

TOSHIBA

TOSHIBA Portable Printer

B-EP Series

External Equipment Interface Specification

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TOSHIBA TEC CORPORATION

MODIFICATION HISTORY

EAA-02465

EXTERNAL EQUIPMENT INTERFACE SPECIFICATION

Date	Modified Pages	Description
Sep. 19, 2008	–	Newly published.
May 11, 2009	2-2	2.3 WEIGHT and 2.5 HEAD SPECIFICATION: Values were changed.
	3-4 to 7, 45, 46, 48, 49	3.2.3 TRANSMISSION CONTROL: 3.5.2 NOTES WHEN SENDING A COMMAND: (including Ir packet error) was added to Command syntax error.
	3-40, 41, 42, 51, 53, 74, 77	The following sections were added: 3.2.9/3.3.1/3.4.1/3.5.3/3.6.1/3.7.4/3.8.4 HANDLING OF RECEIVED DATA WHEN THE PRINTER GOES INTO POWER SAVE MODE
	3-43	3.5 RS-232C INTERFACE: Received buffer was changed from 64K bytes to 512K bytes.
	3-76	3.8.3.1 INFRASTRUCTURE MODE (ESS): 3.8.3.2 ADHOC MODE (IBSS): Time-related description was added.
	4-6 to 25	The following sections were added: 4.2.3 HANDLING OF RECEIVED DATA BY COMMAND 4.2.3.1 BIT MAP FONT FORMAT COMMAND 4.2.3.2 BARCODE/2-D CODE FORMAT COMMAND 4.2.3.3 GRAPHIC COMMAND 4.2.3.4 PC SAVE COMMAND
	4-29 to 42	The following sections were added: 4.3.3 HANDLING OF RECEIVED DATA BY COMMAND 4.3.3.1 COMMAND PROCESSING 4.3.3.2 FORM STORE COMMAND 4.3.3.3 GRAPHIC DATA STORE COMMAND
	4-47 to 51	The following sections were added: 4.4.3 HANDLING OF RECEIVED DATA BY COMMAND 4.4.3.1 PAGE MODE PROCESSING
	4-56 to 60	The following sections were added: 4.5.3 HANDLING OF RECEIVED DATA BY COMMAND 4.5.3.1 PAGE MODE PROCESSING
	5-1, 2, 6-1, 2	5.1/6.1 GENERAL DESCRIPTION: Descriptions were changed.
	5-7, 6-6	5.3.1/6.3.1 LABEL SIZE SET COMMAND: Paper thickness was added to the lists.
	5-14 to 16	5.4.1 PRINT START POSITION FINE ADJUST COMMAND: [Explanation] (5) Descriptions were added. [Explanation] under (5) was deleted. [Strip position fine adjustment] Figures were changed when the label-to-label gap is 3 mm. Figures were added when the gap is 7 mm. (up to V1.0C) was added. [Notes] (6), (7) and (8) were added.

Date	Modified Pages	Description
May 11, 2009 (Continued)	5-18, 19, 7-10, 11, 10-11, 12	5.4.2/7.4.3/10.7.2 PRINT DENSITY FINE ADJUST COMMAND: [Term] Terms were added to [d]: 3: Print quality oriented, 5: Auto2 [Explanation] (6) Descriptions were added.
	5-33	5.6.2 BIT MAP FONT FORMAT COMMAND: Point counts were added for Gothic725 Black.
	5-41	5.6.2 BIT MAP FONT FORMAT COMMAND: [Explanation] (10), (11) Descriptions were added.
	5-141	5.7.1 BIT MAP FONT DATA COMMAND: The max. number of characters was changed from 64 to 63.
	5-164	5.8.1 ISSUE COMMAND: [Explanation] (4) Status response-related description was deleted.
	5-167	5.8.2 FEED COMMAND: [Notes] (4) Description was added.
	5-191	5.12.3 SAVED DATA READ COMMAND: [Notes] (6) Descriptions were added.
	5-192	5.13.1 HEAD BROKEN DOTS CHECK COMMAND: [Explanation] (2), (3) and (4) Descriptions were added.
	5-193	5.13.2 MESSAGE DISPLAY COMMAND: [Notes] (2) A 'head' was changed to a 'cover.'
	5-196, 6-73, 7-42	5.14.1 RESET COMMAND: 6.12.1/7.9.1 INITIALIZE COMMAND: [Notes] (3) USB interface-related descriptions were deleted.
	5-198, 199, 201, 6-57, 58, 75, 76, 79, 7-43, 44, 46, 8-88, 89, 91, 10-16, 17, 19, 20	5.15.1/6.13.1/7.10.1/8.11.3/10.9.1 STATUS REQUEST COMMAND: 5.12.2/6.13.2/7.10.2/8.11.4 RECEIVE BUFFER FREE SPACE STATUS REQUEST COMMAND: 6.6.1 DATA PRINT COMMAND: (including Ir packet error) was added to Command syntax error.
	5-204, 205 6-82, 83, 7-49, 8-94, 95, 10-22	5.15.3/6.13.3/7.10.3/8.11.5/10.9.2 MODE INFORMATION ACQUIRE COMMAND: Spaces (■) are added to the lists.
	6-12, 13	6.4.1 PRINT START POSITION FINE ADJUST COMMAND: [Explanation] (10) Descriptions were added. [Notes] Terms were added to (3), (7) and (8) were added.
	6-14, 15	6.4.2 PRINT DENSITY FINE ADJUST COMMAND: [Term] Terms were added to [d]: 3: Print quality oriented, 5: Auto2 [Explanation] (7) Descriptions were added.
	6-57	6.6.1 DATA PRINT COMMAND: [Explanation] (12) Status response-related description was deleted.
	6-67	6.9.1 GRAPHIC DATA STORE COMMAND: [Term] The max. number of dots was changed.

Date	Modified Pages	Description
May 11, 2009 (Continued)	7-24	7-5-10 NO. OF COLUMNS (STRINGS) COMMAND: The number of columns was represented in hex.
	8-67	8.10.47 BARCODE PRINT COMMAND: [Explanation] "NO." was changed to "No."
	8-87	8.11.2 RESET COMMAND: [Notes] (2) and (3) were deleted.
	9-2	9.2.1 COMMAND SYNTAX ERROR: ③ was added.
	9-6	The following section was added: 9.5 CHARGING ERROR
	9-10	9-11 STATUS VALUES: 'Bluetooth Initialization error' values were corrected in the list.
	9-10, 12	9-11 STATUS VALUES: 'Ir packet error' items were added to the list.
	9-12	9-11 STATUS VALUES: 'Wait for battery recovery' values were corrected in the list.
	9-13	9-11 STATUS VALUES: Description was corrected and note was deleted.
	10-4, 5	10.6.2 MODE SELECT COMMAND: [Explanation] (3) ESC/POS was added. [Notes] (2) Terms were corrected.
	10-8 to 10	10.7.1 PRINT START POSITION FINE ADJUST COMMAND: [Explanation] (5) Descriptions were changed. [Strip position fine adjustment] Figures were changed when the label-to-label gap is 3 mm. Figures were added when the gap is 7 mm. [Notes] Terms were added to (3), (6), (7) and (8) were added.
	10-14	10.8.1 INITIALIZE COMMAND: [Explanation] (3) Descriptions were changed. [Notes] (1) and (2) were added.
	10-26	10.10.4 INTERVAL/WINDOW SETTING AT THE INQUIRY/PAGE: [Explanation] (5) was added.
	11-11, 13, 15, 17, 18	11.11.3 DETAIL STATUS: 11.12 LCD MESSAGES AND LED INDICATIONS: 11.14 LCD MESSAGES IN DIFFERENT LANGUAGES: Ir PACKET ERROR items were added to the lists.
	12-1	The following section was added: 12.2.1 UTF-8 CHARACTER CODE
	12-9 to 12	12.3 TIMES ROMAN, HELVETICA, LETTER GOTHIC, PRESTIGE ELITE, COURIER, GOTHIC725 Black: (15) UTF-8 was added.
	12-16	12.4 PRESENTATION: (8) UTF-8 was added.
	12-20	12.5 OCR-A: (8) UTF-8 was added.
	12-24	12.6 OCR-B: (7) UTF-8 was added.

Date	Modified Pages	Description
May 11, 2009 (Continued)	12-25 to 32	The following sections were added: 12-7 STANDARD CHARACTER (in Japan)/KANJI (16 x 16) (in Japan)/ KANJI (24 x 24)(in Japan) 12-8 STANDARD CHARACTER (outside Japan) 12-9 CHINESE CHARACTER (24 x 24) (outside Japan) 12-10 KOREAN CHARACTER (24 x 24) (outside Japan)
	12-33, 34	12.11 BOLD CHARACTER: 12.12 PRICE CHARACTER 1/ PRICE CHARACTER 2 The following items were added: (1) Other than UTF-8 (2) UTF-8
	12-35, 43, 44	12.13 TEC OUTLINE FONT 1: The font type 'K' was added. (3) UTF-8 was added.
	12-45	12.14 PRICE FONT 1, 2, 3: (1) 'All types of character codes' were changed to 'Other than UTF-8.' (2) UTF-8 was added.
	13-1, 14-1, 15-1	13-2 KANJI CODE: 14-2 CHINESE CODE: 15-2 KOREAN CODE: UTF-8-related descriptions were added.
	13-1	The following section was added: 13.3 RESTRICTIONS ON DISCLOSURE OF SPECIFICATIONS
	Contents	In accordance with the changes above, page numbers were changed.

TABLE OF CONTENTS

	Page
1. SCOPE/GENERAL DESCRIPTION.....	1-1
1.1 SCOPE.....	1-1
1.2 GENERAL DESCRIPTION.....	1-1
1.2.1 SPECIFICATION ORGANIZATION	1-1
2. OUTLINE OF SPECIFICATIONS	2-1
2.1 GENERAL DESCRIPTION.....	2-1
2.2 DIMENSION.....	2-2
2.3 WEIGHT.....	2-2
2.4 PRINTING METHOD.....	2-2
2.5 HEAD SPECIFICATION.....	2-2
2.6 PRINT SPEED	2-2
2.7 PRINT MODE.....	2-2
2.8 FONT TYPE.....	2-3
2.8.1 BIT MAP FONT.....	2-3
2.8.2 OUTLINE FONT.....	2-4
2.9 TYPE OF BARCODE/TWO-DIMENSIONAL CODE.....	2-4
2.9.1 BARCODE	2-4
2.9.2 TWO-DIMENSIONAL CODE	2-4
2.10 FORMAT STORAGE.....	2-4
2.11 GRAPHIC STORAGE.....	2-4
2.12 WRITABLE CHARACTER STORAGE	2-5
2.13 INTERFACE.....	2-5
2.14 POWER SOURCE.....	2-5
2.15 SWITCH.....	2-5
2.16 SENSOR	2-5
2.17 LED	2-5
2.18 LCD.....	2-6
2.19 SPEAKER	2-6
2.20 ISSUE MODE.....	2-6
2.21 PAPER	2-6
2.22 CUT.....	2-7
2.23 BROKEN HEAD DOTS CHECK FUNCTION	2-7
2.24 STATUS TRANSMISSION.....	2-7
2.25 AUTO LABEL POSITIONING FUNCTION	2-7

	Page
2.26 STATUS PRINTING	2-7
2.27 CONTINUOUS PRINTING FUNCTION	2-7
2.28 STRIP ISSUE	2-8
3. INTERFACE	3-1
3.1 GENERAL DESCRIPTION	3-1
3.2 IrDA INTERFACE (TEC Protocol)	3-2
3.2.1 SPECIFICATIONS FOR PHYSICAL LAYER AND TRANSMISSION CONTROL METHOD	3-2
3.2.2 INPUT/OUTPUT SIGNAL	3-3
3.2.3 TRANSMISSION CONTROL	3-3
3.2.4 HOW TO SEND THE DATA PRINT COMMAND WHICH CANNOT BE INCLUDED IN ONE PACKET IN THE LABEL MODE	3-11
3.2.5 CONNECTION SEQUENCE EXAMPLE (LABEL MODE)	3-12
3.2.6 CONNECTION SEQUENCE EXAMPLE (TPCL, RECEIPT OR ESC/POS MODE)	3-32
3.2.7 PRINTER STATE TRANSITION (LABEL MODE)	3-38
3.2.8 PRINTER STATE TRANSITION (TPCL, RECEIPT OR ESC/POS MODE)	3-39
3.2.9 HANDLING OF RECEIVED DATA WHEN THE PRINTER GOES INTO POWER SAVE MODE	3-40
3.3 IrDA (IrCOMM) INTERFACE	3-41
3.3.1 HANDLING OF RECEIVED DATA WHEN THE PRINTER GOES INTO POWER SAVE MODE	3-41
3.4 IrDA (IrOBEX) INTERFACE	3-42
3.4.1 HANDLING OF RECEIVED DATA WHEN THE PRINTER GOES INTO POWER SAVE MODE	3-42
3.5 RS-232C INTERFACE	3-43
3.5.1 TRANSMISSION CONTROL (XON/XOFF PROTOCOL)	3-43
3.5.2 NOTES WHEN SENDING A COMMAND	3-44
3.5.3 HANDLING OF RECEIVED DATA WHEN THE PRINTER GOES INTO POWER SAVE MODE	3-51
3.6 USB INTERFACE	3-52
3.6.1 HANDLING OF RECEIVED DATA WHEN THE PRINTER GOES INTO POWER SAVE MODE	3-53
3.7 BLUETOOTH INTERFACE	3-54
3.7.1 OUTLINED SPECIFICATIONS	3-54
3.7.2 BLUETOOTH DEVICE ADDRESS (BD ADDRESS)	3-55
3.7.3 STANDARD COMMUNICATION SEQUENCE OF BLUETOOTH INTERFACE	3-56
3.8 WIRELESS LAN INTERFACE	3-75
3.8.1 OUTLINED SPECIFICATIONS	3-75
3.8.2 MAC ADDRESS	3-76
3.8.3 CONNECTION SEQUENCE	3-76
3.8.4 HANDLING OF RECEIVED DATA WHEN THE PRINTER GOES INTO POWER SAVE MODE	3-77

4. TRANSMISSION SEQUENCE.....	4-1
4.1 GENERAL DESCRIPTION.....	4-1
4.2 TPCL MODE	4-2
4.2.1 INITIAL SETTING	4-2
4.2.2 LABEL ISSUE OPERATION.....	4-4
4.2.3 HANDLING OF RECEIVED DATA BY COMMAND	4-6
4.3 LABEL MODE	4-26
4.3.1 INITIAL SETTING	4-26
4.3.2 LABEL ISSUE OPERATION.....	4-28
4.3.3 HANDLING OF RECEIVED DATA BY COMMAND	4-29
4.4 RECEIPT MODE	4-43
4.4.1 INITIAL SETTING	4-43
4.4.2 RECEIPT ISSUE OPERATION.....	4-44
4.4.3 HANDLING OF RECEIVED DATA BY COMMAND	4-47
4.5 ESC/POS MODE.....	4-52
4.5.1 INITIAL SETTING	4-52
4.5.2 RECEIPT ISSUE OPERATION.....	4-53
4.5.3 HANDLING OF RECEIVED DATA BY COMMAND	4-56
5. TPCL-LE MODE (INTERFACE COMMANDS).....	5-1
5.1 GENERAL DESCRIPTION.....	5-1
5.2 OUTLINE OF COMMANDS.....	5-3
5.2.1 FORMAT OF INTERFACE COMMAND.....	5-3
5.2.2 HOW TO USE REFERENCE	5-3
5.2.3 PRECAUTIONS	5-3
5.3 COMMANDS RELATED TO SETTING	5-4
5.3.1 LABEL SIZE SET COMMAND [ESC] D	5-4
5.3.2 PRINTER ID SET COMMAND [ESC] ID	5-10
5.3.3 MODE SELECT COMMAND [ESC] M	5-11
5.4 COMMANDS RELATED TO FINE ADJUSTMENT	5-13
5.4.1 PRINT START POSITION FINE ADJUST COMMAND [ESC] AX	5-13
5.4.2 PRINT DENSITY FINE ADJUST COMMAND [ESC] AY	5-18
5.4.3 STRIP SENSOR ADJUST COMMAND [ESC] AH	5-21
5.5 COMMANDS RELATED TO CLEAR.....	5-22
5.5.1 IMAGE BUFFER CLEAR COMMAND [ESC] C	5-22
5.5.2 CLEAR AREA COMMAND [ESC] XR	5-23

	Page
5.6 COMMANDS RELATED TO DRAWING FORMAT	5-25
5.6.1 LINE FORMAT COMMAND [ESC] LC	5-25
5.6.2 BIT MAP FONT FORMAT COMMAND [ESC] PC	5-32
5.6.3 OUTLINE FONT FORMAT COMMAND [ESC] PV	5-49
5.6.4 BARCODE FORMAT COMMAND [ESC] XB	5-67
(WPC, CODE93, CODE128, UCC/EAN128, EAN128, Customer Barcode, POSTNET, RM4SCC, KIX CODE)	
5.6.5 BARCODE FORMAT COMMAND [ESC] XB	5-82
(MSI, Interleaved 2 of 5, CODE39, NW7, Industrial 2 of 5, MATRIX 2 of 5 for NEC)	
5.6.6 BARCODE FORMAT COMMAND (GS1 Databar) [ESC] XB	5-92
5.6.7 TWO-DIMENSIONAL CODE FORMAT COMMAND (Data Matrix) [ESC] XB	5-102
5.6.8 TWO-DIMENSIONAL CODE FORMAT COMMAND (PDF417) [ESC] XB	5-112
5.6.9 TWO-DIMENSIONAL CODE FORMAT COMMAND (MicroPDF417) [ESC] XB	5-119
5.6.10 TWO-DIMENSIONAL CODE FORMAT COMMAND (QR Code) [ESC] XB	5-127
5.6.11 TWO-DIMENSIONAL CODE FORMAT COMMAND (MaxiCode) [ESC] XB	5-135
5.7 COMMANDS RELATED TO PRINT DATA	5-141
5.7.1 BIT MAP FONT DATA COMMAND [ESC] RC	5-141
5.7.2 OUTLINE FONT DATA COMMAND [ESC] RV	5-146
5.7.3 BARCODE/TWO-DIMENSIONAL CODE DATA COMMAND [ESC] RB	5-149
(Any codes other than MaxiCode)	
5.7.4 TWO-DIMENSIONAL CODE DATA COMMAND (MaxiCode) [ESC] RB	5-160
5.8 COMMANDS RELATED TO ISSUE AND FEED	5-162
5.8.1 ISSUE COMMAND [ESC] XS	5-162
5.8.2 FEED COMMAND [ESC] T	5-166
5.8.3 STORAGE AREA ALLOCATE COMMAND [ESC] XF	5-168
5.9 COMMANDS RELATED TO FORMAT	5-170
5.9.1 FLASH MEMORY FORMAT COMMAND [ESC] J1	5-170
5.10 COMMANDS RELATED TO WRITABLE CHARACTERS.....	5-171
5.10.1 2-BYTE WRITABLE CHARACTER CODE RANGE COMMAND [ESC] XE	5-171
5.10.2 BIT MAP WRITABLE CHARACTER COMMAND [ESC] XD	5-173
5.11 COMMANDS RELATED TO GRAPHICS	5-181
5.11.1 GRAPHIC COMMAND [ESC] SG	5-181
5.12 COMMANDS RELATED TO PC COMMAND SAVING	5-188
5.12.1 SAVE START COMMAND [ESC] XO	5-188
5.12.2 SAVE TERMINATE COMMAND [ESC] XP	5-190
5.12.3 SAVED DATA READ COMMAND [ESC] XQ	5-191
5.13 COMMANDS RELATED TO CHECK	5-192
5.13.1 HEAD BROKEN DOTS CHECK COMMAND [ESC] HD	5-192

	Page
5.13.2 MESSAGE DISPLAY COMMAND [ESC] XJ	5-193
5.14 COMMANDS RELATED TO CONTROL	5-195
5.14.1 RESET COMMAND [ESC] WR	5-195
5.14.2 BATCH RESET COMMAND [ESC] Z0 ^(ZERO)	5-196
5.15 COMMANDS RELATED TO STATUS	5-197
5.15.1 STATUS REQUEST COMMAND [ESC] WS, [ESC] FM, [ESC] v	5-197
5.15.2 RECEIVE BUFFER FREE SPACE STATUS REQUEST COMMAND [ESC] WB	5-200
5.15.3 MODE INFORMATION ACQUIRE COMMAND [ESC] WX	5-203
5.15.4 VERSION INFORMATION ACQUIRE COMMAND [ESC] WV	5-206
5.16 COMMANDS RELATED TO BLUETOOTH AND WIRELESS LAN	5-208
5.16.1 DEVICE ADDRESS ACQUIRE COMMAND [ESC] IT	5-208
5.16.2 BLUETOOTH RELATED PARAMETER ACQUIRE COMMAND [ESC] WT	5-209
6. LABEL MODE (INTERFACE COMMANDS)	6-1
6.1 GENERAL DESCRIPTION	6-1
6.2 OUTLINE OF COMMANDS	6-3
6.2.1 FORMAT OF INTERFACE COMMAND	6-3
6.2.2 HOW TO USE REFERENCE	6-3
6.2.3 PRECAUTIONS	6-3
6.3 COMMANDS RELATED TO SETTING	6-4
6.3.1 LABEL SIZE SET COMMAND [ESC] D	6-4
6.3.2 PRINTER ID SET COMMAND [ESC] ID	6-7
6.3.3 MODE SELECT COMMAND [ESC] M	6-8
6.4 COMMANDS RELATED TO FINE ADJUSTMENT	6-11
6.4.1 POSITION FINE ADJUST COMMAND [ESC] AX	6-11
6.4.2 PRINT DENSITY FINE ADJUST COMMAND [ESC] AY	6-14
6.4.3 STRIP SENSOR THRESHOLD VALUE SET COMMAND [ESC] AZ	6-16
6.5 COMMANDS RELATED TO DRAWING FORMAT	6-17
6.5.1 LINE FORMAT COMMAND [ESC] LC	6-17
6.5.2 BIT MAP FONT FIELD COMMAND [ESC] PC	6-19
6.5.3 OUTLINE FONT FIELD COMMAND [ESC] PV	6-25
6.5.4 BAR CODE FORMAT COMMAND (MSI, ITF, CODE39, NW7) [ESC] XB	6-34
6.5.5 BAR CODE FORMAT COMMAND (JAN8/EAN8, JAN13/EAN13) [ESC] XB	6-36
6.5.6 BAR CODE FORMAT COMMAND (EAN128, UCC/EAN128) [ESC] XB	6-37
6.5.7 BAR CODE FORMAT COMMAND (CODE128) [ESC] XB	6-38
6.5.8 BAR CODE FORMAT COMMAND (Customer Barcode) [ESC] XB	6-40

	Page
6.5.9 TWO-DIMENSIONAL CODE FORMAT COMMAND (PDF417) [ESC] XB	6-41
6.5.10 TWO-DIMENSIONAL CODE FORMAT COMMAND (QR Code) [ESC] XB	6-44
6.5.11 TWO-DIMENSIONAL CODE FORMAT COMMAND (Data Matrix) [ESC] XB	6-46
6.5.12 TWO-DIMENSIONAL CODE FORMAT COMMAND (MircoPDF417) [ESC] XB	6-48
6.5.13 TWO-DIMENSIONAL CODE FORMAT COMMAND (Maxicode) [ESC] XB	6-49
6.6 COMMANDS RELATED TO ISSUE AND FEED	6-55
6.6.1 DATA PRINT COMMAND X	6-55
6.7 COMMANDS RELATED TO FORMAT	6-62
6.7.1 FLASH MEMORY STORAGE AREA FORMAT COMMAND [ESC] J1	6-62
6.7.2 STORAGE AREA ALLOCATE COMMAND [ESC] XF	6-63
6.8 COMMANDS RELATED TO WRITABLE CHARACTERS	6-65
6.8.1 WRITABLE CHARACTER DATA STORE COMMAND [ESC] XD	6-65
6.9 COMMANDS RELATED TO GRAPHICS	6-67
6.9.1 GRAPHIC DATA STORE COMMAND [ESC] SG	6-67
6.9.2 GRAPHIC FIELD COMMAND [ESC] N	6-69
6.10 COMMANDS RELATED TO PC COMMAND SAVING	6-70
6.10.1 FORM STORE START COMMAND [ESC] XO	6-70
6.10.2 FORM STORE TERMINATE COMMAND [ESC] XP	6-71
6.11 COMMANDS RELATED TO CHECK	6-72
6.11.1 MESSAGE DISPLAY COMMAND [ESC] XJ	6-72
6.12 COMMANDS RELATED TO CONTROL	6-73
6.12.1 INITIALIZE COMMAND [ESC] WR, [ESC] @	6-73
6.12.2 BATCH RESET COMMAND [ESC] Z0 ^(zero)	6-74
6.13 COMMANDS RELATED TO STATUS	6-75
6.13.1 STATUS REQUEST COMMAND [ESC] FM, [ESC] WS, [ESC] v	6-75
6.13.2 RECEIVE BUFFER FREE SPACE STATUS REQUEST COMMAND [ESC] WB	6-78
6.13.3 MODE INFORMATION ACQUIRE COMMAND [ESC] WX	6-81
6.13.4 VERSION INFORMATION ACQUIRE COMMAND [ESC] WV	6-84
6.14 COMMANDS RELATED TO BLUETOOTH AND WIRELESS LAN	6-86
6.14.1 DEVICE ADDRESS ACQUIRE COMMAND [ESC] IT	6-86
6.14.2 BLUETOOTH RELATED PARAMETER ACQUIRE COMMAND [ESC] WT	6-87
7. RECEIPT MODE (INTERFACE COMMANDS).....	7-1
7.1 GENERAL DESCRIPTION	7-1
7.2 OUTLINE OF COMMANDS	7-2
7.2.1 FORMAT OF INTERFACE COMMAND	7-2

	Page
7.2.2 HOW TO USE REFERENCE	7-2
7.2.3 PRECAUTIONS	7-3
7.3 COMMANDS RELATED TO SETTING	7-4
7.3.1 MODE SELECT COMMAND [ESC] M	7-4
7.3.2 PRINTER ID SET COMMAND [ESC] ID	7-7
7.4 COMMANDS RELATED TO FINE ADJUSTMENT	7-8
7.4.1 LINE FEED LENGTH SET COMMAND [ESC] 3	7-8
7.4.2 PRINT POSITION ALIGN COMMAND [ESC] a	7-9
7.4.3 PRINT DENSITY FINE ADJUST COMMAND [ESC] AY	7-10
7.5 COMMANDS RELATED TO DRAWING FORMAT	7-12
7.5.1 LINE FORMAT COMMAND [ESC] L	7-12
7.5.2 FONT TYPE COMMAND [ESC] K	7-14
7.5.3 OUTLINE FONT FORMAT COMMAND [ESC] KV	7-15
7.5.4 BAR CODE/TWO-DIMENSIONAL CODE PRINT COMMAND [GS] k	7-16
7.5.5 CHARACTER MAGNIFICATION COMMAND [ESC] !	7-18
7.5.6 BARCODE HORIZONTAL SIZE COMMAND [GS] w	7-19
7.5.7 BARCODE HEIGHT COMMAND [GS] h	7-21
7.5.8 NUMERALS UNDER BARS COMMAND [GS] Hn	7-22
7.5.9 SECURITY LEVEL COMMAND [GS] s	7-23
7.5.10 NO. OF COLUMNS (STRINGS) COMMAND [GS] c	7-24
7.5.11 PRINT WIDTH COMMAND [ESC] W	7-25
7.5.12 HORIZONTAL PRINT POSITION COMMAND [ESC] H	7-26
7.5.13 HORIZONTAL OFFSET POSITION COMMAND [ESC] O	7-28
7.5.14 CHARACTER ROTATE COMMAND [ESC] R	7-30
7.5.15 ERROR CORRECTION LEVEL SET COMMAND [GS] q	7-31
7.5.16 QR CODE MODEL SET COMMAND [GS] r	7-32
7.6 COMMANDS RELATED TO ISSUE AND FEED	7-33
7.6.1 PRINT LINE FEED COMMAND [LF]	7-33
7.6.2 BACK FEED OMISSION COMMAND [ESC] B	7-34
7.6.3 PAGE MODE SELECT COMMAND [GS] C	7-35
7.6.4 PAGE MODE PRINT COMMAND [FF]	7-36
7.6.5 PAGE MODE CANCEL COMMAND [CAN]	7-37
7.7 COMMANDS RELATED FORMAT	7-38
7.7.1 FLASH MEMORY FORMAT COMMAND [ESC] J1	7-38
7.8 COMMANDS RELATED TO GRAPHICS	7-39
7.8.1 GRAPHIC DATA STORE COMMAND [ESC] SG	7-39

	Page
7.8.2 GRAPHIC PRINT COMMAND [GS] /	7-41
7.9 COMMANDS RELATED TO CONTROL	7-42
7.9.1 INITIALIZE COMMAND [ESC] @, [ESC] WR	7-42
7.10 COMMANDS RELATED TO STATUS	7-43
7.10.1 STATUS REQUEST COMMAND [ESC] v, [[ESC] FM, [ESC] WS	7-43
7.10.2 RECEIVE BUFFER FREE SPACE STATUS REQUEST COMMAND [ESC] WB	7-45
7.10.3 MODE INFORMATION ACQUIRE COMMAND [ESC] WX	7-48
7.10.4 VERSION INFORMATION ACQUIRE COMMAND [ESC] WV	7-50
7.11 COMMANDS RELATED TO BLUETOOTH AND WIRELESS LAN	7-52
7.11.1 DEVICE ADDRESS ACQUIRE COMMAND [ESC] IT	7-52
7.11.2 BLUETOOTH RELATED PARAMETER ACQUIRE COMMAND [ESC] WT	7-53
7.12 COMMANDS RELATED TO MACRO SETTING	7-54
7.12.1 MACRO DEFINITION COMMAND [GS] :	7-54
7.12.2 MACRO EXECUTE COMMAND [GS] ^ <Data> [NUL]	7-55
7.13 EXAMPLES	7-56
7.13.1 EXAMPLES OF USING COMMANDS	7-56
8. ESC/POS (INTERFACE COMMANDS)	8-1
8.1 GENERAL DESCRIPTION	8-1
8.2 OUTLINE OF COMMANDS	8-2
8.2.1 FORMAT OF INTERFACE COMMAND	8-2
8.2.2 HOW TO USE REFERENCE	8-2
8.2.3 PRECAUTIONS	8-3
8.3 FONT SPECIFICATIONS	8-3
8.4 EXTERNAL (CUSTOM) CHARACTERS SPECIFICATIONS	8-3
8.5 INPUT DATA BUFFER	8-3
8.6 VALUE SPECIFIED BY EACH COMMAND	8-4
8.7 EXPANSION OF PRINT DATA IN PRINT AREA	8-5
8.8 EXAMPLE OF RECEIPT PRINTER PRINT LAYOUT (B-EP2D)	8-6
8.9 EXCEPTION HANDLING	8-7
8.9.1 UNDEFINED CODE	8-7
8.9.2 UNDEFINED COMMAND	8-7
8.9.3 SETTING OUT OF DEFINED RANGE	8-7
8.10 ESC/POS COMMANDS	8-8
8.10.1 HORIZONTAL TAB COMMAND [HT]	8-8
8.10.2 LINE FEED COMMAND [LF]	8-9

	Page
8.10.3 PAGE MODE PRINT COMMAND	[FF] .....8-10
8.10.4 PAGE MODE CANCEL COMMAND	[CAN] .....8-11
8.10.5 PAGE MODE COLLECTIVE PRINT COMMAND	[ESC] [FF] .....8-12
8.10.6 SPACING SET COMMAND	[ESC] [SP] .....8-13
8.10.7 PRINT MODE ALL SET COMMAND	[ESC] !8-14
8.10.8 DOWNLOADED CHARACTER (WRITABLE CHARACTER) SET COMMAND	[ESC] %8-16
8.10.9 DOWNLOADED CHARACTER (WRITABLE CHARACTER) DEFINE COMMAND	[ESC] &8-17
8.10.10 BIT IMAGE MODE SELECT COMMAND	[ESC] *8-20
8.10.11 UNDERLINING SET COMMAND	[ESC] -8-23
8.10.12 DOWNLOADED CHARACTER ERASE COMMAND	[ESC] ?8-24
8.10.13 30-DOT LINE FEED LENGTH SET COMMAND	[ESC] 2 .....8-25
8.10.14 MINIMUM DOTS FOR LINE FEED LENGTH SET COMMAND	[ESC] 3 .....8-26
8.10.15 PRINTER SELECT/DESELECT COMMAND	[ESC] =8-27
8.10.16 INITIALIZE COMMAND	[ESC] @8-28
8.10.17 HORIZONTAL TAB POSITIONS SET COMMAND	[ESC] D .....8-30
8.10.18 BOLD PRINTING SET COMMAND	[ESC] E .....8-32
8.10.19 DOUBLE PRINTING SET COMMAND	[ESC] G .....8-33
8.10.20 FEED LENGTH SET COMMAND	[ESC] J .....8-34
8.10.21 SWITCHING TO PAGE MODE COMMAND	[ESC] L .....8-35
8.10.22 INTERNATIONAL CHARACTER SELECT COMMAND	[ESC] R .....8-36
8.10.23 SWITCHING TO STANDARD MODE COMMAND	[ESC] S .....8-38
8.10.24 PAGE MODE PRINT DIRECTION SET COMMAND	[ESC] T .....8-39
8.10.25 CHARACTER ROTATION SET COMMAND	[ESC] V .....8-40
8.10.26 PAGE MODE PRINT AREA SET COMMAND	[ESC] W .....8-41
8.10.27 JUSTIFICATION COMMAND	[ESC] a .....8-43
8.10.28 PANEL KEY (FEED KEY) SET COMMAND	[ESC] c5 .....8-44
8.10.29 PAPER FEED LENGTH SET COMMAND	[ESC] d .....8-45
8.10.30 CODE PAGE NO. SELECT COMMAND	[ESC] t .....8-46
8.10.31 INVERTED PRINTING SET COMMAND	[ESC] {8-47
8.10.32 ABSOLUTE POSITION SET COMMAND	[ESC] \$8-48
8.10.33 RELATIVE POSITION SET COMMAND	[ESC] \8-49
8.10.34 CHINESE CHARACTER PRINT MODE ALL SET COMMAND	[FS] !8-50
8.10.35 CHINESE CHARACTER MODE SET COMMAND	[FS] &8-51
8.10.36 CHINESE CHARACTER UNDERLINING SET COMMAND	[FS] -8-52

	Page
8.10.37 CHINESE CHARACTER MODE CANCEL COMMAND [FS]	8-53
8.10.38 WRITABLE CHARACTER OF CHINESE CHARACTER DEFINE COMMAND	
[FS] 2	8-54
8.10.39 CHINESE CHARACTER CODE SYSTEM SET COMMAND [FS] C	8-56
8.10.40 CHINESE CHARACTER SPACING SET COMMAND [FS] S	8-58
8.10.41 CHINESE CHARACTER MAGNIFICATION SET COMMAND [FS] W	8-60
8.10.42 PAGE MODE ABSOLUTE POSITION SET COMMAND [GS] \$	8-61
8.10.43 REVERSE CHARACTER SET COMMAND [GS] B	8-62
8.10.44 ID TRANSMISSION COMMAND [GS] I	8-63
8.10.45 PAGE MODE RELATIVE POSITION IN VERTICAL DIRECTION SET COMMAND	
[GS] \	8-64
8.10.47 BARCODE PRINT COMMAND [GS] k	8-65
8.10.48 APPENDIX: BARCODE	8-69
8.10.49 BARCODE HORIZONTAL SIZE COMMAND [GS] w	8-72
8.10.50 BARCODE HEIGHT COMMAND [GS] h	8-74
8.10.51 NUMERALS UNDER BARS COMMAND [GS] H	8-75
8.10.52 PRINT AREA WIDTH SET COMMAND [GS] W	8-76
8.10.53 DOWNLOADED BIT IMAGE DEFINE COMMAND [GS] *	8-77
8.10.54 DOWNLOADED BIT IMAGE PRINT MODE SET COMMAND [GS] /	8-79
8.10.55 MACRO DEFINITION START/END COMMAND [GS] :	8-80
8.10.56 MACRO EXECUTE COMMAND [GS] ^	8-81
8.10.58 LEFT MARGIN SET COMMAND [GS] L	8-82
8.10.59 CHARACTER SIZE SET COMMAND [GS] !	8-83
8.11 TEC ORIGINAL COMMANDS	8-84
8.11.1 MODE SELECT COMMAND [ESC] M	8-84
8.11.2 RESET COMMAND [ESC] WR	8-87
8.11.3 STATUS REQUEST COMMAND [ESC] v, [[ESC] FM, [ESC] WS	8-88
8.11.4 RECEIVE BUFFER FREE SPACE STATUS REQUEST COMMAND [ESC] WB	8-90
8.11.5 MODE INFORMATION ACQUIRE COMMAND [ESC] WX	8-93
8.11.6 DEVICE ADDRESS ACQUIRE COMMAND [ESC] IT	8-96
8.11.7 BLUETOOTH RELATED PARAMETER ACQUIRE COMMAND [ESC] WT	8-97
9. ERROR PROCESSING	9-1
9.1 GENERAL DESCRIPTION	9-1
9.2 COMMUNICATION ERRORS	9-2
9.2.1 COMMAND SYNTAX ERROR	9-2

	Page
9.2.2 HARDWARE ERROR	9-2
9.3 ERRORS IN ISSUING OR FEEDING.....	9-3
9.3.1 PAPER JAM / LABEL END / NORMAL END + LABEL END.....	9-3
9.3.2 BROKEN HEAD DOTS ERROR	9-5
9.3.3 THERMAL HEAD EXCESSIVE TEMPERATURE.....	9-5
9.3.4 COVER OPEN ERROR	9-5
9.4 BATTERY ERROR.....	9-6
9.4.1 LOW BATTERY	9-6
9.4.2 ABNORMAL HIGH VOLTAGE	9-6
9.4.3 ABNORMAL BATTERY TEMPERATURE	9-6
9.5 CHARGING ERROR	9-6
9.6 BLUETOOTH SETTING ERROR	9-6
9.7 ERRORS IN WRITABLE CHARACTER AND PC COMMAND SAVE MODES	9-6
9.7.1 WRITE ERROR	9-6
9.7.2 FORMAT ERROR.....	9-6
9.7.3 MEMORY FULL	9-6
9.8 SYSTEM ERRORS	9-7
9.8.1 ADDRESS ERROR.....	9-7
9.8.2 GENERAL INVALID COMMAND EXCEPTION	9-7
9.8.3 SLOT INVALID EXCEPTION	9-7
9.8.4 PCB IDENTIFICATION ERROR	9-7
9.8.5 THERMAL HEAD IDENTIFICATION ERROR.....	9-7
9.9 OPERATIONS WHEN AN ERROR OCCURS.....	9-8
9.10 OPERATIONS AFTER AN ERROR IS CLEARED	9-8
9.10.1 LABEL MODE	9-8
9.10.2 RECEIPT MODE.....	9-8
9.10.3 RECEIPT1 MODE OR ESC/POS MODE.....	9-8
9.10.4 TPCL MODE	9-8
9.11 STATUS VALUES	9-9
10. SYSTEM MODE.....	10-1
10.1 GENERAL DESCRIPTION	10-1
10.2 STARTING THE PRINTER IN SYSTEM MODE	10-1
10.3 COMMUNICATIONS CONDITIONS	10-1
10.4 LIMITATIONS IN SYSTEM MODE	10-1
10.5 OUTLINE OF COMMANDS.....	10-2

	Page
10.5.1	FORMAT OF INTERFACE COMMAND.....10-2
10.5.2	HOW TO USE REFERENCE.....10-2
10.5.3	PRECAUTIONS.....10-2
10.6	COMMANDS RELATED TO SETTING.....10-3
10.6.1	ID SET COMMAND [ESC] ID .....10-3
10.6.2	MODE SELECT COMMAND [ESC] M .....10-4
10.7	COMMANDS RELATED TO FINE ADJUSTMENT.....10-7
10.7.1	POSITION FINE ADJUST COMMAND [ESC] AX .....10-7
10.7.2	PRINT DENSITY FINE ADJUST COMMAND [ESC] AY .....10-11
10.7.3	STRIP SENSOR THRESHOLD VALUE SET COMMAND [ESC] AH, [ESC] AZ ...10-13
10.8	COMMANDS RELATED TO CONTROL.....10-14
10.8.1	INITIALIZE COMMAND [ESC] WR, [ESC] @ ...10-14
10.9	COMMANDS RELATED TO STATUS.....10-15
10.9.1	STATUS REQUEST COMMAND [ESC] FM, [ESC] WS, [ESC] v .....10-15
10.9.2	MODE INFORMATION ACQUIRE COMMAND [ESC] WX .....10-21
10.10	COMMANDS RELATED TO BLUETOOTH AND WIRELESS LAN.....10-23
10.10.1	DEVICE ADDRESS ACQUIRE COMMAND [ESC] IT .....10-23
10.10.2	BLUETOOTH DEVICE NICKNAME SETTING [ESC] BN .....10-24
10.10.3	INQUIRY RESPONSE TIME SETTING COMMAND [ESC] BZ .....10-25
10.10.4	INTERVAL/WINDOW SETTING AT THE INQUIRY/PAGE [ESC] BQ.....10-26
10.10.5	BONDING SETTING COMMAND [ESC] BP .....10-27
10.10.6	BONDING TABLE DELETION COMMAND [ESC] BE .....10-29
10.10.7	SECURITY SETTING COMMAND [ESC] BS .....10-30
10.10.8	BLUETOOTH RELATED PARAMETER ACQUIRE COMMAND [ESC] WT .....10-31
10.11	SETUP MODE.....10-33
10.11.1	GENERAL DESCRIPTION .....10-33
10.11.2	HOW TO ENTER INTO SETUP MODE .....10-33
10.11.3	AUTO POWER-OFF FUNCTION DURING SETTING .....10-33
10.11.4	HOW TO CHECK EACH SETUP MODE .....10-33
10.11.5	OTHER .....10-33
11.	OTHER FUNCTIONS.....11-1
11.1	GENERAL DESCRIPTION.....11-1
11.2	REPRINT FUNCTION.....11-2
11.2.1	LABEL MODE .....11-2
11.2.2	RECEIPT OR ESC/POS MODE .....11-2

	Page
11.2.3 TPCL MODE	11-2
11.2.4 TPCL1 MODE	11-2
11.3 POWER SAVE MODE	11-2
11.4 AUTOMATIC LABEL PRINT POSITIONING	11-3
11.4.1 LABEL MODE, TPCL MODE	11-3
11.4.2 RECEIPT MODE	11-3
11.5 CONTINUOUS PRINTING FUNCTION	11-3
11.5.1 LABEL MODE, RECEIPT MODE (Mode = 1)	11-3
11.5.2 RECEIPT1 MODE (Mode = 2), TPCL MODE (Mode = A), TPCL1 MODE (Mode = B), ESC/POS MODE (Mode = 4)	11-3
11.6 AUTOMATIC LABEL PRINT POSITIONING AT POWER ON TIME	11-3
11.6.1 DESTINED FOR JAPAN	11-3
11.6.2 DESTINED OVERSEAS	11-3
11.7 BD ADDRESS PRINTING FUNCTION	11-3
11.8 WIRELESS LAN PARAMETER SETTINGS PRINTING FUNCTION	11-4
11.9 STRIP ISSUE MODE	11-4
11.11 STATUS	11-5
11.11.1 FUNCTIONS	11-5
11.11.2 STATUS FORMAT	11-7
11.11.3 DETAIL STATUS	11-10
11.12 LCD MESSAGES AND LED INDICATIONS	11-14
11.13 LIST OF CHARING ERROR NO. AND DETAILS	11-16
11.14 LCD MESSAGES IN DIFFERENT LANGUAGES	11-17
12. CHARACTER CODE TABLE	12-1
12.1 GENERAL DESCRIPTION	12-1
12.2 CHARACTER CODE	12-1
12.2.1 UTF-8 CHARACTER CODE	12-1
12.3 TIMES ROMAN, HELVETICA, LETTER GOTHIC, PRESTIGE ELITE, COURIER, GOTHIC725 Black	12-2
12.4 PRESENTATION	12-13
12.5 OCR-A	12-17
12.6 OCR-B	12-21
12.7 STANDARD CHARACTER (in Japan)/KANJI (16 x 16) (in Japan)/KANJI (24 x 24)(in Japan)	12-25
12.8 STANDARD CHARACTER (outside Japan)	12-27
12.9 CHINESE CHARACTER (24 x 24) (outside Japan)	12-29
12-10 KOREAN CHARACTER (24 x 24) (outside Japan)	12-31
12.11 BOLD CHARACTER	12-33

	Page
12.12 PRICE CHARACTER 1/PRICE CHARACTER 2	12-34
12.13 TEC OUTLINE FONT 1	12-35
12.14 PRICE FONT 1, 2, 3.....	12-45
13. KANJI CODE TABLE	13-1
13.1 GENERAL DESCRIPTION	13-1
13.2 KANJI CODE	13-1
13.3 RESTRICTIONS ON DISCLOSURE OF SPECIFICATIONS	13-1
13.4 KANJI (16 x 16, 24 x 24, 32 x 32).....	13-2
13.5 16 x 16 KANJI CODE TABLE	13-3
13.5.1 CHARACTERS INCLUDING SYMBOLS OTHER THAN KANJI (8140H to 83FCH)	13-3
13.5.2 EXTENDED CHARACTER, LEVEL 1 (8740H to 89AFH)	13-5
13.5.3 LEVEL 2 (9890H to 99BFH)	13-12
13.5.4 WRITABLE CHARACTER AREA (EDC0H to F0FCH).....	13-24
13.5.5 WRITABLE CHARACTER AREA (FF40H to FFFCH).....	13-26
13.6 24 x 24 KANJI CODE TABLE	13-27
13.6.1 CHARACTERS INCLUDING SYMBOLS OTHER THAN KANJI (8140H to 83FCH)	13-27
13.6.2 EXTENDED CHARACTER, LEVEL 1 (8740H to 89AFH)	13-29
13.6.3 LEVEL 2 (9890H to 99BFH)	13-36
13.6.4 NEC-SELECTED IBM EXTENDED CHARACTER (EAB0H to EDBFH)	13-47
13.6.5 NEC-SELECTED IBM EXTENDED CHARACTER, WRITABLE CHARACTER AREA	13-48
(EDC0H to F0FCH)	
13.6.6 IBM EXTENDED CHARACTER (FA40H to FCFCH)	13-49
13.6.7 WRITABLE CHARACTER AREA (FF40H to FFFCH).....	13-50
13.7 32 x 32 KANJI CODE TABLE	13-51
13.7.1 CHARACTERS INCLUDING SYMBOLS OTHER THAN KANJI (8140H to 83FCH)	13-51
13.7.2 EXTENDED CHARACTER, LEVEL 1 (8740H to 89AFH)	13-53
13.7.3 LEVEL 2 (9890H to 99BFH)	13-60
13.7.4 WRITABLE CHARACTER AREA (EDC0H to F0FCH).....	13-72
14. CHINESE CODE TABLE	14-1
14.1 GENERAL DESCRIPTION	14-1
14.2 CHINESE CODE	14-1
14.3 GB18030 (two-byte code)	14-2
14.4 GB18030 (four-byte code)	14-18

15. KOREAN CODE TABLE	15-1
15.1 GENERAL DESCRIPTION	15-1
15.2 KOREAN CODE	15-1
15.3 TWO-BYTE CHARACTER	15-2
 16. BARCODE/TWO-DIMENSIONAL CODE TABLE	 16-1
16.1 GENERAL DESCRIPTION	16-1
16.2 JAN8/EAN8, JAN13/EAN13, UPC-E, UPC-A, UCC/EAN128, EAN128, Interleaved 2 of 5 (ITF), MSI, Industrial 2 of 5, RSS-14, RSS-14 Stacked, RSS-14 Stacked Omni-directional, RSS Limited, EAN13 + 2 digits, EAN13 + 5 digits, UPC-E + 2 digits, UPC-E + 5 digits, EAN8 + 2 digits, EAN8 + 5 digits, UPC-A + 2 digits, UPC-A + 5 digits.....	16-2
16.3 CUSTOMER BARCODE	16-3
16.4 POSTNET	16-4
16.5 RM4SCC	16-4
16.6 KIX CODE	16-5
16.7 CODE39 (Standard)	16-6
16.8 CODE39 (Full ASCII)	16-7
16.9 NW-7	16-8
16.10 CODE93	16-9
16.11 CODE128	16-10
16.11.1 TRANSFER CODE	16-10
16.11.2 HOW TO TRANSMIT THE CONTROL CODE DATA	16-10
16.11.3 HOW TO TRANSMIT THE SPECIAL CODES	16-10
16.11.4 DESIGNATION OF START CODE	16-10
16.11.5 VALUE CODE TABLE.....	16-11
16.11.6 RSS EXPANDED, RSS EXPANDED STACKED	16-12
16.12 DATA MATRIX	16-13
16.12.1 FORMAT ID	16-13
16.12.2 TRANSFER CODE	16-13
16.12.3 HOW TO TRANSMIT THE CONTROL CODE DATA	16-13
16.12.4 HOW TO TRANSMIT THE SPECIAL CODES	16-13
16.12.5 HOW TO TRANSMIT THE KANJI CODES	16-13
16.13 PDF417, MicroPDF417	16-14
16.13.1 MODE/CODE	16-14
16.13.2 TRANSFER CODE	16-15
16.13.3 HOW TO TRANSMIT THE CONTROL CODE DATA	16-15

	Page
16.13.4 HOW TO TRANSMIT THE SPECIAL CODES	16-15
16.13.5 HOW TO TRANSMIT THE KANJI CODES	16-15
16.14 QR CODE	16-16
16.14.1 MODE SELECTION	16-16
16.14.2 TRANSFER CODE	16-17
16.14.3 HOW TO TRANSMIT THE CONTROL CODE DATA	16-18
16.14.4 HOW TO TRANSMIT THE SPECIAL CODES	16-18
16.14.5 HOW TO TRANSMIT THE KANJI CODES	16-18
16.15 MAXICODE	16-19
16.15.1 When the MaxiCode specification is set to "TYPE1: Compatible with the current version" in the system mode:	16-20
16.15.2 When the MaxiCode specification is set to "TYPE2: Special specification" in the system mode:	16-21
16.16 DRAWING OF BARCODE DATA	16-22
16.17 AUTOMATIC ADDITION OF START/STOP CODES	16-44

1. SCOPE/GENERAL DESCRIPTION

1.1 SCOPE

This specification applies to the software that is used with the “B-EP series” portable printer.

1.2 GENERAL DESCRIPTION

The external equipment interface connects a printer to the host computer through the IrDA, RS-232C, Bluetooth[®], wireless LAN or USB interface for storing forms, or issuing labels or receipts. This specification describes how to use the external equipment interface.

The specification is organized as below. Refer to each chapter according to your needs.

1.2.1 SPECIFICATION ORGANIZATION

- Chapter 1: SCOPE/GENERAL DESCRIPTION
- Chapter 2: OUTLINE OF SPECIFICATIONS
- Chapter 3: INTERFACE
- Chapter 4: TRANSMISSION SEQUENCE
- Chapter 5: TPCL MODE (INTERFACE COMMANDS)
- Chapter 6: LABEL MODE (INTERFACE COMMANDS)
- Chapter 7: RECEIPT MODE (INTERFACE COMMANDS)
- Chapter 8: ESC/POS MODE (INTERFACE COMMANDS)
- Chapter 9: ERROR PROCESSING
- Chapter 10: SYSTEM MODE
- Chapter 11: OTHER FUNCTIONS
- Chapter 12: CHARACTER CODE TABLE
- Chapter 13: KANJI CODE TABLE
- Chapter 14: CHINESE CODE TABLE
- Chapter 15: KOREAN CODE TABLE
- Chapter 16: BARCODE/TWO-DIMENSIONAL CODE TABLE

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2. OUTLINE OF SPECIFICATIONS

2.1 GENERAL DESCRIPTION

This chapter describes the outline of specifications – modes, which the printer has. For more details, refer to the appropriate chapter.

■ [TPCL (TEC Printer Command Language) mode]

The printer draws data according to the format information and print data sent from the host, and issues labels according to the Issue Command.

■ [LABEL mode]

The label format information, graphic data, or writable character data sent from the host, is previously stored in flash ROM as an initial setting. The printer links the print data sent through its interface to the format data or writable character data in flash ROM, then draws and issues.

■ [RECEIPT mode]

The printer draws and issues according to the data or commands sent from the host.

■ [ESC/POS mode]

The printer draws and issues according to the data or commands sent from the host.

■ [SYSTEM mode]

In this mode, self-test printing, slant line printing and settings/changing of internal parameters are performed.

2.2 DIMENSION

B-EP2DL	88.0 (W) x 119.0 (L) x 65.0 (D)
B-EP4DL	150.0 (W) x 145.0 (L) x 75.0 (D)

* Excluding the projecting parts.

2.3 WEIGHT

B-EP2DL	
B-EP2DL-GH20-QM-R	Approx. 475 g
B-EP2DL-GH30-QM-R	Approx. 480 g
B-EP2DL-GH40-QM-R	Approx. 480 g
B-EP4DL	
B-EP4DL-GH20-QM-R	Approx. 855 g
B-EP4DL-GH30-QM-R	Approx. 860 g
B-EP4DL-GH40-QM-R	Approx. 865 g

* Including a battery, excluding paper

2.4 PRINTING METHOD

Direct thermal

2.5 HEAD SPECIFICATION

B-EP2DL	8 dots/mm
B-EP4DL	8 dots/mm

2.6 PRINT SPEED

Approx. 12.5 mm/sec to Approx. 105 mm/sec

(at 25°C when using the battery designated and paper recommended by Toshiba TEC)

2.7 PRINT MODE

- LABEL mode
- RECEIPT mode
- TPCL mode
- ESC/POS mode

* ESC/POS™ is a registered trademark of Seiko Epson Corporation.

2.8 FONT TYPE

2.8.1 BIT MAP FONT

Standard character/Characters under bars	12 × 24 dots (alphanumeric, Kana, symbol)
Bold character	48 × 96 dots (numeric, symbol, space)
Price Font 1	16 × 40 dots (numeric, symbol, space)
Price Font 2	32 × 48 dots (numeric, symbol, space)
Times Roman (Medium)	12 point
Times Roman (Medium)	15 point
Times Roman (Bold)	15 point
Times Roman (Bold)	18 point
Times Roman (Bold)	21 point
Times Roman (Italic)	18 point
Helvetica (Medium)	9 point
Helvetica (Medium)	15 point
Helvetica (Medium)	18 point
Helvetica (Bold)	18 point
Helvetica (Bold)	21 point
Helvetica (Italic)	18 point
Presentation (Bold)	27 point
Letter Gothic (Medium)	14.3 point
Prestige Elite (Medium)	10.5 point
Prestige Elite (Bold)	15 point
Courier (Medium)	15 point
Courier (Bold)	18 point
OCR-A	12 point
OCR-B	12 point
GOTHIC725 Black	6 point
Kanji/writable character (Gothic type)	16 × 16 dots ^{*1}
Kanji/writable character (Gothic type)	24 × 24 dots ^{*1}
Kanji/writable character (Ming type)	32 × 32 dots ^{*1}
Chinese	24 × 24 dots
Korean	24 × 24 dots ^{*1}

* Some fonts cannot be printed depending on the print mode.

*1 These fonts are downloaded in the DBCS (Double Byte Character Set) area to be supported.

The Kanji character is supported in Japan only.

The Korean character is supported in Republic of Korea only.

2.8.2 OUTLINE FONT

- TEC Font 1 (Not proportional)
- TEC Font 1 (Proportional)
- Price Font 1, 2, 3 (Outline)

* Not only normal but also italic fonts are supported.

2.9 TYPE OF BARCODE/TWO-DIMENSIONAL CODE

2.9.1 BARCODE

- JAN8/EAN8
- JAN13/EAN13
- UPC-A
- UPC-E
- Interleaved 2 of 5 (ITF)
- CODEBAR (NW-7)
- CODE39
- CODE93
- CODE128/EAN128
- MSI
- Industrial 2 of 5
- MATRIX 2 of 5 for NEC
- GS1 Databar
(Omnidirectional/Stacked/Stacked/Omnidirectional/Limited/Expanded/Expanded Stacked)
- Customer barcode
- POSTNET
- RM4SCC
- KIX CODE

* Some barcodes cannot be printed depending on the print mode.

2.9.2 TWO-DIMENSIONAL CODE

- QR code
- PDF417
- Data Matrix
- MaxiCode
- MicroPDF417

* Some two-dimensional codes cannot be printed depending on the print mode.

2.10 FORMAT STORAGE

LABEL mode.....Max. 20 types
TPCL mode.....Max. 99 types

2.11 GRAPHIC STORAGE

Two graphic data can be stored (in the LABEL or RECEIPT mode).

2.12 WRITABLE CHARACTER STORAGE

LABEL mode.....24 x 24 dots: 50 characters

TPCL mode.....Free size: 224 characters x 40 types

16 x 16 dots: 188 characters

24 x 24 dots: 188 characters

32 x 32 dots: 188 characters

2.13 INTERFACE

- IrDA V1.2 (IrCOMM, IrOBEX, TEC Protocol)
- RS-232C
- Bluetooth V1.2 (Class 2)
- Wireless LAN (802.11b/g)
- USB V2.0

2.14 POWER SOURCE

Type: Lithium-ion battery

Voltage:

	B-EP2DL	B-EP4DL
Voltage	7.4 V	14.8 V
	2600 mAh	2600 mAh

Charging method: Charge only the battery using the battery charger.

2.15 SWITCH

POWER switch

FEED switch

PAUSE switch

2.16 SENSOR

Cover open sensor

Transmissive sensor

Reflective sensor

Strip issue path detection sensor

Head temperature sensor (-15 °C to 70 °C)

Ambient temperature sensor (-15 °C to 70 °C)

Strip wait label detection sensor

2.17 LED

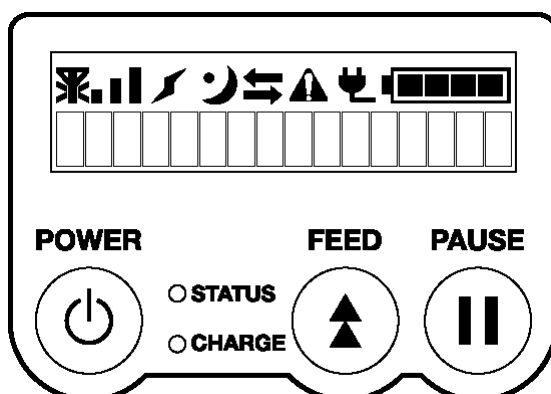
Red

Orange

Green

2.18 LCD

Mark + (5 x 7 dots) x 16 characters



2.19 SPEAKER

On-board beeper
Volume adjustment function

2.20 ISSUE MODE

Strip issue (with label present sensor)
Batch issue

2.21 PAPER

	B-EP2DL	B-EP4DL
Label width	13 to 55 mm	47 to 112 mm
Label-to-label gap	3 to 7 mm	3 to 7 mm
Black mark length	3 to 7 mm	3 to 7 mm
Backing paper width	16 to 58 mm	50 to 115 mm
Receipt paper width	16 to 58 mm	50 to 115 mm

2.22 CUT

Manual cut using the tear bar

2.23 BROKEN HEAD DOTS CHECK FUNCTION

When the printer is turned ON, or the cover is closed, the program will check for broken head dots according to the setting. If broken head dots are detected, a broken head dot error will occur. Printing can be still performed according to the setting, even after a broken head dot error occurred.

2.24 STATUS TRANSMISSION

The printer sends a status when:

- The host requests status transmission.
- The printer receives a command, while it is in an error state.
- Automatic status transmission in the Issue Command has already been designated.

2.25 AUTO LABEL POSITIONING FUNCTION

When the cover is closed after replacing the label paper according to the setting, the label is automatically fed to the first print position.

However, when the RECEIPT mode or ESC/POS mode is selected or no sensor is designated, a first print position feed is not performed.

2.26 STATUS PRINTING

Pressing the POWER key while holding down the FEED key allows the printer (for service technicians and system administrators) to enter the SYSTEM mode.

Pressing the POWER key while holding down the PAUSE key allows the printer (for general users) to enter the SYSTEM mode.

When a menu is selected, the result of the printer's state will be printed.

2.27 CONTINUOUS PRINTING FUNCTION

When the RECEIPT mode (Mode = 2), TPCL mode (Mode = A), TPCL mode (Mode = B) or ESC/POS mode (Mode = 4) is selected, after an error state (label end, cover open error, or a paper jam) is cleared, the printer automatically continues printing the received data. After paper is replaced, the error is cleared by closing the cover. Then, the printer automatically continues printing. When the cover is closed, if the printer has run out of the paper, the printer neither clears the error nor continues printing. It remains in the error state.

2.28 STRIP ISSUE

When the LABEL mode (mode = 0), TPCL mode (mode =A) or TPCL1 mode (mode = B) is selected, the specified number of labels are printed. Note that a next print job is not performed until the printed label is removed from the strip shaft.

3. INTERFACE

3.1 GENERAL DESCRIPTION

This chapter describes details regarding the interfaces between the host and the printer. The printer configurations are as follows:

- IrDA + USB + RS-232C model
- IrDA + USB + Bluetooth model
- IrDA + USB + Wireless LAN model

The interfaces between Bluetooth and wireless LAN can be optionally upgraded:

- RS-232C → Bluetooth
- RS-232C or Bluetooth → Wireless LAN
- RS-232C → RS-232C + Bluetooth
- RS-232C → RS-232C + Wireless LAN
- Bluetooth → Wireless LAN

IrDA supports the following three protocols. Each of them is independently described on later pages.

- TEC Protocol
- IrCOMM (9-WIRE)
- IrOBEX

The printer interface is automatically switched between IrDA and RS-232C/Bluetooth/wireless LAN on the following conditions:

- IrDA + USB + RS-232C model

When the RS-232C cable is connected to the printer, the printer interface will be switched to the RS-232C interface. When the RS-232C cable is disconnected, the interface will be switched to IrDA.

- IrDA + USB + Bluetooth model or IrDA + USB + Wireless LAN model

Usually, IrDA interface is standing by for communications. When data is sent from Bluetooth interface or wireless LAN interface, the printer interface is automatically switched to the appropriate interface.

When the printer enters the power save mode after the termination of a communication by Bluetooth or wireless LAN interface (when five minutes have passed after the termination), the printer interface will return to IrDA.

If data is sent to the printer by Bluetooth or wireless LAN interface during the communication by IrDA, the printer interface will be automatically switched to Bluetooth or wireless LAN, and consequently the communication by IrDA cannot be made successfully.

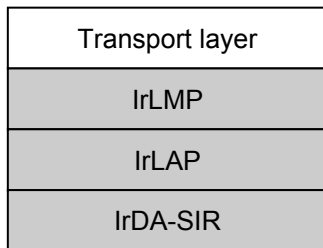
Notes

When the RS-232C is used for communications, the RS-232C cable must be connected to the printer before the power is turned on.

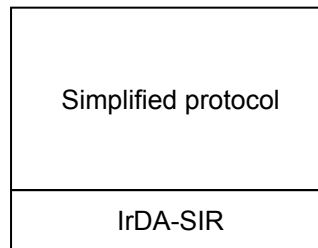
3.2 IrDA INTERFACE (TEC Protocol)

In IrDA standard, only IrDA-SIR of the physical layer should be used. For the data link layer, original simplified protocol should be provided.


3.2.1 SPECIFICATIONS FOR PHYSICAL LAYER AND TRANSMISSION CONTROL METHOD



IrDA V1.2 (Low Power) standard



B-EP

 parts are required.

(1) Specifications

Item	Specifications
	Normal mode
Physical layer	Conforming to IrDA-SIR V1.2 (Low Power) standard
Transfer rate	9600, 19200, 38400, 57600, 115200 bps ^{*1}
Communication distance	within 0.2 m ^{*2}
Peak wave length of emitted light	850 to 900 nm
Communicable angle	within $\pm 15^\circ$
Ambient illuminance	1000 lx or less (fluorescent lamp and incandescent lamp)
Emissive power	Min 3.6 mW/Sr ($\theta_h, \theta_v \leq \pm 15^\circ$)
Min. photo sensibility	Min 9 $\mu\text{W}/\text{cm}^2$ ($\theta_h, \theta_v \leq \pm 15^\circ$)

*1: Values for the normal mode are dependent on the communication protocol settings.

*2: The communication distance may become shorter than 0.2 m, depending on the host's performance.

3.2.2 INPUT/OUTPUT SIGNAL

- RD (Host → Printer)

A data signal which the printer receives from the host.
Logic 1 is Low level, while logic 0 is High level.
It is in a Low state when no transmission is in progress.

- SD (Printer → Host)

A data signal which the printer sends to the host.
Logic 1 is Low level, while logic 0 is High level.
It is in a Low state when no transmission is in progress.

3.2.3 TRANSMISSION CONTROL

The host performs transmission control with a NAK (15H)/ACK (06H), which means the printer is ready, a link request PAD (FFH), and a command packet.

① Link request (Host → Printer)

The host should send a link request PAD (FFH) in order to link to the printer. The link request PAD should be intermittently sent until the printer is linked and enters a ready state.

② Printer ready (Printer → Host)

When the printer detects the link request PAD from the host and enters a ready state for receiving the command packet, the printer sends a NAK within 40 msec. When an error such as CRC occurs, the printer sends a NAK.

NAK
15H

The printer sends an ACK, when the printer properly receives the command packet and enters a ready state for receiving the next data, or when the data is stored into flash ROM.

ACK
06H

③ End of link (Host → Printer)

When there is no packet to be sent, the host sends an EOT to end the link.

EOT
04H

④ Turnaround time

The printer should send a NAK/ACK/status packet after 5 msec. from when a PAD/command packet has been received.

⑤ Time out

Host: Time out due to waiting for a NAK after a PAD is sent..... 50 msec.
Time out due to waiting for an ACK after a command is sent 200 msec.
Printer: Time out due to waiting for a command after a NAK is sent 1 sec.
Time out due to waiting for an EOT or a command after an ACK is sent ... 1 sec.
Time out due to waiting for an EOT after the status is sent 1 sec.

⑥ Status packet (Printer → Host)

If the printer enters an error state when the command is sent from the host, or when status transmission is requested, the printer sends a status.

NOTE: The data error is checked by CRC. However, noise included in sent/received data may cause misprinting. (Though CRC check is carried out in 16 bits, there is a possibility that the data including noise matches 16 bits of CRC check.)

[LABEL, RECEIPT or ESC/POS mode]

Data to be sent

STX	Printer ID		Version No. of each form				Printer status	Battery status	CRC	
02H	xxH	xxH	V01	V02	.....	V20	xxH	xxH	xxH	xxH

Range of CRC calculation

- Printer ID 2-byte hex data (in order from High to Low)
- Version No. of each form (00H to 09H)
 - V01 Version of form No. 1 (1-byte hex data)
 - V02 Version of form No. 2 (1-byte hex data)
 -
 - V20 Version of form No. 20 (1-byte hex data)
- Printer status... Printer status is indicated in 1-byte data.
 - 00H: Normal state (idling)
 - 01H: Cover open state
 - 02H: Command syntax error (including Ir packet error)
 - 03H: Paper jam
 - 04H: Label end
 - 05H: Cover open error
 - 06H: Broken head dots error
 - 07H: Thermal head excessive temperature
 - 08H: Flash ROM write error
 - 09H: Flash ROM erase error
 - 0AH: Low battery (Print failure)
 - 0BH: Operating
 - 0CH: Communication error * In the RECEIPT mode or for RS-232C connection only
 - 0DH: Normal end + Label end
 - 0EH: Flash ROM storage area full state
 - 0FH: Wait for strip * In the LABEL mode only
 - 10H: Normal issue end
 - 14H: Pause state
 - 19H: Ambient temperature error
 - 32H: Abnormal battery temperature
 - 33H: Battery excessive temperature
 - 37H: Charging error
 - (38H: Bluetooth setting successfully completed)
 - Response status for automatic status transmission
 - 39H: Bluetooth setup error (including initialization error)
 - 45H: Wait for battery recovery
 - 46H: Wait for head temperature reduction
 - 47H: Wait for motor temperature reduction
 - 55H: Writable character/PC command save mode

NOTE: 0DH (Normal issue end + Label end) is a state when the printer runs out of labels, after a label is issued.

- Status in the compatible mode for the B-SP series
 - 00H: Normal state (idling)
 - 01H: Cover open state
 - 02H: Command syntax error (including Ir packet error)
 - 03H: Paper jam
 - 04H: Label end
 - 05H: Cover open error
 - 06H: Broken head dots error
 - 07H: Thermal head excessive temperature (including ambient temperature error, abnormal battery temperature, and battery excessive temperature)
 - 08H: Flash ROM write error
 - 09H: Flash ROM erase error
 - 0AH: Low battery (Print failure)
 - 0BH: Operating (including wait for strip, pause state, writable character/PC command save mode, wait for battery recovery, wait for head temperature reduction, and wait for motor temperature reduction)
 - 0CH: Communication error * In the RECEIPT mode or for RS-232C connection only
 - 0DH: Normal end + Label end
 - 0EH: Flash ROM storage area full state
 - 10H: Normal issue end
 - 37H: Charging error
 - (38H: Bluetooth setting successfully completed)
Response status for automatic status transmission
 - 39H: Bluetooth setup error (including initialization error)
- Battery status .. The battery charge status is indicated in 5 levels.
 - (B-EP2DL)
 - 01H: 7.2 V or less (Print failure)
 - 02H: 7.3 V to 7.4 V (remaining No. of printable labels: Approx. 1 to 30)
 - 03H: 7.5 V to 7.7 V (remaining No. of printable labels: Approx. 30 to 150)
 - 04H: 7.8 V to 7.9 V (remaining No. of printable labels: Approx. 150 to 300)
 - 05H: 8.0 V to 8.4 V (remaining No. of printable labels: Approx. 300 or more)
 - (B-EP4DL)
 - 01H: 14.0 V or less (Print failure)
 - 02H: 14.1 V to 14.6 V (remaining No. of printable labels: Approx. 1 to 30)
 - 03H: 14.7 V to 15.2 V (remaining No. of printable labels: Approx. 30 to 150)
 - 04H: 15.3 V to 15.9 V (remaining No. of printable labels: Approx. 150 to 300)
 - 05H: 16.0 V to 16.8 V (remaining No. of printable labels: Approx. 300 or more)

NOTE: The remaining number of printable labels may vary according to the contents to be printed and the ambient environment.
- CRC 2-byte hex data (in order from Low to High)

[TPCL mode]

Data to be sent

STX	Printer ID		Status			Remaining No. of labels				CRC	
02H	xxH	xxH	3xH	3xH	3xH	3xH	3xH	3xH	3xH	xxH	xxH

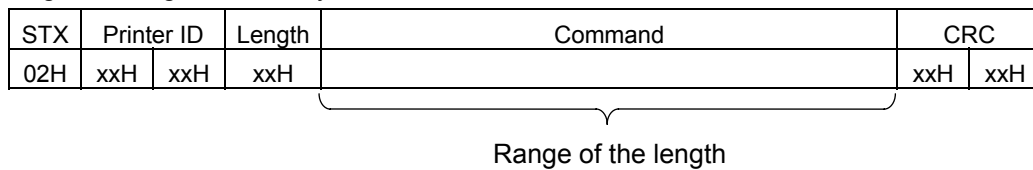
Range of CRC calculation

- Printer ID 2-byte hex data (in order from High to Low)
- Status Detailed status is indicated in 2-byte data.
 - “00”: Normal state
 - “01”: Cover open state
 - “02”: Operating
 - “04”: Pause state
 - “05”: Wait for strip
 - “06”: Command syntax error (including Ir packet error)
 - “09”: Normal issue end + Label end
 - “11”: Paper jam
 - “13”: Label end
 - “15”: Cover open error
 - “17”: Broken head dots error
 - “18”: Thermal head excessive temperature
 - “19”: Ambient temperature error
 - “32”: Abnormal battery temperature
 - “33”: Battery excessive temperature
 - “36”: Low battery
 - “37”: Charging error
 - (“38”: Bluetooth setting successfully completed) Response status for automatic status transmission
 - “39”: Bluetooth setup error (including initialization error)
 - (“40”: Normal issue end) Response status for automatic status transmission
 - (“41”: Normal feed end) Response status for automatic status transmission
 - “45”: Wait for battery recovery
 - “46”: Wait for head temperature reduction
 - “47”: Wait for motor temperature reduction
 - “50”: Flash ROM write error
 - “51”: Flash ROM erase error
 - “54”: Flash ROM storage area full state
 - “55”: Writable character/PC command save mode

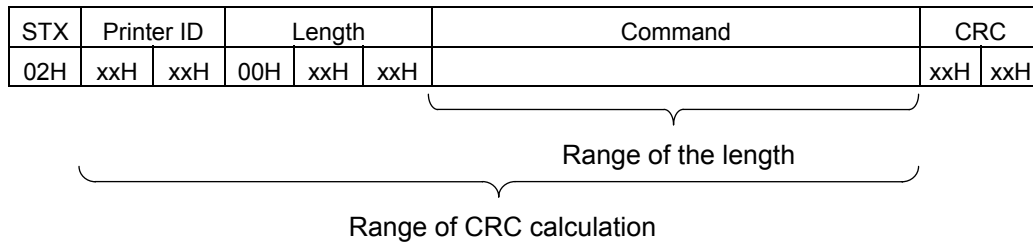
- Detailed status in the compatible mode for the B-SP series
 - “00”: Normal state
 - “01”: Cover open state
 - “02”: Operating (including wait for strip, pause state, wait for battery recovery, wait for head temperature reduction, wait for motor temperature reduction, and writable character/PC command save mode)
 - “06”: Command syntax error (including Ir packet error)
 - “09”: Normal issue end + Label end
 - “11”: Paper jam
 - “13”: Label end
 - “15”: Cover open error
 - “17”: Broken head dots error
 - “18”: Thermal head excessive temperature (including ambient temperature error, battery abnormal temperature, and battery excessive temperature)
 - “36”: Low battery
 - “37”: Charging error
 - (“38”: Bluetooth setting successfully completed) Response status for automatic status transmission
 - “39”: Bluetooth setup error (including initialization error)
 - (“40”: Normal issue end) Response status for automatic status transmission
 - (“41”: Normal feed end) Response status for automatic status transmission
 - “50”: Flash ROM write error
 - “51”: Flash ROM erase error
 - “54”: Flash ROM storage area full state
- Status type Indicated in 1-byte data
 - “1”: Status Request Command
 - “2”: Automatic status transmission
- Remaining No. of labels.... Indicated in 4-byte data
 - “0000” to “9999”
- CRC 2-byte hex data (in order from Low to High)

⑦ Command packet in the LABEL mode (Host → Printer)

Length is designated in 1 byte:



Length is designated in 2 bytes:



- Printer ID 2-byte hex data (in order from High to Low)
 - Length Hex data indicating the number of bytes of command data
 - When the length is designated in 1 byte: 1 byte
01H to FFH
 - When the length is designated in 2 bytes: 3 bytes
The first 1 byte is fixed at 00H.
Designate the length using the remaining 2 bytes.
(in order from Low to High): 0001 H to 0FFFH
 - CRC 2-byte hex data (in order from Low to High)
- * Between the start and the termination of storing the form, a packet including several commands can be sent. However, the command data should not be included in two packets. For other commands, one packet should include only one command.
- * For all commands except the Graphic Data Store Command, data included in several packets should not be sent. The Data Print Command can also send data included in several packets if it is sent using the format on the next page.

- * Multiple packet format for including the Data Print Command in several packets
(Host → Printer)

Length is designated in 1 byte:

STX	Printer ID		Length	Mode	Flag	Command & Data	CRC	
02H	xxH	xxH	xxH	Y	xxH		xxH	xxH

Range of the length

Length is designated in 2 bytes:

STX	Printer ID		Length			Mode	Flag	Command & Data	CRC	
02H	xxH	xxH	00H	xxH	xxH	Y	xxH		xxH	xxH

Range of the length

Range of CRC calculation

- Printer ID 2-byte hex data (in order from High to Low)
- Length Hex data indicating the number of bytes of command data
 - When the length is designated in 1 byte: 1 byte
01H to FFH
 - When the length is designated in 2 bytes: 3 bytes
The first 1 byte is fixed at 00H.
Designate the length using the remaining 2 bytes.
(in order from Low to High): 0001 H to 0FFFH

NOTE: Up to 4 KB per one packet can be sent. However, total data amount from the first block to the final block must be 60 KB or less.

- Mode Fixed at "Y"
- Flag Flag indicating the block No. or the final block flag for the receipt issue
(1 byte)



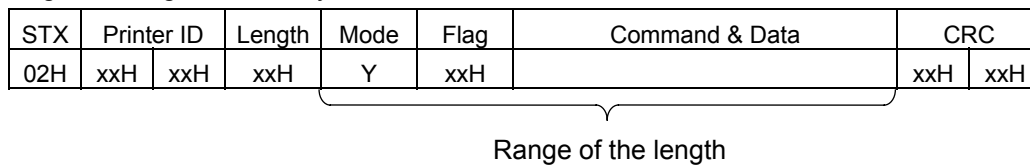
Block No. (0 to 7F)

Final block flag 0: Final
1: Not final

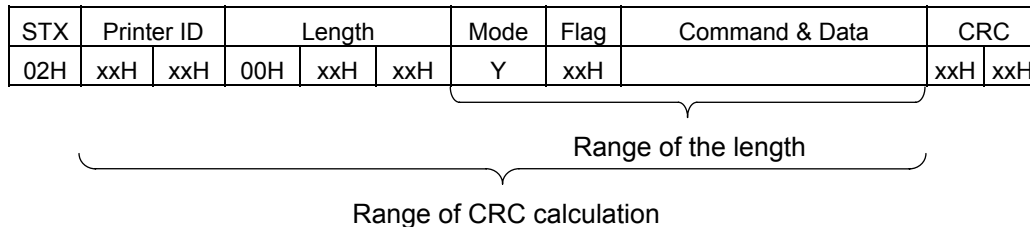
- CRC 2-byte hex data (in order from Low to High)

⑧ Command packet in the TPCL, RECEIPT or ESC/POS mode (Host → Printer)

Length is designated in 1 byte:



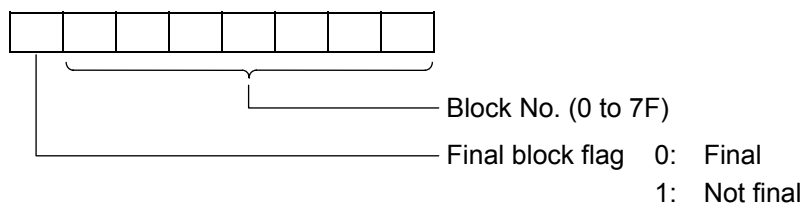
Length is designated in 2 bytes:



- Printer ID 2-byte hex data (in order from High to Low)
- Length Hex data indicating the number of bytes of command data
 - When the length is designated in 1 byte: 1 byte
01H to FFH
 - When the length is designated in 2 bytes: 3 bytes
The first 1 byte is fixed at 00H.
Designate the length using the remaining 2 bytes.
(in order from Low to High): 0001 H to 0FFFH

NOTE: Up to 4 KB per one packet can be sent. However, total data amount from the first block to the final block must be 60 KB or less.

- Mode Fixed at “Y” (indicating the RECEIPT mode)
- Flag Flag indicating the block No. or the final block flag for the receipt issue (1 byte)



- CRC 2-byte hex data (in order from Low to High)

* For the Status Request Command, the Mode Select Command, Reset Command, Receive Buffer Remaining Capacity Request Command, and Printer Option Retrieve Command, one packet should include only one command.

⑨ Turnaround time

The printer should send a NAK/ACK/status packet after 5 msec. from when a PAD/command packet has been received.

3.2.4 HOW TO SEND THE DATA PRINT COMMAND WHICH CANNOT BE INCLUDED IN ONE PACKET IN THE LABEL MODE

When the Data Print Command in the LABEL mode cannot be included in one packet (256 bytes or more in 1-byte length designation, 4096 bytes or more in 2-byte length designation), it can be included in several packets by using the multiple packet format for the Data Print Command, described on page 3-7.

Conditions: Data length for the Bit Map Font Field Command, the Outline Font Field Command, and the Barcode/Two-dimensional Code Format Command, should be fixed at "00".
For the JIS 8 and Shift JIS Kanji codes only.

(Example) To include the Data Print Command below into several packets:

```
X [01H] [01H] [01]
ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF] ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF]
ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF] ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF]
ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF] ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF]
ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF] ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF]
ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF] ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF]
ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF] ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF]
ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF] ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF]
```

Command packet 1

```
[STX] [00H] [00H] [DEH] Y [80H] X [01H] [01H] [01H]
ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF] ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF]
ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF] ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF]
ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF] ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF]
ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF] ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF]
[CRC] [CRC]
```

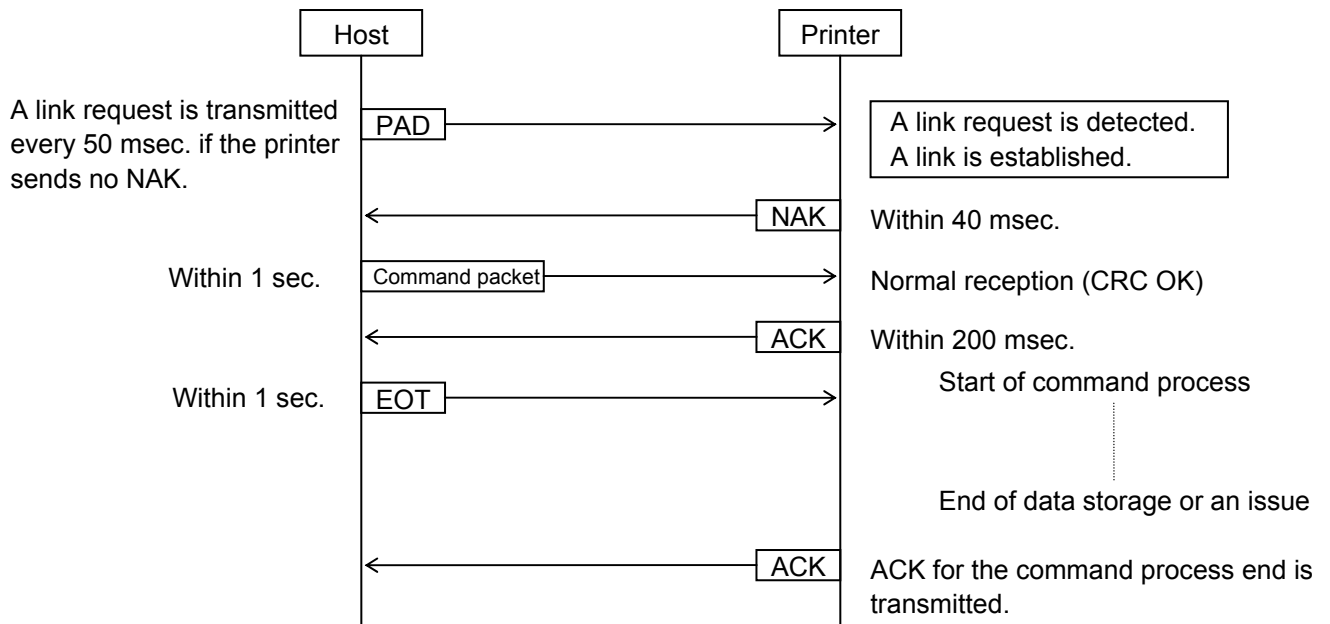
Command packet 2

```
[STX] [00H] [00H] [DAH] Y [01H]
ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF] ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF]
ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF] ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF]
ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF] ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF]
ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF] ABCDEF GHIJ KLMNOP QRSTUV WXYZ [LF]
[CRC] [CRC]
```

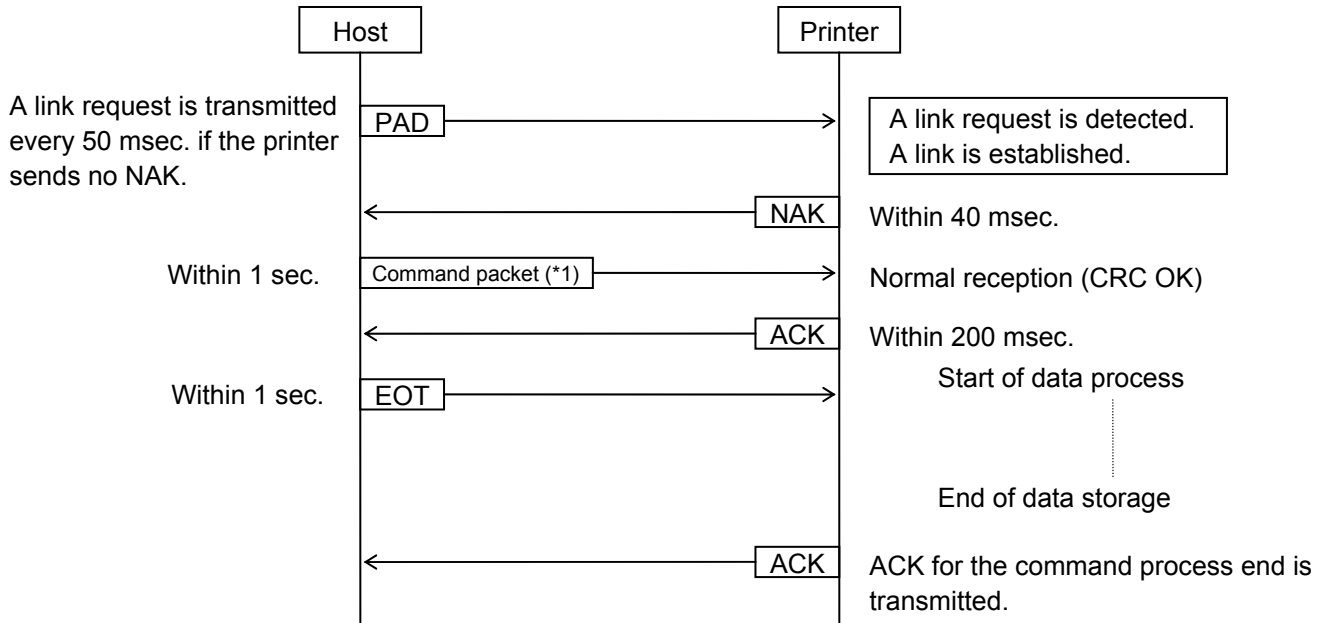
3.2.5 CONNECTION SEQUENCE EXAMPLE (LABEL MODE)

< Normal transmission >

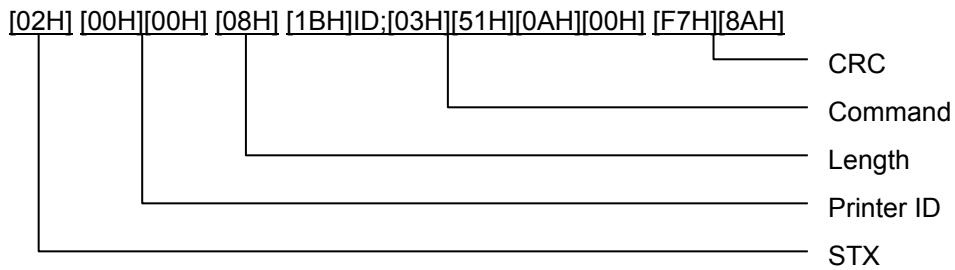
- When one packet is sent.



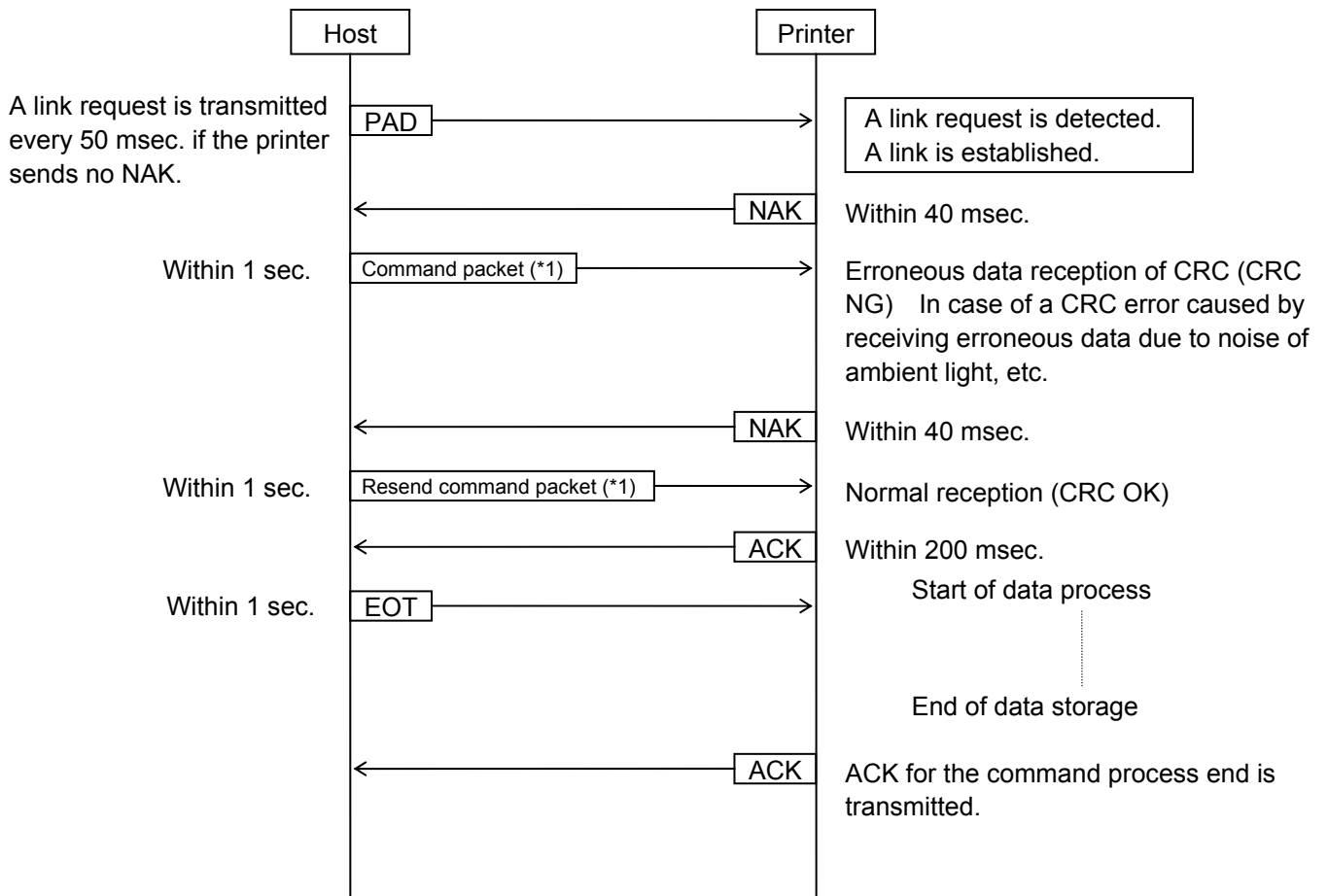
• ID set command (normal transmission)



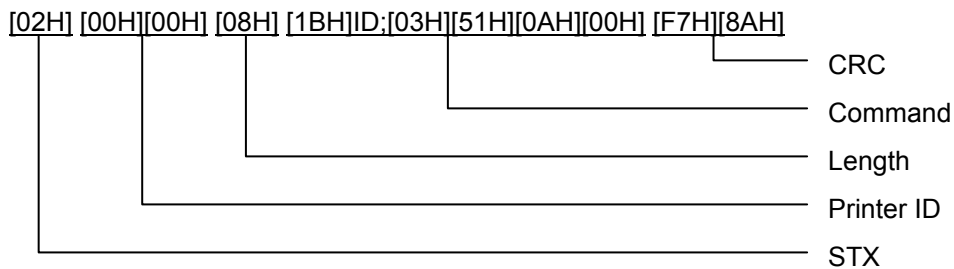
*1: Explanation of a command packet (when the length is designated in 1 byte.)
To send [ESC] ID; [03H] [51H] [LF] [NUL].



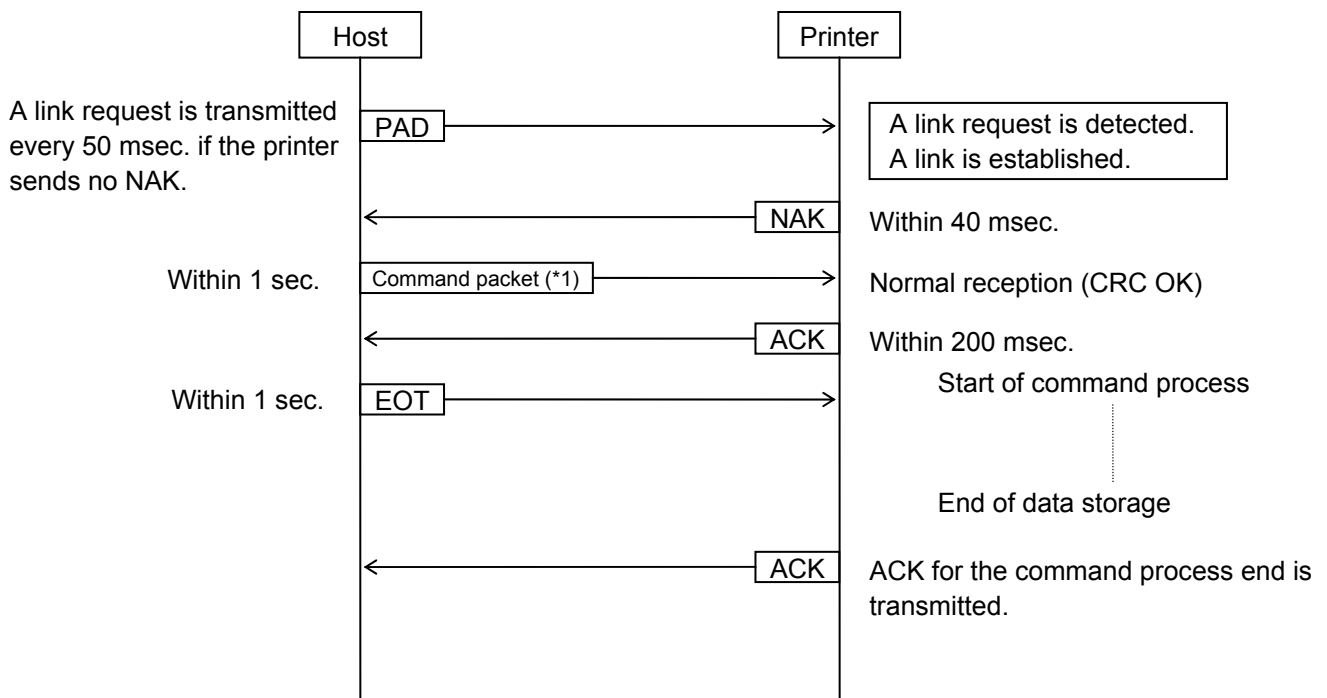
- ID set command (erroneous transmission)



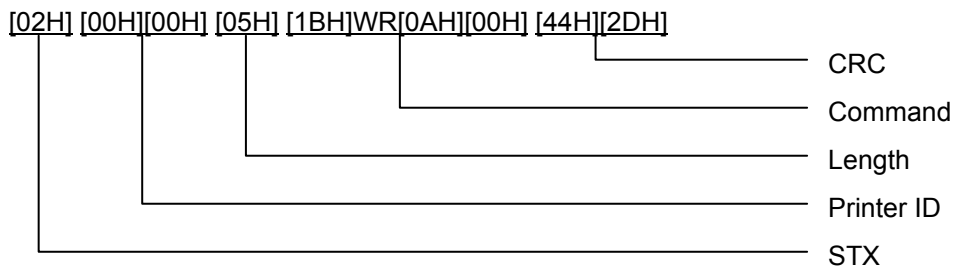
- *1: Explanation of a command packet (when the length is designated in 1 byte.)
To send [ESC] ID; [03H] [51H] [LF] [NUL].



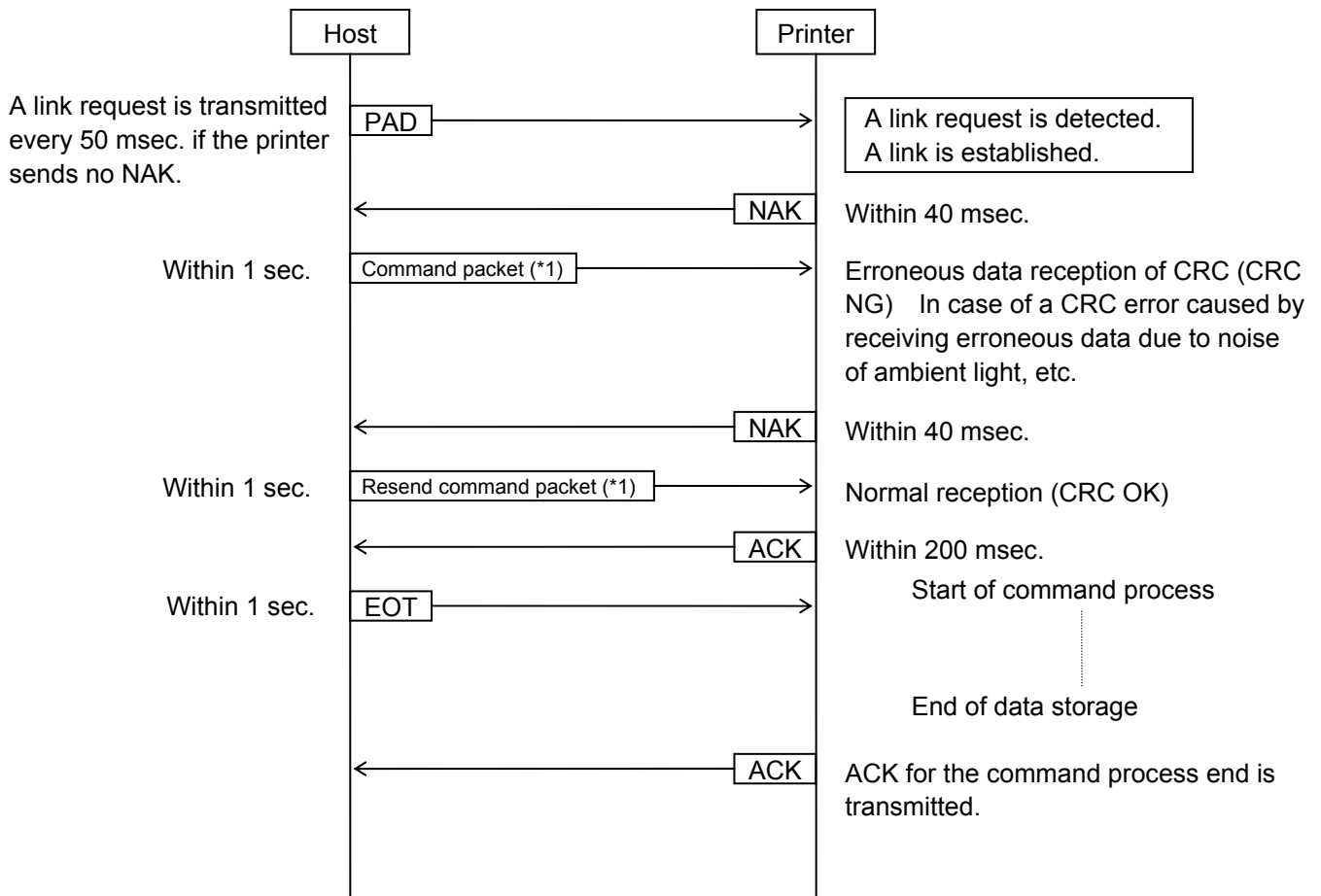
- Initialize command (normal transmission)



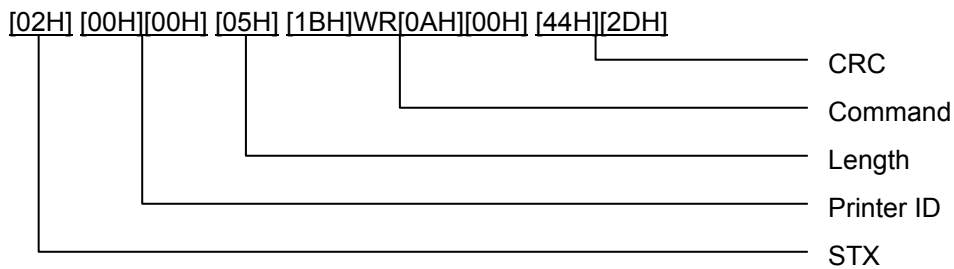
- *1: Explanation of a command packet (when the length is designated in 1 byte.)
To send [ESC] WR [LF] [NUL].



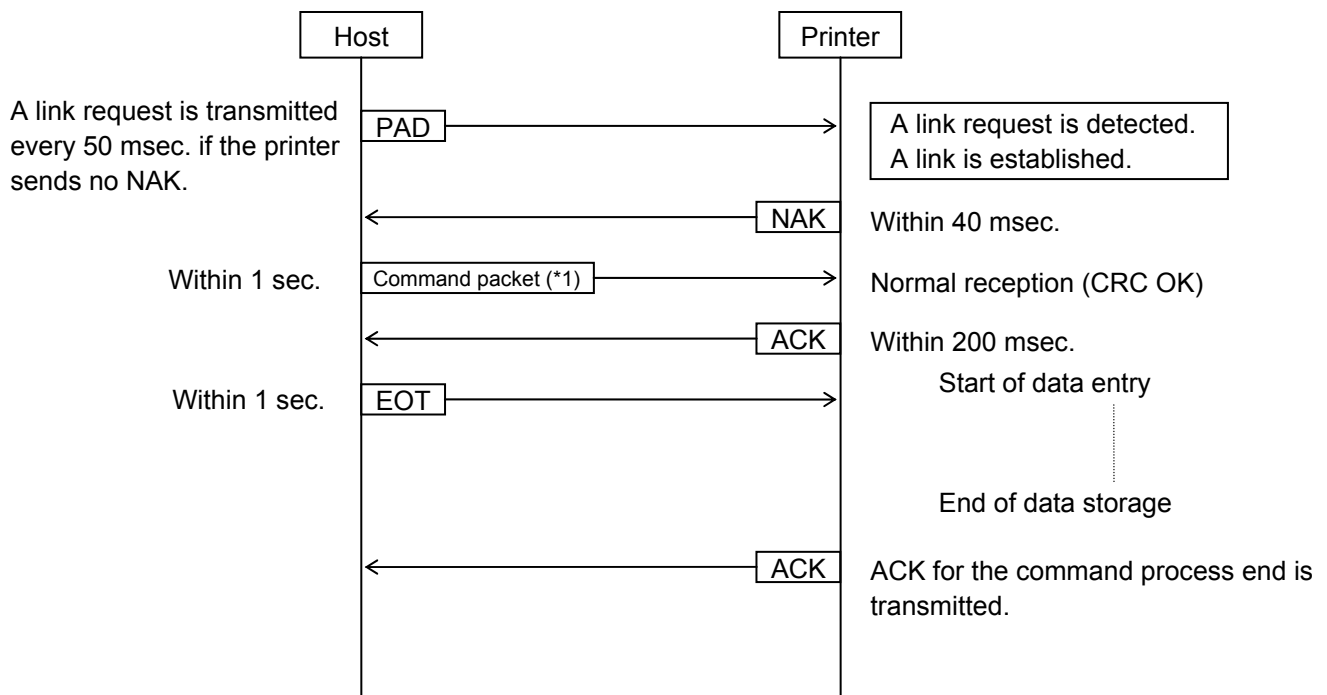
- Initialize command (erroneous transmission)



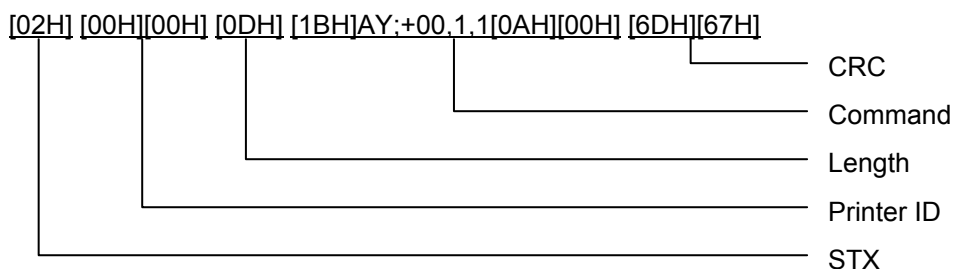
- *1: Explanation of a command packet (when the length is designated in 1 byte.)
To send [ESC] WR [LF] [NUL].



- Print density fine adjust command (normal transmission)



- *1: Explanation of a command packet (when the length is designated in 1 byte.)
To send [ESC] AY; +00, 1, 1 [LF] [NUL].



The above sequence is also applied to the print position fine adjust command and the strip sensor adjust command.

Explanation of each command packet (when the length is designated in 1 byte) is shown below.

Print position fine adjust command

To send [ESC] AX; +000 [LF] [NUL].

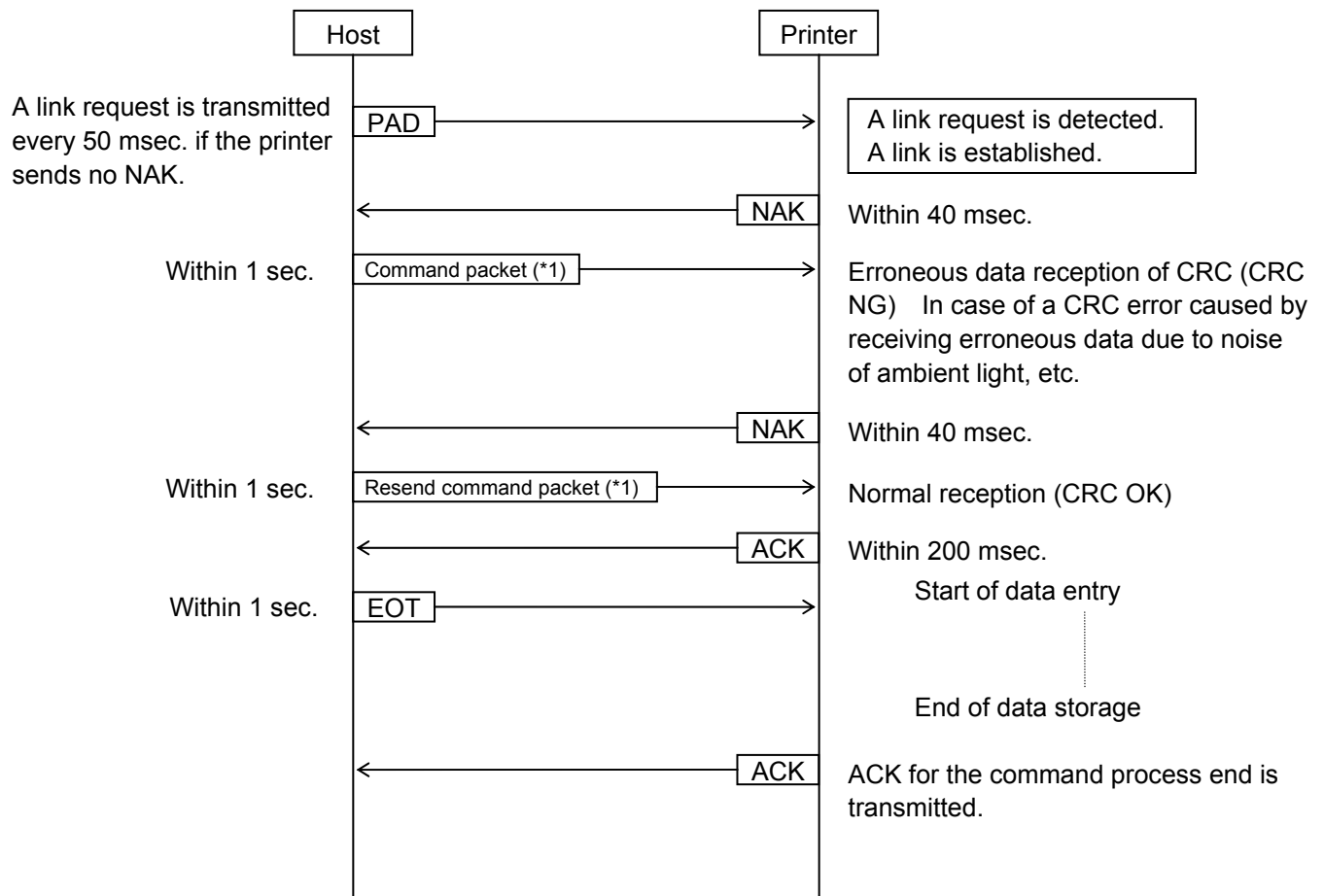
[02H] [00H] [00H] [0DH] [1BH] AX; 000 [0AH] [00H] [AAH] [44H]

Strip sensor adjust command

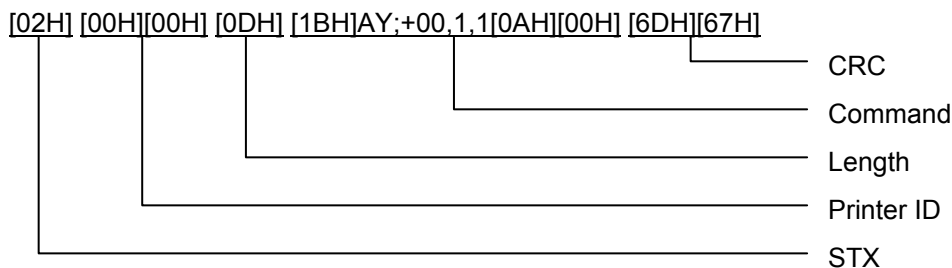
To send [ESC] AZ; 0 [LF] [NUL].

[02H] [00H] [00H] [0DH] [1BH] AZ; 0 [0AH] [00H] [34H] [F4H]

- Print density fine adjust command (erroneous transmission)



- *1: Explanation of a command packet (when the length is designated in 1 byte.)
To send [ESC] AY; +00, 1, 1 [LF] [NUL].



The above sequence is also applied to the print position fine adjust command and the strip sensor adjust command.

Explanation of each command packet (when the length is designated in 1 byte) is shown below.

Print position fine adjust command

To send [ESC] AX; +000 [LF] [NUL].

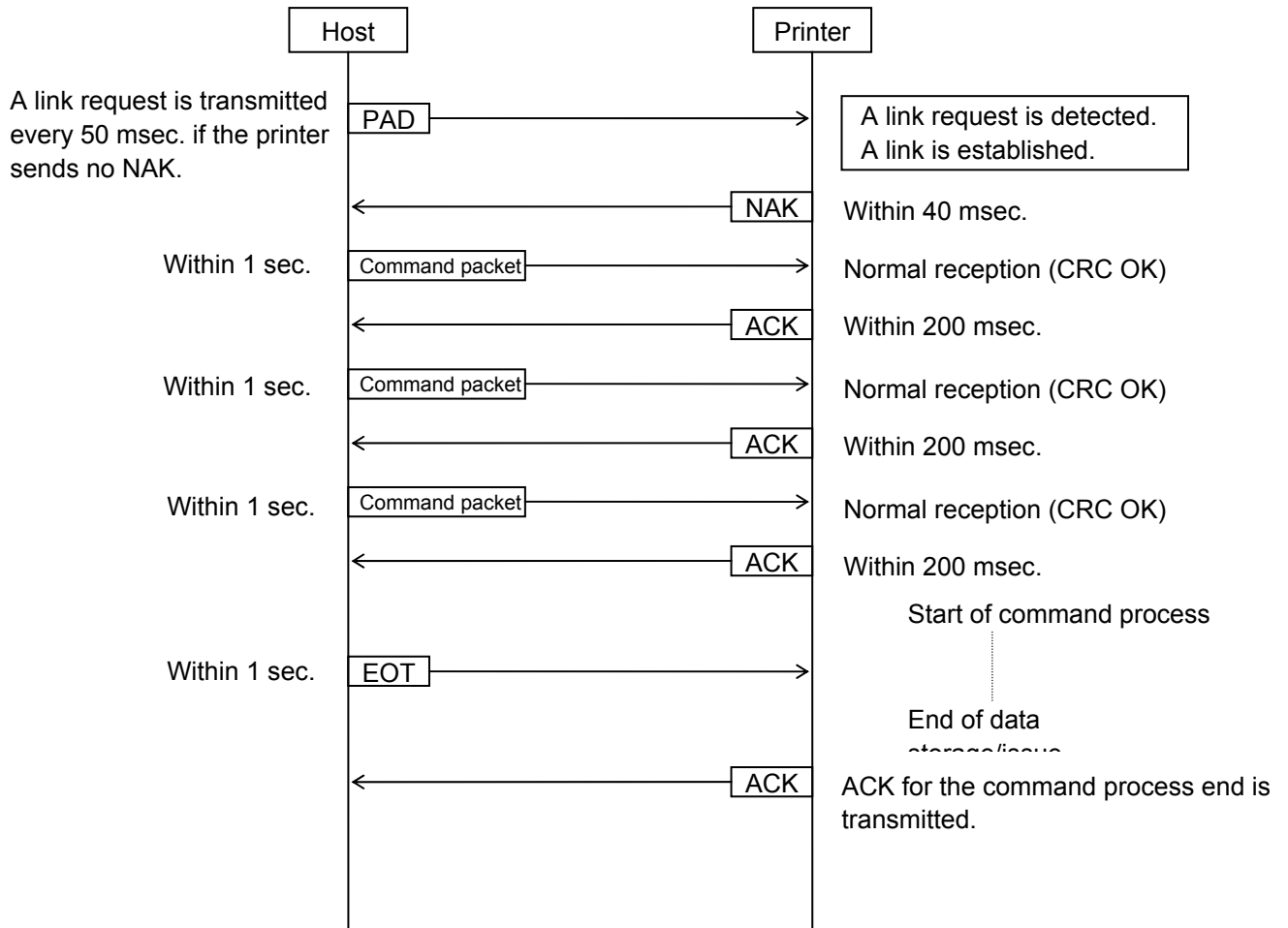
[02H] [00H] [00H] [0DH] [1BH] AX; +000 [0AH] [00H] [AAH] [44H]

Strip sensor adjust command

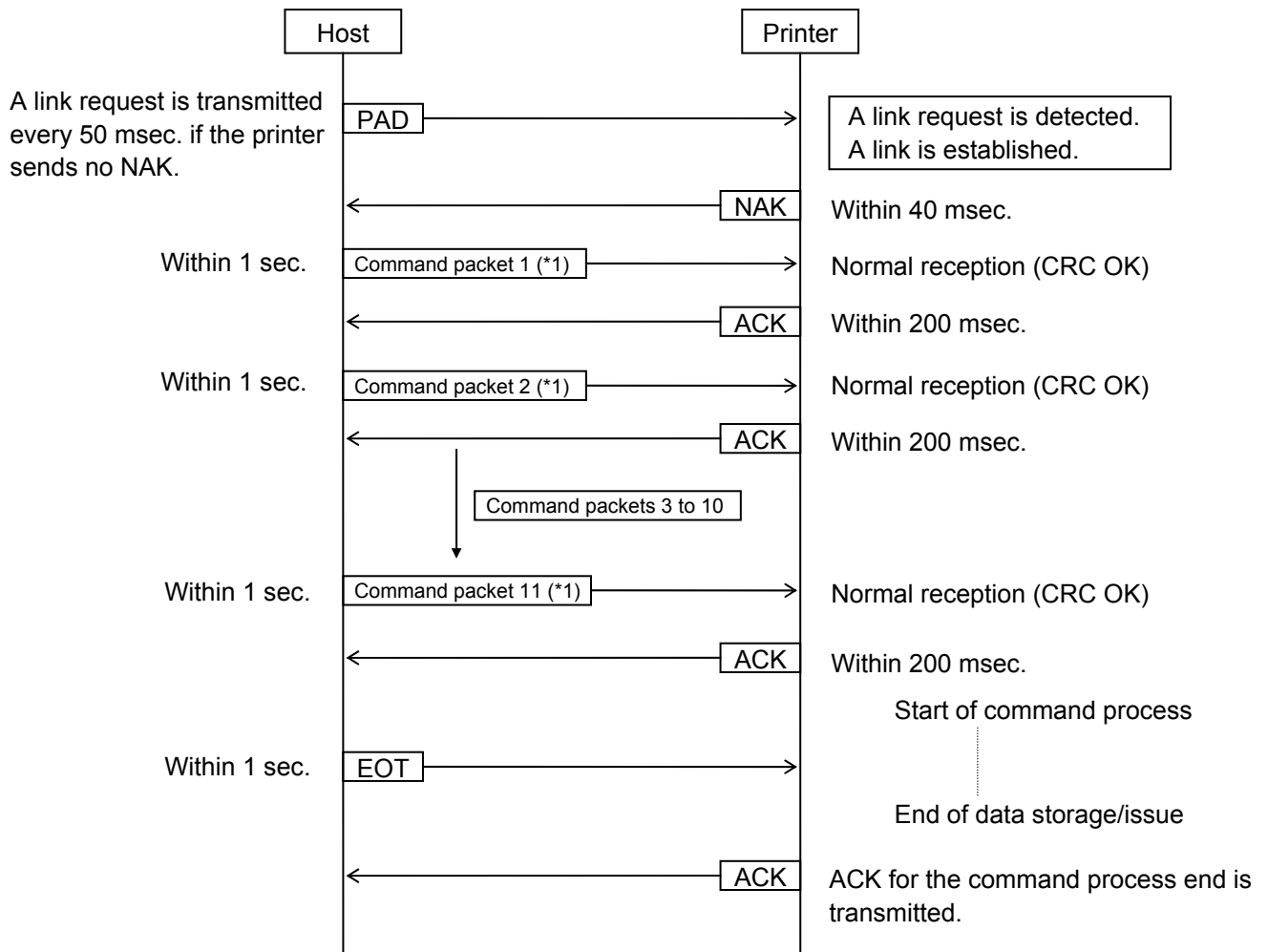
To send [ESC] AZ; 0 [LF] [NUL].

[02H] [00H] [00H] [0DH] [1BH] AZ; 0 [0AH] [00H] [34H] [F4H]

- When several packets are sent (for storing a form or graphics, or printing data).



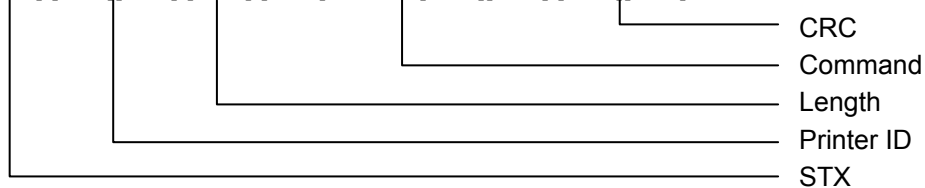
- When several packets are sent (for storing a form or graphics, or printing data).
(For storing a form by sending packets, each of them is including a command.)



*1: Explanation of command packets (when the length is designated in 1 byte.)

Command packet 1

[02H] [00H] [00H] [0AH] [1BH] X0;01,1 [0AH] [00H] [E7H] [24H]



Command packet 2

[02H] [00H] [00H] [12H] [1BH] D0630,0480,0600 [0AH] [00H] [7BH] [D1H]

Command packet 3

[02H] [00H] [00H] [0DH] [1BH] AY;+00,1,1 [0AH] [00H] [6DH] [67H]

Command packet 4

[02H] [00H] [00H] [0AH] [1BH] AX;+000 [0AH] [00H] [AAH] [44H]

Command packet 5

[02H] [00H] [00H] [29H] [1BH] PV01;0050,0250,0030,0030,A,00,B,00,1,0 [0AH] [00H] [BBH] [EEH]

Command packet 6

[02H][00H][00H][26H][1BH]PC02;0150,0100,4,4,A,00,B,00,1,0,P0[0AH][00H][D3H][00H]

Command packet 7

[02H][00H][00H][26H][1BH]PC03;0050,0200,2,2,A,00,B,00,1,0,P0[0AH][00H][F0H][F7H]

Command packet 8

[02H][00H][00H][2CH][1BH]XB04;0250,0350,0,3,02,0,0080,020,1,00,1,0[0AH][00H][76H][6CH]

Command packet 9

[02H][00H][00H][1DH][1BH]LC;0010,0010,0470,0500,1,3[0AH][00H][11H][E5H]

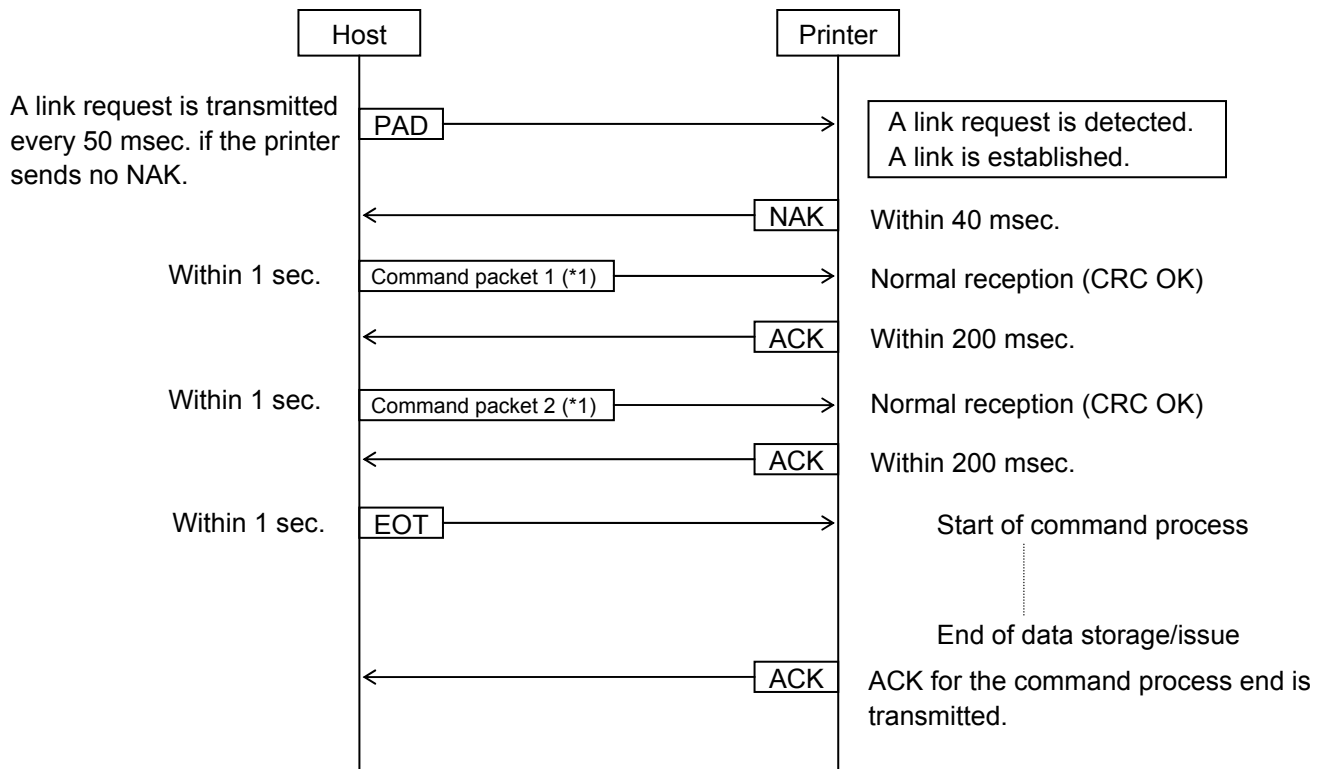
Command packet 10

[02H][00H][00H][10H][1BH]N;1,0050,0350[0AH][00H][EBH][46H]

Command packet 11

[02H][00H][00H][05H][1BH]XP[0AH][00H][05H][2AH]

- When several packets are sent (for storing a form or graphics, or printing data).
(For storing a form by sending packets, each of them is including several commands.)



- *1: Example of command packets for storing the form, each of them is including several commands (when the length is designated in 1 byte.)

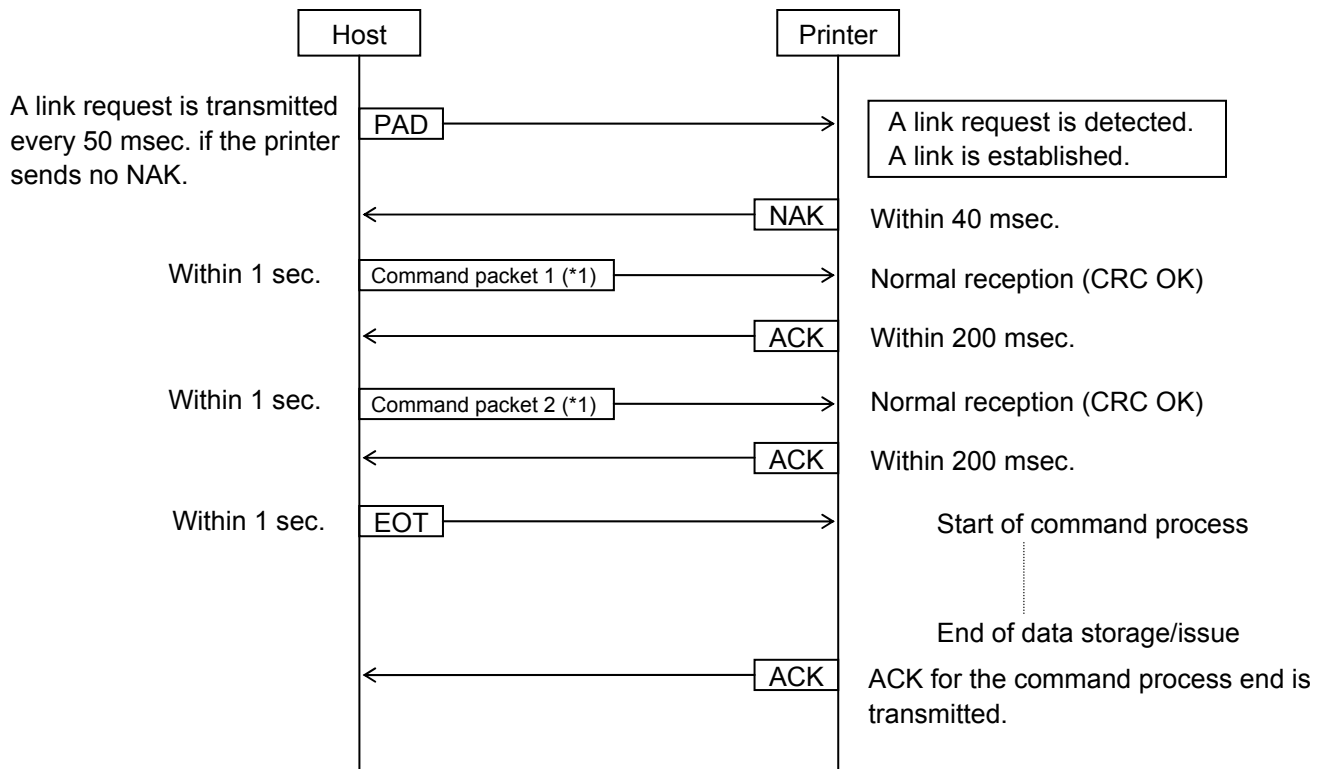
Command packet 1

```
[02H][00H][00H][F1H]
[1BH]XO;01,1[0AH][00H]
[1BH]D0630,0480,0600[0AH][00H]
[1BH]AY;+00,1,1[0AH][00H]
[1BH]AX;+000[0AH][00H]
[1BH]PV01;0050,0250,0030,0030,A,00,B,00,1,0[0AH][00H]
[1BH]PC02;0150,0100,4,4,A,00,B,00,1,0,P0[0AH][00H]
[1BH]PC03;0050,0200,2,2,A,00,B,00,1,0,P0[0AH][00H]
[1BH]XB04;0250,0350,0,3,02,0,0080,020,1,00,1,0[0AH][00H]
[1BH]LC;0010,0010,0470,0500,1,3[0AH][00H]
[9BH][EAH]
```

Command packet 2

```
[02H][00H][00H][15H]
[1BH]N;1,0050,0350[0AH][00H]
[1BH]XP[0AH][00H]
[AAH][5FH]
```

- When several packets are sent (for storing a form or graphics, or printing data)
(For storing graphics by sending packets, each of them is including several commands.)



*1: Example of command packets for storing graphics (when the length is designated in 1 byte.)

Command packet 1

[02H][00H][00H][FFH]

[1BH]SG;1,0050,0050,[FFH][FFH][FFH][FFH][FFH][FFH]

[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]

[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]

[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]

[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]

[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]

[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]

[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]

[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]

[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]

[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]

[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]

[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]

[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]

[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]

[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]

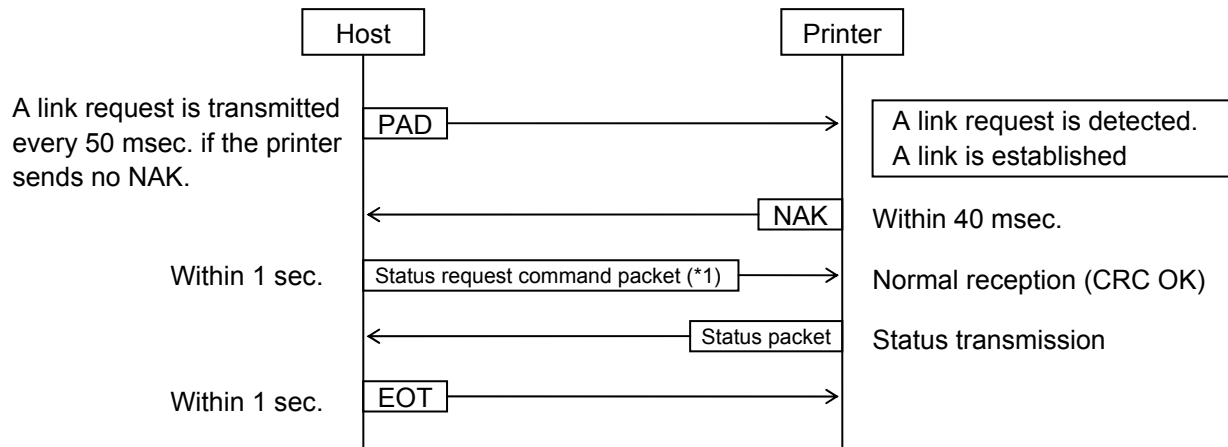
[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]

[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]

Command packet 2

[02H][00H][00H][71H][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]
[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]
[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]
[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]
[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]
[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]
[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]
[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]
[FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH][FFH]
[FFH][FFH][FFH][0AH][00H][7AH][1FH]

- When the Status Request Command is sent.



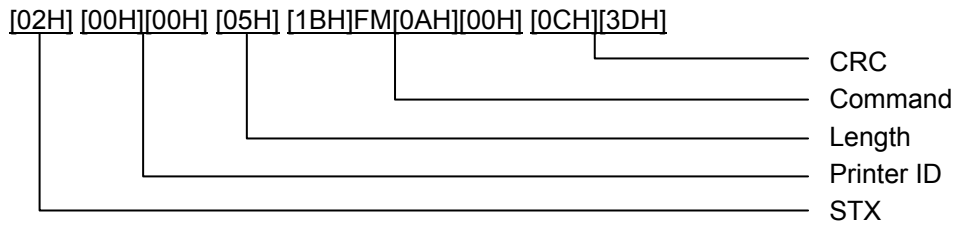
- When the host is started up, the host should send the Status Request Command to acquire the printer ID.
- When the printer ID in the command packet is set to "0", this command is acceptable for all printers.
- For the wireless LAN model or Bluetooth model:
After a specified time (5 seconds except for IrDA) has passed since the end of data transmission and reception, data from other interface can be received. Data received from another interface before the specified time has passed will be discarded.
When data is received from another interface during data transmission and reception with the IrDA interface, the printer interface will be automatically switched to the one from which the data has been received. In this case, the IrDA communication will fail.

Example of a command packet is shown below.

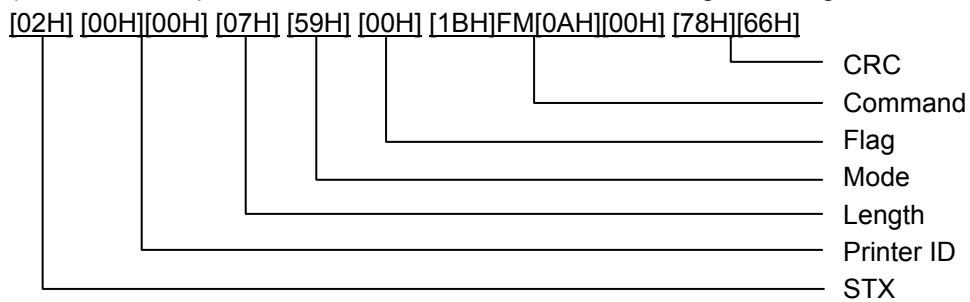
Since the status request command packet mode cannot identify the issue mode which is currently set in the printer, either of command packets below can be sent.

*1: When the status request command packet is FM command.

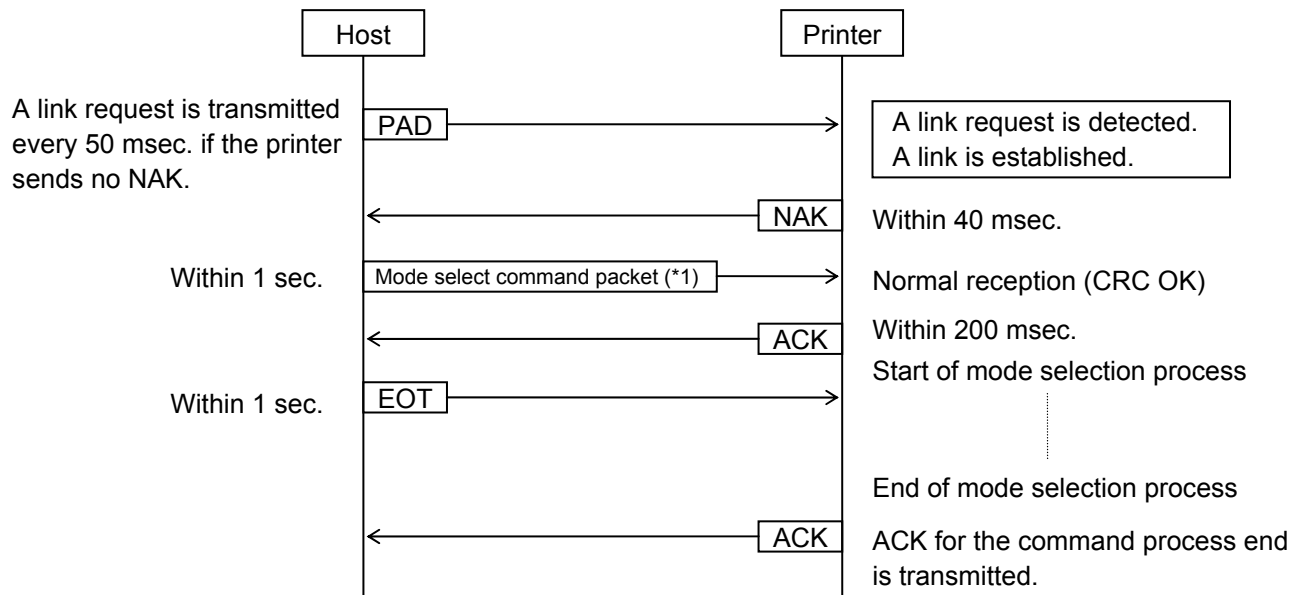
(The command packet in the LABEL mode, of which length is designated in 1 byte)



(The command packet in the RECEIPT mode, of which length is designated in 1 byte)



- When the Mode Select Command is sent.

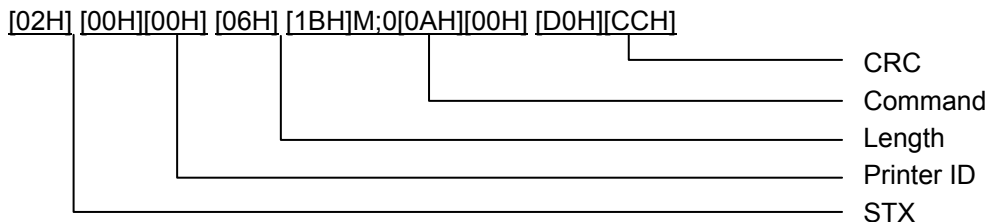


- When an EOT or other command data is not sent, after the mode select command packet is sent, the printer sends an ACK in 1 second after the mode select process is completed.

*1: Example of command in a command packet is shown below.

Since the mode select command packet mode cannot identify the issue mode currently set in the printer, either of command packets below can be sent.

- ① When a command packet includes mode select command (mode = 0)
(The command packet in the LABEL mode, of which length is designated in 1 byte)

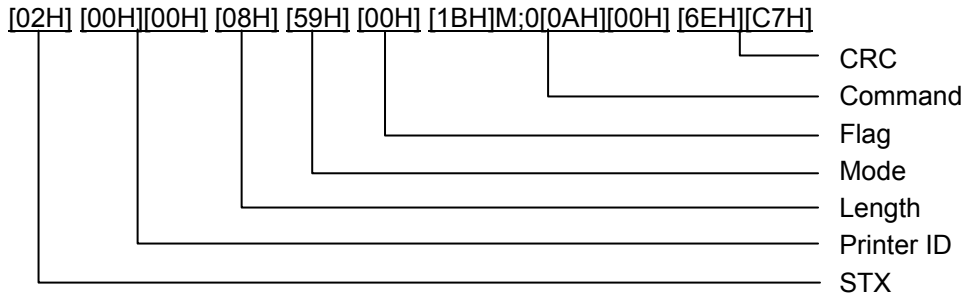


- ② When a command packet includes mode select command (mode = 1)
(The command packet in the LABEL mode, of which length is designated in 1 byte)

[02H][00H][00H][06H][1BH]M;1[0AH][00H][FFH][96H]

- ③ When a command packet includes mode select command (mode = A)
(The command packet in the LABEL mode, of which length is designated in 1 byte)
[02H][00H][00H][06H][1BH]M;A[0AH][00H][D4H][16H]

- ④ When a command packet includes mode select command (mode = 0)
(The command packet in the RECEIPT mode, of which length is designated in 1 byte)

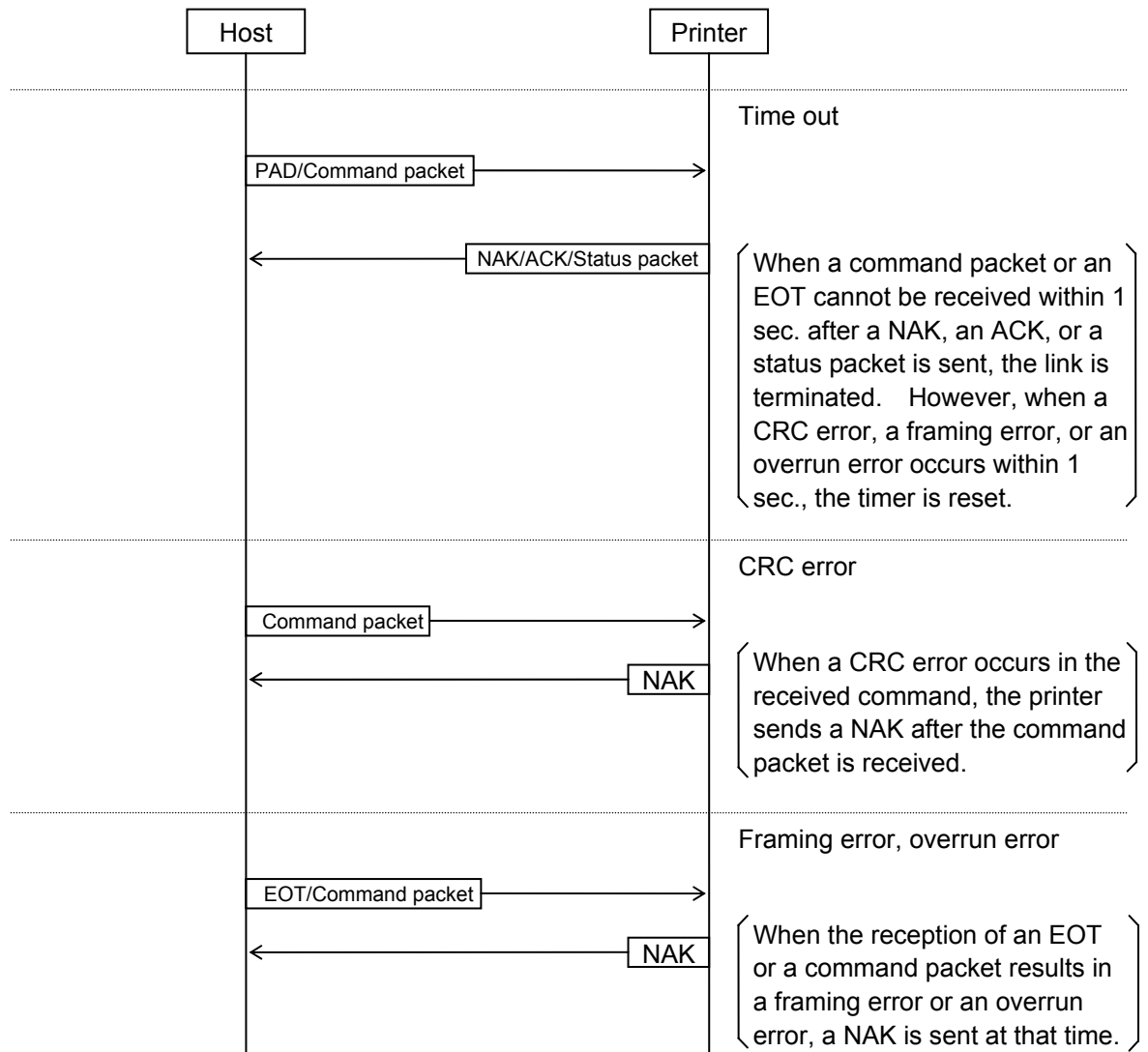


- ⑤ When a command packet includes mode select command (mode = 1)
(The command packet in the RECEIPT mode, of which length is designated in 1 byte)
[02H][00H][00H][08H][59H][00H][1BH]M;1[0AH][00H][B2H][9DH]

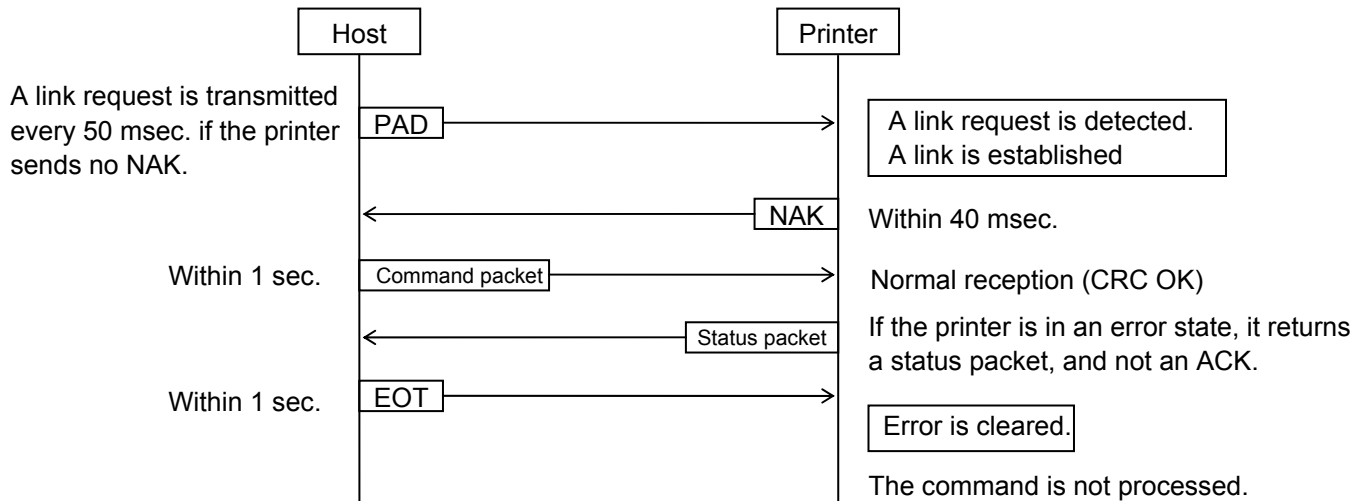
- ⑥ When a command packet includes mode select command (mode = A)
(The command packet in the RECEIPT mode, of which length is designated in 1 byte)
[02H][00H][00H][08H][59H][00H][1BH]M;A[0AH][00H][6AH][1DH]

<Error transmission>

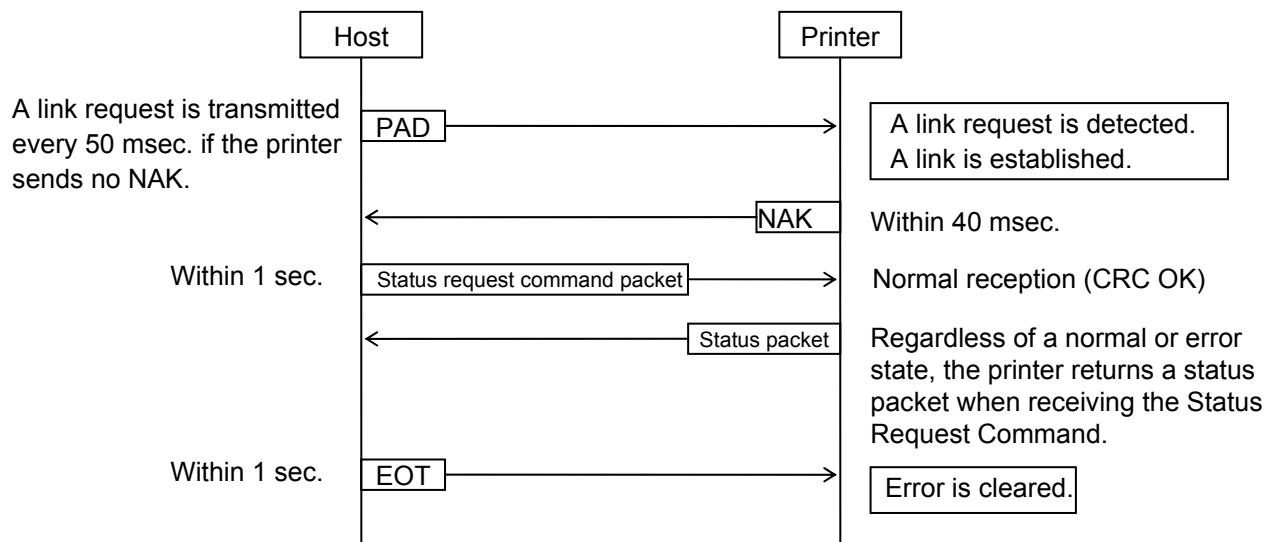
- When an error occurs during communication.



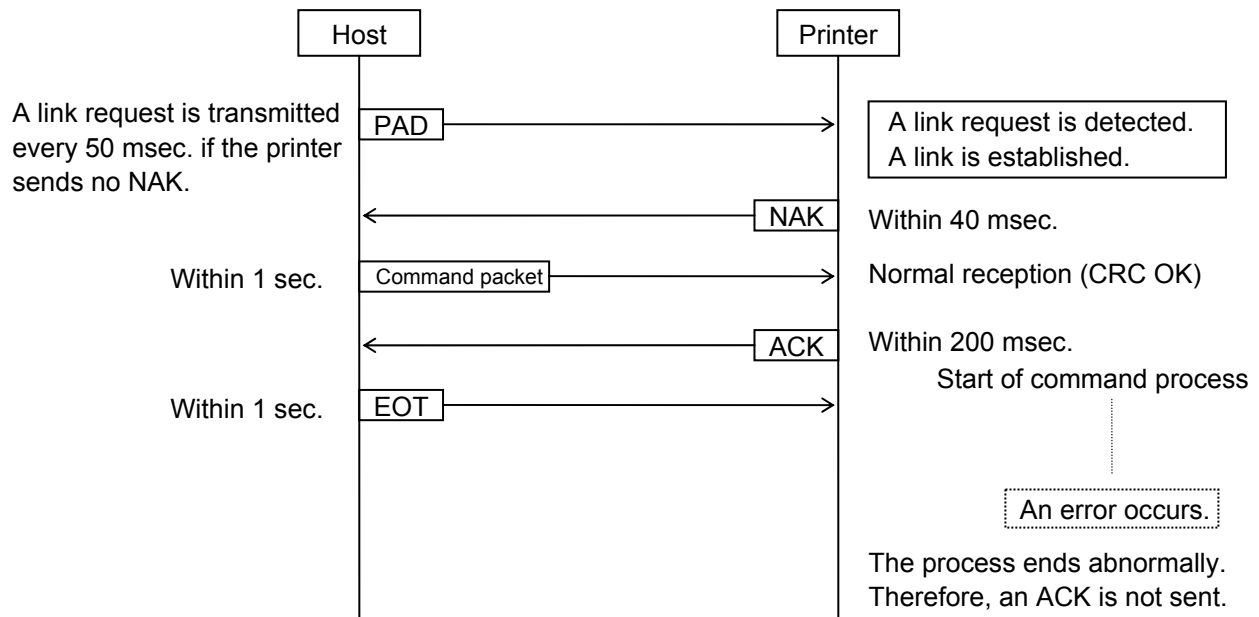
- When the communication is made during an error state.



- When the Status Request Command is sent during an error state.



- When an error occurs while the command is being processed.



Time out

Host: Time out due to waiting for a NAK after a PAD is sent50 msec.

(After time out, a PAD should be sent repeatedly.)

Time out due to waiting for an ACK after a command is sent....200 msec.

NOTE: The process time for issuing a label or storing data into flash ROM varies according to the contents to be processed. Therefore, time out waiting for an ACK is not set.

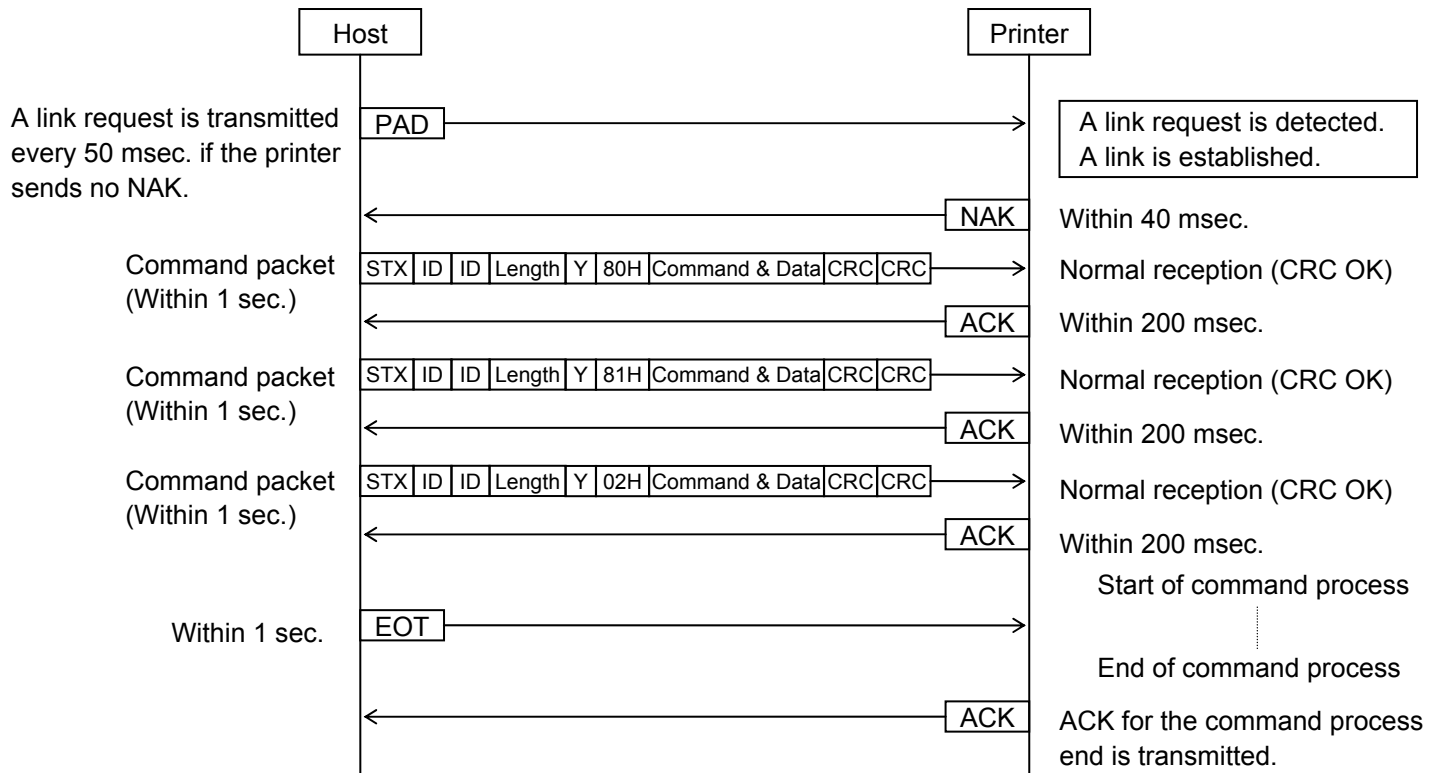
Printer: Time out due to waiting for a command after a NAK is sent..... 1 sec.

Time out due to waiting for an EOT or a command after an ACK is sent..... 1 sec.

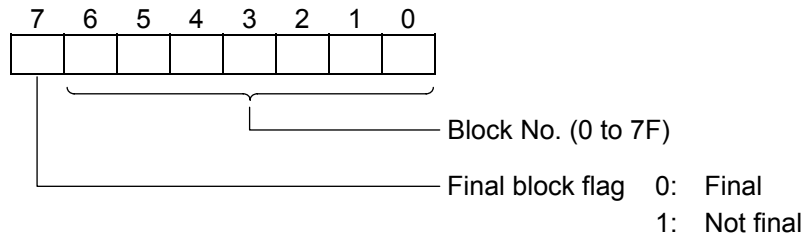
Time out due to waiting for an EOT after the status is sent..... 1 sec.

3.2.6 CONNECTION SEQUENCE EXAMPLE (TPCL, RECEIPT OR ESC/POS MODE)

The transmission control is basically the same as in the LABEL mode. Below is an example of the setting method for the flag of each command packet.

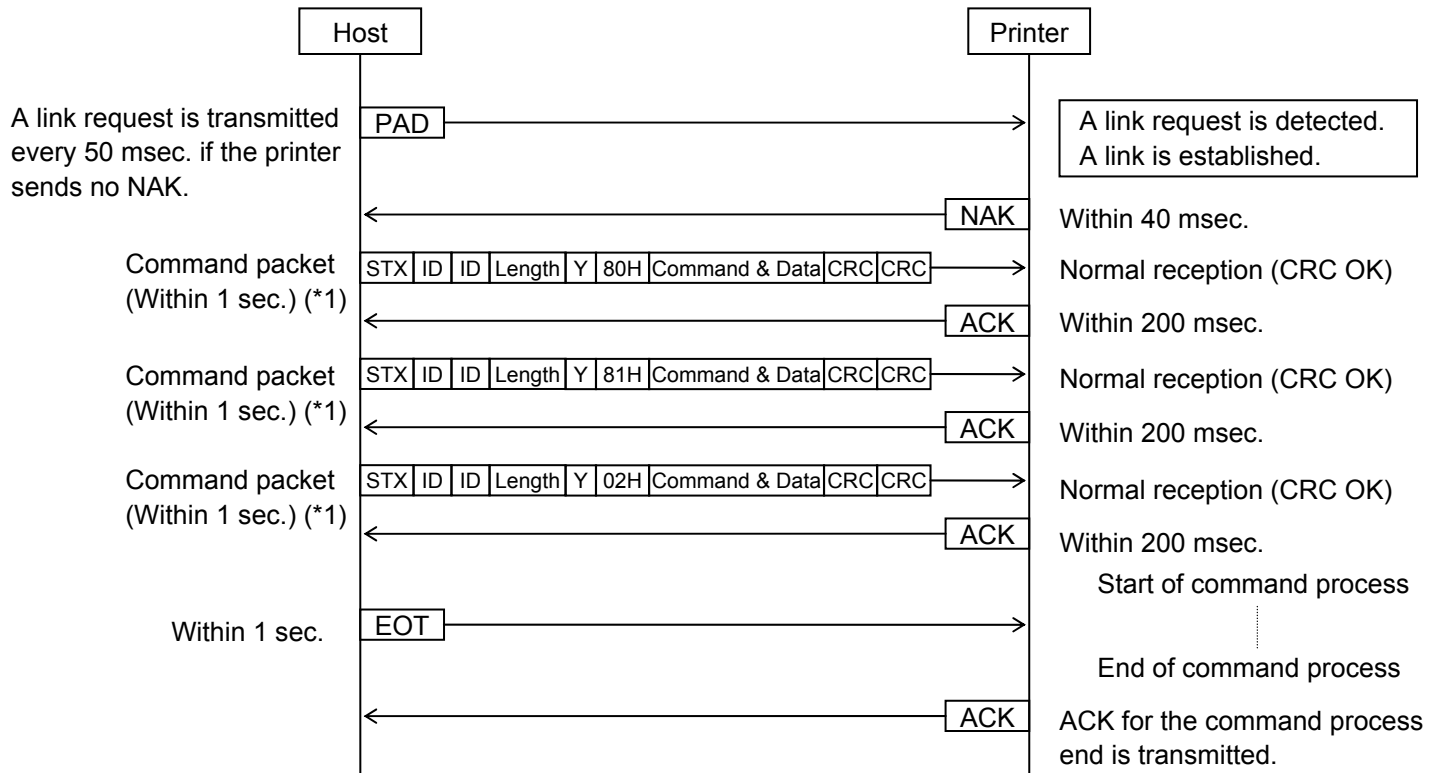


* Flag description:



- * After each packet is checked by CRC, the packets which pass the check are stored. When the final block is received normally, an issue is started.
- * 128 block Nos. can be set from 0 to 7F. (However, if the packet length is designated in 2 bytes, total data amount of all blocks must be 60 KB or less. Therefore, a maximum of 128 block Nos. may not be able to be set.) When 128 block Nos. (or 60 KB) are not enough, terminate the command transmission, and issue the receipt. After issuing the receipt, the remainder can be sent. If the next command packet is sent during an issue, it is discarded without being processed.
- * The block Nos. must be consecutive, starting from 0 (in ascending order). If the block Nos. are not consecutive, starting from 0 in ascending order, a command syntax error occurs. If the same block No. is received again before the final block is received, the block is discarded without being stored.
- * For the final block, the most significant bit must be cleared to 0. The printer starts an issue after the final block is received. Therefore, if this setting is not made, the printer does not start printing.

[TPCL mode]



*1: Example of command packets is shown below.

(When the length is designated in 1 byte and the printer ID of the command packet is 1.)

Command packet 1

[02H][00H][01H][FFH][59H][80H]

{D0630,0480,0600}

{AX;+000,+000,+00}

{AY;+00,1,1}

{T20C10}

{C}

{LC;0030,0030,0450,0550,1,5}

{LC;0030,0300,0450,0300,0,5}

{LC;0250,0300,0250,0550,0,5}

{PC01;0050,0110,2,2,A,+00,00,B,+0000000000,P1}

{PC02;0050,0200,1,1,A,+00,00,B,+000000}

[B6H][B7H]

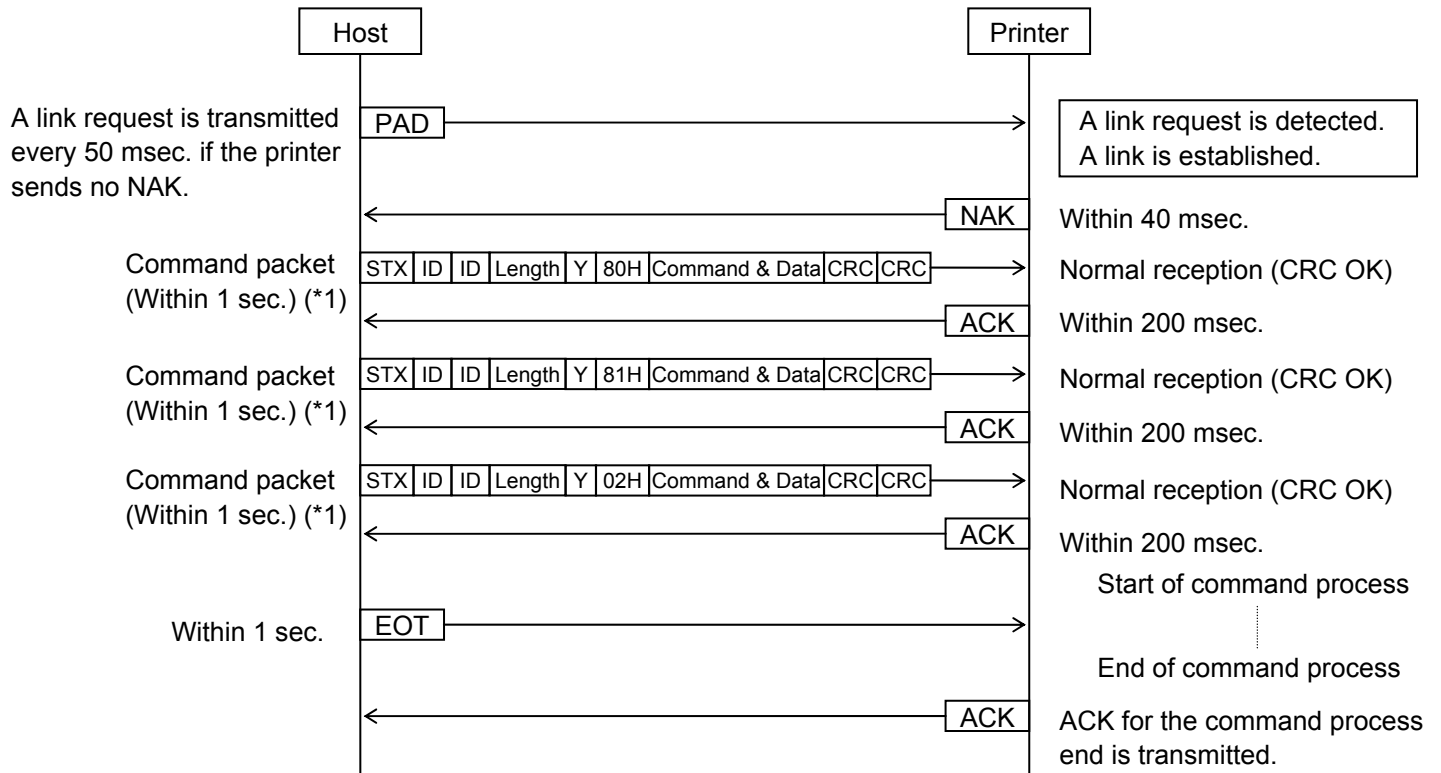
Command packet 2

```
[02H][00H][01H][FFH][59H][81H]
0000,P1}
{PV03;0050,0260,0030,0030,A,+000,00,B,M0,+0000000000,Z00,P1}
{XB04;0050,0380,0,3,02,0,0040,+0000000000,020,1,00}
{XB05;0290,0380,Q,11,03,01,0,C033033}
{RC01;Sample}
{RC02;BITMAPFONT}
{RV03;OUTLINEFONT}
{RB04;1234567}
{RB05;12345
[B8H][4BH]
```

Command packet 3

```
[02H][00H][01H][29H][59H][02H]
6789012345678901234567890123456789012345678901234}
{XS;I,0001,0002C1001}
[D1H][67H]
```

[RECEIPT or ESC/POS mode]



*1: Example of command packets (in the RECEIPT mode) is shown below.

(When the length is designated in 1 byte and the printer ID of the command packet is 849.)

Command packet 1

```
[02H][03H][51H][FFH][59H][80H]
[1BH]W384[1BH]H000[1BH]3
[1BH]a1[1BH]![30H][1BH]O+010[1BH]L3360[0AH][1BH]KCSample[0AH][0AH][1BH]!
[00H][1BH]a0[1BH]KABITMAPFONT[0AH][1BH]![30H][1BH]KABITMAPFONT[0AH]
[1BH]![60H][1BH]KABITMAPFONT[0AH][0AH][1DH]w[02H][1DH]hp[1DH]H1
[1BH]O+000[1DH]k3*1234567890*[00H][0AH][0AH][0AH][1BH]O+100[1BH]L1210[0AH]
[1BH]![00H][1BH]a1[1DH]:12345678901234567890[0AH]12345678901234567890[0AH]
12345678901234567890[0AH]12345678901234567890[0AH]12345678
[25H][5DH]
```

Command packet 2

```
[02H][03H][51H][FFH][59H]
901234567890[0AH]12345678901234567890[0AH]12345678901234567890[0AH]12345
678901234567890[0AH]12345678901234567890[0AH]12345678901234567890[0AH]1234
56789012345678[0AH]#####[1DH]:[0AH][1DH]~ABCDEFGHJKLM[00H][0AH]
[0AH][1BH]a[30H][1BH]KVA030030OUTLINEFONT[0AH][1BH]KVB030030OUTLINEFONT[0AH]
[0AH][1DH]w[04H][1DH]hh[1DH]qM[1DH]r1[1DH]kT1234567890[00H][0AH]
[0AH][1DH]w[03H][1DH]h[03H][1DH]s[00H][1DH]c[01H][1DH]kP
[02H][93H]
```

Command packet 3

```
[02H][03H][51H][55H][59H][02H]
123456789012345678901234567890123456789012345678901234567890[00H]
```

[0AH][0AH][1BH]O+010[1BH]L3360[0AH][0AH][0AH]
[C3H][97H]

3.2.7 PRINTER STATE TRANSITION (LABEL MODE)

Printer state transition

Event State	Ensuring link	Issue Command reception Store Command reception	End of issue End of storage	Status Request Command reception	EOT reception	Time out	CRC error	Syntax error, Storage error, Error during issuing
Wait state for the link S1	NAK transmission → S2	—	—	—	—	—	—	—
Wait state for a command after the NAK transmission S2	—	<u>Normal</u> ACK transmission Command analysis → S3	—	<u>Normal</u> Status transmission → S3	—	End of link → S1	NAK transmission → S2	— → S1
		<u>Error</u> Status transmission → S4	—	<u>Error</u> Status transmission → S4				
Wait state for a command/EOT after the ACK transmission S3	—	ACK transmission Command analysis → S3	<u>EOT has been received</u> ACK transmission (NOTE 1) → S1	Status transmission → S3	<u>Store Command</u> Start of storage process → S3	End of link (NOTE 2) → S1	NAK transmission → S2	— → S1
			<u>EOT has not been received</u>		<u>Issue Command</u> ACK transmission if the issue is completed. (NOTE 1) → S1 If the issue is not completed → S3			
					<u>Status Request Command</u> → S1			
Wait state for an EOT after the status transmission S4	—	Status transmission → S4	—	Status transmission → S4	Clear of error → S1	End of link → S1	—	→ S1

- NOTES:**
1. Only when the ACK transmission for the process end is specified by the Data Print Command, an ACK is sent after an issue is completed.
 2. An ACK for the command process end is also sent, when the time out occurs during the wait state for an EOT.

Host state transition

Event State	NAK reception	ACK reception	Status reception	Time out (NOTE 1)	CRC error Framing error Overrun error	Activation of transmission to the printer
Wait state for a NAK for the link request S1	Command transmission → S2	→ S1	→ S1	→ S1	→ S1	—
Wait state for an ACK/status after the command transmission S2	Command retransmission → S2	<u>Middle block</u> Command transmission → S2	<u>Final block</u> EOT transmission → S3 or → S4	→ S4	→ S4	—
Wait state for an ACK after the EOT transmission S3	—	→ S4	→ S4	→ S4	→ S4	—
Key entry mode S4	→ S4	→ S4	→ S4	—	—	→ S1

NOTE: The retry count is arbitrarily determined by the host.

3.2.8 PRINTER STATE TRANSITION (TPCL, RECEIPT OR ESC/POS MODE)

Printer state transition

Event State	Ensuring link	Reception of the middle block packet	Reception of the final block packet	End of issue	Status Request Command reception	EOT reception	Time out	CRC error	Framing error Overrun error	Syntax error Error during issuing
Wait state for the link S1	NAK transmission → S2	—	—	—	—	—	—	—	—	—
Wait state for a packet after the NAK transmission S2	—	<u>Normal</u> ACK transmission → S3	<u>Normal</u> ACK transmission Command analysis → S3	—	<u>Normal</u> Status transmission → S3	—	End of link → S1	NAK transmission → S2	NAK transmission → S2	—
		<u>Error</u> Status transmission → S4	<u>Error</u> Status transmission → S4	—	<u>Error</u> Status transmission → S4					
Wait state for a packet/EOT after the ACK transmission S3	—	ACK transmission → S3	ACK transmission Command analysis → S3	<u>EOT has been received.</u> ACK transmission → S1	Status transmission → S3	<u>Normal command</u> ACK transmission if the issue is completed. → S1 If the issue is not completed → S3	End of link (NOTE 1) → S1	NAK transmission → S2	NAK transmission → S2	—
				<u>EOT has not been received</u>		<u>Status request</u> → S1				
Wait state for an EOT after the status transmission S4	—	Status transmission → S4	Status transmission → S4	—	Status transmission → S4	Clear of error → S1	End of link → S1	—	Timer reset → S4	→ S1

NOTE: An ACK for the command process end is also sent, when the time out occurs during the wait state for an EOT.

Host state transition

Event State	NAK reception	ACK reception		Status reception	Time out (NOTE 1)	CRC error Framing error Overrun error	Activation of transmission to the printer
Wait state for a NAK of the link request S1	Command transmission → S2	→ S1		→ S1	→ S1	→ S1	—
Wait state for an ACK/status after the command transmission S2	Packet retransmission → S2	<u>Middle block</u> Packet transmission → S2	<u>Final block</u> EOT transmission → S3 or → S4	EOT transmission → S4	→ S4	→ S4	—
Wait state for an ACK after the EOT transmission S3	—	→ S4		→ S4	→ S4	→ S4	—
Key entry mode S4	→ S4	→ S4		→ S4	—	—	→ S1

NOTE: The retry count is arbitrarily determined by the host.

3.2.9 HANDLING OF RECEIVED DATA WHEN THE PRINTER GOES INTO POWER SAVE MODE

When data is divided into multiple blocks in IrDA: TEC Protocol and received, the printer discards previously received data and goes into a wait state to receive data from the first block if reception is stopped and a timeout occurs (power save mode).


During single block, the printer discards partially received data and goes into a wait state to receive data from the first "STX" if reception is stopped and a timeout occurs (power save mode), because the reception mode changes to the "STX reception wait state."

3.3 IrDA (IrCOMM) INTERFACE

The protocol for IrComm specifications is provided.

Application layer
IrComm
Tiny TP
IrLMP
IrLAP
IrDA-SIR

IrDA V1.2 (Low Power) standard

 parts are required.

Item	Specifications
Communication mode	Physical layer conforming to IrDA-SIR V1.2 (Low Power) standard
Transfer speed	9600, 19200, 38400, 57600, 115200 bps ^{*1}
Communication distance	within 0.2 m ^{*2}
Peak wave length of emitted light	850 to 900 nm
Communication angle	within $\pm 15^\circ$
Ambient illuminance	1000 lx or less (fluorescent lamp and incandescent lamp)
Emissive power	Min 3.6 mW/Sr ($\theta_h, \theta_v \leq \pm 15^\circ$)
Min. photo sensibility	Min 9 $\mu\text{W}/\text{cm}^2$ ($\theta_h, \theta_v \leq \pm 15^\circ$)

**1: Values are dependent on the communication protocol settings.*

**2: The communication distance may become shorter than 0.2 m, depending on the host's performance.*

Device nickname: 2-inch/203-dpi modelB-EP2DL-G
4-inch/203-dpi modelB-EP4DL-G
Service name (Class name): IrDA: IrCOMM
Min. turnaround time: 1 msec
Link termination threshold time: 12 sec

3.3.1 HANDLING OF RECEIVED DATA WHEN THE PRINTER GOES INTO POWER SAVE MODE

Data is left in the received buffer until reception is stopped and a timeout occurs (power save mode) because the received buffer has not been initialized.

3.4 IrDA (IrOBEX) INTERFACE

The protocol for IrOBEX specifications is provided.

Application layer
IrOBEX
Tiny TP (PTTP1)
IrLMP (LMP3)
IrLAP
IrDA-SIR

IrDA V1.2 (Low Power) standard

 parts are required.

Item	Specifications
Communication mode	Physical layer conforming to IrDA-SIR V1.2 (Low Power) standard
Transfer speed	9600, 19200, 38400, 57600, 115200 bps ^{*1}
Communication distance	within 0.2 m ^{*2}
Peak wave length of emitted light	850 to 900 nm
Communication angle	within $\pm 15^\circ$
Ambient illuminance	1000 lx or less (fluorescent lamp and incandescent lamp)
Emissive power	Min 3.6 mW/Sr ($\theta_h, \theta_v \leq \pm 15^\circ$)
Min. photo sensibility	Min 9 $\mu\text{W}/\text{cm}^2$ ($\theta_h, \theta_v \leq \pm 15^\circ$)

**1: Values are dependent on the communication protocol settings.*

**2: The communication distance may become shorter than 0.2 m, depending on the host's performance.*

Device nickname: 2-inch/203-dpi modelB-EP2DL-G
4-inch/203-dpi modelB-EP4DL-G

Service name (Class name): IrDA: IrOBEX

Min. turnaround time: 1 msec

Link termination threshold time: 12 sec

3.4.1 HANDLING OF RECEIVED DATA WHEN THE PRINTER GOES INTO POWER SAVE MODE

Data is left in the received buffer until reception is stopped and a timeout occurs (power save mode) because the received buffer has not been initialized.

3.5 RS-232C INTERFACE

Item	Specifications
	Normal mode
Communication mode	Start-stop synchronization mode
Communication direction	Transmission/reception (Full duplex)
Transmission rate	9600, 19200, 38400, 57600, 115200 bps ^{*1}
Start bit	1 bit
Stop bit	1 bit
Data length	8 bits
Parity	None/Even (depending on the setting)
Error detection ^{*2}	Overrun error
	Framing error
	Parity error
Received buffer	512K bytes

^{*1}: Values are dependent on the communication protocol settings.

^{*2}: Error detection is available in the RECEIPT mode only.

3.5.1 TRANSMISSION CONTROL (XON/XOFF PROTOCOL)

- The printer sends an XOFF code (13H) to the host, when the blank positions in the receive buffer become 10Kbytes or less.
- The printer sends an XON code (11H) to the host, when the blank positions in the receive buffer become 256Kbytes or more.
- When there are no blank positions in the receive buffer, the printer discards the received data which exceeds the receive buffer capacity without storing it in the buffer, and the buffer full error occurs. (After detecting the XOFF code, the host must stop transmission before the printer receive buffer becomes full.)

3.5.2 NOTES WHEN SENDING A COMMAND

- In the LABEL mode, when any of the commands below are sent, the host should send the next command after receiving the process end status. If the host sends the next command before receiving the process end status, the printer may discard it without receiving.
 - Print Density Fine Adjust Command (If it is not stored in the form)
 - Print Position Fine Adjust Command (If it is not stored in the form)
 - Form Store Terminate Command
 - Graphic Data Store Command
 - Printer ID Set Command
 - Flash Memory Storage Area Format Command
 - Writable Character Data Store Command
 - Status Request Command
 - Mode Select Command
 - Strip Sensor Adjust Command
 - Data Print Command
 - * When automatic status transmission is not specified by the Data Print Command, the issue end status is not sent. Therefore, check the printer status by transmitting the Status Request Command. When the printer status is idling, the next command should be sent.
- In the TPCL mode, when the automatic status response is selected, the host sends a response when receiving an error, print end, or feed end status.
- In the RECEIPT mode, the host sends a status when receiving an error status, though there is no automatic status response selection. To the print end and feed end statuses, the host does not return any status.
- In the ESC/POS mode, the automatic status response cannot be selected. To the print end and feed end statuses, the host does not return any status. (A response is made with the Status Request Command only.)

- Contents of the status

[LABEL, RECEIPT or ESC/POS mode]

Data to be sent (Fixed at 5 bytes)

STX	Printer ID		Printer status	Battery status
02H	xxH	xxH	xxH	xxH

- Printer ID 2-byte hex data (in order from High to Low)
- Printer status... Printer status is indicated in 1-byte data.
 - 00H: Normal state (idling)
 - 01H: Cover open state
 - 02H: Command syntax error (including Ir packet error)
 - 03H: Paper jam
 - 04H: Label end
 - 05H: Cover open error
 - 06H: Broken head dots error
 - 07H: Thermal head excessive temperature
 - 08H: Flash ROM write error
 - 09H: Flash ROM erase error
 - 0AH: Low battery (Print failure)
 - 0BH: Operating
 - 0CH: Communication error * In the RECEIPT mode or for RS-232C connection only
 - 0DH: Normal end + Label end (See **NOTE**.)
 - 0EH: Flash ROM storage area full state
 - 0FH: Wait for strip * In the LABEL mode only
 - 10H: Normal issue end
 - 14H: Pause state
 - 19H: Ambient temperature error
 - 32H: Abnormal battery temperature
 - 33H: Battery excessive temperature
 - 37H: Charging error
 - 38H: Bluetooth setting successfully completed
 - 39H: Bluetooth setup error (including initialization error)
 - 45H: Wait for battery recovery
 - 46H: Wait for head temperature reduction
 - 47H: Wait for motor temperature reduction
 - 55H: Writable character/PC command save mode

NOTE: In the LABEL mode, this is a state when the printer runs out of labels, after the effective print length is printed. In the RECEIPT mode, this status is returned to the host, when the printer runs out of labels, after a receipt is issued.

- Status in the compatible mode for the B-SP series

00H: Normal state (idling)
01H: Cover open state
02H: Command syntax error (including Ir packet error)
03H: Paper jam
04H: Label end
05H: Cover open error
06H: Broken head dots error
07H: Thermal head excessive temperature (including ambient temperature error, abnormal battery temperature, and battery excessive temperature)
08H: Flash ROM write error
09H: Flash ROM erase error
0AH: Low battery (Print failure)
0BH: Operating (including wait for strip, pause state, writable character/PC command save mode, wait for battery recovery, wait for head temperature reduction, and wait for motor temperature reduction)
0CH: Communication error * In the RECEIPT mode or for RS-232C connection only
0DH: Normal end + Label end
0EH: Flash ROM storage area full state
10H: Normal issue end
37H: Charging error
38H: Bluetooth setting successfully completed
39H: Bluetooth setup error (including initialization error)

- Battery status .. The battery charge status is indicated in 5 levels.

(B-EP2DL)

- 01H: 7.2 V or less (Print failure)
- 02H: 7.3 V to 7.4 V (remaining No. of printable labels: Approx. 1 to 30)
- 03H: 7.5 V to 7.7 V (remaining No. of printable labels: Approx. 30 to 150)
- 04H: 7.8 V to 7.9 V (remaining No. of printable labels: Approx. 150 to 300)
- 05H: 8.0 V to 8.4 V (remaining No. of printable labels: Approx. 300 or more)

(B-EP4DL)

- 01H: 14.0 V or less (Print failure)
- 02H: 14.1 V to 14.6 V (remaining No. of printable labels: Approx. 1 to 30)
- 03H: 14.7 V to 15.2 V (remaining No. of printable labels: Approx. 30 to 150)
- 04H: 15.3 V to 15.9 V (remaining No. of printable labels: Approx. 150 to 300)
- 05H: 16.0 V to 16.8 V (remaining No. of printable labels: Approx. 300 or more)

- * The remaining number of printable labels may vary according to the contents to be printed and the ambient environment.

[TPCL mode]

Data to be sent

SOH	STX	Status			Remaining No. of labels				ETX	EOT	CR	LF
01H	02H	3xH	3xH	3xH	3xH	3xH	3xH	3xH	03H	04H	0DH	0AH

- Detailed status is indicated in 2-byte data.

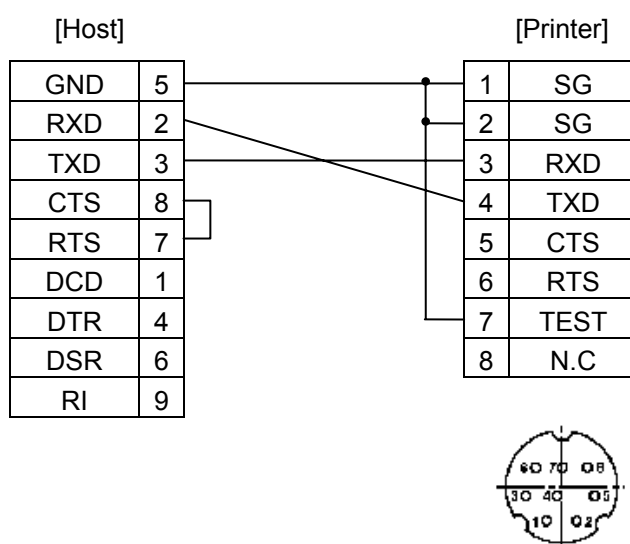
- “00”: Normal state
- “01”: Cover open state
- “02”: Operating
- “04”: Pause state
- “05”: Wait for strip
- “06”: Command syntax error (including Ir packet error)
- “09”: Normal issue end + Label end
- “11”: Paper jam
- “13”: Label end
- “15”: Cover open error
- “17”: Broken head dots error
- “18”: Thermal head excessive temperature
- “19”: Ambient temperature error
- “32”: Abnormal battery temperature
- “33”: Battery excessive temperature
- “36”: Low battery
- “37”: Charging error
- “38”: Bluetooth setting successfully completed
(→ No response with Status Request Command)
- “39”: Bluetooth setup error (including initialization error)
- (“40”: Normal issue end) Response status for automatic status transmission
- (“41”: Normal feed end) Response status for automatic status transmission
- “45”: Wait for battery recovery
- “46”: Wait for head temperature reduction
- “47”: Wait for motor temperature reduction
- “50”: Flash ROM write error
- “51”: Flash ROM erase error
- “54”: Flash ROM storage area full state
- “55”: Writable character/PC command save mode

- Detailed status in the compatible mode for the B-SP series
 - “00”: Normal state
 - “01”: Cover open state
 - “02”: Operating (Including wait for strip, pause state, wait for battery recovery, wait for head temperature reduction, wait for motor temperature reduction, and writable character/PC command save mode)
 - “06”: Command syntax error (including Ir packet error)
 - “09”: Normal issue end + Label end
 - “11”: Paper jam
 - “13”: Label end (including)
 - “15”: Cover open error
 - “17”: Broken head dots error
 - “18”: Thermal head excessive temperature (Including ambient temperature error, abnormal battery temperature, and battery excessive temperature)
 - “36”: Low battery
 - “37”: Charging error
 - “38”: Bluetooth setting successfully completed
(→ No response with Status Request Command)
 - “39”: Bluetooth setup error (including initialization error)
 - (“40”: Normal issue end) Response status for automatic status transmission
 - (“41”: Normal feed end) Response status for automatic status transmission
 - “50”: Flash ROM write error
 - “51”: Flash ROM erase error
 - “54”: Flash ROM storage area full state
- Status type Indicated in 1-byte data
 - “1”: Status Request Command
 - “2”: Automatic status transmission
- Remaining No. of labels.... Indicated in 4-byte data
 - “0000” to “9999”
- CR/LF Indicated in 2-byte data

(1) Connector pin diagram and signal description

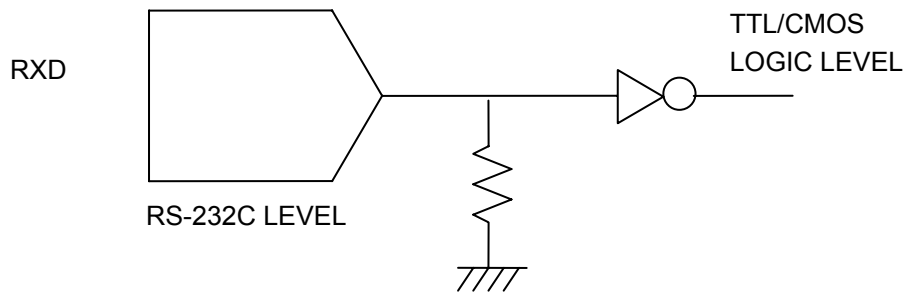
Pin No.	Signal name	Function	Signal direction
1 2	SG	Ground line for all data and control signals. (without the noise filter)	—
3	RXD	Line for data which the host sends to the printer. Logic “1” is a “Low” level, while logic “0” is a “High” level. It is in a “Low (Mark)” state when no transmission is in progress. In power save mode, it should be in a “Low (Mark)” state. If it is in a “High” state, the printer cannot be returned to the normal state from the power save mode by opening/closing the cover, or pressing the [POWER] switch or the [FEED] switch.	← Host
4	TXD	Line for data which the printer sends to the host. Logic “1” is a “Low” level, while logic “0” is a “High” level. It is in a “Low (Mark)” state when no transmission is in progress. It is in a high impedance state in power save mode.	Printer →
5	CTS	N/A	—
6	RTS	N/A	—
7	TEST	The signal is connected with SG.	—
8	N.C		—

(2) Wire connection diagram

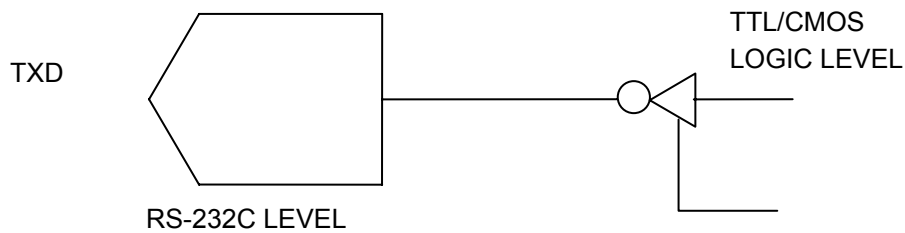


(3) Interface circuit

• Input circuit



• Output circuit



Signal levels

Input voltage

H +2.4 V to +25 V

L -25 V to -0.6 V

Output voltage

H Min. +5.0 V Typ +5.4 V

L Min. -5.0 V Typ -5.4 V

(4) Connector used for the communication cable

• For the printer

Manufacturer: HOSHIDEN

Model name: TCP8685 or equivalent

• For the host

Manufacturer: DDK

Model name: 17JE-13090-02-D8C or equivalent

3.5.3 HANDLING OF RECEIVED DATA WHEN THE PRINTER GOES INTO POWER SAVE MODE

Data is left in the received buffer until reception is stopped and a timeout occurs (power save mode) because the received buffer has not been initialized.

