# COMBINATION PRINTER

# SCP700 SERIES

## Programmer's Manual

star

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Please access the following URL
http://www.star-micronics.co.jp/service/sp_sup_e.htm
for the lastest revision of the manual.

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# *Chapter 1:  Outline*

The SCP700 Series combines both a quick, quiet and highly reliable thermal receipt printer with an impact dot slip printer, enabling printing on single or multiple sheets of slip paper of an unspecified size.

The thermal printer enables receipt printing without a thermal ribbon and makes paper insertion extremely easy.

The biggest advantage of combining the two printer mechanisms into one unit is that less space, only one power supply and only one port are necessary, compared with using a slip printer which is separate from a thermal receipt printer, each requiring space and a power supply.

Thermal printing on receipt paper is quiet and fast.

# *Chapter 2:  DIP Switch Settings*

The printer's DIP switches let you change communications parameters, thermal printing density, interface type, input buffer size, and emulation. This chapter explains the settings you can make and tells you how to actually change DIP switch settings.

## *Accessing the DIP switches*

The DIP switches are located inside the printer, underneath the document table. Use the following procedure to remove the document table so you can operate the DIP switches.

❏ Make sure that the printer is turned off and unplugged from its wall outlet.

❏ Open the printer cover.

❏ Use a Phillips head screwdriver to remove the two screws that secure the document table in place.
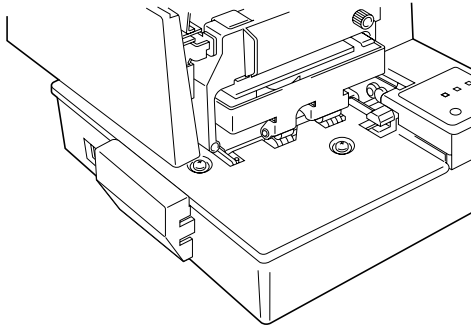
❏ Carefully work the document table loose and slide it to the left of the printer out of the way. It is not necessary to remove the document table complete, just move it enough so you can get at the DIP switches inside.
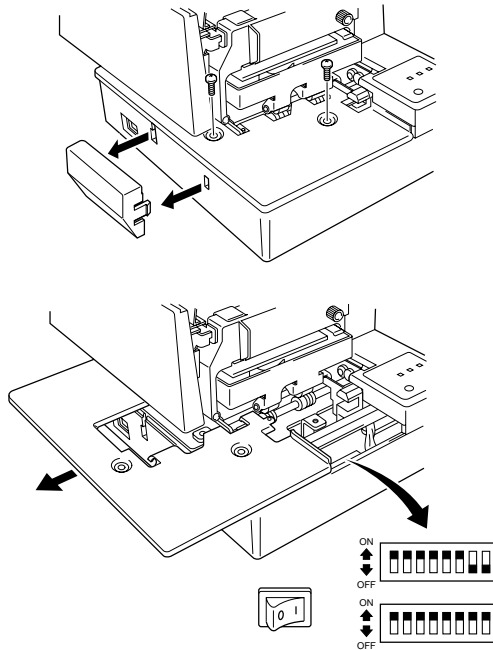
❏ After the document table is opened sufficiently, use a thin flat-blade screwdriver or some other similar object to change DIP switch settings.

❏ Carefully return the document table to its original position and secure it in place with the two screws.

## *Available DIP switch settings*

There are two DIP switches inside the printer, named DIP Switch 1 and DIP Switch 2. DIP Switch 1 controls data communication parameters, while DIP Switch 2 controls other settings.

## DIP Switch 1

The following table shows all the possible settings for DIP Switch 1. This switch sets the transmission parameters of the Standard Serial Interface. All switch settings, except for 1-7 and 1-8, are ON when the printer is shipped from the factory.

| Switch | Parameter | ON | OFF |
|--------|-----------|----|----|
| 1-1 | Baud Rate | See table below | |
| 1-2 | | | |
| 1-3 | Data Length | 8 bits | 7 bits |
| 1-4 | Parity Check | Disabled | Enabled |
| 1-5 | Parity Selection | Odd | Even |
| 1-6 | Handshake | DTR/mode | XON/XOFF mode |
| 1-7 | Serial I/F Pin 6 Reset Signal | Active | Inactive |
| 1-8 | Serial I/F Pin8 Reset Signal | Active | Inactive |

| Baud Rate | Switch 1-1 | Switch 1-2 |
|-----------|-----------|-----------|
| 2400BPS | OFF | OFF |
| 4800BPS | ON | OFF |
| 9600BPS | ON | ON |
| 19200BPS | OFF | ON |

## DIP Switch 2

The following table shows all the possible settings for DIP Switch 2. The factory default setting for this switch is all ON.

| Switch | Parameter | ON | OFF |
|--------|-----------|----|----|
| 2-1 | Thermal Print Density | See table below | |
| 2-2 | | | |
| 2-3 | Input Buffer Size | 4 KB | 45 bytes |

| Switch | Parameter | ON | OFF |
|--------|-----------|-----|-----|
| 2-4 | Always ON | | |
| 2-5 | Interface | Standard | Option |
| 2-6 | Always ON | | |
| 2-7 | Not Used | | |
| 2-8 | Not Used | | |

| Thermal Print Density | Switch 2-1 | Switch 2-2 |
|-----------------------|------------|------------|
| Light | OFF | OFF |
| Standard | ON | ON |
| Heavy | ON | OFF |
| Very Heavy | OFF | ON |

# *Chapter 3: Memory Switch Settings*

Each memory switch is a 16-bit word store in EEPROM. For details on the functions and settings of memory switches, refer to "Chapter 9".

The table below shows the factory settings for the memory switches.

| Memory Switch | Hexadecimal Code |
|:---:|:---:|
| 0 | 0000 |
| 1 | 0000 |
| 2 | 0000 |
| 3 | 0000 |
| 4 | 0000 |
| 5 | 0000 |

# *Chapter 4:  Control Panel Operations*

The control panel gives you some push-button control over the printer's receipt and slip printer operations. It also includes indicator lights, which tell you the current status of the printer at a glance.

```
        RECEIPT   SLIP   POWER
          ☐       ☐      ☐



          ◯              ◯
        RECEIPT      SLIP/RESUME
```
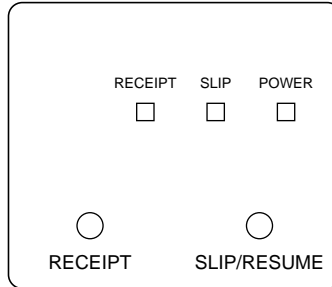
## *Indicator lights*

The following table describes the meaning of indicator lights when it is on, off, or flashing.

| Indicator Light | On | Off | Flashing (slow) | Flashing (fast) |
|---|---|---|---|---|
| **POWER** | Power on | Power off | Slip: Dot adjustment mode / Receipt: Stand-by TM-T85 macro | Automatic recovery Error |
| **SLIP** | Slip paper released | Slip paper engaged | Request slip paper | Slip printer error |
| **RECEIPT** | Receipt printer ready | Receipt printer not ready | Out of receipt paper/Near end | Receipt printer error |

\* All indicators flash to indicate a non-recoverable error.

## *Buttons*

The following table describes the function of the two control buttons of the control panel.

| Button | Description |
|---|---|
| **RECEIPT** | Press to feed the thermal paper. Holding down this button feeds paper at high speed. |
| **SLIP/RESUME** | 1. Press this button to release or engage slip paper from the slip printer. (Switching from releasing to engaging is only possible if slip paper is inserted.)<br>2. Press this button to clear the errors of the slip printer and receipt printer. |

## *Producing a test print*

The following procedure can be used at any time to test the receipt printer and the slip printer.

❏ Turn on the printer and insert a piece of paper into the slip printer. Also make sure that roll paper is loaded for the receipt printer.

*Note:*

*If you want to produce a test print on the receipt printer only, simply don't insert paper into the slip printer.*

❏ Turn off printer power.
❏ While holding down the **RECEIPT** button, turn printer back on. Keep **RECEIPT** depressed for a few moments until the printer beeps and the receipt printer test print starts.

After the receipt test print is complete, the slip printer will produce a test print on the paper you inserted in the first step of this procedure. The slip printer test will continue until it reaches the end of the paper.

*Note:*

*The slip printer momentarily releases the slip paper when you turn printer power back on. If you are using a large piece of paper, it may fall out of the slip printer when this happens, causing the slip printer test to be skipped. Because of this, it is a good idea to keep hold of the paper in the slip printer when you turn power back on.*

## *Adjusting the slip printer's dot alignment*

You may never have to use the procedure described in this section, but after you have been using your printer for some time you may find that the dots of some graphics do not align correctly. For example, what should look like:

H H H

may come out looking like one of the following:

H H H        or like this        H H H
H H H                            H H H

This is caused when mechanical parts of the printer get out of alignment. This happens only rarely and you may never experience it at all throughout the life of the printer. If you do have problems, use the following procedure to correct it.

❏ Execute the test print

❏ When the slip printer produce the test print, hold down the control panel's **RECEIPT** and **SLIP/RESUME** buttons, to enter the Dot Alignment Adjust Mode. The **POWER** indicator flashes slowly to indicate this mode.

Entering the Dot Alignment Adjust Mode causes seven blocks of characters to be printed as shown below. An asterisk to the left of the blocks indicates which setting is currently selected. Use the **RECEIPT** button to specify which block has the best aligned characters. Press **RECEIPT** once to specify the first block, twice to specify the second block, and so on up to seven times to specify the seventh block. Pressing the **RECEIPT** button more than seven times specifies the seventh block, no matter how many times it is pressed.

```
Dot Alignment Adjust Mode
```
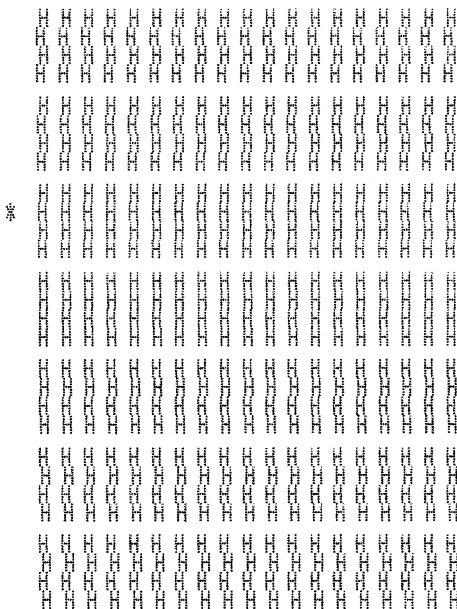
To exit this mode, press the **SLIP/RESUME** button. The dot alignment adjust mode setting is stored in the memory, a pattern using the selected setting, followed by "Adjust Completed" is printed, and the printer ejects the slip paper.

```
Adjust Completed!
```

---
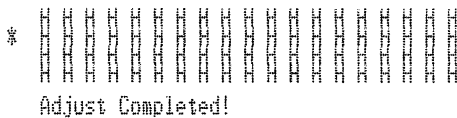
*Note:*

> *If you press the **SLIP/RESUME** button without pressing the **RECEIPT** button after entering the Dot Alignment Adjust Mode, the printer assumes that you do not want make any settings, so it prints the message "Adjust Complete!" and exits the mode.*
> *If a paper feed error occurs during this mode, the printer ejects the paper and this mode is cancelled.*

---

## *Hexadecimal dump*

This procedure prints in hexadecimal format all codes (character codes and control codes) that are sent to the printer by the computer. The printer does not execute any control codes (such as 0A - linefeed), it just prints them out. The hexadecimal dump is useful when you are writing programs for printer control.

❏ Make sure that roll paper is loaded in the receipt printer.

❏ Turn off the printer.

❏ While holding down the control panel's **SLIP/RESUME** button, turn the printer back on to enter this mode. The printer beeps once to indicate in this mode.

❏ The printer will now print out the hexadecimal values of any data that is subsequently sent to it from your computer. The last line buffer should be flushed by pressing the **RECEIPT** button.

❏ To exit this mode, turn the printer off.

## *Errors*

There are three types of errors: *automatic recovery* errors that clear automatically after some condition is attained, *recoverable* errors that require some action by you before they clear, and *non-recoverable* errors that require servicing by an authorized dealer. If a slip printer error occurs, the **SLIP** indicator flashes quickly. If a receipt printer error occurs, the **RECEIPT** indicator flashes quickly.

### Automatic Recovery Error

| Error Name | Cause | POWER Flashing Pattern | Recovery |
|---|---|---|---|
| Head Temperature Error | Abnormal thermal head temperature | Fast | Recovery occurs automatically after head temperature returns to normal. |

## Receipt Printer Recoverable Errors

| Error Name | Cause | RECEIPT Flashing Pattern | Recovery |
|---|---|---|---|
| Paper Out Error | No roll paper | Slow | Insert paper and press SLIP/RESUME. |
| Head Up Error | Raised receipt printer head | Fast | Lower head and press SLIP/RESUME. |
| Near End | Roll paper near end | Slow | Press SLIP/RESUME to resume printing. |
| Cutter Error | Error during roll paper cutting | Fast | If the blade is in the home position, press SLIP/RESUME to continue printing. If the blade is not in the home position, this is a non-recoverable error. |

## Slip Printer Recoverable Errors

| Error Name | Cause | SLIP Flashing Pattern | Recovery |
|---|---|---|---|
| Slip printer mechanism error | • Carriage motor lock<br>• Timing signal defect<br>• Abnormal home position check | Fast | Correct the problem and press SLIP/RESUME. |

## Non-recoverable Errors

First try turning the printer off and then on again. If the error persists or if a non-recoverable error is indicated by all indicators flashing, contact your nearest authorized dealer.

# *Chapter 5: Standard Serial Interface*

❏ This chapter provides detailed specifications for the printer's standard serial interface (Connector Type: D-sub 9-pin).
Set the transmission parameters with DIP Switch 1.

Transmission type ............Asynchronous serial interface

Baud rate (bps).................2400, 4800, 9600, or 19200
(Selected by DIP switch)

Word format
Start bit: ................1
Data bits: ..............7 or 8 (Selected by DIP switch)
Parity: ...................Odd, Even, or None
(Selected by DIP switch)
Stop bit: ................1

Signal polarities
RS-232C ..............Mark = Logic "1" (–3V to –15V)
Space = Logic "0" (+3V to +15V)

Handshaking ...................DTR or XON/XOFF mode (Selected by DIP switch)



A: Start bit
B: Data bits
C: Vertical parity bit
D: Stop bit

Input (RXD, DSR, INIT)



Output (DTR, TXD, RTS)



75188 or equivalent

## *Standard serial interface pins and signal names*

```
 5 ○   ○   ○   ○   ○ 1
 9 ○   ○   ○   ○ 6
```

| Pin No. | Signal Name | Direction | Function |
|---------|-------------|-----------|----------|
| 1 | FG | — | Frame Ground |
| 2 | RXD | IN | Receive data |
| 3 | TXD | OUT | Transmission data |
| 4 | DTR | OUT | Data terminal ready signal. This signal changes to SPACE when the printer is ready to receive data. |
| 5 | SG | — | Signal ground |
| 6 | DSR | IN | Signal line that indicates if the host computer can receive data.<br>  SPACE: host can receive<br>  MARK: host cannot receive<br>The status of this signal is not confirmed.<br>This signal can be specified as an internal reset signal using Switch 7 of DIP Switch 1 (page 4). MARK of 1ms or longer activates the reset. |
| 7 | RTS | OUT | Same as DTR (Pin 4). |
| 8 | INIT | IN | This signal can be specified as an internal reset signal using Switch 8 of DIP Switch 1 (page 4). SPACE of 1ms or longer activates the reset. |
| 9 | N/C | — | Not connected |

## *Interface connections*

❏ Refer to the interface specifications for the host computer for details on connecting to its interface connector. The following illustration shows a typical connection configuration.

RS-232C

| Printer side | IBM PC side |
| (D-sub 9 pin) | (D-sub 25 pin) |

| F-GND | 1 | — | — | 1 | F-GND |
| RXD | 2 | — | — | 2 | TXD |
| TXD | 3 | — | — | 3 | RXD |
| DTR | 4 | — | — | 4 | RTS |
| S-GND | 5 | — | — | 5 | CTS |
| DSR | 6 | — | — | 6 | DSR |
| RTS | 7 | — | — | 7 | S-GND |
| INIT | 8 | — | — | 8 | DCD |
| N/C | 9 | — | — | 20 | DTR |

| Printer side | IBM PC side |
| (D-sub 9 pin) | (D-sub 9 pin) |

| F-GND | 1 | — | — | 1 | DCD |
| RXD | 2 | — | — | 2 | RXD |
| TXD | 3 | — | — | 3 | TXD |
| DTR | 4 | — | — | 4 | DTR |
| S-GND | 5 | — | — | 5 | S-GND |
| DSR | 6 | — | — | 6 | DSR |
| RTS | 7 | — | — | 7 | RTS |
| INIT | 8 | — | — | 8 | CTS |
| N/C | 9 | — | — | 9 | RI |
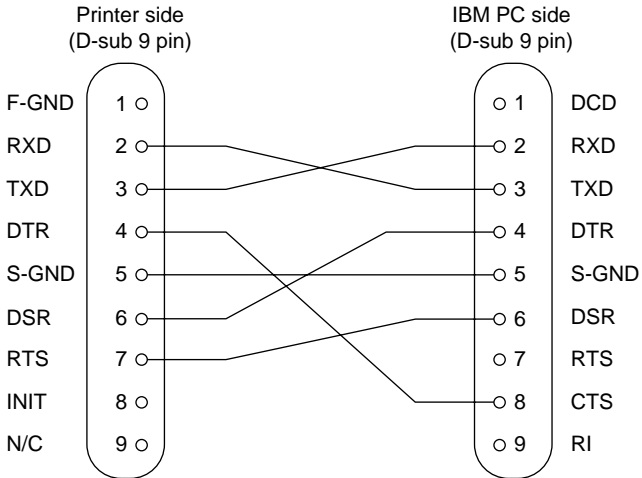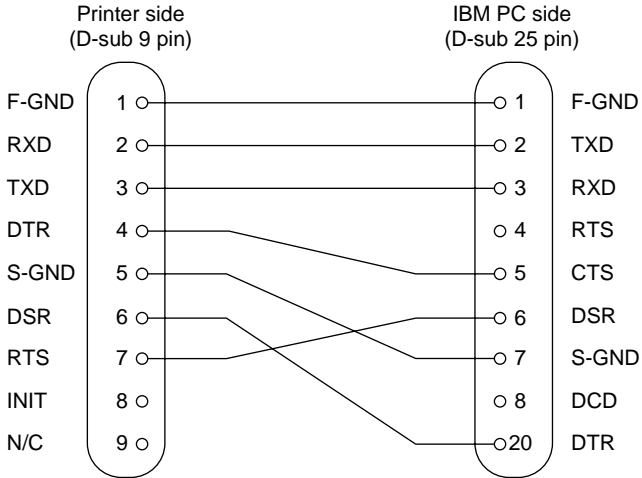
## *Data protocol*

❏ DTR/DSR Mode

Set when dip switch #1-6 is ON. Communication is carried out while handshake is performed with the DTR and DSR signals. Control is executed by selecting the DTR signal for the busy signal when data is downloaded to the printer data. "SPACE" indicates the printer can receive data, and oppositely "MARK" indicates that data cannot be received.

In the ESC/POS mode, control is executed by selecting the DTR signal for the host computer's busy signal when data is uploaded from the printer. "SPACE" indicates the host can receive data, and oppositely "MARK" indicates that data cannot be received.
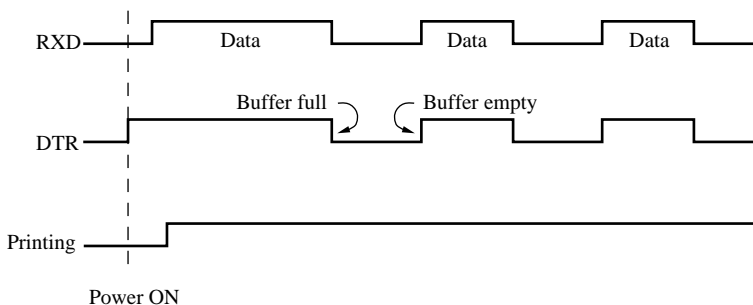


If no error occurs for the printer after turning the power on, the DTR signal line is set to "SPACE." After the host computer recognizes that the DTR signal line is "SPACE," data text is sent to the RXD signal line. When the printer's available buffer space drops below the specified number of bytes (256 bytes if using 4K-byte reception buffer, 16 bytes if using a 45-byte reception buffer; see 3-2 for details), the DTR signal line is set to "MARK." After the host computer recognizes that the DTR signal line is "MARK," data text transmission is interrupted, but the printer can receive data up until the data buffer becomes full. Available space in the data buffer increases as printing is executed, and when the printer's available buffer space drops below the specified number of bytes (256 bytes if using 4K-byte reception buffer, 16 bytes if using a 45-byte reception buffer), the DTR signal line is set to "SPACE."

In the ESC/POS mode, printer status transmission can be received by the host in the DTR/DSR communication mode (status is set after the DSR signal is confirmed as being "SPACE," with the exception of some status transmission commands).

Buffer full cancellation in DTR mode (the following is an example in the Combination mode).

A) Buffer set to "big size" (4K-bytes) (set with dip switch 2-3)
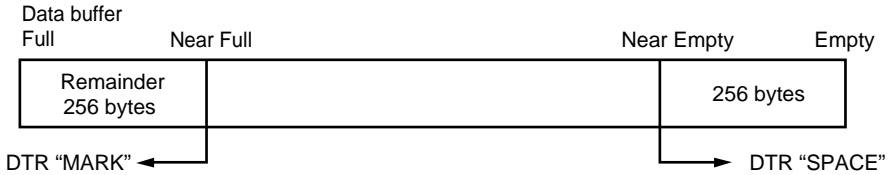
Data buffer

| Full | Near Full | | Near Empty | Empty |

| Remainder 256 bytes | | | 256 bytes | |

DTR "MARK" ←        → DTR "SPACE"

When available space drops below 256 bytes, DTR is set to "MARK." When data in the buffer drops below 256 bytes, DTR is set to "SPACE."

