EPSON

TM-U220II

Technical Reference guide

English

Rev. A
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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.

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About This Manual

Aim of the Manual

This manual was created to provide information on the TM-U220II 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."	Introduces control methods and connection formats
Chapter 4, "Troubleshooting."	Contains useful information for using.
Chapter 5, "Application Development Information."	Contains useful information for programming.
Chapter 6, "Notices for Replacement of the TM-U210/TM-U220/TM-U300."	Contains various notices and comparison information for using the TM-U220II as a replacement for the TM-U220/TM-U210/ TM-U300.
Appendix A, "Comparison table for TM-220II/TM-U220/U210/U300."	Comparison table for replacing TM-U220II/ TM-U210/TM-U300 with the TM-U220II
Appendix B, "Character Code Table."	Contains the supported character tables.

Safety Precautions

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.

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 qualified service personnel 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.*
- ❏ *Do not use with any power voltage other than the indicated voltage. Doing so may cause fire or shock.*
- ❏ *Never use a power cord other than the one included. Do not use the included power cord with any other device.*
- ❏ *Use a power cord that is safety standard certified.*
- ❏ *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 qualified service personnel 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 qualified service personnel.*

⚠ 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.*

❏ *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.*

❏ *Using in the presence of silicon gas (silicon adhesive, silicon oil, silicon powder, etc.) including siloxane and of malignant gas (nitric acid, hydrosulfuric, ammonia, chlorine, etc.) may cause contact failure at contact points in a mechanical switch and a DC motor etc. in a short time because of adhesion or oxidization of the insulation film.*

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Chapter 1
General Information

1.1 Features

The TM-U220II is a POS printer that can print receipt paper (paper roll).

The TM-U220II is designed to be compatible with existing systems built around a TM-U220/ TM-U210.

1.1.1 General

- ❏ Compact and lightweight.
- ❏ 3 model types are provided. (See "Printer types" (page 1-2))
- ❏ Excellent reliability and long life due to adoption of a stepping motor both for moving the carriage and for paper feeding.
- ❏ Can be installed hanging on the wall with an optional hanging bracket (only for type B, D).

1.1.2 Printer handling

- ❏ Easy drop-in paper loading and easy maintenance
- ❏ Cable connectors are housed in the bottom of the printer.
- ❏ Built-in two drawer kick interface connectors
- ❏ Built-in autocutter (for type A or B)
- ❏ Built-in take-up device (for type A)

1.1.3 Printing

- ❏ High-speed printing through logic-seeking control
- ❏ Two-color printing (black and red)
- ❏ Can print on various paper wide range (for type B or D: 76 / 69.5 / 57.5 mm)

1.1.4 Software

- ❏ Command protocol is based on the ESC/POS proprietary command system.
- ❏ Windows drivers, OPOS ADK, OPOS ADK for NET, and similar are available.
- ❏ Automatic status back (ASB) function that automatically transmits changes in printer status.

1.2 Product Structure

1.2.1 Printer types

TM-U220II has 3 model types: A, B, D. The features are as following.

	Type A	Type B	Type D
Two color printing	Yes	Yes	Yes
Autocutter	Yes	Yes	No
Take up device	Yes	No	No
paper width (mm)	76	76/ 69.5/ 57.5	76/ 69.5/ 57.5
wall hanging install	No	Yes	Yes
Supported language	Alphanumeric model: alphanumeric Multilingual model It supports alphanumeric and printing with one of the following: • Japanese Kanji • Simplified Chinese • Traditional Chinese • Korean • Thai	Alphanumeric model: alphanumeric Multilingual model It supports alphanumeric and printing with one of the following: • Japanese Kanji • Simplified Chinese • Traditional Chinese • Korean • Thai	Alphanumeric model: alphanumeric Multilingual model It supports alphanumeric and printing with one of the following: • Japanese Kanji • Simplified Chinese • Traditional Chinese • Korean • Thai
Near end detector	Factory option	Factory option	Factory option

1.2.2 Standard Parts Included with the Printer

This printer is packed with the materials listed below.

- ❑ Manual
- ❑ Roll paper: One roll*
- ❑ Power switch cover (in order to prevent accidentally turning off the power)
- ❑ Exclusive ribbon cassette ERC-38 (B/R)
- ❑ Power supply unit*
- ❑ Wiring clamp (locking wire saddle)*

*May not be included with the printer.

1.2.3 Related materials for TM-U220II

TM-U220II has the related materials listed in the following table.

Category	Name	Description
Options	WH-10	This is an optional unit for installing the printer on a wall.
	DF-10	Affixing Velcro® tape
	PS-180	Epson power supply unit
	PS-190	Epson power supply unit
	OT-WL06	Wireless LAN unit
POS accessories	DM-D series	These are customer displays. (Line Display)
Consumables	Roll Paper	This is required to print.
	Ribbon Casette	This is required to print.

1.3 Consumables

1.3.1 Ribbons

This printer needs a ribbon cassette to print receipts. We provide 2 ribbon cassettes:

- ❏ Ribbon cassette, ERC-38 (B) (Life: 3,000,000 characters / Color: Black)
- ❏ Ribbon cassette, ERC-38 (B/R) (Life: 1,500,000 characters / Color: Black)
  (Life: 750,000 characters / Color: Red)

Note:
These ribbon cassette service life numbers were obtained under our measurement conditions.

1.3.2 Roll paper

We provide roll paper and carbon roll paper with 1 copy for this printer. The widths are 76 mm, 69.5 mm, and 57.5 mm {3.00"/2.74"/2.26"}.

1.4 Product Specifications Overview

Print method	serial impact dot matrix
Paper width	76 mm / 69.5 mm / 57.5 mm {3.00"/2.74"/2.26"}
Cut type	There are 2 types. The type can be changed. Partial cut (cutting with one point on left edge left uncut)
Character sets	95 alphanumeric, 48 international characters, Extended graphics: 128 × 12 pages. (15 tables for Japanese model) Multilingual character model supports printing with one of the following character sets: • Japanese Kanji (Two-pass printing font) (JIS X0208-1990): 6879 • Simplified Chinese (Two-pass printing font) (GB18030-2022 (Lv.2)): 28806 • Traditional Chinese (Two-pass printing font) (Big 5): 13494 • Korean (Two-pass printing font) (KS C5601 type): 8366 • Thai (Three-pass printing font) : 128 characters × 7 pages (133 character types)
Interface (compatible)	RS-232C / Bidirectional parallel Ethernet / USB
Buffer	Receive buffer: 20 KB* or 40 bytes (Selectable by using DIP switch 1-2) *May be 4 KB depending on the model.
	Non-volatile graphics data buffer: 128 KB
	User NV memory: 8 KB
Power supply	Power supplied by AC adapter Be sure to always use a specified AC adapter: AC adapter,C1 (model no.: M235B), PS-180 (model no.: M159E), or PS-190 (model no.: M368A)
Operating voltage	24 VDC±7%
Consumption current (at 24 V)	1.3 A
Power consumption* (except for drawer kick driving)	Operating:Mean: Alphanumeric model: Approximately 31 W Multilingual* model: Approximately 38 W Standby: Mean: Approximately 2.2 W *Average power obtained under our operating conditions. Differs depending on use conditions and model.
Temperature	During operation: 0 to 50°C {41 to 122°F}. (At 34°C {93°F} or higher, there are humidity restrictions; refer to "Environmental Conditions" (page 1-12)
Humidity	During operation:10 to 90% (no condensation) During storage:10 to 90% (no condensation; excludes paper and ribbon)
Weight (mass)	Type A: Approximately 2.7 kg {5.94 lb} Type B: Approximately 2.5 kg {5.5 lb} Type D: Approximately 2.3 kg {5.06 lb}

1.5 Printing and paper Specifications

Printing method:	Serial impact dot matrix
Head wire configuration:	9-pin serial configuration
Printing direction:	Bidirectional printing (logic seeking)
Print speed: *1	Approximately 4.7 lps (printing 40 columns per line at 16 cpi) Approximately 6.0 lps (printing 30 columns per line at 16 cpi, with 1/8" line spacing) (except data transmission and processing time)
Paper width:	76 mm / 69.5 mm / 57.5 mm {3.00"/2.74"/2.26"}
Printing width:	63.4 mm / 57 mm / 47.5 mm {2.50" / 2.24" / 1.87"} Dot positions depend on DIP switch setting. See the table "Dot width of Printable area" (page 1-6) for details.
Characters per line:	35 (font A), 40 (font B, default) (When using 76mm width paper)
Character spacing:	ANK: 3 half dots (default) or 2 half dots. Kanji: 2 half dots (default) or 0 half dots. Thai: 3 half dots (default) or 2 half dots. The spacing of ANK and Thai characters is selectable by DIP SW2-1. The spacing of Kanji characters is selectable by ESC/POS command.
Paper feed speed:	30 lps
Line spacing (default):	4.23 mm {1/6"}, programmable by control commands.
Number of characters:	95 alphanumeric, 48 international characters, Extended graphics: 128 × 12 pages. (15 tables for Japanese model) Multilingual specifications are equipped with one of the following. • Japanese Kanji (Two-pass printing font) (JIS X0208-1990): 6879 • Simplified Chinese (Two-pass printing font) (GB18030-2022 (Lv.2)): 28806 • Traditional Chinese (Two-pass printing font) (Big 5): 13494 • Korean Kanji (Two-pass printing font) (KS C5601 type): 8366 • Thai (Three-pass printing font): 128 characters 7 pages (133 character types)
Character structure:	Font A: 9 × 9 Font B: 7 × 9 Kanji: 16 × 16 (Font B is the default)

*1 This printer adjusts print speed when it prints graphic data, etc.

The dot width of the printable area depends on DIP switch setting and paper width as shown in the following table.

Dot width of Printable area

Paper width	DIP SW2-1 setting	
	ON	OFF
76 mm	385 half dots	400 half dots
69.5 mm	360 half dots	360 half dots
57.5 mm	297 half dots	300 half dots

Character Dimensions, Characters Per Inch, Characters Per line

Character configuration			Character dimensions (mm)	Dot spacing between characters	Paper width (mm) and Characters per line (cpl)			Characters per inch (cpi) (1 inch = 25.4 mm)
Horiz. x Vert.	Condition of DIP SW 2-1	Character type	W x H		76 mm	69.5 mm	57.5 mm	
7 x 9 (Font B) (default)	ON	ANK	1.2 x 3.1	2 half dots	42	40	33	17.8
		Graphic	1.6 x 3.1	0				
	OFF (default)	ANK	1.2 x 3.1	3 half dots	40	36	30	16
		Graphic	1.7 x 3.1	0				
9 x 9 (Font A)	ON	ANK	1.6 x 3.1	2 half dots	35	32	27	14.5
		Graphic	1.9 x 3.1	0				
	OFF (default)	ANK	1.6 x 3.1	3 half dots	33	30	25	13.3
		Graphic	2.0 x 3.1	0				
16 x 16 (Kanji font)	Regardless *	Kanji	2.7 x 2.7	2 half dots (default) *	22	20	16	8.9
				0 *	25	22	18	9.5
7 x 27 (Thai font)	ON	Thai character	1.2 x 9.5	2 half dots	42	40	33	17.8
	OFF (default)			3 half dots	40	36	30	16
9 x 27 (Thai font)	ON	Thai character	1.6 x 9.5	2 half dots	35	32	27	14.5
	OFF (default)			3 half dots	33	30	25	13.3

*: The dot spacing between Kanji character is selected by an ESC/POS command.

1.5.1 Autocutter (for Type A / B)

Cutting method: By separated-blade scissors

Cutting type: Partial cut (one point left uncut)

Note:
It is recommended to feed approximately 2.116 mm or more in advance before printing to prevent dot displacement after cutting.

1.5.2 Paper Roll Supply

Supply method: Drop-in method

Paper roll end detection: Detection method: Mechanical microswitch
Detection position: Positioned within the paper path for the roll paper; detects the end of the roll paper

Near-end detector: Detection method: Mechanical microswitch

Inner diameter of the roll paper core: 10.5 to 12.5 mm

Near-end adjustment: Adjusting screw

Remaining amount: Fixed position
#1 approximately 8 mm
#2 approximately 5 mm
(The adjusting screw has two positions.)
See"Adjusting Position of Roll Paper Near End Detector" (page 3-29).

1.5.2.1 Paper Specifications

Paper feeding method: Friction feed

Paper feed interval: Initial setting: Approximately 4.23 mm {1/6"}
Can be set in units of approximately 0.18 mm {1/144"} by ESC/POS command

Paper feed speed: 30 lps (approximately 4.99" /s)
(during continuous feeding) [lps: lines per second]

Roll paper width: 76 ± 0.5 mm (3" ± 0.02") / 69.5 ± 0.5 mm (2.74" ± 0.02") / 57.5 ± 0.5 mm (2.26" ± 0.02")

Maximum diameter: 83 mm (3.27")

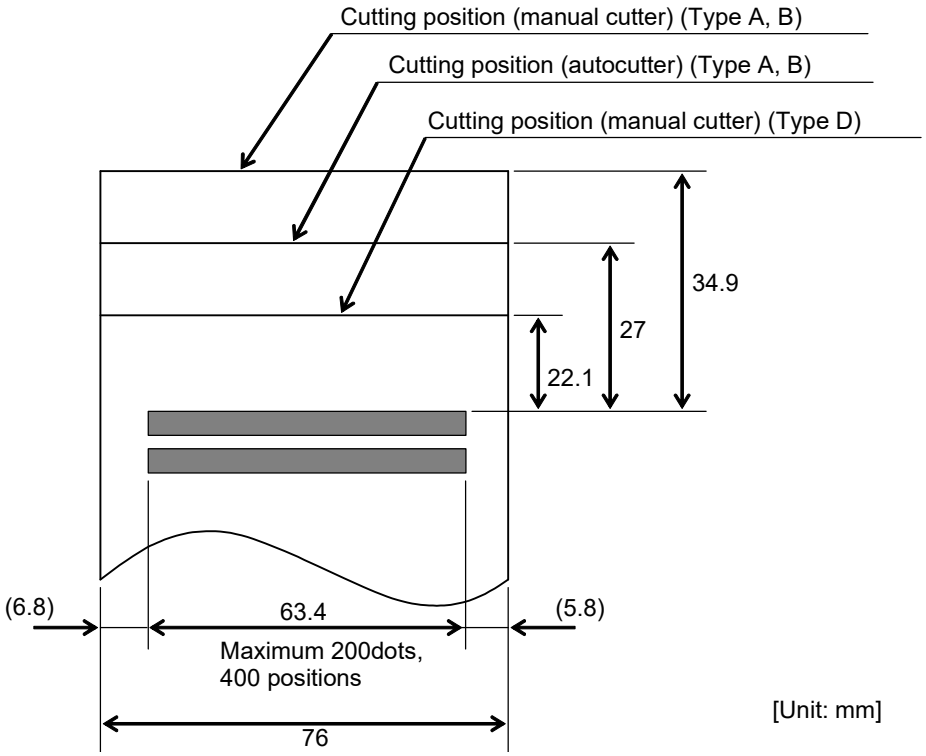
Core: When there is no near-end detector, always be sure to use roll paper that is not glued to the core.

Normal paper specifications: Paper thickness: 1 sheet: 0.06 to 0.085 mm {0.0024 to 0.0033"}
Weight: 52.3 to 64 g/m^2 {14 to 17 lb}
(45 to 55 kg/1000 sheets 1091 × 788 mm)

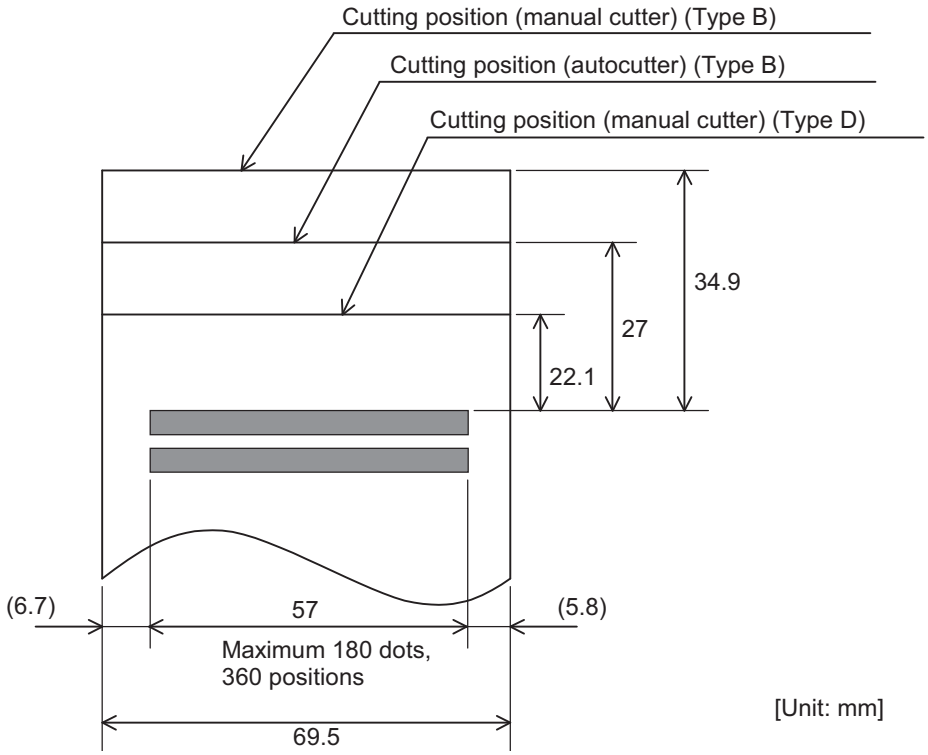
Carbon paper specifications: Number of copies: Original 1 sheet + one copy sheet
Thickness: 0.05 to 0.08 mm {0.002 to 0.0031"}
(thickness of one sheet);
Recommended paper:
Paper by Mitsubishi - Carbonless paper (blue)
Top sheets:
N40Hi (paper thickness: 0.06 mm {0.0024"}, mass: 47.2 g/m^2 {12.6 lb}
Bottom sheet
N60 (paper thickness: 0.08 mm {0.0031"}, mass: 68.0 g/m^2 {18 lb}

The copying capability is affected by the ambient temperature, and is guaranteed for the temperature ranges of 5 to 50°C {41 to 122°F}.

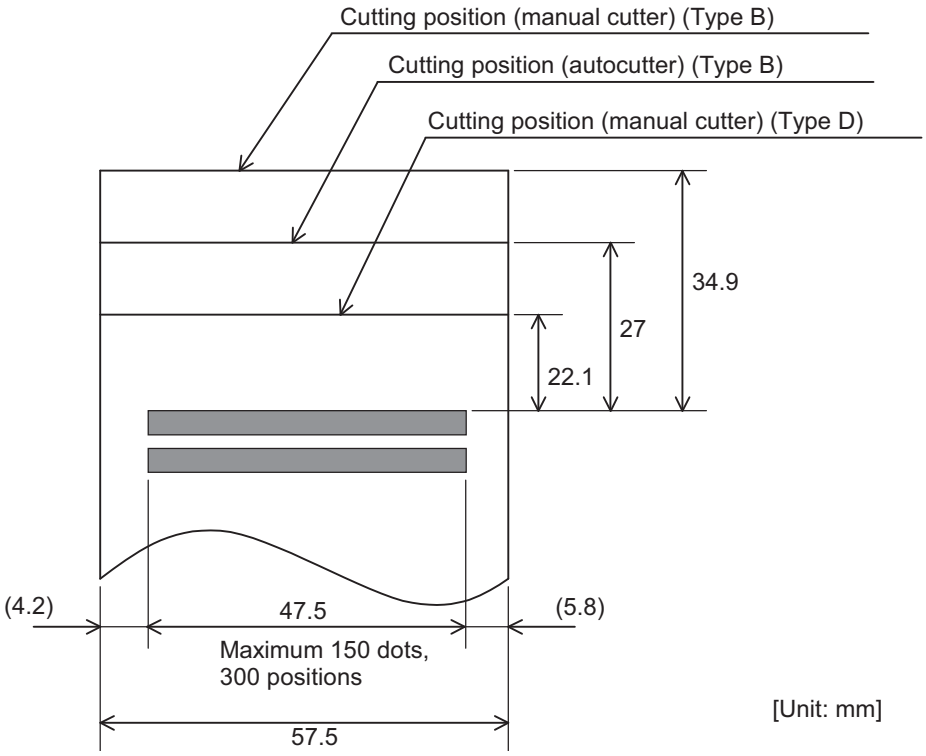
1.5.2.2 Printable Area



Printable area for 76mm width paper



Printable area for 69.5mm width paper



Printable area for 57.5mm width paper

1.6 Other Specifications

1.6.1 Reliability

Life: Mechanism: 7,500,000 lines

MTBF: 180,000 hours
Failure is defined as a Random Failure occurring at the time of the Random Failure Period.

