# The User's Manual of TK500 Control Board

**Shenzhen Icod Digital Co., Ltd.**

**The manufacture has authorized to revise the contents of this document without notice!**

# Table of Contents

# Chapter Ⅰ INTRODUCTION

This standard reference manual applied to TK500 printing control circuit board.

## 1.1 The characters of this product

### 1.1.1 Model

TK500 has the following models

. TK500 P/S model supports IEEE-1284 bidirectional parallel interface/RS-232 serial interface.

### 1.1.2 The supporting character set

. FONT A: 12×24 dot characters.

. FONT B: 9×17 dot characters.

. Chinese: Support GB18030 Chinese(downwards compatibility GB2312-1980).

Note: At present GB18030 only supports double byte 1、2、3、4、5 area.

### 1.1.3 The print head models of the equipment linker

. At present, supports EPSON M-T510/T520/T530/T540 serial print head(all characters driven by +24V DC)

. Select the model of printer by the DIP switch

. High speed printing: Feeds paper which needs the printing speed about 150 ㎜/second (5.9 inch/second).

### 1.1.4 The functions and applications that the printer carries out.

. The standard commands protocol on the basis of ESC/POS®.

. Through the page mode, could carry out manifold different design.

. Could enlarges the characters to the 64 times than the standard measure.

. Could prints the bar code through taking bar code printing command. The bar code printing could print along the horizontal direction(the grid bar code) and vertical direction(trapezium bar code)(*1). Could

print standard EAN13 bar code.

.Takes macro definition which could carry out the repeat operation and copy printing.

.Selects the font size(12×24 or 9×17) through the commands.

.Could print bit image.

Note *1:the trapezium bar code only affects under the page mode.

### 1.1.5Hardware

.An inner parallel interface(IEEE 1284).

.An inner serial interface(RS-232).

.Equipped an interface linker.

.Selects the printing mode and uses the interface through DIP switch.

## 1.2The main use and applicable area

The printer control board is a new type thermal line printing control board, it contains the characters of the low printing speed and noise、the high reliability and printing quality、and dispensing with ribbon. and avoids the daily care trouble.

The printer control board supports manifold bar code printing, contains: EAN8、EAN13、CODE39 etc manifold one dimension bar code printing. Supports GB18030 Chinese characters set, and high speed to print Chinese.

The printer control board has the small bulk, simple operation, and wide applicable area.

## 1.3Environmental specification

◆Temperature:

Operation: 0 - 55℃

Storage: -25 - 70℃ (without printing paper)

◆Humidity:

Operation: 10 - 80% RH (no coagulation)

(80% needs 34℃)

Storage: 19 - 90% RH (without printing paper)

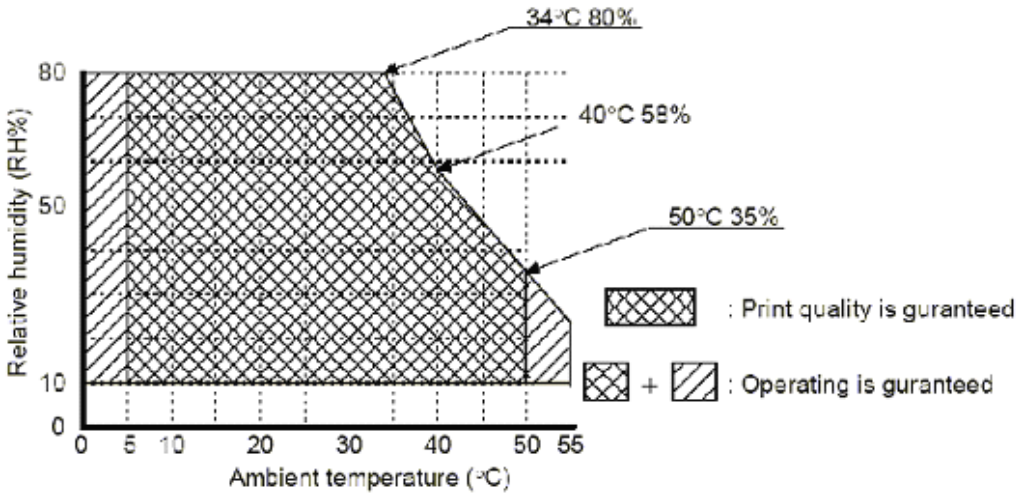



Figure 1.4 The operation temperature and humidity range

## 1.4Operation specification

◆Supply voltage: DC +24.0 V ± 2.4 V

◆Current consumption(24V):

M-T530/T540(for 80 mm/82.5 mm {3.15inch/3.25inch} paper width type)

**High mode:**

Average: about 9 A

Peak value: about 14 A

**Two parts printing mode:**

Average: about 7 A

Peak value: about 11.5 A

**Four parts printing mode:**

Average: about 4.5 A

Peak value: about 5.5 A

**Waiting:**

Average: about 0.1 A

M-T510/T520 (for 58/60 mm {2.28inch/2.36inch} paper width type)

**High speed mode:**

Average: about 6.5 A

Peak value: about 10 A

**Two parts printing mode:**

Average: about 5 A

Peak value: about 8 A

**Four parts printing mode:**

Average: about 3.5 A

Peak value: about 5 A

**Waiting:**

Average: about 0.1 A

## 1.5Security

◆ Can’t impose the over max absolute fixed current and voltage on any pins

Or, it will bring heat damage.

**Max absolute fixed value**

| Item | Notation | Fixed Value | Unit |
|---|---|---|---|
| Input Voltage | VIN | 24.0 | V |
| Storage Temperature | Tstg | -25 to 70 | ℃ |
| Storage Humidity | Hstg | 0 to 90 | % |

◆Operates the printer in the following circumstances:

**Recommendatory operation environment**

| Item | Notation | Standard Value | | | Unit |
|---|---|---|---|---|---|
| | | Min | Typical | Max | |
| The voltage supplied by printer | Vp | 21.6 | 24.0 | 26.4 | V |
| Operation temperature | Topr | 0 | - | 55 | ℃ |
| Operation humidity(no coagulation) | Hopr | 10 | - | 80 | % |

◆Can’t take the power supply to short-circuit for any outputted pins

Takes a low impendence to short-circuit an output pin, maybe it will bring heat damage because of surpassing circuit.

◆There are no electric material(as paper etc.) which followed on the circuit board.

Maybe it will bring heat damage to the pins on the short circuit board because of the surpassing circuit.

◆Be sure to use the defined cable linker device.

Maybe it will bring fire or strike fire because of the incorrect linker.

◆This product can’t be disassembled or modified.

The incorrect modification for this product will bring damage, fire or electric shock.

◆Can’t be used on the high humidity and excessive dust environment.

Maybe it will bring damage, fire or strike fire because of high humidity and excessive dust.

◆This product can’t be disassembled or modified.

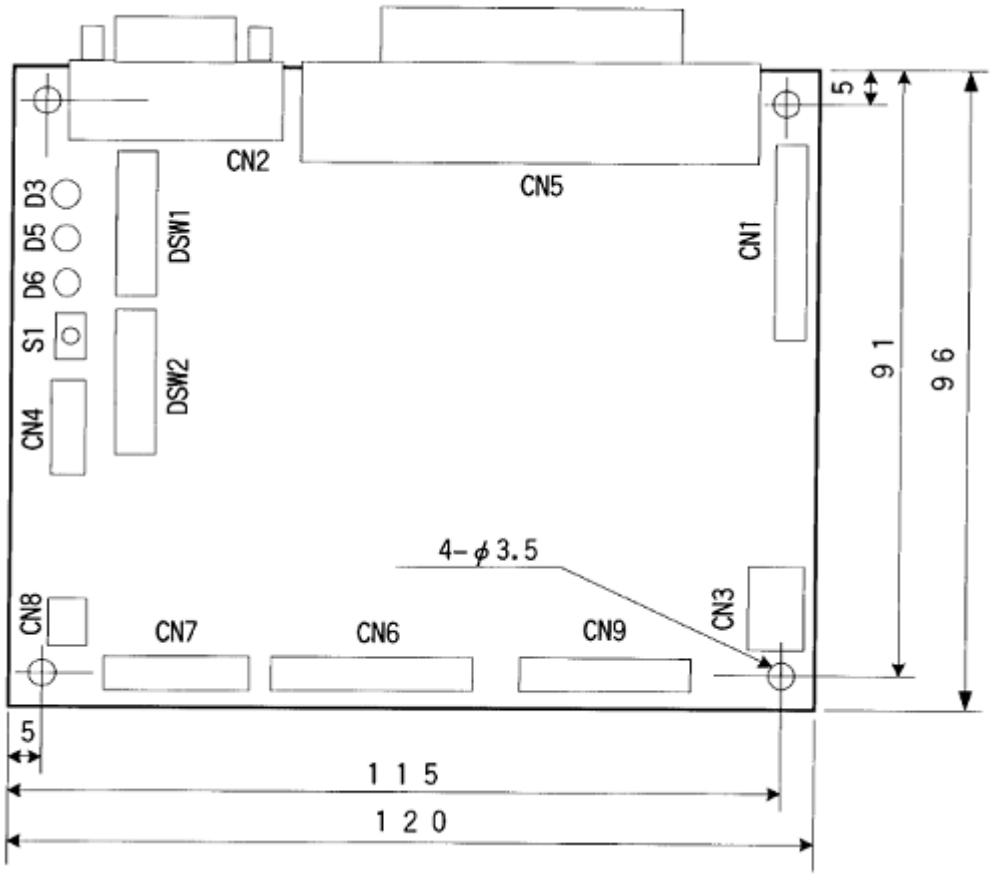
The incorrect modification for this product will bring damage, fire or

electric shock.

# Chapter II CONFIGURATION AND INSTALLATION

## 2.1General Configuration

### 2.1.1The figure of control board configuration




### 2.1.2Dimension

| | |
|---|---|
| Height | About 25㎜ {0.98 inch} |
| Width | About 120㎜ {4.72 inch} |
| Depth | About 96 ㎜ {3.78 inch} |

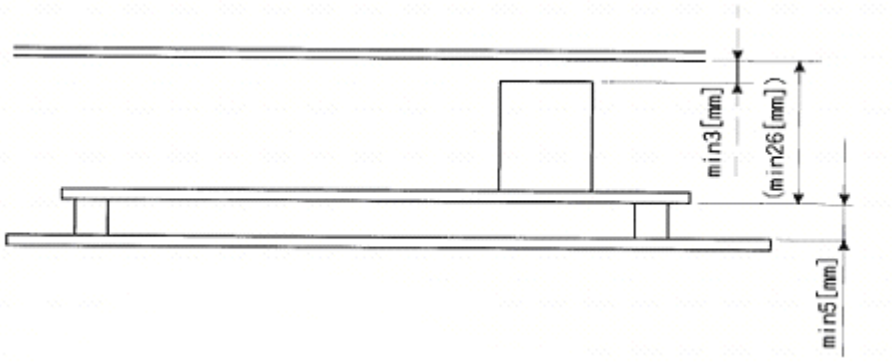
### 2.1.3Weight

Mass About 122g

## 2.2 PCB installing method

In order to install the control board on the case, the designable case must be conformed to the following requirements.

- Between the above of electrolytic condenser which on the control board and case, be sure there are 3 ㎜ or more space.
- Be sure the installation pins of control board have 5 ㎜ or more space.
- Fixes the control board on the mental case.



# Chapter III SYSTEM INSTALLATION AND OPERATION

## 3.1 System connection

### 3.1.1 Power connection

The power connection socket be used to connect printer with exterior power.

#### 3.1.1.1 Power requirement

24 VDC +/- 10%

#### 3.1.1.2 Power socket

There are installed power connection socket CN3 on the board, as the figure 3.1.1.2.

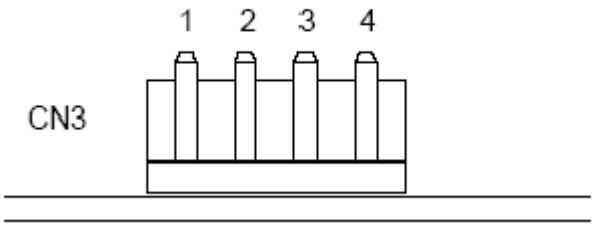



Figure 3.1.1.2 24VDC power connection socket

#### 3.1.1.3 Socket model

5195-04(MOLEX) plug model: 5194(MOLEX)

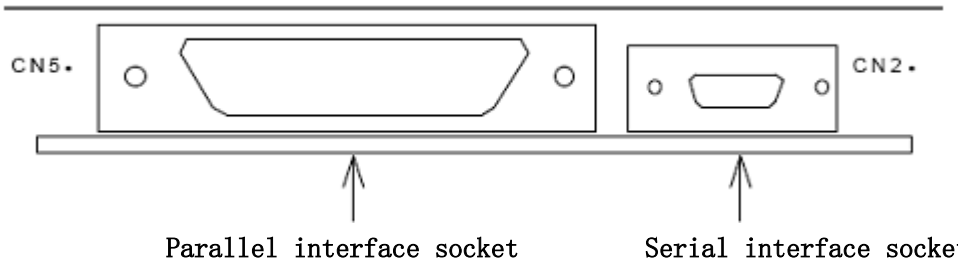
#### 3.1.1.4 Pin definition

| Pin Number | Signal Name |
|---|---|
| 1 | GND |
| 2 | +24 V DC |

| | |
|---|---|
| 3 | +24 V DC |
| 4 | GND |

Form 3.1.1 Power socket pin definition

### 3.1.2 Interface connection




Socket Panel Appearance

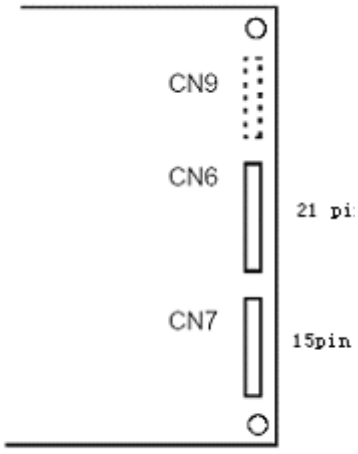
Illustration:

. For unused interface socket, closes the socket cover.

. If the control board installed on the mental case, needs to fix the two ends of serial interface on the case firmly.

## 3.1.3 Print head connection

### 3.1.3.1 Print head connection socket

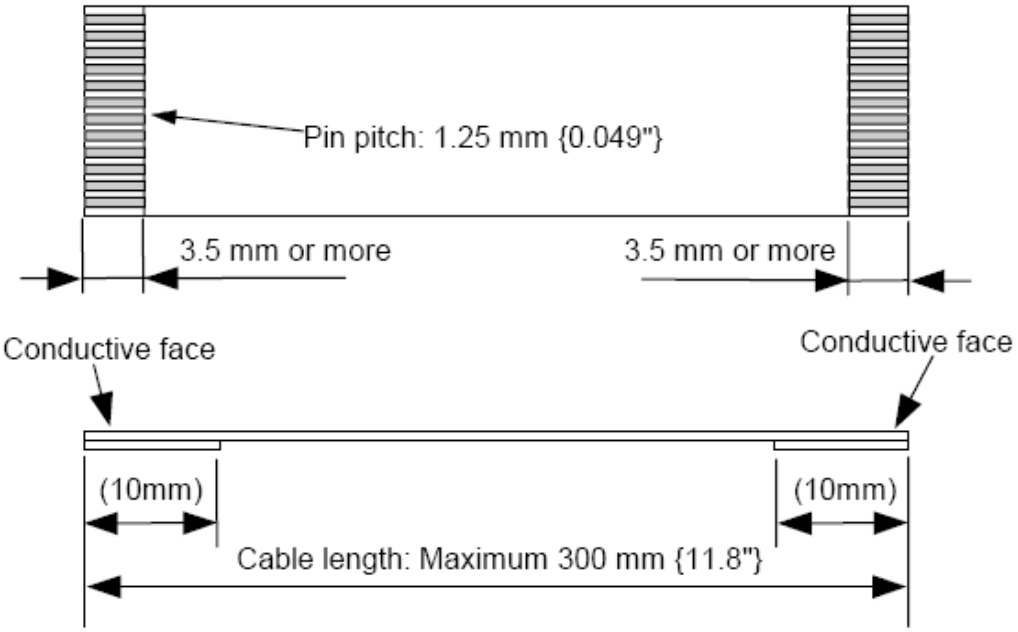



Print head connection socket

### 3.1.3.2 FFC

The FFC cable which connected with the print head, needs to satisfy the measure requirements as the following figure.

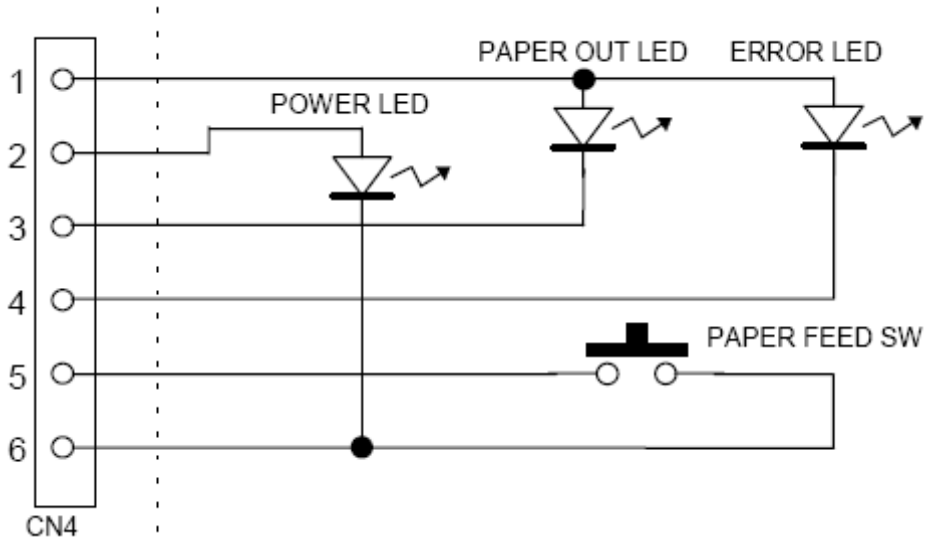
FFC Type(user)




| | |
|---|---|
| Switch spacing | 1.25±0.1㎜ |
| Switch width | 0.8±0.05㎜ |
| Min connection length | 3.5㎜ |
| Switch thickness | 0.25-0.4㎜ |

## 3.1.4 Operation board connection

The control board could connect single buttons and indicators through this connection socket.



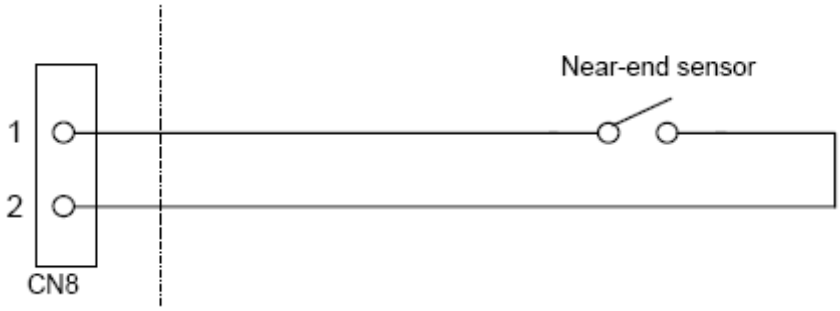

[TK500 Side] [User Side]

The type of end-user connection: Plug: HER-06(JST)

Plug end: SHE-001T-P0.6(JST)

### 3.1.5 Paper near-end sensor connection

If the user needs to install paper near-end sensor, the connection needs to according to the following figure. The paper near-end sensor which uses the mechanical touch switch.




[TK500 Side] [User Side]

The end-user linker type: Plug: IL-S-2S-S.C2-S(JAE)

Plug end: IL-S-C2-S-1000(JAE)

## 3.2 Interface Connection

### 3.2.1 RS-232 serial interface

#### 3.2.1.1 Specification

Data transmission: Serial

Synchronization manner: Asynchronous

Handshaking signal: CTS/RTS, DTR/DSR or XON/XOFF control
Signal level: MARK=-3 to -15V: Logic “1”/OFF
SPACE=+3 to +15V: Logic “0”/ON
Baud rate: 4800, 9600, 19200, 38400bps (bps: transmits bit count per second)
Date word length: 8 bit fixed
Check-out manner: No, Even, Odd
Stop bits: 1 bit or more than 1 bit
Socket(side of the printer): D-SUB9 male thread(positive)

**Notes:** .Handshaking signal, baud rate and check-out manner decided by DIP switch setting. (refer to section 3.3.2)
.The stop bits on the side of the printer fixed 1.

#### 3.2.1.2 Switching between online and offline

The printer goes offline:

1) Between when the power is turned on (or the printer reset) and during the printer have ready to receive the data.
2) During the self-test.
3) When the cover is open.
4) During paper feeding by taking the paper FEED button.
5) When the printer stops printing due to the paper-end.
6) On the macro execution ready conditions.
7) When an error has occurred.

#### 3.2.1.3 Interface socket pin assignments and signal functions

Interface socket pin assignments and signal functions are described in the following table:

Signal assignments and functions

<table>
<tr><th>Pin number</th><th>Signal name</th><th>Signal direction</th><th>Function</th></tr>
<tr><td>2</td><td>RXD</td><td>Input</td><td>Receive data</td></tr>
<tr><td>3</td><td>TXD</td><td>Output</td><td>Transmit data</td></tr>
<tr><td>4</td><td>DTR</td><td>Output</td><td>1) When DTR/DSR control is selected, this signal indicates whether the printer is busy. SPACE indicates that the printer have ready to receive data, and MARK indicates that the printer is busy. The busy condition can be changed by taking the Memory Switch.(Refer to section 3.3.2.3)
<table>
<tr><td></td><td>Printer status</td><td>Memory Switch 1-3 status</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td></td><td></td><td>On</td><td>Off</td></tr>
<tr><td rowspan="8">Offline</td><td>1. During the power turned on(including resetting) to when the printer have ready to receive the data.</td><td>BUSY</td><td>BUSY</td></tr>
<tr><td>2. During the self-test.</td><td>BUSY</td><td>BUSY</td></tr>
<tr><td>3. When the cover is open.</td><td>---</td><td>BUSY</td></tr>
<tr><td>4. During paper feeding taking the paper FEED button.</td><td>---</td><td>BUSY</td></tr>
<tr><td>5. When the printer stops printing due to a paper-end.</td><td>---</td><td>BUSY</td></tr>
<tr><td>6. On the macro execution ready conditions.</td><td>---</td><td>BUSY</td></tr>
<tr><td>7. When an error has occurred.</td><td>---</td><td>BUSY</td></tr>
<tr><td>8. When the receive buffer becomes full.(*1)</td><td>BUSY</td><td>BUSY</td></tr>
</table>
2) When XON/XOFF control is selected:<br>
The signal indicates whether the printer is correctly connected and have ready to receive the data. SPACE indicates that the printer have ready to receive data. The signal is always SPACE except in the following cases:<br>
• During the period from the power turned on to the printer has ready to receive data.<br>
• During the self-test.
</td></tr>
<tr><td>5</td><td>SG</td><td>------</td><td>Signal ground</td></tr>
</table>

Signal assignments and functions (continued)

| Pin number | Signal name | Signal direction | Function |
|---|---|---|---|
| 6 | DSR | Input | This signal indicates whether the host compu |

| | | | |
|---|---|---|---|
| | | | ter can receive the data.<br>SPACE indicates that the host can receive data, and MARK indicates that the host can't receive the data.<br>When DTR/DSR control is selected, the printer transmits data after confirming this signal.<br>When XON/XOFF control is selected, the printer does not check this signal.(except the command transmitted by DLE EOT and GS a)<br>When XON/XOFF control is selected, the printer does not check this signal.<br>Changing DIP switch enables this signal to be used as a reset signal for the printer. |
| 7 | RTS | Output | Same as DTR signal |
| 8 | CTS | Input | This signal indicates whether the host can receive the data.<br>SPACE indicates that the host computer can receive the data, and MARK indicates that the host can't receive the data.<br>When DTR/DSR control is selected, the printer transmits data after confirming this signal.<br>When XON/XOFF control is selected, the printer does not check this signal.(except the command transmitted by DLE EOT and GS a).<br>When XON/XOFF control is selected, the printer does not check this signal. |

*1: When the spare space in the receive buffer declined to 100 bytes, the printer status turns to "buffer full" and keeps "buffer full" status until the free space in buffer area increased to 140 bytes.

### 3.2.1.4 XON/XOFF transmission timing

When XON/XOFF control is selected, the printer transmits XON or XOFF signals as follows. Transmission timing differs depending on the memory switch setting.

XON/XOFF Transmission Timing

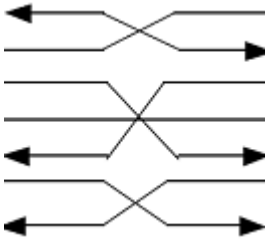
| | Printer status | Memory Switch | |
|---|---|---|---|
| | | ON | OFF |
| XON Transmission | ① When the printer goes online after turning the power on | Transmit | Transmit |
| | ② When the receive buffer is rele | Transmit | Transmit |

| | | | |
|---|---|---|---|
| | ased from the buffer full state<br>③ When the printer switches from offline to online<br>④ When the printer recovers from an error taking the DLE ENQ 1 or DLE ENQ 2 commands | ---<br>--- | Transmit<br>Transmit |
| XOFF Transmission | ⑤ When the receive buffer becomes full<br>⑥ When the printer switches from online to offline | Transmit<br>--- | Transmit<br>Transmit |

**Notes:** • The XON code is <11>H and the XOFF code is <13>H.
• In case ③, XON is not transmitted when the receive buffer is full.
• In case ⑥, XOFF is not transmitted when the receive buffer is full.

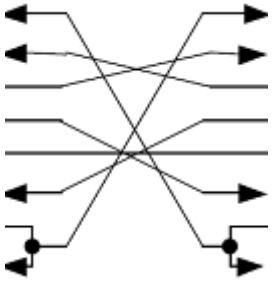
### 3.2.1.5 The example of serial interface socket

Could take the cable which have the following signal connections.

| The sides of board(MB-500) | | | The sides of user | |
|---|---|---|---|---|
| D-sub9 Socket pin number | Signal name | | Signal name | D-SUB9 Plug pin number |
| 1 | (NC) |  | DCD | 1 |
| 2 | RXD | | RXD | 2 |
| 3 | TXD | | TXD | 3 |
| 4 | DTR | | DTR | 4 |
| 5 | SG | | SG | 5 |
| 6 | DSR | | DSR | 6 |
| 7 | RTS | | RTS | 7 |
| 8 | CTS | | CTS | 8 |
| 9 | (NC) | | RI | 9 |

Couldn’ t take the cable which have the following signal connections.

| The sides of board(MB-500) | | | The sides of user | |
|---|---|---|---|---|
| D-sub9 Socket pin number | Signal name | | Signal name | D-SUB9 Plug pin number |

| | | | | |
|---|---|---|---|---|
| 1 | (NC) |  | DCD | 1 |
| 2 | RXD | | RXD | 2 |
| 3 | TXD | | TXD | 3 |
| 4 | DTR | | DTR | 4 |
| 5 | SG | | SG | 5 |
| 6 | DSR | | DSR | 6 |
| 7 | RTS | | RTS | 7 |
| 8 | CTS | | CTS | 8 |
| 9 | (NC) | | RI | 9 |

Note: After turning the printer power on and initializing, transmitting data to printer.

3.2.1.6 Notes on setting the memory switch 1-3

1) The printer only stops operating but not in busy conditions, when an error has occurred, the cover opened, without paper, or paper fed .

2) When setting the memory switch “ON”, and enabling the handshaking effectively, be sure to check the printer status taking “GS a” command and ASB function. In such circumstances, the default value of n for “GS a” is 2. The printer automatically transmits the printer status, it decides by the change of online/offline status.

3) When taking DLE EOT, be sure that the receive buffer is empty.
   - The host can’t transmit the data when the printer is in busy conditions:
     When the printer is busy because of the buffer area is full, If occurs errors, DLE EOT can’t be used.
   - The host can transmit the data when the printer is in busy conditions:
     If the buffer area is full when transmitting the bit image, it is the same as the DLE EOT which transmitted when dealing with bit image, both are bit image data. When the receive buffer area is full, the transmitted date could loss.
     For example: When taking 4KB receive buffer, every time transmits a line data, checks the printer conditions by “GS r 1”. Transmits one line data to make sure the receive buffer won’t be filled.

### 3.2.1.7 Resetting the printer by the serial interface

Through changing the set of DIP switch, the printer could repost by interface pin 6.

Reset Changed

| Signal line | DIP switch | Reset condition |
|---|---|---|
| Pin 6(DSR) | DSW 2-8: ON | MARK level inputting |

If needs to reset, the printer must be satisfied the following

requirements.

. DC characters:

Reposition DC Characters

| | | Pin 6(DSR) |
|---|---|---|
| Positive reposition voltage | VA | -15 to -3V |
| Negative reposition voltage | AN | +3 to +15V |
| Positive reposition voltage | IA | -5.3 mA (max) |
| Negative reposition voltage | IN | -5.0 mA (max) |
| Input impedance | RIN | 3KΩ(min) |

.AC Characters:

The min reset plus width: TRS 1 millisecond (min)

.When taking pin 6(DSR) (DIP switch 2-8 is ON):


The min reposition plus width (pin 6)

When pin 6(DSR) and DIP switch 2-8 are ON, the printer resets.

Note: When the signal inputted which is not satisfied with the above requirements, the printer operation can't be confirmed.

### 3.2.2 IEEE 1284 Bidirectional Parallel Interface



#### 3.2.2.1 Compatible Mode

(The data sent to the printer by the host: Censorings Compatibility)

(1) Introduction

Compatible mode supports Censorings parallel interface compatibility.

(2) Specifications

Data transmission: 8-bit parallel

Synchronization: External supply nStrobe signal
Handshaking: nAck and Busy signal
Signal levels: TTL compatibility
Connector: ADS-B36BLFDR176(Honda) or equivalent products(IEEE 1284 Type B)

(3) Switching between online and offline

The printer is not equipped with any online/offline switch. The printer enters into offline status in the following conditions:

1) When the power turned on or initialized the printer by reposition signal(nlnit) from the interface to the head that the printer has ready to receive data.
2) During self-test.
3) When the cover is open.
4) During paper feeding by the paper FEED button.
5) When the printer stops printing due to paper-end(in cases when without paper is detected by either the paper-end sensor or the paper near-end sensor and stops printing which sets by “ESC c 4”).
6) On the macro execution conditions.
7) When an error has occurred.

### 3.2.2.2 Sending back data mode

Transmits the status data from the printer to the host by four bits mode(nibble) or byte mode.

**Note: At present only supports sending back data by nibble mode.**

. Description

This mode allowed data transmission from the asynchronous printer under the host control.

Transmits data by four bits mode which works through the existed control line of four bits each group(a Nibble). In the eight bits mode, transmits data which completed by dealing with the eight data line as the bidirectional.

