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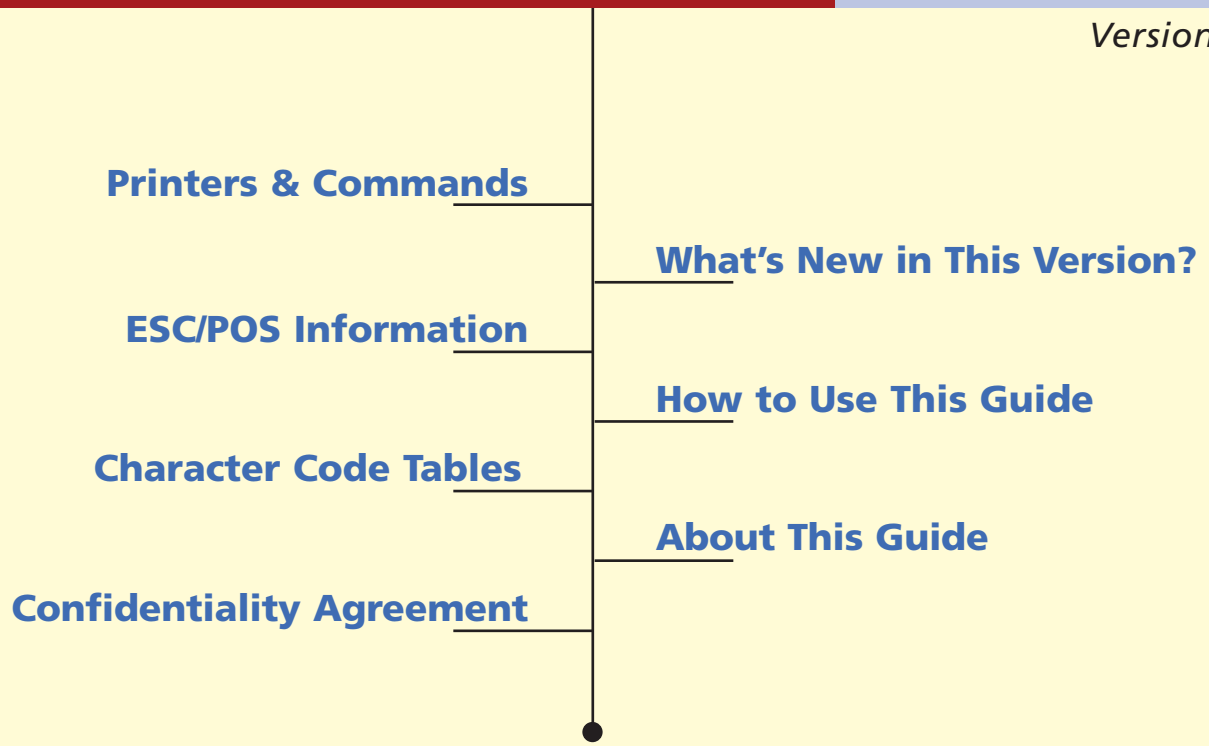
# Receipt/Journal/Cut Sheet Printers

## ESC/POS® Application Programming Guide

Version 10.00

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# printers & commands

- **Commands in Alphanumeric Order**
- **Commands Arranged by Function**
- **Commands Arranged by Printer**
  - TM-U950

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# how to use this guide

| | |
|---|---|
| **blue text** | **Text**<br>Any text colored blue is a link to another screen. Click the text to go to that topic. |
| **PRINTER name** | **Printer information**<br>Most information applies to all printers in a category. If there is information specific to one printer, you see its name in colored text, with a different color for each printer. The model dependent information appears if you click on the name of the printer or look at the bottom of the screen for text in the appropriate color. |

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# what's new in this version?

This guide (Receipt/Journal/Cut Sheet Printers) is now separate from the guides for other types of printers.

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# about this guide

ESC/POS® Application Programming Guide for
Receipt/Journal/Cut Sheet Printers
Version 10.00
Seiko Epson Corporation, System Device Division

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# ESC/POS® PROPRIETARY COMMAND SYSTEM

The market for store automation equipment is changing rapidly with the widespread introduction of POS (point of sale) terminals. These terminals are now appearing even in small retail stores and specialty shops.

As personal computers begin to be used as POS terminals, the demand for matching uniform peripheral devices is expected to rise. At present, however, many of the competing POS terminal printers on the market employ mutually incompatible command sets. This imposes limits on the expandability and range of applications possible with PC-based systems. There is a need for a new command set designed to provide the expandability and universal applicability demanded by the market.

## ESC/POS

EPSON took the initiative by introducing ESC/POS, a proprietary POS printer command system, which includes patented or patent pending commands and enables versatile POS system construction with high scalability. Compatible with all types of EPSON POS printers and displays, this proprietary control system also offers the flexibility to easily make future upgrades. Its popularity is worldwide.

ESC/POS is designed to reduce the processing load on the host computer in POS environments. It comprises a set of highly functional and efficient commands that enables the full realization of the potential of printers.

## A command set designed for universal applicability

The commands that are supported by all EPSON POS printers and those that are specific to individual models are clearly described. This means that ESC/POS compatible software will work with any system and be suitable for a wide range of applications.

## Superb expandability allowing the addition of new functions

New functions can be added and accommodated by the categories already provided in the command system.

## Allows more effective use of software

Once a software application has been created for one printer in the TM series, it can be used as the basis for versions for the other printers in the series. Only a small portion of the program source code needs to be modified.

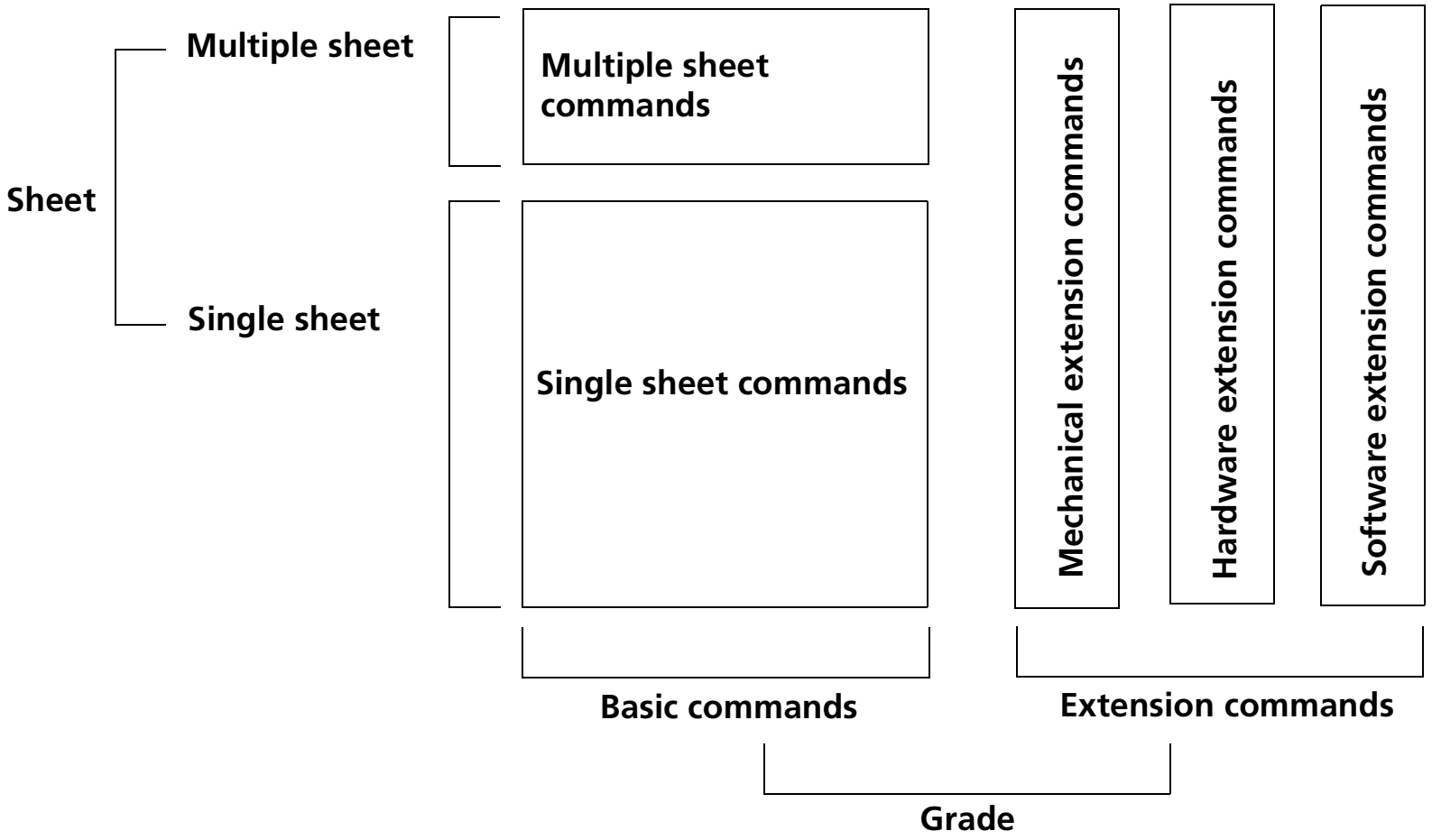
# COMMAND CLASSIFICATION

ESC/POS printer commands are classified by functions such as print, character, print position, printing paper, line spacing, panel button, paper sensor, mechanism control, status, bar code, bit-image, macro function, control option, and miscellaneous functions. The classification is called function classification.

ESC/POS printer commands are also classified by sheet and grade. The sheet and grade classification is called matrix classification.

The sheet classification is divided into single sheet commands and multiple sheet commands. The grade classification is separated into basic commands and extension commands.

Basic commands are defined as fundamental printer controls, including print commands and character type selection commands. Extension commands are defined as control codes for functions specific to individual printers. These commands are further divided into mechanical extension commands that relate to additional mechanical functions such as stamp and autocutter units, hardware extension commands that relate to additional hardware functions such as panel button and status transmission controls, and software extension commands that relate to additional software functions such as user-defined and bar code controls. The next screen is an overview diagram of the matrix classification of ESC/POS.


Multiple sheet
Sheet
Single sheet
Multiple sheet commands
Single sheet commands
Mechanical extension commands
Hardware extension commands
Software extension commands
Basic commands
Extension commands
Grade

# OVERVIEW OF DATA PROCESSING

## Character Data and Normal Commands

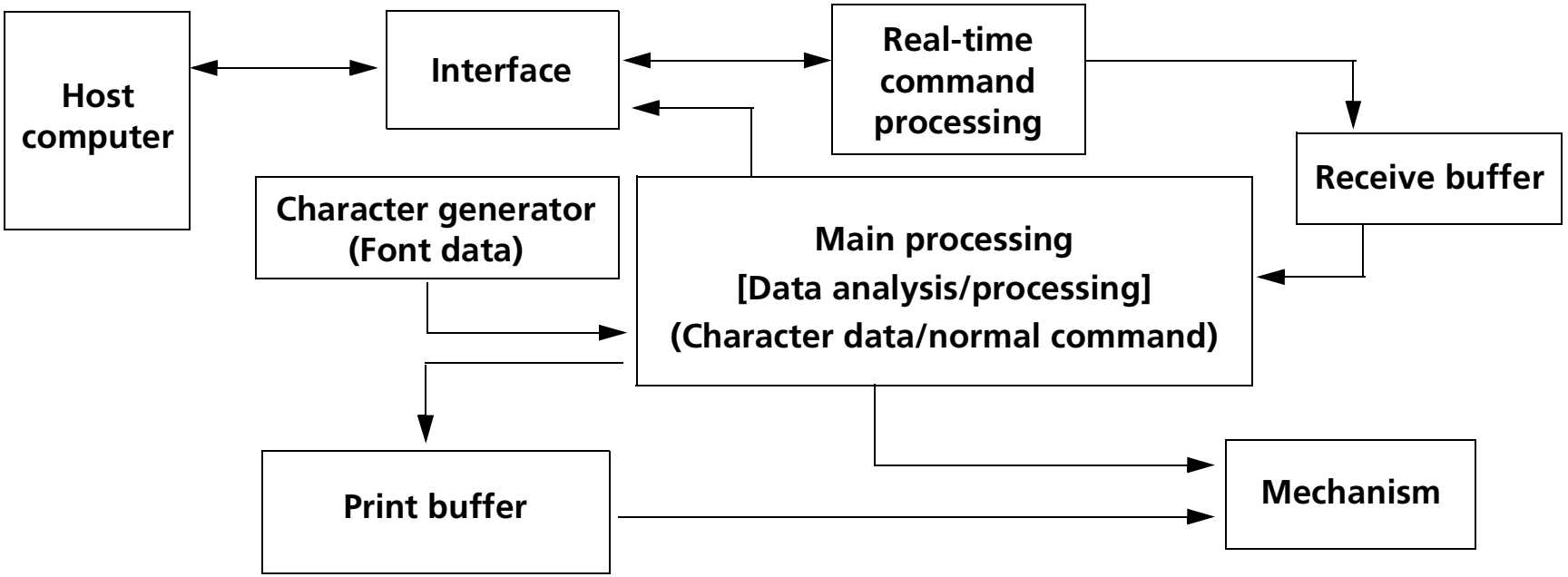
The printer stores data sent from the host computer in the receive buffer temporarily, and then the printer interprets the data and classifies them into commands or character data sequentially. If the data from the receive buffer is a normal command, the printer processes the command corresponding to its function; for example, if the data interpreted is **ESC 3**, the printer changes a setting value for the line spacing, and if it is **LF**, the printer prints the data in the print buffer and feeds the paper one line.

If the data from the receive buffer is character data, the printer reads the appropriate font data from the resident character generator and writes image data to the print buffer.

## Real-time Commands

The printer stores data sent from the host computer in the receive buffer, interprets the data, and processes the commands corresponding to their function one line at a time. The real-time commands are the commands that consist of a **DLE** extension, such as **DLE EOT** or **DLE ENQ**. They are processed immediately. The real-time commands are ignored as undefined codes in the main processing.

## Data processing diagram



# DEFINITIONS

**Normal commands**

Normal commands are all the commands except real-time commands. The normal commands are stored in the receive buffer temporarily and then processed sequentially.

**Real-time commands**

Real-time commands are the commands that consist of a **DLE** extension (such as **DLE EOT** or **DLE ENQ**). The real-time commands execute processing when received. After executing, they are stored in the receive buffer and then discarded as undefined codes when the normal commands are processed.

**Receive buffer**

The receive buffer is used to store data from the host computer. All received data is stored in this buffer and processed in the order received. Buffer capacity depends on the printer model used.

**Print buffer**

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

**Print buffer-full**

This state occurs when the print buffer becomes full.

**Print buffer-full printing**

If new print data (such as characters or bit images) or horizontal tabs are processed in standard mode when the print buffer is full, the image data already stored in the print buffer is printed, and a line feed is executed. This is the same operation as **LF**. The data (print data or horizontal tab) that causes the print buffer-full is processed from the beginning of the next line.

If new print data (such as characters or bit images) or horizontal tabs are processed in page mode when the print buffer is full, the printer moves the print position to the beginning of the next line (the same operation as **LF**) and processes the data (print data or horizontal tabs) that causes the print buffer-full.

**Beginning of the line**

The beginning of the line meets all of the following conditions:

- No data exists in the print buffer.
- No spaces are skipped by **HT** in the print buffer.
- The print position has not been specified by **ESC $** or **ESC **.

In standard mode, the beginning of the line is the left margin.

**Printable area**

This is the maximum printable area specified for each printer model.
This can be changed by setting the paper width with **GS ( E** ***fn*** = 5 or DIP switch or setting of paper layout that is supported by the label printer model.

**Printing area**

This is the printing range set by a command. The printing area should be equal to or smaller than the printable area. In standard mode, the printing area is set by **GS L** and **GS W**, and in page mode, it is set by **ESC W**.

**Ignoring a command**

This is the printer state in which the printer does nothing after receiving all codes, including parameters.

**Horizontal/vertical direction**

Horizontal direction is the direction that is perpendicular to the paper feed direction. Vertical direction is the paper feed direction. In page mode, however, horizontal/vertical direction differs, depending on the print direction of a character, not the paper feed direction.

**Baseline**

The baseline for character sets that are 9 dots high (for example, 7 × 9 and 9 × 9) is the invisible line marking the bottom of the character matrix (the bottom of the lowest dot possible). For other character sets, the baseline is the bottom of all characters, excluding descenders, such as the bottom parts of “g” and “y”, which are below the baseline.

**Setting commands**

Setting commands change printer status by processing a command and affect printer operation and print results thereafter. The commands that can specify enhanced characters, set paper feed amount, and select a character are setting commands as are some of the normal commands.

**Executing commands**

Executing commands affect printer operation and change the printer status temporarily but do not affect the following printer operation. Functions of printing, paper cutting, and status transmission are executing commands and the real-time commands and some of the normal commands are executing commands.

**MSB**

Most Significant Bit

**LSB**

Least Significant Bit

**Obsolete commands**

These are commands that will not be supported by future printer models. The description of each of these commands gives a better command to use for the same function.

**“Reserved” bit**

“Reserved” bits are as follows:

- Bit that will be used for an extended function in the future.
- Bit that has a function in the ESC/POS specification; however, the printer does not support the function.

Use a bit with a value indicated in a table.

**“Fixed” bit**

Use a bit only with a value indicated in a table.

# TM-U950 SUPPORTED COMMANDS

| Command | Classification | Name | Function type |
|---|---|---|---|
| LF | EXECUTING COMMAND | Print and line feed | PRINT COMMANDS |
| FF | EXECUTING COMMAND | Print and eject cut sheet | PRINT COMMANDS |
| CR | EXECUTING COMMAND | Print and carriage return | PRINT COMMANDS |
| RS | EXECUTING COMMAND | Journal tab | PRINT POSITION COMMANDS |
| DLE EOT | EXECUTING COMMAND | Real-time status transmission | STATUS COMMANDS |
| DLE ENQ | EXECUTING COMMAND | Real-time request to printer | MISCELLANEOUS COMMANDS |
| ESC SP | SETTING COMMAND | Set right-side character spacing | CHARACTER COMMANDS |
| ESC ! | SETTING COMMAND | Select print mode(s) | CHARACTER COMMANDS |
| ESC $ | EXECUTING COMMAND | Set absolute print position | PRINT POSITION COMMANDS |
| ESC % | SETTING COMMAND | Select/cancel user-defined character set | CHARACTER COMMANDS |
| ESC & | SETTING COMMAND | Define user-defined characters | CHARACTER COMMANDS |
| ESC * | EXECUTING COMMAND | Select bit-image mode | BIT-IMAGE COMMANDS |
| ESC – | SETTING COMMAND | Turn underline mode on/off | CHARACTER COMMANDS |
| ESC 2 | SETTING COMMAND | Select default line spacing | LINE SPACING COMMANDS |
| ESC 3 | SETTING COMMAND | Set line spacing | LINE SPACING COMMANDS |
| ESC < | EXECUTING COMMAND | Return home | MECHANISM CONTROL COMMANDS |

| Command | Classification | Name | Function type |
|---|---|---|---|
| **ESC =** | SETTING COMMAND | Select peripheral device | MISCELLANEOUS COMMANDS |
| **ESC ?** | SETTING COMMAND | Cancel user-defined characters | CHARACTER COMMANDS |
| **ESC @** | EXECUTING + SETTING | Initialize printer | MISCELLANEOUS COMMANDS |
| **ESC C** | SETTING COMMAND | Set cut sheet eject length | LINE SPACING COMMANDS |
| **ESC E** | SETTING COMMAND | Turn emphasized mode on/off | CHARACTER COMMANDS |
| **ESC G** | SETTING COMMAND | Turn double-strike mode on/off | CHARACTER COMMANDS |
| **ESC J** | EXECUTING COMMAND | Print and feed paper | PRINT COMMANDS |
| **ESC K** | EXECUTING COMMAND | Print and reverse feed | PRINT COMMANDS |
| **ESC R** | SETTING COMMAND | Select an international character set | CHARACTER COMMANDS |
| **ESC U** | SETTING COMMAND | Turn unidirectional printing mode on/off | MECHANISM CONTROL COMMANDS |
| **ESC ** | EXECUTING COMMAND | Set relative print position | PRINT POSITION COMMANDS |
| **ESC a** | SETTING COMMAND | Select justification | PRINT POSITION COMMANDS |
| **ESC c 0** | EXECUTING + SETTING | Select paper type(s) for printing | PRINTING PAPER COMMANDS |
| **ESC c 1** | SETTING COMMAND | Select paper type(s) for command settings | PRINTING PAPER COMMANDS |
| **ESC c 3** | SETTING COMMAND | Select paper sensor(s) to output paper-end signals | PAPER SENSOR COMMANDS |
| **ESC c 4** | SETTING COMMAND | Select paper sensor(s) to stop printing | PAPER SENSOR COMMANDS |
| **ESC c 5** | SETTING COMMAND | Enable/disable panel buttons | PANEL BUTTON COMMAND |
| **ESC d** | EXECUTING COMMAND | Print and feed ***n*** lines | PRINT COMMANDS |

| Command | Classification | Name | Function type |
|---|---|---|---|
| ESC e | EXECUTING COMMAND | Print and reverse feed *n* lines | PRINT COMMANDS |
| ESC f | SETTING COMMAND | Set cut sheet wait time | PRINTING PAPER COMMANDS |
| ESC i | EXECUTING COMMAND | Partial cut (one point left uncut) | MECHANISM CONTROL COMMANDS |
| ESC m | EXECUTING COMMAND | Partial cut (three points left uncut) | MECHANISM CONTROL COMMANDS |
| ESC o | EXECUTING COMMAND | Stamp | MECHANISM CONTROL COMMANDS |
| ESC p | EXECUTING COMMAND | Generate pulse | MISCELLANEOUS COMMANDS |
| ESC t | SETTING COMMAND | Select character code table | CHARACTER COMMANDS |
| ESC u | EXECUTING COMMAND | Transmit peripheral device status | STATUS COMMANDS |
| ESC v | EXECUTING COMMAND | Transmit paper sensor status | STATUS COMMANDS |
| ESC z | EXECUTING COMMAND | Turn parallel printing mode on/off for receipt and journal | CHARACTER COMMANDS |
| ESC { | EXECUTING COMMAND | Turn upside-down printing mode on/off | CHARACTER COMMANDS |
| GS * | SETTING COMMAND | Define downloaded bit image | BIT-IMAGE COMMANDS |
| GS / | EXECUTING COMMAND | Print downloaded bit image | BIT-IMAGE COMMANDS |
| GS E | SETTING COMMAND | Select head control method | MISCELLANEOUS COMMANDS |
| GS I | EXECUTING COMMAND | Transmit printer ID | MISCELLANEOUS COMMANDS |
| GS P | SETTING COMMAND | Set horizontal and vertical motion units | MISCELLANEOUS COMMANDS |
| GS a | EXECUTING + SETTING | Enable/disable Automatic Status Back (ASB) | STATUS COMMANDS |
| GS r | EXECUTING COMMAND | Transmit status | STATUS COMMANDS |

The following commands are supported only by the printers with the optional Magnetic Ink Character Recognition (MICR) reader. (The MICR reader is a factory-installed option.)

| Command | Classification | Name | Function type |
|---|---|---|---|
| **DLE EOT BS** | EXECUTING COMMAND | Real-time MICR status transmission | STATUS COMMANDS |
| **FS a 0** | EXECUTING COMMAND | Read check paper | CONTROL OPTION COMMANDS |
| **FS a 1** | EXECUTING COMMAND | Load check paper to print starting position | CONTROL OPTION COMMANDS |
| **FS a 2** | EXECUTING COMMAND | Eject check paper | CONTROL OPTION COMMANDS |
| **FS b** | EXECUTING COMMAND | Request retransmission of check paper reading result | CONTROL OPTION COMMANDS |
| **FS c** | EXECUTING COMMAND | MICR mechanism cleaning | CONTROL OPTION COMMANDS |

# COMMANDS IN ALPHANUMERIC ORDER

In this table, click any name to see the command description with program examples and print samples.

