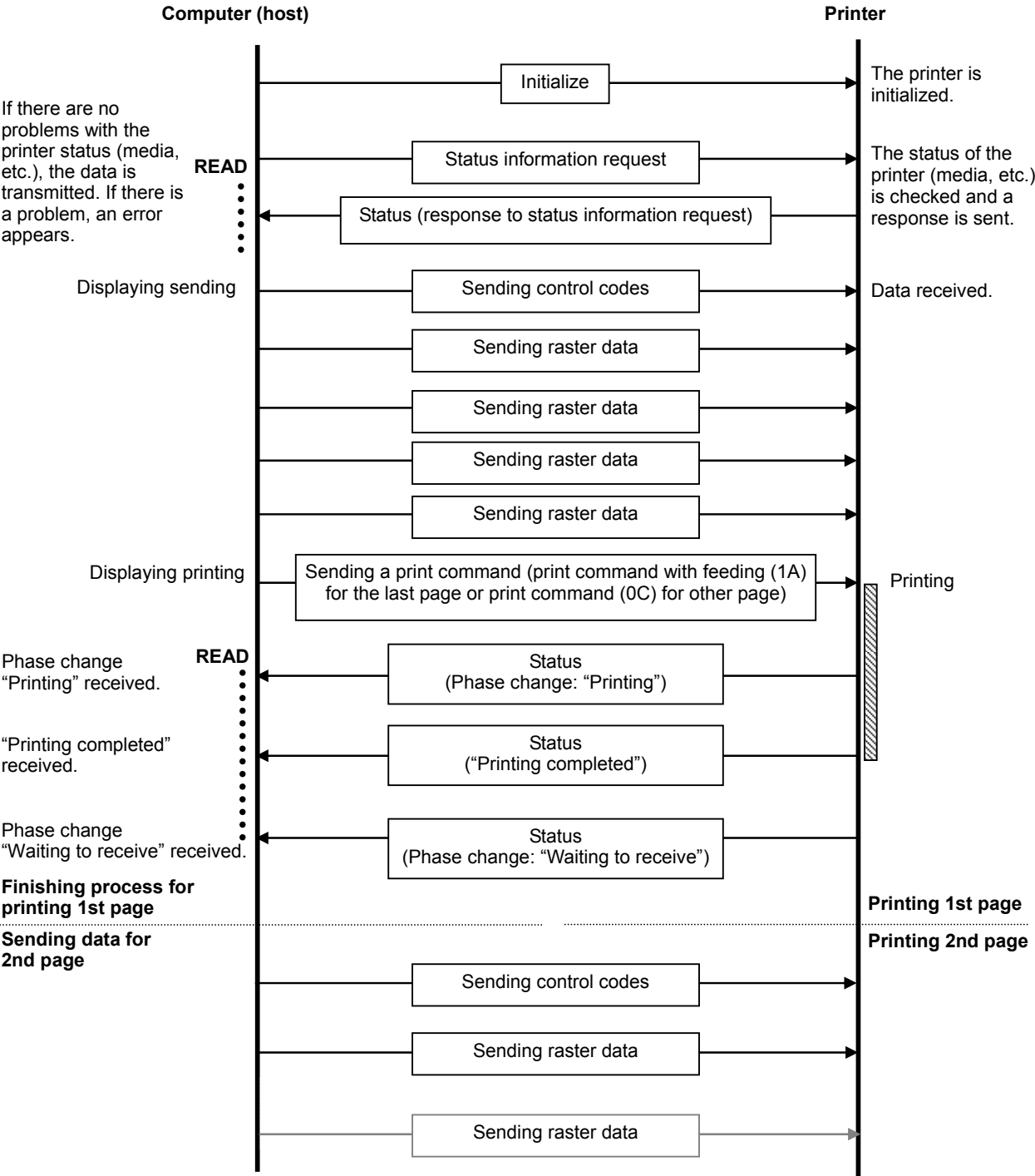
## 5.4 Cooling flow for USB connection



