Software Developer's Manual

Raster Command Reference

TD-4410D/4420DN/4510D/4520DN/4550DNWB/4210D

Version 1.02

IMPORTANT - PLEASE READ CAREFULLY

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Updates

Version	Date	Contents changed
1.00	02/12/2019	Initial version for TD-4410D/4420DN/4510D/4520DN/4550DNWB
1.01	04/12/2019	Fixed the default value for the “Automatic Status Notification Mode"
1.02	17/01/2022	Added TD-4210D Added EPL/DPL mode for the “Switch dynamic command mode”

Contents

1. Introduction

This material provides the necessary information for directly controlling the Brother printer TD-4xxxD (where “4xxxD” is the model name).
This information is provided assuming that the user has full understanding of the operating system being used and basic mastery of USB and networks in a developer's environment.
Details concerning the USB interface are not described in this material. If a USB interface is being used, refer to “Appendix A: USB Specifications” to prepare the interface.

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

2. About Raster Commands

Using raster commands an TD-4xxxD printer (where “4xxxD” 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.

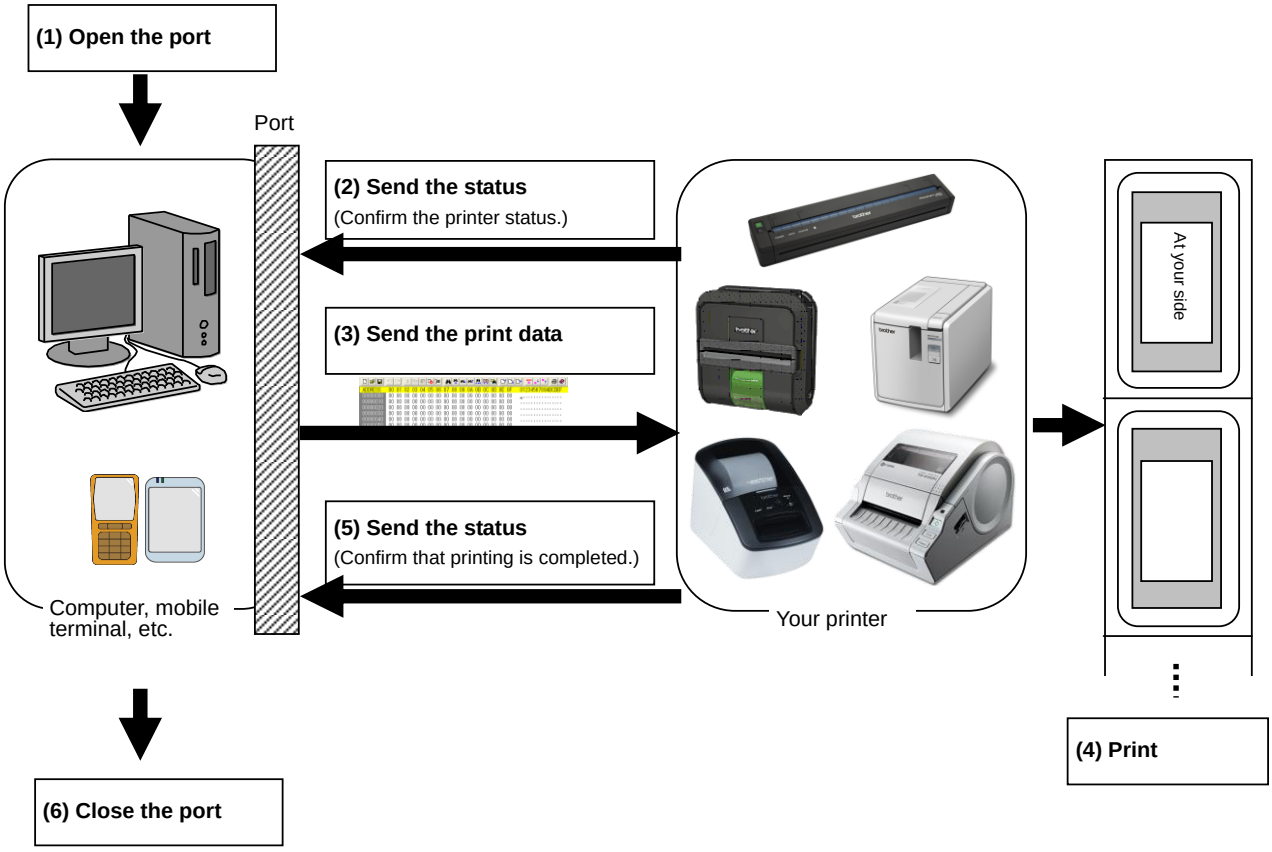
In this material, “raster” refers to binary bitmap data (collection of dots).

Refer to this material to print by sending initialization commands and control codes together with raster data to the TD-4xxxD printer (hereafter, referred to as “printer”).

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

3. Printing Using Raster Commands

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



(1) Open the USB/network port

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

(2) Confirm the printer status sent from the printer

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

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

(3) Send the print data

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

The structure of the print data is explained in the next section, “4. Print Data”.

Note:

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

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

(4) Print the data

(5) Confirm that printing is completed

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

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

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

(6) Close the USB/network port

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

4. Print Data

4.1 Print data overview

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

(1) Initialization commands

Specified only once at the beginning of the job.

Sequence	Command Name	Description/Example
1	Invalidate	Sends a 350-byte invalidate command, and then resets the printer to the receiving state.
2	Initialize	Initializes for printing. 1Bh, 40h (Fixed)

(2) Control codes

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

Sequence	Command Name	Description/Example
1	Switch dynamic command mode	Switches the command mode of the printer to raster mode. 1Bh, 69h, 61h, 01h
2	Switch automatic status notification mode	Dynamically switches whether an automatic status notification is given during printing. 1Bh, 69h, 21h, 00h
3	Additional media information command	1Bh, 69h, 55h, 77h, 01h, 127 bytes of media information **Note** **If the media information is the same as when printing was last performed, it is unnecessary to send the additional media information command.**
4	Print information command	Sets the print information for the printer. For a length setting of 102 mm for 152-mm-wide die-cut label: 1Bh, 69h, 7Ah, 00h, 0Bh, 66h, 98h, F0h, 02h, 00h, 00h, 00h, 00h
5	Various mode	To select “Auto cut” 1Bh, 69h, 4Dh, 40h
6	Specify margin amount	Specifies the amount of the margins. For 3 mm margins: 1Bh, 69h, 64h, 18h, 00h (203 dpi) 1Bh, 69h, 64h, 24h, 00h (300 dpi)
7	Select compression mode	Selects the compression mode for raster graphics. To send the data compressed to TIFF format: 4Dh, 02h

(3) Raster data

Repeated for each page in the print job.

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

(4) Print commands

Specified at the end of the page.

Sequence	Command Name	Description/Example
-	Print command	Specifies at the end of a page that is not the last page. 0Ch
-	Print command with feeding	Specifies at the end of the last page. 1Ah (Fixed)
Last	Switch dynamic command mode	Resets the command mode of the printer to default mode. 1Bh, 69h, 61h, FFh

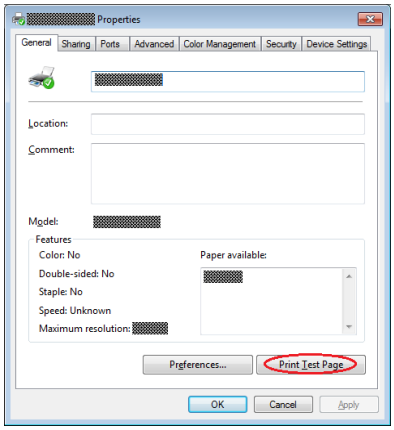
4.2 Sample (analyzing the print data of the test page)

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

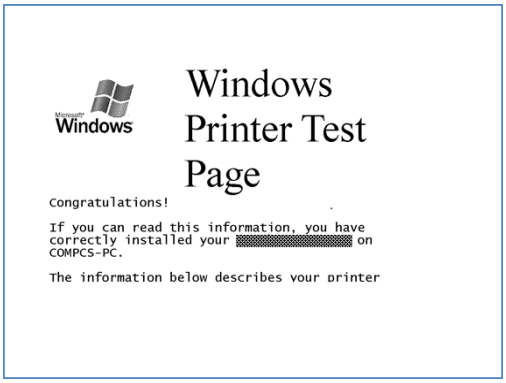
As an example, we will check the print data created when the **[Print Test Page]** button in the printer Properties dialog box is clicked to print the test page.

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

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



Printer Properties



Test page

4.2.1 Preparation

Install the two listed below.

- Printer driver of the Brother TD-4xxxD
- Binary file editor

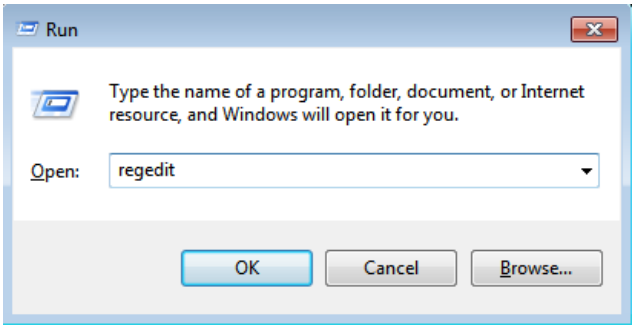
The data that we will analyze in this sample is a binary file.

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

***Please follow the steps below to set registry:**

1: Open the **[Run]** box (keyboard shortcut [Windows Key] + [R])

2: Type **"regedit"** and click **[OK]**. Click **[Yes]** to confirm when UAC prompt appears.