3.6 USB INTERFACE

- (1) Supported standard : Complying with USB Standard Rev. 2.0
- (2) Supported transfer type : Control transfer and bulk transfer
- (3) Transfer rate : Full-speed (12 Mbps)
- (4) Transfer control method : A status with the receive buffer remaining capacity data shown below is returned against the lead request just after [ESC] WB [LF] [NUL].
The host uses it to transfer data without making the receive buffer full.

- Receive Buffer Free Space Status

Commonly used in all modes (TPCL, TPCL1, LABEL, RECEIPT, RECEIPT1, or ESC/POS)

Status after [ESC] WB [LF] [NUL] (23 bytes)

SOH	01H	Header of the status block
STX	02H	
Status	3XH	Printer status
	3XH	* Details are described later.
Status type	33H	This indicates a status with free space of the receive buffer included.
Remaining count	3XH	Remaining print count "0000" (0 label/tag) to "9999"(9999 labels/tags)
	3XH	
	3XH	
	3XH	
Length	32H	Total number of bytes of this status block
	33H	"23" (23 bytes)
Free space of receive buffer	3XH	Free space of the receive buffer "00000" (0K byte) to "00512" (512K bytes) However, the maximum value should be equal to the receive buffer capacity.
	3XH	
	3XH	
	3XH	
	3XH	
Receive buffer capacity	30H	Receive buffer capacity "00512"(512K bytes)
	30H	
	35H	
	31H	
	32H	
CR	0DH	Footer of the status block
LF	0AH	

3.6.1 HANDLING OF RECEIVED DATA WHEN THE PRINTER GOES INTO POWER SAVE MODE

Data is left in the received buffer until reception is stopped and a timeout occurs (power save mode) because the received buffer has not been initialized.

3.7 BLUETOOTH INTERFACE

3.7.1 OUTLINED SPECIFICATIONS

Item	Specifications
Communication method	Bluetooth V1.2 (with logo certification)
Supported profile	Serial port profile
Communication class	Class 2
Communication distance	3 m/360°
Service name	Serial Port Profile 1
Device nickname	Programmable
Factory default setting:	TOSHIBA TEC BT
Flow control	Credit based flow control
Operation mode	Slave mode
PIN code	Available
Receive buffer	Dynamic allocation
Link break time out	20 sec.
Inquiry control	Programmable
Factory default setting:	• Response is made at anytime.
SR mode and timer setting value at page/inquiry scanning	SR mode: R2 * The timer is programmable.
Factory default setting:	Scan interval = 1.28 sec. Scan window = 22.5 msec.
Device class	Major Device Class = Imaging Minor Device Class = Printer

- * Although the SR mode of the printer is R2, that of the host is not necessarily R2. Connectivity depends on the situation. When the clock of the host is already synchronized with the printer (for example, after an inquiry is made or a connection has been once established after a power on), the highest connectivity is obtained by setting R2 in the SR mode of the host. When the host's clock is not synchronized with the printer, the connectivity will become the best when SR mode of the host is set to R0.

3.7.2 BLUETOOTH DEVICE ADDRESS (BD ADDRESS)

As long as the Bluetooth interface has been installed on the printer, when the printer is turned ON, it prints the Bluetooth device address.

[Character]

The BD address is printed on the self-test result in the SYSTEM mode.

[Barcode]

Various parameters are printed by holding down the [POWER] switch (for 3 seconds or more after a message "ON LINE" is displayed on the LCD) at a power ON time.

For details, see the Key Operation Specifications.

3.7.3 STANDARD COMMUNICATION SEQUENCE OF BLUETOOTH INTERFACE

When Bluetooth interface is used, and if a connection between the host and the printer is disconnected right after a data transmission, the transmitted data may not be properly sent to the printer.

This should be avoided by performing one of the following methods on the application program.

- (1) Disconnecting the Bluetooth connection between the host and the printer after the host receives an end of job status from the printer and confirms the completion of the job.
- (2) Waiting for the minimum of 100 msec. after a data transmission to the printer before disconnecting the Bluetooth connection.
- (3) Maintaining the Bluetooth connection while a series of print jobs are performed on the application, and disconnecting the connection by key operations when exiting the print job.

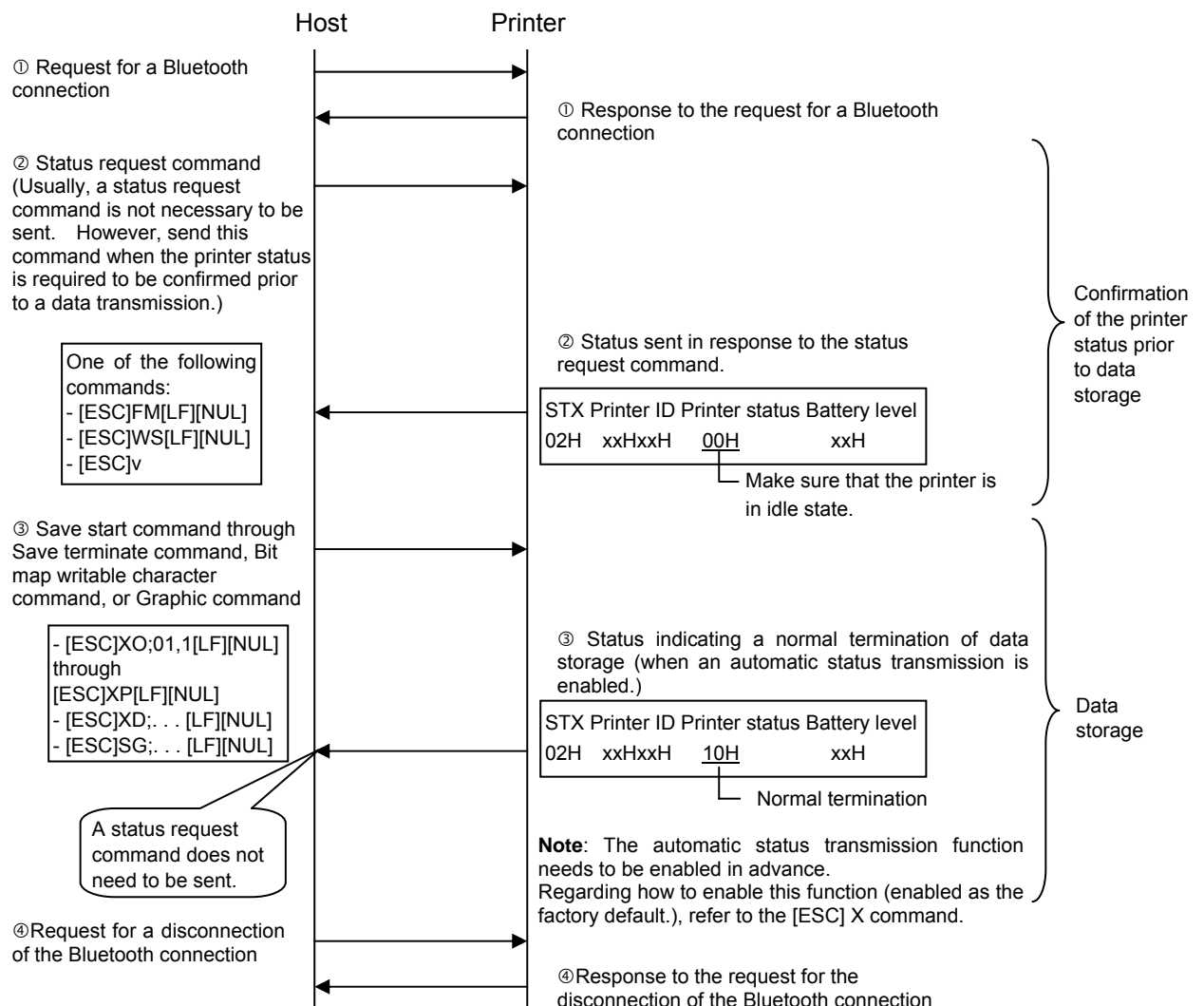
As the completion of printer operations can be confirmed, method (1) or (3) is recommended.

Method (1): Disconnecting a Bluetooth connection between the host and the printer after the completion of a print job is confirmed.

Basically, use the automatic status transmission function (this function is enabled as the factory default.) to confirm the statuses sent from the printer after printing or storing data.

This method enables confirming whether a print job is properly performed on the application. Also, an error, such as a paper end or a paper jam, on the printer can be detected by the application.

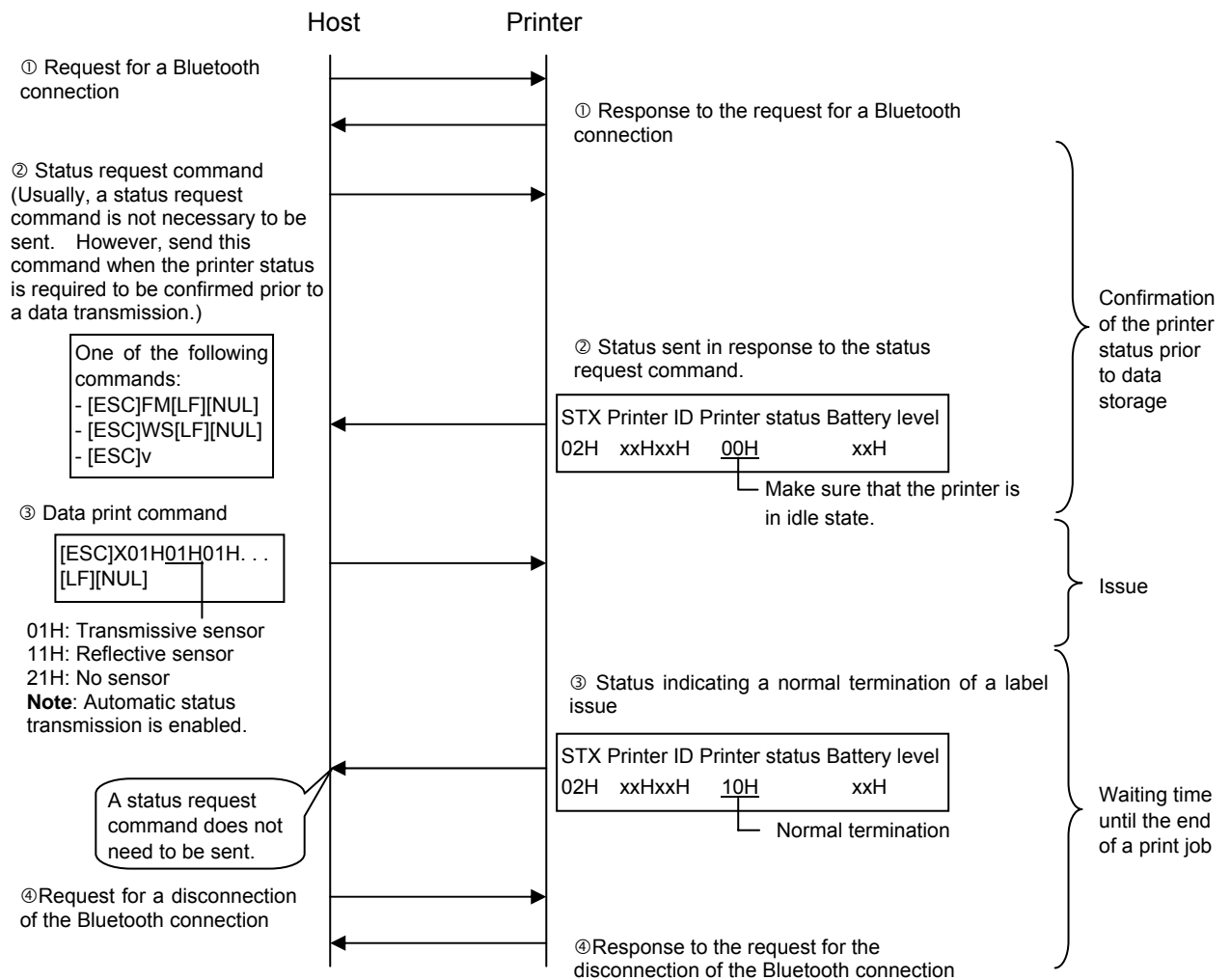
① LABEL mode (Storing forms, writable characters, or graphics)



- * The printer status can also be confirmed with the following command:
 - [ESC] WB [LF] [NUL]

Note that the contents of the status vary, which deserves special attention.

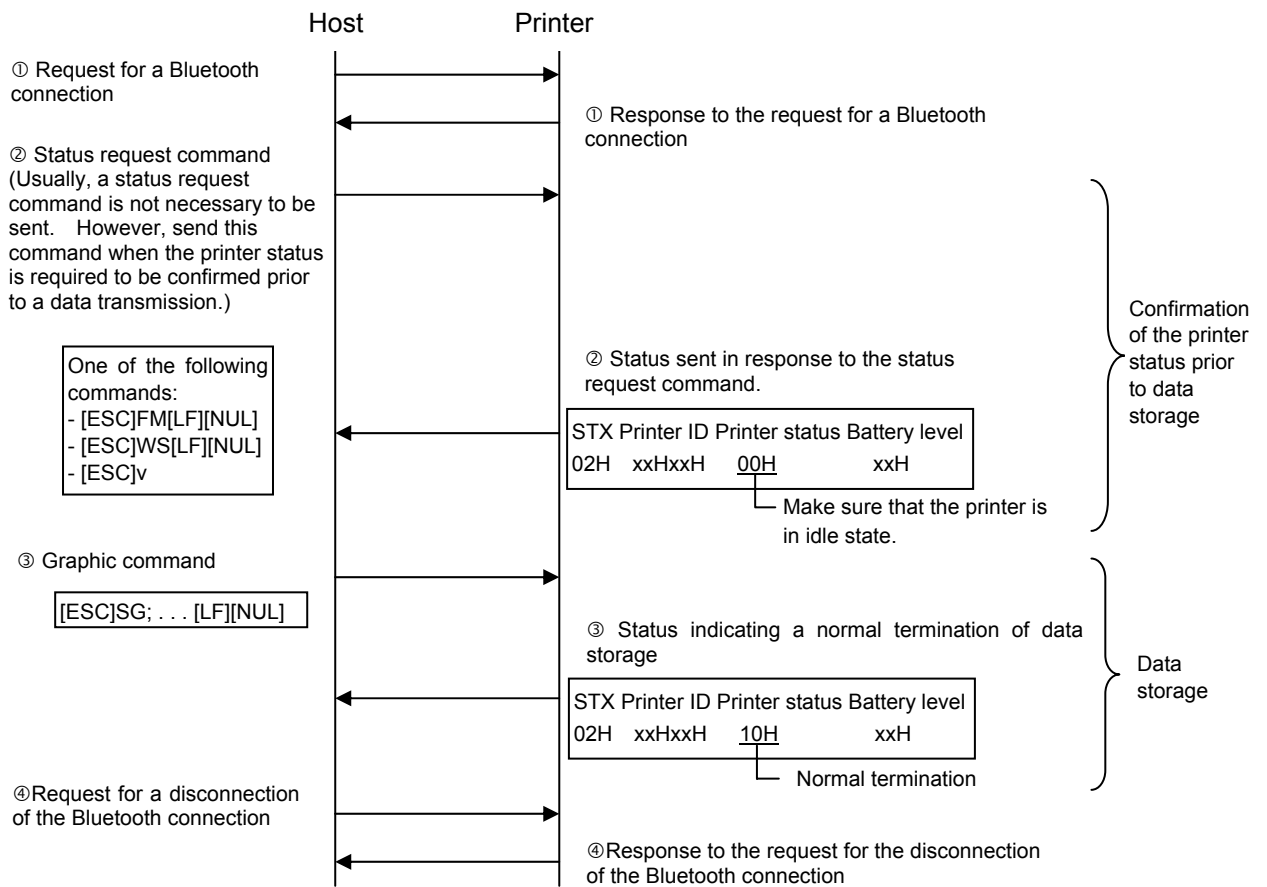
② LABEL mode (Issue)



- * The printer status can also be confirmed with the following command:
 - [ESC] WB [LF] [NUL]

Note that the contents of the status vary, which deserves special attention.

③ RECEIPT mode (Storing graphics)

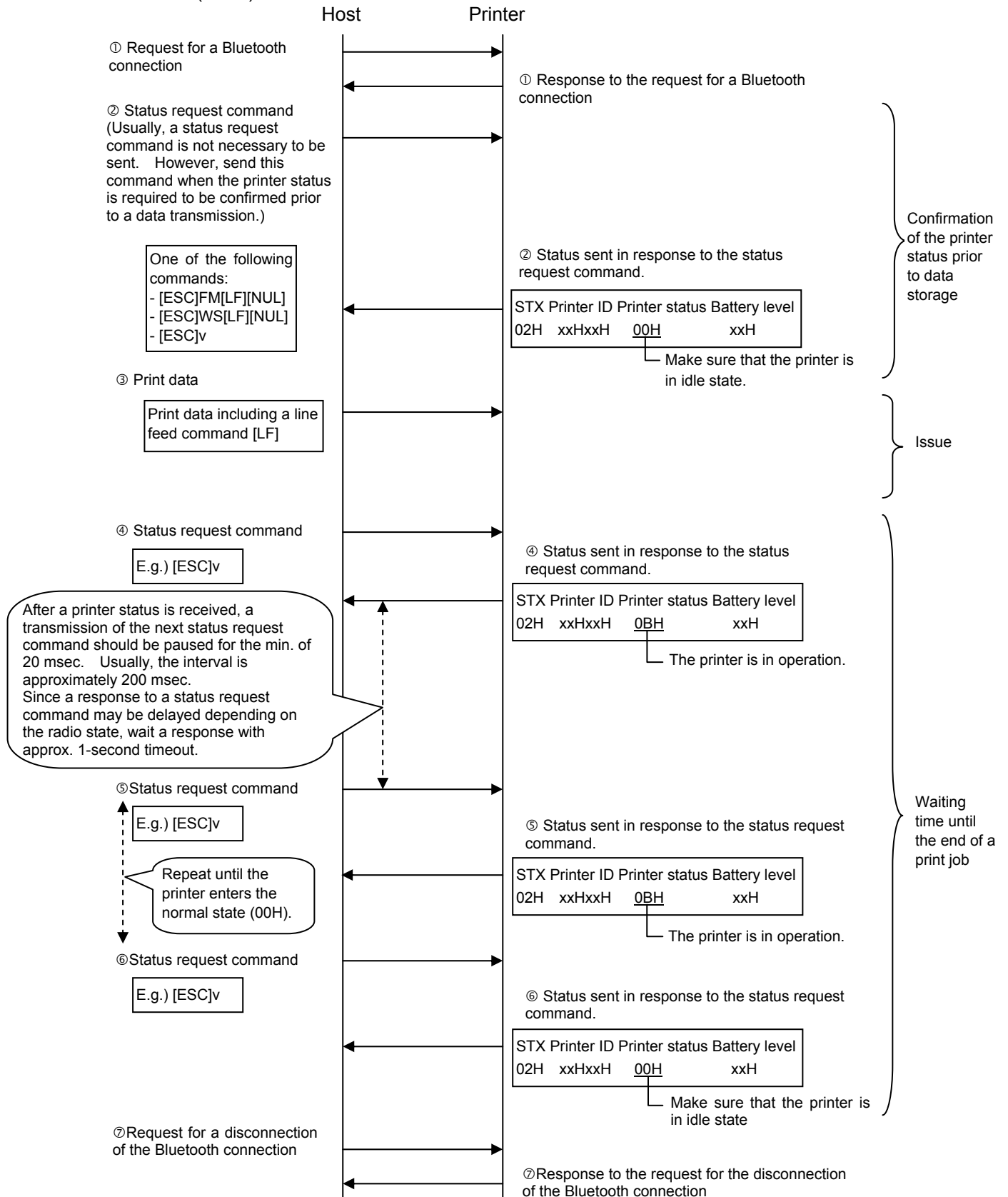


* The printer status can also be confirmed with the following command:

- [ESC] WB [LF] [NUL]

Note that the contents of the status vary, which deserves special attention.

④ RECEIPT mode (Issue)

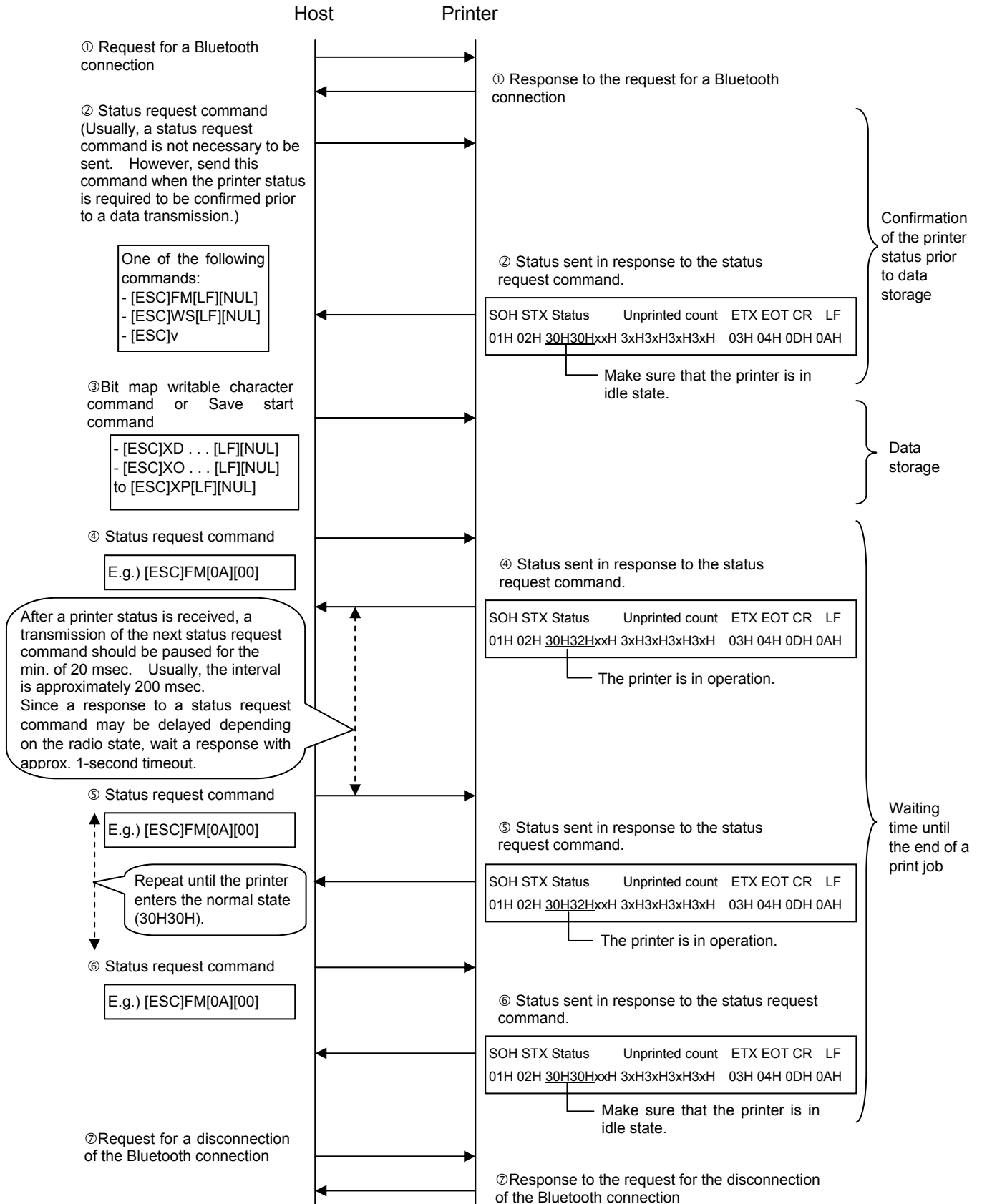


* The printer status can also be confirmed with the following command:

- [ESC] WB [LF] [NUL]

Note that the contents of the status vary, which deserves special attention.

⑤ TPCL mode (Storing writable characters, PC save)

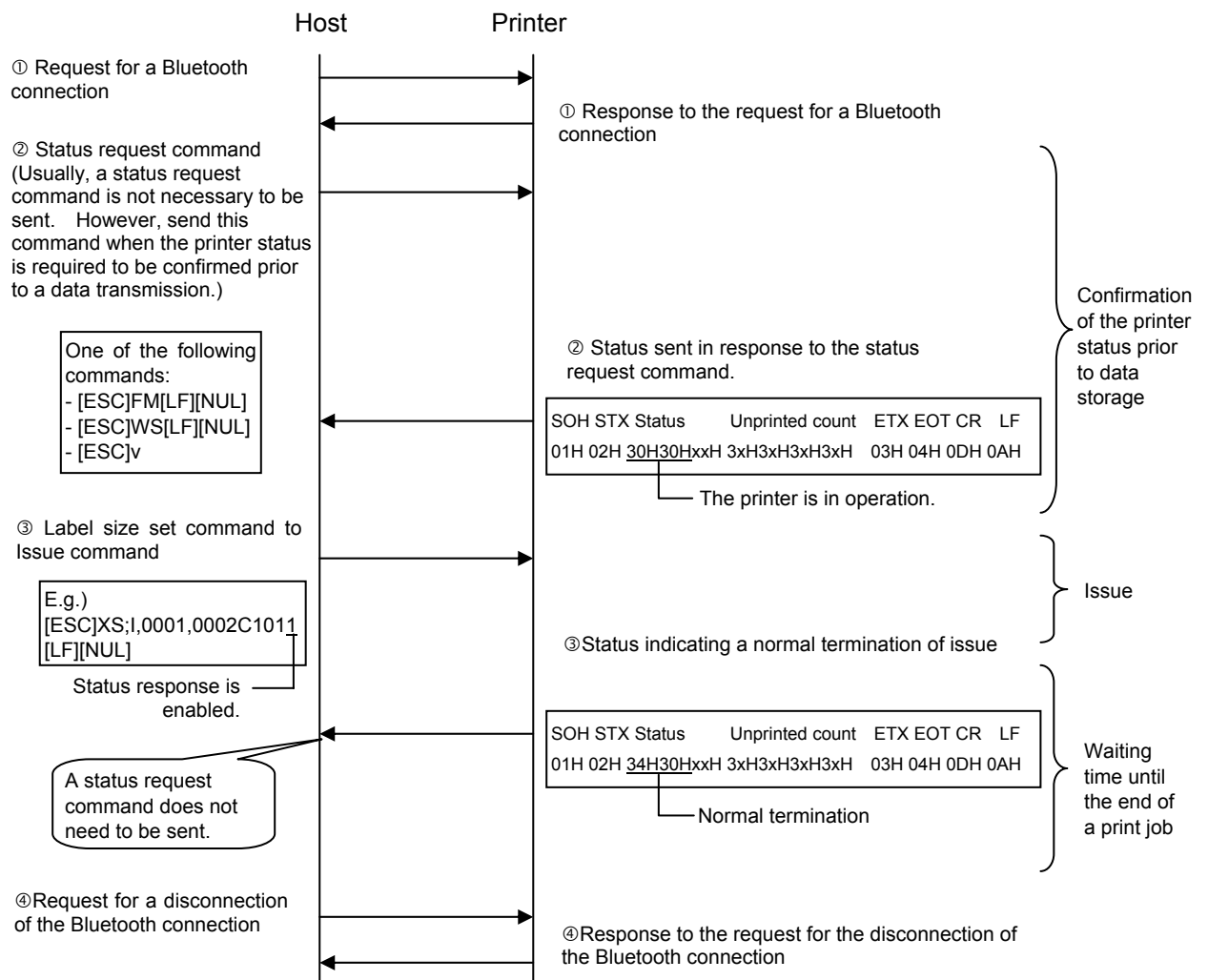


* The printer status can also be confirmed with the following command:

- [ESC] WB [LF] [NUL]

Note that the contents of the status vary, which deserves special attention.

⑥ TPCL mode (Issue)



- * The printer status can also be confirmed with the following command:
 - [ESC] WB [LF] [NUL]

Note that the contents of the status vary, which deserves special attention.

Method (2): Waiting for the minimum of 100 msec. after a data transmission to the printer before disconnecting the Bluetooth connection.

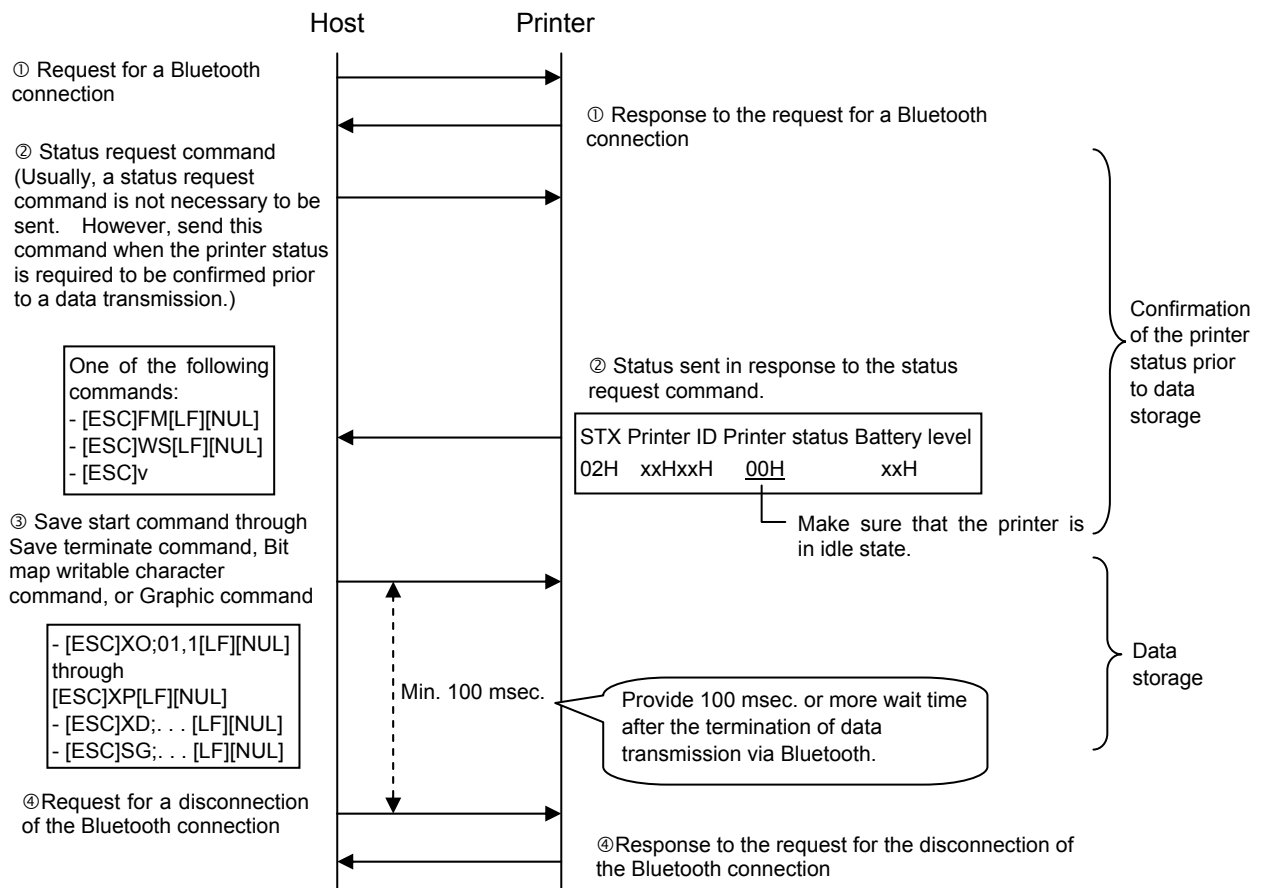
In the case that a method to confirm an end of job status, as described in Method (1), is not applicable, a minimum of 100 msec. should be provided between the last data transmission and a disconnection of Bluetooth connection to avoid an erroneous data transmission via Bluetooth.

The above mentioned 100 msec. is supposed to be counted up from the termination of a data transmission via Bluetooth (radio wave).

Some hosts may store the transmission data of the application in the buffer in the driver, then send them to the printer. In this case, care must be taken that there is time lag between the timing when the application writes data into the output function and when the data transmission is actually completed.

Thus, the time which is required to complete a data transmission should be added to 100 msec.

① LABEL mode (Storing forms, writable characters, or graphics)

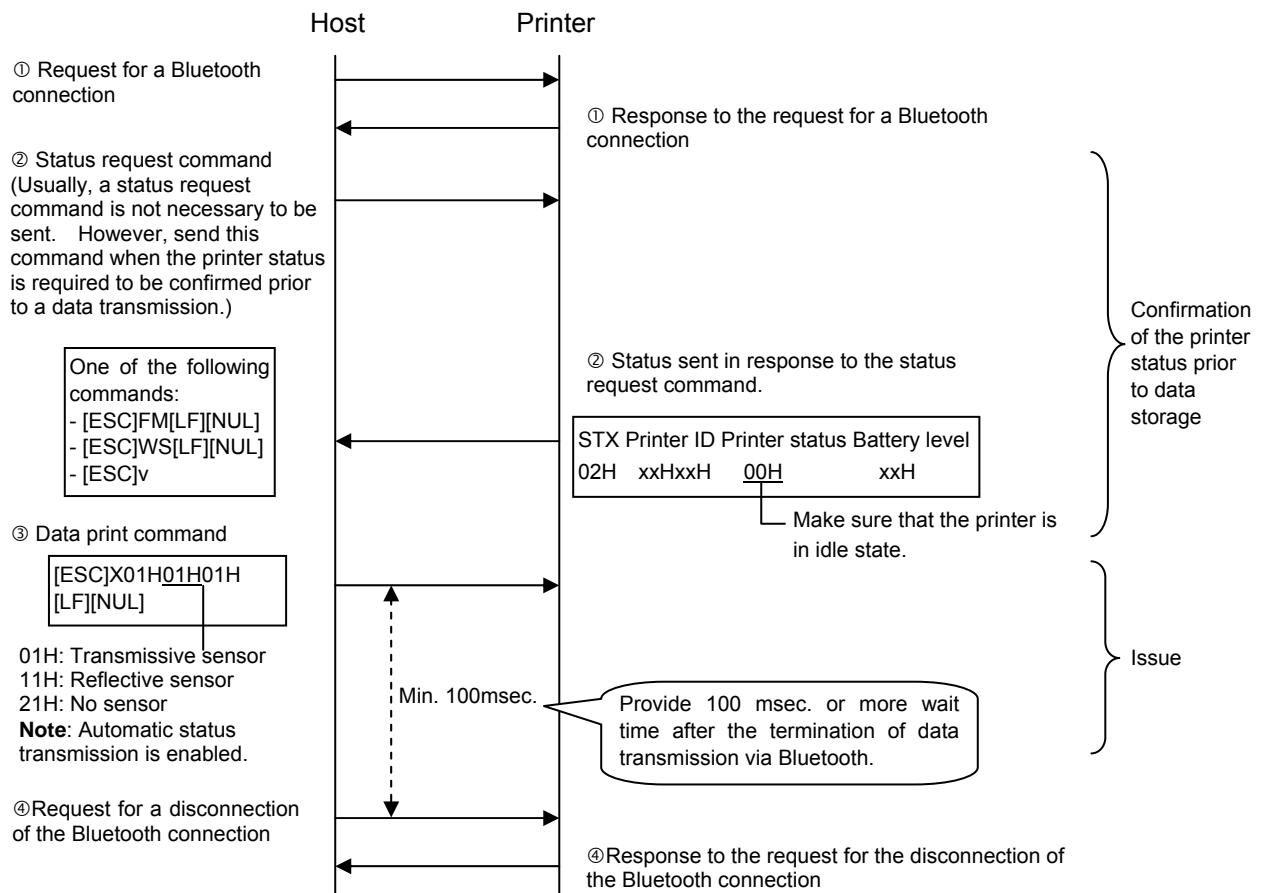


* The printer status can also be confirmed with the following command:

- [ESC] WB [LF] [NUL]

Note that the contents of the status vary, which deserves special attention.

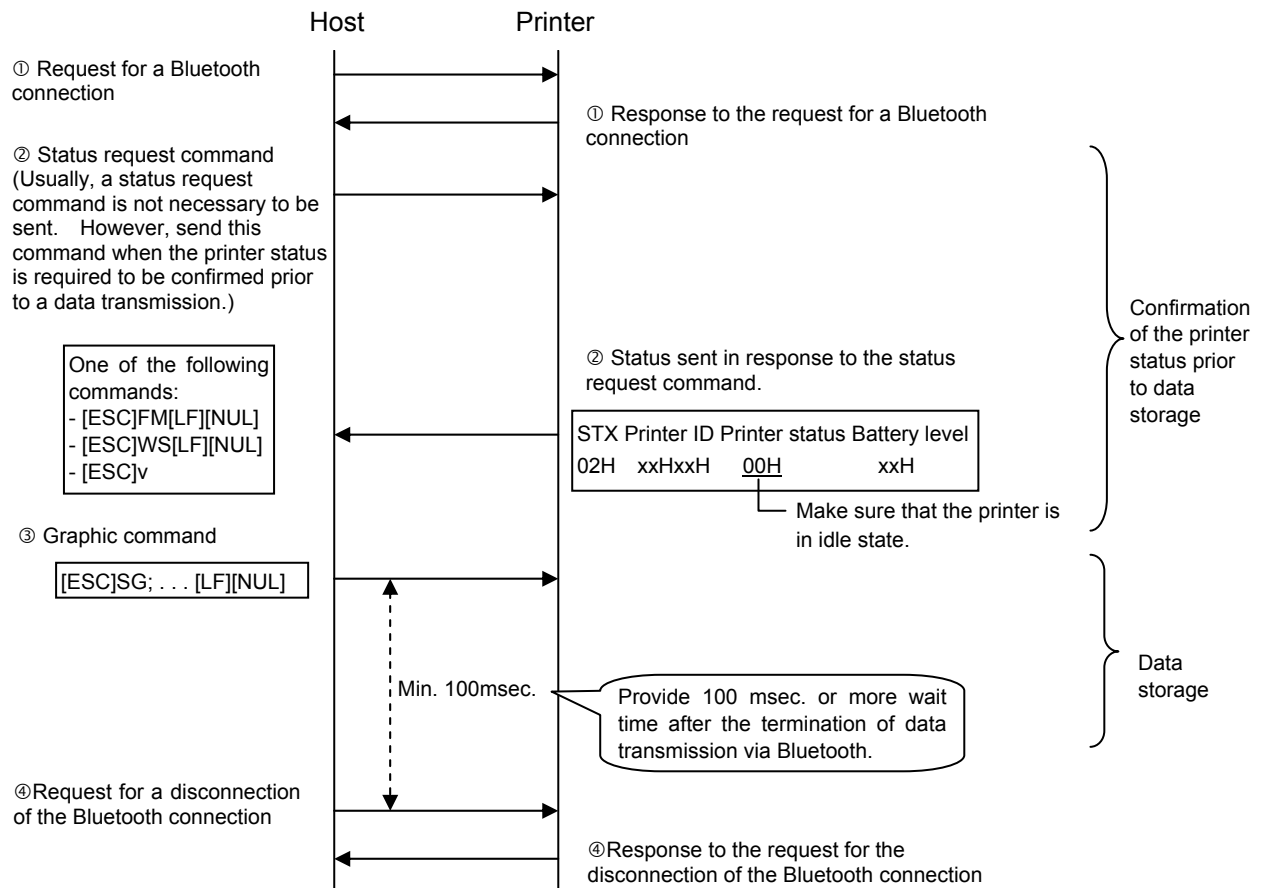
② LABEL mode (Issue)



- * The printer status can also be confirmed with the following command:
- `[ESC] WB [LF] [NUL]`

Note that the contents of the status vary, which deserves special attention.

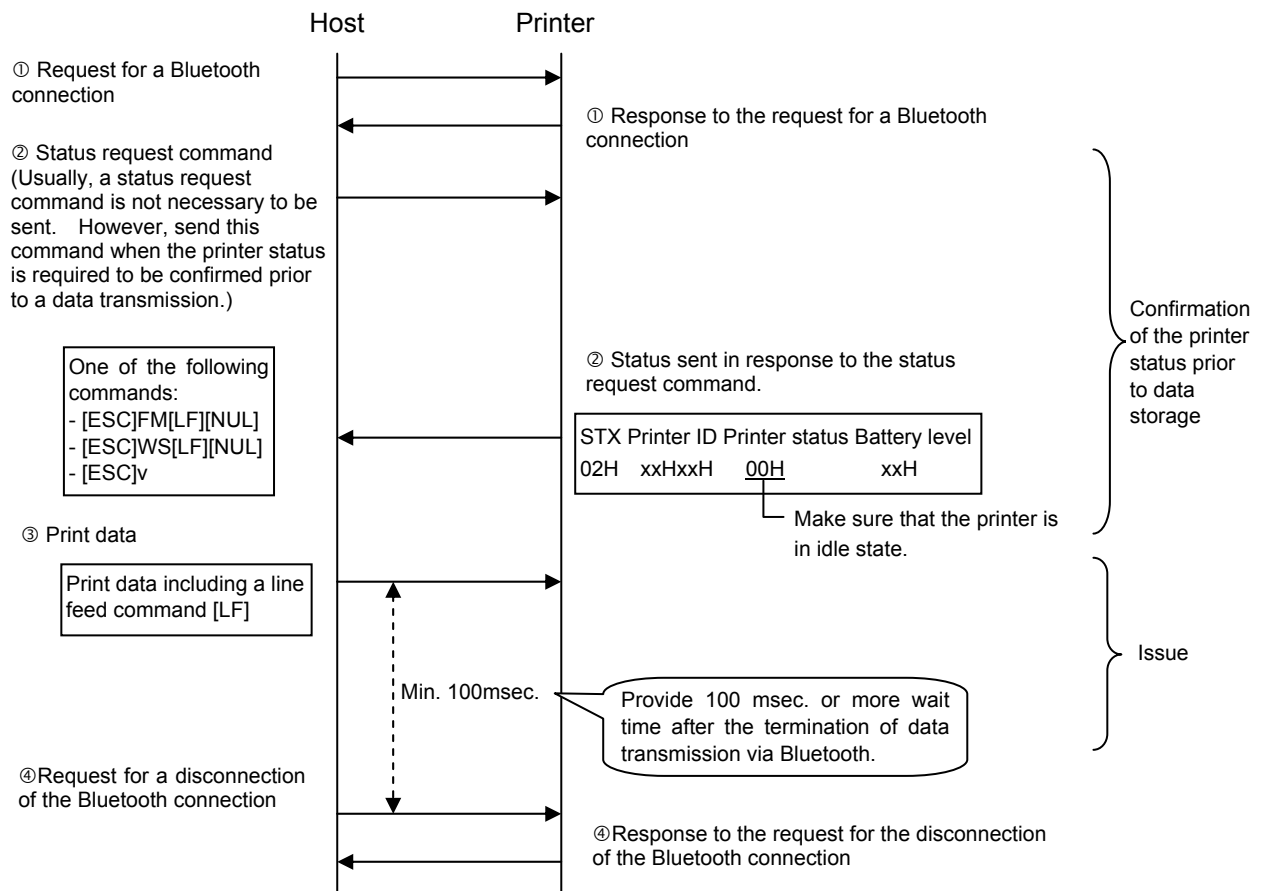
③ RECEIPT mode (Storing graphics)



- * The printer status can also be confirmed with the following command:
- [ESC] WB [LF] [NUL]

Note that the contents of the status vary, which deserves special attention.

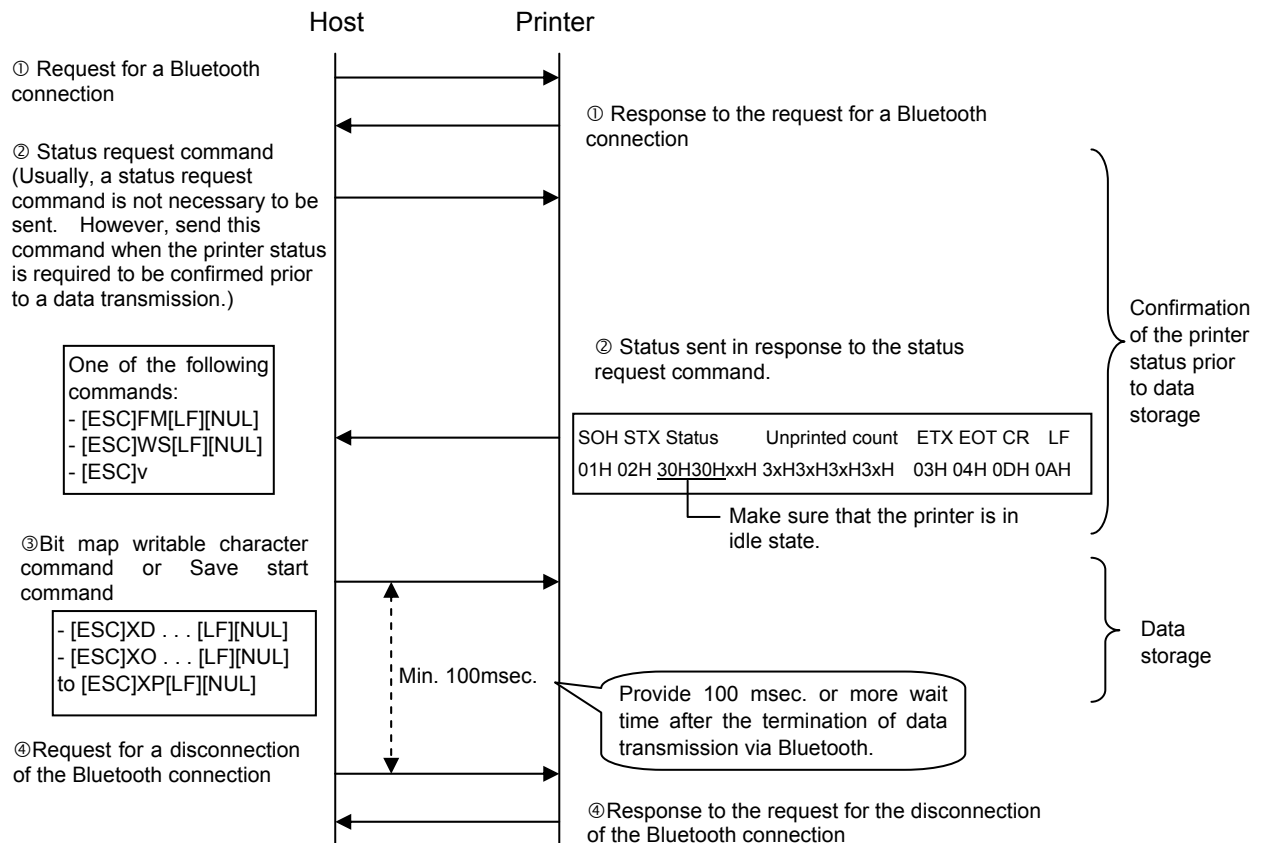
④ RECEIPT mode (Issue)



- * The printer status can also be confirmed with the following command:
 - [ESC] WB [LF] [NUL]

Note that the contents of the status vary, which deserves special attention.

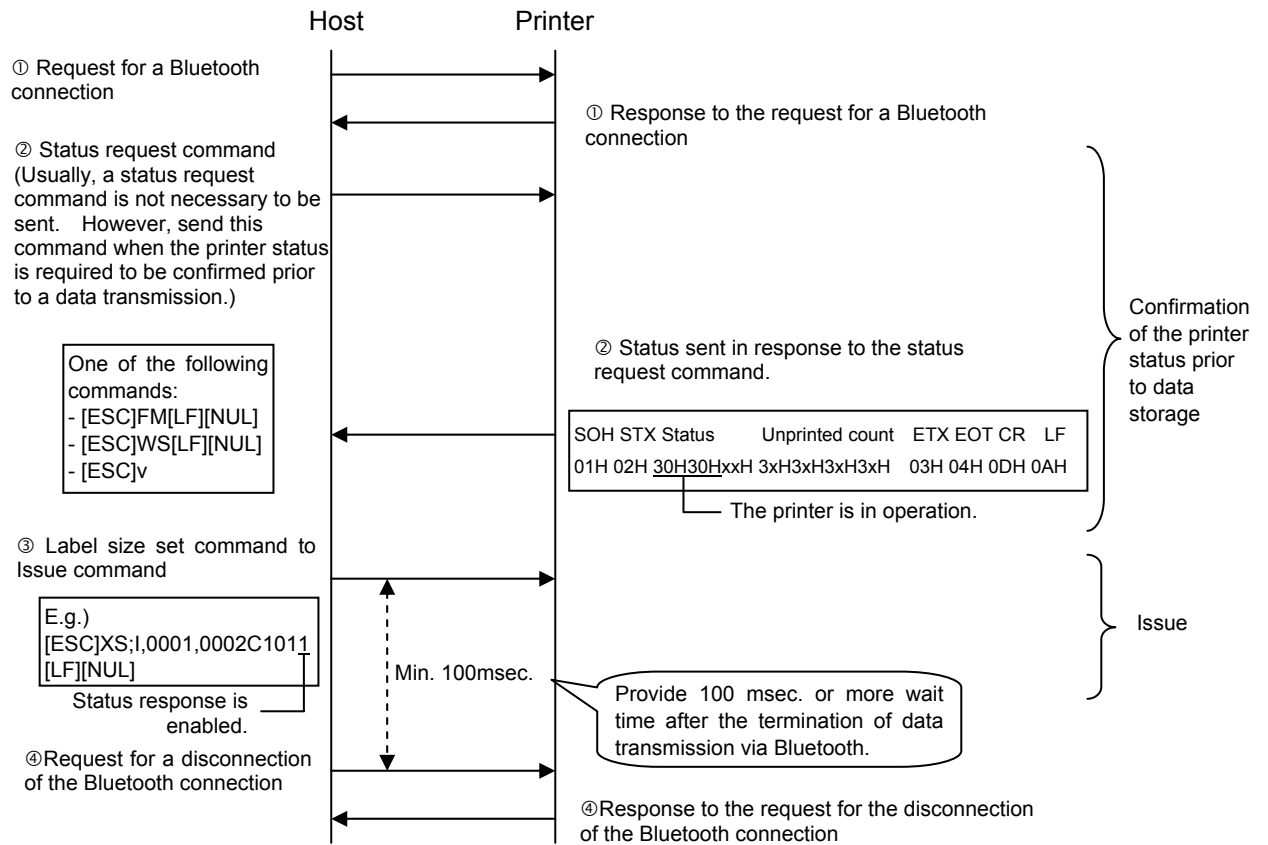
⑤ TPCL mode (Storing writable characters, PC save)



- * The printer status can also be confirmed with the following command:
- [ESC] WB [LF] [NUL]

Note that the contents of the status vary, which deserves special attention.

⑥ TPCL mode (Issue)



- * The printer status can also be confirmed with the following command:
 - [ESC] WB [LF] [NUL]

Note that the contents of the status vary, which deserves special attention.

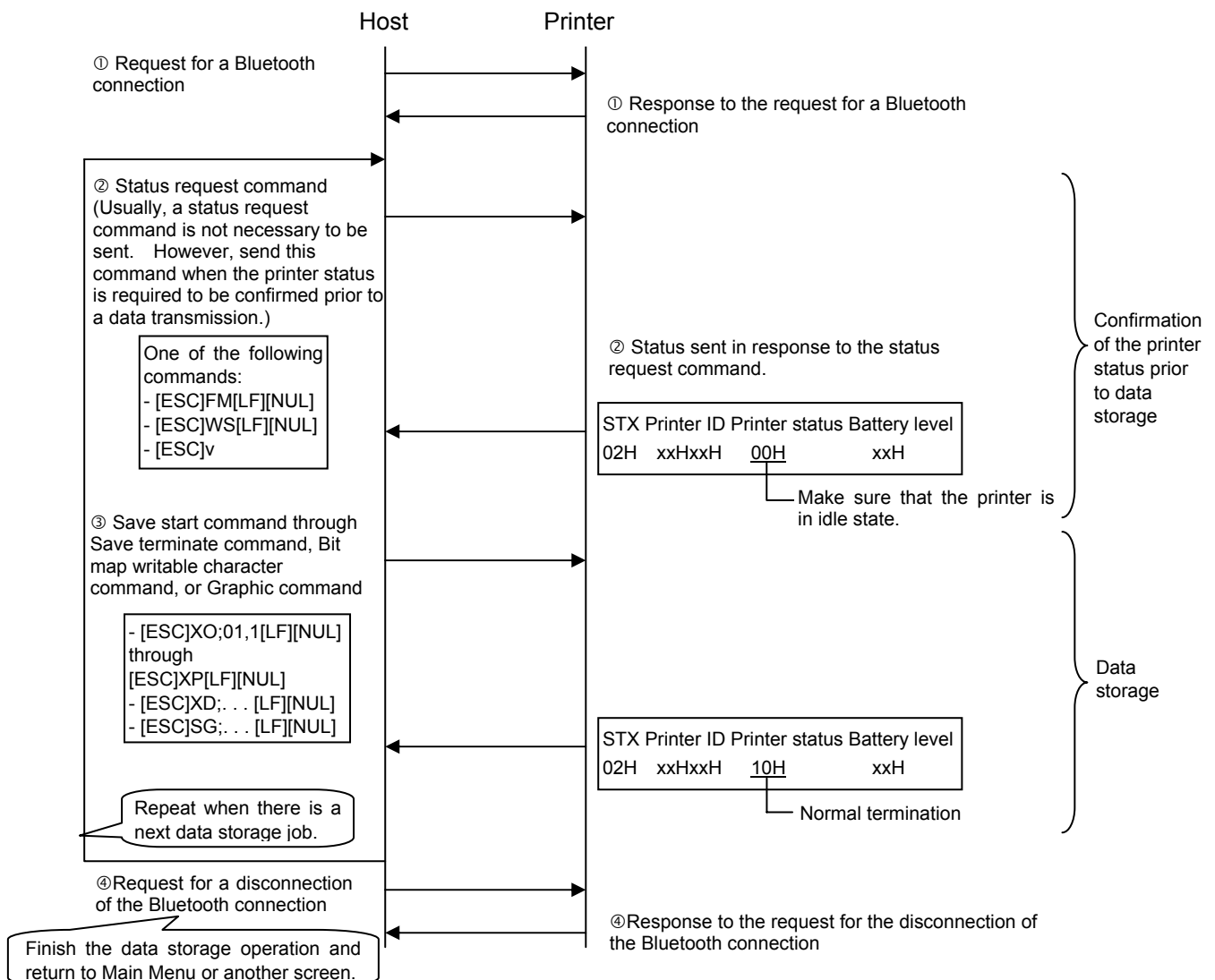
Method (3): Disconnecting the Bluetooth connection by key operations when exiting a series of print jobs.

This method improves the printing throughput of the application, as no procedures are required for establishing Bluetooth connection each time a printing occurs, which takes about 1 to 3 seconds (depending on the radio state.)

Also, maintaining the connection enables an error, such as a paper end or a paper jam, on the printer to be detected by the application. However, when more than one host shares one printer at the same time, this method is not applicable because the printer supports one-to-one connection only.

After a series of print jobs is terminated, Bluetooth connection is supposed to be disconnected at the timing of returning to the main menu by key operations. In this case, a minimum of 100 msec. should be given after all data are completely sent to the printer prior to the disconnection of Bluetooth connection.

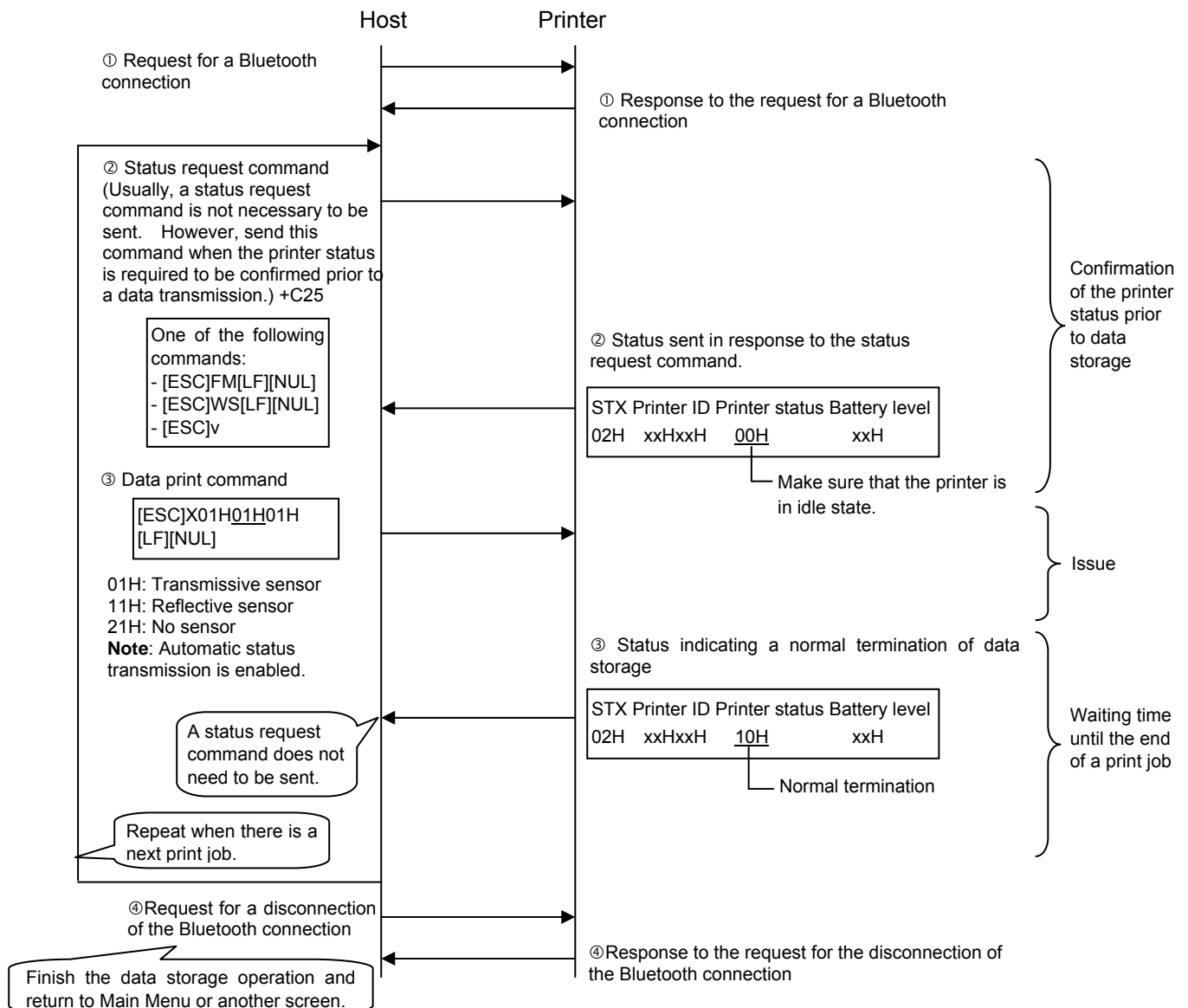
① LABEL mode (Storing forms, writable characters, or graphics)



- * The printer status can also be confirmed with the following command:
 - [ESC] WB [LF] [NUL]

Note that the contents of the status vary, which deserves special attention.

② LABEL mode (Issue)

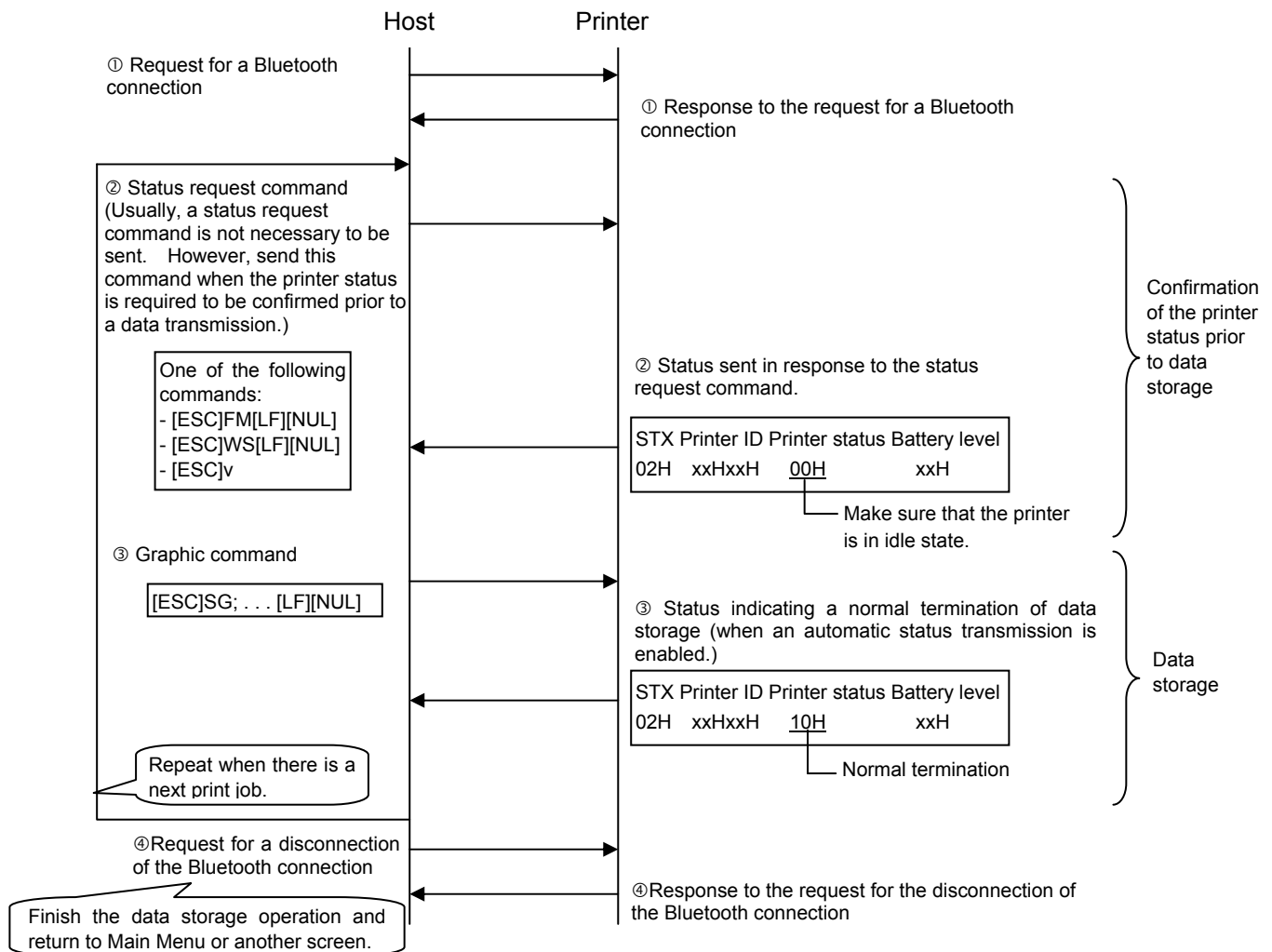


* The printer status can also be confirmed with the following command:

- [ESC] WB [LF] [NUL]

Note that the contents of the status vary, which deserves special attention.

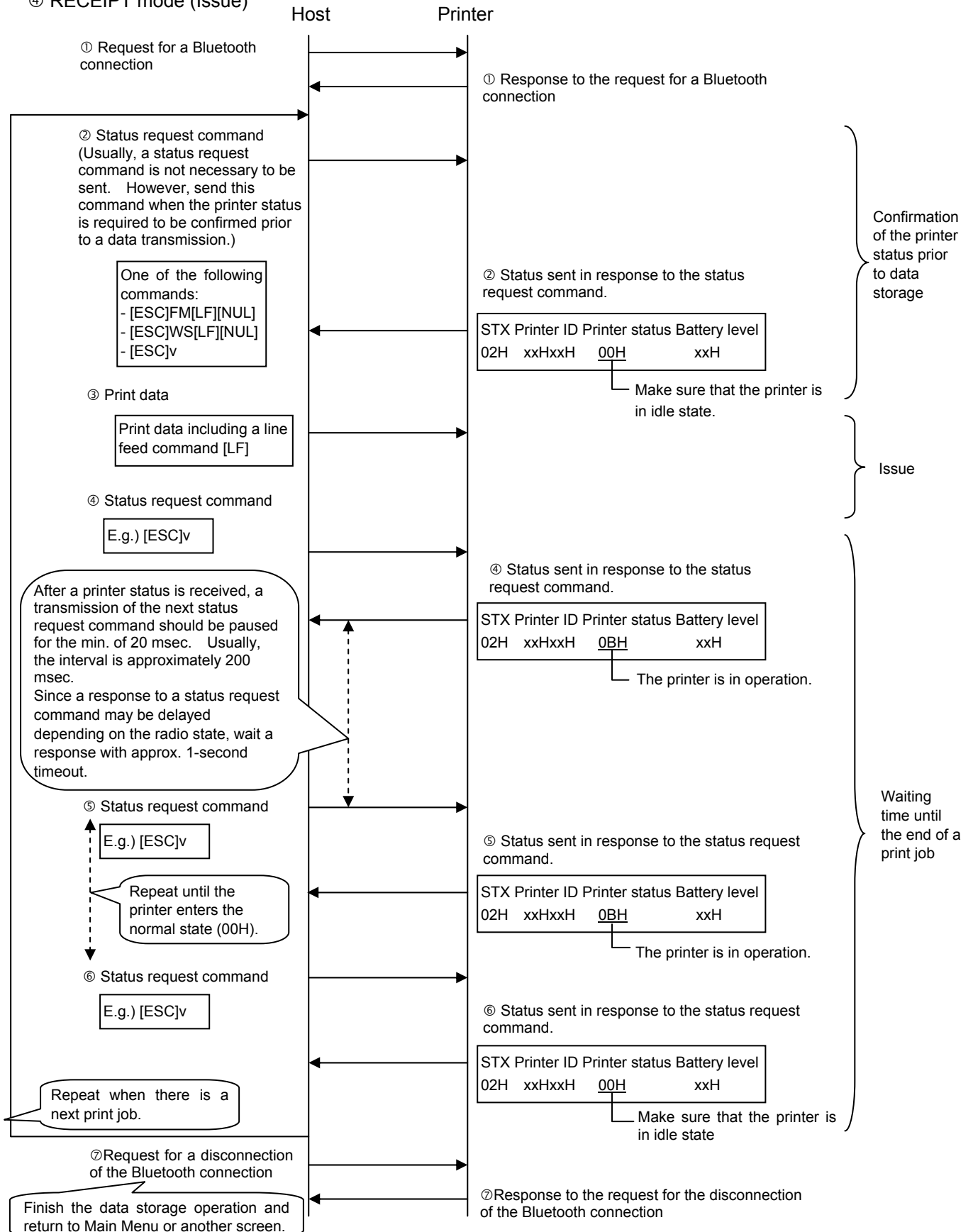
③ RECEIPT mode (Storing graphics)



- * The printer status can also be confirmed with the following command:
- [ESC] WB [LF] [NUL]

Note that the contents of the status vary, which deserves special attention.

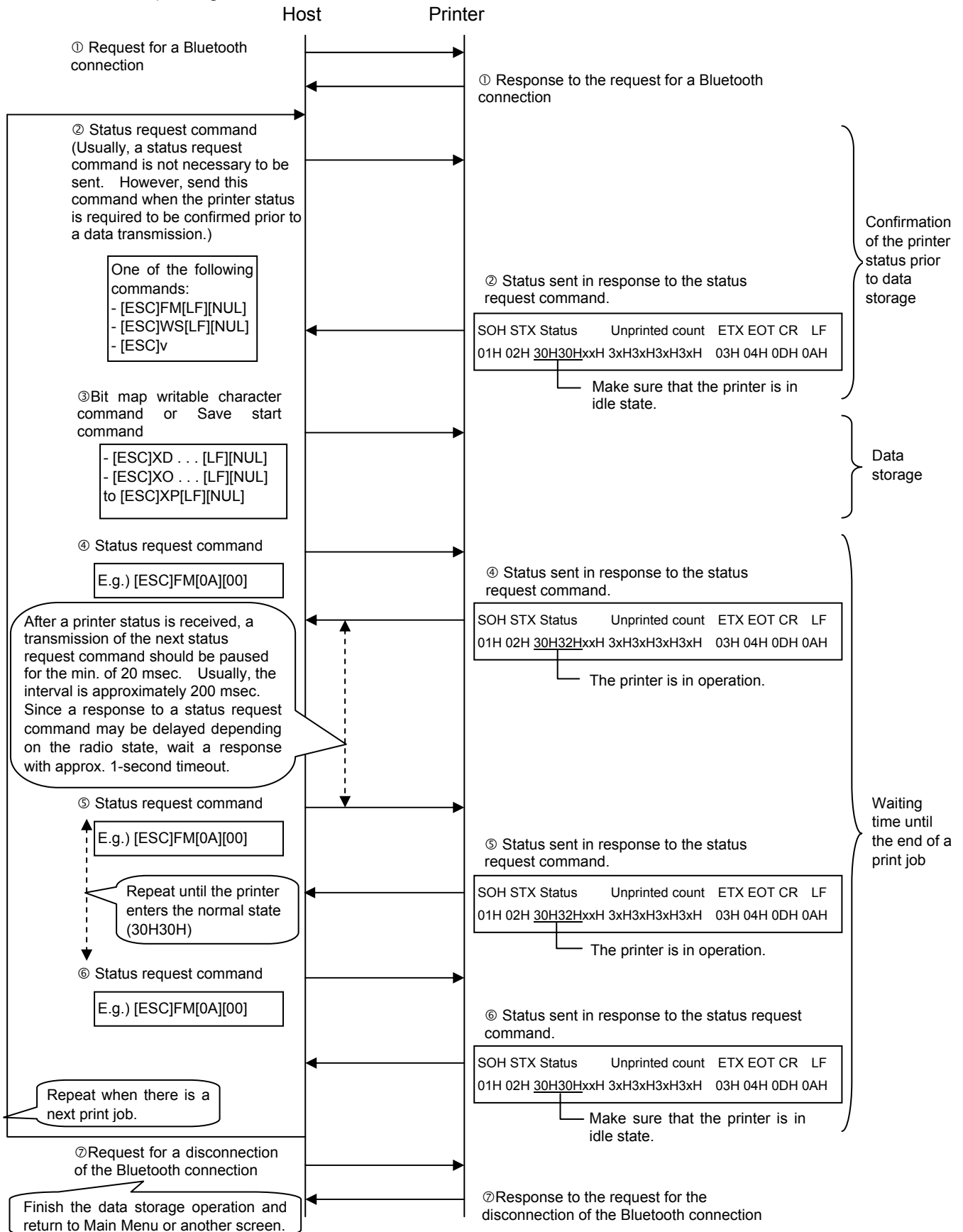
④ RECEIPT mode (Issue)



- * The printer status can also be confirmed with the following command:
- [ESC] WB [LF] [NUL]

Note that the contents of the status vary, which deserves special attention.

⑤ TPCL mode (Storing writable characters, PC save)

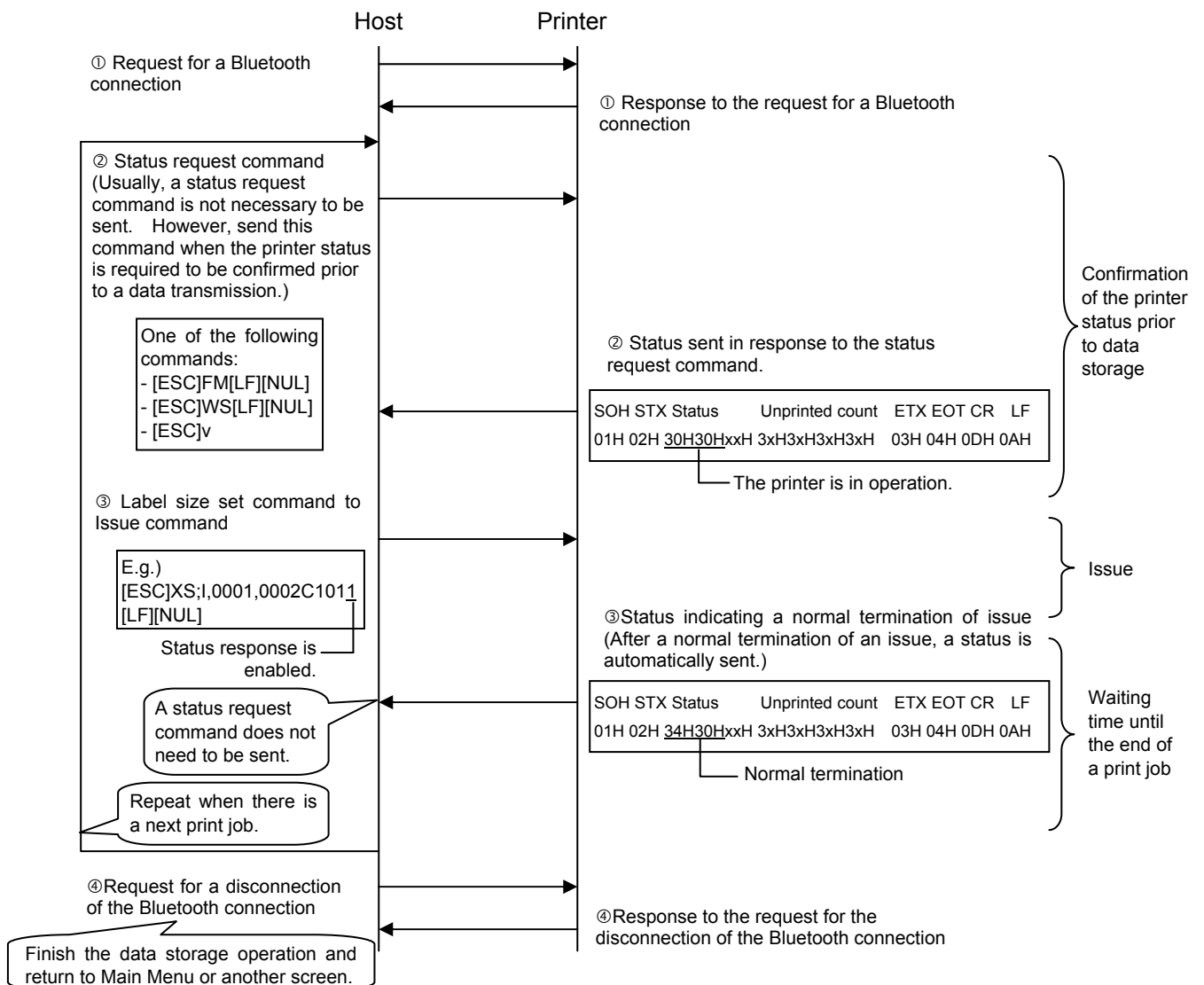


* The printer status can also be confirmed with the following command:

• [ESC] WB [LF] [NUL]

Note that the contents of the status vary, which deserves special attention.

⑥ TPCL mode (Issue)



* The printer status can also be confirmed with the following command:

• [ESC] WB [LF] [NUL]

Note that the contents of the status vary, which deserves special attention.

3.7.4 HANDLING OF RECEIVED DATA WHEN THE PRINTER GOES INTO POWER SAVE MODE

Data is left in the received buffer until reception is stopped and a timeout occurs (power save mode) because the received buffer has not been initialized.

3.8 WIRELESS LAN INTERFACE

3.8.1 OUTLINED SPECIFICATIONS

Supported standard	IEEE 802.11b/g	
Communication distance	100 m/360° (Depending on conditions)	
Client protocol	Physical layer	802.11b/g
	Data link layer	CSMA/CA
	Network layer	IP, ICMP, ARP
	Transport layer	TCP, UDP
	Application layer	SOCKET, LPR, SNMP agent DHCP client, Web server, WINS client
Flow control	TCP/IP flow control	
Antenna	Built-in	
Parameter setting	Via USB	
Parameter status monitoring	Via HTTP	

3.8.2 MAC ADDRESS

When the wireless LAN module has been installed on the printer, the printer prints the MAC address and wireless LAN module's parameter settings.

[MAC address]

The MAC address is printed on the self-test result in the SYSTEM mode.

[Parameter settings]

Various parameters are printed by holding down the [POWER] switch (for 3 seconds or more after a message "ON LINE" is displayed on the LCD) at a power ON time.

For details, see the Key Operation Specifications.

3.8.3 CONNECTION SEQUENCE

For the printer connection setting, the connection sequence varies according to the wireless mode.

3.8.3.1 INFRASTRUCTURE MODE (ESS)

The printer performs active scanning for all the channels that it supports at a power ON time. When receiving a valid active scanning response from the access point, the printer enters the connection state.

The channel set at the access point is used.

The printer out of the connection state repeats active scanning every 40 seconds until it enters the connection state.

If the printer comes into a situation where it cannot receive the beacon from the access point for a specified period of time after the connection due to weaker radio signals or other factors, the printer goes out of the connection state. In this case, just as at a power ON time, the printer waits for 40 seconds and then performs active scanning every 40 seconds until it becomes connected again. This operation continues at maximum for two hours.

If Supplicant is used, the 802.1x authentication is performed when the printer shifts from the out-of-connection state to the connection state.

3.8.3.2 ADHOC MODE (IBSS)

The printer performs active scanning for all the channels that it supports at a power ON time. When receiving a valid active scanning response from the IBSS creator, the printer connects to the network as a joiner. The channel set at the IBSS creator is used.

If the printer can receive no valid active scanning response after active scanning for all the channels for approximately 3.5 seconds, the printer becomes the IBSS creator and creates own BSS for the channel specified for the printer.

3.8.4 HANDLING OF RECEIVED DATA WHEN THE PRINTER GOES INTO POWER SAVE MODE

Data is left in the received buffer until reception is stopped and a timeout occurs (power save mode) because the received buffer has not been initialized.

4. TRANSMISSION SEQUENCE

4.1 GENERAL DESCRIPTION

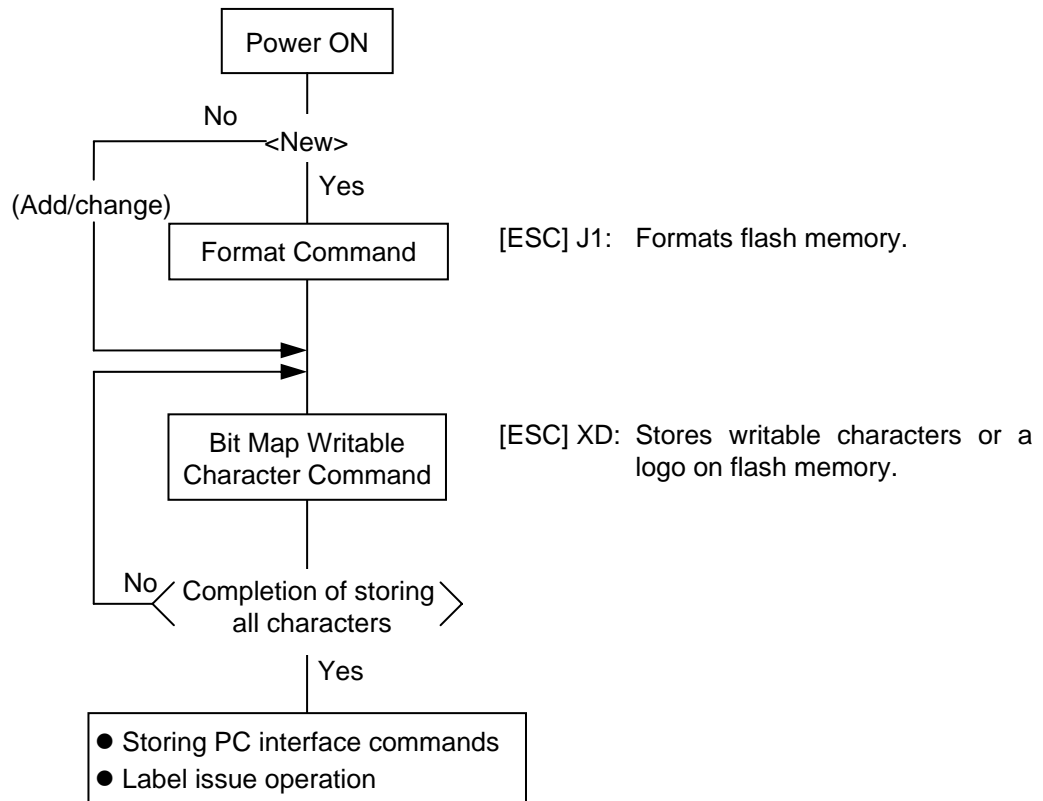
This section describes details regarding the transmission sequence between the host and the printer.

4.2 TPCL MODE

4.2.1 INITIAL SETTING

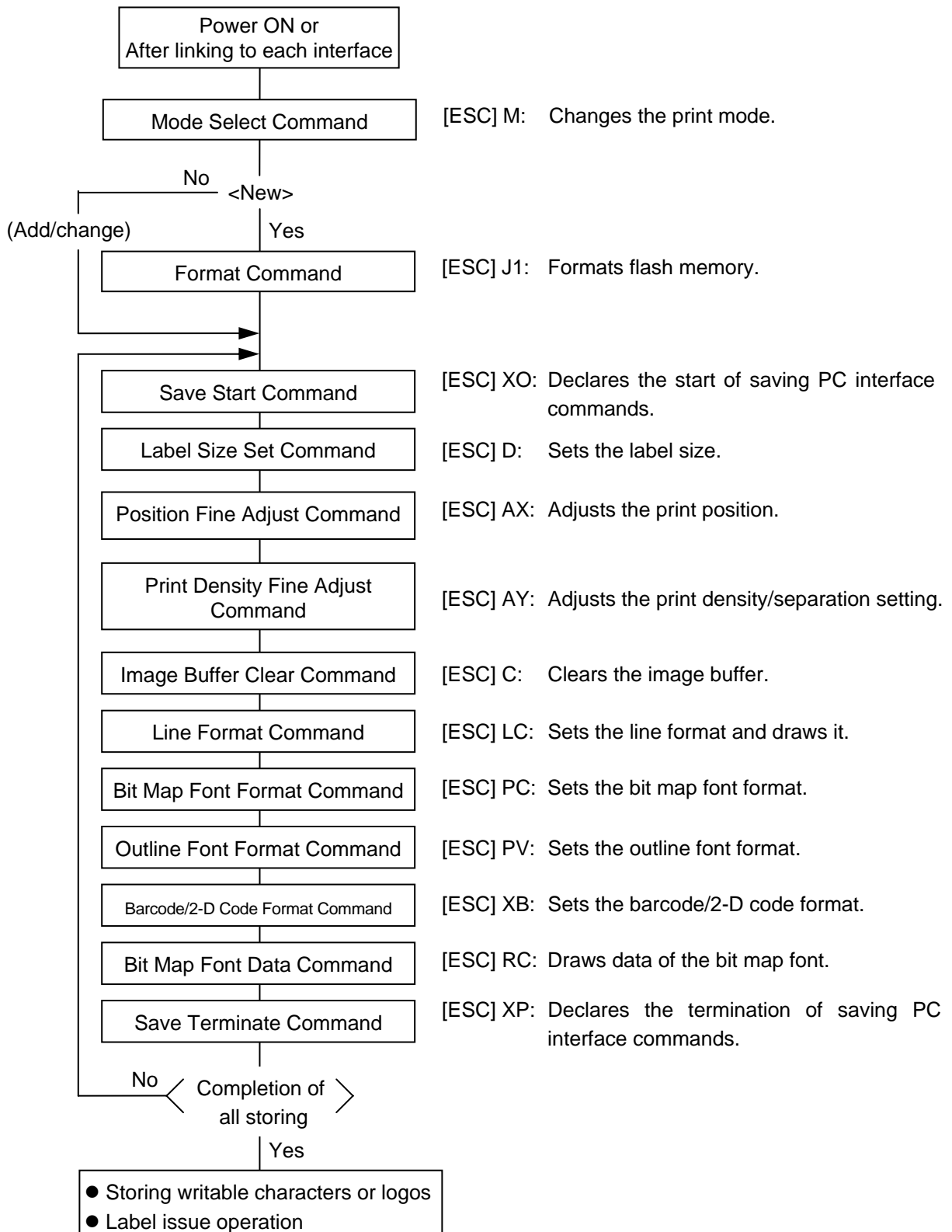
Writable characters, logo, and PC interface commands must be stored, before the label issue operation.

(1) Storing writable characters and logos



- NOTES:**
- (1) The storage of writable characters or logos is only performed if it is required.
 - (2) When the Format Command is not sent before storing a writable character or a logo with the same number as the already stored writable character or logo, memory will be used with each storing.
 - (3) Performing other operations (storing PC interface commands and label issue operation) after storing writable characters or logos automatically clears the image buffer.
 - (4) If the storage operation is not continued after storing writable characters or logos, the printer enters the on-line mode (label issue operation) after approx. 1.6 seconds. At the same time, the image buffer is automatically cleared.

(2) Storing PC interface commands

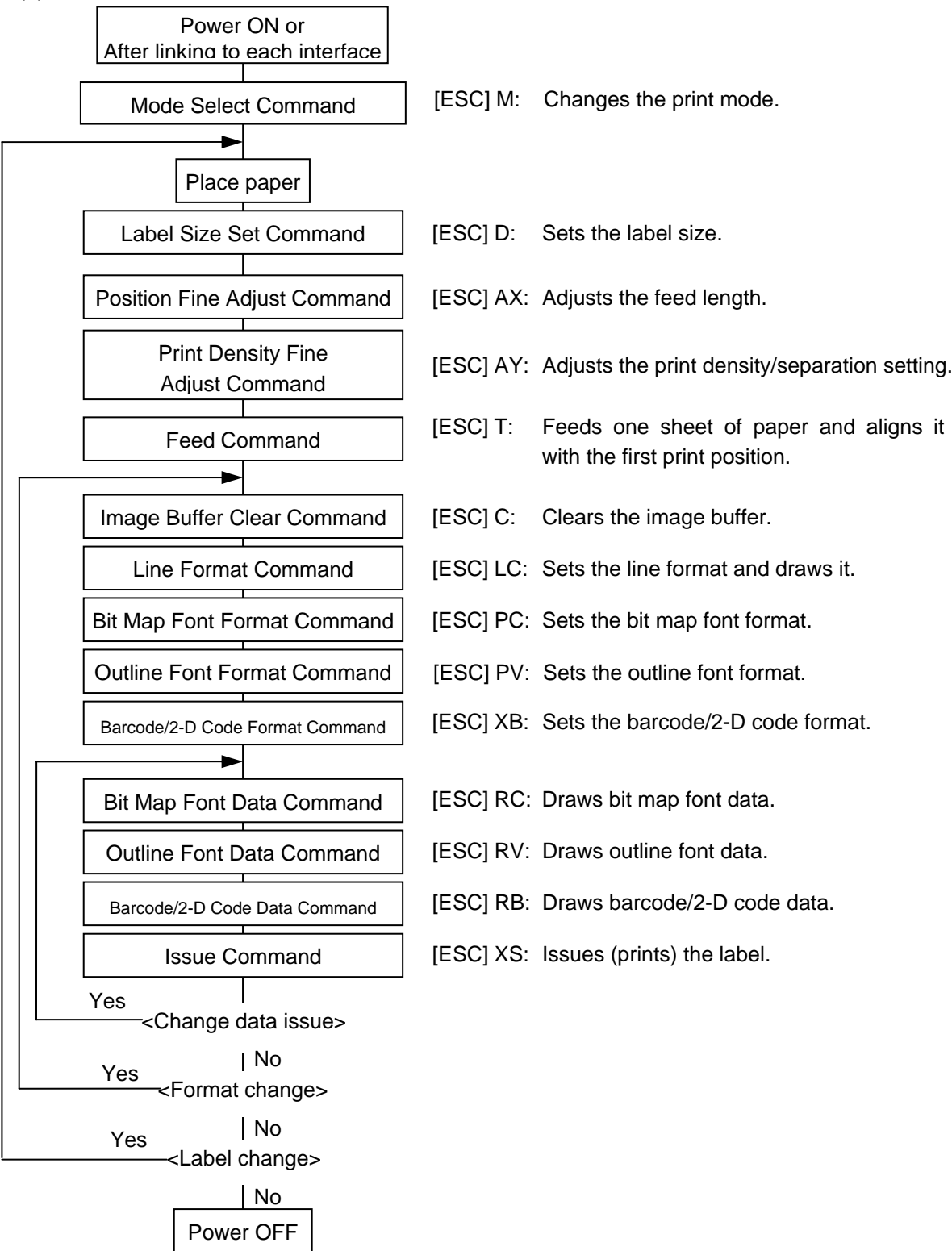


- NOTES:**
- (1) The storage of PC commands is only performed if it is required.
 - (2) When the Format Command is not sent before storing the PC interface command with the same number as the already stored PC command, memory will be used with each storing.
 - (3) Performing other operations (storing PC interface commands and label issue operation) after storing writable characters or logos automatically clears the image buffer.
 - (4) Select commands to be stored as the occasion arises.

4.2.2 LABEL ISSUE OPERATION

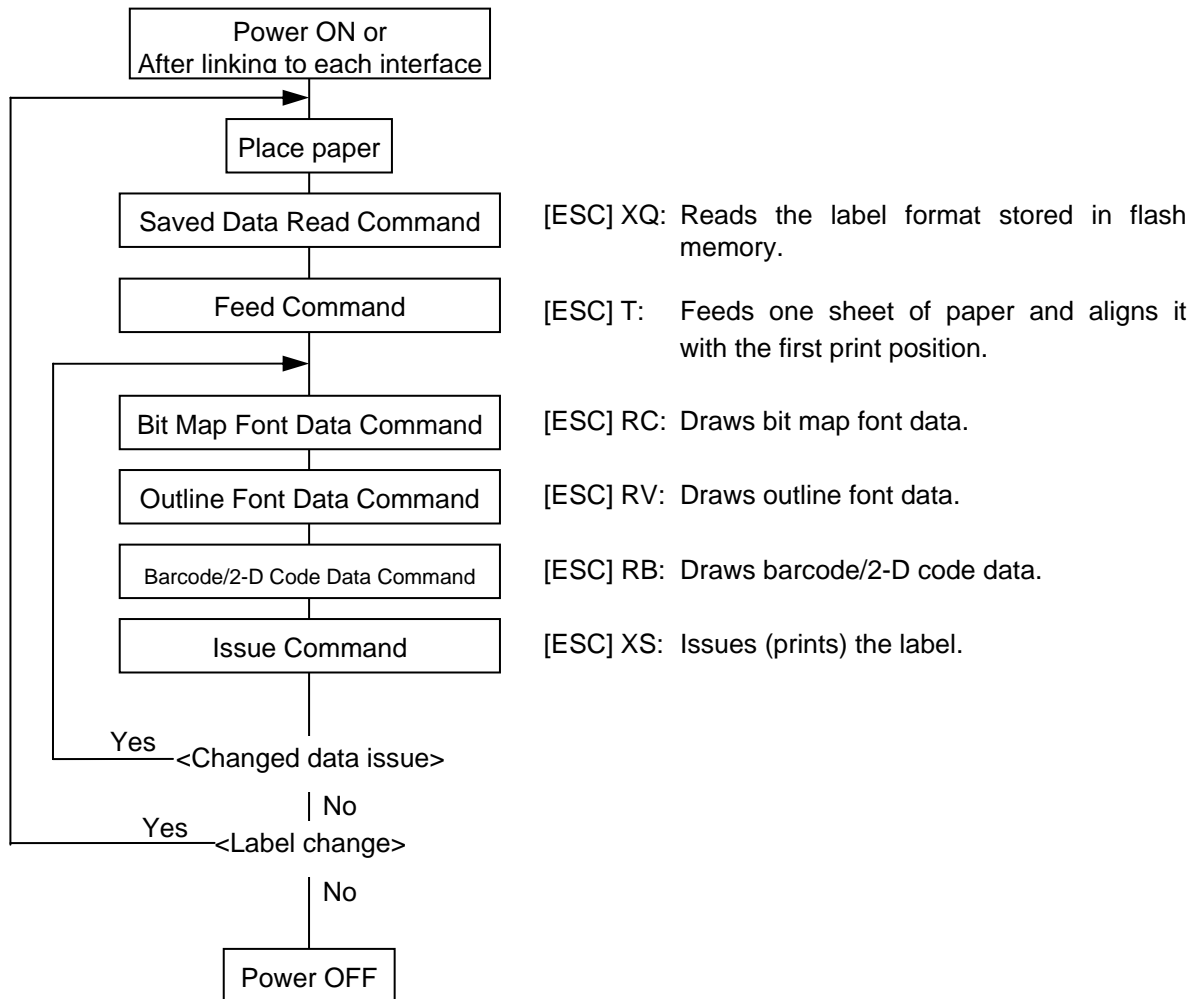
An example of the label issue operation is described below.

(1) Where the Saved Data Read Command is not used:



- NOTES:** (1) The Label Size Set Command must be sent.
(2) After the power is turned off then on, the Bit Map Font Format Command, the Outline Font Format Command, and the Barcode/Two-dimensional Code Format Command should be sent as the occasion arises, because they are not protected in memory.

(2) Where the Saved Data Read Command is used:



- NOTES:**
- (1) The Feed Command can be omitted if the same sheet is used before Power OFF and after Power ON.
 - (2) The Saved Data Read Command can be omitted after the power is turned OFF and then ON if the command is set as [Automatic read after Power ON: Enabled].
 - (3) When XML data is used:
The XML format can be used for transmitting print data to the printer.
 - (*) For details, see the XML Specifications.

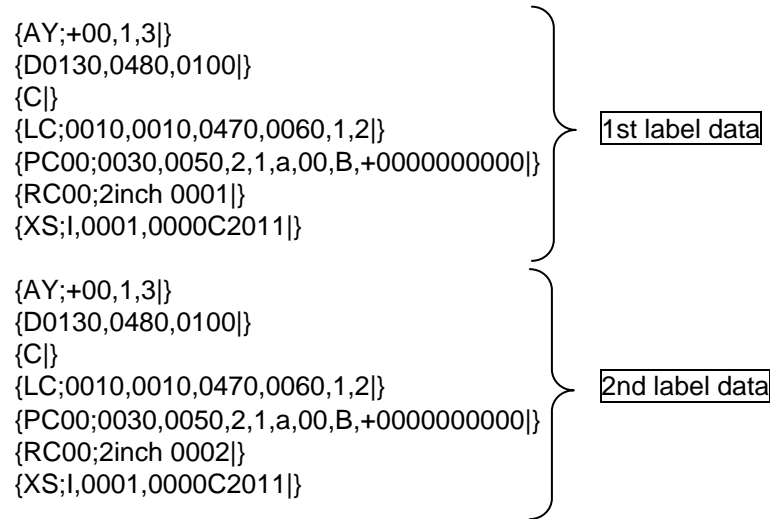
4.2.3 HANDLING OF RECEIVED DATA BY COMMAND

4.2.3.1 BIT MAP FONT FORMAT COMMAND

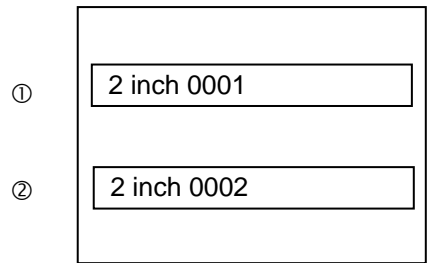
If communication is interrupted while the Bit Map Font Format Command is running and no subsequent data is transmitted in the next transmission, a command error occurs. If communication is interrupted by the command separator, printing is available when the print data is retransmitted from the beginning in the next transmission.

[Command transmission and print results (Examples)]

(1) When transmitting print data for two labels as usual,

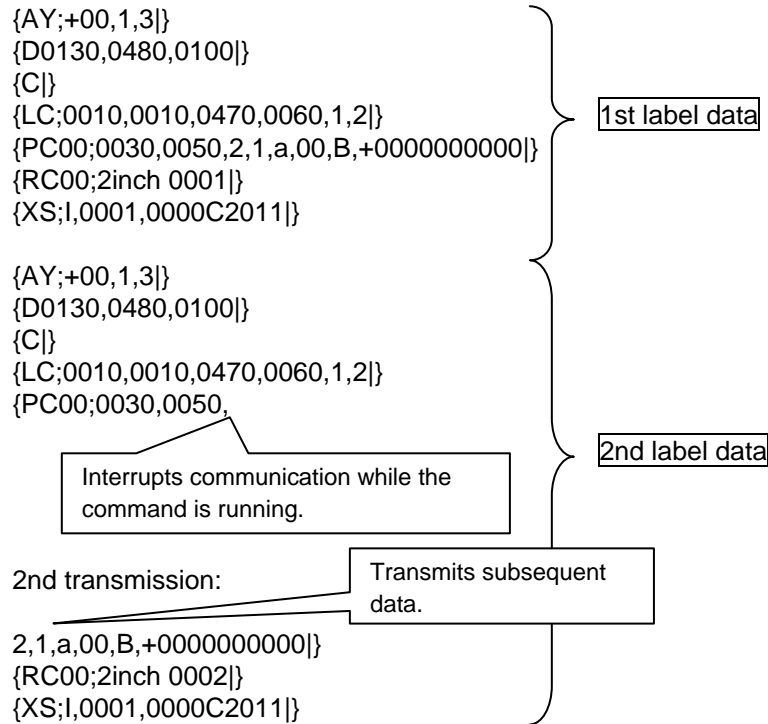


Print result: ① and ② as shown below are printed in a row.

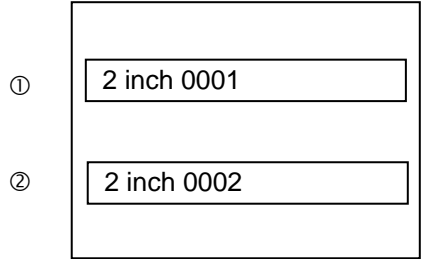


(2) When interrupting communication while the 2nd label command is running, and then transmitting subsequent data,

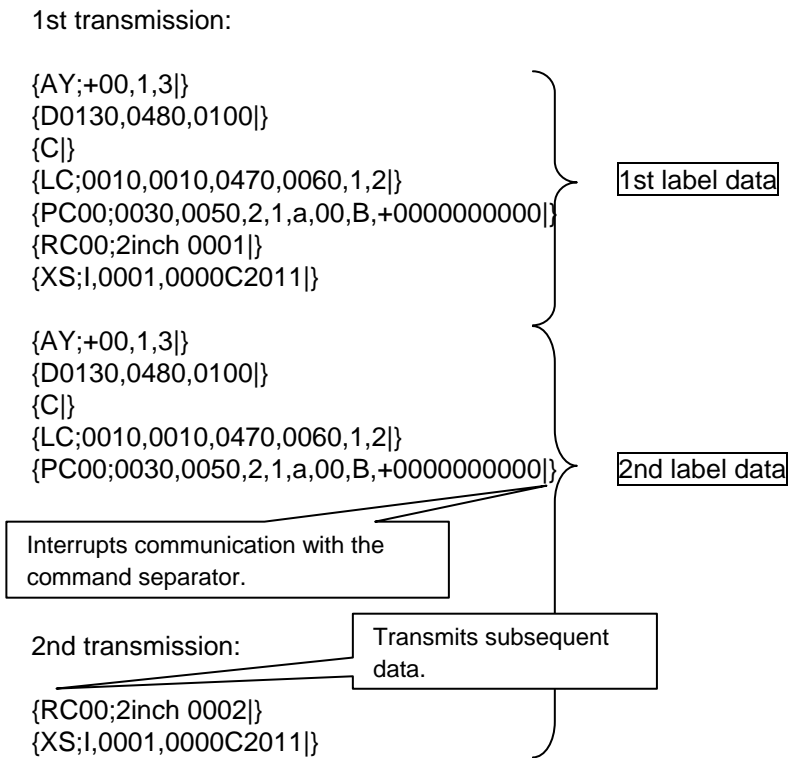
1st transmission:



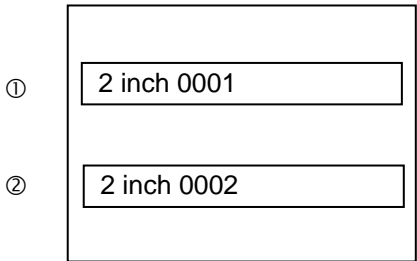
Print result: ① as shown below is printed after the 1st transmission, and ② as shown below is printed after the 2nd transmission.



(3) When interrupting communication with the 2nd label command separator, and then transmitting subsequent data,

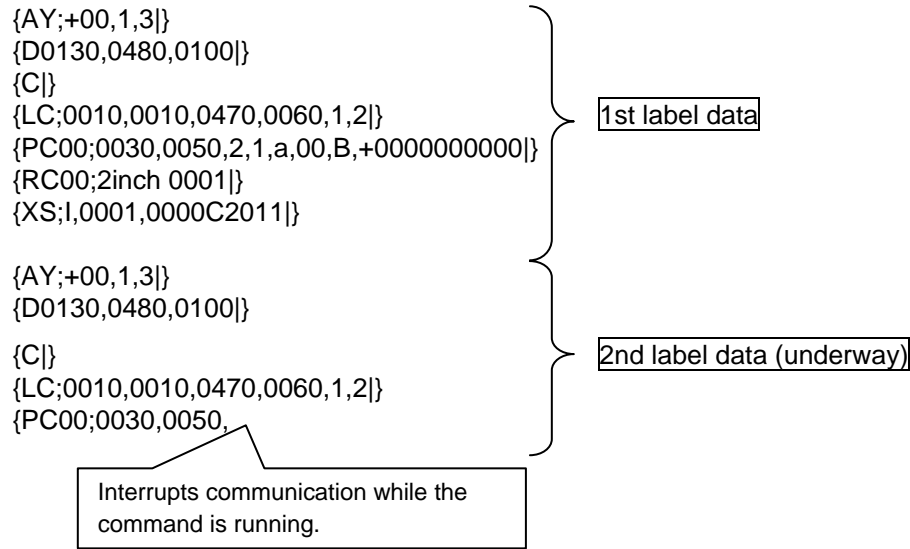


Print result: ① as shown below is printed after the 1st transmission, and ② as shown below is printed after the 2nd transmission.

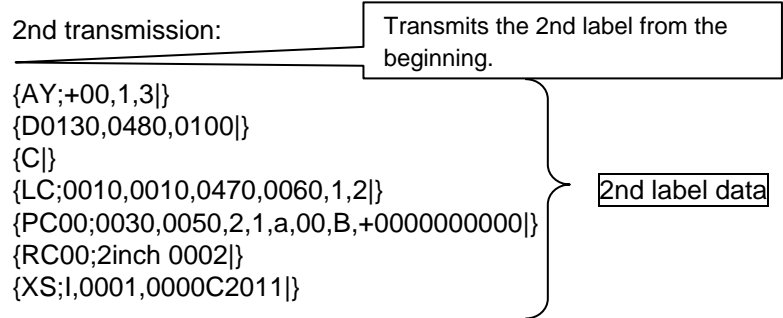


(4) When interrupting communication while the 2nd label command is running, and then retransmitting the 2nd label data from the beginning,

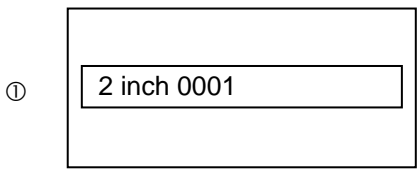
1st transmission:



2nd transmission:

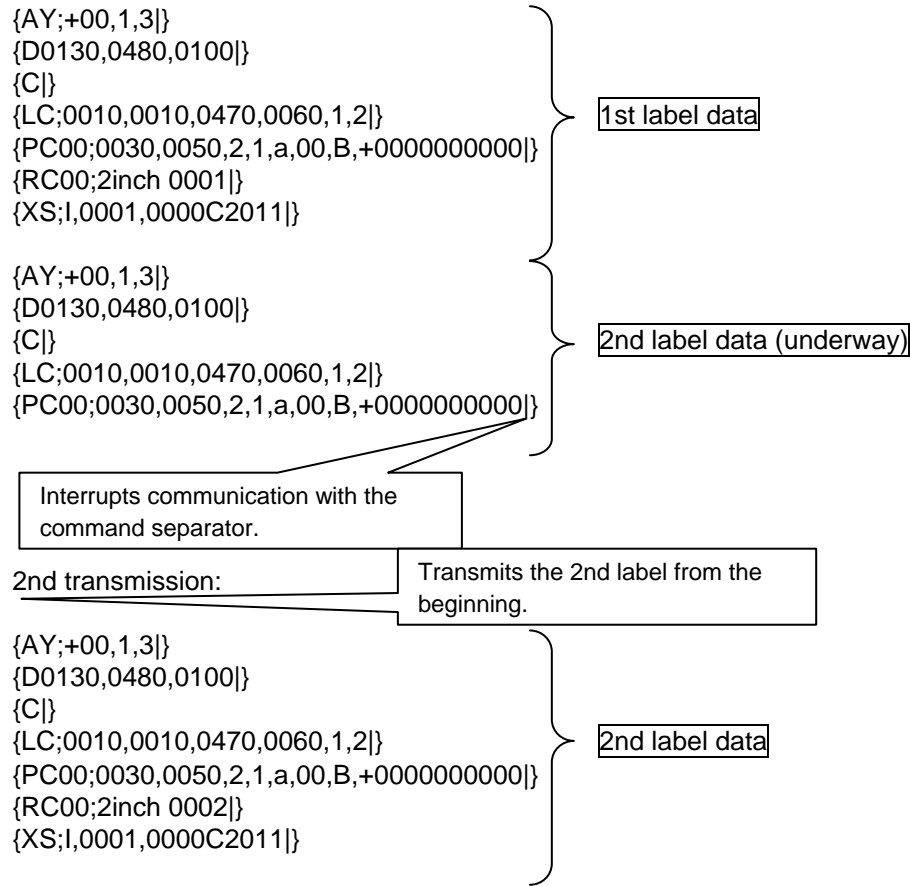


Print result: ① as shown below is printed after the 1st transmission, and a command error occurs after the 2nd transmission.

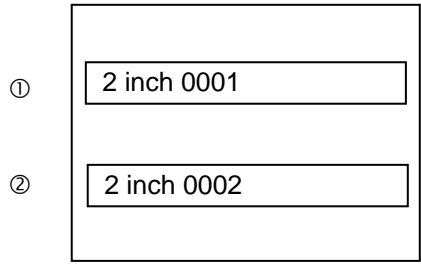


(5) When interrupting communication with the 2nd label command separator, and then retransmitting the 2nd label data from the beginning,

1st transmission:



Print result: ① as shown below is printed after the 1st transmission, and ② as shown below is printed after the 2nd transmission.



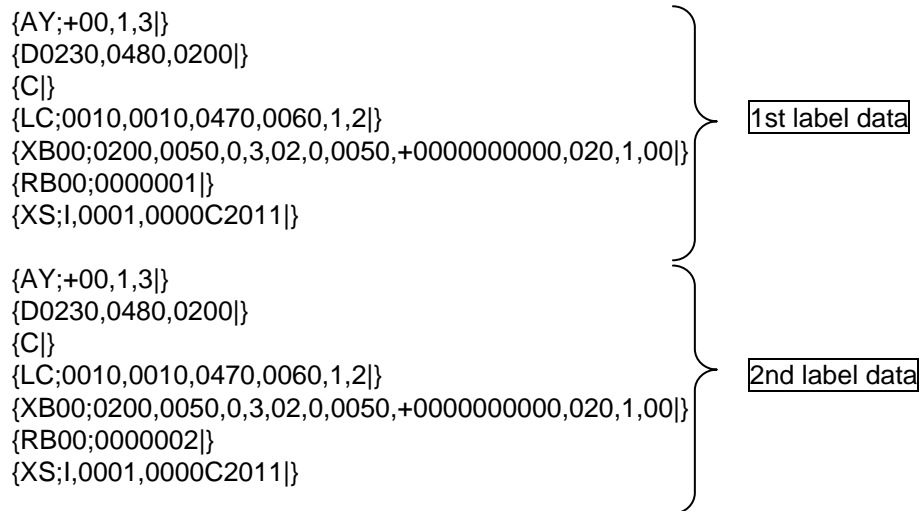
4.2.3.2 BARCODE/2-D CODE FORMAT COMMAND

As in the case of the Bit Map Font Format Command, if communication is interrupted while the Barcode/2-D Code Format Command is running and no subsequent data is transmitted in the next transmission, a command error occurs.

If communication is interrupted by the command separator, printing is available when the print data is retransmitted from the beginning in the next transmission.

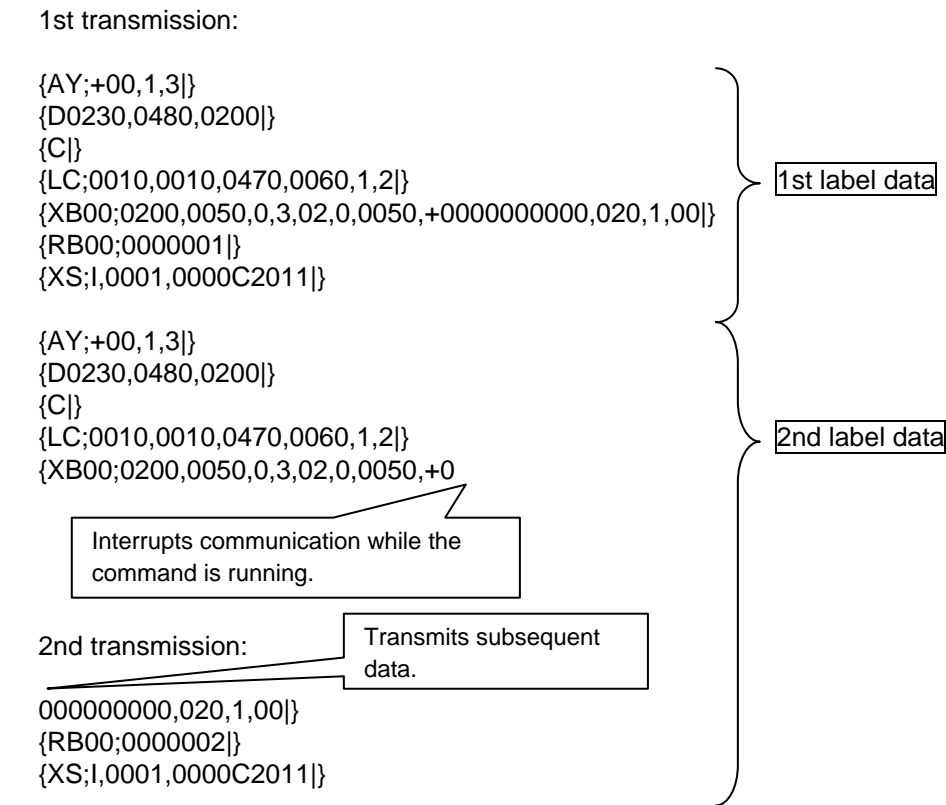
[Command transmission and print results (Examples)]

(1) When transmitting print data for two labels as usual,



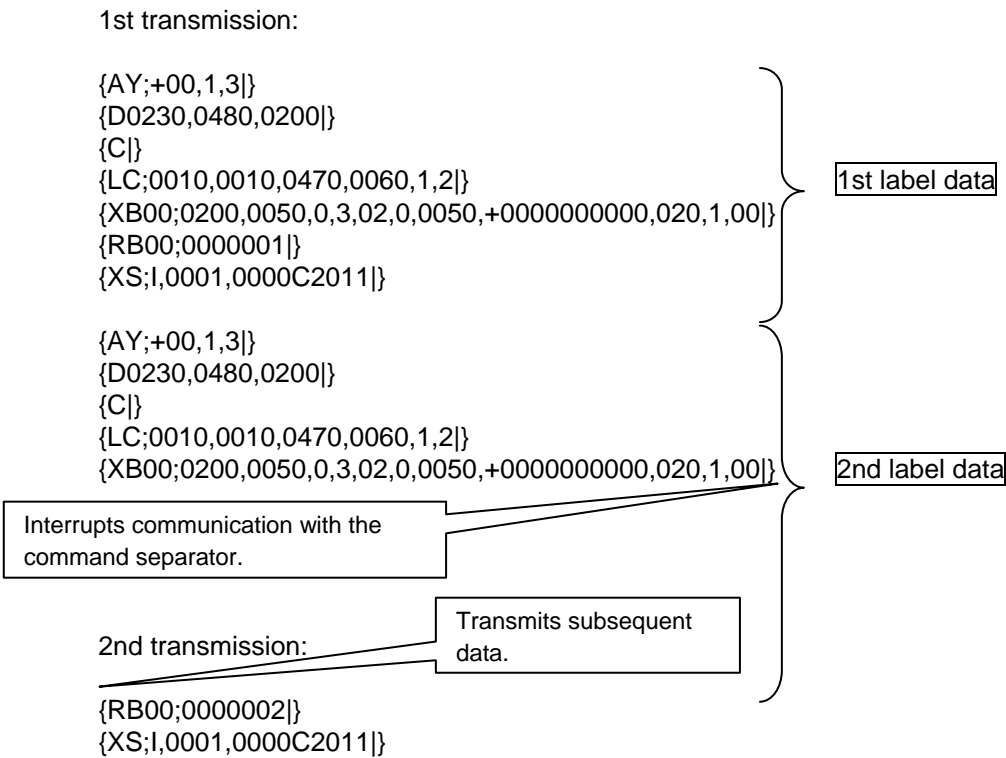
Print result: The 1st label data and 2nd label data are printed in a row.

(2) When interrupting communication while the 2nd label command is running, and then transmitting subsequent data,



Print result: The 1st label data is printed after the 1st transmission, and the 2nd label data is printed after the 2nd transmission.

(3) When interrupting communication with the 2nd label command separator, and then transmitting subsequent data,



Print result: The 1st label data is printed after the 1st transmission, and the 2nd label data is printed after the 2nd transmission.

- (4) When interrupting communication while the 2nd label command is running, and then retransmitting the 2nd label data from the beginning,

1st transmission:

```
{AY;+00,1,3|}  
{D0130,0480,0100|}  
{C|}  
{LC;0010,0010,0470,0060,1,2|}  
{PC00;0030,0050,2,1,a,00,B,+0000000000|}  
{RC00;2inch 0001|}  
{XS;l,0001,0000C2011|}
```

1st label data

```
{AY;+00,1,3|}  
{D0130,0480,0100|}  
{C|}  
{LC;0010,0010,0470,0060,1,2|}  
{XB00;0200,0050,0,3,02,0,0050,+0
```

2nd label data (underway)

Interrupts communication while the command is running.

2nd transmission:

Transmits the 2nd label from the beginning.

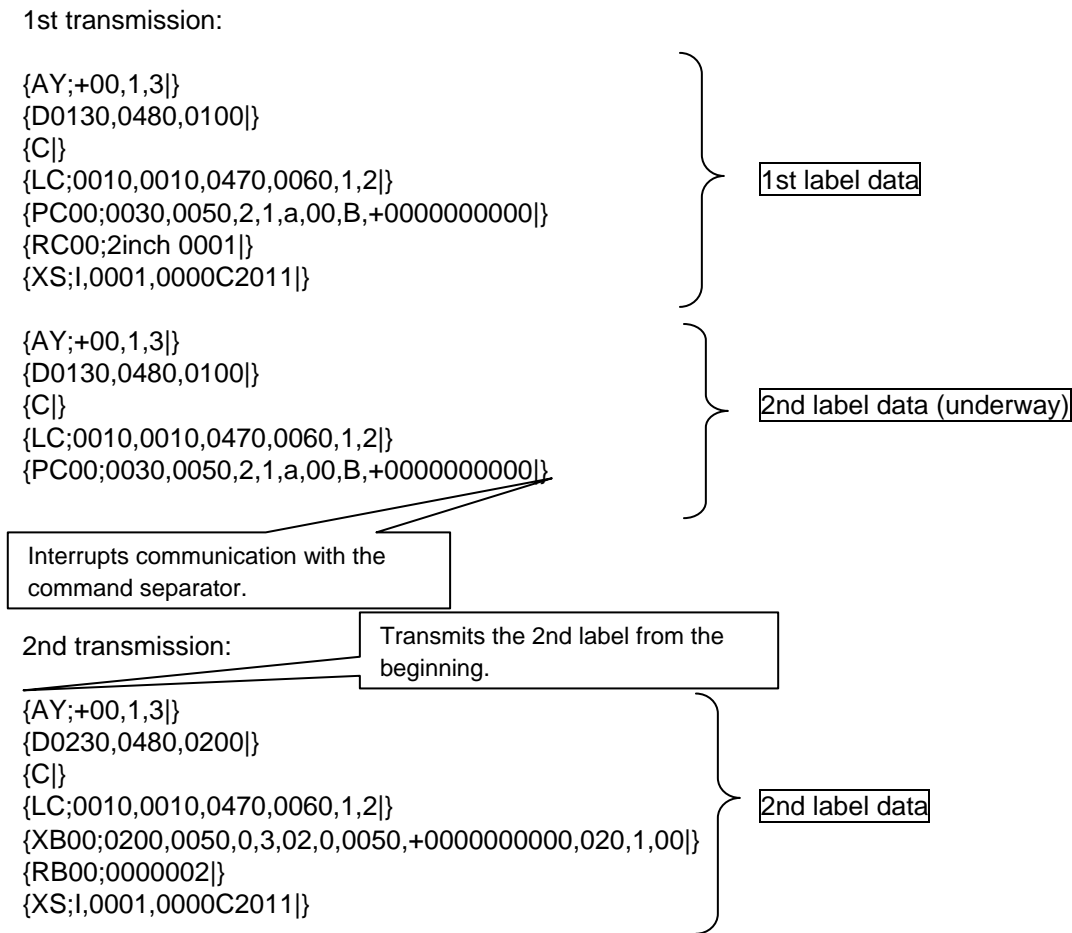
```
{AY;+00,1,3|}
{D0230,0480,0200|}
{C|}

{LC;0010,0010,0470,0060,1,2|}
{XB00;0200,0050,0,3,02,0,0050,+0000000000,020,1,00|}
{RB00;00000002|}
{XS;I,0001,0000C2011|}
```

2nd label data

Print result: The 1st label data is printed after the 1st transmission, and a command error occurs after the 2nd transmission.

(5) When interrupting communication with the 2nd label command separator, and then retransmitting the 2nd label data from the beginning,



Print result: The 1st label data is printed after the 1st transmission, and the 2nd label data is printed after the 2nd transmission.

4.2.3.3 GRAPHIC COMMAND

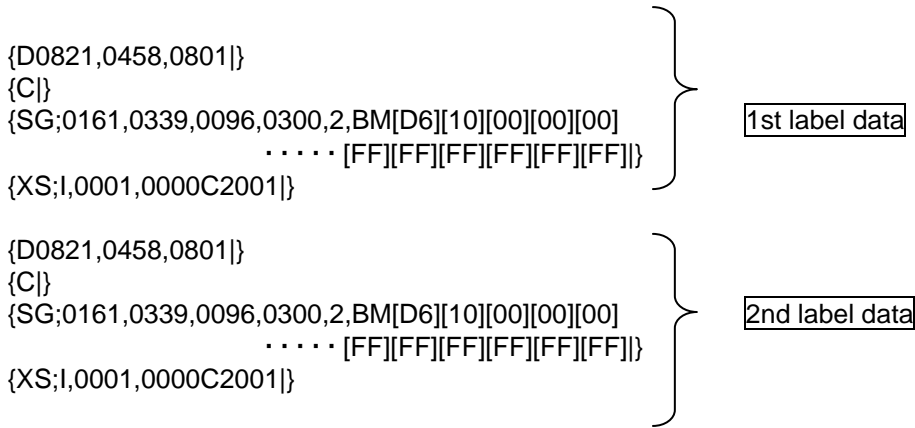
When transmission is cancelled while graphic data is transmitted from the application, the data cannot be properly printed because data subsequently transmitted is recognized as a graphic command unless the graphic data has been transmitted before the transmission is cancelled.

If communication is interrupted while graphic data is transmitted, it is necessary to transmit graphic data for the number of bytes that was not transmitted as dummy data, turn off and on the power of the printer, or reset the printer.

[Command transmission and print results (Examples)]

* Descriptions are provided without graphic data omitted.

(1) When transmitting print data for two labels as usual,



Print result: The 1st label data and 2nd label data are printed in a row.

(2) When interrupting communication while the 2nd label command is running, and then transmitting subsequent data,

1st transmission:

```
{D0821,0458,0801|}  
{C|}  
{SG;0161,0339,0096,0300,2,BM[D6][10][00][00][00  
      . . . . . [FF][FF][FF][FF][FF][FF]]}  
{XS;l,0001,0000C2001|}
```

1st label data

```
{D0821,0458,0801}}
{C}}
{SG;0161,0339,0096,0300,2,BM[D6][10][00]
```

2nd label data

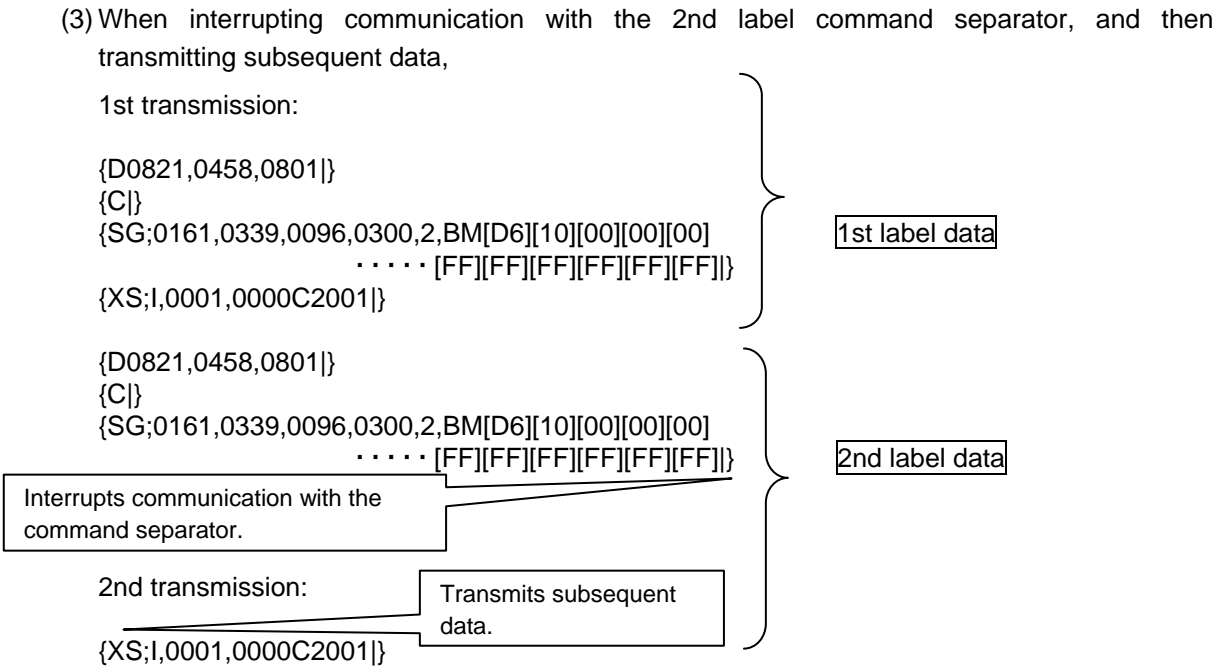
Interrupts communication while the command is running.

2nd transmission:

Transmits subsequent data.

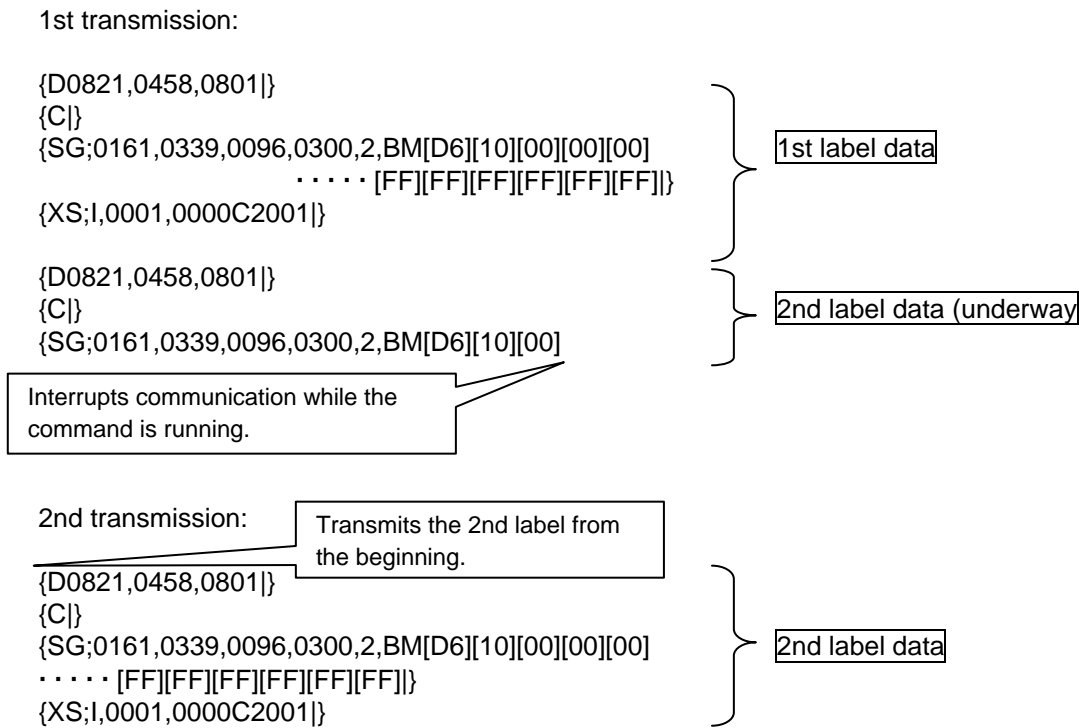
```
[00][00] · · · · [FF][FF][FF][FF][FF][FF]}
{XS;l,0001,0000C2001|}
```

Print result: The 1st label data is printed after the 1st transmission, and the 2nd label data is printed after the 2nd transmission.



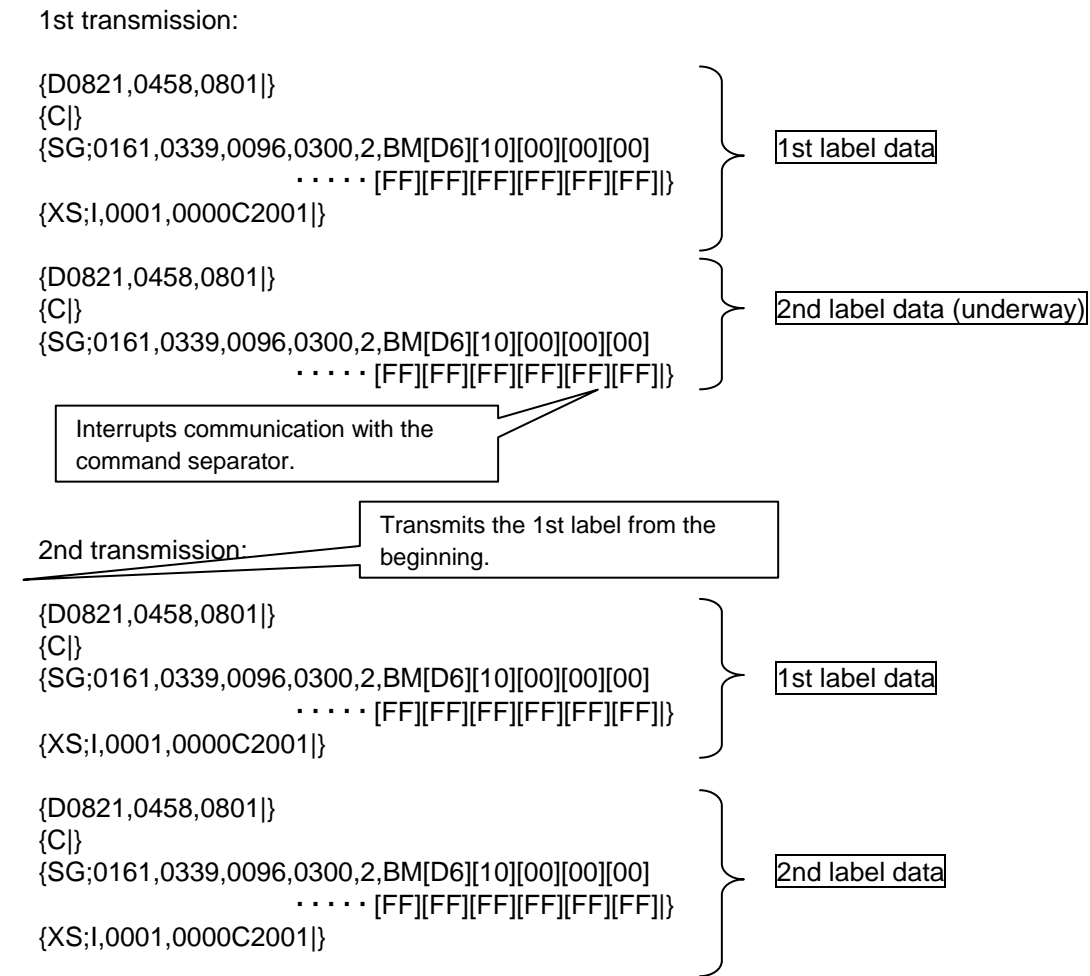
Print result: The 1st label data is printed after the 1st transmission, and the 2nd label data is printed after the 2nd transmission.

(4) When interrupting communication while the 2nd label command is running, and then retransmitting the 2nd label data from the beginning,



Print result: The 1st label data is printed after the 1st transmission, and a command error occurs after the 2nd transmission. (data reception continues until the number of bytes specified by the graphic data in the initial transmission is obtained. Then, a command error occurs when the end code of the command is checked.)

(5) When interrupting communication with the 2nd label command separator, and then retransmitting the 2nd label data from the beginning,



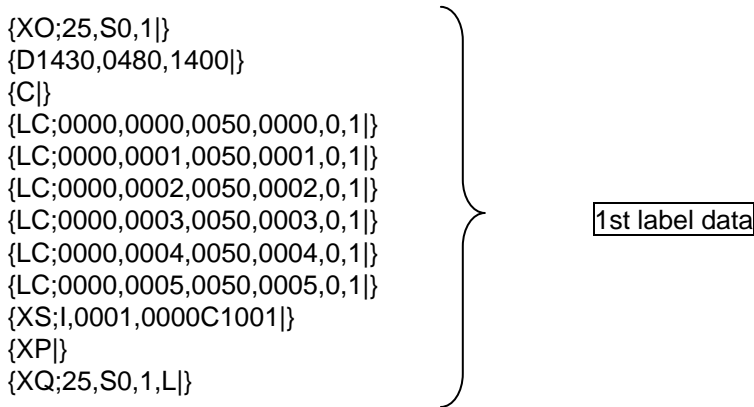
4.2.3.4 PC SAVE COMMAND

When transmission is cancelled while PC saved data is transmitted from the application, the data may not be properly stored because data subsequently transmitted is saved on the PC unless the PC saved data has been transmitted before the transmission is cancelled.

If communication is interrupted while PC saved data is stored, it is necessary to issue the PC Save Terminate Command, turn off and on the power of the printer, or reset the printer.

[Command transmission and storage results (Examples)]

(1) When transmitting PC saved data as usual,



Storage result: Data is properly stored.

(2) When interrupting communication while the PC Save Command is running, and then transmitting subsequent data,

1st transmission:

{XO;25,S0,1|}
{D1430,0480,1400|}
{C|}
{LC;0000,0000,0050,0000,0,1|}
{LC;0000,0001,0050,0001,0,1|}
{LC;0000,0002,0050,0002,0,1|}
{LC;0000,0003,0050,0003,0,1|}
{LC;0000,000

Interrupts communication while the command is running.

1st label data

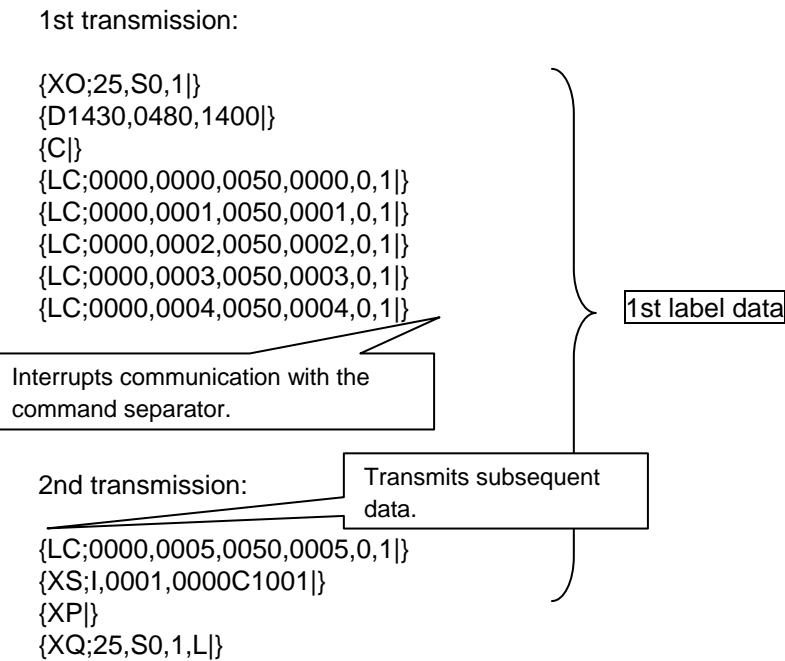
2nd transmission:

4,0050,0004,0,1|}
{LC;0000,0005,0050,0005,0,1|}
{XS;l,0001,0000C1001|}
{XP|}
{XQ;25,S0,1,L|}

Transmits subsequent data.

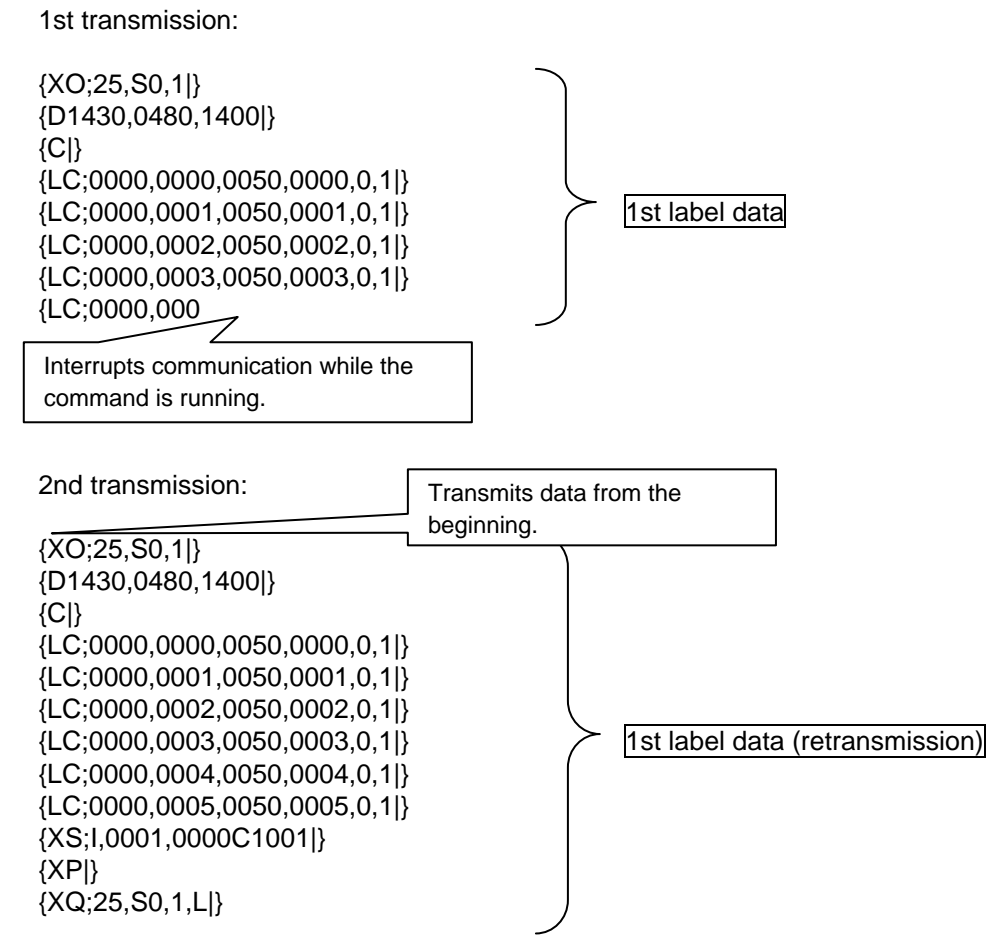
Storage result: Data is properly stored.

(3) When interrupting communication with the PC Save Command separator, and then transmitting subsequent data,



Storage result: Data is properly stored.

(4) When interrupting communication while the PC Save Command is running, and then retransmitting data from the beginning,



Storage result: Data is properly stored, however, when it is read, a command error occurs.

(5) When interrupting communication with the PC Save Command separator, and then retransmitting data from the beginning,

1st transmission:

```
{XO;25,S0,1}  
{D1430,0480,1400}  
{C}  
{LC;0000,0000,0050,0000,0,1}  
{LC;0000,0001,0050,0001,0,1}  
{LC;0000,0002,0050,0002,0,1}  
{LC;0000,0003,0050,0003,0,1}  
{LC;0000,0004,0050,0004,0,1}
```

1st label data

Interrupts communication with the command separator.

2nd transmission:

Transmits data from the beginning.

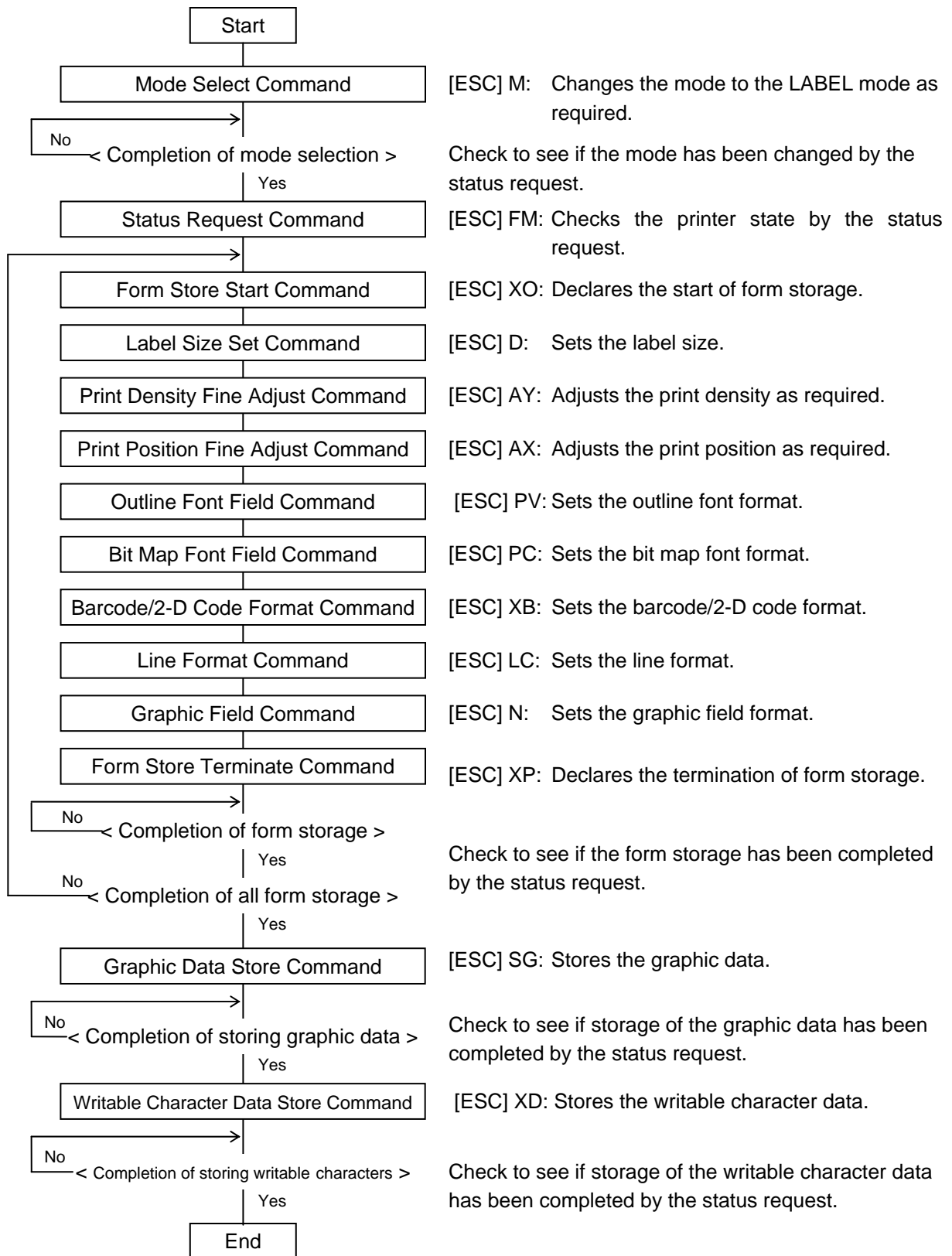
```
{XO;25,S0,1}  
{D1430,0480,1400}  
{C}  
{LC;0000,0000,0050,0000,0,1}  
{LC;0000,0001,0050,0001,0,1}  
{LC;0000,0002,0050,0002,0,1}  
{LC;0000,0003,0050,0003,0,1}  
{LC;0000,0004,0050,0004,0,1}  
{LC;0000,0005,0050,0005,0,1}  
{XS;l,0001,0000C1001}  
{XP}  
{XQ;25,S0,1,L}
```

1st label data (retransmission)

Storage result: Data is properly stored.

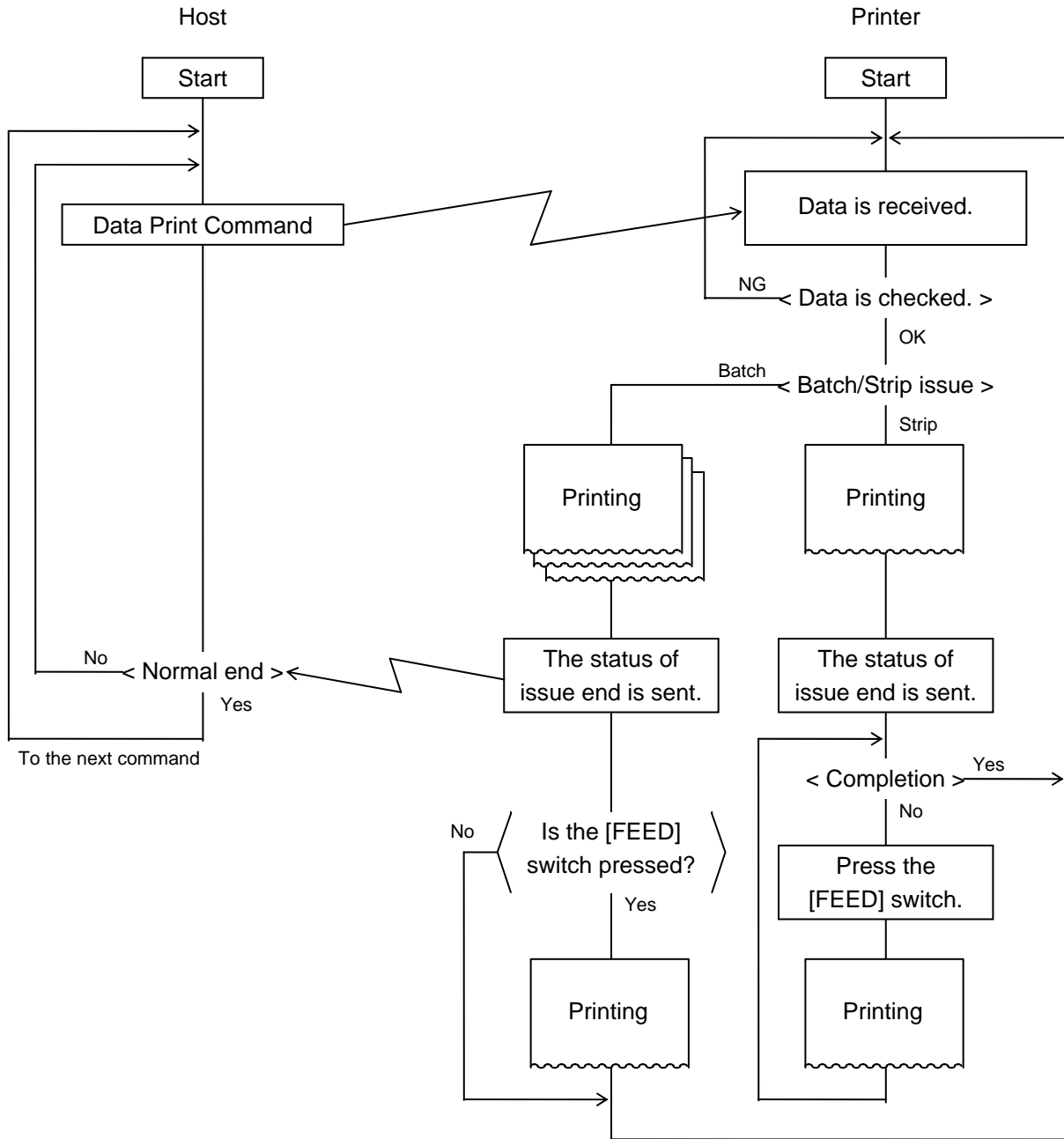
4.3 LABEL MODE

4.3.1 INITIAL SETTING



- NOTES:** (1) *Previously assign the form to be stored to each form No., and store it. Store writable character data and graphic data as required.*
- (2) *When a command such as the above is sent, be sure to confirm that the process is completed, before the next command is sent.*

4.3.2 LABEL ISSUE OPERATION



- NOTES:** (1) In the batch issue mode, the printer issues the designated number of labels. If the labels are short because one failed to attach, issue labels again by pressing the [FEED] switch (according to the parameter in the Data Print Command).
- (2) If the B-SP series compatible mode is validly set with key operations in the strip issue mode, the printer issues only one label in spite of the designation. Issue the required number of labels by pressing the [FEED] switch.
- (*) For the details of the B-SP series compatible mode, see the Key Operation Specifications.

4.3.3 HANDLING OF RECEIVED DATA BY COMMAND

4.3.3.1 COMMAND PROCESSING

If communication is interrupted while a command is running and no subsequent data is transmitted in the next transmission, a command error occurs.

[Command transmission and storage results (Examples)]

(1) When interrupting communication while the 2nd label command is running, and then transmitting subsequent data,

1st transmission:

```
[1B]XO;01,1[0A][00]
[1B]AY;+00,1[0A][00]
[1B]AX;+000[0A][00]
[1B]D0450,0480,0420[0A][00]
[1B]LC;0050,0030,0250,0030,1,1[0A][00]
[1B]LC;0050,0060,0250,0060,1,2[0A][00]
[1B]LC;0050,0090,0250,0090,1,3[0A][00]
[1B]LC;0050,0120,0250,0120,1,4[0A][00]
[1B]LC;0050,0150,0250,0150,1,5[0A][00]
[1B]XP[0A][00]
[1B]X[01][21][01][00]
```

1st label data

Interrupts communication while the command is running.

2nd transmission:

Transmits subsequent data.

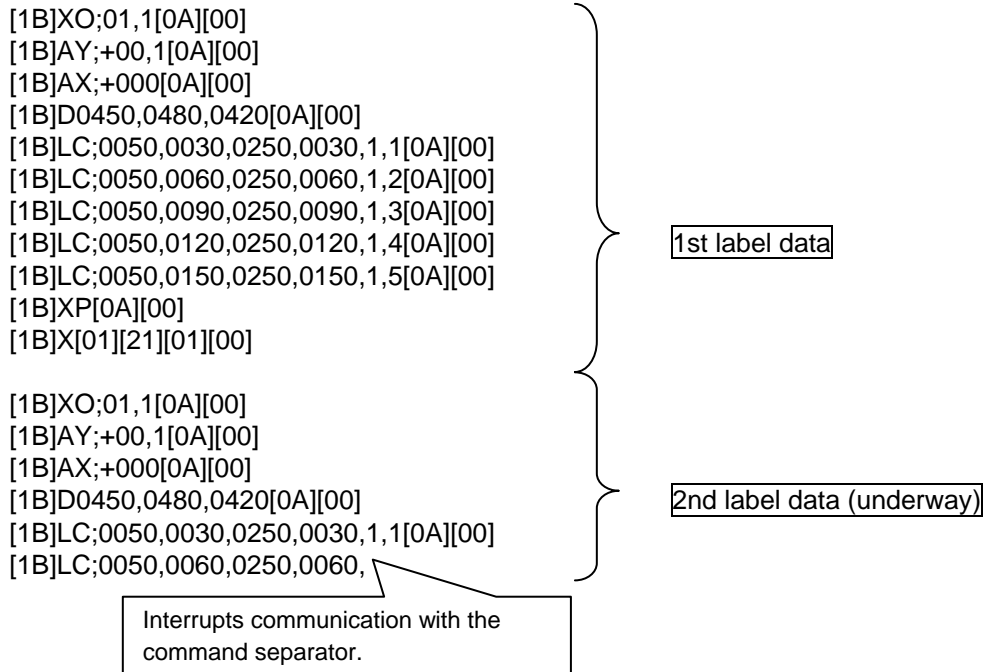
```
[1B]XO;01,1[0A][00]
[1B]AY;+00,1[0A][00]
[1B]AX;+000[0A][00]
[1B]D0450,0480,0420[0A][00]
[1B]LC;0050,0030,0250,0030,1,1[0A][00]
[1B]LC;0050,0060,0250,0060,1,2[0A][00]
[1B]LC;0050,0090,0250,0090,1,3[0A][00]
[1B]LC;0050,0120,0250,0120,1,4[0A][00]
[1B]LC;0050,0150,0250,0150,1,5[0A][00]
[1B]XP[0A][00]
[1B]X[01][21][01][00]
```

2nd label data

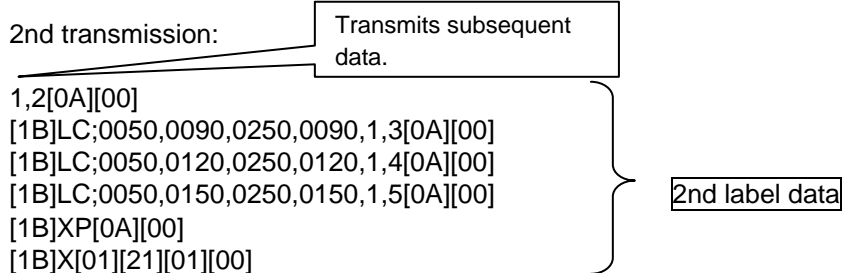
Storage result: The 1st label data is printed after the 1st transmission, and the 2nd label data is printed after the 2nd transmission.

(2) When interrupting communication with the 2nd label command separator, and then transmitting subsequent data,

1st transmission:



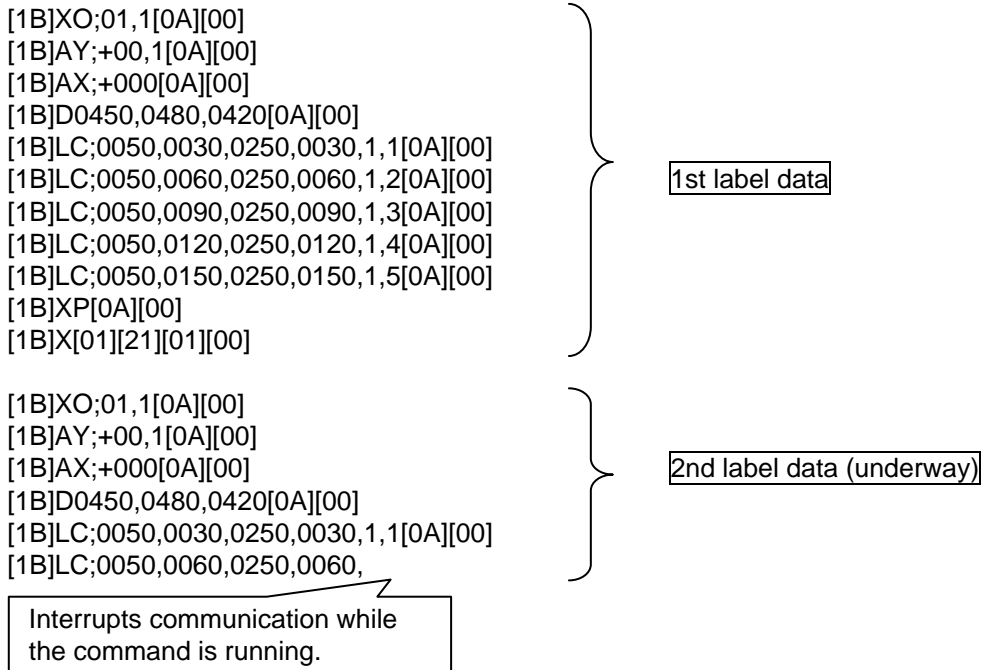
2nd transmission:



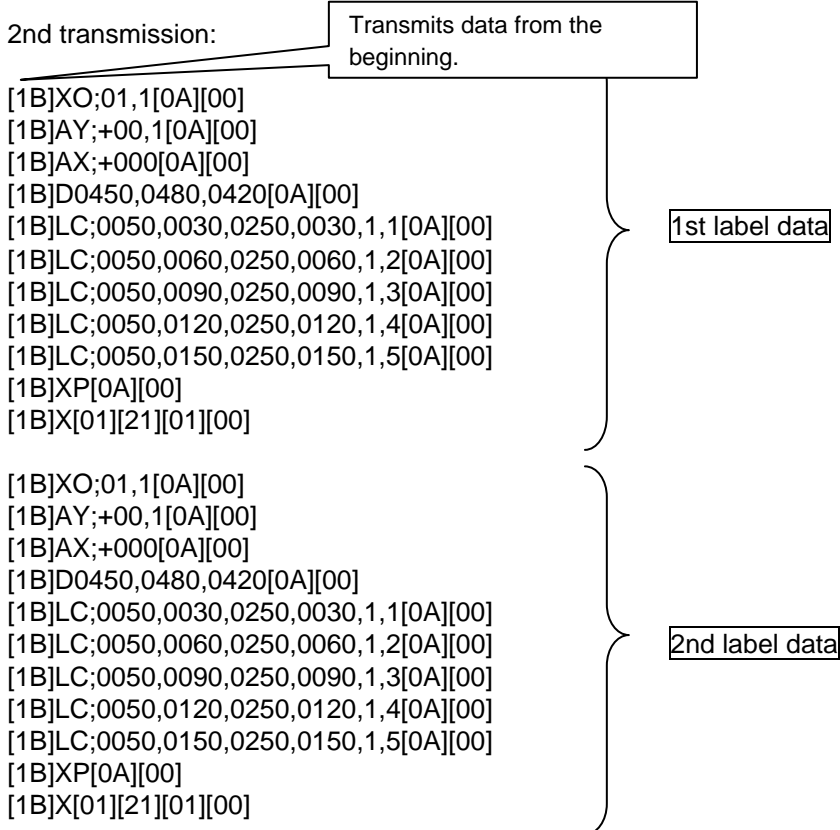
Storage result: The 1st label data is printed after the 1st transmission, and the 2nd label data is printed after the 2nd transmission.

- (3) When interrupting communication while the 3rd label command is running, and then retransmitting data from the beginning,

1st transmission:



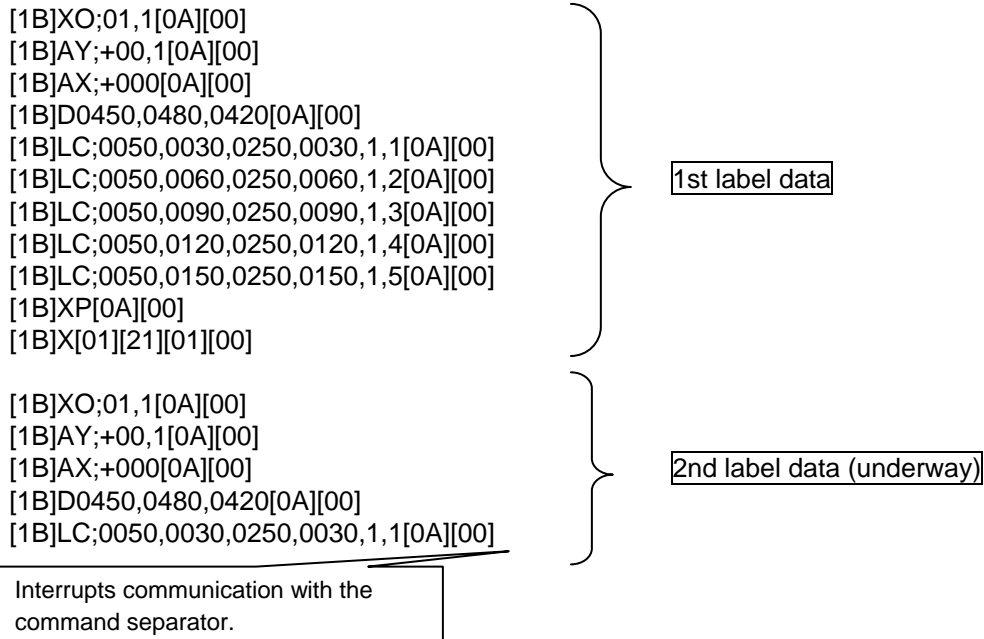
2nd transmission:



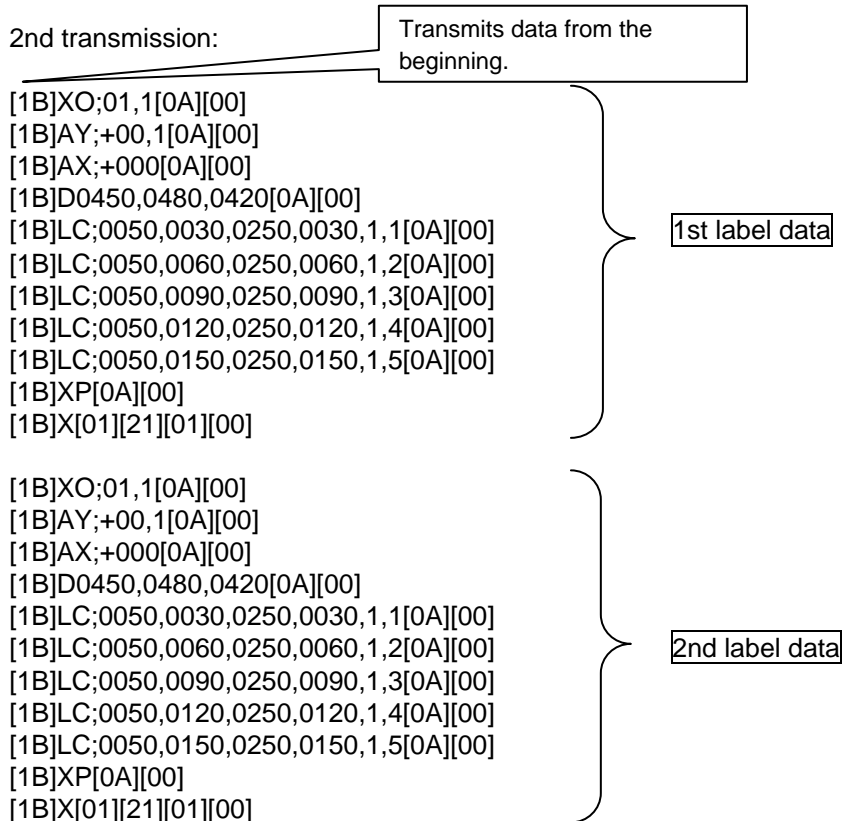
Storage result: The 1st label data is printed after the 1st transmission, and a command error occurs after the 2nd transmission.

- (4) When interrupting communication with the 2nd label command separator, and then retransmitting data from the beginning,

1st transmission:



2nd transmission:



Storage result: The 1st label data is printed after the 1st transmission, and the 1st label data and 2nd label data are printed after the 2nd transmission (3 labels in total).

4.3.3.2 FORM STORE COMMAND

When transmission is cancelled while form storage data is transmitted from the application, the data may not be properly stored because data subsequently transmitted is stored in the form unless the Form Store Terminate Command is issued before the transmission is cancelled.

If communication is interrupted while form storage data is transmitted, it is necessary to issue the Form Store Terminate Command, turn off and on the power of the printer, or reset the printer.

[Command transmission and storage results (Examples)]

(1) When transmitting form storage data as usual,

[1B]XO;01,1[0A][00]	}	<div style="border: 1px solid black; padding: 2px;">1st label data</div>
[1B]AY;+00,1[0A][00]		
[1B]AX;+000[0A][00]		
[1B]D0450,0480,0420[0A][00]		
[1B]LC;0050,0030,0250,0030,1,1[0A][00]		
[1B]LC;0050,0060,0250,0060,1,2[0A][00]		
[1B]LC;0050,0090,0250,0090,1,3[0A][00]		
[1B]LC;0050,0120,0250,0120,1,4[0A][00]		
[1B]LC;0050,0150,0250,0150,1,5[0A][00]		
[1B]LC;0050,0180,0250,0180,1,6[0A][00]		
[1B]XP[0A][00]		
[1B]X[01][21][01][00]		

Storage result: Data is properly stored.

(2) When interrupting communication while the Form Store Command is running, and then transmitting subsequent data,

1st transmission:

[1B]XO;01,1[0A][00]
[1B]AY;+00,1[0A][00]
[1B]AX;+000[0A][00]
[1B]D0450,0480,0420[0A][00]
[1B]LC;0050,0030,0250,0030,1,1[0A][00]
[1B]LC;0050,0060,0250,0060,1,2[0A][00]
[1B]LC;0050,0090,0250,0090,1,3[0A][00]
[1B]LC;0050,

Interrupts communication while the command is running.

1st label data

2nd transmission:

Transmits subsequent data.

,0120,1,4[0A][00]
[1B]LC;0050,0150,0250,0150,1,5[0A][00]
[1B]LC;0050,0180,0250,0180,1,6[0A][00]
[1B]XP[0A][00]
[1B]X[01][21][01][00]

Storage result: Data is properly stored.

(3) When interrupting communication with the Form Store Command separator, and then transmitting subsequent data,

1st transmission:

[1B]XO;01,1[0A][00]
[1B]AY;+00,1[0A][00]
[1B]AX;+000[0A][00]
[1B]D0450,0480,0420[0A][00]
[1B]LC;0050,0030,0250,0030,1,1[0A][00]
[1B]LC;0050,0060,0250,0060,1,2[0A][00]
[1B]LC;0050,0090,0250,0090,1,3[0A][00]
[1B]LC;0050,,0120,1,4[0A][00]

Interrupts communication with the command separator.

1st label data

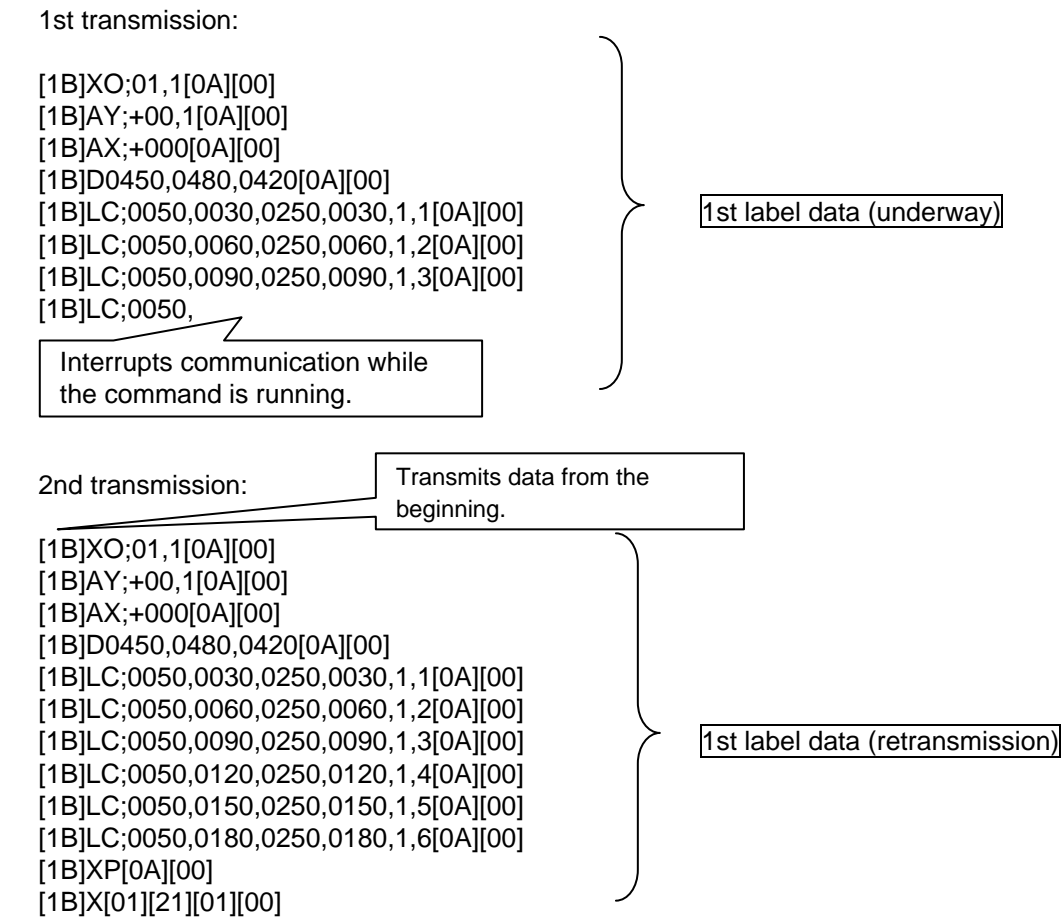
2nd transmission:

Transmits subsequent data.

[1B]LC;0050,0150,0250,0150,1,5[0A][00]
[1B]LC;0050,0180,0250,0180,1,6[0A][00]
[1B]XP[0A][00]
[1B]X[01][21][01][00]

Storage result: Data is properly stored.

(4) When interrupting communication while the Form Store Command is running, and then retransmitting data from the beginning,



Storage result: Data is properly stored, however, when it is read, a command error occurs.

- (5) When interrupting communication with the Form Store Command separator, and retransmitting data from the beginning,

1st transmission:

```
[1B]XO;01,1[0A][00]
[1B]AY;+00,1[0A][00]
[1B]AX;+000[0A][00]
[1B]D0450,0480,0420[0A][00]
[1B]LC;0050,0030,0250,0030,1,1[0A][00]
[1B]LC;0050,0060,0250,0060,1,2[0A][00]
[1B]LC;0050,0090,0250,0090,1,3[0A][00]
[1B]LC;0050,0120,0250,0120,1,4[0A][00]
```

Interrupts communication with the command separator.

1st label data (underway)

2nd transmission:

Transmits data from the beginning.

```
[1B]XO;01,1[0A][00]
[1B]AY;+00,1[0A][00]
[1B]AX;+000[0A][00]
[1B]D0450,0480,0420[0A][00]
[1B]LC;0050,0030,0250,0030,1,1[0A][00]
[1B]LC;0050,0060,0250,0060,1,2[0A][00]
[1B]LC;0050,0090,0250,0090,1,3[0A][00]
[1B]LC;0050,0120,0250,0120,1,4[0A][00]
[1B]LC;0050,0150,0250,0150,1,5[0A][00]
[1B]LC;0050,0180,0250,0180,1,6[0A][00]
[1B]XP[0A][00]
[1B]X[01][21][01][00]
```

1st label data (retransmission)

Storage result: Data is properly stored.

However, if the data retransmitted is different from the one first transmitted, the printed output may be incomplete.

4.3.3.3 GRAPHIC DATA STORE COMMAND

When transmission is cancelled while graphic data is transmitted from the application, the data cannot be properly stored because data subsequently transmitted is recognized as a graphic command unless the graphic data has been transmitted before the transmission is cancelled.

If communication is interrupted while graphic data is transmitted, it is necessary to transmit graphic data for the number of bytes that was not transmitted as dummy data, turn off and on the power of the printer, or reset the printer.

[Command transmission and storage results (Examples)]

(1) When transmitting graphic storage data as usual,

[illegible]

Storage result: Data is properly stored.

(2) When interrupting communication while the Graphic Data Store Command is running, and then transmitting subsequent data,

1st transmission:

[1B][53][47][3B][31][2C][30][30][34][30][2C][30][30][34][30]
[2C][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF]
[FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF]
[FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF]
[FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF]
[FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF]
[FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF]
[FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF]
[FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF]
[FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF],

Interrupts communication while the command is running.

2nd transmission:

Transmits subsequent data.

[FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF]
[FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF]
[FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF]
[FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF]
[FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF][FF]
[FF][FF][FF][FF][FF][FF][0A][00][0D][0A]
[1B]XO;01,1[0A][00]
[1B]D0630,0480,0600[0A][00]
[1B]PC00;0030,0050,2,2,A,00,B,00,1,0[0A][00]
[1B]PC00;0030,0350,2,2,A,00,B,00,1,0[0A][00]
[1B]N;1,0150,0100[0A][00]
[1B]N;2,0150,0400[0A][00]
[1B]XP[0A][00]
[1B]X[01][21][01]Graphic Data No. 1[0A]
Graphic Data No. 2[0A][00]

1st label data

Storage result: Data is properly stored.

- (3) When interrupting communication with the Graphic Data Store Command separator, and then transmitting subsequent data,

1st transmission:

[illegible]

Interrupts communication with the command separator.

- 1st label data

2nd transmission:

Transmits subsequent data.

```
[1B]XO;01,1[0A][00]
[1B]D0630,0480,0600[0A][00]
[1B]PC00;0030,0050,2,2,A,00,B,00,1,0[0A][00]
[1B]PC00;0030,0350,2,2,A,00,B,00,1,0[0A][00]
[1B]N;1,0150,0100[0A][00]
[1B]N;2,0150,0400[0A][00]
[1B]XP[0A][00]
[1B]X[01][21][01]Graphic Data No. 1[0A]
Graphic Data No. 2[0A][00]
```

Storage result: Data is properly stored.

- (4) When interrupting communication while the Graphic Data Store Command is running, and then retransmitting data from the beginning,

[illegible]

Interrupts communication while the command is running.

Transmits data from the beginning.

1st label data
(retransmission)

Storage result: Data is properly stored, however, when it is read, a command error occurs.

- (5) When interrupting communication with the Graphic Store Command separator, and retransmitting data from the beginning,

1st transmission:

[illegible]

1st label data
(underway)

Interrupts communication with the command separator.

2nd transmission:

Transmits data from the beginning.

[illegible]

1st label data
(retransmission
)

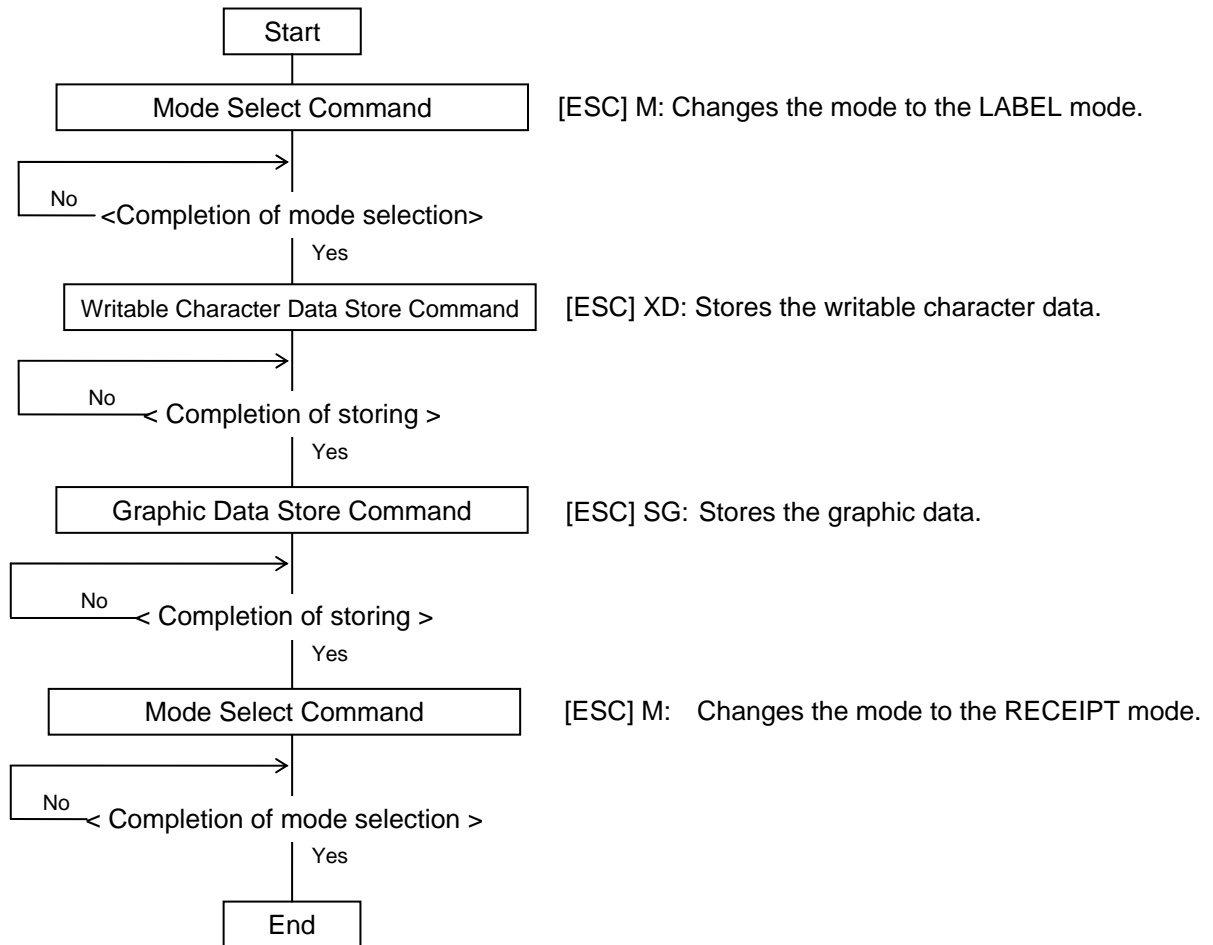
```
[1B]XO;01,1[0A][00]
[1B]D0630,0480,0600[0A][00]
[1B]PC00;0030,0050,2,2,A,00,B,00,1,0[0A][00]
[1B]PC00;0030,0350,2,2,A,00,B,00,1,0[0A][00]
[1B]N;1,0150,0100[0A][00]
[1B]N;2,0150,0400[0A][00]
[1B]XP[0A][00]
[1B]X[01][21][01]Graphic Data No. 1[0A]
Graphic Data No. 2[0A][00]
```

Storage result: Data is properly stored.

However, if the data retransmitted is different from the one first transmitted, the printed output may be incomplete.

4.4 RECEIPT MODE

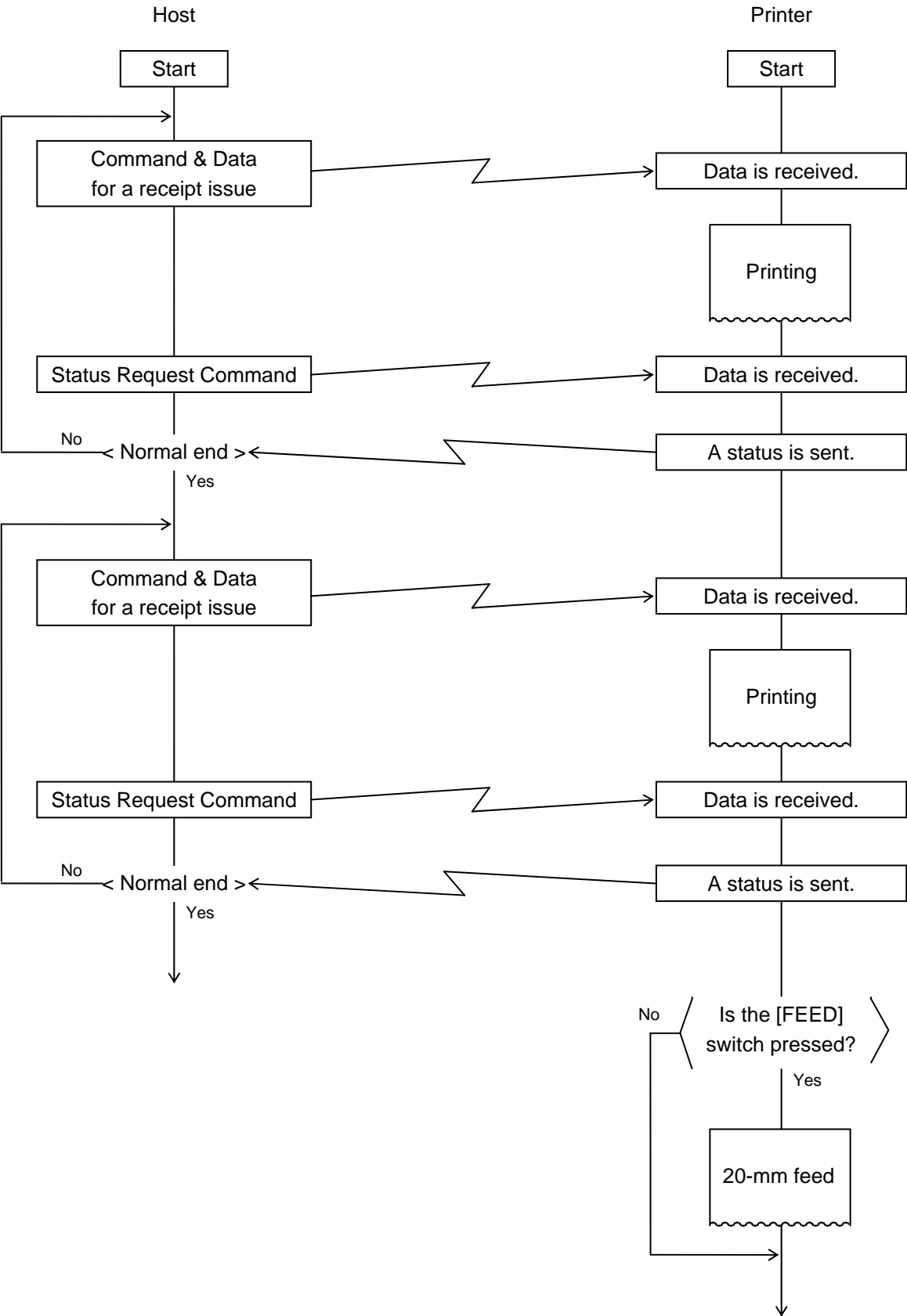
4.4.1 INITIAL SETTING



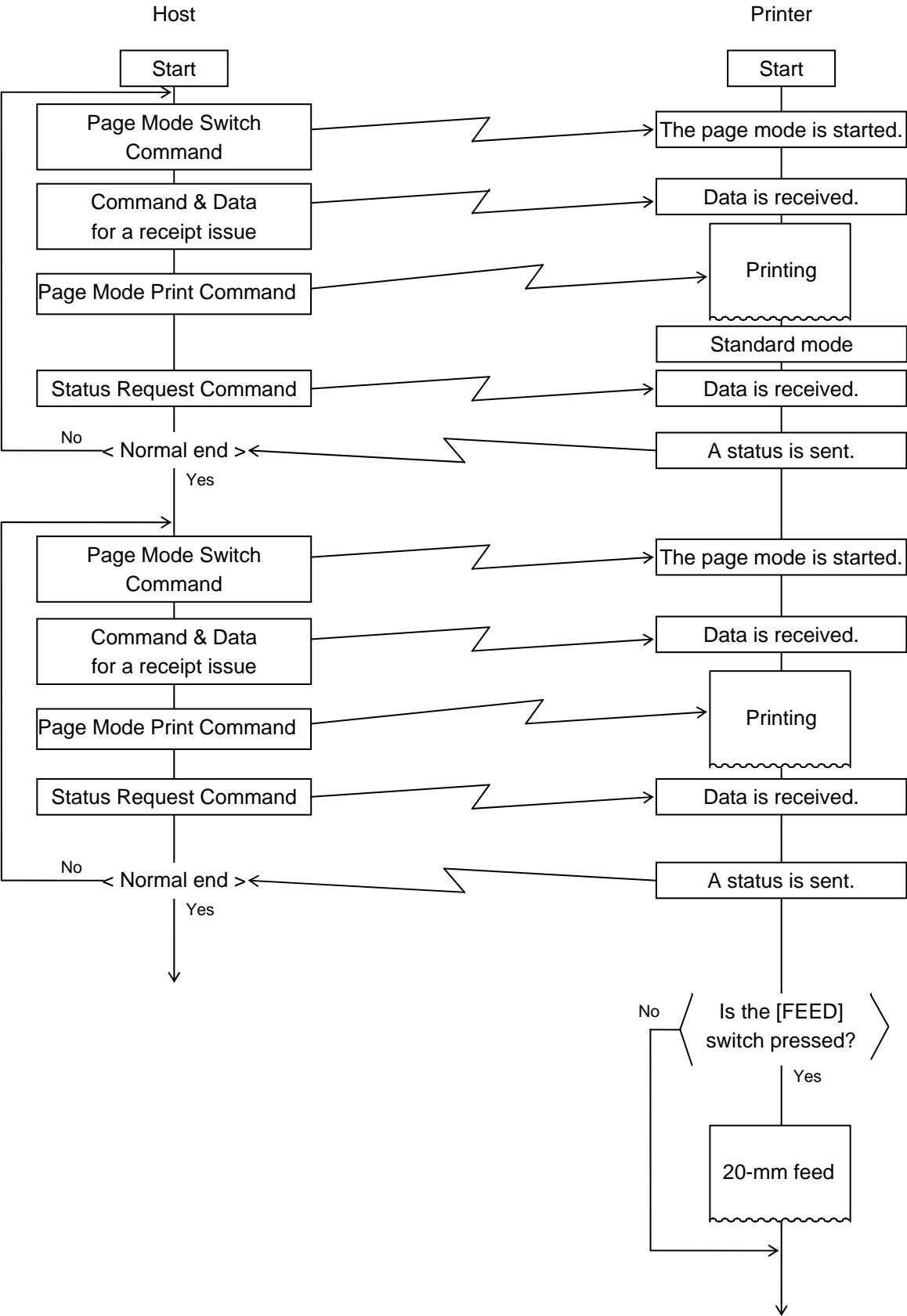
- NOTES:**
- (1) To store the writable character data, the mode should be changed to the LABEL mode. After storing is finished, the mode should be returned to the RECEIPT mode.
 - (2) When a command such as the above is sent, be sure to confirm that the process is completed, before the next command is sent.
 - (3) The graphic data store command is registerable even after changing the mode to the RECEIPT mode.

4.4.2 RECEIPT ISSUE OPERATION

4.4.2.1 STANDARD MODE



4.4.2.2 PAGE MODE



- NOTES:**
- (1) *In the RECEIPT mode, the status of issue end is not automatically sent. Before the next receipt is issued, whether or not the sent data is issued normally should be confirmed by sending the Status Request Command. When a receipt is not issued due to an error, the data should be sent again.*
 - (2) *In the RECEIPT mode, when the [FEED] switch is pressed, a 20-mm feed is performed.*
 - (3) *In the RECEIPT mode, the issue count cannot be set. If the batch/strip issue mode is set, it does not become effective.*

4.4.3 HANDLING OF RECEIVED DATA BY COMMAND

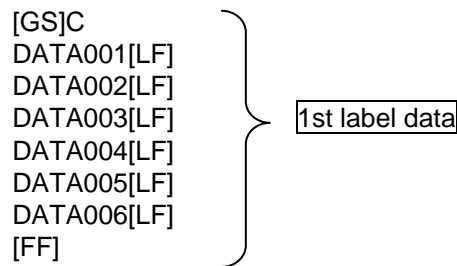
4.4.3.1 PAGE MODE PROCESSING

If communication is interrupted while data is transmitted from the application and no subsequent data is transmitted in the next transmission, a command error occurs. When transmission is cancelled while data is transmitted in page mode, the data may not be properly stored because data subsequently transmitted is processed in page mode unless the Page Mode Terminate Command [FF] or Page Mode Cancel Command [CAN] is issued before the transmission is cancelled. If communication is interrupted while data is transmitted in page mode, it is necessary to issue the Page Mode Terminate (Print) Command or Page Mode Cancel Command, turn off and on the power of the printer, or reset the printer.

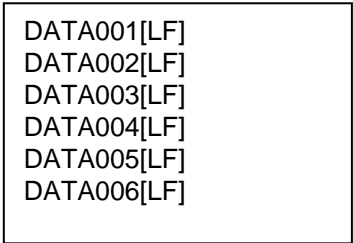
However, please note that when the Page Mode Terminate (Print) Command is issued, all previous data is erased.

