EPSON
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UB-E03

Technical Reference Guide

Product Overview

This chapter explains the features of the product.

Set up

This chapter explains how to connect the UB-E03 to the TM printer and use it.

Programming Samples

This chapter explains information for programming.

UB-E03 Specifications

This chapter explains the specification of the UB-E03.

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Cautions

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ESC/POS® Command System

EPSON has been taking industry's initiatives with its own POS printer command system (ESC/POS). ESC/POS has a large number of commands including patented ones. Its high scalability enables users to build versatile POS systems. The system is compatible with all types of EPSON POS printers (excluding the TM-C100) and displays. Moreover, its flexibility makes it easy to upgrade the future. The functionality and the user-friendliness is valued around the world.

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.
CAUTION	Provides information that must be observed to avoid damage to your equipment or a malfunction.
NOTE	Provides important information and useful tips.

Warnings

WARNING

- **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.
- **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.
- **If you open the DIP switch cover, be sure to close the cover and tighten the screw after adjusting the DIP switch.**
  Using this product with the cover open may cause fire or electric shock.
- **Do not use aerosol sprayers containing flammable gas inside or around this product.**
  Doing so may cause fire.

Cautions

CAUTION

- **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.
- **To ensure safety, unplug this product before leaving it unused for an extended period.**

Product Servicing

This product cannot be serviced at the component level. if damage occurs, the UB-E03 should be replaced as a unit.

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 is aimed to provide all the necessary information for development engineers to develop, design, and install POS system, or to develop and design printer applications.

Manual Content

The manual is made up of the following sections:

Chapter 1 Product Overview

Chapter 2 Set up

Chapter 3 Programming Samples

Chapter 4 UB-E03 Specifications

Contents

■ **For Safety** **3**

Key to Symbols 3
Warnings 4
Cautions 5

■ **Product Servicing** **5**

■ **Restriction of Use** **5**

■ **About this Manual** **6**

Aim of the Manual 6
Manual Content 6

Product Overview 9

■ **Features** **9**

■ **Product Information** **10**

Parts Name and Function 10
Supported TM Printers 11
Supported Browser 11
Supported Protocols 11
Space Required for Installation 11
Environmental Specifications 12
Limitations 12

Set up 13

Flow of Setup 13

■ **Installing the UB-E03** **14**

■ **Setting IP Address Using EPSON TMNet WinConfig** **17**

Setting the TCP/IP Protocol in Your Operating System 17
Setting the UB-E03 23

■ **Setting IP Address Using arp/ping Command** **27**

■ **Checking/Changing the Settings** **29**

Checking/Changing with EPSON TMNet WinConfig 29
Checking/Changing with EPSON TMNet WebConfig 31

■ **Initializing** **33**

■ **EPSON TMNet WebConfig** **34**

Starting EPSON TMNet WebConfig 34
General Information Screen 35
TCP/IP Information Screen 36
SNMP Information Screen 37
TCP/IP Setting Screen 38

SNMP Communication Setting Screen 39
SNMP IP Trap 1 Setting Screen 40
SNMP IP Trap 2 Setting Screen 41
Administrator Setting Screen 42
Password Setting Screen 43
Reset Screen 44
Advanced Screen 45

Programming Samples 47

■ **Method of Printing to a TM Printer 47**
■ **Direct Printing by PORT9100 ..... 48**
For Windows Console 48
For Linux 49
■ **Commands Sent to a TM Printer When the Power is On 50**
■ **Monitoring of the ASB Status 50**
■ **The Rights of Printing 50**
■ **Time-out for Connection 50**

UB-E03 Specifications 51

■ **Software Specifications 51**
Supported Protocols 51
■ **Network Parameter of the UB-E03 ..... 54**
Setting of the network parameter of the UB-E03 55
How to check the Mac Address 55
■ **System Bootup Time 56**
■ **UB-E02 and UB-E03 ..... 57**

Product Overview

This chapter explains the product overview.

Features

The UB-E03 is installed in the TM-series printers as an interface board to provide Ethernet communications.

Features of the UB-E03 are as follows:

Network Function

- 10Base-T, 100Base-TX Ethernet
- Supports TCP/IP protocol.
- Supports DHCP/APIPA.
- SNMP capable. The status of the printer can be acquired by using SNMP.
- IPv4 capable.

Setting

- The setting utility EPSON TMNetWinConfig is available. Please download it from the EPSON Web site and use it.
- You can check and set the parameters by using a Web browser.
- When you push the push button, the present network parameter is initialized and the setting condition is printed for you to check.

Others

- Updating the firmware is possible via the network.
- Low-power consumption mode

NOTE

Low-power consumption mode:

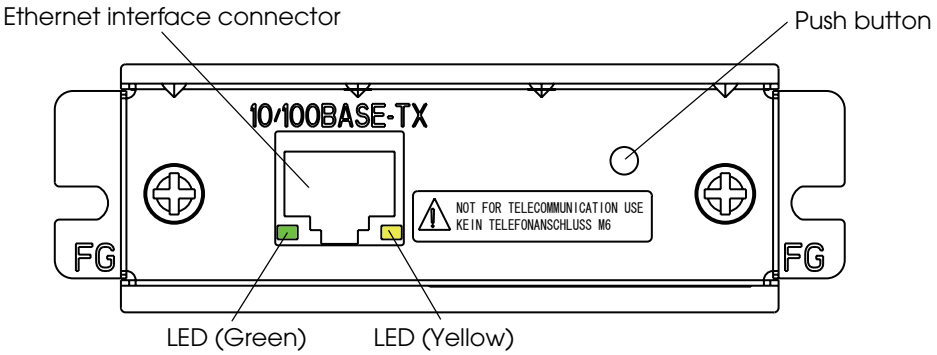
The UB-E03 enters the low-power consumption mode if more than 3 seconds have passed while none of the following is performed;

- Receiving Ethernet data
- Printing by the printer
- Receiving data from the printer
- Operating the push button

When any of the above is performed, The UB-E03 automatically returns to the normal mode. The low-power consumption mode function cannot be disabled.

Product Information

Parts Name and Function



Ethernet interface connector

A LAN cable (RJ45 plug) can be connected to the Ethernet connector.

- 10BASE-T, 100BASE-TX Ethernet, full duplex, half duplex (Auto negotiation function, manual setting)
- Complies with TCP/IP protocol (LP, LPR, and socket communications)

LED

The UB-E03 has 2 LEDs. They are on in the following cases. However, they are off during the low power consumption mode.

The green LED: when the Ethernet link is established.

The yellow LED: when the printer is sending/receiving Ethernet data.

Push button

A push button is provided to perform the following functions.

- Status sheet printing
  Push and hold the push button for three seconds or more when the TM printer is ready for printing (paper is set and the power supply is turned on); the network parameter status is printed.
- Setting initialization
  Push and hold the push button while turning on the power supply. Keep pushing the push button (about ten seconds) until the initialization start massage (Resetting to Factory Default) is printed. All settings are reset to the factory settings.

Supported TM Printers

For supported printers, see TM-UIB Combination Specification, or ask your dealer.

Supported Browser

The UB-E03 supports the following browsers.

- Internet Explorer (Ver. 6.0 or later)
- Firefox (Ver. 3.0 or later)

Supported Protocols

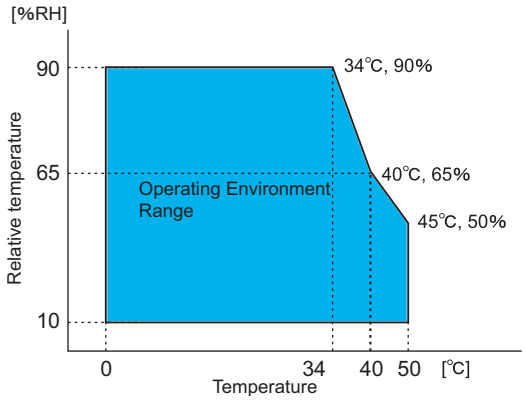
The UB-E03 supports the following protocols.

Protocol	Application
IP, ARP, ICMP, UDP, TCP	Basic communications protocols for various functions.
LP, LPR, TCP Socket Port	Protocol for printing.
DHCP, APIPA	Protocol for automatic settings of IP address, etc.
ENPC, SNMP	Protocol for settings and monitoring.
HTTP	Protocol for using EPSON TMNet WebConfig.
TFTP	Protocol to update the firmware of the interface.

Space Required for Installation

When the UB-E03 is installed in the back of a TM printer, it increases the depth of the printer by 20 mm (0.79"). Take this into consideration for your installation.

Environmental Specifications

Item		Specifications
Temperature	Operating Conditions	0 to 50°C {32 to 122°F}, 10 to 90% RH non-condensation (See the operating temperature and humidity range below.)
	Storage Conditions	-10 to 50°C {14 to 122°F}, 10 to 90% RH non-condensation
		

Limitations

The UB-E03 has following limitations. For limitations on TM printers, see Technical Reference Guides for TM printers.

Limitations for Transmission

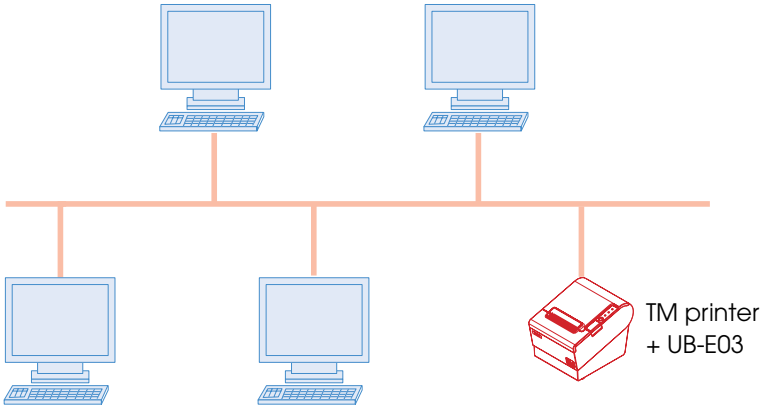
When printing a high volume of data such as graphics, the print speed may be slower.

Limitation for Customer Display Use

When the UB-E03 is connected, the DM-D connector on the TM unit cannot be used. Never attempt to connect the Ethernet cable to the DM-D connector or drawer kick-out connector.

Set up

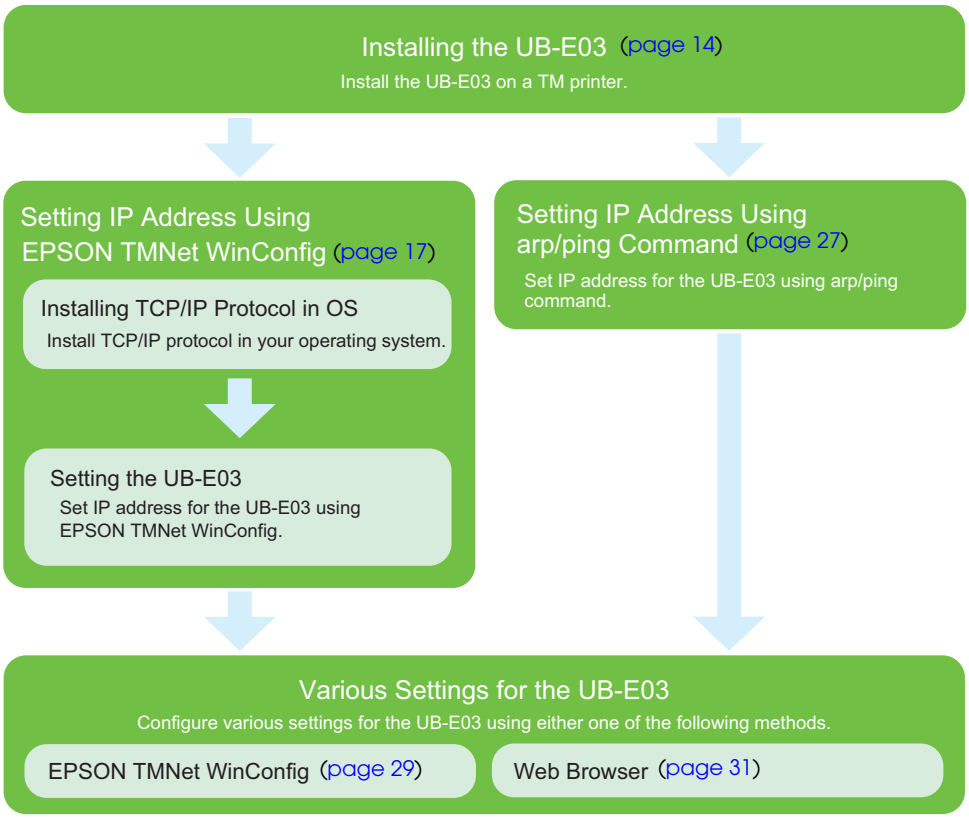
This chapter describes the procedures to set up an interface board for Epson TM printers, the UB-E03, so that you can use it on a network.