Run

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

\HKEY_LOCAL_MACHINE\SOFTWARE\Brother Industries, Ltd.\P-touch\Driver\3.0\Brother TD-4xxxD

E.g. TD-4410D:

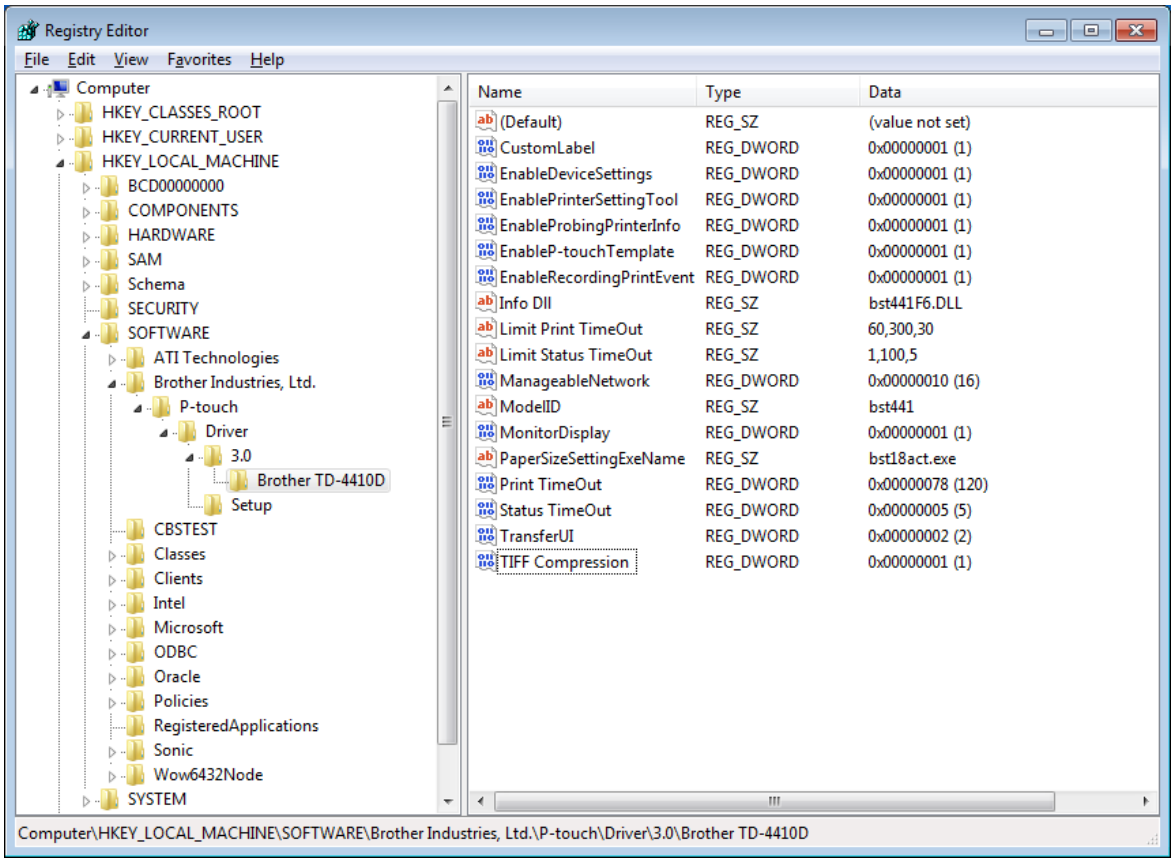
\HKEY_LOCAL_MACHINE\SOFTWARE\Brother Industries, Ltd.\P-touch\Driver\3.0\Brother TD-4410D

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

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

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

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



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

4.2.2 Checking the print data

The procedure for checking the print data is provided below.

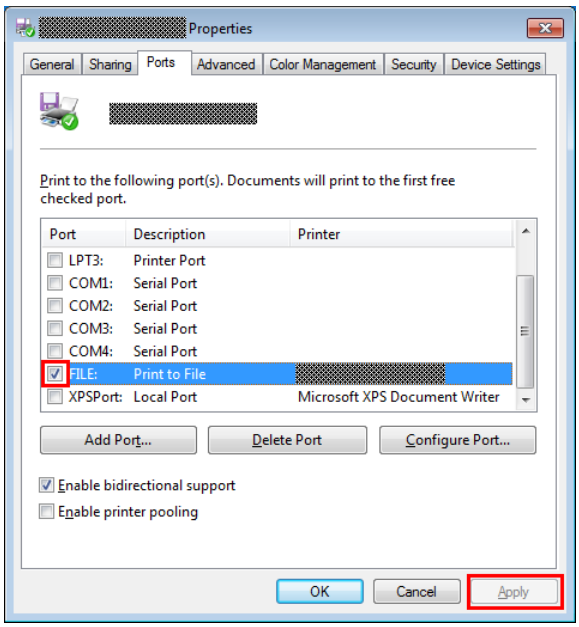
Step 1: Change the port of the printer to "FILE:".

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

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

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

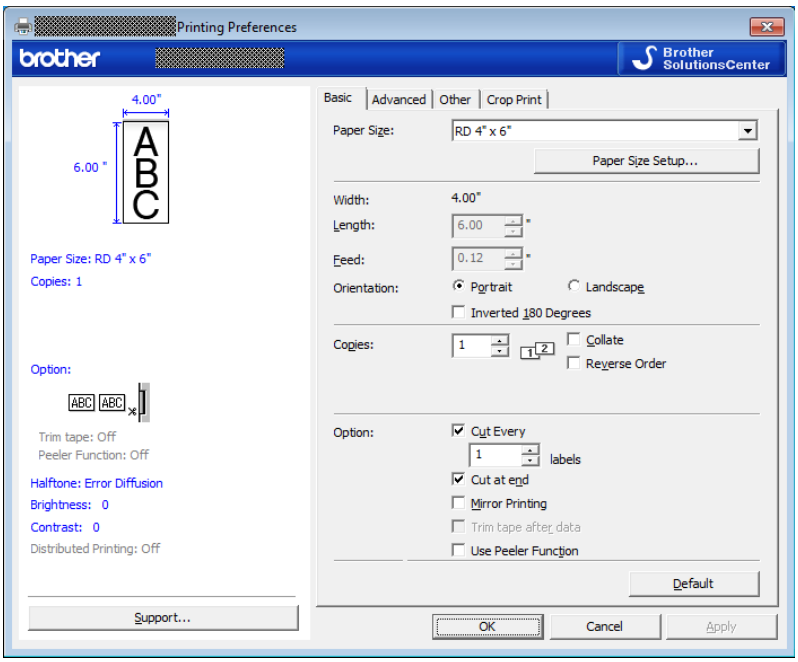
Open the **[Devices and Printers]** window, right-click the printer, and then display the printer’s Properties dialog box. Click the **[Ports]** tab in the printer’s Properties dialog box, select the “FILE:” check box, and then click the **[Apply]** button.



[Ports] tab of the printer Properties dialog box

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

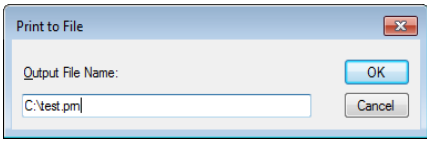
For this sample, print the test page with the default print settings, which were specified immediately after the printer driver was installed.