[Command transmission and print results (Examples)]

(1) When transmitting data in page mode as usual,

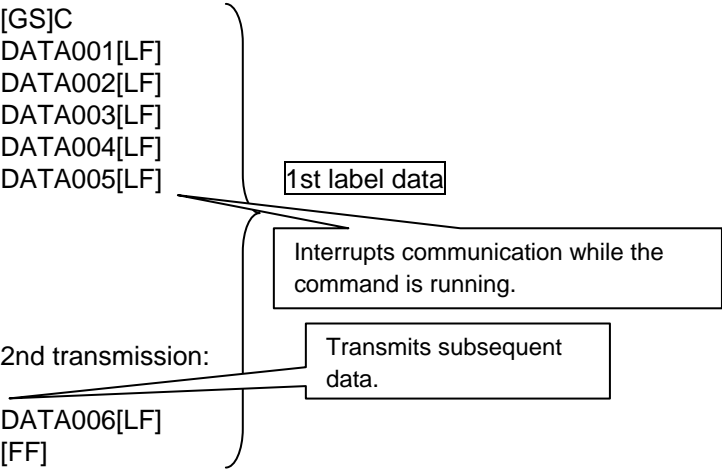


Print result: Data is properly printed (as shown below).



(2) When interrupting communication while the Page Mode Command is running, and then transmitting subsequent data,

1st transmission:



2nd transmission:

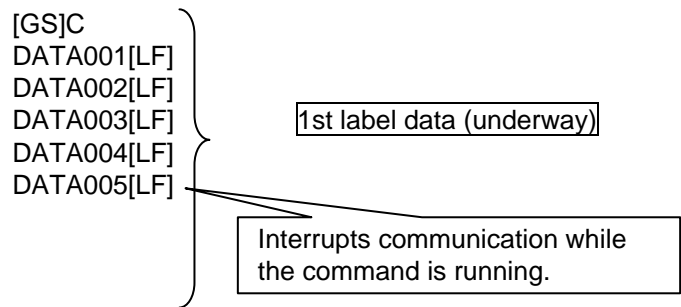
DATA006[LF]
[FF]

Print result: Data is properly printed (as shown below).

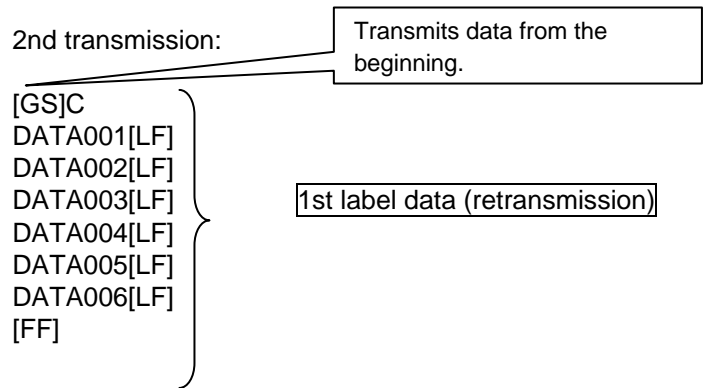
DATA001[LF]
DATA002[LF]
DATA003[LF]
DATA004[LF]
DATA005[LF]
DATA006[LF]

(3) When interrupting communication while the Page Mode Command is running, and then retransmitting data from the beginning,

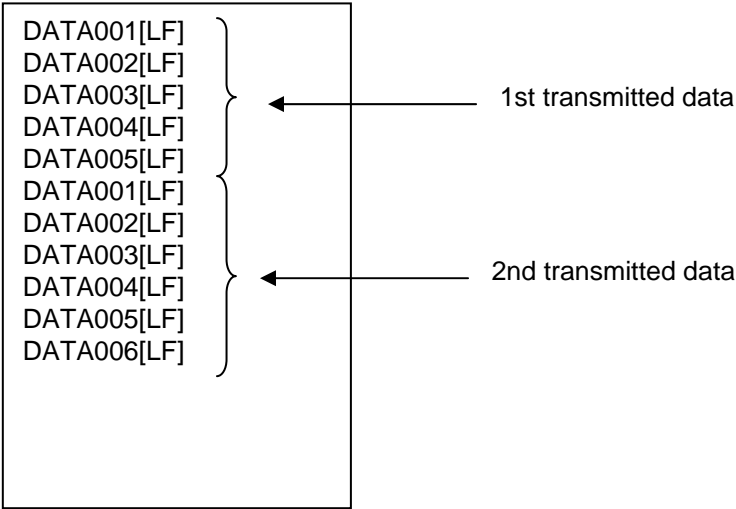
1st transmission:



2nd transmission:

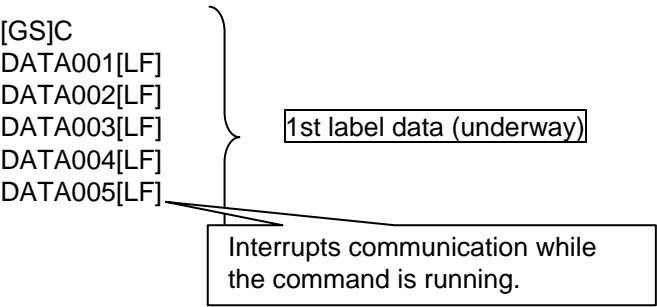


Print result: Data is printed but the printed output does not look correct (as shown below).

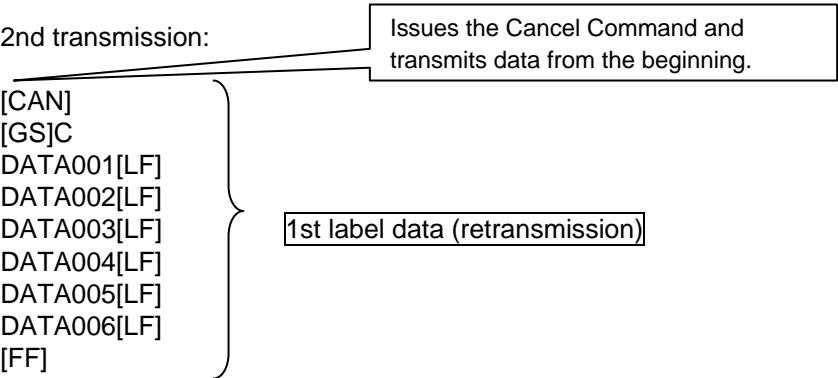


(4) When interrupting communication while the Page Mode Command is running, issuing the Cancel Command during retransmission and then retransmitting data from the beginning,

1st transmission:



2nd transmission:

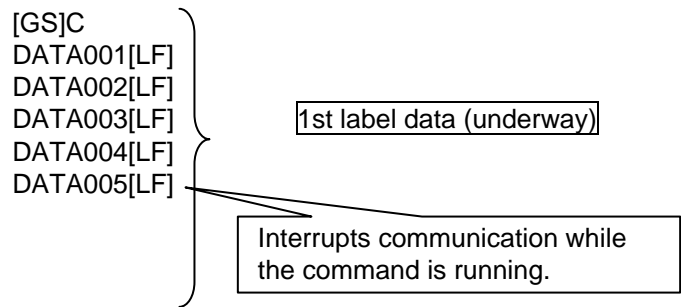


Print result: Data is properly printed (as shown below).

DATA001[LF]
DATA002[LF]
DATA003[LF]
DATA004[LF]
DATA005[LF]
DATA006[LF]

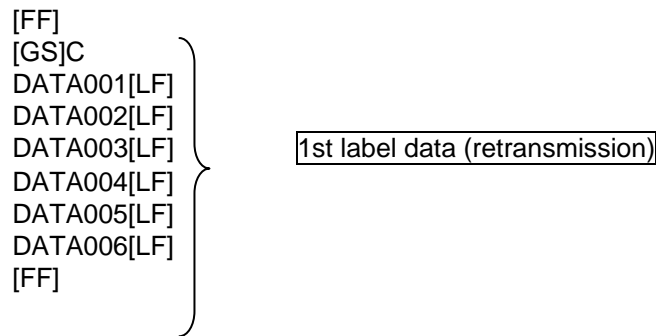
(5) When interrupting communication while the Page Mode Command is running, issuing the Page Mode Print Command during retransmission and then retransmitting data from the beginning,

1st transmission:



2nd transmission:

Issues the Page Mode Print Command and transmits data from the beginning.

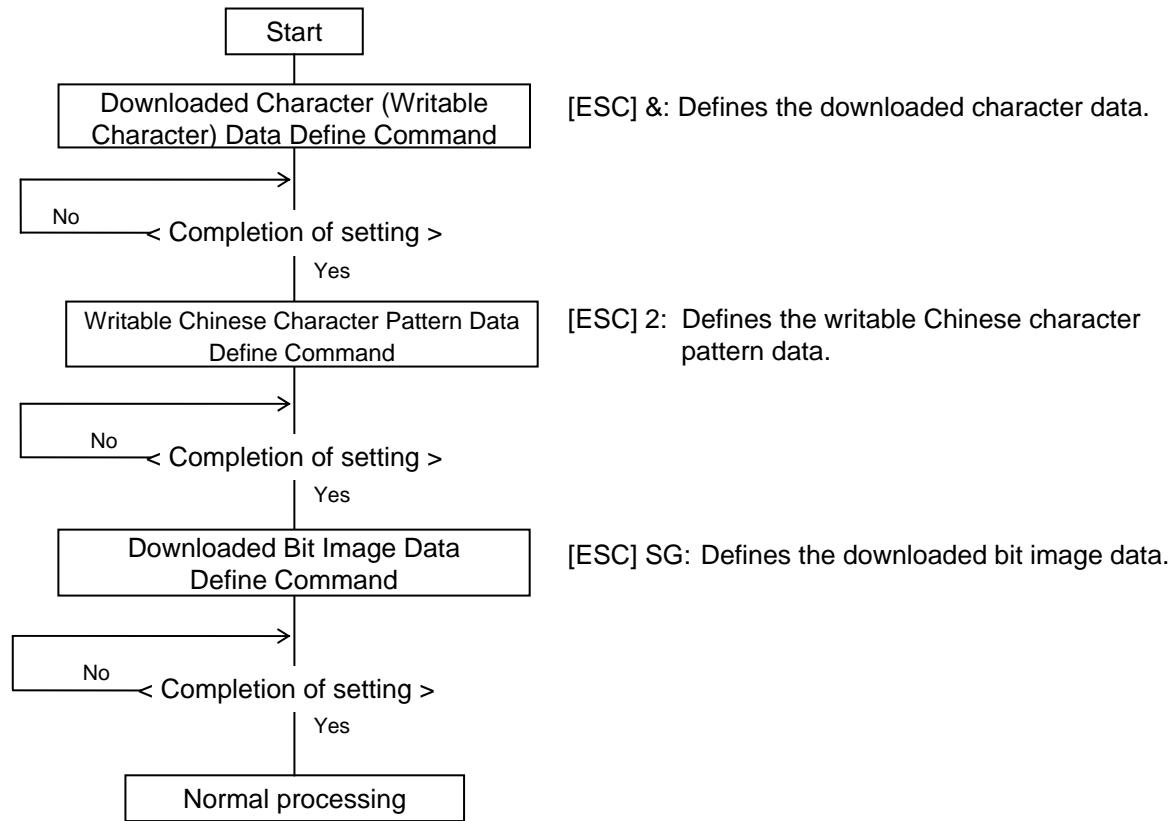


Print result: Data is properly printed (as shown below).

1st label:
DATA001[LF]
DATA002[LF]
DATA003[LF]
DATA004[LF]
DATA005[LF]
2nd label:
DATA001[LF]
DATA002[LF]
DATA003[LF]
DATA004[LF]
DATA005[LF]
DATA006[LF]

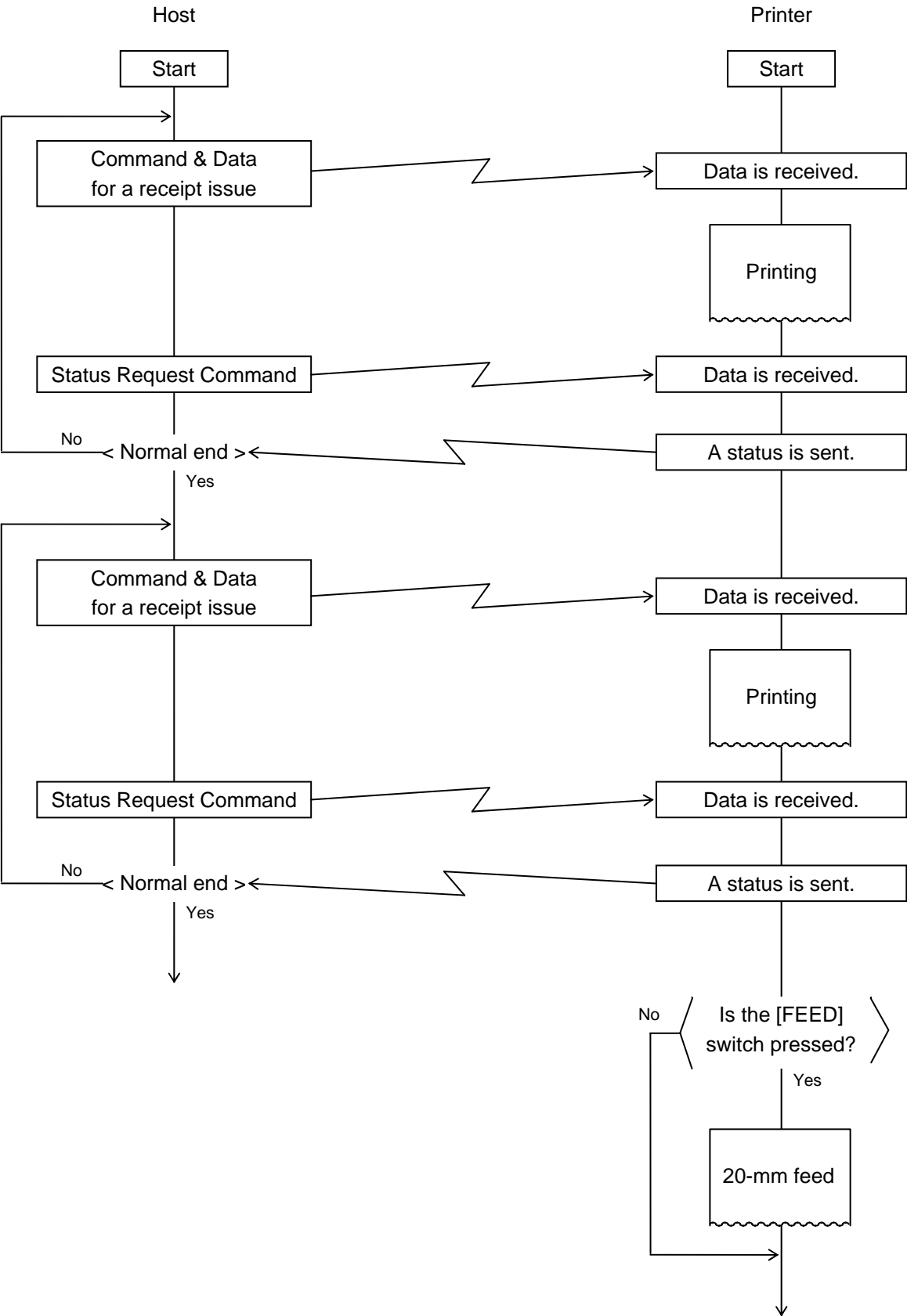
4.5 ESC/POS MODE

4.5.1 INITIAL SETTING

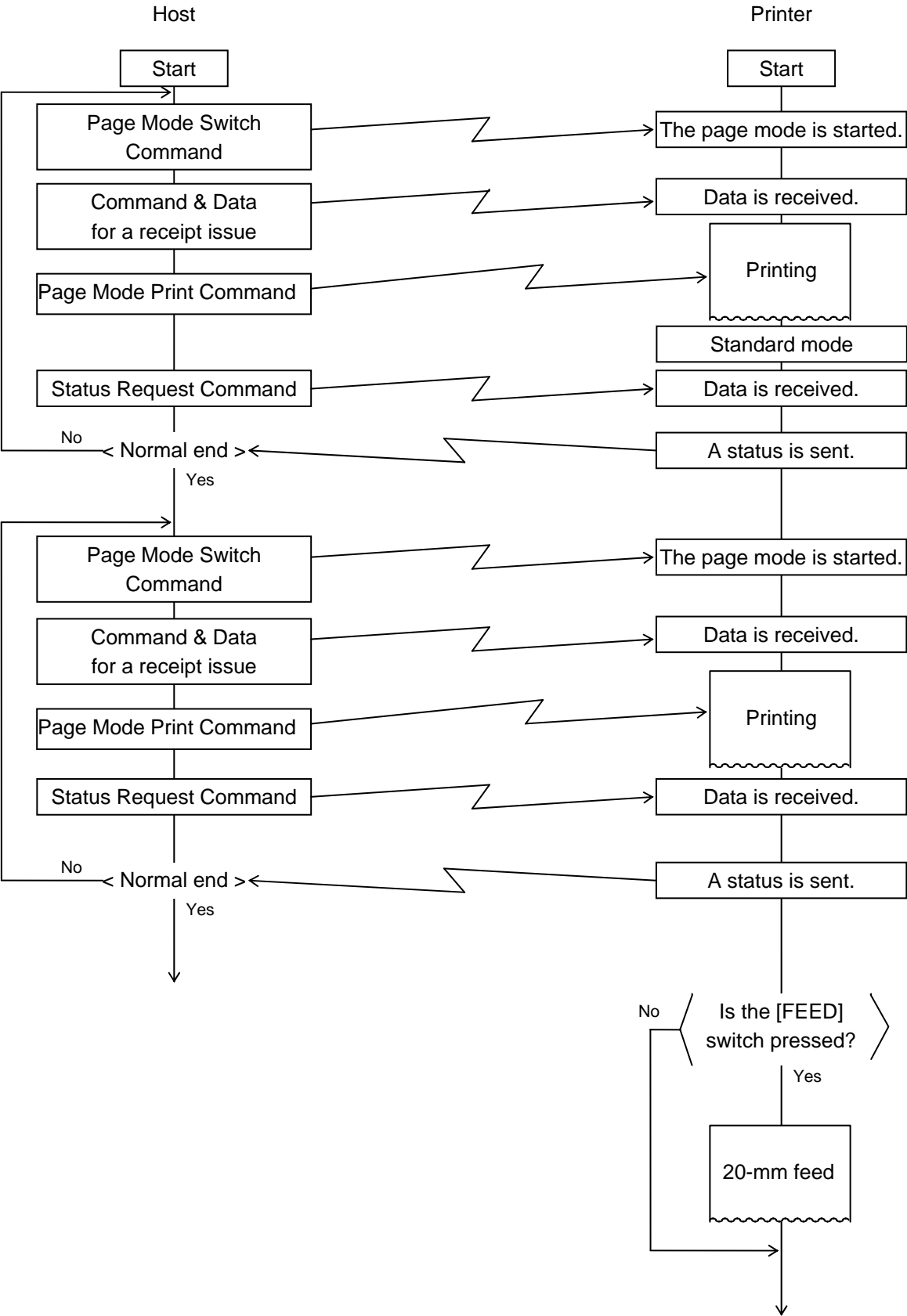


4.5.2 RECEIPT ISSUE OPERATION

4.5.2.1 STANDARD MODE



4.5.2.2 PAGE MODE



- NOTES:**
- (1) *In the ESC/POS mode, the status of issue end is not automatically sent. Before the next receipt is issued, whether or not the sent data is issued normally should be confirmed by sending the Status Request Command. When a receipt is not issued due to an error, the data should be sent again.*
 - (2) *In the ESC/POS mode, when the [FEED] switch is pressed, a 20-mm feed is performed.*
 - (3) *In the ESC/POS mode, the issue count cannot be set. If the batch/strip issue mode is set, it does not become effective.*

4.5.3 HANDLING OF RECEIVED DATA BY COMMAND

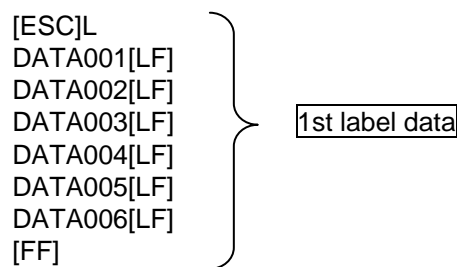
4.5.3.1 PAGE MODE PROCESSING

If communication is interrupted while data is transmitted from the application and no subsequent data is transmitted in the next transmission, a command error occurs. When transmission is cancelled while data is transmitted in page mode, the data may not be properly stored because data subsequently transmitted is processed in page mode unless the Page Mode Terminate Command [FF] or Page Mode Cancel Command [CAN] is issued before the transmission is cancelled. If communication is interrupted while data is transmitted in page mode, it is necessary to issue the Page Mode Terminate (Print) Command or Page Mode Cancel Command, turn off and on the power of the printer, or reset the printer.

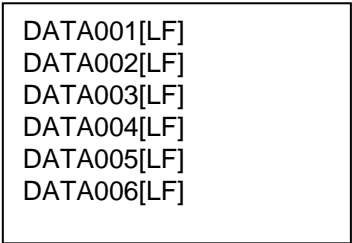
However, please note that when the Page Mode Terminate (Print) Command is issued, all previous data is erased.

[Command transmission and print results (Examples)]

(1) When transmitting data in page mode as usual,

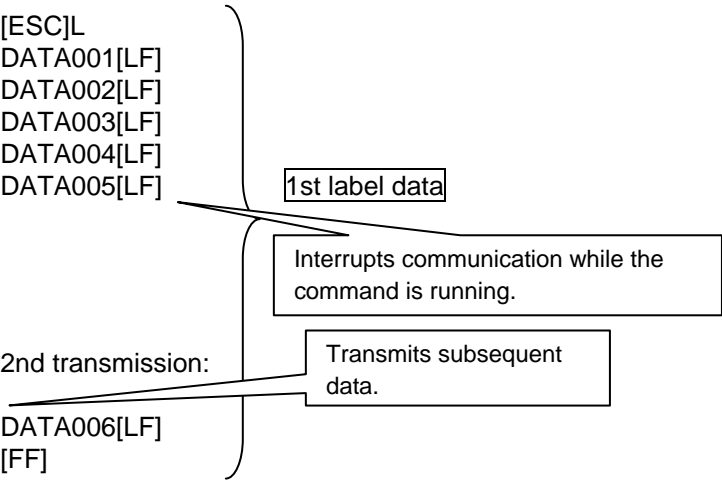


Print result: Data is properly printed (as shown below).



(2) When interrupting communication while the Page Mode Command is running, and then transmitting subsequent data,

1st transmission:



2nd transmission:

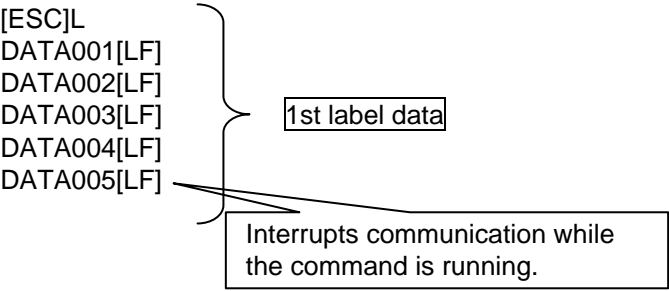
DATA006[LF]
[FF]

Print result: Data is properly printed (as shown below).

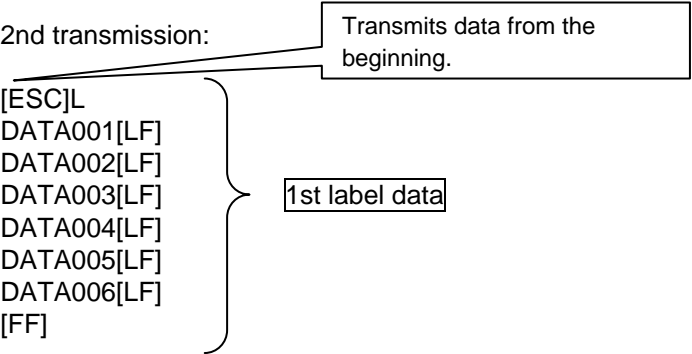
DATA001[LF]
DATA002[LF]
DATA003[LF]
DATA004[LF]
DATA005[LF]
DATA006[LF]

(3) When interrupting communication while the Page Mode Command is running, and then retransmitting data from the beginning,

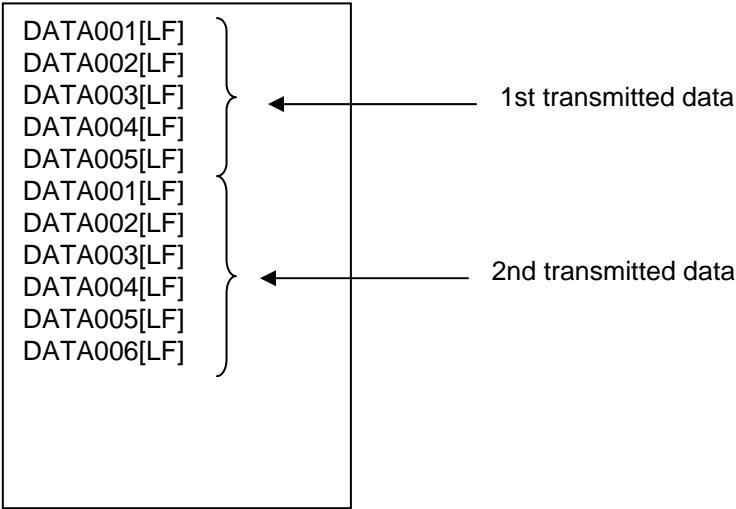
1st transmission:



2nd transmission:

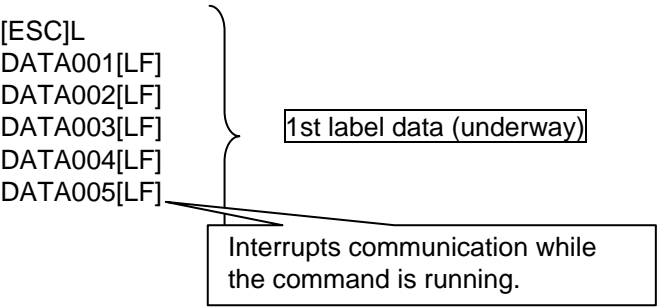


Print result: Data is printed but the printed output does not look correct (as shown below).

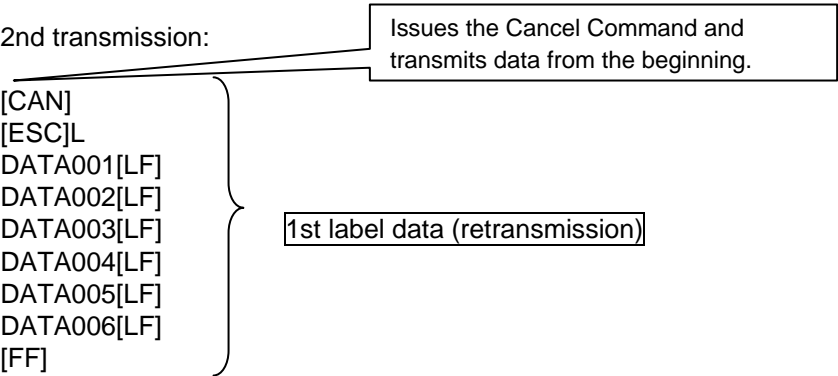


(4) When interrupting communication while the Page Mode Command is running, issuing the Cancel Command during retransmission and then retransmitting data from the beginning,

1st transmission:



2nd transmission:

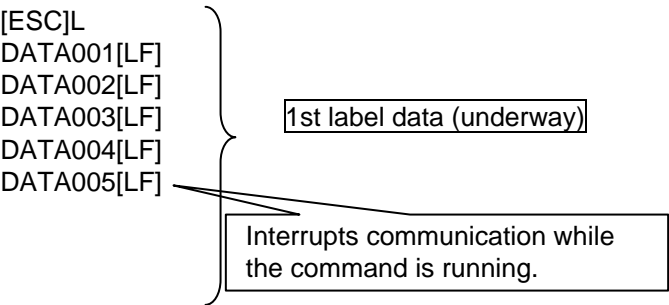


Print result: Data is properly printed (as shown below).

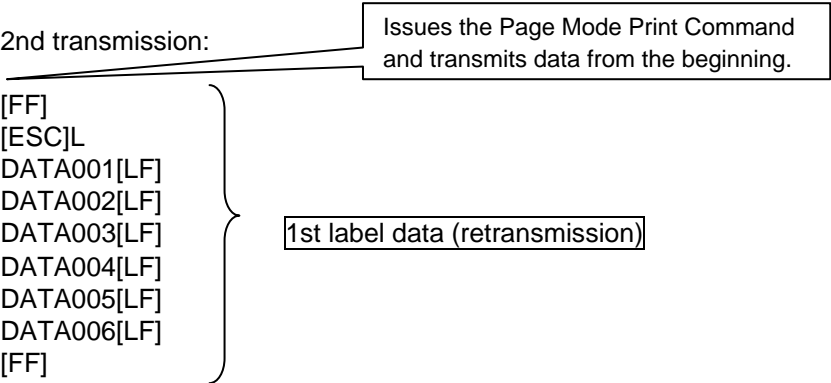
DATA001[LF]
DATA002[LF]
DATA003[LF]
DATA004[LF]
DATA005[LF]
DATA006[LF]

(5) When interrupting communication while the Page Mode Command is running, issuing the Page Mode Print Command during retransmission and then retransmitting data from the beginning,

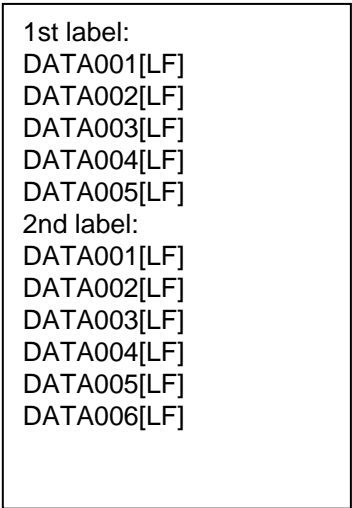
1st transmission:



2nd transmission:



Print result: Data is properly printed (as shown below).



5. TPCL MODE (INTERFACE COMMANDS)

5.1 GENERAL DESCRIPTION

This chapter describes details regarding the interface commands for the TPCL mode of the print mode.

<<Up to V1.0C>>

There are three issue types, "Batch issue," "Strip issue" and "Linerless issue." In batch issues, a back feed is performed before printing, regardless of the selected sensor type. No back feed is performed even in batch issue mode if there is no data to be printed within 9.3 mm from the top of the effective print length.

In strip and linerless issue modes, no back feed is performed.

<<V1.0E or later>>

There are three issue types, "Batch issue," "Strip issue" and "Linerless issue."

In batch issue mode when the type of sensor is designated, whether or not to perform a back feed under the following conditions:

	Back feed restriction setting in the SYSTEM mode or in the Setup Command	
	ON	OFF
Label pitch of less than 20.0 mm	Performs no back feed	Performs a back feed
Label pitch of 20.0 mm or more but less than 24.0 mm and effective print length of less than 15.0 mm	Performs no back feed	Performs a back feed
Label pitch of 20.0 mm or more but less than 24.0 mm and effective print length of 15.0 mm or more	Performs a back feed	Performs a back feed
Label pitch of 24.0 mm or more	Performs a back feed	Performs a back feed
Feeding by the FEED key or in the Feed Command	Performs no back feed (*1)	Performs no back feed (*1)

*1 However, when the label pitch length is equal to the distance between the head and sensor (11.5 mm) or less, a back feed is performed.

No back feed is performed even though the back feed conditions are satisfied if there is no data to be printed within 9.3 mm from the top of the effective print length.

In batch and linerless issue modes when the type of sensor is not designated, a back feed operation is specified depending on the back feed restriction setting in the SYSTEM mode or in the Setup Command.

When the back feed restriction setting is on and the label pitch or effective print length conforms to the condition not to perform a back feed, a label located between the head and cutter at the first printing subsequent to an issue (one or multiple labels) cannot be printed because no back feed is performed. This waste can be prevented by switching the stop position in the SYSTEM mode from "CUT" to "HEAD." However, it is necessary to press the FEED key and move a label to the cut position to take it out because the label is not stopped at the cut position after printing has been completed.

In strip issue mode when the strip issue back feed setting is on and the strip position fine adjustment is set to – (negative), a back feed is performed because the print start position is misaligned. However, for labels whose label-to-label gap is 5 mm or more, no back feed is performed because the print start position is not misaligned.

<<Common in all versions>>

When printing is performed under the following conditions, the print position is misaligned:

In batch issues, use and issue labels shorter than 11.5 mm between the head and sensor, without setting or by omitting to set a back feed parameter of the print position fine adjust command in LABEL mode. Then, switch the mode to TPCL mode and issue labels. As a result, the print position of the second label is misaligned. When labels shorter than the distance between the head and sensor are used, before LABEL mode is switched to TPCL mode, the gap between the first label and second label has passed through the sensor before the first label is printed. Therefore, the third and later labels are printed at the proper position.

Either of the language types, Kanji, Chinese and Korean, can be implemented. Any font other than the on-board fonts is selectable.

5.2 OUTLINE OF COMMANDS

5.2.1 FORMAT OF INTERFACE COMMAND

ESC	Command & Data	LF	NUL
-----	----------------	----	-----

- The length from [ESC] to [LF] [NUL] must be as specified by each command.
- There are the following two kinds of control codes:
 - ① ESC (1BH), LF (0AH), NUL (00H)
 - ② { (7BH), | (7CH), } (7DH)

5.2.2 HOW TO USE REFERENCE

Function	Describes the outline of the function of the command.
Format	Shows the format of the command. The format designation method should conform to the following rules: <ul style="list-style-type: none"> ● Each set of small letters (such as aa, bbbb) indicates a parameter item. ● Parenthesized items may be omitted. ● “---” indicates the repetition of an item. ● Brackets and parentheses are used only in coding, and must not be transmitted in practice. ● Other symbols must always be inserted at designated positions before being transmitted.
Term	Explains the term(s) used in the format. * “0 to 999” described in the entry range indicates that up to 3-digit variable-length entry is allowed. (Entry of “001” or “009” is also possible.) “000 to 999” indicates that the entry must be fixed at 3 digits.
I/F	Indicates the interface that the command functions. All interfaces are available when not described.
Explanation	Explains the command in detail.
Note	Supplementary explanation of the command.
Refer to	Related commands
Examples	Explains the command examples.

[ESC] T20C30 [LF] [NUL]

The above corresponds to the transfer of the following:

1B 54 32 30 43 33 30 0A 00
[ESC] T 2 0 C 3 0 [LF] [NUL]

5.2.3 PRECAUTIONS

The commands and parameters described in this specification must always be used. If any command or parameter other than those covered in this specification is used, the printer's operation will not be guaranteed. When a command is transmitted in the SYSTEM mode, no operation is performed. However, only the reset command is operable.

5.3 COMMANDS RELATED TO SETTING

5.3.1 LABEL SIZE SET COMMAND

[ESC] D

Function	Sets the size of a label or tag paper.
Format	[ESC] Daaaa, bbbb, cccc (, dddd) [LF] [NUL]
Term	<p>aaaa: Pitch length of the label or tag 4 and 5 digits (in 0.1 mm units) 4 digits: 0100 (10.0 mm) to 9999 (999.9 mm) 5 digits: 00100 (10.0 mm) to 09999 (999.9 mm)</p> <p>bbbb: Effective print width Fixed at 4 digits (in 0.1 mm units) 0100 (10.0 mm) to 1057 (105.7 mm)</p> <p>cccc: Effective print length 4 and 5 digits (in 0.1 mm units) 4 digits: 0070 (7.0 mm) to 9970 (997.0 mm) 5 digits: 00070 (7.0 mm) to 09970 (997.0 mm)</p> <p>dddd: Reserved area (Omissible) Fixed at 4 digits 0300 to 1120</p>

The size varies according to the type of thermal head.

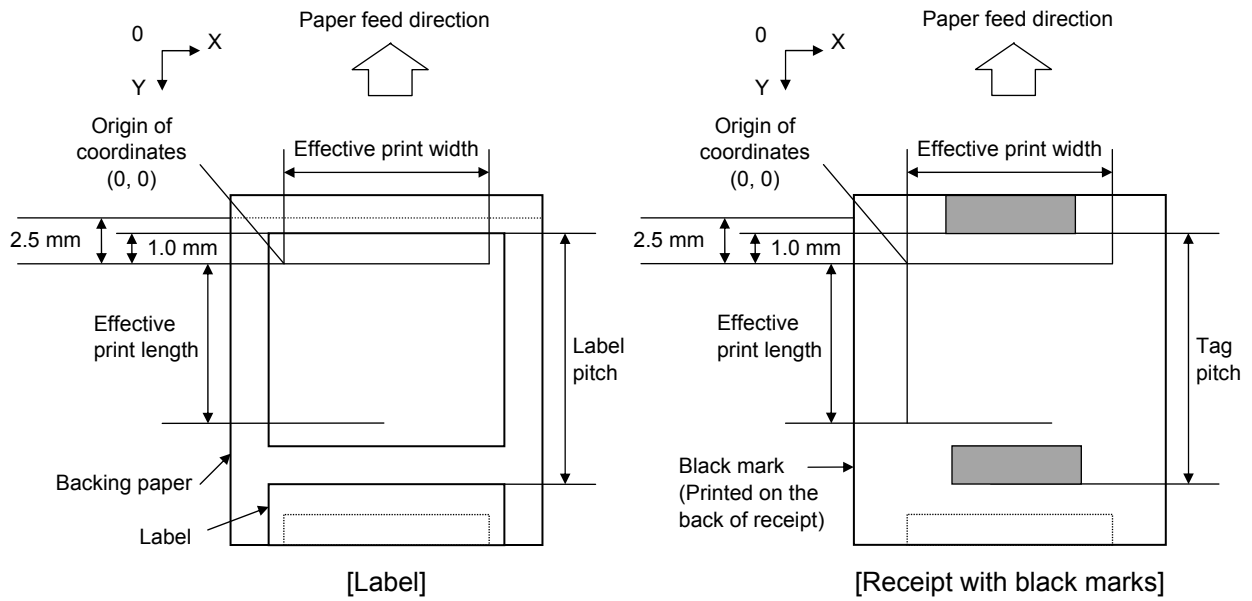
	B-EP2DL-GHxx	B-EP4DL-GHxx
Label pitch/tag pitch	10 x 999.9 mm	10 x 999.9 mm
Effective print width	48.0 mm	104.0 mm
Effective print length	997.0 mm	997.0 mm

Explanation

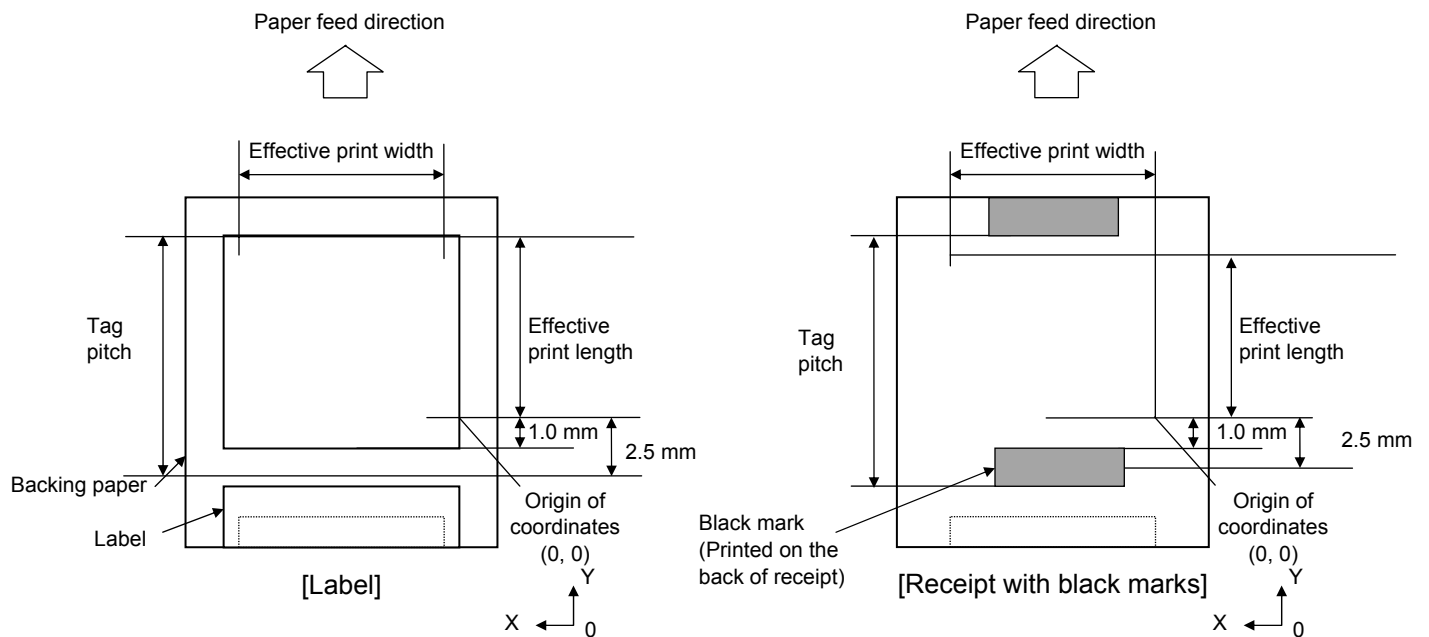
- (1) When the value exceeds the maximum value, it should be changed to the maximum value. When the effective print width exceeds the maximum width of each thermal head, it should be changed to the maximum width of the thermal head.
- (2) When the value is the minimum value or less, it should be changed to the minimum value.
- (3) The reserved area is not checked. However, only the values within the above range should be applied.
- (4) In the compatible mode for the B-SP series, the effective print width is fixed at 48.0 mm.

When the compatible mode for the B-SP series is off

<Top first printing>

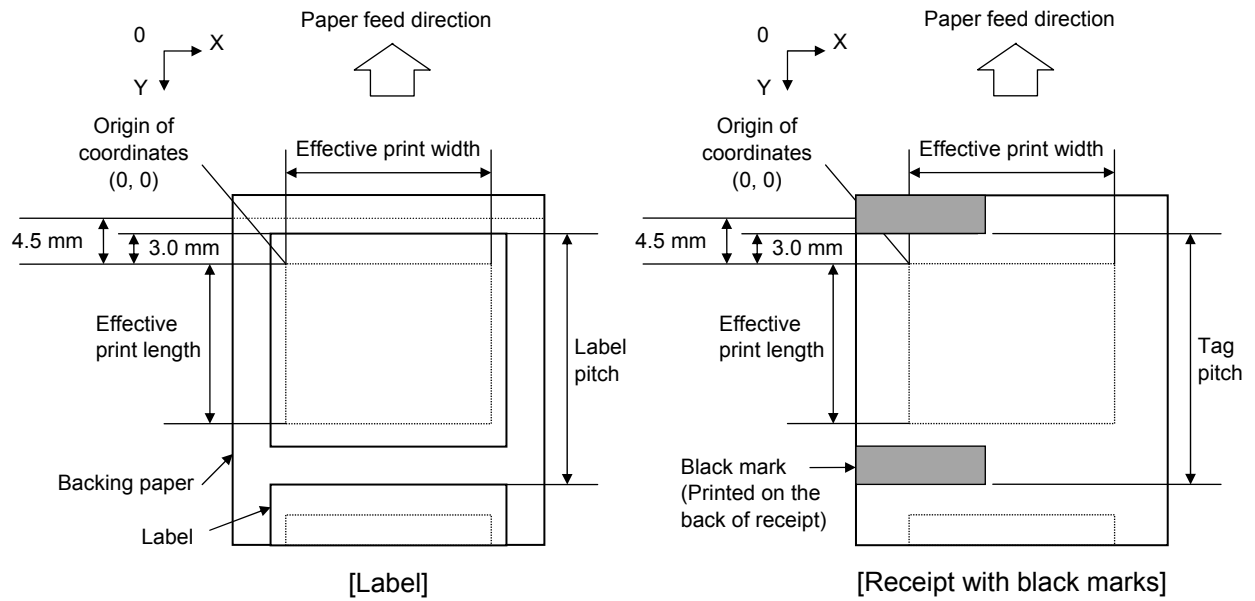


<Bottom first printing>



When the compatible mode for the B-SP series is on

* Top first printing only



Programmable value range by the software

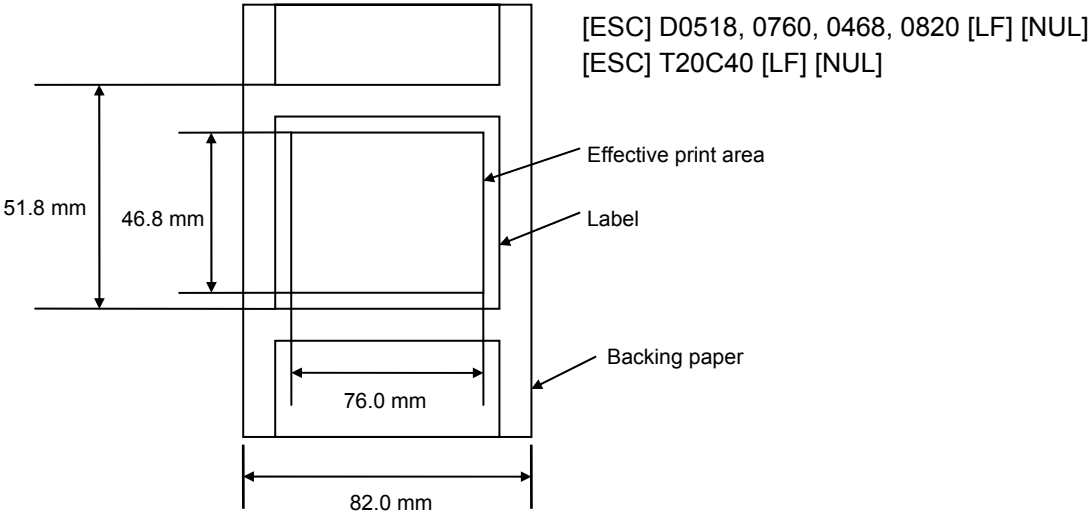
[mm]

Item		Model	B-EP2DL		B-EP4DL	
			203 dpi		203 dpi	
		Mode	Batch	Strip	Batch	Strip
Thermal head dot density			8 dots/mm		8 dots/mm	
Thermal head width			48.0 mm		104.0 mm	
Pitch	Label	Max.	10.0	13.0	10.0	13.0
		Min.	999.9	67.0	999.9	67.0
	Tag	Max.	10.0	-	10.0	-
		Min.	999.9	-	999.9	-
Label length		Max.	7.0	10.0	7.0	10.0
		Min.	997.0	60.0	997.0	60.0
Paper length	Backing paper	Max.	16.0		50.0	
		Min.	58.0		115.0	
	Tag	Max.	16.0	-	50.0	-
		Min.	58.0	-	115.0	-
Label width		Max.	13.0		47.0	
		Min.	55.0		112.0	
Label-to-label gap		Max.	3.0		3.0	
		Min.	7.0		7.0	
Black mark length		Max.	3.0		3.0	
		Min.	7.0		7.0	
Effective print width		Max.	10.0		10.0	
		Min.	48.0		104.0	
Effective print length	Label	Max.	7.0	10.0	7.0	10.0
		Min.	997.0	60.0	997.0	60.0
	Tag	Max.	7.0	-	7.0	-
		Min.	997.0	-	997.0	-
Slow-up/down interval	Slow up		1.0		1.0	
	Slow down		1.0		1.0	
Paper thickness	Label		100 μm to 120 μm			
	Tag		120 μm			
	Receipt		65 μm to 75 μm			
Max. effective print length for on-the-fly issuing			997.0		499.0	

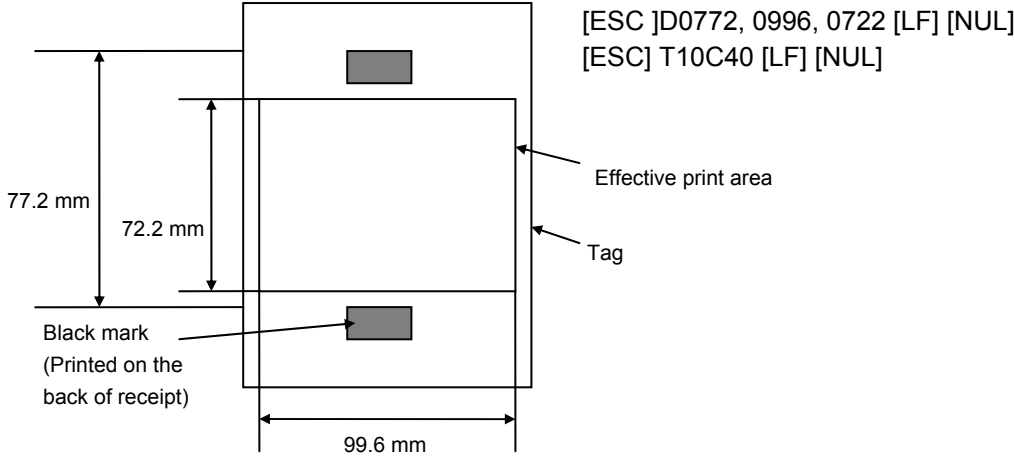
Notes

- (1) When the label size or type of sensor is changed, the Label Size Set Command must first be transmitted.
- (2) The label pitch length is backed up in memory (retained even if the power is turned off).
- (3) After sending the Label Size Set Command, one sheet of paper must be fed by the Feed Command ([ESC] T), to align the paper with the first print position prior to printing.
- (4) The origin of drawing coordinates is determined according to the parameters of the Label Size Set Command as shown in Figure 4.
Refer to PRINT POSITION FINE ADJUST COMMAND for the print stop position in strip issues.
- (5) Printing cannot be performed in the slow up (1 mm) and slow down (1 mm) areas. Consequently, [A: Label, tag pitch] – [H: Effective print length] ≥ 2 mm must be assumed.
- (6) The origin of drawing coordinates and the print stop position (print head position when printing stops) are adjustable by the Fine Adjust Commands and according to the fine adjustment value settings in the SYSTEM mode.
- (7) When label paper is used to align the top first and bottom first print positions, (Effective print length = Label pitch – Gap – 2 mm (slow up (1 mm), slow down (1 mm) areas) should be specified.
- (8) The parameters should be as shown in the figure and table. When any parameter or paper out of the range is specified, printing is not properly performed or an error occurs.
- (9) When a gap or a black mark cannot be detected within less than 150% of the label pitch length, it is assumed to be a paper jam error.
- (10) Even if a gap or a black mark is detected within less than 90% of the effective print length specified by the Label Size Set Command, it is ignored.
- (11) Where the effective print length is specified within the “max. effective print length for on-the-fly issuing,” non-stop batch printing is possible even if the data to be printed is different from each other because printing and drawing of the next label are processed at the same time. [On-the fly issue]
However, printing may stop every label depending on the volume of drawing data.
- (12) After transmitting this command, the image buffer must be cleared using the Image Buffer Clear Command.
- (13) When the print position is changed or the gap between the labels is not 3 mm, the Print Position Fine Adjust Command should be used as required. (When the gap between the labels is 3 mm, the standard print start position is 1 mm from the top of the label. = When the compatible mode for the B-SP series is off.)
(When the gap between the labels is 3 mm, the standard print start position is 3 mm from the top of the label. = When the compatible mode for the B-SP series is on.)

Examples (1) Label



(2) Tag



Refer to • Image Buffer Clear Command ([ESC]C)

5.3.2 PRINTER ID SET COMMAND

[ESC] ID

Function	Sets the ID for the printer.
Format	[ESC] ID ; aa(b) [LF] [NUL]
Term	aa: Printer ID (2-byte hex data) 0000H to FFFFH
	b: Reserved area (Omissible) Fixed at 0.

Explanation

- (1) The printer ID is the information required for the host, such as IrDA: TEC Protocol, to identify each printer.
- (2) When any value other than 0 is specified in the reserved area, an error occurs.

Notes

- (1) The set printer ID is backed up in memory (retained even if the Reset Command ([ESC] WR) is executed or the power is turned off).
- (2) The last 5 digits of the printer's serial number have been set as the printer ID, at the time of shipment from the factory.
- (3) In IrDA: TEC Protocol, the printer checks the set ID against the ID in the received command packet. If they do not match, the printer discards the command packet. However, when the ID in the command packet is "0," the printer accepts the command packet without checking the set IDs.

Example

To set "03H 51H" as the ID of the printer:

[ESC] ID; [03H] [51H] [LF] [NUL]

In this case, the printer ID in status printing is "00849."

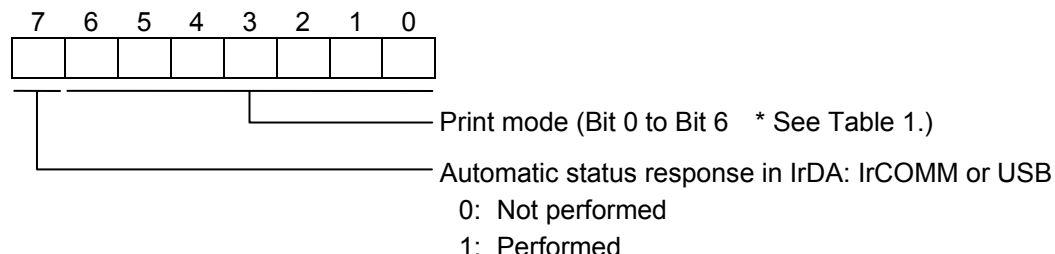
5.3.3 MODE SELECT COMMAND

[ESC] M

Function Changes the print mode.

Format [ESC] M; a (,b) [LF] [NUL]

Term a: Print mode designation



* Table 1 Print mode

HEX	Mode	How to deal with the received data after an error is cleared
30H	LABEL	Discards
31H	RECEIPT	Discards
32H	RECEIPT1	Continues printing
34H	ESC/POS	Continues printing
41H	TPCL	Continues printing
42H	TPCL1	Continues printing

- b: Print position detection feed (Omissible. If omitted, the print position detection feed is not performed.)
- 0: When the mode change from RECEIPT, RECEIPT1 or ESC/POS to LABEL, TPCL or TPCL1 is requested, a print position detection feed is not performed after the mode is changed.
- 1: When the mode change from RECEIPT, RECEIPT1 or ESC/POS to LABEL, TPCL or TPCL1 is requested, a print position detection feed is performed after the mode is changed.

Explanation

- (1) There are 4 types of the print mode: "LABEL," "RECEIPT," "TPCL" and "ESC/POS."
- (2) "Automatic status response in IrDA: IrCOMM" or USB is the function for the specifications which do not allow the printer to spontaneously send the status through IrDA; IrCOMM or USB. This function enables the printer to forcefully send the status to the host, if the link between the printer and the host is established. However, if the link between the printer and the host is not established upon the status transmission, the printer cannot send the status. Therefore, the status is discarded. (In the next connection to the host, the printer does not send the status to the host.)
- (3) The sensor is not used in the RECEIPT, RECEIPT1 or ESC/POS mode. When sensor detectable paper is used for receipts and labels, print position detection feed cannot be done in the LABEL, TPCL or TPCL1 mode. By setting the print position detection feed parameter to 1, print position detection feed is carried out after the mode is changed to LABEL, TPCL or TPCL1.
- (4) In the TPCL1 mode, it is possible to re-print the last print data by pressing the FEED button.

Notes

- (1) The print mode designation (the specified print mode and the automatic status response in IrDA: IrCOMM or USB) is backed up in memory (retained even if the power is turned off).
- (2) The factory default is "TPCL mode" and "Automatic status response in IrDA: IrCOMM or USB is not performed." (The IrDA protocol is "IrCOMM.")
- (3) When the print mode is changed, the type of sensor is automatically changed.

LABEL mode (0):	The previously backed up sensor is designated.
TPCL mode (A):	The previously backed up sensor is designated.
TPCL1 mode (B):	The previously backed up sensor is designated.
RECEIPT mode (1):	No sensor is designated.
RECEIPT1 mode (2):	No sensor is designated.
ESC/POS mode (4):	No sensor is designated.
- (4) If the RECEIPT or ESC/POS mode is selected or no sensor is designated in the LABEL or TPCL mode, an initial feed is not performed when the cover is closed (when the key operation or Set Command ([ESC]ZM03) is used to enable the print position detection feed setting after closing the cover.)
- (5) When the mode change is finished, the printer sends the normal end status or an ACK to the host. However, when the mode is changed to the TPCL mode, the printer does not send the status. In IrDA: IrCOMM or USB, only when bit 7 of the print mode designation is set to "1," the printer sends the status.
- (6) The print mode can be changed by the printer itself. However, since the setting for the automatic status response in IrDA: IrCOMM or USB cannot be changed, the setting remains as the same.
- (7) The print position detection feed is performed according to the conditions, such as, label pitch, fine adjustment, and sensor selection, which were set in the LABEL or TPCL mode before the printer is operated in the RECEIPT, RECEIPT1 or ESC/POS mode. If no sensor is selected, the print position detection feed will not be performed.
- (8) After performing a print position detection feed, the printer does not send a process end status. If an error occurs during the print position detection feed, the print position detection feed is performed after the error is cleared by using the PAUSE key (when the key operation or Set Command ([ESC]ZM03) is used to enable the print position detection feed setting after closing the cover.)
- (9) When changing the print mode by the printer itself, the print position detection feed parameter cannot be set.
- (10) When the mode select command is designated with the print position detection feed at the end of a print data issued in the RECEIPT1 or ESC/POS mode, and if an error occurs while printing, the printing will restart after the error is cleared and then, the print mode will be changed to the LABEL or TPCL mode and a print position detection feed is performed. When the print position detection feed is omitted, the print mode will not be changed to the LABEL or TPCL mode. (The mode select command is discarded.)
- (11) When the LABEL or TPCL mode is selected in the mode select command and the print position detection feed parameter is set 0 (not performed), and if an error occurs while the printer issues in the RECEIPT1 or ESC/POS mode, the print mode is changed to the LABEL or TPCL mode after the error is cleared. (The mode select command is executed.)

5.4 COMMANDS RELATED TO FINE ADJUSTMENT

5.4.1 PRINT START POSITION FINE ADJUST COMMAND [ESC] AX

Function	Adjusts the feed value so that the label will be shifted forward or backward from the automatically positioned print start position.
Format	[ESC] AX; abbb, cddd, eff (, ghhh) [LF] [NUL]
Term	<p>a: Indicates the direction of the print position, forward or backward, in which a fine adjustment is to be made. +: Backward -: Forward</p> <p>bbb: Fine adjustment value for print position 000 to 500 (in 0.1 mm units)</p> <p>c: Indicates the direction of the strip position, forward or backward, in which a fine adjustment is to be made. +: Backward -: Forward</p> <p>ddd: Fine adjustment value for strip position 000 to 030 (in 0.1 mm units) * In - (Forward) a fine adjustment is to be made between 000 and 020.</p> <p>e: Reserved area Fixed at +.</p> <p>ff: Reserved area Fixed at 00.</p> <p>g: Reserved area (Omissible)</p> <p>hhh: Reserved area (Omissible)</p>

[Compatible mode for the B-SP series]

a:	Indicates the direction of the print position, forward or backward, in which a fine adjustment is to be made. +: Backward -: Forward
bbb:	Fine adjustment value for print position 000 to 500 (in 0.1 mm units)
c:	Reserved area Fixed at +.
ddd:	Reserved area Fixed at 000.
e:	Reserved area Fixed at +.
ff:	Reserved area Fixed at 00.

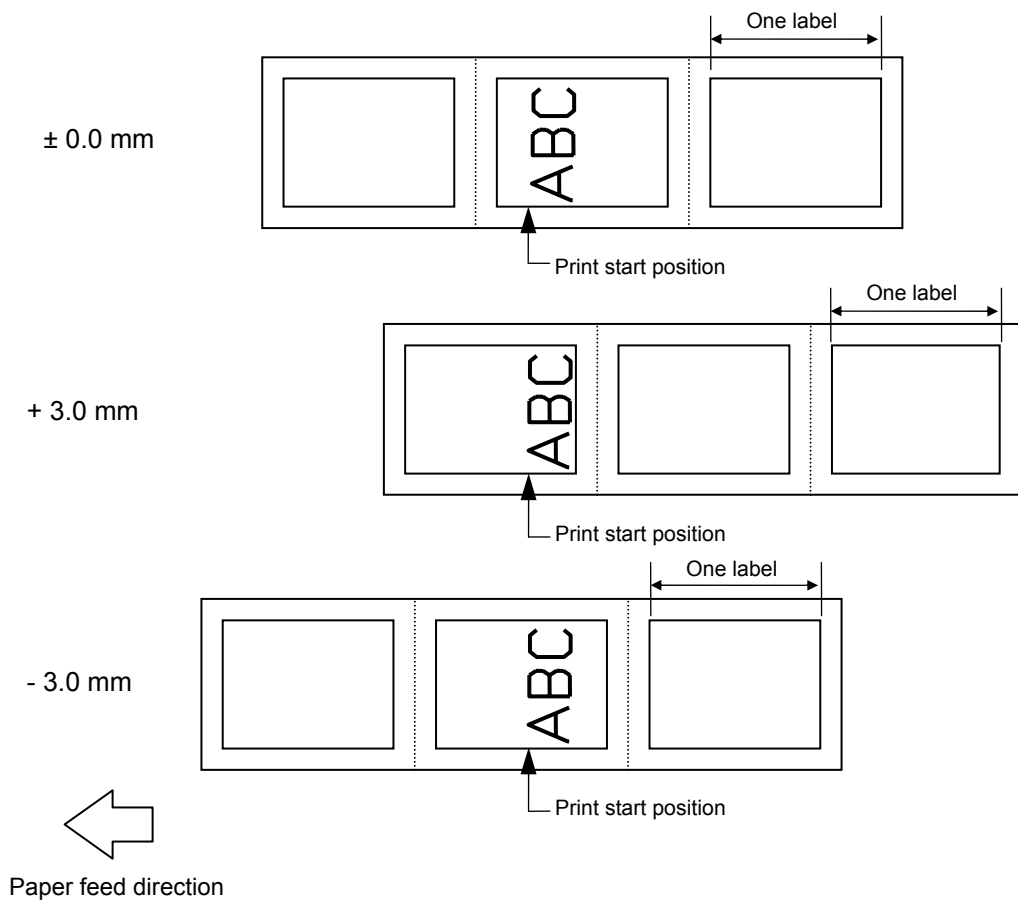
g: Reserved area (Omissible)
hhh: Reserved area (Omissible)

Explanation

- (1) When the parameter “a” is set to any value other than “+” or “-,” a command error occurs.
- (2) If any value out of the above range is specified for the fine adjustment value for print position, a command error occurs.
- (3) When any value above + 10.5 mm (- 1 mm distance between the head and sensor) is specified for the fine adjustment value for print position, it should be changed to + 10.5 mm before printing.
- (4) The reserved area is not checked.
- (5) The fine adjustment value for strip position is valid only when “the compatible mode for the B-SP series” is turned off (disabled) in the SYSTEM mode. When the parameter “a” is set to any value other than “+” or “-,” a command error occurs. When the parameter “a” is set to any value other than “+” or “-,” a command error occurs. When the “compatible mode for the B-SP series” is turned on (enabled), the value is ignored.

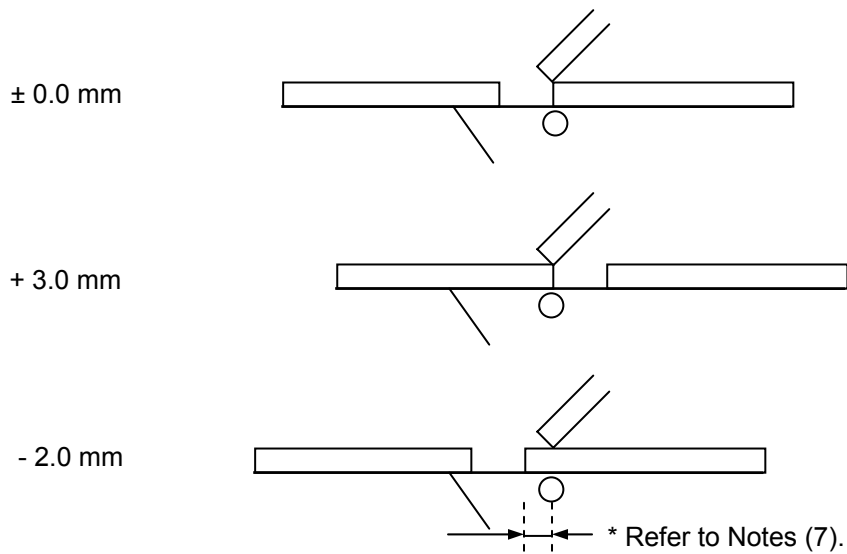
[Print position (feed value) fine adjustment]

(To finely adjust the print position so that it shifts backward or forward)

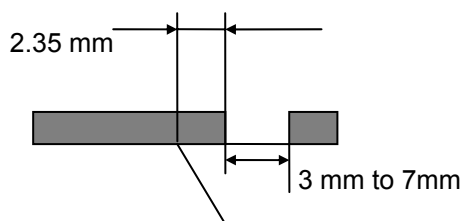
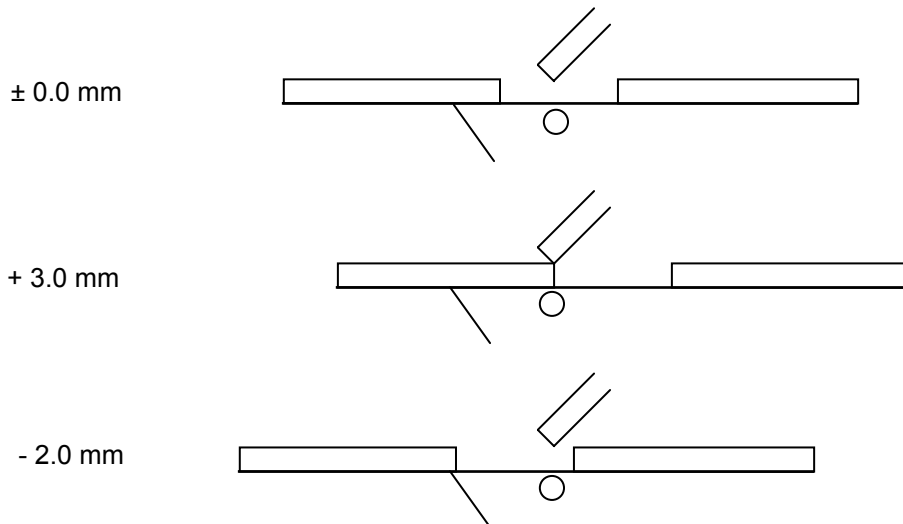


[Strip position fine adjustment]

When the label-to-label gap is 3 mm,



When the label-to-label gap is 7 mm,



- In strip issue mode, a label is stopped at the position where the distance between the leading edge of the strip shaft and the trailing edge of the label is 2.35 mm, regardless of the label-to-label gap. However, only when the fine adjustment value for print position is not selected (up to V1.0C).
- When the stop position is not proper, it should be adjusted using the strip position fine adjustment function.

Notes

- (1) The fine adjustment values are backed up in memory (retained even if the power is turned off).
- (2) The factory default value is 0.0 mm.
- (3) The fine adjustment values (print position, strip position) changed by the Print Position Fine Adjust Command in the LABEL mode, are also effective in the TPCL mode.
- (4) When print position and strip position fine adjustment is selected in the SYSTEM mode (through key operations on the printer), the fine adjustment value is a sum of the value in the fine adjustment command and the system mode fine adjustment value.

Note that the maximum fine adjustment value is as follows:

Print position fine adjustment:	± 50.0 mm
Strip position fine adjustment:	- 2.0 mm to + 3.0 mm

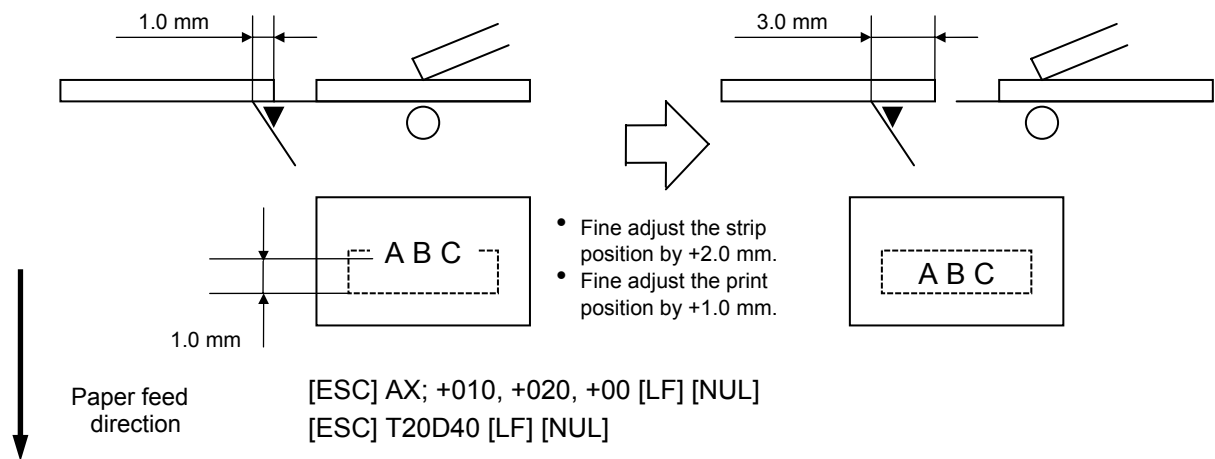
When the sum of the values exceeds ± 50.0 mm, the fine adjustment value for print position should be changed to ± 50.0 mm before printing.

When the sum of the values exceeds + 3.0 mm in the positive direction or falls below - 2.0 mm in the negative direction, the fine adjustment value for strip position should be changed to + 3.0 mm or - 2.0 mm before printing.

- (5) The fine adjustment for strip position is effective only in strip issues.
- (6) The fine adjustment value for strip position up to V1.0C is valid only when the fine adjustment value for print position is not selected (fine adjustment value = 0).
- (7) The fine adjustment value for strip position is selected in the negative direction, a label is stopped backward against the print start position. However, the print start position is misaligned by the set value because no back feed is performed in strip issue mode. (When the label-to-label gap is less than 5 mm) * Refer to the arrows for - 2.0 mm when the label-to-label gap is 3 mm in P.5-15.
- (8) When the label pitch length is 20.0 mm or more but less than 24.0 mm and the effective print length is 15.0 mm or more or the label pitch length is 24.0 mm or more, a back feed is performed before printing.

Examples

Strip issue



5.4.2 PRINT DENSITY FINE ADJUST COMMAND

[ESC] AY

Function	Adjusts the print density which was automatically set.
Format	[ESC] AY ; abb, c (, d) [LF] [NUL]
Term	<p>a: Indicates whether to increase or decrease the density +: Increase (darker) -: Decrease (lighter)</p> <p>bb: Fine adjustment value for print density 00 to 30 (in units of 1 step)</p> <p>c: Print mode 0: Reserved 1: Direct thermal</p> <p>d: Head output division designation (Omissible. If omitted, the backed up setting in memory is used.) 2-inch head width 0: Auto (Divided by 2 or 3) 1: Reserved (If specified, auto (Divided by 2 or 3)) 2: Fixed at Divided by 3 3: Auto1 (Not divided/Divided by 2 or 3)/Print quality oriented 4: Reserved (If specified, fixed at Divided by 3) 5: Auto2 (Not divided/Divided by 2 or 3)/Print speed oriented (supported in V1.0E or later)</p> <p>4-inch head width 0: Auto (Divided by 2, 3 or 6) 1: Reserved (If specified, auto (Divided by 2, 3 or 6)) 2: Reserved (If specified, auto (Divided by 2, 3 or 6)) 3: Auto1 (Not divided/Divided by 2, 3 or 6) 4: Fixed at Divided by 6</p>

Explanation

- (1) The standard density is finely adjusted to increase or decrease.
- (2) When any fine adjustment value for print density out of the range is set, a command error occurs.
- (3) If the print mode is set to any value other than "1: Direct thermal," it should be changed to "1."
- (4) The default value for the head output division designation is "3: Auto1 (Not divided, Divided by 2 or 3)" when the 2-inch print head is used and "3: Auto1 (Not divided, Divided by 2, 3 or 6)" when the 4-inch print head is used.
- (5) When "0: Auto" is designated for the 2-inch print head, "Divided by 3" or "Divided by 2" is automatically selected for every line according to the print ratio. The width of half a dot may not be printed on the line when switching between "Divided by 2" and "Divided by 3." Therefore, do not designate "0: Auto" when a serial barcode is printed.
- (6) When "3: Auto1" or "5: Auto2" is designated for the 2-inch print head, "Not divided," "Divided by 3" or "Divided by 2" is automatically selected for every line according to the print ratio. The width of half a dot may not be printed on the line when switching among "Not divided," "Divided by 2" and "Divided by 3." Therefore, do not designate "3: Auto1" or "5: Auto2" when a serial barcode is printed.

The difference between Auto1 and Auto2 is while Auto1 is print quality oriented, Auto2 is print speed oriented. Auto2 is designated to increase the print speed although the print is slightly faded.

- (7) When "0: Auto" is designated for the 4-inch print head, "Divided by 6," "Divided by 3" or "Divided by 2" is automatically selected for every line according to the print ratio. The width of half a dot may not be printed on the line when switching among "Divided by 2," "Divided by 3" and "Divided by 6." Therefore, do not designate "0: Auto" when a serial barcode is printed.
- (8) When "3: Auto1" is designated for the 4-inch print head, "Not divided," "Divided by 6," "Divided by 3" or "Divided by 2" is automatically selected for every line according to the print ratio. The width of half a dot may not be printed on the line when switching among "Not divided," "Divided by 2" and "Divided by 3" and "Divided by 6." Therefore, do not designate "3: Auto1" when a serial barcode is printed.

Notes

- (1) The set fine adjustment value for print density and the head output division designation are backed up in memory (retained even if the power is turned off).
- (2) The fine adjustment values changed by the Print Density Fine Adjust Command in the TPCL mode, are also effective in the LABEL, RECEIPT or ESC/POS mode.
- (3) When the head output division designation is omitted, the backed up value in memory is used.
- (4) When print density fine adjustment is selected in the SYSTEM mode (through key operations on the printer), the fine adjustment value is a sum of the value in the fine adjustment command and the system mode fine adjustment value. Note that the maximum fine adjustment value is ± 30.0 mm

Examples

To set the density to - 2:

[ESC] AY; -02, 1 [LF] [NUL]

To set the density to + 3:

[ESC] AY; +03, 1 [LF] [NUL]

5.4.3 STRIP SENSOR ADJUST COMMAND

[ESC] AH

Function	Sets the sensor threshold value to switch the mode between strip and batch.
Format	[ESC] AH; a [LF] [NUL]
Term	a: Setting 0: Operation in conformance with the strip sensor 1: Operation in conformance with the strip sensor 2: Fixed at the batch mode 3: Fixed at the strip mode 4: Reserved

Notes	<ol style="list-style-type: none"> (1) The set parameter is backed up and kept until a parameter is set using this command. When the power is turned on, the backed up value is retrieved and set (2) "0: Operation in conformance with the strip sensor" has been set as the default at the time of shipment from the factory. (3) When either "2: Fixed at the batch mode" or "3: Fixed at the strip mode" for parameter "a," is selected, the printer operates in the specified mode, without automatically switching between the batch and strip modes. (4) When "4: Reserved" for parameter "a" is selected, this command is ignored.
-------	--

5.5 COMMANDS RELATED TO CLEAR

5.5.1 IMAGE BUFFER CLEAR COMMAND

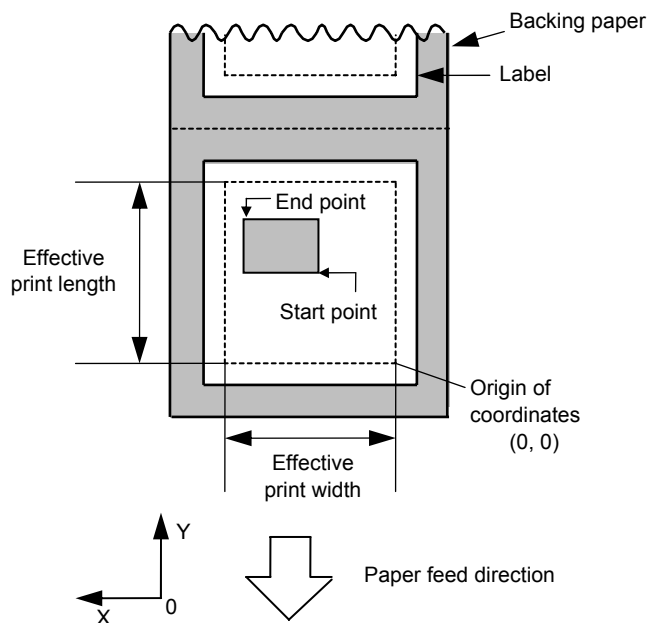
[ESC] C

Function	Clears the image buffer for drawing characters, lines, barcodes, and graphics.
Format	[ESC] C [LF] [NUL]
Explanation	<ol style="list-style-type: none">(1) After changing the label size using the Label Size Set Command ([ESC] D), the image buffer must be cleared using this command. (Unless this command is transmitted, the data drawn before changing the label size remains in the image buffer.)(2) The increment/decrement designation is effective until the Image Buffer Clear Command is transmitted.(3) The link field designation is effective until the Image Buffer Clear Command is transmitted.
Examples	<pre>[ESC] D0508, 0760, 0468 [LF] [NUL] [ESC] T20C41 [LF] [NUL] [ESC] C [LF] [NUL] [ESC] PC000; 0080, 0065, 1, 1, A, +00, 00, B, J0000, M0, +0000000000, Z00, P1 [LF] [NUL] [ESC] PC001; 0250, 0150, 1, 1, G, +00, 00, B, J0000, M0, +0000000000, Z00, P1 [LF] [NUL] [ESC] RC000; ABC [LF] [NUL] [ESC] RC001; DEF [LF] [NUL] [ESC] XS; I, 0001, 0002C1000 [LF] [NUL]</pre>

5.5.2 CLEAR AREA COMMAND

[ESC] XR

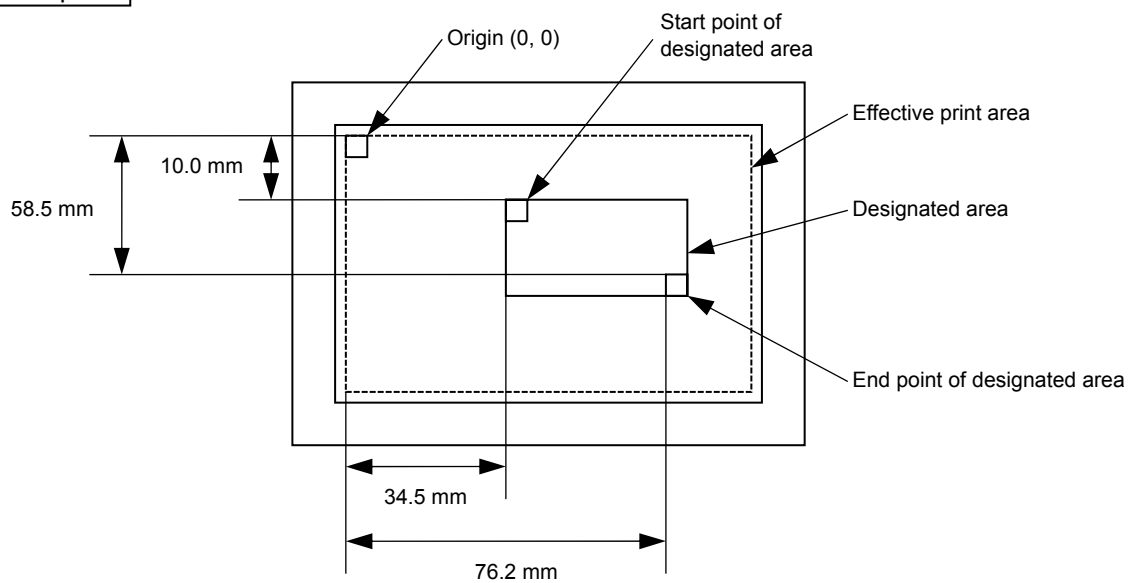
Function	Clears the designated area or reverses the white/black dot pattern in the designated area in the drawing area.
Format	[ESC] XR; aaaa, bbbb, cccc, dddd, e [LF] [NUL]
Term	<p>aaaa: X-coordinate of the designated area start point Fixed at 4 digits (in 0.1 mm units)</p> <p>bbbb: Y-coordinate of the designated area start point 4 or 5 digits (in 0.1 mm units)</p> <p>cccc: X-coordinate of the designated area end point Fixed at 4 digits (in 0.1 mm units)</p> <p>dddd: Y-coordinate of the designated area end point 4 or 5 digits (in 0.1 mm units)</p> <p>e: Type of how to clear A: Clears the contents in the designated area to zeros. B: Reverses the white/black dot pattern in the designated area.</p>
Explanation	



Notes

- (1) The result is the same even if the start and end point coordinates are reversed.
- (2) The result is the same even if the start point is set to the upper right and the end point is set to the lower left, respectively.
- (3) The start and end point coordinates of the designated area must be set within the effective print area set by the Label Size Set Command ([ESC] D).
- (4) Only numerals are available in the coordinate input area.
- (5) When any type other than A and B is selected for how to clear, an error occurs.
- (6) If the print ratio of one line (the print head width) is higher than defined, printing may become poor, or the printer may reset. When "Reverses the white/black dot pattern in the designated area" is selected for how to clear and the black dot pattern is increased, be careful about the print ratio.

Examples



```
[ESC] XR; 0345, 0100, 0762, 0585, A [LF] [NUL]
[ESC] XS; I, 0001, 0002C4000 [LF] [NUL]
```

5.6 COMMANDS RELATED TO DRAWING FORMAT

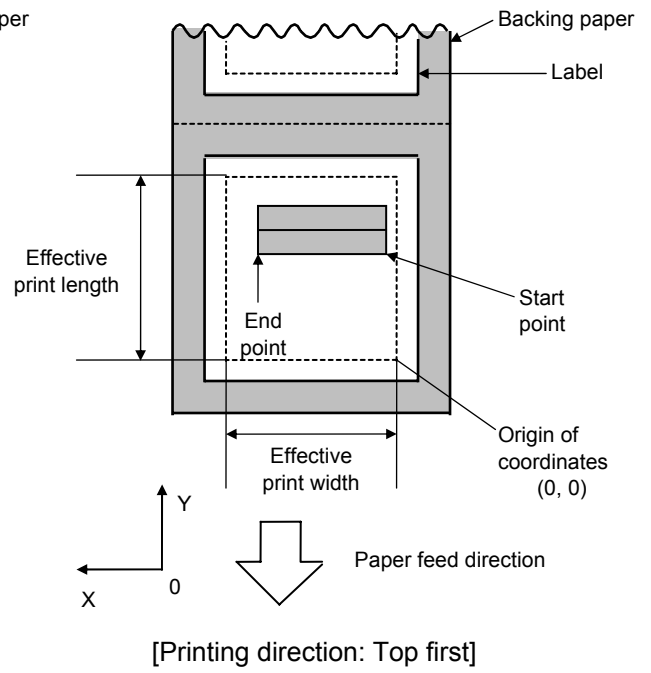
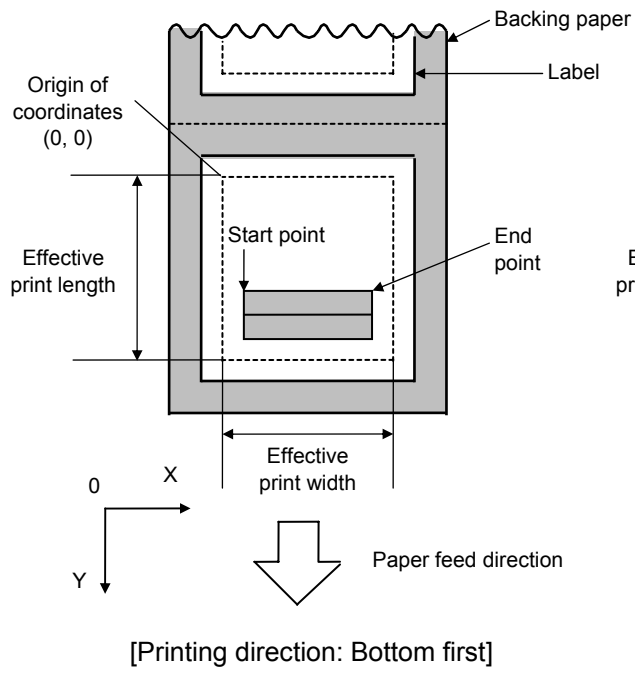
5.6.1 LINE FORMAT COMMAND

[ESC] LC

Function	Sets the line format and draws the line.
Format	[ESC] LC; aaaa, bbbb, cccc, dddd, e, f (, ggg) [LF] [NUL]
Term	<p>aaaa: X-coordinate of the start point Fixed at 4 digits (in 0.1 mm units)</p> <p>bbbb: Y-coordinate of the start point 4 or 5 digits (in 0.1 mm units)</p> <p>cccc: X-coordinate of the end point Fixed at 4 digits (in 0.1 mm units)</p> <p>dddd: Y-coordinate of the end point 4 or 5 digits (in 0.1 mm units)</p> <p>e: Type of line 0: Line (horizontal, vertical) 1: Rectangle 2: Line with dots skipped (horizontal line, vertical line) * Reserved in the case of the compatible mode for the B-SP series (If specified, it is processed as "0.") 3: Rectangle with dots skipped * Reserved in the case of the compatible mode for the B-SP series (If specified, it is processed as "1.") 4: Reserved (If specified, it is processed as "1.") 5: Reserved (If specified, it is processed as "0.") 6: Reserved (If specified, it is processed as "1.")</p> <p>f: No. of line width dots 1 to 9 or 01 to 99 (in 0.1 mm units)</p> <p>ggg: Radius of rounded corners of a rectangle (Omissible. If omitted, the chamfering process for rectangle corners is not performed.) Fixed at 3 digits (in 0.1 mm units) * Reserved in the case of the compatible mode for the B-SP series</p>

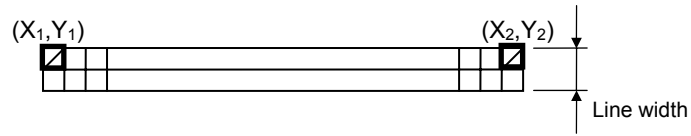
Explanation

- (1) When the set values for the X- and Y- coordinates of the start point and X- and Y- coordinates of the end point are not within the image (frame) buffer, the line is not drawn.
- (2) When the type of line is set to any value other than the range from 0 to 6, a command error occurs.
- (3) When the number of line width dots is set to "0," a command error occurs.
- (4) The reserved parameter (omissible) is not performed.
- (5) If the print ratio of one line (the print head width) is higher than defined, printing may become poor, or the printer may be reset. When a horizontal line is printed, be careful about the print ratio.

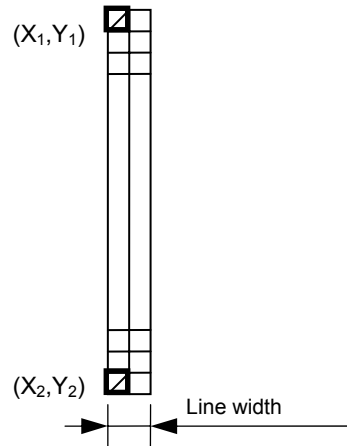


[Line]

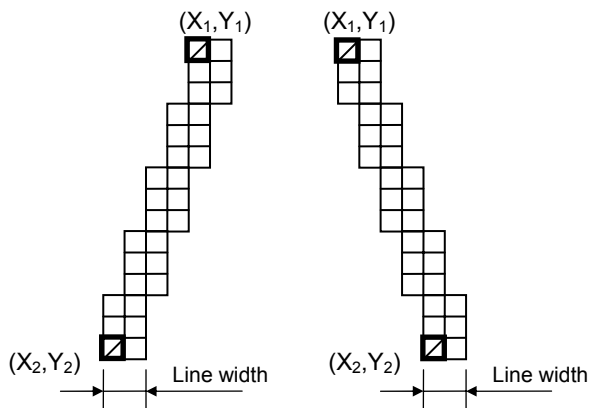
- (1) Horizontal line (In the case of $|Y_2 - Y_1| = 0$)



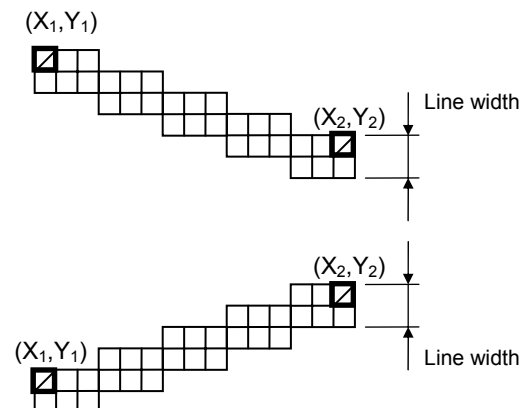
- (2) Vertical line (In the case of $|X_2 - X_1| = 0$)



- (3) Slant line A ($|X_2 - X_1| \leq |Y_2 - Y_1|$)

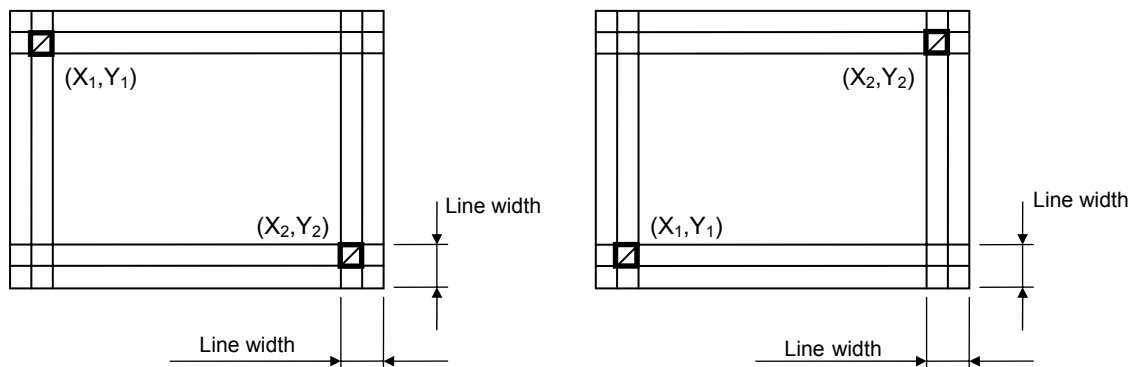


- (4) Slant line B ($|X_2 - X_1| > |Y_2 - Y_1|$)

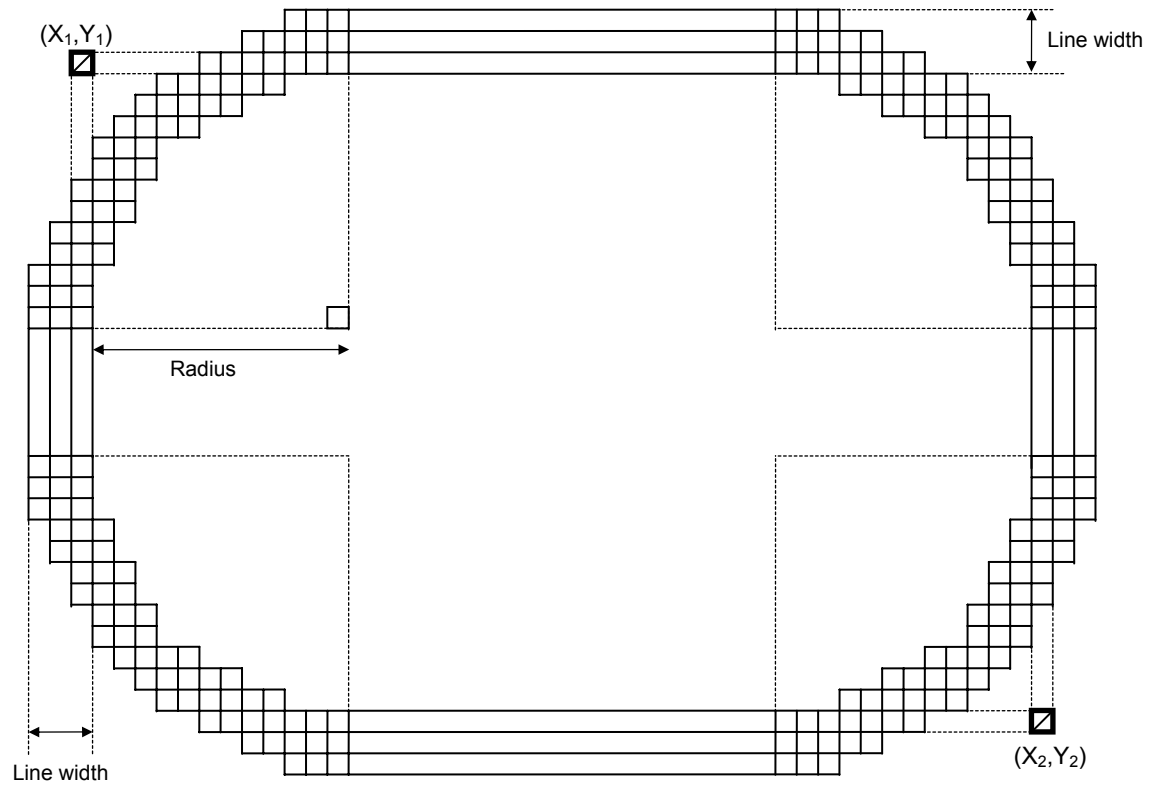


[Rectangle]

- (1) Radius of rounded corners = 000, or parameter is omitted

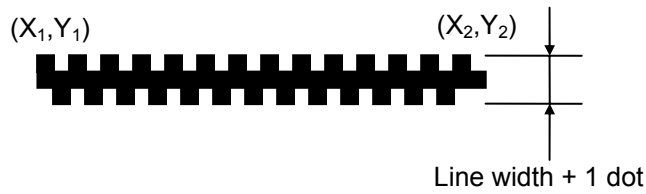


(2) Radius of rounded corners $\neq 000$



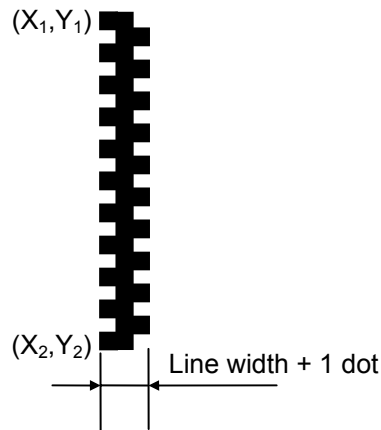
[Line with some dots skipped]

- (1) Horizontal line



Dots are skipped at the top and bottom areas only, which means that the thicker the line width is, the thicker the middle area of the line is.

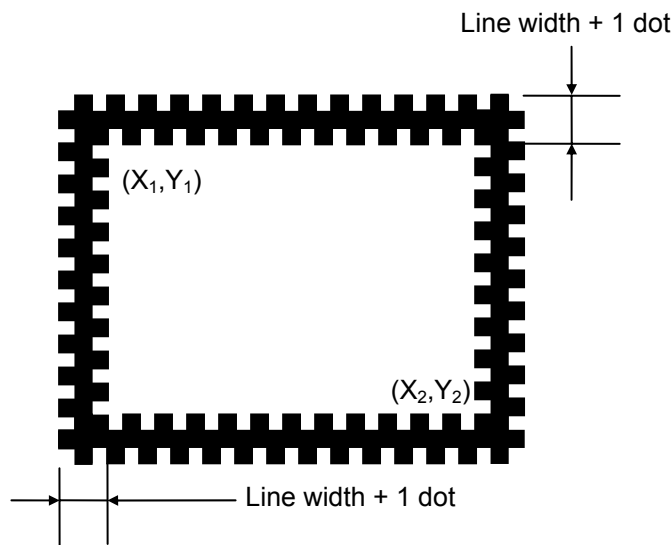
- (2) Vertical line



Dots are skipped at the leftmost and rightmost areas only, which means that the thicker the line width is, the thicker the middle area of the line is.

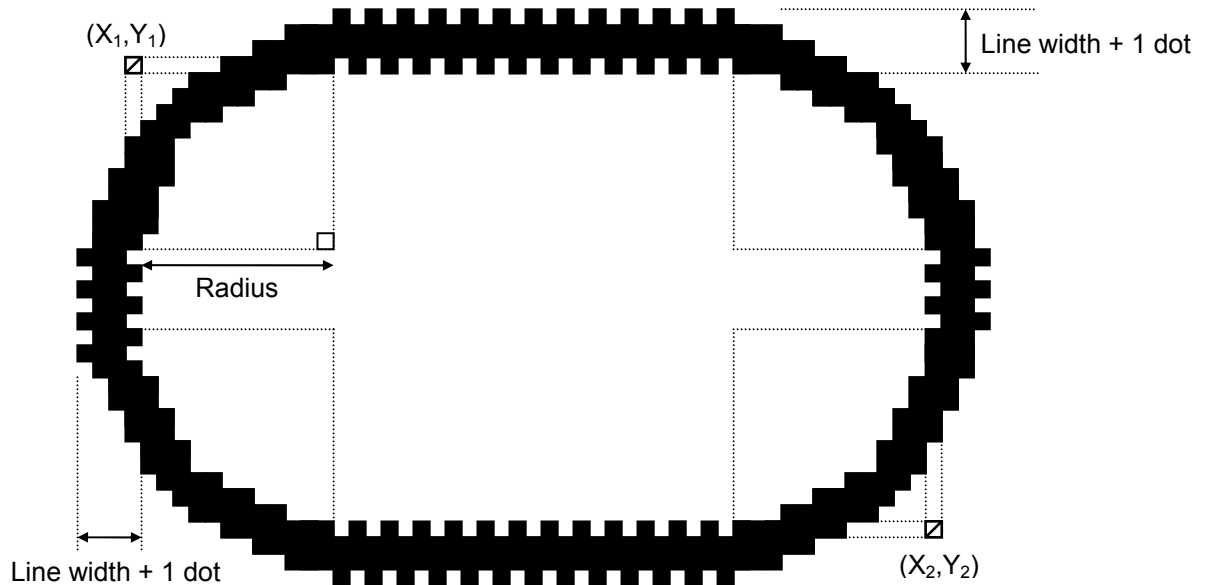
[Rectangle]

- (1) Radius of rounded corners = 000, or parameter is omitted



Dots are skipped at the top, bottom, leftmost and rightmost areas only, which means that the thicker the line width is, the thicker the middle area of the line is.

(2) Rounded corners of a rectangle ≠ 000



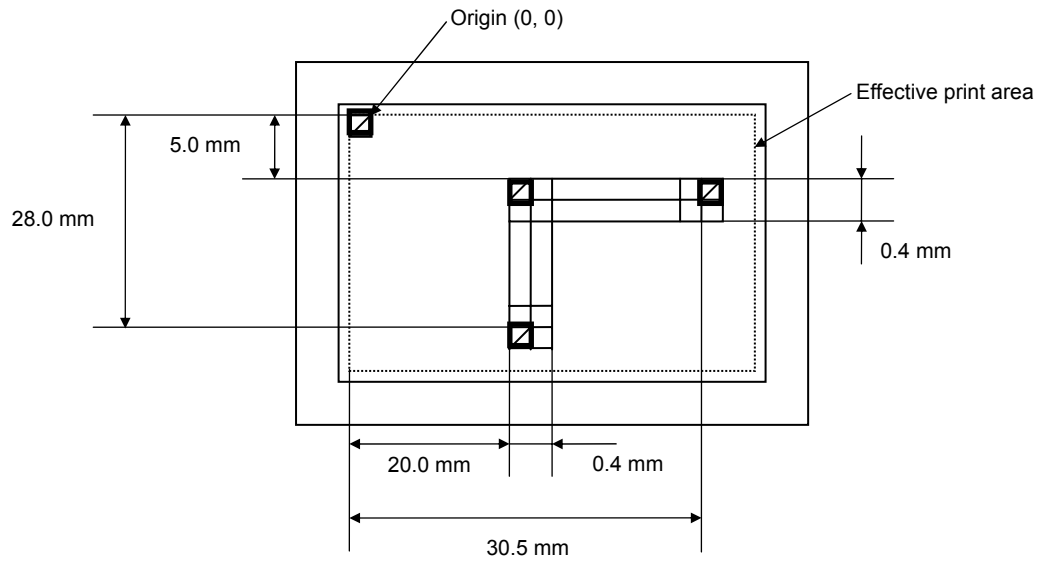
Notes

- (1) In line designation, a horizontal line, vertical line, or slant line A or B is drawn according to the start and end point coordinates. However, in the case of the compatible mode for the B-SP series, when the coordinates which make a slanted line are specified, a rectangle is drawn.
- (2) The result is the same even if the start and end point coordinates are reversed.
- (3) The start and end point coordinates must be set so that the result of line drawing will be within the effective print area set by the Label Size Set Command ([ESC] D).
- (4) Designation of the radius of the rounded corner is effective only when the type of line is set to 1 (rectangle) or 3 (rectangle with dots skipped). When the type of line is set to 0 or 2, designation of the radius is ignored.
- (5) When the type of line is set to 1 or 3 and the radius of the rounded corner is set to 000 or omitted, a normal rectangle is drawn.
- (6) On the following condition, a circle is supposed to be drawn:

$$\frac{|X_2 - X_1|}{2} = \frac{|Y_2 - Y_1|}{2} \leq [\text{Radius of rounded corners}]$$

- (7) Only numerals are available in the coordinate input area.

Example



```
[ESC] C [LF] [NUL]
[ESC] LC; 0200, 0050, 0305, 0050, 0, 4 [LF] [NUL]
[ESC] LC; 0200, 0050, 0200, 0280, 0, 4 [LF] [NUL]
[ESC] XS; I, 0001, 0002C4000 [LF] [NUL]
```

[ESC] PC

5-32

M:	Presentation (Bold)	27 points
N:	Letter Gothic (Medium)	14.3 points
O:	Prestige Elite (Medium)	10.5 points
P:	Prestige Elite (Bold)	15 points
Q:	Courier (Medium)	15 points
R:	Courier (Bold)	18 points
S:	OCR-A	12 points
T:	OCR-B	12 points
U (a):	Kanji	(16 × 16 dots) Writable character 41
V (a):	Kanji	(24 × 24 dots) Writable character 42
W (a):	Reserved	
a:	Standard character	(12 × 24 dots)
b:	Bold character	(48 × 96 dots)
c:	Reserved)	
d:	Price Font 1	(16 × 40 dots)
e:	Price Font 2	(32 × 48 dots)
f:	Reserved	
g:	Reserved	
h:	Reserved	
i:	Reserved	
j:	Reserved	
k:	Reserved	
l:	Reserved	
m:	Reserved	
n:	Reserved	
o:	Gothic725 Black	6 points
p:	Reserved	
q:	Gothic725 Black	6 points
r:	Chinese	(24 × 24 dots) Writable character 42
s:	Korean	(24 × 24 dots) Writable character 42
t:	Reserved	
u:	Reserved	
v:	Reserved	
w:	Kanji (Ming type)	(32 × 32 dots) Writable character 43
01 (a):	Writable character 1 (1 × 1 dot to 720 × 720 dots)	
	⇕	
40 (a):	Writable character 40 (1 × 1 dot to 720 × 720 dots)	
51 (a):	2-byte code set writable character (1 × 1 dot to 720 × 720 dots)	
52 (a):	Reserved	
	⇕	
55 (a):	Reserved	
	a: Reserved area 0 to 2 (Omissible)	
	* The following fonts are proportional.	
	A, B, C, D, E, F, G, H, I, J, K, L, o, q	
ghh:	Fine adjustment of character-to-character space	
	(Omissible. If omitted, space is adjusted according to the designated font.)	
	g: Designates whether to increase or decrease the character-to-character space.	
	+: Increase	
	-: Decrease	
hh:	No. of space dots between characters	

00 to 99 (in units of dots)

ii: Rotational angles of a character and character string

00:	0° (char.)	0° (char.-string)	} Font types: U, V, r and w only
11:	90° (char.)	90° (char.-string)	
22:	180° (char.)	180° (char.-string)	
33:	270° (char.)	270° (char.-string)	
01:	0° (char.)	90° (char.-string)	
12:	90° (char.)	180° (char.-string)	
23:	180° (char.)	270° (char.-string)	}
30:	270° (char.)	0° (char.-string)	

j: Character attribution

B: Black character

W (aabb): Reverse character

aa: No. of dots from the character string to the end of the black background in the horizontal direction

bb: No. of dots from the character string to the end of the black background in the vertical direction

aa: 01 to 99 (in units of dots)

bb: 01 to 99 (in units of dots)

F (aabb): Boxed character

aa: No. of dots from the character string to the box in the horizontal direction

bb: No. of dots from the character string to the box in the vertical direction

aa: 01 to 99 (in units of dots)

bb: 01 to 99 (in units of dots)

* Reserved in the case of the compatible mode for the B-SP series
(If specified, it is processed as "B.")

C (aa): Strike-through character

aa: No. of dots from the character string to the end of a strike-through in the horizontal direction

aa: 01 to 99 (in units of dots)

* Reserved in the case of the compatible mode for the B-SP series
(If specified, it is processed as "B.")

* Descriptions in parentheses are omissible.

(If omitted, it is character magnification (horizontal or vertical magnifications, whichever is larger) × 6 dots.)

Jkkll: Bold character designation

(Omissible. If omitted, this process is not performed.)

kk: No. of horizontal shift dots

00 to 16 (in units of dots)

ll: No. of vertical shift dots

00 to 16 (in units of dots)

* Reserved in the case of the compatible mode for the B-SP series

Mm: Type of check digits to be attached
(Omissible. If omitted, no check digit is drawn.)
m: Type of check digit
0: Modulus 10 (draws data and check digit.)
1: Modulus 43 (draws data and check digit.)
2: DBP Modulus 10 (Draws check digit only.)

* Reserved in the case of the compatible mode for the B-SP series

nooooooooo: Increment and decrement
(Omissible. If omitted, increment/decrement is not performed.)
n: Designates whether to increment or decrement.
+: Increment
-: Decrement

oooooooooooo: Skip value
0000000000 to 9999999999

Zpp: Zero suppress (Omissible. If omitted, zero suppression is not performed.)
pp: No. of digits after zero suppression
00 to 20

* Reserved in the case of the compatible mode for the B-SP series

Pq: Alignment (Omissible. If omitted, the alignment is set to the left.)
q: Designates the character position
1: Left
2: Center
3: Right
4aaaa: Justification
aaaa: Character string in the X direction
0050 to 1040 (in 0.1 mm units)
5aaaabbbcc: Automatic line feed
aaaa: Character string in the X direction
0050 to 1040 (in 0.1 mm units)
bbb: Line feed spacing
010 to 500 (in 0.1 mm units)
cc: No. of lines
01 to 99

rrr ----- rrr: Data string to be printed (Omissible)
Max. 255 digits

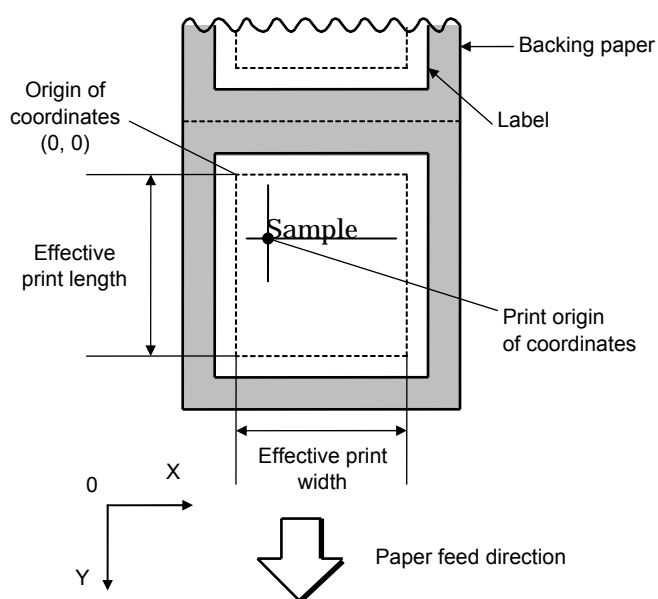
ss₁, ss₂, ss₃ -----, ss₂₀: Link field No. (Omissible)
01 to 99 (1 to 99 can also be used.)
Up to 20 fields can be designated using commas.

Explanation

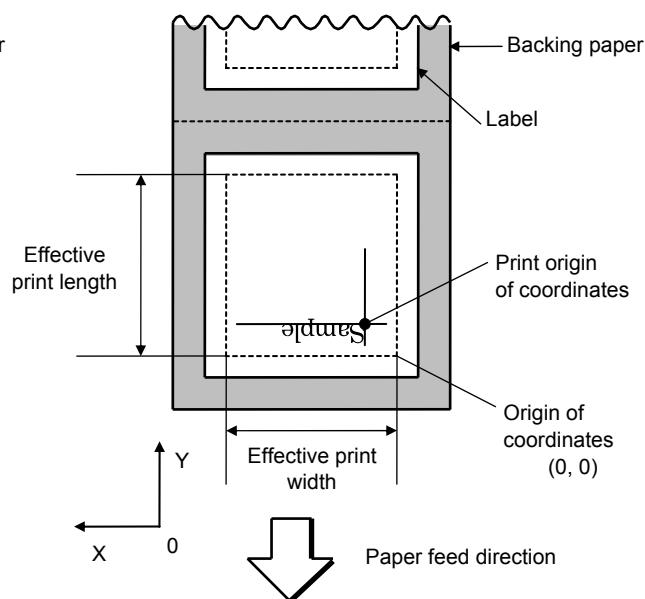
(1) Character string number

When drawing by the Data Command ([ESC] RC), the format designated by the character string number is selected.

(2) Print origin of coordinates



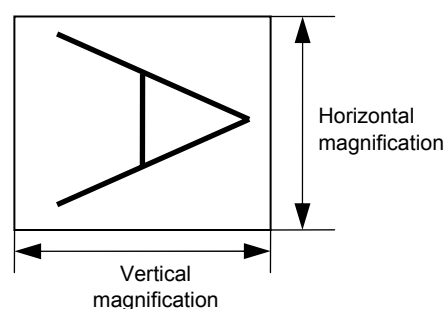
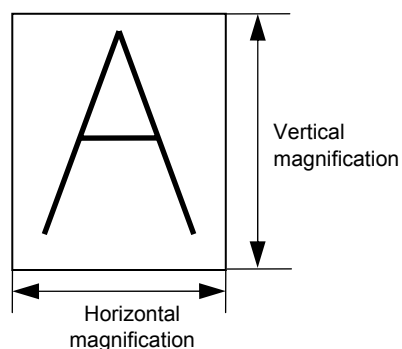
[Printing direction: Bottom first]



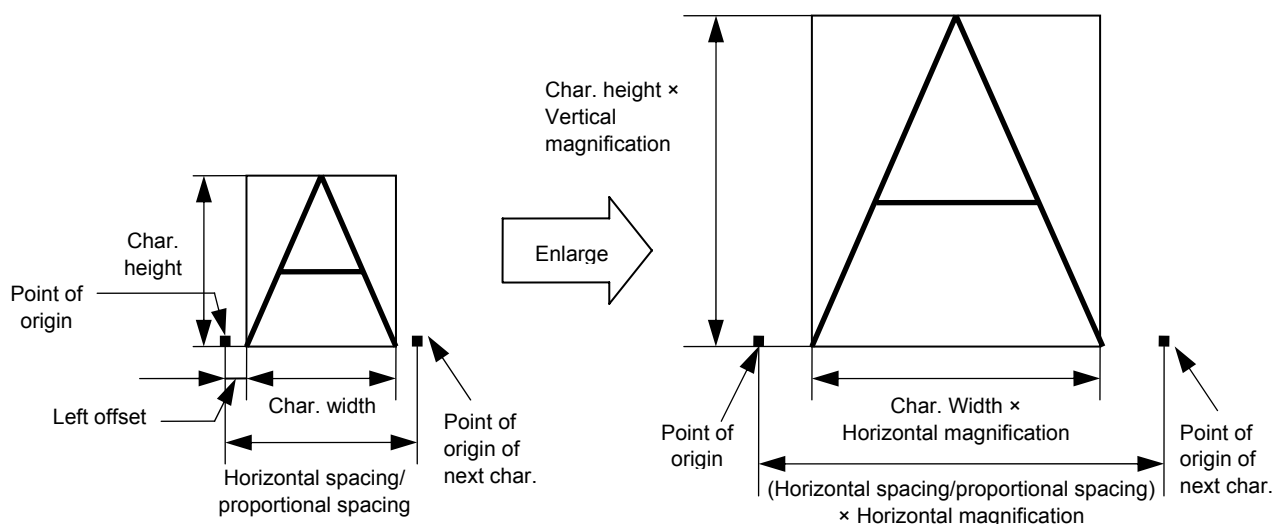
[Printing direction: Top first]

The print origin of coordinates must be set so that the character drawing result will be within the effective print area set by the Label Size Set Command ([ESC] D).

(3) Horizontal magnification and vertical magnification



[Relationship between drawing coordinates and magnification]



(4) Type of font

A: Times Roman !"#\$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMabcdefghijklmÂËÏÐÑÒÓÔÕÖ

B: Times Roman !"#\$%&'()*+,-./0123456789::<=>?@ABCDEFGHabcdefghiœø/Æà/Æ

C: Times Roman !"#\$%&'()*+,-./0123456789::<=>?@ABCDEFGHabcdefghiÀÏØ/Æà/Æ

D: Times Roman !"#\$%&'()*+,-./0123456789:;<=>?@ABCDEFGHabcdefghÏØÆðÆ

E: Times Roman !"#\$%&'()*+,-./0123456789@ABCDEFGHIJabcdefghËîøÆà/Æ

F: Times Roman !"#\$%&'()*+,-./0123456789@ABCDEFGHIJabcdefghÿÀáÂÃÄÅ

G: Helvetica

H: Helvetica | " # \$ % & ' () * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F G H a b c d e f g h Å ä Ö Æ à ã

I: Helvetica !"#\$%&'()*+,-./0123456789@ABCDEFGHIJKLMNabcdefghijklmnoÀÂÃÄÅÆÇÈÉÊË

J: Helvetica !"#\$%&'()*+,-./0123456789@ABCDEFGHIJabcdefghiÿøœàâæ

K: Helvetica !"#\$%&0123456789@ABCDEFGHIJKLMNOPQRSTUVWXYZÅÂÏÆàâ/Æ

L: Helvetica !"#\$%&'()*+,-./0123456789@ABCDEFGHIHabcdeÅîØÆàìÆ

M: Presentation **!"#\$%&0123456789@ABCDEFGHIJKLMNO**

N: Letter Gothic

[illegible]

P: Prestige Elite !"#%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJabcdefghîðëåìø

Q: Courier !"#\$%&'()*+,-./0123456789:;<=>@ABCDEFGHIJabcdefghiœfaïœ

R: Courier !"#\$%&'()*+,-./0123456789@ABCDEabcdeAïOèAïE

S: OCR-A ! " # \$ % & ' () * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ? @ A B C D E F a b c d e f

T: OCR-B !"#\$%&'()*+,-./0123456789:;<=>?@ABCD Eabcdef

q: Gothic 725 Black

r: Chinese (24 x 24 dots) 123ABCabc4く丁世イ己日尸ちんYてナせカ入啊阿捺拾拾曉立唐癩滿矮艾稠愛臨丁兀兀丐廿卅不頁丞嘉亞聖！愚！郎鄧鄭鄉

s: Korean (24 x 24 dots)

Chinese CG is required to print the character type: r.

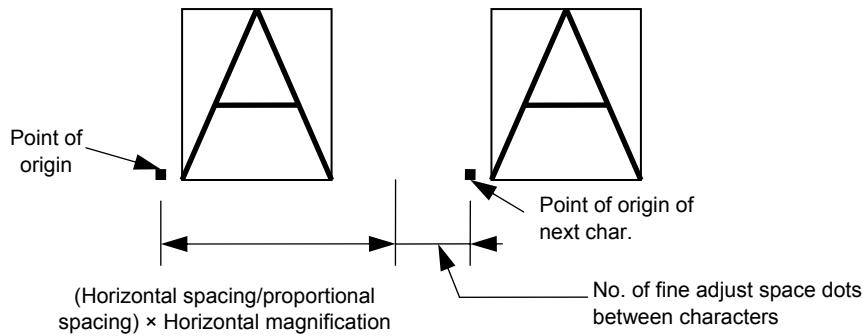
Korean CG is required to print the character type: s.

When any character type of 52 to 55 is specified, it is invalid. However, an error does not occur, instead a blank is printed.

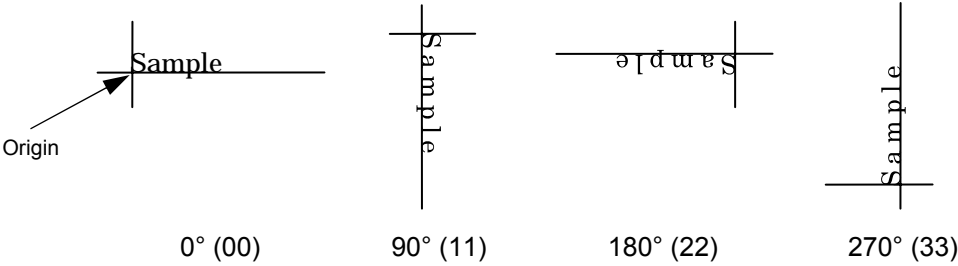
If any character type out of the range is specified, a command error occurs.

(5) Fine adjustment of character-to-character space

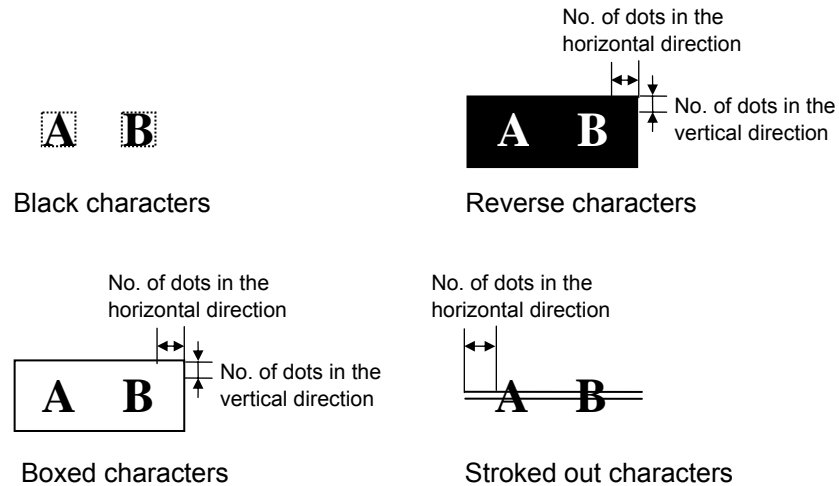
If no character-to-character space is specified or the number of space dots between characters is 0, drawing will take place according to the horizontal spacing/proportional spacing determined for each character. If character-to-character space is specified, drawing will take place according to the value obtained by adding the character spacing/proportional spacing to the specified value.



(6) Rotational angles of a character and character string

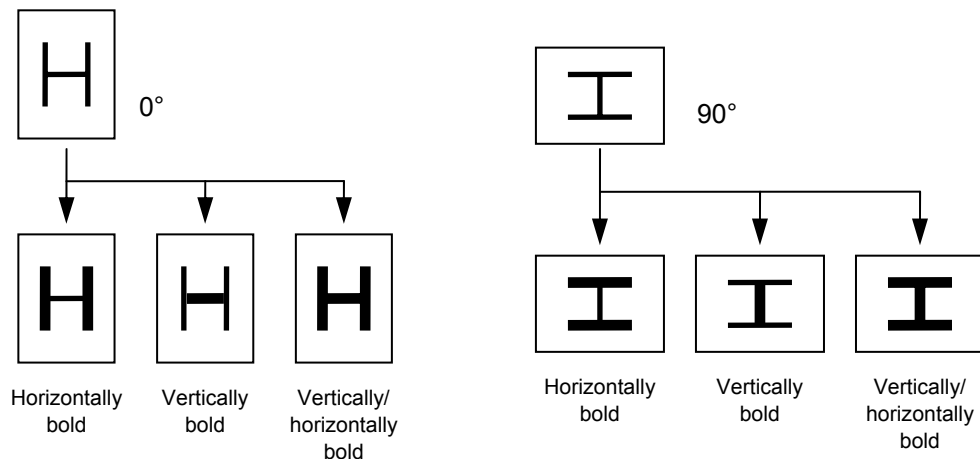


(7) Selection of character attribution



If the print ratio of one line (the print head width) is higher than defined, printing may become poor, or the printer may be reset. When "Reverse character" is selected for how to clear and the black dot pattern is increased, be careful about the print ratio.

(8) Bold character designation



(9) Check digit to be attached

When Modulus 10 or Modulus 43 is selected, the check digit of a data row is calculated and attached to the data row for drawing. In case of Modulus 10, when the data includes any data other than numerals, drawing is not performed. In case of Modulus 43, when the data includes any data other than CODE39, drawing is not performed, either.

When DBP Modulus 10 is selected, the check digit of a data row is calculated and only the check digit is drawn. When the data includes any data other than numerals, drawing is not performed.

When the font type is U, V, r, s or w, the check digit cannot be designated.

(Even if it is designated, it is ignored.)

* DBP Modulus 10 is Modulus 10 for Deutsche Bundespost Postdienst only.

(10) Increment/decrement

Printing is performed while the data is incremented or decremented every time a label is issued. Where the data row exceeds the maximum number of digits (40), the data row will not be drawn.

When the font type is U, V, r, s, w or a (for JA type only), increment/decrement cannot be designated.

(Even if it is designated, it is ignored.)

Initial value	0000	0000	0000	0000	999999
INC/DEC	+10	+10	+10	+10	+1
Zero suppression	Not designated	5	3	0	3
1st label	0000	0000	└000	0000	999999
2nd label	0010	0010	└010	0010	└└└000
3rd label	0020	0020	└020	0020	└└└001
4th label	0030	0030	└030	0030	└└└002
5th label	0040	0040	└040	0040	└└└003

Letters and numerals for increment/decrement

For the data string, up to 40 digits (including letters, numerals, and symbols) are possible. Only the numerals are selected and calculated for incrementing/decrementing, and then are returned to the previous position to draw the data.

Example of increment/decrement calculation

Initial value	00000	A0A0A	7A8/9	A2A0A
INC/DEC	+1	+1	+3	-3
1st label	00000	A0A0A	7A8/9	A2A0A
2nd label	00001	A0A1A	7A9/2	A1A7A
3rd label	00002	A0A2A	7A9/5	A1A4A
4th label	00003	A0A3A	7A9/8	A1A1A
5th label	00004	A0A4A	8A0/1	A0A8A

(11) Zero suppression

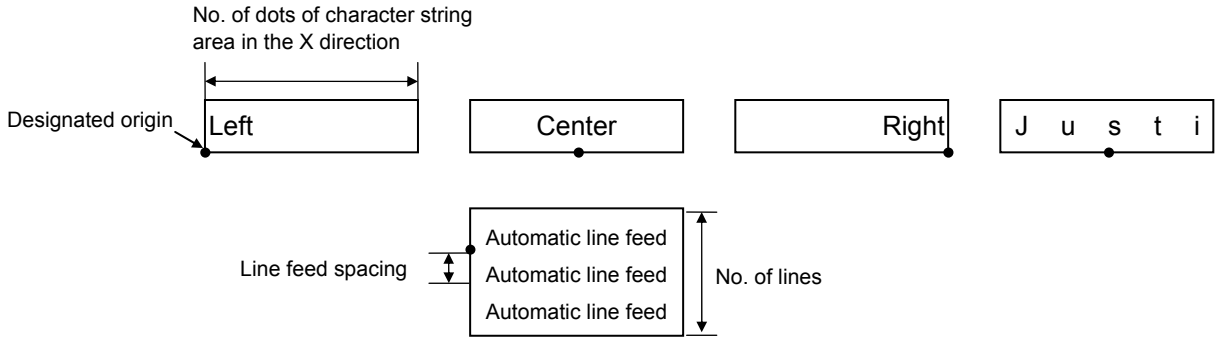
No. of digits after zero suppression	0	1	2	2	3	4	5
Data	0000	0000	0000	0A12	0123	0123	0123
Print	0000	└└└0	└└00	└A12	└123	0123	0123

Zero(s) in a data row is replaced with a space(s) from the upper digits, according to the designated number of digits. However, if the number of digits after zero suppression is greater than the data row, the data row will be drawn without performing zero suppression. Where the data row exceeds the maximum number of digits (40), the data row will not be drawn.

When the font type is U, V, r, s w or a (for JA type only), zero suppression is not designated.

(Even if it is designated, it is ignored.)

(12) Alignment



If characters are not placed on one line when justification and automatic line feed are designated, the following steps are performed.

Decrease the value of the character-to-character space. When characters are not placed on one line even if the value is set to 0, return the value to its default, and then reduce the horizontal magnification for a character by 0.5. If characters are still not placed on one line, repeatedly decrease the value of the character-to-character space, and then reduce the horizontal magnification. When characters are not placed on one line if the character magnification is set to 0.5 and the character-to-character space is set to 0, the field is not drawn.

When Rotational angles of a character and character string is set to 01, 12, 23 or 30, the designation of center, right, justification and automatic line feed is ignored.

(13) Data string to be printed

Drawing data can be programmed by designating the number of digits after the symbol “=.” Up to 255 digits of characters can be printed. However, when the font type is U, V, r, s, w or 51, the maximum number of characters is 127. When it is r as a 4-byte code, the maximum number of characters is 64.

When the number of characters exceeds the maximum number of digits, the excess data will be discarded.

For the character code table, refer to the character code table mentioned later.

(14) Link field No.

The link field No. can be programmed by designating it after the symbol “;.”
After the link field No. is designated using the Format Command, the data strings are linked by the Link Field Data Command to draw an image.
Up to 20 fields can be linked.
If the link field exceeds 20 fields, an error occurs.
The following shows an example of linked fields on the two continuous labels.

[Format Command]

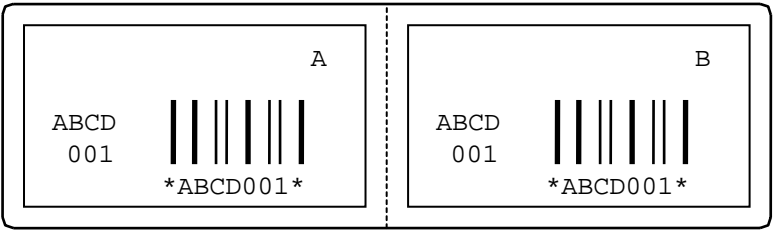
[ESC] PC01; ; 01 [LF] [NUL] : Link field No. 1 is designated.
[ESC] PC02; ; 03 [LF] [NUL] : Link field No. 3 is designated.
[ESC] PC03; ; 04 [LF] [NUL] : Link field No. 4 is designated.
[ESC] XB01; ; 03, 04 [LF] [NUL] : Link fields No. 3 and No. 4 are designated.

[ESC] PC04; ; 02 [LF] [NUL] : Link field No. 2 is designated.
[ESC] PC05; ; 03 [LF] [NUL] : Link field No. 3 is designated.
[ESC] PC06; ; 04 [LF] [NUL] : Link field No. 4 is designated.
[ESC] XB02; ; 03, 04 [LF] [NUL] : Link fields No. 3 and No. 4 are designated.

Designating link field No.

[Data Command]

[ESC] RC; A [LF] B [LF] ABCD [LF] 001 [LF] [NUL]
Link field No. 1
Link field No. 2
Link field No. 3
Link field No. 4



Notes

- (1) The check digit attachment, increment/decrement and zero suppression are performed according to the following priority. If any of the conditions is improper, no drawing will take place.

For example, the zero(s) is replaced with a space(s) as a result of zero suppression, but the modulus 10 designated to be attached cannot be calculated.

Increment/decrement > zero suppression > attachment of check digit

- (2) Up to 32 fields for which increment/decrement has been designated can be drawn. If the total of bit map font, outline font and barcode increment/decrement fields exceeds 32, drawing will take place without incrementing/decrementing any excessive field. The field to be incremented or decremented is incremented or decremented until the Image Buffer Clear Command ([ESC] C) is transmitted.

[Example]

- 1) Format Command (Incrementing character string No. 001 (+1))
- 2) Format Command (No incrementing character string No. 002)
- 3) Format Command (Incrementing character string No. 003 (+2))
- 4) Image Buffer Clear Command
- 5) Data Command (Character string No. 001 "0001")
- 6) Data Command (Character string No. 002 "AB-")
- 7) Data Command (Character string No. 003 "0100")
- 8) Issue Command (2 labels)

0001

AB-0100

0002

AB-0102

- 9) Issue Command (1 label)

0003

AB-0104

- 10) Image Buffer Clear Command

- 11) Data Command (Character string No. 02 "00000")

- 12) Issue Command (1 label)

00000

- (3) The Bit Map Font Format Command may be connected to the Outline Font Format Command when transmitted.

```
[ESC] P C001; 0100, 0150, 1, 1, A, 00, B [LF]
          C002; 0350, 0180, 1, 1, A, 00, B [LF]
          C005; 0200, 0300, 25, 2, C, +05, 00, B, +0000000001 [LF]
          V01; 0500, 0400, 0100, 0100, A, 00, B [LF] [NUL]
```

- (4) When the drawing data differs for every label, the field of the drawing data for the previous label is automatically cleared using the character string number, then the next drawing data is printed. Therefore, the character string number should be designated so that they differ according to the drawing fields.

Since the automatic field clear is not performed between the Clear Command ([ESC] C) and Issue Command ([ESC] XS), the fixed data may be drawn using the same character string number. In this case, the Format Command and Data Command should be sent alternately. (After the Issue Command is sent, the fields with the same character string number are automatically cleared until the Clear Command is sent.)

- (5) The link field designation is cleared by omitting the link field designation using the same character string No. and reformatting data.

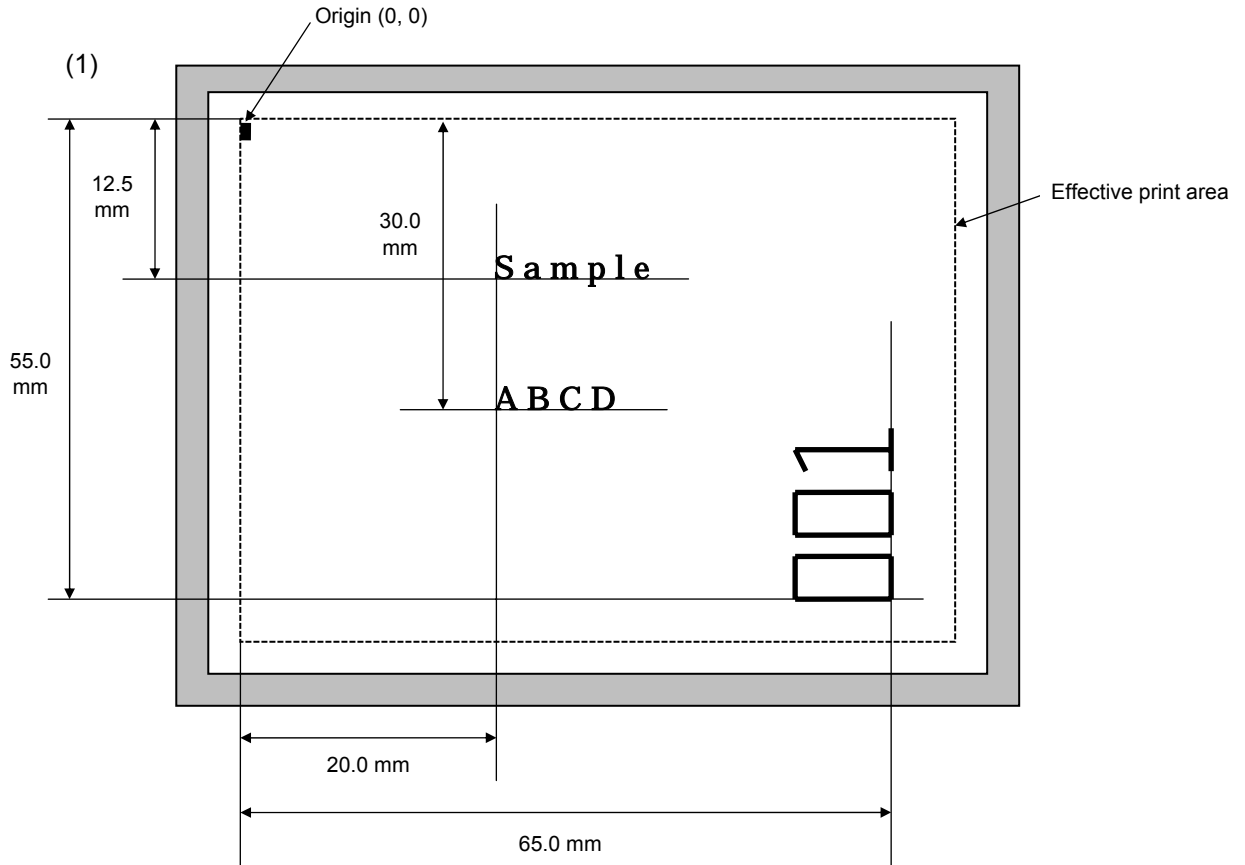
The link field designation can be also cleared by the Image Buffer Clear Command.

- (6) A print data string and link field No. cannot be programmed at the same time.
- (7) When the (reserved) area for the font type is designated, the bit map font format is not specified.
- (8) In the case of the compatible mode for the B-SP series, the reserved area is not checked.
- (9) For character sets from 41 to 43, a character code consisting of 1 byte is stored. However, when the character code is read, F0H is added to the upper digit or FFH is added to the upper digit with Chinese characters installed, and consists of 2 bytes. In this case, up to 188 characters can be stored per character set.

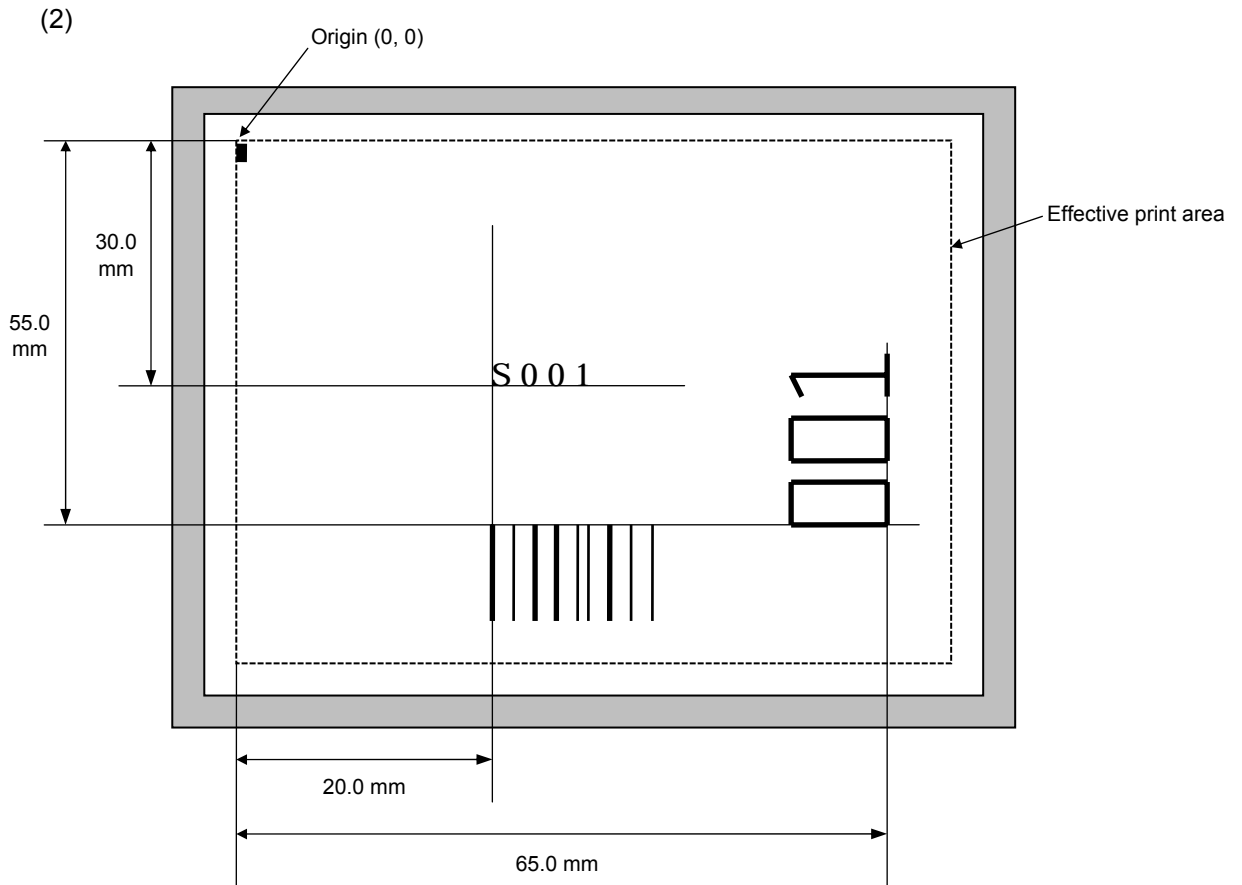
Refer to

- Bit Map Font Data Command ([ESC] RC)
- Outline Font Format Command ([ESC] PV)
- Barcode Format Command ([ESC] XB)

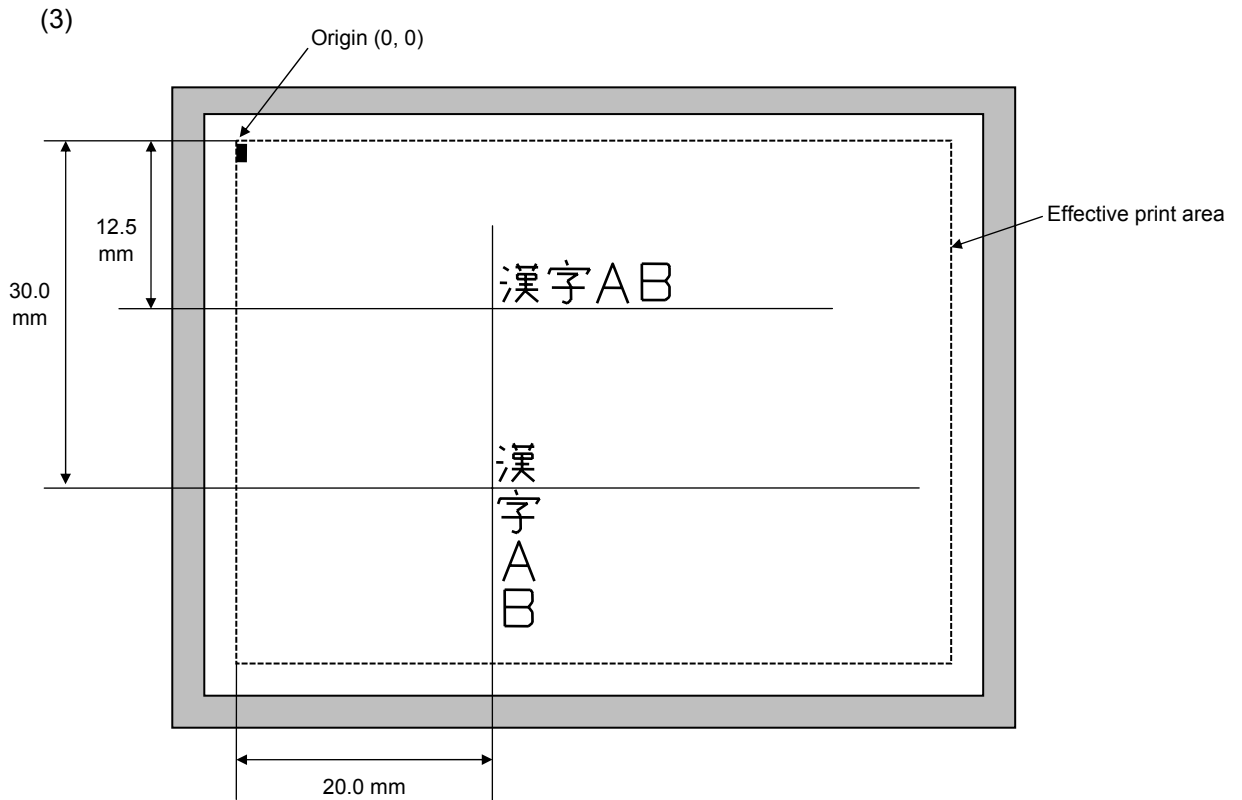
Examples



```
[ESC] C [LF] [NUL]
[ESC] PC000; 0200, 0300, 1, 1, A, 00, B=ABCD [LF] [NUL]
[ESC] PC001; 0200, 0125, 1, 1, C, 00, B [LF] [NUL]
[ESC] PC002; 0650, 0550, 2, 2, G, 33, B, +0000000001 [LF] [NUL]
[ESC] RC001; Sample [LF] [NUL]
[ESC] RC002; 001 [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]
```



```
[ESC] C [LF] [NUL]
[ESC] PC001; 0200, 0300, 1, 1, C, 00, B; 01, 02 [LF] [NUL]
[ESC] PV01; 0650, 0550, 0200, 0150, B, 33, B; 02 [LF] [NUL]
[ESC] XB01; 0200, 0550, 3, 1, 03, 03, 08, 08, 03, 0, 0150; 01, 02 [LF] [NUL]
[ESC] RC; S [LF] 001 [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]
```



```
[ESC] C [LF] [NUL]
[ESC] PC000; 0200, 0125, 1, 1, W, 00, B [LF] [NUL]
[ESC] PC001; 0200, 0300, 1, 1, W, 01, B [LF] [NUL]
[ESC] RC000; 漢字    AB [LF] [NUL]
[ESC] RC001; 漢字    AB [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]
```

5.6.3 OUTLINE FONT FORMAT COMMAND

[ESC] PV

Function	Sets the format to indicate where and how the outline font is to be printed.
Format	<p>① [ESC] PVaa; bbbb, cccc, dddd, eeee, f (, ghhh), ii, j (, Mk) (, lmmmmmmmmmm) (, Znn) (, Po) (, lpp) (, Qoooo, Rpp) (= qq q ----- qq q) [LF] [NUL]</p> <p>② [ESC] PVaa; bbbb, cccc, dddd, eeee, f (, ghhh), ii, j (, Mk) (, lmmmmmmmmmm) (, Znn) (, Po) (, lpp) (, Qoooo, Rpp) (; rr₁, rr₂, rr₃, ----- , rr₂₀) [LF] [NUL]</p>
Term	<p>aa: Character string number 00 to 99</p> <p>bbbb: X-coordinate of the print origin of character string Fixed at 4 digits (in 0.1 mm units)</p> <p>cccc: Y-coordinate of the print origin of character string 4 or 5 digits (in 0.1 mm units)</p> <p>dddd: Width of the character 0020 to 0850 (in 0.1 mm units)</p> <p>eeee: Height of the character 0020 to 0850 (in 0.1 mm units)</p> <p>f: Type of font A: TEC FONT1 (Helvetica [bold]) B: TEC FONT1 (Helvetica [bold], proportional) E: Print front 1 F: Price font 2 G: Price font 3 K: Reserved C, D, H, I, J: Reserved (If specified, it is processed as "B.")</p> <p>ghhh: Fine adjustment of character-to-character space (Omissible. If omitted, space is adjusted according to the designated font.) g: Designates whether to increase or decrease the character-to-character space. +: Increase -: Decrease</p> <p>hhh: No. of space dots between characters 000 to 512 (in units of dots)</p> <p>ii: Rotational angles of a character and character string 00: 0° (char.) 0° (char.-string) 11: 90° (char.) 90° (char.-string) 22: 180° (char.) 180° (char.-string) 33: 270° (char.) 270° (char.-string)</p>

- j: Character attribution
- B: Black character
 - W (aabb): Reverse character
 - aa: No. of dots from the character string to the end of the black background in the horizontal direction
 - bb: No. of dots from the character string to the end of the black background in the vertical direction
 - aa: 01 to 99 (in units of dots)
 - bb: 01 to 99 (in units of dots)
 - F (aabb): Boxed character
 - aa: No. of dots from the character string to the box in the horizontal direction
 - bb: No. of dots from the character string to the box in the vertical direction
 - aa: 01 to 99 (in units of dots)
 - bb: 01 to 99 (in units of dots)
 - * Reserved in the case of the compatible mode for the B-SP series
(If specified, it is processed as "B.")
 - C (aa): Strike-through character
 - aa: No. of dots from the character string to the end of a strike-through in the horizontal direction
 - aa: 01 to 99 (in units of dots)
 - * Reserved in the case of the compatible mode for the B-SP series
(If specified, it is processed as "B.")
 - * Parenthesized descriptions are omissible. (If omitted, it is character size (the character width or height, whichever is greater) ÷ 8 dots.)
- Mk: Type of the check digit to be attached
(Omissible. If omitted, no check digit is drawn.)
- k: Type of check digit
 - 0: Modulus 10 (Draws data and check digit.)
 - 1: Modulus 43 (Draws data and check digit.)
 - 2: DBP Modulus 10 (Draws check digit only.)
 - * Reserved in the case of the compatible mode for the B-SP series
- Immmmmmmmm: Increment and decrement
(Omissible. If omitted, increment/decrement is not performed.)
- l: Designates whether to increment or decrement.
- +: Increment
 - : Decrement
- mmmmmmmmmm: Skip value
0000000000 to 9999999999
- Znn: Zero suppress (Omissible. If omitted, zero suppression is not performed.)
- pp: No. of digits after zero suppression
00 to 20
 - * Reserved in the case of the compatible mode for the B-SP series

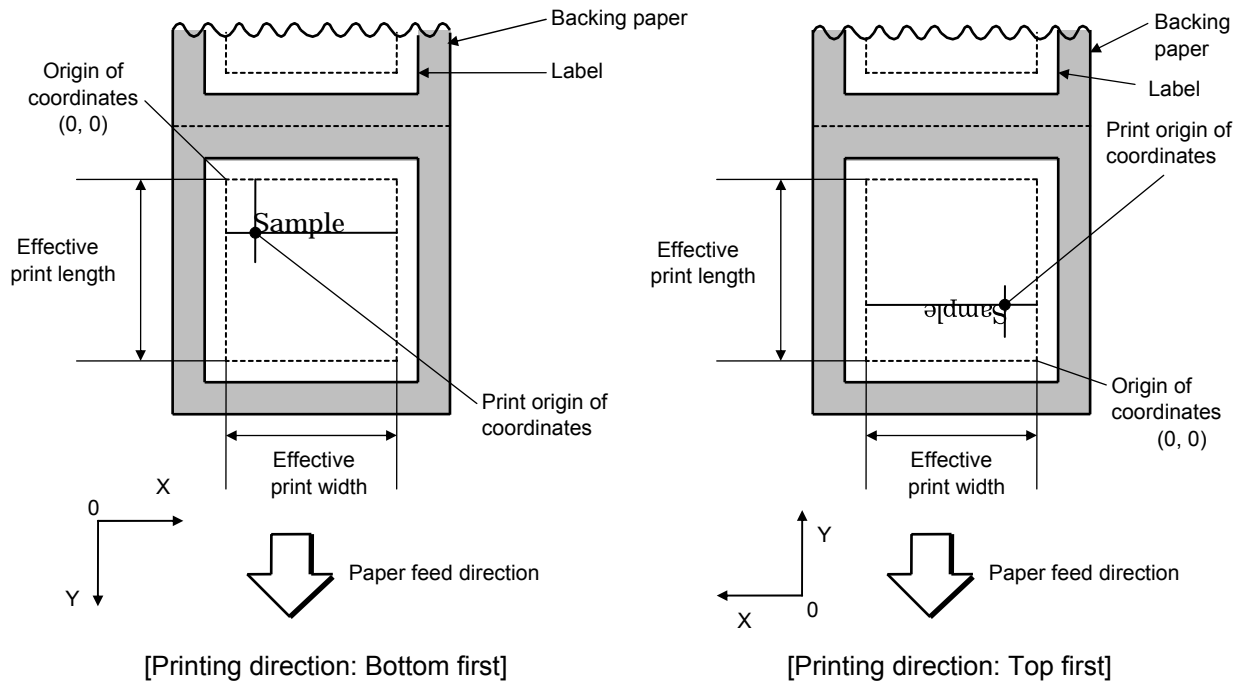
Po: Alignment (Omissible. If omitted, the alignment is set to the left.)
o: Designates the character position.
1: Left
2: Center
3: Right
4aaaa: Justification
aaaa: Character string in the X direction
0050 to 1040 (in 0.1 mm units)
* 4 is reserved in the case of the compatible mode for the B-SP series.
(If specified, it is processed as "1.")
lpp: Italic (Omissible. If omitted, the italic is not applied. Only TEC FONT1 is supported)
pp: Angle of the italic
00 to 45 (in units of degrees)
Qoooo: Character string width (Omissible. If omitted, it is 0000.)
0000 to 1600 (in 0.1 mm units)
Rpp: No. of character string digits
(Omissible. If omitted, it is 00.)
00 to 99
qqq ----- qq: Data string to be printed (Omissible)
Max. 255 digits
rr₁, rr₂, rr₃ ----- , rr₂₀: Link field No. (Omissible)
01 to 99 (1 to 99 can also be used.)
Up to 20 fields can be designated using commas.

Explanation

- (1) Character string number

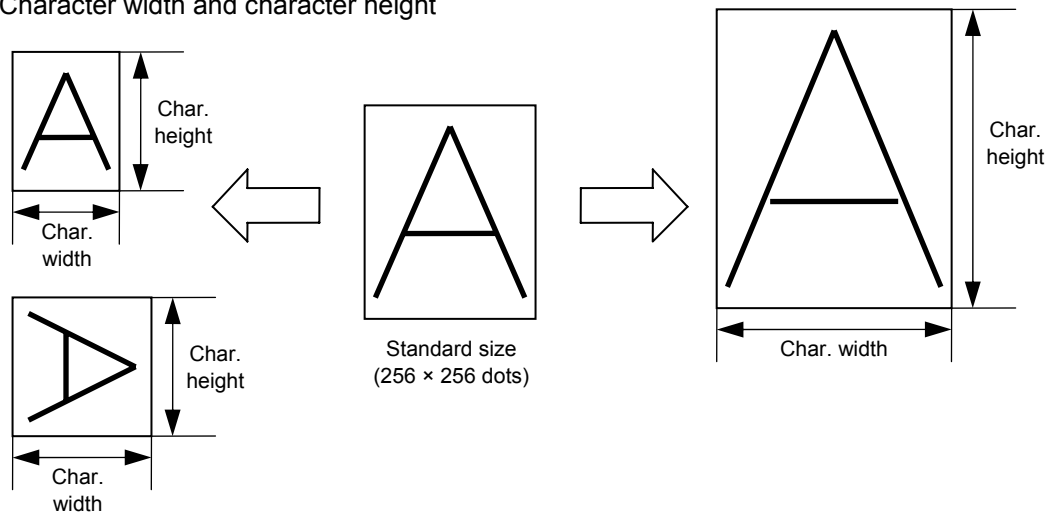
When drawing by the Data Command ([ESC] RV), the format designated by the character string number is selected.

- (2) Print origin of coordinates



The print origin of coordinates must be set so that the character drawing result will be within the effective print area set by the Label Size Set Command ([ESC] D).

- (3) Character width and character height



(4) Type of font

A: TEC FONT1 (Helvetica [bold])

! " # \$ % & ' () * + , - . /
0 1 2 3 4 5 6 7 8 9 : ; < = > ?
@ A B C D E F G H I J K L M N O
' a b c d e f g h i j k l m n o
Ç ü é â ä à å ç ê ë è ì î ï Ä Å

B: TEC FONT1 (Helvetica [bold], proportional)

! " # \$ % & ' () * + , - . /
0 1 2 3 4 5 6 7 8 9 : ; < = > ?
@ A B C D E F G H I J K L M N O
' a b c d e f g h i j k l m n o
Ç ü é â ä à å ç ê ë è ì î ï Ä Å

E: Price Font 1 (POP Font)

\$ % , - . /
0 1 2 3 4 5 6 7 8 9
円 ¥ ~

F: Price Font 2 (POP Font)

\$ % , - . /
0 1 2 3 4 5 6 7 8 9
円 ¥ ~

G: Price Font 3 (POP Font)

\$%, - . /

0 1 2 3 4 5 6 7 8 9

¥ ¥ ~

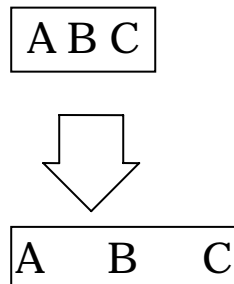
(5) Fine adjustment of character-to-character space

If no character-to-character space is specified or the number of space dots between characters is 0, drawing will take place according to the horizontal spacing/proportional spacing determined for each character.

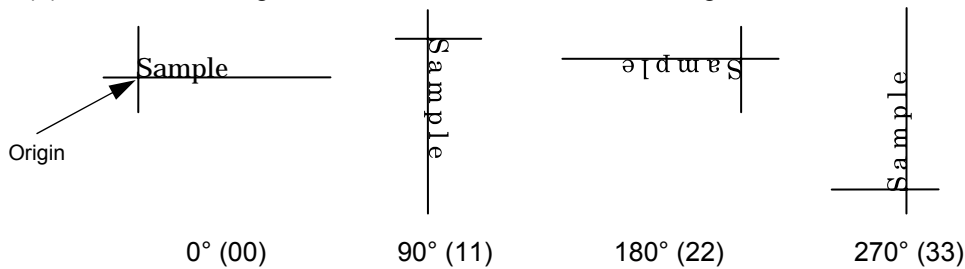
If character-to-character space is specified, drawing will take place according to the value obtained by adding the character spacing/proportional spacing to the specified value.

When justify is selected for the alignment, the character-to-character space setting is invalid.

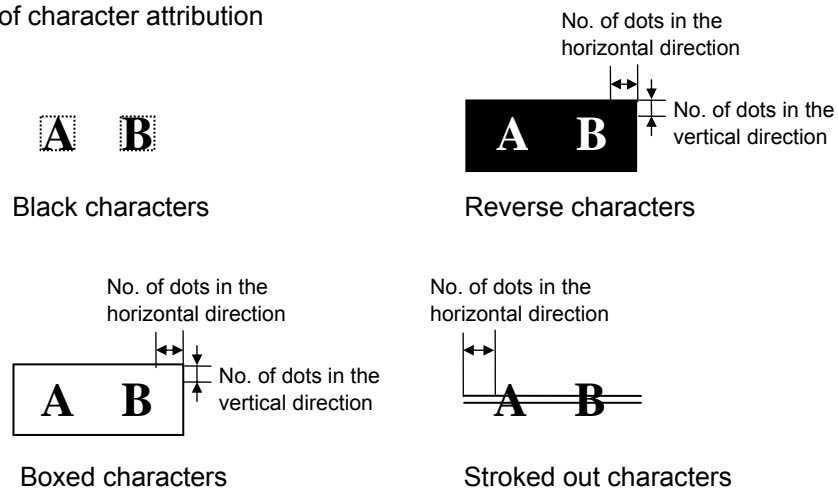
(The horizontal spacing/proportional spacing is increased or decreased depending on the character size.)



(6) Rotational angles of a character and character string



(7) Selection of character attribution



If the print ratio of one line (the print head width) is higher than defined, printing may become poor, or the printer may be reset. When Reverse character is selected for how to clear and the black dot pattern is increased, be careful about the print ratio.

(8) Check digit to be attached

When Modulus 10 or Modulus 43 is selected, the check digit of a data row is calculated and attached to the data row for drawing. In case of Modulus 10, when the data includes any data other than numerals, drawing is not performed. In case of Modulus 43, when the data includes any data other than CODE39, drawing is not performed, either. When DBP Modulus 10 is selected, the check digit of a data row is calculated and only the check digit is drawn. When the data includes any data other than numerals, drawing is not performed.

* DBP Modulus 10 is Modulus 10 for Deutsche Bundespost Postdienst only.

(9) Increment/decrement

Printing is performed while the data is incremented or decremented every time a label is issued. Where the data row exceeds the maximum number of digits (40), the data row will not be drawn.

Initial value	0000	0000	0000	0000	999999
INC/DEC	+10	+10	+10	+10	+1
Zero suppression	Not designated	5	3	0	3
1st label	0000	0000	└000	0000	999999
2nd label	0010	0010	└010	0010	└└└000
3rd label	0020	0020	└020	0020	└└└001
4th label	0030	0030	└030	0030	└└└002
5th label	0040	0040	└040	0040	└└└003

Letters and numerals for increment/decrement

For the data string, up to 40 digits (including letters, numerals, and symbols) are possible. Only the numerals are selected and calculated for incrementing/decrementing, and then are returned to the previous position to draw the data.

Example of increment/decrement calculation

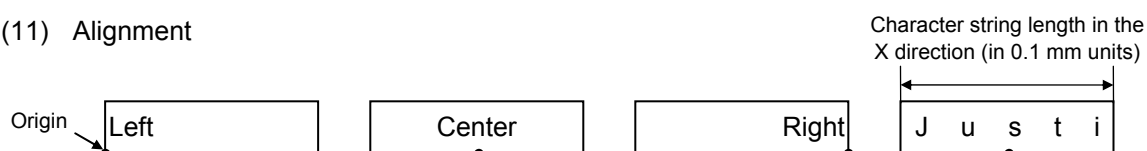
Initial value	00000	A0A0A	7A8/9	A2A0A
INC/DEC	+1	+1	+3	-3
1st label	00000	A0A0A	7A8/9	A2A0A
2nd label	00001	A0A1A	7A9/2	A1A7A
3rd label	00002	A0A2A	7A9/5	A1A4A
4th label	00003	A0A3A	7A9/8	A1A1A
5th label	00004	A0A4A	8A0/1	A0A8A

(10) Zero suppression

No. of digits after zero suppression	0	1	2	2	3	4	5
Data	0000	0000	0000	0A12	0123	0123	0123
Print	0000	└└└0	└└00	└A12	└123	0123	0123

Zero(s) in a data row is replaced with a space(s) from the upper digits, according to the designated number of digits. However, if the number of digits after zero suppression is greater than the data row, the data row will be drawn without performing zero suppression. Where the data row exceeds the maximum number of digits (40), the data row will not be drawn.

(11) Alignment



If characters are not placed on one line when justification is designated, the width is calculated automatically. When the width is less than the limit value (2 mm) for the outline font, that field will not be drawn. (The same previous field will not be drawn.)

(12) Italic designation

This designation allows italic printing. However, it is available only when TEC FONT1 is selected for the type of font.

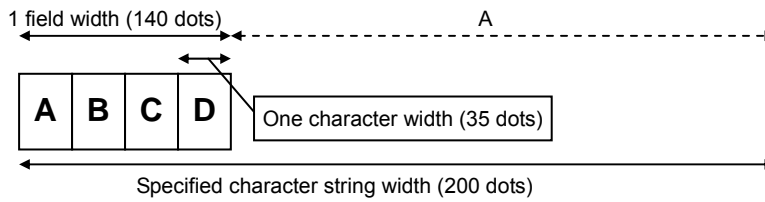
(13) Character string width and number of character string digits

Usually, one character size is determined by the character width and height. When the character string width and number of character string digits are specified, the character width will be automatically changed when printed. If the following conditions are satisfied, however, these parameter settings become ineffective, and the characters are printed in normal size.

- Conditions of ineffectiveness
 - (1) These parameters are omitted.
 - (2) The character string width is set to "0".
 - (3) No. of print data \geq No. of specified character string digits
- Conditions that these parameters become effective are described on the following pages.

- ① When one field width < specified character string width
(Space between characters = 0, Specified character string digits = 6)

- Print image when the parameter setting is omitted.

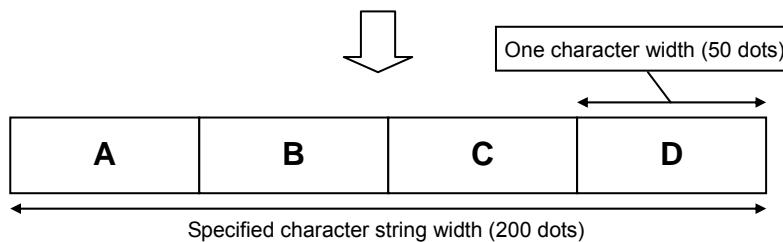


$$A = \text{Specified character string width} - 1 \text{ field width} = 200 \text{ dots} - 140 \text{ dots} = 60 \text{ dots}$$

$$B = A / \text{Data length} = 60 \text{ dots} / 4 = 15 \text{ dots}$$

$$\text{One character width} = 1 \text{ character width} + B = 35 \text{ dots} + 15 \text{ dots} = 50 \text{ dots}$$

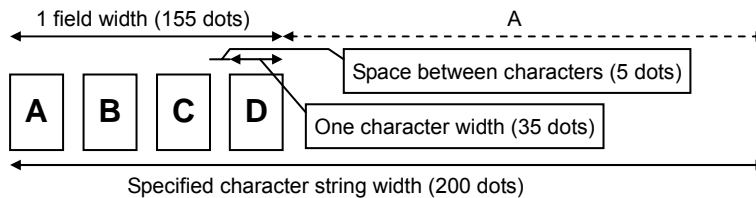
- Print image when the parameter setting is specified.



- * When the number of print data is 6 digits or more, the condition of ineffectiveness (3) is satisfied.
In this case, the characters are printed in normal width.

- ② When one field width < specified character string width
(Space between characters ≥ 0 , Specified character string digits = 5)

- Print image when the parameter setting is omitted.

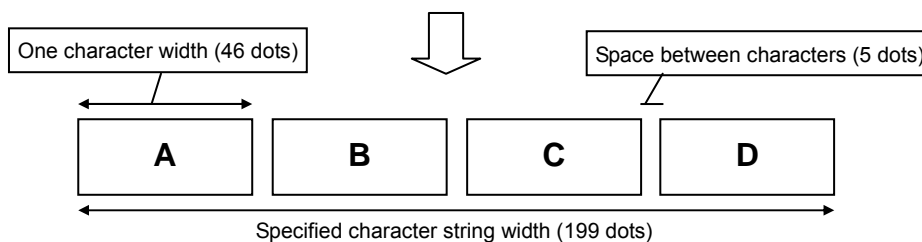


$$A = \text{Specified character string width} - 1 \text{ field width} = 200 \text{ dots} - 155 \text{ dots} = 45 \text{ dots}$$

$$B = A / \text{Data length} = 45 \text{ dots} / 4 \approx 11 \text{ dots}$$

$$\text{One character width} = 1 \text{ character width} + B = 35 \text{ dots} + 11 \text{ dots} = 46 \text{ dots}$$

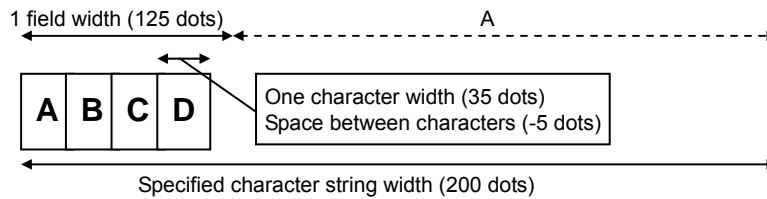
- Print image when the parameter setting is specified.



- * When the number of print data is 5 digits or more, the condition of ineffectiveness (3) is satisfied.
In this case, the characters are printed in normal width.

- ③ When one field width < specified character string width
(Space between characters < 0, Specified character string digits = 8)

- Print image when the parameter setting is omitted.



Corrected space between characters = ((Specified character string digits – data length)

(x 0.5 + 1) x Space between characters = -15 dots

A = Specified character string width – (1 character width x Data length

+ (corrected space between characters x (Data length – 1))

= 200 dots – 95 dots = 105 dots

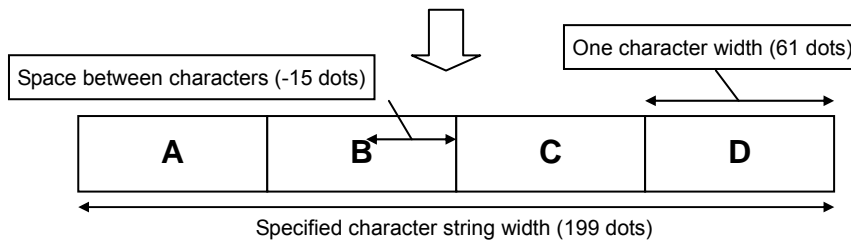
B = A/Data length = 105 dots/4 ≈ 26 dots (rounded down)

One character width = 1 character width + B = 35 dots + 26 dots = 61 dots

* The minimum. corrected space between characters is - 99 dots.

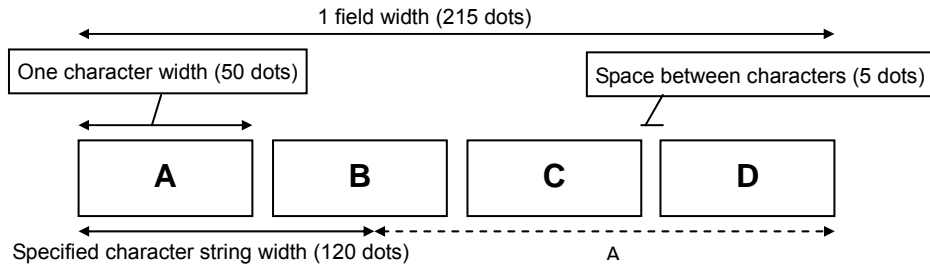
* The calculated one character width is doubled when doubled or more from the original one character width.

- Print image when the parameter setting is specified.



- * When the number of print data is 8 digits or more, the condition of ineffectiveness (3) is satisfied.
In this case, the characters are printed in normal width.

- ④ When one field width \geq specified character string width
(Space between characters ≥ 0 , Specified character string digits = 6)
- Print image when the parameter setting is omitted.

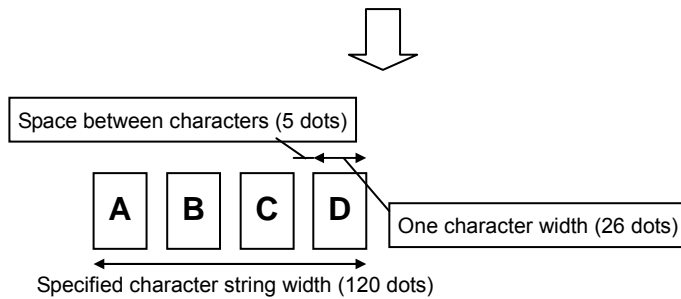


$$A = 1 \text{ field width} - \text{Specified character string width} = 215 \text{ dots} - 120 \text{ dots} = 95 \text{ dots}$$

$$B = A / \text{Data length} = 95 \text{ dots} / 4 \approx 24 \text{ dots (rounded up)}$$

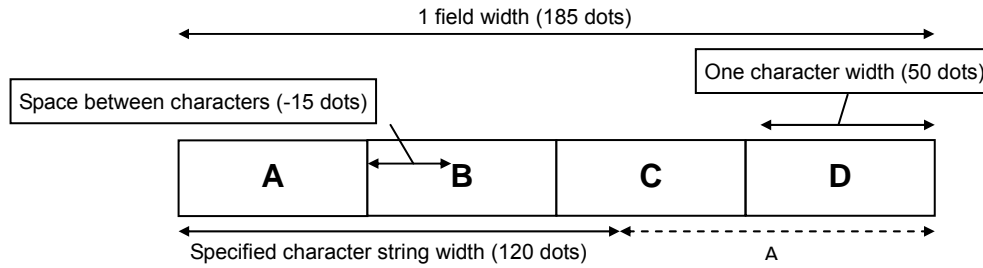
$$\text{One character width} = 1 \text{ character width} - B = 50 \text{ dots} - 24 \text{ dots} = 26 \text{ dots}$$

- Print image when the parameter setting is specified.



- * When the number of print data is 6 digits or more, the condition of ineffectiveness (3) is satisfied.
In this case, the characters are printed in normal width.

- ⑤ When one field width \geq specified character string width
(Space between characters < 0 , Specified character string digits = 5)
- Print image when the parameter setting is omitted.

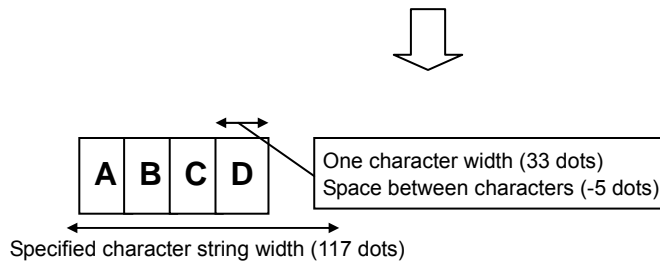


$$A = 1 \text{ field width} - \text{Specified character string width} = 185 \text{ dots} - 120 \text{ dots} = 65 \text{ dots}$$

$$B = A / \text{Data length} = 65 \text{ dots} / 4 = 17 \text{ dots (rounded up)}$$

$$\text{One character width} = 1 \text{ character width} - B = 50 \text{ dots} - 17 \text{ dots} = 33 \text{ dots}$$

- Print image when the parameter setting is specified.



- * When the number of print data is 5 digits or more, the condition of ineffectiveness (3) is satisfied. In this case, the characters are printed in normal width.

(14) Data string to be printed

Drawing data can be programmed by designating the number of digits after the symbol “=.”
Up to 255 digits can be printed.
When the number of digits exceeds the maximum number of characters, the excess data will be discarded.
For the character code table, refer to the character code table mentioned later.

(15) Link field No.

The link field No. can be programmed by designating it after the symbol “;.”
After the link field No. is designated using the Format Command, the data strings are linked by the Link Field Data Command to draw an image.
Up to 20 fields can be linked.
If the link field exceeds 20 fields, an error occurs.
The following shows an example of linked fields on the two continuous labels.

[Format Command]

[ESC] PV01; ; 01 [LF] [NUL] : Link field No. 1 is designated.
[ESC] PV02; ; 03 [LF] [NUL] : Link field No. 3 is designated.
[ESC] PV03; ; 04 [LF] [NUL] : Link field No. 4 is designated.
[ESC] XB01; ; 03, 04 [LF] [NUL] : Link fields No. 3 and No. 4 are designated.

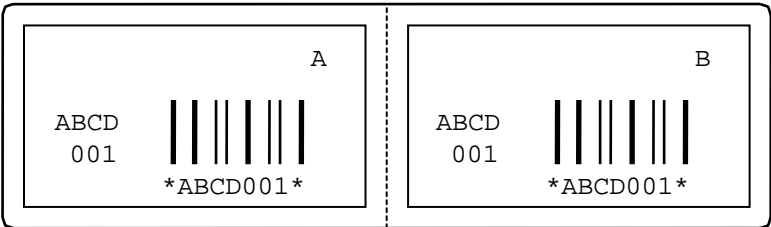
[ESC] PV04; ; 02 [LF] [NUL] : Link field No. 2 is designated.
[ESC] PV05; ; 03 [LF] [NUL] : Link field No. 3 is designated.
[ESC] PV06; ; 04 [LF] [NUL] : Link field No. 4 is designated.
[ESC] XB02; ; 03, 04 [LF] [NUL] : Link fields No. 3 and No. 4 are designated.

Designating the link field No.

[Data Command]

[ESC] RV; A [LF] B [LF] ABCD [LF] 001 [LF] [NUL]

Link field No. 4
Link field No. 3
Link field No. 2
Link field No. 1



Notes

- (1) The check digit attachment, increment/decrement and zero suppression are performed according to the following priority. If any of the conditions is improper, no drawing will take place.

[For example, the zero(s) is replaced by a space(s) as a result of zero suppression, but the modulus 10 designated to be attached cannot be calculated.]

Increment/decrement > zero suppression > attachment of check digit

- (2) Up to 32 fields for which increment/decrement has been designated can be drawn. If the total bit map font, outline font and barcode increment/decrement fields exceeds 32, drawing will take place without incrementing/decrementing any excessive field. The field to be incremented or decremented is incremented or decremented until the Image Buffer Clear Command ([ESC] C) is transmitted.

[Examples]

- 1) Format Command (Incrementing character string No. 01 (+1))
- 2) Format Command (No incrementing character string No. 02)
- 3) Format Command (Incrementing character string No. 03 (+2))
- 4) Image Buffer Clear Command
- 5) Data Command (Character string No. 01 "0001")
- 6) Data Command (Character string No. 02 "AB-")
- 7) Data Command (Character string No. 03 "0100")
- 8) Issue Command (2 labels)

0001

AB-0100

0002

AB-0102

- 9) Issue Command (1 label)

0003

AB-0104

- 10) Image Buffer Clear Command

- 11) Data Command (Character string No. 02 "00000")

- 12) Issue Command (1 label)

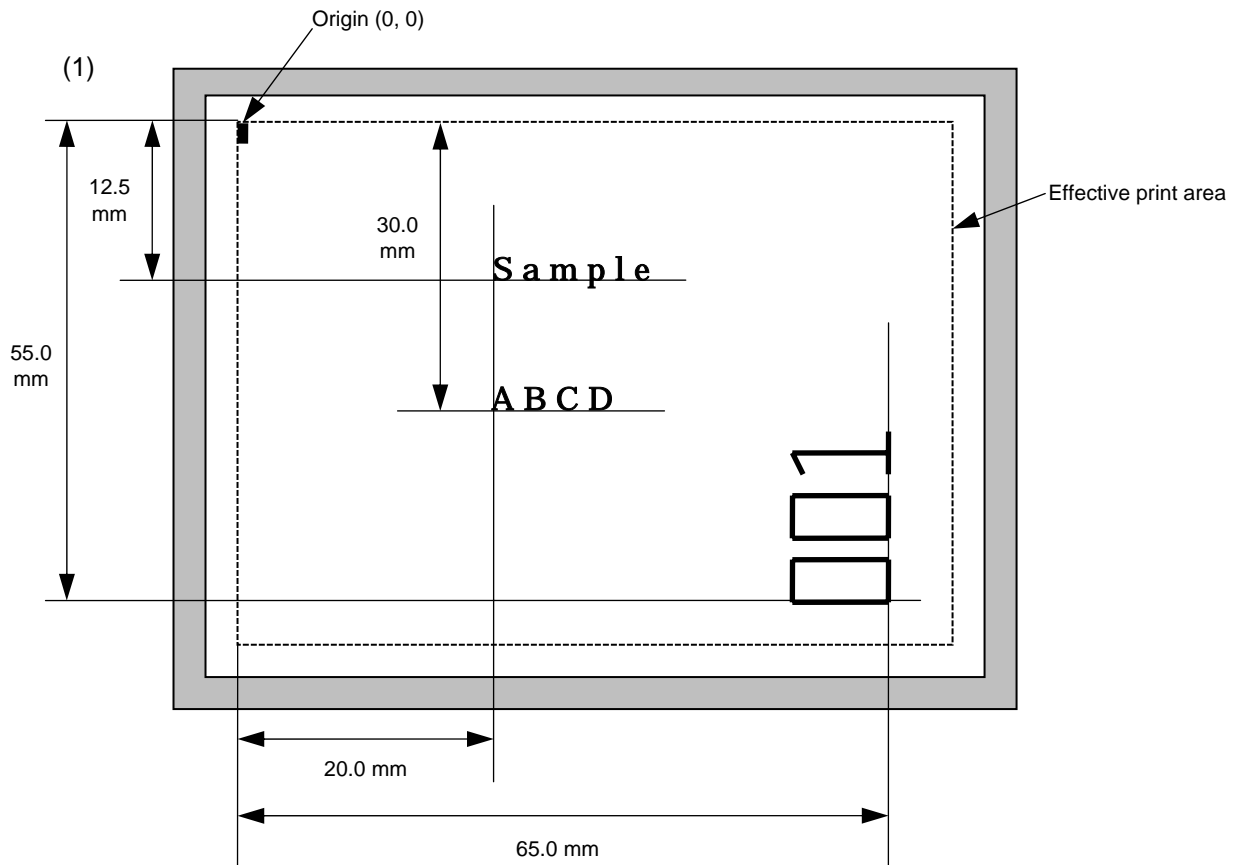
00000

- (3) The Outline Font Format Command may be connected to the Bit Map Font Format Command when transmitted.
- [ESC] PC001; 0100, 0150, 1, 1, A, 00, B [LF]
 C002; 0350, 0180, 1, 1, A, 00, B [LF]
 C005; 0200, 0300, 25, 2, C, +05, 00, B, +0000000001 [LF]
 V01; 0500, 0400, 0100, 0100, A, 00, B [LF] [NUL]
- (4) When the drawing data differs for every label, the field of the drawing data for the previous label is automatically cleared using the character string number, then the next drawing data is printed. Therefore, the character string number should be designated so that they differ according to the drawing fields.
- (5) Since the automatic field clear is not performed between the Clear Command ([ESC] C) and Issue Command ([ESC] XS), the fixed data may be drawn using the same character string number. In this case, the Format Command and Data Command should be sent alternately. (After the Issue Command is sent, the fields with the same character string number are automatically cleared until the Clear Command is sent.)
- (6) When characters overlap due to the character-to-character space fine adjustment, the outline font is not painted properly. Program the fine adjustment value so that characters will not overlap. Also, when drawings such as lines or characters are positioned over the outline font area, the outline font is not painted properly. For font types A, B and K, the fine adjustment value should be set so that other drawings do not overlap the area in which the outline font is to be drawn. For font types E, F and G, the fine adjustment value should be set so that other drawings do not overlap the area of the designated character width and height.
- (7) The link field designation can be cleared by omitting the link field designation using the same character string No. and reformatting data.
- The link field designation can also be cleared by the Image Buffer Clear Command.
- (8) A print data string and link field No. cannot be programmed at the same time.
- (9) In the case of the compatible mode for the B-SP series, the reserved area is not checked.

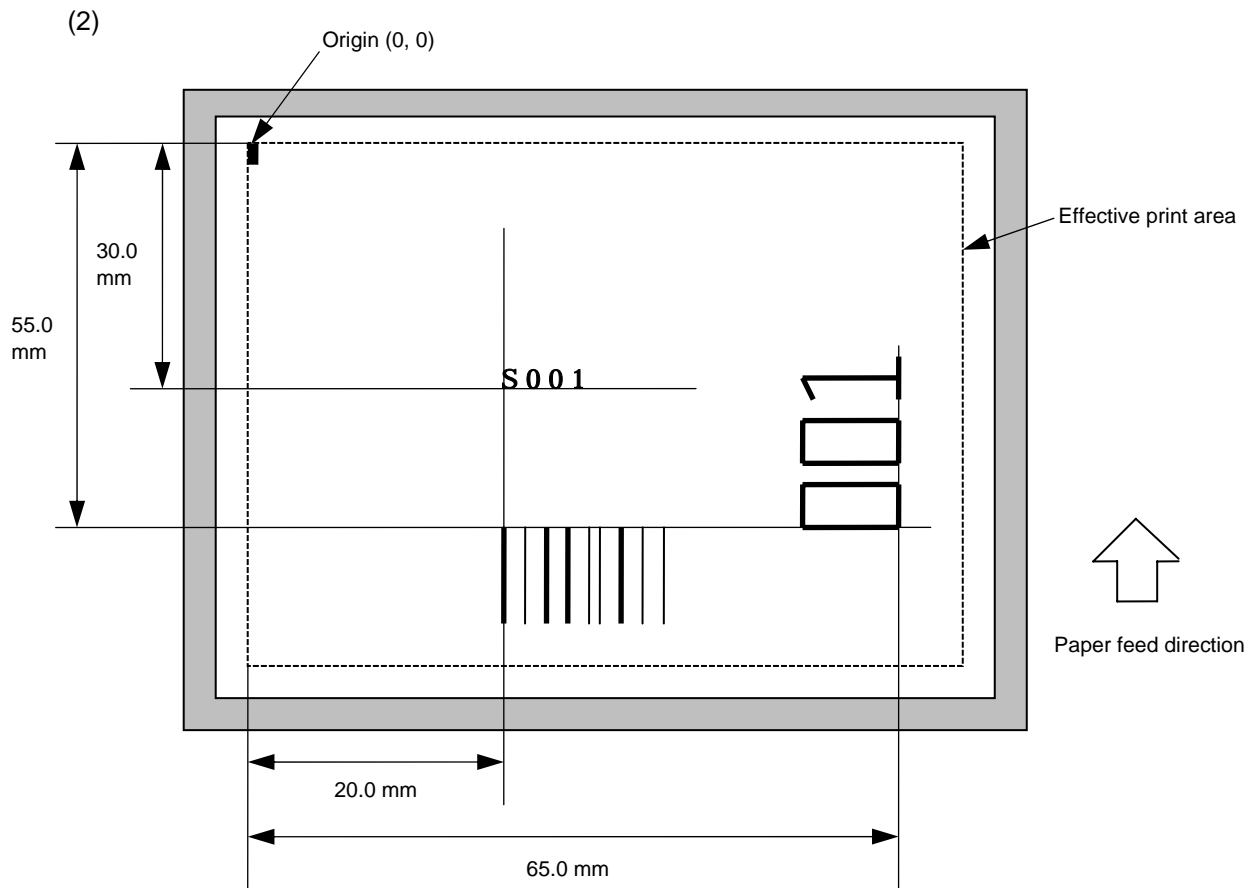
Refer to

- Outline Font Data Command ([ESC] RV)
- Bit Map Font Format Command ([ESC] PC)
- Barcode Format Command ([ESC] XB)

Examples



```
[ESC] C [LF] [NUL]
[ESC] PV00; 0200, 0300, 0080, 0080, B, 00, B=ABCD [LF] [NUL]
[ESC] PV01; 0200, 0125, 0100, 0100, B, 00, B [LF] [NUL]
[ESC] PV02; 0650, 0550, 0200, 0150, B, 33, B, +0000000001 [LF] [NUL]
[ESC] RV01; Sample [LF] [NUL]
[ESC] RV02; 001 [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]
```

```
[ESC] C [LF] [NUL]
[ESC] PC001; 0200, 0300, 1, 1, C, 00, B; 01, 02 [LF] [NUL]
[ESC] PV01; 0650, 0550, 0200, 0150, B, 33, B; 02 [LF] [NUL]
[ESC] XB01; 0200, 0550, 3, 1, 03, 03, 08, 08, 03, 0, 0150; 01, 02 [LF] [NUL]
[ESC] RV; S [LF] 001 [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]
```

5.6.4 BARCODE FORMAT COMMAND

[ESC] XB

Ⓢ In the case of WPC, CODE93, CODE128, UCC/EAN128, EAN128, Customer Barcode, POSTNET, RM4SCC, KIX CODE

Function	Sets the format to indicate where and how the barcode is to be printed and how it is to be printed. (WPC is the generic name for barcodes of JAN, EAN and UPC.)
----------	--

Format	① [ESC] XBaa; bbbb, cccc, d, e, ff, k, llll (, mnnnnnnnnnnn, ooo, p, qq) (= sss ----- sss) [LF] [NUL] ② [ESC] XBaa; bbbb, cccc, d, e, ff, k, llll (, mnnnnnnnnnnn, ooo, p, qq) (; tt ₁ , tt ₂ , tt ₃ , -----, tt ₂₀) [LF] [NUL]
--------	---

Term	aa: Barcode number 00 to 31 bbbb: X-coordinate of the print origin of barcode Fixed at 4 digits (in 0.1 mm units) cccc: Y-coordinate of the print origin of barcode 4 or 5 digits (in 0.1 mm units) d: Type of barcode
------	--

Compatible mode for the B-SP series: OFF	Compatible mode for the B-SP series: ON
0: JAN8, EAN8	
5: JAN13, EAN13	
6: UPC-E	
7: EAN-13 + 2digits	
8: EAN-13 + 5digits	
9: CODE128 (with auto code selection)	
A: CODE128 (without auto code selection)	
C: CODE93	
G: UPC-E + 2 digits	
H: UPC-E + 5 digits	
I: EAN-8 + 2 digits	
J: EAN-8 + 5 digits	
K: UPC-A	
L: UPC-A + 2 digits	
M: UPC-A + 5 digits	
N: UCC/EAN128	N: EAN128
R: Customer barcode (Postal code for Japan)	
S: Highest priority customer barcode (Postal code for Japan)	
U: POSTNET (Postal code for U.S.A.)	
V: RM4SCC (ROYAL MAIL 4 STATE CUSTOMER CODE) (Postal code for U.K.)	
W: KIX CODE (Postal code for Belgium)	

- e: Type of check digit
- 1: Without attaching check digit
 - 2: Check digit check

WPC	Modulus 10
CODE93	Modulus 47
CODE128	PSEUDO 103
 - 3: Check digit auto attachment (1)

WPC	Modulus 10
CODE93	Modulus 47
CODE128	PSEUDO 103
UCC/EAN128 or EAN128	PSEUDO 103
Customer barcode	Special check digit
POSTNET	Special check digit
RM4SCC	Special check digit
 - 4: Check digit auto attachment (2)

WPC	Modulus 10 + Price C/D 4 digits
-----	---------------------------------
 - 5: Check digit auto attachment (3)

WPC	Modulus 10 + Price C/D 5 digits
-----	---------------------------------
- Note: For the Customer barcode, POSTNET and RM4SCC, only "3: Check digit auto attachment (1)" is effective.
- ff: 1-module width
01 to 15 (in units of dots)
- k: Rotational angle of barcode
- 0: 0°
 - 1: 90°
 - 2: 180°
 - 3: 270°
- lll: Height of the barcode
0000 to 1000 (in 0.1 mm units)
- For the Customer barcode, POSTNE and RM4SCC along with KIX CODE, the height of the long bar is specified.
- mnnnnnnnnn: Increment and decrement
(Omissible. If omitted, increment/decrement is not performed.)
- m: Designates whether to increment or decrement.
 - +: Increment
 - : Decrement
- nnnnnnnnn: Skip value
0000000000 to 9999999999
- ooo: Length of WPC guard bar
(Omissible. If omitted, the guard bar is not extended.)
000 to 100 (in 0.1 mm units)
- p: Selection of print or non-print of numerals under bars
(Omissible. If omitted, the numerals under the bars are not printed.)
- 0: Non-print
 - 1: Print

qq: No. of digits after zero suppression
(Omissible. If omitted, zero suppression is not performed.)
00 to 20

* Reserved in the case of the compatible mode for the B-SP series

sss ----- sss: Data string to be printed (Omissible)
Max. 126 digits.
However, the number of digits varies according to the type of barcode.

tt₁, tt₂, tt₃ ----- , tt₂₀: Link field No. (Omissible)
01 to 99 (1 to 99 can also be used.)
Up to 20 fields can be designated using commas.

