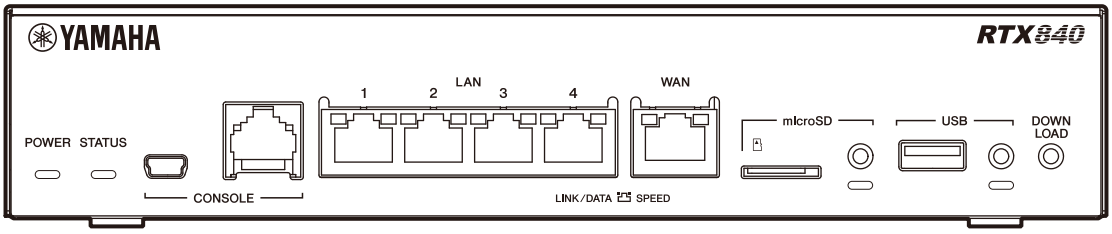
Router
RTX840

User Guide



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index

1. Introduction

This section describes the items necessary to use this product.

1.1. Accessories

The following accessories are included in this product.

- Read This First (including warranty): 1 sheet
- AC100-240V power cord: 1 piece

The following cables are not included in this product. Please check each standard and prepare them separately.

- RJ-45/DB-9 Console Cable
  This cable connects to the RJ-45 CONSOLE port. Please use our optional YRC-RJ45C or an RJ-45/DB-9 console cable of the same standard as the YRC-RJ45C.
- USB Cable
  This cable connects to the miniUSB CONSOLE port. Use a cable with connectors compatible with USB ports on your computer (USB Type-A connector, etc.) and a USB Mini-B connector.

1.2. Safety Precautions

To use this product safely, please read "Read This First" and "Warnings" and "Cautions" in this manual carefully and be sure to observe them.
The "Read This First" and "Warnings" and "Cautions" shown in this manual are intended to prevent harm to customers and others and damage to property by using the product safely and correctly.
After reading, please be sure to store it in a place where the user can see it at any time.

1.3. Precautions for Use

"Precautions for use" shown in "Read This First" are for preventing malfunction, damage or malfunction of this product and loss of data. Please read carefully and be sure to use it.

1.4. Important Notice

Security Measures and the Firewall Function of this product

Using the Internet, you can collect information from all over the world on your website and exchange messages by email, which is very convenient. On the other hand, your computer is at risk of unauthorized access from all over the world. Especially when you are always connected to the Internet or open to the public, it is necessary to understand the danger of unauthorized access and take security measures. Although this product is equipped with a firewall function for security measures, means of unauthorized access and loopholes (security holes) are newly discovered day and night, and there is no perfect means to prevent unauthorized access and security holes. Please understand that connecting to the Internet is dangerous, always obtain new information, and take security measures at your own risk.

Communication Charges

You may need to disable automatic dialing if you use this product with a pay-per-use line service (such as a mobile phone network.)
Please be sure to understand the functions before using them.
When this product is connected to a computer or LAN, this product monitors the destination of data sent by computer software (mail software, web browser, etc.) and data flowing on the LAN.
If there is a destination other than the LAN, it will automatically connect to the line according to the preset contents.

Therefore, if there is a mistake in setting or forgetting to disconnect the line, software or equipment may send packets periodically, and unexpected communication charges and provider connection charges may be incurred.
Please regularly check communication records to see if there are any unintended transmissions.

Unexpected communication charges may be incurred in the following cases.

- When starting to use this product
- When changing the provider connection settings of this product
- When installing new software on your computer
- When connecting a new computer, network device, or peripheral device to the network
- When updating the firmware of this product
- Other cases, such as when you perform an unusual operation or notice a difference in the response of communication.

NOTICE

- Please be sure to delete or reconfigure the connection settings of this product when you cancel or change the provider contract.
  If you do not delete your connection settings, you may be charged an unexpected fee by your network provider.
- Depending on the status of the provider (change of access point, maintenance, failure, etc.), you may be charged an unexpected communication fee.
  Always pay attention to notification information from the provider.

Information on open-source software

Open source software is included in the firmware of this product. You can check the copyright information and usage conditions of each open source software with the following commands.

```
> show copyright detail
```

Software license terms and conditions

By using this product, you are deemed to have agreed to the Yamaha network product software license terms and conditions. Please be sure to read the Yamaha network product software license terms and conditions before using this product. If you do not agree to the Yamaha network product software license terms and conditions, you may not use this product.

- Yamaha network product software license terms and conditions are published on the following website.
  https://www.rtpro.yamaha.co.jp/RT/docs/firmware/license/LICENSE

1.5. Notation in This Manual

1.5.1. Definition of Notation

In this manual, the following notations are used to ensure the safe use of this product.

WARNING
The content is "possible to cause death or serious injury".

CAUTION
The content is "possible to cause injury".

NOTICE
Instructions that must be observed to prevent product failure, damage, malfunction, and data loss.

IMPORTANT
Information required to operate the product correctly.

NOTE
It is information related to operation and operation. Please read it for reference.

1.5.2. Abbreviations

In this manual, each product is described by abbreviations as follows.

- Yamaha Router RTX840: This product
- Microsoft® Windows®: Windows
- Microsoft® Windows® 11: Windows 11
- 10BASE-T/100BASE-TX/1000BASE-T cable: LAN cable

1.5.3. Notation in the text

In order to help understand the content, the following notations are used in the text.

Contents	Rules	Examples
Warnings in the text	Emphasis is placed on underlining.	Communication is interrupted.
Commands	Bold lowercase letters	**show config** command
Keyboard keys	Enclose them in brackets []	[Enter] key
Pressing multiple keys at the same time	List the keys to be pressed simultaneously and connect them with "+."	[Ctrl]+[X]

1.5.4. Contents of this manual

- In this manual, when using a global IP address as an example, use the following IP addresses from IP addresses reserved by RFC6890 for document creation purposes.
    - IP address range: 203.0.113.0/24

  This IP address cannot be used for communication. When actually setting it, please use the one that matches the usage environment.
- Detailed knowledge about the Internet and networks is required to master this product.
  This manual does not provide detailed information on the Internet or networks. For details, refer to the manuals on the market.
- It is prohibited to reprint part or all of the contents of this manual without permission.
- This manual explains the specifications at the time of production. The specifications of this product are subject to change.
- We are not responsible for any loss that may occur as a result of using this product incorrectly. The warranty is limited to the extent of property damage to this product. Please be aware of this.

1.5.5. About trademarks

- The names of companies and products described in this manual are registered trademarks or trademarks of each company.
- This product uses "RC4". RC4 is a registered trademark of RSA Security LLC in the United States and other countries.

1.6. Flow of Use

To use this product, install and configure it according to this manual.

1. Install this product in an appropriate place and connect the necessary cables.
   ("Installing the Product")
2. Start this product.
   ("Starting/Stopping This Product")
3. Prepare to perform the settings in the console of this product.
   ("Using the Console")
4. Set up this product using commands.
   ("Setting Up This Product")
5. Manage this product as needed.
   ("Managing This Product")

1.7. Manual Guidance

The following manuals are available for you to fully utilize the functions of this product. Please read the appropriate manual for your purpose.

1.7.1. Included with the product

- Read This First
  Precautions for using this product are described. Be sure to read and observe the precautions before using this product.

1.7.2. Published on the website

- User Guide (this manual)
  It comprehensively explains how to install, configure, and manage this product for those who manage this product and the network connected to this product. Be sure to read and observe the precautions before using this product.
- Command reference
  The format of commands for setting this product and examples of use are described.

If you encounter any trouble while using this product, please refer to the following methods to solve the problem.

- Please refer to the "command reference" (website) to see how to use the configuration commands.
- Please refer to the information on Yamaha network equipment and review the settings.
  https://network.yamaha.com/setting/
- Please refer to the information on Yamaha network equipment for failure isolation methods and example settings, and review the settings.
  https://www.rtpro.yamaha.co.jp/RT/docs/
  (These pages are in Japanese. Please use your browser's translation feature to check.)

2. Product Overview

This chapter describes the main features and functions of this product.

2.1. Key Features

This product is a Giga Access VPN router for enterprises.
It has a function to easily break out major cloud services locally.
It contributes to strengthening the network infrastructure of enterprises as a base router that is optimal for network environments premised on cloud usage.

2.1.1. Support for Various Network Environments

Equipped with local breakout function as standard

In this product, "local breakout function" can be used free of charge. Use local breakout function and you can connect directly to the Internet without going through the center router for specified cloud services. It contributes to reducing the load on the center router and stabilizing the base network environment.

Supports IPsec, L2TP/IPsec, and PPTP

Supports IPsec, L2TP, and PPTP. Virtual private network over the Internet (VPN) to send and receive data more securely.

2.1.2. High network performance

Supports Gigabit Ethernet on all ports

WAN ports and all LAN ports support 1000BASE-T, 100BASE-TX, and 10BASE-T.

High throughput

It achieves high throughput by incorporating a high-performance CPU, hardware VPN accelerator, and “Fast Path” functionality that enables high-speed packet forwarding.

2.1.3. Reducing Administrative Burden

Easy Setup

By using the Web GUI’s "Easy Setup", you can configure the basic settings of the router using a web browser on your computer, even without knowledge of Yamaha router commands.
For information on how to use Web GUI, see "Using the Web GUI" and "Web GUI Operation Manual" (website).

Visualization of communication traffic

This product supports application control service "DPI" (a paid license is required). DPI function communication traffic can be identified and handled on an application-by-application basis. Signatures necessary for identification are automatically updated on a regular basis, enabling visualization of communication traffic without the need for management or maintenance.

Supports external memory

By connecting a microSDHC card to the microSD slot or USB memory device to the USB port, respectively, the following operations are available for convenient management functions:

- Operations using firmware and configuration files stored in external memory
- Backing up configuration files to external memory
- Saving logs and other data to external memory

For information on external memory that can be used with this product, see "Hardware Specifications".
For information on how to use external memory with this product, see "Using External Memory".

Equipped with a mini-USB console port

Even if your computer does not have an RS-232C terminal (COM port), you can use the console to configure it without having to prepare a separate USB-serial conversion cable.

Lua scripts are available

Lua scripts are available. Changing settings and programming actions according to changes in the state of this product can be used for advanced management.
For more information on Lua scripts available with this product, see the following website.
https://www.rtpro.yamaha.co.jp/RT/docs/lua/
(The page is in Japanese. Please use your browser's translation feature to check.)

Abundant technical information

On the Yamaha Network Peripheral Equipment Technical Information page, you can learn more about detailed usage and troubleshooting of this product.
You can refer to advanced technical information.
https://www.rtpro.yamaha.co.jp/
(The page is in Japanese. Please use your browser's translation feature to check.)

2.1.4. Environmental Considerations

RoHS compatible

Complies with the European RoHS Directive, which restricts the use of lead, mercury, cadmium, hexavalent chromium, PBB (polybrominated biphenyl), PBDE (polybrominated diphenyl ethers), DEHP (bis(2-ethylhexyl) phthalate), DBP (dibutyl phthalate), BBP (butyl benzyl phthalate), and DIBP (diisobutyl phthalate).

It supports EEE (Energy Efficient Ethernet)

It supports EEE (Energy Efficient Ethernet), and can realize power saving in Ethernet communication.
For more information on the EEE function, see "Using the EEE Function".

2.2. Main Functions

The functions of the proven Yamaha router have been inherited and further enhanced.

2.2.1. Router function

Routing

It routes IPv4 and IPv6 packets. The following routing protocols are supported.

Packet type	Routing protocol
IPv4	RIP, RIP2, OSPF, BGP4
IPv6	RIPng, OSPFv3

Filter type routing

It determines the destination of packets by IP address, protocol, and port number.
You can connect to multiple providers at the same time.

NAT/IP masquerade

You can translate addresses using NAT and IP masquerade.

- NAT: It converts global addresses and private addresses in one-to-one correspondence.
- IP masquerade: Multiple private addresses are associated with one global address and converted.

VPN connection

You can connect your locations with Internet VPN. The following protocols are supported.

- IPsec (AES128/256, 3DES, DES, IKEv1, IKEv2, NAT Traversal, XAUTH)
- L2TP/IPsec
- L2TPv3

IPv6 connection function

IPv6 Internet connection using IPv6 PPPoE or IPv6 IPoE, IPv4 Internet connection using IPv6 IPoE. It supports IPv4 over IPv6 MAP-E method/DS-Lite method.

PPPoE client function

You can use the PPPoE client function, which is necessary when using broadband access lines such as FTTH or ADSL lines.

Line backup function

Mobile phone network is used as a backup line in case of failure when using Internet VPN.
Line backup is possible with various configurations.

2.2.2. Security function

Packet filter

Static filter and dynamic filter are available.

- Static filter: Packets are controlled by source and destination IP addresses, port numbers, and protocol.
- Dynamic filter: IP packet flow is controlled on a per-session basis.
  Filtering by MAC address is also possible.

Illegal access detection (IDS) function

It detects malicious packets intended for intrusion or attack, as well as P2P software. Detected unauthorized packets can be discarded and bandwidth can be restricted.

Device authentication function

Using the DHCP-based device authentication function, you can set the access range for each device on the network. You can prohibit network connections from devices other than those with specific MAC addresses or limit the networks that a device can connect to.

URL Filters

It is equipped with an internal database reference type URL filter function. Accessible URLs are restricted by referencing the database configured in this product.

2.2.3. QoS (Quality of Service) function

It has the following basic QoS functions and Yamaha's original adaptive QoS function.

