

TM-H6000II

Technical Reference Guide

EPSON

English

404367002
Rev. C

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ESC/POS® Proprietary Command System

EPSON took the initiative by introducing ESC/POS, a proprietary POS printer command system including patented commands and enabling 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.

Revision Information

Revision	Page	Altered Items and Contents
Rev. A	all pages	newly authorized
Rev. B	all pages	The validation model added
Rev. C	iv	"Restriction of Use" added
		"Downloading Drivers, Utilities, and Manuals" added
	viii	Caution for the manual cutter added
		Caution for aerosol sprayers added

About This Manual

Aim of the Manual

This manual was created to provide the information on the TM-H6000II printer for anyone who is developing hardware, installations, or programs. Programmers will also want to consult other documents.

Contents of the Manual

Chapter 1, "General Information."	General description of features plus specifications.
Chapter 2, "System Planning."	Contains introduction of control methods and each connection form.
Chapter 3, "Setup."	Contains information on such matters as DIP switches, memory switches, error processing for using TM-H6000II.
Chapter 4, "Maintenance & Troubleshooting."	Contains useful information for using.
Chapter 5, "Application Development Information for OPOS."	Contains useful information for programming.
Chapter 6, "Application Development Information for APD."	Contains useful information for programming.

Key to Symbols

The following symbols are used in the documentation for this product. See the specific warnings and cautions at appropriate points throughout this guide.

WARNING:

Warnings must be followed carefully to avoid serious bodily injury.

CAUTION:

Cautions must be observed to avoid minor injury to yourself or damage to your equipment.

Note:

Notes have important information and useful tips on the operation of your printer.

Restriction of Use

When this product is used for applications requiring high reliability/safety such as transportation devices related to aviation, rail, marine, automotive etc.; disaster prevention devices; various safety devices etc; or functional/precision devices etc, you should use this product only after giving consideration to including fail-safes and redundancies into your design to maintain safety and total system reliability. Because this product was not intended for use in applications requiring extremely high reliability/safety such as aerospace equipment, main communication equipment, nuclear power control equipment, or medical equipment related to direct medical care etc, please make your own judgment on this product's suitability after a full evaluation.

Related Software and Documents

Related software and documents

Software/document name	Description
ESC/POS Application Programming Guide	This provides descriptions in Acrobat format of the commands used by each TM printer, along with sample programs and other information about the printers
TM-H6000II User's Manual/	This provides basic handling procedures for the end user of the printer
EPSON OPOS ADK	This is an OCX driver
EPSON OPOS ADK Manual	This provides information for anyone who is programming using OPOS
EPSON Advanced Printer Driver	This is a Window driver
EPSON Advanced Printer Driver Manual	This provides information for anyone who is programming using APD (EPSON Advanced Printer Driver)

Downloading Drivers, Utilities, and Manuals

Drivers, utilities, and manuals can be downloaded from one of the following URLs.

For customers in North America, go to the following web site:

<http://www.epsonexpert.com/> and follow the on-screen instructions.

For customers in other countries, go to the following web site:

<http://www.epson-pos.com/>

Safety Precautions

EMC and Safety Standards Applied

Product Name: TM-H6000II

Type Name: M147B or M147C

The following standards are applied only to the printers that are so labeled. (EMC is tested using the EPSON PS-170 or PS-180 power supply.)

Europe:	CE marking Safety: EN 60950
North America:	EMI: FCC/ICES-003 Class A Safety: UL 1950/CSA C22.2 No. 950
Japan:	EMC: VCCI Class A JEIDA-52
Oceania:	EMC: AS/NZS 3548 M147B: Class B M147C: Class A

WARNING

The connection of a non-shielded printer interface cable to this printer will invalidate the EMC standards of this device.

You are cautioned that changes or modifications not expressly approved by Seiko Epson could void your authority to operate the equipment.

CE Marking

The printer conforms to the following Directives and Norms

Directive 89/336/EEC	EN 55022 M147B: Class B M147C: Class A
	EN 55024 IEC 61000-4-2 IEC 61000-4-3 IEC 61000-4-5 IEC 61000-4-6 IEC 61000-4-8 IEC 61000-4-11
Directive 90/384/EEC	EN45501

WARNING

M147C is a Class A product. In a domestic environment these products may cause radio interference in which case the user may be required to take adequate measures.

FCC Compliance Statement For American Users

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

For Canadian Users

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

GERÄUSCHPEGEL

Gemäß der Dritten Verordnung zum Gerätesicherheitsgesetz (Maschinenlärminformations- Verordnung-3. GSGV) ist der arbeitsplatzbezogene Geräusch-Emissionswert kleiner als 70 dB(A) (basierend auf ISO 7779).

Safety Precautions

This section presents important information to ensure safe and effective use of this product. Please read this section carefully and store it in an accessible location.

WARNING:

- ❑ *Shut down your equipment immediately if it produces smoke, a strange odor, or unusual noise. Continued use may lead to fire or electric shock. Immediately unplug the equipment and contact your dealer or a Seiko Epson service center for advice.*
- ❑ *Never attempt to repair this product yourself. Improper repair work can be dangerous.*
- ❑ *Never disassemble or modify this product. Tampering with this product may result in injury, fire, or electric shock.*
- ❑ *Be sure to use the specified power source. Connection to an improper power source may cause fire or shock.*
- ❑ *Never insert or disconnect the power plug with wet hands. Doing so may result in severe shock.*
- ❑ *Do not allow foreign matter to fall into the equipment. Penetration of foreign objects may lead to fire or shock.*
- ❑ *If water or other liquid spills into this equipment, unplug the power cord immediately, and then contact your dealer or a Seiko Epson service center for advice. Continued usage may lead to fire or shock.*
- ❑ *Do not place multiple loads on the power outlet (wall outlet). Overloading the outlet may lead to fire.*
- ❑ *Always supply power directly from a standard domestic power outlet.*
- ❑ *Handle the power cord with care. Improper handling may lead to fire or shock.*
 - *Do not modify or attempt to repair the cord.*
 - *Do not place any object on top of the cord.*
 - *Avoid excessive bending, twisting, and pulling.*
 - *Do not place cord near heating equipment.*
 - *Check that the plug is clean before plugging it in.*
 - *Be sure to push the prongs all the way in.*
- ❑ *If the cord becomes damaged, obtain a replacement from your dealer or a Seiko Epson service center.*

CAUTION:

- ❑ *Do not connect cables other than as described in this manual. Different connections may cause equipment damage and burning.*
- ❑ *Be sure to set this equipment on a firm, stable, horizontal surface. Product may break or cause injury if it falls.*
- ❑ *Do not use in locations subject to high humidity or dust levels. Excessive humidity and dust may cause equipment damage, fire, or shock.*
- ❑ *Do not place heavy objects on top of this product. Never stand or lean on this product. Equipment may fall or collapse, causing breakage and possible injury.*
- ❑ *Take care not to injure your fingers on the manual cutter*
 - *When you remove printed paper*
 - *When you perform other operations such as loading/replacing roll paper*
- ❑ *To ensure safety, please unplug this product prior to leaving it unused for an extended period.*
- ❑ *Do not touch either the thermal or the dot matrix print head or the paper feed motor. Wait for the heads and the motor to cool. The head and the motor can be very hot after printing for a long time. Touching them may cause burns.*
- ❑ *Do not use aerosol sprayers containing flammable gas inside or around this product. Doing so may cause fire.*

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Chapter 1

General Information

1.1 Features

The TM-H6000II is a high-quality POS printer that can print on slip, validation, and receipt paper (paper roll).



Note:

Validation, MICR, and endorsement printer functions are factory options. Validation and endorsement functions cannot be installed on the same printer.

1.1.1 Slip / Validation Section

- An optional Magnetic Ink Character Recognition (MICR) reader that enables the printer to perform consecutive reading and processing of MICR characters
- An optional endorsement printer (E/P) that enables single-pass high speed printing of endorsements (The endorsement printer cannot be installed on a printer with the validation function.)
- Single-pass processing for checks eliminates the need to reverse the check paper for printing an endorsement. (The validation function model doesn't have an endorsement printer.)
- High throughput using bidirectional, minimum distance printing.
- Mechanical form stopper for stable slip printing
- Two ways are available for slip paper loading (drop-in for validation, and front insertion for slip (validation function is factory option))
- Page mode for flexibility in printing formats

1.1.2 Receipt Section

- High-speed printing with batch processing
- High-speed graphic printing
- Autocutter provides easy user operation
- Easy drop-in paper roll loading
- PDF417 symbols (2-dimensional code) printing is possible
- Two-color printing is possible with two-color paper

1.1.3 Common to Receipt, Slip, Validation

- ❑ Small footprint and simple design
- ❑ Selectable receive buffer size (45 bytes or 4 KB)
- ❑ NV (Non-volatile) bit image buffer (384 KB) (*1)
- ❑ NV (Non-volatile) user memory (1 KB) (*1)

(*1) The memory size can be set by ESC/POS command

- ❑ A counter function that allows checking the printer by remote maintenance
- ❑ Several interface models (USB, RS-232C, bidirectional parallel) are supported

1.1.4 About control method

- ❑ Command protocol based on the ECS/POS[®] Proprietary Command System.
- ❑ Automatic Status Back (ASB) function that automatically transmits changes in the printer status
- ❑ Windows[®] printer driver is provided. (Advanced Printer Driver, and OPOS.)

1.2 Product Structure

1.2.1 Standard Parts Included with the Printer

This printer is packed with the materials listed below.

- ❑ User's Manual
- ❑ Roll paper (diameter 40 mm {1.57"}) 1 roll
- ❑ Power switch cover (using this cover enables you to prevent accidental turning off of the power)
- ❑ Exclusive ribbon cassette ERC-32
- ❑ Endorsement ribbon cassette (only for printers equipped with the optional endorsement print mechanism)

1.2.2 Options

The options for this printer are provided as below.

- ❑ EPSON power supply unit, PS-170, PS-180
- ❑ MICR reader (factory-installed option) (available only for serial interface model)

- ❑ Endorsement printer (factory-installed option) (available only for MICR model)
- ❑ Direct connection customer display DM-D105/D205 or DM-D106/DM-D206 (available only for serial interface model or the USB model)
- ❑ Paper-width spacer for 58 mm or 60 mm {2.3 or 2.4"} PG-58
- ❑ Special tray for TM-H6000 / H6000II (PT-6000, DPR-6000, TA-6000)

1.3 Consumables

1.3.1 Ribbons

This printer needs a ribbon cassette to print on slip/validation (and endorsement). We provide 4 ribbon cassettes:

- ❑ EPSON ribbon cassette, ERC-32 (P) (Life: 6,000,000 characters / Color: Purple) for slip/validation.
- ❑ EPSON ribbon cassette, ERC-32 (B) (Life: 4,000,000 characters / Color: Black) for slip/validation.
- ❑ EPSON ribbon cassette ERC-41 (P) (Life: 1,000,000 characters) (for the optional endorsement print mechanism)
- ❑ EPSON ribbon cassette ERC-41 (B) (Life: 800,000 characters) (for the optional endorsement print mechanism)

1.3.2 Roll paper

We provide roll paper for this printer. The widths are 80 mm / 60 mm / 58 mm {3.15"/2.36"/2.28"}.

1.4 Product Specifications

Print method	Slip/validation: 9-pin serial impact dot matrix Wire pitch approximately 0.353 mm {1/72"} E/P: 8-pin shuttle impact dot matrix Wire pitch approximately 0.353 mm {1/72"} Receipt: Thermal line 0.141 dots/mm × 0.141 dots/mm (180 dpi × 180 dpi)
Paper width	Slip/validation & E/P: 68mm to 230mm × 68mm to 297mm NOTE: The minimum size is 68mm × 152mm Receipt: 80 mm / 60 mm / 58 mm {3.15"/2.36"/2.28"} NOTE: default setting is 80 mm {3.15"}, 58 mm {2.28"} or 60 mm {2.36"} paper width can be selected using the paper roll spacer.
Cut type (Receipt)	Partial cut (cutting with one point on left edge left uncut)
Character sets	Slip/validation: 95 alphanumeric, 37 international characters, graphics: 128 × 12 pages. (including two space pages) Multilingual character model supports printing with one of the following character sets: Simplified Chinese (GB2312): 7580 Traditional Chinese (Big 5): 13494 Receipt: 95 alphanumeric, 37 international characters, graphics: 128 × 11 pages. (including a space page) Multilingual character model supports printing with one of the following character sets: Simplified Chinese (GB2312): 7580 Traditional Chinese (Big 5): 13494 E/P: 95 alphanumeric, 37 international characters, graphics: 128 × 11 pages. (including a space page)
Interface (compatible)	RS-232C / Bidirectional parallel Dealer options: RS-485, USB, 10Base-T I/F
Buffer	Receive buffer: 4KB/45 bytes
	User-defined buffers (both for user-defined characters and user-defined bit images) For Receipt: 12KB For Slip/validation: Approximately 3KB
	Macro buffer: 2KB
	Non-volatile graphics data buffer: 384KB 192KB (Multilingual character model)
	User NV memory: 1KB
Power supply	Power supplied by an AC adapter — the PS-170 or PS-180 (option)
Operating voltage	+24 VDC ± 10% (optional power supply: EPSON PS-170, PS-180)

Current consumption (at 24V except for drawer kickout driving) (*)	Slip/validation: Operating: Mean: Approximately 1.7A (Character font A α-N, all columns printing) Peak: Approximately 5.5A Receipt: Operating: Mean: Approximately 1.8A (Character font A α -N, all columns printing) Peak: Approximately 7.7A Standby: Mean: Approximately 0.2A
Temperature	Operating: 5 to 45 °C {41 to 113 °F} Storage: -10 to 50 °C {14 to 122 °F} (except for paper and ribbon)
Humidity	10 to 90%
Weight (mass)	Approximately 5.8 kg {12.76 lb}

* See "Electrical Characteristics" (page 1-21) for details.

1.5 Printing and Paper Specifications

1.5.1 Slip/Validation Section

Printing method:	Serial impact dot matrix
Head wire configuration:	9-pin vertical line, 0.353 mm {1/72-inch} wire pitch
Printing direction:	Bidirectional, minimum distance printing
Printing speed	Approximately 5.14 LPS (printing 40 columns per line with 17.8 CPI when the head energizing time is set to normal mode.)
Number of characters:	Alphanumeric characters: 95 International characters: 37 Extended graphics: 128 × 12 pages (including two space pages) Multilingual character model supports printing with one of the following character sets: Simplified Chinese (GB2312): 7580 Traditional Chinese (Big 5): 13494
Character structure	Font A: 5 × 9 (total 270 dots horizontally) Font B: 7 × 9 (total 540 half dots horizontally) Kanji: 16 × 16 (two-pass printing font)
Characters per line	Refer to "Character size and print speed."
Characters per inch	Refer to "Character size and print speed."

Character size and print speed

Font	Character structure (horizontal dots × vertical dots)	Character spacing	Characters per inch	Characters per line	Character size (width×height)
A (default)	5 × 9	1 dot	13.3	45	1.56 × 3.1 mm
B	7 × 9	2 half-dots	17.8	60	1.24 × 3.1 mm
Kanji	16 × 16	2 half-dots	13.0	30	2.7 × 2.9 mm



Note:

Kanji character spacing by default setting is 2 half dots. (Kanji character spacing can be changed by ESC/POS command.) Printing speed for Kanji characters shown in table above is in the case of full column printing with two-pass printing.

1.5.1.1 Paper Specifications

1. Cut sheet

Paper type: Normal paper, pressure-sensitive paper, carbon copy paper

Paper size: 70 - 148 mm (W) × 150 - 210 mm (L) (2.8 - 5.8"(W) × 5.9 - 8.3"(L))

Copy capability and paper thickness:

- Normal paper (single-ply): 0.09 to 0.2 mm (0.0035 to 0.0079 in.)
- Carbon copy paper combination: 4 sheets maximum (original + 2 copies)

Backing paper: 0.07 to 0.12 mm (0.0028 to 0.0047 in.)

Copy and original: 0.04 to 0.07 mm (0.0016 to 0.0028 in.)

Carbon paper: Approximately 0.035 mm (0.0014 in.)

Total thickness: 0.09 to 0.31 mm (0.0035 to 0.0122 in.)

- Example: one original + 2 copies,

Original paper 0.04 mm

Carbon paper 0.07 mm (0.035 mm × 2 sheets)

Copy paper 0.04 mm

Backing paper 0.07 mm

Total thickness 0.22 mm (0.0087 in.)

Ambient temperature and copy capability:

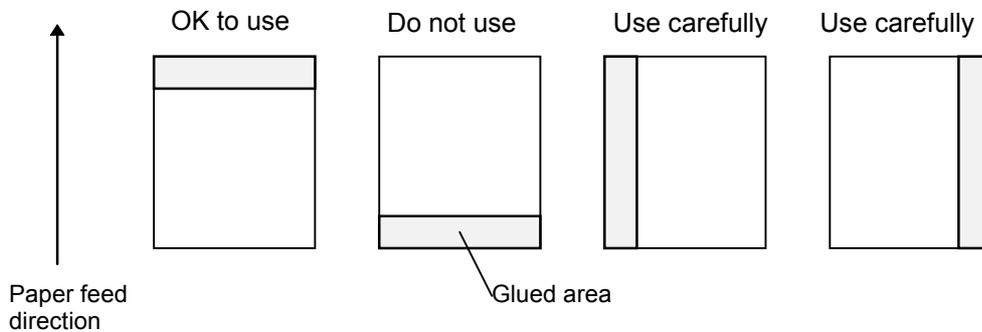
Copy capability is greatly influenced by the ambient temperature, so printing must be performed under the conditions described in the table below.

Relationship between ambient temperature and number of copies

Number of copies	Ambient temperature
Original + 3 copies	10 to 40 °C (50 to 104°F)
Original + 1 copy	5 to 45 °C (41 to 113 °F)

2. Notes on slip/validation paper

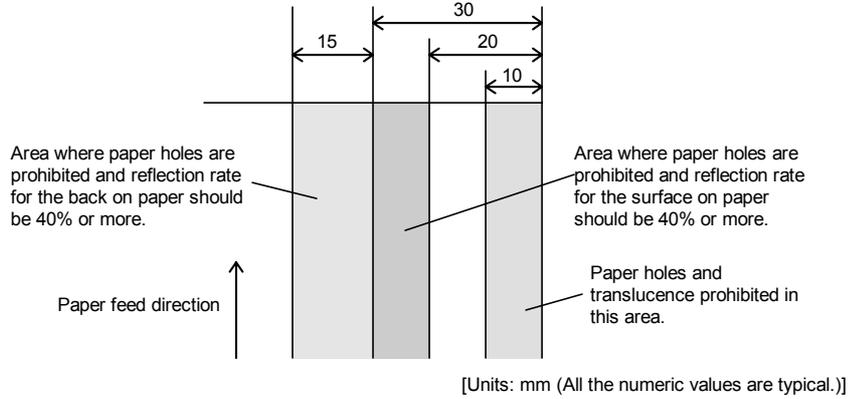
- The paper must be flat, without curls or wrinkles, especially at the top edges. Otherwise, the paper may rub against the ribbon and become dirty.
- Insert a validation from the upper side in the validation entrance of the case opening. If the validation is inserted sliding from the left to the right, the print position may be incorrect since the paper can be crooked or the validation sensor can detect incorrectly.
- There must be no glue on the bottom edge of paper. Choose paper carefully when the glue is on the right or top edge, since paper feeding and insertion are affected by gluing conditions (e.g., glue quality, method, and length) and glue location (refer to the figure below). Be especially careful when paper is wide and has the glue on the left edge, since skew may occur.



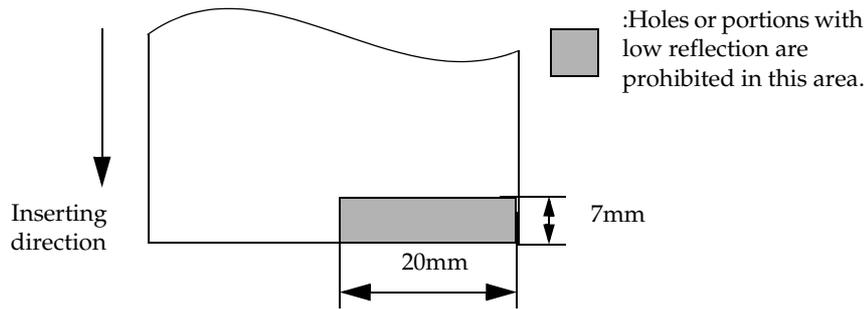
Slip (validation) paper glued area

- Since the slip BOF sensor uses a photo sensor, do not use paper that has holes at the sensor position, or is translucent.
- Since the slip TOF sensor and validation sensor use a reflective photo sensor and it detects from the back of slip paper, do not use paper that has holes or dark portions with low reflection (less than 40% reflection) at the sensor position.
- Since the slip paper ejection sensor uses a reflective photo sensor and it detects from the surface of the paper roll, do not use paper that has holes or dark portions with low reflection (less than 40% reflection) at the sensor position.

- Use thinner paper (N30 or equivalent) between the top and bottom sheets of multi-ply paper. If thick paper is used, the copy capability is lowered.