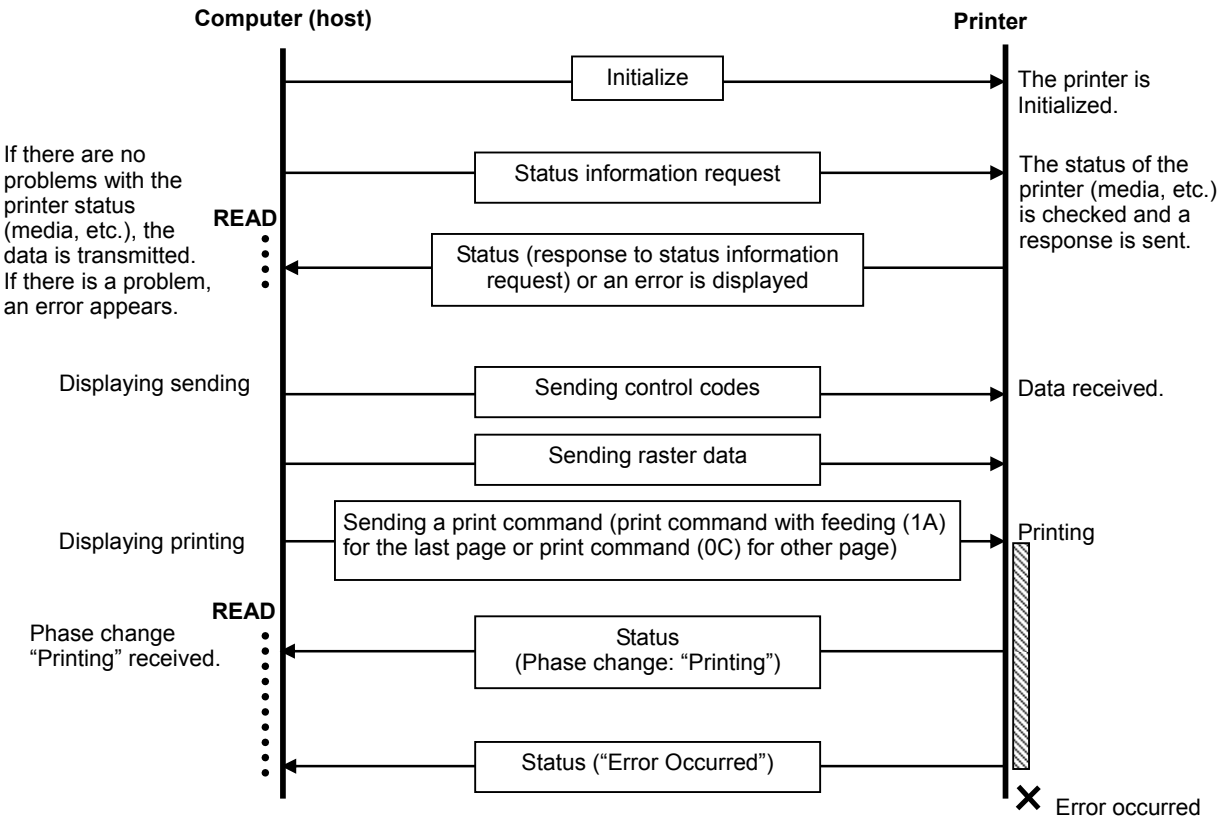
5.5 Flow for setting serial connection baud rate