B) Buffer set to "small size" (45-bytes) (set with dip switch 2-3)

Data buffer

| Full | Near Full | | Near Empty | Empty |

| Remainder 16 bytes | | | 16 bytes | |

DTR "MARK" ←        → DTR "SPACE"
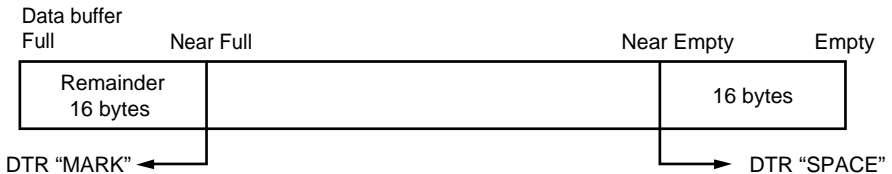
When available space drops below 16 bytes, DTR is set to "MARK." When data in the buffer drops below 16 bytes, DTR is set to "SPACE."

❏ X-ON / X-OFF Mode

Set when dip switch #1-6 is OFF. Mode whereby the host is informed by TXD signal of X-ON (DC1) when data can be received or X-OFF (DC3) when data cannot be received. In the Star mode, X-ON / X-OFF output timing conditions are set by memory switch 4-C.

In the Combination mode, when memory switch 4-C is set to "0" (factory setting), exactly one byte is output for X-ON when the printer switches from offline (printer busy) to online (printer ready), and exactly one byte is output for X-OFF when the printer switches from online (printer ready) to offline (printer busy). The same goes for the ESC/POS mode (Dual mode), regardless of the setting of memory switch C-4. When memory switch C-4 is set to "1," the X-ON signal is output is every three seconds.
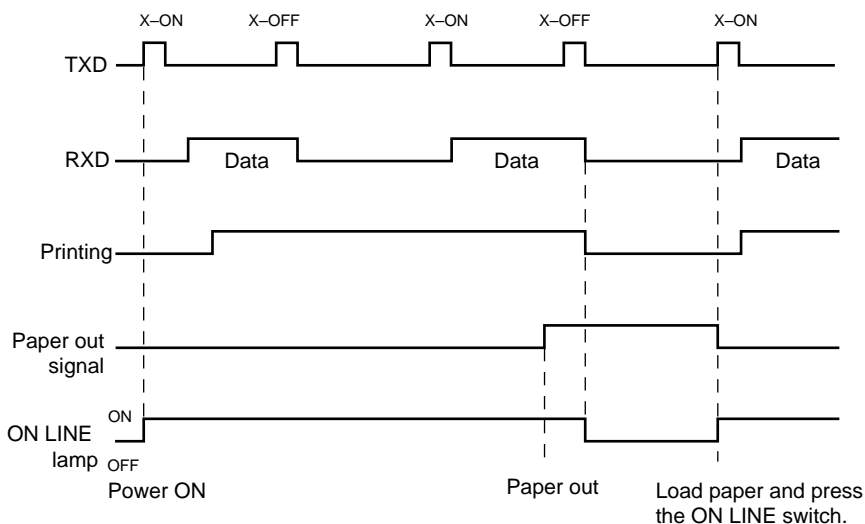


If no error occurs for the printer after turning the power on, the X-ON signal ("DC1" by control code name, "11H" by hexadecimal data) is output by the TXD signal line. X-FF (DC3, 13H) is output when available buffer space drops below the specified number of bytes (256 bytes if using 4K-byte reception buffer, 16 bytes if using a 45-byte reception buffer). If memory switch 4C is set to "1," an X-OFF signal is output each time one byte of data is received. The host computer receiving the X-0FF signals interrupts data text transmission, but the printer can receive data up until the data buffer becomes full. If the amount of data sent exceeds the amount of available buffer space, the excess data is discarded. Available space in the data buffer increases as printing is executed, and the X-ON signal is output when the printer's available buffer space drops below the specified number of bytes (256 bytes if using 4K-byte reception buffer, 16 bytes if using a 45-byte reception buffer).

Buffer full cancellation in X-ON / X-OFF mode (the following is an example in the Combination mode).

A) Buffer set to "big size" (4K-bytes) (set with sip switch 2-3)

Data buffer

| Full | Near Full | | Near Empty | Empty |

| Remainder 256 bytes | | | 256 bytes | |

X-OFF ←              → X-ON

| Printer setting conditions | Description of operation |
|---|---|
| • When in Star mode and memory switch is set to "0" <br> • ESC/POS emulation | When available buffer space drops below 256 bytes, exactly one byte is output for X-OFF. When data in the buffer drops below 256 bytes, exactly one byte is output for X-ON. |
| • When in Star mode and memory switch is set to "1" | When available buffer space drops below 256 bytes, an X-OFF signal is output for each byte of data received. When data in the buffer drops below 256 bytes, and X-ON signal is output. |

B) Buffer set to "big size" (45-bytes) (set with sip switch 2-3)

Data buffer

| Full | Near Full | | Near Empty | Empty |

| Remainder 16 bytes | | | 16 bytes | |

X-OFF ←              → X-ON

| Printer setting conditions | Description of operation |
|---|---|
| • When in Star mode and memory switch is set to "0"<br>• ESC/POS emulation | When available buffer space drops below 256 bytes, exactly one byte is output for X-OFF. When data in the buffer drops below 256 bytes, exactly one byte is output for X-ON. |
| • When in Star mode and memory switch is set to "1" | When available buffer space drops below 256 bytes, an X-OFF signal is output for each byte of data received. When data in the buffer drops below 256 bytes, and X-ON signal is output. |

3-6) X-ON / X-OFF Signal Transmission Timing

An X-OFF signal is sent when the printer switches from online to offline.
An X-ON signal is sent when the printer switches from offline to online.
In the Star mode, an X-ON signal is sent every three seconds if memory switch 4-C is set to "1."

4) Suggestions when memory switch 4-4 is ON [only when using interface specially designed for for ESC/POS (Dual mode)]

(1) Printing is interrupted in the event of an error, the cover is open, there is no paper, or paper is advanced by the paper advance switch, but the printer does not switch to busy status.

(2) When handshake with the printer is executed by this setting, be sure to monitor the status of the printer using the "GS a" command and its automatic data transmission function. With this setting, the "GS a" command becomes initial value setting $n = 2$, and status is automatically transmitted when online/offline status changes.

(3) If using DLE EOT or DLE ENQ, do not allow the reception buffer to become full.

• Suggestions when the printer is busy and the host cannot transmit data DLE EOT or DLE ENQ cannot be used if an error occurs when the printer becomes busy because the reception buffer is full.

• Suggestions when the printer is busy and the host can transmit data
When the reception buffer becomes full during transmission of bit image data, if a DLE EOT or DLE ENQ command is used in the bit image data, DLE EOT or DLE ENQ is processed as bit image data. Data sent when the reception buffer is full may be discarded.

Usage Example: With a 4K-byte reception buffer, status is checked by "ESC v" or "ESC u" each time a printing line is sent. The amount of data per printing line is the amount whereby the reception buffer does not become full.

# *Chapter 6:  Optional Interface*

## *Optional serial interface*

Use a thin flat-blade screwdriver or some other similar object to change DIP switch settings on the optional serial interface board.
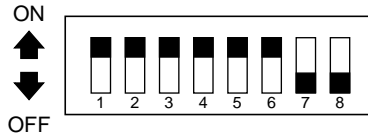


The following table shows all the possible settings for the DIP switches. All switch settings, except for 1-7 and 1-8, are ON when the printer is shipped from the factory.

| Switch | Parameter | ON | OFF |
|--------|-----------|-----|-----|
| 1 | Baud Rate | See table below | |
| 2 | | | |
| 3 | Data Length | 8 bits | 7 bits |
| 4 | Parity Check | Disabled | Enabled |
| 5 | Parity Selection | Odd | Even |
| 6 | Handshake | DTR/DSR | XON/XOFF |
| 7 | Serial I/F Pin 6 Reset Signal | Active | Inactive |
| 8 | Serial I/F Pin 25 Reset Signal | Active | Inactive |

| Baud Rate | Switch 1 | Switch 2 |
|-----------|----------|----------|
| 2400BPS | OFF | OFF |
| 4800BPS | ON | OFF |
| 9600BPS | ON | ON |
| 19200BPS | OFF | ON |

## *Optional serial interface pins and signal names*



| Pin No. | Signal Name | Direction | Function |
|---------|-------------|-----------|----------|
| 1 | FG | — | Frame Ground |
| 2 | TXD | OUT | Transmission data |
| 3 | RXD | IN | Receive data |
| 4 | RTS | OUT | Data terminal ready signal. This signal changes to SPACE when the printer is ready to receive data. |
| 6 | DSR | IN | Signal line that indicates if the host computer can receive data.<br>   SPACE: host can receive<br>   MARK: host cannot receive<br>The status of this signal is not confirmed.<br>This signal can be specified as an internal reset signal using of DIP Switch 7 (page 21).<br>MARK of 1ms or longer activates the reset. |
| 7 | SG | — | Signal ground |
| 20 | DTR | OUT | Same as RTS (Pin 4). |
| 25 | INIT | IN | This signal can be specified as an internal reset signal using of DIP Switch 8 (page 21). SPACE of 1ms or longer activates the reset. |

## *Interface connections*

❏ Refer to the interface specifications for the host computer for details on connecting to is its interface connector. The following illustration shows a typical connection configuration.

```
    Printer side                    IBM PC side
   (D-sub 25 pin)                  (D-sub 25 pin)

F-GND    1 o ─────────────────────── o 1    F-GND
TXD      2 o ───────╲       ╱──────── o 2    TXD
RXD      3 o ────────╲─────╱───────── o 3    RXD
RTS      4 o ─────────╲───╱           o 4    RTS
                       ╲ ╱            o 5    CTS
DSR      6 o ───────────╳──────────── o 6    DSR
S-GND    7 o ──────────╱ ╲─────────── o 7    S-GND
DTR     20 o ─────────╱     ╲         o 8    DCD
INIT    25 o                 ╲─────── o 20   DTR
```

```
    Printer side                    IBM PC side
   (D-sub 25 pin)                  (D-sub 9 pin)

F-GND    1 o                                 F-GND
TXD      2 o ───────╲       ╱──────── o 3    TXD
RXD      3 o ────────╲─────╱───────── o 2    RXD
RTS      4 o ─────────╲───╱           o 7    RTS
                       ╲ ╱            o 8    CTS
DSR      6 o ───────────╳──────────── o 6    DSR
S-GND    7 o ──────────╱ ╲─────────── o 5    S-GND
DTR     20 o ─────────╱     ╲         o 1    DCD
INIT    25 o                 ╲─────── o 4    DTR
```
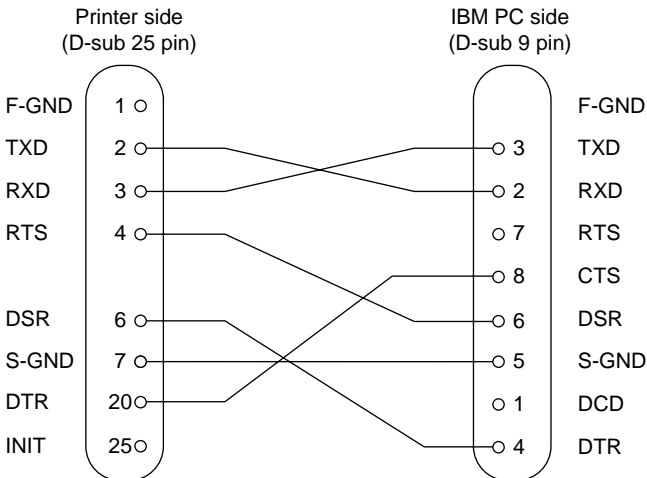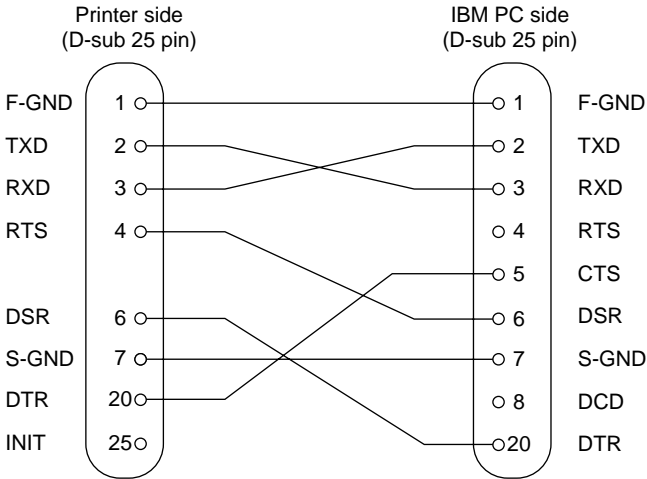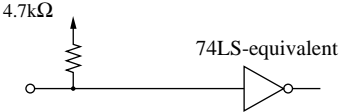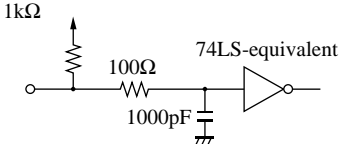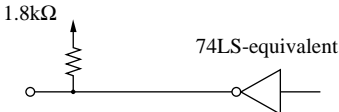
## *Data protocol*

❏ The specifications for the DTR and X-ON/X-OFF modes are the same as for the Standard Serial Interface.

## *Optional parallel interface*

| | |
|---|---|
| Interface: | Conforms with Centronics parallel interface standard |
| Data transfer speed: | 1000 ~ 5000 CPS |
| Synchronization: | External strobe pulse |
| Handshaking: | Using ACK and BUSY |
| Logic level: | TTL-level compatible |



T: At least 0.5μs
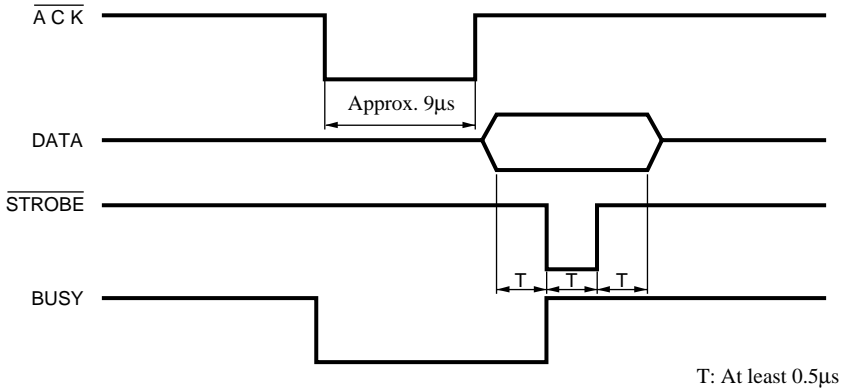
| | Signal Name | Sample Circuit |
|---|---|---|
| Input | DATA 1<br><br>DATA 8 | 4.7kΩ     74LS-equivalent |
| Input | $\overline{\text{STROBE}}$ | 1kΩ   100Ω   74LS-equivalent<br>1000pF |
| Output | BUSY<br>$\overline{\text{ACK}}$ | 1.8kΩ     74LS-equivalent |

*Optional parallel interface pins and signal names*
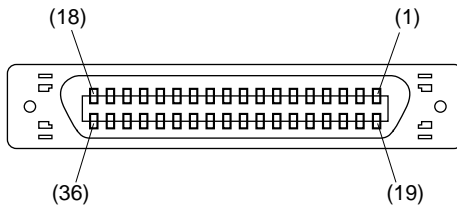
| Pin No. | Signal Name | Direction | Function |
|---------|-------------|-----------|----------|
| 1 | $\overline{\text{STROBE}}$ | IN | Signals when data is ready to be read. Signal goes from HIGH to LOW (for at least 0.5 μs) when data is available. |
| 2 - 9 | DATA 1 - 8 | IN | Information on the first eight bits of parallel data. Each signal is HIGH for logical 1 and LOW for logical 0. |
| 10 | $\overline{\text{ACK}}$ | OUT | 9μs LOW pulse to acknowledge receipt of data |
| 11 | BUSY | OUT | Printer is ready to receive data when LOW. HIGH indicates one of the following conditions.<br>• Data being entered<br>• Printer off line<br>• Error condition |
| 12 | PAPER OUT | OUT | Normally LOW, this signal goes HIGH when the printer is out of paper. |
| 13 | SELECTED | OUT | HIGH when the printer is on line |
| 14 | — | IN | This signal is not checked by printer. |
| 15 | N/C | — | Not connected |
| 16 | SIGNAL GND | — | Signal ground |
| 17 | CHASSIS GND | — | Chassis ground (isolated from logic ground) |
| 18 | +5VDC | — | +5V DC (max. 50mA) |
| 19 - 30 | GND | — | Twisted pair return signal ground level |
| 31 | $\overline{\text{RESET}}$ | IN | LOW when printer is reset to power-on defaults |
| 32 | $\overline{\text{ERROR}}$ | OUT | Normally HIGH, this signal goes LOW to signal that printing is disabled due to an error condition. |
| 33 | EXT GND | — | External ground |
| 34 - 35 | N/C | — | Not connected |
| 36 | — | IN | This signal is not checked by printer. |

# *Chapter 7: Peripheral Unit Driver Circuit*

The main logic board of this printer includes a circuit for driving peripheral units, such as cash drawers. A modular connector for connection of the peripheral unit is located on the back of the printer. To connect to the drive circuit, connect the peripheral unit to the modular connector using a cable supplied by you that meets the following specifications.

• Use a cable with a modular plug like that one shown in the figure below.

---

*Important!*

*Never connect any other type of plug to the peripheral unit connector.*

---

## *Modular plug*

Modular plug: MOLEX 90075-0007,
AMP641337, or JAPAN BURNDY B-66-4

Shield

Wire lead

6

1
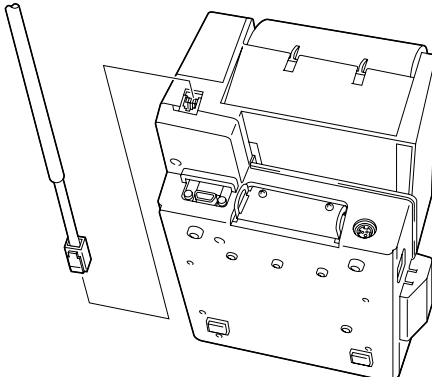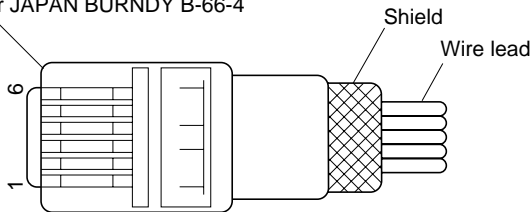
## *Drive circuit*

The recommended drive unit is shown below.

[Drive output 24V, max. 1.0A]
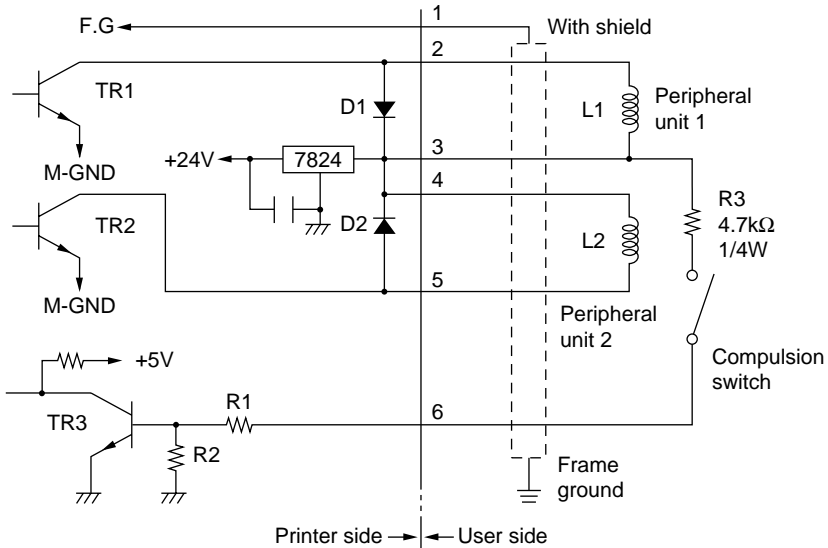


**Notes**

- Peripheral Units 1 and 2 cannot be driven simultaneously.

- For continuous driving, do not use drive duty above 20%.

- Compulsion switch status is available as status data.

- Minimum resistance for coils L1 and L2 is 24Ω.

- Absolute maximum ratings for diodes D1 and D2 (Ta = 25°C) are:
  Average Rectified Current Io = 1A
  Maximum forward surge current (60Hz, 1-cycle sine wave) $I_{FSM}$ = 40A

- Absolute maximum rating for transistors TR1 and TR2 (Ta = 25°C) are:
  Collector current Ic = 2A

# *Chapter 8: Automatic Cutter*

① The cutter operates in response to data commands. To enable cutter operation, set Memory Switch #2-8 to indicate that the cutter is installed.

② NEVER place fingers or metal objects in the cutter area.

③ If a jam occurs in the cutter area, switch off the power, use tweezers to remove the jammed paper, then switch the power back on. The printer will return the blade to the home position.

④ Never clean the cutter blade with alcohol or any other solvent, as this may remove the blade's lubrication and shorten the blade life.

# *Chapter 9: Control Codes*

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***Important!***

> *Please access the following URL*
> *http://www.star-micronics.co.jp/service/sp_sup_e.htm*
> *for the lastest revision of the manual.*

---

This printer has two command modes: Star mode and ESC/POS mode.

The Star mode emulates thermal receipt printers such as the TSP200 series and other previous models. The ESC/POS mode emulates the Epson TM-T85 receipt printer and the Epson TM-295 slip printer.

The Star mode commands are as follows.

