

TM-T88V-DT for Linux

Technical Reference Guide

Product Overview

Describes features and general specifications for the product.

Setup

Describes setup and installation of the product and peripherals.

Preinstalled OS Information

Describes preinstall information and recovery method.

Utility

Describes the utilities included in this product and how to use them.

Application Development Information

Describes how to control the printer and information necessary when you develop applications.

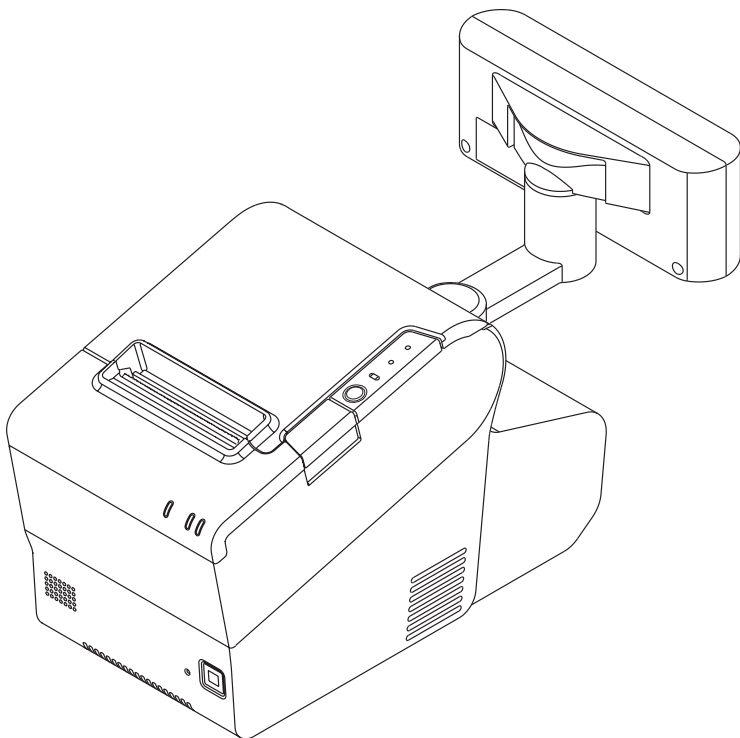
Handling

Describes how to handle the product.

Appendix

Describes character code tables.

M00065301
Rev. B



Cautions

- No part of this document may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of Seiko Epson Corporation.
- The contents of this document are subject to change without notice. Please contact us for the latest information.
- While every precaution has been taken in the preparation of this document, Seiko Epson Corporation assumes no responsibility for errors or omissions.
- Neither is any liability assumed for damages resulting from the use of the information contained herein.
- Neither Seiko Epson Corporation nor its affiliates shall be liable to the purchaser of this product or third parties for damages, losses, costs, or expenses incurred by the purchaser or third parties as a result of: accident, misuse, or abuse of this product or unauthorized modifications, repairs, or alterations to this product, or (excluding the U.S.) failure to strictly comply with Seiko Epson Corporation's operating and maintenance instructions.
- Seiko Epson Corporation shall not be liable against any damages or problems arising from the use of any options or any consumable products other than those specified as Original EPSON Products or EPSON Approved Products by Seiko Epson Corporation.

Trademarks

EPSON is a registered trademark of Seiko Epson Corporation in Japan and other countries/regions.

openSUSE is a registered trademark of SUSE LLC in the United States and other countries.

Linux is the registered trademark of Linus Torvalds in the U.S. and other countries.

Copyright © 2013 Seiko Epson Corporation. All rights reserved.

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 damage. • Possibility of causing information loss.
	Provides information that must be observed to avoid damage to your equipment or a malfunction.
	Provides important information and useful tips.

Warnings



- **To avoid risk of electric shock, do not set up this product or handle cables during a thunderstorm.**
- **Never insert or disconnect the power plug with wet hands.**
Doing so may result in severe shock.
- **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.
- **Be sure to use the specified power source.**
Connection to an improper power source may cause fire or shock.
- **Do not place multiple loads on the power outlet.**
Overloading the outlet may lead to fire or shock.
- **Shut down your equipment immediately if it produces smoke, a strange odor, or unusual noise.**
Continued use may lead to fire. Immediately unplug the equipment and contact your dealer or a Seiko Epson service center for advice.
- **Never attempt to repair this product yourself.**
Improper repair work can be dangerous.
- **Never disassemble or modify this product.**
Tampering with this product may result in injury or fire.
- **Do not allow foreign matter to fall into the equipment.**
Penetration by foreign objects may lead to fire.
- **If water or other liquid spills into this equipment, do not continue to use it.**
Continued use may lead to fire. Unplug the power cord immediately and contact your dealer or a Seiko Epson service center for advice.
- **Do not use aerosol sprayers containing flammable gas inside or around this product.**
Doing so may cause fire.

Cautions



- **Do not connect cables in ways other than those mentioned in this manual.**
Different connections may cause equipment damage or fire.
- **Be sure to set this equipment on a firm, stable, horizontal surface.**
The product may break or cause injury if it falls.
- **Do not use this product in locations subject to high humidity or dust levels.**
Excessive humidity and dust may cause equipment damage or fire.
- **Do not place heavy objects on top of this product. Never stand or lean on this product.**
Equipment may fall or collapse, causing breakage and possible injury.
- **Take care not to injure your fingers on the manual cutter**
 - * When you remove printed paper
 - * When you perform other operations such as loading/replacing roll paper
- **Do not open the roll paper cover without taking the necessary precautions, as this can result in injury from the autocutter fixed blade.**
- **To ensure safety, unplug this product before leaving it unused for an extended period.**

Wireless LAN (OT-WL01) Important Safety Information



- **May exert electromagnetic interference on, and cause malfunction of, cardiac pacemakers.**
Before using this product, check that there is no one in the vicinity using a cardiac pacemaker.
- **May exert electromagnetic interference on, and cause malfunction of, sensitive medical equipment.**
Before using this product, check that there is no sensitive medical equipment in the vicinity.
- **Use of this product on aircraft may be restricted in some countries.**
Before using this product, check that use of this product is not restricted on the aircraft.
- **Never attempt to repair this product yourself.**
Improper repair work can be dangerous.
- **Never disassemble or modify this product.**
Tampering with this product may result in injury or fire.



- **The OT-WL01 is only for indoor use.**
- **The OT-WL01 should only be used for EPSON TM-i series and TM-DT series.**
If it is installed on another device, it may result in computer failure, damage, or malfunctions.
- **To comply with RF exposure compliance requirements, a distance of at least 20 cm must be maintained at all times between the antenna of OT-WL01 and people in the vicinity.**
- **Do not store in locations with high temperatures or high humidity.**
It may in particular be damaged or deformed if left in a vehicle with the windows shut, or placed in locations with unusually high temperatures for extended periods such as in direct sunlight.
- **Do not wet the OT-WL01.**
This may cause malfunctions to occur.
- **Do not use near microwave ovens.**
Wireless communication may be interrupted by electromagnetic interference generated by microwave ovens.
- **Do not drop it, subject it to shocks, or place heavy objects on it.**

Wireless LAN (OT-WL01) Usage Precautions

Wireless Telegraphy Act Regulations

The following acts are prohibited by the Wireless Telegraphy Act.

- Modifying and disassembling (including the antenna)
- Removing the label of conformance

Notes on Security when Using Wireless LAN

Important information on customer rights (maintaining privacy)

The advantage of using a wireless LAN over a LAN cable is that, because information is exchanged using radio signals, you can easily connect to the network if you are within range of the radio signals. A disadvantage of this is that within a certain range, the electromagnetic signals can pass through barriers such as walls, so that if security countermeasures are not implemented in some way, problems such as the following may occur.

- Communication data can be intercepted
A third party may be able to receive wireless transmissions without authorization, and they could obtain personal information from these transmissions such as IDs, passwords, or credit card numbers, or they could intercept the contents of personal e-mail messages.
- Unauthorized access to the network
A third party could access an individual or intra-company network without permission and carry out any of the following activities.
 - Retrieve personal data or other secret information (information leakage)
 - Pose as another user and send inappropriate data (impersonation)
 - Overwrite the contents of intercepted data and resend it (falsification)
 - Introduce a computer virus which could cause data loss or system crashes (damage)

Initially, the possibility that such problems could occur through settings concerning the security of the wireless LAN product and by using the product are decreased, because the wireless LAN card and the access point have security measures to deal with these problems. We recommend that you use this product after making security settings using our own judgement and assuming full responsibility, and with your full understanding of problems that may occur if you do not make any security settings.

Notes on Setting SSID (Service Set Identifier)

For protection of security, note the following precautions when setting the SSID.

- Change the SSID from the default setting.
- Do not set texts by which the owner can be identified as the SSID.

Notes on Setting Cryptographic Key

For protection of security, note the following precautions when setting the cryptographic key.

- Avoid using words on a dictionary as practicably as possible.
- Combine meaningless alphanumeric characters and symbols.
- Use texts consisted of at least 13 characters or more or of 20 characters or more if possible.

Restriction of Use

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

About this Manual

Aim of the Manual

This manual was created to provide information on development, design, and installation of receipt issue systems and development and design of printer applications for developers.

Manual Content

The manual is made up of the following sections:

Chapter 1	Product Overview
Chapter 2	Setup
Chapter 3	Preinstalled OS Information
Chapter 4	Utility
Chapter 5	Application Development Information
Chapter 6	Handling
Appendix	Character Code Tables

Contents

■ For Safety	3
Key to Symbols	3
Warnings	4
Cautions	5
Wireless LAN (OT-WL01) Important Safety Information	6
Wireless LAN (OT-WL01) Usage Precautions	6
■ Restriction of Use	8
■ About this Manual	9
Aim of the Manual	9
Manual Content	9
■ Contents	10

Product Overview 15

■ Features.....	15
System connection examples.....	17
■ Product Configurations	21
Models	21
Paper width.....	21
Colors.....	21
Accessories	22
Related manuals	22
Peripherals.....	22
■ Part Names and Functions	23
Control Panel	24
Storage access LED and status LED	25
Connectors	26
■ Printer function.....	27
Error Status	27
■ NV Memory (Non-Volatile Memory)	29
■ Product Specifications	30
Power capacity to the exterior	31
Software Specifications	31
Printing Specifications.....	32
Character Specifications.....	32
Printable Area.....	33
Printing and Cutting Positions.....	35
Paper Specifications	36
Environmental Conditions	37
External Dimensions.....	38
External Dimensions (when the dedicated optional DM is installed).....	39
TM-T88V-DT Dedicated AC Adapter	40

■ Option Specifications	41
DM-D110 (Dedicated customer display)	41
Wireless LAN Cable Set (OT-WL01)	42
Setup	43
■ Updating the ePOS-Device	43
■ Flow of Setup	44
■ Installing the Product	47
Important Notes.....	47
■ Attaching the Optional Customer Display	47
Setting the Customer Display	47
Attaching the Customer Display.....	49
■ Adjusting the Roll Paper Near-End Sensor	50
■ Connecting the AC Adapter	51
■ OS Initial Settings	52
■ Enabling or Disabling ePOS-Device	54
■ Connecting to the Network	55
For Ethernet Interface	55
For Wireless LAN Interface.....	59
■ Installing Drivers and Applications	67
Installing and Setting the Drivers	67
Installing Applications	67
■ Service Startup Settings	68
■ Registering Web Contents	69
Registering Web content	71
■ Registering device control script files	72
■ Connecting External Devices	73
Connecting a Mouse and Keyboard.....	73
Connecting a Display	73
Connecting a Printer	73
Connection POS Peripherals	74
Connecting the Cash Drawer	75
■ Setting the Devices	77
Registering a Printer.....	77
Customer Display Settings	79
Registering a Key Input Device	80
Serial Communication Device Registration.....	82
Registering Other Devices	84
■ Printer Settings	85
Register Procedures.....	85

■ Product settings	91
Changing the Session	91
Starting YaST	91
Resolution settings	92
Changing DisplayLanguage.....	93
Power button settings.....	93
Time settings.....	94
Auto-mount settings.....	94
■ Attaching the Connector Cover	95
■ Removing the Connector Cover	97
■ Attaching the Power Button Cover	98

Preinstalled OS Information.....99

■ openSUSE	99
Preinstallation information	99
Recovery	100

Utility 103

■ EPSON TMNet WebConfig	103
Starting EPSON TMNet WebConfig	103
Information - Web serv settings - Current status.....	104
Information - System settings - Network	105
Information - System settings - Date Time	107
Settings - Web serv settings - Startup settings.....	108
Settings - Web serv settings - Printer	109
Settings - Web serv settings - Display.....	110
Settings - Web serv settings - Key input device	111
Settings - Web Serv settings - Serial communications	112
Settings - Web Serv settings - Other.....	113
Settings - Web serv settings - Register/delete	114
Settings - Web Serv settings - Update settings	115
Settings - System settings - TCP/IP (Wired)	116
Settings - System settings - Wireless Setting.....	117
Settings - System settings - TCP/IP (Wireless).....	118
Settings - System settings - Time Setting	119
Settings - Admin settings - Save/restore settings.....	120
Settings - Admin settings - Initialization.....	123
Settings - Admin settings - Log	124
Settings - Admin settings - Update Web service function	125
Settings - Admin settings - Admin information	126
Settings - Admin settings - Password	127
■ TM-T88V Utility	128

Application Development Information..... 129

■ Development Information for Each System	129
Download.....	129
■ PC-POS System Development Information	130
Interfaces and External Devices	130
Linux command control.....	131
Control Method for Devices	132
ESC/POS command	133
■ ePOS-Device API	138
External Devices.....	138
Application Information	140
■ ePOS-Device XML.....	141
External Devices.....	141
Application Information	143
■ Setting/Checking Modes.....	144
Self-test Mode	145
Hexadecimal Dumping Mode	146
NV Graphics Print Mode	147
Receipt Enhancement Information Print Mode	148

Handling 149

■ Turning the Power On/Off	149
Turning the Power On	149
Turning the Power Off	149
Forced Termination.....	149
■ Printer Operation	150
Printer Reset.....	150
Setting and Replacing Roll Paper.....	151
Changing the Paper Width	154
Removing Jammed Paper	156
■ Customer Display Operation	158
■ Adjusting the Speaker Volume	158
■ Cleaning the Case	159
■ Cleaning the Thermal Head	159
■ Connecting to External Devices	160
■ Preparing for Transport	160

Appendix..... 161

■ Character Code Tables 161

Common to All Pages.....	161
Page 0 (PC437: USA, Standard Europe).....	162
Page 1 (Katakana).....	163
Page 2 (PC850: Multilingual).....	164
Page 3 (PC860: Portuguese).....	165
Page 4 (PC863: Canadian-French).....	166
Page 5 (PC865: Nordic).....	167
Page 11 (PC851: Greek).....	168
Page 12 (PC853: Turkish).....	169
Page 13 (PC857: Turkish).....	170
Page 14 (PC737: Greek).....	171
Page 15 (ISO8859-7: Greek).....	172
Page 16 (WPC1252).....	173
Page 17 (PC866: Cyrillic #2).....	174
Page 18 (PC852: Latin2).....	175
Page 19 (PC858: Euro).....	176
Page 20 (KU42: Thai).....	177
Page 21 (TIS11: Thai).....	178
Page 26 (TIS18: Thai).....	179
Page 30 (TCVN-3: Vietnamese).....	180
Page 31 (TCVN-3: Vietnamese).....	181
Page 32 (PC720: Arabic).....	182
Page 33 (WPC775: Baltic Rim).....	183
Page 34 (PC855: Cyrillic).....	184
Page 35 (PC861: Icelandic).....	185
Page 36 (PC862: Hebrew).....	186
Page 37 (PC864: Arabic).....	187
Page 38 (PC869: Greek).....	188
Page 39 (ISO8859-2: Latin2).....	189
Page 40 (ISO8859-15: Latin9).....	190
Page 41 (PC1098: Farsi).....	191
Page 42 (PC1118: Lithuanian).....	192
Page 43 (PC1119: Lithuanian).....	193
Page 44 (PC1125: Ukrainian).....	194
Page 45 (WPC1250: Latin 2).....	195
Page 46 (WPC1251: Cyrillic).....	196
Page 47 (WPC1253: Greek).....	197
Page 48 (WPC1254: Turkish).....	198
Page 49 (WPC1255: Hebrew).....	199
Page 50 (WPC1256: Arabic).....	200
Page 51 (WPC1257: Baltic Rim).....	201
Page 52 (WPC1258: Vietnamese).....	202
Page 53 (KZ1048: Kazakhstan).....	203
Page 255 (User-Defined Page).....	204
International Character Sets.....	205

Product Overview

This chapter describes features and specifications of the product.

Features

The TM-T88V-DT is a highly-functional printer that has an auxiliary storage and a Linux controller in the thermal receipt printer TM-T88V. It can control POS peripherals such as customer displays, TM printers, and barcode scanners. The following is its features.

- Integrated thermal receipt printer TM-T88V and controller.
- The controller has the PC architecture that uses Intel® ATOM processor.
- The OS employs Linux® based on openSUSE, and provides functionality as a Linux PC.
- You can connect external devices with USB connections and serial connections (LCD unit with touch panel, keyboard, MSR, etc.).
- Built-in Serial ATA storage device (SSD). You can use it with POS applications or databases.
- Equipped with 10BASE-T / 100BASE-TX / 1000BASE-T LAN communication capability as standard. As an optional feature, it can also support wireless LAN.
- It features a dedicated option, the customer display.
- You can print directly or control POS peripherals from the Web application. (ePOS-Device API).
- You can deploy and execute Web applications using server-side scripting (Perl or php) on the Apache HTTP server of this product.
- If Web contents are placed on this product's Web server, you can periodically acquire the contents from a separate server. (Automatic update of Web content)
- You can print directly and control POS peripheral equipment from a native application of iOS, Android or similar system.
- You can use the pre-installed software required for the Thin-Client environment as the virtual desktop / application client and printer.

Features of this printer

- High speed printing (300 mm/s maximum) is possible.
- Multi-tone graphic printing is possible.
- You can choose 58 mm or 80 mm for the roll paper width.
- Easy drop-in paper loading
- A maintenance counter function is supported.
- Paper-saving function is supported.

System connection examples

As shown below, you can configure various systems.

- PC-POS System ([Page 17](#))
- Printing and controlling POS peripherals from the Web application ([Page 18](#))
- Printing and controlling POS peripherals from an application on a tablet terminal ([Page 19](#))
- Virtual environment client ([Page 20](#))

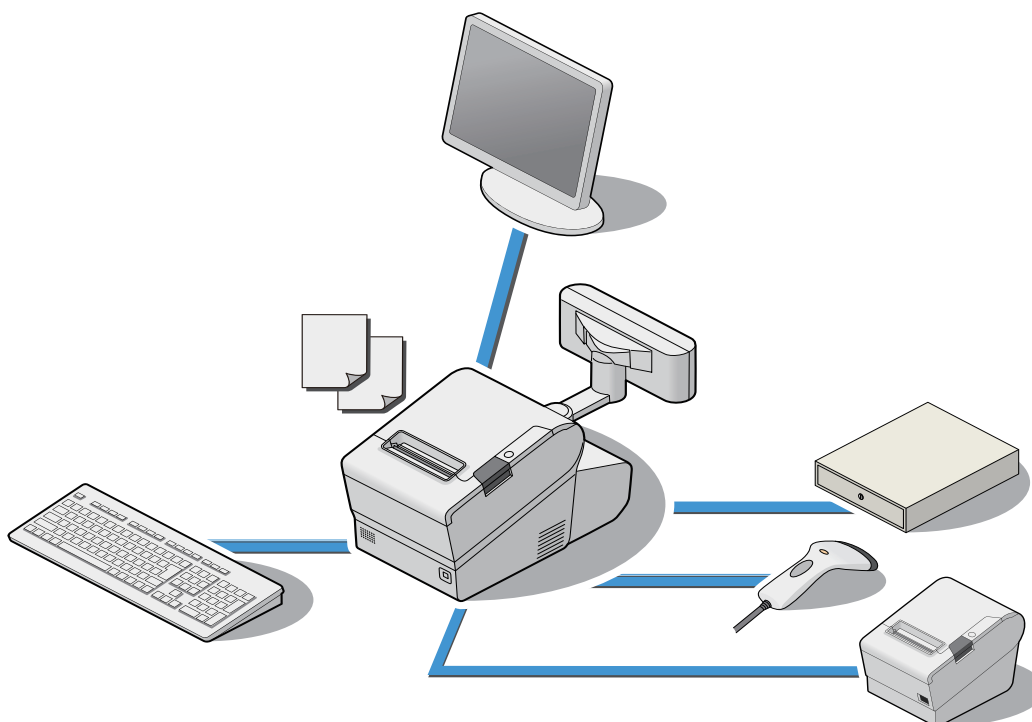
PC-POS System

You can configure a simple POS system by installing POS applications and connecting a display with a touch panel and a barcode scanner to the TM-T88V-DT.

The OS is Linux based on openSUSE. This product includes SATA SSD. You can install the CUPS (Common Unix Printing System) driver and the JavaPOS driver.

You can also transfer the conventional Linux-based PC-POS system as it is.

This saves on system installation fees, saves space, and increases its maintainability.



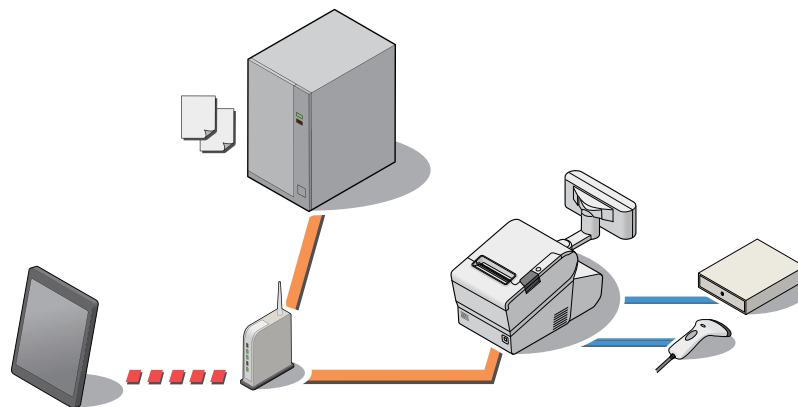
Printing and controlling POS peripherals from the Web application

ePOS-Device API is supported. You can print or control devices (display on the customer display or input/output from the POS peripherals) from the Web application.

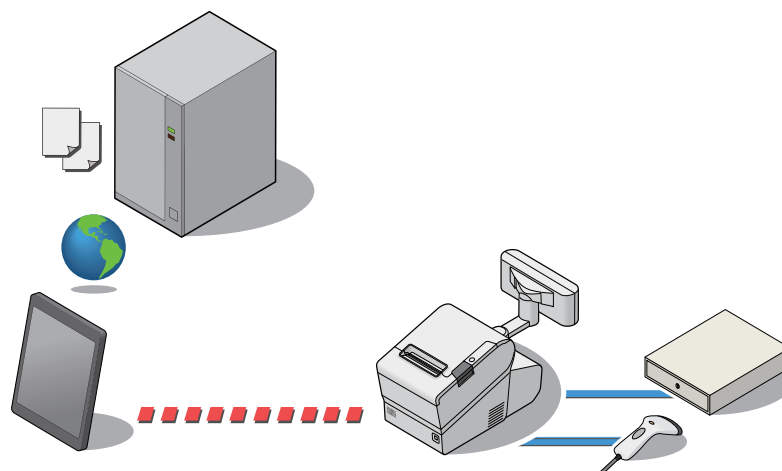
You can control the customer display, barcode scanner, USB devices, or the serial device from the same API system. Also, you can customize the API and send and receive device commands.

You can control it from the Web browser on a computer, smart phone or tablet terminal.

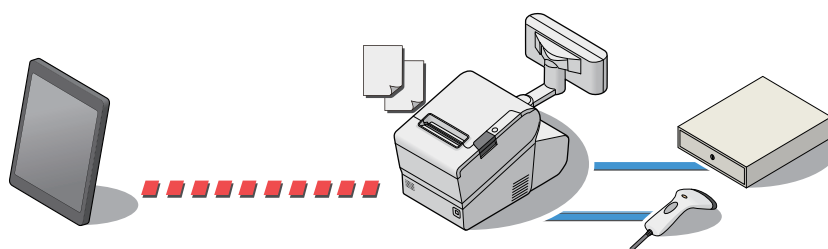
- Connection example 1



- Connection example 2



- Connection example 3



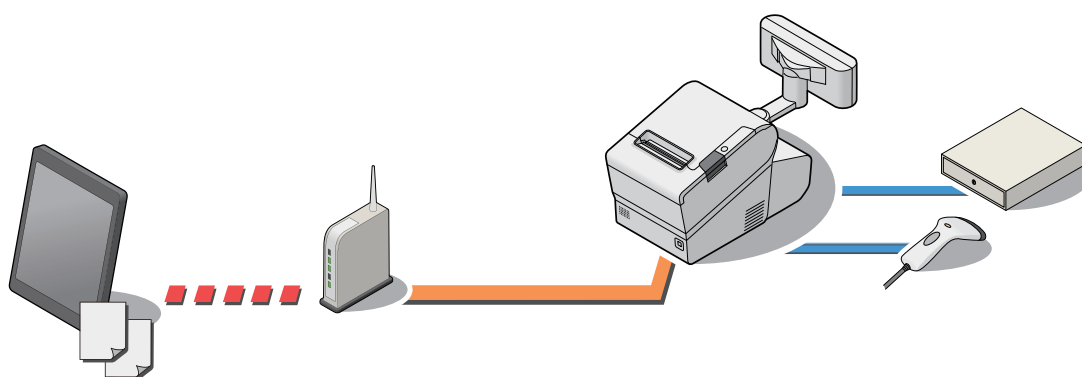
Printing and controlling POS peripherals from an application on a tablet terminal

ePOS-DeviceXML is supported. You can print or control devices (display on the customer display or input/output from the POS peripherals) from a tablet terminal application. You can control the customer display, barcode scanner, USB devices or serial devices from the same system.

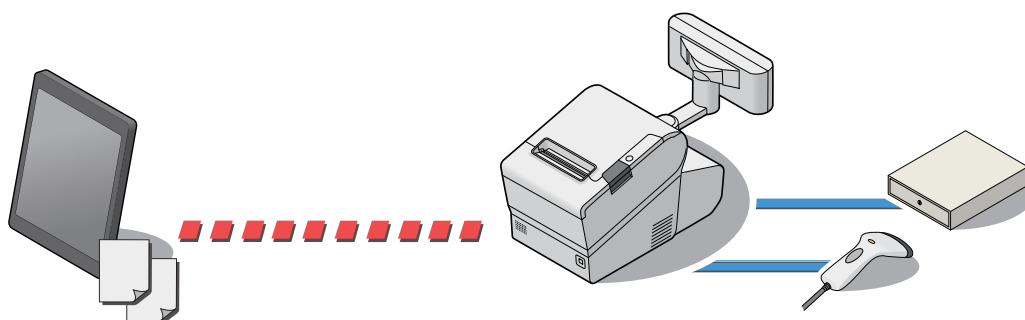
Also, you can customize it and send and receive device commands. You can control it from the application on a smart phone or tablet terminal with socket communication.

If your environment allows for TCP socket communication, you can control it from your OS's native application.

- Connection example 1



- Connection example 2

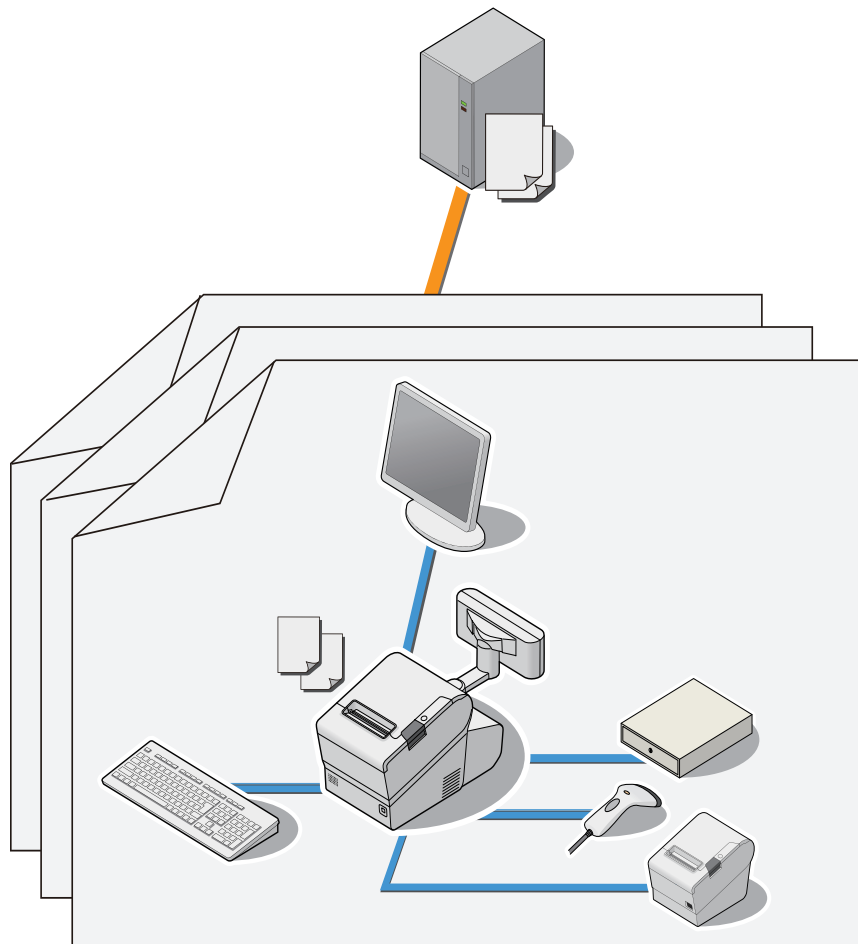


Virtual environment client

You can use the product as a client of a virtual desktop or virtual application.

It supports Citrix XenServer/Client.

Printing is supported for applications that use the JavaPOS driver and CUPS driver.



Product Configurations

Models

The following models are prepared for this product. The model varies depending on the region for sale.

CPU	Main memory	Auxiliary storage
Intel® Atom Processor N2600 1.6GHz	2GB	SATA SSD(16GB)

Paper width

- 80 m / 58 mm

Colors

- White
- Black

Accessories

Included

- AC adapter, T (Model No. M284A)
- AC cable *1
- Connector cover
- Roll paper (for operation check)
- Roll paper guide for 58 mm width paper
- Screw x3
- Two strips for the roll paper guide
- Screw for the roll paper guide
- Recovery disc
- User's manual
- Power button Cover

*1 May vary based on specifications and region.

Options

- Dedicated customer display (Model: DM-D110 (Dedicated Model))
- Wireless LAN cable set (Model: OT-WL01)

Related manuals

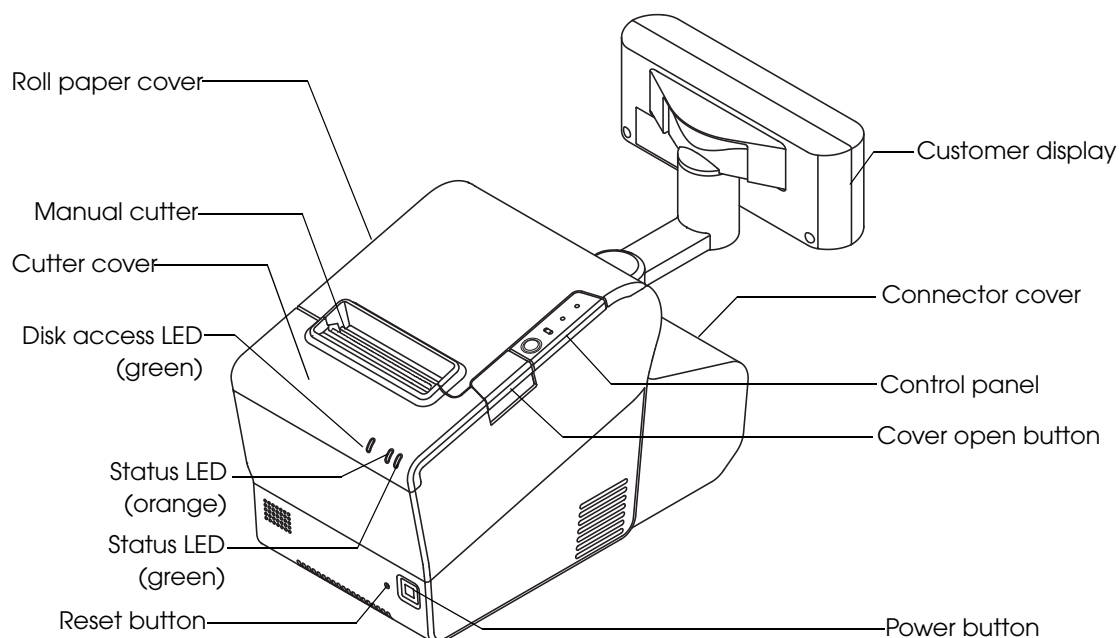
- TM-T88V-DT for Linux Technical Reference Guide (this manual)
- TM-T88V-DT User's Manual
- ePOS-Device API User's Manual
- ePOS-Device XML User's Manual
- TM-DT Linux Thin-Client System Setup Guide
- TM-DT series Easy Setup Guide

For details about each system, refer to "[Application Development Information](#)" on page 129, or to each system manual.

Peripherals

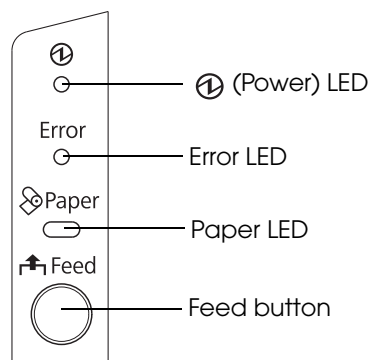
The external devices that can be connected to this product, such as POS peripherals, vary based on the system in use. For details, refer to "[Application Development Information](#)" on page 129.

Part Names and Functions



Name	Description
Power button	Turns the product on or off.
Reset button	Resets the printer unit. The controller unit is not reset.
Manual cutter	A cutter for cutting the roll paper by hand.
Cover open button	Opens the roll paper cover.
Cutter cover	If there is a paper jam in the printer and the printer cover won't open, open this cover, and return the cutter blade to the standard position.
Customer display (optional)	Display information with your application.

Control Panel



Name	Status	Description
Power LED (green)	On	Power is being supplied
	Off	Power is not being supplied
Error LED	Off	Normal operation (online)
	On	- Immediately after the power is turned on or immediately after a reset (offline). Automatically goes off after a while to indicate that the printer is ready. - The end of the roll paper is detected, and when printing has stopped (offline). If this happens, replace the roll paper.
	Flashing	An error has occurred
Paper LED	Off	There is a sufficient amount of roll paper remaining
	On	There is little or no roll paper remaining
	Flashing	A self-test printing standby state and macro execution standby state
Feed button		Pressing this button once feeds the roll paper by one line. Holding this button down feeds the roll paper continuously.

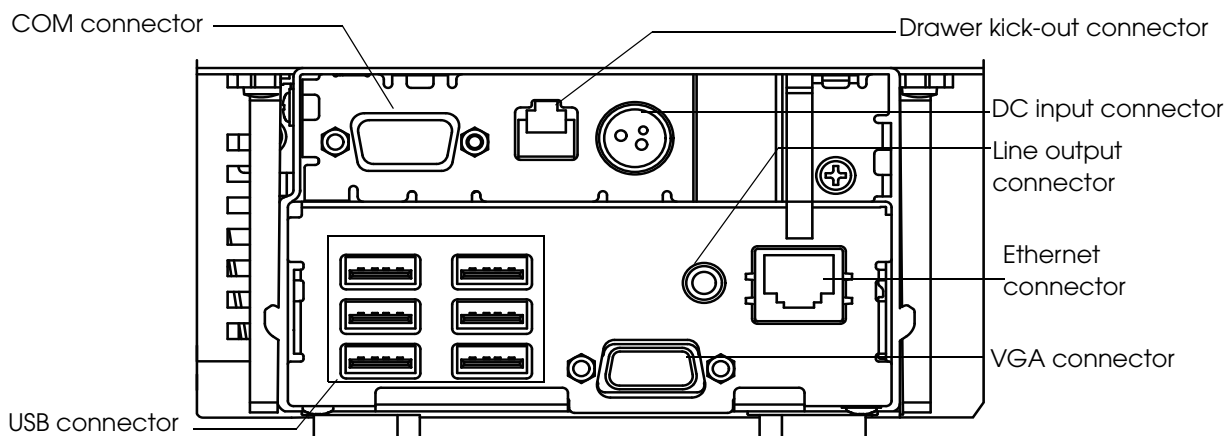
Storage access LED and status LED

These display the controller unit's status.

