TM-T88IV

Technical reference guide

English

410528700

Cautions

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ESC/POS" Command System

EPSON has been taking industry's initiatives with its own POS printer command system (ESC/POS). ESC/POS has a large number of commands including patented ones. Its high scalability enables users to build versatile POS systems. The system is compatible with all types of EPSON POS printers and displays. Moreover, its flexibility make it easy to upgrade in the future. The functionality and the user-friendliness is valued from around the world.

Revision History

Rev.	Page	Details of Change	
Rev. A	All pages	Newly authorized	

Rev. A

For Safety

Key to Symbols

The symbols in this manual are identified by their level of importance, as defined below. Read the following carefully before handling the product.



WARNING:

You must follow warnings carefully to avoid serious bodily injury.



CAUTION:

Provides information that must be observed to prevent damage to the equipment or loss of data.

- Possibility of sustaining physical injuries.
- Possibility of causing physical damages.
- Possibility of causing information loss.



Note

Provides important information and useful tips on handling the equipment.

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Warnings



- ☐ 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.
- Only disassemble this product as described in this manual. Do not make modifications to the unit. Tampering with this product may result in injury, fire, or electric shock.
- ☐ To avoid risk of electric shock, do not set up this product or handle cables during a thunderstorm in order.
- ☐ Be sure to use the specified power source. Connection to an improper power source may cause fire or shock.
- ☐ Never insert or disconnect the power plug with wet hands. Doing so may result in severe shock.
- Do not allow foreign matter to fall into the equipment. Penetration by foreign objects may lead to fire or electric shock.
- ☐ If water or other liquid spills into this equipment, turn off the power supply switch and unplug the power cable immediately. Continued usage may lead to fire or electric shock.
- Do not place multiple loads on power outlet. Overloading the outlet may lead to fire. Always supply power directly from a standard 100 VAC domestic power outlet.
- ☐ Handle the power cable with care. Improper handling may lead to fire or electric shock.
 - Do not modify or attempt to repair the cable.
 - Do not place any heavy object on top of the cable.
 - Avoid excessive bending, twisting and pulling.
 - Do not place the cable near heating equipment.
 - Check that the plug is clean before plugging it in.
 - Be sure to push the plug all the way in.
- ☐ Keep the DIP switch cover closed and fastened with the screw. Using the printer with the cover open may cause fire or electric shock.

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Cautions



- ☐ 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 equipment. Never stand or lean on this equipment. Equipment may fall or collapse, causing breakage and possible injury.
- ☐ To ensure safety, unplug this equipment prior to leaving it unused for an extended period.
- Parts on the circuit board may become hot during operation. Wait approximately 10 minutes after turning the power off before touching them.
- ☐ To avoid injury, take care not to insert fingers or any part of the hand in the roll paper opening where the manual cutter is installed.
- Do not open the roll paper cover without taking the necessary precautions, as this can result in injury from the autocutter fixed blade.
- ☐ When using compressed air products; such as air dusters, for cleaning during repair and maintenance, the use of such products containing flammable gas isprohibited.

Modular Connectors

The printer uses the modular connectors specifically designed for the cash drawer. Do not connect these connectors to an ordinary telephone line.

EMC and Safety Standards Applied

Product Name: TM-T88IV Model Name: M129H

The following standards are applied only to the printers that are so labeled. (EMC is tested using the Epson power supplies.)

Europe: CE marking

Safety: EN 60950

North America: EMI: FCC/ICES-003 Class A

Safety: UL 1950/CSA C22.2 No. 950

Japan: EMC: VCCI Class A

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Oceania: EMC: AS/NZS CISPR22 Class B

China: EMC: GB9254

GB17625.1

Safety: GB4943

Taiwan: EMC: CNS13438

Safety: CNS14336



The connection of a non-shielded printer interface cable to this printer will invalidate the EMC standards of this device. You are cautioned that changes or modifications not expressly approved by Seiko Epson Corporation could void your authority to operate the equipment.

CE Marking

The printer conforms to the following Directives and Norms:

Directive 89/336/EEC EN 55022 Class B

EN 55024

IEC 61000-4-2 IEC 61000-4-3 IEC 61000-4-4 IEC 61000-4-5 IEC 61000-4-6 IEC 61000-4-11

FCC Compliance Statement For American Users

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

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

For Canadian Users

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

Rev. A

About this Manual

This manual describes the TM-T88IV, a current EPSON thermal printer product.

The currently available power supply, the PS-180, works with TM-T88IV.

Aim of the Manual

This manual was created to provide all the information necessary for system planning, design, installation, and application of the printer for designers and developers of POS system.

Manual Content

The manual is made up of the following sections:

Chapter 1 **Product Overview** Chapter 2 Setup Chapter 3 **Application Development Information** Chapter 4 ESC/POS Command-related Information Chapter 5 **Product Specifications** Interfaces and Connectors Appendix A Appendix B Options and Consumables Appendix C **Character Code Tables** Appendix D TM-T88IV/TM-88III Comparison Table

Related Software and Documents

Documents relating to the TM-T88IV are listed below.

Name of document	Description		
TM-T88IV User's Manual	Provides information to enable POS operators to use the TM-T88IV safely and correctly. This manual is packed in the box with the printer.*		
ESC/POS Application Programming Guide	Provides detailed ESC/POS command information. Contact us to obtain this guide.		
TM-T88IV Technical Reference Guide	This guide.*		
EPSON OPOS ADK	This is an OCX driver.*		

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Name of document	Description		
EPSON OPOS ADK Manual	Provides information for anyone who is programming using OPOS. This is included in the EPSON OPOS ADK.*		
EPSON Advanced Printer Driver	This is a Windows driver.*		
EPSON Advanced Printer Driver Manual	Provides information for anyone who is programming using the APD (EPSON Advanced Printer Driver). This is included in the EPSON Advanced Printer Driver.*		

^{*} You can obtain these items from one of the following URLs:

For customers from North America: http://pos.epson.com/

For customers from other countries: http://epson-pos.com/

Select the product from the "Select any product" pull-down menu.

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Product Overview

The TM-T88IV thermal printer product is currently available from EPSON. In addition, the PS-170, the power supply, is obsolete and no longer available. It is described only for legacy support. The currently available power supply, the PS-180, works with TM-T88IV.

1.1 Features

The	TN	1-T88IV	printer	has	the f	follo	wing	features:

- Printing
 - High-speed printing (200 mm/s {7.9"/s} maximum), which enables issuing of batch receipts.
 - Graphics are also printed with a high-speed printing.
 - With a two-color print control, two-color printing is possible on the two-color thermal paper.
- Printer handling
 - Easy drop-in paper loading.
- Software
 - Command protocol is based on the ESC/POS[®] Proprietary Command System.
 - OPOS ADK and Windows[®] printer drivers are available.
 - In addition to supporting several kinds of bar code printing, two-dimensional code (PDF417, QR code) printing is possible.
 - Various layouts are possible by using page mode.
 - A maintenance counter function is supported.
- □ General
 - Various interface boards (EPSON UB series) can be used.

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1.2 Product Structure

1.2.1 Model

☐ Product Name TM-T88IV (current product)

Print method: Thermal line printing

Interface specifications:
 Serial interface specifications (RS-232C)
 Parallel interface specifications (IEEE 1284-compliant)
 USB interface specifications (Full speed)

Ethernet interface specifications (10/100Base-T)

Wireless LAN interface specifications (802.11b)

Paper width specifications:
 80 mm {3.15"} width specifications

1.2.2 Accessories

Printer	(body)

- \square Roll paper \times 1
- ☐ User's manual × 1
- \square Power switch cover $\times 1$
- ☐ Connector cover *
- ☐ External power supply unit model: PS-180 *
 - * May not be included with your printer.

1.2.3 Options

- ☐ External power supply unit
 - Model PS-180 (PS-180 supports the power-saving feature.)
- ☐ Affixing tapes (Model: DF-10)
- ☐ Hanging bracket set (Model: WH-10)
- ☐ Various interface board (UB series)

1.2.4 Consumable products

☐ Specified paper: Thermal paper

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1.2.5 TM-T88IV Basic Specification Table

Table 1-1

	TM-T88IV		
High-speed print mode	Approx. 200 mm/s (7.9") maximum		
High-speed power consumption mode	Average : Approx. 1.8A		
Serial interface selectable baud rates	2400, 4800, 9600, 19200, 38400, 57600, 115200 Default Setting: 9600 Settable baud rate with DIP switches 1-7/1-8: 4800, 9600, 19200, 38400 Settable baud rate with commands:		
	2400, 4800, 9600, 19200, 38400, 57600,115200		
Conditions for canceling receive buffer BUSY state *	Set with DIP SW2-5 *		
Supported character sets (extended graphics)	11 pages including WPC 1252, PC866 (Cyrillic #2), PC852 (Latin2))		
Driver (EPSON OPOS ADK, Advanced Printer Driver)	Some baud rates cannot be used in serial communications (38400 bps). Note: The driver cannot set a 38400 bps baud rate.		

^{*} For details on the conditions for canceling the receive buffer BUSY state, refer to "DIP Switch Functions" (page 2-3).

1.3 Part Names and Basic Operation

1.3.1 Part Names

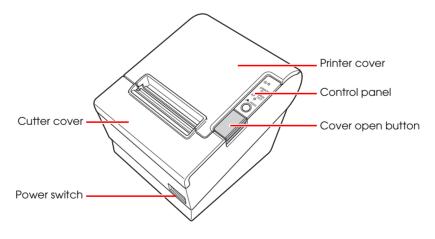


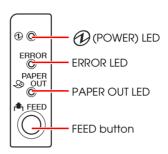
Figure 1-1 Printer part names

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^{*} For details on DIP switch settings, refer to "DIP Switch Positions and Steps for Changing DIP Switch Settings" (page 2-2).

1.3.2 Control Panel

TM-T88IV



1.3.2.1 LED

(POWER) LED (green)

- ☐ Lights when the power supply is on.
- ☐ Goes out when the power supply is turned off.

ERROR LED

Lights or flashes when the printer is offline.

- ☐ Lights after the power is turned on or after a reset (offline). Automatically goes out after a while to indicate that the printer is ready.

 Lights when the end of the roll paper is detected, and when printing has stopped (offline). If this happens, replace with new roll paper.
- ☐ Flashes when an error occurs. (For details about the flash codes, refer to "Error Codes" (page 3-8).)
- ☐ Goes out during regular operation (online).

PAPER OUT LED

- ☐ Lights when there is no more roll paper or there is little remaining.
- Goes out when there is a sufficient amount of roll paper remaining.
- ☐ Flashes when a self-test is in progress or when the printer waits for a macro execution.

1.3.2.2 Buttons

FEED button

Pressing this button once feeds the roll paper by one line. Holding this button down feeds the roll paper continuously.

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1.3.3 Power Switch

The power switch is located at the bottom right front of the printer. (Refer to "Printer part names" (page 1-3).)

Turn the printer on or off. The marks on the switch (0 = on / 1 = off) indicate the printer switch position.



Before turning on the printer be sure to check that the AC adapter is connected to the power supply.

1.3.4 Connectors

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

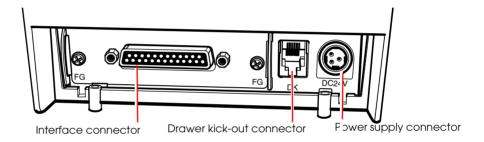


Figure 1-2 Connector panel

- ☐ Drawer kick-out connector for connecting the cash drawer
- ☐ Power supply connector for connecting the power supply unit
- ☐ Interface connector to connect the printer to the host computer interface (serial, parallel, etc.)



Note:

The picture above shows a serial interface model. For details on the various interfaces and how to connect the power supply connector and cash drawer, see "Connecting Power Supply Unit and Cash Drawer" (page 2-15) and "Connecting the Printer to the Host Computer" (page 2-8).

1.4 Handling the Printer



Do not open the printer cover during printing. Doing so may damage the printer.

Do not touch the manual cutter with your hands when installing or replacing roll paper. The manual cutter is sharp and may cause an injury.

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1.4.1 Installing and Replacing Roll Paper



Note

Be sure to use roll paper that meets printer specifications. See Appendix B for details on the paper specifications.

Do not use roll paper whose trailing end is glued to the roll paper core.

1.4.1.1 Installing Roll Paper

1. Make sure the host has not sent a printing command to the printer, and press the cover open button to open the printer cover. If the printer cover does not open, a probable cause is that the autocutter is locked. If this happens, refer to "Removing Jammed Paper" (page 1-7).

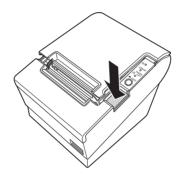


Figure 1-3 Cover open button

2. Load the roll paper.

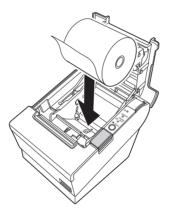


Figure 1-4 Loading paper



Note:

When loading the roll paper, pay attention to the direction that the roll paper is fed out of the printer.

