

Software Developer's Manual

Raster Command Reference

PT-E310BT / E510 / E560BT

Version 1.00

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

Brother is a registered trademark of Brother Industries, Ltd.

© 2026 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-E310BT / E510 / E560BT.

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

IMPORTANT - PLEASE READ CAREFULLY	iii
Note	iii
Condition of Use	iii
No Warranty	iii
Introduction	1
About Raster Commands	2
1. Printing Using Raster Commands	3
2. Print Data	5
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	19
2.3.4 Maximum and minimum lengths	20
2.3.5 Raster line	21
3. Status	26
3.1 Status overview	26
3.2 Definitions of each part	28
3.2.1 Error information 1	28
3.2.2 Error information 2	28
3.2.3 Media width and length	29
3.2.4 Media type	29
3.2.5 Status type	30
3.2.6 Phase type and phase number	30
3.2.7 Notification number	31
3.2.8 Tape color information	32
3.2.9 Text color information	33
4. Print Command List	34
5. Printing Command Details	35
NULL Invalidate	35
ESC @ Initialize	35
ESC i S Status information request	35
ESC i a Switch dynamic command mode	36
ESC i z Print information command	37
ESC i M Various mode settings	38
ESC i A Specify the page number in "cut each * labels"	38
ESC i K Advanced mode settings	39
ESC i d Specify margin amount (feed amount)	40
ESC i L Specify print line control	41
ESC i C Specify color information	42
ESC i ! Specify automatic status notification mode	43
ESC i p Concurrent printing settings	43
M Select compression mode	44
G Raster graphics transfer	46

Z	Zero raster graphics.....	46
FF	Print command.....	46
Control-Z	Print command with feeding	47
6. Flow Charts		48
6.1	Concurrent printing normal flow for USB connection	49
6.2	Concurrent printing error flow for USB connection (when feeding at the end of the page).....	50
6.3	Concurrent printing error flow for USB connection (with a concurrent printing error such as end of tape).....	51
6.4	Buffered printing normal flow for USB/Bluetooth connection	52
6.5	Buffered printing error flow for USB/Bluetooth connection	53
Appendix A: Introducing the Brother Developer Center		54

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.

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.

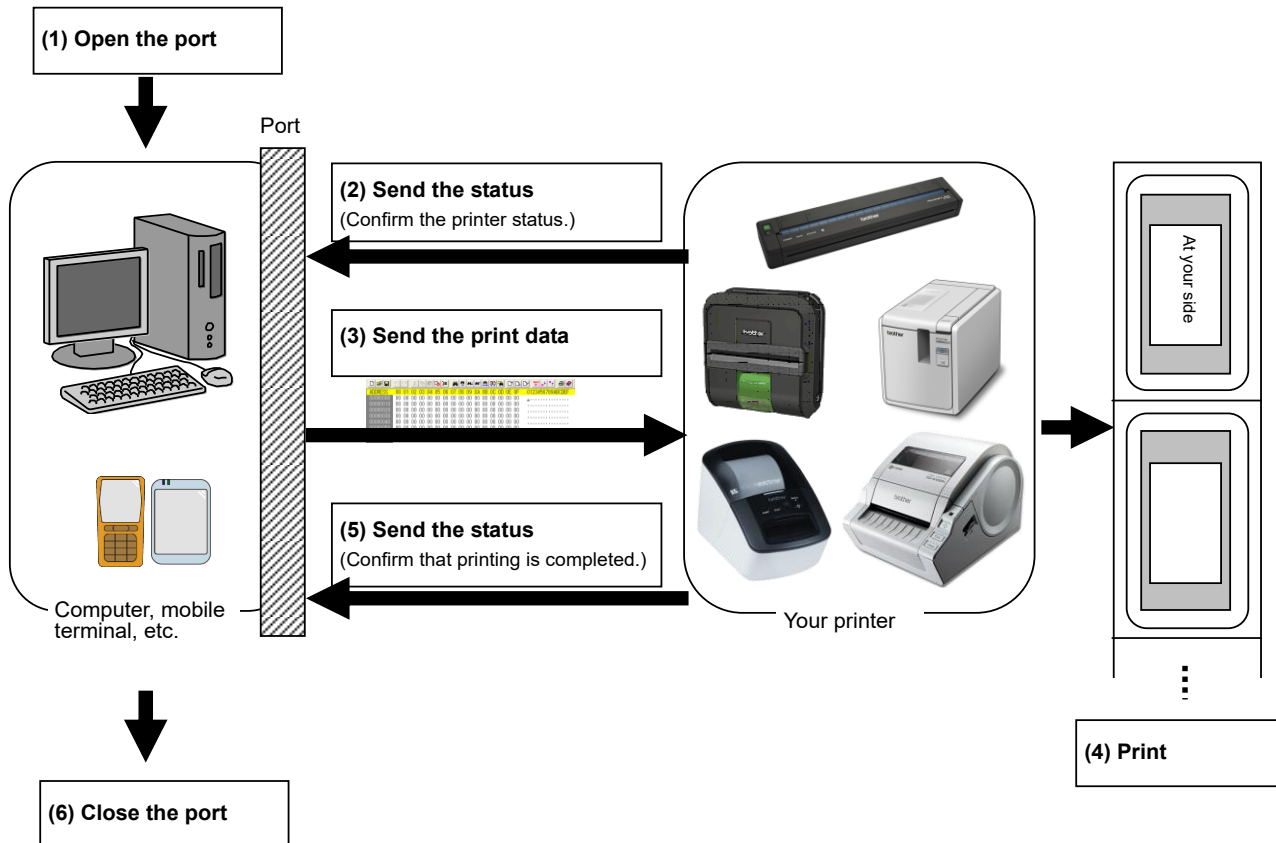
In this material, “raster” refers to binary bitmap data (collection of dots).

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 "[6. Flow Charts](#)". For details on each command, refer to "[5. Printing Command Details](#)".



(1) Open the USB / Bluetooth port

Open the USB / Bluetooth port in the operating environment. The procedure for opening the USB / 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 [“5. 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 / Bluetooth port

After all printing is finished, close the USB / 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 [“6. 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 (code 0x00), 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	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, AAh, 02h, 00h, 00h, 02h, 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	Concurrent printing settings	Enables or disables concurrent printing. When disabled: 1Bh, 69h, 70h, 01h
8	Specify print line control	Specifies the control method for each print line. When performing monochrome printing:

		1Bh, 69h, 4Ch, 00h, 01h, 01h
9	Specify color information	Specifies color information in CMY. When performing monochrome printing: 1Bh, 69h, 43h, 01h, FFh, FFh, FFh
10	Specify margin amount	Specifies the amount of the margins. For 1 mm margins: 1Bh, 69h, 64h, 0Eh, 00h
11	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.

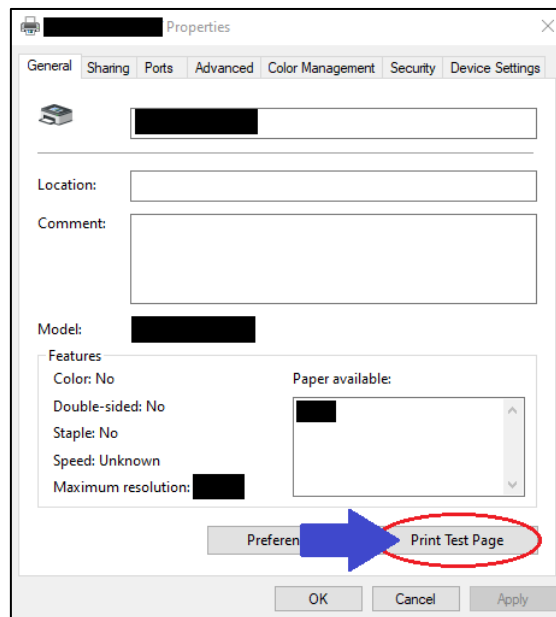
Sequence	Command Name	Description/Example
-	Print command	Specifies at the end of a page that is not the last page. 0Ch (Fixed)
-	Print command with feeding	Specifies at the end of the last page. 1Ah (Fixed)

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.



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.

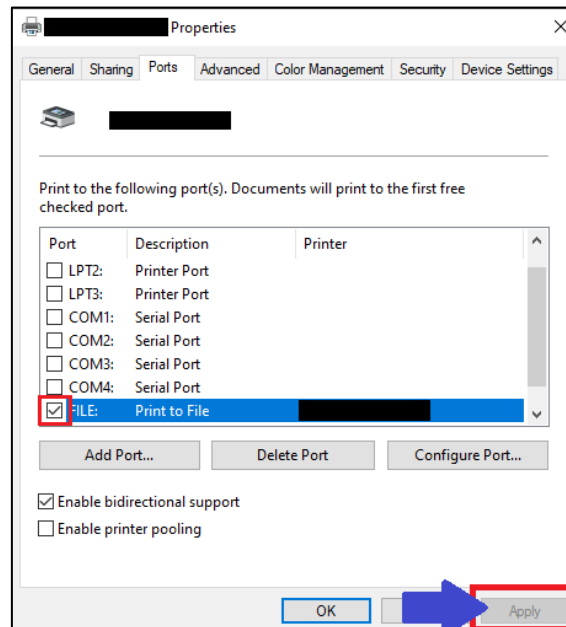
Step 1: Change the port of the printer to "FILE:".