Name	Status	Description
Storage access LED (Green)	On	Accessing the auxiliary storage
Status LED (green)	On	Power is on
	Flashing	Stand-by mode
	Off	Power is off
Status LED (orange)	Flashing (Approx. 1 second intervals)	OS start-up sequence • Accessing the SSD; Do not turn the power off. Doing so may result in data loss.
	Flashing (Approx. 160 millisecond intervals)	CPU high-temperature warning

Connectors

All the cables are connected to the connection panel on the back of the printer.



Name	Description
Drawer kick-out connector	Connect the cash drawer or an external optional buzzer here.
Ethernet connector	Connect the LAN cable here to connect the host computer and printer to the network.
USB connector	Connect external devices with USB interface here.
DC Input connector	Connect the AC adapter T, here.
VGA connector	Connect the display here.
COM connector	Connect a serial communication device with serial interface here.
Line output connector	Connect an external speaker here.

Printer function

Error Status

There are three possible error types: automatically recoverable errors, recoverable errors, and unrecoverable errors. Check the error LED flash code.

Automatically Recoverable Errors

Printing is no longer possible when automatically recoverable errors occur. They can be recovered easily, as described below.

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

Recoverable Errors

Printing is no longer possible when recoverable errors occur. The printer recovers easily by turning the power on again after eliminating the cause of the error.

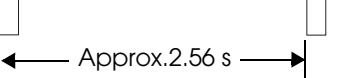
Error	Error description	Error LED flash code 	Recovery measure
Autocutter error	Autocutter does not work correctly.		Remove the jammed paper or foreign matter in the printer, close the roll paper cover, and then turn the power on to recover.

Unrecoverable Errors

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



Turn off the power immediately when unrecoverable errors occur.

Error	Error description	Error LED flash code  Approx. 160 ms
Memory R/W error	After R/W checking, the printer does not work correctly.	
High voltage error	The power supply voltage is extremely high.	
Low voltage error	The power supply voltage is extremely low.	
CPU execution error	The CPU is executing an incorrect address.	
Internal circuit connection error	Internal circuits are not connected correctly.	

NV Memory (Non-Volatile Memory)

The printer's NV memory stores data even after the printer power is turned off. NV memory contains the following memory areas for the user:

- NV graphics memory
- Memory switches (customized value)
- User-defined page
- Maintenance counter



As a guide, NV memory rewriting should be 10 times or less a day when you program applications.

NV Graphics Memory

Graphics, such as shop logos to be printed on receipts, can be stored.

Use the TM-T88V Utility to register graphics.

You can also print and confirm the registered graphics in the NV graphics memory print mode.



- For detailed information about the TM-T88V Utility, see the TM-T88V Utility User's Manual.
- For information about how to use the NV graphics memory print mode, see ["NV Graphics Print Mode" on page 147](#).

User-defined Page

You can store character data in the user-defined page (character code table: page 255) so that you can also print characters not resident in the printer.

Maintenance Counter

With this function, printer information, such as the number of line feeds, the number of autocuts, and printer operation time after the printer starts working, is automatically stored in NV memory. You can read the information with the TM-T88V Utility or in a self-test to use it for periodical checks or part replacement.

Product Specifications

Item		Specifications
CPU	Usable CPU	Intel® Atom™ Processor N2600 (1MB Cache, 1.6 GHz)
Memory	Main memory	2 GB, DDR3-800, SO-DIMM slot
	BIOS	SPI Flash 4Mbyte
Chipset		Intel® NM10
Video controller		On built-in CPU
Auxiliary storage		SATA SSD (16GB)
Interface	Ethernet	10BASE-T/100BASE-TX/1000BASE-T 1port (RJ-45) Support Wake On LAN Network boot
	USB	External: USB 2.0 x 6 (supports high/full/low speed) Internal: USB 2.0 X 1 (for connecting to the printer)
	Serial	External x1 (9-pin DSUB male)
	VGA	External x1 (15-pin DSUB female)
	Drawer	External x1 (RJ12 6pin)
	Line output (Sound capability)	Outputs sound from internal speaker External x1 (line output)
RTC/CMOS backup battery		RTC is backed up by lithium battery
Speaker		Internal monaural speaker
Product's printer		Thermal receipt printer at 300 mm/s on 80-mm wide roll paper
Software	BIOS	AMI BIOS (Supports ACPI 2.0/APM 1.2/Plug&Play)
	OS	Linux® based on openSUSE
	Device control software	ePOS-Device
Power specifications (Dedicated AC adapter)		AC100V - AC240 V / 50 Hz - 60 Hz
Main unit power consumption		12.2W (when not printing) / Nominal value 54W (when printing)
External dimensions		145 mm {5.71"}(W) x 279 mm {10.98"}(D) x 183 mm {7.20"}(H) (only the base unit, inclusive of rear cover)
Case color		White / Black
Weight (Mass) (roll paper excluded)		2.8 kg {6.17 lb} (When the dedicated optional DM is installed; 3.2 kg {7.1 lb})

Power capacity to the exterior

Port	Power	Supply capacity
USB	+5 VDC	500 mA each
Drawer	+24 VDC	1A

Software Specifications

Print control	ePOS-Device API, ePOS-Device XML (No printer driver is required.)
TM Printer, POS peripherals control driver	• CUPS (Common Unix Printing System) driver • JavaPOS Version 1.13.9L
Web applications	Available server-side scripts: • PHP ver.5.3.15 • Perl ver.5.16.0 SQLite database access with the server-side script is also available
Utility	EPSON TMNet WebConfig • Registration of devices controlled by ePOS-Device • Registration settings for Web content • Various administrator function
Controllable printer	Following printers with the UB-E02, UB-E03 embedded • TM-T88V • TM-T70 • TM-T70II • TM-T90 • TM-L90
Number of printers	20 printers at maximum

Printing Specifications

	80 mm width paper printing	58 mm width paper printing
Printing method	Thermal line printing	
Dot density	180 × 180 dpi	
Printing direction	Unidirectional with friction feed (Reverse feed is not supported.)	
Printing width	72.0 mm (2.83"), 512 dots	50.8 mm (2.0"), 360 dots
Characters per line	Font A (12 × 24)	30
	Font B (9 × 17)	40
Maximum print speed* ¹	300 mm/s	
Line spacing	4.23 mm {1/6"} (Initial setting)	

dpi: dots per inch

*1: When printing with the default print density level at 24V and 25°C {77°F}.

Character Specifications

Number of characters		Alphanumeric characters: 95 Extended graphics: 128 × 43 pages (including user-defined page) International characters: 18 sets
Character structure		Font A (default): 12 × 24 (including 2-dot horizontal spacing) Font B: 9 × 17 (including 2-dot horizontal spacing)
Character size	Font A	Standard: 1.41 × 3.39 mm Double-height: 1.41 × 6.77 mm Double-width: 2.82 × 3.39 mm Double-width, double-height: 2.82 × 6.77 mm
	Font B	Standard: 0.99 × 2.40 mm Double-height: 0.99 × 4.80 mm Double-width: 1.98 × 2.40 mm Double-width, double-height: 1.98 × 4.80 mm

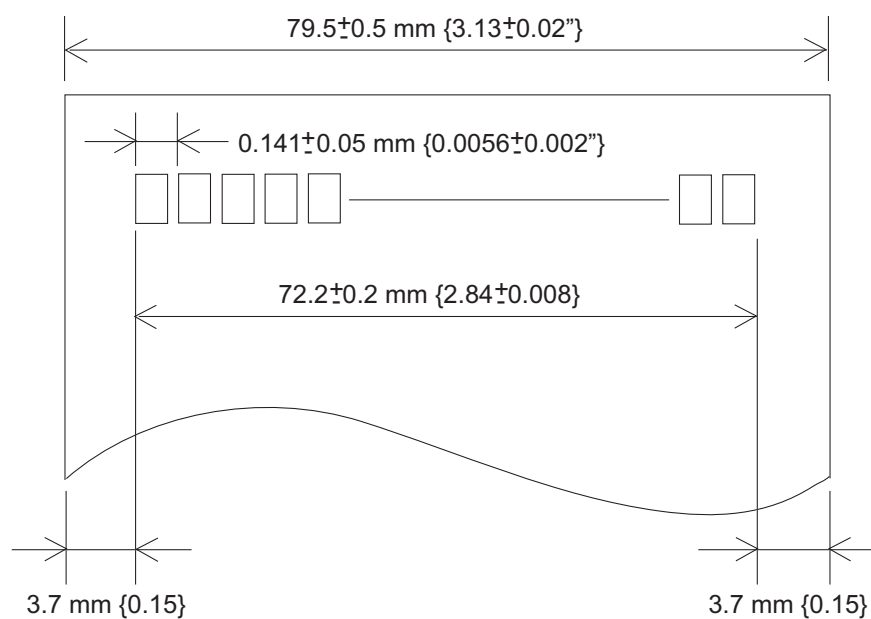
Note:

1. Space between characters is not included.
2. Characters can be scaled up to 64 times as large as the standard size.

Printable Area

80 mm paper width printing

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



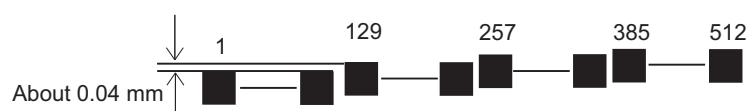
All the numeric values are typical.

CAUTION

- In 2-divided energization, the print position within the printable area of the thermal elements for dots 1 to 256 and 257 to 512 is shifted approximately 0.07 mm $\{0.0028\}$ " in the paper feed direction as shown in the figure below.

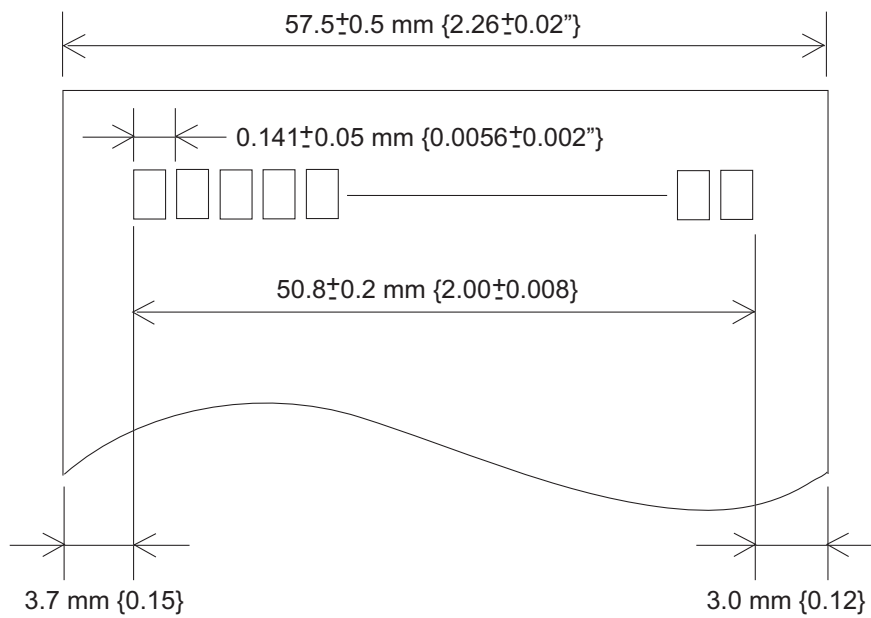


- In 4-divided energization, the print position within the printable area of the thermal elements for dots 1 to 128, 129 to 256, 257 to 384, and 385 to 512 is shifted approximately 0.04 mm $\{0.0016\}$ " in the paper feed direction as shown in the figure below.



58 mm paper width printing

The printable area of paper with a width of 57.5 ± 0.5 mm $\{2.26 \pm 0.02\}$ " is 50.8 ± 0.2 mm $\{2.00 \pm 0.008\}$ " (360 dots), and the space on the left side is approximately 3.7 mm $\{0.15\}$ " and the space on the right side is approximately 3.0 mm $\{0.12\}$ ".



All the numeric values are typical.

CAUTION

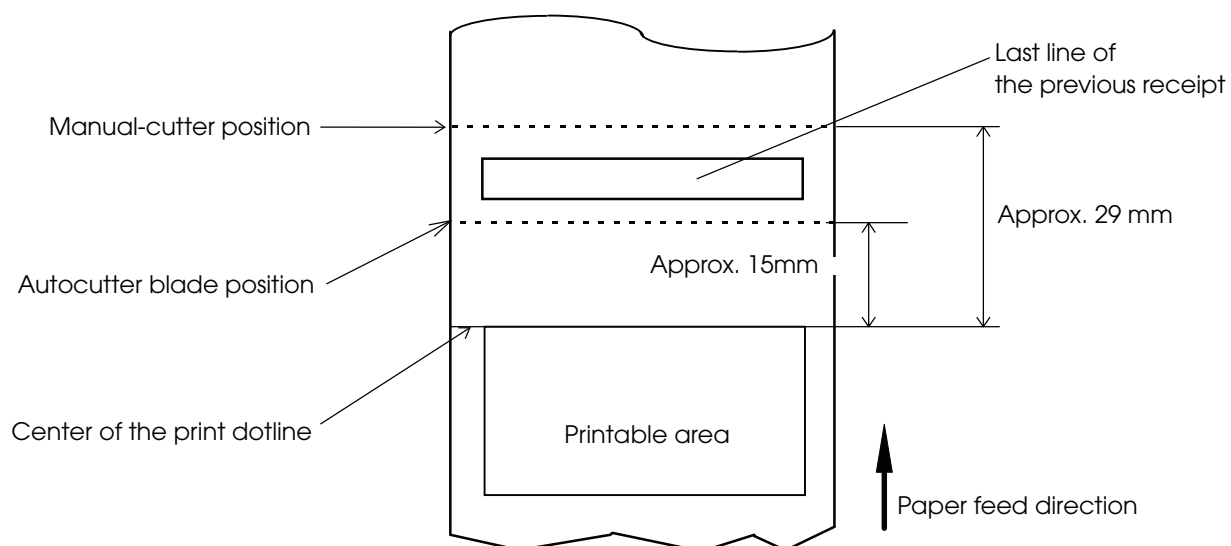
- In 2-divided energization, the print position within the printable area of the thermal elements for dots 1 to 256 and 257 to 360 is shifted approximately 0.07 mm $\{0.0028\}$ " in the paper feed direction as shown in the figure below.



- In 4-divided energization, the print position within the printable area of the thermal elements for dots 1 to 128, 129 to 256, and 257 to 360 is shifted approximately 0.04 mm $\{0.0016\}$ " in the paper feed direction as shown in the figure below.



Printing and Cutting Positions

**CAUTION**

The values above may vary slightly as a result of paper slack or variations in the paper. Take this into account when setting the cutting position of the autocutter.

Paper Specifications

	80 mm width paper printing	58 mm width paper printing
Paper types	Specified thermal paper	
Form	Roll paper	
Size	Roll paper diameter	83 mm {3.27"} maximum
	Roll paper core	Inside: 12 mm {0.47"}, Outside: 18 mm {0.71"}
	Roll width when taken up	80 + 0.5/-1.0 mm
	Paper width	58 + 0.5/-1.0 mm
Specified roll paper type	NTP080-80	NTP058-80
	TRP080-80H	TRP058-80H
Specified original paper type	TF50KS-E, TF60KS-E (NIPPON Paper Industries Co., Ltd.) PD150R, PD160R, PD190R (OJI Paper Mfg. Co., Ltd.) P220AGB-1 (Mitsubishi Paper Mills Limited.) P300, P310, P350 (Kanzaki Specialty Papers) AF50KS-E (Jujo Thermal Oy) F5041 (Mitsubishi HiTec Paper Flensburg GmbH) KT55F20, KT48F20 (Koehler Paper Group)	

CAUTION

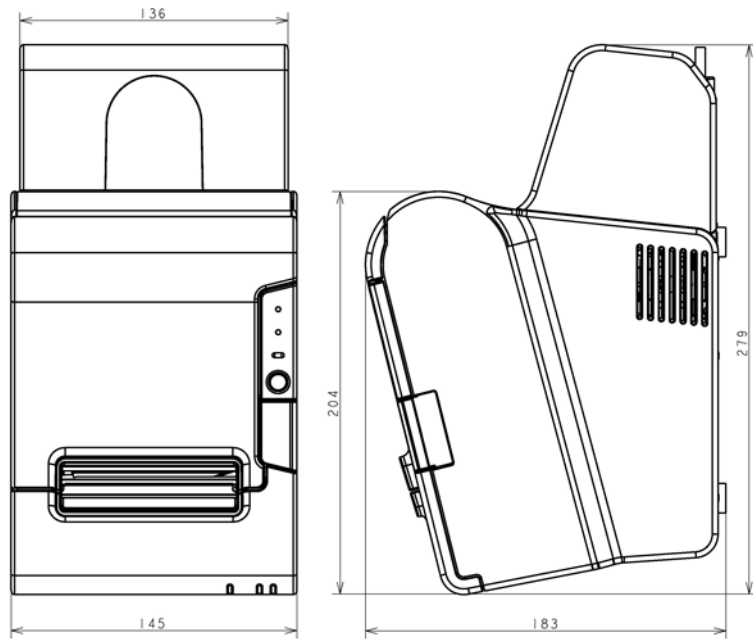
- Paper must not be pasted to the roll paper core.
- The remaining amount of the roll paper when a roll paper near-end is detected differs depending on the core type.

Environmental Conditions

Temperature/ Humidity	Operating	5 to 40°C {41 to 113°F}, 10 to 90% RH (See the operating temperature and humidity range below.)
	Storage (Factory packing)	-10 to 50°C {14 to 122°F}, 10 to 90% RH (except for paper)
		Relative temperature (%RH) Operating environment range Environmental temperature (°C) 31°C, 90% 34°C, 90% 34°C, 75% 40°C, 65% 40°C, 43% ----- Specified original paper: P300, P310, P350 —— Specified original paper other than above
Acoustic noise (operating)		Operating (max.): approximately 54 dB (Standing position) Standby (max.): approximately 42 dB (Standing position) Note: The values above are measured in the Epson evaluation condition. Acoustic noise differs depending on the paper used, printing contents, and the setting values, such as print speed or print density.

External Dimensions

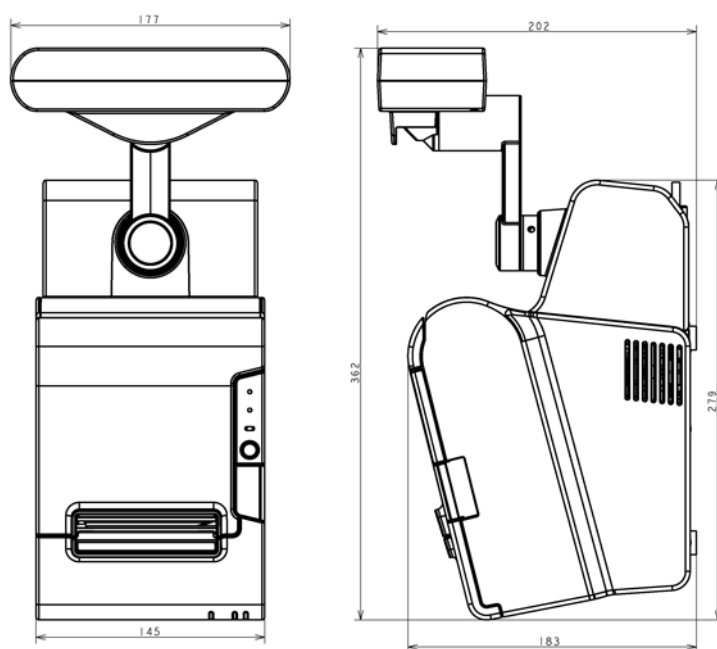
- Width: Approximately 145 mm {5.71"}
- Depth: Approximately 279 mm {10.98"}
- Height: Approximately 183 mm {7.20"}



(Units: mm)

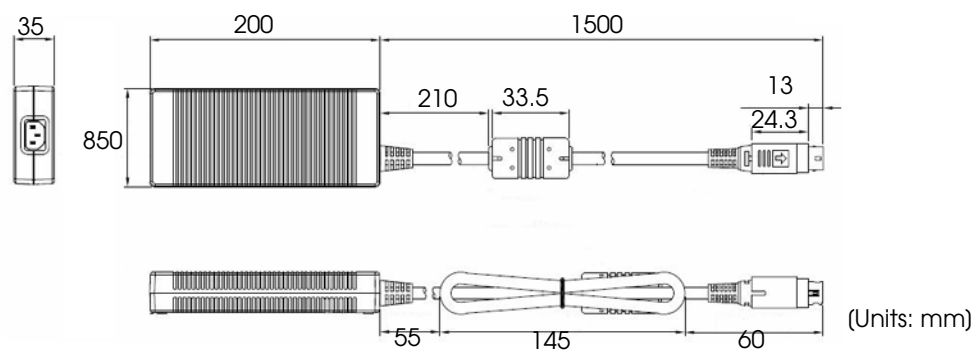
External Dimensions (when the dedicated optional DM is installed)

- Width: Approximately 177 mm {6.97"}
- Depth: Approximately 362 mm {14.25"}
- Height: Approximately 202 mm {7.95"}



(Units: mm)

TM-T88V-DT Dedicated AC Adapter



Input conditions	Input voltage: AC 100V to 240V
	Frequency: 50/60 Hz
	Input current (rating): 2.4A
Output conditions	Output voltage (rating): DC 24V $\pm$ 5%
	Output current (rating): 4.2A

Option Specifications

DM-D110 (Dedicated customer display)

Display format		Fluorescent tube display
Displayed number of characters		40 characters (20 columns x2 lines, 5x7 dot matrix)
Display color		Green (505 nm)
Brightness		690 cd/m ²
Types of characters		Alphanumeric characters: 95 characters International characters: 37 characters Graphic characters: 128 characters x12 pages
Character construction		5x7 dot matrix, cursor
Character size		3.5 x 5.0 mm
Character pitch		5.2 mm
Interface		USB 2.0 Full speed
Reliability		2000 hours (Half-brightness)
Power source	Voltage	DC4.75 to 5.25V
	Current	0.5A
External dimensions	Display	177(W) X 50.5(D) X 69(H)mm
	Dimensions	177(W) X 70(D) X 130(H)mm
Weight (Mass)		0.4kg {0.9 lb }
Colors		White / Black

Wireless LAN Cable Set (OT-WL01)

Wireless module	ELPAP07: 802.11b/g/n wireless LAN Module (EPSON)
Standard	IEEE802.11b/g/n (Wi-Fi certificated)
SSID	1 to 32 one-byte alphanumeric characters
Connection mode	Ad hoc mode, Infrastructure mode
Authentication method, Encryption algorithm	Open+WEP, Shared+WEP, WPA-PSK+TKIP, WPA-PSK+AES, WPA2-PSK+AES, WEP64, WEP128, TKIP, AES
Power voltage	DC 4.5V to 5.5V
Current consumption	300 mA at maximum
Frequency range	2.4 GHz band
Potential interference range	40 m
Overall dimensions	Wireless LAN unit: Approx. 24 mm × 51 mm × 10 mm (W × D × H) USB extension cable: 1 m long

Setup

This chapter explains the installation and setting process for the product and external devices necessary before using this product and the setup for each system.

- PC-POS system ([page 44](#))
- ePOS-Device API ([page 45](#))
- ePOS-Device XML ([page 46](#))

Updating the ePOS-Device

Once you have updated the ePOS-Device, you can use the new ePOS-Device functions. For each system, refer to "[System connection examples](#)" on [page 17](#).

Confirming the ePOS-Device version

You can confirm the version of the ePOS-Device on the EPSON TMNet WebConfig title bar.

Downloading the ePOS-Device update program

Download the following file from the Epson website and save it in your local environment.

- File name: ePOS-Device System Update Package

For more information about the update method, refer to the Readme file in the ePOS-Device update package.

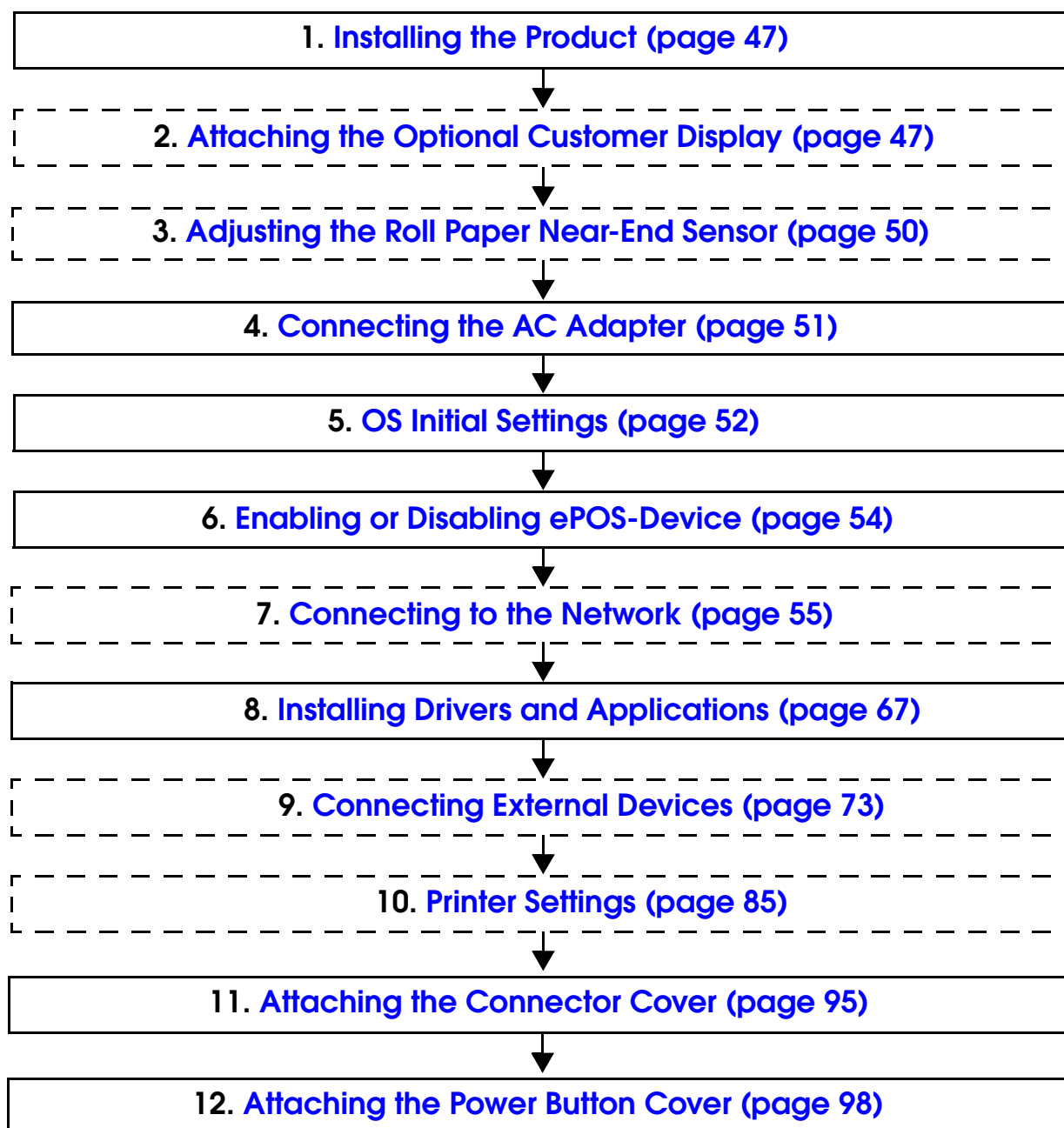
Flow of Setup

Setup for this product and the external devices vary depending on the system configuration method.

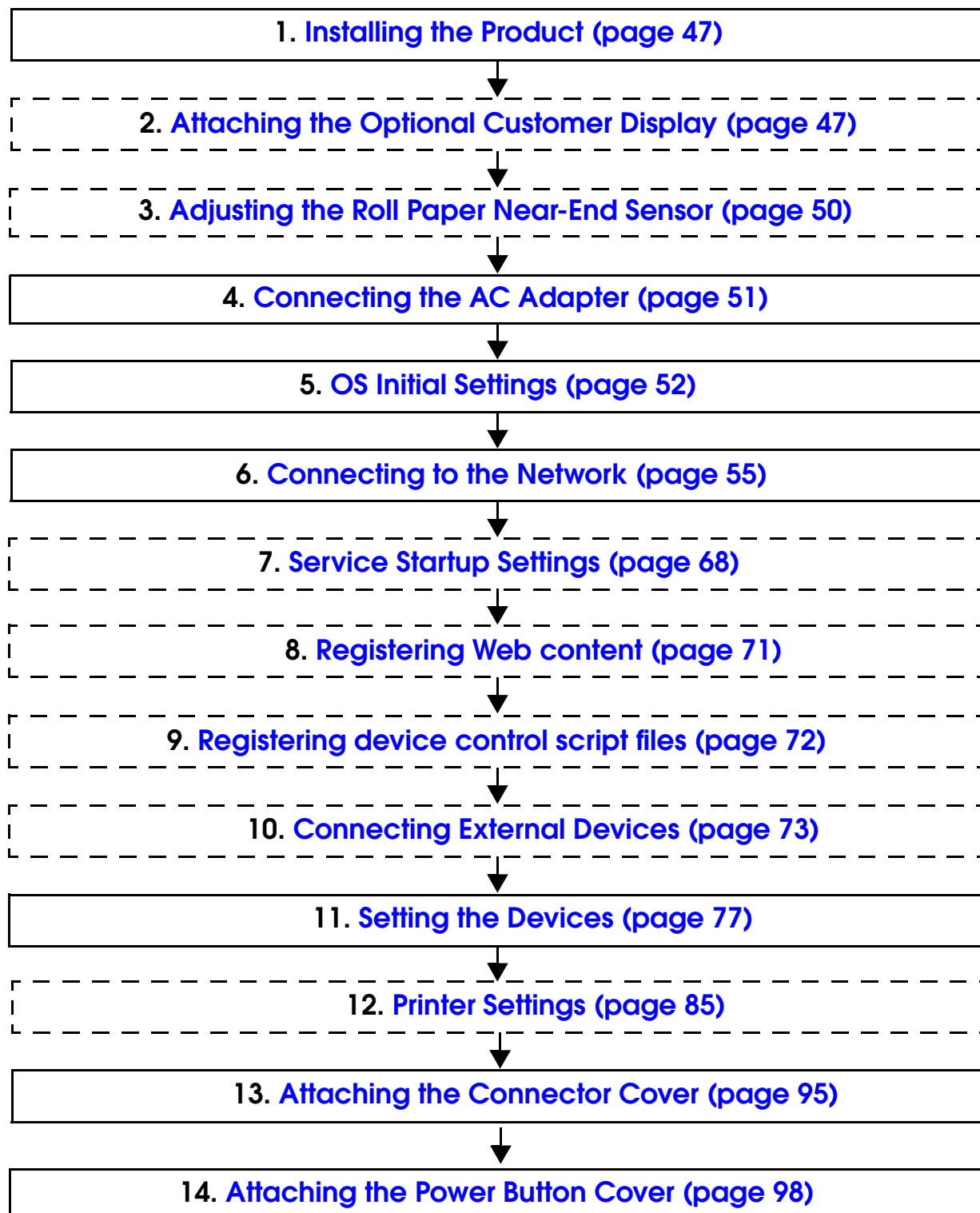
NOTE

In this setup flow, necessary items are in a frame with a solid line. Optional items are explained in an frame with a dotted line.

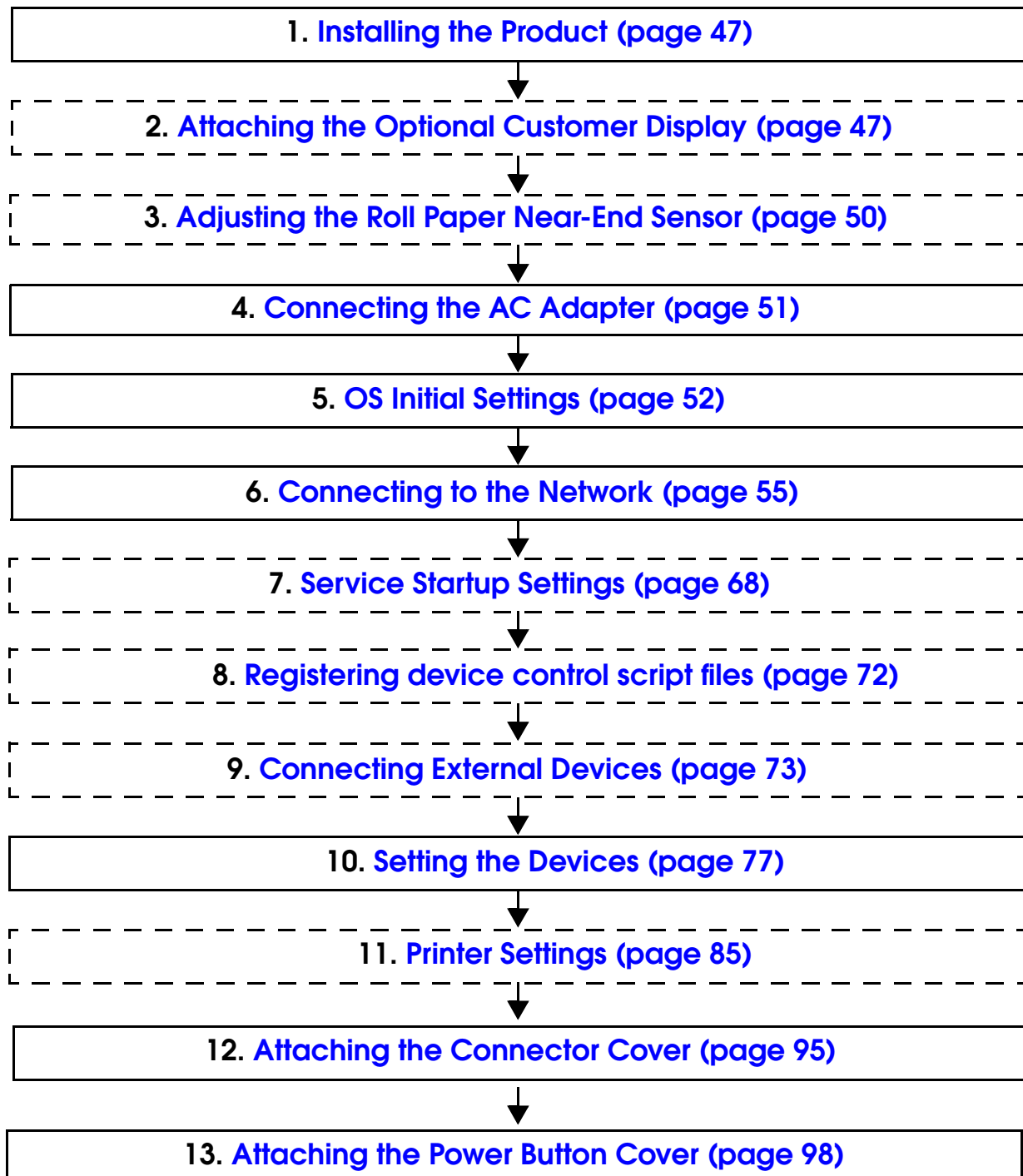
PC-POS System



If using ePOS-Device API (Controlling the printing and external devices from a Web application)



If using ePOS-Device XML (Controlling the printing and external devices from a terminal application)



Installing the Product

Important Notes

- The Product must be installed horizontally on a flat surface (not tilted).
- Do not place the printer in dusty locations.
- Do not knock or strike the Product. This may cause defective print.
- Do not catch cables and do not place foreign matter under the printer.

Attaching the Optional Customer Display

Setting the Customer Display

DM-D110 (dedicated model) has the DIP switches. The functions are as follows.

- Displaying self-test
- Setting the communication speed (Serial communication)

In normal use, you do not need to change the settings. If you change this setting, please match the setting to that of the product. When used in ePOS-Device API / XML, you need to set with EPSON TMNet WebConfig.

DIP Switch Functions

CAUTION

- Remove the USB cable from the computer and remove the cover of the dip switch. If the USB cable is still connected to the computer during operation, this product may break down due to short circuit, etc.
- If you open the DIP switch cover, be sure to close the cover after setting the DIP switch. When used without the cover, it may cause a malfunction.

DSW No.	Function	ON	OFF	Default
1-1	Received Error Data	Ignore	Displays “?”	OFF
1-2	Receive Data Length	7bit	8bit	OFF
1-3	Parity	With Parity	No Parity	OFF
1-4	Parity Selection	Even	Odd	OFF

DSW No.	Function	ON	OFF	Default
1-5	Communication Speed Switching	Refer to " Communication Speed Switching"		ON
1-6				OFF
1-7				ON
1-8	Execution of Self-Test *1	Yes	No	OFF

*1: Executes the self-test once only when the power is tuned on.

