

# **Software Developer's Manual**

**Raster Command Reference**

**PT-P900/P900W/P950NW/P910BT**

**Version 1.02**

The Brother logo is a registered trademark of Brother Industries, Ltd.

Brother is a registered trademark of Brother Industries, Ltd.

© 2020 Brother Industries, Ltd. All rights reserved.

Microsoft and Windows are registered trademarks of Microsoft Corporation in the United States and other countries.

Each owner whose software title is mentioned in this document has a Software License Agreement specific to its proprietary programs.

Any trade names and product names of companies appearing on Brother products, related documents and any other materials are all trademarks or registered trademarks of those respective companies.

## IMPORTANT - PLEASE READ CAREFULLY

### Note

This documentation ("Documentation") provides information that will assist you in controlling your Printer PT-XXXX (where "XXXX" is the model name).

You may use the Documentation only if you first agree to the following conditions.

If you do not agree to the following conditions, you may not use the Documentation.

### Condition of Use

You may use and reproduce the Documentation to the extent necessary for your own use of your Printer Model ("Purpose"). Unless expressly permitted in the Documentation, you may not;

- (i) copy or reproduce the Documentation for any purpose other than the Purpose,
- (ii) modify, translate or adapt the Documentation, and/or redistribute it to any third party,
- (iii) rent or lease the Documentation to any third party, or,
- (iv) remove or alter any copyright notices or proprietary rights legends included within the Documentation.

### No Warranty

- a. Any updates, upgrades or alteration of the Documentation or Printer Model will be performed at the sole discretion of Brother. Brother may not respond to any request or inquiry about the Documentation.
- b. THIS DOCUMENTATION IS PROVIDED TO YOU "AS IS" WITHOUT WARRANTY OF ANY KIND, WHETHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. BROTHER DOES NOT REPRESENT OR WARRANT THAT THIS DOCUMENTATION IS FREE FROM ERRORS OR DEFECTS.
- c. IN NO EVENT SHALL BROTHER BE LIABLE FOR ANY DIRECT, INDIRECT, PUNITIVE, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER, ARISING OUT OF THE USE, INABILITY TO USE, OR THE RESULTS OF USE OF THE DOCUMENTATION OR ANY SOFTWARE PROGRAM OR APPLICATION YOU DEVELOPED IN ACCORDANCE WITH THE DOCUMENTATION.

---

## Contents

---

<b>Introduction .....</b>	<b>1</b>
<b>About Raster Commands .....</b>	<b>2</b>
<b>1. Printing Using Raster Commands .....</b>	<b>3</b>
<b>2. Print Data .....</b>	<b>5</b>
2.1 Print data overview .....	5
2.2 Sample (analyzing the print data of the test page) .....	7
2.2.1 Preparation .....	7
2.2.2 Checking the print data .....	7
2.2.3 Explanation of print data for the test page .....	10
2.3 Page data details .....	12
2.3.1 Resolution .....	12
2.3.2 Page size .....	13
2.3.3 Feed amount .....	17
2.3.4 Maximum and minimum lengths .....	18
2.3.5 Raster line .....	19
<b>3. Print Command List .....</b>	<b>22</b>
<b>4. Printing Command Details .....</b>	<b>23</b>
NULL     Invalidate .....	23
ESC @    Initialize .....	23
ESC i S   Status information request .....	23
ESC i a   Switch dynamic command mode .....	32
ESC i z   Print information command .....	33
ESC i M   Various mode settings .....	35
ESC i K   Advanced mode settings .....	36
ESC i d   Specify margin amount (feed amount) .....	37
ESC i A   Specify the page number in "cut each * labels" .....	37
M        Select compression mode .....	38
G        Raster graphics transfer .....	40
Z        Zero raster graphics .....	40
FF       Print command .....	40
Control-Z   Print command with feeding .....	41
ESC i !   Specify automatic status notification mode .....	41
<b>5. Flow Charts .....</b>	<b>42</b>
5.1 Concurrent printing normal flow for USB connection .....	43
5.2 Concurrent printing error flow for USB connection (when feeding at the end of the page) .....	44
5.3 Concurrent printing error flow for USB connection (with a concurrent printing error such as end of tape) .....	45
5.4 Buffered printing normal flow for USB/Bluetooth connection .....	46
5.5 Buffered printing error flow for USB/Bluetooth connection .....	47
5.6 Normal Flow for Network (Standard TCP/IP port) Connection .....	48
<b>Appendix A: USB Specifications .....</b>	<b>49</b>
<b>Appendix B: Introducing the Brother Developer Center .....</b>	<b>50</b>

## Introduction

This material provides the necessary information for directly controlling the Brother printer PT-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 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 an PT-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.

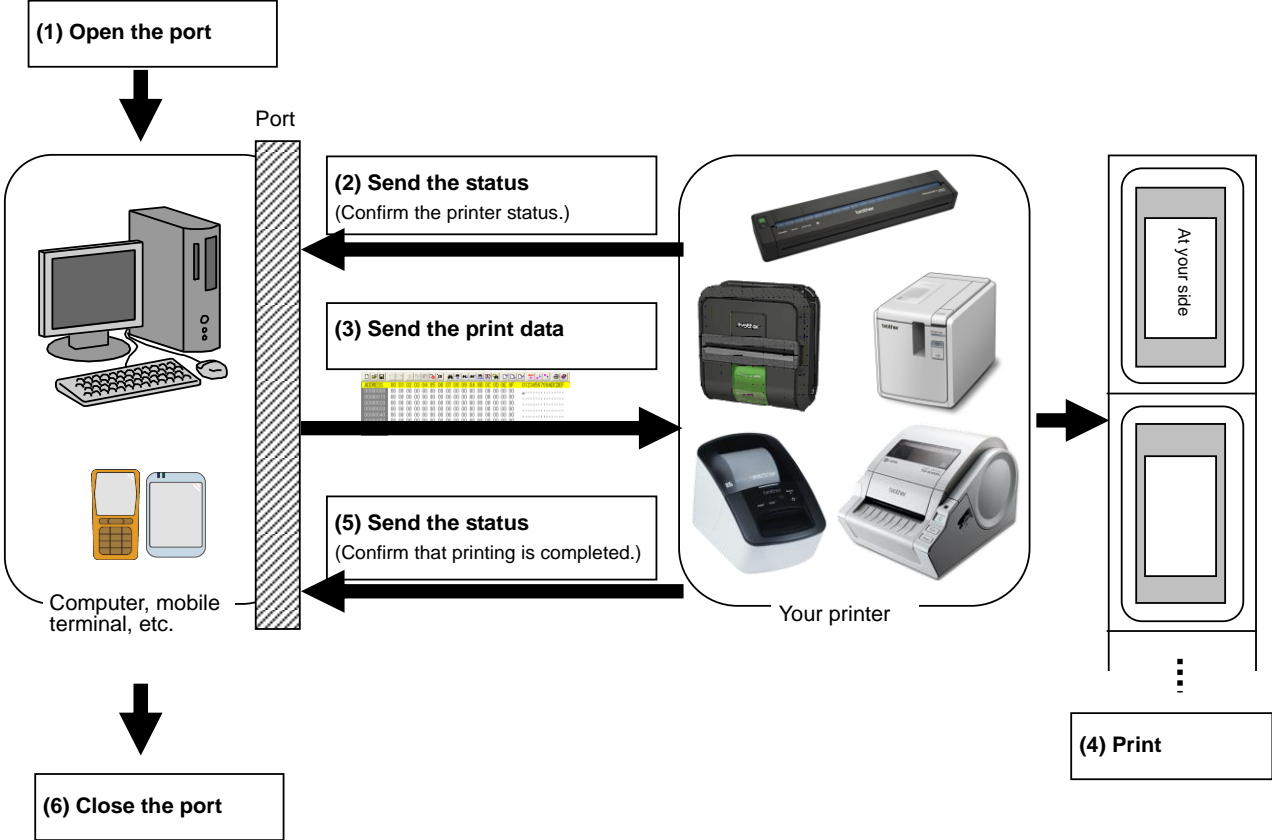
In this material, “raster” refers to binary bitmap data (collection of dots).

Refer to this material to print by sending initialization commands and control codes together with raster data to the PT-XXXX 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/network/Bluetooth port

Open the USB/network/Bluetooth port in the operating environment. The procedure for opening the USB/network/Bluetooth 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/network/Bluetooth port

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

**Note:**

**In order to print at high speed when a USB port is used to send uncompressed raster data, the Brother PT-XXXX 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. 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 printer to raster mode. 1Bh, 69h, 61h, 01h
2	Specify automatic status notification mode (PT-P910BT only)	Dynamically switches whether an automatic status notification is given during printing. 1Bh, 69h, 21h, 00h
3	Print information command	Sets the print information for the printer. When printing 100 mm on 24-mm-wide tape with the 180 dpi model: 1Bh, 69h, 7Ah, 84h, 00h, 18h, 00h, 9Ch, 02h, 00h, 00h, 00h, 00h
4	Various mode settings	When auto cut is enabled: 1Bh, 69h, 4Dh, 40h
5	Specify the page number in "cut each * labels"	When an auto cut setting is effective, specify the number of sheets for auto cut. For auto cut every single sheet, 1Bh, 69h, 41h, 01h
6	Advanced mode settings	When half cut is enabled, and chain printing is disabled: 1Bh, 69h, 4Bh, 0Ch
7	Specify margin amount	Specifies the amount of the margins. For 1 mm margins on the 360 dpi model: 1Bh, 69h, 64h, 0Eh, 00h
8	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". (Valid only when TIFF is selected as the compression mode) 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 (Fixed)
-	Print command with feeding	Specifies at the end of the last page. 1Ah (Fixed)

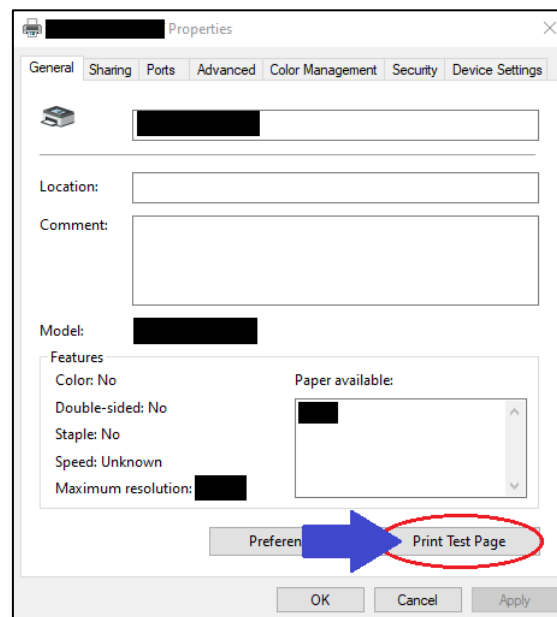
## 2.2 Sample (analyzing the print data of the test page)

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® 10 operating environment. A similar procedure can be performed if you are using a different operating system.