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:”.

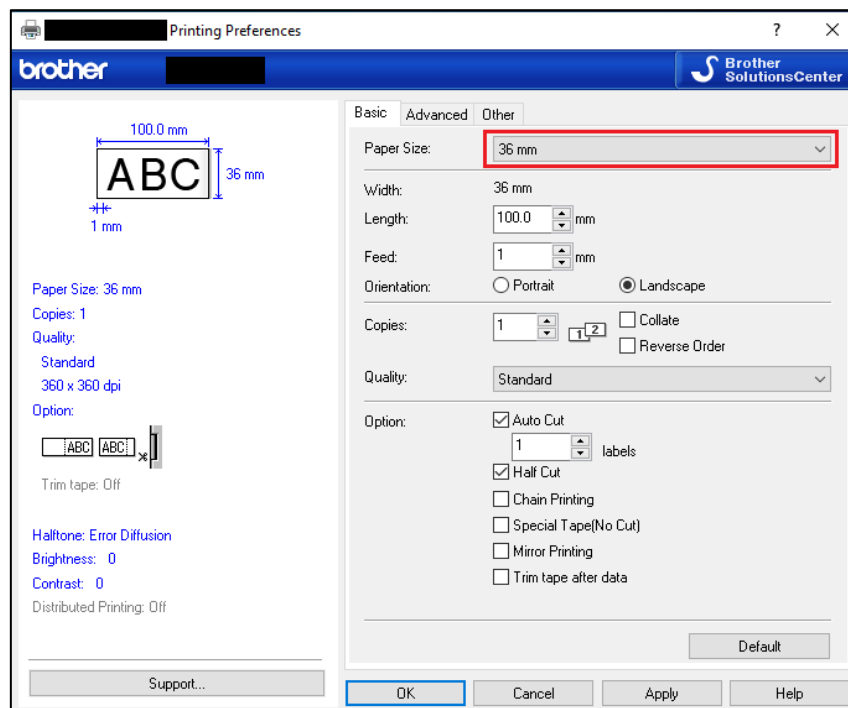
Open the **Printers and Faxes** folder, and then right-click the printer to display the Properties dialog box. In the Properties dialog box, click the **[Ports]** tab, select the “**FILE:**” check box, and then click the **[Apply]** button.



[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 “24 mm” selected as the paper size in the print settings.



2.2.3 Explanation of print data for the test page

The print data for the test page output 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.

[illegible]

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 [“5. 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	Concurrent print settings	The automatic status notification is disabled. \
5	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.
6	Print information command	Media size information for the print data is sent. This is the command for “36 mm” tape.
7	Various mode settings (1Bh+69h+4Dh+40h)	This is a command for specifying a mode. Here, automatically cutting is specified.
8	Specify the page number in “cut each * labels”	The number of pages printed before automatically cutting is specified.
9	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.
10	Concurrent printing settings	Concurrent printing is disabled.
11	Specify print line control	The “Monochrome” is specified.
12	Specify color information	The “Black” is specified.
13	Specify margin amount	Specifies the amount of the margins. This is the command for “14 dots”.
14	Select compression mode	TIFF compression mode is selected.
15	Raster data	Raster data continues. (Zero-raster are included.)
16	Print command with feeding	Since it is the last page, the print command with feeding is sent at the end of the page.
17	Switch dynamic command mode	This command resets to default mode that is switched by No.3.

2.3 Page data details

2.3.1 Resolution

PT-E310BT

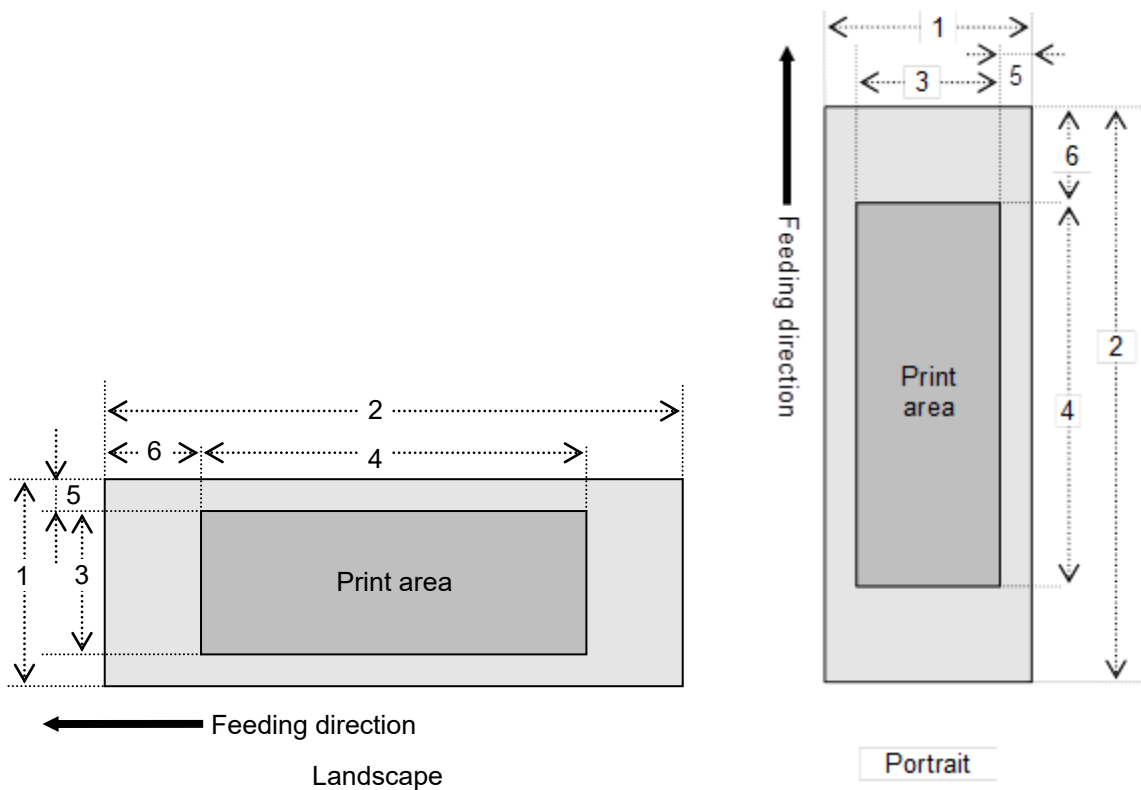
Resolution	Height-to-Width Proportion
180 dpi high, 180 dpi wide	1:1

PT-E510 / E560BT

Resolution	Height-to-Width Proportion
Standard: 180 dpi high, 180 dpi wide	1:1
High resolution mode: 180 dpi high, 360 dpi wide	1:2

2.3.2 Page size

(a) PT-E310BT



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

PT-E310BT

Dimensions & Printable Area

Tape size (mm)	Tape size (inch)	1		2	3		4	ID
		(mm)	(dot)		(mm)	(dot)		
3.5 mm	0.13"	3.40	24	2.3.4	3.40	24	2.3.4	263
6 mm	0.23"	5.90	42		4.50	32		257
9 mm	0.35"	9.00	64		7.10	50		258
12 mm	0.47"	11.90	84		9.90	70		259
18 mm	0.70"	18.10	128		15.80	112		260
24 mm	0.94"	24.00	170		18.10	128		261
12 mm x 2 ^{*2}	0.47" x 2	21.76	154		19.80	140		279
18 mm x 2 ^{*2}	0.70" x 2	33.84	240		31.60	224		280
24 mm x 2 ^{*2}	0.94" x 2	42.12	298		36.20	257		281
12 mm x 3 ^{*2}	0.47" x 3	31.66	224		29.70	210		285