## Print Station Selection (Combo mode only)

| Control codes | Hexadecimal codes | Function | Receipt-printer | Slip printer | Page |
|---|---|---|---|---|---|
| <ESC> "+" "A" 0 <br> <ESC> "+" "A" <0> | 1B 2B 41 30 <br> 1B 2B 41 00 | Select receipt printer | | ○ | 36 |
| <ESC> "+" "A" 3 <br> <ESC> "+" "A" <3> | 1B 2B 41 33 <br> 1B 2B 41 03 | Select slip printer | ○ | | 36 |

## Character Selection

| Control codes | Hexadecimal codes | Function | Receipt-printer | Slip printer | Page |
|---|---|---|---|---|---|
| <ESC> "R" *n* | 1B 52 *n* | Select international character set | ○ | ○ | 36 |
| <ESC> "/" "1" <br> <ESC> "/" <1> | 1B 2F 31 <br> 1B 2F 01 | Select slash zero | ○ | ○ | 36 |
| <ESC> "/" "0" <br> <ESC> "/" <0> | 1B 2F 30 <br> 1B 2F 00 | Select normal zero | ○ | ○ | 36 |
| <ESC> "b" *n1 n2 n3 n4 d1* ... <RS> | 1B 62 *n1 n2 n3 n4 d1* ... 1E | Select bar code printing | ○ | | 37 |
| <ESC> "M" | 1B 4D | Select 12-dot pitch printing | ○ | | 41 |
| | | Select 7 $\times$ 9 (half dot) font | | ○ | 41 |
| <ESC> "p" | 1B 70 | Select 14-dot pitch printing | ○ | | 41 |
| <ESC> "P" | 1B 50 | Select 15-dot pitch printing | ○ | | 41 |
| | | Select 5 $\times$ 9 (2 pulses = 1 dot) font | | ○ | 41 |

| Control codes | Hexadecimal codes | Function | Receipt-printer | Slip printer | Page |
|---|---|---|---|---|---|
| <ESC> ":" | 1B 3A | Select 16-dot pitch printing | O | | 41 |
| | | Select 5 × 9 (3 pulses = 1 dot) font | | O | 41 |
| <ESC> <SP> *n* | 1B 20 *n* | Set character spacing | O | O | 41 |
| <SO> | 0E | Set the printing magnified double in character width. | O | O | 42 |
| <DC4> | 14 | Resets the printing magnified in character width. | O | O | 42 |
| <ESC> "W" *n* | 1B 57 *n* | Set the magnification rate in character width. | O | O | 42 |
| <ESC> <SO> | 1B 0E | Sets the printing magnified double in character width. | O | | 42 |
| <ESC> <DC4> | 1B 14 | Resets the printing magnified in character width. | O | | 42 |
| <ESC> "h" *n* | 1B 68 *n* | Sets the magnification rate in character height. | O | O | 43 |
| <ESC> "i" *n1 n2* | 1B 69 *n1 n2* | Sets the magnification rates in character width and height. | O | | 43 |
| <ESC> "–" "1"<br><ESC> "–" <1> | 1B 2D 31<br>1B 2D 01 | Select underlining | O | O | 43 |
| <ESC> "–" "0"<br><ESC> "–" <0> | 1B 2D 30<br>1B 2D 00 | Cancel underlining | O | O | 43 |
| <ESC> "_" "1"<br><ESC> "_" <1> | 1B 5F 31<br>1B 5F 01 | Select upperlining | O | O | 44 |
| <ESC> "_" "0"<br><ESC> "_" <0> | 1B 5F 30<br>1B 5F 00 | Cancel upperlining | O | O | 44 |
| <ESC> "4" | 1B 34 | Select highlight printing | O | O | 44 |
| <ESC> "5" | 1B 35 | Cancel highlight printing | O | O | 44 |
| <SI> | 0F | Inverted printing | O | O | 44 |
| <DC2> | 12 | Cancel inverted printing | O | O | 44 |
| <ESC> "E" | 1B 45 | Select emphasized printing | O | O | 45 |
| <ESC> "F" | 1B 46 | Cancel emphasized printing | O | O | 45 |
| <ESC> "U" "1"<br><ESC> "U" <1> | 1B 55 31<br>1B 55 01 | Select uni-directional printing | | O | 45 |
| <ESC> "U" "0"<br><ESC> "U" <0> | 1B 55 30<br>1B 55 00 | Select bi-directional printing | | O | 45 |

## Page Formatting

| Control codes | Hexadecimal codes | Function | Receipt-printer | Slip printer | Page |
|---|---|---|---|---|---|
| <ESC> "C" *n* | 1B 43 *n* | Set page length in lines | ○ | | 46 |
| <ESC> "C" <0> *n* | 1B 43 00 *n* | Set page length in inches | ○ | | 46 |
| <ESC> "N" *n* | 1B 4E *n* | Set bottom margin | ○ | | 46 |
| <ESC> "O" | 1B 4F | Cancel bottom margin | ○ | | 46 |
| <ESC> "1" *n* | 1B 6C *n* | Set left margin | ○ | ○ | 47 |
| <ESC> "Q" *n* | 1B 51 *n* | Set right margin | ○ | ○ | 47 |

## Print Position Control

| Control codes | Hexadecimal codes | Function | Receipt-printer | Slip printer | Page |
|---|---|---|---|---|---|
| <LF> | 0A | Line feed | ○ | ○ | 48 |
| <CR> | 0D | Carriage Return | ○ | ○ | 48 |
| <ESC> "a" *n* | 1B 61 *n* | Feed paper *n* lines | ○ | ○ | 48 |
| <FF> | 0C | Form feed | ○ | | 48 |
| <HT> | 09 | Horizontal tab | ○ | ○ | 48 |
| <VT> | 0B | Vertical tab | ○ | | 49 |
| <ESC> "A" *n* | 1B 41 *n* | Define *n*/72-inch line spacing | | ○ | 49 |
| <ESC> "2" | 1B 32 | Set line spacing to *n*/72-inch | | ○ | 49 |
| <ESC> "z" "1" | 1B 7A 31 | Set line spacing to 4 mm | ○ | | 49 |
| <ESC> "z" <1> | 1B 7A 01 | Set line spacing to 1/6-inch | | ○ | 49 |
| <ESC> "0" | 1B 30 | Set line spacing to 3 mm | ○ | | 50 |
| | | Set line spacing to 1/8-inch | | ○ | 50 |
| <ESC> "1" | 1B 31 | Set line spacing to 7/72-inch | | ○ | 50 |
| <ESC> "J" *n* | 1B 4A *n* | One time *n*/4 mm feed | ○ | | 50 |
| | | One time *n*/72-inch feed | | ○ | 50 |
| <ESC> "j" *n* | 1B 6A *n* | One time *n*/4 mm backfeed | ○ | | 51 |
| | | One time *n*/72-inch backfeed | | ○ | 51 |
| <ESC> "3" *n* | 1B 33 *n* | Set line spacing to *n*/216-inch | | ○ | 51 |
| <ESC> "y" *n* | 1B 79 *n* | Set line spacing to *n*/144-inch | | ○ | 51 |
| <ESC> "I" *n* | 1B 49 *n* | One time *n*/8-mm feed | ○ | | 51 |
| <ESC> "B" *n1 n2 ...* <0> | 1B 42 *n1 n2 ...* 00 | Set vertical tab stops | ○ | | 52 |
| <ESC> "D" *n1 n2 ...* <0> | 1B 44 *n1 n2 ...* 00 | Set horizontal tab stops | ○ | ○ | 52 |

## Dot Graphics Printing

| Control codes | Hexadecimal codes | Function | Receipt-printer | Slip printer | Page |
|---|---|---|---|---|---|
| <ESC> "K" *n* <0> *m1 m2 ...* | 1B 4B *n* 00 *m1 m2 ...* | Print normal density graphics | ○ | ○ | 53 |
| <ESC> "L" *n1 n2 m1 m2 ...* | 1B 4C *n1 n2 m1 m2 ...* | Print high density graphics | ○ | ○ | 56 |
| <ESC> "k" *n* <0> *m1 ...* | 1B 6B *n* 00 *m1 ...* | Print fine density graphics | ○ | | 58 |
| <ESC> "X" *n1n2 m1 ...* | 1B 58 *n1n2 m1...* | Print fine density graphics | ○ | | 61 |

## Download Graphics Printing

| Control codes | Hexadecimal codes | Function | Receipt-printer | Slip printer | Page |
|---|---|---|---|---|---|
| <ESC> "&" "1" "1" *n m1 m2 ... m48* | 1B 26 31 31 *n m1 m2 ... m48* | Define download character ($12 \times 24$ dot font) | ○ | | 62 |
| <ESC> "&" <1> <1> *n m1 m2 ... m48* | 1B 26 01 01 *n m1 m2 ... m48* | | | | |
| <ESC> "&" <0> *n1 n2* | 1B 26 00 *n1 n2* | Define download character ($7 \times 9$, $5 \times 9$ dot font) | | ○ | 65 |
| <ESC> "&" "1" "0" *n* | 1B 26 31 30 *n* | Delete a download character ($12 \times 24$ dot font) | ○ | | 65 |
| <ESC> "&" <1> <0> *n* | 1B 26 01 00 *n* | | | | |
| <ESC> "%" "1" <br> <ESC> "%" <1> | 1B 25 31 <br> 1B 25 01 | Enable download character set | ○ | ○ | 65 |
| <ESC> "%" "0" <br> <ESC> "%" <0> | 1B 25 30 <br> 1B 25 00 | Disable download character set | ○ | ○ | 65 |

## Peripheral Device Control

| Control codes | Hexadecimal codes | Function | Receipt-printer | Slip printer | Page |
|---|---|---|---|---|---|
| <ESC> <BEL> *n1 n2* | 1B 07 *n1 n2* | Define drive pulse width for peripheral device #1 | ○ | ○ | 66 |
| <BEL> | 07 | Control peripheral device #1 | ○ | ○ | 66 |
| <FS> | 1C | Control peripheral device #1 immediately | ○ | ○ | 66 |
| <EM> | 19 | Control peripheral device #2 immediately | ○ | ○ | 66 |
| <SUB> | 1A | Control peripheral device #2 immediately | ○ | ○ | 66 |

## Auto Cutter Control

| Control codes | Hexadecimal codes | Function | Receipt-printer | Slip printer | Page |
|---|---|---|---|---|---|
| <ESC> "d" "0"<br><ESC> "d" <0> | 1B 64 30<br>1B 64 00 | Full-cut command to the auto cutter | O | | 67 |
| <ESC> "d" "1"<br><ESC> "d" <1> | 1B 64 31<br>1B 64 01 | Partial-cut command to the auto cutter | O | | 67 |

## Slip Printer Control

| Control codes | Hexadecimal codes | Function | Receipt-printer | Slip printer | Page |
|---|---|---|---|---|---|
| <ESC> <SI> *n* | 1B 0F *n* | Setting slip sensor | | O | 68 |
| <ESC> <FF> *n* | 1B 0C *n* | Slip function | | O | 68 |
| <ESC> <VT> *m n* | 1B 0B *m n* | Set the paper eject direction/length | | O | 69 |
| <EOT> | 04 | Slip status enquiry | | O | 69 |
| <ESC> <EM> *n m*<br><LF> <NUL> | 1B 19 *n m* 0A 00 | Set the wait time until the automatic clamp is activated | | O | 70 |

## Page Mode

| Control codes | Hexadecimal codes | Function | Receipt-printer | Slip printer | Page |
|---|---|---|---|---|---|
| <ESC> "n" | 1B 6E | Select page mode | | O | 70 |
| <ESC> "!" | 1B 21 | Select line mode | | O | 71 |
| <ESC> "*" ... | 1B 2A ... | Setting print area in page mode | | O | 72 |
| <ESC> "T" *n* | 1B 54 *n* | Setting print direction in page mode | | O | 73 |
| <FF> | 0C | Print in page mode | | O | 74 |

## Customer Display Commands (Combo mode only)

| Control codes | Hexadecimal codes | Function | Receipt-printer | Slip printer | Page |
|---|---|---|---|---|---|
| <ESC> "S" | 1B 53 | Start customer display | O | O | 75 |
| <ESC> "G" | 1B 47 | End customer display | O | O | 75 |

## Other Commands

| Control codes | Hexadecimal codes | Function | Receipt-printer | Slip printer | Page |
|---|---|---|---|---|---|
| <CAN> | 18 | Cancel printer buffer & Initialize printer | ○ | ○ | 76 |
| <DC3> | 13 | Deselect printer | ○ | ○ | 76 |
| <DC1> | 11 | Set select mode | ○ | ○ | 76 |
| <RS> | 1E | Beep the buzzer | ○ | ○ | 76 |
| <ESC> "#N, *n1 n2 n3 n4*" <LF> <NUL> | 1B 23 N 2C *n1 n2 n3 n4* 0A 00 | Set memory switch | ○ | ○ | 77 |
| <ESC> "@" | 1B 40 | Initialize printer | ○ | ○ | 80 |
| <ENQ> | 05 | Enquiry | ○ | ○ | 80 |
| <ESC> "?" <LF> <NUL> | 1B 3F 0A 00 | Reset printer hardware and produce a test print. | ○ | ○ | 83 |

## Printer Station Selection (Combo mode only)

| | | | | | |
|---|---|---|---|---|---|
| CODE | <ESC> | "+" | "A" | *n* | |
| HEX | 1B | 2B | 41 | *n* | |

FUNCTION

Print Station Selection
n = 0, "0" : Selects the receipt printer
    3, "3" : Selects the slip printer

This command is only valid when it entered at the beginning of a line. If this command is not set at the beginning of a line, the printer will ignore the command and continue to print on previously selected print station.

## Character Selection

| | | | |
|---|---|---|---|
| CODE | <ESC> | "R" | *n* |
| HEX | 1B | 52 | *n* |

FUNCTION

Select international character set

Selects an international character set according to the value of *n*, as shown below:

$0 \leqq n \leqq 12$, "0" $\leqq n \leqq$ "9", "A" $\leqq n \leqq$ "C"

n = 0, "0" : U.S.A.    1, "1" : France    2, "2" : Germany
    3, "3" : England    4, "4" : Denmark 1    5, "5" : Sweden
    6, "6" : Italy    7, "7" : Spain 1    8, "8" : Japan
    9, "9" : Norway    10, "A" : Denmark 2    11, "B" : Spain 2
    12, "C" : Latin America

Although the international character set can also be selected using a memory switch, the control code setting is given priority.

| | | | |
|---|---|---|---|
| CODE | <ESC> | "/" | *n* |
| HEX | 1B | 2F | *n* |

FUNCTION

Select zero style

Causes subsequent zero characters to be printed with a slash when *n* is 1, and without a slash when *n* is 0.
The valve of *n* can be set to 0(00H) or "0"(30H), or 1(0H) or "1"(31H).

The default may differ depending on the memory switch setting.

| CODE | <ESC> | "b" | *n1* | *n2* | *n3* | *n4* | *d1* | ... *dk* <RS> |
|------|-------|-----|------|------|------|------|------|---------------|

| HEX | 1B | 62 | *n1* | *n2* | *n3* | *n4* | *d1* | ... | *dk 1E* |
|-----|----|----|------|------|------|------|------|-----|---------|

**FUNCTION**      Select bar code printing

Prints bar code according to the value of *n1*, as shown below:
This command is only valid with the receipt printer.

*n1*: Type of bar code

| | |
|---|---|
| 0 | UPC-E |
| 1 | UPC-A |
| 2 | JAN/EAN-8 |
| 3 | JAN/EAN-13 |
| 4 | CODE 39 |
| 5 | ITF |
| 6 | CODE 128 |
| 7 | CODE 93 |
| 8 | NW-7 |

The value of *n1* can be set to 0(00H) or 8(08H) or "0"(30H) to
"8"(38H).


*n2*: Printing character below bar code or line feed

| | |
|---|---|
| 1 | Character below bar code is not printed, Line feed is performed after execution of command. |
| 2 | Character below bar code is printed, Line feed is performed after execution of command. |
| 3 | Character below bar code is not printed, Line feed is not performed after execution of command. |
| 4 | Character below bar code is printed, Line feed is not performed after execution of command. |

The value of *n2* can be set to 1(01H) to 4(04H) or "1"(31H) to
"4"(34H).


*n3*: Mode of bar code

UPC-E, UPC-A, JAN/EAN-8, JAN/EAN-13, CODE 128,
CODE 93

| | |
|---|---|
| 1 | Minimum module 2 dots |
| 2 | Minimum module 3 dots |
| 3 | Minimum module 4 dots |

CODE 39, NW-7, ITF

| | | CODE 39, NW-7 | ITF |
|---|---|---|---|
| 1 | Narrow : wide | 2:6 dots | 2:5 dots |
| 2 | Narrow : wide | 3:9 dots | 4:10 dots |
| 3 | Narrow : wide | 4:12 dots | 6:15 dots |
| 4 | Narrow : wide | 2:5 dots | 2:4 dots |
| 5 | Narrow : wide | 3:8 dots | 4:8 dots |
| 6 | Narrow : wide | 4:10 dots | 6:12 dots |
| 7 | Narrow : wide | 2:4 dots | 2:6 dots |
| 8 | Narrow : wide | 3:6 dots | 3:9 dots |
| 9 | Narrow : wide | 4:8 dots | 4:12 dots |

When the value of *n3* is UPC-E, UPC-A, JAN/EAN-8, JAN/EAN-13, CODE 128 or CODE 93, 1(01H) to 3(03H) or "1"(31H) to "3"(33H) can be set. When the value of n3 is CODE39, NW-7 or ITF, 1(01H) to 9(09H) or "1"(31H) to "9"(39H) can be set.

*n4*: Height of bar code
Can be up to 255 dots (31.9 mm).
If the bar code height is larger than the line feed amount, the line feed amount is automatically multiplied by an integer.

d1...dk: Bar code data

UPC-E/UPC-A: K = 11 (or 12)
The check digit at the 12th digit is automatically added, and ignored even if it is specified.

JAN/EAN-8: K = 7 (or 8)
The check digit at the 8th digit is automatically added, and ignored even if it is specified.

JAN/EAN-13: K = 12 (or 13)
The check digit at the 13th digit is automatically added, and ignored even if it is specified.

CODE39: The value of k is optional, and the maximum value also differs according to the modes (21 digits maximum in mode 7).
The start/stop code ("∗") is automatically added.

ITF          The value of k is optional, and the maximum
             value also differs according to the modes (40
             digits maximum in mode 4).
             If the data is number of an odd digits, 0 is
             automatically added at the beginning of the data.

CODE 128:    The value of k is optional, and the maximum
             value also differs according to the modes and the
             types of character number (51 digits maximum
             in mode 1).
             The check character is automatically added.

CODE 93:     The value of k is optional, and the maximum
             value also differs according to the modes and the
             types of character (30 digits maximum in mode
             1).
             The check characters (C and K) are
             automatically added.

NW-7:        The value of k is optional, and the maximum
             value also differs according to the modes and the
             types of character number (29 digits maximum
             in mode 7).
             The start/stop code is also contained in the data
             (it is not automatically added).

The bar code printing start position is at the upper end of the
current line.
If the bar code is positioned beyond the right margin, neither the
bar code nor the character below the bar code will be printed.

Data of CODE 128 and CODE 93

When <LF> is used in a command, some kinds of control code
cannot be sent by the host PC. The control code should be sent
as the data as shown below:

• When sending the following data, express as a set of two
  characters.
  Express "% (25H)" as "%0 (25H30H)".
  Add "40H-5FH" after "%" for the control codes (00H-1FH).
  Express the control code (7FH) as "%5(25H35H)".
  Add "1 - 4 (31H - 34H)" after "%" for the function code.
  Add "6 - 8 (36H - 38H)" after "%" for the start code.

3) 2-character codes

Control codes

| CODE | | FORMAT | | |
|---|---|---|---|---|
| NUL | 00H | %@ | 25H | 40H |
| SOH | 01H | %A | 25H | 41H |
| STX | 02H | %B | 25H | 42H |
| ETX | 03H | %C | 25H | 43H |
| EOT | 04H | %D | 25H | 44H |
| ENQ | 05H | %E | 25H | 45H |
| ACK | 06H | %F | 25H | 46H |
| BEL | 07H | %G | 25H | 47H |
| BS | 08H | %H | 25H | 48H |
| HT | 09H | %I | 25H | 49H |
| LF | 0AH | %J | 25H | 4AH |
| VT | 0BH | %K | 25H | 4BH |
| FF | 0CH | %L | 25H | 4CH |
| CR | 0DH | %M | 25H | 4DH |
| SO | 0EH | %N | 25H | 4EH |
| SI | 0FH | %O | 25H | 4FH |
| DLE | 10H | %P | 25H | 50H |
| DC1 | 11H | %Q | 25H | 51H |
| DC2 | 12H | %R | 25H | 52H |
| DC3 | 13H | %S | 25H | 53H |
| DC4 | 14H | %T | 25H | 54H |
| NAK | 15H | %U | 25H | 55H |
| SYN | 16H | %V | 25H | 56H |
| ETB | 17H | %W | 25H | 57H |
| CAN | 18H | %X | 25H | 58H |
| EM | 19H | %Y | 25H | 59H |
| SUB | 1AH | %Z | 25H | 5AH |
| ESC | 1BH | %[ | 25H | 5BH |
| FC | 1CH | %¥ | 25H | 5CH |
| GS | 1DH | %] | 25H | 5DH |
| RS | 1EH | %^ | 25H | 5EH |
| US | 1FH | %_ | 25H | 5FH |
| DEL | 7FH | %5 | 25H | 35H |

Special code

| CODE | | FORMAT | | |
|---|---|---|---|---|
| % | 25H | %0 | 25H | 30H |

Function codes

| CODE | | FORMAT | | | |
|---|---|---|---|---|---|
| FNC1 | | %1 | 25H | 31H | ☆ |
| FNC2 | | %2 | 25H | 32H | ☆ |
| FNC3 | | %3 | 25H | 33H | ☆ |
| FNC4 | | %4 | 25H | 34H | ☆ |

Start codes

| CODE | | FORMAT | | | |
|---|---|---|---|---|---|
| START A | | %6 | 25H | 36H | ☆ |
| START B | | %7 | 25H | 37H | ☆ |
| START C | | %8 | 25H | 38H | ☆ |

☆ For CODE 128 only.

| CODE | <ESC> "M" |
|------|-----------|
| HEX | 1B 4D |
| FUNCTION | Receipt printer: Select 12-dot pitch printing |

Prints in a $12 \times 24$ dot font with no spacing between characters.

Slip printer : Select $7 \times 9$ (half dot) font

| CODE | <ESC> "p" |
|------|-----------|
| HEX | 1B 70 |
| FUNCTION | Select 14-dot pitch printing |

Prints in a $12 \times 24$ dot font with 2-dot spacing between characters.
This command is only valid with the receipt printer.

| CODE | <ESC> "P" |
|------|-----------|
| HEX | 1B 50 |
| FUNCTION | Receipt printer: Select 15-dot pitch printing |

Prints in a $12 \times 24$ dot font with 3-dot spacing between characters.

Slip printer : Select $5 \times 9$ (2 pulses = 1 dot) font

| CODE | <ESC> ":" |
|------|-----------|
| HEX | 1B 3A |
| FUNCTION | Receipt printer: Select 16-dot pitch printing |

Prints in a $12 \times 24$ dot font with 4-dot spacing between characters.