Default settings immediately after installation of the printer driver

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

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

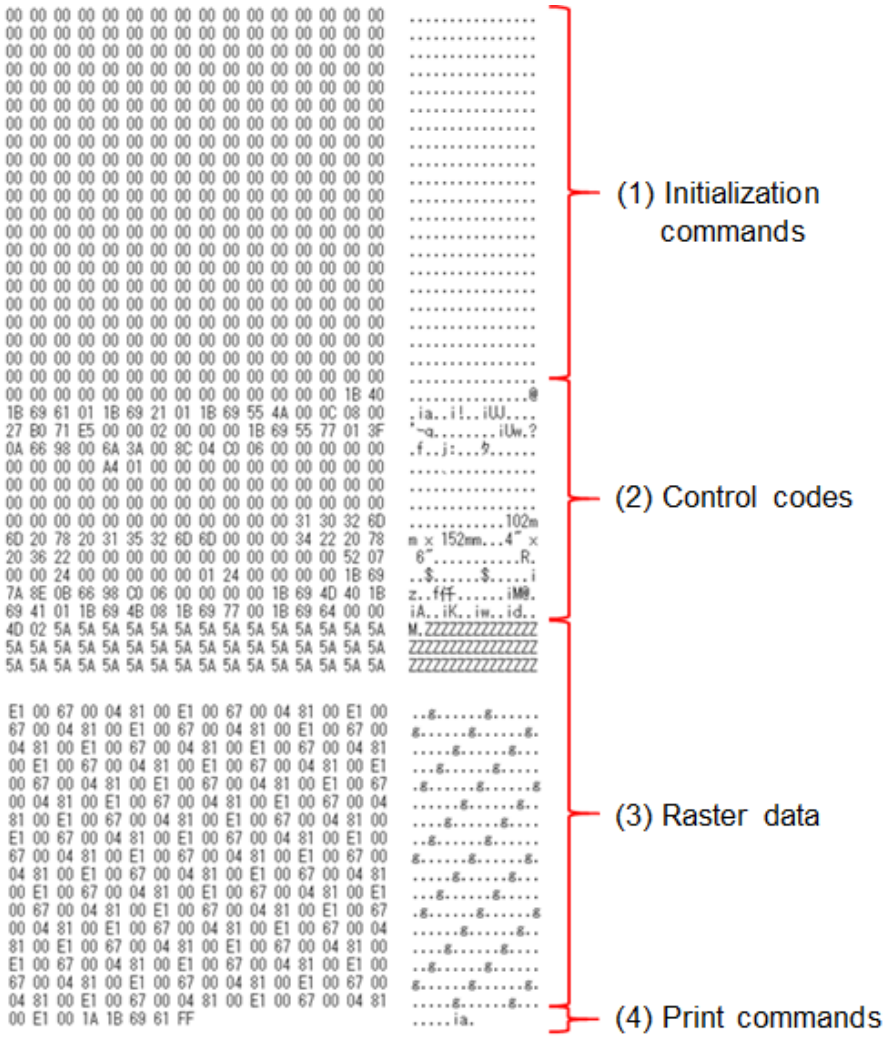


Dialog box for specifying the file name

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

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

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

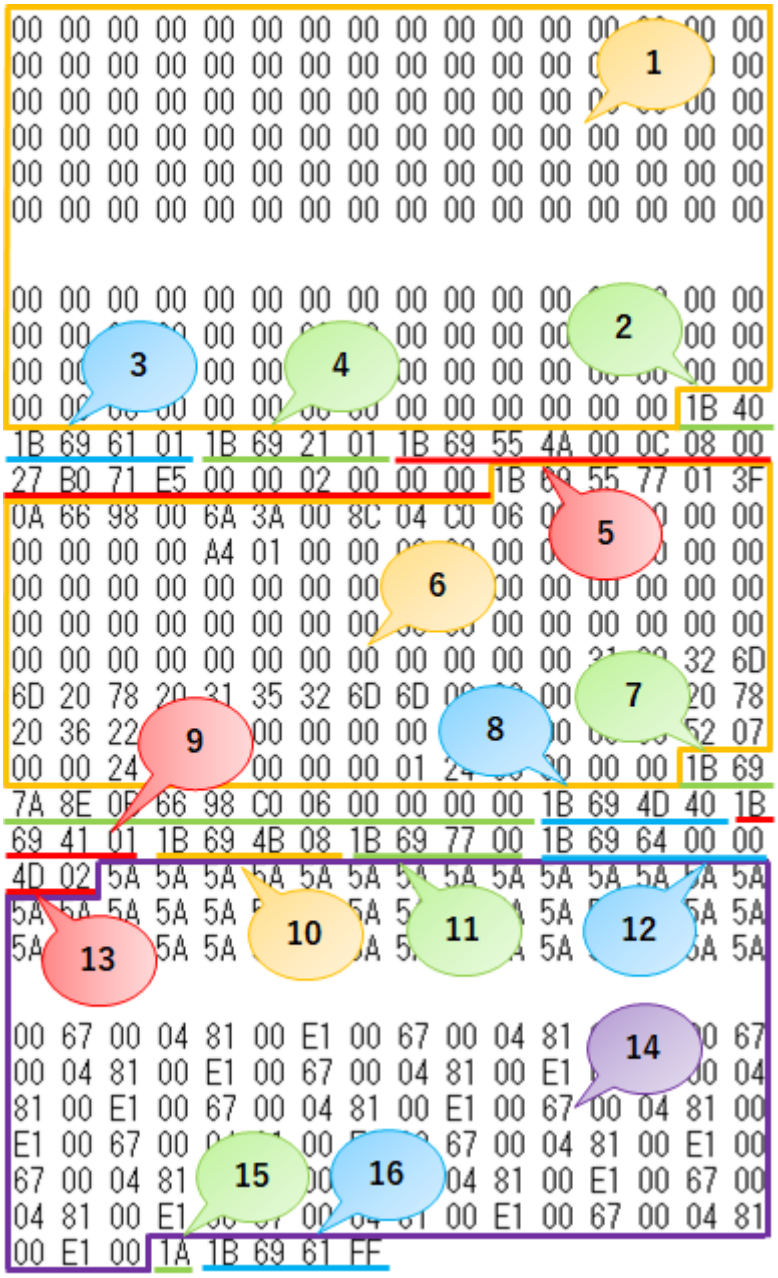


Print data

4.2.3 Explanation of print data for the test page

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

The following illustration shows the print data created in section “4.2.1 Preparation” opened in the binary file editor.



Print data

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

For details on each command, refer to “7. Printing Command Details”.

No.	Command Name	Description
1	Invalidate	A 350-byte invalidate command is sent.
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	Switch automatic status notification mode	Dynamically switches whether an automatic status notification is given during printing.
5	Job ID setting commands	Internal specification commands. Since this is a command for outputting with the commercial version of the driver, it is unnecessary for the user to send this command.
6	Additional media information command	Additional media information on the media size is sent. This is the command for “4" x 6" (102 mm x 152 mm)”.
7	Print information command	Media size information for the print data is sent. This is the command for “4" x 6" (102 mm x 152 mm)” die-cut label.
8	Various mode settings	This command specifies the settings such as cut options. Normally no settings required here.
9	Specify the page number in “cut each * labels”	The number of pages printed before automatically cutting is specified. Here, “auto cut” is specified.
10	Expanded mode	This is the command for specifying expanded functions. Here, “cut at end” is specified.
11	Specify waiting time after printing each page	This command specified the length of time to wait after printing every single page.
12	Specify margin amount	This command specifies the amount of margins.
13	Select compression mode	TIFF compression mode is selected.
14	Raster data	Raster data continues.
15	Print command with feeding	Since one page will be printed, this is sent at the end of the first page.
16	Switch dynamic command mode	This command resets to default mode that is switched by No.3. Send this command after [Print command with feeding] is sent.

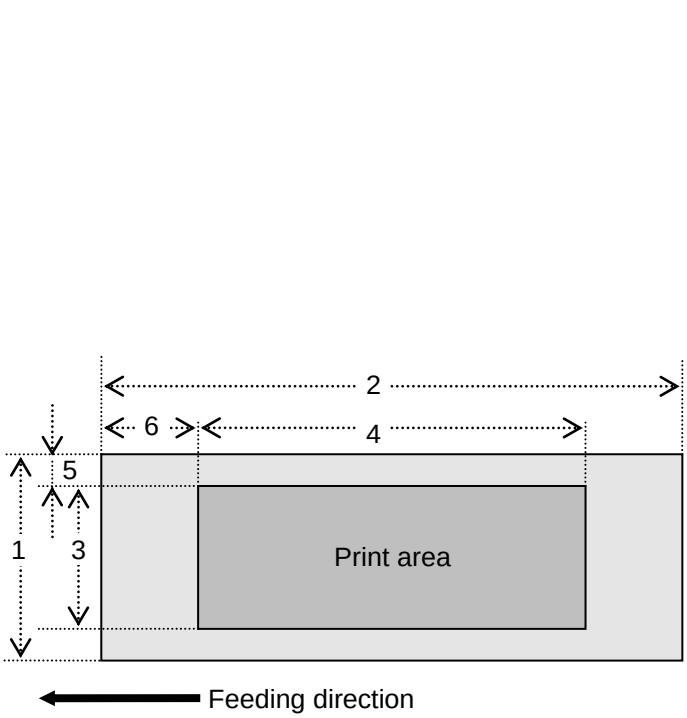
4.3 Page data details

4.3.1 Resolution

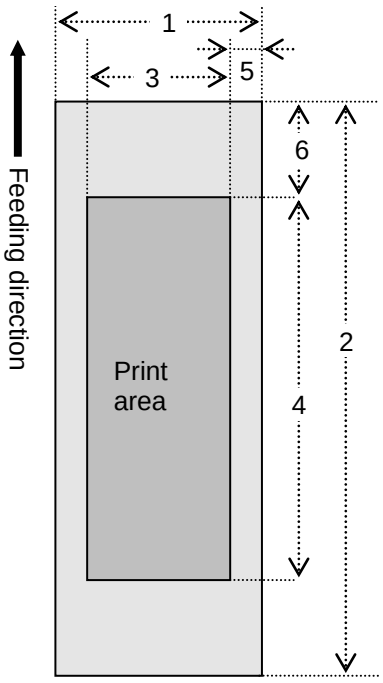
Resolution	Height-to-Width Proportion
TD-4410D/4420DN/4210D - 203 dpi high, 203 dpi wide TD-4510D/4520DN/4550DNWB - 300 dpi high, 300 dpi wide	1:1

4.3.2 Page size

(a) Continuous length tape



Landscape



Portrait

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

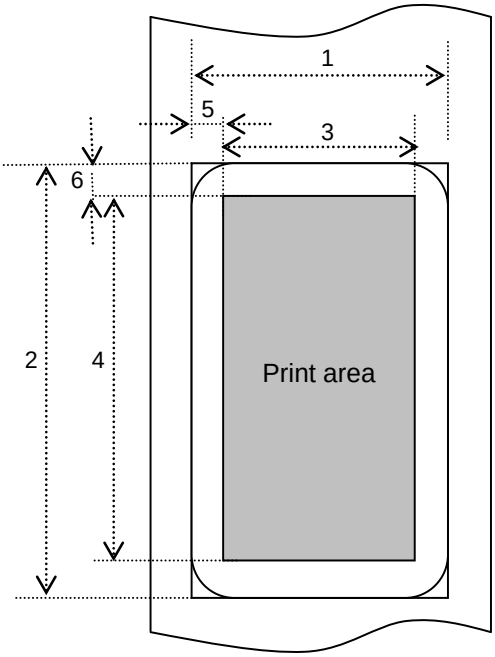
TD-4410D/4420DN/4210D (203 dpi)

ID	Tape Size	1	2	3	4	5	6
415	RD 102 mm RD 4"	101.6 mm 812 dots	→4.3.4	98.6 mm 788 dots	→4.3.5	1.5 mm 12 dots	→4.3.3
440	RD 90 mm RD 3.5"	90.0 mm 719 dots	→4.3.4	87.0 mm 695 dots	→4.3.5	1.5 mm 12 dots	→4.3.3
439	RD 76 mm RD 2.9"	76.0 mm 607 dots	→4.3.4	72.9 mm 583 dots	→4.3.5	1.5 mm 12 dots	→4.3.3
426	RD 58 mm RD 2.2"	58.0 mm 464 dots	→4.3.4	55.1 mm 440 dots	→4.3.5	1.5 mm 12 dots	→4.3.3

TD-4510D/4520DN/4550DNWB (300 dpi)

ID	Tape Size	1	2	3	4	5	6
415	RD 102 mm RD 4"	101.6 mm 1200 dots	→4.3.4	98.6 mm 1164 dots	→4.3.5	1.5 mm 18 dots	→4.3.3
440	RD 90 mm RD 3.5"	90.0 mm 1063 dots	→4.3.4	87.0 mm 1027 dots	→4.3.5	1.5 mm 18 dots	→4.3.3
439	RD 76 mm RD 2.9"	76.0 mm 897 dots	→4.3.4	72.9 mm 861 dots	→4.3.5	1.5 mm 18 dots	→4.3.3
426	RD 58 mm RD 2.2"	58.0 mm 685 dots	→4.3.4	55.1 mm 651 dots	→4.3.5	1.5 mm 18 dots	→4.3.3

(b) Die-cut labels



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

TD-4410D/4420DN/4210D (203 dpi)

ID	Label Size	1	2	3	4	5	6
420	RD 102 mm x 152 mm RD 4" x 6"	101.6 mm 812 dots	152.4 mm 1218 dots	98.6 mm 788 dots	146.4 mm 1170 dots	1.5 mm 12 dots	3.0 mm 24 dots
419	RD 102 mm x 50 mm RD 4" x 2"	101.6 mm 812 dots	49.9 mm 399 dots	98.6 mm 788 dots	43.9 mm 351 dots	1.5 mm 12 dots	3.0 mm 24 dots
421	RD 76 mm x 26 mm RD 3" x 1"	76.2 mm 609 dots	25.6 mm 205 dots	73.2 mm 585 dots	19.6 mm 157 dots	1.5 mm 12 dots	3.0 mm 24 dots
422	RD 51 mm x 26 mm RD 2" x 1"	50.8 mm 406 dots	25.6 mm 205 dots	47.8 mm 382 dots	19.6 mm 157 dots	1.5 mm 12 dots	3.0 mm 24 dots

TD-4510D/4520DN/4550DNWB (300 dpi)

ID	Label Size	1	2	3	4	5	6
420	RD 102 mm x 152 mm RD 4" x 6"	101.6 mm 1200 dots	152.4 mm 1800 dots	98.6 mm 1164 dots	146.4 mm 1728 dots	1.5 mm 18 dots	3.0 mm 36 dots
419	RD 102 mm x 50 mm RD 4" x 2"	101.6 mm 1200 dots	49.9 mm 589 dots	98.6 mm 1164 dots	43.9 mm 519 dots	1.5 mm 18 dots	3.0 mm 35 dots
421	RD 76 mm x 26 mm RD 3" x 1"	76.2 mm 900 dots	25.6 mm 302 dots	73.2 mm 864 dots	19.6 mm 232 dots	1.5 mm 18 dots	3.0 mm 35 dots
422	RD 51 mm x 26 mm RD 2" x 1"	50.8 mm 600 dots	25.6 mm 302 dots	47.8 mm 564 dots	19.6 mm 232 dots	1.5 mm 18 dots	3.0 mm 35 dots

4.3.3 Feed amount

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

Type	Minimum Margin Setting	Maximum Margin Setting
Continuous length tape	3.0 mm 0.12" 24 dots (203 dpi) 35 dots (300 dpi)	127.0 mm 5" 1015 dots (203 dpi) 1500 dots (300 dpi)
Die-cut labels	The length offset indicated in “(b) Die-cut labels” of “4.3.2 Page size” is used. However, set “0” as the value of the “specify margin amount” command.	