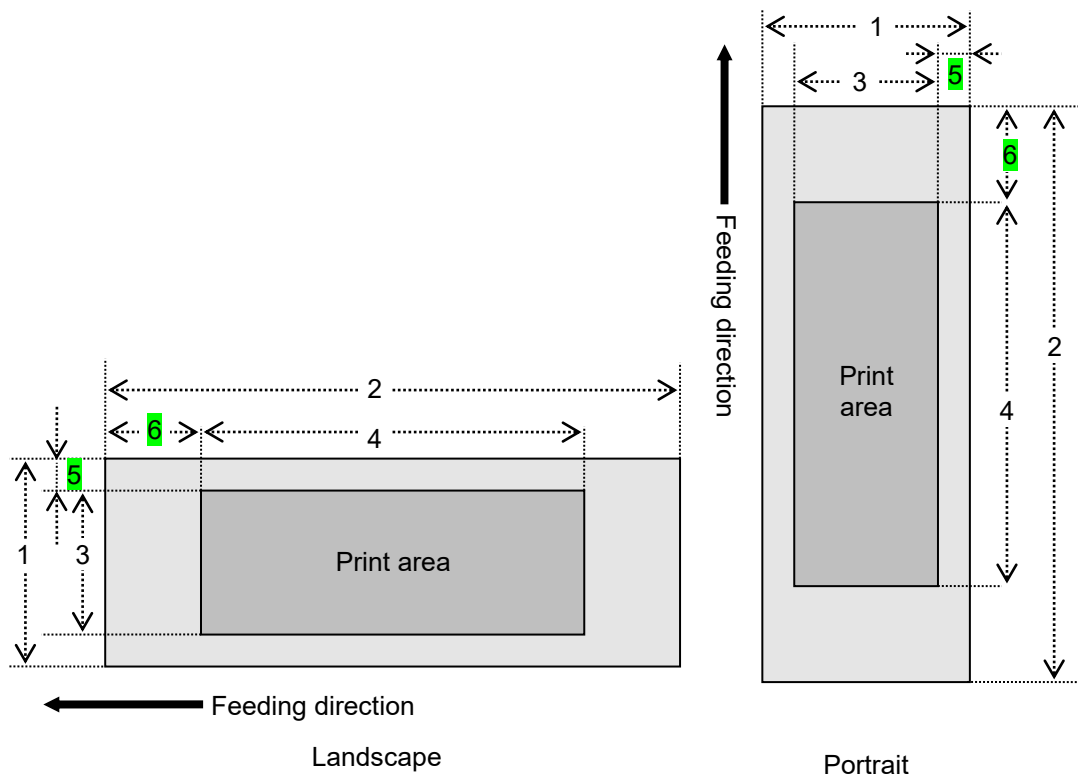
18 mm x 3 ^{*2}	0.70" x 3	49.64	352		47.40	336		286
24 mm x 3 ^{*2}	0.94" x 3	60.22	427		54.30	385		287
12 mm x 4 ^{*2}	0.47" x 4	41.56	295		39.60	281		291
18 mm x 4 ^{*2}	0.70" x 4	65.44	464		63.20	448		292
24 mm x 4 ^{*2}	0.94" x 4	78.32	555		72.40	513		293
HS 5.2 mm	HS 0.20"	5.10	36		2.82	20		420 ^{*1}
HS 5.8 mm	HS 0.23"	5.60	40		3.90	28		415 ^{*1}
HS 8.8 mm	HS 0.34"	8.70	62		6.80	48		416 ^{*1}
HS 9.0 mm	HS 0.35"	9.00	64		6.21	44		421 ^{*1}
HS 11.2 mm	HS 0.44"	11.30	80		7.06	50		422 ^{*1}
HS 11.7 mm	HS 0.46"	11.60	82		9.30	66		417 ^{*1}
HS 17.7 mm	HS 0.69"	17.80	126		14.90	106		418 ^{*1}
HS 21.0 mm	HS 0.82"	20.90	148		16.90	120		423 ^{*1}
HS 23.6 mm	HS 0.93"	23.70	168		18.10	128		419 ^{*1}
SL 24 mm	SL 0.94"	24.00	170		18.10	128		457

^{*1} Hereafter, ID 415 to 419 is referred to as HS 2:1 and ID 420 to 423 are referred to as HS 3:1.

^{*2} For split-size media, 1 indicates the total width, and 3 indicates the total printable area width.

Overall width = Print area width × Number of splits × Width offset × 2

Width of overall print area = Print area width × Number of splits



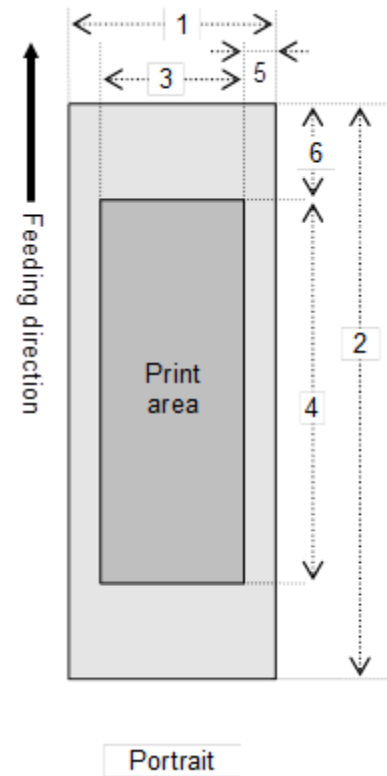
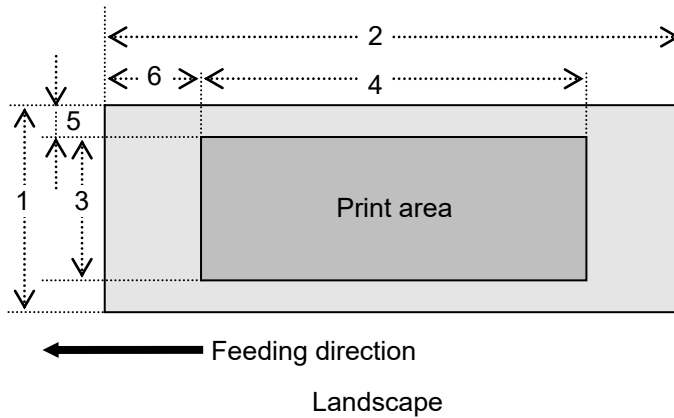
Number	1 Width	2 Length
	3 Print area width (maximum printing width)	4 Print area length
	5 Width offset	6 Length offset

PT-E310BT

Offset

Tape size (mm)	Tape size (dot)	5		6	ID
		(mm)	(dot)		
3.5 mm	0.13"	0.00	0	2.3.3	263
6 mm	0.23"	0.70	5		257
9 mm	0.35"	0.98	7		258
12 mm	0.47"	0.98	7		259
18 mm	0.70"	1.12	8		260
24 mm	0.94"	2.96	21		261
12 mm x 2	0.47" x 2	0.98	7		279
18 mm x 2	0.70" x 2	1.12	8		280
24 mm x 2	0.94" x 2	2.96	21		281
12 mm x 3	0.47" x 3	0.98	7		285
18 mm x 3	0.70" x 3	1.12	8		286
24 mm x 3	0.94" x 3	2.96	21		287
12 mm x 4	0.47" x 4	0.98	7		291
18 mm x 4	0.70" x 4	1.12	8		292
24 mm x 4	0.94" x 4	2.96	21		293
HS 5.2 mm	HS 0.20"	1.13	8		420
HS 5.8 mm	HS 0.23"	0.80	6		415
HS 8.8 mm	HS 0.34"	1.10	8		416
HS 9.0 mm	HS 0.35"	1.41	10		421
HS 11.2 mm	HS 0.44"	2.12	15		422
HS 11.7 mm	HS 0.46"	1.10	8		417
HS 17.7 mm	HS 0.69"	1.40	10		418
HS 21.0 mm	HS 0.82"	1.98	14		423
HS 23.6 mm	HS 0.93"	2.80	20		419
SL 24 mm	SL 0.94"	2.96	21		457

(b) PT-E510 / E560BT



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

PT-E510 / E560BT

Dimensions & Printable Area

Tape size (mm)	Tape size (inch)	1		2	3		4	ID
		(mm)	(dot)		(mm)	(dot)		
3.5 mm	0.13"	3.40	24	2.3.4	3.40	24	2.3.4	263
6 mm	0.23"	5.90	42		4.50	32		257
9 mm	0.35"	9.00	64		7.10	50		258
12 mm	0.47"	11.90	84		9.90	70		259
18 mm	0.70"	18.10	128		15.80	112		260
24 mm	0.94"	24.00	170		18.10	128		261
12 mm x 2 ^{*2}	0.47" x 2	21.76	154		19.80	140		279
18 mm x 2 ^{*2}	0.70" x 2	33.84	240		31.60	224		280
24 mm x 2 ^{*2}	0.94" x 2	42.12	298		36.20	257		281
12 mm x 3 ^{*2}	0.47" x 3	31.66	224		29.70	210		285
18 mm x 3 ^{*2}	0.70" x 3	49.64	352		47.40	336		286