Print Properties

### 2.2.1 Preparation

Install the two listed below.

- Printer driver of the Brother PT-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.

### 2.2.2 Checking the print data

The procedure for checking the print data is provided below.

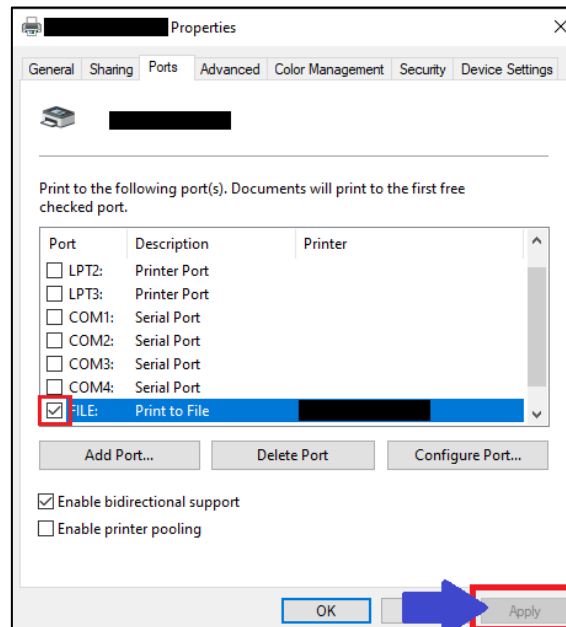
Step 1: Change the port of the printer to "FILE:".

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:”.**

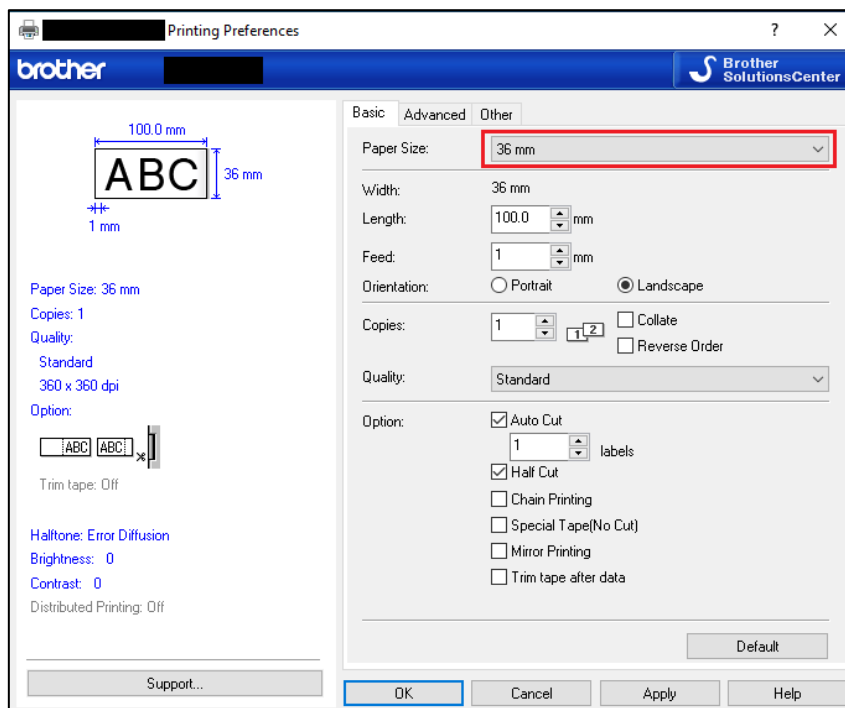
Open the **Printers and Faxes** folder, and then right-click the printer to display the Properties dialog box. In the Properties dialog box, click the **[Ports]** tab, select the “**FILE:**” check box, and then click the **[Apply]** button.



[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.**

Print the test page with “36mm” selected as the paper size in the print settings.







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. 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 driver, it is unnecessary for the user to send this command.
5	Print information command	Media size information for the print data is sent. This is the command for “36 mm” tape.
6	Various mode settings (1Bh+69h+4Dh+40h)	This is a command for specifying a mode. Here, automatically cutting is specified.
7	Specify the page number in “cut each * labels”	The number of pages printed before automatically cutting is specified.
8	Advanced mode settings	This is the command for specifying settings for the advanced mode. In this case, “no chain printing” is enabled, and “half cut” is enabled.
9	Specify number of copies	Internal specification commands Since this is a command for outputting with the commercial version driver, it is unnecessary for the user to send this command.
10	Specify margin amount	Specifies the amount of the margins. This is the command for “14 dots”.
11	Select compression mode	TIFF compression mode is selected.
12	Raster data	Raster data continues.
13	Print command with feeding	Since it is the last page, the print command with feeding is sent at the end of the page.

2.3 Page data details

**2.3.1 Resolution**

PT-P900/P900W/P950NW

Resolution	Height-to-Width Proportion
360 dpi high, 360 dpi wide	1:1
360 dpi high, 720 dpi wide	1:2