Flow of Setup

Follow the steps below for setup.

Use EPSON TMNet WinConfig or arp/ping command to set the IP address.



Installing the UB-E03

Follow the steps below to install the UB-E03 on a TM printer.

WARNING

- Before installing the UB-E03, disconnect the Power Unit from the TM Printer (as well as turning the power switch off).
  Even when the power switch is off, voltage is still present at some points on the circuit board. Changing components while the Power Unit is connected can cause damage to the UB-E03 and the printer.
- Before installing the UB-E03, be sure to set the DIP switches or Memory switches as shown in the table below. For other models, ask your dealer.

Model	Setting
TM-U200 Series	DIP SW 2-8: ON
TM-U210 Series	DIP SW 2-8: ON
TM-U220 Series	DIP SW 2-8: ON
TM-U230 Series	DIP SW 2-8: ON
TM-U325 Series	DIP SW 2-8: ON
TM-U590 Series	DIP SW 2-8: ON
TM-U675 Series	DIP SW 2-8: ON
TM-T88 Series	DIP SW 2-8: ON
TM-T90	MSW 2-8: ON
TM-H5000/H5000II	DIP SW 2-8: ON
TM-H6000 Series	DIP SW 2-8: ON
TM-J2000/J2100	MSW 2-8: ON
TM-L90	MSW 2-8: ON

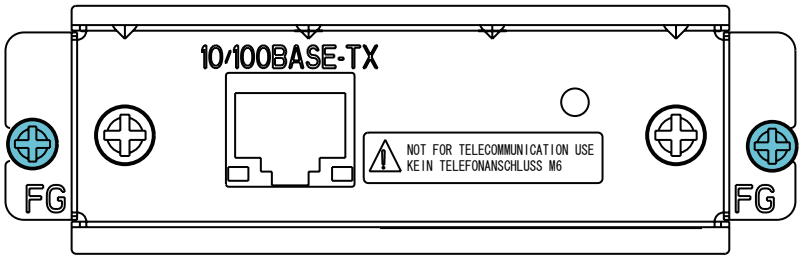
CAUTION

The display module connector on the TM printer cannot be used when the UB-E03 is installed.

1 Be sure that the power supply unit is disconnected from the printer and that the power for the printer and host computer is turned off.

2 Install the UB-E03 on the printer and fix it with screws.

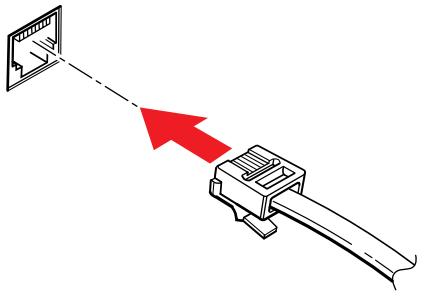
If any interface board is already installed on the printer, remove it and then install the UB-E03. Use the screws removed to attach the UB-E03.



3 Plug the 10Base-T/100Base-TX cable into the Ethernet interface connector on the UB-E03 installed.

WARNING

Never attempt to connect the customer display cable, drawer kick-out cable, or a standard telephone line cable to the Ethernet connector.



4 Connect the power supply unit with the printer.

5 Turn on the printer.

NOTE

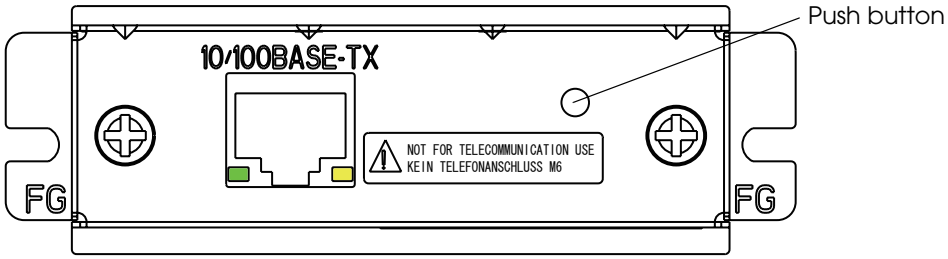
When initializing the UB-E03 by turning off the power and then turning it back on or by resetting the printer, there is a waiting time until the network starts operating. During this time, all the communicating functions of the network do not work.

The waiting time is:

- When the IP address setting is Manual (Fixed): approximately 15 seconds
- When the IP address setting is Auto: approximately 20 seconds (It can be longer, depending on the reply time of the host.)

6 Hold the push button for more than 3 seconds when the printer is ready for printing.

When the UB-E03 is installed correctly, the printer prints a status sheet.



Setting IP Address Using EPSON TMNet WinConfig

This section describes how to set the IP address using EPSON TMNet WinConfig.

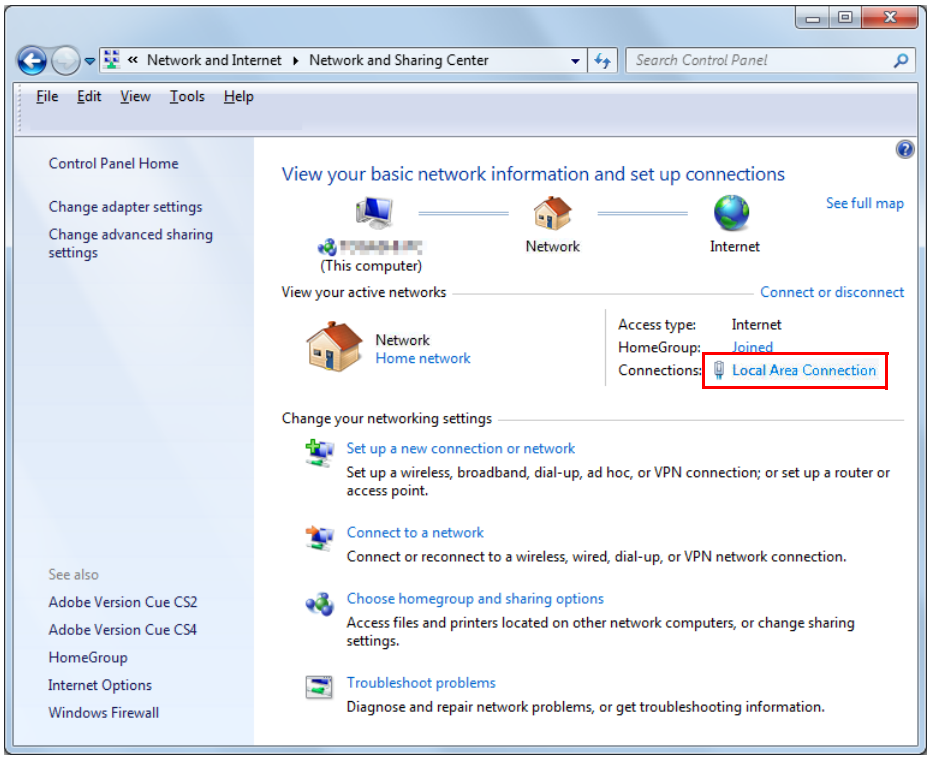
Setting the TCP/IP Protocol in Your Operating System

To set the IP address using EPSON TMNet WinConfig, you need to install the TCP/IP protocol in your operating system.

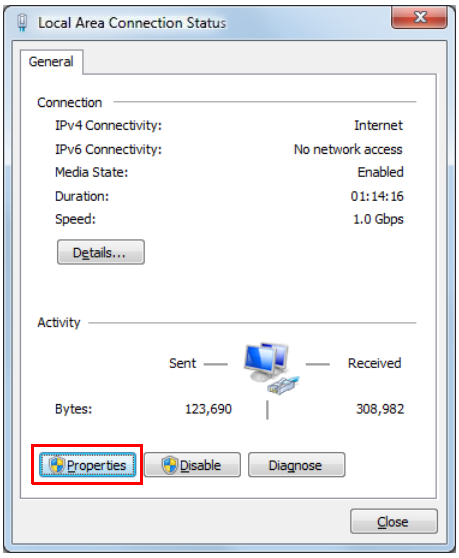
To install TCP/IP protocol in Windows 7, Windows Vista, and Windows XP, follow the instructions below.

Windows 7

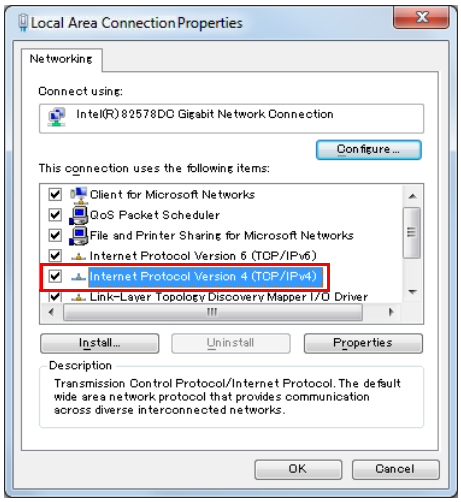
1 Click (Local Area Connection) in the Control Panel.



2 Click the (Properties) button.



3 Confirm whether the (Internet Protocol Version4 (TCP/IPv4)) check box is checked. If not, check it.

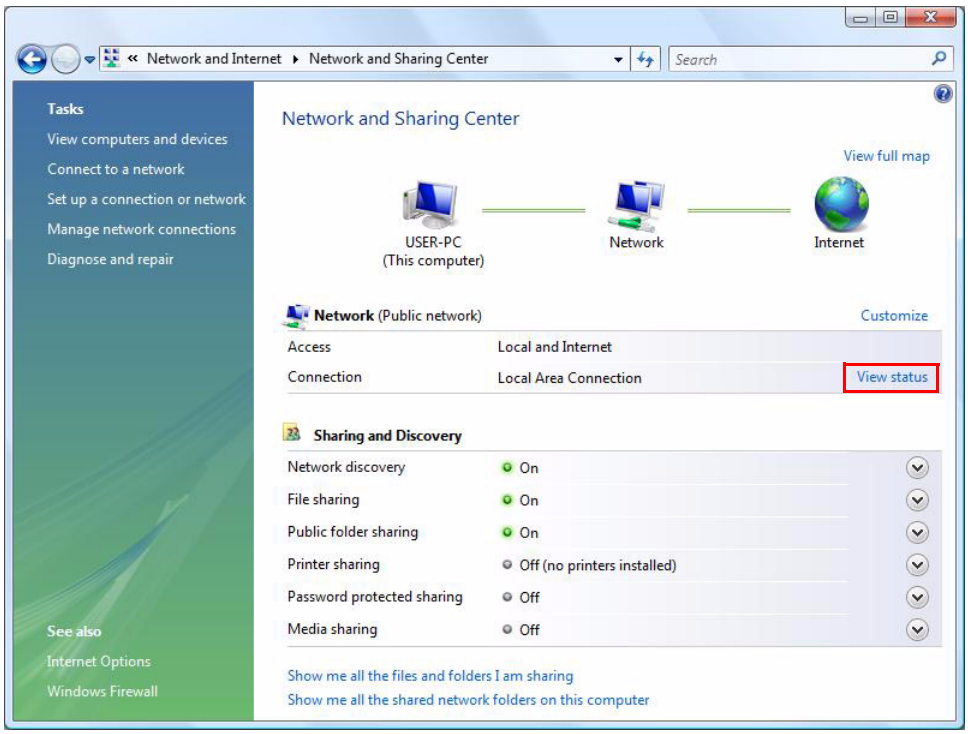


4 Click the (OK) button.

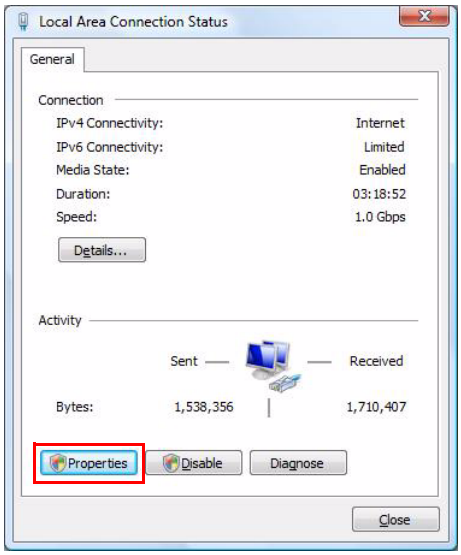
> **NOTE** If you install the TCP/IP protocol, restart your computer after installing.

Windows Vista

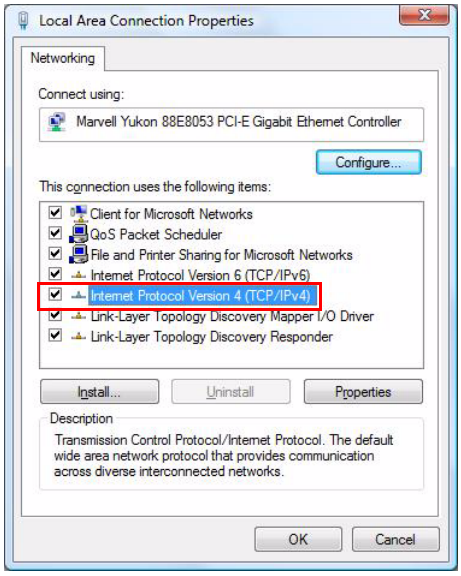
1 Click (View status) in the Control Panel.



