Serial dot impact printer
CD-S500 series
Command Reference

REVISION 1.00 2004.11.24

<Attention>

1. The contents of this manual may be changed without warning.
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Revision list

Revision	Date	Details	Remark
1.00	04/11/24	Original version	

Forward

This manual explains the control commands for CD–S500 series including ESC/POS mode, CBM mode, and Star mode.

We advise you to read thoroughly the User's Manual of the printer before using this manual.

General content of this manual

This manual is organized in the follwing manner so that you can conveniently use Citizen's CD–S500 printer series.

Outline

The type of operation mode and printer control commands are explained.

Control code

It explains the three control commands for the printer: ESC/POS mode, CBM mode, and Star mode.

Appendix

Lists each character code table.

Table of contents

1. Outline

1.1 Mode of Operation

The products of CD-S500 dot-impact-printer series are equipped with ESC/POS mode, CBM mode and Star mode.

1.2 Character Set

All the printing data sent to a printer from a host computer is automatically changed into 1 byte alphanumeric katakana character (ANK) corresponding to the character and sign.

Regarding the change in the character set and the mode that are set as factory default, please refer to the instructions manual attached to each printer.

Cautions: Please refer to the appendix of this manual about the contents of the character set.

1.3 Control Commands

1.3.1 Explanation for Control Commands

Control commands control operation of printers, such as start/end of printing, and line feed, paper feeding.
All functions associated with printing, such as type of character, enlargement of character, or format are controlled.

Control commands vary with modes of operation. (See 1.1)

1.3.2 How to Send Control Commands

While there are several methods of sending control commands to a printer from a host computer, method by BASIC is common.

Example .1

Character set “CITIZEN” is printed in normal size and enlarged size.

It is assumed that the printer is set under CBM mode.

Program Creation

Control commands in CBM mode lists that the command name for a double width large character is SO, and 0E for hexadecimal code . Command name for canceling double width large character is SI and 0F for hexadecimal code . Using these two codes, the resulting program will be as follows:

Program listing
10 A$="CITIZEN"
20 LPRINT CHR$(&HE)
30 LPRINT A$
40 LPRINT CHR$(&HA)
50 LPRINT A$
60 END

Printing result

CITIZEN

CITIZEN

Command for specifying/canceling of double width large character are sent under line numbers 20 and 40. As a result, while the same character set is printed in line numbers 30 and 50, they are printed in double width expansion in line number 30, and printing is canceled in line number 50.

In this manual, BASIC is used for sample program. Please refer to the manual of BASIC for further details in creating a program by BASIC.

2. Control Code Command

This chapter explains the control commands currently supported according to each mode of operation.
Explanation of each control commands is as follows.

Example :

Name of a command/Mnemonic	
[Form type]	Mnemonic code
[Decimal]	The code which constitutes a command is indicated in decimal number.
[Hexadecimal]	The code which constitutes a command is indicated in hexadecimal number.
[Parameter]	Indicates the value (setting range) of argument of the command.
[Description]	Explains the function of a command.

2.1 ESC/POS Mode

The following commands are effective when [Command Type] of the software switch is set to EPSON.

S: STANDARD MODE P: PAGE MODE

Setting: Command valid only for setup

Command	Hex code	S	P	Function
HT	09	O	O	Horizontal tabulation
LF	0A	O	O	Line feed
FF	0C	O	O	Data printing of PAGE MODE *1
CR	0D	O	O	Returning to printing
CAN	18		O	Canceling print data in PAGE MODE *1
DLE EOT	10 04	O	O	Real-time sending of status
DLE ENQ	10 05	O	O	Real-time request to printer
DLE DC4	10 14	O	O	Real-time output of specified pulse
ESC FF	1B 0C		O	Data printing in PAGE MODE *1
ESC RS	1B 1E	O		Buzzer Sounding *1
ESC SP	1B 20	O	O	Setting the spacing of characters
ESC !	1B 21	O	O	Collectively specifying a printing mode
ESC %	1B 25	O	O	Specifying/Canceling the download character
ESC &	1B 26	O	O	Defining the download characters
ESC *	1B 2A	O	O	Specifying the bit image mode
ESC –	1B 2D	O	O	Specifying/Canceling underline
ESC 2	1B 32	O	O	Specifying the 1/6 inch line feed rate
ESC 3	1B 33	O	O	Specifying the N/144 inch line feed rate
ESC <	1B 3C	O		Return form
ESC =	1B 3D	O	O	Selecting peripheral equipment
ESC ?	1B 3F	O	O	Deleting the download characters
ESC @	1B 40	O	O	Initializing the printer
ESC D	1B 44	O	O	Specifying horizontal tab positions
ESC E	1B 45	O	Setting	Specifying/Canceling emphasis printing
ESC G	1B 47	O	Setting	Specifying/Canceling double strike printing
ESC J	1B 4A	O	O	Printing + n/144 inch forward feeding
ESC L	1B 4C	O		Selecting PAGE MODE *1
ESC M	1B 4D	O	O	Selection of character fonts
ESC R	1B 52	O	O	Selecting the international character set
ESC S	1B 53		O	Selecting STANDARD MODE *1
ESC T	1B 54	Setting	O	Selection of character printing direction in PAGE MODE*1
ESC U	1B 55	O	O	Specifying/Canceling single direction printing
ESC V	1B 56	O	Setting	Specifying/Canceling 90° right-turned characters *1 (Only for product overseas)
ESC W	1B 57		O	Setting the print area in PAGE MODE *1
ESC a	1B 61	O	Setting	Aligning the characters
ESC c 3	1B 63 33	O	O	Selecting the paper-less detection valid for paper end signal output
ESC c 4	1B 63 34	O	O	Selecting the paper-less detection valid for print stop
ESC c 5	1B 63 35	O	O	Enabling/Disabling the panel switches
ESC d	1B 64	O	O	Printing + forward feeding by n line
ESC I	1B 69	O		Full cut
ESC m	1B 6D	O		Partial cut (Leaving one area uncut)
ESC p	1B 70	O	O	Generating the specified pulse
ESC r	1B 72	O	Setting	Selecting printing color (black, red)
ESC t	1B 74	O	O	Selecting the character code table
ESC u	1B 75	O	O	Selecting the status of peripheral equipment
ESC v	1B 76	O	O	Sending the status of paper end detector
ESC {	1B 7B	O	Setting	Specifying/Canceling the inverted characters
GS FF	1D 0C	O		Page feeding + cut operation *2
GS (A	1D 28 41	O		Execution of test printing
GS I	1D 49	O	O	Sending the printer ID
GS V	1D 56	O	O	Paper cutting

Command	Hex code	S	P	Function
GS a	1D 61	O	O	Enabling/Disabling Automatic Status Back
GS r	1D 72	O	O	Sending of status
FS g 1	1C 7B 31	O		Writing data into the user NV memory
FS g 2	1C 7B 32	O		Reading data from the user NV memory
FS p	1C 70	O		Printing the NV bit images
FS q	1C 71	O		Defining the NV bit images

*1: Incompatible with TM-U220.

*2: Command valid only at time of BM spec.

(These commands are effective only for model compatible with Japanese and Chinese specification.)

Command	Hex code	S	P	Function
FS !	1C 21	O	O	Collectively specifying the Chinese character mode
FS &	1C 26	O	O	Selecting the Chinese character mode
FS –	1C 2D	O	O	Specifying/canceling Chinese character underline
FS .	1C 2E	O	O	Canceling the Chinese character mode
FS 2	1C 32	O	O	Registering the download Chinese characters
FS ?	1C 3F	O	O	Deleting the download Chinese characters
FS C	1C 43	O	O	Selecting the code for kanji characters (Japanese only)
FS S	1C 53	O	O	Specifying the space for Chinese characters
FS W	1C 57	O	O	Specifying/canceling quadruple large Chinese characters

<Invalid command>

- Incompatible ESC command disregards 1 byte characters after ESC.
- Incompatible GS command disregards 1 byte characters after GS.
- Incompatible FS command disregards, including a parameter. (Only for product overseas)

Command	Hex code	S	P	Function
FS C	1C 43 n			Disregards 3-byte characters
FS –	1C 2D n			3 ↑
FS &	1C 26			2 ↑
FS .	1C 2E			2 ↑
FS ! n	1C 21 n			3 ↑
FS S n1 n2	1C 53 n1 n2			4 ↑

Horizontal Tab/HT

[ASCII]	HT
[Decimal]	9
[Hexadecimal]	09
[Parameter]	
[Description]	● Shifts the printing position to the next horizontal tab position. ● Sending of the HT code that exceeds the specified area (when it exceeds the last tab position in a line) will be ignored. ● The initial setting for horizontal tab position is set at intervals of 8 characters with 7 × 9 font pitch (9th, 17th, 25th columns). ● Horizontal tab positions can be set up by ESC D command. ● The moving position of HT is not underlined while underline is specified.

A new-line/LF

[ASCII]	LF
[Decimal]	10
[Hexadecimal]	0A
[Parameter]	
[Description]	● Line feed is performed. ● When printing data is in a reception buffer, line feeds after printing. ● Line feed rate is 24 dots (1/6 inch) in an initial state. ● Setup is possible from 0 to 255 dots with ESC 3 command. ● Returns to initial value of 24 dots with ESC 2 command.

Data printing in page mode or BM use/FF

[ASCII]	FF
[Decimal]	12
[Hexadecimal]	0C
[Parameter]	
[Description]	● It is this command at the page mode or BM use time, and it accepts and is effective. ● At time of a page mode – Package printing of the data of a printing area is carried out, and it returns to a standard mode. – All the data of an applicable page is eliminated after printing. ● At time of BM use When printing data is in a receiving buffer, it feeds the page so that the center of the next BM is at the head.

Returning to printing/CR

[ASCII]	CR
[Decimal]	13
[Hexadecimal]	0D
[Parameter]	
[Description]	● It prints the unprinted data in the buffer. ● In case of serial interface – Line feed is not performed. The next printing position becomes the head of line. ● In case of parallel interface – While the [AUTO LF] setting of the soft switch is OFF, line feed is not performed. The next printing position becomes the head of line. – While the [AUTO LF] setting of the soft switch is ON, line feed is performed. The next printing position becomes the head of line.

Data canceling in PAGE MODE/CAN

[ASCII]	CAN
[Decimal]	24
[Hexadecimal]	18
[Parameter]	
[Description]	● This command is effective only in PAGE MODE. ● Erases all data contained in the print area set in PAGE MODE. All data in the previously set print area are also erased if they are in the currently specified print area.

Real-time sending of status/DLE EOT

[ASCII] DLE EOT n
[Decimal] 16 4 n
[Hexadecimal] 10 04 n
[Parameter] 1≦n≦4
[Description]

- Sends in real-time the status specified by "n".
  n=1: Printer status.
  n=2: Status caused by an offline condition.
  n=3: Status caused by an error.
  n=4: Paper detector status.
- This command is dealt with when it is received. Each status represents the current status.
- The status is transferred without checking whether the host is ready to receive or busy.
- This command cannot be interleaved into the code string of another command consisting of 2 bytes or more codes.
- This command cannot be executed in a BUSY state under parallel interface.

(1) n=1: In case of printer status

Bit	Function	Value	
		0	1
0	Unused	Fixed at 0	
1	Unused	Fixed at 1	
2	Status of Pin 3 of Drawer	"L"	"H"
3	Online/Offline	Online	Offline
4	Unused	Fixed at 1	
5	Undefined	–	–
6	Undefined	–	–
7	Unused	Fixed at 0	

(2) n=2: In case of status caused by an offline condition

Bit	Function	Value	
		0	1
0	Unused	Fixed at 0	
1	Unused	Fixed at 1	
2	Status of rear cover	Lever closed	Lever closed
3	Paper feed by paper feed switch	Not in paper feed state	In paper feed state
4	Unused	Fixed at 1	
5	Printing stop because of "paper out" state	No stopping	Stopping
6	Error occurred	Not occurred	Occurred
7	Unused	Fixed at 0	

(3) n=3: In case of status caused by an error

Bit	Function	Value	
		0	1
0	Unused	Fixed at 0	
1	Unused	Fixed at 1	
2	Mechanical error occurred	No error	Error occurred
3	Auto Cutter error occurred	No error	Error occurred
4	Unused	Fixed at 1	
5	Unrecoverable error occurred	No error	Error occurred
6	Auto recovery error occurred	No error	Error occurred
7	Unused	Fixed at 0	

Bit 2: If home position error or black mark error occurred, it will become “1”.

Bit 3: If cut position error occurred, it will become “1”.

In Bit 2, 3, ENQ n ($1 \leqq n \leqq 2$) can be used to recover from the error after removing the cause of the error.

It is not possible, however, to recover from any error due to defect in hardware or mechanism.

Bit 5: If hardware error (RAM check, FROM write, 24V) occurred, it will become “1”.

Bit 6: If a head overheat is detected, it will become “1”. If the temperature falls, it will become “0”.

(4) n=4: In case of paper detector status

Bit	Function	Value	
		0	1
0	Unused	Fixed at 0	
1	Unused	Fixed at 1	
2	Detecting paper near-end	Paper found	Paper not found
3		Paper found	Paper not found
4	Unused	Fixed at 1	
5	Detecting paper-end	Paper found	Paper not found
6		Paper found	Paper not found
7	Unused	Fixed at 0	

Real-time request of status/DLE ENQ

[ASCII]	DLE	ENQ	n
[Decimal]	16	5	n
[Hexadecimal]	10	05	n

[Parameter] n=1, n=2

[Description]
- Responds in real-time to the request that the host specifies with number "n".
  - n=1: After recovering from an error, the printer resumes printing from the beginning of the line where the error occurred.
  - n=2: After clearing the receive buffer and the print buffer, the printer recovers from the error.
- This command is effective only when an auto cutter error has occurred.
- This command will be processed as it is received.
- This command cannot be interleaved into the code string of another command consisting of 2 bytes or more codes.
- This command cannot be executed in a BUSY state under parallel interface.

Real-time output of specified pulse/DLE DC4

[ASCII]	DLE	DC4	fn	m	t
[Decimal]	16	05	fn	m	t
[Hexadecimal]	10	05	fn	m	t

[Parameter] fn=1 fixed m=0, 1 $1 \leqq t \leqq 8$

[Description]
- A signal specified with "t" is output at real time to the connector pin specified with "m".
  Drawer Kick-Out Connector m=0: Pin No. 2 m=1: Pin No. 5
  On/Off [t × 100ms]
- This command will be processed as it is received.
- This command cannot be interleaved into the code string of another command consisting of 2 bytes or more codes.
- This command cannot be executed in a BUSY state under parallel interface.

Buzzer sounding/ESC RS

[ASCII]	ESC	RS
[Decimal]	27	30
[Hexadecimal]	1B	1E

[Parameter]

[Description]
- This command is effective only when buzzer setting of the software switch is set to ON.
- If the command is received, buzzer sounds for approx. 200ms.

Data printing in PAGE MODE/ESC FF

[ASCII]	ESC	FF
[Decimal]	27	12
[Hexadecimal]	1B	0C
[Parameter]		

[Description]

- This command is effective only in PAGE MODE.
- Executes a batch printout of data mapped in the print area in PAGE MODE. Data, ESC T and ESC W settings and the character mapping position are held even after printing.

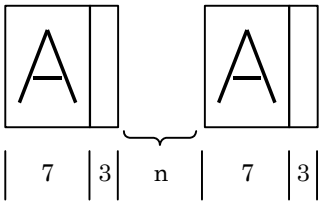
Setting the spacing of characters/ESC SP

[ASCII]	ESC	SP	n
[Decimal]	27	32	n
[Hexadecimal]	1B	20	n

[Parameter] $0 \leqq n \leqq 255$

[Description]

- Sets the spacing of characters in half-dot unit.
- "n" indicates the number of dots. Calculation unit is 1/160 inch.
- Default n=0
- Sets the right spacing of characters to [n × basic calculation pitch] inches.
- If the horizontal magnification of character is 2 or more, the spacing increases with the magnification.
- Character width used during horizontal tab position, left margin, right margin setting includes space between characters.
- In PAGE MODE, if the start point is top left or bottom right, the horizontal basic calculation pitch 1/160 is used. If the start point is top right or bottom left, the vertical basic calculation pitch 1/144 is used.

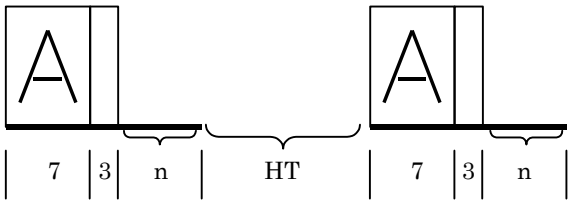


Collectively specifying a printing mode/ESC !

[ASCII] ESC ! n
[Decimal] 27 33 n
[Hexadecimal] 1B 21 n
[Parameter] 0≦n≦255
[Description] ● Printing mode is specified with each bit by combination.
● Printing mode is specified with each bit under n.

Bit	7	6	5	4	3	2	1	0
Function	Under-line	Unused	Double width	Double height	Emphasis	Unused	Unused	FONT
At 1	ON	–	ON	ON	ON	–	–	7 × 9
At 0	OFF	–	OFF	OFF	OFF	–	–	9 × 9

● An underline is attached to the character space <ESC SP n> but not attached to the part having been skipped by the horizontal tab.



Specifying/Canceling the download character set/ESC %

[ASCII]	ESC	%	n
[Decimal]	27	37	n
[Hexadecimal]	1B	25	n

[Parameter] 0≦n≦FFh

[Description]
- Specifying/Canceling the download characters.
- The lowest bit "n0" is valid for "n".
  With n=<*******0>B, the download character set is canceled.
  With n=<*******1>B, the download character set is specified.
- Only the lowest bit is valid for "n".
- If the download character set is canceled, the internal character set will be automatically specified.
- The initial value is n=0.

Defining the download characters/ESC &

[ASCII]	ESC	&	s	n	m	a	p1…	pn
[Decimal]	27	38	s	n	m	a	p1…	pn
[Hexadecimal]	1B	26	s	n	m	a	p1…	pn

[Parameter]
s=2h
20h≦n≦m≦7Eh
In case of 9 × 9 0≦a≦0Ch
In case of 7 × 9 0≦a≦09h
0≦p1…pn≦255

[Description]
- "s" indicates the number of bytes in vertical direction.
- "n" indicates the start character code and "m" indicates the end character code. To define only one character, set n=m.
- "a" indicates the number of dots in horizontal direction.
- Definable character codes include 95 characters at maximum in the range of ASCII code (20h to 7Eh).
- "pn" is the data to be defined, which indicates the pattern equal to "a" dots in horizontal direction from the left end. The rest of pattern on the right side is filled with space.
- Once download characters are defined, they remain valid until redefinition, execution of ESC "@" and delete by ESC ? or power OFF is performed.

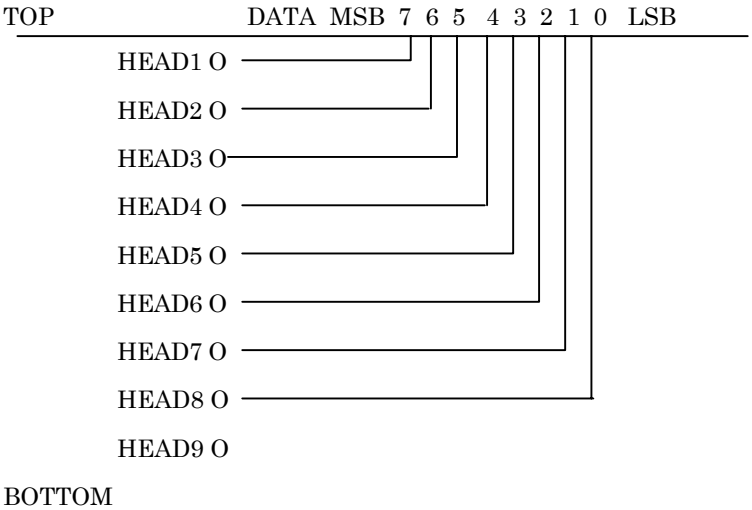
Specifying the bit image mode/ESC *

[ASCII] ESC * m nL nH dn
[Decimal] 27 42 m nL nH dn
[Hexadecimal] 1B 2A m nL nH dn
[Parameter] m=0, 1 0≦nL≦FFh 0≦nH≦03h
[Description]

- According to the bit image mode specified by m, bit image data are printed.
- The number of dots printed is specified as nL, nH in 16 bits.
  Dot width=nL + (256 × nH)
- If bit image data have been input excess of dot positions that can be printed on one line, the excess data are discarded.
- Concerning bit image data (dn), bits to be printed are specified as "1" and bits not to be printed as "0".
- The printing modes specified by m are as follows:

m(h)	Mode	Vertical direction	Horizontal direction
		No. of Dots	Max. Dot Density
0	8-dots single density	8	200/210
1	8-dots double density	8	400/420

- When the value of m is out of the above range, the data after nL is processed as normal printing data.
- If bit image data have been input excess of dot positions that can be printed on one line, the excess data are discarded.



Specifying/Canceling an underline/ESC –

[ASCII]	ESC	–	n
[Decimal]	27	45	n
[Hexadecimal]	1B	2D	n

[Parameter] 0, 1, 2, 30h, 31h, 32h

[Description]
- Specifying/Canceling an underline.
- An underline is attached to the full character width but not attached to the part having been skipped by the horizontal tab (HT) and the dot position shifts.
- The kinds of underline specified by n are as follows:
  n=0: Canceling an underline.
  n=1, 2: Specifying an underline for 1-dot width.
- The width of underline is a specified width regardless of character size.
- The underline can be specified also by ESC !, but the last processed command will become effective.
- The initial value is n=0.