Both modes can’ t work at the same time as the compatible mode, Or, it will cause half-duplex transmission.

### 3.2.2.3 The interface pin assignments under the each mode

| Pin | Source | Compatibility Mode | Four Bits Mode |
|---|---|---|---|
| 1 | Host | nStrobe | HostCIk |
| 2 | Host/Ptr | Data0(LSB) | Data0(LSB) |
| 3 | Host/Ptr | Data1 | Data1 |
| 4 | Host/Ptr | Data2 | Data2 |
| 5 | Host/Ptr | Data3 | Data3 |
| 6 | Host/Ptr | Data4 | Data4 |
| 7 | Host/Ptr | Data5 | Data5 |
| 8 | Host/Ptr | Data6r | Data6 |
| 9 | Host/Ptr | Data7(MSB) | Data7(MSB) |

| | | | |
|---|---|---|---|
| 10 | Printer | nAck | PtrCIk |
| 11 | Printer | Busy | PtrBusy/Data3,7 |
| 12 | Printer | Perror | AckDataReq/Data2,6 |
| 13 | Printer | Select | Xflag/Data1,5 |
| 14 | Host | nAutoFd | HostBusy |
| 15 | | NC | ND |
| 16 | | GND | GND |
| 17 | | FG | FG |
| 18 | Printer | Logic-H | Logic-H |
| 19 | | GND | GND |
| 20 | | GND | GND |
| 21 | | GND | GND |
| 22 | | GND | GND |
| 23 | | GND | GND |
| 24 | | GND | GND |
| 25 | | GND | GND |
| 26 | | GND | GND |
| 27 | | GND | GND |
| 28 | | GND | GND |
| 29 | | GND | GND |
| 30 | | GND | GND |
| 31 | Host | nlnit | nlnit |
| 32 | Printer | nFault | nDataAvail/Data0,4 |
| 33 | | GND | ND |
| 34 | Printer | DK-STATUS | ND |
| 35 | Printer | +5V | ND |
| 36 | Host | nSelectln | 1284-Active |

***NC: Not Connected**

**ND: Not Defined**

Notes: 1. The letter “n” before signal names indicates that the low level is effective.

2. If the host can’t provide all signal lines which lists as above, all communication modes will be failed.
3. For interface, signal lines needed to use the twisted pair cable, and the return sides connected to the signal ground.
4. Interface status setting are taking TTL level which is satisfy the following characters. In addition, both rise time and fall time of all signals should be no more than 0.5 microsecond.
5. Data transmission shouldn’t ignore the nAck or Busy signal. Transmits data when ignoring nAck or Busy signal, it will cause the data losing. (For printer, transmits data should at the behind of checking nAck signal or when the Busy signal in low level.)
6. Interface cables should be the min length which is required.

### 3.2.2.4 Electrical Characters

DC Character (Except for Logic -H+5V)

| Characteristics | Symbol | Specifications | | Conditions |
|---|---|---|---|---|
| | | Min | Max | |
| Output HIGH voltage | $V_{OH}$ | *2.4V | 5.5V | *$L_{OH}$=0.32mA |
| Output LOW voltage | $V_{OL}$ | -0.5V | *0.4V | $L_{OL}$=12 mA |
| Output HIGH current | $L_{OH}$ | 0.32mA | - | $V_{OH}$=2.4V |
| Output LOW current | $L_{OL}$ | -12mA | - | $V_{OL}$=0.4V |
| Input HIGH voltage | $V_{IH}$ | 2.0V | - | |
| Input LOW voltage | $V_{IL}$ | - | 0.8V | |
| Input HIGH voltage | $V_{IH}$ | - | -0.32mA | $V_{IH}$=2.0V |
| Input LOW voltage | $V_{IL}$ | - | 12mA | $V_{IL}$=0.8V |

Logic-H Signal Sender Characters

| Characteristics | Symbol | Specifications | | Conditions |
|---|---|---|---|---|
| | | Min | Max | |
| Output HIGH voltage | $V_{OH}$ | 3.0V | 5.5V | While the power is OFF |
| Output LOW voltage | $V_{OL}$ | - | 2.0V | |

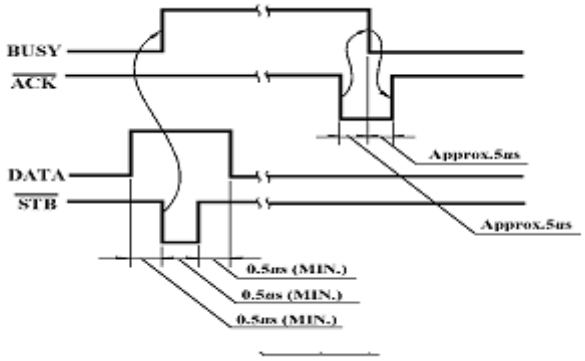
+5V Signal Sender Characters

| Characteristics | Symbol | Specifications | | Conditions |
|---|---|---|---|---|
| | | Min | Max | |
| Output HIGH voltage | $V_{OH}$ | *2.4V | 5.5V | * $L_{OH}$ =0.32mA While the power is OFF $V_{OH}$=2.4V |
| Output LOW voltage | $V_{OL}$ | - | -** | |
| Output HIGH current | $L_{OH}$ | - | 0.32mA - | While the power is OFF |
| Output LOW current | $L_{OL}$ | -** | | |

**No guarantee offered to $V_{OL}$ and $L_{OL}$ while the power is turned off.

### 3.2.2.5 Parallel data receiving timing

Parallel interface signal timing graphic as follows (compatible mode)




### 3.2.2.6 Repositing printer by the parallel interface

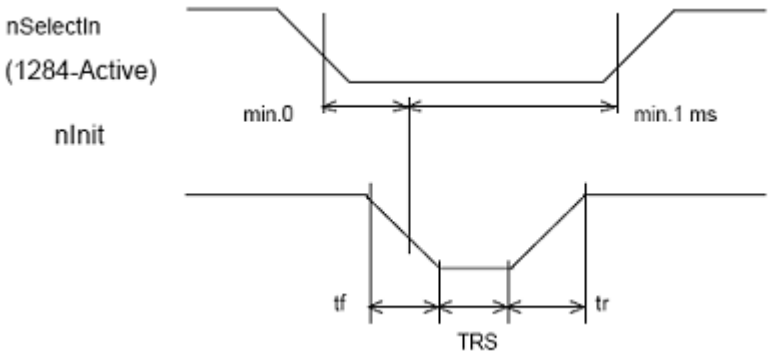
At the compatible mode, the printer resets by the interface nInit signal(pin31), The nInit signal brought by changing DIP switch setting. To enable the printer reset, should be satisfied the following signal timing.

.DC characters

TTL level

.AC characters

The min reset plus width: TRS 50 microsecond (min)




Note: The character “n” before the signal name indicates that the low is effective.

### 3.2.2.7 Receiving printer status through the bidirectional parallel interface

In the bidirectional parallel interface specifications, the printer status transmission is available by the bidirectional communication

facility which operates in the 4 bits/8 bits modes accordance with the IEEE 1284 standard.

In such circumstances, as opposed to the RS-232 serial interface specification, the real-time interruptions from the printer to the host are disabled, and thus, precautions must be taken as the following.

1) Allowable capacity of the printer internal buffer is 99 bytes (except ASB status). Status signals exceeding this capacity will be discarded. To prevent possible loss of status, the host shall be ready for data acceptance (Reverse Mode).
2) When ASB is used, the host is preferably in the wait state for data acceptance(Reverse Idle Mode). When this state is not available, the host shall enter the Reverse Mode to constantly monitor the presence of data.
3) When ASB is used, preference shall be given to the ASB state for transmission over the other states signals. Any accumulated ASB statee signals left for transmission from the last to the newest ASB status transmission shall be transmitted together at one time as one ASB state showing the presence of change, followed by the latest ASB state.

**Example:** In the normal (wait) state, the ASB status is configured as follows.

| First Status | Second Status | Third Status | Fourth Status |
|---|---|---|---|
| 0000 0000 | 0000 0000 | 0000 0000 | 0000 0000 |

When the following sequence of operations proceeds and near end is detected, and the FEED button is pressed and released, the following pieces of data are accumulated.

| First Status | Second Status | Third status | Fourth Status |
|---|---|---|---|
| 0001 0000 | 0000 0000 | 0000 0011 | 0000 0000 |

① Near end detection

| | | | |
|---|---|---|---|
| 0101 0000 | 0000 0000 | 0000 0011 | 0000 0000 |

② The printer board is opened

| | | | |
|---|---|---|---|
| 0001 0000 | 0000 0000 | 0000 0011 | 0000 0000 |

③ The printer board is closed

When the ASB status is received following this, a total of eight (8) bytes of ASB will be transmitted as follows.

Accumulated ASB(①+②+③)

| First Status | Second Status | Third Status | Fourth Status |
|---|---|---|---|
| 0101 1000 | 0000 0000 | 0000 0011 | 0000 0000 |

Accumulated ASB(①+②+③)

The latest ASB(④)

| First Status | Second Status | Third Status | Fourth Status |
|---|---|---|---|
| 0001 0000 | 0000 0000 | 0000 0011 | 0000 0000 |

Fourth Status

## 3.3 Panel Buttons and Indicators

### 3.3.1 Panel buttons

1) Feed button

Type: Non-locking push button

Function:

When BM sensor disabled, the printer feeds paper one line(based on the line spacing which set by ESC 2 and ESC 3). When BM enabled, the length which feeds by printer is the BM paper length unit.

Push feed paper button will not feed paper at the following states:

① Disabled the buttons when takes ESC 5 command.

② Paper-end sensor tests no paper.

③ Raises the print head bar.

·On the conditions of macro waiting execution, push feed paper and execute the defined macro.

· At the process of self-test, push keys could stop self-test printing, push again could self-test continued.

**Note: ESC c 5 command could turn buttons function on/off. When push buttons disabled, it is no effective when push the buttons.**

### 3.3.2 Indicators

1) Power supply LED: Green

On: Power supply is stable.

Off: Power supply is not stable.

2) Roll paper end LED: Red

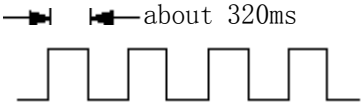
On: The roll paper near end or real end.

Off: Paper is loaded(normal condition).

Flashing: · Self-test waiting state(refer to 3.4) or macro waiting state.

· Execute macro waiting state(when use "executing macro" command)

Table 3.3 waiting state indication

| State | Paper LED flashing pattern | Recovery conditions |
|---|---|---|
| Waiting for self-test printing to be continued or have ready to execute macro. |   | Pressing the feed button caused self-test printing to be continued or executed macro. |

Note: A macro could be executed r times(r means the times that the macro

be executed) as an definition. Macro could be executed continually, and could push the paper feed button once. If execute the macro pattern through pushing the button, the paper end indicator will flash and indicates that have ready to execute macro.(Refer to Section 4: command)

3) Error LED: Red

On: Offline (except during paper feeding using the feed button and during the self-test)

Off: Normal operation

Flashing: Error state(Refer to 3.6)

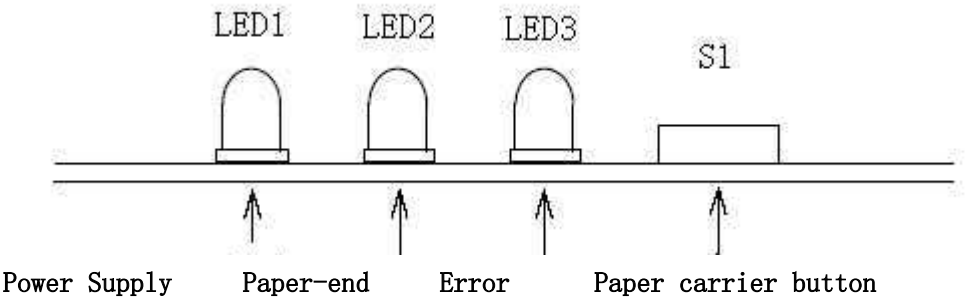



Figure 3.3.2 Panel buttons and indicators

## 3.4 Special operation mode

### 3.4.1 Self-test

Self-test could test whether the printer is normal operation. If can print self-test list correctly, it indicates that the printer is normal except the connection with host, Or needs to test.

1) The printer has a self-test function that checks the following:
   - Control circuit functions
   - The printer structure state when connecting to control board
   - Print quality
   - Interface type and operation conditions
   - Control software version
   - DIP switch settings
   - Memory switch settings

2) Executing the self-test

   Hold down the feed button and turn the printer on with the cover closed, then the current printer state (*1) is printed.

   (*1)
   - Control software version
   - Interface type and communication state
   - DIP switch settings

• Memory switch settings

3) Self-test standby state

After printing the current printer state, the printer prints the message "Self-test printing, please press feeding button." The paper out LED indicator flashes and the printer enters the test printing (*2) standby state. Press the feed button to start test printing.

(*2) • Prints a roll paper mode that only takes the internal character set.

4) Ending the self-test

After a number of lines are printed, the printer indicates the end of the self-test by print"*** completed***," , and initializes and enters into the standard mode.(Refer to section 3.9)

### 3.4.2 Hex Dump

1) Hexadecimal dumping function

This function prints the data transmitted from the host in hexadecimal numbers and in their corresponding characters.

2) Starting hexadecimal dumping

Starting hexadecimal dumping has two patterns:

--Turns the power on while pressing the paper feed button

--Executes the GS ( A.

The printer first prints "Hexadecimal Dump", and then prints the received print data in hexadecimal numbers and in their corresponding characters.

Notes: 1. If a character does not correspond to the data received, the printer prints ".".

2. During hexadecimal dumping, any commands other than DLE EOT, DLE ENQ, and DLE DC4 do not function.

3. Insufficient print data to fill the last line can be printed by mode of the printer is offline(for example press the paper feed button).

3) Ending hexadecimal dumping

Hexadecimal dumping ends by turning the power off, pressing the paper feed button three times, or resetting the printer after printing has finished.

<Printing example>

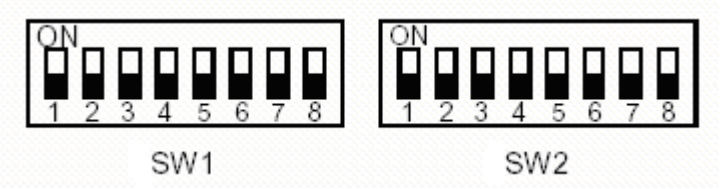
```
Hexadecimal Dump

1B 21 00 1B 26 02 40 40 1B 69        . ! . . & . @@ . i
1B 25 01 1B 63 34 00 1B 30 31        . % . . c 4 . . 0 1
41 42 43 44 45 46 47 48 49 4A        A B C D E F G H I J

                *** completed ***
```

# 3.5 DIP switch and memory switch settings

## 3.5.1 DIP switch setting

### 3.5.1.1 DIP switch

There are two DIP switches on the control board, and the number of DIP switch prints on it, signs SW1 and SW2, the graphics as follows:




Note: The change of DIP switch setting only affects when the printer turned the power on again or reset.

### 3.5.1.2 DIP switch 1

DIP switch 1(SW1)

| Switch No. | Function | ON | OFF | Default |
|---|---|---|---|---|
| 1 | Black mark sensor | Enabled | Disabled | Off |
| 2 | Selects communication interface | Refer to table 3.5.2 | | Off |
| 3 | | | | Off |
| 4 | RS232 serial interface handshaking | XON/XOFF | DTR/DSR or RTS/CTS | Off(*) |
| 5 | Serial interface parity checkout | Used | Unused | Off(*) |
| 6 | Serial interface | Even checko | Odd checko | Off(*) |

| | checkout mode | ut | ut | |
|---|---|---|---|---|
| 7 | Selects serial interface baud rate | Refer to table3.5.3 | | Off(*) |
| 8 | | | | Off(*) |

(*) only affects when selecting RS232 serial interface.

Communication-ports selecting

| Port | DIP switch number | |
|---|---|---|
| | 2 | 3 |
| Parallel interface(IEEE1284 bidirectional parallel interface) | Off | Off |
| Serial interface(RS232) | Off | On |

Baud rate selecting

| Transmission speed(baud rateBPS) | DIP switch number | |
|---|---|---|
| | 7 | 8 |
| 4800 | On | On |
| 9600 | Off | On |
| 19200 | On | Off |
| 38400 | Off | Off |

Note: BPS-bits per second

### 3.5.1.3 DIP switch 2

DIP switch 2(SW2)

| Switch number | Function | ON | OFF | Default |
|---|---|---|---|---|
| 1 | Print head model selecting | | | Off |
| 2 | | | | Off |
| 3 | Printing chroma selecting | Refer to 3.5.6 | | Off |
| 4 | | | | Off |
| 5 | Operation mode selecting | Refer to 3.5.7 | | Off |
| 6 | Manufacture using | | | Off(*1) |
| 7 | Serial interface DSR signal SPACE level reset, Logic 0 | -- | -- | Off |
| 8 | Serial interface DSR signal MARK level reset, Logic 1 | Enabled | Disabled | Off(*2) |

*1: OFF is fixed

*2: only affects when selected RS232 serial interface.

Note: At present the set of bit8 is no effective.

Table 3.5.6 Printing chroma selecting

| Chroma grade | Printing chroma | Switch number | |
|---|---|---|---|
| | | 3 | 4 |
| 1 | Tiny | On | On |
| 2 | Normal | Off | Off |
| 3 | Thick | On | Off |
| 4 | Dense | Off | On |

Table 3.5.7 Operation mode selecting

| Operation mode | Switch number |
|---|---|
| | 5 |
| Hex printing(*) | On |
| Normal | Off |

Note: This operation mode prints the any one of receiving data by hex value.

### 3.5.2 Set memory function switch

Except for DIP SW1 and SW2, Could use memory function setting switch to take the other function settings, these settings confirmed by the specific printing setting commands, the setting parameters will be stored in the printer non-easy losing memory, and it will not lose when turning the power off.

The memory function switch 1

| Switch number | Function | ON(1) | OFF(0) | Default | Note |
|---|---|---|---|---|---|
| 1 | Reserved | --- | 0 is fixed | 0 | |
| 2 | Reserved | --- | 0 is fixed | 0 | |
| 3 | BUSY conditions | The receiving buffer is full | The receiving buffer is full or offline | 0 | |
| 4 | Receiving error dealt with | Ignored | Prints “?” | 0 | *1 |
| 5 | Change a new line automatically | Enabled | Disabled | 0 | *2 |
| 6 | Reserved | --- | 0 is fixed | 0 | |
| 7 | Reserved | --- | 0 is fixed | 0 | |

| | | | | | |
|---|---|---|---|---|---|
| 8 | Reserved | --- | 0 is fixed | 0 | |

Notes: *1 only affects under the serial interface.

*2 only affects under the parallel interface. Please refer to the illustration of CR command.

**Memory function switches 2,3,4,5,6,7**

| Switch number | Function | ON(1) | OFF(0) | Default | Note |
|---|---|---|---|---|---|
| 1 | Reserved | --- | 0 is fixed | 0 | |
| 2 | Reserved | --- | 0 is fixed | 0 | |
| 3 | Reserved | --- | 0 is fixed | 0 | |
| 4 | Reserved | --- | 0 is fixed | 0 | |
| 5 | Reserved | --- | 0 is fixed | 0 | |
| 6 | Reserved | --- | 0 is fixed | 0 | |
| 7 | Reserved | --- | 0 is fixed | 0 | |
| 8 | Reserved | --- | 0 is fixed | 0 | |

**Memory function switch 8**

| Switch number | Function | ON(1) | OFF(0) | Default | Note |
|---|---|---|---|---|---|
| 1 | Printing mode control | | | 0 | |
| 2 | | | | 0 | |
| 3 | Retreats paper | Enabled | Disabled | 0 | *1 |
| 4 | Installs cutter-paper automatically | Not installed | Installed | 0 | |
| 5 | Reserved | --- | 0 is fixed | 0 | |
| 6 | The step of retreating paper | 88 steps | 108 steps | 0 | |
| 7 | Reserved | --- | 0 is fixed | 0 | |
| 8 | When up-elect, initialized black mark position | Not initialized | Initialized | 0 | |

*1: Takes this function when only retreating printing institution be used.

If takes the retreating function, the printer will take the following operation:

. After taking GS V command to cut paper, will execute retreating operation(when the black mark disabled).

. Set the printing starting position at the opposite direction of cutting paper

position by GS ( F command.

**Note: At present not supports the selecting function of Memory switch 8' s**

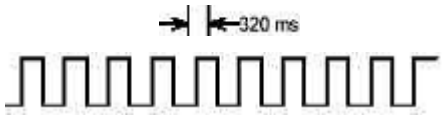
bit 0, bit 1.

## 3.6 Error Processing

### 3.6.1 Error type

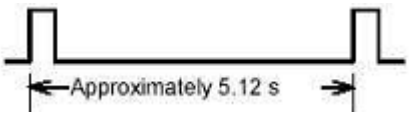
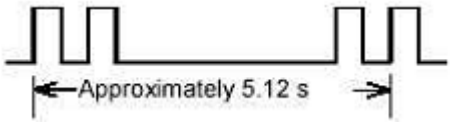
1) Error that recovers automatically

Automatically Recoverable Error

| Error | Description | LED flashing pattern | Recovery |
|---|---|---|---|
| Print head over temperature error | The temperature of the print head is over 57℃ |  | Recovers automatically when the print head cools below 45℃. |

2) Error can be recovered

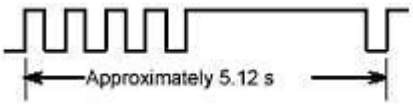
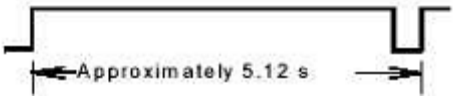
Error can be recovered

| Error | Description | LED flashing pattern | Recovery |
|---|---|---|---|
| The cover open error | The printer can't work because of the print head opened. |  | When installing cover on the print head, then restoring by DLR ENQ 1 or DLE ENQ 2 |
| Auto-cutter error | Abnormality in the auto-cutter. |  | If occur paper jams, recovers by DLE ENQ 1 or DLE ENQ 2 when the jammed paper be exclusion. |
| BM sensor test error | Can't test BM even the roll paper BM printing correct |  | Installed the correct BM paper again, then restoring by DLE ENQ 1 or DLE ENQ 2 |

3) Error can't be recovered

Error can't be recovered

| Error | Description | LED flashing pattern | Recovery |
|---|---|---|---|
| CPU executin | CPU execute | | Can't recover |

| | | | |
|---|---|---|---|
| g error | s one error address or not connects I/F board |  | y |
| Memory or dot list read error | Tests an error when executing read checkout |  | Can’ t recovery |
| High voltage error | The voltage provides too low |  | Can’ t recovery |
| Low voltage error | The printer not linkers well or inner linker error |  | Can’ t recovery |
| CPU linker error | |  | Can’ t recovery |

Note: When occurring any one of the above error, please turns the power off as soon as possible.

### 3.6.2 Operation when an error is detected

The printer executes the following operations when detecting an error:

. Stops all mechanical operations.

. Enter into “BUSY” state(DIP switch, when the memory switch 1-3 is off).

. Flashes the error LED.

### 3.6.3 Data reception error

If any of the following data reception errors occur during serial interface communication, the printer prints “?” or ignores the data, according to the setting of Memory Switch 1.

.Checkout error

.Framing error

.Overrun error

## 3.7 Status test

### 3.7.1 Paper status test

The printer has the following two paper sensors:

1) Roll paper end sensor
   This sensor tests whether there are paper in print head. When the printer detects the paper end, stops printing.
2) Roll paper near-end sensor
   This sensor tests whether the paper is near-end.
   When the roll paper narrowed to some extent, the roll paper-end detector tests “paper near-end” signal, paper-end detector (“no paper” light) turns on. If this sensor to be used (use ESC c 4 command), when printer test paper near-end signal, stop printing.

   Notes: • Installed the new roll paper and covered the bar, the printer will print again.
   • The paper near-end sensor set by user.

### 3.7.2 Print head bar status test

Print head bar sensor tests the open/close state of print head bar, there are installing rubber stick which takes to feed paper on the bar. On the waiting conditions, when the bar sensor tests that the bar has raised, the printer enters into offline conditions, the printer recovered automatically after closing the bar.

## 3.8 Notes on the BM function

It could take the printing paper which prints BM and to realize the accurate orientation printing function.

The BM function which needs to move the DIP SW1-1 to ON, then resets the printer, Refer to section 3.5.1.2.

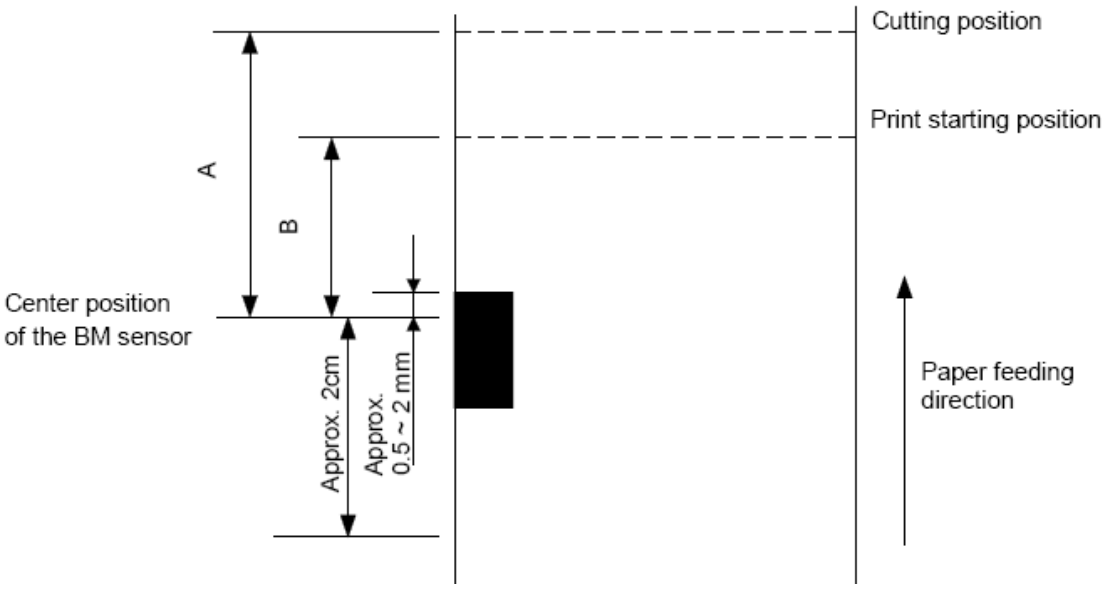
The following graphic shows the relative connection of black mark testing position, cutting paper position and printing starting position. (The distance which from the BM testing sensor of M-T530/T540 printing framework to print head is about 17.6 ㎜, to cutter blade 33.6 ㎜, these framework are fixed.)

The connection of them could be understand like this: when carries paper to the BM which under the BM sensor(meanwhile the printer detects BM), the cutter is front of the BM which about 33.6 ㎜, At this moment, the print head is front of the BM which about 17.6 ㎜, as the following graphic.

As the graphic, when the BM testing sensor tests the BM, the BM paper

passes the testing sensor about 2 ㎜. In order to repeat testing error, the printer doesn't test the BM at the following about 2 ㎝.

The default printing starting position and cutting paper position are the opposite position as the following graphic, the user could adjust by GS ( F command.




## 3.9 Page Mode

### 3.9.1 Introduction

The printer has two operation modes (only on the conditions of selecting roll paper as the paper source): normal mode and page mode. Under the normal mode, each time the printer receives the data or begins to print and feeds paper after feeding paper command. Under the page mode, all the printing data and feeding paper commands received by printer will be dealt with and stored in a special memory, the printer does not to do any operation. When received ESC FF or FF commands, all the stored data will be printed.

**For example:** When received data "ABCDEF"<LF> under the normal mode, the printer prints the characters "ABCDEF" and feeds the paper by one line. Under the page mode, "ABCDEF" be wrote to a special printing data area in the memory, at the same time the printing position descend one line of the next printing data in data area. ESC L command makes the printer to the page mode, all the following data and commands dealt with according to the page mode. Executed ESC FF command which could print all the received data, but executes FF command which may lead the printer to return to the normal mode after printing all the data. Executes ESC S command which will lead

the printer to return to the normal mode directly but not to print the received data under the page mode , these data will be deleted from the memory.

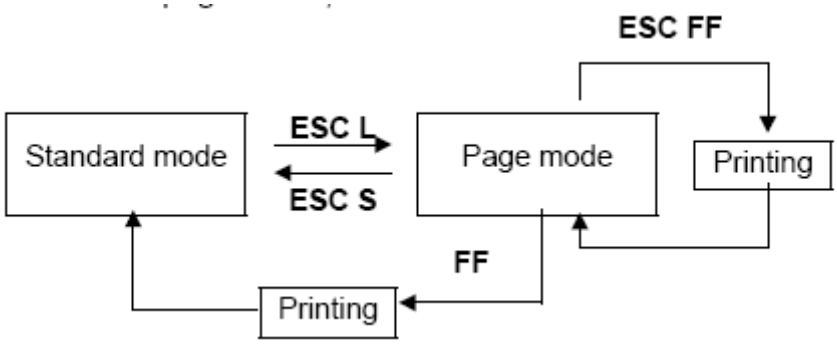



Figure 3.9.1 Transform between normal mode and page mode

### 3.9.2 The setting value under the normal mode and page mode

1) The commands and parameters are the same under the normal mode and page mode. But ESC SP, ESC 2, ESC 3 commands have the different setting values under the normal mode and page mode , It will be recorded respectively under the different mode.
2) Under the normal mode, If takes the roll paper which the width is 82.5 mm, the max printing width of printing dot image is 640 dots; But the same roll paper under the page mode could be print 664 dots at the direction of y(paper feeding direction). (The above needed to take the following setting: the y direction printable area is 664 dots set by ESC W command, the value of the printing direction parameters n set by ESC T is 1 or 3.)