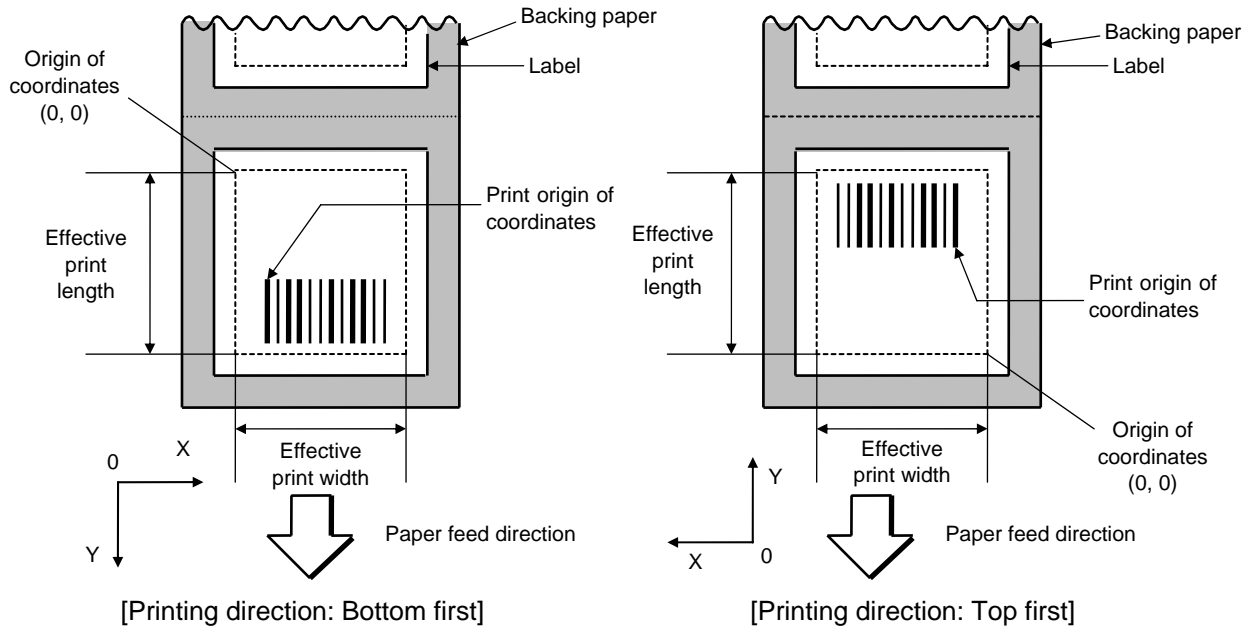
- * Omissible parameters (such as "Increment/decrement," "Selection of print or non-print of numerals under bars" and "No. of digits after zero suppression") cannot be set when the Customer barcode, POSTNET, RM4SCC or KIX CODE is selected.
- * WPC is the generic name for barcodes of JAN, EAN and UPC.
- * In the above descriptions, "Customer barcode" includes the highest priority customer barcode.
- * When the key operation is used to enable the compatible mode for the B-SP series, EAN128 is printed. When the compatible mode for the B-SP series is disabled, UCC/EAN128 is printed.

Explanation

(1) Barcode number

When drawing by the Data Command ([ESC] RB), the format designated by the barcode is selected.

(2) Print origin of coordinates



The print origin of coordinates must be set so that the barcode drawing result will be within the effective print area set by the Label Size Set Command ([ESC] D).

(3) Type of barcode

0: JAN8, EAN8



5: JAN13, EAN13



6: UPC-E



7: EAN13 + 2 digits



8: EAN13 + 5 digits



9: A: CODE128



C: CODE93



G: UPC-E + 2 digits



H: UPC-E + 5 digits



I: EAN8 + 2 digits



J: EAN8 + 5 digits



K: UPC-A



L: UPC-A + 2 digits



M: UPC-A + 5 digits



N: UCC/EAN128



N: EAN128



R: Customer barcode



S: Highest priority customer barcode



U: POSTNET



V: RM4SCC



W: KIX code



(4) Type of check digit

When no check digit is attached, a barcode of the data row will be drawn.

In the case of the check digit check, when each check digit check is performed according to the type of barcode and results in normal, a barcode will be drawn. If the check digit is not proper, the barcode will not be drawn.

When the check digit is automatically attached, each check digit is attached according to the type of barcode when a barcode is drawn.

If the type of barcode is CODE93, CODE128 (with auto code selection), or UCC/EAN128 or EAN128, the check digit will always be attached regardless of the designation of the type of check digit.

If the type of barcode is JAN, EAN or UPC, the designation of no check digit attachment automatically assumes the check digit check.

* DBP Modulus 10 is Modulus 10 for Deutsche Bundespost Postdienst only.

(5) Bar width, space width, and character-to-character space

Designate the bar, space and character-to-character space widths according to the type of barcode. Note that the proper value differs according to the rotational angle of barcode, type, number of digits, print speed, paper used, etc. Examples of such designations are listed below.

In the case of JAN, EAN, UPC, CODE93, CODE128, UCC/EAN128 or EAN128, the width of 2 to 6 modules is automatically calculated by designating a 1-module width.

[Example of setting]

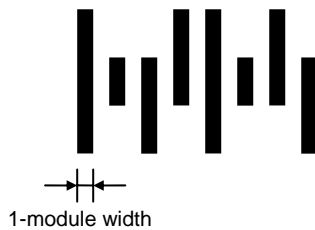
203-dpi print head (1 dot = 1/8 mm)

Type of barcode	1 module		2 modules		3 modules		4 modules		5 modules		6 modules	
	Bar	Space	Bar	Space	Bar	Space	Bar	Space	Bar	Space	Bar	Space
JAN, EAN, UPC	3		6		9		12		-		-	
CODE93	2		4		6		8		-		-	
CODE128, UCC/EAN128, EAN128	2		4		6		8		-		-	

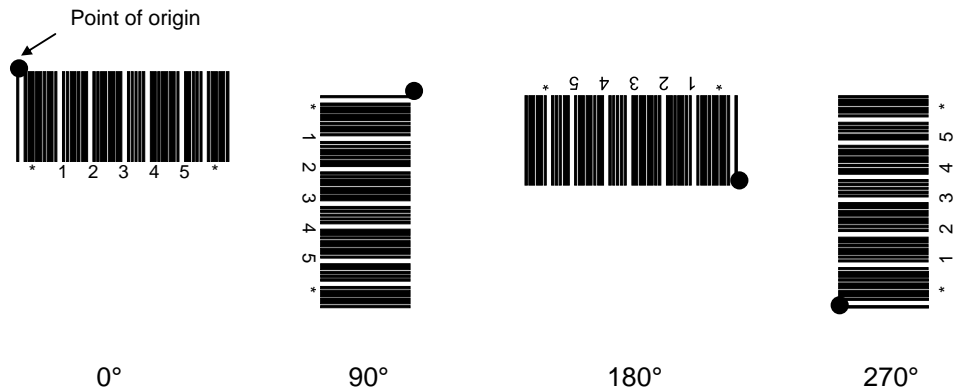
Values to be set in ff: "1-module width"

To be automatically calculated based on the value set in ff: "1-module width"

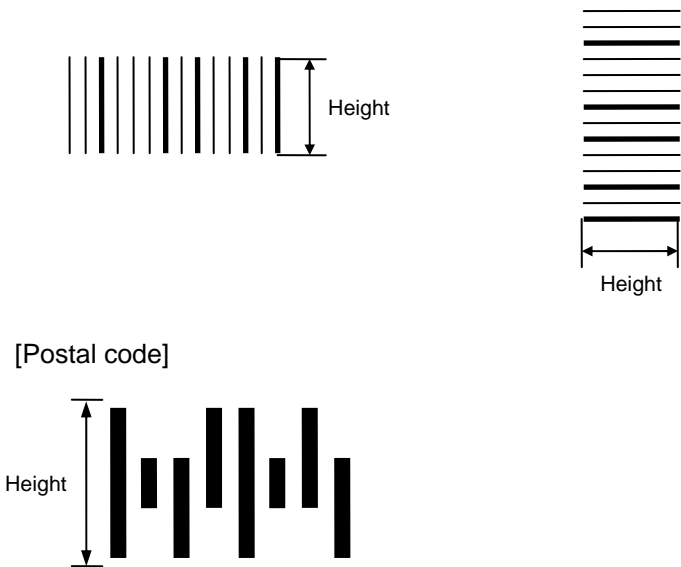
[Customer barcode]



(6) Rotational angle of barcode



(7) Barcode height



(8) Increment/decrement

Printing is performed while the data is incremented or decremented every time a label is issued. Where the data row exceeds the maximum number of digits (40), the data row will not be drawn.

When CODE128 (without auto code selection) is used, the number of the start code (CODE A, CODE B and CODE C) digits is regarded as 2.

Initial value	0000	0000	0000	0000	999999
INC/DEC	+10	+10	+10	+10	+1
Zero suppression	Not designated	5	3	0	3
1st label	0000	0000	└000	0000	999999
2nd label	0010	0010	└010	0010	└└└000
3rd label	0020	0020	└020	0020	└└└001
4th label	0030	0030	└030	0030	└└└002
5th label	0040	0040	└040	0040	└└└003

Letters and numerals for increment/decrement

For CODE93 and CODE128, even if a data string other than numerals are included in the data, increment/decrement is performed. However, if any code which does not exist in each barcode table is contained in the data, increment/decrement is not performed.

For the data string, up to 40 digits (including letters, numerals, and symbols) are possible. Only the numerals are selected and calculated for incrementing/decrementing, and then are returned to the previous position to draw the data.

Example of increment/decrement calculation

Initial value	00000	A0A0A	7A8/9	A2A0A
INC/DEC	+1	+1	+3	-3
1st label	00000	A0A0A	7A8/9	A2A0A
2nd label	00001	A0A1A	7A9/2	A1A7A
3rd label	00002	A0A2A	7A9/5	A1A4A
4th label	00003	A0A3A	7A9/8	A1A1A
5th label	00004	A0A4A	8A0/1	A0A8A

Increment/decrement of data including the special codes of CODE128

Increment/decrement calculation starts from the lowest digit in the data strings. If the data string to be calculated is numeric and the next (upper) digit is ">," this data is a special code (underlined digits shown in the table below). In such case, these two digits are skipped, and the next digit is calculated.

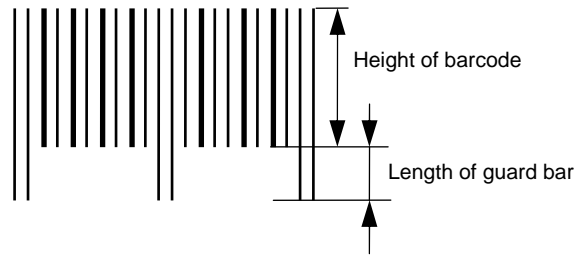
Example of increment/decrement calculation of CODE128

Initial value	00000	00 > <u>08</u>	0A > <u>08</u>	0A9 > <u>08</u>
INC/DEC	+1	+1	+1	+1
1st label	00000	00 > <u>08</u>	0A > <u>08</u>	0A9 > <u>08</u>
2nd label	00001	00 > <u>09</u>	0A > <u>09</u>	0A9 > <u>09</u>
3rd label	00002	01 > <u>00</u>	1A > <u>00</u>	1A0 > <u>00</u>
4th label	00003	01 > <u>01</u>	1A > <u>01</u>	1A0 > <u>01</u>
5th label	00004	01 > <u>02</u>	1A > <u>02</u>	1A0 > <u>02</u>

(9) Length of guard bar

The length of guard bar is valid only when the type of barcode is WPC.

It is ignored in all other cases.



(10) Numerals under bars

Numerals are/are not provided under bars according to the parameter for print/non print of numerals under bars. The numerals under bars to be printed vary according to the type of barcode.

The font of numerals under bars is OCR-B. These numerals are enlarged or reduced only horizontally according to the width of the barcode. When they are drawn vertically, no enlargement or reduction is applied.

[Drawing positions of numerals under bars]

① JAN and EAN

(Example) EAN13 + 2 digits

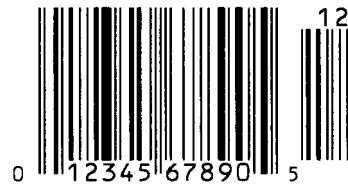


(Example) EAN8



② UPC

(Example) UPC-A + 2 digits



(Example) UPC-E



③ Barcodes other than JAN, EAN and UPC

(Example) CODE39



(Example) UCC/EAN128 or EAN128



(11) Zero suppression

No. of digits after zero suppression	0	1	2	2	3	4	5
Data	0000	0000	0000	0A12	0123	0123	0123
Print	0000	0000	0000	0A12	0123	0123	0123

Zero(s) in a data row is replaced with a space(s) from the upper digits, according to the designated number of digits. However, if the number of digits after zero suppression is greater than the data row, the data row will be drawn without performing zero suppression. Where the data row exceeds the maximum number of digits (40), the data row will not be drawn.

When the print data including start/stop codes are sent, the start/stop codes are also counted as a digit each.

When the barcode type is JAN, EAN, UPC, UCC/EAN 128 or EAN128, the data will be drawn without performing zero suppression.

(12) Data string to be printed

Drawing data can be programmed by designating the number of digits after the symbol “=”.

The maximum number of digits to be printed varies according to the type of barcode. For codes, refer to the barcode table mentioned later.

(13) Link field No.

The link field No. can be programmed by designating it after the symbol “;”.

After the link field No. is designated using the Format Command, the data strings are linked by the Link Field Data Command to draw an image.

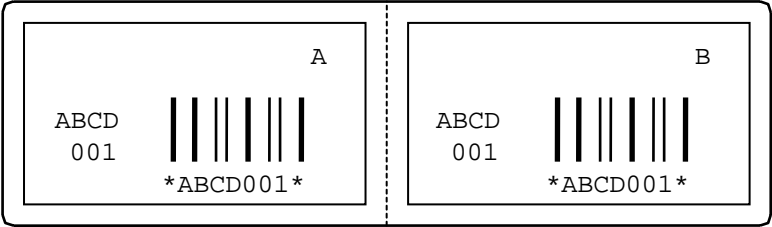
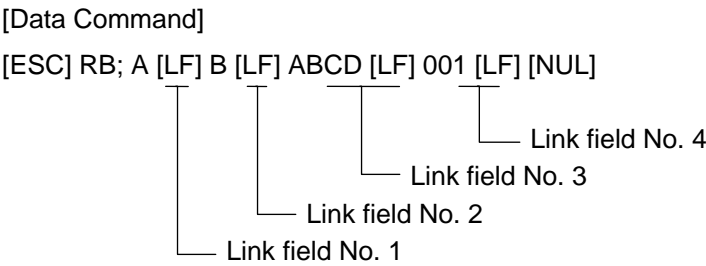
Up to 20 fields can be linked.

The following shows an example of linked fields on the two continuous labels.

[Format Command]

[ESC] PC01;.....	; 01 [LF] [NUL]	: Link field No. 1 is designated.
[ESC] PC02;.....	; 03 [LF] [NUL]	: Link field No. 3 is designated.
[ESC] PC03;.....	; 04 [LF] [NUL]	: Link field No. 4 is designated.
[ESC] XB01;.....	; 03, 04 [LF] [NUL]	: Link fields No. 3 and No. 4 are designated.
[ESC] PC04;.....	; 02 [LF] [NUL]	: Link field No. 2 is designated.
[ESC] PC05;.....	; 03 [LF] [NUL]	: Link field No. 3 is designated.
[ESC] PC06;.....	; 04 [LF] [NUL]	: Link field No. 4 is designated.
[ESC] XB02;.....	; 03, 04 [LF] [NUL]	: Link fields No. 3 and No. 4 are designated.

└── Designating link field No.



Notes

- (1) The check digit attachment, increment/decrement and zero suppression are performed according to the following priority. If any of the conditions is improper, no drawing will take place.
- [For example, the zero(s) is replaced with a space(s) as a result of zero suppression, but the modulus 10 designated to be attached cannot be calculated.]

Increment/decrement > zero suppression > attachment of check digit

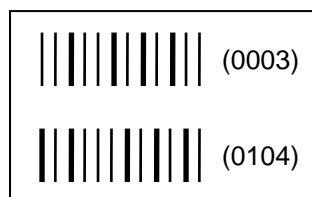
- (2) Up to 32 fields for which increment/decrement has been designated can be drawn. If the total of bit map font, outline font and barcode increment/decrement fields exceeds 32, drawing will take place without incrementing/decrementing any excessive field. The field to be incremented or decremented is incremented or decremented until the Image Buffer Clear Command ([ESC] C) is transmitted.

[Example]

- 1) Format Command (Incrementing barcode No. 01 (+1))
- 2) Format Command (Incrementing barcode No. 02 (+2))
- 3) Image Buffer Clear Command
- 4) Data Command (Barcode No. 01 "0001")
- 5) Data Command (Barcode No. 02 "0100")
- 6) Issue Command (2 labels)



- 7) Issue Command (1 label)



- 8) Image Buffer Clear Command
- 9) Data Command (Barcode No. 02 "3000")
- 10) Issue Command (1 label)

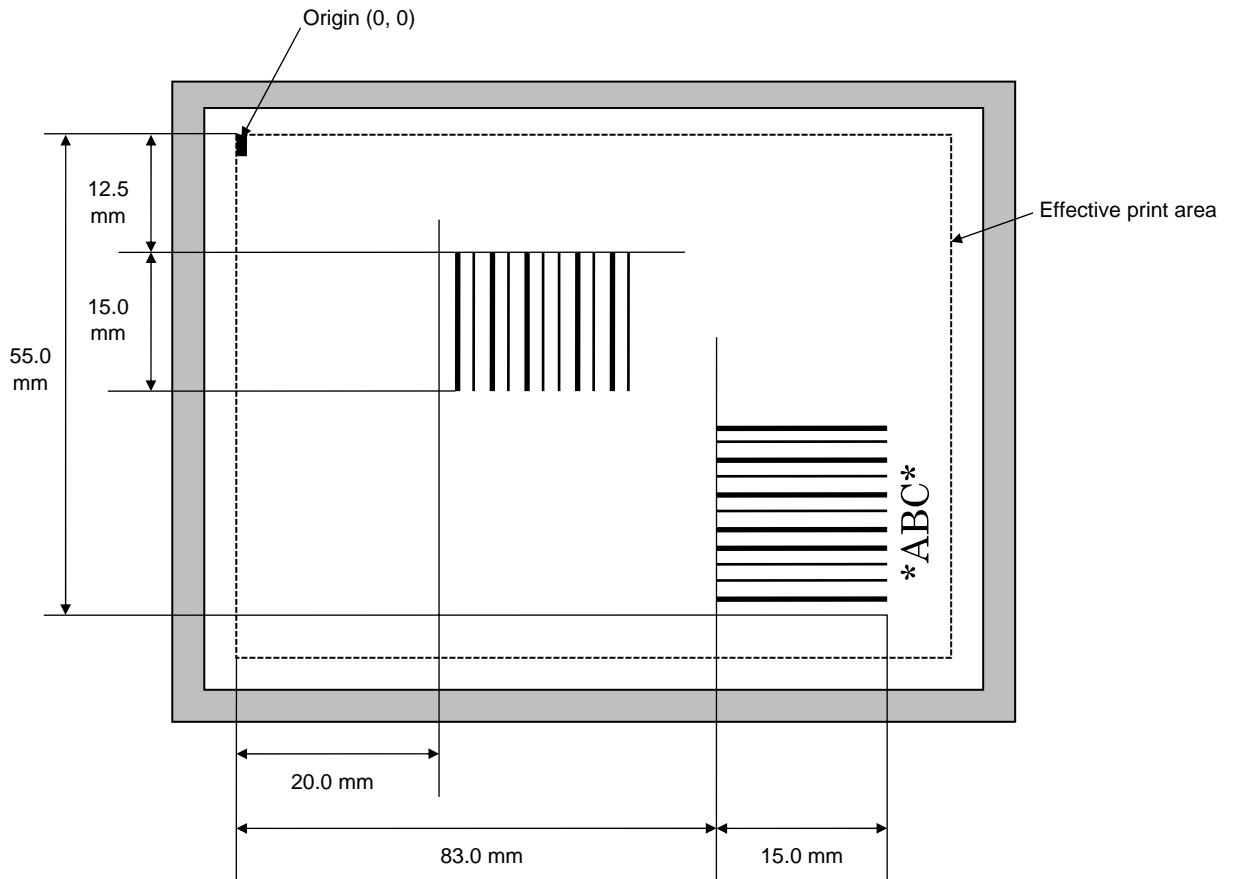


- (3) More than one Barcode Format Command can be connected when transmitted.
[ESC] XB01; 0100, 0150, 3, 1, 02, 02, 06, 06, 02, 0, 0150 [LF]
B02; 0350, 0150, 3, 1, 02, 02, 06, 06, 02, 0, 0150 [LF] [NUL]
- (4) When the drawing data is changed per label issue during printing, the field of the drawing data for the previous label is automatically cleared using the barcode number, then the next drawing data is printed. Therefore, the barcode number which differs according to the drawing fields should be designated.
- (5) Since the automatic field clear is not performed between the Clear Command ([ESC] C) and Issue Command ([ESC] XS), the fixed data may be drawn using the same barcode number. In this case, the Format Command and Data Command should be sent alternately. (After the Issue Command is sent, the fields with the same barcode number are automatically cleared until the Clear Command is sent.)
- (6) The link field designation is cleared by omitting the link field designation using the same barcode No. and reformatting data. The link field designation can be also cleared by the Image Buffer Clear Command.
- (7) A print data string and link field No. cannot be programmed at the same time.

Refer to

- Bit Map Font Format Command ([ESC] PC)
- Outline Font Format Command ([ESC] PV)
- Barcode/Two-dimensional Code Data Command ([ESC] RB)

Examples



[ESC] C [LF] [NUL]

[ESC] XB01; 0200, 0125, 9, 3, 02, 0, 0150, +0000000000, 010, 0, 00 = 12345 [LF] [NUL]

[ESC] XB02; 0830, 0550, 3, 1, 02, 04, 07, 08, 04, 3, 0150, +0000000000, 1, 00, N [LF] [NUL]

[ESC] RB02; *ABC* [LF] [NUL]

[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]

5.6.5 BARCODE FORMAT COMMAND

[ESC] XB

Ⓢ In the case of MSI, Interleaved 2 of 5, CODE39, NW7, Industrial 2 of 5, MATRIX 2 of 5 for NEC

Format	<p>① [ESC] XBaa; bbbb, cccc, d, e, ff, gg, hh, ii, jj, k, lll (, mnnnnnnnnnn, p, qq) (, r) (= sss ----- sss) [LF] [NUL]</p> <p>② [ESC] XBaa; bbbb, cccc, d, e, ff, gg, hh, ii, jj, k, lll (, mnnnnnnnnnn, p, qq) (, r) (; tt₁, tt₂, tt₃, -----, tt₂₀) [LF] [NUL]</p>
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Term	<p>aa: Barcode number 00 to 31</p> <p>bbbb: X-coordinate of the print origin of barcode Fixed at 4 digits (in 0.1 mm units)</p> <p>cccc: Y-coordinate of the print origin of barcode 4 or 5 digits (in 0.1 mm units)</p> <p>d: Type of barcode 1: MSI 2: Interleaved 2 of 5 (ITF) 3: CODE39 (standard) 4: NW7 B: CODE39 (full ASCII) O: Industrial 2 of 5 a: MATRIX 2 of 5 for NEC</p> <p>e: Type of check digit 1: Without attaching check digit 2: Check digit check CODE39 Modulus 43 MSI IBM modulus 10 ITF Modulus 10 Industrial 2 of 5 Modulus check character MATRIX 2 of 5 for NEC Modulus check character 3: Check digit automatic attachment (1) CODE39 Modulus 43 MSI IBM modulus 10 ITF Modulus 10 Industrial 2 of 5 Modulus check character MATRIX 2 of 5 for NEC Modulus check character 4: Check digit automatic attachment (2) MSI IBM modulus 10 + IBM modulus 10 ITF DBP Modulus 10 5: Check digit automatic attachment (3) MSI IBM modulus 11 + IBM modulus 10</p> <p>ff: Narrow bar width 01 to 99 (in units of dots)</p> <p>gg: Narrow space width 01 to 99 (in units of dots)</p>
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* In the case of industrial 2 of 5, designate an element-to-element space.

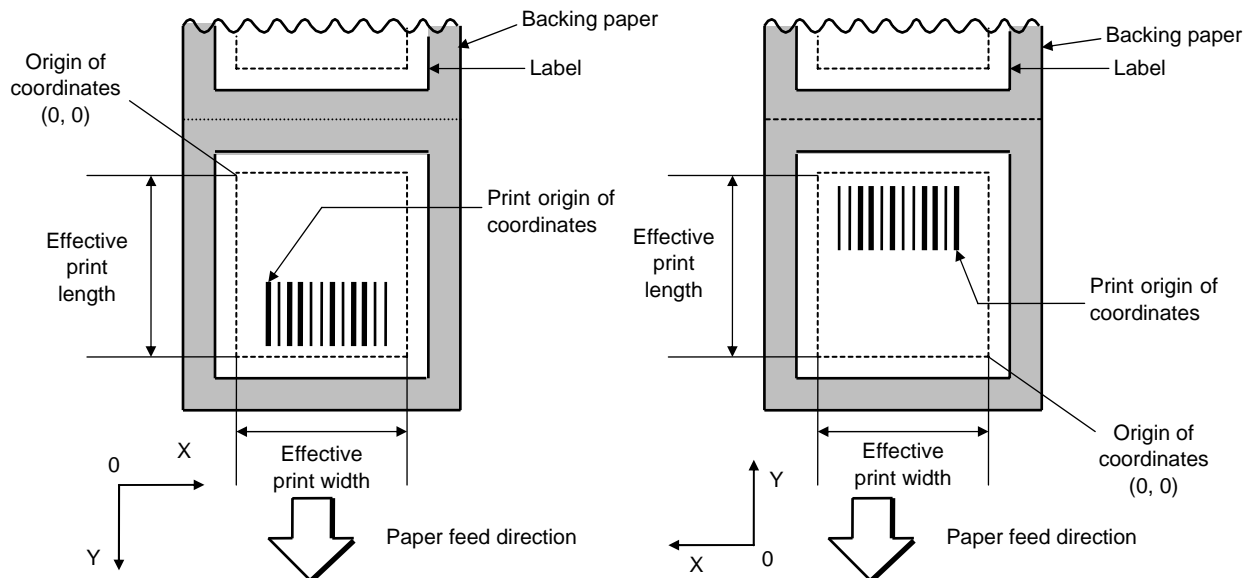
- hh: Wide bar width
01 to 99 (in units of dots)
- ii: Wide space width
01 to 99 (in units of dots)
* In the case of industrial 2 of 5, the value is fixed at 00.
- jj: Character-to-character space width
01 to 99 (in units of dots)
* In the case of MSI and ITF, the character-to-character space width is fixed at 00.
- k: Rotational angle of barcode
0: 0°
1: 90°
2: 180°
3: 270°
- lll: Height of barcode
0000 to 1000 (in 0.1 mm units)
- nnnnnnnnnn: Increment/decrement
(Omissible. If omitted, increment/decrement is not performed.)
m: Indicates whether to increment or decrement
+: Increment
-: Decrement
nnnnnnnnnn: Skip value
0000000000 to 9999999999
- p: Selection of print or non-print of numerals under bars
(Omissible. If omitted, the numerals under the bars are not printed.)
0: Non-print
1: Print
- qq: No. of digits after zero suppression
(Omissible. If omitted, zero suppression is not performed.)
00 to 20
* Reserved in the case of the compatible mode for the B-SP series
- r: Designates the attachment of start/stop code
(Omissible. If omitted, the start/stop code is automatically attached.)
T: Attachment of start code only
P: Attachment of stop code only
N: Start/stop code unattached
- sss ----- sss: Data string to be printed (Omissible)
Max. 126 digits.
However, the number of digits varies according to the type of barcode.
- tt₁, tt₂, tt₃, -----, tt₂₀: Link field No. (Omissible)
01 to 99 (1 to 99 can also be used.)
Up to 20 fields can be designated using commas.

Explanation

(1) Barcode number

When drawing by the Data Command ([ESC] RB), the format designated by the barcode is selected.

(2) Print origin of coordinates



[Printing direction: Bottom first]

[Printing direction: Top first]

The print origin of coordinates must be set so that the barcode drawing result will be within the effective print area set by the Label Size Set Command ([ESC] D).

(3) Type of barcode

1: MSI



2: Interleaved 2 of 5



3: CODE39 (standard)



4: NW7



B: CODE39 (Full ASCII)



O: Industrial 2 of 5



a: Matrix 2 of 5 for NEC



(4) Type of check digit

When no check digit is attached, a barcode of the data row will be drawn.

In the case of the check digit check, when each check digit check is performed according to the type of barcode and results in normal, a barcode will be drawn. If the check digit is not proper, the barcode will not be drawn.

When the check digit is automatically attached, each check digit is attached according to the type of barcode when a barcode is drawn.

* DBP Modulus 10 is Modulus 10 for Deutsche Bundespost Postdienst only.

(5) Bar width, space width, and character-to-character space

Designate the bar, space, and character-to-character space widths according to the type of barcode. Note that the designated proper value differs according to the rotational angle of barcode, type, number of digits, print speed, paper used, etc. Examples of such designations are listed below.

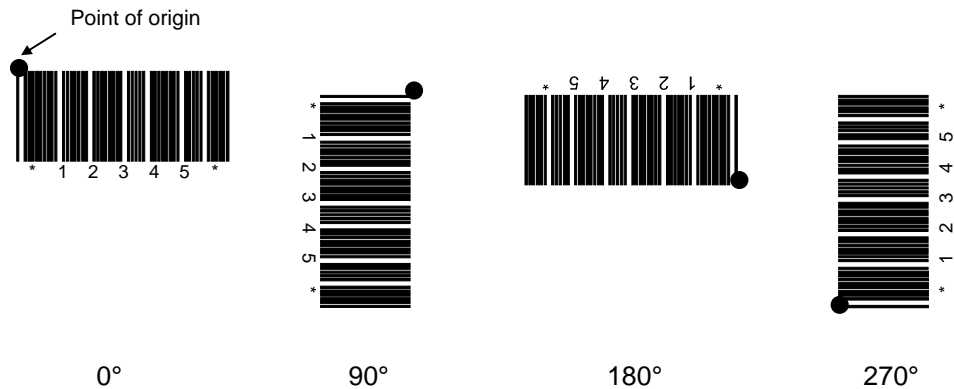
When NW7 is used, transmission of the space character assumes a space equals to 'a narrow space x12 dots'. In this case, the space is max. 255 dots.

[Example of setting]

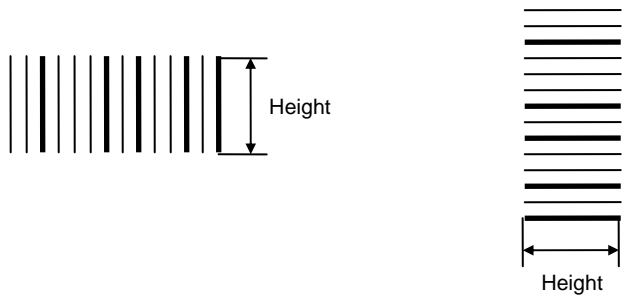
203-dpi print head (1 dot = 1/8 mm)

Type of barcode	Narrow		Wide		Character-to-character space
	Bar	Space	Bar	Space	
MSI	2	2	6	6	0
ITF	2	2	6	6	0
CODE39	2	2	6	6	2
NW7	2	2	6	6	2
Industrial 2 of 5	2	2	6	0	2
MATRIX 2 of 5	2	2	6	6	2

(6) Rotational angle of barcode



(7) Barcode height



(8) Increment/decrement

Printing is performed while the data is incremented or decremented every time a label is issued. Where the data row exceeds the maximum number of digits (40), the data row will not be drawn.

Initial value	0000	0000	0000	0000	999999
INC/DEC	+10	+10	+10	+10	+1
Zero suppression	Not designated	5	3	0	3
1st label	0000	0000	└000	0000	999999
2nd label	0010	0010	└010	0010	└└└000
3rd label	0020	0020	└020	0020	└└└001
4th label	0030	0030	└030	0030	└└└002
5th label	0040	0040	└040	0040	└└└003

Letters and numerals for increment/decrement

For CODE39 (standard), CODE39 (full ASCII) and NW-7, even if a data string other than numerals are included in the data, increment/decrement is performed. However, if any code which does not exist in each barcode table is contained in the data, increment/decrement is not performed.

For the data string, up to 40 digits (including letters, numerals, and symbols) are possible. Only the numerals are selected and calculated for incrementing/decrementing, and then are returned to the previous position to draw the data.

Example of increment/decrement calculation

Initial value	00000	A0A0A	7A8/9	A2A0A
INC/DEC	+1	+1	+3	-3
1st label	00000	A0A0A	7A8/9	A2A0A
2nd label	00001	A0A1A	7A9/2	A1A7A
3rd label	00002	A0A2A	7A9/5	A1A4A
4th label	00003	A0A3A	7A9/8	A1A1A
5th label	00004	A0A4A	8A0/1	A0A8A

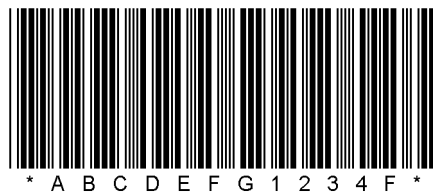
(9) Numerals under bars

Numerals are/are not provided under bars according to the parameter for print/non print of numerals under bars. The numerals under bars to be printed vary according to the type of barcode.

The font of numerals under bars is OCR-B. These numerals are enlarged or reduced only horizontally according to the width of the barcode. When they are drawn vertically, no enlargement or reduction is applied.

[Drawing positions of numerals under bars]

CODE39



(10) Zero suppression

No. of digits after zero suppression	0	1	2	2	3	4	5
Data	0000	0000	0000	0A12	0123	0123	0123
Print	0000	▯▯▯0	▯▯00	▯A12	▯123	0123	0123

Zero(s) in a data row is replaced with a space(s) from the upper digits, according to the designated number of digits. However, if the number of digits after zero suppression is greater than the data row, the data row will be drawn without performing zero suppression. Where the data row exceeds the maximum number of digits (40), the data row will not be drawn.

When the print data including start/stop codes are sent, the start/stop codes are also counted as a digit each.

(11) Start/stop code

This parameter is effective only when the type of barcode is CODE39 and NW7.

When the parameter is designated, whether or not the stop code and the start code are attached to the print data to be sent is not checked.

When the parameter is omitted in the case of CODE39 and NW7, a start/stop code will be attached. The code to be added is "*" in the case of CODE39, and "a" in the case of NW7.

For details, refer to "AUTOMATIC ADDITION OF START/STOP CODES."

(12) Data string to be printed

Drawing data can be programmed by designating the number of digits after the symbol “=”.

The maximum number of digits to be printed varies according to the type of barcode.
For codes, refer to the barcode table mentioned later.

(13) Link field No.

The link field No. can be programmed by designating it after the symbol “;.”
After the link field No. is designated using the Format Command, the data strings are linked by the Link Field Data Command to draw an image.
Up to 20 fields can be linked.
The following shows an example of linked fields on the two continuous labels.

[Format Command]

[ESC] PC01;.....	; 01 [LF] [NUL]	: Link field No. 1 is designated.
[ESC] PC02;.....	; 03 [LF] [NUL]	: Link field No. 3 is designated.
[ESC] PC03;.....	; 04 [LF] [NUL]	: Link field No. 4 is designated.
[ESC] XB01;.....	; 03, 04 [LF] [NUL]	: Link fields No. 3 and No. 4 are designated.
[ESC] PC04;.....	; 02 [LF] [NUL]	: Link field No. 2 is designated.
[ESC] PC05;.....	; 03 [LF] [NUL]	: Link field No. 3 is designated.
[ESC] PC06;.....	; 04 [LF] [NUL]	: Link field No. 4 is designated.
[ESC] XB02;.....	; 03, 04 [LF] [NUL]	: Link fields No. 3 and No. 4 are designated.

└── Designating link field No.

[Data Command]

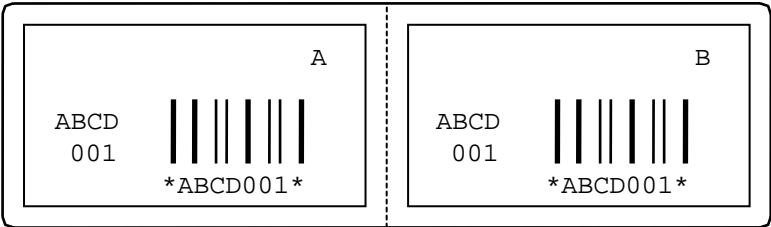
[ESC] RB; A [LF] B [LF] ABCD [LF] 001 [LF] [NUL]

└── Link field No. 4

└── Link field No. 3

└── Link field No. 2

└── Link field No. 1



Notes

- (1) The check digit attachment, increment/decrement and zero suppression are performed according to the following priority. If any of the conditions is improper, no drawing will take place.

For example, the zero(s) is replaced with a space(s) as a result of zero suppression, but the modulus 10 designated to be attached cannot be calculated.

Increment/decrement > zero suppression > attachment of check digit

- (2) Up to 32 fields for which increment/decrement has been designated can be drawn. If the total of bit map font, outline font and barcode increment/decrement fields exceeds 32, drawing will take place without incrementing/decrementing any excessive field. The field to be incremented or decremented is incremented or decremented until the Image Buffer Clear Command ([ESC] C) is transmitted.

[Example]

- 1) Format Command (Incrementing barcode No. 01 (+1))
- 2) Format Command (Incrementing barcode No. 02 (+2))
- 3) Image Buffer Clear Command
- 4) Data Command (Barcode No. 01 "0001")
- 5) Data Command (Barcode No. 02 "0100")
- 6) Issue Command (2 labels)



- 7) Issue Command (1 label)



- 8) Image Buffer Clear Command
- 9) Data Command (Barcode No. 02 "3000")
- 10) Issue Command (1 label)

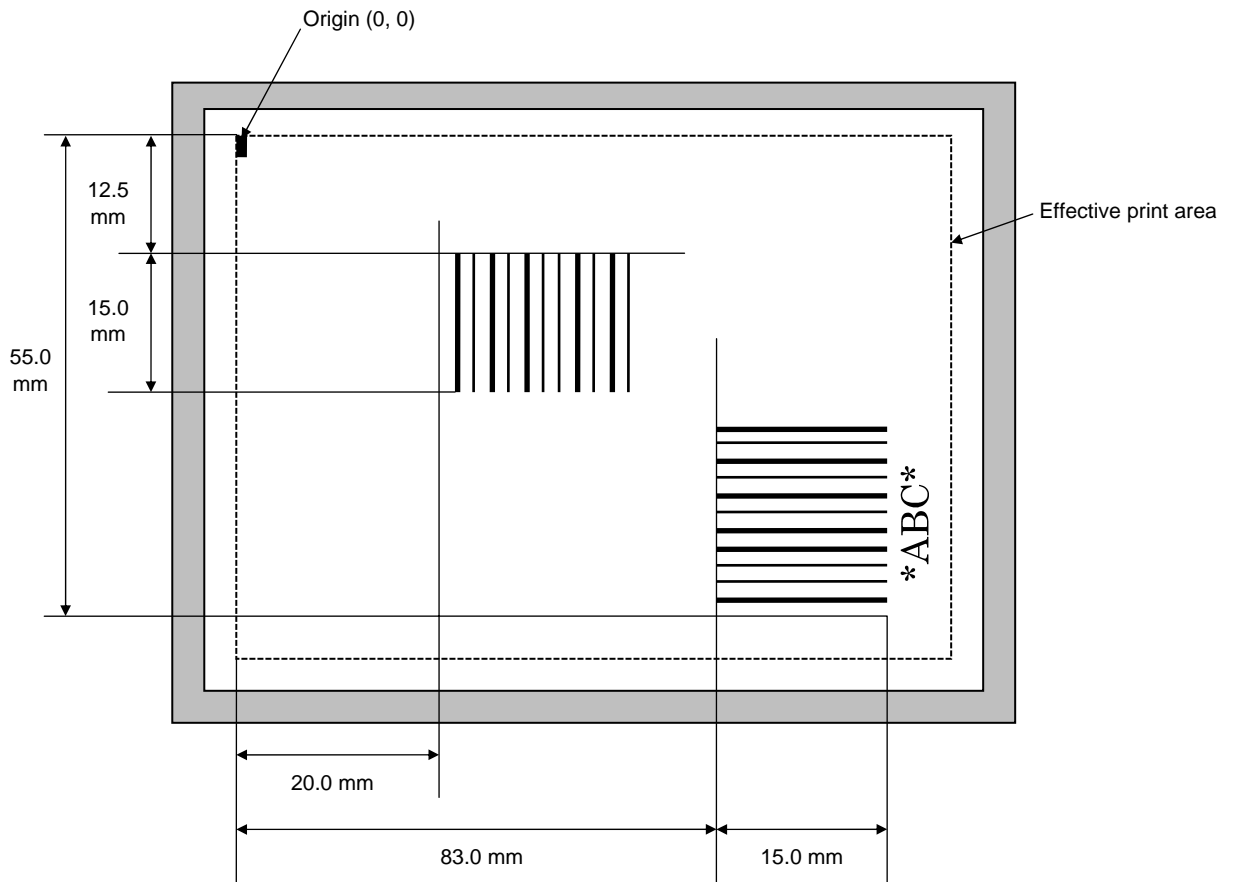


- (3) More than one Barcode Format Command can be connected when transmitted.
[ESC] XB01; 0100, 0150, 3, 1, 02, 02, 06, 06, 02, 0, 0150 [LF]
B02; 0350, 0150, 3, 1, 02, 02, 06, 06, 02, 0, 0150 [LF] [NUL]
- (4) When the drawing data is changed per label issue during printing, the field of the drawing data for the previous label is automatically cleared using the barcode number, then the next drawing data is printed. Therefore, the barcode number which differs according to the drawing fields should be designated.
- (5) Since the automatic field clear is not performed between the Clear Command ([ESC] C) and Issue Command ([ESC] XS), the fixed data may be drawn using the same barcode number. In this case, the Format Command and Data Command should be sent alternately. (After the Issue Command is sent, the fields with the same barcode number are automatically cleared until the Clear Command is sent.)
- (6) The link field designation is cleared by omitting the link field designation using the same barcode No. and reformatting data. The link field designation can be also cleared by the Image Buffer Clear Command.
- (7) A print data string and link field No. cannot be programmed at the same time.
- (8) In the case of the compatible mode for the B-SP series, the reserved area is not checked.

Refer to

- Bit Map Font Format Command ([ESC] PC)
- Outline Font Format Command ([ESC] PV)
- Barcode/Two-dimensional Code Data Command ([ESC] RB)

Examples



[ESC] C [LF] [NUL]

[ESC] XB01; 0200, 0125, 3, 1, 02, 02, 06, 06, 02, 0, 0150 = 12345 [LF] [NUL]

[ESC] XB02; 0830, 0550, 3, 1, 02, 04, 07, 08, 04, 3, 0150, +0000000000, 1, 00, N [LF] [NUL]

[ESC] RB02; *ABC* [LF] [NUL]

[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]

5.6.6 BARCODE FORMAT COMMAND

[ESC] XB

Ⓢ In the case of GS1 Databar

Format	<p>① [ESC] XBaa; bbbb, cccc, d, e, ff, g, hhhh (, ijxxxxxxxx, kk) (= sss ----- sss) [LF] [NUL]</p> <p>② [ESC] XBaa; bbbb, cccc, d, e, ff, g, hhhh (, ijxxxxxxxx, kk) (; tt₁, tt₂, tt₃, -----, tt₂₀) [LF] [NUL]</p>
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Term	<p>aa: Barcode number 00 to 31</p> <p>bbbb: X-coordinate of the print origin of barcode Fixed at 4 digits (in 0.1 mm units)</p> <p>cccc: Y-coordinate of the print origin of barcode 4 or 5 digits (in 0.1 mm units)</p> <p>d: Type of barcode b: GS1 Databar family</p> <p>e: Version (Type of GS1 Databar) 1: GS1 Databar Omni-directional 2: GS1 Databar Stacked 3: GS1 Databar Stacked Omni-directional 4: GS1 Databar Limited 5: GS1 Databar Expanded 6: GS1 Databar Expanded Stacked</p> <p>ff: 1-module width 01 to 15 (in units of dots)</p> <p>g: Rotational angle of barcode 0: 0° 1: 90° 2: 180° 3: 270°</p> <p>hhhh: Height of the barcode 0000 to 1000 (in 0.1 mm units)</p> <p>ijxxxxxxxx: Increment/decrement (Omissible. If omitted, increment/decrement is not performed.) i: Indicates whether to increment or decrement +: Increment -: Decrement</p> <p>jjxxxxxxxx: Skip value 0000000000 to 9999999999</p> <p>kk: No. of digits after zero suppression (Omissible. If omitted, zero suppression is not performed.) 00 to 20</p>
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* Reserved in the case of the compatible mode for the B-SP series

sss ----- sss: Data string to be printed (Omissible)
Max. 126 digits.
However, the number of digits varies according to the type of barcode.

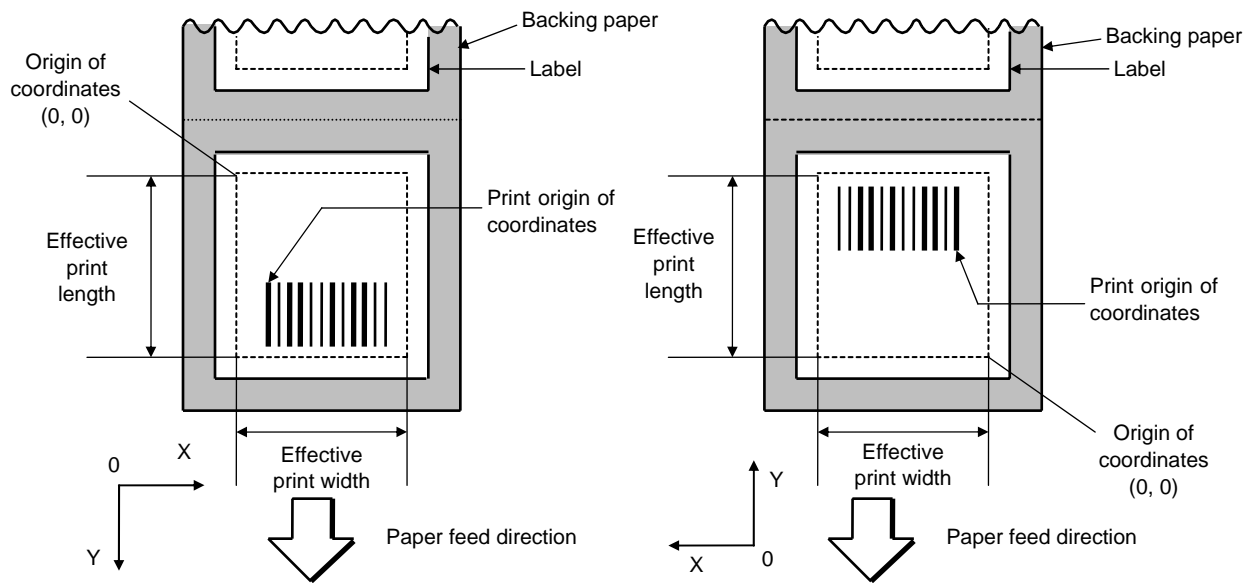
tt₁, tt₂, tt₃, -----, tt₂₀: Link field No. (Omissible)
01 to 99 (1 to 99 can also be used.)
Up to 20 fields can be designated using commas.

Explanation

(1) Barcode number

When drawing by the Data Command ([ESC] RB), the format designated by the barcode is selected.

(2) Print origin of coordinates



[Printing direction: Bottom first]

[Printing direction: Top first]

The print origin of coordinates must be set so that the barcode drawing result will be within the effective print area set by the Label Size Set Command ([ESC] D).

(3) Type of barcode (Detailed version types)

1: GS1 Databar Omni-directional



2: GS1 Databar Stacked



3: GS1 Databar Stacked Omni-directional



4: GS1 Databar Limited



5: GS1 Databar Expanded



6: GS1 Databar Expanded Stacked



(4) Bar width, space width, and character-to-character space

Designate the bar, space, and character-to-character space widths according to the type of barcode. Note that the designated proper value differs according to the rotational angle of barcode, type, number of digits, print speed, paper used, etc. Examples of such designations are listed below.

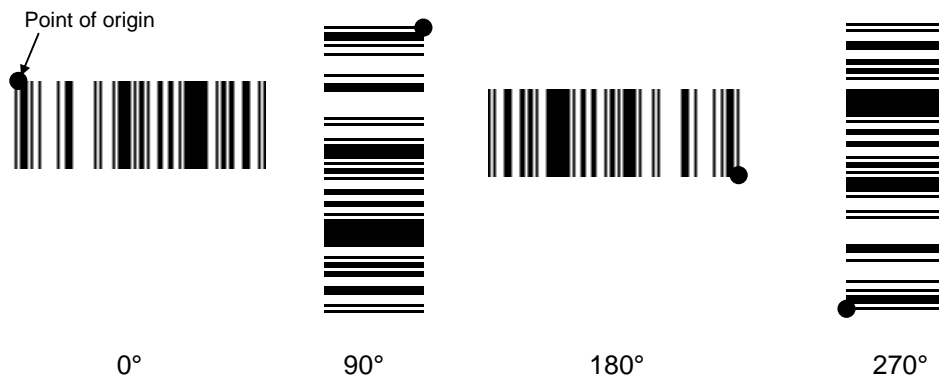
The width of 2 to 4 modules is automatically calculated by designating a 1-module width.

[Example of setting]

203-dpi print head (1 dot = 1/8 mm)

1 module		2 module		3 module		4 module	
Bar	Space	Bar	Space	Bar	Space	Bar	Space
2		4		6		8	
3		6		9		12	

(5) Rotational angle of barcode

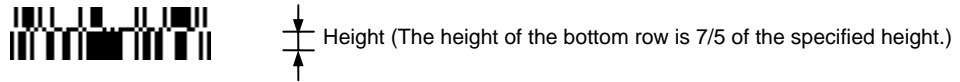


(6) Barcode height

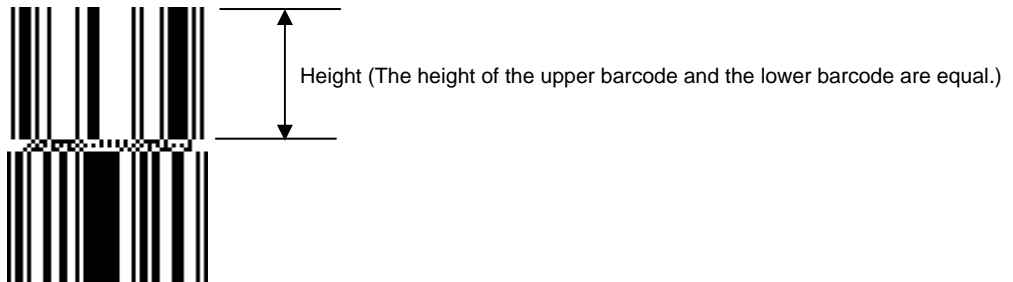
[GS1 Databar Omni-directional]



[GS1 Databar Stacked]



[GS1 Databar Stacked Omni-directional]



[GS1 Databar Limited]



[GS1 Databar Expanded]



[GS1 Databar Expanded Stacked]



When the barcode height is set to 0000, a barcode (including guard bars) and numerals under bars are not drawn. However, the barcode printed on the previous label is cleared.

(7) Increment/decrement

Printing is performed while the data is incremented or decremented every time a label is issued. Where the data row exceeds the maximum number of digits (40), the data row will not be drawn.

Initial value	0000	0000	0000	0000	999999
INC/DEC	+10	+10	+10	+10	+1
Zero suppression	Not designated	5	3	0	3
1st label	0000	0000	└000	0000	999999
2nd label	0010	0010	└010	0010	└└└000
3rd label	0020	0020	└020	0020	└└└001
4th label	0030	0030	└030	0030	└└└002
5th label	0040	0040	└040	0040	└└└003

Letters and numerals for increment/decrement

For the data string, up to 40 digits (including letters, numerals, and symbols) are possible. Only the numerals are selected and calculated for incrementing/decrementing, and then are returned to the previous position to draw the data.

Example of increment/decrement calculation

Initial value	00000	A0A0A	7A8/9	A2A0A
INC/DEC	+1	+1	+3	-3
1st label	00000	A0A0A	7A8/9	A2A0A
2nd label	00001	A0A1A	7A9/2	A1A7A
3rd label	00002	A0A2A	7A9/5	A1A4A
4th label	00003	A0A3A	7A9/8	A1A1A
5th label	00004	A0A4A	8A0/1	A0A8A

(8) Zero suppression

No. of digits after zero suppression	0	1	2	2	3	4	5
Data	0000	0000	0000	0A12	0123	0123	0123
Print	0000	└└└0	└└00	└A12	└123	0123	0123

Zero(s) in a data row is replaced with a space(s) from the upper digits, according to the designated number of digits. However, if the number of digits after zero suppression is greater than the data row, the data row will be drawn without performing zero suppression. Where the data row exceeds the maximum number of digits (40), the data row will not be drawn.

When the print data including start/stop codes are sent, the start/stop codes are also counted as a digit each.

(9) Data string to be printed

Drawing data can be programmed by designating the number of digits after the symbol “=”.

The maximum number of digits to be printed varies according to the type of barcode. For codes, refer to the barcode table mentioned later.

(10) Link field No.

The link field No. can be programmed by designating it after the symbol “;.”
After the link field No. is designated using the Format Command, the data strings are linked by the Link Field Data Command to draw an image.
Up to 20 fields can be linked.
The following shows an example of linked fields on the two continuous labels.

[Format Command]

[ESC] PC01;..... ; 01 [LF] [NUL] : Link field No. 1 is designated.
[ESC] PC02;..... ; 03 [LF] [NUL] : Link field No. 3 is designated.
[ESC] PC03;..... ; 04 [LF] [NUL] : Link field No. 4 is designated.
[ESC] XB01;..... ; 03, 04 [LF] [NUL] : Link fields No. 3 and No. 4 are designated.

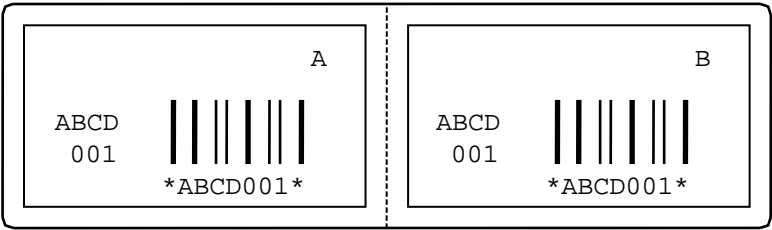
[ESC] PC04;..... ; 02 [LF] [NUL] : Link field No. 2 is designated.
[ESC] PC05;..... ; 03 [LF] [NUL] : Link field No. 3 is designated.
[ESC] PC06;..... ; 04 [LF] [NUL] : Link field No. 4 is designated.
[ESC] XB02;..... ; 03, 04 [LF] [NUL] : Link fields No. 3 and No. 4 are designated.

└── Designating link field No.

[Data Command]

[ESC] RB; A [LF] B [LF] ABCD [LF] 001 [LF] [NUL]

└── Link field No. 4
└── Link field No. 3
└── Link field No. 2
└── Link field No. 1



Notes

- (1) The check digit attachment, increment/decrement and zero suppression are performed according to the following priority. If any of the conditions is improper, no drawing will take place.

For example, the zero(s) is replaced with a space(s) as a result of zero suppression, but the modulus 10 designated to be attached cannot be calculated.

Increment/decrement > zero suppression > attachment of check digit

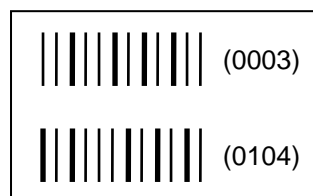
- (2) Up to 32 fields for which increment/decrement has been designated can be drawn. If the total of bit map font, outline font and barcode increment/decrement fields exceeds 32, drawing will take place without incrementing/decrementing any excessive field. The field to be incremented or decremented is incremented or decremented until the Image Buffer Clear Command ([ESC] C) is transmitted.

[Example]

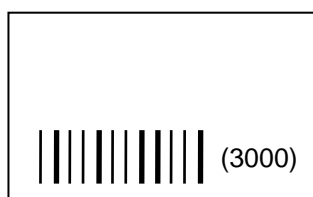
- 1) Format Command (Incrementing barcode No. 01 (+1))
- 2) Format Command (Incrementing barcode No. 02 (+2))
- 3) Image Buffer Clear Command
- 4) Data Command (Barcode No. 01 "0001")
- 5) Data Command (Barcode No. 02 "0100")
- 6) Issue Command (2 labels)



- 7) Issue Command (1 label)



- 8) Image Buffer Clear Command
- 9) Data Command (Barcode No. 02 "3000")
- 10) Issue Command (1 label)

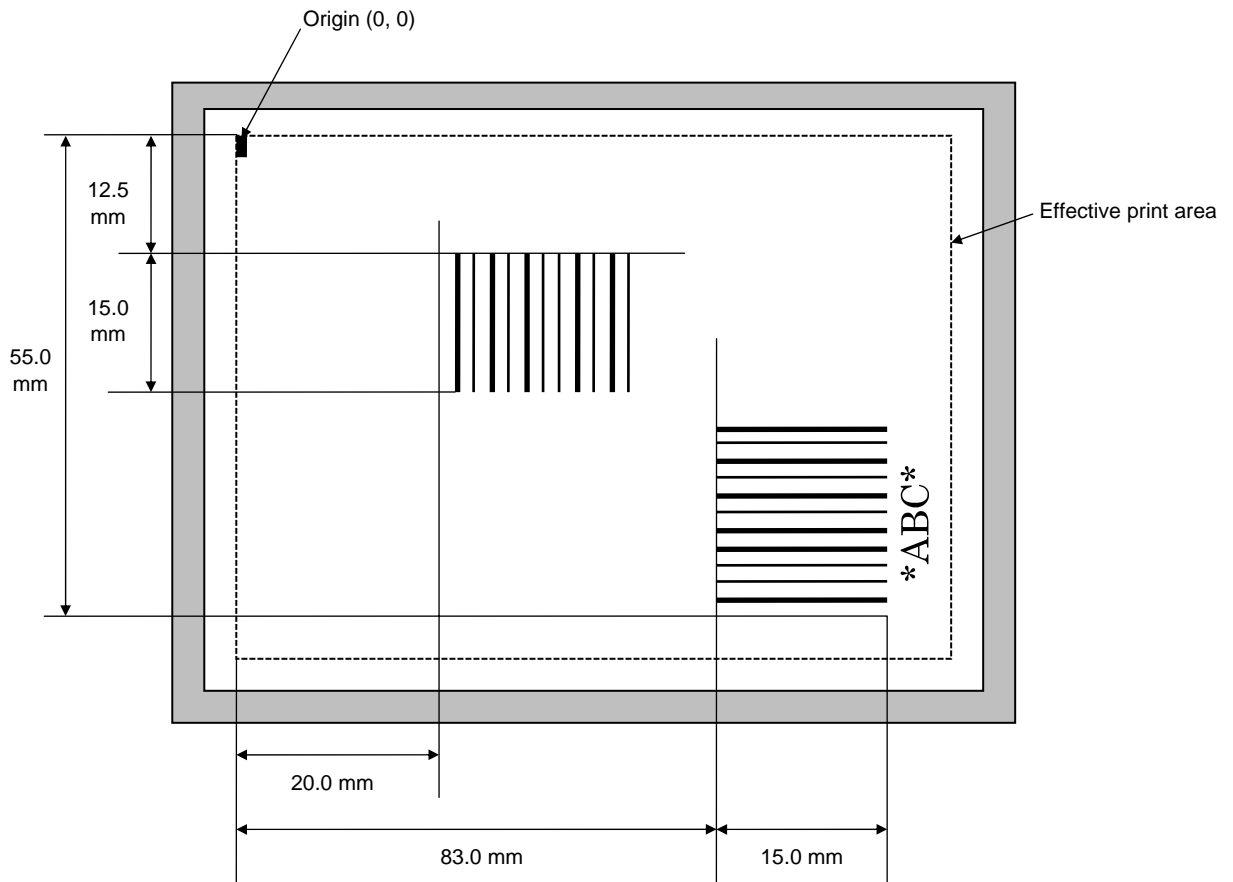


- (3) More than one Barcode Format Command can be connected when transmitted.
[ESC] XB01; 0100, 0150, 3, 1, 02, 02, 06, 06, 02, 0, 0150 [LF]
B02; 0350, 0150, 3, 1, 02, 02, 06, 06, 02, 0, 0150 [LF] [NUL]
- (4) When the drawing data is changed per label issue during printing, the field of the drawing data for the previous label is automatically cleared using the barcode number, then the next drawing data is printed. Therefore, the barcode number which differs according to the drawing fields should be designated.
- (5) Since the automatic field clear is not performed between the Clear Command ([ESC] C) and Issue Command ([ESC] XS), the fixed data may be drawn using the same barcode number. In this case, the Format Command and Data Command should be sent alternately. (After the Issue Command is sent, the fields with the same barcode number are automatically cleared until the Clear Command is sent.)
- (6) The link field designation is cleared by omitting the link field designation using the same barcode No. and reformatting data. The link field designation can be also cleared by the Image Buffer Clear Command.
- (7) A print data string and link field No. cannot be programmed at the same time.
- (8) In the case of the compatible mode for the B-SP series, the reserved area is not checked.

Refer to

- Bit Map Font Format Command ([ESC] PC)
- Outline Font Format Command ([ESC] PV)
- Barcode/Two-dimensional Code Data Command ([ESC] RB)

Examples



[ESC] C [LF] [NUL]

[ESC] XB01; 0200, 0125, 3, 1, 03, 03, 08, 08, 03, 0, 0150 = 12345 [LF] [NUL]

[ESC] XB02; 0830, 0550, 3, 1, 02, 04, 07, 08, 04, 3, 0150, +0000000000, 1, 00, N [LF] [NUL]

[ESC] RB02; *ABC* [LF] [NUL]

[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]

5.6.7 TWO-DIMENSIONAL CODE FORMAT COMMAND (Data Matrix) [ESC] XB

Format	① [ESC] XBaa; bbbb, cccc, d, ee, ff, gg, h (, Ciiijj) (, Jkklmmnnn) (= ooo ----- ooo) [LF] [NUL]
--------	---

② [ESC] XBaa; bbbb, cccc, d, ee, ff, gg, h (, Ciiijj) (, Jkklmmnnn)
(; pp₁, pp₂, pp₃, -----, pp₂₀) [LF] [NUL]

Term	aa: Two-dimensional code number 00 to 31
	bbbb: X-coordinate of the print origin of the two-dimensional code Fixed at 4 digits (in 0.1 mm units)
	cccc: Y-coordinate of the print origin of the two-dimensional code 4 or 5 digits (in 0.1 mm units)
	d: Type of two-dimensional code Q: Data Matrix
	ee: ECC type 00: ECC000 01: ECC050 04: ECC050 05: ECC050 06: ECC080 07: ECC080 08: ECC080 09: ECC100 10: ECC100 11: ECC140 12: ECC140 13: ECC140 14: ECC140 20: ECC200
	ff: 1-cell width 00 to 99 (in units of dots)
	gg: Format ID 01: Format ID 1 02: Format ID 2 03: Format ID 3 04: Format ID 4 05: Format ID 5 06: Format ID 6

* When ECC200 is designated as ECC type, the format ID designation is ignored.
When format ID of 11 through 16 is designated, ECC200 is automatically selected (to ensure compatibility with the old model).

h: Rotational angle of two-dimensional code

- 0: 0°
- 1: 90°
- 2: 180°
- 3: 270°

Ciiiijjj: No. of cells

(Omissible. If omitted, it is automatically set.)

iii: No. of cells in the X direction 000 to 144

jjj: No. of cells in the Y direction 000 to 144

* Cell setting varies according to the ECC type.

	ECC000 to ECC140	ECC200
No. of cells to be designated	Odd numbers only	Even numbers only
Min./Max. No. of cells	9 × 9 to 49 × 49	10 × 10 to 144 × 144
Rectangular code	None	18 × 8 32 × 8 26 × 12 36 × 12 36 × 16 48 × 16

* When this parameter is omitted, the number of cells is automatically set. Also, when any data other than the above values are designated for the number of cells in the X and Y directions, the number of cells is automatically set.

Jkkllmmnnn: Connection setting

(Omissible. If omitted, connection is not made.)

kk: Code number 01 to 16

ll: No. of divided codes 02 to 16

mmm: ID number 1 001 to 254

nnn: ID number 2 001 to 254

ooo ----- ooo: Data string to be printed (Omissible)

Max. 2000 digits

pp₁, pp₂, pp₃, -----, pp₂₀: Link field No. (Omissible)

01 to 99 (1 to 99 can also be used.)

Up to 20 fields can be designated using commas.

* The maximum of 2000 digits of data string to be printed and the maximum of 99 dots of the 1-cell width are acceptable. (The maximum number of digits of the data string to be printed differs depending on the ECC level and the contents of data.) However, note the following limits:

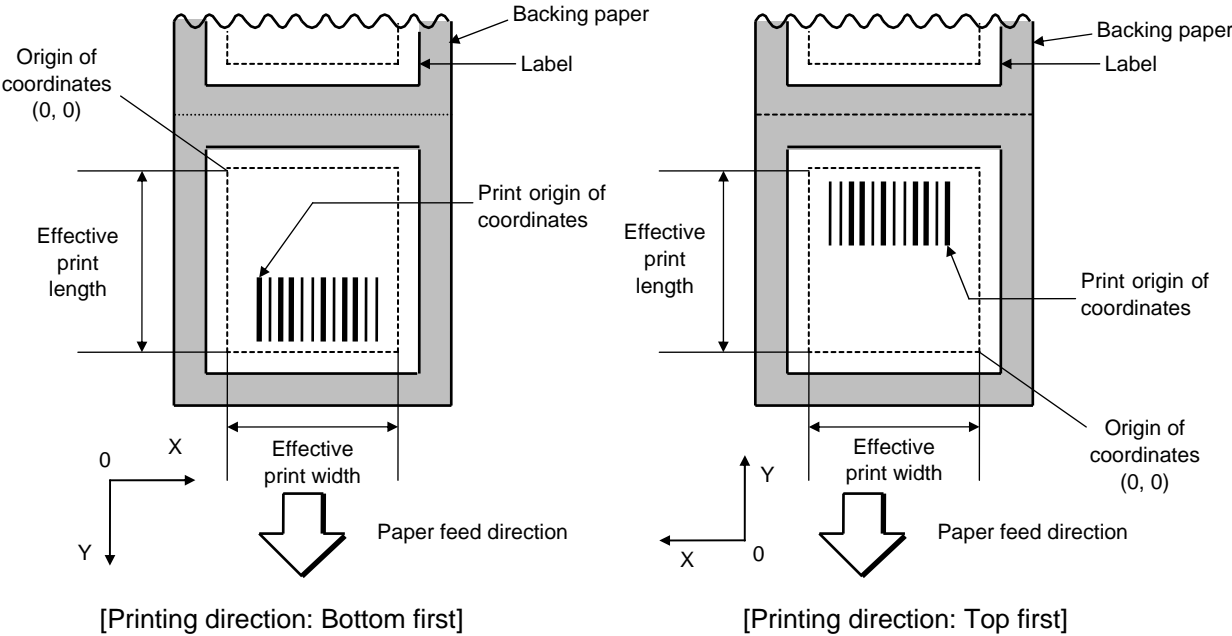
- The maximum of 2000-digit data string to be printed are acceptable. However, it cannot actually be printed, since it cannot be contained within the 2-inch head width.
- If the print ratio of one line (the print head width) is high, printing may become poor, or the printer may be reset. Be careful about the print ratio.
- When a large value is set for the 1-cell width, decrease the number of digits of data to contain the data within the head width.

Explanation

(1) Two-dimensional code number

When drawing by the Data Command ([ESC] RB), the format designated by the two-dimensional code number is selected.

(2) Print origin of coordinates



The print origin of coordinates must be set so that the two-dimensional code drawing result will be within the effective print area set by the Label Size Set Command ([ESC] D).

(3) Type of two-dimensional code

Q: Data Matrix

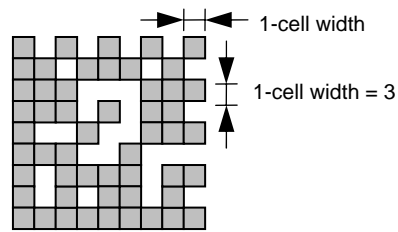


(4) ECC type

Data Matrix contains a function to correct a code reading error using an error correction code (ECC) and restore normal data. The ECC should be chosen from several types of ECCs according to usage. The general correction ability is as follows. However, it may vary according to the error conditions.

ECC type	Error Correction Ability	Overhead by ECC
ECC000	<div>Low</div> <div>↕</div> <div>High</div>	0%
ECC050		25%
ECC080		33%
ECC100		50%
ECC140		75%
ECC200		Approx. 30%

(5) 1-cell width



When 1-cell width is set to 00 for the Data Matrix or CP code, a two-dimensional code is not drawn. However, the barcode printed on the previous label is cleared.

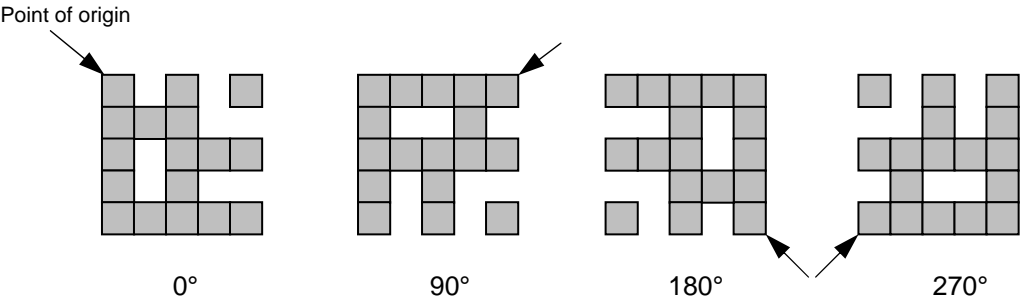
The maximum cell width is 99 dots. (However, the number of digits of data should be limited so the two-dimensional code can be printed within the 2-inch head width.)

(6) Format ID

Data Matrix can handle all codes including alphanumerics, symbols and Kanji. Since the data compression rate varies according to the code, a code to be used is designated using the format ID.

Format ID	Code	Details
1	Numerics	0 to 9 space
2	Letters	A to Z space
3	Alphanumerics, symbols	0 to 9 A to Z space . , - /
4	Alphanumerics	0 to 9 A to Z space
5	ASCII (7 bit)	00H to 7FH
6	ISO (8 bit)	00H to FFH (Kanji)

(7) Rotational angle of two-dimensional code



(8) Maximum number of digits

The maximum number of digits varies according to the ECC type or format ID.

Since a Kanji character uses 2 bytes, its maximum number of digits becomes half of the following values:

	ECC000	ECC050	ECC080	ECC100	ECC140
Format ID 1	500	457	402	300	144
Format ID 2	452	333	293	218	105
Format ID 3	394	291	256	190	91
Format ID 4	413	305	268	200	96
Format ID 5	310	228	201	150	72
Format ID 6	271	200	176	131	63

	Numeric	Alphanumeric	8 bit
ECC200	2000	2000	1556

For the maximum number of digits in cell units, see the next page.

(9) Connection setting

The connection setting is used when the data cannot be expressed with a two-dimensional code. Data is comprised of more than one two-dimensional code. When three two-dimensional codes are used to comprise data, for example, identification information of 1/3, 2/3, and 3/3 is inserted into each two-dimensional code. The ID number is assigned to identify the proper combination of two-dimensional codes when plural connecting symbols are printed on one label. For example, when there are two kinds of data containing identification information for 1/2 and 2/2 in the same label, combination of two-dimensional codes is unclear. By adding the ID number, the combination is made clearer.

(10) Data string to be printed

Drawing data can be programmed by designating the number of digits after the symbol “=.” The maximum number of digits to be printed is 2000. (However, the number of digits of data should be limited so the two-dimensional code can be printed within the 2-inch head width.)

(11) Link field No.

The link field No. can be programmed by designating it after the symbol “;.”
After the link field No. is designated using the Format Command, the data strings are linked by the Link Field Data Command to draw an image.
Up to 20 fields can be linked.
The following shows an example of linked fields on the two continuous labels.

[Format Command]

[ESC] PC01;..... ; 01 [LF] [NUL] : Link field No. 1 is designated.
[ESC] PC02;..... ; 03 [LF] [NUL] : Link field No. 3 is designated.
[ESC] PC03;..... ; 04 [LF] [NUL] : Link field No. 4 is designated.
[ESC] XB01;..... ; 03, 04 [LF] [NUL] : Link fields No. 3 and No. 4 are designated.

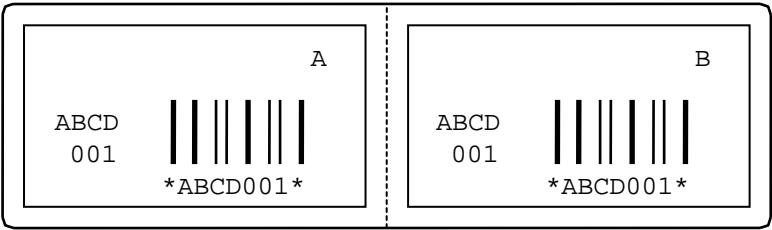
[ESC] PC04;..... ; 02 [LF] [NUL] : Link field No. 2 is designated.
[ESC] PC05;..... ; 03 [LF] [NUL] : Link field No. 3 is designated.
[ESC] PC06;..... ; 04 [LF] [NUL] : Link field No. 4 is designated.
[ESC] XB02;..... ; 03, 04 [LF] [NUL] : Link fields No. 3 and No. 4 are designated.

└─── Designating link field No.

[Data Command]

[ESC] RB; A [LF] B [LF] ABCD [LF] 001 [LF] [NUL]

└─── Link field No. 4
└─── Link field No. 3
└─── Link field No. 2
└─── Link field No. 1



(12) Cell size and the effective data capacity

Symbol size		ECC000			ECC050			ECC080			ECC100			ECC140		
		Numeric capacity	Alphanum capacity	8-bit byte capacity	Numeric capacity	Alphanum capacity	8-bit byte capacity	Numeric capacity	Alphanum capacity	8-bit byte capacity	Numeric capacity	Alphanum capacity	8-bit byte capacity	Numeric capacity	Alphanum capacity	8-bit byte capacity
Row	Col															
9	9	3	2	1	—	—	—	—	—	—	—	—	—	—	—	—
11	11	12	8	5	1	1	—	—	—	—	—	—	—	—	—	—
13	13	24	16	10	10	6	4	4	3	2	1	1	—	—	—	—
15	15	37	25	16	20	13	9	13	9	6	8	5	3	—	—	—
17	17	53	35	23	32	21	14	24	16	10	16	11	7	2	1	1
19	19	72	48	31	46	30	20	36	24	16	25	17	11	6	4	3
21	21	92	61	40	61	41	27	50	33	22	36	24	15	12	8	5
23	23	115	76	50	78	52	34	65	43	28	47	31	20	17	11	7
25	25	140	93	61	97	65	42	82	54	36	60	40	26	24	16	10
27	27	168	112	73	118	78	51	100	67	44	73	49	32	30	20	13
29	29	197	131	86	140	93	61	120	80	52	88	59	38	38	25	16
31	31	229	153	100	164	109	72	141	94	62	104	69	45	46	30	20
33	33	264	176	115	190	126	83	164	109	72	121	81	53	54	36	24
35	35	300	200	131	217	145	95	188	125	82	140	93	61	64	42	28
37	37	339	226	148	246	164	108	214	143	94	159	106	69	73	49	32
39	39	380	253	166	277	185	121	242	161	106	180	120	78	84	56	36
41	41	424	282	185	310	206	135	270	180	118	201	134	88	94	63	41
43	43	469	313	205	344	229	150	301	201	132	224	149	98	106	70	46
45	45	500	345	226	380	253	166	333	222	146	248	165	108	118	78	51
47	47	500	378	248	418	278	183	366	244	160	273	182	119	130	87	57
49	49	500	413	271	457	305	200	402	268	176	300	200	131	144	96	63

		ECC200		
Symbol size		Numeric capacity	Alphanum capacity	8-bit byte capacity
Row	Col			
10	10	6	3	1
12	12	10	6	3
14	14	16	10	6
16	16	24	16	10
18	18	36	25	16
20	20	44	31	20
22	22	60	43	28
24	24	72	52	34
26	26	88	64	42
32	32	124	91	60
36	36	172	127	84
40	40	228	169	112
44	44	288	214	142
48	48	348	259	172
52	52	408	304	202
64	64	560	418	278
72	72	736	550	366
80	80	912	682	454
88	88	1152	862	574
96	96	1392	1042	694
104	104	1632	1222	814
120	120	2000	1573	1048
132	132	2000	1954	1302
144	144	2000	2000	1556

Rectangular code

		ECC200		
Symbol size		Numeric capacity	Alphanum capacity	8-bit byte capacity
Row	Col			
8	18	10	6	3
8	32	20	13	8
12	26	32	22	14
12	36	44	31	20
16	36	64	46	30
16	48	98	72	47

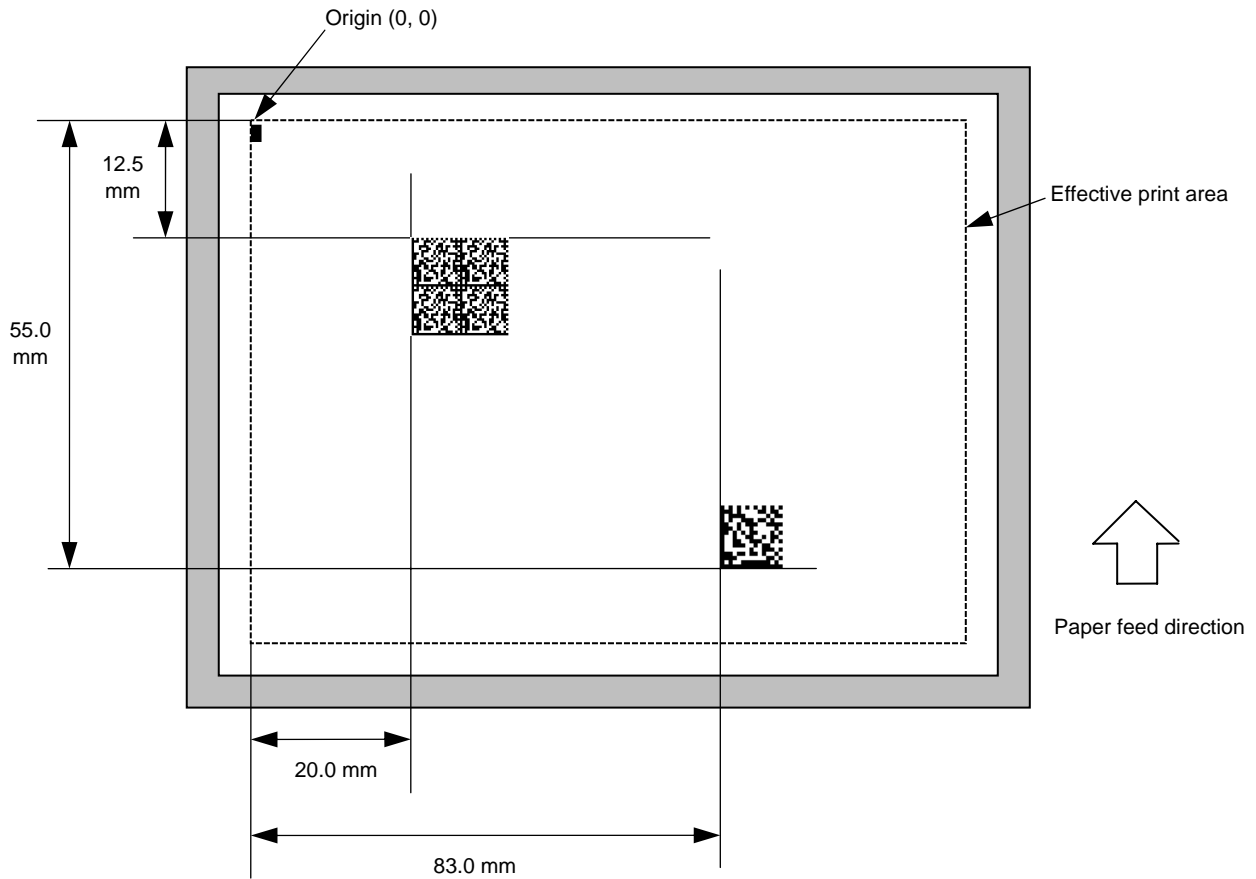
Notes

- (1) More than one Two-dimensional Code Format Command can be connected when transmitted.
[ESC] XB01; 0100, 0150, 3, 1, 02, 02, 06, 06, 02, 0, 0150 [LF]
B02; 0350, 0150, 3, 1, 02, 02, 06, 06, 02, 0, 0150 [LF] [NUL]
- (2) When the drawing data is changed per label issue during printing, the field of the drawing data for the previous label is automatically cleared using the two-dimensional code number, then the next drawing data is printed. Therefore, the two-dimensional code number which differs according to the drawing fields should be designated.
- (3) Since the automatic field clear is not performed between the Clear Command ([ESC] C) and Issue Command ([ESC] XS), the fixed data may be drawn using the same two-dimensional code number. In this case, the Format Command and Data Command should be sent alternately. (After the Issue Command is sent, the fields with the same two-dimensional code number are automatically cleared until the Clear Command is sent.)
- (4) The link field designation is cleared by omitting the link field designation using the same two-dimensional code No. and reformatting data. The link field designation can be also cleared by the Image Buffer Clear Command.
- (5) A print data string and link field No. cannot be programmed at the same time.

Refer to

- Bit Map Font Format Command ([ESC] PC)
- Outline Font Format Command ([ESC] PV)
- Barcode/Two-dimensional Code Data Command ([ESC] RB)

Examples



```
[ESC] C [LF] [NUL]
[ESC] XB01; 0200, 0125, Q, 20, 05, 01, 0 [LF] [NUL]
[ESC] XB02; 0830, 0550, Q, 08, 03, 05, 3 [LF] [NUL]
[ESC] RB01; Toshiba TEC [LF] [NUL]
[ESC] RB02; Data Matrix [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]
```

5.6.8 TWO-DIMENSIONAL CODE FORMAT COMMAND (PDF417) [ESC] XB

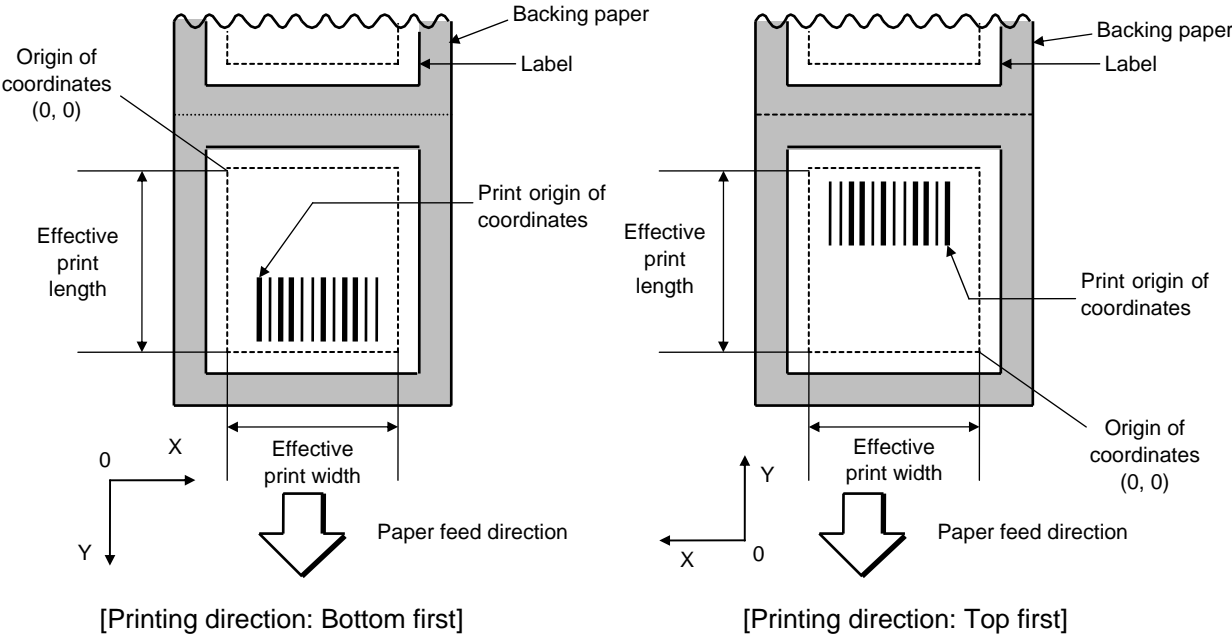
Format	<p>① [ESC] XBaa; bbbb, cccc, d, ee, ff, gg, h, iij (= jjj ----- jjj) [LF] [NUL]</p> <p>② [ESC] XBaa; bbbb, cccc, d, ee, ff, gg, h, iiii (; kk₁, kk₂, kk₃, ----- , kk₂₀) [LF] [NUL]</p>
Term	<p>aa: Two-dimensional code number 00 to 31</p> <p>bbbb: X-coordinate of the print origin of the two-dimensional code Fixed at 4 digits (in 0.1 mm units)</p> <p>cccc: Y-coordinate of the print origin of the two-dimensional code 4 or 5 digits (in 0.1 mm units)</p> <p>d: Type of two-dimensional code P: PDF417</p> <p>ee: Security level 00: Level 0 01: Level 1 02: Level 2 03: Level 3 04: Level 4 05: Level 5 06: Level 6 07: Level 7 08: Level 8</p> <p>ff: 1-module width 01 to 10 (in units of dots)</p> <p>gg: No. of columns/rows 01 to 30</p> <p>h: Rotational angle of two-dimensional code 0: 0° 1: 90° 2: 180° 3: 270°</p> <p>iiii: Bar height 0000 to 0100 (in 0.1 mm units)</p> <p>jjj-----jjj: Data string to be printed (Omissible) Max. 2,000 digits</p> <p>kk₁, kk₂, kk₃, -----, kk₂₀: Link field No. (Omissible) 01 to 99 (1 to 99 can also be used.) Up to 20 fields can be designated using commas.</p>

Explanation

(1) Two-dimensional code number

When drawing by the Data Command ([ESC] RB), the format designated by the two-dimensional code number is selected.

(2) Print origin of coordinates



The print origin of coordinates must be set so that the two-dimensional code drawing result will be within the effective print area set by the Label Size Set Command ([ESC] D).

(3) Type of two-dimensional code

P: PDF417



(4) Security level

The PDF417 contains a function to correct a code reading error using an error correcting code word and restore normal data. The security level should be designated according to usage.

Security level	Error Correction Ability	No. of error correction code words
Level 0	<div>Low</div> <div>↑</div> <div>↓</div> <div>High</div>	0
Level 1		2
Level 2		6
Level 3		14
Level 4		30
Level 5		62
Level 6		126
Level 7		254
Level 8		510

(5) 1-module width

The width of 2 to 6 modules is automatically calculated by designating a 1-module width.

[Example of setting]

203-dpi print head (1 dot = 1/8 mm)

Type of barcode	1 module		2 modules		3 modules		4 modules		5 modules		6 modules	
	Bar	Space	Bar	Space	Bar	Space	Bar	Space	Bar	Space	Bar	Space
PDF417		2		4		6		8		10		12

Values to be set in ff: "1-module width"

To be automatically calculated based on the value set in ff: "1-module width"

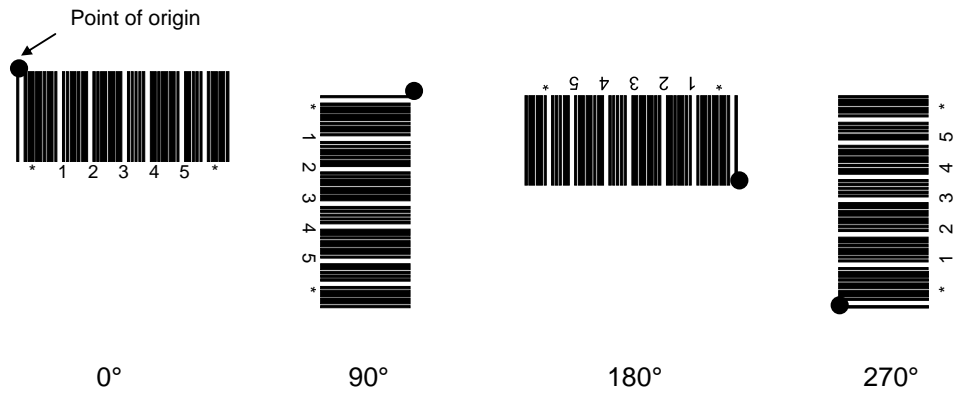
(6) No. of columns/rows

The number of rows and the row length (No. of data strings) are variable. Therefore, the form of the symbol can be changed in the proportion of the height and width in accordance with the paper to be used.

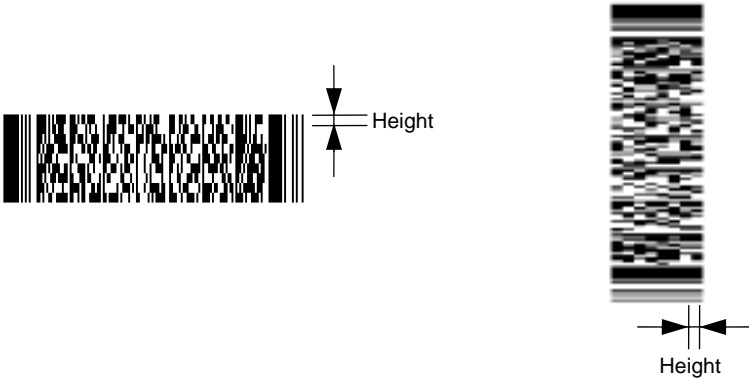
The number of columns (the number of data strings) is varied between 1 and 30.

If the number of columns is set to too small though the data volume is large and the security level is high, drawing may not be performed. This is because the number of rows may exceed 90 when the number of columns is too small. (The number of rows of symbols is limited in a range from 3 to 90.)

(7) Rotational angle of two-dimensional code



(8) Height of two-dimensional code



(9) Data string to be printed

Drawing data can be programmed by designating the number of digits after the symbol “=” The maximum number of digits to be printed is 2000. (However, the number of digits of data should be limited so the two-dimensional code can be printed within the 2-inch head width.)

(10) Link field No.

The link field No. can be programmed by designating it after the symbol “;.”
After the link field No. is designated using the Format Command, the data strings are linked by the Link Field Data Command to draw an image.
Up to 20 fields can be linked.
The following shows an example of linked fields on the two continuous labels.

[Format Command]

[ESC] PC01;.....	; 01 [LF] [NUL]	: Link field No. 1 is designated.
[ESC] PC02;.....	; 03 [LF] [NUL]	: Link field No. 3 is designated.
[ESC] PC03;.....	; 04 [LF] [NUL]	: Link field No. 4 is designated.
[ESC] XB01;.....	; 03, 04 [LF] [NUL]	: Link fields No. 3 and No. 4 are designated.
[ESC] PC04;.....	; 02 [LF] [NUL]	: Link field No. 2 is designated.
[ESC] PC05;.....	; 03 [LF] [NUL]	: Link field No. 3 is designated.
[ESC] PC06;.....	; 04 [LF] [NUL]	: Link field No. 4 is designated.
[ESC] XB02;.....	; 03, 04 [LF] [NUL]	: Link fields No. 3 and No. 4 are designated.

└─── Designating link field No.

[Data Command]

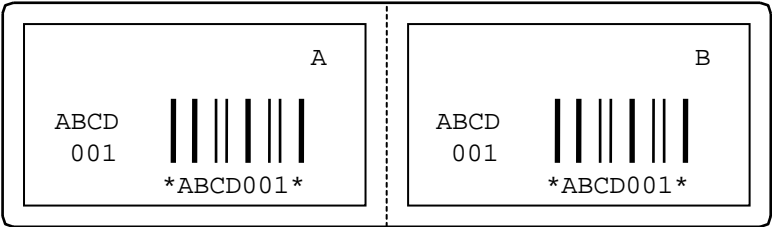
[ESC] RB; A [LF] B [LF] ABCD [LF] 001 [LF] [NUL]

└─── Link field No. 4

└─── Link field No. 3

└─── Link field No. 2

└─── Link field No. 1



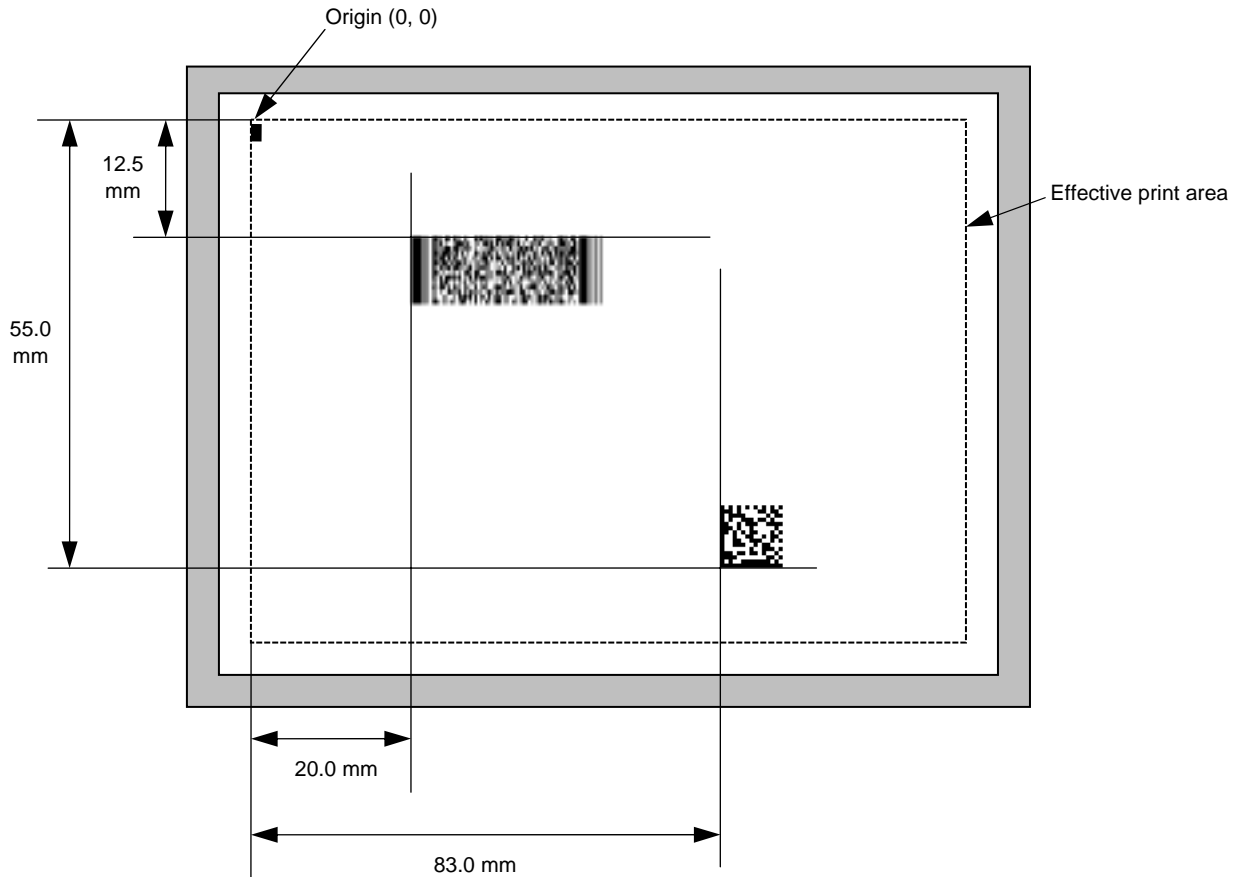
Notes

- (1) More than one Two-dimensional Code Format Command can be connected when transmitted.
[ESC] XB01; 0100, 0150, 3, 1, 02, 02, 06, 06, 02, 0, 0150 [LF]
B02; 0350, 0150, 3, 1, 02, 02, 06, 06, 02, 0, 0150 [LF] [NUL]
- (2) When the drawing data is changed per label issue during printing, the field of the drawing data for the previous label is automatically cleared using the two-dimensional code number, then the next drawing data is printed. Therefore, the two-dimensional code number which differs according to the drawing fields should be designated.
- (3) Since the automatic field clear is not performed between the Clear Command ([ESC] C) and Issue Command ([ESC] XS), the fixed data may be drawn using the same two-dimensional code number. In this case, the Format Command and Data Command should be sent alternately. (After the Issue Command is sent, the fields with the same two-dimensional code number are automatically cleared until the Clear Command is sent.)
- (4) The link field designation is cleared by omitting the link field designation using the same two-dimensional code No. and reformatting data. The link field designation can be also cleared by the Image Buffer Clear Command.
- (5) A print data string and link field No. cannot be programmed at the same time.

Refer to

- Bit Map Font Format Command ([ESC] PC)
- Outline Font Format Command ([ESC] PV)
- Barcode/Two-dimensional Code Data Command ([ESC] RB)

Examples



```
[ESC] C [LF] [NUL]
[ESC] XB01; 0200, 0125, P, 04, 02, 03, 0, 0010 [LF] [NUL]
[ESC] XB02; 0830, 0550, Q, 08, 03, 05, 3 [LF] [NUL]
[ESC] RB01; PDF417 [LF] [NUL]
[ESC] RB02; Data Matrix [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]
```

5.6.9 TWO-DIMENSIONAL CODE FORMAT COMMAND (MicroPDF417)[ESC] XB

- | | |
|--------|--|
| Format | ① [ESC] XBaa; bbbb, cccc, d, ee, ff, gg, h, iii (= jjj ----- jjj) [LF] [NUL] |
|--------|--|
- ② [ESC] XBaa; bbbb, cccc, d, ee, ff, gg, h, iii (; kk₁, kk₂, kk₃, ----- , kk₂₀) [LF] [NUL]

Term	<p>aa: Two-dimensional code number 00 to 31</p> <p>bbbb: X-coordinate of the print origin of the two-dimensional code Fixed at 4 digits (in 0.1 mm units)</p> <p>cccc: Y-coordinate of the print origin of the two-dimensional code 4 or 5 digits (in 0.1 mm units)</p> <p>d: Type of two-dimensional code X: MicroPDF417</p> <p>ee: Security level 00: Fixed</p> <p>ff: 1-module width 01 to 10 (in units of dots)</p> <p>gg: No. of columns/rows 00 to 38</p> <p>h: Rotational angle of two-dimensional code 0: 0° 1: 90° 2: 180° 3: 270°</p> <p>iii: Bar height 0000 to 0100 (in 0.1 mm units)</p> <p>jjj-----jjj: Data string to be printed (Omissible) Max. 366 digits</p>
------	---

* The maximum of 366 digits of data string to be printed are acceptable. (The maximum number of digits of the data string to be printed differs depending on the numbers of columns, the number of rows, and the contents of data.) However, note the following limits:

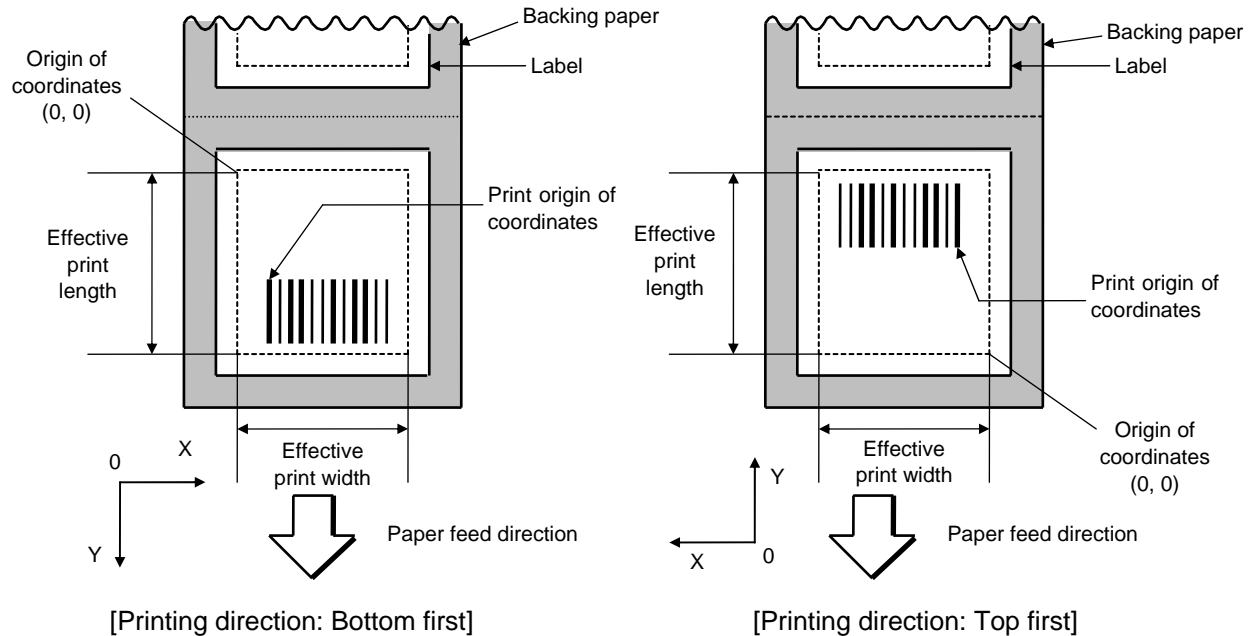
- The maximum of 366-digit data string to be printed are acceptable. However, it cannot actually be printed, since it cannot be contained within the 2-inch head width.
- If the print ratio of one line (the print head width) is high, printing may become poor, or the printer may be reset. Be careful about the print ratio.

Explanation

(1) Two-dimensional code number

When drawing by the Data Command ([ESC] RB), the format designated by the two-dimensional code number is selected.

(2) Print origin of coordinates



The print origin of coordinates must be set so that the two-dimensional code drawing result will be within the effective print area set by the Label Size Set Command ([ESC] D).

(3) Type of two-dimensional code

X: MicroPDF417



(4) Security level

The MicroPDF417 contains a function to correct a code reading error using an error correcting code word and restore normal data. The printer automatically sets the security level.

(5) 1-module width

The width of 2 to 6 modules is automatically calculated by designating a 1-module width.

[Example of setting]

203-dpi print head (1 dot = 1/8 mm)

Type of barcode	1 module		2 modules		3 modules		4 modules		5 modules		6 modules	
	Bar	Space	Bar	Space	Bar	Space	Bar	Space	Bar	Space	Bar	Space
MicroPDF417	2		4		6		8		10		12	

Values to be set in ff: "1-module width"

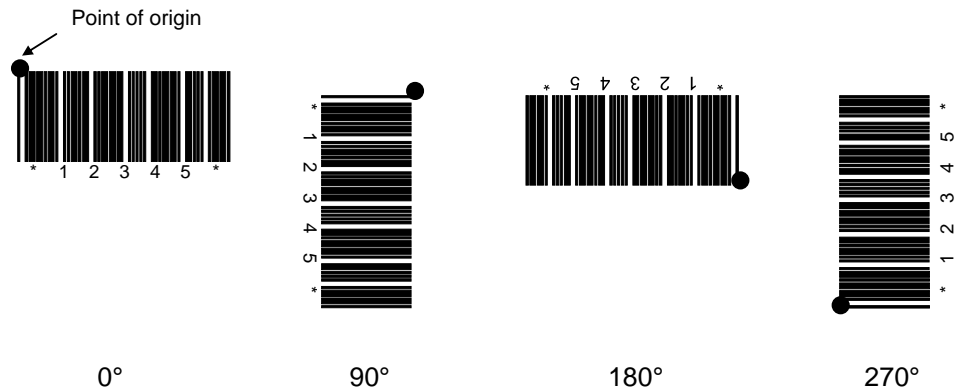
To be automatically calculated based on the value set in ff: "1-module width"

(6) No. of columns/rows

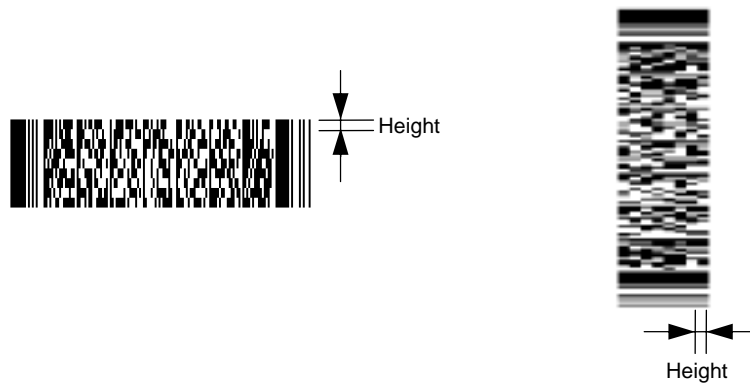
For the MicroPDF417, not only the number of columns (data strings) but also the number of rows (data lines) can be designated. When these are to be designated, see the table. Note that the max. number of digits for the set parameter (gg) varies according to the character type. If data over the max. number of digits for the set parameter (gg) is set, the two-dimensional code is not printed. The number of columns (data strings) is varied in a range from 1 to 4.

Though the max. number of lines is 44, it depends on the number of columns.

(7) Rotational angle of two-dimensional code



(8) Height of two-dimensional code



(9) Data string to be printed

Drawing data can be programmed by designating the number of digits after the symbol “=.” The maximum number of digits to be printed is 366. (However, the number of digits of data should be limited so the two-dimensional code can be printed within the 2-inch head width.)

(10) Link field No.

The link field No. can be programmed by designating it after the symbol “;.”
After the link field No. is designated using the Format Command, the data strings are linked by the Link Field Data Command to draw an image.
Up to 20 fields can be linked.
The following shows an example of linked fields on the two continuous labels.

[Format Command]

[ESC] PC01;..... ; 01 [LF] [NUL] : Link field No. 1 is designated.
[ESC] PC02;..... ; 03 [LF] [NUL] : Link field No. 3 is designated.
[ESC] PC03;..... ; 04 [LF] [NUL] : Link field No. 4 is designated.
[ESC] XB01;..... ; 03, 04 [LF] [NUL] : Link fields No. 3 and No. 4 are designated.

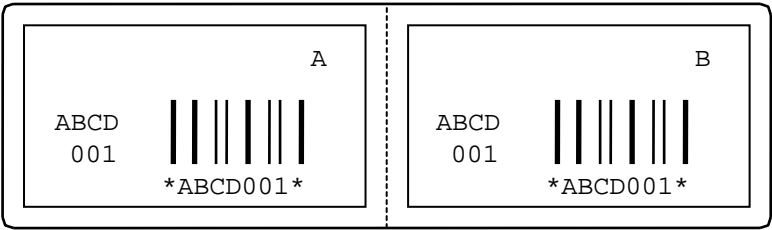
[ESC] PC04;..... ; 02 [LF] [NUL] : Link field No. 2 is designated.
[ESC] PC05;..... ; 03 [LF] [NUL] : Link field No. 3 is designated.
[ESC] PC06;..... ; 04 [LF] [NUL] : Link field No. 4 is designated.
[ESC] XB02;..... ; 03, 04 [LF] [NUL] : Link fields No. 3 and No. 4 are designated.

Designating link field No.

[Data Command]

[ESC] RB; A [LF] B [LF] ABCD [LF] 001 [LF] [NUL]

Link field No. 4
Link field No. 3
Link field No. 2
Link field No. 1



(11) The maximum number of columns and rows

Parameter (gg)	No. of columns	No. of rows	Max. number of digits for binary mode	Max. number of digits for upper case letter/space mode	Max. number of digits for numeric mode
00	—	—	150	250	366
01	1	—	22	38	55
02	2	—	43	72	105
03	3	—	97	162	237
04	4	—	150	250	366
05	1	11	3	6	8
06		14	7	12	17
07		17	10	18	26
08		20	13	22	32
09		24	18	30	44
10		28	22	38	55
11	2	8	8	14	20
12		11	14	24	35
13		14	21	36	52
14		17	27	46	67
15		20	33	56	82
16		23	38	64	93
17		26	43	72	105
18	3	6	6	10	14
19		8	10	18	26
20		10	15	26	38
21		12	20	34	49
22		15	27	46	67
23		20	39	66	96
24		26	54	90	132
25		32	68	114	167
26		38	82	138	202
27		44	97	162	237
28	4	4	8	14	20
29		6	13	22	32
30		8	20	34	49
31		10	27	46	67
32		12	34	58	85
33		15	45	76	111
34		20	63	106	155
35		26	85	142	208
36		32	106	178	261
37		38	128	214	313
38		44	150	250	366

“—” for parameter 00 to 04 indicates the numbers of columns/rows which are automatically set by the printer. In this case, the pattern which has a smaller number of code words is automatically selected. When the numbers of code words is equal, the smaller number of columns is selected.

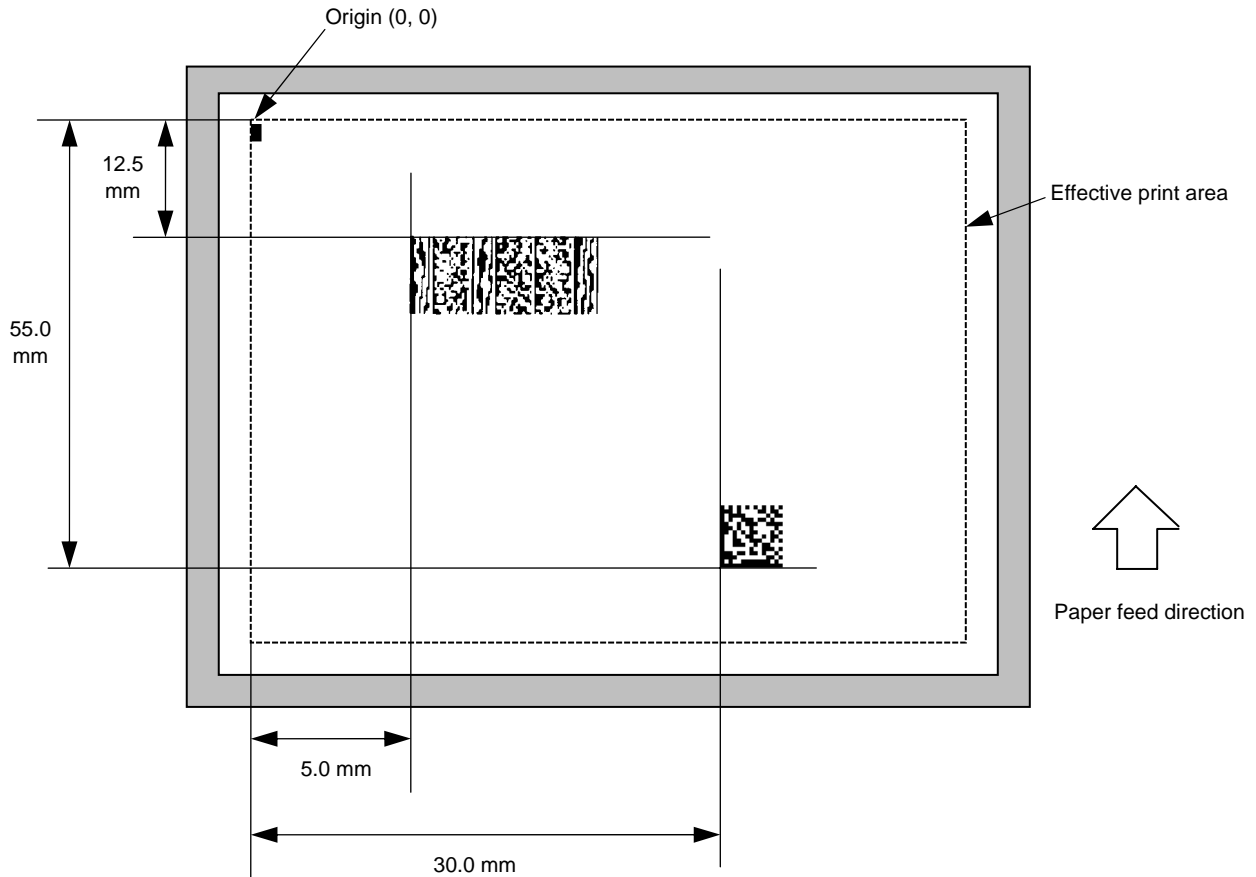
Notes

- (1) More than one Two-dimensional Code Format Command can be connected when transmitted.
[ESC] XB01; 0100, 0150, 3, 1, 02, 02, 06, 06, 02, 0, 0150 [LF]
B02; 0350, 0150, 3, 1, 02, 02, 06, 06, 02, 0, 0150 [LF] [NUL]
- (2) When the drawing data is changed per label issue during printing, the field of the drawing data for the previous label is automatically cleared using the two-dimensional code number, then the next drawing data is printed. Therefore, the two-dimensional code number which differs according to the drawing fields should be designated.
- (3) Since the automatic field clear is not performed between the Clear Command ([ESC] C) and Issue Command ([ESC] XS), the fixed data may be drawn using the same two-dimensional code number. In this case, the Format Command and Data Command should be sent alternately. (After the Issue Command is sent, the fields with the same two-dimensional code number are automatically cleared until the Clear Command is sent.)
- (4) The link field designation is cleared by omitting the link field designation using the same two-dimensional code No. and reformatting data. The link field designation can be also cleared by the Image Buffer Clear Command.
- (5) A print data string and link field No. cannot be programmed at the same time.

Refer to

- Bit Map Font Format Command ([ESC] PC)
- Outline Font Format Command ([ESC] PV)
- Barcode/Two-dimensional Code Data Command ([ESC] RB)

Examples



```
[ESC] C [LF] [NUL]
[ESC] XB01; 0200, 0125, X, 00, 02, 00, 0, 0010 [LF] [NUL]
[ESC] XB02; 0830, 0550, Q, 08, 03, 05, 3 [LF] [NUL]
[ESC] RB01; MicroPDF417 [LF] [NUL]
[ESC] RB02; Data Matrix [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]
```

5.6.10 TWO-DIMENSIONAL CODE FORMAT COMMAND (QR Code) [ESC] XB

Format	<p>① [ESC] XBaa; bbbb, cccc, d, e, ff, g, h (, Mi) (, Kj) (, Jkklmm) (= nnn --- nnn) [LF] [NUL]</p> <p>② [ESC] XBaa; bbbb, cccc, d, e, ff, g, h (, Mi) (, Kj) (, Jkklmm) (; oo₁, oo₂, oo₃, -----, oo₂₀) [LF] [NUL]</p>
Term	<p>aa: Two-dimensional code number 00 to 31</p> <p>bbbb: X-coordinate of the print origin of the two-dimensional code Fixed at 4 digits (in 0.1 mm units)</p> <p>cccc: Y-coordinate of the print origin of the two-dimensional code 4 or 5 digits (in 0.1 mm units)</p> <p>d: Type of two-dimensional code T: QR code</p> <p>e: Designation of error correction level L: High density level M: Standard level Q: Reliability level H: High reliability level</p> <p>ff: 1-cell width 00 to 52 (in units of dots)</p> <p>g: Selection of mode M: Manual mode A: Automatic mode</p> <p>h: Rotational angle of two-dimensional code 0: 0° 1: 90° 2: 180° 3: 270°</p> <p>Mi: Selection of model (Omissible. If omitted, Model 1 is automatically selected.) i = 1: Model 1 2: Model 2</p> <p>Kj: Mask number (Omissible. If omitted, the number is automatically set.) j = 0 to 7: Mask number 0 to 7 8: No mask</p> <p>Jkklmm: Connection setting (Omissible. If omitted, connection is not made.) kk = 01 to 16: Value indicating which divided code is connected. ll = 01 to 16: Number of divided codes mm = 00 to FF: A value for all print data (before divided) which have been XORed in units of bytes.</p>

nnn --- nnn: Data string to be printed (Omissible)
Max. 2000 digits

oo₁ --- oo₂₀: Link field No. (Omissible)
01 to 99 (1 to 99 can also be used.)
Up to 20 digits can be designated using commas.

* The maximum of 2000 digits of data string to be printed and the maximum of 52 dots of the 1-cell width are acceptable. (The maximum number of digits of the data string to be printed differs depending on the error correction level and the contents of data.) However, note the following limits:

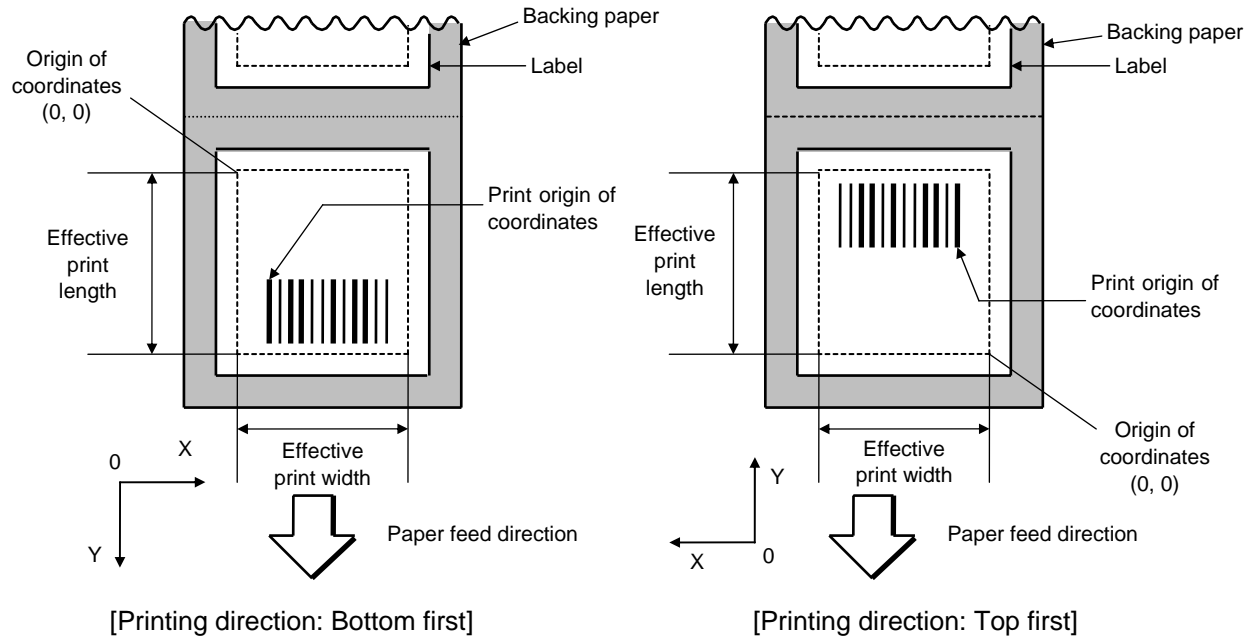
- The maximum of 2000-digit data string to be printed are acceptable. However, it cannot actually be printed, since it cannot be contained within the head width.
- If the print ratio of one line (the print head width) is high, printing may become poor, or the printer may be reset. Be careful about the print ratio.
- When a large value is set for the 1-cell width, decrease the number of digits of data to contain the data within the head width.

Explanation

(1) Two-dimensional code number

When drawing by the Data Command ([ESC] RB), the format designated by the two-dimensional code number is selected.

(2) Print origin of coordinates



The print origin of coordinates must be set so that the two-dimensional code drawing result will be within the effective print area set by the Label Size Set Command ([ESC] D).

(3) Type of two-dimensional code

T: QR code



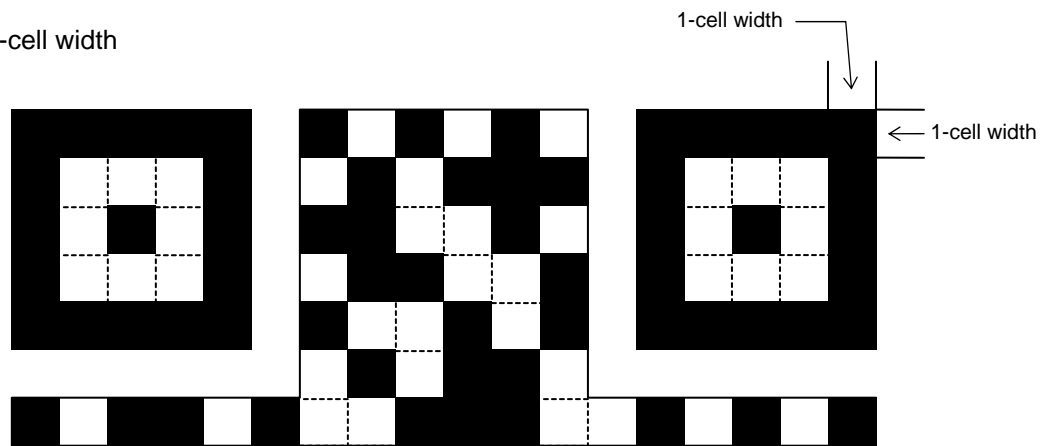
(4) Error correction level

The QR code contains functions to detect and correct an error. If one of the data characters is damaged, the information can be restored when this code is read.

There are 4 levels that can be designated. The level should be specified according to usage. The general correction ability is as follows.

Level	Error correction ability	Overhead by correcting an error
High density level	<div style="text-align: center;"> Low ↑↓ High </div>	7%
Standard level		15%
Reliability level		25%
High reliability level		30%

(5) 1-cell width

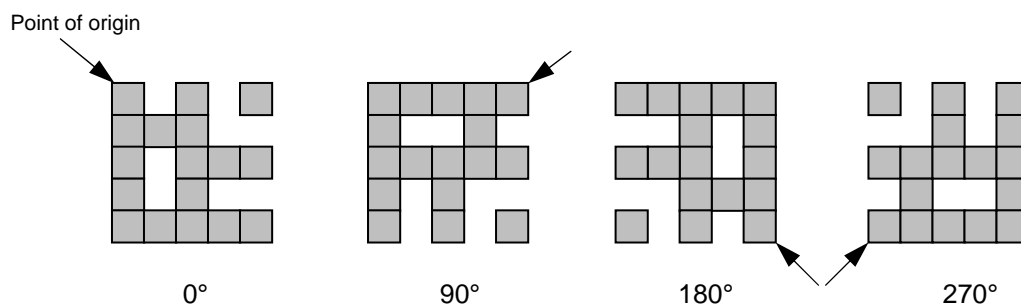


When the 1-cell width is set to 0 for the QR code, a two-dimensional code is not drawn. However, the barcode printed on the previous label is cleared.

(6) Selection of mode

All codes including alphanumerals, symbols and Kanji can be used in one QR code. Manual mode or automatic mode can be selected to perform the operation.

(7) Rotational angle of two-dimensional code



(8) Selection of model

Model 1: Original specification

Model 2: Extended specification which enhances the function of position correction and can contain a large amount of data.

(9) Mask number

It is preferable that the black and white modules are arranged in well-balanced manner so that a QR code is read for sure. The mask number prevents the bit pattern "1011101," which is characteristically seen in the position detecting pattern, from appearing in the symbol as much as possible.

The mask number is ranging from 0 to 7. The pattern of the code is determined by placing each masking pattern for the mask number over the module pattern. When the mask number is set to 8, masking is not performed. When the parameter is omitted, the most appropriate mask number is automatically selected to perform masking.

(10) Connection setting

For QR code, data can be divided into several codes. Even though the print space is limited, divided codes can be printed there. The data can be divided into a max. of 16 codes. Parity data is obtained by XORing all input data in units of bytes before dividing. The input data is calculated based on shift JIS for Kanji, or on JIS 8 for others. Examples are shown below:

“0123456789日本 ” is divided into “0123,” “4567” and “89日本.”

Code No. 1	No. of divided codes: 3	Parity data: 85	Data “0123”
Code No. 2	No. of divided codes: 3	Parity data: 85	Data “4567”
Code No. 3	No. of divided codes: 3	Parity data: 85	Data “89日本 ”

* The parity data is the XORed value for “0123456789日本 ”.

30 31 32 33 34 35 36 37 38 39 93 FA 96 7B = 85

(11) Data string to be printed

Drawing data can be programmed by designating the number of digits after the symbol “=.” The maximum number of digits to be printed is 2000. (However, the number of digits of data should be limited so the two-dimensional code can be printed within the 2-inch head width.)

(12) Link field No.

The link field No. can be programmed by designating it after the symbol “;.”
After the link field No. is designated using the Format Command, the data strings are linked by the Link Field Data Command to draw an image.
Up to 20 fields can be linked.
The following shows an example of linked fields on the two continuous labels.

[Format Command]

[ESC] PC01;..... ; 01 [LF] [NUL] : Link field No. 1 is designated.
[ESC] PC02;..... ; 03 [LF] [NUL] : Link field No. 3 is designated.
[ESC] PC03;..... ; 04 [LF] [NUL] : Link field No. 4 is designated.
[ESC] XB01;..... ; 03, 04 [LF] [NUL] : Link fields No. 3 and No. 4 are designated.

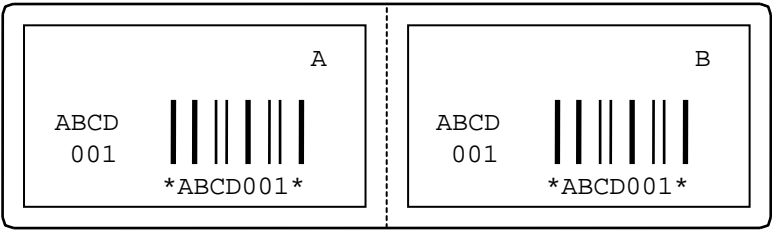
[ESC] PC04;..... ; 02 [LF] [NUL] : Link field No. 2 is designated.
[ESC] PC05;..... ; 03 [LF] [NUL] : Link field No. 3 is designated.
[ESC] PC06;..... ; 04 [LF] [NUL] : Link field No. 4 is designated.
[ESC] XB02;..... ; 03, 04 [LF] [NUL] : Link fields No. 3 and No. 4 are designated.

Designating link field No.

[Data Command]

[ESC] RB; A [LF] B [LF] ABCD [LF] 001 [LF] [NUL]

Link field No. 4
Link field No. 3
Link field No. 2
Link field No. 1



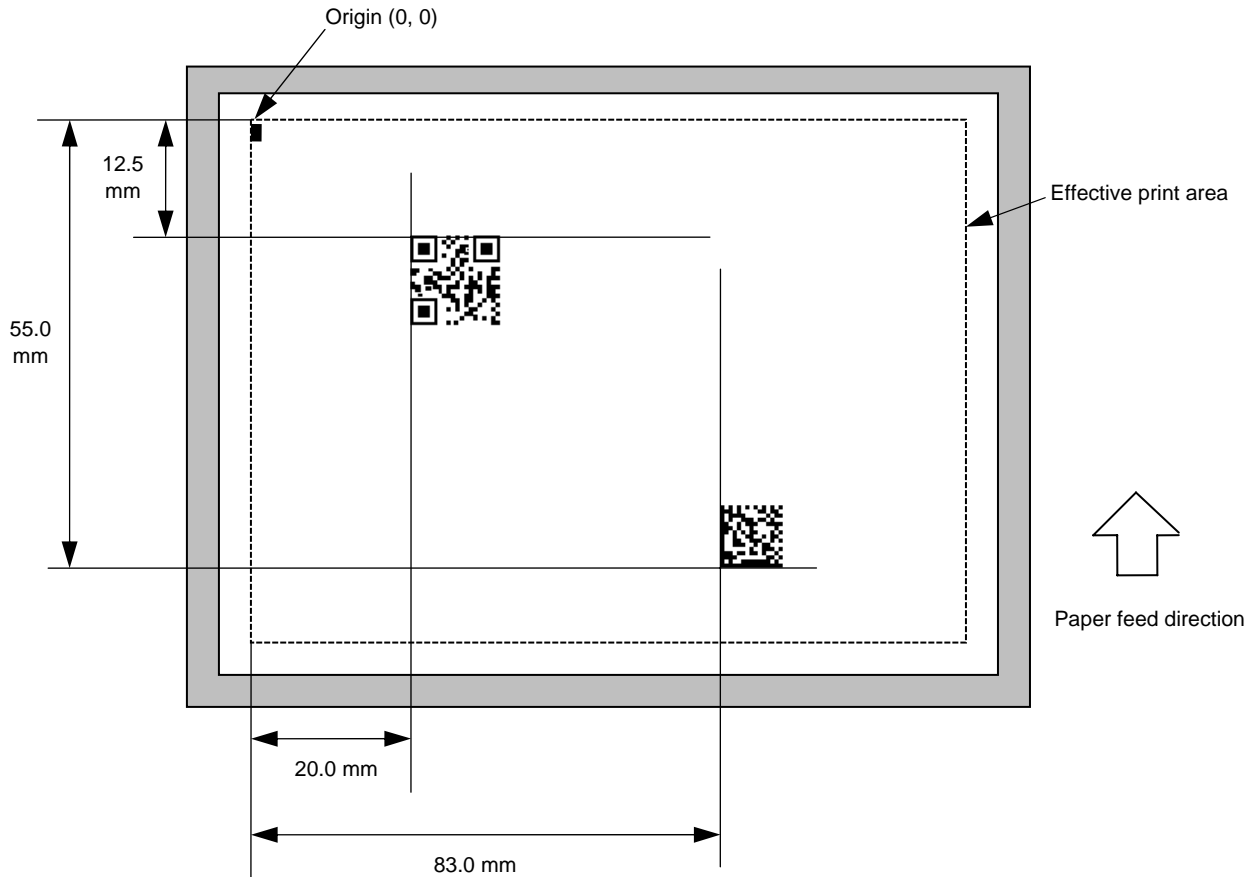
Notes

- (1) More than one Two-dimensional Code Format Command can be connected when transmitted.
[ESC] XB01; 0100, 0150, 3, 1, 02, 02, 06, 06, 02, 0, 0150 [LF]
B02; 0350, 0150, 3, 1, 02, 02, 06, 06, 02, 0, 0150 [LF] [NUL]
- (2) When the drawing data is changed per label issue during printing, the field of the drawing data for the previous label is automatically cleared using the two-dimensional code number, then the next drawing data is printed. Therefore, the two-dimensional code number which differs according to the drawing fields should be designated.
- (3) Since the automatic field clear is not performed between the Clear Command ([ESC] C) and Issue Command ([ESC] XS), the fixed data may be drawn using the same two-dimensional code number. In this case, the Format Command and Data Command should be sent alternately. (After the Issue Command is sent, the fields with the same two-dimensional code number are automatically cleared until the Clear Command is sent.)
- (4) The link field designation is cleared by omitting the link field designation using the same two-dimensional code No. and reformatting data. The link field designation can be also cleared by the Image Buffer Clear Command.
- (5) A print data string and link field No. cannot be programmed at the same time.

Refer to

- Bit Map Font Format Command ([ESC] PC)
- Outline Font Format Command ([ESC] PV)
- Barcode/Two-dimensional Code Data Command ([ESC] RB)

Examples



```
[ESC] C [LF] [NUL]
[ESC] XB01; 0200, 0125, T, M, 02, A, 0 [LF] [NUL]
[ESC] XB02; 0830, 0550, Q, 08, 03, 05, 3 [LF] [NUL]
[ESC] RB01; QR Code [LF] [NUL]
[ESC] RB02; Data Matrix [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]
```

5.6.11 TWO-DIMENSIONAL CODE FORMAT COMMAND (MaxiCode) [ESC] XB

Format	<p>① [ESC] XBaa; bbbb, cccc, d (, e) (, Jffgg) (, Zh) (= mmm ----- mmm) [LF] [NUL]</p> <p>② [ESC] XBaa; bbbb, cccc, d (, e) (, Jffgg) (, Zh) (; nn₁, nn₂, nn₃, -----, nn₂₀) [LF] [NUL]</p>
Term	<p>aa: Two-dimensional code number 00 to 31</p> <p>bbbb: X-coordinate of the print origin of the two-dimensional code Fixed at 4 digits (in 0.1 mm units)</p> <p>cccc: Y-coordinate of the print origin of the two-dimensional code 4 or 5 digits (in 0.1 mm units)</p> <p>d: Type of two-dimensional code Z: MaxiCode</p> <p>e: Mode selection (Omissible)</p> <ul style="list-style-type: none"> • When the MaxiCode specification is set to “TYPE1: Compatible with the current version” in the SYSTEM mode. <ul style="list-style-type: none"> Omitted: Mode 2 0: Mode 2 1: Mode 4 2: Mode 2 3: Mode 3 4: Mode 4 5: Mode 2 6: Mode 6 7: Mode 2 8: Mode 2 9: Mode 2 • When the MaxiCode specification is set to “TYPE2: Special specification” in the SYSTEM mode. <ul style="list-style-type: none"> Omitted: Mode 2 or Mode 3(*) 0: Mode 2 or Mode 3(*) 1: Mode 4 2: Mode 2 3: Mode 3 4: Mode 4 5: Mode 2 or Mode 3 (*) 6: Mode 6 7: Mode 2 or Mode 3 (*) 8: Mode 2 or Mode 3 (*) 9: Mode 2 or Mode 3 (*) <p>*: Mode 2 or Mode 3 should be determined depending on the country code of the data command. When the country code is 840, Mode 2 should be selected. For other codes than 840, Mode 3 should be selected.</p> <p>Jffgg: Connection setting (Omissible. If omitted, connection is not made.)</p> <p>ff: Code number 01 to 08</p> <p>gg: No. of divided codes 01 to 08</p>

Zh: Attachment of Zipper block and Contrast block
(Omissible. If omitted, they are not attached.)

h= 0: No attachment of Zipper block and Contrast block
1: Attachment of Zipper block and Contrast block
2: Attachment of Zipper block
3: Attachment of Contrast block

mmm ----- mmm: Data string to be printed (Omissible)
Max. 93 digits

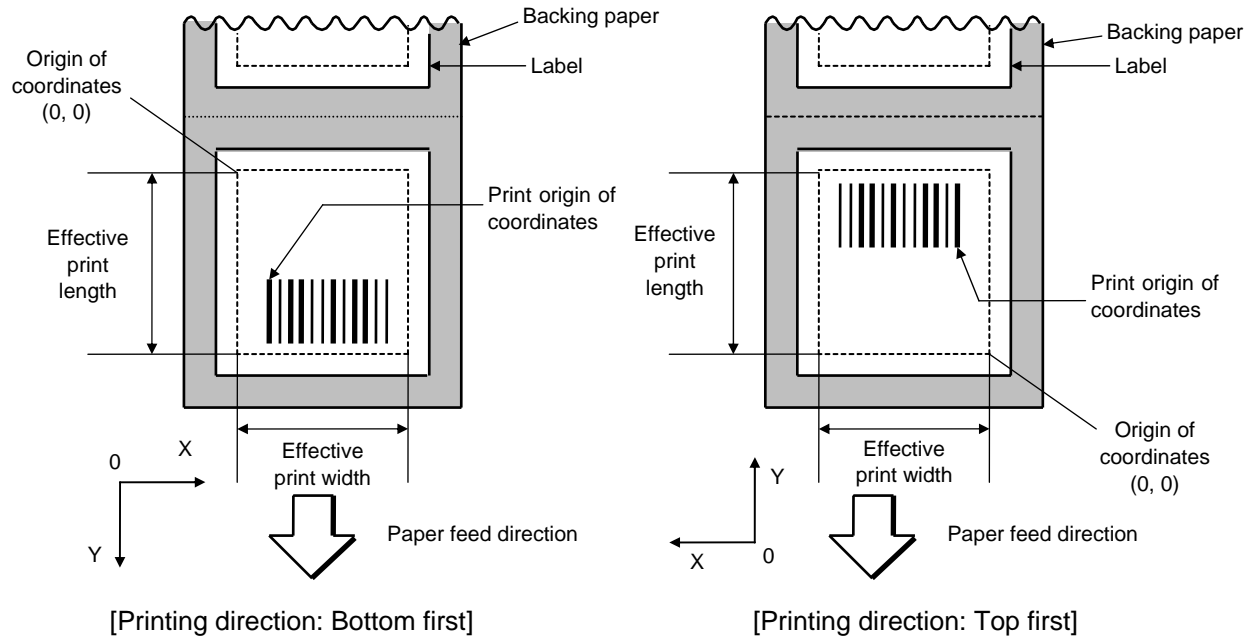
nn₁, nn₂, nn₃, -----, nn₂₀: Link field No. (Omissible)
01 to 99 (1 to 99 can also be used.)
Up to 20 fields can be designated using commas.

Explanation

(1) Two-dimensional code number

When drawing by the Data Command ([ESC] RB), the format designated by the two-dimensional code number is selected.

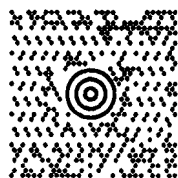
(2) Print origin of coordinates



The print origin of coordinates must be set so that the two-dimensional code drawing result will be within the effective print area set by the Label Size Set Command ([ESC] D).

(3) Type of two-dimensional code

Z: MaxiCode



(4) Data string to be printed

Drawing data can be programmed by designating the number of digits after the symbol “=.” The maximum number of digits to be printed is 93.

(5) Connection setting

For MaxiCode, data can be divided into several codes. The data can be divided into a max. of 8 codes.

(6) Link field No.

The link field No. can be programmed by designating it after the symbol “;.”
After the link field No. is designated using the Format Command, the data strings are linked by the Link Field Data Command to draw an image.
Up to 20 fields can be linked.
The following shows an example of linked fields on the two continuous labels.

[Format Command]

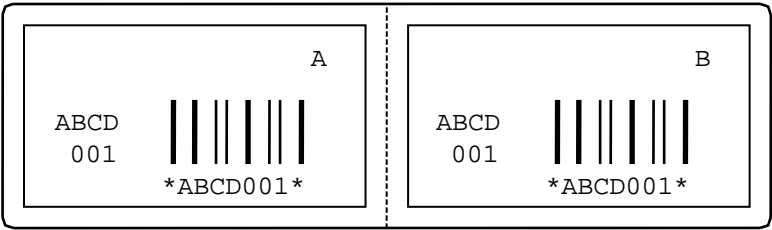
[ESC] PC01;..... ; 01 [LF] [NUL] : Link field No. 1 is designated.
[ESC] PC02;..... ; 03 [LF] [NUL] : Link field No. 3 is designated.
[ESC] PC03;..... ; 04 [LF] [NUL] : Link field No. 4 is designated.
[ESC] XB01;..... ; 03, 04 [LF] [NUL] : Link fields No. 3 and No. 4 are designated.

[ESC] PC04;..... ; 02 [LF] [NUL] : Link field No. 2 is designated.
[ESC] PC05;..... ; 03 [LF] [NUL] : Link field No. 3 is designated.
[ESC] PC06;..... ; 04 [LF] [NUL] : Link field No. 4 is designated.
[ESC] XB02;..... ; 03, 04 [LF] [NUL] : Link fields No. 3 and No. 4 are designated.

└─── Designating link field No.

[Data Command]

[ESC] RV; A [LF] B [LF] ABCD [LF] 001 [LF] [NUL]
└─── Link field No. 1
└─── Link field No. 2
└─── Link field No. 3
└─── Link field No. 4



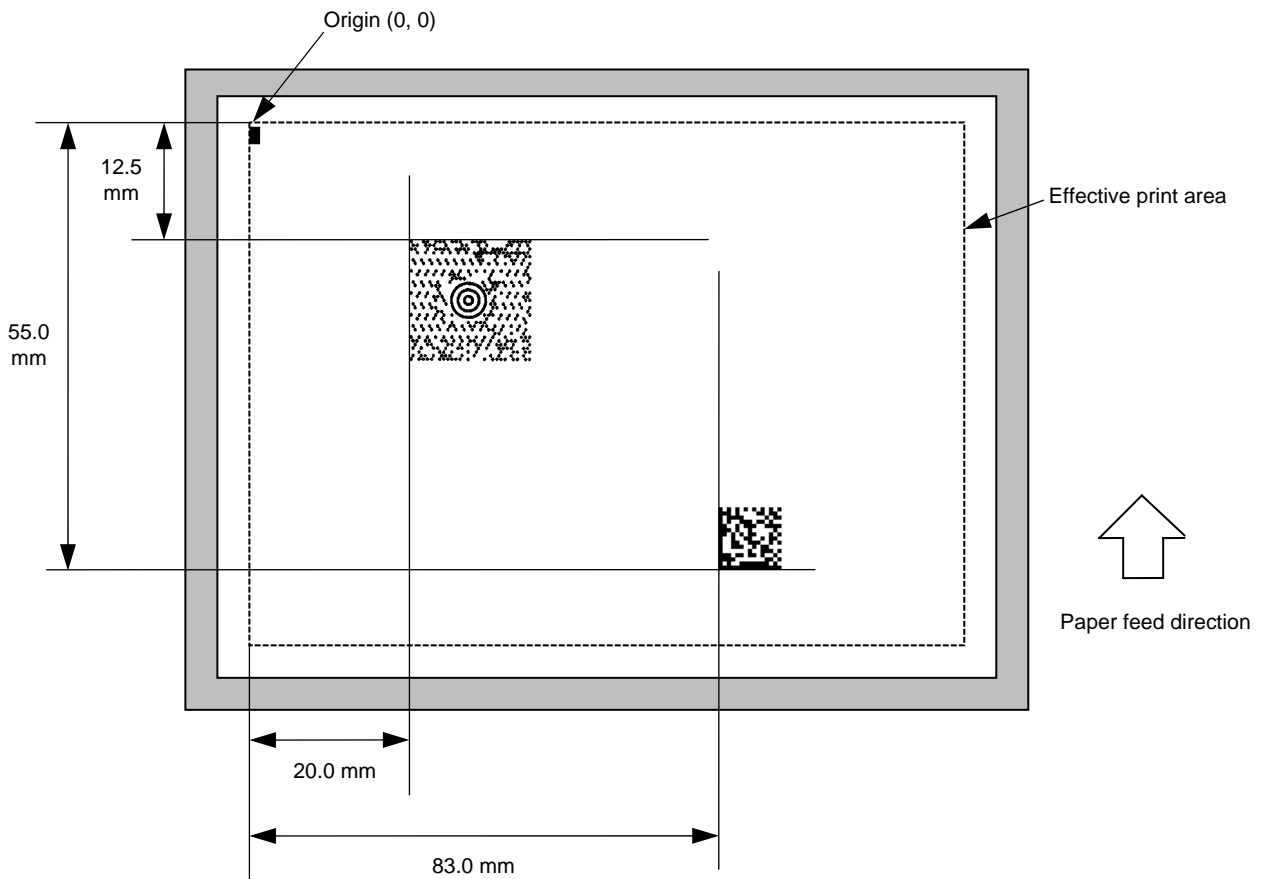
Notes

- (1) More than one Two-dimensional Code Format Command can be connected when transmitted.
[ESC] XB01; 0100, 0150, 3, 1, 02, 02, 06, 06, 02, 0, 0150 [LF]
B02; 0350, 0150, 3, 1, 02, 02, 06, 06, 02, 0, 0150 [LF] [NUL]
- (2) When the drawing data is changed per label issue during printing, the field of the drawing data for the previous label is automatically cleared using the two-dimensional code number, then the next drawing data is printed. Therefore, the two-dimensional code number which differs according to the drawing fields should be designated.
- (3) Since the automatic field clear is not performed between the Clear Command ([ESC] C) and Issue Command ([ESC] XS), the fixed data may be drawn using the same two-dimensional code number. In this case, the Format Command and Data Command should be sent alternately. (After the Issue Command is sent, the fields with the same two-dimensional code number are automatically cleared until the Clear Command is sent.)
- (4) The link field designation is cleared by omitting the link field designation using the same two-dimensional code No. and reformatting data. The link field designation can be also cleared by the Image Buffer Clear Command.
- (5) A print data string and link field No. cannot be programmed at the same time.

Refer to

- Bit Map Font Format Command ([ESC] PC)
- Outline Font Format Command ([ESC] PV)
- Barcode/Two-dimensional Code Data Command ([ESC] RB)

Examples



```
[ESC] C [LF] [NUL]
[ESC] XB01; 0200, 0125, Z [LF] [NUL]
[ESC] XB02; 0830, 0550, Q, 08, 03, 05, 3 [LF] [NUL]
[ESC] RB01; 123456789123123MaxiCode [LF] [NUL]
[ESC] RB02; Data Matrix [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]
```

5.7 COMMANDS RELATED TO PRINT DATA

5.7.1 BIT MAP FONT DATA COMMAND

[ESC] RC

Function	Provides data for the bit map font row.
Format	<p>① [ESC] RCaaa; bbb ----- bbb [LF] [NUL]</p> <p>② Link Field Data Command [ESC] RC; ccc --- ccc [LF] ddd --- ddd [LF] ----- [LF] xxx --- xxx [LF] [NUL]</p>
Term	<p>aaa: Character string number 000 to 199 (Two digits, 00 to 99, also acceptable.) When 000 and 00 are designated at the same time, the data designated later is automatically selected.</p> <p>bbb ----- bbb: Data string to be printed Max. 255 characters (Max. 127 characters when the font type is U, V, r, s, w or 51, and max. 63 characters when it is r as a 4-byte code.) Any excess data will be discarded. For character codes, refer to the character code table mentioned later.</p> <p>ccc ----- ccc: Data string of link field No. 1</p> <p>ddd ----- ddd: Data string of link field No. 2</p> <p>⇕</p> <p>xxx ----- xxx: Data string of link field No. 99</p>

Explanation

(1) Link field data string

- After the link field No. is designated using the Format Command, the data strings are linked by the Link Field Data Command to draw an image.
- Up to 255 characters of data strings can be linked. However, when the font type is U, V, r, s, w or 51, up to 127 characters can be linked. When it is r as a 4-byte code, up to 63 characters can be linked.
When the number of characters exceeds the maximum number of digits, the excess data will be discarded.
- Up to 99 data strings can be linked.
- Up to 2048 bytes can be used as the command length ([ESC] to [NUL]) of the Link Field Data Command.
- When the data string is omitted using the Link Field Data Command, the following process is performed:
 - ① No process will be performed for the field which contains no print data due to the omission.
 - ② When the field partially loses print data due to the omission, the only remaining data will be processed as print data.
- The Link Field Data Command can be used for the bit map font fields, outline font fields and barcode fields.
- (The same result is obtained when any of the “RC,” “RV” or “RB” command code is designated.)

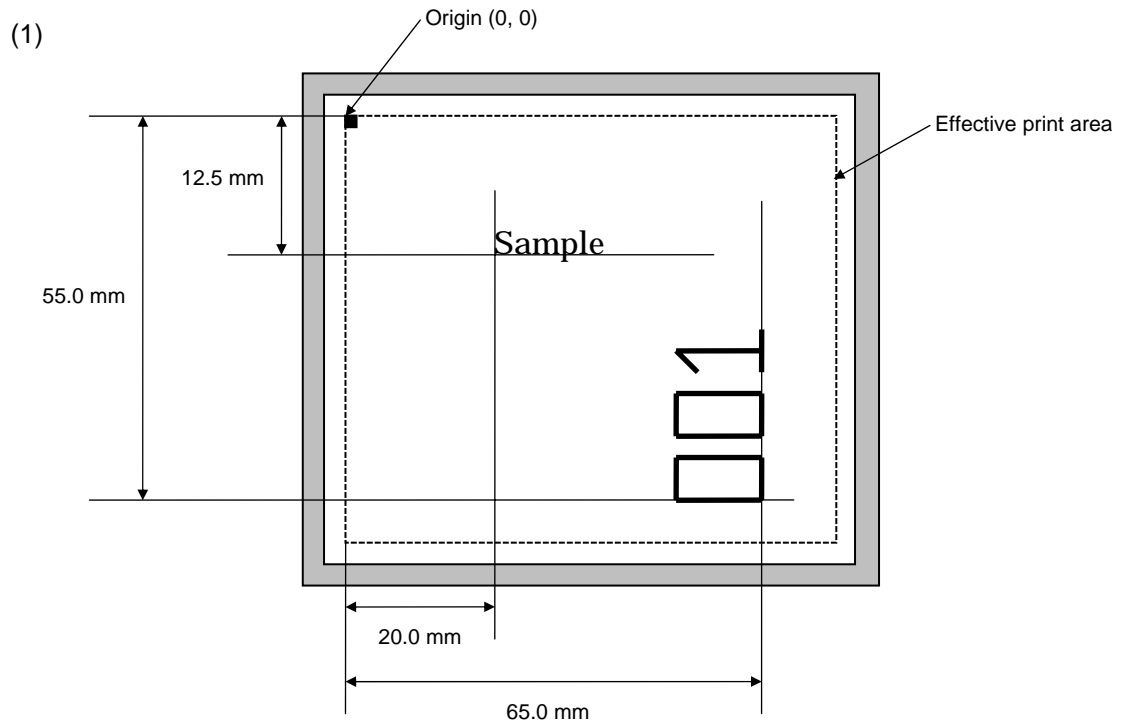
Notes

- (1) For character sets from 41 to 43, a character code consisting of 1 byte is stored. However, when the character code is read, F0H is added to the upper digit or FFH is added to the upper digit with Chinese characters installed, and consists of 2 bytes. In this case, up to 188 characters can be stored per character set.

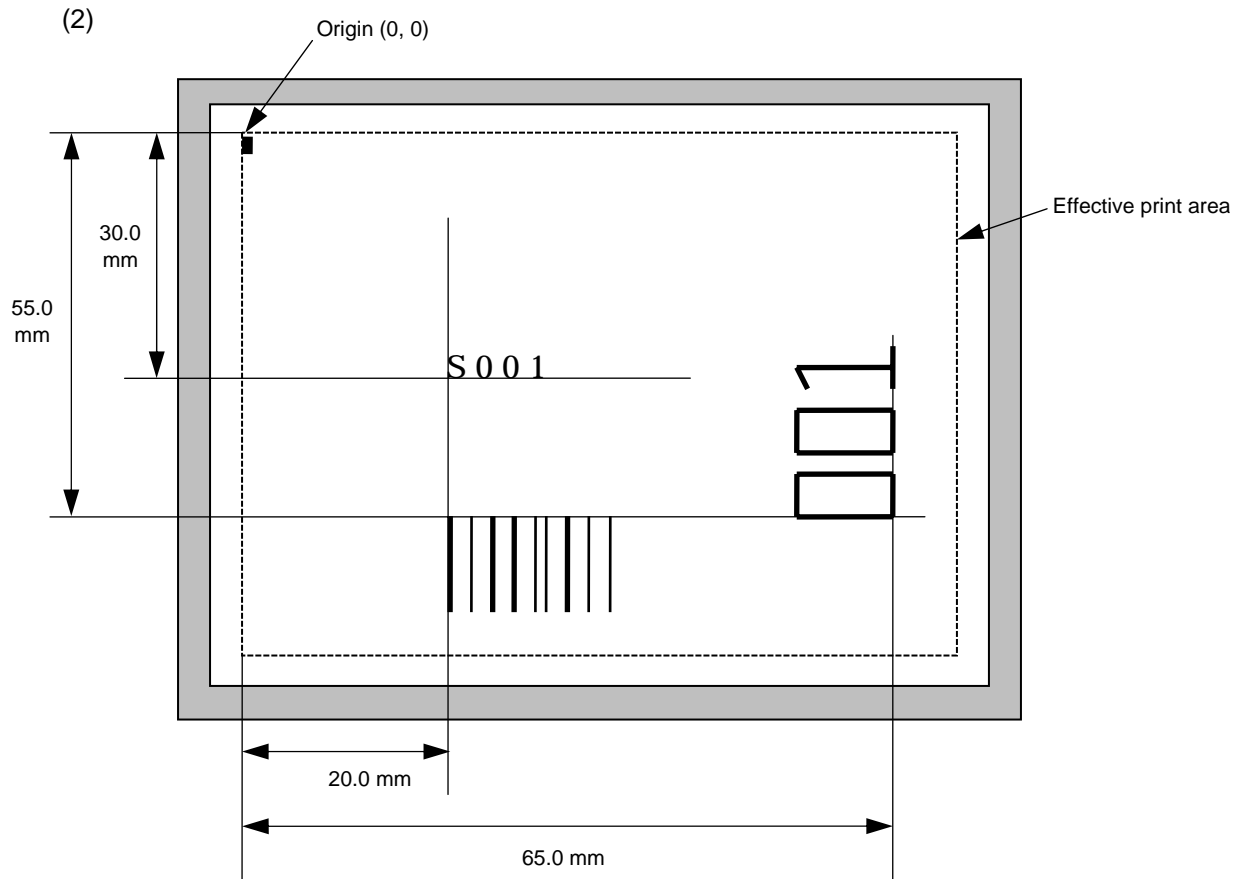
Refer to

- Bit Map Font Data Command ([ESC] RC)

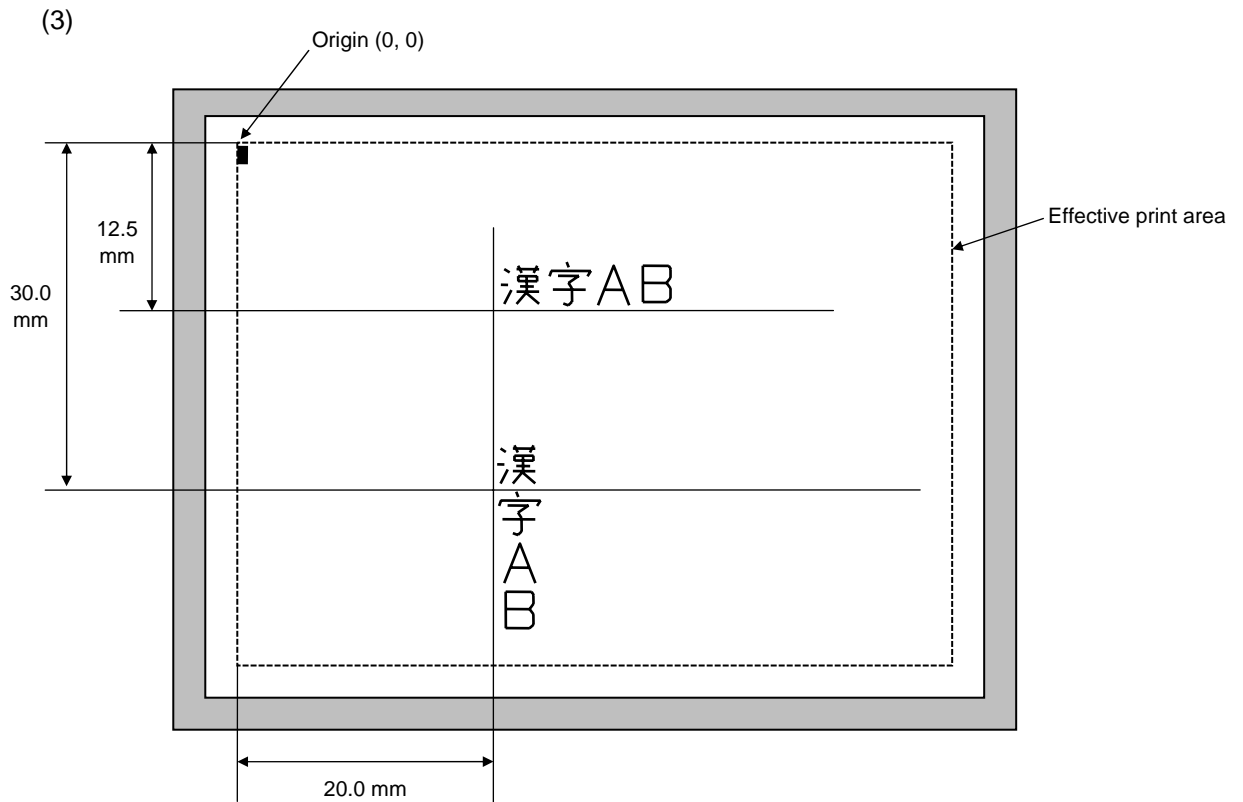
Examples



```
[ESC] C [LF] [NUL]
[ESC] PC001; 0200, 0125, 1, 1, C, 00, B [LF] [NUL]
[ESC] PC002; 0650, 0550, 2, 2, G, 33, B, +0000000001 [LF] [NUL]
[ESC] RC001; Sample [LF] [NUL]
[ESC] RC002; 001 [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]
```



```
[ESC] C [LF] [NUL]
[ESC] PC001; 0200, 0300, 1, 1, C, 00, B; 01, 02 [LF] [NUL]
[ESC] PV01; 0650, 0550, 0200, 0150, B, 33, B; 02 [LF] [NUL]
[ESC] XB01; 0200, 0550, 3, 1, 03, 03, 08, 08, 03, 0, 0150; 01, 02 [LF] [NUL]
[SSC] RC; S001 [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]
```



```
[ESC] C [LF] [NUL]
[ESC] PC000; 0200, 0125, 1, 1, W, 00, B [LF] [NUL]
[ESC] PC001; 0200, 0300, 1, 1, W, 01, B [LF] [NUL]
[ESC] RC000; 漢字    AB [LF] [NUL]
[ESC] RC001; 漢字    AB [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]
```

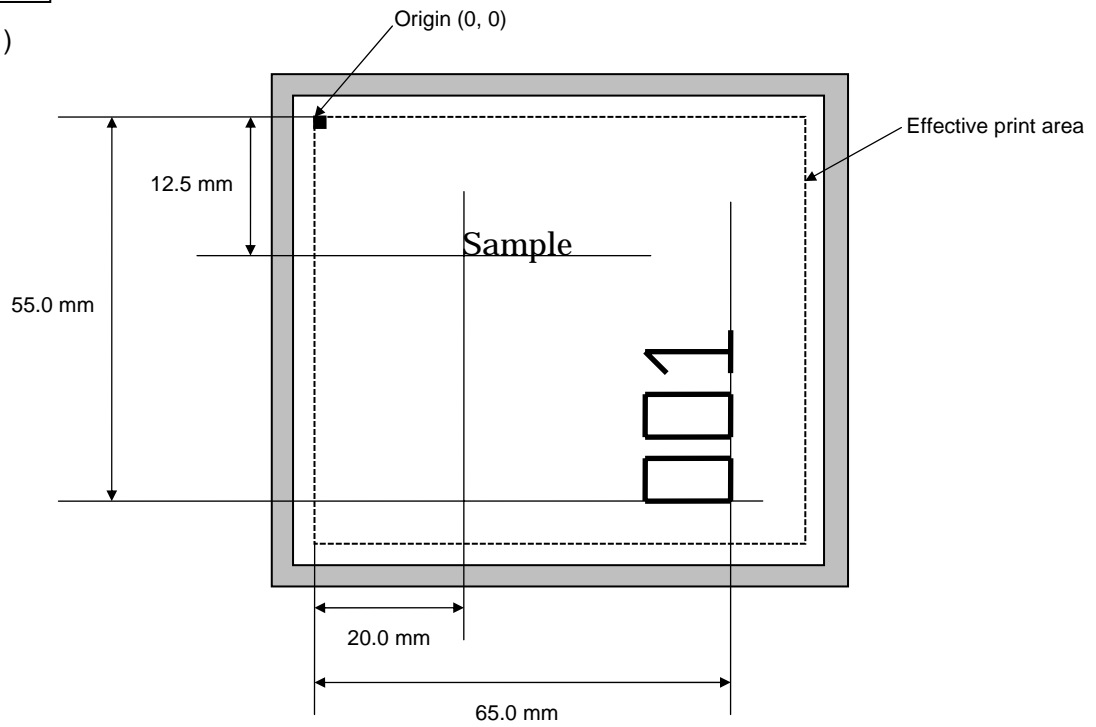

5.7.2 OUTLINE FONT DATA COMMAND

[ESC] RV

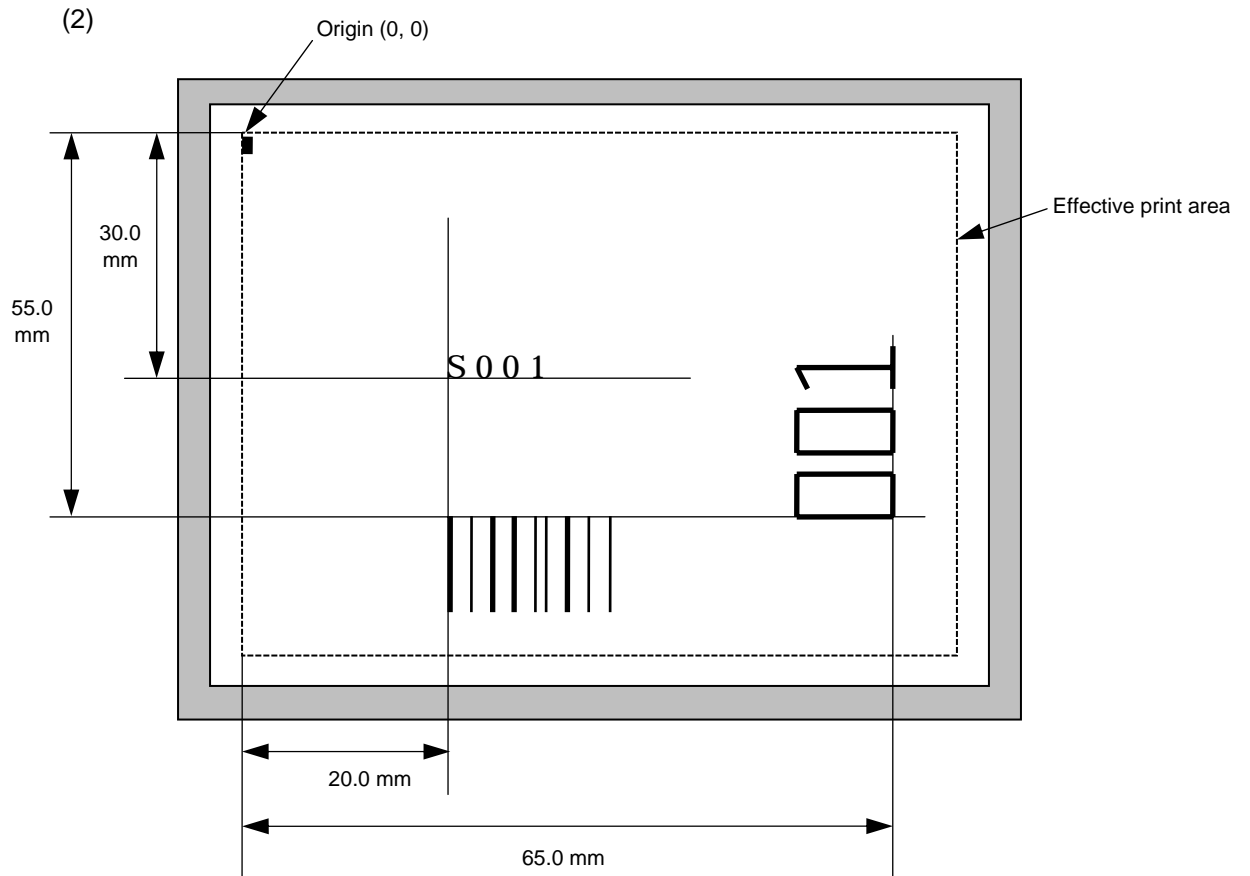
Function	Provides data for the outline font row.
Format	<p>① [ESC] RVaa; bbb ----- bbb [LF] [NUL]</p> <p>② Link Field Data Command [ESC] RV; ccc --- ccc [LF] ddd --- ddd [LF] ----- [LF] xxx --- xxx [LF] [NUL]</p>
Term	<p>aa: Character string number 00 to 99</p> <p>bbb ----- bbb: Data string to be printed Max. 255 characters Any excess data will be discarded. For character codes, refer to the character code table mentioned later.</p> <p>ccc ----- ccc: Data string of link field No. 1</p> <p>ddd ----- ddd: Data string of link field No. 2</p> <p>⇕</p> <p>xxx ----- xxx: Data string of link field No. 99</p>
Explanation	<p>(1) Link field data string</p> <ul style="list-style-type: none"> • After the link field No. is designated using the Format Command, the data strings are linked by the Link Field Data Command to draw an image. • Up to 255 characters of data strings can be linked. However, when the font type is C, up to 127 characters can be linked. When the number of characters exceeds the maximum number of digits, the excess data will be discarded. • Up to 99 data strings can be linked. • Up to 2048 bytes can be used as the command length ([ESC] to [NUL]) of the Link Field Data Command. • When the data string is omitted using the Link Field Data Command, the following process is performed: <ul style="list-style-type: none"> ① No process will be performed for the field which contains no print data due to the omission. ② When the field partially loses print data due to the omission, the only remaining data will be processed as print data. • The Link Field Data Command can be used for the bit map font fields, outline font fields and barcode fields. • (The same result is obtained when any of the “RC,” “RV” or “RB” command code is designated.)
Refer to	Outline Font Format Command ([ESC] PV)

Examples

(1)



```
[ESC] C [LF] [NUL]
[ESC] PV01; 0200, 0125, 0100, 0100, B, 00, B [LF] [NUL]
[ESC] PV02; 0650, 0550, 0200, 0150, B, 33, B, +0000000001 [LF] [NUL]
[ESC] RV01; Sample [LF] [NUL]
[ESC] RV02; 001 [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]
```



```
[ESC] C [LF] [NUL]
[ESC] PC001; 0200, 0300, 1, 1, C, 00, B; 01, 02 [LF] [NUL]
[ESC] PV01; 0650, 0550, 0200, 0150, B, 33, B; 02 [LF] [NUL]
[ESC] XB01; 0200, 0550, 3, 1, 02, 02, 06, 06, 02, 0, 0150; 01, 02 [LF] [NUL]
[SSC] RC; S001 [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]
```

5.7.3 BARCODE/TWO-DIMENSIONAL CODE DATA COMMAND (Any codes other than MaxiCode)
[ESC] RB

Function	Provides data for the barcode/two-dimensional code.
Format	<div>① [ESC] RBaa; bbb ----- bbb [LF] [NUL]</div> <div>② Link Field Data Command</div> <div>[ESC] RB; ccc --- ccc [LF] ddd --- ddd [LF] ----- [LF] xxx --- xxx [LF] [NUL]</div>
Term	<div>aa: Barcode/two-dimensional code number</div> <div> 00 to 31</div> <div>bbb ----- bbb: Data string to be printed</div> <div> The maximum number of digits varies according to the type of</div> <div> barcode/two-dimensional code.</div> <div>ccc ----- ccc: Data string of link field No. 1</div> <div>ddd ----- ddd: Data string of link field No. 2</div> <div> ⇕</div> <div>xxx ----- xxx: Data string of link field No. 99</div>

Explanation

(1) Link field data string

- After the link field No. is designated using the Format Command, the data strings are linked by the Link Field Data Command to draw an image.
- When the barcode type is Data Matrix or PDF417, up to 2000 digits of data strings can be linked. When it is other than Data Matrix or PDF417, up to 126 digits can be linked. (It varies according to the type of barcode.)
When the number of digits exceeds the maximum number of digits, the excess data will be discarded.
- Up to 99 data strings can be linked.
- Up to 2048 bytes can be used as the command length ([ESC] to [NUL]) of the Link Field Data Command.
- When the data string is omitted using the Link Field Data Command, the following process is performed:
 - ① No process will be performed for the field which contains no print data due to the omission.
 - ② When the field partially loses print data due to the omission, the only remaining data will be processed as print data.
- The Link Field Data Command can be used for the bit map font fields, outline font fields and barcode fields.
- (The same result is obtained when any of the "RC," "RV" or "RB" command code is designated.)

(2) Data check

If the data row contains data which does not meet the type of barcode, a barcode will not be drawn. If wrong code selection takes place in the data row of CODE128 (without auto code selection), the barcode will not be drawn.

In case of Data Matrix, if there is data different from the one designated using the format ID, a symbol is not drawn.

(3) No. of digits of data

When data exceeding the maximum number of digits is sent, the excess data will be discarded. For the maximum number of digits for each barcode, see below.

Data Matrix, PDF417, QR code:	2000 digits
MicroPDF417:	366 digits
MaxiCode:	93 digits
Customer barcode:	20 digits
Highest priority customer barcode:	19 digits
POSTNET:	5, 9, 11 digits
ROYAL MAIL 4 STATE CUSTOMER CODE:	12 digits
KIX CODE:	18 digits
Barcodes other than the above	126 digits

When the number of digits does not correspond to the barcode type, the barcode is not drawn.

- (4) The maximum number of digits for Data Matrix varies according to the settings for ECC type, format ID, and the cell size. In the case of Kanji, the maximum number of digits becomes half of the values described below since a Kanji character occupies 2 bytes.

Max number of digits for Data Matrix

	ECC000	ECC050	ECC080	ECC100	ECC140
Format ID 1	500	457	402	300	144
Format ID 2	452	333	293	218	105
Format ID 3	394	291	256	190	91
Format ID 4	413	305	268	200	96
Format ID 5	310	228	201	150	72
Format ID 6	271	200	176	131	63

	Numeric	Alphanumeric	8 bit
ECC200	2000	2000	1556

Cell Size and Effective Data Capacity

		ECC000			ECC050			ECC080			ECC100			ECC140		
		Numeric capacity	Alphanum capacity	8-bit byte capacity	Numeric capacity	Alphanum capacity	8-bit byte capacity	Numeric capacity	Alphanum capacity	8-bit byte capacity	Numeric capacity	Alphanum capacity	8-bit byte capacity	Numeric capacity	Alphanum capacity	8-bit byte capacity
Row	Col															
9	9	3	2	1	—	—	—	—	—	—	—	—	—	—	—	—
11	11	12	8	5	1	1	—	—	—	—	—	—	—	—	—	—
13	13	24	16	10	10	6	4	4	3	2	1	1	—	—	—	—
15	15	37	25	16	20	13	9	13	9	6	8	5	3	—	—	—
17	17	53	35	23	32	21	14	24	16	10	16	11	7	2	1	1
19	19	72	48	31	46	30	20	36	24	16	25	17	11	6	4	3
21	21	92	61	40	61	41	27	50	33	22	36	24	15	12	8	5
23	23	115	76	50	78	52	34	65	43	28	47	31	20	17	11	7
25	25	140	93	61	97	65	42	82	54	36	60	40	26	24	16	10
27	27	168	112	73	118	78	51	100	67	44	73	49	32	30	20	13
29	29	197	131	86	140	93	61	120	80	52	88	59	38	38	25	16
31	31	229	153	100	164	109	72	141	94	62	104	69	45	46	30	20
33	33	264	176	115	190	126	83	164	109	72	121	81	53	54	36	24
35	35	300	200	131	217	145	95	188	125	82	140	93	61	64	42	28
37	37	339	226	148	246	164	108	214	143	94	159	106	69	73	49	32
39	39	380	253	166	277	185	121	242	161	106	180	120	78	84	56	36
41	41	424	282	185	310	206	135	270	180	118	201	134	88	94	63	41
43	43	469	313	205	344	229	150	301	201	132	224	149	98	106	70	46
45	45	500	345	226	380	253	166	333	222	146	248	165	108	118	78	51
47	47	500	378	248	418	278	183	366	244	160	273	182	119	130	87	57
49	49	500	413	271	457	305	200	402	268	176	300	200	131	144	96	63

		ECC200		
Symbol size		Numeric capacity	Alphanum capacity	8-bit byte capacity
Row	Col			
10	10	6	3	1
12	12	10	6	3
14	14	16	10	6
16	16	24	16	10
18	18	36	25	16
20	20	44	31	20
22	22	60	43	28
24	24	72	52	34
26	26	88	64	42
32	32	124	91	60
36	36	172	127	84
40	40	228	169	112
44	44	288	214	142
48	48	348	259	172
52	52	408	304	202
64	64	560	418	278
72	72	736	550	366
80	80	912	682	454
88	88	1152	862	574
96	96	1392	1042	694
104	104	1632	1222	814
120	120	2000	1573	1048
132	132	2000	1954	1302
144	144	2000	2000	1556

Rectangular code

		ECC200		
Symbol size		Numeric capacity	Alphanum capacity	8-bit byte capacity
Row	Col			
8	18	10	6	3
8	32	20	13	8
12	26	32	22	14
12	36	44	31	20
16	36	64	46	30
16	48	98	72	47

- (5) When PDF417 or MicroPDF417 is used, the number of symbol characters, called code words, is limited to 928 or less. Moreover, the data compression rate varies according to the data. Therefore, the maximum number of digits according to the mode is as follows.

When letters and numerics are mixed in data in EXC mode, for example, the maximum values become smaller than the values below, since the internal mode selection code is used.

To correct a reading error by designating the security level, the maximum value becomes further smaller, since the error correction code words below are used.

When the number of the code words exceeds 928, or when the number of rows exceeds 90, a symbol is not drawn.

For the MicroPDF417, the numbers of rows and columns can be specified. The maximum number of digits varies according to the setting.

PDF417

- Extended Alphanumeric Compaction (EXC) mode: 1850 digits
- Binary/ASCII Plus mode: 1108 digits
- Numeric compaction mode: 2000 digits

MicroPDF417

- Binary mode: 150 digits
- Upper case letter/space mode: 250 digits
- Numeric compaction mode: 366 digits

No. of Error Correction Code Words of PDF417

(For the MicroPDF417, the printer sets the security level automatically.)

Security level	Error Correction Ability	No. of error correction code words
Level 0	<div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; margin: 5px auto; width: 60px;">Low</div> <div style="font-size: 2em; margin: 0 auto;">↑</div> <div style="border: 1px solid black; padding: 2px; margin: 5px auto; width: 60px;">High</div> </div>	0
Level 1		2
Level 2		6
Level 3		14
Level 4		30
Level 5		62
Level 6		126
Level 7		254
Level 8		510

The maximum number of columns and rows for the MicroPDF417

Parameter (gg)	No. of columns	No. of rows	Max. number of digits for binary mode	Max. number of digits for upper case letter/space mode	Max. number of digits for numeric mode
00	—	—	150	250	366
01	1	—	22	38	55
02	2	—	43	72	105
03	3	—	97	162	237
04	4	—	150	250	366
05	1	11	3	6	8
06		14	7	12	17
07		17	10	18	26
08		20	13	22	32
09		24	18	30	44
10		28	22	38	55
11	2	8	8	14	20
12		11	14	24	35
13		14	21	36	52
14		17	27	46	67
15		20	33	56	82
16		23	38	64	93
17		26	43	72	105
18	3	6	6	10	14
19		8	10	18	26
20		10	15	26	38
21		12	20	34	49
22		15	27	46	67
23		20	39	66	96
24		26	54	90	132
25		32	68	114	167
26		38	82	138	202
27		44	97	162	237
28	4	4	8	14	20
29		6	13	22	32
30		8	20	34	49
31		10	27	46	67
32		12	34	58	85
33		15	45	76	111
34		20	63	106	155
35		26	85	142	208
36		32	106	178	261
37		38	128	214	313
38		44	150	250	366

(6) CODE128 code selection

In the case of CODE128 (with auto code selection), code selection is performed in the following manner. (Conforming to USS-128 APPENDIX-G)

- ① Determining the start character
 - (a) If the data begins with four or more consecutive numerals, the start code to be used is (CODE C).
 - (b) In any case other than (a) in ①, if a control character appears before a small letter (see ④.) or four or more consecutive numerals, the start code is (CODE A).
 - (c) In none of the above cases, the start code is (CODE B).
- ② If the data begins with an odd number of digits in (a), ①:
 - (a) Insert the (CODE A) or (CODE B) character just before the last numeric data. When (FNC1), if found in the number, breaks a pair of digits in the number, insert the (CODE A) or (CODE B) character before the numeric data preceding the (FNC1). Selection of (CODE A) or (CODE B) should conform to (b) and (c) in ①.
- ③ If four or more digits of numeric data continue in (CODE A) or (CODE B).
 - (a) When the numeric data is an even number of digits, insert the (CODE C) character just before the first numeric data.
 - (b) When the numeric data is an odd number of digits, insert the (CODE C) character immediately after the first numeric data.
- ④ If a control character appears in (CODE B):
 - (a) In the subsequent data, when a small letter appears before the next control character or four or more consecutive digits, insert the (SHIFT) character before the first control character.
 - (b) When not so, insert the (CODE B) character just before the first control character.
- ⑤ If a small letter appears in (CODE A):
 - (a) In the subsequent data, when a control character appears before the next small letter or four or more consecutive digits, insert the (SHIFT) character before the first small letter.
 - (b) When not so, insert the (CODE B) character just before the first small letter.
- ⑥ If any data other than the numerals appears in (CODE C):
 - (a) Insert the (CODE A) or (CODE B) character just before the data other than the numerals. Selection of (CODE A) or (CODE B) should conform to (b) and (c) in ①.

* Refer to chapter 16 "CODE128 Value Code Table."

(7) CODE128 code selection check

Check if selection of (CODE A), (CODE B) or (CODE C) of CODE128 has been set correctly. If an error is found, the barcode will not be drawn.

[Conditions causing an error]

- ① No start code is designated.
- ② A small letter (including { , | , } , ~ , _) is found in (CODE A).
- ③ A control character is found in (CODE B).
- ④ Any data other than the numerals, (FNC1), (CODE A) and (CODE B) is found in (CODE C).
- ⑤ There are two or more consecutive (SHIFT) characters.
- ⑥ The number in (CODE C) is an odd number of digits.
- ⑦ (SHIFT) is followed by (CODE A), (CODE B) or (CODE C).

(8) Kanji code selection

- In the case of Data Matrix, PDF417 and QR code, Kanji codes can be printed. Shift JIS, JIS hexadecimal, JIS 8, or the mixture of these codes can be used.

(9) When manual mode is selected in the Format Command for a QR code

- ① Numeric mode, alphanumeric and symbol mode, Kanji mode

Mode selection	Data to be printed
----------------	--------------------

- ② Binary mode

Mode selection	No. of data strings (4 digits)	Data to be printed
----------------	-----------------------------------	--------------------

- ③ Mixed mode

Data	“,” (comma)	Data	“,” (comma)	Data
------	-------------	------	-------------	------

QR code can handle all codes including alphanumerics, symbols and Kanji. Since the data compression rate varies according to the code, a code to be used is designated when the mode is selected.

Mode	Code	Details
N	Numerics	0 to 9
A	Alphanumerics, symbols	A to Z 0 to 9 space \$ % * + - . / :
B	Binary (8-bit)	00H to FFH
K	Kanji	Shift JIS, JIS hexadecimal

If mixed mode is selected, up to 200 modes can be selected in a QR code.

(10) When the automatic mode is selected using the Format Command for QR code.

Data to be printed

① How to transmit the control code data

NUL (00H) = > @ (3EH, 40H)
SOH (01H) = > A (3EH, 41H)
STX (02H) = > B (3EH, 42H)

GS (1DH) = >] (3EH, 5DH)
RS (1EH) = > ^ (3EH, 5EH)
US (1FH) = > _ (3EH, 5FH)

② How to transmit the special codes

> (3EH) = > 0 (3EH, 30H)

(11) Transfer code for QR code

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p								
1	SOH	DC1	!	1	A	Q	a	q								
2	STX	DC2	"	2	B	R	b	r								
3	ETX	DC3	#	3	C	S	c	s								
4	EOT	DC4	\$	4	D	T	d	t								
5	ENQ	NAK	%	5	E	U	e	u								
6	ACK	SYN	&	6	F	V	f	v								
7	BEL	ETB	'	7	G	W	g	w								
8	BS	CAN	(	8	H	X	h	x								
9	HT	EM	)	9	I	Y	i	y								
A	LF	SUB	*	:	J	Z	j	z								
B	VT	ESC	+	;	K	[	k	{								
C	FF	FS	,	<	L	\	l	|								
D	CR	GS	-	=	M	]	m	}								
E	SO	RS	•	>	N	^	n	~								
F	SI	US	/	?	O	_	o	DEL								

* The shaded parts are Japanese.
They are omitted here.

(12) Examples of data designation

① Alphanumeric mode: ABC123

A A B C 1 2 3
 ↑
 Data to be printed
 Designation of mode

② Binary mode: 01h, 03h, 05h

B 0 0 0 6 > A > C > E
 ↑
 No. of data strings
 Designation of mode

③ Mixed mode

Numeric mode: 123456
 Kanji mode: Kanji data
 Binary mode: a ア i イ u ウ e エ o オ
 Alphanumeric mode: ABC

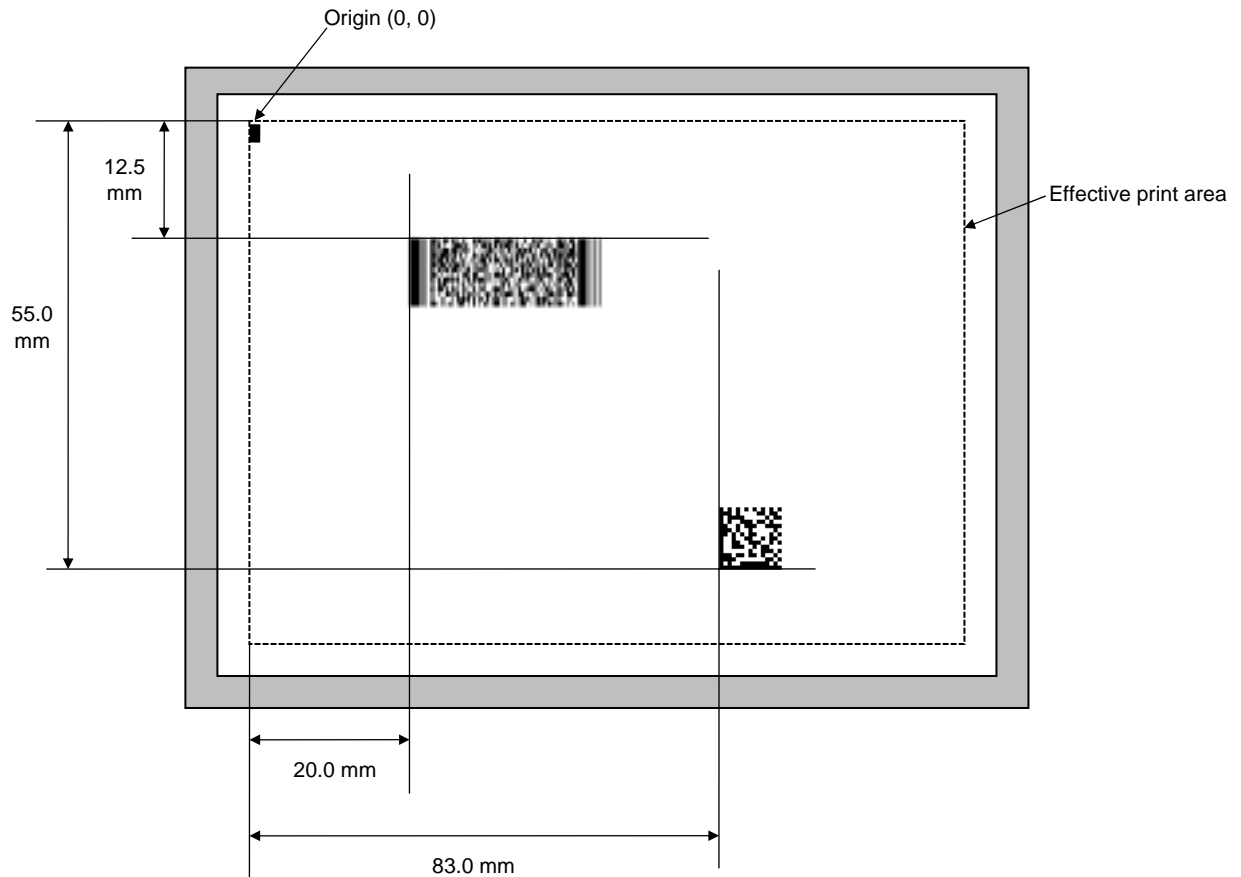
N 1 2 3 4 5 6, K Kanji data, B 0 0 1 0 a ア i イ u ウ e エ o オ, A A B C
 ↑ ↑ ↑ ↑ ↑
 Data to be printed Data to be printed No. of data strings Data to be printed Data to be printed
 Designation of mode

④ Automatic mode

When the data above (③) is designated in automatic mode:

1 2 3 4 5 6 Kanji data a ア i イ u ウ e エ o オ A B C
 Data to be printed

Examples



```
[ESC] C [LF] [NUL]
[ESC] XB01; 0200, 0125, P, 04, 02, 03, 0, 0010 [LF] [NUL]
[ESC] XB02; 0830, 0550, Q, 08, 03, 05, 3 [LF] [NUL]
[ESC] RB01; PDF417 [LF] [NUL]
[ESC] RB02; Data Matrix [LF] [NUL]
[ESC] XS; I, 0002, 0002C4000 [LF] [NUL]
```

5.7.4 TWO-DIMENSIONAL CODE DATA COMMAND (MaxiCode) [ESC] RB

Function	Provides data for the two-dimensional code.
Format	<p>For mode 2 or 3: [ESC] RBaa; bbbbbbbbbbccdddeeeee --- eeeee [LF] [NUL]</p> <p>For mode 4 or 6: [ESC] RBaa; ffffffffggggg --- ggggg [LF] [NUL]</p>
Term	<p>aa: Two-dimensional code number</p> <p>“Modes 2 and 3”</p> <p>bbbbbbbb: Postal code Fixed at 9 digits</p> <ul style="list-style-type: none">• Mode 2:<ul style="list-style-type: none">b₁b₂b₃b₄b₅: Zip code Fixed at 5 digits (Numerics)b₆b₇b₈b₉: Zip code extension Fixed at 4 digits (Numerics)• Mode 3:<ul style="list-style-type: none">b₁b₂b₃b₄b₅b₆: Zip code Fixed at 6 digits (Character “A” of code set)b₇b₈b₉: Vacant Fixed at 3 digits (20H) <p>ccc: Class of service Fixed at 3 digits (Numerics)</p> <p>ddd: Country code Fixed at 3 digits (Numerics)</p> <p>eee --- eee: Message data strings 84 digits</p> <p>“Modes 4 and 6”</p> <p>fffffff: Primary message data strings 9 digits</p> <p>ggg --- ggg: Secondary message data strings 84 digits</p>

Explanation

- (1) When any data other than numerics is included in the data string of zip code (mode 2), zip code extension, class of service, or country code, a MaxiCode is not drawn.
- (2) If the message data is less than 84 digits when mode 2 or 3 is selected, the printer adds one digit of CR (000000) at the end of the data, and the remaining digits will be filled with FSs (011100). When message data exceeding 84 digits is received, the excess data will be discarded before drawing a MaxiCode.
- (3) If the message data is less than 93 digits (9 digits + 84 digits) when mode 4 or 6 is selected, the printer adds one digit of CR (000000) at the end of the data, and the remaining digits will be filled with FSs (011100). When message data exceeding 93 digits is received, the excess data will be discarded before drawing a MaxiCode.
- (4) Mode 6 should not be used for usual operation since it is used for scanner programming.
- (5) When "TYPE2: Special specification" is set for MaxiCode specification setting in the SYSTEM mode and when Mode 2 is selected, the country code must be 840. Otherwise, a MaxiCode will not be drawn.
- (6) When "TYPE2: Special specification" is set for MaxiCode specification setting in the SYSTEM mode and when Mode 3 is selected, the country code must be other than 840. Otherwise, a MaxiCode will not be drawn.