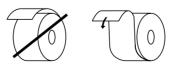


Figure 1-5 Paper direction

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3. Pull out the roll paper toward you, then close the printer cover.

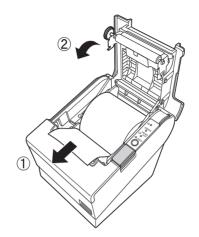


Figure 1-6 Closing the printer cover

4. Tear off the leading edge of the roll paper using the manual cutter.

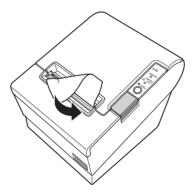


Figure 1-7 Tear off paper

1.4.1.2 Replacing Paper

Follow the procedure below to replace roll paper.

- 1. Open the printer cover, and remove the core of the previously used roll paper.
- 2. Insert the new roll paper following the procedure in "Installing Roll Paper" (page 1-6).

1.4.2 Removing Jammed Paper



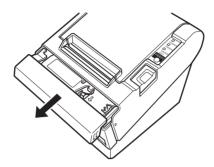
Do not touch the thermal head because it can be very hot after printing. For handling the thermal head, refer to "Cleaning the Thermal Head" (page 1-8).

- 1. Turn the printer off and press the cover open button.
- 2. Remove jammed paper, reinstall the roll, and close the cover.

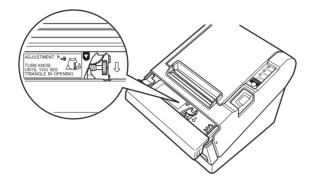
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If paper is caught in the cutter and you cannot open the printer cover

1. Open the cutter cover as shown in the illustration below.



2. Turn the knob until you see a triangle in the opening. This returns the cutter blade to the normal position. There is a label near the cutter to assist you. See the illustration below.



- 3. Close the cutter cover.
- 4. Open the printer cover and remove the jammed paper.

1.4.3 Cleaning the Thermal Head



CAUTION:

After printing, the thermal head can be very hot. Be careful not to touch it and to let it cool before you clean it. Do not damage the thermal head by touching it with your fingers or any hard object.

Turn off the printer, open the printer cover, and clean the thermal elements of the thermal head with a cotton swab moistened with an alcohol solvent (ethanol, methanol, or IPA).

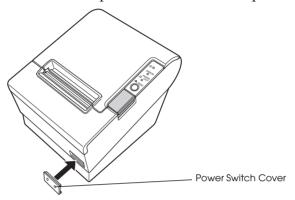
Epson recommends cleaning the thermal head periodically (generally every 3 months) to maintain receipt print quality.

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1.4.4 Power Switch Cover

Install the power switch cover that comes with the TM-T88IV onto the printer to prevent inadvertent changing of the power switch, to prevent tampering, and to improve the appearance of the printer.

To reset the TM printer when the power switch cover is installed, insert a long, thin object (such as the end of a paper clip) into the hole in the power switch cover and press the power switch.





Note

If an accident occurs with the power switch cover attached, unplug the power cord immediately. Continued use may cause fire or shock.

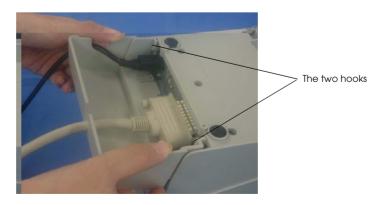
1.4.5 Connector Cover

Use the following method to attach the connector cover.

1.4.5.1 Attaching and Removing the Connector Cover

These instructions apply if a connector cover is packed with your printer to protect your cables. To attach it, follow the steps below:

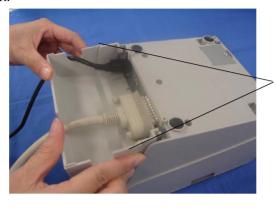
- 1. First, connect all the cables. The connector cover has three possible cable exits: on the right, left, and back.
- 2. Position the two hooks on the connector cover so that they hook the printer case, as shown in illustration.



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3. Push the connector cover down to click onto the printer case.

To remove the connector cover, turn the printer over, and push the connector cover down while pushing both sides of the connector cover inward to detach the hooks from the printer case as shown in the illustration.



pushing both sides of the connector cover inward to detach the hooks from the printer case

1.4.6 Shipping Procedures

Do the following before shipping the printer.

- 1. Press the power switch to turn the power off.
- 2. Make sure the LED is out.
- 3. Remove the power supply connector.
- 4. Pack the printer, keeping the top and bottom correctly oriented.

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Setup

Before using the printer, you need to make various settings to increase the printer's functionality. Configure the printer appropriately depending on the environment.

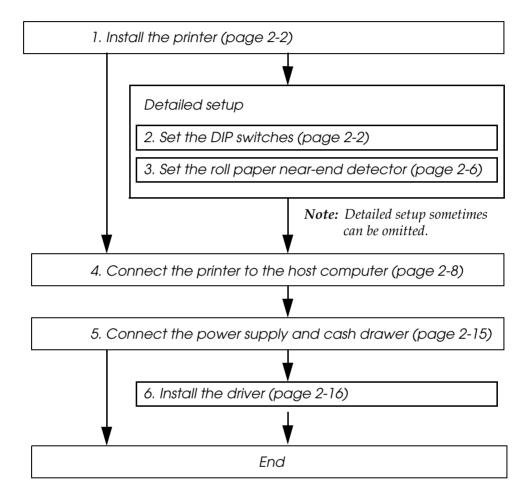


Figure 2-8 Setup flowchart

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2.1 Installing the Printer

In addition to regular horizontal installation, the printer can be hung on a wall using the optional WH-10 Wall Hanging Bracket Set.

2.1.1 Precautions for Horizontal Installation

Ш	Install the printer in a flat, horizontal position.
	Avoid locations susceptible to dust and other foreign matter.
	Be sure to avoid bumping so that the printer is not exposed to strong impact during operation.

Avoid placing the printer on top of the power supply or other cables or other objects.

2.1.2 Precautions for Wall Installation

- ☐ Make the following settings on the printer when you hang it on a wall. For details, refer to the installation manual provided with the optional WH-10 Wall Hanging Bracket Set.
 - Install the roll paper stopper
 - Adjust of near-end detector
 - Attach the connector cover
 - Install the WH-10 Wall Hanging Bracket Set
- ☐ For other details, refer to the installation manual provided with the optional WH-10 Wall Hanging Bracket Set option.



When hanging the printer on the wall with the hanging bracket set, be sure to attach a connector cover to the printer.

2.2 Setting the DIP Switches

On this printer, you can make various settings with DIP switches.



Serial interface communication conditions must be set on serial interface model printers.

2.2.1 DIP Switch Positions and Steps for Changing DIP Switch Settings

Follow the steps below to change the DIP switch settings.

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CAUTION:

Before you remove the DIP switch cover, turn the printer off. Otherwise, a short-circuit may cause the printer to malfunction.

- 1. Make sure the power supply for the printer is turned off.
- 2. Unscrew the screw to remove the DIP switch cover from the base of the printer.

Figure 2-9 Removing the DIP switch cover

- 3. Set the DIP switches as desired, using the tip of a tool, such as a small screwdriver.
- 4. Attach the DIP switch cover, and screw in place.

Note.

New DIP switch settings are enabled after the printer is turned on.

2.2.2 DIP Switch Functions

The DIP switch functions depend on your printer's interface specifications.

2.2.2.1 DIP switch settings for serial interface specifications

Table 2-2 Switch bank 1 settings

SW	Function	ON	OFF
1-1	Data receive error	Ignore	"?" is printed *
1-2	Receive buffer size	45 bytes	4KB *
1-3	Handshake	XON/XOFF	DTR/DSR *
1-4	Bit length	7 bits	8 bits *
1-5	Parity check	Yes	No *

 $1-2(tyif1)5.6(i)10.6(ty se)6.1(l)-4.5(e)6.1(cti)10.6(o)-4.1(n)-17594.5(E)-1.9(ve)6.1(n)-11155.1(O)-2.2(d)-4.4(d)10.8(\cdot)-15.2(^*))TJ0-2.075(10)-11155.1(o)-2.2(d)-4.4(d)10.8(\cdot)-15.2(^*)$

1- ′

For details on DIP SW1-2: Receive buffer size, also refer to DIP SW2-5: Cancellation of receive buffer full BUSY state.

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Table 2-3 Baud rate selection (DIP SW1-7, 1-8)

TM-T88IV

	Switch no.	
Baud rate (BPS)	1-7	1-8
38400 (Default)**	ON	ON
4800	OFF	ON
9600*	ON	OFF
19200	OFF	OFF

^{*} Factory setting.

For the memory switch setup utility, see "Memory Switch Setting Utility" (page 3-6).



Note:

The values of the communication conditions of the serial interface set with commands are enabled only when DIP switches 1-7 and 1-8 are On. Otherwise, the value selected with DIP switch 1 has priority.

Table 2-4 Switch bank 2 settings

sw	Function	ON	OFF
2-1	Handshake (BUSY) conditions	Receive buffer full Printer offline or receive buffer full '	
2-2	Reserved (do not change setting)	Fixed to OFF	
2-3, 2-4	Print density selection/low-power mode	(See separate table.)	
2-5	Conditions for canceling receive buffer BUSY state	Releases BUSY when remaining receive buffer capacity reaches 138 bytes.	Releases BUSY when remaining receive buffer capacity reaches 256 bytes.
2-6	Reserved (do not change setting)	Fixed to OFF	
2-7	Pin # 6 reset signal	Used	Not used *
2-8	Pin # 25 reset signal	Used Not used *	

For details on DIP SW2-1: BUSY conditions, also refer to "Busy State" (page 3-11).

Table 2-5 Print density selection (DIP SW2-3, 2-4)

	Switch No.		
Print density		2-3	2-4
Print density Low-power mode		ON	ON
A	Normal*	OFF	OFF
V	Medium	ON	OFF
Print density	Dark	OFF	ON

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^{**} The baud rate can be changed with the setting values for the communication conditions of the serial interface. The serial interface communication conditions can be changed using command and Memory switch setting utility. The setting values are 2400, 4800, 9600, 19200, 38400, 57600, and 115200.

2.2.2.2 DIP switch settings for other interface specifications

The following DIP switch functions are for parallel interface/USB/Ethernet model printers.



^{*} Factory setting

Table 2-6 Parallel/USB/Ethernet DIP switch bank 1

SW	Function	ON	OFF
1-1	Automatic line feed	Enabled at all times	Disabled at all times *
1-2	Receive buffer size	45 bytes	4KB *
1-3	Select paper sensors to output paper-end signals. (Command default setting value.)	Disabled	Roll Paper end sensor enabled, Roll Paper nearend sensor enabled
1-4	Error signal output	Disabled	Enabled
1-5 ~ 1-8	Not defined (Always use printer with these switches set to OFF.)	_	_ *

Table 2-7 Parallel/USB/Ethernet DIP switch bank 2

sw	Function	ON	OFF
2-1	Handshake (BUSY conditions)	Receive buffer full Offline * Receive buffer full	
2-2	Reserved (do not change setting)	Fixed to OFF	
2-3, 2-4	Print density selection/low-power mode	(See separate table.)	
2-5	Conditions for canceling receive buffer BUSY state	Releases BUSY when remaining receive buffer capacity reaches 138 bytes.	Releases BUSY when remaining receive buffer capacity reaches 256 bytes.
2-6, 2-7	Reserved (do not change setting)	Fixed to OFF	
2-8	Pin #31reset signal (do not change setting)	Fixed to ON	

DIP SW2-1: For details on the BUSY condition, also refer to "Busy State" (page 3-11).

Table 2-8 Selection of print density

	Switch no.		
Print density		2-3	2-4
Print density	Low-power mode	ON	ON
A	Normal*	OFF	OFF
V	Medium	ON	OFF
Print density	Dark	OFF	ON

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2.3 Customized value

The customized value is set with command and Memory switch setting utility.

Table 2-9 Types of the Customized Value

Function	Value
Selection of print density	70% - 130% (13 levels in 5% each)
Selection of print speed	Level 1-9 (9 levels)
Number of head energizing	One-part energizing, Two-part energizing, Four-part energizing, or Auto energizing
Selection of print control	Single-color control / Two-color control
Selection of black-color density in two-color printing	Light / Medium / Dark

Prin mm

In

2.4

2. Loosen the adjustment screw fastening the detector, and align the upper edge of the positioning plate with the adjustment position. Adjustment positions are as follows:

Adjustment position	Remaining amount of roll paper (outer diameter: mm)	
Upper	Approx. 27	
Lower	Approx. 23	

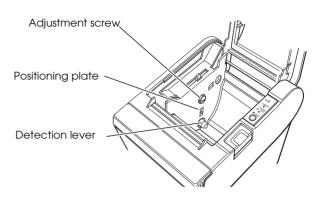


Figure 2-10 NE detector positions



Note:

The adjustment screw is set to the lower position before shipment.