MCBF: 18,000,000 lines
This is an average failure interval based on failures relating to Wearout and Random Failures up to the life of 7.5 million lines.

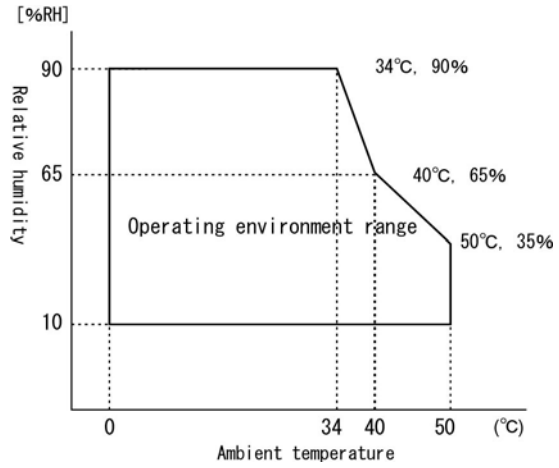
Print head life: 150 million characters (using an average of 2 dots/wire per character). (The printing pattern is EPSON test pattern).

Autocutter life: 800,000 cuts
End of life is defined as the point at which the printer reaches the beginning of the wearout period.

1.6.2 Environmental Conditions

Temperature: During operation: 0 to 50°C {41 to 122°F}.
(At 34°C {93°F} or higher, there are humidity restrictions as listed below.)

Humidity: During operation:10 to 90% (no condensation)
During storage:10 to 90% (no condensation; excludes paper and ribbon)



Operating temperature and humidity range

Vibration resistance: When packed:
Frequency: 5 to 55 Hz
Acceleration: 19.6 m/s^2 {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: 60 cm (2 feet)
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 (2")
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.

1.6.3 Installation

Install the printer horizontally as a basic position.The printer also must be installed so that it does not move or vibrate during paper cutting or the drawer kick operation. Velcro tape is available as an option.

The printer (Type B or D) can be also installed on a wall with the optional wall hanging bracket (WH-10).

1.7 External Dimensions and Mass

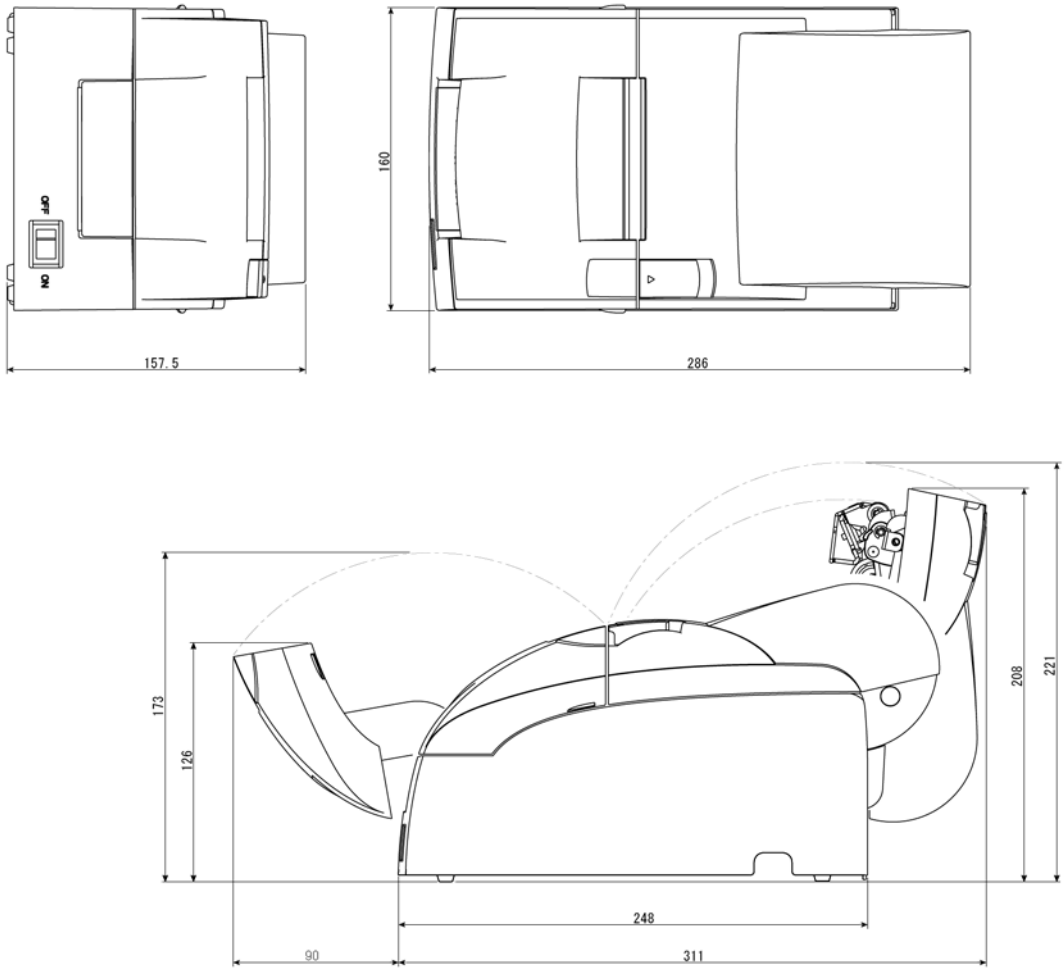
1.7.1 External Dimensions and Mass

Model type	External Dimensions			Mass
	Width	Height	Depth	
Type A	160 mm {Approximately 6.3"}	157.5 mm {Approximately 6.2"}	286 mm {Approximately 11.3"}	Approximately 2.7 kg {5.9 lb}
Type B	160 mm {Approximately 6.3"}	138.5 mm {Approximately 5.5"}	248 mm {Approximately 9.8"}	Approximately 2.5 kg {5.5 lb}
Type D	160 mm {Approximately 6.3"}	138.5 mm {Approximately 5.5"}	248 mm {Approximately 9.8"}	Approximately 2.5 kg {5.1 lb}

(All the numeric values are typical.)

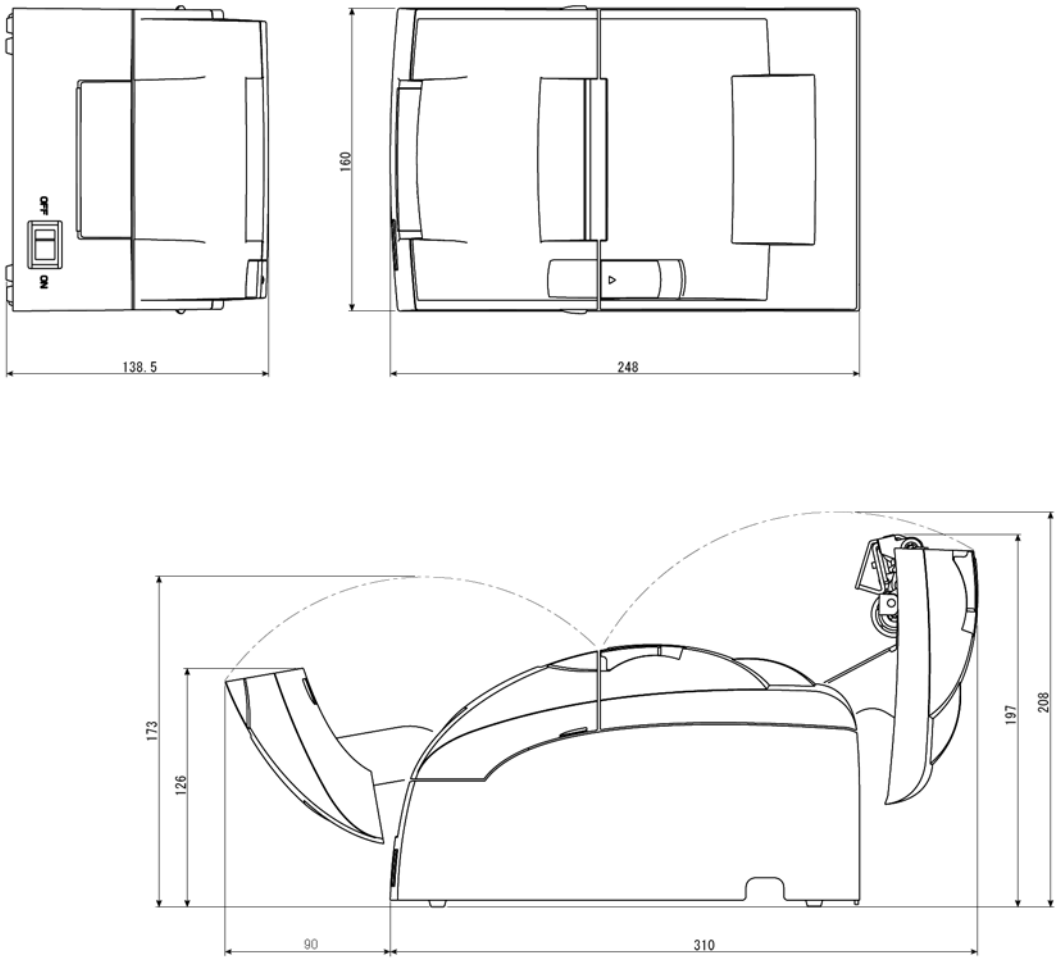
Color: Epson standard color (ECW, EDG)

1.7.1.1 Overview (Type A)



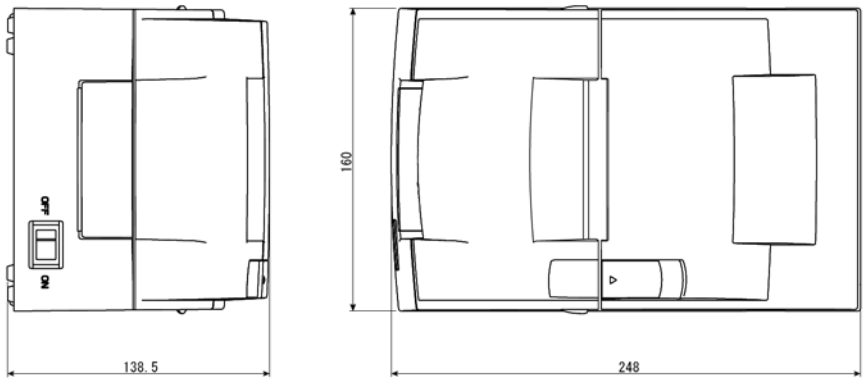
[Unit: mm]

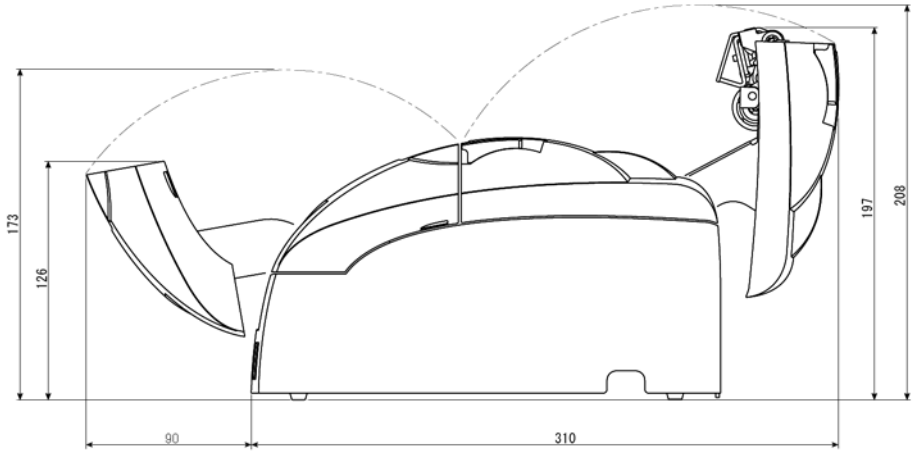
1.7.1.2 Overview (Type B)



[Unit: mm]

1.7.1.3 Overview (Type D)





[Unit: mm]

Chapter 2
System Planning

This section provides you information for system planning.

2.1 Connection Form and Cables

2.2 Serial Connection

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

- Stand alone
- 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

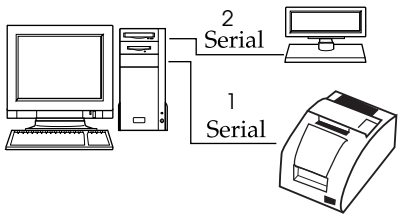
Type B

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.

2.2.1 Stand alone

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

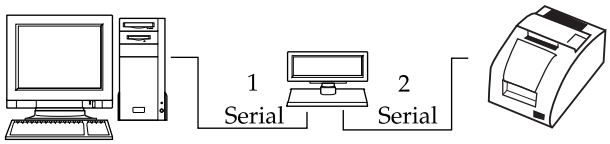


TM side control setting \ Application control		XON/XOFF (except OPOS)	DTR/DSR (DOS, OPOS, Visual C)	RTS/CTS (DOS, Windows driver, Visual C, Visual Basic, MSComm)
XON/XOFF	1	Type A or B	—	—
	2	DM-D500: A,B Other DM-D: not available	—	—
DTR/DSR	1	—	Type A or B	Type B
	2	—	Type A or B	Type B

2.2.2 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.

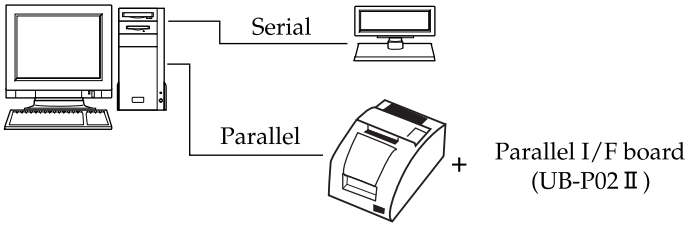
Note:
On the DM-D (DM-D500 etc...) which has a DIP switch to select Y-type connection, confirm that the DIP switch has been set to "Y-type connection: Disable."



TM side control setting \ Application control		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	1	—	Type A or B	Type B
	2	—	Type A or B	Type A or B

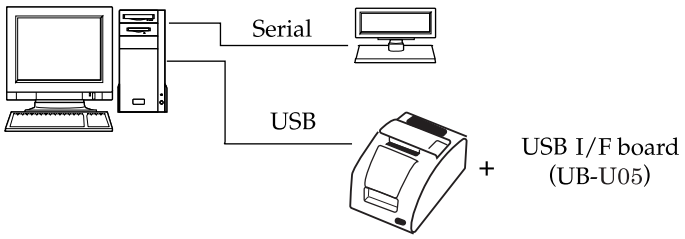
2.3 Parallel Connection

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.



2.4 USB connection

The TM printer can be connected to the host PC via a USB connector. (See "Adjusting the DIP Switches" (page 3-15) in Chapter 3 for DIP switch settings.)



Note:
The host PC must have a "USB device driver" installed in order to use a USB model TM printer. Please contact EPSON or your dealer about the USB device driver and the procedure for installing.

2.5 Wired LAN Connection

Use an Ethernet cable to connect a printer to a network via a hub.

Note:
As with conventional models, network settings can be configured from a web browser by specifying the IP address.

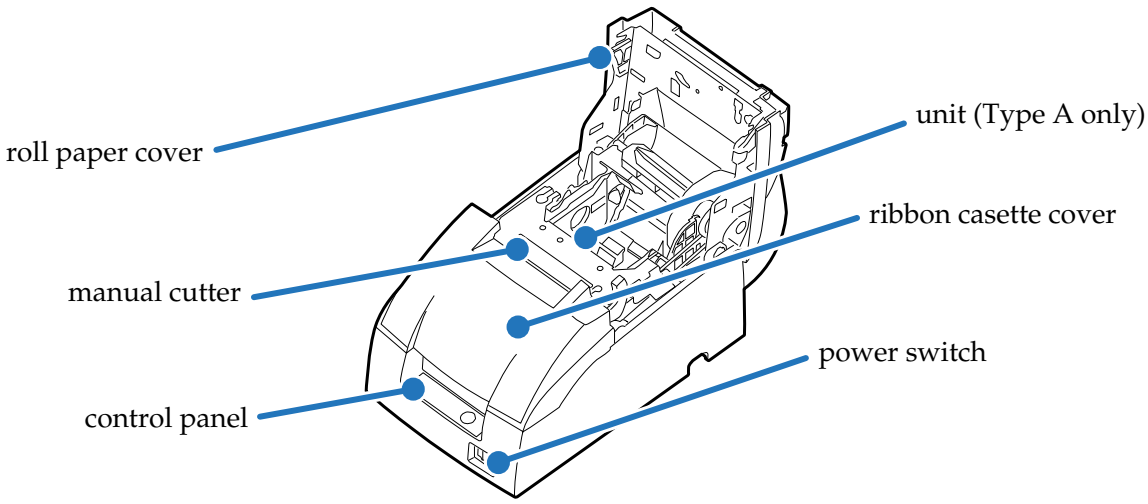
For more information, refer to the Technical Reference Guide for the interface board.

Chapter 3

Setup

3.1 Part Name and Basic Operation

3.1.1 Part name



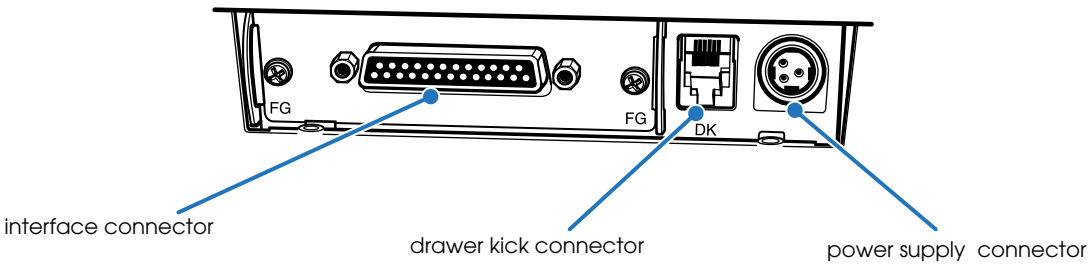
This figure is Type A.

3.1.1.1 Connectors

⚠ WARNING:

- *Do not connect a telephone line to the drawer kick connector or the display module connector; otherwise the printer and the telephone line may be damaged.*
- *Do not insert a Type-B USB connector into the LAN connector or drawer kick connector. Inserting such a connector may damage the connector, printer, or system.*

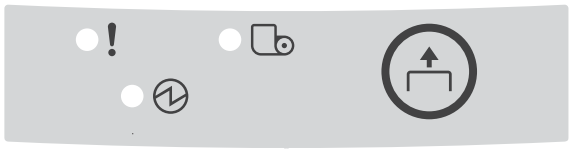
You can connect up to four cables to the printer. They all connect to the connector panel (on the bottom rear of the printer), which is shown below.



Note:
This illustration shows the serial interface model. The other interface connector looks slightly different.

3.1.2 The Control Panel

The control panel is shown below.



- **(Power)** LED: Indicates whether power is on or off.

  On: Power is on. (Power ON)

  Off: Power is off. (Power OFF)

- **(Error)** LED: Indicates the error status.

  Check to see whether a cover is open if this LED is lit up but not blinking (offline status). See "LED Blinking Pattern" (page 4-1) if the LED is blinking (error status).

- **(Paper out)** LED: Indicates the amount of paper remaining.

  On: The roll paper end or near end(*1) is detected.

  Off: Paper is loaded (normal condition).

  Flashing: Self-test waiting state for test print (Waiting for the FEED button to be pressed)

  Note:
  See "Adjusting Position of Roll Paper Near End Detector" (page 3-29) for how to set the detector.

- **(Feed)** button: Paper is fed while this button is pressed.

