58MM THERMAL RECEIPT PRINTER

Programmer Manual

1. COMMANDS

1.1 Command Notation

[Name]　　　The name of the command.

[Format]　　　The code sequence.

[Range]　　　Gives the allowable ranges for the arguments.

[Description] Describes the command's function.

[Details]　　　Describes the usage of the command in detail.

[Notes]　　　Provides important information on setting and using the printer command, if necessary.

[Default]　　　Gives the default values, if any, for the command parameters.

[Reference] Lists related commands.

[Example]　Gives examples of how to use the command.

Hex indicates the hexadecimal equivalents.

Decimal indicates the decimal equivalents.

[ ]*k* indicates the contents of the [ ] should be repeated *k* times.

1.2 Explanation of Terms

(1) Receive buffer

The receive buffer is a buffer that stores, as is, the data received from the host (the reception data). The reception data is stored in the receive buffer temporarily, and is then processed sequentially.

(2) Print buffer

The print buffer is a buffer that stores the image data to be printed.

(3) Print buffer full

This is the state where the print buffer is full. If new print data is input while the print buffer is full, the data in the print buffer is printed out and a line feed is executed. This is the same operation as the **LF** operation.

(4) Start of line

The start of line state satisfies the following condition:

・ There is no print data (including spaces and portions of data skipped due to bit image data) currently in the print buffer.

・ There is no print data (including portions of data skipped due to **HT**)

・ The print position is not specified by the **ESC $** or **ESC ** command.

(5) Printable area

The maximum range within which printing is possible under the printer specifications. The printable area for this printer is as follows:

    ① The length of the horizontal direction in standard mode:

       approximately 72.1 mm {576/203"}

    ② The length of the horizontal direction in page mode:

       approximately 72.1 mm {576/203"}

    ③ The length of the vertical direction in page mode: approximately 117.3 mm {1662/360"}

(6) Printing area

Printing range is set by the command. It must be printing area δ printable area.

(7) Ignore

The state in which all codes, including parameters, are read in and discarded, and nothing happens.

(8) Inch

A unit of length. One inch is 25.4 mm.

(9) MSB

Most Significant Bit

(10) LSB

Least Significant Bit

(11) Base line

Standard position when character data is stored in the print buffer.

Normal character in standard mode and page mode:

1.3. Control Commands

LF

[Name]	Print and line feed	
[Format]	ASCII	LF
	Hex	0A
	Decimal	10
[Description]	Prints the data in the print buffer and feeds one line based on the current line spacing.	
	This command sets the print position to the beginning of the line.	

ESC SO

[Name]	Set double width print for all characters	
[Format]	ASCII	ESC SO
	Hex	1BH OEH
	Decimal	27 14
[Description]	Characters after this command in the same line will be printed double width.	
	This command can be canceled by enter or ESC DC4 command.	

ESC DC4

[Name]	Cancel double width print for all characters	
[Format]	ASCII	ESC DC4
	Hex	1BH 14H
	Decimal	27 20
[Description]	Print the characters in normal width.	

ESC ! n

[Name]	Set print mode		
[Format]	ASCII	ESC !	*n*

	Hex	1B	21	n
	Decimal	27	33	n

[Range] $0 \le n \le 255$

[Description] Set characters print mode, to select to print characters times width and times height. Default n=0, characters normal size printing; n=16, characters times height printing; n=32, characters times width printing; n=48, characters times width and times height printing.

ESC % n

[Name] Select/cancel user-defined character set

[Format]   ASCII   ESC% *n*

	Decimal	27	37	n
	Hex	1B	25	n

[Range] $0 \le nL \le 255$

[Description]   • *n* is available only for the least significant bit.
   • When the LSB of *n* is 0, the build-in character set is selected.
   • When the LSB of *n* is 1, the user-defined character set is selected.

ESC & y c1 c2

[Name] Define user-defined characters

[Format]   ASCII   ESC& y c1 c2 [x1 d1...d(y×x1)]...[xk d1... d(y×xk)]

	Hex	1B	26	y	c1	c2	[x1 d1...d(y×x1)]...[xk d1... d(y×xk)]
	Decimal	27	38	y	c1	c2	[x1 d1...d(y×x1)]...[xk d1... d(y×xk)]