The print samples are images of the printing results of the program examples; they do not represent actual printing.

| Command | Name | Function type |
|---|---|---|
| LF | Print and line feed | PRINT COMMANDS |
| FF | Print and eject cut sheet | PRINT COMMANDS |
| CR | Print and carriage return | PRINT COMMANDS |
| RS | Journal tab | PRINT POSITION COMMANDS |
| DLE EOT | Real-time status transmission | STATUS COMMANDS |
| DLE ENQ | Real-time request to printer | MISCELLANEOUS COMMANDS |
| ESC SP | Set right-side character spacing | CHARACTER COMMANDS |
| ESC ! | Select print mode(s) | CHARACTER COMMANDS |
| ESC $ | Set absolute print position | PRINT POSITION COMMANDS |
| ESC % | Select/cancel user-defined character set | CHARACTER COMMANDS |
| ESC & | Define user-defined characters | CHARACTER COMMANDS |
| ESC * | Select bit-image mode | BIT-IMAGE COMMANDS |
| ESC – | Turn underline mode on/off | CHARACTER COMMANDS |

| Command | Name | Function type |
|---|---|---|
| ESC 2 | Select default line spacing | LINE SPACING COMMANDS |
| ESC 3 | Set line spacing | LINE SPACING COMMANDS |
| ESC < | Return home | MECHANISM CONTROL COMMANDS |
| ESC = | Select peripheral device | MISCELLANEOUS COMMANDS |
| ESC ? | Cancel user-defined characters | CHARACTER COMMANDS |
| ESC @ | Initialize printer | MISCELLANEOUS COMMANDS |
| ESC C | Set cut sheet eject length | LINE SPACING COMMANDS |
| ESC E | Turn emphasized mode on/off | CHARACTER COMMANDS |
| ESC G | Turn double-strike mode on/off | CHARACTER COMMANDS |
| ESC J | Print and feed paper | PRINT COMMANDS |
| ESC K | Print and reverse feed | PRINT COMMANDS |
| ESC R | Select an international character set | CHARACTER COMMANDS |
| ESC U | Turn unidirectional printing mode on/off | MECHANISM CONTROL COMMANDS |
| ESC \ | Set relative print position | PRINT POSITION COMMANDS |
| ESC a | Select justification | PRINT POSITION COMMANDS |
| ESC c 0 | Select paper type(s) for printing | PRINTING PAPER COMMANDS |
| ESC c 1 | Select paper type(s) for command settings | PRINTING PAPER COMMANDS |

| Command | Name | Function type |
|---|---|---|
| **ESC c 3** | Select paper sensor(s) to output paper-end signals | PAPER SENSOR COMMANDS |
| **ESC c 4** | Select paper sensor(s) to stop printing | PAPER SENSOR COMMANDS |
| **ESC c 5** | Enable/disable panel buttons | PANEL BUTTON COMMAND |
| **ESC d** | Print and feed ***n*** lines | PRINT COMMANDS |
| **ESC e** | Print and reverse feed ***n*** lines | PRINT COMMANDS |
| **ESC f** | Set cut sheet wait time | PRINTING PAPER COMMANDS |
| **ESC i** | Partial cut (one point left uncut) | MECHANISM CONTROL COMMANDS |
| **ESC m** | Partial cut (three points left uncut) | MECHANISM CONTROL COMMANDS |
| **ESC o** | Stamp | MECHANISM CONTROL COMMANDS |
| **ESC p** | Generate pulse | MISCELLANEOUS COMMANDS |
| **ESC t** | Select character code table | CHARACTER COMMANDS |
| **ESC u** | Transmit peripheral device status | STATUS COMMANDS |
| **ESC v** | Transmit paper sensor status | STATUS COMMANDS |
| **ESC z** | Turn parallel printing mode on/off for receipt and journal | CHARACTER COMMANDS |
| **ESC {** | Turn upside-down printing mode on/off | CHARACTER COMMANDS |
| **GS *** | Define downloaded bit image | BIT-IMAGE COMMANDS |
| **GS /** | Print downloaded bit image | BIT-IMAGE COMMANDS |

| Command | Name | Function type |
|---|---|---|
| GS E | Select head control method | MISCELLANEOUS COMMANDS |
| GS I | Transmit printer ID | MISCELLANEOUS COMMANDS |
| GS P | Set horizontal and vertical motion units | MISCELLANEOUS COMMANDS |
| GS a | Enable/disable Automatic Status Back (ASB) | STATUS COMMANDS |
| GS r | Transmit status | STATUS COMMANDS |

The following commands are supported only by the printers with the optional Magnetic Ink Character Recognition (MICR) reader. (The MICR reader is a factory-installed option.)

| Command | Name | Function type |
|---|---|---|
| DLE EOT BS | Real-time MICR status transmission | STATUS COMMANDS |
| FS a 0 | Read check paper | CONTROL OPTION COMMANDS |
| FS a 1 | Load check paper to print starting position | CONTROL OPTION COMMANDS |
| FS a 2 | Eject check paper | CONTROL OPTION COMMANDS |
| FS b | Request retransmission of check paper reading result | CONTROL OPTION COMMANDS |
| FS c | MICR mechanism cleaning | CONTROL OPTION COMMANDS |

# COMMANDS ARRANGED BY FUNCTION

The print samples are images of the printing results of the program examples; they do not represent actual printing.

In this table, click any item to see the command description with program examples and print samples. You can also use the bookmarks on the left side of the screen.


**Print commands**

**Line spacing commands**

**Character commands**

**Printing paper commands**

**Panel button command**

**Paper sensor commands**

**Print position commands**

**Bit-image commands**

**Status commands**

**Mechanism control commands**

**Control option commands**

**Miscellaneous commands**

# PRINT COMMANDS

| Command | Name |
|---|---|
| **LF** | Print and line feed |
| **FF** | Print and eject cut sheet |
| **CR** | Print and carriage return |
| **ESC J** | Print and feed paper |
| **ESC K** | Print and reverse feed |
| **ESC d** | Print and feed ***n*** lines |
| **ESC e** | Print and reverse feed ***n*** lines |

# LF



[Name] Print and line feed

[Format]

| | |
|---|---|
| ASCII | LF |
| Hex | 0A |
| Decimal | 10 |

[Range] None

[Default] None

[Printers not featuring this command] None

[Description] Prints the data in the print buffer and feeds one line.

[Notes]

- The amount of paper fed per line is based on the value set using the line spacing command (**ESC 2** or **ESC 3**).
- After printing, the printing position moves the beginning of the line. When a left margin is set, the position of the left margin is the beginning of the line.

[Model-dependent variations] None

**Program Example for all printers**

```
PRINT #1, "AAAAA"; CHR$(&HA);
PRINT #1, "BBBBB"; CHR$(&HA);
```

**Print Sample**

```
AAAAA
BBBBB
```

# FF



[Name] Print and eject cut sheet

[Format]

| | |
|---|---|
| ASCII | FF |
| Hex | 0C |
| Decimal | 12 |

[Range] None

[Default] None

[Printers not featuring this command] None

[Description] Prints the data in the print buffer and ejects the cut sheet (slip paper).

[Notes]

- This command is enabled only when the cut sheet is selected as the paper type by **ESC c 0**.
- The amount of paper fed is based on the value set using **ESC C**.
- After the cut sheet is ejected, the printer selects the receipt and journal paper as the paper type and the printing position moves to the beginning of the line. When a left margin is set, the position of the left margin is the beginning of the line.

[Model-dependent variations] None

**Program Example for all printers**

```
PRINT #1, CHR$(&H1B);"c0";CHR$(4); ← Select paper type
PRINT #1, "AAAAA"; CHR$(&HA);
PRINT #1, "BBBBB"; CHR$(&HC);
```

**Print Sample**

```
AAAAA
BBBBB

Slip paper ejected
```

# CR



[Name] Print and carriage return

[Format]

| | |
|---|---|
| ASCII | CR |
| Hex | 0D |
| Decimal | 13 |

[Range] None

[Default] None

[Printers not featuring this command] None

[Description] When auto line feed is enabled, **CR** prints the data in the print buffer and feeds one line.
When auto line feed is disabled, **CR** prints the data in the print buffer and does not feed the paper.

[Notes]

- Whether enabling or disabling the auto line feed can be selected by the DIP switch (Auto line feed).
- After printing, the printing position moves to the beginning of the line. When a left margin is set, the position of the left margin is the beginning of the line.

[Model-dependent variations] **TM-U950**

**Program Example**

```
PRINT #1, "AAAAA";CHR$(&HD);
PRINT #1, "     BBBBB";CHR$(&HA);
```

**Print Sample**

```
AAAAA
     BBBBB   ←Auto line feed enabled
AAAAABBBBB   ←Auto line feed disabled
```

**TM-U950**

**Auto line feed is selected by DIP switch 2-1.**

# ESC J



[Name] Print and feed paper

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | J | ***n*** |
| Hex | 1B | 4A | ***n*** |
| Decimal | 27 | 74 | ***n*** |

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

[Default] None

[Printers not featuring this command] None

[Description] Prints the data in the print buffer and feeds the paper ***n*** × (vertical motion unit).

[Notes]

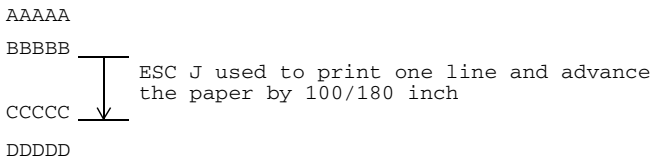
- The maximum paper feed amount is 40 inches. If the specified amount exceeds 40 inches, the paper feed amount is automatically set to 40 inches.
- After printing, the printing position moves to the beginning of the line. When a left margin is set, the position of the left margin is the beginning of the line.
- This command is used to temporarily feed a specific length without changing the line spacing set by other commands.

[Model-dependent variations] **TM-U950**

**Program Example for all printers**

```
PRINT #1, CHR$(&H1D);"P";CHR$(180);CHR$(180);
PRINT #1, "AAAAA"; CHR$(&HA);
PRINT #1, "BBBBB"; CHR$(&H1B);"J";CHR$(100);
PRINT #1, "CCCCC"; CHR$(&HA);
PRINT #1, "DDDDD"; CHR$(&HA);
```

**Print Sample**




**TM-U950**

**The vertical motion unit is specified by GS P.**

# ESC K



[Name] Print and reverse feed

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | K | ***n*** |
| Hex | 1B | 4B | ***n*** |
| Decimal | 27 | 75 | ***n*** |

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

[Default] None

[Printers not featuring this command] None

[Description] Prints the data in the print buffer and feeds the paper ***n*** × (vertical motion unit) in the reverse direction.

[Notes]

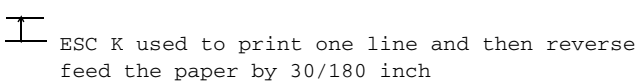
- The maximum paper feed amount depends on the printer model.
- After printing, the printing position moves to the beginning of the line. When a left margin is set, the position of the left margin is the beginning of the line.
- This command is used to temporarily feed a specific length without changing the line spacing set by other commands.

[Model-dependent variations] **TM-U950**

**Program Example for all printers**

```
PRINT #1, CHR$(&H1D);"P";CHR$(180);CHR$(180);
PRINT #1, "AAAAA"; CHR$(&HA);
PRINT #1, "BBBBB"; CHR$(&H1B);"K";CHR$(30);
PRINT #1, "     CCCCC"; CHR$(&HA);
```

**Print Sample**




**TM-U950**

**This command must not be executed continuously more than two times. The vertical motion unit is specified by GS P. In the reverse direction, the maximum paper feed amount is 1/6 inch. If the specified amount exceeds 1/6 inch, the printer prints the data and does not feed the paper.**

# ESC d



[Name] Print and feed ***n*** lines

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | d | ***n*** |
| Hex | 1B | 64 | ***n*** |
| Decimal | 27 | 100 | ***n*** |

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

[Default] None

[Printers not featuring this command] None

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

[Notes]

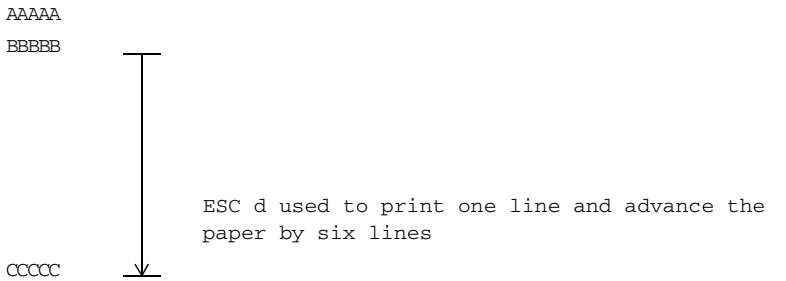
- The amount of paper fed per line is based on the value set using the line spacing command (**ESC 2** or **ESC 3**).
- The maximum paper feed amount is 40 inches. If the specified amount exceeds 40 inches, the paper feed amount is automatically set to 40 inches.
- After printing, the printing position moves to the beginning of the line. When a left margin is set, the position of the left margin is the beginning of the line.
- This command is used to temporarily feed a specific line without changing the line spacing set by other commands.

[Model-dependent variations] None

**Program Example for all printers**

```
PRINT #1, "AAAAA"; CHR$(&HA);
PRINT #1, "BBBBB"; CHR$(&H1B);"d";CHR$(6);
PRINT #1, "CCCCC"; CHR$(&HA);
```

**Print Sample**



# ESC e



[Name] Print and reverse feed ***n*** lines

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | e | ***n*** |
| Hex | 1B | 65 | ***n*** |
| Decimal | 27 | 101 | ***n*** |

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

[Default] None

[Printers not featuring this command] None

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

[Notes]

- The amount of paper fed per line is based on the value set using the line spacing command (**ESC 2** or **ESC 3**).
- The maximum paper feed amount depends on the printer model.
- After printing, the printing position moves to the beginning of the line. When a left margin is set, the position of the left margin is the beginning of the line.
- This command is used to temporarily feed a specific line without changing the line spacing set by other commands.

[Model-dependent variations] **TM-U950**

**Program Example for all printers**

```
PRINT #1, "AAAAA"; CHR$(&HA);
PRINT #1, "BBBBB"; CHR$(&H1B);"e";CHR$(1);
PRINT #1, "     CCCCC"; CHR$(&HA);
```

**Print Sample**

```
AAAAACCCCC
BBBBB
```

Paper reverse fed one line after printing the line of Bs

**TM-U950**

**This command must not be executed continuously more than two times. In the reverse direction, the maximum paper feed amount is 1/6 inch. If the specified amount exceeds 1/6 inch, the printer prints the data and does not feed the paper.**

# LINE SPACING COMMANDS

| Command | Name |
|---|---|
| ESC 2 | Select default line spacing |
| ESC 3 | Set line spacing |
| ESC C | Set cut sheet eject length |

# ESC 2



[Name] Select default line spacing

[Format]

| | | |
|---|---|---|
| ASCII | ESC | 2 |
| Hex | 1B | 32 |
| Decimal | 27 | 50 |

[Range] None

[Default] None

[Printers not featuring this command] None

[Description] Sets the line spacing to 1/6 inch.

[Notes]

- This command is available for the paper type selected by **ESC c 1**. The line spacing can be set independently for receipt, journal, and slip paper.

[Model-dependent variations] **TM-U950**

**See program example and print sample for ESC 2 and ESC 3.**

**TM-U950**

**The default line spacing is 12 dots.**

# ESC 3



[Name] Set line spacing

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | 3 | ***n*** |
| Hex | 1B | 33 | ***n*** |
| Decimal | 27 | 51 | ***n*** |

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

[Default] 1/6 inch or equivalent
**TM-U950: *n* = 24**

[Printers not featuring this command] None

[Description] Sets the line spacing to ***n*** × (vertical motion unit).

[Notes]
- This command is available for the paper type selected by **ESC c 1**. The line spacing can be set independently for receipt, journal, and slip paper.

[Model-dependent variations] **TM-U950**

## Program example for ESC 2 and ESC 3

**Program Example**

```
PRINT #1, CHR$(&H1B);"c0";CHR$(1); ←Select paper type
PRINT #1, CHR$(&H1B);"c1";CHR$(1); ←Select paper type for commands
PRINT #1, CHR$(&H1D);"P";CHR$(180);CHR$(180);
FOR n=25 TO 50 STEP 5
  PRINT #1, CHR$(&H1B);"3";CHR$(n); ← Set line spacing
  PRINT #1, "AAAAA"; CHR$(&HA);
NEXT n
PRINT #1, CHR$(&H1B);"2"; ← Set the default
PRINT #1, "BBBBB"; CHR$(&HA);
PRINT #1, "CCCCC"; CHR$(&HA);
```

**Print Sample**

```
AAAAA
AAAAA  25/180-inch line spacing
AAAAA  30/180-inch line spacing
AAAAA  35/180-inch line spacing
AAAAA  40/180-inch line spacing
AAAAA  45/180-inch line spacing
       50/180-inch line spacing
BBBBB
CCCCC  1/6-inch line spacing
```

**TM-U950**

**The vertical motion unit is specified by GS P.**

# ESC C



[Name] Set cut sheet eject length

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | C | ***n*** |
| Hex | 1B | 43 | ***n*** |
| Decimal | 27 | 67 | ***n*** |

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

[Default] ***n*** = 0

[Printers not featuring this command] None

[Description] Sets the eject length for the cut sheet (slip paper) to ***n*** lines.

- When ***n*** = 0, the eject length setting is canceled.

[Notes]

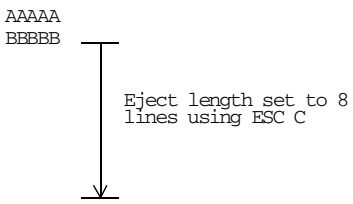
- When ***n*** = 0, eject operation differs depending on the printer model.
- The eject length set by this command is effective only when cut sheet is selected as the paper type and affects ejection.
- The maximum eject length is 40 inches. If the specified amount exceeds 40 inches, the eject length amount is automatically set to 40 inches.
- The amount of paper fed per line is based on the value set using the line spacing commands (**ESC 2** or **ESC 3**).

[Model-dependent variations] **TM-U950**

**Program Example for all printers**

```
PRINT #1, CHR$(&H1B);"c0";CHR$(4); ←Select paper type
PRINT #1, CHR$(&H1B);"c1";CHR$(4); ←Select paper type for commands
PRINT #1, CHR$(&H1B);"C";CHR$(8); ←Set eject length
PRINT #1, "AAAAA"; CHR$(&HA);
PRINT #1, "BBBBB"; CHR$(&HC);
```

**Print Sample**




**TM-U950**

**When *n* = 0, the printer continues paper feed until the cut sheet is ejected completely.**

# CHARACTER COMMANDS

| Command | Name |
|---|---|
| ESC SP | Set right-side character spacing |
| ESC ! | Select print mode(s) |
| ESC % | Select/cancel user-defined character set |
| ESC & | Define user-defined characters |
| ESC – | Turn underline mode on/off |
| ESC ? | Cancel user-defined characters |
| ESC E | Turn emphasized mode on/off |
| ESC G | Turn double-strike mode on/off |
| ESC R | Select an international character set |
| ESC t | Select character code table |
| ESC z | Turn parallel printing mode on/off for receipt and journal |
| ESC { | Turn upside-down printing mode on/off |

# ESC SP



[Name] Set right-side character spacing

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | SP | ***n*** |
| Hex | 1B | 20 | ***n*** |
| Decimal | 27 | 32 | ***n*** |

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

[Default] ***n*** = 0

[Printers not featuring this command] None

[Description] Sets the right-side character spacing to ***n*** × (horizontal motion unit).