QoS type	QoS function
Basic QoS	Priority control, bandwidth control
Yamaha unique adaptive QOS	Dynamic Traffic Control, Dynamic Class Control, Bandwidth detection function, Load notification function

2.2.4. Management and Operation Features

Multiple configuration files can be saved

- Multiple configuration files can be saved in non-volatile memory of this product. When starting this product, you can select any configuration file.
  For more information, see "Selecting the configuration file to be used and starting".
- History of configuration files is also saved. It is useful when you want to restore the original settings. For more information, see "Configuration File Management".
- You can start this product with firmware and configuration files saved in a microSD card and USB memory. It is useful when you want to temporarily try settings.
  For more information, see "Booting with Firmware and Configuration Files from External Memory".

Dashboard

Various information such as CPU and memory usage, traffic volume, VPN connection status can be viewed on the dashboard on the Web GUI. Warning messages are displayed when various parameters to be monitored exceed a threshold, so it can be used for cause analysis and troubleshooting when a failure occurs.

Power-off log saving function

When the POWER switch is set to STANDBY, the log is automatically saved to the non-volatile memory of this product. Since the log does not disappear even after power-off, you can check the log before power-off after restarting this product.

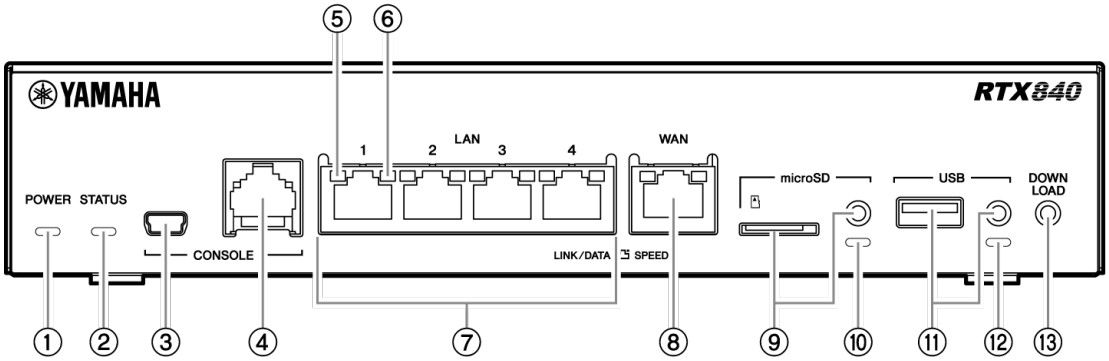
Fail-safe firmware update process/setting file save process

If the update process does not end normally due to a power failure or power cord disconnection while updating the firmware/configuration files in the non-volatile memory of this product, the firmware/configuration files are returned to the ones before updating. This prevents situations such as firmware loss and boot failure, or configuration file loss and malfunction.

3. Names and Functions of Each Part

This chapter explains the names and functions of each part of this product.

3.1. Front



① POWER indicator

Indicates the power status of this product.

- Lights off: The power is off or in standby.
- Lights green: Operating.
- Flashing green: During startup immediately after turning the POWER switch ON, or during shutdown immediately after turning the POWER switch STANDBY.

② STATUS indicator

Indicates the backup status of the line.

- Lights off: The main line is in a communication-capable state.
- Lights orange: The main line is in a communication-incapable state.

③ miniUSB CONSOLE port

A miniUSB port for configuration.
Connect it to the USB port of your computer with a USB cable.
Connectors compatible with USB ports of your computer (USB Type-A connector, etc.) and a USB cable of a USB Mini-B connector.

④ RJ-45 CONSOLE port

RJ-45 port for configuration.
Connect it to the RS-232C terminal (COM port) of your computer with an RJ-45/DB-9 console cable.

⑤ LINK/DATA indicator

Indicates the LAN port/WAN port status.

- Lights off: The LAN and WAN are not in a communication-capable state (Link loss).
- Lights green: The LAN and WAN are in a communication-capable state. (Link established).
- Flashing green: Data is flowing to the LAN and WAN. (Data is being transferred).

⑥ SPEED indicator

Indicates the connection speed of the LAN port/WAN port.

- Lights off: Not connected or connected with 10BASE-T/100BASE-TX.
- Lights green: Connected with 1000BASE-T.

⑦ LAN port

10BASE-T, 100BASE-TX, 1000BASE-T port.
4 Port switching hub.
Connect it to the LAN port of your computer or to the hub port with a LAN cable.

⑧ WAN port

10BASE-T, 100BASE-TX, 1000BASE-T port.
Connect it to a cable modem, ADSL modem, or ONU with a LAN cable.

⑨ microSD slot and button

There is a slot for inserting the microSD card and a button to stop using the microSD card.
When inserting the microSD card, insert the microSD card from the front of the main unit. If you insert it diagonally, it may not come off. Please be careful.
To remove the microSD card, press and hold the microSD button for at least 2 seconds until the microSD indicator light turns off, then remove the card.

⑩ microSD indicator

Indicates the connection and usage status of the microSD card.

- Lights off: The microSD card is not inserted into the slot. Safe to remove the card..
- Lights green: The microSD card is inserted.
- Flashing green: Accessing the microSD card.

⑪ USB port and button

This port connects a USB memory or a USB data communication terminal compatible with the cellular phone network.
To remove the USB device, press and hold the USB button for at least 2 seconds to turn off the USB indicator before removing it.

⑫ USB indicator

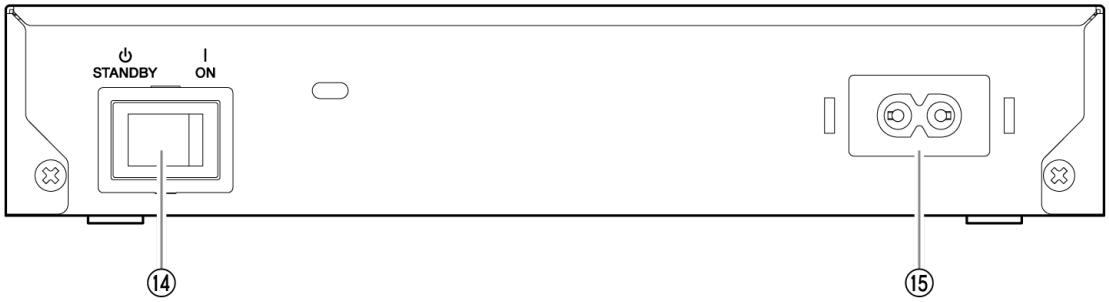
Indicates the connection and usage status of the USB device.

- Lights off: The USB device is not connected to the port. Or you can remove the USB device.
- Lights green: The USB device is connected.
- Flashing green: Accessing the USB device.

⑬ DOWNLOAD button

Press this button for at least 3 seconds to upgrade the firmware.
By default, this feature is disabled.

3.2. Rear



⑭ POWER Switch

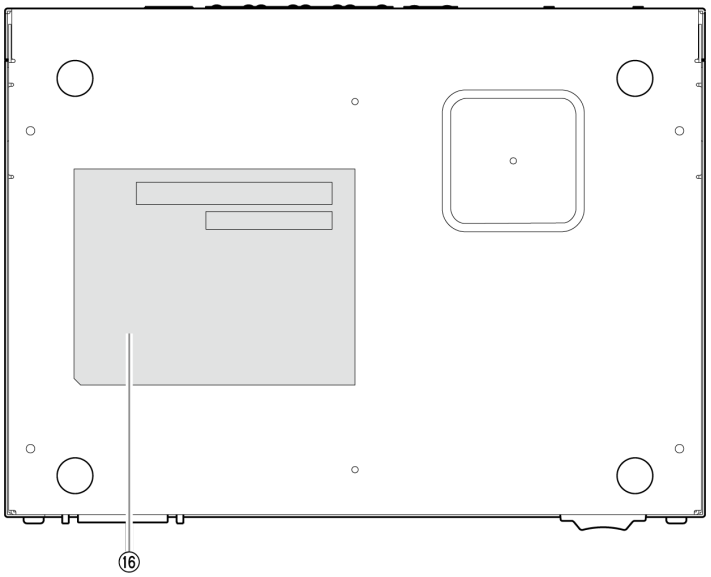
Turn this product ON/STANDBY.

- ON: When starting this product, connect the power cord to this product and then turn the POWER switch ON.
- STANDBY: When stopping the use of this product, set the POWER switch to STANDBY. After this product performs termination processing such as saving a log file, this product automatically enters the STANDBY state.

⑮ Power inlet (2-pole connector, C8 type)

Connect the included power cord.

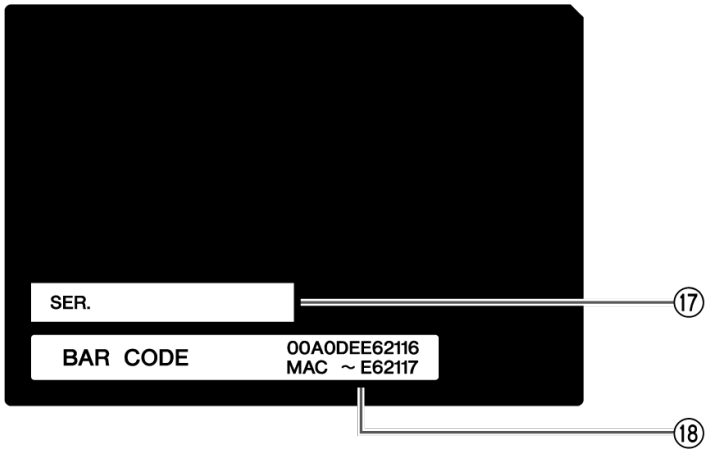
3.3. Bottom



⑯ Product label

The serial number and MAC address of this product are listed.
See "Product Label" for more information.

3.4. Product Label



⑰ Serial number

The serial number for managing/separating the product is listed.

⑱ MAC address

MAC address assigned to each of LAN and WAN is listed.
For example, the following MAC address is set in this figure.

- LAN side MAC address: "00:A0:DE:E6:21:16"
- WAN side MAC address: "00:A0:DE:E6:21:16"

3.5. Hardware Specifications

Items		Specifications and characteristics
External dimensions		220 (W) × 43.5 (H*) × 160 (D) mm (excluding protruding parts) * Height including legs
Mass		1.1 kg (excluding accessories)
Power supply voltage and frequency		AC100 to 240 V, 50/60 Hz
Maximum power consumption / Maximum current consumption		12 W / 0.24 A
LAN port	Standards Number of ports Communication mode Polarity	IEEE802.3 (10BASE-T/100BASE-TX/1000BASE-T) 4 (4-port L2 switch) Auto-negotiation or fixed setting Straight/cross automatic discrimination or straight fixation
WAN port	Standards Number of ports Communication mode Polarity	IEEE802.3 (10BASE-T/100BASE-TX/1000BASE-T) 1 Auto-negotiation or fixed setting Automatic straight/cross discrimination or straight fixation
CONSOLE port (USB Mini-B)	Standards Data transfer rate	USB 2.0 9600 (Initial Value) /19200/38400/57600/115200 bit/s
CONSOLE port (RJ-45)	Standards Data transfer rate	RS-232C 9600 (Initial Value) /19200/38400/57600/115200 bit/s
USB port (Type-A)	Standards File system	USB 2.0 (supply current up to 500 mA) FAT or FAT32
microSD slot	Standards File system	microSD/microSDHC FAT or FAT32
Indicator		POWER, STATUS, LAN [LINK/DATA, SPEED] x 4 WAN [LINK/DATA, SPEED], microSD, USB
Radio interference standards		VCCI Class A
Certification number		P25-0013001, M25-0003
Operating environment conditions	Ambient temperature Ambient humidity	0 to 50°C 15 to 80% (non-condensing)
Storage environment conditions	Ambient temperature Ambient humidity	-20 to 50°C 10 to 90% (non-condensing)

4. Installing the Product

This chapter describes precautions and installation procedures for installing the product.

4.1. Precautions for Installation

WARNING
Before installation, please read the "Read This First" (attached to the product, website) and be sure to follow the "PRECAITIONS" section.

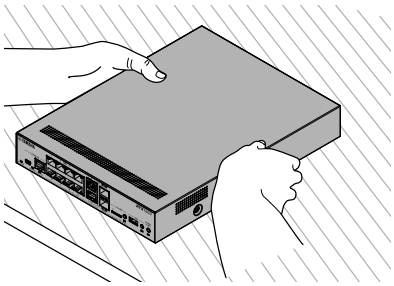
NOTICE
When selecting the installation location of this product, please confirm that the following conditions are met.

- Ambient temperature and humidity must be within operating conditions.
  *For operating conditions, see "Hardware Specifications".
- Allow room for power cords and LAN cables.
- The location must allow for easy maintenance and servicing of the product.

4.2. Installing the Product

4.2.1. When installing horizontally

Install it in a horizontal location such as a desk.



CAUTION
Do not place this product on top of other equipment.

4.3. Preparation Before Starting Up

This section describes the preparations required before starting up this product.
Refer to the following and perform the work. Connect the power cord only after all other connections are complete.

4.3.1. Prepare necessary cables and terminals.

Prepare necessary cables for using this product.
LAN cables, RJ-45/DB-9 console cables, and USB cables are not included. Please prepare them separately.

Preparation of LAN cables

- This product is equipped with a straight/cross automatic discrimination function of the LAN port, so that straight or cross cables can be used.
- When using with 1000BASE-T, use an enhanced category 5 (CAT5e) or higher LAN cable.

NOTICE

The connector shapes of the LAN port and RJ-45 CONSOLE port are the same 8-pin connector. Connecting them incorrectly can lead to hardware damage or failure. Check thoroughly before connecting.