4.3.4 Maximum and minimum lengths

The maximum and minimum lengths are defined below.

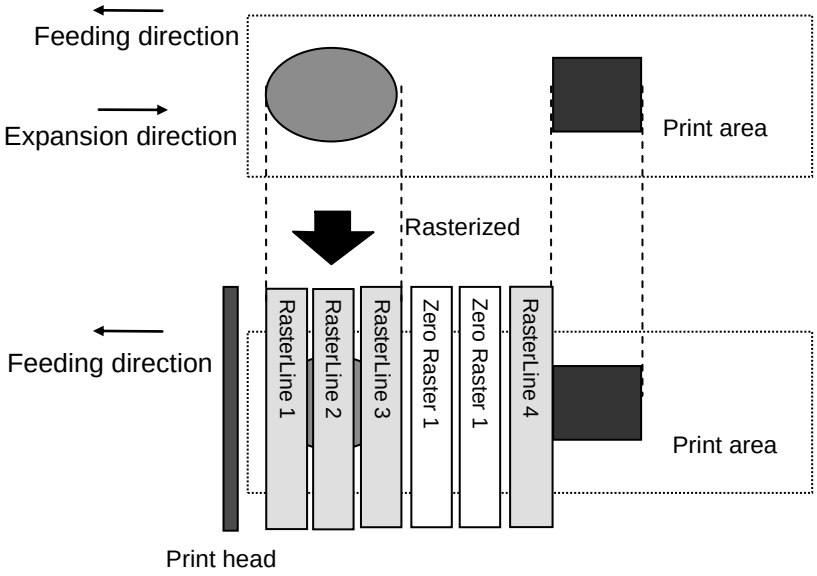
Type	Minimum Length	Maximum Length
Continuous length tape	12.0 mm 0.47" 96 dots 142 dots (300 dpi)	3000.0 mm 118.11” 23977 dots 35433 dots (300 dpi)
Die-cut labels	Fixed	Fixed

The minimum length supported by the optional units are defined below.

Optional Unit	Minimum Length
Peeler	12.7 mm 0.50" 102 dots (203 dpi) 150 dots (300 dpi)
Auto-cutter	20.0 mm 0.79" 160 dots (203 dpi) 236 dots (300 dpi)

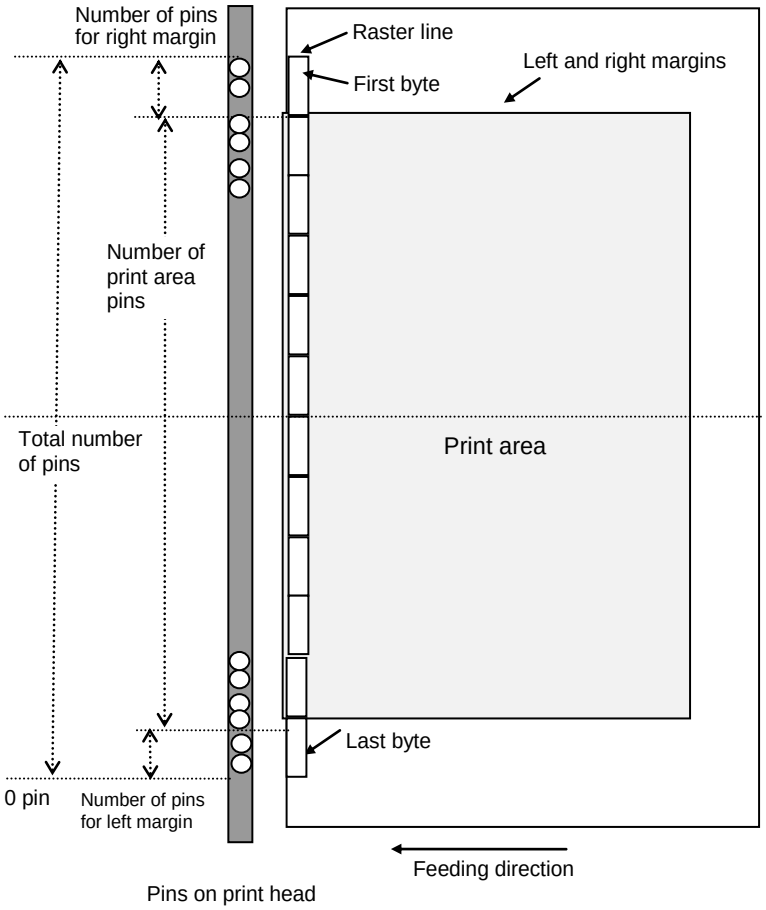
4.3.5 Raster line

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



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

TD-4410D/4420DN/4210D (203 dpi) Total number of pins: 832 pins



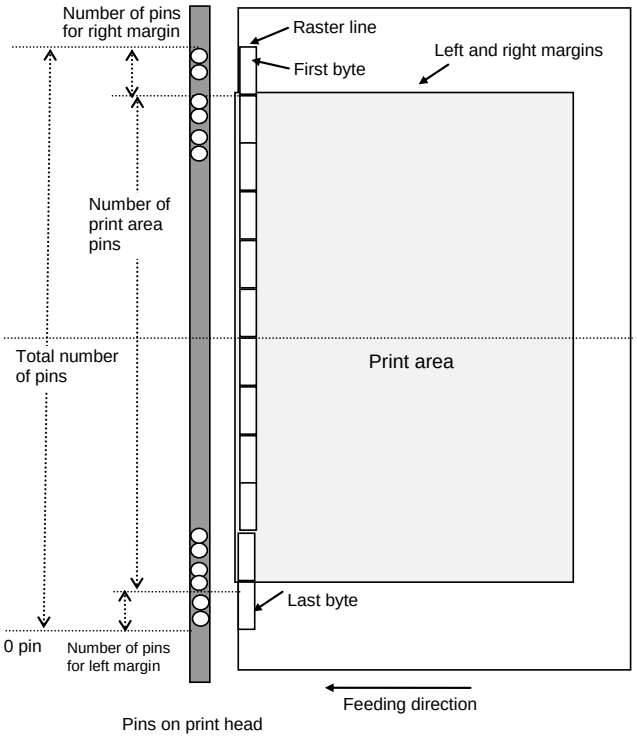
Continuous length tape:

Tape Size	Number of Pins for Left Margin	Number of Print Area Pins	Number of Pins for Right Margin	Number of Bytes for Raster Graphics Transfer
102 mm	22	788	22	104
90 mm	69	695	68	104
76 mm	125	583	124	104
58 mm	196	440	196	104

Die-cut labels:

Label Size	Number of Pins for Left Margin	Number of Print Area Pins	Number of Pins for Right Margin	Number of Bytes for Raster Graphics Transfer
102 mm x 152 mm	22	788	22	104
102 mm x 50 mm	22	788	22	104
76 mm x 26 mm	124	585	123	104
51 mm x 26 mm	225	382	225	104

TD-4510D/4520DN/4550DNWB (300 dpi) Total number of pins: 1280 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
102 mm	58	1164	58	160
90 mm	127	1027	126	160
76 mm	210	861	209	160
58 mm	316	651	313	160

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
102 mm x 152 mm	58	1164	58	160
102 mm x 50 mm	58	1164	58	160
76 mm x 26 mm	208	864	208	160
51 mm x 26 mm	358	564	358	160

5. Status

5.1 Status overview

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

Number	Offset	Size	Name	Value/Reference
1	0	1	Print head mark	Fixed at 80h
2	1	1	Size	Fixed at 20h
3	2	1	Brother code	Fixed at “B” (42h)
4	3	1	Series code	Refer to 5.2.1 Series/model
5	4	1	Model code	Refer to 5.2.1 Series/model
6	5	1	Country code	Fixed at “0” (30h)
7	6	1	Battery level (not used)	Fixed at “00h”
8	7	1	Reserved	Fixed at “00h”
9	8	1	Error information 1	Refer to 5.2.2 Error information 1
10	9	1	Error information 2	Refer to 5.2.3 Error information 2
11	10	1	Media width	Refer to 5.2.4 Media width and length
12	11	1	Media type	Refer to 5.2.5 Media type
13	12	1	Number of colors	Fixed at 00h
14	13	1	Media length (higher order bytes)	Fixed at 00h
15	14	1	Media sensor value	Fixed at 3Fh
16	15	1	Mode	01h
17	16	1	Density	Fixed at 00h
18	17	1	Media length (lower order bytes)	Refer to 5.2.4 Media width and length
19	18	1	Status type	Refer to 5.2.6 Status type
20	19	1	Phase type	Refer to 5.2.7 Phase type and phase number
21	20	1	Phase number (higher order bytes)	
22	21	1	Phase number (lower order bytes)	
23	22	1	Notification number	Refer to 5.2.8 Notification number
24	23	1	Expansion area (number of bytes)	Fixed at 00h
25	24	8	Reserved	Fixed at 00h

5.2 Definitions of each part

5.2.1 Series/model

Model name	Status code	
	Series	Model
TD-4410D	“5” (35h)	“7” (37h)
TD-4420DN	“5” (35h)	“8” (38h)
TD-4510D	“5” (35h)	“9” (39h)
TD-4520DN	“5” (35h)	“A” (41h)
TD-4550DNWB	“5” (35h)	“B” (42h)
TD-4210D	“5” (35h)	“C” (43h)