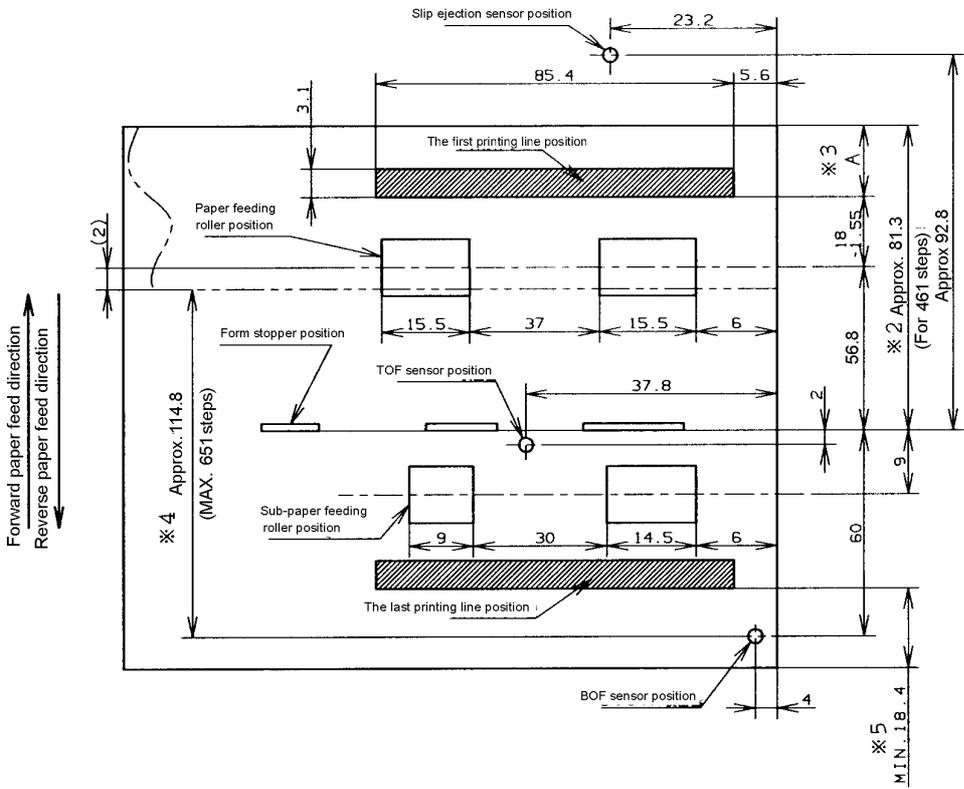


Prohibited area for slip paper holes and low reflection

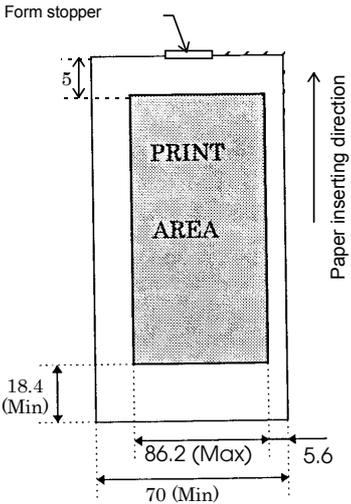


Prohibited area for validation paper holes and low reflection

1.5.1.2 Printable Area for slip (front insertion)

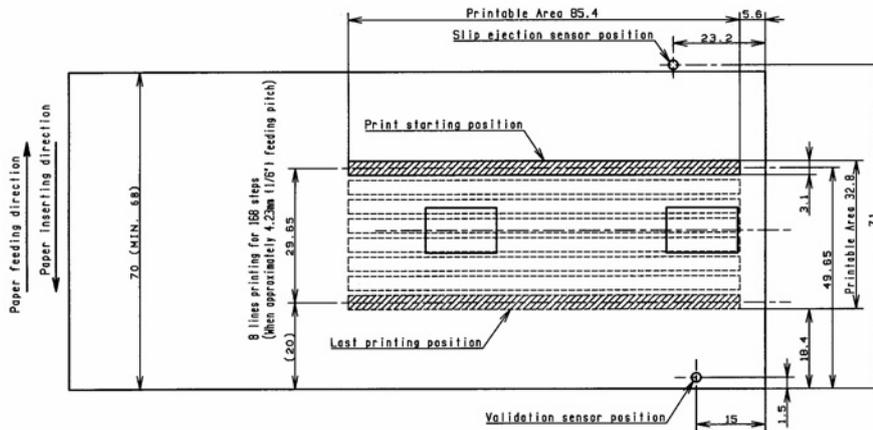


- *2 The length from the form stopper to the tip of the paper.
- *3 The length from the tip of the paper to the first printing line position.
- *4 The printable area after the slip BOF sensor detects the end of the paper. (The bottom margin must be considered for a real printable area.)
- *5 Bottom margin (calculated value).



Printable area (for slip paper (front insertion))

1.5.1.3 Printable Area for validation paper



1.5.1.4 Ribbon Cassette

Exclusive ribbon cassette for slip

Type: ERC-32(P)

Color: Purple

Ribbon life: 6,000,000 characters (at 25 °C (77 °F), continuous printing)

1.5.2 Endorsement Section (Factory Option)

Printing method: Shuttle impact dot matrix

Head wire configuration: 8 print solenoids in a horizontal line

Characters per line: 40 columns

Print speed: Approximately 1.9 LPS

Number of characters: Alphanumeric characters: 95
International characters: 37
Extended graphics: 128 × 11 pages (including one space page)

Character structure: 5 × 7 (total 240 dots horizontally)

Character size: 1.1 × 2.42 mm (W × H)



Note:

Character dot spacing can be changed by an ESC/POS command.

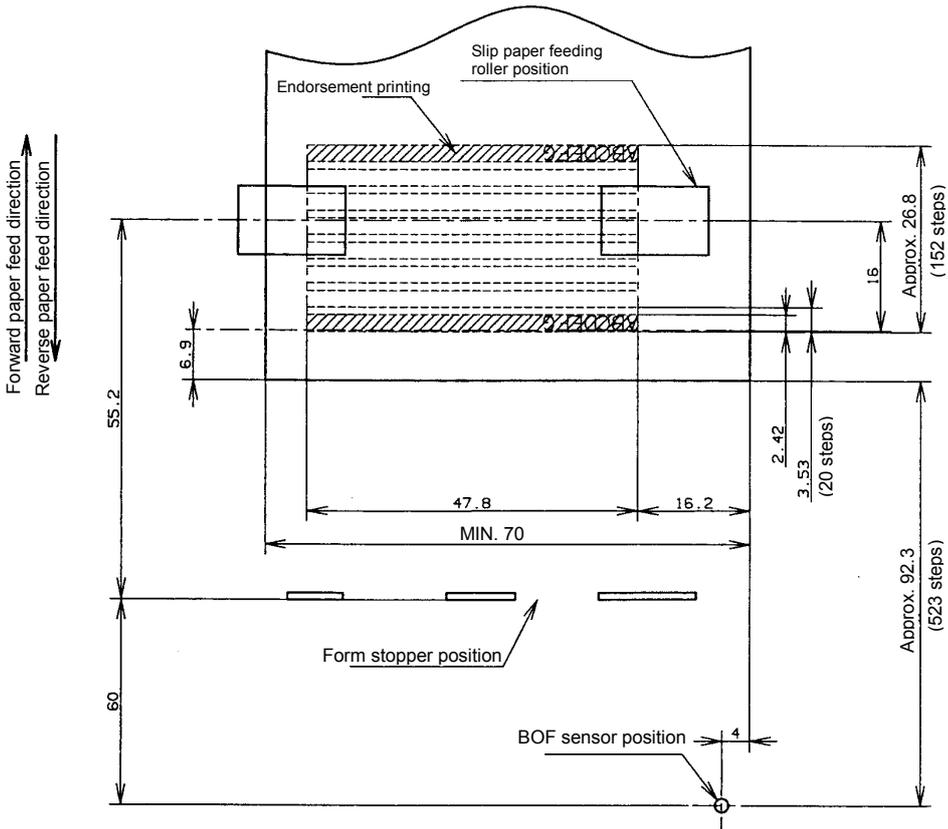
An endorsement printer cannot be installed on a printer with the validation function.

1.5.2.1 Paper Specifications

Cut sheet	
Paper type:	Normal paper
Paper size:	70-148 mm (W) × 150-210 mm (L) (2.8-5.8 in. (W) × 5.9-8.3 in. (L))
Paper thickness:	Single-ply (copy paper cannot be used) 0.09 mm - 0.2 mm (0.0035 - 0.0079 in.)

1.5.2.2 Printable Area

The print head consists of 8 print solenoids (A, B, C, D, E, F, G, and H) arranged in a horizontal line. The print head moves from the left (from the standby position) to the right, printing at 30 positions as each print solenoid is energized, so that one dot line is formed. The total number of dots per dot line is 240 (30 positions × 8 solenoids).



E/P printable area (for endorsement printing)

1.5.2.3 Ribbon Cassette

Exclusive ribbon cassette for E/P

Type: ERC-41 (P)

Color: Purple

Ribbon life: 1,000,000 characters (at 25 °C (77 °F), continuous printing)

1.5.2.4 Notes on Using the Endorsement Print Mechanism

- ❑ The endorsement print mechanism (abbreviated as E/P) enables printing of endorsements as part of a sequence that is automatically processed: MICR reading, printing an endorsement on the back side of a personal check, and printing on the surface of it. Once the end of the paper exceeds the E/P print head position, reverse paper feeding to the front side is not possible.
- ❑ When the endorsement printing is executed after a MICR reading, the printer feeds the paper forward automatically after receiving a command to print the endorsement; then the printer starts printing up to approximately 7.0 mm (0.28 in.) from the end of the check paper by using reverse paper feeding.
- ❑ Since the E/P printing format is assumed to print an endorsement on a U.S. personal check, the print begins on the back side of the paper. (As viewed from the front of the printer, the endorsement printing characters are upside down.)
- ❑ The printing sequence for slip paper is different, depending on whether an endorsement print mechanism is installed. That is, when the E/P is installed, once the printing exceeds the E/P printable area and the slip paper is fed forward, reverse paper feeding must be prohibited. Consider this when developing application programs.
- ❑ The E/P printing must be not performed on copy paper. Otherwise, a paper jam may occur or the E/P may be broken. Because E/P printing feeds the paper in a reverse paper feed direction, the paper may be wrinkled.
- ❑ In some case paper feeding may not be accurate when E/P printing is performed on check paper. This may depend on the width of the check paper. Therefore, it is recommended for the user to check in advance whether the check paper prints correctly or not.

1.5.3 MICR Reader (When the Printer is Used with the MICR Reader)

1.5.3.1 Reading method

Magnetic bias

1.5.3.2 Recognition rating

98% or more (at 25 °C, 77 °F)

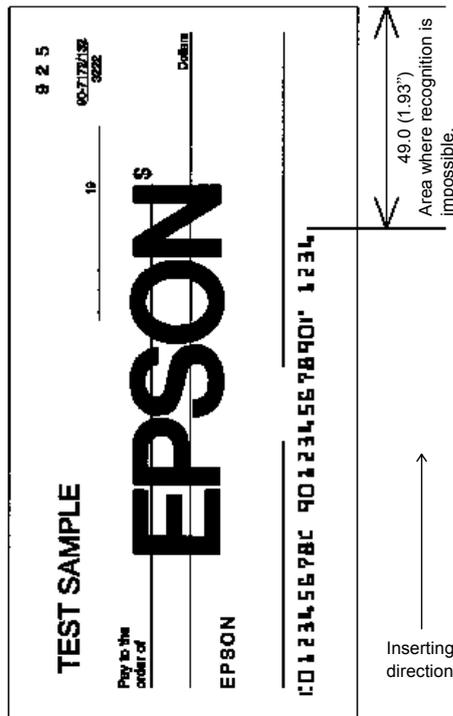
Recognition rating is defined as follows

$$\text{Recognition rating (\%)} = \frac{\text{Total number of checks} - (\text{number of sheets misread or not identified.})}{\text{Total number of checks}} \times 100$$

- Check paper used for test is EPSON standard check paper.
- Checks must be flat, without curls, folds, or wrinkles.

1.5.3.3 Inserting direction and endorsement printing

- ❑ Insert the check with the surface printed with the magnetic ink upward, following the slip side guide.
- ❑ The printer can perform endorsement printing.

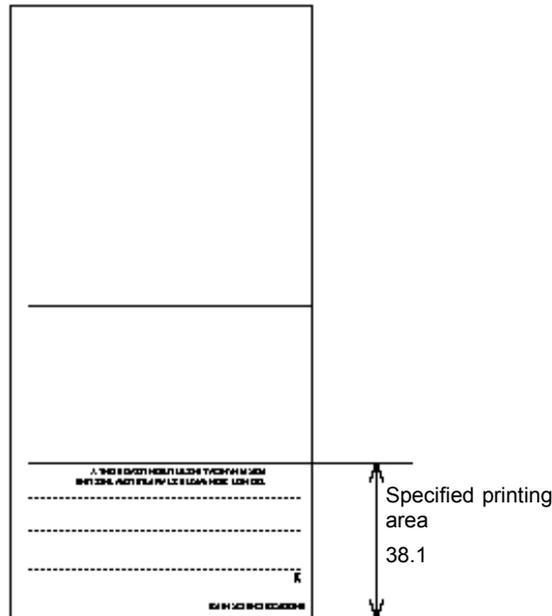


Area of personal check where MICR character recognition is impossible

- ❑ To print endorsements in the specified area (within 38.1 mm {1.5"} from the top), set the print position for the last line so that it is printed at least 3 mm {0.118"} above the bottom of the printable area (Especially when the printer is used near the display device, the user is required to check the recognition rate of the MICR).

Notes:

1. Do not install the printer near any magnetic fields, because this may cause MICR reading errors. (Be sure to check the MICR recognition rate when the printer is used near a display device.)
2. MICR characters may not be recognized when impact or vibration is applied to the printer.



[Units: mm (All numeric values are typical.)]

Endorsement printing

1.5.3.4 Notes on using the MICR reader (only when the printer is used with MICR)

- The personal checks must be flat, without curls, folds, or wrinkles (especially at the edges). Otherwise, the check may rub against the ribbon and become ink-stained.
- Do not insert checks that have clips or staples. These may cause paper jams, MICR reading errors, and damage to the MICR head.
- Let go of the check immediately as soon as the printer starts feeding it. Otherwise, the paper is not fed straight, causing paper jams and MICR reading errors.

1.5.4 Receipt Section

Printing method:	Thermal line printing
Dot density:	180 dpi × 180 dpi [the number of dots per 25.4 mm {1"}]
Printing direction:	Unidirectional with friction feed
Printing width:	72 mm {2.83"}, 512 dot positions
Paper width:	80 mm / 60 mm / 58 mm {3.15"/2.36"/2.28"} NOTE: default setting is 80 mm {3.15"}. 58 mm {2.28"} or 60 mm {2.36"} paper width can be selected using the roll paper spacer.
Characters per line:	42 (font A, default) 56 (font B) (When using 80mm width paper)
Character spacing:	0.28 mm {.01"} (2 dots) (font A, default) 0.28 mm {.01"} (2 dots) (font B) Programmable by control command.
Print speed:	Normal: 54 lps maximum (computed value for 1/8" feed) 170 mm/s maximum {Approximately 6.7"/s} (at 24 V, density level 2) * For the model with paper width 58 mm {2.28"}, 150 mm/s {5.9"/s} maximum. Ladder barcode/2-dimensional code printing: 114 mm/s maximum Two-color print mode: 56.4 mm/s maximum (at 24V, density level 2)
Paper feed speed:	Approximately 170 mm/second {approximately 6.7"/second} continuous feeding
Line spacing (default):	4.23 mm {1/6"}, programmable by control commands.
Number of characters:	Alphanumeric characters: 95 International characters: 37 Extended graphics: 128 × 11 pages (including one space page) Multilingual character model supports printing with one of the following character sets: Simplified Chinese (GB2312): 7580 Traditional Chinese (Big 5): 13494

Character structure: Font A: 12 × 24 (including 2-dot spacing in horizontal)
 Font B: 9 × 17 (including 2-dot spacing in horizontal)
 Kanji: 24 × 24

Font A is the default

Character size, characters per line

	Standard		Double-height		Double-width		Double-width/ Double-height	
	W x H in mm {inches}	CPL	W x H in mm {inches}	CPL	W x H in mm {inches}	CPL	W x H in mm {inches}	CPL
Font A 12 x 24	1.41 x 3.39 {.06 x .13"}	42	1.41 x 6.77 {.06 x .27"}	42	2.82 x 3.39 {.11 x .13"}	21	2.82 x 6.77 {.11 x .27"}	21
Font B 9 x 17	0.99 x 2.40 {.04 x .09"}	56	0.99 x 4.80 {.04 x .19"}	56	1.98 x 2.40 {.08 x .09"}	28	1.98 x 4.80 {.08 x .19"}	28
Kanji 12 x 24	3.39 x 3.39 {.13 x .13"}	21	3.39 x 6.77 {.13 x .27"}	42	6.77 x 3.39 {.27 x .13"}	10	6.77 x 6.77 {.11 x .27"}	21

- * CPL = characters per line
- * Space between characters is not included
- * Characters can be scaled up to 64 times the standard size.
- * When using Font B in a font mode such as emphasized mode, some words may be hard to read. Check the font mode in advance when using Font B.

1.5.4.1 Autocutter

Partial cut: Cutting with one point left uncut

NOTES:1.To prevent dot displacement, after cutting, feed paper approximately 1 mm (14/360 inches) or more before printing.

2.If the printer is stopped, you must feed paper over 40 mm (1.58 in.) before cutting

1.5.4.2 Paper Roll Supply Device Section

Supply method: Drop-in paper roll
Near-end sensor Detection method: Microswitch
 Paper roll spool diameter:
 Inside: 12 mm (.47")
 Outside: 18 mm (.71")
 Near-end adjustment: Adjusting screw
 Remaining amount: Fixed position
 #1 approximately 23 mm (0.9")
 #2 approximately 27 mm (1.06")
 (The adjusting screw has two positions.)
 See Chapter 5.
Paper roll end detection Detection method: Reflective photo sensor

Note:You can use the ESC/POS command to stop printing upon detection of a paper near-end.

1.5.4.3 Paper Specifications

Paper type:	Specified thermal paper
Form:	Paper roll
Paper width:	79.5 ± 0.5 mm (3.13" ± 0.02")
Paper roll size:	Roll diameter: Maximum 83 mm (3.27 in.) Take-up paper roll width: 80+0.0/-1.0 mm (3.15+0.02/-0.04 in.)
Specified paper (see Chapter 1 more details):	Specified thermal roll paper, NTP080-80

In Japan: Nakagawa, Seisakujo
 In USA: Nakagawa Mfg. (USA) Inc.
 In Europe: Nakagawa Mfg. (Europe) GmbH
 In Southeast Asia: N.A.K. Mfg. (Malaysia) SDN BHD

[Original paper: TF50KS-E Nippon Paper Industries Co.,Ltd.]

The following paper can be used instead of the specified paper above:

Original paper: PD 160R (Oji Paper Mfg. Co. Ltd.)
 Original paper: AF50KS-E (Jujo Thermal Oy (Finland))
 Original paper: P350(F380), P310, P300
 (Kanzaki Specialty Papers, Inc. (U.S.A.))

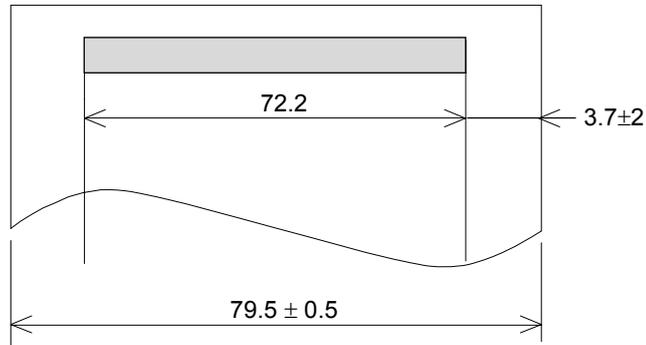
Paper roll spool diameter: Inside: 12 mm (.47") Outside: 18 mm (.71")

Note: Paper must not be pasted to the paper roll spool.
 When paper other than that specified is used, the thermal print head may be worn out. Be sure to use the specified paper.
 Depending on each paper specification, it is recommended to set the DIP switch as shown in Table below:

Original paper type	DIP SW2		Print density level
	3	4	
P350 (F380)	ON	ON	1
PD160R, AF50KS-E, P310, P300	OFF	OFF	2

1.5.4.4 Printable Area

The printable area of a paper roll with a width of 79.5 ± 0.5 mm ($3.13'' \pm 0.02''$) is 72.2 ± 0.2 mm ($2.84'' \pm 0.008''$) (512 dots), and the space on the right and left sides are approximately 3.7 ± 2 mm ($0.15'' \pm 0.079''$).



Printable area for paper roll

NOTE:The print position in the printable area of thermal elements for dots 257 to 512 is shifted approximately 0.07 mm (.003") in the paper feed direction from the position for dots 1 to 256. Be sure not to print a ladder bar code across both printable areas, as this can cause variations in printing that are difficult to read.



Shifting of the print position

1.5.4.5 Printing and Cutting Positions

Printing and cutting positions

NOTE:Numeric values used here are typical values; the values may vary slightly as a result of paper slack or variations in the paper. Take this into account when setting the cutting position of the autocutter.

1.6 Sensors

1.6.1 Paper Sensors

1.6.1.1 Receipt section

- ❑ Paper roll near-end sensor:
 - The sensor is located on the roll paper supply device on the receipt section. It detects the near-end of the paper roll by detecting the paper roll diameter. You can adjust the sensor. See Chapter 5 for details on adjustment.
 - When the printer detects a paper near-end, it either stops or continues printing, depending on the Paper sensor command setting.
 - When the sensor is selected to stop printing and the sensor detects a paper near-end, the printer automatically goes offline after printing the current line. To restart printing, load the paper and set the printer back online by closing the printer cover. The printer starts initializing and continues printing data stored in the print buffer.

- ❑ Paper roll end sensor:
 - The paper roll end sensor is located in the paper path on the receipt section. It detects the presence of paper in the paper path of the printer mechanism.
 - When there is no paper in the paper path, the PAPER OUT LED lights.
 - When the sensor detects a paper end, printing stops even if it is in the middle of one transaction; therefore, it is recommended to use the paper roll near-end sensor and use the paper end sensor as a supplement.

1.6.1.2 Slip/ Validation section

- ❑ TOF (Top of Form) sensor: The slip TOF sensor is located in the slip paper path and detects the presence of slip paper in the paper path. The SLIP LED lights accordingly.
- ❑ BOF (Bottom of Form) sensor:
 - The sensor is located in the slip entrance and detects whether the paper is inserted correctly and whether it is removed or not. The printer does not proceed to the next operation until the paper has been inserted correctly or removed. (The SLIP LED continues blinking.)
 - When the printer detects a paper end, it either stops or continues printing depending on the Paper sensor command setting.
 - When the sensor is selected to stop printing, the sensor detects a paper-end and the printer prints data up to the end of the printable area, ejects the slip when all the next print data is transmitted, and then waits for the slip to be removed. After the slip is removed, the printer enters the paper insertion waiting state.

❑ Validation sensor

- The validation sensor is located below the validation paper path and detects whether the paper is inserted correctly or not. The printer does not proceed to the next operation until the paper has been removed. (The SLIP LED continues flashing.)

❑ Slip/Validation eject sensor:

- The slip/Validation eject sensor is located in the slip paper exit and detects whether the paper is removed or not after printing. The printer does not proceed to the next operation until the paper has been removed.

1.6.2 Printer Cover Sensors

1.6.2.1 Receipt section

❑ Paper roll cover open sensor:

- When a paper roll is selected as the print sheet, if the sensor detects a cover open during printing, the printer goes offline, stops printing immediately, and the ERROR LED blinks. Even if the cover is closed, the ERROR LED still blinks. You need to transmit the error recovery command to recover.

If the printer continues printing, it starts printing from the beginning of the line where the error occurred; therefore, double printing or printing position shift may occur. It is recommended to clear the buffers and resend the print data.

- When a slip is selected as the print sheet, if the sensor detects a cover open during printing, the printer finishes printing data for the line when the cover open is detected, then stops the carriage movement and goes offline. The printer goes online when the cover is closed and restarts printing.

❑ Unit cover open sensor:

- When the sensor detects a unit cover open during printing, the printer goes offline depending on the setting of bit 8 for the memory switch.

The default is that the printer finishes printing data for the line when the cover open is detected and stops printing. The printer goes online when the cover is closed and restarts printing.

If a recoverable error is selected by memory switch, the printer goes offline, stops printing immediately and the ERROR LED blinks. Even if the cover is closed, the ERROR LED still blinks. You need to transmit the error recovery command to recover. If the printer continues printing, it starts printing from the beginning of the line where the error occurred. In this case, double printing or printing position shift may occur. It is recommended to clear the buffers and resend the print data.

1.6.2.2 Slip section

- Front cover open sensor:
 - When the sensor detects a cover open during printing, the printer finishes printing data for the line when the cover open is detected, then stops the carriage movement and goes offline. The printer goes online when the cover is closed and restarts printing.

