CITIZEN

Command Reference

CONTROL BOARD FOR MLT-288/MLT-289
MLT-388/MLT-389

MODEL BD2-2880/2890
BD2-3880/3890

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REVISION

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		BD2-2880 command part modified.
0.01	2003.06.10	2-34 Range changed.
		2-37 Ranges of CODE39/ITF/CODABAR/CODE128 changed.
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1.00	2003.06.23	First version as 1.00.
1.01	2005.12.15	Numbers of reference page changed.

i

1. PRINT CONTROL FUNCTIONS

1.1 Command List

Print Control Commands

Control Code	Function	Code	Page
LF	Printing and paper feed	0Ah	5
CR	Print command	0Dh	6
ESC J	Printing and feeding paper n/203 inch	1Bh4Ah n	7
ESC d	Printing and feeding the paper by n lines	1Bh64h n	8

Print Character Commands

Control Code	Function	Code	Page
ESC SP	Setting the right space amount of the character	1Bh20h n	9
ESC !	Collective specifying printing mode	1Bh21h n	10
ESC %	Specifying/canceling dounwload character set	1Bh25h n	12
ESC &	Defining download characters	1Bh26h s n m [ap1...ps×a]m–n+1	13
ESC –	Specifying/canceling underline	1Bh2Dh n	15
ESC E	Specifying/canceling highlighting	1Bh45h n	16
ESC G	Specifying/canceling double printing	1Bh47h n	17
ESC R	Selecting the international character set	1Bh52h n	18
ESC V	Specifying/Canceling 90°-right- turned Characters	1Bh56h n	19
ESC t	Selecting the character code table	1Bh74h n	20
ESC {	Specifying/canceling the inverted characters	1Bh7Bh n	21

Print Position Commands

Control Code	Function	Code	Page
HT	Horizontal tab command	09h	22
ESC $	Specifying the absolute positions	1Bh24Ah n1 n2	23
ESC D	Setting horizontal tab position	1Bh44[n]k 00h	24
ESC\	Specifying the relative positions	1Bh 5C n1 n2	25
ESC a	Aligning the characters	1Bh 61h n	26

Line Feed Span Commands

Control Code	Function	Code	Page
ESC 2	Specifying 1/6-inch line feed rate	1Bh 32h	27
ESC 3	Setting line feed rate of minimum pitch	1Bh 33h n	28

1

Bit Image Commands

Control Code	Function	Code	Page
ESC *	Specifying the bit image mode	1Bh 2Ah m n1 n2[d]k	29
GS *	Defining the download, bit image	1Dh 2Ah n1 n2	31
GS /	Printing the download, bit image	1Dh 2F	33

Status Command

Control Code	Function	Code	Page
ESC v	Transmitting the printer status (Serial type)	1Bh 76h	34

Panel Switch Command

Control Code	Function	Code	Page
ESC c5	Enabling/disabling the panel switches	1Bh 63h 35h n	35

Macro Commands

Control Code	Function	Code	Page
GS :	Starting/ending macro definition	1Bh 63h 35h n	36
GS ^	Executing the macro	1Dh 5Eh n1 n2 n3	37

Cutter Commands

Control Code	Function	Code	Page
ESC i	Activating auto cutter (Full cut)	1Bh 69h	38
ESC m	Activating auto cutter (Partial cut)	1Bh 6Dh	39

Bar Code Commands

Control Code	Function	Code	Page
GS H	Selecting of print position of HRI code	1Dh 48H n	40
GS f	Selecting the font of HRI code	1Dh 66H n	41
GS h	Selecting the height of the bar code	1Dh 68H n	42
GS k	Printing the bar code	1Dh 6Bh n['d']k 00h (1)	43
		1Dh 6Bh m n[d1...dn] (2)	47
GS w	Selecting the horizontal size (scale factor) of bar code	1Dh 77H n	52

2

Other Commands

Control Code	Function	Code	Page
ESC =	Data input control	1Bh 3Dh n	53
ESC @	Initializing the Printer	1Bh 40h	54
DC2 A	Selecting the Print drive system	12h 41h n	55

NOP Commands

Control Code	Function	Code	Page
ESC c 3	NOP	–	–
ESC c 4	NOP	–	–
ESC p	NOP	–	–
ESC u	NOP	–	–

3

1.2 Command Details

1.2.1 Description of Items

XXXX   ALL

[Function]   Command Function

[Code]   A sequence of code constituting a command is represented in hexadecimal number for <
                          >H, binary number for < >B, and decimal number for < >, respectively; [ ]k represents a
                          repeat count of k-times.

[Range]   Describes an argument value(setting range) for the command.

[Outline]   Describes a command outline.

[Caution]   Describes a caution as required.

[Default]   Describes an initial value for the command when accompanied by an argument.

[See Also]   Describes the associated commands for use.

[Sample Program]   Describes a coding example in the Q-BASIC sample program.
                          * This example is only for your reference and differs depending on the language
                             used, version, and so on. For details, see the manual for the language used.

LF

[Function]	Printing and Paper Feed Command

[Code]   <0A>H

[Outline]   Prints data inside the input buffer and feeds lines based on the line feed amount having been set.

- The head of the line becomes the next print starting position.

[See Also]   ESC 2, ESC 3

[Sample Program]

```
LPRINT "AAA" + CHR$ (&HA);
LPRINT "BBB" + CHR$ (&HA);
LPRINT CHR$ (&HA);
LPRINT "CCC" + CHR$ (&HA);
```

[Print Results]

AAA	⟵ Print and line feed
BBB	⟵ Print and line feed
	⟵ Line feed only
CCC	⟵ Print and line feed

5

CR

[Function]   Print Command

[Code]   <0D>H

[Outline]   1) When DS 1-2 is OFF:

   This command is ignored.

2) When DS 1- 2 is ON:

   With data held inside the internal print buffer, printing and line feed are performed.

   Without data inside the internal print buffer, however, no printing is performed.

[See Also]   LF

[Sample Program]

   LPRINT "AAA" + CHR$ (&HD);
   LPRINT "BBB" + CHR$ (&HD);
   LPRINT CHR$ (&HD);
   LPRINT "CCC" + CHR$(&HD);

[Print Results]

AAA   ⟵ Print and line feed
BBB   ⟵ Print and line feed
         ⟵ Line feed only
CCC   ⟵ Print and line feed

6

ESC J n

[Function]	Printing and feeding paper n/203 inch
[Code]	<1B>H<4A>H<n>
[Range]	{0 =< n =< FF} Data is described in Hex code.
[Outline]	Prints data inside the print buffer and feeds paper by n/360 inch. Since an actual mechanical pitch is 1/203 inch, it is internally converted approximate to the value specified with this command.

- Specified volume does not remain.
- The beginning of the line is to be considered as the next printing start position.
- Initial value is not defined.

[Sample Program]   **[Print Results]**

See Sample Program and Print Results for ESC 2 on Page 48.

7

ESC d n

[Function]	Printing and Feeding the paper by n lines
[Code]	<1B>H<64>H<n>
[Range]	* {0 =< n =< FF} Data is described in Hex code.
[Outline]	Prints data inside the buffer and feeds paper by n lines.
	• Specified line does not remain.
	• The beginning of the line is to be considered as the next printing start position.
[Default]	• The initial value is not defined.

[Sample Program]

```
LPRINT "AAAAA"
LPRINT CHR$ (&H1B) + "d" + CHR$ (2);
LPRINT "AAAAA" + CHR$ (&HA);
```

[Print Results]

A A A A A

2/6-inch line feed

A A A A A

8

ESC SP n

[Function]	Setting the right space amount of the character
[Code]	<1B>H<20>H<n>
[Range]	{0 =< n =< 20} (MLT-2880) Data is described in Hex code.
	{0 =< n =< 30} (MLT-38x0) Data is described in Hex code.
[Outline]	The rightward space amount is set in dot unit (1/203 inch unit). In the initial value, it is n=0.
[Caution]	The rightward space amount in doublewide mode is made double of the set volume.
[Default]	n = 0

[Sample Program]

```
LPRINT CHR$ (&H1B) + "  " + CHR$ (0);
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "  " + CHR$ (1);
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "  " + CHR$ (12);
LPRINT "AAAAA" + CHR$ (&HA);
```

[Print Results]

A A A A A ⟵————————— 0-dot space

A A A A A ⟵——————— 1-dot space

A   A   A   A   A ⟵ 12-dot space

ESC ! n

[Function]   Collective Specifying Printing Mode

[Code]   <1B>H<21>H<n>

[Range]   {0 =< n=< FF}   Data is described in Hex code.

[Outline]   Printing mode is assigned. Each n bit indicates the following:

Bit	Function	Value	
		0	1
0	Character Font	Font A	Font B
1	Undefined		
2	Undefined		
3	High-lighting	Canceled	Specified
4	Double height	Canceled	Specified
5	Double width	Canceled	Specified
6	Undefined		
7	Underline	Canceled	Specified

[Caution]
- With double height and double width being specified simultaneously, double wide and double high characters are consisted.
- An underline is attached to the full character width, which, however, is not attached to the part having been skipped by the horizontal tab.
  Neither is it attached to 90°-right-turned characters.
- The underline width is as having been specified by <ESC ->.
  (The default setting is 1 dot width.)
- Specification with this command is invalid to Kanji, except specification and cancellation of highlighting
- In case that double wide character and normal character exist in same one line, the layout of underline is consistent one.