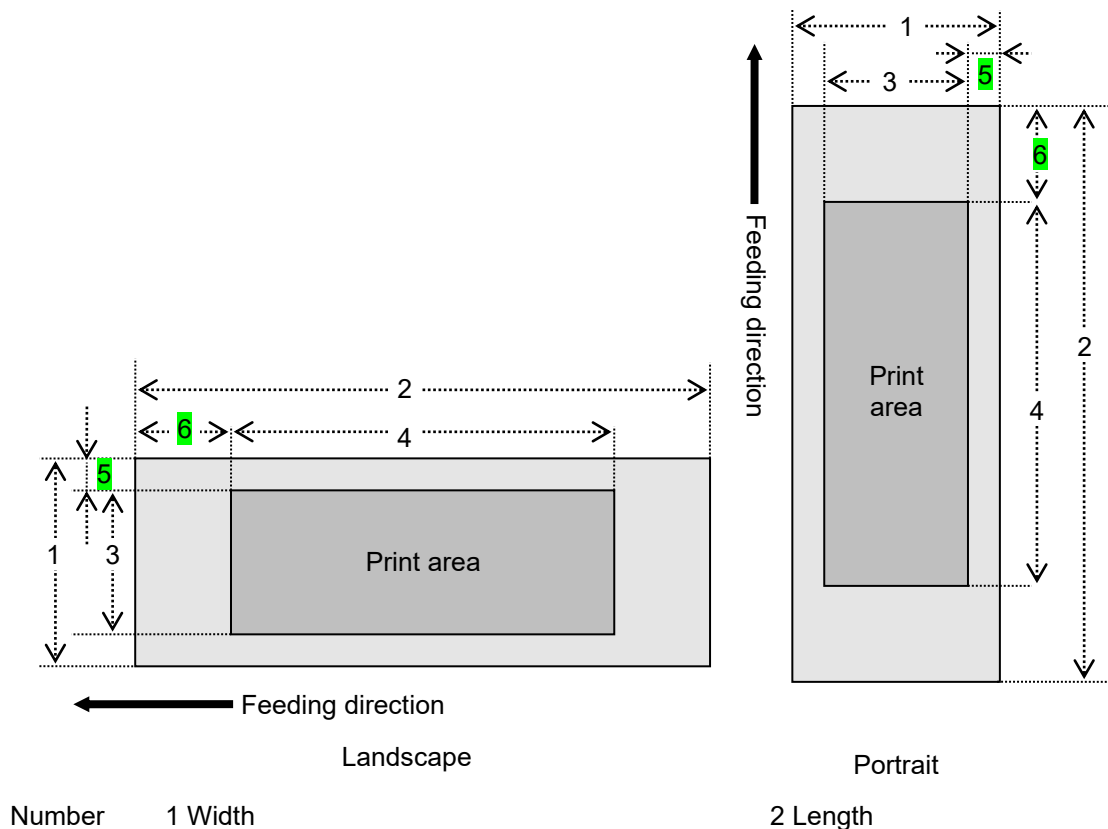
24 mm x 3 ^{*2}	0.94" x 3	60.22	427		54.30	385		287
12 mm x 4 ^{*2}	0.47" x 4	41.56	295		39.60	281		291
18 mm x 4 ^{*2}	0.70" x 4	65.44	464		63.20	448		292
24 mm x 4 ^{*2}	0.94" x 4	78.32	555		72.40	513		293
HS 5.8 mm	HS 0.23"	5.60	40		3.90	28		415 ^{*1}
HS 8.8 mm	HS 0.34"	8.70	62		6.80	48		416 ^{*1}
HS 11.7 mm	HS 0.46"	11.60	82		9.30	66		417 ^{*1}
HS 17.7 mm	HS 0.69"	17.80	126		14.90	106		418 ^{*1}
HS 23.6 mm	HS 0.93"	23.70	168		18.10	128		419 ^{*1}
HS 5.2 mm	HS 0.20"	5.10	36		2.82	20		420 ^{*1}
HS 9.0 mm	HS 0.35"	9.00	64		6.21	44		421 ^{*1}
HS 11.2 mm	HS 0.44"	11.30	80		7.06	50		422 ^{*1}
HS 21.0 mm	HS 0.82"	20.90	148		16.90	120		423 ^{*1}
SL 24 mm	SL 0.94"	24.00	170		18.10	128		457

^{*1} Hereafter, ID 415 to 419 is referred to as HS 2:1 and ID 420 to 423 are referred to as HS 3:1.

^{*2} For split-size media, 1 indicates the total width, and 3 indicates the total printable area width.

Overall width = Print area width × Number of splits + Width offset × 2

Width of overall print area = Print area width × Number of splits



3 Print area width (maximum printing width)

4 Print area length

5 Width offset

6 Length offset

PT-E510 / E560BT

Offset

Tape size (mm)	Tape size (dot)	5		6	ID
		(mm)	(dot)		
3.5 mm	0.13"	0.00	0	2.3.3	263
6 mm	0.23"	0.70	5		257
9 mm	0.35"	0.98	7		258
12 mm	0.47"	0.98	7		259
18 mm	0.70"	1.12	8		260
24 mm	0.94"	2.96	21		261
12 mm x 2	0.47" x 2	0.98	7		279
18 mm x 2	0.70" x 2	1.12	8		280
24 mm x 2	0.94" x 2	2.96	21		281
12 mm x 3	0.47" x 3	0.98	7		285
18 mm x 3	0.70" x 3	1.12	8		286
24 mm x 3	0.94" x 3	2.96	21		287
12 mm x 4	0.47" x 4	0.98	7		291
18 mm x 4	0.70" x 4	1.12	8		292
24 mm x 4	0.94" x 4	2.96	21		293
HS 5.8 mm	HS 0.23"	0.80	6		415
HS 8.8 mm	HS 0.34"	1.10	8		416
HS 11.7 mm	HS 0.46"	1.10	8		417
HS 17.7 mm	HS 0.69"	1.40	10		418
HS 23.6 mm	HS 0.93"	2.80	20		419
HS 5.2 mm	HS 0.20"	1.13	8		420
HS 9.0 mm	HS 0.35"	1.41	10		421
HS 11.2 mm	HS 0.44"	2.12	15		422
HS 21.0 mm	HS 0.82"	1.98	14		423
SL 24 mm	SL 0.94"	2.96	21		457

2.3.3 Feed amount

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

180 dpi x 180 dpi

Type	Minimum margin setting	Maximum margin setting	Minimum margin setting with no precut (Unrelated to driver)
Standard	2 mm 0.04" 14 dots	127 mm 5.00" 900 dots	24.7 mm 0.97" 175 dots

180 dpi x 360 dpi

Type	Minimum margin setting	Maximum margin setting	Minimum margin setting with no precut (Unrelated to driver)
High resolution	2 mm 0.04" 28 dots	127 mm 5.00" 1800 dots	24.7 mm 0.97" 350 dots

2.3.4 Maximum and minimum lengths

The maximum and minimum lengths are defined below.

180 dpi x 180 dpi

Type	Minimum length	Maximum length
Standard	4.8 mm 0.19" 34 dots	1000 mm 39.37" 7087 dots

180 dpi x 360 dpi

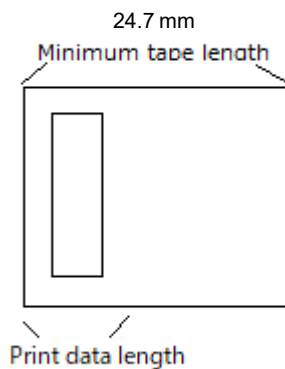
Type	Minimum length	Maximum length
High resolution	4.8 mm 0.19" 68 dots	1000 mm 39.37" 14173 dots

Note: Heat-Shrink Tube

Type	Minimum length	Maximum length
Standard	4.8 mm 0.19" 34 dots	500 mm 19.69" 3543 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 24.7 mm.

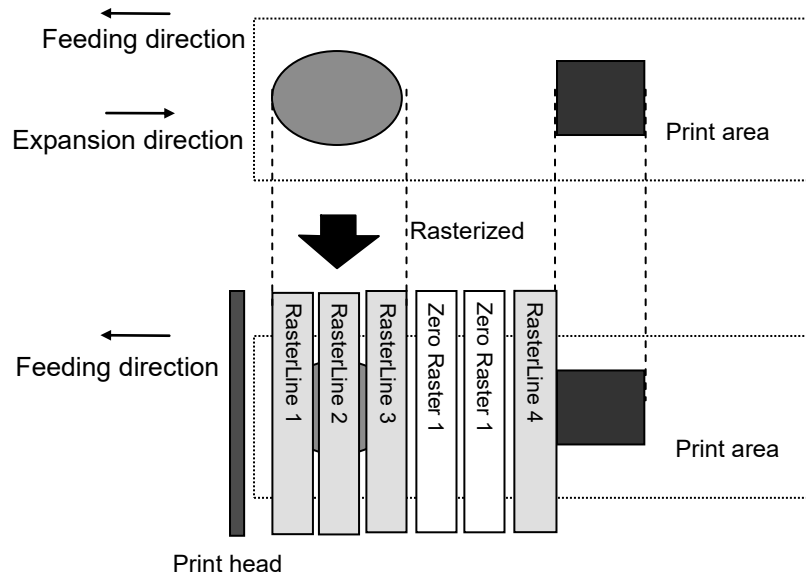
For example, even when the minimum print data of 4.8 mm is created, the print result will be the 24.7 mm of tape shown below, since the minimum length of tape that can be fed out is 24.7 mm.



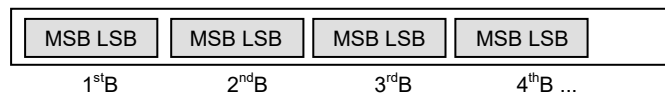
In other words, the print data will be on 24.7 mm of tape when the print data length is 24.7 mm or less.

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 “[specify margin amount \(feed amount\)](#)” at the beginning and the end.