# Chapter IV Printing Control Commands

## 4.1Command Table

| Command | Name | Command Type | Standard Mode | Page Mode | |
|---|---|---|---|---|---|
| | | Execute command | Set Command | | |
| HT | Horizontal tab | ○ | | ○ | ○ |
| LF | Print and line feed | ○ | | ○ | ○ |
| FF | Print and turn to standard mode(under the page mode) | ○ | | Ignored | ○ |
| CR | Print and carriage return | ○ | | ○ | ○ |
| CAN | Cancel printing data under the page mode | ○ | | Ignored | ○ |
| DLE EOT | Real-time status transmission | ○ | | ○ | ○ |
| DLE ENQ | Real-time request to printer | ○ | | ○ | ○ |
| ESC FF | Print data under the page mode | ○ | | Ignored | ○ |
| ESC SP | Set right-side character spacing | | ○ | ○ | ○ |
| ESC $ | Set absolute printing position | ○ | | ○ | ○ |
| ESC % | Select/cancel user-defined character set | | ○ | ○ | ○ |
| ESC & | Define user-defined characters | | ○ | ○ | ○ |
| ESC * | Select bit-image mode | ○ | | ○ | ○ |
| ESC - | Turn underline mode on/off | | ○ | ○ | ○ |
| ESC 2 | Select default line spacing | | ○ | ○ | ○ |

| | | | | | |
|---|---|---|---|---|---|
| ESC 3 | Set line spacing | | ○ | ○ | ○ |
| ESC ? | Cancel user-defined character | | ○ | ○ | ○ |
| ESC @ | Initialize printer | ○ | ○ | ○ | ○ |
| ESC D | Set horizontal tab positions | | ○ | ○ | ○ |
| ESC E | Turn emphasized mode on/off | | ○ | ○ | ○ |
| ESC G | Turn double-strike mode on/off | | ○ | ○ | ○ |
| ESC i | Full cut | ○ | | ○ | ○ |
| ESC J | Feed paper and printing | ○ | | ○ | ○ |
| ESC L | Select page mode | ○ | | (○) | Ignored |
| ESC m | Half cut | ○ | | ○ | ○ |
| ESC M | Select character type | | | ○ | ○ |
| ESC R | Select an international character set | | ○ | ○ | ○ |
| ESC S | Select standard mode | ○ | | Ignored | ○ |
| ESC T | Select printing direction under the page mode | | ○ | ▲ | ○ |
| ESC V | Turn clockwise 90° revolved on/off | | ○ | ○ | ▲ |
| ESC W | Set printable area under the page mode | | ○ | ▲ | ○ |
| ESC \ | Set relative printing position | ○ | | ○ | ○ |
| ESC a | Select justification | | ○ | (○) | ○ |
| ESC c 3 | Select paper sensor to output paper-end signal | | ○ | ○ | ○ |
| ESC c 4 | Select paper sensor(s) to stop printing | | ○ | ○ | ○ |
| ESC c 5 | Enable/disable panel buttons | | ○ | ○ | ○ |
| ESC d | Printing and feeding n lines | ○ | | ○ | ○ |
| ESC t | Select character code table | | ○ | ○ | ○ |
| ESC { | Turn upside-down printing mode on/off | | ○ | (○) | ○ |
| FS p | Print NV bit image | ○ | | ○ | ○ |
| FS q | Define NV bit image | | ○ | (○) | ○ |

| | | | | | |
|---|---|---|---|---|---|
| GS FF | Carries the BM printing paper to the printing starting position | ○ | | ○ | ○ |
| GS ! | Set character size | | ○ | ○ | ○ |
| GS $ | Set absolute vertical printing position under the page mode | ○ | | Ignored | ○ |
| GS * | Define download bit image | | ○ | ○ | ○ |
| GS ( A | Execute test print | ○ | | ○ | Ignored |
| GS ( E | User setting command | ○ | ○ | (○) | Disabled |
| GS ( F | Set adjustable value | | ○ | ○ | ○ |
| GS ( K | Select printing control mode | | ○ | ○ | ○ |
| GS ( M | User-defined printer control value | ○ | | (○) | ▲ |
| GS / | Print download bit image | ○ | | ● | ○ |
| GS : | Begin/finish macro definition | ○ | ○ | ○ | ○ |
| GS B | Turn opposite blank printing mode on/off | | ○ | ○ | ○ |
| GS C 0 | Set count value printing mode | | ○ | ○ | ○ |
| GS C 1 | Select count mode(A) | | ○ | ○ | ○ |
| GS C 2 | Set count value | | ○ | ○ | ○ |
| GS C ; | Select count mode(B) | | ○ | ○ | ○ |
| GS H | Select HRI character printing position | | ○ | ○ | ○ |
| GS I | Transmit printer ID | ○ | | ○ | ○ |
| GS L | Set left side blank measure | | ○ | (○) | ○ |
| GS T | Set printing position to the start printing line | ○ | | ○ | Ignored |
| GS V | Select cutting mode and cut paper | ○ | | (○) | ○ |
| GS W | Set printable width | | ○ | (○) | ▲ |
| GS \ | Set relative vertical printing position under the page mode | ○ | | Ignored | ○ |
| GS ^ | Operate macro | ○ | | ○ | ○ |
| GS a | Enable/disable automatic status back(ASB) | ○ | ○ | ○ | ○ |
| GS b | Turn level and smooth on | | ○ | ○ | ○ |

| | | | | | |
|---|---|---|---|---|---|
| | /off | | | | |
| GS c | Printing count value | ○ | | ○ | ○ |
| GS f | Select HRI character type | | ○ | ○ | ○ |
| GS h | Set bar code height | | ○ | ○ | ○ |
| GS k | Print bar code | ○ | | ● | ○ |
| GS r | Transmit status | ○ | | ○ | ○ |
| GS v 0 | Print grating bit image | ○ | | ● | ○ |
| GS w | Set bar code width | | ○ | ○ | |

Chinese commands table

| Command | Name | Command Type | | Standard Mode | Page Mode |
|---|---|---|---|---|---|
| | | Execute Command | Set Command | | |
| FS ! | Set print mode(s) for Chinese characters | | ○ | ○ | ○ |
| FS & | Set Chinese mode | | ○ | ○ | ○ |
| FS - | Turn underline mode on/off for Chinese characters | | ○ | ○ | ○ |
| FS . | Cancel Chinese character mode | | ○ | ○ | ○ |
| FS 2 | Define user-defined Chinese characters | | ○ | ○ | ○ |
| FS C | Select Chinese character code system | | ○ | ○ | ○ |
| FS S | Set left-and right-side Chinese character spacing | | ○ | ○ | ○ |
| FS W | Turn quadruple size mode on/off for Chinese characters | | ○ | ○ | ○ |

Command type

**Execute command:** The printer executes this command, and changes the command no affects the next data.

**Set command:** The printer set through relative symbol, these set will affect the next data.

**Standard mode**

○: Enabled

(○): This command only affects when the command stand at the beginning of a line.

●: Only affects when there are no data in the buffer area.

**Page mode**

○: Enable

▲: Only could set data value.

Disabled: Parameter dealt with as the printable data.

Ignored: Ignored all the command codes, exclude parameters, and not executes any operation.

## 4.2 Command Introduction

### 4.2.1 Command notation

| | |
|---|---|
| 〔Name〕 | The name of the command. |
| 〔Format〕 | The code sequence. |
| | ( )k indicates the contents of the ( )should be repeated k times. |
| 〔Range〕 | Gives the allowable ranges. |
| 〔Description〕 | Describes the function of the command. |
| 〔Specification〕 | Specification describe the use of command. |
| 〔Notes〕 | Provides important information on setting and using the printer command, if necessary. |
| 〔Short data〕 | If the command with the parameter, gives the parameter short data. |
| 〔Reference〕 | Gives the relevant reference. |

The data signed by <>A, is hexadecimal.

The data signed by<>B, is binary system.

### 4.2.2 Explanation of Terms

(1) Receive buffer

The receive buffer is used to store data from the host. All receive data is stored in this buffer and processed in the order receiving. Then solves by sequence.

(2) Print buffer

The print buffer is used to store image data for printing.

(3) Print full-buffer

The status indicates that the print buffer is full. When the print buffer is full, If appears new print data, the data in the print buffer area will be printed, and executed the operation of changing a new line. The operation same as the LF command.

(4) Line starting point

Satisfied the following conditions defined starting point.

- There are no printing data in the print buffer area.
- Not passes the printing position which designated by ESC $ or ESC \ command.

(5) The area could be printed

At the specification of printer, it can print the max area. The printable area about this printer as follows:

① Under the standard mode, the length of the horizontal direction:

82.5㎜ Paper width type: about 80㎜ {640/203.2inch}

79.5㎜ Paper width type: about 72㎜ {576/203.2inch}

60 ㎜ Paper width type: about 56 ㎜{448/203.2inch}

58 ㎜ Paper width type: about 54㎜ {432/203.2inch}

② Under the page mode, the length of the horizontal direction:

82.5 ㎜ Paper width type: about 80㎜ {640/203.2inch}

79.5 ㎜ Paper width type: about 72㎜ {576/203.2inch}

60 ㎜ Paper width type: about 56㎜ {448/203.2inch}

58 ㎜ Paper width type: about 54㎜ {432/203.2inch}

③ Under the page mode, the length of the vertical direction:

82.5 ㎜ Paper width type: about 83㎜ {664/203.2inch}

79.5 ㎜ Paper width type: about 92㎜ {738/203.2inch}

60 ㎜ Paper width type: about 119 ㎜ {949/203.2inch}

58 ㎜ Paper width type: about 123㎜ {984/203.2inch}

(6) Printable area

The printable range is set by command , the printable area must be not more than the area which could be printed.

(7) Ignored

All the command contains parameter on this condition, be read, then be discarded, but not takes any operation.

(8) Inch

A unit of length. One inch is 25.4㎜

(9) MSB

The highest validity

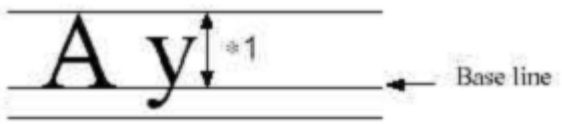
(10)LSB

The lowest validity

(11) Baseline

The standard position of the character data which stored in the printing

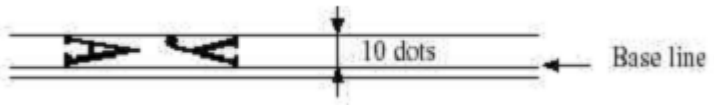
buffer . The normal character position under the standard mode and page mode as the following graphics:




*

When the character selected A, the width is 21 dots.
When the character selected B, the width is 16 dots.

Revolve the character under the standard mode: (only when the character A selected)




## 4.3 Command Specification

### HT

[Name] Horizontal tab
[Format] ASCII HT
Hex 09
Decimal 9
[Description] The printing position moved to the next position.
[Specification] .This command will be ignored, if haven't set the next horizontal anchor point position.
.If the next horizontal anchor point out of the printable area , moves the printing position to "printing width +1".
.The horizontal anchor point position sets by ESC D command.
.This command received when the printing position located on "printable area width +1", the printer executes the full printing buffer area and prints the current line, and deals with the anchor position at the beginning of the next line.
[Reference] ESC D

### LF

[Name] Print and line feed
[Format] ASCII LF
Hex 0A
Decimal 10
[Description] Prints the data in the buffer and feeds one line, based on

the current line spacing.

[Notes] The printing position set at the beginning position of the line by this order.

[Reference] ESC2, ESC3

## FF

[Name] ① Print and turn to standard mode (under the page mode)
② Print and carry BM paper to the printing starting position

**① When selects the page mode:**

[Description] Prints all the data in the printing buffer area and turns to the normal mode.

[Notes] .This command only affects under the page mode.
.The data in the printing buffer deleted after printing.
.Resets the printable area which sets by ESC W to default set.
.This command sets the printing position to the line starting position.

[Reference] ESC FF, ESC L, ESC S

**② When BM sensor affects:**

[Description] Prints the data in the printing buffer area and carries the BM paper to the printing starting position.

[Notes] .This command only enables when the BM sensor setting is effective by DIP SW1-1.
.This command sets that the printing position is the line starting position.
.If executing this command at the printing starting position which contains BM printing paper, the printer feeds the BM printing paper to the next printing starting position.

[Reference] GS ( F, GS FF, 3.5.1.2, DIP switch 1

## CR

[Name] Print and carriage return

[Format] ASCII CR
Hex 0D
Decimal 13

[Description] When automatic line feed is enabled, functions the same as LF. When automatic line feed is disabled, this command will be ignored.

[Specification] .For serial interface mode, the function of feeding paper will be ignored.
.For parallel interface mode , sets this command through storage switch 1-5.
.The starting position sets to the printing starting position.

[Reference] LF

## CAN

[Name] Cancel printing data under the page mode
[Format] ASCII CAN
Hex 18
Decimal 24
[Description] Under the page mode, deletes all the printing data in the current printable area.
[Specification] .Enable this command only under the page mode.
.The data in the designated printable area to be deleted.
[Reference] ESC L, ESC W

## DLE EOT n

[Name] Transmit real-time status
[Format] ASCII DLE EOT n
Hex 10 04 n
Decimal 16 4 n
[Range] 1≤n≤4
[Description] Takes real-time status. Parameter n is used to designate the transmission printable area, the definition as follows:
n=1: Transmits printer status.
n=2: Transmits offline cause status.
n=3: Transmits error cause status.
n=4: Transmits roll paper sensor status.
[Specification] • Transmit the current status, each byte per status.
• Printer couldn't be sure whether the host can receive data when transmitting status.
• Printer starts to execute when received this command.
• Under the serial interface pattern, If the printer is offline, the received buffer is full, or the error occurred, also can execute this command.
. Under the parallel interface pattern, when the printer is busy, can't execute this command. When the printer is offline, the Memory Switch 1-3 is on , the printer can't enter into BUSY condition.
. When return (ASB) through GS a command enabled conditions, should be distinguished the condition sent by DLE EOT command with ASB status. (Refer to appendix C, the identified sending conditions.)
• If the external equipment command not be selected by printer, the command selected by ESC= also affects.

[Notes] • Whenever received <10>H<04>H<n>(1≤n≤4) data sequence, the printer performs this command.

**For example:**

ESC * m nL nH d1...dK, d1=<10>H, d3=<01>H

• Do not embed this command within another command.

**For example:**

If want to transmit ESC 3 n to printer, before transmitting n, DTR(for the host is DSR) is MARK, So, before n received, occurs that DLE EOT 3 interrupted, the code<10>H of DLE EOT 3 will be dealt with as the code<10> of ESC 3.

**n=1 Printer status**

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | No used. Off selected |
| 1 | On | 02 | 2 | No used. On selected |
| 2 | On | 04 | 4 | No used. On selected |
| 3 | Off | 00 | 0 | Online |
| | On | 08 | 8 | Offline |
| 4 | On | 10 | 16 | No used. On selected |
| 5 | Off | 00 | 0 | No used. Off selected |
| 6 | Off | 00 | 0 | No used. Off selected |
| 7 | Off | 00 | 0 | No used. Off selected |

**Note:** bit 5: the online error is the process of the printer executes macro command period and self-test period which waited push buttons.

**n=2: Offline cause status**

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | No used. Off selected |
| 1 | On | 02 | 2 | No used. On selected |
| 2 | Off | 00 | 0 | The print head lever is closed |
| | On | 04 | 4 | The print head lever is opened |
| 3 | Off | 00 | 0 | No used. Off selected |
| 4 | On | 10 | 16 | No used. On selected |
| 5 | Off | 00 | 0 | No used. Off selected |
| 6 | Off | 00 | 0 | No used. Off selected |
| 7 | Off | 00 | 0 | No used. Off selected |

**Bit 5:** When the without paper detector test that the paper have used and stopped printing, it is on.

**n=3: Error cause status**

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | No used. Off selected |
| 1 | On | 02 | 2 | No used. On selected |
| 2 | Off | 00 | 0 | No used. Off selected |
| 3 | Off | 00 | 0 | No used. Off selected |

| | | | | |
|---|---|---|---|---|
| 4 | On | 10 | 16 | No used. On selected |
| 5 | Off | 00 | 0 | No used. Off selected |
| 6 | Off | 00 | 0 | No used. Off selected |
| 7 | Off | 00 | 0 | No used. Off selected |

**Bit 2:** The printer put the bar raised during printing to mechanical error.

**Bit 6:** If the temperature of the print head is over during printing, the bit 6 beset on , until the temperature declined effectively or the bar during printing opened .

**n=4: Roll paper sensor status**

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | No used. Off selected |
| 1 | On | 02 | 2 | No used. On selected |
| 2,3 | Off | 00 | 0 | Roll paper near-end sensor: paper adequate |
| | On | 0C | 12 | Roll paper near-end sensor: paper near end |
| 4 | On | 10 | 16 | No used. On selected |
| 5,6 | Off | 00 | 0 | Roll paper near-end sensor: with paper |
| | On | 60 | 96 | Roll paper near-end sensor: paper near end |
| 7 | Off | 00 | 0 | No used. Off selected |

[Reference] DLE ENQ, GS a, GS r, Appendix C

## DLE ENQ n

[Name] Send real-time request to printer

[Format]

| | | | |
|---|---|---|---|
| ASCII | DLE | ENQ | n |
| Hex | 10 | 05 | n |
| Decimal | 16 | 5 | n |

[Range] n=2

[Description] .Responds to a request from the host computer. n designates the following requests.

| n | Request |
|---|---|
| 1 | Restart printing from the error recovered to appear error. |
| 2 | Recovers from an error after clearing receive and print buffers. |

[Specification] .Only on the state of auto-cutter which occurs error, or the error happened to the print head bar, this command affects.

.The printer deals with the data when receiving this command.
.Even if the printer is offline, the printing buffer is full or the serial interface mode is error, always executing this command.
.Under the parallel interface mode, this command can't be executed when the print is busy. When Memory Switch 1-3 is ON, even the printer is offline, the printer not be set BUSY.
.DLE ENQ 2 enabled to printer after clearing received buffer and prints the data in the buffer, which stored from the error conditions. The printer reserves the set (For example ESC 1, ESC 3 and so on) which is effective when the error occurred. Could use this command and ESC @ initialize the printer completely. This command only effects that the error could be stored, and except for the print head temperature error.

[Note] .Whenever received <10>H<05>H<n>(1≤n≤2) data sequence, will be on sending status.

For example:

ESC * m nL nH dK,d1=<10>H, d2=<05>H, d3=<01>H

.The command date which contains two or more bytes, can't use this command.

For example:

If want to send the ESC 3 n to the printer, before sending the n, DTR(DSR for the host computer) will be changed to MARK, So, before receiving the n, DLE ENQ 2 will be interrupted. The code<10>H of DLE ENQ 2 will be dealt with as the code <10>H of ESC 3.

[Reference] DLE EOT

## ESC FF

[Name] Print data under the page mode

[Format]

| ASCII | ESC | FF |
|---|---|---|
| Hex | 1B | 0C |
| Decimal | 27 | 12 |

[Description] Under the page mode, concentrates all data in the printing buffer.

[Specification] .This command only affects under the page mode.
.After printing, the printer not clear the data ESC T and the setting value of ESC W in the printing buffer and the position of character data in buffer area.

[Reference] FF, ESC L, ESC S

## ESC SP n

[Name] Set right-side character spacing

[Format] ASCII ESC SP n
Hex 1B 20 n
Decimal 27 32 n
[Range] 0≤n≤255
[Description] Set right-side character spacing is （n×0.125㎜）.
[Specification] .The right-side character spacing is two times than the the normal mode for the double width mode. When the characters are broadened n times, the right-side character spacing is n times than the normal mode.
.This command no affects the Chinese character settings.
.This command separately sets the right-side character spacing under the normal mode and the page mode.
[Default] n=0

## ESC ! n

[Name] Select print mode(s)
[Format] ASCII ESC ! n
Hex 1B 21 n
Decimal 27 33 n
[Range] 0≤n≤255
[Description] Selects the printing mode through designating the value of n. the definition of parameter n as follows:

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Character type A(12 × 24). |
| | On | 01 | 1 | Character type B(9×17). |
| 1 | --- | --- | --- | Undefined |
| 2 | --- | --- | --- | Undefined |
| 3 | Off | | 0 | Emphasized mode not selected. |
| | On | | 8 | Emphasized mode selected. |
| 4 | Off | | 0 | Double-height mode not selected. |
| | On | | 16 | Double-height mode selected. |
| 5 | Off | | 0 | Double=width mode not selected. |
| | On | | 32 | Double-width mode selected. |
| 6 | --- | --- | --- | Undefined |

| | | | | |
|---|---|---|---|---|
| 7 | Off | | 0 | Underline mode not selected. |
| | On | | 128 | Underline mode selected. |

[Specification] .When select double-height and double-width mode at the same time , then printing four times size character.
.The printer could add the underline to all characters, But couldn’ t add the underline to the blank which causes by HT command or the character of revolving 90° according to wise clock direction.
.The thickness of the underline set by ESC -, it is not relevant to the characters.
. When some of double-height or more height characters in a line, all the characters in a line will be stayed at the same level along baseline.
. ESC M could be set the font type of characters. At last the set of the received command is effective.
. ESC E could be set or cancel the emphasize mode, At last the set of the received command is effective.
. GS ! could be set the size of character. At last the set of the received command is effective.
. The emphasize mode is effective for the English characters and Chinese. The entire printing modes except for emphasize mode only effects for the English character.

[Default] n=0

[Reference] ESC -, ESC E, GS !

## ESC $ nL nH

[Name] Set absolute printing position

[Format

| | | | | |
|---|---|---|---|---|
| ASCII | ESC | $ | nL | nH |
| Hex | 1B | 24 | nL | nH |
| Decimal | 27 | 36 | nL | nH |

[Range] 0≤nL≤255
0≤nH≤255

[Description] Set the spacing from the beginning of a line to the position of the printing character which will be printed.
. The spacing from the beginning of a line to the printing position is ｛(nL+nH×256)×0.125㎜｝.

[Specification] .Designated the set which out of the printable area that is neglected.
.Under the normal mode , uses the horizontal unit(x).
.Under the page mode, with the difference of the printable area starting position that the horizontal or vertical

moving unit is different, the specification as follows:

① When set the starting position to the printable area' s up-left or down-right by ESC T , takes the horizontal moving unit(x).

② When set the starting position to the printable area' s up-right or down-left , takes the vertical moving unit(y).

[Reference] ESC \, GS $, GS \

## ESC % n

[Name] Select/cancel user-defined character set

[Format]

| ASCII | ESC | % | n |
|---|---|---|---|
| Hex | 1B | 25 | n |
| Decimal | 27 | 37 | n |

[Range] 0≤n≤255

[Description] Selects/cancels user-defined character set

. When the LSB of n is 0, the user-defined character set is canceled.

. When the LSB of n is 1, the user-defined character set is selected.

[Specification] .When canceling the user-defined character set, selects inner character set automatically.

. n only affects to the LSB.

[Default] n=0

[Reference] ESC &, ESC ?

## ESC & y c1 c2 〔x1 d1...d(y×x1)〕...〔xk d1...d(y×x)〕

[Name] Define user-defined characters

[Format]

| ASCII | ESC & y c1 c2 〔x1 d1...d(y×x1)〕...〔xk d1...d(y×x)〕 |
|---|---|
| Hex | 1B 26 y c1 c2 〔x1 d1...d(y×x1)〕...〔xk d1...d(y×x)〕 |
| Decimal | 27 38 y c1 c2 〔x1 d1...d(y×x1)〕...〔xk d1...d(y×x)〕 |

[Range] y=3

32≤c1≤c2≤126

0≤x≤12 (when Font A(12×24) is selected)

0≤x≤9 (when Font B(9×17) is selected)

0≤d1...d(y×xk) ≤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.

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

[Specification] .The scale of defined character code: the ASCII code(95 characters) from <20> to <7E>H.

.Could define the continued character code of several characters. When only needs one character, the c1=c2.

.d is the dot data of character. Dot mode is beginning from the left in the horizontal direction. The right left dot is bland.

.The data defined that the user-defined character is (y×x) bytes.

.Set the relevant bit of the printing dot is 1 or the not printing dot is 0.

.This command could define the different user-defined character mode for each character type. When executing the command, the down-load bit will be cleared.

.At the following states, the user-defined character will be cleared.

① Executes ESC @.

② Executes GS *.

③ Executes ESC ? .

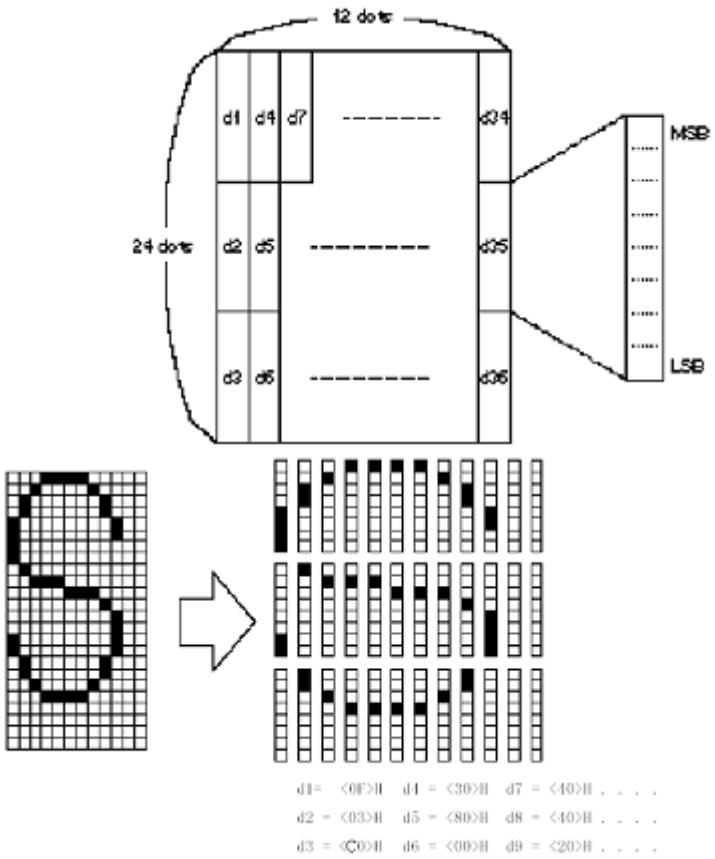
④ Resets the printer or turns off the power.

.When defining the user-defined character at the character type(9×17), only the third highest bit is effective in the vertical direction.

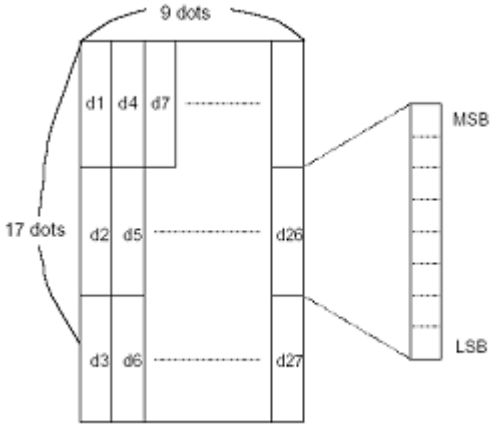
[Default] Inner character set.

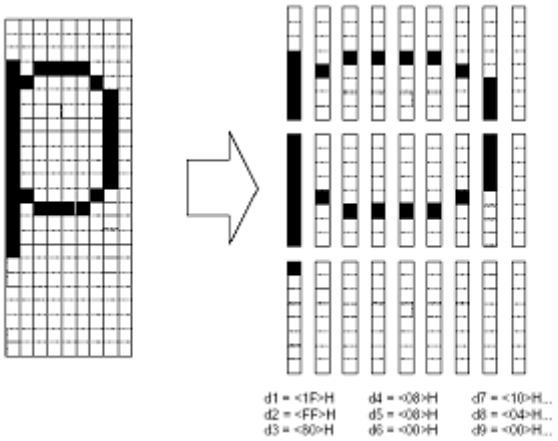
[Reference] ESC %, ESC ?

[For example] **.When setting the character type A(12×24).**




.When setting the character type B(9×17).






## 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
0≤nL≤255
0≤nH≤3
0≤d≤255

[Description] Selects bit-image mode to use m, the dot of bit-image specified by nL and nH, as the following table:

| m | Mode | Vertical Direction | | Horizontal Direction | |
|---|---|---|---|---|---|
| | | Dot Counts | Dot Density | Dot Density | Data Number(K) |
| 0 | 8-dot single density | 8 | 67.7dpi | 101.6 dpi | nL+nH×256 |
| 1 | 8-dot double density | 8 | 67.7 dpi | 203.2 dpi | nL+nH×256 |
| 32 | 24-dot single density | 24 | 203.2 dpi | 101.6 dpi | (nL+nH×256) × 3 |
| 33 | 24-dot double density | 24 | 203.2 dpi | 203.2 dpi | (nL+nH×256) × 3 |

**Dpi: per 25.4㎜ {1 inch} print dot count**

[Notes] • If the data of m over the specified range, then nL and the

following data dealt with as the general data.

- nL and nH specifies the dots of the horizontal direction up bit image. Through nL+nH×256 and counts to dots.
- If the bit image date input overs one line which the dots be printed, then the cover data will be neglected.
- d indicates bit image data. 1 sets by the relevance bit and prints one of dots, or sets 0 and not prints one of dots.

.If the printing scale width which sets by GS L and GS W is less than the requisite width which the data sends by ESC * command, so executes the following operation for the error line(but the printing can't over the largest printing scale):

① The width of the printable area enlarges to right and adapts to the data amount.

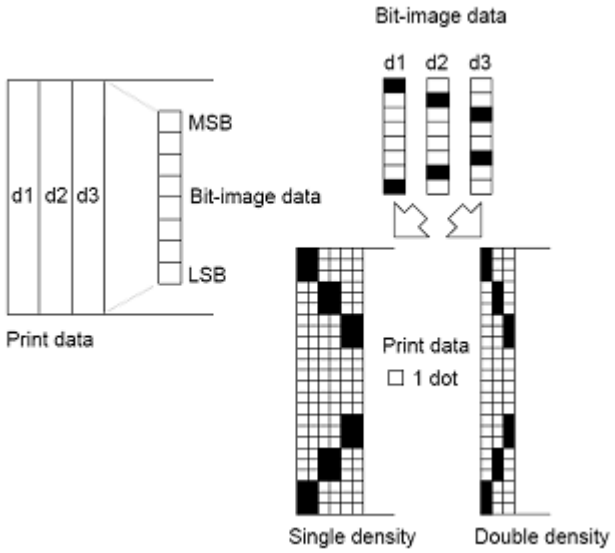
② If the step ① can't provide enough width for data, then the left will be decreased and adapted to data. For each bit data at the single density mode (m=1, 32), The printer prints two dots: for each bit data at the single density mode (m=1,33), the printer prints one bit. When calculating the data account in a line, all these needs to be considered.

.After printing one bit-image, the printer returns to the normal data dealing mode.