Slip printer : Select $5 \times 9$ (3 pulses = 1 dot) font

| CODE | <ESC> <SP> *n* |
|------|-----------|
| HEX | 1B 20 *n* |
| FUNCTION | Set character spacing |

Sets the spacing between characters according to the value of *n*.
The value of *n* can be set from 0 through 15, or from "0" through "9" and "A" through "F".
The default value of *n* is 0.

| CODE | <SO> |
|------|------|
| HEX | 0E |

**FUNCTION** Sets the printing magnified double in character width.
Prints the subsequent data including a character spacing set by
<ESC><SP> *n*, magnified double in character width.

| CODE | <DC4> |
|------|------|
| HEX | 14 |

**FUNCTION** Resets the printing magnified in character width.
Resets the printing magnified in character width set by <SO>,
<ESC><SO>, <ESC> "W" *n* and <ESC> "i"*n1n2*.

| CODE | <ESC> | "W" | *n* |
|------|------|-----|-----|
| HEX | 1B | 57 | *n* |

**FUNCTION** Set the magnification rate in character width
Prints the subsequent data with a character width magnified by a rate
specified by the value of n.
Receipt printer:  n= 0, "0": Reset magnification (same as <DC4>)
                             1, "1": Double magnification (same as <SO>)
                             2, "2": Triple magnification
                             3, "3": Quadruple magnification
                             4, "4": Quintuple magnification
                             5, "5": Sextuple magnification

Slip printer: n= 0, "0": Reset magnification (same as <DC4>)
                        1, "1": Double magnification (same as <SO>)

| CODE | <ESC> | <SO> |
|------|------|------|
| HEX | 1B | 0E |

**FUNCTION** Sets the printing magnified double in character width.
Prints the subsequent data magnified double in character width.
This command is only valid with the receipt printer.

| CODE | <ESC> | <DC4> |
|------|------|------|
| HEX | 1B | 14 |

**FUNCTION** Resets the printing magnified in character width set by
<ESC><SO>, <ESC>"h"*n* and <ESC> "i" *n1n2*.
This command is only valid with the receipt printer.

| CODE | <ESC> "h" *n* |
|------|---------------|
| HEX | 1B 68 *n* |
| FUNCTION | |

Set the magnification rate in character height
Prints the subsequent data with a character height magnified by a rate specified by the value of *n*.
Receipt printer: n= 0, "0": Reset magnification (same as
<ESC><DC4>)
1, "1": Double magnification (same as
<ESC><SO>)
2, "2": Triple magnification
3, "3": Quadruple magnification
4, "4": Quintuple magnification
5, "5": Sextuple magnification

Slip printer: n= 0, "0": Reset magnification (same as <DC4>)
1, "1": Double magnification (same as <SO>)

| CODE | <ESC> "i" *n1 n2* |
|------|---------------|
| HEX | 1B 69 *n* 1 n2 |
| FUNCTION | |

Sets the magnification rates in character width and height
Prints the subsequent data in the size specified by *n1* and *n2*. The value of *n1* indicates the height magnification and the value of *n2* indicates the width magnification.
Receipt printer: n1 (n2)= 0, "0": Normal height (or width) size
1, "1": Double height (or width) size
2, "2": Triple height (or width) size
3, "3": Quadruple height (or width) size
4, "4": Quintuple height (or width) size
5, "5": Sextuple height (or width) size

The value of n is between 0(00H) and 5(05H) or "0" (30H) and "5" (35H). This command is only valid with the receipt printer.

| CODE | <ESC> "–" *n* |
|------|---------------|
| HEX | 1B 2D *n* |
| FUNCTION | |

Underlining
When the value of *n* is 1, underlines the subsequent data including a character spacing set by <ESC><SP> *n*.
The part to be skipped by the horizontal tab setting and the block graphic characters are not underlined.
Resets the underline mode when the value of *n* is 0.
The value of *n* can be set to 0(00H) or "0"(30H), or 1(01H) or "1"(31H).

| CODE | <ESC> "_" *n* |
|---|---|
| HEX | 1B 5F *n* |
| FUNCTION | Upperlining |

When the value of *n* is 1, over lines the subsequent data including a character spacing set by <ESC><SP> *n*.
The part to be skipped by the horizontal tab setting and the block graphic characters are not upper lined.
Resets the upper line mode when the value of *n* is 0.
The value of *n* can be set to 0(00H) or "0"(30H), or 1(01H) or "1"(31H).

| CODE | <ESC> "4" |
|---|---|
| HEX | 1B 34 |
| FUNCTION | Select highlight printing |

Prints the subsequent data including a character spacing set by <ESC><SP> *n* reversed.
The part to be skipped by the horizontal tab setting is not reversed.

| CODE | <ESC> "5" |
|---|---|
| HEX | 1B 35 |
| FUNCTION | Cancel highlight printing |

Cancels highlight printing

| CODE | <SI> |
|---|---|
| HEX | 0F |
| FUNCTION | Inverted printing |

Causes subsequent characters to be inverted.
Enter this command at the beginning of the line. If this code is entered at any other position, it will be invalid. Therefore, it is not possible to mix correct and inverted printing in one line.

| CODE | <DC2> |
|---|---|
| HEX | 12 |
| FUNCTION | Cancel inverted printing |

Cancels inverted printing
Enter this code at the beginning of the line.

| CODE | <ESC> | "E" |
|------|-------|-----|
| HEX | 1B | 45 |

**FUNCTION**  Select emphasized printing
Causes subsequent characters to be emphasized.

| CODE | <ESC> | "F" |
|------|-------|-----|
| HEX | 1B | 46 |

**FUNCTION**  Cancel emphasized printing
Cancels emphasized printing.

| CODE | <ESC> | "U" | "1" | or | <ESC> | "U" | <1> |
|------|-------|-----|-----|----|----|-----|-----|
| HEX | 1B | 55 | 31 | | 1B | 55 | 01 |

**FUNCTION**  Select uni-directional printing
After printing the data in the line buffer, the printer enters the uni-directional mode.
The subsequent data is printed when the print head moves from left to right.
This command is only valid with the slip printer.

| CODE | <ESC> | "U" | "0" | or | <ESC> | "U" | <0> |
|------|-------|-----|-----|----|----|-----|-----|
| HEX | 1B | 55 | 30 | | 1B | 55 | 00 |

**FUNCTION**  Select bi-directional printing
After printing the data in the line buffer, the printer enters the bi-directional mode.
In this mode, the data is printed faster than the uni-directional mode.
This command is only valid with the slip printer.

**Page Formatting (Line Mode)**

| | | | |
|---|---|---|---|
| CODE | <ESC> | "C" | *n* |
| HEX | 1B | 43 | *n* |

FUNCTION  Set page length in lines
Sets the page length using the current line spacing, where *n* is between 1 and 127.
Changing the line spacing later does not alter the physical page length.
The current line becomes the top of the page.
Resets the bottom margin.
Default page length is 42 lines.
This command is only valid with the receipt printer.

| | | | | |
|---|---|---|---|---|
| CODE | <ESC> | "C" | <0> | *n* |
| HEX | 1B | 43 | 00 | *n* |

FUNCTION  Set page length in inches
Sets the page length to $n \times 24$ mm, where *n* is between 1 and 22.
The current line becomes the top of the page.
Resets the bottom margin
This command is only valid with the receipt printer.

| | | | |
|---|---|---|---|
| CODE | <ESC> | "N" | *n* |
| HEX | 1B | 4E | *n* |

FUNCTION  Set bottom margin
Sets the bottom margin to *n* lines at the current line spacing, where *n* is between 0 and 255.
Bottom margin is reset when you change the page length.
Setting is invalid if the printing area on one page is 36 mm or less.
This command is only valid with the receipt printer.

| | | |
|---|---|---|
| CODE | <ESC> | "O" |
| HEX | 1B | 4F |

FUNCTION  Cancel bottom margin
Cancels the bottom margin.
This command is only valid with the receipt printer.

| CODE | <ESC> | "1" | *n* |
|------|-------|-----|-----|

| HEX | 1B | 6C | *n* |
|-----|-----|-----|-----|

**FUNCTION**

Set left margin at column *n* at the current character pitch.
The left margin does not move if the character pitch is changed later.
If this function is set in the middle of a line, it will become valid
starting with the following line. When the power is turned on, the left
edge is set as the left margin.

Receipt printer : The setting is invalid if the print area for one line
would be 36 mm or less.
The value of n is between 0 and 255.

Slip printer : The left margin must be at least 18 dots to the left of
the right margin and within the limits below. If the
size of one character and its spacing is larger than
the print area defined by the margins, printing is not
possible and "?" is printed, instead of the character.
The value of n is between 0 and the value of the
right margin - 2.

| CODE | <ESC> | "Q" | *n* |
|------|-------|-----|-----|

| HEX | 1B | 51 | *n* |
|-----|-----|-----|-----|

**FUNCTION**

Set right margin
Set right margin at column *n* at the current character pitch.
The right margin does not move if the character pitch is changed
later.
If this function is set in the middle of a line, it will become valid
starting with the following line. When the power is turned on, the
right edge is set as the right margin.

Receipt printer : The setting is invalid if the print area for one line
would be 36 mm or less. The value of n is between
0 and 255.

Slip printer : The right margin must be within the limits below
and set so that the allowable print area is more than
18 dots. If the size of one character and its spacing
is larger than the print area defined by the margins,
printing is not possible and "?" is printed, instead of
the character.
The value of n is between 2 and the value of the
maximum number of print columns.

**Print Position Control**

| CODE | | <LF> |
|---|---|---|
| HEX | | 0A |
| FUNCTION | | Line feed |

Prints the current line and feeds the paper to the next line.

| CODE | <CR> |
|---|---|
| HEX | 0D |
| FUNCTION | Carriage return |

The <CR> code is valid for both the receipt and slip printers only if memory switch 3-1 is set to 1. (The factory setting is 0.)
If the <CR> code is valid:
Receipt printer : Functions in the same way as an <LF> code.
Slip printer : The function of the <CR> code changes according to the setting of memory switch 5-8.

When memory switch 5-8 is set to 0 (factory setting): Functions in the same way as an <LF> code (CRLF).
When memory switch 5-8 is set to 1: Executed only when printing. The paper is not fed (CR).

| CODE | <ESC> | "a" | *n* |
|---|---|---|---|
| HEX | 1B | 61 | *n* |
| FUNCTION | Feed paper *n* lines | | |

Prints the current line and feeds the paper *n* lines (where *n* is between 1 and 127).

| CODE | <FF> |
|---|---|
| HEX | 0C |
| FUNCTION | From feed |

Feeds the paper to the top of the next page, according to the page length set by <ESC> "C"*n* or <ESC>"C"<0>*n*.
This command is only valid with the receipt printer.

| CODE | <HT> |
|---|---|
| HEX | 09 |
| FUNCTION | Horizontal tab |

Moves the print position to the next horizontal tab stop. Ignored if there is no next horizontal tab stop on the current line.

| CODE | | <VT> |
|---|---|---|

| HEX | | 0B |
|---|---|---|

**FUNCTION**   Vertical tab
Prints the current line and feeds the paper to the next vertical tab stop
and moves the print position to the left margin.
Performs paper feed if no vertical tabs are or if the current line is
at or below the last vertical tab stop.
This command is only valid with the receipt printer.

| CODE | | <ESC> | "A" | *n* |
|---|---|---|---|---|

| HEX | | 1B | 41 | *n* |
|---|---|---|---|---|

**FUNCTION**   Define *n*/72-inch line spacing
Defines the distance that the paper advances in subsequent line feed.
The line spacing defined here is set by <ESC> "2".
$0 \leq n \leq 85$
The default value of *n* is 12 (1/6-inch feed)
This command is only valid with the slip printer

| CODE | | <ESC> | "2" |
|---|---|---|---|

| HEX | | 1B | 32 |
|---|---|---|---|

**FUNCTION**   Set line spacing to *n*/72-inch
Set the line spacing to *n*/72-inch which is defined by <ESC> "A" *n*.
This command is only valid with the slip printer

| CODE | | <ESC> | "z" | "0" | or | <ESC> | "z" | <0> |
|---|---|---|---|---|---|---|---|---|

| HEX | | 1B | 7A | 30 | or | 1B | 7A | 00 |
|---|---|---|---|---|---|---|---|---|

**FUNCTION**   Receipt printer: Set line spacing to 3 mm
Sets the distance that the paper advances in
subsequent line feed to 3 mm.

Slip printer   : Set line spacing to 1/12 inch
Sets the distance that the paper advances in
subsequent line feeds to 1/12 inch.

| CODE | | <ESC> | "z" | "1" | or | <ESC> | "z" | <1> |
|---|---|---|---|---|---|---|---|---|

| HEX | | 1B | 7A | 31 | or | 1B | 7A | 01 |
|---|---|---|---|---|---|---|---|---|

**FUNCTION**   Receipt printer: Set line spacing to 4 mm
Sets the distance that the paper advances in
subsequent line feed to 4 mm.

Slip printer   : Set line spacing to 1/6 inch
Sets the distance that the paper advances in
subsequent line feeds to 1/6 inch.

| CODE | <ESC> | "0" |
|------|-------|-----|
| HEX | 1B | 30 |

FUNCTION  Receipt printer: Set line spacing to 3 mm
           Sets the distance that the paper advances in
           subsequent line feed to 3 mm.

        Slip printer  : Set line spacing to 1/8 inch
           Sets the distance that the paper advances in
           subsequent line feeds to 1/8 inch.

| CODE | <ESC> | "1" |
|------|-------|-----|
| HEX | 1B | 31 |

FUNCTION  Receipt printer: Set line spacing to 3 mm
           Sets the distance that the paper advances in
           subsequent line feed to 3 mm.

        Slip printer  : Set line spacing to 7/72-inch
           Sets the distance that the paper advances in
           subsequent line feeds to 7/72-inch.

| CODE | <ESC> | "J" | *n* |
|------|-------|-----|-----|
| HEX | 1B | 4A | *n* |

FUNCTION  Receipt printer: One time *n*/4-mm feed
           Performs a line feed of *n*/4 mm only once after
           printing the data in the line buffer. The space setting
           for lines does not change. The value of *n* is between
           1 and 255.

        Slip printer  : One time *n*/72-inch feed
           Performs a line feed of *n*/72-inch only once after
           printing the data in the line buffer. The space setting
           for lines does not change. The value of *n* is between
           1 and 255.

| CODE | <ESC> | "j" | *n* |
|------|-------|-----|-----|
| HEX | 1B | 6A | *n* |

**FUNCTION**  Receipt printer: One time *n*/4-mm backfeed
Feeds the paper back *n*/4 mm only once after printing the data in the line buffer. The space setting for lines do not change. This command can also feed the paper back to a previous page; however, the position in the line on the previous page is determined by the page length control.
The value of *n* is between 1 and 255.

Slip printer : One time *n*/72-inch backfeed
Performs a line feed of *n*/72-inch only once after printing the data in the line buffer. The space setting for lines do not change. The value of *n* is between 1 and 255.

| CODE | <ESC> | "3" | *n* |
|------|-------|-----|-----|
| HEX | 1B | 33 | *n* |

**FUNCTION**  Set line spacing to *n*/216-inch
Sets the subsequent line spacing to *n*/216-inch.
The value of *n* is between 1 and 255.
Since the min. pitch of the slip paper feed mechanism is 1/144-inch, the set value is approximated by the following formula
INT $(n \times 2/3 + 0.5)/144$ inch
This command is only valid with the slip printer

| CODE | <ESC> | "y" | *n* |
|------|-------|-----|-----|
| HEX | 1B | 79 | *n* |

**FUNCTION**  Set line spacing to *n*/144-inch
Sets the subsequent line spacing to *n*/144-inch.
The value of *n* is between 1 and 255.
This command is only valid with the slip printer

| CODE | <ESC> | "I" | *n* |
|------|-------|-----|-----|
| HEX | 1B | 49 | *n* |

**FUNCTION**  One time *n*/8 mm feed
Performs a line feed of *n*/8 mm only once after printing the data in the line bufrer.
The space setting for lines does not change.
The value of *n* is between 1 and 255.
This command is only valid with the receipt printer.

| CODE | <ESC> | "B" | *n1* | *n2* | ... | <0> |
|------|-------|-----|------|------|-----|-----|
| HEX  | 1B    | 42  | *n1* | *n2* | ... | 00  |

FUNCTION

Set vertical tab stops

Cancels all current vertical tab stops and sets new vertical tab stops at lines *n1*, *n2*, etc., where *n1*, *n2*, etc. are numbers between 0 and 255. A maximum of 16 vertical tab stops can be set.

The tab stops must be specified in ascending order; any violation of ascending order terminates the tab stop list. Standard termination is by the <0> control code.

The vertical tab stops are set in terms of the current line spacing and do not move if the line spacing is changed later.

With <ESC> "B" <0>, all vertical tab stops are cancelled. This command is only valid with the receipt printer. When the power is turned on, no vertical tabs are set.

| CODE | <ESC> | "D" | *n1* | *n2* | ... | <0> |
|------|-------|-----|------|------|-----|-----|
| HEX  | 1B    | 44  | *n1* | *n2* | ... | 00  |

FUNCTION

Set horizontal tab stops

Cancels all current horizontal tab stops and sets new tab stops at columns *n1*, *n2*, etc. at the current character pitch, where *n1*, *n2*, etc. are numbers between 1 and 255. A maximum of 16 horizontal tab stops can be set.

The tab stops must be specified in ascending order; any violation of ascending order terminates the tab stop list. Standard termination is by the <0> control code.

With <ESC> "D" <0>, all horizontal tab stops are cancelled. The left edge of the paper is always the reference point for the horizontal tab positions, regardless of the left margin setting. When the power is turned on, no horizontal tabs are set.

## Dot Graphics Printing

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CODE | <ESC> | "K" | *n* | <0> | *m1* | *m2* | ... | |
| HEX | 1B | 4B | *n* | 00 | *m1* | *m2* | ... | |

FUNCTION     Print normal density graphics

Receipt printer: Prints a 3 (horizontal) × 3 (vertical) dot bit image for each dot of entered data. Data extending beyond the right margin is ignored. The relationship between the entered data and the actual printing is shown below. The value of *n* is between 1 and 192.
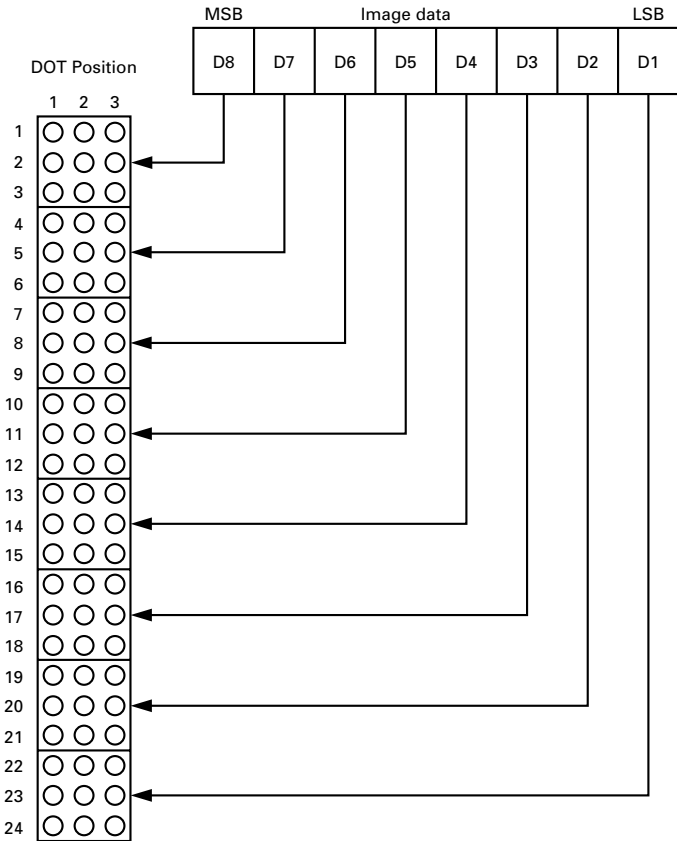
Slip printer: Prints a bit image of the number of dots specified by n. After printing the bit
image, the printer automatically returns to the character mode. The
relationship between the pins on the print head and the data is shown below.
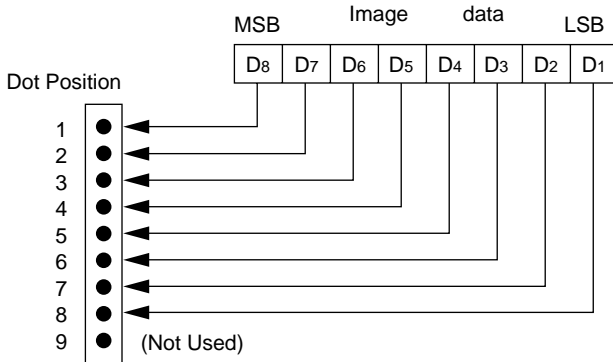


The value of n is between 1 and 210.
A maximum of 210 data bytes can printed in one line. Any data exceeding
210 bytes is ignored. Only uni-directional printing is possible.

| EXAMPLE |

We will create the design below using a bit image.

| | m1 | m2 | m3 | m4 | m5 | m6 | m7 | m8 | m9 | m10 | m11 | m12 | m13 | m14 | m15 | m16 | m17 | m18 | m19 | m20 | m21 | m22 | m23 | m24 | m25 | m26 | m27 | m28 | m29 | m30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D7 | | | | ● | | ● | | | | | | | | | | | | | | | | | | | | | | | | |
| D6 | | | ● | | | | | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| D5 | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | ● | ● | | | ● | | | ● | | | ● | | | ● | ● | | |
| D4 | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| D3 | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| D2 | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| D1 | ● | | | ● | ● | | | ● | ● | | | | | | | ● | ● | | | | | | | | ● | ● | | | | |

First, since the volume of data is 30, $n1 = (1E)н$. If the data $m1 \sim m30$ is converted to hexadecimal, it appears as shown below.