[Notes]

- The right-side character spacing set by this command is effective for all characters.
- The right-side character spacing for double-width mode is twice the normal value.
- It is used to change the spacing between characters.

[Model-dependent variations] **TM-U950**

**Program Example for all printers**

```
PRINT #1, CHR$(&H1D);"P";CHR$(180);CHR$(180);
PRINT #1, CHR$(&H1B);" ";CHR$(0); ← Character spacing set to 0
PRINT #1, "AAAAA"; CHR$(&HA);
PRINT #1, CHR$(&H1B);" ";CHR$(6); ← Character spacing set to 6
PRINT #1, "BBBBB"; CHR$(&HA);
PRINT #1, CHR$(&H1B);" ";CHR$(12); ← Character spacing set to 12
PRINT #1, "CCCCC"; CHR$(&HA);
```

**Print Sample**

```
AAAAA ← 0-inch character spacing
BBBBB ← 6/180-inch character spacing
CCCCC ← 12/180-inch character spacing
```

**TM-U950**

**The horizontal motion unit is specified by GS P.**

# ESC !



[Name] Select print mode(s)

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | ! | ***n*** |
| Hex | 1B | 21 | ***n*** |
| Decimal | 27 | 33 | ***n*** |

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

[Default] **TM-U950: *n* = 0 or 1**

[Printers not featuring this command] None

[Description] Selects or cancels print modes collectively using ***n*** as follows:

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Character font A selected. |
| | On | 01 | 1 | Character font B selected. |
| 1, 2 | — | — | — | Undefined. |
| 3 | Off | 00 | 0 | Emphasized mode not selected. |
| | On | 08 | 8 | Emphasized mode selected. |
| 4 | Off | 00 | 0 | Double-height mode not selected. |
| | On | 10 | 16 | Double-height mode selected. |
| 5 | Off | 00 | 0 | Double-width mode not selected. |
| | On | 20 | 32 | Double-width mode selected. |
| 6 | – | – | – | Undefined. |
| 7 | Off | 00 | 0 | Underline mode not selected. |
| | On | 80 | 128 | Underline mode selected. |

***... how to use this table***

[Notes]

■ Functions for each bit can also be executed by the following commands:

Bit 3 (Emphasized mode): **ESC E**

Bit 7 (underline mode): **ESC –**

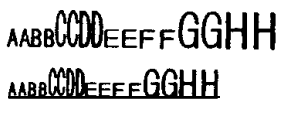
- Configurations of Font A and Font B are different, depending on the printer model.
- The print modes set by this command are effective for all characters.
- When some characters in a line are double-height, all characters on the line are aligned at the baseline.
- When double-width mode is turned on, the characters are enlarged to the right, based on the left side of the character.
- When both double-height and double-width modes are turned on, quadruple size characters are printed.
- The character is enlarged in the paper feed direction when double-height mode is selected, and it is enlarged perpendicular to the paper feed direction when double-width mode is selected.
- The underline thickness is that specified by **ESC –**, regardless of the character size.
- The printer cannot underline the space set by **RS**, **ESC $**, and **ESC **.

[Model-dependent variations] **TM-U950**

**Program Example for all printers**

```
PRINT #1, CHR$(&H1B);"!";CHR$(0); "AA";
PRINT #1, CHR$(&H1B);"!";CHR$(8); "BB";
PRINT #1, CHR$(&H1B);"!";CHR$(16); "CC";
PRINT #1, CHR$(&H1B);"!";CHR$(24); "DD";
PRINT #1, CHR$(&H1B);"!";CHR$(32); "EE";
PRINT #1, CHR$(&H1B);"!";CHR$(40); "FF";
PRINT #1, CHR$(&H1B);"!";CHR$(48); "GG";
PRINT #1, CHR$(&H1B);"!";CHR$(56); "HH"; CHR$(&HA);
PRINT #1, CHR$(&H1B);"!";CHR$(129); "AA";
PRINT #1, CHR$(&H1B);"!";CHR$(137); "BB";
PRINT #1, CHR$(&H1B);"!";CHR$(145); "CC";
PRINT #1, CHR$(&H1B);"!";CHR$(153); "DD";
PRINT #1, CHR$(&H1B);"!";CHR$(161); "EE";
PRINT #1, CHR$(&H1B);"!";CHR$(169); "FF";
PRINT #1, CHR$(&H1B);"!";CHR$(177); "GG";
PRINT #1, CHR$(&H1B);"!";CHR$(185); "HH"; CHR$(&HA);
```

**Print Sample**




```
AA: Normal
BB: Emphasized
CC: Double-height
DD: Emphasized + Double-height
EE: Double-width
FF: Emphasized + Double-width
GG: Double-height + Double-width
HH: Emphasized + Double-height + Double-width
```

**TM-U950**

**Character configurations**

**Bit 0:** **Font A: 9× 9**
**Font B: 7 × 9**

**The default value is set by DIP switch 2-3.**

**When DIP switch 2-3 is Off : *n* = 1**

**When DIP switch 2-3 is On : *n* = 0**

# ESC %



[Name] Select/cancel user-defined character set

[Format]

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

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

[Default] ***n*** = 0

[Printers not featuring this command] None

[Description] Selects or cancels the user-defined character set.

- When the LSB of ***n*** is 0, the user-defined character set is canceled.
- When the LSB of ***n*** is 1, the user-defined character set is selected.

[Notes] ■ When the user-defined character set is canceled, the resident character set is automatically selected.

[Model-dependent variations] None

**See program example and print sample for ESC %, ESC & and ESC ?.**

# ESC &

SETTING COMMAND

[Name] Define user-defined characters

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | & | ***y c1 c2 [x1 d1 ... d(y × x1)] ... [xk d1 ... d(y × xk)]*** |
| Hex | 1B | 26 | ***y c1 c2 [x1 d1 ... d(y × x1)] ... [xk d1 ... d(y × xk)]*** |
| Decimal | 27 | 38 | ***y c1 c2 [x1 d1 ... d(y × x1)] ... [xk d1 ... d(y × xk)]*** |

[Range] **TM-U950:**

$y = 2$
$32 \leq c1 \leq c2 \leq 126$
$0 \leq x \leq 12$ (Font A ($9 \times 9$))
$0 \leq x \leq 9$ (Font B ($7 \times 9$))
$0 \leq d \leq 255$
$k = c2 - c1 + 1$

[Default] None

[Printers not featuring this command] None

[Description] Defines user-defined characters from character code check ***c1*** to ***c2***.

- ***y*** specifies the number of bytes in the vertical direction.
- ***x*** specifies the number of dots in the horizontal direction.
- ***d*** is the dot data for the user-defined characters.

[Notes]

- Character codes from the alphanumeric characters (20H (decimal 32) to 7EH (decimal 126)) can be defined.
- Data (***d***) specifies a bit printed to 1 and not printed to 0. The dot pattern is in the horizontal direction from the left side. Any remaining dots on the right side are blank.
- The data to define a user-defined character is ($y \times x$) bytes.
- When the value of ***y***, ***c1***, ***c2***, or ***x*** is out of the range, this command is canceled, and the following data is processed as normal data.
- This command can define user-defined characters for each font independently. To select a font, use **ESC !**.
- A user-defined character and downloaded bit image cannot be defined simultaneously. When this command is executed, the downloaded bit image is cleared.

- Once the user-defined characters have been defined, they are available until **ESC ?**, **GS** *, or **ESC @**, is executed; the user-defined characters are redefined; the power is turned off; or the printer is reset.
- The user-defined characters are not defined at the default and the resident characters are printed.

[Model-dependent variations] **TM-U950**

**See program example and print sample for ESC %, ESC & and ESC ?.**

**TM-U950**

**The dots adjoining each other horizontally cannot be printed. Only the MSB can be printed in the second byte for vertical direction.**

**The maximum number of user-defined characters differs depending on the receive buffer capacity as described below. When the maximum number of user-defined characters is defined, it is possible to redefine user-defined characters for the defined ASCII code, but not for the new ASCII code.**

| Receive buffer capacity | Maximum number of user-defined characters |
|---|---|
| 2k bytes | 23 |
| 32 bytes | 71 |

# ESC –



[Name] Turn underline mode on/off

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | – | ***n*** |
| Hex | 1B | 2D | ***n*** |
| Decimal | 27 | 45 | ***n*** |

[Range] **TM-U950: *n* = 0, 1, 48, 49**

[Default] ***n*** = 0

[Printers not featuring this command] None

[Description] Turns underline mode on or off using ***n*** as follows:

| ***n*** | **Function** |
|---|---|
| 0, 48 | Turned off underline mode |
| 1, 49 | Turned on underline mode (1-dot thick) |
| 2, 50 | Turned on underline mode (2-dots thick) |

[Notes]

- The underline mode is effective for all characters.
- The printer cannot underline the space set by **RS**, **ESC $**, and **ESC **.
- Changing the character size does not affect the current underline thickness.
- When underline mode is turned off, the following data cannot be underlined, but the thickness is maintained.
- This command and bit 7 of **ESC !** turn on and off underline mode in the same way.
- Some of the printer models support the 2-dot thick underline (***n*** = 2 or 5).

[Model-dependent variations] None

**Program Example for all printers**

```
PRINT #1, CHR$(&H1B);"-";CHR$(1); ← Select
PRINT #1, "AAAAA"; CHR$(&HA);
PRINT #1, CHR$(&H1B);"-";CHR$(0); ← Cancel
PRINT #1, "BBBBB"; CHR$(&HA);
```

**Print Sample**

```
AAAAA  ← Underline (1-dot thick) turned on
BBBBB  ←  Underline turned off
```

# ESC ?



[Name] Cancel user-defined characters

[Format]

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

[Range] $32 \leq n \leq 126$

[Default] None

[Printers not featuring this command] None

[Description] Cancels the user-defined characters defined for the character code ***n***.

[Notes]

- After the user-defined characters are canceled, the resident character set is printed.
- This command can cancel user-defined characters for each font independently. To select a font, use **ESC !**.

[Model-dependent variations] None

# Program example for ESC %, ESC &, and ESC ?

## Program Example

```
PRINT #1, CHR$(&H1B);"&";CHR$(2);"AC";
 PRINT #1, CHR$(9);
  FOR i=1 TO 2*9
   READ d: PRINT #1, CHR$(d);
  NEXT i
 PRINT #1, CHR$(9);
  FOR i=1 TO 2*9
   READ d: PRINT #1, CHR$(d);
  NEXT i
 PRINT #1, CHR$(10);
  FOR i=1 TO 2*10
   READ d: PRINT #1, CHR$(d);
  NEXT i
PRINT #1, CHR$(&H1B);"%";CHR$(0); ← Select resident character
PRINT #1, "A B C D E"; CHR$(&HA);
PRINT #1, CHR$(&H1B);"%";CHR$(1); ← Select user-defined character
PRINT #1, "A B C D E"; CHR$(&HA):
PRINT #1, CHR$(&H1B);"?";"A"; ←Cancel the user-defined character
PRINT #1, "A B C D E"; CHR$(&HA);
```

## Program Example (continued)

```
DATA &H18,&H00,&H00,&H00,&H3C,&H00,&H00,&H00
DATA &H7E,&H00,&H00,&H00,&H3C,&H00,&H00,&H00
DATA &H18,&H00
DATA &H18,&H00,&H00,&H00,&H24,&H00,&H00,&H00
DATA &H42,&H00,&H00,&H00,&H24,&H00,&H00,&H00
DATA &H18,&H00
DATA &H00,&H00,&H10,&H00,&H20,&H00,&H5F,&H00
DATA &H00,&H00,&H81,&H00,&H00,&H00,&H5F,&H00
DATA &H20,&H00,&H10,&H00
```

## Print Sample

```
A B C D E  ← Characters from resident character set
♦◊⇧ D E  ←Characters from user-defined character set
A◊⇧D E  ← Characters from user-defined character set (cancel one character)
```

# ESC E



[Name] Turn emphasized mode on/off

[Format]

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

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

[Default] ***n*** = 0

[Printers not featuring this command] None

[Description] Turns emphasized mode on or off.

- When the LSB of ***n*** is 0, emphasized mode is turned off.
- When the LSB of ***n*** is 1, emphasized mode is turned on.

[Notes]

- The emphasized mode is effective for all characters.
- This command and bit 3 of **ESC !** turn on and off emphasized mode in the same way.

[Model-dependent variations] None

**Program Example for all printers**

```
PRINT #1, CHR$(&H1B);"E";CHR$(1); ← Select
PRINT #1, "AAAAA"; CHR$(&HA);
PRINT #1, CHR$(&H1B);"E";CHR$(0); ← Cancel
PRINT #1, "BBBBB"; CHR$(&HA);
```

**Print Sample**

```
AAAAA ← Emphasized
BBBBB ← Normal
```

# ESC G



[Name] Turn double-strike mode on/off

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | G | ***n*** |
| Hex | 1B | 47 | ***n*** |
| Decimal | 27 | 71 | ***n*** |

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

[Default] ***n*** = 0

[Printers not featuring this command] None

[Description] Turns double-strike mode on or off.

- When the LSB of ***n*** is 0, double-strike mode is turned off.
- When the LSB of ***n*** is 1, double-strike mode is turned on.

[Note] ■ The double-strike mode is effective for all characters.

[Model-dependent variations] None

**Program Example for all printers**

```
PRINT #1, CHR$(&H1B);"G";CHR$(1); ← Select
PRINT #1, "AAAAA"; CHR$(&HA);
PRINT #1, CHR$(&H1B);"G";CHR$(0); ← Cancel
PRINT #1, "BBBBB"; CHR$(&HA);
```

**Print Sample**

```
AAAAA ← Double-strike
BBBBB ← Normal
```

# ESC R

SETTING COMMAND

[Name] Select an international character set

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | R | ***n*** |
| Hex | 1B | 52 | ***n*** |
| Decimal | 27 | 82 | ***n*** |

[Range] $0 \leq n \leq 10$

[Default] ***n*** = 0

[Printers not featuring this command] None

[Description] Selects an international character set ***n*** as follows:

| ***n*** | Country | ASCII code | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Hex | 23 | 24 | 40 | 5B | 5C | 5D | 5E | 60 | 7B | 7C | 7D | 7E |
| | | Dec | 35 | 36 | 64 | 91 | 92 | 93 | 94 | 96 | 123 | 124 | 125 | 126 |
| 0 | U.S.A. | | # | $ | @ | [ | \ | ] | ^ | ` | { | ¦ | } | ~ |
| 1 | France | | # | $ | à | ° | ç | § | ^ | ` | é | ù | è | ¨ |
| 2 | Germany | | # | $ | § | Ä | Ö | Ü | ^ | ` | ä | ö | ü | ß |
| 3 | U.K. | | £ | $ | @ | [ | \ | ] | ^ | ` | { | ¦ | } | ~ |
| 4 | Denmark I | | # | $ | @ | Æ | Ø | Å | ^ | ` | æ | ø | å | ~ |
| 5 | Sweden | | # | ¤ | É | Ä | Ö | Å | Ü | é | ä | ö | å | ü |
| 6 | Italy | | # | $ | @ | ° | \ | é | ^ | ù | à | ò | è | ì |
| 7 | Spain | | Pt | $ | @ | ¡ | Ñ | ¿ | ^ | ` | ¨ | ñ | } | ~ |
| 8 | Japan | | # | $ | @ | [ | ¥ | ] | ^ | ` | { | ¦ | } | ~ |
| 9 | Norway | | # | ¤ | É | Æ | Ø | Å | Ü | é | æ | ø | å | ü |
| 10 | Denmark II | | # | $ | É | Æ | Ø | Å | Ü | é | æ | ø | å | ü |

[Model-dependent variations] None

**Program Example for all printers**

```
FOR n=0 TO 10
  PRINT #1, CHR$(&H1B);"R";CHR$(n);
  PRINT #1, "# $ @ [ \ ] ^ ` { ¦ } ~"; CHR$(&HA);
NEXT n
```

**Print Sample**

```
#  $ @ [ \ ] ^ ` { ¦ } ~ ← n=0 (Default setting)
#  $ à ° ç § ^ ` é ù è ¨ ← n=1
#  $ § Ä Ö Ü ^ ` ä ö ü ß ← n=2
£  $ @ [ \ ] ^ ` { ¦ } ~ ← n=3
#  $ @ Æ Ø Å ^ ` æ ø å ~ ← n=4
#  ¤ É Ä Ö Å Ü é ä ö å ü ← n=5
#  $ @ ° \ é ^ ù à ò è ì ← n=6
Pt $ @ ¡ Ñ ¿ ^ ` ¨ ñ } ~ ← n=7
#  $ @ [ ¥ ] ^ ` { ¦ } ~ ← n=8
#  ¤ É Æ Ø Å Ü é æ ø å ü ← n=9
#  $ É Æ Ø Å Ü é æ ø å ü ← n=10
```

# ESC t



[Name] Select character code table

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | t | ***n*** |
| Hex | 1B | 74 | ***n*** |
| Decimal | 27 | 116 | ***n*** |

[Range] **TM-U950: 0 ≤ *n* ≤ 5, *n* = 254, 255**

[Default] ***n*** = 0

[Printers not featuring this command] None

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

| ***n*** | **Character Code Table** |
|---|---|
| 0 | Page 0 [PC437 (U.S.A. , Standard Europe)] |
| 1 | Page 1 [Katakana] |
| 2 | Page 2 [PC850 (Multilingual)] |
| 3 | Page 3 [PC860 (Portuguese)] |
| 4 | Page 4 [PC863 (Canadian-French)] |
| 5 | Page 5 [PC865 (Nordic)] |
| 254 | Page 254 [Space] |
| 255 | Page 255 [Space] |

[Note]

- The alphanumeric characters (20H (decimal 32) to 7FH (decimal 127)) are the same for each page. The extended characters (80H (decimal 128) to FFH (decimal 255)) are different for each page.

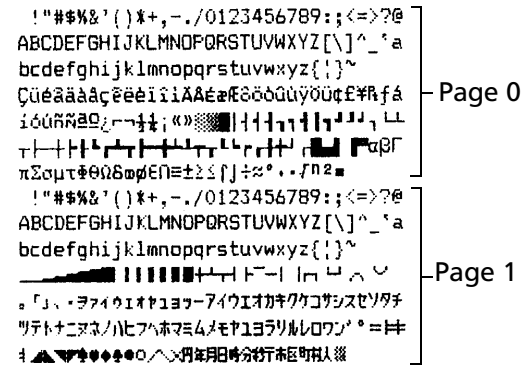
[Model-dependent variations] None

## Program Example for all printers

```
PRINT #1, CHR$(&H1B);"t";CHR$(0); ← Select page 0
GOSUB printing
PRINT #1, CHR$(&H1B);"t";CHR$(1); ← Select page 1
GOSUB printing
END

printing:
  FOR i=&H20 TO &H7F
    PRINT #1, CHR$(i);
  NEXT i
  PRINT #1, CHR$(&HA);
  FOR i=&H80 TO &HFF
    PRINT #1, CHR$(i);
  NEXT i
  PRINT #1, CHR$(&HA);
  RETURN
```

## Print Sample



# ESC z



[Name] Turn parallel printing mode on/off for receipt and journal

[Format]

| | | | |
|---|---|---|---|
| ASC II | ESC | z | ***n*** |
| Hex | 1B | 7A | ***n*** |
| Decimal | 27 | 122 | ***n*** |

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

[Default] ***n*** = 0

[Printers not featuring this command] None

[Description] Turn parallel printing mode on or off. When parallel printing mode is turned on, the printer prints the same data on both receipt and journal paper
When ***n*** = <********0>B, turns off parallel printing mode.
When ***n*** = <********1>B, turns on parallel printing mode.

[Notes]
- This command is enabled only when input at the beginning of a line.
- Parallel printing mode affects all printing when both receipt and journal are selected as the paper types.

**Program Example**

```
PRINT #1, CHR$(&H1B);"c0";CHR$(3); ←Select paper types (receipt and journal)
PRINT #1, "AAAAAAAAAAAAAAAAAAAA";
PRINT #1, "BBBBBBBBBBBBBBBBBBBB";CHR$(&HA);
PRINT #1, CHR$(&H1B);"z";CHR$(1);  ←Turn on parallel printing mode
PRINT #1, "CCCCCCCCCCCCCCCCCCCC";
PRINT #1, "DDDDDDDDDDDDDDDDDDDD";CHR$(&HA);
```

**Print Sample <Receipt>**

```
AAAAAAAAAAAAAAAAAAAABBBBBBBBBB
CCCCCCCCCCCCCCCCCCCCDDDDDDDDDD
DDDDDDDDDD
```

**Print Sample <Journal>**

```
BBBBBBBBBB
CCCCCCCCCCCCCCCCCCCCDDDDDDDDDD
DDDDDDDDDD
```

# ESC {



[Name] Turn upside-down printing mode on/off

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | { | ***n*** |
| Hex | 1B | 7B | ***n*** |
| Decimal | 27 | 123 | ***n*** |

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

[Default] ***n*** = 0

[Printers not featuring this command] None

[Description] In standard mode, turns upside-down printing mode on or off.

- When the LSB of ***n*** is 0, upside-down printing mode is turned off.
- When the LSB of ***n*** is 1, upside-down printing mode is turned on.

[Notes]

- This command is enabled only when processed at the beginning of the line.
- The upside-down printing mode is effective for all data.
- When upside-down printing mode is turned on, the printer prints 180°-rotated characters from right to left. The line printing order is not reversed; therefore, be careful of the order of the data transmitted.

