CITIZEN

IF1-WFx4 / IF1-WFx6
IF2-WFx5 / IF2-WFx6
“Wireless LAN” (WLAN) Interface Board
User’s Manual

Rev2.00

Target firmware version 2.30 or later

CITIZEN SYSTEMS JAPAN CO., LTD.

Contents

Contents 2
Read before using 4
Related SDKs and Documentation 5
1. Introduction 7
1-1. Features 7
1-2. Model Classification 7
1-3. Specifications 8
1-4. Part Names and Functions 10
2. Preparation 12
2-1. Installing the printer and connecting LAN cable 12
2-2. Connecting the USB Wi-Fi Adapter 12
2-3. Connecting a Peripheral Device 12
2-4. Connecting the Interface Board Unit 14
3. Network Settings and Operation 16
3-1. Overview 16
3-2. Panel Button 18
3-3. Printing the Interface Board Configuration 19
3-4. Returning the Interface Board Configuration to Factory Default Settings 20
3-5. Display status by LED 21
3-6. Simple Setting Procedure Example for Wireless LAN 23
4. Web Manager 24
4-1. Starting the Web Manager 24
4-2. HOME Window 26
4-3. STATUS Window 27
4-3-1. STATUS>>System Status Tab 28
4-3-2. STATUS>>Network Status Tab 29
4-3-3. STATUS>>Wireless LAN Tab 30
4-3-4. STATUS>>Printer Status Tab 31
4-4. CONFIG Window 32
4-4-1. CONFIG>>General Tab 33
4-4-2. CONFIG>>Wireless LAN Tab 35
4-4-3. CONFIG>>User Account Tab 37
4-4-4. CONFIG>>Maintenance Tab 38
5. NetToolK 39
5-1. Installing the NetToolK 39
5-2. Information List Window 42
5-3. Setup Window 44
5-3-1. “General” Tab 44
5-3-2. “Wireless LAN” Tab 44

5-3-3. "Supported Protocols" Tab 45
5-3-4. "User Account" Tab 45
5-3-5. "Maintenance" Tab 45
6. XML Function and Peripheral Device Control Function 47
6-1. Overview 47
6-2. CONFIG>>Service Tab 48
6-2-1. Media Converter 49
6-2-2. XML Print 49
6-2-3. XML Device Control 49
6-2-4. XML Device Control / Line Display 50
6-2-5. XML Device Control / Scanner 50
6-2-6. XML Device Control / Speaker 50
6-2-7. Submit / Reset Button 50
6-3. STATUS>>Service Status Tab 51
7. SSL/TLS function 52
7-1. Overview 52
7-2. CONFIG>>SSL/TLS tab 54
7-2-1. SSL/TLS tab 54
7-2-2. Create Self-Signed Certificate 55
7-2-3. Update Self-Signed Certificate 56
7-3. To enable SSL/TLS communication using a self-signed certificate 57
7-3-1. Generating and exporting self-signed certificates 57
7-3-2. Example of importing a self-signed certificate in a browser (Chrome) 62
7-4. SSL/TLS and certificate related specifications 66
7-4-1. SSL/TLS communication specifications 66
7-4-2. Self-signed certificate related specifications 67
7-4-3. CA signed certificate related specifications 68
7-4-4. Handling of saved certificates when restoring factory settings/updating firmware 68
8. Request Print function 69
8-1. Overview 69
8-2. CONFIG>>Request Print tab 70
8-3. STATUS>>Request Print tab 71
8-4. Printing system log 71

Read before using

Be sure to read this manual carefully before using the product. After you read it, store it in a safe place so that you can reread it when necessary.

- Contents of this manual may be changed without notice.
- Reproducing and/or copying the contents of this manual by any means without permission are prohibited.
- We will not be responsible for any adverse occurrence that results from the use of this manual, regardless if it contains omissions, errors/misprints, etc.
- Note that we will not be responsible for (a) loss caused by improper operation or mishandling of the device by the user, or (b) loss due to operational environment.
- Data etc., are basically impermanent; long time or permanent storing/saving of data by the device is not possible.
- Note that we will not be responsible for any loss or loss of profits owing to loss of data due to breakdown, repairs, inspections, etc.
- Please contact us if there are omissions, errors, ambiguities, etc. in this manual.
- Refer to this document along with the user manual of the printer.
- This interface board uses a wireless connection for data communication with other wireless LAN equipment. Therefore, a wireless LAN facility other than this interface board is required. The operation of this interface board has been verified using specific wireless LAN equipment, and operation with all wireless LAN equipment is not guaranteed. Before using this interface board, please evaluate it thoroughly.

Trademarks

- Microsoft, Windows 7, Windows 8 and Windows 10 are registered trademarks of Microsoft Corporation U.S.A.
- Other company names and product names mentioned here are trademarks or registered trademarks of those companies.

Related SDKs and Documentation

Printing with XML data

* XML Print (For POS printers)
  - POS Print SDK(JavaScript)
  - CITIZEN XML Print Service JavaScript POS Print SDK Programming Manual
* XML Print (For Label printers)
  - Label Print SDK(JavaScript)
  - CITIZEN XML Print Service JavaScript Label Print SDK Programming Manual

Network board configuration with XML data

* XML Config (JavaScript)
  - Config SDK(JavaScript)
  - CITIZEN XML Device Control Service JavaScript Device Control SDK Programming Manual

Peripheral device control using XML data

* XML Device【JavaScript】
  - Device Control SDK (JavaScript)
  - CITIZEN XML Config Service JavaScript Config SDK Programming Manual

Peripheral device control using dedicated control port

* Peripheral device control (For POS printer / Windows)
  - POS Print SDK (Windows)
  - Windows POS Print SDK Programming Manual
* Peripheral device control (For POS printer / Android)
  - POS Print SDK (Android)
  - Android POS Print SDK Programming Manual
* Peripheral device control (For POS printer /iOS-Swift)
  - POS Print SDK (iOS-Swift)
  - iOS POS Print SDK (Swift) Programing Manual
* Peripheral device control (For POS printer / iOS Objective C)
  - POS Print SDK (iOS-Objective C)
  - iOS POS Print SDK (Objective-C) Programing Manual

(Peripheral device control from the label printer can also be performed using the SDK for POS printers.)

Request printing

  - Programmer's Manual for "Request Print" on XML Print Service (Sample program)

Term Description

Since different documents are intended for different audiences and assume different levels of expertise, different terms may be applied for clarity even when the content being explained is the same. In addition, some terms are easily confused because they are sometimes referred to from the opposite standpoint depending on their function. The following is a glossary and explanation of terms that you should pay attention to when reading this document in conjunction with other related documents.

Printer / Interface board (Wired or Wireless LAN) / Service

Printers that use network and XML related functions have an interface board (wired/wireless LAN) that is a single board computer. On the memory on that interface board, there are several resident programs that perform specific functions, which are called services.

For example, the XML Print service receives XML data for printing, converts it into commands and data for the printer, passes it to the printer, and sends a reply when it is confirmed that the printing is completed. From the point of view of the terminal sending the data, it is easier to recognize network and XML-related services as interface boards or printers, so we may use the terms "board," "interface board," or "printer" instead of "service" in the explanation.