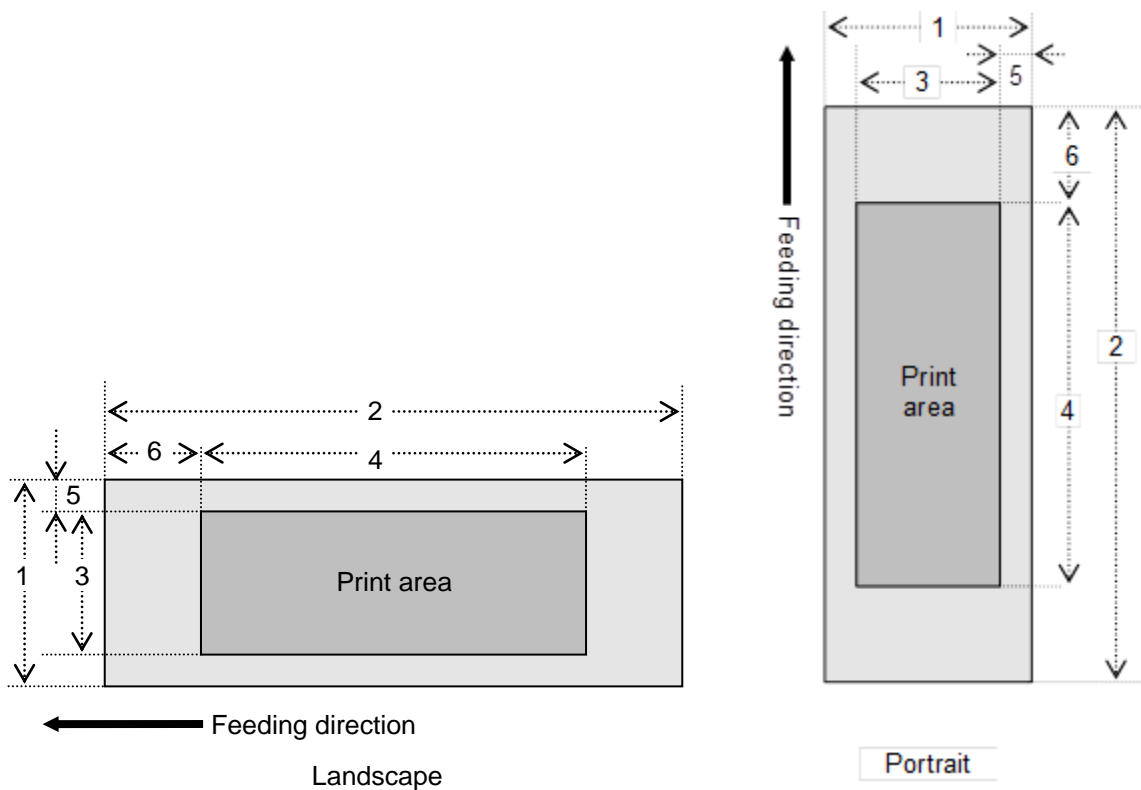
PT-P910BT

Resolution	Height-to-Width Proportion
360 dpi high, 360 dpi wide	1:1



### 2.3.2 Page size

(a) Continuous length tape



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

TZe tape

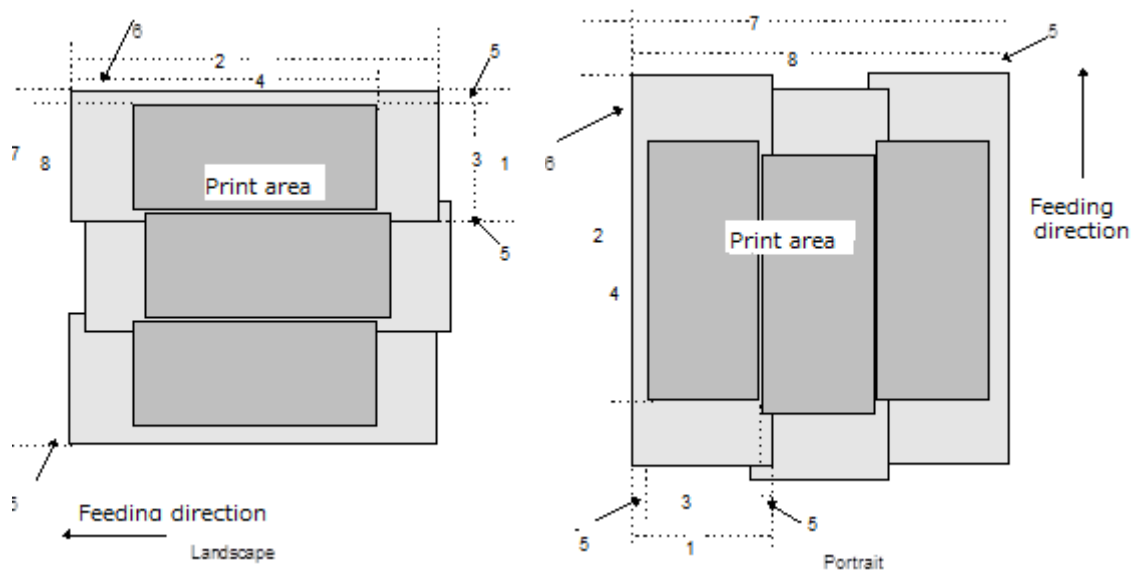
ID	Tape Size	Designation	1	2	3	4	5	6
263	3.5 mm	3.5 mm 0.13"	3.38 mm 48 dots	→ <a href="#">2.3.4</a>	3.38 mm 48 dots	→ <a href="#">2.3.4</a>	0.00 mm 0 dots	→ <a href="#">2.3.3</a>
257	6 mm	6 mm 0.23"	6.00 mm 84 dots	→ <a href="#">2.3.4</a>	4.52 mm 64 dots	→ <a href="#">2.3.4</a>	0.74 mm 10 dots	→ <a href="#">2.3.3</a>
258	9 mm	9 mm 0.35"	9.00mm 128 dots	→ <a href="#">2.3.4</a>	7.48 mm 106 dots	→ <a href="#">2.3.4</a>	0.76 mm 11 dots	→ <a href="#">2.3.3</a>
259	12 mm	12 mm 0.47"	12.0 mm 170 dots	→ <a href="#">2.3.4</a>	10.58 mm 150 dots	→ <a href="#">2.3.4</a>	0.71 mm 10 dots	→ <a href="#">2.3.3</a>
260	18 mm	18 mm 0.70"	18.01 mm 256 dots	→ <a href="#">2.3.4</a>	16.51 mm 234 dots	→ <a href="#">2.3.4</a>	0.75 mm 11 dots	→ <a href="#">2.3.3</a>
261	24 mm	24 mm 0.94"	24.00 mm 340 dots	→ <a href="#">2.3.4</a>	22.58 mm 320 dots	→ <a href="#">2.3.4</a>	0.71 mm 10 dots	→ <a href="#">2.3.3</a>
262	36 mm	36 mm 1.4"	36.09 mm 512 dots	→ <a href="#">2.3.4</a>	32.03 mm 454 dots	→ <a href="#">2.3.4</a>	2.03 mm 29 dots	→ <a href="#">2.3.3</a>

## Heat-Shrink Tube

ID	Tape Size	Designation	1	2	3	4	5	6
415	HS 5.8 mm	HS 5.8mm HS 0.23"	5.60 mm 80 dots	→ <a href="#">2.3.4</a>	3.95 mm 56 dots	→ <a href="#">2.3.4</a>	0.85 mm 12 dots	→ <a href="#">2.3.3</a>
416	HS 8.8 mm	HS 8.8mm HS 0.34"	8.70 mm 124 dots	→ <a href="#">2.3.4</a>	6.77 mm 96 dots	→ <a href="#">2.3.4</a>	1.00 mm 14 dots	→ <a href="#">2.3.3</a>
417	HS 11.7 mm	HS 11.7mm HS 0.46"	11.6 mm 164 dots	→ <a href="#">2.3.4</a>	9.31 mm 132 dots	→ <a href="#">2.3.4</a>	1.10 mm 16 dots	→ <a href="#">2.3.3</a>
418	HS 17.7 mm	HS 17.7mm HS 0.69"	17.8 mm 252 dots	→ <a href="#">2.3.4</a>	14.96 mm 212 dots	→ <a href="#">2.3.4</a>	1.40 mm 20 dots	→ <a href="#">2.3.3</a>
419	HS 23.6 mm	HS 23.6mm HS 0.93"	23.7 mm 336 dots	→ <a href="#">2.3.4</a>	18.06 mm 256 dots	→ <a href="#">2.3.4</a>	2.80 mm 40 dots	→ <a href="#">2.3.3</a>
420	HS 5.2 mm	HS 5.2 mm HS 0.20"	5.2 mm 74 dots	→ <a href="#">2.3.4</a>	2.82 mm 40 dots	→ <a href="#">2.3.4</a>	1.20 mm 17 dots	→ <a href="#">2.3.3</a>
421	HS 9.0 mm	HS 9.0 mmm HS 0.35"	9 mm 128 dots	→ <a href="#">2.3.4</a>	6.21 mm 88 dots	→ <a href="#">2.3.4</a>	1.41 mm 20 dots	→ <a href="#">2.3.3</a>
422	HS 11.2 mm	HS 11.2 mm HS 0.44"	11.3 mm 160 dots	→ <a href="#">2.3.4</a>	7.06 mm 100 dots	→ <a href="#">2.3.4</a>	2.12 mm 30 dots	→ <a href="#">2.3.3</a>
423	HS 21 mm	HS 21 mm HS 0.82"	21.0 mm 298 dots	→ <a href="#">2.3.4</a>	16.93 mm 240 dots	→ <a href="#">2.3.4</a>	2.05 mm 29 dots	→ <a href="#">2.3.3</a>
424	HS 31 mm	HS 31.0 mm HS 1.2"	31.0 mm 440 dots	→ <a href="#">2.3.4</a>	25.40 mm 360 dots	→ <a href="#">2.3.4</a>	2.82 mm 40 dots	→ <a href="#">2.3.3</a>

NOTE: Hereafter, ID 415 to 419 is referred to as HS 2:1 and ID 420 to 424 is referred to as HS 3:1.

(b) Split size



- |        |   |                               |
|--------|---|-------------------------------|
| Number | 1 Width                                     | 2 Length                      |
|        | 3 Print area width (maximum printing width) | 4 Print area length           |
|        | 5 Width offset                              | 6 Length offset               |
|        | 7 Overall width                             | 8 Width of overall print area |

TZe tape

ID	Tape Size	Designation	1	3	5	7 [3] x Split number + [5] x 2	8 [3] x Split number
279	12 mm	12 mm x 2 0.47" x 2	12.00 mm 170 dots	11.99 mm 170 dots	0.00 mm 0 dots	12.00 mm x 2 + 0.00 mm x 2 170 dots x 2 + 0 dots x 2	12.00 mm x 2 170 dots x 2
285	12 mm	12 mm x 3 0.47" x 3	12.00 mm 170 dots	11.99 mm 170 dots	0.00 mm 0 dots	12.00 mm x 3 + 0.00 mm x 2 170 dots x 3 + 0 dots x 2	12.00 mm x 3 70 dots x 3
291	12 mm	12 mm x 4 0.47" x 4	12.00 mm 170 dots	11.99 mm 170 dots	0.00 mm 0 dots	12.00 mm x 4 + 0.00 mm x 2 170 dots x 4 + 0 dots x 2	12.00 mm x 4 70 dots x 4
280	18 mm	18 mm x 2 0.70" x 2	18.01 mm 256 dots	17.92 mm 254 dots	0.04 mm 1 dots	18.01 mm x 2 + 0.04 mm x 2 254 dots x 2 + 1 dots x 2	18.01 mm x 2 254 dots x 2
286	18 mm	18 mm x 3 0.70" x 3	18.01 mm 256 dots	17.92 mm 254 dots	0.04 mm 1 dots	18.01 mm x 3 + 0.04 mm x 2 254 dots x 3 + 1 dots x 2	18.01 mm x 3 254 dots x 3
292	18 mm	18 mm x 4 0.70" x 4	18.01 mm 256 dots	17.92 mm 254 dots	0.04 mm 1 dots	18.01 mm x 4 + 0.04 mm x 2 254 dots x 4 + 1 dots x 2	18.01 mm x 4 254 dots x 4
281	24 mm	24 mm x 2 0.94" x 2	24.00 mm 340 dots	23.99 mm 340 dots	0.01 mm 0 dots	24.00 mm x 2 + 0.01 mm x 2 340 dots x 2 + 0 dots x 2	24.00 mm x 2 340 dots x 2
287	24 mm	24 mm x 3 0.94" x 3	24.00 mm 340 dots	23.99 mm 340 dots	0.01 mm 0 dots	24.00 mm x 3 + 0.01 mm x 2 340 dots x 3 + 0 dots x 2	24.00 mm x 3 340 dots x 3
293	24 mm	24 mm x 4 0.94" x 4	24.00 mm 340 dots	23.99 mm 340 dots	0.01 mm 0 dots	24.00 mm x 4 + 0.01 mm x 2 340 dots x 4 + 0 dots x 2	24.00 mm x 4 340 dots x 4