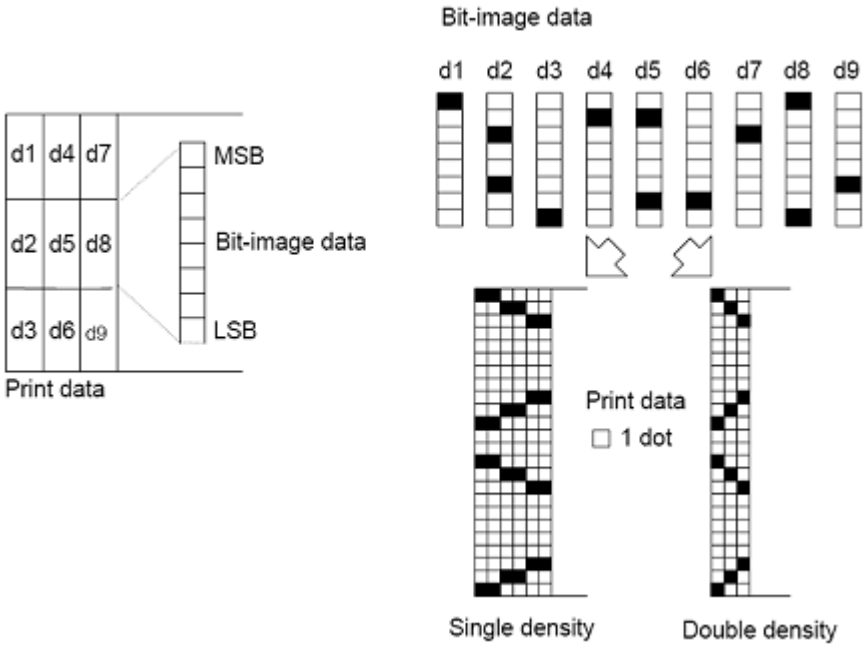
.This command not be affected by the printing mode (bold, repetition, underline, character size, or reverse blank printing), unless the reversed printing mode.

- The following graphic described the relations between bit image data and the dot which be printed.

**When the 8-dot bit image be selected:**




When the 24-dot bit image be selected:




## ESC – n

| | | | | |
|---|---|---|---|---|
| [Name] | Turn underline mode on/off | | | |
| [Format] | ASCII | ESC | - | n |
| | Hex | 1B | 2D | n |
| | Decimal | 27 | 45 | n |

[Range] 0≤n≤2, 48≤n≤50

[Description] On the basis of the following value, turns underline mode on/off:

| n | Function |
|---|---|
| 0, 48 | Turn underline off |
| 1, 49 | Turn underline on(one dot is boldfaced) |
| 2,50 | Turn underline on(two dots is boldfaced) |

[Notes] .The printer could print the underline for all characters (contains right character spacing), but except for the blank which sets by HT.

.The printer can't print the underline for the characters which revolved 90° according to clockwise and reversing blank characters.

.Turns underline off through setting that the data of n is 0 or 48, the next data can't be printed the underline, and before turning the underline mode on, the degree of boldfaced not be changed, the boldfaced default underline is 1 dot.

.Change the character size not affects the current underline boldfaced degree.

.Use ESC ! also could turn underline on/off. But needs to notice, the final received command is effective.

[Default] n=o

[Reference] ESC !

## ESC 2

[Name] Select the line spacing

[Format] ASCII ESC 2

Hex 1B 32

Decimal 27 50

[Description] Selects the line spacing 3.75㎜(30×0.125㎜).

[Note] .Line spacing could be set under the normal mode and the page mode.

[Reference] ESC 3

## ESC 3 n

[Name] Set the line spacing

[Format] ASCII ESC 3 n

Hex 1B 33 n

Decimal 27 51 n

[Range] 0≤n≤255

[Description] Sets the line spacing to 〔n×0.125㎜〕.
[Notes] .Line spacing could be set under the normal mode and the page mode.

.Under the normal mode, uses the vertical moving unit(y).

.Under the page mode, according to the beginning position of printable area, the function of this command as follows:

① When sets the starting position to the printable area's up-left or down-right by ESC T, uses the horizontal moving unit(y).

② When sets the starting position to the printable area's up-right or down-left, uses the vertical moving unit(x).

[Short data] n=30
[Reference] ESC 2

## ESC ? n

[Name] Cancel user-defined characters
[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | ? | n |
| Hex | 1B | 3F | n |
| Decimal | 27 | 63 | n |

[Range] 32≤n≤126
[Description] Cancels the user-defined characters

Notes: .This command stops to use the mode which defined by using the character code, the character code designated by n. After canceling the user-defined character, prints according to the inner character relevant mode.

.Selects the character mode by using ESC ! , This command deleted the mode which defined by designating code.

.If a user-defined character not be defined, the printer ignored this command.

[Reference] ESC &, ESC %

## 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 modes to the modes that affects when the power turned on.
[Notes] • Not checks the DIP switch and the memory switch settings again.
• Not clears the data in the received buffer area.
.Not clears the macro definition.

## ESC D n1...nk NUL

[Name] Set horizontal tab positions

[Format]

| ASCII | ESC | D | n1...nk | NUL |
|---|---|---|---|---|
| Hex | 1B | 44 | n1...nk | 00 |
| Decimal | 27 | 68 | n1...nk | 0 |

[Range] 1≤n≤255
0≤k≤32

[Description]
.Sets the horizontal tab positions.
.n specifies the number of digits from the setting position to the left edge of the printing area.
.k is used to indicate the number of bytes set for the horizontal tab position.

[Notes]
.The horizontal position stored as a value, the value is (the character width×n) which be tested from the beginning of the line. The width of the character contains the character right-side spacing, and the double width character to be dealt with as the double width of normal character.
.This command deleted the advanced setting horizontal position.
.When setting n=8, the printing position be moved to ninth through sending HT.
.Could be set to 32 position (k=32). The data over 32 positions which to be dealt with as the normal data.
.Transmits (n)k according to raise sequence and set a NUL code 0 on the end.
.ESC D NUL cancels all of the horizontal position.
.Even the character width changed, the advanced specified horizontal position won't be changed.
.For normal and page mode, the character width be memorized.

[Default] Default position is the 8 character spacing (for example9,17,25...) of the type A(12×24).

[Reference] HT

## ESC E n

[Name] Turn emphasized mode on/off

[Format]

| ASCII | ESC | E | n |
|---|---|---|---|
| Hex | 1B | 45 | n |
| Decimal | 27 | 69 | n |

[Range] 0≤n≤255

[Description] Turn emphasized mode on/off
When the LSB of n is 0, emphasized mode is turned off.
When the LSB of n is 1, emphasized mode is turned on.

[Notes] .Only the LSB of n enabled to use.
.This command and ESC ! turns emphasized mode on/off at the same way. When this command and ESC ! to be used at the same time, it needs to be careful.
[Default] n=0
[Reference] ESC !

## ESC G n

[Name] Turn double-strike mode on/off
[Format] ASCII ESC G n
Hex 1B 47 n
Decimal 27 71 n
[Range] 0≤n≤255
[Description] Turn double-strike mode on/off
.When the LSB of n is 0, double-strike mode is turned off.
.When the LSB of n is 1, double-strike mode is turned on.
[Notes] . Only the LSB of n enabled to use.
. It's the same that the printer outputted in double-strike mode and boldfaced mode.
[Default] n=0
[Reference] ESC E

## ESC J n

[Name] Print and feed paper
[Format] ASCII ESC J n
Hex 1B 4A n
Decimal 27 74 n
[Range] 0≤n≤255
[Description] Prints the data in the print buffer and feeds the paper〔n× 0.125㎜〕.
[Notes] • After printing, this command sets the starting position of printer to the beginning of line.
• Feeding paper quantity set by this command not affects the data which set by ESC 2 or ESC 3 command.
.At the standard mode, the printer used the vertical moving unit(y).
.At the page mode, according to the starting position of the printable area, the function of this command as follows:
① When sets the starting position to the printable area's up-left or down-right by ESC T, uses the horizontal moving unit(y).
② When sets the starting position to the printable area's

up-right or down-left, uses the vertical moving unit(x).

## ESC L

[Name] Select page mode
[Format] ASCII ESC L
Hex 1B 4C
Decimal 27 76
[Description] Changes from the standard mode to page mode.]
[Notes] .At the standard mode, this command only affects at the beginning of the one.
.This commands no affects under the page mode.
.Finished printing by taking FF or executing ESC S command, the printer returns to the standard mode.
.This command sets the position of the data buffer to the position which specified by ESC T command at the printable area. The printable area specified by ESC W.
.This command sets the following command (under this command, the data of the standard mode and page mode could be set respectively) to shift the relevant set of the page mode.

① Sets right character spacing: ESC SP
② Selects default line spacing: ESC 2, ESC 3

. Under the page mode, only could set the following command data: but these command not executes.

① Sets/cancels the revolved clockwise 90° : ESC V
② Selects parallel mode: ESC a
③ Sets/cancels the reversed printing mode: ESC {
④ Sets the left side page spacing: GS L
⑤ Sets printable area width: GS W

. Turns the power on, resets the printer or uses the ESC @ command, the printer returns to the standard mode.

[Reference] FF, CAN, ESC FF, ESC S, ESC T, ESC W, GS $, GS \

## ESC M n

[Name] Select character font
[Format] ASCII ESC M n
Hex 1B 4D n
Decimal 27 77 n
[Range] n=0, 1, 48, 49
[Description] Selects character font.

| n | Function |
|---|---|

| | |
|---|---|
| 0,48 | Character font A(12×24) selected |
| 1,49 | Character font B(9×17) selected |

[Specification] .ESC ! could select the character type. But, the set is effective which only sets by the final received command.

[Reference] ESC !

## ESC R n

[Name] Select an international character set

[Format] ASCII ESC R n

Hex 1B 52 n

Decimal 27 82 n

[Rang] 0≤n≤13

[Description] Selects the data of n according to the following table, sets an international character set.

| n | Character Set |
|---|---|
| 0 | U.S.A. |
| 1 | France |
| 2 | Germany |
| 3 | England |
| 4 | Denmark I |
| 5 | Sweden |
| 6 | Italy |
| 7 | Spain I |
| 8 | Japan |
| 9 | Norway |
| 10 | Denmark II |
| 11 | Spain II |
| 12 | Latin America |
| 13 | Korea |

[Default] n=0

[Reference] International Set

## ESC S

[Name] Select standard mode

[Format] ASCII ESC S

Hex 1B 53

Decimal 27 83

[Notes] .This command only affects under the page mode.

.Under the page mode , clears the data in the buffer area.

.The starting of the line sets the printing position by this command.

.Initialized the printable area setting and which sets by ESC W.

.This command sets the following command (under this command, the data of the standard mode and page mode could be set respectively) to shift the relevant set of the standard mode.

① Sets right-side character spacing: ESC SP

② Selects default line spacing: ESC 2, ESC 3

[Reference] FF, ESC FF, ESC L

## ESC T n

[Name] Select printing direction under the page mode

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | T | n |
| Hex | 1B | 54 | n |
| Decimal | 27 | 84 | n |

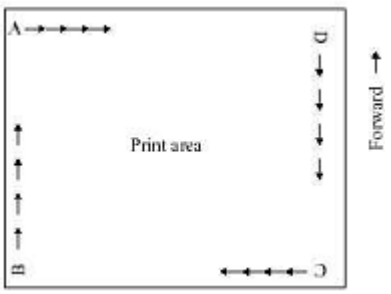
[Range] 0≤n ≤3

48≤n≤51

[Description] Under the page mode, selects printing direction and starting position

Parameter n used to be designated printing direction and starting position, the figure as follows:

| n | Printing Direction | Printing Position |
|---|---|---|
| 0,48 | From left to right | Top left corner(figure A) |
| 1,49 | From bottom to top | Bottom left corner(figure B) |
| 2,50 | From right to left | Bottom right corner(figure C) |
| 3,51 | From top to bottom | Top right corner(figure D) |



[Notes] .Inputs this command under the standard mode, the printer only executes the inner mark operation. This command no affects the printing under the standard mode.
.This command sets data buffer position on the scale of printing area which set by ESC W.

[Default] n=0

[Reference] ESC $, ESC L, ESC W, ESC \, GS $, GS \

## ESC V n

[Name] Turn clockwise 90° revolved on/off

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | V | n |
| Hex | 1B | 56 | n |
| Decimal | 27 | 86 | n |

[Range] 0≤n≤1, 48≤n≤49

[Description] Turns clockwise 90° revolved on/off
The use of n as follows:

| n | Function |
|---|---|
| 0,48 | Turn clockwise 90° revolved off |
| 1,49 | Turn clockwise 90° revolved on |

[Notes] .This command affects printing under the standard mode. And the set always affects.
.For the character of clockwise 90° revolved, when sets the underline mode, the printer doesn't add the underline.
.Under the clockwise 90° revolved mode, the character direction which be enlarged by double height and double width is opposite to the character direction which sets under the normal mode.
.If inputs this command under the page mode, the printer only operates for inner mark position.

[Default] n=0

[Reference] ESC ! , ESC -

## ESC W xL xH yL yH dxL dxH dyL dyH

[Name] Set printable area under the page mode

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | W | xL xH yL yH dxL dxH dyL dyH |
| Hex | 1B | 57 | xL xH yL yH dxL dxH dyL dyH |
| Decimal | 27 | 87 | xL xH yL yH dxL dxH dyL dyH |

[Range] 0≤xL xH yL yH dxL dxH dyL dyH≤255(except for dxL=dxH=0 or

dyL=dyH=0)

[Description] .x0, y0, dx, dy separately specifies the horizontal starting position, vertical starting position, printable area width and printable area height.

Each setting data calculation for printable area as follows:

xo=〔(xL+xH×256)×0.125㎜〕

yo=〔(yL+yH×256)×0.125㎜〕

dx=〔(dxL+dxH×256)×0.125㎜〕

dy=〔(dyL+dyH×256)×0.125㎜〕

[Notes] .If input this command under the standard mode, the printer only executes the inner mark operation. This command no effects the printing under the standard mode.

.If the horizontal starting position setting and vertical starting position setting over the printable area, the printer stops dealing with command and deals with continued data as the normal data .

.If the setting of printable area width and height is 0, the printer stops dealing with command and deals with continued data as the normal data.

.This command set the position of data buffer area, the position specified by ESC T in the printable area.

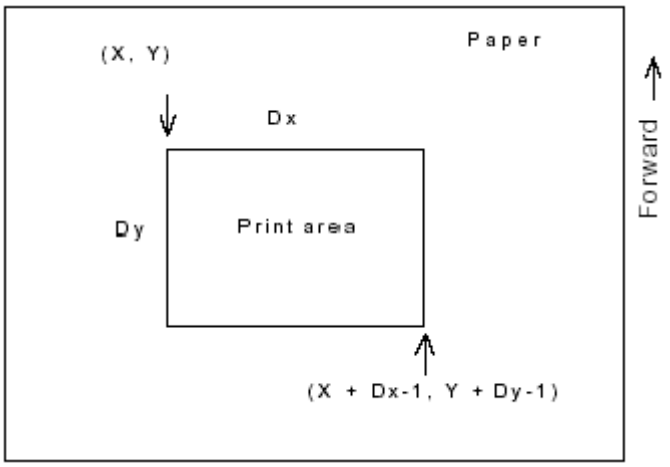
.If (horizontal starting position + printable area width) over the printable area, the printable area width automatically set to (horizontal printable area-horizontal starting position).

.If (vertical starting position + printable area width) over the printable area, the printable area width automatically set to (vertical printable area-horizontal starting position).

.Use 0.125 ㎜ spacing to set horizontal starting position and printable area width, and use 0.125 ㎜ spacing to set vertical starting position and printable area height.

. x0, y0, dx, dy separately specifies the horizontal starting position, vertical starting position, printable area width and printable area height.

**The printable area set as follows.**




[Default] According to DIP and push the switch 2-1 and 2-2 which selects the type model dxL,dxH,dyL and dyH as follows:

| Select model type | Horizontal direction dot count | Default |
|---|---|---|
| 82.5 ㎜ paper width type | 640 dots | dxL=128, dxH=2, dyL=152, dyH=2 |
| 79.5 ㎜ paper width type | 576 dots | dxL=64, dxH=2, dyL=226, dyH=2 |
| 60 ㎜ paper width type | 448 dots | dxL=192, dxH=1, dyL=181, dyH=3 |
| 58 ㎜ paper width type | 432 dots | dxL=176, dxH=1, dyL=216, dyH=3 |

[Reference] CAN, ESC L, ESC T

## ESC \ nL nH

[Name] Set relative printing position

[Format] ASCII ESC \ nL nH
Hex 1B 5C nL nH
Decimal 27 92 nL nH

[Range] 0≤nL≤255
0≤nH≤255

[Description] The current position is base point, and uses the horizontal and vertical moving units, set the printing starting position.
.This command set the printing position from the current position to ｛(nL+nH×256) ×0.125㎜｝.

[Notes] .Any set which over the printable area will be ignored.
.When the space N specified to the right:
nL+nH×256=N

When the space N specified to the left: (reverse direction), uses added code 65536.

nL+nH×256=65536-N

.Under the standard mode , uses the horizontal moving unit.

. At the page mode, according to the starting position of the printable area, the function of this command as follows:

① When set the starting position to the printable area's up-left or down-right by ESC T, uses the horizontal moving unit(x).

② When set the starting position to the printable area's up-right or down-left, uses the vertical moving unit(y).

[Reference] ESC $

## ESC a n

[Name] Select justification mode

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | a | n |
| Hex | 1B | 61 | n |
| Decimal | 27 | 97 | n |

[Range] 0≤n≤2, 48≤n≤50

[Description] According to specified position and justified one line data Uses the following n to select the justification mode:

| n | Justification |
|---|---|
| 0,48 | Left justification |
| 1,49 | Centered |
| 2,50 | Right justification |

Notes: .Under the standard mode, only dealing with the beginning of a line, this command effects.

.If input this command under the page mode, the printer only executes the inner mark operation.

.This commands no effects to the page mode.

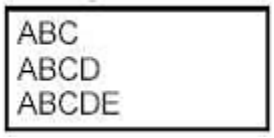
.This command executes justification in the printable area.

.This command justified blank area according to HT, ESC $ or ESC \.

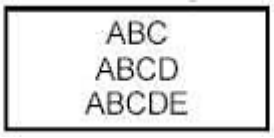
[Default] n=0

For example

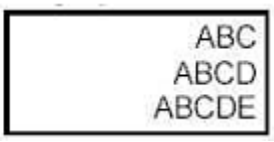
Left justification




Centered




Right justification



## ESC c 3 n

[Name] Select paper sensor to output paper-end signal

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | ESC | c | 3 | n |
| Hex | 1B | 63 | 33 | n |
| Decimal | 27 | 99 | 51 | n |

[Range] 0≤n≤255

[Description] Selects paper sensor to output paper-end signal .The use of each parameter n as the following table:

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | - | - | Undefined |
| 1 | Off | 00 | 0 | Disable paper near-end sensor |
| | On | 02 | 2 | Enable paper near-end sensor |
| 2 | Off | - | - | Undefined |
| 3 | On | 00 | 0 | Disable paper-end sensor |
| | On | 08 | 8 | Enable paper-end sensor |
| 4-7 | - | - | - | Undefined |

[Notes] .Inputs signal which could select several sensors. In such circumstance, if any one of sensors detects no paper, it will input the signal which means no paper.

.This command only affects to the parallel interface, under the serial interface mode, this command will be ignored.

[Default] n=0

## ESC c 4 n

[Name] Select paper sensor(s) to stop printing

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | ESC | c | 4 | n |
| Hex | 1B | 63 | 34 | n |
| Decimal | 27 | 99 | 52 | n |

[Range] 0≤n≤255

[Description] When detecting no paper, selects paper sensors to stop printing. The use of parameter n as follows:

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | - | - | Undefined. |
| 1 | Off | 00 | 0 | Disable paper near-end sensor. |
| | On | 02 | 2 | Enable paper near-end senor. |
| 2-7 | - | - | - | Undefined. |

[Notes] .When takes this command to enable a printing paper sensor, only uses the relevant printing paper, the printer stops printing.
.When without paper sensor detects that the printing paper to end,
The printer stops printing and on offline conditions.
.When bit 1 is on , the printer selects paper near-end sensor and stops Printing .
[Default] n=0

## ESC c 5 n

[Name] Enable/disable panel buttons
[Format] ASCII ESC c 5
Hex 1B 63 35
Decimal 27 99 53
[Range] 0≤n≤255
[Description] Enables or disables the panel buttons.
• When the LSB of n is 0, the panel buttons are enabled.
• When the LSB of n is 1, the panel buttons are disabled.
[Notes] • Only uses the LSB of n.
• If disable the panel buttons, then all the buttons can't be used when closing the print head bar.
• For this printer, the only one panel button is feeding paper button.
• When the printer on the wait, whatever this command set, the feeding paper button will be affected. But can't feed paper.
[Short data] n=0

## ESC d n

[Name] Printing and feeding n lines
[Format] ASCII ESC d n
Hex 1B 64 n
Decimal 27 100 n
[Range] 0≤n ≤255
[Description] Prints the data in the output printing buffer area, and feeds paper n lines.
[Notes] .This command sets the line starting point to the printing starting
position.
.This command no affects the line spacing which set by ESC 2 or ESC 3 command.
.The max quantity of feeding paper is 1016 ㎜{40 inch}. If the specified quantity of feeding paper{n×line spacing} is 1016 ㎜

{40 inch}.
[Reference] ESC 2, ESC 3

## ESC t n

[Name] Select character code table
[Format] ASCII ESC t n
Hex 1B 74 n
Decimal 27 116 n
[Range] 0≤n ≤5, 16≤n ≤19, n=255
[Description] Selects page n from the character code table.

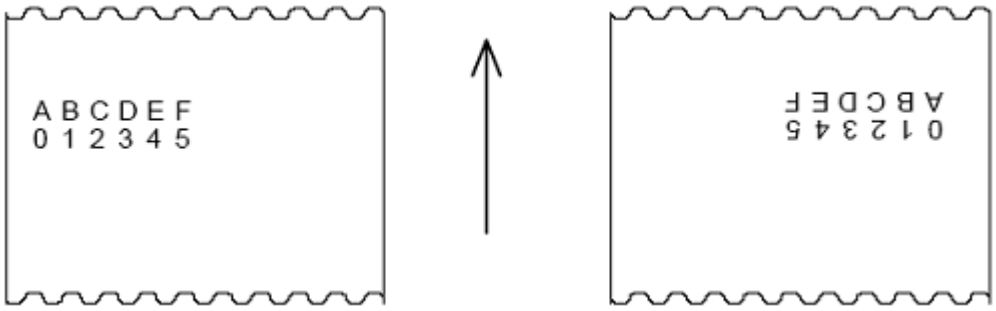
| n | Page |
|---|---|
| 0 | PC437[America, Europe standard] |
| 1 | Katakana |
| 2 | PC850[Multi-language] |
| 3 | PC860[Portuguese] |
| 4 | PC863[Canada-France] |
| 5 | PC865[North Europe] |
| 16 | WPC1252 |
| 17 | PC866[Yugoslavia2] |
| 18 | PC852[Latin2] |
| 19 | PC858[Europe] |
| 255 | Space page |

[Default] n=0
[Reference] Character table

## ESC { n

[Name] Turn upside-down printing mode on/off
[Format] ASCII ESC { n
Hex 1B 7B n
Decimal 27 123 n
[Range] 0≤n ≤255
[Description] Turns upside-down printing mode on/off
.When the LSB of n is 0, turns upside-down printing mode off.
.When the LSB of n is 1, turns upside-down printing mode on.
[Notes] .Only the LSB of n is effective.
.This command only affects when inputting at the beginning of the line under the standard mode.
.This command no affects the printing under the page mode.
.At the upside-down mode, the printer firstly revolved the printing line 180° , then printing.

[Default]  n=0
[For example]




Paper direction

## FS p n m

[Name]  Print NV bit image
[Format]  ASCII  FS  p  n  m
Hex  1C  70  n  m
Decimal  28  112  n  m
[Range]  1≤n≤255
0≤m≤3, 48≤m≤51
[Description]  Prints NV bit image n use the mode specified by m.

| m | Mode | Vertical Density | Horizontal Density |
|---|---|---|---|
| 0,48 | Normal | 203.2dpi | 203.2 dpi |
| 1,49 | Double width | 203.2 dpi | 101.6 dpi |
| 2,50 | Double height | 101.6 dpi | 203.2 dpi |
| 3,51 | Four times size | 101.6 dpi | 101.6 dpi |

Dpi: per 25.4㎜{1 inch} printing dot count
.n is the quantity of NV bit image (defined by FS q).
.m specified bit image mode.
[Specification] .NV bit image is a bit image which defined at the not easy losing memory. Defined by FS q , printed by FS q.
.This command will not affect when the specified NV bit image not existed.
.Under the standard mode , this command affects when there are no data in the printing buffer area.
.This commands no affects under the page mode.
.This command not be affected by the printing mode (bold, repetition, underline, character size, or reverse blank printing), unless the reversed printing mode.
.If the width of NV bit image printable area set by GS L and GS W is less than a vertical line, then executing the following

operation only for the problem lines. At the NV bit image mode, a vertical line means a dot under the normal mode (m=0,48) and double height mode(m=2,50), two dots under the double width mode(m=1,49) and four times size mode(m=3,51).

① Under the NV bit image mode, the width of printable area extends to right a vertical line. In such circumstances, the print can't over the printable area.

② If the width of printable area can't extend a vertical line, then the left blank will be narrowed and to held a vertical line.

.If the printable download bit image over a line, then the over data not to be printed.

.Under the normal and double width mode, this command feed paper n dots, n is the height of NV bit image, Under the double height and four times size mode, this command feeds paper 2n dots, n is the height of NV bit image, it's not relevant to the line spacing which set by ESC 2 or ESC 3.

.After printing bit image, this command sets the printing position at the beginning of a line, and deal with the continued data as the normal data.

[Reference] ESC *, FS q, GS /, GS v o

## FS q n [xL xH yL yH d1...dk] 1... [xL xH yL yH d1...dk]n

[Name] Define NV bit image

[Format] ASCII FS q n [xL xH yL yH d1...dk]1...[xL xH yL yH d1...dk]n

Hex 1C 71 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

[Range] 1≤n≤255

0≤xL≤255

0≤xH≤3(when 1≤(xl+xh×256) ≤1023

0≤yl≤255

0≤yh≤1(when 1≤(yl+yh×256) ≤288

0≤d≤255

K=(xl+xh×256) ×(yl+yh×256) ×8

The total of defined data area=192k byte

[Description] Defines NV bit image which uses the specific value n.

.n specifies the quantity of NV bit image.

.xL, xH specifies the dot count of the horizontal direction in defined NV bit image,the dot count is (xL+xH×256) ×8.

.yL, yH specifies the dot count of the vertical direction in defined NV bit image, the dot count is (yL+yH×256) ×8.

[Specification] .This command cancels the NV bit image which defined by this command. At the serial defined data, the printer can't define any one of data renewable. If renew to define certain data, then all data needs to send again.

.From beginning to deal with this command to finish hardware reset, can't execute mechanical operation(contains initialized print head position when opening the print head bar, feed paper used the paper feeding button and so on.)

.During deal with this command, when writing data to user NV memory, the printer is busy and stops receiving data. So, Disabled sending data during executing this command, contains real-time command.

.NV bit image is a bit image which defined at the not easy losing memory. Defines and prints FS p by FS q.

.Under the standard mode, this command only affects to deal with the beginning of a line.

.This commands no affects under the page mode.

.This command affects after the seven bytes<FS～yH> be dealt with normally.

.When the data quantity over the left capacity of the scale which defined by xL, xH, yL, yH, the printer deals with xL, xH, yL, yH out of the defined scale.

.At the first group bit image, when any parameters in xL, xH, yL, yH over the defined scale, this command will be disabled.

.At any one of group bit image except for the first group, when the printer meets that xL,xH, yL, yH over the defined scale, then stops to deal with this command, and begins to write to NV image. At this moment disabled the undefined NV bit image (undefined), but any NV bit image defined before always affects.

.d indicates defined data. At the data (d), one bit specified one printing dot and one 0 bit specified one couldn't print dot.

.n be defined the quantity of NV bit image by this command. The quantity goes up according to the sequence which begins from bit image 01H. Therefore the first data group [xL xH yL yH dl...dK] is the NV bit image 01H. The last data group [xL xH yL yH dl...dK] is the NV bit image n. The total count is consistent with the NV bit image which set by FS p command.

.The definition data of one NV bit image formed by [xL xH yLl xH dl...dK]. So, when only have one NV bit image n=1, the printer only deals with the data group [xL xH yL yH dl...dK] one time. The printer uses ([data:(xL+xH × 256) × (yL+yH × 256) × 8]+[header:4]) bytes of the NV memory.

.The definition area of this printer is 192K bytes (max). This

command could define several bit images, but can't define the bit image which the total capacity [bit image data + head] over 192K bytes.

.Whatever the set of DIP switches 2-1, the printer turns to "busy" before writing into NV memory.

.Though set ASB, the printer not send the ASB status or executer conditions test during dealing with this command.

.When received this command during macro definition, the printer stops macro definition and executes this command.

.Once defines one NV bit image, it can't be executed ESC @ command, and deleted when resets and turns power off.

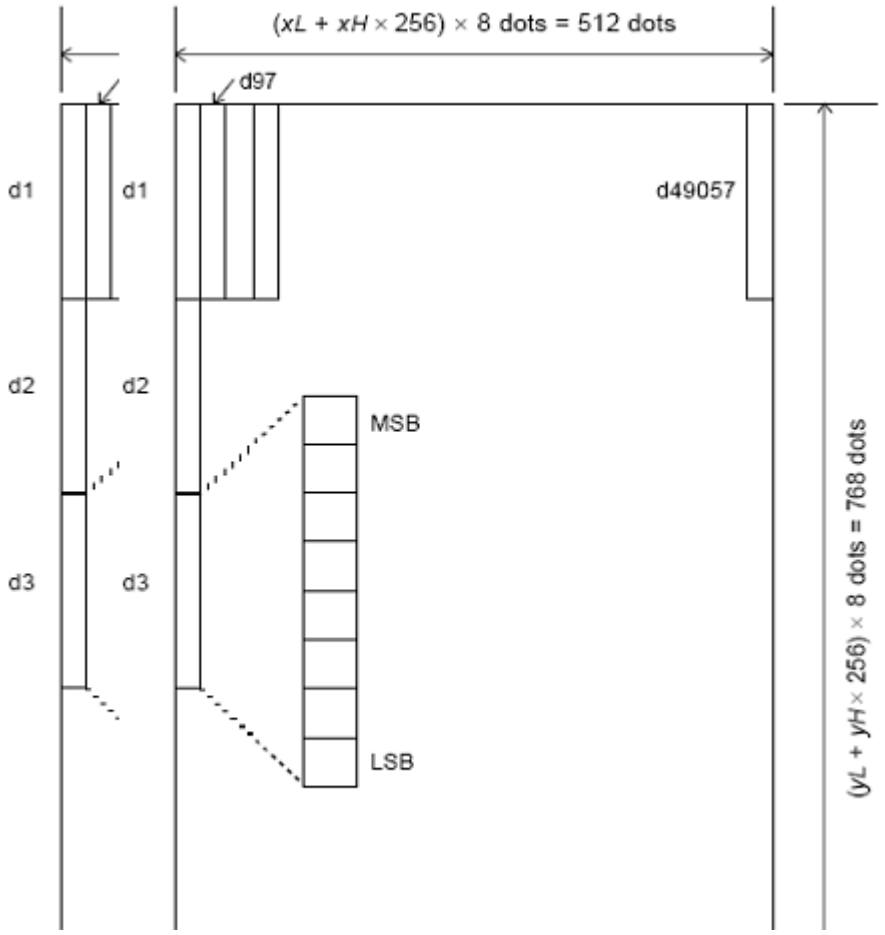
.This command only executes the definition of NV bit image, not executes printing. The printing of NV bit image executed by FS p command.