- 3. Tighten the adjustment screw.
- 4. After adjustment, make sure that the detection lever operates smoothly.
- 5. Load the roll paper.
- 6. Close the roll paper cover.

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2.5 Connecting the Printer to the Host Computer

2.5.1 Serial Interface Connection

2.5.1.1 Cross cable wiring diagrams

The wiring selections for available serial cross cables are as follows:

Pin No	Signal	Signal
	TXD RXD DTR DSR RTS CTS GD RESET	TXD RXD DTR DSR RTS CTS
	RECEI	

Figure 2-11 Cross cable diagrams

The cable needed depends on printer control and handshake method. You can operate the TM printer with a Windows driver, OPOS, or ESC/POS commands. XON/XOFF, DTR/DSR, or RTS/CTS are available as handshake controls. For details on available cables for each connection form, refer to "Section 2.5.1.2, Serial interface connection diagrams."

2.5.1.2 Serial interface connection diagrams

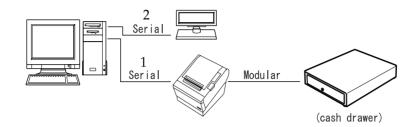
When the TM printer is connected to a host computer by the serial interface, the following two connection forms are possible:

- Stand alone
- Pass-through connection

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Stand alone

Both the TM printer and DM-D are connected to the host computer directly via the serial port.



	olication 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 possible	_	_
DTR/DSR	1	_	Type A or B	Туре В
	2	_	Type A or B	Туре В

Figure 2-12 Configuration of stand-alone connection

Pass-through connection

The host computer is connected to the TM printer over the serial interface via DM-D.



	control	XON/XOFF (except OPOS)	DTR/DSR (DOS, OPOS, Visual C)	RTS/CTS (DOS, Windows driver, Visual C, Visual Basic MSComm)
XON/XOFF		Not possible	_	_
DTR/DSR	1	_	Type A or B	Туре В
	2	_	Type A or B	Type A or B

Figure 2-13 Configuration of pass-though connection

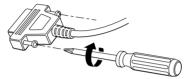
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2.5.1.3 Connecting the serial interface (RS-232) cable

MARNING:

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

- 1. Insert the interface cable connector firmly into the interface connector on the connector panel.
- 2. When using connectors equipped with screws, tighten them to secure the connectors firmly.



- 3. When using 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.

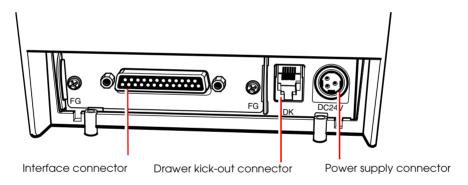


Figure 2-14 Printer connectors

2.5.2 Parallel Interface Connection

The parallel interface model TM printer is connected to the host computer via the parallel port. When a customer display (DM-D) is to be connected, connect the TM printer to the host computer via the serial port.

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2.5.2.1 Parallel interface connection diagram

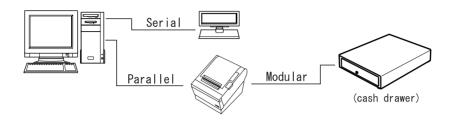


Figure 2-15 Parallel interface connection

2.5.2.2 Connecting the parallel interface cable

- 1. Insert the interface cable connector 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.
- When using 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.

2.5.3 USB Interface Connection

Connect the TM printer to the host computer with a USB cable. A second TM printer can be connected via a self-powered USB hub from a printer connected to the host computer.



A customer display (DM-D) can be connected to a USB model TM-T88IV (with UB-U01/UB-U02) by the exclusive modular cable (RJ-45). When connecting the customer display, connect the modular jack from the customer display to the DM connector (refer to "Installing the locking wire saddle" (page 2-12)).

When connecting the customer display to a USB model TM-T88IV (with UB-U01/UB-U02), set the communication conditions of the customer display as follows:

- Baud rate:19200 bps
- Bit length:8-bit
- Parity:no parity
- Stop bit:1

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2.5.3.1 USB Interface Connection Diagram

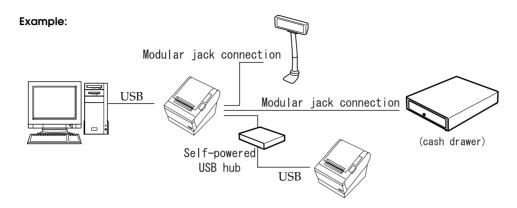


Figure 2-16 USB connection

2.5.3.2 Connecting the USB interface cable

- 1. Attach the locking wire saddle at the location shown in the figure below.
- Put the USB cable through the locking wire saddle as shown in the figure below.



Putting the USB cable through the locking wire saddle, as shown in the figure below, prevents the cable from coming unplugged.

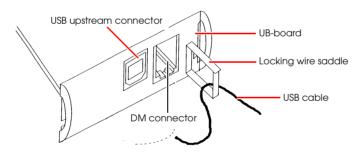


Figure 2-17 Installing the locking wire saddle

- 3. Connect the USB cable from the host computer to the USB upstream connector.
- 4. Up to 2 USB devices can be connected to a USB model TM-T88IV by using 2 USB downstream connectors.



The hub installed in a USB model connector panel is a bus-power-supply hub. It is important to note that bus-power-supply hubs (including other USB model TM printers) and bus-power-supply functions with a current consumption of 100 mA or more cannot be connected directly to the printer.

2-12 Setup Rev. A To use USB model TM printers, the TM printer driver (EPSON OPOS ADK or advanced printer driver) must be installed on the host computer. Get the latest driver information from one of the following URLs:

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

http://pos.epson.com/

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

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

Select the product name from the "Select any product" pull-down menu.

For details on EPSON OPOS ADK or advanced printer driver, refer to "Introducing the Control Methods" (page 3-1).

2.5.4 Ethernet Interface Connection

Connect a TM printer with an Ethernet interface to a network by an Ethernet cable via a hub.

2.5.4.1 Ethernet Interface Connection Diagram

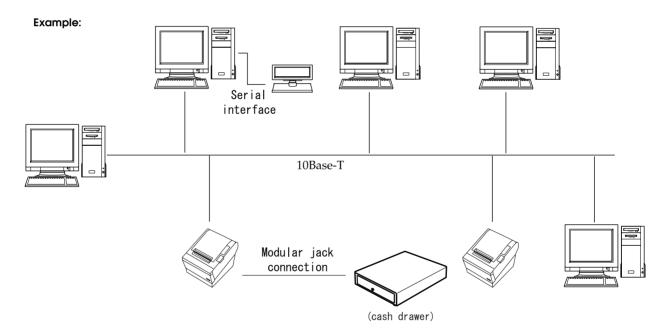


Figure 2-18 Ethernet connection



When a TM printer is connected to the host computer via a network interface, a customer display (DM-D) cannot be connected to the TM printer. If a customer display must be connected, connect it to the host computer's serial interface.

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2.5.4.2 Connecting the Ethernet Interface Cable

- 1. Make sure the power supplies for both the printer and host computer have been turned off.
- For 10Base-T/100Base-T Ethernet, connect a 10Base-T/100Base-T cable to the 10Base-T/ 100Base-T Ethernet connector by pressing firmly until the connector clicks into place.

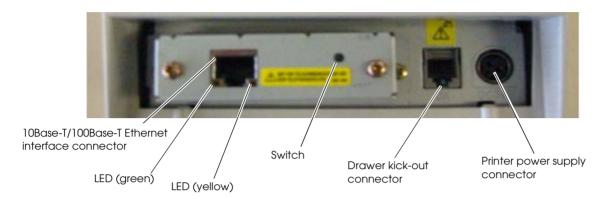


Figure 2-19 Example Ethernet port interface panel (UB-E02)



Connecting devices directly to LAN cables installed outdoors exposes them to damage from power surges caused by lightning and other inductive sources. Make sure devices without proper surge protection are cushioned by being connected through devices that do have surge protection. Otherwise, do not connect them to outdoor lines.

Never attempt to connect the customer display cable, drawer kick-out cable, or the standard telephone line cable to the 10Base-T/100Base-TX Ethernet connector.



To use the Ethernet interface, the separate IP Address Setup Utility for the UB-E02 is required. For details on the various setup methods, refer to "UB-E02 Technical Reference Guide." You can obtain the "IP Address Setup Utility for UB-E02" and the "UB-E02 Technical Reference Guide" from one of the following URLs:

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

http://pos.epson.com/

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

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

Select the product name from the "Select any product" pull-down menu.

Other compatible Ethernet interface modules may be available for your printer. Contact your EPSON dealer for information on the options available.

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2.5.5 Wireless LAN Interface Connection

For details on how to set up a wireless LAN interface, see the UB-R02 Technical Reference Guide.

2.6 Connecting Power Supply Unit and Cash Drawer

Always use one of the following power supplies:

The EPSON PS-180 (the currently available power supply that can be used with the TM-T88IV).

Use the cash drawer handled by EPSON or your dealer.



Always use the EPSON PS-180 or an equivalent product as the power supply unit. Using a nonstandard power supply can result in electric shock and even fire.

Should a fault ever occur in the EPSON PS-180, or equivalent product, immediately turn off the power to the printer and remove the power supply cable from the wall socket.

2.6.1 Connecting the Power Supply Unit

- 1. Make sure the printer's power supply is turned off and the power supply unit's power cable has been removed from the wall socket.
- 2. Check the specifications label on the power supply unit to confirm that the wall socket power supply meets the rated voltage requirements.
- 3. Insert the connector of the power supply cable onto the power supply connector (labeled **DC24V**).

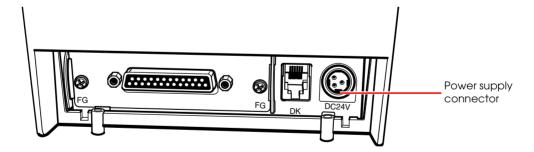


Figure 2-20 Connecting the power supply

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CAUTION:

Be sure to remove the power supply unit's cable from the wall socket whenever connecting or disconnecting the power supply unit to the printer. Failure to do so may result in damage to the power supply unit or the printer.

Make sure the wall socket power supply satisfies the rated voltage requirements of the power supply unit. Never insert the power supply cable plug into a socket that does not meet the rated voltage requirements of the power supply unit. Doing so may result in damage to both the power supply unit and the printer.



Before removing the DC cable connector from the EPSON PS-180 (current model power supply), make sure the power supply cable has been removed from the power supply unit, then grasp the arrow-marked section of the connector and pull straight out.

2.6.2 Connecting the Drawer Kick-out Cable



WARNING.

Prepare a drawer that meets printer specifications. Otherwise, the drawer kick-out solenoid or other parts in the drawer might burn and cause a fire. This may also cause the printer to malfunction at the same time.

Do not insert a telephone line into the drawer kick-out connector. Doing so may damage the telephone line or printer.

Connect the connector of the drawer kick-out cable to the printer.

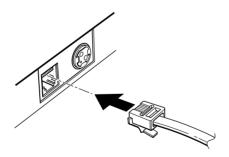


Figure 2-21 Connecting the drawer-kick cable

2.7 Installing the Driver

To use the TM printer, either the Advanced Printer Driver (APD) (Windows driver) or the EPSON OPOS ADK (OCX driver) must be installed. For an outline of each driver, refer to "Introducing the Control Methods" (page 3-1). For details on installation methods, refer to the manual for the respective driver.



ESC/POS commands are also available for directly controlling the printer without the user of a driver. For details on ESC/POS commands, also refer to "ESC/POS Commands" (page 3-6).

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Application Development Information

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

3.1 Introducing the Control Methods

The TM printer can be controlled and can print using any of the following 3 methods.

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

Depending on the driver and interface used, the IP setup tool for the Ethernet model, USB device driver, logo printing registration utility (TMFlash logo utility), etc. are available. Get the latest information from one of the following URLs:

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

http://pos.epson.com/

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

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

Select the product name from the "Select any product" pull-down menu.

3.1.1 Windows Driver (EPSON Advanced Printer Driver)

The EPSON Advanced Printer Driver provides the TM printer with satisfactory control as a Windows driver.

3.1.1.1 EPSON Advanced Printer Driver overview

EPSON Advanced Printer Driver has the following features:

- ☐ Supplies a Windows printer driver for the TM printer to enable printing from a general Windows application.
- ☐ Can execute POS printer-specific functions, such as cutting paper and opening a drawer.
- ☐ Can print printer-resident fonts by selecting the font type.
- ☐ Can get the printer status using programming languages, such as Visual Basic (VB), via status API. This uses the printer's bidirectional communication capability in the Windows standard printer driver operating environment.