Preparation of console cables and terminals

- When setting up this product from a terminal connected to the CONSOLE port of this product, use a USB cable or RJ-45/DB-9 console cables.
- When using the miniUSB CONSOLE port, you need to install the USB serial driver beforehand. See "Installing the USB serial driver".
- Use a USB cable that corresponds to the USB port of the setting computer (such as a USB Type-A connector) and a USB cable of the USB Mini-B connector for connecting to the miniUSB CONSOLE port.

The personal computer requires terminal software that controls the serial (COM) port of the personal computer. Set the parameters of the terminal software as follows.

Terminal parameters	Setting value
Data transfer rate	9600bit/s
Character bit length	8
Parity check	None
Stop bit count	1
Flow control	Xon/Xoff

- The above setting value of the data transfer rate "9600bit/s" is the initial value of the CONSOLE port of this product. If you change the setting of the data transfer rate of the CONSLOE port, you also need to change the data transfer rate of the terminal software of the personal computer.
- When both the RJ-45 CONSOLE port and the miniUSB CONSOLE port are connected to a personal computer, it is possible to set them only with the terminal software that uses the miniUSB CONSOLE port. Note that output messages from this product are output to both CONSOLE ports.

Installing the USB serial driver

Yamaha Network Equipment USB Serial Driver Supported OS : Windows 11

The installer and installation guide for the Yamaha Network Equipment USB Serial Driver can be downloaded from the following website.
https://network.yamaha.com/support/download/utility/
(The page is in Japanese. Please use your browser's translation feature to check.)

4.3.2. Preparing a USB Data Communication Terminal

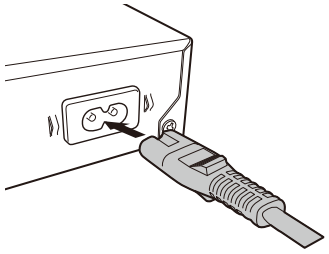
When using the mobile Internet, prepare a compatible USB data communication terminal for this product.

NOTICE

Insert the USB data communication terminal directly into the USB port of this product. Do not use an extension cable.

4.3.3. Connecting a Power Cord

1. Ensure the POWER switch is set to STANDBY.
2. Connect the power cord to the power inlet on the rear of the router.



3. Plug the power plug into an AC outlet.
   For the startup procedure of this product, please refer to "Starting/Stopping This Product".

5. Starting/Stopping This Product

This chapter describes the startup procedure and the shutdown procedure of this product.

5.1. Startup Procedure

In this manual, the following three startup procedures are introduced.

- "Booting with the default configuration file" (basic boot procedure)
- "Selecting the configuration file to be used and starting"
- "Booting with Firmware and Configuration Files from External Memory"

NOTE

The configuration file does not exist when shipped from the factory. After changing the settings of this product with the command, save the settings with the **save** command to create a configuration file.

5.1.1. Booting with the default configuration file

This is the basic startup procedure. Start this product using the firmware and the default configuration file stored in the non-volatile memory of this product.

1. Make sure that the POWER switch of this product is set to STANDBY.
2. Make sure that no microSD card or USB memory is inserted into the microSD slot or USB port of this product.
3. Turn ON the POWER switch of this product.
    - The POWER indicator of this product blinks.
    - After approximately 10 seconds, the router loads the firmware and default configuration file stored in the non-volatile memory of this product are read, and this product starts the startup process.
    - When the startup process is completed, the POWER indicator changes from a blinking state to a lit state.

5.1.2. Selecting the configuration file to be used and starting

Start this product using the firmware and the configuration file stored in the non-volatile memory of this product. If multiple configuration files are stored in the non-volatile memory of this product, you can select which configuration file to use to start this product at startup. For example, if a problem occurs in this product, you can start it with the configuration file before the problem occurred.
Open the console screen of this product on a computer connected to the CONSOLE port.

NOTE

- For the purposes of this section, we assume that you understand how to use the console. For more information about using the console, see "Using the Console".
- The console screen when multiple configuration files are stored is shown here for explanation.

1. Make sure that the POWER switch of this product is set to STANDBY.
2. Make sure that no microSD card or USB memory is inserted into the microSD slot or USB port of this product.
3. Connect the computer to the CONSOLE port of this product.
4. Start the console screen of your computer.
5. Turn on the POWER switch of this product.
   - The POWER indicator of this product blinks.
   - The startup message of this product is displayed on the console screen of your computer, and a countdown for 10 seconds begins.

```
RTX840 BootROM Ver. 1.01
 Copyright (c) 2024 Yamaha Corporation. All Rights Reserved.

Press 'Enter' or 'Return' to select a configuration.
Default settings : config0

Will start automatically in : 10
```

6. Press the [Enter] key on the console screen of your computer before the 10-second countdown ends.
   - A prompt waiting to enter a configuration file number appears on the console screen of your computer.

```
No.   Date       Time     Size    Sects   Comment
----- ---------- -------- ------- ------- ----------------------
* 0   2025/07/01 18:42:36     422 703/703 ospf testing
  0.1 2025/07/01 08:18:06     328 704/704 test
  0.2 2025/07/01 17:17:39     294 705/705
  1   2025/07/02 11:59:18     292 702/702 BGP+VRRP fix
----- ---------- -------- ------- ------- ----------------------
Select the configuration : 0
```

7. Enter the number of the configuration file to be used.
   - To specify a saved configuration file, enter the configuration file number displayed on the console screen. In this example, enter either "0", "0.1", "0.2", or "1".
   - To create a new configuration file, enter the configuration file number that is not displayed on the console screen. In this example, enter either "2", "3", or "4".
8. Press the [Enter] key.
   - Using the selected configuration file, this product starts the startup process. The POWER indicator blinks.
   - When the startup process is completed, the POWER indicator changes from a blinking state to a lit state.

NOTE

After logging in to this product, you can check whether this product is running with the specified configuration file by the following method.

- Checking with the Web GUI:
  Check the display of the "System Information" gadget on the dashboard Live screen.
  For example, if you specify "0" as the configuration file number, it will be displayed as follows.
  Running configuration file: config0
- Checking with the console:
  Run the **show environment** command.
  For example, if "0" is specified as the setting file number, the following is displayed.

```
>show environment
...
Config. file: config0  Default config. file: config0
...
```

5.1.3. Booting with Firmware and Configuration Files from External Memory

Boot this product using firmware and setting files stored in external memory. This is useful when you want to try new firmware and setting files temporarily.

Preparation of external memory

1. Prepare an external memory (microSD card or USB memory) formatted in FAT or FAT32 format.
2. Save the firmware and setting files to be used in external memory.
   If this product is in the factory default state, set the file name of the firmware to "rtx840.bin" and the file name of the setting file to "config.txt".

NOTE

- It is recommended to save files in the root directory.
  (When starting this product, if there are multiple files with the corresponding name in external memory, the file closest to the root directory is selected.)
- Each file name can be changed with **external-memory exec filename** command and **external-memory config filename** command.

Start-up procedure

1. Make sure that the POWER switch of this product is set to STANDBY.
2. Insert the external memory where the firmware and setting files you want to use are stored into the microSD slot or USB port of this product.

NOTE

If the firmware and setting files do not exist in the external memory inserted into this product, boot using the firmware and setting files stored in non-volatile memory of this product.

3. Turn ON the POWER switch of this product.
   - The POWER indicator of this product blinks.
   - After 10 seconds, the product starts by reading the setting file set as the default.
   - The POWER indicator changes from blinking to lit.
   - This product recognizes the external memory and the microSD indicator or USB indicator lights up.
   - This product searches for firmware and setting files in external memory. The microSD indicator or USB indicator flashes while searching.
   - If the firmware and setting files are found in the external memory, the firmware and setting files are expanded to the operating memory of this product. The microSD indicator, USB indicator, and DOWNLOAD indicator blink three times when the startup process is completed.

NOTE

After logging in to this product, you can check whether this product is operating with the firmware and setting files read from the external memory by the following method.

- Checking with Web GUI:
  Check the display of the "System Information" gadget on the Dashboard Live screen.
  For example, if you are using the firmware and setting files read from a microSD card, it will be displayed as follows.
  - Running firmware: sd1:/rtx840.bin
  - Running configuration file: sd1:/config.txt
- Checking with the console:
  Run the **show environment** command.
  For example, if you are using the firmware and setting files read from a microSD card, it will be displayed as follows.

```
>show environment
...
Firmware:sd1:/rtx840.bin
Config. file:sd1:/config.txt
...
```

NOTE

- To prevent the firmware and setting files from working in the external memory, use the following command.
  external-memory boot permit off
- When starting by connecting the external memory, it may take a long time to automatically search for files depending on the number and configuration of files and folders stored in the external memory. To shorten the search time, save the file in a hierarchy close to the root, or specify a file path to omit the automatic search time.
  For more information, please see "Command Reference" (website).

  external-memory config filename
  external-memory exec filename
  external-memory auto-search time

5.2. Procedure for Stopping the Product

This section describes the procedure for safely stopping the product.
In an emergency, such as when the product breaks down, a communication error occurs, or a security problem occurs, turn off the power immediately.

NOTE

This section assumes that you understand how to use the console. For more information about using the console, see "Using the Console".

1. The **pp disable all** command to disable all destinations.
2. The **disconnect all** command disconnects communication with all destinations.
3. The **save** command saves the settings.

NOTICE

If you change the settings of the product using the console, they are immediately reflected in the operation of the product, but they are not saved in the internal memory (Flash ROM). If you turn off the power without saving the settings with the **save** command, the changed settings will be restored. For more information, see "Finishing settings".

4. If a microSD card or USB memory is connected, press and hold the button on the external memory on the front of the product for at least 2 seconds.
   Remove the external memory after the external memory indicator turns off.
5. Set the POWER switch to STANDBY.
   The POWER indicator turns off and the product enters standby mode.

NOTICE

When repowering this product, wait at least 10 seconds after the POWER indicator turns off.

NOTE

- When you turn off the power with the POWER switch, the product automatically saves the log to the product's non-volatile memory (power-off log save function). The log will not disappear even after the power is turned off, so you can check the log before the power was turned off after restarting the product.
- However, if you turn off the power by a method other than the POWER switch, such as by unplugging and plugging in the power cord, the logs before the power was turned off will not be saved.

6. Using the Web GUI

This product is equipped with a Web GUI, and you can make basic settings required for Internet connection using a web browser on your computer.
It also has a convenient screen for management as well as settings.

NOTE

For more information about available web browsers, please visit the following website.
https://www.rtpro.yamaha.co.jp/RT/FAQ/gui/browser.html
(This website is in Japanese only. Use your browser's translation feature to check.)

6.1. Login Procedure

This section describes the procedure for logging in to the Web GUI.

- "First login (factory default)"
  Log in to this product using an account with the default administrative user "admin" (initial password "admin").
  To log in to this product, you need to change the password of the default administrative user.
- "Second and subsequent login (if password has been changed)"

6.1.1. First login (factory default)

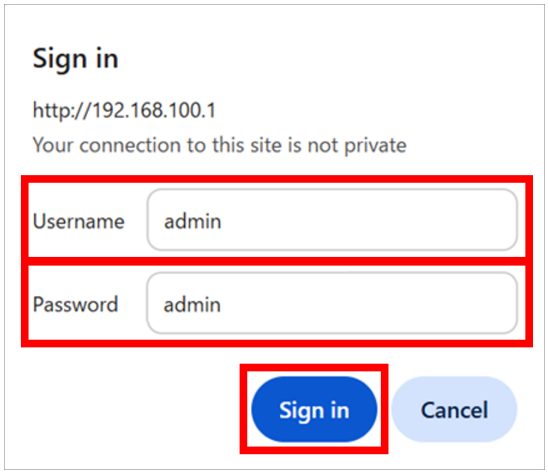
To log in to this product, you need to change the password of the default administrative user "admin" (initial password "admin"). Please follow the steps below to log in and change your password.

1. Connect the LAN interface (one of ports 1 to 4) of this product to a computer with a LAN cable.

IMPORTANT

You cannot log in from a computer connected to the WAN interface until you change the password of the default administrative user "admin".

2. Launch the web browser on your computer.
3. Enter "http://192.168.100.1" in half-width alphanumeric characters in the address bar, and press the [Enter] key.
   A dialog will appear for you to enter your user name and password.
4. Enter "admin" as your user name and "admin" as your password, and click the "Sign In" button.



The password change screen will appear.

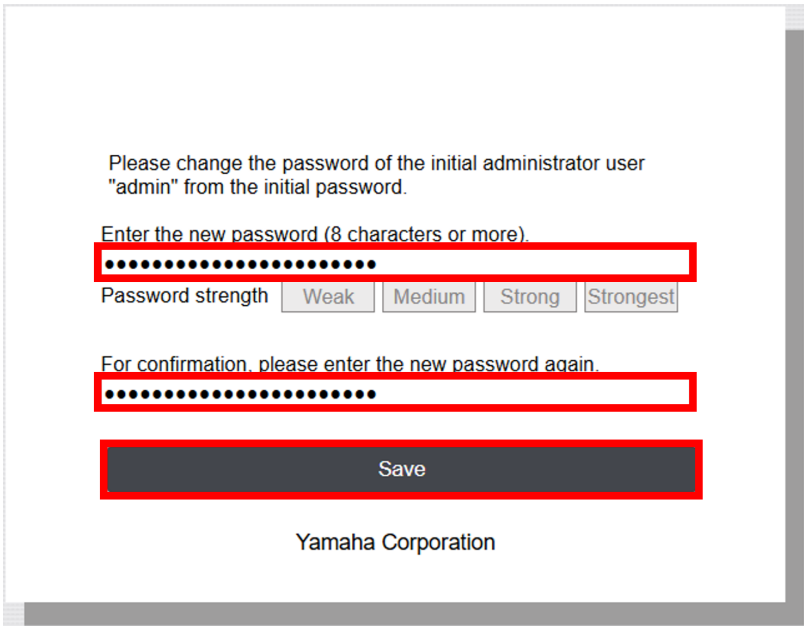
IMPORTANT

You cannot log in to this product until you have set a new password.