.Frequently executes the written command which could be broken the NV memory. So, suggests that executes the written operation not over ten times for NV memory in a day.

.After the process of putting one bit image into NV memory, the printer executes one hardware reset operation. So, defines the user-defined character, downloads bit image and macro after finishing this command. The printer clears receiving and printing buffer area, and resets to the effective mode when connecting the power supply. At this moment, the switch DIP device be checked once again.

[Reference] FS p

[For example] When xL=64, xH=0, yL=96, yH=0




## GS FF

[Name] Carry the BM printing paper to the printing starting position

[Format]

| | | |
|---|---|---|
| ASCII | GS | FF |
| Hex | 1D | 0C |
| Decimal | 29 | 12 |

[Description] Carry the BM printing paper to the printing starting position.

[Notes]
- This command enabled only when the BM sensor setting is effective by DIP SW1-1.
- This command sets the next printing position to the starting of a line.
- Even if this command executes at the printing starting position of the BM printing paper, the printer doesn't carry the paper to the next printing starting position.

[Reference] GS ( F, FF, 3.5.1.2 DIP switch1 Memory Switch 6

## GS ! n

[Name] Set character size

[Format] ASCII GS ! n

Hex 1D 21 n
Decimal 29 33 n

[Range] 0≤n≤255
(1≤vertical double counts≤8, 1≤horizontal double counts≤8)

[Description] Sets the height of character and uses 0 to 2, sets the width of character and uses 4 to 6. The description as follows:

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Sets the height of character. See table 2. | | | |
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | Sets the width of character. See table 1. | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | | | | |

| Hex | Decimal | Width |
|---|---|---|
| 00 | 0 | 1(normal) |
| 10 | 16 | 2(double width) |
| 20 | 32 | 3 |
| 30 | 48 | 4 |
| 40 | 64 | 5 |
| 50 | 80 | 6 |
| 60 | 96 | 7 |
| 70 | 112 | 8 |

**Table 1**
**Character width setting**

| Hex | Decimal | Width |
|---|---|---|
| 00 | 0 | 1(normal) |
| 01 | 1 | 2(double height) |
| 02 | 2 | 3 |
| 03 | 3 | 4 |
| 04 | 4 | 5 |
| 05 | 5 | 6 |
| 06 | 6 | 7 |
| 07 | 7 | 8 |

**Table 2**
**Character height setting**

[Notes] .This command affects to all characters (English characters and Chinese) except for HRI character.

.If n is out of the definition scale, this command will be ignored.

.Under the standard mode, the vertical direction is the paper feeding direction. However, when the character direction revolved clockwise 90° , the relation of vertical direction and horizontal direction will be reversed.

.Under the page mode, the vertical direction and horizontal direction is based on the character direction.

.When enlarges the characters in a line and use the different size, all characters in a line will be paralleled along the baseline.

.Uses ESC ! command could open and close the double width and double height mode. The set of command which received at last will be affected.

[Default] n=0

[Reference] ESC !

## GS $ nL nH

[Name] Set absolute vertical printing position under the page mode

[Format]

| ASCII | GS | $ | nL | nH |
|---|---|---|---|---|
| Hex | 1D | 24 | nL | nH |
| Decimal | 29 | 36 | nL | nH |

[Range] 0≤nL≤255, 0≤nL≤255

[Description] . Under the page mode, sets absolute vertical printing starting position for buffer data.

.This command sets the absolute printing position in [(nL+nH ×256)×0.125 ㎜].

[Notes] .This command only affects under the page mode.

.If [(nL + nH×256) ×(vertical or horizontal moving unit)] over the specified printing area, this command will be ignored

.The position of horizontal starting buffer area won’t be moved.

.The reletive starting position specified by ESC T.

.The operation of this command as follows, decided by the printable area starting position which set by ESC T:

When the starting position sets at the up-left or down-right, this command sets the absolute position in the vertical direction.

① When the starting position sets at the up-right or down-left, this command set the absolute position in the parallel direction.

[Reference] ESC $, ESC T, ESC W, ESC \, GS \

## GS ( A pL pH n m

[Name] Execute test print

[Format]

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ASCII | GS | ( | A | pL | pH | n | m |
| Hex | 1D | 28 | 41 | pL | pH | n | m |
| Decimal | 29 | 40 | 65 | pL | pH | n | m |

[Range] (pH+(pH×256)=2 (pL=2,pH=0)

0≤n≤2, 48≤n≤50

1≤m≤3, 49≤m≤51

[Description] .Executes the test print at the specified printing paper and uses the specifying mode.

.pL and pH sets that the parameter quantity is (pL+(pH × 256))bytes.

n specifies the near-test printing paper

| n | Printing paper |
|---|---|
| 0,48 | Basic sheet(roller paper) |
| 2,50 | Roller paper |

**m specifies the test mode**

| m | Test mode |
|---|---|
| 1, 49 | Hex dump |
| 2, 50 | The printer conditions |
| 3, 51 | The roll paper printing |

[Specification] .This command only affects at the beginning of a line under the standard mode.

.This commands no affects under the page mode.

.When received this command during macro definition, the printer finishes the macro definition and begins to execute this command.

.The printer will reset automatically after finishing printing. Therefore, the defined data before executing this command, For example, the user-defined character, download bit image and macro will change to be undefined; Receiving buffer area and printing buffer area be cleared; all set returned to default data. The printer read the set of switch DIP again.

.The printer cuts the paper when finishing test printing.

.During executes this commands, the printer enters into “BUSY” conditions.

## GS ( E pL pH m

[Name] User-defined command

[Description] The user-defined command controls the value which stored in the user NV memory.

The function sets by m as follows:

| m | Format | Function | |
|---|---|---|---|
| 1 | GS ( E pL pH p d1 d2 | 1 | Start user-defined mode |
| 2 | GS ( E pL pH p d1 d2 d3 | 2 | End user-defined mode |
| 3 | GS ( E pL pH m [a1 b18...b11]...[ak bk8...bk1] | 3 | Set memory switch and customize data |
| 4 | GS ( E pL pH m a | 4 | Transmit the customized data in the memory switch |

.pL, pH specified that the byte which behinds of pH ( m and the parameter is (pL+(pH×256)).

.m specifies the functions.

.d1, d2, d3 specified the parameters to select mode.

.a specifies the type of memory data.

.a specifies the value of memory data which sets by bk8...bk1.

.The user-defined mode is a special mode, under this mode, could take this command to change the data in the user NV memory.

.At the function 2, the printer executes soft reset. So, the printer clears the receiving buffer area and printing buffer area, and resets all sets(user-defined characters, down-load bit image, macro and character type) to the up-electric effective mode.

[Notes] .Frequently executes NV memory to write commands(FS q, GS ( E) which may bring damage for NV memory. So, suggests that the written operation for NV memory a day doesn't over 10 times.

.When dealing with this command, if writing data in the user NV memory, the printer enters into busy conditions and stops receiving data. So, during executing this command, forbidden transmitting the data which contains real-time commands.

## GS ( E pL pH m d1 d2(when m=1)

| [Format] | ASCII | GS | ( | E | pL | pH | m | d1 | d2 |
|---|---|---|---|---|---|---|---|---|---|
| | Hex | 1D | 28 | 45 | pL | pH | 01 | d1 | d2 |
| | Decimal | 29 | 40 | 69 | pL | pH | 1 | d1 | d2 |

[Range] pL=3, pH=0

m=1

d1=73

d2=78

[Description] Starts user-defined mode and sends the following data:

Head: Hex=37H/Decimal=55(1 byte)

Mark: Hex=20H/Decimal=32(1 byte)

NUL: Hex=00H/Decimal=0 (1 byte)

.Under the user-defined mode, only the following commands could be executed.

The function 2, function 3 and function 4 of this command. and command GS I

**GS ( E pL pH m d1 d2 d3 (when m=2)**

| [Format] | ASCII | GS | ( | E | pL | pH | m | d1 | d2 | d3 |
|---|---|---|---|---|---|---|---|---|---|---|
| | Hex | 1D | 28 | 45 | pL | pH | 02 | d1 | d2 | d3 |
| | Decimal | 29 | 40 | 69 | pL | pH | 2 | d1 | d2 | d3 |

[Range] pL=4,pH=0

m=2

d1=79

d2=85

d3=84

[Description] Finishes the user-defined mode and executes the software reset. So, the printer clears the receiving buffer area and printing buffer area, and resets all sets(user-defined characters, down-load bit image, macro and character type) to the effective mode settings when turning the power on.

.This command m=2 function only affects to the user-defined.

## GS ( E PL PH m [m1 b18..b11]..[ak bk8..bk11] (when m=3)

| [Format] | ASCII | GS | ( | E | pL | pH | m | [a1 b18..b11]...[ak bk8...bk1] |
|---|---|---|---|---|---|---|---|---|
| | Hex | 1D | 28 | 45 | pL | pH | 03 | [a1 b18..b11]...[ak bk8...bk1] |
| | Decimal | 29 | 40 | 69 | pL | pH | 3 | [a1 b18..b11]...[ak bk8...bk1] |

[Range] 10≤(pL+pH×256)≤65530

(here (pL+pH×256)= 9×k+1: 0≤pL≤255; 0≤pH≤255)

m=3

1≤a≤8

b=48, 49, 50

1≤k≤7281

[Description] Through the value of b, changes the memory switch settings which specified by a.

| b | Function |
|---|---|
| 48 | Set the specified bit to off |
| 49 | Set the specified bit to on |

| | |
|---|---|
| 50 | Not change the specified conditions |

.The total data bit of memory switch is 8.
.Deals with the value of 8 according to the sequence from the bit 8 to bit 1.
.If occurs the error during writing the data, executes that dealing with the memory error.
.For memory switch, referss to section 3.5.2.
.Sets the reserved bit to “2”(50).
.If changes the settings. These settings only affects when resets the printer or repeatly turns the power on.
.Checkout the setting value by executing self-test.

## GS ( E pL pH m a (when m=4)

[Format] ASCII GS ( E pL pH m a
Hex 1D 28 45 pL pH m a
Decimal 29 40 69 pL pH m a
[Range] (pL+pH×256)=2 (pL=2, pH=0)
m=4
1≤a≤8
[Description] Sends the setting value of memory switch which specified by a.
.The transmission data contents as follows:

| Transmitting data | Hex code | Decimal code | Data byte |
|---|---|---|---|
| ① Head | 37H | 55 | 1 byte |
| ② Mark | 21H | 33 | 1 byte |
| ③ Data | 30H, 31H | 48, 49 | 8 bytes |
| ④ NUL | 00H | 0 | 1 byte |

The above ③ indicates the following contents.
Memory switch on/off sets that the definition is [off: hex code=30H/decimal code=48] or [on: hex=31H/hex=49]. For each byte of 8 memory switches, transmits according to the sequence from
Bit 8 to bit 1.
Example: Transmits data: “10110001”
(31H, 30H, 31H, 30H, 30H, 31H):

| Switch No. | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|
| Status | On | Off | On | On | Off | Off | Off | On |

.If selects a memory switch number which not supported[a surpasses the range], this command will be ignored. In such circumstances, <G S~ a>(7 byte) will be discarded.
.If ignores this command, the printer won’t transmit any data.
.The memory switch number(a) and the memory switch number (a) in

the function 3 have the same meanings.

## GS ( pL pH a m nL nH

[Name] Set the adjustable value

[Format]

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ASCII | GS | ( | F | pL | pH | a | m | nL | nH |
| Hex | 1D | 28 | 46 | pL | pH | a | m | nL | nH |
| Decimal | 29 | 40 | 70 | pL | pH | a | m | nL | Nh |

[Range] (pL+(pH×256))=4 (here pL=4, pH=0)
1≤a≤2
m=0, 48 or 1, 49
0≤nL+nH×256≤1600
(here 0≤nL≤255, 0≤nH≤6)

[Description] This command only affects when enabling BM sensor.
Sets the printer operation adjustable value which specified by parameter.

. pL and pH specified that the number of parameter is 'a' ~ (pL+(pH×256)) bytes.

. a be taken to specify the setting value of starting printing position and cutting paper position.

| a | Function |
|---|---|
| 1 | Set the setting value of starting printing position |
| 2 | Set the setting value of starting cutting paper position |

. m specified the adjustable direction.

| m | Function |
|---|---|
| 0,48 | Specifies that the forward direction is the feeding paper direction |
| 1,49 | Specifies that the backward direction is the feeding paper direction. |

. nL and nH specifies that the setting value is [(nL+nH×256) × 0.125 ㎜].

**Note: When sets the starting cutting paper position, only supports m=0, 48, that's to say, only supports forward feeding paper.**

[Specification] . If executes this command(for GS ( F is three bytes) during macro definition, the printer will stop macro definition and start executing process by this command.

. The adjustable value of the printing starting position(n=1) affected by the following command:
FF, GS FF

. The adjustable value of the cutting paper position(a=2) affected by the following command:

GS V m n

. Receives this command from host, First, stores it in the receiving buffer area, then, executes this command at the process of executing the normal command. Therefore, after the printer received the data, maybe executing this command after extending a period time. The extended time decided by the status of receiving buffer area.

. Starts the starting printing position by GS ( F and about the setting method of cutting paper position adjustable value and specification, please refer to appendix I.

[Default] All adjustable value sets “0”.

(When the default be set from BM sensor testing to BM, the separate position of print head and cutter are the printing starting position and cutting paper.)

[Reference] FF, GS FF, GS V

## GS ( K pL pH n m

[Name] Select printing control mode

[Format]

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ASCII | GS | ( | K | pL | pH | n | m |
| Hex | 1D | 28 | 48 | pL | pH | n | m |
| Decimal | 29 | 40 | 75 | pL | pH | n | m |

[Range] (pL+(pH×256))=2 (here pL=2, pH=0)

1≤n≤255

For parameter m, refer to the per function description of this command.

[Description] . pL, pH specifies that the byte behind of the parameter n is (pL+(pH×256)).

. n specifies the setting value of printing density and the printer mechanical operation.

| n | Function number | Function |
|---|---|---|
| 48 | Function 48 | Select printing control mode |
| 49 | Function 49 | Set printing density |

[Specification] . In the following circumstances, deals with the nonsupport reference, this command will be ignored:

. (pL+pH×256)＜2.

. n doesn’t relative any one of the printer functions.

. At the every function, m surpasses the scale.

. If satisfies all the specified parameters, the printer starts to deal with the specified functions.
If the printer is offline, not executing this command, because the printer doesn't read the data at this moment.
. Receives this command from the host, First stores it in the receiving buffer area, then executes this command at the process of executing another normal commands. Therefore, after the printer received this command, maybe executing this command after executing a period time. The extended time decided by the status of receiving buffer area.

## GS ( K pL pH n m (when n=480<function 48>

[Format] ASCII GS ( K pL pH n m
Hex 1D 28 4B 02 00 30 m
Decimal 29 40 75 2 0 48 m
[Range] (pL+(pH×256))=2 (here pL=2, pH=0)
n=48
n≤m≤3, 48≤m≤51
[Description] * m specifies the printing control mode.

| M | Function |
|---|---|
| 0,48 | Specifies the printing control mode when the first turns the power on |
| 1,49 | Specifies the not divided printing print head electric mode |
| 2,50 | Specifies the two parts print head electric mode |
| 3,51 | Specifies the four parts print head electric mode |

. The printing control mode and the print head electric mode which specified by 0, 48 are the same.

**Note: At present, only supports m=1, another 3 conditions doesn't support.**

[Default] m=0

## GS ( K pL pH n m (when n=49)<function 49>

[Format] ASCII GS ( K pL pH n m
Hex 1D 28 4B 02 00 31 m
Decimal 29 40 75 2 0 49 m
[Range] (pL+(pH×256))=2 (here pL=2, pH=0)
n=49
-10≤m≤10(the relative printing grey degree from 50 to 150%)

[Description] . n specifies the printing density.
. If 10≤m≤-1, the printing density setting is lighter than the standard density.(“-10” is the lightest)
. If m=0, the printing density setting sets to the standard value.
. If 1≤m≤10, the printing density setting is deeper than the standard density.(“10” is the deepest)

[Specification] .If selects the normal mode, even sets the different density, the printing density always is the same in a line. In such circumstances, the last specified printing density is effective.
.If selects the page mode, all data specified by FF or ESC FF takes the same desity. If sets the different printing density under the page mode, the last specified printing density is effective.

[Default] m=0

## GS ( M pL pH a n m

[Name] Customize the printer control value

[Format]

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ASCII | GS | ( | M | pL | pH | n | m |
| Hex | 1D | 28 | 4D | pL | pH | n | m |
| Decimal | 29 | 40 | 77 | pL | pH | n | m |

[Range] (pL+(pH×256))=2 (here pL=2, pH=0)
1≤n≤3, 49≤n≤51
0≤m≤1, 48≤n≤49

[Description] Stores or takes the data which defined by command.

| n | Function |
|---|---|
| 1,49 | Stores the data which sets by GS ( F command to the user NV memory. |
| 2,50 | Takes the data which sets by GS ( F command fromm user NV memory. |
| 3,51 | Enables or disables the data which be taken to the procedure automatically at the beginning of the setting. |

.m specified the data as follows:
m=0, 48: It’s the same as the first setting value of GS ( F command.
m=1, 49: Will be stored to storage.

[Notes] . Frequently executes the command(FS q, GS ( E, or GS ( M) may be brought damage to NV memory. So, suggests that write to NV memory is less than 10 times.
. When the printer turns to busy conditions during dealing with this command, forbidden to transmit the data.

[Default] It’s the same that storage area(at the beginning) which will be reserved and the first setting value of GS ( F command.

[Reference] ESC @

## GS ( M pL pH n m (n=1,49) <function 1>

[Format]

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ASCII | GS | ( | M | pL | pH | n | m |
| Hex | 1D | 28 | 4D | pL | pH | n | m |
| Decimal | 29 | 40 | 77 | pL | pH | n | m |

[Range] (pL+(pH×256))=2 (here pL=2, pH=0)

n=1, 49

m=1, 49

[Description] . The data which set by GS ( F command will be stored to the user NV memory.

If have wrote the data to the user NV memory, then writing the same data to the NV memory again, not executing the operation of storing the data.

. If occurs error when writing data, the printer executes the error disposal.

[Specification] . The printer executes the following procedures:

. Before writing the data to the NV memory, the printer sets the interface to BUSY. In such circumstances, whatever the memory switch settings, the printer enters into busy conditions.

. Even enables the ASB function, the printer aslo doesn’t transmit the ASB conditions. But, If occurs the conditions which be changed during data transmission, the printer transmits the ASB conditions after finishing the data transmission.

[Default] No

[Reference] The <function 2> and <function 3> of this command.

## GS ( M pL pH n m (n=2, 50) <function 2>

[Format]

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ASCII | GS | ( | M | pL | pH | n | m |
| Hex | 1D | 28 | 4D | pL | pH | n | m |
| Decimal | 29 | 40 | 77 | pL | pH | n | m |

[Range] (pL+(pH×256))=2 (here pL=2, pH=0)

n=2, 50

0≤m≤1, 48≤m≤49

[Description] .m=0 or 48, Set the setting value of GS ( F command to the default which described in the reference manual.

.m≠0 or 48, Stores setting value on the m area of memory.

[Specification] .Under the standard mode, this command only deals with the

beginning of a line.
.Under the page mode, this command is ineffective.
.If receives this command during defining macro command, the printer finishes the macro definition, and starts to executing this command.
.About the setting value of this function, please refer to this command <function 1>.

[Default] No

[Reference] <Function 1>

## GS ( M pL pH n m (n=3, 51)<function 3>

[Format]

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ASCII | GS | ( | M | pL | pH | n | m |
| Hex | 1D | 28 | D | pL | pH | n | m |
| Decimal | 29 | 40 | 77 | pL | pH | n | m |

[Range] (pL+(pH×256))=2 (here pL=2, pH=0)
N=3, 51
0≤m≤1, 48≤m≤49

[Description] .When m=0 or 48, when initializing the printer, not takes data from the user NV memory.
After initializing, the setting value of GS ( F is the initialized value as before.
.When m≠0 or 48, when initializing the printer, takes data from the user NV memory.
After initializing, the setting value of GS ( F is the setting value which stored in the memory m area.
.The setting data of this command which stored in the NV memory.
When writing the data to the NV memory, If the memory have wrote the same data, then not executes the data memory operation.
.If occurs the error when writing data, then the printer executes the memory error disposal operation.

[Specification] .When the data loaded automatically, executes any one of the disposal procedure, will be executed the initialization disposal.
. Executes the added electric disposal by power switch.
. When resets the hardware through the interface, executes the added electric disposal.
. Executes ESC @.

[Default] m=0

[Reference] ESC 2, <function 1> of this command.

## GS * x y d1...d(x y 8)

[Name] Define download bit image

[Format] ASCII GS * x y d1...d(x× y× 8)

Hex 1D 2A x y d1...d(x× y× 8)

Decimal 29 42 x y d1...d(x× y× 8)

[Range] 1≤x≤255

1≤y≤48(x× y×1536)

0≤d≤255

[Description] Specifies dot counts by taking x and y and defines the download bit image.

.x specifies the horizontal dot counts.

.y specifies the vertical dot counts.

[Notes] .The dot counts of horizontal direction is x×8; the dot counts of vertical direction is y×8.

.If x × y over the specified scale, then this command will be disabled.

.d indicates the bit image data. The data (d) specifies the printing bit is 1 , the not printing bit is 0.

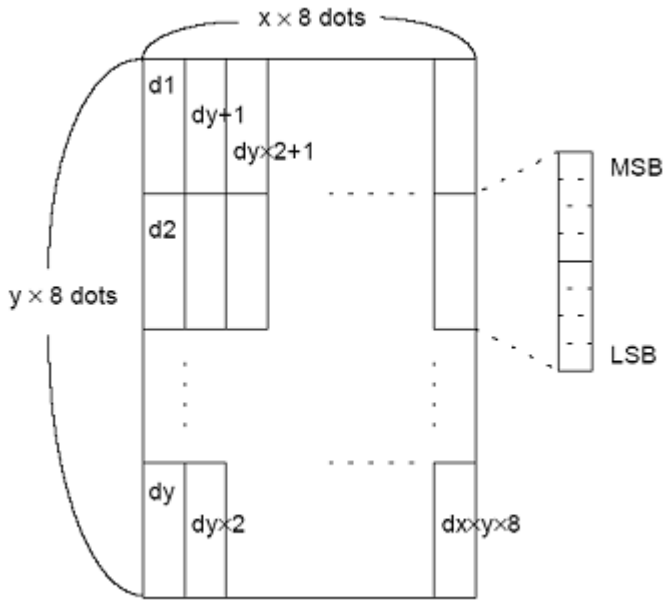
.At the following conditions, clears the download bit image definition:

① Executes ESC @.

② Executes ESC &.

③ The printer reset or turns the power off.

.The connection between download bit image and printing data as follows.




[Reference] GS /

## GS / m

[Name] Print download bit image

[Format] ASCII GS / m

Hex 1D 2F m

Decimal 29 47 m

[Range] 0≤m≤3, 48≤m≤51

[Description] Prints the download bit image through the mode which specified by m.

m sets the mode from the following table:

| m | Mode | Vertical dot density | Horizontal dot density |
|---|---|---|---|
| 0,48 | Normal | 203.2 dpi | 203.2 dpi |
| 1,49 | Double width | 203.2 dpi | 101.6 dpi |
| 2,50 | Double height | 101.6 dpi | 203.2 dpi |
| 3,51 | Four times size | 101.6 dpi | 101.6 dpi |

Dpi: per 25.4㎜{one inch} printing dot count

[Notes] .If the bit image data have not defined, then this command will be ignored.

.Under the standard mode, this command affects only when there are no data in the printing buffer area.

.This command is not effective under the printing mode [bold, overlap, underline, character size or reverses blank printing], except for up-down printing mode.

.If the near-printing download bit image over the printable area, then the over data is not printing.

.If the printable width which set by GS L and GS W is less than the width needed by GS command to send the data, then executes the following continued operation for the problem lines [the print not over the max printable area].

① The width of the printable area which extends to the right and holds the data capacity.

② If the step ① haven't provided enough width for data, then narrows the left blank to hold the data.

Each data under the normal mode (m=0, 48) and double height mode (m=2,50), the printer prints one dot;

Each data under the double width mode (m=1, 48) and four double mode (m=3, 51), the printer prints two dots.

[Reference] GS *

## GS :

[Name] Begin/finish macro definition
[Format] ASCII GS :
Hex 1D 3A
Decimal 29 58
[Description] Begins and finishes the macro definition.
[Notes] .When received this command under the normal operation, begins the macro definition. When received this command during the macro definition, finishes the macro definition.
.During macro definition, when received GS ^, the printer stops macro definition and clears the macro definition.
.When turns the power on, not defined macro.
.ESC @ does not clear the content of the macro definition. So ESC @ could contain in macro definition.
.If the printer received GS : before receiving GS : again, then the printer stays on the macro definition conditions.
.The content of macro definition could reach to 2048 bytes. If the content of macro definition is over 2048 bytes, then not stores over the part of data.
[Reference] GS ^

## GS B n

[Name] Turn opposite blank printing mode on/off
[Format] ASCII GS B n
Hex 1D 42 n
Decimal 29 66 n
[Range] 0≤n≤255
[Description] Turns opposite blank printing mode on/off
.When the LSB of n is 0, turn opposite blank printing mode off.
.When the LSB of n is 1, turn opposite blank printing mode on.
[Notes] .Only the LSB of n is effective.
.This command effects to inner set characters and user-defined characters.
.When turning the opposite blank mode on, it affects the blank area which set by ESC SPL
.This command no affects to bit image, user-defined bit image, bar code, HRI character, and the space skipped by HT, ESC $ and ESC \.
.This commands no affects to line spacing.
.The opposite blank mode is surpassing than the underline mode. When setting opposite blank mode, even though opening the underline mode which will be disabled [but not to cancel].

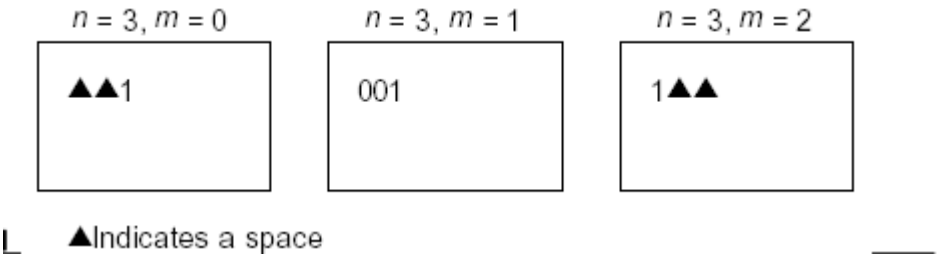
[Default] n=0

## GS C 0 n m

[Name] Set count value printing mode
[Format] ASCII GS C 0 n m
Hex 1D 43 30 n m
Decimal 29 67 48 n m
[Range] 0≤n≤5
0≤m≤2, 48≤m≤50
[Description] Sets printing mode for the continued counter.
.The near-printing figures set by n as follows:
When n=0, the printer prints the actual figure value.
When n=1 to 5, this command sets the figures which is near to print.
.m sets printing position at the whole scale of printing figures, the table as follows:

| m | Printing position | Deal with the figures which is less than the specified bit counts |
|---|---|---|
| 0,48 | Flush right | Add blank at the left |
| 1,49 | Flush right | Add 0 at the left |
| 2,50 | Flush left | Add blank at the left |

[Notes] .If n or m over the defined scale, the advanced defined printing mode not changed.
.If n=0, then m have no any meaning.
[Default] n=0, m=0
[Reference] GS C 1, GS C 2, GS C :, GS c
[For example]




## GS C 1

[Name] Select count mode (A)

[Format] ASCII GS C 1 aL aH aL bH n r
Hex 1D 43 31 aL aH aL bH n r
Decimal 29 67 49 aL aH aL bH n r
[Range] 0≤aL≤255
0≤aH≤255
0≤bL≤255
0≤bH≤255
0≤n≤255
0≤r≤255
[Description] Selects count mode for counter.
.aL,aH or bL,bH specifies the scale of counter.
.When taking count to increase or decrease by degrees, n specified the walking value.
.When the counter value is fixed, r indicates repeat times.
[Notes] .If satisfied the following conditions, then setting count to increase by degrees:
[aL+aH×256]＜[bL+bH×256] and n≠0 or r≠0
.If satisfied the following conditions, then setting count to decrease by degrees:
[aL+aH .256]＞[bL+bH.256] and n.0 or r.0
.If satisfied the following conditions, then stopping counting:
[aL+aH .256]= [bL+bH.256] and n.0 or r.0
.When setting count to increase by degrees, the min of counter is [aL+aH×256], the max is [bL+bH×256] . If the count value increased over the max value, then returns to min and count again.
.When setting count to decrease by degrees, the max of counter is [aL+aH×256],the min is [bL+bH×256] . If the count value decreased less than the min value, then return to max and count again.
.When executes this command, clears the inner counter which indicates repeat count and specified by r.
[Default] aL=1, aH=0, bL=255, bH =255, n=1, r=1
[Reference] GS C 0, GS C 2, GS C :, GS c

## GS C 2 nL nH

[Name] Set count value
[Format] ASCII GS C 2 nL nH
Hex 1D 43 32 nL nH
Decimal 29 67 50 nL nH
[Range] 0≤nL≤255
n≤nH≤255
[Description] Sets the serial count value.

.nL and nH confirms the serial count value is [nL+nH×256].

[Notes] .At the mode of increasing by degrees, If the command sets the counter value which increased over the counter operation scale specified by GS C 1 or GS C, then changing to min value through GS c.

.At the mode of decreasing by degrees, If the command set the counter value which decreased over the counter operation scale specified by GS C 1 or GS C, then changing to max value through GS c.

[Default] nL=1, nH=0

[Reference] GS C 0, GS C 1, GS C :, GS c

## GS C; sa; sb; sn; sr; sc;

[Name] Select count mode (B)

[Format] ASCII GS C : sa : sb : sn : sr : sc :

Hex 1D 43 3b sa 3B sb 3B sn 3B sr 3B sc 3B

Decimal 29 67 59 sa 59 sb 59 sn 59 sr 59 sc 59

[Range] “0”≤sa≤ “65535”

“0”≤sb≤ “65535”

“0” ≤sn≤ “255”

“0” ≤sr≤ “255”

“0”≤sc≤ “65535”

These date are serial characters.

[Description] Selects a count pattern for the counter, and specifies the data of counter.

.sa, sb, sn, sr and sc are ASCII code characters, takes the code from “0” to “9”.

.sa and sb specifies the count scale.

.sn indicates the walking spacing of increasing or decreasing by degrees count.