[Model-dependent variations] None

**Program Example for all printers**

```
PRINT #1, CHR$(&H1B);"{";CHR$(0); ← Cancel
  PRINT #1, "ABCDE"; CHR$(&HA);
  PRINT #1, "BCDEF"; CHR$(&HA);
PRINT #1, CHR$(&H1B);"{";CHR$(1); ← Select
  PRINT #1, "ABCDE"; CHR$(&HA);
  PRINT #1, "BCDEF"; CHR$(&HA);
```

**Print Sample**

```
Normal printing

ABCDE
BCDEF

                                    ABCDE
                                    BCDEF

                                  Upside-down
                                  printing
```

# PRINTING PAPER COMMANDS

| Command | Name |
|---|---|
| ESC c 0 | Select paper type(s) for printing |
| ESC c 1 | Select paper type(s) for command settings |
| ESC f | Set cut sheet wait time |

# ESC c 0



[Name] Select paper type(s) for printing

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | ESC | c | 0 | ***n*** |
| Hex | 1B | 63 | 30 | ***n*** |
| Decimal | 27 | 99 | 48 | ***n*** |

[Range] **TM-U950: $1 \leq n \leq 4$**

[Default] **TM-U950: $n = 3$**

[Printers not featuring this command] None

[Description] Selects paper type(s) for printing, using ***n*** as follows:

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Journal paper disabled. |
| | On | 01 | 1 | Journal paper enabled. |
| 1 | Off | 00 | 0 | Receipt paper disabled. |
| | On | 02 | 2 | Receipt paper enabled. |
| 2 | Off | 00 | 0 | Slip paper disabled. |
| | On | 04 | 4 | Slip paper enabled. |
| 3–7 | Off | 00 | 0 | Undefined. Fixed to Off. |

***... how to use this table***

[Notes]

- This command is enabled only when processed at the beginning of the line.
- When previously disabled slip paper is enabled, the printer is in the slip paper waiting status. The printer waits for the slip paper until the slip paper is inserted, the waiting time ***t1*** set by **ESC f** elapses, the printer is reset, or the power is turned off.
- When the printer is in slip mode and slip paper is disabled, the printer ejects the slip paper.
- When the current paper type is enabled again, this command is ignored.

- During the slip paper waiting period, the printer processes only a real-time command, such as **DLE EOT** or **DLE ENQ**.
- It is possible to cancel the slip paper waiting status using **DLE ENQ 3**. In this case, however, data in the print and receive buffers is cleared. The slip paper insertion waiting status can be confirmed by **DLE EOT**.
- Journal and receipt paper can be selected simultaneously. But slip and another paper type cannot be selected simultaneously.

[Model-dependent variations] None

**Program Example**

```
PRINT #1, CHR$(&H1B);"c0";CHR$(1); ←Select paper type (journal)
PRINT #1, "AAAAA"; CHR$(&HA); ← Print on paper roll
PRINT #1, CHR$(&H1B);"c0";CHR$(4); ← Select paper type (slip)
PRINT #1, "BBBBB"; CHR$(&HC); ← Print on slip
```

**Print Sample <journal>**

```
AAAAA
```

**Print Sample <slip>**

```
BBBBB
```

# ESC c 1



[Name] Select paper type(s) for command settings

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | ESC | c | 1 | ***n*** |
| Hex | 1B | 63 | 31 | ***n*** |
| Decimal | 27 | 99 | 49 | ***n*** |

[Range] **TM-U950: $1 \leq n \leq 7$**

[Default] **TM-U950: $n = 7$**

[Printers not featuring this command] None

[Description] Selects paper type(s) for setting, using ***n*** as follows:

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Journal paper disabled. |
| | On | 01 | 1 | Journal paper enabled. |
| 1 | Off | 00 | 0 | Receipt paper disabled. |
| | On | 02 | 2 | Receipt paper enabled. |
| 2 | Off | 00 | 0 | Slip paper disabled. |
| | On | 04 | 4 | Slip paper enabled. |
| 3–7 | Off | 00 | 0 | Undefined. Fixed to Off. |

***... how to use this table***

[Notes]

- When multiple paper types are selected, each setting is used for all paper types selected.
- The commands that need to select paper types for setting are **ESC 2** and **ESC 3**.

[Model-dependent variations] **TM-U950**

**Program Example**

```
PRINT #1, CHR$(&H1B);"c1";CHR$(1); ← Select setting sheet (journal)
PRINT #1, CHR$(&H1D);"P";CHR$(180);CHR$(180);
PRINT #1, CHR$(&H1B);"3";CHR$(30);  ← Set line spacing for journal
```

**TM-U950**

**It is possible to select all paper types simultaneously.**

# ESC f

SETTING COMMAND

[Name] Set cut sheet wait time

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | f | ***t1*** ***t2*** |
| Hex | 1B | 66 | ***t1*** ***t2*** |
| Decimal | 27 | 102 | ***t1*** ***t2*** |

[Range]
$0 \leq t1 \leq 15$
$0 \leq t2 \leq 64$

[Default]
***t1*** = 0
**TM-U925: *t2* = 10**

[Printers not featuring this command] None

[Description] Sets the time that the printer waits for the cut sheet (slip and check paper) to be inserted.

- The waiting time for the cut sheet to be inserted is ***t1*** × 1 minutes.
- The time from detection of the cut sheet to the start of printing is ***t2*** × 0.1 seconds.

[Notes]

- When ***t1*** = 0, the cut sheet waiting time is not set and the printer continues waiting for the cut sheet to be inserted.
- If the sheet is not inserted within [***t1*** × 1 minutes], the printer cancels the cut sheet mode and selects the journal and receipt paper as the paper types.
- In the following cases, the printer continues waiting for the cut sheet to be inserted, regardless of the setting of ***t1***.
  - Waits for the cut sheet to be inserted when the paper sensor detects no paper with the cut sheet sensor enabled for paper-end stop by **ESC c 4**.
  - Waits for the cut sheet to be inserted when the printer recovers from an error.
- It is possible to cancel the cut sheet waiting state using **DLE ENQ 3**. In this case, however, the data in the print and receive buffers is cleared.
- This setting alone, however, does not cause the printer to immediately start waiting for the cut sheet to be inserted. The setting becomes effective when the printer executes **ESC c 0** or **FS a 0**.

[Model-dependent variations] None

**Program Example**

```
PRINT #1, CHR$(&H1B);"f";CHR$(15);CHR$(20);
PRINT #1, CHR$(&H1B);"c0";CHR$(4); ← Select paper type
```

# PANEL BUTTON COMMAND

| Command | Name |
|---|---|
| **ESC c 5** | Enable/disable panel buttons |

# ESC c 5



[Name] Enable/disable panel buttons

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | ESC | c | 5 | ***n*** |
| Hex | 1B | 63 | 35 | ***n*** |
| Decimal | 27 | 99 | 53 | ***n*** |

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

[Default] ***n*** = 0

[Printers not featuring this command] None

[Description] Enables or disables the panel buttons.

- When the LSB of ***n*** is 0, all buttons are enabled.
- When the LSB of ***n*** is 1, all buttons are disabled.

[Notes]

- When the printer cover is open, there are buttons that are always enabled regardless of this command.
- To prevent problems caused by accidentally pressing the buttons, use this command to disable the buttons.

[Model-dependent variations] **TM-U950**

**Program Example**

```
PRINT #1, CHR$(&H1B);"c5";CHR$(1); ← Disable panel buttons
```

**TM-U950**

**The panel buttons are RECEIPT FEED and JOURNAL/SLIP FEED.**

# PAPER SENSOR COMMANDS

| Command | Name |
|---|---|
| **ESC c 3** | Select paper sensor(s) to output paper-end signals |
| **ESC c 4** | Select paper sensor(s) to stop printing |

# ESC c 3



[Name] Select paper sensor(s) to output paper-end signals

[Format]

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

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

[Default] **TM-U950: *n* = 15**

[Printers not featuring this command] None

[Default] Selects whether to output paper-end signals to a parallel interface or not when a paper-end is detected by the sensor selected, using ***n*** as follows:

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Journal near-end sensor disabled. |
| | On | 01 | 1 | Journal near-end sensor enabled. |
| 1 | Off | 00 | 0 | Receipt near-end sensor disabled. |
| | On | 02 | 2 | Receipt near-end sensor enabled. |
| 2 | Off | 00 | 0 | Journal end sensor disabled. |
| | On | 02 | 4 | Journal end sensor enabled. |
| 3 | Off | 00 | 0 | Receipt end sensor disabled. |
| | On | 08 | 8 | Receipt end sensor enabled. |
| 4 | Off | 00 | 0 | Slip TOF sensor disabled. |
| | On | 10 | 16 | Slip TOF sensor enabled. |
| 5 | Off | 00 | 0 | Slip BOF sensor disabled. |
| | On | 20 | 32 | Slip BOF sensor enabled |
| 6,7 | — | — | — | Undefined |

***... how to use this table***

[Notes]

- This command is enabled only with a parallel interface and is ignored with a serial interface.
- It is possible to select multiple sensors to output signals. When any of the sensors detects a paper-end, the paper-end signal is output.
- Some sensors are not present, depending on the printer model.
- The names of some sensors differ depending on the printer model.

[Model-dependent variations] **TM-U950**

**Program Example**

```
PRINT #1, CHR$(&H1B);"c3";CHR$(4); ← Journal end sensor enabled
```

**TM-U950**

**The name of bit 4 is “Slip insertion sensor”.**

**The name of bit 5 is “Slip ejection sensor”.**

# ESC c 4



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

[Format]

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

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

[Default] **TM-U950: *n* = 12**

[Printers not featuring this command] None

[Description] Selects whether to stop printing or not when the paper runs out using ***n*** as follows:

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Journal near-end sensor disabled. |
| | On | 01 | 1 | Journal near-end sensor enabled. |
| 1 | Off | 00 | 0 | Receipt near-end sensor disabled |
| | On | 02 | 2 | Receipt near-end sensor enabled. |
| 2 | Off | 00 | 0 | Journal end sensor disabled. |
| | On | 02 | 4 | Journal end sensor enabled. |
| 3 | Off | 00 | 0 | Receipt end sensor disabled. |
| | On | 08 | 8 | Receipt end sensor enabled. |
| 4 | Off | 00 | 0 | Slip TOF sensor disabled. |
| | On | 10 | 16 | Slip TOF sensor enabled. |
| 5 | Off | 00 | 0 | Slip BOF sensor disabled. |
| | On | 20 | 32 | Slip BOF sensor enabled. |
| 6,7 | — | — | — | Undefined |

***... how to use this table***

[Notes]

- It is possible to select multiple sensors to stop printing. When any sensor detects a paper-end, printing stops.
- When a paper sensor is enabled with this command, printing stops only when the corresponding paper is selected as the paper type. Paper type can be selected by **ESC c 0**.
- Some sensors are not present, depending on the printer model.
- The names of some sensors differ, depending on the printer model.
- When a journal near-end is detected, printing stops after printing the current line and feeding the paper. The printer goes offline and PAPER LED comes on after printing stops. To resume printing, cancel the "journal near-end" status by replacing the paper roll.
- If the journal near-end sensor is disabled and a paper near-end is detected, printing does not stop and the printer does not go offline, but the PAPER LED comes on.
- When a receipt near-end, journal end, or receipt end is detected, the printer performs the same operations as when a journal near-end is detected.
- When the slip TOF sensor or the slip BOF sensor is enabled and a paper-end is detected, the printer ejects the paper after printing as much as possible and enters the cut sheet waiting state. The printer does not go offline.
- When the slip TOF sensor or the slip BOF sensor is disabled and a paper-end is detected, the printer does not stop printing and ejects the paper.

[Model-dependent variations] **TM-U950**

**Program Example**

```
PRINT #1, CHR$(&H1B);"c4";CHR$(1); ← Journal near-end sensor enabled
```

**TM-U950**

**Bits 4 and 5 indicate the same sensor. The name of the sensor is "slip insertion sensor." The slip insertion sensor is enabled when either bit 4 or bit 5 is on or both are on.**

**When a journal near-end or a journal end is detected, the JOURNAL OUT LED comes on.**

**When a receipt near-end or a receipt end is detected, the RECEIPT OUT LED comes on.**

# PRINT POSITION COMMANDS

| Command | Name |
|---|---|
| **RS** | Journal tab |
| **ESC $** | Set absolute print position |
| **ESC ** | Set relative print position |
| **ESC a** | Select justification |

# RS



[Name] Journal tab

[Format]

| | |
|---|---|
| ASCII | RS |
| Hex | 1E |
| Decimal | 30 |

[Range] None

[Default] None

[Printers not featuring this command] None

[Description] Moves the print position to the beginning of the journal paper

[Notes]

- This command is enabled only when both receipt and journal paper are selected. (The paper type is selected by **ESC c 0**.)
- Parallel printing mode on receipt and journal paper is turned off. (Parallel printing mode is canceled by **ESC z**.)
- Print position is in the receipt printing area.

[Model-dependent variations] None

**Program Example**

```
PRINT #1, CHR$(&H1B);"c0";CHR$(3); ←Select paper type (receipt and journal)
PRINT #1, CHR$(&H1B);"z";CHR$(0);  ←Cancel parallel printing mode
PRINT #1, "AAAAAAAAAAAAAAAAAAAAAAAAAAAAAA";
PRINT #1, "BBBBBBBBBBBBBBBBBBBBBBBBBBBBB";CHR$(&HA);
PRINT #1, "CCCCCCCCCCCCCCCCCCCC";CHR$(&H1E);
PRINT #1, "DDDDDDDDDDDDDDDDDDD";CHR$(&HA);
```

**Print Sample <Receipt>**

```
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
CCCCCCCCCCCCCCCCCCCC                ----------journal tab--------
```

**Print Sample <Journal>**

```
BBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
DDDDDDDDDDDDDDDDDDDD
```

# ESC $



[Name] Set absolute print position

[Format]

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

[Range] $0 \leq nL \leq 255$
$0 \leq nH \leq 255$

[Printers not featuring this command] None

[Description] Sets the print starting position to $(nL + nH \times 256) \times$ (horizontal motion unit) from the beginning of the line.

[Notes]
- The printer ignores any setting that exceeds the printing area.
- When a left margin is set, the position of the left margin is the beginning of the line.

[Model-dependent variations] **TM-U950**

**See program example and print sample for ESC $ and ESC \.**

**TM-U950**

**The horizontal motion unit is specified by GS P.**

# ESC \



[Name] Set relative print position

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | ESC | \ | ***nL*** | ***nH*** |
| Hex | 1B | 5C | ***nL*** | ***nH*** |
| Decimal | 27 | 92 | ***nL*** | ***nH*** |

[Range]
$0 \leq nL \leq 255$
$0 \leq nH \leq 255$

[Default] None

[Printers not featuring this command] None

[Description] Moves the print starting position to (***nL*** + ***nH*** × 256) × (horizontal motion unit) from the current position.

[Notes]

- The printer ignores any setting that exceeds the printing area.
- A positive number specifies movement to the right, and a negative number specifies movement to the left. N pitch movement to the right: (***nL*** + ***nH*** × 256) = N. Use the complement of N for setting N pitch movement to the left: (***nL*** + ***nH*** × 256) = 65536 – N.

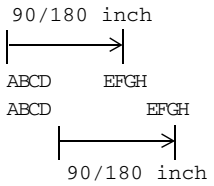
[Model-dependent variations] **TM-U950**

# Program example for ESC $ and ESC \

**Program Example**

```
PRINT #1, CHR$(&H1D);"P";CHR$(180);CHR$(180);
PRINT #1, "ABCD";
PRINT #1, CHR$(&H1B);"$";CHR$(90);CHR$(0); ←Set absolute position
PRINT #1, "EFGH"; CHR$(&HA);
PRINT #1, "ABCD";
PRINT #1, CHR$(&H1B);"\";CHR$(90);CHR$(0); ←Set relative position
PRINT #1, "EFGH"; CHR$(&HA);
```

**Print Sample**




**TM-U950**

**The horizontal motion unit is specified by GS P.**

# ESC a



[Name] Select justification

[Format]

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

[Range] $0 \leq n \leq 2, 48 \leq n \leq 50$

[Default] ***n*** = 0

[Printers not featuring this command] None

[Description] In standard mode, aligns all the data in one line to a specified position, using ***n*** as follows:

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

[Notes]

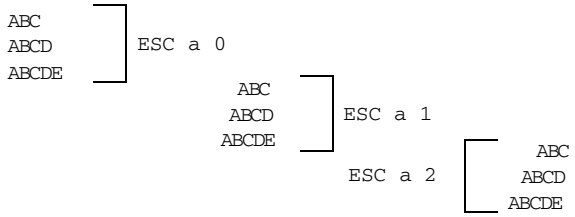
- This command is enabled only when processed at the beginning of the line.
- This command justifies printing data (such as characters and bit images) and space area set by **ESC $**, and **ESC **.

[Model-dependent variations] None

**Program Example**

```
FOR n=0 TO 2
  PRINT #1, CHR$(&H1B);"a";CHR$(n);
  PRINT #1, "ABC"; CHR$(&HA);
  PRINT #1, "ABCD"; CHR$(&HA);
  PRINT #1, "ABCDE"; CHR$(&HA);
NEXT n
```

**Print Sample**



# BIT-IMAGE COMMANDS

| Command | Name |
|---|---|
| ESC * | Select bit-image mode |
| GS * | Define downloaded bit image |
| GS / | Print downloaded bit image |

# ESC ✻



[Name] Select bit-image mode

[Format]

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ASCII | ESC | ✻ | ***m*** | ***nL*** | ***nH*** | ***d1 ... dk*** |
| Hex | 1B | 2A | ***m*** | ***nL*** | ***nH*** | ***d1 ... dk*** |
| Decimal | 27 | 42 | ***m*** | ***nL*** | ***nH*** | ***d1 ... dk*** |

[Range] **TM-U950:**

**$m = 0, 1$**
**$0 \le n_L \le 255$**
**$0 \le n_H \le 3$**
**$0 \le d \le 255$**

[Default] None

[Printers not featuring this command] None

[Description] Selects a bit-image mode using ***m*** for the number of dots specified by ($n_L + n_H \times 256$), as follows:

| ***m*** | **Mode** | **Number of Bits for Vertical data** | **Dot Density in Horizontal** | **Amount of Data (*k*)** |
|---|---|---|---|---|
| 0 | 8-dot single-density | 8 | Single-density | $n_L + n_H \times 256$ |
| 1 | 8-dot double-density | 8 | Double-density | $n_L + n_H \times 256$ |

- ***d*** indicates the bit image data.

[Notes]

- If the value of ***m*** or ***nH*** is out of the range, this command is canceled, and the following data is processed as normal data.
- Data (***d***) specifies a bit printed to 1 and not printed to 0.
- If the bit image data exceeds the number of dots to be printed on a line, the excess data is ignored.
- The bit-image is not affected by print mode (emphasized, double-strike, underline, or character size), except for upside-down printing mode.
- After printing a bit image, the printer processes normal data.
- When printing multiple line bit images, selecting unidirectional printing mode with **ESC U** enables printing patterns in which the top and bottom parts are aligned vertically.
- This command is used to print a picture or logo.

[Model-dependent variations] **TM-U950**

**Program Example**

```
m=0:  GOSUB bitimage8 ← 8-dot single-density
m=1:  GOSUB bitimage8 ← 8-dot double-density
END

bitimage8:
  PRINT #1, CHR$(&H1B);"*";CHR$(m);CHR$(70);CHR$(0);
  FOR i=1 TO 5
    PRINT #1, CHR$(1);CHR$(2);CHR$(4);CHR$(8);
    PRINT #1, CHR$(16);CHR$(32);CHR$(64);CHR$(128);
    PRINT #1, CHR$(64);CHR$(32);CHR$(16);CHR$(8);
    PRINT #1, CHR$(4);CHR$(2);
  NEXT i
  PRINT #1, CHR$(&HA);
  RETURN
```

**Print Sample**

**TM-U950**

**The modes selectable by *m* are as follows:**

| *m* | Mode | Vertical Dot Density | Horizontal Direction | | | |
|---|---|---|---|---|---|---|
| | | | Dot Density | Set Adjacent Dots | Maximum Number of Dots | |
| | | | | | Paper roll | Slip |
| 0 | 8-dot single-density | 72 dpi | 75 dpi | Permitted | 180 | 400 |
| 1 | 8-dot double-density | 72 dpi | 150 dpi | Prohibited | 360 | 800 |

**dpi: dots per 25.4 mm (dots per inch)**

**Amount of data (*k*) is ($n_L + n_H \times 256$).**

**"Paper roll" is journal or receipt paper.**

# GS ✻



[Name] Define downloaded bit image

[Format]

| | | | | | |
|---|---|---|---|---|---|
| ASCII | GS | ✻ | ***x*** | ***y*** | ***d1 ... d(x*** × ***y*** × 8) |
| Hex | 1D | 2A | ***x*** | ***y*** | ***d1 ... d(x*** × ***y*** × 8) |
| Decimal | 29 | 42 | ***x*** | ***y*** | ***d1 ... d(x*** × ***y*** × 8***)*** |

[Range] **TM-U950:**

**1 ≤ *x* ≤ 255**
**1 ≤ *y* ≤ 255**
***x*** × ***y*** **≤ 155 (when the receive buffer capacity is 2 KB)**
***x*** × ***y*** **≤ 404 (when the receive buffer capacity is 32 bytes)**
**0 ≤ *d* ≤ 255**

[Default] None

[Printers not featuring this command] None

[Description] Defines a downloaded bit image using (***x*** × 8) dots in the horizontal direction and (***y*** × 8) dots in the vertical direction.

- ***d*** indicates the bit image data.

[Notes]

- Data (***d***) specifies a bit printed to 1 and not printed to 0.
- If the value of ***x***, ***y***, or (***x*** × ***y***) is out of the range, this command is canceled, and the following data is processed as normal data.
- The downloaded bit image is not defined at the default.
- Once a downloaded bit image has been defined, it is available until another definition is made; **ESC &** or **ESC @** is executed; the printer is reset; or the power is turned off.
- Downloaded bit image and a user-defined character cannot be defined simultaneously. When this command is executed, the user-defined character is cleared.
- The downloaded bit image is printed by **GS /**.