[Default]   n = 0

[See Also]   ESC E, ESC –

10

[Sample Program]

```
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&H00) + "H" ;
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&H01) + "H";
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&H08) + "H";
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&H10) + "H";
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&H20) + "H";
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&H80) + "H";
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&HB9) + "H";
LPRINT CHR$ (&HA);
```

[Print Results]

Font A
Font B
Font A + Highlighting

H H H H H H H

Font B + Highlighting + Quadruple + Underline
Font A + Underline
Font A + Double Width
Font A + Double Height

11

ESC　% n

[Function]	Specifying/Canceling Download Character Set
[Code]	<1B>H<25>H<n>
[Range]	{0 =< n =< FF} data is described in Hex code.
[Outline]	Specifying/canceling download characters.

Further, only the lowest bit (n0) is valid for n.

The lowest bit (n0) indicates the following.

n0	Function
0	Canceling download character set
1	Specifying download character set

[Caution]　　Download characters and download bit images cannot be defined simultaneously.

[Default]　　n = 0

[See Also]　　ESC &

[Sample Program]

GOSUB SETCHR	DATA	6		
LPRINT CHR$ (&H1B) + "%" + CHR$ (0);	DATA	&HFF,	&H80,	&H00
LPRINT "@A" + CHR$ (&HA);	DATA	&H80,	&H80,	&H00
LPRINT CHR$ (&H1B) + "%" + CHR$ (1);	DATA	&H80,	&H80,	&H00
LPRINT "@A" + CHR$ (&HA);	DATA	&H80,	&H80,	&H00
END	DATA	&HFF,	&HFF,	&HFF
SETCHR:	DATA	&HFF,	&HFF,	&HFF
LPRINT CHR$ (&H1B) + "&";	DATA	12		
LPRINT CHR$ (3) + "@" + "A";	DATA	&HFF,	&HFF,	&HFF
FOR J=1 TO 2	DATA	&H80,	&H07,	&HF9
READ REP	DATA	&H80,	&HFF,	&HF9
LPRINT CHR$ (REP);	DATA	&H87,	&HFE,	&H01
FOR I=1 TO REP*3	DATA	&H9F,	&H06,	&H01
READ D	DATA	&HF8,	&H06,	&H01
LPRINTCHR$ (D);	DATA	&HF8,	&H06,	&H01
NEXT I	DATA	&H9F,	&H06,	&H01
NEXT J	DATA	&H87,	&HFE,	&H01
RETURN	DATA	&H80,	&HFF,	&HF9
	DATA	&H80,	&H07,	&HF9
	DATA	&HFF,	&HFF,	&HFF

[Print Results]

@A ◄——— Internal Character Set

⌐A ◄——— Download Character

12

ESC & s n m [a [p] s × a] m – n +1

[Function] Defining Download Character

[Code] <1B>H<26>H<s><n><m> [<a><p1><p2><ps×a>]m-n+1

[Range] {s = 03}

{20 (Hex) =< n =< m =< 7E (Hex)}

{0 =< a =< 0C(Hex)} (Font A)

{0 =< a =< 09(Hex)} (F ont B)

[Outline] Defines the font of download characters of alphanumeric characters.

- "s" indicates the number of bytes in vertical direction.
- "n" indicates the start character code and m the end character code. To define only one character, set n=m.
- Character codes definable includes 95 ASCII codes in total between <20>H~<7E>H.
- "a" indicates the number of dots in horizontal direction for definition.
- "p" is the data to be defined, which indicate a pattern equal to "a" dot in horizontal direction from the left end. The rest of the pattern on the right side is filled with space.
  The rest of data to be defined is s x a.
- Download characters thus defined remain valid until redefinition, ESC @ execution, GS * execution, or power OFF is practiced.

[Caution] Download characters and download bit images can not be defined simultaneously.

Running this command clears the definition of the download bit image.

[Default] Same as the internal character set

13

[Example]
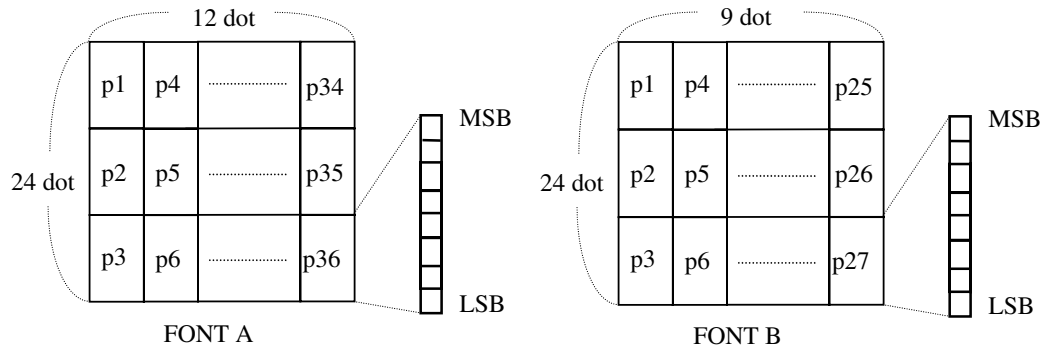
Create each data bit by setting "1" for a printed dot and "0" for an unprinted dot.

[Sample Program]   **[PrintResults]**

See Sample Program and Print Results for ESC % on Page 33.

14

ESC – n

[Function]	Specifying/ Canceling Underline
[Code]	<1B>H<2D>H<n>
[Range]	{0 =< n =< 02} data is described in Hex code.
[Outline]	Specifying/canceling an underline.

- Types of underlines by n value are shown below:

n (Hex)	Type
0	Canceling an underline.
1	Specifying an underline for 1-dot width.
2	Specifying an underline for 2-dots width.

[Caution]
- An underline is attached to the full character width. It is, however, not attached to the part having been skipped by horizontal tab command.
- An underline is not attached to a 90 °- right-turned characters.
- Specification/cancellation with this command is invalid to Kanji.

[See Also]   ESC !, FS –

[Sample Program]

```
LPRINT CHR$ (&H1B) + "─" + CHR$ (0);
LPRINT "AAAAA" ;
LPRINT CHR$ (&H1B) + "─" + CHR$ (1);
LPRINT "AAAAA" + CHR$ (&HA);
```

[Print Results]

Underline Canceled

A A A A A A A A A A

Underline Specified

15

ESC E n

[Function]	Specifying/canceling highlighting

[Code] <1B>H<45>H<n>

[Range] {0 =< n =<FF} Data is described in Hex code.

[Outline] Specifying/canceling the highlighting characters.

- "n" is valid only for the lowest bit (n0).

- Control by the lowest bit (n0) is shown as follows:

n0	Type
0	Canceling highlighting.
1	Specifying highlighting.

- This is effective to all characters.

- Dot configuration of a highlighted character includes one extra dot added at its side.

[Caution] • The print result of Double printing and highlight character printing is completely same.

[See Also] ESC !

[Sample Program]

```
LPRINT CHR$ (&H1B) + "E" + CHR$ (0);
LPRINT "AAABBB" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "E" + CHR$ (1);
LPRINT "AAABBB" + CHR$ (&HA);
```

[Print Results]

A A A B B B ← Highlighting canceled

A A A B B B ← Highlighting canceled

16

ESC G n

[Function]   Specifying/canceling Double Printing

[Code]   <1B>H<47>H<n>

[Range]   {0 =< n =< FF} Data is described in Hex code.

[Outline]   Specifying/canceling the double printing.

- "n" is valid only for the lowest bit (n0).
- Control by n is shown as follows.

n0	Type
0	Canceling double printing.
1	Specifying double printing.

- This is effective to all characters.

[Caution]   • The print result of Double printing and highlight character printing is completely same.

[See Also]   ESC E

[Sample Program]

```
LPRINT CHR$ (&H1B) + "G" + CHR$ (0);
LPRINT "AAABBB" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "G" + CHR$ (1);
LPRINT "AAABBB" + CHR$ (&HA);
```

[Print Results]

A A A B B B   ←   Highlighting canceled

A A A B B B   ←   Highlighting canceled

17

ESC R n

[Function]   Selecting the International Character set

[Code]   <1B>H<52>H<n>

[Range]   {0 =< n =< 0A)   Data is described in Hex code.

[Outline]   Depending on the value of n, following character sets are specified.

n(Hex)	Character Set
0	U.S.A.
1	France
2	Germany
3	U.K.
4	DenmarkI
5	Sweden
6	Italy
7	Spain
8	Japan
9	Norway
A	DenmarkII

[Default]   • The initial value of n indicates the character set specified by Jumper (J1~J3).

[See Also]   Character Code Table (International Character Set)

[Sample Program]

```
        FOR I=0 TO 10
        LPRINT CHR$ (&H1B) + "R" + CHR$ (I);
        LPRINT " #$@[¥]^";
        LPRINT CHR$ (&H60) + "{¥} ~";
        LPRINT "n=" + STR$ (I);
        LPRINT CHR$ (&HA);
        NEXT I
```

[Print Results]

```
#$@[\]^`{|}~   n = 0
#$à°ç§^`éùè¨   n = 1
#$§ÄÖÜ^`äöüß   n = 2
£$@[\]^`{|}~   n = 3
#$@ÆØÅ^`æøå~   n = 4
#¤ÉÄÖÅÜéäöåü   n = 5
#$@°\é^ùàòèì   n = 6
#$@¡Ñ¿^`¨ñ}~   n = 7
#$@[¥]^`{|}~   n = 8
#¤ÉÆØÅÜéæøåü   n = 9
#$ÉÆØÅÜéæøåü   n = 10
```

18

ESC V n

[Function]	Specifying/Canceling 90°-right- turned Characters
[Code]	<1B>H<56>H<n>
[Range]	{0 =< n =< 1} Data is described in Hex code.
[Outline]	Specifying/canceling characters 90°-right- turned character.