Web server / Web app server

The Web server is the terminal that sends data to the browser for screen display. The Web server receives the information of the operations performed on the browser. When a Web server uses a programming language to process data to be sent and received, the group of programs that process the data is called a Web application (hereinafter referred to as a Web app), and the terminal in charge of the function is called a Web app server.

Since there are many cases where a Web server and a Web app server are both used on the same terminal, the two are not strictly separated and may be referred to as a Web server in the sense of a Web app server.

Server / Client

In addition to Web server and Web app sever, there are various other types of servers depending on their functions, which are sometimes referred to simply as servers in the explanation.

The terminal that sends data to the server is called the client. Server and client are sometimes referred to interchangeably, depending on their function and position.

For example, in the main function of the printer, which is to print the received data, the printer is a print server from the terminal that sends the print data to the printer. The printer also has the function of a Web server, which we call a Web manager, for network settings, etc.

On the other hand, when sending a print data request to the Web app server, the printer is in the position of a client.

1. Introduction

Thank you for purchasing the Citizen IFx-WFxX “Wireless LAN” (WLAN) interface board.

By using the WLAN interface board (hereinafter referred to as the interface board) with our POS printers and barcode printers, you can directly connect to various printers via a network and use computers on the network to print from the printers. In addition, the operational status, print settings, and other information about the printer can be checked from computers on the network.

1-1. Features

- Support for WLAN and Ethernet for configuration
- Support for 802.11b/g/n WLAN and capable to support 802.11a
- Support for WPA/WPA2 WLAN encryption
- Support for DHCP, static IP, and ZeroConf methods of IP address acquisition
- Configuration through a browser or utility software
- Support for Raw 9100 port and LPR printing methods
- Panel button to print configuration information and change the configuration mode
- LED indicators for connection, operation, and error statuses
- Support for printing and peripheral device control by XML data depending on the printer
- Secure communication with SSL/TLS function.
- "Request Print" allows printing with XML data from a Web server on the Internet
- XML Config function is available for configuration of the board.

1-2. Model Classification

IF1 type: Applicable to CT-S801(II) / 851(II) / 601(II) / 851(II) / CL-S400DT / 6621 / CL-E7xx

IF2 type: Applicable to CT-D151 / CT-E651 / CT-S251 / 751 / 4500

	IF1 type		IF2 type (with USB host)	
	Normal model	Model with USB host		
Name	IF1-WF04 IF1-WF44 IF1-WFN4	IF1-WF06 IF1-WFN6	IF2-WF05 IF2-WFN5	IF2-WFx6
Peripheral device control	Not possible	Possible	Possible	Possible
Number of USB ports	1	2	1	2

IF1-WF04, IF1-WF44, IF1-WF06, IF2-WF05 come with 2.4GHz USB Wi-Fi dongle.

IF1-WFN4, IF1-WFN6, IF2-WFN5 comes without USB Wi-Fi dongle.

Note: Considering number of USB ports, model name IF1-WFx5 is changed to IF1-WFx6 at the timing of firmware update to v2.30. IF2-WFx6 does not exist as a single item.

1-3. Specifications

USB Wi-Fi adaptor

Model number		WU606n *1
Radio	Supported standards	IEEE802.11n, IEEE802.11g, IEEE802.11b
	Number of channels	1 to 13
	Frequency band	2.4GHz band (2,412 to 2,472 MHz)
	Transmission speed	IEEE802.11n: maximum 150 Mbps IEEE802.11g: maximum 54 Mbps IEEE802.11b: 11 Mbps

Main board (Network)

WLAN	Access mode	Infrastructure, Ad-Hoc *2
	Security	WPA2-PSK (encryption: AES, TKIP)
		WPA2-PSK (encryption: AES, TKIP)
		WEP (Key size: 64 bit/128 bit)
Ethernet	Standards	100BASE-TX/10BASE-T, Full Duplex/Half Duplex auto negotiation
	Port	RJ-45
Network	IP Version	IPv4
	Protocols	TCP, UDP, HTTP, ICMP, DHCP, SNMP
	Port number for printing	RAW (port 9100 (Changeable)), LPR
	IP address setting	Manual, DHCP

Hardware

		IF1-WFx4 / IF1-WFx6	IF2-WFx5
Hardware	Compatible printers	CT-S801 / 851 / 601 / 651(II) CL-S400DT / 6621 / E7xx	CT-D151 / E651 / S251 / 751 CT-S4500
	Operation panel	LED: 4 (2 on panel, 2 on RJ45 connector), Button: 1	
	USB	USB-A connector 1 or 2 USB Specs: USB2.0 High Speed	

Software

Software	Setting methods	Browser, PC setting tool
	Firmware upgrade	Browser, PC setting tool
	Supported Platforms	Windows 7, Windows8, Windows10, HTML5 browser

*1 Wi-Fi adapters using the following chips may work.

When using Wi-Fi adapters with these chips, please note that we are not responsible for the radio laws of each country or any problems with the wireless communication part.

Supported chips (Model name of a typical Wi-Fi adapter)

(1) RTL8188CUS WU606n

(2) MT7610U WN-AC433UK (from I･O DATA)

(3) RTL8821AU Archer T2U Nano (from TP-LINK)

*2 The communication by “Ad-Hoc” does not work correctly in various cases due to various restrictions. If "Ad-Hoc" does not work correctly, we recommend “Infrastructure”.

*Only 2.412GHz~2.462GHz can be used in USA. Available 2.4GHZ channels to choose for US users are only 1 - 11.

*Rules on the use of 5GHz band channels may vary according to different national laws.

Choose the 5GHz channel according to the law of the country to use this device.

1-4. Part Names and Functions

Interface Board Unit

IF1-WFx4 (USB 1 port)

IF1-WFx6 (USB 2 ports)

IF2-WFx5 (USB 1 port)

IF2-WFx6 (USB 2 ports)

① RJ45 connector (compatible with 10Base-T/100Base-TX)
Connection for LAN cable

② Ethernet transmission speed LED indicator (green)*1
Shows Ethernet transmission speed with steady/blinking light.

③ Ethernet status indicator LED (yellow)*1
Shows Ethernet connection status (disconnected, receiving data, etc.).

④ Ethernet/WLAN status LED indicator (green)*1

⑤ Ethernet/WLAN status LED indicator (red)*1
Shows transmission, connection and error statuses with steady/blinking lights combinations.

⑥ Panel button*2
Used to operate the Interface board.

⑦ USB Wi-Fi adaptor / USB connector （First）
Connection for the Wi-Fi adapter.

⑧ USB connector（Second）
This exists only on IF1-WFX6/IF2-WFx6.

*1 See 3-5, Display status by LED (page 21) for indicator details.

*2 See, 3-2, Panel Button (page 18) for panel button operations.

USB Wi-Fi Adapter (WU606n)

① Wireless adapter status indicator LED*

Shows connection status (connecting, communicating, etc.).

Other Wi-Fi adapters using the following chips may work.

When using Wi-Fi adapters with these chips, please note that we are not responsible for the radio laws of each country or any problems with the wireless communication part.

Supported chips (Model name of a typical Wi-Fi adapter)

(1) RTL8188CUS WU606n

(2) MT7610U WN-AC433UK (from I･O DATA)

(3) RTL8821AU Archer T2U Nano (from TP-LINK)

2. Preparation

2-1. Installing the printer and connecting LAN cable

■ Installing Printer

With an unobstructed view, the guideline transmission distance is approximately 30 m. The transmission distance depends on the setup environment. This includes electrical interference from the periphery, obstacles such as the printer, and the antenna location. Carefully consider these points before the installation.