The status API is a printer control API originally supplied by EPSON. This can be used to get the printer status and send ESC/POS commands.

3.1.1.2 EPSON Advanced Printer Driver contents

The installer automatically evaluates the target PC environment and automatically installs the
DLL and software components necessary for operation. You can select the drivers, sample
programs, and manuals to be installed.

Drivers

You can select the driver, based on its purpose (drivers also can be installed simultaneously), including two-color printing, smoothing, continuous printing, cutting method options, and other functions.

- Receipt: For receipt printing
- ☐ Sample programs

You can install sample programs in Visual Basic and Visual C++ to use status API.

Manuals

The following manuals can be installed:

- User's manual (for developers)
- Engineering data for each status
- Main function control methods (for WordPad and VB)

3.1.1.3 EPSON Advanced Printer Driver support environment

- ☐ Supported interfaces
 - Serial, parallel, USB, Ethernet
- ☐ Supported operating systems (with confirmation of system operation)
 - Microsoft Windows NT4.0 SP6a English
 - Microsoft Windows 2000 SP4 English
 - Microsoft Windows XP SP2 English
 - Microsoft Windows XP Embedded

Refer to the release note for the driver for the latest information.

- ☐ Supported development languages
 - Visual Basic
 - Visual C++

☐ Supported devices

Refer to the release note for the driver for details on available equipment.

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



A separate USB device driver is required for a USB model printer, and a separate IP setup utility is required for an Ethernet model printer. See the manual packed with the APD.

When you use the APD for the TM-T88IV, using TrueType fonts may slow printing down, due to the speed of communication between the printer and host computer. If this happens, we recommend using printer-resident fonts. For details on how to use resident fonts, see the user's manual for the APD.

Printing with TrueType fonts on other interfaces may have a slight influence on customer applications. In that case, use the printer-resident fonts. Because of the restrictions of some customer applications, when the APD is used with that application, resident fonts sometimes cannot be used, even if they are specified.

When OPOS is used, this problem does not arise because only the printer-resident fonts are available.

3.1.1.4 Driver information and download destination

Get the latest driver information from one of the following URLs:

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

http://pos.epson.com/

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

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

Select the product name from the "Select any product" pull-down menu.

3.1.2 EPSON OPOS ADK

The EPSON OPOS ADK supports the development environment required for OPOS application development using OPOS Control as described by the OLE for Retail POS (simply called "OPOS" from here on) Technology Association to supply the OPOS-compliant printer driver (OCX). Use this control method to develop OPOS-compliant applications. EPSON's OPOS ADK has the following features:

The EPSON OPOS ADK comprehensively supports the development environment required for OPOS application development at customer sites, including not only OPOS Control (CO + SO) proposed by the OPOS Association, but also the contents necessary for development, ranging from the installers and setup utilities to sample programs and manuals, and the function for getting logs for debugging, and silent installation that achieves ease of installation on a target PC.

☐ The EPSON OPOS ADK reduces the man-hours for application development, since it handles the following functions that application developers up till now have had to consider. The functions are supported by EPSON-original Direct IO with parameters, power-on notification, offline buffer clear processing, and so on.



For details on the API functions, refer to the "Application Programmers Guide Specification" provided by the OLE POS Technology Association.

3.1.2.1 EPSON OPOS ADK (OPOS Control) overview

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

- ☐ Supplies the CO for each device class and SO for EPSON devices.
- ☐ Direct IO with parameters available:
 - Gets the printer maintenance counter value
 - Prints NVRAM-stored bit images, etc.
- Power-on notification function (at power on, this function automatically restores the printer to the state that was active before power off).
- Offline buffer clear processing (clears the print buffer contents in offline mode).
- ☐ Debugging function (trace function):
 - Obtains a log between the application and CO (target: used API and its return value)
 - Device status acquisition log (gets the offline and error causes that actually occurred in the devices)

3.1.2.2 EPSON OPOS ADK contents

The installer of the EPSON OPOS ADK, Ver. 2.10 or later, has a silent installation function, which can install the OPOS environment without a user interface and facilitate installation. With the installer, the following OPOS-compliant OPOS Control for EPSON devices, manuals, various utilities, and sample programs can be installed.

□ OPOS Control for EPSON devices

Header files for CO, SO, C++, header files for VB, TLB file of CO, device information files, etc., can be installed.

- Manuals
 - User's guide (environment construction manual: installation/uninstallation, usage methods for various utilities)
 - Application Development Guide (manual for OPOS-compliant application developer: common manual, manual for each device)

- Various utilities
 - SetUpPOS utility

Facilitates selection of equipment and connection ports and various settings (print wait time, etc.).

TM Flash logo utility

Saves a bitmap file to the printer or customer display, for example.

USB device driver

This driver is necessary to connect a USB model printer.

Sample programs

Sample programs for VB, VC++ can be installed.

3.1.2.3 EPSON OPOS ADK support environment

- ☐ Supported interfaces
 - Serial, parallel, USB, Ethernet
- ☐ Supported OSes (with confirmation of system operation)
 - Windows 95 Standard, OSR 2.5
 - Windows 98 Second Edition
 - Windows NT Ver. 4.0 SP5, SP6
 - Windows 2000 Professional
 - Windows XP Professional

Refer to the release note of the driver for the latest information.

- ☐ Supported development languages
 - Visual Basic
 - Visual C++

3.1.2.4 Driver information and download destination

Get the latest driver information from one of the following URLs:

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

http://pos.epson.com/

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

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

Select the product name from the "Select any product" pull-down menu.

3.1.3 ESC/POS Commands

To directly control the TM printer using ESC/POS commands, EPSON proposes printing/control via ESC/POS commands. The printer can be controlled directly by sending ESC/POS commands from an application to the printer. For detailed information about ESC/POS commands, please contact EPSON or your dealer.

3.1.4 Various Utilities

We provide the utilities described below for developers of TM printer applications. You can obtain the utilities from one of the following URLs:

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

http://pos.epson.com/

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

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

Select the product name from the "Select any product" pull-down menu.

3.1.4.1 Memory Switch Setting Utility

This utility is designed to perform the memory switch-related functions of the TM printer easily.

- ☐ You can execute a communication test and self-test.
- ☐ You can set the switches, etc. (such as customized values and serial communication condition).

3.1.4.2 IP address setup utility for UB-E02

This utility and its detailed manual for developers allow you to set an IP address for a 10Base-T/ 100Base-TX Ethernet interface installed in the TM printer. Customers who have purchased the Ethernet model TM printer need this utility.

3.1.4.3 Electronic logo storage utility for NVRAM

This utility is designed to save logos (bitmaps) to NVRAM (non-volatile RAM). By storing shop logos to NVRAM, the print speed can be increased.

3.2 Switches and Buttons

On this printer, you can disable or enable the FEED button. For details on how to switch between disabled or enabled, refer to the documentation for OPOS Advanced Printer Driver and ESC/POS commands, respectively.

3.2.1 FEED Button

The printer feeds paper based on the line spacing set by the control method (OPOS, Advanced Printer Driver, ESC/POS commands). However, you cannot feed paper using the FEED button under the following conditions:

- When the roll paper cover is open.
- When performing a self-test (Press the FEED button to stop the self-test and press it again to resume it).
- When the FEED button has a function defined in a macro definition command (when ESC/POS commands are used).

3.3 Panel LEDs and Error Status

3.3.1 (POWER) LED

Table 3-10 Power LED

Item		Specifications
LED color		Green
LED states Off		Power is not supplied.
On		Power is supplied.

3.3.2 PAPER OUT LED

Table 3-11 PAPER OUT)LED

Item		Specifications
LED color		Red
LED states Off		Roll paper is loaded.
On A roll paper near end or paper end is detected.		A roll paper near end or paper end is detected.
Flashing		Self-test standby state or standby state when a macro execution command is used.



The macro function is available only when ESC/POS commands are used.

3.3.3 Error LED

Table 3-12 Error LED

Item		Specifications
LED color		Red
On states Off		Printer is performing regular operations or is online.
On Offline		Offline (excluding self-test with the FEED button).
	Flashing	Error state.

3.3.3.1 Error Codes

There are three possible error types: automatically recoverable errors, recoverable errors, and unrecoverable errors.

- ☐ For automatically recoverable errors, the user does not have to take any action. The error recovers automatically when the head temperature returns to normal or the cover is correctly closed.
- ☐ A recoverable error recovers by resetting the printer or sending a command from the driver after the cause of the error is eliminated.
- ☐ For unrecoverable errors, the printer or the power supply may be malfunctioning and must be repaired.

Automatically recoverable errors

Although normal printer operation is no longer possible when automatically recoverable errors occur, they do not represent printer failure. They can be recovered easily, as described below.

Table 3-13 Automatically recoverable errors

Error	Error description	Error LED flash code	Recovery measure
		— ► A pprox. 160 ms	
Roll paper cover open error	The roll paper cover was opened during printing.	wwww	Recovers automatically when the roll paper cover is closed.
Print head temperature error	A high temperature outside the head drive operating range was detected.	mmmm	Recovers automatically when the print head cools.



If the temperature cannot be detected correctly, an internal circuit connection error occurs.

Recoverable errors

Although normal printer operation is not possible after a recoverable error occurs, this is not a printer malfunction. These errors can be recovered easily by turning the power on again or sending an error recovery command from the driver after eliminating the cause of the error.

Table 3-14 Recoverable errors

Error	Error description	Error LED flash code	Recovery measure
		→	
Autocutter error	Autocutter does not work correctly.		Remove the jammed paper or foreign matter in the printer, close the roll paper cover, send the error recover command, or turn the power on to recover.



The error recovery command is valid only if a recoverable error (excluding automatically recoverable errors) occurs. If a recoverable error occurs, the printer recovers from the error upon receipt of an error recovery command from the driver after the cause of the error is eliminated. Turning the printer's power off and on is not required.

Unrecoverable errors

Normal printer operation is no longer possible when unrecoverable errors occur. The printer must be repaired.

Table 3-15 Unrecoverable errors

Error	Error description	Error LED flash code	Recovery measure
		→ Approx. 160 ms	
Memory R/W error	After R/W checking, the printer does not work correctly.		Impossible to recover
High voltage error	The power supply voltage is extremely high.	JU JU	Impossible to recover
Low voltage error	The power supply voltage is extremely low.		Impossible to recover
CPU execution error	The CPU is executing an incorrect address.		Impossible to recover
UIB Error	An abnormal operation occurs in UIB.	MM T	Impossible to recover
Internal circuit connection error	Internal circuits are not connected correctly.		Impossible to recover

Note:

When an unrecoverable error occurs, turn off the power supply immediately.

3.4 Sensors

3.4.1 Paper Sensors

The printer has two paper sensors.

3.4.1.1 Roll paper near-end sensor

The roll paper near-end sensor uses the diameter of the roll paper to detect whether the remaining paper is getting low. This sensor is located inside the roll paper supply unit, and you can fine-tune the amount of remaining paper detected by this sensor. (For details on adjustment, see page 2-6.)

Lighting of the PAPER OUT LED in a near-end state does not indicate an error. Regular printing is possible.

Note:

Detection of the near-end status does not necessarily indicate the complete end of the roll paper. Use the sensor as an indication of when to replace the roll paper.

By changing the driver setting, a print job can be canceled automatically during the near-end status.

3.4.1.2 Roll Paper End Sensor

The roll paper end sensor detects whether there is paper in the paper path. When there is no paper (paper end status), the PAPER OUT LED and ERROR LED light to indicate an error has occurred. If the sensor detects a roll paper end, the printer stops printing, even in the process of printing. We recommend that you mainly rely on the roll paper near-end sensor and use the roll paper end sensor secondarily.

Thiss ishtrahtedand cfRQQR.4rhe383p.cd/il/coo)cinth 3.2995 -1.1954 TD -0.0369 Tc 0.0655 Tw the-r07.6(i)e-ecee-i

3.4.3 Offline

This printer is not equipped with an online/offline switch. The printer automatically goes offline under the following conditions:

- During power on (including resetting with the interface) until the printer is ready
- During the self-test
- When the roll paper cover is open
- During paper feeding using the FEED button
- When the printer stops printing due to a paper-end (if an empty paper supply is detected by the roll paper end sensor or if the driver has been set to stop printing when a roll paper near-end is detected)
- When an error has occurred
- During macro executing standby status

3.4.4 Busy State

3.4.4.1 Selecting conditions for invoking a BUSY state

With DIP SW2-1, you can select conditions for invoking a BUSY state as either of the following:

- ☐ When the receive buffer is full
- ☐ When the receive buffer is full or the printer is offline



In either case above, the printer enters the BUSY state after power is turned on (including resetting with the interface), while the printer is in the standby state waiting for data, and when a self-test is being run.