Specifying the 1/6-inch line feed rate/ESC 2

[ASCII]	ESC	2
[Decimal]	27	50
[Hexadecimal]	1B	32

[Parameter]

[Description]
- Sets the line feed rate per line to 1/6-inch.

Setting the line feed rate/ESC 3

[ASCII]	ESC	3	n
[Decimal]	27	51	n
[Hexadecimal]	1B	33	n

[Parameter] $0 \leq n \leq 255$

[Description]
- Sets the line feed rate per line to [n × 1/144] inches.
- The initial value is n=24 and approximately 1/6 inches (4.25mm).
- In PAGE MODE, if the start point is top left or bottom right, the horizontal basic calculation pitch 1/144 is used. If the start point is top right or bottom left, the vertical basic calculation pitch 1/160 is used.

Return home/ESC <

[ASCII]	ESC	<	
[Decimal]	27	60	
[Hexadecimal]	1B	3C	
[Parameter]			
[Description]	● This command is effective only in STANDARD MODE.		
	● Perform home position detection and return to a centering position.		

Data input control/ESC =

[ASCII]	ESC	=	n
[Decimal]	27	61	n
[Hexadecimal]	1B	3D	n
[Parameter]	n=1, 2, 3		
[Description]	● Selects a peripheral equipment for which data input from the host is valid.		

n	Function
1	Only printer is valid.
2	Only customer display is valid.
3	Both printer and customer display are valid.

● When the printer has not been selected (n=2), the printer abandons all received data until it is selected by this command (excluding DLE, EOT DLE, ENQ).
● The initial value is n=1.
● Returns to n=1 state by ESC @ under n=3 (Both printer and customer display are valid).

Deleting the download characters/ESC ?

[ASCII]	ESC	?	n
[Decimal]	27	63	n
[Hexadecimal]	1B	3F	n

[Parameter] 20≦n≦7E

[Description]
- Deletes the download characters of specified code.
- "n" indicates the code of characters to be deleted.
- This command deletes the character font selected by ESC !.
- If the specified character code is undefined, this command will be ignored.

Initializing the printer/ESC @

[ASCII]	ESC	@
[Decimal]	27	64
[Hexadecimal]	1B	40

[Parameter]

[Description]
- Clears data stored in the print buffer and initializes various settings.
- Data in the receiving buffer are maintained.
- NV bit image definitions are maintained.
- User NV memory data are maintained.

Setting the horizontal tab format/ESC D

[ASCII]	ESC	D	n1…	nK	NULL
[Decimal]	27	68	n1…	nK	NULL
[Hexadecimal]	1B	44	n1…	nK	NULL

[Parameter] 1≦n≦255 0≦k≦32

[Description]
- The tab position is set to the position defined by "character width × n from the left margin". "k" indicates the number of horizontal tab position data to be set.
- At this time, the character width includes space between characters. If a horizontal magnification of character is specified, the character width will increase with the magnification.
- <nK> which denotes a setting position is processed in the increasing order and ends at <00>h. When <nK> is equal to or smaller than its preceding <nK−1>, the tab setting is finished. Then, the next data onward will be processed as normal data.
- Settable tab positions are maximum 32. Tab positions specified exceeding this limit is ignored.
- ESC "D" NULL clears all the set tab positions. The horizontal tab (HT) command after clearing is ignored.
- Default is 7 × 9 and positions at eight-character intervals (9th, 17th, 25th, 33rd,... "n"th columns).

Specifying/Canceling emphasis printing/ESC E

[ASCII]	ESC	E	n
[Decimal]	27	69	n
[Hexadecimal]	1B	45	n
[Parameter]	0≦n≦FFh		
[Description]	● Specifies/Cancels the printing of emphasized characters. ● "n" is valid for the lowest bit (n0). ● Control by the lowest bit is as follows: n=0: Canceling emphasis printing. (Initial value) n=1: Specifying emphasis printing.		

Specifying/Canceling double strike printing/ESC G

[ASCII]	ESC	G	n
[Decimal]	27	71	n
[Hexadecimal]	1B	47	n
[Parameter]	0≦n≦FFh		
[Description]	● Specifies/Cancels the double strike printing. ●"n" is valid for the lowest bit (n0). ● Control by the lowest bit is as follows: n=0: Canceling double strike printing. (Initial value) n=1: Specifying double strike printing.		

Printing and feeding paper/ESC J

[ASCII]	ESC	J	n
[Decimal]	27	74	n
[Hexadecimal]	1B	4A	n
[Parameter]	0≦n≦FFh		
[Description]	● Prints data stored in the print buffer and feeds paper by [n × 1/144] inches. ● After execution of this command, the beginning of line becomes the next print start position. ● This command does not affect the line feed width defined by ESC 2 or ESC 3. ● In PAGE MODE, if the start point is top left or bottom right, the horizontal basic calculation pitch 1/144 is used. If the start point is top right or bottom left, the vertical basic calculation pitch 1/160 is used.		

Selecting PAGE MODE/ESC L

[ASCII] ESC L
[Decimal] 27 76
[Hexadecimal] 1B 4C
[Parameter]
[Description]

- Switches from STANDARD MODE to PAGE MODE.
- This command becomes effective only if it is entered at the head of line.
- With FF code or ESC S, ESC @, STANDARD MODE is restored.
- The starting position of character mapping will be the point specified by ESC T within the print area specified by ESC W.
- The settings by the following commands, which have separate settings for PAGE MODE and STANDARD MODE, are changed to the settings for PAGE MODE.
  Spacing setting: ESC SP
  Line feed setting: ESC 2, ESC 3
- In PAGE MODE, the following commands are effective only for setting.
  (1) ESC V Specifying/Canceling 90°-turned characters.
  (2) ESC a Alignment of characters
  (3) ESC { Specifying/Canceling inverted characters
- In PAGE MODE, the following commands are ignored.
  (1) GS (A Execution of test printing
- In PAGE MODE, the following commands become invalid.
  (1) FS p Printing of NV bit image
  (2) FS q Definition of NV bit image
  (3) FS g 1 Data writing to user NV memory
  (4) FS g 2 Data reading to user NV memory

Selection of character fonts/ESC M

[ASCII] ESC M n
[Decimal] 27 77 n
[Hexadecimal] 1B 4D n
[Parameter] 0, 1, 30h, 31h
[Description]

- Selects character fonts.
- The kinds of font specified by n are as follows:
  n=0, 30 h: 9 × 9 dot font
  n=1, 31 h: 7 × 9 dot font
- The initial value is n=0.

Selecting the international character set/ESC R

[ASCII] ESC R n
[Decimal] 27 82 n
[Hexadecimal] 1B 52 n
[Parameter] 0≦n≦15, 64
[Description]
- Select the international character set.
- Default is U.S.A.
  n=0

n(HEX)	International character set
0	U.S.A.
1	France
2	Germany
3	U.K.
4	Denmark
5	Sweden
6	Italy
7	Spain
8	Japan
9	Norway
10	Denmark 2
11	Spain 2
12	Latin America
13	Korea
14	Slovenia/Croatia
15	China
64	Legal

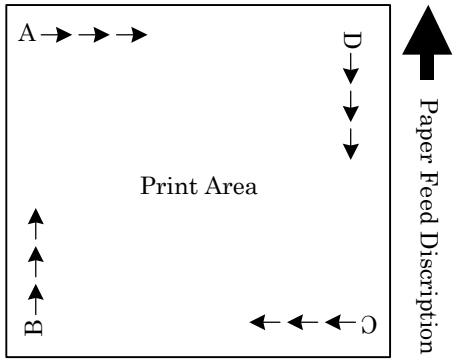
Selecting STANDARD MODE/ESC S

[ASCII] ESC S
[Decimal] 27 83
[Hexadecimal] 1B 53
[Parameter]
[Description]
- Switches from PAGE MODE to STANDARD MODE.
- This command is effective only if it is entered in PAGE MODE.
- Data mapped in PAGE MODE are cleared.
- The print area defined by ESC W is initialized.
- The settings by the following commands, which have separate settings for PAGE MODE and STANDARD MODE, are changed to the settings for PAGE MODE.
  (1) Spacing setting: ESC SP
  (2) Line feed setting: ESC 2, ESC 3
- When the printer is powered ON or reset, or when ESC @ is executed, STANDARD MODE is selected.

Selection of character printing direction in PAGE MODE/ESC T

[ASCII] ESC T n
[Decimal] 27 84 n
[Hexadecimal] 1B 54 n
[Parameter] 0≦n≦3h, 30h≦n≦33h
[Description] ● Selects the printing direction and starting point of characters in PAGE MODE.

n	Printing direction	Starting point
0, 30h	Left to right	Top left (A in the figure)
1, 31h	Bottom to top	Bottom left (B in the figure)
2, 32h	Right to left	Bottom right (C in the figure)
3, 33h	Top to bottom	Top right (D in the figure)



- In STANDARD MODE, only internal settings of printer will be executed with this command.
- The character mapping position will be the starting point within the print area specified by ESC W.
- Default is n=0.
- In Chinese and Japanese specification, only N=0, 2, 30h, 32h is valid.

Specifying/Canceling single direction printing/ESC U

[ASCII] ESC U n
[Decimal] 27 85 n
[Hexadecimal] 1B 55 n
[Parameter] 0≦n≦FFh
[Description] ● Specifies/cancels the single direction printing.
● "n" is valid for the lowest bit (n0).
● Control by the lowest bit is as follows:
n=0: Cancel the single direction printing. (Initial value)
n=1: Specify the single direction printing.

Specifying/Canceling 90°-right-turned characters/ESC V

[ASCII] ESC V n
[Decimal] 27 86 n
[Hexadecimal] 1B 56 n
[Parameter] 0≦n≦1h, 30h≦n≦31h
[Description]
- Specifying/Canceling 90°-right-turned characters.
- Depending on the "n" value, specifying or canceling is performed as follows:

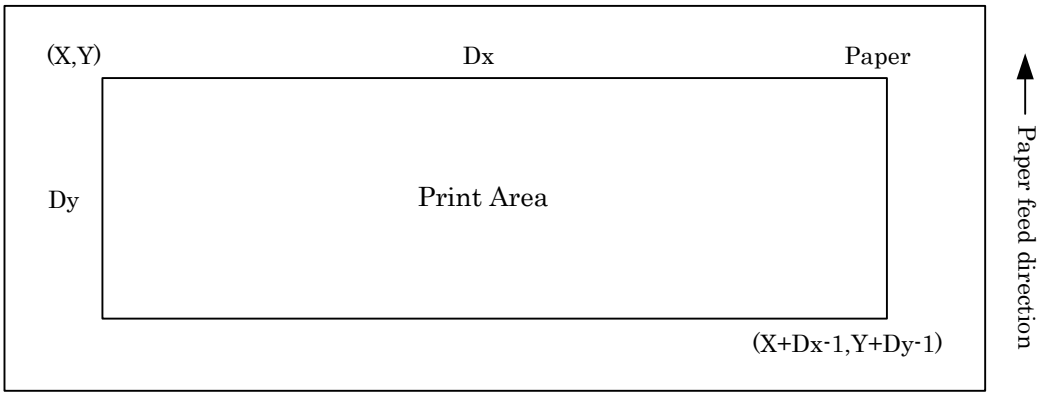
n	Function
0, 30	Canceling 90°-right-turned characters.
1, 31	Specifying 90°-right-turned characters.

- In PAGE MODE, settings with this command are not affected.
- In PAGE MODE, this command executes only the internal flagging of printer without affecting printing in PAGE MODE.
- Default is n=0.
- This command is not valid in Chinese and Japanese specification.

Setting the print area in PAGE MODE/ESC W

[ASCII] ESC W xL xH yL yH dxL dxH dyL dyH
[Decimal] 27 W xL xH yL yH dxL dxH dyL dyH
[Hexadecimal] 1B W xL xH yL yH dxL dxH dyL dyH
[Parameter] 0≦xL, xH, yL, yH, dxL, dxH, dyL, dyH ≦FFh
dxL=dxH=0 or dyL=dyH=0
[Description]
- Sets the location and the size of print area.
  Horizontal start point = xL + xH × 256 / Vertical start point = yL + yH × 256
  Horizontal length = d xL + dxH × 256 / Vertical Length = dyL + dyH × 256
- In STANDARD MODE, this command executes only the internal flagging of printer without affecting printing in STANDARD MODE.
- If the horizontal start point or the vertical start point is out of the printable area, this command will be canceled and the next data will be processed as normal printing data.
- If the horizontal length or the vertical length is 0, this command will be canceled and the next data will be processed as normal printing data.
- The character mapping position will be the start point specified by ESC T in the print area.
  If the (horizontal start point + horizontal length) exceeds the horizontal printable area, the (horizontal printable area − horizontal start point) will be taken as a horizontal length.
  If the (vertical start point + vertical length) exceeds the vertical printable area, the (vertical printable area − vertical start point) will be taken as a vertical length.
- If the calculation leaves a fraction, the fraction will be corrected with the minimum pitch of the mechanism (203DPI) and the remainder will be omitted. The horizontal start point and the horizontal length are calculated with the basic calculation pitch 1/160. The vertical start point and the vertical length are calculated with the basic calculation pitch 1/72.

- The print area, where the horizontal start point is X, the vertical start point is Y, the horizontal length is Dx and the vertical length is Dy, will be as shown in the figure below.
- The horizontal length of printable area for this printer is 4 inches and the vertical length is ? inches.



- An initial value is xL=xH=yL=yH=0.
  dxL=B0, dxH=01, dyL=AA, dyH = it is 03.

Aligning the characters/ESC a

[ASCII] ESC a n
[Decimal] 27 97 n
[Hexadecimal] 1B 61 n
[Parameter] 0≦n≦2h, 30h≦n≦32h
[Description]

- Print data are aligned in the specified position.
- Depending on the "n" value, alignment is carried out as follows:

n	Function
0, 30	Left end alignment
1, 31	Centering
2, 31	Right end alignment

- This command is valid only at the head of line.
- Default is n=0.
- In PAGE MODE, this command executes only the internal flagging of printer without affecting printing in PAGE MODE.

Left end alignment

ABC
ABCD
ABCDE

Centering

ABC
ABCD
ABCDE

Right end alignment

ABC
ABCD
ABCDE

Selecting the paper end sensor valid for paper end signal output/ESC c 3

[ASCII] ESC c 3 n
[Decimal] 27 99 51 n
[Hexadecimal] 1B 63 33 n
[Parameter] 0≦n≦FFh
[Description]
- Selects a sensor with which output to PE signal of Centronics parallel I/F is performed.
- Each bit of "n" means as follows:

Bit	Function	Value	
		Hexadecimal	Decimal
0	Paper near-end sensor disabled	00	0
	Paper near-end sensor enabled	01	1
1	Paper near-end sensor disabled	00	0
	Paper near-end sensor enabled	02	2
2	Paper end sensor disabled	00	0
	Paper end sensor enabled	04	4
3	Paper end sensor disabled	00	0
	Paper end sensor enabled	08	8
4	Undefined		
5	Undefined		
6	Undefined		
7	Undefined		

- This command is valid only for Parallel Interface specification. This command is ignored on Serial Interface specification.
- When this command is executed, sensors are switched. Therefore, depending on reception buffer conditions, change in PE signal may be delayed upon the command receiving.
- If either of bit 2 and bit 3 is 1, a roll paper near-end sensor will be selected as a paper end sensor effective for paper end signal output.
- Default is n=15.

Selecting the paper sensor valid for print stop/ESC c 4

[ASCII]	ESC	c	4	n
[Decimal]	27	99	52	n
[Hexadecimal]	1B	63	34	n

[Parameter] 0≦n≦FFh

[Description]

- Selects the paper end sensor which helps to stop printing when a near-end condition occurs.

Bit	Function	Value	
		Hexadecimal	Decimal
0	Paper near-end sensor disabled	00	0
	Paper near-end sensor disabled	01	1
1	Paper near-end sensor disabled	00	0
	Paper near-end sensor disabled	02	2
2	Undefined		
3	Undefined		
4	Undefined		
5	Undefined		
6	Undefined		
7	Undefined		

- Printing stops after printing of the current line and paper feed are completed.
- If printing stops, it will become offline.
- If either of bit 0 and bit 1 is 1, a roll paper near-end sensor will be selected as a paper end sensor effective for print stop.
- Default is n=0.

Enabling/Disabling the operation panel switches/ESC c 5

[ASCII]	ESC	c	5	n
[Decimal]	27	99	53	n
[Hexadecimal]	1B	63	35	n

[Parameter] 0≦n≦FFh

[Description]
- Switches enabling/disabling the paper feed switch on the operation panel.
- "n" is valid for the lowest bit "n0".
  - n=<*******0>B enables the paper feed switch.
  - n=<*******1>B disables the paper feed switch.
- While a cover is opened, the switch is invalid regardless of specification with this command.
- As for the operation key with the exception of paper feed, the switch is valid regardless of specification with this command.
- Default is n0=0.

Printing and feeding paper by "n" lines/ESC d

[ASCII]	ESC	d	n
[Decimal]	27	100	n
[Hexadecimal]	1B	64	n

[Parameter] 0≦n≦255

[Description]
- Prints date in the print buffer and feeds paper by "n" lines.
- The next print start position is set at the head of line.
- If the maximum feeding amount exceeds 40 inches, paper feeding by 40 inches will be executed.

Full cut/ESC i

[ASCII]	ESC	i	
[Decimal]	27	105	
[Hexadecimal]	1B	69	
[Parameter]			
[Description]	● Executes full cut of Receipt paper.		
	● This command is effective only at the head of line.		
	● We recommend to observe an interval between cuts of 3 seconds or more.		

Partial cut/ESC m

[ASCII]	ESC	m	
[Decimal]	27	109	
[Hexadecimal]	1B	6D	
[Parameter]			
[Description]	● Executes partial cut of Receipt paper (leaving one area uncut).		
	● This command is effective only at the head of line.		
	● We recommend to observe an interval between cuts of 3 seconds or more.		

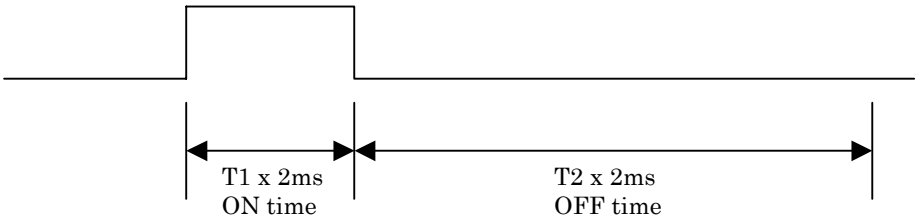
Generating the specified pulses/ESC p

[ASCII]	ESC	p	m	n1	n2
[Decimal]	27	112	m	n1	n2
[Hexadecimal]	1B	70	m	n1	n2
[Parameter]	0≦m≦1	30h≦m≦31h	0≦n1≦FFh		0≦n2≦FFh
[Description]	● The signals specified by “n1” and “n2” are output to the drawer kick-out connector pin specified by “m”.				

m	Connector pin
0, 30	Drawer kick-out connector pin No. 2
1, 31	Drawer kick-out connector pin No. 5

● The ON time is n1 × 2ms, and the OFF time is n2 × 2ms.

● In case of n2<n1, the OFF time is n1 × 2ms for execution.



Selecting printing color/ESC r

[ASCII] ESC r n
[Decimal] 27 114 n
[Hexadecimal] 1B 72 n
[Parameter] 0≦n≦1 30h≦n≦31h
[Description] ● Specifies the color with n.

n	Selection of color
0, 30h	Black
1, 31h	Red

● This command is effective only at the head of line.
● Default is n=0.

Selecting the character code table/ESC t

[ASCII] ESC t n
[Decimal] 27 116 n
[Hexadecimal] 1B 74 n
[Parameter] 0≦n≦255h n=FFh
[Description] ● The character code table depending on the value of "n" is as follows:

n	Character code
0	PC437 (USA: Standard Europe)
1	Katakana
2	PC850 (Multilingual)
3	PC860 (Portugal)
4	PC863 (Canada−French)
5	PC865 (Norway)
6	PC852 (Latin 2)
7	PC866 (Russian)
8	PC857 (Turkey)
9	WPC1252
16	WPC1252
17	PC866 (Russian)
18	PC852 (Latin 2)
19	PC858 (EURO)
255	Blank page

● The initial value of "n" is n=0.

Status signal of peripheral equipment/ESC u

[ASCII] ESC u n
[Decimal] 27 117 n
[Hexadecimal] 1B 75 n
[Parameter] n=0
[Description]
- Sends the current status of drawer kick-out connector pin No.3 (1 byte).
- This command is valid only at Serial I/F.
- The status to be sent is 1 byte and its details are as follows:

Bit	Function	Value	
		0	1
0	Level of No.3 pin	"L"	"H"
1	Undefined		
2	Undefined		
3	Undefined		
4	Unused	Fixed at 0	
5	Undefined		
6	Undefined		
7	Undefined		

- If the serial protocol is DTR and is only valid at serial I/F, before sending a signal, the printer will check that the host is ready for receiving. If the host is not ready for receiving, the printer will wait till it becomes ready for receiving. If the serial protocol is XON/XOFF, the printer will not check that the host is ready for receiving.

Sending the printer status/ESC v

[ASCII] ESC v
[Decimal] 27 118
[Hexadecimal] 1B 76
[Parameter]
[Description]
- Sends the current printer status (1 byte).