■ Connecting LAN cable*

Connect a LAN cable to the RJ45 connector of this interface board. (Diagram on right shows a typical example)

* When configuring the wireless LAN settings on this interface board, connect via Ethernet to configure them.

Warning

- If the Ethernet and Wi-Fi USB adapter are connected at the same time, Ethernet will be enabled.
- For use with a wireless LAN, disconnect the LAN cable after the settings are finished.

2-2. Connecting the USB Wi-Fi Adapter

To perform wireless LAN communication, connect the USB Wi-Fi adapter to a USB port of the board. In the case of the IF1-WFX6 which has two USB ports, connecting USB Wi-Fi adapters to both the left and right ports is possible, but even if two USB Wi-Fi adapters are connected to both the left and right, operation will not be possible.

Connect the USB Wi-Fi adapter while the power of the printer is off.

2-3. Connecting a Peripheral Device

There are the following restrictions regarding peripheral devices. Correctly observe them when using a peripheral device.

• Connecting a device other than a supported model to a USB port is prohibited (please inquire about which devices are supported).

• Connecting a tablet or other device to a USB port for the purpose of supplying power is also prohibited.

• Connecting and disconnecting a peripheral device to/from a USB port while the power of the printer is on is prohibited.

• Connecting via a USB hub is prohibited.

• In the case of the IF1-WFX6 which has two USB ports, connecting to both the left and right ports is possible, but connecting two of the same type of device (two displays, two scanners, etc.) is prohibited.

2-4. Connecting the Interface Board Unit

1) The interface board can be used by connecting it to the main board of a printer.

The printer interface connector is connected to the connector of the main board of the printer.

You can also replace another interface with the wireless LAN interface, but care is required.

(Diagram below shows a typical example)

Warning

- Malfunctions may occur if the interface board is removed or re-inserted.
- To install the interface board, please contact your dealer or service person.
- If you work on your own, consider static electricity and other factors carefully and then install the interface board at your own responsibility.

2) If another interface board is installed in the printer, remove it.

3) Insert the interface board into the interface slot of the printer.

4) Connect the interface connector of the board to the interface connector inside the printer.

5) Fix the interface board in place with screws.

3. Network Settings and Operation

3-1. Overview

To use this interface board connected to a network, you need to connect to the network and configure the settings for communication in addition to configuring the settings of the printer.

There are two methods to configure the settings for a network connection.

Web Manager

Connect to this interface board from a browser and then configure the settings from a dedicated settings screen.

NetToolK

Connect to this interface board from a dedicated tool for Windows and then configure the settings.

You can check the current state and restore the initial state by operating the panel button.

See the next page for an explanation of the panel button.

Furthermore, you can check the communication and other statuses from the LEDs on the interface. See “3-5 Display status by LED”.

XML Config

By sending XML format data to this interface board, you can configure some of the board's functions.

The functions that can be configured or updated are

SSL/TLS settings

Request printing settings

Firmware update

Details are beyond the scope of this manual. Therefore, please refer to the manual of XML Config SDK for details.

JavaScript and Excel VBA macros are available as sample programs for this function.

The timeout setting for this function is present in the 6-2 CONFIG>>Service Tab.

Warning

After the firmware upgrade starts, do not disconnect power or transmission to the printer until the upgrade is complete.

When updating the firmware, it is necessary to obtain the correct firmware data from us.

If the firmware is not updated correctly, this interface board may not boot.

3-2. Panel Button

The panel button on the operation panel is used to operate the Interface board. It allows you to print the setting information of this interface board and restore the initial state. (Example, IF1-WFx6)

■ Starting the LAN Interface Board

Turn on the printer. The Interface board starts working approximately 20 seconds after the printer turns on.

■ Printing the Interface Board Configuration

Press the panel button. See 3-3, Printing the Interface Board Configuration (page 19) for details.

■ Switching to Setting Mode

Press and hold the panel button. The buzzer* will sound once, signaling a switch to setting mode.

・Setting mode enables the reading of the factory default settings. See 3-4, Returning the Interface Board Configuration to Factory Default Settings (page 20) for details

・If there is no activity for three seconds in the setting mode, the buzzer* will sound once, signaling a return to normal mode.

* If the printer to which this interface board is connected is set to not buzz, the buzzer will not sound.

Warning
When the operation is complete, the interface board will restart automatically. When automatically obtaining the IP address from the DHCP server is set, an IP address that differs from the previous one may be assigned.

■ System log printing

If printing etc. does not work as expected, you may be able to check the situation by checking the system log of this board. The system log can be printed using the panel buttons.

Please refer to Chapter 5 "Useful Functions for Request Print" in the "Programmer's Manual for "Request Print" for a description of system log printing.

3-3. Printing the Interface Board Configuration

Press the panel button to print out the configuration of the interface board from the printer.

① Title of the printout.

② Model name, hardware revision, and firmware version of the interface board

③ System information of the interface board The LAN board name, serial number, and MAC address are printed.

④ Network information of the interface board

⑤ Ethernet information. Printed when connected by Ethernet.

⑥ Printer information. The name of the manufacturer and the model name of the printer connected to the interface board are printed.

⑦ Configuration information of the interface board. The information stored in the interface board is printed and may be different from the connection status of the current network. Check the connection status using the network information of ④.

⑧ Information on the connection status of XML-controlled peripheral devices.

⑨ SSL/TLS function setting information.

⑩ Setting information for the Request Print function.

```
①  I/F Board
    Information

②  IFx-WFXx(Rev0.1.3): Ver 2.30

③  System
    WLAN Board Name : Net Printer
    Serial Number   : 100123
    MAC Address     : 00:01:02:0a:0b:0c

④  Current Network Status
    IP Address      : 192.168.0.2 (DHCP)
    Subnet Mask     : 255.255.255.0
    Gateway         : 192.168.0.1
    DHCP Server     : 192.168.0.1

⑤  Ethernet Status
    Speed & Duplex  : Auto (100BaseTx Full)

⑥  Printer Status
    Manufacturer    : CITIZEN
    Model           : CT-S801

⑦  User Configuration
    DHCP            : Enable
    IP Address      : 192.168.0.10
    Subnet Mask     : 255.255.255.0
    Gateway         : 192.168.0.1
    Print Port      : 9100
    Receive Timeout : 180
    Wireless Type   : Infrastructure
    SSID            : CITIZENSYSTEMS
    Security        : None

⑧  XML Device Information
    Display Status  : Offline
    Scanner Status  : Offline
    Speaker Status  : Offline

⑨  SSL/TLS
    Certificate     : Self-Signed
    Self-Signed     : Not Exist
    CA-Signed       : Not Exist

⑩  Request Print
    Service Status  : Disable
    Current URL     :
   http://www.example.net/test.php
   Proxy Address   : 192.168.100.190
    Proxy Port      : 8080
    Interval        : 10 sec
    ID              : AA-BB-CC-DD-EE-FF
    DNS1            : 192.168.10.1
```

3-4. Returning the Interface Board Configuration to Factory Default Settings

1) Press and hold the panel button to switch to setting mode.
2) After the interface board has switched to setting mode, press and holds the panel button again within three seconds. The following message is printed, and the interface board returns to factory default settings.

```
I/F Board
 Information

--!Caution!--
Print Server will
 automatically restart.
```

Warning

When the operation completes, this interface board restarts automatically.
The settings are cleared, and it is necessary to configure the WLAN and other settings again.
When automatically obtaining the IP address from the DHCP server is set, an IP address that differs from the previous one may be assigned.