5.2.2 Error information 1

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

5.2.3 Error information 2

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

5.2.4 Media width and length

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

(a) Continuous length tape

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

* Media Length: Fixed at 00h

Media	Media Width	Media Length
102 mm	66h	00h
90 mm	5Ah	00h
76 mm	4Ch	00h
58 mm	3Ah	00h

(b) Die-cut labels

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

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

Media	Media Width	Media Length
102 mm x 152 mm	66h	98h
102 mm x 50 mm	66h	32h
76 mm x 26 mm	4Ch	1Ah
51 mm x 26 mm	33h	1Ah

5.2.5 Media type

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

5.2.6 Status type

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

5.2.7 Phase type and phase number

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

Phase type	Value
Receiving state	00h
Printing state	01h

Receiving state

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

Printing state

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

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

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

5.2.8 Notification number

Notification	Value
Not available	00h
Cooling (started)	03h
Cooling (finished)	04h
Waiting for peeling	05h
Pausing	07h

6. Print Command List

ASCII Code	Binary Code	Description
NULL	00	Invalidate
ESC @	1B 40	Initialize
ESC i S	1B 69 53	Status information request
ESC i a	1B 69 61	Switch dynamic command mode
ESC i !	1B 69 21	Switch automatic status notification mode
ESC i U w	1B 69 55 77	Additional media information command
ESC i z	1B 69 7A	Print information command
ESC i d	1B 69 64	Specify margin amount (feed amount)
M	4D	Select compression mode
g	67	Raster graphics transfer
Z	5A	Zero raster graphics
FF	0C	Print command
Control-Z	1A	Print command with feeding
ESC i CAN	1B 69 18	Cancel
ESC i w	1B 69 77	Specify waiting time after printing each page
ESC i A	1B 69 41	Specify the page number in “cut each * labels”
ESC i M	1B 69 4D	Various mode settings
ESC i K	1B 69 4B	Expanded mode

7. Printing Command Details

NULL Invalidate

ASCII:	NULL
Hexadecimal:	00

Description

- Skipped
- 350 bytes will be sent.

ESC @ Initialize

ASCII:	ESC	@
Hexadecimal:	1B	40

Description

- Initializes mode settings.

ESC i S Status information request

ASCII:	ESC	i	S
Hexadecimal:	1B	69	53

Description

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

  Note

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

  Do not send this command while printing.

ESC i a Switch dynamic command mode

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

Parameters

Definitions of {n1}:

0: ESC/P mode

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

3: P-touch Template mode (default)

4: CPCL Page Mode

5: CPCL Line Mode

7: EPL emulation mode

8: DPL emulation mode

FF: Mode set as default

Description

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

ESC i ! Switch automatic status notification mode

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

Parameters

Definitions of {n1}

0: Notify.

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 U w　Additional media information command

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

Description

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

Note

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

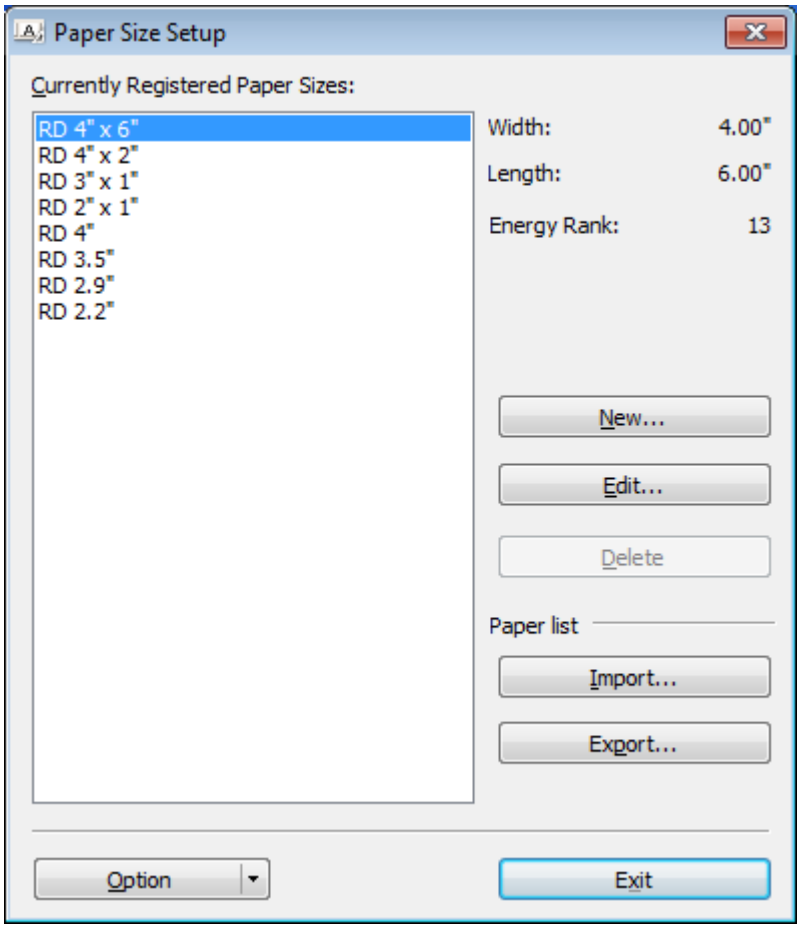
“Save Paper Size Commands” function of Paper Size Setup

1. Preparation
Install the two listed below.

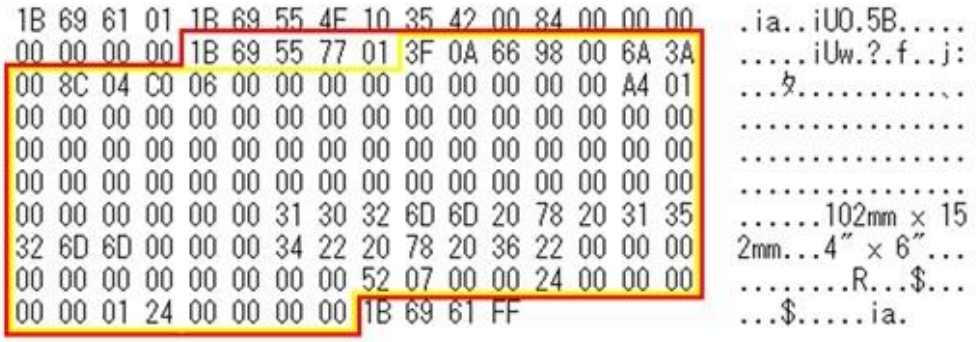
・Printer driver of the Brother TD-4xxxD
・Binary file editor.

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

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



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



ESC i z Print information command

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

Description

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

{n1}:	Valid flag; Specifies which values are valid #define PI_KIND 0x02 // Media type #define PI_WIDTH 0x04 // Media width #define PI_LENGTH 0x08 // Media length #define PI_RECOVER 0x80 // Printer recovery always on
{n2}:	Media type Continuous length tape: 0Ah Die-cut labels: 0Bh
{n3}:	{n3}: Media width (mm) {n4}: Media length (mm) For the media of width 102 mm, specify as n3 = 66h and n4 = 00h.
{n4}:	
{n5-n8}:	Raster number = n8*256*256*256 + n7*256*256 + n6*256 + n5
{n9}:	Starting page: 0 Other pages: 1
{n10}:	Fixed at 0

- If the media is not correctly loaded into the printer when the valid flag for PI_KIND, PI_WIDTH and PI_LENGTH are set to “ON”, an error status is returned (Bit 0 of “5.2.3 Error information 2” is set to “ON”.)

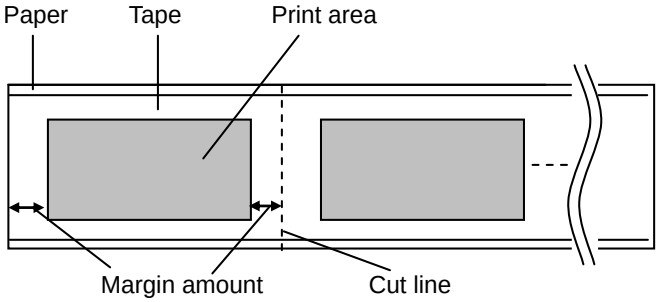
ESC i d Specify margin amount (feed amount)

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

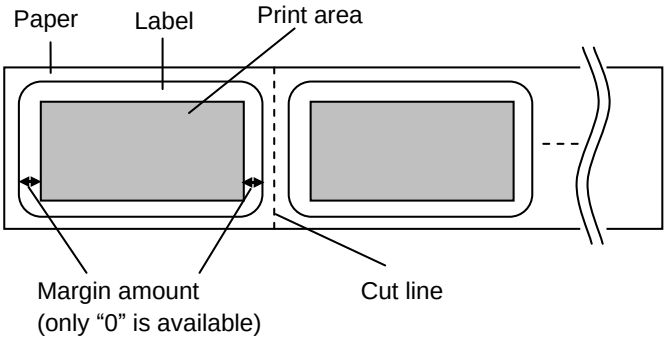
Description

- 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



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.
- Registry has to be added in order to use TIFF compression mode.
  For details, refer to section “4.2.1 Preparation”.