NOTE

If you make a mistake with your user name or password three times in a row, an error screen will appear. In that case,
wait at least one minute, and then start over from step 3.

5. Enter the new password in the two fields, and click the "Save" button.



IMPORTANT

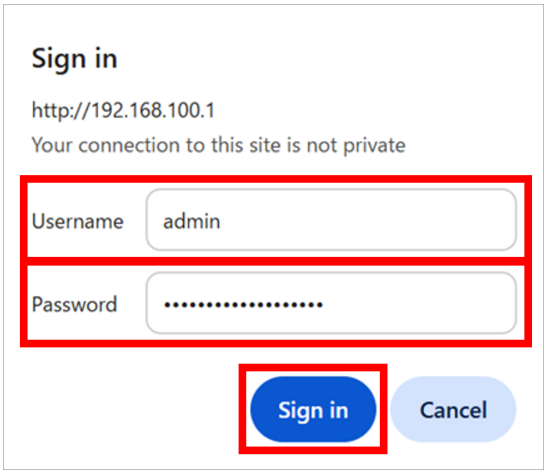
- The password has the following conditions.
  - Number of characters: 8 to 32
  - Characters that can be used
    *Upper and lower case letters are distinguished.

Half-width alphanumeric characters	a-z, A-Z, 0-9
Half-width symbol	!"#$%&'()=|~-^¥`{@[+*};:]<>?_,./\

- From the viewpoint of security, we recommend a password that satisfies the following conditions.
  - 15 characters or more
  - Includes various character types (uppercase letters, lowercase letters, numbers, symbols)

A dialog for entering a user name and password appears.

6. Enter "admin" as the user name and the new password set in step 5 as the password, and click the "Sign In" button.



The Web GUI dashboard is displayed.

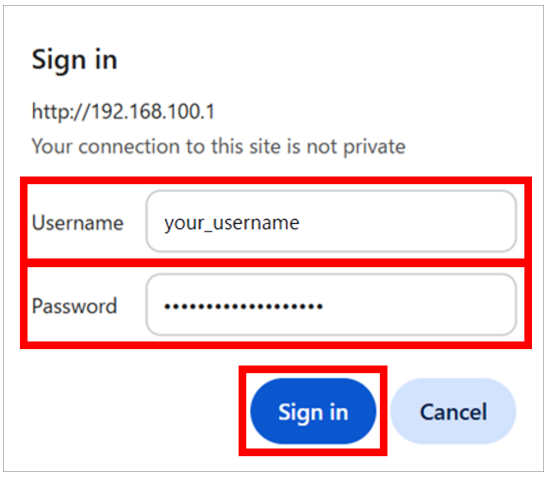
IMPORTANT

After logging in for the first time, it is recommended to register a new user account instead of the initial administrative user "admin" for security enhancement. For instructions on how to register a user account, see "Web GUI Operation Manual" (website).

6.1.2. Second and subsequent login (if password has been changed)

If the password of the initial administrative user "admin" has been changed, you can log in to this product by the following procedure.

1. Connect the LAN interface of this product (one of ports 1 to 4) to a personal computer with a LAN cable.
2. Launch a web browser on your computer.
3. Enter "http://(IP address of this product)/" in half-width alphanumeric characters in the address bar, and press the [Enter] key.
   A dialog for entering a user name and password appears.
4. Enter your user name and password, and click the "Sign In" button.



The Web GUI dashboard is displayed.

NOTE

If you make a mistake in the user name or password three times in a row, an error screen will be displayed. In that case, wait at least one minute, and then start over from step 3.

7. Using the Console

This chapter describes the console of this product.
The console allows you to configure the product and check the status of this product.

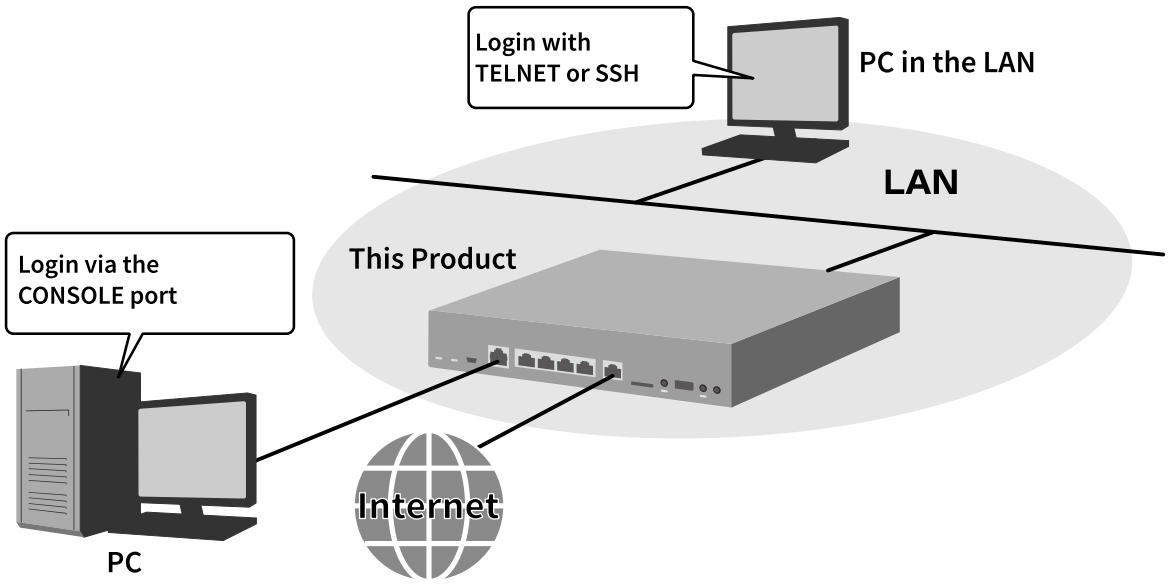
7.1. How to Log In

There are two ways to log in to the console of this product.

- "Logging in from a computer connected to the CONSOLE port"
- "Logging in from a host on the LAN with TELNET or SSH"

NOTE

- Up to eight users can access the product simultaneously via TELNET or SSH.
- Multiple users can become administrative users at the same time, and can be configured from different hosts at the same time.
- Each user can check the access status of all users who are currently accessing the product.
- Administrative users can force other users to disconnect.



7.1.1. Logging in from a computer connected to the CONSOLE port

Connect the computer and the CONSOLE port of this product with a USB cable or an RJ-45/DB-9 console cable, and log in to this product.

NOTE

If you use the miniUSB CONSOLE port, you need to install the USB serial driver beforehand. For more information about USB cable specifications and how to install the USB serial driver, see "Preparation of console cables and terminals" and "Installing the USB serial driver".

The personal computer requires terminal software that controls the serial (COM) port of the personal computer. Please use the terminal software for controlling serial devices provided by each company.

Set the parameters of the terminal software as follows.

Terminal parameters	Setting value
Data transfer speed	9600bit/s
Character bit length	8
Parity check	None
Number of stop bits	1
Flow control	Xon/Xoff

IMPORTANT

The above data transfer speed setting value "9600bit/s" is the initial value of the CONSOLE port of this product. If you change the data transfer speed setting of the CONSOLE port, you also need to change the data transfer speed of the terminal software of the personal computer.

7.1.2. Logging in from a host on the LAN with TELNET or SSH

You can log in to this product from a computer on the LAN with TELNET or SSH.
In this product in the factory default state, the IP address of the LAN interface is set to "192.168.100.1/24" and the DHCP server is enabled. Therefore, if you connect a computer with a DHCP client enabled to a LAN interface, an IP address is automatically assigned.

IMPORTANT

When you log in for the first time, be sure to connect your computer to the LAN interface (one of ports 1 to 4). Until you change the password of the default administrative user "admin", you cannot log in from a computer connected to the WAN interface.

Logging in via TELNET

You can log in to this product (TELNET server) from a computer (TELNET client) on the LAN.
Please use terminal software for TELNET connection provided by each company.

NOTE

You can also operate it with a Windows command prompt. In that case, please enable the "Telnet client" function of Windows.

Logging in via SSH

You can log in to this product (SSH server) from a computer (SSH client) on the LAN.
To log in to this product using SSH, you need to log in to this product using other methods beforehand and make the following settings.

- Registering a User with this product
- Enabling the SSH server of this product

7.2. Login Procedure

This section describes how to log in to the console.

- "First login (factory default)"
  Log in to this product using the account of the default administrative user "admin" (initial password "admin"). You need to change the password of the default administrative user to log in to this product.
- "Second and subsequent login (if password has been changed)"

7.2.1. First login (factory default)

You need to change the password of the default administrative user "admin" (initial password "admin") to log in to this product. Follow the steps below to log in and change your password.

1. Connect this product to a personal computer with a console cable.

IMPORTANT

When logging in with TELNET, connect the LAN interface of this product (one of ports 1 to 4) to a personal computer with a LAN cable.
You cannot log in from a personal computer connected to the WAN interface until you change the password of the default administrative user "admin".

2. Start the terminal software on the personal computer.
3. Press the Enter key.

NOTE

When logging in with TELNET, access the IP address of this product "192.168.100.1" by the operation method according to the terminal software started in step 2.

A prompt is displayed waiting for the user name to be entered.

4. Enter the default administrative user name "admin" and press the Enter key.

```
Username:admin
```

A prompt is displayed waiting for the password to be entered.

5. Enter the password of the default administrative user "admin" and press the Enter key.

```
Password:
```

NOTE

The character string entered as the password is not displayed on the console screen (the same applies in the following steps).

A prompt is displayed waiting for the password to be changed.

IMPORTANT

You cannot log in to this product until you have set a new password.

NOTE

An error is displayed on the console screen if you make a mistake in the user name or password three times in a row. In that case, wait at least one minute and start over from step 3.

6. Enter the new password and press the Enter key.

```
Initial Admin User admin Please change your password
New_Password:
```

IMPORTANT

- The password has the following conditions.
  - Number of characters: 8 to 32
  - Characters that can be used
    *Upper and lower case letters are distinguished.

Half-width alphanumeric characters	a-z, A-Z, 0-9
Half-width symbols	!"#$%&'()=|~-^¥`{@[+*};:]<>?_,./\

- From the viewpoint of security, we recommend a password that meets the following conditions.
  - 15 characters or more
  - Includes various character types (uppercase letters, lowercase letters, numbers, symbols)

A prompt appears waiting for the password to be entered again.

7. Enter the same password as in step 6 again and press Enter.

```
New_Password(Confirm):
```

Saves are automatically performed and you log in to this product. A prompt appears for general users.

```
Saving... Finished
>
```

IMPORTANT

- To configure this product, you need to access it as an administrator user. For more information, see "Access Level" and "Starting settings".
- For security enhancement after the first login, we recommend that you

register and use a new user account instead of the initial administrative user "admin". For instructions for registering a user account, see "Registering a User Account".

NOTE

From the viewpoint of security, if there is no key input to the console for a certain period of time, you will be automatically logged out. For more information, see "Set a login timer".

7.2.2. Second and subsequent login (if password has been changed)

If you have already changed the password of the initial administrative user "admin", you can log in to this product by following the steps below.

1. Connect this product to a personal computer with a console cable.

NOTE

When logging in with TELNET or SSH, connect the LAN interface of this product (one of ports 1 to 4) to a personal computer with a LAN cable.

2. Start the terminal software on your personal computer.
3. Press Enter.

NOTE

When logging in with TELNET, use the operation method according to the terminal software started in step 2 to access the IP address of this product.

A prompt appears waiting for the password to be entered.

4. Enter a user name (e.g. "user1") and press Enter.

```
Username:user1
```

A prompt appears waiting for the password to be entered.

5. Enter the password of the user entered in step 4 and press Enter.

```
Password:
```

NOTE

The character string entered as the password is not displayed on the console screen.

If the password is correct, log in to this product.

NOTE

If you make a mistake in your user name or password three times in a row, an error will be displayed on the console screen. In that case, wait at least one minute and start over from step 3.

A prompt for general users appears.

```
>
```

IMPORTANT

To configure this product, you need to access it as an administrator user. Details See "Access Level" and "Starting settings".

NOTE

From the viewpoint of security, if there is no key input to the console for a certain period of time, you will be automatically logged out. See "Set a login timer" for more information.

7.3. Selection of Character Code to Use

Character codes used in the console can be changed with the **console character** command. You can choose from en.ascii (ASCII), ja.sjis (SJIS), ja.euc (EUC), or ja.utf8 (UTF-8). The factory default setting is "ja.sjis".
The language in which error messages, help messages, and the execution results of **show** command are displayed changes depending on the character code as follows.

- Displayed in English when the character code is ASCII
- Displayed in Japanese when the character code is SJIS, EUC, or UTF-8

For example, to change the character code displayed on the console to ASCII, set as follows.

```
# console character en.ascii
```

7.4. Access Level

Users who log in to this product are classified into two groups: general users and administrative users. This is called access level.
The differences in access level are as follows:

Access level	Description
General users	You can refer to the settings of this product and communication logs. You cannot change the settings. When you log in, you need to enter your user password.
Administrative users	In addition to the operations of general users, you can change the settings of this product. After logging in as a general user, you become an administrative user with the **administrator** command. If an administrative password is set, you need to enter the administrative password.

The prompt displayed on the console screen allows you to check the current access level.
Command prompt for general users:

```
>
```

Command prompt for administrative users:

```
#
```

You can set a password corresponding to each access level.