5.8 COMMANDS RELATED TO ISSUE AND FEED

5.8.1 ISSUE COMMAND

[ESC] XS

Function	Issues labels according to the print conditions programmed.
Format	[ESC] XS; I, aaaa, bbbcddefgh [LF] [NUL]
Term	<p>aaaa: Number of labels to be issued 0001 to 9999</p> <p>bbb: Reserved area 000 to 100</p> <p>c: Type of sensor 0: No sensor 1: Reflective sensor 2: Transmissive sensor 3: Transmissive sensor (when using manual threshold value) 4: Reflective sensor (when using manual threshold value) * In the case of the compatible mode for the B-SP series, Reserved when 3 is specified. (If specified, it is processed as "2.") Reserved when 4 is specified. (If specified, it is processed as "1.")</p> <p>d: Reserved area C, D, E</p> <p>e: Reserved area 1 to 9, A</p> <p>f: Reserved area 0 to 2</p> <p>g: Print orientation and mirror printing 0: Bottom first printing 1: Top first printing 2: Reserved 3: Reserved * Reserved in the case of the compatible mode for the B-SP series (Fixed at 1.)</p> <p>h: Type of status response 0: No status response 1: Status response</p>

Explanation

(1) Number of labels to be issued

- ① If increment/decrement is not specified, the same data will be printed on the designated number of labels.
- ② If increment/decrement is specified, the designated number of labels will be printed while incrementing/decrementing the designated drawing area one by one.
- * The increment/decrement designation is effective until the Image Buffer Clear Command ([ESC] C) is transmitted.

(2) Type of sensor

① No sensor:

Printing takes place according to the parameter designated by the Label Size Set Command.

② Reflective sensor:

Printing takes place according to the parameter designated by the Label Size Set Command. However, the black mark provided on the back side of the tag paper is automatically sensed by the reflective sensor and the paper position is finely adjusted for every piece.

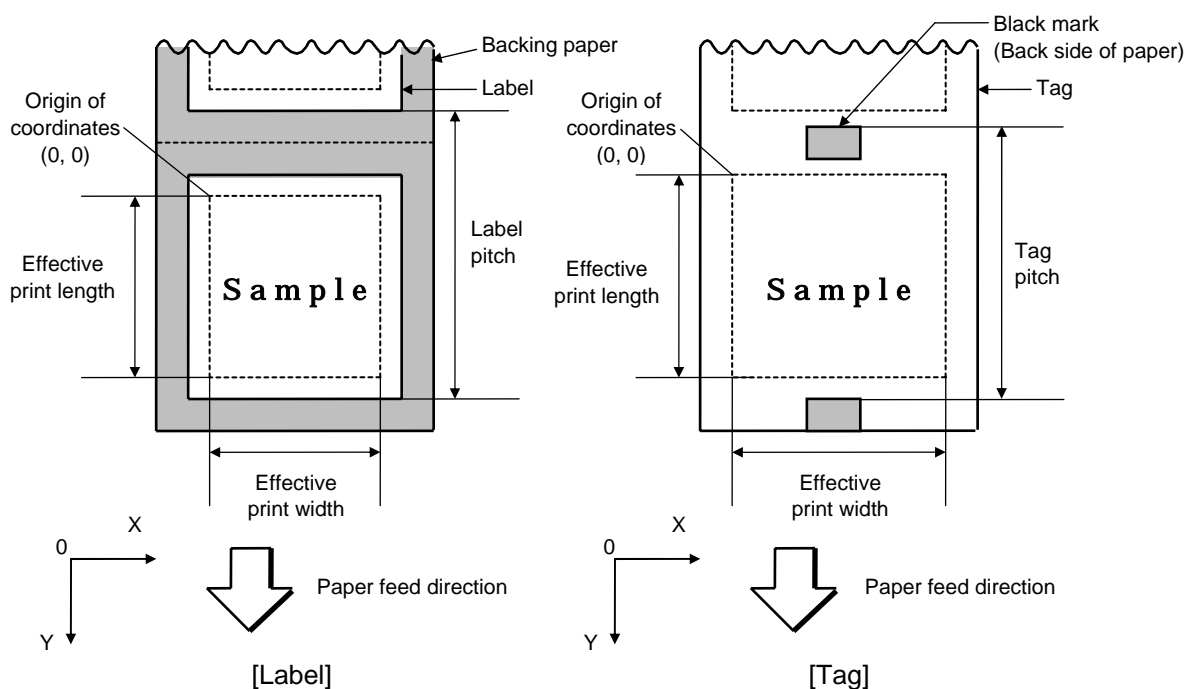
③ Transmissive sensor:

Printing takes place according to the parameter designated by the Label Size Set Command. However, the label-to-label gap is automatically sensed by the transmissive sensor and the paper position is finely adjusted for every piece.

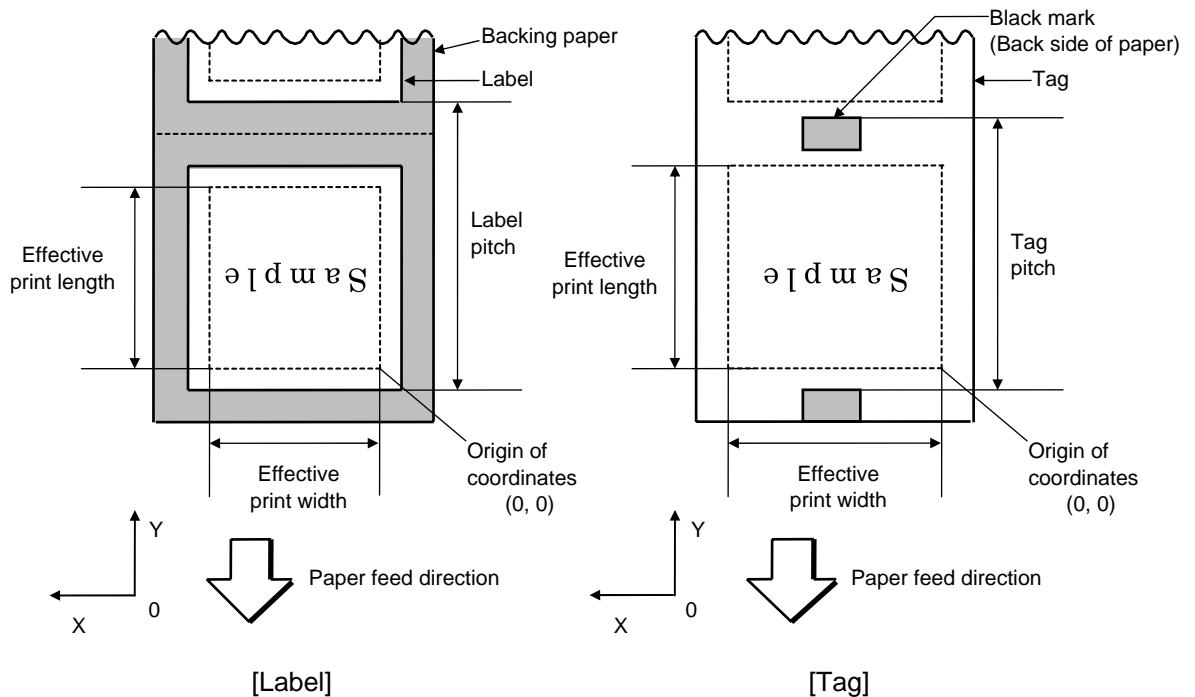
(3) Tag rotation designation

The origin of coordinates and print direction vary according to the designation of tag rotation.

① Bottom first printing



② Top first printing



(4) Status response

When "Status response is returned." is selected, a status response is returned at the end of printing or if an error occurs.

In the batch mode, the print end status response is returned after the designated number of labels is printed.

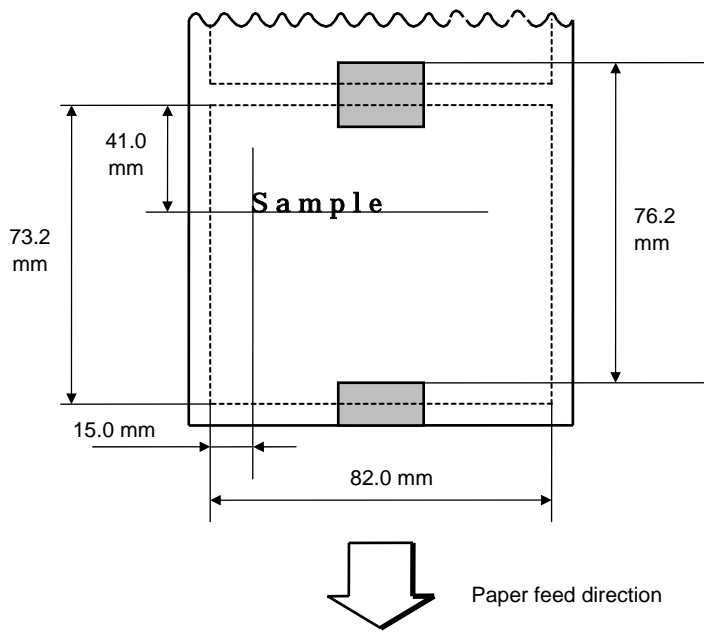
In the strip mode, a status response is returned after one label is printed.

* Do not change the setting of the status response parameter during printing. Otherwise the status response may not be returned properly.

(5) Reserved area (Omissible)

The described values should be designated to d, e, and f. When any value from 0 to 3 is designated to g, a command error does not occur. However, any value other than 1 should not be designated because it is fixed at 1.

Examples



- Issue count: 4 pieces
- Paper: Tag paper
(Reflective sensor is used.)
- Issue mode: Cut issue
- Print speed: 4"/sec.
- Status response: On

```
[ESC] D0762, 0820, 0732 [LF] [NUL]
[ESC] T11C40 [LF] [NUL]
[ESC] C [LF] [NUL]
[ESC] PC001; 0150, 0410, 1, 1, A, 00, B [LF] [NUL]
[ESC] RC001; Sample [LF] [NUL]
[ESC] XS; I, 0004, 0011C4101 [LF] [NUL]
```

5.8.2 FEED COMMAND

[ESC] T

Function	Feeds the paper.
Format	[ESC] Tabcde [LF] [NUL]
Term	<p>a: Type of sensor</p> <p>0: No sensor</p> <p>1: Reflective sensor</p> <p>2: Transmissive sensor</p> <p>3: Transmissive sensor (when using manual threshold value)</p> <p>4: Reflective sensor (when using manual threshold value)</p> <p>* In the case of the compatible mode for the B-SP series, Reserved when 3 is specified. (If specified, it is processed as "2.") Reserved when 4 is specified. (If specified, it is processed as "1.")</p> <p>b: Reserved area 0 to 1</p> <p>c: Reserved area C, D, E</p> <p>d: Reserved area 1 to 9, A</p> <p>e: Reserved area 0 to 2</p>

Explanation

(1) Type of sensor

① No sensor:

Feeding takes place according to the parameter designated by the Label Size Set Command.

② Reflective sensor:

Feeding takes place according to the parameter designated by the Label Size Set Command. However, the black mark provided on the back side of the tag paper is automatically sensed by the reflective sensor and the stop position is finely adjusted.

③ Transmissive sensor:

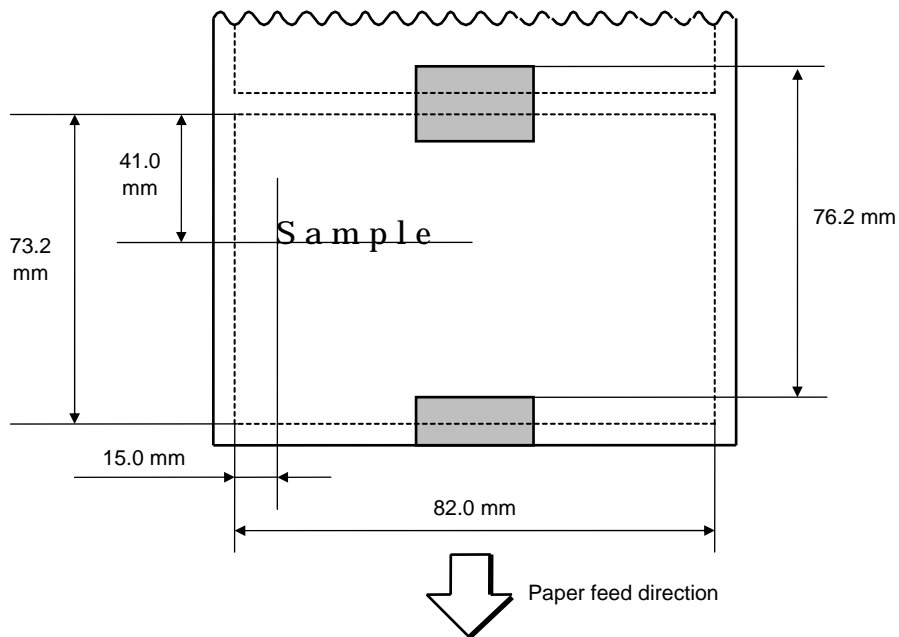
Feeding takes place according to the parameter designated by the Label Size Set Command. However, the label-to-label gap is automatically sensed by the transmissive sensor and the stop position is finely adjusted.

(2) When any value other than the above is specified in the reserved area, an error occurs. (When the above value is specified, this command is ignored.)

Notes

- (1) If the label size, type of sensor, feed amount fine adjustment or strip position fine adjustment is changed, the Feed Command must be sent to adjust the print start position prior to printing by feeding one label.
- (2) The parameter of the Feed Command is stored in memory (retained even if the power is turned off).
- (3) When "status response is returned." has been selected using the Issue Command, a status response is returned after the end of feed or when an error occurs.
- (4) Refer to ISSUE COMMAND for the operation to stop the label at the home position.

Examples



```
[ESC] D0762, 0820, 0732 [LF] [NUL]
[ESC] AX; +010, +000, +10 [LF] [NUL]
[ESC] T11C40 [LF] [NUL]
[ESC] C [LF] [NUL]
[ESC] PC001; 0150, 0410, 1, 1, A, 00, B [LF] [NUL]
[ESC] RC001; Sample [LF] [NUL]
[ESC] XS; I, 0004, 0011C43001 [LF] [NUL]
```

5.8.3 STORAGE AREA ALLOCATE COMMAND

[ESC] XF

Function	Allocates the storage area in the flash ROM on the CPU board.
Format	[ESC] XF; aa, bb, cc (, dd, ee) [LF] [NUL]
Term	<p>aa: Reserved 00 to 14</p> <p>bb: Size of bit map writable character storage area 00 to 50 (0 KB to 3,200 KB) (in units of 64 KB)</p> <p>cc: Size of BASIC file storage area 00 to 14 (0 KB to 896 KB) (in units of 64 KB) AA: The current BASIC file storage area and contents are retained.</p> <p>dd: Size of form storage area (Omissible. If omitted, the contents are retained.) 00 to 14 (0 KB to 896 KB) (in units of 64 KB)</p> <p>ee: Size of graphic storage area (Omissible. If omitted, the contents are retained.) 00 to 03 (0 KB to 192 KB) (in units of 64 KB)</p>

Explanation

- (1) The total capacity of the storage area in flash ROM is variable from 1,024 to 3,200 KB.

* Variable with the two-byte font installed

Kanji	1,344 KB
Chinese	1,024 KB
Korean	2,112 KB
Without the two-byte font installed	3,200 KB

- (2) Allocation priority is assigned as follows:

① All parameters Writable character > BASIC > Form > Graphic > PC save
② Omissible parameters (, dd, ee) are omitted Form > Graphic > Writable character > BASIC > PC save
③ BASIC is retained (AA) BASIC > Writable character > Form > Graphic > PC save
④ BASIC is retained, or omissible parameters are omitted Form > Graphic > BASIC > Writable character > PC save

- (3) When the above command is received, the entire area in flash ROM on the CPU board is cleared. However, omitted parameters are not cleared.

[Example of allocation]

⊙ In case that the size of BASIC file storage area is set in a range of “00” to “14”:

- (1) The storage areas are allocated in the following order of precedence – the bit map writable character storage area, the BASIC file storage area, the form storage area and the graphic storage area. After these storage areas are allocated using the above command, the remaining area is used for the PC save area.
- (2) If the sum of the bit map writable character storage area, the BASIC file storage area, the form storage area and the graphic storage area, specified using this command, is the maximum allocable capacity, the bit map writable character storage area, the BASIC file storage area, the form storage area and the graphic storage area are allocated as specified, respectively. In this case, however, there is no PC save area.
- (3) If the sum of the bit map writable character storage area, the BASIC file storage area, the form storage area and the graphic storage area, specified using this command, exceeds the maximum allocable capacity, the bit map writable character storage area is allocated as specified with the highest priority. Then, the remaining area is allocated to the BASIC file storage area. If there is still remaining area after the bit map writable character storage area and the BASIC file storage area are allocated, it is used for the form storage area. If there is still remaining area, then it is used for the graphic storage area. There is no PC save area. However, the form storage area and the graphic storage area are omitted, the current area is retained.
- (4) When “00” (0 KB) is specified for each of the bit map writable character storage area, the BASIC file storage area, the form storage area and the graphic storage area, the maximum allocable capacity is used for the PC area. However, the form storage area and the graphic storage area are omitted, the current area is retained.
- (5) When the maximum allocable capacity is specified for the bit map writable character storage area, the entire storage area is occupied by that area. However, the form storage area and the graphic storage area are omitted, the current area is retained.
- (6) Any numeric value specified in aa (Reserved) is ignored. However, 2-digit values are possible.

Refer to

- Bit Map Writable Character Command ([ESC] XD)
- Save Start Command ([ESC] XO)
- Flash Memory Format Command ([ESC] J1)
- 2-byte Writable Character Code Range Command ([ESC] XE)

Example

The respective area is set to as follows:

Bit map writable character storage area: 512 KB

BASIC file storage area: 0 KB

Form storage area: 192 KB

Graphic storage area: 64 KB

(PC save area: 896 KB – 512 KB – 0 KB – 192 KB – 64 KB = 128 KB)

Format = [ESC] XF; 00, 08, 00, 03, 01 [LF] [NUL]

When “14 (896 KB)” is specified for any of the formats, the entire storage area is occupied by that area.

For example, if “14” is specified for the bit map writable character storage area, the entire storage area is used only for the bit map writable character storage area. Any area other than the bit map writable character storage area cannot be allocated.

5.9 COMMANDS RELATED TO FORMAT

5.9.1 FLASH MEMORY FORMAT COMMAND

[ESC] J1

Function	Formats (initializes) the flash ROM on the CPU board for storage.
Format	[ESC] J1; a (, b) [LF] [NUL]
Term	a: Formatting (initializing) range A: PC save area of the flash memory + writable character area B: PC save area of the flash memory C: Writable character storage area of the flash memory b: Reserved area (Omissible) 0 to 2

Explanation	<ol style="list-style-type: none"> (1) The storage area of flash memory can be roughly divided into the PC save area and the writable character storage area. They can be formatted (initialized) either separately or at the same time. (2) When using a new flash memory, the area to be used must be formatted (initialized) before the PC interface commands or writable characters are stored. (3) After the flash memory is formatted, the remaining memory capacity is displayed on the LCD. (4) When the already stored data (PC interface commands, writable characters, logos) is stored again, the memory is consumed every time data is stored, unless the Flash Memory Format Command ([ESC] J1) is transmitted. (5) When a label issue operation is performed after the Flash Memory Format Command is sent, the image buffer is automatically cleared. (6) When further storing operation is not continued for about 10 seconds after storing the writable characters, logos and PC interface commands, the printer automatically enters the online mode (label issue operation). In this case, the image buffer is automatically cleared. (7) Reserved area (Omissible) The reserved parameters are not checked.
-------------	---

Notes	<ol style="list-style-type: none"> (1) The writable character storage area is shared between the TPCL mode and the LABEL mode. Therefore, if flash memory is initialized, writable characters stored in the LABEL mode are also erased.
Refer to	<ul style="list-style-type: none"> • Bit Map Writable Character Command ([ESC] XD) • Save Start Command ([ESC] XO) • Save Terminate Command ([ESC] XP)
Example	[ESC] J1; A, 0 [LF] [NUL]

5.10 COMMANDS RELATED TO WRITABLE CHARACTERS

5.10.1 2-BYTE WRITABLE CHARACTER CODE RANGE COMMAND [ESC] XE

Function	Sets the code range when a 2-byte writable character code is stored in the flash ROM on the CPU board.
Format	[ESC] XE (xx); a ₁ a ₁ a ₁ a ₁ , b ₁ b ₁ b ₁ b ₁ , a ₂ a ₂ a ₂ a ₂ , b ₂ b ₂ b ₂ b ₂ -----, a _n a _n a _n a _n , b _n b _n b _n b _n [LF] [NUL]
Term	<p>aaaa: First character code for each range 2020 to FFFF (Indicates the hex. data in ASCII code.)</p> <p>bbbb: No. of characters for each range 0001 to 4000 (Indicates the hex. data in ASCII code.)</p> <p>xx: Character type (Omissible) 51 52 to 55 (Reserved)</p>
Explanation	<p>(1) For a 2-byte character code such as Kanji, the character code range may be divided into two or more. As the control information area for the unnecessary codes can be deleted by designating the character code range, the capacity of flash memory can be used efficiently.</p> <p>(2) The total number of characters for each range must not exceed 0 x 4,000 (16,384 characters).</p> <p>(3) Up to 2700 ranges can be designated.</p> <p>(4) It is not possible to store the character codes which are not conforming to the setting for this command.</p> <p>(5) The first character code for each area should be sent in the ascending order. The areas must not overlap. If these conditions are not satisfied, the operation is not guaranteed.</p> <p>(6) When any character type of 52 to 55 is specified, it is invalid. However, an error does not occur, instead a blank is printed.</p>
Refer to	<ul style="list-style-type: none"> Flash Memory Format Command ([ESC] J1) Bit Map Writable Character Command ([ESC] XD)

Example

Shift JIS 8140H to 83DFH:

Character data is present.
Character data is not present.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
8140																
:																
81F0																
:																
8240																
:																
82F0																
:																
8340																
:																
83D0																

[ESC] XE; 8140, 00BD, 8240, 00B7, 8340, 00BD [LF] [NUL]

5.10.2 BIT MAP WRITABLE CHARACTER COMMAND

[ESC] XD

Function	Stores writable characters and logos in the flash ROM on the CPU board.
Format	[ESC] XD; (Sj,) aa, b, ccc, ddd, eee, fff, ggg, h, iii ----- iii [LF] [NUL]
Term	<p>Sj: Reserved area (Omissible) j: 0 to 2</p> <p>aa: Writable character set 01 to 40 41 16 × 16 (dots) 42 24 × 24 (dots) 43 32 × 32 (dots) 51 2-byte code character 52 to 55 Reserved</p> <p>b(b): Writable character code 20H to FFH (Set in hex.) 40H to 7EH, 80H to FCH (When the writable character set is 41 to 43) 2020H to FFFFH (When the writable character set is 51)</p> <p>ccc: Left offset 000 to 719 (in units of dots)</p> <p>ddd: Top offset 000 to 719 (in units of dots)</p> <p>eee: Character width 001 to 720 (in units of dots)</p> <p>fff: Character height 001 to 720 (in units of dots)</p> <p>ggg: Character-to-character spacing/proportional spacing 000 to 999 (in units of dots)</p> <p>h: Type of writable character data 0: Nibble mode (4 bits/byte) 1: Hex. mode (8 bits/byte)</p> <p>iii ----- iii: Writable character data to be stored</p> <p>* When the writable character type is 41 to 43, left offset, top offset, character width, character height, and character-to-character spacing/proportional spacing are fixed at "000." Any settings are ignored.</p>

Explanation

(1) Type of writable character

Up to 43 types of writable character sets can be stored. However, the maximum number of characters varies depending on the writable character size and number of characters because of the limited memory capacity.

For writable character types 41 to 43, each writable character size is fixed.

If any type of writable character sets out of the range is specified, an error occurs.

When aa is set to 44, an error does not occur. However, writable characters are not stored.

When any writable character type of 52 to 55 is specified, it is invalid. However, an error does not occur, instead a blank is printed.

(2) Character code

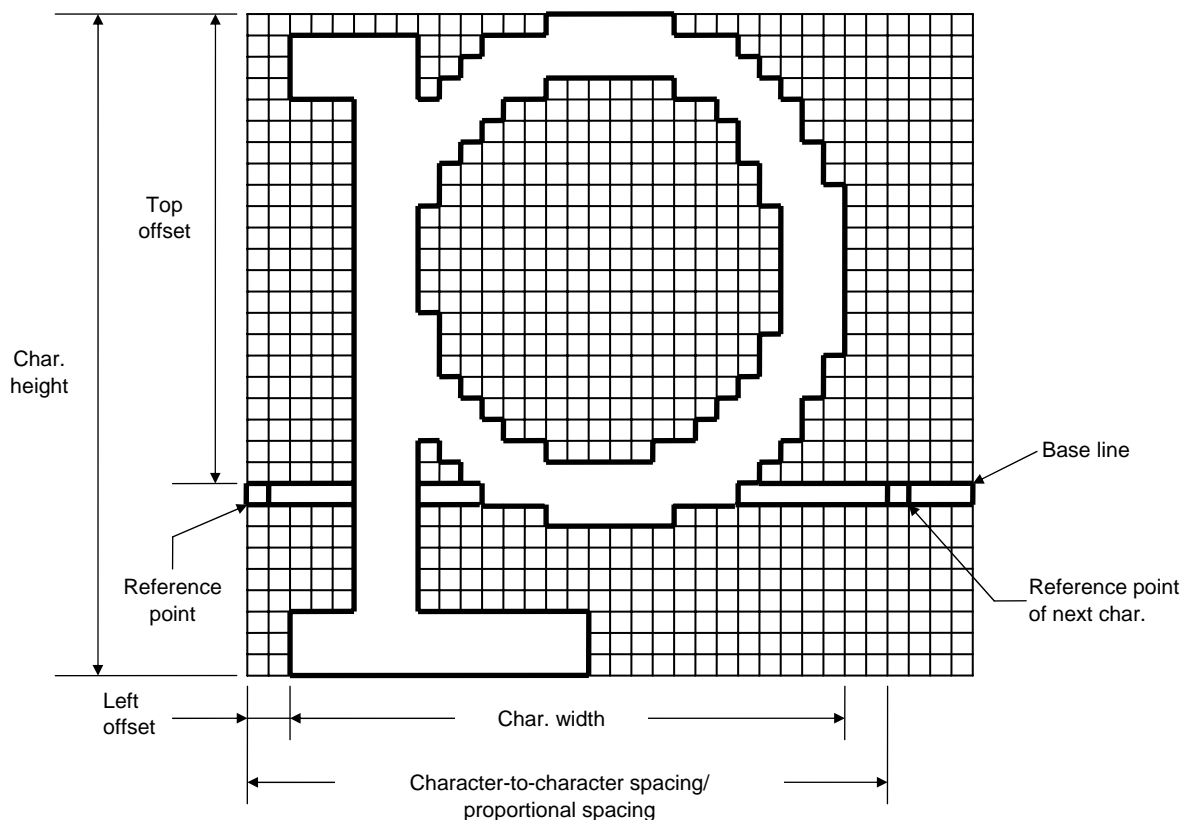
Up to 224 characters can be stored per character set. The maximum number of characters are 40 types × 224 characters = 8960 characters. It varies depending on the writable character size and the number of characters because of the limited memory capacity.

For character sets from 41 to 43, a character code consisting of 1 byte is stored. However, when the character code is read, F0H is added to the upper digit is added to the upper digit, and consists of 2 bytes. In this case, up to 188 characters can be stored per character set.

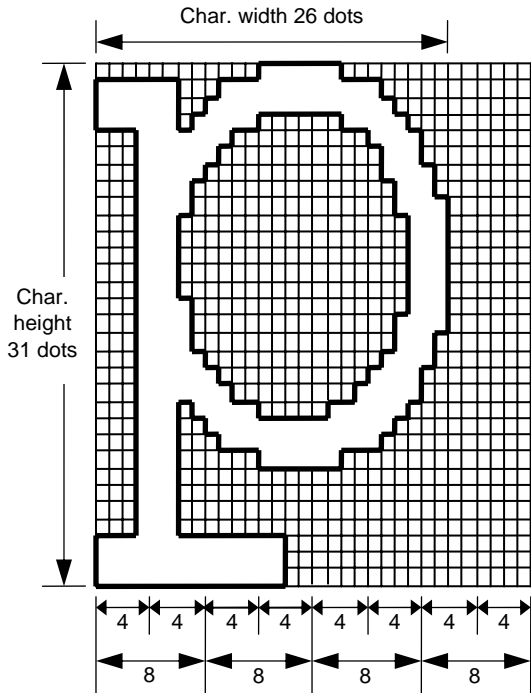
(3) Reserved area

When Sj is set to any value other than 0 to 2, an error occurs.

(4) Each parameter



(5) Writable character types: 01 to 40



Nibble mode															
1	30H	2	30H	3	30H	4	3FH	5	3CH	6	30H	7	30H	8	30H
9	3FH	10	3CH	11	37H				•						
									•						
									•						
									•						
									•						
									•						
									•						
															240 30H
241	3FH	242	3FH	243	3FH	244	3CH	245	30H	246	30H	247	30H	248	30H

Hex. mode			
1	00H	2	0FH
3	C0H	4	00H
5	FCH	6	7FH
			.
			.
			.
			.
			.
			.
			.
			.
			120 00H
121	FFH	122	FCH
123	00H	124	00H

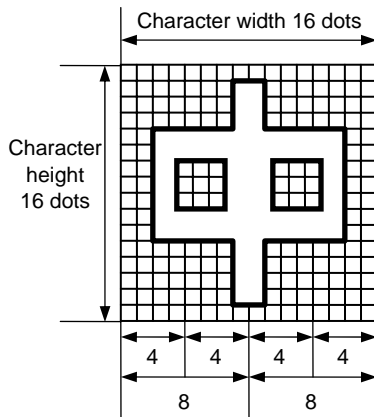
[Nibble mode]

- (1) The writable character data to be stored is separated into four dot units and sent in above-mentioned order (**1 → 248**). (Upper digit: “3”)
- (2) The data of writable characters to be stored is 30H to 3FH.
- (3) The minimum unit in the X direction is 8 dots. Dots with no data are transmitted as data 0.
- (4) The data count of writable characters to be stored must be as follows:
Data count of writable characters to be stored =
 $\{(\text{No. of char. width dots} + 7)/8\} \times \text{No. of char. height dots} \times 2$
* The value in the brackets is rounded down to the nearest whole number.

[Hex. mode]

- (1) The writable character data to be stored is separated into eight dot units and sent in the following order (**1 → 124**).
- (2) The data of writable characters to be stored is 00H to FFH.
- (3) The minimum unit of character width is 8 dots. Dots with no data are transmitted as data 0.
- (4) The number of bytes of the writable character to be stored must be as follows:
The number of bytes of the writable character to be stored =
 $\{(\text{No. of char. width dots} + 7)/8\} \times \text{No. of char. height dots}$
* The value in the brackets is rounded down to the nearest whole number.

(6) Writable character type: 41 (16 dots ×16 dots)



Nibble mode			
1	30H	2	30H
3	30H	4	30H
5	30H	6	31H
		7	38H
			•
			•
			•
		58	31H
		59	38H
		60	30H
61	30H	62	30H
		63	30H
		64	30H

Hex. mode			
1	00H	2	00H
3	01H	4	80H
5	01H	6	80H
		7	01H
			.
			.
			.
		26	80H
		27	01H
		28	80H
29	01H	30	80H
31	00H	32	00H

[Nibble mode]

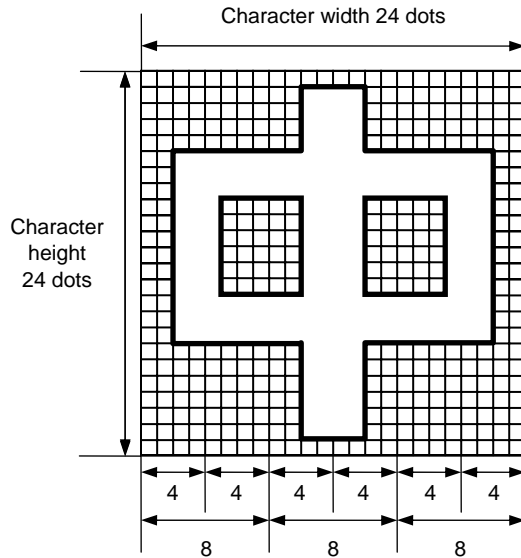
- (1) The writable character data to be stored is separated into four dot units and sent in above-mentioned order (**1** → **64**). (Upper digit: “3”)
- (2) The data of writable characters to be stored is 30H to 3FH.
- (3) The data count of writable characters to be stored should be 64 bytes.

[Hex. mode]

- (1) The writable character data to be stored is separated into eight dot units and sent in above-mentioned order (**1** → **32**).
- (2) The data of writable characters to be stored is 00H to FFH.
- (3) The data count of writable characters to be stored should be 32 bytes.

* When writable character type 41 is designated, the width and height of the character are both 16 dots.

(7) Writable character type: 42 (24 dots x24 dots)



Nibble mode											
1	30H	2	30H	3	30H	4	30H	5	30H	6	30H
7	30H	8	30H	9	33H						
							•				
							•				
							•				
							•				
							•				
								137	30H	138	30H
139	30H	140	30H	141	30H	142	30H	143	30H	144	30H

Hex. mode					
1	00H	2	00H	3	00H
4	00H	5	3CH	6	00H
			.		
			.		
			.		
			.		
67	00H	68	3CH	69	00H
70	00H	71	00H	72	00H

[Nibble mode]

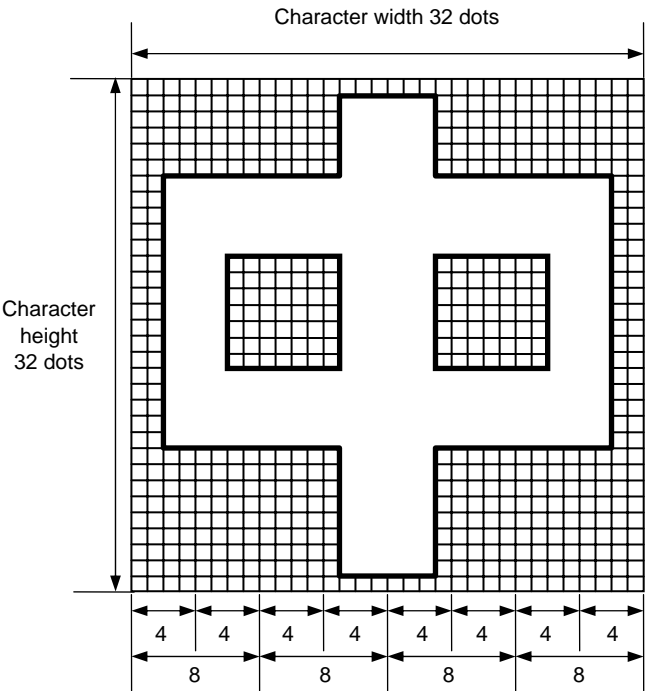
- (1) The writable character data to be stored is separated into four dot units and sent in above-mentioned order (**1** → **144**). (Upper digit: “3”)
- (2) The data of writable characters to be stored is 30H to 3FH.
- (3) The data count of writable characters to be stored should be 144 bytes.

[Hex. mode]

- (1) The writable character data to be stored is separated into eight dot units and sent in above-mentioned order (**1 → 72**).
- (2) The data of writable characters to be stored is 00H to FFH.
- (3) The data count of writable characters to be stored should be 72 bytes.

* When writable character type 42 is designated, the width and height of the character are both 24 dots.

(8) Writable character type: 43 (32 dots ×32 dots)



Nibble mode														
1	30H	2	30H	3	30H	4	30H	5	30H	6	30H	7	30H	
8	30H	9	30H	10	30H	11	30H	12	37H					
							•							
							•							
							•							
							•							
							•							
											248	30H	249	30H
250	30H	251	30H	252	30H	253	30H	254	30H	255	30H	256	30H	

Notes

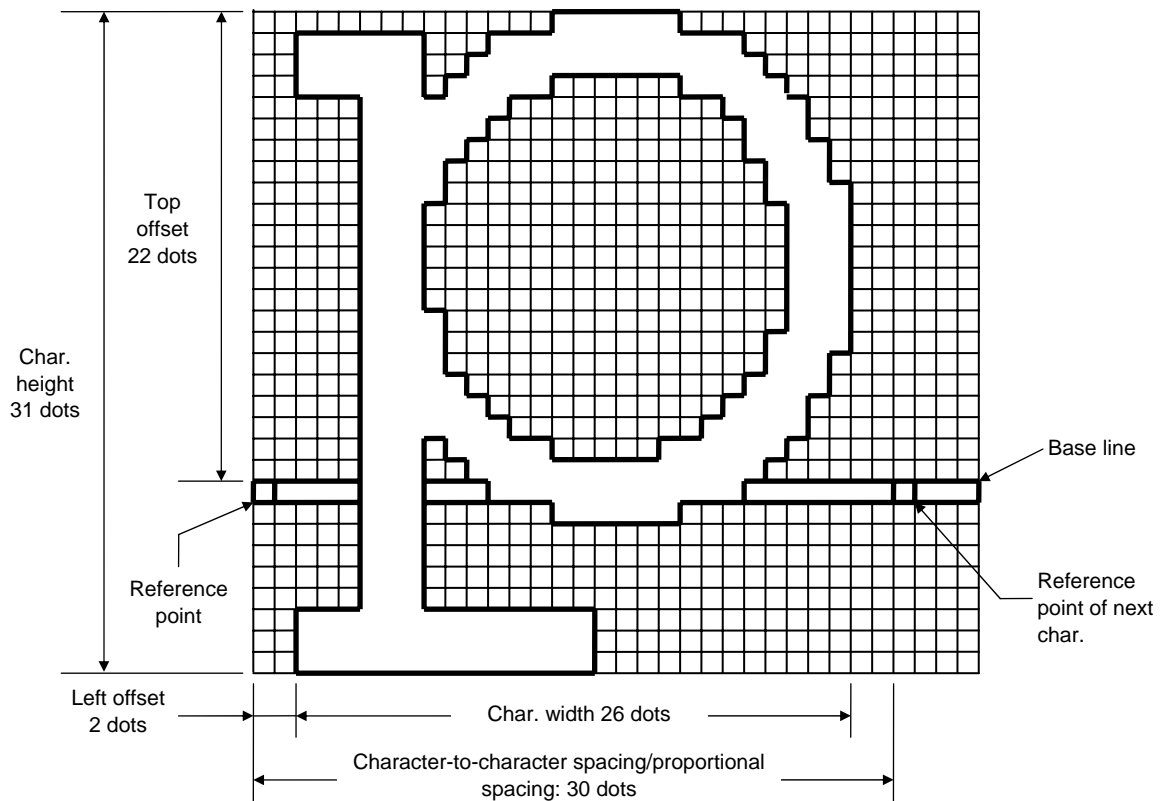
- (1) No matter what character type or character code is selected, no memory will be wasted.
- (2) When a new writable character is stored, the Flash Memory Format Command ([ESC] J1) must be transmitted.
- (3) A character code already stored can be stored in the flash memory again by sending the Bit Map Writable Character Store Command ([ESC] XD, but memory will be consumed each time the code is stored. The memory can be efficiently used if the Flash Memory Format Command ([ESC] J1) is sent in advance.
- (4) Different character width and character height can be designated for the same writable character type, according to the writable character codes. In other words, character size can be changed by each character, thus memory can be saved.
- (5) Proportional spacing and descending characters are possible depending on the parameters of character-to-character spacing/proportional spacing, left offset, and top offset.
- (6) When top offset is 000, the reference coordinate is positioned at the upper left when drawing because the base line is at the top. (Coordinate setting is facilitated for logos.)
- (7) When the flash memory is used, and a label issue operation is performed after the Bit Map Writable Character Command ([ESC] XD) is sent, the image buffer is cleared automatically.
- (8) When further storing operation is not continued for about 10 seconds after storing the writable characters and logos, the printer automatically enters the online mode (label issue operation). In this case, when the flash memory is used, the image buffer is automatically cleared.

Refer to

- Flash Memory Format Command ([ESC] J1)

Examples

Writable character type: 03
Writable character code: 70H



[ESC] J1; C [LF] [NUL]

[ESC] XD; 03, p, 002, 022, 026, 031, 030, 0, 000?<000?<7??800?<???<00?= ?03>001?
<00?001?8007001?0007801>0003801>0003<01<0001<01<0001<01<0001<01<0001<01>
0001<01>0003<01>0003801?0007801?800?001?<01?001=?07>001<???<001<7??8001<0?<
0001<0000001<0000001<0000001<000000???<0000???<0000???<0000 [LF] [NUL]

* 30H = "0"	38H = "8"
31H = "1"	39H = "9"
32H = "2"	3AH = "."
33H = "3"	3BH = ","
34H = "4"	3CH = "<"
35H = "5"	3DH = "="
36H = "6"	3EH = ">"
37H = "7"	3FH = "?"

5.11 COMMANDS RELATED TO GRAPHICS

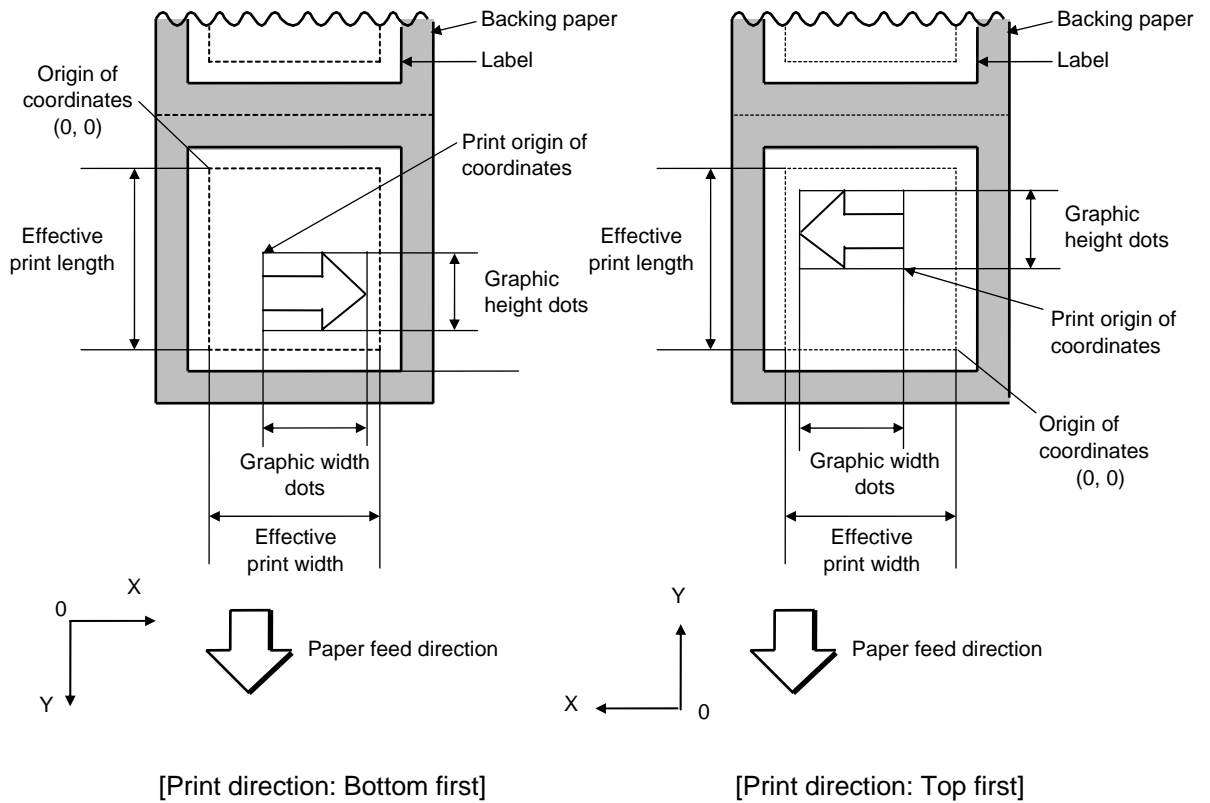
5.11.1 GRAPHIC COMMAND

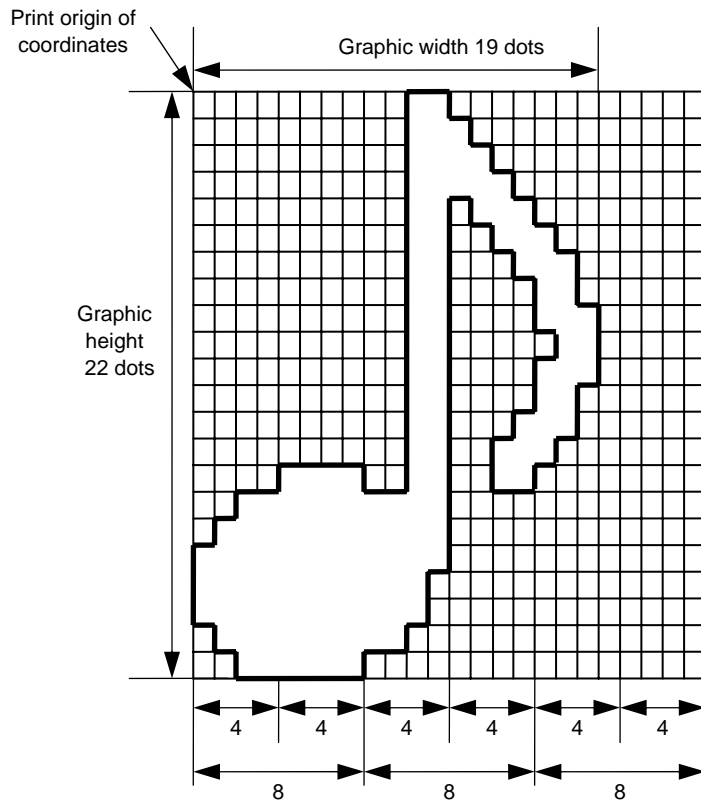
[ESC] SG

Function	Draws graphic data.
Format	[ESC] SG; aaaa(D), bbbb(D), cccc, dddd, e, ggg --- ggg [LF] [NUL]
Term	<p>aaaa(D): X-coordinate of the print origin for drawing graphic data Fixed at 4 digits (in 0.1 mm units) * If "D" is attached after a 4-digit value, the coordinate is specified in units of dots. 0000D or greater</p> <p>bbbb(D): Y-coordinate of the print origin for drawing graphic data 4 or 5 digits (in 0.1 mm units) * If "D" is attached after a 4- or 5-digit value, the coordinate is specified in dots. 0000D or greater</p> <p>cccc: No. of graphic width dots Fixed at 4 digits (in units of dots) However, when the graphic data "2: BMP file" or "6: PCX file" is selected, this designation is ignored. (The information of the graphic width is contained in the graphic data.)</p> <p>dddd: No. of graphic height dots 4 or 5 digits (in units of dots) However, when the graphic data "2: BMP file" or "6: PCX file" is selected, this designation is ignored. (The information of the graphic width is contained in the graphic data.) When "3: TOPIX compression mode" is selected for the type of graphic data: Resolution of graphic data: *only two types { 0150: 150 DPI (Draws data in double resolution.)</p> <p>e: Type of graphic data When the command starts with "[ESC] SG;": 0: Nibble mode (4 dots/byte) Overwrite drawing 1: Hex. mode (8 dots/byte) Overwrite drawing 2: BMP file mode Overwrite drawing 3: TOPIX compression mode Overwrite drawing 4: Nibble mode (4 dots/byte) OR drawing 5: Hex. mode (8 dots/byte) OR drawing 6: PCX file mode Overwrite drawing 7: TOPIX compression mode XOR drawing</p> <p>ggg --- ggg: Graphic data</p>

Explanation

- (1) When the graphic data "0," "1," "2," "3" or "6" is selected, the graphic data is drawn by overwriting the image buffer.
- (2) When the graphic data "4" or "5" is selected, the graphic data is drawn by carrying out OR between the graphic data and the data in the image buffer.
- (3) When the graphic data "7" is selected, the graphic data is drawn by carrying out Exclusive-OR between the graphic data and the data in the image buffer.



[illegible]

Hex. mode			
1	00H	2	30H
3	00H		
4	00H	5	38H
			•
			•
			•
			•
			•
			63 00H
64	3FH	65	00H
		66	00H

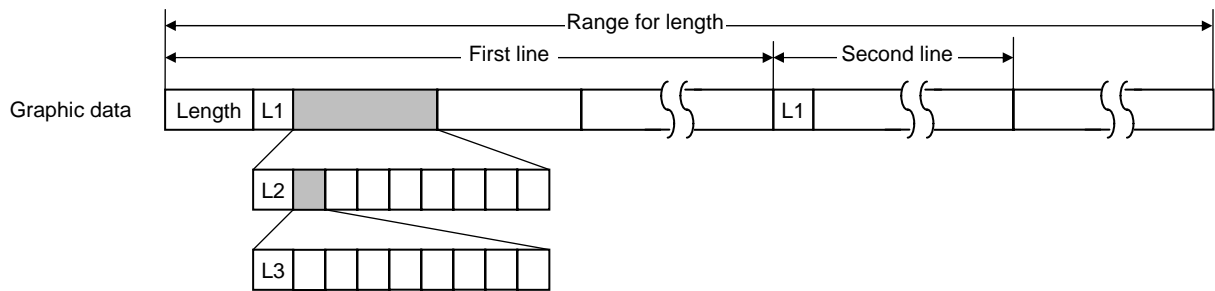
[Nibble mode]

- (1) The graphic data is separated into four dot units and sent in above-mentioned order (**1** → **132**). (Upper digit: “3”)
- (2) The graphic data is 30H to 3FH.
- (3) The minimum unit in the X direction is 8 dots. Dots with no data are transmitted as data 0.
- (4) The graphic data count must be as follows:
Graphic data count = $\{(\text{No. of graphic width dots} + 7) / 8 \} \times \text{No. of graphic height dots} \times 2$
* The value in the brackets is rounded down to the nearest whole number.

[Hex. mode]

- (1) The graphic data is separated into eight dot units and sent in above-mentioned order (1 → 66).
- (2) The graphic data is 00H to FFH.
- (3) The minimum unit in the X direction is 8 dots. Dots with no data are transmitted as data 0.
- (4) The graphic data count must be as follows:
Graphic data count = $\{(No. \text{ of graphic width dots} + 7)/8\} \times No. \text{ of graphic height dots}$
* The value in the brackets is rounded down to the nearest whole number.

[TOPIX compression mode]

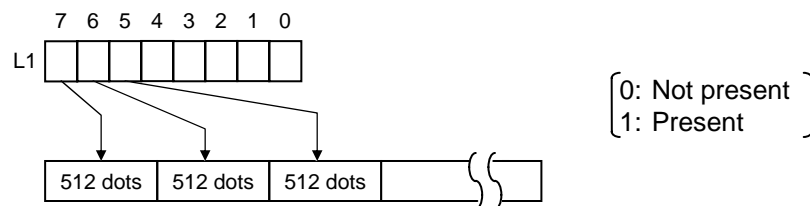


(1) Length: Total number of bytes of the graphic data (0001H ~)

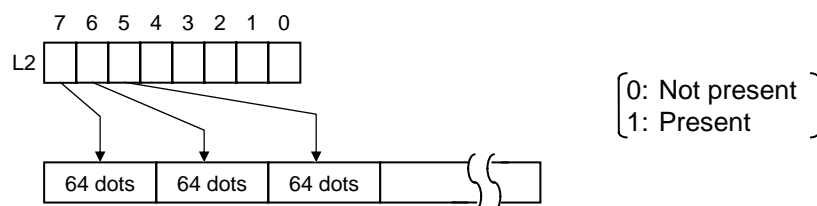
Ex. Length = 20 bytes:

00	14
----	----

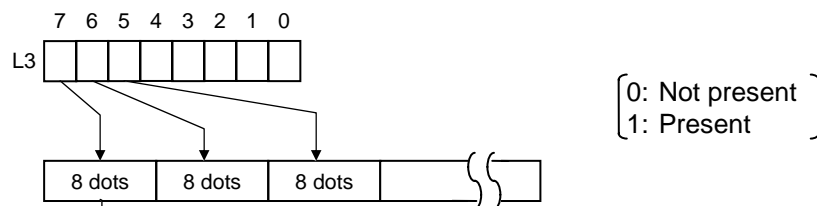
(2) L1 parameter: Shows in which large block (512 dots/block) the changed data is contained.



(3) L2 parameter: Shows in which medium block (64 dots/block) the changed data is contained (of the L1 large block).



(4) L3 parameter: Shows in which small block (8 dots/block) the changed data is contained (of the L2 medium block).



Exclusive-OR is carried out between the current image data and the image data one line previous. Only the changed bit is set to ON (1). The alignment of dots is MSB (left dots) and LSB (right dots).

* The graphic width for only the smaller value of either the designated value or the max. buffer size (512 KB) is drawn.

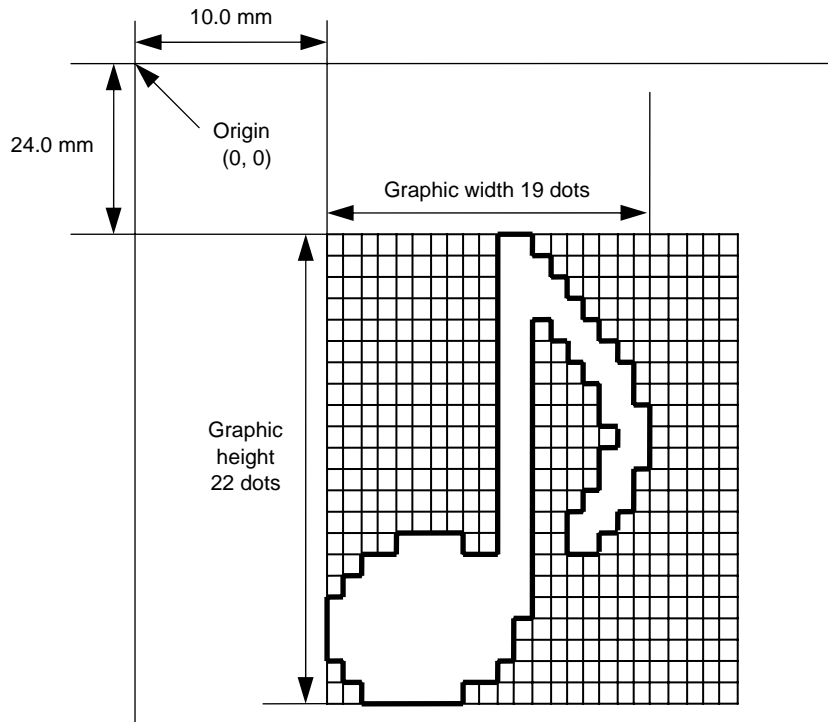
The minimum unit of the data drawing is 8 dots (1 byte). If the graphic width is set to 3 dots, it is reset to 8 dots (1 byte).

Notes

- (1) The print origin of coordinates must be set so that the result of drawing the graphic data will be within the effective print area set by the Label Size Set Command ([ESC] D).
- (2) The number of graphic width dots and the number of graphic height dots must also be set so that the result of drawing the graphic data will be within the effective print area set by the Label Size Set Command ([ESC] D) in the same manner as the above.
- (3) Both width and height are 8 dots/mm in case of the 203 dpi-print head model.
- (4) The actual result of drawing may deviate within ± 0.5 mm in case of the 203 dpi-print head model, in the X direction with respect to the designated print origin of the X-coordinate.

[To draw the received graphic data at high speed, the data is directly developed in the image buffer without applying correction to each bit with respect to the designated X-coordinate. Consequently, an error of up to 4 bits occurs.]

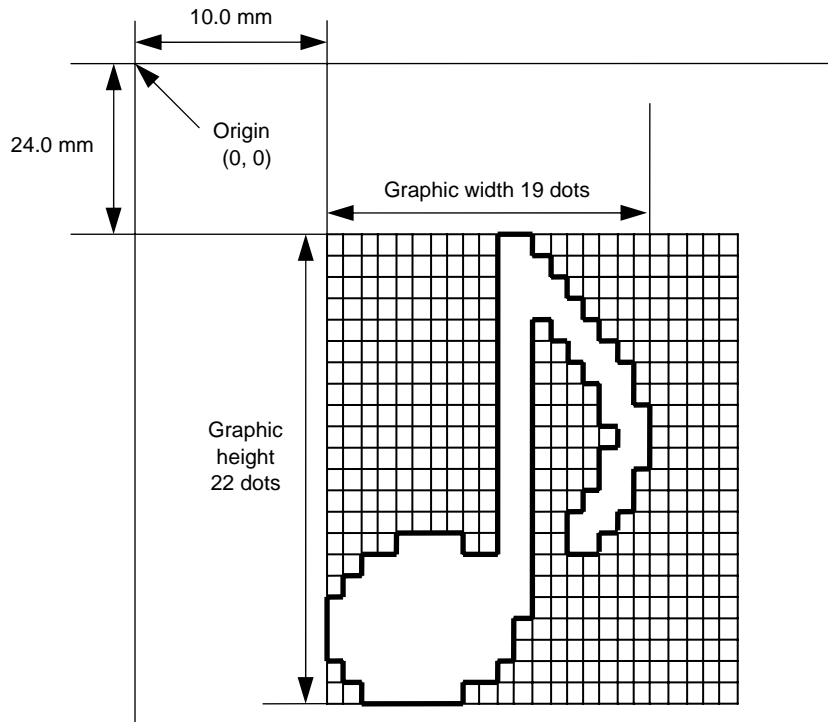
Examples



```
[ESC] C [LF] [NUL]
[ESC] SG; 0100, 0240, 0019, 0022, 0, 003000003800003<00003>000037000033800031
<00030<00030>00030600030>00030<00031<00033800?33003??0007??000??000??
>000??>0007?<0003?0000 [LF] [NUL]
[ESC] XS; I, 0001, 0002C3000 [LF] [NUL]
```

* 30H = "0"	38H = "8"
31H = "1"	39H = "9"
32H = "2"	3AH = "."
33H = "3"	3BH = ","
34H = "4"	3CH = "<"
35H = "5"	3DH = "="
36H = "6"	3EH = ">"
37H = "7"	3FH = "?"

[TOPIX compression mode]



```
[ESC] SG; 0100, 0240, 0019, 0300, 3, 00 5C 80 80 40 30
      Length                               L1  L2 L3 Data  (1st line)

80 80 40 08 80 80 40 04 80 80 40 02 80 80 40 09
(2nd line)  (3rd line)  (4th line)  (5th line)

80 80 60 04 80 80 80 02 40 80 80 40 01 80 80 20 20
(6th line)  (7th line)  (8th line)  (9th line)

80 80 20 80 80 80 20 80 80 80 20 20 80 80 40 01
(10th line) (11th line) (12th line) (13th line)

80 80 60 02 40 80 80 A0 0F 80 80 80 C0 30 C3 80 80 80 40
(14th line)  (15th line)  (16th line)  (17th line)

80 80 80 80 80 80 40 10 00 80 80 C0 80 20 80 80 C0 40 C0 [LF] [NUL]
(18th line)  (19th line)(20th line) (21st line)  (22nd line)
```

5.12 COMMANDS RELATED TO PC COMMAND SAVING

5.12.1 SAVE START COMMAND

[ESC] XO

Function	Declares the start of saving PC interface commands. (Places the printer in the mode where PC interface commands are written in the flash memory.)
Format	[ESC] XO; aa, (Sb,) c [LF] [NUL]
Term	<p>aa: Identification number to be used for saving in flash memory or reading 01 to 99</p> <p>Sb: Reserved area (Omissible) b: 0 to 2</p> <p>c: Status response at save time 0: No status response 1: Status response is returned</p>
Notes	<p>(1) After sending the Save Start Command ([ESC] XO), any command other than the following will be saved into flash memory without being analyzed.</p> <ul style="list-style-type: none"> • Save Start Command ([ESC] XO) • Save Terminate Command ([ESC] XP) • Saved Data Read Command ([ESC] XQ) • Bit Map Writable Character Command ([ESC] XD) • Reset Command ([ESC] WR) • Status Request Command ([ESC] WS, [ESC] FM, [ESC] v) • Flash Memory Format Command ([ESC] J1) • Mode Information Acquire Command ([ESC] WX) • Version Information Acquire Command ([ESC] WV) • Bluetooth Device Address Acquire Command ([ESC] IT) • Strip Sensor Adjust Command ([ESC] AH) • Printer ID Set Command ([ESC] ID) • Mode Select Command ([ESC] M) <p>(2) No error check is made for the commands when saving them.</p> <p>(3) Up to 64 KB can be saved per a save.</p> <p>(4) The status response when saving the commands is not returned when they end normally but only when an error occurs.</p>
Refer to	<ul style="list-style-type: none"> • Save Terminate Command ([ESC] XP) • Flash Memory Format Command ([ESC] J1)

Examples

```
[ESC] J1; B [LF] [NUL]  
[ESC] XO; 01, 0 [LF] [NUL]  
[ESC] D0508, 0760, 0468 [LF] [NUL]  
[ESC] T20C30 [LF] [NUL]  
[ESC] C [LF] [NUL]  
[ESC] PC001; 0200, 0125, 1, 1, A, 00, B [LF] [NUL]  
[ESC] PC002; 0650, 0550, 2, 2, G, 33, B, +0000000001 [LF] [NUL]  
[ESC] XP [LF] [NUL]  
[ESC] XP [LF] [NUL]
```

5.12.2 SAVE TERMINATE COMMAND

[ESC] XP

Function	Declares the termination of saving PC interface commands.
Format	[ESC] XP [LF] [NUL]
Note	<p>(1) When further storing operation is not continued for about 10 seconds after storing the PC interface commands, the printer enters the online mode (label issue operation). In this case, the image buffer is automatically cleared.</p>
Refer to	<ul style="list-style-type: none">• Save Start Command ([ESC] XO)

5.12.3 SAVED DATA READ COMMAND

[ESC] XQ

Function	Reads PC interface commands saved in flash memory.
Format	[ESC] XQ; aa, (Sb,) c, d [LF] [NUL]
Term	<p>aa: Identification number of the file to be read from flash memory 01 to 99</p> <p>Sb: Reserved area (Omissible) b: 0 to 2</p> <p>c: Status response when the data is read 0: No status response 1: Status response is returned</p> <p>d: Automatic read at power on time L: Automatic read M: No automatic read</p>

* Reserved in the case of the compatible mode for the B-SP series (Fixed at M: No automatic read)

Notes

- (1) If the relevant save identification number is not found, an error occurs. However, if no save identification number is found at power on time when the automatic read has been specified, the setting of the automatic read changes to 'No automatic read,' causing no error.
- (2) If a command error is found in the PC interface command that was read by the Saved Data Read Command or the automatic read at power on time, a command error occurs.
- (3) After an error has occurred, the power must be turned off. When the power is turned on again, the setting of the automatic read at power on time changes to 'No automatic read.'
- (4) The printer enters the online mode (label issue operation) when the Save Data Read Command is sent after the Save Terminate Command.
- (5) If any value out of the range is specified, a command error occurs.
- (6) With the wireless LAN-equipped model or Bluetooth-equipped model, although the setting of the automatic read at power on time is set to 'Automatic read,' wireless LAN parameters or BD addresses (by holding down the POWER key at power on) are printed, the automatic read is not performed (V1.0D or later).

Refer to

- Save Start Command ([ESC] XO)
- Save Terminate Command ([ESC] XP)

Examples

[ESC] XQ; 01, 0, L [LF] [NUL]
[ESC] RC001; Sample [LF] [NUL]
[ESC] RC002; 100 [LF] [NUL]
[ESC] XS; I, 0002, 0002C3000 [LF] [NUL]

5.13 COMMANDS RELATED TO CHECK

5.13.1 HEAD BROKEN DOTS CHECK COMMAND

[ESC] HD

Function	Checks the thermal head for broken dots.
Format	[ESC] HD001 (, a) [LF] [NUL] --- All thermal elements are checked.
Term	a: Check result status response (Omissible) A: Status is returned (If omitted, the check result status is not returned.)

Explanation

- (1) The Head Broken Dots Check Command is subject to batch processing. If the Label Issue Command to issue 100 labels is transmitted before the Head Broken Dots Check Command, the head broken dots check will be executed after 100 labels have been issued.
- (2) In case of the all thermal elements check, all thermal elements of the thermal head will be checked.
However, for the B-EP4DL-GHxx, although an error is detected outside the effective print width area, a head broken elements error is not indicated because the head width is larger than the effective print width.
- (3) When the check result is found to be normal under the condition that the check result status is not returned, the next command is processed. If the check result is found to be abnormal, an error occurs. Whether or not the status is returned when an error occurs depends on the Issue Command setting.

When the check result is found to be normal under condition that the check result status is returned, a status indicating the normal end of the head broken elements check is sent. After that, the next command is processed. If the check result is found to be abnormal, a status indicating the head broken elements error is sent, and then the printer stops.

Status for normal end for other than TEC protocols,
[SOH] [STX] "0020000" [EXT] [EOT] [CR] [LF]

Status for normal end for TEC protocols,
[ACK]

Status for head broken elements error
[SOH] [STX] "1720000" [EXT] [EOT] [CR] [LF]
- (4) The following shows the time to check all thermal elements:

B-EP2DL-GHxx	Approx. 2 seconds
B-EP4DL-GHxx	Approx. 5 seconds

Examples	[ESC] C [LF] [NUL] [ESC] RC001; Sample [LF] [NUL] [ESC] RC002; 001 [LF] [NUL] [ESC] XS; I, 0002, 0002C3000 [LF] [NUL] [ESC] HD001 [LF] [NUL]
----------	--

5.13.2 MESSAGE DISPLAY COMMAND

[ESC] XJ

Function	Displays the message on the LCD.
Format	[ESC] XJ; aaa ----- aaa [LF] [NUL]
Term	aaa ----- aaa: Display data (16 digits)
Explanation	

- (1) When the printer receives the Message Display Command, first it processes the already received data (or completes the label issue if the Issue Command has been sent). Then, it displays the message on the LCD, and finally it enters a pause state.
- (2) When the [PAUSE] key is pressed, the pause state is cleared and the LCD displays the normal message. After the pause state is cleared, the printer resumes processing the data received after the Message Display Command.

Notes

- (1) The number of characters to be displayed is 16. When the display data is less than 16 characters, the blanks are filled with spaces. When the display data exceeds 16 characters, the excess data will be discarded.
- (2) During a pause state, a halt due to an error, or a cover open state, the Message Display Command is not processed even if it is received. In this case, the command is processed after the above state is cleared.
- (3) The following characters can be displayed on the LCD.

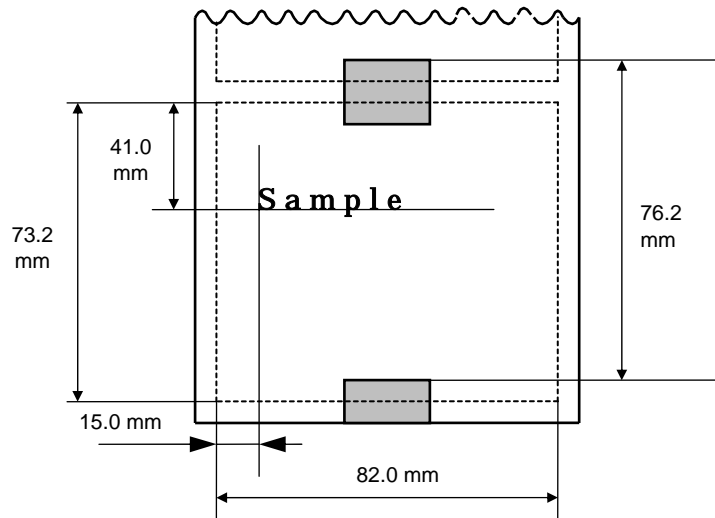
If any character other than the mentioned below is received, "?" is displayed or a command error occurs.

	2	3	4	5	6	7	A	B	C	D
0	SP	0	@	P	`	p				
1	!	1	A	Q	a	q				
2	"	2	B	R	b	r				
3	#	3	C	S	c	s				
4	\$	4	D	T	d	t				
5	%	5	E	U	e	u				
6	&	6	F	V	f	v				
7	'	7	G	W	g	w				
8	(	8	H	X	h	x				
9	)	9	I	Y	i	y				
A	*	:	J	Z	j	z				
B	+	;	K	[	k	{				
C	,	<	L	\	l	|				
D	-	=	M	]	m	}				
E	.	>	N	^	n	→				
F	/	?	O	_	o	←				

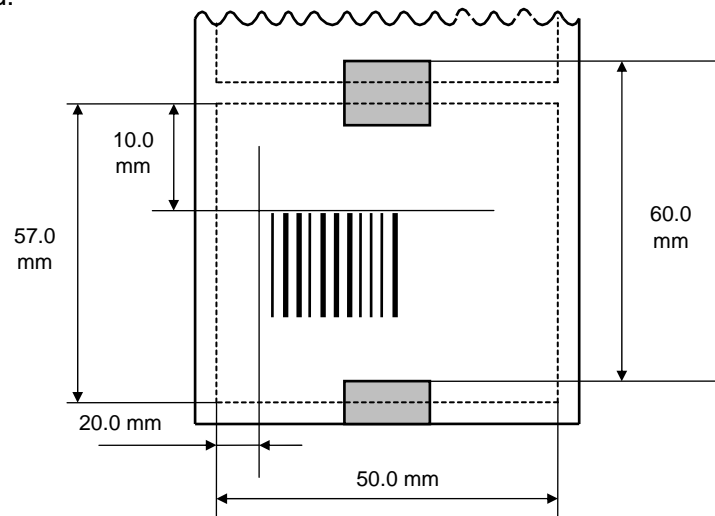
* The shaded parts are Japanese.
They are omitted here.

Examples

- ① Load the paper.
- ② One piece of paper is fed.
- ③ 4 pieces are issued.



- ④ Message, "Please set [Tag]", is displayed.
- ⑤ Change the paper.
- ⑥ Press the [RESTART] key.
- ⑦ One piece of paper is fed.
- ⑧ 2 pieces are issued.



```
[ESC] D0762, 0820, 0732 [LF] [NUL]
[ESC] T11C40 [LF] [NUL]
[ESC] C [LF] [NUL]
[ESC] PC001; 0150, 0410, 1, 1, A, 00, B [LF] [NUL]
[ESC] RC001; Sample [LF] [NUL]
[ESC] XS; I, 0004, 0011C4001 [LF] [NUL]
[ESC] XJ; Please set [Tag] [LF] [NUL]
[ESC] D0600, 0500, 0570 [LF] [NUL]
[ESC] T11C40 [LF] [NUL]
[ESC] C [LF] [NUL]
[ESC] XB01; 0200, 0100, 3, 1, 03, 03, 08, 08, 03, 0, 0150 [LF] [NUL]
[ESC] RB01; 12345 [LF] [NUL]
[ESC] XS; I, 0002, 0011C4001 [LF] [NUL]
```

5.14 COMMANDS RELATED TO CONTROL

5.14.1 RESET COMMAND

[ESC] WR

Function	Returns the printer to its initial state.
Format	[ESC] WR [LF] [NUL]
Explanation	<ol style="list-style-type: none"> (1) The printer is returned to the same state as when the power is turned on. (2) When the printer receives this command during printing, it is initialized after issuing the label which is being printed. (3) After the Initialize Command is sent (or after printing is completed, if printing is performed), the next command must not be sent within approximately 30 seconds on the wireless LAN model or within approximately 5 seconds on other models, because the printer is initialized. In IrDA: TEC Protocol, if ACK/status transmission is specified by the Issue Command, the printer returns an ACK, which indicates the command process end, to the EOT after the printer is initialized. In RS-232C, when the status response is specified, the printer returns the status (34H 30H). After this status is received, the next command may be sent. In IrDA: IrCOMM, IrDA: IrOBEX, USB, Bluetooth or Wireless LAN, the printer does not return the status. (4) When this command is sent through the IrDA interface, only this command should be sent. After the command is sent, the link should be terminated. Even if the host does not terminate the link, the printer performs the termination process. Therefore, after initialization is completed, the host should establish the link again. (5) When receiving this command during data transmission, the printer is initialized after completing the transmission.
Notes	<ol style="list-style-type: none"> (1) If a command error or communication error occurs when receiving the Reset Command, an error message is displayed in the online mode. However, it is not displayed in the SYSTEM mode. (2) After the code of the Bit Map Writable Character Command ([ESC] XD) or the Graphic Command ([ESC] SG) is received, the Reset Command is not processed until the printer receives the data specifying the type of data.
Example	[ESC] WR [LF] [NUL]

5.14.2 BATCH RESET COMMAND

[ESC] Z0 ^(zero)

Function	Resets the printer.
Format	[ESC] Z0 [LF] [NUL]
Explanation	

- (1) This command will not be executed until the printer enters an idle state.

5.15 COMMANDS RELATED TO STATUS

5.15.1 STATUS REQUEST COMMAND

[ESC] WS, [ESC] FM, [ESC] v

Function	Sends the printer status to the host computer.
Format	[ESC] WS [LF] [NUL] [ESC] FM [LF] [NUL] [ESC] v
Explanation	

- (1) This command makes the printer send its status regardless of the setting of the status response parameter. The status to be transmitted is the current printer status, and indicates the latest status only. The remaining count indicates the remaining print count of the batch currently being printed only. No remaining count of the batch waiting to be printed is transmitted.

[IrDA: TEC Protocol]

STX	Printer ID		Status			Remaining No. of labels				CRC	
02H	xxH	xxH	3xH	3xH	3xH	3xH	3xH	3xH	3xH	xxH	xxH

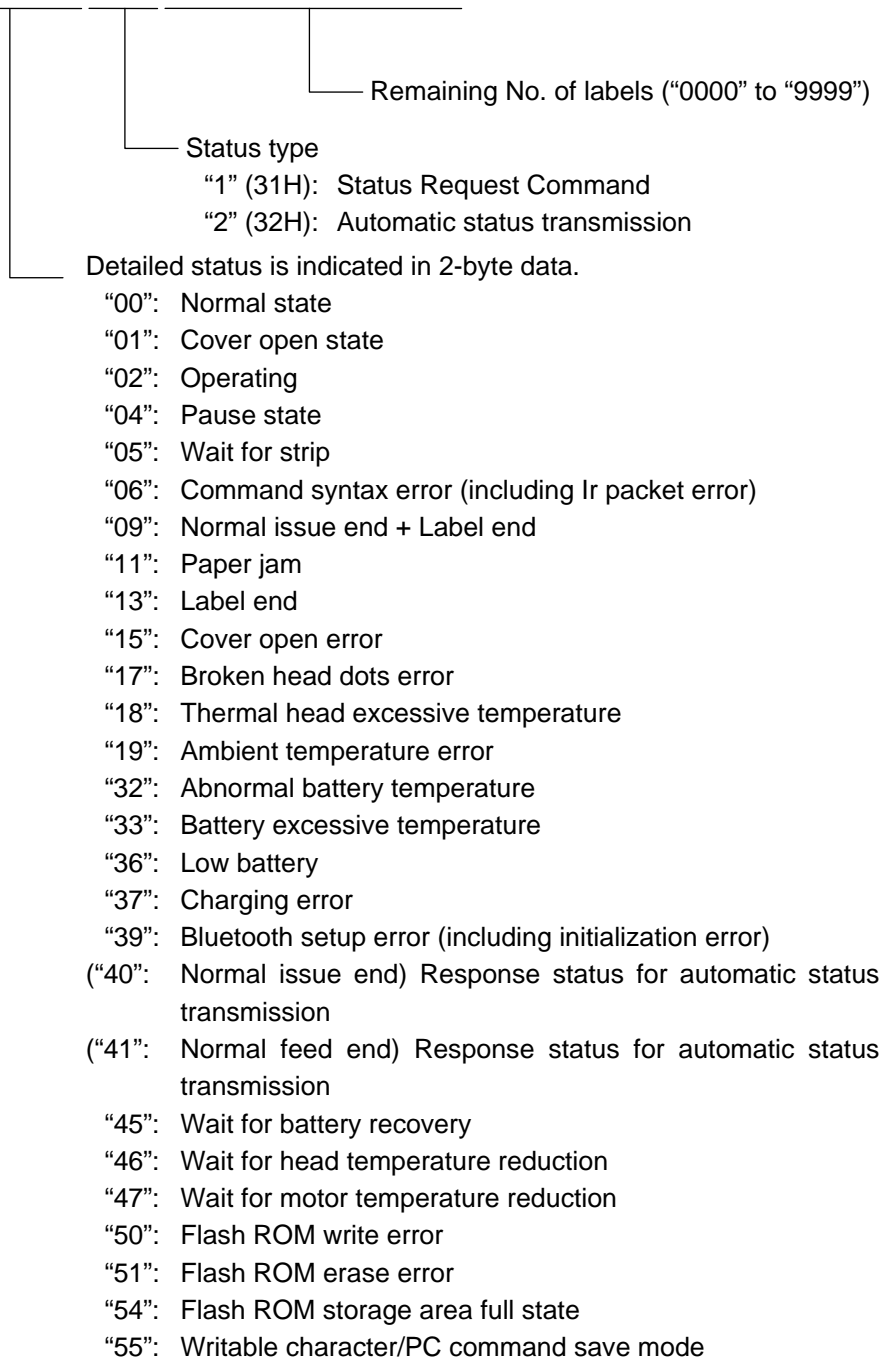
Remaining No. of labels
• 0000 to 9999

Status type
"1" (31H): Status Request Command
"2" (32H): Automatic status transmission

Printer status

[IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, Wireless LAN]

SOH	STX	Status			Remaining No. of labels				ETX	EOT	CR	LF
01H	02H	3xH	3xH	3xH	3xH	3xH	3xH	3xH	03H	04H	0DH	0AH



Detailed status in the compatible mode for the B-SP series

- "00": Normal state
- "01": Cover open state
- "02": Operating
(including wait for strip, pause state, wait for battery recovery, wait for head temperature reduction, wait for motor temperature reduction, writable character/PC command save mode)
- "06": Command syntax error (including Ir packet error)
- "09": Normal issue end + Label end
- "11": Paper jam
- "13": Label end
- "15": Cover open error
- "17": Broken head dots error
- "18": Thermal head excessive temperature
(including ambient temperature error, abnormal battery temperature, battery excessive temperature)
- "36": Low battery
- "37": Charging error
- "39": Bluetooth setup error (including initialization error)
- ("40": Normal issue end) Response status for automatic status transmission
- ("41": Normal feed end) Response status for automatic status transmission
- "50": Flash ROM write error
- "51": Flash ROM erase error
- "54": Flash ROM storage area full state

Notes

- (1) The status is returned only to the interface which sent this command.
- (2) After the code of the Bit Map Writable Character Command ([ESC] XD) or Graphic Command ([ESC] SG) is received, the Status Request Command is not processed until the printer receives the data specified for the type of data.
- (3) After receiving the Status Request Command, there may be a maximum of 20-msec. delay until the printer sends a status.
- (4) At least, a 20-msec. interval must be given between the transmissions of the Status Request Command. If the next Status Request Command is transmitted within 20 msec., the printer may fail to receive it.
- (5) The status "09" is valid only when the compatible mode for the B-SP series is enabled in the SYSTEM mode. In a mode other than the compatible mode, it indicates the label end.

Example

[ESC] WS [LF] [NUL]

5.15.2 RECEIVE BUFFER FREE SPACE STATUS REQUEST COMMAND [ESC] WB

Function Sends information on the printer status and the free space of the receive buffer to the host.

Format [ESC] WS [LF] [NUL]

Explanation

- (1) This command makes the printer send information on its status and free space of the receive buffer, regardless of the setting of the Status Response parameter.
- (2) The status to be transmitted is the current printer status, and indicates the latest status only. The remaining count indicates the remaining print count of the batch currently being printed only. No remaining count of the batch waiting to be printed is transmitted.
- (3) Free space of the receive buffer for the interface which sent this command, is returned to the host.

[IrDA: TEC Protocol] Data to be transmitted (fixed at 22 bytes)

STX	Printer ID		Status	Remaining No. of labels				Length	
02H	3xH	3xH	33H	3xH	3xH	3xH	3xH	32H	32H

Receiving buffer space					Entire receiving buffer space					CRC	
3xH	3xH	3xH	3xH	3xH	30H	30H	35H	31H	32H	xxH	xxH

[IrDA: IrCOMM, IrDAIr: OBEX, USB, RS-232C, Bluetooth, Wireless LAN]

Data to be transmitted (fixed at 23 bytes)

SOH	STX	Printer status		Status type	Remaining No. of labels				Length	
01H	02H	3xH	3xH	33H	3xH	3xH	3xH	3xH	32H	33H

Receiving buffer space					Entire receiving buffer space					CR	LF
3xH	3xH	3xH	3xH	3xH	30H	30H	35H	31H	32H	0DH	0AH

Printer status.....Printer status is indicated in 2-byte data.

- "00": Normal state
- "01": Cover open state
- "02": Operating
- "04": Pause state
- "05": Wait for strip
- "06": Command syntax error (including Ir packet error)
- "09": Normal issue end + Label end
- "11": Paper jam
- "13": Label end
- "15": Cover open error
- "17": Broken head dots error
- "18": Thermal head excessive temperature
- "19": Ambient temperature error
- "32": Abnormal battery temperature
- "33": Battery excessive temperature
- "36": Low battery
- "37": Charging error
- "39": Bluetooth setup error (including initialization error)
- "45": Wait for battery recovery
- "46": Wait for head temperature reduction
- "47": Wait for motor temperature reduction
- "50": Flash ROM write error
- "51": Flash ROM erase error
- "54": Flash ROM storage area full state
- "55": Writable character/PC command save mode

Remaining No. of labels: Indicates the remaining number of labels in four bytes.
"0000" to "9999"

Length: Indicates the number of bytes of the entire status data
IrDA: TEC Protocol: Fixed at "22."
IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232,
Bluetooth or wireless LAN: Fixed at "23."

Receive buffer free space: Indicates the free space of the receive buffer.

Entire receive buffer free space: Indicates the entire free space of the receive buffer.
Fixed at "00512."

CRC/CR, LF: Indicates the end of the status block.

Notes

- (1) The status is returned only to the interface which sent this command.
- (2) The printer returns the same status, regardless of whether or not the compatible mode for the B-SP series is set.
- (3) After the code of the Bit Map Writable Character Command ([ESC] XD) or Graphic Command ([ESC] SG) is received, the Status Request Command is not processed until the printer receives the data specified for the type of data.
- (4) After receiving the Status Request Command, there may be a maximum of 20-msec. delay until the printer sends a status.
- (5) At least, a 20-msec. interval must be given between the transmissions of the Status Request Command. If the next Status Request Command is transmitted within 20 msec., the printer may fail to receive it.

Example

[ESC] WB [LF] [NUL]

5.15.3 MODE INFORMATION ACQUIRE COMMAND

[ESC] WX

Function Sends the printer mode information to the host.

Format [ESC] WX [LF] [NUL]

Explanation

- (1) The status when the compatible mode for the B-SP series is on differs from the status when the compatible mode is off.
- (2) The mode information format to be sent to the host, is as follows:

- When the compatible mode for the B-SP series is off.

TPCL mode (Mode = A)

Batch issue mode

[IrDA: TEC Protocol]

STX	Mode information (16 bytes)													CRC	CRC
	T	P	C	L	SP	SP	SP	SP	SP	SP	SP	SP	SP		
02H	54H	50H	43H	4CH	20H	20H	20H	20H	20H	20H	20H	20H	20H	xxH	xxH

[IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, Wireless LAN]

SOH	STX	Mode information (16 bytes)													ETX	EOT	CR	LF
		T	P	C	L	SP	SP	SP	SP	SP	SP	SP	SP	SP				
01H	02H	54H	50H	43H	4CH	20H	20H	20H	20H	20H	20H	20H	20H	20H	03H	04H	0DH	0AH

Strip issue mode

[IrDA: TEC Protocol]

STX	Mode information (16 bytes)													CRC	CRC
	T	P	C	L	SP	(	S	)	SP	SP	SP	SP	SP		
02H	54H	50H	43H	4CH	20H	28H	53H	29H	20H	20H	20H	20H	20H	xxH	xxH

[IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, Wireless LAN]

SOH	STX	Mode information (16 bytes)													ETX	EOT	CR	LF
		T	P	C	L	SP	(	S	)	SP	SP	SP	SP	SP				
01H	02H	54H	50H	43H	4CH	20H	28H	53H	29H	20H	20H	20H	20H	20H	03H	04H	0DH	0AH

TPCL1 mode (Mode = B)

Batch issue mode

[IrDA: TEC Protocol]

STX	Mode information (16 bytes)																CRC	CRC
	T	P	C	L	1	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP		
02H	54H	50H	43H	4CH	2DH	4CH	45H	20H	20H	20H	20H	20H	20H	20H	20H	20H	xxH	xxH

[IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, Wireless LAN]

SOH	STX	Mode information (16 bytes)																ETX	EOT	CR	LF
		T	P	C	L	1	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP					
01H	02H	54H	50H	43H	4CH	31H	20H	20H	20H	20H	20H	20H	20H	20H	20H	20H	03H	04H	0DH	0AH	

Strip issue mode

[IrDA: TEC Protocol]

STX	Mode information (16 bytes)																CRC	CRC
	T	P	C	L	1	(	S	)	SP	SP	SP	SP	SP	SP	SP	SP		
02H	54H	50H	43H	4CH	31H	28H	53H	29H	20H	20H	20H	20H	20H	20H	20H	20H	xxH	xxH

[IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, Wireless LAN]

SOH	STX	Mode information (16 bytes)																ETX	EOT	CR	LF
		T	P	C	L	1	(	S	)	SP	SP	SP	SP	SP	SP	SP	SP				
01H	02H	54H	50H	43H	4CH	31H	28H	53H	29H	20H	20H	20H	20H	20H	20H	20H	20H	03H	04H	0DH	0AH

The above is an example where the message is received in the TPCL and TPCL-LE modes as well as when the compatible mode for the B-SP series is off. In addition, the following messages are returned.

TPCL mode	TPCL	
TPCL1 mode	TPCL1	
LABEL mode	LABEL	
RECEIPT mode	RECEIPT	
RECEIPT1 mode	RECEIPT1	
ESC/POS mode	ESC/POS	
Online reset menu	USER ■ SYSTEM	
SYSTEM mode for users PAUSE + POWER keys	USER ■ SYSTEM	
SYSTEM mode for administrators FEED + POWER keys	When the password setting is on and before it is entered	USER ■ SYSTEM
	When the password setting is on and after it is entered	SYSTEM
	When the password setting is off	SYSTEM
TPCL (strip issue mode)	TPCL ■ (S)	
TPCL1 (strip issue mode)	TPCL1 (S)	
LABEL (strip issue mode)	LABEL (S)	

* ■ indicates a space.

- When the compatible mode for the B-SP series is on.

TPCL mode (Mode = A)

Batch issue mode

[IrDA: TEC Protocol]

STX	Mode information (16 bytes)																CRC	CRC
	T	P	C	L	-	L	E	SP	SP	SP	SP	SP	SP	SP	SP	SP		
02H	54H	50H	43H	4CH	2DH	4CH	45H	20H	20H	20H	20H	20H	20H	20H	20H	20H	xxH	xxH

[IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, Wireless LAN]

SOH	STX	Mode information (16 bytes)																ETX	EOT	CR	LF
		T	P	C	L	-	L	E	SP	SP	SP	SP	SP	SP	SP	SP	SP				
01H	02H	54H	50H	43H	4CH	2DH	4CH	45H	20H	20H	20H	20H	20H	20H	20H	20H	20H	03H	04H	0DH	0AH

TPCL mode (Mode = B)

[IrDA: TEC Protocol]

STX	Mode information (16 bytes)																CRC	CRC
	T	P	C	L	-	L	E	1	SP	SP	SP	SP	SP	SP	SP	SP		
02H	54H	50H	43H	4CH	2DH	4CH	45H	31H	20H	20H	20H	20H	20H	20H	20H	20H	xxH	xxH

[IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, Wireless LAN]

SOH	STX	Mode information (16 bytes)																ETX	EOT	CR	LF
		T	P	C	L	-	L	E	1	SP	SP	SP	SP	SP	SP	SP	SP				
01H	02H	54H	50H	43H	4CH	2DH	4CH	45H	31H	20H	20H	20H	20H	20H	20H	20H	20H	03H	04H	0DH	0AH

The above is an example where the message is received in the TPCL and TPCL-LE modes as well as when the compatible mode for the B-SP series is on. In addition, the following messages are returned.

TPCL mode	TPCL-LE	
TPCL1 mode	TPCL-LE1	
LABEL mode	LABEL	
RECEIPT mode	RECEIPT	
RECEIPT1 mode	RECEIPT1	
ESC/POS mode	ESC/POS	
Online reset menu	USER ■ SYSTEM	
SYSTEM mode for users PAUSE + POWER keys	USER ■ SYSTEM	
SYSTEM mode for administrators FEED + POWER keys	When the password setting is on and before it is entered	USER ■ SYSTEM
	When the password setting is on and after it is entered	SYSTEM
	When the password setting is off	SYSTEM

* ■ indicates a space.

Example [ESC] WX [LF] [NUL]

5.15.4 VERSION INFORMATION ACQUIRE COMMAND [ESC] WV

Function	Sends information such as the program version of the printer.
Format	[ESC] WV [LF] [NUL]
Explanation	

(1) The format of the program version data to be returned to the host is as follows.

[IrDA: TEC Protocol] (24-byte data in total)

STX		02H	
Creation date	"0"	30H	Creation date of the program: 9-byte data indicated in order of Day- Month-Year
	"4"	34H	
	"A"	41H	
	"P"	50H	
	"R"	52H	
	"2"	32H	
	"0"	30H	
	"0"	30H	
	"8"	38H	
Model	"B"	42H	Model: 7-byte ASCII code indicating the model B-EP2DG (2-inch/203-dpi model) B-EP4DG (4-inch/203-dpi model)
	"_"	2DH	
	"E"	45H	
	"P"	50H	
	"2"	32H	
	"D"	44H	
	"G"	47H	
Version	"V"	56H	Program version: 5-byte data: Vx.xx Revision Version
	"1"	31H	
	"."	2EH	
	"0"	30H	
	"A"	41H	
CRC		xxH	
CRC		xxH	

[IrDA: IrCOMM, IrDA: IrOBEX, RS-232C, Bluetooth, Wireless LAN]
(24-byte data in total)

SOH		01H	
STX		02H	
Creation date	"0"	30H	Creation date of program: 9 bytes of data indicated in order of Day- Month-Year
	"4"	34H	
	"A"	41H	
	"P"	50H	
	"R"	52H	
	"2"	32H	
	"0"	30H	
	"0"	30H	
	"8"	38H	
Model	"B"	42H	Model: 7-byte ASCII code indicating the model B-EP2DG (2-inch/203-dpi model) B-EP4DG (4-inch/203-dpi model)
	"2"	2DH	
	"E"	45H	
	"P"	50H	
	"2"	32H	
	"D"	44H	
	"G"	47H	
Version	"V"	56H	Program version: 5 bytes of data: Vx.xx Revision Version
	"1"	31H	
	"."	2EH	
	"0"	30H	
	"A"	41H	
ETX		03H	
EOT		04H	
CR		0DH	
LF		0AH	

Notes

- (1) This command is processed in order of receipt. This command is not processed until the processing of the commands sent prior to this command is completed. Therefore, if this command is sent while the printer is in the state other than idle, the program version data may not be returned immediately.
- (2) The USB does not return a status.

5.16 COMMANDS RELATED TO BLUETOOTH AND WIRELESS LAN

5.16.1 DEVICE ADDRESS ACQUIRE COMMAND

[ESC] IT

Function	Reads the device address of the Bluetooth or MAC address of the wireless LAN.
Format	[ESC] IT [LF] [NUL]
Explanation	

- (1) This command reads the device address of the Bluetooth or MAC address of the wireless LAN. When using the IrDA: TEC Protocol, the following information field is placed in the information frame and sent in packets.

[Information field to be sent when IrDA: TEC Protocol is used]

STX	Bluetooth device address	CRC	
02H	12 bytes	xxH	xxH

[Information field to be sent when IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, or wireless LAN is used]

SOH	STX	Bluetooth device address	ETX	EOT	CR	LF
01H	02H	12 bytes	03H	04H	0DH	0AH

The printer sends the following information:

Bluetooth device address: 0015b5aa0005

Wireless LAN MAC address: 000940387630

Bluetooth device address:

[30H] [30H] [31H] [35H] [62H] [35H] [61H] [61H] [30H] [30H] [30H] [35H]
0 0 1 5 b 5 a a 0 0 0 5

Wireless LAN MAC address:

[30H] [30H] [30H] [39H] [34H] [30H] [33H] [38H] [37H] [36H] [33H] [30H]
0 0 0 9 4 0 3 8 7 6 3 0

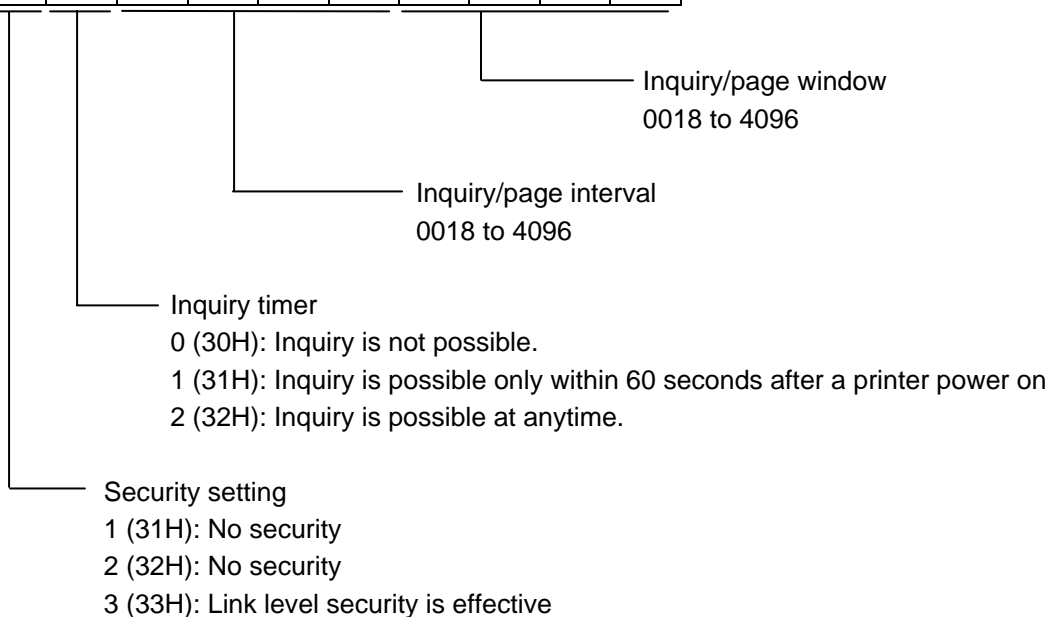
Example	[ESC] IT [LF] [NUL]
---------	---------------------

5.16.2 BLUETOOTH RELATED PARAMETER ACQUIRE COMMAND [ESC] WT

Function	Acquires the parameters related to the Bluetooth.
Format	[ESC] WT [LF] [NUL]
Explanation	(1) This command reads the parameters related to the Bluetooth. When using the IrDA: TEC Protocol, the following information field is placed in the information frame and sent in packets to the host.

[Information field to be sent when IrDA: TEC Protocol is used]

STX	Sec	Inq	Interval				Window			
02H	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH



Bluetooth device name	CRC	
32 bytes	xxH	xxH

Bluetooth device name: Fixed at 32 bytes

When the Bluetooth device name is "TOSHIBATEC BT,"

[54H] [4FH] [53H] [48H] [49H] [42H] [41H] [20H] [54H] [45H] [43H] [20H] [42H] [54H] [00H] [00H]
T O S H I B A ' ' T E C ' ' B T
[00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H]

* When the Bluetooth device name is less than 32 bytes, the remaining bytes are filled with 00H.

[Information field to be sent when IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, or wireless LAN is used]

SOX	STX	Sec	Inq	Interval				Window			
01H	02H	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH

Bluetooth device name	ETX	EOT	CR	LF
32 bytes	03H	04H	0DH	0AH

6. LABEL MODE (INTERFACE COMMANDS)

6.1 GENERAL DESCRIPTION

This chapter describes details regarding the interface commands for the LABEL mode of the issue mode.

<<Up to V1.0C>>

There are three issue types, "Batch issue," "Strip issue" and "Linerless issue." When the back feed amount fine adjustment is omitted in the Position Fine Adjust Command in batch issues, regardless of the selected sensor type, printing is started at 5 mm of from the leading edge of the label. When the back feed amount fine adjustment is set, printing is started at 3 mm from the leading edge of the label. Although the back feed amount fine adjustment is set in strip issues, no back feed is performed.

<<V1.0E or later>>

There are three issue types, "Batch issue," "Strip issue" and "Linerless issue."

When the back feed amount fine adjustment is omitted in the Position Fine Adjust Command in batch issues, regardless of the selected sensor type, printing is started at 5 mm of from the leading edge of the label. When the back feed amount fine adjustment is set, printing is started at 3 mm from the leading edge of the label.

In batch issue mode when the type of sensor is designated, whether or not to perform a back feed under the following conditions:

	Back feed restriction setting in the SYSTEM mode or in the Setup Command	
	ON	OFF
Label pitch of less than 20.0 mm	Performs no back feed	Performs a back feed
Label pitch of 20.0 mm or more but less than 24.0 mm and effective print length of less than 15.0 mm	Performs no back feed	Performs a back feed
Label pitch of 20.0 mm or more but less than 24.0 mm and effective print length of 15.0 mm or more	Performs a back feed	Performs a back feed
Label pitch of 24.0 mm or more	Performs a back feed	Performs a back feed
Feeding by the FEED key or in the Feed Command	Performs no back feed (*1)	Performs no back feed (*1)

*1 However, when the label pitch length is equal to the distance between the head and sensor (11.5 mm) or less, a back feed is performed.

In batch and linerless issue modes when the type of sensor is not designated, a back feed operation is specified depending on the back feed restriction setting in the SYSTEM mode or in the Setup Command.

When the back feed restriction setting is on and the label pitch or effective print length conforms to the condition not to perform a back feed, a label located between the head and cutter at the first printing subsequent to an issue (one or multiple labels) cannot be printed because no back feed is performed. This waste can be prevented by switching the stop position in the SYSTEM mode from "CUT" to

"HEAD." However, it is necessary to press the FEED key and move a label to the cutting position to take it out because the label is not stopped at the cutting position after printing has been completed.

In strip issue mode when the strip issue back feed setting is on and the strip position fine adjustment is set to – (negative), a back feed is performed because the print start position is misaligned. However, for labels whose label-to-label gap is 5 mm or more, no back feed is performed because the print start position is not misaligned.

<<Common in all versions>>

The print position is misaligned when printing under any of the following conditions.

The assumption for the following conditions is that labels/tags of which pitch is shorter than the distance between the print head and the sensor (approx. 11.5 mm) are used in batch issues.

- (1) After labels/tags are issued with "Back feed amount fine adjustment" being set for the Position Fine Adjust Command, another label/tag is issued without setting the back feed amount.
- (2) After labels/tags are issued without setting the "Back feed amount find adjustment" for the Position Fine Adjust Command, another label/tag is issued with Back feed amount fine adjustment set.
- (3) After issuing labels/tags in the TPCL mode, the mode is changed to the LABEL mode and the label/tag is issued without setting the "Back feed amount fine adjustment" for the Position Fine Adjust Command.

When any of the above conditions is met, the print position on the second label/tag is misaligned. This is because when using the labels/tags of which pitch is shorter than the distance between the print head and the sensor, the gap between the first and second labels/tags passes through the sensor before printing the first label/tag, before switching to a different issue condition or the LABEL mode. Therefore, the third and later labels/tags are printed at the proper position.

Either of the language types, Kanji, Chinese and Korean, can be implemented. Any font other than the on-board fonts is selectable.

6.2 OUTLINE OF COMMANDS

6.2.1 FORMAT OF INTERFACE COMMAND

ESC	Command & Data	LF	NUL
-----	----------------	----	-----

- The length from [ESC] to [LF] [NUL] must be as specified by each command.
- Only the following control code is used:
ESC (1BH), LF (0AH), NUL (00H)

6.2.2 HOW TO USE REFERENCE

Function	Describes the outline of the function of the command.
Format	Shows the format of the command. The format designation method should conform to the following rules: <ul style="list-style-type: none"> • Each set of small letters (such as aa, bbbb) indicates a parameter item. • An item enclosed in parentheses may be omitted. • “---” indicates the repetition of an item. • Brackets and parentheses are used only in coding, and must not be transmitted in practice. • Other symbols must always be inserted at designated positions before being transmitted.
Term	Explains the term(s) used in the format. * “0 to 999” described in the entry range indicates that up to 3-digit variable-length entry is allowed. (Entry of “001” or “009” is also possible.) “000 to 999” indicates that the entry must be fixed at 3 digits.
Explanation	Explains the command in detail.
Note	Supplementary explanation of the command.
Refer to	Related commands
Examples	Explains the command examples. <div style="border: 1px solid black; padding: 2px; display: inline-block;">[ESC] FM [LF] [NUL]</div> The above corresponds to the transfer of the following: <div style="text-align: center;"> <u>1B</u> <u>46</u> <u>4D</u> <u>0A</u> <u>00</u> [ESC] F M [LF] [NUL] </div>

6.2.3 PRECAUTIONS

The commands and parameters described in this specification must always be used. If any command or parameter other than those covered in this specification is used, the printer's operation will not be guaranteed.

6.3 COMMANDS RELATED TO SETTING

6.3.1 LABEL SIZE SET COMMAND

[ESC] D

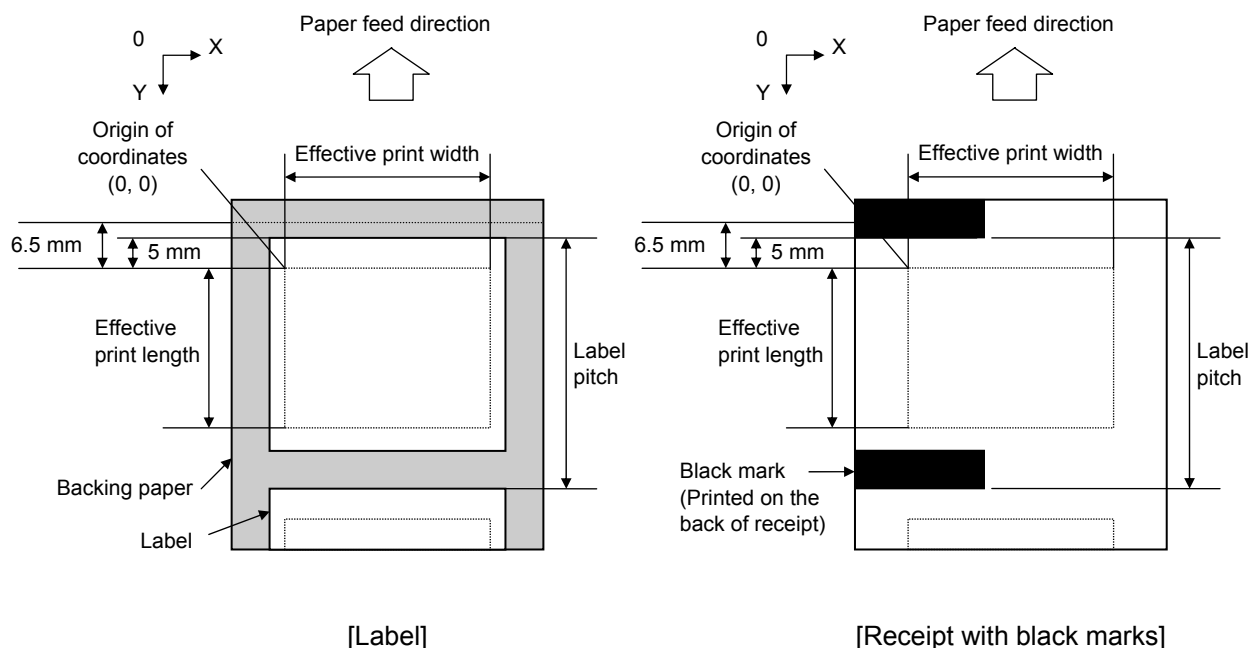
Function	Sets the size of a label or tag.
Format	[ESC] Daaaa, bbbb, cccc [LF] [NUL]
Term	<p>aaaa: Label/tag pitch Fixed at 4 digits (in 0.1 mm units) 0100 (10.0 mm) to 9999 (999.9 mm)</p> <p>bbbb: Effective print width Fixed at 4 digits (in 0.1 mm units) 0100 (10.0 mm) to 1057 (105.7 mm)</p> <p>cccc: Effective print length Fixed at 4 digits (in 0.1 mm units) 0070 (7.0 mm) to 9970 (997.0 mm)</p>

The size depends on the type of the new portable printer.

	B-EP2DL-GHxx	B-EP4DL-GHxx
Label/tag pitch	10 × 999.9 mm	10 × 999.9 mm
Effective print width	48.0 mm	104.0 mm
Effective print length	997.0 mm	997.0 mm

Explanation

- (1) After the Form Store Start Command is sent, the Label Size Set Command must be sent before each field command, the Print Density Fine Adjust Command, or the Position Fine Adjust Command is sent.
- (2) To print data in non-print area at 5 mm from the leading edge of the label, the print start position can be changed by using the Position Fine Adjust Command. However, it is necessary to enlarge the gap between the labels.
- (3) The print origin of coordinates in the Y direction is at 6.5 mm from the center of the gap (black mark). When the gap (black mark) is 3 mm, the print origin of coordinates in the Y direction is at 5 mm from the leading edge of the label. (Refer to the figure below.)
- (4) In the compatible mode for the B-SP series, the effective print width is fixed at 48.0 mm.

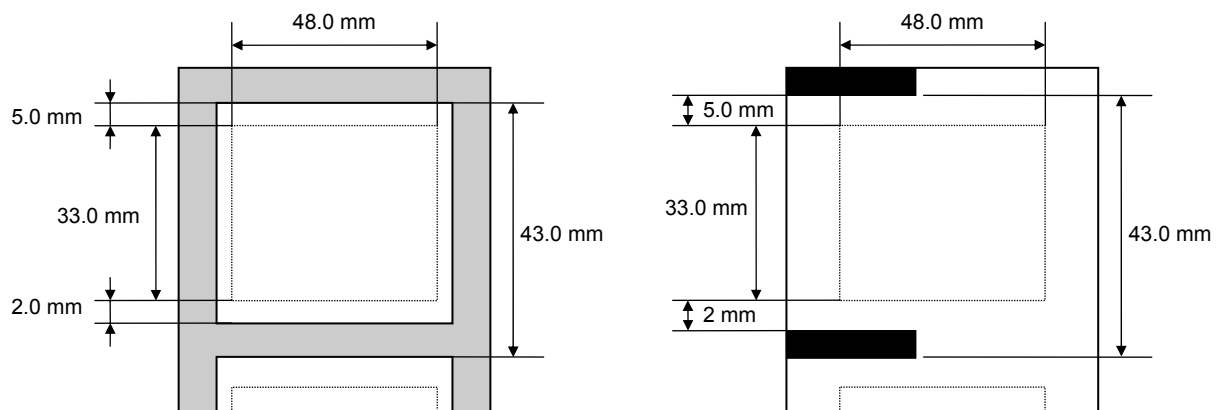


Notes

- (1) The label pitch length is backed up in memory (retained even if the power is turned off).

Example

[ESC] D0430, 0480, 0330 [LF] [NUL]



Programmable value range by the software

[mm]

Item		Model	B-EP2DL		B-EP4DL	
			203 dpi		203 dpi	
		Mode	Batch	Strip	Batch	Strip
Thermal head dot density			8 dots/mm		8 dots/mm	
Thermal head width			48.0 mm		104.0 mm	
Pitch	Label	Max.	10.0	13.0	10.0	13.0
		Min.	999.9	67.0	999.9	67.0
	Tag	Max.	10.0	-	10.0	-
		Min.	999.9	-	999.9	-
Label length		Max.	7.0	10.0	7.0	10.0
		Min.	997.0	60.0	997.0	60.0
Paper length	Backing paper	Max.	16.0		50.0	
		Min.	58.0		115.0	
	Tag	Max.	16.0	-	50.0	-
		Min.	58.0	-	115.0	-
Label width		Max.	13.0		47.0	
		Min.	55.0		112.0	
Label-to-label gap		Max.	3.0		3.0	
		Min.	7.0		7.0	
Black mark length		Max.	3.0		3.0	
		Min.	7.0		7.0	
Effective print width		Max.	10.0		10.0	
		Min.	48.0		104.0	
Effective print length	Label	Max.	7.0	10.0	7.0	10.0
		Min.	997.0	60.0	997.0	60.0
	Tag	Max.	7.0	-	7.0	-
		Min.	997.0	-	997.0	-
Slow-up/down interval	Slow up		1.0		1.0	
	Slow down		1.0		1.0	
Paper thickness	Label		100 μm to 120 μm			
	Tag		120 μm			
	Receipt		65 μm to 75 μm			
Max. effective print length for on-the-fly issuing			997.0		499.0	

6.3.2 PRINTER ID SET COMMAND

[ESC] ID

Function	Sets the ID for the printer.
Format	[ESC] ID; aa(,b) [LF] [NUL]
Term	aa: Printer ID (2-byte hex data) 0000H to FFFFH b: Reserved area (Omissible) Fixed at 0
Explanation	(1) The printer ID is the information required to identify each printer when communicating according to the IrDA: TEC Protocol. (2) When setting the reserved area to other than 0, an error results.
Notes	(1) The set printer ID is backed up in memory (even if the Initialize command ([ESC] WR, [ESC] @) is executed or the power is turned off). (2) The last 5 digits of the printer's serial number have been set as the printer ID, at the time of shipment from the factory. (3) In IrDA: TEC Protocol, the printer checks the set ID against the ID in the received command packet. If they do not match, the printer discards the command packet. However, when the ID in the command packet is "0", the printer accepts the command packet without checking the set IDs.
Example	To set "03H 51H" as the ID of the printer: [ESC] ID; [03H] [51H] [LF] [NUL] In this case, the printer ID in status printing is "00849."

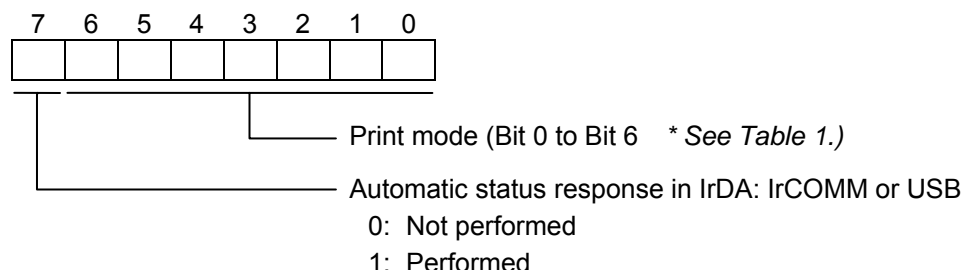
6.3.3 MODE SELECT COMMAND

[ESC] M

Function Changes the print mode.

Format [ESC] M; a(,b) [LF] [NUL]

Term a: Print mode designation



* Table 1 Print mode

HEX	Mode	How to deal with the received data after an error is cleared
30H	LABEL	Discards
31H	RECEIPT	Discards
32H	RECEIPT1	Continues printing
34H	ESC/POS	Continues printing
41H	TPCL	Continues printing
42H	TPCL1	Continues printing

- b: Print position detection feed (Omissible. If omitted, the print position detection feed is not performed.)
- 0: When the mode change from RECEIPT, RECEIPT1 or ESC/POS to LABEL, TPCL or TPCL1 is requested, a print position detection feed is not performed after the mode is changed.
- 1: When the mode change from RECEIPT, RECEIPT1 or ESC/POS to LABEL, TPCL or TPCL1 is requested, a print position detection feed is performed after the mode is changed.

- Explanation**
- (1) There are 4 types of the print mode: "LABEL," "RECEIPT," "TPCL" and "ESC/POS."
 - (2) "Automatic status response in IrDA: IrCOMM or USB" is the function for the specifications which do not allow the printer to spontaneously send the status through IrDA; IrCOMM or USB. This function enables the printer to forcefully send the status to the host, if the link between the printer and the host is established. However, if the link between the printer and the host is not established upon the status transmission, the printer cannot send the status. Therefore, the status is discarded. (In the next connection to the host, the printer does not send the status to the host.)
 - (3) The sensor is not used in the RECEIPT, RECEIPT1 or ESC/POS mode. When sensor detectable paper is used for receipts and labels, print position detection feed cannot be done in the LABEL, TPCL or TPCL1 mode. By setting the print position detection feed parameter to 1, print position detection feed is carried out after the mode is changed to LABEL, TPCL or TPCL1.
 - (4) In the TPCL1 mode, it is possible to re-print the last print data by pressing the FEED button.

Notes

- (1) The print mode designation (the specified print mode and the automatic status response in IrDA: IrCOMM or USB) is backed up in memory (even if the power is turned off).
- (2) The factory default is "TPCL mode" and "Automatic status response in IrDA: IrCOMM or USB is not performed." (The IrDA protocol is "IrCOMM.")
- (3) When the print mode is changed, the type of sensor is automatically changed.

LABEL mode (0):	The previously backed up sensor is designated.
TPCL mode (A):	The previously backed up sensor is designated.
TPCL1 mode (B):	The previously backed up sensor is designated.
RECEIPT mode (1):	No sensor is designated.
RECEIPT1 mode (2):	No sensor is designated.
ESC/POS mode (4):	No sensor is designated.
- (4) If the RECEIPT or ESC/POS mode is selected or no sensor is designated in the LABEL or TPCL mode, an initial feed is not performed when the cover is closed (when the print position detection feed after the cover is closed is enabled with key operations or using the set command ([ESC] ZM03)).
- (5) When the mode change is finished, the printer sends the normal end status or an ACK to the host. However, when the mode is changed to the TPCL mode, the printer does not send the status. In IrDA: IrCOMM or USB, only when bit 7 of the print mode designation is set to "1," the printer sends the status.
- (6) The print mode can be changed by the printer itself. However, since the setting for the automatic status response in IrDA: IrCOMM or USB cannot be changed, the setting remains as the same.
- (7) The print position detection feed is performed according to the conditions, such as, label pitch, fine adjustment, and sensor selection, which were set in the LABEL or TPCL mode before the printer is operated in the RECEIPT, RECEIPT1 or ESC/POS mode. If no sensor is selected, the print position detection feed will not be performed.
- (8) After performing a print position detection feed, the printer does not send a process end status. If an error occurs during the print position detection feed, the print position detection feed is performed by clearing the error using the PAUSE key (when the print position detection feed after the cover is closed is enabled with key operations or using the set command ([ESC] ZM03)).
- (9) When changing the print mode by the printer itself, the print position detection feed parameter cannot be set.
- (10) When the mode select command is designated with the print position detection feed at the end of a print data issued in the RECEIPT1 or ESC/POS mode, and if an error occurs while printing, the printing will restart after the error is cleared and then, the print mode will be changed to the LABEL or TPCL mode and a print position detection feed is performed. When the print position detection feed is omitted, the mode is not changed to LABEL or TPCL. (The mode select command is ignored.)

- (11) When the LABEL or TPCL mode is selected in the mode select command and the print position detection feed parameter is set 0 (not performed), and if an error occurs while the printer issues in the RECEIPT1 or ESC/POS mode, the print mode is changed to the LABEL or TPCL mode after the error is cleared. (The mode select command is executed.)
- (12) Although this command is received while the command is being stored in a form, the mode is not changed.

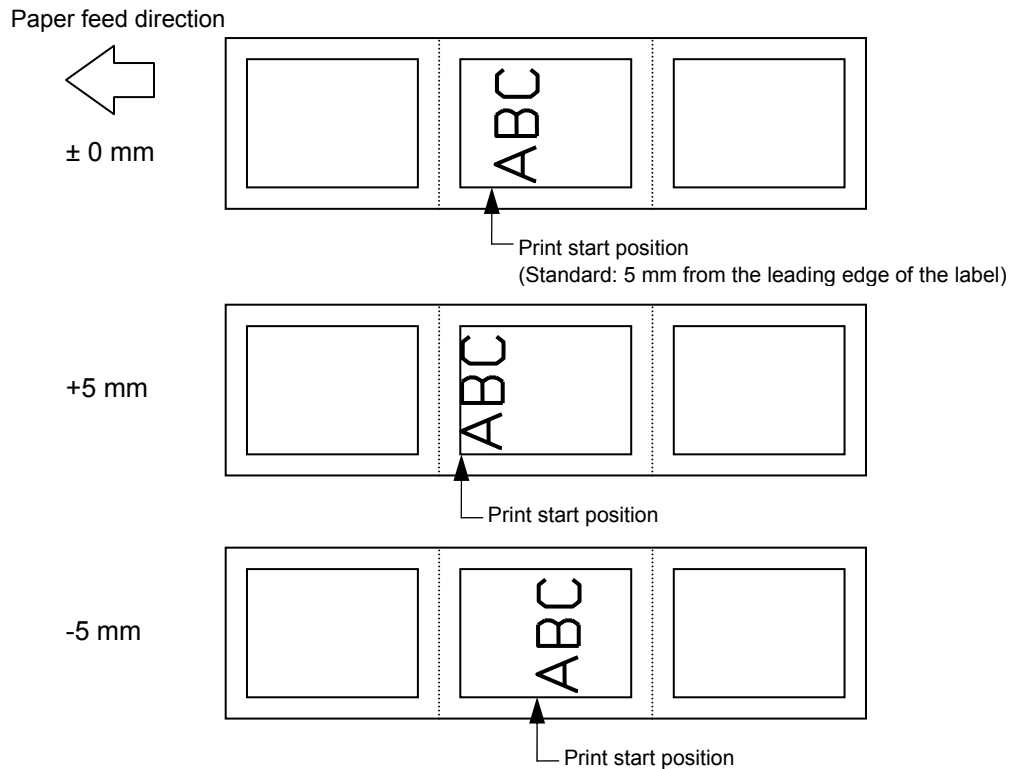
6.4 COMMANDS RELATED TO FINE ADJUSTMENT

6.4.1 PRINT START POSITION FINE ADJUST COMMAND [ESC] AX

Function	Adjusts the feed value so that the label will be shifted forward or backward from the standard print start position.
Format	<p>[ESC] AX; abbb(, cddd, eff) [LF] [NUL]</p> <p>[In compatible mode for the B-SP series] [ESC] AX; abbb(, cddd, eff) [LF] [NUL]</p>
Term	<p>a: Indicates the direction, forward or backward, in which a fine adjustment is to be made. +: Backward -: Forward</p> <p>bbb: Fine adjustment value for print position 000 to 500 (in 0.1 mm units)</p> <p>c: Indicates the direction of the strip position, forward or backward. +: Backward -: Forward</p> <p>ddd: Fine adjustment value for strip position (Omissible) 000 to 030 (in 0.1 mm units) * Fine adjustment in - (forward) direction is made between 000 and 020.</p> <p>eff: Reserved area (Omissible) Omitted or +20 (Fixed) * If omitted, print is started at 5 mm from the leading edge of the label. * If set to +20, print is started at 3 mm from the leading edge of the label.</p> <p>[In compatible mode for the B-SP series]</p> <p>a: Indicates the direction, forward or backward, in which a fine adjustment is to be made. +: Backward -: Forward</p> <p>bbb: Fine adjustment value for print position 000 to 500 (in 0.1 mm units)</p> <p>cddd: Indicates that back feed amount is finely adjusted backward. (Omissible) +000 (Fixed)</p> <p>eff: Indicates that back feed amount is finely adjusted forward. (Omissible) +20 (Fixed)</p> <p>* When the omissible parameters (,cddd and ,eff) are omitted, print is started at 5 mm from the leading edge of the label. When the omissible parameters (,cddd and ,eff) are set, print is started at 3 mm from the leading edge of the label.</p>

Explanation

- (1) The print start position is adjusted to stop backward or forward from the standard print start position.
- (2) When the back feed amount fine adjustment is enabled by this command while the command is being stored in a form, the print start position moves backward by 2mm from the standard position, which enlarges the effective print area.
- (3) If this command is stored in a form, the print position is automatically adjusted when the form is invoked.
- (4) When the back feed amount fine adjustment is enabled by this command while the command is being stored in a form, or when the command is sent without being stored in a form, printing starts at 5 mm from the leading edge of the label.
- (5) When the power is turned on again, the backed up fine adjustment value is set.
- (6) When the print position is changed, or when the gap between the labels is not 3 mm, the Position Fine Adjust Command should be used as required. (When the gap between the labels is 3 mm, the standard print start position is 5 mm from the leading edge of the label.)
- (7) When the compatible mode for the B-SP series is off, and the reserved area (.eff) is set to +20, printing starts at 3 mm from the leading edge of the label. When this parameter is omitted, printing starts at 5 mm from the leading edge of the label. Note that when the parameter is set to any value other than +20, a command error occurs.
- (8) When the compatible mode for the B-SP series is on, and the omissible parameters (.cddd and .eff) are set to +000 and +20, respectively, printing starts at 3 mm from the leading edge of the label. When the parameters are omitted, printing starts at 5 mm from the leading edge of the label. Note that when the parameters are set to any value other than +000 and +20, respectively, a command error occurs.
- (9) When the fine adjustment for print position in + (backward) direction is set to any value exceeding +10.5 mm (distance between the print head and the sensor minus 1 mm), the fine adjustment value is corrected to +10.5 mm before printing.
- (10) The fine adjustment value for strip position is valid only when “the compatible mode for the B-SP series” is turned off (disabled) in the SYSTEM mode. When the parameter “a” is set to any value other than “+” or “-,” a command error occurs.



Notes

- (1) The set fine adjustment value for print position is backed up in memory (retained even if the power is turned off).
- (2) The factory default value is 0.0 mm.
- (3) The fine adjustment value for print position and strip position changed by the Position Fine Adjust Command in the TPCL mode, is also effective in the LABEL mode. However, the fine adjustment value for back feed changed in the LABEL mode is not effective in the TPCL mode.
- (4) When the back feed amount fine adjustment is enabled, printing starts at 3 mm from the leading edge of the label.
- (5) The back feed amount fine adjustment is enabled only while the command is being stored in a form. It is disabled when the command is sent without being stored in a form.
- (6) When print position fine adjustment is selected in the SYSTEM mode (through key operations on the printer), the fine adjustment value is a sum of the value in the fine adjustment command and the system mode fine adjustment value. Note that the maximum fine adjustment value is ± 50.0 mm.
- (7) The fine adjustment value for strip position up to V1.0C is valid only when the fine adjustment value for print position is not selected (fine adjustment value = 0).
- (8) When the label pitch length is 20.0 mm or more but less than 24.0 mm and the effective print length is 15.0 mm or more or the label pitch length is 24.0 mm or more, a back feed is performed before printing.

6.4.2 PRINT DENSITY FINE ADJUST COMMAND

[ESC] AY

Function	Adjusts the automatically set print density.
Format	[ESC] AY; abb, c (, d) [LF] [NUL]
Term	<p>a: Indicates whether to increase or decrease the density +: Increase (Darker) -: Decrease (Lighter)</p> <p>bb: Fine adjustment value for print density 00 to 30 (in units of 1 step)</p> <p>c: Print mode 1 (Fixed): Direct thermal</p> <p>d: Head output division designation (Omissible. When omitted, settings backed up by the memory are valid.)</p> <p>2-inch print head width 0: Auto (Divided by 2 or 3) 1: Reserved (When designated, automatic selection of bipartite/tripartite division is performed.) 2: Divided by 3 (Fixed) 3: Auto1 (Not divided/Divided by 2 or 3)/Print quality oriented 4: Reserved (When designated, tripartite division is performed.) 5: Auto2 (Not divided/Divided by 2 or 3)/Print speed oriented (supported in V1.0E or later)</p> <p>4-inch print head width 0: Auto (Divided by 2, 3 or 6) 1: Reserved (When designated, automatic selection of bipartite/tripartite/6-partite division is performed.) 2: Reserved (When designated, automatic selection of bipartite/tripartite/6-partite division is performed.) 3: Auto1 (Not divided/Divided by 2, 3 or 6) 4: Divided by 6 (Fixed)</p>

Explanation	<p>(1) The standard density is finely adjusted to increase or decrease.</p> <p>(2) When any fine adjustment value for print density out of the above range is set, a command error occurs.</p> <p>(3) The default value of the head output division designation is “3: Auto1 (Not divided/Divided by 2 or 3)” on the 2-inch print head and “3: Auto1 (Not divided/Divided by 2, 3 or 6)” on the 4-inch print head.</p> <p>(4) If this command is stored in a form, the print density is automatically adjusted when the form is invoked.</p> <p>(5) If this command is stored in a form, the print density is adjusted when this command is received.</p>
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- (6) When "0: Auto" is designated on the 2-inch print head, "Divided by 2" or "Divided by 3" is automatically selected for every line according to the print ratio. The width of half a dot may not be printed on the line when switching between "Divided by 2" and "Divided by 3." Therefore, do not designate "0: Auto" when a serial barcode is printed.
- (7) When "3: Auto1" or "5: Auto2" is designated for the 2-inch print head, "Not divided," "Divided by 3" or "Divided by 2" is automatically selected for every line according to the print ratio. The width of half a dot may not be printed on the line when switching among "Not divided," "Divided by 2" and "Divided by 3." Therefore, do not designate "3: Auto1" or "5: Auto2" when a serial barcode is printed.

The difference between Auto1 and Auto2 is while Auto1 is print quality oriented, Auto2 is print speed oriented. Auto2 is designated to increase the print speed although the print is slightly faded.

- (8) When "0: Auto" is designated on the 4-inch print head, "Divided by 2", "Divided by 3" or "Divided by 6" is automatically selected for every line according to the print ratio. The width of half a dot may not be printed on the line when switching among "Divided by 2," "Divided by 3" and "Divided by 6." Therefore, do not designate "0: Auto" when a serial barcode is printed.
- (9) When "3: Auto1" is designated on the 4-inch print head, "Not divided," "Divided by 2," "Divided by 3" or "Divided by 6" is automatically selected for every line according to the print ratio. The width of half a dot may not be printed on the line when switching among "Not divided," "Divided by 2," "Divided by 3" and "Divided by 6." Therefore, do not designate "3: Auto1" when a serial barcode is printed.

Notes

- (1) The set fine adjustment value for print density and the head output division designation are backed up in memory (retained even if the power is turned off).
- (2) The fine adjustment values changed by the Print Density Fine Adjust Command in the LABEL mode, are also effective for the TPCL, RECEIPT and ESC/POS modes.
- (3) When the head output division designation is omitted, the backed up value in memory is used.
- (4) When print density fine adjustment is selected in the SYSTEM mode (through key operations on the printer), the fine adjustment value is a sum of the value in the fine adjustment command and the system mode fine adjustment value. Note that the maximum fine adjustment value is ± 30.0 mm.

6.4.3 STRIP SENSOR THRESHOLD VALUE SET COMMAND [ESC] AZ

Function	Sets the sensor threshold value to switch the mode between strip and batch.
Format	[ESC] AZ; a [LF] [NUL]
Term	<p>a: Setting</p> <ul style="list-style-type: none"> 0: Operation in conformance with the strip sensor 1: Operation in conformance with the strip sensor 2: Fixed at the batch mode 3: Fixed at the strip mode 4: Reserved
Notes	<p>(1) The set parameter is backed up and kept until a new value is set using this command. When the power is turned on, the backed up value is retrieved and set.</p> <p>(2) "0: Operation in conformance with the strip sensor" has been set as the default at the time of shipment from the factory.</p> <p>(3) When either "2: Fixed at the batch mode" or "3: Fixed at the strip mode" for parameter "a," is selected, the printer operates in the specified mode, without automatically switching between the batch and strip modes.</p> <p>(4) When "4: Reserved" is selected, this command is ignored.</p>

6.5 COMMANDS RELATED TO DRAWING FORMAT

6.5.1 LINE FORMAT COMMAND

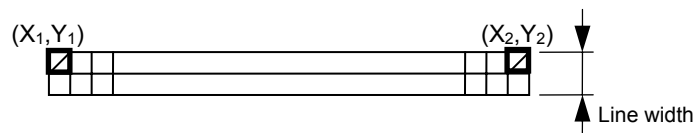
[ESC] LC

Function	Sets the line format and draws the line.
Format	[ESC] LC; aaaa, bbbb, cccc, dddd, e, f [LF] [NUL]
Term	<p>aaaa: Start point X-coordinate Fixed at 4 digits (in 0.1 mm units)</p> <p>bbbb: Start point Y-coordinate Fixed at 4 digits (in 0.1 mm units)</p> <p>cccc: End point X-coordinate Fixed at 4 digits (in 0.1 mm units)</p> <p>dddd: End point Y-coordinate Fixed at 4 digits (in 0.1 mm units)</p> <p>e: Type of line 0: Line (horizontal, vertical) 1: Rectangle</p> <p>f: No. of line width dots 1 to 9 (in 0.1 mm units)</p>

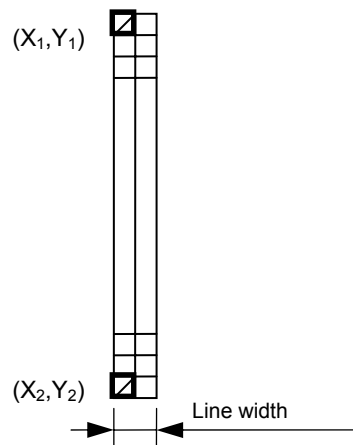
Explanation

(1) The relation between the coordinates of the start and end points and the width of the line, is as follows:

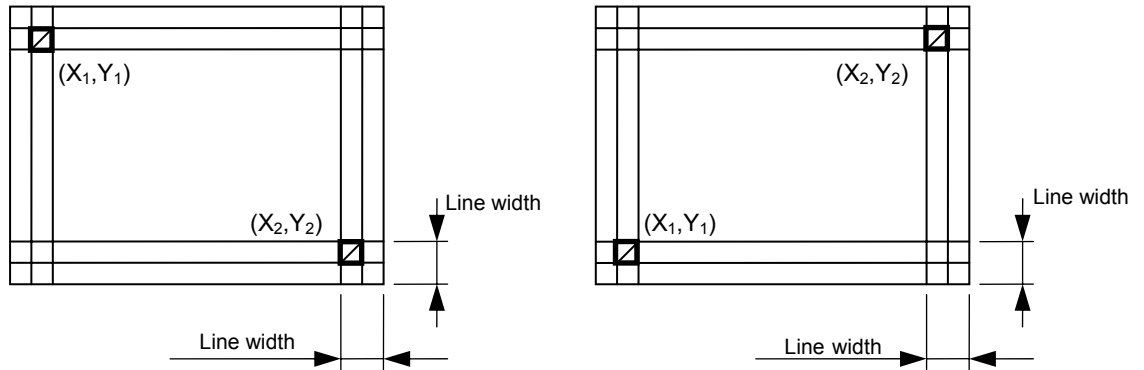
① Horizontal line (In the case of $|Y_2 - Y_1| = 0$)



② Vertical line (In the case of $|X_2 - X_1| = 0$)



③ Rectangle



- (2) When the start and end point coordinates which make a slant line are specified, a rectangle is drawn, even if "Line" is selected for the line type.
- (3) If the print ratio of one line (the print head width) is higher than defined, printing may become poor, or the printer may be reset. When a horizontal line is to be drawn, note the print ratio.
- (4) When the coordinates, which make data over the head width, is specified, printing is not guaranteed.

6.5.2 BIT MAP FONT FIELD COMMAND

[ESC] PC

Function	Sets the format indicating the position on the label at which the bit map font is to be printed and how it is to be printed.
Format	[ESC] PCaa; bbbb, cccc, d, e, f, gg, h, ii, j, k(, PI) [LF] [NUL]
Term	<p>aa: Character string No. 00 to 99 (The same No. must not be used in one form for the bit map font field, the outline font field, and the barcode/two-dimensional field.)</p> <p>bbbb: Print origin of X-coordinate of character string Fixed at 4 digits (in 0.1 mm units)</p> <p>cccc: Print origin of Y-coordinate of character string Fixed at 4 digits (in 0.1 mm units)</p> <p>d: Character horizontal magnification 1: 0.5 magnification 5: 2.5 magnification 2: 1 magnification 6: 3 magnification 3: 1.5 magnification 7: 3.5 magnification 4: 2 magnification 8: 4 magnification</p> <p>e: Character vertical magnification 1: 0.5 magnification 5: 2.5 magnification 2: 1 magnification 6: 3 magnification 3: 1.5 magnification 7: 3.5 magnification 4: 2 magnification 8: 4 magnification</p> <p>f: Type of font A: Standard (12 × 24 dots) B: Bold Character (48 × 96 dots) C: Writable Character (24 × 24 dots) D: Price Font 1 (16 × 40 dots) E: Price Font 2 (32 × 48 dots) 203-dpi print head F: Times Roman (Bold) 21 points G: Helvetica (Bold) 18 points H: Letter Gothic (Medium) 14.3 points I: Courier (Medium) 15 points J: Presentation (Bold) 27 points O: GOTHIC725 Black 6 points P: Kanji/Writable Character (16 × 16 dots) Q: Chinese/Writable Character (24 × 24 dots) R: Korean/Writable Character (24 × 24 dots) S: (Reserved) T: (Reserved) U: (Reserved)</p>

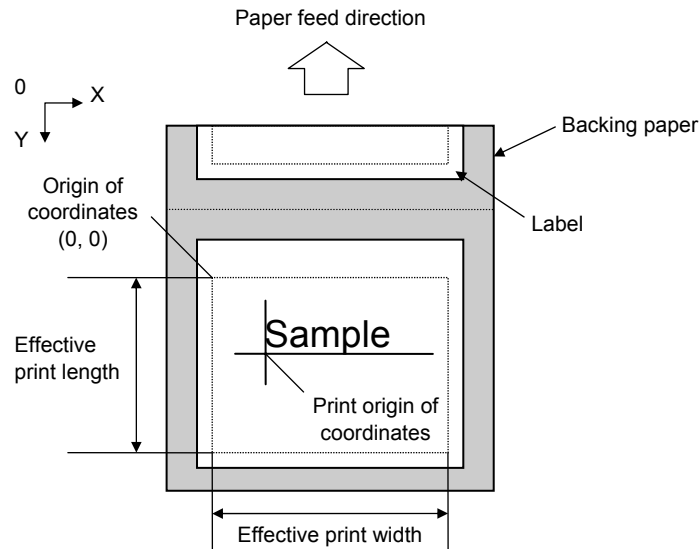
- gg: Rotational angles of a character or character string
00: 0° (chara.) 0° (chara.-string)
01: 90° (chara.) 90° (chara.-string)
02: 180° (chara.) 180° (chara.-string)
03: 270° (chara.) 270° (chara.-string)
- h: Selects black character or reverse character
B (Fixed value): Black character
- ii: Data length
00 to 99 **NOTE:** When "00" is designated, the length is equivalent to the data sent by the Data Print Command.
JIS 8 code: Data which is separated by [LF]
Packed BCD code: Data which is delimited by "F"
- j: Data code
1: JIS 8 code (Fixed at 1 when the type of font is "C," "Q" or "R.")
2: Packed BCD code (only for IrDA: TEC Protocol)
- k: Fixed data No.
0 (Fixed value)
- Pl: Print position (Omissible. If omitted, the print position is left-aligned.)
0: Left
1: Center
2: Right

Explanation

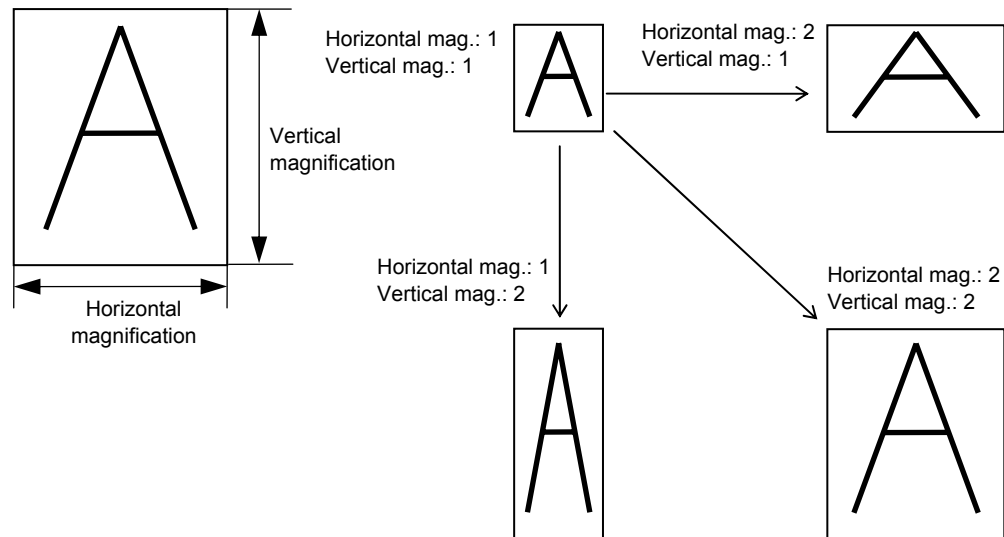
(1) Character string No.

The data in the Data Print Command (X) is selected and linked in the order of this character string No. (The format of character string Nos. 00 and 01 is linked to the first and second data, respectively. In the same order, the format is linked to the data.) Therefore, the Nos. of the bit map font character string, the outline font character string, and the barcode/two-dimensional code, should be consecutive, starting from 00 (in ascending order). The same No. must not be used in one form for the bit map font character string field, the outline font character string field, and the barcode/two-dimensional code field.

(2) Print origin of coordinates



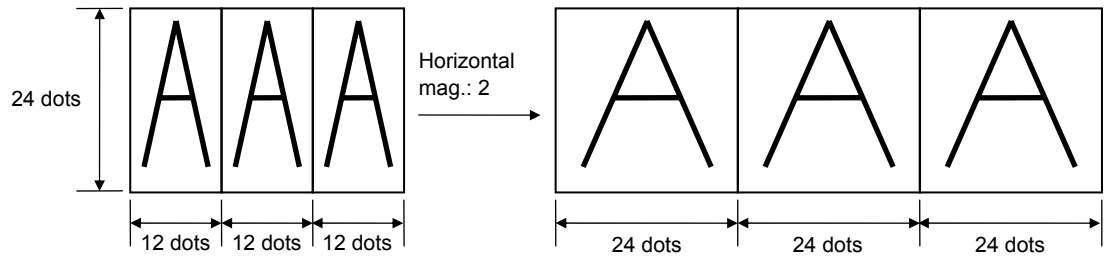
(3) Horizontal magnification and vertical magnification



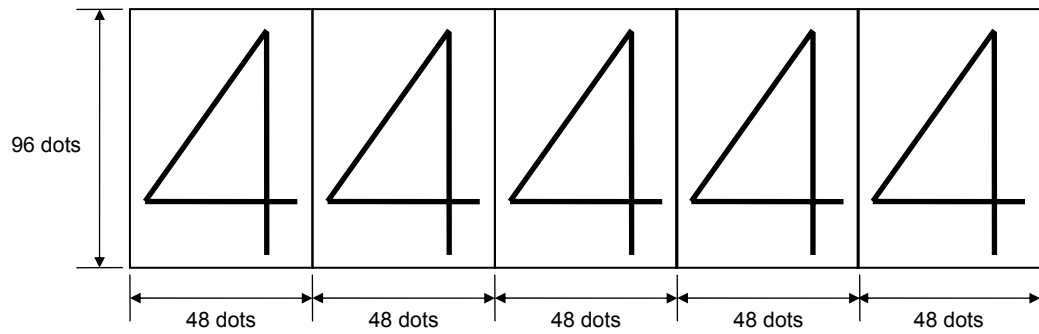
NOTE: When a large character or many characters is/are printed, the print density may become lower. (When the print ratio per line is high, the print density may become lower.)

(4) Space between characters is described below.

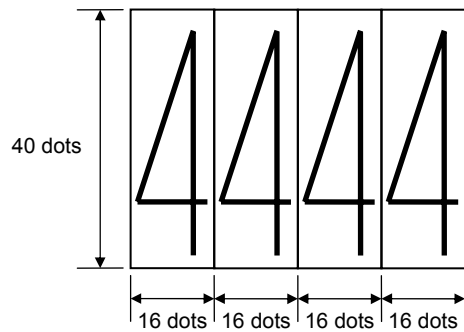
[Standard character]



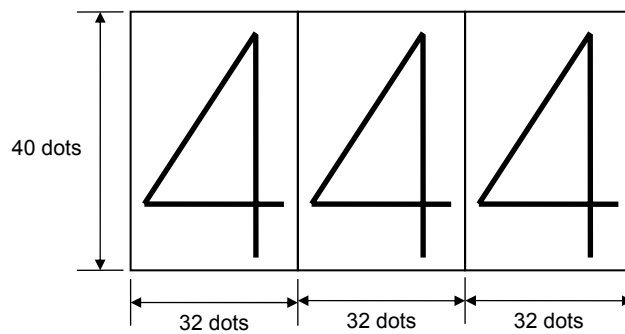
[Bold character]



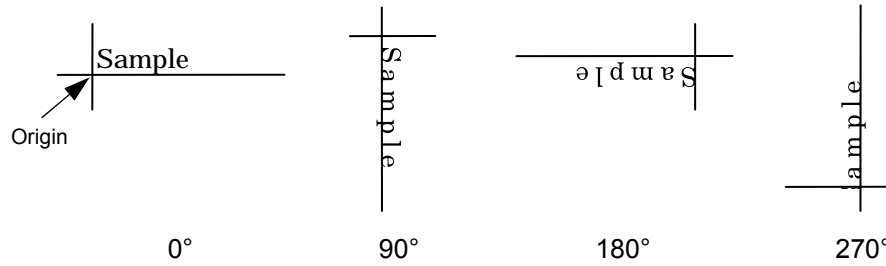
[Price font 1 (Horizontal mag.: 1)]



[Price font 1 (Horizontal mag.: 2)]



(5) Rotational angles of a character and character string



(6) Data length, Data code

JIS 8 code The length that one-byte data is counted as one digit

Packed BCD..... The length before packed

Data code	Data	Data to be sent	Data length
JIS 8	1 2 3 4 5	31H 32H 33H 34H 35H	5
Packed BCD	1 2 3 4 5	12H 34H 50H	5

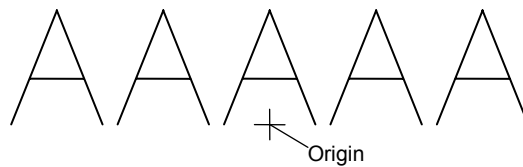
* When the same data is sent, the data length to be set is the same value in both data codes, JIS 8 and Packed BCD.

(7) Print position

• Left (Default)



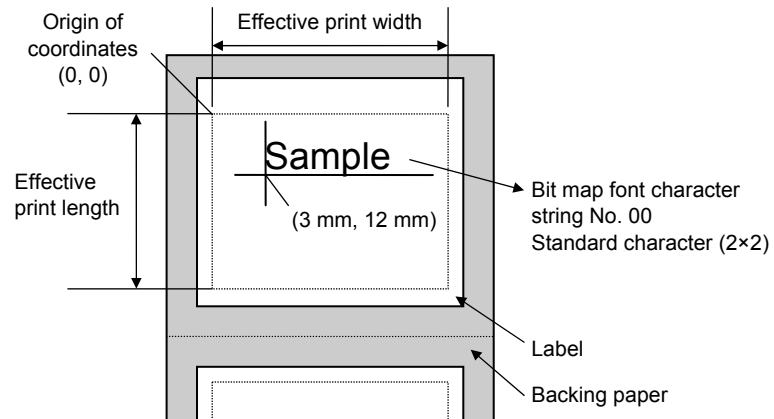
• Center



• Right



Example



```
[ESC] XO; 01, 1 [LF] [NUL]
[ESC] D0430, 0480, 0400 [LF] [NUL]
[ESC] PC00; 0030, 0120, 4, 4, A, 00, B, 00, 1, 0, P0 [LF] [NUL]
[ESC] XP [LF] [NUL]
```

Data Print Command (not for IrDA:TEC Protocol)

```
[ESC] X [01H] [01H] [01H] SAMPLE [LF]
```


6.5.3 OUTLINE FONT FIELD COMMAND

[ESC] PV

Function	Sets the format to indicate the position on the label, at which the outline font is to be printed and how it is to be printed.
Format	[ESC] PVaa; bbbb, cccc, dddd, eeee, f, (.ghh), ii, j, kk, l, m, (.Pn) (,Qoooo,Rppp) [LF] [NUL]
Term	<p>aa: Character string No. 00 to 99 (The same No. must not be used in one form for the bit map font field, the outline font field, and the barcode/two-dimensional code field.)</p> <p>bbbb: Print origin of X-coordinate of character string Fixed at 4 digits (in 0.1 mm units)</p> <p>cccc: Print origin of Y-coordinate of character string Fixed at 4 digits (in 0.1 mm units)</p> <p>dddd: Character width 0020 to 0300 (in units of 0.1 mm)</p> <p>eeee: Character height 0020 to 0300 (in units of 0.1 mm)</p> <p>f: Type of font A: TEC Font 1 (Helvetica [Bold]) B: TEC Font 1 (Helvetica [Bold], Proportional) F: Price Font 2 K: Reserved C, D, E: Reserved (If specified, it is processed as "B.")</p> <p>ghh: Character-to-character space width (Omissible. If omitted, the character-to-character space width depends on the designated font.) g: +, - hh: 00 to 99 (dot)</p> <p>ii: Rotational angles of a character and character string 00: 0° (chara.) 0° (chara.-string) 01: 90° (chara.) 90° (chara.-string) 02: 180° (chara.) 180° (chara.-string) 03: 270° (chara.) 270° (chara.-string)</p> <p>j: Selects black character or reverse character B (Fixed value): Black character</p> <p>kk: Data length 00 to 99 NOTE: When "00" is designated, the length is equivalent to the data sent by the Data Print Command. JIS8 code: Data which is delimited by [LF] Packed BCD code: Data which is delimited by "F"</p> <p>l: Data code 1: JIS8 code 2: Packed BCD code (only for IrDA: TEC Protocol)</p> <p>m: Fixed data No. 0 (Fixed value)</p>

Pn: Print position (Omissible. If omitted, the print position is left-aligned.)
P0: Left
P1: Center
P2: Right

Qoooo: Character string width (Omissible. If omitted, the width is set to 0000.)
0000 to 1600 (in units of 0.1mm)

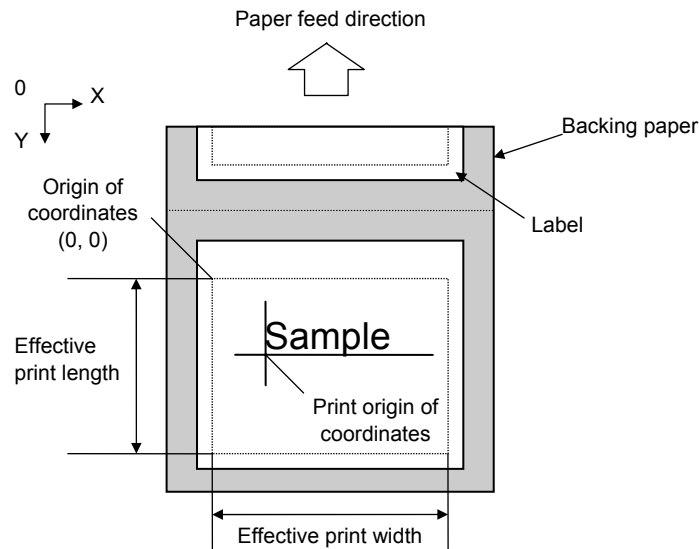
Rpp: No. of character string digits (Omissible. If omitted, the number of digits is 00.)
00 to 99

Explanation

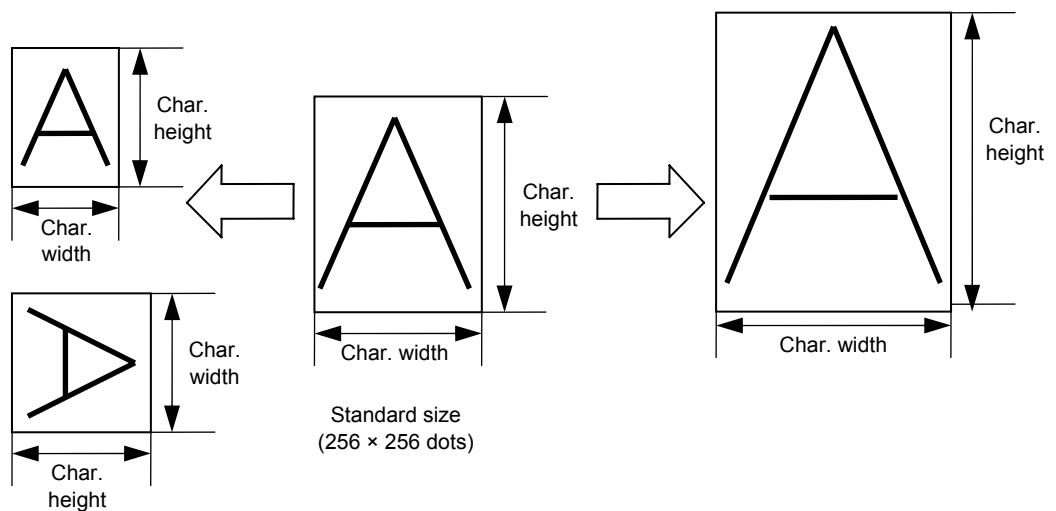
(1) Character string No.

The data in the Data Print Command (X) is selected and linked in the order of this character string No. (The format of character string Nos. 00 and 01 is linked to the first and second data, respectively. In the same order, the format is linked to the data.) Therefore, the Nos. of the bit map font character string, the outline font character string, and the barcode/two-dimensional code, should be consecutive, starting from 00 (in ascending order). The same No. must not be used in one form for the bit map font character string field, the outline font character string field, and the barcode/two-dimensional code field.

(2) Print origin of coordinates

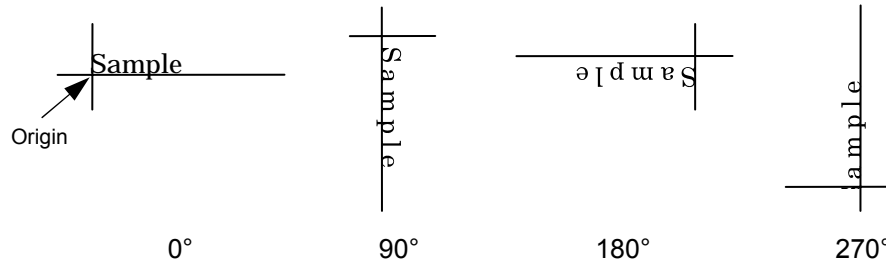


(3) Character width and character height



NOTE: When a large character or many characters is/are printed, the print density may become lower. (When the print ratio per line is high, the print density may become lower.)

(4) Rotational angles of a character and character string

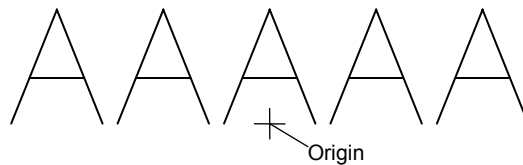


(5) Print position

• Left (Default)



• Center



• Right



(6) Character string width and number of character string digits

Usually, one character size is determined by the character width and height. When the character string width and number of character string digits are specified, the character width will be automatically changed when printed. If the following conditions are satisfied, however, these parameter settings become ineffective, and the characters are printed in normal size.

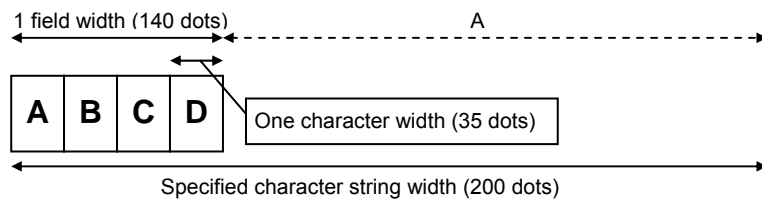
• Conditions of ineffectiveness

- (1) These parameters are omitted.
- (2) The character string width is set to "0."
- (3) No. of print data \geq No. of specified character string digits

Conditions that these parameters become effective are described on the following pages.

- ① When one field width < specified character string width
(Space between characters = 0, Specified character string digits = 6)

■ Print image when the parameter setting is omitted.

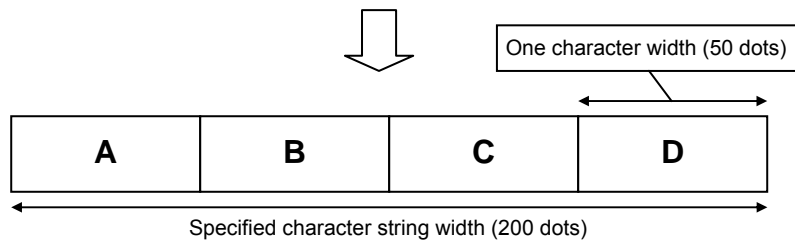


$A = \text{Specified character string width} - 1 \text{ field width} = 200 \text{ dots} - 140 \text{ dots} = 60 \text{ dots}$

$B = A / \text{Data length} = 60 \text{ dots} / 4 = 15 \text{ dots}$

$\text{One character width} = 1 \text{ character width} + B = 35 \text{ dots} + 15 \text{ dots} = 50 \text{ dots}$

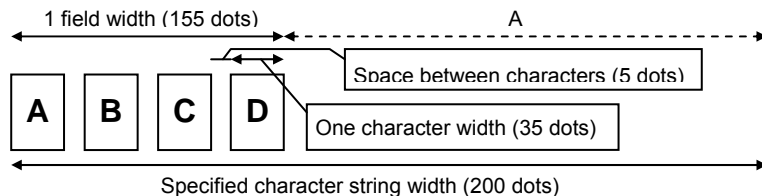
■ Print image when the parameter setting is specified.



* When the number of print data is 6 digits or more, the condition of ineffectiveness (3) is satisfied. In this case, the characters are printed in normal width.

- ② When one field width < specified character string width
(Space between characters ≥ 0 , Specified character string digits = 5)

■ Print image when the parameter setting is omitted.

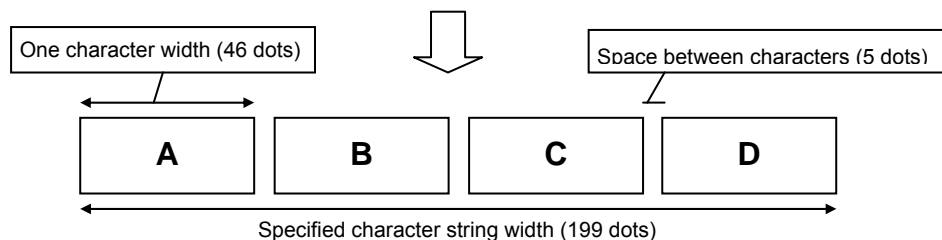


$A = \text{Specified character string width} - 1 \text{ field width} = 200 \text{ dots} - 155 \text{ dots} = 45 \text{ dots}$

$B = A / \text{Data length} = 45 \text{ dots} / 4 \approx 11 \text{ dots}$

$\text{One character width} = 1 \text{ character width} + B = 35 \text{ dots} + 11 \text{ dots} = 46 \text{ dots}$

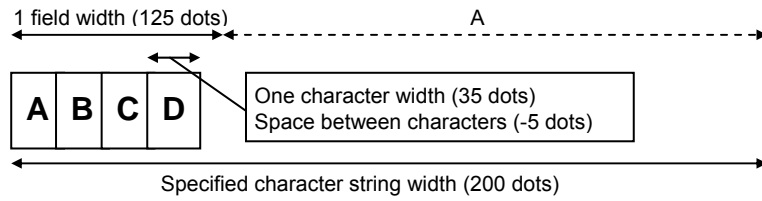
■ Print image when the parameter setting is specified.



* When the number of print data is 5 digits or more, the condition of ineffectiveness (3) is satisfied. In this case, the characters are printed in normal width.

- ③ When one field width < specified character string width
(Space between characters < 0, Specified character string digits = 8)

■ Print image when the parameter setting is omitted.



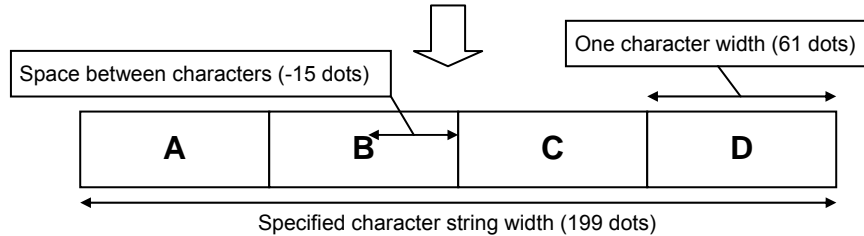
Corrected space between characters=((Specified character string digits – data length(x0.5+1) x Space between characters=-15 dots

A=Specified character string width – (1 character width x Data length+(corrected space between characters x (Data length – 1))=200 dots – 95 dots = 105 dots

B=A/Data length=105 dots/4≈26 dots (rounded down)

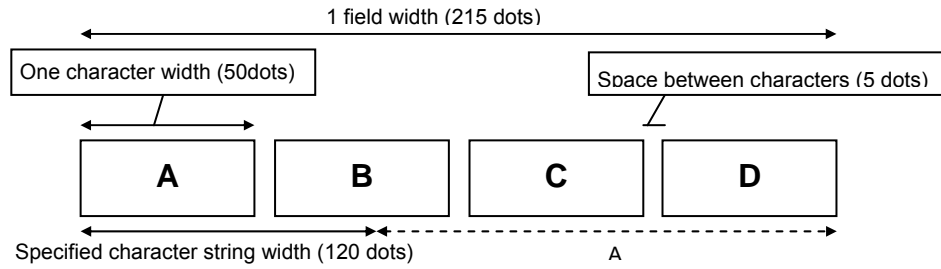
One character width=1 character width+B=35 dots+26 dots=61 dots

■ Print image when the parameter setting is specified.



* When the number of print data is 8 digits or more, the condition of ineffectiveness (3) is satisfied. In this case, the characters are printed in normal width.

- ④ When one field width \geq specified character string width
(Space between characters ≥ 0 , Specified character string digits = 6)
■ Print image when the parameter setting is omitted.

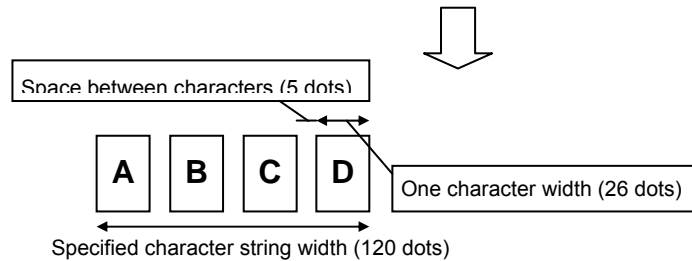


$A = 1 \text{ field width} - \text{Specified character string width} = 215 \text{ dots} - 120 \text{ dots} = 95 \text{ dots}$

$B = A / \text{Data length} = 95 \text{ dots} / 4 \approx 24 \text{ dots (rounded up)}$

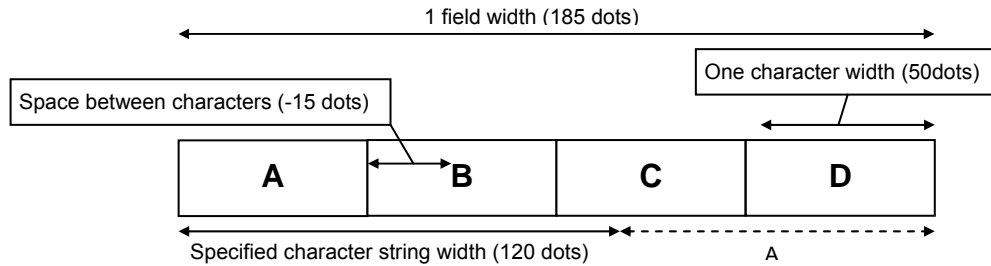
One character width = 1 character width - $B = 50 \text{ dots} - 24 \text{ dots} = 26 \text{ dots}$

- Print image when the parameter setting is specified.



* When the number of print data is 6 digits or more, the condition of ineffectiveness (3) is satisfied. In this case, the characters are printed in normal width.

- ⑤ When one field width \geq specified character string width
(Space between characters < 0 , Specified character string digits = 5)
■ Print image when the parameter setting is omitted.

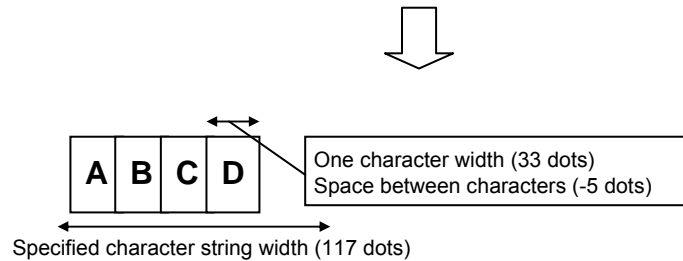


$A = 1 \text{ field width} - \text{Specified character string width} = 185 \text{ dots} - 120 \text{ dots} = 65 \text{ dots}$

$B = A / \text{Data length} = 65 \text{ dots} / 4 = 17 \text{ dots (rounded up)}$

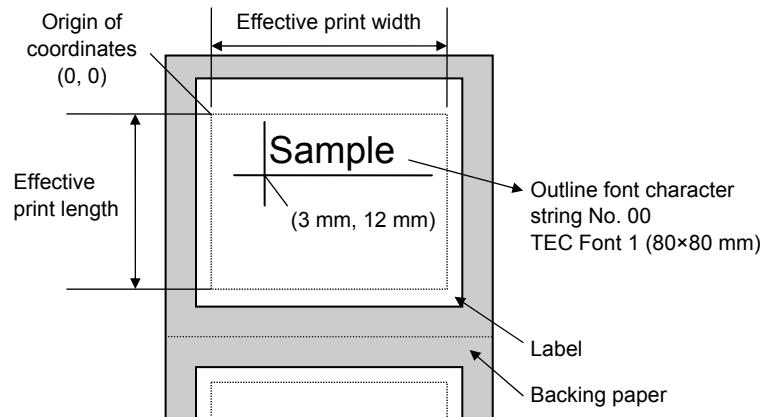
$\text{One character width} = 1 \text{ character width} - B = 50 \text{ dots} - 17 \text{ dots} = 33 \text{ dots}$

- Print image when the parameter setting is specified.



* When the number of print data is 5 digits or more, the condition of ineffectiveness (3) is satisfied. In this case, the characters are printed in normal width.

Example



[ESC] XO; 01, 1 [LF] [NUL]

[ESC] D0430, 0480, 0400 [LF] [NUL]

[ESC] PV00; 0030, 0120, 0050, 0050, A, 00, B, 00, 1, 0, P0 [LF] [NUL]

[ESC] XP [LF] [NUL]

Data print command (not for IrDA:TEC Protocol)

[ESC] X [01H] [01H] [01H] SAMPLE [LF]

Commands to be registered

[ESC] XO; 05, 1 [LF] [NUL]
[ESC] D0780, 0480, 0750 [LF] [NUL]
[ESC] AY; +00, 1, 0 [LF][NUL]
[ESC] AX; +000 [LF] [NUL]
[ESC] PV01; 0325, 0350, 0080, 0100, F,-08, 03, B, 00, 1, 0, P2, Q0300, R07 [LF] [NUL]
[ESC] PV02; 0165, 0000, 0030, 0060, F, 02, B, 00, 1, 0 [LF] [NUL]
[ESC] XB03; 0270, 0290, 5, 3, 02, 2, 0100, 000, 0, 00, 1, 0 [LF] [NUL]
[ESC] XB04; 0270, 0170, 5, 3, 02, 2, 0100, 000, 0, 00, 1, 0 [LF] [NUL]
[ESC] XP [LF] [NUL]

Issue command (not for IrDA:TEC Protocol)

i)

[ESC] X [05H] [01H] [01H]
\$12.00 [LF]
\$12.00 [LF]
214901881186 [LF]
291890001200 [LF]



ii)

[ESC] X [05H] [01H] [01H]
\$80 [LF]
\$80 [LF]
214901881186 [LF]
291890001200 [LF]



6.5.4 BARCODE FORMAT COMMAND (MSI, ITF, CODE39, NW7) [ESC] XB

Function	Sets the format to indicate the position on the label, at which the barcode is to be printed and how it is to be printed.
Format	[ESC] XBaa; bbbb, cccc, d, e, ff, gg, hh, ii, jj, k, llll, m, nn, o, p [LF] [NUL]
Term	<p>aa: Barcode No. 00 to 99 (The same No. must not be used in one form for the bit map font field, the outline font field, and the barcode field.)</p> <p>bbbb: Print origin of X-coordinate of barcode Fixed at 4 digits (in 0.1 mm units)</p> <p>cccc: Print origin of Y-coordinate of barcode Fixed at 4 digits (in 0.1 mm units)</p> <p>d: Type of barcode 1: MSI 2: Interleaved 2 of 5 (ITF) 3: CODE39 (Standard) 4: NW7</p> <p>e: Type of check digit 1 (Fixed value): Without attaching check digit</p> <p>ff: Narrow bar width 02 to 03: 2 to 3 dots</p> <p>gg: Narrow space width 02 to 03: 2 to 3 dots</p> <p>hh: Wide bar width 05 to 09: 5 to 9 dots</p> <p>ii: Wide space width 05 to 09: 5 to 9 dots</p> <p>jj: Character-to-character space width 02 to 03: 2 to 3 dots * Only for MSI and ITF, "00" can be set. If any value is set, the printer automatically changes it to "00."</p> <p>k: Rotational angle of barcode 0: 0° 1: 90° 2: 180° 3: 270°</p> <p>llll: Height of barcode 0001 to 0350 (in 0.1 mm units)</p> <p>m: Selection to print numerals under bars 0: Non-print 1: Print</p>

nn:	Data length (including start/stop codes) 00 to 32	NOTE: When "00" is designated, the length is equivalent to the data sent by the Data Print Command. JIS8 code: Data which is delimited by [LF] Packed BCD code: Data which is delimited by "F"
o:	Data code 1: JIS8 code 2: Packed BCD code (only for IrDA: TEC Protocol)	
p:	Fixed data No. 0 (Fixed value)	

6.5.5 BARCODE FORMAT COMMAND (JAN8/EAN8, JAN13/EAN13) [ESC] XB

Function	Sets the format to indicate the position on the label, at which the barcode is to be printed and how it is to be printed.
Format	[ESC] XBaa; bbbb, cccc, d, e, ff, g, hhhh, iii, j, kk, l, m [LF] [NUL]
Term	<p>aa: Barcode No. 00 to 99 (The same No. must not be used in one form for the bit map font field, the outline font field, and the barcode field.)</p> <p>bbbb: Print origin of X-coordinate of barcode Fixed at 4 digits (in 0.1 mm units)</p> <p>cccc: Print origin of Y-coordinate of barcode Fixed at 4 digits (in 0.1 mm units)</p> <p>d: Type of barcode 0: JAN/8EAN8 5: JAN13/EAN13</p> <p>e: Type of check digit 3 (Fixed value): Check digit auto attachment</p> <p>ff: 1-module width 02 to 03 (in units of dots)</p> <p>g: Rotational angle of barcode 0: 0° 1: 90° 2: 180° 3: 270°</p> <p>hhhh: Height of barcode 0001 to 0350 (in 0.1 mm units)</p> <p>iii: Length of guard bar 000 to 050 (in 0.1 mm units)</p> <p>j: Selection to print numerals under bars 0: Non-print 1: Print</p> <p>kk: Data length 07: JAN8/EAN8 12: JAN13/EAN13 00: NOTE: When "00" is designated, the length is equivalent to the data sent by the Data Print Command. JIS8 code: Data which is delimited by [LF] Packed BCD code: Data which is delimited by "F"</p> <p>l: Data code 1: JIS8 code 2: Packed BCD code (only for IrDA: TEC Protocol)</p> <p>m: Fixed data No. 0 (Fixed value)</p>

6.5.6 BARCODE FORMAT COMMAND (EAN128, UCC/EAN128) [ESC] XB

Function	Sets the format to indicate the position on the label, at which the barcode is to be printed and how it is to be printed.
Format	[ESC] XBaa; bbbb, cccc, d, e, ff, g, hhhh, iii, j, kk, l, m [LF] [NUL]
Term	<p>aa: Barcode No. 00 to 99 (The same No. must not be used in one form for the bit map font field, the outline font field, and the barcode field.)</p> <p>bbbb: Print origin of X-coordinate of barcode Fixed at 4 digits (in 0.1 mm units)</p> <p>cccc: Print origin of Y-coordinate of barcode Fixed at 4 digits (in 0.1 mm units)</p> <p>d: Type of barcode N: EAN128 n: UCC/EAN128</p> <p>e: Type of check digit 3 (Fixed value): Check digit auto attachment</p> <p>ff: 1-module width 02 to 03 (in units of dots)</p> <p>g: Rotational angle of barcode 0: 0° 1: 90° 2: 180° 3: 270°</p> <p>hhhh: Height of barcode 0001 to 0350 (in 0.1 mm units)</p> <p>iii: Length of guard bar 000 (Fixed value)</p> <p>j: Selection to print numerals under bars 0: Non-print 1: Print</p> <p>kk: Data length 00 to 32; only even numbers (for EAN128) 00 or 19 (for UCC/EAN128)</p> <p style="text-align: center;">NOTE: When "00" is designated, the length is equivalent to the data sent by the Data Print Command. JIS8 code: Data which is delimited by [LF] Packed BCD code: Data which is delimited by "F"</p> <p>l: Data code 1: JIS8 code 2: Packed BCD code (only for IrDA: TEC Protocol)</p> <p>m: Fixed data No. 0 (Fixed value)</p>

6.5.7 BARCODE FORMAT COMMAND (CODE128)

[ESC] XB

Function	Sets the format to indicate the position on the label, at which the barcode is to be printed and how it is to be printed.
Format	[ESC] XBaa; bbbb, cccc, d, e, ff, g, hhhh, iii, j, kkk, l, m [LF] [NUL]
Term	<p>aa: Barcode No. 00 to 99 (The same No. must not be used in one form for the bit map font field, the outline font field, and the barcode field.)</p> <p>bbbb: Print origin of X-coordinate of barcode Fixed at 4 digits (in 0.1 mm units)</p> <p>cccc: Print origin of Y-coordinate of barcode Fixed at 4 digits (in 0.1 mm units)</p> <p>d: Type of barcode 9: CODE128</p> <p>e: Type of check digit 3 (Fixed value): Check digit auto attachment</p> <p>ff: 1-module width 02 to 03 (in units of dots)</p> <p>g: Rotational angle of barcode 0: 0° 1: 90° 2: 180° 3: 270°</p> <p>hhhh: Height of barcode 0001 to 0350 (in 0.1 mm units)</p> <p>iii: Length of guard bar 000 (Fixed value)</p> <p>j: Selection to print numerals under bars 0: Non-print 1: Print</p> <p>kkk: Data length 00 to 100 (Both odd and even numbers)</p> <p>NOTES: 1. A two-digit value (00 to 99) is also available. 2. When "00" or "000" is designated, the length is equivalent to the data sent by the Data Print Command.</p> <p>JIS8 code: Data which is delimited by [LF] Packed BCD code: Data which is delimited by "F"</p> <p>l: Data code 1: JIS8 code 2: Packed BCD code (only for IrDA: TEC Protocol)</p> <p>m: Fixed data No. 0 (Fixed value)</p>

Examples of using commands in EAN128, UCC/EAN128 and CODE128

⊙ Form storage

[ESC] ID; 01H23H [LF] [NUL] : ID setting
 [ESC] XO; 01, 1 [LF] [NUL] : Declaration of the start of form storage
 [ESC] D0360, 0480, 0330 [LF] [NUL] : Label size setting
 [ESC] XB00; 0000, 0080, N, 3, 2, 0, 0090, 000, 0, 24, 2, 0 [LF] [NUL] : Format of bar code No. 00

{ EAN128: 00 ~ 32
 { UCC/EAN128: 00 or 19
 { CODE128: 00 ~ 100

{ 9: CODE128
 { N: EAN128
 { n: UCC/EAN128

[ESC] XP [LF] [NUL] : Declaration of the termination of form storage

⊙ Drawing and issue (for IrDA: TEC Protocol)

[STX] 01H 23H 10H X 01H 00H 03H 97H 15H 01H 83H 06H 32H 13H 11H 50H 00H 50H 01H [CRC] [CRC]

Barcode data (971501830632131150005001)
 (*1) Check digit of Modulus 10 is not attached by the printer. Therefore, the check digit should be calculated in advance, then be sent as data.
 No. of labels to be issued: 3
 Transmissive sensor designated, No status response made
 Form No.: 1
 Packet length (10H = 16 bytes)
 Printer ID (0123H)

(*1) How to calculate the Modulus 10 check digit (When barcode data is 971501830632131150005001.)

9	7	1	5	0	1	8	3	0	6	3	2	1	3	1	1	5	0	0	0	5	0	0	1
-	Δ	-	Δ	-	Δ	-	Δ	-	Δ	-	Δ	-	Δ	-	Δ	-	Δ	-	Δ	-	Δ	-	Δ

Sum up the numbers in the column of '-': 33

33 x 3 (fixed number) = 99

Sum up the numbers in the column of 'Δ': 29

29 x 1 (fixed number) = 29

Add the above two numbers: 99 + 29 = 128

Subtract the lowest digit of 128 from 10 (fixed number): 10 - 8 = 2

The obtained number '2' is attached to the end of the barcode data.

9	7	1	5	0	1	8	3	0	6	3	2	1	3	1	1	5	0	0	0	5	0	0	1	2
Barcode data													Check digit of Modulus 10											

6.5.8 BARCODE FORMAT COMMAND (CUSTOMER BARCODE) [ESC] XB

Function	Sets the format to indicate the position on the label, at which the barcode is to be printed and how it is to be printed.
Format	[ESC] XBaa; bbbb, cccc, d, e, ff, g, hhhh, iii, j, kk, l, m [LF] [NUL]
Term	<p>aa: Barcode No. 00 to 99 (The same No. must not be used in one form for the bit map font field, the outline font field, and the barcode field.)</p> <p>bbbb: Print origin of X-coordinate of barcode Fixed at 4 digits (in 0.1 mm units)</p> <p>cccc: Print origin of Y-coordinate of barcode Fixed at 4 digits (in 0.1 mm units)</p> <p>d: Type of barcode R: Customer barcode (Postal code for Japan) S: Highest priority customer barcode (Postal code for Japan)</p> <p>e: Type of check digit 3 (Fixed value): Check digit auto attachment</p> <p>ff: 1-module width 01 to 15 (in units of dots)</p> <p>g: Rotational angle of barcode 0: 0° 1: 90° 2: 180° 3: 270°</p> <p>hhhh: Height of long bars 0001 to 0350 (in 0.1 mm units)</p> <p>iii: Reserved area 000 (Fixed value)</p> <p>j: Reserved area 0 (Fixed value)</p> <p>kk: Data length 00 to 20: Customer barcode 00 to 19: Highest priority customer barcode NOTE: When "00" is designated, the length is equivalent to the data sent by the Data Print Command Data which is delimited by [LF])</p> <p>l: Data code 1 (Fixed value): JIS8 code</p> <p>m: Fixed data No. 0 (Fixed value)</p>

6.5.9 two-dimensional CODE FORMAT COMMAND (PDF417) [ESC] XB

Function	Sets the format to indicate the position on the label, at which the two-dimensional code is to be printed and how it is to be printed.
Format	[ESC] XBaa; bbbb, cccc, d, ee, ff, gg, h, iii, jj, k, l [LF] [NUL]
Term	<p>aa: Two-dimensional code No. 00 to 99 (The same No. must not be used in one form for the bit map font field, the outline font field, and the two-dimensional code field.)</p> <p>bbbb: Print origin of X-coordinate of two-dimensional code Fixed at 4 digits (in 0.1 mm units)</p> <p>cccc: Print origin of Y-coordinate of two-dimensional code Fixed at 4 digits (in 0.1 mm units)</p> <p>d: Type of two-dimensional code P: PDF417</p> <p>ee: Security level 00: Level 0 01: Level 1 02: Level 2 03: Level 3 04: Level 4 05: Level 5 06: Level 6 07: Level 7 08: Level 8</p> <p>ff: 1-module width 02 to 03 (in units of dots)</p> <p>gg: No. of columns (strings) 01 to 30</p> <p>h: Rotational angle of two-dimensional code 0: 0° 1: 90° 2: 180° 3: 270°</p> <p>iii: Bar height 0001 to 0100 (in 0.1 mm units)</p>

jj: Data length
00 to 99

- NOTES:**
1. A two-digit value (00 to 99) is also available.
 2. When "00" is designated, the length is equivalent to the data sent by the Data Print Command.
(JIS8 code: Data which is delimited by [LF])
Data having a max. of 2000 digits is acceptable.
 3. In IrDA: TEC Protocol, when the data length value is set to 250 or more, it can be sent by using the multiple packet format for the Data Print Command in several packets.

k: Data code
1 (Fixed value): JIS8 code

l: Fixed data No.
0 (Fixed value)

Examples of using commands in PDF417

Form storage

[ESC] ID; 01H23H [LF] [NUL]	: ID setting
[ESC] XO; 01, 1 [LF] [NUL]	: Declaration of the start of form storage
[ESC] D0360, 0480, 0330 [LF] [NUL]	: Label size setting
[ESC] XB00; 0000, 0000, P, 00, 02, 06, 0, 0010, 00, 1, 0 [LF] [NUL]	: Format of two-dimensional code No. 00
[ESC] XP [LF] [NUL]	: Declaration of the termination of form storage

Drawing and issue (for IrDA: TEC Protocol)

Command packet in the case that 300-byte issue data is designated in PDF417
(Since the data length is 250 bytes or more, the data is sent by using the command packet in the RECEIPT mode.)

[Example]

[STX] 01H 23H deH Y 80H X 01H 00H 03H ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789

No. of labels to be issued: 3

Transmissive sensor designated,
No status response made

Form No.: 1

Flag (Middle block)

Mode (Fixed at "Y": Indicates the RECEIPT mode.)

Packet length (deH = 222 bytes)

Printer ID (0123H)

ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789 [CRC] [CRC]

[STX] 01H 23H 57H Y 01H ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789
ABCDEFGHIJKL [CRC] [CRC]

Flag (Middle block)

Packet length (57H = 87 bytes)

6.5.10 two-dimensional CODE FORMAT COMMAND (QR CODE) [ESC] XB

Function	Sets the format to indicate the position on the label, at which the two-dimensional code is to be printed and how it is to be printed.
Format	[ESC] XBaa; bbbb, cccc, d, e, ff, g, h (, Mi) (, Kj) (, Jkklmm), nn, o, p [LF] [NUL]
Term	<p>aa: Two-dimensional code No. 00 to 99 (The same No. must not be used in one form for the bit map font field, the outline font field, and the two-dimensional code field.)</p> <p>bbbb: Print origin of X-coordinate of the two-dimensional code Fixed at 4 digits (in units of 0.1 mm)</p> <p>cccc: Print origin of Y-coordinate of the two-dimensional code Fixed at 4 digits (in units of 0.1 mm)</p> <p>d: Type of two-dimensional code T: QR code</p> <p>e: Designation of error correction level L: High density level M: Standard level Q: Reliability level H: High reliability level</p> <p>ff: 1-cell width 01 to 09 (in units of dots)</p> <p>g: Selection of mode M: Manual mode A: Automatic mode</p> <p>h: Rotational angle of two-dimensional code 0: 0° 1: 90° 2: 180° 3: 270°</p> <p>Mi: Selection of model (Omissible. If this parameter is omitted, Model 1 is automatically selected.) i = 1: Model 1 2: Model 2</p> <p>Kj: Mask number (Omissible. If this parameter is omitted, the number is automatically set.) i = 0 to 7: Mask number 0 to 7 8: No mask</p> <p>Jkklmm: Connection setting (Omissible. No connection if this parameter is omitted.) kk = 01 to 16: Value indicating which divided code is connected. ll = 01 to 16: Number of divided codes mm = 00 to FF: A value for all data to be printed, to which XOR is applied in units of bytes (Not divided)</p>

nn: Data length
00 to 99

- NOTES:**
1. A two-digit value (00 to 99) is also available.
 2. When "00" is designated, the length is equivalent to the data sent by the Data Print Command. It corresponds for up to 2000 digits.

o: Data code
1 (Fixed value): JIS8 code

p: Data code
0 (Fixed value)

6.5.11 TWO-DIMENSIONAL CODE FORMAT COMMAND (DATA MATRIX) [ESC] XB

Function	Sets the format to indicate the position on the label, at which the two-dimensional code is to be printed and how it is to be printed.
Format	[ESC] XBaa; bbbb, cccc, d, ee, ff, gg, h (, Ciiijj) (, Jkkllmmnnn), ooo, p, q [LF] [NUL]
Term	<p>aa: Two-dimensional code No. 00 to 99 (The same No. must not be used in one form for the bit map font field, the outline font field, and the two-dimensional code field.)</p> <p>bbbb: Print origin of X-coordinate of the two-dimensional code Fixed at 4 digits (in units of 0.1 mm)</p> <p>cccc: Print origin of Y-coordinate of the two-dimensional code Fixed at 4 digits (in units of 0.1 mm)</p> <p>d: Type of two-dimensional code Q: Data Matrix</p> <p>ee: ECC type 00: ECC000 05: ECC050 08: ECC080 10: ECC100 14: ECC140 20: ECC200</p> <p>ff: 1-cell width 01 to 09 (in units of dots)</p> <p>gg: Format ID 01: Format ID 1 02: Format ID 2 03: Format ID 3 04: Format ID 4 05: Format ID 5 06: Format ID 6</p> <p>h: Rotational angle of two-dimensional code 0: 0° 1: 90° 2: 180° 3: 270°</p>

Ciiiijj: No. of cells (Omissible. If this parameter is omitted, it is automatically set.)
 iii: No. of cells in the X direction 000 to 144
 jjj: No. of cells in the Y direction 000 to 144

NOTE: Cell setting varies according to the ECC type.

	ECC000 to ECC140	ECC200
No. of cells to be designated	Odd numbers only	Even numbers only
Min./Max. No. of cells	9 × 9 to 49 × 49	10 × 10 to 144 × 144
Rectangular code	None	18 × 8 32 × 8 26 × 12 36 × 12 36 × 16 48 × 16

- When this parameter is omitted, the number of cells is automatically set. Also, when data except for the above values is designated for Nos. of cells in the X and Y directions, the number of cells is automatically set.