ID	Tape Size	Designation	1	3	5	7 [3] x Split number + [5] x 2	8 [3] x Split number
282	36 mm	36 mm x 2 1.4" x 2	36.09 mm 512 dots	32.03 mm 454 dots	2.03 mm 29 dots	32.03 mm x 2 + 2.03 mm x 2 454 dots x 2 + 29 dots x 2	32.03 mm x 2 454 dots x 2
288	36 mm	36 mm x 3 1.4" x 3	36.09 mm 512 dots	32.03 mm 454 dots	2.03 mm 29 dots	32.03 mm x 3 + 2.03 mm x 2 454 dots x 3 + 29 dots x 2	32.03 mm x 3 454 dots x 3
294	36 mm	36 mm x 4 1.4" x 4	36.09 mm 512 dots	32.03 mm 454 dots	2.03 mm 29 dots	32.03 mm x 4 + 2.03 mm x 2 454 dots x 4 + 29 dots x 2	32.03 mm x 4 454 dots x 4

### **2.3.3 Feed amount**

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

360dpi x 360dpi

<b>Type</b>	<b>Minimum margin setting</b>	<b>Maximum margin setting</b>	<b>Minimum margin setting with no precut (Unrelated to driver)</b>
Normal	1 mm 0.04" 14 dots	127 mm 5.00" 1800 dots	27 mm 1.06" 382 dots

360dpi x 720dpi

<b>Type</b>	<b>Minimum margin setting</b>	<b>Maximum margin setting</b>	<b>Minimum margin setting with no precut (Unrelated to driver)</b>
High resolution	1 mm 0.04" 28 dots	127 mm 5.00" 3600 dots	27 mm 1.06" 764 dots

### 2.3.4 Maximum and minimum lengths

The maximum and minimum lengths are defined below.

TZe tape

360dpi x 360dpi

Type	Minimum length	Maximum length
Normal	4 mm 0.16" 57 dots	1000 mm 39.37" 14173 dots

360dpi x 720dpi

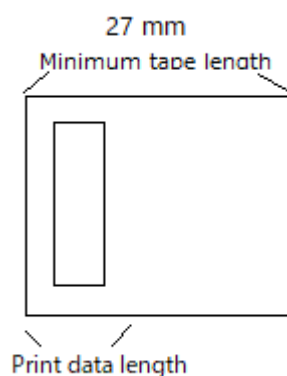
Type	Minimum length	Maximum length
High resolution	4 mm 0.16" 114 dots	1000 mm 39.37" 28346 dots

Heat-Shrink Tube (not supported for PT-P910BT)

Type	Minimum length	Maximum length
Normal	4.2 mm 0.16" 60 dots	500 mm 19.69" 7087 dots

\* The minimum length with the driver is based on the machine specifications (due to the machine cutter position), and the minimum length of tape that can be fed out is 27 mm.

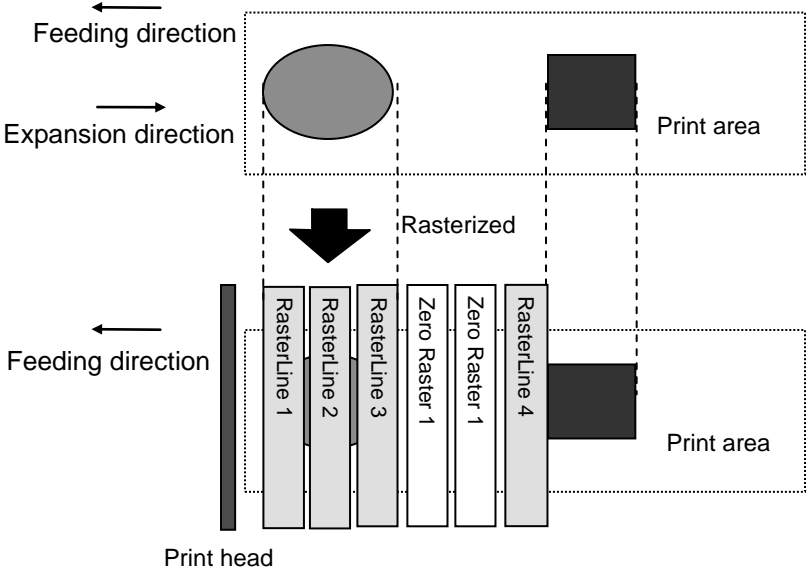
For example, even when the minimum print data of 4.2 mm is created, the print result will be the 27 mm of tape shown below, since the minimum length of tape that can be fed out is 27 mm.



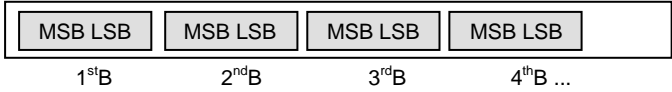
In other words, the print data will be on 27 mm of tape when the print data length is 27 mm or less.

**2.3.5 Raster line**

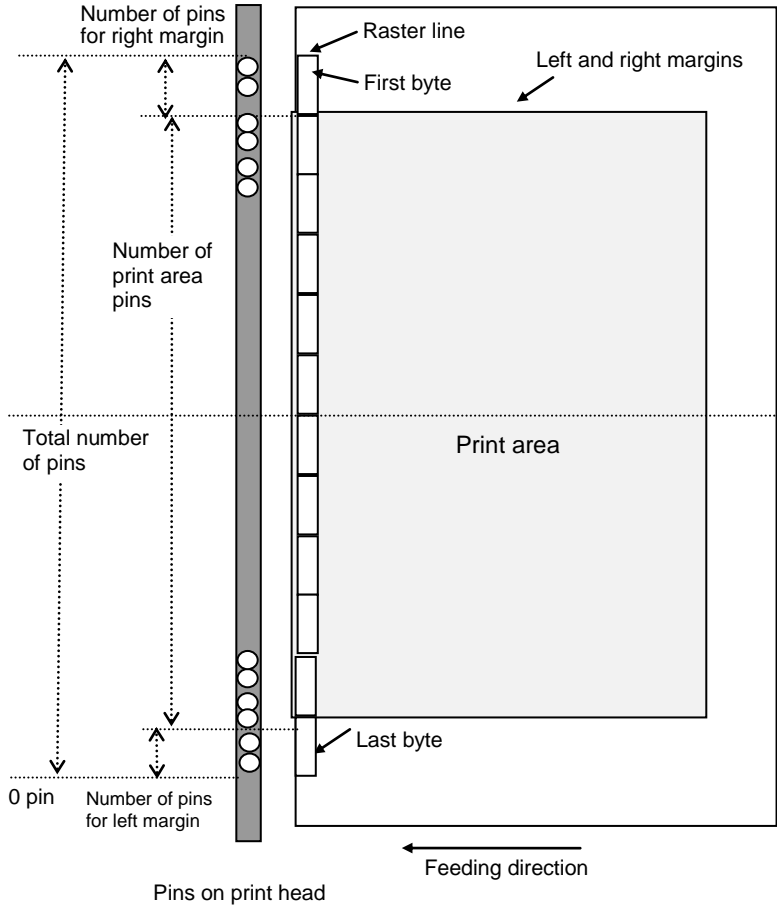
As shown below, the parts with data to be printed are converted with “raster graphics transfer”, and the parts with no data are converted with “zero raster graphics”. On the actual tape, margins (feed) are added specified with “various mode settings” at the beginning and the end.



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



**Total number of pins: 560pin**



TZe tape :

Tape Type	Number of pins for left margin	Number of print area pins	Number of pins for right margin	Number of bytes for raster graphics transfer
3.5 mm	248	48	264	70
6 mm	240	64	256	70
9 mm	219	106	235	70
12 mm	197	150	213	70
18 mm	155	234	171	70
24 mm	112	320	128	70
36 mm	45	454	61	70



## Heat-Shrink Tube :

<b>Tape Type</b>	<b>Number of pins for left margin</b>	<b>Number of print area pins</b>	<b>Number of pins for right margin</b>	<b>Number of bytes for raster graphics transfer</b>
HS 5.8 mm	244	56	260	70
HS 8.8 mm	224	96	240	70
HS 11.7 mm	206	132	222	70
HS 17.7 mm	166	212	182	70
HS 23.6 mm	144	256	160	70
HS 5.2 mm	252	40	268	70
HS 9.0 mm	228	88	244	70
HS 11.2 mm	222	100	238	70
HS 21.0 mm	152	240	168	70
HS 31.0 mm	92	360	108	70

### 3. 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 z	1B 69 7A	Print information command
ESC i M	1B 69 4D	Various mode settings
ESC i A	1B 69 41	Specify the page number in “cut each * labels”
ESC i K	1B 69 4B	Advanced mode settings
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 !	1B 69 21	Switch automatic status notification 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 @      Initialize

ASCII:	ESC	@
Hexadecimal:	1B	40

#### Description

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

### 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. 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	Brother code	Fixed at "B" (42h)
4	3	1	Series code	Fixed at "0" (30h)
5	4	1	Model code	PT-P900: Fixed at "q" (71h) PT-P900W: Fixed at "o" (69h) PT-P950NW: Fixed at "p" (70h) PT-P910BT: Fixed at "x" (78h)
6	5	1	Country code	Fixed at "0" (30h)
7	6	1	Battery Level	Refer to table (10) below.
8	7	1	Extended error	Refer to table (11) below.
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	Number of colors	Fixed at 00h
14	13	1	Fonts	Fixed at 00h
15	14	1	Japanese fonts	Fixed at 00h
16	15	1	Mode	Value specified where the "various mode settings" command 00h if not specified
17	16	1	Density	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 (higher order bytes)	
22	21	1	Phase number (lower order bytes)	
23	22	1	Notification number	Refer to table (7) below.
24	23	1	Expansion area (number of bytes)	Fixed at 00h
25	24	1	Tape color information	Refer to table (8) below.
26	25	1	Text color information	Refer to table (9) below.
27	26	1	Reserved	Fixed at 00h
31~32	30~31	1	Reserved	Fixed at 00h