Bit	Function	Value	
		0	1
0	Paper near-end sensor	Paper-in	Paper-out
1	Paper near-end sensor	Paper-in	Paper-out
2	Paper end sensor	Paper-in	Paper-out
3	Paper end sensor	Paper-in	Paper-out
4	Unused	Fixed at 0	
5	Download of ANK or Kanji	No download	Download enabled
6	Download of bit image	Fixed at 0	
7	Unused	Fixed at 0	

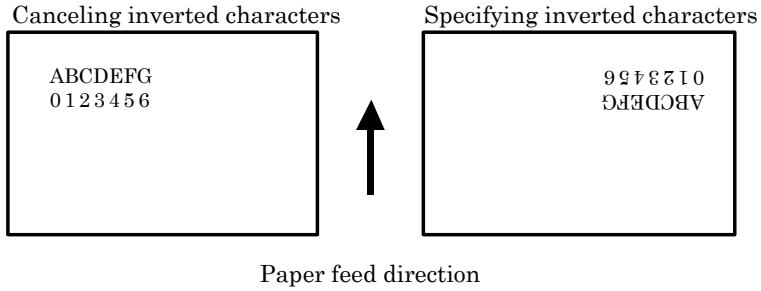
- If the serial protocol is DTR and is only valid at serial I/F, before sending a signal, the printer will check that the host is ready for receiving. If the host is not ready for receiving, the printer will wait till it becomes ready for receiving. If the serial protocol is XON/XOFF, the printer will not check that the host is ready for receiving.

Specifying/Canceling inverted characters/ESC {

[ASCII]	ESC	{	n
[Decimal]	27	123	n
[Hexadecimal]	1B	7B	n

[Parameter] 0≦n≦FFh

[Description]
- Specifies/Cancels inverted characters.
- "n" is valid for the lowest bit.
  - n=<*******0>B Cancels inverted characters.
  - n=<*******1>B Specifies inverted characters.
- Default is n0=0.
- This command is effective only at the head of line.



- In PAGE MODE, this command executes only the internal flagging of printer. This command doesn't affect printing in PAGE MODE.

Page feed + Full cut at time of BM specification / GS FF

[ASCII] GS FF
[Decimal] 29 12
[Hexadecimal] 1D 0C
[Parameter]
[Description]

- The command is effective only at time of BM specification.
- During the reception of the command:
  - When auto cutter is valid: BM center skips to auto cut position and performs full cut after page feed.
  - When auto cutter is invalid: BM center skips to maual cut position and performs full cut after page feed.
- When using this command, area between head and cut becomes unprintable area.
  - When auto cutter is valid: Approx. 19mm
  - When auto cutter is invalid: Approx. 28mm
- When performing a partial cut, set the [CUTTER] of the software switch to PAR.

Execution of test printing/GS (A

[ASCII]	GS	(	A	pL	pH	n	m
[Decimal]	29	40	65	pL	pH	n	m
[Hexadecimal]	1B	28	41	pL	pH	n	m

[Parameter] pL=2, ph=0 (fixed)
$0 \leqq n \leqq 2$, $30h \leqq n \leqq 32h$
$1 \leqq m \leqq 3$, $31h \leqq m \leqq 33h$
[Description]

- Specifies the paper by n, pattern by m, and prints the test pattern >.

n	Kind of paper
0 or 30h	Roll paper
1 or 31h	Roll paper
2 or 32h	Roll paper

m	Test pattern
1 or 31h	HEX DUMP
2 or 32h	Setting for soft switch
3 or 33h	ASCII sliding

- This command is effective only at the head of line.
- Printer is automatically reset after the end of printing and returns to initial power-on status.
- The printer state will be BUSY if process by this command is started.
- This command is ignored when PAGE MODE is selected.

Sending the printer ID/GS I

[ASCII] GS I n
[Decimal] 29 73 n
[Hexadecimal] 1D 49 n
[Parameter] 1≦n≦3, 49≦n≦51, 65≦n≦69
[Description] ● Sends the specified printer ID.

n	Type of printer ID	Specification	Value (Hex.)
1, 49	Model ID	CD-S series	79
2, 50	Type ID	Refer to Table "Type ID".	
3, 51	ROM version	As per ROM version	
65	Firmware version	As per firmware version	
66	Maker name	CBM	
67	Model name	CD-S500	
68	Serial number	As per serial number	
69	Type of Kanji	–	

Table "Type ID"

Bit	Function	Hex.	Decimal
0	Not equipped for 2 byte code	00	0
	Equipped for 2 byte code	01	1
1	Equipped with auto cutter	02	2
2	Direct connection of customer display	00	0
3	Without MICR reader	00	0
4	Unused	00	0
5	Undefined	–	–
6	Undefined	–	–
7	Unused	00	0

- When Serial Interface is being used, under DTR/DSR control, the printer sends the printer ID after checking that the host is ready to receive.
  If the host is not ready to receive, the printer will wait until the host becomes ready to receive. Under XON/XOFF control, the printer sends the printer ID without checking whether the host is ready to receive or not.
- This command is executed at the time of mapping of the receive buffer.
  Therefore, depending on the state of receive buffer, a delay between command receiving and printer ID sending may occur.
- By specifying (1≦n≦3, 49≦n≦51), one byte of printer ID will be sent.
- If ASB is enabled by GS a, it is necessary to discriminate between the printer ID due to this command and the status due to ASB.
- By specifying (65≦n≦69), the following printer information will be sent.
  Header : Hexadecimal=5FH/Decimal=95 (1 byte)
  Data : Printer information
  NUL : Hexadecimal : 00H/Decimal = 0 (1 byte)

After data processing is completed, the following process will be executed.

(1) The process of (READY→BUSY) is executed. At this time, if the printer state has already been BUSY, the printer will do nothing.
(2) The sending process of "Header + Data +NULL" is executed.
(3) The process of (BUSY→READY) is executed. At this time, if the printer state has already been set to BUSY due to other causes, the printer will do nothing.

Paper cutting/GS V

[ASCII]	GS	V	m		–	(1)
[Decimal]	29	86	m			
[Hexadecimal]	1D	56	m			
[Form]	GS	V	m	n	–	(2)
[Decimal]	29	86	m	n		
[Hexadecimal]	1D	56	m	n		

[Parameter] (1) m=0, 1 m=48, 49
(2) m=65, 66 0h≦n≦255

[Description]
- Executes the specified paper cutting.
- This command is effective only at the head of line.

m	Function
0, 48	Full cut
1, 49	Partial cut (leaving one portion uncut)
65	Paper feed by (cut position + n × 1/144) and full cut
66	Paper feed by (cut position + n × 1/144) and partial cut (leaving one portion uncut)

In case of (1)
- In case of m=0, full cut is executed.
- In case of m=1, partial cut is execute.

In case of (2)
In case of n=0, after paper is fed to the cut position, paper is cut.
In case of n≠0, after paper is fed to the position exceeding the cut position by (n × 1/144) inches, paper is cut.

- We recommend to observe an interval between cuts of 3 seconds or more.

Enabling/Disabling Automatic Status Back/GS a

[ASCII] GS a n
[Decimal] 29 97 n
[Hexadecimal] 1D 61 n
[Parameter] 0≦n≦FFh
[Description] ● Selects the status to be addressed by Automatic Status Back (ASB : Automatic Status Back)

Bit	Status to be addressed by ASB	Value	
		Hex.	Decimal
0	Status of Drawer kick-out connector No. 3 pin = Disabled	00	0
	Status of Drawer kick-out connector No. 3 pin = Enabled	01	1
1	Online/Offline status = Disabled	00	0
	Online/Offline status = Enabled	02	2
2	Error status =Disabled	00	0
	Error status =Enabled	04	4
3	Continuous paper sensor = Disabled	00	0
	Continuous paper sensor =Enabled	08	8
4	Undefined	–	–
5	Undefined	–	–
6	Undefined	–	–
7	Undefined	–	–

- If any one of statuses is enabled, the status at the time of execution of this command will be sent. After that, the status will be sent each time an enabled status changes.
- If all statuses are disabled, the ASB function will be disabled.
- The 4 byte statuses shown in the tables below are sent without checking that the host is ready to receive or busy.
- The 4 byte statuses are continuous except XOFF code.

The 1st byte (Printer information)

Bit	Status	Value	
		Hex.	Decimal
0	Unused	00	0
1	Unused	00	0
2	Status of Drawer kick-out connector No. 3 pin = “L”	00	0
	Status of Drawer kick-out connector No. 3 pin = “H”	04	4
3	Online status	00	0
	Offline status	08	8
4	Unused	10	16
5	Rear/front cover closed	00	0
	Rear/front cover opened	20	32
6	Not in the state of paper feeding by the paper feed switch	00	0
	In the state of paper feeding by the paper feed switch	40	64
7	Unused	00	0

The 2nd byte (Error occurrence information)

Bit	Status	Value	
		Hex.	Decimal
0	Undefined	00	0
1	Undefined	00	0
2	No occurrence of mechanical error	00	0
	Occurrence of mechanical error	04	4
3	No occurrence of auto cutter error	00	0
	Occurrence of auto cutter error	08	8
4	Unused	00	0
5	No occurrence of unrecoverable error	00	0
	Occurrence of unrecoverable error	20	32
6	No occurrence of auto recovery error	00	0
	Occurrence of auto recovery error	40	64
7	Unused	00	0

The 3rd byte (Paper sensor information)

Bit	Status	Value	
		Hex.	Decimal
0, 1	Roll paper near-end = Paper-in	00	0
	Roll paper near-end = Paper-out	03	3
2, 3	Roll paper end = Paper-in	00	0
	Roll paper end = Paper-out	0C	12
4	Unused	00	0
5	Undefined	–	–
6	Undefined	–	–
7	Unused	00	0

The 4th byte (Paper sensor information)

Bit	Status	Value	
		Hex.	Decimal
0	Undefined	–	–
1	Undefined	–	–
2	Undefined	–	–
3	Undefined	–	–
4	Unused	00	0
5	Undefined	–	–
6	Undefined	–	–
7	Unused	00	0

- Default: n=0

Sending of status/GS r

[ASCII] GS r n
[Decimal] 29 114 n
[Hexadecimal] 1D 72 n
[Parameter] 1≦n≦2h, 49≦n≦50
[Description] ● Sends the specified status.

n=1, 49: Sends the paper sensor status. Cancels inverted characters.
n=2, 50: Sends the drawer kick-out connector status.

● When Serial Interface is used,

In case of DTR/DSR control.....The printer sends the status after checking that the host is ready to receive. If the host isn't ready to receive, the printer will wait until it becomes ready to receive.

In case of XON/XOFF control.....The printer sends the status without checking whether the host is ready to receive or not.

● This command is executed at time of editing.

Paper sensor status (n=1, 49)

Bit	Status	Value	
		Hex.	Decimal
0, 1	Roll paper near-end = Paper-in	00	0
	Roll paper near-end = Paper-out	03	3
2, 3	Roll paper end = Paper-in	00	0
	Roll paper end = Paper-out	(0C)	(12)
4	Unused	00	0
5	Undefined	–	–
6	Undefined	–	–
7	Unused	00	0

Drawer kick connector status (n=2, 50)

Bit	Status	Value	
		Hex.	Decimal
0	Status of Pin 3 of Drawer "L"	00	0
	Status of Pin 3 of Drawer "H"	01	1
1	Undefined	–	–
2	Undefined	–	–
3	Undefined	–	–
4	Unused	00	0
5	Undefined	–	–
6	Undefined	–	–
7	Unused	00	0

Writing data into the user NV memory/FS g 1

[ASCII]	FS	g	1	m	a1	a2	a3	a4	nL	nH	d1..dk
[Decimal]	28	103	49	m	a1	a2	a3	a4	nL	nH	d1..dk
[Hexadecimal]	1C	7B	31	m	a1	a2	a3	a4	nL	nH	d1..dk

[Parameter]

m=0

$0 \leqq (a1 + (a2 \times 256) + (a3 \times 65536) + (a4 + 16777216)) \leqq 1023$

$1 \leqq (nL + (nH \times 256)) \leqq 1024$

$32 \leqq d \leqq 255$

$k = (nL + (nH \times 256))$

[Description]

- Stores data into the user NV memory.
- This command is effective only at the head of line.
- "m" is fixed at 0.
- a1, a2, a3, a4 specify the start address for storing data at (a1 + (a2 × 256) + (a3 × 65536) + (a4 + 16777216)).
- nL, nH specify the stored data to (nL + (nH × 256)) bytes.
- "d" denotes the data to be stored.
- "User NV memory" refers to a storage area exclusively for character data secured on nonvolatile memory.
  In STANDARD MODE, this command is valid only when it is processed at the head of line.
  In PAGE MODE, this command is invalid.
- If this command is sent while a macro is being defined, the macro definition process will be stopped and the execution of this command will be started.
- If the argument (m), the storage start address (a1, a2, a3, a4) or the number of stored data (nL, nH) is outside the definition area, or in case of "the storage start address (a1, a2, a3, a4) + the number of stored data (nL, nH)≧1024", this command will become invalid and the following data will be processed as normal data.
- At the time of completion of processing of the stored data (d) outside the definition area, processing by this command will be stopped and the next data will be processed as normal data. At this time, the data which has already been processed will be stored into memory.
- Data storage processing executes "overwriting". Therefore, the data which have been already stored into the area for storage processing are erased.
- If an error occurs during the writing process, the error will be "Hardware Error".
- The data in the user NV memory can be read by FS g.
- The data in the user NV memory is not initialized by execution of ESC @, execution of FS q, resetting or power OFF.

[Caution]

- Frequent use of the "writing into the nonvolatile memory" command (FS g 1) may destroy memory. Therefore, the "writing into the nonvolatile memory" command should be used "less than 10 times a day".
- In some cases, the printer may become BUSY while data is being written into the nonvolatile memory with this command.
  While the printer is BUSY, it will stop receiving data and sending data from the host (including real-time commands) will be prohibited.

Reading data to the user NV memory/FS g 2

[ASCII]	FS	g	2	m	a1	a2	a3	a4	nL	nH
[Decimal]	28	103	50	m	a1	a2	a3	a4	nL	nH
[Hexadecimal]	1C	7B	32	m	a1	a2	a3	a4	nL	nH

[Parameter] m=0

$0 \leqq (a1 + (a2 \times 256) + (a3 \times 65536) + (a4 + 16777216) \leqq 1023$

$1 \leqq (nL + (nH \times 256)) \leqq 80$

[Description]

- Reads data to the user NV memory.
- "m" is fixed at 0.
- a1, a2, a3, a4 specify the start address for sending data at (a1 + (a2 × 256) + (a3 × 65536) + (a4 + 16777216)).
- nL, nH specify the number of data to be sent to (nL + (nH × 256)) bytes.
- "User NV memory" refers to a storage area exclusively for character data secured on nonvolatile memory.
- If the argument (m), the storage start address (a1, a2, a3, a4) or the number of stored data (nL, nH) is outside the definition area, or in case of "the storage start address (a1, a2, a3, a4) + the number of stored data (nL, nH) ≧1024", this command will become invalid and the following data will be processed as normal data.
- After the preparation for sending data is completed, the following processes will be executed.
  (1) The printer state will change from READY to BUSY. If the state has already been set to BUSY, the printer will do nothing.
  (2) "Header + Data + NUL" will be sent.
  (3) The printer state will change BUSY from to READY. At this time, if the printer state has already been set to BUSY due to other causes, the printer will do nothing.
- The configuration of "Header + Data + NUL" is as follows:
  Header: Hexadecimal number = 5F/Decimal number = 95 (1 byte)
  Data: Data in User NV memory " (nL + (nH × 256)) bytes"
  NUL: Hexadecimal number = 00H/Decimal number =0 (1 byte)
- When the DTR/DSR control is selected, all codes are sent continuously after checking that the host can receive data when the header is sent. If the host cannot receive data, the printer will wait until the host is ready for receiving data.
- When the XON/XOFF control is selected, all codes are sent continuously without checking whether the host can receive data or not. Data that has been sent is always continuous except for XOFF code.
- When parallel interface is used, the size of buffer for data to be sent (buffer that stores all data to be sent except for ASB status) is 99 bytes. Data exceeding 99 bytes will be discarded.
- Data in the user NV memory can be written by using FS g1.
- Depending on the state of receiving buffer, there may be a delay between receiving this command and storing data.
- After the header is sent, all data will be sent without checking whether the host can receive the data or not. Therefore, when this command is used, more than (the number of sending data + 2) bytes of space should be secured in the receiving buffer of the host in order not to fail to receive data.
- While data is being sent, real-time commands (DLE extension command) are ignored. Even if ASB function is selected as enabled, ASB status will not be sent while data are being sent.
- Accordingly, it is not possible to know any change in printer state by its status during data sending. Users should pay attention to this.

Printing the NV bit images/FS p

[ASCII] FS p n m
[Decimal] 28 112 n m
[Hexadecimal] 1C 70 n m
[Parameter] 1≦n≦255
0≦m≦3, 48≦m≦51
[Description] ● Prints the NV bit images "n" with a mode "m".

n	Mode	Dot density in vertical direction	Dot density in horizontal direction
0, 48	NORMAL MODE	144 DPI	160 DPI
1, 49	DOUBLE WIDTH MODE	144 DPI	80 DPI
65	DOUBLE HEIGHT MODE	72 DPI	160 DPI
66	QUADRUPLE SIZE MODE	72 DPI	80 DPI

- "n" denotes the NV bit image number.
- "m" denotes the NV bit image mode.
- The NV bit image refers to a bit image defined by FS q in the nonvolatile memory and printed by FS p.
- If the specified NV bit image "n" is undefined, this command will be invalid.
- This command is valid only when there is no data in the print buffer.
- This command doesn't affect any printing modes (i.e. emphasis, double strike, underline, character size, reversed characters, 90°-right turned characters) except inverted printing.
- When the print area set by GS L and GS W is not enough for one vertical line of NV bit image, the line alone is dealt with as mentioned below. One vertical line of NV bit image is 1 dot in NORMAL MODE (m=0, 48) and DOUBLE HEIGHT WIDTH (m=2, 50) and 2 dots in DOUBLE WIDTH MODE (m=1, 49) and QUADRUPLE SIZE MODE (m=3,51).
  (1) The print are is extended to the right side within the limit of print area so that one vertical line of NV bit image can be printed.
  (2) When a sufficient print area cannot be maintained even after executing (1), the print area is extended to the left side.
  (The left margin is reduced.)
- If the size of bit image exceeding the limit of print area is specified, the data within the limit of print area will be printed, but the data outside the print area will not be printed.
- In NORMAL MODE and DOUBLE WIDTH MODE, regardless of the line feed amount set by ESC 2 and ESC 3, a paper feed of (the height of NV bit image "n") dots is executed, while in DOUBLE HEIGHT MODE and QUADRUPLE SIZE MODE, a paper feed of (the height of NV bit image "n" × 2) dots is executed.
- After completion of this bit image printing, the head of line will be the next printing position and normal data process will be executed.

Defining the NV bit images/FS q

[ASCII]	FS	q	n	[xL xH yL yH d1...dk] 1... [xL xH yL yH d1...dk] n
[Decimal]	28	113	n	[xL xH yL yH d1...dk] 1... [xL xH yL yH d1...dk] n
[Hexadecimal]	1C	71	n	[xL xH yL yH d1...dk] 1... [xL xH yL yH d1...dk] n

[Parameter]

$1 \leqq n \leqq 255$

$0 \leqq xL \leqq 255$

$0 \leqq xH \leqq 3$ on condition that $1 \leqq (xL + xH \times 256) \leqq 1023$

$0 \leqq yL \leqq 255$

$0 \leqq yH \leqq 1$ on condition that $1 \leqq (yL + yH \times 256) \leqq 288$

$0 \leqq d \leqq 255$

$k = (xL + xH \times 256) \times (yL + yH \times 256) \times 8$

Total definition area =1M bits (256k bytes)

[Description]

- Defines the specified NV bit image.
- xL and xH denote the horizontal size of one NV bit image as (xL + xH × 256) × 8dots.
- yL and yH denote the vertical size of one NV bit image as (xL + xH × 256) × 8dots.
- All the previously defined NV bit images are deleted by this command. Therefore, it is not possible to redefine any one of the previously defined multiple data. To make it possible, all data must be resent.
- During the time between the process start by this command and the completion of hardware reset, any mechanical operation (such as initializing a printer head position by opening a cover and paper feeding with switch) cannot be executed.
- NV bit image refers to a bit image that is defined by FS q in the nonvolatile memory and printed by FS p.
- This command is valid only when it is specified at the head of line where STANDARD MODE was selected,
- This command is valid only when it is specified at the head of line where PAGE MODE was selected.
- This command becomes valid after 7 bytes of <FS～yH> are processed as normal values.
- If the number of data exceeding the remaining capacity of the area defined by (xL, xH, yL, yH) is specified, this command will be invalid.
- "d" denotes a definition data. Bits which correspond to dots to be printed are represented as 1, and bits which correspond to dots not to be printed are represented as 0.
- "n" pieces of NV bit images are defined starting from the number 01H in ascending order. Therefore, the first data group［xL xH yL yH d1...dk］ becomes NV bit image No.01H. This number is identical to the NV bit image number specified by FS p.
- The definition data of one NV bit image consists of [xL xH yL yH d1...dk]. Therefore, if only one NV bit image is defined, n=1; the data group [xL xH yL yH d1...dk] will be processed once, and ([Data: (xL + xH × 256) × (yL + yH × 256) × 8 + [header:4]] bytes of nonvolatile memory is used.
- The maximum definition area of this printer is 1M bits (128K bytes). Multiple NV bit image can be defined, but data of bit images of which total size (bit image data + header) exceeds 1M bits (128K bytes) cannot be defined.
- The printer state will be BUSY just before writing data into the nonvolatile memory.
- While this command is being executed, processes of ABS status sending and status detection will not be executed even if ABS function is specified.
- If this command is sent while a macro is still being defined, the macro definition process will be stopped and the process by this command will start.
- Once NV bit images are defined, the NV bit images are not initialized by execution of ESC @, resetting or Power OFF.
- This command executes only definition of NV bit image, and it doesn't start printing. Printing of NV bit image will be executed by FS p.