2 Click the (Properties) button.



3 Confirm whether the (Internet Protocol Version4 (TCP/IPv4)) check box is checked. If not, check it.



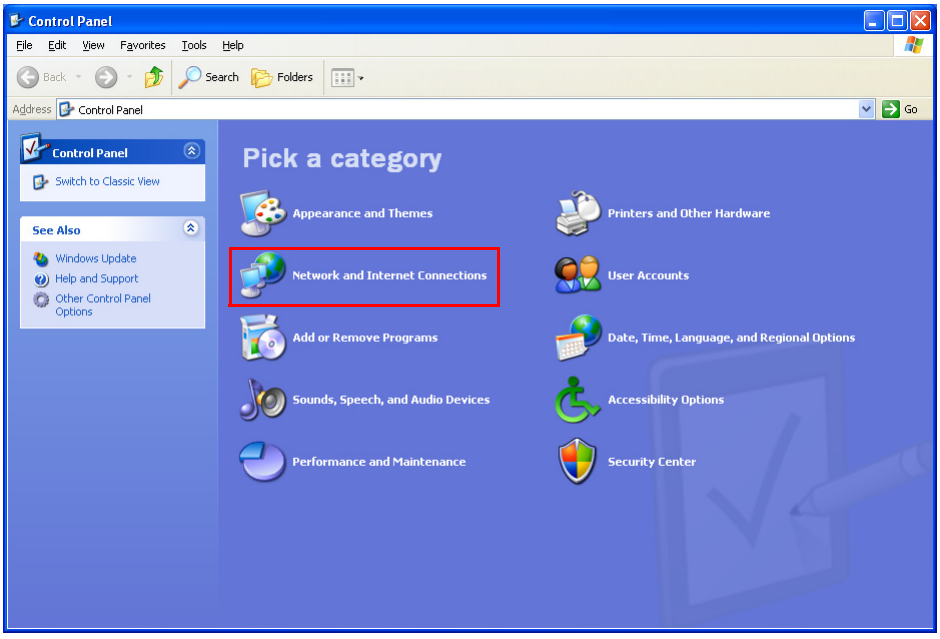
4 Click the (OK) button.

NOTE

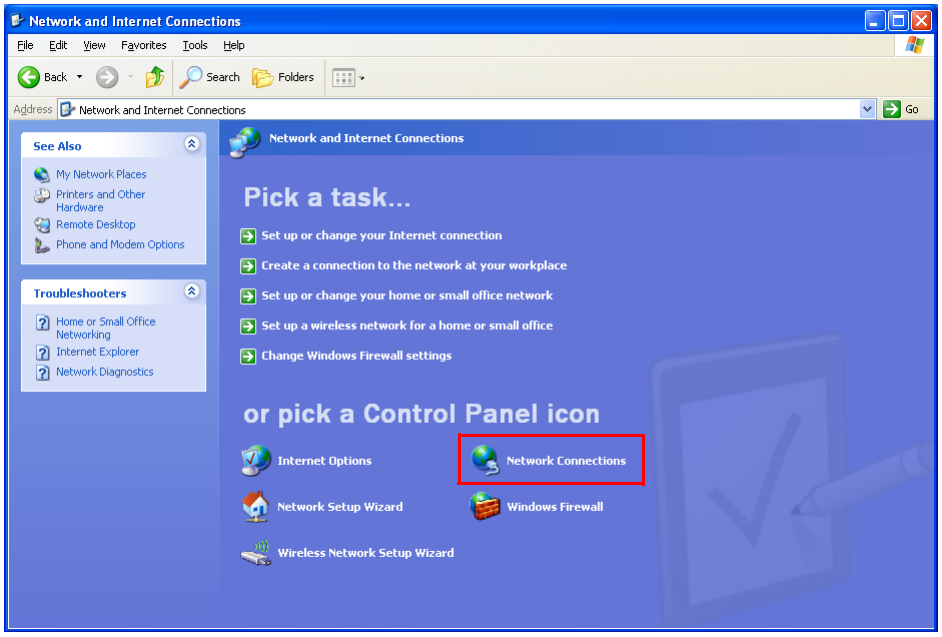
If you install the TCP/IP protocol, restart your computer after installing.

Windows XP

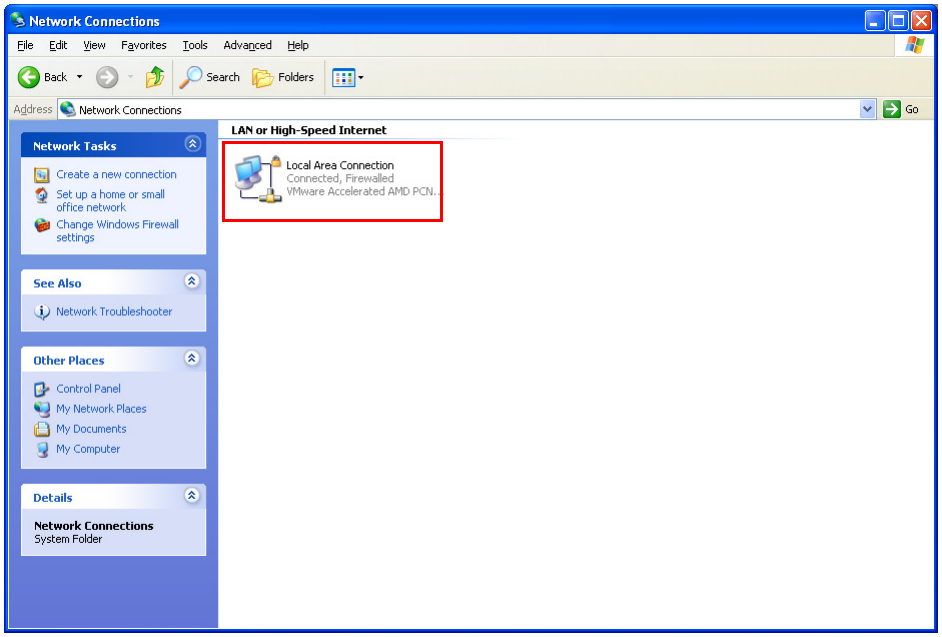
1 Click (Network and Internet Connections) in the Control Panel.



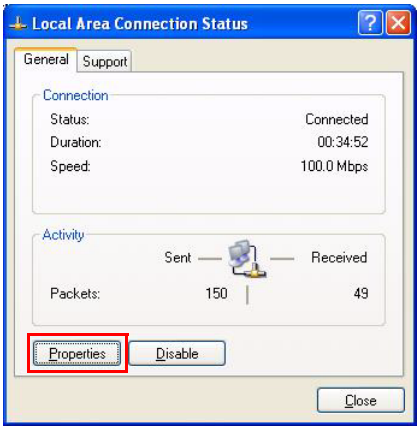
2 Click (Network Connections).



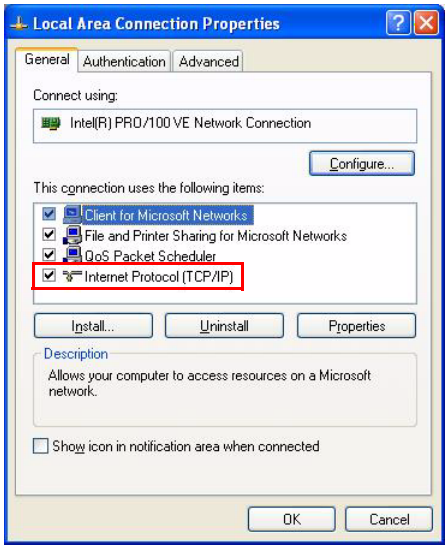
3 Double-click (Local Area Connection).



4 Click the (Properties) button.



5 Confirm whether the (Internet Protocol (TCP/IP)) check box is checked. If not, check it.



6 Click the (OK) button.

NOTE	If you install the TCP/IP protocol, restart your computer after installing.

Setting the UB-E03

Install EPSON TMNet WinConfig on the setting computer and set the IP address for the UB-E03.

Preparing the computer and acquiring the information

Preparation

- TM printer with the UB-E03 installed
- Computer (Windows 7/Windows Vista/Windows XP)
- Utility for setting (EPSON TMNet Winconfig)
- DHCP server (When you set the IP address automatically.)

Downloading/installing EPSON TMNet WinConfig

Download EPSON TMNet WinConfig from Epson web site and install it on the computer. See EPSON TMNet WinConfig User's Guide for information on how to install/use EPSON TMNet WinConfig.

Acquiring the setting information

When you set the IP address manually, acquire the following information from the network administrator.

- IP address
- Subnet mask
- Default gateway

Setting procedure

Follow the steps below to set the IP address.

CAUTION

- Because the same IP address is set for all UB-E03 units in the factory, do not connect more than one UB-E03 whose IP address is not changed from the factory setting. When you set the IP address, connect the UB-E03 to the network and set the IP address one by one.
- Be sure not to turn off the printer or send printing data to the printer while setting.
- Do not use the same IP address as that of other network devices or PCs.

1 Connect the printer to the network.

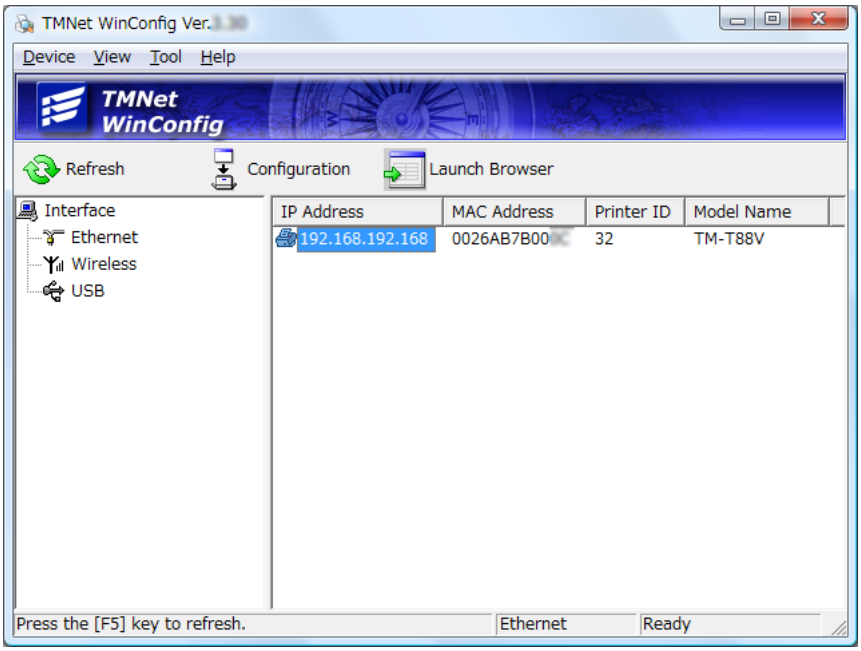
2 Turn on the printer.

3 Start up EPSON TMNet WinConfig.

Select [Start]-[EpsonNet]-[TMNet WinConfig]-[TMNet WinConfigxx].

4 Select the printer where you want to set the IP address and click the (Configuration) button.

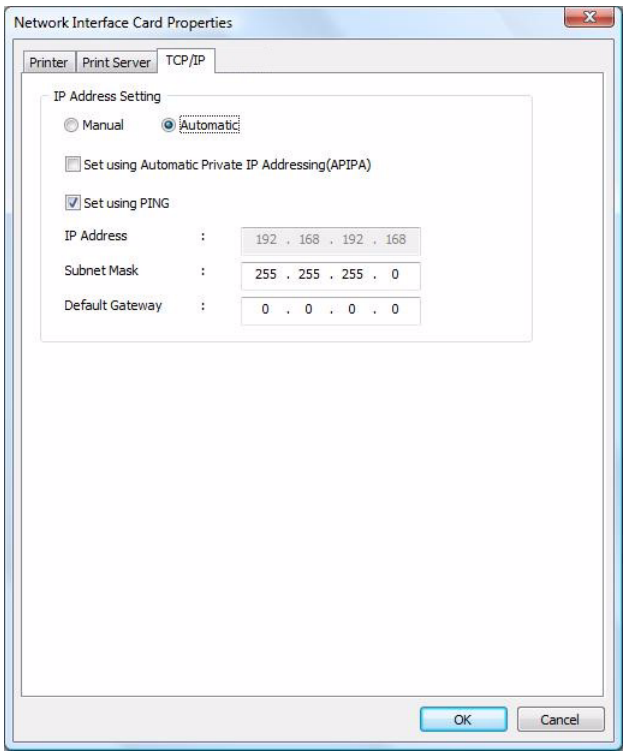
You might wait for 10 seconds or more to view the printer on your screen.