**(1) Error information 1**

Flag	Mask	Definition	PT-P900 PT-P900W PT-P950NW (○:Supported, -:Not supported)	PT-P910BT (○:Supported, -:Not supported)
Bit 0	01h	“No media” error	○	○
Bit 1	02h	“End of media” error	○	-
Bit 2	04h	Cutter jam	○	○
Bit 3	08h	Weak batteries	○	○
Bit 4	10h	Printer in use	-	-
Bit 5	20h	(Not used)	○	○
Bit 6	40h	High-voltage adapter	○	-
Bit 7	80h	(Not used)	○	○

**(2) Error information 2**

Flag	Mask	Definition	PT-P900 PT-P900W PT-P950NW (○:Supported, -:Not supported)	PT-P910BT (○:Supported, -:Not supported)
Bit 0	01h	“Replace media” error (with a serial connecting) Wrong media	○	○
Bit 1	02h	“Expansion buffer full” error	○	-
Bit 2	04h	Communication error	○	○
Bit 3	08h	“Communication buffer full” error	○	○
Bit 4	10h	“Cover open” error	○	-
Bit 5	20h	Overheating error	○	○
Bit 6	40h	“Black marking not detected” error	○	-
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) TZe tape**

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

\* Media Length: Fixed at 00h

Media	Media Width	Media Length	PT-P900 PT-P900W PT-P950NW (○:Supported, -:Not supported)	PT-P910BT (○:Supported, -:Not supported)
No tape	00h	00h	○	○
3.5 mm	04h	00h	○	○
6 mm	06h	00h	○	○
9 mm	09h	00h	○	○
12 mm	0Ch	00h	○	○
18 mm	12h	00h	○	○
24 mm	18h	00h	○	○
36 mm	24h	00h	○	○
HS 5.8 mm	06h	00h	○	-
HS 8.8 mm	09h	00h	○	-
HS 11.7 mm	0Ch	00h	○	-
HS 17.7 mm	12h	00h	○	-
HS 23.6 mm	18h	00h	○	-
FLe 21 mm x 45 mm	15h	2Dh	○	-

**(4) Media type**

Media Type	Value	PT-P900 PT-P900W PT-P950NW (○: Supported, -:Not supported)	PT-P910BT (○: Supported, -:Not supported)
No media	00h	○	○
Laminated tape	01h	○	○
Non-laminated tape	03h	○	○
Fabric Tape	04h	○	○
Heat-Shrink Tube (HS 2:1)	11h	○	-
Fle tape	13h	○	-
Flexible ID tape	14h	○	○
Satin tape	15h	○	○
Heat-Shrink Tube (HS 3:1)	17h	○	-
Incompatible tape	FFh	○	○

**(5) 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)	07h 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
Editing state (reception possible)	00h
Printing state	01h

Editing state

Phase	Value (Dec.)	Higher Order Bytes	Lower Order Bytes
Editing state (reception possible)	0	00h	00h
Feed	1	00h	01h

Printing state

Phase	Value (Dec.)	Higher Order Bytes	Lower Order Bytes
Printing	0	00h	00h
(Not used)	10	00h	0Ah
Cover open while receiving	20	00h	14h
(Not used)	25	00h	19h

**(7) Notification number**

Notification	Value
Not available	00h
Cover open	01h
Cover closed	02h
Cooling (started)	03h
Cooling (finished)	04h



**(8) Tape color information**

Tape color	Tape color ID	Notes
White	01h	
Other	02h	
Clear	03h	
Red	04h	
Blue	05h	
Yellow	06h	
Green	07h	
Black	08h	
Clear (White text)	09h	
Matte White	20h	
Matte Clear	21h	
Matte Silver	22h	
Satin Gold	23h	
Satin Silver	24h	
Blue (D)	30h	TZe-535(12 mm) TZe-545(18 mm) TZe-555(24 mm)
Red (D)	31h	TZe-435(12 mm)
Fluorescent Orange	40h	
Fluorescent Yellow	41h	
Berry Pink (S)	50h	TZe-MQP35
Light Gray (S)	51h	TZe-MQL35
Lime Green (S)	52h	TZe-MQG35
Yellow (F)	60h	
Pink (F)	61h	
Blue (F)	62h	
White (Heat-shrink Tube)	70h	
White (Flex. ID)	90h	
Yellow (Flex. ID)	91h	
Cleaning	F0h	
Stencil	F1h	
Incompatible	FFh	

**(9) Text color information**

Text color	Text color ID
White	01h
Red	04h
Blue	05h
Black	08h
Gold	0Ah
Blue(F)	62h
Cleaning	F0h
Stencil	F1h
Other	02h
Incompatible	FFh

**(10) Battery Level**

PT-P900/P900W/P950NW

Battery Level	Value
Full	00 h
Half	01 h
Low	02 h
Need to be Charged	03 h
Using AC adapter	04 h
Unknown	FF h

PT-P910BT

AC Adapter	Battery Level	Value
AC Adapter not connected	Full	20 h
	Half	22 h
	Low	23 h
	Need to be Charged	24 h
AC Adapter connected	Full	30 h
	Half	32 h
	Low	33 h
	Need to be Charged	34 h
	Battery not installed	37 h

**(11) Extended error**

<b>Error Type</b>	<b>Value</b>	<b>PT-P900 PT-P900W PT-P950NW (○: Supported, -:Not supported)</b>	<b>PT-P910BT (○: Supported, -:Not supported)</b>
File tape end	10h	○	-
High-resolution/draft printing error	1Dh	○	-
Adapter pull/insert error	1Eh	○	-
Incompatible media error	21h	○	○

**ESC i a      Switch dynamic command mode**

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

**Parameters**

Definitions of {n}:

PT-P900/P900W/P950NW

0: ESC/P mode (default)

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

3: P-touch Template mode

PT-P910BT

1: Raster mode (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 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}:	<p>Valid flag: Specifies which values are valid</p> <pre>#define PI_KIND 0x02      // Media type #define PI_WIDTH 0x04    // Media width #define PI_LENGTH 0x08   // Media length #define PI_QUALITY 0x40  // Priority given to print quality (Not used) #define PI_RECOVER 0x80 // Printer recovery always on</pre> <p>If flag 0x80 is specified...</p> <ul style="list-style-type: none"> <li>● PT-P9100/900W/950NW: <ul style="list-style-type: none"> <li>Both “Printer recovery” and “bi-directional communication” will be activated.</li> <li>The printer will send status notification when printing.</li> </ul> </li> <li>● PT-P910BT: <ul style="list-style-type: none"> <li>“bi-directional communication” will not be activated.</li> <li>Please use “Switch automatic status notification mode” command to enable bi-directional communication with the printer when printing.</li> </ul> </li> </ul>
{n2}:	<p>Media type</p> <p>Laminated/Non-laminated tape: 00h</p> <p>Heat-Shrink Tube (HS 2:1): 11h</p> <p>Heat-Shrink Tube (HS 3:1): 17h</p> <p>Fle tape: 13h</p> <p>Incompatible tape: FFh</p> <p>Note:</p> <ul style="list-style-type: none"> <li>● PT-P9100/900W/950NW: <ul style="list-style-type: none"> <li>High-resolution printing and draft printing are supported for Laminated tape only.</li> <li>Please set to 09h when printing.</li> </ul> </li> <li>● PT-P910BT: <ul style="list-style-type: none"> <li>High-resolution printing and draft printing are not supported.</li> </ul> </li> </ul>
{n3}:	{n3}: Media width (mm)
{n4}:	{n4}: Media length (mm) For the media of width 24 mm, specify as n3 = 18h and n4 = 00h.

	n4 is normally 00h, regardless of the paper length.
{n5-n8}:	<p>Raster number = <math>n8*256*256*256 + n7*256*256 + n6*256 + n5</math></p> <p>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 "<a href="#">(2) Error information 2</a>" is set to "ON".)</p>
{n9}:	<p>Starting page: 0</p> <p>Other pages: 1</p> <p>Last page: 2</p> <p>The output will be 2 regardless of starting/last page for the job consists of single page.</p>
{n10}:	Fixed at 0

**ESC i M      Various mode settings**

ASCII:	ESC	i	M	{n1}
Hexadecimal:	1B	69	4D	{n1}

Parameters

Definitions of {n1}

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

Bit 0 (Masked Bit = 0x01): (reserved)

Bit 1 (Masked Bit = 0x02): (reserved)

Bit 2 (Masked Bit = 0x04): (not used)

Bit 3 (Masked Bit = 0x08): (not used)

Bit 4 (Masked Bit = 0x10): (not used)

Bit 5 (Masked Bit = 0x20): (not used)

Bit 6 (Masked Bit = 0x40): Auto cut

Bit 7 (Masked Bit = 0x80): Mirror printing

- Auto cut
  - 1: Automatically cuts
  - 0: Does not automatically cut
- Mirror printing
  - 1: Mirror printing
  - 0: No mirror printing

**ESC i K      Advanced mode settings**

ASCII:	ESC	i	K	{n1}
Hexadecimal:	1B	69	4B	{n1}

Parameters

Definitions of {n1}

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

0bit: Draft printing

1: Draft printing

0: Normal printing

For PT-P910BT, please set this value as 0 (Draft printing is not supported).

1bit: Not used

2bit: Half cut

1: Half cut on

0: Half cut off

3bit: No chain printing

When printing multiple copies, the labels are fed after the last one is printed.

1: No chain printing (Feeding and cutting are performed after the last one is printed.)

0: Chain printing (Feeding and cutting are not performed after the last one is printed.)

4bit: Special tape (no cutting)

Labels are not cut when special tape is installed.

1: Special tape (no cutting) ON

0: Special tape (no cutting) OFF

5bit: Not used

6bit: High-resolution printing

1: High-resolution printing

0: Normal printing

For PT-P910BT, please set this value as 0 (High-resolution printing is not supported).