[Range] y = 3

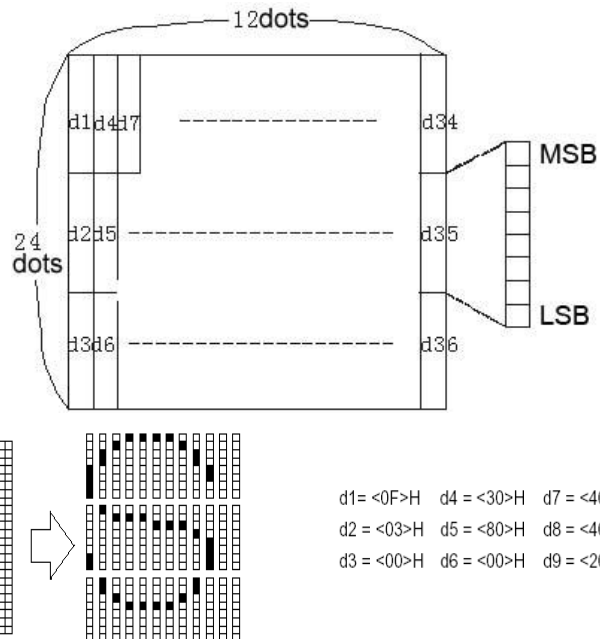$32 \le$ c1 $\le$ c2$\le$ 126

$0 \le$ x $\le$ 12 Font A (9 x 9)

$0 \le$ x$\le$ 9 Font B(7 x 9)

$0 \le d1…d(y×xk) \le 255$

[Description] Defines user-defined characters.

• *y* specifies the number of bytes in the vertical direction.

• *c1* specifies the beginning character code for the definition, and *c2* specifies the final code. Only when c1=c2, up to 96 user-defined characters can be defined.

• *x* specifies the number of dots in the horizontal direction.

• d is the dot data for the characters. The data to define a user-defined character is (x×y) bytes and total is (c2-c1+1) characters.

• The defined user-defined characters will be valid till redefinition or reset or printer power off.

Example: using the standard ASCII code Font (12 x 24)

d1= <0F>H d4 = <30>H d7 = <40>H . . . .
d2 = <03>H d5 = <80>H d8 = <40>H . . . .
d3 = <00>H d6 = <00>H d9 = <20>H . . . .

ESC * m nL nH d1 . . . dk

[Name] Select bit-image mode

[Format]   ASCII   ESC*   m   nL   nH   d1...dk

Hex   1B   2A   m   nL   nH   d1...dk

Decimal   27   42   m   nL   nH   d1...dk

[Range]   m = 0, 1, 32, 33;

$1 \leq$ (nL+nH x 256) $\leq$ 1023

$0 \leq nL \leq 255$;

$0 \leq nH \leq 3$;

$0 \leq d \leq 255$;

k=nL+ nH×256 (m=0, 1); k=(nL+ nH×256)×3 (m=32, 33)

[Description]   • Selects a bit-image mode using *m* for the number of dots specified by *nL* and *nH*.

• The *nL* and *nH* indicate the number of dots of the bit image in the horizontal direction.

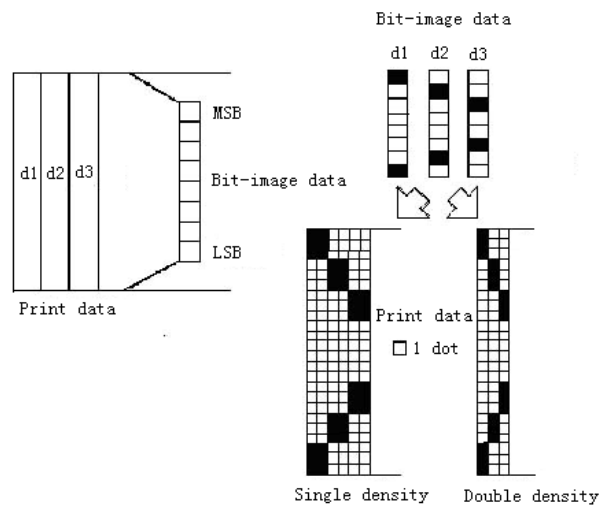The number of dots is calculated by nL + nH X 256.

• If the bit-image data input exceeds the number of dots to be printed on a line, the excess data is ignored.