Communication Speed Switching

SW1-5	SW1-6	SW1-7	Communication Speed (bps)
ON	ON	ON	2400
OFF	ON	ON	4800
ON	OFF	ON	9600
OFF	OFF	ON	19200
ON	ON	OFF	38400
OFF	ON	OFF	57600
ON	OFF	OFF	115200
OFF	OFF	OFF	(Reserved)

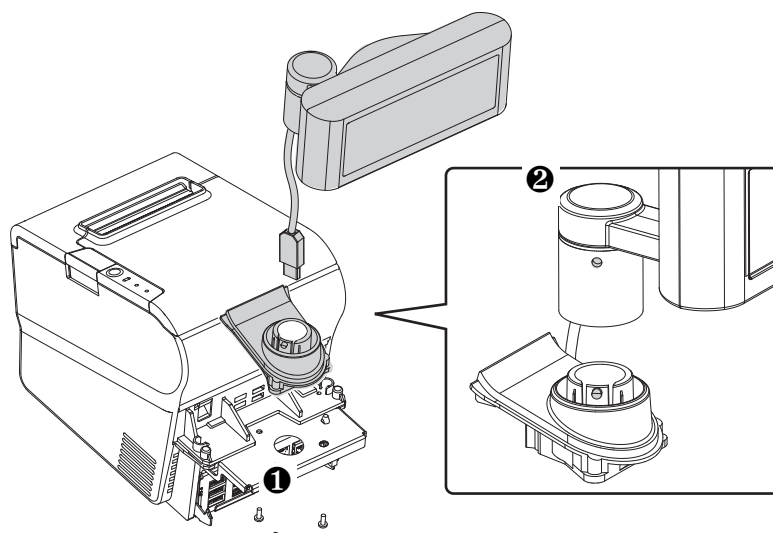
How to set the DIP switch

- 1** Disconnect the cable connecting the DM-D110 (dedicated model).
- 2** Remove the DIP switch cover.
- 3** Switch the switch with something pointy.
- 4** Close the DIP switch cover.

Attaching the Customer Display

If you use the product with the optional customer display, follow the steps below.

- 1** Turn over the main body on its front.
- 2** Align the 3 screw holes on the bundled base with those on the pole mounting plate, and secure the base with the 3 screws included in the customer display package.
- 3** Pass the USB cable through the cable hole on the pole mounting plate. See Illustration ❶.



- 4** Align the dowels on the L-shaped pole and the base, and attach the L-shaped pole with the base. See Illustration ❷.
- 5** Connect the USB cable with one of the USB connectors.

Adjusting the Roll Paper Near-End Sensor

Below are two situations where a roll paper near-end sensor adjustment is required.

- To adjust the detection position to suit the diameter of the roll paper core used.
- To adjust the detection position of remaining amount of paper.

CAUTION

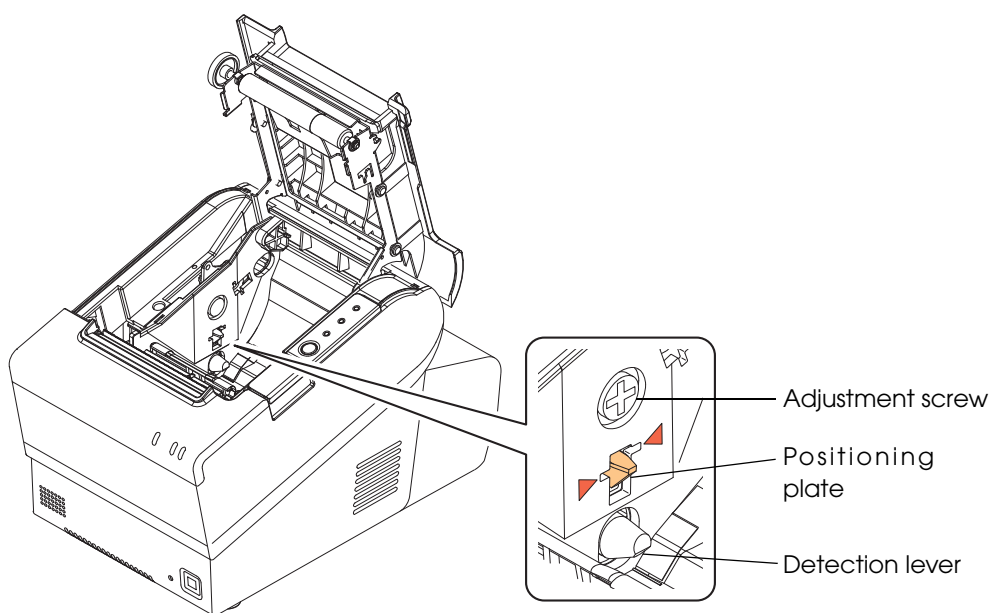
- Since roll paper cores vary slightly in shape, depending on roll paper design and manufacturing tolerances, it is impossible to detect the remaining paper exactly.
- Use roll paper with a core whose inner diameter is 12 mm {0.47"} and outer diameter is 18 mm {0.71"} so that the near-end sensor can detect the remaining paper as accurately as possible.

Follow the steps below to adjust the roll paper near-end sensor.

- 1 Open the roll paper cover, and remove the roll paper.
- 2 Loosen the adjustment screw fastening the sensor, and align the upper edge of the positioning plate with the adjustment position.

Adjustment position	Remaining amount of paper (outer diameter: mm)
Upper	Approx. 27 {1.06"}
Lower (Initial setting)	Approx. 23 {0.97"}

- 3 Tighten the adjustment screw.
- 4 After adjustment, make sure that the detection lever operates smoothly.

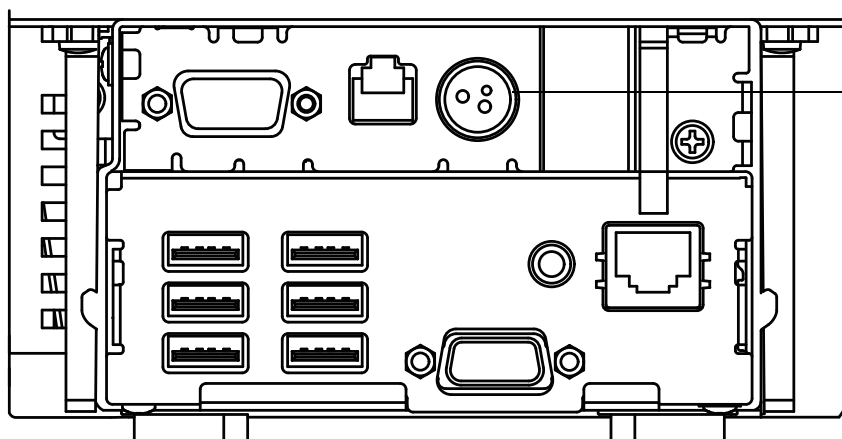


Connecting the AC Adapter

Use this product's dedicated AC adaptor.



- **Be sure to use the included AC adapter as the power supply unit.**
Using a nonstandard power supply can result in electric shock and fire.
- **Should a fault ever occur in the included AC adapter, immediately turn off the power to the printer and unplug the power supply cable from the wall socket.**
- **Be sure to unplug 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 product.
- **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 and the product.



DC Input connector

OS Initial Settings

The following explains the procedures for setting the OS when you turn on the power for this product for the first time.

CAUTION

- When performing setup for the OS, you need a display, a keyboard, and a mouse.
- Connect the display when this product is off.
If you connect the display when this product is on, data may not be properly displayed.

- 1** Check that the product's power is not on, and connect the display, a keyboard, and a mouse.
- 2** Turn on the product.
- 3** The items shown below, including this resolution information, are displayed as start options when the product is started. Select the item that corresponds to the display that you are using.
 - openSUSE 640x480
 - openSUSE 800x600
 - openSUSE 1024x768
 - openSUSE 1280x1024
 - openSUSE 1600x1200
 - openSUSE 12.2 (Failsafe)

NOTE

Select a resolution that is not supported by the display can result in a failure to display anything. If this occurs, restart this product and select an appropriate resolution.

4 The login screen is displayed. Input the password.

The initial settings are as follows.

User name	Password
EPSON-USER	TMDT

NOTE

You can change the session at the login screen. The setting at the time of factory shipment is [KDE Plasma Workspace].

Select [Menu] - [Session Type]. Select [GNOME] or [KDE Plasma Workspace] from the list.

5 The OS desktop is displayed. Set the time, date, and the timezone.

NOTE

You can also set the date, time, and the timezone using EPSON TMNet WebConfig.

Enabling or Disabling ePOS-Device

Use the desktop shortcut to enable or disable ePOS-Device.

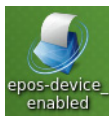
Enable it if you are using ePOS-Device.

NOTE

- If you enabled ePOS-Device, it uses 100 MB or more of memory.
If you are using this product with a PC-POS system or in a virtual environment, we recommend disabling e-POS-Device.
- ePOS-Device is set to [Enabled] in the default settings.

Enabling ePOS-Device

Run [Enabling ePOS-Device] from the shortcut on the desktop.



Disabling ePOS-Device

Run [Disabling ePOS-Device] from the shortcut on the desktop.



Connecting to the Network

CAUTION

The product uses a modular connector specifically designed for the cash drawer. Do not connect the connector to an ordinary telephone line.

For Ethernet Interface

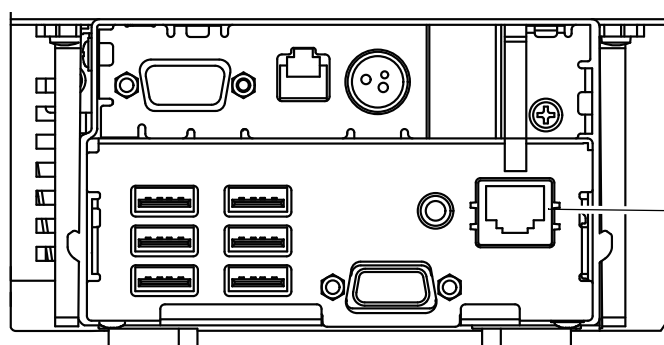
Connect the product to a network by a LAN cable via a hub.

Connecting the Ethernet interface cable

**CAUTION**

- **When LAN cables are installed outdoors, make sure devices without proper surge protection are cushioned by being connected through devices that do have surge protection.**
Otherwise, the devices can be damaged by lightning.
- **Never attempt to connect the customer display cable, drawer kick-out cable, or a standard telephone line cable to the Ethernet connector.**

Insert a category 5e or higher LAN cable into the Ethernet connector until you hear a click.



Ethernet connector

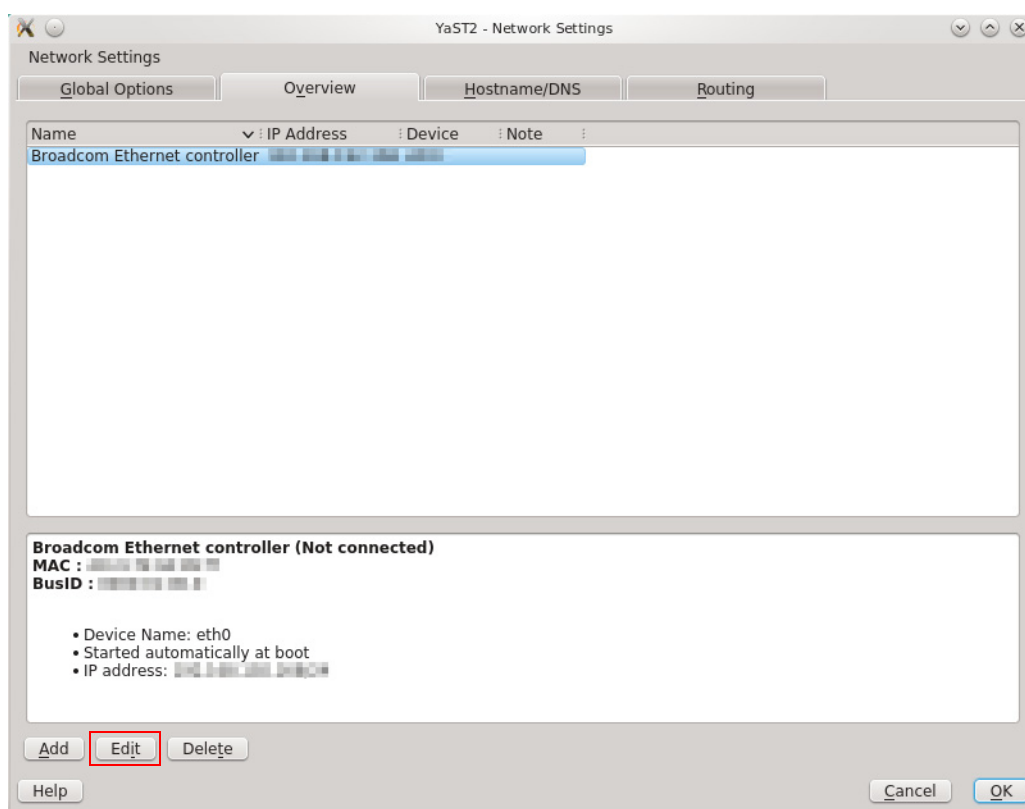
Network settings

Perform network settings, such as the IP address. These settings are the same as a Windows PC. You can perform settings in the following ways.

- Setting in a local environment: Setting with YaST
- Setting on web blowsier from remote/local PC: Setting with EPSON TMNet WebConfig

Setting with YaST

- 1 Start YaST.
- 2 Select (Network Devices) - (Network Settings).
- 3 The "Network Settings" screen is displayed. Select the device to set from the list of the (Overview) tab, then click (Edit).



- 4 The "Network Card Setup" screen is displayed. Change the settings, then click (Next).

YaST2 - Network Settings

Network Card Setup

General Address Hardware

Device Type: Wireless Configuration Name: wlan0

☐ No Link and IP Setup (Bonding Slaves)

☐ Dynamic Address DHCP DHCP both version 4 and 6

☒ Statically assigned IP Address

IP Address: Subnet Mask: Hostname:

Additional Addresses

Alias Name	IP Address	Netmask
------------	------------	---------

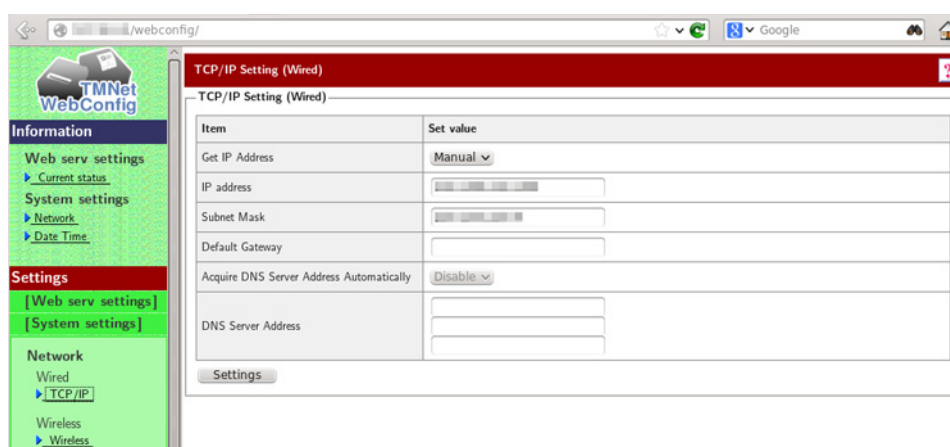
Add Edit Delete

Help Cancel Back Next

EPSON TMNet WebConfig

You can perform settings from a PC for settings via the network. You can also set the IP address without connecting a display to this product.

- 1 Start the Web browser of the PC for settings, and input the following.
http://This product's IP address/webconfig/
EPSON TMNet WebConfig starts.
The default IP address for this product is "192.168.192.168".
- 2 Select (Wired), then (TCP/IP).
The "TCP/IP setting (Wired)" screen is displayed.



The screenshot shows a web browser window with the address bar displaying "/webconfig/". The page title is "TCP/IP Setting (Wired)". On the left, there is a navigation menu with sections: "Information" (containing "Web serv settings" and "System settings"), "Settings" (containing "Web serv settings" and "System settings"), and "Network" (containing "Wired", "TCP/IP", "Wireless", and "Wireless"). The "TCP/IP" option under "Wired" is selected. The main content area is titled "TCP/IP Setting (Wired)" and contains a table with the following items and set values:

Item	Set value
Get IP Address	Manual
IP address	
Subnet Mask	
Default Gateway	
Acquire DNS Server Address Automatically	Disable
DNS Server Address	

At the bottom of the table, there is a "Settings" button.

- 3 Set the IP address and other network settings, then click (Settings).

For Wireless LAN Interface

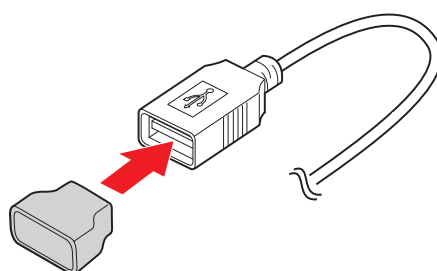
The optional wireless LAN cable set (OT-WL01) enables you to use the product with a wireless LAN connection.

Connecting the wireless LAN cable set

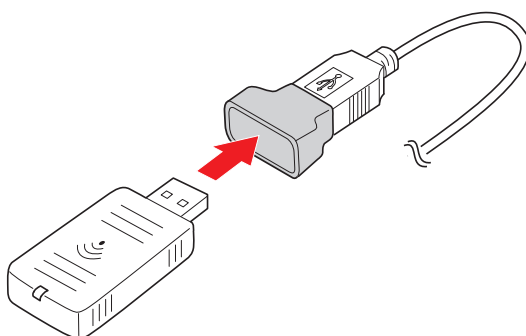
Check whether the following items are included. If any item is damaged, contact your dealer.

- Wireless LAN unit
- USB extension cable
- Affixing tape (1 pair, 2 pieces)
- Rubber cover
- User's manual

- 1 Attach the included rubber cover to the connector of the USB extension cable into which the wireless LAN unit will be inserted, to prevent the unit from coming off.

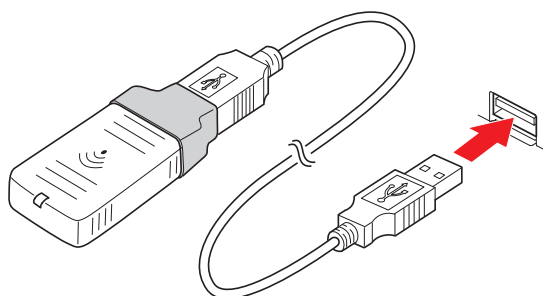


- 2 Insert the wireless LAN unit into the connector of the cable.

**CAUTION**

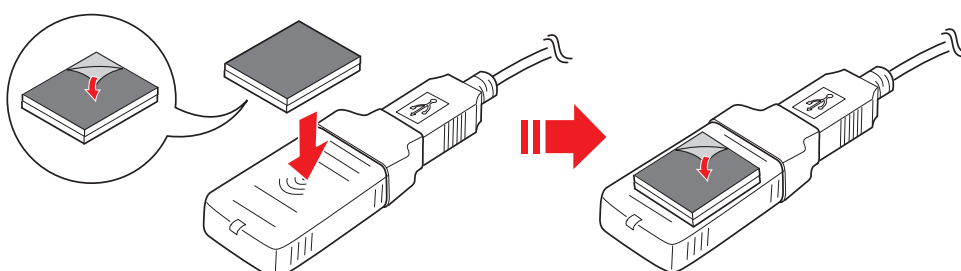
Adjust the position of the rubber cover so that the description on the label on the back side of the wireless LAN unit is not covered.

3 Connect the USB extension cable to the USB connector of the printer.



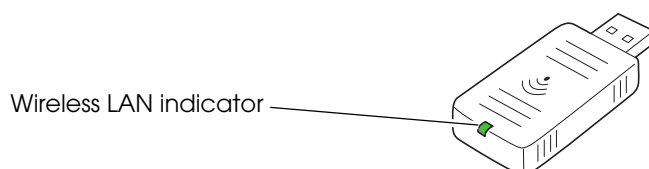
NOTE

If you want to fix the wireless LAN unit, cut the included affixing tape to fit and put on the unit, and fix the unit in a place with good communication.



Wireless LAN indicator

The position of the wireless LAN indicator is shown in the illustration below.



Wireless LAN indicator (Green)	Status
Off	The wireless LAN unit is not connected to the printer. Or the printer power is OFF.
Flashing	This wireless LAN unit is connected to the printer and is in operation.
Flashing rapidly	This wireless LAN unit is connected to the printer and is in operation. This unit is communicating on a network.

Network settings

Perform network settings, such as the IP address. These settings are the same as a Windows PC. You can perform settings in the following ways.

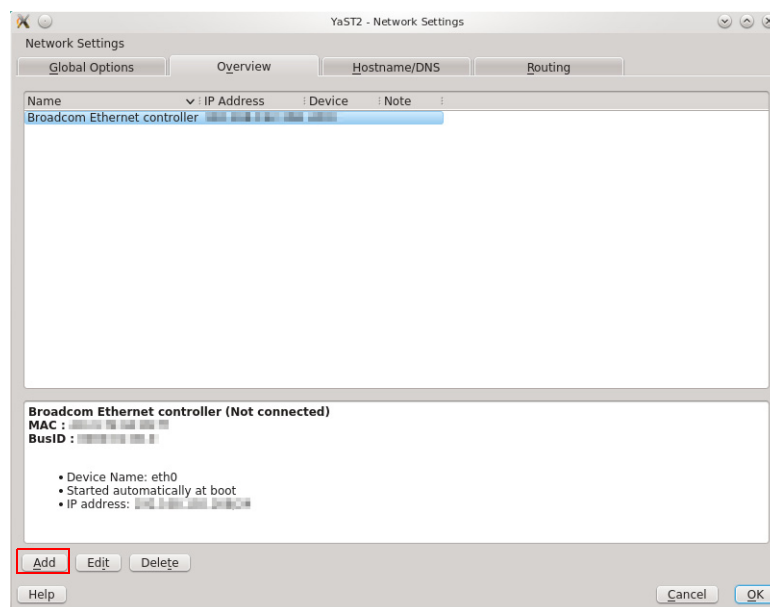
- Setting with YaST
- Setting with EPSON TMNet WebConfig

NOTE

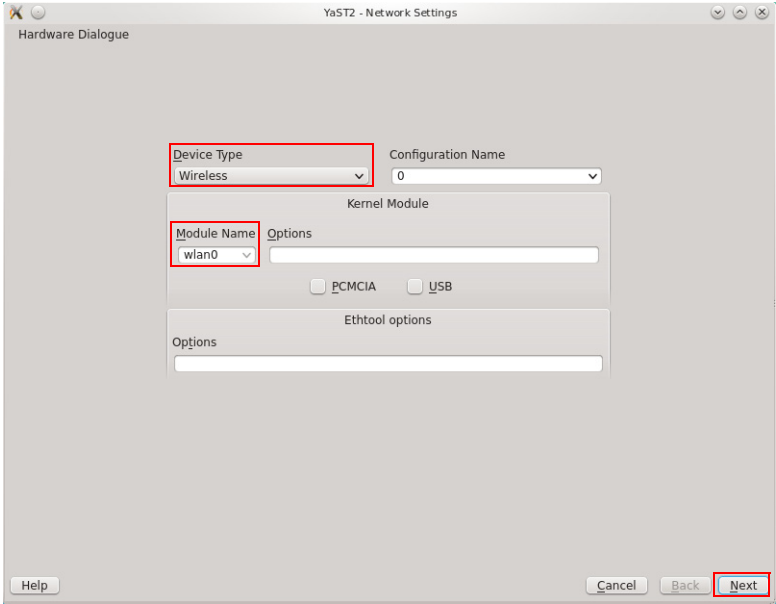
- This product cannot use ad hoc mode and infrastructure mode at the same time.
- Perform network settings the devices you will connect to this product via ad hoc.

Setting with YaST

- 1 Start YaST.
(For details on starting YaST, refer to ["Starting YaST" on page 91.](#))
- 2 Select (Network Devices) - (Network Settings).
- 3 "Network Settings" screen is displayed. Click (Add) in (Overview) tab.



- 4 “Hardware Dialogue” screen is displayed. Set (Device Type) and (Module Name), then click (Next).

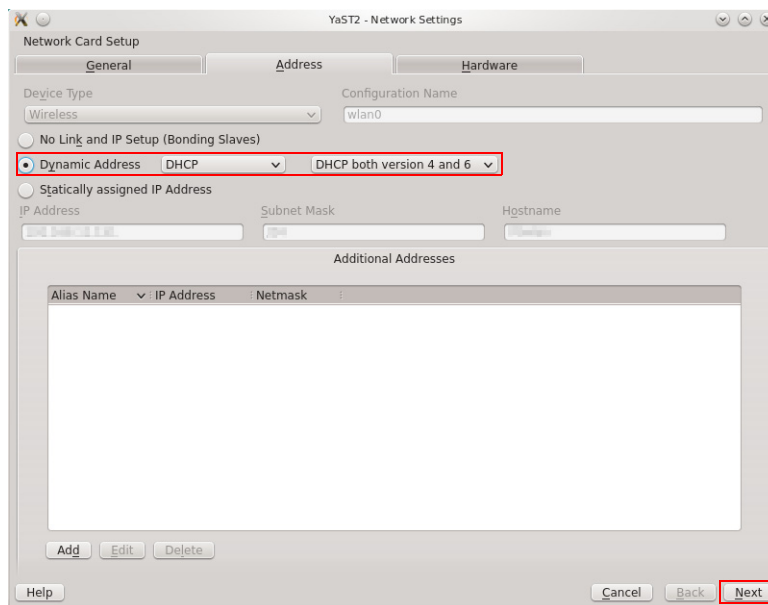


Item	Setting
Device Type	Select “Wireless” from pulldown menu.
Module Name	Input “wlan0”.

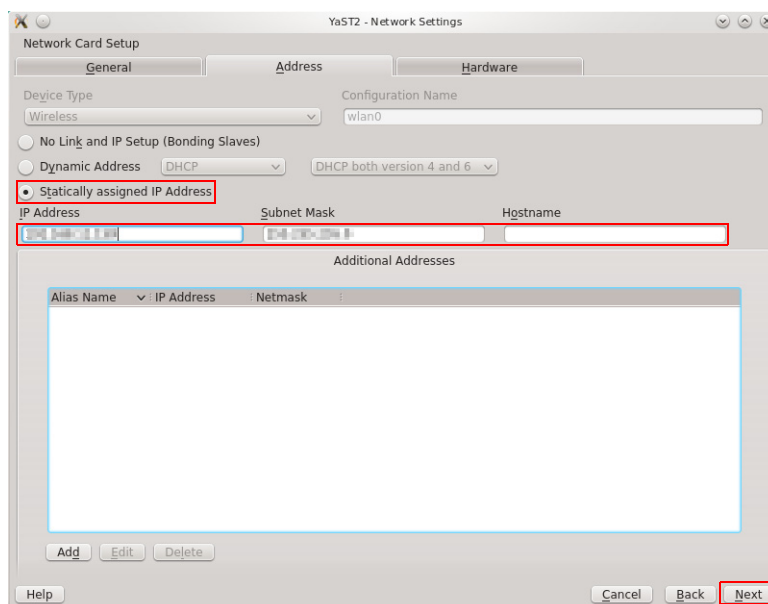
- 5 “Network Card Setup” screen is displayed. Select (Dynamic Address) or (Statically assigned IP Address).

When select (Dynamic Address)	Go to step 7.
When select (Statically assigned IP Address)	Go to step 8.

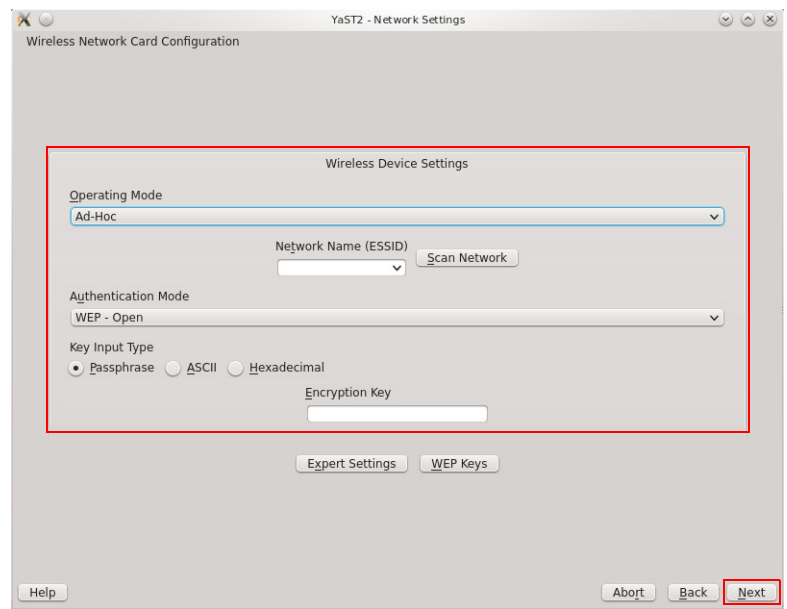
- 6** When Select (Dynamic Address), then set about dynamic address settings. Click (Next). Go to step 8.



- 7** When Select (Statically assigned IP Address), then set (IP Address), (Subnet Mask), and (Hostname). Click (Next). Go to step 8.

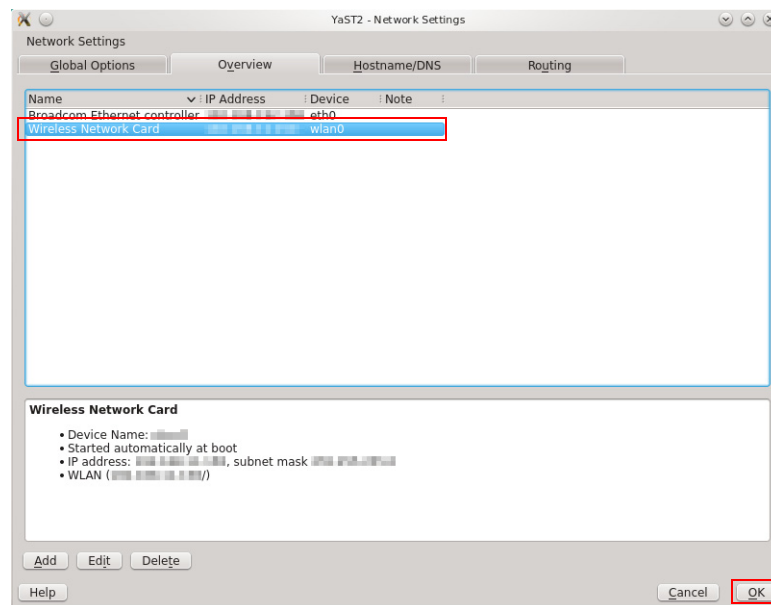


- 8 “Wireless Network Card Configuration” screen is displayed.
After selecting (Operating Mode), specify the security settings.
Click (Next).



Item		Setting
Operating Mode	Ad-Hoc	Select if using Ad-Hoc Mode.
	Managed	Select if using Infrastructure Mode.
Network Name (ESSID)		Input the network ESSID. If the network has already been configured, click (Scan Network) to display the ESSID.
Authentication Mode		For specifying the security setting. Set in accordance with the network environment.

- 9** “Network Settings” screen is displayed.
The device added to the list in the (Overview) tab is displayed.
Click (OK).



- 10** The following file is created if settings of a wireless LAN module are specified.
`/etc/sysconfig/network/ifcfg-wlan0`

- 11** Edit the ifcfg-wlan0 file. Open the file and edit as shown below.

```
POWER='no'
↓
POWER='none'
```

Setting with EPSON TMNet WebConfig

You can perform settings from a PC for settings via the network. You can also set the IP address without connecting a display to this product.

- 1 Start a Web browser of the PC for the settings, and input the following.
http://This product's IP address/webconfig/
EPSON TMNet WebConfig starts.
The default IP address for this product is "192.168.192.168".
- 2 Select (Wireless), then (Wireless).
The "Wireless Settings" screen is displayed.

Item	Set value
Network Mode	☒ Infrastructure ☐ Ad-Hoc
SSID	EpsonNet
Authentication Method	Open System
Security Mode	None
Default WEP Key	1
WEP Key	
WPA/WPA2 Pre-Shared Key	

Settings

- 3 Perform network settings for a wireless LAN, then click (Settings).
- 4 Select (Wireless), then (TCP/IP).
The "TCP/IP Settings (Wireless)" screen is displayed.

Item	Set value
Get IP Address	Auto
IP address	
Subnet Mask	
Default Gateway	
Acquire DNS Server Address Automatically	Disable
DNS Server Address	

Settings

- 5 Set the IP address and other network settings, then click (Settings).

Installing Drivers and Applications

Installing and Setting the Drivers

You must install drivers depending on the type of external devices.

When you want to control an external TM printer with a printer driver, install CUPS driver.

For more about how to install and set the drivers, refer to the manual for each driver.

CAUTION

- Printer settings can not be specified at [Printer] of YaST but at CUPS. The CUPS access procedure is as follows. Input the following in the browser address bar.
`http://localhost:631`
- CUPS driver is installed in this product. The location of the installer is as follows.
`/opt/epson/tmt-cups/tmt-cups-1.4.2.0.tar.gz`
- The location of the CUPS manual is as follows.
`/opt/epson/tmt-cups/manual/...`
- The installers for JavaPOS ADK is included. Install them as necessary. The location of the installer is as follows.
`opt/epson/UPOSforDT/Epson_JavaPOS_ADK_11310.tar.gz`

NOTE

It is not necessary to install printer drivers for the models shown below. By specifying settings using CUPS, you can select the PPD file corresponding to the model. It is necessary to install printer drivers if adding any printers other than those listed below.

- TM-T88V
- TM-T70II
- TM-T20
- TM-T82
- TM-T82II

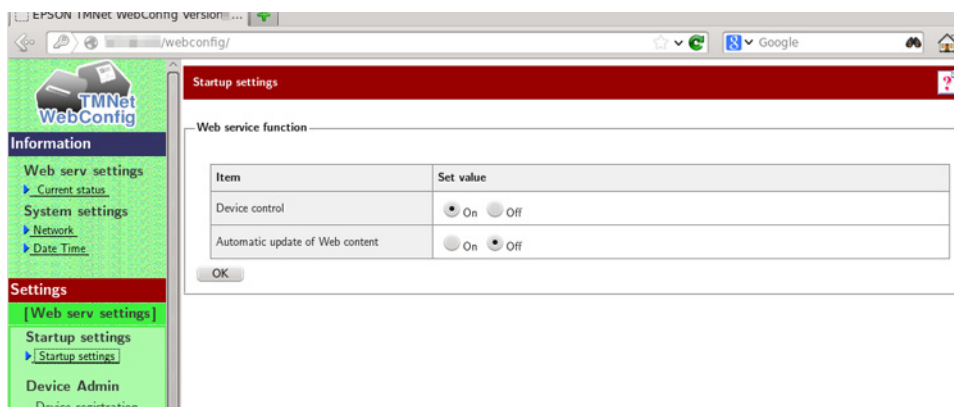
Installing Applications

Install the applications you want to use.

Service Startup Settings

It is necessary to perform service setup settings for the TM-T88V-DT depending on the system operation method.

Use EPSON TMNet WebConfig to perform the service setup settings, following the procedures below.



- 1 Start a Web browser of the PC for the settings, and input the following.
<http://This product's IP address/webconfig/>
EPSON TMNet WebConfig starts.
- 2 Select (Web serv settings), then (Startup settings).
The "Startup settings" screen is displayed.
- 3 Set the following, then click (OK).

Item	Description
Device control	Set whether to control POS peripherals using this product or not.
Automatic update of Web content	Set whether to use the automatic update for Web content or not.

Support system and startup settings for each service are as follows.

System	Device control	Automatic update of Web content
ePOS-Device API	Enabled (default)	Disable / Enable
ePOS-Device XML	Enabled (default)	Disable

Registering Web Contents

Perform registration as follows, depending on the system and method in use.

If placing Web content in this product's Web server using ePOS-Device API, register the Web content.

CAUTION

When you upload Web content, the existing registered Web content is discarded.
(The folders under U_data remain.)

Specifications of the file to be registered

- You can register the following for Web content.
HTML files, CSS files, JavaScript, image data, Perl scripts, php scripts
- You can use SQLite3 as a database.
- If including scripts in Web content, follow the naming rules below.
For Perl scripts: *.cgi
For php scripts: *.php
- Zip the files to be registered all together. The zip file name is arbitrary.

CAUTION

- Use one-byte alphanumeric characters (ASCII characters) for a zip file name and sub-folder name.
- The maximum size of the files before zipping is 100 MB. Otherwise, registering fails.

Cautions for the files to be registered

- Web contents cannot be registered additionally. All files are overwritten and registered. Zip web contents before registering.

<Example for sample program>

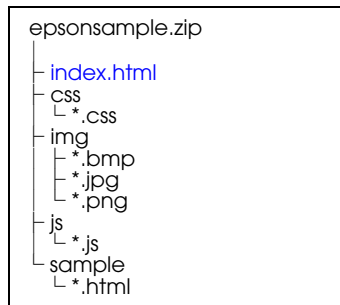
```
ePOS-Device_UM_E_Sample.zip ..... : Zip file
├─ index.html
├─ css
│  └─ *.css
├─ img
│  ├── *.bmp
│  ├── *.jpg
│  └─ *.png
├─ js
│  └─ *.js
└─ sample
   └─ *.html
```

- When you access to registered web contents from an input terminal and so on, the URL differs depending on the folder structure of the zip file.