Collectively specifying the Chinese character mode/FS !

[ASCII] FS ! n
[Decimal] 28 33 n
[Hexadecimal] 1C 21 n
[Parameter] 0≦n≦255
[Description] ● Chinese character mode is specified with each bit by combination.
● Chinese character mode is specified with each bit under n.

Bit	7	6	5	4	3	2	1	0
Function	Under-line	Unused	Unused	Unused	Double height	Double width	Unused	Unused
At 1	ON	–	–	–	ON	ON	–	–
At 0	OFF	–	–	–	OFF	OFF	–	–

● An underline is attached to the character space <FS S n1 n2> but not attached to the part having been skipped by the horizontal tab.
● The initial value is n=0.
● This command is effective only for model compatible with Chinese and Japanese specification.

Specifying the Chinese character mode/FS &

[ASCII] FS &
[Decimal] 28 38
[Hexadecimal] 1C 26
[Parameter]
[Description] ● Specifies the Chinese character mode.
● This command is effective only for model compatible with Chinese and Japanese specification.

Specifying/Canceling Chinese character underline/FS –

[ASCII] FS – n
[Decimal] 27 45 n
[Hexadecimal] 1C 2D n
[Parameter] 0, 1, 30h, 31h
[Description] ● Specifying/Canceling an underline.
● An underline is attached to the full character width but not attached to the part having been skipped by the horizontal tab (HT) and the dot position shifts.
● The kinds of underline specified by n are as follows:
n=0: Canceling an underline.
n=1, 2: Specifying an underline for 1-dot width.
● The underline can be specified also by FS !, but the last processed command will become effective.
● The initial value is n=0.
● This command is effective only for model compatible with Chinese and Japanese specification.

Canceling the Chinese character mode/FS .

[ASCII] FS .
[Decimal] 28 46
[Hexadecimal] 1C 2E
[Parameter]
[Description]
- Cancels the Chinese character mode.
- This command is effective only for model compatible with Chinese and Japanese specification.

Registering the download Chinese characters/FS 2

[ASCII] FS 2 c1 c2 p1…pn
[Decimal] 28 50 c1 c2 p1…pn
[Hexadecimal] 1C 32 c1 c2 p1…pn
[Parameter] c1 c2

Japanese spec. (JIS rating)	c1=77h	21h≦c2≦7Eh
Japanese spec. (Shifted JIS rating)	c1=ECh	40h≦c2≦7Eh, 80h≦c2≦9Eh
Chinese spec. (GB18030)	c1=FEh	A1h≦c2≦FEh

0≦p1…pn≦255
n=32

[Description]
- "c1" indicates the character's first number of bytes and "c2" indicates the second number of bytes.
- "n" indicates the start character code and "m" indicates the end character code. To define only one character, set n=m.
- "pn" is the data to be defined, which indicates the pattern equal to 2 bytes in vertical direction x16 dots in horizontal direction from the left end.
- Once download characters are defined, they remain valid until redefinition, execution of ESC "@" and delete by FS ? or power OFF is performed.
- Definable character codes include 95 characters at maximum in the range of ASCII code (20h to 7Eh).
- This command is effective only for model compatible with Chinese and Japanese specification.

Deleting the download Chinese characters/FS ?

[ASCII] FS ? c1 c2
[Decimal] 28 63 c1 c2
[Hexadecimal] 1C 3F c1 c2
[Parameter] c1 c2

Japanese spec. (JIS rating)	c1=77h	21h<c2<7Eh
Japanese spec. (Shift JIS rating)	c1=ECh	40h<c2<7Eh, 80h<c2<9Eh
Chinese spec. (GB18030)	c1=FEh	A1h≦c2≦FEh

[Description]
- Deletes the download characters of specified by c1, c2.
- "c1" indicates the character's first number of bytes and "c2" indicates the second number of bytes.
- This command is effective only for model compatible with Chinese and Japanese specification.

Selecting the code for Kanji characters/FS C

[ASCII]	FS	C	n
[Decimal]	28	67	n
[Hexadecimal]	1C	43	n
[Parameter]	0, 1, 30h, 31h		
[Description]	● Indicates the JIS character code for Japanese specification. n=0 : JIS character code n=1 : Shifted JIS character code ● The initial value is n=0. ● This command is effective only for model compatible with Chinese and Japanese specification.		

Specifying the space for Chinese characters/FS S

[ASCII]	FS	S	n1	n2
[Decimal]	28	85	n1	n2
[Hexadecimal]	1C	53	n1	n2
[Parameter]	0≦n1≦32 0≦n2≦32			
[Description]	● Specifies the horizontal space amount for Chinese characters. n1 : Space amount on the left side n2 : Space amount on the right side ● The initial value is n1=0, n2=2. ● This command is effective only for model compatible with Chinese and Japanese specification.			

Specifying/Canceling the quadruple large Chinese characters/FS W

[ASCII]	FS	W	n
[Decimal]	28	87	n
[Hexadecimal]	1C	57	n
[Parameter]	0≦n≦FFh		
[Description]	● Specifies/cancels the quadruple large Chinese characters. ● “n” is valid for the lowest bit (n0). ● Control by the lowest bit is as follows: n=<*******0> B : Cancel the quadruple large Chinese characters n=<*******1> B : Specify the quadruple large Chinese characters ● The initial value is n=0. ● This command is effective only for model compatible with Chinese and Japanese specification.		

2.2 CBM1/CBM2 Mode

The following commands are effective when [Command Type] of the software switch is set to CBM1/CBM2.

Command	Hex code	Function
FF n	0C n	Paper feed by n line (CBM1)
FF	0C	Form feed (CBM2)
SO	0E	Double width large character *1
SI	0F	Canceling double width large character *1
LF	0A	Paper feed
CR	0D	Printing *1
DC1	11	Initial setting
DC2	12	Specify/Canceling inverted characters *1
DC3	13	Printing in red *1
CAN	18	Canceling
ESC *	1B 2A	Graphic
ESC -	1B 2D	Specifying/Canceling underline
ESC 1	1B 31	Specifying the 1/9 inch line feed rate
ESC 2	1B 32	Specifying the 2/9 inch line feed rate
ESC 3	1B 33	Setting the line feed rate
ESC C	1B 43	Setting page length
ESC N	1B 4E	Perforated line skip
ESC O	1B 4F	Canceling perforated line skip
ESC f 1	1B 66 01	Form feed
ESC t	1B 74	Selecting the character code table
ESC RS	1B 1E	Buzzer sounding
ESC BEL	1B 07	Specifying the drive pulse width of peripheral equipment
BEL	07	Drive command A for drawer 1
FS	1C	Drive command B for drawer 1
SUB	1A	Drive command for drawer 2
RS	1E	Buzzer sounding
ESC P 0	1B 50 00	Full cut
ESC P 1	1B 50 01	Partial cut (leaving one area uncut)
ESC R	1B 52	Selecting the international character set
ESC &	1B 26	Defining the download character
ESC %	1B 25	Specifying/Canceling the download character set
ESC /	1B 2F	Defining of message
ESC DC3	1B 13	Printing of message
ESC y	1B 79	Setting print line after paper near end detection
ESC DC2	1B 12	Deleting download characters, message, bit image
GS *	1D 2A	Defining download bit images
GS /	1D 2F	Printing download bit images
GS FF	1D 0C	Page feed + cut operation at time of BM spec.

CBM mode

*1: Effective only when [Command Type] of the software switch is set to CBM1. When selecting CBM2, the operation will be as follows:

Command	Hex code	Function
DC1	11	Select
DC2	12	Print in red
CD3	13	De-select

Command	Hex code	When selecting 8 bit data	When selecting 7 bit data
SI	0F	Specifying double width large characters	SI SIde Character
SO	0E	Canceling double width large characters	SO SIde Character

CBM mode

Feeding paper by "n" lines/FF n (CBM1)

[ASCII]	FF	n	
[Decimal]	12	n	
[Hexadecimal]	0C	n	
[Parameter]	1≦n≦127		
[Description]	● Paper feeds line number specified by n.		
	● Paper feed line can be specified from n=1 to 127.		
	● If data exist inside the print buffer, line feed specified by n is performed after printout.		
	● Paper feed is not performed when 0 is specified.		

Form feed/FF (CBM2)

[ASCII]	FF
[Decimal]	12
[Hexadecimal]	0C
[Parameter]	
[Description]	● Performs form feed for the next page after printing the data inside the buffer.

Form feed/ESC f 1

[ASCII]	ESC	f	1
[Decimal]	27	102	1
[Hexadecimal]	1B	66	1
[Parameter]			
[Description]	● Performs form feed for the next page after printing the data inside the buffer.		

Double width large character/SO (CBM1)

[ASCII]	SO
[Decimal]	14
[Hexadecimal]	0E
[Parameter]	
[Description]	● The data following this command is printed doubled in the horizontal direction.
	● While double width large character will be effective until the command is canceled, it is also canceled when one line is printed. Note that the double width characters take up two ordinary characters worth of width, and that the number of data will not exceed one line.

CBM mode

Double width large character, specifying SI character/SO (CBM2)

[ASCII]	SO
[Decimal]	14
[Hexadecimal]	0E
[Parameter]	
[Description]	● The data following this command is printed doubled in the horizontal direction. ● While double width large character will be effective until the command is canceled, it is also canceled when one line is printed. Note that the double width characters take up two ordinary characters worth of width, and that the number of data will not exceed one line. ● In case of serial I/F, SO character is printed when selecting 7 bit data.

Canceling double width large character/SI (CBM1)

[ASCII]	SI
[Decimal]	15
[Hexadecimal]	0F
[Parameter]	
[Description]	● This command cancels the double width large character set by SO. The following data returns to normal character.

Canceling double width large character/Specifying SI character/SI (CBM2)

[ASCII]	SI
[Decimal]	15
[Hexadecimal]	0F
[Parameter]	
[Description]	● This command cancels the double width large character set by SO. The following data returns to normal character. ● In case of serial I/F, SO character is printed when selecting 7 bit data.

Paper feed/LF

[ASCII]	LF
[Decimal]	10
[Hexadecimal]	0A
[Parameter]	
[Description]	● If data exist inside the print buffer, line feed is performed after printout. Without data, only line feed is performed.

Printing/CR

[ASCII]	CR
[Decimal]	13
[Hexadecimal]	0D
[Parameter]	
[Description]	● Performs printing. ● While the AUTO LF setting of software switch is ON, it prints out the data inside the buffer and performs paper feed for one line. ● While the AUTO LF setting of software switch is OFF, it does not perform paper feed.

Initial setting/DC1 **(CBM1)**

[ASCII]	DC1
[Decimal]	17
[Hexadecimal]	11
[Parameter]	
[Description]	● Printer is initialized by this command. ● Does not clear the contents of the input buffer.

Select/DC1 **(CBM2)**

[ASCII]	DC1
[Decimal]	17
[Hexadecimal]	11
[Parameter]	
[Description]	● Printer is changed into a selection state.

CBM mode

Specifying/Canceling inverted characters/DC2 (CBM1)

[ASCII] DC2
[Decimal] 18
[Hexadecimal] 12
[Parameter]
[Description]
- Specifies/Cancels inverted characters.
- This command is valid only when processed at the head of line. Erected and inverted characters cannot be mixed in one line.

Specifying of red character printing/DC2 (CBM2)

[ASCII] DC2
[Decimal] 18
[Hexadecimal] 12
[Parameter]
[Description]
- This command is for specifying red characters.
- By adjusting printer at the head of printing data, all of the character in a line will be printed in red.
- Please use this command for every line to be changed to red character.

Specifying of red character printing/DC3 (CBM1)

[ASCII] DC3
[Decimal] 19
[Hexadecimal] 13
[Parameter]
[Description]
- This command is for specifying red characters.
- By adjusting printer at the head of printing data, all of the character in a line will be printed in red.
- Please use this command for every line to be changed to red character.

De-select/DC3 (CBM2)

[ASCII] DC3
[Decimal] 19
[Hexadecimal] 13
[Parameter]
[Description]
- Turns the printer to de-select state so that data cannot be received.
- Please use DC1 (select command) to change to a selection state.

Cancel/CAN

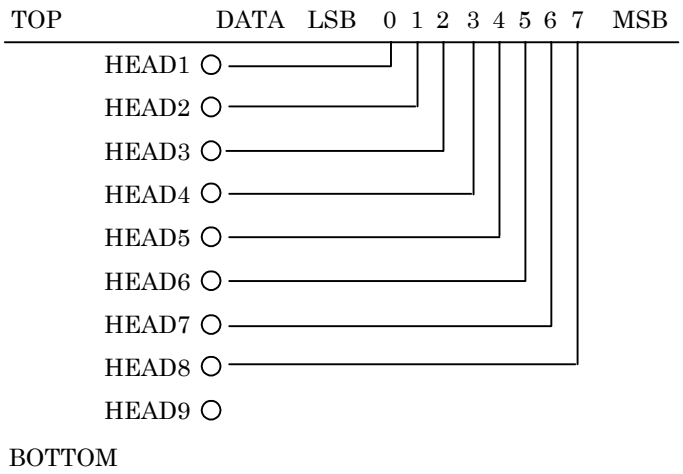
[ASCII]	CAN
[Decimal]	24
[Hexadecimal]	18
[Parameter]	
[Description]	● Clears the printing line data received before the command was executed.

Specifying the graphic/ESC *

[ASCII]	ESC	*	nL	nH	dn
[Decimal]	27	42	nL	nH	dn
[Hexadecimal]	1B	2A	nL	nH	dn
[Parameter]	0≦nL≦FFh	0≦nH≦03h			

[Description]

- Prints according to bit image mode.
- The number of dots printed is specified as nL, nH in 16 bits.
  Dot width: nL + (256 × nH)
- Concerning bit image data (dn), bits to be printed are specified as “1” and bits not to be printed as “0”.
- If bit image data have been input excess of dot positions that can be printed on one line, the excess data are discarded.
- If bit image data have been input excess of dot number that can be printed on one line, the excess data are discarded.
- Returns to normal data processing after bit image printing.
- Printing will be one-sided.



Specifying/Canceling an underline/ESC –

[ASCII]	ESC	–	n
[Decimal]	27	45	n
[Hexadecimal]	1B	2D	n
[Parameter]	0, 1, 30h, 31h		
[Description]	● Specifying/Canceling an underline.		
	● Specifies underline at time of n=1, 31h		
	● Cancels underline at time of n=0, 30h		
	● The initial value is n=0.		

Specifying the 1/9-inch line feed rate/ESC 1

[ASCII]	ESC	1
[Decimal]	27	49
[Hexadecimal]	1B	31
[Parameter]		
[Description]	● Sets the line feed rate per line to 1/9-inch.	

Setting the normal line feed rate/ESC 3

[ASCII]	ESC	3
[Decimal]	27	51
[Hexadecimal]	1B	33
[Parameter]		
[Description]	● Sets the line feed rate per line to 1/6-inch.	

CBM mode

Setting page length/ESC C (CBM1)

[ASCII]	ESC	C	n
[Decimal]	27	67	n
[Hexadecimal]	1B	43	n
[Parameter]	1≦n≦127		
[Description]	● Sets the page length by n lines.		

Setting page length/ESC C (CBM2)

[ASCII]	ESC	C	n
[Decimal]	27	67	n
[Hexadecimal]	1B	43	n
[Parameter]	14≦n≦120		
[Description]	● Sets the page length by n lines. Three-line space is made at the head and end of a page. ● When the value of n is outside the range, it is set at n=66.		

Perforated line skip/ESC N

[ASCII]	ESC	N	n
[Decimal]	27	78	n
[Hexadecimal]	1B	4E	n
[Parameter]	1≦n≦126		
[Description]	● Only the number specified by -n is not printed and performs line feed (skips). ● It cannot be specified for more than 1 page length.		

Canceling perforated line skip/ESC O

[ASCII]	ESC	O
[Decimal]	27	79
[Hexadecimal]	1B	4F
[Parameter]		
[Description]	● Cancels the perforated line skip.	

Selecting the character code table/ESC t

[ASCII] ESC t n
[Decimal] 27 116 n
[Hexadecimal] 1B 74 n
[Parameter] 0≦n≦255h
[Description] ● The character code table depending on the value of "n" is as follows:

n	Character code
0	CBM Overseas
1	CBM Domestic
2	PC850 (Multilingual)
3	PC860 (Portugal)
4	PC863 (Canada–French)
5	PC865 (Norway)
6	PC852 (Latin 2)
7	PC866 (Russian)
8	PC857 (Turkey)
9	WPC1252
16	WPC1252
17	PC866 (Russian)
18	PC852 (Latin 2)
19	PC858 (EURO)
255	Blank page

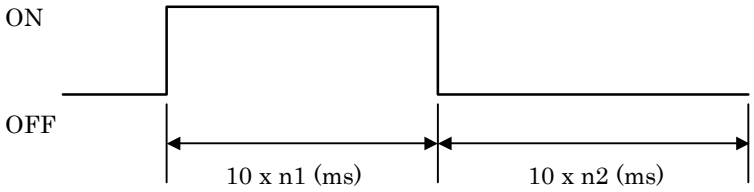
● The initial value of "n" is dependent upon the setting code page of software switch.

Buzzer sounding/ESC RS

[ASCII] ESC RS
[Decimal] 27 30
[Hexadecimal] 1B 1E
[Parameter]
[Description] ● Produces short warning sound for approx. 200ms.

Specifying the drive pulse width of peripheral equipment/ESC BEL

[ASCII] ESC BEL n1 n2
[Decimal] 27 7 n1 n2
[Hexadecimal] 1B 7 n1 n2
[Parameter] 0≦n1≦127 0≦n2≦127
[Description]
- This is the power-distribution time setting command to drive peripheral equipment (such as cash drawers).
  Power distribution time = n1 x 10 (ms)
  Delay time = n2 x 10 (ms)
- To actually drive the drawer, use <BEL> or <FS> command.
- Default is n1=n2=20.



Drive command A for drawer 1/BEL

[ASCII] BEL
[Decimal] 7
[Hexadecimal] 7
[Parameter]
[Description]
- Drives the drawer connector pin 2 under condition set by ESC, BEL n1 n2 command.
- The command is executed by the order received in the buffer.

Drive order B for drawer 1/FS

[ASCII] FS
[Decimal] 28
[Hexadecimal] 1C
[Parameter]
[Description]
- Drives the drawer connector pin 2 under condition set by ESC, BEL n1 n2 command.

Drive command for Drawer 2 / SUB

[ASCII]	SUB
[Decimal]	26
[Hexadecimal]	1A
[Parameter]	
[Description]	● Drives the drawer connector No.5 pin immediately after receiving the command. ● Power-distribution time is fixed at 200ms for ON and 200ms for OFF. ● Drawer 1 and drawer 2 cannot be driven simultaneously.

Buzzer sounding/ RS

[ASCII]	RS
[Decimal]	30
[Hexadecimal]	1E
[Parameter]	
[Description]	● Produces short warning sound for approx. 200ms.

Full cut/ESC P 0 (auto cutter loading model)

[ASCII]	ESC	P	0
[Decimal]	27	80	0
[Hexadecimal]	1B	50	0
[Parameter]			
[Description]	● Executes full cut of Receipt paper. ● We recommend to observe an interval between cuts of 3 seconds or more.		

Partial cut/ESC P 1 (auto cutter loading model)

[ASCII]	ESC	P	1
[Decimal]	27	80	1
[Hexadecimal]	1B	50	1
[Parameter]			
[Description]	● Executes partial cut of Receipt paper (leaving one area uncut). ● We recommend to observe an interval between cuts of 3 seconds or more.		

Selecting the international character set/ESC R

[ASCII]	ESC	R	n
[Decimal]	27	82	n
[Hexadecimal]	1B	52	n
[Parameter]	0≦n≦10		
[Description]	● Selects the international character set depending on the value of "n".		
	● Default is U.S.A.		

n(HEX)	International character set
0	U.S.A.
1	France
2	Germany
3	U.K.
4	Denmark
5	Sweden
6	Italy
7	Spain
8	Japan
9	Norway
10	Denmark 2
11	Spain 2
12	Latin America
13	Korea
14	Slovenia/Croatia
15	China
64	Legal

Defining the download characters/ESC &

[ASCII]	ESC	&	0	n1	n2	[m0 m1 .. m5 m6 m7 m8 m9] x (n2–n1) (+1)
[Decimal]	27	38	0	n1	n2	[m0 m1 .. m5 m6 m7 m8 m9] x (n2–n1) (+1)
[Hexadecimal]	1B	26	0	n1	n2	[m0 m1 .. m5 m6 m7 m8 m9] x (n2–n1) (+1)

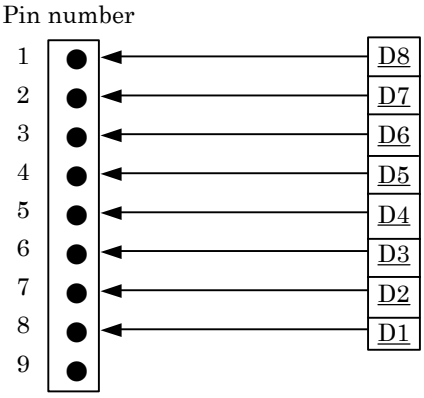
[Parameter] 20h≦n1≦n2≦FFh

m0=00h or, m0=80h

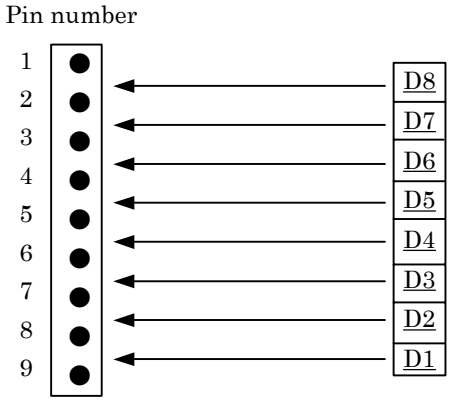
[Description]

- Defines the download characters.
- "n1" indicates the start character code and "n2" indicates the end character code. To define only character, set n1=n2.
- Definable character codes is in the range of ASCII code (20h to FFh).
- Once download characters are defined, they remain valid until redefinition, execution of ESC and DC 2n or n1n2 is performed.