NOTE	If you have connected more than one printer to the network and do not know for which printer you want to set the IP address, you can check the printer by finding out the MAC address of the UB-E03. The MAC address can be found on the status sheet or a label on the UB-E03. To print the status sheet, turn on the printer power, and hold the push button for more than 3 seconds. When you cannot check the MAC address on the label on the UB-E03 that is installed on the printer, be sure to finish EPSON TMNet WinConfig by clicking [Close] from the [Device] tab; then turn off the printer and remove the UB-E03 to check it.

5 Click the (TCP/IP) tab.

6 Select (Manual) or (Auto).



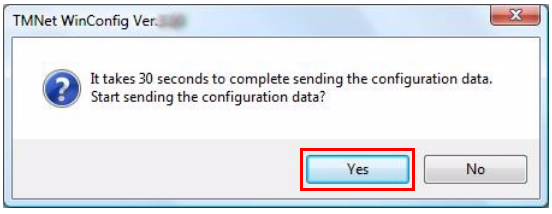
- Manual: Input for [IP Address], [Subnet Mask], and [Default Gateway].
- Auto: The IP address, subnet mask, and default gate way are acquired form DHCP server.

CAUTION

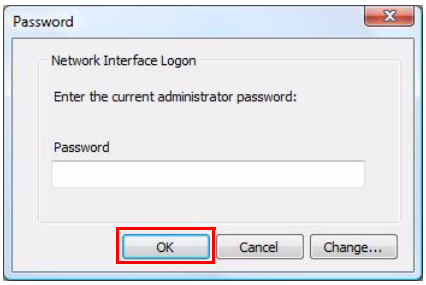
- Do not use the auto setting without a DHCP server. See the manual of the server for setting.
- Be sure that the [Set using PING] check box is checked if a setting by ping or arp command is permitted.

7 Click the (OK) button.

8 Click the (OK) button.

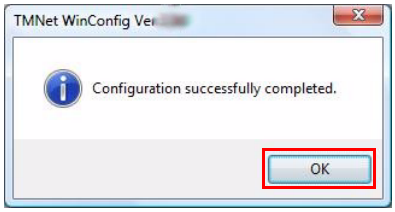


9 Click the (OK) button.



The contents of the setting are transmitted to the UB-E03.

After a while, when following message is displayed, the IP address setting is completed.



Setting IP Address Using arp/ping Command

You can set the IP address using the arp/ping command. This way of setting is available with the host, which is in the same segment as that of the UB-E03.

Preparing the computer and acquiring the information

Preparation

- TM printer with the UB-E03 installed
- Computer (Windows 7/Windows Vista/Windows XP)

Acquiring the setting information

Acquire the following information from the network administrator.

- IP address
- Default gateway

> **NOTE** The subnet mask is set from the IP address automatically.

Setting procedure

Follow the steps below to set the IP address.

> **CAUTION** Do not use the same IP address as that of other network devices or PCs.

In this example, we set the IP address of the UB-E03 (MAC address: 00-26-AB-7B-00-00) to 192.168.192.168 in Windows.

1 Set the gateway address to the computer in which you will input the arp/ping command.

If a server or router acts as a gateway, type the gateway address.

2 Connect the printer to the network and turn on the printer.

3 Execute the arp command to clear the relation of the MAC address and IP address.

<Example>

Format: **arp -d [**IP address to be set for the UB-E03**]**

Input: **arp -d 192.168.192.168**

4 Execute the arp command to relate the IP address to be set for the UB-E03 to the MAC address of the UB-E03.

<Example>

Format: **arp -s [**IP address to be set for the UB-E03**][**MAC address of the UB-E03**]**

Input: **arp -s 192.168.192.168 00-26-AB-7B-00-00**

> NOTE
>
> The MAC address can be found on the status sheet or a label on the UB-E03.
> To print the status sheet, turn on the printer power, and hold the push button for more than 3 seconds.
> When you cannot check the MAC address on the label on the UB-E03 that is installed on the printer, be sure to turn off the printer and remove the UB-E03 to check it.

5 Execute the ping command to set the IP address for the UB-E03.

<Example>

Format: **ping [**IP address to be set for the UB-E03**]**

Input: **ping 192.168.192.168**

When the following messages are displayed (The value of Time is changed.), the IP address setting is completed.

Reply From 192.168.192.168: Bytes=32 Time<10ms TTL=255

Checking/Changing the Settings

The following 2 methods are available to check or change the settings of the UB-E03.

- Setting utility (EPSON TMNet WinConfig)
- Web browser (EPSON TMNet WebConfig)

Checking/Changing with EPSON TMNet WinConfig

EPSON TMNet WinConfig installed on a computer in the network enables you to configure detailed settings as well as to check/change the settings for the UB-E03.

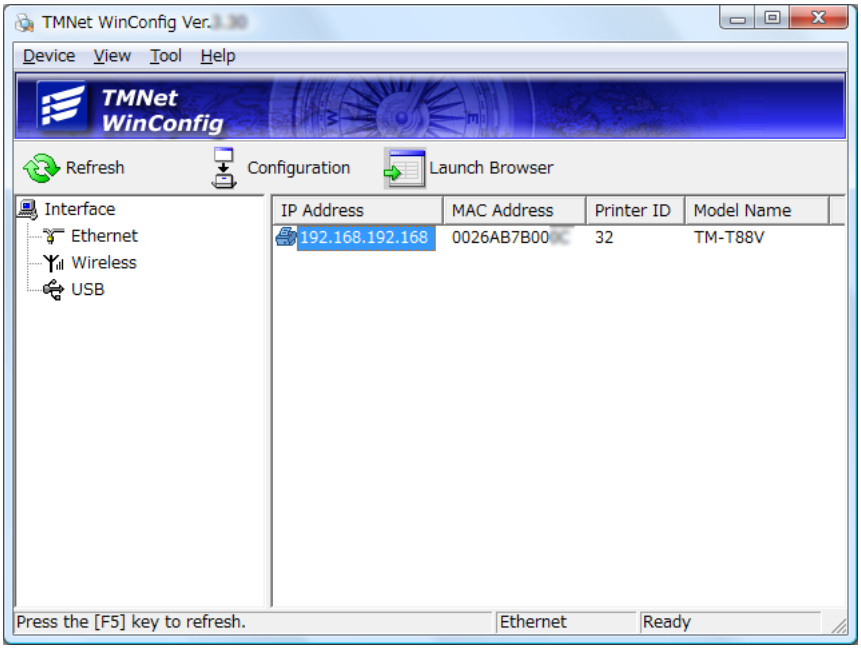
> **NOTE** See EPSON TMNet WinConfig User's Guide for detailed information on EPSON TMNet WinConfig.

1 Turn on the printer.

2 Start up the computer in the network.

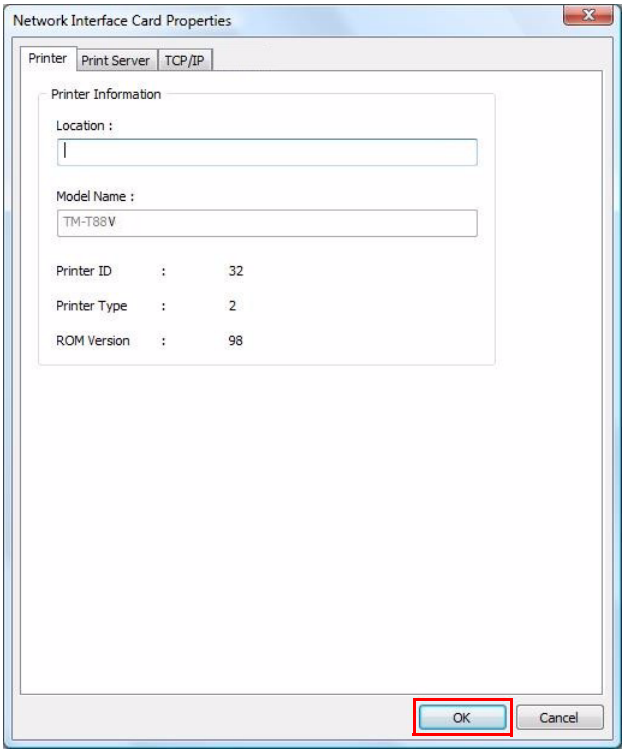
3 Start up EPSON TMNet WinConfig.
Select [Start]-[EpsonNet]-[TMNet WinConfig]-[TMNet WinConfigxx].

4 Click (Ethernet), and select the printer for which you want to check/change the setting.



5 Click the (Configuration) button.

6 Change the setting if necessary, and click the (OK) button.



Checking/Changing with EPSON TMNet WebConfig

A web browser (EPSON TMNet WebConfig) on a computer in the network enables you to check/change the settings for the UB-E03.

Resetting the printer is required after changing the setting.

> **NOTE** See "EPSON TMNet WebConfig" on page 34 for detailed information on EPSON TMNet WebConfig.

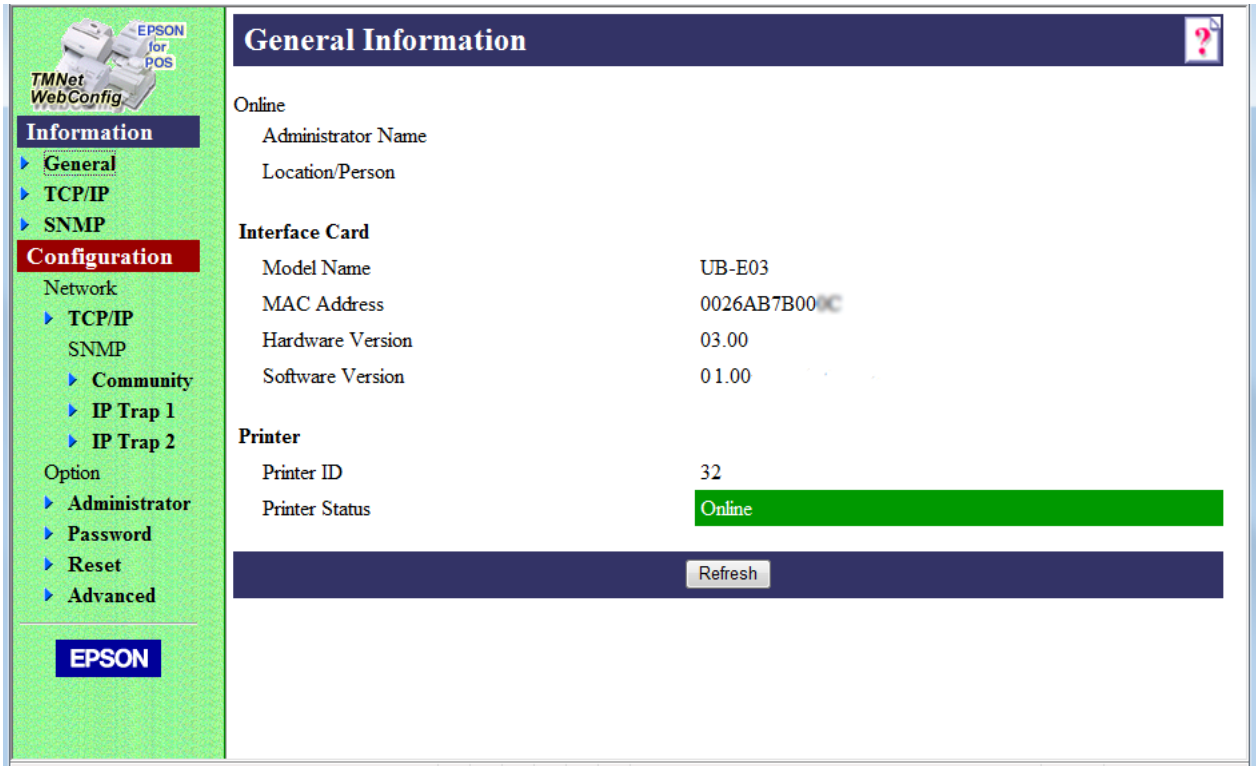
1. Turn on the printer.
2. Start up the computer in the network.
3. Start up the web browser and input the IP address set for the UB-E03 in the address bar.