• *d* indicates the bit-image data. Set a corresponding bit to 1 to print a dot or to 0 to not print a dot.
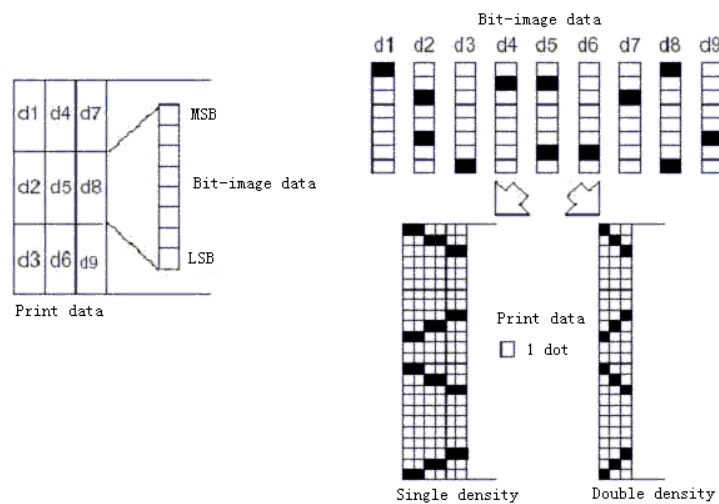
• Selects a bit-image mode using *m* for the number of dots specified by *nL* and *nH*, as follows:

m	Mode	Vertical Direction		Horizontal Direction	
		Dots	Density	Density	Data（k）
0	8-dot single-density	8	67 DPI	100 DPI	nL + nH × 256
1	8-dot double-density	8	67 DPI	200 DPI	nL + nH × 256
3 2	24-dot single-density	24	200 DPI	100 DPI	(nL + nH × 256)×3
3 3	24-dot double-density	24	200 DPI	200 DPI	(nL + nH × 256)×3

Example: 8-dot density selected

24-dot density selected

ESC 2

[Name] Select default line spacing

[Format]   ASCII   ESC2

              Hex   1B 32

              Decimal 27 50

[Description]Selects 3.75mm line spacing.

ESC 3 n

[Name] Set line spacing

[Format]   ASCII   ESC3   n

              Hex   1B 33 n

              Decimal 27 51 n

[Range]   0 ≤   n ≤   255

[Description]Sets the line spacing to *n* dots

[Default]   n = 30

ESC ? n

[Name] Cancel user-defined characters

[Format]   ASCII   ESC?   n

              Hex   1B 3F n

              Decimal 27 63 n

[Range]   32 ≤n ≤126

 [Description]   • This command cancels the pattern defined for the character code specified by *n*. After the user-defined characters are canceled, the corresponding pattern of the internal character is printed.

            • If a user-defined character has not been defined for the specified character code, the printer ignores this command.

ESC @

[Name] Initialize printer

[Format]   ASCII   ESC@

              Hex   1B 40

              Decimal 27 64

 [Description]   Clears the data in the print buffer and resets the printer mode to the mode that is in effect when the power is turned on.

ESC J n

[Name] Print and feed paper

[Format]   ASCII   ESCJ   n

              Hex   1B 4A n

Decimal   27   74   n

[Range]   0 ≤ n ≤ 255

[Description]• Print the data in the print buffer and feed the paper [n x   0.176mm (1/44 inches)].

　　　　　• The paper feed amount set by this command does not affect the values set by **ESC 2** or **ESC 3**.

ESC c 5 n

[Name] Enable/disable panel buttons

[Format]   ASCII   ESCc   5   n

　　　　　Hex   1B   63   35   n

　　　　　Decimal   27   99   53   n

[Range]   0≤n≤255

[Description]Only the least significant bit of n is enabled.

　　　　　• When the LSB of *n* is 0, the panel buttons are enabled.

　　　　　• When the LSB of *n* is 1, the panel buttons are disabled.

[Default]   n = 0

ESC d n

[Name] Print and feed *n* lines

[Format]   ASCII   ESCd   n

　　　　　Hex   1B   64   n

　　　　　Decimal   27   100 n

[Range]   0≤n≤255

[Description]Prints the data in the print buffer and feeds *n* lines.

ESC p m t1 t2

[Name] Generate pulse for drawer

[Format]   ASCII   ESCp   m   t1   t2

　　　　　Hex   1B   70   m   t1   t2

　　　　　Decimal   27   112 m   t1   t2

[Range]   m=0,1,48,49; 0≤t1≤255; 0≤t2≤255

[Description]This command is to generate pulse for controlling the cash drawer.

　　　　　• The pulse ON time is [t1 x 2 ms] and the OFF time is [t2 x 2 ms].

　　　　　• If t2 < t1, the OFF time is [t1x 2 ms].