Note:

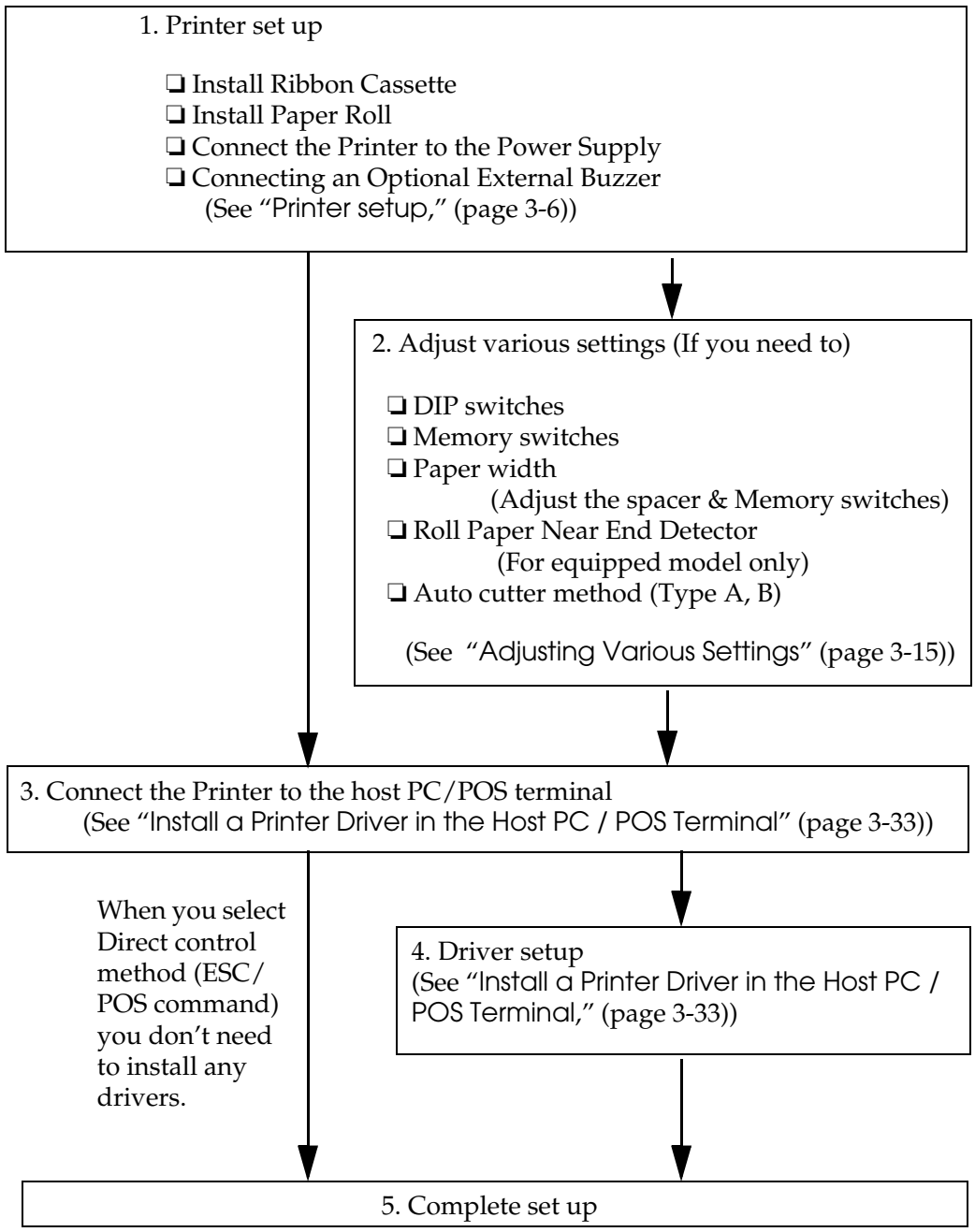
The FEED button can be disabled by ESC/POS command. See the "ESC/POS Command Reference" for details.

Feeding can be performed from an application without using the FEED button. See the driver documentation for details.

3.2 Setup Flow

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

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



The following sections describe the setup. The flow of preparing to use printer is listed below.

1. Printer setup
   - •Install Ribbon Cassette
     ("Installing or Replacing the Ribbon Cassette" (page 3-6))
   - •Install Paper Roll ("Installing the Roll Paper" (page 3-7))
   - • Connect the Priner to the Power Supply
     ("Connecting the Power Supply Unit" (page 3-13))
   - • Connecting an Optional External Buzzer

2. Adjust various setting (If you need to)

   When you use this printer with a serial interface, you have to adjust the communication settings. See "Adjusting the DIP Switches" (page 3-15) and "Memory Switches" (page 3-20) for how to set them.

   - •DIP switches ("Adjusting the DIP Switches" (page 3-15))
     The DIP switches set serial communication conditions, busy condition, print column, receive buffer capacity, etc...
   - •Memory switches ("Memory Switches" (page 3-20))
     The Memory switches set serial communication conditions, roll paper width, cover open status handling, etc...
   - • Paper width ("Adjusting Roll paper width" (page 3-28))
     The paper width is set by the spacer & Memory switch setting.
   - • Roll Paper Near End Detector (For model equipped with the detector)
     ("Adjusting Position of Roll Paper Near End Detector" (page 3-29))

3. Connect the Pritner to the Host PC/POS Terminal (and Cash Drawer)
   ("Connecting the Printer to the Host PC / POS Terminal" (page 3-30))

4. Driver set up (If you use driver)
   ("Install a Printer Driver in the Host PC / POS Terminal" (page 3-33))

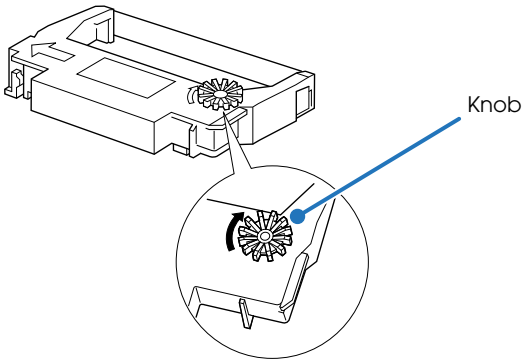
5. Complete the setup

3.3 Printer setup

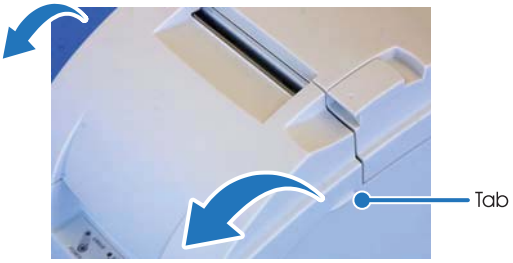
3.3.1 Installing or Replacing the Ribbon Cassette

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:



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



2. Open the ribbon cassette 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 and push the ribbon cassette down until it clicks.

Note:
Make sure the ribbon is installed between the print head and the platen without wrinkles or creases.

5. Close the ribbon cassette cover of the printer.

3.3.2 Installing the Roll Paper

The installing procedure is little different between Type A and Type B, D.

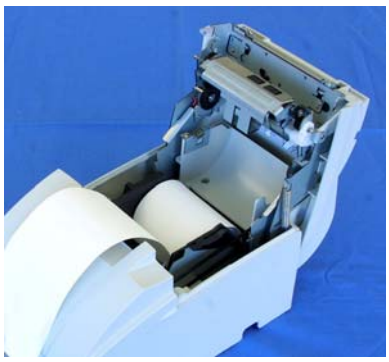
⚠ CAUTION:

Be sure to use roll paper that meets the specifications.
Be sure not to touch the manual cutter. Otherwise your fingers might be injured.

3.3.2.1 Installing rhe Roll Paper for Type B, D

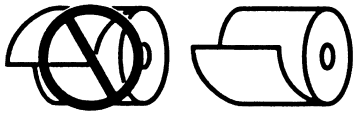
1. Using scissors, cut the leading edge of the roll paper, as shown in the left figure.

2. Turn on the printer and open the roll paper cover by using the tab, as shown in the left.



3. Insert the roll paper, as shown on the left.

Note:
Note the direction the paper comes off the roll, as shown below.



When using 2-ply roll paper, be sure that the top and bottom sheets are aligned at the paper exit. See the below illustration.

4. Close the roll paper cover.

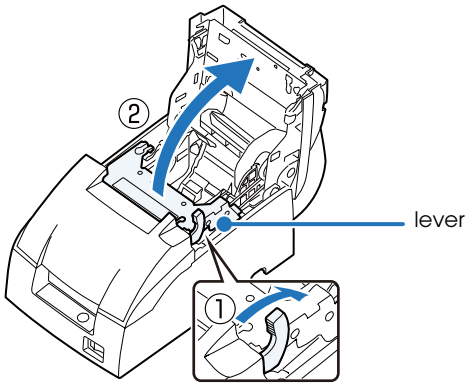
3.3.2.2 Installing the Roll Paper for Type A

1. Using scissors, cut the leading edge of the roll paper, as shown in the left figure.

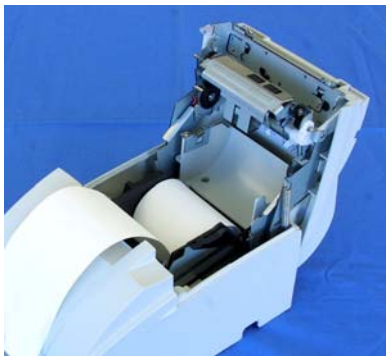
2. Turn on the printer and open the roll paper cover by using the tab, as shown in the left.

   Note:
   The printer feeds for 30 mm automatically if the roll paper cover is open. This is a normal operation to prevent the printer from damaging the paper when the roll paper cover is opened or closed.

   Since the printer does not feed even if the roll paper cover is open when the printer is turned off, make sure not to pinch the paper when the cover is closed.

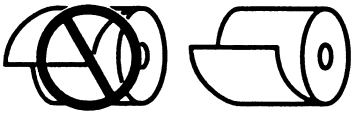


3. Open the unit by using the lever, as shown in the left.



4. Insert the roll paper, as shown in the left.

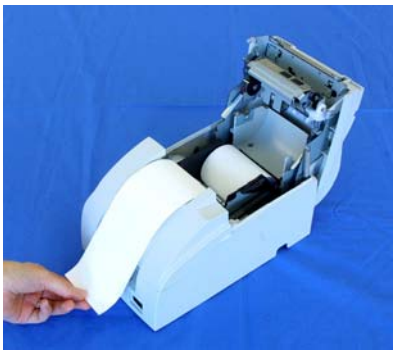
   Note:
   Note the direction the paper comes off the roll, as shown in following



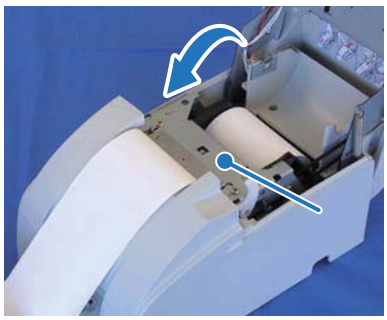
When using 2-ply roll paper, be sure that the top and bottom sheets are aligned at the paper exit. See below illustration.

5. Close the roll paper cover.

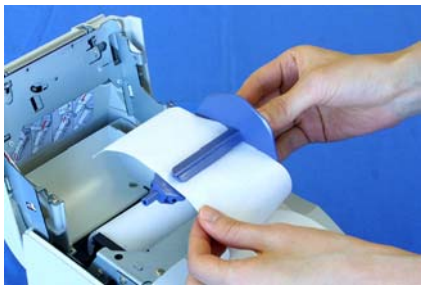
6. **If you are not using a take-up spool,** pull out a small amount of roll paper and close the roll paper cover; then tear off the paper with the manual cutter. You can skip steps 6 through 11.



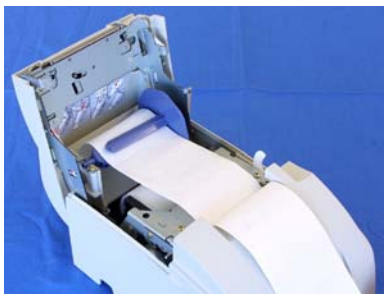
7. When using 2-ply roll paper, pull out the roll paper to the bottom front of the printer as a guide, as shown in left.



8. Close the unit, as shown in the left illustration.

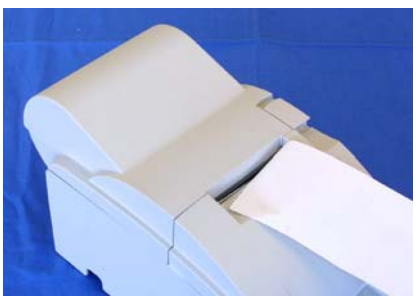


9. Insert the end of the bottom paper (journal paper) into the paper take-up spool, as shown in following.



10. Insert the paper take-up spool in the printer. Be sure that the paper is aligned with the spool's flange, as shown.

11. Feed the paper with the FEED button so that the paper is taken up by the spool.



12. Close the roll paper cover and tear off the roll paper with the manual cutter, as shown.

Note:
Since the printer does not feed even if the roll paper cover is open when the printer is turned off, make sure not to pinch the paper when the cover is closed.

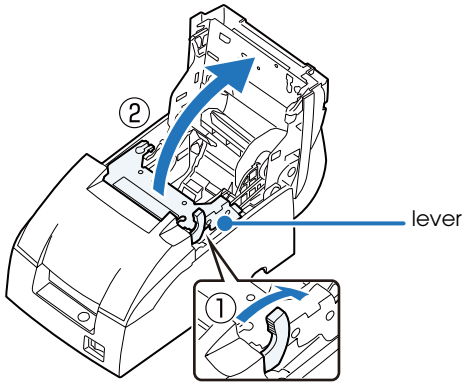
Do not open the roll paper cover during printing or paper feeding.

When using the printer, be sure to cut the roll paper with the manual cutter after paper feeding is complete.

3.3.2.3 Replacing the Roll Paper

1. Turn on the printer and open the roll paper cover by using the tab, as shown.

2. Types B and D: Remove the used roll paper core.



3. Type A only: Remove the take-up spool, and open the unit by using the unit open lever, as shown; then remove the used roll paper core.

4. Insert new roll paper. See the section “Installing the Roll Paper for Type A” (page 3-9).

3.3.3 Connecting the Power Supply Unit

⚠ WARNING:

Be sure to always use the included AC adapter: AC adapter,C1 (model no.: M235B).
Don't use the PA-#### or PB-#### power supply unit with TM-U210.
Using an incorrect power supply may cause fire or electrical shock.

⚠ CAUTION:

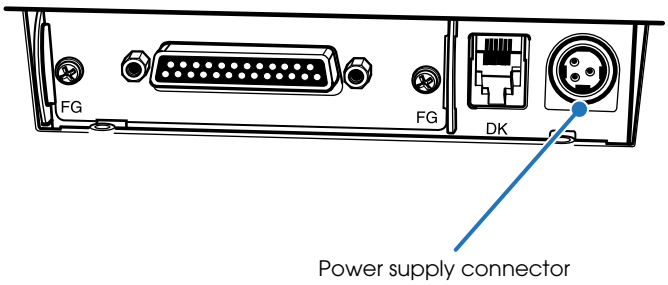
When connecting or disconnecting the power supply from the printer, make sure the power supply is not plugged into an electrical outlet. Otherwise you may damage the power supply or the printer.

3.3.3.1 Connecting procedure

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.



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

When you connect the power supply unit to the printer, we recommend to do a self test to confirm the operation. See "Self Test" (page 3-33) for details.

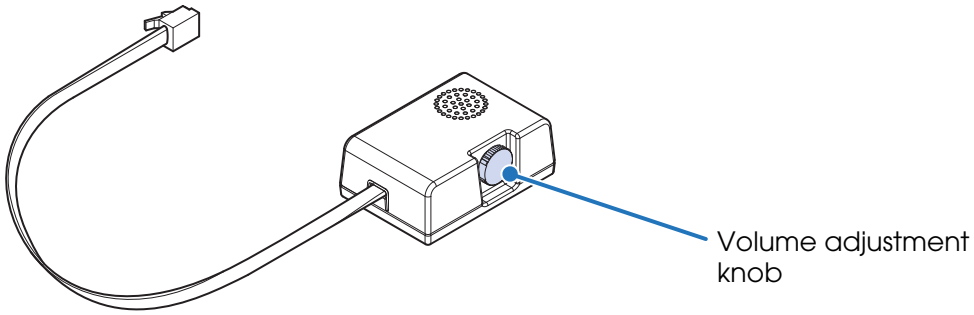
3.3.4 Connecting an Optional External Buzzer

You can connect an optional external buzzer (model no.: OT-BZ20) to a printer by using a drawer kick connector in order to set the buzzer to sound by command, or when the printer performs a specific operation such as when an error occurs or paper is automatically cut. You can also specify different buzzer sound patterns and amount of repetitions according to the reason for the buzzer sounding.

Use the memory switch (customize value) to specify settings such as buzzer enable/disable, pattern, and amount of repetitions. See"Memory Switches" (page 3-20) for details about the memory switches (customize value).

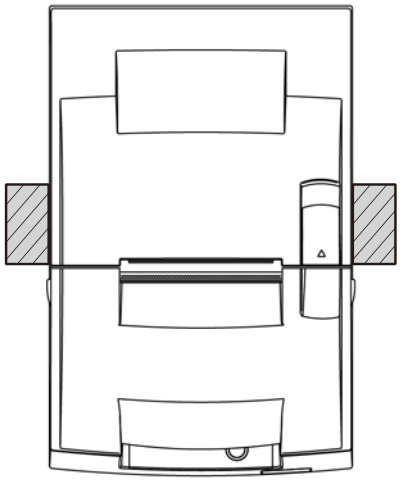
Note:

- *Be sure to always turn off the printer power when connecting or removing the optional external buzzer.*
- *You cannot use an optional external buzzer at the same time as a cash drawer. Do not use a branch connector or similar to connect both to a printer at the same time.*



3.3.4.1 Installation location

We recommend installing the optional external buzzer at one of the locations shown below.



Note:

- *Do not install to a surface where roll paper is ejected.*
- *Install so that the volume adjustment knob of the optional external buzzer is facing to the side or downward in order to prevent liquid and similar from getting inside the buzzer.*

3.4 Adjusting Various Settings

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

- ❏ DIP switch (communication condition, busy condition, print column, receive buffer capacity, etc...)
- ❏ Memory switch (serial communication conditions, roll paper width, cover open status handling, etc...)
- ❏ Roll paper width (76mm / 69.5mm / 59.5mm) Adjusting the spacer & memory switch
- ❏ Position of roll paper near end detector

The current settings can be confirmed by a self test. (See "Self Test" (page 3-33).)

Note:
When you use serial interface model with 1200, 2400, 19200, 38400, 57600, or 115200 bps, you have to adjust DIP switch "Serial interface selection" function and Memory switch "Serial communication condition".

When you adjust the items, we recommend to confirm the new setting. The confirmation is performed by running a self-test. See "Self Test Procedure" (page 3-33).

3.4.1 How to Confirm Current Settings

You can use a self-test to confirm the current settings. See "Self Test" (page 3-33).

3.4.2 Adjusting the DIP Switches

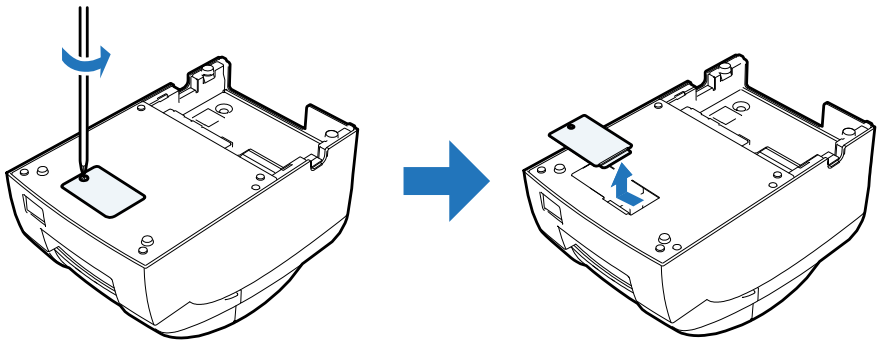
The printer has two sets of DIP switches. DIP switch functions vary depending on the DIP switch type (US/STD) and interface model.

DIP switch type can be checked by performing a self test. See "Self Test" (page 3-33).

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

1. Check that the printer power is turned off.

2. Use a crosshead screwdriver to remove the DIP switch cover on the underside of the printer.

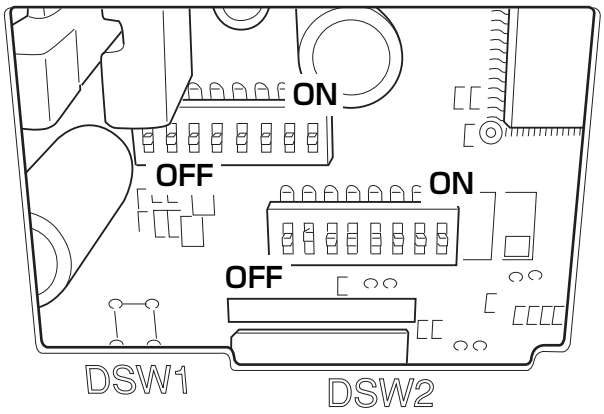


3. Use tweezers or a similar tool to set the DIP switches as you like. (Refer to the next page for DIP switch functions.)