At time of m0=<80>H



At time of m0=<00>H



- Dots horizontally next to each other cannot be printed.

Specifying/Canceling the download character set/ESC %

[ASCII] ESC % n
[Decimal] 27 37 n
[Hexadecimal] 1B 25 n
[Parameter] n=0, 1, 30h, 31h
[Description]
- Specifies/cancels the download characters. Download characters cannot be printed by simply defining them by ESC & 0 command. Printing of download characters is executed by sending of this command to the printer.

n	Download character set
0	Cancels
30	
1	Specifies
31	

Defining of message/ESC /

[ASCII] ESC / n "data" CR or LF
[Decimal] 27 37 n "data" CR or LF
[Hexadecimal] 1B 25 n "data" CR or LF
[Parameter] 1≦n≦10
[Description]
- Defines upto 50 bites of messages in one line.
- When the n value is specified beyond the defined domain, the data after n is treated as printing data.
- Once messages are defined, they remain valid until redefinition.
- Finish the end of data by CR (0DH) or LF (0AH).
- When data is 50 bytes or more, the continuing data is treated as printing data.
- Once download characters are defined, they remain valid until redefinition, execution of ESC and DC 2n or n1n2 is performed.

Printing of message/ESC DC3

[ASCII] ESC DC3 n
[Decimal] 27 19 n
[Hexadecimal] 1B 13 n
[Parameter] 1≦n≦10
[Description]
- Prints out the message.
- When the n value is specified beyond the defined domain, data is not printed.

Setting printing line after paper near-end detection/ESC y

[ASCII]	ESC	y	n
[Decimal]	27	121	n
[Hexadecimal]	1B	79	n

[Parameter] 0≦n≦255

[Description]
- Selects the printing line after paper near-end detection.
- Stops printing after printing n x 2 lines after paper near-end detection.
- Enters paper near-end state.
- Paper end signal parallel changes by the time paper near-end is detected.
- Default is n=0.

Deleting download characters, message, bit image/ESC DC2

[ASCII]	ESC	DC2	n1	n2
[Decimal]	27	18	n1	n2
[Hexadecimal]	1B	12	n1	n2

[Parameter] 0≦n1≦3

0≦n2(When selecting n1=0, select 0.)

(When selecting n1=1, 1≦n2≦10.)

(When selecting n1=2, 32≦n2≦255.)

(When selecting n1=3, select 0.)

[Description]
- Deletes download character, message, bit image.
- Specifies download function to be deleted by n1.

n1	Deleting data
0	All (message, character, bit image)
1	Download message
2	Download character
3	Download bit image

- Specifies which data of the function specified by n1 by n2 is deleted.
- Deletes all the data registered by the download function specified by n2=0 n1.
- n2≠0 deletes part of download data specified by n2 (value specified at registering by download command).

Defining the download bit image/GS *

[ASCII]	GS	*	n1	n2	[<d>] x (n1 x n2 x 8)
[Decimal]	27	42	n1	n2	[<d>] x (n1 x n2 x 8)
[Hexadecimal]	1B	2A	n1	n2	[<d>] x (n1 x n2 x 8)

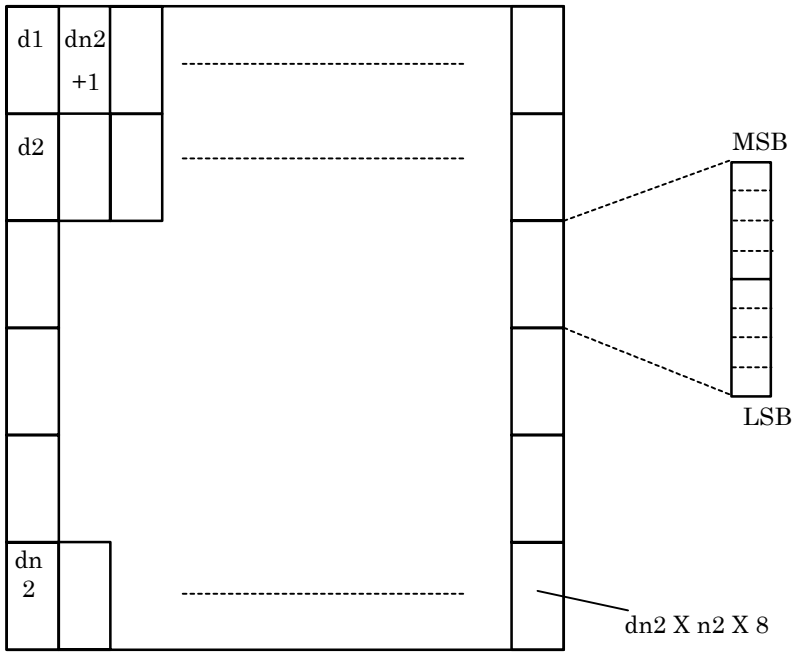
[Parameter] $1 \leqq n1 \leqq 45$

$0 \leqq n2 \leqq 24$

Set the data number to (n1 x n2 x 8) $\leqq$2048.

[Description]

- Defines the download bit images of dots specified by n1 and n2.
- The number of dots in horizontal direction is n1 x 8 and the number of dots in vertical direction is n2 x 8.
  "d" indicates bit image data.
- Once a download bit image is defined, it remains effective until redefinition, execution of ESC, DC2 & n1 n2 is conducted.



Printing the download bit image/GS /

[ASCII]	GS	/	m
[Decimal]	27	47	m
[Hexadecimal]	1B	2F	m

[Parameter] 0≦m≦255

[Description]
- Prints the bit image defined by download bit image command.

  [Caution]

  If data exist in the print buffer, this command will be ignored.

  If a download bit image has not been registered, this command is ignored.

  Prints nothing unless m=0, 1, 2, 3.

Page feed + Full cut at time of BM specification / GS FF

[ASCII]	GS	FF
[Decimal]	29	12
[Hexadecimal]	1D	0C

[Parameter]

[Description]
- The command is effective only at time of BM specification.
- During the reception of the command:

  When auto cutter is valid: BM center skips to auto cut position and performs full cut after page feed.

  When auto cutter is invalid: BM center skips to manual cut position and performs full cut after page feed.
- When using this command, area between head and cut becomes unprintable area.

  When auto cutter is valid: Approx. 19mm

  When auto cutter is invalid: Approx. 28mm
- When performing a partial cut, set the [CUTTER] of the software switch to PAR.

2.3 Star Mode

The following commands are effective when [Command Type] of the printer is set to STAR.

Command	Hex code	Opportunity Ability
ESC	1B 52	Selecting the international character set
ESC 6	1B 36	NOP
ESC 7	1B 37	NOP
ESC M	1B 4D	NOP
ESC P	1B 50	NOP
ESC :	1B 3A	NOP
SO	0E	Selecting double width large characters
DC4	14	Canceling double width large characters
ESC E	1B 45	Selecting emphasis characters
ESC F	1B 46	Canceling emphasis characters
ESC –	1B 2D	Specifying/Canceling underline
ESC _	1B 5F	NOP
ESC 4	1B 34	Specifying the red printing
ESC 5	1B 35	Canceling the red printing
SI	0F	Selecting the inverted printing
DC2	12	Canceling the inverted printing
LF	0A	Printing and line feed
CR	0D	Printing and line feed
ESC z	1B 7A	Setting the standard line feed width
ESC 0	1B 30	NOP
ESC a	1B 61	Paper feed by n lines
FF	0C	Page feed (form feed)
ESC C	1B 43	Setting the page length by n lines
ESC C 0	1B 43 00	Setting the page length by n inches
VT	0B	Executing the vertical tab
ESC B	1B 42	Setting vertical tab positions
ESC N	1B 4E	Setting the bottom margin
ESC O	1B 4F	Canceling the bottom margin
ESC l	1B 6C	Setting the left margin
ESC Q	1B 51	Setting the right margin
HT	09	Executing the horizontal tab
ESC D	1B 44	Setting horizontal tab positions
ESC 1	1B 31	Setting the 1/9-inch line feed rate
ESC A	1B 41	NOP
ESC 2	1B 32	Setting the 2/9-inch line feed rate
ESC J	1B 4A	NOP
ESC K	1B 4B	8-dot standard density bit image
ESC L	1B 4C	8-dot double density bit image
ESC h	1B 68	Setting/Canceling double height characters

Command	Hex code	Opportunity Ability
ESC &	1B 26	Defining the download characters
ESC %	1B 25	Setting/Canceling the download characters
ESC BEL	1B 07	Setting the drive pulse width of peripheral
ESC RS	1B 1E	Buzzer sounding
BEL	07	Drive command A for Drawer 1
FS	1C	Drive command B for Drawer 1
SUB	1A	Drive command for Drawer 2
CAN	18	Canceling print data
DC3	13	Setting Deselect Mode
DC1	11	Setting Select Mode
ESC U	1B 55	Setting/Canceling Single Direction Print Mode
ESC @	1B 40	Initializing the printer
ENQ	05	Inquiry
STX	02	Text start
ETX	03	Text end
RS	1E	Buzzer sounding
ESC d	1B 64	Full cut/partial cut
ESC t	1B 74	Selecting the character code table
ESC /	1B 2F	Defining messages
ESC DC3	1B 13	Printing messages
ESC y	1B 79	Setting the printing lines after paper near-end
ESC DC2	1B 12	Deleting download characters, messages, bit
GS *	1D 2A	Defining the download bit image
GS /	1D 2F	Printing download bit images
GS FF	1D 0C	Page feed and cutting at the time of BM

Selecting the international character set/ESC "R" n

[ASCII] ESC R n
[Decimal] 27 82 n
[Hexadecimal] 1B 52 n
[Parameter] 0≦n≦10
[Description]
- Selects the international characters according to the value of n.
- Default is USA (n = 0).

n(HEX)	International character set
0	U.S.A
1	France
2	Germany
3	U.K.
4	Denmark
5	Sweden
6	Italy
7	Spain
8	Japan
9	Norway
10	Denmark 2
11	Spain 2
12	Latin America
13	South Korea
14	Slovenia/Croatia
15	China
64	Legal

Selecting double width large characters/SO

[ASCII] SO
[Decimal] 14
[Hexadecimal] 0E
[Parameter]
[Description]
- The data following this command is printed doubled in the horizontal direction.
- Note that the double width characters take up two ordinary characters worth of width, and that the number of data will not exceed one line.

Canceling double width characters/DC4

[ASCII]	DC4
[Decimal]	20
[Hexadecimal]	14
[Parameter]	
[Description]	● This command cancels double width characters. The data following this command are printed in ordinary character width.

Specifying emphasis characters/ESC E

[ASCII]	ESC E
[Decimal]	27 69
[Hexadecimal]	1B 45
[Parameter]	
[Description]	● The data following this command are printed with emphasis (double strike). Emphasis character continues until the emphasis character cancel command is entered.

Canceling emphasis characters/ESC F

[ASCII]	ESC F
[Decimal]	27 70
[Hexadecimal]	1B 46
[Parameter]	
[Description]	● This command cancels emphasis characters. The data following this command becomes ordinary characters.

Specifying/canceling underline/ ESC –

[ASCII]	ESC –
[Decimal]	27 45
[Hexadecimal]	1B 2D
[Parameter]	0, 1, 30h, 31h
[Description]	● Specifies/cancels underline. ● When n=1, 31h, underline is set. ● When n=0, 30h, underline is canceled. ● The initial value is n=0. Underline is not attached to the space by the horizontal tab.

Specifying the red printing/ ESC 4

[ASCII]	ESC	4
[Decimal]	27	52
[Hexadecimal]	1B	34
[Parameter]		
[Description]	● Prints data following this command in red.	
	● This command continues until the red printing cancel command is entered.	

Canceling the red printing/ESC 5

[ASCII]	ESC	5
[Decimal]	27	53
[Hexadecimal]	1B	35
[Parameter]		
[Description]	● Cancels red printing.	

Selecting the inverted printing/SI

[ASCII]	SI
[Decimal]	15
[Hexadecimal]	0F
[Parameter]	
[Description]	● This command is the inverted character specification command and prints inverted characters. This command is valid only when processed at the head of line. Erected and inverted characters cannot be mixed in one line.

Canceling the inverted printing/ DC2

[ASCII]	DC2
[Decimal]	18
[Hexadecimal]	12
[Parameter]	
[Description]	● Cancels inverted printing. This command is valid only when processed at the head of line.

Printing and line feed/LF

[ASCII]	LF
[Decimal]	10
[Hexadecimal]	0A
[Parameter]	
[Description]	● Prints data in the print buffer and feeds paper by one line. If there is no data preceding this command, the printer only feeds paper by one line.

Printing and line feed/CR

[ASCII]	CR
[Decimal]	13
[Hexadecimal]	0D
[Parameter]	
[Description]	● The function is the same as <LF>.

Setting the standard line feed width/ESC z

[ASCII]	ESC	z
[Decimal]	27	122
[Hexadecimal]	1B	7A
[Parameter]		
[Description]	● The line feed width becomes 1/6 inch.	

Paper feed by n lines/ESC a

[ASCII]	ESC	a	n
[Decimal]	27	97	n
[Hexadecimal]	1B	61	n
[Parameter]	$1 \leqq n \leqq 127$		
[Description]	● Feeds paper by lines specified by n. The number of lines to be fed can be specified within the range of n=1−127. When this command is used, and if data exist in the print buffer, it will print data and then feed paper for n lines.		

Page feed (form feed)/FF

[ASCII]	FF
[Decimal]	12
[Hexadecimal]	0C
[Parameter]	
[Description]	● After printing the data in the print buffer, it shifts the print position to the head of the next page.

Setting the page length by n lines/ESC C

[ASCII]	ESC	C	n
[Decimal]	27	67	n
[Hexadecimal]	1B	43	n
[Parameter]	1≦n≦255		
[Description]	● Sets the 1-page length by n lines. ● Default is n = 42.		

Setting the page length by n inches/ESC C <0>

[ASCII]	ESC	C	0	n
[Decimal]	27	67	0	n
[Hexadecimal]	1B	43	0	n
[Parameter]	1≦n≦127			
[Description]	●Sets the 1-page length by n inches.			

Executing the vertical tab/VT

[ASCII]	VT
[Decimal]	11
[Hexadecimal]	0B
[Parameter]	
[Description]	● Feeds paper to the next vertical tab position. If any tab position is not set, paper feed will not be executed. If the current position is equal to or larger than the maximum vertical position, it will feed paper to the top of the next page.

Setting vertical tab positions/ESC B

[ASCII]	ESC	B	[n] k	NUL
[Decimal]	27	66	[n] k	NUL
[Hexadecimal]	1B	42	[n] k	NUL

[Parameter] 1≦n≦255 1≦k≦16

[Description]
- Cancels the vertical tab position that has already been set and sets a new vertical tab position.
  The vertical tab position to be set is set in ascending order and ended with <00>.
  The settable vertical tab is 16 at maximum.
  If the tab setting position <nK> is equal to or smaller than the immediately preceding setting position <nk-1>, the vertical tab position setting will be considered to be done.

Setting the bottom margin/ESC N

[ASCII]	ESC	N	n
[Decimal]	27	78	n
[Hexadecimal]	1B	4E	n

[Parameter] 0≦n≦255

[Description]
- Sets a bottom margin by n lines.
- Default is n=0.

Canceling the bottom margin/ ESC 0

[ASCII]	ESC	O
[Decimal]	27	79
[Hexadecimal]	1B	4F

[Parameter]

[Description]
- Cancels the bottom margin setting.

Setting the left margin/ESC l

[ASCII]	ESC	l	n
[Decimal]	27	108	n
[Hexadecimal]	1B	6C	n

[Parameter] 0≦n≦ (right margin-2)

[Description]
- Sets a left margin and prints from the line following the setting.

Setting the right margin/ESC Q

[ASCII]	ESC	Q	n
[Decimal]	27	81	n
[Hexadecimal]	1B	51	n

[Parameter] 2 ≦ n ≦ (Maximum printing column)

[Description] ●Sets a right margin and prints to n columns.

Executing the horizontal tab/HT

[ASCII] HT

[Decimal] 09

[Hexadecimal] 09

[Parameter]

[Description] ● Shifts the print position to the next horizontal tab position. If the next horizontal tab position is not set, this command will be ignored.

Setting horizontal tab positions/ESC D

[ASCII]	ESC	D	[n] k	NUL
[Decimal]	27	68	[n] k	NUL
[Hexadecimal]	1B	44	[n] k	NUL

[Parameter] 1 ≦n≦ Maximum printing column−1 1≦k≦16

[Description] ● Set horizontal tab positions.

n indicates the number of columns from the head of the line to the position where the horizontal tab is set.

k indicates the number of the horizontal tab position to be set.

Tab positions are set to the position of “character width x n” from the head of the line. At this time, the character width includes the right space amount of a character. The character width doubles when double width printing is specified.

The data <n>k indicating setting position is entered in ascending order and ended with <00> H.

ESC D NUL clears all setting tab positions. After clearing, HT is ignored.

[Notes]

If the data <n>k is equal to or smaller than the immediately preceding data <n>k-1, horizontal tab setting is considered to be to done. In this case, data from the next is processed as ordinary data.

The settable vertical tab is 16 tabs at maximum. The data exceeding this is processed as ordinary data. If data <n>k exceed the 1-line print area, it is set as “setting column position = maximum printing column + 1."

Even when character width is changed after a horizontal tab position is set, the horizontal tab position does not change.

Setting the 1/9-inch line feed rate/ESC 1

[ASCII]	ESC	1
[Decimal]	27	49
[Hexadecimal]	1B	31
[Parameter]		
[Description]	● The line feed rate is set to 1/9 inch.	

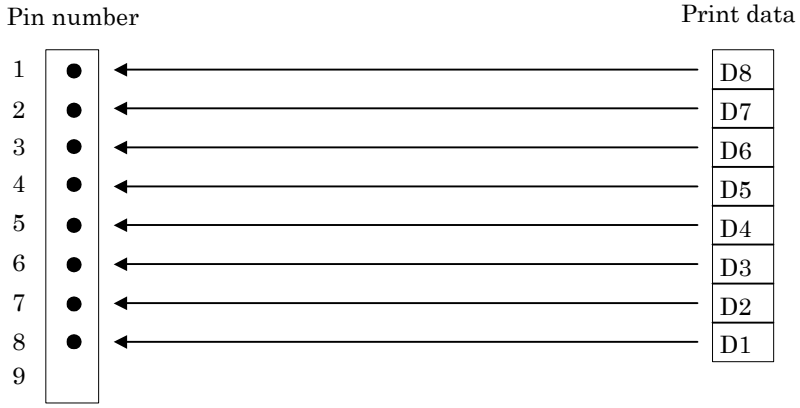
Setting the 2/9-inch line feed rate/ ESC 2

[ASCII]	ESC	2
[Decimal]	27	50
[Hexadecimal]	1B	32
[Parameter]		
[Description]	● The line feed rate is set to 2/9 inch.	

8-dot standard density bit image/ESC K

[ASCII]	ESC	K	n1	<0>	m1 m2.
[Decimal]	27	75	n1	<0>	m1 m2.
[Hexadecimal]	1B	4B	n1	<0>	m1 m2.
[Parameter]	$1 \leqq n1 \leqq 200$				

[Description]
- This command executes the printing of bit image for the number of data specified by n1. At this time, printing is performed in a single direction.
- The data exceeding the number of data printable in one line is ignored.
- Returns to the character mode automatically after printing bit image.



8-dot double density bit image/ESC L

[ASCII] ESC K n1 n2 m1 m2.
[Decimal] 27 75 n1 n2 m1 m2.
[Hexadecimal] 1B 4B n1 n2 m1 m2.
[Parameter] 1≦ n1 ≦ 400
[Description]
- This command executes the printing of 8-dot double density (half dot printing) bit image. At this time, printing is performed in a single direction.
- The data exceeding the number of data printable to one line is ignored.
- Returns to the character mode automatically after printing bit image.
- The relation between the head pin number and data for printing is the same as that in 8-bit standard density image.
- During printing double density bit image, the dots adjoining in the horizontal direction cannot be printed.