[Model-dependent variations] None

**See program example and print sample for GS ✻ and GS /.**

# GS /



[Name] Print downloaded bit image

[Format]

| | | | |
|---|---|---|---|
| ASCII | GS | / | ***m*** |
| Hex | 1D | 2F | ***m*** |
| Decimal | 29 | 47 | ***m*** |

[Range] **TM-U950: *m* = 0, 1, 48, 49**

[Default] None

[Printers not featuring this command] None

[Description] Prints a downloaded bit image using the mode specified by ***m***, as follows:

| ***m*** | **Mode** |
|---|---|
| 0, 48 | Normal |
| 1, 49 | Double-width |
| 2, 50 | Double-height |
| 3, 51 | Quadruple |

[Notes]

- This command is ignored if a downloaded bit image has not been defined.
- This command is enabled only when there is no data in the print buffer.
- After printing, the printing position moves to the beginning of the line.
- If a downloaded bit image exceeds one line, the excess data is not printed.
- This command feeds as much paper as is required to print the downloaded bit image, regardless of the line spacing specified by **ESC 2** or **ESC 3**.
- The downloaded bit image is not affected by print mode (emphasized, double-strike, underline, or character size), except for upside-down printing mode.
- When printing a downloaded bit image, selecting unidirectional printing mode with **ESC U** enables printing patterns in which the top and bottom parts are aligned vertically.
- The downloaded bit image is defined by **GS** *.

[Model-dependent variations] **TM-U950**

# Program example for GS ✻ and GS /

## Program Example

```
PRINT #1, CHR$(&H1D);"*";CHR$(18);CHR$(5);
FOR i=1 TO 18*5*8
  READ a$: d=VAL("&H"+a$)
  PRINT #1, CHR$(d);
NEXT i

PRINT #1, CHR$(&H1B);"U";CHR$(1);
PRINT #1, CHR$(&H1D);"/";CHR$(0);CHR$(&HA); ←Normal
PRINT #1, CHR$(&H1D);"/";CHR$(1);CHR$(&HA); ←Double width

DATA AA,AA,AA,AA,AA,55,55,55,55,54,80,00,00,00,02
DATA 40,00,00,00,04,80,00,00,00,02,40,00,00,00,04
DATA 8A,AA,AA,AA,A2,45,55,55,55,44,8A,AA,AA,AA,A2
DATA 45,55,55,55,44,8A,AA,AA,AA,A2,45,00,50,01,44
DATA 8A,80,A8,02,A2,45,00,50,01,44,8A,80,A8,02,A2
DATA 45,00,50,01,44,8A,80,A8,02,A2,45,00,50,01,44
DATA 8A,80,A8,02,A2,45,00,00,01,44,8A,80,00,02,A2
DATA 40,00,00,00,04,80,00,00,00,02,40,00,00,00,04
DATA 80,AA,00,02,A2,41,55,00,01,44,82,AA,80,02,A2
DATA 45,55,40,01,44,8A,AA,A0,02,A2,45,45,50,01,44
DATA 8A,82,A8,02,A2,45,01,54,01,44,8A,80,AA,02,A2
DATA 45,00,55,01,44,8A,80,2A,82,A2,45,00,15,55,44
DATA 8A,80,0A,AA,A2,45,00,05,55,44,8A,80,02,AA,82
DATA 40,00,01,55,04,80,00,00,00,02,40,00,00,00,04
DATA 80,00,00,00,02,40,15,55,50,04,80,2A,AA,A8,02
DATA 40,55,55,54,04,80,AA,AA,AA,02,41,55,55,55,04
DATA 82,A8,00,2A,82,45,50,00,15,44,8A,A0,00,0A,A2
DATA 45,40,00,05,44,8A,80,00,02,A2,45,00,00,01,44
DATA 8A,80,00,02,A2,45,00,00,01,44,8A,80,00,02,A2
DATA 45,00,00,01,44,8A,80,00,02,A2,40,00,00,00,04
DATA 80,00,00,00,02,40,00,00,00,04,80,00,00,00,62
DATA 40,00,00,03,84,80,00,00,1C,02,40,00,00,60,04
DATA 80,00,03,80,02,40,00,1C,00,04,80,00,60,00,02
DATA 40,03,80,00,04,80,0C,00,00,02,40,70,00,00,04
```

Define downloaded bit image

## Program Example (continued)

```
DATA 83,80,00,00,02,4C,00,00,00,04,80,00,00,00,02
DATA 40,00,00,00,04,80,00,00,00,02,4A,AA,AA,AA,A4
DATA 85,55,55,55,42,4A,AA,AA,AA,A4,85,55,55,55,42
DATA 4A,AA,AA,AA,A4,85,00,05,00,02,4A,08,0A,80,04
DATA 85,00,05,00,02,4A,80,0A,80,04,85,00,05,00,02
DATA 4A,80,0A,80,04,85,00,05,00,02,4A,80,0A,80,04
DATA 85,55,55,00,02,42,AA,AA,00,04,81,55,54,00,02
DATA 40,AA,A8,00,04,80,55,50,00,02,40,00,00,00,04
DATA 80,00,00,00,02,40,00,00,00,04,80,2A,AA,A8,02
DATA 40,55,55,54,04,80,AA,AA,AA,02,41,55,55,55,04
DATA 82,AA,AA,AA,82,45,40,00,05,44,8A,80,00,02,A2
DATA 45,00,00,01,44,8A,80,00,02,A2,45,00,00,01,44
DATA 8A,80,00,02,A2,45,00,00,01,44,8A,80,00,02,A2
DATA 45,00,00,01,44,8A,80,00,02,A2,45,40,00,05,44
DATA 82,AA,AA,AA,82,41,55,55,55,04,80,AA,AA,AA,02
DATA 40,55,55,54,04,80,2A,AA,A8,02,40,00,00,00,04
DATA 80,00,00,00,02,40,00,00,00,04,80,AA,00,02,A2
DATA 41,55,00,01,44,82,AA,80,02,A2,45,55,40,01,44
DATA 8A,AA,A0,02,A2,45,45,50,01,44,8A,82,A8,02,A2
DATA 45,01,54,01,44,8A,80,AA,02,A2,45,00,55,01,44
DATA 8A,80,2A,82,A2,45,00,15,55,44,8A,80,0A,AA,A2
DATA 45,00,05,55,44,8A,80,02,AA,82,40,00,01,55,04
DATA 80,00,00,00,02,40,00,00,00,04,80,00,00,00,02
DATA 40,00,00,00,04,AA,AA,AA,AA,AA,55,55,55,55,54
```

### Print Sample

← GS / 0

← GS / 1

**TM-U950**

**The downloaded bit image mode for this printer is different from the standard ESC/POS downloaded bit image mode.**

**The modes selectable by *m* are as follows:**

| *m* | Mode | Horizontal Direction | | | | Vertical Dot Density |
|---|---|---|---|---|---|---|
| | | Dot Density | Set Adjacent Dots | Maximum Number of Dots | | |
| | | | | Paper roll | Slip | |
| 0, 48 | Single-density | 75 dpi | Permitted | 180 | 400 | 72 dpi |
| 1, 49 | Double-density | 150 dpi | Prohibited | 360 | 800 | 72 dpi |

**dpi: dots per 25.4 mm (dots per inch)**

**“Paper roll” is journal or receipt paper.**

# STATUS COMMANDS

| Command | Name |
|---|---|
| **DLE EOT** | Real-time status transmission |
| **DLE EOT BS** | Real-time MICR status transmission |
| **ESC u** | Transmit peripheral device status |
| **ESC v** | Transmit paper sensor status |
| **GS a** | Enable/disable Automatic Status Back (ASB) |
| **GS r** | Transmit status |

# DLE EOT



[Name] Real-time status transmission

[Format]

| | | | |
|---|---|---|---|
| ASCII | DLE | EOT | ***n*** |
| Hex | 10 | 04 | ***n*** |
| Decimal | 16 | 4 | ***n*** |

[Range] **TM-U950: 1 ≤ *n* ≤ 5**

[Default] None

[Printers not featuring this command] None

[Description] Transmits 1 byte of status data specified in real time, using ***n*** as follows:

| ***n*** | **Function** |
|---|---|
| 1 | Transmit printer status |
| 2 | Transmit offline status |
| 3 | Transmit error status |
| 4 | Transmit paper roll sensor status |
| 5 | Transmit slip status |

[Notes]

- The printer executes this command upon receiving it.
- The printer transmits the status without confirming whether the host computer can receive data.
- With a serial interface model, this command is executed even when the printer is offline, the receive buffer is full, or an error occurs.
- With a parallel interface model, this command is not executed in following status, because the printer is busy and unable to receive data from the host computer. The DIP switch (BUSY condition) is different, depending on the printer model.
  - Receive buffer is full when DIP switch is set to On.
  - Printer is offline, an error occurs, or receive buffer is full when DIP switch is set to Off.

- This command is ignored during a process of transmitting the check paper reading result (only with the MICR reader model).
- The real-time status to be transmitted is as follows:

• Printer status (***n*** = 1)

| Bit | Off/On | Hex | Decimal | Status |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Not used. Fixed to Off. |
| 1 | On | 02 | 2 | Not used. Fixed to On. |
| 2 | Off | 00 | 0 | Drawer kick-out connector pin 3 is LOW. |
| | On | 04 | 4 | Drawer kick-out connector pin 3 is HIGH. |
| 3 | Off | 00 | 0 | Online. |
| | On | 08 | 8 | Offline. |
| 4 | On | 10 | 16 | Not used. Fixed to On. |
| 5,6 | — | — | — | Undefined. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

***... how to use this table***

• Offline status (***n*** = 2)

| Bit | Off/On | Hex | Decimal | Status |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Not used. Fixed to Off. |
| 1 | On | 02 | 2 | Not used. Fixed to On. |
| 2 | Off | 00 | 0 | Cover is closed. |
| | On | 04 | 4 | Cover is open. |
| 3 | Off | 00 | 0 | Paper is not being fed by the paper feed button. |
| | On | 08 | 8 | Paper is being fed by the paper feed button. |
| 4 | On | 10 | 16 | Not used. Fixed to On. |

***... how to use this table***

| Bit | Off/On | Hex | Decimal | Status |
|---|---|---|---|---|
| 5 | Off | 00 | 0 | No paper-end stop. |
| | On | 20 | 32 | Printing stops due to a paper-end. |
| 6 | Off | 00 | 0 | No error. |
| | On | 40 | 64 | Error occurred. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

- Bit 5 becomes on when the journal or receipt sensor (near-end sensor or end sensor) detects a paper-end and printing stops.
- Error status (***n*** = 3)

| Bit | Off/On | Hex | Decimal | Status |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Not used. Fixed to Off. |
| 1 | On | 02 | 2 | Not used. Fixed to On. |
| 2 | Off | 00 | 0 | No mechanical error. |
| | On | 04 | 4 | Mechanical error occurred. |
| 3 | Off | 00 | 0 | No autocutter error. |
| | On | 08 | 8 | Autocutter error occurred. |
| 4 | On | 10 | 16 | Not used. Fixed to On. |
| 5 | Off | 00 | 0 | No unrecoverable error. |
| | On | 20 | 32 | Unrecoverable error occurred. |
| 6 | Off | 00 | 0 | No auto-recoverable error. |
| | On | 40 | 64 | Auto-recoverable error occurred. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

***... how to use this table***

- If mechanical error (bit 2) or autocutter error (bit 3) occurs due to paper jams or the like, it is possible to recover by correcting a cause of the error and executing **DLE ENQ**. But if an error due to a circuit failure (such as a wire break) occurs, it is impossible to recover.
- When printing is stopped during automatically recoverable error (bit 6) occurs.
- If an unrecoverable error (bit 5) occurs, turn off the power as soon as possible.
- Paper roll sensor status (***n*** = 4)

| Bit | Off/On | Hex | Decimal | Status |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Not used. Fixed to Off. |
| 1 | On | 02 | 2 | Not used. Fixed to On. |
| 2 | Off | 00 | 0 | Journal near-end sensor: paper adequate. |
| | On | 04 | 4 | Journal near-end sensor: paper near end. |
| 3 | Off | 00 | 0 | Receipt near-end sensor: paper adequate. |
| | On | 08 | 8 | Receipt near-end sensor: paper near end. |
| 4 | On | 10 | 16 | Not used. Fixed to On. |
| 5 | Off | 00 | 0 | Journal end sensor: paper present. |
| | On | 20 | 32 | Journal end sensor: paper not present. |
| 6 | Off | 00 | 0 | Receipt end sensor: paper present. |
| | On | 40 | 64 | Receipt end sensor: paper not present. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

*... how to use this table*

- Some paper sensors are not present, depending on the printer model.
- The names of some paper sensors are different, depending on the printer model.

- Slip status (***n*** = 5)

| Bit | Off/On | Hex | Decimal | Status |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Not used. Fixed to Off. |
| 1 | On | 02 | 2 | Not used. Fixed to On. |
| 2 | Off | 00 | 0 | Slip paper selected. |
| | On | 04 | 4 | Slip paper not selected. |
| 3 | Off | 00 | 0 | Does not wait for slip paper insertion. |
| | On | 08 | 8 | Waits for slip insertion. |
| 4 | On | 10 | 16 | Not used. Fixed to On. |
| 5 | Off | 00 | 0 | Slip TOF sensor: paper present. |
| | On | 20 | 32 | Slip TOF sensor: paper not present. |
| 6 | Off | 00 | 0 | Slip BOF sensor: paper present. |
| | On | 40 | 64 | Slip BOF sensor: paper not present. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

***... how to use this table***

- Some paper sensors are not present, depending on the printer model.
- The names of some paper sensors are different, depending on the printer model.

[Model-dependent variations] **TM-U950**

**Program Example**

```
PRINT #1, CHR$(&H10);CHR$(&H4);CHR$(2); ←Transmits offline status
```

**TM-U950**

**BUSY condition for a parallel interface is selected by DIP switch 2-5.**

- **Error status (*n* = 3)**

**Mechanical error indicates the home position detection error, carriage detection error, or cut sheet (slip or validation) ejection error.**

**Automatically recoverable error indicates the high head temperature error.**

- **Slip status (*n* = 5)**

**The names of the paper sensors for bits 5 and 6:**

- **Slip insertion sensor is the same sensor as the Slip TOF sensor.**
- **Slip ejection sensor is the same sensor as the Slip BOF sensor.**

# DLE EOT BS



[Name] Real-time MICR status transmission

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | DLE | EOT | BS | ***n*** |
| Hex | 10 | 04 | 08 | ***n*** |
| Decimal | 16 | 4 | 8 | ***n*** |

[Range] ***n*** = 1

[Default] None

[Printers not featuring this command] None

[Description] Transmits 1 byte of MICR status in real time when ***n*** = 1.

[Notes]

- This command supports the printers with the MICR option.
- The printer executes this command upon receiving it.
- The printer transmits the status without confirming whether the host computer can receive data.
- With a serial interface model, this command is executed even when the printer is offline, the receive buffer is full, or an error occurs.
- With a parallel interface model, this command is not executed in following statuses, because the printer is busy and unable to receive data from the host computer. The DIP switch (BUSY condition) is different, depending on the printer model.
  - Receive buffer is full when DIP switch is set to On.
  - Printer is offline, an error occurs, or receive buffer is full when DIP switch is set to Off.
- This command is ignored during a process of transmitting the check paper reading result.
- The MICR status to be transmitted is as follows:

• MICR status (***n*** = 1)

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Not used. Fixed to Off. |
| 1 | On | 02 | 2 | Not used. Fixed to On. |

***... how to use this table***

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 2 | Off | 00 | 0 | MICR function selected. |
| | On | 04 | 4 | MICR function not selected. |
| 3 | Off | 00 | 0 | Does not wait for check paper or cleaning sheet insertion. |
| | On | 08 | 8 | Waits for check paper or cleaning sheet insertion. |
| 4 | On | 10 | 16 | Not used. Fixed to On. |
| 5 | Off | 00 | 0 | TOF sensor: paper present. |
| | On | 20 | 32 | TOF sensor: paper not present. |
| 6 | Off | 00 | 0 | BOF sensor: paper present. |
| | On | 40 | 64 | BOF sensor: paper not present. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

- Some paper sensors are not present, depending on the printer model.
- The names of some paper sensors are different, depending on the printer model.

[Model-dependent variations] **TM-U950**

**Program Example**

```
PRINT #1, CHR$(&H10);CHR$(&H4);CHR$(&H8);CHR$(1); ← Transmits MICR status
```

**TM-U950**

**BUSY condition for a parallel interface is selected by DIP switch 2-5.**

**The names of the paper sensors for bits 5 and 6:**

- **Check insertion sensor is the same sensor as the TOF sensor.**
- **Check ejection sensor is the same sensor as the BOF sensor.**

# ESC u



[Name] Transmit peripheral device status

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | u | ***n*** |
| Hex | 1B | 75 | ***n*** |
| Decimal | 27 | 117 | ***n*** |

[Range] ***n*** = 0, 48

[Default] None

[Printers not featuring this command] None

[Description] Transmits the status of drawer kick-out connector pin 3 as 1 byte of data when ***n*** = 0 or 48.

[Notes]

- **GS r 2** can also be used to check the status. **GS r** is recommended for transmitting the peripheral device status. **ESC u** is not a recommended command.
- When DTR/DSR control set by DIP switch (Handshaking) is selected with a serial interface, the printer transmits the status after confirming that the host is ready to receive data. If the host computer is not ready to receive data, the printer waits until the host becomes ready.
- When XON/XOFF control is selected by DIP switch (Handshaking) with a serial interface, the printer transmits the status without confirming whether the host computer can receive data.
- The peripheral device status to be transmitted is as follows:

| Bit | Off/On | Hex | Decimal | Status |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Drawer kick-out connector pin 3 is LOW. |
| | On | 01 | 1 | Drawer kick-out connector pin 3 is HIGH. |
| 1-3 | — | — | — | Undefined. |
| 4 | Off | 00 | 0 | Not used. Fixed to Off. |
| 5, 6 | — | — | — | Undefined. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

*... how to use this table*

[Model-dependent variations] **TM-U950**

**Program Example**

```
PRINT #1,CHR$(&H1B);"u";CHR$(0);
```

**TM-U950**

**Handshaking for a serial interface is selected by DIP switch 1-8.**

# ESC v



[Name] Transmit paper sensor status

[Format]

| | | |
|---|---|---|
| ASCII | ESC | v |
| Hex | 1B | 76 |
| Decimal | 27 | 118 |

[Range] None

[Default] None

[Printers not featuring this command] None

[Description] Transmits the status of paper sensor(s) as 1 byte of data.