7bit: No buffer clearing when printing (Not used for PT-P910BT)

The expansion buffer of the machine is not cleared with the “no buffer clearing when printing” command.

If this command is sent when the data of the first label is printed (it is specified between the “initialize” command and the print data), printing is possible only if a print command is sent with the second or later label.

1: No buffer clearing when printing ON

0: No buffer clearing when printing OFF



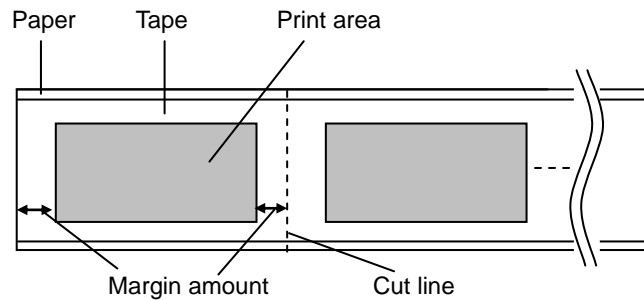
**ESC i d    Specify margin amount (feed amount)**

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

Description

- Specifies the amount of the margins.
- Margin amount (dots)= $n1+n2*256$

(a) Continuous length tape

**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).

If 00h is set, label will not be cut.

Description

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

**M**      **Select compression mode**

ASCII:	M	{n}
Hexadecimal:	4D	{n}

Parameters

Definitions of {n}

- 0    No-compression mode (Enabled)
- 1    Reserved (Disabled)
- 2    TIFF (Enabled)

Description

- Selects the compression mode. Data compression is available only for data in raster graphic transfer.

[TIFF(Pack Bits)]

- 1-byte units
- If the same data is repeated, the number of data units and that 1 byte of data are specified.  
If different data is in a series, the number of data items and all of the different data are specified.
- If the same data is repeated, the number of data units is specified as the actual number minus 1, expressed as a negative number.  
If different data is in a series, the number of data units is specified as the number of bytes minus 1, expressed as a positive number.
- If the above process results in more than 70 bytes of compressed data, the data is treated as being all different. As a result, the data will be 71 bytes, including the 1 byte that specifies the data length.

Example

1 raster of raster graphics transfer:

Without compression: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00  
00 00 00 00 00 22 22 23 BA BF A2 22 2B.....

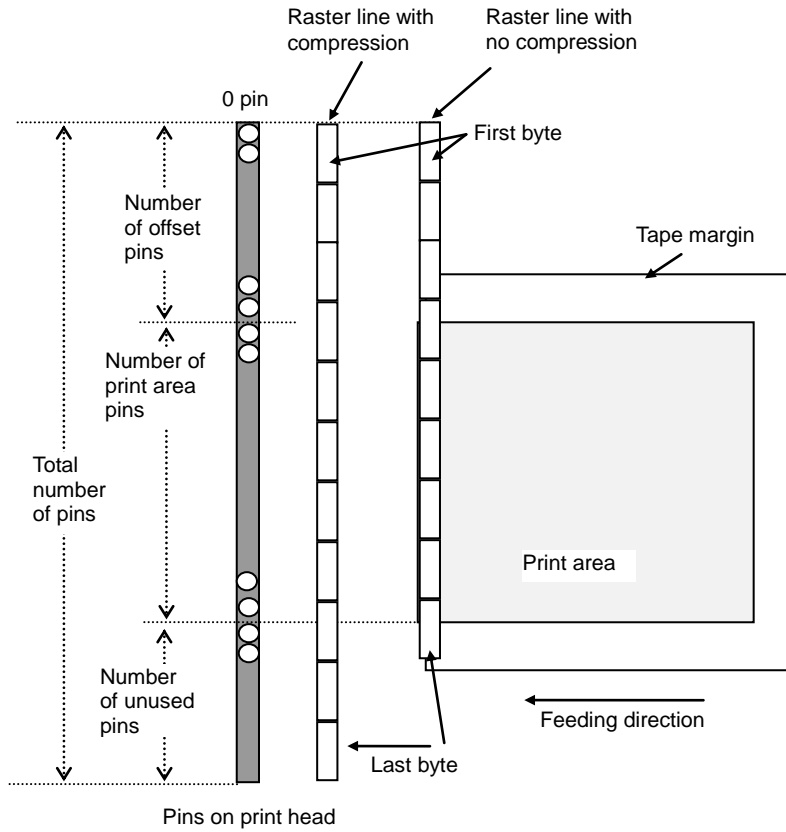
With compression: ED 00 FF 22 05 23 BA BF A2 22 2B ...  
a            b            c

- a. Since "00h" is repeated for 20 bytes, 20d -> 19d -> 13h changed into a negative number is EDh.  
Therefore: ED 00
- b. Since "22h" is repeated for 2 bytes, 2d -> 1d -> 1h changed into a negative number is FFh.  
Therefore: FF 22
- c. The following 6 bytes remain unchanged. 6d -> 5d -> 5h  
Therefore: 05 23 BA BF A2 22 2B

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 70 bytes of the total number of pins (560). 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 70 bytes when it is expanded by the printer, regardless of the tape width.



**G Raster graphics transfer**

ASCII:	G	{n1}	{n2}	{d1}	...	{dk}
Hexadecimal:	47	{n1}	{n2}	{d1}	...	{dk}

Description

- Transfers the specified number of bytes (k) of data.
- The data is expanded by overwriting from the position where the margin was added.
- If the expanded data does not reach the end of the expansion buffer, the remainder is filled with 0 data.
- If the expanded data exceeds the end of the expansion buffer, the excess is cut off.

Parameters

{n1}{n2} Specified number of bytes  $k = n1 + n2 * 256$

$0000h \leq$  Specified number of bytes  $k \leq$  First positive number that exceeds the value of the number of print head pins divided by 8 (Gauss number)

{k} Number of bytes of raster data (d1 to dk)

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

k=70

{d1~dk} 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 !    Specify automatic status notification mode**

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

Parameters

Definitions of {n1}

0: Notify.

1: Do not notify. (default)

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.

## 5. Flow Charts

Normally, printing is performed as buffered printing.

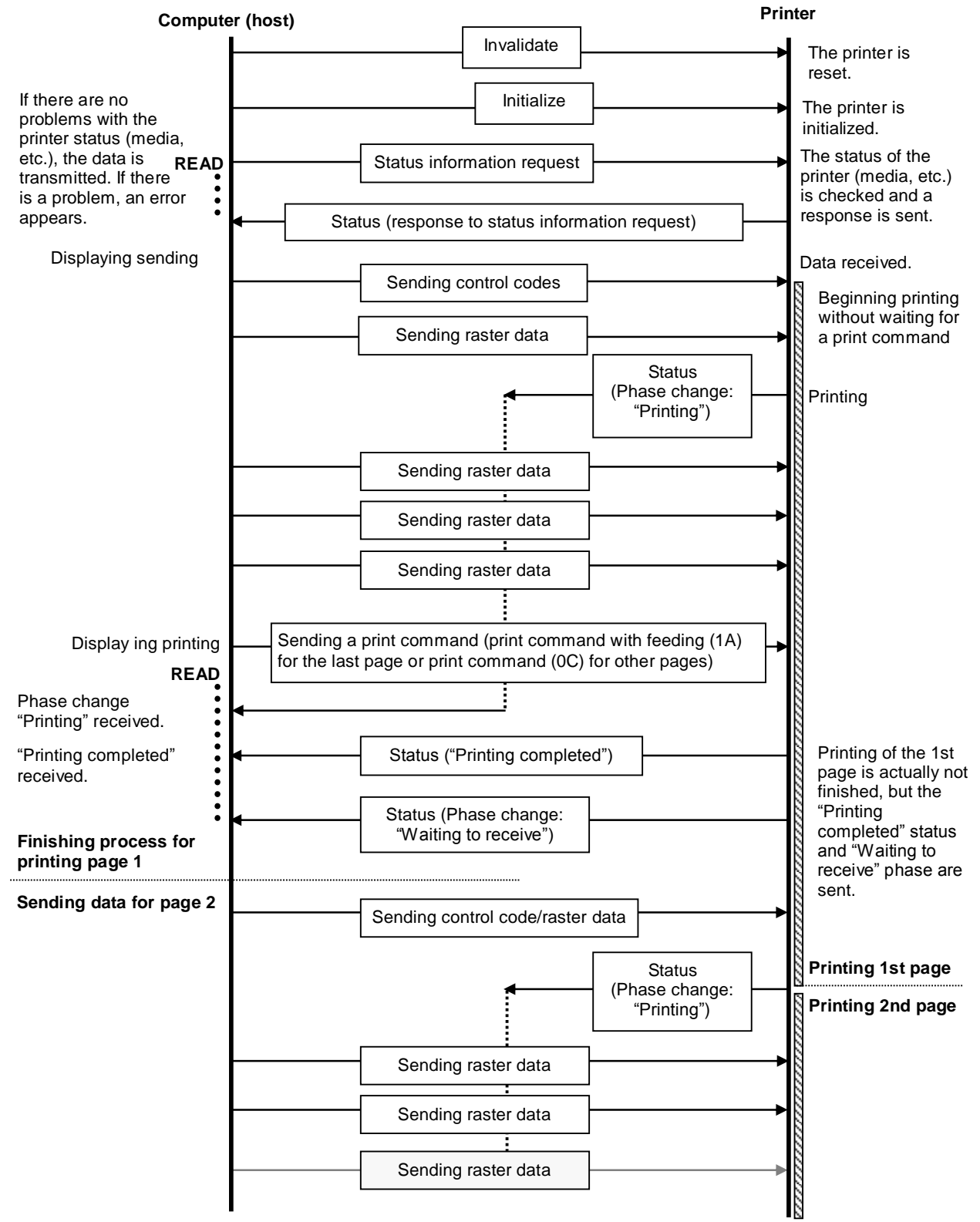
However, if the printer is connected via USB and uncompressed data is received, concurrent printing is performed.