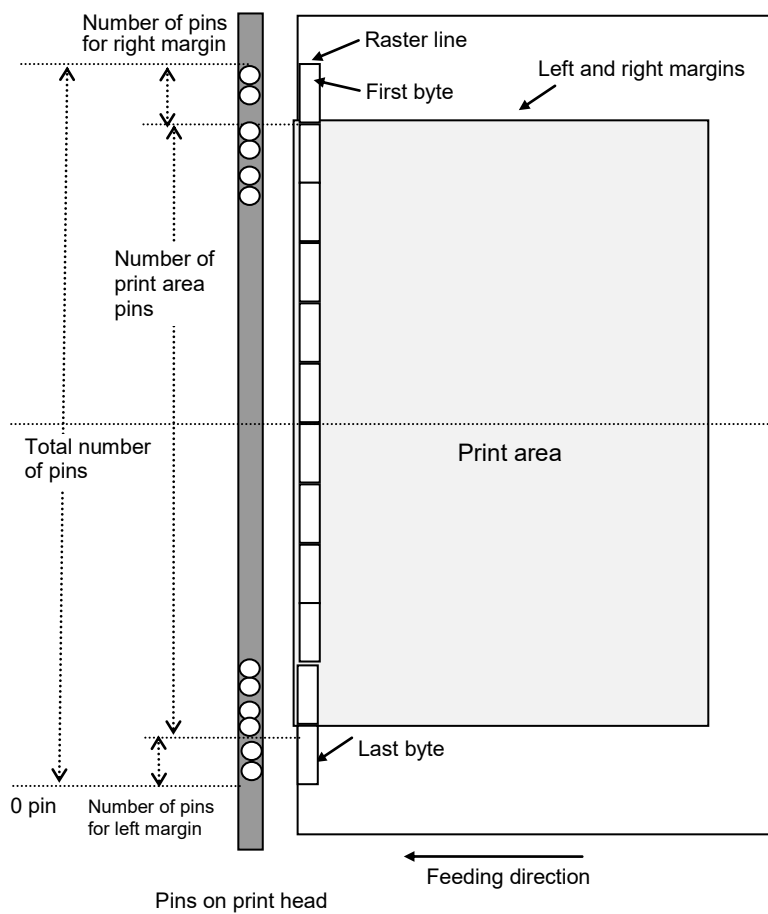


The following shows the relationship between the raster graphics parameters and the pixels.



(a) PT-E310BT

Total number of pins: 128 pin



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
3.5mm	52	24	52	16
6mm	48	32	48	
9mm	39	50	39	
12mm	29	70	29	
18mm	8	112	8	
24mm	0	128	0	

Heat-Shrink Tube :

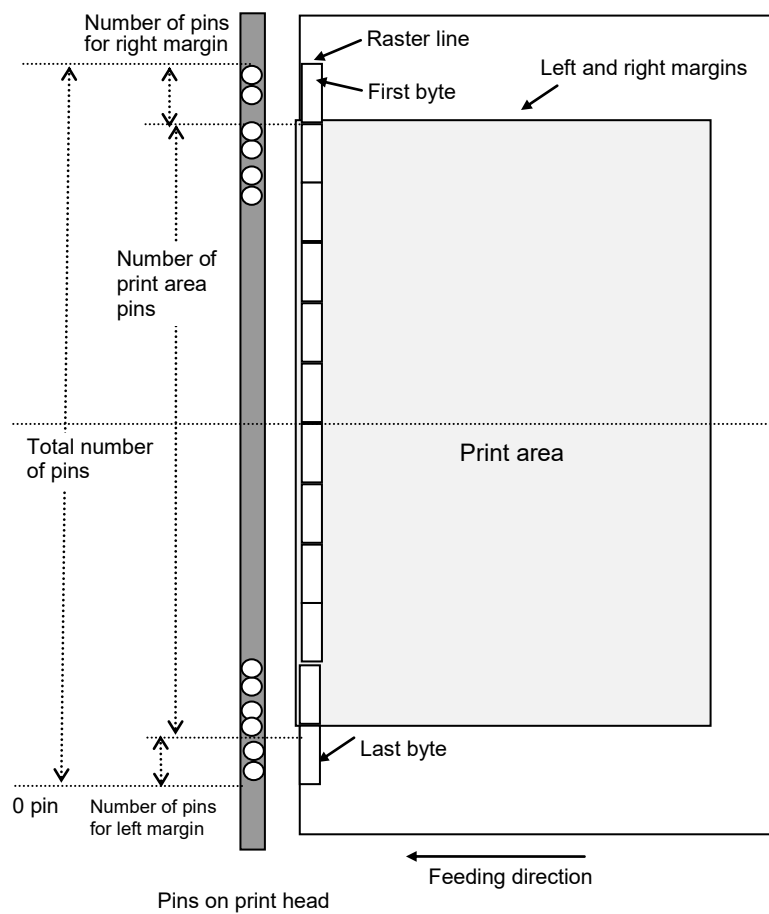
Tape Type	Number of pins for left margin	Number of print area pins	Number of pins for right margin	Number of bytes for raster graphics transfer
HS 5.2mm	54	20	54	16
HS 5.8mm	50	28	50	
HS 8.8mm	40	48	40	
HS 9.0mm	42	44	42	
HS 11.2mm	39	50	39	
HS 11.7mm	31	66	31	
HS 17.7mm	11	106	11	
HS 21.0mm	4	120	4	
HS 23.6mm	0	128	0	

Self-Laminating 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
SL 24mm	0	128	0	16

(b) PT-E510 / 560BT

Total number of pins: 128 pin



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
3.5mm	52	24	52	16
6mm	48	32	48	
9mm	39	50	39	
12mm	29	70	29	
18mm	8	112	8	
24mm	0	128	0	

Heat-Shrink Tube :

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
HS 5.8mm	50	28	50	16
HS 8.8mm	40	48	40	
HS 11.7mm	31	66	31	
HS 17.7mm	11	106	11	
HS 23.6mm	0	128	0	
HS 5.2mm	54	20	54	
HS 9.0mm	42	44	42	
HS 11.2mm	39	50	39	
HS 21.0mm	4	120	4	

Self-Laminating 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
SL 24mm	0	128	0	16

3. Status

3.1 Status overview

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

Number	Offset	Size	Name	Value/Reference
1	0	1	Print head mark	Fixed at 80h
2	1	1	Size	Fixed at 20h
3	2	1	Brother code	Fixed at “B” (42h)
4	3	1	Series code	Fixed at “0” (30h)
5	4	1	Model code	7Dh: PT-E310BT 7Eh: PT-E510 7Fh: PT-E560BT
6	5	1	Country code	Fixed to one of 30h, 32h, 33h, or 39h.
7	6	1	Battery Level	AC adaptor not connected 20h Lv4 21h Lv3 22h Lv2 23h Lv1 24h Need to be charged AC adaptor connected 30h Lv4 31h Lv3 32h Lv2 33h Lv1 34h Need to be charged 37h No battery
8	7	1	Extended error	21h: Incompatible media error 27h: Unsupported USB Power Source
9	8	1	Error information 1	Refer to 3.2.1.
10	9	1	Error information 2	Refer to 3.2.2.
11	10	1	Media width	Refer to 3.2.3.

12	11	1	Media type	Refer to 3.2.4.
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 3.2.3.
19	18	1	Status type	Refer to 3.2.5.
20	19	1	Phase type	Refer to 3.2.6.
21	20	1	Phase number (higher order bytes)	
22	21	1	Phase number (lower order bytes)	
23	22	1	Notification number	Refer to 3.2.7.
24	23	1	Expansion area (number of bytes)	Fixed at 00h
25	24	1	Tape color information	Refer to 3.2.8.
26	25	1	Text color information	Refer to 3.2.9.
27	26	1	Reserved	Fixed at 00h
31-32	30-31	1	Reserved	Fixed at 00h

3.2 Definitions of each part

3.2.1 Error information 1

Flag	Mask	Definition
Bit 0	01h	"No media" error
Bit 1	02h	(Not used)
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)

3.2.2 Error information 2

Flag	Mask	Definition
Bit 0	01h	"Replace media" error (with a serial connecting) Wrong media
Bit 1	02h	(Not used)
Bit 2	04h	Communication error
Bit 3	08h	"Communication buffer full" error
Bit 4	10h	"Cover open" error *1
Bit 5	20h	Overheating error
Bit 6	40h	(Not used)
Bit 7	80h	System error

*1 Supported model: PT-E510 / E560BT

3.2.3 Media width and length

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

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

* Media Length: Fixed at 00h

Media	Media Width	Media Length
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
HS 5.2 mm	05h	00h
HS 5.8 mm	06h	00h
HS 8.8 mm	09h	00h
HS 9.0 mm	09h	00h
HS 11.2 mm	11h	00h
HS 11.7 mm	0Ch	00h
HS 17.7 mm	12h	00h
HS 21.0 mm	21h	00h
HS 23.6 mm	18h	00h
SL 24 mm	24h	00h

3.2.4 Media type

Media Type	Value
No media	00h
Laminated tape	01h
Non-laminated tape	03h
Fabric Tape	04h
Heat-Shrink Tube (HS 2:1)	11h
Flexible ID tape	14h
Satin tape	15h
Self-laminating tape	16h

Heat-Shrink Tube (HS 3:1)	17h
Incompatible tape	FFh

3.2.5 Status type

Status Type	Value
Reply to status request	00h
Printing completed	01h
Error occurred	02h
(Not used)	03h
(Not used)	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.