1.7 Other Specifications

1.7.1 Internal Buffer

1. Receive buffer selectable as 45 or 4 KB using the DIP switch.
2. User-defined buffer (both for user-defined characters and user-defined bit images)
Receipt: 12KB; Slip: 3KB
3. Macro buffer 2KB
4. NV (non-volatile) bit image buffer 384KB
5. NV (non-volatile) user memory 1KB

1.7.2 Electrical Characteristics

Supply voltage:	+24 VDC \pm 10% (optional power supply: EPSON PS-170) Ripple voltage: 300 mVpp or less (only when the printer is used with the MICR reader)
Current consumption (at 24V except for drawer kickout driving)	<p>Slip: Operating: Mean: Approximately 1.7A (Character font A α-N, all columns printing) Peak: Approximately 5.5A When the print platen is released: 2.0A (200 msec)</p> <p>Receipt: Operating: Mean: Approximately 1.8A (Character font A α-N, all columns printing) Peak: Approximately 7.7A</p> <p>Standby: Mean: Approximately 0.2A</p>



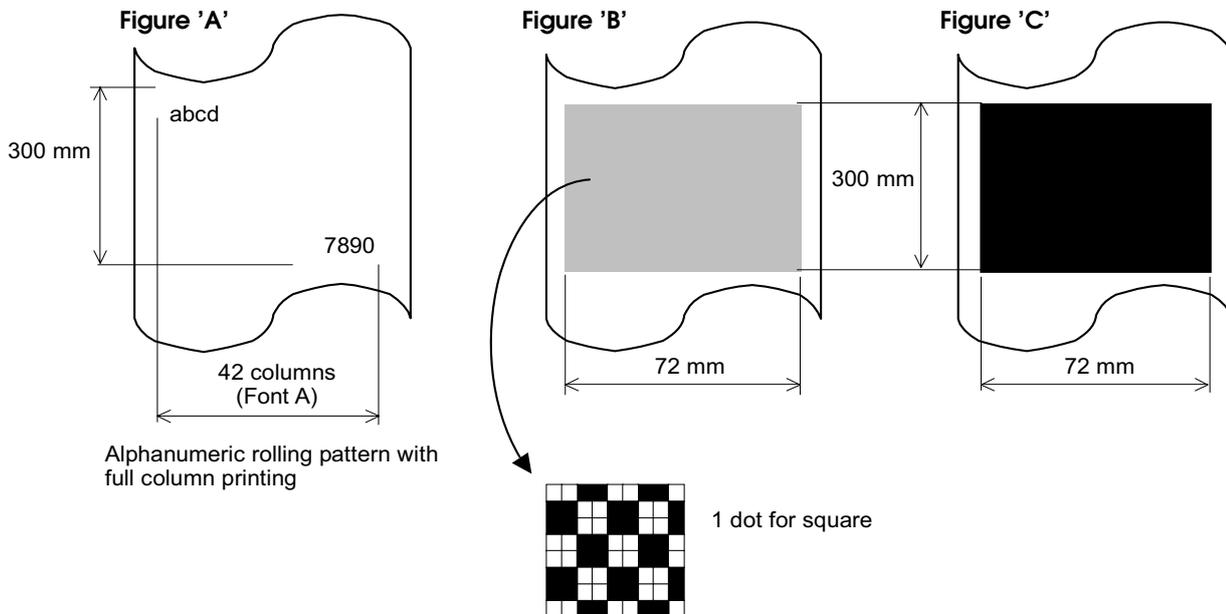
Note:

The current consumption is as follows when a receipt is printed in low temperature. Take in consideration if a power supply other than the Epson specified one is used or the print pattern is different.

Print pattern	See figure 'A' below		See figure 'B' below		See figure 'C' below	
Print duty	18% (Alphanumeric in full column)		50%		100%	
Current value (A) at 5C°	Peak	Mean	Peak	Mean	Peak	Mean
	7.7	1.9	8.5	3.5	9.5	5.0

- ❑ The values in the table above are measured in the following conditions, but are just for your reference.
- ❑ The Epson original power supply PS-170 or PS-180 can print within the print duty above.
- ❑ Contact Epson if you need more detailed information.

Environmental temperature: 5°C {41°F}
 Supply voltage: 24 V
 Print pattern: See figures below
 Measurement terminal: At the connector of the printer's power supply
 Print density: Print density level 2
 The print density levels 3 and 4 are higher by +15% and +30% respectively than the value of the level 2 in the table above.



1.7.3 EMI and Safety Standards Applied

EMC is Tested Using the EPSON PS-170 Power Supply.

Europe:

CE Marking
Directive 89/336/EEC
EN55022 Class B
EN55024
IEC 61000-4-2
IEC 61000-4-3
IEC 61000-4-4
IEC 61000-4-5
IEC 61000-4-6
IEC 61000-4-8
IEC 61000-4-11

Safety Standards: EN 60950 (Tüv)

North America:

EMI: FCC Class A
Safety Standards: UL1950/CSA C22.2 No. 950

Japan:

EMI: VCCI Class A

Oceania:

EMI: AS/NZS 3548 class B

1.7.4 Reliability

1.7.4.1 Endorsement print mechanism section:

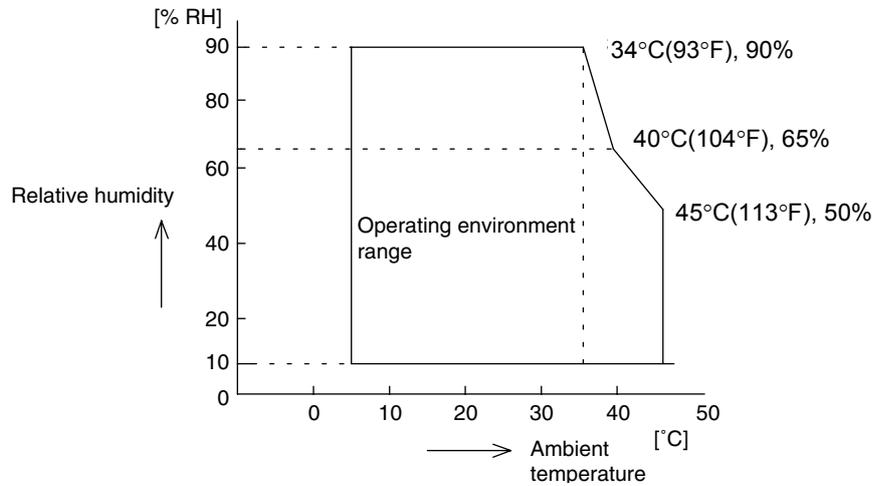
Life	Mechanism: 1,350,000,000 lines The printer is defined to have reached the end of its life when it reaches the beginning of the Wearout Period.
Print head life:	6,750,000 characters

1.7.4.2 Receipt printer section:

Life	Mechanism: 15,000,000 lines The printer is defined to have reached the end of its life when it reaches the beginning of the Wearout Period.
MTBF	360,000 hours Failure is defined as a Random Failure occurring at the time of the Random Failure Period.
MCBF	52,000,000 lines This is an average failure interval based on failures relating to Wearout and Random Failures up to the life of 15 million lines.
Thermal head life:	100 million pulses, 100 Km
Autocutter life:	1,500,000 cuts

1.7.5 Environmental Conditions

Temperature:	Operating: 5 C° to 45 C° (41F° to 113F°) Storage: -10C° to 50 C° (14F° to 122F°) (except for paper and ribbon)
Humidity:	Operating: 10 to 90% RH Storage: 10 to 90% RH (except for paper and ribbon)



Operating temperature and humidity range

Vibration resistance:

When packed:
 Frequency: 5 to 55 Hz
 Acceleration: 2 G
 Sweep: 10 minutes (half cycle)
 Duration: 1 hour
 Directions: x, y, and z

No external or internal damage should be found after the vibration test, and the unit should operate normally.

Impact resistance:

When packed:
 Package: EPSON standard package
 Height: 50 cm (19.69")
 Directions: 1 corner, 3 edges, and 6 surfaces

No external or internal damage should be found after the drop test, and the unit should operate normally.

When unpacked:
 Height: 5 cm (1.97")
 Directions: Lift one edge and release it (for all 4 edges).

When the printer is not printing, no external or internal damage should be found after the drop test.

Acoustic noise (operating):

Receipt:

When using autocutter:

Approximately 52 dB (bystander position)

When not using autocutter:

Approximately 45 dB (bystander position)

1.7.6 Installation

The printer must be installed horizontally.

1.8 Notes for Barcode printing

This printer supports the bar code printing on roll paper and slips. Note the following when a bar code is printed on the slip/validation.

- Ladder bar code is not supported.
- HRI character must be added.
- Use the ERC-32(B) black ink ribbon cassette that is sold separately.

1.9 External Dimensions and Weight

Width:186 mm (7.32 in)

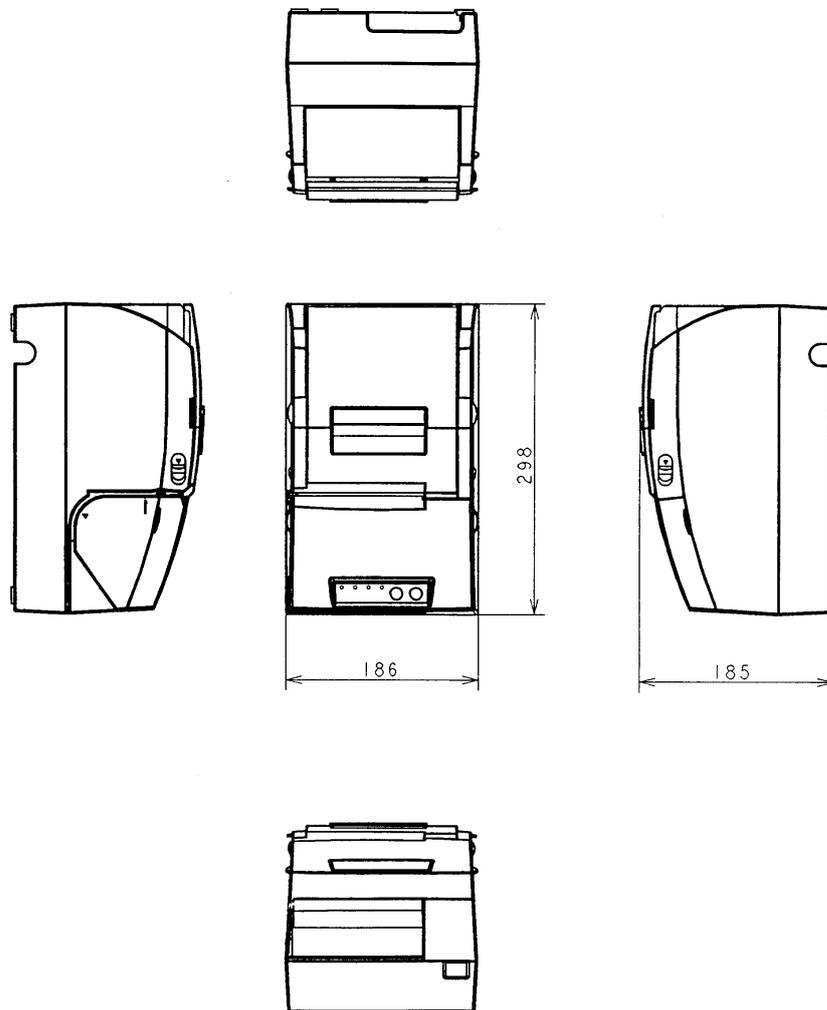
Depth:298 mm (11.73 in) (except for the protrusion)

Height:185 mm (7.28 in)

Weight:Approximately 5.8 kg (12.8 lb)

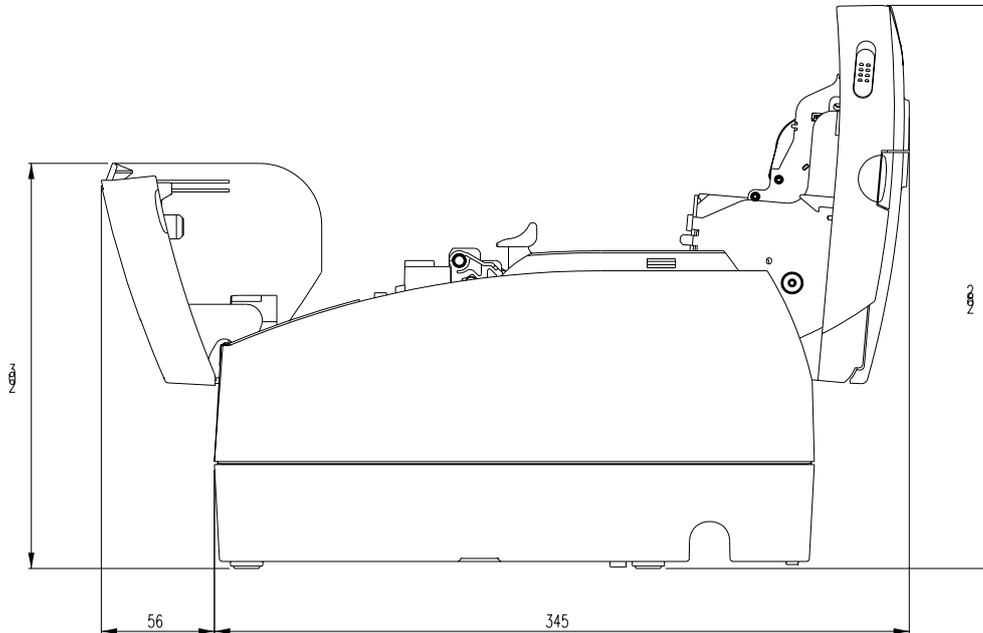
(All the numeric values are typical.)

Color:EPSON standard color (ECW)



T.10 Maintenance Area

The illustrations below show the area around the printer required for maintenance.



NOTE:203 mm =8 in
 56 mm =2.2 in
 345 mm =13.6 in
 282 mm =11.1 in

T.11 Comparison Table

Differences between the TM-H6000II and the previous model, the TM-H6000, are shown in the following table.

Specification related items	TM-H6000	TM-H6000II
Validation printer option (Factory option)	Not available	Available
2 dimension barcode PDF 417 availability	Not available	Available
2 color printing	Not available	Available
Image scanning	Not available	Not available
Image data storage	Not available	Not available
Image data compression method	--	--
Image data transmission format	--	--

Specification related items	TM-H6000	TM-H6000II
Thermal print speed	max 150 mm/s	Single color mode: max 170 mm/s 2-color print mode: max 56.4 mm/s
Optional roll paper spacer for 58mm or 60mm PG-58	Available by memory switch setting option: PG-58	Available by memory switch setting option: PG-58 Print speed: Single color mode: max 150 mm/s 2-color print mode: max 56.4 mm/s
Ladder barcode print speed	max 70mm/s	max 114mm/s
ESC/POS commands	--	Supports more command than TM-H6000 (*1)
EMI (CE marking)	Class B	Class B (North American model is Class A)
OPOS supported version (*2)	1.92E or later	2.10E or later
APD (Advanced Printer Driver) supported version (*2)	2.01E or later	2.03E or later

(*1) About supported ESC/POS command, see each specification or ESC/POS Application Programming Guide(APG).

(*2) Please contact EPSON about supported OS version,

Chapter 2

System Planning

This section provides you information for system planning.

2.1 Control Method

A TM printer can print and be controlled using any of the following three methods:

1. Windows printer driver (EPSON Advanced Printer Driver)
2. EPSON OPOS ADK
3. ESC/POS commands

Depending on the driver or interface to be used, an IP setting tool for the Ethernet specification, a USB device driver, and a logo registration utility for printing (TMFlash logo utility) are provided.

See “How to Get a Driver” in this chapter.

2.1.1 Windows Driver (EPSON Advanced Printer Driver)

The EPSON Advanced Printer Driver is a method for controlling the TM printer in the same manner as the Windows standard printer driver.

2.1.1.1 General Features of the EPSON Advanced Printer Driver

The EPSON Advanced Printer Driver has the following features:

- ❑ Supplies the Windows printer driver for the TM printer, which enables printing through general Windows applications.
- ❑ Enables executing unique functions of the POS printer, such as paper cutting and drawer opening.
- ❑ Font type selection enables printing with the printer’s internal fonts.
- ❑ Enables obtaining the printer status by StatusAPI with a programming language such as VisualBasic. This makes it possible to have bi-directional communication with the TM printer under the Windows standard printer driver environment.



Note:

The statusAPI is the API for controlling the printer, which is supplied exclusively by EPSON. Using this enables obtaining printer status and transmitting ESC/POS commands.

2.1.1.2 EPSON Advanced Printer Driver Components

Installer recognizes PC environment in which the installation will be done and installs DLL files and software components necessary for operating automatically. Driver, sample program, or manual can be selected to be installed.

Driver

You can select a driver depending on the purpose of usage (installation can be done at the same time). Each has functions such as two-color printing, smoothing, continuous printing, and option selection for cutting method.

- Receipt: printing receipt
- Slip: printing slip
- Reduce35: reducing whole print display to fit it into the width of receipt paper and printing it

Sample program

Sample program for using the StatusAPI with Visual Basic and Visual C++ can be installed.

Manual

The following manuals can be installed:

- Driver: User's Manual
- Status API: Reference Manual

2.1.1.3 EPSON Advanced Printer Driver Support Environment

Supported interfaces

- Serial, Parallel, USB, EtherNet

Supported Operating Systems: Epson has confirmed performance with the following:

- Windows 95 English Version Standard OSR2.5
- Windows 98 English Version Second Edition
- Windows NT Ver 4.0 English Version SP5, SP6
- Windows 2000 English Version

Supported Development Languages

- Visual Basic
- VisualC++

❑ Supported devices

(For detailed information on which devices can be used, see the release note for the driver.)

- EPSON receipt printer
- EPSON customer display
- EPSON cash drawer



Note:

The USB specification printer needs the USB driver and the Ethernet specification printer needs the IP setting utility in addition.

For detailed information, please contact your dealer or EPSON.

2.1.2 EPSON OPOS ADK

EPSON OPOS ADK supports the development environment necessary for OLE for Retail POS (OPOS) application development by OPOS Control proposed by the OPOS committee and supplies a printer driver (OCX) conforming to OPOS.

When developing an OPOS confirmed application, use the following control methods. EPSON OPOS ADK has the following features.

- ❑ EPSON OPOS ADK supports not only the OPOS Control (CO + SO) proposed by the OPOS committee but also totally supports the OPOS application development environment such as utilities for installation and setup, the contents necessary for development, such as sample programs and manuals, and also the function of Log when debugging, and silent installation, which enables easy installation for a targeted PC.
- ❑ EPSON OPOS ADK supports DirectIO with parameters for unique functions exclusively for TM printers by EPSON. Also the power notice function, offline buffer clear processing, and device irregular processing that has been taken into account by developers are supported by the driver; these can reduce the number of application steps.



Note:

For detailed information for the API functions, refer to "Application Programmer's Guide (APG)" issued by the OPOS committee.

2.1.2.1 General Features of EPSON OPOS ADK (OPOS Control)

OPOS Control included in EPSON OPOS ADK has the following features:

- ❑ Offers CO for each device class and SO for EPSON devices.
- ❑ Can use Direct IO with parameter
 - Acquires maintenance counter
 - Prints bit image for which NVRAM has already been registered

- ❑ Power on notice function (recovering automatically to the status before the power is turned off when turning on the power again)
- ❑ Offline buffer clear processing (deleting contents in print buffer at offline)
- ❑ Debugging function (trace function)
 - Logs between an application and CO (for used API and its return value)
 - Logs for device status (acquires causes for offline and errors in devices)

2.1.2.2 EPSON OPOS ADK Contents

Any installer later than EPSON OPOS ADK Ver2.10 supports the silent install function that can install the OPOS environment without a user interface, which offers easier installation. With this installer, OPOS Control for EPSON devices that are compatible with OPOS, manuals, utilities and sample programs described below can be installed.

- ❑ OPOS Control for EPSON devices

The following can be installed: CO, SO, header file for C++, header file for VB, TLB file for CO, or device information file.

- ❑ Manuals

- User's Guide (Environment construction manual: installation/uninstallation/usage of each utility)
- Application Development Guide (for OPOS compatible application developers: editions for common description and for each device)

- ❑ Utilities

- SetUpPOS Utility

Can select a device to be used, connection port and settings, such as paper width, monochrome/two-color (only for two-color supported devices) and print waiting time.

- TM Flash logo utility

Can register a bit map file to the printer and customer display.

- USB device driver

Required to connect a USB specification printer.

- Sample program

Sample programs in VB and VC++ can be installed.

2.1.2.3 EPSON OPOS ADK Supported Environment

- ❑ Supported interfaces
 - Serial, Parallel, USB, EtherNet
- ❑ Supported Operating Systems: Epson has confirmed performance with the following:
 - Windows 95 English Version Standard OSR2.5
 - Windows 98 English Version Second Edition
 - Windows NT Ver 4.0 English Version SP5, SP6
 - Windows 2000 English Version
- ❑ Supported Development Languages
 - Visual Basic
 - VisualC++

2.1.3 ESC/POS Command

Print/control by ESC/POS commands is direct control for TM printers using the ESC/POS commands proposed by EPSON. Sending ESC/POS commands to the printer from an application enables direct control of the printer. For the detailed information regarding the ESC/POS commands, contact the dealer where you purchased the product.



Note:

USB specification printer needs the USB driver and the Ethernet specification printer needs the IP setting utility in addition.

For detailed information, see item 4.1.4 Driver Information and Download Site in this Chapter.

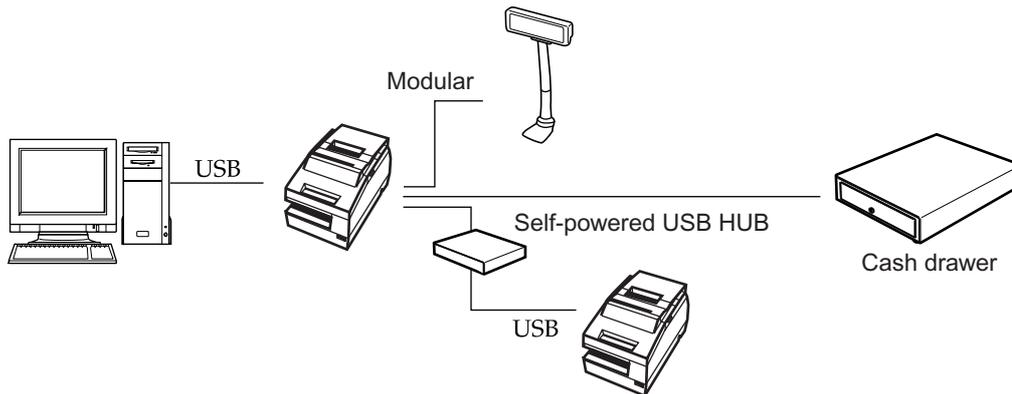
2.1.4 How to Get a Driver

Please contact EPSON or your dealer about OPOS, APD, and ESC/POS.

2.2 Connection Form and Cables

2.2.1 USB

The TM printer can be connected to the host PC via a USB connector, and other TM printers can be connected to the first printer via USB. (See “Changing the DIP Switch Settings” in Chapter 3 for DIP switch settings.)



Note:

UB-U01II has bus-powered USB HUB. Therefore This USB model printer can't be connected directly to other bus powered HUB (including other USB model TM printer) and bus-powered function which current consumption is over 100mA. If you would like to connect other USB model TM printer with UB-U01II, use a self powered USB HUB as shown in the above figure.