Specifying/Canceling double height characters/ESC h

[ASCII] ESC h n
[Decimal] 27 104 n
[Hexadecimal] 1B 68 n
[Parameter] 0, 1, 30h, 31h
[Description]
- The data following this command is printed double in the vertical direction.
- Bit image mode <ESC>"K" and <ESC> "L" are excluded.
- By combination with <SO> command, double height and width characters, which characters doubled in the horizontal and vertical direction, can be printed.
- This command cannot be combined with the inverted character <SI> command.
- The relation between double height and width characters and ordinary characters is the bottom alignment.

n	Double height character command
0	Cancels
30	
1	Specifies
31	

Defining the download characters/ ESC &

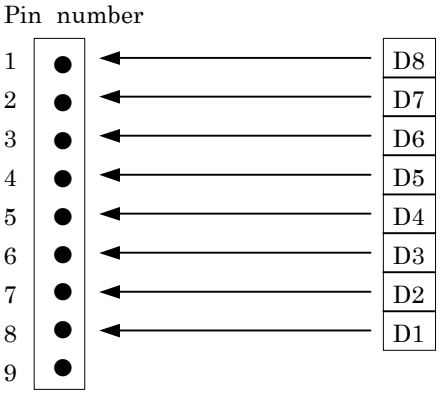
[ASCII]	ESC	&	<0>	n1 n2	[m0m1m2m3m4m5m6m7m8m9] x (n2–n1+1)
[Decimal]	27	38	<0>	n1 n2	[m0m1m2m3m4m5m6m7m8m9] x (n2–n1+1)
[Hexadecimal]	1B	26	<0>	n1 n2	[m0m1m2m3m4m5m6m7m8m9] x (n2–n1+1)

[Parameter] 20h ≦n1 ≦n2 ≦FFh

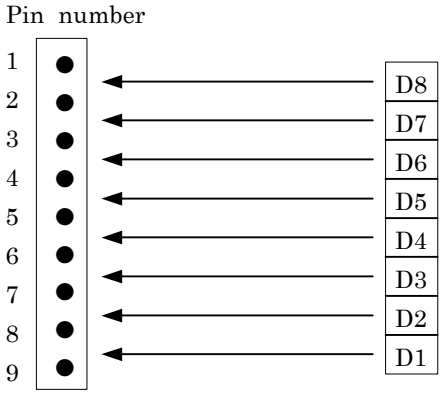
m0=00h or m0=00h or m0=08h

[Description]
- Defines download characters.
- n1 and n2 indicate a character code to start and end the definition, respectively. To define only one character, set n1=n2.
- Character codes can be defined within the range of <20>H to <FF>H by ASCII code.
- The dots adjoining in the horizontal direction cannot be printed.
- Once the download characters are defined, they remain valid until they are redefined or the download deletion command (ESC DC2n1n2) is executed.

At the time of m=[0] <80> H



At the time of m =[0] <00> H



- Dots horizontally next to each other cannot be printed.

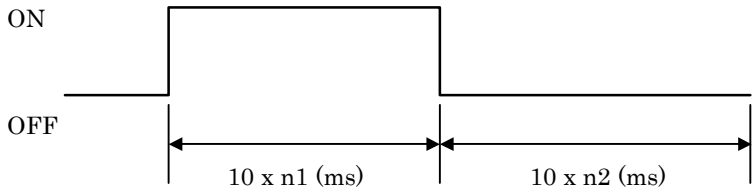
Specifies/Canceling the download characters/ESC %

[ASCII] ESC % n
[Decimal] 27 37 n
[Hexadecimal] 1B 25 n
[Parameter] 0, 1, 30h, 31h
[Description] ● Specifies/cancels the download characters. Download characters cannot be printed by simply defining them by ESC & 0 command. Printing of download characters is executed by sending of this command to the printer.

n	Download character set
0	Cancels
30	
1	Specifies
31	

Setting the drive pulse width of peripheral equipment/ESC BEL n1 n2

[ASCII] ESC BEL n1 n2
[Decimal] 27 07 n1 n2
[Hexadecimal] 1B 07 n1 n2
[Parameter] 1 ≦n1 ≦127 1 ≦n2 ≦127
[Description] ● This is the power-distribution time setting command to drive peripheral equipment (such as cash drawers).
Power-distribution time = n1 × 10 (ms)
Delay time = n2 × 10 (ms)
● To actually drive the drawer, use <BEL> or <FS> command.



● Default is n1 = n2 = 20 (200 mS).

Drive command A for Drawer 1/BEL

[ASCII]	BEL
[Decimal]	7
[Hexadecimal]	7
[Parameter]	
[Description]	● Drives the drawer connector pin 2 under condition set by ESC, BEL n1 n2 command. ● The command is executed by the order received in the buffer.

Drive command B for Drawer 1/FS

[ASCII]	FS
[Decimal]	28
[Hexadecimal]	1C
[Parameter]	
[Description]	● Drives the drawer connector pin 2 under condition set by ESC, BEL n1 n2 command.

Drive command for Drawer 2 / SUB

[ASCII]	SUB
[Decimal]	26
[Hexadecimal]	1A
[Parameter]	
[Description]	● Drives the drawer connector No.5 pin immediately after receiving the command. ● Power-distribution time is fixed at 200ms for ON and 200ms for OFF. ● Drawer 1 and drawer 2 cannot be driven simultaneously.

Canceling of printing data / CAN

[ASCII] CAN
[Decimal] 24
[Hexadecimal] 18
[Parameter]
[Description] ● The input buffer and print buffer are cleared.
In STX-ETX mode of the serial interface printer, the data in the data buffer is cleared, and then STX-ETX mode is ended.

Specifying the De-select mode / DC3

[ASCII] DC3
[Decimal] 19
[Hexadecimal] 13
[Parameter]
[Description] ● When the printer receives <DC3>, it ignores the data after the command. Canceling of the deselect mode can be executed by <DC1>.

Specifying the select mode / DC1

[ASCII] DC1
[Decimal] 17
[Hexadecimal] 11
[Parameter]
[Description] ● When the printer receives the command, it inputs the data after the command to the input buffer.

Specifying/Canceling single direction print mode / ESC U

[ASCII] ESC U n
[Decimal] 27 85 n
[Hexadecimal] 1B 55 n
[Parameter] 0≦n≦255
[Description] ● Specifies/cancels the single direction printing.

n0=0	Two direction printing
n0=1	Single direction printing

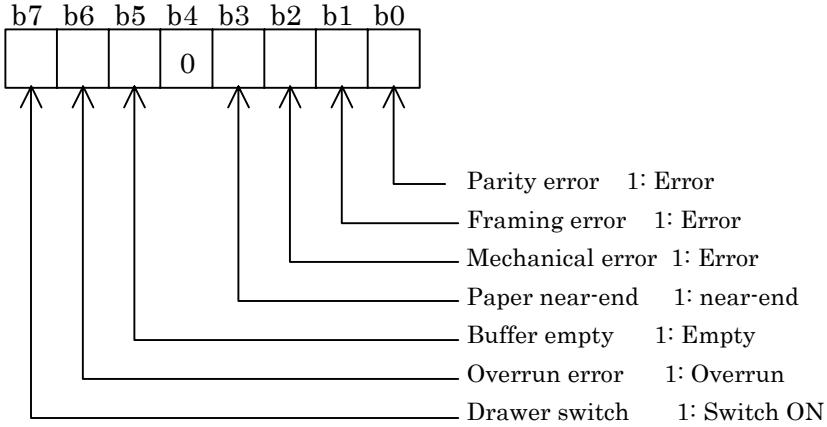
Initialization of a printer/ ESC @

[ASCII]	ESC	@
[Decimal]	27	64
[Hexadecimal]	1B	40
[Parameter]		
[Description]	● Cancels all the setting set after power-on and returns the printer to the same condition as that of power-on.	

Inquiry/ENQ

[ASCII]	ENQ
[Decimal]	05
[Hexadecimal]	05
[Parameter]	
[Description]	● This command is valid only with the serial interface. The printer sends status information. In STX-ETX mode, if this command is entered after receiving text information, the printer will send status information and check byte.

Status



Text start / STX

[ASCII]	STX
[Decimal]	02
[Hexadecimal]	02
[Parameter]	
[Description]	● This command is valid only with the serial interface. The printer enters STX-ETX mode.

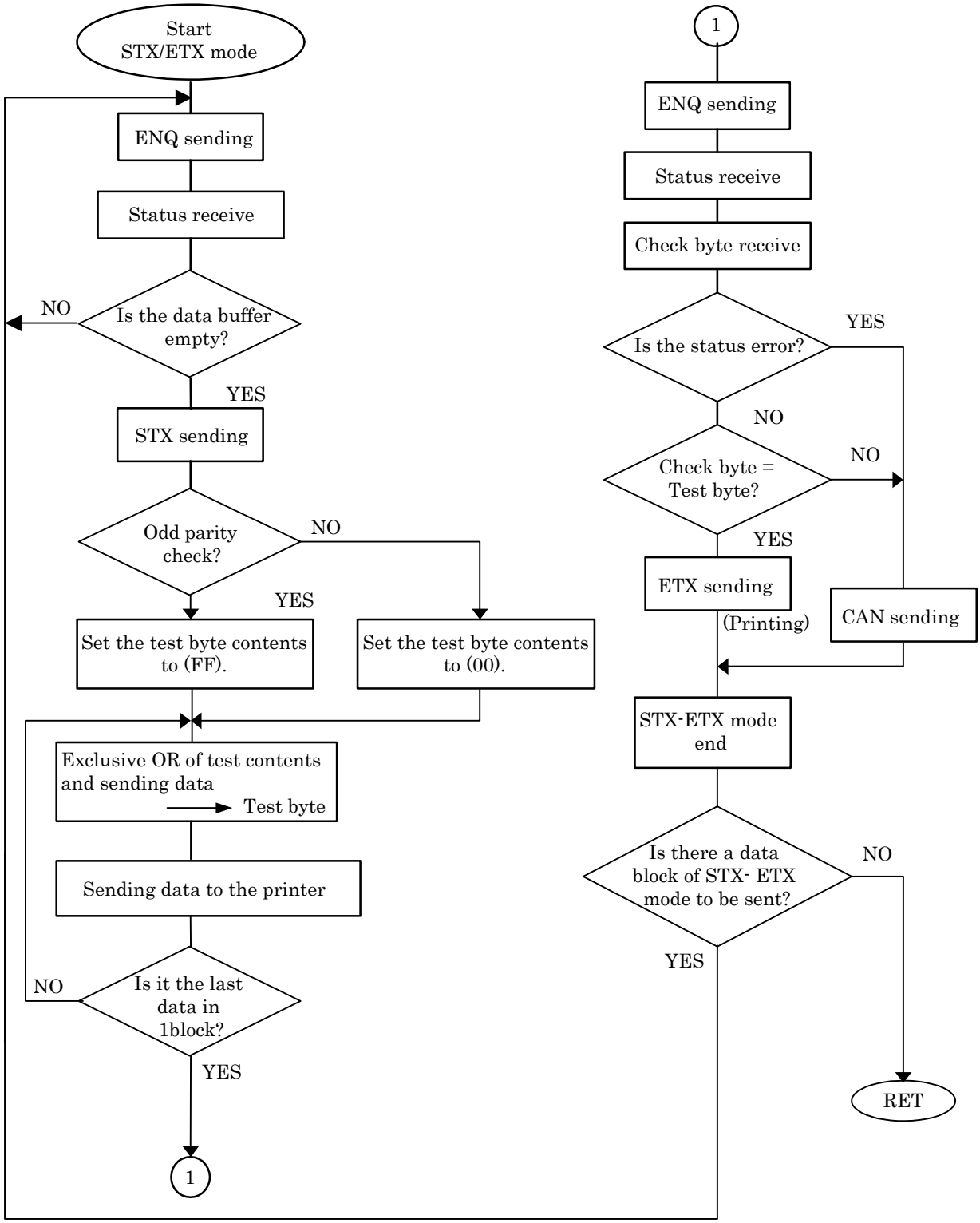
Text end / ETX

[ASCII]	ETX
[Decimal]	03
[Hexadecimal]	03
[Parameter]	
[Description]	● This command is valid only with the serial interface. Ends STX-ETX mode and prints data.

Buzzer sounding/RS

[ASCII]	RS
[Decimal]	30
[Hexadecimal]	1E
[Parameter]	
[Description]	● Produces short warning sound for approx. 200ms.

* ETX-STX mode


Start
STX/ETX mode
ENQ sending
Status receive
Is the data buffer empty?
NO
YES
STX sending
Odd parity check?
NO
YES
Set the test byte contents to (FF).
Set the test byte contents to (00).
Exclusive OR of test contents and sending data
Test byte
Sending data to the printer
Is it the last data in 1block?
NO
YES
1
1
ENQ sending
Status receive
Check byte receive
Is the status error?
YES
NO
Check byte = Test byte?
NO
YES
ETX sending
(Printing)
CAN sending
STX-ETX mode end
Is there a data block of STX- ETX mode to be sent?
NO
YES
RET

Full cut / ESC d (auto cutter loading model)

[ASCII] ESC d n
[Decimal] 27 100 n
[Hexadecimal] 1B 64 n
[Parameter] 0, 1, 30h, 31h
[Description] ● Executes the cutting of paper.

n	Cut operation
0	Full cut
30	
1	Partial cut
31	

● We recommend to observe an interval between cuts of 3 seconds or more.

Selecting the character code table/ESC t

[ASCII] ESC t n
[Decimal] 27 116 n
[Hexadecimal] 1B 74 n
[Parameter] 0 ≦n≦255
[Description] ● Selects a page n of the character code table.

n	Character code
0	CBM Overseas
1	CBM Domestic
2	PC850 (Multilingual)
3	PC860 (Portugal)
4	PC863 (Canada−French)
5	PC865 (Norway)
6	PC852 (Latin 2)
7	PC866 (Russian)
8	PC857 (Turkey)
9	WPC1252
16	WPC1252
17	PC866 (Russian)
18	PC852 (Latin 2)
19	PC858 (EURO)
255	Blank page

● The initial value of “n” is dependent upon the setting code page of software switch.

Defining messages/ESC /

[ASCII]	ESC	/	n	"data"	CR or LF
[Decimal]	27	37	n	"data"	CR or LF
[Hexadecimal]	1B	25	n	"data"	CR or LF

[Parameter] $1 \leqq n \leqq 10$

[Description]
- Messages up to 50 bytes can be defined in 1 line.
- When the value of n is specified beyond the defined area, the data after n will be treated as printing data.
- Once a message is defined, it remains valid until it is redefined.
- End data with CR (0DH) or LF (OAH).
- When data is 50 bytes or more, the following data will be treated as printing data.
- Once a message is defined, it remains valid until the download deletion command (ESC DC 2n1n2) is executed.

Printing messages/ ESC DC3

[ASCII]	ESC	DC3	n
[Decimal]	27	19	n
[Hexadecimal]	1B	13	n

[Parameter] $1 \leqq n \leqq 10$

[Description]
- Message is printed.
- When the value of n is specified out of the domain, don't print.

Setting printing line after paper near-end detection/ESC y

[ASCII]	ESC	y	n
[Decimal]	27	121	n
[Hexadecimal]	1B	79	n

[Parameter] $0 \leqq n \leqq 255$

[Description]
- Selects the printing line after paper near-end detection.
- Stops printing after printing n x 2 lines after paper near-end detection. Enters paper near-end state.
- Paper end signal parallel changes by the time paper near-end is detected.
- Default is n=0.

Deleting download characters, message, bit image/ESC DC2

[ASCII] ESC DC2 n1 n2
[Decimal] 27 18 n1 n2
[Hexadecimal] 1B 12 n1 n2
[Parameter] 0≦n1≦3
0≦n2 (When selecting n1=0, select 0.)
(When selecting n1=1, 1≦n2≦10.)
(When selecting n1=2, 32≦n2≦224.)
(When selecting n1=3, select 0.)

[Description]
- Deletes download character, message, bit image.
- Specifies download function to be deleted by n2.

n1	Candidate for deletion
0	All (message, character, bit image)
1	Download message
2	Download character
3	Download bit image

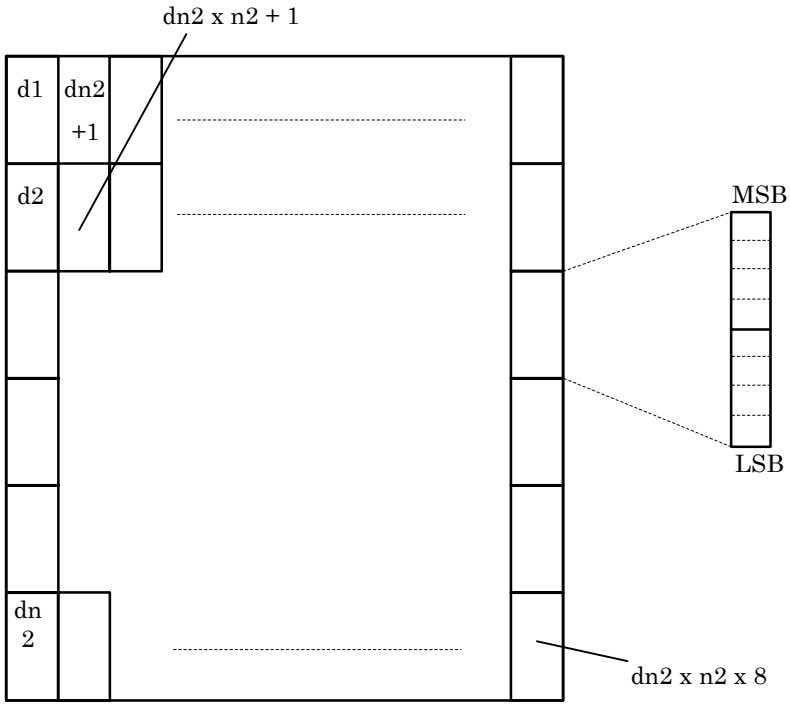
- Specifies which data of the function specified by n1 by n2 is deleted.
- Deletes all the data registered by the download function specified by n2=0 n1.
- Deletes part of download data specified by n2 (value specified at registering by download command).

Defining the download bit image/GS *

[ASCII]	GS	*	n1	n2	[<d>] x (n1xn2x8)
[Decimal]	27	42	n1	n2	[<d>] x (n1xn2x8)
[Hexadecimal]	1B	2A	n1	n2	[<d>] x (n1xn2x8)

[Parameter]
$1 \leqq n1 \leqq 45$
$0 \leqq n2 \leqq 24$
Set the data number to (n1 x n2 x 8) $\leqq$2048.

[Description]
- Defines the download bit images of dots specified by n1 and n2.
- The number of dots in horizontal direction is n1 x 8 and the number of dots in vertical direction is n2 x 8.
  "d" indicates bit image data.
- Once a download bit image is defined, it remains effective until redefinition, execution of ESC, DC2 and n1 n2 is conducted.



Printing the download bit image/GS /

[ASCII]	GS	/	m
[Decimal]	27	47	m
[Hexadecimal]	1B	2F	m
[Parameter]	0≦m≦255		
[Description]	● Prints the bit image defined by download bit image command. [Caution] ● If data exist in the print buffer, this command will be ignored. ● If a download bit image has not been registered, this command is ignored. Prints nothing unless m=0, 1, 2, 3.		

Page feed + Full cut at time of BM specification / GS FF

[ASCII]	GS	FF
[Decimal]	29	12
[Hexadecimal]	1D	0C
[Parameter]		
[Description]	● The command is effective only at time of BM specification. ● During the reception of the command: When auto cutter is valid: BM center skips to auto cut position and performs full cut after page feed. When auto cutter is invalid: BM center skips to manual cut position and performs full cut after page feed. ● When using this command, area between head and cut becomes unprintable area. When auto cutter is valid: Approx. 19mm When auto cutter is invalid: Approx. 28mm ● When performing a partial cut, set the [CUTTER] of the software switch to PAR.	