3.2.6 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

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.

3.2.7 Notification number

Notification	Value
Cooling (started)	03h
Cooling (finished)	04h
Cut wait (started) *	0Bh
Cut wait (finished) *	0Ch

* Supported model: PT-E310BT

3.2.8 Tape color information

Tape color	Tape color ID
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
Red (D)	31h
Fluorescent Orange	40h
Fluorescent Yellow	41h
Berry Pink (S)	50h
Light Gray (S)	51h
Lime Green (S)	52h
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

3.2.9 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

4. 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)
ESC i L	1B 69 4C	Specify print line control
ESC i C	1B 69 43	Specify color information
ESC i !	1B 69 21	Switch automatic status notification mode
ESC i p	1B 69 70	Concurrent printing settings
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

5. Printing Command Details

NULL Invalidate

ASCII:	NULL
Hexadecimal:	00

Description

- Skipped
- If data transmission is to be stopped midway, send 200 bytes of 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

- 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 [3. Status](#).

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 [“6. Flow Charts”](#).

ESC i a Switch dynamic command mode

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

Parameters

Definitions of {n1}:

1: Raster mode (default)

FF: Mode set as default

Description

- Dynamically switches between the printer's command modes. A printer that receives this command operates in the specified command mode until the printer is turned off.

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 0x02: Media type 0x04: Media width 0x08: Media length 0x40: Not used 0x80: Not used
{n2}:	Media type 00h: Laminated / Self-laminated tape 09h: Laminated tape (High-resolution printing* ¹) 11h: Heat-Shrink Tube (HS 2:1) 17h: Heat-Shrink Tube (HS 3:1) * ¹ PT-E510 / E560BT support high-resolution printing only on laminated tape. Please set to 09h when printing.
{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}:	Number of raster lines = $n8 \times 256 \times 256 \times 256 + n7 \times 256 \times 256 + n6 \times 256 + n5$ 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 " 3.2.2 Error information 2 " is set to "ON".)
{n9}:	Starting page: 0 Other pages: 1 Last page: 2 The output will be 2 regardless of starting/last page for the job consists of single page.
{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 A Specify the page number in “cut each * labels”

ASCII:	ESC	i	A	{n1}
Hexadecimal:	1B	69	41	{n1}

Parameters

Definitions of {n1}

Page number = 01h to FFh (1 to 255 pages)

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”.

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.

0 bit: Not used.

1 bit: Not used

2 bit: Half cut

1: Half cut on

0: Half cut off

3 bit: 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.)

4 bit: 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

5 bit: Not used

6 bit: High-resolution printing

1: High-resolution printing

0: Normal printing

For PT-E310BT, please set this value as 0 (High-resolution printing is not supported).

7 bit: Not used.

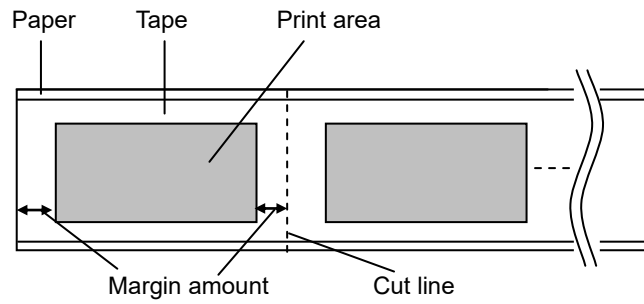
ESC i d Specify margin amount (feed amount)

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 L Specify print line control

ASCII:	ESC	i	L	{n1}	{n2}	{n3}
Hexadecimal:	1B	69	4C	{n1}	{n2}	{n3}

Parameters

Definitions of {n1} through {n3}

{n1}	Specifies the control method for one print line. 00h: Monochrome 01h: Red/black
{n2}	Number of lines required to print one dot 01h: Monochrome 02h: Red/black
{n3}	Number of bits per dot 01h: Available for both monochrome and red/black.

Description

- Specifies the print line control method.

Examples:

Monochrome printing 1B 69 4C 00 01 01

Red/black printing 1B 68 4C 01 02 01

- PT-E310BT / E510 / E560BT do not support red/black printing.

Data pattern	Data image
Monochrome	
Red/black	

ESC i C Specify color information

ASCII:	ESC	i	C	{n} {n11} {n12} {n13} ({n21} {n22} {n23})
Hexadecimal:	1B	69	43	{n} {n11} {n12} {n13} ({n21} {n22} {n23})

Parameters

{n} Number of colors

{n11} {n12} {n13} First color (1 byte each for C, M, Y) Example: Black = FFh, FFh, FFh

{n21} {n22} {n23} Second color (1 byte each for C, M, Y) Example: Red = 00h, FFh, FFh

Description

- Specifies color information using CMY values.

Examples:

Monochrome printing 1B 69 43 01 FF FF FF

Red/black printing 1B 69 43 02 FF FF FF 00 FF FF

- PT-E310BT / E510 / E560BT do not support red/black printing.

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.

ESC i p Concurrent printing settings

ASCII:	ESC	i	p	{n1}
Hexadecimal:	1B	69	70	{n1}

Parameters

Definitions of {n1}

0: Enabled ([Concurrent printing](#))

1: Disabled ([Buffered printing](#))

Description

- Enable or disable concurrent printing.

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 16 bytes of compressed data, the data is treated as being all different. As a result, the data will be 17 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 22 22 23 BA BF A2 22 2B

With compression: F9 00 FF 22 05 23 BA BF A2 22 2B ...

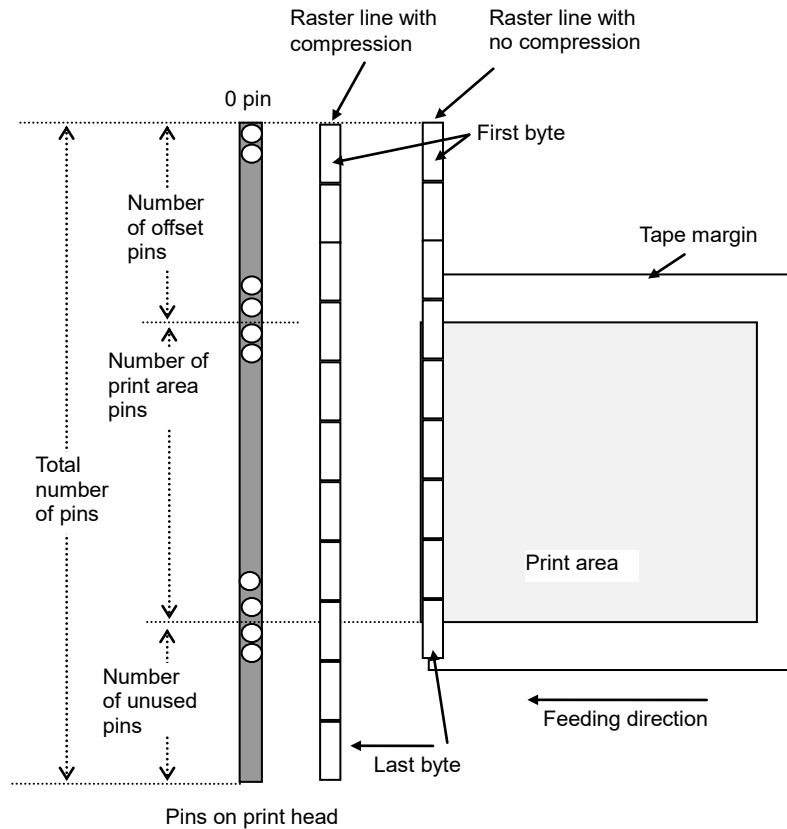
a b c

- a. Since "00h" is repeated for 8 bytes, 8d -> 7d -> 7h changed into a negative number is F9h.
Therefore: F9 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 16 bytes of the total number of pins (128). 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 16 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 $k = n1 + n2 \times 256$

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

{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=16

{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.

6. Flow Charts

Normally, printing is performed as buffered printing.