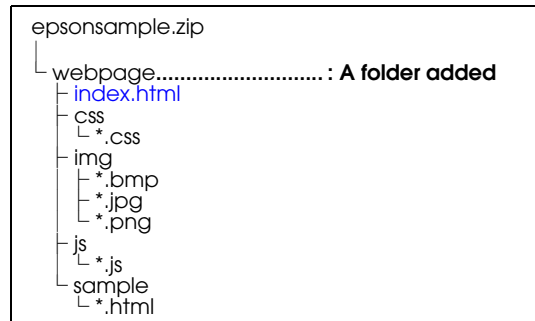
① [http://\[the product's IP address\]/index.html](http://[the product's IP address]/index.html)

② [http://\[the product's IP address\]/webpage/index.html](http://[the product's IP address]/webpage/index.html)

①

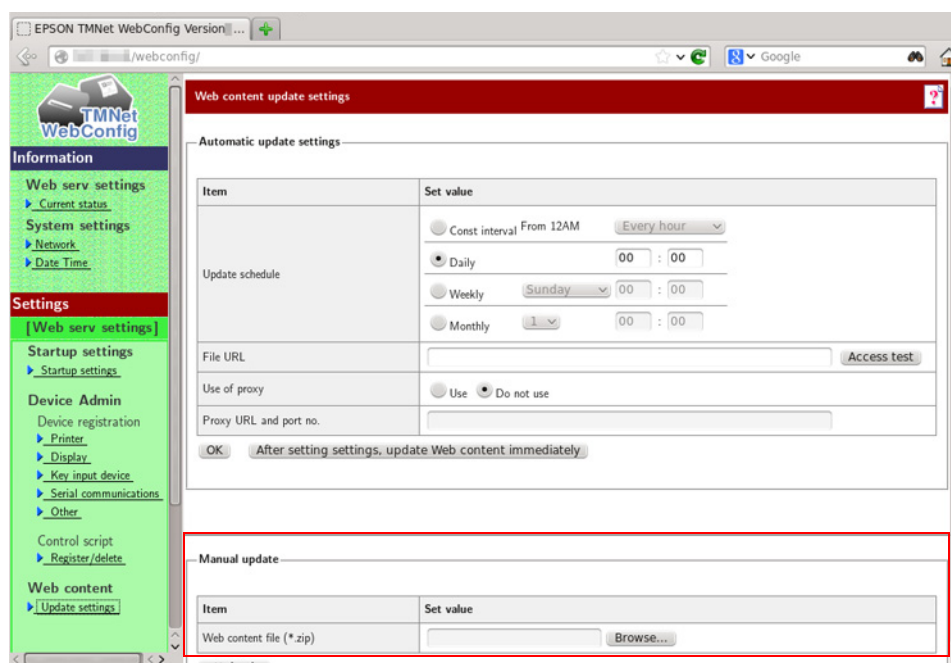


②



Registering Web content

Use EPSON TMNet WebConfig to register Web contents on this product, following the procedures below.



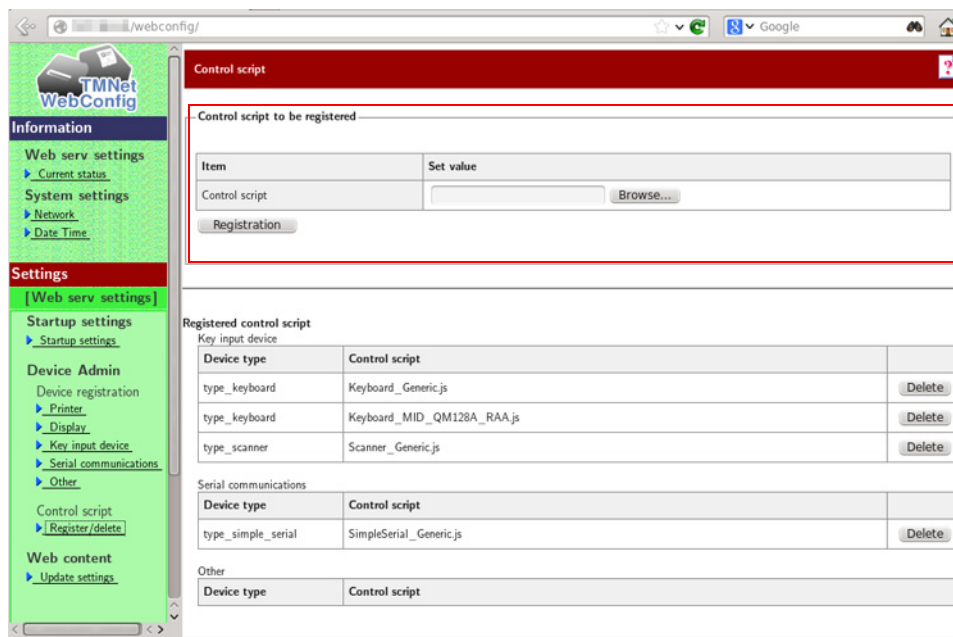
- 1 Start a Web browser of the PC for the settings, and input the following.
http://This product's IP address/webconfig/
EPSON TMNet WebConfig starts.
- 2 Select (Web serv settings), then (Update settings).
The "Web content update settings" screen is displayed.
- 3 Select (Browse...), and specify the file (zip file format) you want to register, then click (Upload).

Registering device control script files

Use EPSON TMNet WebConfig to register device control scripts on this product, following the procedures below.

NOTE

This registration is used when registering device control script files, such as serial communication devices, using ePOS-Device.



- 1 Start a Web browser of the PC for the settings, and input the following.
http://This product's IP address/webconfig/
EPSON TMNet WebConfig starts.
- 2 Select (Web serv settings), then (Register/delete).
The "Control script" screen is displayed.
- 3 Select (Browse...), and specify the control script you want to register,
then click (Registration).

Connecting External Devices

NOTE

Connect external devices as necessary.

Connecting a Mouse and Keyboard

Connect a USB mouse and USB keyboard to the USB connectors.

NOTE

When connecting the USB keyboard, keymap specified on the OS might not match the keymap of the connected keyboard. If this occurs, specify the keymap settings.

Connecting a Display

Connect a display to the VGA connector.

CAUTION

Connect the display when this product is off.
If you connect the display when this product is on, data may not be properly displayed.

Connecting a Printer

Connect a printer that is supported by the system and applications. You can connect it using the following methods.

- USB connection
- Serial connection
- Network connection

(For network printers, we recommend setting the IP address in advance.)

NOTE

The connection method varies depending on your system in operation. For details, refer to ["Development Information for Each System" on page 129](#).

Connection POS Peripherals

- Connect POS peripherals with USB interface to the USB connectors.
- Connect POS peripherals with serial interface to the COM connector or use USB-serial conversion cables to convert them and connect them to the USB connectors, and install the drivers for each model. For details such as the order in which to connect them, refer to each device's user's manual.
- You can perform the connection test from EPSON TMNet WebConfig. For details, refer to "[Setting the Devices](#)" on page 77.



Dedicated drivers are necessary, depending on the devices.
Acquire and install the drivers as necessary.

Connecting the Cash Drawer

When using a cash drawer, connect the cash drawer.

Use the cash drawer handled by EPSON or your dealer.

If the optional external buzzer is used, you cannot use a cash drawer.

Connecting the Drawer Kick-out Cable

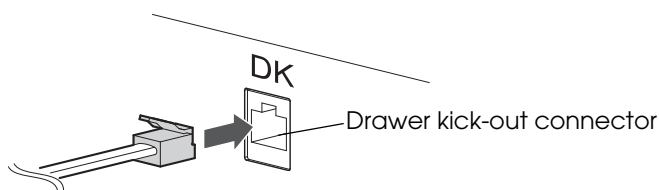


- **Specifications of drawers differ a great deal, depending on makers or models. When you use a drawer other than the specified, make sure its specifications meet the following conditions.**

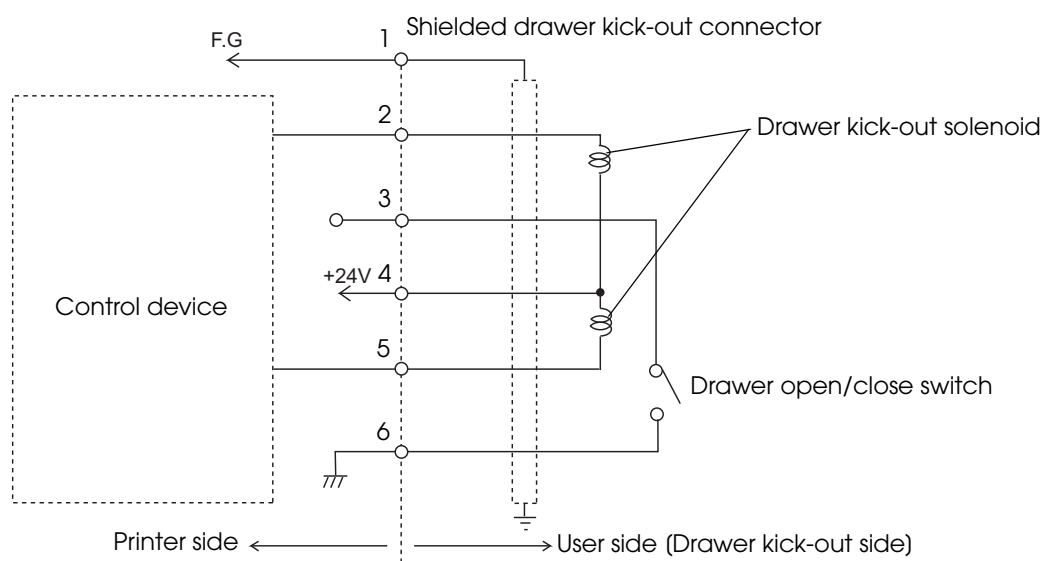
Otherwise, devices may be damaged.

- * The load, such as a drawer kick-out solenoid, must be connected between pins 4 and 2 or pins 4 and 5 of the drawer kick-out connector.
- * When the drawer open/close signal is used, a switch must be provided between drawer kick-out connector pins 3 and 6.
- * The resistance of the load, such as a drawer kick-out solenoid, must be $24\ \Omega$ or more or the input current must be 1A or less.
- * Be sure to use the 24V power output on drawer-kick out connector pin 4 for driving the equipment.
- **Use a shield cable for the drawer connector cable.**
- **Two driver transistors cannot be energized simultaneously.**
- **Leave intervals longer than 4 times the drawer driving pulse when sending it continuously.**
- **Be sure to use the printer power supply (connector pin 4) for the drawer power source.**
- **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.



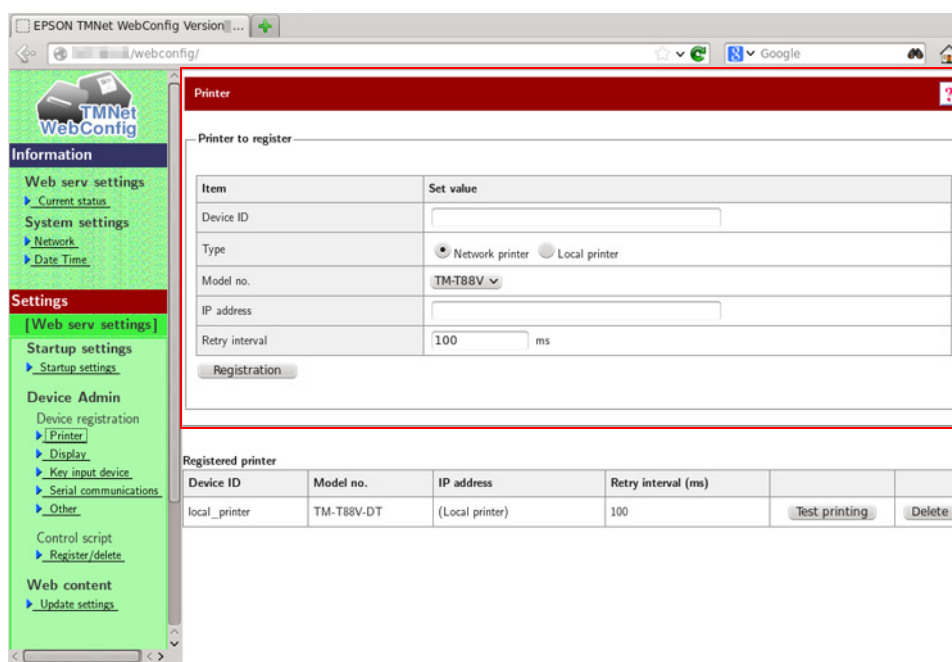
Drawer Connection Circuitry



Setting the Devices

Registering a Printer

Use EPSON TMNet WebConfig to register a network printer on this product, following the procedures below. This product's printer is already registered, so settings are not necessary.



- 1 Start a Web browser of the PC for the settings, and input the following.
<http://This product's IP address/webconfig/>
 EPSON TMNet WebConfig starts.
- 2 Select (Web serv settings), then (Printer).
 The "Printer" screen is displayed.

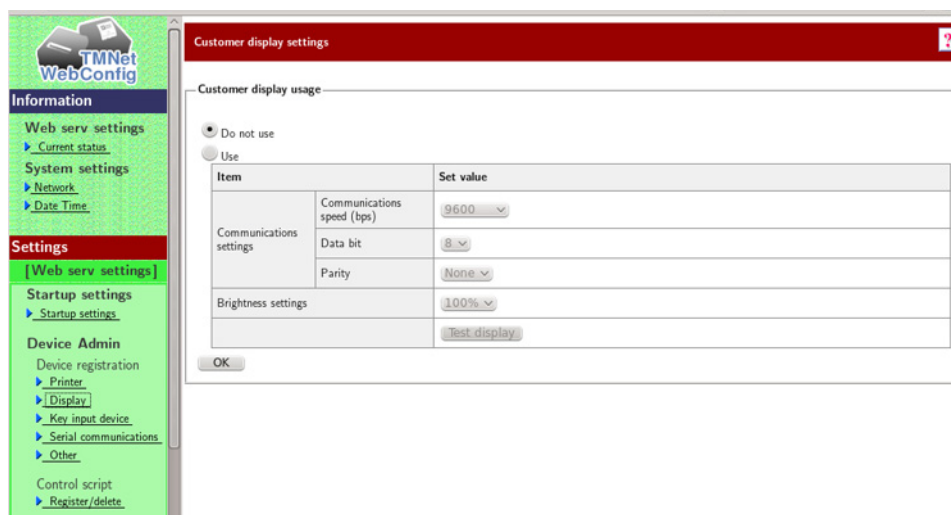
- 3** Set the following, then click (Registration).
The information for the registered device is displayed in (Registered printer).

Item	Description
Device ID	Set the device ID for the printer you want to register. (Any character string)
Type	Select network printer.
Model no.	Select the printer model.
IP address	Input the IP address of the printer you want to control.
Retry interval	Set the printer's retry interval.

- 4** Click (Test printing) and check if the registered printer operates properly.

Customer Display Settings

Use EPSON TMNet WebConfig to register the dedicated customer display DM-D110, following the procedures below.



- 1 Start a Web browser of the PC for the settings, and input the following.
<http://This product's IP address/webconfig/>
 EPSON TMNet WebConfig starts.
- 2 Select (Web serv settings), then (Display).
 The "Customor display settings" screen is displayed.
- 3 Select (Use) and perform the following settings.

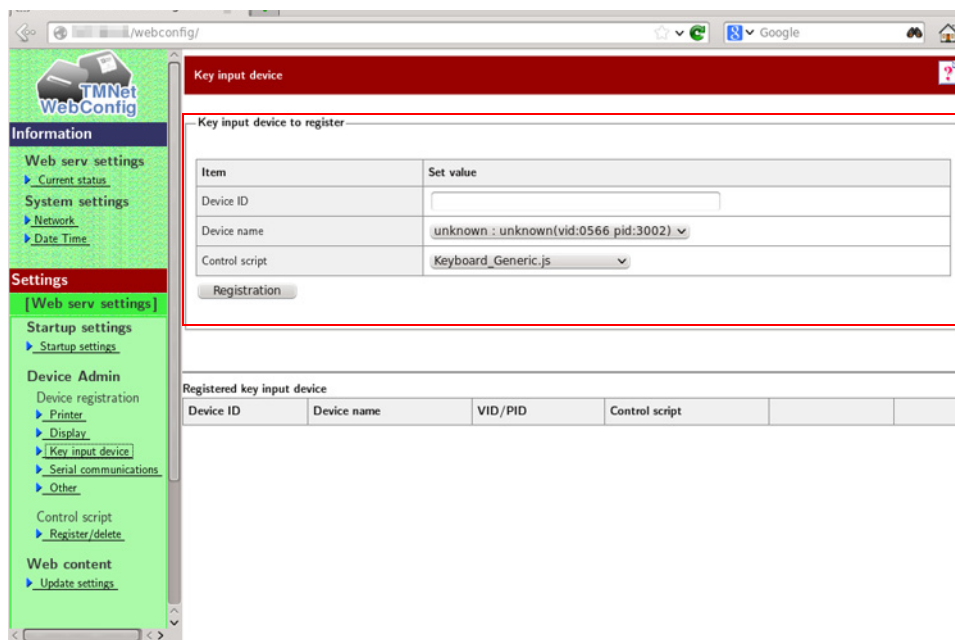
Item	Description
Communications settings	Used for customer display communication settings. If you changed the DM-D110 (dedicated model) dip switch settings, change the communication settings in accordance with those changes. (If you do not change the dip switch settings, use the default settings.)
Brightness settings	Set the brightness of the customer display in percentages. You can set 20%, 40%, 60%, or 100%. The maximum brightness is 100%.

Device ID for the dedicated customer display is fixed to "local_display".

- 4 Check the settings and click (OK).

Registering a Key Input Device

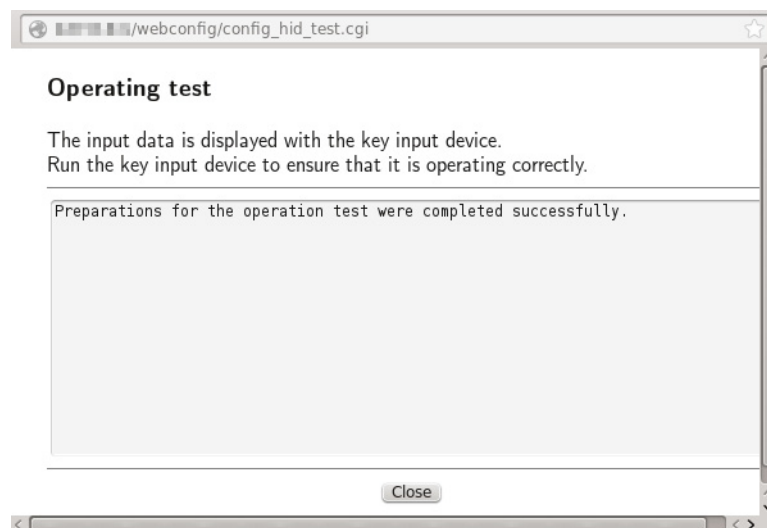
Use EPSON TMNet WebConfig to register a key input device on this product, following the procedures below.



- 1 Start a Web browser of the PC for the settings, and input the following.
<http://This product's IP address/webconfig/>
EPSON TMNet WebConfig starts.
- 2 Select (Web serv settings), then (Key input device).
The "Key input device" screen is displayed.
- 3 Set the following, then click (Registration).
The information for the registered device is displayed in (Registered key input device).

Item	Description
Device ID	Set the device ID for the key input device you want to control.
Device name	Select the key input device model. Unregistered key input devices that are currently connected to the unit are listed.
Control script	Select the script to control the device.

- 4** Click the (Operating test).
The (Operating test -- Webpage Dialog) screen is displayed.



- 5** Use the key input device, and check if the registered key input device operates properly.

Serial Communication Device Registration

Use EPSON TMNet WebConfig to register a serial communication device with this product, following the procedures below.

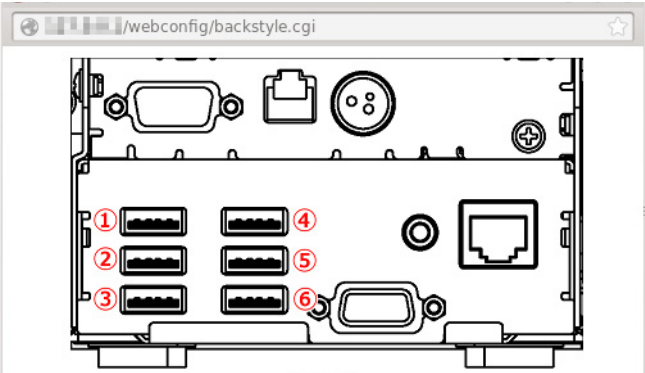
The screenshot shows the EPSON TMNet WebConfig interface in a web browser. The left sidebar contains a navigation menu with sections: Information (Web serv settings, System settings, Date Time), Settings (Web serv settings, Startup settings, Device Admin, Control script, Web content), and a red box highlights the 'Serial communications device' section under Device Admin. The main content area is titled 'Serial communications device' and contains a table for 'Serial communications device to register'.

Item	Set value
Device ID	
Device name	Model selection: No registerable devices were found... Port selection: Physical serial port Display of port location
Control script	SimpleSerial_Generic.js
Communications speed (bps)	9600
Data bit	8
Parity	None
Stop bit	1
Flow control	None

At the bottom of the table is a 'Registration' button.

- 1 Start a Web browser of the PC for the settings, and input the following.
http://This product's IP address/webconfig/
EPSON TMNet WebConfig starts.
- 2 Select (Web serv settings), then (Serial communications).
The "Serial communications devices" screen is displayed.

- 3 Set the device ID. (Any character string)
- 4 Select the product name or port for the serial communication device.

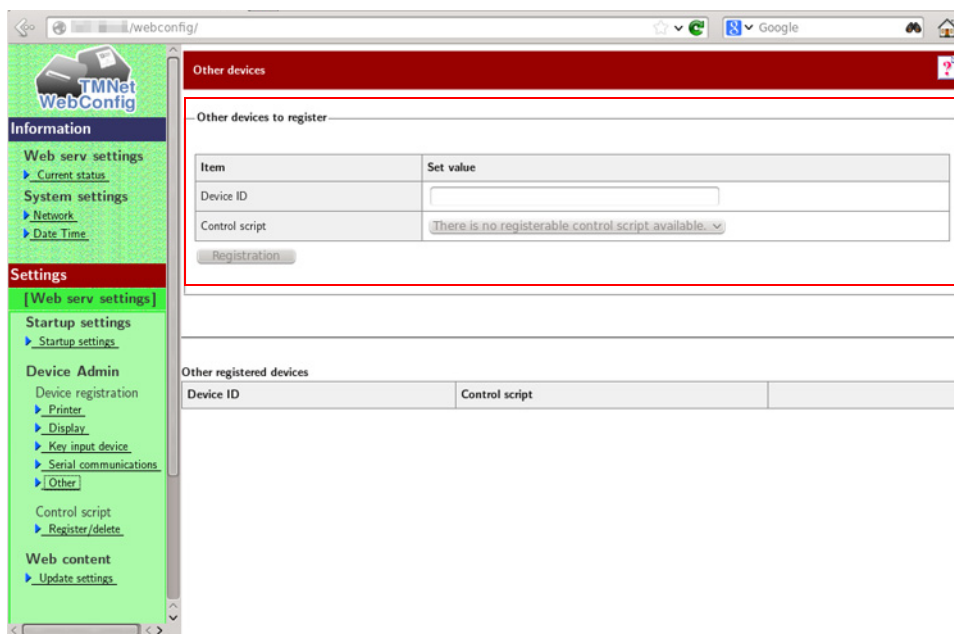
Item	Description
Physical serial port	This is the serial port on the back of this product.
USB port 1 to 6	These are the USB ports on the back of this product. If connecting a serial device using a COM-USB cable, select the corresponding USB port. You can check the USB port number using (Display port locations). 

- 5 Set the following, then click (Registration).
Information of the registered device is displayed in the (Registered serial communications device).

Item	Description
Control script	Select the control script to control the serial communication device.
Communications speed (bps)	Select the communication speed.
Data bit	Select the data bit.
Parity	Select the parity.
Stop bit	Select the stop bit.
Flow control	Select whether there is flow control or not.

Registering Other Devices

Use EPSON TMNet WebConfig to register other devices on this product, following the procedures below.



- 1 Start a Web browser of the PC for the settings, and input the following.
http://This product's IP address/webconfig/
EPSON TMNet WebConfig starts.
- 2 Select (Web serv settings), then (Other).
The "Other devices" screen is displayed.
- 3 Set the following, then click (Registration).
The information for the registered device is displayed in (Other registered devices).

Item	Description
Device ID	Set the device ID for the device you want to control.
Control script	Select the control script to control the other devices.

Printer Settings

You can register logos in the NV (non volatile) memory area in the printer unit and print them. Registering of logos is performed from the TM-88V Utility on the Windows computer via the network.

NOTE

You can also directly print raster format image data as logos without registering them on the product.

Register Procedures

Follow the steps below to register logos.

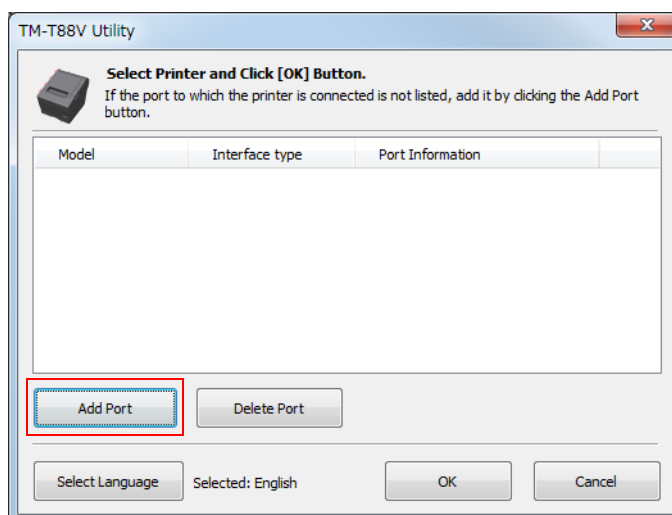
CAUTION

Check that this printer and the computer used for specifying settings are connected to the network.

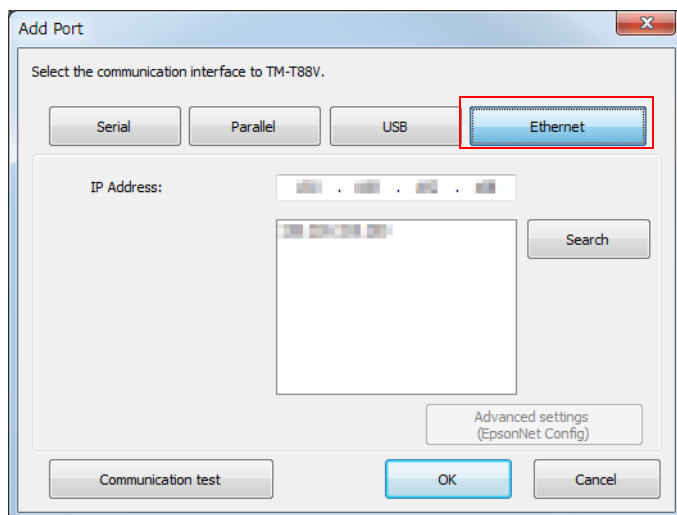
NOTE

It is recommended to write all logos together in the printer when you register more than one logo.

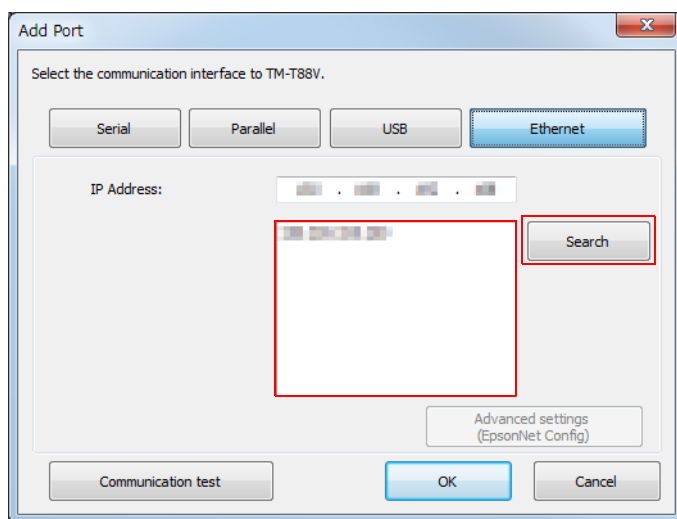
- 1 On the computer used for specifying settings, select (Start)-(All Programs)-(TM-88V Utility).
The TM-T88V Utility is started.
- 2 Click (AddPort).



3 Select (Ethernet).



4 Click (Search) and select the IP address of this printer from the displayed IP addresses. Click (OK).

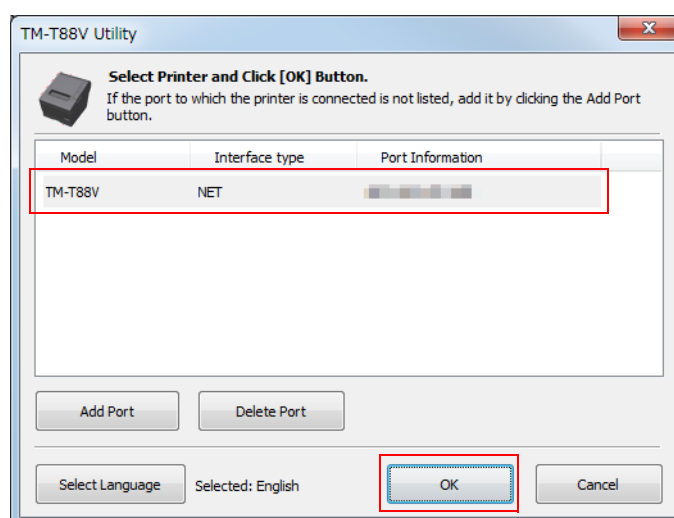


Display returns to the port selection screen.

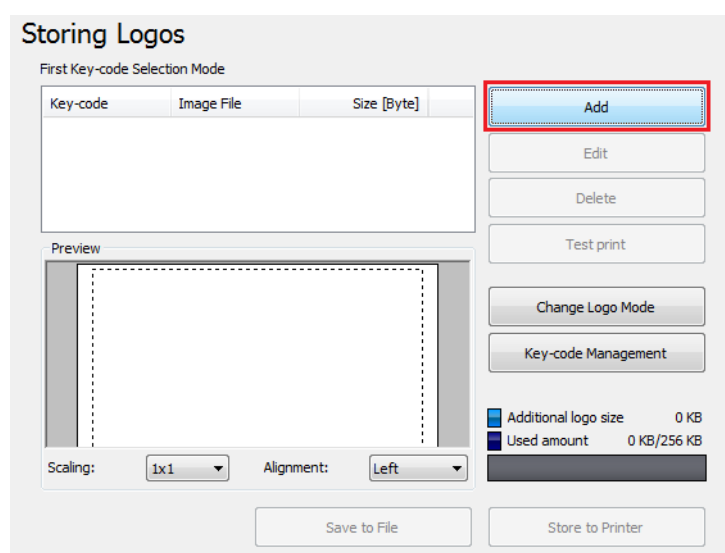
NOTE

- If the IP address of this printer is not displayed when [Search] is clicked, input the IP address of this printer in the [IP Address:] input field, then click [OK].
- Click [Communication Test] to perform a communication test for this printer. Epson recommends performing a communication test before adding this printer.

5 Select this printer. Click (OK).



6 Select (Storing Logos), and then click (Add).

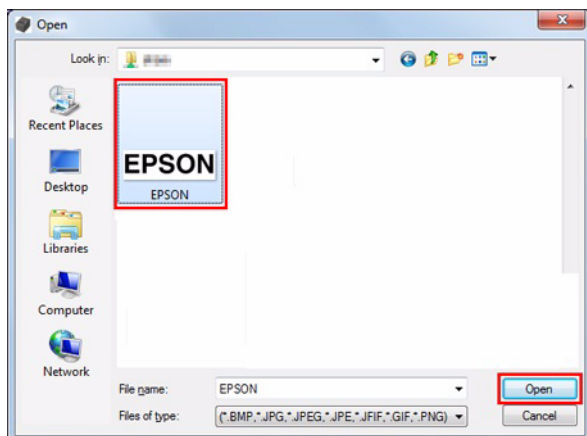


7 Specify the image data file for logo.

The file must be smaller than W: 2047 × H: 831 pixels (dots) in bmp, jpeg, gif, or png format.

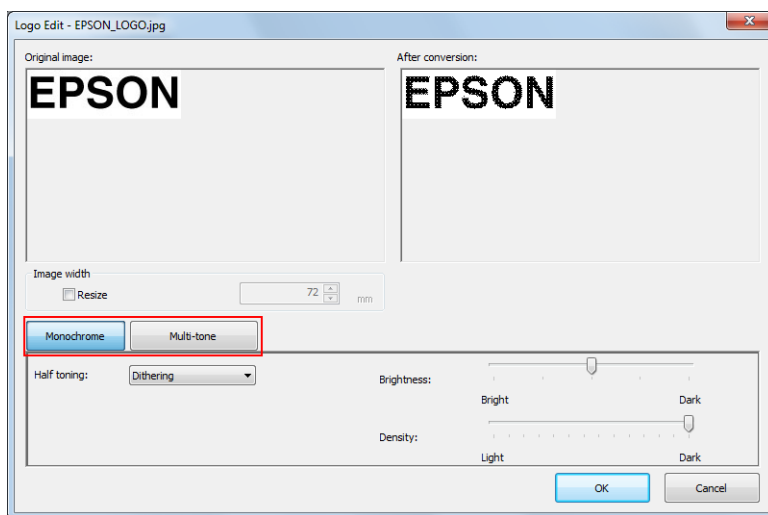
NOTE

If the logo width exceeds the paper width (80 mm printing: 512 dots, 58 mm printing: 360 dots), an error message appears. Click [OK], and go to Step 4 to reduce the size in the [Logo Edit] screen.



8 On the (Logo Edit) screen, click (Monochrome) or (Multi-tone) to select the image format to output.

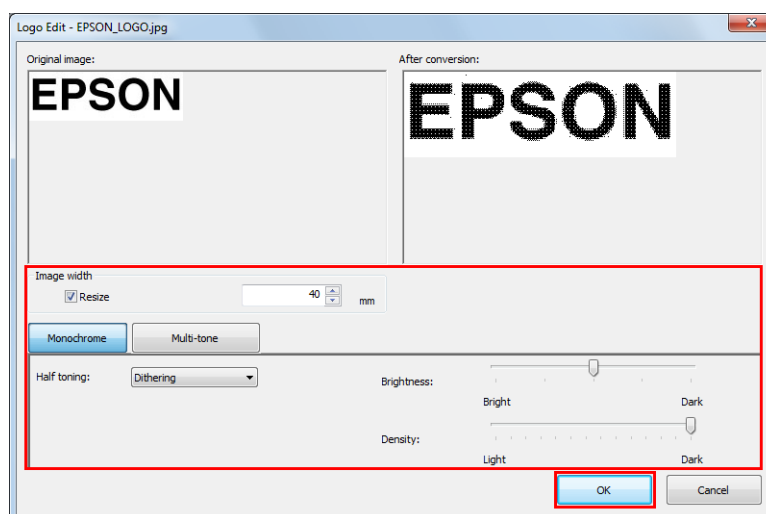
[Monochrome] reduces the colors to black and white. [Multi-tone] reduces the colors to 16 colors (gradation) in grayscale.



NOTE

When the Mode for Storing Logo is set to "Key-code Nonuse Mode (not recommended)," [Multi-tone] does not appear.

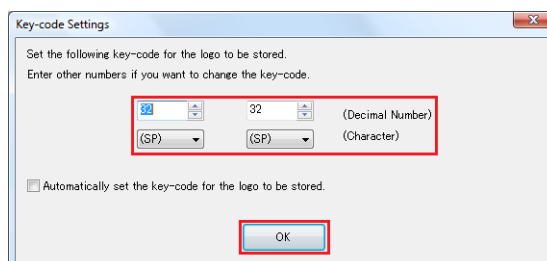
- 9 Edit the image data checking the preview window on the right, and then click (OK).



Item	Description
Resize	Set whether you will resize the image or not and the image size after resizing. (Units: mm) If the image size is wider than the paper width and it is not resized, the part out of the paper width will not be printed.
Half toning	Select from Dithering, Error diffusion, or None. If Monochrome is selected in Step 4, Halftoning cannot be changed.
Brightness	Set the brightness.

When Mode for Storing Logo is set to “First Key-code Selection Mode” and the checkbox for [Automatically set the key-code for the logo to be stored] is not checked, the [Key-code Settings] screen appears (Step 6).

- 10 Set a key code, and then click (OK).
Logo data is added to the list.