Note:

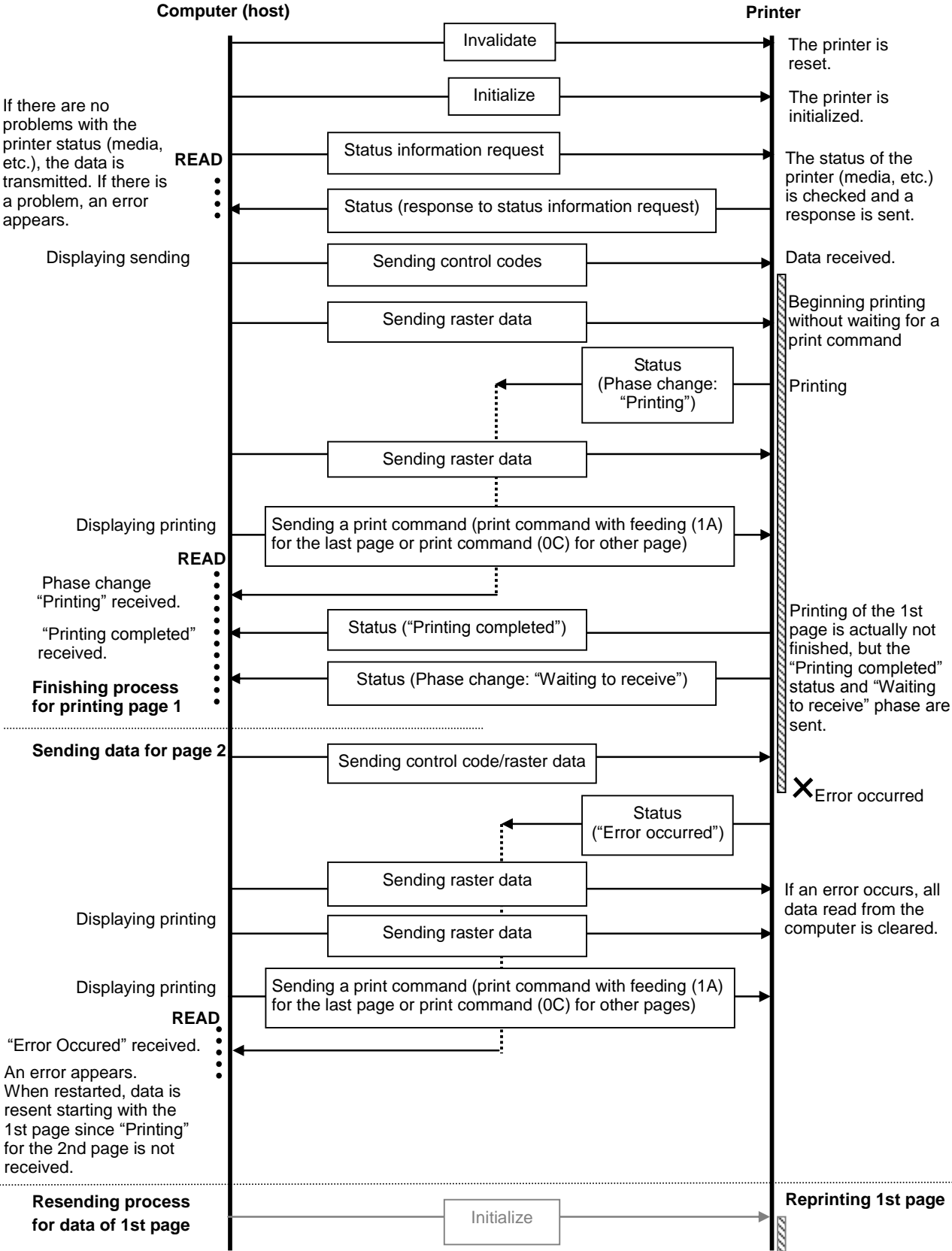
Concurrent printing: Printing starts immediately after the printer receives print data.

Buffered printing: Printing starts after one page of print data is received.