- See "Setting Up a User Account" for how to set your user password.

NOTE

If the password of the initial administrative user "admin" is "admin", you are required to change your password when you log in for the first time. See "Login Procedure" for details.

- See "Setting an Administrative Password" for how to set up your administrative password.

7.5. How to Use the Console

7.5.1. Command input format

Command input format is general line input. Enter a command line after the prompt and press Enter to execute the command.

This product does not normally distinguish between uppercase and lowercase letters for characters entered from the keyboard. However, if it is necessary to distinguish between uppercase and lowercase letters, such as usernames and passwords, it is necessary to distinguish between uppercase and lowercase letters.

7.5.2. Screen display

If the number of lines of information displayed on the screen is large and does not fit on one screen, the set number of lines is displayed on the screen and then the display of the screen stops. Also, the following message is displayed at the bottom of the screen.

```
--- more ---
```

- Press the space key to display the remaining information.
  Press Enter to display a new line.
- After displaying the information until the end, you can automatically enter commands again.
  If you want to finish the display without displaying the information until the end, press the [Q] key. After that, you can enter commands again.

The number of lines of information displayed on the screen can be set with the **console lines** command. To prevent the screen display from stopping when displaying the number of lines that do not fit on one screen, set as follows.

```
# console lines infinity
```

7.5.3. Editing Keyboard Input

- To correct a character entered on the keyboard by one character, press the [Backspace] key or the [Delete] key on the keyboard to delete one character.
- If you move the cursor with the [←] key or the [→] key while entering a character, the next character entered will be inserted at the cursor position.

NOTE

The arrow keys may not work properly depending on the type of console terminal. In that case, use the key operations in the table below.

- The following key operations are available for editing keyboard input.

Key operations	Meaning
[Ctrl] + [A]	Move the cursor to the beginning of a line
[Ctrl] + [B]	Move the cursor to the left by one character
[Ctrl] + [C]	Line breaks without executing commands

Key operations	Meaning
[Ctrl] + [D]	Delete a character on the cursor
[Ctrl] + [E]	Move the cursor to the end of a line
[Ctrl] + [F]	Move the cursor one character to the right.
[Ctrl] + [K]	Delete characters after the cursor.
[Ctrl] + [U]	Clear input line.
[Ctrl] + [W]	Delete characters before the cursor.

NOTE

You can also check how to operate the console screen with the **help** command.

7.5.4. Error message for keyboard input

If the command name is inappropriate, the number of parameters of the command is inappropriate, or the parameter exceeds the specified range, an error message will be displayed on the console screen after pressing [Enter].
For example, if you do not enter parameters that must be entered, you will see the following error message.

```
# console lines
Error: Insufficient or too many parameters
```

NOTE

The error messages displayed by this product include communication error messages in addition to those related to the above command operation. Communication error messages are recorded as a communication log.

7.6. Auxiliary Functions for Command Input

Functions that assist keyboard input on the console include the command history function, command completion candidate display function, and command name auto-completion function.

7.6.1. Command history function

- Commands entered and executed up to that point can be called back to the command line sequentially with the [↑] key or [Ctrl] + [P].
- Commands executed after the currently displayed command can be called to the command line with the [↓] key or [Ctrl] + [N].
- Called commands can be deleted, edited, and moved by cursor as in the case of commands entered directly. See "Editing Keyboard Input" for how to operate it.

NOTE

The arrow keys may not work properly depending on the type of console terminal. In such cases:
Use [Ctrl] + [P], [Ctrl] + [N], [Ctrl] + [B], or [Ctrl] + [F].

7.6.2. Command completion candidate display function

- If you enter a command before or during input, a list of commands that can be entered will be displayed. The new command line will show the part before the [?] key is entered.
  (Example 1) If you enter "cons" in the console and then enter the [?] key:
  A keyword candidate following "cons" will be displayed.

```
# cons?
? console
# cons
```

  (Example 2) If you enter "console" in the console and then enter the [?] key:
  Since one keyword "console" has already been completed, a keyword candidate following "console" will be displayed. Note that there is a space between the keyword and "?".

```
# console ?
? character columns info lines prompt
# console
```

- If you enter the [?] key after the command name is confirmed, the command input format and description will be displayed.

NOTE

If you want to include the character "?" in a command parameter, enter "¥" (yen sign, "\" (backslash) on an English keyboard) immediately before the "?". The "¥" removes the help function of the key and allows you to enter the "?" character.

7.6.3. Command name Auto-Completion function

- If you press the space key or [Tab] key in the middle of entering a command name, you can complete the unentered part of the command name and the keyword of the parameter following the command. If there are multiple candidates for completion, the final part is completed.
- If you press [Enter] key when completion is possible until the end of the command, the command will be executed after completion. For example, you can execute **save** command by typing "sa" and pressing [Enter].

7.7. List of Commands That Can Be Entered

You can display a list of command names and summary descriptions with the **show command** command.

```
# show command
administrator:          Logs in as an administrator.
administrator password: Assigns a password for administrator.
```

For more information on commands, see the "Command Reference" (website).

8. Setting Up This Product

This chapter describes precautions for setting up this product and the setting flow.

- First items to set up
  - "Setting Up a User Account"
  - "Setting an Administrative Password"
- Flow of Setting Up, Precautions, etc.
  - "Configuration Workflow"
  - "Specific Settings"
  - "Checking Connectivity"
- How to Initialize Settings
  - "Restoring Factory Defaults"

NOTE

IP addresses used as examples in this chapter are for illustration only. When actually setting up, please read them according to your environment.

8.1. Setting Up a User Account

In this section, the following setting methods are explained.

- "Registering a User Account"
- "Changing User Privileges"
- "Changing a User Password"

8.1.1. Registering a User Account

For security reasons, it is recommended that you log in with a user account other than the initial administrative user "admin" when someone other than a network administrator accesses this product.

You can register a user account with the **login user** command. The setting conditions for the user name and password are as follows.

<table>
<tr><th>Items</th><th>Setting Conditions</th></tr>
<tr><td>User Name</td><td>
• Number of Characters: 1-32
• Characters that can be used
*Upper and lower case letters are distinguished.
<table>
<tr><td>Half-width alphanumeric characters</td><td>a-z, A-Z, 0-9</td></tr>
<tr><td>Half-width symbol</td><td>hyphens (-), and underscores (_)</td></tr>
</table>
</td></tr>
<tr><td>Password</td><td>
• Number of Characters: 8-32
• Characters that can be used
*Upper and lower case letters are distinguished.
<table>
<tr><td>Half-width alphanumeric characters</td><td>a-z, A-Z, 0-9</td></tr>
<tr><td>Half-width symbol</td><td>!"#$%&'()=|~^¥`{@[+*};:]<>?_,./\</td></tr>
</table>
</td></tr>
</table>

For example, if you want to register a user account with a user name of "user1" and a password of "Password-1234567890", enter the following.

```
# login user user1 Password-1234567890
Password Strength : Very Strong
# save
```

IMPORTANT

- From the viewpoint of security, we recommend a password that meets the following conditions.
  - 15 characters or more
  - Includes various character types (uppercase letters, lowercase letters, numbers, symbols)
- User privileges can be changed according to the purpose of use of the registered account. For more information, see "Changing User Privileges".
- From the viewpoint of security, we recommend that you also perform "Setting an Administrative Password" along with registering a user account.

NOTE

Even an administrative user cannot verify the password after setting it.
If you forget your password, run the **login user** command again. You can override the password setting by specifying a registered user name and a new password.

8.1.2. Changing User Privileges

You can change the privileges of a user by executing the **user attribute** command with a registered user name. For example, when someone other than a network administrator accesses this product, we recommend that you set the user privileges according to the purpose of use of your account.

NOTE

For how to register a user name, see "Registering a User Account".

The user privileges of this product have the following three configuration patterns. Depending on the setting value, the login privileges to this product differ as follows.

Setting Value	Permissions when Using the Web GUI	Permissions When Using the Web GUI	Notes
2	Promotion to an administrative user is possible. (Entering an administrative password is not required.)	Log in as an administrative user	Initial Administrator User "admin" Equal authority.
1	Promotion to an administrative user is possible. (Entering an administrative password is required.)	Log in as a general user	This privilege is automatically set for users immediately after registration.
off	Promotion to an administrative user is not possible.	Log in as a general user	

NOTE

For how to set an administrative password, see "Setting an Administrative Password".

For example, if you want to grant administrative user privileges even when using the Web GUI, enter the following:

```
# user attribute user1 administrator=2
# save
```

NOTE

For more information about the **user attribute** command, see Command Reference (Website).

8.1.3. Changing a User Password

You can override the password setting by specifying a registered user name and a new password with the **login user** command.
For details such as operation methods and password input conditions, see "Registering a User Account".

8.2. Setting an Administrative Password

The "Administration Password" is the password that the user added in "Registering a User Account" enters when accessing the console of this product as an administrative user.
The factory default state of this product does not have an administrative password set. For added security, it is recommended to set an administrative password.

To set an administrative password, use the **administrator password** command.

```
# administrator password
Old_Password:
New_Password:
New_Password(Confirm):
Password Strength : Very Strong
# save
```

NOTE

The character string entered as a password is not displayed on the console screen.

IMPORTANT

- The password has the following conditions.
  - Characters: 8-32 characters
  - Characters that can be used
    *Upper and lower case letters are distinguished.

Half-width alphanumeric characters	a-z, A-Z, 0-9
Half-width symbols	!"#$%&'()=|~-^¥`{@[+*};:]<>?_,./\

- From the viewpoint of security, we recommend passwords that meet the following conditions.
  - 15 characters or more
  - Including various character types (upper case letters, lower case letters, numbers, symbols)

NOTICE

- Even an administrative user cannot confirm the administrative password after setting. Be sure to remember your password.
- By using external memory, it is possible to change the startup firmware and settings of this product regardless of the setting of the administrative password. Therefore, the administrative password is rewritten, and it is also possible to execute commands that only the administrative user can execute. Use the following commands to prohibit changing the startup firmware and settings using external memory.
  - **external-memory boot permit off**
  - **operation external-memory download permit off**
  - **operation execute batch permit off**

8.3. Configuration Workflow

This product operates according to the setting file saved in the memory inside this product. This section describes the flow of operation when editing a setting file directly.

- "Using the Console"
  - "Starting settings"
  - "Settings"
  - "Checking the settings"
  - "Finishing settings"
- "Using TFTP"
  - "Advance preparation"
  - "Settings (transferring configuration files)"
  - "Checking the settings (getting the setting file)"
  - "Finishing settings"

NOTICE

If you configure this product incorrectly, it may cause serious damage to the entire network. The administrative user should be fully exercise caution when configuring the router.

8.3.1. Using the Console

Directly enter commands on the console screen of this product to edit the setting file.

Starting settings

After logging in as a general user, access it as an administrative user with the **administrator** command.
If an administrative password is set, you must enter the administrative password.

```
> administrator
Password:
#
```

NOTE

If you are logged in as an initial administrative user "admin", you can access it as an administrative user without entering the administrative password.

Settings

Directly enter commands on the console screen.
For details of settings, see "Specific Settings".

IMPORTANT

To change the settings for the destination information for the line connection, follow the steps below.

1. Use **pp disable** command to disable the target destination.
2. (If connected to the line) Use **disconnect** command to disconnect communication with the target device.
3. Execute various commands to change the destination information settings.
4. Use **pp enable** command to set the target destination to a usable state.

Checking the settings

You can display the settings on the console screen with the **show config** command.
If you have applied new settings to this product, check the settings.

```
# show config
# RTX840 Rev.23.02.02 (Mon Apr 28 09:19:26 2025)
# MAC Address : ac:44:f2:00:00:00, ac:44:f2:00:00:01
# Memory 1024Mbytes, 2LAN
# main: RTX840 ver=00 serial=M96000000 MAC-Address=ac:44:f2:00:00:00
MAC-Address=ac:44:f2:00:00:01
# Reporting Date: Jul 1 09:33:07 2025
login user admin *
user attribute admin administrator=2
ip lan1 address 192.168.100.1/24
:
#
```

Finishing settings

When you enter a configuration command, it is immediately reflected in the operation of this product, but the configuration is not saved in non-volatile memory. To save the settings, run the **save** command.

```
# save
Saving...CONFIG0 Done .
#
```

NOTICE

If you turn off or restart the power without saving the settings, the changed settings will be restored.

NOTE

If you are running with a configuration file in external memory, the settings are saved in external memory.

When you log out as an administrative user, you can also save the settings changed by the setting command in non-volatile memory of this product.
Run the **quit** command with the save option as shown below.