   <Example>

   Format: **`http://[`**IP address set for the UB-E03**`]/`**

   Input: **`http://192.168.192.168`**

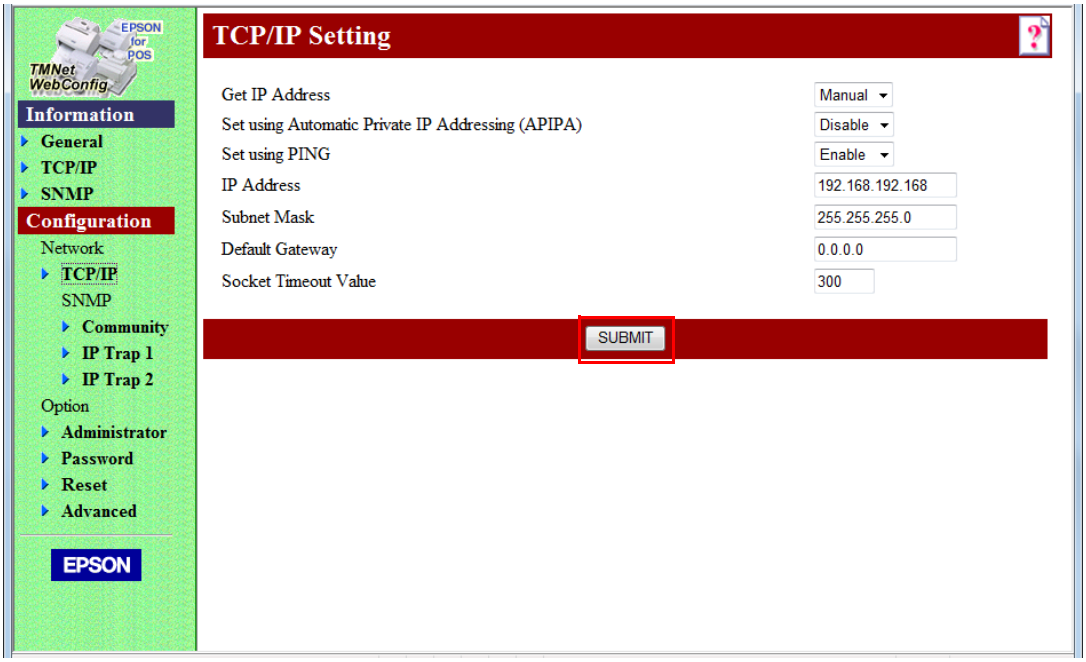
   The screen of EPSON TMNet WebConfig is displayed.



4 Select the item you want to check/change in (Configuration).

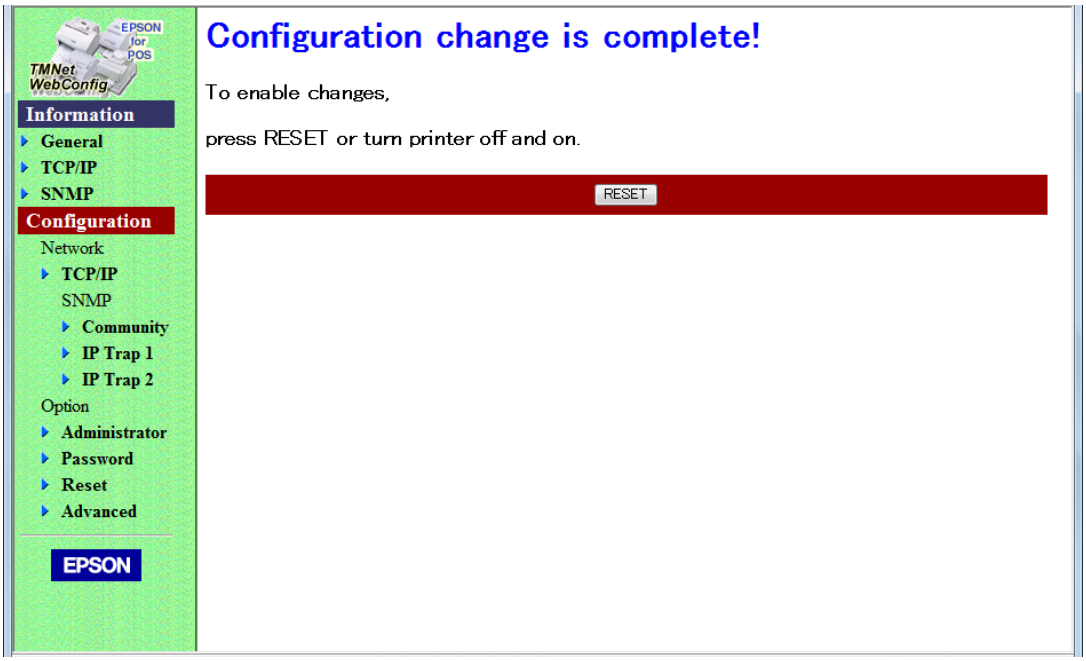
5 Change the setting if necessary, and click the (SUBMIT) button.

The set content should be reflected in the UB-E03 when you click the [SUBMIT] button of each screen. If the screen is switched without clicking the [SUBMIT] button, the input contents are cleared.



6 When the setting is completed, the message is displayed.

Click the [RESET] button, or turn off the printer and turn on it again.

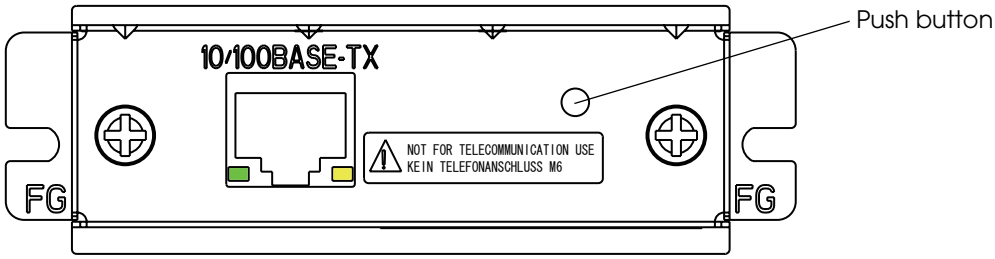


Initializing

The UB-E03 setting can be reset to the default, such as when communication with the UB-E03 is not possible.
Follow the steps below to initialize the UB-E03.

1 Turn off the printer.

2 While holding down the Push button, turn on the printer.
Use an extended paper clip or a pen point to push the push button.



3 Keep holding down the Push button until the following message is printed (about 10 seconds).

```
Resetting to Factory Default!
Please Wait...

WARNING: DO NOT
TURN OFF POWER
```

CAUTION Do not turn off the printer until the initialization is completed.

4 After about 20 seconds, a message notifying the completion of socialization is printed.

```
Reset to Factory Default Finished!
```

After the completion message, a status sheet is printed.

EPSON TMNet WebConfig

EPSON TMNet WebConfig is a utility that allows you to make settings for the UB-E03 using a Web browser.

This section is explained using screenshots of Internet Explorer.

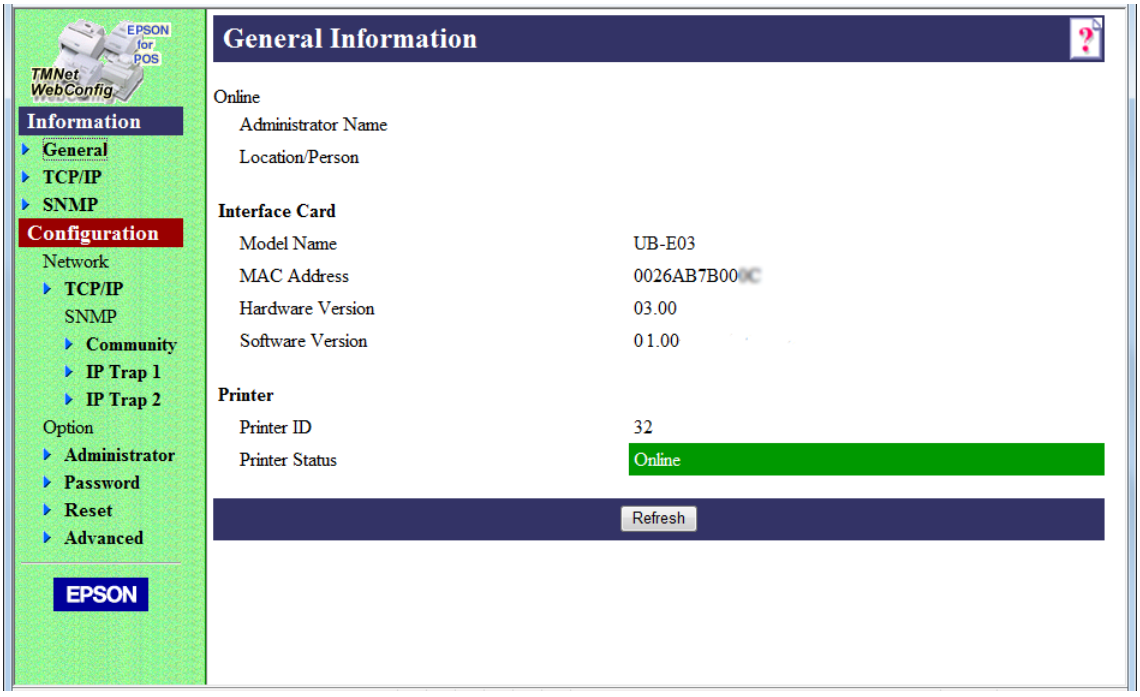
Starting EPSON TMNet WebConfig

1 Start up the computer connected to the network.

2 Start up the web browser, and enter the IP address of the UB-E03 in the address bar.

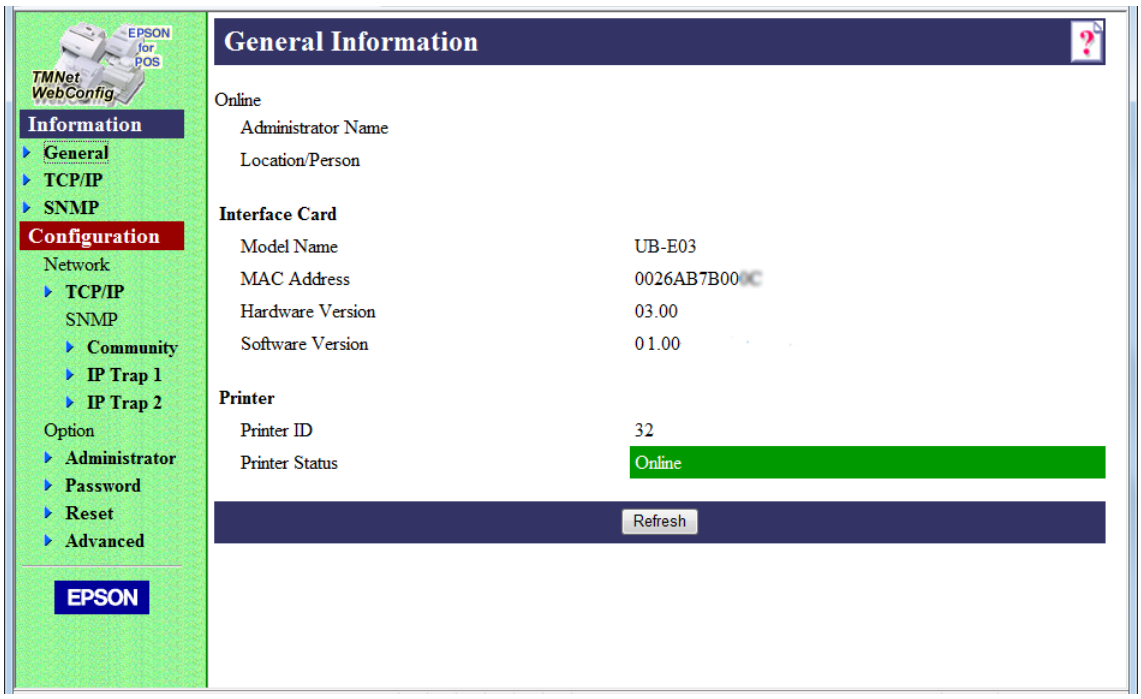
address: **http://[**IP address of the UB-E03**]/**

EPSON TMNet WebConfig starts.



General Information Screen

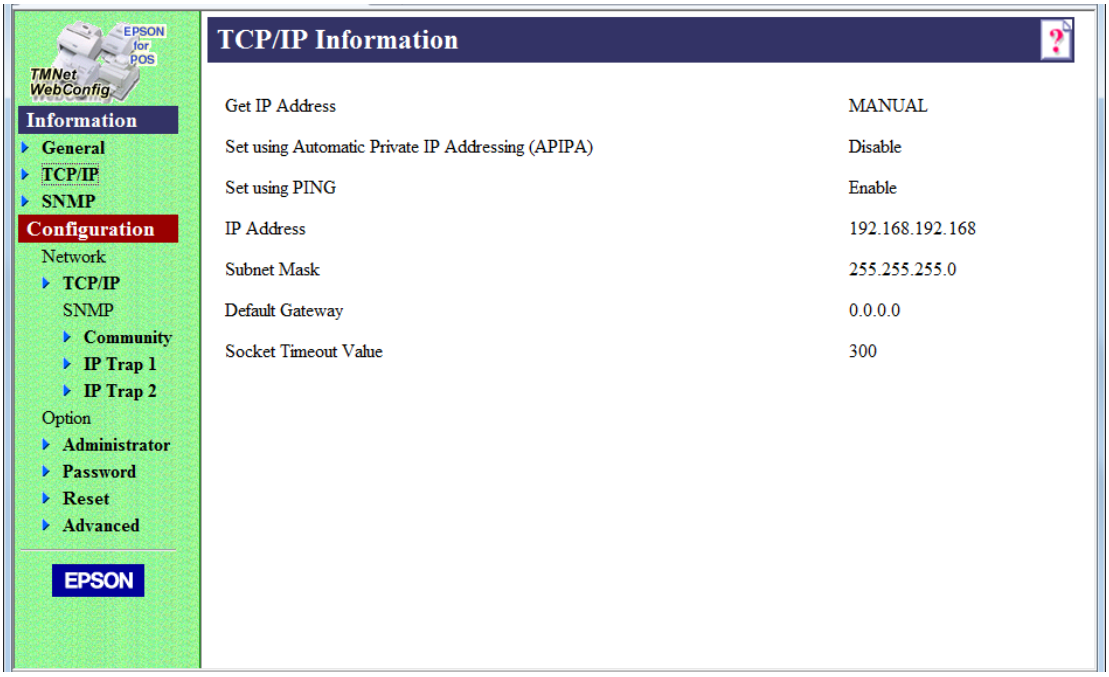
You can check the settings for the UB-E03.