[Notes]

- **GS r 1** can also be used to check the status. **GS r** is recommended for transmitting the paper sensor status. **ESC v** is not a recommended command.
- When DTR/DSR control is selected by DIP switch (Handshaking) with a serial interface, the printer transmits the status after confirming that the host is ready to receive data. If the host computer is not ready to receive data, the printer waits until the host becomes ready.
- When XON/XOFF control is selected by DIP switch (Handshaking) with a serial interface, the printer transmits the status without confirming whether the host computer can receive data.
- Some paper sensors are not present, depending on the printer model.
- The names of some paper sensors are different, depending on the printer model.
- The peripheral device status to be transmitted is as follows:

| Bit | Off/On | Hex | Decimal | Status |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Journal near-end sensor: paper adequate. |
| | On | 01 | 1 | Journal near-end sensor: paper near end. |
| 1 | Off | 00 | 0 | Receipt near-end sensor: paper present. |
| | On | 02 | 2 | Receipt near-end sensor: paper not present. |

*... how to use this table*

| Bit | Off/On | Hex | Decimal | Status |
|---|---|---|---|---|
| 2 | Off | 00 | 0 | Journal end sensor: paper present. |
| | On | 04 | 4 | Journal end sensor: paper not present. |
| 3 | Off | 00 | 0 | Receipt end sensor: paper present. |
| | On | 08 | 8 | Receipt end sensor: paper not present. |
| 4 | Off | 00 | 0 | Not used. Fixed to Off. |
| 5 | Off | 00 | 0 | TOF sensor: paper present. |
| | On | 20 | 32 | TOF sensor: paper not present. |
| 6 | Off | 00 | 0 | BOF sensor: paper present. |
| | On | 40 | 64 | BOF sensor: paper not present. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

[Model-dependent variations] **TM-U950**

**Program Example**

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

**TM-U950**

**Handshaking for a serial interface is selected by DIP switch 1-8.**

**The names of the paper sensors for bits 5 and 6:**

- **Slip insertion sensor is the same sensor as the TOF sensor.**
- **Slip ejection sensor is the same sensor as the BOF sensor.**

# GS a



[Name] Enable/disable Automatic Status Back (ASB)

[Format]

| | | | |
|---|---|---|---|
| ASCII | GS | a | ***n*** |
| Hex | 1D | 61 | ***n*** |
| Decimal | 29 | 97 | ***n*** |

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

[Default] When DIP switch (BUSY condition) is Off : ***n*** = 0
When DIP switch (BUSY condition) is On : ***n*** = 2

[Printers not featuring this command] None

[Description] Enable or disable ASB and specifies the status items to include, using ***n*** as follows:

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Drawer kick-out connector pin 3 status disabled. |
| | On | 01 | 1 | Drawer kick-out connector pin 3 status enabled. |
| 1 | Off | 00 | 0 | Online/offline status disabled. |
| | On | 02 | 2 | Online/offline status enabled. |
| 2 | Off | 00 | 0 | Error status disabled. |
| | On | 04 | 4 | Error status enabled. |
| 3 | Off | 00 | 0 | Paper roll sensor status disabled. |
| | On | 08 | 8 | Paper roll sensor status enabled. |
| 4 | — | — | — | Undefined. |
| 5 | Off | 00 | 0 | Cut sheet sensor and status disabled. |
| | On | 20 | 32 | Cut sheet sensor and status enabled. |
| 6,7 | — | — | — | Undefined. |

***... how to use this table***

[Notes]

- ASB is enabled if any status item is selected. The printer transmits a 4-byte status when this command is executed. The printer automatically transmits a 4-byte status message whenever the status changes. The disabled status items may change, because each status transmission represents the current status.
- Multiple status items can be selected.
- When ***n*** = 0, ASB is disabled.
- The 4-byte status are transmitted without confirming whether the host computer is ready to receive data. The 4-byte status must be consecutive, except for the XOFF code.
- If ASB is enabled when the printer is disabled by **ESC =**, the printer transmits the 4-byte status message whenever the status changes.
- The ASB statuses, corresponding to each bit for ***n*** are as follows:

| ***n*** | | **ASB status** | |
|---|---|---|---|
| **Bit** | **Function** | **Bit** | **Status** |
| 0 | Drawer kick-out connector pin 3 status. | Bit 2 of the first byte | Drawer kick-out connector pin 3 status. |
| 1 | Online/offline status. | Bit 3 of the first byte | Online/ offline status. |
| | | Bit 5 of the first byte | Cover status. |
| | | Bit 6 of the first byte | Paper is being fed by paper feed button status. |
| 2 | Error status. | Bit 2 of the second byte | Mechanical error status. |
| | | Bit 3 of the second byte | Autocutter error status. |
| | | Bit 5 of the second byte | Unrecoverable error status. |
| | | Bit 6 of the second byte | Automatically recoverable error status. |
| 3 | Paper roll sensor status. | Bit 0 of the third byte | Journal near-end sensor status. |
| | | Bit 1 of the third byte | Receipt near-end sensor status. |
| | | Bit 2 of the third byte | Journal end sensor status. |
| | | Bit 3 of the third byte | Receipt end sensor status. |

*... how to use this table*

| *n* | | ASB status | |
|---|---|---|---|
| **Bit** | **Function** | **Bit** | **Status** |
| 5 | Cut sheet sensor and status. | Bit 5 of the third byte | Slip TOF sensor status. |
| | | Bit 6 of the third byte | Slip BOF sensor status. |
| | | Bit 0 of the fourth byte | Slip paper selection status. |
| | | Bit 1 of the fourth byte | Slip printing status. |

■ The status to be transmitted are as follows:

- First byte (printer information)

| Bit | Off/On | Hex | Decimal | Status for ASB |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Not used. Fixed to Off. |
| 1 | Off | 00 | 0 | Not used. Fixed to Off. |
| 2 | Off | 00 | 0 | Drawer kick-out connector pin 3 is LOW. |
| | On | 04 | 4 | Drawer kick-out connector pin 3 is HIGH. |
| 3 | Off | 00 | 0 | Online. |
| | On | 08 | 8 | Offline. |
| 4 | On | 10 | 16 | Not used. Fixed to On. |
| 5 | Off | 00 | 0 | Cover is closed. |
| | On | 20 | 32 | Cover is open. |
| 6 | Off | 00 | 0 | Paper is not being fed by the paper feed button. |
| | On | 40 | 64 | Paper is being fed by the paper feed button. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

***... how to use this table***

- Second byte (printer information)

| Bit | Off/On | Hex | Decimal | Status for ASB |
|---|---|---|---|---|
| 0,1 | — | — | — | Undefined |
| 2 | Off | 00 | 0 | No mechanical error. |
| | On | 04 | 4 | Mechanical error occurred. |
| 3 | Off | 00 | 0 | No autocutter error. |
| | On | 08 | 8 | Autocutter error occurred. |
| 4 | Off | 00 | 0 | Not used. Fixed to Off. |
| 5 | Off | 00 | 0 | No unrecoverable error. |
| | On | 20 | 32 | Unrecoverable error occurred. |
| 6 | Off | 00 | 0 | No automatically recoverable error. |
| | On | 40 | 64 | Automatically recoverable error occurred. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

*... how to use this table*

- If mechanical error (bit 2) or autocutter error (bit 3) occurs due to paper jams or the like, it is possible to recover by correcting a cause of the error and executing **DLE ENQ**. But if an error due to a circuit failure (such as a wire break) occurs, it is impossible to recover.
- Printing is stopped while automatically recoverable error (bit 6) occurs.
- If an unrecoverable error (bit 5) occurs, turn off the power as soon as possible.
- Third byte (paper sensor information)

| Bit | Off/On | Hex | Decimal | Status for ASB |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Journal near-end sensor: paper adequate. |
| | On | 01 | 1 | Journal near-end sensor: paper near end. |
| 1 | Off | 00 | 0 | Receipt near-end sensor: paper present. |
| | On | 02 | 2 | Receipt near-end sensor: paper not present. |

*... how to use this table*

| Bit | Off/On | Hex | Decimal | Status for ASB |
|---|---|---|---|---|
| 2 | Off | 00 | 0 | Journal end sensor: paper present. |
| | On | 04 | 4 | Journal end sensor: paper not present. |
| 3 | Off | 00 | 0 | Receipt end sensor: paper present. |
| | On | 08 | 8 | Receipt end sensor: paper not present. |
| 4 | Off | 00 | 0 | Not used. Fixed to Off. |
| 5 | Off | 00 | 0 | Slip TOF sensor: paper present. |
| | On | 20 | 32 | Slip TOF sensor: paper not present. |
| 6 | Off | 00 | 0 | Slip BOF sensor: paper present. |
| | On | 40 | 64 | Slip BOF sensor: paper not present. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

- Some paper sensors are not present, depending on the printer model.
- The names of some paper sensors are different, depending on the printer model.
- Fourth byte (paper sensor information)

| Bit | Off/On | Hex | Decimal | Status for ASB |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Slip paper selected. |
| | On | 01 | 1 | Slip paper not selected. |
| 1 | Off | 00 | 0 | Slip printing possible. |
| | On | 02 | 2 | Slip printing not possible. |
| 2,3 | — | — | — | Undefined |
| 4 | Off | 00 | 0 | Not used. Fixed to Off. |
| 5,6 | — | — | — | Undefined |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

***... how to use this table***

- Some paper sensors are not present, depending on the printer model.
- The names of some paper sensors are different, depending on the printer model.

**Program Example**

```
PRINT #1, CHR$(&H1D);"a";CHR$(4); ← Enable "Error" status
```

**TM-U950**

**The default value is set by DIP switch 2-5.**

- **Second byte (printer information)**

**Mechanical error indicates the home position detection error, carriage detection error, or cut sheet (slip or check paper) ejection error.**

**Automatically recoverable error indicates the high head temperature error.**

- **Third byte (paper sensor information)**

**The names of the paper sensors for bits 5 and 6:**

- **Slip insertion sensor is the same sensor as the Slip TOF sensor.**
- **Slip ejection sensor is the same sensor as the Slip BOF sensor.**

# GS r



[Name] Transmit status

[Format]

| | | | |
|---|---|---|---|
| ASCII | GS | r | ***n*** |
| Hex | 1D | 72 | ***n*** |
| Decimal | 29 | 114 | ***n*** |

[Range] $1 \leq n \leq 3$
$49 \leq n \leq 51$

[Default] None

[Printers not featuring this command] None

[Description] Transmits 1 byte of status data using ***n*** as follows:

| ***n*** | **Function** |
|---|---|
| 1, 49 | Transmits paper sensor status |
| 2, 50 | Transmits drawer kick-out connector status |
| 3, 51 | Transmits cut sheet (slip) status |

[Notes]

- When DTR/DSR control is selected by DIP switch (Handshaking) with a serial interface, the printer transmits the status after confirming that the host is ready to receive data. If the host computer is not ready to receive data, the printer waits until the host becomes ready.
- When XON/XOFF control is selected by DIP switch (Handshaking) with a serial interface, the printer transmits the status without confirming whether the host computer can receive data.
- The status to be transmitted is as follows:

• Paper sensor status (***n*** = 1, 49)

| **Bit** | **Off/On** | **Hex** | **Decimal** | **Status** |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Journal near-end sensor: paper adequate. |
| | On | 01 | 1 | Journal near-end sensor: paper near end. |
| 1 | Off | 00 | 0 | Receipt near-end sensor: paper present. |
| | On | 02 | 2 | Receipt near-end sensor: paper not present. |

***... how to use this table***

| Bit | Off/On | Hex | Decimal | Status |
|---|---|---|---|---|
| 2 | Off | 00 | 0 | Journal end sensor: paper present. |
| | On | 04 | 4 | Journal end sensor: paper not present. |
| 3 | Off | 00 | 0 | Receipt end sensor: paper present. |
| | On | 08 | 8 | Receipt end sensor: paper not present. |
| 4 | Off | 00 | 0 | Not used. Fixed to Off. |
| 5 | Off | 00 | 0 | TOF sensor: paper present. |
| | On | 20 | 32 | TOF sensor: paper not present. |
| 6 | Off | 00 | 0 | BOF sensor: paper present. |
| | On | 40 | 64 | BOF sensor: paper not present. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

- Some paper sensors are not present, depending on the printer model.
- The names of some paper sensors are different, depending on the printer model.
- Drawer kick-out connector status (***n*** = 2, 50)

| Bit | Off/On | Hex | Decimal | Status |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Drawer kick-out connector pin 3 is LOW. |
| | On | 01 | 1 | Drawer kick-out connector pin 3 is HIGH. |
| 1-3 | — | — | — | Undefined. |
| 4 | Off | 00 | 0 | Not used. Fixed to Off. |
| 5, 6 | — | — | — | Undefined. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

***... how to use this table***

- Cut sheet status (***n*** = 3, 51)

  Transmits the remaining printing area (times the number of dots for the resident characters in the vertical direction) by using the values from 00H to 0FH. When the cut sheet is not selected as the paper type, the status is 00H. The range for the cut sheet status is different, depending on the printer model.

**Program Example**

```
PRINT #1, CHR$(&H1D);"r";CHR$(1); ← Transmits paper sensor status
```

**TM-U950**

**Handshaking for a serial interface is selected by DIP switch 1-8.**

- **Paper sensor status (*n* = 1, 49)**

**The names of the paper sensors for bits 5 and 6:**

- **Slip insertion sensor is the same sensor as the TOF sensor.**
- **Slip ejection sensor is the same sensor as the BOF sensor.**

- **Slip status (*n* = 3, 51)**

**Slip status is used as Cut sheet status.**

**The slip status information for this printer is different from the standard ESC/POS cut sheet status information as follows:**

| Slip Status | Status | |
|---|---|---|
| | Hex | Decimal |
| No printing area or slip not selected. | 00 | 0 |
| 1-line printing excluding double-height characters is possible. | 01 | 1 |
| 1-line printing including double-height characters is possible. | 02 | 2 |
| One or more lines can be printed with the line spacing to have been set. | 03 | 3 |

# MECHANISM CONTROL COMMANDS

| Command | Name |
|---|---|
| ESC < | Return home |
| ESC U | Turn unidirectional printing mode on/off |
| ESC i | Partial cut (one point left uncut) |
| ESC m | Partial cut (three points left uncut) |
| ESC o | Stamp |

# ESC <



[Name] Return home

[Format]

| | | |
|---|---|---|
| ASCII | ESC | < |
| Hex | 1B | 3C |
| Decimal | 27 | 60 |

[Range] None

[Default] None

[Printers not featuring this command] None

[Description] Moves the print head to the standby position.

[Note] ■ The standby position is different, depending on the printer model.

[Model-dependent variations] **TM-U950**

**Program Example**

```
PRINT #1, CHR$(&H1B);"<";
```

**TM-U950**

**The standby position is in the right.**

# ESC U



[Name] Turn unidirectional printing mode on/off

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | U | ***n*** |
| Hex | 1B | 55 | ***n*** |
| Decimal | 27 | 85 | ***n*** |

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

[Default] **TM-U950: *n* = 0**

[Printers not featuring this command] None

[Description] Turns unidirectional printing mode on or off.

- When the LSB of ***n*** is 0, unidirectional printing mode is turned off.
- When the LSB of ***n*** is 1, unidirectional printing mode is turned on.

[Notes]

- When unidirectional printing mode is turned off, bidirectional printing mode is automatically turned on.
- Unidirectional printing mode can be turned on when printing double-height characters or downloaded bit image to ensure that the top and bottom of the printing patterns are aligned.

[Model-dependent variations] None

**Program Example**

```
PRINT #1, CHR$(&H1B);"U";CHR$(1); ← Unidirectional printing mode turned on
```

# ESC i



[Name] Partial cut (one point left uncut)

[Format]

| | | |
|---|---|---|
| ASCII | ESC | i |
| Hex | 1B | 69 |
| Decimal | 27 | 105 |

[Range] None

[Default] None

[Printers not featuring this command] None

[Description] Executes a partial cut of the receipt paper with one point left uncut.

[Notes]

- **ESC i** is not a recommended command.
- This command is enabled only when receipt paper is selected as the paper type. If the cut sheet (slip paper) is selected as the paper type, this command is ignored.
- This command is enabled only when processed at the beginning of the line.
- If an autocutter is not provided for the receipt paper selected as the paper type, this command is ignored.
- When using this command, there is a gap between the autocutter and print position.

[Model-dependent variations] None

**See program example and print sample for ESC i and ESC m.**

# ESC m



[Name] Partial cut (three points left uncut)

[Format]

| | | |
|---|---|---|
| ASCII | ESC | m |
| Hex | 1B | 6D |
| Decimal | 27 | 109 |

[Range] None

[Default] None

[Printers not featuring this command] None

[Description] Executes a partial cut of the receipt paper with three points left uncut.

[Notes]

- **ESC m** is not a recommended command.
- This command is enabled only when receipt paper is selected as the paper type. If the cut sheet (slip paper) is selected as the paper type, this command is ignored.
- This command is enabled only when processed at the beginning of the line.
- If an autocutter is not provided for the receipt paper selected as the paper type, this command is ignored.
- When using this command, there is a gap between the autocutter and print position.

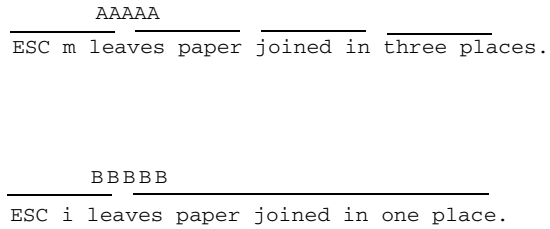
[Model-dependent variations] None

# Program example for ESC i and ESC m

**Program Example**

```
PRINT #1,CHR$(&H1B);"c0";CHR$(2); ←Select paper type
PRINT #1,"    AAAAA";
PRINT #1,CHR$(&H1B);"d";CHR$(5);
PRINT #1,CHR$(&H1B);"m"; ←Cut paper
PRINT #1,"    BBBBB";
PRINT #1,CHR$(&H1B);"d";CHR$(5);
PRINT #1,CHR$(&H1B);"i";  ←Cut paper
```

**Print Sample**



# ESC o



[Name] Stamp

[Format]

| | | |
|---|---|---|
| ASCII | ESC | o |
| Hex | 1B | 6F |
| Decimal | 27 | 111 |

[Range] None

[Default] None

[Printers not featuring this command] None

[Description] Executes stamp printing on the receipt paper.

[Notes]

- This command is enabled only when receipt paper is selected as the paper type. If the cut sheet (slip paper) is selected as the paper type, this command is ignored.
- This command is enabled only when processed at the beginning of the line.
- If a stamp is not provided for the receipt paper selected as the paper type, this command is ignored.
- When using this command, there is a gap between the stamp position and the print position.

[Model-dependent variations] None

**Program Example**

```
PRINT #1,CHR$(&H1B);"c0";CHR$(2); ←Select paper type
PRINT #1,CHR$(&H1B);"o"; ←Stamp
PRINT #1,CHR$(&H1B);"d";CHR$(13);
PRINT #1,"    AAAAA";CHR$(&HA);
```

**Print Sample**

# CONTROL OPTION COMMANDS

| Command | Name |
|---|---|
| **FS a 0** | Read check paper |
| **FS a 1** | Load check paper to print starting position |
| **FS a 2** | Eject check paper |
| **FS b** | Request retransmission of check paper reading result |
| **FS c** | MICR mechanism cleaning |

# FS a 0



[Name] Read check paper

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | FS | a | 0 | ***n*** |
| Hex | 1C | 61 | 30 | ***n*** |
| Decimal | 28 | 97 | 48 | ***n*** |

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

[Default] None

[Printers not featuring this command] None

[Description] Selects the MICR function and reads the check paper, using ***n*** as follows:

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Readable fonts. **See the table below.** |
| | On | 01 | 1 | |
| 1 | Off | 00 | 0 | |
| | On | 02 | 2 | |
| 2-7 | — | — | — | Undefined. |

Readable fonts:

| Bit 1 | Bit 0 | Hex | Decimal | Font |
|---|---|---|---|---|
| Off | Off | 00 | 0 | E13B |
| Off | On | 01 | 1 | CMC7 |
| On | Off | 02 | 2 | Undefined |
| On | On | 03 | 3 | Undefined |

- If an undefined font is selected, this command is ignored.

[Notes]

- Readable fonts indicate the character standard for converting a readable waveform to a character data.
- This command supports the printers with the MICR option.

- This command is enabled only when processed at the beginning of the line.
- If MICR function is not selected when this command is executed, the MICR function is selected and the printer is in the check paper waiting status. The printer waits for the check paper until the check paper is inserted, the waiting time ***t1*** set by **ESC f** elapses, the printer is reset, or the power is turned off. Selected/unselected of the MICR function is confirmed by **DLE EOT BS**.
- During the check paper waiting period, the printer processes only a real-time command, such as **DLE EOT** or **DLE ENQ**.
- It is possible to cancel the check paper waiting status using **DLE ENQ 3**. In this case, however, data in the print and receive buffer is cleared. The check paper insertion waiting status can be confirmed by **DLE EOT BS**.
- If a character detected cannot be identified as the specified character font, the printer ends this command at this point and transmits "header + reading status (abnormal end) + NUL" (bit 5 of Reading status is On) to the host computer.
- The printer transmits a reading result to the host computer after reading.
  - When the printer ends reading normally, it transmits "① header + ② reading status (normal end) + ③ data + ④ NUL" to the host computer.
  - When a reading result is abnormal, the printer transmits "① header + ② reading status (abnormal end) + ④ NUL" to the host computer. The printer does not transmit "③ data".

    ① Header: 5FH (decimal 95)

② Reading status:

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Readable fonts. **See the table below.** |
| | On | 01 | 1 | |
| 1 | Off | 00 | 0 | |
| | On | 02 | 2 | |
| 2, 3 | — | — | — | Undefined. |
| 4 | Off | 00 | 0 | Rereading possible. |
| | On | 10 | 16 | Rereading not possible. |
| 5 | Off | 00 | 0 | Reading: Normal end. |
| | On | 20 | 32 | Reading: Abnormal end. |
| 6 | On | 40 | 64 | Not used. Fixed to On. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

Readable fonts:

| Bit 1 | Bit 0 | Hex | Decimal | Font |
|---|---|---|---|---|
| Off | Off | 00 | 0 | E13B |
| Off | On | 01 | 1 | CMC7 |
| On | Off | 02 | 2 | Undefined |
| On | On | 03 | 3 | Undefined |

③ Data: Identified character strings (ASCII code).

④ NUL: 00H (decimal 0)

- Bits 0 and 1 of the Reading status indicate identified character fonts. When an abnormal end occurs, bit 0 and bit 1 have no meaning.
- In the following cases, rereading is not possible (bit 4 is On):
  - When an abnormal end occurs.
  - When the printer gets to the maximum times for rereading (the maximum time is different for different models).
  - When the MICR status is not selected.

- The following cases are abnormal ends (bit 5 of Reading status is On):
  - The check paper waiting status is canceled by **DLE ENQ 3.**
  - The wait time ***t1*** set by **ESC f** has elapsed.
  - Character waveforms cannot be detected.
  - Normal waveform reading cannot be detected.
  - An error occurs during the period from the start of command processing to the transmission of Header.
  - When an error occurs (errors are different depending on the printer).
- When bit 4 of reading status is Off (rereading possible) and codes other than **FS a 0, FS a 1, FS a 2, FS b,** or real-time commands are processed, the printer ejects the check paper, ends the MICR function, turns bit 4 On (rereading not possible), and selects the journal and receipt paper as the paper types.
- When bit 4 of reading status is On (rereading not possible) and codes other than **FS a 1, FS a 2, FS b,** or real-time commands are processed, the printer ejects the check paper, ends the MICR function, and selects the journal and receipt paper as the paper types.
- When bit 5 of reading status is Off (reading ends normally), the printer transmits "Header ~ NUL" to the host computer but does not eject the check paper. And then, codes other than **FS a 1, FS a 2, FS b**, or real-time commands are processed, the printer ejects the check paper, ends the MICR function, and selects the journal and receipt paper as the paper types.
  - When an abnormal end occurs, the printer ejects the check paper, deselects the MICR function, and selects the journal and receipt paper as the paper types.
- When an abnormal end occurs due to a recoverable error, the printer does not transmit "Header ~ NUL." The printer recovers from the error by **DLE ENQ 1** or **DLE ENQ 2** after the cause of the error is removed, ejects the check paper, deselects the MICR function, and selects the journal and receipt paper as the paper types.
- The printer ignores real-time commands during "Header ~ NUL" transmission.
- Even if the ASB function is selected, the ASB status is not transmitted during reading and "Header ~ NUL" transmission.
- When DTR/DSR control (handshaking) is selected by DIP switch with a serial interface, the printer confirms just before transmitting the header that the host computer is ready to receive data. If the host computer is not ready to receive data, the printer waits until the host becomes ready. After transmitting the header, the printer transmits all data without confirming whether the host computer can receive data.