3-5. Display status by LED

The following charts show what each LED indicator indicates.

(Diagram shows a typical example. There are interface boards where the positioning of LEDs differs, but the order from left to right is the same.)

Green Yellow Green Red

① Ethernet transmission speed indicator

Transmission speed	LED (green)
100 Mbps	On
10 Mbps / Disconnected	Off

② Ethernet connection/transmission status indicator

Connection status	LED (yellow)
Connected	On
Disconnected	Off
Transmitting data	Flashing

③ Wired/WLAN status indicator

Connection Status		LED (green)	LED (red)	Description
Printer disconnected		Off	-	Not connected to printer.
Printer connection	Network: disconnected	On	Off	Connected to printer.
	Ethernet connecting	On	Flashing (1-second cycle)	Seeking IP address from DHCP server via Ethernet.
	Ethernet working	On	On	Network operation via Ethernet.
	WLAN connecting	Flashing (2-second cycle)	Flashing (1-second cycle)	Connecting to access point or seeking IP address from DHCP server via WLAN.
	WLAN working	Flashing (2-second cycle)	On	Network operation via WLAN.
Resource error		Alternating blinking (1-second cycle)		The interface board is malfunctioning.
System error		Alternating blinking (0.2-second cycle)		The interface board is malfunctioning.

④ USB Wi-Fi adapter status indicator (WU606n)

Status	LED
Connecting	Repeats short-cycle and long-cycle flashing.
Communicating	Irregular flashing (changes with data transmission status)

3-6. Simple Setting Procedure Example for Wireless LAN

If you do not know much about network settings, configure the settings about the corresponding procedure below.

However, the instructions in the procedure may not necessarily be appropriate for your network environment.

■ When a DHCP server assigns an IP address

1) Connect the USB Wi-Fi adapter and LAN cable to this interface board. The LAN cable must be connected to, for example, an enabled network environment in which a DHCP server exists. (LAN takes precedence over wireless LAN.).

2) The IP address is automatically obtained from the DHCP server within 90 seconds after powering on the printer and starting up this interface board.

   Press the panel button to print out the configuration information and check the assigned IP address. See 3-3, Printing the Interface Board Configuration (page 19) for details.

3) Once the conditions for the printer to join the network are in place, configure the wireless LAN settings on the Web manager.

   Connect to Web Manager of the printer from the browser of a PC connected to the same network. See “4 Web Manager” (page 24) for details.

   Instead of Web Manager, you can also use NetToolK, a network configuration tool for Windows. See “5 NetToolK” (page 39) for details.

   Once the settings are complete, unplug the LAN cable, restart the printer, and check to see if the printer can connect to the wireless LAN.

■ Configuration using a static IP address

Since the IP address assigned by the DHCP server is not used, the ZeroConf function assigns an IP address of 169.254.XX.YY (XX.YY varies depending on the environment). Press the panel button to print the setting information and then confirm the assigned IP address.

Adjust the IP address of your PC so that it can connect to the IP address of the printer.

The subsequent procedure is the same as step 4) and after above.

4. Web Manager

The interface board is equipped with a Web manager function, which allows accessing the interface board from a Web browser to check the status of the interface board and change its settings.

4-1. Starting the Web Manager

In the address bar, enter the IP address and then press **Enter**.

If the SSL/TLS feature is enabled, you can also connect using “https”.

＊ The image to the left is a sample. Enter the actual allocated value for the IP address.

Warning

- The configuration window of the interface board cannot be displayed if the network settings of your computer and the interface board differ. Ensure that the IP address of the interface board matches the settings of your network.
- The IP address of this interface can be confirmed as described in “Printing the Interface Board Configuration”.

Web Manager Window Layout

The Web manager consists of the following windows and tabs.

- HOME
- STATUS
  - System Status
  - Network Status
  - Wireless LAN Status *4
  - Printer Status
  - Service Status *1
  - Request Print *3
- CONFIG
  - General
  - Wireless LAN *4
  - Service *1
  - SSL/TLS *2
  - Request Print *3
  - User Account
  - Maintenance

*1 If the XML and peripheral control functions are available, the Service Status tab will appear on the STATUS screen and the Service tab will appear on the CONFIG screen.

*2 If the SSL/TLS function is available, the SSL/TLS tab will appear in the CONFIG screen.

*3 If Request Print function is available, Request Print tab appears on STATUS and CONFIG screens.

*4 The tabs related to Wireless LAN will appear when the wireless LAN function is ready to be used.

See “6 XML Function and Peripheral Device Control Function”,”1

SSL/TLS function" and "8 Request Print function" for details on each function.

4-2. HOME Window

This is the Home window of the Web manager.

① HOME button

Display the Home window.

② STATUS button

Display the Status window. At the status window, you can check the status of the Interface board.

③ CONFIG button

Display the CONFIG window. At the CONFIG window, you can configure the Interface board.

④ Logout button

Log out from the CONFIG window of the Interface board. It is not possible to open the CONFIG window at multiple PCs of the same time. You must log out to make settings using another Web manager or NetToolK.

4-3. STATUS Window

Displays the status of the Interface board.

① System Status tab

See 4-3-1, STATUS>>System Status Tab (page 28).

② Network Status tab

See 4-3-2, STATUS>>Network Status Tab (page 29).

③ Wireless LAN Status tab

See 4-3-3, STATUS>>Wireless LAN Tab (page 30).

④ Printer Status tab

See 4-3-4, STATUS>>Printer Status Tab (page 31).

⑤ Service Status tab

See 6-3 STATUS>>Service Status Tab (page 51)

⑥ Request Print tab

See 8-3 STATUS>>Request Print tab (page 71)

4-3-1. STATUS>>System Status Tab

① Firmware Version

Displays the firmware version of the Interface board.

② Model Name

Displays the model name of the Interface board.

③ Serial Number

Displays the serial number of the Interface board.

④ MAC Address

Displays the MAC address of the Interface board.

⑤ RAW Port Number

Displays the TCP port number for RAW printing.

⑥ Timeout for print data

Displays the socket timeout duration during printing. When the host and the TCP/IP socket are connected, and the host sends no data for this duration during printing, the socket is forced to close. When the setting is “0”, the socket remains connected until a disconnection request is received from the host.

⑦ LPR Queue Name

Displays the LPR queue name.

⑧ UPnP

Displays the UPnP configuration status.

4-3-2. STATUS>>Network Status Tab

① LAN board name

displays the LAN board name of the Interface board.

② IP Address

Displays the IP address of the Interface board.

③ Subnet Mask

displays the subnet mask of the Interface board.

④ Default Gateway

displays the default gateway of the Interface board.

⑤ DHCP Server

Displays the IP address of the DHCP server from which the Interface board obtained its IP address.

⑥ Lease Time

Displays the lease time of the IP address allocated by the DHCP server.

⑦ SSL/TLS

Displays the status of SSL/TLS function

Disable：The function is disabled.

Self-Singed：The function is enabled by the self-signed certificate.