STAR mode (domestic)

	8	9	A	B	C	D	E	F
0	SP	┘	SP	―	タ	ミ	▌	═
1	│	┌	｡	ア	チ	ム	▁	═
2	¯	■	｢	イ	ツ	メ	═	═
3	│	■	┘	ウ	テ	モ	‖	═
4	¯	■	、	エ	ト	ヤ	┼	▌
5	│	■	･	オ	ナ	ユ	┘	▌
6	―	／	ヲ	カ	ニ	ヨ	└	▌
7	│	＼	ｧ	キ	ヌ	ラ	┐	▚
8	―	◥	ｨ	ク	ネ	リ	■	▞
9	│	◤	ｩ	ケ	ノ	ル	■	◢
A	＿	┌	ｪ	コ	ハ	レ	┴	◣
B	│	┴	ｫ	サ	ヒ	ロ	←	═
C	├	┬	ｬ	シ	フ	ワ	↑	‖
D	＿	┤	ｭ	ス	ヘ	ン	→	◟
E	└	◆	ｮ	セ	ホ	゛	↓	◞
F	┐	×	ｯ	ソ	マ	゜	◜	◝

STAR mode (overseas)

	8	9	A	B	C	D	E	F
0	SP	┘	Ä	é	ù	ã	▌	═
1	│	┌	Ö	è	ũ	â	▁	═
2	¯	■	Ü	ẽ	û	°	═	═
3	│	■	ß	ê	ç	℃	‖	═
4	¯	■	§	ï	¿	℉	┼	▌
5	│	■	a	í	Ñ	Ω	┘	▌
6	―	／	o	ì	ñ	μ	└	▌
7	│	＼	£	ĩ	Ẽ	Σ	┐	▚
8	―	◥	¢	î	Ɔ	σ	■	▞
9	│	◤	½	ð	¡	☒	■	◢
A	＿	┌	Ƥ	ó	Å	₺	┴	◣
B	│	┴	☒	ò	ϕ	×	←	═
C	├	┬	¥	õ	θ	∞	↑	‖
D	＿	┤	¼	ô	ä	±	→	◟
E	└	◆	Å	ü	á	÷	↓	◞
F	┐	×	ë	ú	à	π	◜	◝

CodePage437 (USA, Standard Europe6)

	8	9	A	B	C	D	E	F
0	Ç	É	á	⣿	└	╨	α	≡
1	ü	æ	í	▓	┴	╤	β	±
2	é	Æ	ó	▓	┬	╥	Γ	≥
3	â	ô	ú	│	├	╙	π	≤
4	ä	ö	ñ	┤	─	╘	Σ	⌠
5	à	ò	Ñ	╡	┼	╒	σ	⌡
6	å	û	ª	╢	╞	╓	μ	÷
7	ç	ù	º	╖	╟	╫	τ	≈
8	ê	ÿ	¿	╕	╚	╪	Φ	°
9	ë	Ö	⌐	╣	╔	┘	θ	∙
A	è	Ü	¬	║	╩	┌	Ω	·
B	ï	¢	½	╗	╦	■	δ	√
C	î	£	¼	╝	╠	▄	∞	n
D	ì	¥	¡	╜	═	▌	φ	²
E	Ä	Pt	«	╛	╬	▐	∈	■
F	Å	ƒ	»	┐	╧	▀	∩	

Katakana

	8	9	A	B	C	D	E	F
0	_	┴	SP	―	タ	ミ	═	×
1	▂	┬	｡	ア	チ	ム	╞	円
2	▂	┤	｢	イ	ツ	メ	╪	年
3	▃	├	｣	ウ	テ	モ	╡	月
4	▄	―	、	エ	ト	ヤ	◢	日
5	■	‗	･	オ	ナ	ユ	◣	時
6	■	│	ヲ	カ	ニ	ヨ	◥	分
7	▇	┃	ァ	キ	ヌ	ラ	◤	秒
8	▏	┌	ィ	ク	ネ	リ	♠	〒
9	▏	┐	ゥ	ケ	ノ	ル	♥	市
A	▌	└	ェ	コ	ハ	レ	♦	区
B	▌	┘	ォ	サ	ヒ	ロ	♣	町
C	▋	╱	ャ	シ	フ	ワ	●	村
D	▋	╲	ュ	ス	ヘ	ン	○	人
E	▊	╳	ョ	セ	ホ	゛	／	▒
F	┼	╯	ッ	ソ	マ	゜	＼	SP

CodePage850 (Multilingual)

	8	9	A	B	C	D	E	F
0	Ç	É	á	⣿	└	ð	Ó	—
1	ü	æ	í	▓	┴	Ð	ß	±
2	é	Æ	ó	▓	┬	Ê	Ô	=
3	â	ô	ú	│	├	Ë	Ò	¾
4	ä	ö	ñ	┤	─	È	õ	¶
5	à	ò	Ñ	Á	┼	ı	Õ	§
6	å	û	a	Â	ã	Í	µ	÷
7	ç	ù	º	À	Ã	Î	þ	¸
8	ê	ÿ	¿	©	╚	Ï	Þ	°
9	ë	Ö	®	╣	╔	┘	Ú	¨
A	è	Ü	¬	‖	╩	┌	Û	·
B	ï	¢	½	╗	╦	▉	Ù	¹
C	î	£	¼	╝	╠	▄	ý	³
D	ì	¥	¡	¢	═	¦	Ý	²
E	Ä	×	«	¥	╬	Ì	¯	■
F	Å	ƒ	»	¬	¤	▀	´	

CodePage860(Portugal)

	8	9	A	B	C	D	E	F
0	Ç	É	á	⣿	└	╨	α	≡
1	ü	À	í	▓	┴	╤	ß	±
2	é	È	ó	▓	┬	╥	Γ	≥
3	â	ô	ú	│	├	╙	π	≤
4	ã	õ	ñ	┤	─	╘	Σ	⌠
5	à	ò	Ñ	╡	┼	╒	σ	⌡
6	Á	Ú	a	╢	╞	╓	µ	÷
7	ç	ù	º	╖	╟	╫	τ	≈
8	ê	Ì	¿	╕	╚	╪	Φ	°
9	Ê	Õ	Ò	╣	╔	┘	θ	∙
A	è	Ü	¬	‖	╩	┌	Ω	.
B	Í	¢	½	╗	╦	▉	δ	√
C	Ô	£	¼	╝	╠	▄	∞	ⁿ
D	ì	Ù	¡	╜	═	▌	φ	²
E	Ã	Pt	«	╛	╬	▐	∈	■
F	Â	Ó	»	¬	╧	▀	∩	

CodePage863 (Canadian-French)

	8	9	A	B	C	D	E	F
0	Ç	É	¦	⣿	└	╨	α	≡
1	ü	È	´	▒	┴	╤	β	±
2	é	Ê	ó	▓	┬	╥	Γ	≥
3	â	ô	ú	│	├	╙	π	≤
4	Â	Ë	¨	┤	─	╘	Σ	⌠
5	à	Ï	⸗	╡	┼	╒	σ	⌡
6	¶	û	³	╢	╞	╓	μ	÷
7	ç	ù	¯	╖	╟	╫	τ	≈
8	ê	¤	Î	╕	╚	╪	Φ	°
9	ë	Ô	⌐	╣	╔	┘	θ	∙
A	è	Ü	¬	║	╩	┌	Ω	·
B	ï	¢	½	╗	╦	█	δ	√
C	î	£	¼	╝	╠	▄	∞	n
D	=	Ù	¾	╜	═	▌	ϕ	²
E	À	Û	⟪	╛	╬	▐	∈	■
F	§	ƒ	⟫	┐	╧	▀	∩	

CodePage865(Norway)

	8	9	A	B	C	D	E	F
0	Ç	É	á	⣿	└	╨	α	≡
1	ü	æ	í	▒	┴	╤	β	±
2	é	Æ	ó	▓	┬	╥	Γ	≥
3	â	ô	ú	│	├	╙	π	≤
4	ä	ö	ñ	┤	─	╘	Σ	⌠
5	à	ò	Ñ	╡	┼	╒	σ	⌡
6	å	û	ª	╢	╞	╓	μ	÷
7	ç	ù	º	╖	╟	╫	τ	≈
8	ê	ÿ	¿	╕	╚	╪	Φ	°
9	ë	Ö	⌐	╣	╔	┘	θ	∙
A	è	Ü	¬	║	╩	┌	Ω	·
B	ï	ϕ	½	╗	╦	█	δ	√
C	î	£	¼	╝	╠	▄	∞	n
D	ì	ø	¡	╜	═	▌	ϕ	²
E	Ä	Pt	⟪	╛	╬	▐	∈	■
F	Å	ƒ	¤	┐	╧	▀	∩	

CodePage852 (Latin 2)

	8	9	A	B	C	D	E	F
0	Ç	É	á	▒	└	đ	Ó	-
1	ü	Ĺ	í	▓	┴	Đ	ß	˝
2	é	Í	ó	▓	┬	Ď	Ô	˛
3	â	ô	ú	┤	├	Ë	Ń	ˇ
4	ä	ö	Ą	╡	─	ð	ń	˘
5	ů	Ľ	a	Á	┼	Ň	ň	§
6	ć	ľ	Ž	Â	Ă	Í	Š	÷
7	ç	Ś	ž	Ě	ă	Î	š	¸
8	ł	ś	Ę	Ş	╚	ě	Ŕ	°
9	ë	Ö	ę	╣	╔	┘	Ú	¨
A	Ő	Ü	¬	║	╩	┌	ŕ	·
B	ő	Ť	ź	╗	╦	█	Ű	ű
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CodePage866 (Russian)

	8	9	A	B	C	D	E	F
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2	В	Т	в	▒	┬	╥	т	Є
3	Г	У	г	┤	├	╙	у	є
4	Д	Ф	д	╡	─	╘	ф	Ї
5	Е	Х	е	╢	┼	╒	х	ї
6	Ж	Ц	ж	╖	╞	╓	ц	Ў
7	З	Ч	з	╕	╟	╫	ч	ў
8	И	Ш	и	╣	╚	╪	ш	°
9	Й	Щ	й	║	╔	┘	щ	∙
A	К	Ъ	к	╗	╩	┌	ъ	·
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CodePage857 (Turkey)

	8	9	A	B	C	D	E	F
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1	ü	æ	í	▒	┴	a	β	±
2	é	Æ	ó	▓	┬	Ê	Ô	
3	â	ô	ú	│	├	Ë	Ò	¾
4	ä	ö	ñ	┤	—	È	õ	¶
5	à	ò	Ñ	Á	†		Õ	§
6	å	û	Ğ	Â	ã	í	µ	+
7	ç	ù	ğ	À	Ã	Î		¸
8	ê	±	¿	©	╚	Ï	×	°
9	ë	Ö	®	╣	╔	┘	Ú	¨
A	è	Ü	¬	‖	╩	┌	Û	•
B	ï	ø	½	╗	╦	█	Ù	¹
C	î	£	¼	╝	╠	▄	ì	³
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CodePage858(Euro)

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2	é	Æ	ó	▓	┬	Ê	Ô	=
3	â	ô	ú	│	├	Ë	Ò	¾
4	ä	ö	ñ	┤	—	È	õ	¶
5	à	ò	Ñ	Á	┼	€	Õ	§
6	å	û	a	Â	ã	Í	µ	÷
7	ç	ù	ϱ	À	Ã	Î	þ	¸
8	ê	ÿ	¿	©	╚	Ï	Þ	°
9	ë	Ö	®	╣	╔	┘	Ú	¨
A	è	Ü	¬	‖	╩	┌	Û	•
B	ï	ϕ	½	╗	╦	■	Ù	¹
C	î	£	¼	╝	╠	▄	ý	³
D	ì	ø	¡	¢	═	¦	Ý	²
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WPC1252

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5	…	•	¥	µ	Å	Õ	å	õ
6	†	–	¦	¶	Æ	Ö	æ	ö
7	‡	—	§	·	Ç	×	ç	÷
8	ˆ	˜	¨	¸	È	Ø	è	ø
9	‰	™	©	¹	É	Ù	é	ù
A	Š	š	ª	º	Ê	Ú	ê	ú
B	‹	›	«	»	Ë	Û	ë	û
C	Œ	œ	¬	¼	Ì	Ü	ì	ü
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4. Attention on Use

4.1 Cutter Operation

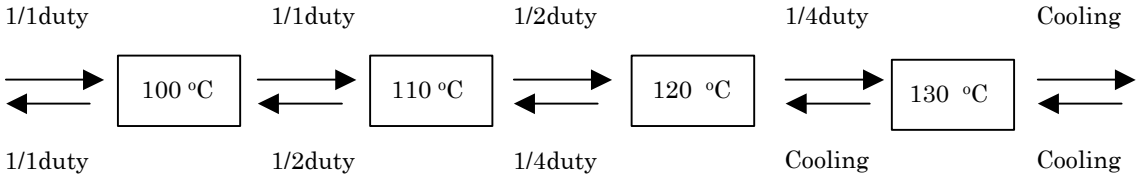
The minimum cutting interval must be 1/2 inch (3 lines in 6LPI).
Once a cutting command is executed, even if any other cutting command is sent before paper feeds for at least 1/2 inch, it is ignored and the cutting operation is not executed.

Moreover, a paper tends to be caught in a cutter when a paper is cut using a manual cutter.
Printing result immediately after a cut may produce clogging at the top-bottom of the print out page.
Please insert an extra line feed before printing to prevent clogging.

4.2 Cooling Operation by Head Temperature

Cooling is operated according to the thermistor temperature, which is monitored during printing.

Cooling operation



1/1duty — Normal printing.
1/2duty — Carriage empty-moves once at every one-line printing.
1/4duty — Carriage empty-moves 3 times at every one-line printing.
Cooling — A carriage empty-moves until it falls to a specified temperature.

Note: If an object having a high printing density such as bit image is printed during the above control operation after the thermistor detects 100°C or higher, the printing quality may deteriorate.

4.3 Morning Shot

When a printing is started at the following timing with the head temperature of 5°C or lower, the carriage is moved to position B (see 9.5 Color Ribbon Change) and a dummy electricity-distribution is performed before printing.

(1) First printing immediately after power-on.
(2) First printing after centering.

Caution: Depending on the thickness of the paper & the type of ribbon, the start up operation may leave (vertical 9-pin) printing marks on the right edge of the paper.

4.4 Cover Opening-and-Closing Processing

● Front cover opening/closing

1) Opening: Printing stops. If red printing is set, the ribbon color is changed to black. After centering, the printer stands by at that state.

2) Closing: If red printing is set before the cover is opened, the printing color is returned to red. If there is printing data, printing is resumed.

● Rear cover opening/closing

1) Opening: Printing stops. After centering, the printer stands by at that state. In case of printers equipped with a rewinder, if the cover is opened when paper is loaded, paper feeds forward for approximately 1 inch, and then centering is performed.

2) Closing: After initializing the home position and cut position, the printer performs the backlash operation (forward paper feed for 12/144 inch), and then performs printing if there is printing data.

Note :

(1) If the rear cover is opened during printing, it may cause a problem in the head or cutter. Please check that printing has stopped when opening the rear cover.

(2) When closing the rear cover, hold the paper end by hand so that neither slack nor a crease generates inside the printer.

(3) If a cutter problem occurs because of paper jam or other reasons, the printer may stop with the cutter blade protruding, and the rear cover may be stuck with the cutter blade. In this case, do not try to open the cover forcibly, but cancel the cutter error by pressing FEED switch. If the error is not cancelled by pressing FEED switch, the cutter blade needs to be returned manually before the cover is opened. Insert a screwdriver into the hole on the left side of the rear cover and rotate it (the cutter blade returns when the screwdriver is rotated in either direction).

(4) Be careful not to catch your finger in the cover when opening or closing the front/rear cover. Especially, be careful with the manual cutter.

4.5 Recording Paper

Use the recording paper shown below to maintain printing quality and stabilize paper feeding.

(1) Roll paper

a) Regular paper

Paper width	76.2 ± 0.7 mm (3 ± 1 / 36 inches) 69.5 ± 0.6 mm (3 ± 1 / 36 inches) 57.5 ± 0.5 mm (2.26 ± 0.02 inches)
Roll diameter	ϕ30mm to ϕ83 mm
Core diameter	Internal Diameter: ϕ 10 +2-/-0 mm External diameter: ϕ 27mm or less
Paper thickness	0.06 – 0.085 mm
Weight	52.3 – 64.0 g/m2 (JIS P8124) (45 – 55 kg / 1000 sheets / 788mm × 1091 mm)
Recommended paper	Register paper (Oji Paper) or equivalent

b) Thermal paper (Non-carbon 2P/3P paper, 1 original + 1copy/2 copies)

Paper width, roll diameter, core diameter	Same as regular paper.
Paper thickness	0.05 – 0.20 mm The total thickness that can be cut is from 0.05 to 0.14 mm.
Recommended paper	2P NCR Super (Mitsubishi Paper Mills) (blue background) or equivalent

(2) Notes on roll paper

Starting to wind the roll paper (with a core). (Inside end processing)

1) It must not be folded. Inside end must be even.
2) It must not be rolled back.
3) There must be no glue on its center core.
4) It must be wound with its printing side facing outwards.
5) When 2P paper is used, there must be no glue between the top and bottom sheets.
6) When 3P paper is used, there must be no glue on the top, middle, or bottom sheets.
7) Use thermal paper with total thickness no greater than 0.20mm. Note that the printer will not cut paper with total thickness greater than 0.14mm.
   If you use thermal paper with total thickness greater than 0.14mm, do not use the cutter. Or, rewind the bottom paper with the rewinder to reduce the total thickness (top paper + middle paper) to 0.14mm or less.

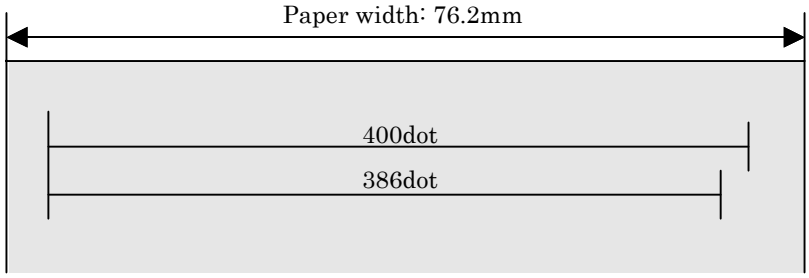
4.6 Paper Width and Printing Digit Number

This machine supports three kinds (76.2/69.5/57.5mm) of paper width.
When using the paper of 69.5/57.5mm width, a setup of paper width can be changed by setup of Software SW,
The attached paper partition plate is set and a paper is set on a right end.

• When paper width is set as 76.2mm

Selected number of columns	Selected fonts	Space between characters	Printing line columns	Full columns
40 / 33:00	9x9dots	3dots	33 columns	400dots
	7x9dots	3dots	40 columns	
42 / 35:00	9x9dots	2dots	35 columns	386dots
	7x9dots	2dots	42 columns	

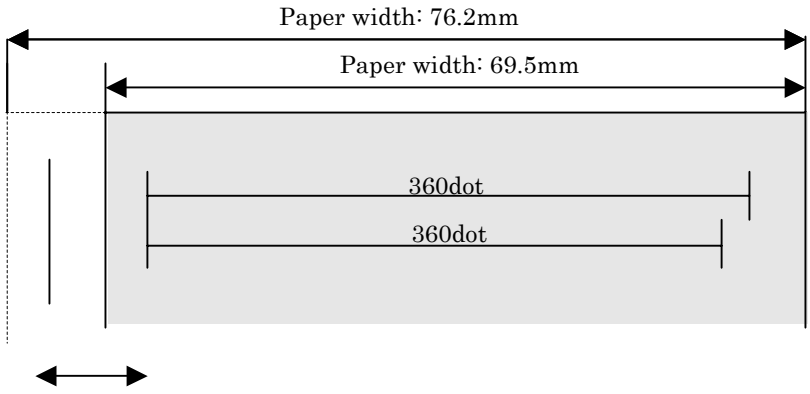
<Print range>



• When paper width is set as 69.5mm

Selected number of columns	Selected fonts	Space between characters	Printing line columns	Full columns
40 / 33:00	9x9dots	3dots	30 columns	360dots
	7x9dots	3dots	36 columns	
42 / 35:00	9x9dots	2dots	32 columns	360dots
	7x9dots	2dots	40 columns	

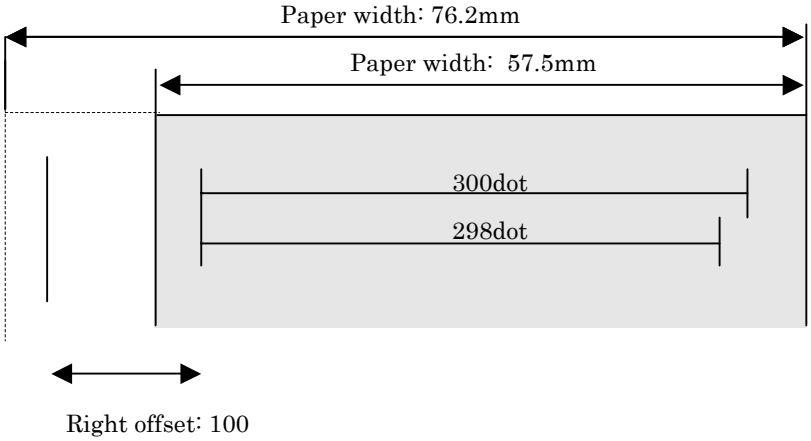
<Print range>



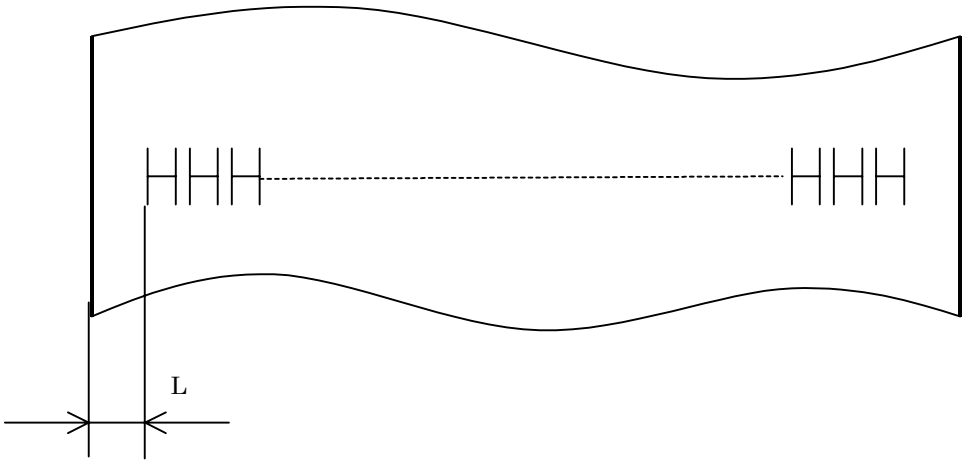
• When paper width is set as 57.5mm

Selected number of columns	Selected fonts	Space between characters	Printing line columns	Full columns
40 / 33:00	9x9dots	3dots	25 columns	300dots
	7x9dots	3dots	30 columns	
42 / 35:00	9x9dots	2dots	27 columns	298dots
	7x9dots	2dots	33 columns	

<Print range>



• Printing position at the beginning of each paper

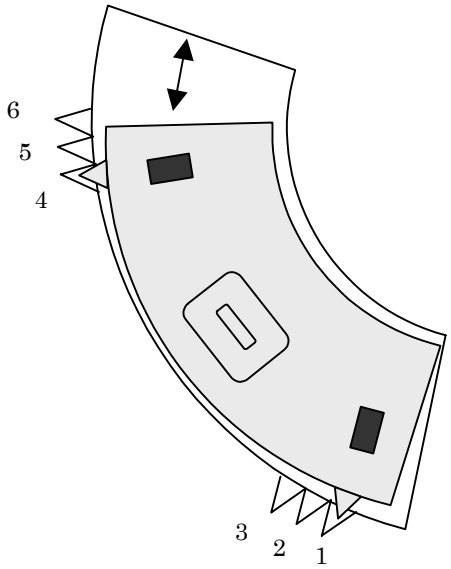


Paper type	L
Paper width of 76.2mm	6.0±3mm
Paper width of 69.5mm	6.0±3mm
Paper width of 57.5mm	3.2±3mm

4.7 Paper Near-End (PNE) Detection

The detection level of paper near-end is selectable by the three positions for each of vertical and horizontal installation as shown bellow.
At the time of factory shipments, it is set to ϕ 24 (sensor position 2 and 5).