| Data | Binary | Hexa-decimal | Data | Binary | Hexa-decimal | Data | Binary | Hexa-decimal |
|---|---|---|---|---|---|---|---|---|
| *m1* | 00000001 | 01 | *m11* | 00111110 | 3E | *m21* | 00111110 | 3E |
| *m2* | 00011110 | 1E | *m12* | 00000010 | 02 | *m22* | 00101110 | 2E |
| *m3* | 00111110 | 3E | *m13* | 00000010 | 02 | *m23* | 00101110 | 2E |
| *m4* | 01011111 | 5F | *m14* | 00111110 | 3E | *m24* | 00111110 | 3E |
| *m5* | 00011111 | 1F | *m15* | 00111110 | 3E | *m25* | 00101111 | 2F |
| *m6* | 01011110 | 5E | *m16* | 00101111 | 2F | *m26* | 00101111 | 2F |
| *m7* | 00011110 | 1E | *m17* | 00101111 | 2F | *m27* | 00111110 | 3E |
| *m8* | 00111111 | 3F | *m18* | 00111110 | 3E | *m28* | 00111110 | 3E |
| *m9* | 00101111 | 2F | *m19* | 00101110 | 2E | *m29* | 00000010 | 02 |
| *m10* | 00111110 | 3E | *m20* | 00101110 | 2E | *m30* | 00000010 | 02 |

| Printing Sample |

| CODE | <ESC> | "L" | *n1* | *n2* | *m1* | *m2* | ... |
|------|-------|-----|------|------|------|------|-----|
| HEX | 1B | 4C | *n1* | *n2* | *m1* | *m2* | ... |

**FUNCTION**  Print high density graphics

Receipt printer: Prints a 1 (horizontal) × 3 (vertical) dot bit image for each dot of entered data. Data extending beyond the right margin is ignored. The relationship between the entered data and the actual printing is shown below. The value of n1 + n2 × 256 is between 1 and 576.
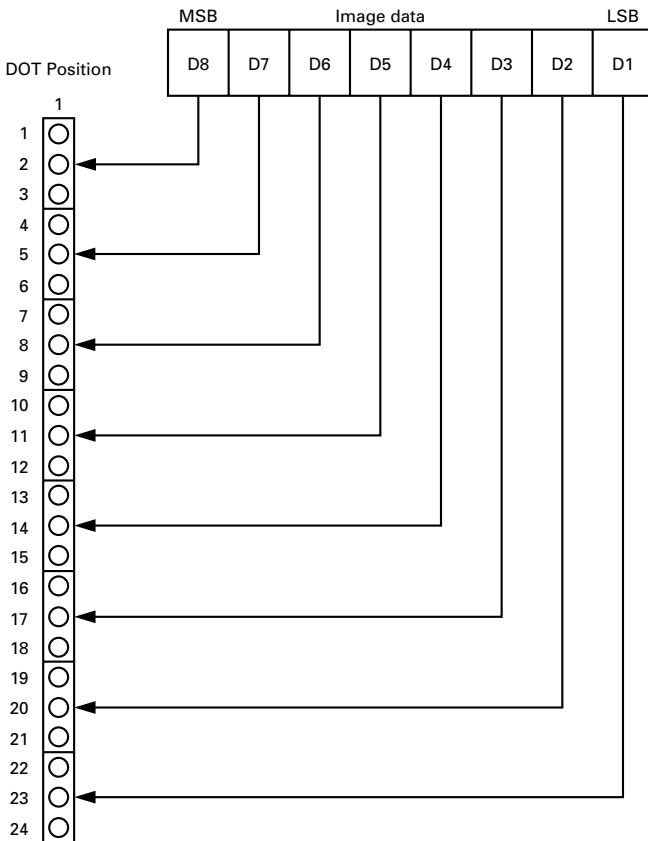
Slip printer: Prints a high density bit image of the number of dots specified by n1 and n2. The value of n1 + 256 × n2 is between 1 and 420.
A maximum of 420 data bytes can printed in one line. Any data exceeding 420 bytes is ignored.
After printing the bit image, the printer automatically returns to the character mode. The relationship between the pins on the print head and the data is the same as those shown for the previous bit image code <ESC> "K".
While printing a high density bit image, the horizontally adjacent dots cannot be printed.

| EXAMPLE | We will create the design below using a bit image.

| | m1 | m2 | m3 | m4 | m5 | m6 | m7 | m8 | m9 | m10 | m11 | m12 | m13 | m14 | m15 | m16 | m17 | m18 | m19 | m20 | m21 | m22 | m23 | m24 | m25 | m26 | m27 | m28 | m29 | m30 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D7 | | | | ● | | ● | | | | | | | | | | | | | | | | | | | | | | | | |
| D6 | | | ● | | | | | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| D5 | | ● | ● | ● | ● | ● | ● | ● | | ● | ● | | | ● | ● | | | ● | | | ● | | | ● | | | ● | ● | | |
| D4 | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| D3 | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | | |
| D2 | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| D1 | ● | | | ● | ● | | | ● | ● | | | | | | | ● | ● | | | | | | | | ● | ● | | | | |

First, since the volume of data is 30, $n1 = (1E)_H$. If the data $m1 \sim m30$ is converted to hexadecimal, it appears as shown below.

| Data | Binary | Hexa-decimal | Data | Binary | Hexa-decimal | Data | Binary | Hexa-decimal |
|---|---|---|---|---|---|---|---|---|
| *m1* | 00000001 | 01 | *m11* | 00111110 | 3E | *m21* | 00111110 | 3E |
| *m2* | 00011110 | 1E | *m12* | 00000010 | 02 | *m22* | 00101110 | 2E |
| *m3* | 00111110 | 3E | *m13* | 00000010 | 02 | *m23* | 00101110 | 2E |
| *m4* | 01011111 | 5F | *m14* | 00111110 | 3E | *m24* | 00111110 | 3E |
| *m5* | 00011111 | 1F | *m15* | 00111110 | 3E | *m25* | 00101111 | 2F |
| *m6* | 01011110 | 5E | *m16* | 00101111 | 2F | *m26* | 00101111 | 2F |
| *m7* | 00011110 | 1E | *m17* | 00101111 | 2F | *m27* | 00111110 | 3E |
| *m8* | 00111111 | 3F | *m18* | 00111110 | 3E | *m28* | 00111110 | 3E |
| *m9* | 00101111 | 2F | *m19* | 00101110 | 2E | *m29* | 00000010 | 02 |
| *m10* | 00111110 | 3E | *m20* | 00101110 | 2E | *m30* | 00000010 | 02 |

Horizontal density is three times that of the bit image for <ESC>"k". (Compare the print samples.)

| Printing Sample |

| CODE | \<ESC\> | "k" | *n* | \<0\> | *m1* | *m2* | ... |
|------|---------|-----|-----|-------|------|------|-----|
| HEX | 1B | 6B | *n* | 00 | *m1* | *m2* | ... |

FUNCTION   Print fine density graphics
Prints a 1 (horizontal) × 1 (vertical) dot bit image for each dot of entered data. Data extending beyond the right margin is ignored. The relationship between the entered data and the actual printing is shown below. The value of n is between 1 and 72.

This command is only valid with the receipt printer.

Relationship between image data and print dots

Image data

| b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |

Dot position

| $d_1$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_2$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_n$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
|---|---|---|---|
| $d_{n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{2n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{2n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{2n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{3n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{3n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{3n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{4n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{4n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{4n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{5n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{5n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{5n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{6n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{6n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{6n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{7n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{7n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{7n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{8n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{8n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{8n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{9n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{9n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{9n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{10n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{10n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{10n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{11n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{11n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{11n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{12n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{12n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{12n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{13n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{13n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{13n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{14n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{14n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{14n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{15n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{15n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{15n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{16n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{16n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{16n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{17n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{17n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{17n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{18n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{18n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{18n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{19n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{19n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{19n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{20n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{20n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{20n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{21n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{21n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{21n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{22n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{22n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{22n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{23n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |
| $d_{23n+1}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | $d_{23n+2}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ | • • • | $d_{24n}$ $b_7\,b_6\,b_5\,b_4\,b_3\,b_2\,b_1\,b_0$ |

*60*

EXAMPLE

Printing Sample



| Data | Binary | Hexa-decimal | Data | Binary | Hexa-decimal |
|------|--------|--------------|------|--------|--------------|
| *d1* | 00000000 | 00 | *d2* | 00000000 | 00 |
| *d3* | 00011111 | 1F | *d4* | 11111000 | F8 |
| *d5* | 00111111 | 3F | *d6* | 11111100 | FC |
| *d7* | 01110111 | 77 | *d8* | 01110111 | EE |
| *d9* | 11111000 | F8 | *d10* | 00011111 | 1F |
| *d11* | 11111000 | F8 | *d12* | 00011111 | 1F |
| *d13* | 11111000 | F8 | *d14* | 00011111 | 1F |
| *d15* | 00001111 | 0F | *d16* | 11110000 | F0 |
| *d17* | 00011111 | 1F | *d18* | 11111000 | F8 |
| *d19* | 00011111 | 1F | *d20* | 11111000 | F8 |
| *d21* | 00111110 | 3E | *d22* | 01111100 | 7C |
| *d23* | 00111000 | 38 | *d24* | 00011100 | 1C |
| *d25* | 01111001 | 79 | *d26* | 10011110 | 9E |
| *d27* | 01110011 | 73 | *d28* | 11001110 | CE |
| *d29* | 01110011 | 73 | *d30* | 11001110 | CE |
| *d31* | 11111001 | F9 | *d32* | 10011111 | 9F |
| *d33* | 11111000 | F8 | *d34* | 00011111 | 1F |
| *d35* | 11111110 | FE | *d36* | 01111111 | 7F |
| *d37* | 11111111 | FF | *d38* | 11111111 | FF |
| *d39* | 11111111 | FF | *d40* | 11111111 | FF |
| *d41* | 00000000 | 00 | *d42* | 00000000 | 00 |
| *d43* | 00000000 | 00 | *d44* | 00000000 | 00 |
| *d45* | 00000000 | 00 | *d46* | 00000000 | 00 |
| *d47* | 00000000 | 00 | *d48* | 00000000 | 00 |

| CODE | <ESC> | "X" | *n1* | *n2* | *m1* | *m2* | ... |
|---|---|---|---|---|---|---|---|
| HEX | 1B | 5 | *n1* | *n2* | *m1* | *m2* | ... |

FUNCTION

Print fine density graphics
Prints a bit image of the input data using horizontal and vertical resolutions of 8 dots/mm.
Data extending past the right margin is ignored.
The relationship between the input data and the actual printing is shown below.
$1 \leqq n1 + n2 \times 256 \leqq 576$

## Download Graphics Printing

| CODE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | \<ESC\> | "&" | \<1\> | \<1\> | *n* | *m1* | *m2* | *...* | *m48* |
| | \<ESC\> | "&" | "1" | "1" | *n* | *m1* | *m2* | *...* | *m48* |
| HEX | 1B | 26 | 01 | 01 | *n* | *m1* | *m2* | *...* | *m48* |
| | 1B | 26 | 31 | 31 | *n* | *m1* | *m2* | *...* | *m48* |

FUNCTION    Define download character
Defines one new character and stores it in RAM for later use.
*n* is the character code of the character defined and must be between
21H and 7F4.
If the maximum of 32 external characters have already been stored,
the oldest stored external character are deleted so that new external
character can be stored.
The character matrix is 12 dots wide and 24 dots high.
Relationship between the character pattern and the character data is
shown below.
This command is only valid with the receipt printer.

EXAMPLE
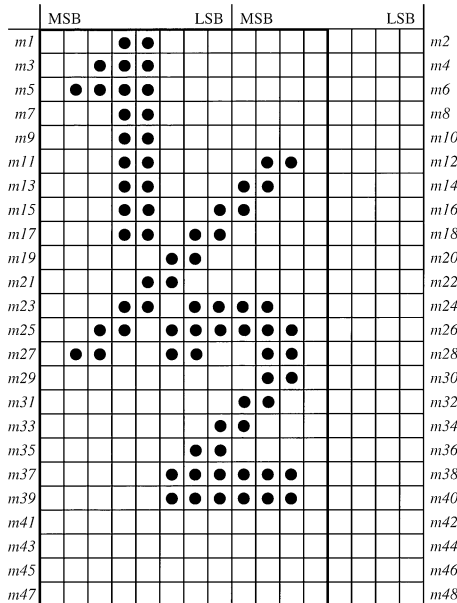


Ignored
4 bits

| Data | Binary | Hexa-decimal | Data | Binary | Hexa-decimal |
|------|--------|--------------|------|--------|--------------|
| *m1* | 00011000 | 18 | *m2* | 00000000 | 00 |
| *m3* | 00111000 | 38 | *m4* | 00000000 | 00 |
| *m5* | 01111000 | 78 | *m6* | 00000000 | 00 |
| *m7* | 00011000 | 18 | *m8* | 00000000 | 00 |
| *m9* | 00011000 | 18 | *m10* | 00000000 | 00 |
| *m11* | 00011000 | 18 | *m12* | 01100000 | 60 |
| *m13* | 00011000 | 18 | *m14* | 11000000 | C0 |
| *m15* | 00011001 | 19 | *m16* | 10000000 | 80 |
| *m17* | 00011011 | 1B | *m18* | 00000000 | 00 |
| *m19* | 00000110 | 06 | *m20* | 00000000 | 00 |
| *m21* | 00001100 | 0C | *m22* | 00000000 | 00 |
| *m23* | 00011011 | 1B | *m24* | 11000000 | C0 |
| *m25* | 00110111 | 37 | *m26* | 11100000 | E0 |
| *m27* | 01100110 | 66 | *m28* | 01100000 | 60 |
| *m29* | 00000000 | 00 | *m30* | 01100000 | 60 |
| *m31* | 00000000 | 00 | *m32* | 11000000 | C0 |
| *m33* | 00000001 | 01 | *m34* | 10000000 | 80 |
| *m35* | 00000011 | 03 | *m36* | 00000000 | 00 |
| *m37* | 00000111 | 07 | *m38* | 11100000 | E0 |
| *m39* | 00000111 | 07 | *m40* | 11100000 | E0 |
| *m41* | 00000000 | 00 | *m42* | 00000000 | 00 |
| *m43* | 00000000 | 00 | *m44* | 00000000 | 00 |
| *m45* | 00000000 | 00 | *m46* | 00000000 | 00 |
| *m47* | 00000000 | 00 | *m48* | 00000000 | 00 |

When the $7 \times 9$ (half dot) character size (default setting) is set:

CODE       <ESC> "&" <0> *n1 n2* [*m0 m1 m2 m3 m4 m5 m6 m7*] $_{n2 - n1 + 1}$

HEX       (1B)н (26)н (00)н *n1 n2* [*m0 m1 m2 m3 m4 m5 m6 m7*] $_{n2 - n1 + 1}$
When the $5 \times 9$ dot character size is set:

CODE       <ESC> "&" <0> *n1 n2* [*m0 m1 m2 m3 m4 m5*] $_{n2 - n1 + 1}$

HEX       (1B)н (26)н (00)н *n1 n2* [*m0 m1 m2 m3 m4 m5*] $_{n2 - n1 + 1}$

**FUNCTION**  Define download character ($7 \times 9$ (half dot) font or $5 \times 9$ dot font)
Defines download characters
Up to 10 download characters can be defined and the defined
character patterns can be stored in the printer's RAM.
The values of *n1* and *n2* are between (21)H and (7F)H with *n1* less
than or equal to *n2* and the value of *m0* is either (00)H or (80)H.
Defining of download characters begins with character code *n1* and
completes with *n2*. When only one character is defined, *n1 = n2*.
*m0* indicates the relationship between the character pattern and print
head.
*m1 m2*.... Indicate the character pattern
This command is only valid with the slip printer.
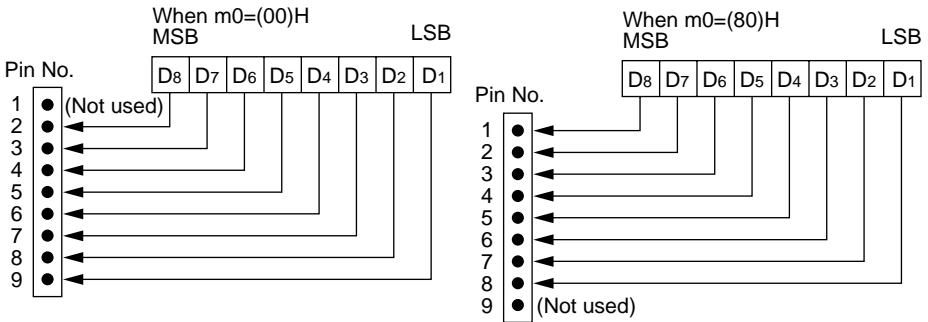


**EXAMPLE**  When the $7 \times 9$ (half dot) character size (default setting) is set, the
horizontally adjacent dots cannot be printed.
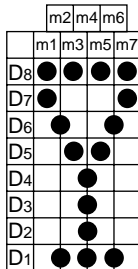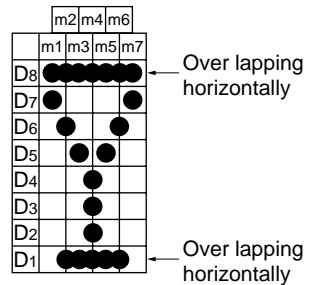
| CODE | &lt;ESC&gt; | "&" | &lt;1&gt; | &lt;0&gt; | *n* |
| --- | --- | --- | --- | --- | --- |
| | &lt;ESC&gt; | "&" | "1" | "0" | *n* |
| HEX | 1B | 26 | 01 | 00 | *n* |
| | 1B | 26 | 31 | 30 | *n* |

**FUNCTION**  Delete a download character ($12 \times 24$ dot font)
Deletes the download character which was assigned the value *n*.
This command is only valid with the receipt printer.

| CODE | &lt;ESC&gt; | "%" | "1" | or | &lt;ESC&gt; | "%" | &lt;1&gt; |
| --- | --- | --- | --- | --- | --- | --- | --- |
| HEX | 1B | 25 | 31 | or | 1B | 25 | 01 |

**FUNCTION**  Enable download character set
Enables the download character set.

| CODE | &lt;ESC&gt; | "%" | "0" | or | &lt;ESC&gt; | "%" | &lt;0&gt; |
| --- | --- | --- | --- | --- | --- | --- | --- |
| HEX | 1B | 25 | 30 | or | 1B | 25 | 00 |

**FUNCTION**  Disable download character set
Disables the selected download character set and returns to the built-in ROM character set.

**Peripheral Device Control**

| CODE | <ESC> <BEL> *n1* *n2* |
|---|---|
| HEX | 1B 07 *n1* *n2* |
| FUNCTION | Define drive pulse width for peripheral device #1 |

Defines the drive pulse width for peripheral devices requiring other than standard 200 ms pulse time and delay time.
*n1* indicates the energizing time and *n2* indicates the delay time, using 10ms units.

| CODE | <BEL> |
|---|---|
| HEX | 07 |
| FUNCTION | Control peripheral device #1 |

Executes drive pulse for peripheral device #1.

| CODE | <FS> |
|---|---|
| HEX | 1C |
| FUNCTION | Control peripheral device #1 immediately |

Executes drive pulse for peripheral device #1 immediately.

| CODE | <EM> |
|---|---|
| HEX | 19 |
| FUNCTION | Control peripheral device #2 immediately |

Drives peripheral device #2. The drive pulse width and delay time are fixed at 200 ms.

| CODE | <SUB> |
|---|---|
| HEX | 1A |
| FUNCTION | Control peripheral device #2 immediately |

Drives peripheral device #2. The drive pulse width and delay time are fixed at 200 ms.

**Auto Cutter Control**

| CODE | <ESC> | "d" | "0" | or | <ESC> | "d" | <0> |
|------|-------|-----|-----|-----|-------|-----|-----|
| HEX  | 1B    | 64  | 30  | or  | 1B    | 64  | 00  |

FUNCTION   Full-cut command to the auto cutter
Cuts the receipt paper fully.
This command is only valid with the receipt printer.

| CODE | <ESC> | "d" | "1" | or | <ESC> | "d" | <1> |
|------|-------|-----|-----|-----|-------|-----|-----|
| HEX  | 1B    | 64  | 31  | or  | 1B    | 64  | 01  |

FUNCTION   Partial-cut command to the auto cutter
Cuts the receipt paper partially.
This command is only valid with the receipt printer.

**Slip Printer Control**

| CODE | <ESC>   <SI>   *n* |
|------|-------------------|
| HEX  | 1B   0F   *n* |
| FUNCTION | Setting slip sensor |

Sets the slip printer TOF/BOF sensor according to the value of *n*.

|              | TOF Sensor | BOF Sensor |
|--------------|------------|------------|
| *n* = 00, "0" : | Valid    | Valid    |
| 01, "1" :    | Valid      | Invalid    |
| 02, "2" :    | Invalid    | Valid      |
| 03, "3" :    | Invalid    | Invalid    |

Default values are:
n = 0 when memory switch 5-2 = 0 (factory setting)
n = 3 when memory switch 5-2 = 1

| CODE | <ESC>   <FF>   *n* |
|------|-------------------|
| HEX  | 1B   0C   *n* |
| FUNCTION | Slip function |

After printing the data in the line buffer, operates the slip printer according to the value of *n*.

*n* = 00, "0" : Operates the clamp
01, "1" : Releases the paper
02, "2" : Releases the paper and waits until it is removed
03, "3" : Feeds the paper backward (backfeed) until it moves past the TOF sensor, then releases the paper. (See NOTE below.)
04, "4" : Feeds the paper into the printer (operational feed) until it moves past the BOF sensor, then releases the paper.
05, "5" : Feeds the paper according to the direction and length set by <ESC> <VT> m n (the paper is not released)

(NOTE) When the slip paper is attached to duplicates, a paper jam may occur if the paper is always fed backward. Therefore, the paper should not be ejected with n=3. To feed slip paper attached to duplicates backward, use <ESC> <VT> to set the eject length to about half of the paper length, then eject the paper using <ESC> <FF> 5.

This command is only valid with the slip printer.

| CODE | | <ESC> | <VT> | *m* | *n* |
|---|---|---|---|---|---|
| HEX | | 1B | 0B | *m* | *n* |

**FUNCTION**  Set the paper eject direction/length
Sets the length of the ejection operation performed using <ESC> <FF> 5 in line mode.

The value of m determines the ejection direction.

When m= "+": the ejection direction is into the printer (operational feed), and the ejection length is n lines (at the current carriage return)
When m= "-": the ejection direction is backward (backfeed), and the ejection length is n lines (at the current carriage return)
When m= 0   : the ejection direction is backward (backfeed), and the ejection length is n inches
The default value of n is 0.