The host PC needs to have an installed “USB device driver” for using USB model TM printer. Please contact EPSON or your dealer about the USB device driver and the procedure for installing.

2.3 Serial Connection

When the TM printer is connected to the host PC with a serial interface, the following connection forms are possible:

- Stand alone
- Y-connection
- Pass-through connection

Connections for usable serial cross cables are as follows:

Type A

D-Sub 25P(TM)			D-Sub 9P(PC)	
Pin No	Signal		Signal	Pin No
1	FG		DCD	1
2	TXD		TXD	3
3	RXD		RXD	2
20	DTR		DTR	4
6	DSR		DSR	6
4	RTS		RTS	7
5	CTS		CTS	8
7	GD		GD	5
25	RESET		RI/RESET	9

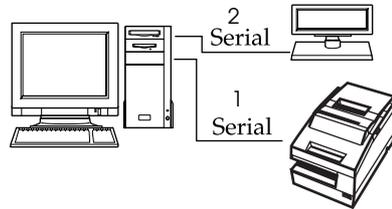
Type B

D-Sub 25P(TM)			D-Sub 9P(PC)	
Pin No	Signal		Signal	Pin No
1	FG		DCD	1
2	TXD		TXD	3
3	RXD		RXD	2
20	DTR		DTR	4
6	DSR		DSR	6
4	RTS		RTS	7
5	CTS		CTS	8
7	GD		GD	5
25	RESET		RI/RESET	9

The type of cable that should be used depends on the operation and the handshake method for the TM printer. You can operate the TM printer by Windows driver, OPOS, or ESC/POS commands. XON/XOFF, DTR/DSR, or RTS/CTS are available as handshake controls. See tables in following sections for the type cable for each connection.

2.3.1 Stand alone

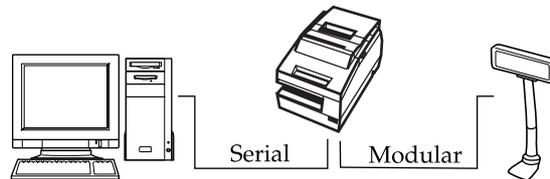
Both TM printer and customer display (DM-D) are connected to the host PC via serial port.



Application control setting		XON/XOFF (except OPOS)	DTR/DSR (DOS, OPOS, Visual C)	RTS/CTS (DOS, Windows driver, Visual C, Visual Basic, MSComm)
XON/XOFF	1	Type A or B	—	—
	2	DM-D500: A,B Other DM-D: not available	—	—
DTR/DSR	1	—	Type A or B	Type B
	2	—	Type A or B	Type B

2.3.2 Y-connection

TM printer is connected to the host PC via serial port and the customer display (DM-D) is connected to TM printer via modular connector.



Application control setting		XON/XOFF (except OPOS)	DTR/DSR (DOS, OPOS, Visual C)	RTS/CTS (DOS, Windows driver, Visual C, Visual Basic, MSComm)
XON/XOFF		Not available	—	—
DTR/DSR		—	Type B (*)	Type B

(*) When RTS/CTS control is used between the TM and DM.



Note:

You need to use the UB-S09 interface when you use a modular connector.

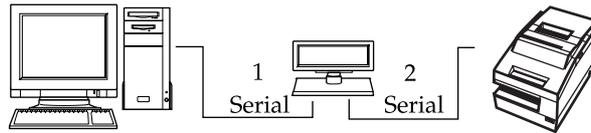
On the DM-D (DM-D500 etc...) which has DIP switch to select Y-type connection, confirm that the DIP switch has been set "Y-type connection: Enable."

2.3.3 Pass-through connections

The TM printer is connected to the customer display (DM-D) via a serial port, and the DM-D is connected to the host PC via a serial port.

 Note:

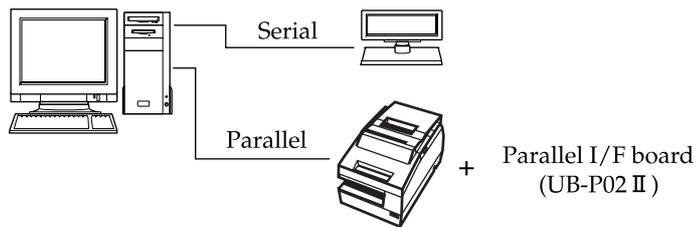
On the DM-D (DM-D500 etc...) which has DIP switch to select Y-type connection, confirm that the DIP switch has been set "Y-type connection: Disable."



Application control		XON/XOFF (except OPOS)	DTR/DSR (DOS, OPOS, Visual C)	RTS/CTS (DOS, Windows driver, Visual C, Visual Basic, MScComm)
TM side control setting				
XON/XOFF		Not available	—	—
DTR/DSR	1	—	Type A or B	Type B
	2	—	Type A or B	Type A or B

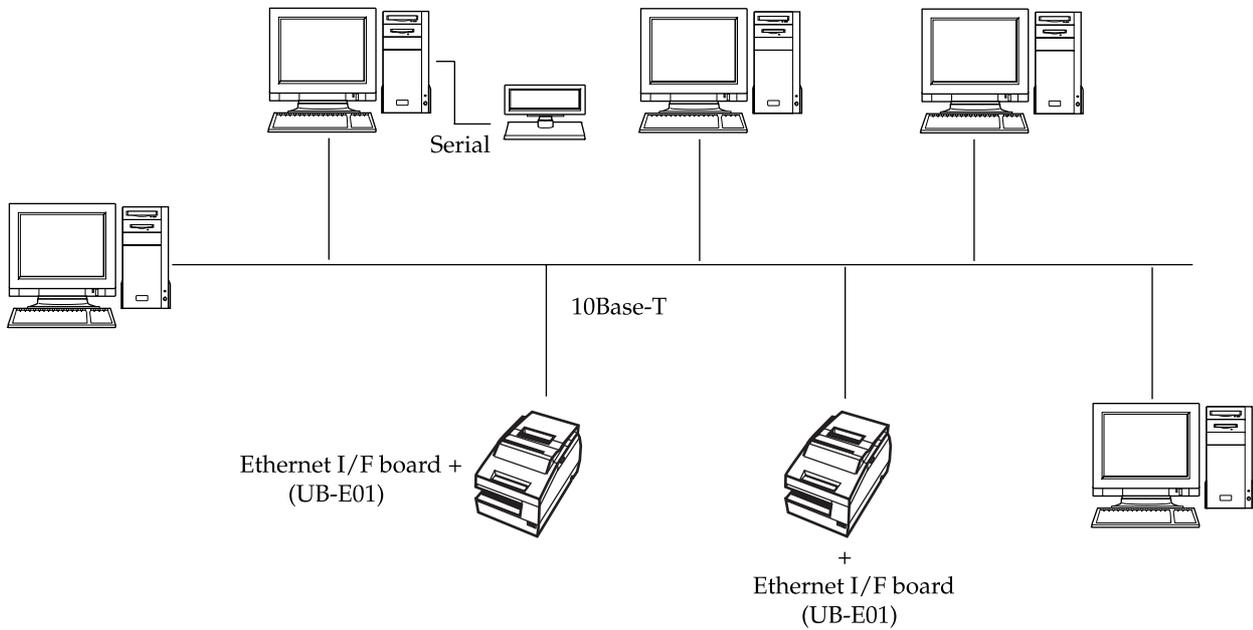
2.4 Parallel Connection

The TM printer is connected to the host PC via a parallel interface board (UB-P02II). The customer display (DM-D) is connected to the host PC via a serial port.



2.5 Ethernet

TM printers are connected to a network via a hub using an Ethernet cable.



Note:

If the TM printer is connected to the host PC via an Ethernet interface, a DM-D cannot be connected to the TM printer.

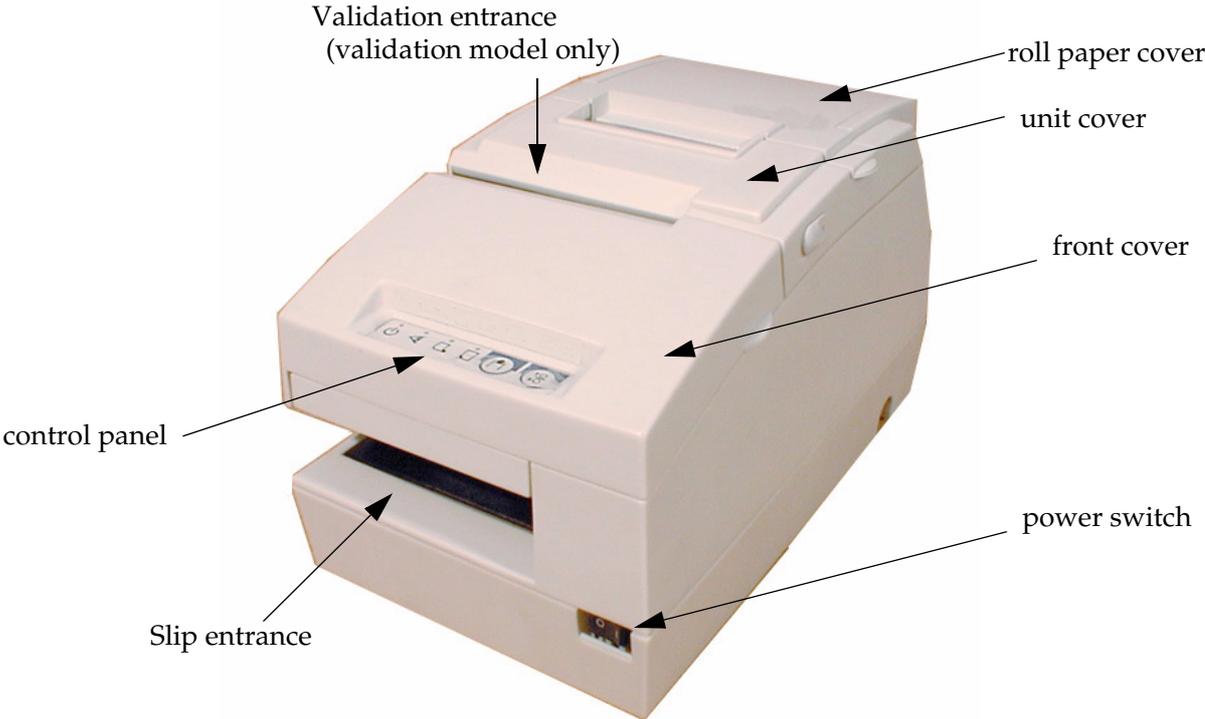
We provide the IP address setup utility "EPSON TMNet WinConfig," for setting the IP address of the Ethernet model TM printer on the host PC. Please contact EPSON or your dealer about "EPSON TMNet WinConfig" and the procedure for installing.

Chapter 3

Setup

3.1 Part Name and Basic Operation

3.1.1 part name

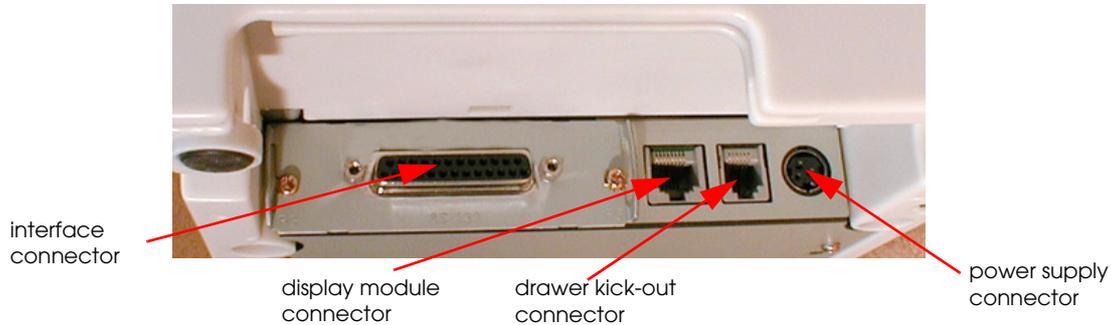


3.1.2 Connectors

⚠ WARNING:

Do not connect a telephone line to the drawer kick-out connector or the display module connector; otherwise the printer and the telephone line may be damaged.

You can connect up to four cables to the printer. They all connect to the connector panel (on the bottom rear of the printer), which is shown below.



Note:

This illustration shows the serial interface model. The parallel interface connector looks slightly different.

3.1.3 The Control Panel



3.1.3.1 LED

POWER

This light is on when the power is turned on.

ERROR

When this light is on but not blinking, it means that the printer is offline. Check to see if a cover is open. When this light is blinking, there is an error. See “LED Blinking Pattern” in Chapter 4.

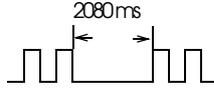
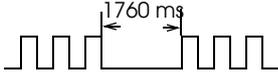
PAPER OUT

This light comes on when the printer is out, or nearly out, of roll paper. The printer has a paper end detector, and it also has a near-end detector (which can be adjusted) to warn you that the printer is nearly out of paper. See “Adjusting the Roll Paper Near End Detector” on page 3-17 for information on adjusting the detector.

This light blinks during the self-test printing standby state or macro execution standby state (when the macro execution command is used).

SLIP

- This light blinks when the printer is ready to receive slip paper. It stays on during printing on slip paper and blinks again when slip paper should be removed. When the slip paper is removed in the slip removal waiting state, the printer enters the paper roll mode two seconds later. The SLIP LED light is on during this time. The blinking patterns for the slip inserting and removal waiting states are different as follows:

State	SLIP LED Blinking Pattern  320 ms
Slip insertion waiting	
Slip removal waiting	 2080ms
Check insertion waiting (only for MICR-equipped model)	 1760ms

3.1.3.2 Control Panel Buttons

The control panel has two paper buttons that you may have to use, although most paper handling functions will be handled by your software.

FEED

Use this button to feed roll paper or to start a roll paper self test. (See the instructions later in this chapter.)

RELEASE

Use this button to release slip paper or to start a slip paper self test. (See the instructions later in this chapter.)

Panel Button Operations

ESC/POS command can be set to enable or disable the panel buttons, but in some situations the setting of ESC/POS command is ignored, as you can see in the table below:

		Normal Mode			
		All covers are closed	Paper roll cover is opened	Unit cover is opened	Front cover is opened
If receipt is selected	FEED	Follow ESC/POS command	Disabled	Disabled	Follow ESC/POS command
	RELEASE	Follow ESC/POS command	Enabled		
If slip is selected	FEED	Follow ESC/POS command	Follow ESC/POS command	Enabled	Enabled
	RELEASE	Follow ESC/POS command	Enabled		

		Slip insertion waiting status	Slip ejection waiting status			
			All covers are closed	Paper roll cover is opened	Unit cover is opened	Front cover is opened
If receipt is selected	FEED	—	—	—	—	—
	RELEASE	—	—	—	—	—
If slip is selected	FEED	Disabled	Follow ESC/POS command	Follow ESC/POS command	Enabled	Enabled
	RELEASE	Disabled	Follow ESC/POS command	Enabled		



Note:

The default setting of the ESC/POS command is "Enable."

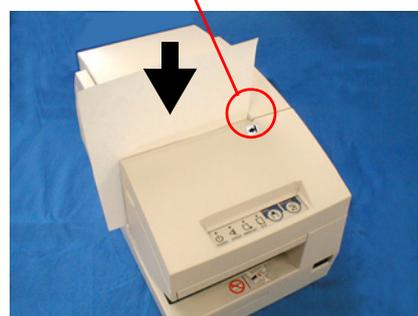
3.1.4 Validation paper handling

1. Transmit the command from host PC to make the printer ready for a validation paper to be inserted.
2. Insert a validation paper into the validation entrance from the upper side.

insert the paper against the corner



incorrect insertion



correct insertion



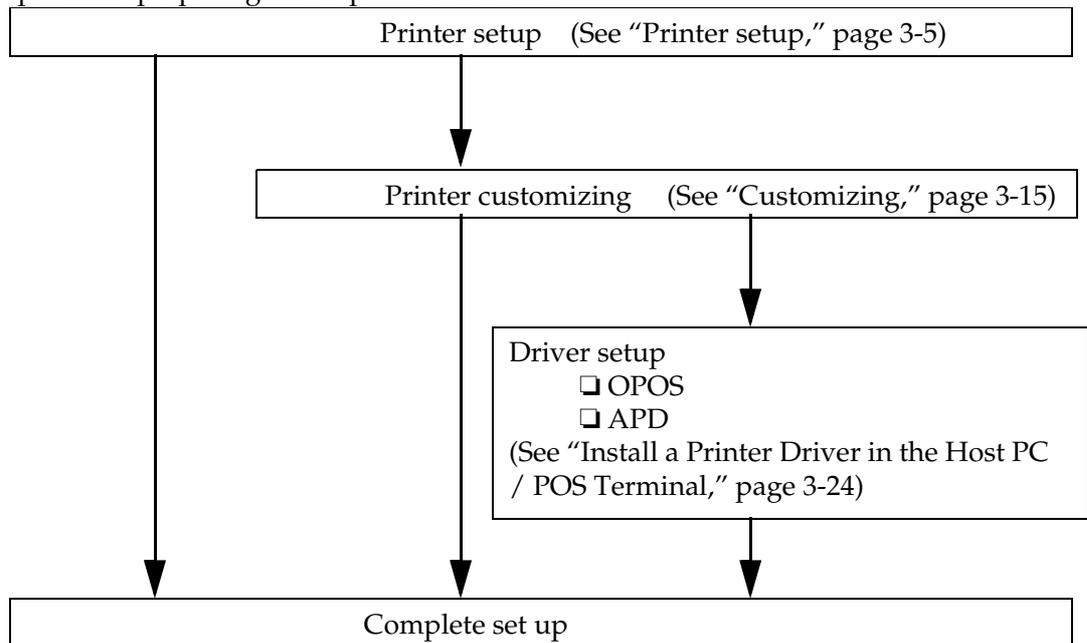
Note:

Use only validation paper (flat paper, without wrinkles, creases, or folds) that matches the specifications. The validation function is a factory option.

3.2 Setup Flow

You have to set up your printer to use it. And you can adjust some feature by customizing them. This section describes the setup.

The set up flow of preparing to use printer is below..

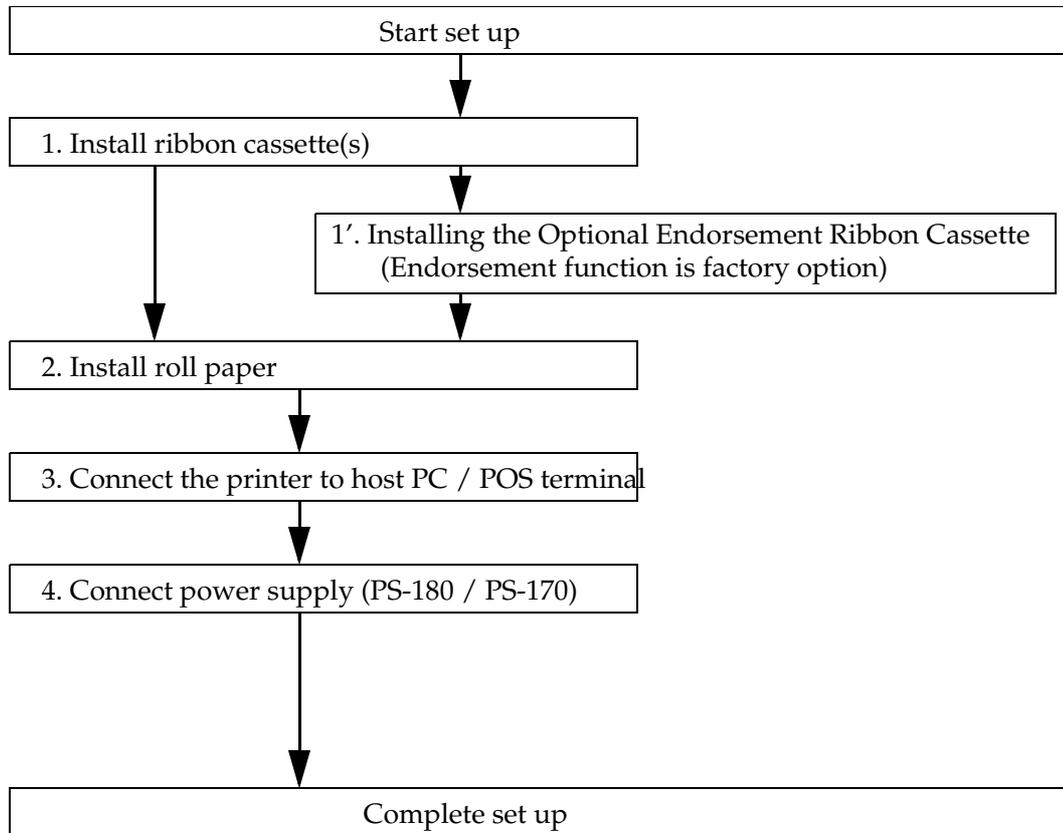


Note:

When you use OPOS (OCX driver from EPSON) or Advanced Printer Driver, you need to install the driver. When you use ESC/POS commands, you don't have to install drivers. For information on these drivers, see "Control Method" on page 2-1 and "Install a Printer Driver in the Host PC / POS Terminal" on page 3-24.

3.3 Printer setup

This section describes the setup. The flow of preparing to use printer is below



Note:

If your printer is equipped with the optional endorsement function, you also need to install the endorsement ribbon cassette, which is smaller than the standard ribbon cassette. If your printer isn't equipped with the optional endorsement function, you don't need to install it.

When you use this printer with serial interface, you have to adjust the communication settings. See "Customizing" on page 3-15 for how to set them.

3.3.1 Installing or Replacing the Ribbon Cassette

EPSON recommends the use of genuine EPSON ribbon cassettes. Ribbon cassettes not manufactured by EPSON may cause damage to your printer that is not covered by EPSON's warranties.

To install the ribbon cassette for the first time or to replace a used ribbon, follow the steps below:

 **Note:**

Be sure to turn on the power before installing a ribbon cassette. When the printer is turned off, the ribbon cassette cannot be installed or removed.

1. Unpack the ribbon cassette and turn the knob in the direction shown to take up any slack.



2. Open the front cover of the printer, using the tabs on each side of the cover.

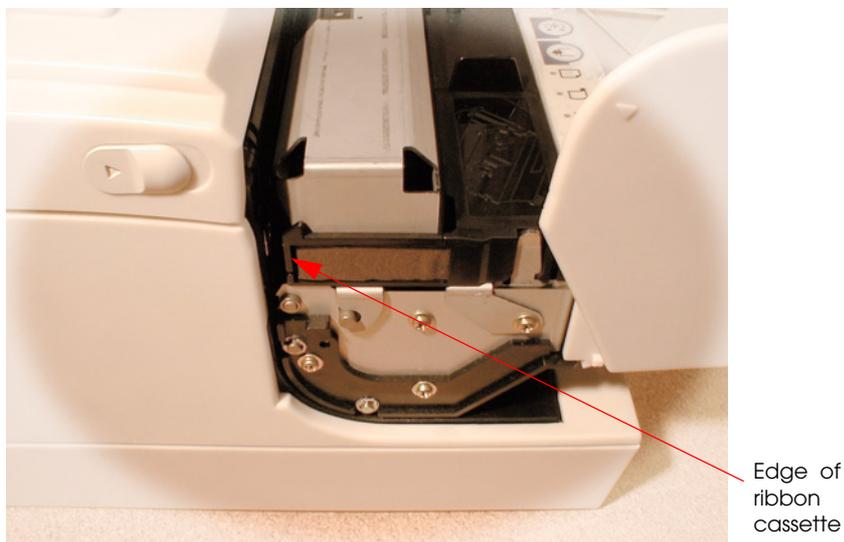


3. Remove the old ribbon, if there is one.

4. Insert the new ribbon cassette as shown.



5. Turn the knob two or three times to make sure the ribbon is seated correctly. You can also look at the side of the slip unit to see if the ribbon is in the correct place. See below.