For details on how to change the DIP switch setting for receive buffer full, see "Setting the DIP Switches" on page 2-2.

When using the Advanced Printer Driver, DIP SW2-1 must be ON. When using OPOS, it can be either ON or OFF.

Table 3-16 Printer BUSY conditions and status of DIP SW2-1

		DIP SW2	-1 status
Printer status		ON	OFF
Offline	During the period after power is turned on (including resetting with the interface) to when the printer is ready to receive data.	BUSY	BUSY
	During the self-test.	BUSY	BUSY
	When the cover is open.	_	BUSY
	During paper feed with the FEED button.	_	BUSY
	When the printer stops printing due to a paper-end (when printer has run out of roll paper).	_	BUSY
	When an error has occurred.	_	BUSY
When the rece	eive buffer is full	BUSY	BUSY



When DIP SW2-1 is ON, the printer will not become BUSY even if printer hardware stops operating.

- When an error has occurred
- When the cover is open
- When printing has stopped for a paper out
- When paper is fed by the FEED button

3.5 NVRAM (Non-volatile Memory)

NVRAM is mounted on this printer, and bitmap images (for example, business logos) or other data are written to it. Pay attention to the following when using NVRAM.

- The following restriction applies when performing operations (including storing and deleting data) in NVRAM.
 - Do not use the FEED button.
- ☐ The printer sometimes enters the BUSY state when data is being written to NVRAM. It is important not to send data from the host computer while the printer is in the BUSY state, because the printer cannot process any received data.
- ☐ Frequent use of the functions for writing data to and deleting data from NVRAM may damage the memory. As a rule, in using the various commands to write to NVRAM, avoid writing more than an average of ten times per day.

3.6 Bar Code Printing

This printer can print the following types of bar codes:

UPC-A, UPC-E

JAN 8 (EAN 8), JAN 13 (EAN 13)

CODE 39

ITF (Interleaved 2 of 5)

CODABAR (NW-7)

CODE 93

CODE 128

PDF417 (2D code)

OR Code

To set and print each bar code, refer to the OPOS, Advanced Printer Driver, and ESC/POS command documentation, respectively.



Take a consideration as described below to determine whether the ability of the reader (scanner) can be satisfied when the print result on the receipt, such as bar code, 2-dimensional code, or characters.

Print density The print density may vary depending on the type of roll paper or the environmental conditions.

3.7 Notes on Printing 2-Dimensional Code

The TM-T88IV supports 2-dimensional code printing. Be sure to follow the notes below when printing 2-dimensional codes.

- When printing PDF417 (2-dimensional code), it is recommended to set the height of one module of the symbol to three to five times the width of one module, also making sure that the total height is almost 5 mm {0.20"} or more.
- The recognition rate of the 2-dimensional code may be affected by such items as different widths of the modules, print density, environmental temperature, type of the thermal paper, and characteristics of the reader. Therefore, the user should check the recognition rate in advance so that the limitations of the reader can be considered.

3.8 Two-color printing

For selecting colors/how to print, see the relevant documents for OPOS, the printer driver, and the ESC/POS commands.

3.9 Operating Mode (Switch Panel Operation)

The printer has a self-test mode to check printer settings in addition to the regular print mode.

3.9.1 Self-test Mode

In the self-test mode, the following items are checked and printed out:

- Control circuit functions
- Printer mechanism functions
- Print quality
- Control software ROM version
- DIP switch settings

Follow the steps below to start a self-test:

- 1. With the roll paper cover open, press and hold down the FEED button and turn on the printer. The printer prints various printer settings.
- 2. When the printer finishes printing the printer status, check whether the following message is printed (The printer is now in the self-test wait mode.):

```
"If you want to continue SELF-TEST printing.
Please press PAPER FEED button"
```

- 3. To start a test print, press the FEED button while the printer is in the self-test wait mode.
- 4. Check that the following has been printed:

```
"*** completed ***"
```

This indicates that the printer has been initialized and returned to the normal mode.

3.10 FAQ List

Listed here are the most-asked questions (Q) and answers (A).

- 1. Look for information relating to your inquiry or problem in the questions.
- 2. Then, follow the instructions described in the "A" sentence below it.

3.10.1 Q: Why has my print data dropped out?

A: Check the handshake process. Data dropout can occur when the handshake between the host computer and printer is not performed correctly. This can result in errors related to print buffer size.

3.10.1.1 Corrective procedure

- 1. Check the serial communication cable, and check the cable connector specifications. (See "Serial Interface Connection" on page 2-8.)
- 2. Check the serial communication conditions of the printer and the host.

Serial communication conditions

- Baud rate
- Parity
- Flow control
- Data length

You can check printer settings as follows:

- 1. Run a self-test to check the printer's serial communication conditions. (See page 3-13.)
- 2. Setting communication conditions using the DIP switches. Set the baud rate with DIP SW1-7 and SW1-8. (Refer to page 2-4.)

3.10.2 Q: Why does the drawer kick-out not operate properly?

A: Drawer specifications differ depending on the manufacturer and the part number. Make sure the specifications of the drawer to be used meet the following conditions before connecting it to the drawer kick-out connector. These conditions also apply to any other devices that use the drawer kick-out connector. Any devices that do not satisfy all the following conditions must not be used.

Conditions

- A load must be provided across drawer kick-out connector pins 4 and 2 or across pins 4 and 5. (*1)
- When the drawer open/close signal is used, a switch must be provided across drawer kick-out connector pins 3 and 6. (*2)
- The solenoid used for the cash drawer must have a resistance of 24 Ω or higher. (*3)

NOTES

- (*1) Operating the printer with incorrectly installed devices voids the warranty.
- (*2) Connecting devices other than the drawer open/close switch voids the warranty.
- (*3) Using a drawer or a drawer kick-out connector with an input current of 1 A or more may cause an over current, which will cause the device to malfunction.

3.10.3 Q: I cannot print part of Page 0 in Visual Basic. Why?

Cannot print a part of Page 0 (for example: **ä**, **ü**, **ë**) in Visual Basic.

A: Try printing using the following procedure:

When programming with Visual Basic, limitations prevent data from 81H through 9FH and from E0H through FEh from being sent as characters. However, you can use the following procedure to send this data:

Dim Send_ data(0) As Byte
Send_data(0) = &h81 '1 byte of sending data
MSComm1.Output = Send_data

ESC/POS Command-related Information

This chapter introduces the printer operation settings, which can be made by using ESC/POS commands, and precautions for those operation settings.

4.1 NV Memory (Non-volatile Memory)

The printer's NV memory can be roughly divided into three parts:

- Firmware program area
- NV memory area for product information (This area cannot be edited by the user.)
- NV memory area that the user can access

The following areas are in the NV memory that the user can access:

- NV user memory
- NV graphics memory
- User-defined character code page ("C.11 Page 255 (Blank Page)")
- Area of user-defined command default values

You can customize your printer by changing these values. Note the following when writing to and deleting from NV memory.

- The following restrictions apply when performing non-volatile memory operations (including data writing and deleting).
 - Do not press the FEED button.
 - Do not execute a real-time command.
 - The ASB status is not sent, even when the ASB function in ESC/POS commands is set to Enabled.
- The printer sometimes enters the BUSY state while data is written to NV memory. It is important not to send data from the host computer while the printer is BUSY, because the printer cannot process any received data.
- Frequent use of the functions for writing data to and deleting data from NV memory may damage the memory. As a rule in using the various commands to write to NV memory, avoid writing more than an average of ten times per day.

4.1.1 Using NV Memory

You can use the free area in NV memory for writing memos, for other character information, for anything you like. Data written to this area is held in the memory even if you turn off the power. For details on how to read and write data, see the "ESC/POS Application Programming Guide."



For details on NV graphics and NV bit images, see the "ESC/POS Application Programming Guide."

4.2 Printer Status

There are three ways to get the printer status, and each method has the following features. For details, see the "ESC/POS Application Programming Guide."

- Automatic status back (ASB):
 When a status request is processed as a regular command, the printer automatically returns a status message whenever the status changes. Always monitor the value returned
- Real-time status: When the printer receives a real-time status command, it responds with the specified printer status. Returning the printer status takes priority over any regular print data.
- Status:

 The printer transmits a specified printer status in the same way it processes normal print data.

4.3 Precautions When the Printer Is Offline

When printer handshake is set with DIP SW2-1 ON (BUSY = receive buffer full), use the ASB function to check the printer status. Using the ASB lets the printer send status automatically at the time of switching online/offline. When using a real-time command, make sure the receive buffer is not full.

Example: After using the 4KB receive buffer to send data for each line, check the printer status.

4.4 Outputting Hex Dumps

TM printers can print data transmitted from the host computer as hexadecimal numbers and their corresponding characters. Called "hex dump mode," this allows you to make sure that data has been sent correctly to the TM printer by comparing the printed result with the program. Follow the steps below to output a hex dump:

- 1. With the roll paper cover open, turn power on while holding down the FEED button.
- 2. Close the roll paper cover.
- 3. Data received from then on is printed out from the TM printer in hexadecimal numbers and their corresponding characters.

To quit the hex dump mode, turn the printer off or press FEED button three times.



Note:

Do not use this mode when using OPOS or the APD. Doing so will cause unexpected data to be printed, because the driver uses proprietary control to drive the printer.

Product Specifications

5.1 Product Specifications (TM-T88IV)

Table 5-17 Specifications

Print method	Thermal line printing		
Print width	Standard:	paper width of 80 mm — print width of 72 mm {2.84"}, 512 dot positions	
Cut type	Partial cut (left-most	one point uncut)	
Character sets	95 alphanumeric, 37	international characters, 128×11 pages of extended graphics	
Interface (compatible)	Serial (RS232/RS485)/	/ Parallel (IEEE1284)/ Ethernet (10/100Base-T)/ USB (Full speed)	
Buffer	Receive buffer: 4KB/	45 bytes	
	User-defined buffer For both downloade	ed bitmap images and fonts: Approx. 12KB	
	Macro buffer: 2KB		
	NV graphics data storage area: 256KB NV user memory: 1KB		
DKD function	2 drives		
Power supply	Power supplied by optional AC adapter: PS-180		
Operating voltage	24 VDC ±7%		
Current consumption	Low-power mode Average: Appro (Font A, α-N, 36 co Standby:	apital letters, rolling pattern, 42-column printing)	
Temperature/humidity		5°C (41 to 113°F), 10 to 90% RH ed packed state -10 to +50°C (14 to 122°F), 10 to 90% RH	
Weight	Approx. 1.8 kg {3.968	3 lb}	

5.2 Print Specifications (TM-T88IV)

Table 5-18 Print characteristics

Characteristics	Specifications
Print method	Thermal line printing
Paper feed method	Unidirectional with friction feed
Print width	72 mm {2.84"} (80mm paper width model)
Characters per line	See table titled "Print width/characters per line," below.
Print speed	See table titled "Print speed," below.
Paper feed speed	High-speed mode: 200 mm/s {7.9"/s} max.; 47.2 lps (4.23 mm {1/6"} feed) Ladder bar code and 2D code: 100mm/s {2.4"/s} Low-power consumption mode: 150 mm/s {5.9"/s} max.; 35.5 lps (4.23 mm feed {1/6"}) Bit image, Ladder bar code, 2D code and Page mode: 60mm/s {2.4"/s} The above speed values are approximate. The values are when the printer prints with density "Normal" at 24 V and 25°C {77°F} Speed is adjusted automatically depending on the voltage applied and head temperature.
Carriage return width	4.23 mm or 1/6"

Table 5-19 Print width/characters per line

Paper width (mm)	Roll paper width (mm)
	80 (standard)
Number of print dots	512
Print width (mm)	72 {2.84"}
Font A (12 × 24) number of columns	42
Font B (9 × 17) number of columns	56
Kanji font (24 × 24) number of columns	21

Table 5-20 Print speed

Print control mode	Unit	Setting	Print speed (approx.)
High-speed mode (*1)	mm/sec	_	200mm/s {7.9"/s}
	lps	Line space setting: 4.23 mm {1/6"}	47.2 lbs
Low-power mode	mm/sec	_	150mm/s {5.9"/s}
	lps	Line space setting: 4.23 mm {1/6"}	35.5lbs

Table 5-20 Print speed

Print control mode	Unit	Setting	Print speed (approx.)
Printing ladder bar codes and 2D code	mm/sec	High-speed mode: Line space setting: 4.23 mm {1/6"}	100mm/s {2.4"/s}
	mm/sec	Low-speed mode: Line space setting: 4.23 mm {1/6"}	60mm/s {2.4"/s}
Bit image and Page mode	mm/sec	Low-speed mode: Line space setting: 4.23 mm {1/6"}	60mm/s {2.4"/s}
Two-color printing	mm/sec	High-speed mode: Line space setting: 4.23 mm {1/6"}	100mm/s {1.65"/s}

During printing (at 24 V, 28°C {82.4°F}, Print density Normal). Note, however, the print speed automatically changes with the voltage applied to the printer and with the head temperature conditions.