- "n" means the followings.

n (Hex)	Condition
0	Canceling 90°-right- turned Characters
1	Specifying 90°-right- turned Characters

[Caution]   • No underlines are attached to 90°-right- turned characters.

[Default]   • The initial value of n is "0".

[Sample Program]

LPRINT CHR$ (&H1B) + "V" + CHR$ (0);
LPRINT "AAAAA";
LPRINT CHR$ (&H1B) + "V" + CHR$ (1);
LPRINT "AAAAA" + CHR$ (&HA);

[Print Results]

90° Rotation Canceled

AAAAA A A A A A

90° Rotation Specified

19

ESC t n

[Function]	Selecting Character Code Table
[Code]	<1B>H<74>H<n>
[Range]	{0 =< n =< 1} Data is described in Hex code.

Selecting Page n on the character code table:

The character code table is selected depending on the value of n.

"n" means the followings.

n (Hex)	Condition
0	Page0(IBM Character #2)
1	Page1(Domestic Character)

[Default]   The initial value of n is subject to the character set for the country specified

by the Jumper(J1~J3).

- When Japan is selected: Domestic characters
- When non-Japan is selected: IBM characters #2

[See Also]   Character Code Table

[Sample Program]

```
LPRINT CHR$ (&H1B) + "t" + CHR$ (0);
LPRINT " n=0      ";
FOR C=&HB1 TO &HB5
LPRINT CHR$ (C);
NEXT C
LPRINT CHR$ (&HA);
LPRINT CHR$ (&H1B) + "t" + CHR$ (1);
LPRINT " n=1      ";
FOR C=&HB1 TO &HB5
LPRINT CHR$ (C);
NEXT C
LPRINT CHR$ (&HA);
```

[Print Results]

n = 0   ▦|┤┤ ← Page 0
n = 1   アイウエオ ← Page 1

20

ESC ｛ n

[Function]	Specifying/Canceling the Inverted Characters
[Code]	<1B>H<7B>H<n>
[Range]	{0 =< n =< FF} Data is described in Hex code.
[Outline]	Specifying/canceling inverted characters.

- "n" is valid only for the lowest bit (n0).
- Bit n (n0) means the followings.

n0	Condition
0	Canceling inv rted characters.
1	Specifying inverted characters.

[Caution]

- Inverted-printing means printing the line at 180°turned.
- This is valid only when this is specified at the beginning of a line.

[Default]

- The initial value of n is "0".

[Sample Program]

```
LPRINT CHR$ (&H1B) + "{" + CHR$ (0);
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT "BBBBB" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "{" + CHR$ (1);
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT "BBBBB" + CHR$ (&HA);
```

[Print Results]

A A A A A ⎞
B B B B B ⎠ Inversion Canceled

Inversion Specified ⎛ ∀ ∀ ∀ ∀ ∀
⎝ ᗺ ᗺ ᗺ ᗺ ᗺ

Paper Feed Direction

21
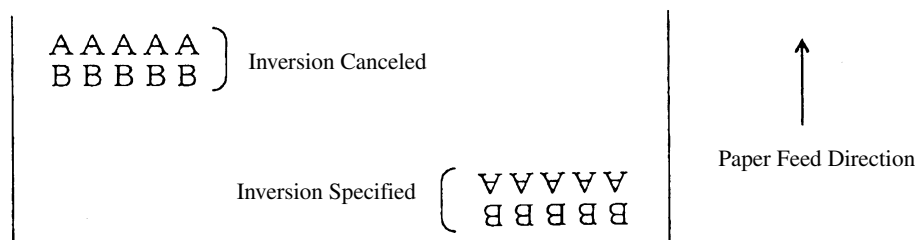
HT

[Function]	Horizontal Tab Command
[Code]	<09>H
[Outline]	Shifts the printing position to the next horizontal tab position.

- Ignored when the next horizontal tab position has not been set.

[Caution]	

- The horizontal tab position is set by ESC D.
- Initial setting of the horizontal tab position is each 8 characters in 9th, 17th, 25th,columns.

[See Also]   ESC D

[Sample Program]

```
LPRINT "012345678901234567890l";
LPRINT CHR$ (&HA);
LPRINT CHR$ (&H9) + "AAA";
LPRINT CHR$ (&H9) + "BBB";
LPRINT CHR$ (&HA);
LPRINT CHR$ (&H1B) + "D";
LPRINT CHR$ (3) + CHR$ (7) + CHR$ (14) + CHR$ (0);
LPRINT CHR$ (&H9) + "AAA";
LPRINT CHR$ (&H9) + "BBB";
LPRINT CHR$ (&H9) + "CCC" + CHR$ (&HA);
```

[Print Results]

```
012345678901234567890 l
        AAA     BBB        ←──────  Initially set horizontal tab
     AAA BBB    CCC        ←──────  When set to the 4th, 8th, and 15th digits
```

22

ESC $ n1 n2

[Function]	Specifying the Absolute Positions
[Code]	<1B>H<24>H<n1><n2>
[Range]	{0 =< n1 =< FF} {0 =< n2 =< 1} (BD2-2880) {0 =< n2 =< 2} (BD2-38x0) Data is described in Hex code.
[Outline]	The printing start position is specified in the number of dots (1/203 inch unit) from the beginning of line. • The number of dots is divided by 256, whose quotient is taken as n2 and the residual as n1. • Therefore, the printing start position is equal to n1+n2 x 256 from the beginning of line.
[Caution]	• Specifying beyond the line end is ignored.
[Default]	• The initial value is not specified.
[See Also]	ESC \

[Sample Program]

```
LPRINT CHR$ (&H1B) + "$";
LPRINT CHR$ (0) + CHR$ (0) + "A";
LPRINT CHR$ (&H1B) + "$";
LPRINT CHR$ (50) + CHR$ (0) + "B";
LPRINT CHR$ (&H1B) + "$";
LPRINT CHR$ (0) + CHR$ (1) + "C";
LPRINT CHR$ (&HA);
LPRINT CHR$ (&H1B) + "$";
LPRINT CHR$ (100) + CHR$ (0) + "A";
LPRINT CHR$ (&H1B) + "¥";
LPRINT CHR$ (&HC2) + CHR$ (&HFF) + "B";
LPRINT CHR$ (&HA);
```

[Print Results]

Absolute Position Specified

```
0       5 0    1 0 0                  2 5 6
↓        ↓      ↓                       ↓
A       B      |                       C
               ↓
         B     A
         |←———————|
```

Relative Position Specified – 62

23
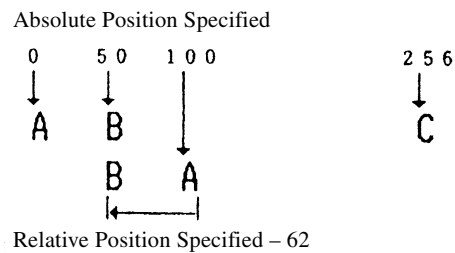
ESC D [n] k NUL

[Function]	Setting Horizontal Tab Position

[Code] <1B>H<44>H [<n>] k<00>H

[Range] {0 =< n =< FFH} Data is described in Hex code.

{0 =< k =< 20H} Data is described in Hex code.

[Outline] Specifying a horizontal tab position.

- "n" indicates the no. of columns from the beginning to the horizontal tab position.

   At this time, n= set position − 1 is to be specified. For example, to set the position at 9th column, n=8 is to be specified.

- k denotes the number of horizontal tab positions you want to set.

- The tab position is set at position where it is "character width x n" from the line beginning.

   The character width, at this time, includes the rightward space amount.

   In double wide characters, it is made double of the ordinary case.

- Tab positions can be specified are maximum 32. Specifying exceeding this is ignored.

- <n> k, which denotes a setting position, is input in the increasing order and ends at <00> H.

- ESC D NUL clears all the set tab positions. Following clearing, horizontal tab command is ignored.

[Caution] When the data, <n> k, is equal to or smaller than its preceding data, <n> k-1, it is assumed that tab setting is finished. If this is the case, the next data onward will be processed as normal data.

When the data, <n> k, exceeds a 1-line print area, set the horizontal tab position, assuming "Set digit position = Maximum print digits + 1." The horizontal tab position does not change even if the character width is altered after setting the horizontal tab position.

[Default] - Initial value is specified for each eight characters(9th.17th.25th column) of ANK characters.

[See Also] HT

[Sample Program]   **[Print Results]**

See Sample Program and Print Results for HT on Page 43.

24

ESC \ n1 n2

[Function]   Specifying the Relative Positions

[Code]   <1B>H<5C>H<n1>< n2>

[Range]   {0 =< n1 =< FF}

                    {0 =< n2 =< FF} Data is described in Hex code.

[Outline]   The printing start position is specified in the number of dots(1/203 inch unit) from
the current position.