[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 104 bytes of compressed data with TD-4410D/4420DN/4210D (203 dpi) or 160 bytes of compressed data with TD-4510D/4520DN/4550DNWB (300 dpi), the data is treated as being all different. As a result, the data will be 105 bytes with TD-4410D/4420DN/4210D (203 dpi) or 161 bytes with TD-4510D/4520DN/4550DNWB (300 dpi), 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 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

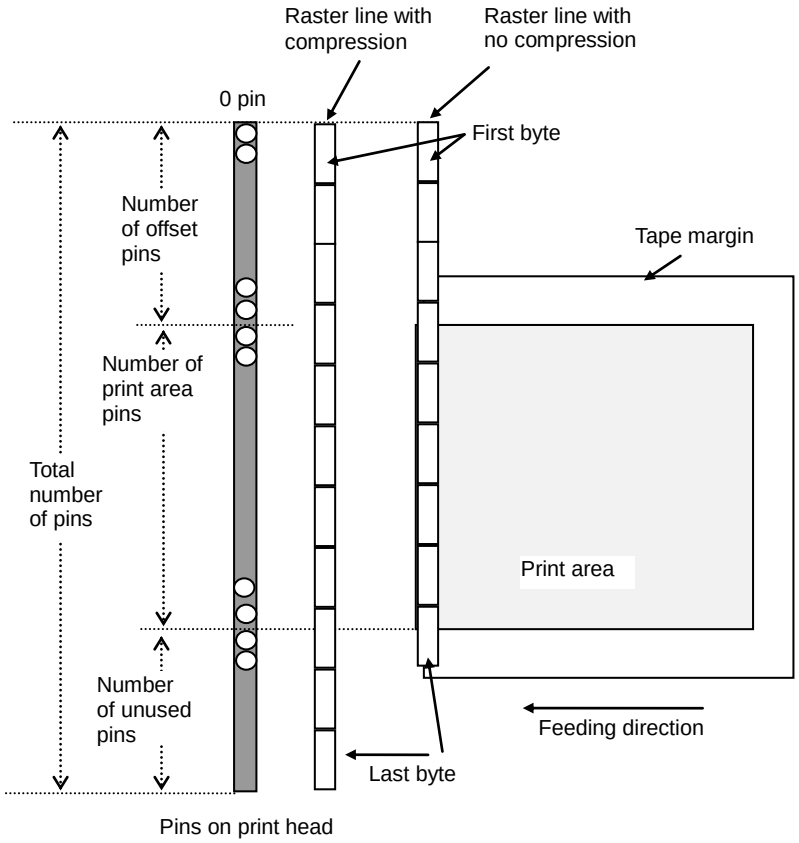
Continue for the remaining number of bytes for the uncompressed data. Even if 00h continues until the end, it cannot be omitted.

Explanation of “TIFF compression mode”

With compression, the data for the “raster graphics transfer” command is based on 104bytes (TD-4410D/4420DN/4210D (203 dpi)) or 160 bytes (TD-4510D/4520DN/4550DNWB (300 dpi)) of the total number of pins (TD-4410D/4420DN/4210D (203 dpi): 832 and TD-4510D/4520DN/4550DNWB (300 dpi): 1280).

As shown below, with no compression, the sum of the number of offset pins and the number of pins within the print area is the byte data.

However, with compression, the number of unused pins is also added to the data. In other words, with compression, this becomes 104 bytes with TD-4410D/4420DN/4210D (203 dpi) or 160 bytes with TD-4510D/4520DN/4550DNWB (300 dpi) when it is expanded by the machine, regardless of the tape width.



g Raster graphics transfer

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

Parameters

{s} 00h

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

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

(TD-4410D/4420DN/4210D: n = 104, TD-4510D/4520DN/4550DNWB: n = 160)

{d1~dn} Raster data.

Z Zero raster graphics

ASCII:	Z
Hexadecimal:	5A

Description

- Fills raster line with 0 data.

FF Print command

ASCII:	FF
Hexadecimal:	0C

Description

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

Control-Z Print command with feeding

ASCII:	Control-Z
Hexadecimal:	1A

Description

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

ESC i CAN　Cancel

ASCII:	ESC	i	CAN
Hexadecimal:	1B	69	18

Description

- Cancel sending data while sending printing data. For no-compression mode, may cancel printing previous page depending on the cancel timing.
- Printing will not be cancelled after receiving the “Control-Z Print command with feeding”.

ESC i w Specify waiting time after printing each page

ASCII:	ESC	i	w	{n1}
Hexadecimal:	1B	69	77	{n1}

Parameters

Definitions of {n1}:

0: Don't wait / Non-stop printing enabled (default)

1 ~ 255 (FFh): Time to wait = 0.1 [sec] ~ 25.5 [sec] / non-stop printing enabled

Description

- Wait for the specified duration after printing every single page.
- The accuracy of the waiting time is not guaranteed.
  This means that the printer will not stop exactly for 500 [msec] even when 500 [msec] is being set as the waiting duration.
- Especially when the specified time is very short (e.g. 100 msec), the other processes may cause the extension of the waiting time.

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.

0 ~ 3bit: Not used

4bit: Peeler 1: Peeler 0: No peeler

5bit: Not used

6bit: Auto cut 1: Auto cut 0: No auto cut

7bit: 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.

0~2bit: Not used

3bit: Cut at end 1: Cut at end (default) 0: Not cut at end

4~7bit: Not used

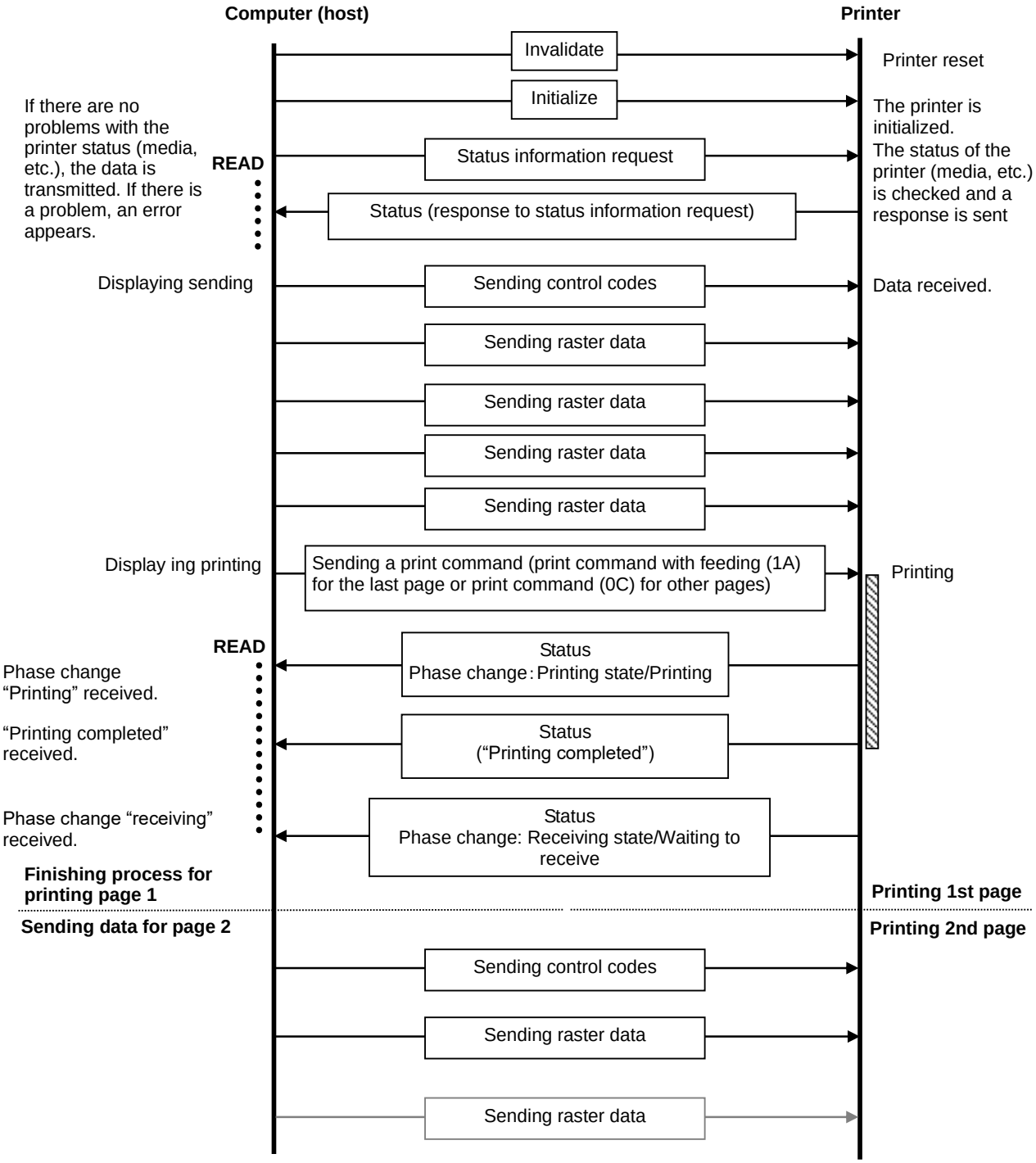
8. Flow Charts

TD-4xxxD printers perform as buffered printing.

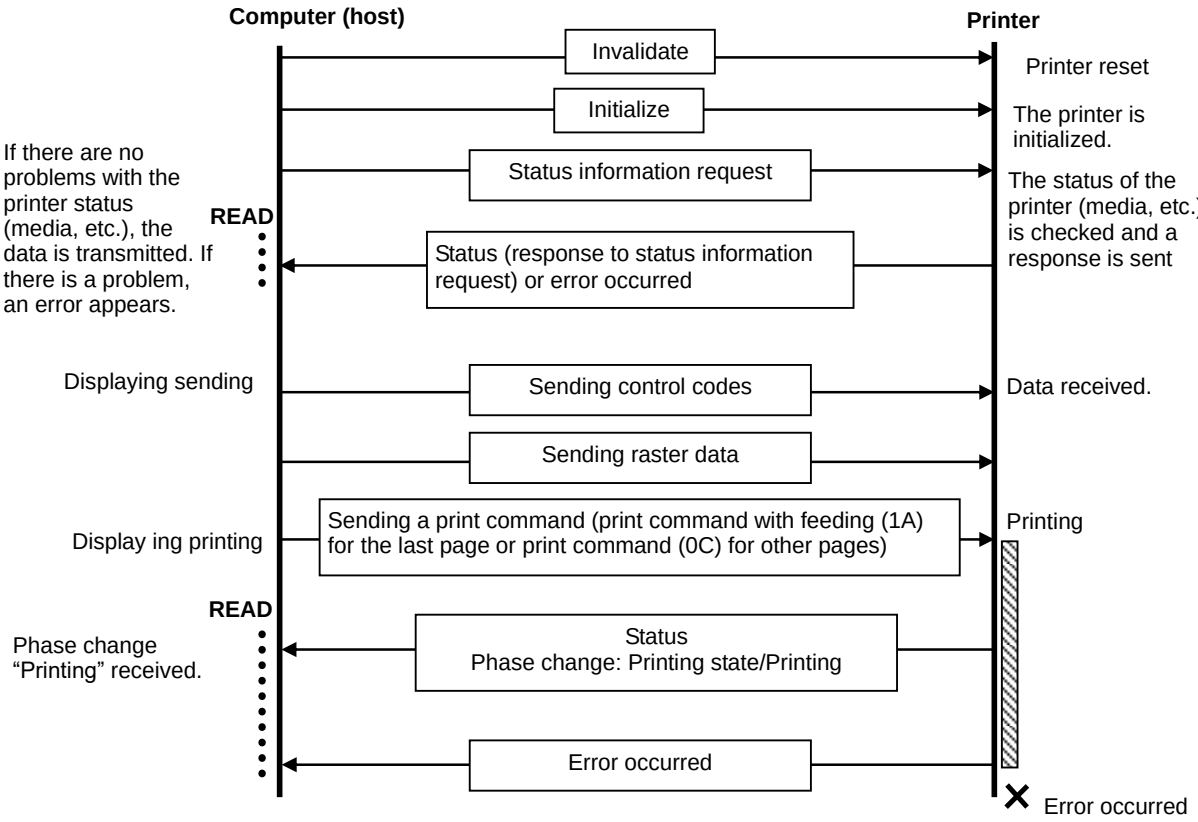
Buffered printing is a method that a print starts after one page of print data is received.