The print speed sometimes slows down, depending on the data transfer speed and other settings.

A slow baud rate is a probable cause of intermittent printing. We recommend using a faster baud rate.

5.3 Character Specifications (TM-T88IV)

Table 5-21 Character specifications

Item		Specifications	
Character type Alphanumeric		95 character sets	
	International	37 types	
	Extended graphics	128 characters x 11 pages (including 1 blank page)	
Character configuration		See table titled "Character configurations and dimensions," below. (Default is font A.)	
Character dimensions		See "Character configurations and dimensions," below. (Spaces between characters not included.)	

Table 5-22 Character configurations and dimensions

	Standard	Double-height	Double-width	Double-width / Double-height
	W × H (mm)	W × H (mm)	W × H (mm)	W × H (mm)
Font A (12 × 24)	1.41 × 3.39	1.41 × 6.77	2.82 × 3.39	2.82 × 6.77
Font B (9 × 17)	0.99 × 2.40	0.99 × 4.80	1.98 × 2.40	1.98 × 4.80
Kanji font (24 × 24)	3.39 × 3.39	3.39 × 6.77	6.77 × 3.39	6.77 × 6.77

Notes: 1. Spaces between characters not included.

2. Characters can be scaled up to 64 times as large as the standard size.

5.4 Paper Specifications (TM-T88IV)

See Appendix B.

5.5 Printable Area (TM-T88IV)

For 80mm paper width model:

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

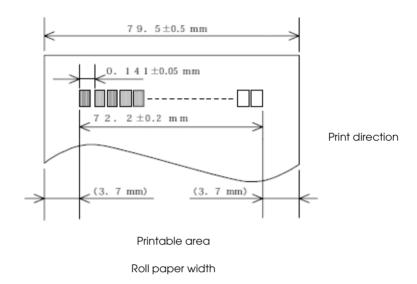


Figure 5-22 Printable area

Table 5-23 Dimensions

a (roll paper width)	b (left margin)	c (print width)	d (right margin)
79.5 ± 0.5	3.7	72.2 ± 0.2	3.7

^{*} Units: mm

5.6 Print Position versus Cutter Position (TM-88IV)

The following illustration shows the relationship between print position and cutter position.

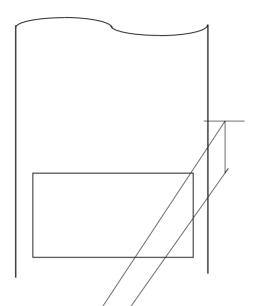


Figure 5-23 Print position versus cutter position

Note:

The values in the figure are center values. The margins vary, due to paper slack or paper variations from piece to piece. Allow a certain margin of eyror when setting the paper cutter cut position.

5.7 Overview of External Dimensions (TM-T88IV)

5.7.1 External Dimensions

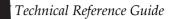
The dimensions in the figure below are common to both the TM-88III and TM-88III.

- □ Height 148 mm {5.83"}
 □ Width 145 mm {5.71"}
 □ Depth 195 mm {7.68"}
- ☐ Weight Approx. 1.8 kg {3.97 lb} (without roll paper)

(funds: mm) 148



Figure 5-24 Dimensions



condensation allowed. le figure below.)

(excluding paper)

34 40 45

ure 5-25

the Epson evaluation s depending on the ne setting values such as

Interfaces and Connectors

A.1 RS-232 Serial Interface

A.1.1 Interface Board Specifications (RS-232-compliant)

Table A-1 Serial interface specifications

Item		Specifications		
Data transfer method		Serial		
Synchronization		Asynchronous		
Handshake		Select one of the following with DIP SW1-3: □ DTR/DSR (DIP SW1-3 OFF) default □ XON/XOFF (DIP SW1-3 ON)		
Signal level	MARK	-3 V to -15 V logic "1" /ON		
	SPACE	+3 V to +15 V logic "0" /OFF		
Bit length		Select one of the following with DIP SW1-4: 7 bit (DIP SW1-4 ON) 0 8 bit (DIP SW1-4 OFF) default		
Baud rate		Select one of the following with DIP SW1-7 and SW1-8: 4800bps, 9600bps, 19200bps, 38400bps Select one of the following with Commands: 2400bps, 4800bps, 9600bps, 19200bps, 38400bps, 57600bps, 115200bps (bps: bits per second)		
Parity check		Select one of the following with DIP SW1-5: UNIVERSE (DIP SW1-5 ON) UNIVERSE (DIP SW1-5 OFF)		
Parity selection		Select one of the following with DIP SW1-6: □ Even (DIP SW1-6 ON) □ Odd (DIP SW1-6 OFF)		
Stop bit		1 or more bits However, the stop bit for data transfer from the printer is fixed to 1 bit.		
Connector Printer side		DSUB 25-pin (female) connector		

A.1.2 Functions of each Connector Pin

Table A-2 Pin assignments

Pin no.	Signal name	Signal direction	Function	
1	FG	_	Frame ground	
2	TXD	Output	Transmission data	
3	RXD	Input	Reception data	
4	RTS	Output	Equivalent to DTR signal (pin 20)	
6	DSR	Input	This signal indicates whether the host computer can receive data. SPACE indicates that the host computer can receive data. MARK indicates that the host computer cannot receive data. When DTR/DSR control is selected, the printer transmits data after confirming this signal (except if transmitted using some ESC/POS commands). When XON/XOFF control is selected, the printer does not check this signal. Changing DIP SW2-7 lets this signal be used as a printer reset signal. When you use this signal as the printer's reset signal, the printer is reset when the signal remains MARK for a pulse width of 1 ms or more.	
7	SG	_	Signal ground	
20	DTR	Output	 When DTR/DSR control is selected, this signal indicates whether the printer is Busy. SPACE status — indicates the printer is ready to receive data. MARK status — indicates the printer is Busy. Set Busy conditions with DIP SW2-1. (Refer to "Busy State" on page 3-11). When XON/XOFF control is selected, the signal indicates that the printer is properly connected and ready to receive data from the host. SPACE status — indicates the printer is properly connected and ready to receive data from the host. The signal is always SPACE, except in the following cases: During the period from when power is turned on to when the printer is ready to receive data. During the self-test. 	
25	INIT	Input	Changing DIP SW2-8 enables this signal to be used as a reset signal for the printer. The printer is reset if the signal remains at SPACE for a pulse width of 1 ms or more.	

A.1.3 XON/XOFF

When XON/XOFF control is selected, the printer transmits the XON or XOFF signals as follows. The transmission timing of XON/XOFF differs, depending on the setting of DIP SW2-1.

Table A-3 XON/XOFF transmissions

Signal	nal Printer status		DIP SW2-1 status	
		1 (ON)	0 (OFF)	
XON	When the printer goes online after turning on the power (or reset using the interface)	Transmit	Transmit	
	2) When the receive buffer is released from the buffer full state	Transmit	Transmit	
	3) When the printer switches from offline to online	_	Transmit	
	4) When the printer recovers from an error using some ESC/POS commands	_	Transmit	
XOFF	5) When the receive buffer becomes full	Transmit	Transmit	
	6) When the printer switches from online to offline	_	Transmit	

A.1.4 Code

The hexadecimal numbers corresponding to the XON/XOFF codes are shown below.

■ XON code: 11H ■ XOFF code: 13H



When the printer goes from offline to online and the receive buffer is full, XON is not transmitted.

When the printer goes from online to offline and the receive buffer is full, XOFF is not transmitted.

When memory switch Dip switch 1-3 is off, XON is not transmitted as long as the printer is offline, even if a receive buffer full state has been cleared.

A.2 IEEE 1284 Parallel Interface

A.2.1 Modes

The IEEE 1284 parallel interface supports the following two modes.

Table A-4 Parallel modes

Mode Communication direction		Other information	
Compatibility mode	Host →Printer communication	Centronics-compliant	
Reverse mode	Printer →Host communication	Assumes a data transfer from an asynchronous printer	

Compatibility mode

Compatibility mode allows data transmission from host to printer only: Centronics-compatible.

Specifications

Data transmission: 8-bit parallel

Externally supplied STROBE* signals Synchronization:

Handshaking: ACK* and BUSY signals

Signal levels: TTL-compatible connector

ADS-B36BLFDR176 (HONDA) or equivalent product Connector:

(IEEE 1284 Type B)

Reverse communication: Nibble or byte mode

^{*}A rule above a signal name indicates an "L" active signal.

Reverse mode

The transfer of status data from the printer to the host proceeds in the nibble or byte mode.

This mode allows data transfer from an asynchronous printer under the control of the host. Data transfers in the nibble mode are made via the existing control lines in units of four bits (a nibble). In the byte mode, data transfer proceeds by making the 8-bit data lines bidirectional. Both modes fail to proceed concurrently in the compatibility mode, thereby causing half-duplex transmission.

A.2.2 Interface Signals

Table A-5 Connector pin assignments

Pin	Source	Compatibility Mode	Nibble Mode	Byte Mode
1	Host	Strobe	HostClk	HostClk
2	Host/Ptr	DataO(LSB)	Data0 (LSB)	DataO (LSB)
3	Host/Ptr	Data1	Data1	Data1
4	Host/Ptr	Data2	Data2	Data2
5	Host/Ptr	Data3	Data3	Data3
6	Host/Ptr	Data4	Data4	Data4
7	Host/Ptr	Data5	Data5	Data5
8	Host/Ptr	Data6	Data6	Data6
9	Host/Ptr	Data7 (MSB)	Data7 (MSB)	Data7 (MSB)
10	Printer	Ack	PtrClk	PtrClk
11	Printer	Busy	PtrBusy/Data3, 7	PtrBusy
12	Printer	Perror	AckDataReq/Data2, 6	AckDataReq
13	Printer	Select	Xflag/Data1, 5	Xflag
14	Host	AutoFd	HostBusy k	HostBusy
15		NC	ND	ND
16		GND	GND	GND
17		FG	FG	FG
18	Printer	Logic-H	Logic-H	Logic-H
19		GND	GND	GND
20		GND	GND	GND
21		GND	GND	GND
22		GND	GND	GND
23		GND	GND	GND
24		GND	GND	GND
25		GND	GND	GND
26		GND	GND	GND
27		GND	GND	GND
28		GND	GND	GND
29		GND	GND	GND
30		GND	GND	GND
31	Host	<u>Init</u>	<u>Init</u>	<u>Init</u>
32	Printer	Fault	DataAvail/Data0, 4	DataAvail
33		GND	ND	ND
34	Printer	DK_STATUS	ND	ND
35	Printer	+5V	ND	ND
36	Host	Selectin	1284-Active	1284-Active

* NC: Not Connected ND: Not Defined



A signal name with a rule above it indicates an "L" active signal.

Bidirectional communications cannot take place, unless all signal names for both sides correspond to each other.

Connect all signal lines using a twisted-pair cable. Connect the return side to the signal ground level.

Make sure the signals satisfy electrical characteristics.

Set the leading edge and trailing edge times to 0.5 µs or less.

Do not ignore \overline{Ack} or BUSY signals during a data transfer. Ignoring such signals may result in data corruption.

Make the interface cables as short as possible.

Options and Consumables

B.1 Roll Paper

The table below shows the roll paper specifications.

Table B-1 Paper specifications

Type of paper	Specified thermal paper Roll Select from the following: 79.5 mm ± 0.5 mm (default) Internal diameter 12 mm {0.47"} Outer diameter 18 mm {0.71"} Outer diameter 83 mm {3.27"} or less					
Shape	Roll					
Paper width		O .				
Roll core		, ,				
External dimensions	Outer diameter	83 mm {3.27"} or less				
Thermal paper type	Specified: Nakagawa (Original: Nippon Pape	Seisakujo, NTP080-80 er Industries Co., Ltd.,TF50KS-E)				

Note:

If roll core standards vary from the figures above, it is difficult for the roll paper NE detector to detect the remaining amount of roll paper exactly. Use these figures merely as a guideline.

B.2 Power Supply

The following describes the specifications for the optional power supplies (PS-180).

B.2.1 PS-180

B.2.1.1 Electrical characteristics

☐ Input conditions

Input voltage (rating): 90 to 264 VAC

(100 VAC -10% to 230 VAC +15%)

Frequency (rating): $50/60 \text{ Hz} \pm 3 \text{ Hz}$

Power consumption (rating): 100 VA

Output conditions

Output voltage (rating): $24 \text{ VDC} \pm 5\%$

Output current (rating): 1.8 A
Output electric power (rating): 48 VA
Output peak current: 4.5 A

B.2.1.2 Case specifications

 \square Dimensions: 68 mm (D) × 136 mm (L) × 32 mm (H) (excluding projections)

 $\{2.68" \times 5.35" \times 1.26"\}$ Refer to the figure below.