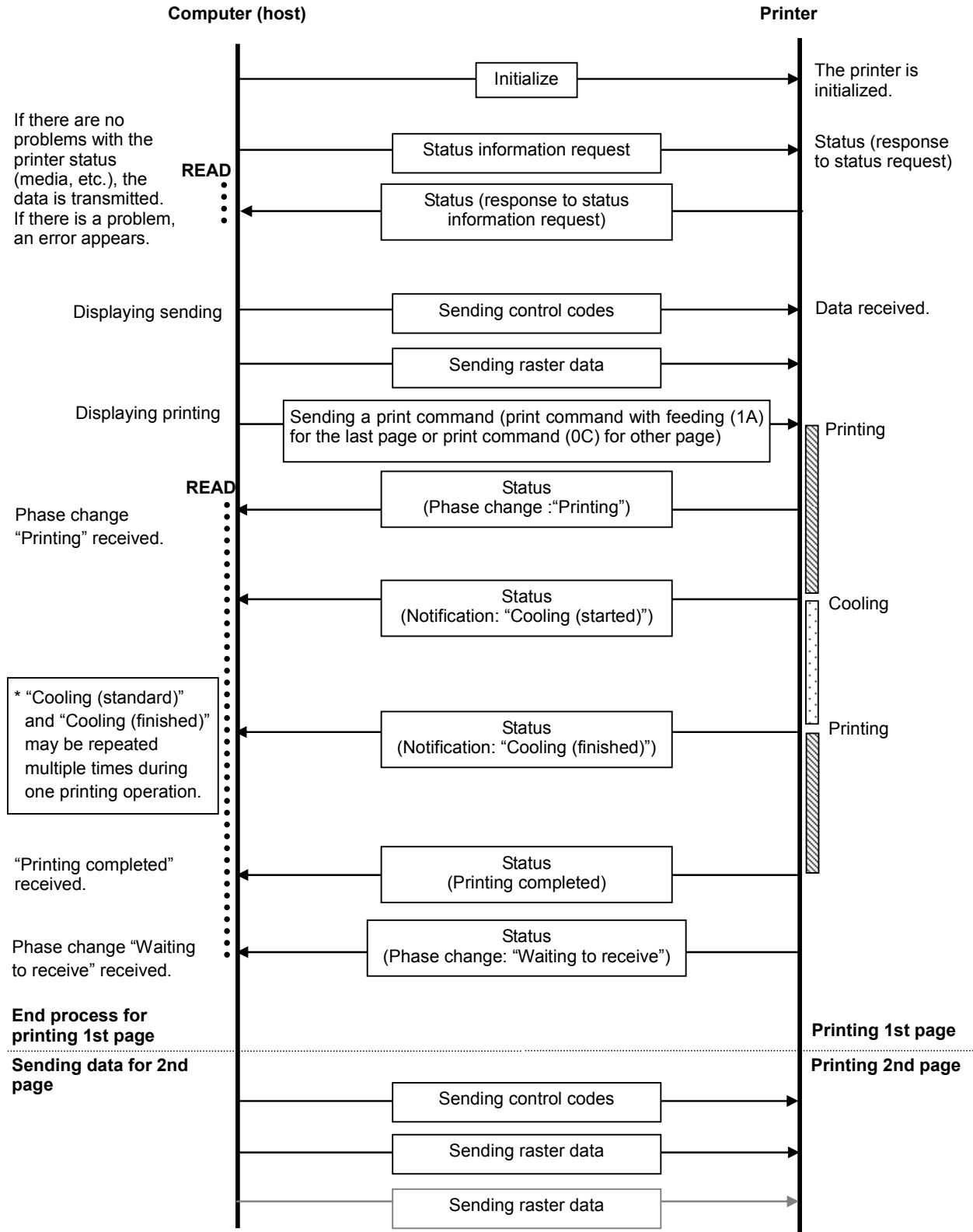
5.6 Normal flow for serial connection



5.7 Error flow for serial connection



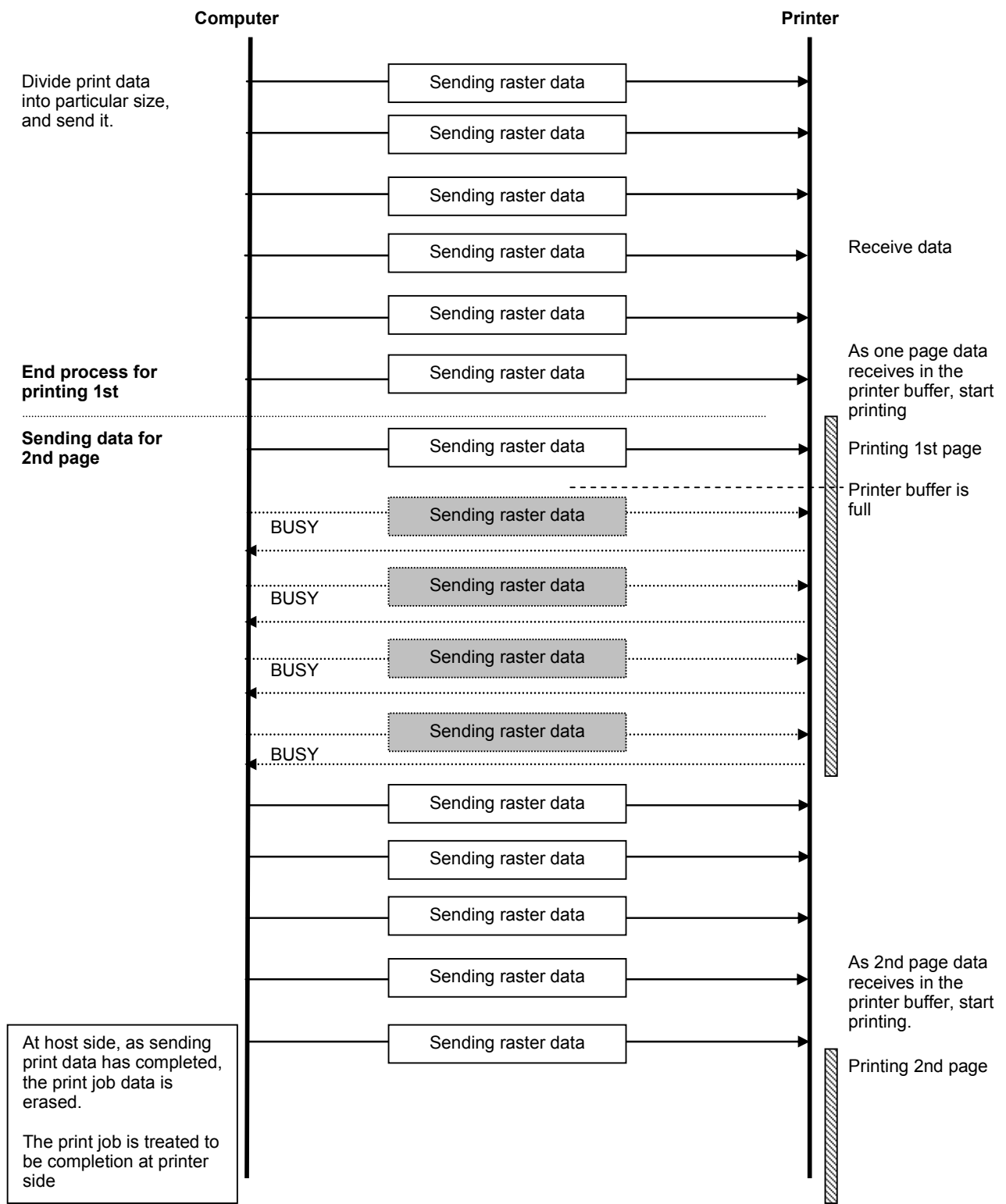
5.8 Cleaning flow for serial connection



5.9 Normal Flow for Network (Standard TCP/IP port) Connection

\*With a network connection, print data from the operating system’s port monitor is simply sent as is.

When it prints 2 pages data



## Appendix A: USB Specifications

### USB specifications 1.1

| Item                               | Description                                                                                                      |
|------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Vendor ID                          | 0x04F9                                                                                                           |
| Product ID                         | QL-710W : 0x2043<br>QL-720NW : 0x2044                                                                            |
| Class                              | Printer<br>Mass storage                                                                                          |
| Character string for manufacturer  | Character string descriptor: 0x01<br>0x0409: "Brother"                                                           |
| Character string for serial number | Character string descriptor: 0x03<br>0x0409: "000000000001"<br>Last twelve 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.)<br>Maximum packet size: 64 bytes                    |
| End point 2                        | Out bulk (Sends print commands and data from the computer to the printer.)<br>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>

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