.sr indicates the repeat times, the count value is fixed.

[Notes] .When satisfied the following conditions, it is the increase by degrees mode:

sa＜sb and sn≠ “0” and sr≠ “0”

.When satisfied the following conditions, it is the increase by degrees mode:

sa＞sb and sn≠ “0” and sr≠ “0”

.When satisfied the following conditions, it stops counting:

sa=sb or sn=“0” or sr=“0”

.When specifies the mode of increase by degrees, sa is the min count value, sb is the max count value. If the increase counts

value over the max value, the count value returns to the min value and begins again. If the count value set by sc over the counter operation scale, will change the count value to min value through executing GS c.

.When specified the mode of decrease by degrees , sa is the max count value, sb is the min count value. If the decrease count value over the min count value , the count value returns to the max value and begins again. If the count value set by sc over the counter operation scale, will change the count value to max value through executing GS c.

.Could omit parameter sa to sc. If omitting, then these parameter value won't change.

.The parameter sa to sa can't contain another characters out of the "0" to "9".

.If the grammar is incorrect, then the relevant parameters setting is not effective , and deals with the following data as the normal data.

[Default] sa= "1", sb= "65535", sn= "1", sr= "1", sc= "1"

[Reference] GS C 0, GS C 1, GS C 2, GS c

## GS H n

[Name] Select the printing position of HRI character

[Format]

| | | | |
|---|---|---|---|
| ASCII | GS | H | n |
| Hex | 1D | 48 | n |
| Decimal | 29 | 72 | n |

[Range] 0≤n≤3, 48≤n≤51

[Description] When prints bar code, selects the printing position of HRI character.

n selects the printing position, the table as follows:

| n | Printing position |
|---|---|
| 0,48 | Not printing |
| 1,49 | Above the bar code |
| 2,50 | Below the bar code |
| 3,51 | Above and below the bar code |

Note: The position of the printer prints HRI characters is not set according to the standard position.

.HRI (Human Readable Interpretation) indicates the readable bar code relevant characters .

[Note] .Takes the characters which specified by GS f to print HRI characters.

[Default] n=0

[Reference] GS f, GS k

## GS I n

[Name] Transmit the printer ID

[Format] ASCII GS I n

Hex 1D 49 n

Decimal 29 73 n

[Range] 1 ≤n≤3, 49≤n≤51

[Description] Transmits the specifying printer ID.

.n specifies the type of printer ID.

| n | The printer ID types | ID |
|---|---|---|
| 1,49 | The printer model ID | Model: T80, Hex code: 21H |
| 2,50 | Type ID | See the following table |
| 3,51 | Fixed version ID | 43H |

[Type ID]

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | OFF | 00 | 0 | Not supports double byte character code. |
| | ON | 01 | 1 | Supports double byte character code. |
| 1 | OFF | 00 | 0 | Uninstalled auto cut paper machine. |
| | ON | 02 | 2 | Installed auto cut paper machine. |
| 2 | - | - | - | Undefined. |
| 3 | - | - | - | Unused. |
| 4 | - | - | - | Unused. |
| 5 | - | - | - | Undefined. |
| 6 | - | - | - | Undefined. |
| 7 | - | - | - | Unused. |

[Specification] .Under the serial interface mode, when selecting DTR/DSR control, be sure that the host computer have ready to receive data(DSR signal is SPACE), The printer only transmits one byte. If the host computer have not ready to receive data (DSR signal is MARK), the printer will be waited, until the printer have ready.

.Under the serial interface mode, when selecting XON/XOFF control, the printer only transmits one byte, and not be sure that the conditions of DSR signal.

.When spreading the data in the receiving buffer area, transmits printer ID. After receiving this command, could be waited a period of transmitting conditions, it decided by the

conditions of receiving buffer area.

.When taking GS a to enable automatically restoring(ASB), must be distinguished the conditions of transmitting by GS I and ASB.

Note: At present no the conditions changing information of bit0.

## GS L nL nH

[Name] Set left-side blank quantity

[Format] ASCII GS L nL nH

Hex 1D 4C nL nH

Decimal 29 76 nL nH

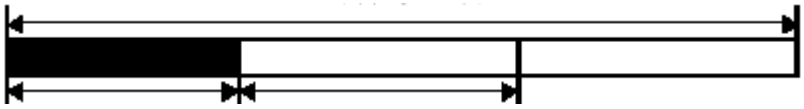
[Range] 0≤nL≤255

0≤nH≤255

[Description] Sets the left side blank quantity by nL and nH

.The left side blank quantity set [(nL+nH×256) ×0.125㎜]

Printable area



The left side blank The width of printable width

[Notes] .Under the standard mode, this command only affects when dealing with at the starting of a line.

.If input this command under the page mode, the printer only executes inner marked operation.

.Under the page mode, this commands no effects printing.

.If the set over the printable area , then taking the max value of the printing unit.

.When executing the light bit image command (GS v o), sets the left side blank quantity through this command, and only could take the unit of 8 bits. If the left side blank quantity which wanted be set can’t divide by 8, then omit the remainder counts.

For example: If (nL+nH×256)=20, the data set by 16.

Note: Takes this command and others, likes GS /, ESC * , when combining to use, the printing outcome may be not the expected.

[Default] nL= 0, nH=0

[Reference] GS W

## GS T n

| m | Printing mode |
|---|---|

| | |
|---|---|
| 1,49 | Partial cut(reserve a little) |
| 66 | Feeds paper to (cutting paper position+[n×0.125㎜]), and takes partial cut(reserve a little), p type cutter. |

[Name] Set printing position to the start printing line

[Format] ASCII GS T n

Hex 1D 54 n

Decimal 29 84 n

[Range] n=0, 1, 48, 49

[Description] The printing position set to the start printing line.

.n specifies the data solving method in the printing buffer area.

| n | Printing position |
|---|---|
| 0,48 | After deleting all data in the printing buffer area, set the printing position to the starting of printing line. |
| 1,49 | After printing all data in the printing buffer area, set the printing position to the starting of printing line. |

## GS V m ②GS V m n

[Name] Select cut paper mode and cut paper

[Format] ①ASCII GS V m

Hex 1D 56 m

Decimal 29 86 m

②ASCII GS V m n

Hex 1D 56 m n

Decimal 29 86 m n

[Range] ①m=1, 49

② m=66, 0≤n≤255

[Description] Selects a cut paper mode, and executes cut paper operation.

Selects model by taking the value of m, as follows:

[The description for ① and ② ]

.According to the different of the auto-cut paper machine type, the cut paper conditions is different.

.This command effects only when dealing with this command at the beginning of a line.

[The specification for ①]

.Only partial cut paper; not full cut paper.

[The specification for ②]

.When n≠0, the printer feeds paper to (cutting paper position+[n ×0.125㎜{0.0049inch}] and cut paper.

## GS W nL nH

[Name] Set printing area width

[Format] ASCII GS W nL nH

Hex 1D 57 nL nH

Decimal 29 87 nL1 nH

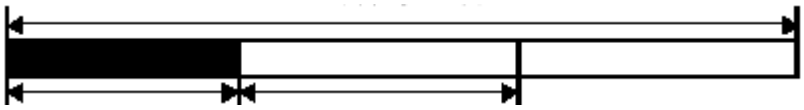
[Range] 0≤nL≤255

0≤nH≤255

[Description] nL and nH sets the printing area width.

.The printable width set by [(nL+nH×256) ×0.125 ㎜].

Printable area



The left side blank The width of printable width

[Notes] .This command only effects when dealing at the beginning of the line.

.If input this command under the page mode , the printer executes the inner marked operation.

.This commands no effects printing under the page mode.

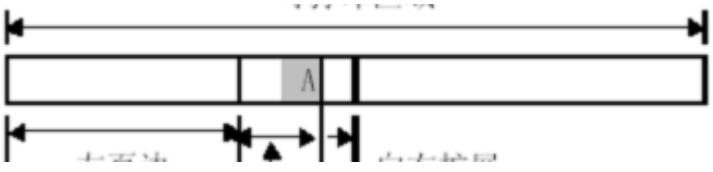
.If the setting value over the printable area, takes the max printable area.

.The setting PRI of GS L is surpass than the setting PRI of GS W. If [the left side blank + printable area width] is over the printable area, the printer takes [printable area width-the left side blank]. However, not takes the set which sets through GS W even if at the current printing, reserves the set which sets through GS W.

.If the width which sets in the printable area is smaller than the width of one character, when printing character data, executes the following disposals:

① The printable area width extends to right and to adapt one character.

Printable area



The left side Extends to right

The printable area width set by nL and nH

② If extends the printable area width not enough, then narrows the right spacing.

.If the width which sets by the printable area is narrower than a vertical line, when printing non-character data (for example, bit image,

the bit image of user-defined), only for the problem lines to the following disposals:

① Extends the printable area width to right and adapts a vertical line of bit image in the printable area.

② If extends the printable area width not enough, then narrows the left spacing to adapt a vertical line.

[Default]

| The mode types to be selected | Horizontal dot count | Default |
|---|---|---|
| (82.5㎜ paper width model) | 640dots | nL=128, nH=2 |
| (79.5㎜ paper width model) | 576dots | nL=64, nH=2 |
| (60㎜ paper width model) | 448dots | nL=192, nH=1 |
| (58㎜ paper width model) | 432dots | nL=176, nH=1 |

[Reference] GS L

## GS \ pL pH

[Name] Set relative vertical printing position under the page mode

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | GS | \ | nL | nH |
| Hex | 1D | 5C | nL | nH |
| Decimal | 29 | 92 | nL | nH |

[Range] 0≤nL ≤255

0≤nH≤255

[Description] Under the page mode, sets from the current position, and relative vertical printing starting position. The space sets by this command from the current position to [(nL+nH×256)×0.125㎜].

[Notes] If not selects the page mode, this command will be ignored.

When N specified to the downward moving:

nL+nH×256=N

When N specified to the upward moving (negative direction), takes 65536 added code.

When N specified to the upward moving:

nL+nH×256=65536-N

.Any set which over the specified printable area will be ignored.

.According to the printing starting position which sets by ESC T, the function of this command as follows:

① When set the starting position to the printable area's up-left or down-right by ESC T, uses the horizontal moving unit(y).

②When set the starting position to the printable area's up-right or down-left, uses the vertical moving unit(x).

[Reference]  ESC $, ESC T, ESC W, ESC \, GS $

## GS ^ r t m

[Name]  Operate macro
[Format]  ASCII  GS  ^  r  t  m
Hex  1D  5E  r  t  m
Decimal  29  94  r  t  m
[Range]  0≤r≤255
0≤t≤255
m=0,1
[Description]  Operates macro
.r specifies the times of operating macro.
.t specifies the waiting time of operating macro.
.m specified the macro operating mode.
When the LSB of m is 0:
Macro continues to execute r times at the specified time spacing.
When the LSB of m is 1:
After the waiting time which specifies by t, PAPER OUT LED will be flashed, and the printer be on waited, FEED button will be pushed. After the button to be pushed, the printer executes one macro. The print operates r time's repeat.
[Notes]  . For executing macro every time, the waiting time is t×100ms.
. If received this command when defining a macro, then the macro definition will be failed and the definition will be cleared.
. If not defined the macro or r is 0, not executing any operation.
. When operating macro' (m=1), feeding paper can't take the FEED button.
[Reference]  GS  :

## GS a  n

[Name]  Enable/disable automatic status back (ASB)
[Format]  ASCII  GS  a  n
Hex  1D  61  n
Decimal  29  97  n
[Range]  0≤n≤255
[Description]  Enable/disable ASB and contained conditions specified by n,
As follows:

| Bit | Off/On | Hex code | Decimal code | ASB status |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Not takes the off which is fixed. |
| 1 | Off<br>On | 00 | 0 | Disable online/offline conditions. |
| | | 02 | 2 | Enable online/offline conditions. |
| 2 | Off | 00 | 0 | Error conditions disabled. |
| | On | 04 | 4 | Error conditions enabled. |
| 3 | Off<br>On | 00 | 0 | Disable the printing paper sensor conditions. |
| | | 08 | 8 | Enable the printing paper sensor conditions. |
| 4 | | - | - | Undefined. |
| 5 | | - | - | Undefined. |
| 6 | Off<br>On | 00 | 0 | Disable printing paper FEED button conditions. |
| | | 40 | 64 | Enable printing paper FEED button conditions. |
| 7 | - | - | - | Undefined. |

[Notes] .If any one of conditions in the above table is enabled, then the printer transmits conditions when executing this command. Once the enabled conditions changed, the printer transmits conditions automatically. Because every condition transmission means the current conditions, So, the disabled conditions could be changed.

.If all conditions are disabled, the ASB function also be disabled.

.If put ASB enabled as the default set, then when the printer opened at the first time and could receive and transmit the printer data, the printer is transmission conditions.

.Transmits the following four condition bytes, not be sure whether the host computer have ready to receive data. The four condition byte needs to be continued, except for the XOFF code.

.Because executes the command data in the receiving buffer area, so there are a period of stopping time between date receiving and condition transmission.

.When takes DLE EOT or GS r, needs to distinguish the conditions and ASB status which transmits by these commands, according to appendix C, the process of transmission conditions in read.

.The conditions needs to transmit as follows:

The first byte (the printer information)

| Bit | Off/On | Hex code | Decimal code | ASB status |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Unused. Off is fixed. |
| 1 | Off | 00 | 0 | Unused. Off is fixed. |
| 2 | On | 04 | 4 | Undefined. On is fixed. |
| 3 | Off | 00 | 0 | Online. |
| | On | 08 | 8 | Offline. |
| 4 | On | 10 | 16 | Unused. On is fixed. |
| 5 | Off | 00 | 0 | Close the print head bar. |
| | On | 20 | 32 | Open the print head bar. |
| 6 | Off | 00 | 0 | Button feeding paper couldn't be through taking the printing paper FEED. |
| | On | 40 | 64 | Button feeding paper could be through taking the printing paper FEED. |
| 7 | Off | 00 | 0 | Unused. Off is fixed. |

The second byte(the printer information)

| Bit | Off/On | Hex code | Decimal code | ASB status |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Offline waiting conditions. |
| | On | 01 | 1 | Online waiting conditions. |
| 1 | Off | 00 | 0 | Turn the printing paper FEED off. |
| | On | 02 | 2 | Turn the printing paper FEED on. |
| 2 | Off | 00 | 0 | No mechanical error. |
| | On | 04 | 4 | Occurred that the mechanical error. |
| 3 | Off | 00 | 0 | No auto cut paper error. |
| | On | 08 | 8 | Occurred auto cut paper error. |
| 4 | Off | 00 | 0 | Unused. Off is fixed. |
| 5 | Off | 00 | 0 | Any error could be restored. |
| | On | 20 | 32 | Occurred that the error which can't be restored. |
| 6 | Off | 00 | 0 | No error could be restor |

| | | | | |
|---|---|---|---|---|
| | | | | ed automatically. |
| | On | 40 | 64 | Occurred that the error which could be restored automatically. |
| 7 | Off | 00 | 0 | Unused. Off is fixed. |

Bit 0: Could see the relative explanation of DLE EOT.

Bit 2: Could see the relative explanation of DLE EOT.

Bit 6: When stops printing because of the print head over temperature, bit 6 is ON(open), until the print head temperature declines to enough low or the cover of roller paper will be opened during printing roller paper.

Printing restored, Bit 6 changed to OFF.

**The third byte (the printing paper sensor information)**

| Bit | Off/On | Hex code | Decimal code | ASB status |
|---|---|---|---|---|
| 0,1 | Off | 00 | 0 | Printing paper near-end: enough printing paper. |
| | On | 03 | 3 | Printing paper near-end: the printing paper near-end. |
| 2,3 | Off | 00 | 0 | Printing paper end sensor: printing paper existed. |
| | On | 0C | 12 | Printing paper end sensor: printing paper not existed. |
| 4 | Off | 00 | 0 | Unused. Off is fixed. |
| 5,6 | - | - | - | Undefined. |
| 7 | Off | 00 | 0 | Unused. Off is fixed. |

**The fourth byte (the printing paper sensor information)**

| Bit | Off/On | Hex code | Decimal code | ASB status |
|---|---|---|---|---|
| 0-3 | - | - | - | Undefined. |
| 4 | Off | 00 | 0 | Unused. Off is fixed. |
| 5,6 | - | - | - | Undefined. |
| 7 | Off | 00 | 0 | Unused. Off is fixed. |

[Default] .When memory switch 1-3 is off n=0

.When memory switch 1-3 is on n=2

[Reference] DLE EOT, GS r

## GS b n

[Name] Turn level and smooth on/off
[Format] ASCII GS b n
Hex 1D 62 n
Decimal 29 98 n
[Range] 0≤n≤255
[Description] Turn level and smooth mode on/off
When the LSB of n is 0, turn level and smooth mode on.
When the LSB of n is 1, turn level and smooth mode off.
[Notes] .Only the LSB of n is effective.
.The level and smooth mode for the inner set user-defined character is useful.
.Even setting the level and smooth mode, when the width of character or the height of character is not the normal size, not executes level and smooth.
[Default] n=0
[Reference] ESC !, GS !

**Note: The enlarged level and smooth arithmetic of characters and Chinese is complex, At present, there are no practical realization method, takes this command now can't reach to the printing result that you expects.**

## GS c

[Name] Printing count value
[Format] ASCII GS c
Hex 1D 63
Decimal 29 99
[Description] Sets a serial count value, and sets the increase or decrease of count value in the printing buffer area.
[Notes] .After setting the current counter value to the printing data (one character font) in the printing buffer area, on the basis of the count mode setting the printer counts increase or decrease by degrees. When the printer received a printing command or on the conditions of the full printing buffer area, prints the count value in the printing buffer area.
.At the count mode of increasing by degrees, If the count value which sets by this command is over the count operation scale which sets by GS C 1 or GS C, then the count value to be changed to min value.
.At the count mode of decreasing by degrees, If the count value which sets by this command is over the count operation scale which sets by GS C 1 or GS C, the count value to be changed to

max value.
[Reference] GS C 0, GS C 2, GS C :

## GS f n

[Name] Select HRI (Human Readable Interpretation) character type
[Format] ASCII GS f n
Hex 1D 66 n
Decimal 29 102 n
[Range] n=0, 1, 48, 49
[Description] When printing bar code, selects one font for the HRI character which to be used.
n used to be selected one font as the following table

| n | Font |
|---|---|
| 0, 48 | Font A(12×24) |
| 1, 49 | Font B(9×17) |

[Notes] .HRI Human Readable Interpretation indicates the relative characters of
readable bar code.
.Prints HRI characters on the position of specifying by GS H.
[Default] n=0
[Reference] GS H, GS K

## GS h n

[Name] Set the bar code height
[Format] ASCII GS h n
Hex 1D 68 n
Decimal 29 104 n
[Range] 1≤n≤255
[Description] Sets the bar code height
n sets the dot counts in the vertical direction.
[Default] n=162
[Reference] GS k

## GS k m d1...dk NUL ②GS k m n d1...n

[Name] Print bar code
[Format] ①ASCII GS k m d1...dk NUL
Hex 1D 6B m d1...dk 00
Decimal 29 107 m d1...dk 0
②ASCII GS k m n d1...dn
Hex 1D 6B m n d1...dn

Decimal 29 107 m n d1...dn

[Range] ① 0≤m≤6 (k and d decided by the used bar code system)

②65≤m≤73 (n and d decided by the used bar code system)

[Description] Selects bar code system and prints bar code.

**m selects the bar code system as follows**

| m | | Bar code system | Character units | Notes |
|---|---|---|---|---|
| | 0 | UPC-A | 11≤k≤12 | 48≤d≤57 |
| | 1 | UPC-E | 11≤k≤12 | 48≤d≤57 |
| | 2 | JAN13(EAN13) | 12≤k≤13 | 48≤d≤57 |
| | 3 | JAN8(EAN8) | 7≤k≤8 | 48≤d≤57 |
| | 4 | CODE39 | 1≤k | 48≤d≤57, 65≤d≤90,32,36,37,43,45,46,47 |
| | 5 | ITF | 1≤k(k is even) | 48≤d≤57 |
| | 6 | CODABAR | 1≤k | 48≤d≤57, 65≤d≤68,36,43,45,46,47,58 |
| | 7 | Standard EAN13 | 12≤k≤13 | 48≤d≤57 |
| | 8 | Standard EAN8 | 7≤k≤8 | 48≤d≤57 |
| | 65 | UPC-A | 11≤n≤12 | 48≤d≤57 |
| | 66 | UPC-E | 11≤n≤12 | 48≤d≤57 |
| | 67 | JAN13(EAN13) | 12≤n≤13 | 48≤d≤57 |
| | 68 | JAN8(EAN8) | 7≤n≤8 | 48≤d≤57 |
| | 69 | CODE39 | 1≤n≤255 | 48≤d≤57, 65≤d≤90,32,36,37,43,45,46,47 |
| | 70 | ITF | 1≤n≤255(n is even) | 48≤d≤57 |
| | 71 | CODABAR | 1≤n≤255 | 48≤d≤57, 65≤d≤68,36,43,45,46,47,58 |
| | 72 | CODE93 | 1≤n≤255 | 0≤d≤127 |
| | 73 | CODE128 | 1≤n≤255 | 0≤d≤127 |
| | 74 | Standard EAN13 | 12≤n≤13 | 48≤d≤57 |
| | 75 | Standard EAN8 | 7≤n≤8 | 48≤d≤57 |

**Notes ①**

.This commands be finished by NUL.

.When the used bar code system is UPC-A or UPC-E, prints the bar code and deals with the continued data as the normal data after the printer received 12 bytes bar code data.

.When the used bar code system is JAN13 (EAN13) , prints the bar code and deals with the continued data as the normal data after the printer received 13 bytes bar code data.

.When the used bar code system is JAN8 (EAN8) , prints the bar code and deals with the continued data as the normal data after the printer received 8 bytes bar code data.

.The units of ITF bar code data must be the even. When the input data

is odd, the printer ignores the last received data.

Notes ②

.n specified the data bytes, and the printer deals with the n byte data as the bar code data from the next character.

.If n over the specified scale, then the printer stops to deal with this command, and deals with the continued data as the normal data.

The notes under the standard mode

.If d over the specified scale, the printer only feeds paper and deals with the continued data as the normal data.

.If the size in the horizontal direction over the printable area, the printer only feeds paper.

.This command feeds paper according to the printing bar code, In spite of the line spacing which sets by EΣX2 or EΣX3.

.This command effects only when there are no data in the printing buffer area. When there are data in the printing buffer area, the printer deals with the continued data of m as the normal data.

.After printing the bar code, this command sets the printing position to the beginning of a line.

.This command no effects by the printing mode(over-striking, overlap, underline, character size, opposites blank printing, or character 90 ° revolved and so on.), except for the reversed printing mode.

The notes under the page mode

.This command makes the bar code data in the printing buffer area, but not printing. After dealing with the bar code data, this command moves the printing position to the right side of bar code.

.If d over the specified scale, the printer stops to deal with this command and deals with the continued data as the normal data. In such circumstance, the position of data buffer area not changed.

.If the bar code width over the printable area, the printer doesn't print the bar code, but moves the position of data buffer area to left and out of the printable area.

.Refers to the section 3.9 the page mode.

When takes thermal mark:

.If the bar code width is not fit for the current mark, the over part to be printed on the next mark.

When takes CODE93 (m=73):

.The printer prints a HRI character at the beginning of the HRI character font(□), as the starting character of HRI character font.

. The printer prints a HRI character at the end of the HRI character font(□), as the ended character of HRI character font.

. The printer prints HRI character( ■ +one character) as the control character(<00>H to <1F> and <7F>H):

| Control character | | | HRI | Control character | | | HRI |
|---|---|---|---|---|---|---|---|
| ASCII | Hex | Decimal | character | ASCII | Hex | Decimal | character |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| NUL | 00 | 0 | ■U | DLE | 10 | 16 | ■P |
| SOH | 01 | 1 | ■A | DC1 | 11 | 17 | ■Q |
| STX | 02 | 2 | ■B | DC2 | 12 | 18 | ■R |
| ETX | 03 | 3 | ■C | DC3 | 13 | 19 | ■S |
| EOT | 04 | 4 | ■D | NAK | 14 | 20 | ■T |
| ENQ | 05 | 5 | ■E | SYN | 15 | 21 | ■U |
| ACK | 06 | 6 | ■F | ETB | 16 | 22 | ■V |
| BEL | 08 | 7 | ■G | CAN | 17 | 23 | ■W |
| BS | 09 | 8 | ■H | EN | 18 | 24 | ■X |
| HT | 09 | 9 | ■I | EN | 19 | 25 | ■Y |
| LF | 0A | 10 | ■J | SUB | 1A | 26 | ■Z |
| VT | 0B | 11 | ■K | ESC | 1B | 27 | ■A |
| FF | 0C | 12 | ■L | FS | 1C | 28 | ■B |
| CR | 0D | 13 | ■M | GS | 1D | 29 | ■C |
| SO | 0E | 14 | ■N | RS | 1E | 30 | ■D |
| SI | 0F | 15 | ■O | US | 1F | 31 | ■E |
| | | | | DEL | 7F | 127 | ■T |

[For example] Prints GS k 72 7 67 111 100 101 13 57 51


**When takes CODE128 (m=73):**

.About CODE128 bar code and code table information , refers to the appendix E.

.When the printer takes CODE128, please considers the following which about the data transmitting data:

① The head of bar code data font needs to be the code font selected character(CODE A, CODE B, or CODE C), takes to be selected the first using code fond.

② Defines the special character by character “{” and a character group. Defines ASCII character “{” through continuing transmitting “{” twice.

| Special characters | Transmit data | | |
|---|---|---|---|
| | ASCII | Hex | Decimal |
| SHIFT | {S | 7B, 53 | 123,83 |
| CODE A | {A | 7B, 41 | 123,65 |
| CODE B | {B | 7B, 42 | 123,66 |
| CODE C | {C | 7B, 43 | 123,67 |
| FNC1 | {1 | 7B, 31 | 123,49 |
| FNC2 | {2 | 7B, 32 | 123,50 |

| | | | |
|---|---|---|---|
| FNC3 | {3 | 7B, 33 | 123,51 |
| FNC4 | {4 | 7B, 34 | 123,52 |
| “{” | { { | 7B,7B | 123, 123 |

[For example] Prints the actual example data of “No. 123456”
At this actual example, first the printer takes CODE B to print “No.”, then takes CODE C to print the following figures.

GS k 73 10 123 66 78 111 46 123 67 12 34 56


.If the data font head of bar code is not the code fond selected character, the printer stops to command disposal, and deals with the continued data as the normal data.
.If the combined of “{” and continued characters is not fit for the any special characters, the printer stops to command disposal, and deals with the continued data as the normal data.
.If the printer received characters which can’t be used to special code font, the printer stops to command disposal, and deals with the continued data as the normal data.
.The printer doesn’t print the HRI characters which relatives to shift characters or code font selected characters.
.The HRI characters of function character is blank.
.The HRI characters is the blank which about control characters (<00>H to <7F>H).
[Others] Be sure to reserve spacing at the left and right of bar code.
[Reference] GS H, GS f, GS h, GS w

## GS r n

[Name] Transmit status
[Format] ASCII GS r n
Hex 1D 72 n
Decimal 29 114 n
[Range] n=1, 49
[Description] Transmits the status n which specified by n as follows:

| n | Function |
|---|---|
| 1,49 | Transmits the printing paper sensor status |

[Notes] .When taking serial interface, If sets DTR/DSR control, the printer only transmits one byte after be sure that the host have received the date (DSR signal is SPACE). If the host haven’t ready to receive

data (DSR signal is MARK), the printer waited until the host have ready to.

If sets SON/XOFF control, the printer only transmits one byte, and be not sure the DSR signal status.

.Executes this commands when the data affects in the printing buffer area. So, between receiving this command and transmitting status, may be have a time spacing, it decided by the status of receiving buffer area.

.When takes ASB by GS a, distinguished the transmitting status of GS r and ASB status which refers to the table in the appendix C.

.The transmitting status types as follows:

**The printing paper sensor status (n=1,49)**

| Bit | Off/On | Hex | Decimal | ASB status |
|---|---|---|---|---|
| 0,1 | Off | 00 | 0 | Paper near-end sensor: printing paper enough. |
| | On | 03 | 3 | Paper near-end sensor: printing paper enough. |
| 2,3 | Off | 00 | 0 | Paper-end sensor: printing paper enough. |
| | On | (0C) | (12) | Paper-end sensor: without paper. |
| 4 | Off | 00 | 0 | Unused. Off is fixed. |
| 4,6 | - | - | - | Undefined. |
| 7 | On | 00 | 0 | Unused. Off is fixed. |

Bit 2 and 3: When the paper-end sensor tests the printing paper-end, the printer enters into offline. So, bit 2 and 3 not transmits without paper status.

[Reference] DLE EOT, GS a

## GS v 0 m xL xH yL yH d1...dk

[Name] Print grating 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≤m≤3, 48≤m≤51

0≤xL≤255

0≤xH≤255 here 1≤(xL+xH×256) ≤128

0≤yL≤255

0≤yH≤8 here 1≤(yL+yH×256) ≤4095

01≤d≤255

K=(xL+xH×256) ×(yL+yH×256) (k≠0)

[Description] Sets grating bit image m as follows:

| m | Mode | Vertical Dot Density | Horizontal Dot Density |
|---|---|---|---|
| 0, 48 | Normal | 203.2 dpi | 203.2 dpi |
| 1, 49 | Double width | 203.2 dpi | 101.6 dpi |
| 2, 50 | Double height | 101.6 dpi | 203.2 dpi |
| 3, 51 | Four times size | 101.6 dpi | 101.6 dpi |

(dpi: per 25.4㎜{one inch} printing dots)

- xL, xH, sets bit image horizontal direction data bytes(xL+xH×256)
- yL, yH, sets bit image vertical direction data bytes(yL+yH×256)

[Notes] ·Under the standard mode, this command only affects when there are no data in the printing buffer area.

.For the grating bit image printing, this command no affects by the printing mode(character size, over striking, overlap, up-down printing, underline, reverses blank printing mode and so on).

.If the printable area width which sets by GS L and GS W is narrower than the min width , the printer only extends the problem line to the nine width. The min width for normal mode (m=0,48) and double height mode(m=2, 50) is a dot, for the double width mode(m=1,49) and four times size mode(m=3,51) is two dots.

. The data out of the printing area be read, and discarded one by one.