6. Close the front cover of the printer.

3.3.2 Installing or Replacing the Optional Endorsement Ribbon Cassette

If your printer is equipped with the optional endorsement function, you also need to install the endorsement ribbon cassette, which is smaller than the standard ribbon cassette.

EPSON recommends the use of genuine EPSON ribbon cassettes. Ribbon cassettes not manufactured by EPSON may cause damage to your printer that is not covered by EPSON's warranties.



Note:

Be sure to turn on the power before installing a ribbon cassette.

1. Unpack the ribbon cassette and turn the knob in the direction shown to take up any slack.

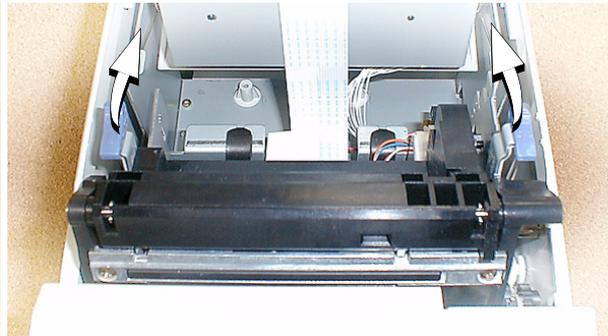


2. Open the unit cover, as shown below. Inside the printer, push the levers backward to open the unit.

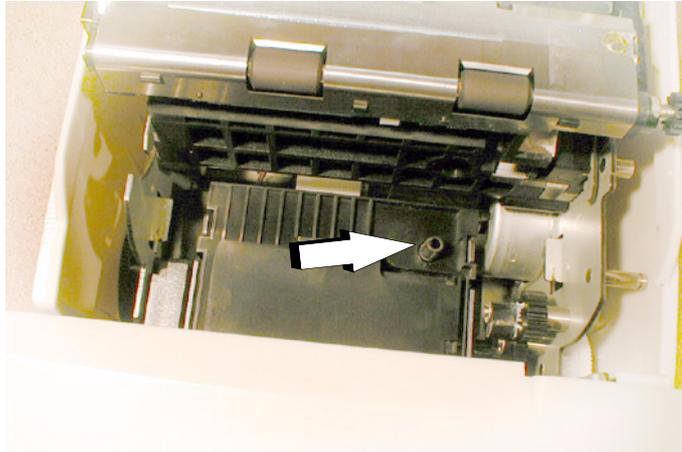


Note:

Do not open the unit during printing.



3. Insert the ribbon cartridge into the printer. You can see a properly installed ribbon in the illustration below with the arrow pointing to the knob.



4. Turn the knob two or three times to make sure that the ribbon is seated correctly.
5. Close the cover of the printer.

3.3.3 Installing or Replacing the Paper Roll



Note:

Do not use paper rolls that have the paper glued or taped to the core because they might cause a paper jam.

To prevent paper jams, make sure that nothing obstructs paper coming out of the paper exit, and do not pull the paper out of the printer.

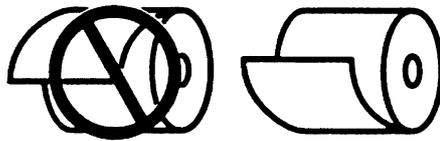
If you would like to use roll paper which is 60mm or 58mm width, you need to adjust paper width of printer. See "Adjusting the Roll Paper Width" on page 3-16 for details.

1. To prevent data loss make sure that the printer is not receiving data.
2. Open the paper roll cover by lifting up the two tabs on the paper roll cover and then pushing the cover back.
3. Remove the used paper roll core if there is one.

4. Insert the paper roll as shown.



5. Be sure to note the correct direction that the paper should come off the roll.

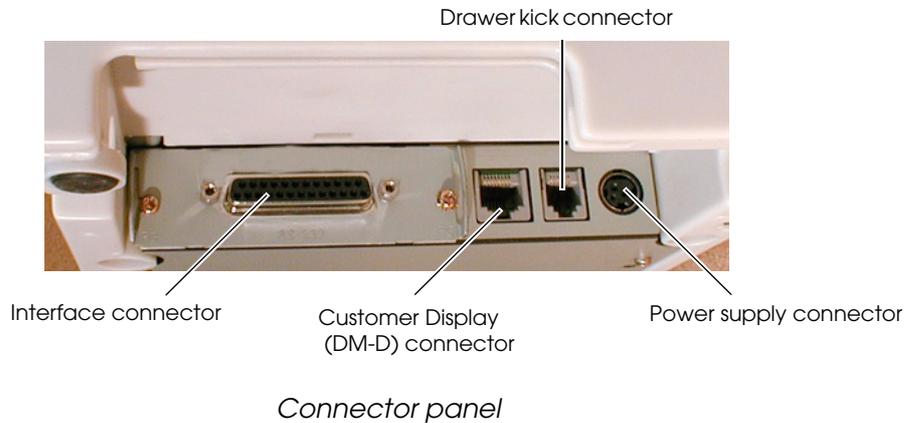


6. Pull out a small amount of paper, as shown. Then close the cover and tear off the extra paper by pulling it toward the front of the printer.



3.3.4 Connecting the Printer to the Host PC / POS Terminal

All cables are connected to the connector panel located on the lower rear side of the printer.



Note:

The figure above shows the connector panel for the RS-232/RS-485 interface model printer. The shape of the interface connector varies according to the type of interface used.

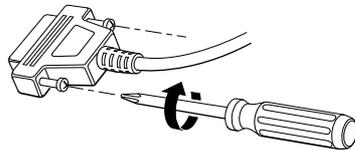
Be sure to turn off the power supply for both the printer and the host computer unit before connecting the various cables.

3.3.4.1 Serial interface model

Before connecting any of the cables, make sure that both the printer and the host PC are turned off.

You need an appropriate serial, parallel, USB, or Ethernet interface cable to connect your computer to the printer. For the serial model, it is important that you use a null modem cable, not any other serial cable, and for the parallel model use an IEEE 1284 cable.

1. Plug the cable connector securely into the printer's interface connector.
2. If the cable connector has screws on it, tighten the screws on both sides of the connector.



3. If your interface connector has a grounding wire, attach it to the printer using the screw labeled FG, which is next to the interface connector.
4. Attach the other end of the cable to the host PC.



Note:

When using serial interface, you need to adjust serial communication using the DIP switches. See "Adjusting the DIP Switches" on page 3-18 for details.

3.3.4.2 Parallel Interface Models

1. Press the connector on the end of the interface cable firmly into the interface connector on the connector panel.
2. Press down the clips on either side of the connector to lock it in place.
3. For interface cables equipped with a ground line, attach the ground line to the screw hole marked "FG" on the printer.
4. Connect the other end of the interface cable to the host computer.

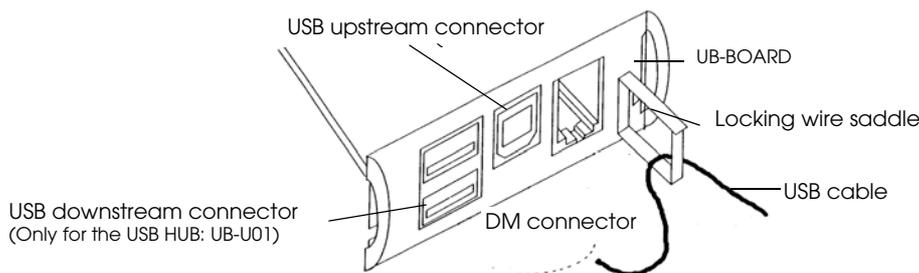
3.3.4.3 USB Interface Models

1. Attach the locking wire saddle at the location shown in the figure below.
2. Hook the USB cable through the locking wire saddle, as shown in the figure below.



Note:

Hooking the USB cable through the locking wire saddle, as shown in the figure below, will prevent the cable from coming unplugged.



Attaching locking wire saddle

3. Connect the USB cable from the host computer to the USB upstream connector.
4. For models that have the UB-U01II installed, a maximum of two USB devices can be connected to the USB downstream connector.



Note:

The UB-U01 serves as a bus power-supply hub. Therefore, it is important to note that bus power supply hubs (including the UB-U01II) and bus power supply functions with power dissipation of 100 mA or more cannot be connected directly to the printer. (A UB-U02II can be directly connected to a UB-U01 hub.)

5. Install the UB-U01II/02II device driver on the host computer.



Note:

For information on how to obtain the required device drivers and their installation procedures, contact the nearest EPSON service center.

3.3.4.4 Connecting a Drawer

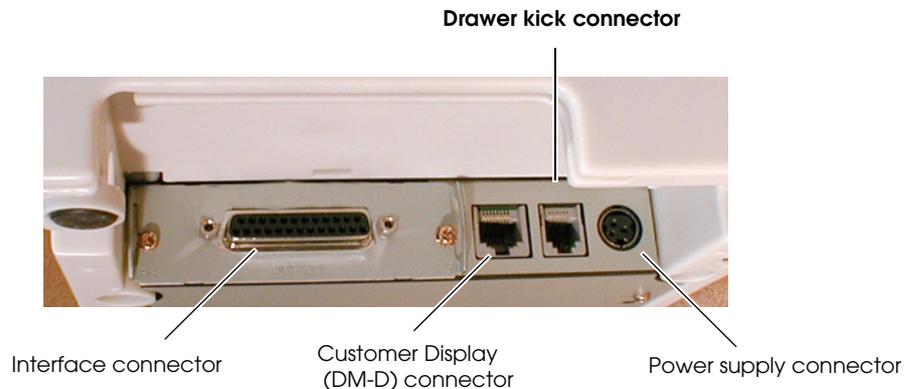
CAUTION:

Be sure to connect a drawer that meets printer specifications. Connecting a drawer of the wrong specifications may result in damage to both the drawer and the printer.

Never connect a telephone line to the drawer kick out connector (labeled "DK"). Doing so may result in damage to both the telephone line and the printer.

Never connect the drawer cable to the customer display connector (labeled "DM-D"). Doing so may result in damage to both the drawer cable and the printer.

1. Connect the drawer cable to the drawer kick out connector (labeled "DK") on the connector panel.



Connecting drawer

2. The connecting is finished.

3.3.5 Connecting the Power Supply Unit (PS-180/ 170)

Use the optional EPSON PS-170 power supply or equivalent for your printer.

WARNING:

Make sure you use the EPSON PS-170 power supply or equivalent. Using an incorrect power supply may cause fire or electrical shock.

CAUTION:

When connecting or disconnecting the power supply from the printer, make sure the power supply is not plugged into an electrical outlet. Otherwise you may damage the power supply or the printer.

If the power supply's rated voltage and your outlet's voltage do not match, contact your dealer for assistance. Do not plug in the power cord. Otherwise you may damage the power supply or the printer.

1. Make sure the printer's power switch is turned off, and the power supply's power cord is unplugged from the electrical outlet.
2. Check the label on the power supply to make sure the voltage required by the power supply matches that of your electrical outlet.
3. Plug the power supply cord into the connector shown below.



Power supply connector

Note:

To remove the DC cable connector, make sure the power supply's power cord is unplugged; then grasp the connector at the arrow and pull it straight out.

3.4 Customizing

This printer is able to be customized for the items below:

- Roll paper width (80mm / 60mm / 58mm)
- Roll paper near end detector
- DIP switch (communication condition, print density, two-color mode, etc...)
- Memory switch (some notices enable/disable, roll paper supply, etc...)

The current settings can be confirmed by a self-test.

3.4.1 How to Confirm Current Settings

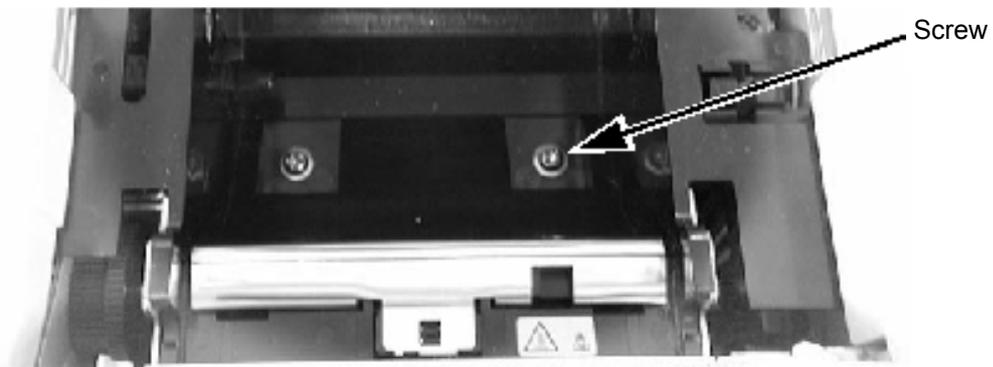
You can use a self-test to confirm the current settings. See “Self Tests” on page 3-30.

3.4.2 Adjusting the Roll Paper Width

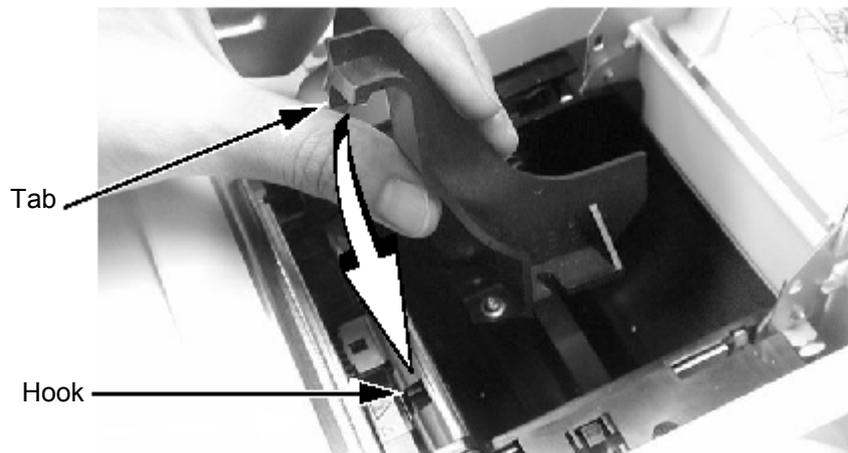
Follow the procedure below to adjust the roll paper width.

1. Open the roll paper cover.
2. Install/remove/adjust the roll paper guide (PG-58).

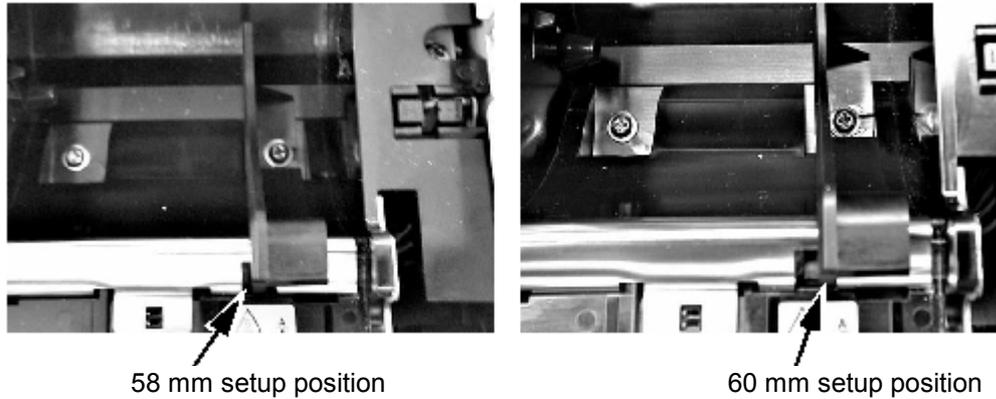
Open the roll paper cover and remove the screw on the right end. Do not discard the screw, as it may be reused later.



Insert the tab on the paper guide into the hook on the printer and then push the paper guide into place.



When using 58mm paper, slide the entire paper guide to the left; when using 60mm paper, slide the entire paper guide to the right. Make sure that the paper guide is set securely in place.



Secure the paper guide in place with the screw that was provided with the paper guide.

3. Set Memory switch 8-3 according to the paper width by using Memory switch setting utility. Please contact your dealer or EPSON about detail information of the memory switch, and see the manual of Memory switch setting utility for how to use the utility.



Note:

When you using OPOS or APD, you may not set the memory switch.

The procedure is finished.

3.4.3 Adjusting the Roll Paper Near End Detector

The paper near end detector detects when paper is almost gone by measuring the diameter of the paper roll. The detector has two settings.



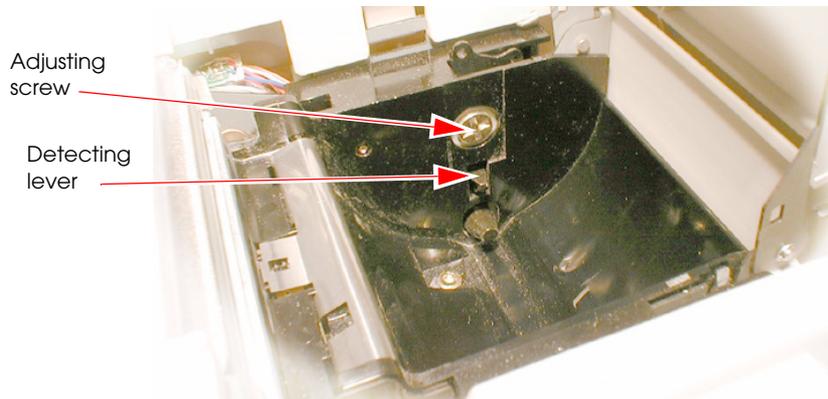
Note:

Because of variations in paper roll cores, it is not possible for the detector to measure exactly the length of paper left on the roll when the detector is triggered.

If you want more paper left when the detector is triggered, change the setting, as described below.

1. Open the printer cover, and remove the paper roll.

2. Loosen the adjusting screw with a coin, and carefully move the detecting lever up.



3. Tighten the adjusting screw, and check to be sure that the detecting lever moves freely.
4. Replace the paper roll.

3.4.4 Adjusting the DIP Switches

The printer has two sets of DIP switches. The function of the DIP switches is different for each interface model.

3.4.4.1 Changing the DIP Switch Settings

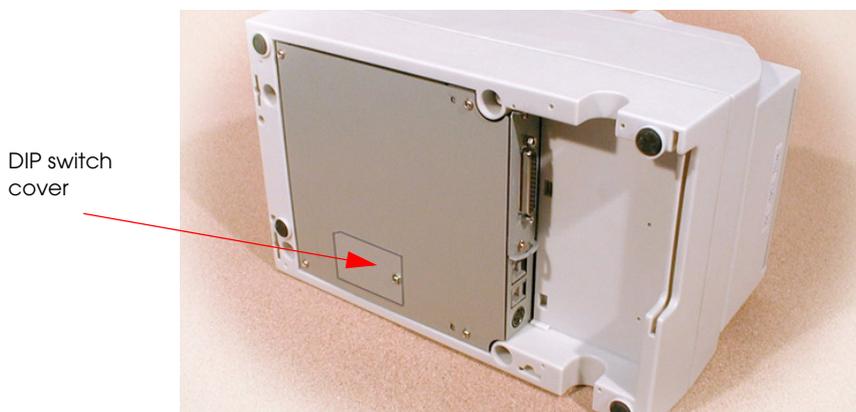
If you need to change settings, follow the steps below to make your changes:

CAUTION:

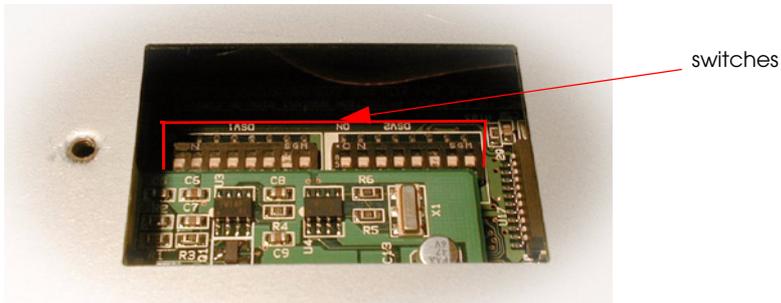
Turn off the power while removing the DIP switch cover to prevent an electric short, which can damage the printer.

Use a crosshead screwdriver to remove the screw holding the DIP switch cover.

1. Make sure the printer is turned off.
2. Remove the screw from the DIP switch cover. Then take off the DIP switch cover.



3. Set switches using a pointed tool, such as tweezers or a small screwdriver.



4. Replace the DIP switch cover. Then secure it with the screw.

The new settings take effect when you turn on the printer.



Note:
The functions of the switches of are shown in the following sections.

3.4.4.2 Serial interface model

DIP Switch 1

SW	Function	ON	OFF
1-1	Data receive error	Ignored	Prints "?"
1-2	Receive buffer capacity	45 bytes	4 KB
1-3	Handshaking	XON/XOFF	DTR/DSR
1-4	Data word length	7 bits	8 bits
1-5	Parity check	Enabled	Disabled
1-6	Parity selection	Even	Odd
1-7	Transmission speed (See the table below.)		
1-8			

Transmission speed

Transmission Speed in BPS (bits per second)	1-7	1-8
4800	ON	ON
9600	OFF	ON
19200	ON	OFF
38400	OFF	OFF

DIP Switch 2

SW	Function	ON	OFF
2-1	Handshaking (BUSY condition)	Receive buffer full	Offline or receive buffer full
2-2	Customer display connection	Connected	Not connected
2-3	Print density (See the table below.)		
2-4			
2-5	Internal use	Fixed to OFF	
2-6	Internal use	Fixed to OFF	
2-7	I/F pin 6 reset signal	Enabled	Disabled
2-8	I/F pin 25 reset signal	Enabled	Disabled

Print density

Print Density	SW 2-3	SW 2-4
1 (Light)	ON	ON
2↑	OFF	OFF
3↓	ON	OFF
4 (Dark)	OFF	ON

Notes:

Changes in DIP switch settings (excluding switches 2-7 and 2-8, interface reset signals) are recognized only when the printer power is turned on or when the printer is reset. If the DIP switch setting is changed after the printer power is turned on, the change does not take effect until the printer is turned on again or is reset.

If you turn on DIP switch 2-7 or 2-8 while the printer power is turned on, the printer may be reset, depending on the signal state. DIP switches should not be changed while the printer power is on.

If the print density is set to level 3 or 4, printing speed is usually reduced.

For a tip about print density, see "When Using Original Paper" on page 3-23.