Jkkllmmnnn: Connection setting
 (Omissible: No connection if this parameter is omitted)

kk: Code number 01 to 16
 ll: No. of divided codes 01 to 16
 mmm: ID number 001 to 254
 nnn: ID number 2 001 to 254

NOTE: It is effective only when ECC200 is selected.

ooo: Data length
 000 to 100

- NOTES:**
1. A two-digit value (00 to 99) is also available.
 2. When "00" is designated, the length is equivalent to the data sent by the Data Print Command (data which is delimited by [LF].)
 3. When "00" is designated, the length is equivalent to the data sent by the Data Print Command. It corresponds for up to 2000 digits.

p: Data code
 1 (Fixed value): JIS8 code

q: Reserved area
 0: Fixed value

6.5.12 TWO-DIMENSIONAL CODE FORMAT COMMAND (MIRCOPDF417) [ESC] XB

Function	Sets the format to indicate the position on the label, at which the two-dimensional code is to be printed and how it is to be printed.
Format	[ESC] XBaa; bbbb, cccc, d, ee, ff, gg, h, iii, jjj, k, l [LF] [NUL]
Term	<p>aa: Two-dimensional code No. 00 to 99 (The same No. must not be used in one form for the bit map font field, the outline font field, and the two-dimensional code field.)</p> <p>bbbb: Print origin of X-coordinate of the two-dimensional code Fixed at 4 digits (in units of 0.1 mm)</p> <p>cccc: Print origin of Y-coordinate of the two-dimensional code Fixed at 4 digits (in units of 0.1 mm)</p> <p>d: Type of two-dimensional code X: MicroPDF417</p> <p>ee: Security level 00: Fixed value</p> <p>ff: 1-module width 01 to 09 (in units of dots)</p> <p>gg: No. of columns/rows 01 to 38</p> <p>h: Rotational angle of two-dimensional code 0: 0° 1: 90° 2: 180° 3: 270°</p> <p>iii: Bar height 0001 to 0100 (in units of 0.1 mm)</p> <p>jjj: Data length 000 to 100</p> <p>NOTES:</p> <ol style="list-style-type: none"> 1. A two-digit value (00 to 99) is also available. 2. When "00" is designated, the length is equivalent to the data sent by the Data Print Command (data which is delimited by [LF].) 3. When "00" is designated, the length is equivalent to the data sent by the Data Print Command. It corresponds for up to 366 digits. <p>k: Data code 1 (Fixed value): JIS8 code</p> <p>l: Reserved area 0 (Fixed value)</p>

6.5.13 TWO-DIMENSIONAL CODE FORMAT COMMAND (MAXICODE) [ESC] XB

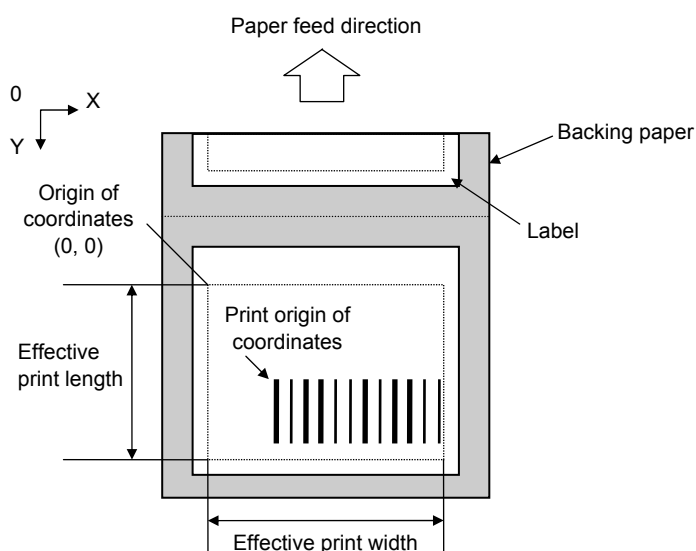
Function	Sets the format to indicate the position on the label, at which the two-dimensional code is to be printed and how it is to be printed.
Format	[ESC] XBaa; bbbb, cccc, d, e (, Jffgg) (, Zh), iii, j, k [LF] [NUL]
Term	<p>aa: Two-dimensional code No. 00 to 99 (The same No. must not be used in one form for the bit map font field, the outline font field, and the two-dimensional code field.)</p> <p>bbbb: Print origin of X-coordinate of the two-dimensional code Fixed at 4 digits (in units of 0.1 mm)</p> <p>cccc: Print origin of Y-coordinate of the two-dimensional code Fixed at 4 digits (in units of 0.1 mm)</p> <p>d: Type of two-dimensional code Z: Maxicode</p> <p>e: Mode selection 2: Mode 2 3: Mode 3 4: Mode 4 6: Mode 6</p> <p>Jffgg: Connection setting (Omissible. If omitted, no connection is made.) ff: Code number 01 to 08 gg: No. of divided codes 01 to 08</p> <p>Zh: Attachment of Zipper block and Contrast block (Omissible. If omitted, the Zipper block and Contrast block are not attached.) h: 0: No attachment of Zipper block and Contrast block 1: Attachment of Zipper block and Contrast block 2: Attachment of Zipper block 3: Attachment of Contrast block</p> <p>iii: Data length 000 to 100 NOTES: 1. A two-digit value (00 to 99) is also available. 2. When "00" is designated, the length is equivalent to the data sent by the Data Print Command (data which is delimited by [LF].)</p> <p>j: Data code 1 (Fixed value): JIS8 code</p> <p>k: Reserved area 0 (Fixed value)</p>

Explanation

(1) Two-dimensional code No.

The data in the Data Print Command (X) is selected and linked in the order of this barcode/two-dimensional code No. (The formats of barcode/two-dimensional code Nos. 00 and 01 are linked to the first and second data, respectively. In the same order, the format is linked to the data.) Therefore, the Nos. of the bit map font character string, the outline font character string, and the barcode/two-dimensional code, should be consecutive, starting from 00 (in ascending order). The same No. must not be used in one form for the bit map font character string field, the outline font character string field, and the barcode/two-dimensional code field.

(2) Print origin of coordinates

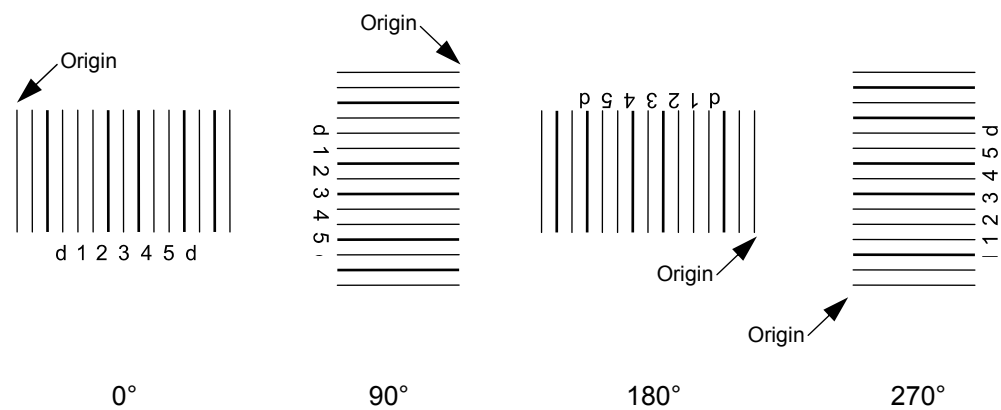


(3) Type of check digit

The check digit is automatically attached according to the type designation as shown below.

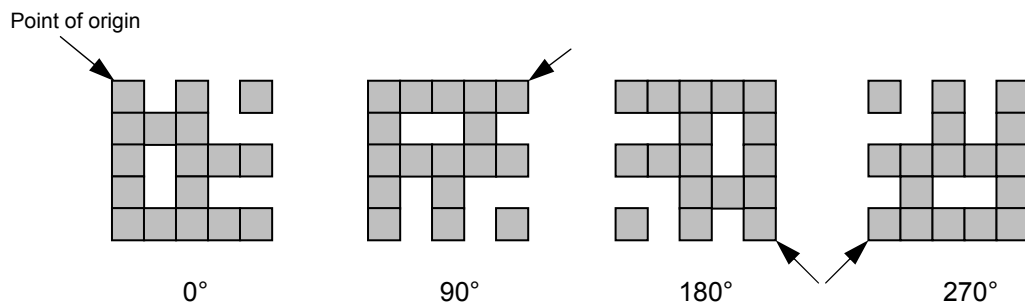
Barcode type C/D type	NW7, CODE39, Interleaved 2 of 5	JAN8/EAN8, JAN13/EAN13	EAN128, UCC/EAN128, CODE128
1	Without attaching check digit	No designation	No designation
3	No designation	Auto attachment of Modulus 10	Auto attachment of PSEUDO103

(4) Rotational angles of a barcode

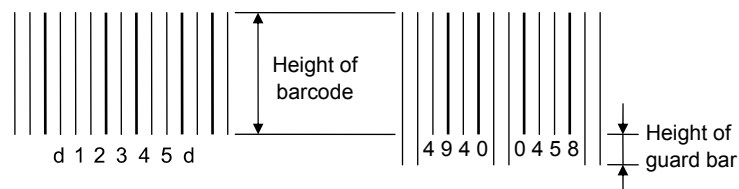


NOTE: If a barcode is rotated at 90° or 270°, the print density may become lower in relation to the bar height. A barcode with a height of 14 mm or less should be used. When a barcode with a height of over 14 mm is used, the print quality is not guaranteed.

Rotational angle of a two-dimensional code



(5) Barcode height



(6) Numerals under bars

Numerals are provided under bars depending on the parameter for numerals under bars. Standard fonts are used.

(7) Since the start/stop codes are not automatically attached when using NW7, they should be included in the data to be sent as required. Although no start/stop codes are attached to data, a barcode is drawn.

When using CODE39, the first and last characters of the data are checked. Unless the characters are not “*”, “*” is automatically attached. When the host sends data while attaching “*” as the start/stop codes, a barcode is drawn.

(8) When Interleaved 2 of 5 is selected and the number of data length digits is odd, 0 is automatically added to the beginning of the data, to change the number of data length digits to even.

(9) Explanation for QR code

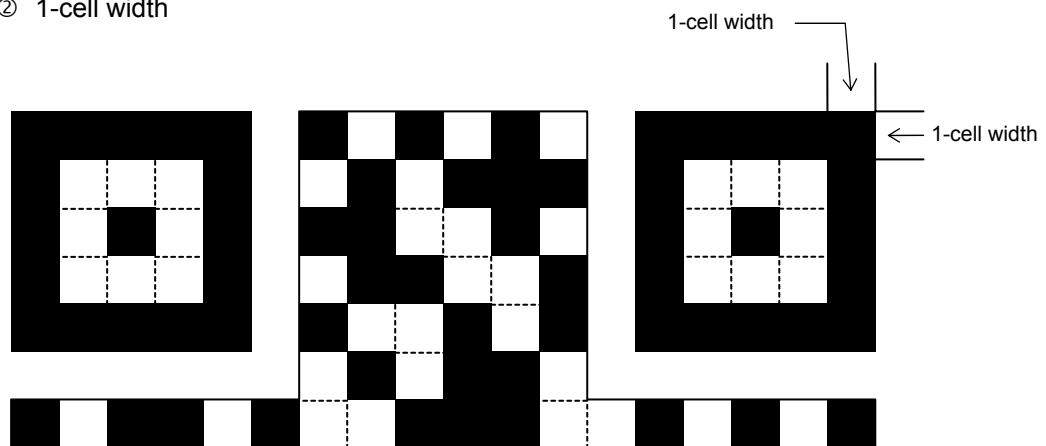
① Error correction level

The QR code contains functions to detect and correct an error. If one of the data characters is damaged, the information can be restored when this code is read.

There are 4 levels that can be designated. The level should be specified according to usage. The general correction ability is as follows.

Level	Error correction ability	Overhead by correcting an error
High density level	<div style="text-align: center;"> Low ↑↓ High </div>	7%
Standard level		15%
Reliability level		25%
High reliability level		30%

② 1-cell width



③ Selection of mode

All codes including alphanumerics, symbols, and Kanji can be used in one QR code. Manual mode or automatic mode can be selected to perform the operation. When automatic mode is selected, FFH cannot be used. However, this data can be used in manual mode.

④ Selection of model

Model 1: Original specification
Model 2: Extended specification which enhances the function of position correction and can contain a large amount of data.

⑤ Mask number

To be sure the QR code is read, it is preferable that white and black modules are arranged in this symbol in a balanced manner. This prevents the bit pattern "1011101", which is characteristically seen in the position detecting pattern, from appearing in the symbol as much as possible.

The mask number is 0 to 7. The pattern is determined by placing each masking pattern for the mask number upon the module pattern. When the mask number is set to 8, masking is not performed. When the parameter is omitted, the most appropriate mask number is automatically selected to perform masking.

⑥ Connection setting

For QR code, data can be divided into several codes. Even though there is only a narrow print space, the code can be entered in the space by dividing the code. The data can be divided into a max. of 16 codes. Parity data is obtained by XORing all input data in units of bytes before dividing. The input data is calculated based on shift JIS for Kanji, or on JIS8 for others. Examples are shown below:

“0123456789 日本 ” is divided into “0123”, “4567”, and “89 日本 .”

Code No. 1	No. of divided codes: 3	Parity data: 84	Data “0123”
Code No. 2	No. of divided codes: 3	Parity data: 84	Data “4567”
Code No. 3	No. of divided codes: 3	Parity data: 84	Data “89 日本 ”

* The parity data is the XORed value for “0123456789 日本 .”

30 31 32 33 34 35 36 37 38 39 93 FA 96 7B = 85

Note

When the QR code is printed, note the setting for the coordinates positions. If the specified coordinates are close to the maximum effective print length, the QR code may not be included within the maximum effective print length, depending on the 1-cell width or the data count. If the QR code is not included within the maximum effective print width, one part of the printed QR code may be missing. Be sure to check to see if the QR code is included within the effective print length.

(For example, when the maximum effective print length is 97 mm, if the Y-coordinate of the QR code is set to 90 mm, one part of the printed QR code may be missing, depending on the QR code size.

(10) Security level

The PDF417 contains a function to correct a code reading error using an error correcting code word and restore normal data. The security level should be designated according to usage to perform the error correction function.

Security level	Error Correction Ability	No. of error correction code words
Level 0	<div style="text-align: center;"> <div style="border: 1px solid black; padding: 2px; margin: 0 auto; width: 50px;">Low</div> <div style="display: inline-block; width: 100%; height: 100%; border-left: 1px solid black; border-right: 1px solid black; position: relative;"> <div style="position: absolute; top: 0; bottom: 0; left: 50%; transform: translateX(-50%);"></div> </div> <div style="border: 1px solid black; padding: 2px; margin: 0 auto; width: 50px;">High</div> </div>	0
Level 1		2
Level 2		6
Level 3		14
Level 4		30
Level 5		62
Level 6		126
Level 7		254
Level 8		510

(11) No. of columns (strings)

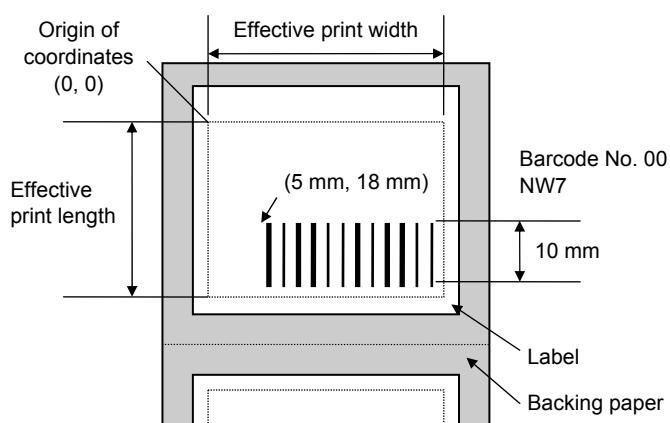
The number of lines is variable in the PDF417. The line length (No. of data strings) is also variable. Therefore, a symbol can be created in a form that can be easily printed, by changing the proportion of the height and width.

The number of columns (data strings) is variable between 1 and 30.

If a small value for the number of columns is set when the data is large and the security level is high, drawing may not be performed. This is because the number of lines exceeds 90 when the number of columns becomes small. If the number of lines exceeds 90, a label is issued without being printed.

(When the PDF417 is used, the number of lines of symbols is limited from 3 to 90.)

Example



[ESC] XB00 ; 0050, 0180, 4, 1, 02, 02, 05, 05, 02, 0, 0100, 0, 07, 1, 0 [LF] [NUL]

6.6 COMMANDS RELATED TO ISSUE AND FEED

6.6.1 DATA PRINT COMMAND

X

Function	Draws or prints the data.																				
Format	<p>[IrDA: TEC Protocol]</p> <p>Xabcddd --- eee --- nnn ---</p> <p>[IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, Wireless LAN]</p> <p>[ESC] Xabcddd --- eee --- nnn --- [NUL]</p>																				
Term	<p>a: Form No.</p> <p>01H to 14H (1 to 20)</p> <table><tr><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> <p>Form No. (Bit 0 to Bit 6) 01H to 14H (1 to 20)</p> <p>Reprint key enabled or disabled (Bit 7)</p> <p>Selection of the reprint key function (Firmware V1.1 or greater)</p> <p>0: Enabled</p> <p>1: Disabled</p> <p>When the form No. is 81H to 8AH (1 to 10) and if an error occurs during printing, the reprint key will be enabled until a label is successfully issued.</p> <p>When the form No. is 8BH to 94H (11 to 20), the reprint key will be disabled if an error occurs during printing.</p> <p>b: Sensor designation and ACK (IrDA: TEC Protocol) /status transmission (IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth) to notify the issue end</p> <p>00H: Transmissive sensor, No ACK/status transmission</p> <p>01H: Transmissive sensor, ACK/status transmission</p> <p>10H: Reflective sensor, No ACK/status transmission</p> <p>11H: Reflective sensor, ACK/status transmission</p> <p>20H: No sensor designation, No ACK/status transmission</p> <p>21H: No sensor designation, ACK/status transmission</p> <p>c: No. of labels to be issued</p> <p>01H to FFH (1 to 255)</p> <p>Even in the strip issue mode, the designated number of labels is printed.</p> <table><tr><td>ddd ---: Data of character/barcode/2-D code No. 00</td><td rowspan="3">} When a delimiter is required, it should be added to the end of data. (Refer to "Explanation.")</td></tr><tr><td>eee ---: Data of character/barcode/2-D code No. 01</td></tr><tr><td>nnn ---: Data of character/barcode/2-D code No. nn</td></tr></table>	7	6	5	4	3	2	1	0									ddd ---: Data of character/barcode/2-D code No. 00	} When a delimiter is required, it should be added to the end of data. (Refer to "Explanation.")	eee ---: Data of character/barcode/2-D code No. 01	nnn ---: Data of character/barcode/2-D code No. nn
7	6	5	4	3	2	1	0														
ddd ---: Data of character/barcode/2-D code No. 00	} When a delimiter is required, it should be added to the end of data. (Refer to "Explanation.")																				
eee ---: Data of character/barcode/2-D code No. 01																					
nnn ---: Data of character/barcode/2-D code No. nn																					

Explanation

- (1) When the printer receives this command, the following operations will be performed.
 - ① The printer clears the drawing buffer.
 - ② The printer links the form to the data.
 - ③ The printer draws the data in the drawing buffer.
 - ④ The printer draws the data if invocation of graphics is set in the form.
 - ⑤ The printer sets the fine adjustment values for print density/position stored in the form.
 - ⑥ The printer starts printing
- (2) Data is indicated in JIS8 code or packed BCD code. The type of data code is set by the Bit Map Font Field Command, the Outline Font Field Command, or the Barcode/Two-dimensional Code Format Command.
- (3) When the length and the data code set by the Bit Map Font Field Command, the Outline Font Field Command, or the Barcode/Two-dimensional Code Format Command is "00" and JIS8 code, respectively, the delimiter [LF] (0AH) should be entered at the end of the field data. When the packed BCD is used as the data code, the delimiter "F" (4 bits) should be entered at the end of the field data. When the data length stored in the form is anything other than "00", a delimiter such as [LF] or "F" should not be attached, since the length of the data is linked.
- (4) If the length of the data corresponding to one field (including a delimiter) is an odd number of digits when the packed BCD code is used, the last 4 bits of the final data in the field should be "0".
- (5) When there is data which does not match the type of barcode/two-dimensional code in the data string for the barcode/two-dimensional code, the barcode/two-dimensional code is not drawn. When the barcode/two-dimensional code digit is fixed, and the type of barcode/two-dimensional code does not match the number of the data digit, the barcode/two-dimensional code is not drawn.
- (6) If an error occurs while printing two or more labels, the printer discards the remaining received data and waits for a command, after the error is cleared by pressing the PAUSE key.
- (7) If the form which corresponds to the form No. designated is not stored, a syntax error occurs.
- (8) When the form No. is other than 01H to 14H, the Data Print Command is discarded.
- (9) When the number of labels to be printed is other than 01H to FFH, a syntax error occurs.
- (10) If the battery capacity becomes low while printing two or more labels, the printer may stop after issuing every label (for Max. 7 seconds).

- (11) Automatic status transmission (IrDA: IrCOMM, IrDA: IrOBEX, RS-232C, Bluetooth, Wireless LAN)

When the status response is designated, the printer automatically sends the printer status and the battery status after issuing labels.

Data to be sent (Fixed at 5 bytes)

STX	Printer ID		Printer status	Battery status
02H	xxH	xxH	xxH	xxH

Printer ID.....2-byte hex data (in order from High to Low)

Printer status.....Printer status is indicated in 1-byte data.

- 00H: Normal state (idling)
- 01H: Cover open state
- 02H: Command syntax error (including Ir packet error)
- 03H: Paper jam
- 04H: Label end
- 05H: Cover open error
- 06H: Broken thermal head dots error
- 07H: Thermal head excessive temperature
- 08H: Flash ROM write error
- 09H: Flash ROM erase error
- 0AH: Low battery (Print failure)
- 0BH: Operating
- 0DH: Normal end + Label end
- 0EH: Flash ROM storage area full state
- 0FH: Wait for strip
- 10H: Normal issue end
- 14H: Pause state
- 19H: Ambient temperature error
- 32H: Abnormal battery temperature
- 33H: Battery excessive temperature
- 37H: Charging error
- 38H: Bluetooth setting successfully completed
- 39H: Bluetooth setup error (including initialization error)
- 45H: Wait for battery recovery
- 46H: Wait for head temperature reduction
- 47H: Wait for motor temperature reduction
- 55H: Writable character/PC command save mode

0DH (Normal issue end + Label end) is a state when the printer runs out of labels, after the effective print length is printed.

Status in the compatible mode for B-SP series

- 00H: Normal state (idling)
- 01H: Cover open state
- 02H: Command syntax error (including Ir packet error)
- 03H: Paper jam
- 04H: Label end (including ambient temperature error)
- 05H: Cover open error
- 06H: Broken thermal head dots error
- 07H: Thermal head excessive temperature
{ including abnormal battery temperature and battery excessive temperature }
- 08H: Flash ROM write error
- 09H: Flash ROM erase error
- 0AH: Low battery (Print failure)
- 0BH: Printer operating
{ including the following statuses: wait for strip, pause state, writable character/PC command save mode, wait for battery recovery and wait for print head/motor temperature reduction }
- 0DH: Normal end + Label end
- 0EH: Flash ROM storage area full state
- 10H: Normal issue end
- 37H: Charging error
- 38H: Bluetooth setting successfully completed
- 39H: Bluetooth setup error (including initialization error)

Battery status..... The battery charge status is indicated in 5 levels.

(B-EP2DL)

- 01H: 7.2 V or less (Print failure)
- 02H: 7.3 V to 7.4 V
(Remaining No. of printable labels: Approx. 1 to 30)
- 03H: 7.5 V to 7.7 V
(Remaining No. of printable labels: Approx. 30 to 150)
- 04H: 7.8 V to 7.9 V
(Remaining No. of printable labels: Approx. 150 to 300)
- 05H: 8.0 V to 8.4 V
(Remaining No. of printable labels: Approx. 300 min.)

(B-EP4DL)

- 01H: 14.0 V or less (Print failure)
- 02H: 14.1 V to 14.6 V
(Remaining No. of printable labels: Approx. 1 to 30)
- 03H: 14.7 V to 15.2 V
(Remaining No. of printable labels: Approx. 30 to 150)
- 04H: 15.3 V to 15.9 V
(Remaining No. of printable labels: Approx. 150 to 300)
- 05H: 16.0 V to 16.8 V
(Remaining No. of printable labels: Approx. 300 min.)

* The remaining number of printable labels may vary according to the contents to be printed and the ambient environment.

- (13) If an error occurs when 99% of print data has been printed, pressing the FEED key after clearing the error causes the printer to reprint, even when the restart key is set to disabled and the form number is selected from 1 to 10.
- (14) If an error occurs before printing, the printer will not reprint by pressing the FEED key after clearing the error, when the restart key is set to disabled and the form number is selected from 11 to 20.
- (15) In case of “normal issue end + label end”, pressing the FEED key after clearing the error causes the printer to reprint even when the restart key is set to disabled and the form number is selected from 1 to 10.
- (16) When the sensor is specified, even if a gap or a black mark is detected within less than 90% of the effective print length specified by the Label Size Set Command, it is ignored.
However, this is not applicable when the programmed media pitch is less than 40mm. When this media is used and a gap or a black mark is detected within less than 90% of the effective print length, the detected gap or black mark will be effective. As a result, printing will stop even if it is halfway.

• The definition of packed BCD code

Code	Character string				Barcode			
	Standard/ Presentation	Bold	Price	Others	EAN8/13 ITF EAN128 UCC/EAN128 MIS	NW7	CODE39	CODE128
0000 (0) ~ 1001 (9)	“0” ~ “9”							
1010 (A)	Reserved	“-”	“\$”	“£”	Reserved	“a”	“*”	“ ”
1011 (B)	Reserved	Reserved	Reserved	“p”	Reserved	“b”	“_”	“ ”
1100 (C)	“.”	Reserved	“ ”	“ ”	Reserved	“c”	“ ”	“ ”
1101 (D)	“ ”	“ ”	“ ”	“ ”	Reserved	“d”	“ ”	“ ”
1110 (E)	Reserved							
1111 (F)	Delimiter							

* E (H) is reserved for expansion. F (H) is used as the delimiter for each field in the Data Print Command (only when the data length and the data code are “00” and “Packed BCD code”, respectively).

[Example] Barcode data = “a 1 2 3 4 5 6 7 8 9 0 d”

[A1H]	[23H]	[45H]	[67H]	[89H]	[0DH]
a1	23	45	67	89	0d

● When the manual mode is selected in the Format Command for a QR code

- Numeric mode, alphanumeric and symbol mode, Kanji mode

Mode selection	Data to be printed
----------------	--------------------

- Binary mode

Mode selection	No. of data strings (4 digits)	Data to be printed
----------------	-----------------------------------	--------------------

- Mixed mode

Data	“,” (comma)	Data	“,” (comma)	Data
------	-------------	------	-------------	------

The QR code can handle all codes including alphanumerics, symbols and Kanji. Since data compression rate varies according to codes, the code to be used is designated when the mode is selected.

Mode	Code	Details
N	Numerals	0 to 9
A	Alphanumerics, symbols	A to Z 0 to 9 space \$ % * + - . / :
B	Binary (8-bit)	00H to FFH
K	Kanji	Shift JIS

If mixed mode is selected, up to 200 modes can be selected in a QR code.

● When the automatic mode is selected in the Format Command for a QR code.

Data to be printed

① How to send the control code data

NUL (00H)	=	> @ (3EH, 40H)
SOH (01H)	=	> A (3EH, 41H)
STX (02H)	=	> B (3EH, 42H)
⋮		
GS (1DH)	=	>] (3EH, 5DH)
RS (1EH)	=	> ^ (3EH, 5EH)
US (1FH)	=	> _ (3EH, 5FH)

② How to send the special codes

> (3EH)	=	> 0 (3EH, 30H)
---------	---	----------------

[Transfer code]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p								
1	SOH	DC1	!	1	A	Q	a	q								
2	STX	DC2	"	2	B	R	b	r								
3	ETX	DC3	#	3	C	S	c	s								
4	EOT	DC4	\$	4	D	T	d	t								
5	ENQ	NAK	%	5	E	U	e	u								
6	ACK	SYN	&	6	F	V	f	v								
7	BEL	ETB	'	7	G	W	g	w								
8	BS	CAN	(	8	H	X	h	x								
9	HT	EM	)	9	I	Y	i	y								
A	LF	SUB	*	:	J	Z	j	z								
B	VT	ESC	+	;	K	[	k	{								
C	FF	FS	,	<	L	\	l	|								
D	CR	GS	-	=	M	]	m	}								
E	SO	RS	•	>	N	^	n	~								
F	SI	US	/	?	O	_	o	DEL								

* The shaded parts are Japanese.
They are omitted here.

When the automatic mode is selected in the Format Command, FFH data cannot be used. It is available when the manual mode is selected.

Examples of data designation for QR code

- ① Alphanumeric mode: ABC123

A A B C 1 2 3
 ↑
 Data to be printed
 Designation of mode

- ② Binary mode: 01H, 03H, 05H

B 0 0 0 6 > A > C > E
 ↑
 Data to be printed
 No. of data strings
 Designation of mode

- ③ Mixed mode

Numeric mode : 123456
 Kanji mode : Kanji data
 Binary mode : a ア i イ u ウ e エ o オ
 Alphanumeric mode : ABC

N 1 2 3 4 5 6, K Kanji data, B 0 0 1 0 a ア i イ u ウ e エ o オ, A A B C
 ↑ Data to be printed ↑ Data to be printed ↑ No. of data strings Data to be printed ↑ Data to be printed
 Designation of mode

- ④ Automatic mode

When the data above (③) is designated in automatic mode:

1 2 3 4 5 6 Kanji data a ア i イ u ウ e エ o オ A B C
 Data to be printed

6.7 COMMANDS RELATED TO FORMAT

6.7.1 FLASH MEMORY STORAGE AREA FORMAT COMMAND [ESC] J1

Function	Formats (Initializes) the form storage area in flash memory.
Format	[ESC] J1; a [LF] [NUL]
Term	a: Format (Initialization) designation A: Form storage area B: Writable character storage area C: Graphic storage area D: All storage areas (Form, Writable character, Graphic)
Explanation	(1) When the storage area in flash ROM becomes full, the old data is automatically deleted and only the newest data is left. Only the form storage area in flash ROM can be forcefully cleared by this command. However, if this command is sent, all data of the stored forms, including the newest data, is deleted (initialized). (2) The remaining capacity of flash memory after formatting is displayed on the LCD. (3) Whenever already registered data (PC saving, writable character or logo) is registered again, memory is consumed unless a format command is sent. (4) After a format command is sent, the image buffer is cleared automatically.
Note	(1) Since the writable character storage area is shared by the LABEL and TPCL modes, writable characters registered in TPCL mode are erased.
Refer to	Form Store Start Command ([ESC] XO)

6.7.2 STORAGE AREA ALLOCATE COMMAND

[ESC] XF

Function	Allocates the storage area in the flash ROM on the CPU board.
Format	[ESC] XF; aa, bb, cc (, dd, ee) [LF] [NUL]
Term	<p>aa: Reserved 00 to 14</p> <p>bb: Size of bit map writable character storage area 00 to 50 (0 KB to 3,200 KB) (in units of 64 KB)</p> <p>cc: Size of BASIC file storage area 00 to 14 (0 KB to 896 KB) (in units of 64 KB) AA: The current BASIC file storage area and contents are retained.</p> <p>dd: Size of form storage area (Omissible. If omitted, the contents are retained.) 00 to 14 (0 KB to 896 KB) (in units of 64 KB)</p> <p>ee: Size of graphic storage area (Omissible. If omitted, the contents are retained.) 00 to 03 (0 KB to 192 KB) (in units of 64 KB)</p>

Explanation

- (1) The total capacity of the storage area in flash ROM is variable from 1,024 to 3,200 KB.

* Variable with the two-byte font installed

Kanji	1,344 KB
Chinese	1,024 KB
Korean	2,112 KB
Without the two-byte font installed	3,200 KB

- (2) Allocation priority is assigned as follows:

① All parameters Writable character > BASIC > Form > Graphic > PC save
② Omissible parameters (, dd, ee) are omitted Form > Graphic > Writable character > BASIC > PC save
③ BASIC is retained (AA) BASIC > Writable character > Form > Graphic > PC save
④ BASIC is retained, or omissible parameters are omitted Form > Graphic > BASIC > Writable character > PC save

- (3) When the above command is received, the entire area in flash ROM on the CPU board is cleared. However, omitted parameters are not cleared.

[Example of allocation]

⊙ In case that the size of BASIC file storage area is set in a range of “00” to “14”:

- (1) The storage areas are allocated in the following order of precedence – the bit map writable character storage area, the BASIC file storage area, the form storage area and the graphic storage area. After these storage areas are allocated using the above command, the remaining area is used for the PC save area.
- (2) If the sum of the bit map writable character storage area, the BASIC file storage area, the form storage area and the graphic storage area, specified using this command, is the maximum allocable capacity, the bit map writable character storage area, the BASIC file storage area, the form storage area and the graphic storage area are allocated as specified, respectively. In this case, however, there is no PC save area.
- (3) If the sum of the bit map writable character storage area, the BASIC file storage area, the form storage area and the graphic storage area, specified using this command, exceeds the maximum allocable capacity, the bit map writable character storage area is allocated as specified with the highest priority. Then, the remaining area is allocated to the BASIC file storage area. If there is still remaining area after the bit map writable character storage area and the BASIC file storage area are allocated, it is used for the form storage area. If there is still remaining area, then it is used for the graphic storage area. There is no PC save area. However, the form storage area and the graphic storage area are omitted, the current area is retained.
- (4) When “00” (0 KB) is specified for each of the bit map writable character storage area, the BASIC file storage area, the form storage area and the graphic storage area, the maximum allocable capacity is used for the PC area. However, the form storage area and the graphic storage area are omitted, the current area is retained.
- (5) When the maximum allocable capacity is specified for the bit map writable character storage area, the entire storage area is occupied by that area. However, the form storage area and the graphic storage area are omitted, the current area is retained.
- (6) Any numeric value specified in aa (Reserved) is ignored. However, 2-digit values are possible.

Refer to

- Writable Character data Store Command ([ESC] XD)
- Form Store Start Command ([ESC] XO)
- Flash Memory Storage Area Format Command ([ESC] J1)

Example

The respective area is set to as follows:

Bit map writable character storage area: 512 KB
 BASIC file storage area: 0 KB
 Form storage area: 192 KB
 Graphic storage area: 64 KB

PC save area: $896 \text{ KB} - 512 \text{ KB} - 0 \text{ KB} - 192 \text{ KB} - 64 \text{ KB} = 128 \text{ KB}$
 (Format = [ESC] XF; 00, 08, 00, 03, 01 [LF] [NUL])

When “14 (896 KB)” is specified for any of the formats, the entire storage area is occupied by that area.

For example, if “14” is specified for the bit map writable character storage area, the entire storage area is used only for the bit map writable character storage area. Any area other than the bit map writable character storage area cannot be allocated.

6.8 COMMANDS RELATED TO WRITABLE CHARACTERS

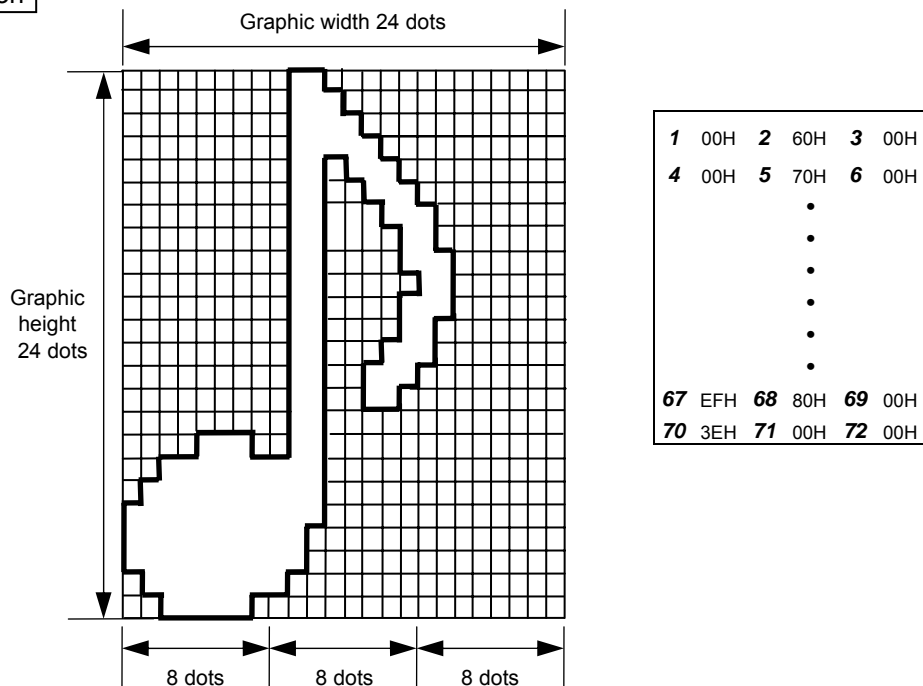
6.8.1 WRITABLE CHARACTER DATA STORE COMMAND [ESC] XD

Function Stores writable characters and logos into flash memory.

Format [ESC] XD; aa, bbb --- bbb [LF] [NUL]

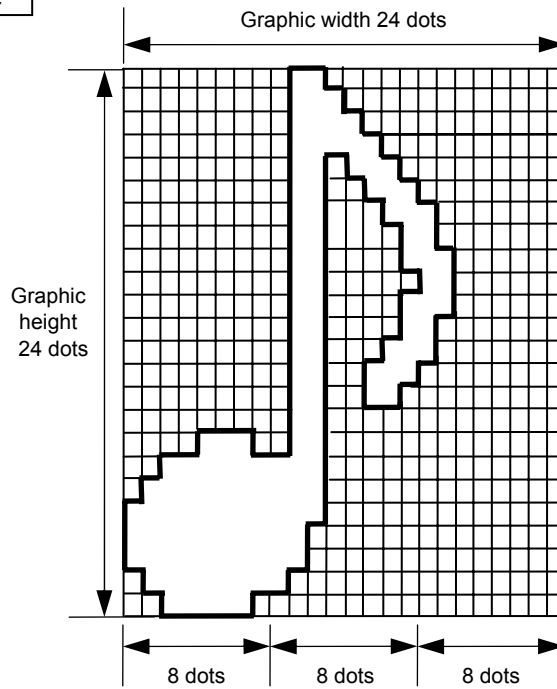
Term aa: Writable character code
FF40H to FF71H
bbb---bbb: Writable character data (Fixed at 72 bytes)

Explanation



- (1) The writable character data should be separated into units of 8 dots and sent in the above order (1 to 72).
- (2) The writable character data is 00H to FFH.
- (3) The number of dots of a writable character width and a writable character height are fixed at 24 dots. Dots with no data are transmitted as data 0. 72-byte data should be sent.
- (4) Max. 50 types of writable character data can be stored. The writable character data is backed up in memory (even if the power is turned off).
- (5) Writable character data is assigned from FF40H to FF71H. Therefore, to read the code, the code (2 bytes) which was stored by this command should be designated.
- (6) A new writable character can be stored in codes which have been stored in an already existing code.

Example



```
[ESC] XD; <FFH> <40H>,
[00H] [60H] [00H] [00H] [70H] [00H] [00H] [78H] [00H]
[00H] [7CH] [00H] [00H] [6EH] [00H] [00H] [67H] [00H]
[00H] [63H] [80H] [00H] [61H] [80H] [00H] [61H] [C0H]
[00H] [60H] [C0H] [00H] [61H] [C0H] [00H] [61H] [80H]
[00H] [63H] [80H] [00H] [67H] [C0H] [00H] [66H] [00H]
[0FH] [60H] [00H] [0EH] [60H] [00H] [3FH] [E0H] [00H]
[7FH] [FEH] [00H] [FFH] [E0H] [00H] [FFH] [C0H] [00H]
[FFH] [C0H] [00H] [EFH] [80H] [00H] [3EH] [00H] [00H]
[LF] [NUL]
```

6.9 COMMANDS RELATED TO GRAPHICS

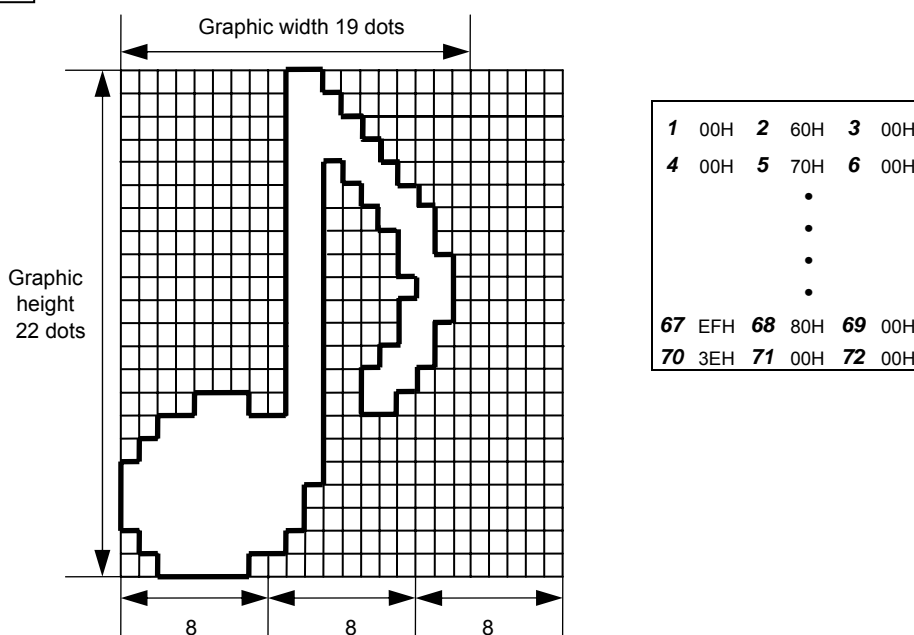
6.9.1 GRAPHIC DATA STORE COMMAND

[ESC] SG

Function	Stores the graphic data on the printer.						
Format	[ESC] SG ; a, bbbb, cccc, ddd --- ddd [LF] [NUL]						
Term	<p>a: Graphic No. 1 to 2</p> <p>bbbb: No. of graphic width dots to be stored 0001 to 1248 (in units of dots)</p> <table border="1"> <thead> <tr> <th></th> <th>Max. No. of</th> </tr> </thead> <tbody> <tr> <td>B-EP2DL-GHxx</td> <td>2</td> </tr> <tr> <td>B-EP4DL-GHxx</td> <td>4</td> </tr> </tbody> </table> <p>cccc: No. of graphic height dots to be stored 0001 to 9999 (in units of dots)</p> <p>ddd --- ddd: Graphic data</p>		Max. No. of	B-EP2DL-GHxx	2	B-EP4DL-GHxx	4
	Max. No. of						
B-EP2DL-GHxx	2						
B-EP4DL-GHxx	4						

	Max. No. of width dots
B-EP2DL-GHxx	384
B-EP4DL-GHxx	832

Explanation



- (1) The graphic data should be separated into units of 8 dots and sent in the above order (**1** to **72**).
- (2) The graphic data is 00H to FFH.
- (3) The minimum unit of a graphic width is 8 dots. Dots with no data are transmitted as data 0.

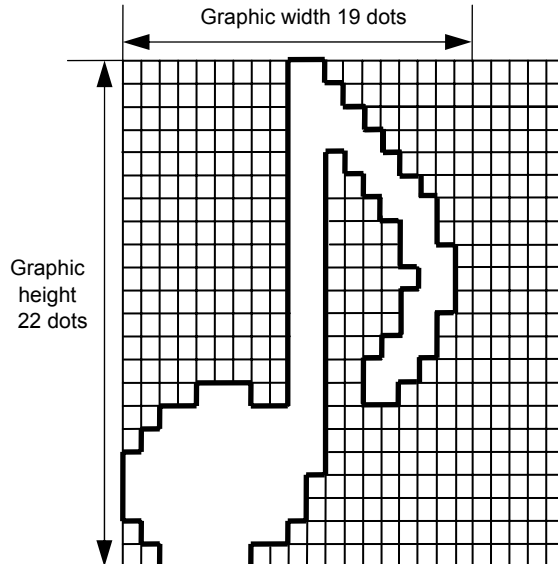
- (4) The number of bytes of the graphic to be transmitted must be as follows;

The number of bytes of the graphic to be transmitted (Max. 64 KB)

$$= \{(\text{No. of graphic width dots} + 7)/8\} \times \text{No. of graphic height dots}$$

* The value in the brackets is rounded down to the nearest whole number.

Example

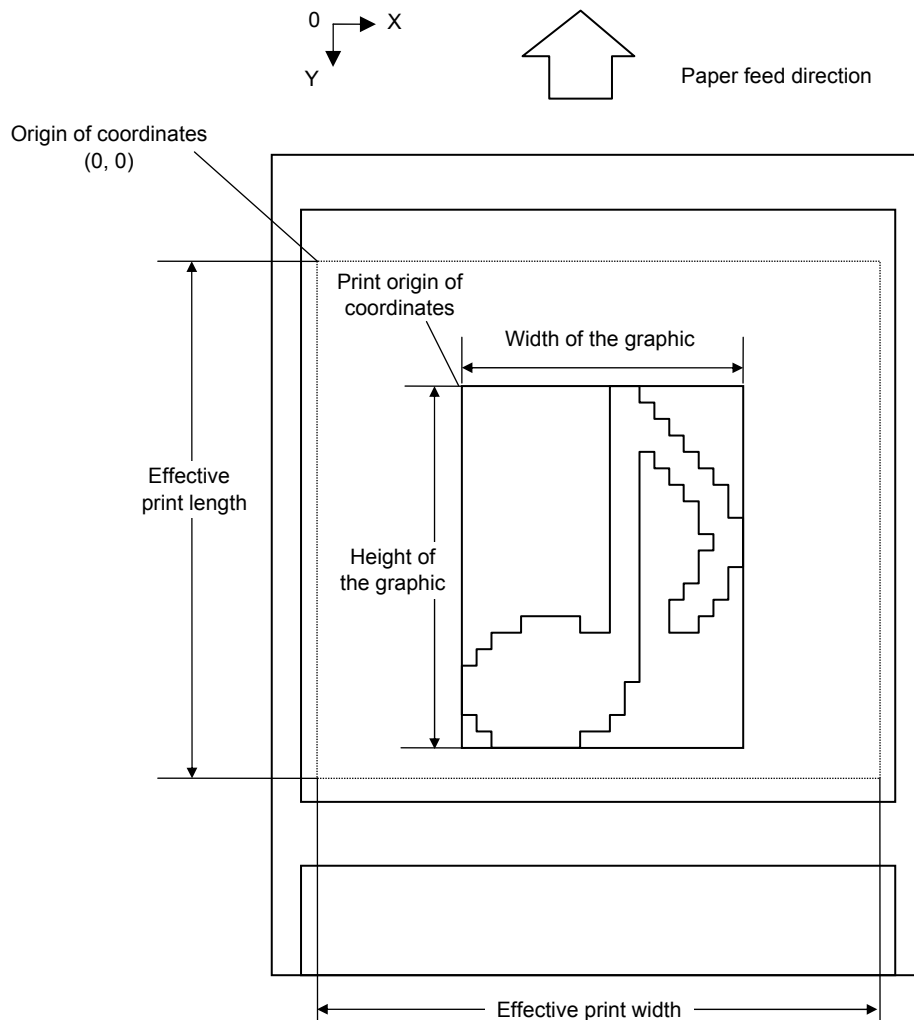


```
[ESC] SG; 1, 0019, 0024,
[00H] [60H] [00H] [00H] [70H] [00H] [00H] [78H] [00H]
[00H] [7CH] [00H] [00H] [6EH] [00H] [00H] [67H] [00H]
[00H] [63H] [80H] [00H] [61H] [80H] [00H] [61H] [C0H]
[00H] [60H] [C0H] [00H] [61H] [C0H] [00H] [61H] [80H]
[00H] [63H] [80H] [00H] [67H] [C0H] [00H] [66H] [00H]
[0FH] [60H] [00H] [0EH] [60H] [00H] [3FH] [E0H] [00H]
[7FH] [FEH] [00H] [FFH] [E0H] [00H] [FFH] [C0H] [00H]
[FFH] [C0H] [00H] [EFH] [80H] [00H] [3EH] [00H] [00H]
[LF] [NUL]
```

6.9.2 GRAPHIC FIELD COMMAND

[ESC] N

Function	Sets how the graphic data is to be printed on the label.
Format	[ESC] N; a, bbbb, cccc [LF] [NUL]
Term	<p>a: Graphic No. to be invoked and drawn 1 to 2</p> <p>bbbb: Print origin of X-coordinate of graphic data Fixed at 4 digits (in 0.1 mm units)</p> <p>cccc: Print origin of Y-coordinate of graphic data Fixed at 4 digits (in 0.1 mm units)</p>
Explanation	<p>(1) If the Graphic Field Command is stored in a form, like the Bit Map Font Field Command, the Outline Font Field Command, or the Barcode/Two-dimensional Code Format Command, the graphic data is automatically drawn, when the stored form is invoked by the Data Print Command.</p> <p>(2) When no graphic data has been stored, the printer does not print any graphics even if a graphic data number is specified by the Graphic Field Command.</p>



6.10 COMMANDS RELATED TO PC COMMAND SAVING

6.10.1 FORM STORE START COMMAND

[ESC] XO

Function	Declares the start of form storage.
Format	[ESC] XO; aa, b [LF] [NUL]
Term	aa: Form No. 01 to 20 b: Form version No. 0 to 9 (It is not stored when "0" is designated)
Notes	(1) Max. 20 types can be stored. However, since the memory capacity is limited, the maximum number may vary depending on the form size to be stored. (2) The data which is stored most recently is the newest in spite of the version No. (3) When the form number which has been stored is stored again, the new form can be stored if the Form Store Start Command ([ESC] XO) is sent. However, memory is used every time a form is stored again. (4) Until the Form Store Terminate Command ([ESC] XP) is received after the Form Store Start Command ([ESC] XO) is received, any command other than below is not stored and is ignored. <ul style="list-style-type: none"> • Label Size Set Command ([ESC] D) • Print Density Fine Adjust Command ([ESC] AY) • Position Fine Adjust Command ([ESC] AX) • Bit Map Font Field Command ([ESC] PC) • Outline Font Field Command ([ESC] PV) • Barcode/Two-dimensional Code Format Command ([ESC] XB) • Graphic Field Command ([ESC] N) • Line Format Command ([ESC] LC) (5) If the Form Store Start Command is not sent, the Label Size Set Command ([ESC] D), the Bit Map Font Field Command ([ESC] PC), the Outline Font Field Command ([ESC] PV), the Barcode/Two-dimensional Code Format Command ([ESC] XB), and the Graphic Field Command ([ESC] N) are ignored and discarded. After the Form Store Start Command is sent, the Label Size Set Command should be sent before each field command, the Print Density Fine Adjust Command, or the Position Fine Adjust Command is sent. (6) When there is no free space in the form storage area in flash ROM because of storing a form, this area is automatically initialized. However, the latest version of each form is held. (7) Since the drawing buffer is cleared after receiving this command, reprint by the reprint key is disabled.
Refer to	Form Store Terminate Command ([ESC] XP)
Example	To start storing version 3 of form No. 2. [ESC] XO; 02, 3 [LF] [NUL]

6.10.2 FORM STORE TERMINATE COMMAND

[ESC] XP

Function	Declares the termination of form storage.
Format	[ESC] XP [LF] [NUL]
Note	(1) If the Form Store Start Command ([ESC] XO) is not previously received when this command is received, this command is ignored.
Refer to	Form Store Start Command ([ESC] XO)

6.11 COMMANDS RELATED TO CHECK

6.11.1 MESSAGE DISPLAY COMMAND

[ESC] XJ

Function	Displays the message on the LCD.
Format	[ESC] XJ; aaa ----- aaa [LF] [NUL]
Term	aaa ----- aaa: Display data (16 digits)
Explanation	<p>(1) When the printer receives the Message Display Command, first it processes the already received data (or completes the label issue if the data print command has been sent). Then, it displays the message on the LCD, and finally it enters a pause state.</p> <p>(2) When the [PAUSE] key is pressed, the pause state is cleared and the LCD displays the normal message. After the pause state is cleared, the printer resumes processing the data received after the Message Display Command.</p>
Notes	<p>(1) The number of characters to be displayed is 16. When the display data is less than 16 characters, the blanks are filled with spaces. When the display data exceeds 16 characters, the excess data will be discarded.</p> <p>(2) During a pause state, a halt due to an error, or a head open state, the Message Display Command is not processed even if it is received. In this case, the command is processed after the above state is cleared.</p> <p>(3) The following characters can be displayed on the LCD.</p> <p>If any character other than the mentioned below is received, “?” is displayed or a command error occurs.</p>

	2	3	4	5	6	7	A	B	C	D
0	SP	0	@	P	`	p				
1	!	1	A	Q	a	q				
2	”	2	B	R	b	r				
3	#	3	C	S	c	s				
4	\$	4	D	T	d	t				
5	%	5	E	U	e	u				
6	&	6	F	V	f	v				
7	'	7	G	W	g	w				
8	(	8	H	X	h	x				
9	)	9	I	Y	i	y				
A	*	:	J	Z	j	z				
B	+	;	K	[	k	{				
C	,	<	L	\	l	|				
D	-	=	M	]	m	}				
E	.	>	N	^	n	→				
F	/	?	O	_	o	←				

* The shaded parts are Japanese.
They are omitted here.

6.12 COMMANDS RELATED TO CONTROL

6.12.1 INITIALIZE COMMAND

[ESC] WR, [ESC] @

Function	Returns the printer to its initial state.
Format	[ESC] WR [LF] [NUL] [ESC] @
Explanation	<p>(1) The printer is returned to the same state as when the power is turned on.</p> <p>(2) If the printer receives this command during printing, the printer prints the label which is being printed, then performs initialization.</p> <p>(3) After the Initialize Command is sent (or after printing is completed, if printing is performed), the next command must not be sent within approx. 30 seconds on the wireless LAN model or within 5 seconds on other models since the printer perform initialization. In IrDA: TEC Protocol, if ACK/status transmission is specified by the Issue Command, the printer returns an ACK, which indicates the command process end, to the EOT after the printer is initialized. In RS-232C, when the status response is specified, the printer returns the status (10H). After this status is received, the next command may be sent. In IrDA: IrCOMM, IrDA: IrOBEX, USB, Bluetooth, or Wireless LAN, the printer does not return the status.</p> <p>(4) To use IrDA interface for sending this command to the printer, only this command should be sent. After the command is sent, the link should be terminated. Even if the host does not terminate the link, the printer performs the termination process. Therefore, after initialization is completed, the host should establish the link again.</p> <p>(5) When receiving this command during data transmission, the printer is initialized after transmission is completed.</p>
Notes	<p>(1) If a command error or communication error occurs when receiving the Reset Command, an error message is displayed in the online mode. However, it is not displayed in the SYSTEM mode.</p> <p>(2) After the code of the Bit Map Writable Character Command ([ESC] XD) or the Graphic Command ([ESC] SG) is received, the Reset Command is not processed until the printer receives the data specifying the type of data.</p>

6.12.2 BATCH RESET COMMAND

[ESC] Z0 ^(ZERO)

Function	Resets the printer.
Format	[ESC] Z0 [LF] [NUL]
Explanation	(1) This command will not be executed until the printer enters an idle state.

6.13 COMMANDS RELATED TO STATUS

6.13.1 STATUS REQUEST COMMAND

[ESC] FM, [ESC] WS, [ESC] V

Function	Sends the printer status to the host computer.
Format	[ESC] WS [LF] [NUL] [ESC] FM [LF] [NUL] [ESC] v
Explanation	(1) When receiving this command, the printer sends the printer status and battery status to the host.

- For IrDA: TEC Protocol: Data to be sent (Fixed at 27 bytes)

STX	Printer ID		Version No. of each form				Printer status	Battery status	CRC	
02H	xxH	xxH	V01	V02	.....	V20	xxH	xxH	xxH	xxH

- For IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, Wireless LAN:
Data to be sent (Fixed at 5 bytes)

STX	Printer ID		Printer status	Battery status
02H	xxH	xxH	xxH	xxH

Printer ID.....2-byte hex data (in order from High to Low)

Printer status.....Printer status is indicated in 1-byte data.

- 00H: Normal status (Idling)
- 01H: Cover open state
- 02H: Command syntax error (including Ir packet error)
- 03H: Paper jam
- 04H: Label end
- 05H: Cover open error
- 06H: Broken thermal head dots error
- 07H: Thermal head excessive temperature
- 08H: Flash ROM write error
- 09H: Flash ROM erase error
- 0AH: Low battery (Print failure)
- 0BH: Operating
- 0DH: Normal end + Label end (See **NOTE.**)
- 0EH: Flash ROM storage area full state
- 0FH: Wait for strip
- (10H: Normal issue end):
Response status for automatic status transmission
- 14H: Pause state
- 19H: Ambient temperature error
- 32H: Abnormal battery temperature
- 33H: Battery excessive temperature
- 37H: Charging error
- 39H: Bluetooth setup error (including initialiation error)
- 45H: Wait for battery recovery
- 46H: Wait for print head temperature reduction
- 47H: Wait for motor temperature reduction
- 55H: Writable character/PC command save mode

Status in the compatible mode for B-SP series

- 00H: Normal state (idling)
- 01H: Cover open state
- 02H: Command syntax error (including Ir packet error)
- 03H: Paper jam
- 04H: Label end
- 05H: Cover open error
- 06H: Broken thermal head dots error
- 07H: Thermal head excessive temperature
{
including ambient temperature error, abnormal battery
temperature and battery excessive temperature
}
- 08H: Flash ROM write error
- 09H: Flash ROM erase error
- 0AH: Low battery (Print failure)
- 0BH: Printer operating
{
including the following statuses: wait for strip, pause
state, writable character/PC command save mode, wait
for battery recovery and wait for print head/motor
temperature reduction
}
- 0DH: Normal end + Label end (See **NOTE**.)
- 0EH: Flash ROM storage area full state
- (10H: Normal issue end):
Response status for automatic status transmission
- 37H: Charging error
- 39H: Bluetooth setup error (including initialization error)

NOTE: *This is a state when the printer runs out of labels, after the effective print length is printed.*

Battery status..... The battery charge status is indicated in 5 levels.

(B-EP2DL)

- 01H: 7.2 V or less (Print failure)
- 02H: 7.3 V to 7.4 V
(Remaining No. of printable labels: Approx. 1 to 30)
- 03H: 7.5 V to 7.7 V
(Remaining No. of printable labels: Approx. 30 to 150)
- 04H: 7.8 V to 7.9 V
(Remaining No. of printable labels: Approx. 150 to 300)
- 05H: 8.0 V to 8.4 V
(Remaining No. of printable labels: Approx. 300 min.)

(B-EP4DL)

01H: 14.0 V or less (Print failure)

02H: 14.1 V to 14.6 V

(Remaining No. of printable labels: Approx. 1 to 30)

03H: 14.7 V to 15.2 V

(Remaining No. of printable labels: Approx. 30 to 150)

04H: 15.3 V to 15.9 V

(Remaining No. of printable labels: Approx. 150 to 300)

05H: 16.0 V to 16.8 V

(Remaining No. of printable labels: Approx. 300 min.)

* The remaining number of printable labels may vary according to the contents to be printed and the ambient environment.

CRC.....2-byte hex data (in order from Low to High)

6.13.2 RECEIVE BUFFER FREE SPACE STATUS REQUEST COMMAND [ESC] WB

Function	Sends information on the printer status and the free space of the receive buffer to the host.
Format	[ESC] WB [LF] [NUL]
Explanation	<p>(1) This command makes the printer send information on its status and free space of the receive buffer, regardless of the setting of the Status Response parameter.</p> <p>(2) The status to be transmitted is the current printer status, and indicates the latest status only. The remaining count indicates the remaining print count of the batch currently being printed only. No remaining count of the batch waiting to be printed is transmitted.</p> <p>(3) Free space of the receive buffer for the interface which sent this command, is returned to the host.</p>

[IrDA: TEC Protocol] Data to be transmitted (fixed at 22 bytes)

STX	Printer ID		Status	Remaining No. of labels				Length	
02H	3xH	3xH	33H	3xH	3xH	3xH	3xH	32H	32H

Receiving buffer space					Entire receiving buffer space					CRC	
3xH	3xH	3xH	3xH	3xH	30H	30H	35H	31H	32H	xxH	xxH

[IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, Wireless LAN]

Data to be transmitted (fixed at 23 bytes)

SOH	STX	Printer status		Status type	Remaining No. of labels				Length	
01H	02H	3xH	3xH	33H	3xH	3xH	3xH	3xH	32H	33H

Receiving buffer space					Entire receiving buffer space					CR	LF
3xH	3xH	3xH	3xH	3xH	30H	30H	35H	31H	32H	0DH	0AH

Printer status.....Printer status is indicated in 2-byte data.

- "00": Normal status
- "01": Cover open state
- "02": Operating
- "04": Pause state
- "05": Wait for strip
- "06": Command syntax error (including Ir packet error)
- "09": Normal issue end + Label end
- "11": Paper jam
- "13": Label end
- "15": Cover open error
- "17": Broken thermal print head dots
- "18": Thermal head excessive temperature
- "19": Ambient temperature error
- "32": Abnormal battery temperature
- "33": Battery excessive temperature
- "36": Low battery
- "37": Charging error
- "39": Bluetooth setup error (including initialization error)
- "45": Wait for battery recovery
- "46": Wait for print head temperature reduction
- "47": Wait for motor temperature reduction
- "50": Flash ROM write error
- "51": Flash ROM erase error
- "54": Flash ROM storage area full state
- "55": Writable character/PC command save mode

Remaining No. of labels ...Indicates the remaining number of labels in four bytes.
"0000" to "9999"

Length:Indicates the number of bytes of the entire status data
IrDA: TEC Protocol: Fixed at "22."
IrDA: IrCOMM, IrDA: IrOBEX, USB,
RS-232C, Bluetooth, Wireless LAN: Fixed at "23."

Receive buffer free space:Indicates the free space of the receive buffer.

Entire receive buffer free space:Indicates the entire free space of the receive buffer.
Fixed at "00512."

CRC/CR, LF: Indicates the end of the status block.

Notes

- (1) The status is returned only to the interface which sent this command.
- (2) The printer returns the same status, regardless of whether or not the compatible mode for the B-SP series is set.
- (3) After the code of the Bit Map Writable Character Command ([ESC] XD) or Graphic Command ([ESC] SG) is received, the Status Request Command is not processed until the printer receives the data specified for the type of data.
- (4) After receiving the Status Request Command, there may be a maximum of 20-msec. delay until the printer sends a status.
- (5) At least, a 20-msec. interval must be given between the transmissions of the Status Request Command. If the next Status Request Command is transmitted within 20 msec., the printer may fail to receive it.

Example

[ESC] WB [LF] [NUL]

6.13.3 MODE INFORMATION ACQUIRE COMMAND

[ESC] WX

Function	Sends the printer mode information to the host.
Format	[ESC] WX [LF] [NUL]
Explanation	<p>(1) The status when the compatible mode for the B-SP series is on differs from the status when the compatible mode is off.</p> <p>(2) The mode information format to be sent to the host, is as follows:</p> <ul style="list-style-type: none"> When the compatible mode for the B-SP series is off.

LABEL mode (Mode = 0)

Batch issue mode

[IrDA: TEC Protocol]

STX	Mode information (16 bytes)																CRC	CRC
	L	A	B	E	L	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP		
02H	4CH	41H	42H	45H	4CH	20H	20H	20H	20H	20H	20H	20H	20H	20H	20H	20H	xxH	xxH

[IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, Wireless LAN]

STX	Mode information (16 bytes)															
	L	A	B	E	L	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP
02H	4CH	41H	42H	45H	4CH	20H	20H	20H	20H	20H	20H	20H	20H	20H	20H	20H

Strip issue mode

[IrDA: TEC Protocol]

STX	Mode information (16 bytes)																CRC	CRC
	L	A	B	E	L	(	S	)	SP	SP	SP	SP	SP	SP	SP	SP		
02H	4CH	41H	42H	45H	4CH	28H	53H	29H	20H	20H	20H	20H	20H	20H	20H	20H	xxH	xxH

[IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, Wireless LAN]

STX	Mode information (16 bytes)															
	L	A	B	E	L	(	S	)	SP	SP	SP	SP	SP	SP	SP	SP
02H	4CH	41H	42H	45H	4CH	28H	53H	29H	20H	20H	20H	20H	20H	20H	20H	20H

The previous page shows examples where the message is received in LABEL mode when the compatible mode for the B-SP series is off. In addition, the following messages are returned.

TPCL mode	TPCL	
TPCL1 mode	TPCL1	
LABEL mode	LABEL	
RECEIPT mode	RECEIPT	
RECEIPT1 mode	RECEIPT1	
ESC/POS mode	ESC/POS	
Online reset menu	USER■SYSTEM	
SYSTEM mode for users PAUSE + POWER keys	USER■SYSTEM	
SYSTEM mode for administrators FEED + POWER keys	When the password setting is on and before it is entered	USER■SYSTEM
	When the password setting is on and after it is entered	SYSTEM
	When the password setting is off	SYSTEM
TPCL (strip issue mode)	TPCL■(S)	
TPCL1 (strip issue mode)	TPCL1 (S)	
LABEL (strip issue mode)	LABEL (S)	

* ■ indicates a space.

- When the compatible mode for the B-SP series is on.

LABEL mode (Mode = 0)

[IrDA: TEC Protocol]

STX	Mode information (16 bytes)																CRC	CRC
	L	A	B	E	L	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP		
02H	4CH	41H	42H	45H	4CH	20H	20H	20H	20H	20H	20H	20H	20H	20H	20H	20H	xxH	xxH

[IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, Wireless LAN]

STX	Mode information (16 bytes)															
	L	A	B	E	L	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP
02H	4CH	41H	42H	45H	4CH	20H	20H	20H	20H	20H	20H	20H	20H	20H	20H	20H

The above shows examples where the message is received in LABEL mode when the compatible mode for the B-SP series is off. In addition, the following messages are returned.

TPCL mode	TPCL-LE	
TPCL1 mode	TPCL-LE1	
LABEL mode	LABEL	
RECEIPT mode	RECEIPT	
RECEIPT1 mode	RECEIPT1	
ESC/POS mode	ESC/POS	
Online reset menu	USER■SYSTEM	
SYSTEM mode for users PAUSE + POWER keys	USER■SYSTEM	
SYSTEM mode for administrators FEED + POWER keys	When the password setting is on and before it is entered	USER■SYSTEM
	When the password setting is on and after it is entered	SYSTEM
	When the password setting is off	SYSTEM

* ■ indicates a space.

6.13.4 VERSION INFORMATION ACQUIRE COMMAND

[ESC] WV

Function	Sends information such as the program version of the printer.
Format	[ESC] WV [LF] [NUL]
Explanation	(1) The format of the program version data to be returned to the host is as follows.

[IrDA: TEC Protocol]

STX		02H	
Creation date	"0"	30H	Creation date of the program: 9-byte data indicated in order of Day- Month-Year
	"4"	34H	
	"A"	41H	
	"P"	50H	
	"R"	52H	
	"2"	32H	
	"0"	30H	
	"0"	30H	
	"8"	38H	
Model	"B"	42H	Model: 7-byte ASCII code indicating the model B-EP2DG (2-inch/203-dpi model) B-EP4DG (4-inch/203-dpi model)
	"-"	2DH	
	"E"	45H	
	"P"	50H	
	"2"	32H	
	"D"	44H	
	"G"	47H	
Version	"V"	56H	Program version: 5-byte data: Vx.xx Revision Version
	"1"	31H	
	"."	2EH	
	"0"	30H	
	"A"	41H	
CRC		xxH	
CRC		xxH	

[IrDA: IrCOMM, IrDA: IrOBEX, RS-232C, Bluetooth, Wireless LAN]

SOH		01H	
STX		02H	
Creation date	"0"	30H	Creation date of program: 9 bytes of data indicated in order of Day- Month-Year
	"4"	34H	
	"A"	41H	
	"P"	50H	
	"R"	52H	
	"2"	32H	
	"0"	30H	
	"0"	30H	
	"8"	38H	
Model	"B"	42H	Model: 7-byte ASCII code indicating the model B-EP2DG (2-inch/203-dpi model) B-EP4DG (4-inch/203-dpi model)
	"-"	2DH	
	"E"	45H	
	"P"	50H	
	"2"	32H	
	"D"	44H	
	"G"	47H	
Version	"V"	56H	Program version: 5 bytes of data: Vx.xx Revision Version
	"1"	31H	
	"."	2EH	
	"0"	30H	
	"A"	41H	
ETX		03H	
EOT		04H	
CR		0DH	
LF		0AH	

Notes

(1) No statuses are returned when using USB.

Example

[ESC] WV [LF] [NUL]

6.14 COMMANDS RELATED TO BLUETOOTH AND WIRELESS LAN

6.14.1 DEVICE ADDRESS ACQUIRE COMMAND

[ESC] IT

Function	Reads the device address of the Bluetooth interface or MAC address of the wireless LAN interface.
Format	[ESC] IT [LF] [NUL]
Explanation	(1) This command reads the device address of the Bluetooth or MAC address of the Wireless LAN. When using the IrDA, the following information field is placed in the information frame and sent.

[Information field to be sent when IrDA: TEC Protocol is used]

STX	Bluetooth device address or Wireless LAN MAC address	CRC	
02H	12 bytes	xxH	xxH

[Information field to be sent when IrDA: IrCOMM, IrDA: IrOBEX, RS-232C, USB, Bluetooth, Wireless LAN is used]

STX	Bluetooth device address or Wireless LAN MAC address
02H	12 bytes

The printer sends the following information:

Bluetooth device address: 0015b5aa0005

Wireless LAN MAC address: 000940387630

Bluetooth device address

[30H] [30H] [31H] [35H] [62H] [35H] [61H] [61H] [30H] [30H] [30H] [35H]
0 0 1 5 b 5 a a 0 0 0 5

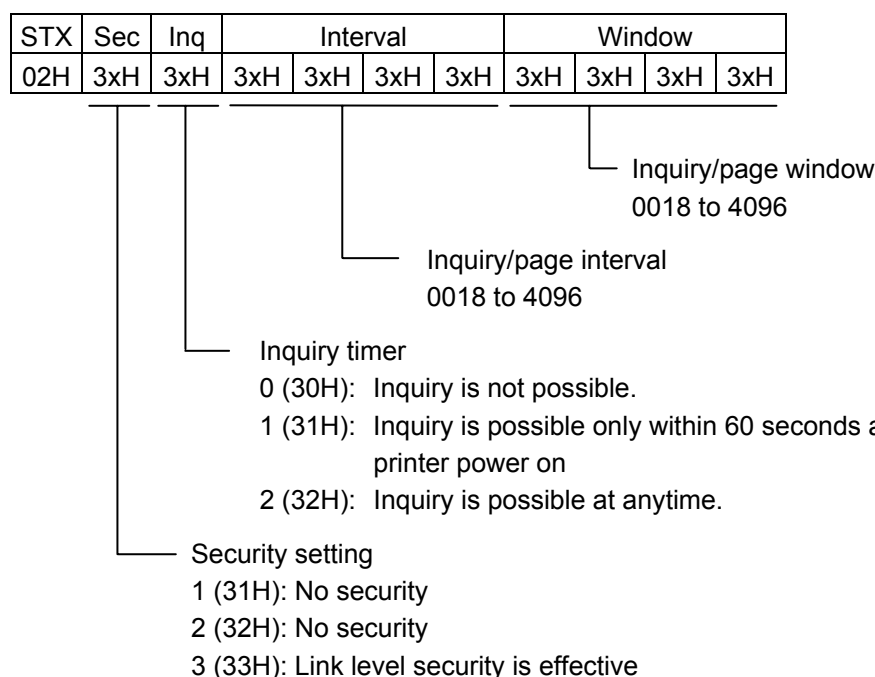
Wireless LAN MAC address

[30H] [30H] [30H] [39H] [34H] [30H] [33H] [38H] [37H] [36H] [33H] [30H]
0 0 0 9 4 0 3 8 7 6 3 0

6.14.2 BLUETOOTH RELATED PARAMETER ACQUIRE COMMAND [ESC] WT

Function	Acquires the parameter settings related to the Bluetooth.
Format	[ESC] WT [LF] [NUL]
Explanation	(1) This command reads the parameters related to the Bluetooth. When using the IrDA, the following information field is placed in the information frame and sent to the host.

[Information field to be sent when IrDA: TEC Protocol is used]



Bluetooth device name	CRC
32 bytes	xxH xxH

Bluetooth device name: Fixed at 32 bytes.

When the Bluetooth device name is "TOSHIBA TEC BT."

[54H] [4FH] [53H] [48H] [49H] [42H] [41H] [20H] [54H] [45H] [43H] [20H] [42H] [54H] [00H] [00H]
T O S H I B A ' ' T E C ' ' B T
[00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H]

* When the Bluetooth device name is less than 32 bytes, the remaining bytes are filled with 00H.

[Information field to be sent when IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth or Wireless LAN is used]

STX	Sec	Inq	Interval				Window		
02H	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH

Bluetooth device name
32 bytes

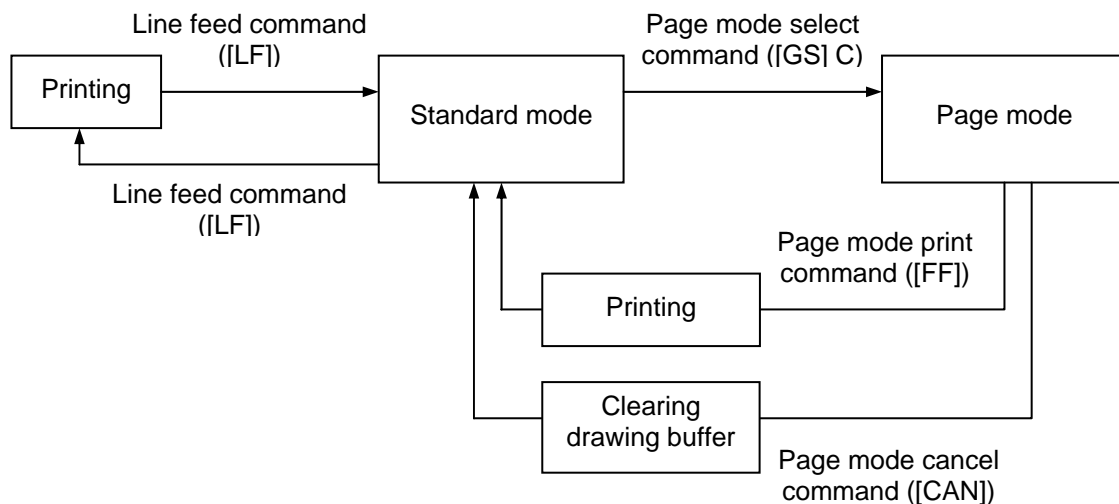
7. RECEIPT MODE (INTERFACE COMMANDS)

7.1 GENERAL DESCRIPTION

This chapter describes details regarding the interface commands for the RECEIPT and RECEIPT1 modes of the print mode. If operations are the same between the RECEIPT mode and the RECEIPT1 mode, only "RECEIPT mode" is described in explanations, and the RECEIPT1 mode is included. If operations are different between them, the RECEIPT mode (Mode = 1 or 3) or the RECEIPT1 mode (Mode = 2) is specified. In the RECEIPT mode, only batch issues are supported.

This printer has 2 modes: standard mode and page mode.

In standard mode, the printer performs a print job or feeds paper every time the line feed command ([LF]) is received. In page mode, however, all received line feed commands ([LF]) are just expanded in the print area on the memory and the printer does not operate. Once the Page Mode Print Command ([FF]) is executed, the printer prints all data expanded in the print area in a collective manner.



Either of the language types, Kanji, Chinese and Korean, can be implemented. Any font other than the on-board fonts is selectable.

7.2 OUTLINE OF COMMANDS

7.2.1 FORMAT OF INTERFACE COMMAND

ESC	Command		
GS	Command		
ESC	Command	LF	NUL
FF			
CAN			

The control codes are as follows:

- ESC (1BH)
- LF (0AH)
- NUL (00H)
- GS (1DH)
- FF (0CH)
- CAN (18H)

7.2.2 HOW TO USE REFERENCE

Function	Describes the outline of the function of the command.
Format	Shows the format of the command The format designation method should conform to the following rules: <ul style="list-style-type: none"> • “n” indicates a parameter item. • Brackets and parentheses are used only in coding, and must not be transmitted in practice. • Other symbols must always be inserted at the designated positions before being transmitted.
Term	Explains the term(s) used in the format.
Initial value	Indicates the initial value of the parameter (when turning the power on, or changing the print mode to the RECEIPT mode.)
Explanation	Explains the command in detail.
Refer to	Related commands

7.2.3 PRECAUTIONS

- (1) The host should send the print data and the Print Line Feed Command for printing. Commands other than these should be sent as required.

- (2) Character type

Only standard characters are used when printing the data.

[Ex] 1 2 3 4 5 A B C D E

[31H]	[32H]	[33H]	[34H]	[35H]	[41H]	[42H]	[43H]	[44H]	[45H]
1	2	3	4	5	A	B	C	D	E

- (3) While the RECEIPT mode is selected, writable character data cannot be stored. To store writable character data, change the print mode from the RECEIPT mode to the LABEL or the TPCL mode.

- (4) [FEED] key

In the RECEIPT mode, if the [FEED] key is pressed, the receipt is not printed again. A 20-mm feed is performed. To cut a receipt using the tear bar after issuing it, a receipt can be fed to the position at which the receipt can be easily cut by pressing the [FEED] key.

- (5) Error processing

[RECEIPT mode]

When an error occurs while the printer is issuing a receipt, the LED blinks. The printer discards all data and commands which have been received, and enters a wait state for a command. Therefore, if an error occurs, the print data or a command should be sent again after clearing the error.

[RECEIPT1 mode]

After the label end error or the cover open error is cleared, the printer automatically continues printing the data which has been received before the error occurred.

- (6) Status response

In the RECEIPT mode, the printer does not automatically send a status indicating the normal end. Therefore, the host should send the Status Request Command to check the printer status. However, when the Mode Select Command or the Graphic Command is sent, or if an error occurs, the printer sends the status. In IrDA: IrCOMM communications, only when the status transmission is specified, the printer sends the status.

- (7) Initial values (Default setting values of parameters designated by commands.)

When the power is turned on or when RECEIPT mode or RECEIPT1 mode is selected, the initial values will be set. The initial values are also set when the mode is switched between RECEIPT mode and RECEIPT1 mode, or when the mode is switched from RECEIPT mode to RECEIPT mode, or from RECEIPT1 mode to RECEIPT1 mode.

7.3 COMMANDS RELATED TO SETTING

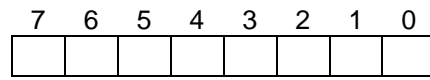
7.3.1 MODE SELECT COMMAND

[ESC] M

Function Changes the print mode.

Format [ESC] M; a(b) [LF] [NUL]

Term a: Print mode designation



Print mode (Bit 0 to Bit 6 * See Table 1.)

Automatic status response in IrDA: IrCOMM or USB

0: Not performed

1: Performed

* Table 1 Print mode

HEX	Mode	How to deal with the received data after an error is cleared
30H	LABEL	Discards
31H	RECEIPT	Discards
32H	RECEIPT1	Continues printing
34H	ESC/POS	Continues printing
41H	TPCL	Continues printing
42H	TPCL1	Continues printing

b: Print position detection feed (Omissible. If omitted, the print position detection feed is not performed.)

0: When the mode change from RECEIPT, RECEIPT1 or ESC/POS to LABEL, TPCL or TPCL1 is requested, a print position detection feed is not performed after the mode is changed.

1: When the mode change from RECEIPT, RECEIPT1 or ESC/POS to LABEL, TPCL or TPCL1 is requested, a print position detection feed is performed after the mode is changed.

Explanation

(1) There are 4 types of the print mode: "LABEL", "RECEIPT," "TPCL" and "ESC/POS."

(2) "Automatic status response in IrDA: IrCOMM or USB" is the function for the specifications which do not allow the printer to spontaneously send the status through IrDA; IrCOMM or USB. This function enables the printer to forcefully send the status to the host, if the link between the printer and the host is established. However, if the link between the printer and the host is not established upon the status transmission, the printer cannot send the status. Therefore, the status is discarded. (In the next connection to the host, the printer does not send the status to the host.)

- (3) The sensor is not used in the RECEIPT, RECEIPT1 or ESC/POS mode. When sensor detectable paper is used for receipts and labels, print position detection feed cannot be done in the LABEL, TPCL or TPCL1 mode. By setting the print position detection feed parameter to 1, print position detection feed is carried out after the mode is changed to LABEL, TPCL or TPCL1.
- (4) In the TPCL1 mode, it is possible to re-print the last print data by pressing the FEED button.

Notes

- (1) The print mode designation (the specified print mode and the automatic status response in IrDA: IrCOMM or USB) is backed up in memory (even if the power is turned off).
- (2) The factory default is "TPCL mode" and "Automatic status response in IrDA: IrCOMM or USB is not performed." (The IrDA protocol is "IrCOMM.")
- (3) When the print mode is changed, the type of sensor is automatically changed.

LABEL mode (0):	The previously backed up sensor is designated.
TPCL mode (A):	The previously backed up sensor is designated.
TPCL1 mode (B):	The previously backed up sensor is designated.
RECEIPT mode (1):	No sensor is designated.
RECEIPT1 mode (2):	No sensor is designated.
ESC/POS mode (4):	No sensor is designated.
- (4) If the RECEIPT mode is selected or no sensor is designated in the LABEL or TPCL mode, an initial feed is not performed when the cover is closed (when the print position detection feed after the cover is closed is enabled with key operations or using the set command ([ESC] ZM03)).
- (5) When the mode change is finished, the printer sends the normal end status or an ACK to the host. However, when the mode is changed to the TPCL mode, the printer does not send the status. In IrDA: IrCOMM or USB, only when bit 7 of the print mode designation is set to "1", the printer sends the status.
- (6) The print mode can be changed by the printer itself. However, since the setting for the automatic status response in IrDA: IrCOMM or USB cannot be changed, the setting remains as the same.
- (7) As the print position detection feed parameter is effective only when changing the print mode to LABEL or TPCL, this parameter status will be ignored when changing the mode to RECEIPT, RECEIPT1 or ESC/POS.
- (8) The print position detection feed is performed according to the conditions, such as, label pitch, fine adjustment, and sensor selection, which were set in the LABEL or TPCL mode before the printer is operated in RECEIPT, RECEIPT1 or ESC/POS mode. If no sensor is selected, the print position detection feed will not be performed.
- (9) After performing a print position detection feed, the printer does not send a process end status. If an error occurs during the print position detection feed, the feed is performed after the error is cleared by pressing the PAUSE key (when the print position detection feed after the cover is closed is enabled with key operations or using the set command ([ESC] ZM03)).

- (10) When changing the print mode by the printer itself, the print position detection feed parameter cannot be set.
- (11) When the mode select command is designated with the print position detection feed at the end of a print data issued in RECEIPT1 or ESC/POS mode, and if an error occurs while printing, the printing will restart after the error is cleared and then, the print mode will be changed to the LABEL or TPCL mode and a print position detection feed is performed. When the print position detection feed setting is omitted, the mode is not changed to LABEL or TPCL (the mode select command is discarded).
- (12) When the LABEL or TPCL mode is selected in the mode select command and the print position detection feed parameter is set 0 (not performed), and if an error occurs while the printer issues in RECEIPT1 or ESC/POS mode, the print mode is changed to the LABEL or TPCL mode after the error is cleared. (The mode select command is executed.)

7.3.2 PRINTER ID SET COMMAND

[ESC] ID

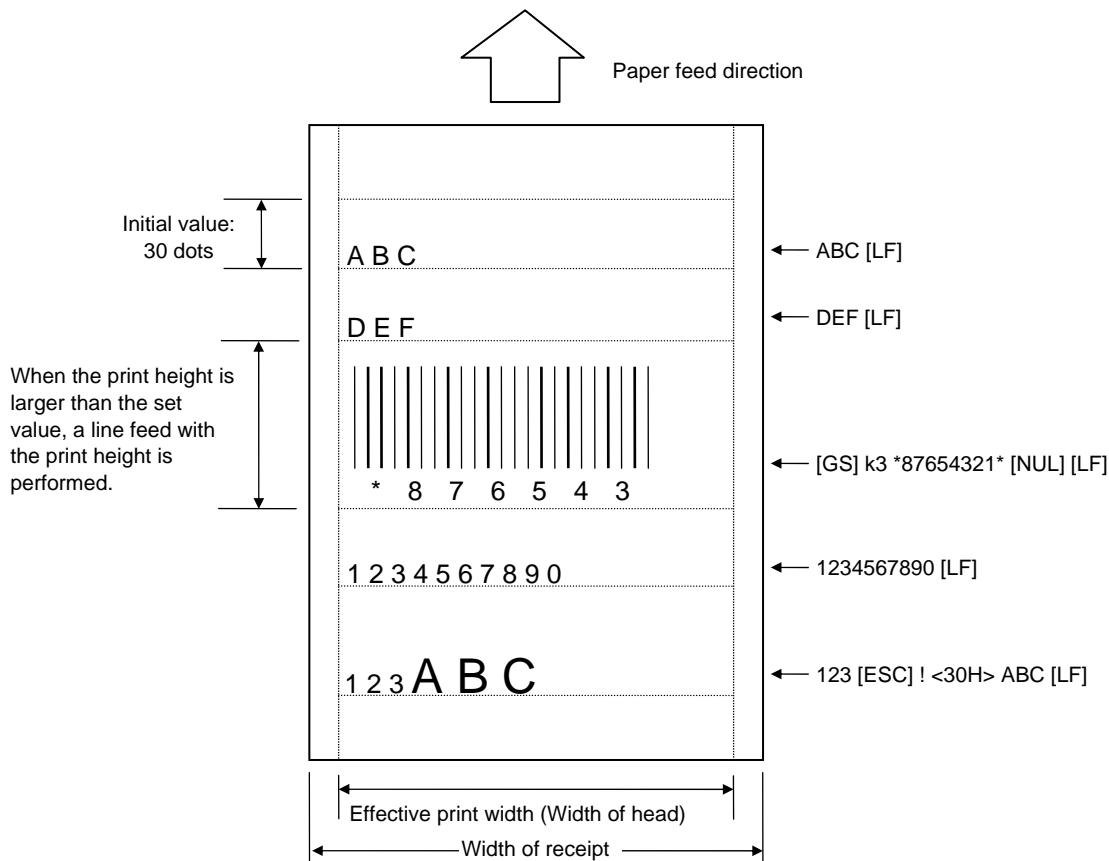
Function	Sets the ID for the printer.
Format	[ESC] ID; aa [LF] [NUL]
Term	aa: Printer ID (2-byte hex data) 0000H to FFFFH
Explanation	(1) The printer ID is the information required to identify each printer when communicating according to the IrDA: TEC Protocol.
Notes	<p>(1) The set printer ID is backed up in memory (even if the Initialize command ([ESC] WR, [ESC] @) is executed or the power is turned off).</p> <p>(2) The last 5 digits of the printer's serial number have been set as the printer ID, at the time of shipment from the factory.</p> <p>(3) In IrDA: TEC Protocol, the printer checks the set ID against the ID in the received command packet. If they do not match, the printer discards the command packet. However, when the ID in the command packet is "0", the printer accepts the command packet without checking the set IDs.</p>
Example	<p>To set "03H 51H" as the ID of the printer:</p> <p>[ESC] ID; [03H] [51H] [LF] [NUL]</p> <p>In this case, the printer ID in status printing is "00849."</p>

7.4 COMMANDS RELATED TO FINE ADJUSTMENT

7.4.1 LINE FEED LENGTH SET COMMAND

[ESC] 3

Function	Sets the length of the line feed (the number of dots) which is performed by the Print Line Feed Command ([LF]).
Format	[ESC] 3n
Term	n: Length of line feed (1 byte) 00H to FFH (0 to 255 dots)
Initial value	n: 1EH (30 dots)
Explanation	(1) When the power is turned on or the printer enters the RECEIPT mode, the initial value is 30 dots (2) When the specified length of the line feed is larger than the character on the next line or the height of the barcode plus 6 dots, a line feed with the specified length is performed. (3) When the specified length of the line feed is smaller than the character on the next line or the height of the barcode plus 6 dots, the specified length of the line feed is ignored, and a line feed with the height of the character or the barcode to be printed is performed.

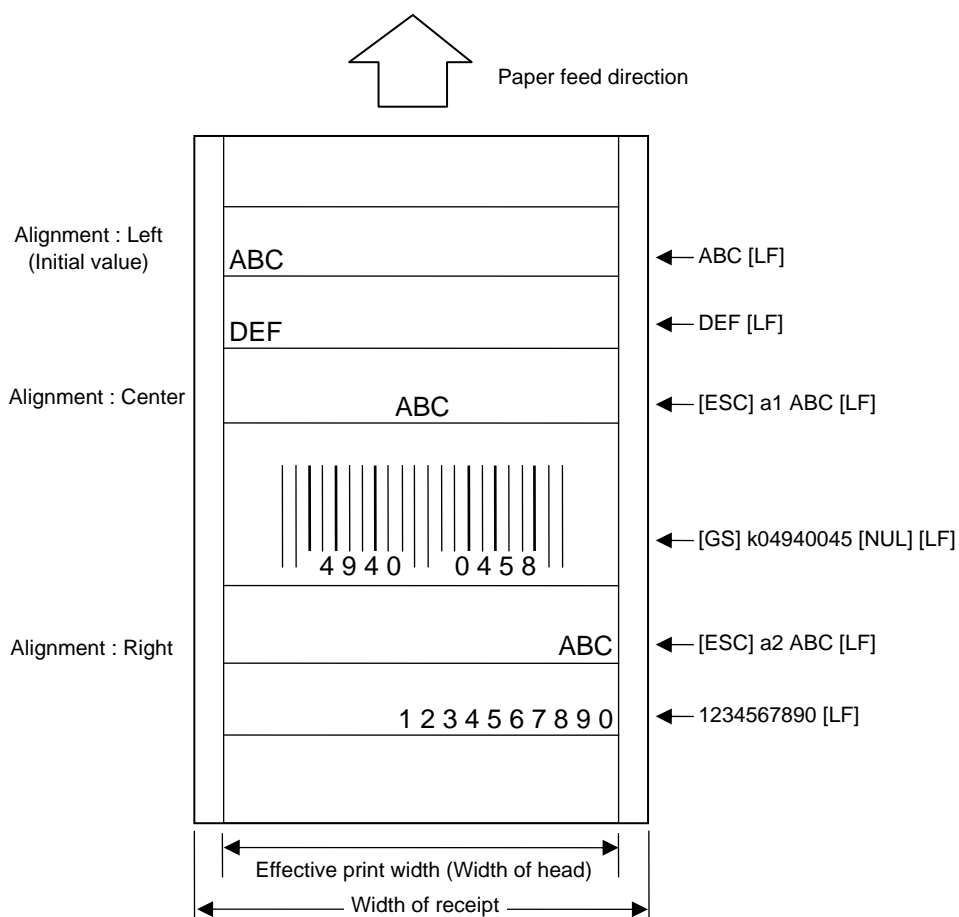


Refer to	Print Line Feed Command ([LF])
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7.4.2 PRINT POSITION ALIGN COMMAND

[ESC] a

Function	Aligns the print position on the left, the right, or at the center.
Format	[ESC] an
Term	n: Alignment 0: Left 1: Center 2: Right
Initial value	n: 0 (Left)
Explanation	(1) When “n” is set to any value other than the above, a command error occurs. (2) This command is effective for all lines which are printed after the command is received. (3) For CODE128, EAN128 and UCC/EAN128, the print position should be aligned on the left.



7.4.3 PRINT DENSITY FINE ADJUST COMMAND

[ESC] AY

Function	Adjusts the automatically set print density.
Format	[ESC] AY; abb, c (, d) [LF] [NUL]
Term	<p>a: Indicates whether to increase or decrease the density +: Increase (Darker) -: Decrease (Lighter)</p> <p>bb: Fine adjustment value for print density 00 to 30 (in units of 1 step)</p> <p>c: Print mode 0: Reserved 1: Direct thermal</p> <p>d: Head output division designation (Omissible. When omitted, settings backed up by the memory are valid.)</p> <p>2-inch print head width 0: Auto (Divided by 2 or 3) 1: Reserved (When designated, automatic selection of bipartite/tripartite division is performed.) 2: Divided by 3 (Fixed) 3: Auto1 (Not divided/Divided by 2 or 3)/Print quality oriented 4: Reserved (When designated, tripartite division is performed.) 5: Auto2 (Not divided/Divided by 2 or 3)/Print speed oriented (supported in V1.0E or later)</p> <p>4-inch print head width 0: Auto (Divided by 2, 3 or 6) 1: Reserved (When designated, automatic selection of bipartite/tripartite/6-partite division is performed.) 2: Reserved (When designated, automatic selection of bipartite/tripartite/6-partite division is performed.) 3: Auto1 (Not divided/Divided by 2, 3 or 6) 4: Divided by 6 (Fixed)</p>

Explanation	<p>(1) The standard density is finely adjusted to increase or decrease.</p> <p>(2) When any fine adjustment value for print density out of the above range is set, a command error occurs.</p> <p>(3) When designating any value other than “1: Direct thermal” the print mode is corrected to 1.</p> <p>(4) The default value of the head output division designation is “3: Auto1 (Not divided/Divided by 2 or 3)” on the 2-inch print head and “3: Auto1 (Not divided/Divided by 2, 3 or 6)” on the 4-inch print head.</p> <p>(5) When “0: Auto” is designated on the 2-inch print head, “Divided by 2” or “Divided by 3” is automatically selected for every line according to the print ratio. The width of half a dot may not be printed on the line when switching between “Divided by 2” and “Divided by 3”. Therefore, do not designate “0: Auto” when a serial barcode is printed.</p>
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- (6) When “3: Auto1” or “5: Auto2” is designated for the 2-inch print head, “Not divided,” “Divided by 3” or “Divided by 2” is automatically selected for every line according to the print ratio. The width of half a dot may not be printed on the line when switching among “Not divided,” “Divided by 2” and “Divided by 3.” Therefore, do not designate “3: Auto1” or “5: Auto2” when a serial barcode is printed.

The difference between Auto1 and Auto2 is while Auto1 is print quality oriented, Auto2 is print speed oriented. Auto2 is designated to increase the print speed although the print is slightly faded.

- (7) When “0: Auto” is designated on the 4-inch print head, “Divided by 2,” “Divided by 3” or “Divided by 6” is automatically selected for every line according to the print ratio. The width of half a dot may not be printed on the line when switching among “Divided by 2,” “Divided by 3” and “Divided by 6.” Therefore, do not designate “0: Auto” when a serial barcode is printed.
- (8) When “3: Auto1” is designated on the 4-inch print head, “Not divided,” “Divided by 2,” “Divided by 3” or “Divided by 6” is automatically selected for every line according to the print ratio. The width of half a dot may not be printed on the line when switching among “Not divided,” “Divided by 2,” “Divided by 3” and “Divided by 6.” Therefore, do not designate “3: Auto1” when a serial barcode is printed.

Notes

- (1) The set fine adjustment value for print density and the head output division designation are backed up in memory (retained even if the power is turned off).
- (2) The fine adjustment value changed by the Print Density Fine Adjust Command in the RECEIPT mode, is also effective for the TPCL, LABEL and ESC/POS modes.
- (3) When the head output division designation is omitted, the backed up value in memory is used.
- (4) When print density fine adjustment is selected in the SYSTEM mode (through key operations on the printer), the fine adjustment value is a sum of the value in the fine adjustment command and the system mode fine adjustment value. Note that the maximum fine adjustment value is ± 30.0 mm

Examples

To set the density to - 2:

[ESC] AY; -02, 1 [LF] [NUL]

To set the density to + 3:

[ESC] AY; +03, 1 [LF] [NUL]

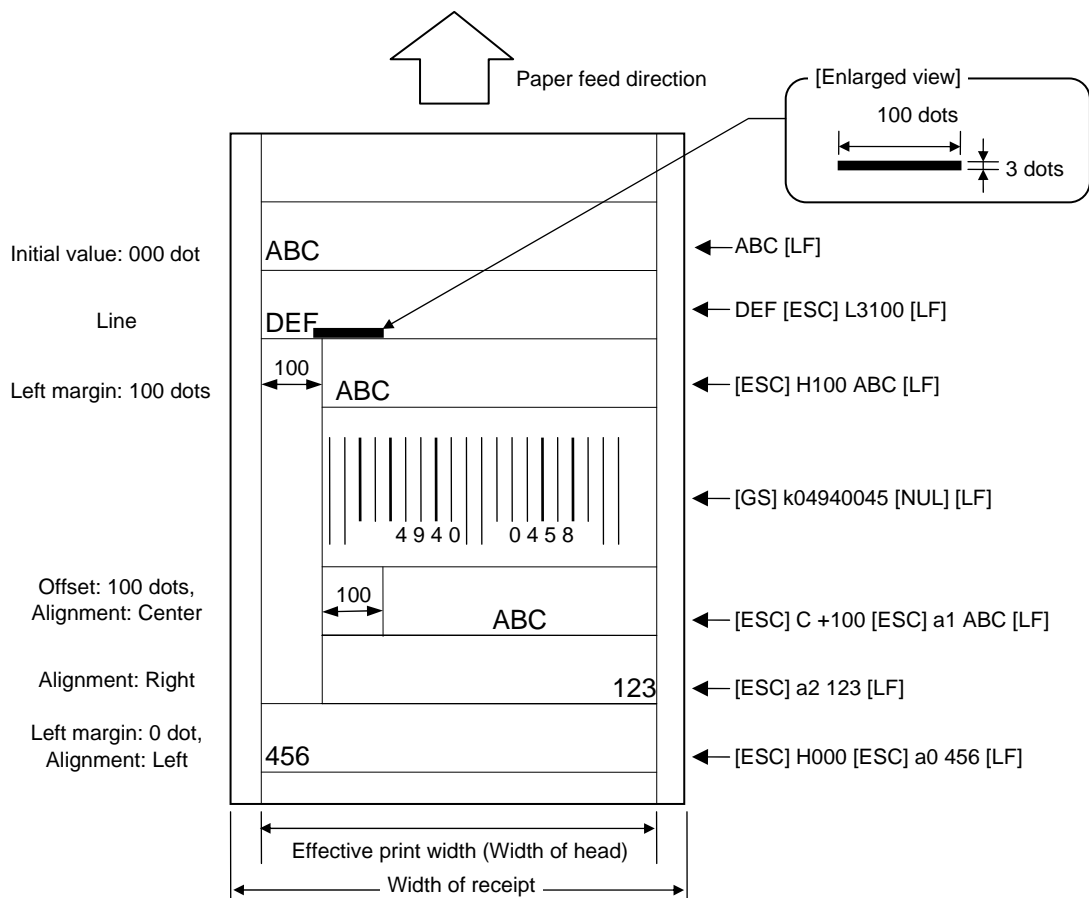
7.5 COMMANDS RELATED TO DRAWING FORMAT

7.5.1 LINE FORMAT COMMAND

[ESC] L

Function	Specifies the line format and draws it.
Format	[ESC] Labbb [ESC] Lcddeeee
Term	<p>a: Line width 1 to 9 (in units of dots)</p> <p>bbb: Line length 001 to 999 (in units of dots)</p> <p>c: Expansion parameter e (Command parameter expansion designated)</p> <p>dd: No. of line width dots 01 to 99 (in units of dots) Note that any value of 9 or more is corrected to 9.</p> <p>eeee: No. of line length dots 0001 to 1296 (in units of dots)</p>

Explanation (1) The print position of the line is shown below:



Note

- (1) If the print ratio of one line (the print head width) is higher than defined, printing may become poor, or the printer may be reset. When a horizontal line is to be drawn, note the print ratio.
- (2) When any line length exceeding the effective print width, the length is corrected to the maximum head width that varies depending on model.

	B-EP2DL-GHxx	B-EP4DL-GHxx
Max. head width	48.0 mm	104.0 mm

7.5.2 FONT TYPE COMMAND

[ESC] K

Function	Specifies the font used for printing.		
Format	[ESC] Kn		
Initial value	n:	A: Standard character	
Term	n:	Font type	
		A: Standard Character	(12 × 24 dots)
		B: Bold Character	(48 × 96 dots)
		C: Writable Character	(24 × 24 dots)
		D: Price Font 1	(16 × 40 dots)
		E: Price Font 2	(32 × 48 dots)
			203-dpi print head
		F: Times Roman (Bold)	21 points
		G: Helvetica (Bold)	18 points
		H: Letter Gothic (Medium)	14.3 points
		I: Courier (Medium)	15 points
		J: Presentation (Bold)	27 points
		O: GOTHIC725 Black	6 points
		Q: Chinese/Writable Character	(24 × 24 dots)
		R: Korean/Writable Character	(24 × 24 dots)
		S: (Reserved)	
		T: (Reserved)	
		U: (Reserved)	
Explanation	(1)	When “n” is set to any value other than the above, a command error occurs.	

7.5.3 OUTLINE FONT FORMAT COMMAND

[ESC] KV

Function	Sets the outline font.
Format	[ESC] KVabbbccc
Initial value	None
Term	<p>a: Font type</p> <p>A: TEC Font 1 (Helvetica [Bold])</p> <p>B: TEC Font 1 (Helvetica [Bold], Proportional)</p> <p>K: Reserved</p> <p>bbb: Character width</p> <p>016 to 240 (in units of dots)</p> <p>ccc: Character height</p> <p>016 to 240 (in units of dots)</p>
Explanation	(1) When "a," "bbb," and "ccc" are set to any value other than the above, a command error occurs.

7.5.4 BARCODE/TWO-DIMENSIONAL CODE PRINT COMMAND [GS] k

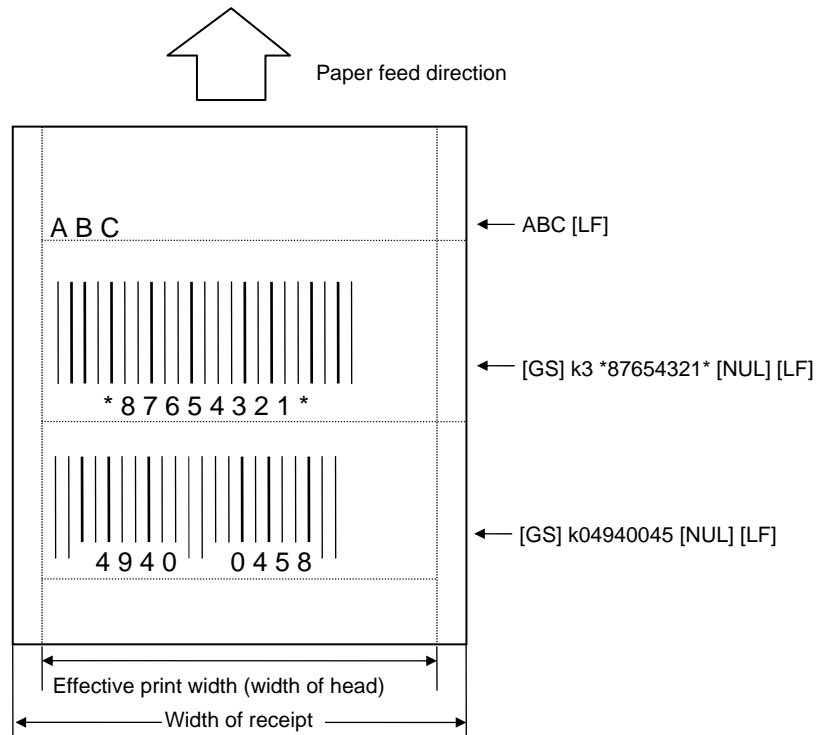
Function	Prints the specified barcode/two-dimensional code.
----------	--

Format	[GS] kn <bar data> [NUL]
--------	--------------------------

Term	<p>n: Type of barcode/two-dimensional code</p> <p>0: JAN8/EAN8</p> <p>1: MSI</p> <p>2: Interleaved 2 of 5 (ITF)</p> <p>3: CODE39 (Standard)</p> <p>4: NW7</p> <p>5: JAN13/EAN13</p> <p>6: UPC-E</p> <p>7: EAN13 + 2 digits</p> <p>8: EAN13 + 5 digits</p> <p>9: CODE128 (with auto code selection)</p> <p>A: CODE128 (with auto code selection)</p> <p>B: CODE39 (Full ASCII)</p> <p>C: CODE93</p> <p>G: UPC-E + 2 digits</p> <p>H: UPC-E + 5 digits</p> <p>I: EAN8 + 2 digits</p> <p>J: EAN8 + 5 digits</p> <p>K: UPC-A</p> <p>L: UPC-A + 2 digits</p> <p>M: UPC-A + 5 digits</p> <p>N: EAN128</p> <p>n: UCC/EAN128</p> <p>P: PDF417 (Two-dimensional code)</p> <p>T: QR code (Two-dimensional code)</p>
------	---

<bar data>: Barcode/two-dimensional code data

- | | |
|-------------|--|
| Explanation | <p>(1) When “n” is set to any value other than the above, a command error occurs.</p> <p>(2) When the type of barcode is JAN8, EAN8, EAN8 + 2 digits, EAN8 + 5 digits, JAN13, EAN13, EAN13 + 2 digits, EAN13 + 5 digits, EAN128, UCC/EAN128, CODE128, UPC-E, UPC-E + 2 digits, UPC-E + 5 digits, UPC-A, UPC-A + 2digits or UPC-A + 5 digits, a check digit is automatically attached.</p> <p>(3) When the type of barcode is CODE39, NW7, Interleaved 2 of 5 or MSI, a check digit is not attached. When a NW7 is used, the start/stop codes are not attached. Therefore, the host should attach them to the data.</p> <p>(4) For CODE128, EAN128 and UCC/EAN128, only barcodes aligned on the left can be printed.</p> <p>(5) For QR code, the mode, the mask number, and the connection settings are as follows: Automatic mode, automatically-set mask number, no connection.</p> |
|-------------|--|



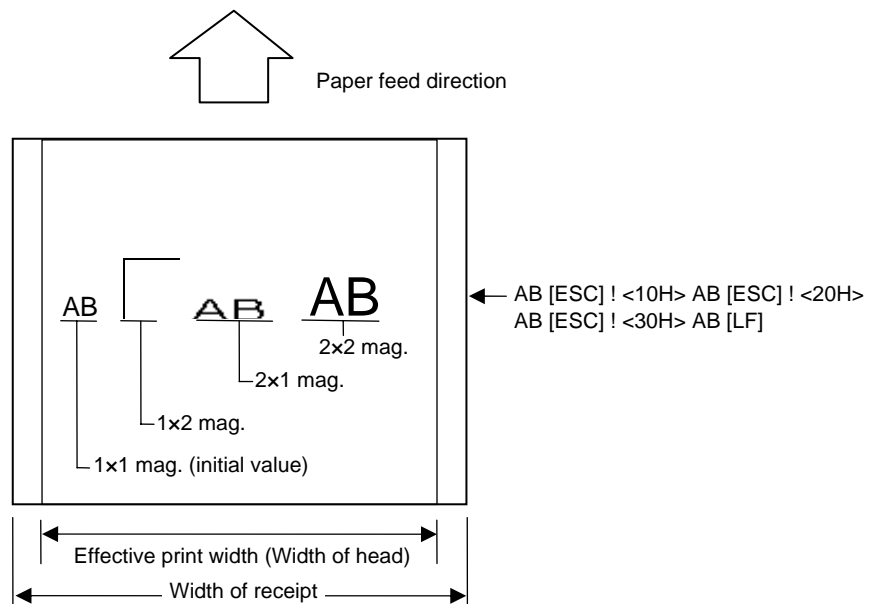
Refer to

Barcode Horizontal Size Command ([GS] w)
Barcode Height Command ([GS] h)
Numerals Under Bars Command ([GS] H)
Security Level Command ([GS] s)
No. of Columns (Strings) Command ([GS] c)
Error Correction Level Set Command (for QR code) ([GS] q)
QR Code Model Set Command ([GS] r)

7.5.5 CHARACTER MAGNIFICATION COMMAND

[ESC] !

Function	Designates the magnification of the character to be printed.
Format	[ESC] !n
Term	<p>n: Character magnification (1 byte)</p> <p>00H: 1 magnification (horizontal) × 1 magnification (vertical)</p> <p>10H: 1 magnification (horizontal) × 2 magnification (vertical)</p> <p>20H: 2 magnification (horizontal) × 1 magnification (vertical)</p> <p>30H: 2 magnification (horizontal) × 2 magnification (vertical)</p> <p>40H: 2 magnification (horizontal) × 3 magnification (vertical)</p> <p>50H: 3 magnification (horizontal) × 2 magnification (vertical)</p> <p>60H: 3 magnification (horizontal) × 3 magnification (vertical)</p> <p>70H: 3 magnification (horizontal) × 4 magnification (vertical)</p> <p>80H: 4 magnification (horizontal) × 3 magnification (vertical)</p> <p>90H: 4 magnification (horizontal) × 4 magnification (vertical)</p>
Initial value	n: 00H (1 magnification (horizontal) × 1 magnification (vertical))
Explanation	<p>(1) When “n” is set to any value other than the above, a command error occurs.</p> <p>(2) After this command is received, it is effective until the setting is changed again by the Character Magnification Command in spite of a line feed or printing.</p>



7.5.6 BARCODE HORIZONTAL SIZE COMMAND

[GS] w

Function	Sets the horizontal size of the barcode. For QR code, the 1-cell width is set.
Format	[GS] wn
Term	n: Horizontal size of the barcode (1 byte) 02H to 05H
Initial value	n: 02H
Explanation	(1) When “n” is set to any value other than the above, a command error occurs. (2) The horizontal size designated by this command is as follows. 1 dot = 1/8 mm on the 203-dpi printer.

The maximum value varies depending on model and barcode type.

	Model	B-EP2DL-GHxx	B-EP2DL-GHxx
	Range	02H to 05H	02H to 0AH
	Initial value	02H	02H
JAN-system *1	Max. value	03H	06H
NW7-system *2	Max. value	05H	0AH
PDF417	Max. value	03H	06H
QR code	Max. value	05H	0AH

*1 The JAN system refers to JAN8, EAN8, EAN8 + 2 digits, EAN8 + 5 digits, JAN13, EAN13, EAN13 + 2 digits, EAN13 + 5 digits, EAN128, UCC/EAN128, CODE128, UPC-E, UPC-E + 2 digits, UPC-E + 5 digits, UPC-A, UPC-A + 2 digits, UPC-A + 5 digits and CODE93.

*2 The NW7 system refers to NW7, CODE39, Interleaved 2 of 5 and MSI.

[JAN8, EAN8, EAN8 + 2 digits, EAN8 + 5 digits, JAN13, EAN13, EAN13 + 2 digits, EAN13 + 5 digits, EAN128, UCC/EAN128, CODE128, UPC-E, UPC-E + 2 digits, UPC-E + 5 digits, UPC-A, UPC-A + 2 digits, UPC-A + 5 digits, CODE93]

n	1 module		2 modules		3 modules		4 modules	
	Bar	Space	Bar	Space	Bar	Space	Bar	Space
02H	2		4		6		8	
03H	3		6		9		12	
04H	4		8		12		16	
05H	5		10		15		20	
06H	6		12		18		24	
07H	7		14		21		28	
08H	8		16		24		32	
09H	9		18		27		36	

(Unit: dots)

[NW7, CODE39, Interleaved 2 of 5, MSI]

n	Narrow		Wide		Character-to-character space
	Bar	Space	Bar	Space	
02H	2	2	5	5	2
03H	2	2	6	6	2
04H	3	3	8	8	3
05H	3	3	9	9	3
06H	4	4	11	11	4
07H	4	4	12	12	4
08H	5	5	14	14	5
09H	5	5	15	15	5
0AH	6	6	17	17	6
0BH	6	6	18	18	6
0CH	7	7	20	20	7
0DH	7	7	21	21	7
0EH	8	8	23	23	8
0FH	8	8	24	24	8

(Unit: dots)

* The character-to-character space does not exist in Interleaved 2 of 5 and MSI.

[PDF417]

n	1 module		2 modules		3 modules		4 modules		5 modules		6 modules	
	Bar	Space	Bar	Space	Bar	Space	Bar	Space	Bar	Space	Bar	Space
02H	2		4		6		8		10		12	
03H	3		6		9		12		15		18	
04H	4		8		12		16		20		24	
05H	5		10		15		20		25		30	
06H	6		12		18		24		30		36	
07H	7		14		21		28		35		42	
08H	8		16		24		32		40		48	
09H	9		18		27		36		45		54	

(Unit: dots)

[QR code]

n	1-cell size
02H	2
03H	3
04H	4
05H	5
06H	6
07H	7
08H	8
09H	9

(Unit: dots)

Refer to:

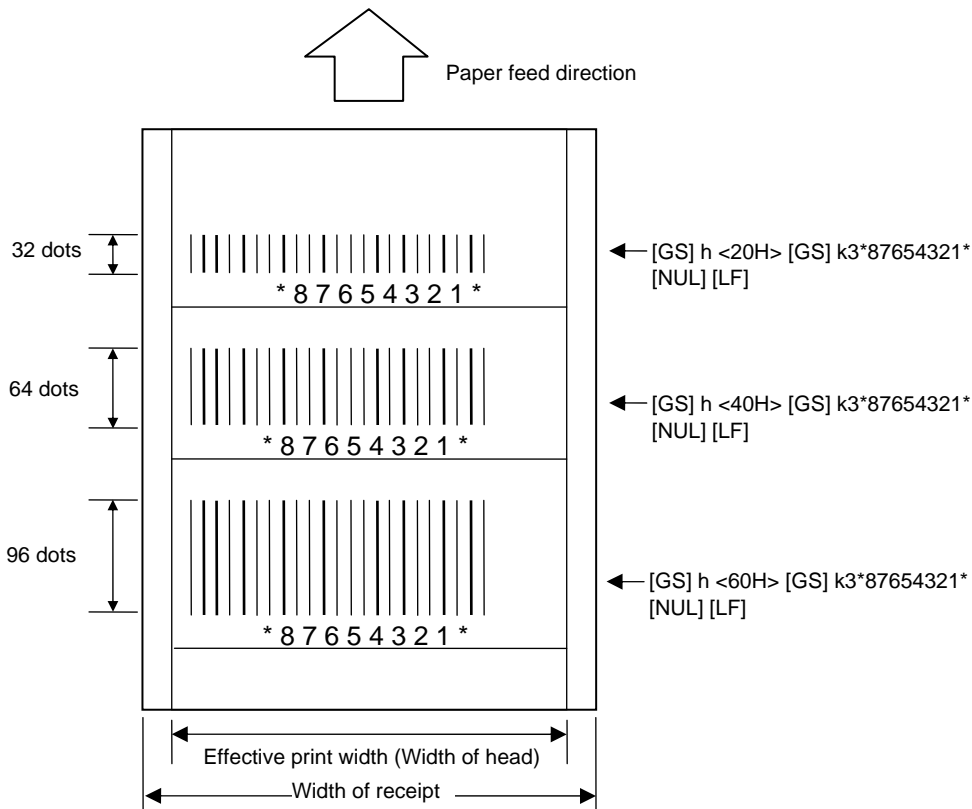
Barcode/Two-Dimensional Code Print Command ([GS] k)

7.5.7 BARCODE HEIGHT COMMAND

[GS] h

Function	Sets the barcode height.
Format	[GS] hn
Term	n: Barcode height (1 byte) 01H to FFH (1 to 255 dots)
Initial value	n: 68H (104 dots)
Explanation	(1) When “n” is set to any value other than the above, a command error occurs.

* For PDF417, the bar height for one row is set by this command. Note that the height of the whole barcode cannot be set by this command. The PDF417 can have the maximum of 90 rows. Therefore, if 88 or more dots are specified, the PDF417 may not be stored in the image buffer. In that case, the printer’s operation is not guaranteed.

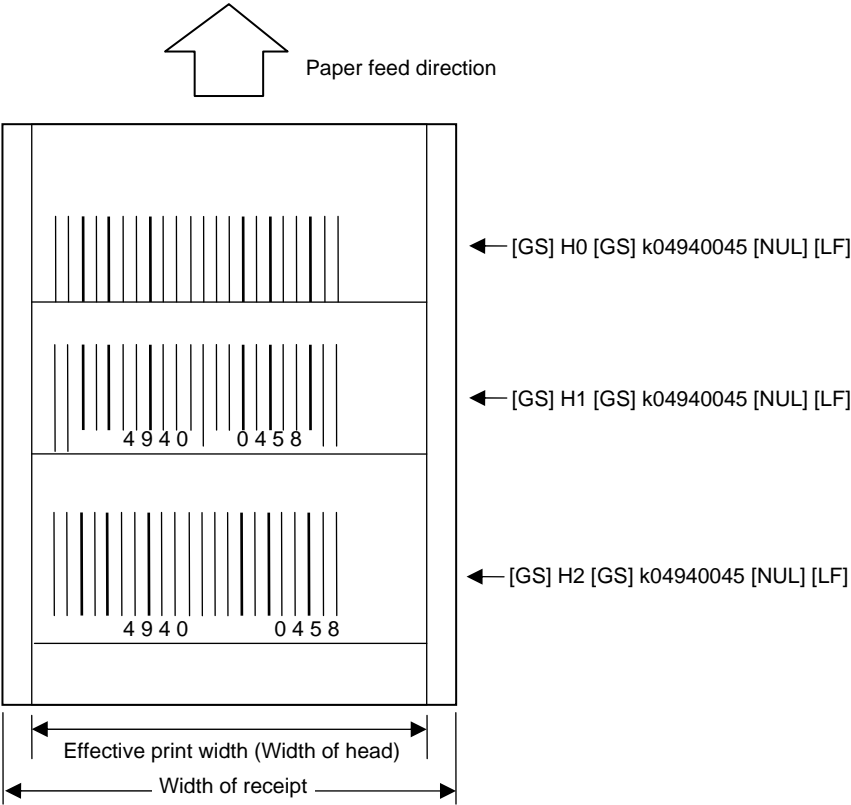


Refer to	Barcode/Two-Dimensional Code Print Command ([GS] k)
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7.5.8 NUMERALS UNDER BARS COMMAND

[GS] Hn

Function	Sets numerals under bars.
Format	[GS] Hn
Term	n: Selection to print numerals under bars 0: Non-print 1: Print (with EAN guard bar) 2: Print (without EAN guard bar)
Initial value	n: 1: Print (with EAN guard bar)
Explanation	(1) When “n” is set to any value other than the above, a command error occurs. (2) For NW7, CODE39, Interleaved 2 of 5 and MSI, if “n” is set to “1” or “2,” printing is the same. The length of the guard bar is fixed as follows: • B-EP2DL-GHxx, B-EP4DL-GHxx: 16 dots (2 mm)



Refer to	Barcode/Two-Dimensional Code Print Command ([GS] k)
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7.5.9 SECURITY LEVEL COMMAND

[GS] s

Function	Sets the security level.
Format	[GS] sn
Initial value	n: 00H
Term	n: Security level to be set 00: Level 0 01: Level 1 02: Level 2 03: Level 3 04: Level 4 05: Level 5 06: Level 6 07: Level 7 08: Level 8
Explanation	(1) When “n” is set to any value other than the above, a command error occurs. (2) This command is effective for the PDF417 only. If this command is send for printing other barcode/two-dimensional codes, the command will be ignored.
Refer to	Barcode/Two-Dimensional Code Print Command ([GS] k)

7.5.10 NO. OF COLUMNS (STRINGS) COMMAND

[GS] c

Function	Sets the number of columns (strings).
Format	[GS] cn
Initial value	n: 06H
Term	n: No. of columns (strings) 01H to 1EH (01 to 30)
Explanation	(1) When “n” is set to any value other than the above range, a command error occurs. (2) This command is effective for the PDF417 only. If this command is sent for printing other barcode/two-dimensional codes, the command will be ignored.
Refer to:	Barcode/Two-Dimensional Code Print Command ([GS] k)

7.5.11 PRINT WIDTH COMMAND

[ESC] W

Function Sets the print width.

Format [ESC] Wnnn

Initial value nnn:

384	B-EP2DL-GHxx
832	B-EP4DL-GHxx

Term nnn: No. of dots for the print width matching the receipt width (Fixed at 3 digits).

216 ≤ nnn	≤ 384	B-EP2DL-GHxx
	≤ 832	B-EP4DL-GHxx

- Explanation**
- (1) When “nnn” is set to any value other than the above range, a command error occurs.
 - (2) The print width can be set, matching the receipt width. Using this command, the data can be printed properly at the position where the alignment (right or center) is specified. However, when paper width is smaller than the print head width, it is necessary to adjust the print start position to the paper width via X-direction Fine Adjustment through key operations, the Horizontal Print Position command or the Horizontal Offset Position command. This should be done since the print width is set using the center of the print head as an origin, not based on the left edge of the print head.
 - (3) If the printer receives this command while receiving one part of 1-line data, the printer prints the data which has been received before receiving this command, then sets the print width. However, printing of the line is not guaranteed.
 - (4) If the data is not included in the specified print width, the excess data is not printed.

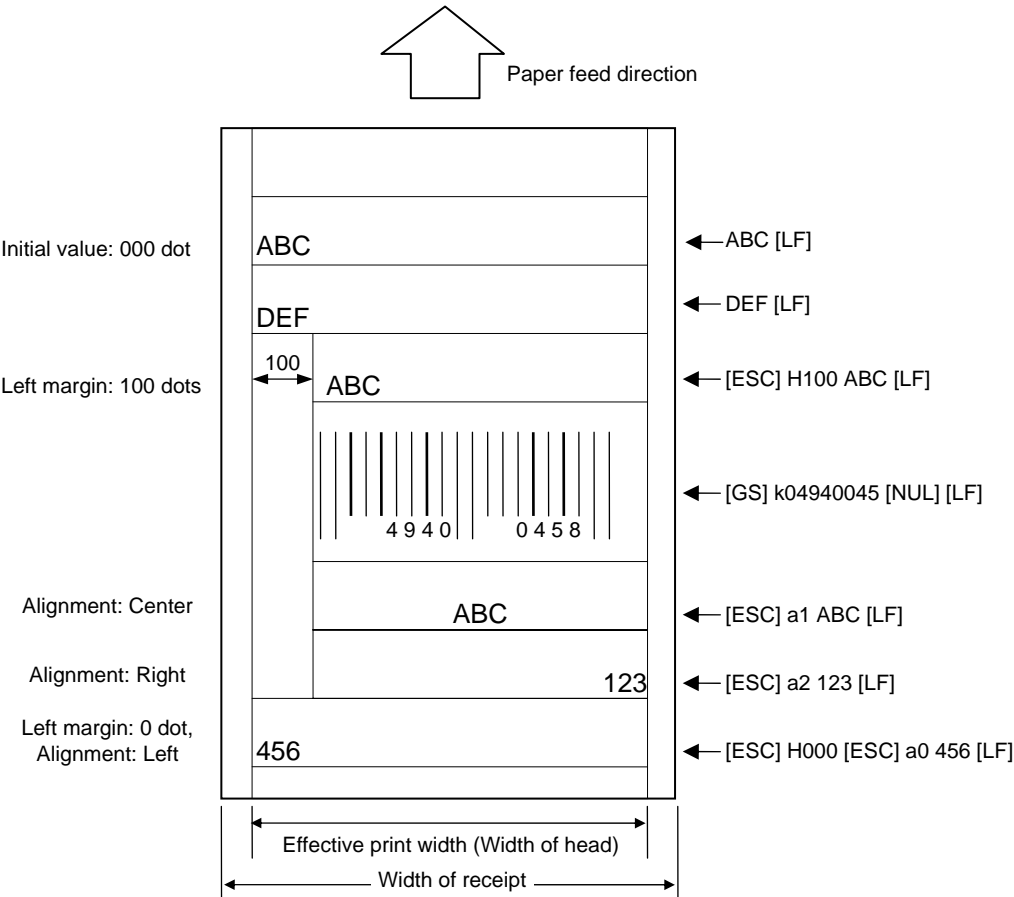
- Refer to**
- Horizontal Print Position Command ([GS] H)
 - Horizontal Offset Position Command ([GS] O)

7.5.12 HORIZONTAL PRINT POSITION COMMAND

[ESC] H

Function	Sets the left margin of the line (space from the left edge).					
Format	[ESC] Hnnn					
Initial value	nnn: 000 dot					
Term	nnn: No. of dots for the margin (space) from the left edge of the paper to the print start position (Fixed at 3 digits)					
	<table><tr><td rowspan="2">000</td><td>to 383</td><td>B-EP2DL-GHxx</td></tr><tr><td>to 831</td><td>B-EP4DL-GHxx</td></tr></table>	000	to 383	B-EP2DL-GHxx	to 831	B-EP4DL-GHxx
000	to 383		B-EP2DL-GHxx			
	to 831	B-EP4DL-GHxx				

Explanation	<p>(1) When “nnn” is set to any value other than the above range, a command error occurs.</p> <p>(2) This command is effective for all lines to be printed after it is received, until this command is received again, the setting is initialized by the Mode Select Command, or the power is turned off.</p> <p>(3) When the alignment (left, right, center) is specified by the Position Align Command, the alignment is performed within the effective range excluding the left margin set by this command.</p> <p>(4) In the case that the left margin is set for printing character strings and barcodes, if the data is not included within one line excluding the left margin, the excess data may be printed in the left margin on the next line. Do not send the data which is not included within one line.</p> <p>(5) When this command is received while one part of 1-line data is being received, it becomes effective from the next line.</p> <p>(6) If the print start position specified by this command is on the right of the right end of the print width specified by the Print Width Command ([ESC] W), a command error occurs.</p>
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7.5.13 HORIZONTAL OFFSET POSITION COMMAND

[ESC] O

Function	Sets the left margin (space from the left edge) of only the line.
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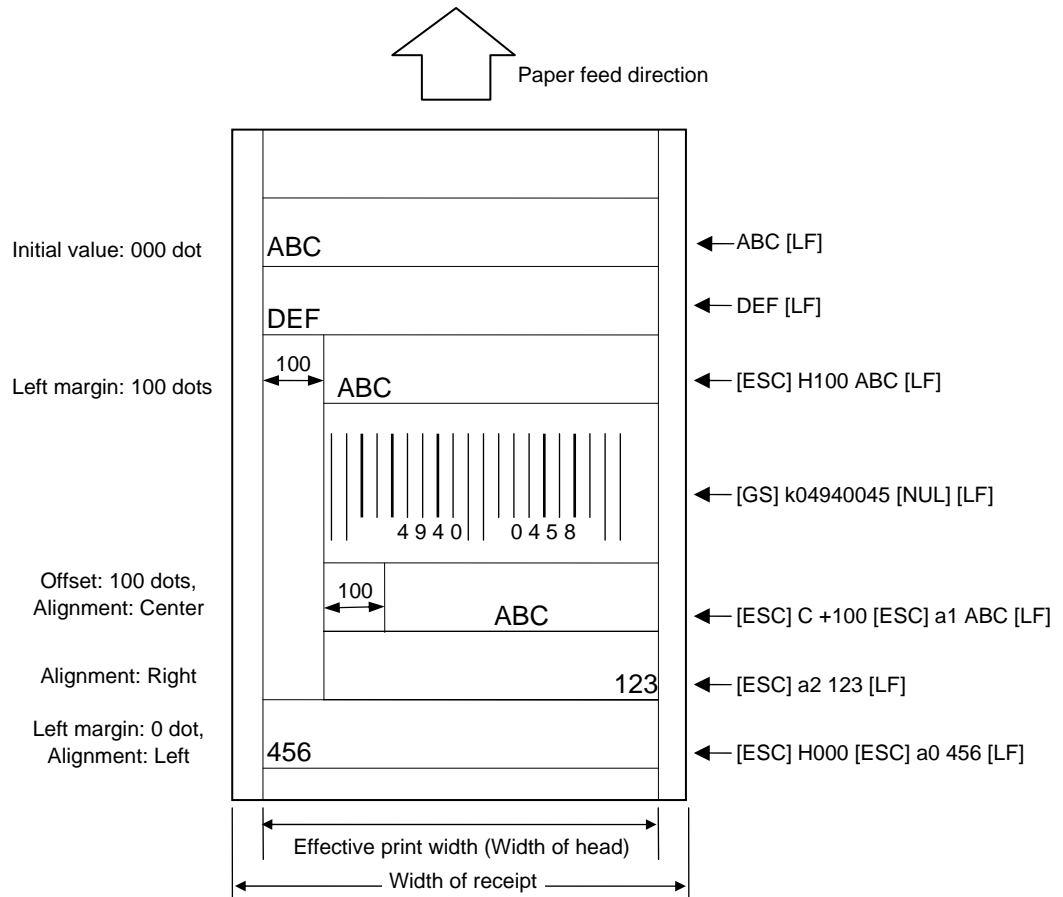
Format	[ESC] Oabbb [ESC] Ocadddd
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Initial value	abbb: +000
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Term	<p>a: Indicates whether the number of offset dots is increased or decreased</p> <p style="padding-left: 40px;">+: Increased</p> <p style="padding-left: 40px;">-: Decreased</p> <p>bbb: No. of offset dots from the position specified by [ESC] H (Fixed at 3 digits)</p>
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-383 to +383	B-EP2DL-GHxx
-831 to +831	B-EP4DL-GHxx

Explanation	<p>(1) When “a” or “bbb” is set to any value other than the above range, a command error occurs.</p> <p>(2) If other data is received after the horizontal offset position is specified again by this command even though the data has already been drawn on the line, it is printed at the position specified by this command. Therefore, it is printed over the already drawn data.</p> <p>(3) This command is effective until a line feed is performed. After a line feed is performed, printing is performed at the print start position specified by the Horizontal Print Position Command ([ESC] H).</p> <p>(4) If the print start position specified by this command is on the right of the right end of the print width specified by the Print Width Command ([ESC] W), a command error occurs.</p> <p>(5) If the print start position specified by this command is on the left of the print start position specified by the Horizontal Print Position Command ([ESC] H), or the left edge of the paper, a command error occurs.</p>
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7.5.14 CHARACTER ROTATE COMMAND

[ESC] R

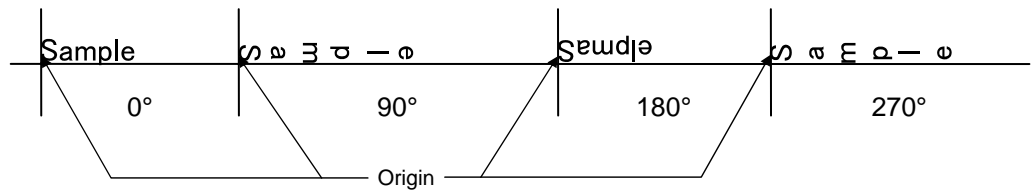
Function	Specifies the rotational angle of characters.
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Format	[ESC] Rn
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Initial value	n: 0
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Term	n: Rotational angle of characters 0: 0° 1: 90° 2: 180° 3: 270°
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Explanation	(1) When “n” is set to any value other than the above, a command error occurs. (2) The characters are rotated as shown below:
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* When characters are rotated, they are not aligned to the reference line, because each font has a different parameter for the print position. If the character magnification is changed, they are not aligned to the reference line either.

7.5.15 ERROR CORRECTION LEVEL SET COMMAND

[GS] q

Function	Sets the error correction level.
Format	[GS] qn
Term	n: Error correction level to be set L: High density level M: Standard level Q: Reliability level H: High reliability level
Initial value	n: M (Standard level)
Explanation	(1) When “n” is set to any value other than the above, a command error occurs. (2) This command is effective for the QR code only. If this command is set when printing other barcode/two-dimensional codes, the command will be ignored.
Refer to	Barcode/Two-Dimensional Code Print Command ([GS] k)

7.5.16 QR CODE MODEL SET COMMAND

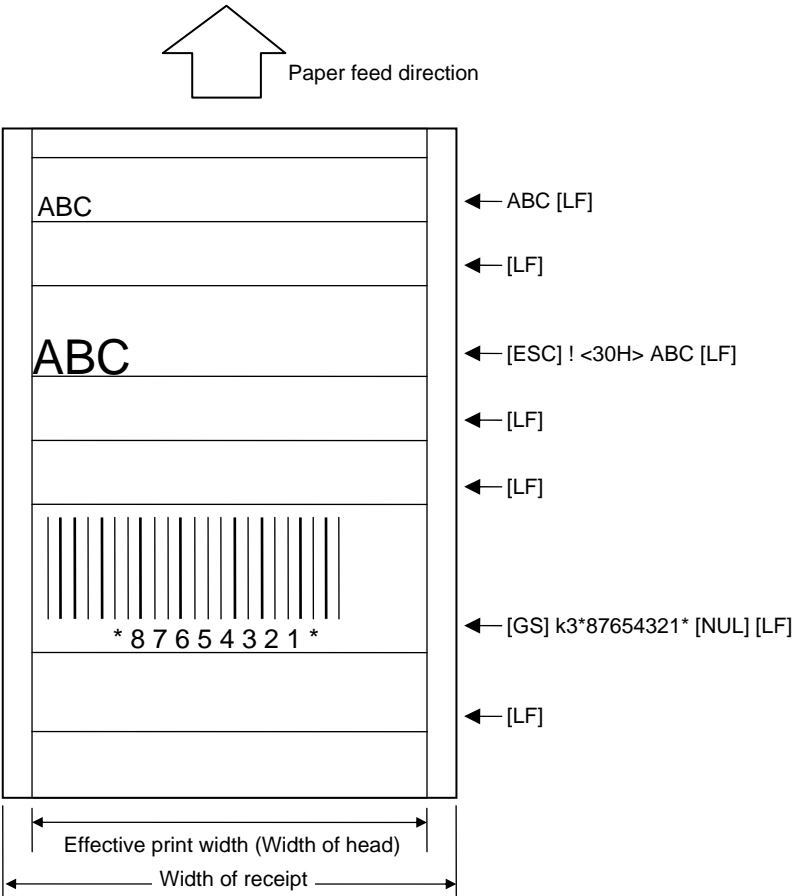
[GS] r

Function	Sets the model of the QR code.
Format	[GS] rn
Term	n: Model to be set 1: Model 1 2: Model 2
Initial value	n: 1 (Model 1)
Explanation	(1) When “n” is set to any value other than the above, a command error occurs. (2) This command is effective for the QR code only. If this command is set when printing other barcode/two-dimensional codes, the command will be ignored.
Refer to	Barcode/Two-Dimensional Code Print Command ([GS] k)

7.6 COMMANDS RELATED TO ISSUE AND FEED

7.6.1 PRINT LINE FEED COMMAND [LF]

Function	Prints the received data and performs a line feed.
Format	[LF]
Explanation	<p>(1) When the Print Line Feed Command is received without data to be printed, only the length of the line feed which has been set is performed.</p> <p>(2) In the RECEIPT mode, the printer is operated without designating the sensor.</p> <p>(3) Since the printer does not perform a line feed automatically, be sure to send the Print Line Feed Command for each data which can be included within one line. If data which is not included within one line is received, characters cannot be printed in the proper position.</p> <p>(4) Although this command is received in page mode, it is ignored.</p>



Refer to	Line Feed Length Set Command ([ESC] 3)
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7.6.2 BACK FEED OMISSION COMMAND

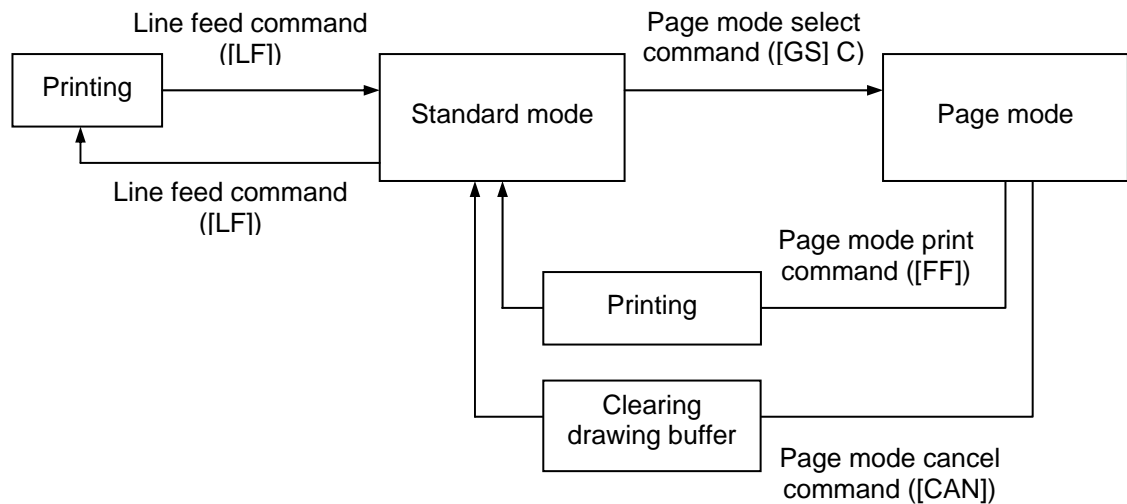
[ESC] B

Function	Omits a back feed before printing.
Format	[ESC] B
Explanation	<p>(1) Usually, in the RECEIPT mode, the printer feeds for about 1-mm backward before starting to print or before printing after a pause. This is intended to adjust the print start position (line feed), however, the first back feed may be unnecessary depending on the print layout. Also, a back feed can reduce the throughput. So, the first back feed can be omitted by this command, if unnecessary.</p> <p>(2) This command can be sent only once for one receipt prior to other receipt commands or print data. If this command is sent in the middle of other commands, the printer operation is not guaranteed (Necessary back feeds are not performed, and, as a result, the print may be overlapped or the print position is misaligned.) This command is effective in the first receipt to be printed after the command is received. That is, this command needs to be issued for every receipt before printing because the command is effective only one receipt.</p> <p>NOTE: When printing more than one receipt continuously, the printer does not stop at the top of each receipt because the printer does not recognize the receipt one by one. In this case, the Back Feed Omission Command should be issued only for the first receipt, not for every receipt. (The printer recognizes the Back Feed Omission Command is sent in the middle of other commands, and it may print improperly.)</p> <p>(3) If a cover open error or a paper end error occurred before printing, a back feed is performed after the error is cleared, even if this command has been issued. Also, the printer performs a back feed when printing is restarted after clearing an error which occurred during printing.</p>

7.6.3 PAGE MODE SELECT COMMAND

[GS] C

Function	Changes to page mode.
Format	[GS] C
Explanation	<p>(1) When any data remains unprinted before the Page Select command is received, the data is printed before changing to page mode.</p> <p>(2) The printer performs a line feed only without printing in page mode even if the Line Feed command ([LF]) is received.</p> <p>(3) By sending the Page Mode Print Command ([FF]), print data received in page mode can be printed collectively.</p> <p>(4) To cancel the page mode and return to usual print and line feed operations using the Print and Line Feed Command ([LF]) for each line, or to disable issue of data received in page mode, page mode can be canceled by sending the Page Mode Cancel Command ([CAN]) until the Page Mode Print Command is received.</p> <p>(5) When this command is received in page mode, it is ignored.</p> <p>(6) Length to be printed collectively is 1000.0 mm. When data length to be printed exceeds the above value, the subsequent data is discarded and printing is not performed until the Page Mode Print Command ([FF]) is received.</p>



7.6.4 PAGE MODE PRINT COMMAND

[FF]

Function	Starts printing in page mode.
Format	[FF]
Explanation	<ol style="list-style-type: none">(1) This command is used to print data received in page mode.(2) After printing the data received in page mode, the printer returns to usual print and line feed operations using the Print and Line Feed Command ([LF]) for each line.(3) This command is ignored when it is received while the printer is not in page mode.

7.6.5 PAGE MODE CANCEL COMMAND

[CAN]

Function	Cancels page mode.
Format	[CAN]
Explanation	<ol style="list-style-type: none">(1) Data received in page mode is cleared.(2) Values set before the Page Mode Select Command is sent, or set in page mode are retained.(3) This command is ignored when it is received while the printer is not in page mode.(4) To cancel the page mode and return to usual print and line feed operations using the Print and Line Feed Command ([LF]) for each line, or to disable issue of data received in page mode, page mode can be canceled by sending the Page Mode Cancel Command ([CAN]) until the Page Mode Print Command ([FF]) is received.

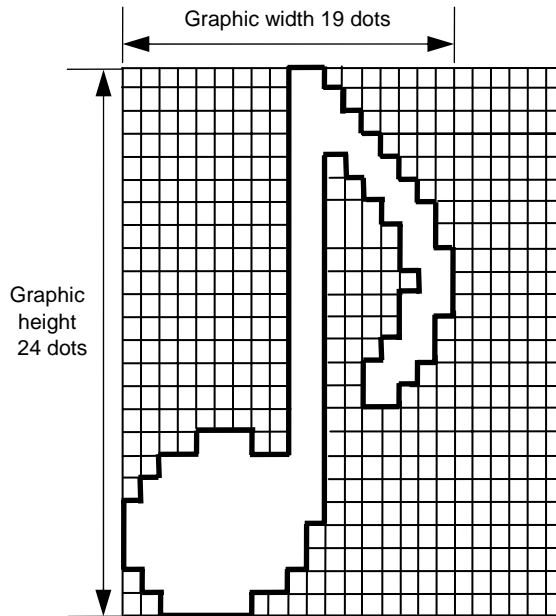
7.7 COMMANDS RELATED TO FORMAT

7.7.1 FLASH MEMORY FORMAT COMMAND

[ESC] J1

Function	Formats (Initializes) flash ROM on the CPU board.
Format	[ESC] J1; a [LF] [NUL]
Term	a: Format (Initialization) designation A: Form storage area B: Writable character storage area C: Graphic storage area D: All storage areas (Form, Writable character, Graphic)
Explanation	(1) When the storage area in flash ROM becomes full, the old data is automatically deleted and only the newest data is left. Only the form storage area in flash ROM can be forcefully cleared by this command. However, if this command is sent, all data of the stored forms, including the newest data, is deleted (initialized). (2) The remaining capacity of flash memory after formatting is displayed on the LCD. (3) Whenever already registered data (PC saving, writable character or logo) is registered again, memory is consumed unless a format command is sent. (4) When label issue is performed after a format command is sent, the image buffer is cleared automatically.
Note	(1) Since the writable character storage area is shared by the LABEL and TPCL modes, writable characters registered in the LABEL or TPCL mode are erased.

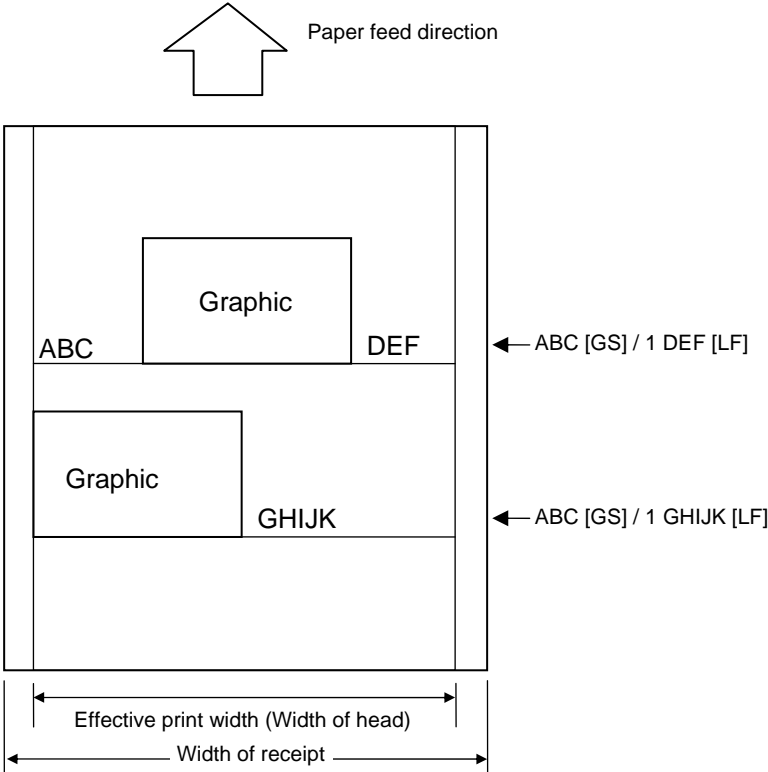
Example



```
[ESC] SG; 1, 0019, 0024,
[00H] [60H] [00H] [00H] [70H] [00H] [00H] [78H] [00H]
[00H] [7CH] [00H] [00H] [6EH] [00H] [00H] [67H] [00H]
[00H] [63H] [80H] [00H] [61H] [80H] [00H] [61H] [C0H]
[00H] [60H] [C0H] [00H] [61H] [C0H] [00H] [61H] [80H]
[00H] [63H] [80H] [00H] [67H] [C0H] [00H] [66H] [00H]
[0FH] [60H] [00H] [0EH] [60H] [00H] [3FH] [E0H] [00H]
[7FH] [FEH] [00H] [FFH] [E0H] [00H] [FFH] [C0H] [00H]
[FFH] [C0H] [00H] [EFH] [80H] [00H] [3EH] [00H] [00H]
[LF] [NUL]
```

7.8.2 GRAPHIC PRINT COMMAND [GS] /

Function	Prints the graphic data which is stored on the printer.
Format	[GS] /n
Term	n: Graphic No. 1 or 2
Explanation	(1) When “n” is set to any value other than the above, a command error occurs. (2) When the graphic data is not stored, this command is ignored.



Refer to	Graphic Data Store Command ([ESC] SG) Mode Select Command ([ESC] M)
----------	--

7.9 COMMANDS RELATED TO CONTROL

7.9.1 INITIALIZE COMMAND

[ESC] @, [ESC] WR

Function	Returns the printer to its initial state.
Format	[ESC] WR [LF] [NUL] [ESC] @
Explanation	<ol style="list-style-type: none"> (1) The printer is returned to the same state as when the power is turned on. (2) If the printer receives this command during printing, the printer prints the label which is being printed, then performs initialization. (3) After the Initialize Command is sent (or after printing is completed, if printing is performed), the next command must not be sent within approx. 30 seconds on the wireless LAN model or within 5 seconds on other models since the printer perform initialization. In IrDA: TEC Protocol, if ACK/status transmission is specified by the Issue Command, the printer returns an ACK, which indicates the command process end, to the EOT after the printer is initialized. In RS-232C, when the status response is specified, the printer returns the status (10H). After this status is received, the next command may be sent. In IrDA: IrCOMM, IrDA: IrOBEX, RS-232C, Bluetooth, or Wireless LAN, the printer does not return the status. (4) To use IrDA interface for sending this command to the printer, only this command should be sent. After the command is sent, the link should be terminated. Even if the host does not terminate the link, the printer performs the termination process. Therefore, after initialization is completed, the host should establish the link again. (5) When receiving this command during data transmission, the printer is initialized after transmission is completed.
Notes	<ol style="list-style-type: none"> (1) If a command error or communication error occurs when receiving the Reset Command, an error message is displayed in the online mode. However, it is not displayed in the SYSTEM mode. (2) After the code of the Graphic Command ([ESC] SG) is received, the Reset Command is not processed until the printer receives the data specifying the type of data.

7.10 COMMANDS RELATED TO STATUS

7.10.1 STATUS REQUEST COMMAND

[ESC] v, [[ESC] FM, [ESC] WS

Function	Requests that the printer sends back the printer status and the battery status to the host.
Format	[ESC] v, [ESC] FM [LF] [NUL], or [ESC] WS [LF] [NUL]
Explanation	When this command is received, the printer sends the printer status and battery status to the host.

- For IrDA: TEC Protocol: Data to be sent (Fixed at 27 bytes)

STX	Printer ID		Version No. of each form				Printer status	Battery status	CRC	
02H	xxH	xxH	V01	V02	.....	V20	xxH	xxH	xxH	xxH

- For IrDA; IrCOMM, IrDA: IrOBEX, RS-232C, USB, Bluetooth or Wireless LAN:
Data to be sent (Fixed at 5 bytes)

STX	Printer ID		Printer status	Battery status
02H	xxH	xxH	xxH	xxH

Printer ID.....2-byte hex data (in order from High to Low)

Printer status.....Printer status is indicated in 1-byte data.

- 00H: Normal status (while idling)
- 01H: Cover open status
- 02H: Command syntax error (including Ir packet error)
- 03H: Paper jam
- 04H: Label end
- 05H: Cover open error
- 06H: Broken thermal head dots error
- 07H: Thermal head excessive temperature
- 08H: Flash ROM write error
- 09H: Flash ROM erase error
- 0AH: Low battery (Print failure)
- 0BH: Operating
- 0CH: Communication error For RS-232C connection only
- 0DH: Normal end + Label end (See **NOTE.**)
- 0EH: Flash ROM storage area full state
- 10H: Normal issue end
- 14H: Pause state
- 19H: Ambient temperature error
- 32H: Abnormal battery temperature
- 33H: Battery excessive temperature
- 37H: Charging error
- (38H: Bluetooth setting successfully completed)
Response status for automatic status transmission
- 39H: Bluetooth setup error (including initialization error)
- 45H: Wait for battery recovery
- 46H: Wait for print head temperature reduction
- 47H: Wait for motor temperature reduction
- 55H: Writable character/PC command save mode

Status in the compatible mode for B-SP series

- 00H: Normal state (idling)
- 01H: Cover open state
- 02H: Command syntax error (including Ir packet error)
- 03H: Paper jam
- 04H: Label end
- 05H: Cover open error
- 06H: Broken thermal head dots error
- 07H: Thermal head excessive temperature
{ including ambient temperature error, abnormal battery
} temperature and battery excessive temperature
- 08H: Flash ROM write error
- 09H: Flash ROM erase error
- 0AH: Low battery (Print failure)
- 0BH: Printer operating
{ including the following statuses: wait for strip, pause
} state, writable character/PC command save mode, wait
} for battery recovery and wait for print head/motor
} temperature reduction
- 0CH: Communication error For RS-232C connection only
- 0DH: Normal end + Label end (See **NOTE**.)
- 0EH: Flash ROM storage area full state
- 10H: Normal issue end
- 37H: Charging error
- (38H: Bluetooth setting successfully completed)
Response status for automatic status transmission
- 39H: Bluetooth setup error (including initialization error)

NOTE: 0DH (Normal issue end + Label end) is a state when the printer runs out of labels, after a label is issued.

Battery status The battery charge status is indicated in 5 levels.

(B-EP2DL)

- 01H: 7.2 V or less
- 02H: 7.3 V to 7.4 V
- 03H: 7.5 V to 7.7 V
- 04H: 7.8 V to 7.9 V
- 05H: 8.0 V to 8.4 V

(B-EP4DL)

- 01H: 14.0 V or less
- 02H: 14.1 V to 14.6 V
- 03H: 14.7 V to 15.2 V
- 04H: 15.3 V to 15.9 V
- 05H: 16.0 V to 16.8 V

CRC.....2-byte hex data (in order from Low to High)

7.10.2 RECEIVE BUFFER FREE SPACE STATUS REQUEST COMMAND [ESC] WB

Function Sends information on the printer status and the free space of the receive buffer to the host.

Format [ESC] WB [LF] [NUL]

- Explanation**
- (1) This command makes the printer send information on its status and free space of the receive buffer, regardless of the setting of the Status Response parameter.
 - (2) The status to be transmitted is the current printer status, and indicates the latest status only. The remaining count indicates the remaining print count of the batch currently being printed only. No remaining count of the batch waiting to be printed is transmitted.
 - (3) Free space of the receive buffer for the interface which sent this command, is returned to the host.

[IrDA: TEC Protocol] Data to be transmitted (fixed at 22 bytes)

STX	Printer ID		Status	Remaining No. of labels				Length	
02H	3xH	3xH	33H	3xH	3xH	3xH	3xH	32H	32H

Receiving buffer space					Entire receiving buffer space					CRC	
3xH	3xH	3xH	3xH	3xH	30H	30H	35H	31H	32H	xxH	xxH

[IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, Wireless LAN]

Data to be transmitted (fixed at 23 bytes)

SOH	STX	Printer status		Status type	Remaining No. of labels				Length	
01H	02H	3xH	3xH	33H	3xH	3xH	3xH	3xH	32H	33H

Receiving buffer space					Entire receiving buffer space					CR	LF
3xH	3xH	3xH	3xH	3xH	30H	30H	35H	31H	32H	0DH	0AH

Printer status.....Printer status is indicated in 2-byte data.

- "00": Normal status
- "01": Cover open state
- "02": Operating
- "04": Pause state
- "05": Wait for strip
- "06": Command syntax error (including Ir packet error)
- "09": Normal issue end + Label end
- "11": Paper jam
- "13": Label end
- "15": Cover open error
- "17": Broken thermal print head dots
- "18": Thermal head excessive temperature
- "19": Ambient temperature error
- "32": Abnormal battery temperature
- "33": Battery excessive temperature
- "36": Low battery
- "37": Charging error
- "39": Bluetooth setup error (including initialization error)
- "45": Wait for battery recovery
- "46": Wait for print head temperature reduction
- "47": Wait for motor temperature reduction
- "50": Flash ROM write error
- "51": Flash ROM erase error
- "54": Flash ROM storage area full state
- "55": Writable character/PC command save mode

Remaining No. of labelsIndicates the remaining number of labels in four bytes.
"0000" to "9999"

Length: Indicates the number of bytes of the entire status data
IrDA: TEC Protocol: Fixed at "22."
IrDA: IrCOMM, IrDA: IrOBEX, USB,
RS-232C, Bluetooth, Wireless LAN: Fixed at "23."

Receive buffer free space:....Indicates the free space of the receive buffer.

Entire receive buffer free space:....Indicates the entire free space of the receive buffer.
Fixed at "00512."

CRC/CR, LF:..... Indicates the end of the status block.

Notes

- (1) The status is returned only to the interface which sent this command.
- (2) The printer returns the same status, regardless of whether or not the compatible mode for the B-SP series is set.
- (3) After the code of the Bit Map Writable Character Command ([ESC] XD) or Graphic Command ([ESC] SG) is received, the Status Request Command is not processed until the printer receives the data specified for the type of data.
- (4) After receiving the Status Request Command, there may be a maximum of 20-msec. delay until the printer sends a status.
- (5) At least, a 20-msec. interval must be given between the transmissions of the Status Request Command. If the next Status Request Command is transmitted within 20 msec., the printer may fail to receive it.

Example

[ESC] WB [LF] [NUL]

7.10.3 MODE INFORMATION ACQUIRE COMMAND

[ESC] WX

Function Sends the printer mode information to the host.

Format [ESC] WX [LF] [NUL]

Explanation (1) The mode information format to be sent to the host, is as follows:

RECEIPT mode (Mode = 1)

[IrDA: TEC Protocol]

STX	Mode information (16 bytes)																CRC	CRC
	R	E	C	E	I	P	T	SP	SP	SP	SP	SP	SP	SP	SP	SP		
02H	52H	45H	43H	45H	49H	50H	54H	20H	20H	20H	20H	20H	20H	20H	20H	20H	xxH	xxH

[IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, Wireless LAN]

STX	Mode information (16 bytes)															
	R	E	C	E	I	P	T	SP	SP	SP	SP	SP	SP	SP	SP	SP
02H	52H	45H	43H	45H	49H	50H	54H	20H	20H	20H	20H	20H	20H	20H	20H	20H

RECEIPT1 mode (Mode = 2)

[IrDA: TEC Protocol]

STX	Mode information (16 bytes)																CRC	CRC
	R	E	C	E	I	P	T	1	SP	SP	SP	SP	SP	SP	SP	SP		
02H	52H	45H	43H	45H	49H	50H	54H	31H	20H	20H	20H	20H	20H	20H	20H	20H	xxH	xxH

[IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, Wireless LAN]

STX	Mode information (16 bytes)															
	R	E	C	E	I	P	T	1	SP	SP	SP	SP	SP	SP	SP	SP
02H	52H	45H	43H	45H	49H	50H	54H	31H	20H	20H	20H	20H	20H	20H	20H	20H

The above shows examples where the message is received in the RECEIPT mode (Mode = 1) and the RECEIPT1 mode (Mode = 2). In addition, the messages described on the following page are returned.

- When the compatible mode for the B-SP series is on.

TPCL mode	TPCL	
TPCL1 mode	TPCL1	
LABEL mode	LABEL	
RECEIPT mode	RECEIPT	
RECEIPT1 mode	RECEIPT1	
ESC/POS mode	ESC/POS	
Online reset menu	USER ■ SYSTEM	
SYSTEM mode for users PAUSE + POWER keys	USER ■ SYSTEM	
SYSTEM mode for administrators FEED + POWER keys	When the password setting is on and before it is entered	USER ■ SYSTEM
	When the password setting is on and after it is entered	SYSTEM
	When the password setting is off	SYSTEM
TPCL (strip issue mode)	TPCL ■ (S)	
TPCL1 (strip issue mode)	TPCL1 (S)	
LABEL (strip issue mode)	LABEL (S)	

* ■ indicates a space.

- When the compatible mode for the B-SP series is off.

TPCL mode	TPCL-LE	
TPCL1 mode	TPCL-LE1	
LABEL mode	LABEL	
RECEIPT mode	RECEIPT	
RECEIPT1 mode	RECEIPT1	
ESC/POS mode	ESC/POS	
Online reset menu	USER ■ SYSTEM	
SYSTEM mode for users PAUSE + POWER keys	USER ■ SYSTEM	
SYSTEM mode for administrators FEED + POWER keys	When the password setting is on and before it is entered	USER ■ SYSTEM
	When the password setting is on and after it is entered	SYSTEM
	When the password setting is off	SYSTEM

* ■ indicates a space.

7.10.4 VERSION INFORMATION ACQUIRE COMMAND

[ESC] WV

Function	Sends information such as the program version of the printer.
Format	[ESC] WV [LF] [NUL]
Explanation	(1) The format of the program version data to be returned to the host is as follows.

[IrDA: TEC Protocol]

STX		02H	Creation date of the program: 9-byte data indicated in order of Day- Month-Year
Creation date	"0"	30H	
	"4"	34H	
	"A"	41H	
	"P"	50H	
	"R"	52H	
	"2"	32H	
	"0"	30H	
	"0"	30H	
	"8"	38H	
Model	"B"	42H	Model: 7-byte ASCII code indicating the model B-EP2DG (2-inch/203-dpi model) B-EP4DG (4-inch/203-dpi model)
	"."	2DH	
	"E"	45H	
	"P"	50H	
	"2"	32H	
	"D"	44H	
	"G"	47H	
Version	"V"	56H	Program version: 5-byte data: Vx.xx └── Revision └── Version
	"1"	31H	
	"."	2EH	
	"0"	30H	
	"A"	41H	
CRC		xxH	
CRC		xxH	

[IrDA: IrCOMM, IrDA: IrOBEX, RS-232C, Bluetooth, Wireless LAN]

SOH		01H	
STX		02H	
Creation date	"0"	30H	Creation date of program: 9 bytes of data indicated in order of Day- Month-Year
	"4"	34H	
	"A"	41H	
	"P"	50H	
	"R"	52H	
	"2"	32H	
	"0"	30H	
	"0"	30H	
	"8"	38H	
Model	"B"	42H	Model: 7-byte ASCII code indicating the model B-EP2DG (2-inch/203-dpi model) B-EP4DG (4-inch/203-dpi model)
	"_"	2DH	
	"E"	45H	
	"P"	50H	
	"2"	32H	
	"D"	44H	
	"G"	47H	
Version	"V"	56H	Program version: 5 bytes of data: Vx.xx Revision Version
	"1"	31H	
	"."	2EH	
	"0"	30H	
	"A"	41H	
ETX		03H	
EOT		04H	
CR		0DH	
LF		0AH	

Notes

- (1) No statuses are returned when using USB.

7.11 COMMANDS RELATED TO BLUETOOTH AND WIRELESS LAN

7.11.1 DEVICE ADDRESS ACQUIRE COMMAND

[ESC] IT

Function	Reads the device address of the Bluetooth or MAC address of the Wireless LAN.
Format	[ESC] IT [LF] [NUL]
Explanation	(1) This command reads the device address of the Bluetooth or MAC address of the Wireless LAN. When using the IrDA, the following information field is placed in the information frame and sent.

[Information field to be sent when IrDA: TEC Protocol is used]

STX	Bluetooth device address or Wireless LAN MAC address	CRC	
02H	12 bytes	xxH	xxH

[Information field to be sent when IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, Wireless LAN is used]

STX	Bluetooth device address or Wireless LAN MAC address
02H	12 bytes

The printer sends the following information:

Bluetooth device address: 0015b5aa0005
Wireless LAN MAC address: 000940387630

Bluetooth device address

[30H] [30H] [31H] [35H] [62H] [35H] [61H] [61H] [30H] [30H] [30H] [35H]
0 0 1 5 b 5 a a 0 0 0 5

Wireless LAN MAC address

[30H] [30H] [30H] [39H] [34H] [30H] [33H] [38H] [37H] [36H] [33H] [30H]
0 0 0 9 4 0 3 8 7 6 3 0

7.11.2 BLUETOOTH RELATED PARAMETER ACQUIRE COMMAND [ESC] WT

Function	Acquires the parameter settings related to the Bluetooth.
Format	[ESC] WT [LF] [NUL]
Explanation	(1) This command reads the parameters related to the Bluetooth. When using the IrDA, the following information field is placed in the information frame and sent.

[Information field to be sent when IrDA: TEC Protocol is used]

STX	Sec	Inq	Interval				Window			
02H	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH

Inquiry/page window
0018 to 4096

Inquiry/page interval
0018 to 4096

Inquiry timer
0 (30H): Inquiry is not possible.
1 (31H): Inquiry is possible only within 60 seconds after a printer power on
2 (32H): Inquiry is possible at anytime.

Security setting
1 (31H): No security
2 (32H): No security
3 (33H): Link level security is effective

Bluetooth device name	CRC	
32 bytes	xxH	xxH

Bluetooth device name: Fixed at 32 bytes.

When the Bluetooth device name is "TOSHIBA TEC BT."

[54H] [4FH] [53H] [48H] [49H] [42H] [41H] [20H] [54H] [45H] [43H] [20H] [42H] [54H] [00H] [00H]
T O S H I B A ' ' T E C ' ' B T
[00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H]

* When the Bluetooth device name is less than 32 bytes, the remaining bytes are filled with 00H.

[Information field to be sent when IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth or Wireless LAN is used]

STX	Sec	Inq	Interval				Window			
02H	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH

Bluetooth device name
32 bytes

7.12 COMMANDS RELATED TO MACRO SETTING

7.12.1 MACRO DEFINITION COMMAND

[GS] :

Function	Defines the print position and the items to be printed at the fixed position.
Format	[GS] : aaaaa#####bbbbbbbbbb#####cccccc [GS] :
Term	aaaaa, bbbbbbbbbbb, cccccc: Fixed data #####: Variable data (The character codes are specified by the Macro Execute Command.)
Explanation	<ol style="list-style-type: none"> (1) The macro definition can be made by entering the character code or [LF] (Print Line Feed Command) between “[GS]:” and “[GS]:.” (2) From the start to end of the macro definition, must be a maximum of 253 bytes. (3) The macro definition data is kept until the power is turned off. (4) The number of digits indicated using “#” must match that for the macro to be actually executed. (5) Character code designated by the Macro Definition Command is sent to the printer for printing it on the receipt. Use of the macro function reduces the number of data transmissions by the standard format and transmission time, and increases the number of printable lines at one transmission.

7.12.2 MACRO EXECUTE COMMAND

[GS] ^ <Data> [NUL]

Function	Stores data for items for which the macro definitions are made.
Format	[GS] ^ aaaaabbbbbccccc [NUL]
Term	aaaaa: 1st data to be printed bbbbb: 2nd data to be printed ccccc: 3rd data to be printed
Explanation	(1) If this command is sent without making a macro definition by the Macro Definition Command, a syntax error occurs. (2) The receipt is printed by transferring the character code specified by the Macro Definition Command. The No. of times of data transfer and transfer time for printing in a fixed format, can be saved. Also, the printable No. of lines per batch transfer can be increased by using the macro function.

[Ex.] [GS] ^ 0023071T1 A Label 1 ¥9,000 [NUL]

```
[GS]: NO.### (####)[LF]
##### [LF]
Quantity ##### [LF]
Price ##### [LF]
-----[LF][GS]:
```

The print position and items to be printed at the fixed position are defined by making a macro definition.



```
NO.### (####)
#####
Quantity #####
Price #####
```

To print data on two or more lines, only the variable data specified by "#", is sent using the Macro Execute Command.

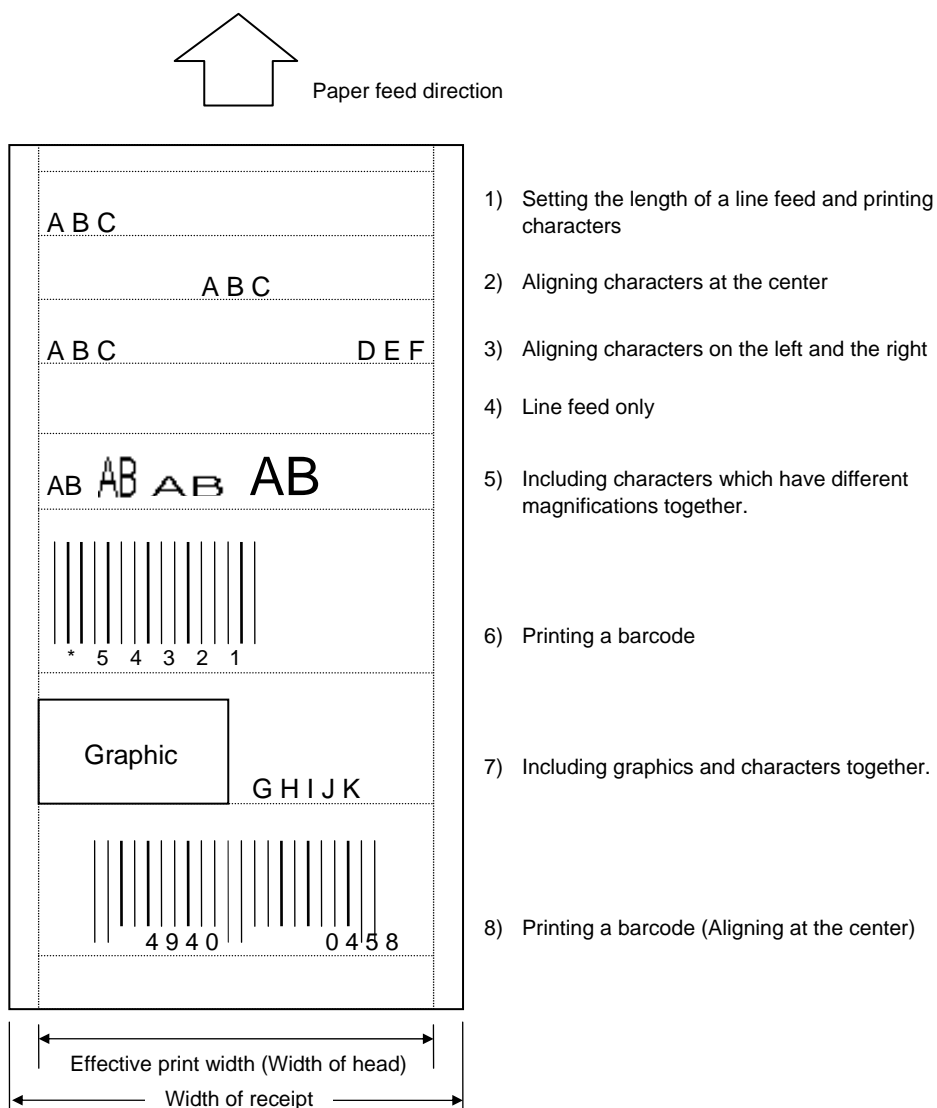


[GS]^0023071T1 A Label 1 ¥9,000 [NUL]

```
NO.002 (3071)
T1 A Label
Quantity 1
Price ¥9,000
```

7.13 EXAMPLES

7.13.1 EXAMPLES OF USING COMMANDS



[Examples of transmitted data]

	Command/Print data	Result
1)	[ESC] 3 [20H] ABC [LF]	Setting the length of a line feed (32 dots) Printing characters and a line feed
2)	[ESC] a1ABC [LF]	Alignment of the print position (Center) + Printing and a line feed
3)	[ESC] a0ABC [ESC] a2DEF [LF]	Alignment of the print position (Left) Alignment of the print position (Right) + Printing and a line feed
4)	[LF]	Line feed
5)	[ESC] a0 AB [ESC] ! [10H] AB [ESC] ! [20H] AB [ESC] ! [30H] AB [LF]	Alignment of the print position (Left) Printing characters (1x1 magnification) Printing characters (1x2 magnification) Printing characters (2x1 magnification) Printing characters (2x2 magnification) Printing and a line feed

[Examples of transmitted data] (Continued)

6)	[GS] k3*54321* [NUL] [LF]	Printing CODE39 Printing and a line feed
7)	[GS]/1 [ESC] ! [00H] GHIJK [LF]	Printing a graphic Printing characters (1x1 magnification) + printing and a line feed
8)	[ESC] a1 [GS] h [50H] [GS] k04940045 [NUL] [LF]	Alignment of the print position (Center) Setting the height of the barcode (80 dots) Printing EAN8 Printing and a line feed

8. ESC/POS MODE (INTERFACE COMMAND)

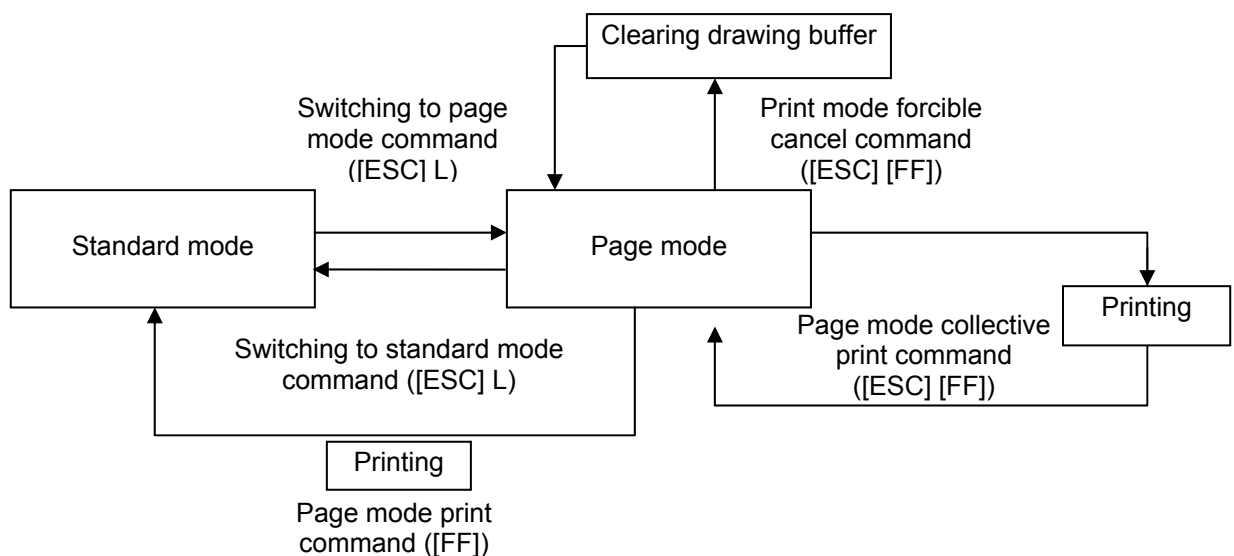
8.1 GENERAL DESCRIPTION

This printer has 2 modes: standard mode and page mode.

In standard mode, the printer performs a print job or feeds paper every time a print or feed command is received. In page mode, however, all received print or feed commands are just expanded in the print area on the memory and the printer does not operate. Once the Page Mode Collective Print Command ([ESC] [FF]) or Page Mode Print Command ([FF]) is executed, the printer prints all data expanded in the print area in a collective manner.

For instance, if printing and feeding of data "ABCDEFGH" [LF] is performed, "ABCDEFGH" will be printed, and a new line will be started in standard mode. In page mode, "ABCDEFGH" will be written into the specified print area on the memory, and the memory position to write subsequent print data will be shifted 1 line.

The printer is placed in page mode upon the receipt of the Switching to Page Mode Command ([ESC]L). Any commands received subsequently are processed for page mode. Executing the Page Mode Collective Print Command ([ESC] [FF]) allows all received data to be printed in a collective manner. In addition, executing the Page Mode Print Command ([FF]) allows all received data to be printed in a collective manner, and returns the printer to standard mode. Executing the Switching to Standard Mode Command ([ESC] S) returns the printer to standard mode without printing the print data for page mode. Note that the print data is cleared.



Either of the language types, Kanji, Chinese and Korean, can be implemented. Any font other than the on-board fonts is selectable.

8.2 OUTLINE OF COMMANDS

8.2.1 FORMAT OF INTERFACE COMMAND

ESC	Command
GS	Command
FS	Command
HT	
LF	
FF	
CAN	

Control codes are as listed below:

- ESC (1BH)
- GS (1DH)
- FS (1CH)
- HT (09H)
- LF (0AH)
- FF (0CH)
- CAN (18H)

8.2.2 HOW TO USE REFERENCE

Function	Describes the outline of the function of the command.
----------	---

Format	Shows the format of the command.
--------	----------------------------------

The format designation method should conform to the following rules:

- n refers to a parameter item.
- Brackets and parentheses (e.g. [] or < >) are used only for description, and must not be transmitted in practice.
- Other symbols must always be inserted at designated positions before being transmitted.

Term	Explains the term(s) used in the format.
------	--

Default value	Default value of a parameter (at power-on or switching to ESC/POS mode)
---------------	---

Explanation	Explains the command in detail.
-------------	---------------------------------

Refer to	Related commands
----------	------------------

8.2.3 PRECAUTIONS

Print density fine adjustment cannot be selected in the ESC/POS mode. The mode must be switched to the TPCL, LABEL or RECEIPT1 mode once, to select print density fine adjustment.

8.3 FONT SPECIFICATIONS

Font type: Alphanumeric characters: 95

Extended graphics: 128 characters × 4

Chinese characters: JIS 1 level 2

Font structure:

	ANK	Chinese character, Chinese, or Korean
Font A	12×24	24×24

8.4 EXTERNAL (CUSTOM) CHARACTERS SPECIFICATIONS

- ANK

Font A 95 characters (20h to 7Eh)

- Chinese characters

* 7721h to 777Eh for JIS, EC40h to EC9Eh (except for EC7Fh) for shift JIS, and F7A1h to F7Feh for the EUC code

- Chinese

FF40h to FF7Eh, FF80h to FFFCh

- Korean

FF40h to FF7Eh, FF80h to FFFCh

* The specified writable characters are not backed up. (They apply until the printer is turned off.)

8.5 INPUT DATA BUFFER

Input data buffer (receive buffer) size: 512 Kbytes

8.6 VALUE SPECIFIED BY EACH COMMAND

The values specified by each command are commonly applied in standard and page modes. However, as for the following commands, values must be independently specified and maintained in standard and page modes.

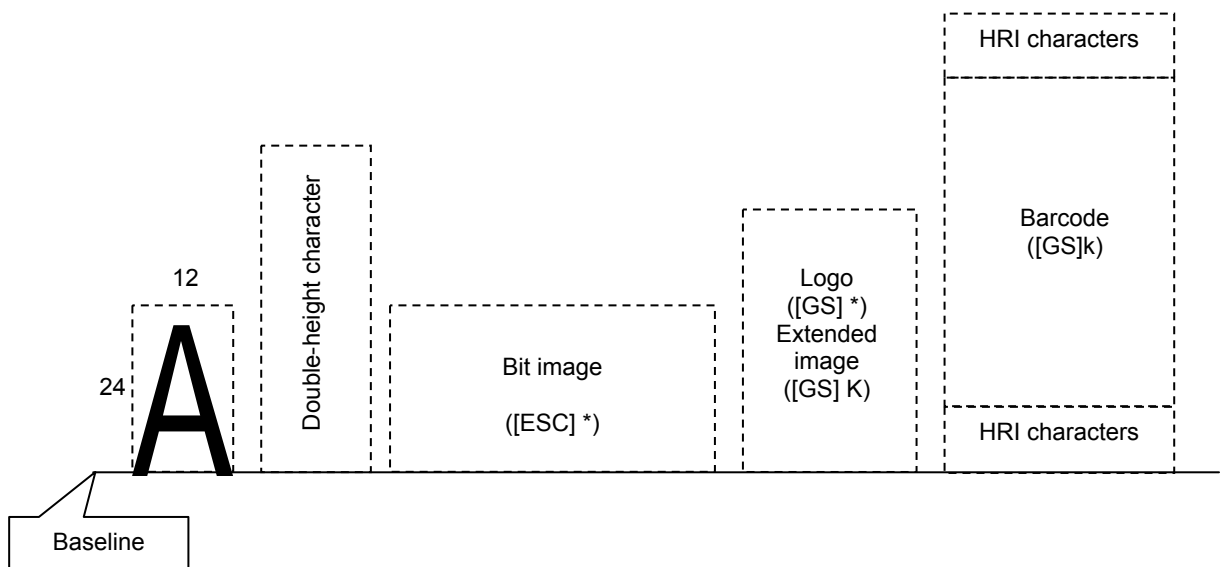
- [ESC] [SP]: Setting of spacing on the right of a character
- [ESC] 2 : Setting of 30-dot feeding
- [ESC] 3 : Setting of minimum dots for line feed
- [FS] S : Setting of spacing on both sides of a chinese character

8.7 EXPANSION OF PRINT DATA IN PRINT AREA

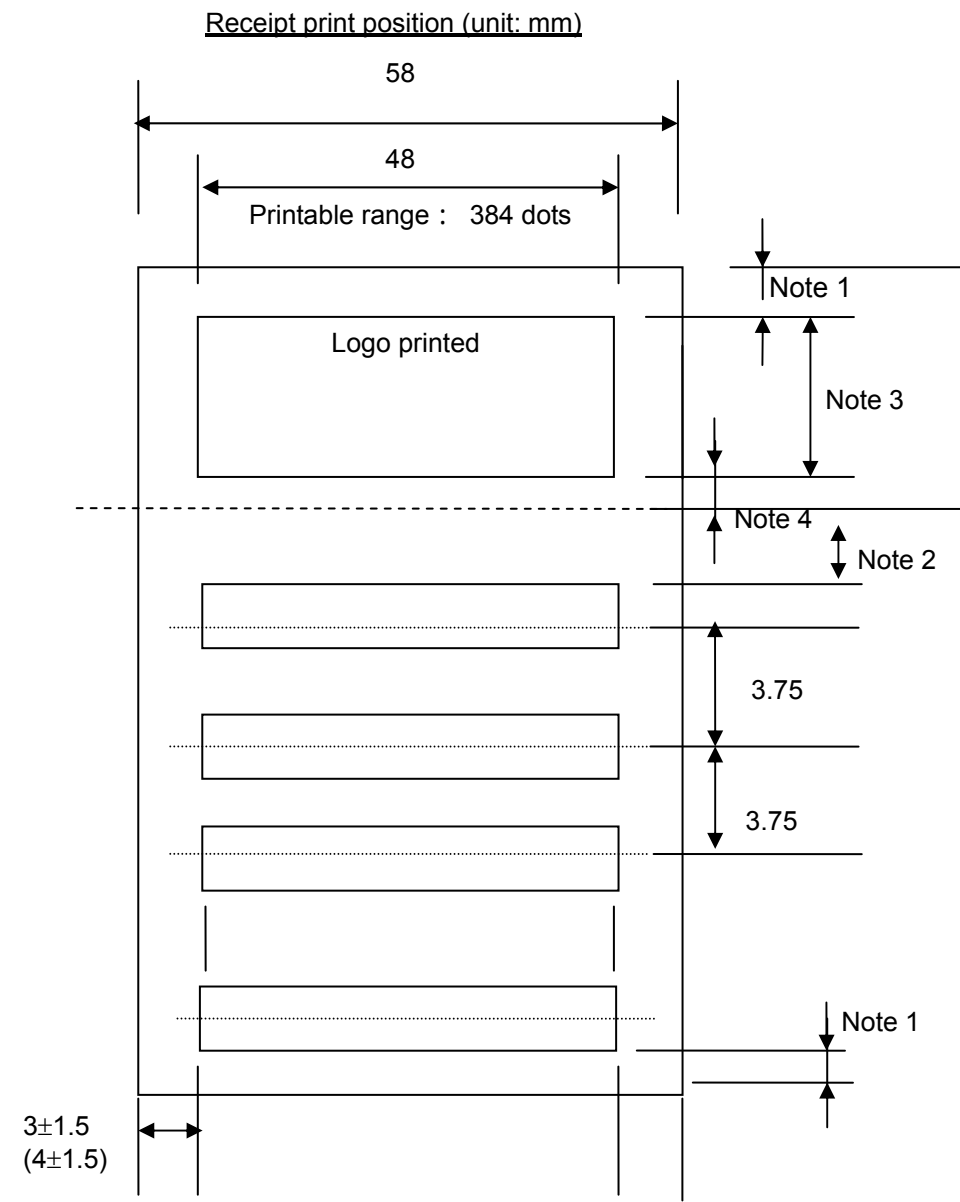
The print data is expanded in the print area as follows.

- (1) The print area is defined by the Page Mode Print Area Set command ([ESC] W). The left end of the printer as one face must be considered as the starting point of the print area (x0,y0) at the moment when printing or feeding before the printer receives [ESC] W is completed. The print area is formed by a rectangle that is dx pitches wide (from the starting point in the x or horizontal direction) and dy pitches high (from the starting point in the y or vertical direction). (If the print area is not defined by [ESC] W, a default value will be applied.)
- (2) If the printer receives print data after the print area is defined by the Page Mode Print Area Set command ([ESC] W) and the print direction is defined by the Page Mode Print Direction Set Command ([ESC] T), characters and downloaded bit images are expanded aligning their bottom left point to the baseline.
- (3) If the print data (including space on the right of a character) deviates from the print area before a command that includes line feed (Line Feed Command ([LF]) or Feed Length Set Command ([ESC] J) is received, line feed will be performed automatically within the print area. The position where print data is expanded is shifted 1 line. Also, the next expansion position is the beginning of the line. Line feed must be performed in accordance with the line feed length specified by the 30-dot Line Feed Length Set Command ([ESC] 2) or Minimum Dots for Line Feed Length Set Command ([ESC] 3).
- (4) The default line feed length is 30 dots. Therefore, if the print data for the next line includes double-height characters or downloaded bit image, the default line feed length may be insufficient. As a result, the higher order dots may be superimposed on the previous print data. Therefore, the line feed length must be increased.
- (5) Printing of a barcode in horizontal orientation is not allowed due to a large reading error.

[Position where print data is expanded]



8.8 EXAMPLE OF RECEIPT PRINTER PRINT LAYOUT (B-EP2DL)



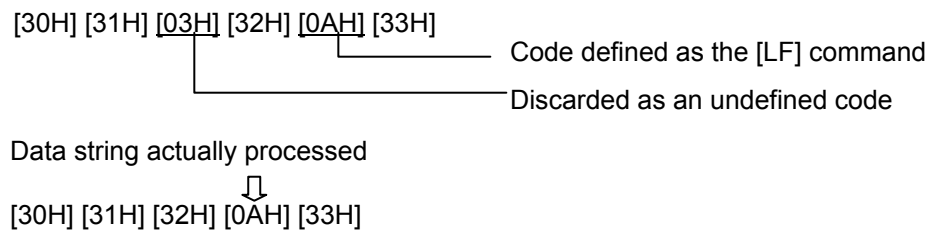
- Note 1) A minimum margin of 2 mm must be reserved at the top and bottom of a receipt.
- Note 2) If printing starts from a stand-by position (or motor stop position) after a logo is printed, a blank must be inserted for a minimum of 24 pulses (3.0 mm) (or 48 pulses (6.0 mm) or over recommended). (This is because of reserving a slow-up area. The number of slow-up pulses varies depending on the print speed.)
- Note 3) A logo must be printed within the range of 21 mm at maximum.
- Note 4) After a logo is printed, a blank must be inserted for a minimum of 24 pulses (3.0 mm) (or 48 pulses (6.0 mm) recommended).

8.9 EXCEPTION HANDLING

8.9.1 UNDEFINED CODE

This applies to the codes that fall in the range between 00h and 1Fh in the character code table. If a code that is not defined in the range is inputted as a command, 1 byte must be discarded, and the subsequent data must be processed as normal data.

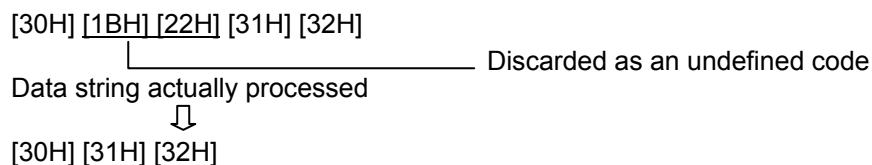
<Ex.> Data string [30H][31H][03H][32H][0AH][33H] is inputted.



8.9.2 UNDEFINED COMMAND

If a code following the [ESC] (1Bh), [FS] (1Ch), or [GS] (1Dh) is not defined as a command, [ESC], [FS], or [GS] and the following code (2 bytes in total) must be discarded.

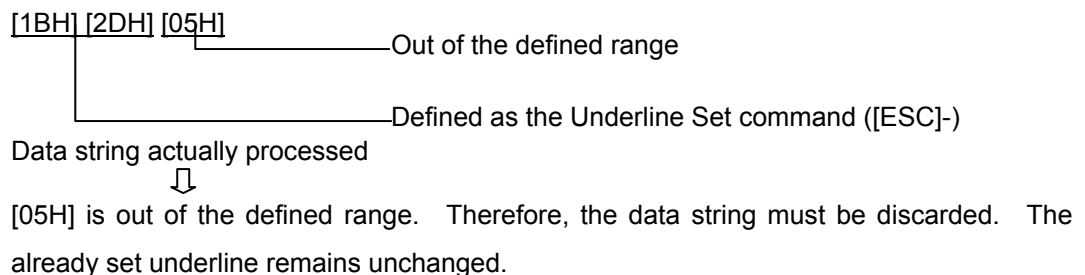
<Ex.> Data string [30H][1BH][22H][31H][32H] is inputted.