This command is only valid with the slip printer.

| CODE | | <EOT> |
|---|---|---|
| HEX | | 04 |

**FUNCTION**  Slip status enquiry
Sends slip printer status information to the host computer.
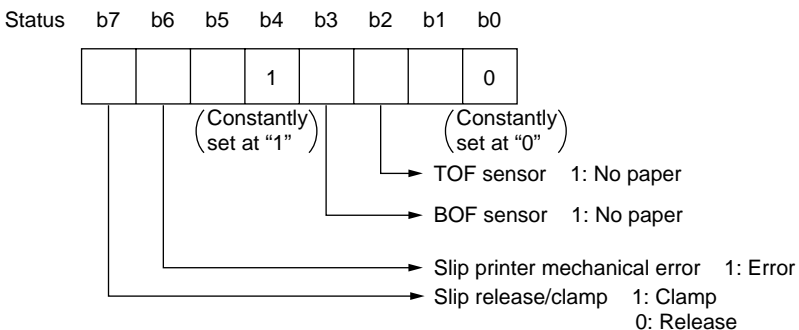


Status b1 and b5 is variable.

This command is only valid with the slip printer.

| CODE | \<ESC\> | \<EM\> | *n* | *m* | \<LF\> | \<NUL\> |
|------|---------|--------|-----|-----|--------|---------|
| HEX | 1B | 19 | *n* | *m* | 0A | 00 |

**FUNCTION**  Set the wait time until the automatic clamp is activated
Set the wait time between paper insertion (TOF/BOF sensor senses the paper) and automatic clamp activation by $n \times 0.1$ sec.
The default value of *n* is 7 (wait time is 0.7 sec.)
The value of *m* is fixed to 0.
This command is only valid with the slip printer, besides memory switch 5-1 is set to 0.

## Page Mode

| CODE | \<ESC\> | "*n*" |
|------|---------|-------|
| HEX | 1B | 6E |

**FUNCTION**  Select page mode
Switches from line mode (default) to page mode.
This code is only valid when it is entered at the beginning of the line.
The page mode is suitable even though data is printed in the rotational direction specified by \<ESC\> "T" n and in the page coordinate range specified by \<ESC\> "*" •••, and though paper with a horizontal length of a check, etc. is rotated 90 or 270 and printing is carried out in all modes.
In page mode, since OR is applied to the data in the print area, characters and bit images can be printed overlapping each other and each character can be rotated and oriented independently.
In page mode, if printing data and a command such as \<CR\> or \<LF\> are sent in the same way as in line mode, there is an automatic rotation to the printer side.
All printing of data in the print area is performed according to \<LF\>.
After printing according to \<FF\>, the printer returns to line mode. In addition, if \<ESC\> "!", \<ESC\> "@" or \<CAN\> are specified, printing is not performed and the printer leaves page mode and returns to line mode.
While returning to line mode, the data in the printer buffer, the area coordinates and the rotation directions are all cleared.
This command is only valid with the slip printer.

The following restrictions exist in page mode.

1) In page mode, half-dot characters cannot be printed since printing is carried out in normal dot units.
   When entering page mode, the ANK font is automatically set to a $5 \times 9$ (2 pulses = 1 dot) font.
   Since the $7 \times 9$ font and $5 \times 9$ (3 pulses = 1 dot) font commands cannot be executed in page mode, they are executed after the

printer returns to line mode.
High density printing of graphics is ignored.

2) Paper feed command
   In paper mode, the paper feed command and carriage return are executed in units of dots. A 1/72-inch (0.353-mm) paper feed is considered 1 dot. Since a 1-dot pitch in the horizontal direction is 0.30 mm and a 1-dot pitch in the vertical direction is 0.353 mm, the paper amount that is fed while printing using a 90 or 270 rotation is less when compared with a 0 or 150 rotation. As a result, when printing using a 90 or 270 rotation, execute a test print, check the horizontal and vertical dot alignment, then adjust the alignment as necessary.

3) The following commands are not executed in page mode, but are stored and executed when the printer returns to line mode.

| | |
|---|---|
| Select 7 × 9 (half dot) font | <ESC> "M" |
| Select 5 × 9 (3 pulses = 1 dot) font | <ESC> ":" |
| Inverted printing/Cancel inverted printing | <SI>/<DC2> |
| Select highlight printing/Cancel highlight printing | <ESC> "4"/<ESC> "5" |
| Underlining | <ESC> "-" n |
| Upperlining | <ESC> "_" n |
| Select print direction | <ESC> "U" n |
| Select emphasized printing/Cancel emphasized printing | <ESC> "E"/<ESC> "F" |
| Select left margin | <ESC> "1" n |
| Select right margn | <ESC> "Q" n |

4) The following commands are ignored in page mode.

| | |
|---|---|
| One time backfeed | <ESC> "j" n |
| Print high density graphics | <ESC> "L" ••• |
| Slip function | <ESC> <FF> n |
| Select print station | <ESC> "+" "A" n |
| STX-ETX mode | <STX> ••• <ETX> |

| CODE | <ESC> "!" |
|---|---|
| HEX | 1B 21 |

FUNCTION

Select line mode (default)
If this command is specified while in page mode, printing is not carried out and the printer returns to line mode.
This command is only valid with the slip printer.

| | |
|---|---|
| CODE | <ESC> "*" XL XH YL YH dXL dXH dYL dYH |
| HEX | 1B 2A XL XH YL YH dXL dXH dYL dYH |

**FUNCTION**  Setting print area in page mode

The coordinates of the current position at the moment that page mode is entered are (0,0). The starting point of the print area is defined by $X_L$, $X_H$, $Y_L$ and $Y_H$. In addition, the length DX in the X direction is specified by $dX_L$ and $dX_H$, and the length DY in the Y direction is specified by $dY_L$ and $dY_H$.
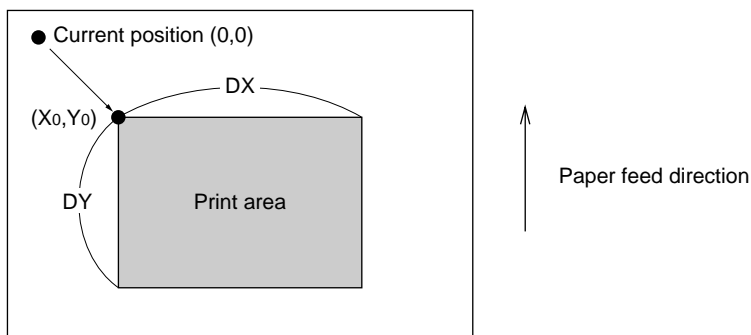


Starting point $X_0 = X_L + (X_H \times 256)$ dots
Starting point $Y_0 = Y_L + (Y_H \times 256)$ dots
Length in horizontal direction $DX = dX_L + (dX_H \times 256)$ dots
Length in vertical direction $DY = dY_L + (dY_H \times 256)$ dots

The values of XL, YL, dXL and dYL are between 0 and 255, and the values of XH, YH, dXH and dYH are between 0 and 1.
However, $dX_L = dX_H = 0$ and $dY_L = dY_H = 0$ are not included.
In addition, since the maximum range in the X direction $(X_O + DX)$ is 210 dots and the maximum range in the Y direction $(Y_O + DY)$ is 720 dots, each parameter should be specified to satisfy these ranges. When the power is turned on, $XL = XH = YL = YH = 0$ $(X_O, Y_O = 0,0)$

$dX_L = 210$, $dX_H = 0$ $(DX = 210)$ and
$dY_L = 64$, $dY_H = 2$ $(DY = 576)$.

This command is stored, even in line mode, and the position at the time that page mode is entered is used as the standard point (0,0). Since the bottom of the character is used as the baseline, a minimum print area of 8 dots are necessary in the character height direction to print data in the page. (When printing a magnified character height, the paper must be fed before printing.)

This command is only valid with the slip printer.

When n = 4, "4," special mode page mode functions as check high-speed printing mode.

| CODE | <ESC> | "T" | *n* |
|---|---|---|---|

| HEX | 1B | 54 | *n* |
|---|---|---|---|

**FUNCTION**   Setting print direction in page mode
Sets the direction in which the printing will be executed in page mode according to the value of n.
This command is only valid in line mode.

| Value of n | Mode |
|---|---|
| 0 or "0" | 0 rotation mode (uni-directional printing) |
| 1 or "1" | 270 rotation mode (uni-directional printing) |
| 2 or "2" | 180 rotation mode (uni-directional printing) |
| 3 or "3" | 90 rotation mode (uni-directional printing) |
| 4 or "4" | 270 rotation mode (bi-directional printing) |

The default value of n is 0.

<Rotation direction examples>

| n = 0 | n = 1 or 4 | n = 2 | n = 3 |
|---|---|---|---|
| 0° rotation | 270° rotation | 180° rotation | 90° rotation |



<N=4,"4": Check high-speed printing mode>
This parameter is only valid when no character data is expanded into the page area, and this command is added immediately after <ESC>"n".
Also, once the check high-speed printing mode has been entered with <ESC>"T"4, it is not possible to move across to a different rotation mode (<ESC>"T"0-3) until the page mode has been exited. The check high-speed printing mode provides high-speed printing with the check at a 270 degree rotation angle and bi-directional printing, and a wide range of limitations have been included to enable bi-directional printing.

This mode can only be used with printing data that uses a 5 X 9 (2P-1) font without decorations.

The limitations are listed below. The quality of the printed product cannot be guaranteed if these limitations are removed and the unit used.

[Limitations on the check high-speed printing mode]

- The only characters that can be printed are the 5 X 9 (2P-1) font ANK characters.

- The double-sized width command cannot be used (the double-sized height command may be used.)

- The bit image command cannot be used.

- Horizontal tabs cannot be used.

- The space setting command for the space between characters cannot be used.

- The following limitations apply for the Y direction in the printing area (value set with <ESC> "*"...)
  ① As To=0 has been fixed as the starting point for the printing area, the printing area command set with <ESC> "*" .... Must be specified with Yo=YL=YH=0. (It will forcibly set at 0 if it is at any other setting.)
  ② The value of Dy must be a six-fold value.
  As bi-directional printing in 6-pin units will be performed in this mode, there are cases where the characters that have been entered in a misaligned state will be printed in a wave-like style and will not be able to be distinguished when the value of Dy is anything other than a six-fold value as a joint will be established within a single character for return printing. Consequently, setting anything other than the six-fold value must not be carried out. However, the printer will discard any remainders from dividing by six and automatically correct it into six-fold when any value other than six -fold has been set.

This command is only valid with the slip printer.

| CODE | <FF> |
|---|---|
| HEX | 0C |
| FUNCTION | Print in page mode (only valid when in page mode) |

Print in page mode (only valid when in page mode)
This command can only activate the slip printer. In page mode, all page data in the page area is printed, then the printer returns to line mode. After all the page data is printed, the data in the page, the page print area and the print direction are all initialized.

In addition, this command has no function in line mode.

**Customer display commands (Combo mode only)**

| CODE | <ESC> "S" |
|---|---|

| HEX | 1B 53 |
|---|---|

FUNCTION    Start customer display
Subsequent data is sent through the customer display. Customer display data is sent as follows.
This command is saved in the print buffer and retrieved from the print buffer and executed in the same way as the other print data.

    <ESC> "S"   Customer display data   <ESC> "G"

                  Through the customer display

This command is only effective in the combination mode and when memory switch 0-8 = 0.
When the customer display is being used, the option RS232C I/F communication conditions must be baud rate = 9699BPS, data length = 8 bits, no parity, so set the dip switches accordingly.

| CODE | <ESC> "G" |
|---|---|

| HEX | 1B 47 |
|---|---|

FUNCTION    End customer display
This command is regarded as the customer display data end code and subsequent data is processed as print data. This command is saved in the print buffer and retrieved from the print buffer and executed in the same way as the other print data. This command is only effective in the combination mode and when memory switch 0-8 = 0.
This command is only valid with the slip printer.

**Other Commands**

| CODE | <CAN> |
|------|-------|
| HEX | 18 |

FUNCTION | Cancel printer buffer & Initialize printer
Clears the line buffer, and initializes the commands set already.
Does not affect the external equipment drive conditions set by the
code <ESC> <BEL> *n1 n2*. (This is the same during a mechanical
error.)
(Line buffer means the print data expansion area.)
If <CAN> is specified in page mode while printing using the slip
printer, printing is not carried out and the printer returns to line mode
from page mode.
In addition, <CAN> initializes the print station selection. If the slip
printer was selected, the receipt printer will be re-selected.
This command cannot recover from errors or return to the on-line
status from off-line.

| CODE | <DC3> |
|------|-------|
| HEX | 13 |

FUNCTION | Deselect printer
Deselects the printer. The printer disregards all subsequent
characters and commands except <DC1>, which activates the
printer.

| CODE | <DC1> |
|------|-------|
| HEX | 11 |

FUNCTION | Set select mode
When the printer receives a <DC1> code, the deselect mode is
canceled and data following this code is input to the buffer.

| CODE | <RS> |
|------|-------|
| HEX | 1E |

FUNCTION | Beep the buzzer
Sounds a brief beep tone.

| | |
|---|---|
| CODE | <ESC> "# N , n1n2n3n4" <LF> <NUL> |
| HEX | 1B 23 N 2C n1n2n3n4 0A 00 |

**FUNCTION**  Set the memory switch. In order to enable changed memory switch setting, turn the printer OFF and ON again or send printer reset command (<ESC> "?"<LF><NUL>") to the printer. Changed memory switch settings are stored in EEPROM and these setting will be stored as long as the time when they are changed again.

N          :Memory switch number ("0", "1", "2", "3", "4", "5")
n1n2n3n4   :Mode settings (For details see below)

1)  N=0 (Star mode only)
      n1 :Always "0"
      n3 :Always "0"

(Default)

| Parameter | Setting | "0" | "1" |
|---|---|---|---|
| n2 | Customer display commands | Valid | Invalid |

(Default)

| Parameter | Setting | "0" to "3" | "4" to "7" | "8" to "A" | "B" to "F" |
|---|---|---|---|---|---|
| n4 | Receipt FF command | Form Feed | Paper Feed, Cut & Back | Form Feed | Paper Feed, Cut & Back |
| | FF cut mode | — | Full-cut | — | Partial-cut |

2)  N=1 (Star mode only)
      n1 :Always "0"
      n2 :Always "0"

(Default)

| Parameter | Setting | "0" | "1" |
|---|---|---|---|
| n3 | Zero style | Normal zero | Slashed zero |
| n4 | International character set | See below | |

| n4 | Country |
|---|---|
| "0" | USA |
| "1" | France |
| "2" | Germany |

| n4 | Country |
|---|---|
| "3" | UK |
| "4" | Denmark #1 |
| "5" | Sweden |

| n4 | Country |
|---|---|
| "6" | Italy |
| "7" | Spain #1 |
| "8" | Japan |

| n4 | Country |
|---|---|
| "9" | Norway |
| "A" | Denmark #2 |
| "B" | Spain #2 |

| n4 | Country |
|---|---|
| "C" | Latin America |
| | |
| | |

3)　N=2

　　n3　:Always "0"

(Default)

| Parameter | Setting | "0" | "1" | Remark |
|---|---|---|---|---|
| n1 | Receipt printer ESC d command<br>Receipt printer | Cut | Paper feed, & Cut | Star mode only |
| n2 | Receipt printer cutter | Valid | Invalid | Star and ESC/POS |
| n4 | Receipt printer paper near end | Invalid | Valid | Star mode only |

4)　N=3 (Star mode only)

　　n1　:Always "0"

(Default)

| Parameter | Setting | "0" | "1" | "2" | "3" |
|---|---|---|---|---|---|
| n2 | Character table (Code page) | See belows | | | |
| n3 | Receipt printer printer column | 48 | 38 | – | – |
| n4 | CR code | Invalid | Invalid | Valid | Valid |
| | Receipt printer line feed (mm) | 4 | 3 | 4 | 3 |

| n2 | Code page |
|---|---|
| "0" | Normal |
| "1" | katakana |
| "2" | 437 |

| n2 | Code page |
|---|---|
| "3" | 437 |
| "4" | 850 |
| "5" | 852 |

| n2 | Code page |
|---|---|
| "6" | 860 |
| "7" | 861 |
| "8" | 863 |

| n2 | Code page |
|---|---|
| "9" | 865 |
| "A" | 866 |
| | |

5)　N=4 (Star mode)

　　n2　:Always "0"

　　n3　:Always "0"

　　n4　:Always "0"

(Default)

| Parameter | Setting | "0" | "1" | "2" | "3" |
|---|---|---|---|---|---|
| n1 | X on/X off Timing | When Toggled | every 3 sec | When Toggled | every 3 sec |
| | RTS Signal Condition | Save as DTR | Save as DTR | always SPACE | always SPACE |

N=4 (ESC/POS mode)
    n1  :Always "0"
    n2  :Always "0"

(Default)

| Parameter | Setting | "0" | "1" | "2" | "3" |
|-----------|---------|-----|-----|-----|-----|
| n3 | DTR signal during setting status transmission | See belows | | | |
| n4 | Data receipt error | "?" printed | Ignored | "?" printed | Ignored |

Parameter :n3

| Setting (DTR signal) | "0", "1" | "2", "3" |
|----------------------|----------|----------|
| 1. From when the power is turned on or I/F reset until communication possible | BUSY | BUSY |
| 2. Test printing | BUSY | BUSY |
| 3. Paper feed by paper feed switch | — | BUSY |
| 4. Stop due to no paper | — | BUSY |
| 5. During waiting for switch input in macro execution | — | BUSY |
| 6. Other error | — | BUSY |
| 7. Receiving buffer full | BUSY | BUSY |

6)   N=5 (Star mode)
        n1  :Always "0"
        n3  :Always "0"

(Default)

| Parameter | Setting | "0" | "1" | "2" | "3" |
|---|---|---|---|---|---|
| n2 | When slip printer <CR> code is valid | Print + line feed (CRLF) | print (CR) | Print + line feed (CRLF) | print (CR) |
| n4 | Initial status of the TOF/ BOF sensor | Valid | Valid | Valid | Valid |
| | Slip printer automatic clamp | Valid | Valid | Invalid | Invalid |
| | Slip printer automatic starting print positioning | Valid | Invalid | Valid | Invalid |

| Parameter | Setting | "4" | "5" | "6" | "7" |
|---|---|---|---|---|---|
| n2 | When slip printer <CR> code is valid | Print + line feed (CRLF) | print (CR) | Print + line feed (CRLF) | print (CR) |
| n4 | Initial status of the TOF/ BOF sensor | Invalid | Invalid | Invalid | Invalid |
| | Slip printer automatic clamp | Valid | Valid | Invalid | Invalid |
| | Slip printer automatic starting print positioning | Valid | Invalid | Valid | Invalid |

N=5 (ESC/POS mode)
        n1  :Always "0"
        n2  :Always "0"
        n3  :Always "0"

(Default)

| Parameter | Setting | "0" | "1" | "2" | "3" |
|---|---|---|---|---|---|
| n4 | Slip printer automatic clamp | Valid | Valid | Invalid | Invalid |
| | Slip printer automatic starting print positioning | Valid | Invalid | Valid | Invalid |

N=A
        n1  :Always "0"
        n2  :Always "0"
        n3  :Always "0"

(Default)

| Parameter | Setting | "0" | "1" |
|---|---|---|---|
| n4 | Receipt adherence-prevention control | Valid | Invalid |

N=D
    n1  :Always "0"
    n2  :Always "0"
    n3  :Always "0"

| Parameter | Setting | "0" | "1" | "2" | "3" |
|-----------|---------|-----|-----|-----|-----|
| n2 | Thermal head rank | A | B | C | C |

| Rank | Average resistance value |
|------|--------------------------|
| A | $1215 \pm 67 \, \Omega$ |
| B | $1350 \pm 67 \, \Omega$ |
| C | $1485 \pm 67 \, \Omega$ |

| CODE | <ESC>   "@" |
|------|------|
| HEX | 1B    40 |
| FUNCTION | Initialize printer |

Reinitializes the printer. Clears the print buffer and returns settings to their power-up values.

Does not clear the input buffer, downloaded characters, or conditions for peripheral devices.

If this command is specified in page mode while printing using the slip printer, printing is not carried out and the printer returns to line mode from page mode.

This command cannot recover from errors or return to the on-line status from off-line.

| CODE | <ENQ> |
|------|-------|
| HEX | 05 |
| FUNCTION | Enquiry |

Causes the printer to transmit a status byte.

## Status byte

Status

| b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|----|----|----|----|----|----|----|----|
|    |    |    | 0  |    |    |    |    |

$\left(\begin{array}{c}\text{Constantly}\\\text{set at}\quad 0\end{array}\right)$

Vertical parity error
1: Error

Framing error
1: Error

Receipt printer head-up error
Receipt printer auto cutter error
Receipt printer thermistor error
Cover open error
Slip printer mechanical error
1: Error

Receipt paper empty
1: Empty

Buffer empty
1: Empty

Buffer overflow
1: Overflow

Compulsion switch
1: High level (Switch is set to ON.)