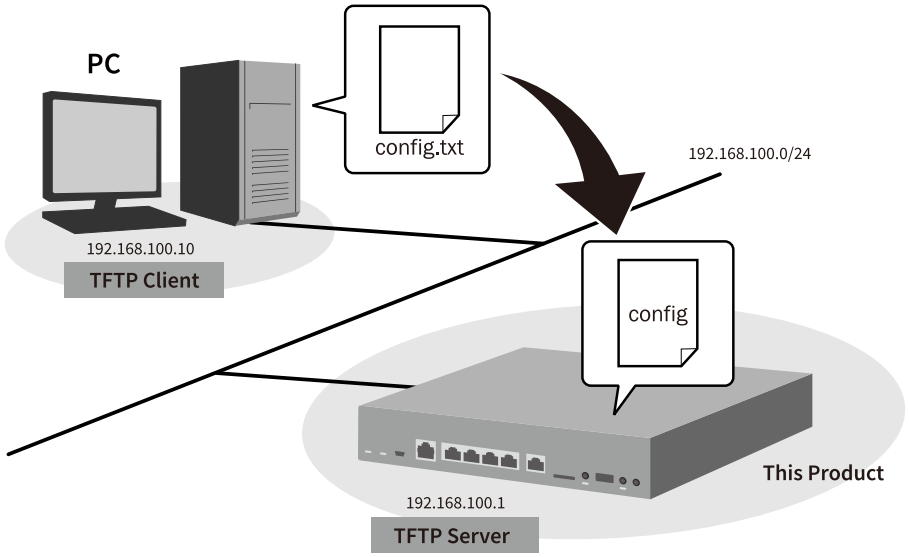
```
# quit save
```

If you execute the **quit** command without executing the **save** command, a message appears asking if you want to save the settings. Press the [Y] key to save, or press the [N] key to not save.

```
# quit
Save new configuration ? (Y/N)
```

8.3.2. Using TFTP

You can edit the settings file of this product by transferring the settings file created on a personal computer to this product using TFTP.
When setting using TFTP, this product operates as a TFTP server, and the personal computer operates as a TFTP client.



This manual explains how to change the settings of this product using TFTP from a Windows personal computer. If you use anything other than a Windows personal computer, please replace the operation on the Windows personal computer with your environment as appropriate.

Advance preparation

- Settings of this product (TFTP server)
  Execute the **tftp host** command on the console of this product to set the IP address of the personal computer (TFTP client) to which the settings file is to be transferred.
  For example, if the IP address of your personal computer is "192.168.100.10", enter the following:

```
> administrator
Password:
# tftp host 192.168.100.10
# save
```

- Personal computer (TFTP client) settings
  Enable the TFTP client settings on your personal computer.

NOTE

On Windows, TFTP is disabled by default. To use TFTP, display the [Enable or Disable Windows Features] screen from the Windows [Control Panel], and enable the TFTP client.

- Creating a configuration file
  Enter the set of commands to be set for this product in a text file and save it on your personal computer. For details of settings, see "Specific Settings".

IMPORTANT

On a text file, enter a newline after the last command. Commands without newlines are not executed.

NOTE

If you enter the **clear configuration** command at the beginning of the text file, you can rewrite the entire contents of the configuration file (delete existing settings of this product). If you do not enter the **clear configuration** command, the command entered in the text file is added based on the existing settings of this product.

Settings (transferring configuration files)

Execute the **tftp** command from your personal computer to transfer the configuration file to this product.

NOTE

- The execution format of TFTP depends on each OS.
- The transfer mode should be "ASCII" or "character".
- If an administrative password is set for this product, specify the administrative password after the file name.

Launch the Windows command prompt and enter the following:

- Example
  - IP address of this product: 192.168.100.1
  - Administration password of this product: "password"
  - Name of the configuration file to be transferred to this product: "config1.txt".

```
C:¥>tftp 192.168.100.1 PUT config1.txt config/password
Transfer successful: xxxx bytes in x second, xxxx bytes/s
C:¥
```

NOTE

Instead of "config", you can also specify "config0" to "config4". For details about the configuration file number, see "Configuration File Management".

Checking the settings (getting the setting file)

Execute the **tftp** command from your computer to read the settings of this product as a setting file.
If you have applied a new setting to this product, check the settings.

NOTE

- The format of the command used depends on the OS of the host.
- The transfer mode should be "ASCII" or "character".
- If an administration password is set for this product, specify the administration password following the file name.

Launch a Windows command prompt and type:

- Example
  - IP address of this product: 192.168.100.1
  - Management password of this product: "password"
  - Name of the file to be saved on your computer: "config0.txt"

```
C:¥>tftp 192.168.100.1 GET config/password config0.txt
Transfer successful: xxxx bytes in x second, xxxx bytes/s
C:¥
```

NOTE

You can also specify "config0" to "config4.2" instead of "config". For more information about the setting file number, see "Configuration File Management".

Finishing settings

When you transfer the settings file, the settings are immediately reflected in the operation of this product, but the settings are not saved in non-volatile memory. To save the settings, transfer a text file containing the **save** command to this product as a settings file.
For how to transfer the settings, see "Settings (transferring configuration files)".

NOTICE

If you turn off or restart the power supply without saving the settings, the changed settings will be restored.

IMPORTANT

In a text file, enter a new line after the **save** command. Commands with no newline will not be executed.

NOTE

If you are working with a setting file in external memory, the settings will be saved in external memory.

8.4. Specific Settings

The main setting items and commands used for the settings are shown below.

Setting items	Commands to use	Default values
Routing	**ip routing**	on
OSPF	**ospf use**	off
RIP	**rip use**	off
BGP	**bgp use**	off
Terminal parameters	**console character**	sjis
	console columns	80
	console lines	24
	set-serial-baudrate	9600
Login Timeout	**login timer**	300
IP Address (LAN Port)	**ip lan1 address**	192.168.100.1/24
IP Address (WAN Port)	**ip lan2 address**	None

For more information about each command and other commands, see the "Command Reference" (Website). You can also easily set it by using the setting examples or by contacting the "Yamaha Network Product Customer Service Center."

Utilization of Setting Examples

In setting, first consider a concrete configuration diagram like the setting examples.
If a LAN is already built, list network addresses and protocols being sent and received, and write them directly to the configuration diagram. If a network address has not been determined, it is necessary to secure a network address corresponding to the number of hosts connected to the network.

Once a network address has been determined, consider how to route each network. If your network is relatively small, you may be able to use Proxy ARP, or static routing may be sufficient. Dynamic routing is required when several networks are interconnected. It may be uniquely determined depending on the connection partner.

In the setting examples, the configuration is described mainly for connections between LANs via WAN lines. If a dial-up connection to a provider or a connection route to the Internet are available, filtering is required to restrict host access, deal with unauthorized access, and protect against DoS attacks.

Some setting examples are also posted on the Yamaha Network Equipment Web Site. Please refer to it.
https://network.yamaha.com/setting/
(This website is in Japanese only. Use your browser's translation feature to check.)

Inquire to Our Service Provider

If you do not know the configuration (CONFIG) of the target setting (CONFIG), or if you would like to consult with us, please contact to our service provider. If there is a problem with the configuration diagram, setting file, or operation in advance, prepare a DEBUG level SYSLOG to shorten the time it takes to solve the problem. For information on obtaining the setting file, see "Checking the settings", and for information on how to take a SYSLOG, see "Check SYSLOG".

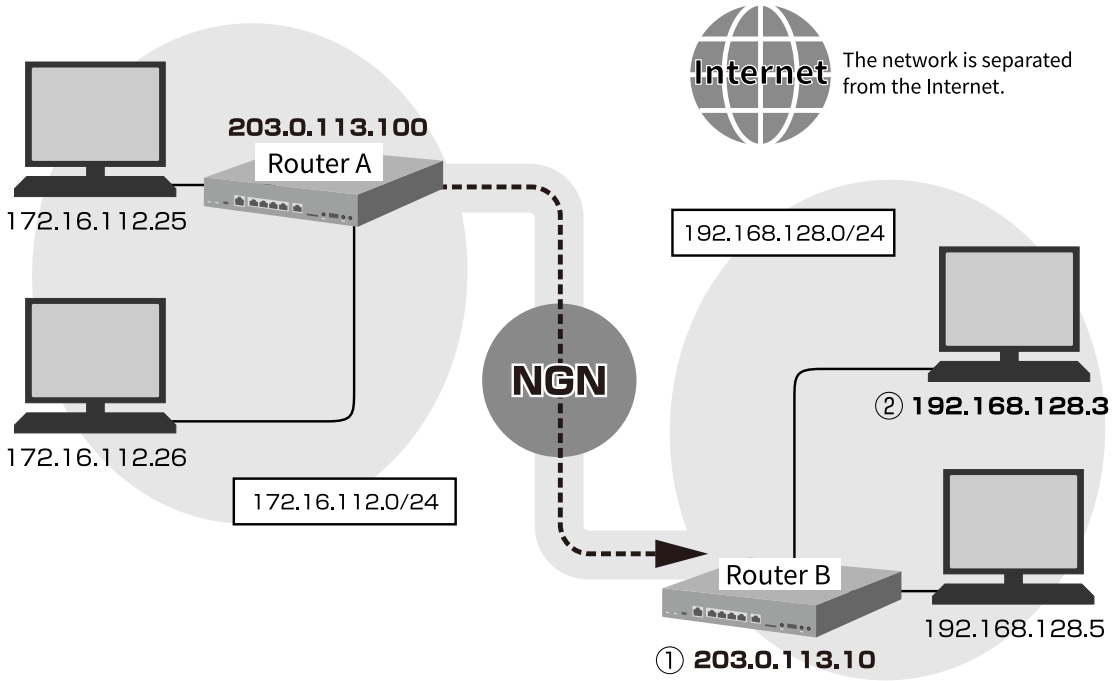
8.5. Checking Connectivity

After the configuration is complete, check whether the connection to the other party's network or an FTP server on the Internet is performed correctly and as intended.

There are two commands to check whether a connection with the other party is performed: the **ping** command and the **traceroute** command.

- The **ping** command:
  In a relatively simple network, it is executed to check whether packets reach each connection point or host in the network.
- The **traceroute** command:
  It is executed to check whether packets pass as intended on a route that goes through multiple networks.

For example, if you consider the following configuration diagram, execute the **ping** command from router A in the figure to points 1 and 2.



If there is no response to point 1, the routing information of router A or router B may be incorrect.
If there is no response to point 2, it is possible that the default route setting of the computer is incorrect, or the ping has been discarded by the firewall of the computer.
For more information on commands, please refer to the "Command Reference" (website).

NOTE

Windows does not respond to pings when firewall settings are enabled.

8.6. Restoring Factory Defaults

There are three ways to restore the settings of this product to the factory default state.

- "Restore factory default state with microSD, USB, and DOWNLOAD buttons"
- "Restore factory default state with cold start command"
- "Restore factory default state from Web GUI of this product"

IMPORTANT

- Immediately after performing the operation, all communications are disconnected.
- The IP address of this product is reset to "192.168.100.1/24" (factory default state).
- When this product is restored to the factory default state, all configuration files and SYSLOG recorded in non-volatile memory are erased (This operation cannot be undone).
  If necessary, please evacuate the information to a personal computer in advance.
  For how to read data, refer to the "Web GUI Operation Manual" (website) or the "Command Reference" (website).
- Even if this product is restored to the factory default state, the firmware recorded in non-volatile memory remains as it is.

8.6.1. Restore factory default state with microSD, USB, and DOWNLOAD buttons

You can restore this product to the factory default state by turning on the power while simultaneously pressing the microSD, USB, and DOWNLOAD buttons on the front.

1. Set the POWER switch of this product to STANDBY.
2. Turn ON the POWER switch while simultaneously pressing the microSD, USB, and DOWNLOAD buttons.
   This product starts up and returns to the factory default state.

8.6.2. Restore factory default state with cold start command

You can restore this product to the factory default state by executing the **cold start** command on the console screen. When you execute the **cold start** command, you will be prompted for an administrative password. After entering the management password, this product will restart and return to the factory default state.

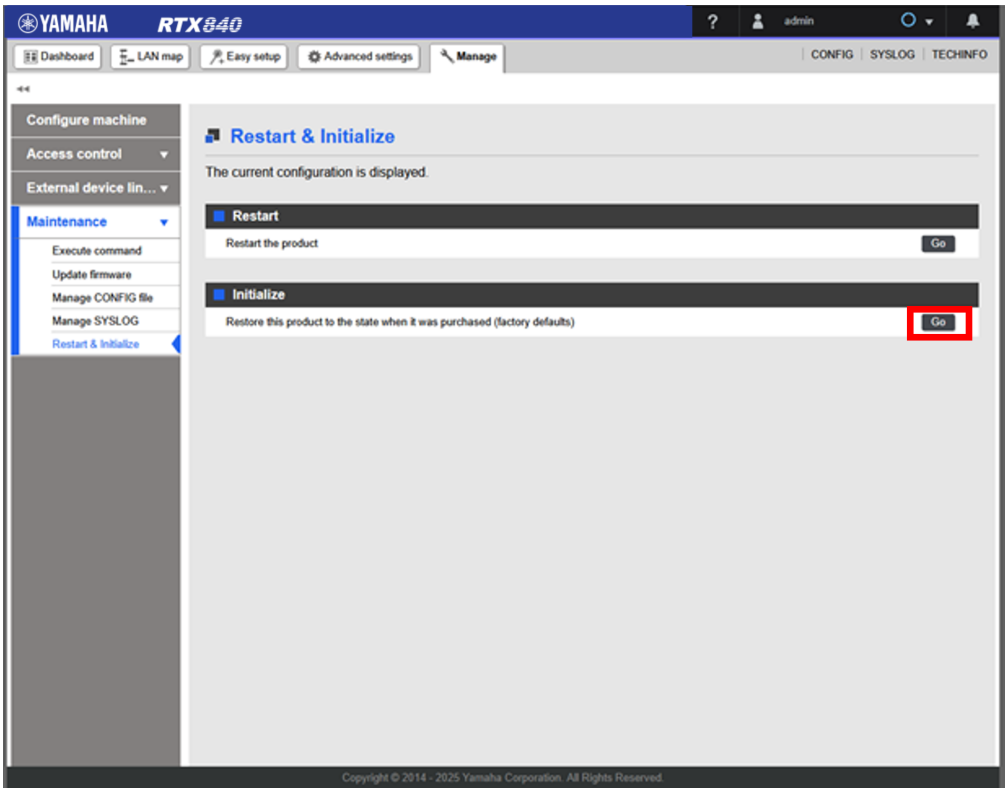
```
> administrator
Password:
# cold start
Password:
```

NOTE

If you are logged in with TELNET etc., the communication will be disconnected.