8.9.3 SETTING OUT OF DEFINED RANGE

If a numeric value outside the defined range is inputted, the command must be ignored, and an already set value must not be changed. For commands that have multiple arguments, once a numeric value out of the defined range is inputted, command processing is aborted, and the subsequent data is processed as normal data.

<Ex.> Data string [1BH][2DH][05H] is inputted.



8.10 ESC/POS COMMANDS

8.10.1 HORIZONTAL TAB COMMAND

[HT]

Function	Moves a print position to the next horizontal tab position.
Format	ASCII: HT Hex: 09h
Default	Every 8 characters of font A (9th, 17th digit...)
Explanation	<p>(1) This command will be ignored if the next horizontal tab position is not specified.</p> <p>(2) The Horizontal Tab Positions Set Command ([ESD] D) must be used to specify a position of a horizontal tab.</p>

[Program example]

```
fprintf( stdprn, "01234567890123456789012345678901234\n");
    for( i=0; i<4; i++ ) {
        fputc( '\t', stdprn );    /* Horizontal tab */
        fputc( 'H', stdprn );
    }
    fputc( '\n', stdprn );
```

[Print example]: Default horizontal tab position

```
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4
                H                H                H                H
```

Reference	Horizontal Tab Positions Set Command ([ESD]D)
-----------	---

8.10.2 LINE FEED COMMAND

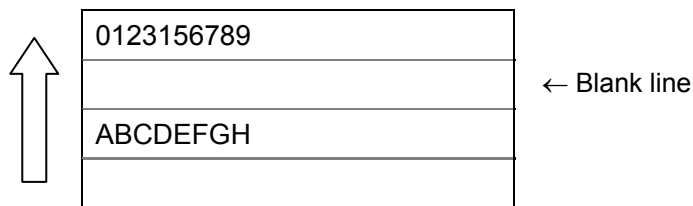
[LF]

Function	Prints data and inserts a line feed.
Format	ASCII: LF Hex: 0Ah
Explanation	<p>(1) If print data is received with the specified number of digits per line exceeded and no line feed ([LF]), it will be printed with a line feed inserted automatically.</p> <p>(2) If this command is received without print data, a line feed of a specified length will be just inserted.</p> <p>(3) Data that contains 4,096 bytes in a single line (up to [LF]) must not be transmitted. If the number of bytes exceeds 4,096, the correct functioning of the printer will not be guaranteed.</p>

[Program example]

```
fprintf( stdprn, "0123456789\n");
fputc( '\n', stdprn );          /* Line feed */
fprintf( stdprn, "ABCDEFGH\n");
```

[Print example]



Reference	<p>30-dot Line Feed Length Set Command ([ESC] 2)</p> <p>Minimum Dots for Line Feed Length Set Command ([ESC] 3)</p>
-----------	---

8.10.3 PAGE MODE PRINT COMMAND

[FF]

Function	Prints the data expanded in the print area in page mode, and returns the printer to standard mode.
Format	ASCII: FF Hex: 0Ch
Explanation	<ul style="list-style-type: none">(1) This command is ignored except when page mode is selected.(2) The data that has been drawn is all erased after printing is completed.(3) The print area specified by the Page Mode Print Area Set Command ([ESC] W) is initialized.(4) After this command is executed, the next print starting position is the beginning of a line.
Reference	Page Mode Collective Print Command ([ESC] [FF]) Switching to Page Mode Command ([ESC] L) Switching to Standard Mode Command ([ESC] S)

8.10.4 PAGE MODE CANCEL COMMAND

[CAN]

Function	Clears all data in the currently specified print area for page mode.
Format	ASCII: CAN Hex: 18h
Explanation	(1) This command is ignored except when page mode is selected. (2) The data contained in the currently specified print area will be cleared even if it is the data contained in the previously specified print area. The print starting position in the currently specified print area is returned to the starting position defined by the Page Mode Print Area Set Command ([ESC] W).
Reference	Switching to Page Mode Command ([ESC] L) Page Mode Print Area Set Command ([ESC] W)

8.10.5 PAGE MODE COLLECTIVE PRINT COMMAND

[ESC] [FF]

Function	Prints the data expanded in the print area in page mode altogether.
Format	ASCII: ESC FF Hex: 1Bh 0Ch
Explanation	(1) This command is ignored except when page mode is selected. (2) The values specified by the Page Mode Print Direction Set Command ([ESC] T) or the Page Mode Print Area Set Command ([ESC] W) and the position where the print data is expanded are maintained after printing is completed.
Reference	Page Mode Print Command ([FF]) Switching to Page Mode Command ([ESC] L) Switching to Standard Mode Command ([ESC] S)

8.10.6 SPACING SET COMMAND

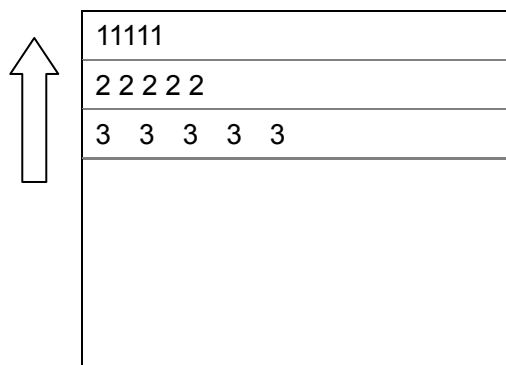
[ESC] [SP]

Function	Specifies spacing (or the number of dots) on the right of an ANK character.
Format	[ESC] SPn
Term	ASCII: ESC SP n Hex: 1Bh 20h n
	[Parameter] n: Spacing (or the number of dots) on the right $0 \leq n \leq 99$ ($00h \leq n \leq 63h$)
Default value	n : 1
Explanation	<p>(1) For a double-width character, spacing will also be doubled.</p> <p>(2) The maximum permissible spacing on the right of a character is 99 dots. If a specified value exceeds 99, the maximum value of 99 will be applied.</p> <p>(3) Spacing can be independently specified in standard and page modes.</p> <p>(4) The value specified by this command is not applicable to Chinese characters.</p> <p>Instead, the Chinese Character Spacing Set Command ([FS] S) must be applied.</p>

[Program example]

```
fprintf( stdprn, "\033 ");          /* 1 dot on the right */
fputc( 1, stdprn );
fprintf( stdprn, "11111\n");
fprintf( stdprn, "\033 %c", 13 );   /* 13 dots on the right */
fprintf( stdprn, "22222\n");
fprintf( stdprn, "\033 %c", 26 );   /* 26 dots on the right */
fprintf( stdprn, "33333\n");
```

[Print example]



11111
2 2 2 2 2
3 3 3 3 3

8.10.7 PRINT MODE ALL SET COMMAND

[ESC] !

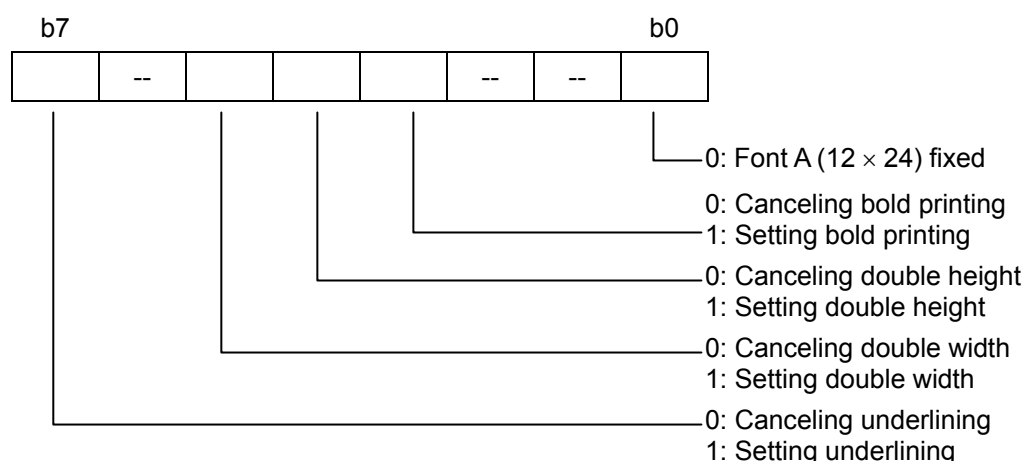
Function	Performs character control (specifies print modes altogether).
----------	--

Format	[ESC] !n
--------	----------

Term	ASCII: ESC ! n Hex: 1Bh 21h n
------	----------------------------------

[Parameter]

n: Specifying print mode $0 \leq n \leq 255$ (00h \leq n \leq FFh)



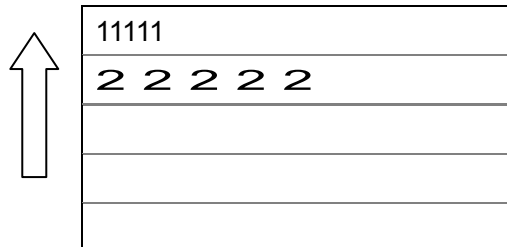
Default value	n : 0
---------------	-------

- | | |
|-------------|---|
| Explanation | <ol style="list-style-type: none"> (1) With underlining set, a portion skipped by HT or a character rotated 90 degrees clockwise will not be underlined. (2) An underline is 1 dot thick. However, the thickness of an underline is determined in accordance with the thickness specified by the Underlining Set Command ([ESC]-). (3) Bold printing can also be set or canceled by the Bold Printing Set Command ([ESC]E), but the most recently processed command is applied. (4) An ANK character size can also be specified by the Character Size Set Command ([GS] !), but the most recently processed command is applied. (5) Underlining can also be set or canceled by the Underlining Set Command ([ESC]-), but the most recently processed command is applied. (6) If both double height and double width are set at the same time, a character size will be quadrupled (double height × double width). |
|-------------|---|

[Program example]

```
fprintf( stdprn, "\033! ");          /* Normal width */
fputc( 0, stdprn );
fprintf( stdprn, "11111\n");
fprintf( stdprn, "\033 %c", 0 × 20 ); /* Double width */
fprintf( stdprn, "22222\n");
```

[Print example]



Reference

Underlining Set Command ([ESC] -)

Bold Printing Set Command ([ESC] E)

Character Size Set Command ([GS] !)

8.10.8 DOWNLOADED CHARACTER (WRITABLE CHARACTER) SET COMMAND [ESC] %

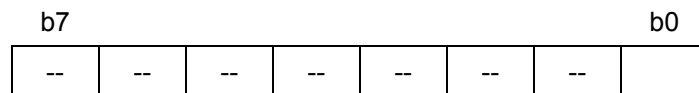
Function	Sets or cancels downloaded characters (writable characters).
----------	--

Format	[ESC] %n
--------	----------

Term	ASCII: ESC % n Hex: 1Bh 25h n
------	----------------------------------

[Parameter]

n: Setting / canceling downloaded character $0 \leq n \leq 255$ (00h \leq n \leq FFh)



└ 0: Canceling downloaded characters
1: Setting downloaded characters

Default value	n: 0
---------------	------

Explanation	<p>(1) n is valid only in the least significant bit.</p> <p>(2) If downloaded characters (writable characters) are not registered with a specified code, the internal ANK characters will be printed. Also, when the downloaded characters (writable characters) are canceled, the internal ANK characters will be selected automatically for printing.</p>
-------------	---

Reference	<p>Downloaded Character (Writable Character) Define Command ([ESC] &)</p> <p>Downloaded Character Erase Command ([ESC] ?)</p>
-----------	---

8.10.9 DOWNLOADED CHARACTER (WRITABLE CHARACTER) DEFINE COMMAND [ESC] &

Function	Defines downloaded characters (writable characters) of the ANK code.
Format	[ESC] &ynm [xd ₁ d ₂ d ₃ ...d _{yx}] _n.....[xd ₁ d ₂ d ₃ ...d _{yx}] _m
Term	<p>ASCII: ESC & Hex: 1Bh 26h</p> <p>[Parameter] y: No. of bytes in the vertical direction 3 (03h) Fixed n: Setting start character code 32 ≤ n ≤ 126 (20h ≤ n ≤ 7Eh) m: Setting end character code 32 ≤ m ≤ 126 (20h ≤ m ≤ 7Eh) * n = m if there is only 1 character. d: Data to be defined 00h ≤ d₁, d₂, ... d_{yx} ≤ FFh x: No. of bytes in the horizontal direction 0 ≤ x ≤ 12 (00h ≤ x ≤ 0Ch)</p>
Default value	Internal ANK characters (no writable characters registered)
Explanation	<p>(1) Multiple consecutive character codes can be defined in the single execution of this command.</p> <p>(2) d refers to not only data to be defined, but also a pattern of dots from the left end in the x (horizontal) direction. If x is below the number of dots to form a character, the remaining dots on the right will be space filled.</p> <p>(3) At a moment when an error occurs with parameter y, n, m, or x due to a factor such as an unmatched condition, command processing will be aborted, and the data subsequent to x will be processed as normal data.</p> <p>(4) The defined downloaded characters are cleared in the event of the following commands:</p> <ul style="list-style-type: none"> • Initialize Command ([ESC] @) • Downloaded Bit image Define Command ([GS] *) • Downloaded Character Erase Command ([ESC] ?)
Reference	[ESC] %, [ESC] ?

[Program example]

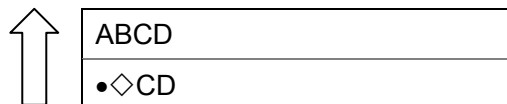
```

/* Data for registration of writable characters */
unsigned char gaiji1[3] = { 0x10, 0x00, 0x00 };
unsigned char gaiji2[15] = { 0x10, 0x00, 0x00, 0x28, 0x00, 0x00, 0x44, 0x00, 0x00,
    0x28, 0x00, 0x00, 0x10, 0x00, 0x00 };

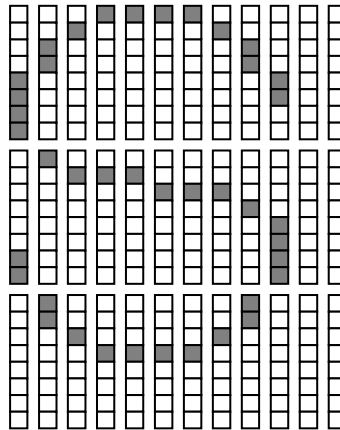
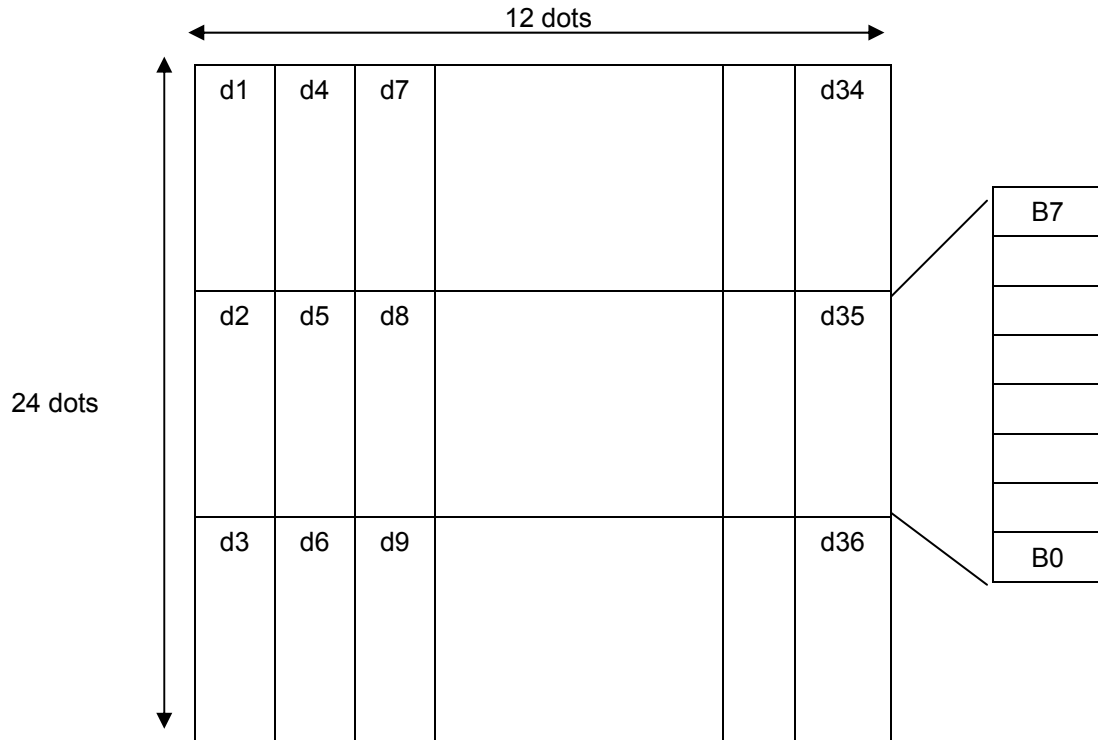
fprintf( stdprn, "\033&\003AB");          /* Registration of writable characters 41H,42H code */
fputc( 1, stdprn );                       /* 1 dot in the horizontal direction */
for(i=0;i<3;i++)
    fputc( gaiji1[i], stdprn );
fputc( 5, stdprn );                       /* 5 dots in the horizontal direction */
for(i=0;i<15;i++)
    fputc( gaiji2[i], stdprn );
fprintf( stdprn, "\033%%");               /* Canceling writable characters */
fputc( 0, stdprn );
fprintf( stdprn, "ABCD\n");
fprintf( stdprn, "\033%%");               /* Setting writable characters */
fputc( 1, stdprn );
fprintf( stdprn, "ABCD\n");

```

[Print example]



[Specified character] Example of font A



d1 = 0 × 0F d4 = 0 × 30 d7 = 0 × 40 ...
d2 = 0 × 03 d5 = 0 × 80 d8 = 0 × 40 ...
d3 = 0 × 00 d6 = 0 × C0 d9 = 0 × 20 ...

8.10.10 BIT IMAGE MODE SELECT COMMAND

[ESC] *

Function	Selects bit image mode (or prints image data).
----------	--

Format	[ESC] *mnLnH (d1d2...d _{((n1 + 256 × n2) × k)})
--------	---

Term	ASCII: ESC * Hex: 1Bh 2Ah
------	------------------------------

[Parameter]

m: Mode m = 0, 1, 32, 33 (m = 00h, 01h, 20h, 21h)
nL: No. of bytes in the horizontal direction (low order) $0 \leq nL \leq 255$ (00h ≤ nL ≤ FFh)
nH: No. of bytes in the horizontal direction (high order) $0 \leq nH \leq 3$ (00h ≤ nH ≤ 03h)
d: Image data $00h \leq d_1, d_2, \dots, d_{yx} \leq FFh$
k: No. of bytes in the vertical direction k = 1 if m = 0 or 1 (m = 00h k = 01h)
k = 3 if m = 32 or 33 (m = 20h, k = 21h)

Explanation	(1) Image data m is specified by the number of dots defined by nL, nH and k.
-------------	--

(2) The number of dots in the horizontal direction is determined by $nL + 256 \times nH$.

(3) If the number of dots in the horizontal direction ($nL + 256 \times nH$) exceeds the value listed in the table below, printing will be performed while wrapping around, and consequently corrupted.

B-EP2DL-GHxx (203 dpi)	384 mm
B-EP4DL-GHxx (203 dpi)	832 mm

(4) d refers to image data. A bit to be printed is set to 1, and the one not to be printed is set to 0.

(5) The table below shows mode selected by m.

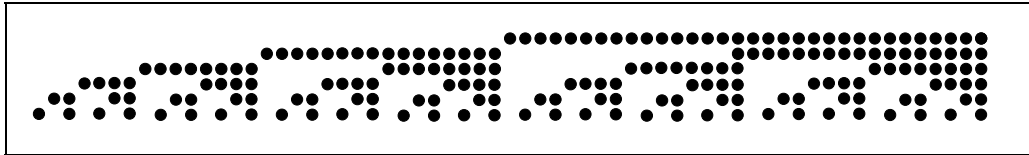
m (mode)	No. of dots in the vertical direction	Dot density
0	8	Single density
1	8	Double density
32	24	Single density
33	24	Double density

(6) Underlining, bold printing, reverse printing (white on black background), or inverted printing (upside-down) is not applicable to this image data.

(7) A bit image in page mode is valid only when 0 (0-degree rotation) is specified by the Page Mode Print Direction Set Command ([ESC] T). If anything other than 0 degree is selected, the bit image will not be rotated.

(8) At a moment when an error occurs with parameter m, nL, or nH due to a factor such as an unmatched condition, command processing will be aborted, and the subsequent data subsequent to x will be processed as normal data.

(9) The most significant bit is printed on top, and the least significant at the bottom.



[Program example]

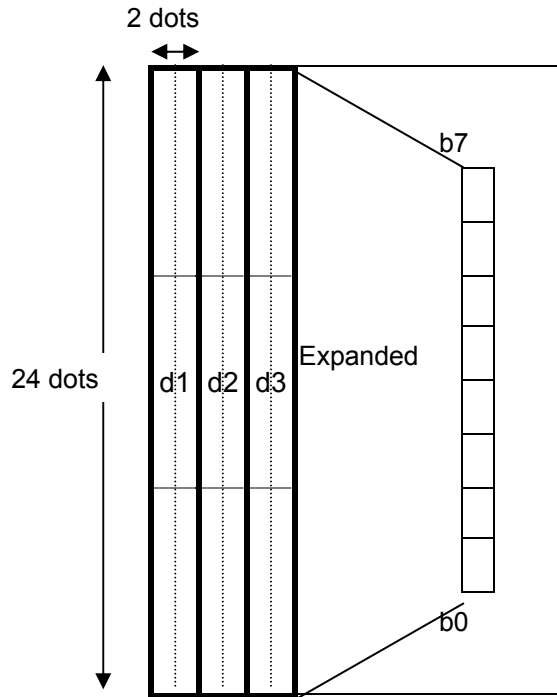
```
for(m=0;m<1;m++) {  
    fprintf( stdprn, "\033*%c\x3F%c", m, 0 );  
    for(i=1;i<=0x3F;i++) {  
        fputc( i, stdprn );  
    }  
    fputc( '\n', stdprn );  
}  
fprintf( stdprn, "\n\r");
```

[Print example]

Single density (m = 0)

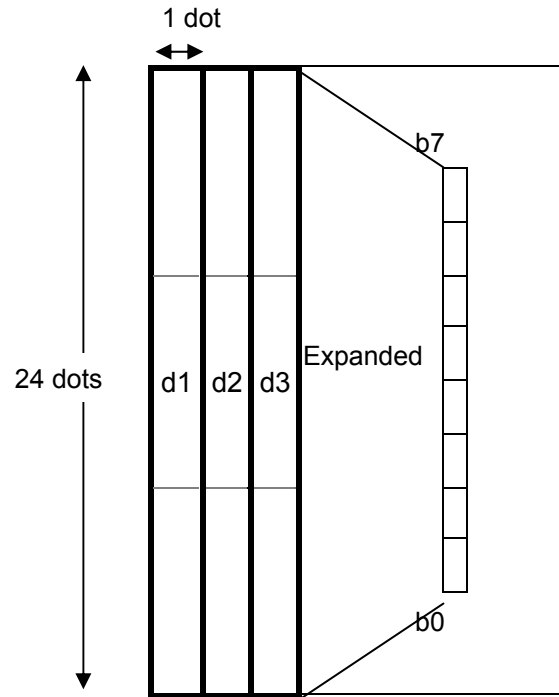
8-dot single density:

1-byte data is tripled in the vertical direction,
and doubled in the horizontal direction.



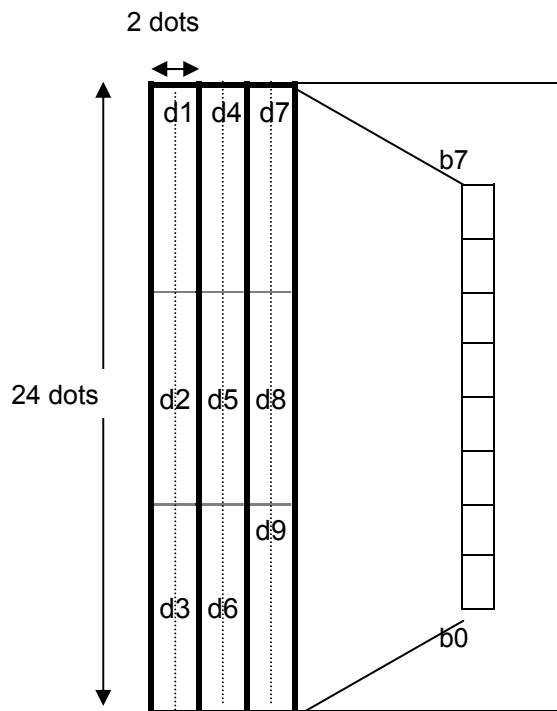
8-dot double density:

1-byte data is tripled in the vertical direction,
and doubled in the horizontal direction.



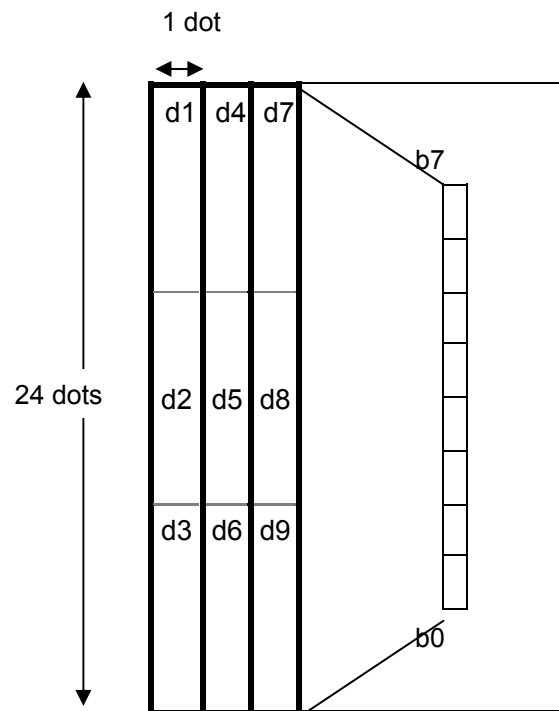
24-dot single density:

1-byte data is doubled in the horizontal
direction.



24-dot double density:

1-byte data is edited in sequence.



8.10.11 UNDERLINING SET COMMAND

[ESC] -

Function	Sets or cancels underlining.
Format	[ESC] -n
Term	<p>ASCII: ESC - Hex: 1Bh 2Dh</p> <p>[Parameter] n: Setting underlining</p> <p> $0 \leq n \leq 2$ (00h \leq n \leq 02h) or $48 \leq n \leq 50$ (30h \leq n \leq 32h) </p> <p> 0: Canceling underlining 1: Setting underlining (1-dot wide) 2: Setting underlining (2-dot wide) </p>
Default value	n : 0
Explanation	<p>(1) The character including the space on its right is underlined. However, a portion skipped by the Horizontal Tab Command ([HT]) is not underlined.</p> <p>(2) A character rotated 90 degrees clockwise or a character in reverse is not underlined.</p> <p>(3) If underlining is canceled with n = 0 or n = 48, subsequent data will not be underlined. However, the width of the underline specified most recently is maintained. Also, a 1-dot wide underline is selected by default.</p> <p>(4) The width of the underline is consistent regardless of a character size.</p> <p>(5) Underlining can also be set or canceled by the Print Mode All Set Command ([ESC] !), but the most recently processed command is applied.</p> <p>(6) There is no impact upon Chinese Characters.</p>
Reference	Print Mode All Set Command ([ESC] !)

8.10.12 DOWNLOADED CHARACTER ERASE COMMAND [ESC] ?

Function	Erases downloaded characters in a specified code.
Format	[ESC] ?n
Term	<p>ASCII: ESC ?</p> <p>Hex: 1Bh 3Fh</p> <p>[Parameter]</p> <p>n: Erasing downloaded characters $32 \leq n \leq 126$ ($20h \leq n \leq 7Eh$)</p>
Default value	n: 0
Explanation	<p>(1) n refers to a character code in which a defined pattern is erased. After downloaded characters are erased, the same pattern as the internal characters are printed.</p> <p>(2) If a specified character code is undefined, this command will be ignored.</p>
Reference	<p>Downloaded Character (Writable Character) Define Command ([ESC] &)</p> <p>Downloaded Character (Writable Character) Set Command ([ESC] %)</p>

8.10.13 30-DOT LINE FEED LENGTH SET COMMAND

[ESC] 2

Function	Sets a line feed length to 30 dots. 203 dpi: 0.125 mm/dot
Format	ASCII: ESC 2 Hex: 1Bh 32h
Explanation	(1) Line feed lengths can be independently specified in standard and page modes.
Reference	Minimum Dots for Line Feed Length Set Command ([ESC] 3)

8.10.14 MINIMUM DOTS FOR LINE FEED LENGTH SET COMMAND [ESC] 3

Function	<p>Sets a line feed length to $n/2$ dot.</p> <p>Specifies the minimum number of dots for line feed.</p>
Format	[ESC] 3n
Term	<p>ASCII: ESC 3</p> <p>Hex: 1Bh 33h</p> <p>[Parameter]</p> <p>n: Line feed length ($n/2$ dot) $0 \leq n \leq 255$ ($00h \leq n \leq FFh$)</p>
Default value	n: 60 (Line feed length of 30 dots)
Explanation	<p>(1) Line feed lengths can be independently specified in standard and page modes.</p> <p>(2) Fractions are rounded up.</p> <p>(3) The minimum permissible value is 00h for a line feed length. However, a line feed length is only applicable when a value of 60 (30 dots) or over is specified. If a value less than 60 is specified, a line feed length will be changed to 30 dots.</p>
Reference	30-dot Line Feed Length Set Command ([ESC] 2)

8.10.15 PRINTER SELECT/DESELECT COMMAND

[ESC] =

Function	<p>Selects or deselects the printer.</p> <p>While the printer is deselected, received data is discarded until it is selected by this command again.</p>
Format	[ESC] =n
Term	<p>ASCII: ESC =</p> <p>Hex: 1Bh 3Dh</p> <p>[Parameter]</p> <p>n: Selecting / deselecting printer $0 \leq n \leq 255$ (00h \leq n \leq FFh)</p> <div><div><div>b7</div><div></div><div></div><div></div><div></div><div></div><div></div><div>b0</div></div><div><div>--</div><div>--</div><div>--</div><div>--</div><div>--</div><div>--</div><div>--</div><div></div></div><div><div></div><div>0: Deselecting printer</div><div>1: Selecting printer</div></div></div>
Default value	n: 1
Explanation	<p>(1) n is valid only in the least significant bit.</p> <p>(2) While being deselected, the printer is waiting only for this command. So please note that if the same code arrangement as [ESC] =1 (1Bh, 3Dh, 01h) is contained in the data such as writable characters or images transmitted while the printer is being deselected, the printer will be returned to the “selected” state.</p>

8.10.16 INITIALIZE COMMAND

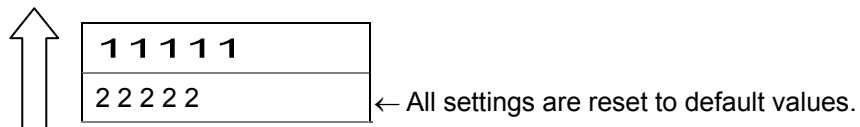
[ESC] @

Function	Clears data in the currently expanded image buffer, and initializes the settings.
Format	[ESC] @
Term	ASCII: ESC @ Hex: 1Bh 40h
Explanation	<p>(1) The data and macro definition in the receive buffer are maintained.</p> <p>(2) Please refer to the next page for further information regarding the data to be initialized.</p>

[Program example]

```
fprintf( stdprn, "\033!%c", 0x20 );      /* Double width */
fprintf( stdprn, "11111\n");
/*Other settings*/
fprintf( stdprn, "\033@" );              /* Initializing printer */
fprintf( stdprn, "22222\n");
```

[Print example]



1 1 1 1 1
2 2 2 2 2

← All settings are reset to default values.

[Data initialized by ESC@]

Command	Functions	Default value
HT	Horizontal tab	Every 8 characters of font A (9th, 17th digit ...)
ESC SP	Spacing on the right of character	1 dot
ESC !	Character control	0 (No settings)
ESC %	Setting / canceling specified characters	0 (No writable characters specified)
ESC &	Definition of specified characters	Internal ANK characters (No writable characters registered)
ESC -	Setting / canceling underlining	0 (Canceling underline)
ESC 3	Minimum No. of dots for line feed length	60 (Line feed length of 30 dots)
ESC =	Selecting / deselecting printer	
ESC D	Horizontal tab position	
ESC E	Setting / canceling bold printing	0 (No bold printing)
ESC G	Setting / canceling double printing	0 (No double printing)
ESC T	Selecting print direction and starting point	0 (Left → right)
ESC V	Setting / canceling 90-degree rotation of character	0 (Canceling 90-degree rotation)
ESC W	Specifying print area	0,0,384,384 (B-EP2DL-GHxx) 0,0,832,832 (B-EP4DL-GHxx)
ESC a	Specifying print position	0 (Left justified)
ESC c5	Enabling / disabling panel switch	0 (Enabled)
ESC {	Setting / canceling inverted printing	0 (Canceling inverted printing)
FS !	Specifying print modes for Chinese characters altogether	0 (No settings)
FS &	Specifying Chinese Character mode	Canceled
FS -	Setting / canceling underlining for Chinese characters	0 (No underlining)
FS .	Canceling Chinese character mode	0 (Chinese character mode canceled)
FS 2	Defining writable characters of Chinese characters	All space
FS C	Selecting Chinese character code system	0 (JIS code system)
FS S	Specifying spacing on both sides of Chinese character	Left: 0 dot Right: 2 dots
FS W	Setting / canceling quadrupled Chinese character (double height × double width)	0 (Canceled)
GS B	Setting / canceling reversed printing	0 (Reversed printing canceled)
GS a	Setting / canceling auto status transmission	134(86h) (Status transmitted)
GS w	Specifying width of barcode	3 (1 module 3 dots)
GS h	Specifying height of barcode	162 (20.25 mm)
GS H	Specifying position of HRI character of barcode	0 (No HRI printed)
GS f	Specifying font of HRI character of barcode	0 (HRI character = font A)
GS W	Specifying width of print area	384 dots (B-EP2DL-GHxx) 832 dots (B-EP4DL-GHxx)
GS L	Specifying left margin	0 (No left margin)
GS !	Specifying character size	0 (Character size: × 1)

8.10.17 HORIZONTAL TAB POSITIONS SET COMMAND

[ESC] D

Function	Specifies the position of the horizontal tab.
----------	---

Format	[ESC] D [$n_1 n_2 n_3 \dots n_k$] [NUL]
--------	---

Term	ASCII: ESC D Hex: 1Bh 44h
------	------------------------------

[Parameter]

n: Horizontal tab position (No. of digits) $1 \leq n \leq 255$ (01h \leq n \leq FFh)
k: Maximum number of horizontal tab positions $0 \leq k \leq 32$ (00h \leq k \leq 20h)

Default value	Every 8 characters of font A (9th, 17th, 25th digit...)
---------------	---

Explanation	<ol style="list-style-type: none"> (1) The specified position of the horizontal tab is determined by [character width \times n] from the left margin or the beginning of a line. "Character width" in this context refers to the width of a character including space on its right. Therefore, if a magnification is set to x 2 or more, the character width will be enlarged accordingly. (2) The position of the horizontal tab that has been specified is cleared. (3) With n = 8 for the position of the horizontal tab, the next print position will be shifted to the 9th digit by executing the Horizontal Tab Command ([HT]). (4) The maximum permissible number of horizontal tab positions is 32 (k = 32). If it is exceeded, the subsequent data will be processed as normal data. (5) Values are inputted to <n> for the position of the horizontal tab in ascending order, ending with (00H). If <n> is equal to or smaller than the previous <n>, the horizontal tab position setting will be aborted immediately, and the subsequent data will be processed as normal data. (6) All horizontal tab positions are cleared by [ESC] D [NUL]. (7) The specified horizontal tab position will remain unchanged even if the character width is changed after the horizontal tab position is specified.
-------------	--

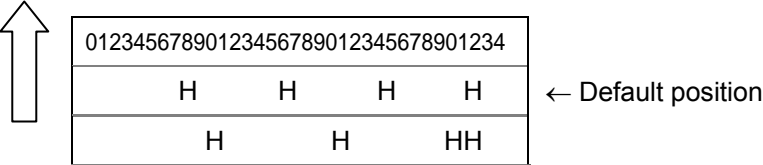
Example

01234567890123456789012345678901234[0A]
[09]H[09]H[09]H[09]H[0A]
[1B]D[0A][14][1E][00[09]H[09]H[09]H[0A]

[Program example]

```
fprintf( stdprn, "01234567890123456789012345678901234\n");  
fprintf( stdprn, "\033D%c%c%c", 10, 20, 30);  
fputc( 0, stdprn );  
for(i=0;i<4;i++) {  
    fputc( '\t', stdprn );  
    fputc( 'H', stdprn );  
}  
fputc( '\n', stdprn );
```

[Print example]



Reference

Horizontal Tab Command ([HT])

8.10.18 BOLD PRINTING SET COMMAND

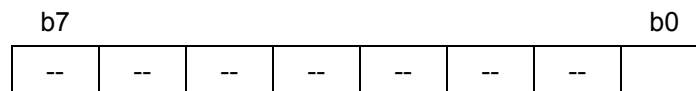
[ESC] E

Function	Sets or cancels bold printing.
----------	--------------------------------

Format	[ESC] En
--------	----------

Term	ASCII: ESC E Hex: 1Bh 45h
------	------------------------------

[Parameter]
n: Bold printing $0 \leq n \leq 255$ (00h $\leq n \leq$ FFh)



0: Canceling bold printing
1: Setting bold printing

Default value	n: 0
---------------	------

- | | |
|-------------|---|
| Explanation | <p>(1) n is valid only in the least significant bit.</p> <p>(2) In bold printing, one character is shifted 1 dot horizontally and superimposed on another. However, in the event of the Character Rotation Set Command ([ESC]V), bold printing is performed after the rotation of the character. Therefore the direction in which bold is applied is different.</p> <p>(3) Bold printing can also be set or canceled by the Print Mode All Set Command ([ESC] G), but the most recently processed command is applied.</p> <p>(4) The same print output is obtained as when the Double Printing Set Command ([ESC] G) is executed.</p> |
|-------------|---|

Reference	Print Mode All Set Command ([ESC] !)
-----------	--------------------------------------

8.10.19 DOUBLE PRINTING SET COMMAND

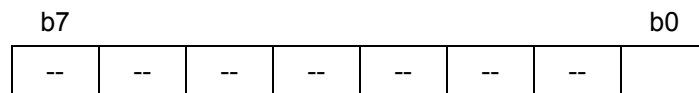
[ESC] G

Function	Sets or cancels double printing.
----------	----------------------------------

Format	[ESC] Gn
--------	----------

Term	ASCII: ESC G Hex: 1Bh 47h
------	------------------------------

[Parameter]
n: Double printing $0 \leq n \leq 255$ (00h \leq n \leq FFh)



0: Canceling double printing
1: Setting double printing

Default value	n: 0
---------------	------

Explanation	<p>(1) n is valid only in the least significant bit.</p> <p>(2) The same print output is obtained as when the Bold Printing Set Command ([ESC]E) is executed.</p>
-------------	---

Reference	Bold Printing Set Command ([ESC] E)
-----------	-------------------------------------

8.10.20 FEED LENGTH SET COMMAND

[ESC] J

Function	Prints data and feeds over the length of n/2 dots.
----------	--

Format	[ESC] Jn
--------	----------

Term	ASCII: ESC J Hex: 1Bh 4Ah
------	------------------------------

[Parameter]
n: Feed length $0 \leq n \leq 255$ (00h \leq n \leq FFh)

- | | |
|-------------|--|
| Explanation | <p>(1) After this command is executed, the next print starting position is the beginning of a line.</p> <p>(2) There is no impact upon the line feed length specified by the 30-dot Line Feed Length Set Command ([ESC] 2) or Minimum Dots for Line Feed Length Set Command ([ESC] 3).</p> <p>(3) Fractions are rounded up, if any.</p> <p>(4) In standard mode, dots in the vertical direction (y) are used.</p> <p>(5) In page mode, the printer operation varies depending on the starting position, as follows:</p> <ul style="list-style-type: none"> ① If “top left” or “bottom right” is selected as the starting position by the Page Mode Print Direction Set Command ([ESC] T), the print position will be shifted in the paper feed direction (vertical direction of a character). In this case, dots in the vertical direction (y) are used. ② If “top right” or “bottom left” is selected as the starting position by the Page Mode Print Direction Set Command ([ESC] T), the print position will be shifted in the direction perpendicular to the paper feed direction (vertical direction of a character). In this case, dots in the horizontal direction (x) are used. <p>(6) The value in the table below must be applied if the specified feed length exceeds it.</p> |
|-------------|--|

B-EP2DL-GHxx (203 dpi)	999 mm
B-EP4DL-GHxx (203 dpi)	999 mm

- (7) If the value set in the parameter of this command is smaller than the feed length of a character, printing will be performed with one character superimposed on another. Therefore, care must be taken to select the feed length.

8.10.21 SWITCHING TO PAGE MODE COMMAND

[ESC] L

Function	Makes transition from standard mode to page mode
Format	[ESC] L
Term	ASCII: ESC L Hex: 1Bh 4Ch
Explanation	<p>(1) This command will be valid only if it is included at the beginning of a line.</p> <p>(2) This command will be valid if it is included in page mode.</p> <p>(3) The printer returns to standard mode after printing ends with the Page Mode Print Command ([FF]), or with the Switching to Standard Mode Command ([ESC] S).</p> <p>(4) The print data is expanded within the print area specified by the Page Mode Print Area Set Command ([ESC] W). Also, the starting position is the position in the print area specified by the Page Mode Print Direction Set Command ([ESC] T).</p> <p>(5) The following commands have different values in page and standard modes. So, the values are switched to the ones for page mode.</p> <ul style="list-style-type: none"> ① Spacing Set [ESC] [SP], [FS] S ② Line Feed Set [ESC] 2, [ESC] 3 <p>(6) The parameter settings made when the following commands are received in standard mode are applied after switching to page mode.</p> <ul style="list-style-type: none"> ① [ESC] V Setting / canceling 90-degree rotation of character ② [ESC] a Justifying print position ③ [ESC] { Setting / canceling inverted printing ④ [GS] L Setting left margin ⑤ [GS] W Setting width of print area <p>(7) The printer returns to standard mode by the Initialize Command ([ESC] @).</p>
Reference	<p>Page Mode Print Command ([FF])</p> <p>Page Mode Cancel Command ([CAN])</p> <p>Page Mode Collective Print Command ([ESC] [FF])</p> <p>Switching to Standard Mode Command ([ESC] S)</p> <p>Page Mode Print Direction Set Command ([ESC] T)</p> <p>Page Mode Print Area Set Command ([ESC] W)</p> <p>Page Mode Relative Position in Vertical Direction Set Command ([GS] \)</p>

8.10.22 INTERNATIONAL CHARACTER SELECT COMMAND [ESC] R

Function Selects an international character set.

The value specified by this command is invalid because the B-EP series does not support this function.

Format [ESC] Rn

Term ASCII: ESC R
Hex: 1Bh 52h

[Parameter]

n: Selecting international character set $0 \leq n \leq 10$ ($00h \leq n \leq 0Ah$)

n	Character set
0	USA
1	France
2	Germany
3	UK
4	Denmark
5	Sweden
6	Italy
7	Spain
8	Japan
9	Norway
10	Denmark 2

Default value n: 0

Explanation (1) Even if an international character set is switched between Japan and other countries by this command, there is no impact upon the Chinese character code system.

[Program example]

```
for(i=0;i<11;i++) {
    fprintf( stdprn, "\033R");/* Selecting country */
    fputc( i, stdprn );
    fprintf( stdprn, " # $ @ [ \ ] ^ ` { | } ~ \n");
}
```

[Print example]

23h	24h	40h	5Bh	5Ch	5Dh	5Eh	60h	7Bh	7Ch	7Dh	7Eh		
#	\$	@	[	\	\]	^	`	{	|	}	~	←ア メ リ カ	USA
#	\$	à	°	ç	§	^	`	é	ù	è	¨	フ ラ ン ス	France
#	\$	§	Ä	ö	Ü	^	`	ä	ö	ü	ß	ド イ ツ	Germany
£	\$	@	[	\	\]	^	`	{	|	}	~	イ ギ リ ス	UK
#	\$	@	Æ	Ø	Å	^	`	æ	ø	å	~	デンマーク I	Denmark I
#	¤	É	Ä	ö	Å	Ü	é	ä	ö	å	ü	スウェーデン	Sweden
#	\$	@	°	\	é	^	`	à	ò	è	ì	イ タ リ ア	Italy
Pt	\$	@	¡	Ñ	¿	^	`	ˆ	ñ	}	~	ス ペ イ ン	Spain
#	\$	@	[	¥	]	^	`	{	|	}	~	日 本	Japan
#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü	ノルウェー	Norway
#	\$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü	デンマーク II	Denmark II

8.10.23 SWITCHING TO STANDARD MODE COMMAND [ESC] S

Function	Makes transition from page mode to standard mode.
Format	[ESC] S
Term	ASCII: ESC S Hex: 1Bh 53h
Explanation	<p>(1) This command will be valid only if it is executed in page mode.</p> <p>(2) The data expanded in page mode is erased.</p> <p>(3) After this command is executed, the next print starting position is the beginning of a line.</p> <p>(4) The following commands have different values in page and standard modes. So, the values are switched to the ones for standard mode.</p> <p>① Spacing Set [ESC] [SP], [FS] S</p> <p>② Line Feed Length Set [ESC] 2, [ESC] 3</p> <p>(5) Standard mode is selected at power-on, when resetting, or when the Initialize Command ([ESC] @) is executed.</p> <p>(6) The print area defined by the Page Mode Print Area Set Command ([ESC] W) is initialized.</p>
Reference	<p>Page Mode Print Command ([FF])</p> <p>Page Mode Collective Print Command ([ESC] [FF])</p> <p>Switching to Page Mode Command ([ESC] L)</p>

8.10.24 PAGE MODE PRINT DIRECTION SET COMMAND [ESC] T

Function Selects a print direction and print starting point in page mode.

Format [ESC] Tn

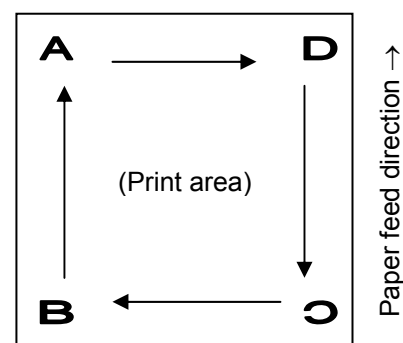
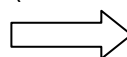
Term ASCII: ESC T
Hex: 1Bh 54h

[Parameter]

n: Selecting print direction and starting point $0 \leq n \leq 3$ (00h $\leq n \leq$ 03h)
 $48 \leq n \leq 51$ (30h $\leq n \leq$ 33h)

N	Print direction	
0, 48	Left → Right	Top left (A in the figure on the right)
1, 49	Bottom → Top	Bottom left (B in the figure on the right)
2, 50	Right → Left	Bottom right (C in the figure on the right)
3, 51	Top → Bottom	Top right (D in the figure on the right)

(Reference)



Default value n: 0

- Explanation**
- (1) If this command is received while the printer is in standard mode, the defined parameter setting will be applied after switching to page mode.
 - (2) The position where characters are expanded is the starting position in the print area defined by the Page Mode Print Area Set Command ([ESC] W).

Reference

Switching to Standard Mode Command ([ESC] S)
Switching to Page Mode Command ([ESC] L)
Page Mode Print Area Set Command ([ESC] W)
Relative Position Set Command ([ESC] \)
Page Mode Relative Position in Vertical Direction Set Command ([GS] \)

8.10.25 CHARACTER ROTATION SET COMMAND

[ESC] V

Function Sets or cancels the 90-degree rotation (clockwise) of a character.

Format [ESC] Vn

Term ASCII: ESC V
Hex: 1Bh 56h

[Parameter]
n: Selecting 90-degree rotation (clockwise) $0 \leq n \leq 1$ (00h $\leq n \leq$ 01h)
or
 $48 \leq n \leq 49$ (30h $\leq n \leq$ 31h)

N	
0, 48	Canceling 90-degree of rotation (clockwise)
1, 49	Setting 90-degree of rotation (clockwise)

Default value n: 0

Explanation

- (1) Even if underlining is set, a character rotated 90 degrees clockwise will not be underlined.
- (2) If 90-degree of rotation (clockwise) is set, a relationship between double width and double height is the reverse of the one when 90-degree rotation is canceled.
- (3) The command setting does not have any impacts upon page mode.
- (4) If this command is received while the printer in page mode, the defined parameter setting will be applied after switching to standard mode.

Reference Print Mode All Set Command ([ESC] !)
Underlining Set Command ([ESC] -)

8.10.26 PAGE MODE PRINT AREA SET COMMAND

[ESC] W

Function	Specifies a position and size of the print area in page mode.
Format	[ESC] WxLxHyLyHdxLdxHdyLdyH
Term	<p>ASCII: ESC W</p> <p>Hex: 1Bh 57h</p> <p>[Parameter]</p> <p>xL : Starting point in horizontal direction (low order) $0 \leq xL \leq 255$ (00h \leq xL \leq FFh)</p> <p>xH : Starting point in horizontal direction (high order) $0 \leq xH \leq 255$ (00h \leq xH \leq FFh)</p> <p>yL : Starting point in vertical direction (low order) $0 \leq yL \leq 255$ (00h \leq yL \leq FFh)</p> <p>yH : Starting point in vertical direction (high order) $0 \leq yH \leq 255$ (00h \leq yH \leq FFh)</p> <p>dxL : Length in horizontal direction (low order) $0 \leq dxL \leq 255$ (00h \leq dxL \leq FFh)</p> <p>dxH : Length in horizontal direction (high order) $0 \leq dxH \leq 255$ (00h \leq dxH \leq FFh)</p> <p>dyL : Length in vertical direction (low order) $0 \leq dyL \leq 255$ (00h \leq dyL \leq FFh)</p> <p>dyH : Length in vertical direction (high order) $0 \leq dyH \leq 255$ (00h \leq dyH \leq FFh)</p> <p>* Starting point in horizontal direction = $xL + xH \times 256$ dots</p> <p>Starting point in vertical direction = $yL + yH \times 256$ dots</p> <p>Length in horizontal direction = $dxL + dxH \times 256$ dots</p> <p>Length in vertical direction = $dyL + dyH \times 256$ dots</p>
Default value	<p>B-EP2DL-GHxx: xL=xH=yL=yH=0, dxL=80h dxH=01h dyL=80h dyH=01h</p> <p>B-EP4DL-GHxx: xL=xH=yL=yH=0, dxL=40h dxH=03h dyL=40h dyH=03h</p>
Explanation	<p>(1) If this command is received while the printer in standard mode, the defined parameter setting will be applied after switching to page mode.</p> <p>(2) If the starting point in the horizontal or vertical direction is out of the print area, command processing will be aborted, and the subsequent data will be processed as normal data.</p> <p>(3) If the length in the horizontal or vertical direction is 0, command processing will be aborted, and the subsequent data will be processed as normal data.</p> <p>(4) The position where characters are expanded is the starting position in the print area defined by the Page Mode Print Direction Set Command ([ESC] T).</p>

- (5) At a moment when an error occurs with parameter xL to dyH due to a factor such as an unmatched condition, command processing will be aborted, and the data subsequent to dyH will be processed as normal data.
- (6) If the following commands, which are used commonly among the B-EP series, are received, a higher priority will be given to them. Therefore, the same range as these commands cannot be specified.

[ESC] WS [LF] [NUL]
[ESC] WT [LF] [NUL]
[ESC] WB [LF] [NUL]
[ESC] WR [LF] [NUL]
[ESC] WW [LF] [NUL]

(Example)

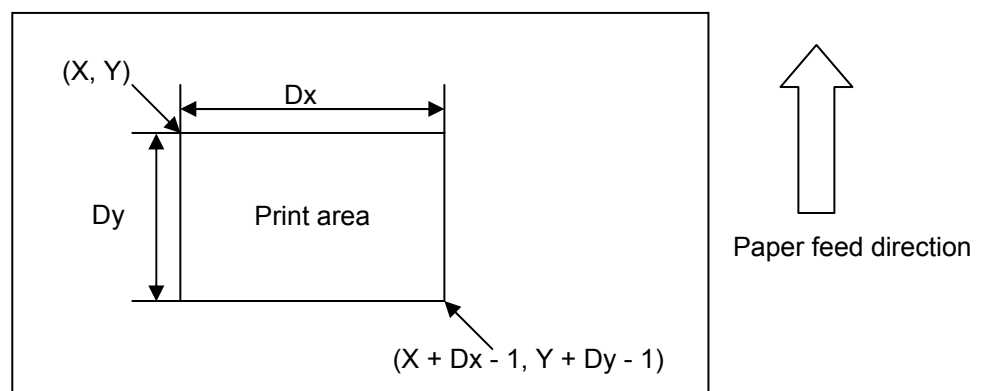
[ESC] W	<u>xL</u>	<u>xH</u>	<u>yL</u>	<u>yH</u>	<u>dxL</u>	<u>dxH</u>	<u>dyL</u>	<u>dyH</u>
	↓	↓	↓	↓	↓	↓	↓	↓
	S	10	0	0	160	1	160	1

The above values are specified. If inputted in hex format, they are as follows:

[1BH][57H][53H][0AH][00H][00H][A0H][01H][A0H][01H]

However the underlined portion is considered as [ESC] WS [LF] [NUL]. Therefore, a priority is given to the Status Request Command rather than the Page Mode Print Area Set Command.

- (7) The figure below illustrates a print area with the starting point in the horizontal direction X, starting point in the vertical direction Y, length in the horizontal direction Dx, and length in the vertical direction Dy.



8.10.27 JUSTIFICATION COMMAND

[ESC] a

Function	Justifies print data.
----------	-----------------------

Format	[ESC] an
--------	----------

Term	ASCII: ESC a Hex: 1Bh 61h
------	------------------------------

[Parameter]
n: Justifying print position

$0 \leq n \leq 2$ (00h \leq n \leq 02h)
or
 $48 \leq n \leq 50$ (30h \leq n \leq 32h)

0: Left-justifying

1: Centering

2: Right-justifying

Default value	n: 0
---------------	------

Explanation	<p>(1) This command will be executed only if it is received at the beginning of a line.</p> <p>(2) If this command is received while the printer in page mode, the defined parameter setting will be applied after switching to standard mode.</p> <p>(3) Justification is performed within the specified print area.</p> <p>(4) Justification also applies to a portion skipped by the Horizontal Tab Command ([HT]), Absolute Position Set Command ([ESC] \$), or Relative Position Set Command ([ESC] \).</p>
-------------	--

8.10.28 PANEL KEY (FEED KEY) SET COMMAND

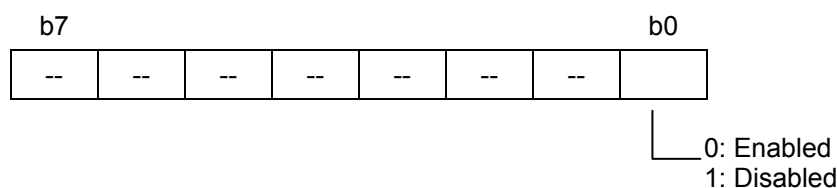
[ESC] c5

Function	Enables or disables the panel key (FEED key).
----------	---

Format	[ESC] c5n
--------	-----------

Term	ASCII: ESC c 5 Hex: 1Bh 63h 35h
------	------------------------------------

[Parameter]
n: Selecting / deselecting printer $0 \leq n \leq 255$ (00h \leq n \leq FFh)



Default value	n: 0
---------------	------

Explanation	<p>(1) n is valid only in the least significant bit.</p> <p>(2) The [FEED] key will be disabled if the parameter is set to "Disabled."</p> <p>(3) While waiting for the [FEED] key entry when a macro is executed, the [FEED] key is enabled regardless of the parameter setting of this command. However, paper feed is not performed.</p>
-------------	---

8.10.29 PAPER FEED LENGTH SET COMMAND

[ESC] d

Function	Prints data and feeds paper over n lines. However, the specified number of lines that paper is fed over is not stored.
Format	[ESC] d
Term	ASCII: ESC d Hex: 1Bh 64h

[Parameter]

n: No. of lines that paper is fed over $0 \leq n \leq 255$ (00h \leq n \leq FFh)

- | | |
|-------------|---|
| Explanation | <p>(1) After this command is executed, the next print starting position is the beginning of a line.</p> <p>(2) There is no impact upon the line feed length defined by the feed length set commands ([ESC] 2 or [ESC] 3).</p> <p>(3) The value in the table below must be applied if $n \times$ line feed length exceeds it.</p> |
|-------------|---|

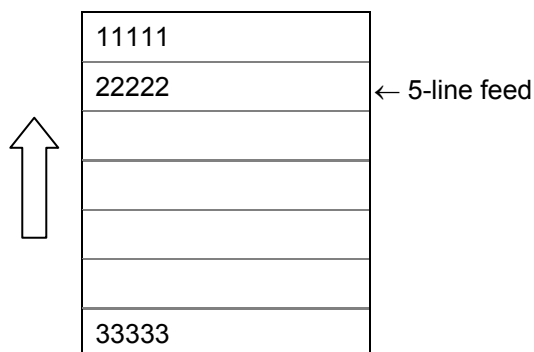
B-EP2DL-GHxx (203 dpi)	999 mm
B-EP4DL-GHxx (203 dpi)	999 mm

- (4) The line feed length is 30 dots per line.

[Program example]

```
fprintf( stdprn, "11111\n");
fprintf( stdprn, "22222");
fprintf( stdprn, "\033d\x05");          /* 5-line feed */
fprintf( stdprn, "33333\n");
```

[Print example]



8.10.30 CODE PAGE NO. SELECT COMMAND

[ESC] t

Function	Selects a code page No.
----------	-------------------------

Format [ESC] tn

Term	ASCII: ESC t Hex: 1Bh 74h
------	------------------------------

[Parameter]

n: Selecting code page No.

$$0 \leq n \leq 5 \text{ (00h} \leq n \leq 05\text{h)}$$

n = 255 (n = FFh)

0: PC437 (USA: Standard Europe)

1: Japanese (Katakana)

2: PC850 (Multilingual)

3: PC860 (Portuguese)

4: PC863 (Canadian-French)

5: PC865 (Nordic)

255: Blank page

Default value	n: 0
---------------	------

Explanation	(1) PC850 is the only code page that the B-EP series supports. Therefore, any values other than 2 are invalid.
-------------	--

[Program example]

```
for(i=0;i<2;i++) {
    fprintf( stderr, "\033t");      /* Selecting code page */
    fputc( i, stderr );
    for(j=0x20;j<0xff;j++) {
        fputc( j, stderr );
    }
    fprintf( stderr, "\n\r" );
}
```

[Print example]

!”# ● ● ● ●	← Page 0
:	
:	
● ● ● ● 2	
!”# ● ● ● ●	← Page 1
:	
:	
● ● ● ● 村人	

8.10.31 INVERTED PRINTING SET COMMAND

[ESC] {

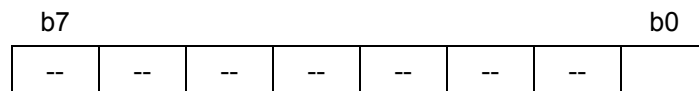
Function Sets or cancels inverted printing (upside-down).

Format [ESC] {n

Term ASCII: ESC {
Hex: 1Bh 7Bh

[Parameter]

n: Setting/canceling inverted printing $0 \leq n \leq 255$ (00h $\leq n \leq$ FFh)



0: Canceling inverted printing
1: Setting inverted printing

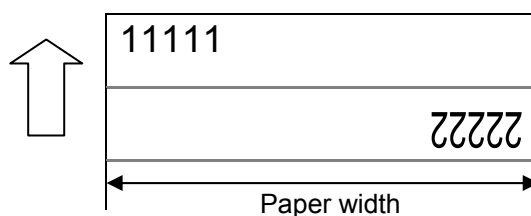
Default value n: 0

- Explanation**
- (1) n is valid only in the least significant bit.
 - (2) This command is executed only if it is received at the beginning of a line.
 - (3) Inverted printing means that a line is inverted 180 degrees and printed.
 - (4) Inverted printing is performed in the direction opposed to normal printing.
 - (5) If this command is received while the printer is in page mode, the defined parameter setting will be applied after switching to standard mode.

[Program example]

```
fprintf( stdprn, "\033{");          /* Canceling inverted printing */
fputc( 0, stdprn );
fprintf( stdprn, "11111\n");
fprintf( stdprn, "\033{");          /* Setting inverted printing */
fputc( 1, stdprn );
fprintf( stdprn, "22222\n");
```

[Printer example]



8.10.32 ABSOLUTE POSITION SET COMMAND

[ESC] \$

Function	Specifies an absolute position.
Format	[ESC] \$nLnH
Term	<p>ASCII: ESC \$</p> <p>Hex: 1Bh 24h</p> <p>[Parameter]</p> <p>n: No. of dots to specify absolute position (low order) $0 \leq nL \leq 255$ (00h \leq nL \leq FFh)</p> <p>n: No. of dots to specify absolute position (high order) $0 \leq nH \leq 255$ (00h \leq nH \leq FFh)</p>
Explanation	<p>(1) An absolute position of the subsequent print starting position is specified with reference to the left margin. The next print starting position is located $(nL + nH \times 256) / \text{dots}$ away from the left margin.</p> <p>(2) An absolute position out of the print area is ignored.</p> <p>(3) Dots in the horizontal direction (x) are applied in standard mode.</p> <p>(4) The printer operation varies in page mode depending on the starting position as follows:</p> <p>① If “top left” or “bottom right” is selected as the starting point defined by the Page Mode Print Direction Set Command ([ESC] T), an absolute position in the direction perpendicular to the paper feed direction (horizontal direction of a character) is specified.</p> <p>② If “top right” or “bottom left” is selected as the starting point defined by the Page Mode Print Direction Set Command ([ESC] T), an absolute position in the paper feed direction (horizontal direction of a character) is specified.</p>
Reference	<p>Relative Position Set Command ([ESC] \)</p> <p>Page Mode Absolute Position in Vertical Direction Set Command ([GS] \$)</p> <p>Page Mode Relative Position in Vertical Direction Set Command ([GS] \)</p>

8.10.33 RELATIVE POSITION SET COMMAND

[ESC] \

Function	Specifies a relative position.
Format	[ESC] \nLnH
Term	<p>ASCII: ESC \</p> <p>Hex: 1Bh 5Ch</p> <p>[Parameter]</p> <p>n: No. of dots to specify relative position (low order) $0 \leq nL \leq 255$ (00h \leq nL \leq FFh)</p> <p>n: No. of dots to specify relative position (high order) $0 \leq nH \leq 255$ (00h \leq nH \leq FFh)</p>
Default value	Not defined.
Explanation	<p>(1) A relative position of the subsequent print starting position is specified with reference to a current position. The next print starting position is located (nL + nH \times 256) away from the current position.</p> <p>(2) A relative position out of the print area is ignored.</p> <p>(3) If the right direction of the current position is specified, a positive number must be defined. If the left direction of the current position is specified, a negative number must be defined.</p> <p>(4) A negative number is represented by a complement number of 65535.</p> <p>Ex.) To specify N dots in the left (negative) direction</p> $nL + nH \times 256 = 65536 - N.$ <p>(5) Dots in the horizontal direction (x) are applied in standard mode.</p> <p>(6) The printer operation varies in page mode depending on the starting position as follows:</p> <p>① If "top left" or "bottom right" is selected as the starting point in the Page Mode Print Direction Set Command ([ESC] T), a relative position in the direction perpendicular to the paper feed direction (horizontal direction of a character) is specified.</p> <p>② If "top right" or "bottom left" is selected as the starting point in the Page Mode Print Direction Set Command ([ESC] T), a relative position in the paper feed direction (horizontal direction of a character) is specified.</p>
Reference	Absolute Position Set Command ([ESC] \$)

8.10.34 CHINESE CHARACTER PRINT MODE ALL SET COMMAND [FS] !

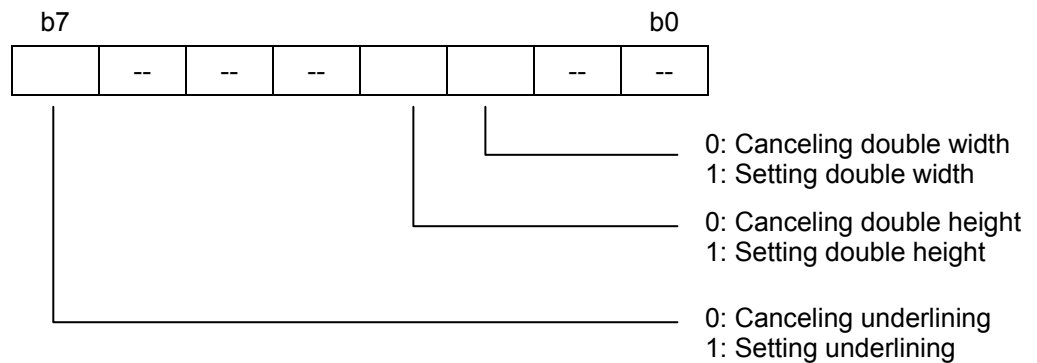
Function	Specifies printing mode for Chinese characters altogether.
----------	--

Format	[FS] !
--------	--------

Term	ASCII: FS! Hex: 1Ch 21h
------	----------------------------

[Parameter]

n: Specifying character control of Chinese character $0 \leq n \leq 255$ ($00h \leq n \leq FFh$)



Default value	n: 0
---------------	------

- | | |
|-------------|--|
| Explanation | <ol style="list-style-type: none"> (1) If both double width and double height are specified, a character size will be quadrupled (double width × double height). (2) Chinese characters including space on both sides of them are underlined.
However, a portion skipped by the Horizontal Tab Command ([HT]) or a character rotated 90 degrees clockwise is not underlined. (3) The width of an underline for Chinese characters is determined in accordance with the width defined by the Chinese Character Underlining Set Command ([FS] -). (4) If characters with different magnifications in the vertical direction coexist in the same line, they will be aligned to the baseline. (5) The size of Chinese characters can also be specified by the Chinese Character Magnification Set Command ([FS] W) or Character Size Set Command ([GS] !).
But the most recently processed command is applied. (6) Underlining for Chinese characters can also be set or canceled by the Chinese Character Underlining Set Command ([FS] -), but the most recently processed command is applied. (7) The parameter setting applies to the Chinese language settings with Chinese language implemented for the QM model (destined overseas), or to the Korean language setting with Korean language implemented. |
|-------------|--|

8.10.35 CHINESE CHARACTER MODE SET COMMAND [FS] &

Function	Prints Chinese characters.
Format	[FS] &
Term	ASCII: FS& Hex: 1Ch 26h
Explanation	<p>(1) If this command is received with shift JIS selected for a Chinese character code system, the defined parameter setting will be applied when the Chinese character code system is changed to JIS. There is no impact upon printing.</p> <p>(2) Chinese character mode is canceled by default.</p> <p>(3) A Chinese character code is processed from the 1st to the 2nd byte.</p> <p>(4) The parameter setting applies to the Chinese language settings with Chinese language implemented for the QM model (destined overseas), or to the Korean language setting with Korean language implemented.</p>
Reference	Chinese Character Mode Cancel Command ([FS] .) Chinese Character Code System Set Command ([FS] C)

8.10.36 CHINESE CHARACTER UNDERLINING SET COMMAND [FS] -

Function	Sets or cancels underlining for ANK characters.
Format	[FS]-n
Term	<p>ASCII: FS- Hex: 1Ch 2Dh</p> <p>[Parameter] n: Setting underlining for Chinese character</p> <div style="display: flex; justify-content: space-between;"> <div> <p>0: Canceling underlining 1: Setting underlining (1-dot wide) 2: Setting underlining (2-dot wide)</p> </div> <div> <p>$0 \leq n \leq 2$ (00h \leq n \leq 02h) or $48 \leq n \leq 50$ (30h \leq n \leq 32h)</p> </div> </div>
Default value	n: 0
Explanation	<p>(1) Chinese characters including space on both sides of them are underlined. However, a portion skipped by the Horizontal Tab Command ([HT]) or a character rotated 90 degrees clockwise is not underlined.</p> <p>(2) If underlining Chinese characters is canceled with n = 0, the subsequent Chinese characters will not be underlined. However, the width of the underline immediately before canceling the underline is maintained. Also, a 1-dot wide underline is selected by default.</p> <p>(3) The width of an underline for Chinese characters is consistent regardless of a character size.</p> <p>(4) Underlining Chinese characters can also be set or canceled by the Chinese Character Print Mode All Set Command ([FS] !), but the most recently processed command is applied.</p> <p>(5) The parameter setting applies to the Chinese language settings with Chinese language implemented for the QM model (destined overseas), or to the Korean language setting with Korean language implemented.</p>
Reference	Chinese Character Print Mode All Set Command ([FS] !)

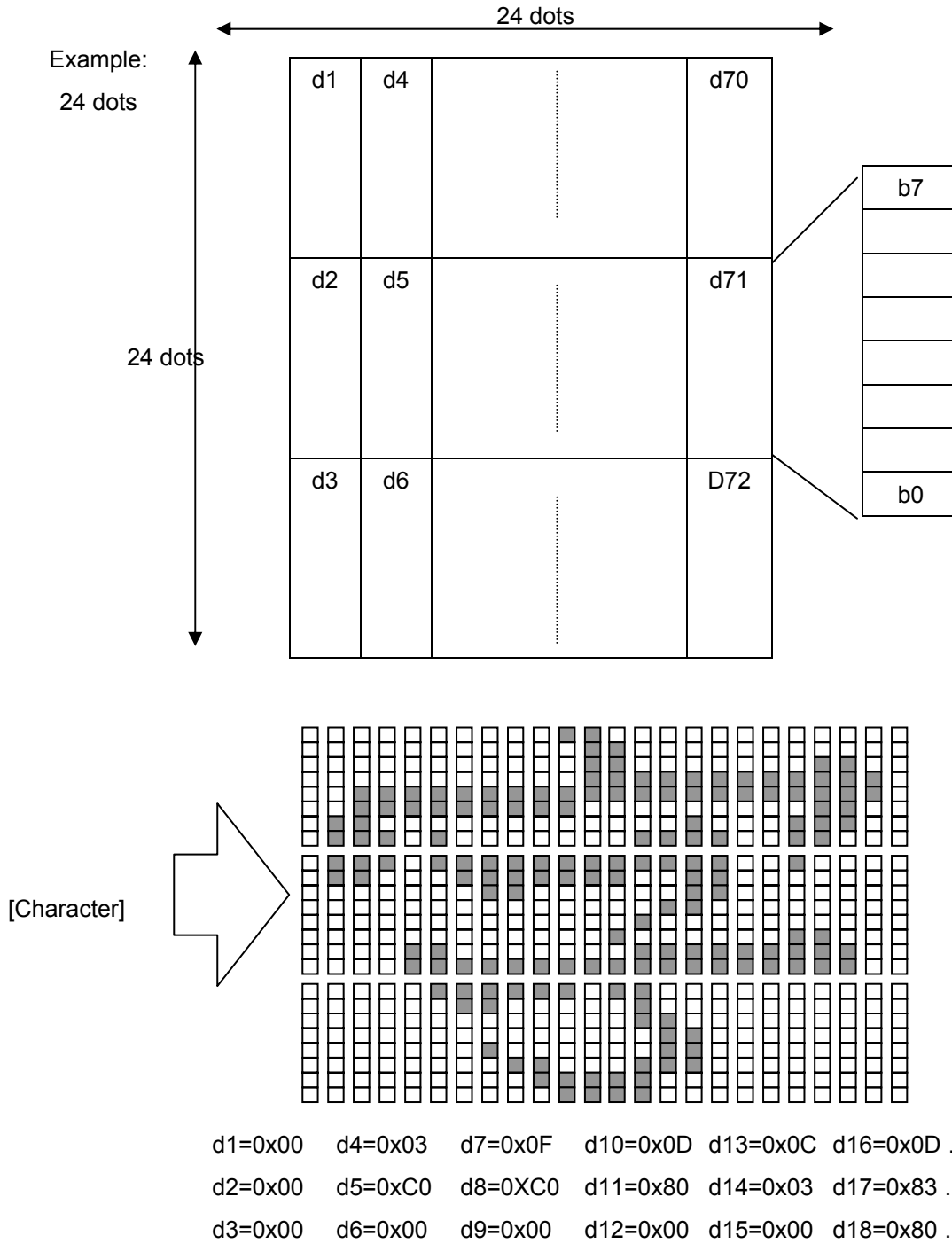
8.10.37 CHINESE CHARACTER MODE CANCEL COMMAND [FS] .

Function	Cancels Chinese character mode.
Format	[FS] .
Term	ASCII: FS. Hex: 1Ch 2Eh
Explanation	(1) If this command is received with shift JIS selected for a Chinese character code system, the defined parameter setting will be applied when the Chinese character code system is changed to JIS. There is no impact upon printing. (2) Chinese character mode is canceled by default.
Reference	Chinese Character Mode Set Command ([FS] &) Chinese Character Code System Set Command ([FS] C)

8.10.38 WRITABLE CHARACTER OF CHINESE CHARACTER DEFINE COMMAND [FS] 2

Function	Specifies writable characters of Chinese characters.
Format	[FS] 2a1a2 [d ₁ d ₂ d ₃ ...d _k]
Term	<p>ASCII: FS2 Hex: 1Ch 32h</p> <p>[Parameter] a1: Writable character code (high order) a2: Writable character code (low order) JIS code: a1 = 77h, 21h ≤ a2 ≤ 7Eh Shift JIS: a1 = ECh, 40h ≤ a2 ≤ 9Eh (except for 7Fh) EUC code: a1 = F7h, A1h ≤ a2 ≤ FEh Chinese/Korean: a1 = FFh, 40h ≤ a2 ≤ 7Eh, 80h ≤ a2 ≤ FCh d: Data to be defined 0 ≤ d ≤ 255 Data consists of 72 bytes (k = 72) (3 bytes (high) × 24 dots)</p>
Default value	All space
Explanation	<p>(1) a1 and a2 refer to a Chinese character code to define writable characters. a1 refers to the 1st byte, and a2 the 2nd byte.</p> <p>(2) d refers to data to be defined. A bit corresponding to a dot to be printed is 1, and the one corresponding to a dot not to be printed is 0.</p> <p>(3) Font A accepts 94 characters.</p> <p>(4) At a moment when an error occurs with parameter a1 or a2 due to a factor such as an unmatched condition, command processing will be aborted, and the data subsequent to a2 will be processed as normal data.</p> <p>(5) The defined writable characters apply until resetting or until the printer is turned off.</p>
Reference	Chinese Character Code System Set Command ([FS] C)

[Defined character] Example of font A



8.10.39 CHINESE CHARACTER CODE SYSTEM SET COMMAND [FS] C

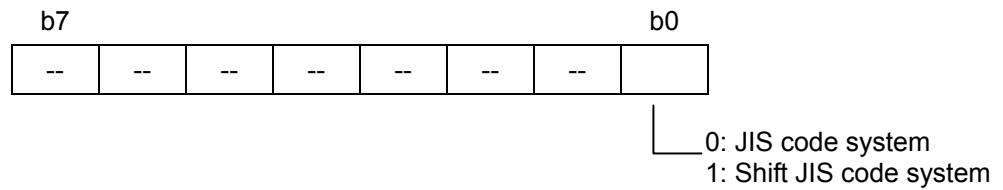
Function	Selects a Chinese character code system.
----------	--

Format	[FS] Cn
--------	---------

Term	ASCII: FS C Hex: 1Ch 43h
------	-----------------------------

[Parameter]

n: Selecting Chinese character code system n = 0, 1 (n = 00h, 01h)



Default value	n: 0
---------------	------

- | | |
|-------------|---|
| Explanation | <p>(1) For JIS code, valid Chinese character codes are 21 to 7Eh for both the 1st and 2nd bytes.</p> <p>(2) For shift JIS code, valid Chinese character codes are as follows:</p> <p style="margin-left: 40px;">1st byte: 81h to 9Fh, or E0h to EFh</p> <p style="margin-left: 40px;">2nd byte: 40h to 7Eh, or 80h to FCh</p> <p>(3) There is no impact upon the setting with Chinese or Korean language implemented.</p> |
|-------------|---|

[Program example]

```

fprintf( stdprn, "\034C\x01");          /* SHIFT-JIS selected */
fprintf( stdprn, "\x44\x7b\n");
fprintf( stdprn, "\034C%c",0x00);        /* JIS selected */
fprintf( stdprn, "\034&");              /* Beginning of Chinese character */
fprintf( stdprn, "\x44\x7b\n");
fprintf( stdprn, "\034.");               /* End of Chinese character */
fprintf( stdprn, "\x44\x7b\n");

```

[Print example]

↑

D{
訂
D{

[Example]

- ① <SJIS>123ABCあい<ANK>アイ
[1C][43][01][1C][26][31][32][33][41][42][43][82][A0][82][A2][82][A4][1C][2E][B1][B2][B3]
- ② <ANK>123ABC<JIS>あい<ANK>アイ
[1C][2E][31][32][33][41][42][43][1C][43][00][1C][26][24][22][24][24][24][26][1C][2E][B1][B2][B3]
- ③ <ANK>123ABC<SJIS>あい<ANK>アイ
[1C][2E][31][32][33][41][42][43][1C][43][01][1C][26][82][A0][82][A2][82][A4][1C][2E][B1][B2][B3]
- ④ <SJIS>123ABCあいアイ
[1C][43][01][1C][26][31][32][33][41][42][43][82][A0][82][A2][82][A4][B1][B2][B3]
- ⑤ <ANK>123ABC<SJIS>あいアイ
[1C][2E][31][32][33][41][42][43][1C][43][01][1C][26][82][A0][82][A2][82][A4][B1][B2][B3]
- ⑥ <ANK>123ABC<JIS>あいアイ
[1C][2E][31][32][33][41][42][43][1C][43][00][1C][26][24][22][24][24][24][26][B1][B2][B3]

Reference

Chapter 12 Character Code Table

Chapter 13 Chinese Character Code Table


8.10.40 CHINESE CHARACTER SPACING SET COMMAND [FS] S

Function	Specifies spacing (or the number of dots) on both sides of a Chinese character.
Format	[FS] Sn1n2
Term	<p>ASCII: FS S</p> <p>Hex: 1Ch 53h</p> <p>[Parameter]</p> <p>n1: Spacing on the left of Chinese character $0 \leq n1 \leq 99$ (00h \leq n1 \leq 63h)</p> <p>n2: Spacing on the right of Chinese character $0 \leq n2 \leq 99$ (00h \leq n2 \leq 63h)</p>
Default value	n1: 0, n2: 0
Explanation	<p>(1) Spacing defined this command is the one when a character size is standard. If a character with a magnification of x 2 or over in the horizontal direction is expanded, spacing will be determined by the specified spacing \times magnification in the horizontal direction.</p> <p>(2) A sum of spacing on both sides of a character must never exceed 99. If so, it will be changed to 99.</p> <p>(3) Spacing can be independently specified in page and standard modes.</p> <p>(4) If a double-width character is specified, spacing will also be doubled.</p> <p>(5) For the B-EP series, spacing on the left of a Chinese character is added to spacing on its right. Therefore, there is no space found on the left of the Chinese character in the print output.</p>

[Program example]

```
fprintf( stdprn, "\034S%c\x02",0x00);      /* 2 dots on the right of character */  
fprintf( stdprn, "\x82\x50\x82\x50\x82\x50\x82\x50\n");  
fprintf( stdprn, "\034S%c\x1c",0x00);      /* 28 dots on the right of character */  
fprintf( stdprn, "\x82\x51\x82\x51\x82\x51\x82\x51\n");
```

[Print example]

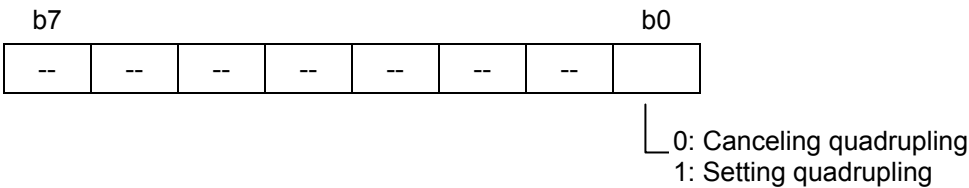


1111
2 2 2 2

8.10.41 CHINESE CHARACTER MAGNIFICATION SET COMMAND [FS] W

Function	Sets or cancels the quadrupling of Chinese character (double height × double width).
Format	[FS] Wn
Term	ASCII: FS W Hex: 1Ch 57h

[Parameter]
n: Setting quadrupling of Chinese character (double height × double width)
 $0 \leq n \leq 255$ (00h ≤ n ≤ FFh)



Default value n: 0

- Explanation
- (1) n is valid only in the least significant bit.
 - (2) If the quadrupling of a Chinese character (double height × double width) is canceled by this command, the subsequent Chinese character is printed in standard size (x 1).
 - (3) A Chinese character size can also be specified by the Character Size Set Command ([GS] !) or Chinese Character Print Mode All Set Command ([FS] !), but the most recently processed command is applied.

Reference Chinese Character Print Mode All Set Command ([FS] !)
Character Size Set Command ([GS] !)

8.10.42 PAGE MODE ABSOLUTE POSITION SET COMMAND [GS] \$

Function	Specifies an absolute position in the vertical direction in page mode.
Format	[GS] \$nLnH
Term	<p>ASCII: GS \$ Hex: 1Dh 24h</p> <p>[Parameter]</p> <p>nL: Specifying absolute position in the vertical direction in page mode (low order) $0 \leq nL \leq 255$ (00h \leq nL \leq FFh)</p> <p>nH: Specifying absolute position in the vertical direction in page mode (high order) $0 \leq nH \leq 255$ (00h \leq nH \leq FFh)</p>
Default value	
Explanation	<p>(1) An absolute position of the data expansion starting position in the vertical direction in page mode is specified with reference to the starting position. The next data expansion starting position is shifted (nL + nH \times 256) dots away from the current position in the vertical direction.</p> <p>(2) This command is ignored except when page mode is selected.</p> <p>(3) An absolute position in the vertical direction out of the specified print area is ignored.</p> <p>(4) A starting position, which is a reference to an absolute position, is specified in the Page Mode Print Direction Set Command ([ESC] T).</p>
Reference	<p>Absolute Position Set Command ([ESC] \$)</p> <p>Page Mode Print Direction Set Command ([ESC] T)</p> <p>Page Mode Print Area Set Command ([ESC] W)</p> <p>Relative Position Set Command ([ESC] \)</p> <p>Page Mode Relative Position in Vertical Direction Set Command ([GS] \)</p>

8.10.43 REVERSE CHARACTER SET COMMAND

[GS] B

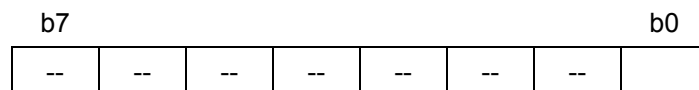
Function	Sets or cancels reverse characters (white text on black)
----------	--

Format	[FS] Bn
--------	---------

Term	ASCII: GS B Hex: 1Dh 42h
------	-----------------------------

[Parameter]

n: Setting reverse characters $0 \leq n \leq 255$ ($00h \leq n \leq FFh$)



└ 0: Canceling reverse character
1: Setting reverse character

Default value	n: 0
---------------	------

- | | |
|-------------|--|
| Explanation | <ol style="list-style-type: none"> (1) n is valid only in the least significant bit. (2) Reversed printing applies to the internal and downloaded characters. (3) Reversed printing also applies to spacing on the right of a character defined by the Spacing Set Command ([ESC] [SP]). (4) There is no impact upon bit images, downloaded bit images, barcodes, or HRI characters, or a portion skipped by the Horizontal Tab Command ([HT]) or Relative Position Set Command ([ESC] \). (5) There is no impact upon spacing between lines. (6) A higher priority is given to reversed printing than underlining. Therefore, even if underlining is specified, reverse characters will not be underlined. However, the underlining settings will remain unchanged. |
|-------------|--|

8.10.44 ID TRANSMISSION COMMAND

[GS] I

Function Transmits the following ID specified by n.

Format [GS] In

Term ASCII: GS I
Hex: 1Dh 49h

[Parameter]

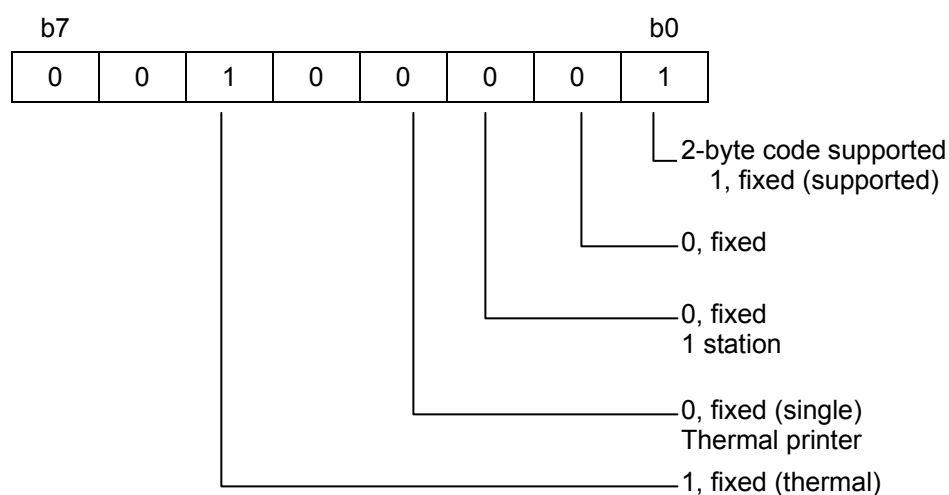
n: Selecting ID to transmit

$1 \leq n \leq 3$ (01h $\leq n \leq$ 03h)

or

$49 \leq n \leq 51$ (31h $\leq n \leq$ 33h)

n	ID type	ID to transmit
1	Model ID	0CH (12)
2	Type ID	See (1) below for further information.
3	Firmware version	See (2) below for further information.



Default value n:

Explanation (1) Type ID is fixed at 21H for this printer.

(2) The firmware version is updated as below every time firmware is upgraded or revised:

A(41H) → B(42H) → C(43H) → ... → Z(5AH) → a(61H) → b(62H) → ...

8.10.45 PAGE MODE RELATIVE POSITION IN VERTICAL DIRECTION SET COMMAND [GS] \

Function	Specifies a relative position in the vertical direction in page mode.
Format	[GS] \nLnH
Term	<p>ASCII: GS \</p> <p>Hex: 1Dh 5Ch</p> <p>[Parameter]</p> <p>nL: Specifying relative position in the vertical direction in page mode (low order) $0 \leq nL \leq 255$ (00h \leq nL \leq FFh)</p> <p>nH: Specifying relative position in the vertical direction in page mode (high order) $0 \leq nH \leq 255$ (00h \leq nH \leq FFh)</p>
Default value	
Explanation	<p>(1) A relative position of the data expansion starting position in the vertical direction in page mode is specified with reference to a current position. The next data expansion starting position is shifted (nL + nH \times 256) dots away from the current position in the vertical direction.</p> <p>(2) This command is ignored except when page mode is selected.</p> <p>(3) In JIS standard characters, “¥” is equivalent to “\”.</p> <p>(4) A relative position in the vertical direction out of the specified print area is ignored.</p> <p>(5) A positive number must be specified for the downward direction, and a negative number for the upward direction.</p> <p>(6) The number of dots is determined by $nH \times 256 + nL$.</p> <p>(7) N dots in the upward (negative) direction are specified by a complement number of N.</p> <p style="padding-left: 40px;">- N dots = 65536 - N</p>
Reference	<p>Absolute Position Set Command ([ESC] \$)</p> <p>Page Mode Print Direction Set Command ([ESC] T)</p> <p>Page Mode Print Area Set Command ([ESC] W)</p> <p>Relative Position Set Command ([ESC] \)</p> <p>Page Mode Absolute Position in Vertical Direction Set Command ([GS] \$)</p>

8.10.47 BARCODE PRINT COMMAND

[GS] k

Function

Selects a barcode system and prints barcodes.

Format

① [GS] km [d₁d₂d₃...d_k] [NUL]

② [GS] kmn [d₁d₂d₃...d_n]

Term

ASCII: GS k

Hex: 1Dh 6Bh

[Parameter]

m: Barcode type

①: $0 \leq m \leq 6$ (00h $\leq m \leq$ 06h)

The ranges of k and d vary depending on the selected barcode system.

②: $65 \leq m \leq 73$ (41h $\leq m \leq$ 49h)

The ranges of n and d vary depending on the selected barcode system.

①

m	Barcode type	Range of k	Range of d (ASCII)
0	UPC-A	$11 \leq k \leq 12$	0 to 9
1	UPC-E	$11 \leq k \leq 12$	0 to 9
2	JAN13 (EAN)	$12 \leq k \leq 13$	0 to 9
3	JAN8 (EAN)	$7 \leq k \leq 8$	0 to 9
4	CODE39	$1 \leq k$	SP,\$,%,+,-,.,/,0 to 9,A to Z
5	Interleaved 2 of 5 (ITF)	$1 \leq k$ (even number only)	0 to 9
6	NW-7	$1 \leq k$	,\$,+,-,.,/,0 to 9,A to D

②

m	Barcode type	Range of n	Range of d (ASCII)
65	UPC-A	$11 \leq n \leq 12$	0 to 9
66	UPC-E	$11 \leq n \leq 12$	0 to 9
67	JAN13 (EAN)	$12 \leq n \leq 13$	0 to 9
68	JAN8 (EAN)	$7 \leq n \leq 8$	0 to 9
69	CODE39	$1 \leq n \leq 255$	SP,\$,%,+,-,.,/,0 to 9,A to Z
70	Interleaved 2 of 5 (ITF)	$1 \leq n \leq 255$ (even number only)	0 to 9
71	NW-7	$1 \leq n \leq 255$	,\$,+,-,.,/,0 to 9,A to D
72	CODE93	$1 \leq n \leq 255$	0x00 to 0x7F
73	CODE128	$2 \leq n \leq 255$	0x00 to 0x7F

Explanation

①

- (1) This command ends with the [NUL] code.
- (2) For UPC-A and UPC-E, upon the input of 12-byte barcode data, a barcode is printed. The data subsequent to it is processed as normal data.
- (3) For JAN13, upon the input of 13-byte barcode data, a barcode is printed. The data subsequent to it is processed as normal data.
- (4) For JAN8, upon the input of 8-byte barcode data, a barcode is printed. The data subsequent to it is processed as normal data.
- (5) The number of data items of ITF barcode must be an even number. If it is an odd number, the final data will be ignored.

②

- (1) n refers to the number of data items. n bytes from the subsequent data are processed as barcode data.
- (2) If n is out of the defined range, command processing will be aborted, and the subsequent data will be processed as normal data.

[In standard mode]

- (1) If d is out of the defined range, only paper feed will be performed, and the subsequent data will be processed as normal data.
- (2) If the width of a barcode exceeds the print area per line, it will not be guaranteed that the barcode is printed properly.
- (3) Paper will be fed over the length equivalent to the height of a barcode (including HRI characters if HRI character printing is specified), regardless of a line feed length defined by the 30-dot Line Feed Length Set Command ([ESC] 2) or Minimum Dots for Line Feed Length Set Command ([ESC] 3).
- (4) This command will be valid only if no data is present in the print buffer. If data is present in the print buffer, the data subsequent to m will be processed as normal data.
- (5) After a barcode is printed, the next print position is the beginning of a line.
- (6) There is no impact upon print modes (bold printing, double printing, underlining, and character size) except for inverted printing.

[In page mode]

- (1) A barcode is expanded, but not printed. After the expansion of the barcode, the dot subsequent to the final barcode data is the data expansion starting position.
- (2) If d is out of the defined range, command processing will be aborted, and the subsequent data will be processed as normal data. Note that the data expansion starting position remains unchanged.
- (3) If the width of a barcode exceeds the print area per line, it will not be guaranteed that the barcode is printed properly.

Explanation

[CODE128]

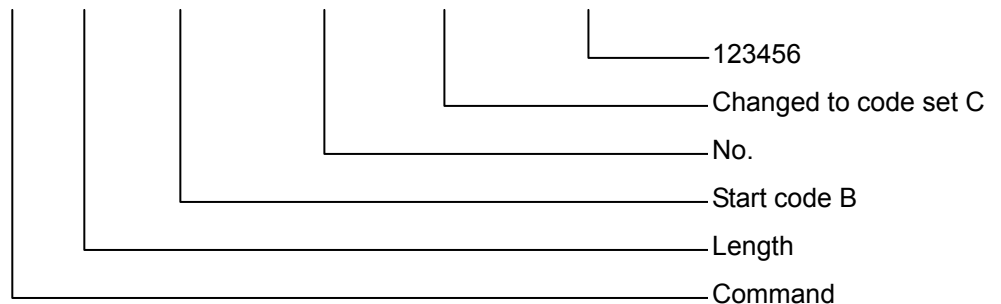
- (1) Please refer to “APPENDIX: BARCODE” for the overview of CODE 128.
- (2) When this printer is used to print a CODE128 barcode, care must be taken regarding the following points when transmitting barcode data:
 - ① The beginning of the barcode data must always be a code set (CODE A, CODE B, or CODE C), based on which the first code set is selected.
 - ② Special characters are specified by two characters: ‘{’ followed by 1 character. Also, an ASCII character ‘{’ is specified by transmitting 2 ‘{’ characters in a row.

Special character	Data to be transmitted	
	ASCII	Hex
SHIFT	{S	7B 53
CODE A	{A	7B 41
CODE B	{B	7B 42
CODE C	{C	7B 43
FNC1	{1	7B 31
FNC2	{2	7B 32
FNC3	{3	7B 33
FNC4	{4	7B 34
{	{{	7B 7B

[Example] Data to be transmitted to print “No.123456”

In this example, first, code set B is used to print “No.” After that, the code set is changed to code set C, and the 6-digit number is printed.

[GS] k [49] [0A] [7B] [42] [4E] [6F] [2E] [7B] [43] [0C] [22] [38]



- (3) If the beginning of the barcode data string is not a code set, command processing will be aborted immediately, and the subsequent data will be processed as normal data.
- (4) If the combination of ‘{’ and the following character does not match any special characters, command processing will be aborted immediately, and the subsequent data will be processed as normal data.
- (5) If a character that cannot be used with a selected code set is received, command processing will be aborted immediately, and the subsequent data will be processed as normal data.

- (6) An HRI (Human Readable Interpretation) character corresponding to a shift character and code set character is not printed.
- (7) An HRI character for a function character is space.
- (8) An HRI character for a control character (00H to 1FH and 7FH) is space.

[CODE93]

The B-EP series does not support the following functions:

- (1) An HRI character for a start character (□) is printed at the beginning of the HRI character string.
- (2) An HRI character for a stop character (□) is printed at the end of the HRI character string.
- (3) An HRI character for a control character (00H to 1FH and 7FH) is printed with ■ and an alphabet combined.

Control character		HRI character	Control character		HRI character
ASCII	Hex		ASCII	Hex	
NUL	00	■U	DLE	10	■P
SOH	01	■A	DC1	11	■Q
STX	02	■B	DC2	12	■R
ETX	03	■C	DC3	13	■S
EOT	04	■D	DC4	14	■T
ENQ	05	■E	NAK	15	■U
ACK	06	■F	SYN	16	■V
BEL	07	■G	ETB	17	■W
BS	08	■H	CAN	18	■X
HT	09	■I	EM	19	■Y
LF	0A	■J	SUB	1A	■Z
VT	0B	■K	ESC	1B	■A
FF	0C	■L	FS	1C	■B
CR	0D	■M	GS	1D	■C
SO	0E	■N	RS	1E	■D
SI	0F	■O	US	1F	■E
			DEL	7F	■T

Reference

HRI Character Print Position Set Command ([GS] H)
Barcode Height Set Command ([GS] h)
Barcode Width Set Command ([GS] w)

8.10.48 APPENDIX: BARCODE

8.10.48.1 CODE128

Code set A: ASCII characters ranging between 00H and 5FH can be represented.

Code set B: ASCII characters ranging between 20H and 7FH can be represented.

Code set C: Two digits can be represented using 1 character.

In addition to the above characters, CODE128 has the following special characters:

- Shift character (SHIFT)

In code set A, a character immediately after SHIFT is treated as a character of code set B. In code set B, a character immediately after SHIFT is treated as a character of code set A. Note that SHIFT cannot be used in code set C.

- Code set character (CODEA, CODEB, CODEC)

The code set subsequent to a code set character is changed to A, B, or C.

- Function character (FNC1, FNC2, FNC3, FNC4)

Uses of the function character vary depending on the application. Note that only FNC1 can be used in code set C.

[Characters printable with code set A]

Char	Data to be transmitted	Char	Data to be transmitted	Char	Data to be transmitted	Char	Data to be transmitted	Char	Data to be transmitted
NUL	00	CAN	18	0	30	H	48	FNC1	7B 31
SOH	01	EM	19	1	31	I	49	FNC2	7B 32
STX	02	SUB	1A	2	32	J	4A	FNC3	7B 33
ETX	03	ESC	1B	3	33	K	4B	FNC4	7B 34
EOT	04	FS	1C	4	34	L	4C	SHIFT	7B 35
ENQ	05	GS	1D	5	35	M	4D	CODEB	7B 42
ACK	06	RS	1E	6	36	N	4E	CODEC	7B 43
BEL	07	US	1F	7	37	O	4F		
BS	08	SP	20	8	38	P	50		
HT	09	!	21	9	39	Q	51		
LF	0A	"	22	:	3A	R	52		
VT	0B	#	23	;	3B	S	53		
FF	0C	\$	24	<	3C	T	54		
CR	0D	%	25	=	3D	U	55		
SO	0E	&	26	>	3E	V	56		
SI	0F	'	27	?	3F	W	57		
DLE	10	(	28	@	40	X	58		
DC1	11	)	29	A	41	Y	59		
DC2	12	*	2A	B	42	Z	5A		
DC3	13	+	2B	C	43	[	5B		
DC4	14	,	2C	D	44	\	5C		
NAK	15	-	2D	E	45	]	5D		
SYN	16	.	2E	F	46	~	5E		
ETB	17	/	2F	G	47	=	5F		

[Characters printable with code set B]

Char	Data to be transmitted
SP	20
!	21
"	22
#	23
\$	24
%	25
&	26
'	27
(	28
)	29
*	2A
+	2B
,	2C
-	2D
.	2E
/	2F
0	30
1	31
2	32
3	33
4	34
5	35
6	36
7	37

Char	Data to be transmitted
8	38
9	39
:	3A
;	3B
<	3C
=	3D
>	3E
?	3F
@	40
A	41
B	42
C	43
D	44
E	45
F	46
G	47
H	48
I	49
J	4A
K	4B
L	4C
M	4D
N	4E
O	4F

Char	Data to be transmitted
P	50
Q	51
R	52
S	53
T	54
U	55
V	56
W	57
X	58
Y	59
Z	5A
[	5B
\	5C
]	5D
~	5E
`	5F
	60
a	61
b	62
c	63
d	64
e	65
f	66
g	67

Char	Data to be transmitted
h	68
i	69
j	6A
k	6B
l	6C
m	6D
n	6E
o	6F
p	70
q	71
r	72
s	73
t	74
u	75
v	76
w	77
x	78
y	79
z	7A
{	7B
|	7C
}	7D
~	7E
DEL	7F

Char	Data to be transmitted
FNC1	7B 31
FNC2	7B 32
FNC3	7B 33
FNC4	7B 34
SHIFT	7B 53
CODEA	7B 41
CODEC	7B 43

[Characters printable with code set C]

Char	Data to be transmitted
00	00
01	01
02	02
03	03
04	04
05	05
06	06
07	07
08	08
09	09
10	0A
11	0B
12	0C
13	0D
14	0E
15	0F
16	10
17	11
18	12
19	13
20	14
21	15
22	16
23	17

Char	Data to be transmitted
24	18
25	19
26	1A
27	1B
28	1C
29	1D
30	1E
31	1F
32	20
33	21
34	22
35	23
36	24
37	25
38	26
39	27
40	28
41	29
42	2A
43	2B
44	2C
45	2D
46	2E
47	2F

Char	Data to be transmitted
48	30
49	31
50	32
51	33
52	34
53	35
54	36
55	37
56	38
57	39
58	3A
59	3B
60	3C
61	3D
62	3E
63	3F
64	40
65	41
66	42
67	43
68	44
69	45
70	46
71	47

Char	Data to be transmitted
72	48
73	49
74	4A
75	4B
76	4C
77	4D
78	4E
79	4F
80	50
81	51
82	52
83	53
84	54
85	55
86	56
87	57
88	58
89	59
90	5A
91	5B
92	5C
93	5D
94	5E
95	5F

Char	Data to be transmitted
96	60
97	61
98	62
99	63
FNC1	7B 31
CODEA	7B 41
CODEB	7B 42

8.10.48.2 UPC-E

Conversion to UPC-E is performed as shown by the tables below.

UPC-E (7 digit) version								UPC-A (12 digit) version											
P1	P2	P3	P4	P5	P6	P7	P8	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
0	X1	X2	Y1	Y2	Y3	0	CD	0	X1	X2	0	0	0	0	0	Y1	Y2	Y3	CD
0	X1	X2	Y1	Y2	Y3	1	CD	0	X1	X2	1	0	0	0	0	Y1	Y2	Y3	CD
0	X1	X2	Y1	Y2	Y3	2	CD	0	X1	X2	2	0	0	0	0	Y1	Y2	Y3	CD
0	X1	X2	X3	Y1	Y2	3	CD	0	X1	X2	X3	0	0	0	0	0	Y1	Y2	CD
0	X1	X2	X3	X4	Y1	4	CD	0	X1	X2	X3	X4	0	0	0	0	0	Y1	CD
0	X1	X2	X3	X4	X5	Y1	CD	0	X1	X2	X3	X4	X5	0	0	0	0	Y1	CD

- Data check is performed for the “0” portion (shaded in the right table) to categorize the data into 4 patterns from ① to ④. If the data does not match the 4 patterns, command processing will be aborted.
- The data categorized into the 4 patterns from ① to ④ is converted, as shown by the left table.
- A4 data in pattern ① accepts only 0, 1, or 2. However, the printer does not perform any data integrity check. Therefore, a barcode will be printed even if any value other than 0 to 2 is specified for A4 (P7) data.

8.10.49 BARCODE HORIZONTAL SIZE COMMAND

[GS] w

Function Sets the horizontal size of the barcode.

Format [GS] wn

Term ASCII: GS w
Hex: 1Dh 77h

[Parameter]

n: Horizontal size of the barcode

$2 \leq n \leq 15$ (02h \leq n \leq 0Fh)

Default value n : 3

Explanation The maximum value varies depending on model and barcode type.

	Model	B-EP2DL-GHxx	B-EP4DL-GHxx
	Range	02H to 05H	02H to 0AH
	Initial value	03H	03H
UPC-A, UPC-E, JAN13, JAN8, CODE128	Maximum value	03H	06H
CODE39 Interleaved 2 of 5, NW-7	Maximum value	05H	0AH

[UPC-A, UPC-E, JAN13, JAN8, or CODE128]

n	1 module		2 modules		3 modules		4 modules	
	Bar	Space	Bar	Space	Bar	Space	Bar	Space
02H	2		4		6		8	
03H	3		6		9		12	
04H	4		8		12		16	
05H	5		10		15		20	
06H	6		12		18		24	
07H	7		14		21		28	
08H	8		16		24		32	
09H	9		18		27		36	

(Unit: dot)

[CODE39, Interleaved 2 of 5, or NW-7]

n	Narrow		Wide		Character-to-character space
	Bar	Space	Bar	Space	
02H	2	2	5	5	2
03H	2	2	6	6	2
04H	3	3	8	8	3
05H	3	3	9	9	3
06H	4	4	11	11	4
07H	4	4	12	12	4
08H	5	5	14	14	5
09H	5	5	15	15	5
0AH	6	6	17	17	6
0BH	6	6	18	18	6
0CH	7	7	20	20	7
0DH	7	7	21	21	7
0EH	8	8	23	23	8
0FH	8	8	24	24	8

(Unit: dot)

* The character-to-character space does not exist in Interleaved 2 of 5.

(1) A multilevel barcode refers to the following barcode system:

UPC-A, UPC-E, JAN13, JAN8, CODE93, and CODE128

(2) A 2-level barcode refers to the following barcode system:

CODE39, ITF, and NW-7

(3) If “n” is out of range, this command will be ignored.

Reference

Barcode Print Command ([GS] k)

8.10.50 BARCODE HEIGHT COMMAND

[GS] h

Function	Sets the barcode height.
----------	--------------------------

Format	[GS] hn
--------	---------

Term	ASCII: GS h Hex: 1Dh 68h
------	-----------------------------

[Parameter]
n: No. of dots for the barcode height
 $1 \leq n \leq 255$ (01h \leq n \leq FFh)

Default value	n: 162
---------------	--------

Explanation	(1) When “n” is set to any value other than the above, this command will be ignored.
-------------	--

Reference	Barcode Print Command ([GS] k)
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8.10.51 NUMERALS UNDER BARS COMMAND

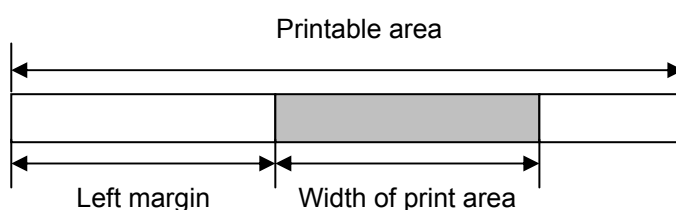
[GS] H

Function	Specifies a print position of an HRI character when a barcode is printed.
Format	[GS] Hn
Term	<p>ASCII: GS H</p> <p>Hex: 1Dh 48h</p> <p>[Parameter]</p> <p>n: Print position of HRI character $0 \leq n \leq 3$ ($00h \leq n \leq 03h$) or $48 \leq n \leq 50$ ($30h \leq n \leq 33h$)</p> <p>0: Not printing 1: Above barcode 2: Below barcode 3: Above and below barcode</p>
Default value	n: 0
Explanation	(1) HRI stands for Human Readable Interpretation.
Reference	Barcode Print Command ([GS] k)

8.10.52 PRINT AREA WIDTH SET COMMAND

[GS] W

Function	Specifies the width of the print area defined by nL and nH. The width of the print area is determined by $[(nL + nH \times 256) \text{ dots}]$.
Format	[GS] WnLnH
Term	ASCII: GS W Hex: 1Dh 57h [Parameter] nL: Width of print area $0 \leq nL \leq 255$ (00h \leq nL \leq FFh) nH: Width of print area $0 \leq nH \leq 255$ (00h \leq nH \leq FFh)



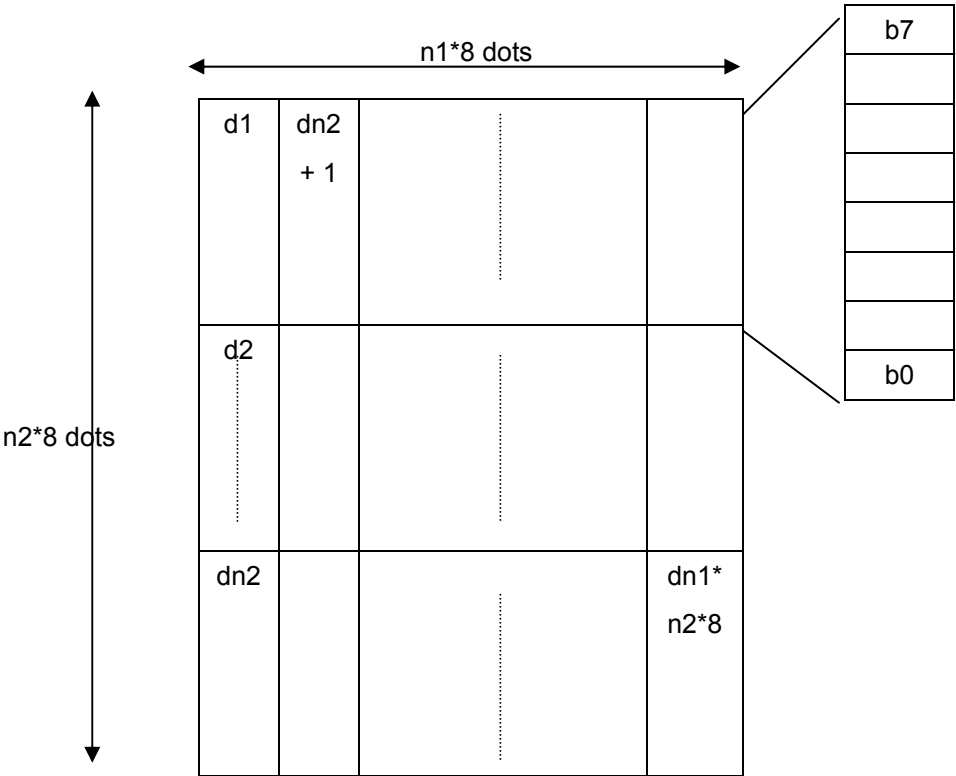
Default value	384 dots (nL = 128, nH = 1) (B-EP2DL-GHxx) 832 dots (nL = 64, nH = 3) (B-EP4DL-GHxx)
---------------	---

Explanation	<ol style="list-style-type: none"> (1) This command will be executed only if received at the beginning of a line. (2) If this command is received while the printer is in page mode, the defined parameter setting will be applied after switching to standard mode. (3) The command settings do not have any impacts upon page mode. (4) If a value beyond the printable area per line is inputted, all area except for the left margin will be specified as a print area. (5) If a value specified for the width of the print area is smaller than the width of a character to be printed, printing will only be performed by up to the specified width of the print area. (6) If the width of the print area is set to 0 ([GS] W [00] [00]), printing will start from the left edge of the printable area.
-------------	---

Reference	Left Margin Set Command ([GS] L)
-----------	----------------------------------

8.10.53 DOWNLOADED BIT IMAGE DEFINE COMMAND [GS] *

Function	Defines a downloaded bit image that contains the number of dots specified by n1 and n2.
Format	[GS] *n1n2 [d ₁ d ₂ d ₃ ...d _(n1×n2×8)]
Term	<p>ASCII: GS *</p> <p>Hex: 1Dh 2Ah</p> <p>[Parameter]</p> <p>n1: No. of dots in the horizontal direction (n1 × 8) 1 ≤ n1 ≤ 255 (01h ≤ n1 ≤ FFh)</p> <p>n2: No. of dots in the vertical direction (n2 × 8) 1 ≤ n2 ≤ 48 (01h ≤ n2 ≤ 30h)</p> <p> * n1 × n2 ≤ 1,536</p> <p>d: Image data 1 ≤ d ≤ 255 (01h ≤ d ≤ FFh)</p> <p> * 1 refers to a bit to be printed, and 0 to the one not to be printed.</p>
Default value	
Explanation	<p>(1) If n1 × n2 is out of the defined range, this command will be ignored.</p> <p>(2) d refers to bit image data. A bit corresponding to a dot to be printed is set to 1, and the one corresponding to a dot not to be printed is set to 0.</p> <p>(3) The defined downloaded bit image is cleared in the event of:</p> <p> Initialize Command ([ESC] @)</p> <p> Downloaded Character (Writable Character) Define Command ([ESC] &)</p> <p> Resetting or turning the printer off</p> <p>(4) A downloaded bit image is defined.</p> <p>(5) A specified logo is valid until resetting or the printer is turned off. However, in the event of a parameter error (e.g. a value out of range), the most recently stored logo is not guaranteed.</p> <p>(6) At a moment when an error occurs with parameter n1 or n2 due to a factor such as an unmatched condition, command processing will be aborted, and the data subsequent to n2 will be processed as normal data.</p> <p>(7) This command is valid in page mode only when the parameter of the Page Mode Print Direction Set Command ([ESC] T) is set to 0 (0-degree rotation). The bit image will not be rotated if any value other than 0 is specified.</p> <p>(8) The figure on the next page illustrates a relationship between data and printed dots.</p>



Reference

Downloaded Bit image Print Mode Set Command ([GS] /)

8.10.54 DOWNLOADED BIT IMAGE PRINT MODE SET COMMAND [GS] /

Function	Prints a logo (image data) specified by n in mode specified by k
----------	--

Format	[GS] /m
--------	---------

Term	ASCII: GS / Hex: 1Dh 2Fh
------	-----------------------------

[Parameter]

m: Downloaded bit image data print mode $0 \leq m \leq 3$ (00h $\leq m \leq$ 03h)

or

$48 \leq m \leq 51$ (30h $\leq m \leq$ 33h)

0,48	Normal mode
1,49	Double-width mode
2,50	Double-height mode
3,51	Quadruple mode

- | | |
|-------------|---|
| Explanation | <p>(1) Unless downloaded bit image data is defined, this command will be ignored.</p> <p>(2) When standard mode is selected, the command will be valid only if no data is present in the print buffer.</p> <p>(3) Inverted printing, bold printing, double printing, underlining, character size, or reversed printing will become invalid even if specified.</p> <p>(4) If there is a line where the print area specified by the Left Margin Set Command ([GS] L) or Print Area Width Set Command ([GS] W) does not reach the minimum width in bit image mode (1 dot in normal or double-height mode, or 2 dots in double-width or quadruple mode), the print area will be extended to the right until it reaches the minimum width in bit image mode to the extent that the printable area is not exceeded. This only applies to such a line.</p> |
|-------------|---|

Reference	Downloaded Bit image Define Command ([GS] *)
-----------	--

8.10.55 MACRO DEFINITION START/END COMMAND

[GS] :

Function	Specifies the start or end of a macro.
Format	[GS] :
Term	ASCII: GS : Hex: 1Dh 3Ah
Explanation	<p>(1) If this command is included under normal operation, the start of a macro definition will be specified. If this command is included while a macro is being defined, the end of the macro definition will be specified.</p> <p>(2) If the Macro Execute Command ([GS] ^) is included while the macro is being defined, the macro definition will be aborted, and cleared.</p> <p>(3) A macro is "undefined" initially.</p> <p>(4) Undefined items are not cleared by the Initialize Command ([ESC] @).</p> <p>(5) If [GS] : is included immediately after the receipt of this command, a macro will become "undefined."</p> <p>(6) The maximum permissible number of bytes for a macro definition will be limited to 2,048, even if it exceeds 2,048.</p>
Reference	Macro Execute Command ([GS] ^)

8.10.56 MACRO EXECUTE COMMAND

[GS] ^

Function	Executes a defined macro.
----------	---------------------------

Format	[GS] ^n1n2n3
--------	--------------

Term	ASCII: GS ^ Hex: 1Dh 5Eh
------	-----------------------------

[Parameter]

n1: No. of times macro is executed $0 \leq n1 \leq 255$ (00h \leq n1 \leq FFh)

n2: Waiting time when macro is executed $0 \leq n2 \leq 255$ (00h \leq n2 \leq FFh)

Waiting time of $n2 \times 100$ msec every time a macro is executed

n3: Mode to execute a macro $0 \leq n3 \leq 1$ (00h \leq n3 \leq 01h)

0: A macro is executed n1 times at interval of time specified by n2.

1: After a lapse of time specified by n2, the STATUS LED (green) blinks and waits for the [FEED] key to be pressed. Once the [FEED] key is pressed, a macro is executed once. This is repeated n1 times.

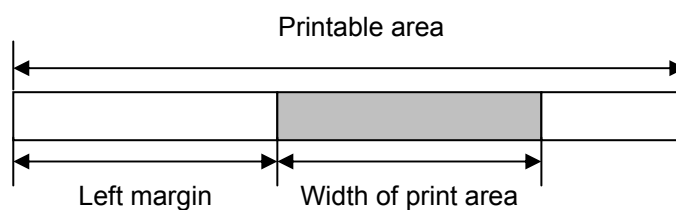
Explanation	<p>(1) If this command is included while the macro is being defined, the macro definition will be aborted, and cleared.</p> <p>(2) Nothing will be done with no macro defined or with $n1 = 0$.</p> <p>(3) The [FEED] key is inoperable during the specified waiting time when a macro is executed.</p>
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Reference	Macro Definition Start/End Command ([GS] :)
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8.10.58 LEFT MARGIN SET COMMAND

[GS] L

Function	<p>Sets the left margin as specified by nL and nH.</p> <p>The left margin is determined by $[(nL + nH \times 256) \times \text{dots}]$.</p>
Format	[GS] LnLnH
Term	<p>ASCII: GS L</p> <p>Hex: 1Dh 4Ch</p> <p>[Parameter]</p> <p>nL: Width of print area $0 \leq nL \leq 255$ (00h \leq nL \leq FFh)</p> <p>nH: Width of print area $0 \leq nH \leq 255$ (00h \leq nH \leq FFh)</p>



Default value	nL = 0, nH = 0
---------------	----------------

Explanation	<p>(1) This command will be valid only if received at the beginning of a line.</p> <p>(2) If this command is received while the printer is in page mode, the defined parameter setting will be applied after switching to standard mode.</p> <p>(3) The command settings do not have any impacts upon page mode.</p> <p>(4) The maximum permissible left margin is equal to the width of the printable area. If a specified value exceeds the maximum value, it will be rounded to the maximum value.</p>
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Reference	Print Area Width Set Command ([GS] W)
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8.10.59 CHARACTER SIZE SET COMMAND

[GS] !

Function Specifies a character size (magnification in the vertical / horizontal direction).

Format [GS] !n

Term ASCII: GS !
Hex: 1Dh 21h

[Parameter]

n: Specifying a character size $1 \leq n \leq 255$ (00h \leq n \leq FFh)

* $1 \leq$ Magnification in vertical direction ≤ 8 , $1 \leq$ Magnification in horizontal direction ≤ 8

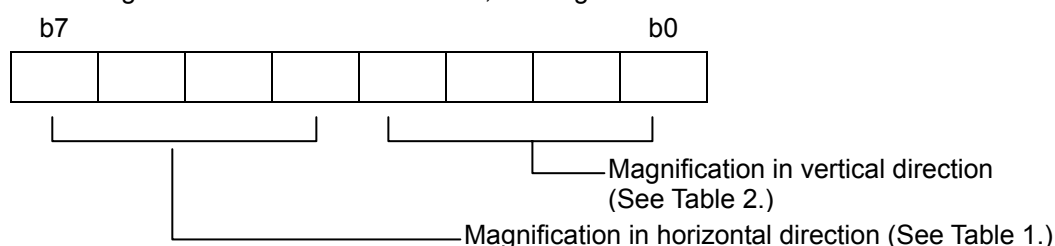


Table 1 [Magnification in horizontal direction]

1-byte data (hex)	Magnification
00	x 1 (standard)
10	x 2 (double width)
20	x 3
30	x 4
40	x 5
50	x 6
60	x 7
70	x 8

Table 2 [Magnification in vertical direction]

1-byte data (hex)	Magnification
00	x 1 (standard)
01	x 2 (double height)
02	x 3
03	x 4
04	x 5
05	x 6
06	x 7
07	x 8

Default value n: 0

Example A magnification in the horizontal direction is x 3, and a magnification in the vertical direction is x 6.

The command is [GS] ! [25].

- Explanation**
- (1) This parameter setting applies to all characters (ANK and Chinese characters) except for HRI characters.
 - (2) If either a specified magnification in the vertical or horizontal direction is out of the defined range, this command will be ignored.
 - (3) In standard mode, “vertical direction” refers to the paper feed direction, and “horizontal direction” to the direction perpendicular to the paper feed direction. Therefore, if 90-degree rotation is specified, this relationship will be reversed.
 - (4) In page mode, “vertical direction” refers to the vertical direction of a character, and the horizontal direction to the width.
 - (5) Double width and double height can be set or canceled by the Print Mode All Set Command ([ESC] !). But the most recently processed command is applied.

Reference Print Mode All Set Command ([ESC] !)

8.11 TEC ORIGINAL COMMANDS

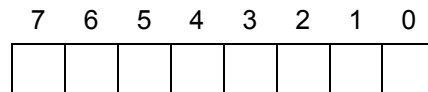
8.11.1 MODE SELECT COMMAND

[ESC] M

Function Changes the print mode.

Format [ESC] M; a (,b) [LF] [NUL]

Term a: Print mode designation



Print mode (Bit 0 to Bit 6 * See Table 1.)

Automatic status response in IrDA: IrCOMM or USB

0: Not performed

1: Performed

* Table 1 Print mode

HEX	Mode	How to deal with the received data after an error is cleared
30H	LABEL	Discards
31H	RECEIPT	Discards
32H	RECEIPT1	Continues printing
34H	ESC/POS	Continues printing
41H	TPCL	Continues printing
42H	TPCL1	Continues printing

b: Print position detection feed (Omissible. If omitted, the print position detection feed is not performed.)

0: When the mode change from RECEIPT, RECEIPT1 or ESC/POS to LABEL, TPCL or TPCL1 is requested, a print position detection feed is not performed after the mode is changed.

1: When the mode change from RECEIPT, RECEIPT1 or ESC/POS to LABEL, TPCL or TPCL1 is requested, a print position detection feed is performed after the mode is changed.

Explanation

- (1) There are 4 types of the print mode: "LABEL," "RECEIPT," "TPCL" and "ESC/POS."
- (2) "Automatic status response in IrDA: IrCOMM" or USB is the function for the specifications which do not allow the printer to spontaneously send the status through IrDA; IrCOMM or USB. This function enables the printer to forcefully send the status to the host, if the link between the printer and the host is established. However, if the link between the printer and the host is not established upon the status transmission, the printer cannot send the status. Therefore, the status is discarded. (In the next connection to the host, the printer does not send the status to the host.)
- (3) The sensor is not used in the RECEIPT, RECEIPT1 or ESC/POS mode. When sensor detectable paper is used for receipts and labels, print position detection feed cannot be done in the LABEL, TPCL or TPCL1 mode. By setting the print position detection feed parameter to 1, print position detection feed is carried out after the mode is changed to LABEL, TPCL or TPCL1.
- (4) In the TPCL1 mode, it is possible to re-print the last print data by pressing the FEED button.

Notes

- (1) The print mode designation (the specified print mode and the automatic status response in IrDA: IrCOMM or USB) is backed up in memory (retained even if the power is turned off).
- (2) The factory default is "TPCL mode" and "Automatic status response in IrDA: IrCOMM or USB is not performed." (The IrDA protocol is "IrCOMM.")
- (3) When the print mode is changed, the type of sensor is automatically changed.

LABEL mode (0):	The previously backed up sensor is designated.
TPCL mode (A):	The previously backed up sensor is designated.
TPCL1 mode (B):	The previously backed up sensor is designated.
RECEIPT mode (1):	No sensor is designated.
RECEIPT1 mode (2):	No sensor is designated.
ESC/POS mode (4):	No sensor is designated.
- (4) If the RECEIPT or ESC/POS mode is selected or no sensor is designated in the LABEL or TPCL mode, an initial feed is not performed when the cover is closed (when the key operation or Set Command ([ESC] ZM03) is used to enable the print position detection feed setting after closing the cover.)
- (5) When the mode change is finished, the printer sends the normal end status or an ACK to the host. However, when the mode is changed to the TPCL mode, the printer does not send the status. In IrDA: IrCOMM or USB, only when bit 7 of the print mode designation is set to "1," the printer sends the status.

- (6) The print mode can be changed by the printer itself. However, since the setting for the automatic status response in IrDA, IrCOMM or USB cannot be changed, the setting remains as the same.
- (7) As the print position detection feed parameter is effective only when changing the print mode to LABEL or TPCL, this parameter status will be ignored when changing the mode to RECEIPT, RECEIPT1 or ESC/POS.
- (8) The print position detection feed is performed according to the conditions, such as, label pitch, fine adjustment, and sensor selection, which were set in the LABEL or TPCL mode before the printer is operated in the RECEIPT, RECEIPT1 or ESC/POS mode. If no sensor is selected, the print position detection feed will not be performed.
- (9) After performing a print position detection feed, the printer does not send a process end status. If an error occurs during the print position detection feed, the print position detection feed is performed after the error is cleared by using the PAUSE key (when the key operation or Set Command ([ESC] ZM03) is used to enable the print position detection feed setting after closing the cover.)
- (10) When changing the print mode by the printer itself, the print position detection feed parameter cannot be set.
- (11) When the mode select command is designated with the print position detection feed at the end of a print data issued in the RECEIPT1 or ESC/POS mode, and if an error occurs while printing, the printing will restart after the error is cleared and then, the print mode will be changed to the LABEL or TPCL mode and a print position detection feed is performed. When the print position detection feed is omitted, the print mode will not be changed to the LABEL or TPCL mode. (The mode select command is discarded.)
- (12) When the LABEL or TPCL mode is selected in the mode select command and the print position detection feed parameter is set 0 (not performed), and if an error occurs while the printer issues in the RECEIPT1 or ESC/POS mode, the print mode is changed to the LABEL or TPCL mode after the error is cleared. (The mode select command is executed.)

8.11.2 RESET COMMAND

[ESC] WR

Function	Returns the printer to its initial state.
Format	[ESC] WR [LF] [NUL]
Explanation	<ol style="list-style-type: none"> (1) The printer is returned to the same state as when the power is turned on. (2) When the printer receives this command during printing, it is initialized after issuing the label which is being printed. (3) After the Reset Command is sent (or after printing is completed, if printing is performed when the Reset Command is sent), the next command must not be sent within 30 seconds by the wireless LAN model or within 5 seconds by other models, because the printer is initialized. In IrDA: TEC Protocol, if ACK/status transmission is specified by the Issue Command, the printer returns an ACK, which indicates the command process end, to the EOT after the printer is initialized. In RS-232C, when the status response is specified, the printer returns the status (34H 30H). After this status is received, the next command may be sent. In IrDA: IrCOMM, IrDA: IrOBEX, USB, Bluetooth or Wireless LAN, the printer does not return the status. (4) When this command is sent through the IrDA interface, only this command should be sent. After the command is sent, the link should be terminated. Even if the host does not terminate the link, the printer performs the termination process. Therefore, after initialization is completed, the host should establish the link again. (5) When receiving this command during data transmission, the printer is initialized after completing the transmission.
Notes	<ol style="list-style-type: none"> (1) If a command error or communication error occurs when receiving the Reset Command, an error message is displayed in the online mode. However, it is not displayed in the SYSTEM mode.
Example	[ESC] WR [LF] [NUL]

8.11.3 STATUS REQUEST COMMAND

[ESC] v, [ESC] FM, [ESC] WS

Function	Requests that the printer sends back the printer status and the battery status to the host.
Format	[ESC] v [ESC] FM [LF] [NUL] [ESC] WS [LF] [NUL]
Explanation	(1) When this command is received, the printer sends the printer status and battery status to the host.

- For IrDA: TEC Protocol: Data to be sent (Fixed at 27 bytes)

STX	Printer ID		Version No. of each form				Printer status	Battery status	CRC	
02H	xxH	xxH	V01	V02	.....	V20	xxH	xxH	xxH	xxH

- For IrDA; IrCOMM, IrDA: IrOBEX, RS-232C, USB, Bluetooth or Wireless LAN:

Data to be sent (Fixed at 5 bytes)

STX	Printer ID		Printer status	Battery status
02H	xxH	xxH	xxH	xxH

Printer ID 2-byte hex data (in order from High to Low)

Printer status Printer status is indicated in 1-byte data.

00H: Normal state (idling)
01H: Cover open state
02H: Command syntax error (including Ir packet error)
03H: Paper jam
04H: Label end
05H: Cover open error
06H: Broken head dots error
07H: Thermal head excessive temperature
08H: Flash ROM write error
09H: Flash ROM erase error
0AH: Low battery (Print failure)
0BH: Operating
0CH: Communication error * For RS-232C connection only
0DH: Normal end + Label end (See **NOTE**.)
0EH: Flash ROM storage area full state
10H: Normal issue end
14H: Pause state
19H: Ambient temperature error
32H: Abnormal battery temperature
33H: Battery excessive temperature
37H: Charging error
(38H: Bluetooth setting successfully completed) Response status for automatic status transmission
39H: Bluetooth setup error (including initialization error)
45H: Wait for battery recovery
46H: Wait for head temperature reduction
47H: Wait for motor temperature reduction
55H: Writable character/PC command save mode

Status in the compatible mode for the B-SP series

- 00H: Normal state (idling)
 - 01H: Cover open state
 - 02H: Command syntax error (including Ir packet error)
 - 03H: Paper jam
 - 04H: Label end
 - 05H: Cover open error
 - 06H: Broken head dots error
 - 07H: Thermal head excessive temperature
(including ambient temperature error, abnormal battery temperature, battery excessive temperature)
 - 08H: Flash ROM write error
 - 09H: Flash ROM erase error
 - 0AH: Low battery (Print failure)
 - 0BH: Operating
(including wait for strip, pause state, bit map writable character/PC command mode, wait for battery recovery, wait for head temperature reduction, wait for motor temperature reduction)
 - 0CH: Communication error * For RS-232C connection only
 - 0DH: Normal end + Label end (See **NOTE**.)
 - 0EH: Flash ROM storage area full state
 - 10H: Normal issue end
 - 37H: Charging error
 - (38H: Bluetooth setting successfully completed) Response status for automatic status transmission
 - 39H: Bluetooth setup error (including initialization error)
- NOTE:** 0DH (Normal issue end + Label end) is a state when the printer runs out of labels, after a label is issued.

Battery status The battery charge status is indicated in 5 levels.

(B-EP2DL)

- 01H: 7.2V or less
- 02H: 7.3V to 7.4V
- 03H: 7.5V to 7.7V
- 04H: 7.8V to 7.9V
- 05H: 8.0V to 8.4V

(B-EP4DL)

- 01H: 14.0V or less
- 02H: 14.1V to 14.6V
- 03H: 14.7V to 15.2V
- 04H: 15.3V to 15.9V
- 05H: 16.0V to 16.8V

CRC: 2-byte hex data (in order from Low to High)

8.11.4 RECEIVE BUFFER FREE SPACE STATUS REQUEST COMMAND [ESC] WB

Function Sends information on the printer status and the free space of the receive buffer to the host.

Format [ESC] WB [LF] [NUL]

- Explanation**
- (1) This command makes the printer send information on its status and free space of the receive buffer, regardless of the setting of the Status Response parameter.
 - (2) The status to be transmitted is the current printer status, and indicates the latest status only. The remaining count indicates the remaining print count of the batch currently being printed only. No remaining count of the batch waiting to be printed is transmitted.
 - (3) Free space of the receive buffer for the interface which sent this command, is returned to the host.

[IrDA: TEC Protocol] Data to be transmitted (fixed at 22 bytes)

STX	Printer ID		Status	Remaining No. of labels				Length	
02H	3xH	3xH	33H	3xH	3xH	3xH	3xH	32H	32H

Receiving buffer space					Entire receiving buffer space					CRC	
3xH	3xH	3xH	3xH	3xH	30H	30H	35H	31H	32H	xxH	xxH

[IrDA: IrCOMM, IrDAIr: OBEX, USB, RS-232C, Bluetooth, Wireless LAN]

Data to be transmitted (fixed at 23 bytes)

SOH	STX	Printer status		Status type	Remaining No. of labels				Length	
01H	02H	3xH	3xH	33H	3xH	3xH	3xH	3xH	32H	33H

Receiving buffer space					Entire receiving buffer space					CR	LF
3xH	3xH	3xH	3xH	3xH	30H	30H	35H	31H	32H	0DH	0AH

Printer status Printer status is indicated in 2-byte data.

"00": Normal state
 "01": Cover open state
 "02": Operating
 "04": Pause state
 "05": Wait for strip
 "06": Command syntax error (including Ir packet error)
 "09": Normal issue end + Label end
 "11": Paper jam
 "13": Label end
 "15": Cover open error
 "17": Broken head dots error
 "18": Thermal head excessive temperature
 "19": Ambient temperature error
 "32": Abnormal battery temperature
 "33": Battery excessive temperature
 "36": Low battery
 "37": Charging error
 "39": Bluetooth setup error (including initialization error)
 "45": Wait for battery recovery
 "46": Wait for head temperature reduction
 "47": Wait for motor temperature reduction
 "50": Flash ROM write error
 "51": Flash ROM erase error
 "54": Flash ROM storage area full state
 "55": Writable character/PC command save mode

Remaining No. of labels: Indicates the remaining number of labels in four bytes.
 "0000" to "9999"

Length: Indicates the number of bytes of the entire status data
 IrDA: TEC Protocol: Fixed at "22."
 IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232,
 Bluetooth or wireless LAN: Fixed at "23."

Receive buffer free space: Indicates the free space of the receive buffer.

Entire receive buffer free space:
 Indicates the entire free space of the receive buffer.
 Fixed at "00512."

CRC/CR, LF: Indicates the end of the status block.

Notes

- (1) The status is returned only to the interface which sent this command.
- (2) The printer returns the same status, regardless of whether or not the compatible mode for the B-SP series is set.
- (3) After receiving the Status Request Command, there may be a maximum of 20-msec. delay until the printer sends a status.
- (4) At least, a 20-msec. interval must be given between the transmissions of the Status Request Command. If the next Status Request Command is transmitted within 20 msec., the printer may fail to receive it.

Example

[ESC] WB [LF] [NUL]

8.11.5 MODE INFORMATION ACQUIRE COMMAND

[ESC] WX

Function	Sends the printer mode information to the host.
Format	[ESC] WX [LF] [NUL]
Explanation	(1) The status when the compatible mode for the B-SP series is on differs from the status when the compatible mode is off. (2) The mode information format to be sent to the host, is as follows:

ESC/POS mode (Mode = 4)

[IrDA: TEC Protocol]

STX	Mode information (16 bytes)																CRC	CRC
	E	S	C	/	P	O	S	SP	SP	SP	SP	SP	SP	SP	SP	SP		
02H	45H	53H	43H	2FH	50H	4FH	53H	20H	20H	20H	20H	20H	20H	20H	20H	20H	xxH	xxH

[IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, or wireless LAN]

STX	Mode information (16 bytes)															
	E	S	C	/	P	O	S	SP	SP	SP	SP	SP	SP	SP	SP	SP
02H	45H	53H	43H	2FH	50H	4FH	53H	20H	20H	20H	20H	20H	20H	20H	20H	20H

The above is an example where the message is received in the ESC/POS mode (Mode = 4). In addition, the following messages are returned.

- When the compatible mode for the B-SP series is off

TPCL mode	TPCL	
TPCL1 mode	TPCL1	
LABEL mode	LABEL	
RECEIPT mode	RECEIPT	
RECEIPT1 mode	RECEIPT1	
ESC/POS mode	ESC/POS	
Online reset menu	USER ■ SYSTEM	
SYSTEM mode for users PAUSE + POWER keys	USER ■ SYSTEM	
SYSTEM mode for administrators FEED + POWER keys	When the password setting is on and before it is entered	USER ■ SYSTEM
	When the password setting is on and after it is entered	SYSTEM
	When the password setting is off	SYSTEM
TPCL (strip issue mode)	TPCL ■ (S)	
TPCL1 (strip issue mode)	TPCL1 (S)	
LABEL (strip issue mode)	LABEL (S)	

* ■ indicates a space.

- When the compatible mode for the B-SP series is on

TPCL mode	TPCL-LE	
TPCL1 mode	TPCL-LE1	
LABEL mode	LABEL	
RECEIPT mode	RECEIPT	
RECEIPT1 mode	RECEIPT1	
ESC/POS mode	ESC/POS	
Online reset menu	USER■SYSTEM	
SYSTEM mode for users PAUSE + POWER keys	USER■SYSTEM	
SYSTEM mode for administrators FEED + POWER keys	When the password setting is on and before it is entered	USER■SYSTEM
	When the password setting is on and after it is entered	SYSTEM
	When the password setting is off	SYSTEM

* ■ indicates a space.

Example	[ESC] WX [LF] [NUL]
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8.11.6 DEVICE ADDRESS ACQUIRE COMMAND

[ESC] IT

Function	Reads the device address of the Bluetooth or MAC address of the wireless LAN.
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Format	[ESC] IT [LF] [NUL]
--------	---------------------

Explanation	(1) This command reads the device address of the Bluetooth or MAC address of the wireless LAN. When using the IrDA: TEC Protocol, the following information field is placed in the information frame and sent in packets.
-------------	---

[Information field to be sent when IrDA: TEC Protocol is used]

STX	Bluetooth device address or wireless LAN MAC address	CRC	CRC
02H	12 bytes	xxH	xxH

[Information field to be sent when IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, or wireless LAN is used]

STX	Bluetooth device address or wireless LAN MAC address
02H	12 bytes

The printer sends the following information:

Bluetooth device address: 0015b5aa0005

Wireless LAN MAC address: 000940387630

Bluetooth device address:

[30H][30H][31H][35H] [62H] [35H] [61H] [61H] [30H] [30H] [30H] [35H]
0 0 1 5 b 5 a a 0 0 0 5

Wireless LAN MAC address:

[30H][30H][30H][39H] [34H] [30H] [33H] [38H] [37H] [36H] [33H] [30H]
0 0 0 9 4 0 3 8 7 6 3 0

8.11.7 BLUETOOTH RELATED PARAMETER ACQUIRE COMMAND [ESC] WT

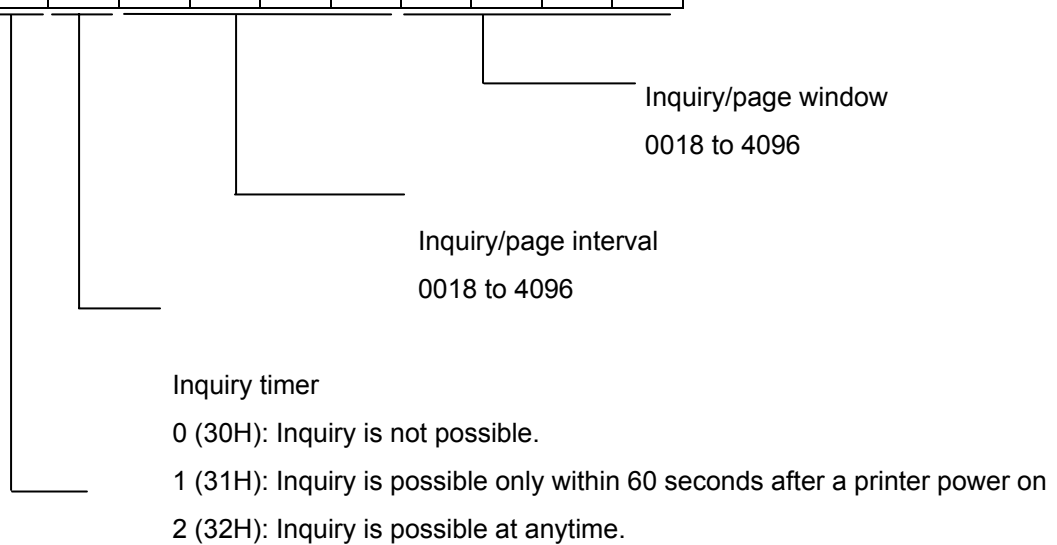
Function Acquires the parameters related to the Bluetooth.

Format [ESC] WT [LF] [NUL]

Explanation (1) This command reads the parameters related to the Bluetooth. When using the IrDA: TEC Protocol, the following information field is placed in the information frame and sent in packets to the host.

[Information field to be sent when IrDA: TEC Protocol is used]

STX	Sec	Inq	Interval				Window			
02H	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH



Bluetooth device name	CRC	
32 bytes	xxH	xxH

Bluetooth device name: Fixed at 32 bytes

When the Bluetooth device name is "TOSHIBATEC BT,"

[54H] [4FH] [53H] [48H] [49H] [42H] [41H] [20H] [54H] [45H] [43H] [20H] [42H] [54H] [00H] [00H]
T O S H I B A " T E C " B T
[00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H]

* When the Bluetooth device name is less than 32 bytes, the remaining bytes are filled with 00H.

[Information field to be sent when IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, or wireless LAN is used]

STX	Sec	Inq	Interval				Window			
02H	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH

Bluetooth device name
32 bytes

9. ERROR PROCESSING

9.1 GENERAL DESCRIPTION

This chapter describes details regarding the errors of the printer.

If the printer detects an error, it indicates an error message (on the LCD or LED), returns a status response and stops its operation.

9.2 COMMUNICATION ERRORS

9.2.1 COMMAND SYNTAX ERROR

- ① An error will occur if a command length error or parameter designation error is found while analyzing the command. If the form corresponding to the form number designated by the Data Print Command is not stored, or if the form length designated by the Data Print Command does not match the stored form length, an error will occur.
- ② If the block number is not numbered consecutively, starting with "0" in the ascending order, an error will occur.
- ③ If a block number error is found through the IrDA (TEC Protocol) interface, an error will occur.

9.2.2 HARDWARE ERROR

A hardware error will occur if a framing error or parity error is found while receiving data through the serial interface (RS-232C).

- * At the moment when a command syntax error or hardware error occurs, the printer shows the error message and returns a status response before it stops. Any commands except for the Status Request Command and Reset Command are not processed.

9.3 ERRORS IN ISSUING OR FEEDING

9.3.1 PAPER JAM / LABEL END / NORMAL END + LABEL END

B-EP (It does not matter whether the compatibility setting for the B-SP series is on or off.)			
Paper jam		Label end	Normal end + label end
TPCL / LABEL	While passing over the media sensor, the label is fed over the distance 1.5 times as long as the label pitch (label length + gap length) specified by the command, but the media sensor (or transmissive sensor) cannot detect a gap between the labels.	When (or before) the motor is driven for feeding or printing, the media sensor (transmissive sensor or reflective sensor) detects the label end state.	While printing is being performed on the label with the transmissive sensor designated, the media sensor (transmissive sensor or reflective sensor) detects the label end state for 1 mm continuously after the effective print length of the current label is printed.
	The tag paper is fed over the distance 1.5 times as long as the tag pitch (length of the white portion + black mark length) specified by the command, but the media sensor (or reflective sensor) cannot detect a black mark.	While printing is being performed on the label with the transmissive sensor designated, the media sensor (transmissive sensor or reflective sensor) detects the label end state for 1 mm continuously before the effective print length of the current label is printed.	While printing is being performed on the tag paper with the reflective sensor designated, the media sensor (transmissive sensor or reflective sensor) detects the label end state for 1 mm continuously after the effective print length of the current label is printed.
	While a gap between labels is passing over the media sensor, the label is fed over the distance 1.5 times as long as the label pitch (label length + gap length) specified by the command, but the label cannot be detected.	While printing is being performed on the tag paper with the reflective sensor designated, the media sensor (transmissive sensor or reflective sensor) detects the label end state for 1 mm continuously before the effective print length of the current label is printed.	While printing is being performed on the receipt with no sensor designated, the media sensor (transmissive sensor or reflective sensor) detects the label end state for 1 mm continuously after the effective print length of the current label is printed.
	While a black mark is passing over the media sensor, the tag paper is fed over the distance 1.5 times as long as the tag pitch (length of the white portion + black mark length) specified by the command, but the white portion cannot be detected.	While printing is being performed on the label with the transmissive sensor designated, the media sensor (transmissive sensor) detects the backing paper for xx mm continuously before the effective print length of the current label is printed.	While printing is being performed on the label with the transmissive sensor designated, the media sensor (transmissive sensor) detects the backing paper for xx mm continuously after the effective print length of the current label is printed.
	With the automatic label print positioning enabled, and the transmissive sensor designated, the label is loaded, and the cover is opened and closed. If the label pitch is 170 mm or less, the backing paper is fed over the distance of 170 mm, but the label cannot be detected.	"xx mm" varies depending on the gap length: 21 mm for a 3-mm gap 22 mm for a 4-mm gap 23 mm for a 5-mm gap 24 mm for a 6-mm gap 25 mm for a 7-mm gap	"xx mm" varies depending on the gap length: 21 mm for a 3-mm gap 22 mm for a 4-mm gap 23 mm for a 5-mm gap 24 mm for a 6-mm gap 25 mm for a 7-mm gap
	If the label pitch is longer than 170 mm, the label is fed over the distance 1.5 times as long as the label pitch (label length + gap length) specified by the command, but the label cannot be detected.	While printing is being performed on the tag paper with the reflective sensor designated, the media sensor (reflective sensor) detects the black mark over for xx mm continuously before the effective print length of the current label is printed.	While printing is being performed on the tag paper with the reflective sensor designated, the media sensor (reflective sensor) detects the black mark for xx mm continuously after the effective print length of the current label is printed.
	With the automatic label print positioning enabled, and the reflective sensor designated, the tag paper is loaded, and the cover is opened and closed. If the tag pitch is 170 mm or less, the black mark is fed over the distance of 170 mm, but the white portion cannot be detected.	"xx mm" varies depending on the length of the black mark: 21 mm for a 3-mm black mark 22 mm for a 4-mm black mark 23 mm for a 5-mm black mark 24 mm for a 6-mm black mark 25 mm for a 7-mm black mark	"xx mm" varies depending on the length of the black mark: 21 mm for a 3-mm black mark 22 mm for a 4-mm black mark 23 mm for a 5-mm black mark 24 mm for a 6-mm black mark 25 mm for a 7-mm black mark

	If the label pitch is longer than 170 mm, the tag paper is fed over the distance 1.5 times as long as the tag pitch (length of the white portion + black mark length) specified by the command, but a black mark cannot be detected.	While printing is being performed on the receipt with no sensor designated, the media sensor (transmissive sensor or reflective sensor) detects the label end state for 1 mm continuously before the effective print length of the current receipt is printed.	
		While the label is being fed with the transmissive sensor designated, the media sensor (transmissive sensor or reflective sensor) detects the label end state for 1 mm continuously.	
		While the tag paper is being fed with the reflective sensor designated, the media sensor (transmissive sensor or reflective sensor) detects the label end state for 1 mm continuously.	
		While the receipt is being fed with no sensor designated, the media sensor (transmissive sensor or reflective sensor) detects the label end state for 1 mm continuously.	

B-EP (It does not matter whether the compatibility setting for the B-SP series is on or off.)			
	Paper jam	Label end	Normal end + label end
RECEIPT		When (or before) the motor is driven for feeding or printing, the media sensor (transmissive sensor or reflective sensor) detects the label end state.	The media sensor (transmissive sensor or reflective sensor) detects the label end state before a print image that is printable in a single print job is printed completely. After that, while the media sensor is detecting the label end state for 1 mm continuously, printing is completed.
		While printing is performed on the receipt with no sensor designated, the media sensor (transmissive sensor or reflective sensor) detects the label end state for 1 mm continuously before the effective print length of the current label is printed.	
		While the receipt is being fed with the reflective sensor designated, the media sensor (transmissive sensor or reflective sensor) detects the label end state for 1 mm continuously.	
RECEIPT/ESC/POS		When (or before) the motor is driven for feeding or printing, the media sensor (transmissive sensor or reflective sensor) detects the label end state.	
		The media sensor (transmissive sensor or reflective sensor) detects the label end state for 10 mm continuously before printing is completed.	
		While the media sensor (transmissive sensor or reflective sensor) is detecting the label end state for 10 mm continuously, the "no print data" state is detected for 1.5 mm continuously.	

9.3.2 BROKEN HEAD DOTS ERROR

- ① If broken head dots are detected in the broken head dots check when turning the power on or closing the cover, an error will occur.
- ② If the thermal head driver fails, an error will occur.

9.3.3 THERMAL HEAD EXCESSIVE TEMPERATURE

- ① If the thermistor detects an excessively high temperature of 71 °C or higher, an error will occur.

9.3.4 COVER OPEN ERROR

- ① If the cover open state is detected for 5 mm continuously while printing or feeding, an error will occur.
- ② When printing is attempted with the cover opened, an error will occur.
 - * At the moment an error occurs, the printer displays an error message, and returns a status response before it stops. Any commands except for the Status Request Command and the Reset Command are not processed. The [PAUSE] key can be used for resetting except in case where a thermal head excessive temperature error occurs. (The printer resumes printing the label at which the error had occurred.)

9.4 BATTERY ERROR

9.4.1 LOW BATTERY

The LED lights up in red, if printing is cannot be performed any more because the battery level is low.

9.4.2 ABNORMAL HIGH VOLTAGE

If it is detected that the battery voltage exceeds 9.5V for B-EP2DL or 17.5V for B-EP4DL, an error will occur.

9.4.3 ABNORMAL BATTERY TEMPERATURE

If it is detected that the battery temperature exceeds 61 °C or is below -20 °C, an error will occur.

9.5 CHARGING ERROR

A charging error will occur if the following operations are performed while the AC adapter is connected.

- ① If the power of the printer is turned on while it is off (with no battery attached)
- ② If the battery is removed while the power of the printer is on

9.6 BLUETOOTH SETTING ERROR

The printer recognizes an error when the Bluetooth related parameter setting fails.

9.7 ERRORS IN WRITABLE CHARACTER AND PC COMMAND SAVE MODES

9.7.1 WRITE ERROR

- An error has occurred in writing data in the storage memory.

9.7.2 FORMAT ERROR

- An erase error has occurred in formatting the storage memory.

9.7.3 MEMORY FULL

- Further data cannot be stored any more because of insufficient space in the storage memory.

* At the moment when an error occurs, the printer displays an error message, and returns a status response before it stops. Any commands except for the Status Request Command and the Reset Command are not processed. Restoration by the [RESTART] key is not allowed.

9.8 SYSTEM ERRORS

9.8.1 ADDRESS ERROR

- A command has been fetched from an odd address.
- Word data has been accessed from a place other than the boundary of the word data.
- Long word data has been accessed from a place other than the boundary of the long word data.

9.8.2 GENERAL INVALID COMMAND EXCEPTION

- An undefined command in a place other than the delay slot has been decoded.

9.8.3 SLOT INVALID EXCEPTION

- An undefined command in the delay slot has been decoded.
- A command which rewrites the data in the delay slot has been decoded.

9.8.4 PCB IDENTIFICATION ERROR

- The B-EP4DL Drive PCB is connected to the B-EP2DL Main PCB, or the firmware for the B-EP4DL model is downloaded to the B-EP2DL.
- The B-EP2DL Drive PCB is connected to the B-EP4DL Main PCB, or the firmware for the B-EP2DL model is downloaded to the B-EP4DL.

9.8.5 THERMAL HEAD IDENTIFICATION ERROR

- The thermal head for the B-EP4DL is connected to the B-EP2DL Main PCB.
- The thermal head for the B-EP2DL is connected to the B-EP4DL Main PCB.
- * As soon as the error occurs, the printer displays an error message, and stops.
(No commands or key operations ([FEED] key / [PAUSE] key) are processed except for the [POWER] key.)

9.9 OPERATIONS WHEN AN ERROR OCCURS

If the printer detects an error, the LED will blink (at intervals of 0.1 seconds), the printer stops the operation, and reverts to a wait state for a command from the host.

9.10 OPERATIONS AFTER AN ERROR IS CLEARED

9.10.1 LABEL MODE

If the [FEED] key is pressed, the remaining number of labels is not issued. Since the printer issues only the same label as one which is being printed when the error occurs, issue the required number of labels by pressing the [FEED] key.

9.10.2 RECEIPT MODE

If the [FEED] key is pressed, the printer performs a 20-mm feed.

9.10.3 RECEIPT1 MODE OR ESC/POS MODE

After the label end error or the cover open error is cleared, the printer automatically continues printing the data which has been received before the error occurred. After paper is replaced, the error is cleared by pressing the [PAUSE] key. Then, the printer automatically continues printing. When the cover is closed, if the printer has run out of the paper, the printer neither clears the error nor continues printing. It remains in the error state. In any state other than the above, the printer performs a 20-mm feed by pressing the [FEED] key.

* If the cover is opened due to the pressing of the key during printing, the head will separate from the platen. Therefore, printing does not necessarily continue.

9.10.4 TPCL MODE

After the label end error or the cover open error is cleared, the printer automatically continues printing the data which has been received before the error occurred. After paper is replaced, the error is cleared by pressing the [PAUSE] key. Then, the printer automatically continues printing. If the sensor is designated, the printer feeds the paper to the print start position, then continues printing. When the cover is closed, if the printer has run out of the paper, the printer neither clears the error nor continues printing. It remains in the error state. In any state other than the above, if the sensor is designated, when the [FEED] key is pressed, the printer performs the specified label pitch length of the feed. If no sensor is designated, the printer performs a 20-mm feed.

9.11 STATUS VALUES

[The compatible mode for the B-SP series is off.]

- * The values in the upper cell are provided for the LABEL/RECEIPT mode (1 byte).
The values in the lower cell are provided for the TPCL mode (3 bytes).

State	LED indication	Status by the Status Request Command	Auto status transmission	Status when the command is received during an error state	Condition of clearing error
		IrDA: TEC Protocol IrDA: IrCOMM RS-232C Bluetooth Wireless LAN	IrDA: IrCOMM RS-232C Bluetooth Wireless LAN	IrDA: TEC Protocol IrDA: IrCOMM RS-232C Bluetooth Wireless LAN	RS-232C IrDA Bluetooth Wireless LAN
Power is turned on.	Blink in green	—	—	—	—
Normal state (Idling)	ON in green (or orange)	00H 30H, 30H, 31H	—	—	—
Cover open state	ON in green (or orange)	01H 30H, 31H, 31H	—	01H 30H, 31H, 32H	—
Command syntax error	Blink in red	02H 30H, 36H, 31H	02H 30H, 36H, 32H	02H 30H, 36H, 32H	Reset by the [PAUSE] key.
Paper jam	Blink in red	03H 31H, 31H, 31H	03H 31H, 31H, 32H	03H 31H, 31H, 32H	Restart by the [PAUSE] key.
Label end	Blink in red	04H 31H, 33H, 31H	04H 31H, 33H, 32H	04H 31H, 33H, 32H	Restart by the [PAUSE] key after loading paper.
Cover open error	Blink in red	05H 31H, 35H, 31H	05H 31H, 35H, 32H	05H 31H, 35H, 32H	Close the cover.
Broken head dots error	Blink in red	06H 31H, 37H, 31H	06H 31H, 37H, 32H	06H 31H, 37H, 32H	Turn the power off or restart by the [PAUSE] key. Replace the thermal head.
Thermal head excessive temperature	Blink in red	07H 31H, 38H, 31H	07H 31H, 38H, 32H	07H 31H, 38H, 32H	Turn the power off.
Flash ROM write error	Blink in red	08H 35H, 30H, 31H	08H 35H, 30H, 32H	08H 35H, 30H, 32H	Turn the power off.
Flash ROM erase error	Blink in red	09H 35H, 31H, 31H	09H 35H, 31H, 32H	09H 35H, 31H, 32H	Turn the power off.
Low battery (Printing cannot be performed.)	ON in red	0AH 33H, 36H, 31H	0AH 33H, 36H, 32H	0AH 33H, 36H, 32H	Turn the power off.
Operating (Communicating)	ON in green	0BH 30H, 32H, 31H	—	—	—
Communication error * RECEIPT/232C only	Blink in red	0CH —	0CH —	0CH —	Reset by the [PAUSE] key.
Normal end + Label end	Blink in red	0DH 30H, 39H, 31H	0DH 30H, 39H, 32H	0DH 30H, 39H, 32H	Restart by the [PAUSE] key. Load paper.
Flash ROM storage area full state	Blink in red	0EH 35H, 34H, 31H	0EH 35H, 34H, 32H	0EH 35H, 34H, 32H	Turn the power off.
Wait for strip	ON in green	0FH 30H, 35H, 31H			
Abnormal battery temperature	Blink in red	32H 33H, 32H, 31H	32H 33H, 32H, 32H	32H 33H, 32H, 32H	Turn the power off.
Battery excessive temperature	Blink in red	33H 33H, 33H, 31H	33H 33H, 33H, 32H	33H 33H, 33H, 32H	Turn the power off.

State	LED indication	Status by the Status Request Command	Auto status transmission	Status when the command is received during an error state	Condition of clearing error
		IrDA: TEC Protocol IrDA: IrCOMM RS-232C Bluetooth Wireless LAN	IrDA: IrCOMM RS-232C Bluetooth Wireless LAN	IrDA: TEC Protocol IrDA: IrCOMM RS-232C Bluetooth Wireless LAN	RS-232C IrDA Bluetooth Wireless LAN
Charging error	Blink in red	37H	37H	37H	Turn the power off.
		33H, 37H, 31H	33H, 37H, 32H	33H, 37H, 32H	
Bluetooth initialization error	Blink in red	39H	39H	39H	Turn the power off.
		33H, 39H, 31H	33H, 39H, 32H	33H, 39H, 32H	
Bluetooth setup error	Blink in red	39H	39H	39H	Turn the power off.
		33H, 39H, 31H	33H, 39H, 32H	33H, 39H, 32H	
Wait for battery recovery	ON in green	45H			
		34H, 35H, 31H			
Wait for head temperature reduction	ON in green	46H			
		34H, 36H, 31H			
Wait for motor temperature reduction	ON in green	47H			
		34H, 37H, 31H			
Pause state	OFF	14H			Press the [PAUSE] key.
		30H, 34H, 31H			
Bit map writable character/PC command mode	ON in green	55H			
		35H, 35H, 31H			
Sleep	ON in green	—	—	—	—
Ir packet error	Blink in red	02H	02H	02H	Reset by the [PAUSE] key
		30H, 36H, 31H	30H, 36H, 32H	30H, 36H, 32H	

[The compatible mode for the B-SP series is on.]

- * The values in the upper cell are provided for the LABEL/RECEIPT mode (1 byte).
The values in the lower cell are provided for the TPCL mode (3 bytes).

State	LED indication	Status by the Status Request Command	Auto status transmission	Status when the command is received during an error state	Condition of clearing error
		IrDA: TEC Protocol IrDA: IrCOMM RS-232C Bluetooth Wireless LAN	IrDA: IrCOMM RS-232C Bluetooth Wireless LAN	IrDA: TEC Protocol IrDA: IrCOMM RS-232C Bluetooth Wireless LAN	RS-232C IrDA Bluetooth Wireless LAN
Power is turned on.	Blink in green	—	—	—	—
Normal state (Idling)	ON in green (or orange)	00H 30H, 30H, 31H	—	—	—
Cover open state	ON in green (or orange)	01H 30H, 31H, 31H	—	01H 30H, 31H, 32H	—
Command syntax error	Blink in red	02H 30H, 36H, 31H	02H 30H, 36H, 32H	02H 30H, 36H, 32H	Reset by the [PAUSE] key.
Paper jam	Blink in red	03H 31H, 31H, 31H	03H 31H, 31H, 32H	03H 31H, 31H, 32H	Restart by the [PAUSE] key.
Label end	Blink in red	04H 31H, 33H, 31H	04H 31H, 33H, 32H	04H 31H, 33H, 32H	Restart by the [PAUSE] key after loading paper.
Cover open error	Blink in red	05H 31H, 35H, 31H	05H 31H, 35H, 32H	05H 31H, 35H, 32H	Close the cover.
Broken head dots error	Blink in red	06H 31H, 37H, 31H	06H 31H, 37H, 32H	06H 31H, 37H, 32H	Turn the power off or restart by the [PAUSE] key. Replace the thermal head.
Thermal head excessive temperature	Blink in red	07H 31H, 38H, 31H	07H 31H, 38H, 32H	07H 31H, 38H, 32H	Turn the power off.
Flash ROM write error	Blink in red	08H 35H, 30H, 31H	08H 35H, 30H, 32H	08H 35H, 30H, 32H	Turn the power off.
Flash ROM erase error	Blink in red	09H 35H, 31H, 31H	09H 35H, 31H, 32H	09H 35H, 31H, 32H	Turn the power off.
Low battery (Printing cannot be performed.)	ON in red	0AH 33H, 36H, 31H	0AH 33H, 36H, 32H	0AH 33H, 36H, 32H	Turn the power off.
Operating (Communicating)	ON in green	0BH 30H, 32H, 31H	—	—	—
Communication error * RECEIPT/232C only	Blink in red	0CH —	0CH —	0CH —	Reset by the [PAUSE] key.
Normal end + Label end	Blink in red	0DH 30H, 39H, 31H	0DH 30H, 39H, 32H	0DH 30H, 39H, 32H	Restart by the [PAUSE] key. Load paper.
Flash ROM storage area full	Blink in red	0EH 35H, 34H, 31H	0EH 35H, 34H, 32H	0EH 35H, 34H, 32H	Turn the power off.
Wait for strip	ON in green	0FH 30H, 32H, 31H			
Abnormal battery temperature	Blink in red	07H 31H, 38H, 31H	07H 31H, 38H, 32H	07H 31H, 38H, 32H	Turn the power off.
Battery excessive temperature	Blink in red	07H 31H, 38H, 31H	07H 31H, 38H, 32H	07H 31H, 38H, 32H	Turn the power off.

State	LED indication	Status by the Status Request Command	Auto status transmission	Status when the command is received during an error state	Condition of clearing error
		IrDA: TEC Protocol IrDA: IrCOMM RS-232C Bluetooth Wireless LAN	IrDA: IrCOMM RS-232C Bluetooth Wireless LAN	IrDA: TEC Protocol IrDA: IrCOMM RS-232C Bluetooth Wireless LAN	RS-232C IrDA Bluetooth Wireless LAN
Charging error	Blink in red	37H	37H	37H	Turn the power off.
		33H, 37H, 31H	33H, 37H, 32H	33H, 37H, 32H	
Bluetooth initialization error	Blink in red	39H	39H	39H	Turn the power off.
		33H, 39H, 31H	33H, 39H, 32H	33H, 39H, 32H	
Bluetooth setup error	Blink in red	39H	39H	39H	Turn the power off.
		33H, 39H, 31H	33H, 39H, 32H	33H, 39H, 32H	
Wait for battery recovery	ON in green	0BH			
		30H, 32H, 31H			
Wait for head temperature reduction	ON in green	0BH			
		30H, 32H, 31H			
Wait for motor temperature reduction	ON in green	0BH			
		30H, 32H, 31H			
Pause state	OFF	0BH			Press the [PAUSE] key.
		30H, 32H, 31H			
Bit map writable character/PC command mode	ON in green	0BH			
		30H, 32H, 31H			
Sleep	ON in green	—	—	—	—
Ir packet error	Blink in red	02H	02H	02H	Reset by the [PAUSE] key
		30H, 36H, 31H	30H, 36H, 32H	30H, 36H, 32H	

- * The LED goes OFF when:
 - The auto power-off function is performed. (This is the same state when the printer is turned OFF.)
 - The error LED turns off in 5 minutes if the auto power-off time is set to 6 minutes or more.

10. SYSTEM MODE

10.1 GENERAL DESCRIPTION

This chapter describes details regarding the interface commands for the SYSTEM mode. For specification regarding keys, refer to the Key Operation Specification, and command specification for setup tools, refer to the Setup Command Specification.

10.2 STARTING THE PRINTER IN SYSTEM MODE

Unlike the TPCL, TPCL1, LABEL, RECEIPT, RECEIPT1 and ESC/POS modes, the SYSTEM mode cannot be accessed by the Mode Select Command. The SYSTEM mode can be accessed by turning on the power of the printer while holding down the FEED or PAUSE key..

10.3 COMMUNICATIONS CONDITIONS

Communication is carried out using valued currently set for the printer.

Communication is enabled via all interfaces except for Wireless LAN.

Once communication has started, interface does not automatically change to another. To change the interface, it is required to press the FEED key or PAUSE key, or turning the printer power off then on.

For communication statuses of each interface, refer to "I/F SETTING" in the SYSTEM mode.

* For details, refer to the Key Operation Specification.

10.4 LIMITATIONS IN SYSTEM MODE

When the SYSTEM mode is selected, the printer does not enter into the power save mode.

When the SYSTEM mode is selected, the auto power-off function is not performed.

The settings specified by any Set Commands are stored into flash ROM, when the printer is turned OFF or is initialized by the Initialize Command. They take effect when the printer is turned ON, or after initialization is completed. Do not remove the battery during storing the settings, or the data cannot be written into flash ROM.

10.5 OUTLINE OF COMMANDS

10.5.1 FORMAT OF INTERFACE COMMAND

ESC	Command & Data	LF	NUL
-----	----------------	----	-----

- The length from [ESC] to [LF] [NUL] must be as specified by each command.
- There is the following control code:
 - ① ESC (1BH), LF (0AH), NUL (00H)
 - ② { (7BH), | (7CH), } (7DH)

10.5.2 HOW TO USE REFERENCE

Function	Describes the outline of the function of the command.
----------	---

Format	Shows the format of the command.
--------	----------------------------------

The format designation method should conform to the following rules:

- Each set of small letters (such as aa, bbbb) indicates a parameter item.
- An item enclosed in parentheses may be omitted.
- “---” indicates the repetition of an item.
- Brackets and parentheses are used only in coding, and must not be transmitted in practice.
- Other symbols must always be inserted at designated positions before being transmitted.

Term	Explains the term(s) used in the format. * “0 to 999” described in the entry range indicates that up to 3-digit variable-length entry is allowed. (Entry of “001” or “009” is also possible.) “000 to 999” indicates that the entry must be fixed to 3 digits.
------	---

Explanation	Explains the command in detail.
-------------	---------------------------------

Note	Supplementary explanation of the command.
------	---

Refer to	Related commands
----------	------------------

Examples	Explains the command examples.
----------	--------------------------------

[ESC] FM [LF] [NUL]

The above corresponds to the transfer of the following:

<u>1B</u>	<u>46</u>	<u>4D</u>	<u>0A</u>	<u>00</u>
[ESC]	F	M	[LF]	[NUL]

10.5.3 PRECAUTIONS

The commands and parameters described in this specification must always be used. If any command or parameter other than those covered in this specification are used, the printer's operation will not be guaranteed.

10.6 COMMANDS RELATED TO SETTING

10.6.1 ID SET COMMAND

[ESC] ID

Function	Sets the ID for the printer.
Format	[ESC] ID; aa(, b) [LF] [NUL]
Term	<p>aa: Printer ID (2-byte hex data) 0000H to FFFFH</p> <p>b: Wireless LAN IP Address Invalid Setting (Omissible. If omitted, IP address setting is effective.) 0: IP Address setting is invalid.</p>
Explanation	(1) The printer ID is the information required for the host, such as a handy terminal, to identify each printer.
Notes	<p>(1) The set printer ID is backed up in memory (even if the power is turned off).</p> <p>(2) The last 5 digits of the printer's serial number have been set as the printer ID, at the time of shipment from the factory.</p> <p>(3) In IrDA: TEC Protocol, the printer checks the set ID against the ID in the received command packet. If they do not match, the printer discards the command packet. However, when the ID in the command packet is "0", the printer accepts the command packet without checking the set IDs.</p> <p>(4) In case of the wireless LAN model, the printer's ID will be set as the lower 2-byte number of the IP address unless "0" is set to the Wireless LAN IP Address Invalid Setting parameter. The upper 2 bytes are fixed to "192.168." At this time, the subnet mask will be set to "255.255.0.0."</p>
Example	<p>To set "03H 51H" as the ID of the printer:</p> <p>[ESC] ID; [03H] [51H] [LF] [NUL]</p> <p>In this case, the printer ID in status printing is "00849."</p> <p>In case of the wireless LAN model, the IP address is "192.168.3.81."</p>

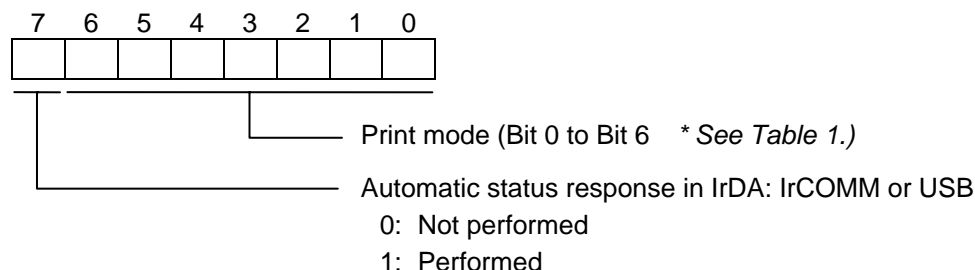
10.6.2 MODE SELECT COMMAND

[ESC] M

Function Changes the print mode.

Format [ESC] M; a(, b) [LF] [NUL]

Term a: Print mode designation



* Table 1 Print mode

HEX	Mode	How to deal with the received data after an error is cleared
30H	LABEL	Discards
31H	RECEIPT	Discards
32H	RECEIPT1	Continues printing
34H	ESC/POS	Continues printing
41H	TPCL	Continues printing
42H	TPCL1	Continues printing

b: Print position detection feed

(Omissible. If omitted, the print position detection feed is not performed.)

- 0: When the mode change from RECEIPT, RECEIPT1 or ESC/POS to LABEL, TPCL or TPCL1 is requested, a print position detection feed is not performed after the mode is changed.
- 1: When the mode change from RECEIPT, RECEIPT1, ESC/POS to LABEL, TPCL or TPCL1 is requested, a print position detection feed is performed after the mode is changed.

Explanation

- (1) There are 4 types of the print mode: "LABEL," "RECEIPT," "TPCL," and "ESC/POS."
- (2) "Automatic status response in IrDA: IrCOMM or USB is the function for the specifications which do not allow the printer to spontaneously send the status through IrDA; IrCOMM or USB. This function enables the printer to forcefully send the status to the host, if the link between the printer and the host is established. However, if the link between the printer and the host is not established upon the status transmission, the printer cannot send the status. Therefore, the status is discarded. (In the next connection to the host, the printer does not send the status to the host.)
- (3) The sensor is not used in the RECEIPT, RECEIPT1 or ESC/POS mode. When sensor detectable paper is used for receipts and labels, print position detection feed cannot be done in the LABEL, TPCL or TPCL1 mode. By setting the print position detection feed parameter to 1, print position detection feed is carried out after the mode is changed to LABEL, TPCL or TPCL1.
- (4) In the TPCL1 mode, it is possible to re-print the last print data by pressing the FEED button.

Notes

- (1) The print mode designation (the specified print mode and the automatic status response in IrDA: IrCOMM or USB) is backed up in memory (even if the power is turned off).
- (2) The factory default is "30H: TPCL mode" and "Automatic status response in IrDA: IrCOMM or USB is not performed". (The IrDA protocol is "IrCOMM.")
- (3) When the print mode is changed, the type of sensor is automatically changed.

LABEL mode (0):	The previously backed up sensor is designated.
TPCL mode (A):	The previously backed up sensor is designated.
TPCL1 mode (B):	The previously backed up sensor is designated.
RECEIPT mode (1):	No sensor is designated.
RECEIPT1 mode (2):	No sensor is designated.
ESC/POS mode (4):	No sensor is designated.
- (4) If the RECEIPT or ESC/POS mode is selected or no sensor is designated in the LABEL or TPCL mode, an initial feed is not performed when the cover is closed. (when the print position detection feed after the cover is closed is enabled with key operations).
- (5) When the mode change is finished, the printer sends the normal end status or an ACK to the host. However, when the mode is changed to the TPCL mode, the printer does not send the status. In IrDA: IrCOMM or USB, only when bit 7 of the print mode designation is set to "1," the printer sends the status.
- (6) The print mode can be changed by the printer itself. However, since the setting for the automatic status response in IrDA: IrCOMM or USB cannot be changed, the setting remains as the same.
- (7) The print position detection feed is performed according to the conditions, such as, label pitch, fine adjustment, and sensor selection, which were set in the LABEL or TPCL mode before the printer is operated in the RECEIPT, RECEIPT1 or ESC/POS mode. If no sensor is selected, the print position detection feed will not be performed.
- (8) After performing a print position detection feed, the printer does not send a process end status. If an error occurs during the print position detection feed, the feed is performed after the error is cleared by pressing the PAUSE key (when the print position detection feed after the cover is closed is enabled with key operations).
- (9) The print position detection feed is ignored when it is specified in the SYSTEM mode.
- (10) When changing the print mode by the printer itself, the print position detection feed parameter cannot be set.
- (11) When the mode select command is designated with the print position detection feed at the end of a print data issued in RECEIPT1 or ESC/POS mode, and if an error occurs while printing, the printing will restart after the error is cleared and then, the print mode will be changed to the LABEL or TPCL mode and a print position detection feed is performed. When the print position detection feed setting is omitted, the mode is not changed to LABEL or TPCL (the mode select command is discarded).

- (12) When the LABEL or TPCL mode is selected in the mode select command and the print position detection feed parameter is set 0 (not performed), and if an error occurs while the printer issues in RECEIPT1 or ESC/POS mode, the print mode is changed to the LABEL or TPCL mode after the error is cleared. (The mode select command is executed.)

10.7 COMMANDS RELATED TO FINE ADJUSTMENT

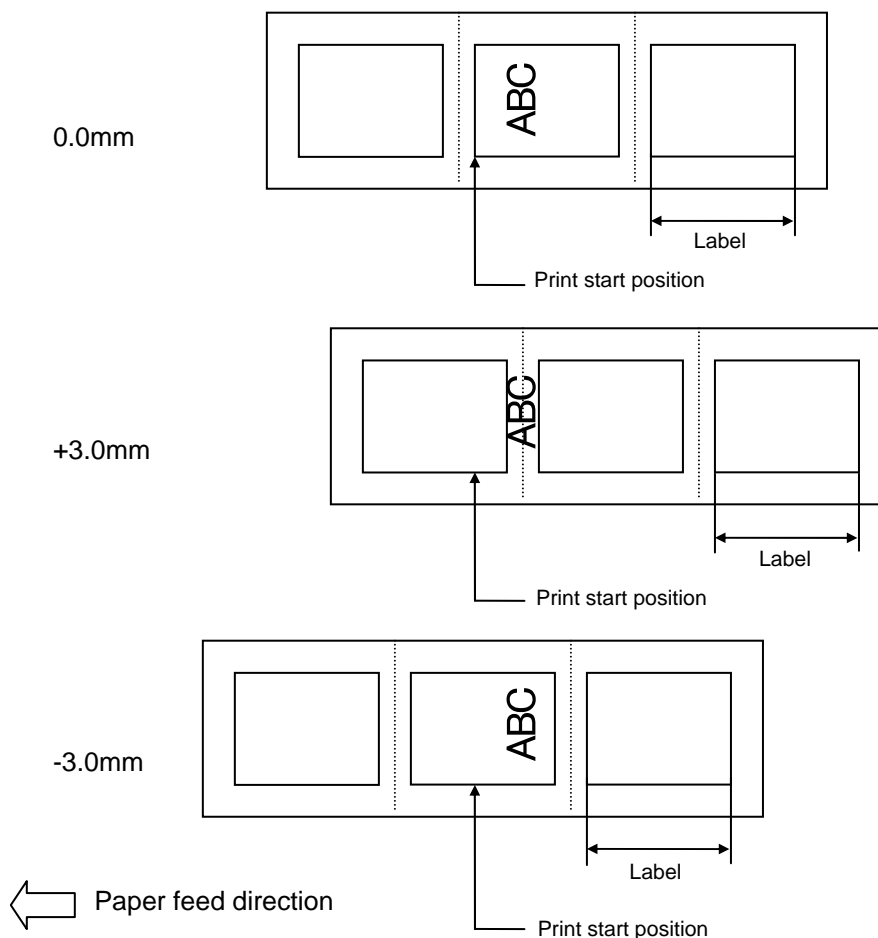
10.7.1 PRINT START POSITION FINE ADJUST COMMAND [ESC] AX

Function	Adjusts the feed value so that the label will be shifted forward or backward from the print start position automatically determined.
Format	[ESC] AX; abbb, cddd, eff(, g) [LF] [NUL]
Term	<p>a: Indicates the direction, forward or backward, in which a fine adjustment is to be made. +: Backward -: Forward</p> <p>bbb: Fine adjustment value for print position 000 to 500 (in 0.1 mm units)</p> <p>c: Indicates the direction of the strip position, forward or backward. +: Backward -: Forward</p> <p>ddd: Fine adjustment value for strip position 000 to 030 * In - (Forward) a fine adjustment is to be made between 000 and 020.</p> <p>e: Reserved area Fixed at +.</p> <p>ff: Reserved area Fixed at 00.</p> <p>g: Reserved area (Omissible)</p> <p>hhh: Reserved area (Omissible)</p> <p>[In compatible mode for the B-SP series]</p> <p>a: Indicates the direction, forward or backward, in which a fine adjustment is to be made. +: Backward -: Forward</p> <p>bbb: Fine adjustment value for print position 000 to 500 (in 0.1 mm units)</p> <p>c: Reserved area Fixed at +.</p> <p>ddd: Reserved area Fixed at 000.</p> <p>e: Reserved area Fixed at +.</p> <p>ff: Reserved area Fixed at 00.</p> <p>g: Reserved area (Omissible)</p> <p>hhh: Reserved area (Omissible)</p>

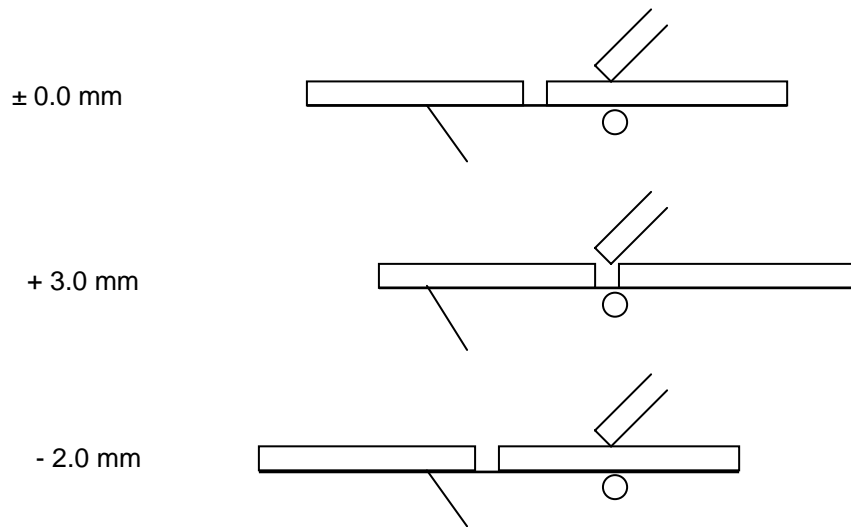
Explanation

- (1) When any value other than + or – is designated for the backward/forward print position fine adjustment, a command error results.
- (2) When any fine adjustment value for print position which is out of the above range, is set, an error results.
- (3) A range check is not carried out for the reserved areas. However, only numerals can be used.
- (4) The fine adjustment value is a sum of the value set using this command and the value set in the SYSTEM mode (through printer key operations). However, the maximum value is ± 50.0 mm. When the sum exceeds ± 50.0 mm, the value is corrected to ± 50.0 mm when printing is performed.
- (5) The fine adjustment value for strip position is valid only when “the compatible mode for the B-SP series” is turned off in the SYSTEM mode. When the parameter “a” is set to any value other than “+” or “-,” a command error occurs. When the “compatible mode for the B-SP series” is turned on, the value is ignored.

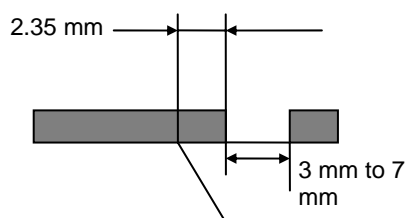
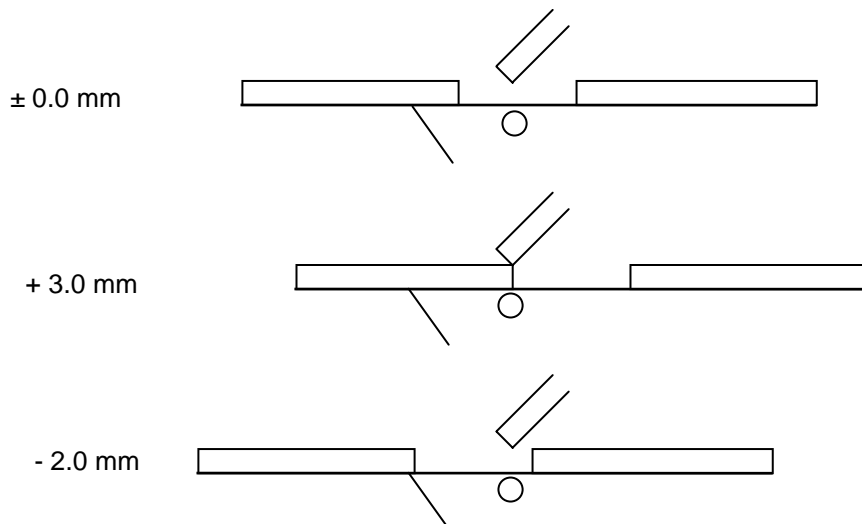
[Print position (feed amount) fine adjustment] (to shift the label backward or forward)



[Strip position fine adjustment]
When the label-to-label gap is 3 mm,



When the label-to-label gap is 7 mm,



- In strip issue mode, printing stops at the position where the distance between the leading edge of the strip plate and the trailing edge of the label is 2.35 mm, regardless of gap length. Note that this applies unless the fine adjustment value for print position is set.
- When the print stop position is not appropriate, the stop position must be changed using strip position fine adjustment.

Notes

- (1) Each fine adjustment value is backed up in memory (even if the power is turned off).
- (2) Each parameter is set to 0.0 mm at the time of shipment from the factory.
- (3) The fine adjustment value for print position and strip position changed by the Position Fine Adjust Command in the TPCL mode, is also effective in the LABEL mode.
- (4) When print position fine adjustment or strip position fine adjustment is set in the SYSTEM mode (through printer key operations), each fine adjustment value is a sum of the value set by this command and the value set in the SYSTEM mode. However, the maximum fine adjustment value is as follows:

Print position fine adjustment: ± 50.0 mm
Strip position fine adjustment: -2.0 mm to +3.0 mm

When the sum of the fine adjustment value for print position exceeds ± 50.0 mm, the fine adjustment value is corrected to ± 50.0 mm during printing.
When the sum of the fine adjustment value for strip position exceeds +3.0 mm in the + (backward) direction or -2.0 mm in the – (forward) direction, the fine adjustment value is corrected to +3.0 mm or -2.0 mm, respectively, during printing.
- (5) Strip position fine adjustment is effective only in strip issue mode.
- (6) The fine adjustment value for strip position up to V1.0C is valid only when the fine adjustment value for print position is not selected (fine adjustment value = 0).
- (7) The fine adjustment value for strip position is selected in the negative direction, a label is stopped backward against the print start position. However, the print start position is misaligned by the set value because no back feed is performed in strip issue mode. (When the label-to-label gap is less than 5 mm) * Refer to the arrows for – 2.0 mm when the label-to-label gap is 3 mm in P.5-15.
- (8) When the label pitch length is 20.0 mm or more but less than 24.0 mm and the effective print length is 15.0 mm or more or the label pitch length is 24.0 mm or more, a back feed is performed before printing.

10.7.2 PRINT DENSITY FINE ADJUST COMMAND

[ESC] AY

Function	Adjusts the automatically set print density.
Format	[ESC] AY; abb, c(, d) [LF] [NUL]
Term	<p>a: Indicates whether to increase or decrease the density +: Increase (Darker) -: Decrease (Lighter)</p> <p>bb: Fine adjustment value for print density 00 to 30 (in units of 1 step)</p> <p>c: Print mode 0: Reserved 1: Direct thermal</p> <p>d: Head output division designation (Omissible. When omitted, settings backed up by the memory are valid.)</p> <p>2-inch print head width 0: Auto (Divided by 2 or 3) 1: Reserved (When designated, automatic selection of bipartite/tripartite division is performed.) 2: Divided by 3 (Fixed) 3: Auto1 (Not divided/Divided by 2 or 3)/Print quality oriented 4: Reserved (When designated, tripartite division is performed.) 5: Auto2 (Not divided/Divided by 2 or 3)/Print speed oriented (supported in V1.0E or later)</p> <p>4-inch print head width 0: Auto (Divided by 2, 3 or 6) 1: Reserved (When designated, automatic selection of bipartite/tripartite/6-partite division is performed.) 2: Reserved (When designated, automatic selection of bipartite/tripartite/6-partite division is performed.) 3: Auto1 (Not divided/Divided by 2, 3 or 6) 4: Divided by 6 (Fixed)</p>
Explanation	<p>(1) The standard density is finely adjusted to increase or decrease.</p> <p>(2) When any fine adjustment value for print density out of the above range is set, a command error will occur.</p> <p>(3) If the print mode is set to any value other than "1: Direct thermal", it should be changed to "1."</p> <p>(4) The default value of the head output division designation is "3: Auto1 (Not divided/Divided by 2 or 3)" on the 2-inch print head and "3: Auto1 (Not divided/Divided by 2, 3 or 6)" on the 4-inch print head.</p> <p>(5) When "0: Auto" is designated on the 2-inch print head, "Divided by 2" or "Divided by 3" is automatically selected for every line according to the print ratio. The width of half a dot may not be printed on the line when switching between "Divided by 2" and "Divided by 3." Therefore, do not designate "0: Auto" when a serial barcode is printed.</p>

- (6) When “3: Auto1” or “5: Auto2” is designated for the 2-inch print head, “Not divided,” “Divided by 3” or “Divided by 2” is automatically selected for every line according to the print ratio. The width of half a dot may not be printed on the line when switching among “Not divided,” “Divided by 2” and “Divided by 3.” Therefore, do not designate “3: Auto1” or “5: Auto2” when a serial barcode is printed.

The difference between Auto1 and Auto2 is while Auto1 is print quality oriented, Auto2 is print speed oriented. Auto2 is designated to increase the print speed although the print is slightly faded.

- (7) When “0: Auto” is designated on the 4-inch print head, “Divided by 2,” “Divided by 3” or “Divided by 6” is automatically selected for every line according to the print ratio. The width of half a dot may not be printed on the line when switching among “Divided by 2,” “Divided by 3” and “Divided by 6.” Therefore, do not designate “0: Auto” when a serial barcode is printed.
- (8) When “3: Auto1” is designated on the 4-inch print head, “Not divided,” “Divided by 2,” “Divided by 3” or “Divided by 6” is automatically selected for every line according to the print ratio. The width of half a dot may not be printed on the line when switching among “Not divided,” “Divided by 2,” “Divided by 3” and “Divided by 6.” Therefore, do not designate “3: Auto1” when a serial barcode is printed.