Status b3 is variable.

| CODE | <ESC> | "?" | <LF> | <NUL> |
|------|-------|-----|------|-------|
| HEX | 1B | 3F | 0A | 00 |

FUNCTION     Reset the printer hardware.
Resets the printer hardware and produces a test print

# *Chapter 10: ESC/POS Mode*

## *TM-T85 mode*

| Code | Function |
|------|----------|
| HT | Horizontal tab |
| LF | Print line feed |
| FF | Page mode print and return |
| DLE EOT | Real time transmission of status |
| DLE ENQ | Real time request to printer |
| CAN | Cancel print data in page mode |
| ESC FF | Print page mode data |
| ESC SP | Set right space amount of character |
| ESC ! | Universal print mode designation |
| ESC $ | Designate absolute printing |
| ESC % | Designate/cancel download characters set |
| ESC & | Define download characters |
| ESC * | Designate bit image mode |
| ESC - | Designate/cancel underline |
| ESC 2 | Set 1/6 inch line feed amount |
| ESC 3 | Set line feed amount |
| ESC = | Select peripheral equipment |
| ESC ? | Delete download characters |
| ESC @ | Initialize printer |
| ESC D | Set horizontal tab position |
| ESC E | Designate/cancel emphasized print |
| ESC G | Designate/cancel double print |
| ESC J | Print and paper feed |
| ESC L | Select page mode |
| ESC R | Select international characters |
| ESC S | Select standard mode |
| ESC T | Select character print direction in print mode |
| ESC V | Designate/cancel 90° character rotation |
| ESC W | Set print range in page mode |
| ESC \ | Designate relative position |
| ESC a | Align position |
| ESC c4 | Select no effective paper detector at print stop |
| ESC c5 | Enable/disable panel switch |

| Code | Function |
|---|---|
| ESC d | Print and paper feed "*n*" lines |
| ESC i | Partial cut (one section remaining) |
| ESC p | Designate pulse generation |
| ESC t | Select character code table |
| ESC u | Transmission of peripheral equipment status |
| ESC v | Transmission of paper detection status |
| ESC { | Designate/cancel inverted printing |
| GS ! | Designate character size |
| GS $ | Designate absolute position of vertical direction of characters in page mode |
| GS * | Define download bit image |
| GS / | Print download bit image |
| GS : | Start/finish macro definition |
| GS B | Designate/cancel reverse printing |
| GS H | Select print position of HRI characters |
| GS I | Printer ID transmission |
| GS L | Set left margin |
| GS P | Set basic calculated pitch |
| GS V | Paper cut |
| GS W | Set print range |
| GS \ | Designate the relative position of vertical characters when printing in the page mode |
| GS ^ | Execute macro |
| GS a | Enable/disable automatic status transmission |
| GS b | Designate/cancel smoothing |
| GS f | Select HRI character font |
| GS h | Set bar code height |
| GS k | Printing of bar code |
| GS r | Transmission of status |
| GS w | Set lateral size of bar code |

## *TM-295 mode*

| Code | Function |
|---|---|
| HT | Horizontal tab |
| LF | Print line feed |
| FF | Page mode print and return |
| DLE EOT | Real time transmission of status |
| CAN | Cancel print data in page mode |
| ESC SP | Set right space amount of character |
| ESC ! | Universal print mode designation |
| ESC % | Designate/cancel download characters set |
| ESC & | Define download characters |
| ESC * | Designate bit image mode |
| ESC 2 | Set 1/6 inch line feed amount |
| ESC 3 | Set line feed amount |
| ESC = | Select peripheral equipment |
| ESC @ | Initialize printer |
| ESC C | Single sheet paper eject length setting |
| ESC D | Set horizontal tab position |
| ESC F | Designation/cancel single sheet paper reverse direction ejection |
| ESC J | Print and feed |
| ESC K | Print and reverse direction feed |
| ESC L | Select page mode |
| ESC R | Select international characters |
| ESC T | Select character print direction in print mode |
| ESC W | Set print range in page mode |
| ESC c4 | Select no effective paper detector at print stop |
| ESC c5 | Enable/disable panel switch |
| ESC d | Print and paper feed "*n*" lines |
| ESC e | Print and reverse direction feed "*n*" lines |
| ESC f | Single sheet paper hold time setting |
| ESC p | Designate pulse generation |
| ESC q | Release |
| ESC t | Select character code table |
| ESC u | Transmission of peripheral equipment status |
| ESC v | Transmission of paper detection status |
| ESC { | Designate/cancel inverted printing |
| GS I | Printer ID transmission |
| GS a | Enable/disable automatic status transmission |
| GS r | Transmission of status |

## *TM-295 mode emulation cautionary items*

Since, as shown below, the paper feed pitch, dot pitch and the installation distances between the TOF/BOF sensors and the print head differ depending on the mechanism of the SCP700 slip and TM-295, the printing results may not be the same because of the differences in the mechanism. Also, even though, since the TM-295 is a shuttle printer, the paper feed set values and actual paper feed amount are different.

| Difference | SCP700 slip | TM-295 |
|---|---|---|
| Difference in the paper feed motor pitch | 1/144 inch units | 1/60 inch units |
| Difference in the vertical direction dot pitch | 0.353mm | 0.423mm |
| Difference in the horizontal direction dot pitch | 0.30mm | 0.315mm |
| Difference in the distance from the top of the paper to the top of the print head | 26.5mm (When automatically feeding) | 26.5mm ~ 36.5mm Variable with mechanical stopper |
| Difference in the distance from the TOF sensor to the top of the print head | 26.0mm | 3.0mm ~ 13.0mm Variable with mechanical stopper |
| Difference in the distance from the BOF sensor to the bottom of the print head | 38.1mm | 27.3mm |

<Influence and command differences due to differences in paper feed motor pitch and horizontal/vertical dot pitch>
Since the pitches are different, the printing results are reduced in the vertical/horizontal direction compared to the TM-295. Especially in the page mode, since the coordinates are controlled in dots, the printing results are reduced. (There is a difference of $n/60$" dots - $n/72$" dots in the Y direction.)
In the case of the line mode, since the difference in the paper feed pitch is absorbed as much as possible, the commands which are connected with the $n/60$ inch unit paper feed (<ESC> "3" $n$, <ESC> "J" $n$, <ESC> "K" $n$) use INT$((6n/5)+0.5)$.
However, since even in this case, depending on the value of $n$, the paper feed amount may not be exactly the same, the vertical direction printing position may be different.

<Influence due to the difference in the TOF and BOF sensor positions>
The paper position when the condition of the TOF or BOF sensor changes due to the status is different to that of the TM-295.
Since the position of the BOF sensor is especially different, whereas the BOF sensor reports "no paper" at 27.3mm from the bottom of the paper with the TM-295, the BOF sensor reports "no paper" at approximately 38mm from the bottom of the paper with the SCP700. Therefore, when the BOF "no paper" sensor is effective, the BOF sensor "no paper" is reported quicker than with the TM-295 and it may not be possible to print in the same position at the bottom of the same form.
For this reason, by controlling the printing so that it does not stop until approximately 27.3mm from the bottom of the paper even if the paper has passed the BOF sensor at the 38.1mm position, this difference is compensated. However, due to the differences in the paper feed pitch (star = $n$/72", TM-295 = $n$/60"), the emulation is not perfect.

<Influence due to mechanical stopper position>
With the TM-295, by adjusting the mechanical stopper position, the paper top position can be changed between 0 to 10mm. However, since the mechanical stopper position is fixed with the SCP700, if the TM-295 mechanical stopper position is changed and the printing results are compared, they may be different.

# Appendix : Character Code Tables

## Star Mode
(Character table: Normal)

| Hexa-decimal | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| 0 | `<NUL>` 0 | 16 | SP 32 | 0 48 | @ 64 | P 80 | ` 96 | p 112 |
| 1 | 1 | `<DC1>` 17 | ! 33 | 1 49 | A 65 | Q 81 | a 97 | q 113 |
| 2 | 2 | `<DC2>` 18 | " 34 | 2 50 | B 66 | R 82 | b 98 | r 114 |
| 3 | 3 | `<DC3>` 19 | # 35 | 3 51 | C 67 | S 83 | c 99 | s 115 |
| 4 | 4 | `<DC4>` 20 | $ 36 | 4 52 | D 68 | T 84 | d 100 | t 116 |
| 5 | `<ENQ>` 5 | 21 | % 37 | 5 53 | E 69 | U 85 | e 101 | u 117 |
| 6 | 6 | 22 | & 38 | 6 54 | F 70 | V 86 | f 102 | v 118 |
| 7 | `<BEL>` 7 | 23 | ' 39 | 7 55 | G 71 | W 87 | g 103 | w 119 |
| 8 | 8 | `<CAN>` 24 | ( 40 | 8 56 | H 72 | X 88 | h 104 | x 120 |
| 9 | `<HT>` 9 | `<EM>` 25 | ) 41 | 9 57 | I 73 | Y 89 | i 105 | y 121 |
| A | `<LF>` 10 | `<SUB>` 26 | * 42 | : 58 | J 74 | Z 90 | j 106 | z 122 |
| B | `<VT>` 11 | `<ESC>` 27 | + 43 | ; 59 | K 75 | [ 91 | k 107 | { 123 |
| C | `<FF>` 12 | `<FS>` 28 | , 44 | < 60 | L 76 | \ 92 | l 108 | ¦ 124 |
| D | `<CR>` 13 | 29 | – 45 | = 61 | M 77 | ] 93 | m 109 | } 125 |
| E | `<SO>` 14 | `<RS>` 30 | . 46 | > 62 | N 78 | ^ 94 | n 110 | ~ 126 |
| F | `<SI>` 15 | 31 | / 47 | ? 63 | O 79 | _ 95 | o 111 | ▓ 127 |

Note: The (7F)H code is a space when neither normal nor katakana.

## *Star Mode*
(Character table: Normal)

| Hexa-decimal | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|
| 0 | (128) | ⌐ (144) | Ä (160) | é (176) | ù (192) | ā (208) | ▌ (224) | ⊤ (240) |
| 1 | │ (129) | Γ (145) | Ö (161) | è (177) | ū (193) | â (209) | ▬ (225) | ─ (241) |
| 2 | ─ (130) | ▪ (146) | Ü (162) | ē (178) | û (194) | ° (210) | ▬ (226) | ─ (242) |
| 3 | │ (131) | ▪ (147) | ß (163) | ê (179) | ç (195) | °C (211) | ▌ (227) | ─ (243) |
| 4 | ─ (132) | ▪ (148) | § (164) | ï (180) | ¿ (196) | °F (212) | ⊥ (228) | │ (244) |
| 5 | │ (133) | ▪ (149) | a̲ (165) | í (181) | N̄ (197) | Ω (213) | ⌟ (229) | │ (245) |
| 6 | ─ (134) | ╱ (150) | o̲ (166) | ì (182) | n̄ (198) | μ (214) | ⌞ (230) | │ (246) |
| 7 | │ (135) | ╲ (151) | f̲ (167) | Ī (183) | Ē (199) | Σ (215) | ⌐ (231) | ▪ (247) |
| 8 | ─ (136) | ◀ (152) | ¢ (168) | î (184) | Ɔ (200) | σ (216) | ■ (232) | ▪ (248) |
| 9 | │ (137) | ▰ (153) | ½ (169) | ö (185) | i (201) | x̄ (217) | ▓ (233) | ◣ (249) |
| A | ─ (138) | ┌ (154) | NT (170) | ó (186) | Å (202) | TL (218) | ⊥ (234) | ◤ (250) |
| B | │ (139) | ┴ (155) | TX (171) | ò (187) | φ (203) | X (219) | ← (235) | ═ (251) |
| C | ├ (140) | ⊤ (156) | ¥ (172) | ō (188) | θ (204) | ∞ (220) | ↑ (236) | ‖ (252) |
| D | ─ (141) | ▸ (157) | ¼ (173) | ô (189) | ä (205) | ± (221) | → (237) | ⌐ (253) |
| E | ⌞ (142) | ♦ (158) | Ā (174) | ü (190) | á (206) | ÷ (222) | ↓ (238) | ⌐ (254) |
| F | ⌐ (143) | ✕ (159) | ë (175) | ú (191) | à (207) | π (223) | ⌐ (239) | ⌐ (255) |

## *Star Mode*
(Character table: katakana)

| Hexa-decimal | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|
| 0 | 128 | ┘ 144 | 160 | ─ 176 | タ 192 | ミ 208 | ▮ 224 | ⊤ 240 |
| 1 | │ 129 | ┌ 145 | ° 161 | ア 177 | チ 193 | ム 209 | ▬ 225 | ─ 241 |
| 2 | ─ 130 | ▪ 146 | 「 162 | イ 178 | ツ 194 | メ 210 | ▬ 226 | ─ 242 |
| 3 | │ 131 | ▪ 147 | 」 163 | ウ 179 | テ 195 | モ 211 | ▮ 227 | ─ 243 |
| 4 | ─ 132 | ▪ 148 | 、 164 | エ 180 | ト 196 | ヤ 212 | ┴ 228 | ▮ 244 |
| 5 | │ 133 | ▪ 149 | • 165 | オ 181 | ナ 197 | ユ 213 | ┘ 229 | ▮ 245 |
| 6 | ─ 134 | ╱ 150 | ヲ 166 | カ 182 | ニ 198 | ヨ 214 | └ 230 | ▮ 246 |
| 7 | │ 135 | ╲ 151 | ァ 167 | キ 183 | ヌ 199 | ラ 215 | ┐ 231 | ヽ 247 |
| 8 | ─ 136 | ◣ 152 | ィ 168 | ク 184 | ネ 200 | リ 216 | ■ 232 | ʼ 248 |
| 9 | │ 137 | ◤ 153 | ゥ 169 | ケ 185 | ノ 201 | ル 217 | ▨ 233 | ◢ 249 |
| A | ─ 138 | ┌ 154 | ェ 170 | コ 186 | ハ 202 | レ 218 | ┴ 234 | ◣ 250 |
| B | │ 139 | ┴ 155 | ォ 171 | サ 187 | ヒ 203 | ロ 219 | ← 235 | ═ 251 |
| C | ├ 140 | ┬ 156 | ャ 172 | シ 188 | フ 204 | ワ 220 | ↑ 236 | ‖ 252 |
| D | ─ 141 | ┤ 157 | ュ 173 | ス 189 | ヘ 205 | ン 221 | → 237 | ⌐ 253 |
| E | └ 142 | ♦ 158 | ョ 174 | セ 190 | ホ 206 | ゛ 222 | ↓ 238 | ⌐ 254 |
| F | ┐ 143 | ✕ 159 | ッ 175 | ソ 191 | マ 207 | ° 223 | ⌐ 239 | ⌐ 255 |

Note: Other characters are the same as those for Character table: Normal.

## *Star Mode*
(Character table: IBM (Code page 437))

| Hexa-decimal | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|
| 0 | Ç 128 | É 144 | á 160 | ▓ 176 | └ 192 | ╨ 208 | α 224 | ≡ 240 |
| 1 | ü 129 | æ 145 | í 161 | ▒ 177 | ┴ 193 | ╤ 209 | β 225 | ± 241 |
| 2 | é 130 | Æ 146 | ó 162 | ▓ 178 | ┬ 194 | ╥ 210 | Γ 226 | ≥ 242 |
| 3 | â 131 | ô 147 | ú 163 | │ 179 | ├ 195 | ╙ 211 | π 227 | ≤ 243 |
| 4 | ä 132 | ö 148 | ñ 164 | ┤ 180 | ─ 196 | ╘ 212 | Σ 228 | ⌠ 244 |
| 5 | à 133 | ò 149 | Ñ 165 | ╡ 181 | ┼ 197 | ╒ 213 | σ 229 | ⌡ 245 |
| 6 | å 134 | û 150 | ª 166 | ╢ 182 | ╞ 198 | ╓ 214 | μ 230 | ÷ 246 |
| 7 | ç 135 | ù 151 | º 167 | ╖ 183 | ╟ 199 | ╫ 215 | τ 231 | ≈ 247 |
| 8 | ê 136 | ÿ 152 | ¿ 168 | ╕ 184 | ╚ 200 | ╪ 216 | Φ 232 | ° 248 |
| 9 | ë 137 | Ö 153 | ⌐ 169 | ╣ 185 | ╔ 201 | ┘ 217 | Θ 233 | ∙ 249 |
| A | è 138 | Ü 154 | ¬ 170 | ║ 186 | ╩ 202 | ┌ 218 | Ω 234 | − 250 |
| B | ï 139 | ¢ 155 | ½ 171 | ╗ 187 | ╦ 203 | █ 219 | δ 235 | √ 251 |
| C | î 140 | £ 156 | ¼ 172 | ╝ 188 | ╠ 204 | ▄ 220 | ∞ 236 | ∩ 252 |
| D | ì 141 | ¥ 157 | ¡ 173 | ╜ 189 | = 205 | ▌ 221 | φ 237 | ² 253 |
| E | Ä 142 | ₧ 158 | « 174 | ╛ 190 | ╬ 206 | ▐ 222 | ∈ 238 | ■ 254 |
| F | Å 143 | ƒ 159 | » 175 | ┐ 191 | ┴ 207 | ▀ 223 | ∩ 239 | 255 |

Note: Other characters are the same as those for Character table: Normal.

## *Star Mode*

### Code Page #850
### Multi-lingual

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

### Code Page #852
### Latin-2

|   | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|
| 0 | Ç | É | á | ░ | L | đ | Ó | - |
| 1 | ü | Ĺ | í | ░ | ⊥ | Đ | ß | " |
| 2 | é | í | ó | ▓ | ┬ | Ď | Ô |   |
| 3 | â | ô | ú | │ | ├ | Ë | Ň | ˇ |
| 4 | ä | ö | Ą | ┤ | ─ | ď | ń | ˘ |
| 5 | ů | Ľ | ą | Á | ┼ | Ň | ň | § |
| 6 | ć | ľ | Ž | Â | Ă | í | Š | ÷ |
| 7 | ç | Ś | ž | Ě | ă | Î | š | ¸ |
| 8 | ł | ś | Ę | Ş | ╚ | ě | Ř | ° |
| 9 | ë | Ö | ę | ╣ | ╔ | ┘ | Ú | ¨ |
| A | Ő | Ü |   | ║ | ╩ | ┌ | ŕ | · |
| B | ő | Ť | ź | ╗ | ╦ | █ | Ű | ű |
| C | î | ť | Č | ╝ | ╠ | ▄ | ý | Ř |
| D | Ź | Ł | ş | Ż | = | Ţ | Ý | ř |
| E | Ä | × | « | ż | ╬ | Ů | ţ | ■ |
| F | Ć | č | » | ┐ | ¤ | ■ | ´ |   |

### Code Page #860
### Portuguese

|   | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|
| 0 | Ç | É | á | ░ | L | ╨ | α | ≡ |
| 1 | ü | À | í | ░ | ⊥ | ╤ | β | ± |
| 2 | é | È | ó | ▓ | ┬ | π | Γ | ≥ |
| 3 | â | ô | ú | │ | ├ | ╨ | π | ≤ |
| 4 | ã | õ | ñ | ┤ | ─ | ╠ | Σ | ⌠ |
| 5 | à | ò | Ñ | ╣ | ┼ | F | σ | ⌡ |
| 6 | Á | Ú | ª | ╢ | ╟ | π | µ | ÷ |
| 7 | ç | ù | º | ╖ | ╟ | ╫ | τ | ≈ |
| 8 | ê | Ì | ¿ | ╕ | ╚ | ╧ | Φ | ° |
| 9 | Ê | Õ | Ò | ╣ | ╔ | ┘ | θ | • |
| A | è | Ü | ¬ | ║ | ╩ | ┌ | Ω | · |
| B | Í | ¢ | ½ | ╗ | ╦ | █ | δ | √ |
| C | Ô | £ | ¼ | ╝ | ╠ | ■ | ∞ | n |
| D | ì | Ù | ¡ | ╜ | = | ▌ | ø | ² |
| E | Ã | ₧ | « | ╛ | ╬ | ▐ | ∈ | ■ |
| F | Â | Ó | » | ┐ | ╧ | ■ | ∩ |   |

### Code Page #861
### Icelandic

|   | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|
| 0 | Ç | É | á | ░ | L | ╨ | α | ≡ |
| 1 | ü | æ | í | ░ | ⊥ | ╤ | β | ± |
| 2 | é | Æ | ó | ▓ | ┬ | π | Γ | ≥ |
| 3 | â | ô | ú | │ | ├ | ╨ | π | ≤ |
| 4 | ä | ö | Á | ┤ | ─ | ╠ | Σ | ⌠ |
| 5 | à | þ | Í | ╣ | ┼ | F | σ | ⌡ |
| 6 | å | û | Ó | ╢ | ╟ | π | µ | ÷ |
| 7 | ç | Ý | Ú | ╖ | ╟ | ╫ | τ | ≈ |
| 8 | ê | ý | ¿ | ╕ | ╚ | ╧ | Φ | ° |
| 9 | ë | Ö | ⌐ | ╣ | ╔ | ┘ | θ | • |
| A | è | Ü | ¬ | ║ | ╩ | ┌ | Ω | · |
| B | Ð | ø | ½ | ╗ | ╦ | █ | δ | √ |
| C | ð | £ | ¼ | ╝ | ╠ | ■ | ∞ | n |
| D | Þ | Ø | ¡ | ╜ | = | ▌ | ø | ² |
| E | Ä | ₧ | « | ╛ | ╬ | ▐ | ∈ | ■ |
| F | Å | ƒ | » | ┐ | ╧ | ■ | ∩ |   |

Note: Other characters are the same as those for Character table: Normal

**Code Page #863**
**Canadian French**

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

**Code Page #865**
**Nordic**

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

**Code Page #866**
**Russian**

|   | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|
| 0 | А | Р | а | ░ | └ | ╨ | р | Ё |
| 1 | Б | С | б | ▒ | ┴ | ╤ | с | ё |
| 2 | В | Т | в | ▓ | ┬ | ╥ | т | Є |
| 3 | Г | У | г | │ | ├ | ╙ | у | є |
| 4 | Д | Ф | д | ┤ | ─ | ╘ | ф | Ї |
| 5 | Е | Х | е | ╡ | ┼ | ╒ | х | ї |
| 6 | Ж | Ц | ж | ╢ | ╞ | ╓ | ц | ў |
| 7 | З | Ч | з | ╖ | ╟ | ╫ | ч | ў |
| 8 | И | Ш | и | ╕ | ╚ | ╪ | ш | ° |
| 9 | Й | Щ | й | ╣ | ╔ | ┘ | щ | ∙ |
| A | К | Ъ | к | ║ | ╩ | ┌ | ъ | · |
| B | Л | Ы | л | ╗ | ╦ | █ | ы | √ |
| C | М | Ь | м | ╝ | ╠ | ▄ | ь | № |
| D | Н | Э | н | ╜ | = | ▌ | э | ¤ |
| E | О | Ю | о | ┘ | ╬ | ▐ | ю | ■ |
| F | П | Я | п | ┐ | ┴ | ▀ | я |   |