ESC t n

[Name] Select character code table

[Format]   ASCII   ESCt   n

　　　　　Hex   1B   74   n

　　　　　Decimal   27   116 n

[Range]   0 ≤n ≤ 10, 16 ≤n ≤ 19

[Description]Selects a page n from the character code table:

n	Page
0	PC437 [U.S.A. & Europe Standard]
1	Katakana

[Default]   n = 0

GS   *   x   y   d1…dk

[Name] Define download bit image
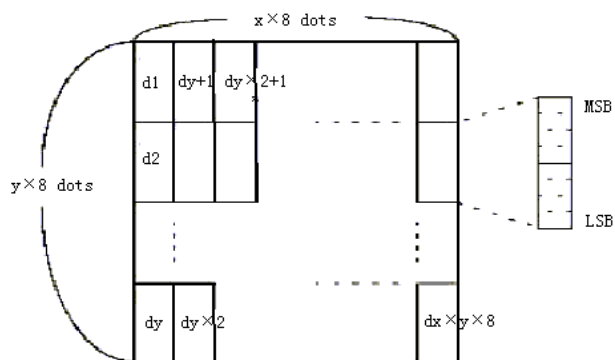
[Format]   ASCII   GS *   x   y   d1…dk

            Hex   1D 2A x   y   d1…dk

            Decimal   29 42 x   y   d1…dk

[Range]   1≤x≤48, 1≤y≤48, x×y≤1500, k=x×y×8

[Description]Defines download bit image.

　　　　　• Only the least significant bit of *n* is enabled.

　　• *d* indicates the bit image data, that is, *d*=1 for printing the corresponding dot and *d*=0 for not printing the corresponding dot.

　　• There are (x×8) dots on horizontal direction and (y×8) dots on vertical direction.

　　• Once the download bit image has been defined, it is valid till executes redefine, printer reset or printer power-off.

　　• Relation between print data and download bit image:

GS / m

[Name] Print downloaded bit image

[Format]　　ASCII　　　GS　/　　m

　　　　　　Hex　　　1D　2F　m

　　　　　　Decimal　29　47　m

[Range]　　0 ≤ *m* ≤ 3, 48 ≤ *m* ≤ 51

[Description]Prints downloaded bit image using the mode specified by *m*.

　　　　　　• *m* is for selecting bit image mode.

　　　　　• GS * command can be use to define bit image.

　　　　　• Selects bit image mode using *m* as follows:

m	Mode	Vertical Dot Density	Horizontal Dot Density
0, 48	Normal	200 DPI	200 DPI
1, 49	Double-width	200 DPI	100 DPI
2, 50	Double-height	100 DPI	200 DPI
3, 51	Double-width & Double-height	100 DPI	100 DPI

GS　v　0　m　xL　xH　yL　yH　d1....dk

[Name] Print raster bit image

[Format]　　ASCII　　　　GS v　0　m　xL　xH　yL　yH　d1....dk

　　　　　　Hex　　　1D　76　30　m　xL　xH　yL　yH　d1....dk

　　　　　　Decimal　29　118　48　m　xL　xH　yL　yH　d1....dk

[Range]　　0≤xL≤48, xH=0; 0≤yL≤255, yH=0; 0≤d≤255

　　　　k=(xL+xH×256)×(yL+yH×256)(k≠0)

[Description]Selects Raster bit-image mode. The value of m selects the mode, as follows:

m	MODE	Vertical Dot Density	Horizontal Dot ensity
0, 48	Normal	200 DPI	200 DPI
1, 49	Double-width	200 DPI	100 DPI
2, 50	Double-height	100 DPI	200 DPI
3, 51	Quadruple	100 DPI	100 DPI

　　　　• xL, xH, select the number of data bits (xL+ xH × 256) in the horizontal direction for the bit image.

　　　　• yL, yH, select the number of data bits (yL+ yH × 256) in the vertical direction for the bit image.

• This command has no effect in all print modes (character size, emphasized, double-strike, upside-down, underline, white/black reverse printing, etc.) for raster bit image.

• The part of bit image that exceeds the printable area will not be printed.

• *d* indicates the bit-image data. Set time a bit to 1 prints a dot and setting it to 0 does not print a dot.

FS &

[Name] Select Kanji character mode

[Format]   ASCII   FS &

            Hex   1C 26

            Decimal   28 38

[Description]Selects Kanji character mode.

        The default print mode is Kanji character mode.

FS .

[Name] Cancel Kanji character mode

[Format]   ASCII   FS .

            Hex   1C 2E

            Decimal   28 46

[Description]   Cancels Kanji character mode.

        • Every character is processed as ASCII code and 1byte is processed every time.

        • Kanji character mode is selected while printer is power on.