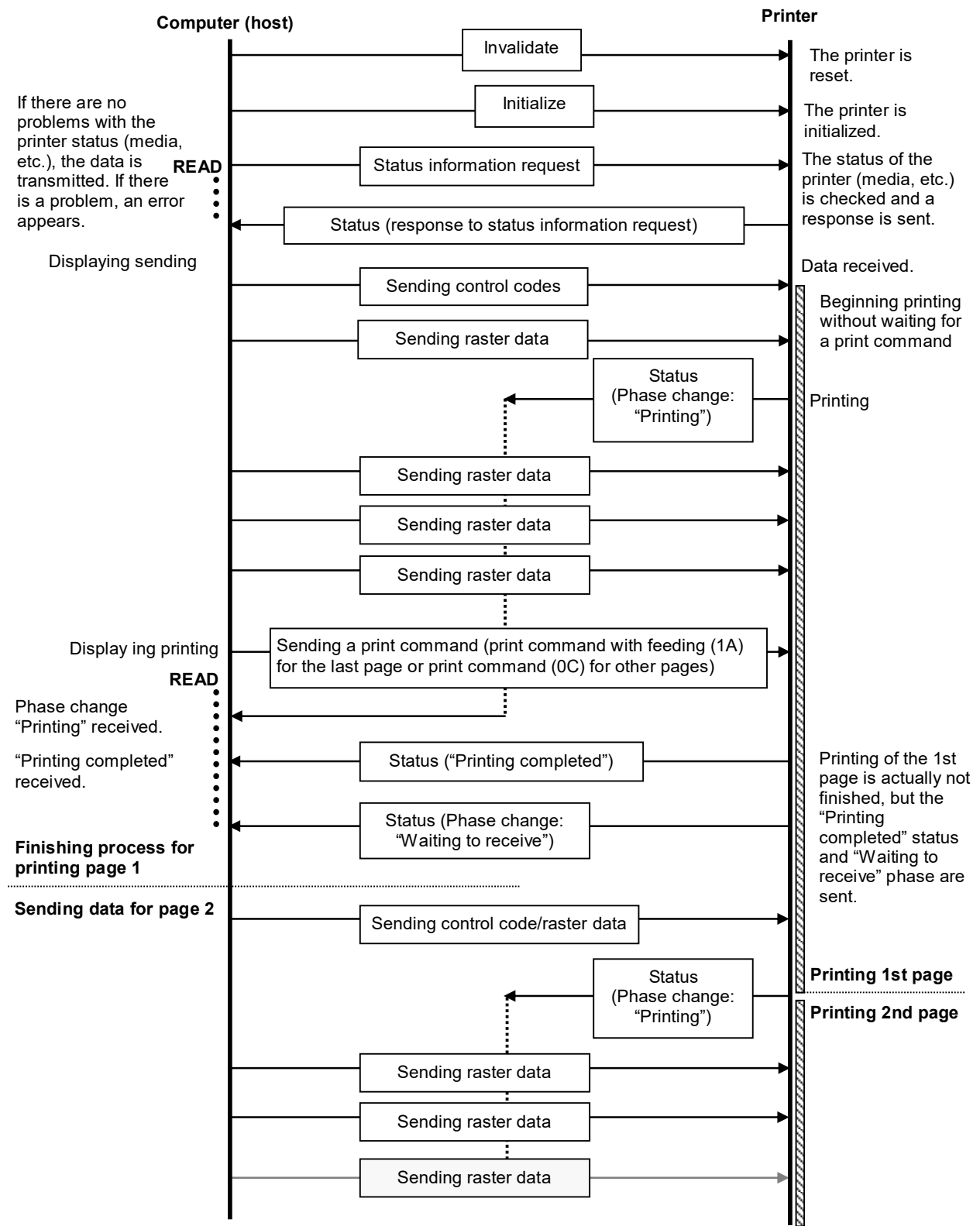
However, if the printer is connected via USB and uncompressed data is received, concurrent printing is performed.

Concurrent printing and Buffered printing

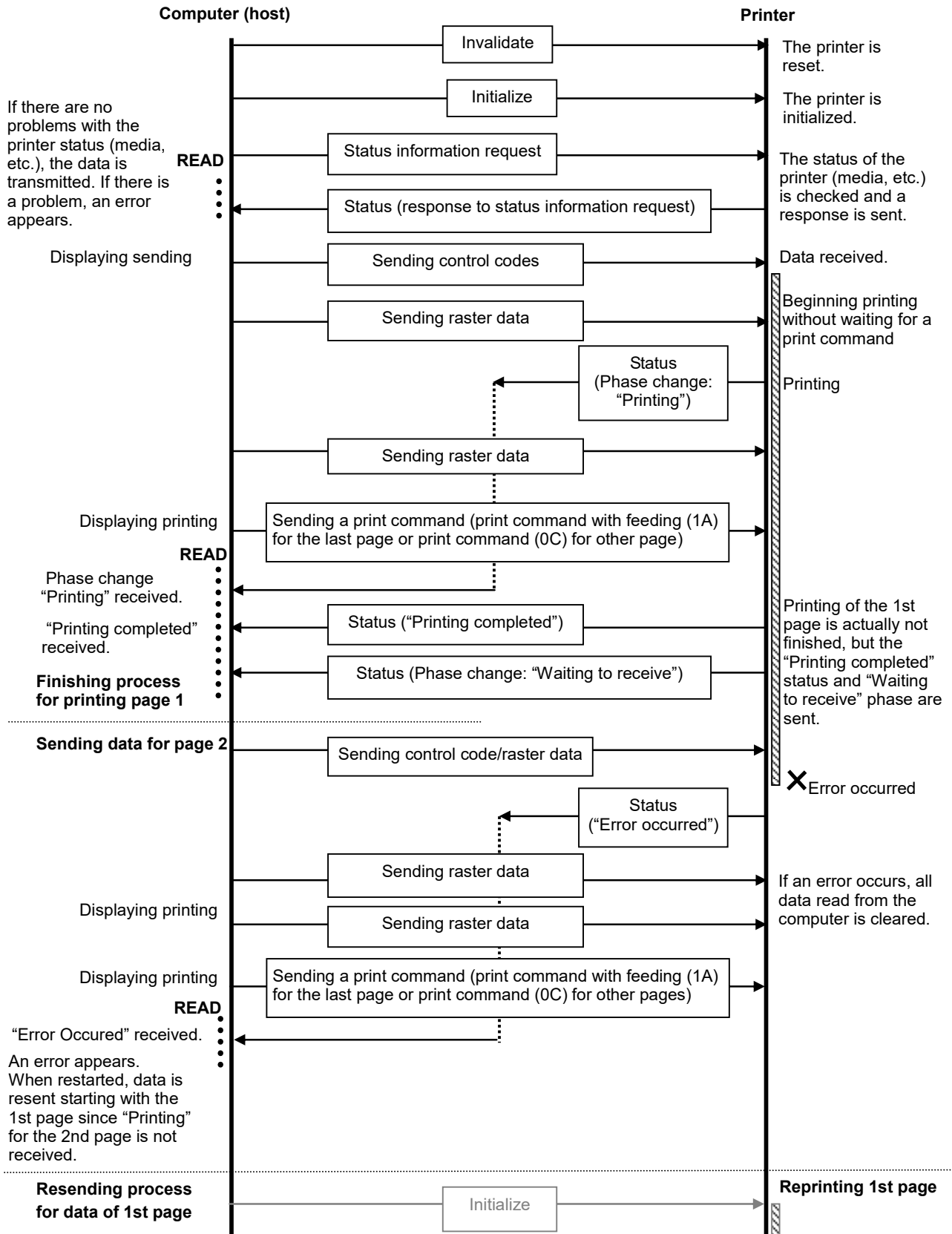
Concurrent printing: Printing starts immediately after the printer receives print data.

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

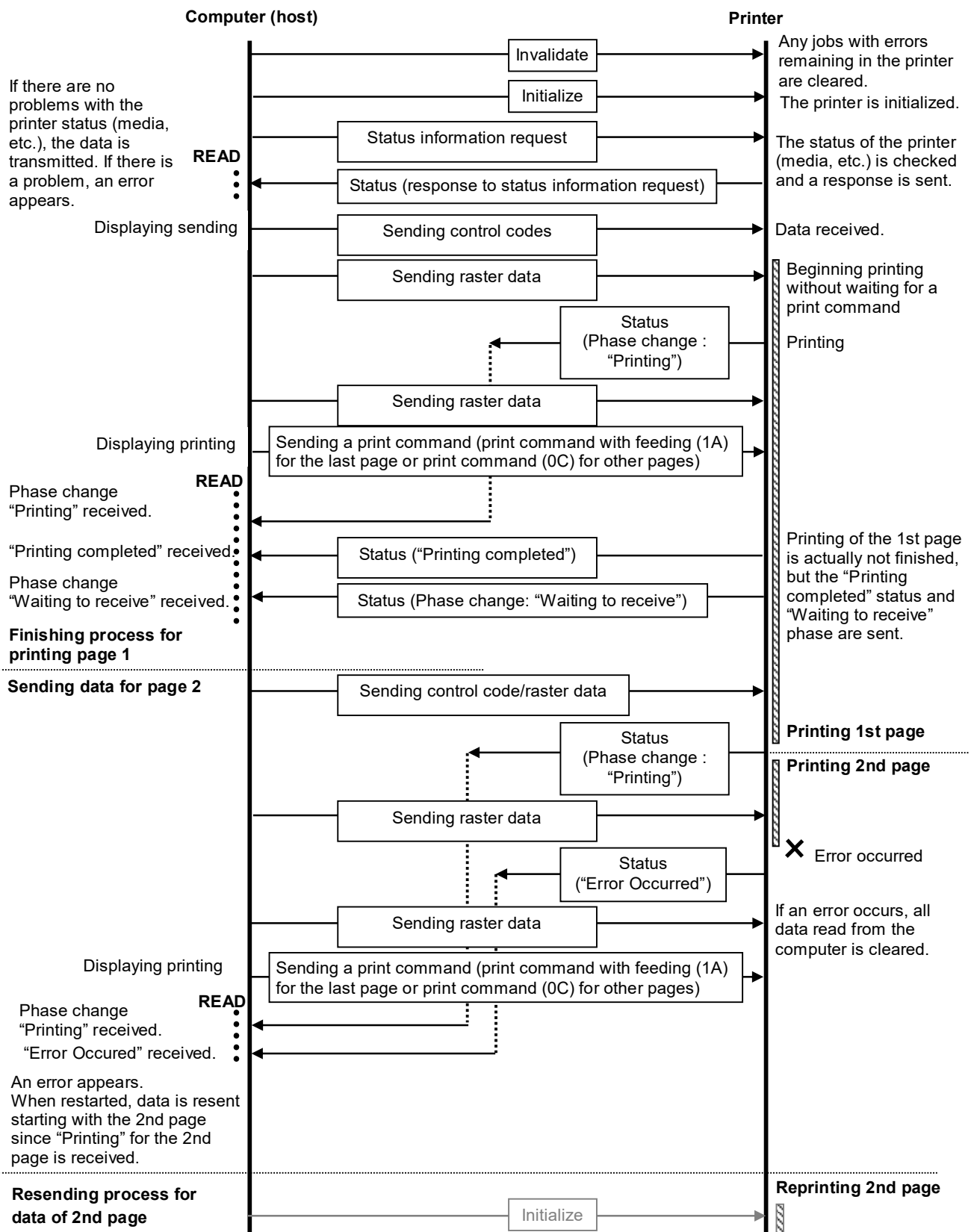
6.1 Concurrent printing normal flow for USB connection