- 11** When you register more than one logo, repeat the Steps 1 to 6.
- 12** After registering all logo data, check the indicator on the right to make sure that the data size is small enough to write in the printer, and then click (Store to Printer).

Storing Logos

First Key-code Selection Mode

Key-code	Image File	Size [Byte]
32, 32 * *	EPSON.png	3228

Preview



Scaling: 1x1 Alignment: Left

Buttons: Add, Edit, Delete, Test print, Change Logo Mode, Key-code Management, Save to File, Store to Printer

Additional logo size 0 KB
Used amount 0 KB/256 KB

The logo data is stored in the printer.

Storing Logos

First Key-code Selection Mode

Key-code	Image File	Size [Byte]
32, 32 * *	(Stored)	

Preview



Scaling: 1x1 Alignment: Left

Buttons: Add, Edit, Delete, Test print, Change Logo Mode, Key-code Management, Save to File, Store to Printer

Additional logo size 0 KB
Used amount 0 KB/256 KB

Product settings

Changing the Session

You can change the session at the login screen. The setting at the time of factory shipment is [KDE Plasma Workspace].

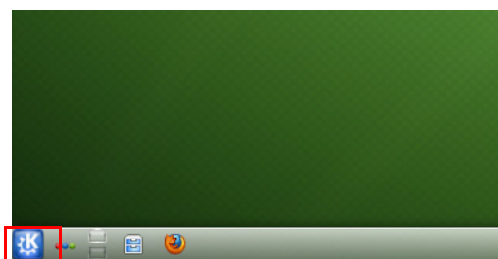
At the login screen, select [Menu] - [Session Type]. Select [GNOME] or [KDE Plasma Workspace] from the list. Log in to display the selected session screen.

The selected session is stored in memory and applied from your next login and thereafter.

Starting YaST

How to start YaST from the GUI of KDE:

Click the icon at the lower-left of the screen, then select [Computer] - [YaST].



The password is the root user password of "TMDT".

How to start YaST from the command line:

You can start YaST by using the following commands.

```
>su
```

```
Password:(root user's password "TMDT")
```

```
#!/sbin/yast2
```

Resolution settings

The items shown below, including this resolution information, are displayed as start options when the product is started. Select the item that corresponds to the display that you are using.

- openSUSE 640x480
- openSUSE 800x600
- openSUSE 1024x768
- openSUSE 1280x1024
- openSUSE 1600x1200
- openSUSE 12.2 (Failsafe)

NOTE

openSUSE 12.2 (Failsafe) is the mode used when a system fault occurs. The system is started with the selected optimal resolution.

Default resolution setting

- 1** Start YaST.
(For details on starting YaST, refer to ["Starting YaST" on page 91.](#))
- 2** Select (System) - (Boot Loader).
- 3** "Boot Loader" screen is displayed. Select the resolution you want to set as the default, then click (Set as Default). After selecting, click (OK).

CAUTION

- Using [Set as Default] sets the specified resolution as the default resolution. The computer might not start if the kernel start option for edit is changed. Only change this option if you fully understand the affects of making such a change.
- Starting is not affected by changing the order of the options or by the [Set as Default] operation.

Changing DisplayLanguage

You can change the display language according to the procedures described below.

CAUTION

Always be sure to change the display language on YaST.

- 1** Start YaST.
(For details on starting YaST, refer to ["Starting YaST" on page 91.](#))
- 2** Select (System) - (Language).
- 3** "Language" screen is displayed. Set "Primary Language" and "Secondary Language", then click (OK).
- 4** Log out once and then log in again.

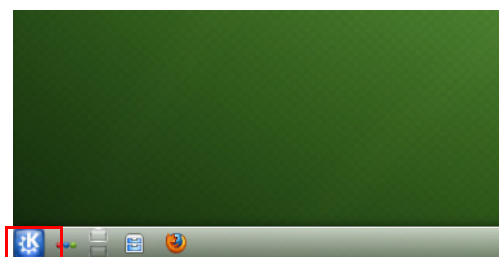
NOTE

The language will not be changed unless you log in again.

Power button settings

KDE

- 1** Click the icon at the lower-left of the screen, select (Applications) - (System Settings).



- 2** "System Settings" screen is displayed. Click (Power Management).
- 3** "Power Management" screen is displayed. Set for (Button events handling).

GNOME

- 1** Start the dconf editor.
- 2** Select (org) - (gnome) - (settings-daemon) - (plugins) - (power).
- 3** Settings are displayed on the right-side of the screen. Set for (Power button action).

Time settings

- 1** Start YaST.
(For details on starting YaST, refer to ["Starting YaST" on page 91.](#))
- 2** Select (System) - (Date and Time).
- 3** "Date and Time" screen is displayed. Set (Region), (Time Zone), and (Date and Time), then click (OK).

Auto-mount settings

- 1** Start the dconf editor.
- 2** Select (org) - (gnome) - (desktop) - (media-handling).
- 3** Settings are displayed on the right-side of the screen. Set for auto-mount.

Attaching the Connector Cover

To protect the cables, attach the connector cover in the steps below. When the optional customer display unit is not installed, attach the connector cover with the U-shaped part.

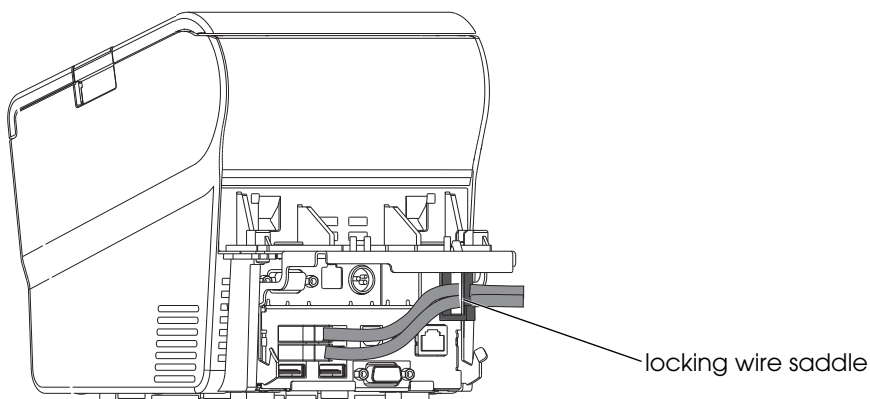


Be sure to hold both sides of the connector cover when attaching it, or the it may become damaged.

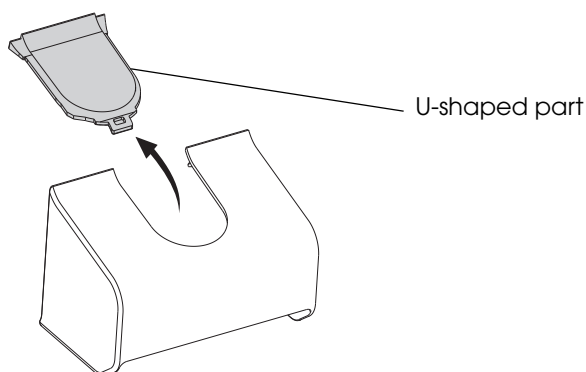


When pulling out the cables whose connectors do not lock themselves (USB cables and Line-Out cable) from the cable exits on the back, fix the cables with the lock wire saddle to prevent the cables from coming off.

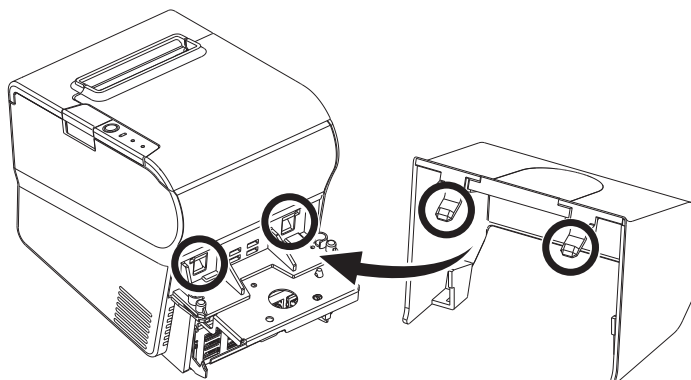
- 1 Pass the interface cables through the locking wire saddle on the pole mounting plate.



- 2 Pass each cable through the cable exits at the bottom of the connector cover.
- 3 If you use the product with the optional customer display, remove the U-shaped part from the connector cover. If you use the product without the optional customer display, keep the U-shaped part attached.



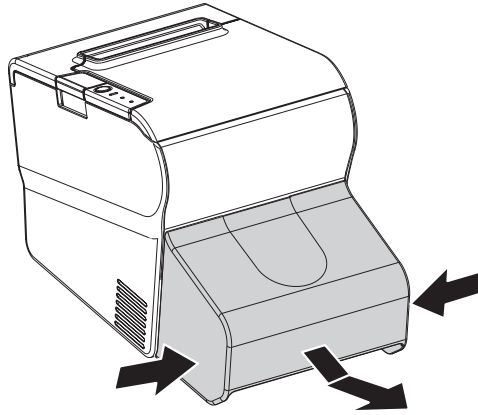
- 4** Align the tabs on the upper side of the connector cover with the notches on the main body, and push the front part of it to click onto the printer cover.
- 5** Hold the lower part of the connector cover, align the tabs on the upper side of it with the notches on the main body, and push the front part of connector cover to attach it.



- 6** Turn over the main body back on its bottom, and make sure the cables are not pinched.

Removing the Connector Cover

To remove the connector cover, push the connector cover down while pushing both sides of the connector cover inward to detach the hooks from the printer case.



Attaching the Power Button Cover

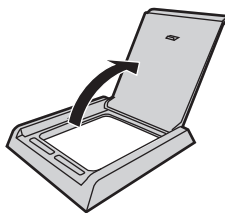
Attach the power button cover that comes with the product onto the power button to prevent accidental operation of the power button.

Follow the steps below to attach the power button cover.

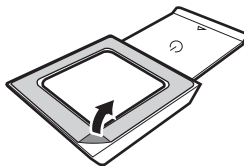
NOTE

It is recommended to clean the area around the power button with a cloth moistened with alcohol before you attach the cover.

- 1 Open the power button cover.



- 2 Peel off the backing paper.



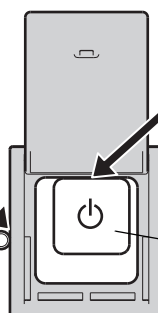
- 3 Attach the power button cover as shown in the illustration below.

Align the left edge of the power button cover with the right edge of the printer reset button.

Align the inside edge of the power button cover with the upper edge of the power button.

Printer reset button

Power button



Preinstalled OS Information

openSUSE

Preinstallation information

Item	Details	
SSD format		
	File system	ext3
	Volume label	TM-DT
Preinstalled software*		
	OS	Linux [®] based on openSUSE
	Driver	N2600+NM10
		Embedded VGA driver
		Sound driver
		Network controller driver
		OT-WL01 driver (Wireless LAN driver)
		Virtual COM port driver
		LED controll driver
	Tool	TMT-CUPS dirver (Driver for EPSON TM printer)
		JavaPOS (The installer is bundled)
		ePOS-Device Version 2.00
		Mozilla Firefox Version 19.02
Network information (Default)		
	IP address	192.168.192.168
	Subnet mask	255.255.255.0
User information (Default)		
	User Name	EPSON-USER
	User Password	TMDT
EPSON TMNet WebConfig Information (Default)		
	User Name	epson
	User Password	epson

*: This product is based on openSUSE 12.2. The following software is excluded from standard installation. You can add software by mounting the openSUSE 12.2 DVD.

- Multimedia

- Office Software
- Graphics
- Games
- Disc Proprietary branding-openSUSE package

Recovery

Follow the steps below to perform the recovery.

NOTE

- When the recovery procedure is performed, all data will be deleted. Back up any necessary data before performing the procedure.
- Recovery requires about 10 minutes.

- 1** Turn off the power of the product.
- 2** Connect a DVD drive, and a USB keyboard to the product's USB connectors.
- 3** Connect a display to the product's VGA connector.
- 4** Turn on the power of the product, and insert the recovery disk into the DVD drive.
- 5** Restart the product.
- 6** The system starts using the recovery disk. When a message that says "Do you really want to recover internal storage?" is displayed, select (yes).

CAUTION

You can not cancel recovery by the [*] key.

- 7** A confirmation message that says "All data on the storage will be deleted?" is displayed. Click (Yes).
Recovery is performed.

- 8 The “Ejecting sr0...” message is displayed. The recovery disk is ejected.
- 9 The product automatically starts and the resolution selection screen is displayed.

NOTE

Before the resolution selection screen is displayed, the product restarts once to perform initial settings. The resolution selection screen is displayed followed by the login screen being displayed and then the login screen is displayed for only approximately five seconds. After that, the system automatically shuts down and then restarts.

- 10 The login screen is displayed. Input the password to log in.

NOTE

The initial password is “TMDT”.

- 11 Set the date, time and time zone.



Utility

The following explains the utilities equipped in this product.

EPSON TMNet WebConfig

Starting EPSON TMNet WebConfig

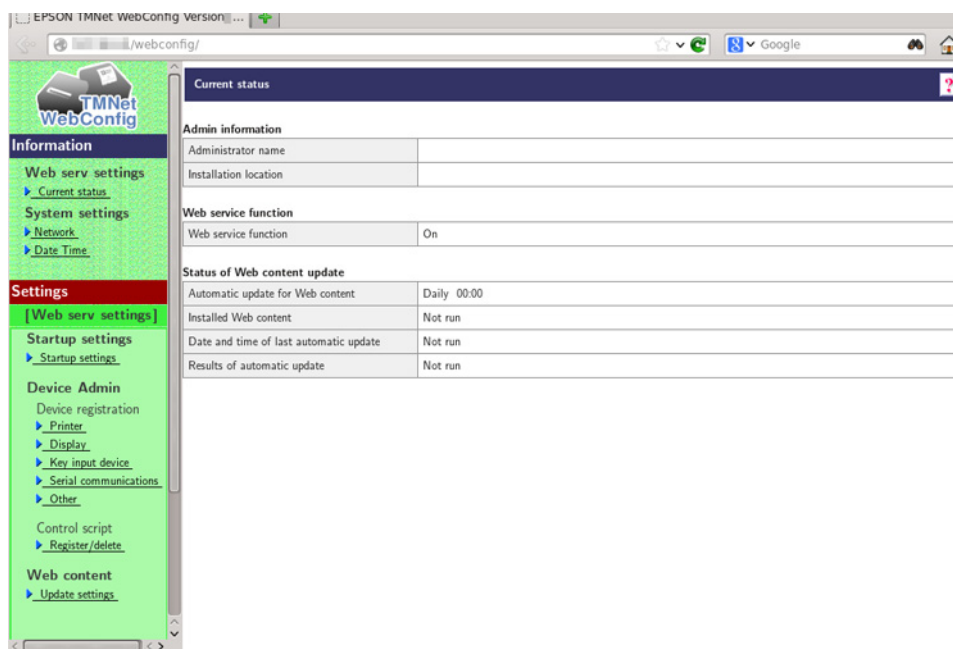
Start EPSON TMNet WebConfig using the method below.

- 1 Connect a display and keyboard to the product.
Log in as the Administrator.
- 2 Start TMNet WebConfig from the shortcut on the desktop.
EPSON TMNet WebConfig starts.

NOTE

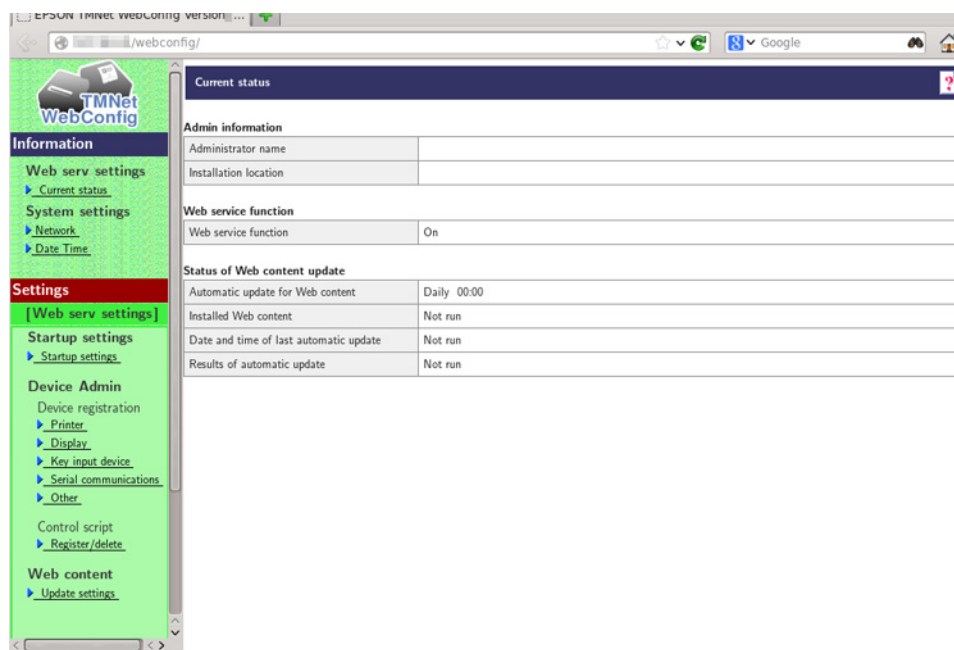
If you are making settings from an external device, start the Web browser, and input the following.

<http://This product's IP address/webconfig/>



Information - Web serv settings - Current status

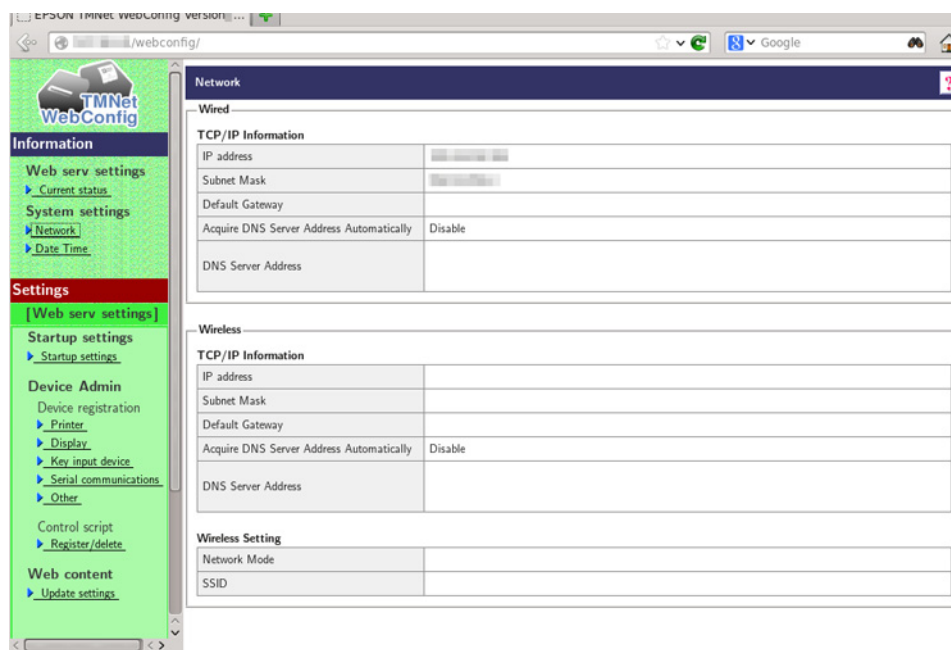
You can check the basic settings for this product.



Item		Description
Admin information	Administrator name	Displays the administrator name for this product.
	Installation location	Displays the installation location for this product.
Web service function	Web service function	Displays whether the Web service function is enabled or not.
Status of Web content update	Automatic update for Web content	Displays the schedule for automatic updates for Web content.
	Installed Web content	Displays the installed Web content.
	Date and time of last automatic update	Displays the date and time of the last automatic update performed.
	Results of automatic update	Displays the results of the automatic update.

Information - System settings - Network

You can check the network settings for this product.

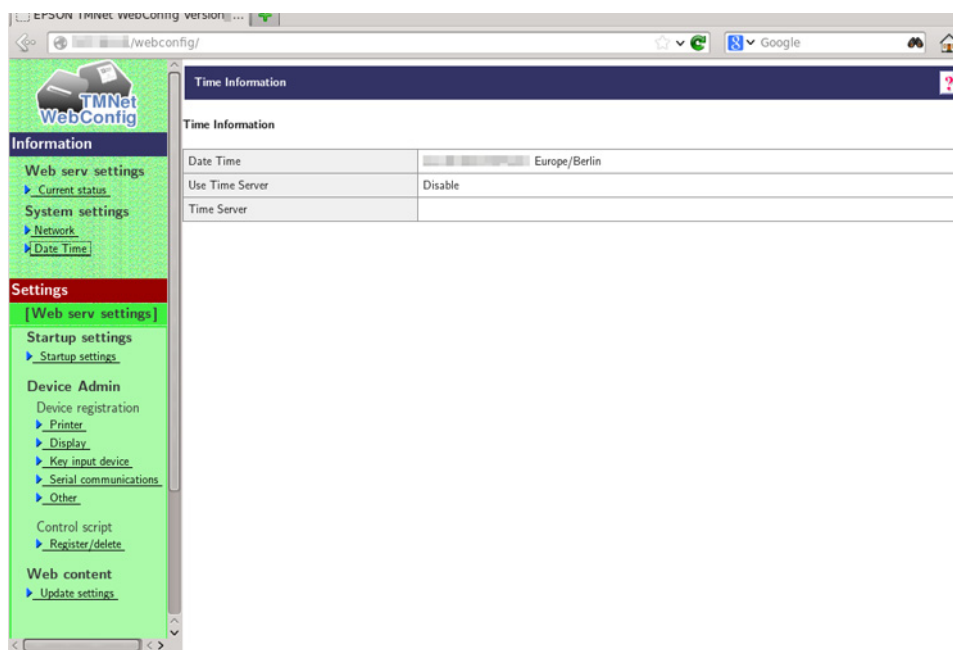


Item		Description
TCP/IP Information (Wired)	IP address	Displays this product's IP address for a wired LAN network.
	Subnet Mask	Displays the subnet mask.
	Default Gateway	Displays the default gateway.
	Acquire DNS Server Address Automatically	Displays whether the Acquire DNS Server Address Automatically function is enabled or not.
	DNS Server Address	Displays automatically acquired DNS server addresses in the order they are used.

Item		Description
TCP/IP Information (Wireless)	IP address	Displays this product's IP address for a wireless LAN network.
	Subnet Mask	Displays the subnet mask.
	Default Gateway	Displays the default gateway.
	AcquireDNS Server Address Automatically	Displays whether the Acquire DNS Server Address Automatically function is enabled or not.
	DNS Server Address	Displays automatically acquired DNS server addresses in the order they are used.
Wireless Setting	Network Mode	Displays this product's wireless LAN network mode.
	SSID	Displays the SSID for the registered wireless LAN network.

Information - System settings - Date Time

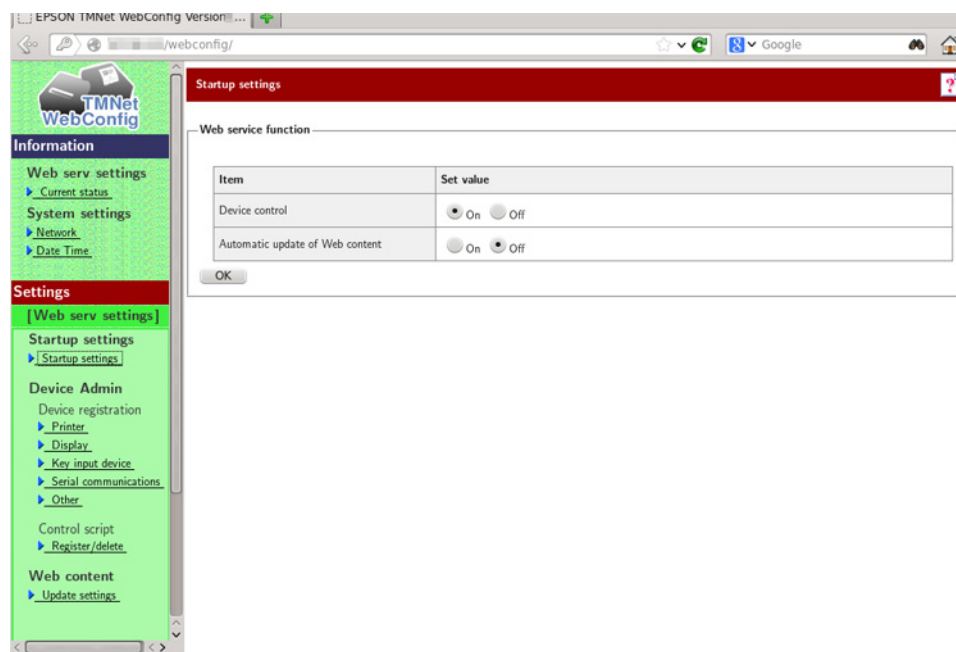
You can check this product's time settings.



Item	Description
Date Time	Displays the time and the timezone set for this product.
Use Time Server	Displays whether the function to use a time server is enabled or not.
Time Server	Displays the address set as a time server.

Settings - Web serv settings - Startup settings

Performs startup settings for various Web service functions.



Item	Description
Device control	Enables or disables device control functions that use Web service. Used for ePOS-Device.
Automatic update of Web content	Enables or disables the automatic update function for Web content.
OK	Registers the settings on this product.

Settings - Web serv settings - Printer

Performs the settings for printers controlled by this product.

The screenshot shows the EPSON TMNet WebConfig interface. The sidebar on the left contains the following navigation links:

- Information
 - Web serv settings
 - Current status
 - System settings
 - Network
 - Date Time
- Settings
 - [Web serv settings]
 - Startup settings
 - Startup settings
 - Device Admin
 - Device registration
 - Printer
 - Display
 - Key input device
 - Serial communications
 - Other
 - Control script
 - Register/delete
 - Web content
 - Update settings

The main content area is titled 'Printer' and contains the following sections:

Printer to register

Item	Set value
Device ID	
Type	☒ Network printer ☐ Local printer
Model no.	TM-T88V
IP address	
Retry interval	100 ms

Registration

Registered printer

Device ID	Model no.	IP address	Retry interval (ms)		
local_printer	TM-T88V-DT	(Local printer)	100	Test printing	Delete

Item	Description
Device ID	Set the ID for the controlled printer. (Any character string)
Type	Select the type for the controlled printer.
Model no.	Select the model number for the controlled printer.
IP address	Set the printer IP address for each device ID.
Retry interval	Set the timeout retry interval.
Registration	Registers the printer on this product.
Registered printer	Displays a list of registered printers.
Test printing	Performs a test printing. "TEST_PRINT" is printed.
Delete	Deletes a registered printer.

NOTE

The initial value for the device ID for the printer equipped in this product is "local_printer."

Settings - Web serv settings - Display

Performs the settings for the customer display controlled by this product.

The screenshot shows the 'Customer display settings' page in the TMNet WebConfig interface. The left sidebar contains a tree view with the following structure:

- Information
 - Web serv settings
 - Current status
 - System settings
 - Network
 - Date Time
- Settings
 - [Web serv settings]
 - Startup settings
 - Startup settings
 - Device Admin
 - Device registration
 - Printer
 - Display
 - Key input device
 - Serial communications
 - Other
 - Control script
 - Register/delete
 - Web content
 - Update settings

The main content area is titled 'Customer display settings' and contains the following sections:

- Customer display usage:**
 - ☒ Do not use
 - ☐ Use
- Communications settings:**

Item	Set value
Communications speed (bps)	9600
Data bit	8
Parity	None
- Brightness settings:**

Item	Set value
Brightness settings	100%

At the bottom of the main content area, there is an 'OK' button and a 'Test display' button.

Item		Description
Do not use		Do not use a customer display.
Use		Use a customer display.
Communications settings	Communications speed (dps)	Set the communication speed.
	Data bit	Set the data bit.
	Parity	Set the parity.
Brightness settings		Set the brightness of the customer display in percentages. You can set 20%, 40%, 60%, or 100%. The maximum brightness is 100%.
OK		Registers the settings on this product.

Settings - Web serv settings - Key input device

Performs the settings for the key input device controlled by this product.

The screenshot shows the 'Key input device' settings page in the TMNet WebConfig interface. The left sidebar contains navigation links under 'Information' (Web serv settings, Current status, System settings, Network, Date Time) and 'Settings' (Web serv settings, Startup settings, Device Admin, Control script, Web content). The main content area is titled 'Key input device' and contains a 'Key input device to register' section with input fields for Device ID, Device name, and Control script, followed by a 'Registration' button. Below this is a 'Registered key input device' section with a table listing registered devices.

Item	Description
Device ID	Set the ID for the key input device.
Device name	Set the device name for the key input device.
Control script	Set the device control script to control the key input device.
Registration	Registers the key input device.
Registered key input device	Displays a list of registered key input devices.
Operating test	Performs an operating test for a registered key input device.
Delete	Deletes a registered key input device.

NOTE

Register device control scripts as necessary. For details, refer to "[Settings - Web serv settings - Register/delete](#)" on page 114.

Settings - Web Serv settings - Serial communications

Performs the settings for serial communication devices controlled by this product.

Item	Set value
Device ID	
Device name	Model selection: No registerable devices were found. Port selection: Physical serial port Display of port location
Control script	SimpleSerial_Generic.js
Communications speed (bps)	9600
Data bit	8
Parity	None
Stop bit	1
Flow control	None

Registration

Item		Description
Device ID		Set the device ID.
Device name	Model selection	Select the device model name.
	Port selection	Select the device port.
Control script		Select the device control script for controlling the serial communication device.
Communications speed (bps)		Set the device communication speed.
Databit		Set the data bit.
Parity		Set the parity.
Stop bit		Set the stop bit.
Flow control		Set the flow control.
Registration		Registers the set serial communication device on this product.
Registered serial communications device		Displays a list of registered serial communication devices.



Register device control scripts as necessary.

For details, refer to "Settings - Web serv settings - Register/delete" on page 114.

Settings - Web Serv settings - Other

Performs settings for other devices controlled by this product.

Item	Description
Device ID	Set the ID for the controlled device.
Control script	Set the device control script to control the device.
Registration	Registers the device on this product.
Other registered devices	Displays other devices registered on this product.

NOTE

Register device control scripts as necessary.
For details, refer to ["Settings - Web serv settings - Register/delete" on page 114.](#)

Settings - Web serv settings - Register/delete

Performs registration or deletion for device control scripts used by this product.

The screenshot shows the 'Control script' settings page in the TMNet WebConfig interface. The left sidebar contains navigation links for Information, Settings, and Web content. The main content area has a red header and a 'Control script to be registered' section. This section includes a table with 'Item' and 'Set value' columns, a 'Browse...' button, and a 'Registration' button. Below this is a 'Registered control script' section with a table listing registered scripts and their device types, each with a 'Delete' button.

Item	Set value
Control script	Browse...

[Registration](#)

Registered control script

Device type	Control script	
type_keyboard	Keyboard_Generic.js	Delete
type_keyboard	Keyboard_MID_QM128A_RAA.js	Delete
type_scanner	Scanner_Generic.js	Delete

Serial communications

Device type	Control script	
type_simple_serial	SimpleSerial_Generic.js	Delete

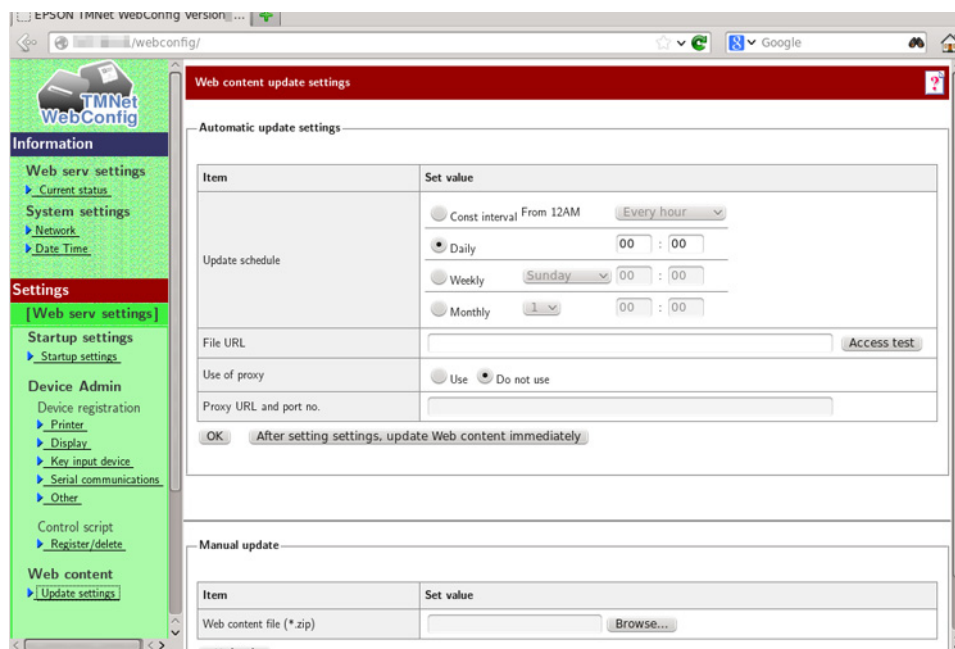
Other

Device type	Control script

Item	Description
Control script	Set the control script to be registered.
Registration	Registers the device control script on this product.
Registered control script	Displays a list of device control scripts registered on this product based on the device type. Delete: Deletes the corresponding device control script from this product. In use: The corresponding device control script is in use.

Settings - Web Serv settings - Update settings

Performs settings for the installation method and update settings for the Web content registered on this product.



Item		Description
Automatic update settings	Update schedule	Set the schedule for automatic update of the Web content.
	File URL	Specify a URL for the file to automatically update. After designating it, click "File Access Test" and check if the URL is properly specified.
	Use of proxy	Set whether you are using a proxy server or not. If you selected "Use", set "Proxy URL and port no."
	Proxy URL and port no.	Set the URL and port number for the proxy server in use.
	OK	Registers the automatic update settings on this product.
	After setting settings, update Web content immediately	After the automatic update settings are registered on this product, the Web content will be updated.
Manual update	Web content file(*.zip)	Specify the Web content to be installed.
	Upload	Uploads the specified Web content.

Settings - System settings - TCP/IP (Wired)

Performs TCP/IP settings for this product's wired LAN.

The screenshot shows the TMNet WebConfig interface. The left sidebar has a tree view with the following structure:

- Information
 - Web serv settings
 - Current status
 - System settings
 - Network
 - Date Time
- Settings
 - [Web serv settings]
 - [System settings]
 - Network
 - Wired
 - TCP/IP
 - Wireless
 - Wireless
 - TCP/IP
 - Date Time
 - Time Setting

The main content area is titled 'TCP/IP Setting (Wired)' and contains a table with the following items and set values:

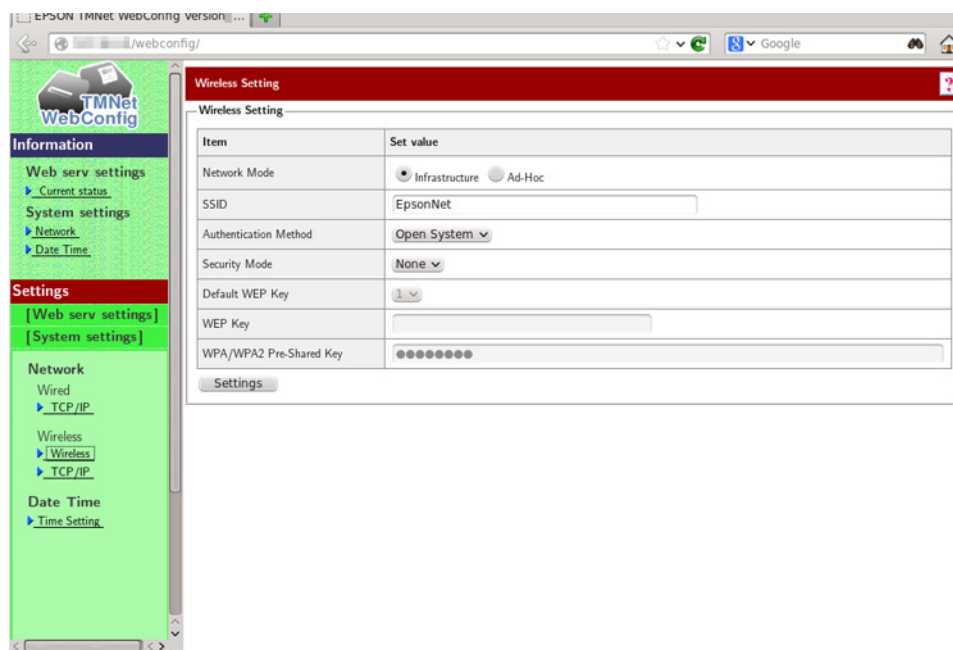
Item	Set value
Get IP Address	Manual
IP address	
Subnet Mask	
Default Gateway	
Acquire DNS Server Address Automatically	Disable
DNS Server Address	

A 'Settings' button is located at the bottom of the table.