CA-Signed： The function is enabled by the certificate authenticated by CA

⑧ Self-Signed

Displays the registration status of the self-signed certificate

⑨ CA-Signed

Displays the registration status of the certificate authenticated by CA

4-3-3. STATUS>>Wireless LAN Tab

① SSID

Displays the SSID of the access point to which the Interface board is connected.

② BSSID

Displays the BSSID of the WLAN to which the Interface board is connected. Generally, the BSSID is the MAC address of the access point.

③ Channel No

Displays the WLAN channel used by the Interface board.

④ Network Type

Displays the current access method (Infrastructure or Ad Hoc).

⑤ Link Quality

Displays the current link quality of the WLAN using four bars.

⑥ Signal Strength

Displays the signal strength of the WLAN using four bars.

⑦ Security System

Displays the security method of the WLAN to which the Interface board is currently connected.

4-3-4. STATUS>>Printer Status Tab

① Manufacturer

Displays “CITIZEN”.

② Printer Model

Displays the model of the printer to which the Interface board is connected.

③ Printer Status

Displays the operational status of the printer to which the Interface board is connected.

Ready: Ready to print.

Offline: Not ready to print.

Paper Empty: Out of paper.

Error: Error status.

(Note) When the printer is connected to the Interface board and the bi-directional port of the printer driver is enabled, the printer status is not correctly displayed. In such cases, confirm the printer status from the Windows spooler.

4-4. CONFIG Window

You can configure the Interface board after logging in as an administrator.

User Name / Password

Enter administrator user name and administrator password. (Initial setting: admin / admin)

Login button

Click “Login”. The CONFIG window appears.

Cancel button

Cancel login.

① General tab

See 4-4-1 CONFIG>>General Tab (page 33).

② Wireless LAN tab

See 4-4-2 CONFIG>>Wireless LAN Tab (page 35).

③ Service tab

See 6-2 CONFIG>>Service Tab (48 page)

④ SSL/TLS tab

See 0

CONFIG>>SSL/TLS tab (54 page)

⑤ Request Print tab

See 8-2 CONFIG>>Request Print tab (70 page)

⑥ User Account tab

See 4-4-3 CONFIG>>User Account Tab (page 37)

⑦ Maintenance tab

See 4-4-4 CONFIG>>Maintenance Tab (page 38).

4-4-1. CONFIG>>General Tab

LAN board Information

- LAN board name (factory default: Net Printer)

  Set the ID of the Interface board.

TCP/IP

- Obtain an IP Address Automatically (factory default)

  Automatically obtain the IP address from the DHCP server.

- Use the following IP Address

  Enter IP addresses in the IP Address, Subnet Mask, and Default Gateway fields.

UPnP Setting

- UPnP (factory default: Enable)

  Set the UPnP setting.

LAN Setting

- Priority to Ethernet (factory default: Enable)

  Enable: When Ethernet cable is connected, LAN (Ethernet) is chosen.

  Disable: The connection is fixed for either LAN or WLAN chosen at boot.

	Enable	Disable
WLAN at boot	WLAN	WLAN
WLAN at boot + Ethernet connected later	LAN	WLAN
LAN at boot	LAN	LAN
LAN at boot + Ethernet disconnected later	WLAN	LAN

Print Settings

Configure the printing functions of the printer.

- Raw Port Number (factory default: 9100)

  Set the TCP port number for RAW protocol printing.

- Timeout for print data

  Set the timeout duration for the connection to the host.

- Action at Timeout

  Select the action for other connections when a timeout occurs with the host. There are two selections: Close all connections and Move to next connection.

- TCP Keep Alive

  Select whether the TCP Keep Alive feature is enabled or disabled.

Submit button

Enter the changes.

Reset button

Cancel the changes.

4-4-2. CONFIG>>Wireless LAN Tab

Basic

- Network Type (factory default: Infrastructure)

  Select the access mode from Infrastructure and Ad Hoc.
- SSID (factory default: CITIZENSYSTEMS)

  Enter the SSID specified for the connection access point.

Security

- Security System (factory default: Disable)

  Select the encryption method from Disable, WEP, WPA-PSK, and WPA2-PSK.

<u>For WEP</u>

- Authentication (factory default: Open System)

  Select the authentication method from Open System and Shared Key.
- Key Size (factory default: 64 Bit (Hex - 10 chars))

  Select a key size from 64 Bit (Hex - 10 chars), 64 Bit (ASCII - 5 chars), 128 Bit (Hex - 26 chars), and 128 Bit (ASCII - 13 chars).
- Key 1 to Key 4 (factory default: Key 1=0123456789)

  Enter the WEP key and then select the button of the key to be used.
- Show Key

  Enables/disables the masquerade display of the WEP key.

For WPA - PSK and WPA2 - PSK

- Key Format (factory default: Passphrase (8-63 chars))

  Select the key format from Passphrase (8-63 chars) and Hex (64 chars).
- Pre-Shared Key (factory default: ABCDEF4321)

  Enter the shared key.

Scan Access pointite Survey Setting

- Scan AP

This function searches for access points. An SSID can be selected when this function is used.

Click “Start” to display the following window.

Select the button of the access point you want to set, and then click “Set”.

Region

When using the interface board in the USA or Canada, select USA/Canada to prevent channels for which use is not permitted from being selected in your location. In other locations, this can be left set to Default.

Submit button

Enter the changes.

Reset button

Cancel the changes

4-4-3. CONFIG>>User Account Tab

You must log in as an administrator to change the settings of the Interface board. At this screen, the administrator name and password can be changed.

Set User

- New User name (factory default: admin)

  Enter the new administrator name.
- New Password (factory default: admin)

  Enter the new password.
- Confirm New Password

  Enter the password again.

Warning

If you forget the new username and password, settings must be returned to the factory default settings.

4-4-4. CONFIG>>Maintenance Tab

- Save & Restart button

  Save changes, and restart the Interface board.
- Restart button

  Restart the Interface board without saving changes.
- Factory Default button

  Return the Interface board to the factory default settings.
- Firmware Upgrade button

  Upgrade the firmware of the Interface board.

Firmware upgrade

1) Click “Browse” and select the firmware file.
2) Click “Write”.

Warning

After the firmware upgrade starts, do not disconnect power or transmission to the printer until the upgrade is complete.

5. NetToolK

The “NetToolK” utility software runs in the Windows operating system and can be used to change the settings of the interface board. This tool can be used with both wired and wireless LAN interface boards.

5-1. Installing the NetToolK

1) Acquire the file “NetToolKSetupToolSetup.exe” from the CD-ROM or our website. Double click the file.

2) If the “User Account Control” screen appears, click “Continue.”

3) The screen shown on the right appears. Click “Next.”

4) Enter a username and organization, and then click “Next”.

5) The screen shown on the right appears.
Click “Next.”

6) The screen shown on the right appears.
Click “Install”.

7) Click “Finish” to complete installation.

8) The PC setting tool starts. From the" System" menu, select" Exit".

9) The icon on the right is placed on the desktop of the computer. You can now start program by double clicking this icon.

5-2. Information List Window

① ”System”

Select ”System” – ”Exit” to exit the NetToolK.

② ”Tools”

Select ”Tools” – ”Settings” to switch the display of the interface board information. When the “Show LAN board information” check box is selected, the LAN interface board operation status can be displayed as shown below.

③ ”Help” menu

Select ”Help” – ”About” to display the version information of the NetToolK.