☐ Weight: Approx. 0.4 kg {14.11 oz} (excluding the AC cable)

☐ Material: Durability level: V0

☐ Color: Black (matte)

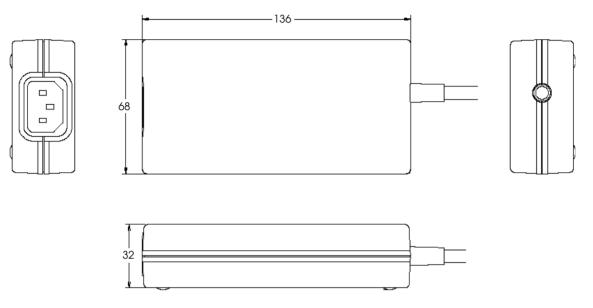


Figure B-1 Case specifications

B.2.1.3 Material

No specific brominated flame retardants, such as PBBE and PBB, are used in this product.

B.2.1.4 AC cable selection

- □ Select an AC cable that satisfies the following conditions.
 - Safety standard product
 - Plug with PE terminal
- ☐ Ground connection: Be sure to ground for safety.

Character Code Tables

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

(International character set: when "America" is selected)

ſτ	1		240	+1	241	_	242	V	243		244		245	-1-	246		247		248		249		250		251	c	252	62	253	_	254	S.	255
įz	112	217	224	-	225	L	226	H	227	ω	228	ס	229	<u> </u>	230	₩.	231	Ð	232	0	233	c	234	ω ω	235		236	Ø	237	W	238	C	539
6	1 =	1011	208	ŀ	209	 -	210	_	211		212	L	213	_	214	+	215	—	216		217	L	218		219		220		221	_	222		223
C	1100		192	-	193	F	194		195		196	+	197	_	198	_	199		200	_	201	4	202	ŀ	203		204	ı	205	-	206	- -	207
В	1011		176	**	177		178		179		180	_	181	-	182	_	183	_	184		185	_	186	F	187	7	188	7	189	,	190	_[191
A	1010	8		í	161	ý	162	'n	163	ŭ	164	iZ,	165	ଣ	166	OI	167	٠,٥	168	L	169	г	170	-40	171	*	172		173	*	174	<u> </u>	175
6	1001	伍	_	88	145	Æ	146	(0	147	းဝ	148	ە ا	149	ŋ	150	ú	151	:>>	152	Ö	153	Ü	154	Q	155	3	156	*	157	굺	158	د م	159
∞	1000	U	128	בי	129	é,	130	නි	131	:œ	132	æ	133	-ൻ	134	5	135	(D)	136	:o	137	è	138	:-1	139	î	140	<i>,</i> –1	141	¥.	142	\ \ \	143
7	0111	۵		σ,	113	ы	114	s	115	+	116	=	117	Δ	118	. M	119	×	120	٨	121	2	122		123		124		125	\	126	Sp	127
9	0110	,	8	83	97	q	86	o	99	٦	100	0	101	4 1	102	90	103	ų	104		105	j	106	X	107		108	E	109	E.	110		111
ı	0101	Ы	80	Ö	81	R	82	S	83	<u>(</u>	84		85	\ \	86	A	87	X	88	Y	83	Z	6		91		92		93		94	_[92
4	0100	0	64	¥	65	В	99	ပ	67	Ω	88		69	<u>.</u>	2	ט	11	H	72	I	73		74	× [75	_ 	92	_ ∑	77	z	78		79
6	0011	0	48		49	7	20	m	51		25		23		54		55		56	6	57		28		29		9		19		62		83
2	0010	SP	32	_[33		34	##	35	န	8	%	37	න් නේ	38	_	39		40		41	*	42	_[43	į	44		45		46		4.7
1	1000	DLE	16	Š Š	17		18	XOFF	119	DC4	07	_	21	7	22		23	§	24	Î	25		92		27	ξ.	788	<u>. </u>	59	-	30	[31
0	0000	NUL	8		10		02		03		104	2 2	S		90		02		80	E	60		10		=		122		13	_[4-1	_[:	12
HEX	(BIN	0000	3	000		0100		0011		0100	ľ	0101		0110		0111		1000	_	1001		10101		1011	\rightarrow	1100	- '	1101	1	1110		1111	-
Ц	HEX	_	>		•	2		۳		4		ro		ب	· _	_		00	,	ď	·	*	: [£		ပ		0		ш		ſĽ,	

Note:

The character code tables show only character configurations. They do not show the actual print pattern.

C.2 Page 1 (Katakana)

	HEX	8	9	A	В	С	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
			ユ	SP		タ	3	=	X
0	0000	128	144	160	176	192	208	224	240
1	0001		Τ	0	ア	チ	4	F	円
1	0001	129	145	161	177	193	209	225	241
2	0010		\dashv	Γ	イ	ツ	メ	#	年
	0010	130	146	162	178	194	210	226	242
3	0011	=	 -	J	ウ	テ	モ]	月
	0011	131	147	163	179	195	211	227	243
4	0100	=		`	エ		ヤ	⊿	日
_	0100	132	148	164	180	196	212	228	244
5	0101		—	•	才	ナ	ユ		時
	0101	133	149	165	181	197	213	229	245
6	0110		l	ヲ	カ	=	∄	▼	分
	0110	134	150	166	182	198	214	230	246
7	0111			ア	キ	ヌ	ラ	/	秒
<u> </u>	0111	135	151	167	183	199	215	231	247
8	1000	l	Г	イ	ク	ネ	リ	_	₸
	1000	136	152	168	184	200	216	232	248
9	1001	I	٦	ウ	ケ	ノ	ル	♥	市
	1001	137	153	169	185	201	217	233	249
A	1010		L		コ	ハ	レ	♦	区
	1010	138	154	170	186	202	218	234	250
В	1011		ا	オ	サ	ド	п	.	町
	1011	139	155	171	187	203	219	235	251
$ _{\mathbf{C}}$	1100			ヤ	シ	フ	ワ	•	村
	1100	140	156	172	188	204	220	236	252
D	1101) [ュ	ス	^	ン	0	人
<u> </u>		141	157	173	189	205	221	237	253
E	1110			3	セ	ホ		/	**
	1110	142	158	174	190	206	222	238	254
F	1111	+	J	ッ	ソ	マ			SP
_	****	143	159	175	191	207	223	239	255

C-2 Character Code Tables Rev. A

C.3 Page 2 (PC850: Multilingual)

	HEX	8	9	Α	В	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç	É	á	***	L	ð	Ó	
	0000	128	144	160	176	192	208	224	240
1	0001	ü	æ	í	₩		Ð	ß	±
	0001	129	145	161	177	193	209	225	241
2	0010	é	Æ	ó	₩	一	Ê	Ô	–
		130	146	162	178	194	210	226	3 242
3	0011	â	ô	ú		 -	Ë	Ò	34
		131	147	163	179	195	211	227	243
4	0100	ä	Ö	ñ	٦		È	õ	¶
		132	148	164	180	196	212	228	244
5	0101	à	ò	Ñ	Á	+	1	Õ	§
		133	149	165	181	197	213	229	245
6	0110	å	û	<u>a</u>	Â	ã	Í 214	μ 230	÷ 946
		134	150	166 O	182	198		b	246
7	0111	Ç 135	ù 151	167	À 183	$ ilde{ ilde{ ext{A}}}_{ ext{199}}$	$\hat{\mathbf{I}}_{215}$	231	247
					©		Ϊ	þ	0
8	1000	ê	ÿ	خ 168	184	200	216	232	248
		ë	Ö	®				Ú	
9	1001	137	153	169	185	201	217	233	249
	1010	è	Ü	7				Û	
Α	1010	138	154	170	186	202	218	234	250
Ъ	1011	ï	ø	1 2	٦			Ù	1
В	1011	139	155	171	187	["] 203	219	235	251
	1100	î	£	$\frac{1}{4}$		<u> </u>		ý	3
C	1100	140	156	172	188	204	220	236	252
D	1101	ì	Ø	i	¢	_	1	Ý	2
ע	1101	141	157	173	189	205	221	237	253
E	1110	Ä	×	«	¥	+	Ì		
15	1110	142	158	174	190	206	222	238	254
F	1111	Å	f	>	٦	¤		·	SP
1.	1111	143	159	175	191	207	223	239	255

C.4 Page 3 (PC860: Portuguese)

	HEX	8	9	Α	В	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
	0000	Ç	É	á		L		a	
0	0000	128	144	160	176	192	208	224	240
1	0001	ü	À	í	***			ß	±
	0001	129	145	161	177	193	209	225	241
2	0010	é	È	ó	₩	一		Γ	≥
	0010	130	146	162	178	194	210	226	242
3	0011	â	ô	ú		 -	L	π	≤
		131	147	163	179	195	211	227	243
4	0100	ã	õ	ñ	┥		L	Σ	f
		132	148	164	180	196	212	228	244
5	0101	à	ò	Ñ	-	+		σ	J
		133	149	165	181	197	213	229	245
6	0110	Á	Ú	<u>a</u>	H	-	F	μ	÷
		134	150	166	182	198	214	230	246
7	0111	Ç	ù	0	7	-	+	τ	≈
		135	151	167	183	199	215	231	0 247
8	1000	ê	Ì	ذ ا	'	900	916	Φ	
		136	152	168	184	200	216	232	248
9	1001	$\hat{\mathbf{E}}$ 137	Õ 153	Ò	105	201	217	θ_{233}	249
				169 	185				249
Α	1010	è 138	Ü 154	170	186	202	218	Ω	250
		Í	¢	$\frac{1}{2}$			Z 10	δ	
В	1011	139	155	171	□ 187	203	219	235	V 251
		Ô	£	$\frac{1}{4}$		L		∞	n
C	1100	140	156	172	188	204	220	236	252
	_	ì	Ù	i			I	Ø	2
D	1101	141	157	173	189	205	221	237	253
_		Ã	Pt	«		1		€	I
E	1110	142	158	174	190	206	222	238	254
12		Â	Ó	>				\cap	SP
F	1111	143	159	175	191	207	223	239	255

C-4 Character Code Tables Rev. A

C.5 Page 4 (PC863: Canadian-French)

	HEX	8	9	A	В	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç	É	l	***	L	┴	a	=
	0000	128	144	160	176	192	208	224	240
1	0001	ü	È	'	***	<u> </u>	 _	ß	±
		129	145	161	177	193	209	225	241
2	0010	é	Ê	ó	***	Τ		Г	≥
		130	146	162	178	194	210	226	242
3	0011	â	ô	ú	170	-	-	π	≤
		131	147	163	179	195	211	227	243
4	0100	$\hat{\mathbf{A}}_{132}$	Ë 148	164	180	196	212	Σ 228	244
			Ϊ			130			J 244
5	0101	à 133	149	165	181	197	213	σ_{229}	J 245
			û	3		L			÷
6	0110	¶ 134	150	166	182	198	214	μ 230	246
_		ç	ù	_			+	τ	≈
7	0111	135	151	167	183	199	215	231	247
0	1000	ê	¤	Î	7	L	 	Φ	0
8	1000	136	152	168	184	200	216	232	248
9	1001	ë	ô		4			θ	•
9	1001	137	153	169	185	201	217	233	249
Α	1010	è	Ü	「		<u></u>	∫ г	Ω	•
	1010	138	154	170	186	202	218	234	250
В	1011	ï	¢	1 2	٦			δ	$\sqrt{}$
		139	155	171	187	203	219	235	251 n
C	1100	î	£	$\frac{1}{4}$		 -	=	∞	
		140	156	172	188	204	220	236	252
D	1101	=	Ù	3 4				Ø	
		141	157	173	189	205	221	237	253
\mathbf{E}	1110	À	Û	≪ 174	100	+ 000	000	€	054
		142	158	174	190	206	222	238	254
F	1111	§ 149	f 150	» 175	101	907		930	SP
		143	159	175	191	207	223	239	255

C.6 Page 5 (PC865: Nordic)