Item	Description
Get IP Address	Selects (Auto) or (Manual) for the method for acquiring the IP address.
IP Address	Specifies the IP address. Only enabled when the method for acquiring the IP address is (Manual).
Subnet Mask	Specifies the subnet mask. Only enabled when the method for acquiring the IP address is (Manual).
Default Gateway	Specifies the default gateway. Only enabled when the method for acquiring the IP address is (Manual).
Acquire DNS Server Address Automatically	Selects (Enable) or (Disable) for automatically acquiring the DNS server address. Only enabled when the method for acquiring the IP address is (Auto).
DNS Server Address	Specifies DNS server addresses in order of use. Can be specified only when (Disable) is selected for automatically acquiring the DNS server address.
Settings	Registers the settings on this product.

Settings - System settings - Wireless Setting

Performs settings for this product's wireless LAN.



Item	Description
Network Mode	Specifies this product's network mode.
SSID	Specifies the SSID for the SSID network.
Authentication Method	Specifies the authentication method for the wireless LAN network.
Security Mode	Specifies the encryption method for the wireless LAN network.
Default WEP Key	Selects the WEP key used in the wireless LAN network.
WEP Key	Inputs the network WEP key.
WPA/WPA2 Pre-Shared Key	Inputs the pre-shared key used if the encryption method is "WPA" or "WPA2".
Settings	Registers the settings on this product.

Settings - System settings - TCP/IP (Wireless)

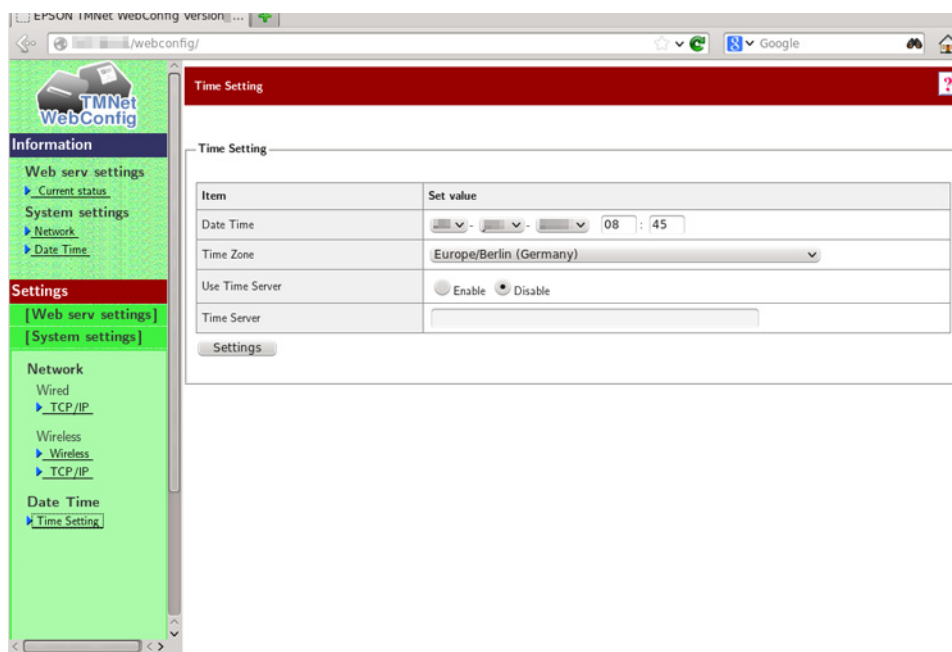
Performs TCP/IP settings for this product's wireless LAN.

Item	Set value
Get IP Address	Auto
IP address	
Subnet Mask	
Default Gateway	
Acquire DNS Server Address Automatically	Disable
DNS Server Address	

Item	Description
Get IP Address	Selects (Auto) or (Manual) for the method for acquiring the IP address.
IP address	Specifies the IP address. Only enabled when the method for acquiring the IP address is (Manual).
Subnet Mask	Specifies the subnet mask. Only enabled when the method for acquiring the IP address is (Manual).
Default Gateway	Specifies the default gateway. Only enabled when the method for acquiring the IP address is (Manual).
Acquire DNS Server Address Automatically	Selects (Enable) or (Disable) for automatically acquiring the DNS server address. Only enabled when the method for acquiring the IP address is (Auto).
DNS Server Address	Specifies DNS server addresses in order of use. Can be specified only when (Disable) is selected for automatically acquiring the DNS server address.
Settings	Registers the settings on this product.

Settings - System settings - Time Setting

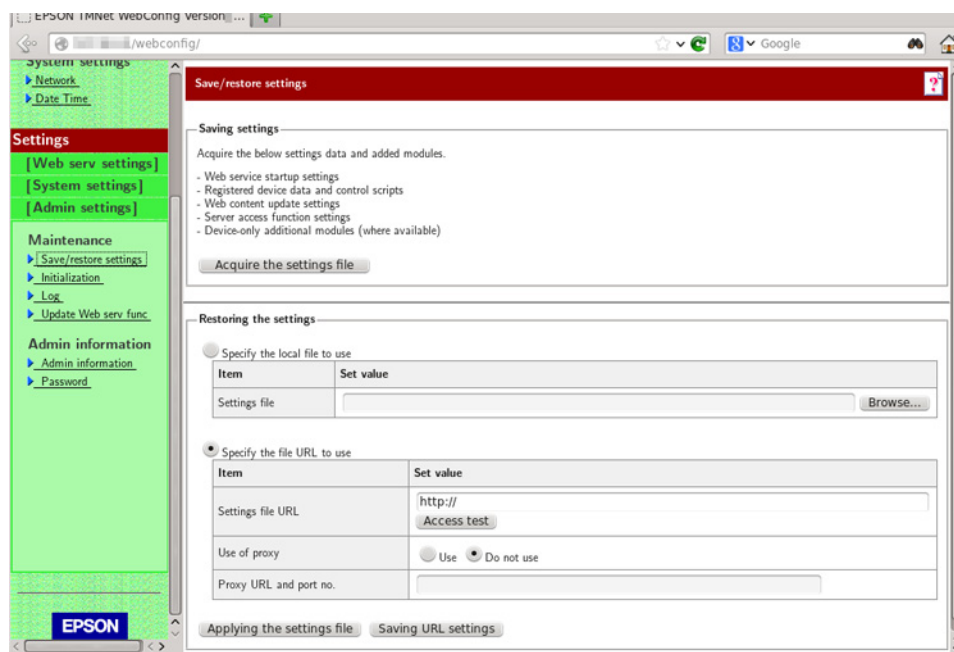
Performs time settings for this product.



Item	Description
Date Time	Sets the time.
Time Zone	Sets the area. Sets the time difference from Coordinated Universal Time.
Use Time Server	Selects whether to use a time server.
Time Server	Specifies the URL for the time server.
Settings	Registers the settings with this product.

Settings - Admin settings - Save/restore settings

Saves and restores various settings for this product.



Item		Description
Acquire the settings file		Acquires the settings file for this product.
Specify the local file to use	Settings file	Specify the location of the local settings file.
Specify the file URL to use	Settings file URL	Specify the URL of the settings file.
	Use of proxy	Set whether you are using a proxy server or not.
	Proxy URL and port no.	Set the proxy URL and port number.
Applying the settings file		Applies the settings file.
Saving URL Settings		Saves the setting file URL and proxy settings.

Restored items

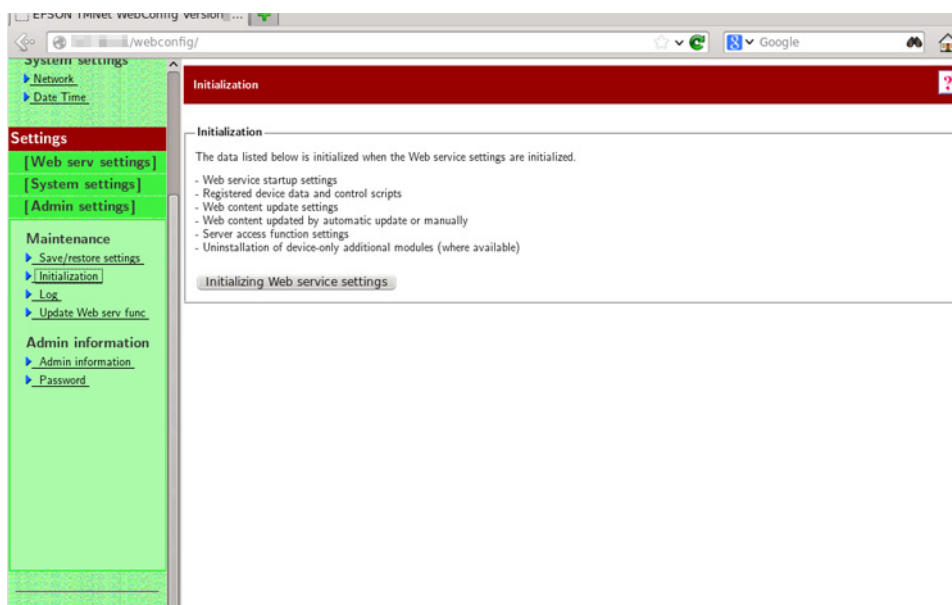
Items to be restored in the [Restore the settings] are as follows.

Item			Saved/ Not Saved
Wired	TCP/IP Settings (Wired)	• Get IP Address • IP address • Subnet Mask • Default Gateway • Acquire DNS Server Address Automatically • DNS Server Address	Not Saved
Wireless	Wireless Setting	• Network Mode • SSID • Authentication Method • Security Mode • Default WEP Key • WEP Key • WPA/WPA2 Pre-Shared Key	Not Saved
	TCP/IP Settings (Wireless)	• Get IP Address • IP address • Subnet Mask • Default Gateway • Acquire DNS Server Address Automatically • DNS Server Address	Not Saved
Date Time	Time Setting	• Date time • Time Zone • Automatically adjust clock for Day light Saving Time • Use Time Server • Time Server	Not Saved
Maintenance	Save/restore settings	• Specify the local file to use/Specify the file URL to use • Settings file URL • Use of proxy • Proxy URL and port no.	Saved
	Update Web service function	• Specify the local file to use/Specify the file URL to use • Settings file URL • Use of proxy • Proxy URL and port no.	Saved

Item			Saved/ Not Saved
Admin Informa- tion	Administrator information	- Administrator name - Installation location	Saved
	Password	Password	Not Saved

Settings - Admin settings - Initialization

Initializes the Web service settings for this product.



Item	Description
Initializing Web service settings	Initializes the Web service settings.

CAUTION

If you initialize the Web service, the password for EPSON TMNet WebConfig will also be initialized.

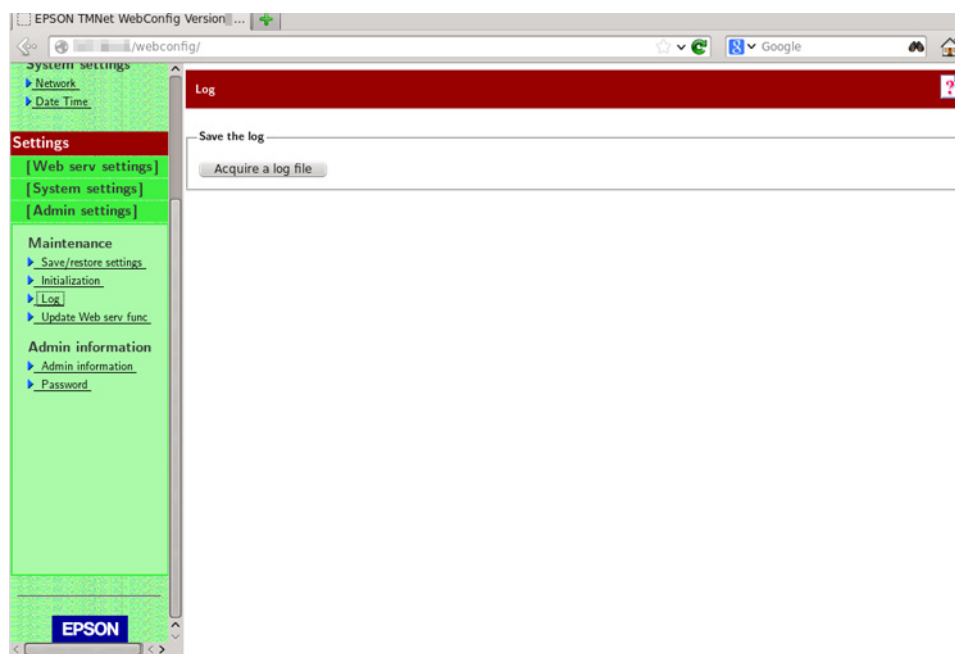
The initial values are below.

User name: epson

Password: epson

Settings - Admin settings - Log

Acquires this product's log file.



Item	Description
Acquire a log file	Acquires this product's log file.

Settings - Admin settings - Update Web service function

Updates the Web service function used in this product.

Item		Description
Specify the local file to use	File for updating	Specify the local file for updating.
Specify the file URL to use	Update file URL	Specify the URL of the file for updating.
	Use of proxy	Set whether you are using a proxy server or not.
	Proxy URL and port no.	Set the proxy URL and port number.
Applying the update file		Applies the update file.
Saving URL Settings		Saves the URL settings for the Web service function.

Settings - Admin settings - Admin information

Sets the administrator information for this product.

The screenshot shows a web browser window with the address bar displaying `/webconfig/`. The page title is "Administrator information". On the left side, there is a navigation menu with the following sections: "Information" (containing "Web serv settings", "Current status", "System settings", "Network", and "Date Time"), "Settings" (containing "[Web serv settings]", "[System settings]", and "[Admin settings]"), "Maintenance" (containing "Save/restore settings", "Initialization", "Log", and "Update Web serv func"), and "Admin information" (containing "Admin information" and "Password"). The "Admin information" section is currently selected. The main content area is titled "Administrator information" and contains a table with two columns: "Item" and "Set value". The table has two rows: "Administrator name" and "Installation location", each with a corresponding text input field. Below the table is an "OK" button.

Item	Description
Administrator name	Set the administrator.
Installation location	Set the installation location.
OK	Sends the settings to this product.

Settings - Admin settings - Password

Sets the password for this utility.

The screenshot shows the 'Password' configuration page in the Epson TMNet WebConfig utility. The left sidebar contains the following menu items: Information (Web serv settings, Current status, System settings, Network, Date Time), Settings (Web serv settings, System settings, Admin settings), Maintenance (Save/restore settings, Initialization, Log, Update Web serv func), and Admin information (Admin information, Password). The main content area has a table for setting the password.

Item	Set value
Old password	
New password	
New password (Reenter to confirm)	

Below the table is an **OK** button.

Item	Description
Old password	Input the current password.
New password	Input the new password.
New password (Reenter to confirm)	For confirmation, input the new password again.
OK	Registers the set password on this product.

CAUTION

After setting the password, you will be asked for your user name and password on the certification screen displayed when this utility starts. Input "epson" for the user name and input the set password for the password. The initial value for the password is "epson".

TM-T88V Utility

This TM-T88V Utility is provided as a utility for setting this product's printer. You can set the following.

CAUTION

Start the TM-88V Utility by using the same Windows computer on the same network as this product. When specifying settings, check that this printer and the computer used for specifying settings are connected to the same network.

- Storing Logos
- Paper Reduction settings
- Automatic Paper Cut settings
- Printing Control settings
- Font settings
- Option Buzzer settings
Not used in this product.
- Communication Interface settings
Not used in this product.
- Backup / Restore

For details about how to use TM-T88V Utility, refer to the TM-T88V Utility User's Manual.

Application Development Information

This chapter explains the control method for printers and necessary information for developing applications that use this product.

Development Information for Each System

TM-T88V-DT application development information varies based on the system.

- PC-POS System
- ePOS-Device API
- ePOS-Device XML
- Virtual environments system

Download

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

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

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

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

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

PC-POS System Development Information

This system uses the same development environment as a Windows PC.

Interfaces and External Devices

Category	Device	Interface	Description
Printer	TM-T88V-DT (This product's printer)	USB	Recognized as a USB-connection TM-T88V. The printer name is "TM-88V". The device file is /dev/usb/lp(0-9).
	TM printer	USB	For details, refer to the CUPS driver manual.
	TM printer	network	For details, refer to the CUPS driver manual.
Cash drawer	-	Drawer	Recognized as connected to this TM-T88V.
Customer display	DM-D110 (dedicated model)	USB	Connect a USB to access from the following device file.*1 /dev/DM-D110-USB
	DM-D110-USB (USB)		
	DM-D110/210/500 (serial)	Serial	Customer display connected via the serial interface. You can access from the following device. /dev/ttyS0
USB communication device	Barcode reader, etc.	USB	For a USB serial device, a device file is created in one of the /dev/tty/USB* directories. For a USB HID device, a device file is created in one of the /dev/input/event* directories. Refer to the corresponding device manual for other USB devices.
Serial communication device	-	Serial	For more on settings, refer to each device's manual.
Display	-	VGA	Used in operating the application. For more on settings, refer to each device's manual.

*1:For detail, refer to "[Linux command control](#)" on page 131.

*2: The number starts at zero ("0") and increases accordingly in order as devices are connected.

Linux command control

This section describes information for controlling devices using Linux commands.

TM-T88V-DT (This product's printer)

"TM-T88V" is specified as the name of the built-in printer by CUPS.

The CUPS driver specifies "TM-T88V" as the printer name and it is specified as the default printer. The following two commands are equivalent if printing by specifying the internal printer.

- `# lpr -PTM-T88V sample.txt`
- `#lpr sample.txt`

(Print "sample.txt")

The internal printer can also be accessed from the following device file.

- `/dev/USB/lp0`

Using example

```
# echo "testABCD" > /dev/usb/lp0
```

(The character string "testABCD" is sent to the printer.)

Others Printer

Specify the printer name by using the CUPS driver.

The TM printer can also be accessed from the following device file.

- `/dev/USB/lp1*`

The number starts at one ("1") and increases accordingly in order as devices are connected.

DM-D110 (Dedicated Model) / DM-D110-USB

You can access from the following device when only one DM-D110 unit is connected.

- `/dev/DM-D110-USB`

Using example

```
# echo "testABCD" > /dev/DM-D110-USB
```

("testABCD" is displayed by the DM-D110.)

When a DM-D110 is connected, it is mounted to one of `/dev/ttyUSB*` directories as a virtual serial device, and a symbolic link designated as `/dev/DM-D110-USB` is created for the device file of the mounted virtual serial device.

`/dev/ttyUSB*` directories are mounted with any virtual serial device, not limited to DM-D110. If two DM-D110 (Dedicated Model) printers are connected, the last connected device is mounted to `/dev/DM-D110-USB`. In such cases, you can directly the first device from `/dev/ttyUSB0`.

Control Method for Devices

The following are methods for controlling devices.

- **ESC/POS command:** This can control the EPSON TM printer, cash drawer, and customer display. (For details, refer to ["ESC/POS command" on page 133.](#))
- **CUPS (Common Unix Printing System):**

This is a Linux printer driver for use with Epson TM printers.
The driver controls paper cut , buzzer and cash drawer.
You cannot use any other customer display except for the DM-D110 (Dedicated Model). This driver has been installed in this product.
- **JavaPOS ADK:** JavaPOS is the standard specification which defines an architecture and device interface (API) to access various POS devices from a Java based system. Using JavaPOS standard API allows control with Javabased applications of functions inherent to each device. A flexible design with Java language and JavaPOS enables many different types of computer systems, such as stand alone or network configuration, to use a same application. You can use JavaPOS to build applications and drivers independently of platforms. This allows flexible configurations using thin clients to meet the system requirements.

ESC/POS command

ESC/POS is the Epson original printer command system. With ESC/POS commands, you can directly control all the TM printer functions, but detailed knowledge of printer specifications or combination of commands is required, compared to using a driver.

To use ESC/POS commands, you need to agree to a nondisclosure contract first and obtain the ESC/POS Application Programming Guide. Ask your dealer for details.

The ESC/POS command functions are listed below. See the ESC/POS Application Programming Guide for more details.

ESC/POS command functions

Commands for printing
Print and line feed
Print and feed <i>n</i> lines
Print data in page mode
Print and return to standard mode (in page mode)
Commands for line spacing
Set line spacing
Select default line spacing
Commands for print character
Select character code table
Select an international character set
Set right-side character spacing
Set all character fonts and styles
Turn underline mode on/off
Turn emphasized mode on/off
Select character font
Select character size
Turn smoothing mode on/off
Turn upside-down print mode on/off
Turn white/black reverse print mode on/off
Set character fonts and styles

Select/cancel user-defined character set
Define/delete user-defined characters
Cancel print data in page mode
Commands for panel buttons
Enable/disable panel buttons
Commands for paper sensors
Select paper sensor(s) to stop printing
Select paper sensor(s) to output paper-end signals
Commands for print positions
Horizontal tab
Set horizontal tab positions
Set left margin
Set print area width
Select justification
Set absolute print position
Set relative print position
Set print area in page mode
Select print direction in page mode
Set absolute vertical print position in page mode
Set relative vertical print position in page mode
Commands for bit image
Transmit the NV graphic memory capacity
Print the graphics data in the print buffer
Transmit the remaining amount of NV graphics
Transmit the key code list for defined NV graphics
Delete the specified NV graphics data
Define the NV graphics data
Print the specified NV graphics data
Store the graphics data in the print buffer
Select bit-image mode

Define downloaded bit image
Print downloaded bit image
Define the BMP in the NV graphics memory
Define downloaded BMP NV graphics
Commands for status
Enable/disable Automatic Status Back (ASB)
Transmit status
Transmit real-time status
Commands for barcode
Print barcode
Set barcode height
Set barcode width
Select print position of HRI characters
Select font for HRI characters
Commands for two-dimensional codes
PDF417: Set the number of columns in the data region
PDF417: Set the number of rows
PDF417: Set the width of module
PDF417: Set the row height
PDF417: Set the error correction level
PDF417: Select the options
PDF417: Store the data in the symbol storage area
PDF417: Print the symbol data in the symbol storage area
PDF417: Transmit the size information of the symbol data in the symbol storage area
QR Code: Select the model
QR Code: Set the size of module
QR Code: Select the error correction level
QR Code: Store the data in the symbol storage area
QR Code: Print the symbol data in the symbol storage data area
QR Code: Transmit the size information of the symbol data in the symbol storage area

MaxiCode: Select the mode
MaxiCode: Store the data in the symbol storage area
MaxiCode: Print the symbol data in the symbol storage area
MaxiCode: Transmit the size information of the symbol data in the symbol storage area
Two-dimensional GS1 DataBar: Set the width of module
Two-dimensional GS1 DataBar: Set the maximum width of GS1 DataBar Expanded Stacked
Two-dimensional GS1 DataBar: Store the data in the symbol storage area
Two-dimensional GS1 DataBar: Print the symbol data in the symbol storage area
Two-dimensional GS1 DataBar: Transmit the size information of the symbol data in the symbol storage area
Composite Symbology: Set the width of module
Composite Symbology: Set the maximum width of GS1 DataBar Expanded Stacked
Composite Symbology: Select font for HRI characters
Composite Symbology: Store the data in the symbol storage area
Composite Symbology: Print the symbol data in the symbol storage area
Composite Symbology: Transmit the size information of the symbol data in the symbol storage area
Commands for mechanical control
Select cut mode and cut paper
Commands for customization
Set the customized setting values
Transmit the customized setting values
Set the configuration item for the serial interface
Transmit the configuration item for the serial interface
Delete the specified record of NV user memory
Store the data in the specified record of NV user memory
Transmit the data in the specified record of NV user memory
Transmit capacity of the NV user memory currently being used
Transmit the remaining capacity of the NV user memory
Transmit the key code list of the records stored in the NV user memory
Delete all data in the NV user memory

Commands for sub-functions
Initialize printer
Transmit printer ID
Set horizontal and vertical motion units
Select peripheral device
Generate pulse to drawer
Generate pulse to drawer in real-time
Execute power-off sequence
Clear buffer(s)
Enable/disable real-time command
Send real-time request to printer
Select page mode
Select standard mode
Set the process ID response
Execute test print
Select the print speed
Select the number of parts for the thermal head energization
Initialize maintenance counter
Transmit maintenance counter

ePOS-Device API

The following explains the items required to develop a system that uses ePOS-Device API.
For details about ePOS-Device API, refer to the ePOS-Device API User's Manual.

External Devices

The following is information as of February, 2013. For the latest information, refer to the ePOS-Device API User's Manual.

Printer

- ☐ TM-T88V-DT: This product's printer
- ☐ Network printer: TM printer connected to the same network as this product. Applicable models:
 - TM-T88V
 - TM-T70
 - TM-T70II
 - TM-T90
 - TM-L90

CAUTION

TM printers connected to this product via USB interface cannot be used.

Cash drawer

Recognized as connected to this product's printer.

Customer display

- ☐ DM-D110 (dedicated model)

CAUTION

Other customer displays connected to this product via USB or serial interface cannot be used.

Key input device

Device with the device control script prepared in advance

- ☐ MSR
- ☐ barcode scanner
- ☐ USB keyboard device

Device with the device control script prepared in advance

- ☐ Input device that can operate with the OS standard HID driver

Serial communication device

Device with the device control script prepared in advance

- ☐ Serial communication device that can operate with the OS standard serial communication driver:
A separate serial-USB conversion driver is necessary.
- ☐ USB devices that can be controlled the same as a serial communication device

Other devices

These can be used if you create a device control script file and register the device.

Application Information

Web applications

Register (install) a Web application (contents) that uses ePOS-Device API in any of the following Web servers.

- TM-T88V-DT Web server
- Web server in the network
- Web server via the Internet

If registering a Web application on the TM-T88V-DT, use EPSON TMNet WebConfig to register it.

Device control

Specify a device ID for each device. The initial value for the device ID for this product's printer is "local_printer".

You do not need to specify one for DM-D110 (dedicated model). Device ID for the dedicated customer display is fixed to "local_display".

Make the device control setting with EPSON TMNet WebConfig.

ePOS-Device XML

The following explains the items required to develop a system that uses ePOS-Device XML. For details about ePOS-Device XML, refer to the ePOS-Device XML User's Manual.

External Devices

The following is information as of February, 2013. For the latest information, refer to the ePOS-Device XML User's Manual.

Printer

- ☐ TM-T88V-DT: This product's printer
- ☐ Network printer: TM printer connected to the same network as this product.
Applicable models:
 - TM-T88V
 - TM-T70
 - TM-T70II
 - TM-T90
 - TM-L90

CAUTION

TM printers connected to this product via USB cannot be used.

Cash drawer

Recognized as connected to this product's printer.

Customer display

- ☐ DM-D110 (dedicated model)

CAUTION

Other customer displays connection to this product via USB or serial cannot be used.

Key input device

Device with the device control script prepared in advance

- ☐ MSR
- ☐ Barcode scanner
- ☐ USB keyboard device

Device with the device control script prepared in advance

- ☐ Input device that can operate with the OS standard HID driver

Serial communication device

Device with the device control script prepared in advance

- ☐ Serial communication device that can operate with the OS standard serial communication driver:
A separate serial-USB conversion driver is necessary.
- ☐ USB devices that can be controlled the same as a serial communication device

Other devices

These can be used if you create a device control script file and register the device.

Application Information

Environment that can use socket communication and can handle XML documents

- ❑ Examples: iOS / Android / Windows CE / Windows / Linux / Mac OS, etc.
- ❑ Java, .NET Framework

Device control

Specify a device ID for each device. The initial value for the device ID for this product's printer is "local_printer".

You do not need to specify one for DM-D110 (dedicated model). Device ID for the dedicated customer display is fixed to "local_display".

Make the control setting with EPSON TMNet WebConfig.

Setting/Checking Modes

Besides the normal print mode, the printer has the following modes to set or check settings of the printer.

- Self-test Mode
- Hexadecimal Dumping Mode
- NV Graphics Print Mode
- Receipt Enhancement Information Print Mode
- Memory Switch Setting Mode

Self-test Mode

You can confirm the following information by running the self-test mode.

- Control software version
- Receive buffer size
- Busy conditions
- Built-in character sets
- Print density
- Maintenance Information (Print head running length, count of autotcutting)

Follow the steps below to run this mode.

- 1 Close the roll paper cover.
- 2 While pressing the Feed button, turn on the printer. (Keep pressing the Feed button until the printer starts printing.)
The printer starts printing the current status of the printer.
When the printer finishes printing the printer status, the following message is printed and the Paper LED flashes. (The printer is now in the self-test wait mode.):

“Select Modes by pressing Feed button.
Continue SELF-TEST: Less than 1 second
Mode Selection : 1 second or more”
- 3 Press the Feed button while the printer is in the self-test wait mode.
If you select SELF-TEST, the printer prints a rolling pattern using only the built-in character set.
If you select the mode selection, follow the instructions printed by the printer.

After printing the following message, the printer is initialized and returns to the normal mode.

“*** completed***”

Hexadecimal Dumping Mode

In the hexadecimal dumping mode, the printer prints the data transmitted from a host computer in hexadecimal numbers and their corresponding characters.

Follow the steps below to run this mode.

CAUTION

- If there is no character corresponding to print data, "." is printed.
- If print data is less than one line, press the Feed button to print the line.
- Applications that confirm printer status may not work correctly during the hexadecimal dumping mode. The printer returns only the status for "Transmit real-time status."

- 1 Open the roll paper cover.
- 2 While pressing the Feed button, turn on the printer.
- 3 Close the roll paper cover.

The printer starts printing data received from then on in hexadecimal numbers and their corresponding characters.

Print example:

```
Hexadecimal Dump
To terminate hexadecimal dump,
press FEED button three times.

1B 21 00 1B 26 02 40 40 1B 69 . ! . . & . @ @ . i
1B 25 01 1B 63 34 00 1B 30 31 . % . . c 4 . . 0 1
41 42 43 44 45 46 47 48 49 4A A B C D E F G H I J

*** completed ***
```

Turn off the printer or press the Feed button three times to return to the normal mode.

NV Graphics Print Mode

You can confirm the following information by running NV graphics print mode:

- Capacity of the NV graphics
- Used amount of the NV graphics
- Unused capacity of the NV graphics
- Number of NV graphics that are registered
- Key code, number of dots in X direction, number of dots in Y direction, number of colors to be defined.
- NV graphics data

NOTE

For detailed information about NV graphics, see ["NV Graphics Memory" on page 29](#).

Follow the steps below to run this mode.

- 1** Close the roll paper cover.
- 2** While pressing the Feed button, turn on the printer. (Keep pressing the Feed button until the printer starts printing.)
The printer starts printing the current status of the printer.
- 3** After the printing has been completed, press the Feed button for more than one second.
The printer starts printing instructions.
- 4** After the printing has been completed, press the Feed button.
- 5** Press the Feed button for more than one second.

Turn the power off and on to return to the normal mode.

Receipt Enhancement Information Print Mode

You can confirm the following information by running the receipt enhancement (R/E) information mode:

- Automatic top logo setting
- Automatic bottom logo setting
- Extended settings for automatic top/bottom logo

Follow the steps below to run this mode.

- 1** Close the roll paper cover.
- 2** While pressing the Feed button, turn the power on. (Keep pressing the Feed button until the printer starts printing.)
The printer prints the current status of the printer.
- 3** After the printing has been completed, press the Feed button for more than one second.
The printer starts printing instructions.
- 4** After the printing has been completed, press the Feed button twice.
- 5** Then press the Feed button for more than one second.

Turn the power off and on to return to the normal mode.

Handling

This chapter explains how to handle the TM-T88V-DT.

Turning the Power On/Off

Turning the Power On

Use the power button to turn on the power for this product. You can also turn on the power via the network.

Turning the Power Off

Use the power button to turn off the power for this product.
By default, the OS shuts down when the power button is pressed.

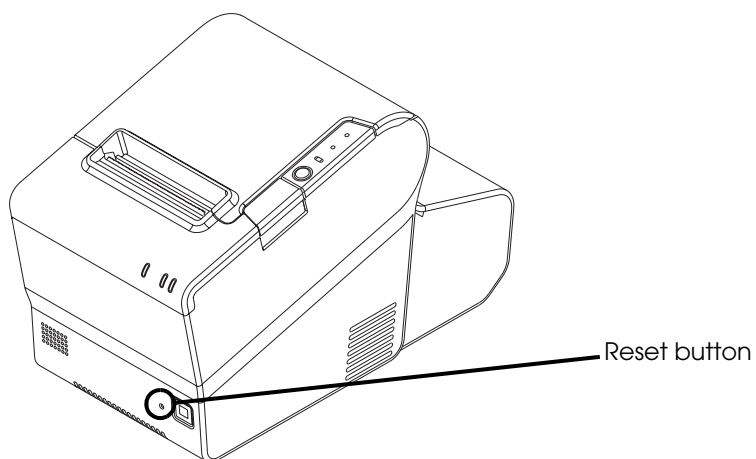
Forced Termination

If you cannot turn this product off using applications or the OS, you can execute forced termination as a last resort. Keep pressing the power button for approximately 4 seconds until this product is turned off. Be careful; when forced termination is executed, all unsaved data is lost.

Printer Operation

Printer Reset

Press the printer reset button with a pointed object (such as a pen) to reset the printer unit.



Setting and Replacing Roll Paper



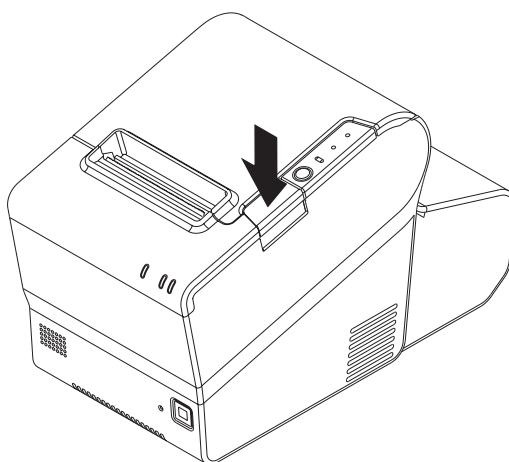
WARNING

- **Do not open the roll paper cover during printing.**
Doing so may damage the printer.
- **Do not touch the manual cutter when installing or replacing roll paper.**
Because the manual cutter is sharp, you may injure yourself.

CAUTION

- Use roll paper that fits the printer specifications. For details about paper specifications, refer to ["Paper Specifications" on page 36](#).
- Do not use a type of roll paper of which the roll paper is glued to the core.

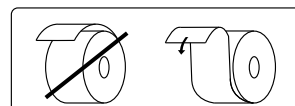
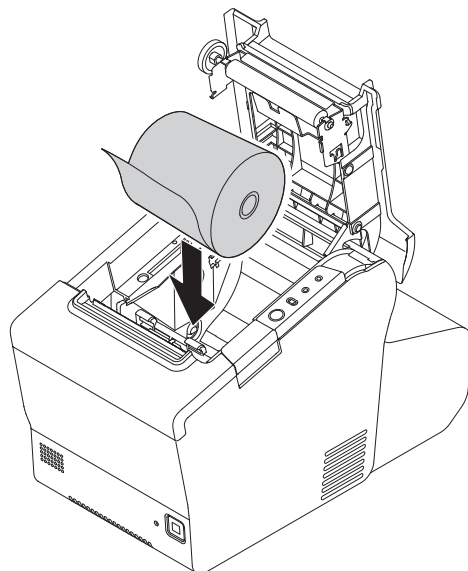
- 1 Press the cover open button to open the roll paper cover.



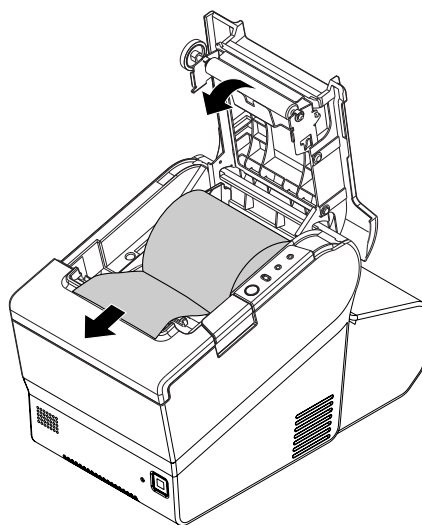
CAUTION

If you cannot open the roll paper cover, refer to ["Removing Jammed Paper" on page 156](#).

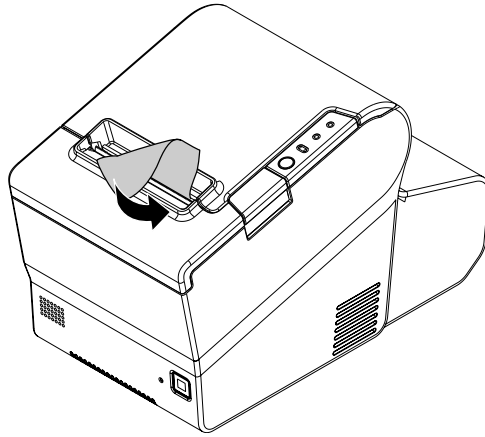
- 2** If there is a used roll paper core, remove it.
- 3** Be careful of the rolling direction, and set the roll paper in the printer.