.

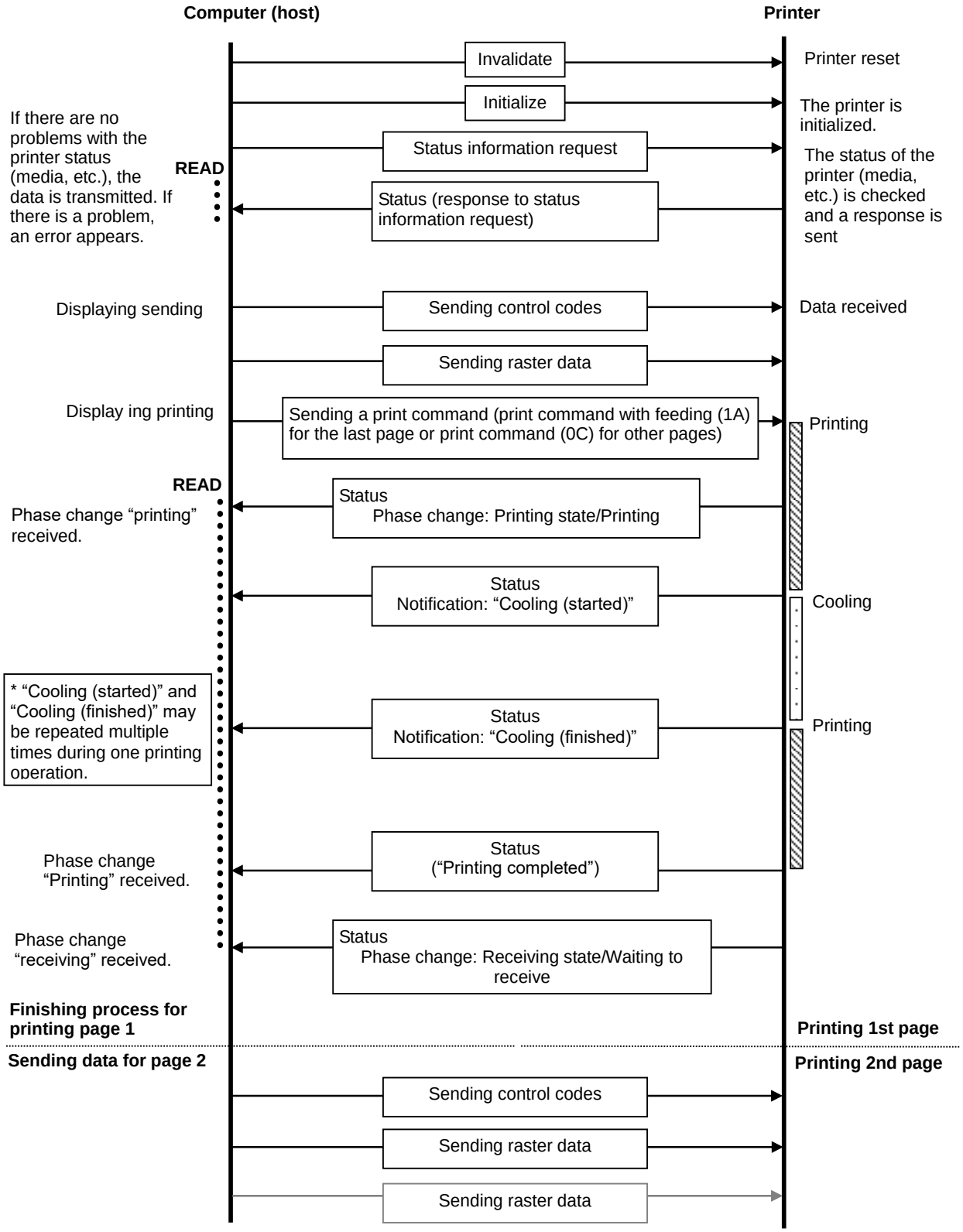
8.1 Buffered printing normal flow for USB/Bluetooth connection



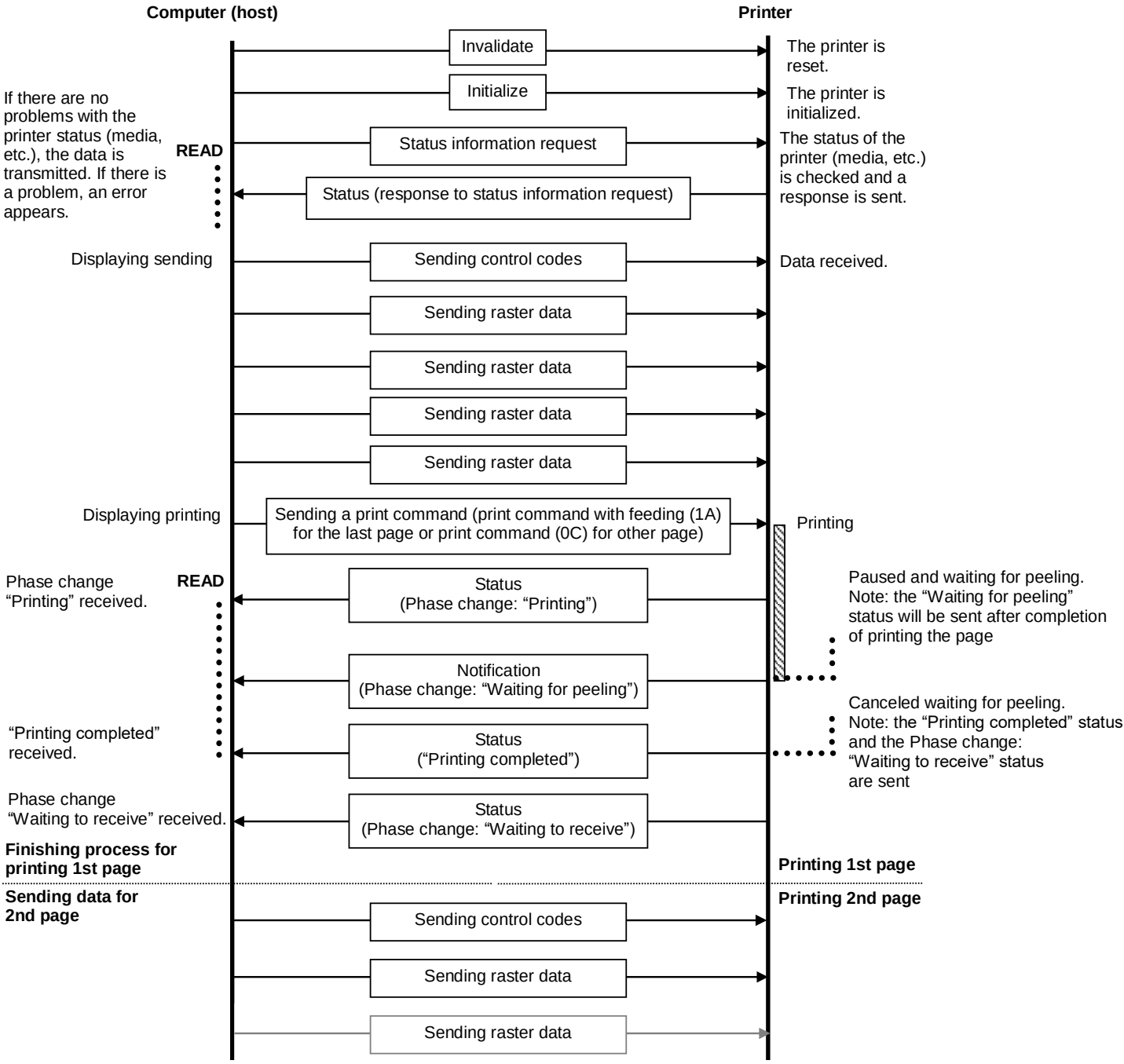
8.2 Buffered printing error flow for USB/Bluetooth connection