④ ”Refresh List” button

Refresh the list of the LAN interface board. The application periodically refreshes the list, but you can refresh the list manually by clicking this button.

⑤ ”Go to Web Page” button

Select the LAN interface board you want to configure, and then click “Go to Web Page”. The browser starts and displays the Web manager.

⑥ ”Configure the LAN Board” button

Select the LAN interface board you want to configure, and then click “Configure the LAN Board”. See 5-3 Setup Window (page 44).

⑦ LAN interface board list

The list displays the LAN interface boards connected to the network. The LAN interface boards connected to the same subnet are displayed.

5-3. Setup Window

You can configure the LAN interface board by selecting the LAN interface board from the list screen and clicking “Configure the LAN Board”.

To login at the login screen, enter a username and password.

Username: admin (factory default)

Password: admin: (factory default)

5-3-1. “General“ Tab

Use the “General“ tab to configure the LAN board name and IP address

5-3-2. “Wireless LAN“ Tab

Use the “Wireless LAN“ tab to configure the LAN.

(This tab is not displayed for a wired LAN interface board.)

5-3-3. “Supported Protocols“ Tab

Use the “Supported Protocols“ tab to enable LPR and the RAW protocol, set the printer timeout duration, enable "Priority to Ethernet", and enable UPnP.

5-3-4. “User Account“ Tab

Use the “User Account“ tab to change the administrator name and password.

Warning

If you forget the new username and password, settings must be returned to the factory default settings.

5-3-5. “Maintenance“ Tab

Use the “Maintenance“ tab to restart the LAN interface board, return the settings to the factory default settings, and update the firmware.

Note

After the firmware upgrade starts, do not disconnect power or transmission to the printer until the upgrade is complete.

Note: If the computer at which you are performing the configuration and the LAN interface board have different subnet values, a message like the one shown below appears in red letters. If this message appears, set the IP address using the “Configure the LAN Board” button before configuring the LAN interface board.

Only the server name and IP address can be configured. Configure the IP address correctly one time before configuring the wireless LAN interface board.

6. XML Function and Peripheral Device Control Function

6-1. Overview

The XML Print / Peripheral device control function are functions of this interface board to convert specific data in XML tag format to implement functions such as printing.

The peripheral device control function is a function to control a device connected to USB ports of the interface board by using data in XML tag format. (A method to control a peripheral device without using the XML function is also provided.)

See the separate documents for CITIZEN XML Print Service for details on data in XML tag format, JavaScript library to generate that data, etc.

This function can be used when the following conditions are met.

Printer supports the XML function.

This interface is connected.

The firmware version of the printer and this interface board supports XML function.

If the conditions are met, the Service Status tab is displayed in the STATUS window and the Service tab & SSL/TLS tab are displayed in the CONFIG window.

When using these functions, the URL to which the XML tag format data is sent is as follows.

If you use the URL specification method by port number, the numeric part will change depending on the port number setting.

		URL
HTTP	XML Print service	http://IP address:8080/ http://IP address/xmlprint/
	XML Device service	http://IP address:8085/ http://IP address/xmldevice/
	XML Config service	http://IP address/xmlconfig/
HTTPS	XML Print service	https://IP address/xmlprint/
	XML Device service	https://IP address/xmldevice/
	XML Config service	https://IP address/xmlconfig/

6-2. CONFIG>>Service Tab

The setting items that are displayed differ depending on the type of interface board that is connected to the printer.

IFx-xFX2 / IFx-xFX5 : All items

Other: XML Print items only

The Media Converter items may be displayed even when the interface board is used in combination with a printer that does not meet the conditions.

6-2-1. Media Converter

Item	Initial value	Configurable range	Description
VCOM Convert	Disable	Enable Disable	Set Enable when using a display or scanner using OPOS without XML control.
HID Scanner Convert	Disable	Enable Disable	Set Enable when using a scanner in HID mode without XML control.
Show Configuration	Unselected	Selected Unselected	If you select this, the advanced settings for communication with the device are displayed. The initial value of each item is the value for the corresponding device so there is no need to change it.

6-2-2. XML Print

Item	Initial value	Configurable range	Description
Port Number	8080	1025 - 65535	Connection port number
Timeout for connect	10	5 - 60	Timeout time to wait for printing to start
Timeout for print	60	10 - 600	Timeout time to wait for the printer process to complete

6-2-3. XML Device Control

Configure the following general settings for XML Device Control Service.

Item	Initial value	Configurable range	Description
Port Number	8085	1025 - 65535	Connection port number
Timeout for connect	10	5 - 180	Timeout time to wait for control to start (sec.)
Max Connections	2	1 - 3	Maximum number of simultaneous connections (normally use with the initial value)

6-2-4. XML Device Control / Line Display

Configure the following general settings for a display. The setting initial values are already the appropriate values for the corresponding display so do not change them in the case of normal use.

Item	Initial value	Configurable range
Baud rate	9600	2400, 4800, 9600, 19200, 38400, 57600, 115200
Data	8 bit	7 bit, 8 bit
Parity	None	None, Odd, Even
Stop	1 bit	1 bit, 2 bit
Flow Control	Off	Hardware, Xon/Xoff, Off

If you press the “Test Device” button, a text string is displayed on the display according to these settings. If a connection with the display cannot be confirmed, an alert message (“Test failed”) is displayed in the browser.

6-2-5. XML Device Control / Scanner

If you press the “Test Device” button, the connection with the scanner (USB HID keyboard method) is checked. If a connection with the scanner cannot be confirmed, an alert message (“Test failed”) is displayed in the browser.

6-2-6. XML Device Control / Speaker

If the “Test Device” button is pressed while a USB speaker is connected, the sound (chime) prerecorded in the interface board is played. If a connection with the USB speaker cannot be confirmed, an alert message (“Test failed”) is displayed in the browser.
If you wish to use this function, submit an inquiry to us.

6-2-7. Submit / Reset Button

After changing the settings, press the “Submit” button and then press the “Save & Reboot” button in the Maintenance menu. The settings will be enabled after the board reboots.

6-3. STATUS>>Service Status Tab

The settings on the Service tab, the connection state of the peripheral device, etc. are reflected here.

7. SSL/TLS function

7-1. Overview

Necessity of SSL/TLS support

Encrypted communication is necessary to prevent third parties from eavesdropping on, altering, or spoofing the communication data flowing over the network. The SSL/TLS protocol has become the standard for encrypted communication infrastructure.

The http protocol is used to send and receive web data and XML data, and https is the SSL/TLS-compatible version of it. If https is used for communication between the host and the printer, the printer must also support SSL/TLS.

Overview of SSL/TLS support

A digitally signed certificate (hereafter referred to as a signed certificate) is required for SSL/TLS encrypted communication. The server stores the signed certificate, and the client side must confirm or approve the certificate as trustworthy to enable SSL/TLS encrypted communication.

There are two types of signing certificates: those signed by a public certification authority (CA) and self-signed certificates signed by the private CA.

In the case of self-signed certificates, the client side must certify that the certificate is trustworthy so that it can communicate without warning. For this purpose, this board has a function to export a file that contains the unique information for certification.

This board also allows importing a certificate signed by a public CA for more secure communication.

Differences in procedures for preparing signed certificates between this board and a normal server

For SSL/TLS communication, you will need a signed certificate file and a private key file. The general procedure for preparing these on a normal server is as follows.