Item		Description
Administrator name		Shows the administrator name.
Location/Person		Shows the user name.
Interface card	Model Name	Shows the model name.
	MAC Address	Shows the MAC address of the UB-E03.
	Hardware Version	Shows the hardware version of the UB-E03.
	Software Version	Shows the software version of the UB-E03.
Printer	Printer ID	Shows the printer ID.
	Printer Status	Shows the printer status.

TCP/IP Information Screen

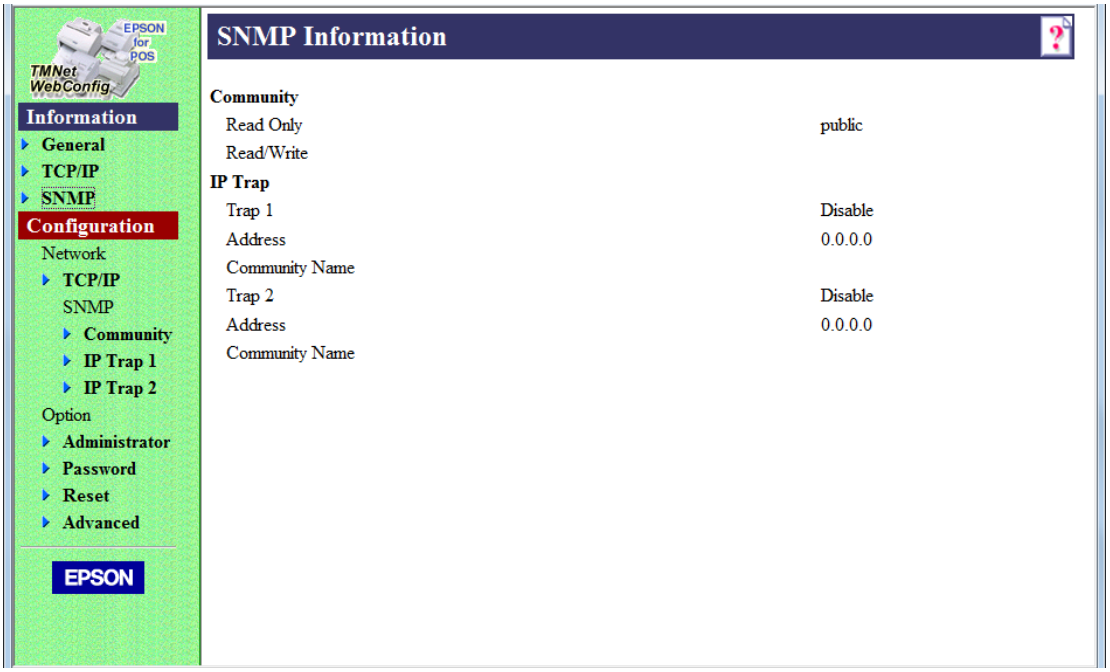
You can check the settings for the UB-E03, such as the IP address.



Item	Description
Get IP Address	Shows the method of setting the IP address.
Set using Automatic Private IP Addressing (APIPA)	Shows the APIPA setting.
Set using PING	Shows the IP Address using the PING command.
IP Address	Shows the IP address.
Subnet Mask	Shows the subnet mask.
Default Gateway	Shows the default gateway.
Socket Timeout Value	Shows the timeout time for printing.

SNMP Information Screen

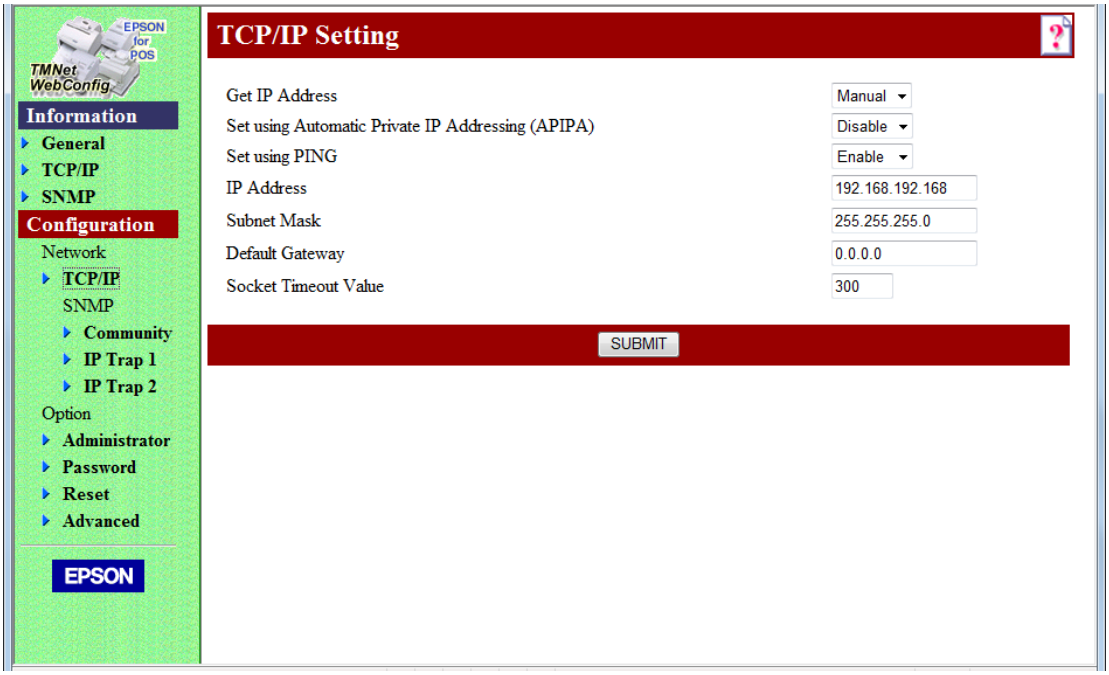
You can check the SNMP settings for the UB-E03.



Item		Description
Community	Read Only	Shows the Read Community information.
	Read/Write	Shows the Read/Write Community information.
IP Trap	Trap 1	Shows the Trap 1 information.
	Address	Shows the Trap 1 Address.
	Community Name	Shows the Trap 1 Community Name.
	Trap 2	Shows the Trap 2 information.
	Address	Shows the Trap 2 Address.
	Community Name	Shows the Trap 2 Community Name.

TCP/IP Setting Screen

You can change the settings for the UB-E03, such as the IP address.



Item	Description
Get IP Address	Select the method of acquiring the IP address.
Set using Automatic Private IP Addressing (APIPA)	Set APIPA enable/disable.
Set using PING	Set the IP Address using the PING command.
IP Address	Set the IP address.
Subnet Mask	Set the subnet mask of the IP address.
Default Gateway	Set the default gateway.
Socket Timeout Value	Set the timeout time for printing.

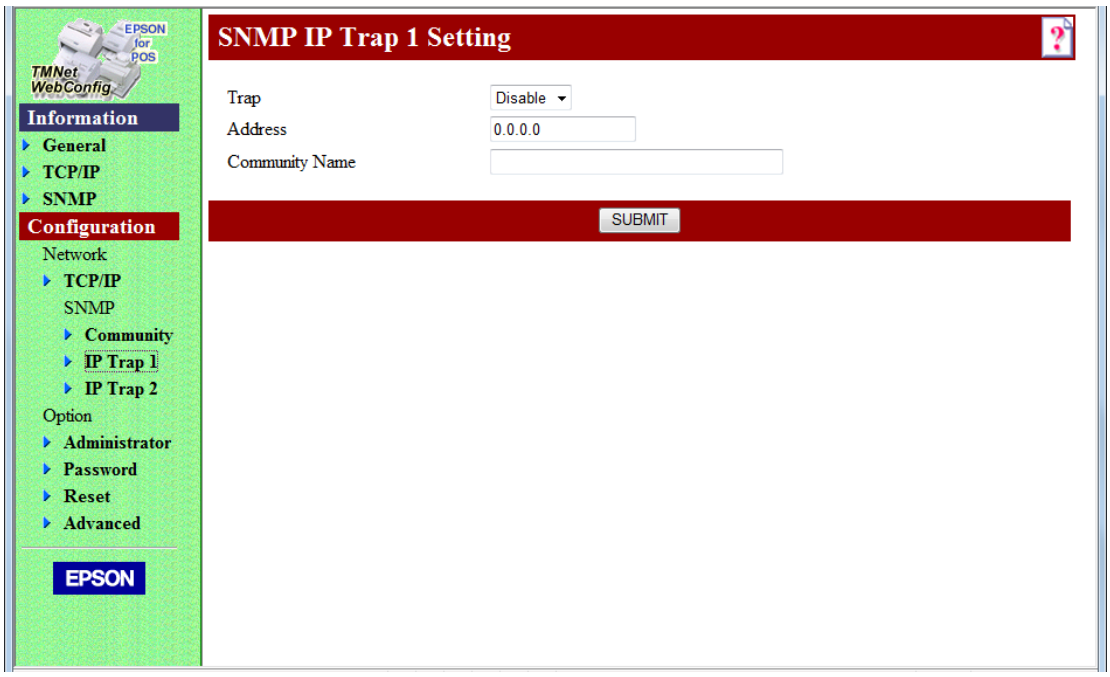
SNMP Communication Setting Screen

You can change the SNMP community name for the UB-E03.

Item		Description
Community	Read Only	The setting is fixed to "Public."
	Read/Write	Set the Read/Write Community Name (up to 16 characters).

SNMP IP Trap 1 Setting Screen

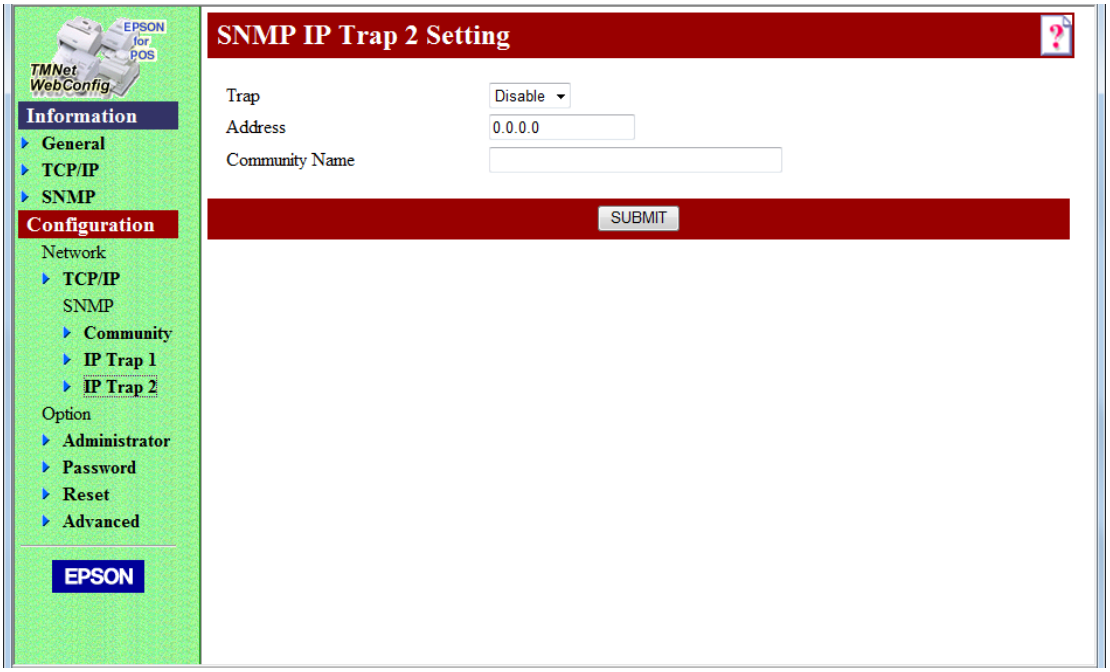
You can change the settings of SNMP IP Trap 1 for the UB-E03.