3.4.4.3 Parallel / Ethernet interface model

DIP Switch 1

SW	Function	ON	OFF
1-1	Auto line feed	Always enabled	Always disabled
1-2	Receive buffer capacity	45 bytes	4KB
1-3~ 1-8	Reserved	Fixed to OFF	

DIP Switch 2

SW	Function	ON	OFF
2-1	Handshaking (BUSY condition)	Receive buffer full	Offline or receive buffer full
2-2	Internal use (Do not change setting.)	Fixed to OFF	
2-3	Print density (See the table below.)		
2-4			
2-5~ 2-6	Internal use (Do not change setting.)	Fixed to OFF	
2-7	Reserved (for serial interface)	Fixed to OFF	
2-8	I/F pin 31 reset signal (Do not change setting.)	Fixed to ON	

Print density

Print Density	SW 2-3	SW 2-4
1 (Light)	ON	ON
2↑	OFF	OFF
3↓	ON	OFF
4 (Dark)	OFF	ON

Notes:

When pin 6 of the interface connector is used for the reset signal, the printer is reset at MARK on the RS-232 level.

Changes in DIP switch settings (excluding switch 2-8, interface reset signal) are recognized only when the printer power is turned on or when the printer is reset by using the interface. If the DIP switch setting is changed after the printer power is turned on, the change does not take effect until the printer is turned on again or is reset.

If you turn on DIP switch 2-8 while the printer is turned on, the printer may be reset, depending on the signal state. DIP switches should not be changed while the printer power is on.

If the print density is set to level 3 or 4, printing speed is usually reduced.

For a tip about print density, see "When Using Original Paper" on page 3-23.

3.4.4.4 USB interface model*DIP Switch 1*

SW	Function	ON	OFF
1-1	Auto line feed	Always enabled	Always disabled
1-2	Receive buffer capacity	45 bytes	4KB
1-3~ 1-8	Reserved	Fixed to OFF	

DIP Switch 2

SW	Function	ON	OFF
2-1	Handshaking (BUSY condition)	Receive buffer full	Offline or receive buffer full
2-2	Customer display connection	Connected	Not connected
2-3	Print density (See the table below.)		
2-4			
2-5~ 2-6	Internal use (Do not change setting.)	Fixed to OFF	
2-7	Reserved (for serial interface)	Fixed to OFF	
2-8	Reserved	Fixed to OFF	

Print density

Print Density	SW 2-3	SW 2-4
1 (Light)	ON	ON
2↑	OFF	OFF
3↓	ON	OFF
4 (Dark)	OFF	ON

Notes:

If the print density is set to level 3 or 4, printing speed is usually reduced.

For a tip about print density, see "When Using Original Paper" on page 3-23.

3.4.4.5 When Using Original Paper

When you use original paper such as P350 (F380), we recommend setting the DIP switches as shown in the table below. The setting differs depending on each paper specification. See the Other Qualified Suppliers for Thermal Paper section later in this chapter.

Original paper type	DIP SW2		Print density level
	3	4	
P350 (F380)	ON	ON	1
PD160R, AF50KS-E, P310, P300	OFF	OFF	2



Note:

See the thermal paper section in Chapter 4 for information about thermal paper.

3.4.5 Memory Switches

This printer has “Memory switches” which are software switches. A memory switch setting utility can change the memory switch 1 or 8 to ON or OFF as shown in the table below (default: all OFF):

- Switch 1

Bit	ON	OFF
1	Transmits the power ON notice	Does not transmit the power ON notice
2 ~8	Reserved (Do not change the setting)	

- Switch 8

Bit	ON	OFF
1-2	Reserved (Do not change the setting)	
3	Uses a 58 mm width roll paper	Uses an 80 mm width roll paper
4	Uses two-color roll paper	Uses monochrome roll paper
5-6	Reserved (Do not change the setting)	
7	Slip paper jam detection: Disabled	Slip paper jam detection: Enabled
8	Becomes recoverable error if the unit cover is open during printing	Goes offline if the unit cover is open during printing



Note:

Settings of the memory switch are stored in the NV memory; therefore, even if the printer is turned off, the settings are maintained. Excessive use of this function may destroy the NV memory. As a guideline, do not use this function more than 10 times a day.

For information about the Memory switch utility, please contact your dealer or EPSON.

When you use OPOS or APD, generally you don't need to adjust memory switch because OPOS or APD are able to set these items automatically.

3.4.6 How to Use Two-Color Printing

This printer is able to print in two colors by using two-color thermal paper. The adjustment method is described below.

1. Adjust Memory switch 8-4 to ON "Uses two-color roll paper." (See "Memory Switches" on page 3-23.) When you use OPOS, adjust the "paper" item in the setupPOS utility.
2. Install two-color thermal paper in the printer.
3. Print two color data. (Ex: two-color graphic data)



Note:

When you use APD, you may use the memory switch utility to set the memory switch. For information about the Memory switch utility, please contact your dealer or EPSON.

3.5 Install a Printer Driver in the Host PC / POS Terminal

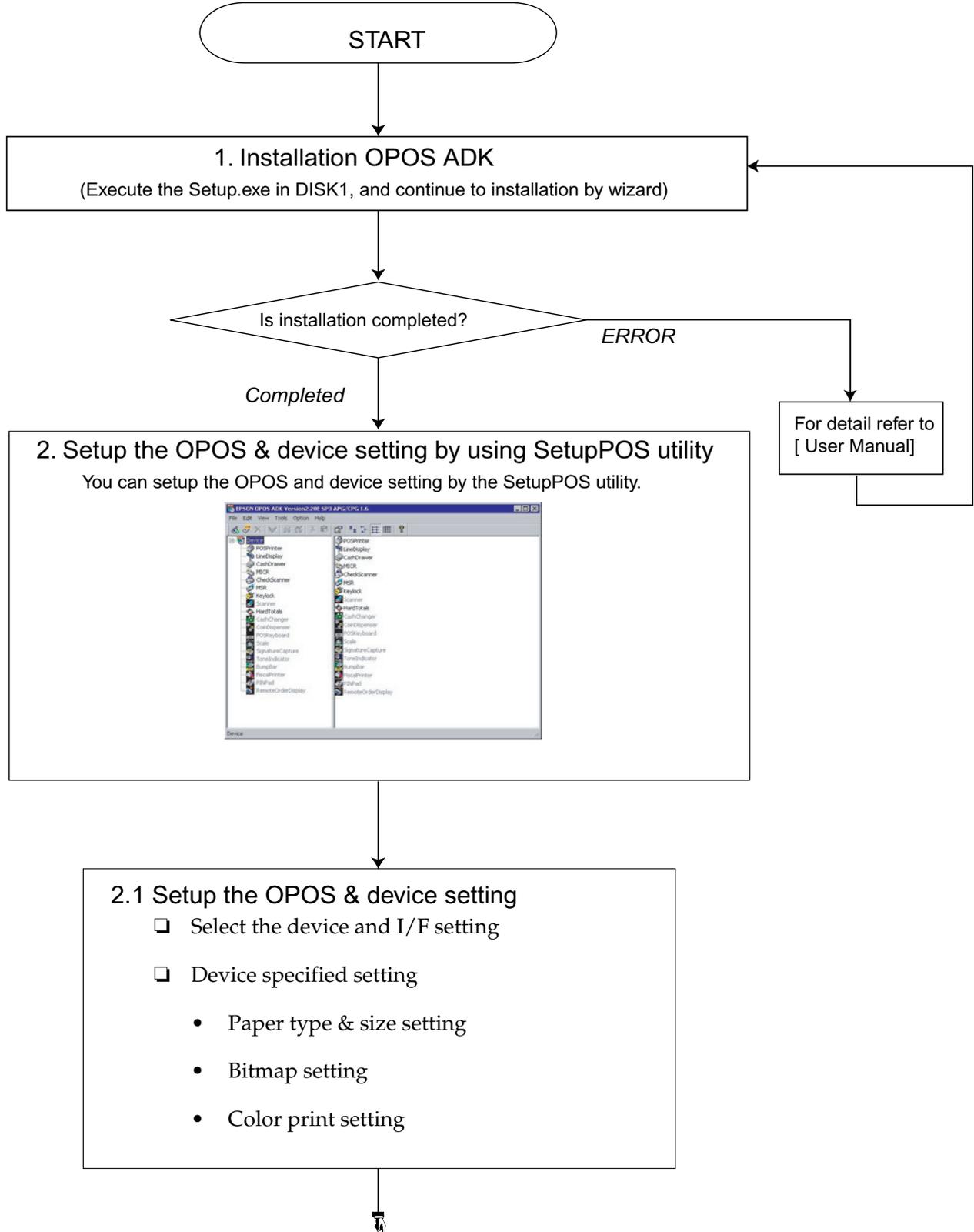
EPSON provides printer drivers for the TM-H6000II. The drivers are OPOS and Advanced Printer Driver (APD). They are for the Windows® environment.

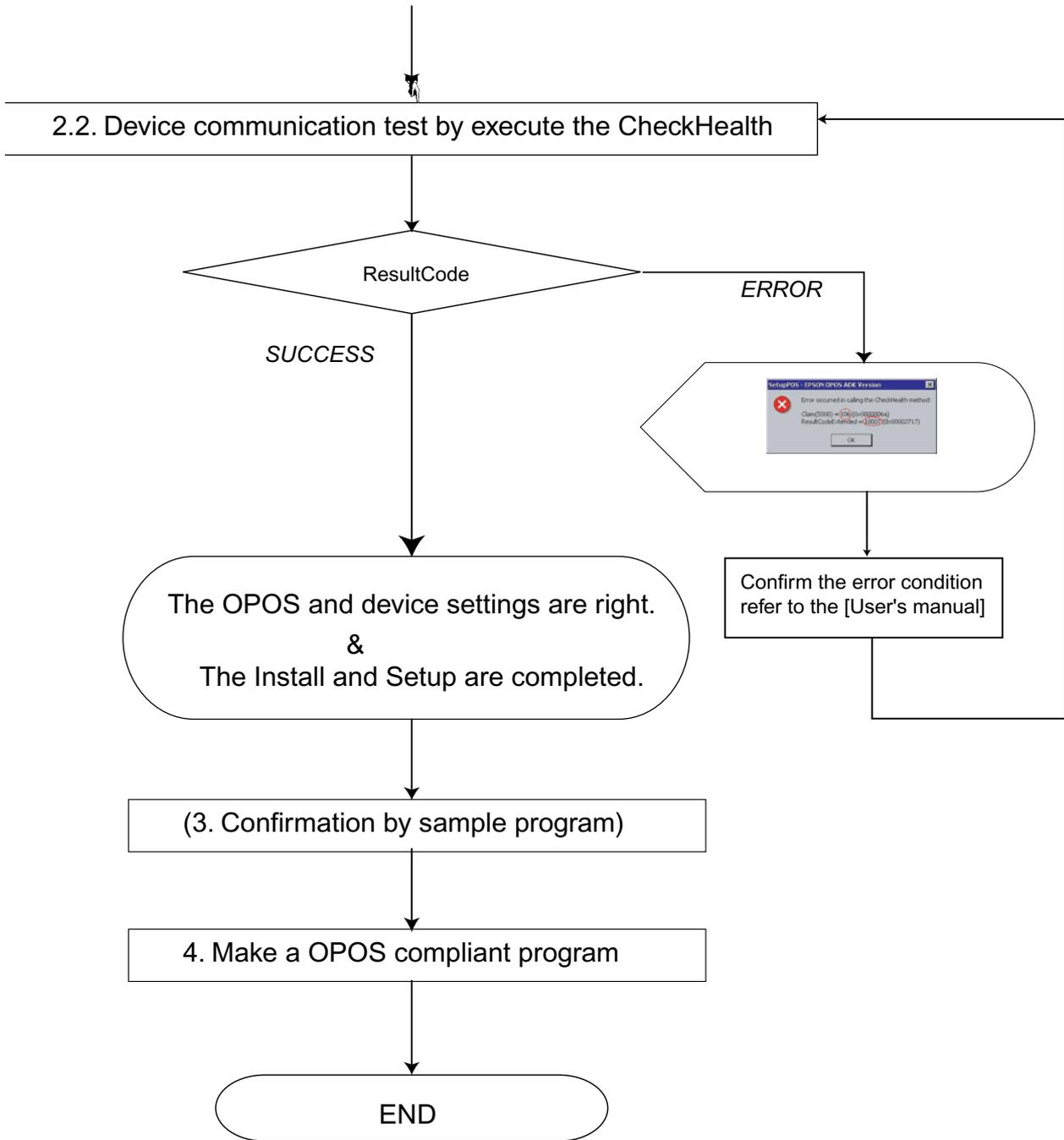
3.5.1 OPOS

3.5.1.1 Installing and Setting Up

When you install and set up, please refer to the User's Manual. The file is automatically created by the installation of the OPOS ADK.

Outline of the installation and setup procedure is as follows.





1. Installation.

Execute the Setup.exe in DISK1. and continue to installation by wizard.

2. Setup the device and environment.

1. Set the device setting by using SetupPOS utility.

- Select the device and I/F setting.
- Device specified setting. (set the specified setting of the device)

2. Execute the CheckHealth

Device communication test.

- If you get "SUCCESS", the setting of the device are right.
- If you get others ResultCode (error), please re-check the device connection setting by following the [User's Manual].

After performing the above procedure, please use an OPOS compliant program in your system.



Note:

Please refer to sample program when you make a program.

OPOS ADK provide a sample program for each device class. The sample programs are intended as programs to serve as references for application developers. The ways to use the principal methods and properties for each device are introduced in the form of Visual Basic, Visual C++ programs. In this manual, it is introduced in the form of Visual Basic.

3.5.1.2 Package contents of EPSON OPOS ADK.

Package contents of EPSON OPOS ADK are same as that of previous one.

Installer

SetupPOS Utility

OPOS Controls

Manual

- User's Manual :Installation of the EPSON OPOS ADK, Configurations,and explanations of the attached tools.
- ADG : Detailed information on the each device to support the development.

ADG for General : General information on the development.

ADG for Common Information : Common information to all the devices.

ADG for device class : General information on the device class.

ADG for model : Specific explanation on the device.

Sample program : Information on the Sample Programs.

Sample Program

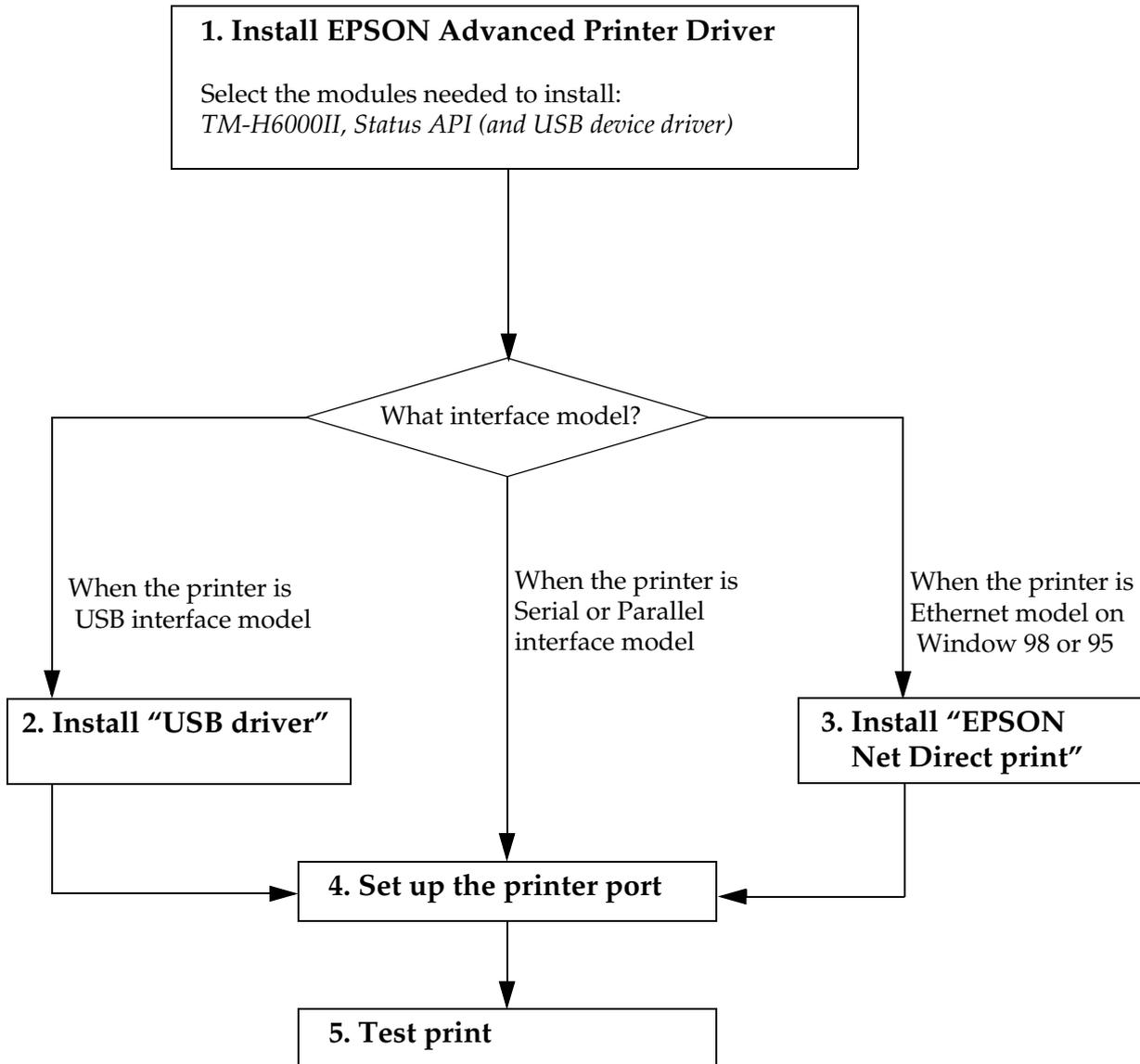
Sample program for VB and VC (for each device class)

3.5.2 Advanced Printer Driver (APD)

3.5.2.1 Installing and Setting Up

When you install and set up the APD, please refer to the “EPSON Advanced Printer Driver Install Manual.” The Manual is a PDF file, which is provided with other manuals for the APD.

Outline of installation and setup procedure is as follows.



1. Install EPSON Advanced Printer Driver

Execute the installer “ADT###e.exe,” and select modules which you need. The recommended modules are shown below. Refer the installation manual for details.

EPSON TM-H6000II Slip:	This module (printer driver) is needed for printing on the face of a slip.
EPSON TM-H6000II Endorsement	This module (printer driver) is need for printing on the back of a slip. (This module is for the endorsement printer installed model only.)
EPSON TM-H6000II Validation	This module (printer driver) is need for printing on validation paper. (This module is for the validation printer installed model only.)
EPSON TM-H6000II Receipt:	This module (printer driver) is need for printing on receipt.
EPSON TM-H6000II Reduce35:	This module (printer driver) is usable for printing A4 size document on receipt with reduction.
Status API:	This module is need for monitoring the printer. This module provides API to monitor the printer’s status.
USB driver:	This module (device driver) is need for the USB interface model printer.



Note:

For About Each Manual, Sample program, and each utility, you have to download separately the ADT###e.exe.

2. Install “USB driver”

When you use USB interface model printer, you need to install “USB driver.” The procedure depends on the OS; therefore see the install manual. If you aren’t using a USB interface model printer, you don’t need to install this module.

3. Install “EPSON Net Direct print”

When you use the Ethernet interface model printer with Windows98/95, you need to install “EPSON Net Direct print.” See the installation manual for details. If you aren’t using the Ethernet interface model printer, or aren’t using Windows 98/95, you don’t need to install this module.

4. Setup the printer port

After installing APD (and “USB driver” or “EPSON Net Direct print”) you need to adjust the printer port setting for the printer interface model. See the Installation manual and the User’s manual for details.



Note:

When you use the serial interface model printer, you need to adjust serial communication setting between printer and printer driver. See "Serial interface model" on page 3-20 for information on the settings.

5. Test print

Execute test print from the "property" of printer to confirm the setting. If the test print is not correct, please see the "Notes" on the "User's Manual" and "Status API Reference Manual" to solve the your problem.



Note:

You can use the printer with the sample program (written in Microsoft Visual Basic, Visual C++). The sample program is provided separately.

3.6 Self Tests

The self tests let you know if your printer is operating properly. There are self tests for both roll paper and slip paper. They check the control circuits, printer mechanisms, print quality, control software version, and DIP switch settings.

These tests are independent of any other equipment or software, so it is a good idea to run them when you first set up the printer and if you have any trouble. If the self tests work correctly, the problem is in the other equipment or the software, not the printer.

3.6.1 Running the Self Test on Roll Paper

1. Make sure the printer is turned off and the printer cover is closed properly.
2. While holding down the FEED button, turn on the printer using the switch on the front of the printer. The self test prints the printer settings and then prints the following, cuts the paper, and pauses. (The PAPER OUT light blinks.)

If you want to continue SELF-TEST printing, Please press the FEED button.

3. Press the FEED button to continue printing. The printer prints a pattern using the built-in character set.
4. The self test automatically ends and cuts the paper after printing the following:

***** completed *****

The printer is ready to receive data as soon as it completes the self test.



Note:

If you want to pause the self test manually, press the FEED button. Press the FEED button again to continue the self test.

3.6.2 Running the Self Test with Slip Paper

1. Make sure the printer is turned off and the printer cover is closed properly.

2. While holding down the RELEASE button, turn on the printer using the switch on the front of the printer. (The SLIP light blinks.)
3. Feed a sheet of slip paper into the printer. The printer loads the paper automatically, prints the printer settings, and then ejects the paper. (The SLIP light blinks.)
4. Remove the paper from the printer and feed another sheet of slip paper into the printer to print characters from the character table. Continue to feed slip paper into the printer until the self test prints the following:

*****completed*****

The printer is ready to receive data as soon as it completes the self test.

3.6.3 Running the Self Test with the Validation paper

1. Make sure the printer is turned off and the printer cover is closed properly.
2. While holding down the FEED button and RELEASE button, turn on the printer using the switch on the front of the printer. (The SLIP light flashes.)
3. Feed a validation paper into the printer. The printer loads the paper automatically, prints the printer settings, and then ejects the paper. (The SLIP light flashes.)
4. Remove the paper from the printer and feed another validation paper into the printer to print characters from the character table. Continue to feed slip paper into the printer until the self test prints the following:

*****completed*****

The printer is ready to receive data as soon as it completes the self test.

3.6.4 Running the Self Test with the Optional Endorsement Function

If your printer has the optional endorsement function, the slip paper self test is slightly different. When you feed additional sheets of slip paper in step 4, two lines are printed on the back of the slip by the endorsement print mechanism; then the test continues printing on the surface side of the slip as described above.

Chapter 4

Maintenance & Troubleshooting

This section describes maintenance and general troubleshooting.

4.1 Maintenance

4.1.1 Cleaning the Thermal Print Head

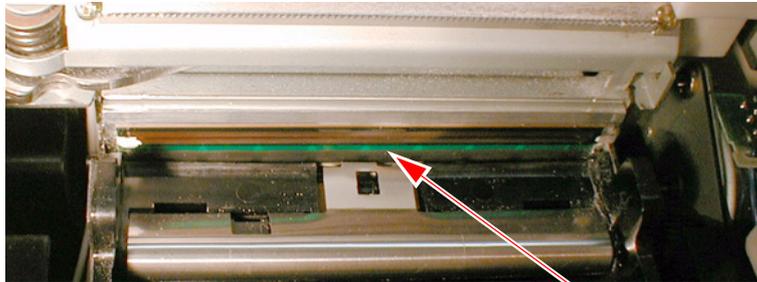
CAUTION:

After printing, the print head can be very hot. Be careful not to touch it. Also let it cool before you clean it.