1. The applicant requesting the certificate generates a private key.
2. Applicant creates a certificate signing request (CSR) by entering the applicant's identification information and adding a signature with the applicant's private key.
3. The applicant submits the CSR to either a self-certification authority prepared by the applicant or an external public CA.
4. The signing authority generates a certificate with its own private key signature attached to the CSR and returns it to the applicant. (Depending on the submitted certification authority, the certification becomes either a self-signed certificate or a public CA signed certificate).
5. The applicant stores and places the signed certificate file and his private key file.

This board has an internal private key and self-certification authority, and if you want to use a self-signed certificate, you only need to enter the identification information in step 2 above. (For the detailed procedure, refer to 7-3-1 Creating and exporting a self-signed certificate.

On the other hand, to use a public CA signed certificate on this board, the user must perform steps 1 through 4 above, and then import the certificate file (which has signature by public CA) and the applicant's private key file to this board (as step5).
It is also possible to import self-signed a certificate prepared by the user (not generated by this board) into this board in the same way as public CA signed certificate.

Certificate Expiration

Signed certificate have expiration date and must be updated to the new expiration date before they expire. A window to update the expiration date is also provided, or you can use the XML Config function to send an XML file to the printer for updating expiration date.

Types of Certificates and Descriptions in Subsequent Chapters

The certification authority that issues the certificate and the way the certificate is handled on this board are as follows

A. Internal certificate: A self-signed certificate generated and stored inside the printer.
B. Local certificate: A certificate signed by a private certification authority (CA) on the local network and imported into the board.
C. Public certificate: A certificate 子 signed by a public certification authority (CA) on the Internet and imported into the board.

The descriptions in the following chapters correspond to certificate A, B, or C as follows.

Chapter	A. Internal certificate	B. Local certificate	C. Public certificate
7-2-1	Applicable	Applicable	Applicable
7-2-2	Applicable		
7-2-3	Applicable		
7-3-1	Applicable		
7-3-2	Applicable	Applicable	
7-4-1	Applicable	Applicable	Applicable
7-4-2	Applicable		
7-4-3		Applicable	Applicable
7-4-4	Applicable	Applicable	Applicable

There are two types of local certificates: those with the same certification server and certification authority, and those with a different certification server and certification authority. The differences do not affect whether the explanations in each chapter are applicable or not, so they are not separated.
However, depending on the browser you use and other factors, there may be differences between

these two conditions.

7-2. CONFIG>>SSL/TLS tab

7-2-1. SSL/TLS tab

SSL/TLS Setting

- Service

  Select whether the SSL/TLS function is enabled or disabled.

Certificate Setting

- Server Certification

  Select the server certificate type used for SSL/TLS communication from either Self-Signed Certificate or CA-signed certificate.

Self-Signed Certificate

- “Create” button

  Move to “Create Self-Signed Certificate” page. See “7-2-2 Create Self-Signed Certificate”.

- “Update” button

  Move to “Update Self-Signed Certificate” page. See “7-2-3 Update Self-Signed Certificate”.

- “Export” button

  Export a certificate to install the server information to the client.

  No need to reinstall for certificate renewal.

- “Delete” button

  Deletes the self-signed certificate that was created.

CA-Signed Certificate

- CA-Signed Certificate File

  Select the public CA signed certificate file to import.

- Private Key File

  Select the private key file to import.

- “Import” button

  Import the selected certificate and private key into the printer.

- “Delete” button

  Delete the imported certificate and private key.

7-2-2. Create Self-Signed Certificate

Create Self-Signed Certificate (Items and meanings for CA-Signed Certificate are the same.)

- Issuer

  Enter the information about the organization that operates the server (administrator).

- Common Name

  Enter the IP address or FQDN of the print server.

- Organization Unit

  Enter the name of the department of the operating organization.

- Organization

  Enter the name of the operating organization.

- Locate

  Enter the location (city, ward, town, village, etc.) of the Operator.

- State

  Enter the location of the Operator (State/Prefecture).

- Country

  Enter the country code where the Operator is located using two letters of the alphabet.

- Validity (Not Before) (Default: Entry Date)

  Enter the start date of the certificate validity period.

- Validity (Not After) (Default: 1 year after the entry date)

  Enter the end date of the certificate validity period.

- Internal Certification Authority

  This field is for entering information about certificate renewal.

- Validity (Not Before) (Default value: Entry date)

  Enter the start date of the period for which you wish to renew the certificate. Enter the Specify a date before the certificate validity period.

- Validity (Not After) (Default: 12/31/2049)

  Enter the end date of the period for which you wish to renew the certificate. Specify the date after the certificate validity period.

7-2-3. Update Self-Signed Certificate

Update Self-Signed Certificate

(The same applies to the items on the CA-Signed Certificate Update.)

- Issuer

  Enter the information about the organization that operates the server (administrator).

- Common Name

  Enter the IP address or FQDN of the print server.

- Organization Unit

  Enter the name of the department of the operating organization.

- Organization

  Enter the name of the operating organization.

- Locate

  Enter the location (city, ward, town, village, etc.) of the Operator.

- State

  Enter the location of the Operator (State/Prefecture).

- Country

  Enter the country code where the Operator is located using two letters of the alphabet.

- Validity (Not Before) (Default value: Entry date)

  Enter the start date of the certificate validity period within the period for which the certificate can be renewed.

- Validity (Not After) (Default: 1 year after the entry date)

  Enter the end date of the certificate validity period within the period for certificate renewal.

- Internal Certification Authority

  Displays information on certificate renewal.

- Validity (Not Before)

  displays the start date of the period during which certificate renewal is possible.

- Validity (Not After)

  displays the end date of the period for which the certificate can be renewed.

7-3. To enable SSL/TLS communication using a self-signed certificate

7-3-1. Generating and exporting self-signed certificates

1) Access the IP address of the board from your browser. 2) Select the "CONFIG" tab.

3) Enter User Name: admin, Password: admin to enter the configuration screen.

4) Set a static IP and select the "Submit" button.

5) Select the "SSL/TLS" tab and go to the SSL/TLS setting window.

6) Click the "Create" button to enter the self-certification windows.

7) Enter a static IP in Common Name,.

For Validity, the first one is the validity period of the certificate stored on the board, and the second one is the validity period of the file to be exported. Basically, there is no need to change it.

An error will occur if the first Validity is set outside the period of the second Validity.

8) Click the "Create" button.

9) Press the "OK" button.

10) Select "Enable" for Service and CA-Signed Certificate for Server Certification in SSL/TLS Setting.

11) Click the "Export" button to save the self-certificate file. The file will be used for importing into your browser.

12) Press the "Submit" button.

13) Press "Save & Reboot".

14) Click the "Yes" button to save & reboot.

Please wait until the board reboots. The configuration changes will be reflected after the reboot.

7-3-2. Example of importing a self-signed certificate in a browser (Chrome)

Chrome Settings =>Privacy and security =>Security => Manage certificate

Select the "Trusted Root Certification Authorities" tab and click the "Import" button.

Press "Next".

Press “Browse” and choose the self-signed certificate file that you exported in 7-3-1 and press “Next”.

Press "Next".

Press “Finish”

When a security warning appears, press Yes to complete the certificate installation, Then the printer's self-signed certificate has been registered with the "Trusted Root Certification Authority".