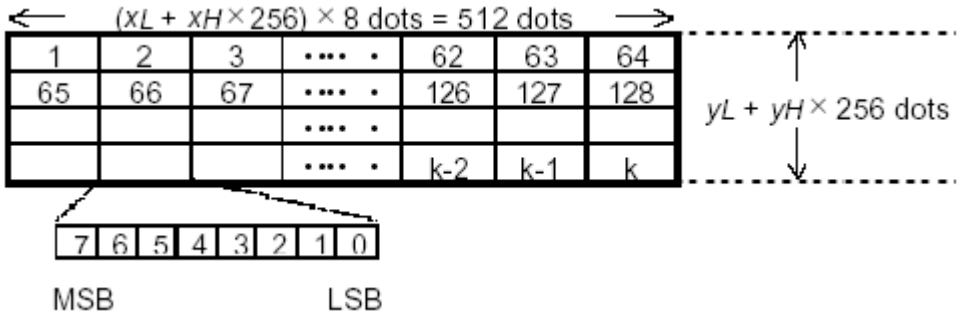
. If the printing position of continued character is the multiple of 8. The continued will be the character printing position of grating bit image, sets by HT(horizontal table), ESC $(set absolute printing position), ESC \(set relative printing position) and GS L(set left side spacing).

.The set by ESC a (set justification) for the grating bit image is effective.

.Receives this command during macro definition, the printer finishes the macro definition, and begins to execute this command. Should clear the definition of this command.

. d designates bit image data. Set the printing dot 1, no printing dot 0.

[For example] When xL+xH×256=64




**GS w n**

[Name] Set bar code width
[Format] ASCII GS w n
Hex 1D 77 n
Decimal 29 119 n
[Range] 2≤n≤6
[Description] Set bar code horizontal size.

n set the bar code width as follows:

| n | Multi-bar code unit Width(mm) | Two-bar code | |
|---|---|---|---|
| | | Narrow width(mm) | Wide width(mm) |
| 2 | 0.250 | 0.250 | 0.625 |
| 3 | 0.375 | 0.375 | 1.000 |
| 4 | 0.560 | 0.500 | 1.250 |
| 5 | 0.625 | 0.625 | 1.625 |
| 6 | 0.750 | 0.750 | 2.000 |

- The following is the multi-bar code:
  UPC-A, UPC-E, JAN13 (EAN13), JAN8(EAN8), CODE93, CODE128
- The following is the two-bar code:
  CODE39, ITF, CODABAR

[Short data] n=3
[Reference] GS k

## 4.4Chinese control command

**FS ! n**

[Name] Set character print mode(s)
[Format] ASCII FS ! n
Hex 1C 21 n
Decimal 28 33 n
[Range] 0≤n≤255

[Description] Sets the character print mode, set n as follows:

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | -- | -- | -- | Undefined |
| 1 | -- | -- | -- | Undefined |
| 2 | Off | 00 | 0 | Prohibit double width mode |
| | On | 04 | 4 | Permit double width mode |
| 3 | Off | 00 | -- | Prohibit double height mode |
| | On | 08 | 8 | Permit double height mode |
| 4 | -- | -- | -- | Undefined |
| 5 | -- | -- | -- | Undefined |
| 6 | -- | -- | -- | Undefined |
| 7 | Off | -- | -- | Undefined |
| | On | -- | -- | Undefined |

[Specification]
- On the conditions of setting the double wide and height mode(contains the right and left character spacing), will print the four times size character.
- The printer can add underline for all characters(contains right-side and left-side character spacing), but can't add underline for the blank which set by HT command, and clockwise 90° revolved characters.
- The width of underline designated by FS. It is not relevant to the size of character.
- When some of characters in a line is double height characters or more, all characters in this line will stand at the same level along datum line.
- Enlarge Chinese character could use FS W or GS ! command, the set is effective when received finally.
- The command which received finally is effective, the set is effective when received finally.

[Short data] n=0
[Reference] FS -, FS W, GS !

## FS &

[Name] Set Chinese mode
Format ASCII FS &
Hex 1C 26

Decimal 28 38

[Description] Selects Chinese characters mode.

[Specification]
- This command only affects when selects GB18030 code system.
- GB18030 only affects double byte 1,2,3,4,5 area.
- When selects Chinese character mode, the printer deals with all the Chinese code, two bytes each time.
- The sequence arranged the Chinese code according to the first and the second byte.
- When turn on the power, the printer enter into Chinese mode automatically.
- When selects Chinese character mode, at first the printer check the code whether the Chinese: If it is the Chinese, then deals with the first and the second bytes of Chinese code.

[Reference] FS . .FS C

## FS – n

[Name] Turn underline mode on/off for Chinese characters

[Format]

| | | | |
|---|---|---|---|
| ASCII | FS | - | n |
| Hex | 1C | 2D | n |
| Decimal | 28 | 45 | n |

[Range] 0≤n≤2,48≤n≤50

[Description] For the receipt and appendix, according to the following n value, turn underline mode on/off for Chinese characters.

| n | Function |
|---|---|
| 0,48 | Turn underline mode off for Chinese characters |
| 1,49 | Turn underline mode on for Chinese characters(1-dot width) |
| 2,50 | Turn underline mode on for Chinese characters(2-dot width) |

[Specification]
. The printer can add underline for all characters(contains right-side and left-side character spacing), but can't add underline for the blank which set by HT command, and clockwise 90° revolved characters.
. Through setting n which is 0, after turning the underline off for Chinese characters, won't execute the underline printing, but the underline width which be specified before not be changed. The default underline width is 1 dot.
. Sets or cancel the underline mode through FS !, and the

final received command is effective.
. When selecting appendix, even n is 2 or 50, the width of underline is 1 dot.

[Default] n=0

[Reference] FS !

## FS .

[Name] Cancel Chinese character

[Format] ASCII FS .
Hex 1C 2E
Decimal 28 46

[Description] Cancel the Chinese character mode

[Specification] • This command only affects when selects GB18030 code system.
• When not selects the Chinese character mode, all character code is ASCII code, per character dealt with each time.
• When turns the power on, the printer enters into Chinese mode automatically.

[Reference] FS &, FS C

## FS 2 [c11 c12 d1...d1k] 1...[cn1 cn2 d1...dnk]n NULL

[Name] Define use-defined Chinese

[Format] ASCII FS 2 [c11 c12 d1...d1k]1...[cn1 cn2 d1...dnk]n NULL
Hex 1C 32 [c11 c12 d1...d1k]1...[cn1 cn2 d1...dnk]n NULL
Decimal 28 50 [c11 c12 d1...d1k]1...[cn1 cn2 d1...dnk]n NULL

[Range] c1, c2 is the area and bit code in user-defined Chinese which confirmed by FS 2, needs to confirm the used yard area. K=72, n is the units of the defined Chinese, d1...dk is the user-defined Chinese data. Not on the scale of the selected user-defined Chinese, it will be as the ineffective definition.

[Description] .c1 is an area code, c2 is a bit code. User-defined Chinese hold in FLASH, it won't loss if power off.
.Before defining user-defined Chinese by FS 2 command, needs to confirm the used code area. (takes FS C command, the specification please refer to the FS C command.)
.After transmitting FS 2 [c11 c12 d1...d1k]1...[cn1 cn2 d1...dnk]n, finishes definition by transmitting NUL finally.
.Repeat [note] to define the character frequently, It may break FLASH MEMORY, so suggests that it is less than ten times each day.
.Defining several characters, finishes by one command and makes definition together.

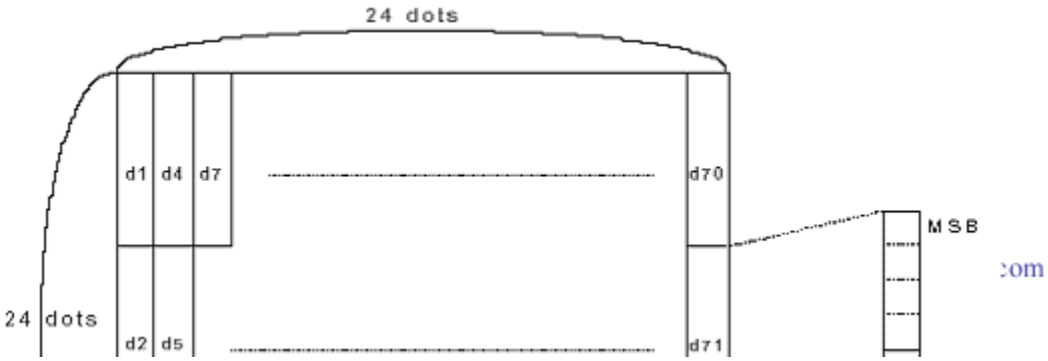
[Specification] This command could define n characters, after finishing FS 2

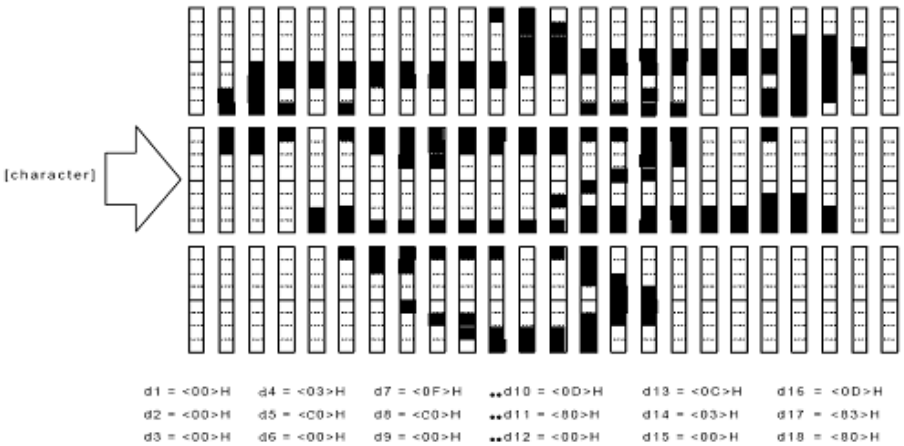
[c11 c12 d1...d1k]1...[cn1 cn2 d1...dnk]n, to end the definition by transmitting NUL finally. You could define all characters in the scale of user-defined area and bit code according to this command. Repeat definition, that's to say, takes the definition for the same area and bit code which selected the scale of user-defined more than two times.

[Default] Complete blank.

[Reference] FS C

[For example]




## FS C n

[Name] Select user-defined character area

[Format] ASCII FS C n

Hex 1C 43 n

Decimal 28 67 n

[Range] n=0, 1, 2, 48, 49, 50

[Description]

| N | User-defined area | Code scale |
|---|---|---|
| 0,48 | User area 1 | AAA1～AFFE |
| 1,49 | User area 2 | F8A1～FEFE |
| 2,50 | User area 3 | A140～A7A0 |

Notes: 1.Changes the user area , will clear all characters which defined before.

2. When taking user-defined characters, notes that the selected area as the same as the defined area, Or, may print incorrectly.
3. Before using that FS 2 defined, firstly ensure

[Default] n=0

## FS S n1 n2

[Name] Set Chinese right and left character spacing

[Format] ASCII FS S n1 n2
Hex 1C 53 n1 n2
Decimal 28 83 n1 n2

[Range] 0≤n1≤255
0≤n2≤255

[Description] Respectively sets left side and right side Chinese character spacing is n1 and n2.
.The left side character spacing is [n1×0.125 ㎜], the right character spacing is [n2×0.125 ㎜].

[Specification] .This command sets the left side and right side character spacing of normal size character. When setting double width mode, the left side and right side character spacing is twice than the normal mode.
.Could set the spacing by this command respectively under the standard mode and page mode.
.Under the standard mode, takes the horizontal moving unit.
.Under the page mode, takes the horizontal moving unit or vertical moving unit changed by page mode, depends on the difference of printable area starting position. The specification as follows:
①When set the starting position to the printable area up-left or down-right by ESC T, uses the horizontal moving unit(y).
②When set the starting position to the printable area up-right or down-left, uses the vertical moving unit(x).
③For appendix, the widest right side spacing about 32 ㎜(255×0.125 ㎜). Any set which over the max will change to the max value automatically.

[Default] n1=0, n2=0

**FS W n**

| | |
|---|---|
| [Name] | Turn quadruple-size mode on/off for Chinese characters |
| [Format] | ASCII FS W n<br>Hex 1C 57 n<br>Decimal 28 87 n |
| [Rang] | 0≤n≤255 |
| [Description] | Turn quadruple-size mode on/off for Chinese characters.<br>.When the LSB of n is 0, quadruple-size mode is turned off.<br>.When the LSB of n is 1, quadruple-size mode is turned on. |
| [Specification] | .Only the LSB of n is effective.<br>.Under the quadruple-size mode, the printing character size is the same as the printing character size when sets double width and double height.<br>.When taking this command to turn the quadruple-size mode off, prints the following characters according to the size of normal characters.<br>.When the different of some characters height in a line, all characters in this line will flush on the basis of baseline.<br>.When the characters enlarged along the horizontal direction, the character enlarged to right, and the baseline according to the left side of characters.<br>.Turn the quadruple-side mode on/off by FS ! or GS ! which could through selecting double width and double height mode. The command set which receives at last is also effective. |
| [Default] | n=0 |
| [Reference] | FS !, GS ! |

# Chapter VI MALFUNCTION ANALYSIS AND EXCLUSION

## 5.1 Malfunction and exclusion

| Malfunction Phenomenon | Exclusion Method |
|---|---|
| If the external objects, for exampl | If the problem isn’t serious, The |

| | |
|---|---|
| e clip, which fallen to the auto-cutter machine, and led to lock about the auto-cutter machine, then the printer enters into error status and restores operation automatically. | auto-cutter machine could be restore to the normal position and needn't to restore by manual, (The error indicator flashed continually, but the error could be corrected by itself)<br>If the auto-cutter machine doesn't restore to the normal position by itself, then please revolves the auto-cutter machine motor wheel to make it restore to starting position. |
| Auto-cutter machine locked, and couldn't revolve the motor wheel. | Reserve to run and loose the wheel, then push the paper feeding button. Next checkout the error indicator, if the error indicator flashes, and repeat the same process, until confirming the error indicator turned off. When the error indictor turned off, the cutter of auto-cutter machine have restored to the normal position. Open the cover, and move the paper which be jammed, and install the roll paper again. Finally close the cover. |

## 5.2 Transport、Storage

1) During transport and storage, store the sets to the electric sponge, lead,
   Be sure to protect the equipments.
2) The electric materials(clips and so on) fallen to the circuit board.
   The pins on the short circuit board may bring heat damage or blowout fuse because of the over circuit.
3) During transport and storage, store the sets to the electric sponge, lead,
   Be sure to protect the equipments.
4) Be sure to put this set to the fixed, steady horizontal surface.
   If the set be fallen, may lead to break or another damages.
5) The set can't be used to the high humid and dusty environment.
   The over humid and dusty may be brought damage, fire or strike fire to set.
6) The heavy objects can't be put on this set, stand or lean against this set

forbidden.
This set fallen or collapsed which will be brought broken and damaged.

7) Be sure to safe, please pull the plug down if you won't use this set for
a long time.

# Appendix A: Miscellaneous Notes

## Notes on printing and feeding paper

1) The printer is line printer, so it can feed paper automatically after printing the data. So, when a line spacing set value is smaller than the printing data, maybe the quantity of feeding paper is larger than the quantity which be set, and print the data.
For example, when the line spacing be set 10 dots(10/180inch), only executes feeding paper, the paper moved ahead 10 dots, if print the bit image character, will feed paper 24 dots.
When only printing revolved characters in a line, executes feeding paper as the table A.1

| | | The feeding paper quantity to be needed(dot) |
|---|---|---|
| Normal characters | Character type A | 24 × vertical enlargement multiple |
| | Character type B | 17 × vertical enlargement multiple |
| | Chinese | 24 × vertical enlargement multiple |
| Revolved characters | Character type A | 12 × vertical enlargement multiple |
| | Character type B | 9 × vertical enlargement multiple |
| | Chinese | 24×vertical enlargement multiple |
| Bit image (ESC *) | | 24 |

2) When the printer enter into waited conditions (data waited) in the printing period, then it stops printing and feeding paper for the moment. When executing that the data transmitted and printed , the paper will offset one to three dots from the starting position, it mainly effects the bit image printing.

3) The space time of auto-cutting operation in bill parts.
For the auto-cutting machine of the driving bill parts, the narrowest

space is ten printing lines or feeding paper lines (avoid that the slice paper fallen into the auto-cutting paper machine).

## Notes on the external power connection

• Connect the external power supply to the power supply connector of the printer.

Then plug in the external power supply and turn it on if necessary. Be sure not to connect the external power supply with the wrong polarity. If it is connected incorrectly, the internal circuit fuse of the printer may be blown or the external power supply may be damaged.

- The power supply voltage is within the range of 24V ±2.4V. If the power supply voltage drops to a value outsides the range above during printing, the printer stops printing and waits until the voltage returns to normal and then automatically begins printing again. If the voltage does not return to normal, the printer generates an error. Therefore, printing speed may slow, the print pitch may not be correct, and some dots in some characters may not be printed.
- The error of high or low voltage listed on the table 3.7.3. The flashing mode listed on the table.
- When either a high or low voltage error occurs, turn off the power as soon as possible.
- The power capacity of the printer to be suggested over the 150W.

## Appendix B: Recovery from an auto-cutter error

- If a external object such as a push pin or paper clip drops in the auto-cutter and caused the auto-cutter to lock up, the printer enters an error state and begins the recovery operation automatically.

  If the problem is not serious, the auto-cutter returns to its normal position without any intervention by the user. (The error LED blinks continuously, but it is possible for the error to be corrected automatically.)

  If the auto-cutter does not return to its normal position by itself, please rotate the motor until it recovers to the starting position.
- If the cutter blade knob can't be rotated, rotate it in the reverse direction to loosen it; Next, check the error LED . If the error LED is not off, repeat the same procedure and confirm that the error LED is off. When the error LED is off, the auto-cutter blade has returned to its normal position and the roll paper cover can be opened. Open the roll paper cover, remove the jammed paper, and reinstall the roll paper. Then close the roll paper cover.

# Appendix C: The transmission status mark

Because the transmission special status bit from this circuit board to the printer is fixed, the user could confirm the status belonged command.

Table C.1 transmission status mark

| Command and Function | Reply status |
|---|---|
| GS r | <0**0****> B |
| XON | <00010001> B |
| XOFF | <00010001> B |
| DLE EOT | <0**1**10> B |
| ASB(1st byte) | <0**1**00> B |
| ASB(2nd to 4th byte) | <0**0****> B |

# Appendix D: The page mode printing example

Takes the page mode printing example and which notes in this appendix.

Under the page mode, the type process of transmitting command as follows:

① Transmits ESC L to enter into the page mode.

② Defines printable area by ESC W.

③ Specifies the printing direction by ESC T.

④ Transmits the printing data.

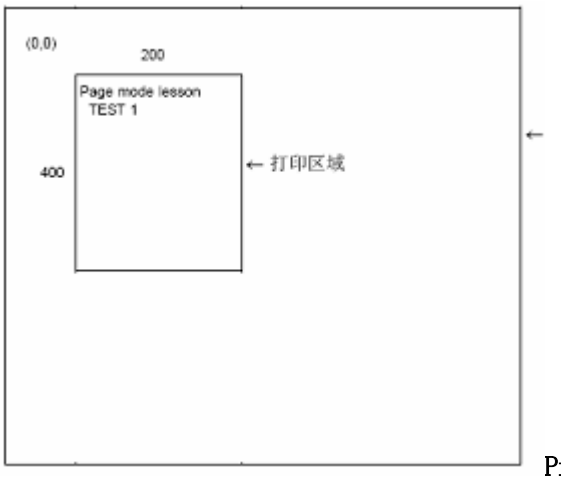
⑤ Sends FF to print data together.

⑥ After printing, the printer back to the standard mode automatically.

**The example 1:** BASIC procedure example (when opening the #1 document, could transmit the data to printer)

```
100 PRINT #1,CHR$(&H1B);"L";
110 PRINT #1,CHR$(&H1B);"W";CHR$(0);CHR$(0);CHR$(0);CHR$(0);
120 PRINT #1,CHR$(200);CHR$(0);CHR$(144);CHR$(1);
130 PRINT #1,CHR$(&H1B);"T";CHR$(0);
140 PRINT #1,"Page mode lesson TEST 1"
150 PRINT #1,CHR$(&HC);
```

At the procedure of example 1, sets a 200×400 dots printable area which begins (0,0), and the characters prints at the first line in the printable area, the picture as follows.




The page mode example 1

**Note:** As the above picture plugs a feeding paper line between “lesson” and “TEST 1”. Because at the horizontal scale of 200 ×400 printable area, behind the word “lesson” there are no position to capacity the blank mark “”, so plug this feeding paper line automatically. The feeding paper quantity at this position sets by ESC 3. Before executing FF, could set any one of quantity printable area. If there are any one of printable area overlaps, so the logical sum of the overlapping part data prints as the final data.

The data which have been made could be deleted partly. Takes ESC W to specify a printable area, this area will be made the deleted part; then deletes data by CAN. All data in the specified printable area will be deleted, even if it’s the only part of characters.

**The example 2:** BASIC procedure example

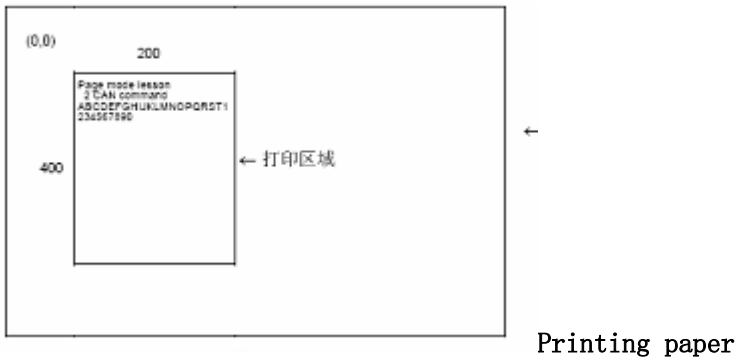
```
100 PRINT #1,CHR$(&H1B);"L";
110 PRINT #1,CHR$(&H1B);"W";CHR$(0);CHR$(0);CHR$(0);CHR$(0);
120 PRINT #1,CHR$(200);CHR$(0);CHR$(144);CHR$(1);
130 PRINT #1,CHR$(&H1B);"T";CHR$(0);
140 PRINT #1,"Page mode lesson 2 CAN command"
150 PRINT #1,CHR$(&HA);
160 PRINT #1,"ABCDEFGHIJKLMNOPQRST1234567890"
170 PRINT #1,CHR$(&HC);
```

**The procedure of this example as follows:**

At first, changes to the page mode (100 lines) by transmitting ESC L. Then, specifies the printable area which sends eight parameters from n1 to n8 by ESC W. Specifies a printable area from (0,0), x direction is 200 dots, y direction is 400 dots, Transmits the parameters according the sequence of 0,0,0,0,200,0,144,1(the line number is 110 and 120). In addition, 0 be set the printing direction by ESC T(the line number is 130).

After setting these items, transmits the printing data “Page mode lesson 2 CAN command” and “ABCDEFGHIJKLMNOPQRST1234567890”(the line number from 140 to 160). Brings the following printing result through transmitting FF

(the line number is 170).

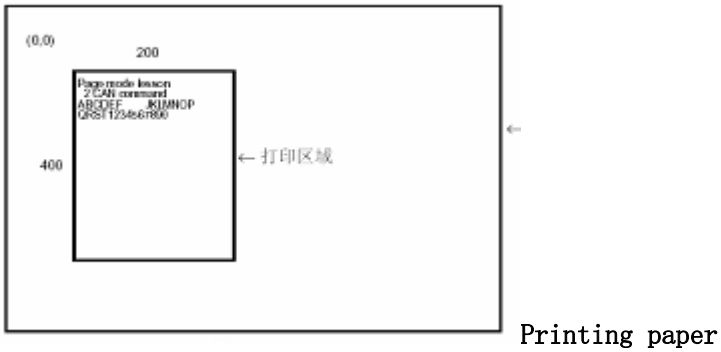



The page mode example 2

If contains the following procedure lines before transmitting FF, the part of data will be deleted:

```
170 PRINT #1,CHR$(&H1B);"W";CHR$(72);CHR$(0);CHR$(96);CHR$(0);
180 PRINT #1,CHR$(51);CHR$(0);CHR$(81);CHR$(0);
190 PRINT #1,CHR$(&H18);
200 PRINT #1,CHR$(&HC);
```

If contains the above procedure, the character font "GHI" will be deleted, and lead to the following printing result. When an area deleted by CAN, the deleted part will be reserved blank.




The page mode example 3

# Appendix E: CODE 128 bar code

## E.1 The description of CODE128 bar code

At the CODE128 bar code system, using one bar code character fond, it could indicate 128 units ASCII characters and 2 bit counts.
These bar code characters defined by 103 units bar code characters and 3 units code fond, Per code fond indicates the following characters:

- Code fond A: ASCII character 00H to 5FH
- Code fond B: ASCII character 20H to 7FH
- Code fond C: Use one character indicates 2 bits natural characters (100 units numerals from 00 to 99)

  There are other special characters among CODE128:
- SHIFT character

  At the code fond A, the code which followed with SHIFT be treated as the code B character. At the code fond B, the code which followed with SHIFT be treated as the code A character. SHIFT character can't be used at code fond C.
- Code fond chosen character(CODE A, CODE B, CODE C)

  This character changes the following code fond to code fond A B or C
- Function character(FNC1, FNC2,FNC3,FNC4)

  The use of function character depends on the application software. In the code fond C, only FNC 1 in practical.

## E.2 Code Table

Printing character among code fond A

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CR | 0D | 13 | 5 | 35 | 53 | ] | 5D | 93 |
| SO | 0E | 14 | 6 | 36 | 54 | ^ | 5E | 94 |
| SI | 0F | 15 | 7 | 37 | 55 | _ | 5F | 95 |
| DLE | 10 | 16 | 8 | 38 | 56 | FNC1 | 7B, 31 | 123, 49 |
| DC1 | 11 | 17 | 9 | 39 | 57 | FNC2 | 7B, 32 | 123, 50 |
| DC2 | 12 | 18 | : | 3A | 58 | FNC3 | 7B, 33 | 123, 51 |
| DC3 | 13 | 19 | ; | 3B | 59 | FNC4 | 7B, 34 | 123, 52 |
| DC4 | 14 | 20 | < | 3C | 60 | SHIFT | 7B, 53 | 123, 83 |
| NAK | 15 | 21 | = | 3D | 61 | CODEB | 7B, 42 | 123, 66 |
| SYN | 16 | 22 | > | 3E | 62 | CODEC | 7B, 43 | 123, 67 |
| ETB | 17 | 23 | ? | 3F | 63 | | | |
| CAN | 18 | 24 | @ | 40 | 64 | | | |
| EM | 19 | 25 | A | 41 | 65 | | | |
| SUB | 1A | 26 | B | 42 | 66 | | | |
| ESC | 1B | 27 | C | 43 | 67 | | | |
| FS | 1C | 28 | D | 44 | 68 | | | |
| GS | 1D | 29 | E | 45 | 69 | | | |
| RS | 1E | 30 | F | 46 | 70 | | | |
| US | 1F | 31 | G | 47 | 71 | | | |
| SP | 20 | 32 | H | 48 | 72 | | | |
| ! | 21 | 33 | I | 49 | 73 | | | |
| " | 22 | 34 | J | 4A | 74 | | | |
| # | 23 | 35 | K | 4B | 75 | | | |
| $ | 24 | 36 | L | 4C | 76 | | | |
| % | 25 | 37 | M | 4D | 77 | | | |
| & | 26 | 38 | N | 4E | 78 | | | |
| ' | 27 | 39 | O | 4F | 79 | | | |

**Printing character among code fond B**

| Character | Transmit Data | | Character | Transmit Data | | Character | Transmit Data | |
|---|---|---|---|---|---|---|---|---|
| | Hex | Decimal | | Hex | Decimal | | Hex | Decimal |
| SP | 20 | 32 | H | 48 | 72 | p | 70 | 112 |
| ! | 21 | 33 | I | 49 | 73 | q | 71 | 113 |
| " | 22 | 34 | J | 4A | 74 | r | 72 | 114 |
| # | 23 | 35 | K | 4B | 75 | s | 73 | 115 |
| $ | 24 | 36 | L | 4C | 76 | t | 74 | 116 |
| % | 25 | 37 | M | 4D | 77 | u | 75 | 117 |
| & | 26 | 38 | N | 4E | 78 | v | 76 | 118 |
| ' | 27 | 39 | O | 4F | 79 | w | 77 | 119 |
| ( | 28 | 40 | P | 50 | 80 | x | 78 | 120 |
| ) | 29 | 41 | Q | 51 | 81 | y | 79 | 121 |
| * | 2A | 42 | R | 52 | 82 | z | 7A | 122 |
| + | 2B | 43 | S | 53 | 83 | { | 7B,7B | 123,123 |
| , | 2C | 44 | T | 54 | 84 | \| | 7C | 124 |
| - | 2D | 45 | U | 55 | 85 | } | 7D | 125 |
| . | 2E | 46 | V | 56 | 86 | — | 7E | 126 |
| / | 2F | 47 | W | 57 | 87 | DEL | 7F | 127 |
| 0 | 30 | 48 | X | 58 | 88 | FNC1 | 7B,31 | 123,49 |
| 1 | 31 | 49 | Y | 59 | 89 | FNC2 | 7B,32 | 123,50 |
| 2 | 32 | 50 | Z | 5A | 90 | FNC3 | 7B,33 | 123,51 |
| 3 | 33 | 51 | [ | 5B | 91 | FNC4 | 7B,34 | 123,52 |
| 4 | 34 | 52 | \ | 5C | 92 | SHIFT | 7B,53 | 123,83 |
| 5 | 35 | 53 | ] | 5D | 93 | CODE A | 7B,41 | 123,66 |
| 6 | 36 | 54 | ^ | 5E | 94 | CODE C | 7B,43 | 123,67 |
| 7 | 37 | 55 | _ | 5F | 95 | | | |
| 8 | 38 | 56 | ` | 60 | 96 | | | |
| 9 | 39 | 57 | a | 61 | 97 | | | |
| : | 3A | 58 | b | 62 | 98 | | | |
| ; | 3B | 59 | c | 63 | 99 | | | |
| < | 3C | 60 | d | 64 | 100 | | | |
| = | 3D | 61 | e | 65 | 101 | | | |
| > | 3E | 62 | f | 66 | 102 | | | |
| ? | 3F | 63 | g | 67 | 103 | | | |
| @ | 40 | 64 | h | 68 | 104 | | | |
| A | 41 | 65 | i | 69 | 105 | | | |
| B | 42 | 66 | j | 6A | 106 | | | |
| C | 43 | 67 | k | 6B | 107 | | | |
| D | 44 | 68 | l | 6C | 108 | | | |
| E | 45 | 69 | m | 6D | 109 | | | |
| F | 46 | 70 | n | 6E | 110 | | | |
| G | 47 | 71 | o | 6F | 111 | | | |