8.6.3. Restore factory default state from Web GUI of this product

From the "Manage" tab - "Maintenance" - "Restart & Initialize" screen of the Web GUI, you can restore this product to the factory default state.



For details, please refer to "Web GUI Operation Manual" (Web site).

9. Managing This Product

This chapter explains the contents of daily management work, specific settings, and diagnostic methods.

NOTE

The IP addresses listed in this chapter are for illustration only. When actually setting, please use the one that suits your usage environment.

9.1. Necessary Work as an Administrator

The administrator should regularly manage the following items.

- Changing User Passwords and Administrative Passwords
- Changing Passwords for Authentication Used in Various Communications
- Checking Communication Logs
- Checking and Clearing Accounts

Also, in the following situations, the administrator should perform appropriate work.

- When Adding New Destination Information
- When Deleting Unnecessary Destination Information
- When there is a change in destination information
- When the connection method with an Internet Service Provider is changed
- When the configuration of the network on the LAN side is changed
- When Managing System and Network Security
- When Upgrading Firmware of this product
- When Failure or Network Failure Occurs

9.2. Configuration File Management

This product can record five configuration files (config0 to config4) in the built-in non-volatile memory.

Also, each of these configuration files can have two backup files (backup files). The names of the backup files are "configX.1" and "configX.2".
The backup file is automatically generated each time the **save** command is executed.
For example, if the **save** command is executed while "config1" is running, the recording in non-volatile memory changes as follows.

- The contents of "config1" in non-volatile memory become the backup file "config1.1", and the current setting contents are "config1".
- If "config1.1" already exists, the backup file becomes "config1.2".
- If "config1.2" already exists, its contents are discarded.

NOTE

If it is running in an external memory configuration file, the **save** command saves the configuration contents to a microSD card. In this case, the save file is not generated.

Before executing the **save** command, always make sure that you know the current configuration file series.

- When you run the **show environment** command, you can see the number of the configuration file currently running.

```
# show environment
...
Firmware:internal
Config. file: config0  Default config. file: config0
...
```

- When you run the **show config list** command, you can see the list of configuration files and backup files.

```
> show config list
No.   Date       Time     Size    Sects   Comment
----- ---------- -------- ------- ------- ---------------------------
* 0   2025/07/01 18:42:36     422 703/703 ospf testing
 0.1  2025/07/01 08:18:06     328 704/704 test
 0.2  2025/07/01 17:17:39     294 705/705
 1    2025/07/02 11:59:18     292 702/702 BGP+VRRP fix
----- ---------- -------- ------- ------- ---------------------------
>
```

To switch to a different configuration file and operate the router, run the **restart** command to return to the startup process, then specify the configuration file number or the backup file number during the configuration file selection step. If the contents of the active memory have not been saved to non-volatile memory when you enter the **restart** command, a message will appear asking whether you want to save the active memory contents. Even if you save it at this time, a save file will be generated, and the existing file will be overwritten in the same way as when you execute the **save**

command.

NOTICE

If you start by specifying a save file and execute the **save** command after startup, the contents of the operating memory (specifying the save file at startup) will be overwritten in the configuration file.

Setting a Default Configuration File

The default configuration file is a configuration file that is automatically selected when no configuration file is specified in the startup process.
In TELNET access or remote setup, the configuration file cannot be selected in the startup process and the default configuration file is automatically selected.
Use the **set-default-config** command to set a default configuration file.
Saving changes using the **save** command is unnecessary because the result of the **set-default-config** command is not saved in the configuration file.

```
# set-default-config 1.1
```

Copying a configuration file or a save file

If you want to save a configuration file or a save file in a configuration file of another number series, use the **copy config** command.
Both the configuration file and the save file can be specified as the copy source, but only the configuration file can be specified as the copy destination. The following is an example when copying the save file "config1.2" to "config3".

```
# copy config 1.2 3
```

Delete a configuration file or a save file

To delete a configuration file or a save file, use the **delete config** command.
When you delete a configuration file, all save files of the same number series are deleted at the same time. Also, when you delete save file 1, save file 2 is deleted at the same time.

9.3. Firmware Revision Update

This section describes the outline and procedure for transferring firmware obtained from the Yamaha Network Peripheral Equipment Technical Information page to this product.

NOTE

You can update to a newer version or revert to an older version.
There are five ways to update the firmware.

- "Using DOWNLOAD button"
- "Using tftp command on a personal computer"
- "Using External Memory"
- Using SFTP from an SSH client on your computer
- Using the SCP function of this product

NOTE

- To use SFTP, you need to install the SSH client software on your computer.
- For how to update using SFTP or SCP, see the Yamaha Network Equipment Technical Information page.

  SFTP server function
  https://www.rtpro.yamaha.co.jp/RT/docs/sftpd/

  SCP
  https://www.rtpro.yamaha.co.jp/RT/docs/scp/
  (These pages are in Japanese only. Use your browser's translation feature to check.)

Download Firmware

The latest firmware can be downloaded from the Yamaha Network Equipment Technical Information page below.
https://www.rtpro.yamaha.co.jp/RT/firmware/
(This page is in Japanese only. Use your browser's translation feature to check.)

The firmware is "rtx840.bin".
The MD5 checksum file "rtx840.md5" should also be downloaded at the same time as the firmware.

Before updating the firmware, you need to check whether the firmware you obtained was downloaded correctly.
To check whether the firmware was downloaded correctly, use the "MD5SUM utility" to check the MD5 checksum.

The MD5SUM utility can be obtained from the Yamaha Network Equipment Technical Information page below.
https://www.rtpro.yamaha.co.jp/RT/utility/md5sum/
(This page is in Japanese only. Use your browser's translation feature to check.)

To check the MD5 checksum, enter the following in a Windows command prompt.

```
C:¥>md5sum -v -c rtx840.md5
rtx840.bin OK
```

If "OK" is not displayed, the file may be corrupted. Note the transfer mode and download the firmware again.

9.3.1. Firmware Revision Update Using DOWNLOAD Button

When this product is connected to a network, you can automatically update the firmware on the web server by pressing the DOWNLOAD button (http revision up).

To enable this feature, use the **operation http revision-up permit** command.
To specify the web server to download the firmware from, use the **http revision-up url** command. The factory defaults to downloading the firmware from Yamaha's web server.

Press the DOWNLOAD button for more than 3 seconds to check whether the firmware of the new revision exists.
If there is a new revision of the firmware, it will automatically download the firmware and execute the firmware revision update.

If the firmware revision update is successful, this product will automatically restart.

NOTICE

Never turn off the power of this product until it restarts.

NOTE

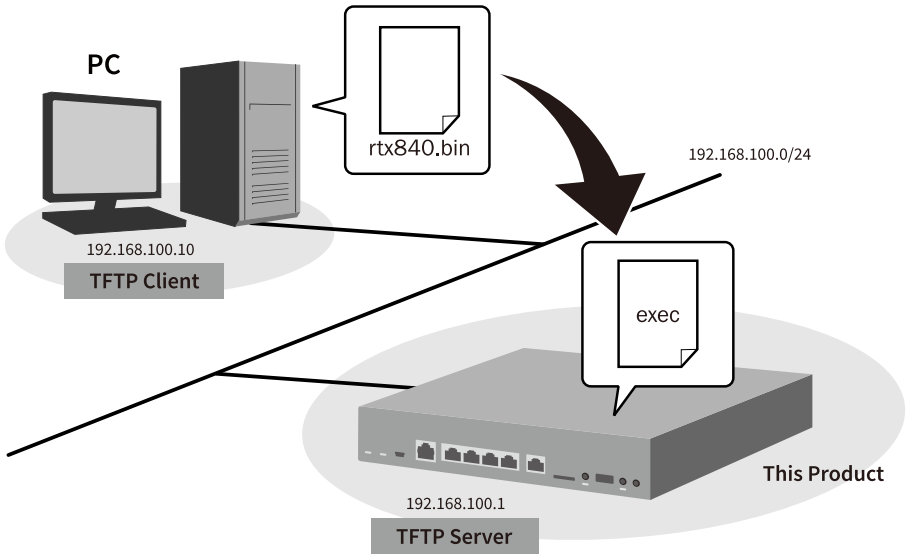
You can also allow old revisions to be updated to firmware using the **http revision-down permit** command.

9.3.2. Firmware Revision Update Using TFTP

When you update using TFTP, this product operates as a TFTP server and your computer operates as a TFTP client.
You can run the **tftp** command from the command prompt on Windows or from the Terminal application on macOS.

The execution format of TFTP depends on the OS. Please pay attention to the following points.

- The transfer mode should be binary (expressed as binary or bin).
- The remote file name must be specified as "exec".
- The file name of the sender is "rtx840.bin".



NOTE

- On Windows, TFTP is disabled by default. To use TFTP, open the Windows [Control Panel] - [Programs and Features] > [Enable or Disable Windows Features] screen and enable the TFTP client.
- Even if you update the firmware, the settings of this product will not be changed.

Firmware Revision Update Using TFTP

This section explains how to update the firmware of this product using TFTP from a Windows computer.
When using a computer other than a Windows computer, please replace the operation on the Windows computer with your environment as appropriate.

1. Set the IP address of the computer (TFTP client) to which the firmware is transferred to this product (TFTP server).
   - In the console of this product, enter the following.
   - In this section, set the IP address of the computer as "192.168.100.10".

```
# tftp host 192.168.100.10
```

2. Disconnect communication on the PP side to avoid unstable conditions during program changes.
   - In the console of this product, enter the following:

```
# pp disable all
```

IMPORTANT

In this example, since the **save** command is not executed, communication on the PP side is not disconnected (the **pp disable all** command is executed) after restarting this product.

3. The firmware is transferred from a personal computer to this product.
   - Launch the Windows Command Prompt and enter the following:

```
C:\>tftp -i 192.168.100.1 PUT rtx840.bin exec
Transfer successful: xxxx bytes in x second, xxxx bytes/s
C:\
```

   - While writing the firmware transferred to this product to non-volatile memory, the indicators of STATUS, LAN, WAN, microSD, and USB light up alternately.
   - This product restarts automatically when writing the firmware to non-volatile memory is completed.
   - The firmware in external memory is updated when operating with the firmware in external memory.

NOTICE

Never turn off the power of this product until this product restarts.
The TFTP client may time out because it takes a long time to write to non-volatile memory, but it can be updated normally.

NOTE

In this product, **no-reboot** (do not restart this product) and **reboot** (reboot this product) can be specified as options of the **tftp** command.

4. Run the **show environment** command in the console of this product to confirm that the firmware has been updated correctly.

9.3.3. Firmware Revision Update Using External Memory

The firmware saved in external memory can be loaded into this product and update. This is useful when you want to update the firmware of multiple units of this product.
This method can also load a configuration file at the same time.

To update using external memory, follow the steps below.

1. The firmware obtained from the Yamaha Network Peripherals Technical Information Page is saved in external memory. The file name is "rtx840.bin".
   If you want to load a configuration file at the same time, a text file with the command input is also saved in external memory. The file name is "config.txt".

NOTE

- We recommend that each file be stored directly under the root directory. (When starting this product, if there are multiple files with the corresponding name in external memory, the file closest to the root directory will be selected.)
- The file names can be changed using the **external-memory exec filename** command and the **external-memory config filename** command.

2. Connect the external memory to this product in operation.
   The buzzer sounds and the microSD indicator or USB indicator of this product lights up when the external memory is recognized.
3. Hold down the microSD button or USB button and press and hold the DOWNLOAD button for at least 3 seconds.
   The buzzer sounds and the microSD indicator or USB indicator blinks to load the firmware into this product. Then, the indicators of STATUS, LAN, WAN, microSD, and USB light up alternately and the firmware is written to the non-volatile memory of this product.
   When writing the firmware to non-volatile memory is completed, this product automatically restarts.

NOTICE

Do not turn off the power of this product until it restarts.

NOTE

When restarted, this product runs with the firmware and configuration files in external memory.
If this is not necessary, remove the external memory while this product restarts and the POWER indicator blinks.

4. In the console of this product, use the **show environment** command to verify that the firmware has been updated correctly.

NOTE

To prohibit firmware revision update using external memory, use the following command.
operation external-memory download permit off

9.4. Console Security Settings

The following two security settings for console operation are introduced.

- "Set a login timer"
- "Set a security class"

9.4.1. Set a login timer

If you do not enter keys to the console for a certain period of time, you will be automatically logged out of this product. In the factory default state, the logout timer is 300 seconds.

There are two ways to change the login timer value:

- Add a **login timer** command:
  You can set a login timer collectively for all users who do not have the **user attribute** command set.
- With the **user attribute** command, add the login-timer option:
  You can set a login timer for each user.

Hereafter, we will explain using the following example when the following commands are set in this product.

```
# show config
  :
login user admin *
login user user1 *
login user user2 *
user attribute admin administrator=2
  :
#
```

- If you add the **login timer** command, you can change the login timers of users "user1" and "user2" all at once.
  - If you want to set the login timer to 120 seconds, enter the following:

```
# login timer 120
# save
```

NOTE

The login timer of the default administrative user "admin" is not changed (because the **user attribute** command is set at the factory default point).

- If you want to set a login timer for each user, enter the command with the logintimer option added to the currently set **user attribute** command.
  - If you want to set the login timer for the default administrative user "admin" to 120 seconds, enter the following:

```
# user attribute admin administrator=2 login-timer=120
# save
```

  - If you want to set the login timer for the default administrative user "admin" (currently no **user attribute** command is set) to 120 seconds, enter the following:

```
# user attribute user1 administrator=1 login-timer=120
# save
```

In either case, specifying "clear" as the parameter instead of "120" disables automatic logout. In this case, you will remain logged in to this product until you execute the **quit** command.