This will allow SSL/TLS communication between this Chrome and the printer using https without warning. The procedure is basically the same for other browsers.

Note

When using a self-signed certificate exported from this board, it is necessary to import the certificate for each browser as shown in this procedure to prevent the warning from appearing. However, if the user has prepared a self-signed certificate separately from this board, the self-signed certificate and private key can be registered as a set to this board, just like a public CA signed certificate, so that no warning will be issued without importing the certificate for each browser.

For more information, please contact us.

7-4. SSL/TLS and certificate related specifications

7-4-1. SSL/TLS communication specifications

TCP/IP version	TCP/IP v4
SSL/TLS version	TLS1.2（SSL3.3）
Application protocol	HTTPS (Server Authentication)
TCP communication port	443
Supported certificate	Self-signed certificate CA signed certificate
Encryption algorithm	AES 128/256
Hash algorithm	SHA2-256, SHA1
Key Exchange Method	RSA 2048 bit

Supported cipher suite

Priority	Cipher suite
1	TLS_RSA_WITH_AES_256_CBC_SHA256
2	TLS_DHE_RSA_WITH_AES_256_CBC_SHA256
3	TLS_RSA_WITH_AES_256_CBC_SHA
4	TLS_DHE_RSA_WITH_AES_256_CBC_SHA
5	TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA
6	TLS_RSA_WITH_AES_128_CBC_SHA256
7	TLS_DHE_RSA_WITH_AES_128_CBC_SHA256
8	TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA256
9	TLS_RSA_WITH_AES_128_GCM_SHA256
10	TLS_DHE_RSA_WITH_AES_128_GCM_SHA256
11	TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256
12	TLS_DHE_RSA_WITH_CHACHA20_POLY1305_SHA256
13	TLS_ECDHE_RSA_WITH_CHACHA20_POLY1305_SHA256
14	TLS_RSA_WITH_AES_128_CBC_SHA
15	TLS_DHE_RSA_WITH_AES_128_CBC_SHA
16	TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA

7-4-2. Self-signed certificate related specifications

By entering the necessary items on the Web Manager screen, you can issue, save, and export a self-signed certificate on this board. The initial state is without certificate information.

Self-signed certificate entry field

Field	Items	Initial value	Available characters and symbols	Max. Chars
Issuer Subject	Common Name (CN)	IP address in use	Alphanumeric, Space, "-" (Hyphen), "." (Dot) (Inputs other than IP addresses are allowed.)	64 chars
	Organization Unit (OU)	(Blank)	Alphanumeric, Space, "," (Comma), "+" (Plus), "-" (Hyphen), "." (Dot), "/" (Slash), "_" (Underscore), "(" (Bracket L),")" (Bracket R)	64 chars
	Organization (O)	CITIZEN SYSTEMS JAPAN		64 chars
	Locate (L)	(Blank)		128 chars
	State (S)	(Blank)		128 chars
	Country (C)	JP	Alphanumeric	2 chars
Validity (Not After)		2049/12/31 or 1 year after “Create”	YYYY/MM/DD (2020/01/01 ~ 2049/12/31)	
Validity (Not Before)		2020/01/01 or the time of “Create”	YYYY/MM/DD (2020/01/01 ~ 2049/12/31)	

The other items set in the certificate creation are entered as shown in the table below. No changes can be made by the user.

Self-signed certificate fixed fields

Field	Items	Fixed value
Certificate Subject Alt Name	DNS Name	Common name（CN）
	IP Address	Common name（CN）if common name is IP address.
Certificate Key Usage		Non-repudiation, Digital Signature, Key Encipherment (a0)
Extended Key Usage		TLS Web Server Authentication (1.3.6.1.5.5.7.3.1) TLS Web Client Authentication (1.3.6.1.5.5.7.3.2)
Certificate Basic Constraint	Subject Type	End Entity
	Path Length Constraint	None

Specification for exporting a certificate file signed by a internal certifying authority.

Encoding type	Base64
File extension	.crt
Version	V3
Key Exchange Method	RSA 2048 bit
Signature algorithm	SHA2-256 with RSA

7-4-3. CA signed certificate related specifications

The specifications of CA signed certificate that can be imported and used are as follows.

Please make sure that the certificate and private key are paired before importing.

CA signed certificate	“.pem” format / “.der” format
Private key	“.key” format (Password protection not supported)
Encryption algorithm	AES 128/256
Hash algorithm	SHA2-256, SHA1
Key Exchange Method	RSA 2048 bit

7-4-4. Handling of saved certificates when restoring factory settings/updating firmware

- When the Factory Default process in the CONFIG>Maintenance tab is executed, each setting value will be set to the default value and the registered certificate will be deleted; when the Firmware Upgrade process is executed, each setting value and the registered certificate will be retained.

8. Request Print function

8-1. Overview

The request printing function is required to realize printing from the Web server to the printer.

The general procedure is as follows.

This board periodically sends to the Web server a print data request. On the other hand, the server needs to respond to the print data request when the request comes in, and if the print data exists on the server, server needs includes the print data in the response

This chapter describes the settings for request printing on this board side.

The request, response, and print data are in XML format. For details on the messages structure etc., please refer to the Request Print Programmer Manual prepared separately.

A sample kit that can be installed on a Web server for demonstration is also available, and the manual explains how to install it.

This function is available when the following conditions are met

The printer must be a model that supports the XML function.

IFx-EFX2 with firmware version 2.30 or higher is connected to the printer.

The printer's firmware must support the connection to the IFx-EFX2.

When these conditions are met, the Request Print tab will appear on the STATUS window and the Request Print tab will appear on the CONFIG window in the Web Manager.

8-2. CONFIG>>Request Print tab

Request Print Settings

- Request Print (Default: Disable)

  Set whether to enable the request printing function.

- URL

  Enter the server URL of the request.

- Via Proxy Server (Default: Disable)

  Enables or disables the proxy setting.

  - Proxy Address

    Enter the IP address of the proxy server.

  - Proxy Port

    Enter the port of the proxy server.

- Interval

  Enter the interval at which you want to make requests to the server.

- ID（Default: Mac address of this interface board）

  Enter the individual identification code to be sent upon request.

- DNS

  Enter IP addresses of "preferred DNS" and "alternate DNS" to be used when making requests.

Basic Authorization Settings

If the server to which printer is communicating requires Basic authentication, it can pass the authentication and communicate with the server by this function.

- Basic Authorization (Default: Disable)

  Sets whether to send Basic authentication credentials to the request destination server.

- User

  Enter the user name to be used for basic authentication.

- Password

  Enter the password to be used for Basic Authentication.

Warning print for failed Requests

If communication with the server for the request print fails, this board can notify you of it by printing or beeping.

- Number of allowed failure before warning (Default: 0)

  Enter the number of consecutive failures before an alarm printout is executed.

  If 0 is entered, the alarm printing function is disabled.

- Beep for warning（Default: Disable）

  Sets whether to enable the buzzer function for alarm printing.

8-3. STATUS>>Request Print tab

The settings on the Request Print tab and the connection status of peripheral devices are shown here.

8-4. Printing system log

If Request Print did not work as expected, you may be able to check the situation by checking the system log of this board.

Please refer to Chapter 5 "Useful Functions for Request Print" in the "Programmer's Manual for "Request Print" for a description of system log printing.