                  • Rightward direction is taken as plus and leftward direction as minus.

                  • To specify N dot in minus (left) direction, use a complement of N for assignment.

                    $-$N dots $= 65536 - $N

                  • The number of dots is divided by 256, whose quotient is taken as n2 and the residual as n1.

[Caution]   • Specifying exceeding the top of line or the end of line is ignored.

[Default]   • The initial value is not specified.

[See Also]   ESC $

[Sample Program]   **[Print Results]**

                  See Sample Program and Print Results for ESC $ on Page 44.

ESC a n

[Function]	Aligning the characters
[Code]	<1B>H<61>H<n>
[Range]	{0 =< n =< 2} Data is described in Hex code.
[Outline]	All the printed data within one line are aligned in the specified position.

• Depending on n value, positional alignment is carried out as in the table below:

n (Hex)	Position
0	Left end alignment
1	Centering
2	Right end alignment

[Caution]

• This is valid only when n is inputted at the beginning of line.

• The initial value of n is "0".

[Sample Program]

```
LPRINT CHR$ (&H1B) + "a" + CHR$ (0);
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "a" + CHR$ (1);
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "a" + CHR$ (2);
LPRINT "AAAAA" + CHR$ (&HA);
```

[Print Results]

Left-justified   Centered   Right-justified

Paper Feed Direction

26

ESC 2

[Function]   Specifying 1/6-inch line feed rate

[Code]   <1B>H<32>H

[Outline]   The line feed rate per line is specified by 1/6 inch.

[Sample Program]

```
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "3" + CHR$ (0);
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "3" + CHR$ (50);
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "2";
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT "AAAAA";
LPRINT CHR$ (&H1B) + "J" + CHR$ (100);
LPRINT "AAAAA" + CHR$ (&HA);
LPRINT "AAAAA" + CHR$ (&HA);
```

[Print Results]

```
A A A A A      1/6-inch line feed

A A A A A      0/360-inch line feed
A A A A A
               50/360-inch line feed

A A A A A
               1/6-inch line feed
A A A A A
               100/360-inch line feed

A A A A A
               1/6-inch line feed
A A A A A
```

ESC 3 n

[Function]   Setting line feed rate of minimum pitch

[Code]   <1B>H<33>H<n>

[Range]   {0 =< n =< FF} Data is described in Hex code.

[Outline]   The line feed rate per line is specified by n/360 inch.

Since an actual mechanical pitch is 1/203 inch, it is internally converted approximate

to the value specified with this command.

[Default]   • The initial value is n = 60 (1/6 inch) (18H), being 4.23 mm line feed rate.

[Sample Program]   **[Print Results]**

See Sample Program and Print Results for ESC 2 on Page 48.

28

ESC * m n1 n2 [d] k

[Function]	Specifying the Bit Image Mode
[Code]	<1B>H<2A>H<m><n1><n2> [<d>] k
[Range]	{m= 0, 1, 32, 33 bit image mode (See the table below.)}

{0 =< n1 =< FF(Hex)}

{0 =< n2 =< 01(Hex)}   (BD2-2880)

{0 =< n2 =< 02(Hex)}   (BD2-38x0)

{0 =< d =< FF(Hex)}

{k = n1 + FF(Hex)× n2   (m = 0, 1)

{k = (n1+ FF(Hex)×n2)×3}   (m = 32, 33)

[Outline]   According to the number of dots specified in n1, n2, specify the bit image of mode n.

- The No. of dots printed is divided by 256, whose quotient is taken as n2 and residual as n1.
- The total no. of dots printed in the bit image is equal to n1 + (256 x n2).
- When bit image data have been input in excess of dot position of one line (448 dots) , the excess data are discarded.
- d is bit image data, the bits subject to printing are taken as "1" and those not as "0".
- The bit image modes specified by m are shown as follows:

m(Hex)	Mode	Vertical Direction		Horizontal Direction	
		No. of Dots	Dot Density	Dot Density	Max. No. of Dots
0	8-dot single density	8	67 DPI	101 DPI	192
1	8-dot double density	8	67 DPI	203 DPI	384
32	24-dot single density	24	203 DPI	101 DPI	192
33	24-dot double density	24	203 DPI	203 DPI	384

[Caution]
- When the values set in m (bit image mode) are out of the above range, the data following after n1 is processed as normal printing data.
- After completion of bit image printing, printer returns to normal data processing mode.

[Example]

For 8-dot Mode

Single Density   Double Density   Single Density   Double Density

29
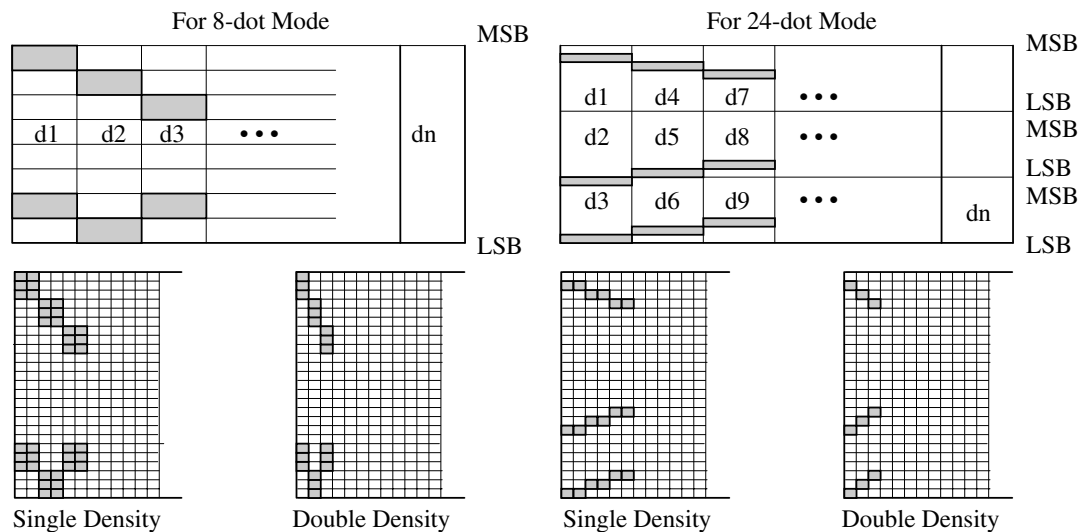
[Sample Program]

```
LPRINT CHR$ (&H1B) + "*";
LPRINT CHR$ (0) + CHR$ (20) + CHR$ (0);          IMG1 :
GOSUB IMG1                                        LPRINT CHR$ (&HFF) ;
LPRINT CHR$ (&HA);                                FOR I=1 TO 18
LPRINT CHR$ (&H1B) + "*";                         LPRINT CHR$ (&H85) ;
LPRINT CHR$ (1) + CHR$ (20) + CHR$ (0);           NEXT I
GOSUB IMG1                                        LPRINT CHR$ (&HFF) ;
LPRINT CHR$ (&HA);                                RETURN
LPRINT CHR$ (&H1B) + "*";                         IMG2 ;
LPRINT CHR$ (32) + CHR$ (20) + CHR$ (0);          LPRINT  CHR$ (&HFF) ;
GOSUB IMG2                                        LPRINT CHR$ (&HFF) ;
LPRINT CHR$ (&HA);                                LPRINT  CHR$ (&HFF) ;
LPRINT CHR$ (&H1B) + "*";                         FOR I=1 TO 18
LPRINT CHR$ (33) + CHR$ (20) + CHR$ (0);          LPRINTCHR$ (&H80) ;
GOSUB IMG2                                        LPRINTCHR$ (&H00) ;
LPRINT CHR& (&HA);                                LPRINTCHR$ (&H05) ;
END                                               NEXT I
                                                  LPRINT CHR$ (&HFF) ;
                                                  LPRINT CHR$ (&HFF) ;
                                                  LPRINT CHR$ (&HFF) ;
                                                  RETURN
```

[Print Results]

30
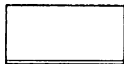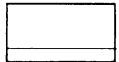
GS * n1 n2 [d] n1 × n2 × 8

[Function]   Defining the Download Bit Image

[Code]   <1D>H<2A>H<n1><n2> [< d >] n1 × n2 × 8

[Range] $\{1 =< n1\}$
$\{1 =< n2\}$
$\{n1 \times n2 =< 1311\}$ (BS2-2880)
$\{n1 \times n2 =< 1536\}$ (BS2-38x0)

[Outline]   Defines downloading bit images of the number of dots specified by n1/n2.

• The numbers of dots are n1 x 8 in horizontal direction and n2 x 8 in vertical direction.

• d indicates bit image data.

• The download bit image thus defined remains effective until redefinition,

ESC @ execution, ESC &, or power OFF takes place.

[Caution]   • A download character and a download bit image can not be defined simultaneously.

With this command executed, defined content of a download character is cleared.

• Relations between the bit image data and the dot defined are shown below:

• If a download bit image is defined with this command while it is being printed (GS/),
printing operation may become unstable (fluctuating print pitch).