- 4** Pull the roll paper out towards you, and close the roll paper cover.



- 5** Cut the end of the roll paper using the manual cutter.



Changing the Paper Width

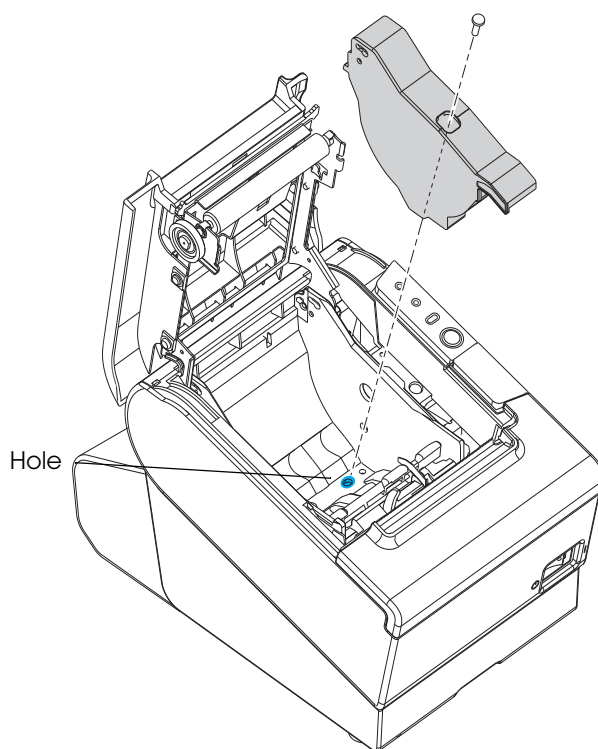
The printer is initially set to print on 80 mm width paper and you can change the printer to print on 58 mm width paper by installing the roll paper guide and changing the paper width setting with the customized value.

Follow the steps below to install the roll paper guide.

CAUTION

- Once you change the paper width from 80 mm to 58 mm, you cannot change it back to 80 mm.
- If changing the paper width, use TM-T88V-Utility, and change the width on the TM-T88V-DT or via the network.

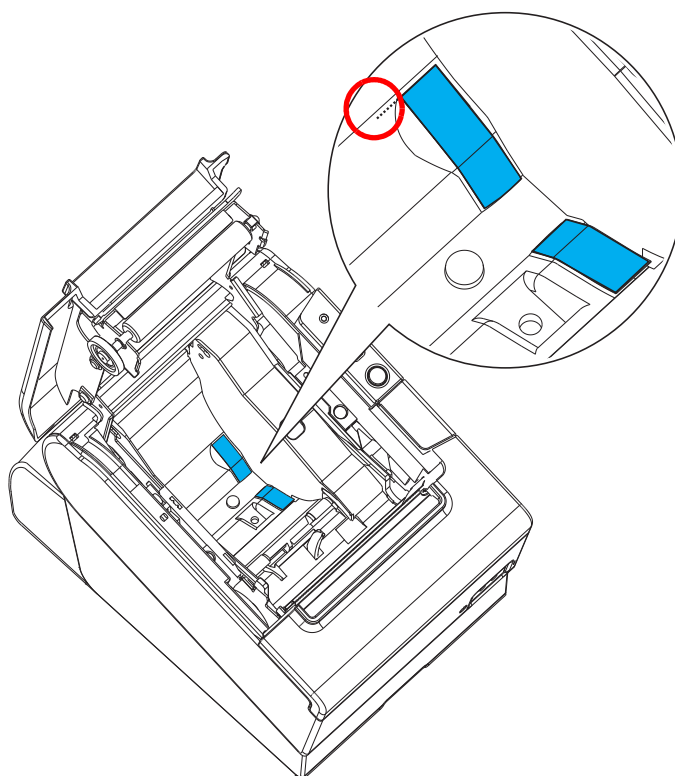
- 1 Open the roll paper cover.
- 2 Install the roll paper guide so that the projection on its bottom is aligned with the hole at the right of the roll paper holder.



- 3 Tighten the enclosed screw to fix the roll paper guide.
- 4 Paste the enclosed 2 small strips along the roll paper guide on the bottom of the roll paper holder.

CAUTION

Make sure the space between the top edge of the strip and the line of the groove in the roll paper guide is 0.5 mm or less.



Removing Jammed Paper

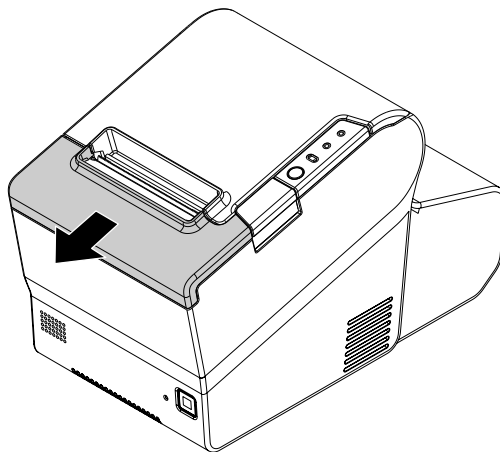
When a paper jam occurs, never pull out the paper forcibly. Open the roll paper cover and remove the jammed paper.

When the roll paper cover does not open, follow the steps below to remove the jammed paper.



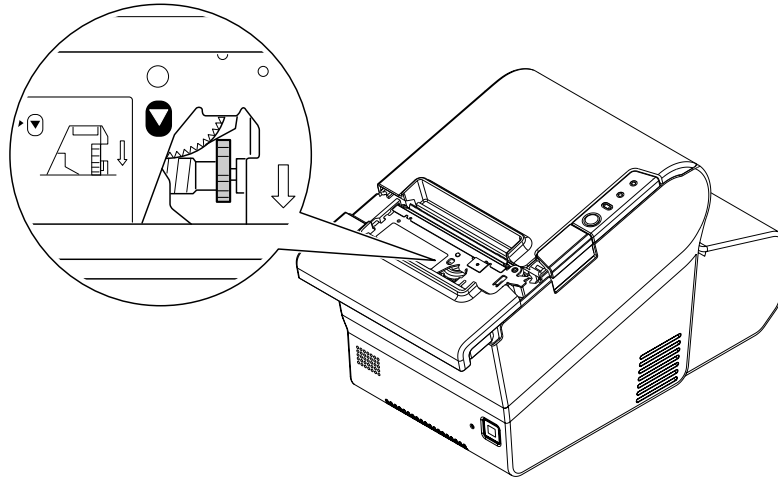
Do not touch the thermal head (See ["Cleaning the Thermal Head" on page 159.](#)) because it can be very hot after printing.

- 1** Turn off the printer.
- 2** Slide the cutter cover toward the front to open it.



- 3** 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.

- 4** Close the cutter cover.



- 5** Open the roll paper cover and remove the jammed paper.
- 6** Press the reset button on this product and reset the printer.

Customer Display Operation

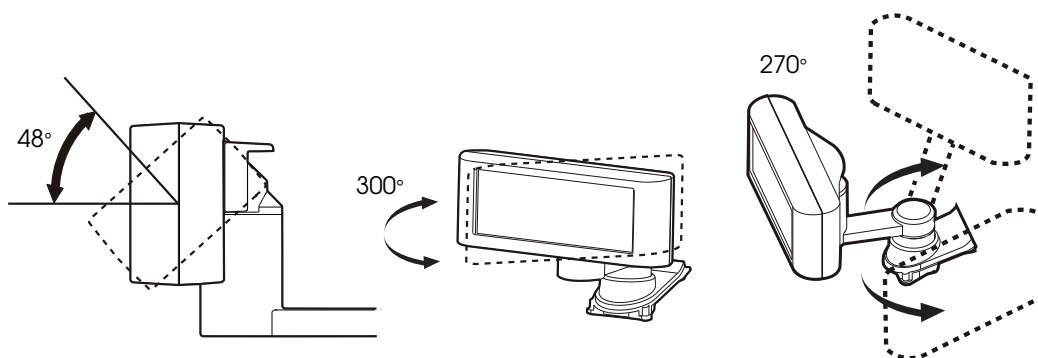
Hold the main body with your hand and move the optional customer display to change the direction or angle. Make sure to move it in their mobile range only.

CAUTION

Do not rotate the customer display with excessive force. Doing so may break the customer display.

The mobile range of the customer display is as follows.

- Display tilt : Maximum angle of 48°(4 levels, 5 positions)
- Display rotation : Maximum angle of 300°
- Arm rotation : Maximum angle of 270°



Adjusting the Speaker Volume

You can adjust the speaker volume with the speaker volume adjustment function of the OS included in the TM-T88V-DT.

Cleaning the Case

Turn off the printer before cleaning the case, and wipe the dirt off the case with a dry or slightly damp cloth. If it is very dirty, soak a cloth in a neutral liquid detergent, tightly wring it out, and wipe the dirt away.

CAUTION

Never clean the product with alcohol, benzene, thinner, or other such solvents. Doing so may damage or break the parts made of plastic and rubber.

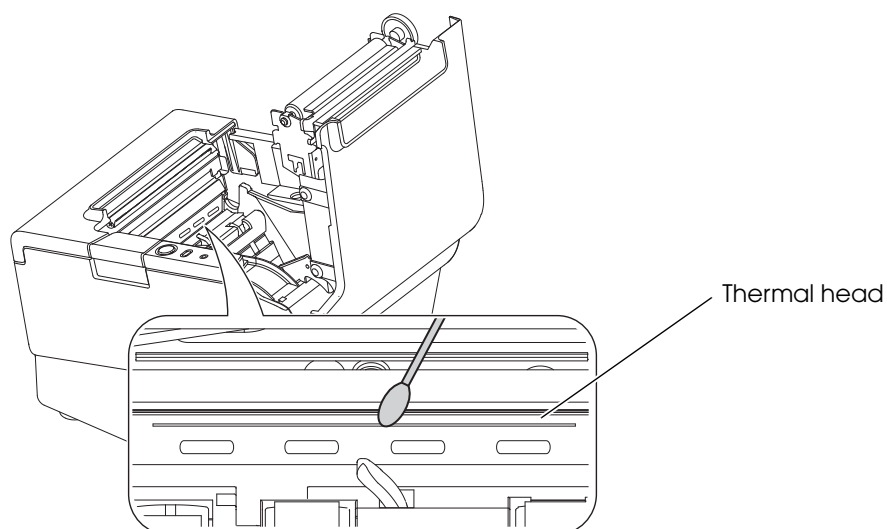
Cleaning the Thermal Head

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



After printing, the thermal head can be very hot. Do not touch it and 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 roll paper cover, and clean the thermal elements of the thermal head with a cotton swab slightly moistened with an alcohol solvent (ethanol or IPA).



Depending on the roll paper used, paper dust may stick to the platen roller and roll paper end sensor. To remove the paper dust, clean the platen roller and roll paper end sensor with a cotton swab slightly moistened with water. Turn on the printer power only after the water has completely dried.

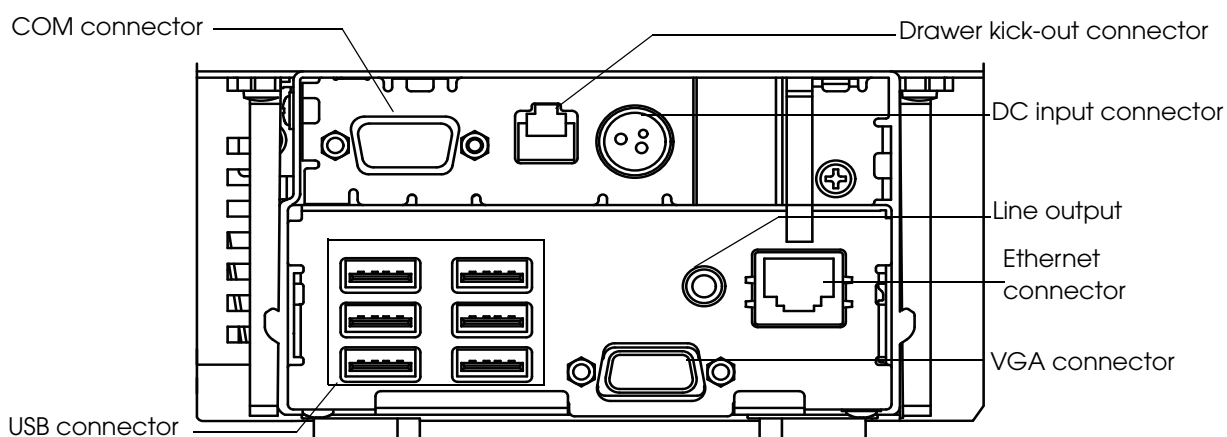
Connecting to External Devices

When connecting an external device to the interface unit, follow the procedures below.



When connecting an external device to a USB connector, be sure to check this product and the device's manual for the amount of power consumed by the external device.

- 1** Connect all the cables to the connectors on the back of the printer.



- 2** Connect the other cable connectors to the external devices.

Preparing for Transport

Follow the steps below to transport the product.

- 1** Turn off the product.
- 2** Remove the peripherals and the power connector.
- 3** Remove the roll paper.
- 4** Remove the customer display.
- 5** Pack the product upright.

Appendix

Character Code Tables

CAUTION

- The character code tables show only character configurations. They do not show the actual print pattern.
- "SP" in the table shows a space.

Common to All Pages

When International character set (See ["International Character Sets" on page 205.](#)) is USA:

HEX	0	1	2	3	4	5	6	7
0	NUL 00	DLE 16	SP 32	0 48	@ 64	P 80	` 96	p 112
1		XON 17	! 33	1 49	A 65	Q 81	a 97	q 113
2			" 34	2 50	B 66	R 82	b 98	r 114
3		XOFF 19	# 35	3 51	C 67	S 83	c 99	s 115
4	EOT 04	DC4 20	\$ 36	4 52	D 68	T 84	d 100	t 116
5	ENQ 05	NAK 21	% 37	5 53	E 69	U 85	e 101	u 117
6	ACK 06		& 38	6 54	F 70	V 86	f 102	v 118
7			' 39	7 55	G 71	W 87	g 103	w 119
8		CAN 24	(40	8 56	H 72	X 88	h 104	x 120
9	HT 09		) 41	9 57	I 73	Y 89	i 105	y 121
A	LF 10		* 42	: 58	J 74	Z 90	j 106	z 122
B		ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123
C	FF 12	FS 28	, 44	< 60	L 76	¥ 92	l 108	 124
D	CR 13	GS 29	- 45	= 61	M 77	] 93	m 109	} 125
E		RS 30	. 46	> 62	N 78	^ 94	n 110	~ 126
F			/ 47	? 63	O 79	— 95	o 111	SP 127

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	 176	L 192	⌌ 208	α 224	≡ 240
1	ü 129	æ 145	í 161	 177	⊥ 193	⌑ 209	β 225	± 241
2	é 130	Æ 146	ó 162	 178	⌒ 194	⌐ 210	Γ 226	≥ 242
3	â 131	ô 147	ú 163	 179	⌓ 195	⌌ 211	π 227	≤ 243
4	ä 132	ö 148	ñ 164	⌑ 180	— 196	⌑ 212	Σ 228	∫ 244
5	à 133	ò 149	Ñ 165	⌑ 181	⌑ 197	⌑ 213	σ 229	∫ 245
6	â 134	û 150	ä 166	⌑ 182	⌑ 198	⌑ 214	μ 230	÷ 246
7	ç 135	ù 151	º 167	⌑ 183	⌑ 199	⌑ 215	τ 231	≈ 247
8	ê 136	ÿ 152	¿ 168	⌑ 184	⌑ 200	⌑ 216	Φ 232	° 248
9	ë 137	Ö 153	Г 169	⌑ 185	⌑ 201	⌑ 217	Θ 233	• 249
A	è 138	Ü 154	Г 170	⌑ 186	⌑ 202	⌑ 218	Ω 234	• 250
B	ï 139	ø 155	½ 171	⌑ 187	⌑ 203	■ 219	δ 235	√ 251
C	î 140	£ 156	¼ 172	⌑ 188	⌑ 204	■ 220	∞ 236	ⁿ 252
D	ì 141	¥ 157	ì 173	⌑ 189	= 205	■ 221	Φ 237	² 253
E	Ä 142	Pt 158	« 174	⌑ 190	⌑ 206	■ 222	ε 238	■ 254
F	Å 143	f 159	» 175	⌑ 191	⌑ 207	■ 223	∩ 239	SP 255

Page 1 (Katakana)

HEX	8	9	A	B	C	D	E	F
0	ー 128	ㇰ 144	SP 160	ー 176	ㇱ 192	ㇴ 208	= 224	ㇵ 240
1	ㇰ 129	ㇱ 145	。○ 161	ㇲ 177	ㇴ 193	ㇵ 209	ㇶ 225	円 241
2	ㇱ 130	ㇲ 146	ㇳ 162	イ 178	ㇵ 194	ㇶ 210	ㇷ 226	年 242
3	ㇲ 131	ㇳ 147	ㇴ 163	ウ 179	ㇶ 195	ㇷ 211	ㇸ 227	月 243
4	ㇳ 132	ー 148	、 164	エ 180	ㇷ 196	ㇸ 212	▲ 228	日 244
5	ㇴ 133	ー 149	・ 165	オ 181	ナ 197	ㇹ 213	▶ 229	時 245
6	ㇴ 134	ㇴ 150	ㇵ 166	カ 182	ニ 198	ㇺ 214	▼ 230	分 246
7	ㇴ 135	ㇴ 151	ㇶ 167	キ 183	ヌ 199	ㇻ 215	◀ 231	秒 247
8	ㇵ 136	ㇳ 152	イ 168	ク 184	ネ 200	ㇼ 216	♠ 232	千 248
9	ㇵ 137	ㇴ 153	ウ 169	ケ 185	ノ 201	ㇽ 217	♥ 233	市 249
A	ㇶ 138	ㇴ 154	エ 170	コ 186	ハ 202	ㇾ 218	♦ 234	区 250
B	ㇶ 139	ㇵ 155	オ 171	サ 187	ヒ 203	ㇿ 219	♣ 235	町 251
C	ㇷ 140	ㇴ 156	ヤ 172	シ 188	フ 204	ㇿ 220	● 236	村 252
D	ㇷ 141	ㇴ 157	ユ 173	ス 189	ヘ 205	ソ 221	○ 237	人 253
E	ㇸ 142	ㇴ 158	ヨ 174	セ 190	ホ 206	ゝ 222	/ 238	⦿ 254
F	ㇸ 143	ㇵ 159	ㇶ 175	リ 191	マ 207	。 223	＼ 239	SP 255

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	 176	Ł 192	đ 208	Ó 224	- 240
1	ü 129	æ 145	í 161	 177	Ł 193	Đ 209	β 225	± 241
2	é 130	Æ 146	ó 162	 178	Ŧ 194	Ê 210	Ô 226	= 242
3	â 131	ô 147	ú 163	 179	Ŧ 195	Ë 211	Ò 227	¾ 243
4	ä 132	ö 148	ñ 164	† 180	— 196	È 212	õ 228	¶ 244
5	à 133	ò 149	Ñ 165	Á 181	† 197	ı 213	Õ 229	§ 245
6	â 134	û 150	ä 166	Â 182	ã 198	Í 214	μ 230	÷ 246
7	ç 135	ù 151	å 167	À 183	Ã 199	Î 215	þ 231	˙ 247
8	ê 136	ÿ 152	ı 168	© 184	Ł 200	İ 216	Ɔ 232	° 248
9	ë 137	Ö 153	® 169	¶ 185	Ŧ 201	Ɔ 217	Ú 233	ˆ 249
A	è 138	Ü 154	¬ 170	 186	Ł 202	Ŧ 218	Û 234	· 250
B	ï 139	ø 155	½ 171	¶ 187	Ŧ 203	 219	Ù 235	¹ 251
C	î 140	£ 156	¼ 172	¶ 188	Ŧ 204	 220	Ý 236	³ 252
D	ì 141	Ø 157	ı 173	¢ 189	= 205	ı 221	Ý 237	² 253
E	Ä 142	× 158	« 174	¥ 190	Ŧ 206	İ 222	— 238	■ 254
F	Å 143	f 159	» 175	Ŧ 191	α 207	 223	‘ 239	SP 255

Page 3 (PC860: Portuguese)

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	 176	L 192	⌌ 208	α 224	≡ 240
1	ü 129	À 145	í 161	 177	⊥ 193	⌑ 209	β 225	± 241
2	é 130	È 146	ó 162	 178	⊥ 194	⌑ 210	Γ 226	≥ 242
3	â 131	ô 147	ú 163	 179	⊥ 195	⌌ 211	π 227	≤ 243
4	ã 132	õ 148	ñ 164	⊥ 180	— 196	⌌ 212	Σ 228	∫ 244
5	à 133	ò 149	Ñ 165	⊥ 181	⊥ 197	⌌ 213	σ 229	∫ 245
6	Á 134	Ú 150	ä 166	⌌ 182	⌌ 198	⌌ 214	μ 230	÷ 246
7	ç 135	ù 151	º 167	⌌ 183	⌌ 199	⌌ 215	τ 231	≈ 247
8	ê 136	Ì 152	¿ 168	⌌ 184	⌌ 200	⌌ 216	Φ 232	° 248
9	Ê 137	Õ 153	Ò 169	⌌ 185	⌌ 201	⌌ 217	Θ 233	• 249
A	è 138	Ü 154	¬ 170	⌌ 186	⌌ 202	⌌ 218	Ω 234	· 250
B	Í 139	ø 155	½ 171	⌌ 187	⌌ 203	■ 219	δ 235	√ 251
C	Ô 140	£ 156	¼ 172	⌌ 188	⌌ 204	■ 220	∞ 236	ⁿ 252
D	ì 141	Ù 157	ì 173	⌌ 189	= 205	■ 221	Φ 237	² 253
E	Ã 142	Pt 158	« 174	⌌ 190	⌌ 206	■ 222	ε 238	■ 254
F	Â 143	Ó 159	» 175	⌌ 191	⌌ 207	■ 223	∩ 239	SP 255

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	Ì 160	⋮ 176	Ł 192	⋬ 208	α 224	≡ 240
1	Ü 129	È 145	´ 161	⋭ 177	⊥ 193	⋭ 209	β 225	± 241
2	é 130	Ê 146	Ó 162	⋮ 178	Ƨ 194	Π 210	Γ 226	≥ 242
3	â 131	ô 147	ú 163	 179	Ƨ 195	⋬ 211	π 227	≤ 243
4	Â 132	Ë 148	¨ 164	Ƨ 180	— 196	Ł 212	Σ 228	∫ 244
5	à 133	Ï 149	‚ 165	Ƨ 181	† 197	Ƒ 213	σ 229	∫ 245
6	¶ 134	û 150	³ 166	⋮ 182	Ƒ 198	π 214	μ 230	÷ 246
7	ç 135	ù 151	— 167	Π 183	⋮ 199	⋮ 215	τ 231	≈ 247
8	ê 136	æ 152	Î 168	Ƒ 184	⋬ 200	≠ 216	Φ 232	° 248
9	ë 137	Ô 153	Ɔ 169	⋮ 185	Ɔ 201	⋮ 217	Θ 233	• 249
A	è 138	Û 154	Ƨ 170	⋮ 186	⋬ 202	Ɔ 218	Ω 234	· 250
B	ï 139	ø 155	½ 171	¶ 187	Π 203	■ 219	δ 235	√ 251
C	î 140	£ 156	¼ 172	⋮ 188	⋮ 204	■ 220	∞ 236	ⁿ 252
D	= 141	Ù 157	¾ 173	⋮ 189	= 205	■ 221	Φ 237	² 253
E	À 142	Û 158	« 174	Ƒ 190	⋮ 206	■ 222	ε 238	■ 254
F	§ 143	f 159	» 175	Ƨ 191	⋮ 207	■ 223	∩ 239	SP 255

Page 5 (PC865: Nordic)

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	 176	L 192	⌌ 208	α 224	≡ 240
1	ü 129	æ 145	í 161	 177	⊥ 193	⌑ 209	β 225	± 241
2	é 130	Æ 146	ó 162	 178	⌞ 194	⌐ 210	Γ 226	≥ 242
3	â 131	ô 147	ú 163	 179	⌞ 195	⌌ 211	π 227	≤ 243
4	ä 132	ö 148	ñ 164	⌞ 180	— 196	⌞ 212	Σ 228	∫ 244
5	à 133	ò 149	Ñ 165	⌞ 181	⌞ 197	⌞ 213	σ 229	∫ 245
6	å 134	û 150	ä 166	⌞ 182	⌞ 198	⌞ 214	μ 230	÷ 246
7	ç 135	ù 151	ø 167	⌞ 183	⌞ 199	⌞ 215	τ 231	≈ 247
8	ê 136	ÿ 152	¿ 168	⌞ 184	⌞ 200	⌞ 216	Φ 232	° 248
9	ë 137	Ö 153	Г 169	⌞ 185	⌞ 201	⌞ 217	Θ 233	• 249
A	è 138	Ü 154	Г 170	⌞ 186	⌞ 202	⌞ 218	Ω 234	• 250
B	ï 139	ø 155	½ 171	⌞ 187	⌞ 203	■ 219	δ 235	√ 251
C	î 140	£ 156	¼ 172	⌞ 188	⌞ 204	■ 220	∞ 236	ⁿ 252
D	ì 141	Ø 157	ì 173	⌞ 189	= 205	■ 221	Φ 237	² 253
E	Ä 142	Pt 158	« 174	⌞ 190	⌞ 206	■ 222	ε 238	■ 254
F	Å 143	f 159	α 175	⌞ 191	⌞ 207	■ 223	∩ 239	SP 255

HEX	8	9	A	B	C	D	E	F
0	Ç 128	İ 144	ï 160	 176	Ł 192	Ť 208	ζ 224	- 240
1	ü 129	SP 145	ĩ 161	 177	⊥ 193	Υ 209	η 225	± 241
2	é 130	Ŏ 146	ó 162	 178	Ƨ 194	Φ 210	θ 226	υ 242
3	â 131	ô 147	ú 163	 179	† 195	Χ 211	ι 227	Φ 243
4	ä 132	ö 148	À 164	‡ 180	— 196	Ψ 212	κ 228	Χ 244
5	à 133	Ƴ 149	Β 165	Ƒ 181	‡ 197	Ω 213	λ 229	§ 245
6	Ä 134	û 150	Γ 166	Λ 182	Π 198	α 214	μ 230	ψ 246
7	ç 135	ù 151	Δ 167	Ɔ 183	Ɔ 199	β 215	ν 231	ˆ 247
8	ê 136	Ω 152	Ε 168	Ɔ 184	Ɔ 200	γ 216	ξ 232	° 248
9	ë 137	Ö 153	Ζ 169	Ɔ 185	Ɔ 201	Ɔ 217	ο 233	ˆ 249
A	è 138	Ü 154	Η 170	 186	⌌ 202	Ɔ 218	π 234	ω 250
B	ï 139	ά 155	½ 171	Ɔ 187	Ɔ 203	 219	ρ 235	Ü 251
C	î 140	£ 156	Θ 172	Ɔ 188	Ɔ 204	 220	σ 236	Û 252
D	Έ 141	έ 157	Ι 173	≡ 189	= 205	δ 221	ς 237	ώ 253
E	Ä 142	ή 158	« 174	Ο 190	Ɔ 206	ε 222	τ 238	■ 254
F	Ή 143	ι 159	» 175	Ɔ 191	Σ 207	 223	΄ 239	SP 255

Page 12 (PC853: Turkish)

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	 176	L 192	SP 208	Ó 224	- 240
1	ü 129	č 145	í 161	 177	⊥ 193	SP 209	β 225	SP 241
2	é 130	Ĉ 146	ó 162	 178	⊥ 194	Ê 210	Ô 226	ł 242
3	â 131	ô 147	ú 163	 179	⊥ 195	Ë 211	Ò 227	ʰ 243
4	ä 132	ö 148	ñ 164	⊥ 180	— 196	È 212	Ġ 228	˘ 244
5	à 133	ò 149	Ñ 165	Á 181	⊥ 197	ı 213	ğ 229	§ 245
6	ĉ 134	û 150	Ĝ 166	Â 182	Ŝ 198	Í 214	μ 230	÷ 246
7	ç 135	ù 151	ğ 167	À 183	ŝ 199	Î 215	℥ 231	˙ 247
8	ê 136	İ 152	Ĥ 168	Ş 184	℥ 200	Ï 216	ħ 232	° 248
9	ë 137	Ö 153	ĥ 169	⌌ 185	℥ 201	⌌ 217	Ú 233	ˆ 249
A	è 138	Ü 154	SP 170	⌌ 186	⌌ 202	⌌ 218	Û 234	˙ 250
B	ï 139	ĝ 155	½ 171	⌌ 187	⌌ 203	 219	Ù 235	SP 251
C	î 140	£ 156	Ĵ 172	⌌ 188	⌌ 204	 220	Ŭ 236	³ 252
D	ì 141	Ĝ 157	ş 173	Ž 189	= 205	SP 221	ŭ 237	² 253
E	Ä 142	× 158	« 174	ž 190	⌌ 206	Ì 222	· 238	■ 254
F	Ĉ 143	ĵ 159	» 175	⌌ 191	α 207	 223	˙ 239	SP 255

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

Page 14 (PC737: Greek)

HEX	8	9	A	B	C	D	E	F
0	A 128	P 144	ι 160	 176	L 192	⏏ 208	ω 224	Ω 240
1	B 129	Σ 145	κ 161	 177	⊥ 193	⏏ 209	ά 225	± 241
2	Γ 130	Τ 146	λ 162	 178	⊥ 194	⏏ 210	έ 226	≥ 242
3	Δ 131	Υ 147	μ 163	 179	⊥ 195	⏏ 211	ή 227	≤ 243
4	E 132	Φ 148	ν 164	⊥ 180	— 196	⏏ 212	ι 228	İ 244
5	Z 133	X 149	ξ 165	⊥ 181	⊥ 197	⏏ 213	ι 229	ÿ 245
6	H 134	Ψ 150	ο 166	⏏ 182	⏏ 198	⏏ 214	ό 230	÷ 246
7	Θ 135	Ω 151	π 167	⏏ 183	⏏ 199	⏏ 215	ύ 231	≈ 247
8	I 136	α 152	ρ 168	⏏ 184	⏏ 200	⏏ 216	ü 232	° 248
9	K 137	β 153	σ 169	⏏ 185	⏏ 201	⏏ 217	ώ 233	• 249
A	Λ 138	γ 154	ς 170	⏏ 186	⏏ 202	⏏ 218	Α 234	· 250
B	M 139	δ 155	τ 171	⏏ 187	⏏ 203	 219	Έ 235	√ 251
C	N 140	ε 156	υ 172	⏏ 188	⏏ 204	 220	Ή 236	ⁿ 252
D	≡ 141	ζ 157	φ 173	⏏ 189	= 205	 221	Ί 237	² 253
E	O 142	η 158	χ 174	⏏ 190	⏏ 206	 222	Ό 238	■ 254
F	Π 143	θ 159	ψ 175	⏏ 191	⏏ 207	 223	Ύ 239	SP 255

HEX	8	9	A	B	C	D	E	F
0	SP 128	SP 144	SP 160	° 176	ı 192	Π 208	Ü 224	π 240
1	SP 129	SP 145	‘ 161	± 177	Α 193	Ρ 209	α 225	ρ 241
2	SP 130	SP 146	’ 162	² 178	Β 194	Σ 210	β 226	ς 242
3	SP 131	SP 147	£ 163	³ 179	Γ 195	Τ 211	γ 227	σ 243
4	SP 132	SP 148	€ 164	’ 180	Δ 196	Τ 212	δ 228	τ 244
5	SP 133	SP 149	Ɔρ 165	” 181	Ε 197	Υ 213	ε 229	υ 245
6	SP 134	SP 150	ı 166	Α 182	Ζ 198	Φ 214	ζ 230	φ 246
7	SP 135	SP 151	§ 167	• 183	Η 199	Χ 215	η 231	χ 247
8	SP 136	SP 152	” 168	Έ 184	Θ 200	Ψ 216	θ 232	ψ 248
9	SP 137	SP 153	© 169	Η 185	Ι 201	Ω 217	ι 233	ω 249
A	SP 138	SP 154	˘ 170	Ι 186	Κ 202	Ϊ 218	κ 234	ϊ 250
B	SP 139	SP 155	« 171	» 187	Λ 203	Ϋ 219	λ 235	ϋ 251
C	SP 140	SP 156	¬ 172	Ό 188	Μ 204	ά 220	μ 236	ό 252
D	SP 141	SP 157	- 173	½ 189	Ν 205	έ 221	ν 237	ύ 253
E	SP 142	SP 158	SP 174	Υ 190	Ξ 206	ή 222	ξ 238	ώ 254
F	SP 143	SP 159	— 175	Ω 191	Ο 207	ι 223	ο 239	SP 255

Page 16 (WPC1252)

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

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

Page 18 (PC852: Latin2)

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	 176	L 192	đ 208	Ó 224	- 240
1	ü 129	Í 145	í 161	 177	⊥ 193	Đ 209	β 225	“ 241
2	é 130	Í 146	ó 162	 178	⊥ 194	Ď 210	Ô 226	„ 242
3	â 131	ô 147	ú 163	 179	⊥ 195	Ě 211	Ň 227	ˇ 243
4	ä 132	ö 148	Ą 164	⊥ 180	— 196	ď 212	ń 228	˘ 244
5	û 133	Ĺ 149	ą 165	Á 181	⊥ 197	Ň 213	ň 229	§ 245
6	ć 134	ĭ 150	ž 166	Â 182	Ă 198	Í 214	Š 230	÷ 246
7	ç 135	Ś 151	ž 167	Ě 183	ă 199	Î 215	š 231	˙ 247
8	ł 136	ś 152	Ę 168	Ş 184	Ł 200	ě 216	Ŕ 232	° 248
9	ë 137	Ö 153	ę 169	Ź 185	Ŧ 201	Ĵ 217	Ú 233	“ 249
A	Ő 138	Ü 154	SP 170	 186	⊥ 202	Ŧ 218	ŕ 234	• 250
B	ő 139	Ť 155	ž 171	Ŧ 187	⊥ 203	 219	Ů 235	ů 251
C	î 140	ť 156	Č 172	Ź 188	Ŧ 204	 220	ý 236	Ř 252
D	Ž 141	Ł 157	ş 173	Ž 189	= 205	Ŧ 221	Ý 237	ř 253
E	Ä 142	× 158	« 174	ž 190	Ŧ 206	Ů 222	ţ 238	■ 254
F	Ć 143	č 159	» 175	Ŧ 191	α 207	 223	‘ 239	SP 255

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	 176	Ł 192	đ 208	Ó 224	- 240
1	ü 129	æ 145	í 161	 177	Ł 193	Đ 209	β 225	± 241
2	é 130	Æ 146	ó 162	 178	Ŧ 194	Ê 210	Ô 226	= 242
3	â 131	ô 147	ú 163	 179	Ŧ 195	Ë 211	Ò 227	¾ 243
4	ä 132	ö 148	ñ 164	Ŧ 180	— 196	È 212	õ 228	¶ 244
5	à 133	ò 149	Ñ 165	Á 181	† 197	€ 213	Õ 229	§ 245
6	â 134	û 150	ä 166	Â 182	ã 198	Í 214	μ 230	÷ 246
7	ç 135	ù 151	å 167	À 183	Ã 199	Î 215	þ 231	· 247
8	ê 136	ÿ 152	ı 168	© 184	Ł 200	İ 216	Ɔ 232	° 248
9	ë 137	Ö 153	® 169	Ŧ 185	Ŧ 201	Ɔ 217	Ú 233	“ 249
A	è 138	Ü 154	¬ 170	 186	Ł 202	Ŧ 218	Û 234	· 250
B	ï 139	ø 155	½ 171	Ŧ 187	Ŧ 203	 219	Ù 235	¹ 251
C	î 140	£ 156	¼ 172	Ŧ 188	Ŧ 204	 220	Ý 236	³ 252
D	ì 141	Ø 157	ì 173	¢ 189	= 205	ı 221	Ý 237	² 253
E	Ä 142	× 158	« 174	¥ 190	Ŧ 206	Ì 222	— 238	■ 254
F	Å 143	f 159	» 175	Ŧ 191	α 207	 223	’ 239	SP 255

Page 20 (KU42: Thai)