4. Re-install the DIP switch cover to the underside of the printer.

⚠ CAUTION:

Turn off the power and disconnect all cables while removing the DIP switch cover.
Removing with the power on may cause an electric short that can damage the printer.
Be sure to always close the DIP switch cover after setting if it is open.
Leaving it open during printer use may cause fire or shock.



3.4.2.1 If the DIP switch type is "US"

Serial interface model

DIP Switch 1

SW	Function	On	Off	Default	
				B	D
1	Printing mode	Right side up printing mode	Normal printing mode	Off	Off
2	Receive buffer capacity	40 bytes	20KB	Off	Off
3	Handshaking	XON/XOFF	DTR/DSR	Off	Off
4	Word length	7 bits	8 bits	Off	Off
5	Parity check	Yes	No	Off	Off
6	Parity selection	Even	Odd	Off	Off
7	Baud rate	4800 bps	9600 bps	Off	Off
8	BUSY condition	Receive buffer-full	- Offline - Receive buffer-full	Off	Off

DIP Switch 2

SW	Function	On	Off	Default	
				B	D
1	Selects number of characters per line (cpl) (*)	42 cpl / 35 cpl	40 cpl / 33 cpl	Off	Off
2	Reserved (Autocutter)	Enabled	Disabled	On	Off
3	Pin 6 reset signal	Used	Not used	Off	Off
4	Pin 25 reset signal	Used	Not used	Off	Off
5	Undefined	-	-	Off	Off
6	Reserved (Flash memory rewriting)	Enabled	Disabled	Off	Off
7	Undefined	-	-	Off	Off
8	Serial communication set selection	By memory switch	By DIP switch	Off	Off

(*) Selection of dots between characters: On = 2 half dots, Off = 3 half dots
The number of characters per line in the Table indicates for the 76 mm-width paper.

Note:
"Data receive error" is fixed to "?." Regardless of the setting of DIP switch 1-1, if you want to perform right side up printing, DIP switch 1-2 must be fixed to Off.

Other than serial interface model

DIP Switch 1

SW	Function	On	Off	Default	
				B	D
1	Printing mode	Right side up printing mode	Normal printing mode	Off	Off
2	Receive buffer	40 bytes	20KB	Off	Off
3	Undefined	-	-	Off	Off
4	Undefined	-	-	Off	Off
5	Undefined	-	-	Off	Off
6	Undefined	-	-	Off	Off
7	Undefined	-	-	Off	Off
8	BUSY condition	- Receive buffer-full	- Offline - Receive buffer-full	Off	Off

DIP Switch 2

SW	Function	On	Off	Default	
				B	D
1	Selects number of characters per line (cpl) (*)	42 cpl / 35 cpl	40 cpl / 33 cpl	Off	Off
2	Reserved (Autocutter)	Enabled	Disabled	On	Off
3	Undefined	-	-	Off	Off
4	Pin 31 reset signal (Parallel interface model)	Used	Not used	On	On
	Undefined (Other than Parallel interface model)	-	-	Off	Off
5	Undefined	-	-	Off	Off
6	Reserved (Flash memory rewriting)	Enabled	Disabled	Off	Off
7	Undefined	-	-	Off	Off
8	Undefined	-	-	Off	Off

(*) Selection of dots between characters: On = 2 half dots, Off = 3 half dots
The number of characters per line in the Table indicates for the 76 mm-width paper.

Note:
"Auto line feed" is fixed to "Disabled." Regardless of the setting of DIP switch 1-1, if you want to perform right side up printing, DIP switch 1-2 must be fixed to Off.

3.4.2.2 If the DIP switch type is "STD"

Serial interface model

DIP Switch 1

SW	Function	On	Off	Default		
				A	B	D
1	Data reception error	Ignored	Print "?"	Off	Off	Off
2	Receive buffer capacity	40 bytes	4KB/20KB*	Off	Off	Off
3	Handshaking	XON/XOFF	DTR/DSR	Off	Off	Off
4	Word length	7 bits	8 bits	Off	Off	Off
5	Parity check	Yes	No	Off	Off	Off
6	Parity selection	Even	Odd	Off	Off	Off
7	Baud rate	4800 bps	9600 bps	Off	Off	Off
8	BUSY condition	- Receive buffer-full	- Offline - Receive buffer-full	Off	Off	Off

Note:
May be 4K bytes depending on the model.

DIP Switch 2

SW	Function	On	Off	Default		
				A	B	D
1	Selects number of characters per line (cpl) (*)	42 cpl / 35 cpl	40 cpl / 33 cpl	Off	Off	Off
2	Reserved (Autocutter)	Enabled	Disabled	On	On	Off
3	Undefined	-	-	Off	Off	Off
4	Serial communication set selection	By memory switch	By DIP switch	Off	Off	Off
5	Undefined	-	-	Off	Off	Off
6	Reserved (Flash memory rewriting)	Enabled	Disabled	Off	Off	Off
7	Pin 6 reset signal	Used	Not used	Off	Off	Off
8	Pin 25 reset signal	Used	Not used	Off	Off	Off

(*) Selection of dots between characters: On = 2 half dots, Off = 3 half dots
The number of characters per line in the Table indicates for the 76 mm-width paper.

Parallel interface model

DIP Switch 1

SW	Function	On	Off	Default		
				A	B	D
1	Auto line feed	Enabled	Disabled	Off	Off	Off
2	Receive buffer	40 bytes	4KB/20KB*	Off	Off	Off
3	Undefined	-	-	Off	Off	Off
4	Undefined	-	-	Off	Off	Off
5	Undefined	-	-	Off	Off	Off
6	Undefined	-	-	Off	Off	Off
7	Undefined	-	-	Off	Off	Off
8	BUSY condition	- Receive buffer-full	- Offline - Receive buffer-full	Off	Off	Off

Note:
May be 4K bytes depending on the model.

DIP Switch 2

SW	Function	On	Off	Default		
				A	B	D
1	Selects number of characters per line (cpl) (*)	42 cpl / 35 cpl	40 cpl / 33 cpl	Off	Off	Off
2	Reserved (Autocutter)	Enabled	Disabled	On	On	Off
3	Undefined	-	-	Off	Off	Off
4	Undefined	-	-	Off	Off	Off
5	Undefined	-	-	Off	Off	Off
6	Reserved (Flash memory rewriting)	Enabled	Disabled	Off	Off	Off
7	Undefined	-	-	Off	Off	Off
8	Pin 31 reset signal (Parallel interface model)	Used	Not used	On	On	On
	Undefined (Other than Parallel interface model)	-	-	Off	Off	Off

(*) Selection of dots between characters: On = 2 half dots, Off = 3 half dots
The number of characters per line in the Table indicates for the 76 mm-width paper.

3.4.2.3 Notes for DIP switch 2-1

The DIP switch 2-1 defines the print columns as listed in the following table.

Paper width	Character font	DIP switch 2-1 status	
		ON	OFF
76 mm	Font A (9 x 9)	35	33
	Font B (7 x 9)	42	40
69.5 mm	Font A (9 x 9)	32	30
	Font B (7 x 9)	40	36
57.5 mm	Font A (9 x 9)	27	25
	Font B (7 x 9)	33	30

Unit: cpl (Character per line)

Note:
The cpl of a Kanji character font is available to be changed by an ESC/POS command. (default: 22 to 25 cpl)

3.4.3 Memory Switches

This printer has "Memory switch" set which is software switches. Memory switch set has "Msw 2," "Msw 8," "Customize value," "Serial communication condition."

"Memory switch setting utility" can change the Memory switch set to ON or OFF as shown in the table below (default: all OFF):

Note:
The Memory switch is available to be changed by five methods:

- *Memory switch setting utility*
- *Memory switch setup mode (there are limitations on what can be changed)*
- *Control from setupPOS (OPOS only, and there are limitations on what can be changed)*
- *Control from Windows driver (Advanced Printer Driver only, and there are limitations on what can be changed)*
- *Control from ESC/POS command*

Some Memory switch settings can be changed by the "Memory switch setting mode."See "Memory Switch Setup Mode" on page 3-23.

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.

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.

When you replace a TM-U210 with a TM-U220II, you should adjust the Msw 8-5 to OFF.

Memory Switch 2

SW	Function	On	Off	Default
1	Reserved	-	Fixed to Off	Off
2	Reserved	-	Fixed to Off	
3	Selection of the character code system of the Simplified Chinese	GB2312	GB18030	
4 ~ 8	Reserved	-	Fixed to Off	

Memory Switch 8

SW	Function	On	Off	Default
1 ~ 4	Reserved	-	Fixed to Off	Off
5	Selection of the cover open status	Cover open	Paper end	
6	Reserved	-	Fixed to Off	
7	Reserved	-	-	
8	Printer cover open during operation	Errors that can possibly recover	Errors that automatically recover	

Note:

Msw 8-5:

When Off is selected, a bit of the "roll paper end sensor" in each status that is transmitted from the printer is changed every time the roll paper cover is open or closed. When On is selected, a bit of the "roll paper cover open / close" in each status that is transmitted from the printer is changed every time the roll paper cover is open or closed. When you replace a TM-U210 with a TM-U220II, you should adjust the Msw 8-5 to Off.

Msw 8-8:

When Off is selected, a bit of the "automatic recoverable error" in each status that is transmitted from the printer is changed every time the roll paper cover is open. When On is selected, a bit of the "mechanical error" in each status that is transmitted from the printer is changed every time the roll paper cover is open.

The setting of Msw 8-5 and 8-8 can be set by "Memory switch setup mode." See "Memory Switch Setup Mode" on page 3-23.

Customize value

Function		Selectable value	
Automatic paper reduction	Reduction of top margin	No margin reduction (default)	Reduced
	Reduction of bottom margin	No margin reduction (default)	Reduced
	Reduction of line spacing	No reduction (default)	Reduced by 25%
		Reduced by 50%	Reduced by 75%
	Reduction of line spacing where extra line feeds are included	No reduction (default)	Reduced by 25%
		Reduced by 50%	Reduced by 75%
Roll paper width specification		57.5 mm	69.5 mm
		76 mm (default)	--
Command execution when offline		Enabled	Disabled (default)
Automatic paper cutting when cover is closed		Cutting performed	No cutting (default)
Buzzer function: Enable/Disable optional external buzzer		Enabled	Disabled (default)

Customize value

Function	Selectable value	
Buzzer function: Buzzer repetitions when an error occurs*1	Does not sound	Only once
	Sounds continuously (default)	-
Buzzer function: Sound pattern for automatic cutting command*1	Pattern A (default)	Pattern B
	Pattern C	Pattern D
	Pattern E	-
Buzzer function: Buzzer repetitions for automatic cutting command*1	Does not sound	Only once (default)
Buzzer function: Sound pattern for specified pulse generation command 1*1	Pattern A (default)	Pattern B
	Pattern C	Pattern D
	Pattern E	-
Buzzer function: Buzzer repetitions for specified pulse generation command 1*1	Does not sound	Only once (default)
Buzzer function: Sound pattern for specified pulse generation command 2*1	Pattern A	Pattern B (default)
	Pattern C	Pattern D
	Pattern E	-
Buzzer function: Buzzer repetitions for specified pulse generation command 2*1	Does not sound	Only once (default)
Model name	TM-U220II (default)	TM-U220

*1: Enabled for optional external buzzer

Note:
These setting can be set by "Memory switch setup mode." See "Memory Switch Setup Mode" on page 3-23.

See "Adjusting Roll paper width" (page 3-28) also to adjust roll paper width.

Serial communication

Function	Selectable value	
baud rate	1200 bps	2400 bps
	4800 bps	9600 bps
	19200 bps	38400 bps
	57600 bps	115200 bps
Parity	None	Odd
	Even	--
Handshake	DSR/DTR	XON/XOFF
Data length	7 bit	8 bit

Note:
There are two methods, DIP switch and Memory switch, to adjust the serial communication conditions. DIP SW2 selects which is effective, DIP switch or Memory switch.

To enable the "Serial communication" setting, you have to adjust the "Serial interface selection" function of DIP switch 2 to "Memory switch."

These settings can be set by "Memory switch setup mode." See "Memory Switch Setup Mode" on page 3-23.

Communication condition settings for USB interface

Conditions can be set by ESC/POS command or utility software.

Function	Selectable value	
Class	Vendor-defined class (default)	printer class

3.4.4 Memory Switch Setup Mode

The following items are specified in the memory switch setup mode:

- ❏ Basic Serial communication condition (Serial communication)
  - Transmission speed
  - Parity
  - Handshaking
  - Data length
- ❏ Automatic Paper Reduction (Customized value)
- ❏ Roll paper width (Customize value)
- ❏ Cover open status (Msw 8-5)
- ❏ USB power-saving function

Note:
All new settings will be lost if the power supply is turned off in the memory switch setup mode. Be sure to follow the proper procedure, and turn the power off at the correct time.

3.4.4.1 Starting the memory switch setup mode

Use the following procedure to start the memory switch setup mode.

1. Open the roll paper cover.
2. Turn the power on while pressing the paper FEED button.
3. Press the FEED button twice while POWER, ERROR, and PAPER OUT LEDs are lit.
4. Close the cover. The printer prints the enabled settings of the memory switches and instructions.
5. Follow the instructions to process the switch setup.

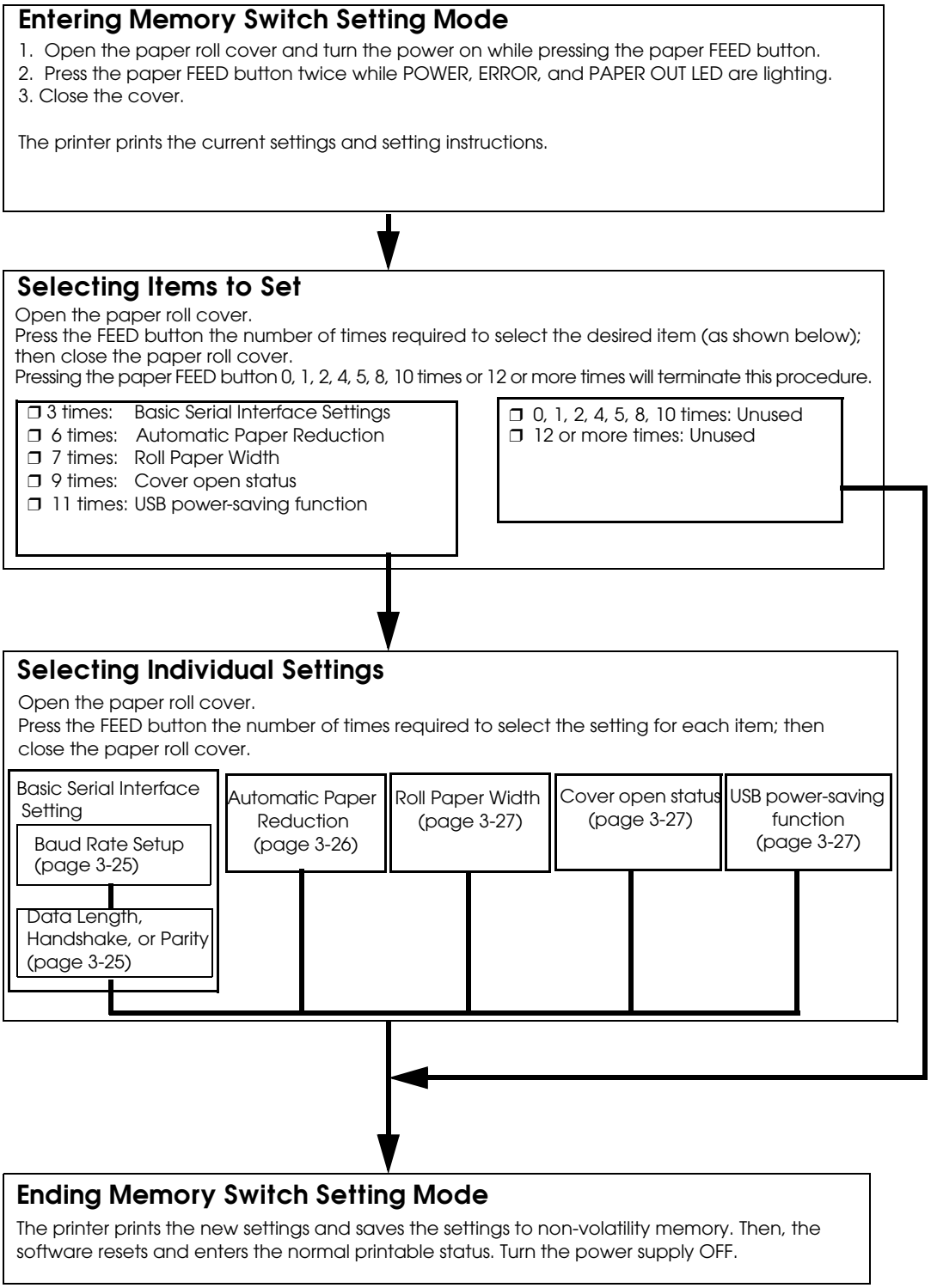
Note:
In the memory switch setup, the paper out LED may be flashing. The flashing time indicates "The times of FEED button is pressed before the roll paper cover is closed."

3.4.4.2 Ending memory switch setting mode

Once the setting is performed, the contents of the setting are stored. Then the printer initializes. When initialization is finished, the printer returns to normal operating mode.

3.4.4.3 Operating procedure

The procedures used for this process are described below.



Selecting individual settings

❏ Basic serial interface setting

To select transmission conditions, first choose "Serial interface settings".

❏ Baud Rate Setup

Press the FEED button the number of times required to select the desired "Baud Rate Setup" used for transmission conditions.

Press FEED button	**Setting selected**
0 times:	No change
1 time:	115200 bps
2 times:	57600 bps
3 times:	38400 bps
4 times:	19200 bps
5 times:	9600 bps
6 times:	4800 bps
7 times:	2400 bps
8 times:	1200 bps
9 or more times:	No change

bps: Indicates the number of transmitted bits per second (bps).

❏ Data length, handshake, or parity

Press the FEED button the number of times required to select the desired "Data length, handshake, or parity" setting used for transmission conditions.

Press FEED button	**Setting selected**		
	Data Length	**Handshake**	**Parity**
0 times:	No change		
1 time:	8 bits	DTR/DSR control	No parity
2 times:			Even
3 times:			Odd
4 times:		XON/XOFF control	No parity
5 times:			Even
6 times:			Odd
7 times:	7 bits	DTR/DSR control	No parity
8 times:			Even
9 times:			Odd
10 times:		XON/XOFF control	No parity
11 times:			Even
12 times:			Odd
13 or more times:	No change		

❑ Automatic paper reduction setting

Press the FEED button the number of times required to select the desired automatic paper reduction setting (Customize value.)

Press FEED button	Reduction of top margin/Reduction of bottom margin
0 times:	No change
1 time:	Reduce
2 times:	Does not reduce
3 or more times:	No change

Press FEED button	Reduction of line spacing/Reduction of line spacing where extra line feeds are included
0 times:	No change
1 time:	Reduces 25%
2 times:	Reduces 50%
3 times:	Reduces 75%
4 times:	Does not reduce
5 or more times:	No change

❏ Paper width setting

Press the FEED button the number of times required to select the desired roll paper width setting (Customize value.)

Press FEED button	Selecting paper width
0 times:	No change
1 time:	76 mm
2 times:	69.5 mm
3 times:	57.5 mm
4 or more times:	No change

Note:
See "Adjusting Roll paper width" (page 3-28) also to adjust roll paper width.

❏ Cover open status

Press the FEED button the number of times required to select the desired the mapping of cover open status setting.