[See Also]   GS /
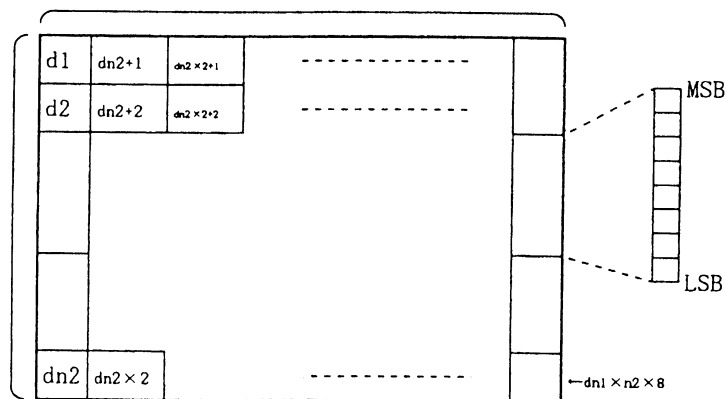
[Sample Program]

```
GOSUB IMG
LPRINT CHR$ (&H1D) + "/" + CHR$ (0);
LPRINT CHR$ (&H1D) + "/" + CHR$ (1);
LPRINT CHR$ (&H1D) + "/" + CHR$ (2);
LPRINT CHR$ (&H1D) + "/" + CHR$ (3);
END
IMG:
n 1 = 10 : n 2= 5
LPRINT CHR$ (&H1D) + "*";
LPRINT CHR$ (n1) + CHR$ (n2);
FOR J=1 TO n1*8
FOR I=1 TO n2
LPRINT CHR$ (J);
NEXT I
NEXT J
RETURN
```

[Print Results]

Nomal Mode

Double Width Mode

Double Height Mode

Quadruple Mode

32

GS / m

[Function]   Printing the Download, Bit Image

[Code]   <1D>H<2F>H<m>

[Range]   {0 =< m =< 03} Data is described in Hex code.

[Outline]   Prints download bit image in a mode specified by m.

• Modes can be selected by m are shown below.

m	Mode Name	Dot Density in Vertical Direction	Dot Density in Horizontal Direction
0	Normal mode	203 DPI	203 DPI
1	Double wide mode	203 DPI	101 DPI
2	Double high mode	101 DPI	203 DPI
3	Double wide/double high mode	101 DPI	101 DPI

[Caution]   • When data exist inside the print buffer, this command is ignored.

• When a download bit image has not been defined, this command is ignored.

• A portion of a download bit image exceeding one line length is not printed.

• A download character and a download bit image cannot be defined simultaneously.

• If a download bit image data is defined while it is being printed with this command, printing operation may become unstable (fluctuating print pitch).

[Default]   • The initial value is not specified.

[See Also]   GS *

[Sample Program]   **[Print Results]**

See Sample Program and Print Results for GS * on Page 52.

33

ESC v (Serial Interface Only)

[Function]   Transmitting the printer status (Serial Type)

[Code]   <1B>H<76>H

[Outline]   Current printer status is transmitted.

[Caution]
- Status sent out consists of 1 byte whose content is as in the table below.
- In DTR/DSR control, after revertible state of the host (DSR signal being in SPACE state) is confirmed, only 1 byte is transmitted. In XON/XOFF control, DSR signal state not being confirmed, only 1 byte is transmitted.
- In DTR/DSR control, when the host is in unrespectable state (DSR signal being in MARK state), it waits until receptacle state is created.
- In paper end (paper near end) status, this command may be unrespectable state due to BUSY state.

Remarks. This command is valid only for serial interface model.

Bit	Function	Value	
		0	1
0	Not defined		
1	Not defined		
2	Paper end	With paper	Without paper
3	Not defined		
4	Not used	Fixed to 0	–
5	Not defined		
6	Not defined		
7	Not defined		

[Sample Program]

OPEN "COM1: N81NN" AS #1;

PRINT #1, CHR$ (&H1B) + "v";

A$ = INPUT$ (1, #1);

CLOSE #1

34

ESC c5 n

[Function] Enabling/Disabling Panel Switches

[Code]   <1B>H<63>H<35>H<n>

[Range]   {0 =< n =< FF} Data is described in Hex code.

[Outline] Selecting the LF switch valid/invalid.

     • "n" is valid only in the lowest bit (n0).

     • "n" bit means the followings.

n0	Condition
0	LFSW valid.
1	LFSW invalid.

[Caution] When the panel switch is disabled with this command, the LF switch is disabled. Therefore, the paper cannot be fed by operating the LF switch.

[Default] • The initial value of n is "0".

[Sample Program]

      LPRINT CHR$ (&H1B) + "c5" + CHR$ (0); ………When enabling the LF switch
      LPRINT CHR$ (&H1B) + "c5" + CHR$ (1); ………When disabling the LF switch

35

GS :

[Function]	Starting / Ending Macro Definition
[Code]	<1D>H<3A>H
[Outline]	Specifying starting / ending macro definition. Means termination when received while defining a macro.
[Caution]	Maximum content available for macro definition is 2048 bytes. A portion exceeding 2048 bytes is not defined.

- Even with ESC @ (initialization of the printer) having been executed, defined content is not cleared. Therefore, it is possible to include ESC @ into the content of macro definition.
- Normal printing operation is carried out even while in macro definition

[Default]	• Initially, Macro is not specified.
[See Also]	GS ^

[Sample Program]

```
LPRINT CHR$ (&H1D) + ": " ;
LPRINT "+——+" + CHR$ (&HA);
LPRINT "|     |" + CHR$ (&HA);
LPRINT "+——+" + CHR$ (&HA);
LPRINT CHR$ (&H1D) + ": ";
LPRINT CHR$ (&H1D) + " ^ ";
LPRINT CHR$ (2) + CHR$ (10);
LPRINT CHR$ (0);
```

[Print Results]

```
+---+  ⎤   Nomal Printing during
¦   ¦  ⎥   Macro Definition
+---+  ⎦

+---+  ⎤
¦   ¦  ⎥   Printing during Macro Execution
+---+  ⎥
+---+  ⎥
¦   ¦  ⎥
+---+  ⎦
```
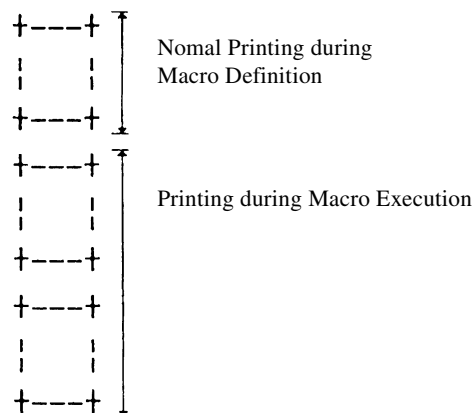
GS ^ n1 n2 n3

[Function]	Executing the Macro
[Code]	<1D>H<5E>H<n1><n2><n3>
[Range]	{0 =< n1 =< FF}
	{0 =< n2 =< FF}
	{0 =< 3 =< 1} Data is described in Hex code.
[Outline]	Executing contents defined in macro.

- "n1~ n3" indicate as follows:

n1 : The number of times of macro execution

n2 : Waiting time on macro execution

   Waiting time of n2 x 100msec is given for every execution.

n3 : Macro execution mode

n3	Mode
0	Continuous execution
1	Execution by LFSW

Continuous execution:	The Macro is executed n1 times continuously at the time intervals specified by n2.
Execution by FEED S:	After waiting for lapse of time specified by n2, the ALAME LED flickers and the LF switch is waited to be pressed. When it is pressed, the macro is executed once. This action is repeated n1 times.

[Caution]

- When this command is received while in macro definition, suspension of macro definition is indicated. At this time, the defined content is cleared.
- No execution takes place when macro is held undefined or n1=0.
- While in macro execution with n3=1, paper feed with the LF SW is not available.

[Default]

- Initially, this command is not specified.

[See Also]   GS :

[Sample Program]   **[Print Results]**

See Sample Program and Print Results for GS : on Page 57.

37

ESC i (When Using Auto Paper Cutter)

[Function]   Full Cut
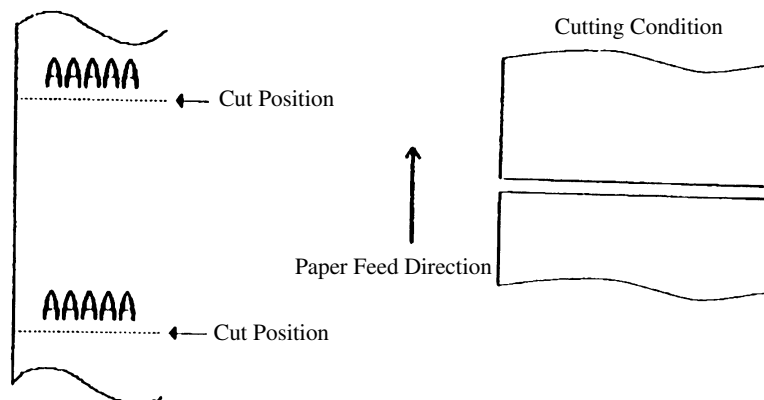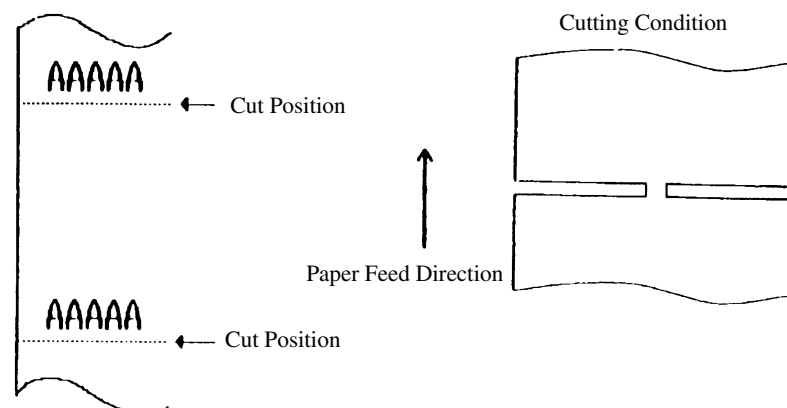
[Code]   <1B>H<69>H

[Outline]   Activating auto cutter unit (Full cut)

[Caution]   • This is valid only when n is inputted at the beginning of line.
• Prior to cutting the paper, feed the paper from the printing position to beyond the paper cutting position of the cutter. Otherwise, the character just after print will remain on this side of the cutter.