HEX	8	9	A	B	C	D	E	F
0	┐ 128	○ 144	SP 160	ฅ 176	ย 192	เ 208	' 224	๒ 240
1	└ 129	๑ 145	ก 161	ณ 177	ร 193	แ 209	๖ 225	๓ 241
2	┌ 130	๒ 146	ข 162	ด 178	ถ 194	โ 210	๗ 226	๔ 242
3	┘ 131	๓ 147	ค 163	ต 179	ล 195	ใ 211	+ 227	๕ 243
4	├ 132	๔ 148	ฃ 164	ถ 180	ว 196	๒ 212	๘ 228	๖ 244
5	─ 133	๕ 149	ง 165	ท 181	ศ 197	ๆ 213	· 229	๗ 245
6	┤ 134	๖ 150	จ 166	ธ 182	ษ 198	๓ 214	˙ 230	๘ 246
7	└┐ 135	๗ 151	ฉ 167	น 183	ส 199	' 215	๙ 231	๙ 247
8	└┐ 136	๘ 152	ช 168	บ 184	ห 200	๔ 216	๐ 232	๑๐ 248
9	└┐ 137	๙ 153	ฅ 169	ป 185	ฬ 201	๕ 217	˚ 233	๑๑ 249
A	└┐ 138	๑๐ 154	ฅ 170	ผ 186	อ 202	๖ 218	๑ 234	๑๒ 250
B	■ 139	ค 155	ญ 171	ฝ 187	ฮ 203	๗ 219	๒ 235	๑๓ 251
C	← 140	โ 156	ฎ 172	พ 188	๐ 204	๘ 220	๓ 236	๑๔ 252
D	↑ 141	ใ 157	ฏ 173	ฟ 189	ภ 205	๑ 221	๔ 237	๑๕ 253
E	→ 142	๒ 158	ฐ 174	ภ 190	า 206	๒ 222	๕ 238	๑๖ 254
F	↓ 143	๓ 159	ท 175	ม 191	ำ 207	๓ 223	๖ 239	SP 255

HEX	8	9	A	B	C	D	E	F
0	๐ 128	๑ 144	๒ 160	๓ 176	๔ 192	๕ 208	๖ 224	๗ 240
1	๘ 129	๙ 145	๑๐ 161	๑๑ 177	๑๒ 193	๑๓ 209	๑๔ 225	๑๕ 241
2	๑๖ 130	๑๗ 146	๑๘ 162	๑๙ 178	๒๐ 194	๒๑ 210	๒๒ 226	๒๓ 242
3	๒๔ 131	๒๕ 147	๒๖ 163	๒๗ 179	๒๘ 195	๒๙ 211	๓๐ 227	๓๑ 243
4	๓๒ 132	๓๓ 148	๓๔ 164	๓๕ 180	๓๖ 196	๓๗ 212	๓๘ 228	๓๙ 244
5	๓๔ 133	๓๕ 149	๓๖ 165	๓๗ 181	๓๘ 197	๓๙ 213	๔๐ 229	๔๑ 245
6	๔๒ 134	๔๓ 150	๔๔ 166	๔๕ 182	๔๖ 198	๔๗ 214	๔๘ 230	๔๙ 246
7	๔๔ 135	๔๕ 151	๔๖ 167	๔๗ 183	๔๘ 199	๔๙ 215	๕๐ 231	๕๑ 247
8	๕๒ 136	๕๓ 152	๕๔ 168	๕๕ 184	๕๖ 200	๕๗ 216	๕๘ 232	๕๙ 248
9	๕๔ 137	๕๕ 153	๕๖ 169	๕๗ 185	๕๘ 201	๕๙ 217	๖๐ 233	๖๑ 249
A	๖๒ 138	๖๓ 154	๖๔ 170	๖๕ 186	๖๖ 202	๖๗ 218	๖๘ 234	๖๙ 250
B	๖๔ 139	๖๕ 155	๖๖ 171	๖๗ 187	๖๘ 203	๖๙ 219	๗๐ 235	๗๑ 251
C	๗๒ 140	๗๓ 156	๗๔ 172	๗๕ 188	๗๖ 204	๗๗ 220	๗๘ 236	๗๙ 252
D	๗๔ 141	๗๕ 157	๗๖ 173	๗๗ 189	๗๘ 205	๗๙ 221	๘๐ 237	๘๑ 253
E	๘๒ 142	๘๓ 158	๘๔ 174	๘๕ 190	๘๖ 206	๘๗ 222	๘๘ 238	๘๙ 254
F	๘๔ 143	๘๕ 159	๘๖ 175	๘๗ 191	๘๘ 207	๘๙ 223	๙๐ 239	๙๑ 255

Page 26 (TIS18: Thai)

HEX	8	9	A	B	C	D	E	F
0	┐ 128	┐ 144	SP 160	๒ 176	ภ 192	ะ 208	เ 224	อ 240
1	┘ 129	┘ 145	ก 161	ท 177	ม 193	ะ 209	แ 225	ด 241
2	└ 130	๖ 146	ข 162	ฒ 178	ย 194	า 210	โ 226	๒ 242
3	┘ 131	๖ 147	ข 163	ณ 179	ร 195	ำ 211	ใ 227	๓ 243
4	┐ 132	๖ 148	ค 164	ด 180	ฤ 196	๖ 212	ใ 228	๔ 244
5	─ 133	๖ 149	ค 165	ด 181	ล 197	๖ 213	า 229	๕ 245
6	┘ 134	๖ 150	ฃ 166	ถ 182	ภ 198	๖ 214	า 230	๖ 246
7	┘ 135	๖ 151	ง 167	ท 183	ว 199	๖ 215	๖ 231	๗ 247
8	┘ 136	๖ 152	จ 168	ธ 184	ศ 200	๖ 216	๖ 232	๘ 248
9	┘ 137	๖ 153	ฉ 169	น 185	๖ 201	๖ 217	๖ 233	๙ 249
A	┘ 138	๖ 154	ช 170	บ 186	ส 202	๖ 218	๖ 234	๖ 250
B	■ 139	๖ 155	ช 171	ป 187	ห 203	๖ 219	๖ 235	๖ 251
C	← 140	๖ 156	ณ 172	ผ 188	ฬ 204	๖ 220	๖ 236	๖ 252
D	↑ 141	๖ 157	ญ 173	ฝ 189	อ 205	๖ 221	๖ 237	๖ 253
E	→ 142	๖ 158	ฎ 174	พ 190	ฮ 206	๖ 222	๖ 238	๖ 254
F	↓ 143	๖ 159	ฏ 175	ฟ 191	๖ 207	๖ 223	๖ 239	SP 255

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

Page 31 (TCVN-3: Vietnamese)

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

HEX	8	9	A	B	C	D	E	F
0	SP 128	SP 144	ب 160	 176	ل 192	ل 208	ن 224	≡ 240
1	SP 129	ٲ 145	ة 161	 177	ل 193	ف 209	ط 225	ٲ 241
2	é 130	ٲ 146	ن 162	 178	ت 194	ن 210	ظ 226	ٲ 242
3	â 131	ô 147	ث 163	 179	ٲ 195	ل 211	ع 227	ٲ 243
4	SP 132	ٲ 148	ج 164	ٲ 180	— 196	ل 212	غ 228	ٲ 244
5	à 133	- 149	ح 165	ٲ 181	ٲ 197	ف 213	ف 229	ٲ 245
6	SP 134	û 150	خ 166	ل 182	ٲ 198	ن 214	م 230	ٲ 246
7	ç 135	ù 151	د 167	ن 183	ل 199	ل 215	ق 231	≈ 247
8	ê 136	ء 152	ذ 168	ٲ 184	ل 200	ٲ 216	ك 232	° 248
9	ë 137	آ 153	ر 169	ل 185	ن 201	ل 217	ل 233	° 249
A	è 138	أ 154	ز 170	ل 186	ل 202	ر 218	م 234	° 250
B	ï 139	ؤ 155	س 171	ل 187	ن 203	 219	ن 235	√ 251
C	î 140	£ 156	ش 172	ل 188	ل 204	 220	ه 236	n 252
D	SP 141	إ 157	س 173	ل 189	= 205	 221	و 237	2 253
E	SP 142	ئ 158	« 174	ل 190	ل 206	 222	ي 238	■ 254
F	SP 143	ا 159	» 175	ل 191	ل 207	 223	ي 239	SP 255

Page 33 (WPC775: Baltic Rim)

HEX	8	9	A	B	C	D	E	F
0	Ć 128	É 144	Ā 160	 176	Ł 192	ą 208	Ó 224	- 240
1	Ü 129	æ 145	Ī 161	 177	⊥ 193	č 209	ß 225	± 241
2	é 130	Æ 146	ó 162	 178	⊥ 194	ę 210	Ō 226	“ 242
3	ā 131	ō 147	Ž 163	 179	┌ 195	è 211	Ń 227	¾ 243
4	ä 132	ö 148	ž 164	└ 180	— 196	ì 212	õ 228	¶ 244
5	ǵ 133	Ǧ 149	ž 165	Ą 181	† 197	š 213	Ŏ 229	§ 245
6	ǻ 134	ϕ 150	” 166	Č 182	Ȳ 198	ȳ 214	μ 230	÷ 246
7	ć 135	ś 151	ı 167	Ę 183	Ū 199	ū 215	ń 231	” 247
8	ł 136	ś 152	© 168	Ė 184	Ł 200	ž 216	ķ 232	° 248
9	ē 137	Ö 153	® 169	Ĳ 185	Ɔ 201	Ɔ 217	ķ 233	· 249
A	Ŕ 138	Ü 154	¬ 170	 186	⌚ 202	Ɔ 218	ķ 234	· 250
B	ŗ 139	ø 155	½ 171	ŕ 187	⌚ 203	 219	ĳ 235	¹ 251
C	ĩ 140	£ 156	¼ 172	ŕ 188	⌚ 204	 220	ŋ 236	³ 252
D	Ž 141	Ø 157	Ł 173	ł 189	= 205	 221	Ė 237	² 253
E	Ä 142	× 158	« 174	Š 190	⌚ 206	 222	Ņ 238	■ 254
F	Å 143	α 159	» 175	ŕ 191	Ž 207	 223	, 239	SP 255

HEX	8	9	A	B	C	D	E	F
0	ђ 128	љ 144	а 160	 176	Љ 192	л 208	Я 224	- 240
1	Ђ 129	Љ 145	А 161	 177	Ћ 193	Л 209	р 225	ы 241
2	ѓ 130	њ 146	б 162	 178	Т 194	м 210	Р 226	Ы 242
3	Ѓ 131	Њ 147	Б 163	179	ѳ 195	М 211	с 227	з 243
4	ё 132	ћ 148	ц 164	┆ 180	— 196	н 212	С 228	З 244
5	Ё 133	Ћ 149	Ц 165	х 181	† 197	Н 213	т 229	ш 245
6	е 134	ќ 150	д 166	Х 182	к 198	о 214	Т 230	Ш 246
7	Е 135	Ќ 151	Д 167	и 183	К 199	О 215	у 231	э 247
8	ѕ 136	ђ 152	е 168	И 184	Љ 200	п 216	У 232	Э 248
9	Ѕ 137	Ђ 153	Е 169	185	ѓ 201	Ј 217	ж 233	щ 249
A	і 138	џ 154	ф 170	186	Љ 202	Г 218	Ж 234	Щ 250
B	І 139	Џ 155	Ф 171	џ 187	ѳ 203	 219	В 235	Ч 251
C	Ї 140	Ю 156	Г 172	Ј 188	ѳ 204	 220	В 236	Ч 252
D	Ї 141	Ю 157	Г 173	й 189	= 205	П 221	ь 237	§ 253
E	ј 142	ѣ 158	« 174	Й 190	ѳ 206	я 222	Ь 238	■ 254
F	Ј 143	ѣ 159	» 175	Г 191	ѡ 207	 223	№ 239	SP 255

Page 35 (PC861: Icelandic)

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	 176	L 192	⌌ 208	α 224	≡ 240
1	ü 129	æ 145	í 161	 177	⊥ 193	⌑ 209	ß 225	± 241
2	é 130	Æ 146	ó 162	 178	⊤ 194	⌒ 210	Γ 226	≥ 242
3	â 131	ô 147	ú 163	 179	⊢ 195	⌌ 211	π 227	≤ 243
4	ä 132	ö 148	Á 164	⊣ 180	— 196	⌑ 212	Σ 228	∫ 244
5	à 133	þ 149	í 165	⊣ 181	⊢ 197	⌑ 213	σ 229	∫ 245
6	å 134	û 150	Ó 166	⌑ 182	⌑ 198	⌑ 214	μ 230	÷ 246
7	ç 135	Ý 151	Ú 167	⌑ 183	⌑ 199	⌑ 215	τ 231	≈ 247
8	ê 136	ý 152	¿ 168	⌑ 184	⌑ 200	⌑ 216	Φ 232	° 248
9	ë 137	Ö 153	⌑ 169	⌑ 185	⌑ 201	⌑ 217	Θ 233	· 249
A	è 138	Ü 154	⌑ 170	⌑ 186	⌑ 202	⌑ 218	Ω 234	· 250
B	Ð 139	ø 155	½ 171	⌑ 187	⌑ 203	 219	ð 235	√ 251
C	ð 140	£ 156	¼ 172	⌑ 188	⌑ 204	 220	∞ 236	ⁿ 252
D	þ 141	Ø 157	í 173	⌑ 189	= 205	 221	φ 237	² 253
E	Ä 142	Pt 158	« 174	⌑ 190	⌑ 206	 222	ε 238	 254
F	Å 143	f 159	» 175	⌑ 191	⌑ 207	 223	∩ 239	SP 255

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

Page 37 (PC864: Arabic)

HEX	8	9	A	B	C	D	E	F
0	° 128	β 144	SP 160	• 176	¢ 192	ذ 208	- 224	? 240
1	· 129	∞ 145	 161	۱ 177	ء 193	ر 209	ف 225	? 241
2	· 130	φ 146	آ 162	۲ 178	آ 194	ز 210	ق 226	ن 242
3	√ 131	± 147	£ 163	۳ 179	أ 195	ع 211	ك 227	ه 243
4	 132	½ 148	¤ 164	٤ 180	ؤ 196	ث 212	ل 228	ه 244
5	— 133	¼ 149	أ 165	ه 181	ع 197	ط 213	م 229	ى 245
6	 134	≈ 150	SP 166	٦ 182	ذ 198	ظ 214	ن 230	ي 246
7	† 135	« 151	€ 167	٧ 183	ا 199	ط 215	ه 231	غ 247
8	‡ 136	» 152	ا 168	٨ 184	ب 200	ظ 216	و 232	ق 248
9	⌈ 137	لا 153	ب 169	٩ 185	ة 201	ع 217	ى 233	لا 249
A	⌋ 138	لا 154	ت 170	ف 186	ت 202	غ 218	ي 234	لا 250
B	⌌ 139	SP 155	ث 171	؛ 187	ث 203	ا 219	ض 235	ل 251
C	⌍ 140	SP 156	، 172	س 188	ج 204	ا 220	ع 236	ك 252
D	⌎ 141	لا 157	ج 173	ش 189	ح 205	÷ 221	غ 237	ي 253
E	⌏ 142	لا 158	ح 174	ص 190	خ 206	× 222	غ 238	■ 254
F	⌐ 143	ء 159	خ 175	؟ 191	د 207	ع 223	م 239	SP 255

HEX	8	9	A	B	C	D	E	F
0	SP 128	İ 144	ï 160	 176	Ł 192	Ť 208	ζ 224	 240
1	SP 129	Ĳ 145	ĳ 161	 177	⊥ 193	Υ 209	η 225	± 241
2	SP 130	Œ 146	ó 162	 178	Ŧ 194	Φ 210	θ 226	υ 242
3	SP 131	SP 147	ú 163	 179	† 195	Χ 211	ι 227	φ 243
4	SP 132	SP 148	À 164	‡ 180	— 196	Ψ 212	κ 228	χ 244
5	SP 133	Ÿ 149	Β 165	Ƒ 181	‡ 197	Ω 213	λ 229	§ 245
6	À 134	Ÿ 150	Γ 166	Λ 182	Π 198	α 214	μ 230	ψ 246
7	€ 135	© 151	Δ 167	Ɔ 183	Ɔ 199	β 215	ν 231	ˆ 247
8	· 136	Ω 152	Ε 168	Ɔ 184	Ł 200	γ 216	ξ 232	° 248
9	¬ 137	² 153	Ζ 169	Ɔ 185	Ɔ 201	Ɔ 217	ο 233	ˆ 249
A	ı 138	³ 154	Η 170	Ɔ 186	Ɔ 202	Ɔ 218	π 234	ω 250
B	‘ 139	ά 155	½ 171	Ɔ 187	Ɔ 203	 219	ρ 235	Ü 251
C	’ 140	£ 156	Θ 172	Ɔ 188	Ɔ 204	 220	σ 236	Û 252
D	Έ 141	έ 157	Ι 173	Ξ 189	= 205	δ 221	ς 237	ώ 253
E	— 142	ή 158	« 174	Ο 190	Ɔ 206	ε 222	τ 238	■ 254
F	Ή 143	ι 159	» 175	Γ 191	Σ 207	 223	’ 239	SP 255

Page 39 (ISO8859-2: Latin2)

HEX	8	9	A	B	C	D	E	F
0	 128	L 144	SP 160	° 176	Ř 192	Đ 208	ř 224	ď 240
1	 129	Ł 145	Ą 161	ą 177	Á 193	Ń 209	á 225	ń 241
2	 130	Ť 146	˘ 162	˙ 178	Â 194	Ň 210	â 226	ň 242
3	131	† 147	Ł 163	ł 179	Ă 195	Ó 211	ă 227	ó 243
4	† 132	— 148	α 164	´ 180	Ä 196	Ô 212	ä 228	ô 244
5	J 133	‡ 149	Ĺ 165	ĺ 181	Í 197	Õ 213	í 229	ï 245
6	Г 134	■ 150	Ś 166	ś 182	Ć 198	Ö 214	ć 230	ö 246
7	■ 135	■ 151	Ş 167	˘ 183	Ç 199	× 215	ç 231	÷ 247
8	© 136	Ł 152	ˆ 168	˙ 184	Č 200	Ř 216	č 232	ř 248
9	137	Ŧ 153	Š 169	š 185	É 201	Û 217	é 233	û 249
A	138	Ł 154	Ş 170	ş 186	Ę 202	Ú 218	ę 234	ú 250
B	139	Ŧ 155	Ť 171	ť 187	Ě 203	Ů 219	ě 235	ů 251
C	140	Ŧ 156	Ž 172	ž 188	Ě 204	Ü 220	ě 236	ü 252
D	¢ 141	= 157	173	ˆ 189	Í 205	Ý 221	í 237	ý 253
E	¥ 142	Ŧ 158	Ž 174	ž 190	Î 206	Ț 222	î 238	ț 254
F	Ŧ 143	® 159	Ž 175	ž 191	Ď 207	ß 223	ď 239	· 255

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

Page 41 (PC1098: Farsi)

HEX	8	9	A	B	C	D	E	F
0	SP 128	و 144	ح 160	 176	L 192	ع 208	ک 224	 240
1	SP 129	د 145	خ 161	 177	ل 193	ء 209	ک 225	ی 241
2	، 130	ب 146	ذ 162	 178	T 194	ع 210	گ 226	پ 242
3	؛ 131	ب 147	د 163	 179	ت 195	غ 211	گ 227	- 243
4	؟ 132	پ 148	ذ 164	ت 180	- 196	غ 212	ل 228	۰ 244
5	ء 133	پ 149	ر 165	ض 181	ت 197	غ 213	ل 229	۱ 245
6	آ 134	ت 150	ز 166	ض 182	ظ 198	غ 214	م 230	۲ 246
7	آ 135	ت 151	ژ 167	ط 183	ع 199	ف 215	م 231	۳ 247
8	ج 136	ث 152	س 168	ط 184	ل 200	ف 216	ن 232	۴ 248
9	ا 137	ث 153	س 169	ط 185	ل 201	ل 217	ن 233	۵ 249
A	ا 138	ج 154	ش 170	 186	ل 202	ر 218	و 234	۶ 250
B	ج 139	چ 155	ش 171	ط 187	ت 203	 219	ه 235	۷ 251
C	ء 140	چ 156	ص 172	ک 188	ل 204	 220	ه 236	۸ 252
D	أ 141	چ 157	ط 173	ط 189	= 205	ق 221	ه 237	۹ 253
E	أ 142	x 158	« 174	ظ 190	ل 206	ق 222	ه 238	 254
F	ج 143	ح 159	» 175	ط 191	SP 207	 223	ی 239	SP 255

HEX	8	9	A	B	C	D	E	F
0	Ç 128	É 144	á 160	 176	L 192	ą 208	α 224	≡ 240
1	ü 129	æ 145	í 161	 177	⊥ 193	č 209	β 225	± 241
2	é 130	Æ 146	ó 162	 178	⊥ 194	ę 210	Γ 226	≥ 242
3	â 131	ô 147	ú 163	 179	† 195	è 211	π 227	≤ 243
4	ä 132	ö 148	ñ 164	‡ 180	— 196	ì 212	Σ 228	” 244
5	à 133	ò 149	Ñ 165	À 181	† 197	š 213	σ 229	“ 245
6	â 134	û 150	ª 166	Č 182	Ų 198	ų 214	μ 230	÷ 246
7	ç 135	ù 151	º 167	Ė 183	Ū 199	ū 215	τ 231	≈ 247
8	ê 136	ÿ 152	¿ 168	Ė 184	Ł 200	ž 216	Φ 232	° 248
9	ë 137	Ö 153	ƒ 169	Ł 185	Ł 201	Ɔ 217	Θ 233	· 249
A	è 138	Ü 154	ƒ 170	Ł 186	Ł 202	Ɔ 218	Ω 234	· 250
B	ï 139	¢ 155	½ 171	Ų 187	Ų 203	 219	ð 235	√ 251
C	î 140	£ 156	¼ 172	Ų 188	Ų 204	 220	∞ 236	ⁿ 252
D	ì 141	¥ 157	ı 173	ł 189	= 205	 221	φ 237	² 253
E	Ä 142	Ɔ 158	« 174	Š 190	Ł 206	 222	ε 238	■ 254
F	Å 143	Ɔ 159	» 175	Ų 191	Ž 207	 223	∩ 239	SP 255

Page 43 (PC1119: Lithuanian)

HEX	8	9	A	B	C	D	E	F
0	A 128	P 144	a 160	 176	L 192	a 208	p 224	Ė 240
1	Б 129	С 145	б 161	 177	┘ 193	č 209	c 225	ė 241
2	В 130	Т 146	в 162	 178	┘ 194	ę 210	т 226	≥ 242
3	Г 131	У 147	г 163	 179	┘ 195	è 211	y 227	≤ 243
4	Д 132	Ф 148	д 164	┘ 180	— 196	ì 212	φ 228	” 244
5	Е 133	Х 149	е 165	Ą 181	┘ 197	š 213	x 229	“ 245
6	Ж 134	Ц 150	ж 166	Č 182	У 198	ų 214	ц 230	÷ 246
7	З 135	Ч 151	з 167	Ę 183	Ū 199	ū 215	ч 231	≈ 247
8	И 136	Ш 152	и 168	Ė 184	Ł 200	ž 216	ш 232	° 248
9	Й 137	Щ 153	й 169	Į 185	Г 201	Ј 217	щ 233	· 249
A	К 138	Ъ 154	к 170	 186	┘ 202	Г 218	ъ 234	· 250
B	Л 139	Ы 155	л 171	┘ 187	┘ 203	 219	ы 235	√ 251
C	М 140	Ь 156	м 172	┘ 188	┘ 204	 220	ь 236	ⁿ 252
D	Н 141	Э 157	н 173	┘ 189	= 205	 221	э 237	² 253
E	О 142	Ю 158	о 174	Š 190	┘ 206	 222	ю 238	■ 254
F	П 143	Я 159	п 175	┘ 191	Ž 207	 223	я 239	SP 255

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

Page 45 (WPC1250: Latin 2)

HEX	8	9	A	B	C	D	E	F
0	€ 128	SP 144	SP 160	° 176	Ř 192	Đ 208	ř 224	ď 240
1	SP 129	‘ 145	˘ 161	± 177	Á 193	Ň 209	á 225	ň 241
2	, 130	, 146	˘ 162	˘ 178	Â 194	Ň 210	â 226	ň 242
3	SP 131	“ 147	Ł 163	ł 179	Ă 195	Ó 211	ă 227	ó 243
4	” 132	” 148	α 164	’ 180	Ä 196	Ô 212	ä 228	ô 244
5	... 133	• 149	Ą 165	μ 181	Í 197	Ů 213	í 229	ő 245
6	† 134	— 150	ı 166	¶ 182	Ć 198	Ö 214	ć 230	ö 246
7	‡ 135	— 151	§ 167	· 183	Ç 199	× 215	ç 231	÷ 247
8	SP 136	SP 152	“ 168	’ 184	Č 200	Ř 216	č 232	ř 248
9	‰ 137	™ 153	© 169	ą 185	É 201	Û 217	é 233	ű 249
A	Š 138	š 154	Ş 170	ş 186	Ě 202	Ú 218	ě 234	ú 250
B	‹ 139	› 155	« 171	» 187	Ě 203	Ů 219	ě 235	ű 251
C	Ś 140	ś 156	¬ 172	Ĺ 188	Ě 204	Ü 220	ś 236	ü 252
D	Ť 141	ť 157	˘ 173	˘ 189	Í 205	Ý 221	í 237	ý 253
E	Ž 142	ž 158	® 174	Ÿ 190	Î 206	Ț 222	î 238	ț 254
F	Ž 143	ž 159	Ž 175	ž 191	Ď 207	ß 223	ď 239	· 255

HEX	8	9	A	B	C	D	E	F
0	Ѣ 128	ђ 144	SP 160	° 176	А 192	Р 208	а 224	р 240
1	ѓ 129	‘ 145	ѣ 161	± 177	Б 193	С 209	б 225	с 241
2	, 130	, 146	ѝ 162	І 178	В 194	Т 210	в 226	т 242
3	ѓ 131	“ 147	Ј 163	і 179	Г 195	У 211	г 227	у 243
4	” 132	” 148	ѡ 164	ѓ 180	Д 196	Ф 212	д 228	ф 244
5	... 133	• 149	Ѓ 165	μ 181	Е 197	Х 213	е 229	х 245
6	† 134	— 150	Ї 166	¶ 182	Ж 198	Ц 214	ж 230	ц 246
7	‡ 135	— 151	§ 167	· 183	З 199	Ч 215	з 231	ч 247
8	€ 136	SP 152	Ё 168	ё 184	И 200	Ш 216	и 232	ш 248
9	‰ 137	™ 153	© 169	№ 185	Й 201	Щ 217	й 233	щ 249
A	Љ 138	љ 154	Є 170	є 186	К 202	Ъ 218	к 234	ъ 250
B	‹ 139	› 155	« 171	» 187	Л 203	Ы 219	л 235	ы 251
C	Њ 140	њ 156	ѣ 172	ј 188	М 204	Ь 220	м 236	ь 252
D	Ќ 141	ќ 157	 173	Ѕ 189	Н 205	Э 221	н 237	э 253
E	Њ 142	њ 158	® 174	ѕ 190	О 206	Ю 222	о 238	ю 254
F	Ќ 143	ќ 159	Ї 175	ї 191	П 207	Я 223	п 239	я 255

Page 47 (WPC1253: Greek)

HEX	8	9	A	B	C	D	E	F
0	€ 128	SP 144	SP 160	° 176	ï 192	Π 208	Û 224	π 240
1	SP 129	‘ 145	“ 161	± 177	Α 193	Ρ 209	α 225	ρ 241
2	, 130	, 146	Α 162	² 178	Β 194	SP 210	β 226	ς 242
3	f 131	“ 147	£ 163	³ 179	Γ 195	Σ 211	γ 227	σ 243
4	” 132	” 148	α 164	´ 180	Δ 196	Τ 212	δ 228	τ 244
5	... 133	• 149	¥ 165	μ 181	Ε 197	Υ 213	ε 229	υ 245
6	† 134	— 150	¡ 166	¶ 182	Ζ 198	Φ 214	ζ 230	φ 246
7	‡ 135	— 151	§ 167	· 183	Η 199	Χ 215	η 231	χ 247
8	SP 136	SP 152	“ 168	Έ 184	Θ 200	Ψ 216	θ 232	ψ 248
9	‰ 137	™ 153	© 169	Ή 185	Ι 201	Ω 217	ι 233	ω 249
A	SP 138	SP 154	ª 170	Ί 186	Κ 202	Ϊ 218	κ 234	ϊ 250
B	‹ 139	› 155	« 171	» 187	Λ 203	Ϋ 219	λ 235	ϋ 251
C	SP 140	SP 156	¬ 172	Ό 188	Μ 204	ά 220	μ 236	ό 252
D	SP 141	SP 157	 173	½ 189	Ν 205	έ 221	ν 237	ύ 253
E	SP 142	SP 158	® 174	Ύ 190	Ξ 206	ή 222	ξ 238	ώ 254
F	SP 143	SP 159	— 175	Ω 191	Ο 207	ι 223	ο 239	SP 255

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

Page 49 (WPC1255: Hebrew)

HEX	8	9	A	B	C	D	E	F
0	€ 128	SP 144	SP 160	° 176	˙ 192	ı 208	א 224	נ 240
1	SP 129	‘ 145	ı 161	± 177	˚ 193	˙ 209	ב 225	ו 241
2	, 130	’ 146	¢ 162	² 178	˚ 194	˙ 210	ג 226	ע 242
3	f 131	“ 147	£ 163	³ 179	˚ 195	˙ 211	ד 227	ף 243
4	” 132	” 148	₪ 164	´ 180	˙ 196	ן 212	ה 228	פ 244
5	... 133	• 149	¥ 165	μ 181	˚ 197	י 213	ו 229	ץ 245
6	† 134	— 150	ı 166	¶ 182	˚ 198	י 214	ז 230	צ 246
7	‡ 135	— 151	§ 167	˙ 183	˚ 199	’ 215	ח 231	ק 247
8	^ 136	~ 152	˚ 168	˚ 184	˚ 200	” 216	ט 232	ר 248
9	‰ 137	™ 153	© 169	¹ 185	˙ 201	SP 217	י 233	ש 249
A	SP 138	SP 154	× 170	÷ 186	SP 202	SP 218	ך 234	ת 250
B	‹ 139	› 155	« 171	» 187	˚ 203	SP 219	כ 235	SP 251
C	SP 140	SP 156	ֿ 172	¼ 188	˙ 204	SP 220	ל 236	SP 252
D	SP 141	SP 157	173	½ 189	˙ 205	SP 221	ם 237	SP 253
E	SP 142	SP 158	® 174	¾ 190	˚ 206	SP 222	נ 238	SP 254
F	SP 143	SP 159	— 175	¿ 191	˚ 207	SP 223	ן 239	SP 255

HEX	8	9	A	B	C	D	E	F
0	€ 128	گ 144	SP 160	° 176	ˆ 192	ذ 208	à 224	´ 240
1	پ 129	‘ 145	‘ 161	± 177	ء 193	ر 209	ل 225	” 241
2	, 130	’ 146	¢ 162	² 178	آ 194	ز 210	â 226	” 242
3	f 131	“ 147	£ 163	³ 179	أ 195	س 211	م 227	´ 243
4	” 132	” 148	¤ 164	´ 180	ؤ 196	ش 212	ن 228	ô 244
5	... 133	• 149	¥ 165	μ 181	إ 197	ص 213	ه 229	´ 245
6	† 134	— 150	¡ 166	¶ 182	ئ 198	ض 214	و 230	´ 246
7	‡ 135	— 151	§ 167	· 183	ا 199	× 215	ç 231	÷ 247
8	^ 136	ک 152	” 168	د 184	ب 200	ط 216	è 232	´ 248
9	‰ 137	™ 153	© 169	¹ 185	ة 201	ظ 217	é 233	ù 249
A	ٹ 138	ڑ 154	ھ 170	؛ 186	ت 202	ع 218	ê 234	° 250
B	‹ 139	› 155	« 171	» 187	ث 203	غ 219	ë 235	û 251
C	Œ 140	œ 156	¬ 172	¼ 188	ج 204	- 220	ی 236	ü 252
D	چ 141	SP 157	 173	½ 189	ح 205	ف 221	ي 237	SP 253
E	ژ 142	SP 158	® 174	¾ 190	خ 206	ق 222	î 238	SP 254
F	ڈ 143	ں 159	— 175	؟ 191	د 207	ك 223	ï 239	ء 255

Page 51 (WPC1257: Baltic Rim)

HEX	8	9	A	B	C	D	E	F
0	€ 128	SP 144	SP 160	° 176	À 192	Š 208	ą 224	š 240
1	SP 129	‘ 145	SP 161	± 177	Ĳ 193	Ń 209	į 225	ń 241
2	, 130	, 146	¢ 162	² 178	Ā 194	Ņ 210	ā 226	ņ 242
3	SP 131	“ 147	£ 163	³ 179	Ć 195	Ó 211	ć 227	ó 243
4	” 132	” 148	¤ 164	´ 180	Ä 196	Õ 212	ä 228	õ 244
5	... 133	• 149	SP 165	μ 181	Å 197	Ö 213	å 229	ö 245
6	† 134	— 150	ı 166	¶ 182	Ę 198	Ö 214	ę 230	ö 246
7	‡ 135	— 151	§ 167	· 183	Ě 199	× 215	ě 231	÷ 247
8	SP 136	SP 152	Ø 168	ø 184	Č 200	Ț 216	č 232	ț 248
9	‰ 137	™ 153	© 169	¹ 185	É 201	Ł 217	é 233	ł 249
A	SP 138	SP 154	Ŕ 170	ŗ 186	Ž 202	Ś 218	ż 234	ś 250
B	‹ 139	› 155	« 171	» 187	Ě 203	Ū 219	è 235	ū 251
C	SP 140	SP 156	¬ 172	¼ 188	Ğ 204	Ü 220	ğ 236	ü 252
D	“ 141	— 157	173	½ 189	Ķ 205	Ž 221	ķ 237	ž 253
E	˘ 142	˘ 158	® 174	¾ 190	Ī 206	Ž 222	ī 238	ž 254
F	˙ 143	SP 159	Æ 175	æ 191	Ł 207	ß 223	Į 239	· 255

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

Page 53 (KZ1048: Kazakhstan)

HEX	8	9	A	B	C	D	E	F
0	Ъ 128	ђ 144	SP 160	° 176	А 192	Р 208	а 224	р 240
1	ѓ 129	‘ 145	Ў 161	± 177	Б 193	С 209	б 225	с 241
2	, 130	, 146	ў 162	І 178	В 194	Т 210	в 226	т 242
3	ѓ 131	“ 147	Ә 163	і 179	Г 195	У 211	г 227	у 243
4	” 132	” 148	Җ 164	ө 180	Д 196	Ф 212	д 228	ф 244
5	... 133	• 149	Ө 165	μ 181	Е 197	Х 213	е 229	х 245
6	† 134	— 150	Ї 166	¶ 182	Ж 198	Ц 214	ж 230	ц 246
7	‡ 135	— 151	§ 167	· 183	З 199	Ч 215	з 231	ч 247
8	€ 136	SP 152	Ё 168	ё 184	И 200	Ш 216	и 232	ш 248
9	‰ 137	™ 153	© 169	№ 185	Й 201	Щ 217	й 233	щ 249
A	Љ 138	љ 154	Ғ 170	ғ 186	К 202	Ъ 218	к 234	ъ 250
B	‹ 139	› 155	« 171	» 187	Л 203	Ы 219	л 235	ы 251
C	Њ 140	њ 156	ҫ 172	ә 188	М 204	Ь 220	м 236	ь 252
D	Қ 141	қ 157	- 173	Ң 189	Н 205	Э 221	н 237	э 253
E	Һ 142	һ 158	® 174	ң 190	О 206	Ю 222	о 238	ю 254
F	Ҫ 143	ҫ 159	Ү 175	ү 191	П 207	Я 223	п 239	я 255

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

International Character Sets

Country	ASCII code (Hex)													
	23	24	25	2A	40	5B	5C	5D	5E	60	7B	7C	7D	7E
USA	#	\$	%	*	@	[	¥	]	^	`	{		}	~
France	#	\$	%	*	à	°	ç	§	^	`	é	ù	è	¨
Germany	#	\$	%	*	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
U.K.	£	\$	%	*	@	[	¥	]	^	`	{		}	~
Denmark I	#	\$	%	*	@	Æ	Ø	Å	^	`	æ	ø	å	~
Sweden	#	¤	%	*	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Italy	#	\$	%	*	@	°	¥	é	^	ù	à	ò	è	ì
Spain I	Pt	\$	%	*	@	í	Ñ	¿	^	`	¨	ñ	}	~
Japan	#	\$	%	*	@	[	¥	]	^	`	{		}	~
Norway	#	¤	%	*	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Denmark II	#	\$	%	*	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
Spain II	#	\$	%	*	á	í	Ñ	¿	é	`	í	ñ	ó	ú
Latin America	#	\$	%	*	á	í	Ñ	¿	é	ü	í	ñ	ó	ú
Korea	#	\$	%	*	@	[	₩	]	^	`	{		}	~
Slovenia/Croatia	#	\$	%	*	Ž	Š	Đ	Ć	Č	ž	š	đ	ć	č
China	#	¥	%	*	@	[	¥	]	^	`	{		}	~
Vietnam	₫	\$	%	*	@	[	¥	]	^	`	{		}	~
Arabia	#	\$	%	*	@	[	¥	]	^	`	{		}	~