NOTE

If you are logged in to this product via TELNET or SSH, the login timer is treated as 300 seconds from the viewpoint of security even if "clear" is specified as the parameter.

9.4.2. Set a security class

By setting a security class, you can change the login method to the console of this product, availability of the TELNET client function, and availability of the SSH client function.

- Logging in to the Console
  There are three ways to log in to the console of this product.
  - Logging in from a computer connected to the CONSOLE port
  - Logging in from a host on the LAN with TELNET or SSH
  - Logging in from a remote router

  Security classes range from Level 1 to Level 3. Depending on the level, you can restrict the login method of this product as follows.

Level	Logging in from CONSOLE port	Logging in from TELNET or SSH	Logging in from Remote routers
1	Permission	Permission	Permission
2	Permission	Permission	Rejection
3	Permission	Rejection	Rejection

  The factory default setting value is "1".

- Whether or not the TELNET client function can be used
  The **security class** command enables or disables the TELNET client function.

Parameters	Using the TELNET client function
on	Enabled
off	Disabled

  The factory default setting value is "off".

- Using the SSH client function
  The **security class** command enables or disables the SSH client function.

SSH parameters	Using the SSH client function
on	Enabled
off	Disabled

  The factory default setting value is "off".

To configure a security class, use the **security class** command.
For example, if you want to set the security class level to "2" and enable the TELNET client, enter the following:

```
# security class 2 off on
# save
```

You can check the security class settings with the **show environment** command.

```
#show environment
...
Security class Level:2, FORGET:OFF, TELNET:ON, SSH:OFF
...
```

9.5. Settings for SNMP Management

This product supports RFC1157 (SNMP) and RFC1213 (MIB-II).
After you configure SNMP (Simple Network Management Protocol), you can use SNMP Manager to monitor and change network management information.
The following table shows the SNMP settings.

Command Name	Description
snmp community read-only	Set the community name for the SNMP read-only access mode.
snmp community read-write	Set the community name for SNMP read/write access mode.
snmp host	Set the hosts that are allowed to access via SNMP.
snmp syscontact	Sets the MIB variable "sysContact".
snmp syslocation	Set the MIB variable "sysLocation".
snmp sysname	Set the MIB variable "sysName".
snmp trap community	Set the community name for sending traps.
snmp trap host	Sets the trap receiving host.

IMPORTANT

Do not use the same string for the community name as your user or administrator password. The factory default community name is set to "public".

NOTE

- A group exchanging information by SNMP is called a community. Access between communities has two modes: read-only and read-write.
- An SNMP message notifying the status of this product is called a trap.

Access to this product by SNMP is not allowed when shipped from the factory. You can set the hosts to which access is allowed with the **snmp host** command.
For example, you can allow access from all hosts and specify the IP address of the host that receives the trap.
To set it to "192.168.112.25", set as follows.

```
# snmp host any
# snmp trap host 192.168.112.25
# save
```

9.6. Display of Status

You can check the status of this product by using the **show** command.
Use this command to check the status of this product during operation or to solve problems.

Display Items	Command Name	Description
Display of Resource Usage	**show environment**	Displays resource usage for this product.
Display of ARP Table	**show arp**	Displays the ARP table held by this product.
Display of SYSLOG	**show log**	Displays logs related to operation status and communication.
Display of IP Route Information Table	**show ip route**	Displays the IP Route Information Table.
Displaying the Status of a LAN Port	**show status lan1**	Displays the MAC address, MTU, and communication statistics for the LAN port.
Displaying the Status of a WAN Port	**show status lan2**	Displays the MAC address, MTU, and communication statistics for the WAN port.
Displaying the Status of the USB Data Communication Terminal	**show status wan1**	Displays communication information (IP address, MTU) for the USB data communication terminal.
Displaying the Status of Each Other Party	**show status pp N**	Displays the connection status or the status at the time of the last connection for the specified contact.

9.7. Using External Memory

By inserting an external memory into this product, you can copy configuration files and firmware between this product and external memory. You can also save SYSLOG in external memory. By browsing the information stored in external memory with a personal computer, you can easily manage this product.

If you insert an external memory into this product, you can use the following functions.

- "Copying Firmware from External Memory to this product"
- "Copying Configuration Files Between This Product and External Memory"
- "Saving the SYSLOG of this product to the external memory"

IMPORTANT

- Format the external memory used in this product in FAT or FAT32 format.
- The microSD slot and USB port of this product do not guarantee the operation of all external memories.
  - To check the operation of a microSD card and USB memory, use the **external-memory performance-test go** command.
  - For more information about microSD cards and USB memory, refer to the following website.
    https://www.rtpro.yamaha.co.jp/RT/docs/external-memory/
    (This page is in Japanese only. Use your browser's translation feature to check.)

NOTICE

- When connecting a USB memory to a USB port, do not use an extension cable.

9.7.1. Copying Firmware from External Memory to this product

Copy the firmware stored in external memory to the non-volatile memory of this product.

NOTE
You can also copy it by pressing and holding the microSD button or USB button and the DOWNLOAD button simultaneously for three seconds. When copying is complete, this product will automatically restart.

1. Insert the external memory into the microSD slot or USB port of this product.
2. Copy the firmware stored in external memory to the non-volatile memory of this product using the **copy exec** command.
   - To copy the firmware "rt_firmware.bin" stored in external memory to the non-volatile memory of this product, enter the following in the console of this product.

     For a microSD card:

     ```
     # copy exec sd1:rt_firmware.bin 0
     ```

     For a USB memory:

     ```
     # copy exec usb1:rt_firmware.bin 0
     ```

   - The firmware stored in external memory is copied to the non-volatile memory of this product.
3. Press and hold the microSD button or USB button on the front of this product for two seconds or more.
   - Remove the external memory after the indicator of the corresponding external memory turns off.
4. Restart this product with the power switch or **restart** command.
   - The firmware stored in the non-volatile memory of this product is copied automatically.

9.7.2. Copying Configuration Files Between This Product and External Memory

Copy Configuration Files Between This Product and External Memory
By saving multiple configuration files in the non-volatile memory of this product, you can start this product using any configuration file. This is useful when there is a problem with the settings of this product and you want to start it with the setting file before the problem occurred.

NOTE

You can also copy it by pressing and holding the microSD button or USB button and the DOWNLOAD button at the same time for 3 seconds. The product will automatically restart when the copy is completed.

1. Insert the external memory into the microSD slot or USB port of this product.

2. Use the **copy config** command to copy the setting file between the external memory and the non-volatile memory of this product.
   - The setting file "rt_config1.txt" saved in the external memory is copied to the non-volatile memory of this product.
     If you copy it as "0", enter the following in the console.

     If you use a USB memory:

     ```
     # copy config sd1:rt_config1.txt 0
     ```

     If you use a USB memory:

     ```
     # copy config usb1:rt_config1.txt 0
     ```

   - The setting file is copied to the non-volatile memory of this product or the external memory.
     If you copy it as "rt_config1.txt", enter the following in the console.

     If you use a microSD card:

     ```
     # copy config 0 sd1:rt_config1.txt
     ```

     If you use a USB memory:

     ```
     # copy config 0 usb1:rt_config1.txt
     ```

   - The setting file is copied to the non-volatile memory of this product or the external memory.
3. Press and hold the microSD button or USB button on the front of this product for 2 seconds or more.
   - Remove the external memory after the indicator of the corresponding external memory goes out.

NOTE

To use the setting file copied to the non-volatile memory of this product, restart this product with the power switch or **restart** command. For the startup procedure when multiple setting files are saved in the non-volatile memory of this product, see "Selecting the configuration file to be used and starting".

9.7.3. Saving the SYSLOG of this product to the external memory

Saving the SYSLOG of this product to the external memory.
If you encounter a problem with this product, reading the SYSLOG saved in the external memory on your computer will help solve the problem.

1. Insert the external memory into the microSD slot or USB port of this product.
2. Use the **external-memory syslog filename** command to set the file name of the SYSLOG to be saved in the external memory.
   - If you want to set the file name of -SYSLOG to "rt_syslog.log", enter the following in the console.

     If you use a microSD card:

     ```
     # external-memory syslog filename sd1:rt_syslog.log
     ```

     If you use a USB memory:

     ```
     # external-memory syslog filename usb1:rt_syslog.log
     ```

   - The SYSLOG of this product is saved as "rt_syslog.log" in the external memory.
   - After that, the SYSLOG of this product will continue to be saved in the external memory while the **external-memory syslog filename** command is set.

NOTE

- In the factory state, the SYSLOG of the INFO level is written. For more detailed information, set it so that the DEBUG level SYSLOG is written. For more information, see "Check SYSLOG".
- When the size of the SYSLOG file saved in the external memory reaches the upper limit, the SYSLOG file is rotated (backed up).
  For more information about rotating the SYSLOG file, see "Command Reference" (website).

9.8. Useful Operations

This section describes operations that simplify management of this product and convenient operations when problems occur.

- "Interrupting communication without changing destination information"
- "Set a timer for connecting and disconnecting cellular lines"
- "Check SYSLOG"

9.8.1. Interrupting communication without changing destination information

This product automatically connects and disconnects lines based on destination information.
You can disable connections with specific destinations without changing settings, for example, when maintenance is required. There are the following ways to disable connections.

Restrict outgoing and incoming calls to specified destinations

The **pp disable** command prevents outgoing and incoming calls to specified destinations.
For example, to apply the **pp disable** command to destination number 2:

```
# pp disable 2
```

9.8.2. Set a timer for connecting and disconnecting cellular lines

For cellular connection and disconnection settings, you can set various timers for each destination information.

Timer type	Setting command name	Description
Disconnection timer	**mobile disconnect time**	If there is no data being sent or received from the PP side, the line will be disconnected after this timer has elapsed. The factory default value is "60 seconds".
Input disconnection timer	**mobile disconnect input time**	If no data is received from the PP side, the line will be disconnected when this timer expires. The factory default value is "120 seconds".
Output disconnection timer	**mobile disconnect output time**	If no data is being sent to the PP side, the line will be disconnected when this timer expires. The factory default value is "120 seconds".
Forced disconnect timer	**mobile access limit time**	Limits the maximum time you can connect to a peer. When this timer expires, the connection will be forcibly disconnected regardless of the communication status.
Disconnection due to packet communication limit	**mobile access limit length**	When the cumulative data length of packets being sent and received reaches the upper limit, the connected line will be forcibly disconnected regardless of the communication status. The factory default value is "50 MB".

For more information, please refer to the "Command Reference" (website).

9.8.3. Check SYSLOG

Using the SYSLOG function, you can check information on filtered packets and the operation status of various functions.
The types of SYSLOG are as follows.

Type	Information obtained	Factory default value
NOTICE	Filtered packet information, etc.	off
INFO	Operation status of various functions, etc.	on
DEBUG	Information for debugging	off

Check the currently output SYSLOG

For example, if you want to temporarily check the DEBUG type SYSLOG, follow the steps below.

1. Clear the past SYSLOG with the **clear log** command.

```
# clear log
```

2. Set to output DEBUG type SYSLOG with the **syslog debug** command.

```
# syslog debug on
```

3. Check the newly outputted SYSLOG with the **show log** command.

```
# show log
```

4. Revert the setting so that DEBUG type SYSLOG is not output with the **no syslog debug** command.

```
# no syslog debug
```

Transferring SYSLOG

This product's SYSLOG can be transferred to a SYSLOG host that has the function of SYSLOG.
It is useful when you want to record a large amount of communication logs over a long period of time.
Use the **syslog host** command to specify the destination of the SYSLOG. For example, if the IP address of the SYSLOG host is "192.168.112.25", set as follows.

```
# syslog host 192.168.112.25
# save
```

9.9. Check the Communication Status with the STATUS Indicator

If you enable various keep-alive functions and are always connected to a connected device, you can check the communication status with the connected device with the STATUS indicator of this product. If the STATUS indicator is lit (orange), communication with the connected device is not possible. Check whether a line failure has occurred or each communication device that makes up the network is malfunctioning.
The STATUS indicator turns off when communication with the connected device is restored.

NOTE

- The keep-alive function requires a predetermined time before detecting a state in which communication is not possible. Therefore, even if the STATUS indicator is not lit, communication with the connected device may not be possible.
- The STATUS indicator is lit even when firmware revision update is executed from the DOWNLOAD button. For more information, see "Firmware Revision Update Using DOWNLOAD Button".

9.10. Using the EEE Function

This product supports EEE (Energy Efficient Ethernet).

- 10BASE-Te
- 100BASE-TX/1000BASE-T (LPI)

NOTE

- In the factory default state, the EEE function is set to be disabled.
- In order to use the EEE function, devices connected to a LAN port must also support the EEE function.

To enable the EEE function, set as follows.

When setting the LAN port to 10BASE-Te:

```
# lan type lan1 10-hdx energy-saving=on
```

When setting the LAN port to LPI:

```
# lan type lan1 auto energy-saving=on
```

NOTE

When the EEE function is enabled, communication may not be possible depending on the connected device. If communication is not possible, disable the EEE function before using.

10. Transferring/Disposing of This Product

This chapter describes precautions to be taken when transferring or disposing of this product.

- This product contains a lithium battery for the clock function. Dispose of the product according to local regulations.
- When transferring or disposing of this product, please perform the following operation.
    - Restore the router to factory defaults.
      If important information remains in this product, there is a possibility that information may be leaked to a third party or that it may be subject to unauthorized access.

  For details, see "Restoring Factory Defaults".

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