Sensor position	Installation method	Amount of remaining roll paper (mm)
1	Horizontal	Approx. ϕ 22
2		Approx. ϕ 24
3		Approx. ϕ 27
4	Vertical	Approx. ϕ 27
5		Approx. ϕ 24
6		Approx. ϕ 22



How to change the switch: Pushing the concave part of the center of the switch with your finger, move it to the right or left.

Note: (1) The amount of remaining roll paper differs greatly depending on the type of roll paper. Use these values only as guideline.
(2) If the sensor detects the Paper Near-End during printing, the printer stops only after it has printed all the data that it has received in the reception buffer.
(3) Under the centronics interface specification, this Paper Near-End (PNE) detection is valid only when Paper Near-End of the software switch is enabled. If PNE of the software switch is set disabled, PNE detection is ignored.
Under the serial interface specification, PNE is always valid.
(4) If roll paper loosens too easily when its external diameter is becoming small, PNE may not be detected correctly.

5. Attention of Black Mark Sensor Equipped Model

5.1 Operation of Black Mark Equipped Model

- Auto cutter equipped model
  When the printer is turned on, or the rear cover is opened and then closed, the printer feeds paper for 1 page in order to automatically measure white/black area. Then, it feeds paper until the black mark center at the next page head comes to the cutting position. After this, cutting is operated and the printer goes to a standby state.

- Model not equipped with an auto cutter
  When the printer is turned on, or the rear cover is opened and then closed, the printer feeds paper for 1 page in order to automatically measure white/black area. Then, it feeds paper until the black mark center at the next page head comes to the manual cutting position. After this, the printer goes to a standby state.
  During the above measurement, if a black mark cannot be detected by a paper feed for 285mm, a black mark detection error is indicated.

Even if it carries out 285mm paper feed, when a black mark is undetectable at the time of the above-mentioned automatic length, it becomes the error of the abnormalities in black mark detection.

5.2 FEED Switch Operation of Black Mark Equipped Model

Pressing shortly: Paper feeds for 1 line at the line feed rate by the current setting.
Pressing continuously for 2 seconds or more:

For auto cutter equipped model
The printer feeds paper until the center of next black mark comes to the cutting position. Then it operates cutting and goes to a standby state.

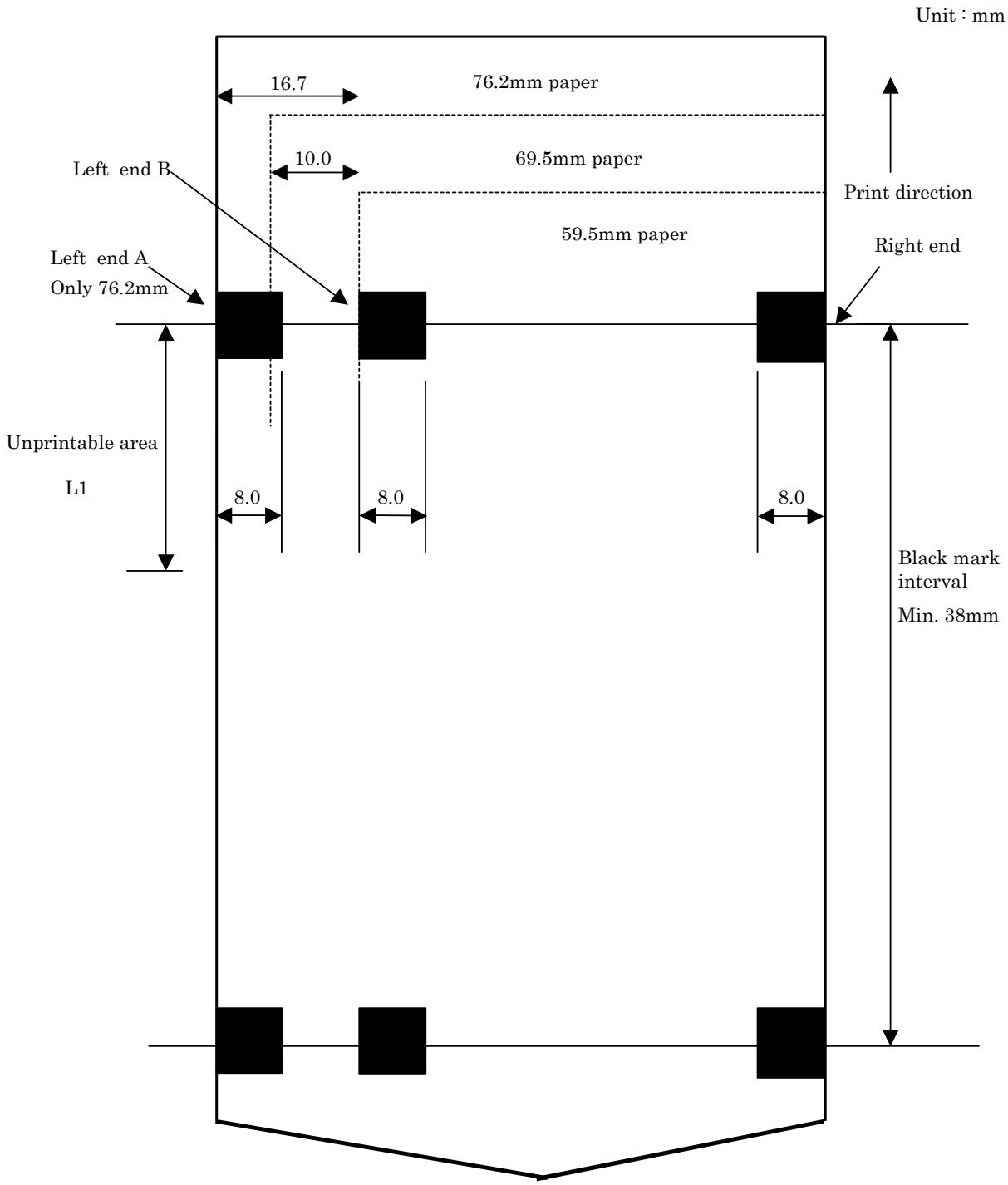
For model not equipped with an auto cutter
The printer feeds paper until the center of next black mark comes to the manual cutting position. Then it operates cutting and goes to a standby state.

5.3 Cautions on Program Creation

When the black mark has been arranged to the printing side, it can also print on the Black Mark (it does not skip).
If you prefer not to print on the Black Mark, user must reconsider the arrangement of program.

Command effective only at the time of using Black Mark equipped model.
GS+FF (1Dh+0Ch) is effective in EPSON, CBM, and all Star modes.
When this command is received it operates in the same manner as pressing the FEED switch of 5.2 2 continuously for 2 seconds or more.
Please use this command when printing with Black Mark paper.

5.4 Black Mark Position of Paper



The black mark positions are the same on face and reverse side of paper.

Note :

(1) The width of a black mark shall be 8.0mm or more.

(2) When the black mark sensor is attached in the left end B, it shall be set to the following position.
Paper width of 76.2mm : At 16.7mm from the left end of paper
Paper width of 69.5mm : At 10.0mm from the left end of paper

(3) Black mark interval shall be from 38.0 to 280mm.

(4) The unprintable area (L1) at the time of using [GS FF] command shall be as follows.
When the cutter is valid: Approximately 19mm from the mark center (between the head and the auto cutter)
When the cutter is invalid: Approximately 28mm from the mark center (between the head and the manual cutter)

(5) The reflectance of paper for which the black mark detection is operated shall be 10% or less for black paper (black mark) and 70% or more for white paper. Reflectance shall be measured using Macbeth densitometer (PCMII) D filter.

6. Interface

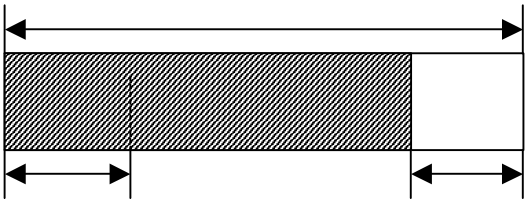
6.1 Serial Interface

Pin arrangement

PIN No.	Signal Name	Direction	Function
1	FG	–	Frame ground
2	TXD	Output	Transmitting data
3	RXD	Input	Receiving data
4	RTS	Output	Equivalent to DTR (20 pin).
6	DSR	Input	Receivable state of HOST HIGH-READY/LOW-NOT READY [At the time of DTR/RTS control] PRINTER after--check-data-transmits that DSR is HIGH. (On condition that, the transmission by DLE EOT and GS a is removed) [At the time of XON/XOFF control] A printer does not check DSR.
7	SG	–	Signal ground
20	DTR	Output	READY/BUSY state of PRINTER HIGH-READY/LOW-BUSY [At the time of DTR/RTS control] In a receivable state, PRINTER is BUSY, when READY and reception are improper. It is alike and carries out.
			The state of PRINTER
			1) Until initial setting finishes at the time of a power supply injection — BUSY
			2) The usual OFFLINE state — BUSY
			3) The OFFLINE state at the time of PE — BUSY
			4) In addition, the OFFLINE state at the time of error generating — BUSY
			5) At the time of the receiving buffer FULL — BUSY
			6) At the time of Self-Print — BUSY
			[At the time of XON/XOFF control] It is always HIGH-READY except the following conditions. 1) Until initial setting finishes at the time of a power supply injection 2) At the time of Self-Print
25	INIT	Input	PRINTER RESET (HIGH takes 1ms or more)

[Buffer Full Control]

Reception buffer: 40/4K

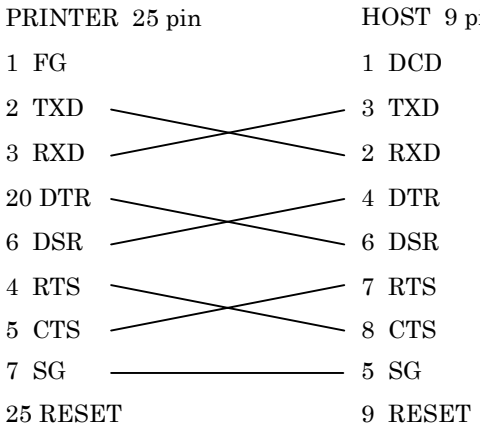


8/1536bytes XON

16/512bytes XOFF

Overrun buffer size : 16/512 bytes
XOFF reset size : 8/1536 bytes

[Connection with HOST]



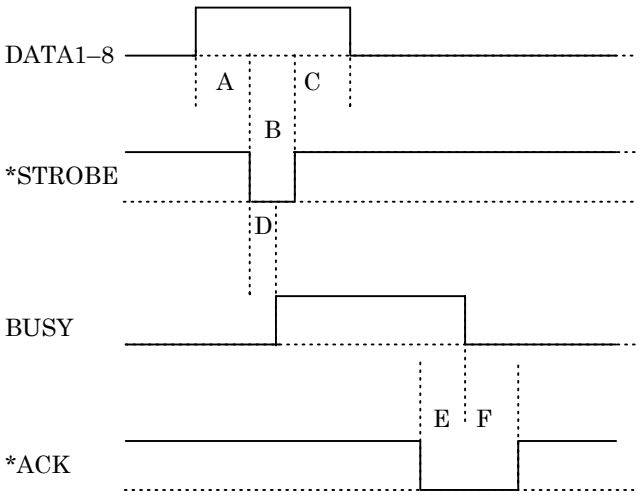
6.2 IEEE 1284 Interface

Pin arrangement

PIN No.	Direction	Function		
		Compatibility Mode	Nibble Mode	Byte Mode
1	Input	*Strobe	HostCLK	HostCLK
2	Input/Output	Data0	Data0	Data0
3	Input/Output	Data1	Data1	Data1
4	Input/Output	Data2	Data2	Data2
5	Input/Output	Data3	Data3	Data3
6	Input/Output	Data4	Data4	Data4
7	Input/Output	Data5	Data5	Data5
8	Input/Output	Data6	Data6	Data6
9	Input/Output	Data7	Data7	Data7
10	Output	*ACK	PtrCLK	PtrCLK
11	Output	BUSY	PtrBUSY/Data3,7	PtrBUSY
12	Output	PE	AckDataReq/Data2,6	AckDataReq
13	Output	SELECT	Xflag/Data1,5	Xflag
14	Input	*AutoFeed	HostBUSY	HostBUSY
15	–	(NC)	(ND)	(ND)
16	–	GND	GND	GND
17	–	FG	FG	FG
18	Output	Logic-H	Logic-H	Logic-H
19–30	–	GND	GND	GND
31	Input	*INIT	*INIT	*INIT
32	Output	*FAULT	*DataAvail/Data0,4	*DataAvail
33	–	GND	(ND)	(ND)
34	Output	DK_STATUS	(ND)	(ND)
35	Output	+5V	(ND)	(ND)
36	Input	*Select-in	1284-Active	1284-Active

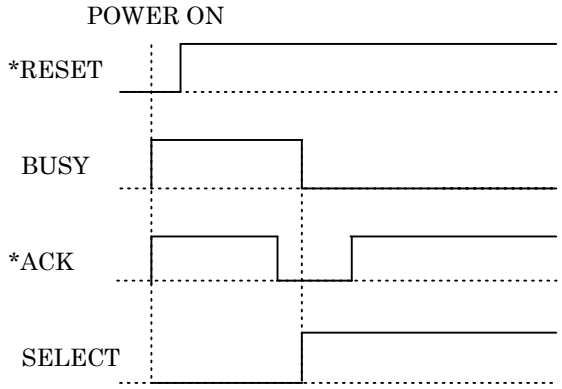
(* : Active LOW)

Data receiving timing

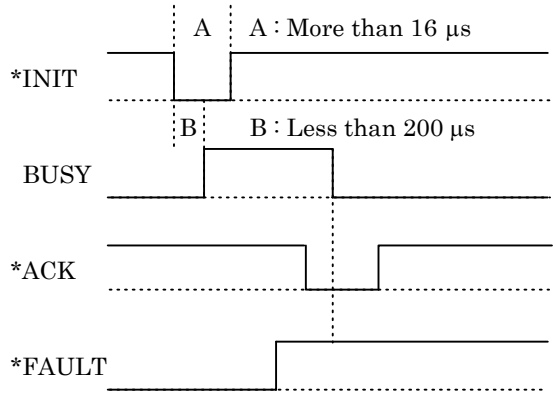


A : MIN. 1 µs
B : MIN. 1 µs
C : MIN. 1 µs
D : MAX. 1 µs
E : APPROX. 3.2 µs
F : APPROX. 3.2 µs

Power-on timing

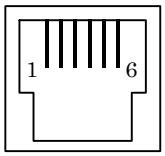


INIT signal timing

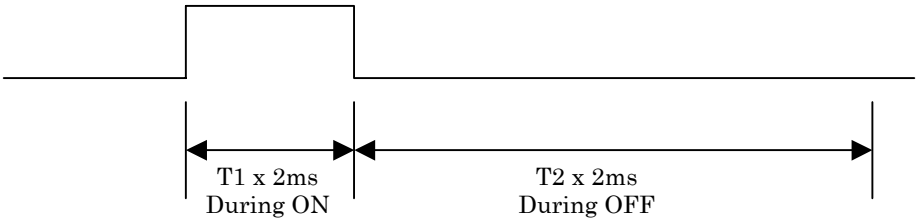


6.3 Drawer Kick-out Interface

PIN No.	Direction	Function
1	–	Frame GND
2	Output	Drawer Kick-out Signal 1
3	Input	Drawer Open/Close
4	–	+24V
5	Output	Drawer Kick-out Signal 2
6	–	Signal GND



Select Drawer Kick-out Signal 1 or 2 by ESC p m t1 t2 command, and the time of a pulse is set up.



< cautions! >

(1) Satisfy T2 (OFF time) ≧ T1(ON time) x4.

(2) The maximum current of +24V is taken as to 1A. When the thing exceeding 1A is connected, they are this product and connection apparatus.
There is a possibility of damaging.

7. General specification

	Item	Function
1.	Printing mode	Serial impact dot matrix
2.	Printing direction	Bi-directional
3.	Head pins	9 pins (ϕ: 0.3mm, Pin interval: 1/72 inch)
4.	Printing line columns	Paper width of 76.2mm: 40/42 or 33/35 columns Paper width of 69.5mm: 36/40 or 30/32 columns Paper width of 57.5mm: 30/33 or 25/27 columns Maximum printing region: 200/400 dots (full dot/including half dot)
5.	Font configuration	ANK 7x9 or 9x9 dots Chinese 16x16 (Compatible only with Chinese spec.) Japanese 16x16 (Compatible only with Japanese spec.)
6.	Character types	ASCII (96 characters), international characters, Katakana Code pages: 437, 850, 860, 863, 865, 852, 866, 857, 858, WPC1252 Simplified Chinese GB18030–2000 (Compatible only with Chinese spec.) Japanese JIS (Compatible only with Japanese spec.)
7.	Panel/switch	1 switch (FEED), 3 LEDs (POWER/PAPER OUT/ERROR), 1 buzzer
8.	Printing speed	Printing: 240CPS (3P paper 200CPS) Through-put: 76.2mm wide, 40 columns (7x9+3sp, 6LPI) 5.0LPS 69.5mm wide, 36 columns (7x9+3sp, 6LPI) 5.4LPS 57.5mm wide, 30 columns (7x9+3sp, 6LPI) 6.0LPS
9.	Paper feed	Friction feed Minimum pitch: 1/144 inch Paper feed speed: 40LPS (6LPI)
10.	Paper	Types: 1P roll paper 2P copy roll paper (1 original + 1 copy) 3P copy roll paper (1 original + 2 copies) * When 3Pis used, printing speed falls 16%. Paper width: 76.2/69.5/57.5 (±0.5)mm Roll diameter: ϕ30mm to ϕ83mm Corediameter: Interior diameter ϕ10 +2–0 mm, exterior diameter ϕ27 mm or less Paper thickness: 1P 0.06 to 0.085mm Copy paper 0.05 to 0.20mm (total thickness) But the total thickness that can be cut is from 0.05 to 0.14mm. * No glue on the core or end of the paper. * See 12.1. Paper for recommended paper.
11.	Ribbon	Method: Special ribbon cassette Colors: Single color (purple, black), 2–color (black and red) Life: Purple, approx. 4 million characters (continuous printing at 25°C) Black, approx. 3 million characters (continuous printing at 25°C) Black/red, Black 1.5 million characters, Red 750,000 characters (continuous printing at 25°C)
12.	Interface	Standard model: 2 models, either RS232C or IEEE1284 Options: USB, Ethernet (exchanged with standard I/F)
13.	Emulation	ESC/POS (Page mode) CBM mode, STAR mode
14.	Data buffer	Receiving buffer: 40 or 4K bytes NV bit image: 128K bytes User NV memory: 8K
15.	Features	Paper drop–in type Auto cutter function (full cut/partial cut) Rewinder function Black mark sheet compatible Copy (2P/3P) paper compatible DKD (Drawer Kick Driver) function ASB (Auto Status Back) function

	Item	Function
16.	Power	AC adapter (Built–in type) Input: AC90V–246V, 50/60 Hz Output: DC24V±5% Power consumption: 24W (rating)
17.	External dimensions	Standard model: 156(W) x 247.7(D) x 132(H) mm Auto cutter equipped model: 156(W) x 247.7(D) x 132(H) mm Auto cutter and rewinder equipped model: 156(W) x 277.7(D) x 157(H) mm
18.	Body weight	Standard model: 2.20kg Auto cutter equipped model: 2.30kg Auto cutter and rewinder equipped model: 2.45kg On condition that, these exclude the AC adaptor, AC case, ribbon, and paper.
19.	Environmental conditions	During operation: Temperature 0 to 50°C Humidity 10 to 90%RH (no condensation) During storage: Temperature –20 to 70°C Humidity 5 to 90%RH (no condensation)
20.	Durability	Machine reliability: 180,000 hours (MTBF) 7.5 million lines (MCBF) Head lifetime: 150 million characters Cutter lifetime: 1 million cuts
21.	Vibration-proof	Frequency: 5–55–5 Hz, Sweep: 20 minutes (full sweep) X/Y/Z direction: 1 hour each, Acceleration: 19.6 m/s^2
22.	Shock-proof	When packed: Height: 1m, Direction: 1 corner, 3 edges, 6 faces When unpacked: Height: 5cm, Direction: 4 edges, single side support
23.	Electrostatic Discharge Threshold	Conforms to IEC 61000-4-2, Contact discharge: 4 kV, air/indirect discharge: 8 kV
24.	Safety standard	CE Marking Class A, FCC Class A, UL60950, VCCI Class A

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