5.1 Concurrent printing normal flow for USB connection

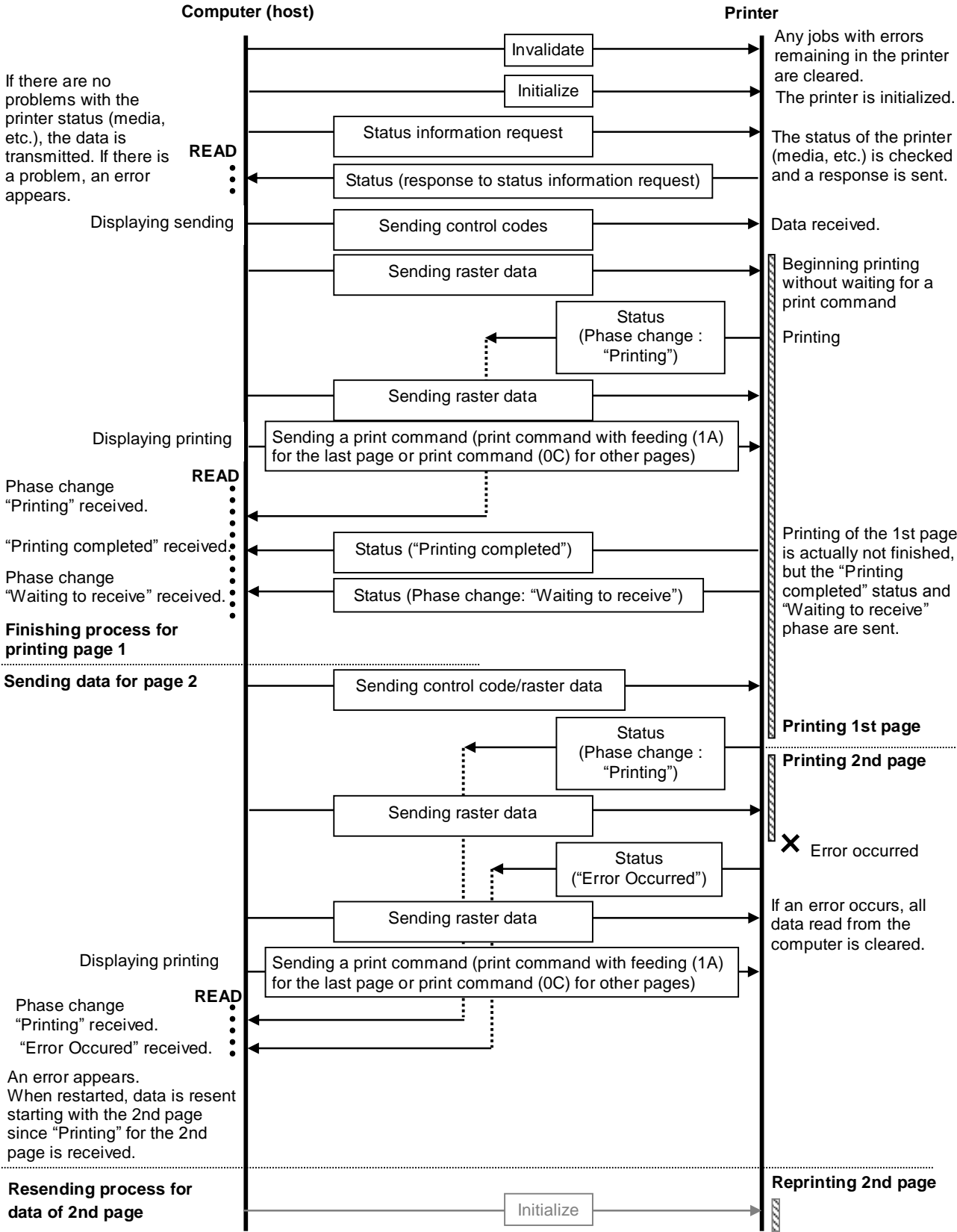


5.2 Concurrent printing error flow for USB connection (when feeding at the end of the page)

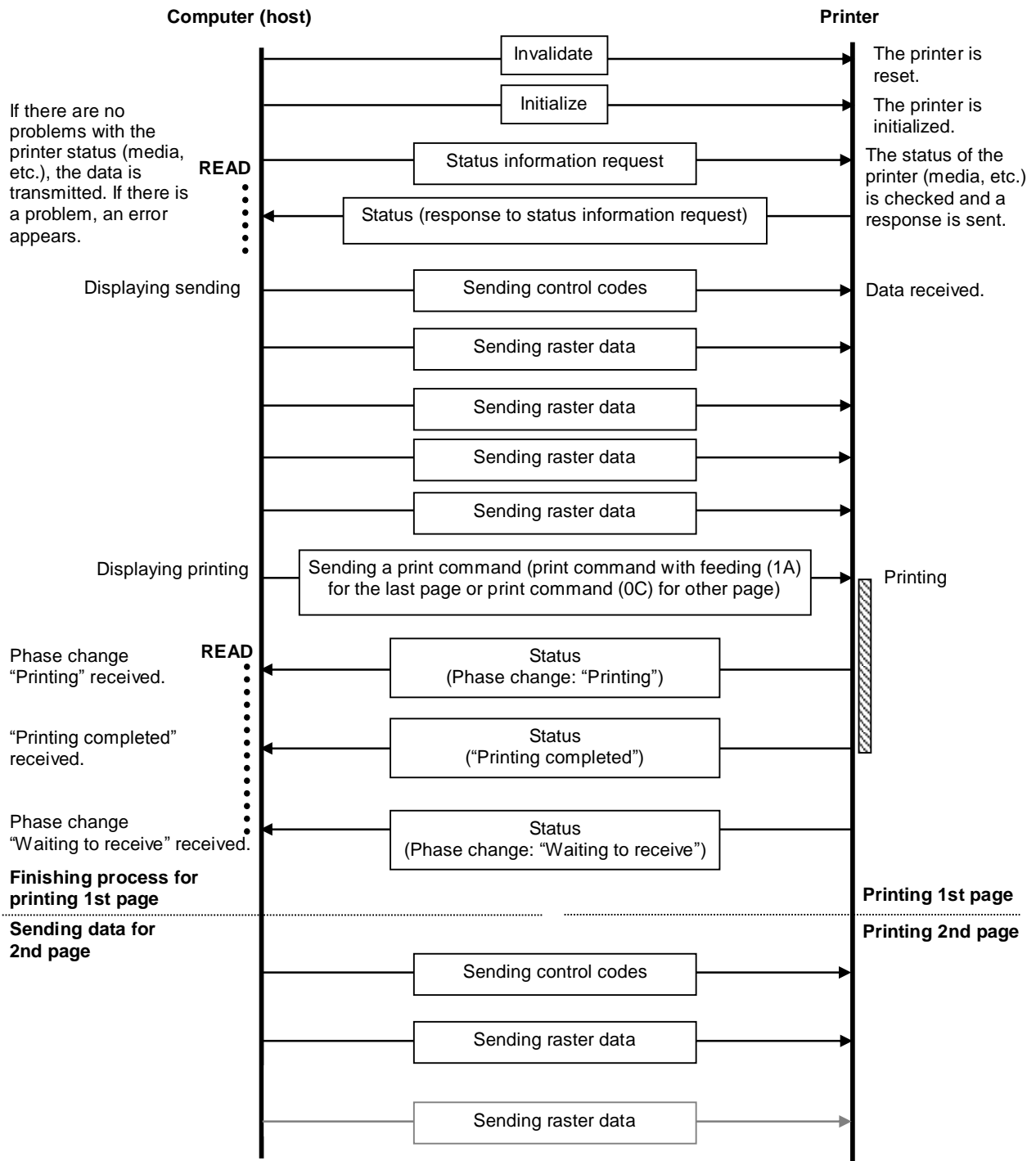




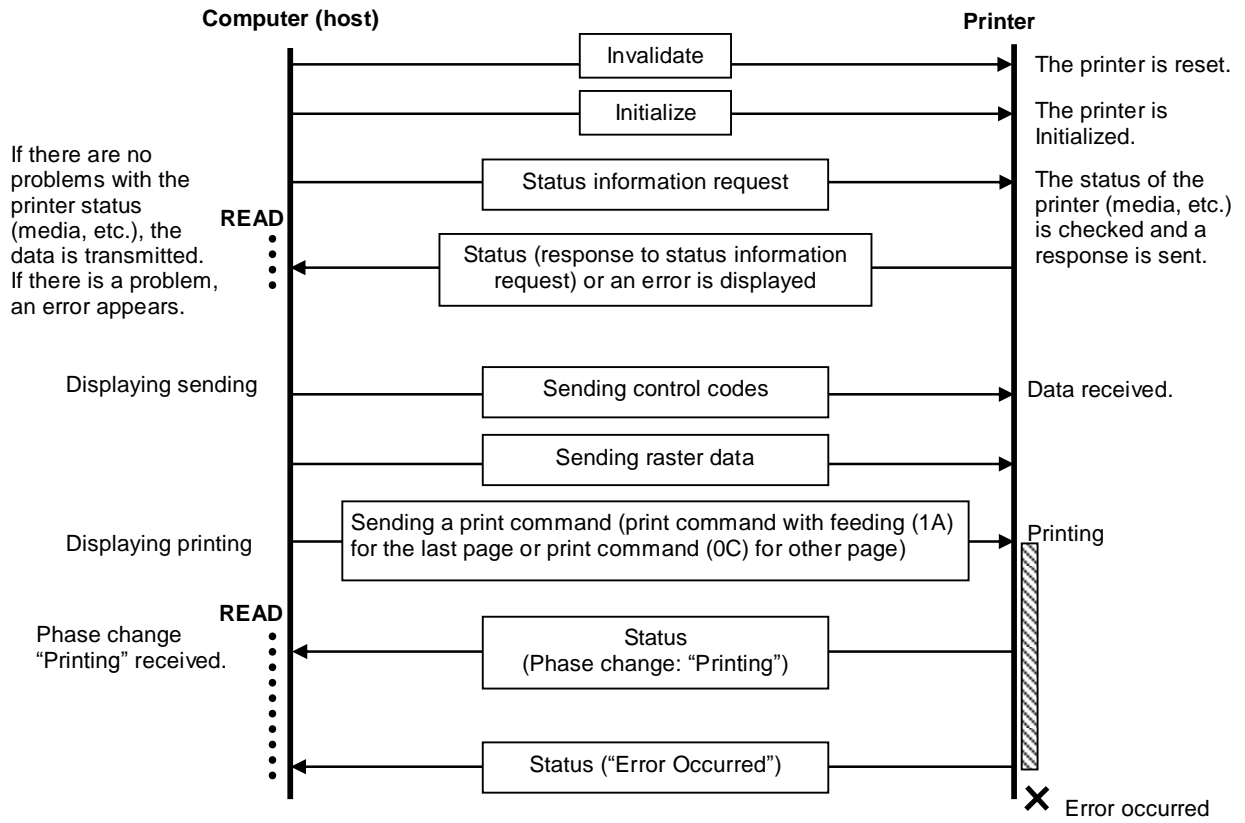
5.3 Concurrent printing error flow for USB connection (with a concurrent printing error such as end of tape)



5.4 Buffered printing normal flow for USB/Bluetooth connection



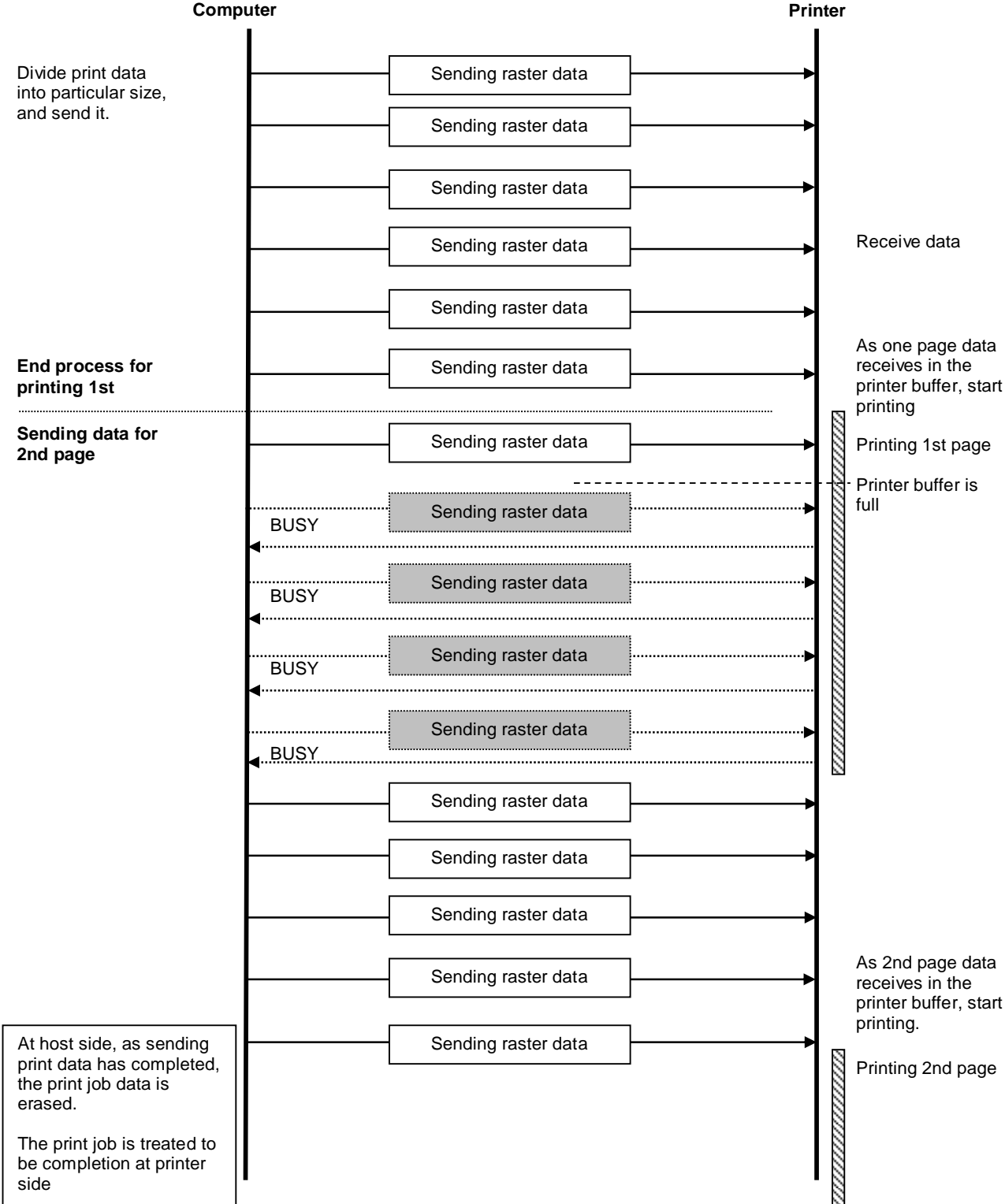
5.5 Buffered printing error flow for USB/Bluetooth connection



5.6 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	PT-P900W 0x2085 PT-P950NW 0x2086 PT-P900 0x2083 PT-P910BT 0x20c7
Class	Printer
Character string for manufacturer	Character string descriptor: 0x01 0x0409: "Brother"
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)
With the printer class	
Power supply	Self-powered (As a printer class, Bus power is also set to "ON".)
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**