FS   2   c1   c2   d1…dk

[Name] Define user-defined Kanji characters

[Format]   ASCII   FS   2   c1   c2   d1…dk

　　　　　 Hex   1C   32   c1   c2   d1…dk

　　　　　 Decimal   28   50   c1   c2   d1…dk
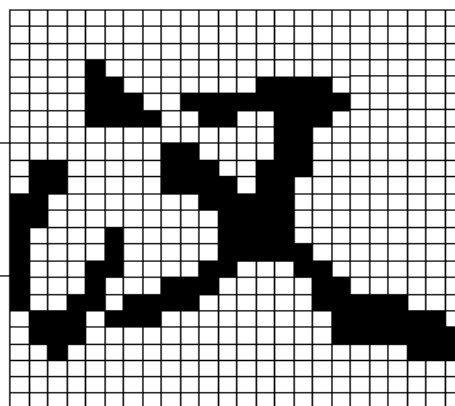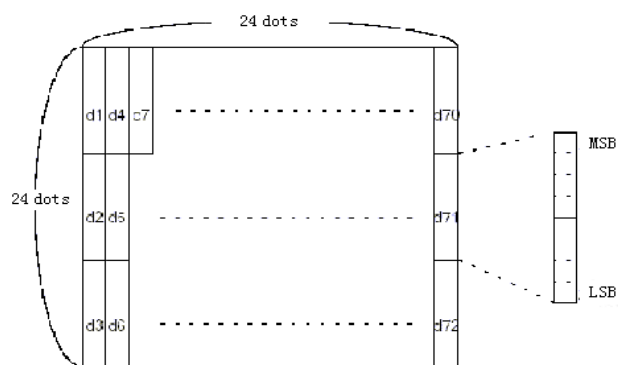
[Range]   c1=[FEH]、[A1H]≤c2≤[FEH]、k=72、0≤d≤255

[Description]   • Defines user-defined Kanji characters for the character codes specified by c1 and c2.

　　　　　　　• c_1 and c_2 indicate character codes for the defined characters. c_1 specifies for the first byte, and c_2 for the second byte.

　　　　　　• d indicates the dot data. Set a corresponding bit to 1 to print a dot or to 0 to not print a dot.

[Example]

D1=00H, D4=00H, D7=00H, D10=00H. . . . . .
D2=1FH, D5=78H, D8=60H, D11=00H. . . . . . .
D3=C0H, D6=30H, D9=38H, D12=70H. . . . .

5.2 LED Digital Display Command

ESC @

[Name] Initial command

[Format]   ASCII   ESC@

　　　　　 Hex   1BH 40H

　　　　　 Decimal   027 064

[Description]   Resume to the status of power on.

CLR

[Name] Clear display screen

[Format]   ASCII   CLR

            Hex   0CH

            Decimal   012

[Description]   Clear all characters on the screen.

ESC Q A d1d2d3…dn CR

[Name] Send data to screen

[Format]   ASCII   ESCQ A   d1d2d3…dn CR

      Hex   1BH 51H 41H d1d2d3…dn 0DH

             30H≤dn≤39H或dn=2DH或dn=2EH

      Decimal   027 081 065 d1d2d3…dn 013

             48≤dn≤57或dn=45或dn=46

[Description]   • Data will be sent to the screen in overwrite mode by this command. By this method, it's no need to use command CAN to clear the cursor line before sending data to the screen.

            • If d1…dn is an integer, 1≤n≤8

            • If d1…dn is a decimal, 1≤n≤15 (8 bits for integer & 7 bits for decimal)

            • The data on screen can be clear by using command CLR or CAN.

ESC s n

[Name] Set "Unit Price" or "Total Price"

[Format]   ASCII   ESCs   n

         Hex   1BH 73H n

         Decimal   027 115 n

[Range]   0≤n≤4

[Description]   • When n=0, 3, 4, both "Unit Price" and "Total Price" dims;

             • When n=1, "Unit Price" lights and "Total Price" dims;

             • When n=2, "Unit Price" dims and "Total Price" lights.

CAN

[Name] Clear the cursor line

[Format]   ASCII   CAN

            Hex   18H

            Decimal   024

[Description]   Clear all the characters on the line of cursor and the cursor moves to the first position. Commonly, use command ESC Q A d1d2d3…dn CR instead of this one.

ESC _ n

[Name] Set the cursor

[Format]   ASCII   ESC_   n
            Hex   1BH 5FH n
            Decimal   027 095 n
[Range]   0≤n≤1
[Description]   This command is not commonly used.
            • When n=0, the cursor dims;
            • When n=1, the cursor lights.

ESC l x

[Name] Move the cursor
[Format]   ASCII   ESCl   x
            Hex   1BH 6CH x
            Decimal   027 108 x
[Range]   0≤x≤8
[Description]   This command is not commonly used. It's used to move cursor to the position x.