[Sample Program]

```
LPRINT "AAAAA";
LPRINT CHR$ (&H1B) + "J";
LPRINT CHR$ (150);
LPRINT CHR$ (&H1B) + "i";
LPRINT "AAAAA";
LPRINT CHR$ (&H1B) + "J";
LPRINT CHR$ (150);
LPRINT CHR$ (&H1B) + "i";
```

[Print Results]

Cutting Condition

AAAAA ←— Cut Position

Paper Feed Direction

AAAAA ←— Cut Position

38

ESC m (When Using Auto Paper Cutter)

[Function]   Partial Cut

[Code]   <1B>H<6D>H

[Outline]   Activating auto cutter unit (Partial cut)

[Caution]   • This is valid only when n is inputted at the beginning of line.
      • Prior to cutting the paper, feed the paper from the printing position to beyond the paper cutting position of the cutter. Otherwise, the character just after print will remain on this side of the cutter.

[Sample Program]

```
LPRINT "AAAAA";
LPRINT CHR$ (&H1B) + "J";
LPRINT CHR$ (150);
LPRINT CHR$ (&H1B) + "m";
LPRINT "AAAAA";
LPRINT CHR$ (&H1B) + "J";
LPRINT CHR$ (150);
LPRINT CHR$ (&H1B) + "m";
```

[Print Results]

Cutting Condition

Cut Position

AAAAA

Cut Position

AAAAA

Paper Feed Direction

39

GS H n

[Function]	Selecting of Printing Position of HRI Code
[Code]	<1D>H<48>H<n>
[Range]	{0 =< n =< 3} Data is described in Hex code.
[Outline]	Selecting printing position of HRI code in printing bar codes.

• "n" means the followings.

n (Hex)	Printing Position
0	No printing
1	Above the bar code
2	Below the bar code
3	Both above and below the bar code

The HRI code refers to the bar code-turned characters so that you can read them.

[Caution]	The HRI code is printed in the font selected with GS f. Specify before the GS k command.
[Default]	• The initial value of n is "0".
[See Also]	GS f

[Sample Program]

```
LPRINT CHR$ (&H1B) + "3" + CHR$ (5);
LPRINT CHR$ (&H1D) + "h" + CHR$ (50);
LPRINT CHR$ (&H1D) + "H" + CHR$ (0);
GOSUB BC
LPRINT CHR$ (&H1D) + "H" + CHR$ (1);
GOSUB BC
LPRINT CHR$ (&H1D) + "H" + CHR$ (2);
GOSUB BC
LPRINT CHR$ (&H1D) + "H" + CHR$ (3);
GOSUB BC
END
BC:
LPRINT CHR$ (&H1D) + "k";
LPRINT CHR$ (4);
LPRINT "12" + CHR$ (0);
LPRINT CHR$ (&HA);
RETURN
```

[Print Results]

No Visible Code.

Printed above

Printed below

Printed above and below
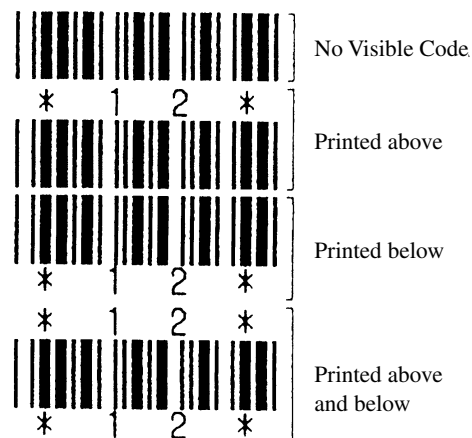
GS f n

[Function]	Selecting the font of HRI code
[Code]	<1D>H<66>H<n>
[Range]	n = 0, 1
[Outline]	Selecting the font of HRI code in printing bar code.
	The type of font can be printed by selecting n is as follows.
	The HRI code refers to the bar code-turned characters so that you can read them.

n	Font
0	Font A
1	Font B

[Caution]	The HRI code is printed at the position specified with GS h on page 42.
[Default]	The initial value of n is "0".
[See Also]	GS H

[Sample Program]

```
LPRINT CHR$ (&H1D) + "h" + CHR$ (50);
LPRINT CHR$ (&H1D) + "H" + CHR$ (2);
LPRINT CHR$ (&H1D) + "f" + CHR$ (0);
GOSUB BC
LPRINT CHR$ (&H1D) + "f" + CHR$ (1);
GOSUB BC
END
BC:
LPRINT CHR$ (&H1D) + "k";
LPRINT CHR$ (4);
LPRINT "123" + CHR$ (0);
LPRINT CHR$ (&HA);
RETURN
```

[Print Results]

← FONT A

← FONT B

41

GS h n

[Function]	Selecting the height of the Bar Code
[Code]	<1D>H<68>H<n>
[Range]	{1 =< n =< FF} Data is described in Hex code.
[Outline]	Selecting bar code height. n denotes the number of dots in the vertical direction.
[Default]	• The initial value of n is "162".

[Sample Program]　　　　　　**[Print Results]**

See Sample Program and Print Results for GS w on page 52.

GS k n [d] k NUL

[Function]	Printing the Bar Code (1)
[Code]	<1D>H<6B>H<n> [< d>] k <00>H
[Range]	{0 =< n =< 7} Data are described in Hex code.
[Outline]	Specifying a type of bar code and printing bar codes.

- The beginning of line is considered as the next printing start position.
- Depending on the value of n, the following bar code can be selected.

  d indicates a character code to be printed and k indicates the number of character to be printed.

n (Hex)	Bar Code System	Maximum Columns
0	UPC-A	---
1	UPC-E	---
2	JAN13 (EAN)	---
3	JAN 8 (EAN)	---
4	CODE 39	13
5	ITF	22
6	CODABAR (NW-7)	17
7	CODE 128	15

[Caution]
- When data being held in the print buffer, this command is ignored.
- Regardless of the specified feed pitch, this command feeds the paper to be required to print a bar code.
- If the character code d cannot be printed in the respective bar code system, the bar code so far will be printed, processing the subsequent data as normal data.
- When a bar code whose number of characters to be printed is fixed has been selected, the number of characters k have to be always made equal to the number of characters to be printed. (The bar code is not printed when not matching.)
- When the horizontal direction exceeds one line length, the excess part is not printed.

[Default]
- The initial value is not specified.

43

[Descriptionof Bar Codes]   <For print examples, see Page 46. >

UPC-A   This bar code, consisting of numerals only, has a fixed length of 12 column; a 11-columns
               number entered from the host or application software plus a check column(12th column)
               automatically calculated inside the printer. If the 12th-column numeral is sent from the host,
               the entire bar code will be printed as it is.

UPC-E   This bar code, consisting of numerals only, has a fixed length of 8 column; the first
               number system character is "0" stationary. A 12-column numeral entered from the host or
               application software is compressed to 8 columns with a check column and printed. The 12th-
               column check column is automatically calculated inside the printer and sent from the host, the
               entire bar code will be printed, compressed to 8 columns.

JAN-13(EAN)   This bar code, consisting of numerals only, has a fixed length of 13 column; a 12-column
               number entered from the host or application software plus a check column(13th column)
               automatically calculated inside the printer. If the 13th-column numeral is sent from the host,
               the entire bar code will be printed as it is.

JAN-8(EAN)   This bar code, consisting of numerals only, has a fixed length of 8 column; a 7-column number
               entered from the host or application software plus a check column(8th column) automatically
               calculated inside the printer. If the 8th-column numeral is sent from the host, the entire bar
               code will be printed as it is.

CODE39   This bar code, consisting of uppercase alphabets and numerals, has a variable length of column.
           A start/stop code "*" is automatically added by the printer. Available characters include a
           space and "$, %, +, -, · , /, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9," and uppercase alphabets.

ITF   This bar code, consisting of numerals only, has a variable length of even column. If an odd-
               column code is transferred, nothing will be printed.

CODABAR (NW-7)
               This bar code, consisting of alpha numerals, has a variable length of column. Available
               characters include "0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, D, D, $, +, -,., /, :." A start/stop code is
               required; any one of A, B, C, and D is used.

CODE128   • This bar code consists of all of 128 ASCII code characters and has a variable length of
             column. This printer supports the code subsets A, B, and C. By prefixing a transfer
             code with any one character of A, B, and C, you can select the code subset to start from.
             If not prefixed with A, B, or C, the code subset B will be selected.
           • The code subset A is the bar code consisting of standard uppercase alphabets, numerals,
             symbols, and special codes.
           • The code subset B is the bar code consisting of standard uppercase/lowercase alphabets,
             numerals, symbols, control codes, and special codes.
           • The code subset C is the bar code consisting of special characters and 100 kinds of
             numbers ranging from 00 to 99.
           • The check column automatically calculated inside the printer is added to the end of the
             entered column to be printed.