- When XON/XOFF control is selected by DIP switch (Handshaking) with a serial interface, the printer transmits "Header ~ NUL" consecutively without confirming whether the host computer can receive data.
- The Reading status is not cleared until the next **FS a 0** is executed, **ESC @** is executed, the printer is reset, or the power is turned off.
- Paper feeding with the Paper feed button cannot be performed during the period from starting MICR reading to ending check paper ejection.
- MICR encoding table

① E13B

| MICR | Character | Hex | Decimal | MICR | Character | Hex | Decimal |
|---|---|---|---|---|---|---|---|
| | NULL | 0 0 | 0 | 0 | 0 | 3 0 | 4 8 |
| | SP | 2 0 | 3 2 | 1 | 1 | 3 1 | 4 9 |
| | ? | 3 F | 6 3 | 2 | 2 | 3 2 | 5 0 |
| | | | | 3 | 3 | 3 3 | 5 1 |
| | T | 5 4 | 8 4 | 4 | 4 | 3 4 | 5 2 |
| | A | 4 1 | 6 5 | 5 | 5 | 3 5 | 5 3 |
| | O | 4 F | 7 9 | 6 | 6 | 3 6 | 5 4 |
| | D | 4 4 | 6 8 | 7 | 7 | 3 7 | 5 5 |
| | | | | 8 | 8 | 3 8 | 5 6 |
| | | | | 9 | 9 | 3 9 | 5 7 |

② CMC7

| MICR | Character | Hex | Decimal | MICR | Character | Hex | Decimal |
|---|---|---|---|---|---|---|---|
| | NULL | 0 0 | 0 | 0 | 0 | 3 0 | 4 8 |
| | SP | 2 0 | 3 2 | 1 | 1 | 3 1 | 4 9 |
| | ? | 3 F | 6 3 | 2 | 2 | 3 2 | 5 0 |
| | | | | 3 | 3 | 3 3 | 5 1 |
| | / | 2 F | 4 7 | 4 | 4 | 3 4 | 5 2 |
| | # | 2 3 | 3 5 | 5 | 5 | 3 5 | 5 3 |
| | = | 3 D | 6 1 | 6 | 6 | 3 6 | 5 4 |
| | > | 3 E | 6 2 | 7 | 7 | 3 7 | 5 5 |
| | ^ | 5 E | 9 4 | 8 | 8 | 3 8 | 5 6 |
| | | | | 9 | 9 | 3 9 | 5 7 |

**Program Example**

```
PRINT #1, CHR$(&H1C);"a0";CHR$(0); ←Readable font as E13B
```

**TM-U950**

**Handshaking for a serial interface is selected by DIP switch 1-8.**

**The printer can only reread once. No individual abnormal ends.**

# FS a 1



[Name] Load check paper to print starting position

[Format]

| | | | |
|---|---|---|---|
| ASCII | FS | a | 1 |
| Hex | 1C | 61 | 31 |
| Decimal | 28 | 97 | 49 |

[Range] None

[Default] None

[Printers not featuring this command] None

[Description] Loads the check paper to the print starting position.

[Notes]

- This command is only supported with the MICR option.
- This command is ignored unless the MICR function is selected.
- When this command is executed, bit 4 of reading status for **FS b** is On (rereading not possible).
- After loading the check paper, the printer ends the MICR function and selects slip paper as the paper type.

[Model-dependent variations] None

**Program Example**

```
PRINT #1, CHR$(&H1C);"a1";
```

# FS a 2



[Name] Eject check paper

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | FS | a | 2 |
| Hex | 1C | 61 | 32 |
| Decimal | 28 | 97 | 50 |

[Range] None

[Default] None

[Printers not featuring this command] None

[Description] Ejects the check paper.

[Notes]

- This command is only supported with the MICR option.
- This command is ignored unless the MICR function is selected.
- When this command is executed, bit 4 of reading status for **FS b** is On (rereading not possible).
- After ejecting the check paper, the printer ends the MICR function and selects the journal and receipt paper as the paper types.

[Model-dependent variations] None

**Program Example**

```
PRINT #1, CHR$(&H1C);"a2";
```

# FS b



[Name] Request retransmission of check paper reading result

[Format]

| | | |
|---|---|---|
| ASCII | FS | b |
| Hex | 1C | 62 |
| Decimal | 28 | 98 |

[Range] None

[Default] None

[Printers not featuring this command] None

[Description] Retransmits the previous check paper reading results.

[Notes]

■ This command supports printers with the MICR option.

■ The transmitted information is the same as that previously transmitted by **FS a 0**.

- Header: 5FH (decimal 95)
- Reading status:

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Readable fonts.<br>**See the table below.** |
| | On | 01 | 1 | |
| 1 | Off | 00 | 0 | |
| | On | 02 | 2 | |
| 2, 3 | — | — | — | Undefined. |
| 4 | Off | 00 | 0 | Rereading possible. |
| | On | 10 | 16 | Rereading not possible. |
| 5 | Off | 00 | 0 | Reading: Normal end. |
| | On | 20 | 32 | Reading: Abnormal end. |
| 6 | On | 40 | 64 | Not used. Fixed to On. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

Readable fonts:

| Bit 1 | Bit 0 | Hex | Decimal | Font |
|---|---|---|---|---|
| Off | Off | 00 | 0 | E13B |
| Off | On | 01 | 1 | CMC7 |
| On | Off | 02 | 2 | Undefined |
| On | On | 03 | 3 | Undefined |

- Data: Identified character strings (ASCII code).
- NUL: 00H (decimal 0)

■ Bits 0 and 1 of the Reading status indicate identified character fonts. When an abnormal end occurs, both bit 0 and 1 have no meaning.

■ If **FS a 0** is not executed before **FS b**, the printer transmits " ① Header + ② Reading status (abnormal end) + ④ NUL". "③ data" is not transmitted.

■ The printer ignores real-time commands during "Header ~ NUL" transmission.

■ Even if the ASB function is selected, the ASB status is not transmitted during "Header ~ NUL" transmission.

■ When DTR/DSR control is selected by DIP switch (Handshaking) with a serial interface, the printer confirms just before transmitting the Header that the host computer is ready to receive data. If the host computer is not ready to receive data, the printer waits until the host becomes ready. After transmitting the Header, the printer transmits all data without confirming whether the host can receive data.

■ When XON/XOFF control is selected by DIP switch (Handshaking) with a serial interface, the printer transmits "Header ~ NUL" consecutively without confirming whether the host computer can receive data.

[Model-dependent variations] **TM-U950**

**Program Example**

```
PRINT #1, CHR$(&H1C);"b";
```

**TM-U950**

**Handshaking for a serial interface is selected by DIP switch 1-8.**

# FS c



[Name] MICR mechanism cleaning

[Format]

| | | |
|---|---|---|
| ASCII | FS | c |
| Hex | 1C | 63 |
| Decimal | 28 | 99 |

[Range] None

[Default] None

[Printers not featuring this command] None

[Description] Cleans the MICR mechanism.

[Notes]

- This command supports printers with the MICR option.
- This command is enabled only when processed at the beginning of the line.
- When this command is executed, the printer enters the cleaning sheet waiting status. Insert the cleaning sheet into the check paper entrance. The printer waits for the cleaning sheet until a cleaning sheet is inserted, the waiting time ***t1*** set by **ESC f** elapses, the printer is reset, or the power is turned off.
- During the cleaning sheet waiting period, the printer processes only a real-time command, such as **DLE EOT** or **DLE ENQ**.
- It is possible to cancel the cleaning sheet waiting status using **DLE ENQ 3**. In this case, however, data in the print and receive buffer is cleared. The cleaning sheet insertion waiting status can be confirmed by **DLE EOT BS**.
- After cleaning the MICR mechanism, the printer automatically selects the journal and receipt paper as the paper types.

[Model-dependent variations] None

**Program Example**

```
PRINT #1, CHR$(&H1C);"c";
```

# MISCELLANEOUS COMMANDS

| Command | Name |
|---|---|
| DLE ENQ | Real-time request to printer |
| ESC = | Select peripheral device |
| ESC @ | Initialize printer |
| ESC p | Generate pulse |
| GS E | Select head control method |
| GS I | Transmit printer ID |
| GS P | Set horizontal and vertical motion units |

# DLE ENQ



[Name] Real-time request to printer

[Format]

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

[Range] $1 \leq n \leq 3$

[Default] None

[Printers not featuring this command] None

[Description] Responds to a request in real time from the host computer, using ***n*** as follows:

| ***n*** | **Request** |
|---|---|
| 1 | Restarts printing from the beginning of the line where an error occurred, after recovering from the error. |
| 2 | Recovers from an error after clearing the receive and print buffers. |
| 3 | Cancels the cut sheet waiting status after clearing the receive and print buffers. |

[Notes]

- The printer executes this command upon receiving it.
- With a serial interface model, this command is executed even when the printer is offline, or the receive buffer is full.
- With a parallel interface model, this command is not executed in the following statuses, because the printer is busy and unable to receive data from the host computer. The DIP switch (BUSY condition) is different, depending on the printer model.
  - Receive buffer is full when DIP switch is set to On.
  - Printer is offline or receive buffer is full when DIP switch is set to Off.
- This command is ignored during the process of transmitting the check paper reading result (only with MICR reader model).

- When a recoverable error occurs, after the cause of the error is removed, the printer can recover from the error by transmitting **DLE ENQ 1** or **DLE ENQ 2** without turning off the power.
- **DLE ENQ 1** or **DLE ENQ 2** is enabled only when a recoverable error occurs with the exception of an automatically recovered error, and is ignored in other cases. Errors recoverable by **DLE ENQ 1** or **DLE ENQ 2** depend on the printer model.
- **DLE ENQ 1** or **DLE ENQ 2** is also executed to recover from a recoverable error when the printer is disabled by **ESC =.**
- When the printer recovers from an error using **DLE ENQ 1** with cut sheet (slip paper) selected, the printer ejects the current sheet completely and waits for insertion of a new sheet. However, the printer only ejects the sheet and does not wait for insertion of a new sheet when the printer recovers from a cut sheet ejection error.
- When the printer recovers from an error using **DLE ENQ 2** with cut sheet selected, the printer ejects the current sheet completely and selects the journal and receipt paper as the paper types.
- **DLE ENQ 3** is enabled only when the printer is in the cut sheet (slip paper, check paper, and cleaning sheet) insertion waiting status, and is ignored in other cases. The slip paper insertion waiting status can be confirmed by **DLE EOT**. And the check paper or cleaning sheet insertion waiting status can be confirmed by **DLE EOT BS**.
- When the cut sheet waiting status is canceled using **DLE ENQ 3**, the printer selects paper roll as the paper type.

[Model-dependent variations] **TM-U950**.

**Program Example**

```
PRINT #1, CHR$(&H10);CHR$(&H5);CHR$(2);
```

**TM-U950**

**BUSY condition for a parallel interface is selected by DIP switch 2-5.**

**Recoverable error indicates the autocutter error, home position detection error, carriage detection error, or cut sheet (slip or check paper or cleaning sheet) ejection error.**

# ESC =



[Name] Select peripheral device

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | = | ***n*** |
| Hex | 1B | 3D | ***n*** |
| Decimal | 27 | 61 | ***n*** |

[Range] $1 \leq n \leq 3$

[Default] A serial interface model:

- When DIP switch (connection of customer display) is Off: ***n*** = 1.
- When DIP switch (connection of customer display) is On: ***n*** = 2.

A parallel interface model: ***n*** = 1.

[Printers not featuring this command] None

[Description] Selects the device to which the host computer sends data, using ***n*** as follows:

| ***n*** | **Peripheral Device Status** |
|---|---|
| 1 | Only printer selected (customer display is disabled). |
| 2 | Only customer display selected (printer is disabled). |
| 3 | Both printer and customer display selected. |

[Notes]

- When the printer is disabled (***n*** = 2), it ignores all received data with the exception of **DLE ENQ 1** and **DLE ENQ 2**.
- If ASB is enabled when the printer is disabled by this command, the printer transmits 4-byte status message whenever the status changes.

■ When executing **ESC @**, the default value of this command is as follows, depending on the value set by this command just before processing **ESC @** and on the setting of DIP switch (connection of customer display).

| | | ***n*** | | |
|---|---|---|---|---|
| **Before ESC @ processing** | | **1** | **2** | **3** |
| After **ESC @** processing | When DIP switch (connection of customer display) is Off | 1 | 2 | 1 |
| | When DIP switch (connection of customer display) is On | 1 | 2 | 2 |

- If the printer does not support DIP switch (connection of customer display), the default value of this command is the same as when DIP switch is Off.

[Model-dependent variations] **TM-U950**

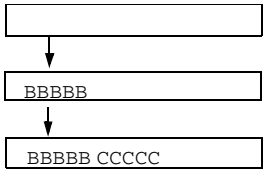
**Program Example**

```
PRINT #1, CHR$(&H1B);"=";CHR$(1); ← Only printer selected
PRINT #1, "AAAAA";
PRINT #1, CHR$(&H1B);"=";CHR$(2); ← Only customer display selected
PRINT #1, "BBBBB";
PRINT #1, CHR$(&H1B);"=";CHR$(3);← Both printer and customer display selected
PRINT #1, " CCCCC"; CHR$(&HA);
```

**Print Sample**

```
AAAAA CCCCC
```

**Customer Display Sample**




**TM-U950**

**Connection of customer display (DM-D) for a serial interface is selected by DIP switch 1-6.**

# ESC @



[Name] Initialize printer

[Format]

| | | |
|---|---|---|
| ASCII | ESC | @ |
| Hex | 1B | 40 |
| Decimal | 27 | 64 |

[Range] None

[Default] None

[Printers not featuring this command] None

[Description] The data in the print buffer is cleared and the printer mode(s) is reset to the mode that was in effect when the power was turned on.

[Notes]

- The DIP switch settings are not checked again.
- The data in the receive buffer is not cleared.
- Any macro definitions are not cleared.
- When **ESC @** is executed, the setting of **ESC =** (Select peripheral device) differs from the default value when the power is turned on.
  - The value of ***n*** after **ESC @** is executed is different, depending on the status of the peripheral device selection just before executing **ESC @** and the DIP switch setting for customer display (DM-D) connection as follows:)

| | | ***n*** | | |
|---|---|---|---|---|
| Setting when the power is turned on | DIP switch for customer display (DM-D) connection is Off. | 1 | | |
| | DIP switch for customer display (DM-D) connection is On. | 2 | | |
| Setting just before executing **ESC @** | | 1 | 2 | 3 |
| Setting after executing **ESC @** | DIP switch for customer display (DM-D) connection is Off. | 1 | 2 | 1 |
| | DIP switch for customer display (DM-D) connection is On. | 1 | 2 | 2 |

- If the printer does not support the DIP switch for connection of a customer display, the setting is the same as when the DIP switch is Off.

■ When this command is processed with the cut sheet selected as the paper type, all settings are initialized after ejecting the cut sheet.

■ This command can cancel all the settings, such as print mode and line feed, at the same time.

[Model-dependent variations] **TM-U950**

**Program Example**

```
PRINT #1, CHR$(&H1D);"P";CHR$(180);CHR$(180);
PRINT #1, CHR$(&H1B);"3";CHR$(60);
PRINT #1, CHR$(&H1B);"U";CHR$(1);
PRINT #1, CHR$(&H1B);"E";CHR$(1);
PRINT #1, CHR$(&H1B);"-";CHR$(1);
PRINT #1, CHR$(&H1D);"!";CHR$(17);
PRINT #1, "AAAAA"; CHR$(&HA);
PRINT #1, CHR$(&H1B);"@";  ← Initialize printer
PRINT #1, "BBBBB"; CHR$(&HA);
```

**Print Sample**

```
AAAAA
BBBBB        ←All settings are canceled after ESC @ is executed
```

**TM-U950**

**Connection of customer display (DM-D) for a serial interface is selected by DIP switch 1-6.**

# ESC p



[Name] Generate pulse

[Format]

| | | | | | |
|---|---|---|---|---|---|
| ASCII | ESC | p | ***m*** | ***t1*** | ***t2*** |
| Hex | 1B | 70 | ***m*** | ***t1*** | ***t2*** |
| Decimal | 27 | 112 | ***m*** | ***t1*** | ***t2*** |

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

[Default] None

[Printers not featuring this command] None

[Description] Outputs the pulse specified by ***t1*** and ***t2*** to the specified connector pin ***m*** as follows:

| ***m*** | **Connector pin** |
|---|---|
| 0, 48 | Drawer kick-out connector pin 2 |
| 1, 49 | Drawer kick-out connector pin 5 |

- ***t1*** indicates ON time and t2 indicates OFF time.

[Notes]
- If ***m*** is out of range, this command is canceled and the following data is processed as normal data.
- If ***t2*** < ***t1***, the OFF time is equal to the ON time.

[Model-dependent variations] **TM-U950**

**Program Example**

```
PRINT #1, CHR$(&H1B);"p";CHR$(0);CHR$(25);CHR$(250);
```

**TM-U950**

**A pulse is (ON time = *t1* × 10 msec / OFF time = *t2* × 10 msec).**

# GS E



[Name] Select head control method

[Format]

| | | | |
|---|---|---|---|
| ASCII | GS | E | ***n*** |
| Hex | 1D | 45 | ***n*** |
| Decimal | 29 | 69 | ***n*** |

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

[Default] **TM-U950: For the paper roll: when DIP switch 2-4 is Off, *n* = 1**
**when DIP switch 2-4 is On, *n* = 17**
**For the slip paper: *n* = 16**

[Printers not featuring this command] None

[Description] Selects the print speed and head energizing time, using ***n*** as follows:

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Head energizing time: Copy. |
| | On | 01 | 1 | Head energizing time: Normal. |
| 1-3 | — | — | — | Undefined. |
| 4 | Off | 00 | 0 | Printing speed: HIGH. |
| | On | 10 | 16 | Printing speed: LOW. |
| 5-7 | — | — | — | Undefined. |

***... how to use this table***

[Notes]

- This command is enabled only when processed at the beginning of the line.
- This command is available for paper type selected by **ESC c 0**. The head control method can be selected independently for journal, receipt, and slip paper.

**Program Example**

```
PRINT #1,CHR$(&H1D);"E";CHR$(16); ← Select printing speed to Low
```

**TM-U950**

**In this printer, high printing speed and copy head energizing time cannot be set simultaneously. *n* is used as follows:**

| *n* | Printing speed | Head energizing time |
|---|---|---|
| 1 | High | Normal |
| 16 | Low | Copy |
| 17 | Low | Normal |

# GS I



[Name] Transmit printer ID

[Format]

| | | | |
|---|---|---|---|
| ASCII | GS | I | ***n*** |
| Hex | 1D | 49 | ***n*** |
| Decimal | 29 | 73 | ***n*** |

[Range] $1 \leq n \leq 3$
$49 \leq n \leq 51$

[Default] None

[Printers not featuring this command] None

[Description] Transmits 1 byte of printer ID using ***n*** as follows:

| ***n*** | **Printer ID** | **Specification** |
|---|---|---|
| 1, 49 | Printer model ID | Printer model |
| 2, 50 | Type ID | Printer type |
| 3, 51 | Version ID | Firmware version |

[Notes]

- Printer model ID depends on the printer model.
- Type ID to be transmitted is as follows:

| **Bit** | **Off/On** | **Hex** | **Decimal** | **Function** |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Two-byte character code not supported. |
| 1 | Off | 00 | 0 | Not autocutter equipped. |
| | On | 02 | 2 | Autocutter equipped. |
| 2 | Off | 00 | 0 | DIP switch for connection of customer display is Off. |
| | On | 04 | 4 | DIP switch for connection of customer display is On. |
| 3 | Off | 00 | 0 | Without MICR reader. |
| | On | 08 | 8 | With MICR reader. |

***... how to use this table***

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 4 | Off | 00 | 0 | Not used. Fixed to Off. |
| 5, 6 | — | — | — | Undefined. |
| 7 | Off | 00 | 0 | Not used. Fixed to Off. |

- With a parallel interface model, bit 2 is fixed to Off.

■ When DTR/DSR control is selected by DIP switch (Handshaking) with a serial interface, the printer transmits the ID data after confirming that the host is ready to receive data. If the host computer is not ready to receive data, the printer waits until the host becomes ready.

■ When XON/XOFF control is selected by DIP switch (Handshaking) with a serial interface, the printer transmits the ID data without confirming whether the host computer can receive data.

[Model-dependent variations] **TM-U950**

**Program Example**

```
PRINT #1, CHR$(&H1D);"I";CHR$(1);← Transmits printer ID
```

**TM-U950**

**Handshaking for a serial interface is selected by DIP switch 1-8.**

**Connection of customer display (DM-D) for a serial interface is selected by DIP switch 1-6.**

- **Printer model ID (*n* = 1, 49)**

**Hex: 09H / Decimal: 9**

- **Type ID (*n* = 2, 50)**

**Bit 1 is fixed to On (autocutter equipped).**

# GS P



[Name] Set horizontal and vertical motion units

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | GS | P | ***x*** | ***y*** |
| Hex | 1D | 50 | ***x*** | ***y*** |
| Decimal | 29 | 80 | ***x*** | ***y*** |

[Range] $0 \leq x \leq 255$
$0 \leq y \leq 255$

[Default] **TM-U950: *x* = 150, *y* = 144**

[Printers not featuring this command] None

[Description] Sets the horizontal and vertical motion units to 1/***x*** and 1/***y*** inches, respectively.

- When ***x*** = 0, the default setting of horizontal value is used.
- When ***y*** = 0, the default setting of vertical value is used.