8.3 Buffered printing cooling flow for USB/Bluetooth connection



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

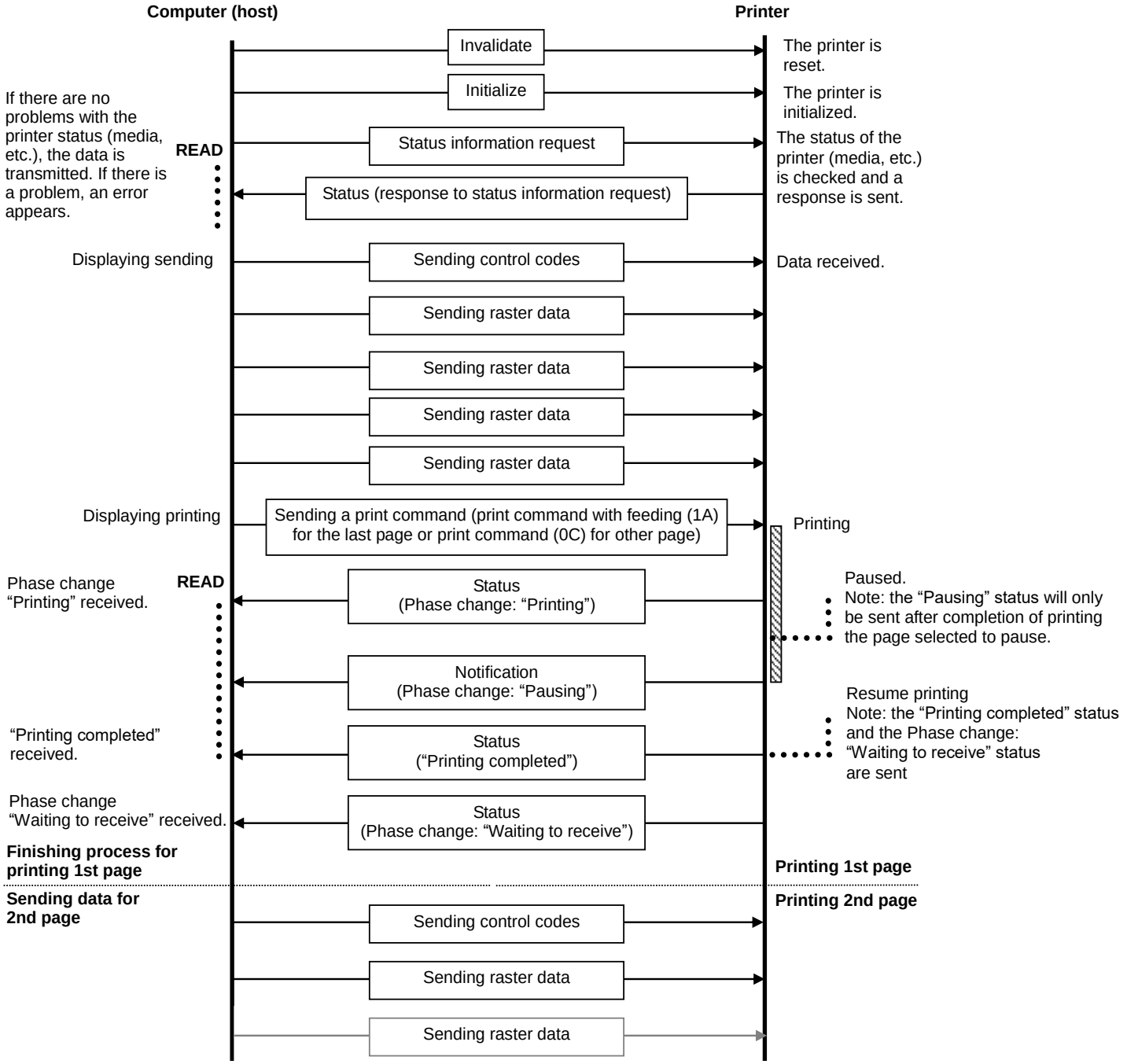


8.5 Buffered printing waiting for pausing/resumed flow for USB/Bluetooth connection

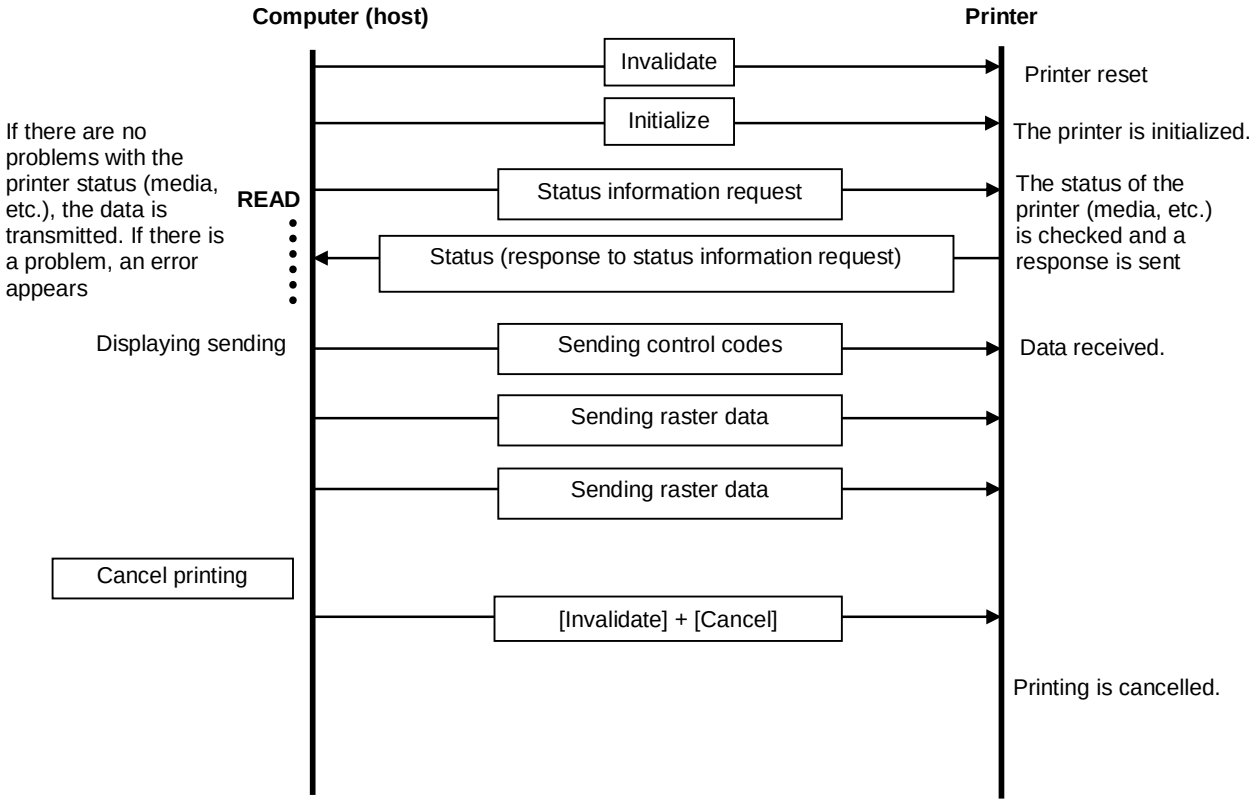
Note: Print pausing is only effective when printing pages.

“Pausing” on printer will be neglected after sending the print command with feeding (1A).

When paused, the printer will print till receiving the print command (0C), then pause.



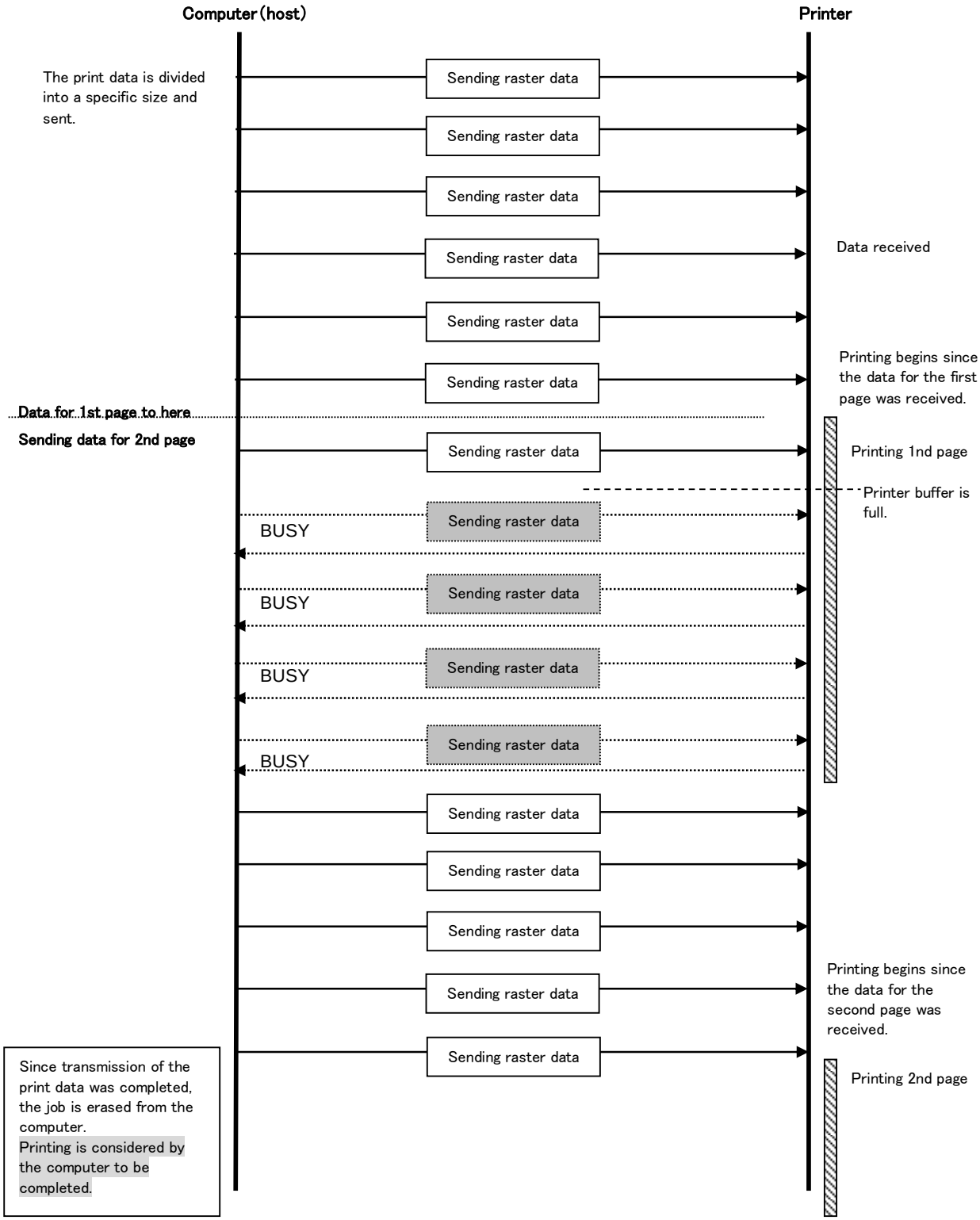
8.6 Buffered printing cancelling flow in USB/Bluetooth connection



8.7 Buffered printing normal flow for network (standard TCP/IP port) connection

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

The following example is for printing 2 pages.



Appendix A: USB Specifications

USB specifications 1.1

Item	Description
Vendor ID	0x04F9
Product ID	TD-4410D: 20b6 TD-4420DN: 20b7 TD-4510D: 20b8 TD-4520DN: 20b9 TD-4550DNWB: 20ba TD-4210D:20f2
Class	Printer
Character string for manufacturer	Character string descriptor: 0x01 0x0409: “Brother”
Character string for product	Character string descriptor: 0x02 0x0409: “TD-4410D” 0x0409: “TD-4420DN” 0x0409: “TD-4510D” 0x0409: “TD-4520DN” 0x0409: “TD-4550DNWB” 0x0409: “TD-4210D”
Character string for serial number	Character string descriptor: 0x03 0x0409: “000[Last nine digits of the printer’s serial number]”
Device speed	Full speed
Number of interfaces	1 (No alternate interfaces)
Power supply	Self-powered
End point 1	In bulk (Sends the status from the printer to the computer.) Maximum packet size: 64 bytes
End point 2	Out bulk (Sends print commands and data from the computer to the printer.) Maximum packet size: 64 bytes

Appendix B: Introducing the Brother Developer Center

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

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