44

- Processing of the special characters
  The characters above the ASCII code number 96 are considered special characters. The following lists the converted characters for entering these characters.

ASCII Code	Converted Character	Subset Code	Subset Code B	Subset Code C
96	80h	FNC 3	FNC 3	-N/A-
97	81h	FNC 2	FNC 2	-N/A-
98	82h	SHIFT	SHIFT	-N/A-
99	83h	CODE C	CODE C	-N/A-
100	84h	CODE B	FNC 4	CODE B
101	85h	FNC 4	CODE A	CODE A
102	86h	FNC 1	FNC 1	FNC 1

The following exemplifies a selection of the code subset as a method to utilize the special characters.

<Selection of Code Subset>
- Initial selection: Enter any one character of A, B, and C.
- Conversion on the way: Enter any one character of 82h through 85h

Example)   When initially testing with the code subset B, and then, printing the bar code, "123," with the code subset A
- Input code   : | B | | TEST | | <85> | | 123 |
- Bar code data : <CODE B>TEST<CODE A>123

[Sample Program]
LPRINT CHR$ (&H1D) + "H" + CHR$ (2);
LPRINT CHR$ (&H1D) + "k";
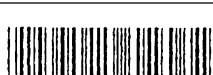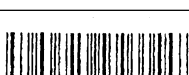LPRINT CHR$ (4);
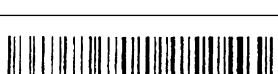LPRINT "123" + CHR$ (0);

[Print Results]

When the data "123" is printed with the code 39

45
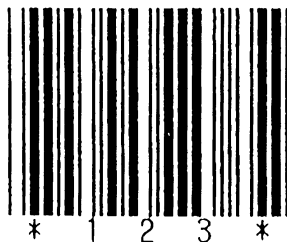
[Descriptionof Bar Codes]

UPC-A, UPC-E, JAN-13 (EAN), JAN-8 (EAN), CODE39, ITF, CODABAR, CODE128

Type	Print Sample	Outline of Symbol	Max. column
UPC-A	123456 789012	12-column fixed-length bar code consisting of numerals only	–
UPC-E	123643	8-column fixed-length bar code consisting of numerals only. Abbreviated version of UPC-A	–
JAN-13	1234567 890128	13-column fixed-length bar code consisting of numerals only	–
JAN-8	1234 5670	8-column fixed-length bar code consisting of numerals only	–
CODE39	*12345*	Variable-length bar code consisting of alphabets and numerals. The start/stop code "*" is automatically added.	13
ITF	1234567890	Even-column variable-length bar code consisting of numerals only	22
CODABAR (NW-7)	a123456a	Variable-length bar code consisting of alpha numerals. Any one of A, B, C, and D is required as the start/stop code.	17
CODE128	ABCD12345	Variable-length bar code consisting of all 128 ASCII code characters.	15

Printing is done depending on bar code specification type, number of print column, bar code height, width (Magnification), visible code presence, and bar code data specification.

46

GS k m n [d1 ... dn]

[Function]	Printing the Bar Code (2)	

[Code]   <1D>H<6B>H<m><n>[d1...dn]

[Range]   65 =< m =< 73   Ranges of n and d differ depending on the barcode system.

[Outline]   Specifying a type of bar code and printing bar codes.

m	Bar Code System	Range of n	Range of d	Max. Column
65	UPC-A	11 =< n =< 12	48 =< d =< 57	—
66	UPC-E	11 =< n =< 12	48 =< d =< 57	—
67	JAN13 (EAN)	12 =< n =< 13	48 =< d =< 57	—
68	JAN8 (EAN)	7 =< n =< 8	48 =< d =< 57	—
69	CODE39	1 =< n =< 255	48 =< d =< 57, 65 =< d =< 90 32, 36, 43, 45, 46, 47	17
70	ITF	1 =< n =< 255 (even)	48 =< d =< 57	34
71	CODABAR	1 =< n =< 255	48 =< d =< 57, 65 =< d =< 68 36, 43, 45, 46, 47, 58	25
73	CODE128	2 =< n =< 255	0 =< d =< 127	23

* Maximum number of digits is the maximum number with this printer.

[Caution]
- n indicates number of data and treats the n bytes from next data as barcode data.
- When n is outside the range, command processing is stopped and next data is processed as normal data.
- When d is outside the range, only paper feed is executed and next data is processed as normal data.
- Executes paper feeding as much as the height of barcode (including visible code when visible code printing is designated) regardless of the line feed amount set by <ESC 2>, <ESC 3>, etc.
- Valid only when data is not present in the print buffer. When data is present in the print buffer, data from m and on is processed as normal data.
- After printing barcode, the top of a line is specified as the next print position.
- Printing mode except overturned character (bold printing, double-strike printing, underline, character size) has no effect.
- This command is ignored when 90° clockwise turn of character is specified.

[Default]   The initial value is not defined.

47

[Description of Bar Codes]

UPC-A   This bar code, consisting of numerals only, has a fixed length of 12 column; a 11-columns number entered from the host or application software plus a check column (12th column) automatically calculated inside the printer. If the 12th-column numeral is sent from the host, the entire bar code will be printed as it is.

UPC-E   This bar code, consisting of numerals only, has a fixed length of 8 column; the first number system character is "0" stationary. A 12-column numeral entered from the host or application software is compressed to 8 columns with a check column and printed. The 12th column check column is automatically calculated inside the printer and sent from the host, the entire bar code will be printed, compressed to 8 columns.

JAN-13 (EAN)

This bar code, consisting of numerals only, has a fixed length of 13 column; a 12-column number entered from the host or application software plus a check column (13th column) automatically calculated inside the printer. If the 13th-column numeral is sent from the host, the entire bar code will be printed as it is.

JAN-8 (EAN)

This bar code, consisting of numerals only, has a fixed length of 8 column; a 7-column number entered from the host or application software plus a check column (8th column) automatically calculated inside the printer. If the 8th column numeral is sent from the host, the entire bar code will be printed as it is.

CODE39   This bar code, consisting of uppercase alphabets and numerals, has a variable length of column. A start/stop code "*" is automatically added by the printer. Available characters include a space and "$%+–./0123456789", and uppercase alphabets.

ITF   This bar code, consisting of numerals only, has a variable lenght of even column.
If an odd-column code is transferred, nothing will be printed.

CODABAR (NW-7)

This bar code, consisting of alpha numerals, has a variable length of column. Available characters include "0123456789$+–./:". A start/stop code is required; any one of A, B, C, and D is used.

Control Character		HRI Code	Control Character		HRI Code
ASCII	Hex.		ASCII	Hex.	
NUL	00	■U	DLE	10	■P
SOH	01	■A	DC1	11	■Q
STX	02	■B	DC2	12	■R
ETX	03	■C	DC3	13	■S
EOT	04	■D	DC4	14	■T
ENQ	05	■E	NAK	15	■U
ACK	06	■F	SYN	16	■V
BEL	07	■G	ETB	17	■W
BS	08	■H	CAN	18	■X
HT	09	■I	EM	19	■Y
LF	0A	■J	SUB	1A	■Z
VT	0B	■K	ESC	1B	■A
FF	0C	■L	FS	1C	■B
CR	0D	■M	GS	1D	■C
SO	0E	■N	RS	1E	■D
SI	0F	■O	US	1F	■E
			DEL	7F	■T

CODE128   This barcode consists of 103 kinds of barcode characters and three code subsets with a variable length. It can print 128 ASCII characters.
- Code set A can print ASCII characters of 00H through 5FH.
- Code set B can print ASCII characters of 20H through 7FH.
- Code set C can print two digits of 00 through 99 with one character.

In addition to the above characters, special characters are printed.
- Shift character (SHIFT)
  With code set A, one character just after SHIFT is treated as a character of code set B.
  With code set B, one character just after SHIFT is treated as a character of code set A.
  No such character can be treated with code set C.
- Switches the code sets after code set selecting characters (CODE A, CODE B, CODE C) to A, B, C, respectively.
- Use of function characters (FNC1, FNC2, FNC3, FNC4) differ depending on the application. Only FNC1 is usable with code C.

When sending print data, note the following matters.
(1) The top of barcode data must be any one of code set selection characters (CODE A, CODE B, CODE C) which selects the first code set.
(2) Special character is designated by two characters : "{" and the succeeding one character. Or, two characters of "{" are sent consecutively.

49

[Special Characters]

Hex. Code	ASCII Code	Code Set A	Code Set B	Code Set C
7B53	{S	SHIFT	SHIFT	–N/A
7B41	{A	–N/A	CODE A	CODE A
7B42	{B	CODE B	–N/A	CODE B
7B43	{C	CODE C	CODE C	–N/A
7B31	{1	FNC1	FNC1	FNC1
7B32	{2	FNC2	FNC2	–N/A
7B33	{3	FNC3	FNC3	–N/A
7B34	{4	FNC4	FNC4	–N/A
7B7B	{{	' { '	' { '	' { '

Example: Transmitting data for printing "No" with code set B first and then "123456"with code set C.