Do not damage the print head by touching it with your fingers or any hard object.

1. Open the paper roll cover.
2. Clean the thermal element (the green part) of the print head with a cotton swab moistened with an alcohol solvent (ethanol, methanol, or IPA)

Clean the thermal head periodically (generally every three months) to maintain receipt print quality.



Print head

4.1.2 Cleaning the MICR Mechanism

Use a moistened cleaning sheet for the MICR head.

Note:

Be sure not to use an adhesive cleaning sheet.

4.1.2.1 Cleaning frequency

Clean the MICR head every 12 months or 72,000 passes.

4.1.2.2 *Cleaning sheet*

Use the following or an equivalent commercially available cleaning sheet:

PRESAT brand (KIC) "CHECK READER CLEANING CARD."

4.1.2.3 *Cleaning procedure*

You can perform cleaning either in self mode or command mode. These modes are described below.

4.1.2.4 *Self mode*

1. Load a paper roll in the printer.
2. Turn off the power.
3. Open the paper roll cover.
4. Turn the power back on while holding down the RELEASE button.
5. Press the RELEASE button seven times.
6. Close the paper roll cover.
7. The printer prints the following message on receipt paper and the SLIP light flashes.

**** RECOGNITION MODE ****

Please set check.

8. Load the cleaning sheet like a standard check.

CAUTION:

Be sure that the sheet is inserted with the correct side up and that it is inserted in the correct direction.

9. When the sheet is ejected, press the RELEASE button, and remove the sheet from the printer.

CAUTION:

Do not use a cleaning sheet more than once.

4.1.2.5 *Command mode*

1. Send the cleaning command to the printer.
2. Perform steps 8 and 9, as described in self mode.

4.2 Troubleshooting

4.2.1 Removing a Paper Jam

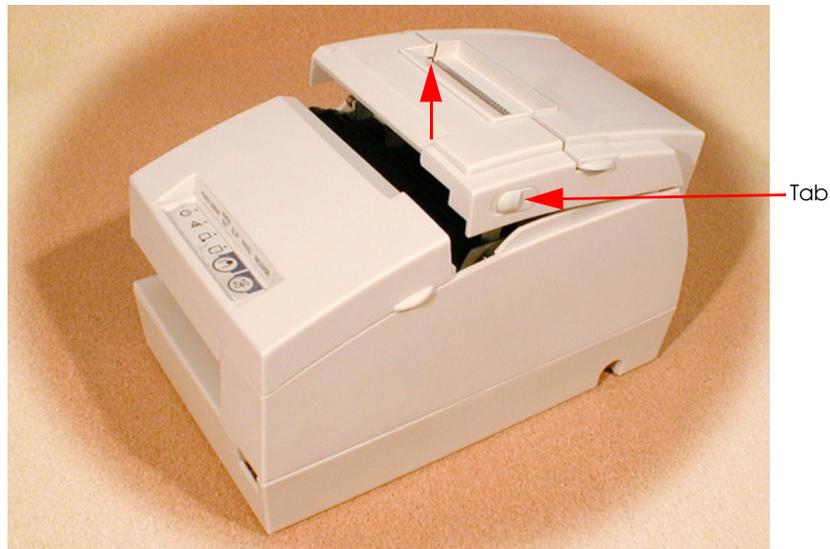


CAUTION:

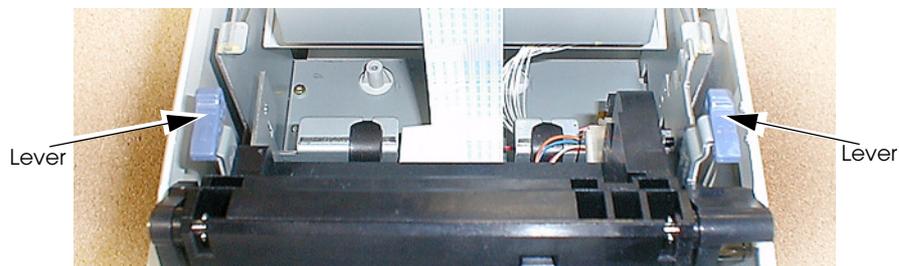
Do not touch the paper feed motor because it can be very hot.

If the paper is jammed in the paper roll section, turn the printer off. Next, open the paper roll cover. Then remove the jammed paper and put the roll back in the printer and close the cover.

If the paper is jammed in the slip section, turn off the printer and remove the jammed paper and use a fresh sheet. If you cannot remove the jammed paper easily, open the unit cover. Move the tabs on the sides of the cover forward and then lift the cover, as shown below.



Push the levers backward to open the unit as shown below, and then remove the jammed paper.



If the paper roll cover cannot be opened because paper is caught in the autocutter in the receipt section, follow the instructions in the autocutter section below.

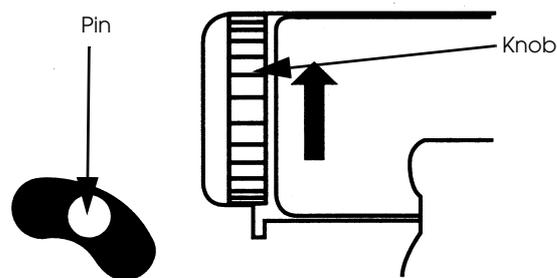
4.2.2 Autocutter Jam

If a foreign object such as a push pin or paper clip drops in the autocutter and causes the auto cutter to lock up, the printer enters an error state and begins the recovery operation automatically.

If the problem is not serious, the autocutter returns to its normal position without any intervention by the user.

If the autocutter does not return to its normal position by itself, follow the steps below to correct the problem:

1. If the paper roll cover cannot be opened because paper is caught in the autocutter in the receipt section, open the unit cover. Move the tabs on the sides of the cover forward and then lift the cover, as shown on the previous page.
2. Following the instructions on the label inside the printer, turn the knob until you see a pin in the opening, as shown in the illustration below. This returns the cutter blade to the normal position.



3. Close the unit cover.

4.2.3 LED Blinking Pattern

4.2.3.1 Error Types

The printer stops all printer operations for the selected paper section, goes offline, and blinks the ERROR LED when detecting an error.

- ❑ Errors that automatically recover

ERROR	Description	ERROR LED Blinking Pattern  320 ms	Recovery
Print head temperature error	The temperature of the print head is extremely high		Recovers automatically when the print head cools



Note:

Print head temperature error is not abnormal.

- ❑ Errors that have the possibility of recovery:
When a recoverable error occurs, after the cause of the error is removed, the printer can recover from the error by transmitting error recovery command without turning off the power:

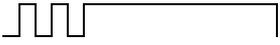
ERROR	Description	ERROR LED Blinking Pattern  320 ms	Recovery
Autocutter error	The autocutter does not work correctly		Recovers by error recovery command
Home position detection error	The home position cannot be detected due to a paper jam		Recovers by error recovery command
Carriage detection error	The carriage is malfunctioning due to a paper jam, etc.		Recovers by error recovery command
Paper roll cover open error	Printing on the paper roll is not performed correctly due to a paper roll cover open or unit cover open		Recovers by error recovery command with the cover closed
Slip ejection error	The slip is not ejected when the printer feeds a specified amount of paper		Recovers by error recovery command
Unit cover open error	Printing on the paper roll or on the slip is not performed correctly due to a unit cover open		When bit 8 of memory switch 8 is set to OFF: Recovers by closing the unit cover When bit 8 of memory switch 8 is set to ON: Recovers by error recovery command

See “Removing a Paper Jam” (page 4-3) for removing a paper jam.

 **Note:**

When the printer recovers from an error using error recovery command while slip paper is selected, the printer first ejects the slip. A error recovery command do loading paper additionally. However, when the printer recovers from a slip ejection error, the printer only ejects the slip and does not load paper.

- ❑ Errors that are impossible to recover:

ERROR	Description	ERROR LED Blinking Pattern 	Recovery
R/W error in memory or gate array	After R/W checking, the printer does not work correctly. Writing to, reading out, or erasing the NV memory for image scanning results does not work correctly.		Impossible to recover
High voltage error	The power supply voltage is extremely high		Impossible to recover
Low voltage error	The power supply voltage is extremely low		Impossible to recover
CPU execution error	The CPU executes an incorrect address or I/F board is not connected		Impossible to recover
Control circuit board error	There is an abnormality in the print head temperature, thermistor is detected incorrectly or thermistor wiring is not connected or the endorsement printer is broken or the lever driving motor is broken, or the image scanner operation is not correct		Impossible to recover

4.2.4 Printer prints “?” or Incorrect Data With Serial Interface

If one of the following errors occurs during serial interface communication, the printer prints “?” or ignores the data, depending on the setting of DIP switch 1-1.

- ❑ Parity error
- ❑ Framing error
- ❑ Overrun error



Note:

For other errors, we recommend confirming the transmission setting of DIP switch 1-3: Handshaking.

4.2.5 Hexadecimal Dump

This feature allows experienced users to see exactly what data is coming to the printer. This can be useful in finding software problems. When you turn on the hex dump function, the printer prints all commands and other data in hexadecimal format, along with a guide section to help you find specific commands.

To use the hex dump feature, follow these steps:

1. After you make sure the printer is off, open the paper roll cover.
2. Hold down the FEED button while you turn on the printer.
3. Close the cover.
4. Run any software program that sends data to the printer. The printer prints "Hexadecimal Dump" and then all the codes it receives in a two-column format. The first column contains the hexadecimal codes and the second column gives the ASCII characters that correspond to the codes. Part of a hexadecimal dump is shown below:

Hexadecimal Dump

To terminate hexadecimal dump,
press FEED button three times.

```

1B 21 00 1B 26 02 40 40      . ! . . & . @ @
1B 25 01 1B 63 34 00 1B      . % . . c 4 . .
41 42 43 44 45 46 47 48      A B C D E F G H
    
```

- A period (.) is printed for each code that has no ASCII equivalent.
 - In hex dump mode all commands except real time ESC/POS commands are disabled.
5. Open the cover to set the printer offline so that it will print the last line.
 6. Close the cover and turn off the printer, press the FEED button three times, or reset the printer to turn off the hex dump mode.



Note:

The hexadecimal dump mode can't be used with OPOS or APD.

4.3 Thermal Paper

Thermal paper is available from the supplier in your area.

4.3.1 Specified Monochrome Thermal Paper: NTP080-80

In Japan:	Nakagawa Mfg. Co., Ltd. 2-5-21 Nishiki-Cho Warabi-Shi Saitama-Ken 335 Japan Tel: (048) 444-8211 Fax: (048) 443-6652
In USA:	Nakagawa Mfg (USA) Inc. 2305 Lincoln Avenue Hayward, CA 94545 USA Tel: (510) 782-0197 Fax: (510) 782-7124
In Europe:	Nakagawa Mfg (Europe) GmbH Krützpoot 16, 47804 Krefeld, Germany Tel: 02151-711051 Fax: 02151-713293
In Southeast Asia:	N.A.K. Mfg (Malaysia) SDN BHD Lot 19-11, Bersatu Industrial Complex, Jalan Satu, Kaw Per. Cheras Jaya, Balakong Industrial Area, 43200 Cheras. Selangor Darul Ehsan, Malaysia Tel: 03-9047896, 9047900, 9047691 Fax: 03-9047889
Original paper:	TF50KS-E Nippon Paper Industry Co., Ltd. 1-12-1, Yuraku-Cho, Chiyoda-Ku Tokyo 100 Japan Tel: 03-3218-8000 Fax: 03-3216-1375

4.3.2 Other Qualified Suppliers for Thermal Paper

The following suppliers sell thermal paper that may be used if desired. Contact each company for information.

Original paper:	PD160R Oji Paper Mfg. Co., Ltd. 7-5 Ginza 4-Chome Chuo-Ku Tokyo 104 Japan Tel: 03-3563-4800 Fax: 03-3563-1136
-----------------	---

Original paper: AF50KS-E
Jujo Thermal Oy (Finland)
P.O. Box 92 FIN27501 Kauttua Finland
Tel: 38-3932900
Fax: 38-3932419

Original paper:P350(F380), P310, P300
Kanzaki Specialty Papers, Inc. (U.S.A)
1500 Main Street
Springfield, MA 01115 USA
Tel: (413) 736-3216
Fax: (413) 734-5101

4.3.3 Specified Two-color Thermal Paper: ENTPB080080

In Japan: Nakagawa Mfg. Co., Ltd.

In USA: Nakagawa Mfg (USA) Inc.

In Europe: Nakagawa Mfg (Europe) GmbH

In Southeast Asia: N.A.K. Mfg (Malaysia) SDN BHD

[Original paper: PD750R (Oji Paper Mfg. Co., Ltd.)]

If roll paper is made from Original paper: PD750R (Oji paper Mfg. Co., Ltd.), it can be used.

Chapter 5

Application Development Information for OPOS

5.1 Bitmap Printing

There are three methods of printing bitmaps. Use the one appropriate to your purpose.

5.1.1 Explanation of Bitmap Printing

1. Normal Bit-image

The PrintBitmap method is to directly print the bitmap. One bitmap printed by this method is formed as a combination of “n” numbers of 1-line bitmaps. So, the width of the paper sets the limit on the size of bitmap, and printing is slow. But the height of paper doesn’t set the limit on the size of bitmap.

2. Download Bit-image

The SetBitmap method can be used to save a bitmap in the printer, and every time the correct escape sequence (ESC |#B: Prints the pre-stored bitmap. The character ‘#’ is replaced by the bitmap number.) is used, the image will be printed. This method has limits on the size of the bitmap that can be stored, but printing is very fast. If the power supply of printer is shut off, the saved bitmap in the printer will disappear.

3. NV Bit-image

EPSON OPOS ADK provides a tool, “TMFLogo” that enables registration of a bitmap image in the NVRAM of an EPSON TM series printer. The tool can be used from the device specific settings of the SetupPOS utility. The bitmap image in the NVRAM can be printed with a printer by using the DirectIO method. Concerning the available NVRAM size for the TM-H6000II, refer to the ADG for TM-H6000II in the OPOS ADK.

Function list

	Printable Size	Printing Quality	Printing method	Printing Speed.	Color Printing	Receipt / Slip Printing	Printing Position	Note
Normal Bit-Image	<width> Less than paper width.	Normal	<u>Store</u> No need.	.	Available	Available	Select parameter	When printing a different bitmap each time, this method is suitable.
	<height> no limitation		<u>Print</u> The bitmap data is sent to TM from PC by using PrintBitmap method. And print it by each line.	Slow				

Download Bit-Image	<width> Less than paper width. <height> There is a limitation Height length = RAM Size / width length. *For details, please refer to the ADG for TM-H6000II in OPOS ADK.	High level	<u>Store</u> Store bitmap to RAM by SetBitmap method after turn on the printer.	-	Available	Available	Select parameter	When printing a stored bitmap that is used many times, this method is suitable.
			<u>Print</u> Print stored bitmap by escape sequence command "ESC #B".	Fast				
NV Bit-Image	<width> Less than paper width. <height> There is a limitation Height length = RAM Size / width length	High level	<u>Store</u> Store bitmap to NVRAM by TMFLogo utility in device specific settings on the SetupPOS utility. If store the bitmap in a NVRAM at once, it is not necessary to restore unless the NVRAM is deleted.	-	Available	Available	Select parameter	When printing a stored bitmap that is always used, this method is suitable.. (e.g. a shop logo)
			<u>Print</u> Print stored bitmap by DirectIO method. *Command : PTR_DI_PRINT_FLASH_BITMAP	Fast				

The available NVRAM size for the TM-H6000II:

- ANK model: max. 384KB
- Multilingual model: max. 192KB

5.1.2 Supplementary Explanation of Function

5.1.2.1 LetterQuality

It is possible to change the speed and quality of a bitmap by using the XXXLetterQuality property.

RecLetterQuality = TRUE 'print Receipt's bitmap in quality mode.

RecLetterQuality = FALSE 'print Receipt's bitmap in speed mode.

SlpLetterQuality = TRUE 'print Slip's bitmap in quality mode.

SlpLetterQuality = FALSE 'print Slip's bitmap in speed mode.



Note:

It is possible to use with receipt. But it is not possible to use with slip.

5.1.2.2 Setting of printing position by escape sequence

POS Printers support escape sequences that can be treated as printing data. The following commands are the escape sequence command for setting of printing position.

Name	Data	Remarks
Center	ESC cA	Aligns following text in the center.
Right justify	ESC rA	Aligns following text at the right.
Normal	ESC N	Restores printer characteristics to normal condition.



Note1: manner of "ESC |cA" and "ESC |rA"

Characteristics are reset at the end of each print method or by a "Normal" sequence, so these escape sequences cannot be used in the following manner.

```
OPOSPOSPrinter1.PrintNormal PTR_S_RECEIPT, Chr(&H1B) + "|cA" + "123"  
OPOSPOSPrinter1.PrintNormal PTR_S_RECEIPT, "456" + Chr(13) + Chr(10)
```

The "123" characters will be printed in the center, but not under "456". When using a new method to print characters, it is necessary to add the desired escape sequence again.



Note2 : limitation of "ESC |cA" and "ESC |rA"

- *During rotated printing mode (Left90, right90), these escape sequences will not work.
- *These will not work if they are not the first character of a line.
- *It is not possible to use these on PrintBitmap method.

5.1.2.3 Color bitmap printing

If a 16 color or a 256-color bitmap file is supplied, the image may be printed using 2 colors. If the original file is a 2-color bitmap, it will be printed in monochrome. The halftone method may be set using the device specific setting dialog. To print as image using 2 colors, 2-color thermal paper must be selected in the device specific settings and 2-color thermal receipt paper must be installed in the printer.

5.1.3 Printable bitmap format

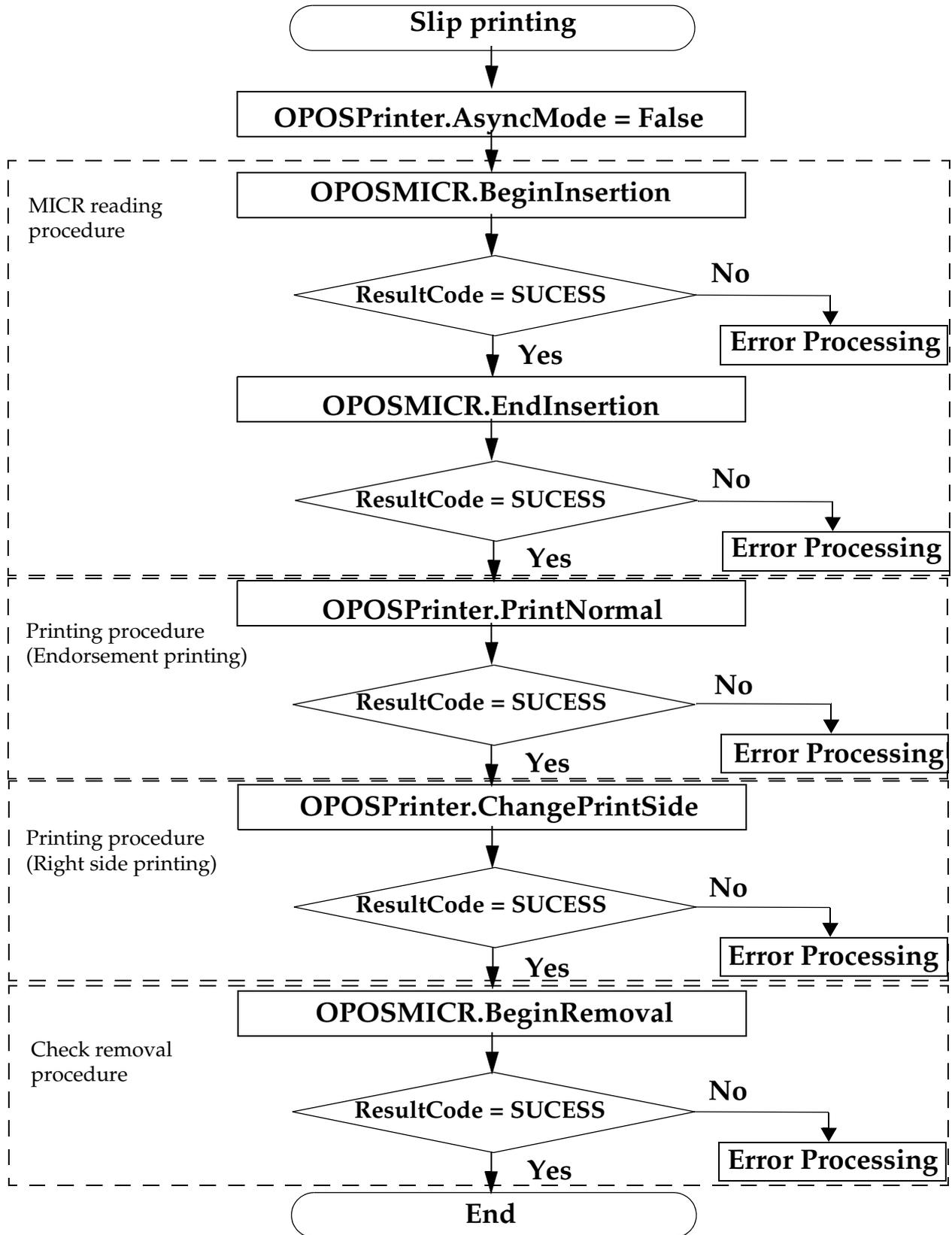
The printable bitmap formats are formats that meet all the following conditions.

- BMP files
- Monochrome, 16-color (4 bit), 256-color (8 bit)
- Uncompressed

5.2 Slip & MICR Combination

If the slip function and the MICR function are used at the same time, the following control flow is recommended.

5.2.1 Recommended Flow



5.2.2 Sample Program

Below is an example of how to use Slip & MICR Combination with OPOS ADK Ver.2.20 SP3.

```

Dim RC As Long          'Return Code
Dim I = 1 as Integer

OPOSPOSPrinter1.AsyncMode = False

'Paper preparation procedure

Do
    RC = OPOSMICR1.BeginInsertion(3000)
    If RC = OPOS_SUCCESS Then
        Exit Do

    Else If RC = OPOS_E_TIMEOUT Then
        MsgBox "Please insert a check."
    Else
        MsgBox "insert error."
        Exit Do
    End If
Loop

OPOSMICR1.EndInsertion

With OPOSPOSPrinter1
    'Endorsement Printing
    .PrinterNormal PTR_S_SLIP, Chr(&H1B) & "Endorsement Printing" & vbLf
    'Change of the printing side
    .ChangePrintSide PTR_PS_SODE1
    .PrinterNormal PTR_S_SLIP, Chr(&H1B) & "Slip Printing" & vbLf
End With

RC = OPOSMICR1.BeginRemoval(3000)
If RC = OPOS_E_TIMEOUT Then
    MsgBox "Please insert a check."
Else If RC <> OPOS_SUCCESS Then
    MsgBox "remove error."
    Exit Sub
End If

Do While OPOSPOSPrinter1.EndRemoval <> OPOS_SUCCESS
    MsgBox "Please remove a check."
    I = I + 1
    If I = 5 Then Exit Do
Loop

```

5.3 Cash Drawer

Programming examples of how to use API function relating to a Cash Drawer are shown below.