Item	Description
Trap 1	Set the Trap 1.
Address	Set the Trap 1 Address.
Community Name	Set the Trap 1 Community Name.

SNMP IP Trap 2 Setting Screen

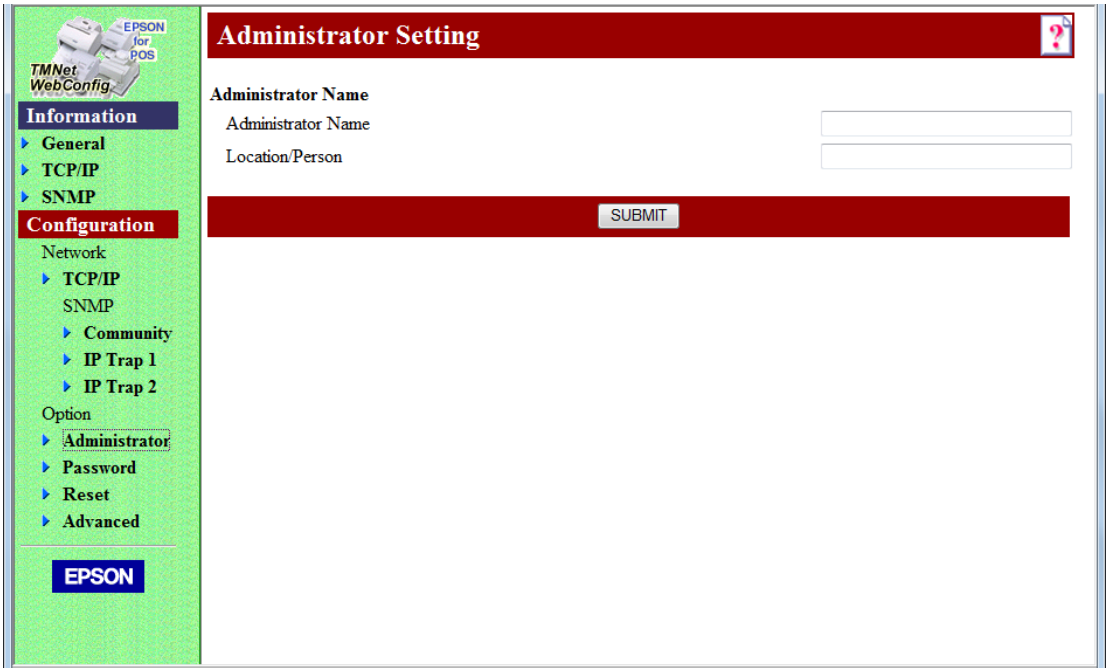
You can change the settings of SNMP IP Trap 2 for the UB-E03.



Item	Description
Trap 2	Set the Trap 2.
Address	Set the Trap 2 Address.
Community Name	Set the Trap 2 Community Name.

Administrator Setting Screen

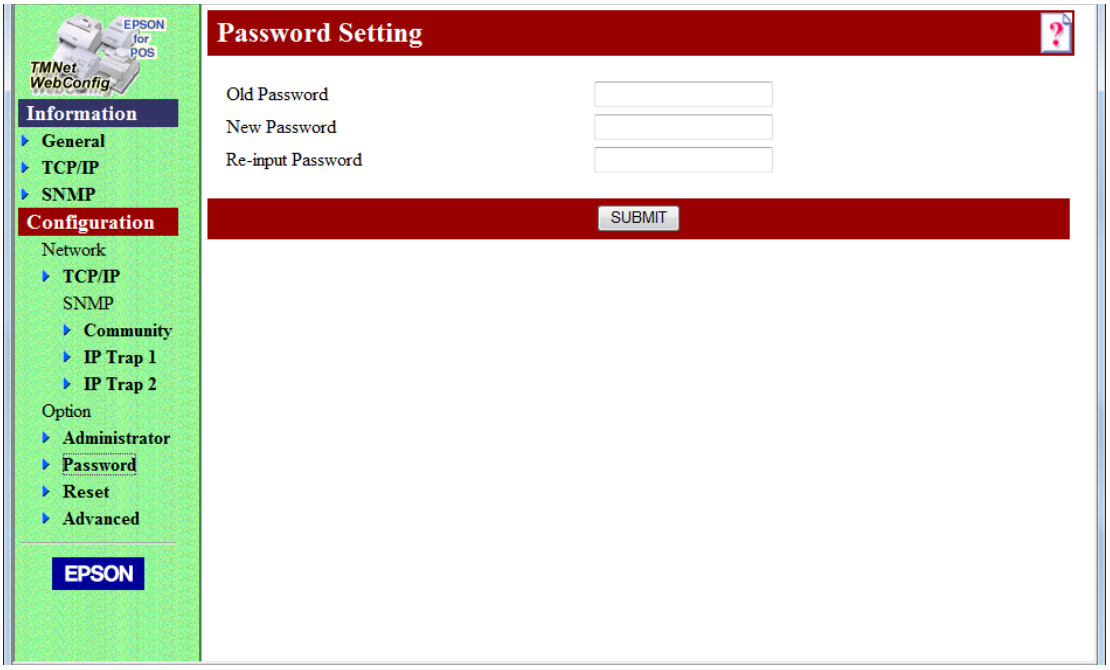
You can change the settings for the UB-E03, such as the administrator name.



Item	Description
Administrator name	Set the administrator name.
Location/Person	Set the location or user name.

Password Setting Screen

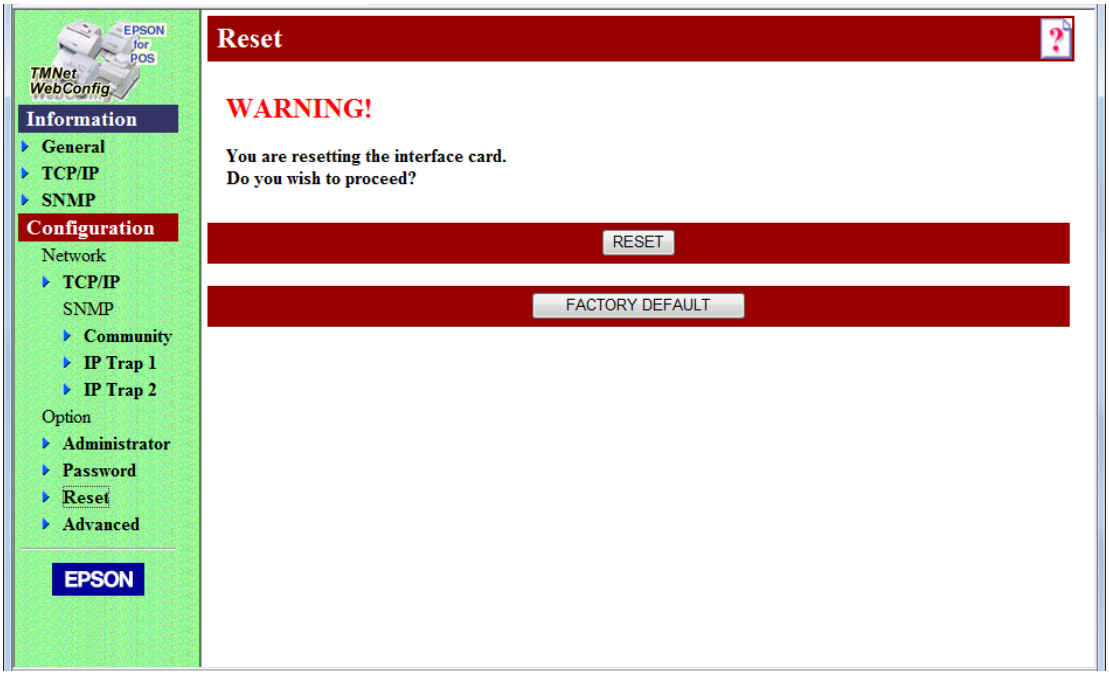
You can change the password for the UB-E03.



Item	Description
Old Password	Input the old password.
New Password	Input the new password.
Re-input Password	Re-input the new password.

Reset Screen

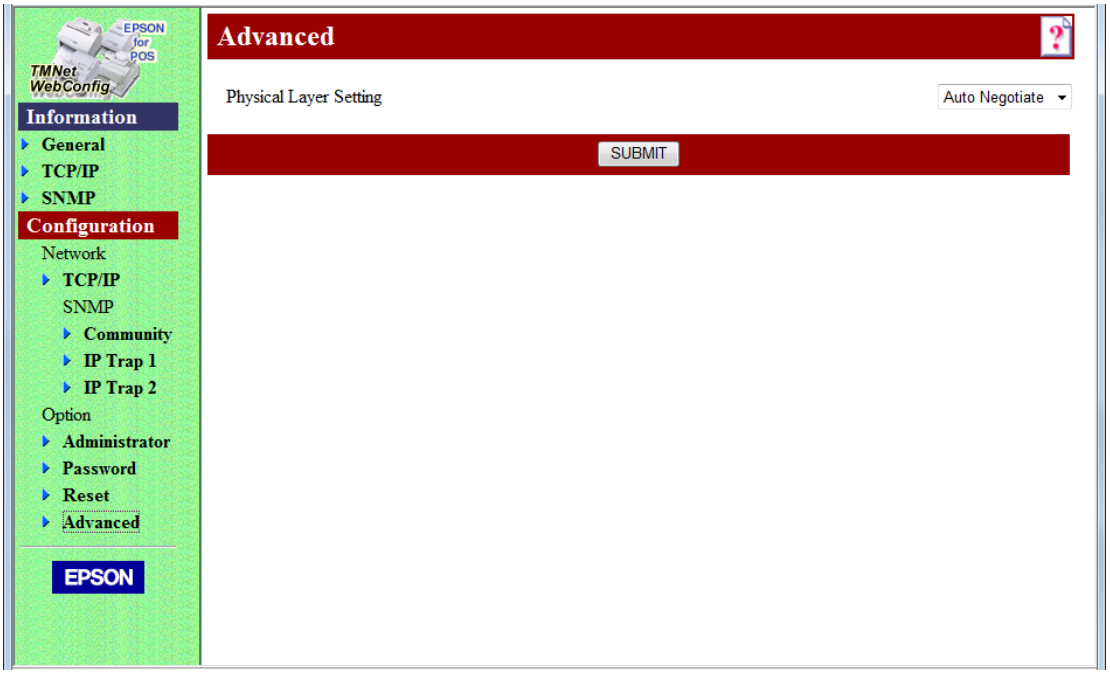
You can reset the UB-E03 to reflect the contents of the setting or reset it to the factory settings.



Item	Description
RESET	Reset the UB-E03.
FACTORY DEFAULT	The setting of the UB-E03 is changed to the factory default settings.

Advanced Screen

You can change the communication method for the UB-E03.



Item	Description
Physical Layer Setting	Set the communication method.

Programming Samples

This chapter describes the following information for the programming of a TM printer that is installed the UB-E03.

Method of printing to a TM printer (page 47)

Direct printing by PORT9100 (page 48)

Commands sent to a TM printer when the power is on (page 50)

Monitoring of the ASB status (page 50)

The rights of printing (page 50)

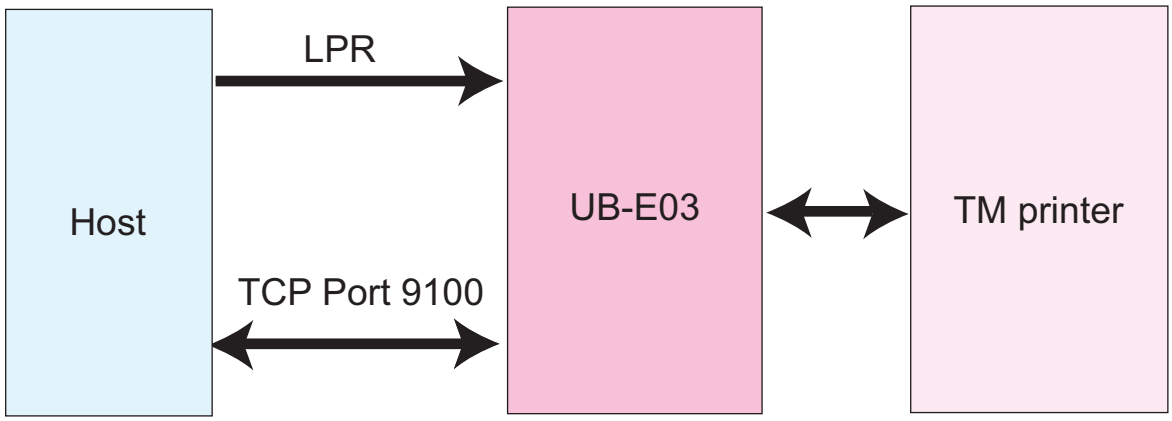
Time-out for connection (page 50)

Method of Printing to a TM Printer

The UB-E03 is equipped with lpr protocols as general print protocols. It is easy to print by using lpr because the printing is also supported by the operating system.