10.7.3 STRIP SENSOR THRESHOLD VALUE SET COMMAND [ESC] AH, [ESC] AZ

Function	Sets the sensor threshold value to switch the mode between strip and batch.
Format	[ESC] AH; a [LF] [NUL] [ESC] AZ; a [LF] [NUL]
Term	a: Setting 0: Operation in conformance with the strip sensor 1: Operation in conformance with the strip sensor 2: Fixed to the batch mode 3: Fixed to the strip mode 4: Reserved
Notes	(1) The set parameter value is backed up and kept until a new value is set using this command. When the power is turned on, the backed up value is retrieved and set (2) "0: Operation in conformance with the strip sensor" has been set as the default at the time of shipment from the factory. (3) When either "2: Fixed to the batch mode" or "3: Fixed to the strip mode" for parameter "a" is selected, the printer operates in the specified mode, without automatically switching between the batch and strip modes. (4) Designation of "4: Reserved" is ignored.

10.8 COMMANDS RELATED TO CONTROL

10.8.1 INITIALIZE COMMAND

[ESC] WR, [ESC] @

Function	Returns the printer to its initial state.
Format	[ESC] WR [LF] [NUL] [ESC] @
Explanation	<p>(1) The printer is returned to the same state as when the power is turned on.</p> <p>(2) If the printer receives this command during printing, the printer prints the label which is being printed, then performs initialization.</p> <p>(3) After the Initialize Command is sent (or after printing is completed, if printing is performed), the next command must not be sent within approximately 30 seconds on the wireless LAN model or within approximately 5 seconds on other models, because the printer is initialized. In IrDA: TEC Protocol, if ACK/status transmission is specified by the Issue Command, the printer returns an ACK, which indicates the command process end, to the EOT after the printer is initialized. In RS-232C, when the status response is specified, the printer returns the status (34H 30H). After this status is received, the next command may be sent. In IrDA: IrCOMM, IrDA: IrOBEX, USB, Bluetooth or Wireless LAN, the printer does not return the status.</p> <p>(4) To use IrDA interface for sending this command to the printer, only this command should be sent. After the command is sent, the link should be terminated. Even if the host does not terminate the link, the printer performs the termination process. Therefore, after initialization is completed, the host should establish the link again.</p> <p>(5) When receiving this command during data transmission, the printer is initialized after transmission is completed.</p> <p>(6) Communication is disabled during self-test printing or slant line printing.</p>
Notes	<p>(1) If a command error or communication error occurs when receiving the Reset Command, an error message is displayed in the online mode. However, it is not displayed in the SYSTEM mode.</p> <p>(2) After the code of the Bit Map Writable Character Command ([ESC] XD) or the Graphic Command ([ESC] SG) is received, the Reset Command is not processed until the printer receives the data specifying the type of data.</p>
Examples	[ESC] WR [LF] [NUL]

10.9 COMMANDS RELATED TO STATUS

10.9.1 STATUS REQUEST COMMAND

[ESC] FM, [ESC] WS, [ESC] v

Function	Sends the printer status to the host computer.
----------	--

Format	[ESC] FM [LF] [NUL] [ESC] WS [LF] [NUL] [ESC] v
--------	---

Explanation

[LABEL/RECEIPT modes]

When receiving this command, the printer sends the printer status and battery status to the host.

- For IrDA: TEC Protocol: Data to be sent (Fixed at 27 bytes)

STX	Printer ID		Version No. of each form				Printer status	Battery status	CRC	
02H	xxH	xxH	V01	V02	.....	V20	xxH	xxH	xxH	xxH

- For IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, Wireless LAN:
Data to be sent (Fixed at 5 bytes)

STX	Printer ID		Printer status	Battery status
02H	xxH	xxH	xxH	xxH

Printer ID.....2-byte hex data (in order from High to Low)

Printer status.....Printer status is indicated in 1-byte data.

- 00H: Normal status (Idling)
- 01H: Cover open status
- 02H: Command syntax error (including Ir packet error)
- 03H: Paper jam
- 04H: Label end
- 05H: Cover open error
- 06H: Broken thermal head dots error
- 07H: Thermal head excessive temperature
- 08H: Flash ROM write error
- 09H: Flash ROM erase error
- 0AH: Low battery (Print failure)
- 0BH: Printer operating
- 0CH: Communication error
 - * For RECEIPT mode/RS-232C connection only
- 0DH: Normal end + Label end (See **NOTE**.)
- 0EH: Flash ROM storage area full state
- 0FH: Wait for strip * Only in the LABEL mode
- (10H: Normal issue end)
 - Response status for automatic status transmission
- 14H: Pause state
- 19H: Ambient temperature error
- 32H: Abnormal battery temperature
- 33H: Battery excessive temperature
- 37H: Charging error
- 38H: Bluetooth setting successfully completed
- 39H: Bluetooth setup error (including initialization error)
- 45H: Wait for battery recovery
- 46H: Wait for head temperature reduction
- 47H: Wait for motor temperature reduction
- 55H: Writable character/PC command save mode

NOTE: In the LABEL mode, "0DH: Normal end + Label end" is a state when the printer runs out of labels, after the effective print length is printed. In the RECEIPT mode, this status is returned to the host when the printer runs out of labels after a receipt is issued.

Status in the compatible mode for B-SP series

- 00H: Normal state (idling)
- 01H: Cover open state
- 02H: Command syntax error (including Ir packet error)
- 03H: Paper jam
- 04H: Label end
- 05H: Cover open error
- 06H: Broken thermal head dots error
- 07H: Thermal head excessive temperature
{ including ambient temperature error, abnormal battery
} temperature and battery excessive temperature
- 08H: Flash ROM write error
- 09H: Flash ROM erase error
- 0AH: Low battery (Print failure)
- 0BH: Printer operating
{ including the following statuses: wait for strip, pause
} state, writable character/PC command save mode, wait
} for battery recovery, wait for print head/motor
} temperature reduction
- 0CH: Communication error
 * For RECEIPT mode/RS-232C connection only
- 0DH: Normal end + Label end
- 0EH: Flash ROM storage area full state
- (10H: Normal issue end)
 Response status for automatic status transmission
- 37H: Charging error
- 38H: Bluetooth setting successfully completed
- 39H: Bluetooth setup error (including initialization error)

Battery statusThe battery charge status is indicated in 5 levels.

(B-EP2DL)

- 01H: 7.2 V or less (Print failure)
- 02H: 7.3 V to 7.4 V
- 03H: 7.5 V to 7.7 V
- 04H: 7.8 V to 7.9 V
- 05H: 8.0 V or more

(B-EP4DL)

- 01H: 14.0 V or less (Print failure)
- 02H: 14.1 V to 14.6 V
- 03H: 14.7 V to 15.2 V
- 04H: 15.3 V to 15.9 V
- 05H: 16.0 V to 16.8 V

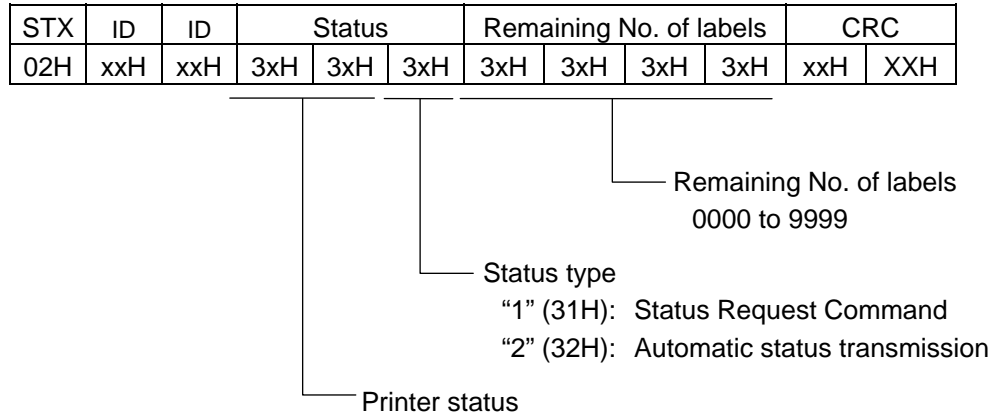
* The remaining number of printable labels may vary according to the contents to be printed and the ambient environment.

CRC.....2-byte hex data (in order from Low to High)

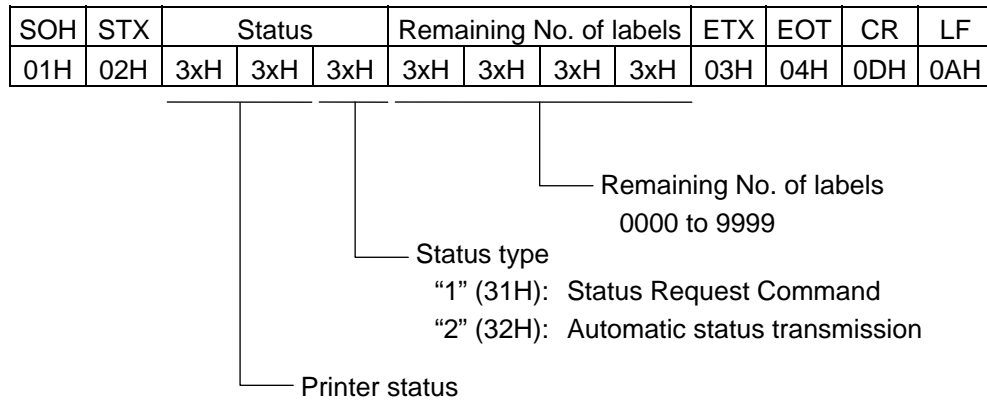
[TPCL mode]

This command makes the printer send its status regardless of the status response setting. The status to be transmitted is the current printer status, and indicates the latest status only. The remaining count indicates the remaining count of the batch currently being printed. No remaining count of the batch waiting to be printed is transmitted.

[IrDA: TEC Protocol]



[IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, Wireless LAN]



Printer status

- "00": Normal state
- "01": Cover open state
- "02": Operating
- "04": Pause state
- "05": Wait for strip
- "06": Command syntax error (including Ir packet error)
- "11": Paper jam
- "13": Label end
- "15": Cover open error
- "17": Broken thermal head dots error
- "18": Thermal head excessive temperature
- "19": Ambient temperature error
- "32": Abnormal battery temperature
- "33": Battery excessive temperature
- "36": Low battery
- "37": Charging error
- "38": Bluetooth setting successfully completed
(Not returned when the Status Request Command is used)
- "39": Bluetooth setup error (including initialization error)
- ("40": Normal issue end)
Response status for automatic status transmission
- ("41": Normal feed end)
Response status for automatic status transmission
- "45": Wait for battery recovery
- "46": Wait for print head temperature reduction
- "47": Wait for motor temperature reduction
- "50": Flash ROM write error
- "51": Flash ROM erase error
- "54": Flash ROM storage area full state
- "55": Writable character/PC command save mode

Printer status for the compatible mode for the B-SP series

- "00": Normal state
- "01": Cover open state
- "02": Operating
 - (including the following statuses: wait for strip, pause state, wait for battery recovery, wait for print head/motor temperature reduction and writable character/PC command save mode)
- "06": Command syntax error (including Ir packet error)
- "09": Normal issue end + Label end
- "11": Paper jam
- "13": Label end
- "15": Cover open error
- "17": Broken head dots error
- "18": Thermal head excessive temperature
 - (including ambient temperature error, abnormal battery temperature, and battery excessive temperature)
- "36": Low battery
- "37": Charging error
- "38": Bluetooth setting successfully completed
(Not returned when the Status Request Command is used)
- "39": Bluetooth setup error (including initialization error)
- ("40": Normal issue end)
Response status for automatic status transmission
- ("41": Normal feed end)
Response status for automatic status transmission
- "50": Flash ROM write error
- "51": Flash ROM erase error
- "54": Flash ROM storage area full state

Notes

- (1) The status is returned only to the interface which sent this command.
- (2) A max. delay of 20 msec may occur until the printer sends the status after receiving the Status Request Command.
- (3) The interval from when the Status Request Command is sent to when the next Status Request Command is sent should be 20 msec or more. If the interval is less than 20 msec, the printer may fail to receive the Status Request Command.
- (4) Status "09" is effective only when the compatible mode for the B-SP series is enabled in the SYSTEM mode. In other modes, this status indicates label end.

Example

[ESC] WS [LF] [NUL]

10.9.2 MODE INFORMATION ACQUIRE COMMAND

[ESC] WX

Function	Sends the printer mode information to the host.
Format	[ESC] WX [LF] [NUL]
Explanation	<p>(1) Statuses are different between when the compatible mode for the B-SP series is on and when it is off.</p> <p>(2) The mode information format to be sent to the host, is as follows:</p>

[LABEL, RECEIPT, ESC/POS modes]

[IrDA: TEC Protocol]

STX	Mode information (16 bytes)																CRC	CRC
	S	Y	S	T	E	M	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP		
02H	53H	59H	53H	54H	45H	4DH	20H	20H	20H	20H	20H	20H	20H	20H	20H	20H	xxH	xxH

[IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, Wireless LAN]

STX	Mode information (16 bytes)															
	S	Y	S	T	E	M	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP
02H	53H	59H	53H	54H	45H	4DH	20H	20H	20H	20H	20H	20H	20H	20H	20H	20H

[TPCL mode]

[IrDA: TEC Protocol]

STX	Mode information (16 bytes)																CRC	CRC
	S	Y	S	T	E	M	SP	SP	SP	SP	SP	SP	SP	SP	SP	SP		
02H	53H	59H	53H	54H	45H	4DH	20H	20H	20H	20H	20H	20H	20H	20H	20H	20H	xxH	xxH

[IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, Wireless LAN]

SOH	STX	Mode information (16 bytes)																ETX	EOT	CR	LF
		S	Y	S	T	E	M	SP	SP	SP	SP	SP	SP	SP	SP	SP					
01H	02H	53H	59H	53H	54H	45H	4DH	20H	20H	20H	20H	20H	20H	20H	20H	20H	20H	03H	04H	0DH	0AH

The above shows examples where the message is received in the SYSTEM mode for administrators (after a password is entered, when password setting is on). In addition, the messages described on the following page are returned.

- When the compatible mode for the B-SP series is on.

TPCL mode	TPCL	
TPCL1 mode	TPCL1	
LABEL mode	LABEL	
RECEIPT mode	RECEIPT	
RECEIPT1 mode	RECEIPT1	
ESC/POS mode	ESC/POS	
Online reset menu	USER ■ SYSTEM	
SYSTEM mode for users PAUSE + POWER keys	USER ■ SYSTEM	
SYSTEM mode for administrators FEED + POWER keys	When the password setting is on and before it is entered	USER ■ SYSTEM
	When the password setting is on and after it is entered	SYSTEM
	When the password setting is off	SYSTEM
TPCL (strip issue mode)	TPCL ■ (S)	
TPCL1 (strip issue mode)	TPCL1 (S)	
LABEL (strip issue mode)	LABEL (S)	

* ■ indicates a space.

- When the compatible mode for the B-SP series is off.

TPCL mode	TPCL-LE	
TPCL1 mode	TPCL-LE1	
LABEL mode	LABEL	
RECEIPT mode	RECEIPT	
RECEIPT1 mode	RECEIPT1	
ESC/POS mode	ESC/POS	
Online reset menu	USER ■ SYSTEM	
SYSTEM mode for users PAUSE + POWER keys	USER ■ SYSTEM	
SYSTEM mode for administrators FEED + POWER keys	When the password setting is on and before it is entered	USER ■ SYSTEM
	When the password setting is on and after it is entered	SYSTEM
	When the password setting is off	SYSTEM

* ■ indicates a space.

10.10 COMMANDS RELATED TO BLUETOOTH AND WIRELESS LAN

10.10.1 DEVICE ADDRESS ACQUIRE COMMAND

[ESC] IT

Function	Reads the device address of the Bluetooth or MAC address of the wireless LAN.
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Format	[ESC] IT [LF] [NUL]
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Explanation	(1) This command reads the device address of the Bluetooth or MAC address of the wireless LAN. When using the IrDA, the following information field is placed in the information frame and sent to the Bluetooth or wireless LAN.
-------------	---

[LABEL, RECEIPT, ESC/POS modes]

[Information field to be sent when IrDA: TEC Protocol is used]

STX	Bluetooth device address	CRC	
02H	12 bytes	xxH	xxH

[Information field to be sent when IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth or wireless LAN is used]

STX	Bluetooth device address
02H	12 bytes

[TPCL mode]

[Information field to be sent when IrDA: TEC Protocol is used]

STX	Bluetooth device address	CRC	
02H	12 bytes	xxH	xxH

[Information field to be sent when IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, or wireless LAN is used]

SOH	STX	Bluetooth device address	ETX	EOT	CR	LF
01H	02H	12 bytes	03H	04H	0DH	0AH

The printer sends the following information:

Bluetooth device address: 0001ccf0042b

Bluetooth device address:

[30H] [30H] [30H] [31H] [63H] [63H] [66H] [30H] [30H] [34H] [32H] [62H]
0 0 0 1 c c f 0 0 4 2 b

Example	[ESC] IT [LF] [NUL]
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10.10.2 BLUETOOTH DEVICE NICKNAME SETTING

[ESC] BN

Function	Sets Bluetooth device nickname.
Format	[ESC] BN; aaa...aaa [LF] [NUL]
Term	aaa...aaa: Device nickname Up to 32 bytes using characters of 20H to 7FH Factory default: "TOSHIBATEC BT"
Explanation	<p>(1) Printer device nickname to be notified to the host is set.</p> <p>(2) The device nickname set by this command becomes effective when the printer is restarted after a proper power off of the printer.</p> <p>(3) In the LABEL mode (Mode = 0), RECEIPT mode (Mode = 1) or RECEIPT1 mode (Mode = 2), the printer returns "38H" (setting completed) when the processing is completed successfully, and returns "39H" (setting error) when the processing is not successfully completed. In the TPCL mode (Mode = A) or TPCL1 mode (Mode = B), the printer returns "38" (setting completed) when the processing is completed, and returns "39" (setting error) when the processing is not successfully completed.</p> <p>(4) Characters of 20H to 7FH can be used for a device nickname.</p>
Example	<p>To set "PRINTER" for a device nickname.</p> <p>[ESC] BN; PRINTER [LF] [NUL]</p>

10.10.3 INQUIRY RESPONSE TIME SETTING COMMAND [ESC] BZ

Function	Sets the time for the printer to respond to an inquiry of the Bluetooth.
Format	[ESC] BZ; a [LF] [NUL]
Term	<p>a: Inquiry response time</p> <p>0: Inquiry is not possible.</p> <p>1: Inquiry is possible only within 60 seconds after a power on.</p> <p>2: Inquiry is possible ay anytime. (Factory default setting)</p>
Explanation	<p>(1) Time of printer's response to an inquiry from the host is set.</p> <p>0: The printer does not respond to an inquiry from the host.</p> <p>1: The printer responds to an inquiry from the host only within 60 seconds after the power is turned on.</p> <p>2: The printer responds to an inquiry from the host at anytime while the power is on.</p> <p>(2) The response time set by this command becomes effective when the printer is restarted after a proper power off of the printer.</p> <p>(3) When the Bluetooth installed in the printer is replaced, start the printer in the SYSTEM mode, and then, turn the power off. Doing this makes the parameter effective.</p> <p>(4) This command can be sent from either the Bluetooth interface or the IrDA interface. When the printer power is not turned off then on after sending the command via either interface, and command transmission is performed via a different interface, the command may be invalid.</p> <p>(5) In the LABEL mode (Mode = 0), RECEIPT mode (Mode = 1) or RECEIPT1 mode (Mode = 2), the printer returns "38H" (setting completed) when the processing is completed successfully, and returns "39H" (setting error) when the processing is not successfully completed. In the TPCL mode (Mode = A) or TPCL1 mode (Mode = B), the printer returns "38" (setting completed) when the procesing is completed, and returns "39" (setting error) when the processing is not successfully completed.</p>
Example	<p>To set the response time to "within 60 seconds after a power on".</p> <p>[ESC] BZ; 1 [LF] [NUL]</p>

10.10.4 INTERVAL/WINDOW SETTING AT THE INQUIRY/PAGE [ESC] BQ

Function	Sets an interval and window of inquiry/page for the Bluetooth interface.
Format	[ESC] BQ; aaaa, bbbb [LF] [NUL]
Term	<p>aaaa: Interval of an inquiry/page (Fixed at 4 digits) 0018 to 4096 (0.625 msec./unit) Factory default setting (inquiry/page): 2048 ⇒ 1.28 sec</p> <p>bbbb: Window of an inquiry/page (Fixed at 4 digits) 0018 to 4096 (0.625 msec./unit) Factory default setting (inquiry/page): 0036 ⇒ 22.5 msec</p>
Explanation	<p>(1) An interval and window related to the time for the printer to respond to an inquiry or page from the host are set. When the printer is used in the environment where a connection with the host takes time, the connectivity will be improved by making the value of the interval smaller and the window larger.</p> <p>(2) When the value of the interval is set smaller and the window larger for improving the connectivity, the printer's power consumption will be increased. Also, compared with the printer which is used with the factory default setting, the standby time and the number of issues will be decreased.</p> <p>(3) This setting becomes effective when the printer is restarted after the parameter is set and the printer power is turned off properly.</p> <p>(4) In the LABEL mode (Mode = 0), RECEIPT mode (Mode = 1) or RECEIPT1 mode (Mode = 2), the printer returns "38H" (setting completed) when the processing is completed successfully, and returns "39H" (setting error) when the processing is not successfully completed. In the TPCL mode (Mode = A) or TPCL1 mode (Mode = B), the printer returns "38" (setting completed) when the processing is completed, and returns "39" (setting error) when the processing is not successfully completed.</p> <p>(5) When the value of the interval is smaller than the value of the window, the printer returns "39" (setting error).</p>
Example	<p>To set the interval to 640 msec. and the window to 45.0 msec.</p> <p>[ESC] BQ; 1024, 0072 [LF] [NUL]</p>

10.10.5 BONDING SETTING COMMAND

[ESC] BP

Function	Sets the destination and the PIN code (bonding setting) of the Bluetooth.
Format	[ESC]BP; aaaaaaaaaaaa, b, ccccccccccccccccccccccccccccccc [LF] [NUL]
Term	<p>aaaaaaaaaaaa: Bluetooth device address (BD address) of the destination</p> <p>(1) 12-digit ASCII characters (hex. code) "0" to "9" and "A" to "F" (in the case of BD address of specific destination)</p> <p>(2) 12 digits of "*" (in the case of BD address of unspecified destination)</p> <p>b: Size of PIN code</p> <p>0: 1 byte</p> <p>1: 2 bytes</p> <p>2: 3 bytes</p> <p>:</p> <p>D: 14 bytes</p> <p>E: 15 bytes</p> <p>F: 16 bytes</p> <p>c: PIN code</p> <p>Byte string corresponding to the PIN code size is set in ASCII.</p>
Explanation	<p>(1) In the LABEL mode (Mode = 0), RECEIPT mode (Mode = 1) or RECEIPT1 mode (Mode = 2), the printer returns "38H" (setting completed) when the processing is completed successfully, and returns "39H" (setting error) when the processing is not successfully completed. In the TPCL mode (Mode = A) or TPCL1 mode (Mode = B), the printer returns "38" (setting completed) when the processing is completed, and returns "39" (setting error) when the processing is not successfully completed.</p> <p>(2) Up to 10 BD addresses can be set by this command. If 11th BD address is set, the first one is automatically deleted.</p> <p>(3) If the PIN code is changed without changing BD address, the previously registered PIN code is voided, and the latest one becomes effective.</p> <p>(4) When a 12-digit "*" is set to a specific destination, the previously set BD address of that destination becomes invalid.</p> <p>(5) To set a BD address for a specific designation after an address for unspecified destination has been set, it is required to delete all bonding table by a Bonding Table Deletion Command.</p> <p>(6) The PIN code of the unspecified destination can be changed without deleting all the bonding table.</p> <p>(7) This command is effective only when the power is turned on in the SYSTEM mode. It is invalid when the SYSTEM mode is entered by using the System Mode Shift Command.</p> <p>(8) This command can be sent from either the Bluetooth interface or the IrDA interface. When the printer power is not turned off then on after sending the command via either interface, and command transmission is performed via a different interface, the command may be invalid.</p>

- (9) Both uppercase and lowercase letters are effective as ASCII codes for "A" to "F" in the BD address of the destination.
- (10) Alphanumeric characters of "0" to "9," "A" to "Z," and "a" to "z" can be used for a PIN code.

Example

To set the BD address of destination to "00043e0101ef" and PIN code to "3A" with PIN code size to 1 (2 bytes):

As the PIN code "3A" corresponds to 0x33,0x41 in ASCII, the command will be:

[ESC] BP; 00043e0101ef, 1, 3341 [LF] [NUL]

10.10.6 BONDING TABLE DELETION COMMAND

[ESC] BE

Function	Deletes the bonding table of the Bluetooth.
Format	[ESC] BE; aaaaaaaaaa [LF] [NUL] [ESC] BE; b [LF] [NUL]
Term	aaaaaaaaaaaa: Bluetooth device address (BD address) 12-byte ASCII (hex. code) "0" to "9," "A" to "F" b: Delete all (all registered bonding tables) 1-byte "*" (fixed)
Explanation	<p>(1) This command deletes not only the bonding table of designated BD address but the link between the bonding table and the BD address.</p> <p>(2) In the LABEL mode (Mode = 0), RECEIPT mode (Mode = 1) or RECEIPT1 mode (Mode = 2), the printer returns "38H" (setting completed) when the processing is completed successfully, and returns "39H" (setting error) when the processing is not successfully completed. In the TPCL mode (Mode = A) or TPCL1 mode (Mode = B), the printer returns "38" (setting completed) when the processing is completed, and returns "39" (setting error) when the processing is not successfully completed.</p> <p>(3) An error status is returned when the designated BD address does not exist in the bonding table, as well as a deletion of the table from the flash ROM cannot be performed properly.</p> <p>(4) When "Delete all (*)" is designated, the registered BD addresses are all deleted. When the BD address of unspecified destination was set in the bonding setting, they can be deleted only by designating "Delete all." To set BD address of specific destination again, it is required to execute a "Delete all" by this command.</p> <p>(5) This command is effective only when the power is turned on in the SYSTEM mode. It is invalid when the SYSTEM mode is entered by using the System Mode Shift Command.</p> <p>(6) This command can be sent from either the Bluetooth interface or the IrDA interface. When the printer power is not turned off then on after sending the command via either interface, and command transmission is performed via a different interface, the command may be invalid.</p> <p>(7) Both uppercase and lowercase letters are effective as ASCII codes for "A" to "F" in the BD address of the destination.</p>

10.10.7 SECURITY SETTING COMMAND

[ESC] BS

Function Performs the security setting for the Bluetooth.

Format [ESC] BS; a [LF] [NUL]

Term a: Security setting
1: No security (Factory default setting)
2: Reserved.
3: Link level security

Explanation

- (1) In the LABEL mode (Mode = 0), RECEIPT mode (Mode = 1) or RECEIPT1 mode (Mode = 2), the printer returns "38H" (setting completed) when the processing is completed successfully, and returns "39H" (setting error) when the processing is not successfully completed. In the TPCL mode (Mode = A) or TPCL1 mode (Mode = B), the printer returns "38" (setting completed) when the processing is completed, and returns "39" (setting error) when the processing is not successfully completed.
- (2) In the SYSTEM mode, "No security" is designated regardless of this security setting.
- (3) This setting becomes effective when the printer is restarted after the parameter is set and the printer power is turned off properly.
- (4) When "2: Reserved" is specified, the functions without security.
- (5) When "3: Link level security" is specified, be sure to set the destination and the PIN code in the bonding table.

Bonding setting	Security setting	Operation
Unregistered	None	Functions without a PIN code.
Unregistered	Link level security	Not connectable.
Registered	None	Functions without a PIN code.
Registered	Link level security	Functions with a PIN code.

Example To set the security to the link level.
[ESC] BS; 3 [LF] [NUL]

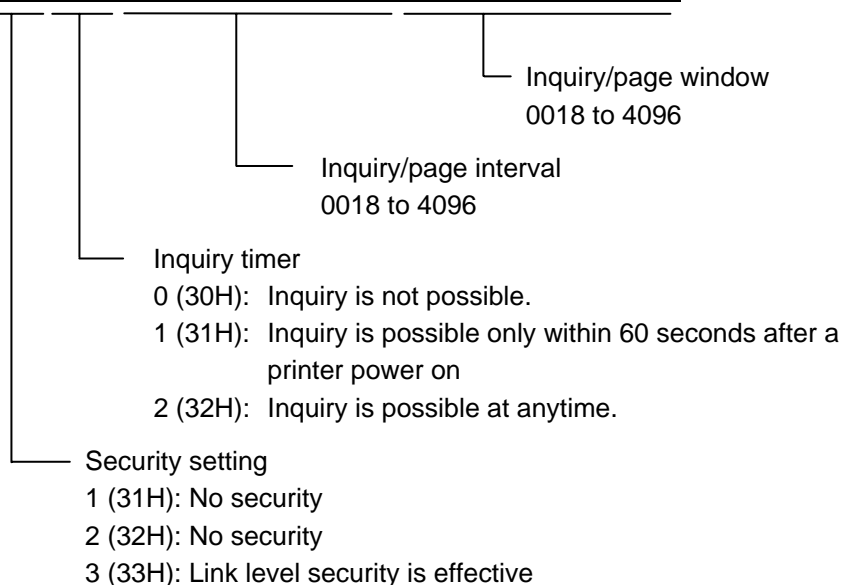
10.10.8 BLUETOOTH RELATED PARAMETER ACQUIRE COMMAND [ESC] WT

Function	Acquires the parameter settings related to the Bluetooth.
Format	[ESC] WT [LF] [NUL]
Explanation	This command reads the parameters related to the Bluetooth. When using the IrDA, the following information field is placed in the information frame and sent to the host.

■ LABEL, RECEIPT, ESC/POS modes

[Information field to be sent when IrDA: TEC Protocol is used]

STX	Sec	Inq	Interval				Window		
02H	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH



Bluetooth device name	CRC	CRC
32 bytes	xxH	xxH

Bluetooth device name: Fixed at 32 bytes.

When the Bluetooth device name is "TOSHIBA TEC BT."

[54H] [4FH] [53H] [48H] [49H] [42H] [41H] [20H] [54H] [45H] [43H] [20H] [42H] [54H] [00H] [00H]
T O S H I B A ' ' T E C ' ' B T
[00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H]

* When the Bluetooth device name is less than 32 bytes, the remaining bytes are filled with 00H.

[Information field to be sent when IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth or Wireless LAN is used]

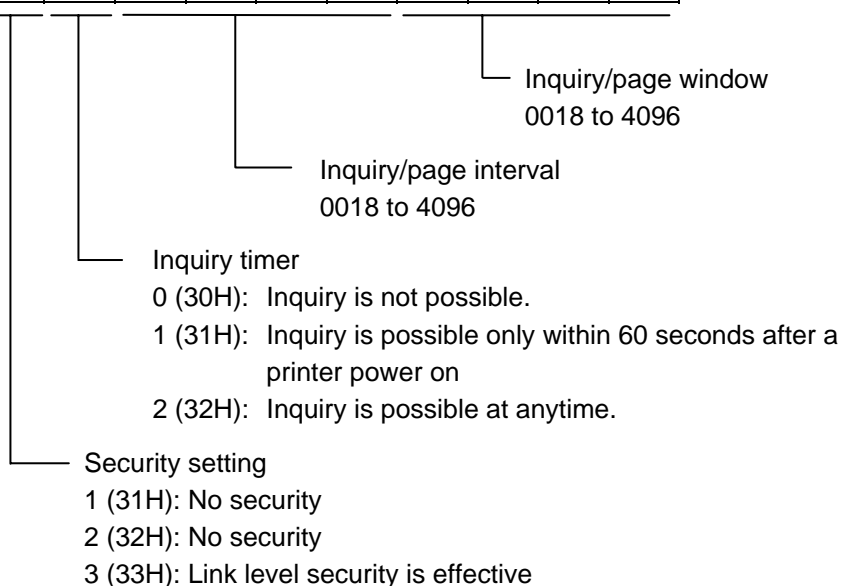
STX	Sec	Inq	Interval				Window		
02H	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH

Bluetooth device name
32 bytes

■ TPCL mode

[Information field to be sent when IrDA: TEC Protocol is used]

STX	Sec	Inq	Interval				Window			
02H	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH



Bluetooth device name	CRC	CRC
32 bytes	xxH	xxH

Bluetooth device name: Fixed at 32 bytes.

When the Bluetooth device name is "TOSHIBA TEC BT."

[54H] [4FH] [53H] [48H] [49H] [42H] [41H] [20H] [54H] [45H] [43H] [20H] [42H] [54H] [00H] [00H]
T O S H I B A ' ' T E C ' ' B T
[00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H] [00H]

* When the Bluetooth device name is less than 32 bytes, the remaining bytes are filled with 00H.

[Information field to be sent when IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth or Wireless LAN is used]

SOH	STX	Sec	Inq	Interval				Window			
01H	02H	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH	3xH

Bluetooth device name	ETX	EOT	CR	LF
32 bytes	03H	04H	0DH	0AH

10.11 SETUP MODE

10.11.1 GENERAL DESCRIPTION

The settings can be changed not only by commands but also by the key operations from the printer. This section describes how to change the settings by the key operations from the printer.

10.11.2 HOW TO ENTER INTO SETUP MODE

The [POWER] key is pressed while holding down the [FEED] or [PAUSE] key.

10.11.3 AUTO POWER-OFF FUNCTION DURING SETTING

Not performed.

10.11.4 HOW TO CHECK EACH SETUP MODE

Setup mode check is conducted by printing self-test results.

* For details, refer to the Key Operation Specification.

10.11.5 OTHER

The printer does not enter into the power save mode during the setup mode.

If the setting is the same as before, it is not written into flash ROM.

Settings made take effect, after the printer is turned OFF then ON by pressing the [POWER] key in the SYSTEM mode, or when the printer is restarted by the Reset Command.

11. OTHER FUNCTIONS

11.1 GENERAL DESCRIPTION

This chapter describes details regarding the individual functions of the printer.

11.2 REPRINT FUNCTION

11.2.1 LABEL MODE

When the batch issue mode is selected, the same label as the last one issued is printed out by pressing the [FEED] key. When the [FEED] key is pressed if no label has been printed, the specified label pitch length of one label is fed. (If no sensor is designated, a 20-mm feed is performed.)

In the strip issue mode, the specified number of labels is issued regardless of whether the compatible mode for the B-SP series is enabled or not.

If an error occurs, the drawing buffer data is kept until the next Data Print Command is received. Therefore, after the error is cleared, if the reprint key is enabled in the Data Print Command, one label can be issued every time the [FEED] key is pressed.

11.2.2 RECEIPT OR ESC/POS MODE

A label is not issued again. A 20-mm feed is performed every time the [FEED] key is pressed.

11.2.3 TPCL MODE

A label is not issued again. The specified label pitch length of a feed is performed every time the [FEED] key is pressed. (If no sensor is designated, a 20-mm feed is performed.)

11.2.4 TPCL1 MODE

When the batch issue mode is selected, the same label as the last one issued is printed out by pressing the [FEED] key. When the [FEED] key is pressed if no label has been printed, the specified label pitch length of one label is fed. (If no sensor is designated, a 20-mm feed is performed.)

If an error occurs, key entries are ignored. However, the drawing buffer data is kept until the next Data Print Command is received. Therefore, after the error is cleared, one label can be issued every time the [FEED] key is pressed.

11.3 POWER SAVE MODE

This printer will enter the power save mode after the printer has been in an idle state for the specified 'time to the power save mode' to save the power consumption. When the printer enters the power save mode, all data in the receive buffer is cleared. During an error state (including a low battery state), the printer does not enter the power save mode, but turns off according to the auto power off time setting. If the auto power off time is set to 5 minutes or longer, however, the printer will turn off in 5 minutes.

The power save mode is cleared when:

- The IrDA link is established. (TEC Protocol, IrCOMM)
- A USB cable is connected, and USB communications are started.
- RS-232C communications are started.
- Bluetooth communications are started.
- Wireless LAN communications are started.
- The cover is closed.
- The [FEED] key is pressed.
- The [POWER] key is pressed.

* A time period until the printer enters the power save mode varies depending on the setting (1 to 30 seconds.)

11.4 AUTOMATIC LABEL PRINT POSITIONING

11.4.1 LABEL MODE, TPCL MODE

When the cover is closed, the label is automatically fed to the first print position. However, if no sensor is designated, a feed is not performed.

11.4.2 RECEIPT MODE

Even if the cover is closed, the label is not automatically fed to the first print position.

11.5 CONTINUOUS PRINTING FUNCTION

11.5.1 LABEL MODE, RECEIPT MODE (Mode = 1)

The continuous printing function is not supported. When an error occurs, the receive buffer is entirely cleared.

11.5.2 RECEIPT1 MODE (Mode = 2), TPCL MODE (Mode = A), TPCL1 MODE (Mode = B), ESC/POS MODE (Mode = 4)

After the label end error or the cover open error is cleared, the printer automatically continues printing the data which has been received before the error occurred. After paper is replaced, the error is cleared by pressing the [PAUSE] key. Then, the printer automatically continues printing. If the sensor is designated, the printer performs a feed to position the label at the first print position, then continues printing. When the cover is closed, if the printer has run out of the paper, the printer neither clears the error nor continues printing. It remains in the error state.

11.6 AUTOMATIC LABEL PRINT POSITIONING AT POWER ON TIME

11.6.1 DESTINED FOR JAPAN

Not applicable.

11.6.2 DESTINED OVERSEAS

If the sensor is designated, and if the transmissive sensor detects the backing paper of the label, the printer performs a feed to position the label at the first print position. Note that this is not done without the sensor adjustment.

In addition, even if the paper is not loaded, the printer will recognize that as the backing paper, and this will result in the label end error.

11.7 BD ADDRESS PRINTING FUNCTION

When the printer which supports Bluetooth interface is turned ON by holding down the [POWER] key, the barcode below is printed, regardless of the print mode. However, if the barcode is not properly printed due to an error caused by the label end or paper jam, the printer does not reprint it. Clear the error, and then try to reprint it by performing the procedure from the beginning (the power off state).

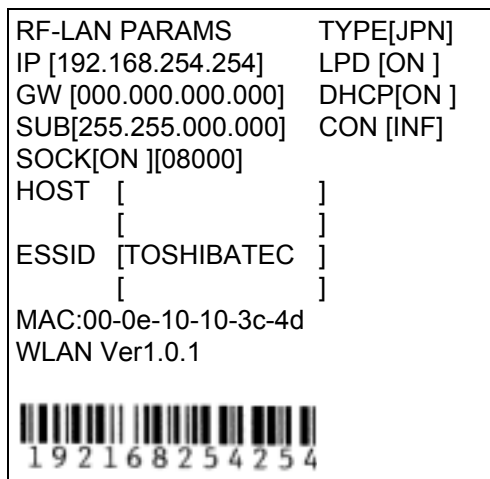
[Barcode sample of Bluetooth device address]



11.8 WIRELESS LAN PARAMETER SETTINGS PRINTING FUNCTION

When the printer which supports the wireless LAN is turned ON by holding down the [POWER] key while the power is off, the printer prints a wireless LAN parameter settings label regardless of the issue mode. If the label is not printed successfully due to an error like no paper or feed jam, it is required to load the media correctly, turn off the power, and then retry from the beginning. This is because the printer will not reprint the label even if the error is cleared.

[Sample of the wireless LAN parameter setting printout (B-EP2DL)]



11.9 STRIP ISSUE MODE

- (1) In TPCL mode (mode =A), TPCL1 mode (mode = B), or LABEL mode (mode = 0), the specified number of labels are printed. Note that a next print job is not performed until the printed label is removed from the strip shaft.

* If the [FEED] key is pressed in the “strip wait” status, stripping will be performed forcibly. (In other words, this is the same state as the media is removed.)

- (2) Please refer to the following commands related to the strip issue mode:

- Mode Select Command
- Position Fine Adjustment Command
- Strip Sensor Threshold Value Set Command (TPCL mode)
- Strip Sensor Adjust Command (LABEL mode)
- Issue Command
- Mode Information Acquire Command

11.11 STATUS

11.11.1 FUNCTIONS

The printer has the status response functions as listed below:

- (1) Status transmission at the end of a normal issue or in the event of the occurrence of an error (automatic status transmission)

This function is available for IrDA: IrCOMM, IrDA: TEC Protocol, USB, RS-232C and Bluetooth interfaces, or socket communications (during connection).

If the option “status response is returned.” has been selected (and if the automatic status transmission is enabled for the IrDA: IrCOMM or USB interface), the printer sends the status to the host computer when the printer completes an issue normally. (For the batch/cut mode: after the designated number of labels has been printed. For the strip mode: after one label has been printed.)

When an error occurs, the status is sent to the host computer.

The remaining count included in the status response indicates the remaining print count of the batch currently in progress only. No remaining count of the batch waiting to be printed is transmitted.

- (2) Status transmission in response to a status request (Status Request Command)

This function is available for IrDA: IrCOMM, IrDA: TEC Protocol, IrDA: IrOBEX, RS-232C, USB and Bluetooth interfaces, or socket communications.

Upon receipt of the Status Request Command, the printer sends the latest status indicating its current state to the host computer, regardless of the status response parameter setting (and regardless of whether the automatic status transmission is enabled for the IrDA: IrCOMM or USB interface). The remaining count indicates the remaining print count of the batch currently in progress only. No remaining count of the batch waiting to be printed is transmitted. This command is not stored in the receive buffer, but executed immediately after received.

- (3) Receive buffer free space status transmission in response to a status request (Receive Buffer Free Space Status Request Command)

This function is available for IrDA: IrCOMM, IrDA: TEC Protocol, IrDA: IrOBEX, RS-232C, USB and Bluetooth interfaces, or socket communications.

Upon receipt of the Receive Buffer Free Space Status Request Command, the printer sends the latest status indicating its current state and free space of the receive buffer to the host computer, regardless of the status response parameter setting (and regardless of whether the automatic status transmission is enabled for the IrDA: IrCOMM or USB interface). The remaining count indicates the remaining print count of the batch currently in progress only. No remaining count of the batch waiting to be printed is transmitted. This command is not stored in the receive buffer, but executed immediately after received.

- Strip wait status

If the Status Request Command is sent while printing is being attempted using the [FEED] key and a label is on the strip shaft (for example, while idling, after feeding a label, or after printing all specified number of labels), the printer returns the strip wait status to the host. If the Status Request Command is sent while a label is being printed or issued, the strip wait status is returned.

- Status in ESC/POS mode

Similarly, a response is returned to the Status Request command commonly used by the B-EP series in ESC/POS mode.

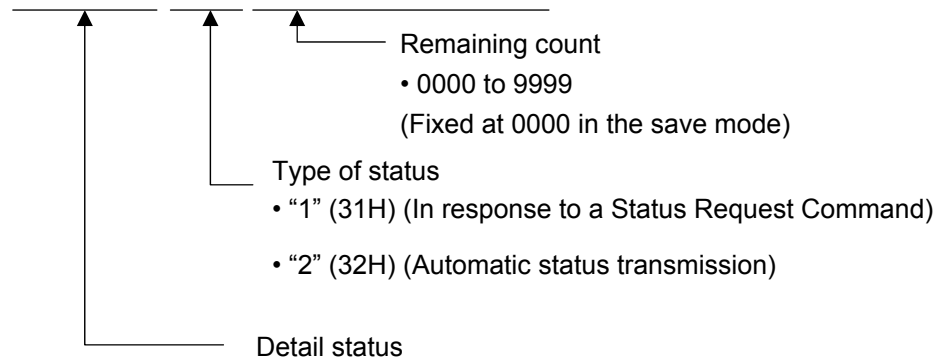
However, any status transmission will not be performed after the completion of printing as described in (1) above and when an error occurs.

11.11.2 STATUS FORMAT

- TPCL Mode

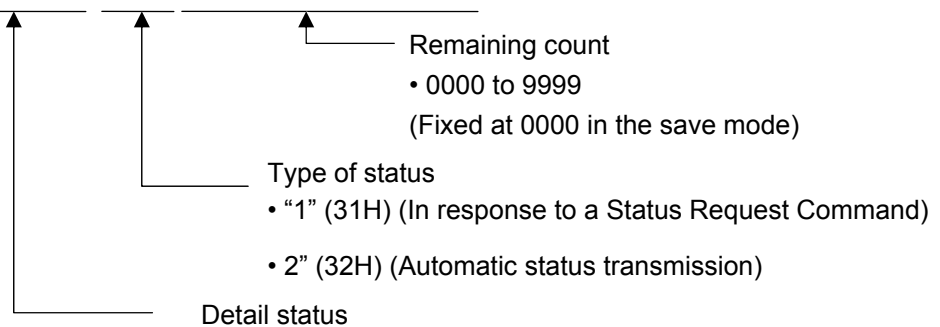
[IrDA: TEC Protocol]

STX	ID	ID	Status			Remaining count				CRC	CRC
01H	XXH	XXH	3XH	3XH	3XH	3XH	3XH	3XH	3XH	XXH	XXH



[IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, or wireless LAN interface]

SOH	STX	Status			Remaining count				ETX	EOT	CR	LF
01H	02H	3XH	3XH	3XH	3XH	3XH	3XH	3XH	03H	04H	0DH	0AH



- LABEL, RECEIPT, or ESC/POS Mode

[IrDA: TEC Protocol] Data to be transmitted (fixed at 27 bytes)

STX	Printer ID		Version No. of each form				Printer status	Battery status	CRC	
02H	xxH	xxH	V01	V02	.....	V20	xxH	xxH	xxH	xxH

[IrDA :IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, or wireless LAN interface]

Data to be transmitted (fixed at 5 bytes)

STX	Printer ID		Printer status	Battery status
02H	xxH	xxH	xxH	xxH

Printer ID : 2-byte hex data (from High to Low)

Printer status : 1-byte data representing the printer status

Battery status : A battery charging condition is represented in 5 levels.

CRC : 2-byte hex data(from Low to High)

Status to be returned in response to the Receive Buffer Free Space Status Request Command

Commonly used in all modes (TPCL, TPCL1, LABEL, RECEIPT, RECEIPT1, or ESC/POS)

[IrDA: TEC Protocol]

Status after [ESC] WB [LF] [NUL] (22 bytes)

STX	02H	Header of the status block
Status	3XH	Printer status
	3XH	* Details are described later.
Status type	33H	This indicates a status with free space of the receive buffer included
Remaining count	3XH	Remaining print count "0000" (0 label/tag) to "9999"(9999 labels/tags)
	3XH	
	3XH	
	3XH	
Length	32H	Total number of bytes of this status block
	32H	"22" (22 bytes)
Free space of receive buffer	3XH	Free space of the receive buffer "00000" (0K byte) to "00512" (512K bytes) However, the maximum value should be equal to the receive buffer capacity.
	3XH	
	3XH	
	3XH	
	3XH	
Receive buffer capacity	30H	Receive buffer capacity "00512"(512K bytes)
	30H	
	35H	
	31H	
	32H	
CRC	XXH	Footer of the status block
CRC	XXH	

[IrDA: IrCOMM, IrDA: IrOBEX, USB, RS-232C, Bluetooth, or wireless LAN interface]

Status after [ESC] WB [LF] [NUL] (23 bytes)

SOH	01H	Header of the status block
STX	02H	
Status	3XH	Printer status
	3XH	* Details are described later.
Status type	33H	This indicates a status with free space of the receive buffer included.
Remaining count	3XH	Remaining print count "0000" (0 label/tag) to "9999"(9999 labels/tags)
	3XH	
	3XH	
	3XH	
Length	32H	Total number of bytes of this status block
	33H	"23" (23 bytes)
Free space of receive buffer	3XH	Free space of the receive buffer "00000" (0K byte) to "00512" (512K bytes) However, the maximum value should be equal to the receive buffer capacity.
	3XH	
	3XH	
	3XH	
	3XH	
Receive buffer capacity	30H	Receive buffer capacity "00512"(512K bytes)
	30H	
	35H	
	31H	
	32H	
CR	0DH	Footer of the status block
LF	0AH	

11.11.3 DETAIL STATUS

[The compatible mode for the B-SP series is off.]

* The values in the upper cell are provided for LABEL/RECEIPT mode (1 byte HEX).

The values in the lower cell are provided for TPCL mode (2 bytes ASCII).

No.	LCD Message of the Upper Line (English)	Printer Status	Detail Status	
			Auto Status Transmission	Status Request Command
1	ON LINE	The printer is in the online mode.		00H "00"
	ON LINE	The printer is in the online mode (or communicating).		0BH "02"
	LBL PRESENT ****	A label is waiting to be stripped.		0FH "05"
	ON LINE	A label issue has been completed normally.	10H *1 "40"	
	ON LINE	A feed has been completed normally.		"41"
	ON LINE	A head broken dots check has been completed normally.	00	
	ON LINE	Initialization has been completed normally.	10H	
2	COVER OPEN	The front cover was opened in the online mode.		01H "01"
3	PAUSE ****	The printer is in a pause state.		14H "04"
4	COMMS ERROR	A parity error, overrun error, or framing error has occurred during communication through the RS-232C interface.	0CH	0CH
5	PAPER JAM ****	A paper jam has occurred during a paper feed.	03H "11"	03H "11"
6	NO PAPER ****	The paper has run out.	04H "13"	04H "13"
7	NO PAPER	A label has been completed normally, and then the paper has run out.	0DH "09"	0DH "09"
8	COVER OPEN ****	An attempt was made to feed or issue with the cover opened (except the [PAUSE] key).	05H "15"	05H "15"
9	HEAD ERROR	A broken element has been found on the thermal head.	06H "17"	06H "17"
10	EXCESS HEAD TEMP	The print head temperature has exceeded 71 °C.	07H "18"	07H "18"
11	SAVING ##### &&&&	The printer is in writable character or PC command save mode.		55H "55"
12	FORMAT ERROR	An erase error has occurred in formatting the flash memory.	09H "51"	09H "51"
13	FLASH WRITE ERR.	An error has occurred in writing data into the flash memory.	08H "50"	08H "50"

No.	LCD Message of the Upper Line (English)	Printer Status	Detail Status	
			Auto Status Transmission	Status Request Command
14	FLASH MEM FULL	Saving failed because of insufficient space in the flash memory.	0EH "54"	0EH "54"
15	EEPROM ERROR	A back-up EEPROM cannot be read/written properly.		
16	LOW BATTERY	The battery voltage has dropped to 7.2V or less for B-EP2DL, or 14V or less for B-EP4DL.	0AH "36"	0AH "36"
17	AMBIENT TEMP ERR	An ambient temperature has dropped to -20 °C or lower, or exceeded 60 °C.	19H "19"	19H "19"
18	BATT. TEMP ERROR	The battery may be heated and hurt operators. Please be careful not to get burned.	32H "32"	32H "32"
19	HIGH VOLT. ERROR	The battery may be heated and hurt operators.	33H "33"	33H "33"
20	SYSTEM ERROR --	System error (a) A command has been fetched from an odd address. (b) Word data has been accessed from a place other than the boundary of the word data. (c) Long word data has been accessed from a place other than the boundary of the long word data. (d) The logical area ranging from 80000000H to FFFFFFFFH has been accessed in user mode. (e) An undefined command in a place other than the delay slot has been decoded. (f) An undefined command in the delay slot has been decoded. (g) A command which rewrites the data in the delay slot has been decoded.		
21	WAITING (BATT.)	The battery protection function is active.		45H "45"
22	WAITING (HEAD)	The print head protection function is active.		46H "46"
23	WAITING (MOTOR)	The motor protection function is active.		47H "47"
24	BT INIT ERROR	The initialization of Bluetooth failed.		39H "39"
25	BT SETTING ERROR	There is an error in the Bluetooth setting.		39H "39"
26	CHARGE ERROR \$	An error occurred while the battery was recharged.	37H "37"	37H "37"
27	Ir PACKET ERROR	A block number error occurred in the TEC protocol.	02H "06"	02H "06"
28	Display of error command (See NOTE 1.)	A command error has been found in analyzing the command.	02H "06"	02H "06"

* 1 LABEL mode only (when connected through the RS-232C, IrCOMM or Bluetooth interface)

[The compatible mode for the B-SP series is on.]

* The values in the upper cell are provided for LABEL/RECEIPT mode (1 byte HEX).

The values in the lower cell are provided for TPCL mode (2 bytes ASCII).

No.	LCD Message of the Upper Line (English)	Printer Status	Detail Status	
			Auto Status Transmission	Status Request Command
1	ON LINE	The printer is in the online mode.		00H
				"00"
	ON LINE	The printer is in the online mode (or communicating).		0BH
				"02"
	LBL PRESENT ****	A label is waiting to be stripped.		0BH
				"02"
	ON LINE	A label issue has been completed normally.	10H *1	
2			"40"	
	ON LINE	A feed has been completed normally.	"41"	
3				
	ON LINE	A head broken dots check has been completed normally.	00	
4			10H	
	ON LINE	Initialization has been completed normally.		
5				
	COVER OPEN	The front cover was opened in the online mode.		01H
6				"01"
	PAUSE ****	The printer is in a pause state.		0BH
7				"02"
	COMMS ERROR	A parity error, overrun error, or framing error has occurred during communication through the RS-232C interface.	0CH	0CH
8				
	PAPER JAM ****	A paper jam has occurred during a paper feed.	03H	03H
9			"11"	"11"
	NO PAPER ****	The paper has run out.	04H	04H
10			"13"	"13"
	NO PAPER	A label has been completed normally, and then the paper has run out.	0DH	0DH
11			"09"	"09"
	COVER OPEN	An attempt was made to feed or issue with the cover opened (except the [PAUSE] key).	05H	05H
12			"15"	"15"
	HEAD ERROR	A broken element has been found on the thermal head.	06H	06H
13			"17"	"17"
	EXCESS HEAD TEMP	The print head temperature has exceeded 71 °C.	07H	07H
14			"18"	"18"
	ON LINE	The printer is in writable character or PC command save mode		0BH
15				"02"
	FORMAT ERROR	An erase error has occurred in formatting the flash memory.	09H	09H
16			"51"	"51"
	FLASH WRITE ERR.	An error has occurred in writing data into the flash memory.	08H	08H
17			"50"	"50"

No.	LCD Message of the Upper Line (English)	Printer Status	Detail Status	
			Auto Status Transmission	Status Request Command
14	FLASH MEM FULL	Saving failed because of insufficient space in the flash memory.	0EH "54"	0EH "54"
15	EEPROM ERROR	A back-up EEPROM cannot be read/written properly.		
16	LOW BATTERY	The battery voltage has dropped to 7.2V or less for B-EP2DL, or 14V or less for B-EP4DL.	0AH "36"	0AH "36"
17	AMBIENT TEMP ERR	An ambient temperature has dropped to -20 °C or lower, or exceeded 60 °C.	07H "18"	07H "18"
18	BATT. TEMP ERROR	The battery may be heated and hurt operators. Please be careful not to get burned.	07H "18"	07H "18"
19	HIGH VOLT. ERROR	The battery may be heated and hurt operators.	07H "18"	07H "18"
20	SYSTEM ERROR --	System error (a) A command has been fetched from an odd address. (b) Word data has been accessed from a place other than the boundary of the word data. (c) Long word data has been accessed from a place other than the boundary of the long word data. (d) The logical area ranging from 80000000H to FFFFFFFFH has been accessed in user mode. (e) An undefined command in a place other than the delay slot has been decoded. (f) An undefined command in the delay slot has been decoded. (g) A command which rewrites the data in the delay slot has been decoded.		
21	WAITING (BATT.)	The battery protection function is active.		0BH "02"
22	WAITING (HEAD)	The print head protection function is active.		0BH "02"
23	WAITING (MOTOR)	The motor protection function is active.		0BH "02"
24	BT INIT ERROR	The initialization of Bluetooth failed.		39H "39"
25	BT SETTING ERROR	There is an error in the Bluetooth setting.		39H "39"
26	CHARGE ERROR \$	An error occurred while the battery was recharged.	37H "37"	37H "37"
27	Ir PACKET ERROR	A block number error occurred in the TEC protocol.	02H "06"	02H "06"
28	Display of error command (See NOTE 1.)	A command error has been found in analyzing the command.	02H "06"	02H "06"

* 1 LABEL mode only (when connected through the RS-232C, IrCOMM or Bluetooth interface)

11.12 LCD MESSAGES AND LED INDICATIONS

The model and the firmware version are displayed on the character-oriented LCD.

No.	LCD Messages of Upper line (English)	LED Indication	Printer Status	Restoration by the [PAUSE] key Yes/No	Acceptance of Status Request and Reset Commands Yes/No
		STATUS			
1	ON LINE	○	In the online mode	-	Yes
	ON LINE	○	In the online mode (Communicating)	-	Yes
	LBL PRESENT ****	⊙	A label is waiting to be stripped.	-	Yes
2	COVER OPEN	○	The front cover was opened in the online mode.	-	Yes
3	PAUSE ****	●	In a pause state	Yes	Yes
4	COMMS ERROR	◇	A parity error, overrun error or framing error has occurred during communication through the RS-232C interface.	Yes	Yes
5	PAPER JAM ****	◇	A paper jam has occurred during paper feed.	Yes	Yes
6	NO PAPER ****	◇	The paper has run out.	Yes	Yes
7	NO PAPER	◇	A label has been completed normally, and then the paper has run out.	Yes	Yes
8	COVER OPEN	◇	A feed or an issue was attempted with the print head opened (except the [PAUSE] key).	Yes	Yes
9	HEAD ERROR	◇	A broken element has been found on the thermal head.	Yes	Yes
10	EXCESS HEAD TEMP	◇	The print head temperature has exceeded 71 °C.	No	Yes
11	SAVING ##### &&&&	○	In writable character or PC command save mode	-	Yes
12	FORMAT ERROR	◇	An erase error has occurred in formatting the flash ROM on the CPU board.	No	Yes
13	FLASH WRITE ERR.	◇	An error has occurred in writing data into the flash memory.	No	Yes
14	FLASH MEM FULL	◇	Saving failed because of insufficient space in the flash memory.	No	Yes
15	EEPROM ERROR	◇	A back-up EEPROM cannot be read/written properly.	No	No
16	LOW BATTERY	□	The battery voltage has dropped to 7.2V or less for B-EP2DL, or 14V or less for B-EP4DL.	No	Yes
17	AMBIENT TEMP ERR	◇	An ambient temperature has dropped to -20 °C or lower, or exceeded 60 °C.	Yes	Yes
18	BATT. TEMP ERROR	◇	The battery may be heated and hurt operators. Please be careful not to get burned.	No	Yes
19	HIGH VOLT. ERROR	◇	The battery may be heated and hurt operators.	No	Yes

No.	LCD Messages of Upper line (English)	LED Indication	Printer Status	Restoration by the [PAUSE] key Yes/No	Acceptance of Status Request and Reset Commands Yes/No
		STATUS			
20	SYSTEM ERROR --	◇	System error (a) A command has been fetched from an odd address. (b) Word data has been accessed from a place other than the boundary of the word data. (c) Long word data has been accessed from a place other than the boundary of the long word data. (d) The logical area ranging from 80000000H to FFFFFFFFH has been accessed in user mode. (e) An undefined command in a place other than the delay slot has been decoded. (f) An undefined command in the delay slot has been decoded. (g) A command which rewrites the data in the delay slot has been decoded.	No	No
21	WAITING (BATT.)	○	The battery protection function is active.	-	Yes
22	WAITING (HEAD)	○	The print head protection function is active.	-	Yes
23	WAITING (MOTOR)	○	The motor protection function is active.	-	Yes
24	BT INIT ERROR	○	The initialization of Bluetooth failed.	No	Yes
25	BT SETTING ERROR	○	There is an error in the Bluetooth setting.	No	Yes
26	CHARGE ERROR \$	◇	An error occurred while the battery was recharged.	No	Yes
27	Ir PACKET ERROR	◇	A block number error occurred in the TEC protocol.	Yes	Yes
28	Display of error command (See NOTE 1.)	◇	A command error has been found in analyzing the command.	Yes	Yes

* When the compatible mode for the B-SP series is enabled, No.11 SAVING ##### &&&& displays "ON LINE."

NOTE 1: When a command error has been found in the sent command, 16-byte command code of the erroneous command is displayed on the LCD. (However, [LF] and [NUL] are not displayed.)

[Example 1] [ESC] PC001; 0A00, 0300, 2, 2, A, 00, B [LF] [NUL]

Command error

LCD display

PC001;0A00,0300,

[Example 2] [ESC] T02A G30 [LF] [NUL]

Command error

LCD display

T20A30

[Example 3] [ESC] XR; 0200, 0300, 0450, 1200, 1 [LF] [NUL]

Command error

LCD display

XR;0200,0300,045

NOTE 2: When the command error is displayed, “? (3FH)” is displayed for codes other than 20H to 7FH and A0H to DFH.

NOTE 3: ◇: Blinking (red)
□: ON (red)
○: ON (green or orange)
⊙: Blinking (green)
●: Dimmed
****: Remaining number of labels to be printed 0001 to 9999 (in units of 1 label/tag)
####: Remaining memory capacity of PC save area in the flash memory:
0 to 3,200 (in K bytes)
&&&&: Remaining memory capacity of writable character / basic files / forms / graphics storage area
in the flash memory
0 to 3,200 (in K bytes)
- -: System error No.: 00 to 21
* Please refer to the next section for further information regarding system error No.
\$: Charging error No.: 1 to 5

11.13 LIST OF CHARGING ERROR NO. AND DETAILS

No.	Description	Cause
1	Battery ID error	It is detected that no battery is loaded or that an inappropriate battery is loaded.
2	Abnormal battery temperature	8.7V or over for B-EP2DL 17.4 V or over for B-EP4DL
3	Abnormal current (during trickle charging)	1.2A or over for B-EP2DL 2.0A or over for B-EP4DL
4	Trickle charging timeout	Transition to normal charging does not take place after trickle charging for 90 minutes.
5	Abnormal current (during normal charging)	1.2A or over for B-EP2DL 2.0A or over for B-EP4DL

11.14 LCD MESSAGES IN DIFFERENT LANGUAGES

No.	ENGLISH
1	ON LINE
2	COVER OPEN
3	PAUSE *****
4	COMMS ERROR
5	PAPER JAM *****
6	NO PAPER *****
7	NO PAPER
8	COVER OPEN *****
9	HEAD ERROR
10	EXCESS HEAD TEMP
11	SAVING ##### &&&&
12	FORMAT ERROR
13	FLASH WRITE ERR.
14	FLASH MEM FULL
15	EEPROM ERROR
16	LOW BATTERY
17	AMBIENT TEMP ERR
18	BATT. TEMP ERROR
19	HIGH VOLT. ERROR
20	SYSTEM ERROR --
21	WAITING (BATT.)
22	WAITING (HEAD)
23	WAITING (MOTOR)
24	BT INIT ERROR
25	BT SETTING ERROR
26	CHARGE ERROR \$
27	Ir PACKET ERROR
28	LBL PRESENT *****

No.	GERMAN
1	ON LINE
2	DECKEL OFFEN
3	PAUSE *****
4	UEBERTR.-FEHLER
5	PAPIERSTAU *****
6	PAPIERENDE *****
7	PAPIERENDE
8	DECKEL OFFEN*****
9	KOPF DEFEKT
10	KOPF UEBERHITZT
11	SP.-MOD##### &&&&
12	FORMATFEHLER
13	FLASH FEHLER
14	FLASH ZU KLEIN
15	EEPROM FEHLER
16	BATTERY SCHWACH
17	TEMP. FEHLER
18	BATT.TEMP.FEHLER
19	HIGH VOLT.FEHLER
20	SYSTEM FEHLER --
21	WAITING (BATT.)
22	WAITING (HEAD)
23	WAITING (MOTOR)
24	BT INIT ERROR
25	BT SETTING ERROR
26	BATT.LADEFEHLER\$
27	Ir PACKET ERROR
28	LBL ABNEHMEN*****

No.	FRENCH
1	PRETE
2	ERR. CAPOT
3	PAUSE *****
4	ERR. COMMUNICAT.
5	PB. PAPIER *****
6	FIN PAPIER *****
7	FIN PAPIER
8	ERR. CAPOT *****
9	ERREUR TETE
10	TETE TROP CHAUDE
11	MEM LIB##### &&&&
12	ERREUR DE FORMAT
13	ERREUR MEM FLASH
14	MEM INSUFFISANTE
15	ERREUR EEPROM
16	BATTERIE FAIBLE
17	ERR.TEMP. EXTER.
18	ERR.TEMP.BATT.
19	HIGH VOLT. ERROR
20	ERR. SYSTEME --
21	ATTENTE (BATT.)
22	ATTENTE (TETE)
23	ATTENTE (MOT.)
24	ERR. INIT BT
25	ERR. CONF BT
26	ERREUR CHARGE \$
27	Ir PACKET ERROR
28	MEDIA DISPO *****

No.	DUTCH
1	IN LIJN
2	DEKSEL OPEN
3	PAUZE ****
4	COMM. FOUT
5	PAPIER VAST ****
6	PAPIER OP ****
7	PAPIER OP
8	DEKSEL OPEN ****
9	PRINTKOP DEFECT
10	TEMP. FOUT
11	MEM ##### &&&&
12	FORMAAT FOUT
13	FLASH MEM FOUT
14	GEHEUGEN VOL
15	EEPROM ERROR
16	LAGE BATTERIJ
17	OMGEVNG TMP FOUT
18	FOUT BATT. TEMP
19	HIGH VOLT. ERROR
20	SYSTEEM FOUT --
21	Wachten (BATT.)
22	Wachten (HEAD)
23	Wachten (MOTOR)
24	BT INIT ERROR
25	BT SETTING ERROR
26	OPLAADFOUT \$
27	Ir PACKET ERROR
28	ETIKET KLAAR****

No.	SPANISH
1	ON LINE
2	TAPA ABIERTA
3	PAUSA ****
4	ERROR COMUNICACI
5	ATASCO PAPEL****
6	SIN PAPEL ****
7	SIN PAPEL
8	TAPA ABIERTA****
9	ERROR DE CABEZAL
10	TEMP.CABEZA ALTA
11	SALVAR ##### &&&&
12	ERROR DE FORMATO
13	ERROR ESCRITURA
14	MEMORIA INSUFICI
15	EEPROM ERROR
16	BATERIA BAJA
17	TEMP.AMBIEN.ALTA
18	ERR.TEMP.BATERIA
19	ERR.VOLT.BATERIA
20	ERR DE SISTEMA--
21	ESPERA: BATERIA
22	ESPERA: CABEZAL
23	ESPERA: MOTOR
24	ERR.INICIALIZ.BT
25	ERROR CONFIG. BT
26	ERROR DE CARGA \$
27	Ir PACKET ERROR
28	ETQT PRESENT****

No.	ITALIAN
1	PRONTA
2	TESTA APERTA
3	PAUSA ****
4	ERR. COMUNICAZ.
5	CARTA INCEP.****
6	NO CARTA ****
7	NO CARTA
8	APERTA TESTA****
9	ERRORE TESTINA
10	TEMP TESTA ALTA
11	SALVA ##### &&&&
12	ERR. FORMATTAZ
13	ERR.SCRITT.CARD
14	MEM. CARD PIENA
15	EEPROM ERROR
16	LOW BATTERY
17	AMBIENT TEMP ERR
18	BATT. TEMP ERROR
19	ERRORE VOLT BATT
20	ERR. SISTEMA --
21	ATTESA (BATT.)
22	ATT. TESTA CALDA
23	ATT.MOTORE CALDO
24	ERR. INIZ. B.T.
25	ERR.CONFIG. B.T.
26	ERR.CARICANTO \$
27	Ir PACKET ERROR
28	ETICH.PRONTA****

No.	JAPANESE
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	

* The Japanese messages are omitted here.

12. CHARACTER CODE TABLE

12.1 GENERAL DESCRIPTION

This chapter provides the character code tables.

12.2 CHARACTER CODE

The printable characters are slightly different according to the character type, because the fonts, which have been installed on the printer, are not described in the table.

12.2.1 UTF-8 CHARACTER CODE

Characters to be printed are shown below when UTF-8 is selected as a character code and its code is entered.

- * In the following code list, the high bytes are plotted along the vertical coordinate while the low bytes are plotted along the horizontal coordinate.
When the horizontal coordinate requires 1, 3 and 5 digits, characters are represented in one, two and three bytes respectively.

e.g. In the following list, the character for 0xE282A1 represents “A” based on 4 of the vertical coordinate and 1 of the horizontal coordinate.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
E2809		!	“	#	\$	%	&	'	()	*	+	,	-	.	/
E281B	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
E282A	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
E2889	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_

12.3 TIMES ROMAN, HELVETICA, LETTER GOTHIC, PRESTIGE ELITE, COURIER, GOTHIC725 Black (Bit map font type: A, B, C, D, E, F, G, H, I, J, K, L, N, O, P, Q, R, o, q)

(1) PC-850

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	€		ð	Ó	-
1			!	1	A	Q	a	q	ü	æ	í			Ð	ß	±
2			"	2	B	R	b	r	é	Æ	ó			Ê	Ô	=
3			#	3	C	S	c	s	â	Ö	ú			Ë	Ò	¾
4			\$	4	D	T	d	t	ä	Ö	ñ			È	õ	¶
5			%	5	E	U	e	u	à	Ò	Ñ	Á		·	Ö	§
6			&	6	F	V	f	v	â	Û	·	Â	ã	Í	μ	÷
7			'	7	G	W	g	w	ç	ù	·	À	Ã	Î	þ	¸
8			(	8	H	X	h	x	ê	ÿ	¿	©		Ï	þ	°
9			)	9	I	Y	i	y	ë	Ö	®				Ú	¨
A			*	:	J	Z	j	z	è	Ü	¬				Û	•
B			+	;	K	[	k	{	ï	ø	½				Ü	¹
C			,	<	L	\	l	|	î	£	¼				Ý	³
D			-	=	M	]	m	}	ì	Ø	¡	¢		ÿ	Ý	²
E			.	>	N	^	n	~	Ä	×	«	¥		ì	¯	■
F			/	?	O	_	o	¸	Å	f	»		α		´	

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”
The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(2) PC-8

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	€			α	≡
1			!	1	A	Q	a	q	ü	æ	í				β	±
2			"	2	B	R	b	r	é	Æ	ó				Γ	≥
3			#	3	C	S	c	s	â	ô	ú				π	≤
4			\$	4	D	T	d	t	ä	ö	ñ				Σ	∫
5			%	5	E	U	e	u	à	ò	Ñ				σ	∫
6			&	6	F	V	f	v	â	û	·				μ	÷
7			'	7	G	W	g	w	ç	ù	·				τ	≈
8			(	8	H	X	h	x	ê	ÿ	¿				Φ	°
9			)	9	I	Y	i	y	ë	Ö	·				Θ	•
A			*	:	J	Z	j	z	è	Ü	¬				Ω	•
B			+	;	K	[	k	{	ï	¢	½				δ	√
C			,	<	L	\	l	|	î	£	¼				∞	n
D			-	=	M	]	m	}	ì	¥	¡				∅	2
E			.	>	N	^	n	~	Ä	Pt	«				ε	■
F			/	?	O	_	o	¸	Å	f	»				∩	

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”
The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(3) PC-852

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	€			Ó	-
1			!	1	A	Q	a	q	ü		í			Đ	ß	
2			"	2	B	R	b	r	é		ó				Ô	
3			#	3	C	S	c	s	â	ô	ú			È		
4			\$	4	D	T	d	t	ä	ö						
5			%	5	E	U	e	u				Á				§
6			&	6	F	V	f	v				Â		Í		÷
7			'	7	G	W	g	w	ç					Î		ˆ
8			(	8	H	X	h	x								°
9			)	9	I	Y	i	y	ë	Ö					Ú	¨
A			*	:	J	Z	j	z		Ü	¬					•
B			+	;	K	[	k	{								
C			,	<	L	\	l	|	î						ý	
D			–	=	M	]	m	}							Ý	
E			.	>	N	^	n	~	Ä	×	«					■
F			/	?	O	_	o				»					

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”
The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(4) PC-857

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	€		º	Ó	-
1			!	1	A	Q	a	q	ü	æ	í			ª	ß	±
2			"	2	B	R	b	r	é	Æ	ó			Ê	Ô	
3			#	3	C	S	c	s	â	ô	ú			Ë	Ò	¾
4			\$	4	D	T	d	t	ä	ö	ñ			È	õ	¶
5			%	5	E	U	e	u	à	ò	Ñ	Á			Õ	§
6			&	6	F	V	f	v	â	û		Â	ã	Í	µ	÷
7			'	7	G	W	g	w	ç	ù		À	Ã	Î		ˆ
8			(	8	H	X	h	x	ê		¿	©		Ï	×	°
9			)	9	I	Y	i	y	ë	Ö	®				Ú	¨
A			*	:	J	Z	j	z	è	Ü	¬				Û	•
B			+	;	K	[	k	{	ï	ø	½				Ù	¹
C			,	<	L	\	l	|	î	£	¼				ì	³
D			–	=	M	]	m	}		Ø	ì	¢		í	ÿ	²
E			.	>	N	^	n	~	Ä		«	¥		î	–	■
F			/	?	O	_	o		Å		»				´	

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”
The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(5) PC-851

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç			€				
1			!	1	A	Q	a	q	ü							±
2			"	2	B	R	b	r	é							
3			#	3	C	S	c	s	â	ô						
4			\$	4	D	T	d	t	ä	ö						
5			%	5	E	U	e	u	à							§
6			&	6	F	V	f	v		û						
7			'	7	G	W	g	w	ç	ù						•
8			(	8	H	X	h	x	ê							°
9			)	9	I	Y	i	y	ë	Ö						™
A			*	:	J	Z	j	z	è	Ü						
B			+	;	K	[	k	{	ï		½					
C			,	<	L	\	l	|	î	£						
D			—	=	M	]	m	}								
E			.	>	N	^	n	~	Ä		«					■
F			/	?	O	_	o				»					

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”
The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(6) PC-855

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			\$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|								
D			—	=	M	]	m	}								§
E			.	>	N	^	n	~			«					■
F			/	?	O	_	o				»		α			

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”
The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(7) PC-1250

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q				±	Á		á	
2			"	2	B	R	b	r					Â		â	
3			#	3	C	S	c	s						Ó		ó
4			\$	4	D	T	d	t			¤	'	Ä	Ô	ä	ô
5			%	5	E	U	e	u				μ				
6			&	6	F	V	f	v			¡	¶		Ö		ö
7			'	7	G	W	g	w			§	·	Ç	×	ç	÷
8			(	8	H	X	h	x			¨	,				
9			)	9	I	Y	i	y			©		É		é	
A			*	:	J	Z	j	z						Ú		ú
B			+	;	K	[	k	{			«	»	Ë		ë	
C			,	<	L	\	l	|			¬			Ü		ü
D			-	=	M	]	m	}					Í	Ý	í	ý
E			.	>	N	^	n	~			®		Î		î	
F			/	?	O	_	o	⌘						ß		

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”
The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(8) PC-1251

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q				±				
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			\$	4	D	T	d	t			¤					
5			%	5	E	U	e	u				μ				
6			&	6	F	V	f	v			¡	¶				
7			'	7	G	W	g	w			§	·				
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y			©					
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{			«	»				
C			,	<	L	\	l	|			¬					
D			-	=	M	]	m	}								
E			.	>	N	^	n	~			®					
F			/	?	O	_	o	⌘								

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”
The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(9) PC-1252

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€	À	Ð	à	ð
1			!	1	A	Q	a	q			ı	±	Á	Ñ	á	ñ
2			"	2	B	R	b	r			ç	²	Â	Ò	â	ò
3			#	3	C	S	c	s	<i>f</i>		£	³	Ã	Ó	ã	ó
4			\$	4	D	T	d	t			¤	'	Ä	Ô	ä	ô
5			%	5	E	U	e	u			¥	μ	Å	Ö	å	ö
6			&	6	F	V	f	v			ı	¶	Æ	Ö	æ	ö
7			'	7	G	W	g	w			§	·	Ç	×	ç	÷
8			(	8	H	X	h	x	^	~	¨	ˆ	È	Ø	è	ø
9			)	9	I	Y	i	y			©	¹	É	Ù	é	ù
A			*	:	J	Z	j	z			ª	º	Ê	Ú	ê	ú
B			+	;	K	[	k	{			«	»	Ë	Û	ë	û
C			,	<	L	\	l	|			¬	¼	Ì	Ü	ì	ü
D			–	=	M	]	m	}				½	Í	Ý	í	ý
E			.	>	N	^	n	~			®	¾	Î	Þ	î	þ
F			/	?	O	_	o	¸				¿	Ï	ß	ï	ÿ

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”
The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(10) PC-1253

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q				±				
2			"	2	B	R	b	r				²				
3			#	3	C	S	c	s	<i>f</i>		£	³				
4			\$	4	D	T	d	t			¤					
5			%	5	E	U	e	u			¥	μ				
6			&	6	F	V	f	v			ı	¶				
7			'	7	G	W	g	w			§	·				
8			(	8	H	X	h	x			¨					
9			)	9	I	Y	i	y			©					
A			*	:	J	Z	j	z			ª					
B			+	;	K	[	k	{			«	»				
C			,	<	L	\	l	|			¬					
D			–	=	M	]	m	}				½				
E			.	>	N	^	n	~			®					
F			/	?	O	_	o	¸								

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”
The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(11) PC-1254

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€	À		à	
1			!	1	A	Q	a	q			ı	±	Á	Ñ	á	ñ
2			"	2	B	R	b	r			¢	²	Â	Ò	â	ò
3			#	3	C	S	c	s	f		£	³	Ã	Ó	ã	ó
4			\$	4	D	T	d	t			¤	´	Ä	Ô	ä	ô
5			%	5	E	U	e	u			¥	µ	Å	Ö	å	ö
6			&	6	F	V	f	v			¦	¶	Æ	Ö	æ	ö
7			'	7	G	W	g	w			§	·	Ç	×	ç	÷
8			(	8	H	X	h	x	^	~	¨	¸	È	Ø	è	ø
9			)	9	I	Y	i	y			©	¹	É	Ù	é	ù
A			*	:	J	Z	j	z			ª	º	Ê	Ú	ê	ú
B			+	;	K	[	k	{			«	»	Ë	Û	ë	û
C			,	<	L	\	l	|			¬	¼	Ì	Ü	ì	ü
D			-	=	M	]	m	}				½	Í		í	¹
E			.	>	N	^	n	~			®	¾	Î		î	
F			/	?	O	_	o					¿	Ï	ß	ï	ÿ

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”
The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(12) PC-1257

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q				±				
2			"	2	B	R	b	r			¢	²				
3			#	3	C	S	c	s			£	³		Ó		ó
4			\$	4	D	T	d	t			¤	´	Ä		ä	
5			%	5	E	U	e	u				µ	Å	Ö	å	ö
6			&	6	F	V	f	v			¦	¶		Ö		ö
7			'	7	G	W	g	w			§	·		×		÷
8			(	8	H	X	h	x			Ø	ø				
9			)	9	I	Y	i	y			©	¹	É		é	
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{			«	»				
C			,	<	L	\	l	|			¬	¼		Ü		ü
D			-	=	M	]	m	}		¨	-	½				
E			.	>	N	^	n	~			®	¾				
F			/	?	O	_	o				Æ	æ		ß		

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”
The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(13) LATIN9

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€	À	Ð	à	ð
1			!	1	A	Q	a	q			ı	±	Á	Ñ	á	ñ
2			"	2	B	R	b	r			¢	²	Â	Ò	â	ò
3			#	3	C	S	c	s			£	³	Ã	Ó	ã	ó
4			\$	4	D	T	d	t			€		Ä	Ô	ä	ô
5			%	5	E	U	e	u			¥	μ	Å	Ö	å	ö
6			&	6	F	V	f	v				¶	Æ	Ö	æ	ö
7			'	7	G	W	g	w			§	·	Ç	×	ç	÷
8			(	8	H	X	h	x					È	Ø	è	ø
9			)	9	I	Y	i	y			©	¹	É	Ù	é	ù
A			*	:	J	Z	j	z			ª	º	Ê	Ú	ê	ú
B			+	;	K	[	k	{			«	»	Ë	Û	ë	û
C			,	<	L	\	l	|			¬		Ì	Ü	ì	ü
D			-	=	M	]	m	}					Í	Ý	í	ý
E			.	>	N	^	n	~			®		Î	Þ	î	þ
F			/	?	O	_	o					¿	Ï	ß	ï	ÿ

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”
The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(14) Arabic

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			\$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|								
D			-	=	M	]	m	}								
E			.	>	N	^	n	~								
F			/	?	O	_	o									

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”
The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(15) UTF-8

(15.1) Bit map font type: A, B, D, F, K, O, Q or R

* For the font type O, !, ©, ¬, ®, ², ³, µ, ¶, ¹, ¼, Pt and ¯ are not printed.

	0	1	2	3	4	5	6	7	8	9	10 A	11 B	12 C	13 D	14 E	15 F
0																
1																
2		!	"	#	\$	%	&	'	()	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
6	'	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	☒
C28																
C29																
C2A		ı	ç	£	¤	¥	¦	§	¨	©	ª	«	¬	-	®	¯
C2B	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
C38	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
C39	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
C3A	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
C3B	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ
C48																
C49	Ð															
C4A																
C4B		ı														
C68										Ð						
C69			f													
C6A										Σ						
C6B																
C98																
C99																
C9A																
C9B									φ							
CA8																
CA9																
CAA																
CAB										,						

											10	11	12	13	14	15
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
CB8							^				'					
CB9										.	°	,	~			
CBA																
CBB																
CC8		'		~	—	—		.	..		°					
CC9																
CCA								,								
CCB																
CE8																
CE9				Γ					Θ							
CEA				Σ			Φ			Ω						
CEB		α	β		δ	ε							μ			
CF8	π			σ	τ		φ									
CF9																
CFA																
CFB																
E2809								=								
E281B																η
E282A								Pt					€			
E2889										•	√				∞	
E288A										∩						
E2898									≈							
E289A		≡			≤	≥										
E28C9	┐															
E28CA	└	J														
E296A	■															
E5808																

(15.2) Bit map font type: C, E, G, H, I, J, L, N, P, o or q

- * For the font types G, N and P, I , © , ¬ , ® , ² , ³ , μ , ¶ , ¹ , ¾ , ÷ , Σ and φ are not printed.
- * For the font types H, I, J and L, Σ and φ are not be printed.
- * For the font types o and q, Σ , φ and 0xC8B2(β) are not be printed but 0xC8B2(β) is printed.

	0	1	2	3	4	5	6	7	8	9	10 A	11 B	12 C	13 D	14 E	15 F
0																
1																
2		!	“	#	\$	%	&	'	()	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
6	'	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	Σ
C28																
C29																
C2A		ı	ç	£	¤	¥	¦	§	¨	©	ª	«	¬	–	®	—
C2B	°	±	²	³	´	µ	¶	•	¸	¹	º	»	¼	½	¾	¿
C38	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
C39	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
C3A	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
C3B	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ
C48																
C49	Ð															
C4A																
C4B		ı														
C68										Ð						
C69			f													
C6A										Σ						
C6B																
C98																
C99																
C9A																
C9B									φ							

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
											A	B	C	D	E	F
CA8																
CA9																
CAA																
CAB										,						
CB8							^				,					
CB9										.	°	˘	~			
CBA																
CBB																
CC8		,		~	—	—		.	˝		°					
CC9																
CCA								˘								
CCB																
CE8																
CE9																
CEA																
CEB													μ			
E2809								=								
E281B																
E282A													€			
E2889																
E28CA																
E296A	■															
E5808																

12.4 PRESENTATION (Bit map font type: M)

(1) PC-850, PC-857

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				-
1			!	1	A	Q	A	Q								
2			"	2	B	R	B	R								
3			#	3	C	S	C	S								
4			\$	4	D	T	D	T								
5			%	5	E	U	E	U								
6			&	6	F	V	F	V								
7			'	7	G	W	G	W								
8			(	8	H	X	H	X								
9			)	9	I	Y	I	Y								
A			*	:	J	Z	J	Z								
B			+	;	K	[	K	{								
C			,	<	L	\	L	|								
D			—	=	M	]	M	}								
E			.	>	N	^	N	~				¥				
F			/	?	O	_	O	⌘								

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”
The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(2) PC-8

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	A	Q								
2			"	2	B	R	B	R								
3			#	3	C	S	C	S								
4			\$	4	D	T	D	T								
5			%	5	E	U	E	U								
6			&	6	F	V	F	V								
7			'	7	G	W	G	W								
8			(	8	H	X	H	X								
9			)	9	I	Y	I	Y								
A			*	:	J	Z	J	Z								
B			+	;	K	[	K	{								
C			,	<	L	\	L	|								
D			—	=	M	]	M	}		¥						
E			.	>	N	^	N	~								
F			/	?	O	_	O									

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”
The Euro code (B0H) can be changed in the parameter setting in the SYSETM mode.

(3) PC-852

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	P				€				-
1			!	1	A	Q	A	Q								
2			"	2	B	R	B	R								
3			#	3	C	S	C	S								
4			\$	4	D	T	D	T								
5			%	5	E	U	E	U								
6			&	6	F	V	F	V								
7			'	7	G	W	G	W								
8			(	8	H	X	H	X								
9			)	9	I	Y	I	Y								
A			*	:	J	Z	J	Z								
B			+	;	K	[	K	{								
C			,	<	L	\	L	|								
D			-	=	M	]	M	}								
E			.	>	N	^	N	~								
F			/	?	O	_	O									

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”
The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(4) PC-851, PC-855, PC-1250, PC-1251, PC-1257, Arabic

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	P				€				
1			!	1	A	Q	A	Q								
2			"	2	B	R	B	R								
3			#	3	C	S	C	S								
4			\$	4	D	T	D	T								
5			%	5	E	U	E	U								
6			&	6	F	V	F	V								
7			'	7	G	W	G	W								
8			(	8	H	X	H	X								
9			)	9	I	Y	I	Y								
A			*	:	J	Z	J	Z								
B			+	;	K	[	K	{								
C			,	<	L	\	L	|								
D			-	=	M	]	M	}								
E			.	>	N	^	N	~								
F			/	?	O	_	O									

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”
The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(5) PC-1252, PC-1254

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	P				€				
1			!	1	A	Q	A	Q								
2			"	2	B	R	B	R								
3			#	3	C	S	C	S								
4			\$	4	D	T	D	T								
5			%	5	E	U	E	U			¥					
6			&	6	F	V	F	V								
7			'	7	G	W	G	W								
8			(	8	H	X	H	X	^	~						
9			)	9	I	Y	I	Y								
A			*	:	J	Z	J	Z								
B			+	;	K	[	K	{								
C			,	<	L	\	L	|								
D			-	=	M	]	M	}								
E			.	>	N	^	N	~								
F			/	?	O	_	O									

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”
The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(6) PC-1253

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	P				€				-
1			!	1	A	Q	A	Q								
2			"	2	B	R	B	R								
3			#	3	C	S	C	S								
4			\$	4	D	T	D	T								
5			%	5	E	U	E	U			¥					
6			&	6	F	V	F	V								
7			'	7	G	W	G	W								
8			(	8	H	X	H	X								
9			)	9	I	Y	I	Y								
A			*	:	J	Z	J	Z								
B			+	;	K	[	K	{								
C			,	<	L	\	L	|								
D			-	=	M	]	M	}								
E			.	>	N	^	N	~								
F			/	?	O	_	O									

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”
The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(7) LATIN9

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	A	q								
2			"	2	B	R	B	r								
3			#	3	C	S	C	s								
4			\$	4	D	T	D	t			€					
5			%	5	E	U	E	u			¥					
6			&	6	F	V	F	v								
7			'	7	G	W	G	w								
8			(	8	H	X	H	x								
9			)	9	I	Y	I	y								
A			*	:	J	Z	J	z								
B			+	;	K	[	K	{								
C			,	<	L	\	L	|								
D			-	=	M	]	M	}								
E			.	>	N	^	N	~								
F			/	?	O	_	O									

(8) UTF-8

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																
1																
2		!	"	#	\$	%	&	'	()	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
6	'	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	⌘
C28																
C29																
C2A			¢			¥								-		
C2B																
CB8							^									
CB9													~			
CBA																
CBB																
CC8				~												
CC9																
CCA																
CCB																
E2809																
E281B																
E282A													€			
E2889																

12.5 OCR-A (Bit map font type: S)

(1) PC-850, PC-857

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0		P	Г									-
1				1	A	Q										
2			"	2	B	R										
3				3	C	S										
4			\$	4	D	T										
5				5	E	U										
6				6	F	V										
7				7	G	W										
8				8	H	X										
9				9	I	Y										
A					J	Z										
B			+		K											
C				<	L											
D			-		M											
E			.	>	N							¥				
F			/		O											

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”

(2) PC-8

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0		P	Г									
1				1	A	Q										
2			"	2	B	R										
3				3	C	S										
4			\$	4	D	T										
5				5	E	U										
6				6	F	V										
7				7	G	W										
8				8	H	X										
9				9	I	Y										
A					J	Z										
B			+		K											
C				<	L											
D			-		M					¥						
E			.	>	N											
F			/		O											

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”

(3) PC-852

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0		P	ł									-
1				1	A	Q										
2			"	2	B	R										
3				3	C	S										
4			\$	4	D	T										
5				5	E	U										
6				6	F	V										
7				7	G	W										
8				8	H	X										
9				9	I	Y										
A					J	Z										
B			+		K											
C				<	L											
D			-		M											
E			.	>	N											
F			/		O											

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”

(4) PC-851, PC-855, PC-1250, PC-1251, PC-1257, Arabic

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0		P	ł									
1				1	A	Q										
2			"	2	B	R										
3				3	C	S										
4			\$	4	D	T										
5				5	E	U										
6				6	F	V										
7				7	G	W										
8				8	H	X										
9				9	I	Y										
A					J	Z										
B			+		K											
C				<	L											
D			-		M											
E			.	>	N											
F			/		O											

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”

(5) PC-1252, PC-1254

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0		P	П									-
1				1	A	Q										
2			"	2	B	R										
3				3	C	S										
4			\$	4	D	T										
5				5	E	U					¥					
6				6	F	V										
7				7	G	W										
8				8	H	X			^	~						
9				9	I	Y										
A					J	Z										
B			+		K											
C				<	L											
D			-		M											
E			.	>	N											
F			/		O											

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”

(6) PC-1253

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0		P	П									-
1				1	A	Q										
2			"	2	B	R										
3				3	C	S										
4			\$	4	D	T										
5				5	E	U					¥					
6				6	F	V										
7				7	G	W										
8				8	H	X										
9				9	I	Y										
A					J	Z										
B			+		K											
C				<	L											
D			-		M											
E			.	>	N											
F			/		O											

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”

(7) LATIN9

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0		P	▯									
1				1	A	Q										
2			"	2	B	R										
3				3	C	S										
4			\$	4	D	T										
5				5	E	U					¥					
6				6	F	V										
7				7	G	W										
8				8	H	X										
9				9	I	Y										
A					J	Z										
B			+		K											
C				<	L											
D			-		M											
E			.	>	N											
F			/		O											

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”

(8) UTF-8

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
											A	B	C	D	E	F
0																
1																
2			“		\$							+		-	.	/
3	0	1	2	3	4	5	6	7	8	9			<		>	
4		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z					
6	▯															
7																
C28																
C29																
C2A						¥								-		
C2B																

12.6 OCR-B (Bit map font type: T)

(1) PC-850, PC-857

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0		P			0							-
1				1	A	Q			1							
2			"	2	B	R			2							
3				3	C	S			3							
4			\$	4	D	T			4							
5				5	E	U			5							
6				6	F	V			6							
7				7	G	W			7							
8				8	H	X			8							
9				9	I	Y			9							
A					J	Z										
B			+		K											
C				<	L											
D			-		M											
E			.	>	N							¥				
F			/		O											

The size of the numerals of codes 80h ~ 89h are reduced to 80%.

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”

(2) PC-8

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0		P			0							
1				1	A	Q			1							
2			"	2	B	R			2							
3				3	C	S			3							
4			\$	4	D	T			4							
5				5	E	U			5							
6				6	F	V			6							
7				7	G	W			7							
8				8	H	X			8							
9				9	I	Y			9							
A					J	Z										
B			+		K											
C				<	L											
D			-		M					¥						
E			.	>	N											
F			/		O											

The size of the numerals of codes 80h ~ 89h are reduced to 80%.

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”

(3) PC-852

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0		P			0							-
1				1	A	Q			1							
2			"	2	B	R			2							
3				3	C	S			3							
4			\$	4	D	T			4							
5				5	E	U			5							
6				6	F	V			6							
7				7	G	W			7							
8				8	H	X			8							
9				9	I	Y			9							
A					J	Z										
B			+		K											
C				<	L											
D			-		M											
E			.	>	N											
F			/		O											

The size of the numerals of codes 80h ~ 89h are reduced to 80%.

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”

(4) PC-851, PC-855, PC-1250, PC-1251, PC-1257, Arabic

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0		P			0							
1				1	A	Q			1							
2			"	2	B	R			2							
3				3	C	S			3							
4			\$	4	D	T			4							
5				5	E	U			5							
6				6	F	V			6							
7				7	G	W			7							
8				8	H	X			8							
9				9	I	Y			9							
A					J	Z										
B			+		K											
C				<	L											
D			-		M											
E			.	>	N											
F			/		O											

The size of the numerals of codes 80h ~ 89h are reduced to 80%.

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”

(5) PC-1252, PC-1254, LATIN9

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0		P			0							
1				1	A	Q			1							
2			"	2	B	R			2							
3				3	C	S			3							
4			\$	4	D	T			4							
5				5	E	U			5		¥					
6				6	F	V			6							
7				7	G	W			7							
8				8	H	X			8	~						
9				9	I	Y			9							
A					J	Z										
B			+		K											
C				<	L											
D			-		M											
E			.	>	N											
F			/		O											

The size of the numerals of codes 80h ~ 89h are reduced to 80%.

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”

(6) PC-1253

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0		P			0							
1				1	A	Q			1							
2			"	2	B	R			2							
3				3	C	S			3							
4			\$	4	D	T			4							
5				5	E	U			5		¥					
6				6	F	V			6							
7				7	G	W			7							
8				8	H	X			8							
9				9	I	Y			9							
A					J	Z										
B			+		K											
C				<	L											
D			-		M											
E			.	>	N											
F			/		O											

The size of the numerals of codes 80h ~ 89h are reduced to 80%.

When any Japanese message is selected in the SYSTEM mode, code 5CH indicates “¥.”

(7) UTF-8

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																
1																
2			“		\$							+		-	.	/
3	0	1	2	3	4	5	6	7	8	9			<		>	
4		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z					
6																
7																
C28																
C29																
C2A						¥								-		
C2B																

12.7 STANDARD CHARACTER (in Japan)/KANJI (16 x 16) (in Japan)/ KANJI (24 x 24)(in Japan) (Bit map font type: A, U, V)

- (1) Other than UTF-8 (PC-850, PC-852, PC-857, PC-8, PC-851, PC-855, PC-1250, PC-1251, PC-1252, PC-1253, PC-1254, PC-1257, LATIN9, Arabic, PC-866)

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0	@	P	`	p								
1	!	1	A	Q	a	q								
2	"	2	B	R	b	r								
3	#	3	C	S	c	s								
4	\$	4	D	T	d	t								
5	%	5	E	U	e	u								
6	&	6	F	V	f	v								
7	'	7	G	W	g	w								
8	(	8	H	X	h	x								
9	)	9	I	Y	i	y								
A	*	:	J	Z	j	z								
B	+	;	K	[	k	{								
C	,	<	L	¥	l	|								
D	-	=	M	]	m	}								
E	.	>	N	^	n	~								
F	/	?	O	_	o									

* The shaded parts are Japanese.
They are omitted here.

(2) UTF-8

UTF-8	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																
1																
2		!	"	#	\$	%	&	'	()	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
6	'	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
C28																
C29																
C2A						¥								-		
C2B																
C38																
C39		Ñ														
C3A																
C3B		ñ														
C48																
C49	Ð															
C4A																
C4B		1														
CB8							^									
CB9													~			
CBA																
CBB																
CC8				~												
CC9																
CCA																
CCB																
E2809																
E281B																
E282A													€			
E2889																
EFBDA																
EFBDB																
EFBE8																
EFBE9																

* The shaded parts are Japanese. They are omitted here.

12.8 STANDARD CHARACTER (outside Japan) (Bit map font type: a)

- (1) Other than UTF-8 (PC-850, PC-852, PC-857, PC-8, PC-851, PC-855, PC-1250, PC-1251, PC-1252, PC-1253, PC-1254, PC-1257, LATIN9, Arabic, PC-866)

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0	@	P	`	p				€				
1	!	1	A	Q	a	q								
2	"	2	B	R	b	r								
3	#	3	C	S	c	s								
4	\$	4	D	T	d	t								
5	%	5	E	U	e	u								
6	&	6	F	V	f	v								
7	'	7	G	W	g	w								
8	(	8	H	X	h	x								
9	)	9	I	Y	i	y								
A	*	:	J	Z	j	z								
B	+	;	K	[	k	{								
C	,	<	L	\	l	|								
D	-	=	M	]	m	}								
E	.	>	N	^	n	~								
F	/	?	O	_	o	¥								

* The shaded parts are Japanese.
They are omitted here.

The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(2) UTF-8

UTF-8	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																
1																
2		!	“	#	\$	%	&	'	()	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
6	'	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
C28																
C29																
C2A						¥								-		
C2B																
C38																
C39		Ñ														
C3A																
C3B		ñ														
C48																
C49	Đ															
C4A																
C4B		ł														
CB8							^									
CB9													~			
CBA																
CBB																
CC8				~												
CC9																
CCA																
CCB																
E2809																
E281B																
E282A													€			
E2889																
EFBDA																
EFBDB																
EFBE8																
EFBE9																

* The shaded parts are Japanese. They are omitted here.

12.9 CHINESE CHARACTER (24 x 24) (outside Japan) (Bit map font type: r)

- (1) Other than UTF-8 (PC-850, PC-852, PC-857, PC-8, PC-851, PC-855, PC-1250, PC-1251, PC-1252, PC-1253, PC-1254, PC-1257, LATIN9, Arabic, PC-866)

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0	@	P	`	p								
1	!	1	A	Q	a	q								
2	"	2	B	R	b	r								
3	#	3	C	S	c	s								
4	\$	4	D	T	d	t								
5	%	5	E	U	e	u								
6	&	6	F	V	f	v								
7	'	7	G	W	g	w								
8	(	8	H	X	h	x								
9	)	9	I	Y	i	y								
A	*	:	J	Z	j	z								
B	+	;	K	[	k	{								
C	,	<	L	\	l	|								
D	-	=	M	]	m	}								
E	.	>	N	^	n	~								
F	/	?	O	_	o	¥								

(2) UTF-8

UTF-8	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																
1																
2		!	“	#	\$	%	&	'	()	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
6	‘	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
C28																
C29																
C2A						¥								-		
C2B																
C38																
C39		Ñ														
C3A																
C3B		ñ														
C48																
C49	Đ															
C4A																
C4B		ł														
CB8							^									
CB9													~			
CBA																
CBB																
CC8				~												
CC9																
CCA																
CCB																
E2809																
E281B																
E282A													€			
E2889																
EFBDA																
EFBDB																
EFBE8																
EFBE9																

* The shaded parts are Japanese. They are omitted here.

12.10 KOREAN CHARACTER (24 x 24) (outside Japan) (Bit map font type: s)

- (1) Other than UTF-8 (PC-850, PC-852, PC-857, PC-8, PC-851, PC-855, PC-1250, PC-1251, PC-1252, PC-1253, PC-1254, PC-1257, LATIN9, Arabic, PC-866)

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0	@	P	`	p								
1	!	1	A	Q	a	q								
2	"	2	B	R	b	r								
3	#	3	C	S	c	s								
4	\$	4	D	T	d	t								
5	%	5	E	U	e	u								
6	&	6	F	V	f	v								
7	'	7	G	W	g	w								
8	(	8	H	X	h	x								
9	)	9	I	Y	i	y								
A	*	:	J	Z	j	z								
B	+	;	K	[	k	{								
C	,	<	L	\	l	|								
D	-	=	M	]	m	}								
E	.	>	N	^	n	~								
F	/	?	O	_	o	¥								

(2) UTF-8

UTF-8	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																
1																
2		!	“	#	\$	%	&	'	()	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
6	‘	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
C28																
C29																
C2A						¥								-		
C2B																
C38																
C39		Ñ														
C3A																
C3B		ñ														
C48																
C49	Đ															
C4A																
C4B		ł														
CB8							^									
CB9													~			
CBA																
CBB																
CC8				~												
CC9																
CCA																
CCB																
E2809																
E281B																
E282A													€			
E2889																
EFBDA																
EFBDB																
EFBE8																
EFBE9																

* The shaded parts are Japanese. They are omitted here.

12.11 BOLD CHARACTER (Bit map font type: b)

- (1) Other than UTF-8 (PC-850, PC-852, PC-857, PC-8, PC-851, PC-855, PC-1250, PC-1251, PC-1252, PC-1253, PC-1254, PC-1257, LATIN9, Arabic, PC-866)

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0												-
1		1												
2		2												
3		3												
4		4												
5		5												
6		6												
7		7												
8		8												
9		9												
A														
B														
C														
D	-													
E														
F														

- (2) UTF-8

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
											A	B	C	D	E	F
0																
1																
2														-		
3	0	1	2	3	4	5	6	7	8	9						
4																
5																
6																
7																
C28																
C29																
C2A														-		
C2B																

12.12 PRICE CHARACTER 1/PRICE CHARACTER 2 (Bit map font type: d, e)

- (1) Other than UTF-8 (PC-850, PC-852, PC-857, PC-8, PC-851, PC-855, PC-1250, PC-1251, PC-1252, PC-1253, PC-1254, PC-1257, LATIN9, Arabic, PC-866)

	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		0												-
1		1												
2		2												
3		3												
4	\$	4												
5		5												
6		6												
7		7												
8		8												
9		9												
A														
B														
C	,			¥										
D	-													
E	.									¥				
F						円								

* Code 5CH for “¥” indicates “ ” in the international setting.

- (2) UTF-8

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
											A	B	C	D	E	F
0																
1																
2					\$,	-	.	
3	0	1	2	3	4	5	6	7	8	9						
4																
5																
6																
7																
C28																
C29																
C2A					¥									-		
C2B																
E5868						円										

12.13 TEC OUTLINE FONT 1 (Outline font type: A, B, K)

(1) When any Japanese message is selected in the SYSTEM mode:

(1.1) PC-850, PC-8, PC-852, PC-857

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p								
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			\$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	¥	l	|								
D			-	=	M	]	m	}								
E			.	>	N	^	n	~								
F			/	?	O	_	o	Δ								

* The shaded parts are Japanese.
They are omitted here.

(2) When any message other than Japanese is selected in the SYSTEM mode:

(2.1) PC-850

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	€				-
1			!	1	A	Q	a	q	ü	æ	í	€			ß	±
2			"	2	B	R	b	r	é	Æ	ó					
3			#	3	C	S	c	s	â	ô	ú					
4			\$	4	D	T	d	t	ä	ö	ñ				õ	
5			%	5	E	U	e	u	à	ò	Ñ					§
6			&	6	F	V	f	v	ã	û	ª		ã		µ	÷
7			'	7	G	W	g	w	ç	ù	º					
8			(	8	H	X	h	x	ê	ÿ	¿					°
9			)	9	I	Y	i	y	ë	Ö						
A			*	:	J	Z	j	z	è	Ü	¬					•
B			+	;	K	[	k	{	ï	ø	½					
C			,	<	L	\	l	|	î	£	¼					
D			-	=	M	]	m	}	ì	Ø	¡	¢				²
E			.	>	N	^	n	~	Å		«	¥				■
F			/	?	O	_	o	Δ	Ä	f	»		α			

The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(2.2) PC-8

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	€			α	≡
1			!	1	A	Q	a	q	ü	æ	í	€			β	±
2			"	2	B	R	b	r	é	Æ	ó				Γ	≥
3			#	3	C	S	c	s	â	ô	ú				π	≤
4			\$	4	D	T	d	t	ä	ö	ñ				Σ	|
5			%	5	E	U	e	u	à	ò	Ñ				σ]
6			&	6	F	V	f	v	å	û	ª				μ	÷
7			'	7	G	W	g	w	ç	ù	º				τ	≈
8			(	8	H	X	h	x	ê	ÿ	¿				Φ	°
9			)	9	I	Y	i	y	ë	Ö					Θ	•
A			*	:	J	Z	j	z	è	Ü	¬				Ω	•
B			+	;	K	[	k	{	ï	¢	½				δ	√
C			,	<	L	\	l	|	î	£	¼				∞	•
D			—	=	M	]	m	}	ì	¥	¡				∅	₂
E			.	>	N	^	n	~	Ä	Pt	«				ε	■
F			/	?	O	_	o	Δ	Å	f	»				∩	

The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(2.3) PC-852

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	€				-
1			!	1	A	Q	a	q	ü		í	€			ß	
2			"	2	B	R	b	r	é		ó					
3			#	3	C	S	c	s	â	ô	ú					
4			\$	4	D	T	d	t	ä	ö						
5			%	5	E	U	e	u								§
6			&	6	F	V	f	v								÷
7			'	7	G	W	g	w	ç							
8			(	8	H	X	h	x								°
9			)	9	I	Y	i	y	ë	Ö						
A			*	:	J	Z	j	z		Ü	¬					•
B			+	;	K	[	k	{								
C			,	<	L	\	l	|	î							
D			—	=	M	]	m	}								
E			.	>	N	^	n	~	Ä		«					■
F			/	?	O	_	o	Δ			»		α			

The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(2.4) PC-857

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç	É	á	€		º		-
1			!	1	A	Q	a	q	ü	æ	í	€		ª	ß	±
2			"	2	B	R	b	r	é	Æ	ó					
3			#	3	C	S	c	s	â	ô	ú					
4			\$	4	D	T	d	t	ä	ö	ñ				õ	
5			%	5	E	U	e	u	à	ò	Ñ					§
6			&	6	F	V	f	v	å	û			ã		µ	÷
7			'	7	G	W	g	w	ç	ù						
8			(	8	H	X	h	x	ê		¿					°
9			)	9	I	Y	i	y	ë	Ö						
A			*	:	J	Z	j	z	è	Ü	¬					•
B			+	;	K	[	k	{	ï	ø	½					
C			,	<	L	\	l	|	î	£	¼				ì	
D			-	=	M	]	m	}		Ø	í	¢			ÿ	²
E			.	>	N	^	n	~	Ä		«	¥				■
F			/	?	O	_	o		Å		»		α			

The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(2.5) PC-851

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p	Ç			€				
1			!	1	A	Q	a	q	ü			€				±
2			"	2	B	R	b	r	é							
3			#	3	C	S	c	s	â	ô						
4			\$	4	D	T	d	t	ä	ö						
5			%	5	E	U	e	u	à							§
6			&	6	F	V	f	v		û						
7			'	7	G	W	g	w	ç	ù						
8			(	8	H	X	h	x	ê							°
9			)	9	I	Y	i	y	ë	Ö						
A			*	:	J	Z	j	z	è	Ü						
B			+	;	K	[	k	{	ï		½					
C			,	<	L	\	l	|	î	£						
D			-	=	M	]	m	}								
E			.	>	N	^	n	~	Ä		«					■
F			/	?	O	_	o	Δ			»					

The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(2.6) PC-855

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q				€				
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			\$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|								
D			—	=	M	]	m	}								§
E			.	>	N	^	n	~			«					■
F			/	?	O	_	o	Δ			»		α			

The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(2.7) PC-1250

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q				€			á	
2			"	2	B	R	b	r							â	
3			#	3	C	S	c	s								ó
4			\$	4	D	T	d	t			α		Ä		ä	ô
5			%	5	E	U	e	u				μ				
6			&	6	F	V	f	v						Ö		ö
7			'	7	G	W	g	w			§	·	Ç		ç	÷
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y					É		é	
A			*	:	J	Z	j	z								ú
B			+	;	K	[	k	{			«	»			ë	
C			,	<	L	\	l	|			¬			Ü		ü
D			—	=	M	]	m	}							í	
E			.	>	N	^	n	~							î	
F			/	?	O	_	o	Δ						ß		

The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(2.8) PC-1251

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q				€				
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			\$	4	D	T	d	t			¤					
5			%	5	E	U	e	u				μ				
6			&	6	F	V	f	v								
7			'	7	G	W	g	w			§	·				
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{			«	»				
C			,	<	L	\	l	|			¬					
D			–	=	M	]	m	}								
E			.	>	N	^	n	~								
F			/	?	O	_	o	Δ								

The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(2.9) PC-1252

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€			à	
1			!	1	A	Q	a	q			ı	€		Ñ	á	ñ
2			"	2	B	R	b	r			¢	²			â	ò
3			#	3	C	S	c	s	<i>f</i>		£				ã	ó
4			\$	4	D	T	d	t			¤		Ä		ä	ô
5			%	5	E	U	e	u			¥	μ	Å		å	õ
6			&	6	F	V	f	v					Æ	Ö	æ	ö
7			'	7	G	W	g	w			§	·	Ç		ç	÷
8			(	8	H	X	h	x	^	~				Ø	è	ø
9			)	9	I	Y	i	y							é	ù
A			*	:	J	Z	j	z			à				ê	ú
B			+	;	K	[	k	{			«	»			ë	û
C			,	<	L	\	l	|			¬	¼		Ü	ì	ü
D			–	=	M	]	m	}				½			í	
E			.	>	N	^	n	~							î	
F			/	?	O	_	o	Δ				¿		ß	ï	ÿ

The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(2.10) PC-1253

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q				€				
2			"	2	B	R	b	r				²				
3			#	3	C	S	c	s	<i>f</i>		£					
4			\$	4	D	T	d	t			¤					
5			%	5	E	U	e	u			¥	μ				
6			&	6	F	V	f	v								
7			'	7	G	W	g	w			§	.				
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z			ª					
B			+	;	K	[	k	{			«	»				
C			,	<	L	\	l	|			¬					
D			–	=	M	]	m	}				½				
E			.	>	N	^	n	~								
F			/	?	O	_	o	Δ								

The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(2.11) PC-1254

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€			à	
1			!	1	A	Q	a	q			ı	€		Ñ	á	ñ
2			"	2	B	R	b	r			ç	²			â	ò
3			#	3	C	S	c	s	<i>f</i>		£				ã	ó
4			\$	4	D	T	d	t			¤		Ä		ä	ô
5			%	5	E	U	e	u			¥	μ	Å		å	õ
6			&	6	F	V	f	v					Æ	Ö	æ	ö
7			'	7	G	W	g	w			§	.	Ç		ç	÷
8			(	8	H	X	h	x	^	~				Ø	è	ø
9			)	9	I	Y	i	y					É		é	ù
A			*	:	J	Z	j	z			ª	º			ê	ú
B			+	;	K	[	k	{			«	»			ë	û
C			,	<	L	\	l	|			¬	¼		Ü	ì	ü
D			–	=	M	]	m	}				½			í	
E			.	>	N	^	n	~							î	
F			/	?	O	_	o					¿		ß	ï	ÿ

The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(2.12) PC-1257

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q				€				
2			"	2	B	R	b	r			¢	²				
3			#	3	C	S	c	s			£					ó
4			\$	4	D	T	d	t			¤		Ä		ä	
5			%	5	E	U	e	u				μ	Å		å	õ
6			&	6	F	V	f	v						Ö		ö
7			'	7	G	W	g	w			§	·				÷
8			(	8	H	X	h	x			Ø	ø				
9			)	9	I	Y	i	y					É		é	
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{			«	»				
C			,	<	L	\	l	|			¬	¼		Ü		ü
D			—	=	M	]	m	}				½				
E			.	>	N	^	n	~								
F			/	?	O	_	o	Δ			Æ	æ		ß		

The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(2.13) LATIN9

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€			à	
1			!	1	A	Q	a	q			ı	€		Ñ	á	ñ
2			"	2	B	R	b	r			¢	²			â	ò
3			#	3	C	S	c	s			£				ã	ó
4			\$	4	D	T	d	t			¤		Ä		ä	ô
5			%	5	E	U	e	u			¥	μ	Å		å	õ
6			&	6	F	V	f	v					Æ	Ö	æ	ö
7			'	7	G	W	g	w			§	·	Ç		ç	÷
8			(	8	H	X	h	x						Ø	è	ø
9			)	9	I	Y	i	y					É		é	ù
A			*	:	J	Z	j	z			ª	º			ê	ú
B			+	;	K	[	k	{			«	»			ë	û
C			,	<	L	\	l	|			¬			Ü	ì	ü
D			—	=	M	]	m	}							í	
E			.	>	N	^	n	~							î	
F			/	?	O	_	o					¿		ß	ï	ÿ

The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(2.14) Arabic

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	@	P	`	p				€				
1			!	1	A	Q	a	q				€				
2			"	2	B	R	b	r								
3			#	3	C	S	c	s								
4			\$	4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K	[	k	{								
C			,	<	L	\	l	|								
D			—	=	M	]	m	}								
E			.	>	N	^	n	~								
F			/	?	O	_	o	Δ								

The Euro code (B0H) can be changed in the parameter setting in the SYSTEM mode.

(3) UTF-8

	0	1	2	3	4	5	6	7	8	9	10 A	11 B	12 C	13 D	14 E	15 F
0																
1																
2		!	“	#	\$	%	&	'	()	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
6	‘	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	Δ
C280																
C290																
C2A0		ı	ç	£	¤	¥		§			ª	«	¬	-		
C2B0	°	±	²			µ		•			º	»	¼	½		¿
C380					Ä	Å	Æ	Ç		É						
C390		Ñ					Ö		Ø				Ü			ß
C3A0	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
C3B0		ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü			ÿ
C680																
C690			f													
C6A0										Σ						
C6B0																
C980																
C990																
C9A0																
C9B0								φ								
CB80							ˆ									
CB90										˙	•		˜			
CBA0																
CBB0																
CC80				˘				˙			•					
CC90																
CCA0																
CCB0																

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
											A	B	C	D	E	F
CE80																
CE90				Γ					Θ							
CEA0				Σ			Φ			Ω						
CEB0		α	β		δ	ε							μ			
CF80	π			σ	τ		φ									
CF90																
CFA0																
CFB0																
E2809																
E281B																n
E282A								Pt					€			
E2889									▪	√					∞	
E288A									∩							
E2898									≈							
E289A		≡			≤	≥										
E28C9	┐															
E28CA	┌	J														
E296A	▪															
E5868																
EFBDA																
EFBDB																
EFBE8																
EFBE9																

* The shaded parts are Japanese. They are omitted here.

12.14 PRICE FONT 1, 2, 3 (Outline font type: E, F, G)

- (1) Other than UTF-8 (PC-850, PC-852, PC-857, PC-8, PC-851, PC-855, PC-1250, PC-1251, PC-1252, PC-1253, PC-1254, PC-1257, LATIN9, Arabic, PC-866)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	円											-
1				1												
2				2												
3				3												
4			\$	4												
5			%	5												
6				6												
7				7												
8				8												
9				9												
A																
B																
C			,		¥											
D			-													
E			.					~								
F			/													

- (2) UTF-8

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																
1																
2					\$	%							,	-	.	/
3	0	1	2	3	4	5	6	7	8	9						
4	円															
5													¥			
6																
7														~		
E5868							円									

16. BARCODE/TWO-DIMENSIONAL CODE TABLE

16.1 GENERAL DESCRIPTION

This chapter provides the barcode/two-dimensional code tables. Note that some barcodes/two-dimensional codes are not supported depending on the print mode.

16.2 JAN8/EAN8, JAN13/EAN13, UPC-E, UPC-A, UCC/EAN128, EAN128, Interleaved 2 of 5 (ITF), MSI, Industrial 2 of 5, RSS-14, RSS-14 Stacked, RSS-14 Stacked Omni-directional, RSS Limited, EAN13 + 2 digits, EAN13 + 5 digits, UPC-E + 2 digits, UPC-E + 5 digits, EAN8 + 2 digits, EAN8 + 5 digits, UPC-A + 2 digits, UPC-A + 5 digits

WPC (JAN, EAN, UPC)

ITF/MSI/UCC, EAN128

	2	3	4	5	6	7
0		0				
1		1				
2		2				
3		3				
4		4				
5		5				
6		6				
7		7				
8		8				
9		9				
A						
B						
C						
D						
E						
F						

16.3 CUSTOMER BARCODE

	2	3	4	5	6	7
0		0		P		
1		1	A	Q		
2		2	B	R		
3		3	C	S		
4		4	D	T		
5		5	E	U		
6		6	F	V		
7		7	G	W		
8		8	H	X		
9		9	I	Y		
A			J	Z		
B			K			
C			L			
D	—		M			
E			N			
F			O			

16.4 POSTNET

	2	3	4	5	6	7
0		0				
1		1				
2		2				
3		3				
4		4				
5		5				
6		6				
7		7				
8		8				
9		9				
A						
B						
C						
D						
E						
F						

16.5 RM4SCC

	2	3	4	5	6	7
0		0		P		
1		1	A	Q		
2		2	B	R		
3		3	C	S		
4		4	D	T		
5		5	E	U		
6		6	F	V		
7		7	G	W		
8	(	8	H	X		
9	)	9	I	Y		
A			J	Z		
B			K			
C			L			
D			M			
E			N			
F			O			

16.6 KIX CODE

	2	3	4	5	6	7
0		0		P		p
1		1	A	Q	a	q
2		2	B	R	b	r
3		3	C	S	c	s
4		4	D	T	d	t
5		5	E	U	e	u
6		6	F	V	f	v
7		7	G	W	g	w
8		8	H	X	h	x
9		9	I	Y	i	y
A			J	Z	j	z
B			K		k	
C			L		l	
D			M		m	
E			N		n	
F			O		o	

NOTE: “(,)” in the above table is used only as the start/stop codes. It should not be included in the middle of data. In this case, a barcode is not drawn.

16.7 CODE39 (Standard)

	2	3	4	5	6	7
0	SP	0		P		
1		1	A	Q		
2		2	B	R		
3		3	C	S		
4	\$	4	D	T		
5	%	5	E	U		
6		6	F	V		
7		7	G	W		
8		8	H	X		
9		9	I	Y		
A	*		J	Z		
B	+		K			
C			L			
D	—		M			
E	.		N			
F	/		O			

16.8 CODE39 (Full ASCII)

[Transfer code]

	2	3	4	5	6	7
0	SP	0	@	P	`	p
1	!	1	A	Q	a	q
2	"	2	B	R	b	r
3	#	3	C	S	c	s
4	\$	4	D	T	d	t
5	%	5	E	U	e	u
6	&	6	F	V	f	v
7	'	7	G	W	g	w
8	(	8	H	X	h	x
9	)	9	I	Y	i	y
A	*	:	J	Z	j	z
B	+	;	K	[	k	{
C	,	<	L	¥	l	|
D	—	=	M	]	m	}
E	.	>	N	^	n	~
F	/	?	O	_	o	Δ



[Drawing code]

	2	3	4	5	6	7
0	SP	0	%V	P	%W	+P
1	/A	1	A	Q	+A	+Q
2	/B	2	B	R	+B	+R
3	/C	3	C	S	+C	+S
4	/D	4	D	T	+D	+T
5	/E	5	E	U	+E	+U
6	/F	6	F	V	+F	+V
7	/G	7	G	W	+G	+W
8	/H	8	H	X	+H	+X
9	/I	9	I	Y	+I	+Y
A	/J	/Z	J	Z	+J	+Z
B	/K	%F	K	%K	+K	%P
C	/L	%G	L	%L	+L	%Q
D	—	%H	M	%M	+M	%R
E	.	%I	N	%N	+N	%S
F	/O	%J	O	%O	+O	%T

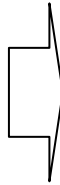
16.9 NW-7

	2	3	4	5	6	7
0	SP	0			`	
1		1	A		a	
2		2	B		b	
3		3	C		c	
4	\$	4	D		d	t
5		5			e	
6		6				
7		7				
8		8				
9		9				
A	*	:				
B	+					
C						
D	—					
E	.				n	
F	/					

16.10 CODE93

[Transfer code]

	2	3	4	5	6	7
0	SP	0	@	P	`	p
1	!	1	A	Q	a	q
2	"	2	B	R	b	r
3	#	3	C	S	c	s
4	\$	4	D	T	d	t
5	%	5	E	U	e	u
6	&	6	F	V	f	v
7	'	7	G	W	g	w
8	(	8	H	X	h	x
9	)	9	I	Y	i	y
A	*	:	J	Z	j	z
B	+	;	K	[	k	{
C	,	<	L	¥	l	|
D	—	=	M	]	m	}
E	.	>	N	^	n	~
F	/	?	O	_	o	Δ



[Drawing code]

	2	3	4	5	6	7
0	SP	0	%V	P	%W	+P
1	/A	1	A	Q	+A	+Q
2	/B	2	B	R	+B	+R
3	/C	3	C	S	+C	+S
4	/D	4	D	T	+D	+T
5	/E	5	E	U	+E	+U
6	/F	6	F	V	+F	+V
7	/G	7	G	W	+G	+W
8	/H	8	H	X	+H	+X
9	/I	9	I	Y	+I	+Y
A	/J	/Z	J	Z	+J	+Z
B	+	%F	K	%K	+K	%P
C	/L	%G	L	%L	+L	%Q
D	—	%H	M	%M	+M	%R
E	.	%I	N	%N	+N	%S
F	/	%J	O	%O	+O	%T

16.11 CODE128

16.11.1 TRANSFER CODE

	—	—	2	3	4	5	6	7
0	NUL	DLE	SP	0	@	P	`	p
1	SOH	DC1	!	1	A	Q	a	q
2	STX	DC2	"	2	B	R	b	r
3	ETX	DC3	#	3	C	S	c	s
4	EOT	DC4	\$	4	D	T	d	t
5	ENQ	NAK	%	5	E	U	e	u
6	ACK	SYN	&	6	F	V	f	v
7	BEL	ETB	'	7	G	W	g	w
8	BS	CAN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	i	y
A	LF	SUB	*	:	J	Z	j	z
B	VT	ESC	+	;	K	[	k	{
C	FF	FS	,	<	L	\	l	|
D	CR	GS	—	=	M	]	m	}
E	SO	RS	.	>	N	^	n	~
F	SI	US	/	?	O	_	o	Δ



[Drawing code]

Value Code Table

16.11.2 HOW TO TRANSMIT THE CONTROL CODE DATA

NUL (00H)	→	> @ (3EH, 40H)
SOH (01H)	→	> A (3EH, 41H)
STX (02H)	→	> B (3EH, 42H)
⇕		
GS (1DH)	→	>] (3EH, 5DH)
RS (1EH)	→	> ^ (3EH, 5EH)
US (1FH)	→	> _ (3EH, 5FH)

16.11.3 HOW TO TRANSMIT THE SPECIAL CODES

Value		
30 (Character >)	→	> 0
95	→	> 1
96	→	> 2
97	→	> 3
98	→	> 4
99	→	> 5
100	→	> 6
101	→	> 7
102	→	> 8

16.11.4 DESIGNATION OF START CODE

START (CODE A)	→	> 7
START (CODE B)	→	> 6
START (CODE C)	→	> 5

16.11.5 VALUE CODE TABLE

VALUE	CODE A	CODE B	CODE C
0	SP	SP	00
1	!	!	01
2	"	"	02
3	#	#	03
4	\$	\$	04
5	%	%	05
6	&	&	06
7	'	'	07
8	(	(	08
9	)	)	09
10	*	*	10
11	+	+	11
12	,	,	12
13	—	—	13
14	.	.	14
15	/	/	15
16	0	0	16
17	1	1	17
18	2	2	18
19	3	3	19
20	4	4	20
21	5	5	21
22	6	6	22
23	7	7	23
24	8	8	24
25	9	9	25
26	:	:	26
27	;	;	27
28	<	<	28
29	=	=	29
30	>	>	30
31	?	?	31
32	@	@	32
33	A	A	33
34	B	B	34
35	C	C	35

VALUE	CODE A	CODE B	CODE C
36	D	D	36
37	E	E	37
38	F	F	38
39	G	G	39
40	H	H	40
41	I	I	41
42	J	J	42
43	K	K	43
44	L	L	44
45	M	M	45
46	N	N	46
47	O	O	47
48	P	P	48
49	Q	Q	49
50	R	R	50
51	S	S	51
52	T	T	52
53	U	U	53
54	V	V	54
55	W	W	55
56	X	X	56
57	Y	Y	57
58	Z	Z	58
59	[	[	59
60	\	\	60
61	]	]	61
62	^	^	62
63	_	_	63
64	NUL	`	64
65	SOH	a	65
66	STX	b	66
67	ETX	c	67
68	EOT	d	68
69	ENQ	e	69
70	ACK	f	70
71	BEL	g	71

VALUE	CODE A	CODE B	CODE C
72	BS	h	72
73	HT	i	73
74	LF	j	74
75	VT	k	75
76	FF	l	76
77	CR	m	77
78	SO	n	78
79	SI	o	79
80	DLE	p	80
81	DC1	q	81
82	DC2	r	82
83	DC3	s	83
84	DC4	t	84
85	NAK	u	85
86	SYN	v	86
87	ETB	w	87
88	CAN	x	88
89	EM	y	89
90	SUB	z	90
91	ESC	{	91
92	FS	|	92
93	GS	}	93
94	RS	~	94
95	US	DEL	95
96	FNC3	FNC3	96
97	FNC2	FNC2	97
98	SHIFT	SHIFT	98
99	CODE C	CODE C	99
100	CODE B	FNC4	CODE B
101	FNC4	CODE A	CODE A
102	FNC1	FNC1	FNC1

103	START CODE A
104	START CODE B
105	START CODE C

16.11.6 RSS EXPANDED, RSS EXPANDED STACKED

[Transfer code]

			2	3	4	5	6	7								
0			SP	0		P		p								
1			!	1	A	Q	a	q								
2			"	2	B	R	b	r								
3			FNC1	3	C	S	c	s								
4				4	D	T	d	t								
5			%	5	E	U	e	u								
6			&	6	F	V	f	v								
7			'	7	G	W	g	w								
8			(	8	H	X	h	x								
9			)	9	I	Y	i	y								
A			*	:	J	Z	j	z								
B			+	;	K		k									
C			,	<	L		l									
D			-	=	M		m									
E			.	>	N		n									
F			/	?	O	_	o									

16.12 DATA MATRIX

16.12.1 FORMAT ID

The code to be used is designated using the format ID.

Format ID	Code	Details
1	Numerics	0 to 9 space
2	Letters	A to Z space
3	Alphanumerics, symbols	0 to 9 A to Z space . , - /
4	Alphanumerics	0 to 9 A to Z space
5	ASCII (7-bit)	00H to 7FH
6	ISO (8-bit)	00H to FFH (Kanji)

16.12.2 TRANSFER CODE

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p								
1	SOH	DC1	!	1	A	Q	a	q								
2	STX	DC2	"	2	B	R	b	r								
3	ETX	DC3	#	3	C	S	c	s								
4	EOT	DC4	\$	4	D	T	d	t								
5	ENQ	NAK	%	5	E	U	e	u								
6	ACK	SYN	&	6	F	V	f	v								
7	BEL	ETB	'	7	G	W	g	w								
8	BS	CAN	(	8	H	X	h	x								
9	HT	EM	)	9	I	Y	i	y								
A	LF	SUB	*	:	J	Z	j	z								
B	VT	ESC	+	;	K	[	k	{								
C	FF	FS	,	<	L	\	l	|								
D	CR	GS	-	=	M	]	m	}								
E	SO	RS	.	>	N	^	n	~								
F	SI	US	/	?	O	_	o	△								

16.12.3 HOW TO TRANSMIT THE CONTROL CODE DATA

NUL (00H)	→	> @ (3EH, 40H)
SOH (01H)	→	> A (3EH, 41H)
STX (02H)	→	> B (3EH, 42H)
⇕		
GS (1DH)	→	>] (3EH, 5DH)
RS (1EH)	→	> ^ (3EH, 5EH)
US (1FH)	→	> _ (3EH, 5FH)

16.12.4 HOW TO TRANSMIT THE SPECIAL CODES

> (3EH)	→	> 0 (3EH, 30H)
---------	---	----------------

16.12.5 HOW TO TRANSMIT THE KANJI CODES

- Shift JIS
- JIS hexadecimal
(For details, refer to the section for the Barcode Data Command.)

16.13 PDF417, MicroPDF417

16.13.1 MODE/CODE

The following modes are automatically selected according to the code used.

[PDF417]

Mode	Code	Details
EXC mode	Alphanumerics, symbols	0 to 9 A to Z a to z space ! " # \$ % & ' ( ) * + , - . / : ; < = > ? @ [ \ \] ^ _ ` { | } ~ Δ CR HT
Binary/ASCII Plus mode	Binary International Character Set	00H to FFH (Kanji)
Numeric Compaction mode	Numerics	0 to 9

[MicroPDF417]

Mode	Details
Upper case letters, space	A to Z space
Binary international character set	00H to FFH (Kanji)
Numerics	0 to 9

16.13.2 TRANSFER CODE

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p								
1	SOH	DC1	!	1	A	Q	a	q								
2	STX	DC2	"	2	B	R	b	r								
3	ETX	DC3	#	3	C	S	c	s								
4	EOT	DC4	\$	4	D	T	d	t								
5	ENQ	NAK	%	5	E	U	e	u								
6	ACK	SYN	&	6	F	V	f	v								
7	BEL	ETB	'	7	G	W	g	w								
8	BS	CAN	(	8	H	X	h	x								
9	HT	EM	)	9	I	Y	i	y								
A	LF	SUB	*	:	J	Z	j	z								
B	VT	ESC	+	;	K	[	k	{								
C	FF	FS	,	<	L	\	l	|								
D	CR	GS	-	=	M	]	m	}								
E	SO	RS	.	>	N	^	n	~								
F	SI	US	/	?	O	_	o	Δ								

16.13.3 HOW TO TRANSMIT THE CONTROL CODE DATA

NUL (00H) → > @ (3EH, 40H)
 SOH (01H) → > A (3EH, 41H)
 STX (02H) → > B (3EH, 42H)
 ⤴
 GS (1DH) → >] (3EH, 5DH)
 RS (1EH) → > ^ (3EH, 5EH)
 US (1FH) → > _ (3EH, 5FH)

16.13.4 HOW TO TRANSMIT THE SPECIAL CODES

> (3EH) → > 0 (3EH, 30H)

16.13.5 HOW TO TRANSMIT THE KANJI CODES

- Shift JIS
- JIS hexadecimal
(For details, refer to the section for the Barcode Data Command.)

16.14 QR CODE

16.14.1 MODE SELECTION

When manual mode is selected in the Format Command

- Numeric mode, alphanumeric and symbol mode, Kanji mode

Mode selection	Data to be printed
----------------	--------------------

- Binary mode

Mode selection	No. of data strings (4 digits)	Data to be printed
----------------	-----------------------------------	--------------------

- Mixed mode

Data	“,” (comma)	Data	“,” (comma)	Data
------	-------------	------	-------------	------

QR code can handle all codes including alphanumerics, symbols and Kanji. Since the data compression rate varies according to the code, a code to be used is designated when the mode is selected.

Mode	Code	Details
N	Numerics	0 to 9
A	Alphanumerics, symbols	A to Z 0 to 9 space \$ % * + - . / :
B	Binary (8-bit)	00H to FFH
K	Kanji	Shift JIS, JIS hexadecimal

If mixed mode is selected, up to 200 modes can be selected in a QR code.

When the automatic mode is selected in the Format Command for a QR code:

Data to be printed

16.14.2 TRANSFER CODE

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p								
1	SOH	DC1	!	1	A	Q	a	q								
2	STX	DC2	"	2	B	R	b	r								
3	ETX	DC3	#	3	C	S	c	s								
4	EOT	DC4	\$	4	D	T	d	t								
5	ENQ	NAK	%	5	E	U	e	u								
6	ACK	SYN	&	6	F	V	f	v								
7	BEL	ETB	'	7	G	W	g	w								
8	BS	CAN	(	8	H	X	h	x								
9	HT	EM	)	9	I	Y	i	y								
A	LF	SUB	*	:	J	Z	j	z								
B	VT	ESC	+	;	K	[	k	{								
C	FF	FS	,	<	L	\	l	|								
D	CR	GS	-	=	M	]	m	}								
E	SO	RS	.	>	N	^	n	~								
F	SI	US	/	?	O	_	o	DEL								

* The shaded parts are Japanese.
They are omitted here.

16.14.3 HOW TO TRANSMIT THE CONTROL CODE DATA

NUL (00H)	=	> @ (3EH, 40H)
SOH (01H)	=	> A (3EH, 41H)
STX (02H)	=	> B (3EH, 42H)
⇕		
GS (1DH)	=	>] (3EH, 5DH)
RS (1EH)	=	> ^ (3EH, 5EH)
US (1FH)	=	> _ (3EH, 5FH)

16.14.4 HOW TO TRANSMIT THE SPECIAL CODES

> (3EH) → > 0 (3EH, 30H)

16.14.5 HOW TO TRANSMIT THE KANJI CODES

- Shift JIS
 - JIS hexadecimal
- (For details, refer to the section for the Barcode Data Command.)

Examples of data designation for QR code

① Alphanumeric mode: ABC123

A A B C 1 2 3
↑
Data to be printed
Designation of mode

② Binary mode: 01H, 03H, 05H

B 0 0 0 6 > A > C > E
↑
No. of data strings
Data to be printed
Designation of mode

③ Mixed mode

Numeric mode: 123456
Kanji mode: Kanji data
Binary mode: aアiイuウeエoオ
Alphanumeric mode: ABC

N 1 2 3 4 5 6, K Kanji data, B 0 0 1 0 a アiイuウeエoオ, A A B C
↑ Data to be printed ↑ Data to be printed ↑ No. of data strings ↑ Data to be printed ↑ Data to be printed
Designation of mode

④ Automatic mode

When the data above (③) is designated in automatic mode:

1 2 3 4 5 6 Kanji data a アiイuウeエoオ A B C
Data to be printed

16.15 MAXICODE

Symbol Character Value		Code Set A		Code Set B		Code Set C		Code Set D		Code Set E	
Decimal	Binary	Character	Decimal	Character	Decimal	Character	Decimal	Character	Decimal	Character	Decimal
0	000000	CR	13	'	96	À	192	à	224	NUL	0
1	000001	A	65	a	97	Á	193	á	225	SOH	1
2	000010	B	66	b	98	Â	194	â	226	STX	2
3	000011	C	67	c	99	Ã	195	ã	227	ETX	3
4	000100	D	68	d	100	Ä	196	ä	228	EOT	4
5	000101	E	69	e	101	Å	197	å	229	ENQ	5
6	000110	F	70	f	102	Æ	198	æ	230	ACK	6
7	000111	G	71	g	103	Ç	199	ç	231	BEL	7
8	001000	H	72	h	104	È	200	è	232	BS	8
9	001001	I	73	i	105	É	201	é	233	HT	9
10	001010	J	74	j	106	Ê	202	ê	234	LF	10
11	001011	K	75	k	107	Ë	203	ë	235	VT	11
12	001100	L	76	l	108	Ì	204	ì	236	FF	12
13	001101	M	77	m	109	Í	205	í	237	CR	13
14	001110	N	78	n	110	Î	206	î	238	SO	14
15	001111	O	79	o	111	Ï	207	ï	239	SI	15
16	010000	P	80	p	112	Ð	208	ð	240	DLE	16
17	010001	Q	81	q	113	Ñ	209	ñ	241	DC1	17
18	010010	R	82	r	114	Ò	210	ò	242	DC2	18
19	010011	S	83	s	115	Ó	211	ó	243	DC3	19
20	010100	T	84	t	116	Ô	212	ô	244	DC4	20
21	010101	U	85	u	117	Õ	213	õ	245	NAK	21
22	010110	V	86	v	118	Ö	214	ö	246	SYN	22
23	010111	W	87	w	119	×	215	÷	247	ETB	23
24	011000	X	88	x	120	Ø	216	ø	248	CAN	24
25	011001	Y	89	y	121	Ù	217	ù	249	EM	25
26	011010	Z	90	z	122	Ú	218	ú	250	SUB	26
27	011011	[EC]		[EC]		[EC]		[EC]		[EC]	
28	011100	FS	28	FS	28	FS	28	FS	28	[Pad]	
29	011101	GS	29	GS	29	GS	29	GS	29	[Pad]	
30	011110	RS	30	RS	30	RS	30	RS	30	ESC	27
31	011111	[NS]		[NS]		[NS]		[NS]		[NS]	
32	100000	Space	32	(	123	Û	219	û	251	FS	28
33	100001	[Pad]		[Pad]		Ü	220	ü	252	GS	29
34	100010	"	34	)	125	Ý	221	ý	253	RS	30
35	100011	#	35	~	126	Þ	222	þ	254	US	31
36	100100	\$	36	DEL	127	ß	223	ÿ	255	{C159}	159
37	100101	%	37	;	59	à	170	ï	161	NBSP	160
38	100110	&	38	<	60	ı	172	"	168	¢	162
39	100111	'	39	=	61	±	177	«	171	£	163
40	101000	(	40	>	62	²	178	¬	175	¤	164
41	101001	)	41	?	63	³	179	°	176	¥	165
42	101010	"	42	[	91		181	'	180		166
43	101011	+	43	\	92	¹	185	·	183	§	167
44	101100	,	44	]	93	º	186		184	©	169
45	101101	-	45	^	94	¼	188	»	187	SHY	173
46	101110	.	46	_	95	½	189	¿	191	®	174
47	101111	/	47	Space	32	¾	190	{C138}	138	¶	182
48	110000	0	48	,	44	{C128}	128	{C139}	139	{C149}	149
49	110001	1	49	.	46	{C129}	129	{C140}	140	{C150}	150
50	110010	2	50	/	47	{C130}	130	{C141}	141	{C151}	151
51	110011	3	51	:	58	{C131}	131	{C142}	142	{C152}	152
52	110100	4	52	@	64	{C132}	132	{C143}	143	{C153}	153
53	110101	5	53	!	33	{C133}	133	{C144}	144	{C154}	154
54	110110	6	54	|	124	{C134}	134	{C145}	145	{C155}	155
55	110111	7	55	[Pad]		{C135}	135	{C146}	146	{C156}	156
56	111000	8	56	[2 Shift A]		{C136}	136	{C147}	147	{C157}	157
57	111001	9	57	[3 Shift A]		{C137}	137	{C148}	148	{C158}	158
58	111010	:	58	[Pad]		[Latch A]		[Latch A]		[Latch A]	
59	111011	[Shift B]		[Shift A]		Space	32	Space	32	Space	32
60	111100	[Shift C]		[Shift C]		[Lock In C]		[Shift C]		[Shift C]	
61	111101	[Shift D]		[Shift D]		[Shift D]		[Lock In D]		[Shift D]	
62	111110	[Shift E]		[Shift E]		[Shift E]		[Shift E]		[Lock In E]	
63	111111	[Latch B]		[Latch A]		[Latch B]		[Latch B]		[Latch B]	

16.15.1 When the MaxiCode specification is set to “TYPE1: Compatible with the current version” in the system mode:

① How to transmit the control code data

SOH (01H)	→	> A (3EH, 41H)
STX (02H)	→	> B (3EH, 42H)
⇕		
GS (1DH)	→	>] (3EH, 5DH)
RS (1EH)	→	> ^ (3EH, 5EH)
US (1FH)	→	> _ (3EH, 5FH)

② How to transmit the special codes

> (3EH)	→	> 0 (3EH, 30H)
---------	---	----------------

③ How to transmit the Kanji codes

- Shift JIS
 - JIS hexadecimal
- (For details, refer to the section for the Barcode Data Command.)


NOTE: “NUL” code in the table cannot be used; however, it can be designated. If it is designated, data following “NUL” code is not printed.





16.15.2 When the MaxiCode specification is set to “TYPE2: Special specification” in the system mode:

[Transfer Code for MaxiCode]

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	DLE	SP	0	@	P	`	p								
1	SOH	DC1	!	1	A	Q	a	q								
2	STX	DC2	"	2	B	R	b	r								
3	ETX	DC3	#	3	C	S	c	s								
4	EOT	DC4	\$	4	D	T	d	t								
5	ENQ	NAK	%	5	E	U	e	u								
6	ACK	SYN	&	6	F	V	f	v								
7	BEL	ETB	'	7	G	W	g	w								
8	BS	CAN	(	8	H	X	h	x								
9	HT	EM	)	9	I	Y	i	y								
A	LF (Note1)	SUB	*	:	J	Z	j	z								
B	VT	ESC	+	;	K	[	k	{								
C	FF	FS	,	<	L	\	l	|								
D	CR	GS	-	=	M	]	m	}								
E	SO	RS	.	>	N	^	n	~								
F	SI	US	/	?	O	_	o	DEL								(Note2)

The all codes (00H to FFH) can be used. In the following cases, however, the codes will become special codes. For the transfer method, refer to the following:

Note 1: In case of LF (0AH) data:
LF (0AH) →  J (FFH, 4AH)

Note 2: In case of  (FFH) data:
 (FFH) →   (FFH, FFH)

ESC (1BH) and NUL (00H) can be used as they are.

16.16. DRAWING OF BARCODE DATA

———— : Field to be incremented/decremented
(The absence of a solid line invalidates incrementing/decrementing.)

———— : Field subject to printing numerals under bars.

Type of Barcode: JAN8, EAN8

No affix

No. of Input Digits		
8 digits	Input Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> </div> <div style="text-align: right; margin-top: -10px;">└─ To be checked as modulus 10 C/D</div>
	Drawing Data	<div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div>
Other than 8 digits		Not to be drawn

Modulus 10 check

No. of Input Digits		
8 digits	Input Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> </div> <div style="text-align: right; margin-top: -10px;">└─ To be checked as modulus 10 C/D</div>
	Drawing Data	<div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div>
Other than 8 digits		Not to be drawn

Auto affix of modulus 10

No. of Input Digits		
7 digits	Input Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> </div>
	Drawing Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">C/D</div> </div> <div style="text-align: right; margin-top: -10px;">└─ Affix a modulus 10 C/D.</div>
Other than 7 digits		Not to be drawn

Type of Barcode: JAN13, EAN13

No affix

No. of Input Digits															
13 digits	Input Data	<table><tr><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td></tr></table> <p>To be checked as modulus 10 C/D</p>	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃
	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃		
Drawing Data	<table><tr><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td></tr></table>	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃		
D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃				
Other than 13 digits		Not to be drawn													

Modulus 10 check

No. of Input Digits															
13 digits	Input Data	<table><tr><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td></tr></table> <p>To be checked as modulus 10 C/D</p>	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃
	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃		
Drawing Data	<table><tr><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td></tr></table>	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃		
D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃				
Other than 13 digits		Not to be drawn													

Auto affix of modulus 10

No. of Input Digits														
12 digits	Input Data	<table><tr><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td></tr></table>	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂
	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂		
Drawing Data	<table><tr><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>C/D</td></tr></table> <p>Affix a modulus 10 C/D.</p>	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	C/D	
D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	C/D			
Other than 12 digits		Not to be drawn												

Auto affix of modulus 10 + Price C/D 4 digits

No. of Input Digits													
11 digits	Input Data	<table><tr><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td></tr></table>	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁
	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁		
Drawing Data	<table><tr><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>P/CD</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>C/D</td></tr></table> <p>Affix a modulus 10 C/D.</p> <p>Affix price C/D 4 digits.</p>	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	P/CD	D ₈	D ₉	D ₁₀	D ₁₁	C/D
D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	P/CD	D ₈	D ₉	D ₁₀	D ₁₁	C/D		
Other than 11 digits		Not to be drawn											

Auto affix of modulus 10 + Price C/D 5 digits

No. of Input Digits													
11 digits	Input Data	<table><tr><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td></tr></table>	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁
	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁		
Drawing Data	<table><tr><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>P/CD</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>C/D</td></tr></table> <p>Affix price C/D 5 digits.</p> <p>Affix a modulus 10 C/D.</p>	D ₂	D ₃	D ₄	D ₅	D ₆	P/CD	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	C/D
D ₂	D ₃	D ₄	D ₅	D ₆	P/CD	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	C/D		
Other than 11 digits		Not to be drawn											

Type of Barcode: UPC-A

No affix

No. of Input Digits		
12 digits	Input Data	<div style="display: flex; justify-content: space-between; border: 1px solid black; padding: 2px;"> D₁D₂D₃D₄D₅D₆D₇D₈D₉D₁₀D₁₁D₁₂ </div> <div style="text-align: center; margin-top: 5px;">To be checked as modulus 10 C/D</div>
	Drawing Data	<div style="display: flex; justify-content: space-between; border: 1px solid black; padding: 2px;"> D₁D₂D₃D₄D₅D₆D₇D₈D₉D₁₀D₁₁D₁₂ </div>
Other than 12 digits		Not to be drawn

Modulus 10 check

No. of Input Digits		
12 digits	Input Data	<div style="display: flex; justify-content: space-between; border: 1px solid black; padding: 2px;"> D₁D₂D₃D₄D₅D₆D₇D₈D₉D₁₀D₁₁D₁₂ </div> <div style="text-align: center; margin-top: 5px;">To be checked as modulus 10 C/D</div>
	Drawing Data	<div style="display: flex; justify-content: space-between; border: 1px solid black; padding: 2px;"> D₁D₂D₃D₄D₅D₆D₇D₈D₉D₁₀D₁₁D₁₂ </div>
Other than 12 digits		Not to be drawn

Auto affix of modulus 10

No. of Input Digits		
11 digits	Input Data	<div style="display: flex; justify-content: space-between; border: 1px solid black; padding: 2px;"> D₁D₂D₃D₄D₅D₆D₇D₈D₉D₁₀D₁₁ </div>
	Drawing Data	<div style="display: flex; justify-content: space-between; border: 1px solid black; padding: 2px;"> D₁D₂D₃D₄D₅D₆D₇D₈D₉D₁₀D₁₁C/D </div> <div style="text-align: right; margin-top: 5px;">Affix a modulus 10 C/D.</div>
Other than 11 digits		Not to be drawn

Auto affix of modulus 10 + Price C/D 4 digits

No. of Input Digits		
10 digits	Input Data	<div style="display: flex; justify-content: space-between; border: 1px solid black; padding: 2px;"> D₁D₂D₃D₄D₅D₆D₇D₈D₉D₁₀ </div>
	Drawing Data	<div style="display: flex; justify-content: space-between; border: 1px solid black; padding: 2px;"> D₁D₂D₃D₄D₅D₆P/CDD₇D₈D₉D₁₀C/D </div> <div style="text-align: right; margin-top: 5px;">Affix a modulus 10 C/D.</div> <div style="text-align: center; margin-top: 5px;">Affix price C/D 4 digits.</div>
Other than 10 digits		Not to be drawn

Auto affix of modulus 10 + Price C/D 5 digits

No. of Input Digits		
10 digits	Input Data	<div style="display: flex; justify-content: space-between; border: 1px solid black; padding: 2px;"> D₁D₂D₃D₄D₅D₆D₇D₈D₉D₁₀ </div>
	Drawing Data	<div style="display: flex; justify-content: space-between; border: 1px solid black; padding: 2px;"> D₁D₂D₃D₄D₅P/CDD₆D₇D₈D₉D₁₀C/D </div> <div style="text-align: right; margin-top: 5px;">Affix a modulus 10 C/D.</div> <div style="text-align: center; margin-top: 5px;">Affix price C/D 5 digits.</div>
Other than 10 digits		Not to be drawn

Type of Barcode: UPC-E

No affix

No. of Input Digits		
7 digits	Input Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> </div> <div style="margin-left: 150px;"> To be checked as modulus 10 C/D </div>
	Drawing Data	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">0</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="margin-left: 5px;">D₇</div> </div>
Other than 7 digits		Not to be drawn

Modulus 10 check

No. of Input Digits		
7 digits	Input Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> </div> <div style="margin-left: 150px;"> To be checked as modulus 10 C/D </div>
	Drawing Data	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">0</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="margin-left: 5px;">D₇</div> </div>
Other than 7 digits		Not to be drawn

Auto affix of modulus 10

No. of Input Digits		
6 digits	Input Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="margin-left: 20px;">Calculate and reflect modulus 10 in the barcode.</div> </div>
	Drawing Data	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">0</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="margin-left: 5px;">C/D</div> </div>
Other than 6 digits		Not to be drawn

Type of Barcode: JAN8 + 2 digits, EAN8 + 2 digits

No affix

No. of Input Digits		
10 digits	Input Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₀</div> </div> <div style="margin-left: 150px;"> └─ To be checked as modulus 10 C/D </div>
	Drawing Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="margin: 0 10px;"> </div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₀</div> </div>
Other than 10 digits		Not to be drawn

Modulus 10 check

No. of Input Digits		
10 digits	Input Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₀</div> </div> <div style="margin-left: 150px;"> └─ To be checked as modulus 10 C/D </div>
	Drawing Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="margin: 0 10px;"> </div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₀</div> </div>
Other than 10 digits		Not to be drawn

Auto affix of modulus 10

No. of Input Digits		
9 digits	Input Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> </div>
	Drawing Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">C/D</div> <div style="margin: 0 10px;"> </div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> </div> <div style="margin-left: 150px;"> └─ Affix a modulus 10 C/D. </div>
Other than 9 digits		Not to be drawn

Type of Barcode: JAN8 + 5 digits, EAN8 + 5 digits

No affix

No. of Input Digits		
13 digits	Input Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₀</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₃</div> </div> <div style="margin-left: 150px;"> └─ To be checked as modulus 10 C/D </div>
	Drawing Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="margin: 0 10px;"> </div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₀</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₃</div> </div>
Other than 13 digits		Not to be drawn

Modulus 10 check

No. of Input Digits		
13 digits	Input Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₀</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₃</div> </div> <div style="margin-left: 150px;"> └─ To be checked as modulus 10 C/D </div>
	Drawing Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="margin: 0 10px;"> </div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₀</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₃</div> </div>
Other than 13 digits		Not to be drawn

Auto affix of modulus 10

No. of Input Digits		
12 digits	Input Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₀</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₂</div> </div>
	Drawing Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">C/D</div> <div style="margin: 0 10px;"> </div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₀</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₂</div> </div> <div style="margin-left: 150px;"> └─ Affix a modulus 10 C/D. </div>
Other than 12 digits		Not to be drawn

Type of Barcode: JAN13 + 2 digits, EAN13 + 2 digits

No affix

No. of Input Digits																	
15 digits	Input Data	<table><tr><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td><td>D₁₄</td><td>D₁₅</td></tr></table>	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅
	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅		
Drawing Data	<div><div>To be checked as modulus 10 C/D</div><div><table><tr><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td></tr></table><table><tr><td>D₁₄</td><td>D₁₅</td></tr></table></div></div>	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅		
D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃						
D ₁₄	D ₁₅																
Other than 15 digits		Not to be drawn															

Modulus 10 check

No. of Input Digits																	
15 digits	Input Data	<table><tr><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td><td>D₁₄</td><td>D₁₅</td></tr></table>	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅
	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅		
Drawing Data	<div><div>To be checked as modulus 10 C/D</div><div><table><tr><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td></tr></table><table><tr><td>D₁₄</td><td>D₁₅</td></tr></table></div></div>	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅		
D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃						
D ₁₄	D ₁₅																
Other than 15 digits		Not to be drawn															

Auto affix of modulus 10

No. of Input Digits																
14 digits	Input Data	<table><tr><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td><td>D₁₄</td></tr></table>	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄
	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄		
Drawing Data	<table><tr><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>C/D</td><td colspan="2">D₁₃ D₁₄</td></tr></table> <p>Affix a modulus 10 C/D.</p>	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	C/D	D ₁₃ D ₁₄		
D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	C/D	D ₁₃ D ₁₄				
Other than 14 digits		Not to be drawn														

Auto affix of modulus 10 + Price C/D 4 digits

No. of Input Digits															
13 digits	Input Data	<table><tr><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td></tr></table>	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃
	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃		
Drawing Data	<table><tr><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>P/CD</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>C/D</td><td>D₁₂</td><td>D₁₃</td></tr></table> <p>Affix price C/D 4 digits.</p> <p>Affix a modulus 10 C/D.</p>	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	P/CD	D ₈	D ₉	D ₁₀	D ₁₁	C/D	D ₁₂	D ₁₃
D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	P/CD	D ₈	D ₉	D ₁₀	D ₁₁	C/D	D ₁₂	D ₁₃		
Other than 13 digits		Not to be drawn													

Auto affix of modulus 10 + Price C/D 5 digits

No. of Input Digits															
13 digits	Input Data	<table><tr><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td></tr></table>	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃
	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃		
Drawing Data	<table><tr><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>P/CD</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>C/D</td><td>D₁₂</td><td>D₁₃</td></tr></table> <p>Affix price C/D 5 digits.</p> <p>Affix a modulus 10 C/D.</p>	D ₂	D ₃	D ₄	D ₅	D ₆	P/CD	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	C/D	D ₁₂	D ₁₃
D ₂	D ₃	D ₄	D ₅	D ₆	P/CD	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	C/D	D ₁₂	D ₁₃		
Other than 13 digits		Not to be drawn													

Type of Barcode: JAN13 + 5 digits, EAN13 + 5 digits

No affix

No. of Input Digits																				
18 digits	Input Data	<table><tr><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td><td>D₁₄</td><td>D₁₅</td><td>D₁₆</td><td>D₁₇</td><td>D₁₈</td></tr></table>	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇	D ₁₈
	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇	D ₁₈		
Drawing Data	<div><div><div>To be checked as modulus 10 C/D</div><div><table><tr><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td></tr></table></div><div><table><tr><td>D₁₄</td><td>D₁₅</td><td>D₁₆</td><td>D₁₇</td><td>D₁₈</td></tr></table></div></div></div>	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇	D ₁₈		
D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃									
D ₁₄	D ₁₅	D ₁₆	D ₁₇	D ₁₈																
Other than 18 digits		Not to be drawn																		

Modulus 10 check

No. of Input Digits																				
18 digits	Input Data	<table><tr><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td><td>D₁₄</td><td>D₁₅</td><td>D₁₆</td><td>D₁₇</td><td>D₁₈</td></tr></table>	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇	D ₁₈
	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇	D ₁₈		
Drawing Data	<div><div>To be checked as modulus 10 C/D</div><div><table><tr><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td></tr></table></div><div><table><tr><td>D₁₄</td><td>D₁₅</td><td>D₁₆</td><td>D₁₇</td><td>D₁₈</td></tr></table></div></div>	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇	D ₁₈		
D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃									
D ₁₄	D ₁₅	D ₁₆	D ₁₇	D ₁₈																
Other than 18 digits		Not to be drawn																		

Auto affix of modulus 10

No. of Input Digits																			
17 digits	Input Data	<table><tr><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td><td>D₁₄</td><td>D₁₅</td><td>D₁₆</td><td>D₁₇</td></tr></table>	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇
	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇		
Drawing Data	<table><tr><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>C/D</td><td>D₁₃</td><td>D₁₄</td><td>D₁₅</td><td>D₁₆</td><td>D₁₇</td></tr></table> <p>Affix a modulus 10 C/D.</p>	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	C/D	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇	
D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	C/D	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇			
Other than 17 digits		Not to be drawn																	

Auto affix of modulus 10 + Price C/D 4 digits

No. of Input Digits																		
16 digits	Input Data	<table><tr><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td><td>D₁₄</td><td>D₁₅</td><td>D₁₆</td></tr></table>	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆
	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆		
Drawing Data	<table><tr><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>P/CD</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>C/D</td><td>D₁₂</td><td>D₁₃</td><td>D₁₄</td><td>D₁₅</td><td>D₁₆</td></tr></table> <p>Affix price C/D 4 digits.</p> <p>Affix a modulus 10 C/D.</p>	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	P/CD	D ₈	D ₉	D ₁₀	D ₁₁	C/D	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆
D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	P/CD	D ₈	D ₉	D ₁₀	D ₁₁	C/D	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆		
Other than 16 digits		Not to be drawn																

Auto affix of modulus 10 + Price C/D 5 digits

No. of Input Digits																		
16 digits	Input Data	<table><tr><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td><td>D₁₄</td><td>D₁₅</td><td>D₁₆</td></tr></table>	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆
	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆		
Drawing Data	<table><tr><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>P/CD</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>C/D</td><td>D₁₂</td><td>D₁₃</td><td>D₁₄</td><td>D₁₅</td><td>D₁₆</td></tr></table> <p>Affix price C/D 5 digits.</p> <p>Affix a modulus 10 C/D.</p>	D ₂	D ₃	D ₄	D ₅	D ₆	P/CD	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	C/D	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆
D ₂	D ₃	D ₄	D ₅	D ₆	P/CD	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	C/D	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆		
Other than 16 digits		Not to be drawn																

Type of Barcode: UPC-A + 2 digits

No affix

No. of Input Digits		
14 digits	Input Data	<div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃ D₁₄ </div> To be checked as modulus 10 C/D
	Drawing Data	<div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ </div> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-left: 20px;"> D₁₃ D₁₄ </div>
Other than 14 digits		Not to be drawn

Modulus 10 check

No. of Input Digits		
14 digits	Input Data	<div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃ D₁₄ </div> To be checked as modulus 10 C/D
	Drawing Data	<div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ </div> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-left: 20px;"> D₁₃ D₁₄ </div>
Other than 14 digits		Not to be drawn

Auto affix of modulus 10

No. of Input Digits		
13 digits	Input Data	<div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃ </div>
	Drawing Data	<div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ C/D </div> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-left: 20px;"> D₁₂ D₁₃ </div> Affix a modulus 10 C/D.
Other than 13 digits		Not to be drawn

Auto affix of modulus 10 + Price C/D 4 digits

No. of Input Digits		
12 digits	Input Data	<div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ </div>
	Drawing Data	<div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁ D₂ D₃ D₄ D₅ D₆ P/CD D₇ D₈ D₉ D₁₀ C/D </div> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-left: 20px;"> D₁₁ D₁₂ </div> Affix price C/D 4 digits. Affix a modulus 10 C/D.
Other than 12 digits		Not to be drawn

Auto affix of modulus 10 + Price C/D 5 digits

No. of Input Digits		
12 digits	Input Data	<div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ </div>
	Drawing Data	<div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁ D₂ D₃ D₄ D₅ P/CD D₆ D₇ D₈ D₉ D₁₀ C/D </div> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-left: 20px;"> D₁₁ D₁₂ </div> Affix price C/D 5 digits. Affix a modulus 10 C/D.
Other than 12 digits		Not to be drawn

Type of Barcode: UPC-A + 5 digits

No affix

No. of Input Digits		
17 digits	Input Data	<div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃ D₁₄ D₁₅ D₁₆ D₁₇ </div> To be checked as modulus 10 C/D
	Drawing Data	<div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ </div> <div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁₃ D₁₄ D₁₅ D₁₆ D₁₇ </div> </div>
Other than 17 digits		Not to be drawn

Modulus 10 check

No. of Input Digits		
17 digits	Input Data	<div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃ D₁₄ D₁₅ D₁₆ D₁₇ </div> To be checked as modulus 10 C/D
	Drawing Data	<div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ </div> <div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁₃ D₁₄ D₁₅ D₁₆ D₁₇ </div> </div>
Other than 17 digits		Not to be drawn

Auto affix of modulus 10

No. of Input Digits		
16 digits	Input Data	<div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃ D₁₄ D₁₅ D₁₆ </div>
	Drawing Data	<div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ C/D </div> <div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁₂ D₁₃ D₁₄ D₁₅ D₁₆ </div> </div> Affix a modulus 10 C/D.
Other than 16 digits		Not to be drawn

Auto affix of modulus 10 + Price C/D 4 digits

No. of Input Digits		
15 digits	Input Data	<div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃ D₁₄ D₁₅ </div>
	Drawing Data	<div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁ D₂ D₃ D₄ D₅ D₆ P/CD D₇ D₈ D₉ D₁₀ C/D </div> <div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁₁ D₁₂ D₁₃ D₁₄ D₁₅ </div> </div> Affix price C/D 4 digits. Affix a modulus 10 C/D.
Other than 15 digits		Not to be drawn

Auto affix of modulus 10 + Price C/D 5 digits

No. of Input Digits		
15 digits	Input Data	<div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃ D₁₄ D₁₅ </div>
	Drawing Data	<div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁ D₂ D₃ D₄ D₅ P/CD D₆ D₇ D₈ D₉ D₁₀ C/D </div> <div style="border: 1px solid black; padding: 2px; display: inline-block;"> D₁₁ D₁₂ D₁₃ D₁₄ D₁₅ </div> </div> Affix price C/D 5 digits. Affix a modulus 10 C/D.
Other than 15 digits		Not to be drawn

Type of Barcode: UPC-E + 2 digits

No affix

No. of Input Digits		
9 digits	Input Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> </div> <div style="margin-left: 150px;"> └─ To be checked as modulus 10 C/D </div>
	Drawing Data	<div style="display: flex; align-items: center;"> 0 <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="margin: 0 5px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> </div>
Other than 9 digits		Not to be drawn

Modulus 10 check

No. of Input Digits		
9 digits	Input Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> </div> <div style="margin-left: 150px;"> └─ To be checked as modulus 10 C/D </div>
	Drawing Data	<div style="display: flex; align-items: center;"> 0 <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="margin: 0 5px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> </div>
Other than 9 digits		Not to be drawn

Auto affix of modulus 10

No. of Input Digits		
8 digits	Input Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> </div> <div style="margin-left: 20px;">Calculate and reflect modulus 10 C/D in the barcode.</div>
	Drawing Data	<div style="display: flex; align-items: center;"> 0 <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="margin: 0 5px;">C/D</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> </div>
Other than 8 digits		Not to be drawn

Type of Barcode: UPC-E + 5 digits

No affix

No. of Input Digits		
12 digits	Input Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₀</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₂</div> </div> <div style="margin-left: 100px;"> └─ To be checked as modulus 10 C/D </div>
	Drawing Data	<div style="display: flex; align-items: center;"> 0 <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="margin: 0 5px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₀</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₂</div> </div>
Other than 12 digits		Not to be drawn

Modulus 10 check

No. of Input Digits		
12 digits	Input Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₀</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₂</div> </div> <div style="margin-left: 100px;"> └─ To be checked as modulus 10 C/D </div>
	Drawing Data	<div style="display: flex; align-items: center;"> 0 <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="margin: 0 5px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₀</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₂</div> </div>
Other than 12 digits		Not to be drawn

Auto affix of modulus 10

No. of Input Digits		
11 digits	Input Data	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₀</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₁</div> </div> <div style="margin-left: 10px;">Calculate and reflect modulus 10 C/D in the barcode.</div>
	Drawing Data	<div style="display: flex; align-items: center;"> 0 <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₂</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₃</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₄</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₅</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₆</div> <div style="margin: 0 5px;">C/D</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₇</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₈</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₉</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₀</div> <div style="border: 1px solid black; padding: 2px; margin: 2px;">D₁₁</div> </div>
Other than 11 digits		Not to be drawn

Type of Barcode: MSI

No affix

No. of Input Digits		
Max. 15 digits	Input Data	<div style="border: 1px solid black; display: inline-block; padding: 2px;">D₁</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₂</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₃</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₄</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₅</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₆</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₇</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₈</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₉</div>
	Drawing Data	<div style="border: 1px solid black; display: inline-block; padding: 2px;">D₁</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₂</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₃</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₄</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₅</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₆</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₇</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₈</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₉</div>
16 digits or more		Not to be drawn

IBM modulus 10 check

No. of Input Digits		
Min. 2 digits Max. 15 digits (including C/D)	Input Data	<div style="border: 1px solid black; display: inline-block; padding: 2px;">D₁</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₂</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₃</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₄</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₅</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₆</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₇</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₈</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₉</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₁₀</div>
	Drawing Data	<div style="border: 1px solid black; display: inline-block; padding: 2px;">D₁</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₂</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₃</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₄</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₅</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₆</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₇</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₈</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₉</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₁₀</div>
1 digit 16 digits or more		Not to be drawn

Auto affix of IBM modulus 10

No. of Input Digits		
Max. 14 digits	Input Data	<div style="border: 1px solid black; display: inline-block; padding: 2px;">D₁</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₂</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₃</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₄</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₅</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₆</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₇</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₈</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₉</div>
	Drawing Data	<div style="border: 1px solid black; display: inline-block; padding: 2px;">D₁</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₂</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₃</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₄</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₅</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₆</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₇</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₈</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₉</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">C/D</div>
15 digits or more		Not to be drawn

IBM modulus 10 + Auto affix of IBM modulus 10

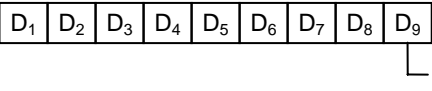
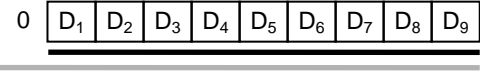
No. of Input Digits		
Max. 13 digits	Input Data	<div style="border: 1px solid black; display: inline-block; padding: 2px;">D₁</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₂</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₃</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₄</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₅</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₆</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₇</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₈</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₉</div>
	Drawing Data	<div style="border: 1px solid black; display: inline-block; padding: 2px;">D₁</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₂</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₃</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₄</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₅</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₆</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₇</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₈</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₉</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">C/D₁</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">C/D₂</div>
14 digits or more		Not to be drawn

IBM modulus 11 + Auto affix of IBM modulus 10

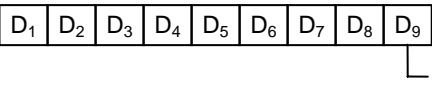
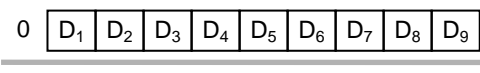
No. of Input Digits		
Max. 13 digits	Input Data	<div style="border: 1px solid black; display: inline-block; padding: 2px;">D₁</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₂</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₃</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₄</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₅</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₆</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₇</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₈</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₉</div>
	Drawing Data	<div style="border: 1px solid black; display: inline-block; padding: 2px;">D₁</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₂</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₃</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₄</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₅</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₆</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₇</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₈</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">D₉</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">C/D₁</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">C/D₂</div>
14 digits or more		Not to be drawn

Type of Barcode: Interleaved 2 of 5

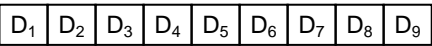
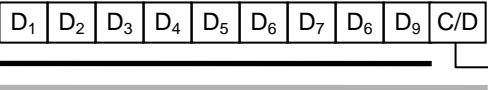
No affix

No. of Input Digits		
Max. 126 digits	Input Data	
	Drawing Data	
127 digits or more		Not to be drawn


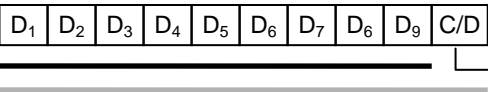
Modulus 10 check

No. of Input Digits		
Min. 2 digits Max. 126 digits (including C/D)	Input Data	
	Drawing Data	
1 digit 127 digits or more		Not to be drawn

Auto affix of modulus 10

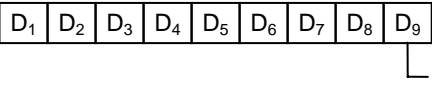
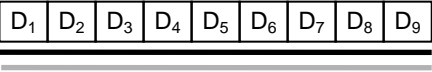
No. of Input Digits		
Max. 125 digits	Input Data	
	Drawing Data	
126 digits or more		Not to be drawn

Auto affix of DBP modulus 10

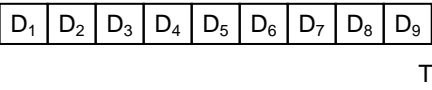
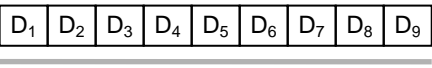
No. of Input Digits		
Max. 125 digits	Input Data	
	Drawing Data	
126 digits or more		Not to be drawn

Type of Barcode: Industrial 2 of 5

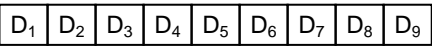
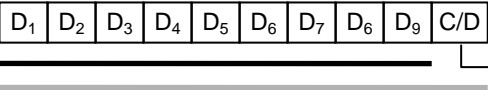
No affix

No. of Input Digits		
Max. 126 digits	Input Data	
	Drawing Data	
127 digits or more		Not to be drawn

Modulus check character check

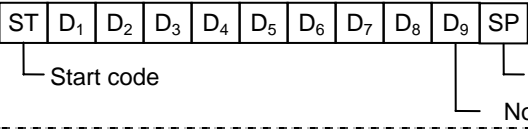
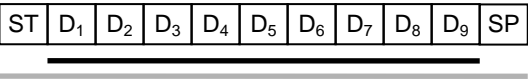
No. of Input Digits		
Min. 2 digits Max. 126 digits (including C/D)	Input Data	
	Drawing Data	
1 digit 127 digits or more		Not to be drawn

Auto affix of modulus check character

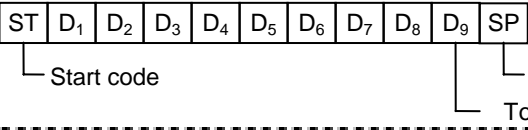
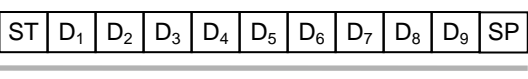
No. of Input Digits		
Max. 125 digits	Input Data	
	Drawing Data	
126 digits or more		Not to be drawn

Type of Barcode: CODE39 (Standard)

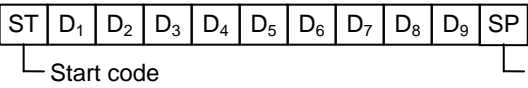
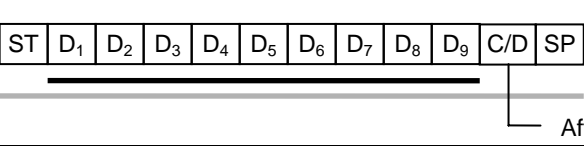
No affix

No. of Input Digits		
Max. 123 digits	Input Data	
	Drawing Data	
124 digits or more		Not to be drawn

Modulus 43 check

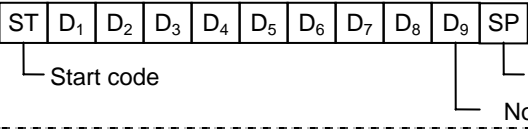
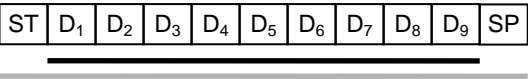
No. of Input Digits		
Min. 2 digits Max. 123 digits (including C/D)	Input Data	
	Drawing Data	
1 digit 124 digits or more		Not to be drawn

Auto affix of modulus 43

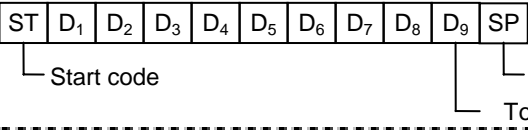
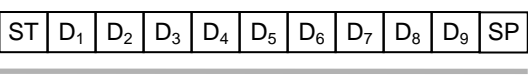
No. of Input Digits		
Max. 122 digits	Input Data	
	Drawing Data	
123 digits or more		Not to be drawn

Type of Barcode: CODE39 (Full ASCII)

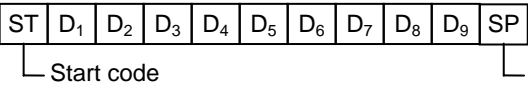
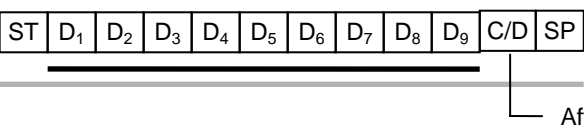
No affix

No. of Input Digits		
Max. 60 digits	Input Data	
	Drawing Data	
61 digits or more		Not to be drawn

Modulus 43 check

No. of Input Digits		
Min. 2 digits Max. 60 digits (including C/D)	Input Data	
	Drawing Data	
1 digit 61 digits or more		Not to be drawn

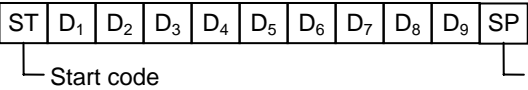
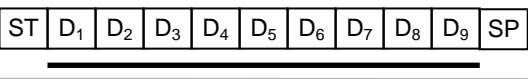
Auto affix of modulus 43

No. of Input Digits		
Max. 60 digits	Input Data	
	Drawing Data	
61 digits or more		Not to be drawn

NOTE: Numerals under bars are not characters corresponding to the bars but the characters of the codes received are drawn.

Type of Barcode: NW7

No affix, C/D check, Auto affix

No. of Input Digits		
Max. 125 digits	Input Data	
	Drawing Data	
126 digits or more		Not to be drawn

Type of Barcode: No auto selection of CODE128 (Character “>” to be also counted as a digit)

No affix, PSEUDO103 check, Auto affix of PSEUDO103

No. of Input Digits		
Min. 3 digits Max. 125 digits (including start code)	Input Data	ST D ₁ D ₂ D ₃ D ₄ D ₅ D ₆ D ₇ D ₈ D ₉ D ₁₀ D ₁₁
	Drawing Data	ST D ₁ D ₂ D ₃ D ₄ D ₅ D ₆ D ₇ D ₈ D ₉ D ₁₀ D ₁₁ C/D SP Affix PSEUDO103 C/D.
2 digits or less 126 digits or more		Not to be drawn

NOTE: The following characters are not drawn as numerals under bars.
NUL (00H) to US (1FH), FNC1, FNC2, FNC3, SHIFT, CODE A, CODE B, CODE C

Type of Barcode: Auto selection of CODE128

No affix, C/D check, Auto affix of C/D

No. of Input Digits		
Max. 60 digits	Input Data	D ₁ D ₂ D ₃ D ₄ D ₅ D ₆ D ₇ D ₈ D ₉ D ₁₀ D ₁₁
	Drawing Data	ST D ₁ D ₂ D ₃ D ₄ AD D ₅ D ₆ D ₇ AD D ₈ D ₉ D ₁₀ D ₁₁ C/D SP Start code Selection code Stop code Affix PSEUDO103 C/D.
61 digits or more		Not to be drawn

NOTE: The following characters are not drawn as numerals under bars.
NUL (00H) to US (1FH), FNC1, FNC2, FNC3, SHIFT, CODE A, CODE B, CODE C

Type of Barcode: CODE93

No affix, C/D check, Auto affix of C/D

No. of Input Digits		
Max. 60 digits	Input Data	D ₁ D ₂ D ₃ D ₄ D ₅ D ₆ D ₇ D ₈ D ₉
	Drawing Data	ST D ₁ D ₂ D ₃ D ₄ D ₅ D ₆ D ₇ D ₈ D ₉ C/D ₁ C/D ₂ SP Start code Stop code Affix a modulus 47 “K” C/D. Affix a modulus 47 “C” C/D.
61 digits or more		Not to be drawn

NOTE: Numerals under bars are not characters corresponding to the bars but the characters of the codes received are drawn.

Type of Barcode: UCC/EAN128

No affix, C/D check, Auto affix of C/D

No. of Input Digits		
19 digits	Input Data	D ₁ D ₂ D ₃ D ₄ D ₅ D ₆ --- D ₁₄ D ₁₅ D ₁₆ D ₁₇ D ₁₈ D ₁₉
	Drawing Data	
Other than 19 digits		Not to be drawn

Type of Barcode: POSTNET

Auto affix of dedicated C/D

No. of Input Digits		
5 digits	Input Data	D ₁ D ₂ D ₃ D ₄ D ₅
	Drawing Data	
9 digits	Input Data	D ₁ D ₂ D ₃ D ₄ D ₅ D ₆ D ₇ D ₈ D ₉
	Drawing Data	
11 digits	Input Data	D ₁ D ₂ D ₃ D ₄ D ₅ D ₆ D ₇ D ₈ D ₉ D ₁₀ D ₁₁
	Drawing Data	
Other than 5, 9 and 11 digits		Not to be drawn

Type of Barcode: RM4SCC

Auto affix of dedicated C/D

No. of Input Digits																
12 digits	Input Data	(ST) <table><tr><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td></tr></table> (SP) <div>Start code</div> <div>Stop code</div>	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂		
	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂				
Drawing Data	<table><tr><td>ST</td><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>C/D</td><td>SP</td></tr></table> <div>Start code</div> <div>Stop code</div> <div>Dedicated check digit</div>	ST	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	C/D	SP
ST	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	C/D	SP		
13 digits or more		Not to be drawn														

Type of Barcode: KIX CODE

No affix

No. of Input Digits																				
18 digits	Input Data	<table><tr><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td><td>D₁₄</td><td>D₁₅</td><td>D₁₆</td><td>D₁₇</td><td>D₁₈</td></tr></table>	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇	D ₁₈
	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇	D ₁₈		
Drawing Data	<div><table><tr><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td><td>D₁₄</td><td>D₁₅</td><td>D₁₆</td><td>D₁₇</td><td>D₁₈</td></tr></table></div>	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇	D ₁₈	
D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇	D ₁₈			
19 digits or more		Not to be drawn																		

Type of Barcode: Customer barcode

Auto affix of dedicated C/D

No. of Input Digits																								
20 digits	Input Data	<table><tr><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td><td>D₁₄</td><td>D₁₅</td><td>D₁₆</td><td>D₁₇</td><td>D₁₈</td><td>D₁₉</td><td>D₂₀</td></tr></table>	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇	D ₁₈	D ₁₉	D ₂₀		
	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇	D ₁₈	D ₁₉	D ₂₀				
Drawing Data	<table><tr><td>ST</td><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td><td>D₁₄</td><td>D₁₅</td><td>D₁₆</td><td>D₁₇</td><td>D₁₈</td><td>D₁₉</td><td>D₂₀</td><td>C/D</td><td>SP</td></tr></table> <div>Start code</div> <div>Dedicated check digit</div> <div>Stop code</div>	ST	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇	D ₁₈	D ₁₉	D ₂₀	C/D	SP
ST	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇	D ₁₈	D ₁₉	D ₂₀	C/D	SP		
21 digits or more		Data of up to 20 digits is drawn. Data of 21 digits or more is discarded.																						

Type of Barcode: Highest priority customer barcode

Auto affix of dedicated C/D

No. of Input Digits																								
19 digits	Input Data	<table><tr><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td><td>D₁₄</td><td>D₁₅</td><td>D₁₆</td><td>D₁₇</td><td>D₁₈</td><td>D₁₉</td></tr></table>	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇	D ₁₈	D ₁₉			
	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇	D ₁₈	D ₁₉					
Drawing Data	<table><tr><td>ST</td><td>D₁</td><td>D₂</td><td>D₃</td><td>D₄</td><td>D₅</td><td>D₆</td><td>D₇</td><td>D₈</td><td>D₉</td><td>D₁₀</td><td>D₁₁</td><td>D₁₂</td><td>D₁₃</td><td>D₁₄</td><td>D₁₅</td><td>D₁₆</td><td>D₁₇</td><td>D₁₈</td><td>D₁₉</td><td>CC7</td><td>C/D</td><td>SP</td></tr></table> <div><div>Start code</div><div>CC7</div><div>Dedicated check digit</div><div>Stop code</div></div>	ST	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇	D ₁₈	D ₁₉	CC7	C/D	SP
ST	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃	D ₁₄	D ₁₅	D ₁₆	D ₁₇	D ₁₈	D ₁₉	CC7	C/D	SP		
20 digits or more		Data of up to 19 digits is drawn. Data of 20 digits or more is discarded.																						

Type of Barcode: RSS-14, RSS-14 Stacked, RSS-14 Stacked Omni-directional, RSS Limited

Auto affix of dedicated C/D

No. of Input Digits		
13 digits	Input Data	D ₁ D ₂ D ₃ D ₄ D ₅ D ₆ D ₇ D ₈ D ₉ D ₁₀ D ₁₁ D ₁₂ D ₁₃
	Drawing Data	<div> D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃ C/D </div> <div> Dedicated check digit </div>
14 digits or more		Not to be drawn

Type of Barcode: RSS Expanded

Auto affix of dedicated C/D

No. of Input Digits		
70 digits	Input Data	D ₁ D ₂ D ₃ D ₄ D ₅ D ₆ D ₇ D ₈ D ₉ D ₁₀ D ₁₁ D ₁₂ D ₁₃
	Drawing Data	<div> D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ D₁₀ D₁₁ D₁₂ D₁₃ C/D </div> <div> Dedicated check digit </div>
71 digits or more		Not to be drawn NOTE: Some data cannot be drawn even if the number of input digits is less than 70.

Type of Barcode: MATRIX 2 of 5 for NEC

No affix

No. of Input Digits		
Max. 126 digits	Input Data	<div> <div>D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉</div> <div>Not recognized as a check digit.</div> </div>
	Drawing Data	<div> <div>D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉</div> <div></div> </div>
127 digits or more		Not to be drawn

Modulus check character check

No. of Input Digits		
Min. 2 digits Max. 126 digits (including C/D)	Input Data	<div> <div>D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉</div> <div>To be checked as a modulus check character</div> </div>
	Drawing Data	<div> <div>D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉</div> <div></div> </div>
1 digit 127 digits or more		Not to be drawn

Auto affix of modulus check character

No. of Input Digits		
Max. 125 digits	Input Data	<div> <div>D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉</div> </div>
	Drawing Data	<div> <div>D₁ D₂ D₃ D₄ D₅ D₆ D₇ D₈ D₉ C/D</div> <div>Affix a modulus check character.</div> </div>
126 digits or more		Not to be drawn

16.17. AUTOMATIC ADDITION OF START/STOP CODES

Type of Barcode	Designation of Start/Stop Codes	Input Data	Drawing Data	
CODE 39	Omit (No designation)	12345ABC	Standard	*12345ABC*
			Full ASCII	*12345ABC*
		*12345ABC	Standard	*12345ABC*
			Full ASCII	*12345ABC*
		12345ABC*	Standard	*12345ABC*
			Full ASCII	*12345ABC*
		12345ABC	Standard	*12345ABC*
			Full ASCII	*12345ABC*
		12345*ABC	Standard	*12345*ABC*
			Full ASCII	*12345/JABC*
		**12345ABC	Standard	**12345ABC*
			Full ASCII	*/J12345ABC*
		*12345ABC**	Standard	*12345ABC**
			Full ASCII	*12345ABC/J*
		*12345*ABC*	Standard	*12345*ABC*
			Full ASCII	*12345/JABC*
	Add start code	12345ABC	Standard	*12345ABC
			Full ASCII	*12345ABC
		*12345ABC	Standard	**12345ABC
			Full ASCII	*/J12345ABC
		12345ABC*	Standard	*12345ABC*
			Full ASCII	*12345ABC*
		12345ABC	Standard	**12345ABC*
			Full ASCII	*/J12345ABC*
		12345*ABC	Standard	*12345*ABC
			Full ASCII	*12345/JABC
		12345ABC	Standard	*12345ABC
			Full ASCII	*/J/J12345ABC
		*12345ABC**	Standard	**12345ABC**
			Full ASCII	*/J12345ABC/J*
		*12345*ABC*	Standard	**12345*ABC*
			Full ASCII	*/J12345/JABC*
	Add stop code	12345ABC	Standard	12345ABC*
			Full ASCII	12345ABC*
		*12345ABC	Standard	*12345ABC*
			Full ASCII	*12345ABC*
		12345ABC*	Standard	12345ABC**
			Full ASCII	12345ABC/J*
		12345ABC	Standard	*12345ABC**
			Full ASCII	*12345ABC/J*
		12345*ABC	Standard	12345*ABC*
			Full ASCII	12345/JABC*
		**12345ABC	Standard	**12345ABC*
			Full ASCII	*/J12345ABC*
		*12345ABC**	Standard	*12345ABC***
			Full ASCII	*12345ABC/J/J*
		*12345*ABC*	Standard	*12345*ABC**
			Full ASCII	*12345/JABC/J*

Type of Barcode	Designation of Start/Stop Codes	Input Data	Drawing Data	
CODE 39	Start/stop code not added	12345ABC	Standard	12345ABC
			Full ASCII	12345ABC
		*12345ABC	Standard	*12345ABC
			Full ASCII	*12345ABC
		12345ABC*	Standard	12345ABC*
			Full ASCII	12345ABC*
		12345ABC	Standard	*12345ABC*
			Full ASCII	*12345ABC*
		12345*ABC	Standard	12345*ABC
			Full ASCII	12345/JABC
		**12345ABC	Standard	**12345ABC
			Full ASCII	*/J12345ABC
		*12345ABC**	Standard	*12345ABC**
			Full ASCII	*12345ABC/J*
		*12345*ABC*	Standard	*12345*ABC*
			Full ASCII	*12345/JABC*

Type of Barcode	Designation of Start/Stop Codes	Input Data	Drawing Data
NW7	Omit (No designation)	12345678	a12345678a
		a12345678	a12345678
		12345678c	12345678c
		b12345678d	b12345678d
		12345a678	a12345a678a
		ab12345678	ab12345678
		a12345678bc	a12345678bc
		d12345b678c	d12345b678c
	Add start code	12345678	a12345678
		a12345678	aa12345678
		12345678c	a12345678c
		b12345678d	ab12345678d
		12345a678	a12345a678
		ab12345678	aab12345678
		a12345678bc	aa12345678bc
		d12345b678c	ad12345b678c
	Add stop code	12345678	12345678a
		a12345678	a12345678a
		12345678c	12345678ca
		b12345678d	b12345678da
		12345a678	12345a678a
		ab12345678	ab12345678a
		a12345678bc	a12345678bca
		d12345b678c	d12345b678ca
	Start/stop code not added	12345678	12345678
		a12345678	a12345678
		12345678c	12345678c
		b12345678d	b12345678d
		12345a678	12345a678
		ab12345678	ab12345678
		a12345678bc	a12345678bc
		d12345b678c	d12345b678c