5.3.1 Drawer Open/Close

Using the OpenDrawer method opens the cash drawer. The DrawerOpened property can be used to check the current state of the drawer. To pause the program until the drawer is closed, the WaitForDrawerClose method is used.

Below is an example of a program to open and close a cash drawer.

```
If Not OPOSCashdrawer1.DrawerOpened Then
    OPOSCashdrawer1.OpenDrawer
    OPOSCashdrawer1.WaitForDrawerClose 10000, 1000, 100, 100
End If
```

5.3.2 Checking Drawer Status

There are methods other than explained in section 5.3.1 that can be used to check drawer status. A StatusUpdateEvent is fired whenever the drawer is opened or closed.

Below are examples of programs that use events to check if the drawer has been opened or closed.

```
[Main Program]

Global DrawerFlag As Boolean
If Not OPOSCashdrawer1.DrawerOpened Then
    DrawerFlag = True
OPOSCashdrawer1.OpenDrawer
    While (DrawerFlag = True)
        'This part uses timer management to check the status of DrawerFlag.
        DoEvents
    Wend
End If

[Event Management]

Private Sub OPOSCashdrawer1_StatusUpdateEvent(ByVal As Long)
    If Data = False Then
        DrawerFlag = False
    End If
End Sub
```

Chapter 6

Application Development Information for APD

6.1 Slip & MICR Combination

If the slip function and the MICR function are used at the same time, the following control procedure should be used.



Note:

There is more paper feeding action than with OPOS, but the action takes less than one second.

6.1.1 Recommended procedure

The procedure below is recommended when you would like to use the slip function and the MICR function at the same time.

1. Open the "TM-H6000II Slip" by using "BiOpenMonPrinter."
2. Read the MICR data by using "BiMICRReadCheck."



Note:

You should specify the result data handling by using "BiMICRSelectDataHandling."

3. Feed the check to the print start position on the face by "BiMICRLoadCheck."
4. Print data on face of the slip.
5. Switch the printer driver to "TM-H6000II Endorsement" from "TM-H6000II Slip."



Note:

Switch means "Close the "TM-H6000II Slip" by using "BiCloseMonPrinter" and Open "TM-H6000II Endorsement" by using "BiOpenMonPrinter."

6. Feed the check to the print start position on the back by "BiMICRLoadCheck."
7. Print data on back of the slip.
8. Eject the slip.



Note:

This flow needs to use the Status API function.

6.2 Bitmap Printing

There are three methods of printing bitmaps. Use the one appropriate to your purpose.

6.2.1 Explanation of Bitmap Printing

1. Normal Bit-image

The PrintBitmap method is to directly print the bitmap. One bitmap printed by this method is formed as a combination of “n” numbers of 1-line bitmaps. So, the width of the paper sets the limit on the size of bitmap, and printing is slow. But the height of paper doesn’t set the limit on the size of bitmap.

This printer prints Windows fonts by this method.

2. NV Bit-image

EPSON provides a tool, “TMFLogo” that enables registration of a bitmap image in the NVRAM of an EPSON TM series printer. A bitmap image in the NVRAM can be printed with a “control font” method.

Function list

	Printable Size	Printing Quality	Printing method	Printing Speed.	2 Color Printing	Receipt / Slip Printing	Printing Position	Note
Normal Bit-Image	<width> Less than paper width.	Normal	<u>Store</u> No need.	-	Available	Available	Select parameter	When printing a different bitmap each time, this method is suitable.
	<height> no limitation		<u>Print</u> The bitmap data is sent to TM from PC directly. Refer to the sample program of APD for detail.	Slow				
NV Bit-Image	<width> Less than paper width.	High level	<u>Store</u> Store bitmap to NVRAM by TMFLogo utility. If store the bitmap in a NVRAM at once, it is not necessary to restore unless the NVRAM is deleted.	-	Available	Available	Select parameter	When printing a stored bitmap that is always used, this method is suitable.. (e.g. a shop logo)
	<height> There is a limitation Height length = RAM Size / width length		<u>Print</u> Print stored bitmap by using “Control font.” Refer the User’s Manual for detail.	Fast				

The available NVRAM size for the TM-H6000II:

- ❑ ANK model: max. 384KB
- ❑ Multilingual model: max. 192KB

6.2.2 Color bitmap printing

First adjust memory switch 8-4 to print using 2 color. Refer to “3.4.6 How to Use Two-Color Printing (3-24 page)” for details.

6.2.3 Printable bitmap format

The printable bitmap formats are formats that meet all the following conditions.

- ❑ When using “Normal Bit-image”
 - Any format the application can handle.
- ❑ When using “NV Bit-image”
 - Depends on the TM Flogo utility. (.BMP format)

6.3 Two-Dimensional Code

This printer and APD support two-dimensional code (PDF417 format.) APD can print two-dimensional code the same as other barcode (ex. EAN13, etc....); however, it can't adjust the detail setting (ex. step number, module height and width, etc....) The adjusting is done with the “Two-Dimensional Code Parameter Setting Tool.” The tool is provided with APD. This tool is for APD printing and is not for OPOS and direct printing (using ESC/POS commands). See the “Two-Dimensional Code Parameter Setting Tool User's Manual” for details about this tool.

6.4 Drawer Control

6.4.1 Drawer Open

When you control a drawer connected to this printer using APD, you have two methods to open the drawer. The first method is using "Control font"; the second is using "Status API."

Below is an example of a program (Visual Basic) to open a cash drawer using Control font.

```
'Execute open cash drawer1.  
Printer.Font.Name = "control"  
Printer.Print "A"           'This "A" means "open the drawer1 with 50msec pulse."
```

Below is an example of a program (Visual Basic) to open a cash drawer using Status API.

```
'call api to open the drawer1  
rtn = BiOpenDrawer(m_hApi, EPS_BI_DRAWER_1, EPS_BI_PULSE_100)  
           'This calling means "open the drawer1 with 100msec pulse."
```

Note: Program needs to call "BiOpenMonPrinter" before calling "BiOpenDrawer."

6.4.2 Checking Drawer Status

You can get drawer status by using Status API. Below is an example program which checks the drawer status.

```
'get the current printer status  
rtn = BiGetStatus(m_hApi, getstatus)  
If rtn < 0 Then  
    ErrMsg (rtn) 'Error handling  
    Exit Sub  
End If  
  
If (getstatus And ASB_DRAWER_KICK) = ASB_DRAWER_KICK Then  
    MsgBox("Drawer is opened")    'Pin No.3 is high  
Else  
    MsgBox("Drawer is closed")  
End If
```

There are other checking methods (BiSetStatusBackFunction, BiSetStatusBackWnd) in Status API. Refer to the Status API User's Manual and the sample programs for details.

A.2 Page 1 (Katakana)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	一 128	上 144	SP 160	ー 176	タ 192	ミ 208	ニ 224	× 240
1	0001	二 129	下 145	。 161	ア 177	チ 193	ム 209	ト 225	円 241
2	0010	三 130	十 146	「 162	イ 178	ツ 194	メ 210	キ 226	年 242
3	0011	四 131	ト 147	」 163	ウ 179	テ 195	モ 211	コ 227	月 243
4	0100	五 132	一 148	、 164	エ 180	ト 196	ヤ 212	日 228	日 244
5	0101	六 133	二 149	・ 165	オ 181	ナ 197	ユ 213	時 229	時 245
6	0110	七 134	三 150	ヲ 166	カ 182	ニ 198	ヨ 214	分 230	分 246
7	0111	八 135	四 151	ア 167	キ 183	ヌ 199	ラ 215	秒 231	秒 247
8	1000	九 136	リ 152	イ 168	ク 184	ネ 200	リ 216	市 232	市 248
9	1001	十 137	ロ 153	ウ 169	ケ 185	ノ 201	ル 217	区 233	区 249
A	1010	十一 138	ハ 154	エ 170	コ 186	ハ 202	レ 218	町 234	町 250
B	1011	十二 139	ニ 155	オ 171	サ 187	ヒ 203	ロ 219	村 235	村 251
C	1100	十三 140	ホ 156	ヤ 172	シ 188	フ 204	ワ 220	人 236	人 252
D	1101	十四 141	ヘ 157	ユ 173	ス 189	ヘ 205	ン 221	人 237	人 253
E	1110	十五 142	ニ 158	ヨ 174	セ 190	ホ 206	ノ 222	人 238	人 254
F	1111	十六 143	ハ 159	ツ 175	ソ 191	マ 207	ノ 223	SP 239	SP 255

A.3 Page 2 (PC850: Multilingual)

HEX	8	9	A	B	C	D	E	F	
BIN	1000	1001	1010	1011	1100	1101	1110	1111	
0	0000	Ç 128	É 144	á 160	⌘ 176	Ⓛ 192	š 208	ó 224	— 240
1	0001	ü 129	æ 145	í 161	⌘ 177	Ⓛ 193	Đ 209	β 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	$\frac{3}{4}$ 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	ö 229	§ 245
6	0110	â 134	û 150	ä 166	Â 182	ã 198	í 214	μ 230	÷ 246
7	0111	ç 135	ù 151	ó 167	À 183	Ã 199	î 215	þ 231	ˆ 247
8	1000	ê 136	ÿ 152	¿ 168	© 184	Ⓛ 200	ï 216	ð 232	° 248
9	1001	è 137	ö 153	® 169	¶ 185	Ⓛ 201	ı 217	ú 233	ˆ 249
A	1010	è 138	Û 154	¬ 170	186	Ⓛ 202	Ⓛ 218	Û 234	ˆ 250
B	1011	ï 139	ø 155	$\frac{1}{2}$ 171	¶ 187	Ⓛ 203	■ 219	Û 235	¹ 251
C	1100	î 140	£ 156	$\frac{1}{4}$ 172	¶ 188	Ⓛ 204	■ 220	ý 236	³ 252
D	1101	ì 141	Ø 157	ı 173	ϕ 189	— 205	ı 221	Ý 237	² 253
E	1110	Ä 142	× 158	« 174	¥ 190	Ⓛ 206	Ï 222	— 238	■ 254
F	1111	Å 143	f 159	» 175	Ⓛ 191	Ⓛ 207	■ 223	’ 239	SP 255

A.4 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	β 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	á 166	⌘ 182	⌘ 198	⌘ 214	μ 230	÷ 246
7	0111	ç 135	ù 151	ó 167	⌘ 183	⌘ 199	⌘ 215	τ 231	≈ 247
8	1000	ê 136	î 152	ç 168	⌘ 184	⌘ 200	⌘ 216	φ 232	° 248
9	1001	Ê 137	Ï 153	ò 169	⌘ 185	⌘ 201	⌘ 217	θ 233	• 249
A	1010	è 138	Û 154	¬ 170	⌘ 186	⌘ 202	⌘ 218	Ω 234	• 250
B	1011	Í 139	Φ 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	Û 157	ì 173	⌘ 189	⌘ 205	■ 221	∅ 237	² 253
E	1110	Ã 142	Π 158	« 174	⌘ 190	⌘ 206	■ 222	ε 238	■ 254
F	1111	Â 143	Ó 159	» 175	⌘ 191	⌘ 207	■ 223	∩ 239	SP 255

A.5 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	Ï 160	Ï 176	Ł 192	Ł 208	α 224	≡ 240
1	0001	ü 129	È 145	Ï 161	Ï 177	Ł 193	Ł 209	β 225	± 241
2	0010	é 130	Ê 146	Ó 162	Ï 178	Ł 194	Ł 210	Γ 226	≥ 242
3	0011	â 131	ô 147	ú 163	Ï 179	Ł 195	Ł 211	π 227	≤ 243
4	0100	Â 132	Ë 148	Ï 164	Ï 180	Ł 196	Ł 212	Σ 228	∫ 244
5	0101	à 133	Ï 149	Ï 165	Ï 181	Ł 197	Ł 213	σ 229	∫ 245
6	0110	ñ 134	û 150	Ï 166	Ï 182	Ł 198	Ł 214	μ 230	÷ 246
7	0111	ç 135	ù 151	Ï 167	Ï 183	Ł 199	Ł 215	τ 231	≈ 247
8	1000	ê 136	œ 152	Ï 168	Ï 184	Ł 200	Ł 216	φ 232	° 248
9	1001	ë 137	ô 153	Ï 169	Ï 185	Ł 201	Ł 217	θ 233	• 249
A	1010	è 138	Û 154	Ï 170	Ï 186	Ł 202	Ł 218	Ω 234	• 250
B	1011	ï 139	ϕ 155	½ 171	Ï 187	Ł 203	■ 219	δ 235	√ 251
C	1100	î 140	£ 156	¼ 172	Ï 188	Ł 204	■ 220	∞ 236	n 252
D	1101	— 141	Û 157	¾ 173	Ï 189	Ł 205	■ 221	∅ 237	² 253
E	1110	À 142	Û 158	« 174	Ï 190	Ł 206	■ 222	€ 238	■ 254
F	1111	§ 143	f 159	» 175	Ï 191	Ł 207	■ 223	∩ 239	SP 255

A.6 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	β 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	ã 134	û 150	ä 166	⌘ 182	⌚ 198	⌛ 214	μ 230	÷ 246
7	0111	ç 135	ù 151	ó 167	⌘ 183	⌚ 199	⌛ 215	τ 231	≈ 247
8	1000	ê 136	ÿ 152	¿ 168	⌘ 184	⌚ 200	⌛ 216	Φ 232	° 248
9	1001	ë 137	ÿ 153	ƒ 169	⌘ 185	⌚ 201	⌛ 217	θ 233	• 249
A	1010	è 138	ÿ 154	ƒ 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	∞ 252
D	1101	ì 141	Ø 157	ı 173	⌘ 189	⌚ 205	■ 221	∅ 237	² 253
E	1110	Ä 142	ƒ 158	« 174	⌘ 190	⌚ 206	■ 222	€ 238	■ 254
F	1111	Å 143	ƒ 159	œ 175	⌘ 191	⌚ 207	■ 223	∩ 239	SP 255

A.7 Page 16 (WPC1252)

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

A.8 Page 17 (PC866: Cyrillic2)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	А 128	Р 144	а 160	▣ 176	▣ 192	▣ 208	Р 224	Ё 240
1	0001	Б 129	С 145	б 161	▣ 177	▣ 193	▣ 209	с 225	ё 241
2	0010	В 130	Т 146	в 162	▣ 178	▣ 194	▣ 210	т 226	Є 242
3	0011	Г 131	У 147	г 163	▣ 179	▣ 195	▣ 211	у 227	є 243
4	0100	Д 132	Ф 148	д 164	▣ 180	▣ 196	▣ 212	ф 228	ї 244
5	0101	Е 133	Х 149	е 165	▣ 181	▣ 197	▣ 213	х 229	і 245
6	0110	Ж 134	Ц 150	ж 166	▣ 182	▣ 198	▣ 214	ц 230	ў 246
7	0111	З 135	Ч 151	з 167	▣ 183	▣ 199	▣ 215	ч 231	ъ 247
8	1000	И 136	Ш 152	и 168	▣ 184	▣ 200	▣ 216	ш 232	° 248
9	1001	Й 137	Щ 153	й 169	▣ 185	▣ 201	▣ 217	щ 233	• 249
A	1010	К 138	Ъ 154	к 170	▣ 186	▣ 202	▣ 218	ъ 234	• 250
B	1011	Л 139	Ы 155	л 171	▣ 187	▣ 203	▣ 219	ы 235	✓ 251
C	1100	М 140	Ь 156	м 172	▣ 188	▣ 204	▣ 220	ь 236	№ 252
D	1101	Н 141	Э 157	н 173	▣ 189	▣ 205	▣ 221	э 237	☐ 253
E	1110	О 142	Ю 158	о 174	▣ 190	▣ 206	▣ 222	ю 238	▣ 254
F	1111	П 143	Я 159	п 175	▣ 191	▣ 207	▣ 223	я 239	SP 255

A.9 Page 18 (PC852: Latin2)

	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	đ 208	Ó 224	- 240
1	0001	ü 129	Ł 145	í 161	⌘ 177	⌘ 193	Đ 209	ß 225	" 241
2	0010	é 130	í 146	ó 162	■ 178	⌘ 194	Ď 210	Ô 226	´ 242
3	0011	â 131	ô 147	ú 163	⌘ 179	⌘ 195	Ě 211	Ń 227	˘ 243
4	0100	ä 132	ö 148	À 164	⌘ 180	⌘ 196	ď 212	ń 228	˘ 244
5	0101	ù 133	Ł 149	ą 165	Á 181	⌘ 197	Ň 213	ň 229	§ 245
6	0110	ć 134	ĩ 150	ż 166	Â 182	Å 198	í 214	š 230	÷ 246
7	0111	ç 135	ś 151	ż 167	Ě 183	ā 199	î 215	š 231	· 247
8	1000	ł 136	ś 152	Ę 168	Ş 184	⌘ 200	ě 216	Ŕ 232	° 248
9	1001	ē 137	Ö 153	ę 169	⌘ 185	⌘ 201	⌘ 217	Ú 233	˘ 249
A	1010	Ö 138	Ü 154	⌘ 170	⌘ 186	⌘ 202	⌘ 218	í 234	· 250
B	1011	ö 139	Ť 155	z 171	⌘ 187	⌘ 203	■ 219	Û 235	û 251
C	1100	î 140	ř 156	č 172	⌘ 188	⌘ 204	■ 220	ý 236	ř 252
D	1101	Ž 141	Ł 157	ś 173	Ž 189	⌘ 205	Ť 221	Ý 237	ř 253
E	1110	Ä 142	× 158	« 174	ž 190	⌘ 206	Û 222	ł 238	■ 254
F	1111	Ć 143	č 159	» 175	⌘ 191	⌘ 207	■ 223	´ 239	SP 255

A.10 Page 19 (PC858: Euro)

HEX	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	¼ 243
4	0100	ä 132	ö 148	ñ 164	‡ 180	— 196	È 212	õ 228	¶ 244
5	0101	à 133	ò 149	Ñ 165	À 181	+ 197	€ 213	ö 229	§ 245
6	0110	â 134	û 150	ä 166	Â 182	ã 198	í 214	µ 230	÷ 246
7	0111	ç 135	ù 151	ó 167	À 183	Ã 199	î 215	þ 231	³ 247
8	1000	ê 136	ÿ 152	¿ 168	© 184	⌚ 200	ï 216	þ 232	° 248
9	1001	ë 137	ÿ 153	® 169	⌘ 185	⌚ 201	⌚ 217	Û 233	² 249
A	1010	è 138	Û 154	¬ 170	 186	⌚ 202	⌚ 218	Ü 234	· 250
B	1011	ï 139	ø 155	½ 171	⌘ 187	⌚ 203	■ 219	Ü 235	¹ 251
C	1100	î 140	£ 156	¼ 172	⌘ 188	⌚ 204	■ 220	Ý 236	³ 252
D	1101	ì 141	Ø 157	ì 173	¢ 189	— 205	ì 221	Ý 237	² 253
E	1110	Ä 142	× 158	« 174	¥ 190	⌘ 206	î 222	— 238	■ 254
F	1111	Å 143	f 159	» 175	⌘ 191	⌘ 207	■ 223	' 239	SP 255

A.11 Page 254 (Space Page)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	SP 128	ø 144	SP 160	0 176	@ 192	P 208	. 224	p 240
1	0001	δ 129	μ 145	! 161	1 177	A 193	Q 209	a 225	q 241
2	0010	Ð 130	Þ 146	" 162	2 178	B 194	R 210	b 226	r 242
3	0011	Ë 131	Ð 147	# 163	3 179	C 195	S 211	c 227	s 243
4	0100	È 132	Ú 148	\$ 164	4 180	D 196	T 212	d 228	t 244
5	0101	È 133	Û 149	% 165	5 181	E 197	U 213	e 229	u 245
6	0110	Í 134	Û 150	& 166	6 182	F 198	V 214	f 230	v 246
7	0111	Î 135	Ý 151	' 167	7 183	G 199	W 215	g 231	w 247
8	1000	Ï 136	Ÿ 152	(168	8 184	H 200	X 216	h 232	x 248
9	1001	Ï 137	± 153) 169	9 185	I 201	Y 217	i 233	y 249
A	1010	Ó 138	÷ 154	* 170	: 186	J 202	Z 218	j 234	z 250
B	1011	ß 139	. 155	+ 171	; 187	K 203	[219	k 235	{ 251
C	1100	ø 140	SP 156	, 172	< 188	L 204	\ 220	l 236	 252
D	1101	ø 141	SP 157	- 173	= 189	M 205] 221	m 237	} 253
E	1110	SP 142	SP 158	. 174	> 190	N 206	^ 222	n 238	~ 254
F	1111	ø 143	SP 159	/ 175	? 191	O 207	~ 223	o 239	. 255

A.12 Page 255 (Space Page)

	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	H 208	SP 224	SP 240
1	0001	ü 129	æ 145	í 161	. 177	. 193	I 209	SP 225	SP 241
2	0010	é 130	Æ 146	ó 162	. 178	. 194	SP 210	SP 226	SP 242
3	0011	â 131	ô 147	ú 163	. 179	. 195	SP 211	SP 227	SP 243
4	0100	ä 132	ö 148	ñ 164	. 180	. 196	SP 212	SP 228	SP 244
5	0101	à 133	ò 149	Ñ 165	À 181	. 197	SP 213	SP 229	SP 245
6	0110	å 134	û 150	Ĝ 166	Â 182	â 198	. 214	SP 230	SP 246
7	0111	ç 135	ù 151	ğ 167	Á 183	Ä 199	. 215	SP 231	SP 247
8	1000	ê 136	ÿ 152	¿ 168	ì 184	Ł 200	SP 216	SP 232	SP 248
9	1001	ë 137	Ö 153	. 169	‡ 185	ŕ 201	SP 217	SP 233	SP 249
A	1010	è 138	Û 154	. 170	 186	⊥ 202	SP 218	SP 234	SP 250
B	1011	ï 139	ø 155	. 171	‡ 187	‡ 203	SP 219	SP 235	SP 251
C	1100	î 140	£ 156	. 172	‡ 188	‡ 204	SP 220	SP 236	SP 252
D	1101	ï 141	Ø 157	ì 173	¢ 189	= 205	SP 221	SP 237	SP 253
E	1110	Ä 142	Š 158	. 174	. 190	‡ 206	SP 222	SP 238	SP 254
F	1111	Å 143	š 159	ǫ 175	. 191	. 207	SP 223	SP 239	SP 255

A.13 International Character Sets

Country	ASCII code (Hex)											
	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
U.S.A	#	\$	@	[\]	^	`	{		}	~
France	#	\$	à	°	ç	§	^	`	é	ù	è	¨
Germany	#	\$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
U.K.	£	\$	@	[\]	^	`	{		}	~
Denmark I	#	\$	@	Æ	Ø	Å	^	`	æ	ø	å	~
Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Italy	#	\$	@	°	\	é	^	ù	à	ò	è	ì
Spain I	Pt	\$	@	ı	Ñ	ı	^	`	¨	ñ	}	~
Japan	#	\$	@	[¥]	^	`	{		}	~
Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Denmark II	#	\$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Spain II	#	\$	á	ı	Ñ	ı	é	`	í	ñ	ó	ú
Latin America	#	\$	á	ı	Ñ	ı	é	ü	í	ñ	ó	ú
Korea	#	\$	@	[₩]	^	`	{		}	~

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