However, the command statuses sent by the printer are ignored because the printing by protocols applies only to output of the printer.

The UB-E03 supports direct printing by TCP PORT9100. It is possible to control the printer directly by an application with the ESC/POS commands through writing and reading to the TCP PORT9100.



Direct Printing by PORT9100

For Windows Console

The program is a sample of printing "EPSON UB-E03" to a TM printer with the UB-E03 from the Windows shell, through the Ethernet connection.

```
/* TCP9100 programming sample for win32
 * HOW TO BUILD
 *    cl wtcp.cpp wsock32.lib
 */
#include <stdio.h>
#include <winsock.h>

int main(int argc, char* argv[])
{
  WSADATA data;
  SOCKET sock;
  struct linger Linger;
  struct sockaddr_in addr;

  if (argc != 2) {
    printf("usage: wtcp <IP_ADDRESS>\n");
    exit(1);
  }

  /* Initialize windows socket */
  WSAStartup(0x0101, &data);

  /* Create socket */
  if ((sock = socket(AF_INET, SOCK_STREAM, 0)) == INVALID_SOCKET) {
    fprintf(stderr, "Error socket(): %d\n", WSAGetLastError());
    exit(1);
  }

  /* Set connection timeout */
  Linger.l_onoff = 1;
  Linger.l_linger = 60;
  setsockopt(sock, SOL_SOCKET, SO_LINGER,(char*)&Linger,sizeof(struct linger));

  /* initialize the parameter */
  memset(&addr, 0, sizeof(addr));
  addr.sin_family = AF_INET;
  addr.sin_port = htons(9100);
  addr.sin_addr.s_addr = inet_addr(argv[1]);

  /* connect */
  if (connect(sock, (struct sockaddr*)&addr, sizeof(addr)) < 0) {
    fprintf(stderr, "Error connect(): %d\n", WSAGetLastError());
    exit(1);
  }
  printf("connected\n");

  /* send data */
  send(sock, "EPSON|n", 6, 0);

  /* gracefully close */
  shutdown(sock, 1);/* SD_SEND*/
  while(1){
   char buf[64];
   int n = recv(sock, buf, 64, 0);
   if(n = SOCKET_ERROR||n==0)
     break;
}
shtdown(sock, 2);/*SD_BOTH*/

/* close socket */
closesocket(sock);
return 0;
}
```

For Linux

The program is a sample of printing "EPSON UB-E03" to a TM printer with the UB-E03 from the Linux shell, through the Ethernet connection.

```
/* TCP9100 programming sample for LINUX
 * HOW TO BUILD
 *    cc ltcp.c
 */
#include <stdio.h>
#include <netdb.h>

int main(int argc, char* argv[])
{
  int sock;
  struct sockaddr_in addr;

  if (argc != 2) {
    printf("usage: ltcp <ip address>\n");
    exit(1);
  }

  /* create socket */
  sock = socket(AF_INET, SOCK_STREAM, 0);
  if (sock < 0){
    perror("socket()");
    exit(1);
  }

  /* initialize the parameter */
  memset(&addr, 0, sizeof(addr));
  addr.sin_family = AF_INET;
  addr.sin_port = htons(9100);
  addr.sin_addr.s_addr = inet_addr(argv[1]);

  /* connect */
  if (connect(sock, (struct sockaddr*)&addr, sizeof(addr)) < 0){
    perror("connect()");
  }
  printf("connected\n");

  /* send data */
  send(sock, "EPSON\n", 6, 0);

  /* close socket */
  close(sock);

  return 0;
}
```

Commands Sent to a TM Printer When the Power is On

When the power is turned on, the UB-E03 transmits the following commands to the TM printer and maintains the statuses. The UB-E03 acquires printer information by GS I and monitors the printer status using the GS a 255 command through the TMNet WebConfig.

If the printer is off-line when the power is turned on, the commands below are not transmitted.

ESC/POS command	Description
GS I 1	Acquires printer ID
GS I 2	Acquires printer type ID
GS I 3	Acquires printer ROM version ID
GS a FFh	Enables ASB status

Monitoring of the ASB Status

The ASB status function of the printer is used for the UB-E03 to check the state of the printer. Therefore, when the transmission data from the application includes the command to nullify the ASB status function, the UB-E03 cannot control the state of the printer.

Take care not to transmit the command to nullify the ASB status function to check the state of the printer correctly by the UB-E03. Or retransmit the command that makes the ASB status function effective again.

The Rights of Printing

The UB-E03 permits up to 3 requests of connecting regardless of the lpr/port9100 protocol. The TM printer can print only the first accepted connection. Data transmission is blocked for other requests until the first connection is closed (explicit close or close by time-out).

Time-out for Connection

If there is no data transmitted from the host for 5 minutes, regardless of the protocol, lpr/port9100, the UB-E03 closes the connection.

> **NOTE** The time-out of connection can be set with EPSON TMNet WebConfig. The default value is 5 minutes (300 seconds).

UB-E03 Specifications

This chapter describes the specifications of the UB-E03.

Software Specifications

Supported Protocols

The UB-E03 supports the following protocols.

Protocol	Application
IP, ARP, ICMP, UDP, TCP	Basic communications protocols for various functions.
LP, LPR, TCP Socket Port	Protocol for printing.
DHCP, APIPA	Protocol for automatic settings of IP address, etc.
ENPC, SNMP	Protocol for setting and monitoring.
HTTP	Protocol using for EPSON TMNet WebConfig.
TFTP	Protocol to update the firmware of the interface.

Printing Protocols

The UB-E03 uses the following protocol for printing.

- LP, LPR: Transfers printing data.

Remote printer name	aux
Port number	515
Maximum Simultaneous Connections	6
Number of connections that can print	1 (Other users must wait until the printing has completed.)
Timeout	Default: 300 seconds Can be set with EPSON TMNet WebConfig. (0 ~ 300 seconds) Set to 0: No timeout
Job cancellation	Not supported
Banner printing	Not supported

- TCP Socket Port: Transfers printing data and printer status by direct socket communications (bi-directional).

Port type	TCP communication port for direct printing
Port number	9100
Port communication direction	Bi-directional
Maximum Simultaneous Connections	6
Number of connections that can print	1 (Other users must wait until the printing has completed.)
Timeout	Default: 300 seconds Can be set with EPSON TMNet WebConfig. (0 ~ 300 seconds) Set to 0: No timeout
Job cancellation	Not supported

Automatic IP Address Assignment Protocols

The UB-E03 supports DHCP and APIPA, the protocols that assign an IP Address automatically.

Automatic IP address assignment is performed with the protocols in the order of descending priorities shown in the table below. If automatic assignment with one protocol results in "disabled" or "failure," the subsequent protocol is used.

Protocol	Priority	Explanation
DHCP	1	Demands the assignments of the IP address, the subnet mask and the getaway address to the DHCP server and sets them.
APIPA	2	Assign only IP address from following IP addresses. 169.254.1.0 to 169.254.254.255 In this case, it is not possible to communicate on the network outside the router.
Manual assignment	3	When the automatic IP address assignment protocol is set to unused, the manually controlled address is set.

Protocol for acquiring status and setting

The following protocols are used to acquire the status and set for the UB-E03.

- HTTP: HTTP is used to display module status and make settings by a web browser.

Port number	80
User name	Epson (Default)
Password	Undefined (Default)
Maximum simultaneous connections	1
HTTP version	HTTP/1.1

- SNMP: SNMP is used to acquire the status and make settings for the module or printer by custom or general purpose MIB tool.

SNMP Version	SNMP v1 (RFC1157) compliant (SNMP v2 not supported)
Transport Protocol	UDP/IP
Server Port Number	161
Trap Sending Port Number	162
Trap Destination	Up to two settable IP addresses
Supported MIB type	Part of MIB-II (RFC1213), Part of Host Resource MIB, Part of Print Server MIB, Part of Printer MIB
Supported PDU type	Get Request, Get Next Request, Set Request, Get Response, Trap
Community	Each community name can be set with 16 ASCII characters or less.

- ENPC: ENPC is used to acquire the status and make settings for the module or printer.

Protocol	UDP/IP
UDP port number	3289
Compatible packet types	Probe, Initialize, Query, Setup, Notify

- TFTP: TFTP is used to update the firmware of the UB-E03. The following methods are available for the update.
  - ∗ Using the dedicated update utility
  - ∗ Using the TFTP command

Protection with a password

You can set a password for protecting the set content.

User Name	"epson" (User name cannot be changed.)	
Password	Default	:Undefined
	Type of characters settable	:ASCII characters
	Number of characters settable	:Maximum 20

NOTE

The password set by the EPSON TMNet WebConfig function is used as a password when setting by using the EPSON TMNet WebConfig.

Network Parameter of the UB-E03

The following table shows whether Initial value and Refer/Setting are printed by printing of the Status Sheet.

Articles	Parameters	Initial Value	TMNet WinConfig		TMNet WebConfig		Status Sheet
			Refer	Setting	Refer	Setting	
IP address	-	192.168.192.168	Yes	Yes	Yes	Yes	Yes
Subnet mask	-	255.255.255.0	Yes	Yes	Yes	Yes	Yes
Gateway address	-	0.0.0.0	Yes	Yes	Yes	Yes	Yes
DHCP	Enable/Disable	Disable	Yes	Yes	Yes	Yes	Yes
APIPA	Enable/Disable	Disable	Yes	Yes	Yes	Yes	Yes
arp+ping IP setting	Enable/Disable	Enable	Yes	Yes	Yes	Yes	No
Community name 1 (read-only)	0-16 characters	"public"	Yes	No	Yes	No	Yes
Community name 2 (read-wirte)	0-16 characters	None	Yes	Yes	Yes	Yes	Yes
IP Trap 1	Enable/Disable	Disable	Yes	Yes	Yes	Yes	No
IP Trap 2	Enable/Disable	Disable	Yes	Yes	Yes	Yes	No
Community name (IP Trap #1)	0-16 characters	None	Yes	Yes	Yes	Yes	No
Community name (IP Trap #2)	0-16 characters	None	Yes	Yes	Yes	Yes	No
IP trap #1 address	-	0.0.0.0	Yes	Yes	Yes	Yes	No
IP trap #2 address	-	0.0.0.0	Yes	Yes	Yes	Yes	No
Socket Timeout	0: No timeout 1-300: Timeout value (sec)	300	No	No	Yes	Yes	Yes
Password	-	None	No	Yes	No	Yes	No
Communication mode setting	Auto Negotiation 10Base-T Half 10Base-T Full 100Base-TX Half 100Base-TX Full	Auto Negotiation	Yes	Yes	Yes	Yes	Yes
Hardware version	-	03.xx	Yes	No	Yes	No	Yes
Firmware version	-	01.xx	Yes	No	Yes	No	Yes
MAC address	-	00-26-AB-xx-xx-xx	Yes	No	Yes	No	Yes

Setting of the network parameter of the UB-E03

The network parameter of the UB-E03 can be set by the following methods:

- EPSON TMNet WinConfig
- Setting using a Web browser (EPSON TMNet WebConfig function)
- Using the ARP command (Only the IP Address)

How to check the Mac Address

The Mac address of the UB-E03 can be checked with the following method:

- Printing the status sheet
- Label attached on the product
- A printer self-test (May not be supported by some TM printers.)
- EPSON TMNet WinConfig
- Web browser (EPSON TMNet WebConfig function)

System Bootup Time

The UB-E03 requires some bootup time for initializing the system after power-on or system reset. The required bootup time is as follows. The network communication functions are unavailable during system bootup.

When setting the IP address in the Manual mode	: Approximately 15 seconds
When setting the IP address automatically	: Approximately 20 seconds (The value may vary, depending on the response time of the DHCP server.)

UB-E02 and UB-E03

The comparison table between the UB-E02 and the UB-E03 is shown below.

		UB-E02	UB-E03
Basic specification	Communication function	10Base-T, 100Base-TX Full duplex, Half duplex, Auto duplex	
	Communication protocols	IP, ARP, ICMP, UDP, TCP, LPR, Port9100	
	Automatic IP address setting protocols	DHCP, APIPA	
	Status inquiry and setting protocols	HTTP, SNMP, ENPC, TFTP	
	Network setting utility	EPSON TMNet WinConfig, EPSON TMNet WebConfig	
	Auto-MDIX	Not available	Available
External/ environment	Size	70 mm × 58 mm	
	Operating conditions	0°C to 50°C/10% to 90%	
Added functions	Maximum printing speed*1	190 mm/s	300 mm/s*2
	Low-power consumption mode	Not available	Available
	Buzzer function	Not available	Not available
Details	Socket Time Out	Fixed (300 sec.)	Changeable (0 to 300 sec.)
	OID for SNMP Trap	1.3.6.1.2.1.43.18.2	1.3.6.1.4.1.43.18.2

*1: Full graphics/180 dpi

*2: 300 mm/s speed supported printers only