	HEX	8	9	Α	В	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	a 224	= 240
1	0001	ü 129	æ 145	í 161	177	193	209	ß	± 241
2	0010	é 130	Æ 146	ó 162	178	T 194	1 210	Γ 226	≥ 242
3	0011	â 131	ô 147	ú 163	179	195	□ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	π 227	\le \(\frac{242}{243} \)
4	0100	ä 132	Ö 148	ñ 164	180	196	211	Σ 228	1 244
5	0101	à 133	ò 149	Ñ 165	181	+ 197	213	σ 229	J 245
6	0110	å 134	û 150	<u>a</u>	182	198	214	μ 230	÷ 246
7	0111	Ç 135	ù 151	<u>0</u>	183	199	+ 215	τ 231	pprox 240
8	1000	ê 136	ÿ 152	i 168	T84	200	+ 216	Φ 232	o 248
9	1001	ë 137	Ö 153	Tee	185	201	217	θ 233	• 249
A	1010	è 138	Ü 154	¬ 170	186	202	7 218	Ω 234	. 250
В	1011	ï 139	Ø 155	$\begin{array}{c c} \frac{1}{2} \\ \hline 171 \end{array}$	T 187	203	219	δ 235	$\sqrt{}$ 251
C	1100	î 140	£ 156	$\begin{array}{c} \frac{1}{4} \\ 172 \end{array}$	188	204	220	∞ 236	n 252
D	1101	ì 141	Ø 157	173		205	221	Ø 237	2 253
Е	1110	Ä 142	Pt 158	≪ 174	⊒ 190	206	222	€ 238	■ 254
F	1111	Å 143	f 159	¤ 175	7 191	207	223	239	SP 255

C-6 Character Code Tables Rev. A

C.7 Page 16 (WPC1252)

	HEX	8	8		9		A]	В	(C]	D]	E]	F
HEX	BIN	10	00	10	01	10	10	10	11	11	.00	11	.01	11	10	11	.11
0	0000	€		SP		SP		٥		À		Đ		à		ð	
U	0000		128		144		160		176		192		208		224		240
1	0001	SP		6		i		±		Á		Ñ		á		ñ	
	0001		129		145		161		177		193		209		225		241
2	0010	,		,		¢		2		Â		Ò		â		ò	
			130		146		162		178		194		210		226		242
3	0011	f		66		£		3		Ã		Ó		ã		ó	
_			131		147		163		179		195		211		227		243
4	0100	"		"		¤		•		Ä		Ô		ä	$\overline{}$	ô	
			132		148		164		180		196		212		228		244
5	0101	• • •				¥		μ		Å		Ō		å		õ	
			133		149		165	_	181		197		213		229		245
6	0110	†	104	_	150		100	¶	100	Æ	100	О	01.4	æ	000	ö	0.40
			134		150	c	166		182	~	198		214		230		246
7	0111	‡	135	_	151	§	167	•	183	Ç	199	X	215	Ç	231	+	247
		^		~	191		101		100	È	199	a		è			241
8	1000		136		152		168	د	184	E	200	Ø	216		232	Ø	248
		‰		тм	102	©		1	104	É	200	τ'n	210		202	ù	240
9	1001		137		153		169		185	Е	201		217		233	u	249
		š		š		<u>a</u>		<u>o</u>		Ê		ΤΊ		ê		ú	
Α	1010		138	1	154		170		186		202		218		234	•	250
		<		>		«		»		Ë	1	Û		ë		û	
В	1011		139	1	155	-	171		187	_	203		219		235		251
	1100	Œ		œ		-		1/4		Ì		Ü		ì		ü	
C	1100		140	-	156		172		188		204		220		236		252
D	1101	SP		SP				1/2		Í		Ý		í		ý	1
D	1101	<u> </u>	141		157	1	173		189		205		221		237	-	253
Ter	1110	ž		ž		®		3/4		Î		þ		î		þ	
E	1110		142		158		174		190		206		222		238	_	254
F	1111	SP		Ÿ		_		ં		Ĭ		ß		ï		ÿ	
r	1111		143		159		175		191		207		223		239		255

C.8 Page 17 (PC866: Cyrillic #2)

	HEX	8	9	A	В	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	A 128	P 144	a 160	176	192	208	p	Ë 240
1	0001	Б	C 145	б	177	193	209	c 225	ë 241
2	0010	B 130	T 146	B 162	178	194	210	T 226	6
3	0011	Γ 131	У 147	Г 163	179	195	211	y 227	6 243
4	0100	Д	Ф 148	Д	180	196	212	ф	Ï
5	0101	E 133	X 149	e 165	181	197	213	X 229	ï 245
6	0110	Ж 134	Ц 150	Ж 166	182	198	214	ц	ў
7	0111	3	Ч 151	3 167	183	199	215	ч 231	ў 247
8	1000	И 136	Ш 152	и 168	184	200	216	Ш 232	o 248
9	1001	Й	Щ	1	185	201	217	Щ 233	• 249
A	1010	K 138	Ъ 154	K	186	202	218	ъ 234	250
В	1011	Л	ы	Л 171	187	203	219	ы 235	√ 251
C	1100	M 140	Ь	M 172	188		220	ь 236	N ₂
D	1101	H 141	Э 157	H 173	189	205	221	Э 237	¤ 253
E	1110	O 142	Ю 158	O 174	190	206	222	Ю 238	254
F	1111	Π 143	Я 159	П 175	191	207	223	Я 239	SP 255

C-8 Character Code Tables Rev. A

C.9 Page 18 (PC852: Latin2)

	HEX	8	9	A	В	C	D	E	F
HEX	BIN	1000	1001	1010	1011	1100	1101	1110	1111
0	0000	Ç 128	É 144	á 160	176	192	d 208	Ó	240
1	0001	ü	$\hat{\mathbf{L}}_{145}$	í 161	177		\mathbf{D}_{209}	ß 225	241
2	0010	é 130	1 146	ó 162	178	H	Ď	Ô_	242
3	0011	â	ô 147	ú 163	179		Ë 211	Ń	243
4	0100	ä 132	Ö 148	A 164	H		ď	ń	244
5	0101	ů 133	$\mathbf{\check{L}}_{149}$	ą ₁₆₅	Á	H	Ň	ň	§ 245
6	0110	ć 134	Ĭ 150	Ž 166	Â	Ă	Í 214	š_	÷ 246
7	0111	Ç 135	Ś 151	ž 167	Ě	ă	$\hat{\mathbf{I}}_{215}$	š	240
8	1000	ì 136	ś 152		\$		ě 216	Ŕ	o 248
9	1001	ë 137	Ö 153	e 169	H			Ú	249
A	1010		Ü	170			218	ŕ	250
В	1011	Ö 139	Ť	ź	187		219	Ũ	ũ
C	1100	î 140		Č		E		ý	Ř
D	1101	Ź 141	Ł 157	§ 173	Ż 189	205	Ţ ₂₂₁	$\mathbf{\hat{Y}}_{237}$	ř 253
E	1110	Ä 142	× 158	« 174	ż 190	206	$\mathbf{\mathring{U}}_{222}$	ţ 238	254
F	1111	$\dot{\mathbf{C}}_{143}$	č 159	» 175	191	200 207	223	239	SP 255

C.10 Page 19 (PC858: Euro)

	HEX	8	3		9		A		В		С		D		E		F
HEX	BIN	10	00	10	001	10)10	10)11	11	L00	11	L01	11	10	11	111
0	0000	Ç	128	É	144	á	160	***	176	L	192	ð	208	Ó	224		240
1	0001	ü	129	æ	145	í	161	**	177		193	Đ	209	ß	225	±	241
2	0010	é	130	Æ	146	ó	162	**	178	Т	194	Ê	210	Ô	226	=	242
3	0011	â	131	ô	147	ú	163		179	H	195	Ë	211	Ò	227	34	243
4	0100	ä	132	ö	148	ñ	164	\exists	180		196	È	212	õ	228	1	244
5	0101	à	133	ò	149	Ñ	165	Á	181	+	197	€	213	Õ	229	§	245
6	0110	å		û		a		Â		ã		Í		μ		÷	
7	0111	Ç	134	ù	150	Ō	166	À	182	Ã	198	Î	214	þ	230	د	246
8	1000	ê	135	ÿ	151	ં	167	©	183	L	199	Ϊ	215	þ	231	0	247
9	1001	ë	136	Ö	152	®	168	4	184	F	200		216	Ú	232	••	248
	1010	è	137	Ü	153		169		185		201		217	Û	233		249
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В	1011		139	W	155		171	٦	187		203		219		235		251
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D	1101	ì	141	Ø	157	i	173	¢	189	_	205	ł	221	Ý	237	2	253
E	1110	Ä	142	×	158	«	174	¥	190	+	206	Ì	222	_	238		254
F	1111	Å		f		>>		7		¤		-		,		SP	
			143		159		175		191		207		223		239		25

C-10 Character Code Tables Rev. A

C.11 Page 255 (Blank Page)

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]]	0001		129		145		161		177		193		209		225		241
	0010	SP		SP		SP		SP		SP		SP		SP		SP	
2	0010		130		146		162		178		194		210		226		242
	0011	SP		SP		SP		SP		SP		SP		SP		SP	
3	0011		131		147		163		179		195		211		227		243
	0100	SP		SP		SP		SP		SP		SP		SP		SP	
4	0100		132		148		164		180		196		212		228		244
_	0101	SP		SP		SP		SP		SP		SP		SP		SP	
5	0101		133		149		165		181		197		213		229		245
C	0110	SP		SP		SP		SP		SP		SP		SP		SP	
6	0110		134		150		166		182		198		214		230		246
7	0111	SP		SP		SP		SP		SP		SP		1		,	
7	0111		135		151		167		183		199		215		231		247
D	1000	SP		SP		SP		SP		SP		1				SP	
8	1000		136		152		168		184		200		216	<u> </u>	232		248
	1001	SP		SP		SP		SP		SP		SP		SP		SP	
9	1001		137		153		169		185		201		217		233		249
	1010	SP		SP		SP		SP		SP		SP		SP		SP	
A	1010		138		154		170		186		202		218		234		250
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	1011		139		155		171		187		203		219		235		251
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UD: undefined

C.12 International Character Set

						ASCII code (Hex)										
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C-12 Character Code Tables Rev. A

TM-T88IV/TM-88III Comparison Table

	TM-T88IV	TM-T88III		
1. Print speed	<high mode="" speed=""> 200 mm/s maximum <low consumption="" mode="" power=""> 150 mm/s maximum</low></high>	<high mode="" speed=""> 150 mm/s maximum <low consumption="" mode="" power=""> 70 mm/s maximum</low></high>		
2. High speed graphic printing	200 mm/s maximum			
3. Two-color printing	Possible by the setting			
4. Multilingual support <japanese model=""></japanese>	JIS (JISX0208-1990) 6879 characters Special font 845 characters	JIS (JISX0208-1990) 6879 characters 13494 characters		
<traditional chinese=""></traditional>	13535 characters (41 characters of 0xF9D6-0xF9FE that are defined by Big-5E)			
5. Font structure	The font structure of the following characters differs Font A (seven characters): 2, 3, 4, 5, 6, 7, 9 Font B (three characters): 2, 6, 9			
6. Page mode area	<single color="" paper="" printing=""> Horizontal: 512dots Vertical: 1662 dots (max.) <two-color paper="" porinting=""> Horizontal: 512dots Vertical: 831 dots (max.)</two-color></single>	Horizontal: 512dots Vertical: 831 dots (max.)		
7. Dot density	180 dpi x 180 dpi (dpi: dots per 25.4 mm {1"})	180 dpi x 180 dpi (dpi: dots per 25.4 mm {1"})		
8. Hexadecimal dumping	When hexadecimal dumping ends by pressing the FEED button three times, the printer cuts paper, with one point left uncut.	When hexadecimal dumpint ends by pressing the FEED button three times, the printer cuts paper completely.		
9. Power consumption	<high mode="" speed=""> Mean: Approximately 1.8 A <low consumption="" power=""> Mean: Approximately 1.1 A <standby> Mean: Approximately 0.1 A</standby></low></high>	<high mode="" speed=""> Mean: Approximately 1.8 A <low consumption="" power=""> Mean: Approximately 1.2 A <standby> Mean: Approximately 0.2 A</standby></low></high>		
10. Selection of transmission speed of serial interface	2400, 4800, 9600 (Default), 19200, 38400, 57600, 115200 bps (By DIP switch or the Commands)	4800, 9600, 19200, 38400 bps (By DIP switch)		

	TM-T88IV	TM-T88III		
11. Customized value	The customized value can be set with the command and Memory switch setting utility. • Print density • Print speed • Number of head energizing • Print control (signal or two color) • Print density level of the black color in two-color printing			
12. Number of head energizing	One-/two-/four- enegizing can be selected	Fixed to two-energizing		
13. Low power consumption mode	Depending on the condition of the command or the print duty, the printer controls the print speed or the number of the head energizing, in order to save the power.	The print speed is limitted to 70 mm/s maximum to save the power.		
14. UB series interface support	UB-U05, U06, U19 can be used. (These are USB interface)	The UB series interfacelisted in left column cannot be used.		
15. Limitation of the function when UB series interface support	A buzzer function cannot be operated on the UB series interface that supports the buzzer function.	A buzzer function can be operated.		



SEIKO EPSON CORPORATION

Printed in Japan