Press FEED button	Setting selected
0 times:	No change
1 time:	Paper out (Msw 8-8: OFF)
2 times:	Cover open (Msw 8-8: ON)
3 or more times:	No change

❏ USB power-saving function

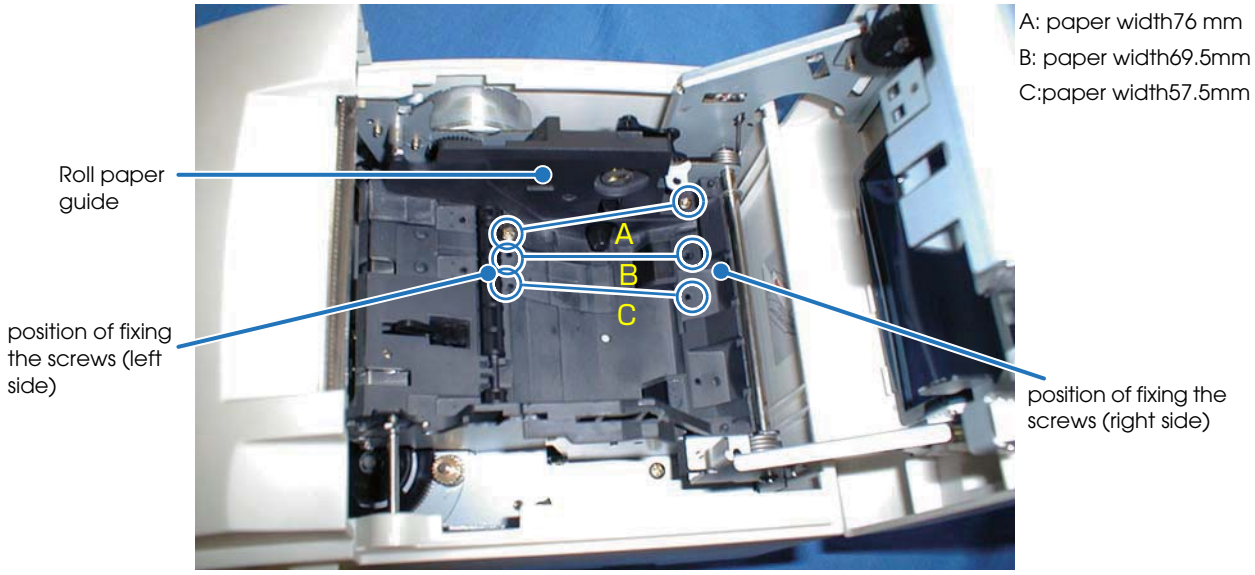
You can select the setting of the USB power-saving function by pressing the FEED button numerous times.

Press FEED button	Setting selected
0 times:	No change
1 time:	Enabled
2 times:	Disabled
3 or more times:	No change

3.4.5 Adjusting Roll paper width

Acommodates 76 mm {3"}, 69.5 mm {2.74"}, 57.5 mm {2.26"} wide paper rolls.

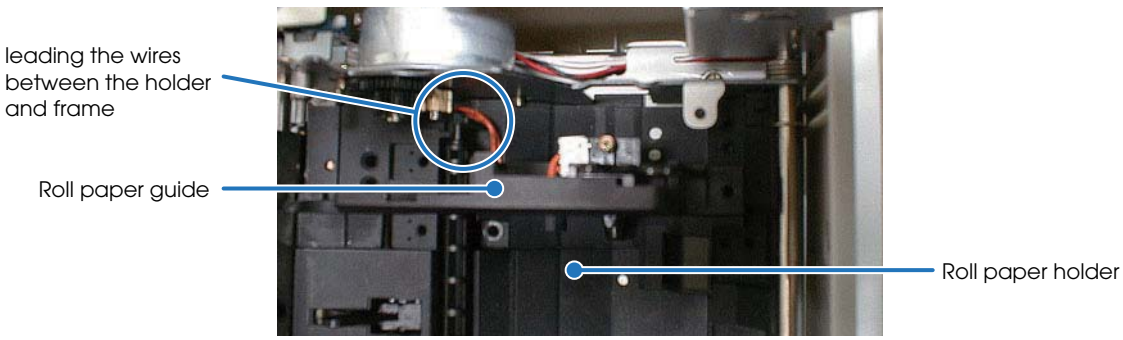
1. Make sure the power supply is disconnected.
2. Open the roll paper cover.
3. Take off the roll paper guide from the printer by loosening the two screws.



4. Push the roll paper guide on the appropriate width. (See figure above.)

Note:
When you use a near-end detector equipped model, be sure not to pinch the lead wires of the near-end detector between the roll paper guide and the roll paper holder, and to push the lead wires inside so that the lead wire of the paper-end detector does not contact the motor gear.

When replacing the wires, be sure that the wires do not catch between the roll paper guide and the roll paper holder.



5. Tighten the spacer with two screws included with the guide. (See figure above.)

6. Set the memory switch (customize value) for the paper width. (See "Memory Switches" (page 3-20))

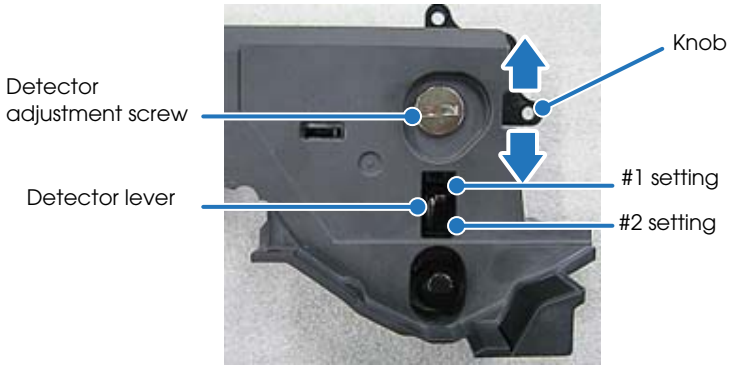
3.4.6 Adjusting Position of Roll Paper Near End Detector

Below are two reasons for the roll paper to require an Near End Detector adjustment.

- ❏ To adjust the location of detection for the diameter of the roll paper core.
- ❏ To adjust the amount of remaining paper.

The procedure is as following.

1. Make sure the power supply is disconnected.
2. Open the roll paper cover, and remove the paper roll.
3. Loosen the detector adjustment screw with a coin or similar tool.
4. Adjust the detector by sliding the lever in the direction shown below.



Seeing at outside for roll paper spacer

The table below shows the point at which the near-end detector is triggered. Note that this figure is a calculated value, and there may be some variations, depending on the printer.

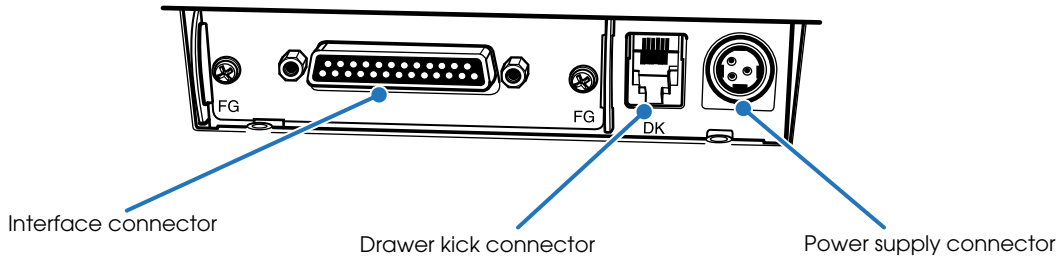
Detection point of roll paper near-end

Detector position (attaching point of the detector adjustment lever)	Trigger point (included the thickness of paper roll core)
#1 setting	Approx. 8 mm
#2 setting	Approx. 5 mm

5. Tighten the detector adjustment screw.
6. Check to be sure that the detecting lever moves freely.

3.4.7 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.



Connector panel

Note:
The figure above shows the connector panel for the serial interface model printer. The shape of the interface connector varies according to the type of interface used.

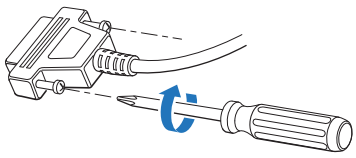
Be sure to turn off the power supply for both the printer and the host computer unit before connecting the various cables.

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.

3.4.7.1 Serial Interface model

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

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" (page 3-15) for details.

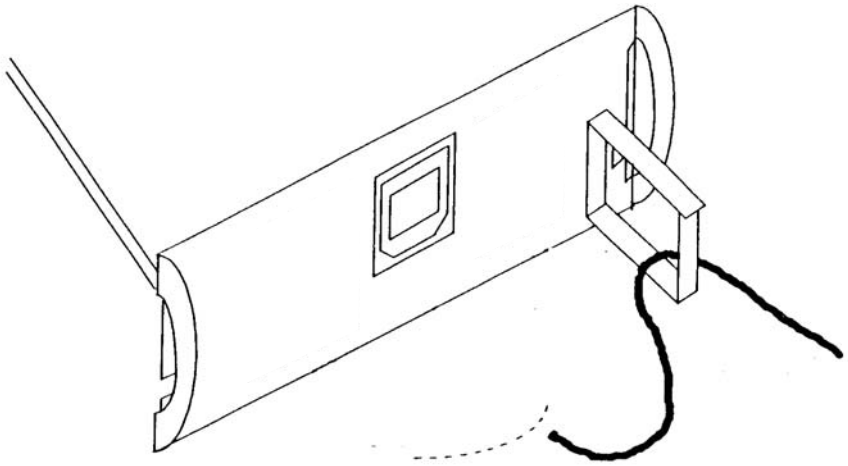
When using serial interface, see "Serial Connection" in Chapter 2 also.

3.4.7.2 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.

3.4.7.3 USB Interface

If using a USB interface, hook the USB cable through the locking wire saddle to prevent the cable from coming unplugged.



⚠ CAUTION:

When connecting the USB cable, make sure that no load is placed on the cable. A load on the cable may result in cable or connector damage.

Use a USB cable conforming to the USB 2.0 standard.

3.4.7.4 Wired LAN Interface

Use a LAN cable to connect this printer to a network via a hub.

⚠ CAUTION:

Connect using equipment with surge protection if installing the LAN cable outdoors. The equipment may be damaged by lightning.

Absolutely do not use a drawer kick cable or standard telephone line cable to connect to the LAN connector.

3.4.7.5 Connecting a Drawer

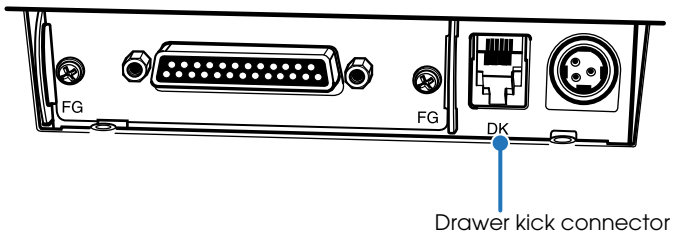
⚠ CAUTION:

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 the telephone line to the drawer kick 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 connector (labeled "DK") on the connector panel.



Connecting drawer

2. The connecting is finished.

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

See the corresponding printer driver manual for printer driver installation procedures.

3.6 Self Test

The self test lets you know if your printer is operating properly. It checks the control circuits, printer mechanisms, print quality, control software version, and DIP switch settings.

This test is independent of any other equipment or software, so it is a good idea to run it 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 Self Test Procedure

1. Make sure the printer is turned off and the roll paper 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.*

Chapter 4
Troubleshooting

This section describes general troubleshooting.

4.1 LED Blinking Pattern

4.1.1 Error Types

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

4.1.1.1 Errors that automatically recover

ERROR	Description	ERROR LED Blinking Pattern (320 ms)	Recovery
Roll paper cover open error (when recoverable error is selected) (*1)	The roll paper cover is opened when printing.		Recovers automatically when the cover is closed.
Print head temperature error (*2)	The temperature of the print head is extremely high		Recovers automatically when the print head cools

Note:
*(*1) This conditions are selected by MSW 8-5, 8-8. When MSW 8-5 (mapping of the cover open status) is off, the error hasn't occurred but there is a "paper end error" instead. If MSW 8-8 is off, this error is handled as an automatically recoverable error.*

(2) Print head temperature error is not abnormal.*

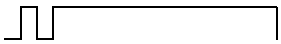
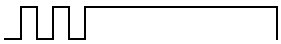
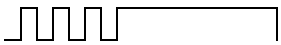
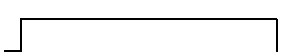
4.1.1.2 Recoverable Errors

When a recoverable error occurs, after the cause of the error is removed, the printer can recover from the error by receiving an error recovery command without turning off the power:

ERROR	Description	ERROR LED Blinking Pattern (320 ms)	Recovery
Paper roll cover open error (*1)	The roll paper cover is opend when printing.		Recovers by error recovery command with the cover closed
Autocutter error (Type A, B only)	The autocutter does not work correctly		Recovers by error recovery command. (See "Autocutter Jam" (page 4-3))
Home position detection error (This is "Mechanical error")	The home position cannot be detected due to a paper jam		Recovers by error recovery command

Note:
*(*1) These conditions are selected by MSW 8-5 and 8-8. When MSW 8-5 (mapping of the cover open status) is OFF, the error does not occur and a "paper end error" occurs instead. If MSW 8-8 is ON, this error is handled as a recoverable error.*

4.1.1.3 Errors that are impossible to recover:

ERROR	Description	ERROR LED Blinking Pattern (320 ms)	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
Print head temperature detection circuit error	There is an abnormality in the print head temperature		Impossible to recover

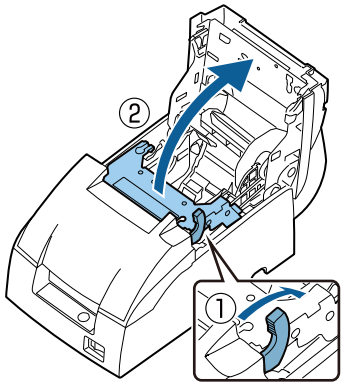
4.2 Removing a Paper Jam

⚠ CAUTION:

Be sure not to touch the manual cutter. Otherwise your finger might be injured.

1. Turn the power off.
2. Open the roll paper cover by using the tab, as shown in the below illustration.
3. If you have a Type A printer, remove the take-up spool and open the unit by using the unit open lever, as shown in the illustration.

1. open the roll paper cover



2. (only type A) open the unit

4. Remove the jammed paper.

Note:
When you turn the power off by mistake during the printing operation, the cutter blade may stop in the paper feed line. So the paper may not be fed in the first operation normally when you turn the power on. If the phenomenon happens again after removing the jammed paper, try the solution "Autocutter Jam" (page 4-3).

4.3 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.

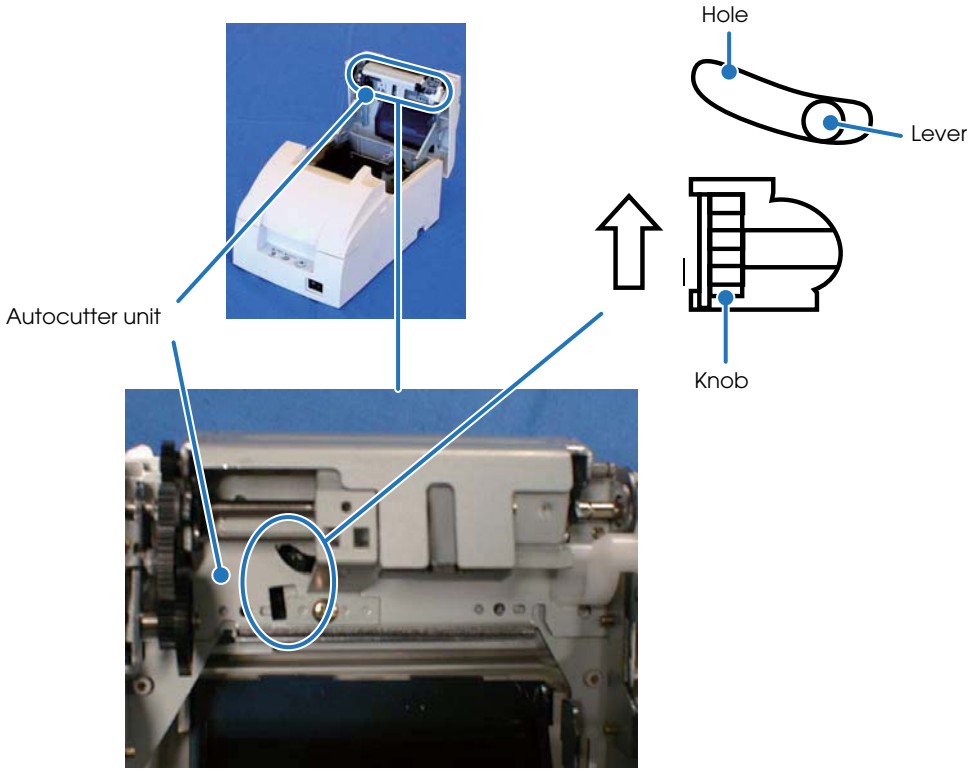
If the problem is not serious, the autocutter returns to its normal position without any intervention by the user.

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

1. Open the roll paper cover, and remove the jammed object if there is one.

2. Turn off the printer, and close the roll paper cover, and turn it back on. Then the cutter blade returns to the normal position. If you would like not to turn off the printer, send an error recovery command and initialize printer command instead.

3. If the cutter blade doesn't return to the normal position, return the cutter blade to the normal position by rotating the autocutter knob in the direction of the arrow. When it is returned to the normal position, a lever comes into the center of hole in the autocutter frame.



4. Close the roll paper cover.

4.4 Printer Stops Printing / Printer Repeats Printing on a Line

The printer may not operate correction if not using PS-190, PS-180, or AC adapter C1. Check that a correct power supply unit is connected to the printer.

4.5 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.

4.6 Print Speed is Slow When Using Windows Printer Driver

When the printer prints a Windows font using the EPSON Advanced Printer Driver, the print speed is slow. To improve the print speed, use a printer font.

4.7 Printer doesn't cut roll paper with the autocutter

TM-U220II Type D does not have an autocutter unit. If you use the type D model, you can't use the autocutter function. Use the manual cutter.

4.8 Hexadecimal Dump mode

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. While you hold down the FEED button, 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 the APD.

Chapter 5
Application Development Information

This chapter describes how to control the printer and gives information useful for printer application development.

5.1 Controlling the Printer

The printer supports the following command systems:

- ESC/POS

Users can control the printer by using the aforementioned commands, or the following development kits or drivers.

- Epson ePOS SDK
- OPOS ADK
- OPOS ADK for .NET
- JavaPOS ADK
- EPSON Advanced Printer Driver (APD)

5.1.1 ESC/POS

ESC/POS is the Epson original printer command system for POS printers and customer display. With ESC/POS commands, you can directly control all the printer functions, but detailed knowledge of printer specifications or combination of commands is required, compared to using drivers and applications.

For detailed information about ESC/POS commands, see the ESC/POS Command Reference that can be accessed from the following URL.

☞ https://download4.epson.biz/sec_pubs/pos/reference_en/

5.2 Controlling the Cash Drawer

A pulse output is sent to drawer kick connector pin 2 or pin 5, and you can open the drawer.

You can also check the open/close status of the drawer by checking the signal level of the drawer kick connector pin 3.

These controls are executed by a driver or by commands.

ESC/POS Commands

Prepare the output command for the specified pulse and the status transmission command.

For details, see the ESC/POS Command Reference.

For Windows Printer Drivers (APD)

You can set the drawer to open when printing is started. For details, see the manual for drivers.

For details on control, see the manual for Status API of the driver.

OPOS (OCX Driver)

Register a cash drawer using the SetupPOS Utility, and control using the OpenDrawer method or the DirectIO function.

For details, see the "EPSON OPOS ADK MANUAL APPLICATION DEVELOPMENT GUIDE Cash Drawer" and the "UnifiedPOS Specification".

OPOS for .NET

Register a cash drawer using the SetupPOS Utility, and control using the OpenDrawer method or the DirectIO function.

For details, see the "EPSON OPOS ADK for .NET MANUAL Application Development Guide Cash Drawer (EPSON Standard)" and the "UnifiedPOS Specification".

Epson ePOS SDK

The output command for the drawer kick pulse and the status transmission command are provided in each SDK library. For details, see the user's manuals provided with each SDK.

Note

- *Whether or not pin 2 or pin 5 operates the drawer kick connector depends on the connected cash drawer.*
- *You can acquire documents regarding the UnifiedPOS from the following link. https://www.omg.org/spec/UPOS*

5.3 Controlling the Optional External Buzzer

You can set the optional external buzzer to buzz when an error occurs and when an automatic cut off occurs.

By using the driver or the command, you can specify when to sound the buzzer.

In addition, the beep pattern and how many times to sound the buzzer can be changed.

ESC/POS Command

Use the buzzer control command or the output command for the specified pulse.

For details, see the ESC/POS Command Reference.

For Windows Printer Drivers (APD)

Use the DirectIO function or the API for opening the drawer. For details, see the manual for Status API of the drivers.

OPOS (OCX Driver)

Register a POS printer using the SetupPOS Utility and control using the DirectIO function.