Note: Other characters are the same as those for Character table: Normal

## *Star Mode*
### International Character Set

|  | 35 | 36 | 64 | 91 | 92 | 93 | 94 | 96 | 123 | 124 | 125 | 126 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U. S. A. | # | $ | @ | [ | \ | ] | ^ | ` | { | \| | } | ~ |
| France | # | $ | à | ° | ç | § | ^ | ` | é | ù | è | ¨ |
| Germany | # | $ | § | Ä | Ö | Ü | ^ | ` | ä | ö | ü | ß |
| England | £ | $ | @ | [ | \ | ] | ^ | ` | { | \| | } | ~ |
| Denmark 1 | # | $ | @ | Æ | Ø | Å | ^ | ` | æ | ø | å | ~ |
| Sweden | # | ¤ | É | Ä | Ö | Å | Ü | é | ä | ö | å | ü |
| Italy | # | $ | @ | ° | \ | é | ^ | ù | à | ò | è | ì |
| Spain 1 | ₧ | $ | @ | ¡ | Ñ | ¿ | ^ | ' | ¨ | ñ | } | ~ |
| Japan | # | $ | @ | [ | ¥ | ] | ^ | ` | { | \| | } | ~ |
| Norway | # | ¤ | É | Æ | Ø | Å | Ü | é | æ | ø | å | ü |
| Denmark 2 | # | $ | É | Æ | Ø | Å | Ü | é | æ | ø | å | ü |
| Spain 2 | # | $ | á | ¡ | Ñ | ¿ | é | ' | í | ñ | ó | ú |
| Latin America | # | $ | á | ¡ | Ñ | ¿ | é | ü | í | ñ | ó | ú |

## *ESC/POS Mode*

Page 0 (PC437)

| Hexa-decimal | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| 0 | <NUL> 0 | <DLE> 16 | SP 32 | 0 48 | @ 64 | P 80 | ` 96 | p 112 |
| 1 | 1 | <XON> 17 | ! 33 | 1 49 | A 65 | Q 81 | a 97 | q 113 |
| 2 | 2 | 18 | ” 34 | 2 50 | B 66 | R 82 | b 98 | r 114 |
| 3 | 3 | <XOFF> 19 | # 35 | 3 51 | C 67 | S 83 | c 99 | s 115 |
| 4 | <EOT> 4 | 20 | $ 36 | 4 52 | D 68 | T 84 | d 100 | t 116 |
| 5 | <ENQ> 5 | 21 | % 37 | 5 53 | E 69 | U 85 | e 101 | u 117 |
| 6 | 6 | 22 | & 38 | 6 54 | F 70 | V 86 | f 102 | v 118 |
| 7 | 7 | 23 | ' 39 | 7 55 | G 71 | W 87 | g 103 | w 119 |
| 8 | 8 | <CAN> 24 | ( 40 | 8 56 | H 72 | X 88 | h 104 | x 120 |
| 9 | <HT> 9 | 25 | ) 41 | 9 57 | I 73 | Y 89 | i 105 | y 121 |
| A | <LF> 10 | 26 | * 42 | : 58 | J 74 | Z 90 | j 106 | z 122 |
| B | 11 | <ESC> 27 | + 43 | ; 59 | K 75 | [ 91 | k 107 | { 123 |
| C | <FF> 12 | 28 | , 44 | < 60 | L 76 | \ 92 | l 108 | ¦ 124 |
| D | 13 | <GS> 29 | – 45 | = 61 | M 77 | ] 93 | m 109 | } 125 |
| E | 14 | 30 | . 46 | > 62 | N 78 | ^ 94 | n 110 | ~ 126 |
| F | 15 | 31 | / 47 | ? 63 | O 79 | _ 95 | o 111 | SP 127 |

## ESC/POS Mode

Page 0 (PC437)

| Hexa-decimal | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|
| 0 | Ç 128 | É 144 | á 160 | ▦ 176 | └ 192 | ╨ 208 | α 224 | ≡ 240 |
| 1 | ü 129 | æ 145 | í 161 | � 177 | ┴ 193 | ╤ 209 | β 225 | ± 241 |
| 2 | é 130 | Æ 146 | ó 162 | ▓ 178 | ┬ 194 | ╥ 210 | Γ 226 | ≥ 242 |
| 3 | â 131 | ô 147 | ú 163 | │ 179 | ├ 195 | ╙ 211 | π 227 | ≤ 243 |
| 4 | ä 132 | ö 148 | ñ 164 | ┤ 180 | ─ 196 | ╘ 212 | Σ 228 | ⌠ 244 |
| 5 | à 133 | ò 149 | Ñ 165 | ╡ 181 | ┼ 197 | ╒ 213 | σ 229 | ⌡ 245 |
| 6 | å 134 | û 150 | ª 166 | ╢ 182 | ╞ 198 | ╓ 214 | μ 230 | ÷ 246 |
| 7 | ç 135 | ù 151 | º 167 | ╖ 183 | ╟ 199 | ╫ 215 | τ 231 | ≈ 247 |
| 8 | ê 136 | ÿ 152 | ¿ 168 | ╕ 184 | ╚ 200 | ╪ 216 | Φ 232 | ° 248 |
| 9 | ë 137 | Ö 153 | ⌐ 169 | ╣ 185 | ╔ 201 | ┘ 217 | Θ 233 | • 249 |
| A | è 138 | Ü 154 | ¬ 170 | ║ 186 | ╩ 202 | ┌ 218 | Ω 234 | · 250 |
| B | ï 139 | ¢ 155 | ½ 171 | ╗ 187 | ╦ 203 | █ 219 | δ 235 | √ 251 |
| C | î 140 | £ 156 | ¼ 172 | ╝ 188 | ╠ 204 | ▄ 220 | ∞ 236 | ⁿ 252 |
| D | ì 141 | ¥ 157 | ¡ 173 | ╜ 189 | ═ 205 | │ 221 | φ 237 | ² 253 |
| E | Ä 142 | ₧ 158 | « 174 | ╛ 190 | ╬ 206 | ▌ 222 | ∈ 238 | ■ 254 |
| F | Å 143 | ƒ 159 | » 175 | ┐ 191 | ╧ 207 | ▀ 223 | ∩ 239 | SP 255 |

## ESC/POS Mode

Page 1 (Katakana)

| Hexa-decimal | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|
| 0 | ─ <br>128 | ⊥ <br>144 | SP <br>160 | ─ <br>176 | タ <br>192 | ミ <br>208 | = <br>224 | ✕ <br>240 |
| 1 | ─ <br>129 | ⊤ <br>145 | ゜ <br>161 | ア <br>177 | チ <br>193 | ム <br>209 | ╟ <br>225 | 円 <br>241 |
| 2 | ━ <br>130 | ┤ <br>146 | 「 <br>162 | イ <br>178 | ツ <br>194 | メ <br>210 | ╪ <br>226 | 年 <br>242 |
| 3 | ■ <br>131 | ├ <br>147 | 」 <br>163 | ウ <br>179 | テ <br>195 | モ <br>211 | ╡ <br>227 | 月 <br>243 |
| 4 | ■ <br>132 | ─ <br>148 | 、 <br>164 | エ <br>180 | ト <br>196 | ヤ <br>212 | ◢ <br>228 | 日 <br>244 |
| 5 | ■ <br>133 | ─ <br>149 | ・ <br>165 | オ <br>181 | ナ <br>197 | ユ <br>213 | ◣ <br>229 | 時 <br>245 |
| 6 | ■ <br>134 | | <br>150 | ヲ <br>166 | カ <br>182 | ニ <br>198 | ヨ <br>214 | ◥ <br>230 | 分 <br>246 |
| 7 | ■ <br>135 | | <br>151 | ァ <br>167 | キ <br>183 | ヌ <br>199 | ラ <br>215 | ◤ <br>231 | 秒 <br>247 |
| 8 | ¦ <br>136 | ┌ <br>152 | イ <br>168 | ク <br>184 | ネ <br>200 | リ <br>216 | ♠ <br>232 | 〒 <br>248 |
| 9 | | <br>137 | ┐ <br>153 | ゥ <br>169 | ケ <br>185 | ノ <br>201 | ル <br>217 | ♥ <br>233 | 市 <br>249 |
| A | ▮ <br>138 | └ <br>154 | ェ <br>170 | コ <br>186 | ハ <br>202 | レ <br>218 | ♦ <br>234 | 区 <br>250 |
| B | ▌ <br>139 | ┘ <br>155 | ォ <br>171 | サ <br>187 | ヒ <br>203 | ロ <br>219 | ♣ <br>235 | 町 <br>251 |
| C | ■ <br>140 | ⌒ <br>156 | ャ <br>172 | シ <br>188 | フ <br>204 | ワ <br>220 | ● <br>236 | 村 <br>252 |
| D | ■ <br>141 | ⌐ <br>157 | ュ <br>173 | ス <br>189 | ヘ <br>205 | ン <br>221 | ○ <br>237 | 人 <br>253 |
| E | ■ <br>142 | ⌣ <br>158 | ョ <br>174 | セ <br>190 | ホ <br>206 | ゛ <br>222 | / <br>238 | ▨ <br>254 |
| F | ✚ <br>143 | ⌐ <br>159 | ッ <br>175 | ソ <br>191 | マ <br>207 | ゜ <br>223 | \ <br>239 | SP <br>255 |

Note: Other characters are the same as those for Page 0.

## ESC/POS Mode

Page 2 (PC850: Multilingual)

| Hexa-decimal | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|
| 0 | Ç 128 | É 144 | á 160 | ▦ 176 | └ 192 | ð 208 | α 224 | — 240 |
| 1 | ü 129 | æ 145 | í 161 | ▓ 177 | ┴ 193 | Ð 209 | β 225 | ± 241 |
| 2 | é 130 | Æ 146 | ó 162 | ▓ 178 | ┬ 194 | Ê 210 | Ô 226 | = 242 |
| 3 | â 131 | ô 147 | ú 163 | │ 179 | ├ 195 | Ë 211 | Ò 227 | ¾ 243 |
| 4 | ä 132 | ö 148 | ñ 164 | ┤ 180 | ─ 196 | È 212 | õ 228 | ¶ 244 |
| 5 | à 133 | ò 149 | Ñ 165 | Á 181 | ┼ 197 | ı 213 | Õ 229 | § 245 |
| 6 | å 134 | û 150 | ª 166 | Â 182 | ã 198 | Í 214 | µ 230 | ÷ 246 |
| 7 | ç 135 | ù 151 | º 167 | À 183 | Ã 199 | Î 215 | Þ 231 | ¸ 247 |
| 8 | ê 136 | ÿ 152 | ¿ 168 | © 184 | ╚ 200 | Ï 216 | Þ 232 | ° 248 |
| 9 | ë 137 | Ö 153 | ® 169 | ╣ 185 | ╔ 201 | ┘ 217 | Ú 233 | ¨ 249 |
| A | è 138 | Ü 154 | ¬ 170 | ║ 186 | ╩ 202 | ┌ 218 | Û 234 | · 250 |
| B | ï 139 | ø 155 | ½ 171 | ╗ 187 | ╦ 203 | █ 219 | Ù 235 | ¹ 251 |
| C | î 140 | £ 156 | ¼ 172 | ╝ 188 | ╠ 204 | ▄ 220 | ý 236 | ³ 252 |
| D | ì 141 | Ø 157 | ¡ 173 | ¢ 189 | = 205 | ¦ 221 | Ý 237 | ² 253 |
| E | Ä 142 | × 158 | « 174 | ¥ 190 | ╬ 206 | Ì 222 | ¯ 238 | ■ 254 |
| F | Å 143 | ƒ 159 | » 175 | ┐ 191 | ¤ 207 | ▪ 223 | ´ 239 | SP 255 |

Note: Other characters are the same as those for Page 0.

## ESC/POS Mode *(Receipt printer only)*

Page 3 (PC860: Portuguese)

| Hexa-decimal | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|
| 0 | Ç 128 | É 144 | á 160 | ▦ 176 | └ 192 | ╨ 208 | α 224 | ≡ 240 |
| 1 | ü 129 | À 145 | í 161 | ▒ 177 | ┴ 193 | ╤ 209 | β 225 | ± 241 |
| 2 | é 130 | È 146 | ó 162 | ▓ 178 | ┬ 194 | π 210 | Γ 226 | ≥ 242 |
| 3 | â 131 | ô 147 | ú 163 | │ 179 | ├ 195 | ╩ 211 | π 227 | ≤ 243 |
| 4 | ã 132 | õ 148 | ñ 164 | ┤ 180 | ─ 196 | ╞ 212 | Σ 228 | ⌠ 244 |
| 5 | à 133 | ò 149 | Ñ 165 | ╡ 181 | ┼ 197 | ╟ 213 | σ 229 | ⌡ 245 |
| 6 | Á 134 | Ú 150 | ª 166 | ╢ 182 | ╞ 198 | ╓ 214 | µ 230 | ÷ 246 |
| 7 | ç 135 | ù 151 | º 167 | ╖ 183 | ╟ 199 | ╫ 215 | τ 231 | ≈ 247 |
| 8 | ê 136 | Ì 152 | ¿ 168 | ╕ 184 | ╚ 200 | ╪ 216 | Φ 232 | ° 248 |
| 9 | Ê 137 | Õ 153 | Ò 169 | ╣ 185 | ╔ 201 | ┘ 217 | Θ 233 | • 249 |
| A | è 138 | Ü 154 | ¬ 170 | ║ 186 | ╩ 202 | ┌ 218 | Ω 234 | · 250 |
| B | Í 139 | Ç 155 | ½ 171 | ╗ 187 | ╦ 203 | █ 219 | δ 235 | √ 251 |
| C | Ô 140 | £ 156 | ¼ 172 | ╝ 188 | ╠ 204 | ▄ 220 | ∞ 236 | ⁿ 252 |
| D | ì 141 | Ù 157 | ¡ 173 | ╜ 189 | = 205 | ▌ 221 | φ 237 | ² 253 |
| E | Ã 142 | ₧ 158 | « 174 | ╛ 190 | ╬ 206 | ▐ 222 | ∈ 238 | ∎ 254 |
| F | Â 143 | Ó 159 | » 175 | ┐ 191 | ┴ 207 | ▀ 223 | ∩ 239 | SP 255 |

Note: Other characters are the same as those for Page 0.

## ESC/POS Mode (Receipt printer only)

Page 4 (PC863: Canadian-French)

| Hexa-decimal | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|
| 0 | Ç 128 | É 144 | \| 160 | ░ 176 | └ 192 | ╨ 208 | α 224 | ≡ 240 |
| 1 | ü 129 | È 145 | ´ 161 | ▒ 177 | ┴ 193 | ╤ 209 | β 225 | ± 241 |
| 2 | é 130 | Ê 146 | ó 162 | ▓ 178 | ┬ 194 | ╥ 210 | Γ 226 | ≥ 242 |
| 3 | â 131 | ô 147 | ú 163 | │ 179 | ├ 195 | ╙ 211 | π 227 | ≤ 243 |
| 4 | Â 132 | Ë 148 | ¨ 164 | ┤ 180 | ─ 196 | ╘ 212 | Σ 228 | ⌠ 244 |
| 5 | à 133 | Ï 149 | ┘ 165 | ╡ 181 | ┼ 197 | ╒ 213 | σ 229 | ⌡ 245 |
| 6 | ¶ 134 | û 150 | $^3$ 166 | ╢ 182 | ╞ 198 | ╓ 214 | μ 230 | ÷ 246 |
| 7 | ç 135 | ù 151 | ─ 167 | ╖ 183 | ╟ 199 | ╫ 215 | τ 231 | ≈ 247 |
| 8 | ê 136 | ¤ 152 | Î 168 | ╕ 184 | ╚ 200 | ╪ 216 | Φ 232 | ° 248 |
| 9 | ë 137 | Ô 153 | ┌ 169 | ╣ 185 | ╔ 201 | ┘ 217 | Θ 233 | • 249 |
| A | è 138 | Ü 154 | ¬ 170 | ║ 186 | ╩ 202 | ┌ 218 | Ω 234 | · 250 |
| B | ï 139 | ¢ 155 | ½ 171 | ╗ 187 | ╦ 203 | █ 219 | δ 235 | √ 251 |
| C | î 140 | £ 156 | ¼ 172 | ╝ 188 | ╠ 204 | ▄ 220 | ∞ 236 | $^n$ 252 |
| D | = 141 | Ù 157 | ¾ 173 | ╜ 189 | ═ 205 | ▌ 221 | φ 237 | $^2$ 253 |
| E | À 142 | Û 158 | « 174 | ╛ 190 | ╬ 206 | ▐ 222 | ∈ 238 | ■ 254 |
| F | § 143 | ƒ 159 | » 175 | ┐ 191 | ╧ 207 | ▀ 223 | ∩ 239 | SP 255 |

Note: Other characters are the same as those for Page 0.

# ESC/POS Mode *(Receipt printer only)*

Page 5 (PC865: Nordic)

| Hexa-decimal | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|
| 0 | Ç 128 | É 144 | á 160 | ▦ 176 | └ 192 | ╨ 208 | α 224 | ≡ 240 |
| 1 | ü 129 | æ 145 | í 161 | ▒ 177 | ┴ 193 | ╤ 209 | β 225 | ± 241 |
| 2 | é 130 | Æ 146 | ó 162 | ▓ 178 | ┬ 194 | π 210 | Γ 226 | ≥ 242 |
| 3 | â 131 | ô 147 | ú 163 | │ 179 | ├ 195 | ╙ 211 | π 227 | ≤ 243 |
| 4 | ä 132 | ö 148 | ñ 164 | ┤ 180 | ─ 196 | ╘ 212 | Σ 228 | ⌠ 244 |
| 5 | à 133 | ò 149 | Ñ 165 | ╡ 181 | ┼ 197 | ╒ 213 | σ 229 | J 245 |
| 6 | å 134 | û 150 | ª 166 | ╢ 182 | ╞ 198 | ╓ 214 | µ 230 | ÷ 246 |
| 7 | ç 135 | ù 151 | º 167 | ╖ 183 | ╫ 199 | ╪ 215 | τ 231 | ≈ 247 |
| 8 | ê 136 | ÿ 152 | ¿ 168 | ╕ 184 | ╚ 200 | ╪ 216 | Φ 232 | ° 248 |
| 9 | ë 137 | Ö 153 | ⌐ 169 | ╣ 185 | ╔ 201 | ┘ 217 | Θ 233 | • 249 |
| A | è 138 | Ü 154 | ¬ 170 | ║ 186 | ╩ 202 | ┌ 218 | Ω 234 | · 250 |
| B | ï 139 | ø 155 | ½ 171 | ╗ 187 | ╦ 203 | █ 219 | δ 235 | √ 251 |
| C | î 140 | £ 156 | ¼ 172 | ╝ 188 | ╠ 204 | ▄ 220 | ∞ 236 | n 252 |
| D | ì 141 | Ø 157 | ¡ 173 | ╜ 189 | ═ 205 | ▌ 221 | φ 237 | $^2$ 253 |
| E | Ä 142 | ₧ 158 | « 174 | ╛ 190 | ╬ 206 | ▐ 222 | ∈ 238 | ∎ 254 |
| F | Å 143 | ƒ 159 | ¤ 175 | ┐ 191 | ┴ 207 | ▀ 223 | ∩ 239 | SP 255 |

Note: Other characters are the same as those for Page 0.

## *ESC/POS Mode (Receipt printer only)*

Page 255 (Space Page)

| Hexa-decimal | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|
| 0 | SP 128 | SP 144 | SP 160 | SP 176 | SP 192 | SP 208 | SP 224 | SP 240 |
| 1 | SP 129 | SP 145 | SP 161 | SP 177 | SP 193 | SP 209 | SP 225 | SP 241 |
| 2 | SP 130 | SP 146 | SP 162 | SP 178 | SP 194 | SP 210 | SP 226 | SP 242 |
| 3 | SP 131 | SP 147 | SP 163 | SP 179 | SP 195 | SP 211 | SP 227 | SP 243 |
| 4 | SP 132 | SP 148 | SP 164 | SP 180 | SP 196 | SP 212 | SP 228 | SP 244 |
| 5 | SP 133 | SP 149 | SP 165 | SP 181 | SP 197 | SP 213 | SP 229 | SP 245 |
| 6 | SP 134 | SP 150 | SP 166 | SP 182 | SP 198 | SP 214 | SP 230 | SP 246 |
| 7 | SP 135 | SP 151 | SP 167 | SP 183 | SP 199 | SP 215 | SP 231 | SP 247 |
| 8 | SP 136 | SP 152 | SP 168 | SP 184 | SP 200 | SP 216 | SP 232 | SP 248 |
| 9 | SP 137 | SP 153 | SP 169 | SP 185 | SP 201 | SP 217 | SP 233 | SP 249 |
| A | SP 138 | SP 154 | SP 170 | SP 186 | SP 202 | SP 218 | SP 234 | SP 250 |
| B | SP 139 | SP 155 | SP 171 | SP 187 | SP 203 | SP 219 | SP 235 | SP 251 |
| C | SP 140 | SP 156 | SP 172 | SP 188 | SP 204 | SP 220 | SP 236 | SP 252 |
| D | SP 141 | SP 157 | SP 173 | SP 189 | SP 205 | SP 221 | SP 237 | SP 253 |
| E | SP 142 | SP 158 | SP 174 | SP 190 | SP 206 | SP 222 | SP 238 | SP 254 |
| F | SP 143 | SP 159 | SP 175 | SP 191 | SP 207 | SP 223 | SP 239 | SP 255 |

Note: Other characters are the same as those for Page 0.

## *ESC/POS Mode*

International Character Set

|           | 35 | 36 | 64 | 91 | 92 | 93 | 94 | 96 | 123 | 124 | 125 | 126 |
|-----------|----|----|----|----|----|----|----|----|-----|-----|-----|-----|
| U. S. A.  | #  | $  | @  | [  | \  | ]  | ^  | `  | {   | \|  | }   | ~   |
| France    | #  | $  | à  | °  | ç  | §  | ^  | `  | é   | ù   | è   | ¨   |
| Germany   | #  | $  | §  | Ä  | Ö  | Ü  | ^  | `  | ä   | ö   | ü   | ß   |
| England   | £  | $  | @  | [  | \  | ]  | ^  | `  | {   | \|  | }   | ~   |
| Denmark 1 | #  | $  | @  | Æ  | Ø  | Å  | ^  | `  | æ   | ø   | å   | ~   |
| Sweden    | #  | ¤  | É  | Ä  | Ö  | Å  | Ü  | é  | ä   | ö   | å   | ü   |
| Italy     | #  | $  | @  | °  | \  | é  | ^  | ù  | à   | ò   | è   | ì   |
| Spain     | ₧  | $  | @  | ¡  | Ñ  | ¿  | ^  | '  | ¨   | ñ   | }   | ~   |
| Japan     | #  | $  | @  | [  | ¥  | ]  | ^  | `  | {   | \|  | }   | ~   |
| Norway    | #  | ¤  | É  | Æ  | Ø  | Å  | Ü  | é  | æ   | ø   | å   | ü   |
| Denmark 2 | #  | $  | É  | Æ  | Ø  | Å  | Ü  | é  | æ   | ø   | å   | ü   |