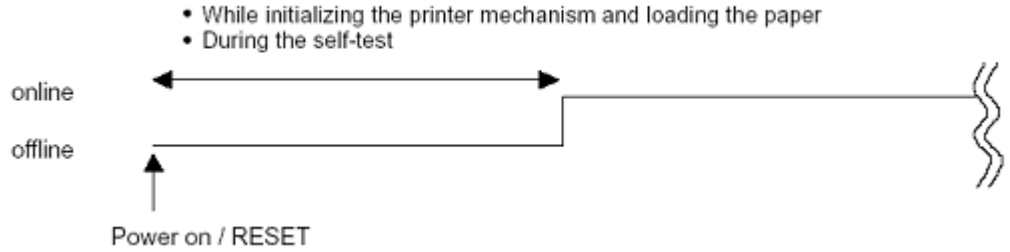
**Printing character among code fond C**

| Character | Transmit Data | | Character | Transmit Data | | Character | Transmit Data | |
|---|---|---|---|---|---|---|---|---|
| | Hex | Decimal | | Hex | Decimal | | Hex | Decimal |
| 00 | 00 | 0 | 40 | 28 | 40 | 80 | 50 | 80 |
| 01 | 01 | 1 | 41 | 29 | 41 | 81 | 51 | 81 |
| 02 | 02 | 2 | 42 | 2A | 42 | 82 | 52 | 82 |
| 03 | 03 | 3 | 43 | 2B | 43 | 83 | 53 | 83 |
| 04 | 04 | 4 | 44 | 2C | 44 | 84 | 54 | 84 |
| 05 | 05 | 5 | 45 | 2D | 45 | 85 | 55 | 85 |
| 06 | 06 | 6 | 46 | 2E | 46 | 86 | 56 | 86 |
| 07 | 07 | 7 | 47 | 2F | 47 | 87 | 57 | 87 |
| 08 | 08 | 8 | 48 | 30 | 48 | 88 | 58 | 88 |
| 09 | 09 | 9 | 49 | 31 | 49 | 89 | 59 | 89 |
| 10 | 0A | 10 | 50 | 32 | 50 | 90 | 5A | 90 |
| 11 | 0B | 11 | 51 | 33 | 51 | 91 | 5B | 91 |
| 12 | 0C | 12 | 52 | 34 | 52 | 92 | 5C | 92 |
| 13 | 0D | 13 | 53 | 35 | 53 | 93 | 5D | 93 |
| 14 | 0E | 14 | 54 | 36 | 54 | 94 | 5E | 94 |
| 15 | 0F | 15 | 55 | 37 | 55 | 95 | 5F | 95 |
| 16 | 10 | 16 | 56 | 38 | 56 | 96 | 60 | 96 |
| 17 | 11 | 17 | 57 | 39 | 57 | 97 | 61 | 97 |
| 18 | 12 | 18 | 58 | 3A | 58 | 98 | 62 | 98 |
| 19 | 13 | 19 | 59 | 3B | 59 | 99 | 63 | 99 |
| 20 | 14 | 20 | 60 | 3C | 60 | FNC1 | 7B,31 | 123,49 |
| 21 | 15 | 21 | 61 | 3D | 61 | CODE A | 7B,41 | 123,65 |
| 22 | 16 | 22 | 62 | 3E | 62 | CODE B | 7B,42 | 123,66 |
| 23 | 17 | 23 | 63 | 3F | 63 | | | |
| 24 | 18 | 24 | 64 | 40 | 64 | | | |
| 25 | 19 | 25 | 65 | 41 | 65 | | | |
| 26 | 1A | 26 | 66 | 42 | 66 | | | |
| 27 | 1B | 27 | 67 | 43 | 67 | | | |
| 28 | 1C | 28 | 68 | 44 | 68 | | | |
| 29 | 1D | 29 | 69 | 45 | 69 | | | |
| 30 | 1E | 30 | 70 | 46 | 70 | | | |
| 31 | 1F | 31 | 71 | 47 | 71 | | | |
| 32 | 20 | 32 | 72 | 48 | 72 | | | |
| 33 | 21 | 33 | 73 | 49 | 73 | | | |
| 34 | 22 | 34 | 74 | 4A | 74 | | | |
| 35 | 23 | 35 | 75 | 4B | 75 | | | |
| 36 | 24 | 36 | 76 | 4C | 76 | | | |
| 37 | 25 | 37 | 77 | 4D | 77 | | | |
| 38 | 26 | 38 | 78 | 4E | 78 | | | |
| 39 | 27 | 39 | 79 | 4F | 79 | | | |

# Appendix F: Switch on online and offline

At the following conditions, the printer switches from the offline to online or from the online to offline:

1) Turns the power on or takes to self-test by paper feeding button FEE

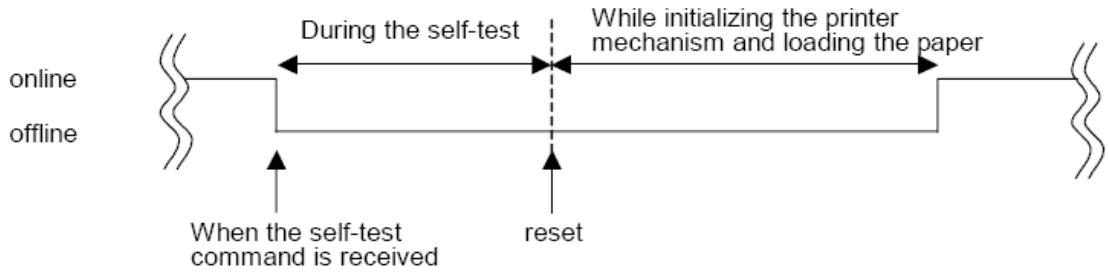



During turning the printer power on (or resets the printer) to that the printer have ready to receive the data, the printer be offline status.

If enables ASB, the printer transmits per status as the error occurs. Even the

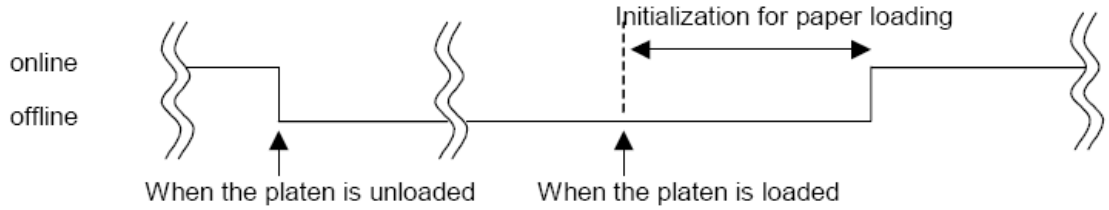
printer be offline status, when the printer sensor tests the changes, the printer also sends ASB.
As the above description, when the printer initializing, If the status of sensor have changed, the printer transmits the offline information which can't be analyzed the reasons.
If occurs this phenomenon, then waiting that the printer deals with a change of status or the printer restores online.

2) Executes self-test(by a command):




The printer enters into offline status during self-test. When finished self-test, the printer resets automatically.
When executes self-test through commands, even enables ASB, the printer also doesn't transmit the offline status.

3) Discharges the print head bar(on standby condition) initialized the installing of printing paper



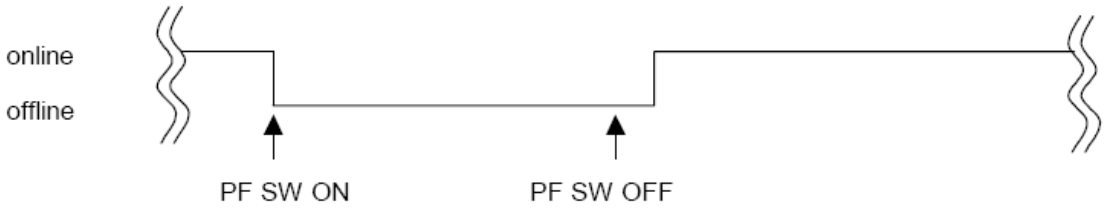

If the printer be on standby condition, takes the print head bar off, the printer enters into offline condition(this is not sure that the error has occurred). If installs the print head bar again, the printer enters into online condition.
If enable ASB, when occurs matters, the printer will transmit a condition.
When the printer sensor tests the change of condition, even it is on offline condition, the printer will also transmit ASB.
If at the period of printing paper installed initialization, the change of sensor condition, the printer transmits the unknown reasons about offline information. (If the offline which doesn't brought by error or without paper.)
If the offline because of the printing paper near-end, then waiting that the printer deals with a status change or the printer restores to online.

4) Discharge the print head bar(during printing)


If during printing, discharges the print head bar, the printer will enter into offline condition and it will lead to error.

Only installed the print head bar, can't restore the printer to the normal from offline condition. It needs to transmit error to restore command(DLE ELQ) or reset.

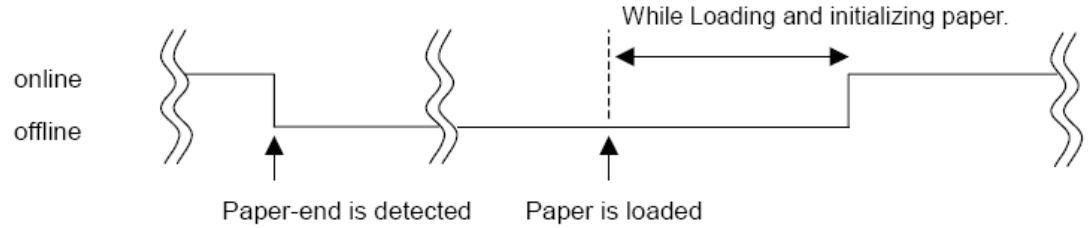
5) When feeding paper by paper feeding button




When feeding paper through pushing FEED button, the printer be offline status. When finished feeding paper, lose the FEED button, the printer enters into offline status. If enables ASB, when happened one matter, the printer will transmit every status item.

When the printer sensor tests the condition change, even on the offline status, the printer always transmits ASB.

6) When testing without paper:




When testing without paper, the printer enters into offline status, and halt printing(it not be sure the error).

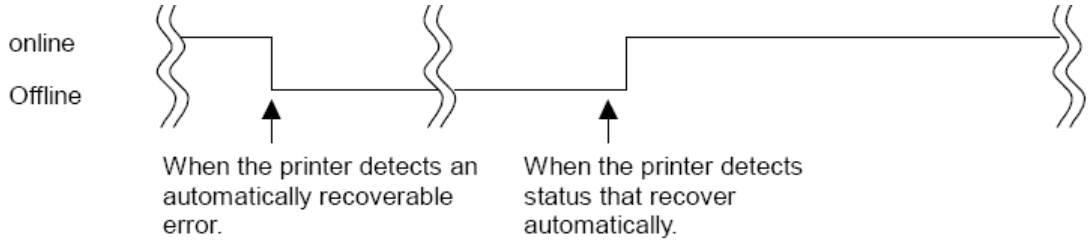
If installed and initialed the printer, when the printer have ready to receive data, and restored to online status.

If enables ASB, when happened one matter, the printer will transmit each status item. The printer sensor tests the status change, even on the offline status, the printer will always transmit ASB.

During installed printing paper and initials, the sensor tests the status change, the printer may enter into offline status and not take the reason distinguish.

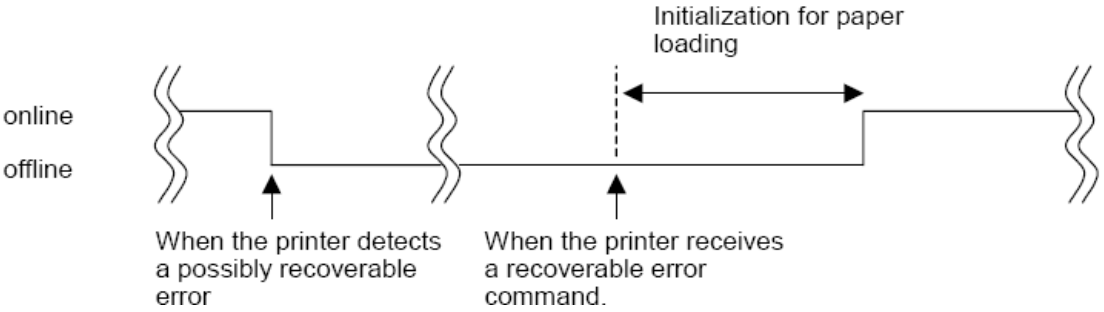
If occurs this condition, then waiting that the printer deals with a condition change or the printer restores to online status.

7) Occurs the error which could be restored automatically




When the printer tests the error which could be restored automatically, After the printer tests the error which could be restored automatically, automatic restore to online. If enables ASB, and occurs errors, the printer transmits the ASB. Then the printer won't transmit ASB, until the printer restores to offline. For this product, the print head high temperature error is the one of automatic restoring error.

8) When occurs restored error




When the printer tests the error which could be restored, transmits a restored error status, and offline.

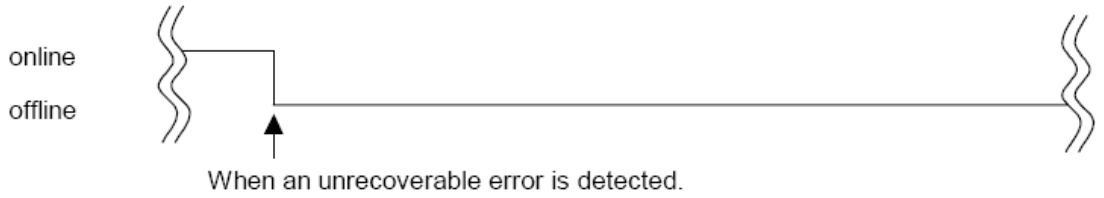
When the printer could be restored to online status, restores offline through restored error command or reset.(for the resetting time, refer to the first point of this section)

If enables ASB, the printer transmits ASB when occurs error.

Then, the printer doesn't transmit ASB, until the printer restores to online status.

For this product, automatic cutting paper error is one of the restored error.

9) When occurs an error which couldn't be restored:




When the printer tests an error which couldn't be restored, the printer transmits this error status and changes to offline status. The only one method is to reset again or turn the power off then opening again.(If a malfunction brings an error, the printer won't restore until the printer have adjusted.)

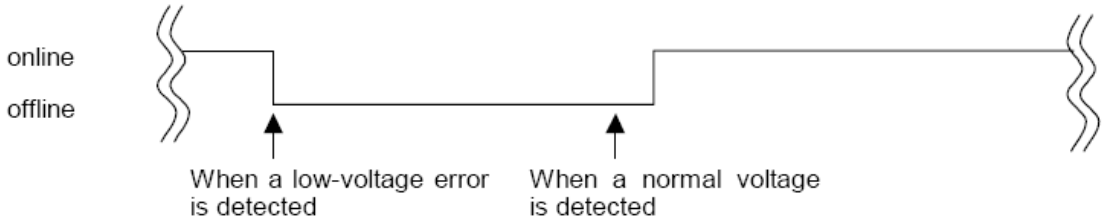
(As for RESET time, refer to the first part of this section.)

If ASB is enabled, when occurs an error, the printer will transmit ASB. Next, the printer won't transmit ASB until the printer restored to online status.

Among these products, the high voltage is one of the errors which couldn't be restored.

However, When tests an strong error, as CPU executing error or memory error, the printer won't transmit ASB.

10) When the printer enters into offline status but have no specific reason:




If the printer temporarily tests a low voltage when printing, the printer halts printing and turns to offline under the condition of haven't distinguished the reasons.

After the printer tests a normal standard voltage, the printer restores to offline and starts to printing automatically. If the printer tests a low voltage again, the printer sends low voltage error status(the error couldn't be restored)

If the printer turns to offline which have no any distinguished reasons(the offline which is not brought by one error or without paper), When monitors the printer status, suggests that not to judge the printer status until the printer restores to online or the printer turns to offline under the distinguished reasons(the offline which is brought by one error or without paper).

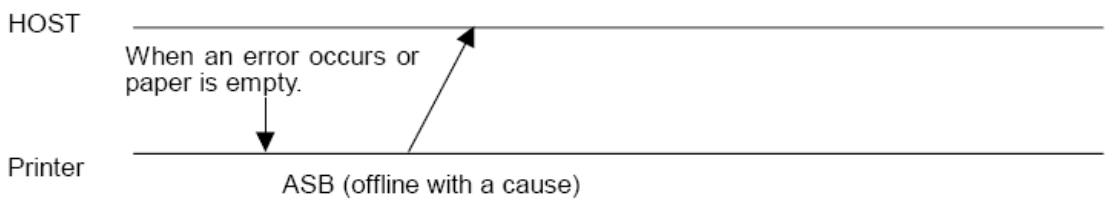
# Appendix G: Status transmission disposal

This product transmitted status according to the following sequence.

At this manual, Supposes that the ASB is enabled, and the memory switch 8-5 is on(disuses the data in the special offline status).

Only when the memory switch 8-5 is on, one buffer area clears the relevant transmission 3 bytes (-37H, 24H, and 00h)

1) When the printer is offline which brought by an error or without paper.



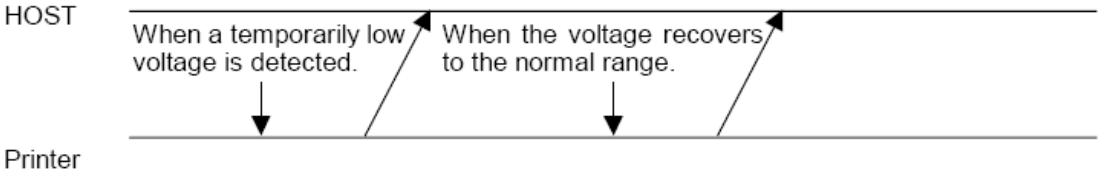

When feeds paper by FEED button, the printer is offline. Looses the

printing paper FEED button and finishes to feed paper, the printer backs to online.

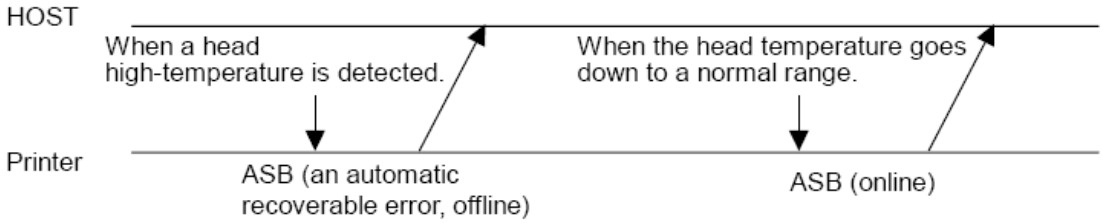
If ASB is enabled, the printer transmits every status item when occurs one matter.

When the printer tests a status change by sensor, even the printer is offline. The printer also transmits ASB.

2)When the printer is offline because of one error which could be restored automatically, this error brought by an temporary low voltage.(Because the printer can't disuse the data under the automatic restored offline status, so the printer also can't input buffer area clearing response.)



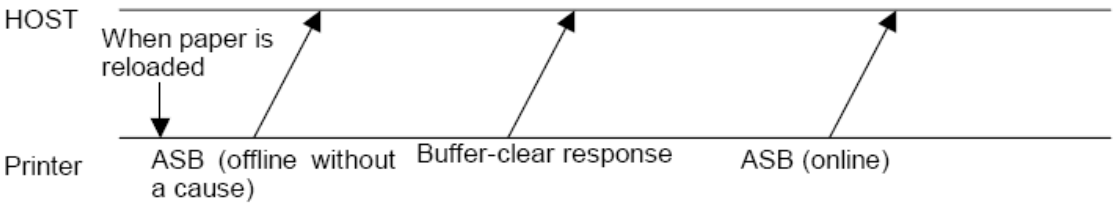

3) When the printer is offline because of an automatic restored error, this error is brought by the high temperature of a print head. ( Because the printer can't disuse the data under the automatic restored offline status, so the printer also can't input buffer area clearing response.)




4) When the printer is offline because of without paper or occurring an error.


5) When the printer restores to online.

(For example: the printing paper from without paper to enough paper)




When installed the printing paper again, the printer with the BM sensor turns to offline when initial BM sensor.

An error has occurred during the error restores, the printer transmits ASB(offline because of certain reason)and doesn't restore to online, when the print head bar is from open to close under the standby condition, the operation

of the printer as the above description.

6) Limited

If the printer hasn't ready to receive the data, the printer stores data in the data transmission buffer area, but doesn't transmit the data until the host has ready to receive data.

At the parallel mode, if ASB and other status data are stored in the data transmission buffer area, the printer transmits them firstly. So, this is the different sequence which compares with the above. When doesn't take the data transmission, suggests that inputs the vertical data for parallel interface.

If the printer statues have been changed, such as when initialing the BM sensor, tests that the paper near-end, the printer transmits the ASB at any moment.

## Appendix H: The calculation method that GS ( F sets the adjustable value

1. When the distance L from the cutting/tearing position to BM printing position is the same as the printer fixed mechanical value Lo, and the distance Q from the cutting/tearing position to starting printing position is the same as the printer fixed mechanical value "Qo" (as the figure 1), the offset which sets by GS ( F is 0.
2. When the distance L from the BM printing position to cutting/tearing position is shorter than the printer mechanical value Lo(as the figure 2), The offset calculation about cutting/tearing position of GS ( F command sees formula 1:

   Cutting/tearing paper position offset distance=(Lo-L) (mm)

   Cutting/tearing paper position offset=(Lo-L)×8 (dots) ...(1)

When the distance L from the BM printing position to cutting/tearing position is longer than the printer mechanical value Lo(as the figure 2), The offset calculation about cutting/tearing position of GS ( F command sees formula 2:

Cutting/tearing paper position offset distance=(Lo + the distance of two conjoint BM-L) (mm)

Cutting/tearing paper position offset=(Lo + the distance of two conjoint-L) ×8 (dots) .....(2)

Note 1: When sets cutting/tearing position offset, the parameter a of GS ( F command is 2.

Note 2: Cutting/tearing position offset which needed to select m=0 and calculated along the feeding paper direction.

3. When cutting/tearing offset is not 0 or the distance Q from each starting printing position to cutting/tearing position is larger than the printer mechanical value(Qo)(as figure 4), The offset calculation about cutting/tearing position of GS ( F command sees

formula 3:

The offset distance of starting printing position=(Q-Qo)+tearing position offset record (mm)

The offset distance of starting printing position=(Q-Qo) × 8+ tearing position offset record (dot) .....(3)

Note 1: When sets the starting printing position offset, the parameter a of GS ( F is 1. selects m=0 and calculates along the feeding paper direction.

Note 2: When the setting BM printing position L is near to printer mechanical Lo+ and L ＜ Lo, If the distance Q from setting cutting/tearing position to starting printing position is small, needs that the retreating paper can reach to the requirement starting printing position, the calculation value may be happened: the conditions of (Q-Qo)+cutting/tearing paper position offset distance＜0, Only this moment, setting according to the retreating paper direction, and the starting printing position offset calculation see the formula 4:

m=1

starting printing position offset distance=-[(Q-Qo)+cutting/tearing paper position offset distance] (mm)

starting printing position offset distance=-[(Q-Qo) × 8+cutting/tearing paper position offset] (dot) .....(4)

Note 3: When the setting BM printing position L is near to printer mechanical Lo+ and L＞Lo, If the distance Q of cutting/tearing paper position starting printing position＞L which needed to feed paper that can reach to the requested starting printing position, then the calculation may be happened: (Q-Qo)+ cutting/tearing paper position offset distance＞the distance of two conjoint BM, here the needed starting printing position offset as the formula 5:

Starting printing position offset distance=(Q-Q3)+cutting/tearing position offset distance-the distance of two conjoint BM

Starting printing position offset=[(Q-Q3)+cutting/tearing position offset distance-the distance of two conjoint BM]×8 .....(5)

4. Fixed mechanical value of printer (refer to 2.5.3)

Lo=A mm, the distance from cutting/tearing paper position to the BM testing switch.

Qo=C mm, the distance from cutting/tearing paper position to the starting printing position.

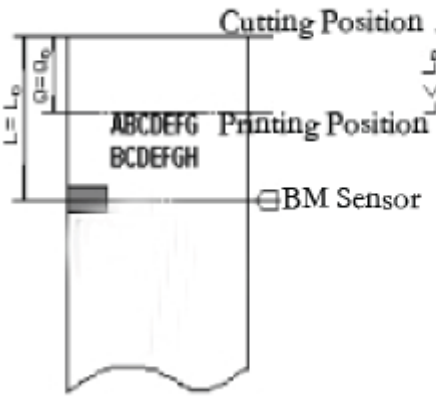



Figure 1

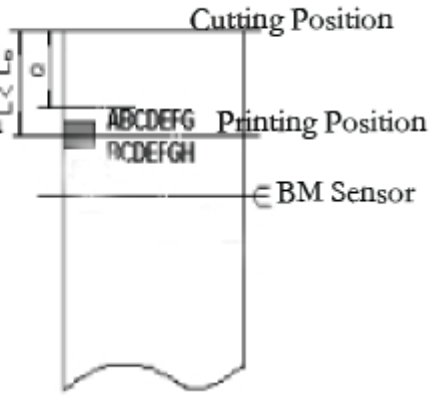



Figure 2

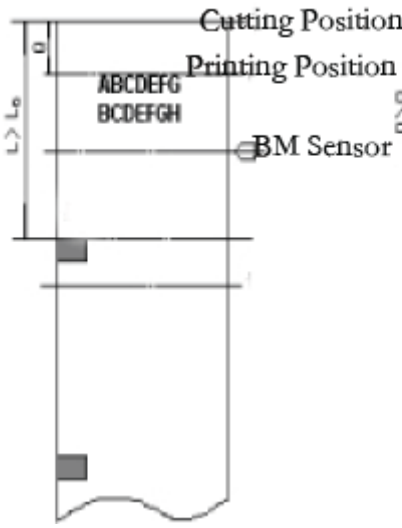



Figure 3

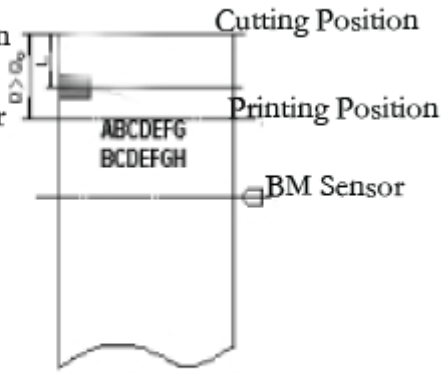


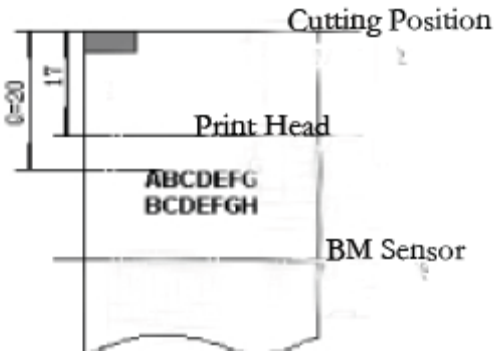

Figure 4

The example for BM position control command which specifies the printing notes

The following examples sets the tearing paper position to the printer tearing paper blade, Lo=33.6 mm, Qo=16 mm (refer to 2.5.3)

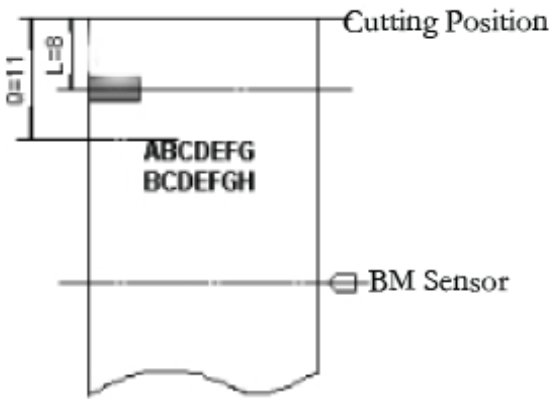
[example 1] Note demanded: the cutting/tearing paper position on the printing BM position,

Each printing starting position on the 20 mm of cutting/tearing paper position.




. Calculates cutting/tearing paper position offset
Because the BM on the cutting/tearing paper position, L=0, so,
Cutting/tearing paper position offset=(33.6-0)×7=269 dots.
. Takes the following commands to set the cutting/tearing paper offset
GS ( F <4><0><2><0><D><1>
. Calculates the offset of starting printing position
(20-16)×8+269=301 dots
.Takes the following commands to set cutting/tearing offset
GS ( F <4><0><1><0><2D><1>
.After finishing the above settings, when printing each note:
Feeds paper to the starting printing position by GS FF command:
Sends the printing data of each one, and prints these data line by line:
Feeds paper to cut/tear paper position by GS V m, and cut/tear the note.

[Example 2]Notes remanded: the distance from cutting/tearing paper position to BM is 8 ㎜.
The distance of starting printing position to cut/tear paper position is 11 ㎜.




.Calculates the offset of cutting/tearing paper position
Because the distance from BM to cut/tear paper line＜Lo(45 ㎜), so the offset of cutting/tearing paper position is:

(33.6-8)×8=205 dots

.Takes the following command to set cutting/tearing paper offset

GS ( F <4><0><2><0><205><0>

.Calculates the starting printing position is:

(11-16) ×8+205=165 dots

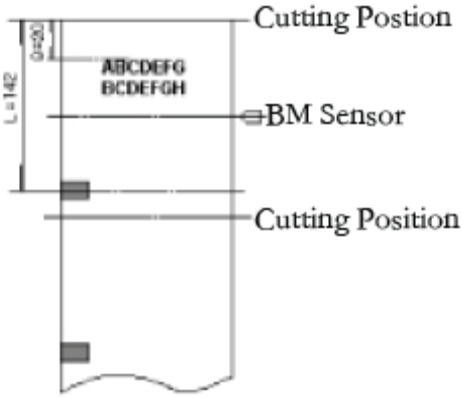
.Takes the following command to set starting printing position offset

GS ( F <4><0><1><0><165><0>

[Example]Notes remanded: the length of note 140 ㎜.

The distance from cutting/tearing paper position to BM is 132 ㎜.

The distance from starting printing position to cut/tear paper position is 20 ㎜.




.Calculates the offset of cutting/tearing position

Because the offset from BM to cut/tear paper line＞Lo(45 ㎜), so the offset of starting position is:

(33.6+140-132)×8=333 dots

.Takes the following commands to set cutting/tearing offset

GS ( F <4><0><2><0><4D><1>

.Calculates the starting printing position offset

(20-16) ×8+333=365 dots

.Takes the following commands to set starting printing position offset

GS ( F <4><0><1><6D><1>

.Finishes the above settings, when printing each of notes, the commands which be used is the same as the example 1.

Notes:

1. On the conditions of the offset of cutting/tearing paper position and starting printing position is 0, only needs GS V m to finish each of position printing.
2. Only needs the cutting/tearing paper position offset is not 0, needs GS ( F to set cutting /tearing paper position offset(a=2) and starting printing position offset(a=1) separately.

3. Only after setting the starting printing position, can feed paper to starting printing position by GS FF command, Or, may be occurred incorrect position or fed an empty note.
4. When changed the last time setting offset by GS ( F, maybe when printing the first note, occurred incorrect position or fed an empty note, but the following notes is correct.