For details, see the "EPSON OPOS ADK MANUAL APPLICATION DEVELOPMENT GUIDE POSPrinter (TM Series)".

OPOS for .NET

Register a POS printer using the SetupPOS Utility and control using the DirectIO function.

For details, see the "EPSON OPOS ADK for .NET MANUAL Application Development Guide POSPrinter".

Epson ePOS SDK

The command for the buzzer function is provided in each SDK library. For details, see the user's manuals provided with each SDK.

Note

For details on setting the optional external buzzer, see "Connecting an Optional External Buzzer" (page 3-13).

5.4 Software

The following software is provided for application development.

5.4.1 Development Kit

Software	Description
Epson ePOS SDK	This is a development kit for controlling TM printers from native applications of smart devices or web applications. This includes libraries, manuals, and sample programs.
for Android	
for iOS	
for JavaScript	
EPSON OPOS ADK	This OCX driver can control POS peripherals using OLE technology.* Because controlling POS peripherals with original commands is not required on the application side, efficient system development is possible.
EPSON OPOS ADK for .NET	The OPOS ADK for .NET is a POS industry standard printer driver compatible with Microsoft POS for .NET. It allows you to develop applications that are compatible with the UPOS (Unified POS) specification. When developing applications, use a separate development environment such as Microsoft Visual Studio .NET.
EPSON JavaPOS ADK	JavaPOS is the standard specification which defines an architecture and device interface (API) to access various POS devices from a Java based system. Using JavaPOS standard API allows control with Java based applications of functions inherent to each device. A flexible design with Java language and JavaPOS enables many different types of computer systems, such as stand alone or network configuration, to use a same application. You can use JavaPOS to build applications and drivers independently of platforms. This allows flexible configurations using thin clients to meet the system requirements.

*: OLE technology developed by Microsoft divides software into part blocks. The OPOS driver is presupposed to be used with a development environment, such as Visual Basic, unlike ordinary Windows printer drivers. It is not a driver to be used for printing from commercial applications. You can acquire documents regarding the UnifiedPOS from the following link.
https://www.omg.org/spec/UPOS

5.4.2 Drivers

Software	Description	Operating environment
EPSON Advanced Printer Driver (APD)	In addition to ordinary Windows printer driver functions, this driver has controls specific to POS. The Status API (Epson original DLL) that monitors printer status and sends ESC/POS commands is also attached to this driver.	Windows

Mac Printer Driver	Mac printer driver allows you to control the printer using Common UNIX Printing System (CUPS) on macOS. This is a full raster printer driver. It is able to print images, text, and vector graphics etc., that an application displays. With this driver many printer controls are possible, such as paper cut timing control, cash drawer control, printing speed control, blank line skip, and upside-down printing. It also provides API and dialogues for print setting, sample applications, and logo setting utility.	macOS
Epson TM/BA Series Thermal Printer Driver	This driver allows you to control the printer using Common UNIX Printing System (CUPS) on GNU/Linux. This is a full raster printer driver. It is able to print images, text, and vector graphics etc., that an application displays. With this driver many printer control are possible, such as paper cut timing control, cash drawer control, printing speed control, blank line skip, and upside-down printing.	GNU/Linux

5.4.3 Utilities

Software	**Description**	**Operating environment**
Epson TM Utility	A utility that is available on the App Store or Google Play. Use this to change settings on the printer from iOS and Android devices. In addition, the utility has the following functions. • Sample receipt printing • Printer status display • Firmware update	iOS, Android
TM-m30III Utility	A utility for checking and changing various printer settings. Use this utility to: • Check the current settings • Test operation • Store logos • Set paper saving • Set printing control • Set communication interfaces • Configure the network settings • Configure the TM-Intelligent function settings • Save/restore settings	Windows
TM Bluetooth Connector	Pairs the Bluetooth printer with your device, and sets the Bluetooth port to be used by the printer driver and/or an application. Using this software makes it easy to pare the printer because the software searches for and displays only Epson Bluetooth printers, and allows you to search the printer by its product name.	Windows
Deployment Tool	Use to make network and printer settings simultaneously. Allows you to make settings efficiently at the time of introducing TM printers for the first time, or when configuring multiple TM printers at the same time.	Windows
Monitoring Tool	Use to check a list of status for the Epson printers connected to the network. You can also update certificates for multiple printers used for WPA-Enterprise in a batch.	Windows
TM-m30III Firmware Updater	Use this tool to update the printer's firmware. An executable file and the firmware are packaged together.	Windows

5.4.4 Download

You can obtain software and manuals from one of the following URLs.
For customers in North America, go to the following web site:
☞ https://www.epson.com/support/
For customers in other countries and regions, go to the following web site:
☞ https://epson.sn

Chapter 6
Notices for Replacement of the TM-U210/TM-U220/TM-U300

The TM-U220II is designed to smoothly replace the TM-U220/TM-U210/TM-U300. This section provides answers to your questions during replacement.

6.1 For TM-U210/TM-U220 Replacement

When you replace TM-U210 with theTM-U220II, you have to set the memory switches [MemSW8-5: OFF (default)] and [MemSW 8-8: OFF (default)] to maintain the same status provided by TM-U210. See "Provided statuses" (page 6-5) for details.

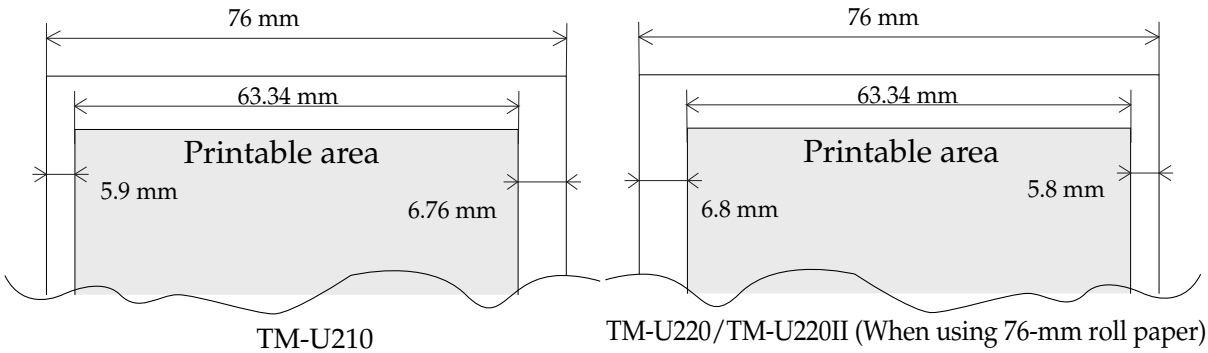
6.1.1 Printing format compatibility

This section describes the printing area, character, and top margin (cutting position) compatibilities.

6.1.1.1 Printing area

The TM-U220II has almost the same printing area as the TM-U210 as shown in the following table and figures. Additionally, the TM-U220II and TM-U220 have the same printing areas. Therefore, the TM-U220II can print the same contents as the TM-U220/TM-210 without any special adjustment of settings.

Printing area item	TM-U210 (Type A, B, and D)	TM-U220/TM-U220II (Type A, B, and D) (when using 76-mm width paper)
Print width	63.34 mm (200 dots, 400 position)	63.34 mm (200 dots, 400 position)
Left margin	5.9 mm	6.8 mm
Right margin	6.76 mm	5.8 mm



These values are reference values.

Printing area and margins

6.1.1.2 Characters

The TM-U220II has nearly the same character specifications as the TM-U210. Additionally, the TM-U220II and TM-U220 have the same character specifications. Therefore, the TM-U220II can print same contents as the TM-U210/TM-U220 without any adjustment of settings.

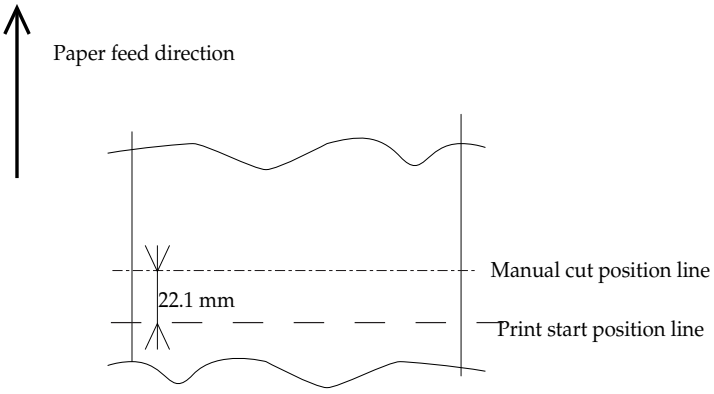
Character specifications		TM-U210 (Type A, B, and D)	TM-U220/TM-U220II (Type A, B, and D)
Characters per line (cpl)	Font A (9 x 9)	33 (35) cpl	33 (35) cpl
	Font B (7 x 9)	40 (42) cpl	40 (42) cpl
	Kanji (16 x 16)	22 (25) cpl	22 (25) cpl
Character width	Font A (9 x 9)	1.6 x 3.1	1.6 x 3.1
	Font B (7 x 9)	1.2 x 3.1	1.2 x 3.1
	Kanji (16 x 16)	2.7 x 2.7	2.7 x 2.7
Character configuration		Code page 0 to 8 and 19 to 26	Code page 0 to 8 and 19 to 26, and code page 16, 17, and 18

Note:
The characters per line (cpl) for fonts A and B can changed by DIP SW2-1.
The cpl for the kanji font can be changed by ESC/POS command (default: 22 cpl).

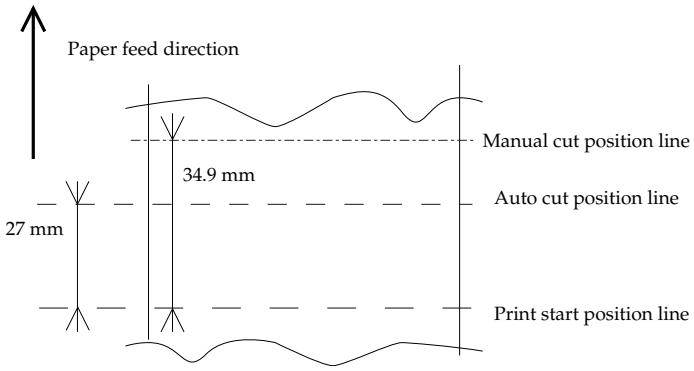
6.1.1.3 Cutting distance from print start position

The TM-U220II has the same distance between the auto cut position and print start position as the TM-U210/TM-U220. Therefore, the top margin remains the same when the TM-U210/TM-U220 is replaced with the TM-U220II with autocutter. In other cases, please refer to the table and figures below.

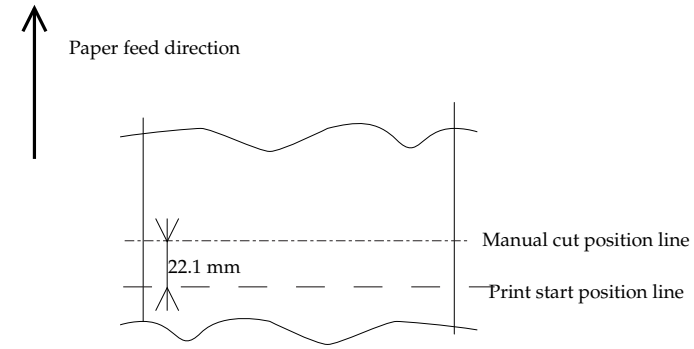
Cutting position	TM-U210 (Type A, B, and D)	TM-U220/TM-U220II (Type A, B, and D)
Autocutting position to print start position	27 mm	27 mm
Manual cut position to print start position	20.2 mm	Type D: 22.1 mm Type A and B: 34.9 mm
Cutting method for partial cut	One point on the left edge uncut at center (Type A and B only)	One point on the right edge uncut at right position (Type A and B only)



TM-U210 (Type A, B, and D)



TM-U220/TM-U220II (Type A and B)
(When using 76-mm roll paper)



TM-U220/TM-U220II (Type D)
(When using 76-mm roll paper)

These values are reference values.

6.1.2 Cutting method

The left uncut position for partial cutting of the TM-U220II (Type A and B) is different than the TM-U210 in that it is on the right edge. The TM-U210 always uses a partial cut method in which there is one point left uncut on the left edge at the center position.
Cutting methods of the TM-U220II (Type A and B) and TM-U220 (Type A and B) are the same.

6.1.3 Dimensions

The dimensions of the TM-U220II (except for Type D) are somewhat smaller than the TM-U210, such that the TM-U220II TypeA and B can be installed in the same space as the TM-U210 Type A and B.
The dimensions of the TM-U220II and TM-U220 are the same.

		TM-U210	TM-U220/TM-U220II
Dimensions (W x D x H) (Unit: mm)	Type A	160 x 295 x 160	160 x 286 x 158
	Type B	160 x 248 x 150	160 x 248 x 139
	Type D	160 x 248 x 133	160 x 248 x 139

See "External Dimensions and Mass" (page 1-14) for details.

6.1.4 Receive buffer size

This section applies to the serial model.

Product	Receive buffer capacity	Buffer full condition	Buffer full release condition	Number of bytes from buffer full to release full state
TM-U210	40 bytes (DIP SW1-2 is on) (ANK: DIP SW1-2 is off) 1 KB (Multilingual: DIP SW1-2 is off) 512 bytes	Buffer space is 16 bytes	Buffer space is 26 bytes	10 bytes
TM-U220	40 bytes (DIP SW1-2 is on)	Buffer space is 16 bytes	Buffer space is 26 bytes	10 bytes (Regardless of MemSW8-7 setting)
	4 KB (DIP SW1-2 is off) (default)	Buffer space is 128 bytes	Buffer space is 256 bytes	128 bytes (MemSW8-7: OFF) (default)
		Buffer space is 128 bytes	Buffer space is 138 bytes	10 bytes (MemSW8-7: ON)
TM-U220II	40 bytes (DIP SW1-2 is on)	Buffer space is 16 bytes	Buffer space is 26 bytes	10 bytes
	4 KB (DIP SW1-2 is off) (default)	Buffer space is 128 bytes	Buffer space is 256 bytes	128 bytes

Note:
Data may be lost if the receive buffer of TM-U210 is at buffer full state when there is no FIFO setting, or the FIFO setting is larger than 16 bytes.
However, the TM-U220II has enough remaining receive buffer space to prevent data loss at buffer full state when DIP SW1-2 is off.

The "Number of bytes from buffer full to release full state" is larger than the TM-U210. However, you should pay attention to the following.

6.1.4.1 Effect on the application when buffer full condition is changed

The time from buffer empty to buffer full is longer than the TM-U210. However, there should be no problems as the host PC never monitors the time.

6.1.4.2 Effect on the application when buffer full release condition is changed

The time from buffer full to release full is longer than the TM-U210. This may cause a timeout to occur depending on application configuration.

6.1.5 Accessories compatibility

The TM-U220II can use the same consumables as the TM-U210/TM-U220. However, the power supply units of the TM-U220II and TM-U210 are not compatible.
This is explained in the next section.

6.1.5.1 Power supply unit

The power supply unit of the TM-U210 (PA-#### or PB-####) cannot be used for the TM-U220II. Power supply units that can be used for the TM-U220II are indicated in the following table.

TM-U220II (Type A, B, and D)
AC adapter,C1, PS-180, or PS-190

⚠ CAUTION:

Do not use the PA-#### or PB-#### power supply units for the TM-U220II. Connection to an improper power source may cause fire or shock.

6.1.5.2 Consumables compatibility

The TM-U220II cannot print on the carbon roll paper (original + two copies) that can be used with the TM-U210. Besides that, the TM-U220II can use the same consumables as the TM-U210/ TM-U220.

Consumables	TM-U210/TM-U220/TM-U220II (Type A, B, and D)
Ribbon cassette	ERC-38 (B) and (B/R)

6.1.6 Provided statuses

The TM-U220II has the same statuses as the TM-U210 and the following status has been added. Statuses of the TM-U220II and TM-U220 are the same.

- ❏ Roll paper cover open/close status (and detector)

If replacing the TM-U210 with the TM-U220II, you must set the memory switches as indicated below. These settings will provide the TM-U220II with nearly the same behaviors as the TM-U210 statuses.

- ❏ Msw 8-5 “Cover open status mapping”: OFF
  (Default: Paper end status)

- ❏ Msw 8-8 “Error select when cover is opened during printing”: OFF
  (Default: Auto recover error)

See the following tables for behaviors.

Behaviors of status changes are as shown in the following two tables.

Printer status bit / Operation when paper-end	U210			
	Offline	**Paper out LED**	**Waiting on-line recovery**	**Cover open**
1) Paper end occurs.	Offline	ON	OFF	--
2) Operator opens the cover for setting a paper roll.	Offline	ON	OFF	--
3) Operator installed paper roll then closed cover.	Offline	OFF	Waiting on-line recovery	--
4) Type B and D: Operator pressed FEED SW when paper out LED blinks. Type A: After approx. 500 msec. passed.	Online	OFF	OFF	--

There are no statuses because this printer does not have a cover open detector.

There is no ASB (Auto Status Back) notification because status did not change.

ASB (Auto Status Back) notification is generated because status changed.

Printer status bit / Operation when paper-end	U220II (Msw 8-5: OFF)				U220II (Msw 8-5: ON)			
	Offline	**Paper out LED**	**Waiting on-line recovery**	**Cover open**	**Offline**	**Paper out LED**	**Waiting on-line recovery**	**Cover open**
1) Paper end occurs.	Offline	ON	--	OFF	Offline	ON	--	OFF
2) Operator opens the cover for setting a paper roll.	Offline	ON	--	ON	Offline	ON	--	ON
3) Operator installed paper roll then closed cover.	Online	OFF	--	OFF	Online	OFF	--	OFF

This "cover open" means
Off: Cover is closed
On: Cover is open

The mapping of cover open status is as shown in the following two tables.

Printer status bit / Operation when paper-end	U210			
	Offline	**Paper out LED**	**Waiting on-line recovery**	**Cover open**
Cover open	OFF	OFF	OFF	_
Cover close	OFF	OFF	OFF	_

Printer status bit / Operation when paper-end	U220II (Msw 8-5: OFF)				U220II (Msw 8-5: ON)			
	Offline	**Paper out LED**	**Waiting on-line recovery**	**Cover open**	**Offline**	**Paper out LED**	**Waiting on-line recovery**	**Cover open**
Cover open	OFF	ON	_	OFF	OFF	OFF	--	ON
Cover close	OFF	OFF	_	OFF	OFF	OFF	--	OFF

You don't have to worry even if you set memory switches 8-5 and 8-8 to OFF when using the printer with OPOS or Advanced Printer Driver (APD). Status changes normally do not affect applications.

Read the following if using the printer with ESC/POS commands (if controlling the printer without the use of drivers).

The TM-U210 uses the "waiting on-line recover" bit in ASB status ("0" or "1" is displayed). The TM-U220II does not use this bit because it recovers online status when the cover is closed (this is detected by the cover open detector). Therefore, if your application program monitors that bit, check that it doesn't affect the program operation.

Note that ASB data transmission timing of the TM-U220II is the same as that of the TM-U210. You do not have to worry even if your application program does not monitor that bit.

Note:
The "waiting on-line recover" status is configured by an ASB (Auto Status Back) data bit. This status is for indicating to the host PC that the printer is not prepared to print (roll paper cover isn't closed, etc.). This status informs you that the preparation performed by the host PC has been canceled. This status is canceled by operation of the FEED button or host PC. These canceling operations must be executed after the roll paper is installed and the roll paper cover is closed.

The "waiting on-line recover" bit of TM-U220II is always "0" because the TM-U220II can indicate to the host PC that the status is "ready for printing (roll paper is installed and roll paper cover is closed)."

6.1.7 Use for journal

The TM-U220II TypeA can be used for journals in the same manner as the TM-U210/TM-U220 (Type A). However, you need to be aware of the following points when replacing the TM-U210 with the TM-U220II.

- ❏ The TM-U210 (Type D) can print two copies using carbon paper but the TM-U220II can only print one copy using carbon paper.

6.1.8 New functions added (if replacing the TM-U210)

6.1.8.1 Wall hanging

The TM-U220II Type B and D can be installed on a wall using the optional wall-hanging hardware WH-10.

6.1.8.2 NV bit-image

The TM-U220II can print bit-images on roll paper.

6.1.8.3 User NV memory

The TM-U220II can store text data.

6.1.8.4 Memory Switches and Memory Switch Setup Mode

The TM-U220II has memory switches in the form of a software DIP switch. The memory switch setup mode is for setting the memory switches by using only the printer (no host PC required). See "Memory Switches" (page 3-20) and "Memory Switch Setup Mode" (page 3-23) for details.