[Notes]

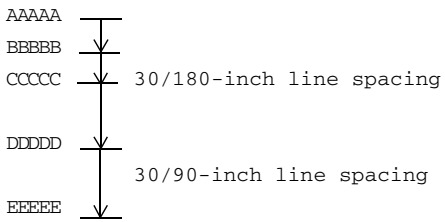
- The horizontal direction is perpendicular to the paper feed direction and the vertical direction is the paper feed direction.
- The horizontal and vertical motion units indicate the minimum pitch used for calculating the values of related commands (shown on the next screen).
- The following commands use ***x*** or ***y***.
  - Commands using ***x***: **ESC SP, ESC $,** and **ESC **
  - Commands using ***y***: **ESC 3, ESC J,** and **ESC K**
- The calculated result from combining this command with others is truncated to the minimum value of the mechanical pitch.
- This command does not affect the current setting values.

[Model-dependent variations] **TM-U950**

**Program Example**

```
PRINT #1, CHR$(&H1D);"P";CHR$(180);CHR$(180);
PRINT #1, CHR$(&H1B);"3";CHR$(30);  ← Set line spacing
PRINT #1, "AAAAA"; CHR$(&HA);
PRINT #1, "BBBBB"; CHR$(&HA);
PRINT #1, CHR$(&H1D);"P";CHR$(180);CHR$(90);
PRINT #1, CHR$(&H1B);"3";CHR$(30); ← Set line spacing
PRINT #1, "CCCCC"; CHR$(&HA);
PRINT #1, "DDDDD"; CHR$(&HA);
PRINT #1, "EEEEE"; CHR$(&HA);
```

**Print Sample**




**TM-U950**

**The default values equal a half dot pitch in horizontal and 1/2 dot pitch in vertical.**

# CHARACTER CODE TABLES

SP in a table represents space. See **Using the character code tables** for information on how to read these tables.

Page 0 (PC437: U.S.A., Standard Europe) (International character set: U.S.A.)

| HEX | BIN | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0000 | 0001 | 0010 | 0011 | 0100 | 0101 | 0110 | 0111 | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | NUL 00 | DLE 16 | SP 32 | 0 48 | @ 64 | P 80 | ` 96 | p 112 | Ç 128 | É 144 | á 160 | ▒ 176 | └ 192 | ╨ 208 | α 224 | ≡ 240 |
| 1 | 0001 | 01 | 17 | ! 33 | 1 49 | A 65 | Q 81 | a 97 | q 113 | ü 129 | æ 145 | í 161 | ▒ 177 | ┴ 193 | ╤ 209 | ß 225 | ± 241 |
| 2 | 0010 | 02 | 18 | " 34 | 2 50 | B 66 | R 82 | b 98 | r 114 | é 130 | Æ 146 | ó 162 | ▒ 178 | ┬ 194 | ╥ 210 | Γ 226 | ≥ 242 |
| 3 | 0011 | 03 | 19 | # 35 | 3 51 | C 67 | S 83 | c 99 | s 115 | â 131 | ô 147 | ú 163 | │ 179 | ├ 195 | ╙ 211 | π 227 | ≤ 243 |
| 4 | 0100 | EOT 04 | 20 | $ 36 | 4 52 | D 68 | T 84 | d 100 | t 116 | ä 132 | ö 148 | ñ 164 | ┤ 180 | ─ 196 | ╘ 212 | Σ 228 | ⌠ 244 |
| 5 | 0101 | ENQ 05 | 21 | % 37 | 5 53 | E 69 | U 85 | e 101 | u 117 | à 133 | ò 149 | Ñ 165 | ╡ 181 | ┼ 197 | ╒ 213 | σ 229 | ⌡ 245 |
| 6 | 0110 | 06 | 22 | & 38 | 6 54 | F 70 | V 86 | f 102 | v 118 | å 134 | û 150 | ª 166 | ╢ 182 | ╞ 198 | ╓ 214 | µ 230 | ÷ 246 |
| 7 | 0111 | 07 | 23 | ' 39 | 7 55 | G 71 | W 87 | g 103 | w 119 | ç 135 | ù 151 | º 167 | ╖ 183 | ╟ 199 | ╫ 215 | τ 231 | ≈ 247 |
| 8 | 1000 | BS 08 | CAN 24 | ( 40 | 8 56 | H 72 | X 88 | h 104 | x 120 | ê 136 | ÿ 152 | ¿ 168 | ╕ 184 | ╚ 200 | ╪ 216 | Φ 232 | ° 248 |
| 9 | 1001 | HT 09 | 25 | ) 41 | 9 57 | I 73 | Y 89 | i 105 | y 121 | ë 137 | Ö 153 | ⌐ 169 | ╣ 185 | ╔ 201 | ┘ 217 | Θ 233 | • 249 |
| A | 1010 | LF 10 | 26 | * 42 | : 58 | J 74 | Z 90 | j 106 | z 122 | è 138 | Ü 154 | ¬ 170 | ║ 186 | ╩ 202 | ┌ 218 | Ω 234 | · 250 |
| B | 1011 | 11 | ESC 27 | + 43 | ; 59 | K 75 | [ 91 | k 107 | { 123 | ï 139 | ¢ 155 | ½ 171 | ╗ 187 | ╦ 203 | ▉ 219 | δ 235 | √ 251 |
| C | 1100 | FF 12 | FS 28 | , 44 | < 60 | L 76 | \ 92 | l 108 | ¦ 124 | î 140 | £ 156 | ¼ 172 | ╝ 188 | ╠ 204 | ▄ 220 | ∞ 236 | n 252 |
| D | 1101 | CR 13 | GS 29 | − 45 | = 61 | M 77 | ] 93 | m 109 | } 125 | ì 141 | ¥ 157 | ¡ 173 | ╜ 189 | ═ 205 | ▌ 221 | ø 237 | ² 253 |
| E | 1110 | 14 | 30 | . 46 | > 62 | N 78 | ^ 94 | n 110 | ~ 126 | Ä 142 | ₧ 158 | « 174 | ╛ 190 | ╬ 206 | ▐ 222 | ∈ 238 | ■ 254 |
| F | 1111 | 15 | 31 | / 47 | ? 63 | O 79 | _ 95 | o 111 | SP 127 | Å 143 | ƒ 159 | » 175 | ┐ 191 | ╧ 207 | ▀ 223 | ∩ 239 | SP 255 |

Page 1 (Katakana)

| | HEX | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|
| HEX | BIN | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | ー 128 | 丄 144 | SP 160 | ー 176 | タ 192 | ミ 208 | 二 224 | × 240 |
| 1 | 0001 | ▬ 129 | 丅 145 | 。 161 | ア 177 | チ 193 | ム 209 | 卜 225 | 円 241 |
| 2 | 0010 | ▬ 130 | 丬 146 | 「 162 | イ 178 | ツ 194 | メ 210 | 丰 226 | 年 242 |
| 3 | 0011 | ▬ 131 | 卜 147 | 」 163 | ウ 179 | テ 195 | モ 211 | 刊 227 | 月 243 |
| 4 | 0100 | ▬ 132 | 一 148 | 、 164 | エ 180 | ト 196 | ヤ 212 | ◢ 228 | 日 244 |
| 5 | 0101 | ■ 133 | 一 149 | ・ 165 | オ 181 | ナ 197 | ユ 213 | ◣ 229 | 時 245 |
| 6 | 0110 | ■ 134 | 丨 150 | ヲ 166 | カ 182 | ニ 198 | ヨ 214 | ◥ 230 | 分 246 |
| 7 | 0111 | ■ 135 | 丨 151 | ァ 167 | キ 183 | ヌ 199 | ラ 215 | ◤ 231 | 秒 247 |
| 8 | 1000 | ▌ 136 | 「 152 | ィ 168 | ク 184 | ネ 200 | リ 216 | ♠ 232 | 〒 248 |
| 9 | 1001 | ▌ 137 | 「 153 | ゥ 169 | ケ 185 | ノ 201 | ル 217 | ♥ 233 | 市 249 |
| A | 1010 | ▌ 138 | 乚 154 | ェ 170 | コ 186 | ハ 202 | レ 218 | ✦ 234 | 区 250 |
| B | 1011 | ▌ 139 | 」 155 | ォ 171 | サ 187 | ヒ 203 | ロ 219 | ♣ 235 | 町 251 |
| C | 1100 | ▌ 140 | 𠂉 156 | ャ 172 | シ 188 | フ 204 | ワ 220 | ● 236 | 村 252 |
| D | 1101 | ▌ 141 | 丶 157 | ュ 173 | ス 189 | ヘ 205 | ン 221 | ○ 237 | 人 253 |
| E | 1110 | ▌ 142 | 乀 158 | ョ 174 | セ 190 | ホ 206 | ゛ 222 | ／ 238 | ▒ 254 |
| F | 1111 | ┼ 143 | 丿 159 | ッ 175 | ソ 191 | マ 207 | ゜ 223 | ＼ 239 | SP 255 |

Page 2 (PC850: Multilingual)

| | HEX | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|
| HEX | BIN | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | Ç 128 | É 144 | á 160 | ░ 176 | └ 192 | ð 208 | Ó 224 | — 240 |
| 1 | 0001 | ü 129 | æ 145 | í 161 | ▒ 177 | ┴ 193 | Ð 209 | ß 225 | ± 241 |
| 2 | 0010 | é 130 | Æ 146 | ó 162 | ▓ 178 | ┬ 194 | Ê 210 | Ô 226 | ‗ 242 |
| 3 | 0011 | â 131 | ô 147 | ú 163 | │ 179 | ├ 195 | Ë 211 | Ò 227 | ¾ 243 |
| 4 | 0100 | ä 132 | ö 148 | ñ 164 | ┤ 180 | ─ 196 | È 212 | õ 228 | ¶ 244 |
| 5 | 0101 | à 133 | ò 149 | Ñ 165 | Á 181 | ┼ 197 | ı 213 | Õ 229 | § 245 |
| 6 | 0110 | å 134 | û 150 | ª 166 | Â 182 | ã 198 | Í 214 | µ 230 | ÷ 246 |
| 7 | 0111 | ç 135 | ù 151 | º 167 | À 183 | Ã 199 | Î 215 | þ 231 | ¸ 247 |
| 8 | 1000 | ê 136 | ÿ 152 | ¿ 168 | © 184 | ╚ 200 | Ï 216 | Þ 232 | ° 248 |
| 9 | 1001 | ë 137 | Ö 153 | ® 169 | ╣ 185 | ╔ 201 | ┘ 217 | Ú 233 | ¨ 249 |
| A | 1010 | è 138 | Ü 154 | ¬ 170 | ║ 186 | ╩ 202 | ┌ 218 | Û 234 | · 250 |
| B | 1011 | ï 139 | ø 155 | ½ 171 | ╗ 187 | ╦ 203 | ■ 219 | Ù 235 | ¹ 251 |
| C | 1100 | î 140 | £ 156 | ¼ 172 | ╝ 188 | ╠ 204 | ▄ 220 | ý 236 | ³ 252 |
| D | 1101 | ì 141 | Ø 157 | ¡ 173 | ¢ 189 | ═ 205 | ¦ 221 | Ý 237 | ² 253 |
| E | 1110 | Ä 142 | × 158 | « 174 | ¥ 190 | ╬ 206 | Ì 222 | ¯ 238 | ■ 254 |
| F | 1111 | Å 143 | ƒ 159 | » 175 | ┐ 191 | ¤ 207 | ▀ 223 | ´ 239 | SP 255 |

Page 3 (PC860: Portuguese)

| | HEX | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|
| HEX | BIN | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | Ç 128 | É 144 | á 160 | ░ 176 | └ 192 | ╨ 208 | α 224 | ≡ 240 |
| 1 | 0001 | ü 129 | À 145 | í 161 | ▒ 177 | ┴ 193 | ╤ 209 | ß 225 | ± 241 |
| 2 | 0010 | é 130 | È 146 | ó 162 | ▓ 178 | ┬ 194 | ╥ 210 | Γ 226 | ≥ 242 |
| 3 | 0011 | â 131 | ô 147 | ú 163 | │ 179 | ├ 195 | ╙ 211 | π 227 | ≤ 243 |
| 4 | 0100 | ã 132 | õ 148 | ñ 164 | ┤ 180 | ─ 196 | ╘ 212 | Σ 228 | ⌠ 244 |
| 5 | 0101 | à 133 | ò 149 | Ñ 165 | ╡ 181 | ┼ 197 | ╒ 213 | σ 229 | ⌡ 245 |
| 6 | 0110 | Á 134 | Ú 150 | ª 166 | ╢ 182 | ╞ 198 | ╓ 214 | µ 230 | ÷ 246 |
| 7 | 0111 | ç 135 | ù 151 | º 167 | ╖ 183 | ╟ 199 | ╫ 215 | τ 231 | ≈ 247 |
| 8 | 1000 | ê 136 | Ì 152 | ¿ 168 | ╕ 184 | ╚ 200 | ╪ 216 | Φ 232 | ° 248 |
| 9 | 1001 | Ê 137 | Õ 153 | ⌐ 169 | ╣ 185 | ╔ 201 | ┘ 217 | Θ 233 | • 249 |
| A | 1010 | è 138 | Ü 154 | ¬ 170 | ║ 186 | ╩ 202 | ┌ 218 | Ω 234 | · 250 |
| B | 1011 | Í 139 | ¢ 155 | ½ 171 | ╗ 187 | ╦ 203 | ■ 219 | δ 235 | √ 251 |
| C | 1100 | Ô 140 | £ 156 | ¼ 172 | ╝ 188 | ╠ 204 | ▄ 220 | ∞ 236 | n 252 |
| D | 1101 | ì 141 | Ù 157 | ¡ 173 | ╜ 189 | ═ 205 | ▌ 221 | ø 237 | ² 253 |
| E | 1110 | Ã 142 | ₧ 158 | « 174 | ╛ 190 | ╬ 206 | ▐ 222 | ∈ 238 | ■ 254 |
| F | 1111 | Â 143 | Ó 159 | » 175 | ┐ 191 | ╧ 207 | ▀ 223 | ∩ 239 | SP 255 |

Page 4 (PC863: Canadian-French)

| | HEX | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|
| HEX | BIN | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | Ç 128 | É 144 | ¦ 160 | ▒ 176 | └ 192 | ╨ 208 | α 224 | ≡ 240 |
| 1 | 0001 | ü 129 | È 145 | ´ 161 | ▒ 177 | ┴ 193 | ╤ 209 | ß 225 | ± 241 |
| 2 | 0010 | é 130 | Ê 146 | ó 162 | ▒ 178 | ┬ 194 | ╥ 210 | Γ 226 | ≥ 242 |
| 3 | 0011 | â 131 | ô 147 | ú 163 | │ 179 | ├ 195 | ╙ 211 | π 227 | ≤ 243 |
| 4 | 0100 | Â 132 | Ë 148 | ¨ 164 | ┤ 180 | ─ 196 | ╘ 212 | Σ 228 | ⌠ 244 |
| 5 | 0101 | à 133 | Ï 149 | ¸ 165 | ╡ 181 | ┼ 197 | ╒ 213 | σ 229 | ⌡ 245 |
| 6 | 0110 | ¶ 134 | û 150 | ª 166 | ╢ 182 | ╞ 198 | ╓ 214 | µ 230 | ÷ 246 |
| 7 | 0111 | ç 135 | ù 151 | ‾ 167 | ╖ 183 | ╟ 199 | ╫ 215 | τ 231 | ≈ 247 |
| 8 | 1000 | ê 136 | ¤ 152 | Î 168 | ╕ 184 | ╚ 200 | ╪ 216 | Φ 232 | ° 248 |
| 9 | 1001 | ë 137 | Ô 153 | ⌐ 169 | ╣ 185 | ╔ 201 | ┘ 217 | Θ 233 | • 249 |
| A | 1010 | è 138 | Ü 154 | ¬ 170 | ║ 186 | ╩ 202 | ┌ 218 | Ω 234 | · 250 |
| B | 1011 | ï 139 | ¢ 155 | ½ 171 | ╗ 187 | ╦ 203 | ■ 219 | δ 235 | √ 251 |
| C | 1100 | î 140 | £ 156 | ¼ 172 | ╝ 188 | ╠ 204 | ▄ 220 | ∞ 236 | n 252 |
| D | 1101 | ‗ 141 | Ù 157 | ¾ 173 | ╜ 189 | ═ 205 | ▌ 221 | ø 237 | ² 253 |
| E | 1110 | À 142 | Û 158 | « 174 | ╛ 190 | ╬ 206 | ▐ 222 | ∈ 238 | ■ 254 |
| F | 1111 | § 143 | ƒ 159 | » 175 | ┐ 191 | ╧ 207 | ▀ 223 | ∩ 239 | SP 255 |

Page 5 (PC865: Nordic)

| | HEX | 8 | 9 | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|---|---|
| HEX | BIN | 1000 | 1001 | 1010 | 1011 | 1100 | 1101 | 1110 | 1111 |
| 0 | 0000 | Ç 128 | É 144 | á 160 | ▒ 176 | └ 192 | ╨ 208 | α 224 | ≡ 240 |
| 1 | 0001 | ü 129 | æ 145 | í 161 | ▒ 177 | ┴ 193 | ╤ 209 | ß 225 | ± 241 |
| 2 | 0010 | é 130 | Æ 146 | ó 162 | ▒ 178 | ┬ 194 | ╥ 210 | Γ 226 | ≥ 242 |
| 3 | 0011 | â 131 | ô 147 | ú 163 | │ 179 | ├ 195 | ╙ 211 | π 227 | ≤ 243 |
| 4 | 0100 | ä 132 | ö 148 | ñ 164 | ┤ 180 | ─ 196 | ╘ 212 | Σ 228 | ⌠ 244 |
| 5 | 0101 | à 133 | ò 149 | Ñ 165 | ╡ 181 | ┼ 197 | ╒ 213 | σ 229 | ⌡ 245 |
| 6 | 0110 | å 134 | û 150 | ª 166 | ╢ 182 | ╞ 198 | ╓ 214 | µ 230 | ÷ 246 |
| 7 | 0111 | ç 135 | ù 151 | º 167 | ╖ 183 | ╟ 199 | ╫ 215 | τ 231 | ≈ 247 |
| 8 | 1000 | ê 136 | ÿ 152 | ¿ 168 | ╕ 184 | ╚ 200 | ╪ 216 | Φ 232 | ° 248 |
| 9 | 1001 | ë 137 | Ö 153 | ⌐ 169 | ╣ 185 | ╔ 201 | ┘ 217 | Θ 233 | • 249 |
| A | 1010 | è 138 | Ü 154 | ¬ 170 | ║ 186 | ╩ 202 | ┌ 218 | Ω 234 | · 250 |
| B | 1011 | ï 139 | ø 155 | ½ 171 | ╗ 187 | ╦ 203 | ■ 219 | δ 235 | √ 251 |
| C | 1100 | î 140 | £ 156 | ¼ 172 | ╝ 188 | ╠ 204 | ▄ 220 | ∞ 236 | n 252 |
| D | 1101 | ì 141 | Ø 157 | ¡ 173 | ╜ 189 | ═ 205 | ▌ 221 | ø 237 | ² 253 |
| E | 1110 | Ä 142 | Pt 158 | « 174 | ╛ 190 | ╬ 206 | ▐ 222 | ∈ 238 | ■ 254 |
| F | 1111 | Å 143 | ƒ 159 | ¤ 175 | ┐ 191 | ╧ 207 | ▄ 223 | ∩ 239 | SP 255 |

# USING THE CHARACTER CODE TABLES

The example below uses Page 0 (PC437) to illustrate the use of the character code tables.

You can find the character "A" in Page 0 as follows:

The decimal value for the character "A" is 65.
Follow its column straight up to find the digits.
Hexadecimal . . . . . 4
Binary . . . . . 0100
These numbers are the most significant bits of the ASCII code.
Follow its row to the left to find the digits.
Hexadecimal . . . . . 1
Binary . . . . . 0001
These numbers are the least significant bits of the ASCII code.
The combination of the numbers above is the ASCII code for character "A".
Decimal . . . . . 65
Hexadecimal . . . . . 41
Binary . . . . . 01000001

# USING BIT VALUE TABLES

For each command that has a complex method of determining the variable ***n***, there is a table showing how to calculate the variable in three numbering systems: binary, hexadecimal, and decimal.

When you look at the table, first find the value of each component of the variable. Then add the values of the components together to determine the value of the variable ***n***.

For example, here is how you would use the table below, which selects the print mode, to combine double-height, double-width, and underline. In the table, you see that bit 4 on (or hex 10 or decimal 16) turns on double-height, bit 5 on (or hex 20 or decimal 32) turns on double-width, and bit 7 on (or hex 80 or decimal 128) turns on underline mode.

To combine all three, turn on bits 4, 5, and 7, which is 10110000 in binary. Or you can add the hex values 10, 20, and 80 for the hex sum of B0, or you can add the decimal values 16, 32, and 128 for the decimal value of 176.

Therefore, you send the following to turn on double-height, double-width, and underline, depending on the numbering system used:

| | | | |
|---|---|---|---|
| ASCII | ESC | ! | ***n*** |
| Hex | 1B | 21 | B0 |
| Decimal | 28 | 33 | 176 |

| Bit | Off/On | Hex | Decimal | Function |
|---|---|---|---|---|
| 0 | Off | 00 | 0 | Character Font A selected. |
| | On | 01 | 1 | Character Font B selected. |
| 1, 2 | — | — | — | Undefined. |
| 3 | Off | 00 | 0 | Emphasized mode not selected. |
| | On | 08 | 8 | Emphasized mode selected. |
| 4 | Off | 00 | 0 | Double-height mode not selected. |
| | On | 10 | 16 | Double-height mode selected. |
| 5 | Off | 00 | 0 | Double-width mode not selected. |
| | On | 20 | 32 | Double-width mode selected. |
| 6 | — | — | — | Undefined. |
| 7 | Off | 00 | 0 | Underline mode not selected. |
| | On | 80 | 128 | Underline mode selected. |

Note that although the program examples throughout this chapter use decimal numbers, binary, decimal, and hexadecimal numbers all have the same printing results.