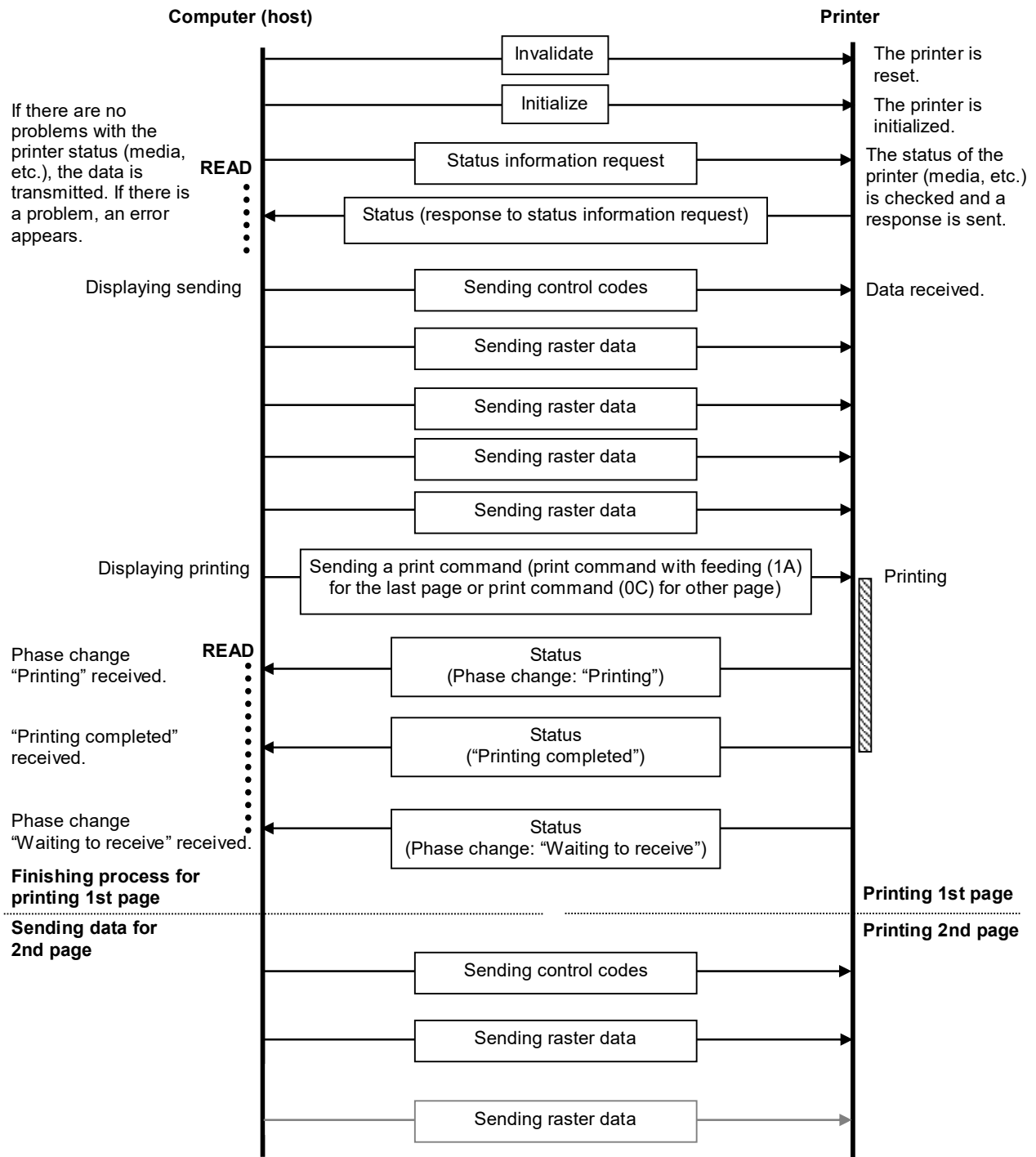
6.2 Concurrent printing error flow for USB connection (when feeding at the end of the page)



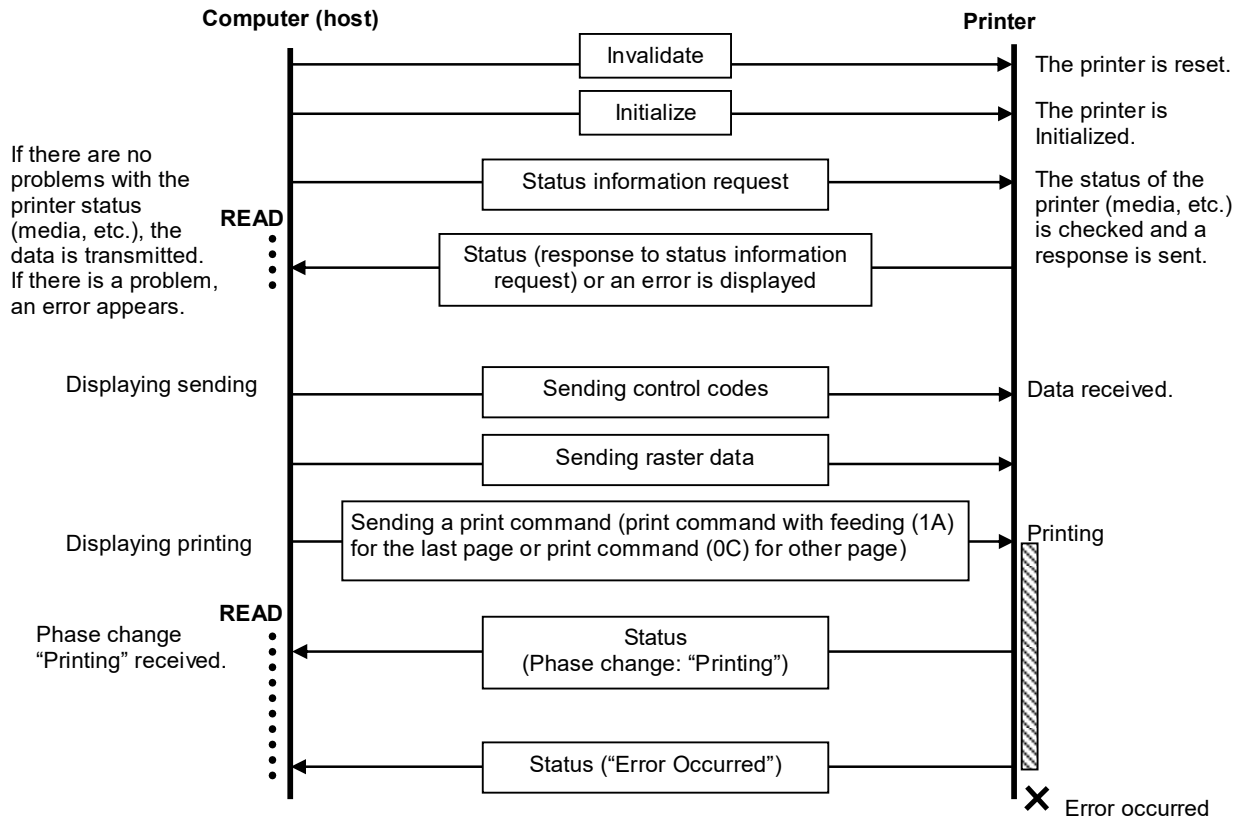
6.3 Concurrent printing error flow for USB connection (with a concurrent printing error such as end of tape)



6.4 Buffered printing normal flow for USB/Bluetooth connection



6.5 Buffered printing error flow for USB/Bluetooth connection



Appendix A: 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.

<https://support.brother.com/g/s/es/dev/en/index.html?navi=offall>

brother