6.1.9 Driver compatibility

This section describes compatibility and important points for replacement.

6.1.9.1 Advanced Printer Driver

The TM-U220II has APD compatibility with the TM-U210/TM-U220. Therefore, the TM-U220II can be operated using the TM-U210/TM-U220 Advanced Printer Driver.

However, the print margin is slightly different from the TM-U210 and the TM-U210 driver cannot use the NV memory function. See "Printing format compatibility" (page 6-1) and "New functions added (if replacing the TM-U210)" (page 6-7) for the differences.

6.1.9.2 OPOS

The TM-U220II has OPOS compatibility with the TM-U210/TM-U220. Therefore, the TM-U220II can be operated using the TM-U210/TM-U220 OPOS. However, the print margin is slightly different from the TM-U210 and the TM-U210 driver cannot use the NV memory function. See "Printing format compatibility" (page 6-1) and "New functions added (if replacing the TM-U210)" (page 6-7) for the differences.

6.1.9.3 ESC/POS command (Direct control)

The TM-U220II has ESC/POS command compatibility with the TM-U210/TM-U220. Therefore, the TM-U220II can be operated using the program source of the TM-U210/TM-U220. However, the print margin is slightly different from the TM-U210 and the TM-U210 driver cannot use the NV memory function. See "Printing format compatibility" (page 6-1) for the differences.

6.2 For TM-U300 Replacement

6.2.1 Printing format compatibility

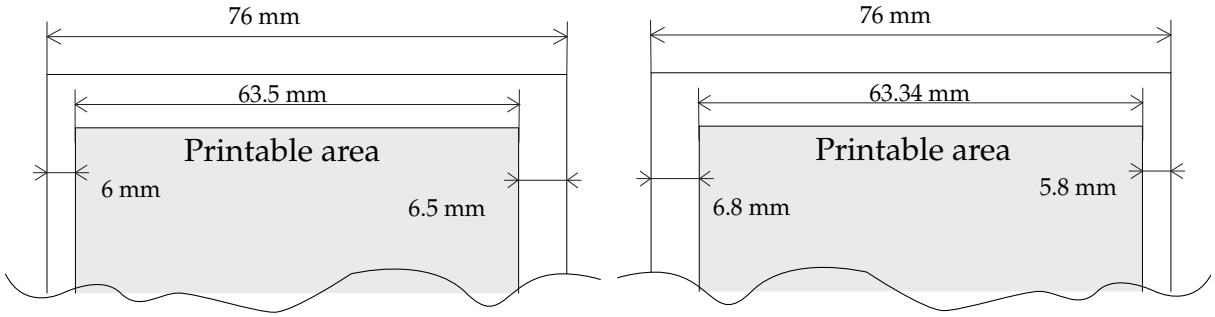
Printing results of the TM-U220II are nearly the same as the TM-U300. This section describes the printing area, character, and top margin (cutting position) compatibilities.

6.2.1.1 Printing area

The TM-U220II has almost the same printing area as the TM-U300 as shown in the following table and figures.Therefore, the TM-U220II can print the same contents as the TM-U300 without any special adjustment of settings.

Printing area item	TM-U300 (Type A, B, C, and D)	TM-U220II (Type A, B, C, and D) (when using 76-mm width paper)
Print width	63.5 mm (200 dots, 400 position)	63.34 mm (200 dots, 400 position)
Left margin	6 mm	6.8 mm
Right margin	6.5 mm	5.8 mm

These values are reference values.



TM-U300 TM-U220II (When using 76-mm roll paper)

These values are reference values.

Printing area and margins

6.2.1.2 Character specifications

The TM-U220II has nearly the same character specifications as the TM-U300. Therefore, the TM-U220II can print the same contents as the TM-U300 without any adjustment of settings.

Character specifications		**TM-U300 (Type A, B, C, and D)**	**TM-U220II (Type A, B, and D)**
Characters per line (cpl)	Font A (9 x 9)	33 cpl	33 (35) cpl
	Font B (7 x 9)	40 cpl	40 (42) cpl
	Kanji (16 x 16)	22 (25) cpl	22 (25) cpl
Character width	Font A (9 x 9)	1.6 x 3.1	1.6 x 3.1
	Font B (7 x 9)	1.2 x 3.1	1.2 x 3.1
	Kanji (16 x 16)	2.7 x 2.7	2.7 x 2.7
Character configuration		Code page 0 to 5	Code page 0 to 8 and 19 to 26 and code page 16, 17, and 18

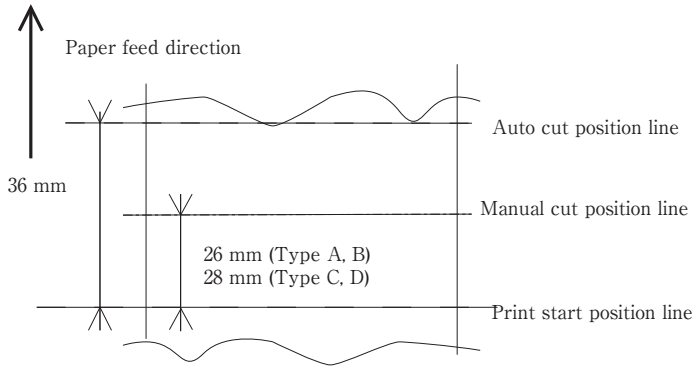
 *Note:*

The characters per line (cpl) for fonts A and B can changed by DIP SW2-1.
The cpl for the kanji font can be changed by ESC/POS command (default: 22 cpl).

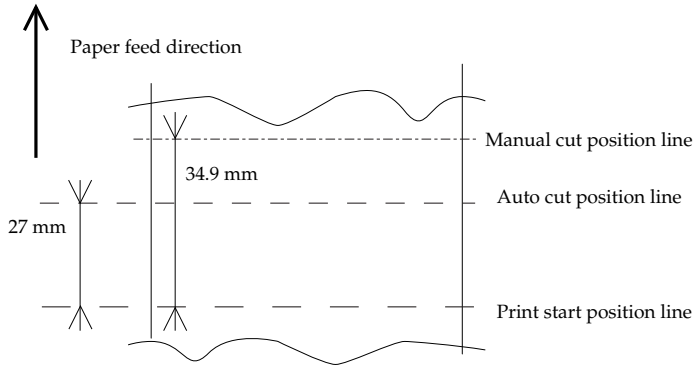
6.2.1.3 Cutting distance from print start position

The TM-U220II has nearly the same distance between the auto cut position and print start position as the TM-U300. Therefore, the top margin remains the same when the TM-U300 is replaced with the TM-U220II with autocutter. In other cases, please refer to the table and figures below.

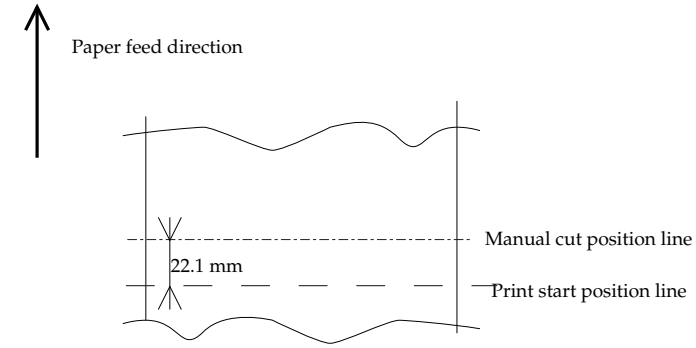
Cutting position	TM-U300 (Type A, B, C, and D)	TM-U220II (Type A, B, C, and D)
Autocutting position to print start position	36 mm	27 mm
Manual cut position to print start position	26 mm (Type A and B) 28 mm (Type C and D)	Type D: 22.1 mm Type A and B: 34.9 mm



TM-U300 (TypeA, B, C, and D)



TM-U220II (Type A and B)
(When using 76-mm roll paper)



TM-U220II (Type D)
(When using 76-mm roll paper)

These values are reference values.

6.2.2 Cutting method

For the TM-U300, you can select the partial cut method from Driver or ESC/POS command control. There are two partial cut methods. One is a three points left uncut method and the other is one point left uncut on the left edge.

The TM-U220II (Type A and B) allows you to select Partial cut (one point is left uncut on the right edge).

6.2.3 Dimensions

The dimensions of the TM-U220II (except for Type D) are somewhat smaller than the TM-U300, such that the TM-U220II can be installed in the same space as the TM-U300.

		TM-U300	TM-U220II
Dimensions (W x D x H)	Type A:	170 x 288 x 183	160 x 286 x 158
	Type B:	170 x 253 x 148	160 x 248 x 139
	Type C:	158 x 295 x 145	--
	Type D:	158 x 235 x 125	160 x 248 x 139

See "External Dimensions and Mass" (page 1-14) for details.

6.2.4 Receive buffer size

This section applies to the serial model.

The receive buffer size of the TM-U220II can be changed as shown in the following table.

Product	Receive buffer capacity	Buffer full condition	Buffer full release condition	Number of bytes from buffer full to release full state
TM-U300	40 bytes (DIP SW1-2 is on) (ANK: DIP SW1-2 is off) 1 KB (Multilingual: DIP SW1-2 is off) 512 bytes	Buffer space is 10 bytes	Buffer space is 20 bytes	10 bytes
TM-U220II	40 bytes (DIP SW1-2 is on)	Buffer space is 16 bytes	Buffer space is 26 bytes	10 bytes
	4 KB (DIP SW1-2 is off) (default)	Buffer space is 128 bytes	Buffer space is 256 bytes	128 bytes

Note:
Data may be lost if the receive buffer of TM-U300 is at buffer full state when there is no FIFO setting, or the FIFO setting is larger than 10 bytes.
However, the TM-U220II has enough remaining receive buffer space to prevent data loss at buffer full state when DIP SW1-2 is off.

The "Number of bytes from buffer full to release full state" is larger than the TM-U300. However, you should pay attention to the following.

6.2.4.1 Effect on the application when buffer full condition is changed

The time from buffer empty to buffer full is longer. However, there should be no problems as the host PC never monitors the time.

6.2.4.2 Effect on the application in buffer full release status

The time from buffer full to release full is longer than the TM-U300. This may cause a timeout to occur depending on application configuration.

6.2.5 Accessories compatibility

The TM-U220II can use the same consumables as the TM-U300. However, the power supply units are not compatible. This is explained in the next section.

6.2.5.1 Power supply unit

The power supply unit of the TM-U300 (PA-#### or PB-####) cannot be used for the TM-U220II. Power supply units that can be used for the TM-U220II are indicated in the following table.

TM-U220II (Type A, B, and D)
AC adapter C1, PS-180, or PS-190

CAUTION:

Do not use the PA-#### or PB-#### power supply units for the TM-U220II. Connection to an improper power source may cause fire or shock.

6.2.5.2 Consumables

The TM-U220II can use the same consumables as the TM-U300 except for carbon roll paper (original + two copies). The TM-U220II cannot print on two copies using carbon paper.

Consumables	TM-U300 (Type A, B, C, and D)	TM-U220II (Type A, B, and D)
Ribbon cassette	ERC-38 (B/R)	ERC-38 (B) and (B/R)

6.2.6 Provided statuses and detectors

The TM-U220II has the same statuses as the TM-U300 and new statuses have also been added. The following section describes them.

6.2.6.1 Newly added statuses

The following statuses have been added to the TM-U220II.

- ❏ Roll paper cover open/close status
- ❏ Roll paper near-end status (When equipped with a near-end detector [Factory option])

6.2.7 Use for journal

The TM-U220II Type A can be used for journals in the same manner as the TM-U300 (Type A and C). However, you need to be aware of the following points when replacing the TM-300 with the TM-U220II.

- ❏ The TM-U300 can print two copies using carbon paper but the TM-U220II can only print one copy using carbon paper.

6.2.8 Added new functions

6.2.8.1 Wall hanging

The TM-U220II Type B and D can be installed on a wall using the optional wall-hanging hardware WH-10.

6.2.8.2 NV bit-image

The TM-U220II can print bit-images on roll paper.

6.2.8.3 User NV memory

The TM-U220II can store text data.

6.2.8.4 Memory Switches and Memory Switch Setup Mode

The TM-U220II has memory switches in the form of a software DIP switch. The memory switch setup mode is for setting the memory switches by using only the printer (no host PC required). See "Memory Switches" (page 3-20) and "Memory Switch Setup Mode" (page 3-23) for details.

6.2.9 Driver compatibility

This section describes compatibility and important points for replacement.

6.2.9.1 Advanced Printer Driver

The TM-U220II does not have Advanced Printer Driver (APD) compatibility with the TM-U300. Therefore, the TM-U220II cannot be operated using the TM-U300 APD. However, you can obtain nearly the same print results as the TM-U300 by using the TM-U220II APD. The print margin is slightly different. See "Printing format compatibility" (page 6-1) for the differences.

6.2.9.2 OPOS

The TM-U220II does not have OPOS compatibility with the TM-U300.
Therefore, the TM-U220II cannot be operated using the TM-U300 OPOS. However, you can easily replace the printer module in OPOS. You only have to change the printer device of the TM-U300 to another printer.

See "6.2.1 Printing format compatibility (6-9 page)." for the print margin differences.

6.2.10 ESC/POS command (Direct control)

The TM-U220II has some ESC/POS command compatibility with the TM-U300. See "Printing format compatibility" (page 6-9) for the print margin differences.

Appendix A
Comparison table for TM-220II/TM-U220/U210/U300

			TM-U300 (Type A, B, C, D)	TM-U210 (Type A, B, D)	TM-220II/TM-U220 (Type A, B, D)
Print specification	Print method		Serial 9 pin Bi-direction, logical seeking		<==
	Print speed		Approx. 3.5 lines/sec.(40 column, 16cpi)		"Approx. 4.7 lines/sec. (76mm, 40column, 16cpi, 1/6 inch line feed) Approx. 6.0 lines/sec.(57.5mm, 30column, 16cpi, 1/8 inch line feed)"
	2 color printing		possible	possible	<==
	Character per line	Font A (9 x 9)	33 cpl	33 (35) cpl	<==
		Font B (7 x 9)	40 cpl	40 (42) cpl	<==
		Kanji (16 x 16)	25 (22) cpl	25 (22) cpl	<==
	Character width	Font A (9 x 9)	1.6 x 3.1	1.6 x 3.1	<==
		Font B (7 x 9)	1.2 x 3.1	1.2 x 3.1	<==
		Kanji (16 x 16)	2.7 x 2.7	2.7 x 2.7	<==
	Character configuration		Code page 0 to 5	Code page 0 to 8, and 19 to 26	Code page 0 to 8, and 19 to 26 and code page 16, 17, 18
	Ribbon cassette		ERC-38 (P), (B/R)	ERC-38 (B), (B/R)	<==

			TM-U300 (Type A, B, C, D)	TM-U210 (Type A, B, D)	TM-220II/TM-U220 (Type A, B, D)
Paper supply functions	Roll Paper install method		Paper roll holding shaft	Paper roll drop in	<==
	Paper roll setting		Auto-loading	Auto-loading	1-2-3 setting
	Paper end detector		Yes	Yes	<==
	Paper near-end detector		Yes	Option	Factory option.
	Cover open detector		Yes	No	Yes
	Validation detector		Yes (Option for type C, D)	No Validation function	<==
	Paper feed method		Friction feed	Friction feed	<==
	Paper feed length		Default 4.23mm(1/6 inches): changeable by command	Default 4.23mm(1/6 inches): changeable by command	<==
	Paper feed speed		25 lines/sec	25 lines/sec	30 lines/sec
Paper specification	Paper roll dimensions		Paper width:76mm, Roll diameter: max.83mm	Paper width:76mm, Roll diameter: max.83mm	Paper width: 76mm (Type A) 76mm / 69.5mm / 57.5mm (Type B, D) Roll diameter: max 83mm
	Normal paper		Paper thickness: 0.06 ~ 0.085mm	Paper thickness: 0.06 ~ 0.085mm	<==
	Carbon paper	Number of copies	Original + 1 copies Original + 2 copies (at temperature approx. 25C°) (Copy mode need to be set by command)	Original + 1 copies Original + 2 copies (type D only)	Original + 1 copies (for all type A, B, D)
	Validation paper		Type C, D only	Not supported	<==

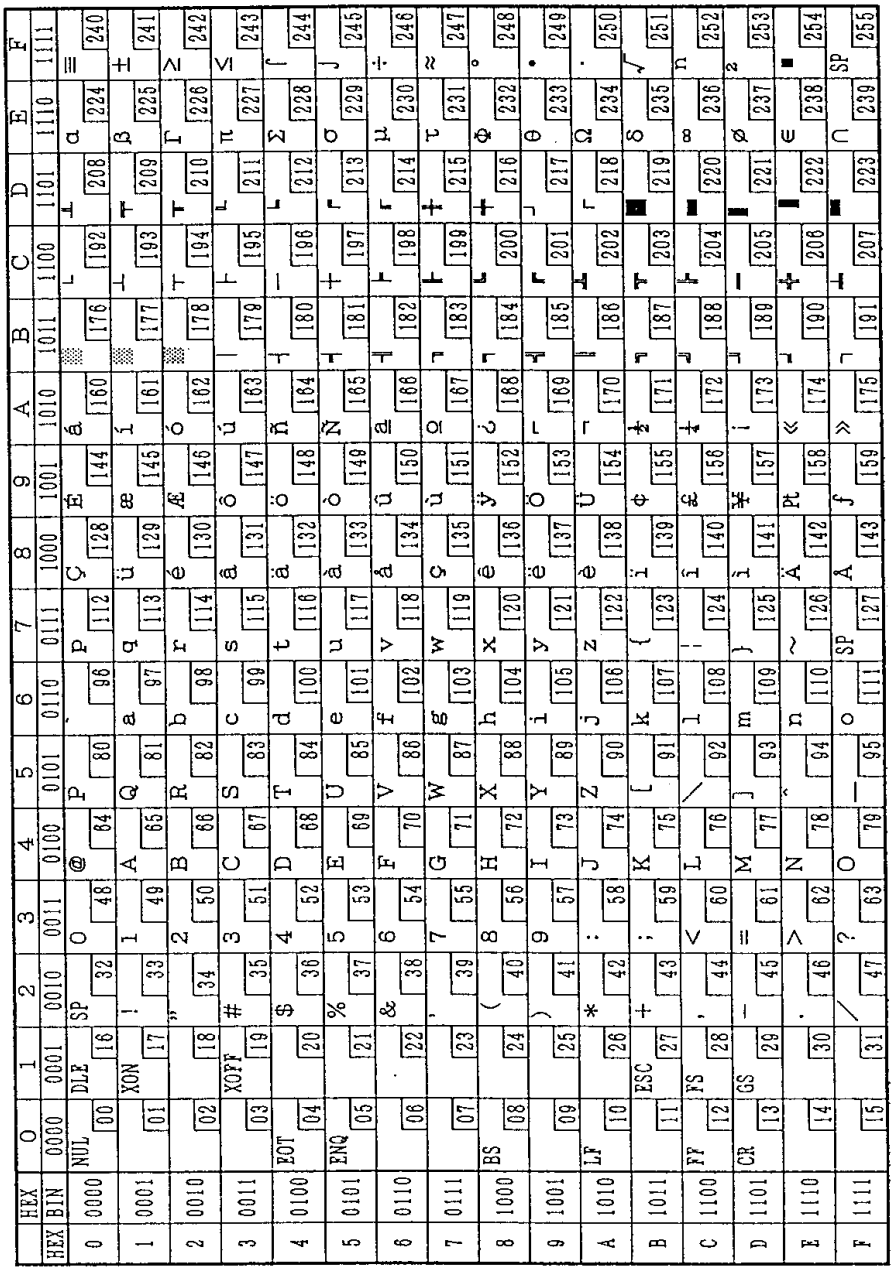
			TM-U300 (Type A, B, C, D)	TM-U210 (Type A, B, D)	TM-220II/TM-U220 (Type A, B, D)
Take up unit			Auto-take up (type A, C)	Auto-take up (type A)	<==
Autocutter (type A/B)			Full cut / partial cut; selectable by command	Partial cut (one point left uncut at center position)	TM-U220II : Partial cut TM-U220 : Partial cut or full cut (optional factory setting) (Partial cut: one point left uncut at right position.)
Print area	A/C position to print start position		36mm	27mm	<==
	Manual cut position to print start position		26mm (type A, B) 28mm (type C, D)	20.2mm	34.9mm (Type A, B) 22.1mm (Type D)
	Print width		63.5mm (200dots, 400 position)	63.34mm (200dots, 400 position)	76: 63.34mm(200dots,400position), 69.5: 57mm(180,360), 57.5:47.5mm(150,300)
	Left margin		(6mm)	(5.9mm)	76: 6.8mm, 69.5: 6.7mm, 57.5: 4.2mm
	Right margin		Approx. 6.5mm	(6.76mm)	76: 5.8mm, 69.5: 5.8mm, 57.5: 5.8mm
Internal buffer	Receive buffer	ANK model	1KB / 40 bytes: selectable	1KB / 40 bytes: selectable	TM-U220II : 20K bytes/40 bytes; selectable TM-U220 : 4K bytes/40 bytes; selectable
		Multi-language model	512 bytes / 40 bytes; selectable	512 bytes / 40 bytes; selectable	TM-U220II : 20K bytes*/40 bytes; selectable TM-U220 : 4K bytes/40 bytes; selectable *May be 4K bytes depending on the model.
	NV bit image	ANK model	No	No	128 KB
		Multi-language model	No	No	128 KB
	User NV memory	ANK model	No	No	8 KB
		Multi-language model	No	No	8 KB

		TM-U300 (Type A, B, C, D)	TM-U210 (Type A, B, D)	TM-220II/TM-U220 (Type A, B, D)
Applicable Power supply unit	For North America	PA-6509 or PB-6509	PB-6509	AC adapter,C1, PS-180, or PS-190* *PS-190 can only be used for the TM-U220II.
	For Europe (Germany)	PA-6510 or PB-6510	PB-6510	
	For Europe (U.K.)	PA-6511 or PB-6511	PA-6511	
	Australia	PA-6513 or PB-6513	PA-6513	
Dimensions (W x D x H mm)		Type A; 170 x 288 x 183	Type A; 160 x 295 x 160	Type A: 160x286x158
		Type B: 170 x 253 x 148	Type B; 160 x 248 x 150	Type B: 160x248x139,
		Type C; 158 x 295 x 145	--	--
		Type D; 158 x 235 x 125	Type D; 160 x 248 x 133	Type D: 160 x 248 x 139
Burn-resistant grade of case		V-0	V-0	V-0
Install		Horizontal (max. slant 15 degree) and Wall hanging possible.(Type B, D)	Horizontal (max. slant 15 degree)	Horizontal (max. slant 15 degree) and Wall hanging possible.(Type B, D)

Appendix B
Character Code Table

B.1 Page 0 (PC437: USA, Standard Europe)

(International character set: when U.S. is selected.)



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

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

B.3 Page 2 (PC850: Multilingual)

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

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

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

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

B.7 Page 6 (Hiragana)

This page is available on the Japanese model only.

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	礎 128	本 144	SP 160	ー 176	た 192	み 208	過 224	換 240
1	0001	129	145	。 161	あ 177	ち 193	む 209	225	241
2	0010	除 130	荷 146	「 162	い 178	つ 194	め 210	足 226	攻 242
3	0011	131	147	」 163	う 179	て 195	も 211	227	243
4	0100	定 132	特 148	、 164	え 180	と 196	や 212	利 228	産 244
5	0101	133	149	・ 165	お 181	な 197	ゆ 213	229	245
6	0110	信 134	越 150	を 166	か 182	に 198	よ 214	用 230	打 246
7	0111	135	151	ぁ 167	き 183	ぬ 199	ら 215	231	247
8	1000	緑 136	他 152	ぃ 168	く 184	ね 200	り 216	移 232	納 248
9	1001	137	153	ぅ 169	け 185	の 201	る 217	233	249
A	1010	科 138	社 154	ぇ 170	こ 186	は 202	れ 218	下 234	変 250
B	1011	139	155	ぉ 171	さ 187	ひ 203	ろ 219	235	251
C	1100	目 140	瓶 156	ゃ 172	し 188	ふ 204	わ 220	加 236	跳 252
D	1101	141	157	ゅ 173	す 189	へ 205	ん 221	237	253
E	1110	々 142	奉 158	ょ 174	せ 190	ほ 206	゛ 222	解 238	件 254
F	1111	143	159	っ 175	そ 191	ま 207	゜ 223	239	255

B.8 Page 7 (One-pass printing Kanji characters)

This page is available on the Japanese model only.

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	日 128	会 144	水 160	受 176	点 192	課 208	買 224	非 240
1	0001	129	145	161	177	193	209	225	241
2	0010	扱 130	客 146	木 162	前 178	中 194	証 210	号 226	承 242
3	0011	131	147	163	179	195	211	227	243
4	0100	外 132	券 148	土 164	残 180	内 196	組 212	有 228	送 244
5	0101	133	149	165	181	197	213	229	245
6	0110	額 134	回 150	振 166	止 182	部 198	店 214	期 230	― 246
7	0111	135	151	167	183	199	215	231	247
8	1000	割 136	在 152	数 168	純 184	別 200	認 216	限 232	棄 248
9	1001	137	153	169	185	201	217	233	249
A	1010	検 138	算 154	精 170	替 186	戻 202	廃 218	頭 234	累 250
B	1011	139	155	171	187	203	219	235	251
C	1100	高 140	上 156	銭 172	代 188	門 204	両 220	差 236	違 252
D	1101	141	157	173	189	205	221	237	253
E	1110	価 142	火 158	総 174	値 190	料 206	効 222	括 238	番 254
F	1111	143	159	175	191	207	223	239	255

B.9 Page 8 (One-pass printing Kanji characters)

This page is available on the Japanese model only.

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	訂 128	計 144	払 160	売 176	名 192	次 208	万 224	室 240
1	0001	129	145	161	177	193	209	225	241
2	0010	正 130	小 146	掛 162	取 178	個 194	不 210	責 226	商 242
3	0011	131	147	163	179	195	211	227	243
4	0100	品 132	金 148	入 164	係 180	領 196	枚 212	終 228	人 244
5	0101	133	149	165	181	197	213	229	245
6	0110	円 134	現 150	貸 166	未 182	収 198	誤 214	了 230	大 246
7	0111	135	151	167	183	199	215	231	247
8	1000	種 136	釣 152	出 168	消 184	予 200	休 216	免 232	安 248
9	1001	137	153	169	185	201	217	233	249
A	1010	担 138	預 154	支 170	費 186	約 202	契 218	伝 234	仕 250
B	1011	139	155	171	187	203	219	235	251
C	1100	当 140	税 156	単 172	年 188	込 204	開 220	自 236	控 252
D	1101	141	157	173	189	205	221	237	253
E	1110	合 142	引 158	返 174	月 190	明 206	閉 222	設 238	基 254
F	1111	143	159	175	191	207	223	239	255

B.10 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	Đ 208	à 224	ð 240
1	0001	SP 129	‘ 145	¡ 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	Ù 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

B.11 Page 17 (PC866: Cyrillic #2)

	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	ї 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	ў 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

B.12 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	Ĺ 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	Ë 211	Ń 227	ˇ 243
4	0100	ä 132	ö 148	Ą 164	180	196	ď 212	ń 228	˘ 244
5	0101	ů 133	Ľ 149	ą 165	Á 181	197	Ň 213	ň 229	§ 245
6	0110	ć 134	ľ 150	Ž 166	Â 182	Ă 198	Í 214	Š 230	÷ 246
7	0111	ç 135	Ś 151	ž 167	Ě 183	ă 199	Î 215	š 231	¸ 247
8	0100	ì 136	ś 152	Ę 168	Ş 184	200	ě 216	Ř 232	° 248
9	1001	ë 137	Ö 153	ę 169	185	201	217	Ú 233	¨ 249
A	1010	Ö 138	Ü 154	170	186	202	218	ŕ 234	˙ 250
B	1011	ö 139	Ť 155	ź 171	187	203	219	Ű 235	ű 251
C	1100	î 140	ť 156	Č 172	188	204	220	ý 236	Ř 252
D	1101	Ź 141	Ł 157	ş 173	Ż 189	205	Ţ 221	Ý 237	ř 253
E	1110	Ä 142	× 158	« 174	ż 190	206	Ů 222	ţ 238	■ 254
F	1111	Ć 143	č 159	» 175	191	¤ 207	223	´ 239	SP 255

B.13 Page 19 (PC858: Euro)

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

B.14 Page 20 (Thai character code 42)

This page is available on the Thai model only.

	8	9	A	B	C	D	E	F
0	┌	๐		ฒ	ย	เ	◌่	◌ิ๊
1	┐	๑	ก	ณ	ร	แ	◌้	◌ิ๋
2	└	๒	ข	ด	ฤ	โ	◌๊	◌ิ์
3	┘	๓	ค	ต	ล	ใ	◌๋	◌ี่
4	│	๔	ฆ	ถ	ว	ไ	◌์	◌ี้
5	─	๕	ง	ท	ศ	ๆ	◌ํ	◌ี๊
6	├	๖	จ	ธ	ษ	ฯ	◌ํ่	◌ี๋
7	┤	๗	ฉ	น	ส	◌ุ	◌ํ้	◌ึ่
8	┴	๘	ช	บ	ห	◌ู	◌ํ๊	◌ึ้
9	┬	๙	ซ	ป	ฬ	◌ิ	◌ํ๋	◌ึ๊
A	┼	ฃ	ฌ	ผ	อ	◌ี	◌ั่	◌ึ๋
B	█	ฅ	ญ	ฝ	ฮ	◌ึ	◌ั้	◌ื่
C	←	◌ู	ฎ	พ	ะ	◌ื	◌ั๊	◌ื้
D	↑	◌ุ	ฏ	ฟ	ฦ	◌ั	◌ั๋	◌ื๊
E	→	◌ฺ	ฐ	ภ	า	◌ํ	◌ิ่	◌ื๋
F	↓	เ	ฑ	ม	ำ	◌็	◌ิ้	

B.15 Page 21 (Thai character code 11)

This page is available on the Thai model only.

	8	9	A	B	C	D	E	F
0	◌ั	◌็	เ	ฐ	ภ	ะ	๐	๐
1	◌ะ	◌่	ก	ฑ	ม	◌ั	๑	๑
2	◌า	◌้	ข	ฒ	ย	◌า	๒	๒
3	◌ำ	◌๊	ฃ	ณ	ร	◌ำ	๓	๓
4	◌ิ	◌๋	ค	ด	ฤ	◌ิ	๔	๔
5	◌ี	◌์	ฅ	ต	ล	◌ี	๕	๕
6	◌ึ	◌ํ	ฆ	ถ	ฦ	◌ึ	๖	๖
7	◌ื	◌๎	ง	ท	ว	◌ื	๗	๗
8	◌ุ	◌๏	จ	ธ	ศ	◌ุ	๘	๘
9	◌ู	๐	ฉ	น	ษ	◌ู	๙	๙
A	◌ฺ	๑	ช	บ	ส	◌ฺ	ฯ	ฯ
B	◌฻	๒	ซ	ป	ห	฿	๋	๋
C	◌฼	๓	ฌ	ผ	ฬ	๏	์	์
D	◌฽	๔	ญ	ฝ	อ	๎	ํ	ํ
E	◌฾	๕	ฎ	พ	ฮ	๊	๎	๎
F	◌฿	๖	ฏ	ฟ	ฯ	๋	๏	

B.16 Page 26 (Thai character code 18)

This page is available on the Thai model only.

	8	9	A	B	C	D	E	F
0	┌	ั		ฐ	ภ	ะ	เ	๐
1	┐	็	ก	ฑ	ม	ั	แ	๑
2	└	ั่	ข	ฒ	ย	า	โ	๒
3	┘	ั้	ฃ	ณ	ร	ำ	ใ	๓
4	│	ั๊	ค	ด	ฤ	ิ	ไ	๔
5	─	ั๋	ฅ	ต	ล	ี	ๅ	๕
6	├	ิ่	ฆ	ถ	ฦ	ึ	ๆ	๖
7	┤	ิ้	ง	ท	ว	ื	็	๗
8	┴	ิ๊	จ	ธ	ศ	ุ	่	๘
9	┬	ิ๋	ฉ	น	ษ	ู	้	๙
A	┼	ิ์	ช	บ	ส	ฺ	๊	๛
B	█	ี่	ซ	ป	ห	ึ่	๋	ื่
C	←	ี้	ฌ	ผ	ฬ	ึ้	์	ื้
D	↑	ี๊	ญ	ฝ	อ	ึ๊	ํ	ื๊
E	→	ี๋	ฎ	พ	ฮ	ึ๋	๎	ื๋
F	↓	เ	ฏ	ฟ	ฯ	฿	๏	

B.17 Page 30 (TCVN-3: Vietnamese)

HEX	8	9	A	B	C	D	E	F
0	SP 128	SP 144	SP 160	SP 176	SP 192	é 208	SP 224	SP 240
1	SP 129	SP 145	SP 161	SP 177	SP 193	ẹ 209	ỏ 225	ủ 241
2	SP 130	SP 146	SP 162	SP 178	SP 194	ề 210	õ 226	ũ 242
3	SP 131	SP 147	SP 163	SP 179	SP 195	ể 211	ó 227	ú 243
4	SP 132	SP 148	SP 164	SP 180	SP 196	ễ 212	ọ 228	ụ 244
5	SP 133	SP 149	SP 165	à 181	SP 197	ế 213	ồ 229	ừ 245
6	SP 134	SP 150	SP 166	ả 182	ặ 198	ệ 214	ổ 230	ử 246
7	SP 135	SP 151	SP 167	ã 183	ầ 199	ì 215	ỗ 231	ữ 247
8	SP 136	SP 152	ă 168	á 184	ẩ 200	ỉ 216	ố 232	ứ 248
9	SP 137	SP 153	â 169	ạ 185	ẫ 201	SP 217	ộ 233	ự 249
A	SP 138	SP 154	ê 170	SP 186	ấ 202	SP 218	ờ 234	ỳ 250
B	SP 139	SP 155	ô 171	ằ 187	ậ 203	SP 219	ở 235	ỷ 251
C	SP 140	SP 156	ơ 172	ẳ 188	è 204	ĩ 220	ỡ 236	ỹ 252
D	SP 141	SP 157	ư 173	ẵ 189	SP 205	í 221	ớ 237	ý 253
E	SP 142	SP 158	đ 174	ắ 190	ẻ 206	ị 222	ợ 238	ỵ 254
F	SP 143	SP 159	SP 175	SP 191	ẽ 207	ò 223	ù 239	SP 255

B.18 Page 31 (TCVN-3: Vietnamese)

HEX	8	9	A	B	C	D	E	F
0	SP 128	SP 144	SP 160	SP 176	SP 192	É 208	SP 224	SP 240
1	SP 129	SP 145	Ă 161	SP 177	SP 193	Ẹ 209	Ỏ 225	Ủ 241
2	SP 130	SP 146	Â 162	SP 178	SP 194	Ề 210	Õ 226	Ũ 242
3	SP 131	SP 147	SP 163	SP 179	SP 195	Ể 211	Ó 227	Ú 243
4	SP 132	SP 148	SP 164	SP 180	SP 196	Ễ 212	Ọ 228	Ụ 244
5	SP 133	SP 149	SP 165	À 181	SP 197	Ế 213	Ồ 229	Ừ 245
6	SP 134	SP 150	SP 166	Ả 182	Ặ 198	Ệ 214	Ổ 230	Ử 246
7	SP 135	SP 151	Đ 167	Ã 183	Ầ 199	Ì 215	Ỗ 231	Ữ 247
8	SP 136	SP 152	SP 168	Á 184	Ẩ 200	Ĩ 216	Ố 232	Ứ 248
9	SP 137	SP 153	SP 169	Ạ 185	Ẫ 201	SP 217	Ộ 233	Ự 249
A	SP 138	SP 154	Ê 170	SP 186	Ấ 202	SP 218	Ờ 234	Ỳ 250
B	SP 139	SP 155	Ô 171	Ả 187	Ậ 203	SP 219	Ở 235	Ỷ 251
C	SP 140	SP 156	Ơ 172	Ằ 188	È 204	Ĩ 220	Ỡ 236	Ỹ 252
D	SP 141	SP 157	Ư 173	Ã 189	SP 205	Í 221	Ớ 237	Ý 253
E	SP 142	SP 158	SP 174	Ắ 190	Ẻ 206	Ị 222	Ợ 238	Ỵ 254
F	SP 143	SP 159	SP 175	SP 191	Ẽ 207	Ò 223	Ù 239	SP 255

B.19 Page 254 (Blank page)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	SP 128	SP 144	SP 160	SP 176	SP 192	SP 208	SP 224	SP 240
1	0001	SP 129	SP 145	SP 161	SP 177	SP 193	SP 209	SP 225	SP 241
2	0010	SP 130	SP 146	SP 162	SP 178	SP 194	SP 210	SP 226	SP 242
3	0011	SP 131	SP 147	SP 163	SP 179	SP 195	SP 211	SP 227	SP 243
4	0100	SP 132	SP 148	SP 164	SP 180	SP 196	SP 212	SP 228	SP 244
5	0101	SP 133	SP 149	SP 165	SP 181	SP 197	SP 213	SP 229	SP 245
6	0110	SP 134	SP 150	SP 166	SP 182	SP 198	SP 214	SP 230	SP 246
7	0111	SP 135	SP 151	SP 167	SP 183	SP 199	SP 215	SP 231	SP 247
8	1000	SP 136	SP 152	SP 168	SP 184	SP 200	SP 216	SP 232	SP 248
9	1001	SP 137	SP 153	SP 169	SP 185	SP 201	SP 217	SP 233	SP 249
A	1010	SP 138	SP 154	SP 170	SP 186	SP 202	SP 218	SP 234	SP 250
B	1011	SP 139	SP 155	SP 171	SP 187	SP 203	SP 219	SP 235	SP 251
C	1100	SP 140	SP 156	SP 172	SP 188	SP 204	SP 220	SP 236	SP 252
D	1101	SP 141	SP 157	SP 173	SP 189	SP 205	SP 221	SP 237	SP 253
E	1110	SP 142	SP 158	SP 174	SP 190	SP 206	SP 222	SP 238	SP 254
F	1111	SP 143	SP 159	SP 175	SP 191	SP 207	SP 223	SP 239	SP 255

B.20 Page 255 (Blank page)

	HEX	8	9	A	B	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	SP 128	SP 144	SP 160	SP 176	SP 192	SP 208	SP 224	SP 240
1	0001	SP 129	SP 145	SP 161	SP 177	SP 193	SP 209	SP 225	SP 241
2	0010	SP 130	SP 146	SP 162	SP 178	SP 194	SP 210	SP 226	SP 242
3	0011	SP 131	SP 147	SP 163	SP 179	SP 195	SP 211	SP 227	SP 243
4	0100	SP 132	SP 148	SP 164	SP 180	SP 196	SP 212	SP 228	SP 244
5	0101	SP 133	SP 149	SP 165	SP 181	SP 197	SP 213	SP 229	SP 245
6	0110	SP 134	SP 150	SP 166	SP 182	SP 198	SP 214	SP 230	SP 246
7	0111	SP 135	SP 151	SP 167	SP 183	SP 199	SP 215	SP 231	SP 247
8	1000	SP 136	SP 152	SP 168	SP 184	SP 200	SP 216	SP 232	SP 248
9	1001	SP 137	SP 153	SP 169	SP 185	SP 201	SP 217	SP 233	SP 249
A	1010	SP 138	SP 154	SP 170	SP 186	SP 202	SP 218	SP 234	SP 250
B	1011	SP 139	SP 155	SP 171	SP 187	SP 203	SP 219	SP 235	SP 251
C	1100	SP 140	SP 156	SP 172	SP 188	SP 204	SP 220	SP 236	SP 252
D	1101	SP 141	SP 157	SP 173	SP 189	SP 205	SP 221	SP 237	SP 253
E	1110	SP 142	SP 158	SP 174	SP 190	SP 206	SP 222	SP 238	SP 254
F	1111	SP 143	SP 159	SP 175	SP 191	SP 207	SP 223	SP 239	SP 255

B.21 International Character Sets

Country	ASCII code (hexadecimal number)											
	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
U.S.	#	$	@	[	\	]	^	`	{	|	}	~
France	#	$	à	°	ç	§	^	`	é	ù	è	¨
Germany	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
UK	£	$	@	[	\	]	^	`	{	|	}	~
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	$	@	¡	Ñ	¿	^	`	¨	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	¡	Ñ	¿	é	`	í	ñ	ó	ú
Latin America	#	$	á	¡	Ñ	¿	é	ü	í	ñ	ó	ú
Korea	#	$	@	[	₩	]	^	`	{	|	}	~