GS k <73> <10> <7B>H <42>H, " No." <7B>H <43>H <12> <34> <56>

- When the top of barcode data raw is not code set selection character, the command processing stops at that point and the succeeding data is processed as normal data.
- When receiving a character that cannot be used by the selected code set, the command processing stops at that point and the succeeding data is processed as normal data.
- Visible codes corresponding to shift character and code set selection character are not printed. In addition, visible codes of function character and control character are treatedas space characters.

[Sample Program]
```
LPRINT CHR$(&H1D);"H";CHR$(2);
LPRINT CHR$(&H1D);"k";
LPRINT CHR$(4);
LPRINT "123";CHR$(0);
```

[Print Results]

When the data "123" is printed with the code 39

50
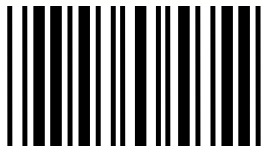
[Description of Bar Codes]

UPC-A, UPC-E, JAN13 (EAN), JAN8 (EAN), CODE39, ITF, CODABAR, CODE128

Type	Print Sample	Outline of Symbol
UPC-A	123456 789012	12-column fixed-length bar code consisting of numerals only.
UPC-E	123453	8-column fixed-length bar code consisting of numerals only. Abbreviated version of UPC-A.
JAN13	1234567890128	13-column fixed-length bar code consisting of numerals only.
JAN8	1234 5670	8-column fixed-length bar code consisting of numerals only.
CODE39	* 1 2 3 4 5 *	Variable-length bar code consisting of alphabets and numerals. The start/stop code "*" is automatically added.
ITF	1234567890	Even-column variable-length bar code consisting of numerals only.
CODABAR (NW-7)	A 1 2 3 4 5 6 A	Variable-length bar code consisting of alpha numerals. Any one of A, B, C, and D is required as the start/stop code.
CODE128	ABCD12345	Variable-length bar code consisting of all 128 ASCII code characters.

[Barcode Designation]

Printing is done depending on bar code specification type, number of print column, bar code height, width (Magnification), visible code presence, and bar code data specification.

51

GS w n

[Function]	Selecting the horizontal size (Scale factor) of the Bar Code
[Code]	<1D>H <77>H<n>
[Range]	{2 =< n =< 4} Data is described in Hex code.
[Outline]	Selecting bar code width. n denotes the number of dots in fine element width.
[Default]	• The initial value of this width is "3".

[Sample Program]

```
LPRINT CHR$ (&H1D) + "h" + CHR$ (30);
LPRINT CHR$ (&H1D) + "w" + CHR$ (2);
GOSUB BC
LPRINT CHR$ (&H1D) + "h" + CHR$ (50);
LPRINT CHR$ (&H1D) + "w" + CHR$ (3);
GOSUB BC
LPRINT CHR$ (&H1D) + "h" + CHR$ (80);
LPRINT CHR$ (&H1D) + "w" + CHR$ (4);
GOSUB BC
END
BC:
LPRINT CHR$ (&H1D) + "k";
LPRINT CHR$ (4);
LPRINT "12" + CHR$ (0);
RETURN
```

[Print Results]

Height 30, Magnification 2

Height 50, Magnification 3

Height 80, Magnification 4

52
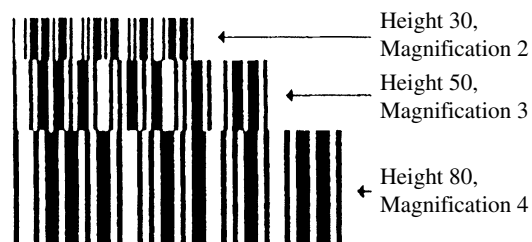
ESC = n

[Function]   Data Input Control

[Code]   <1B>H<3D>H<n>

[Range]   {0 =< n =< FF} Data is described in Hex code.

[Outline]   Selecting equipment in which data input from the host is effective.

- Each bit of n indicates as follows:

Bit	Equipment	Value	
		0	1
0	Printer	Invalid	Valid
1	Not defined		
2	Not defined		
3	Not defined		
4	Not defined		
5	Not defined		
6	Not defined		
7	Not defined		

- When the printer has not been selected, this printer abandons all the received data until it is selected by this command.

[Caution]
- Even when the printer has not been selected, it can become BUSY state through printer operation.
- When the printer is deselected, this printer discards all the data until it is selected with this command.

[Default]
- The initial value of n is "1".

[Sample Program]

```
LPRINT "AAAAA";
LPRINT CHR$ (&H1B) + "=" + CHR$ (0);
LPRINT "aaaaa" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "=" + CHR$ (1);
LPRINT "AAAAA" + CHR$ (&HA);
```

[Print Results]

A A A A A A A A A
↑
a a a a a   is not printed

53

ESC @

[Function]	Initializing the Printer
[Code]	<1B>H<40>H
[Range]	Clears data stored in the print buffer and brings various settings to the initial state (Default state).
[Caution]	• Data inside the internal input buffer are not cleared.
	• Dip switches setting are red once again.

[Sample Program]

```
LPRINT CHR$ (&H1B) + " ! " + CHR$ (&H30) ;
LPRINT CHR$ (&H1B) + "V" + CHR$ (1);
LPRINT "AAA" + CHR$ (&HA);
LPRINT CHR$ (&H1B) + "@";
LPRINT "AAA" + CHR$ (&HA);
```

[Print Results]

DC2 A n

[Function] Selecting the Print drive system

[Code] <12>H<41>H<n>

[Range] {0 =< n =< FF}

[Outline] Selecting the Fixed division system or the Variable division system.

• "n" is valid only for the lowest bit (n0).

n0	Print Drive System
0	Fixed division number system
1	Variable division number system

[Default] The initial value of n is specified by Jumper (J5).

55

2. CHARACTER CODE TABLE

2.1 International

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL		SP	0	@	P	`	p	Ç	É	á	░	└	╨	α	≡
1		XON	!	1	A	Q	a	q	ü	æ	í	▒	┴	╤	ß	±
2			"	2	B	R	b	r	é	Æ	ó	▓	┬	╥	Γ	≥
3		XOFF	#	3	C	S	c	s	â	ô	ú	│	├	╙	π	≤
4			$	4	D	T	d	t	ä	ö	ñ	┤	─	╘	Σ	⌠
5			%	5	E	U	e	u	à	ò	Ñ	╡	┼	╒	σ	⌡
6			&	6	F	V	f	v	å	û	ª	╢	╞	╓	µ	÷
7			'	7	G	W	g	w	ç	ù	º	╖	╟	╫	τ	≈
8			(	8	H	X	h	x	ê	ÿ	¿	╕	╚	╪	Φ	°
9	HT		)	9	I	Y	i	y	ë	Ö	⌐	╣	╔	┘	Θ	∙
A	LF		*	:	J	Z	j	z	è	Ü	¬	║	╩	┌	Ω	·
B		ESC	+	;	K	[	k	{	ï	¢	½	╗	╦	█	δ	√
C		FS	,	<	L	\	l	|	î	£	¼	╝	╠	▄	∞	ⁿ
D		GS	-	=	M	]	m	}	ì	¥	¡	╜	═	▌	φ	²
E			.	>	N	^	n	~	Ä	₧	«	╛	╬	▐	ε	■
F			/	?	O	_	o	SP	Å	ƒ	»	┐	╧	▀	∩	SP

56

2.2 Japanese

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL								HT	LF						
1		DC1		DC3								ESC	FS	GS		
2	SP	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[	¥	]	^	_
6	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	SP
8	■	▮	▮	▮	▬	▬	■	■	▬	▬	▬	▬	■	■	■	+
9	┤	├	┬	┴	│	│	─	─	└	┌	┘	┐	╰	╭	╮	╯
A	SP	｡	｢	｣	､	･	ヲ	ァ	ィ	ゥ	ェ	ォ	ャ	ュ	ョ	ッ
B	ｰ	ｱ	ｲ	ｳ	ｴ	ｵ	ｶ	ｷ	ｸ	ｹ	ｺ	ｻ	ｼ	ｽ	ｾ	ｿ
C	ﾀ	ﾁ	ﾂ	ﾃ	ﾄ	ﾅ	ﾆ	ﾇ	ﾈ	ﾉ	ﾊ	ﾋ	ﾌ	ﾍ	ﾎ	ﾏ
D	ﾐ	ﾑ	ﾒ	ﾓ	ﾔ	ﾕ	ﾖ	ﾗ	ﾘ	ﾙ	ﾚ	ﾛ	ﾜ	ﾝ	ﾞ	ﾟ
E	│	⊥	＋	Ｔ	◥	◢	◣	◤	◀	▶	◆	♣	●	○	＼	／
F	角	×	亡	半	月	日	時	分	秒	年	市	区	町	村	人	※

57

2.3 International Character Set

	COUNTRY	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
0	U.S.A.	#	$	@	[	\	]	^	`	{	|	}	~
1	France	#	$	à	°	ç	§	^	`	é	ù	è	¨
2	Germany	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
3	U.K.	£	$	@	[	\	]	^	`	{	|	}	~
4	Denmark I	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~
5	Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
6	Italy	#	$	@	°	\	é	^	ù	à	ò	è	ì
7	Spain	₧	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~
8	Japan	#	$	@	[	¥	]	^	`	{	|	}	~
9	Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
10	Denmark II	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü