

IP-HE950

SOFTWARE USER'S GUIDE



USING IP-HE950 SAFELY

Handling of This Document

This document contains important information regarding the safe use of the IP-HE950. Read it thoroughly before operating this unit. Make sure that users of this equipment read and understand thoroughly all safety precautions contained in the document. Keep the document in a safe and convenient location for quick reference.

Fujitsu makes every effort to prevent users and bystanders from being injured and to prevent property damage. Be sure to use this unit in accordance with instructions in the document.

Warning on Electromagnetic Interference

The following notice is for USA users only.

The IP-HE950 has been tested and found to comply with the limits for a Class A digital unit, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction document, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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The IP-HE950 is designed and manufactured for use in standard applications such as office work, personal units, and household appliances. The product is not intended for special uses (such as nuclear-reactor control in atomic energy facilities, aeronautics and space systems, air traffic control, operation control in mass transit systems, medical units for life support, and missile firing controls in weapons facilities) where particularly high reliability requirements exist, where the pertinent levels of safety are not guaranteed, or where a failure or operational error could threaten a life or cause physical injury (hereafter referred to as "mission-critical" use). Customers considering use of this product for mission-critical applications must have safety-assurance measures in place beforehand. Moreover, they are requested to consult our sales representative before embarking on such specialized use.

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PREFACE

This document explains how to use software for the IP-HE950.
For information on how to install the IP-HE950, connect cables, and use buttons and LEDs, refer to the following document:

- IP-HE950 Hardware User's Guide

This document is intended for system designers and administrators who use the IP-HE950. Readers are assumed to have a basic understanding of networks and video distribution.

Edition 02 July 2017

Note

The contents of this document are subject to change without notice.

ORGANIZATION AND CONTENTS OF THIS DOCUMENT

This document consists of five chapters and an appendix.

Chapter 1 gives an overview of the IP-HE950.

Before starting to use the IP-HE950, read Chapter 2 and configure the initial settings. Read Chapters 3 and 4 for operating instructions.

Chapter 1 Preparations

This chapter describes the checks required before the start of IP-HE950 operation.

Chapter 2 Initial Configuration

This chapter describes how to configure the initial settings of the IP-HE950.

Chapter 3 Web Operations

This chapter describes how to operate each function from a Web browser.

Chapter 4 Front Panel Operations

This chapter describes settings and operations from the front panel.

Chapter 5 Troubleshooting

This chapter describes the actions to take if, for example, audio/video is not output or an alarm LED goes on.

Appendix

The appendix shows alert information, a list of the IP port numbers used, and how to apply an option license. Also, a glossary describes the technical terms that readers of this document need to know.

WARNING INDICATIONS

This document uses warning indications to warn of conditions in order to prevent serious injury and property damage. Warning indications consist of warning markings of specific levels and warning messages. The warning markings are shown below along with their definitions.

⚠WARNING WARNING indicates a situation that could lead to serious injury or loss of life if procedures are not followed correctly.

⚠CAUTION CAUTION indicates a situation that could lead to minor or moderate injury and/or damage to this equipment itself if procedures are not followed correctly.

Warning indications within text

Warning markings are followed by warning messages. Every warning marking is centered on a line. Left and right indents are set for warning messages to differentiate them from ordinary text. Furthermore, the lines immediately before and after warning indications are left blank.

(Example)

⚠WARNING

Possibility of electric shock
Contact your system administrator before checking the voltage of a power outlet.
Otherwise, electric shock may occur.

PRODUCT HANDLING PRECAUTIONS

Maintenance

WARNING

Do not try to repair this equipment yourself. Contact Fujitsu sales or Fujitsu partners.

CAUTION

Read this document thoroughly before attempting to operate this equipment. If you have any questions, contact Fujitsu sales or Fujitsu partners.

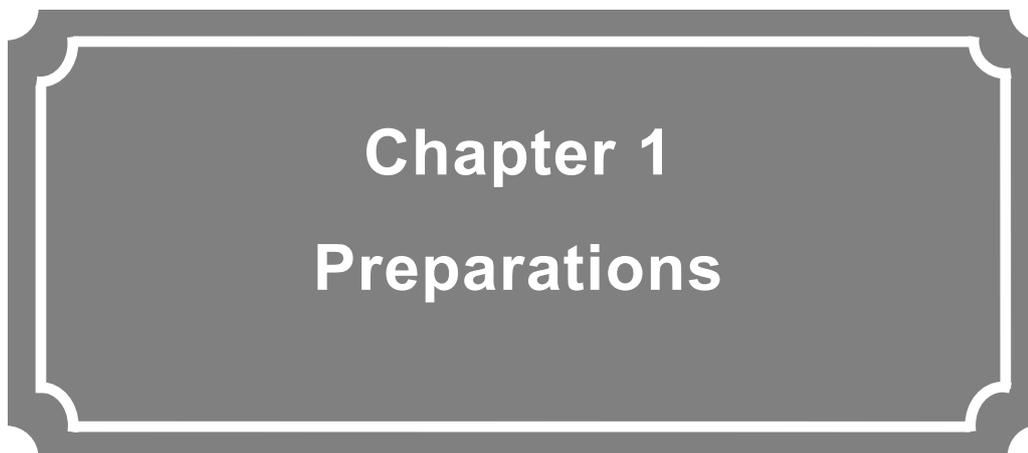
If a problem occurs, contact Fujitsu sales or Fujitsu partners.

They will ask you to describe the problem, the lamp display status of alarm LEDs, and other details. Check the system for this information.

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Chapter 1 Preparations

This chapter describes the overview of IP-HE950.

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1.1

Main Features

1.1.1 Features

The IP-HE950 is a video transmission unit that uses the latest video encoding technology, H.265/HEVC (below called H.265). As the successor to the video compression technology of H.264/MPEG-4 AVC (below called H.264), H.265 doubles the compression rate of H.264. H.265 has been adopted for 4K broadcasting such as "Channel 4K," with high-definition video including 8K as a target.

The IP-HE950 has the following features:

- Support for H.265, the latest video encoding technology
- Small chassis that is half the 1U rack size
- Operations from the front panel
- Support for a wide range of resolutions, SD^{*1}/HD/4K
- Equipped with IP interfaces and DVB-ASI to support various transmission scenarios
- Error correction function using FEC/ARQ and SMPTE 2022-1
- SFP adopted to support diverse input and output interfaces
- Support of multi-channel (8ch^{*1}) audio

*1 Not supported in V01L010. Support in a future enhancement is planned.

1.1.2 Software options

The IP-HE950 has basic functions and optional functions. You can enable an optional function with the license key provided in a software option.

Table 1-1 Software options lists the software options currently available and their functions. For example, with the IP-HE950 4K encoder option, you can add the 4K video encoding function to the IP-HE950E. More will be added to the lineup in the future.

For instructions to install a license key, refer to "**Chapter 2 Initial Configuration.**"

If the IP-HE950D or IP-HE950E has been purchased together with a software option for pre-installation, the unit is shipped with the license key installed.

Table 1-1 Software options

Name	Function
IP-HE950 4K encoder option	4K video encoding function
IP-HE950 4K decoder option	4K video decoding function
IP-HE950 contribution-plus encoder option	422/ancillary ^(*) , 8ch audio ^(*) , encoding function
IP-HE950 contribution-plus decoder option	422/ancillary ^(*) , 8ch audio ^(*) , decoding function
IP-HE950 BISS scramble option	BISS encryption function (for encoder) ^(**)

*1 Not supported in V01L010. Support in a future enhancement is planned.

*2 IP-HE950D of V01L010 has BISS decryption function as a standard.

For hardware options, refer to the *IP-HE950 Hardware User's Guide*.

1.1.3 Specifications

The IP-HE950E is the encoder unit, and the IP-HE950D is the decoder unit. Their respective functions are shown in **Table 1-2 IP-HE950E specifications** and **Table 1-3 IP-HE950D specifications**.

Table 1-2 IP-HE950E specifications

Item		Specification
Video	Input	12G-SDI ^{*1} /3G-SDI/HD-SDI Quad 3G/HD-SDI (2-Sample Interleave/Square Division) ^{*1,3}
Encoder 1	Encoding format and profile	H.265 Main 4:2:2 10 (4:2:2 10-bit) ^{*2} Main 10 (4:2:0 10-bit) Main (4:2:0 8-bit)
	Resolution and bit rate	2160p x 3840 (50/59.94 Hz) ^{*1} : 8 to 58 Mbps 2160p x 3840 (29.97 Hz) ^{*1} : 2 to 58 Mbps 1080p x 1920 (50/59.94 Hz) : 2 to 58 Mbps 1080i x 1920 (50/59.94 Hz) : 2 to 58 Mbps 720p x 1280 (50/59.94 Hz) : 2 to 58 Mbps
	Performance	High resolution: [Progressive] B3 level, [Interlaced] B2 level Standard: [Progressive] B2 level, [Interlaced] B1 level Low latency: IBBB (non-hierarchical structure)
	Pre-filter	OFF/LIGHT/MEDIUM/HEAVY
	GOP	Open Adaptive / Fixed Cycle: 0.5s / 1s
	Video PES	1 Field/1PES
	Encoder 2	Encoding format and profile
Resolution and bit rate		1080i x 1920/1440 (50/59.94 Hz) : 2 to 27 Mbps
Performance		High resolution :IBBP Standard :IBBP Low latency :IPPP
Pre-filter		OFF/LIGHT/MEDIUM/HEAVY
GOP		Open Fixed Cycle: 0.5s /1s
Video PES		1 Field/1PES

Item		Specification
Audio	Input	SDI embedded
Encoder1	Encoding and bit rate	MPEG-1 Layer2 Stereo (2/0): 128/256/384 kbps MPEG-2 AAC LC Dual monaural (1/0 + 1/0): 64/128/256 kbps Stereo (2/0): 64/128/256 kbps Pass-thru (SMPTE 302M) 16-bit: 1920 kbps 20-bit : 2340kbps 24-bit : 2688kbps
	Sampling frequency	48 kHz
	Quantization bit	MPEG-1 Layer2: 16-bit MPEG-2 AAC LC: 16-bit Pass-thru (SMPTE 302M): 16-bit,20-bit,24-bit
Encoder2	Encoding and bit rate	MPEG-1 Layer2 Stereo (2/0): 128/256/384 kbps MPEG-2 AAC LC Stereo (2/0): 64/128/256 kbps
	Sampling frequency	48 kHz
	Quantization bit	MPEG-1 Layer2: 16-bit MPEG-2 AAC LC: 16-bit
Multiplexing method		MPEG-2 TS / TTS(H.264 only)
Controls		Web GUI, Front panel, SNMP
IP network	LAN1 (control/streaming)	10BASE-T/100BASE-TX/1000BASE-T (Auto) Static IP/DHCP/PPPoE
	LAN2 (control/streaming)	10BASE-T/100BASE-TX/1000BASE-T (Auto) Static IP
	IP version	IPv4
	Protocol	http, SNMP v1/v2c, SNTP, RTP, UDP, Unicast/Multicast
	Error correction	SMPTE 2022-1 FEC, Fujitsu FEC & ARQ
DVB-ASI	Streaming	DVB-ASI output x 2
	TS transmission format	Packet mode
	TS packet length	188 bytes/204 bytes

*1 The IP-HE950 4K encoder option is required.

*2 The IP-HE950 contents transmission encoder option is required.

*3 The Quad 3G-SDI input option is required.

* Encoder2 is available when video input format is 1080i.

Table 1-3 IP-HE950D specifications

Item		Specification
Video	Output	12G-SDI ^{*4} /3G-SDI/HD-SDI Quad 3G/HD-SDI (2-Sample Interleave/Square Division) ^{*4,6}
	Encoding format and profile	H.265 Main 4:2:2 10 (4:2:2 10-bit) ^{*5} Main 10 (4:2:0 10-bit) Main (4:2:0 8-bit)
	Resolution and bit rate	2160p x 3840 (50/59.94 Hz) ^{*4} : 8 to 58 Mbps 2160p x 3840 (29.97 Hz) ^{*4} : 2 to 58 Mbps 1080p x 1920 (50/59.94 Hz) : 2 to 58 Mbps 1080i x 1920 (50/59.94 Hz) : 2 to 58 Mbps 720p x 1280 (50/59.94 Hz) : 2 to 58 Mbps
Audio	Output	SDI embedded
	Encoding and bit rate	MPEG-1 Layer2 Stereo (2/0): 128/256/384 kbps MPEG-2 AAC LC Dual monaural (1/0 + 1/0): 64/128/256 kbps Stereo (2/0): 64/128/256 kbps Pass-thru (SMPTE 302M) 16-bit: 1920 kbps 20-bit : 2340kbps 24-bit : 2688kbps
	Sampling frequency	48 kHz
	Quantization bit	MPEG-1 Layer2: 16-bit MPEG-2 AAC LC: 16-bit Pass-thru (SMPTE 302M): 16-bit,20-bit,24-bit
Multiplexing method		MPEG-2 TS
Controls		Web GUI, front panel, SNMP
IP network	LAN1 (control/streaming)	10BASE-T/100BASE-TX/1000BASE-T (Auto) Static IP/DHCP/PPPoE
	LAN2 (control/streaming)	10BASE-T/100BASE-TX/1000BASE-T (Auto) Static IP
	IP version	IPv4
	Protocol	http, SNMP v1/v2c, SNTP, RTP, UDP, Unicast/Multicast (IGMPv2/v3)
	Error correction	SMPTE 2022-1 FEC, Fujitsu FEC & ARQ
DVB-ASI	Streaming	DVB-ASI input x 1
	TS transmission format	Packet mode/Burst mode
	TS packet length	188 bytes/204 bytes
Reference	Input	BB/Tri-sync/PCR/Internal
	Output	BB/No output

*4 The IP-HE950 4K decoder option is required.

*5 The IP-HE950 contents transmission decoder option is required.

*6 The Quad 3G-SDI output option is required.

1.2

Typical Applications

1.2.1 Application examples

This section shows system application examples.

The basic configuration is for video transfer over point-to-point connections. Here, a camera is connected to the encoder, and video is transferred to the decoder via the Internet and output to the monitor.

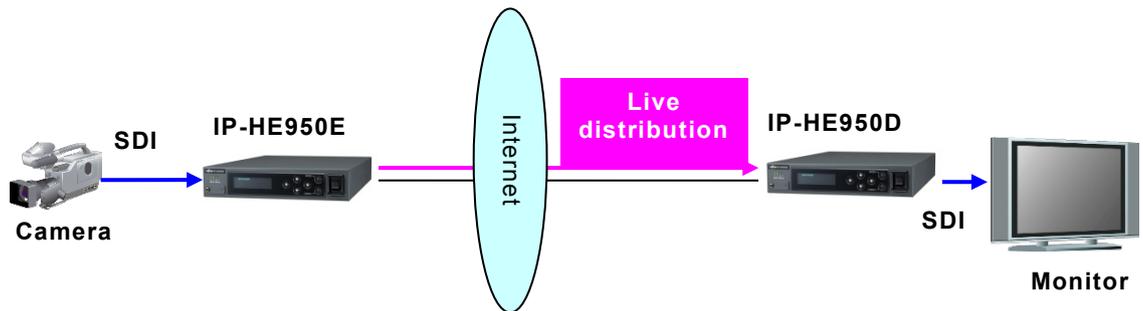


Figure 1-1 Sample System configuration: Broadcast Contents transmission and live coverage

By using the DVB-ASI interface provided as a standard function, the IP-HE950 can transmit video via SNG (Satellite News Gathering) and FPU (Field Pickup Units).

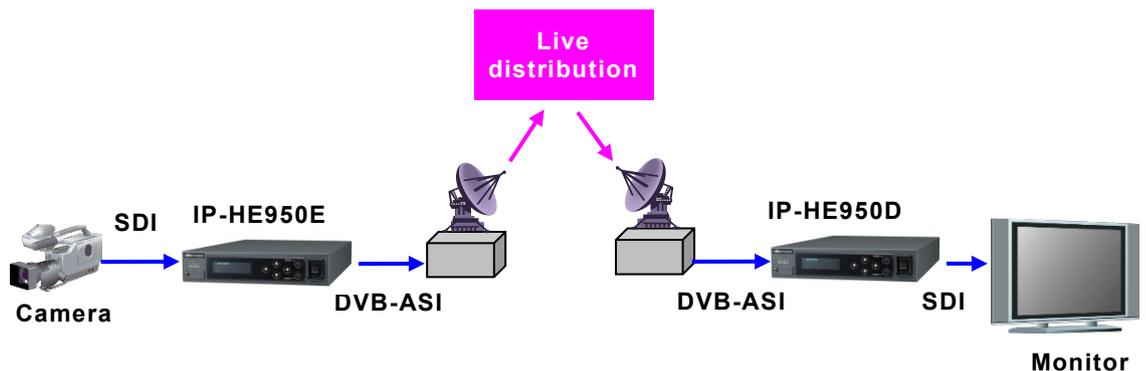


Figure 1-2 Sample System configuration: SNG

1.2.2 Interoperability with existing IP series

IP-HE950E Encoder 2 in V01L010 supports H.264. The existing IP series decoder can receive the H.264 stream from IP-HE950E. IP-HE950E Encoder 1 support of H.264 will be added in a future enhancement.

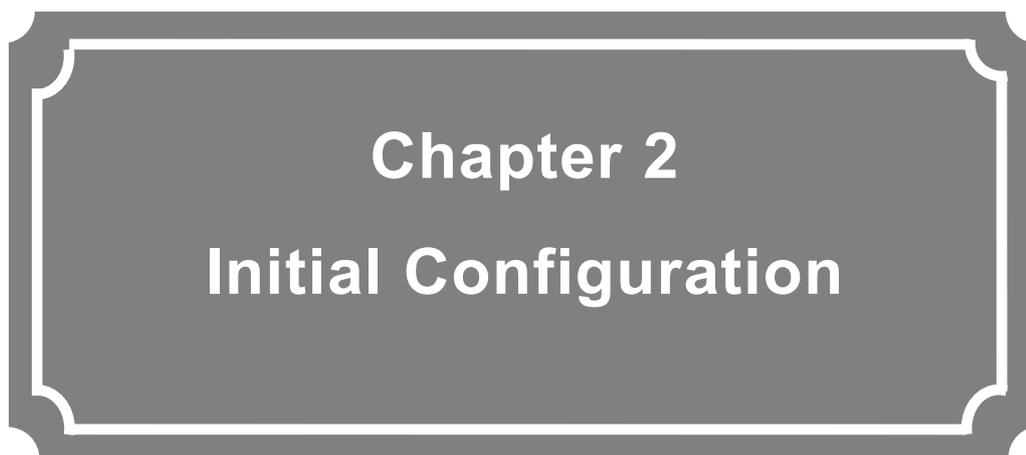
IP-HE950 software is provided from Fujitsu official website, in the same way as for the existing IP series.

1.2.3 Unit control

You can control the IP-HE950 from a Web browser, such as on a PC, and the front panel from the front of the unit. The next chapters describe these operations. The IP-HE950 supports standard MIB, extended MIB and extended SNMP traps, which you can monitor and control from an SNMP manager. The five types of supported extended traps are as follows:

- Major alert occurred
- Major alert recovery
- Minor alert occurred
- Minor alert recovery
- Notification occurred

The MIB file is in the unit. Please download it from the Web GUI when you need it.

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Chapter 2

Initial Configuration

This chapter describes how to configure the initial settings of the IP-HE950.

2.1 Configuration Preparations	10
2.2 Check Software	15

2.1

Configuration Preparations

2.1.1 Web access

Configure the IP-HE950 settings via the LAN1 or LAN2 port. Disconnect the unit from your network and connect either of these LAN ports to your PC via a hub or with a direct connection.

Start the IP-HE950 by turning on the power, and confirm that the RDY lamp is on. Enter the following IP address into the Web browser address bar to access the Web GUI of the unit. For access, disable the proxy and compatibility view settings of the Web browser.

- * Factory default IP address settings of the IP-HE950

LAN1:	IP address	10.0.0.1
	Subnet mask	255.0.0.0
LAN2:	IP address	192.168.255.253
	Subnet mask	255.255.255.252

- * The supported Web browsers are Internet Explorer, Chrome, and Safari.
Operation has been confirmed in the following browsers: Internet Explorer 11.0, Chrome 59.0, and Safari 10.1.

If the unit is not accessible with the above IP addresses, you can confirm and set IP addresses from the front panel. For information on front panel operations, refer to "**Chapter 4 Front Panel Operations.**" Also refer to "**5.1 Troubleshooting.**"

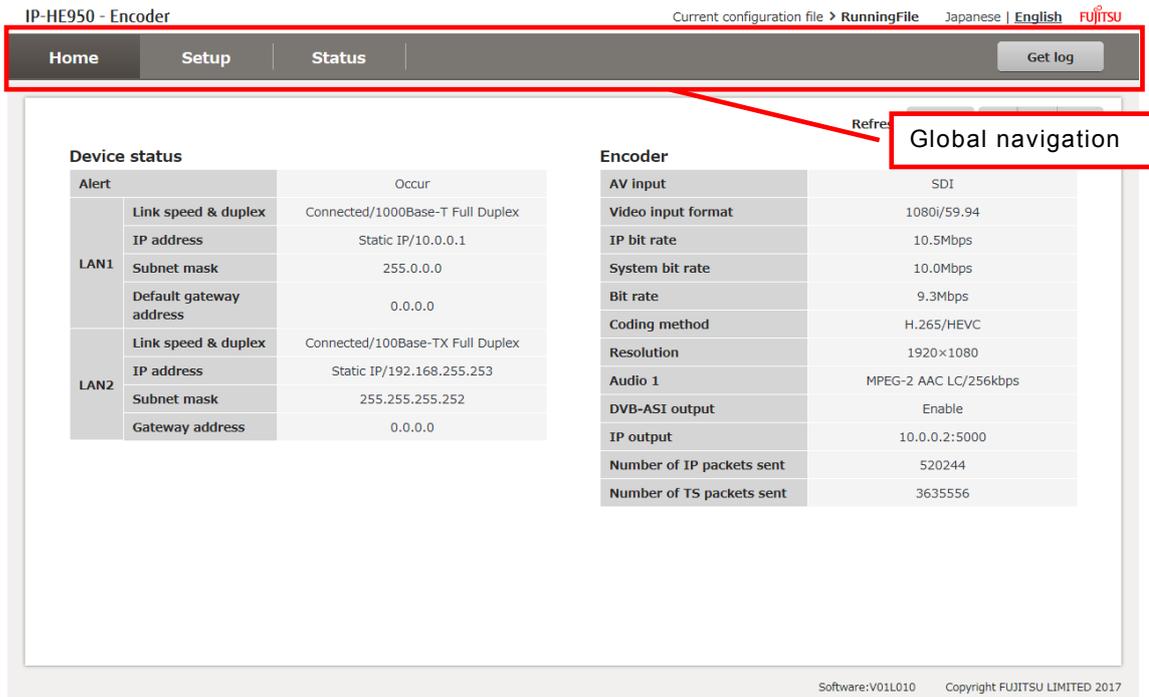


Figure 2-1 IP-HE950 Sample Web GUI (Encoder home screen)

⚠ CAUTION

When operating the IP-HE950 with the default IP address, keep it disconnected from your network. Connect it to your PC via a hub or with a direct connection. Before connecting to the network, configure the unit with the appropriate settings for the network. If connected as is with the default setting, the unit may cause an unexpected failure to occur in your network.

2.1.2 LAN settings

From the settings menu list on [Setup] in global navigation, click [Network settings] to display the following screen.

The screenshot displays the 'Network settings' interface. On the left, a sidebar shows a tree view with 'Network' expanded, containing 'IP version', 'LAN1', and 'LAN2'. The main content area is titled 'Network' and shows the following settings:

- IP version:** IPv4
- LAN1:**
 - Link speed & duplex:** Auto
 - MTU size:** 1454 Byte(1280-1500)
 - IP address mode:** Static IP (selected), DHCP, PPPoE
 - IP address:** 10.0.0.1
 - Subnet mask:** 255.0.0.0
 - Default gateway address:** 0.0.0.0

At the bottom of the main area are 'Cancel' and 'Apply' buttons. The footer text reads 'Software: V01L010 Copyright FUJITSU LIMITED 2017'.

Figure 2-2 Sample screen of Network settings

Set each item in **Table 2-1 Network settings** for one or both of LAN1 and LAN2. Be sure to set the port for connecting to the network. After setting the items, click the **Apply** button.

Table 2-1 Network settings

Item	Setting	Selection/Setting values	Remarks	
IP version	IP version	{IPv4}		
LAN1	Link speed and duplex	{Auto / Auto(Max 100Mbps) / Auto(Max 10Mbps) / 100BASE-TX Full Duplex / 100BASE-TX Half Duplex / 10BASE-TX Full Duplex / 10BASE-TX Half Duplex}		
	MTU size	1280 to 1500 (bytes)		
	IP address mode	{Static IP / DHCP / PPPoE}		
	IP address	***.***.***.***	When IP address mode is Static IP	
	Subnet mask	***.***.***.***		
	Default gateway	***.***.***.***		
	PPPoE user ID	Up to 64 alphanumeric characters	When IP address mode is PPPoE	
	PPPoE password	Up to 64 alphanumeric characters		
LAN2	Link speed and duplex	{Auto / Auto(Max 100Mbps) / Auto(Max 10Mbps) / 100BASE-TX Full Duplex / 100BASE-TX Half Duplex / 10BASE-TX Full Duplex / 10BASE-TX Half Duplex}		
	MTU size	1280 to 1500 (bytes)		
	IP address mode	{Static IP}		
	IP address	***.***.***.***		
	Subnet mask	***.***.***.***		
	Gateway	***.***.***.***		
	Static network 1 to 5			External network address for communication
	Network address	***.***.***.***	Ex) 172.16.xxx.xxx	
	Subnet mask	***.***.***.***	Ex) 255.255.0.0	

* *** represents a numerical or other such entry.

Enter the set IP address again for the Web browser address to confirm that you can access the IP-HE950 Web GUI.

2.1.3 Time settings

From the settings menu list on [Setup] in global navigation, click [Maintenance] to display the following screen.

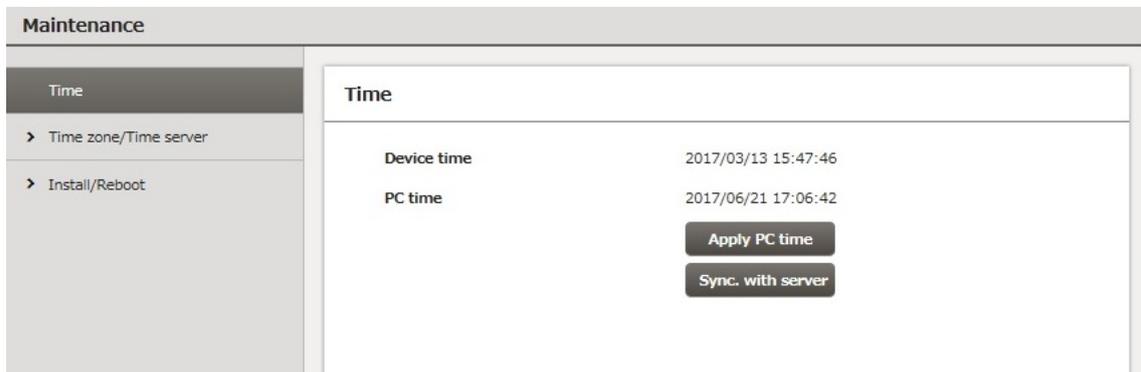


Figure 2-3 Screenshot of performing unit maintenance

Click the **Apply PC time** button to set the unit time to the PC time.

2.2

Check Software

2.2.1 Check the software version and options

Here, check the version of software installed on the IP-HE950 and the installation status of options.

After selecting [Setup] in global navigation, select [Maintenance] - [Install/Reboot] to display the following screen. Check the software version and installation status of optional license. The software version is always displayed at the bottom right of the Web GUI.

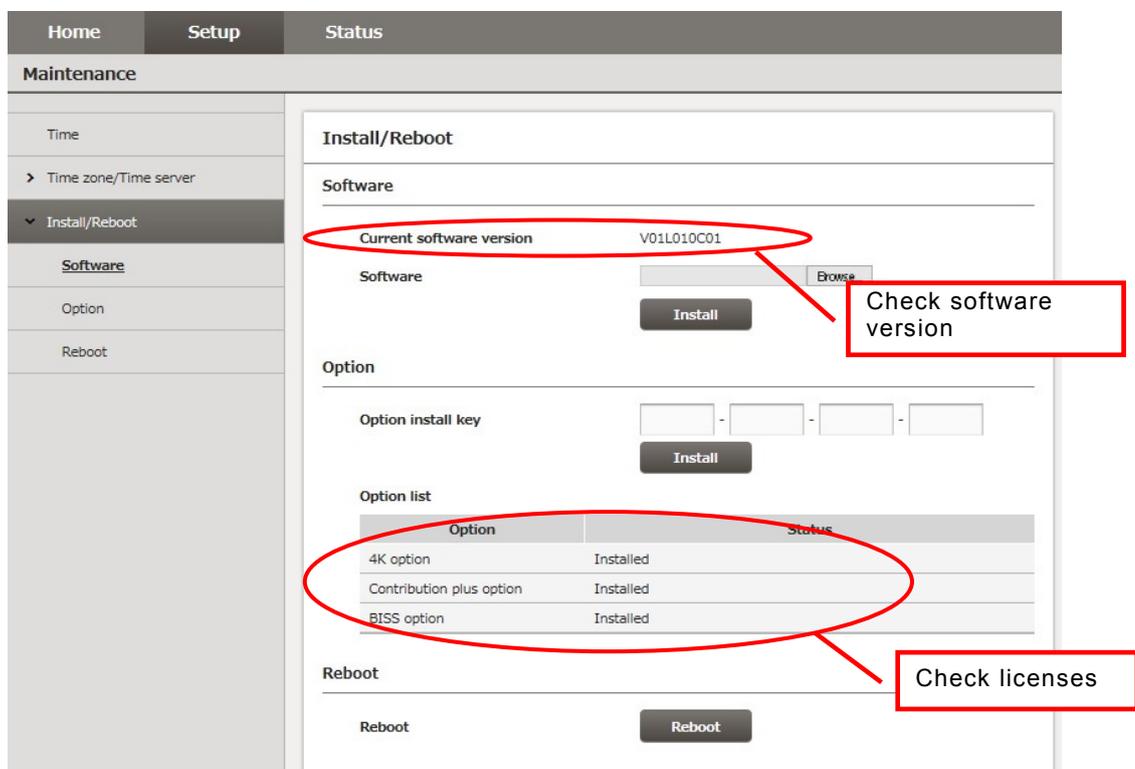


Figure 2-4 Install/Reboot screen

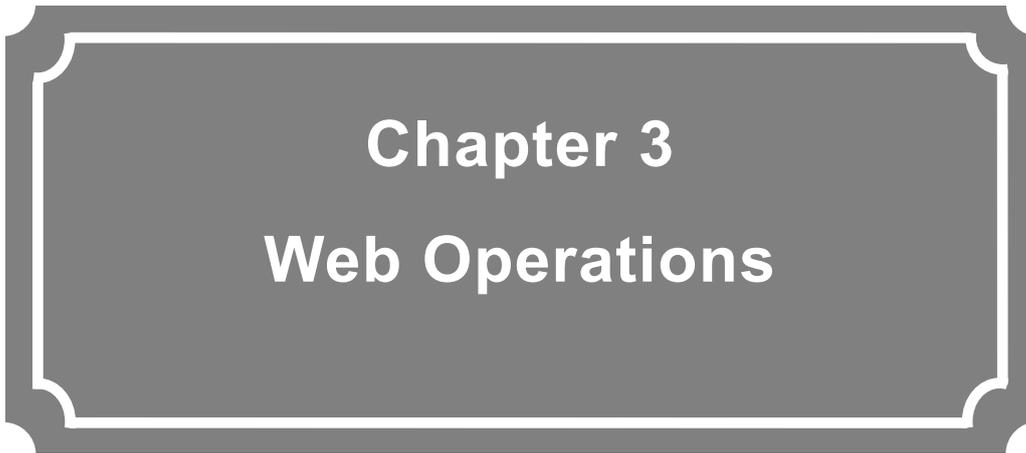
Confirm that the software version is the latest. Fujitsu official website publishes information on the latest software.

IP series webpage

<http://www.fujitsu.com/global/products/computing/peripheral/video/download/>

Confirm that the options of the license agreements that came with the IP-HE950 are already installed.

If they are (it is) not installed, install them (it) by following "Installing an option" in "3.3.4 Maintenance."

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Chapter 3

Web Operations

This chapter describes how to operate each function from a Web browser.

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3.1

Activating the Web GUI

3.1.1 Displaying the Web GUI

Enter the IP address of the IP-HE950 in a Web browser to display the Web GUI (home screen).

IP-HE950 - Encoder

Current configuration file > RunningFile Japanese | English FUJITSU

Home Setup Status Get log

Refresh Manual 3s 5s 10s

Device status

Alert	Occur	
LAN1	Link speed & duplex	Connected/1000Base-T Full Duplex
	IP address	Static IP/10.0.0.1
	Subnet mask	255.0.0.0
	Default gateway address	0.0.0.0
LAN2	Link speed & duplex	Connected/100Base-TX Full Duplex
	IP address	Static IP/192.168.255.253
	Subnet mask	255.255.255.252
	Gateway address	0.0.0.0

Encoder

AV input	SDI
Video input format	1080/59.94
IP bit rate	10.5Mbps
System bit rate	10.0Mbps
Bit rate	9.3Mbps
Coding method	H.265/HEVC
Resolution	1920×1080
Audio 1	MPEG-2 AAC LC/256kbps
DVB-ASI output	Enable
IP output	10.0.0.2:5000
Number of IP packets sent	520244
Number of TS packets sent	3635556

Software:V01L010 Copyright FUJITSU LIMITED 2017

Figure 3-1 IP-HE950 Sample Web GUI (Encoder home screen)

If the user authentication function is enabled, a user authentication message appears. Enter your user name and password. The user authentication function is disabled by default. For the user authentication function settings, refer to "3.3.2 Management."

Connect to 10.0.0.1

User name:

Password:

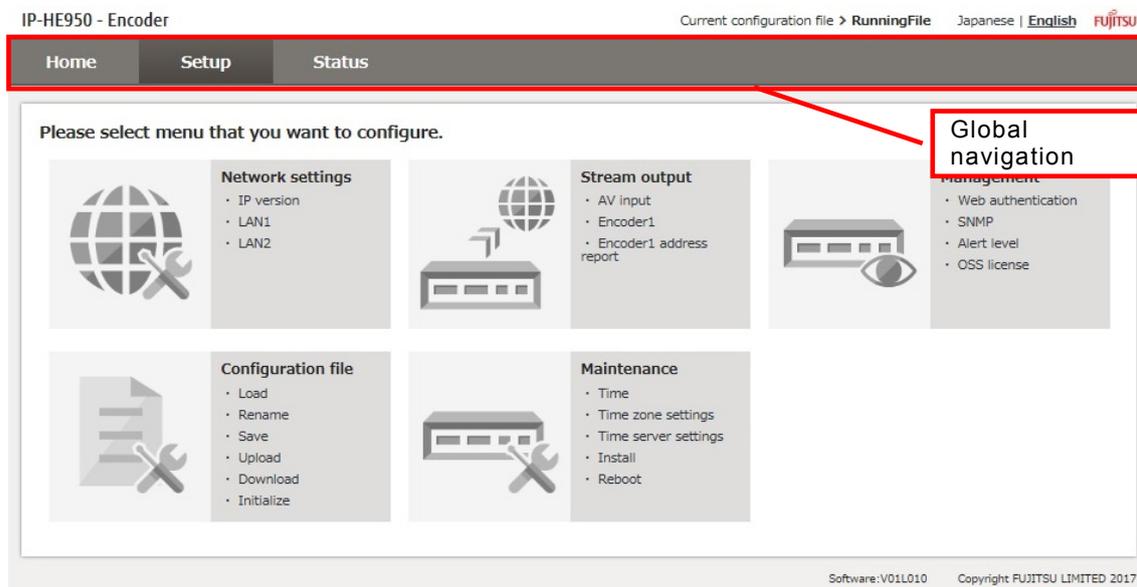
Remember my password

OK Cancel

- * Immediately after the unit is powered on or rebooted, the Web GUI may be inaccessible. Wait for a while before attempting access.

3.1.2 Basic configuration of the Web GUI

The IP-HE950 Web GUI consists of three functions: Home, Setup, and Status. They are selected and displayed from global navigation at the top of the screen.



**Figure 3-2 IP-HE950 Web GUI configuration
(example of the encoder setup screen)**

After selecting items and entering setting values on one of the setting screens, click the **Apply** button to reflect the changed settings. Clicking the **Cancel** button will return items to the pre-input state. An item shown in red means that the content of the setting is outside the operating range of the unit or that the setting cannot be configured because of another setting. In such cases, review and reconfigure the setting contents.

3.2

Home

3.2.1 Home screen

The IP-HE950 home screen appears at initial access to the IP-HE950 Web GUI or when [Home] in global navigation is clicked. In addition to the network status, you can check the unit operating status, including the encoding status and sending statistics on the IP-HE950E and the decoding status and receiving statistics on the IP-HE950D.

IP-HE950 - Encoder Current configuration file > RunningFile Japanese | English

Home | Setup | Status Get log

Refresh Manual 3s 5s 10s

Device status		
Alert		Occur
LAN1	Link speed & duplex	Connected/1000Base-T Full Duplex
	IP address	Static IP/10.0.0.1
	Subnet mask	255.0.0.0
	Default gateway address	0.0.0.0
LAN2	Link speed & duplex	Connected/100Base-TX Full Duplex
	IP address	Static IP/192.168.255.253
	Subnet mask	255.255.255.252
	Gateway address	0.0.0.0

Encoder	
AV input	SDI
Video input format	1080i/59.94
IP bit rate	10.5Mbps
System bit rate	10.0Mbps
Bit rate	9.3Mbps
Coding method	H.265/HEVC
Resolution	1920×1080
Audio 1	MPEG-2 AAC LC/256kbps
DVB-ASI output	Enable
IP output	10.0.0.2:5000
Number of IP packets sent	520244
Number of TS packets sent	3635556

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Figure 3-3 IP-HE950 home screen (Single Encoder)

IP-HE950 - Encoder Current configuration file > RunningFile Japanese | English

Home Setup Status Get log

Refresh Manual 3s 5s 10s

Device status

Alert		Occur
LAN1	Link speed & duplex	Connected/1000Base-T Full Duplex
	IP address	Static IP/10.0.0.1
	Subnet mask	255.0.0.0
	Default gateway address	0.0.0.0
LAN2	Link speed & duplex	Connected/100Base-TX Full Duplex
	IP address	Static IP/192.168.255.253
	Subnet mask	255.255.255.252
	Gateway address	0.0.0.0

Encoder

	Encoder 1	Encoder 2
AV input	SDI	
Video input format	1080/59.94	
IP bit rate	10.5Mbps	10.6Mbps
System bit rate	10.0Mbps	10.0Mbps
Video bit rate	9.3Mbps	9.4Mbps
Video coding	H.265/HEVC	H.264/AVC
Video resolution	1920×1080	1920×1080
Audio	MPEG-2 AAC LC/256kbps	MPEG-2 AAC LC/256kbps
DVB-ASI output	Enable	---
IP output	10.0.0.2:5000	10.0.0.11:5010
Number of IP packets sent	1402078	139996
Number of TS packets sent	9803632	0

Software:V01L010 Copyright FUJITSU LIMITED 2017

Figure 3-4 IP-HE950 home screen (Dual Encoder)

Select a refresh interval from {3s / 5s / 10s} at the top right to automatically refresh the displayed information at the specified interval. Select {Manual} to suspend automatic refresh.

You can download log information by clicking the **Get log** button to the right of global navigation.

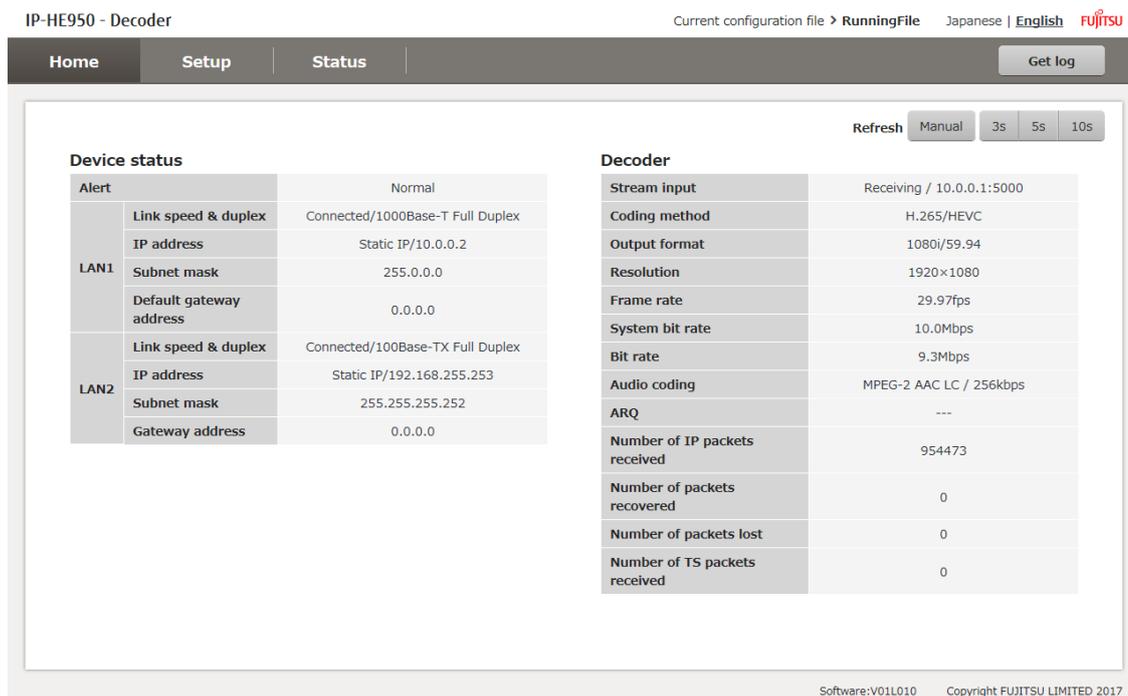


Figure 3-5 IP-HE950 home screen

Table 3-1 List of home screen display items shows what appears on the home screen.

Table 3-1 List of home screen display items

	Item	Displayed contents	
Unit status	Alert	{Normal / Generated}	
	LAN1	Link speed and duplex	{Connected / Disconnected} / {1000Base-T Full Duplex / 1000Base-T Half Duplex / 100Base-TX Full Duplex / 100Base-TX Half Duplex / 10Base-T Full Duplex / 10Base-T Half Duplex}
		IP address	{Static IP / DHCP / PPPoE} / ***.***.***.***
		Subnet mask	***.***.***.***
		Default gateway address	***.***.***.***
	LAN2	Link speed and duplex	{Connected / Disconnected} / {1000Base-T Full Duplex/1000Base-T Half Duplex / 100Base-TX Full Duplex/100Base-TX Half Duplex / 10Base-T Full Duplex / 10Base-T Half Duplex}
		IP address	{Static IP} / ***.***.***.***
		Subnet mask	***.***.***.***
		Gateway address	***.***.***.***

	Item	Displayed contents
Encoder	AV input	{SDI / SFP1 & SFP2}
	Video input format	{2160p/59.94 / 2160p/50 / 2160p/29.97 / 1080p/59.94 / 1080p/50 / 1080i/59.94 / 1080i/50 / 720p/59.94 / 720p/50 / ---/---}
Encoder 1	IP bit rate	XX.X Mbps
	System bit rate	XX.X Mbps
	Video bit rate	XX.X Mbps
	Video coding	H.265/HEVC
	Video resolution	{3840x2160 / 1920x1080 / 1280x720}
	Audio	{MPEG-1 Layer2 / MPEG-2 AAC LC / Pass-thru(SMPTE302M) / No audio} / XXX kbps
	DVB-ASI output	{Enable / Disable}
	IP output	Destination IP address / port number
	Number of IP packets sent	Counts up from 0 to 4294967295
	Number of TS packets sent	Counts up from 0 to 4294967295
Encoder 2	IP bit rate	XX.X Mbps
	System bit rate	XX.X Mbps
	Video bit rate	XX.X Mbps
	Video coding	H.264/AVC
	Video resolution	{1920x1080}
	Audio	{MPEG-1 Layer2 / MPEG-2 AAC LC / No audio} / XXX kbps
	IP output	Destination IP address / port number
	Number of IP packets sent	Counts up from 0 to 4294967295
	Number of TS packets sent	Counts up from 0 to 4294967295
Decoder	Stream input	{Started(Receiving) / Started(Not received) / Stopped} / For IP interface input {Source IP address:Port number}
	Video coding	H.265/HEVC
	Video output format	{2160p/59.94 / 2160p/50 / 2160p/29.97 / 1080p/59.94 / 1080p/50 / 1080i/59.94 / 1080i/50 / 720p/59.94 / 720p/50 / ---/---}
	Video resolution	{3840x2160 / 1920x1080 / 1280x720}
	Frame rate	XX.XX fps
	System bit rate	XX.X Mbps
	Video bit rate	XX.X Mbps
	Audio coding	{MPEG-1 Layer2 / MPEG-2 AAC LC / Pass-thru(SMPTE302M) / No audio} / XXX kbps
	ARQ	{Enable(RTT=XX.X ms) / ---}
	Number of IP packets received	Counts up from 0 to 4294967295
	Number of packets recovered	Counts up from 0 to 4294967295
	Number of packets lost	Counts up from 0 to 4294967295
	Number of TS packets received	Counts up from 0 to 4294967295

* Encoder2 is displayed only when Encoding mode is Dual encoder.

3.3

Setup

Click [Setup] in global navigation to display the following screen with the settings menu list.

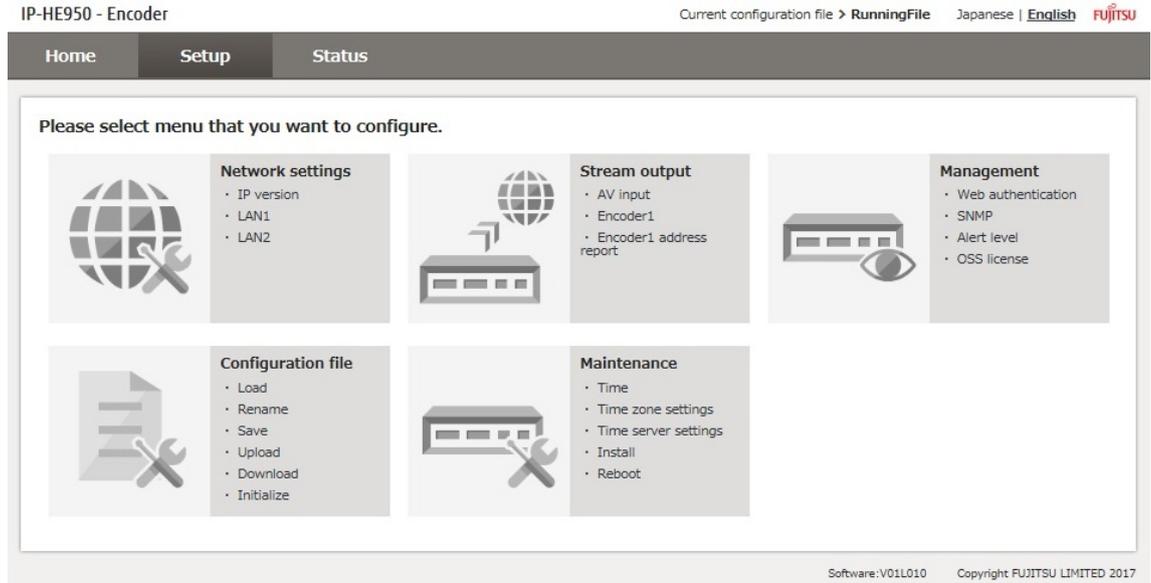


Figure 3-6 Sample encoder setup screen

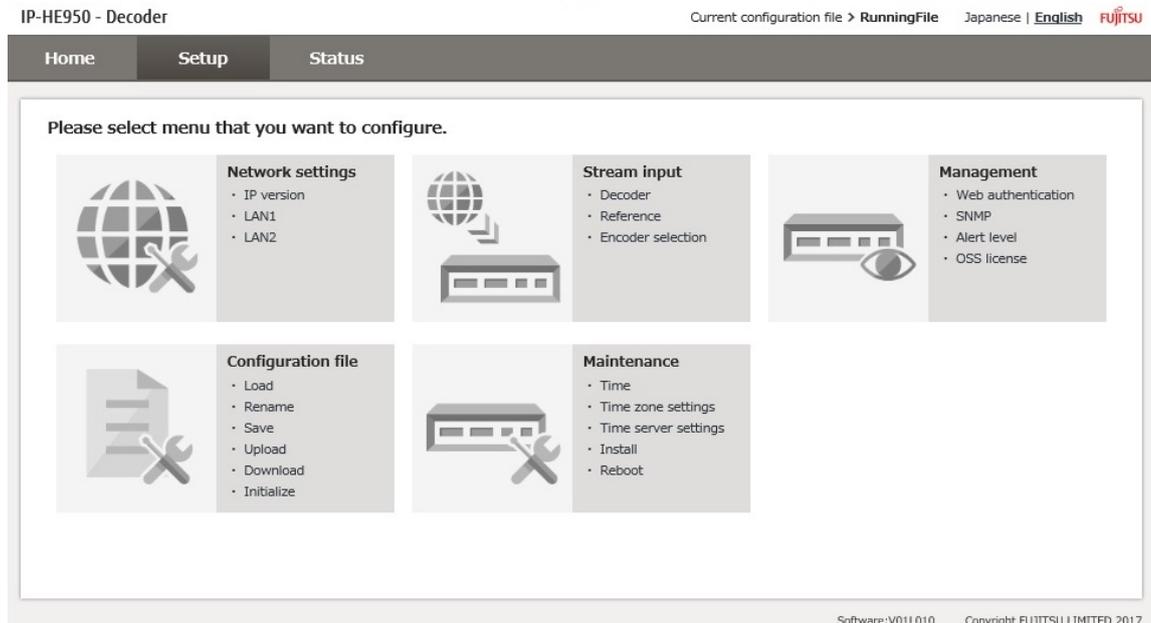


Figure 3-7 Sample decoder setup screen

Table 3-2 Settings menu shows the settings menu and items for each unit.

Unit	Menu	Item
Common	Network settings	IP version
		LAN1
		LAN2
	Management	Web authorization
		SNMP
		Alert level
		OSS license
	Configuration File	Load
		Rename
		Save
		Upload
		Download
		Initialize
	Maintenance	Time
		Time zone settings
		Time server settings
Install		
Reboot		
IP-HE950E (Encoder)	Stream output	AV input
		Encoder1
		Encoder1 address report
		Encoder2 ^{*1}
		Encoder2 address report ^{*1}
IP-HE950D (Decoder)	Stream input	Decoder
		Reference
		Encoder selection

*1 Displayed only when Encoding mode is Dual encoder.

The next sections contain lists of setting items in each menu.

3.3.1 Network settings

Click [Network settings] from the settings menu list to display the following screen.

The screenshot displays the 'Network settings' web interface. On the left, a sidebar shows 'Network' expanded with sub-items 'IP version', 'LAN1', and 'LAN2'. The main content area is titled 'Network' and contains the following settings:

- IP version:** A dropdown menu showing 'IPv4'.
- LAN1:**
 - Link speed & duplex:** A dropdown menu showing 'Auto'.
 - MTU size:** A text input field with '1454' and a label 'Byte(1280-1500)'.
 - IP address mode:** Three buttons: 'Static IP' (highlighted), 'DHCP', and 'PPPoE'.
 - IP address:** A text input field with '10.0.0.1'.
 - Subnet mask:** A text input field with '255.0.0.0'.
 - Default gateway address:** A text input field with '0.0.0.0'.

At the bottom of the main panel are 'Cancel' and 'Apply' buttons. The footer of the interface reads 'Software:V01L010 Copyright FUJITSU LIMITED 2017'.

Figure 3-8 Sample screenshot of Network settings

Table 3-3 Network settings shows each setting item and setting details.

Table 3-3 Network settings

Item	Setting	Selection/Setting values	Remarks
IP version	IP version	{IPv4}	
LAN1	Link speed & duplex	{Auto / Auto(Max 100Mbps) / Auto(Max 10Mbps) / 100BASE-TX Full Duplex / 100BASE-TX Half Duplex / 10BASE-TX Full Duplex / 10BASE-TX Half Duplex}	
	MTU size	1280 to 1500 (bytes)	
	IP address mode	{Static IP / DHCP / PPPoE}	
	IP address	***.***.***.***	When IP address mode is Static IP
	Subnet mask	***.***.***.***	
	Default gateway address	***.***.***.***	
	PPPoE user ID	Up to 64 alphanumeric characters	When IP address mode is PPPoE
	PPPoE password	Up to 64 alphanumeric characters	

Item	Setting	Selection/Setting values	Remarks	
LAN2	Link speed & duplex	{Auto / Auto(Max 100Mbps) / Auto(Max 10Mbps) / 100BASE-TX Full Duplex / 100BASE-TX Half Duplex / 10BASE-TX Full Duplex / 10BASE-TX Half Duplex}		
	MTU size	1280 to 1500 (bytes)		
	IP address mode	{Static IP}		
	IP address	***.***.***.***		
	Subnet mask	***.***.***.***		
	Gateway address	***.***.***.***		
	Static networks 1 to 5			External network address for communication
		Network address	***.***.***.***	Ex) 172.16.xxx.xxx
		Subnet mask	***.***.***.***	Ex) 255.255.0.0

* *** represents a numerical or other such entry.

3.3.2 Management

Click [Management] from the settings menu list to display the following screen.

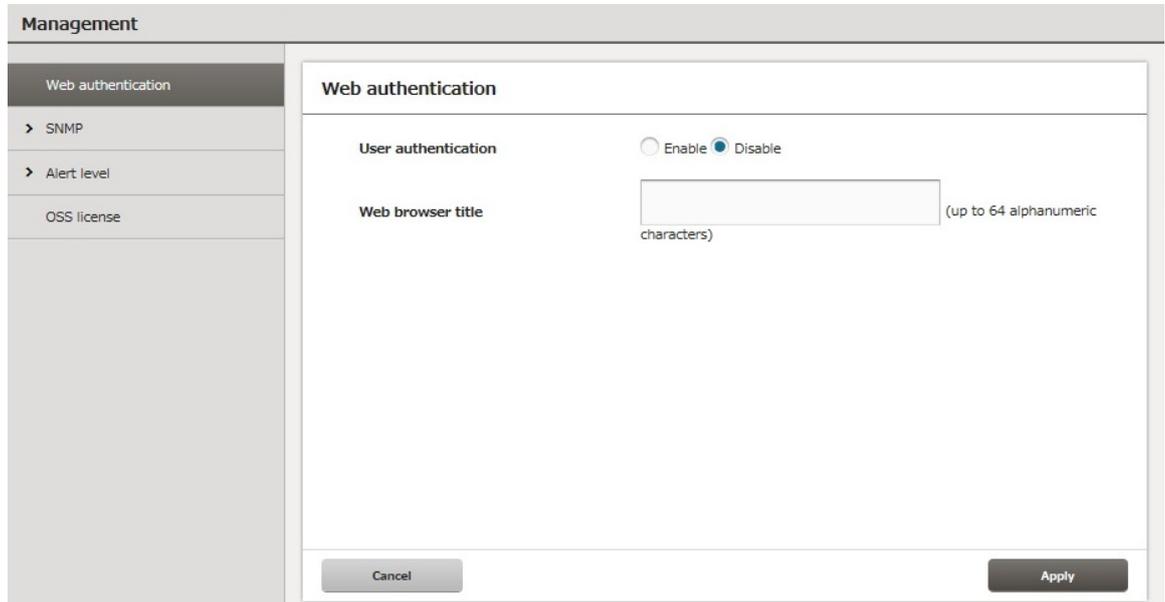


Figure 3-9 Sample screenshot of Management

Table 3-4 Management settings shows each setting item and setting details.

Table 3-4 Management settings

Item	Setting	Selection/Setting values	Remarks
Web authentication	User authentication	{Enable / Disable}	
	User ID	Up to 16 alphanumeric characters	When User authorization is Enable
	Password	Up to 16 alphanumeric characters	
	Web browser title	Up to 64 alphanumeric characters	
SNMP	Agent settings		
	Communities 1 to 5	Up to 16 alphanumeric characters	
	Trap settings Manager 1 to 5		
	Trap	{Send / Do not send}	When Trap transmission is Send
	SNMP version	{SNMPv1 / SNMPv2c}	
	IP address	***.***.***.***	
	Community	Up to 16 alphanumeric characters	
MIB			
MIB file	Download		
Alert level	Unit status (E0000 to EFFF)	{Off / Major / Minor / Warning}	A.1 Alert/Log List shows list of alert codes
	AV/Stream input (I000 to IFFF)	{Off / Major / Minor / Warning}	
	Network status (L000 to LFFF)	{Off / Major / Minor / Warning}	
	Information (0000 to 0FFF)	{Off / Notification / Warning}	

* *** represents a numerical or other such entry.

When you want to download the MIB file to the PC, select [SNMP] > [MIB] in this menu and click the **Download** button.

3.3.3 Configuration file

Click [Configuration File] from the settings menu list to display the following screen.

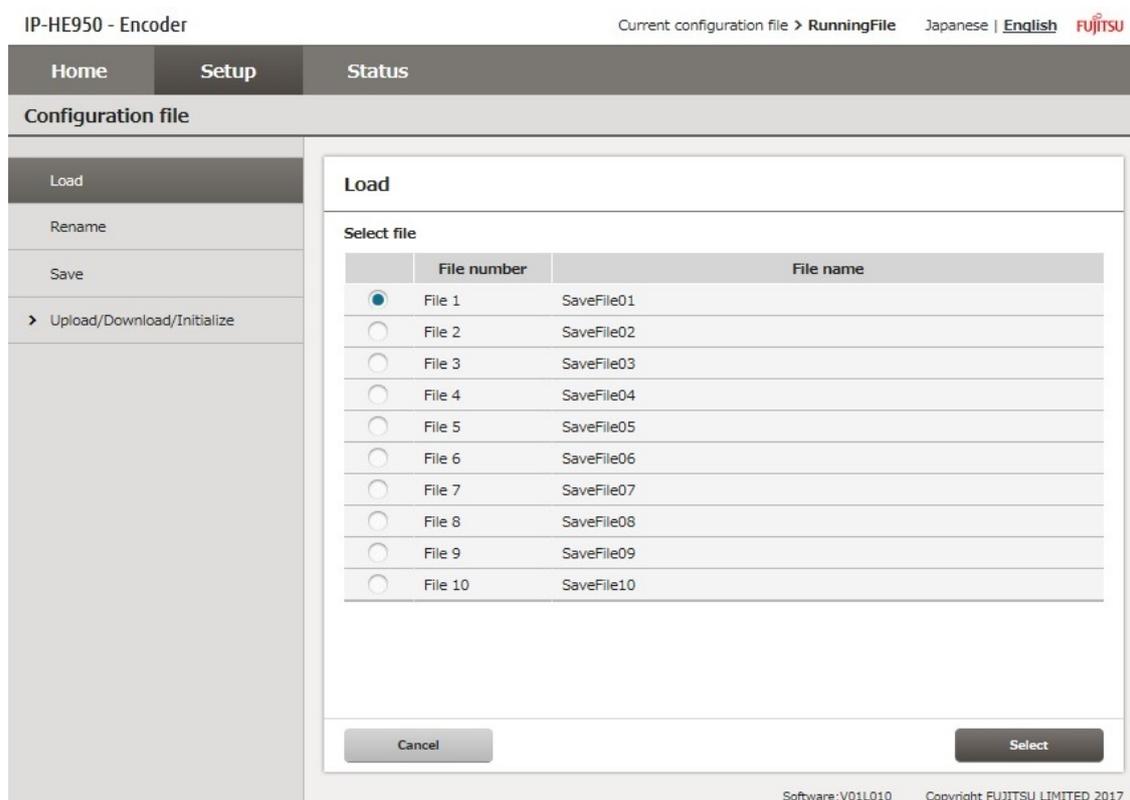


Figure 3-10 Sample screenshot of Configuration file

You can save up to 10 files on the unit as configuration information.

Use the save menu to save the currently used configuration information to any of files 1 to 10. Use the load menu to load the contents of a configuration file into the current unit settings. You can save a configuration file with an arbitrary name of up to 16 alphanumeric characters. You can likewise rename the file too.

The top right of the Web GUI displays the name of the currently used configuration file.

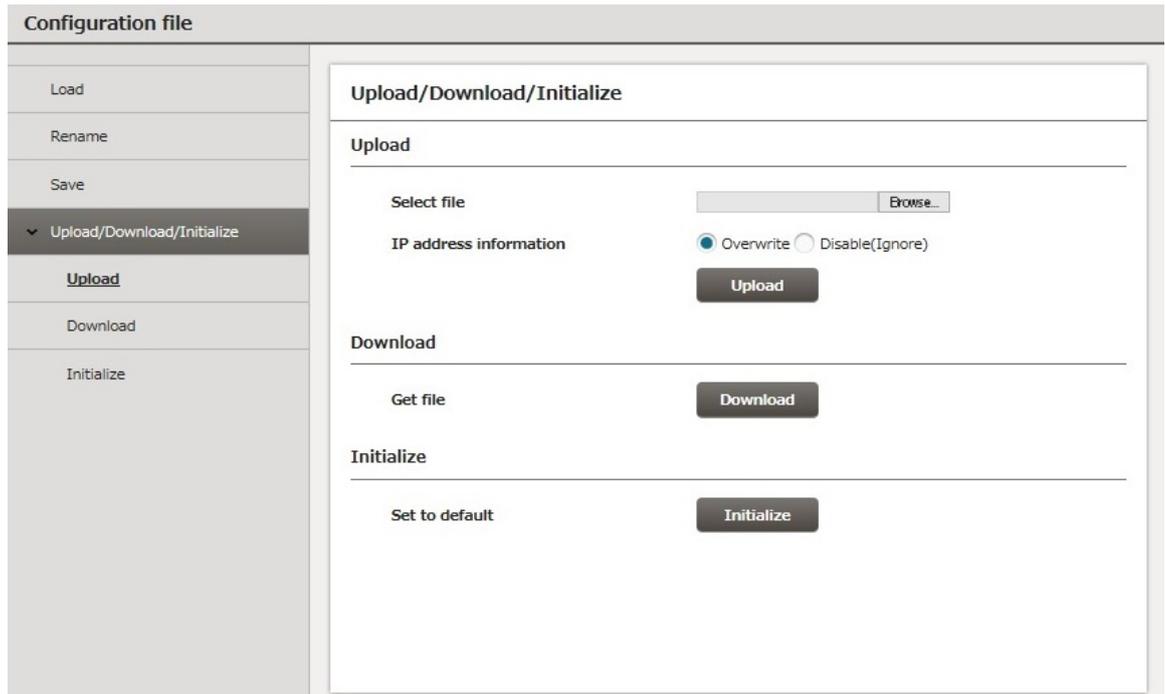


Figure 3-11 Sample screenshot of Upload / Download / Initialize

You can back up the currently used configuration information to a PC, or load a file from a PC to configure the unit.

- Upload
Select a file on the PC and click the **Upload** button to configure the unit with the contents of the file. You can select whether to update the IP address of the unit. This is useful for copying information other than an IP address from another unit.
- Download
Click the **Download** button to save the contents of settings to the PC.
- Initialize
Click the **Initialize** button to initialize the configuration information.

3.3.4 Maintenance

Click [Maintenance] from the settings menu list to display the following screen.

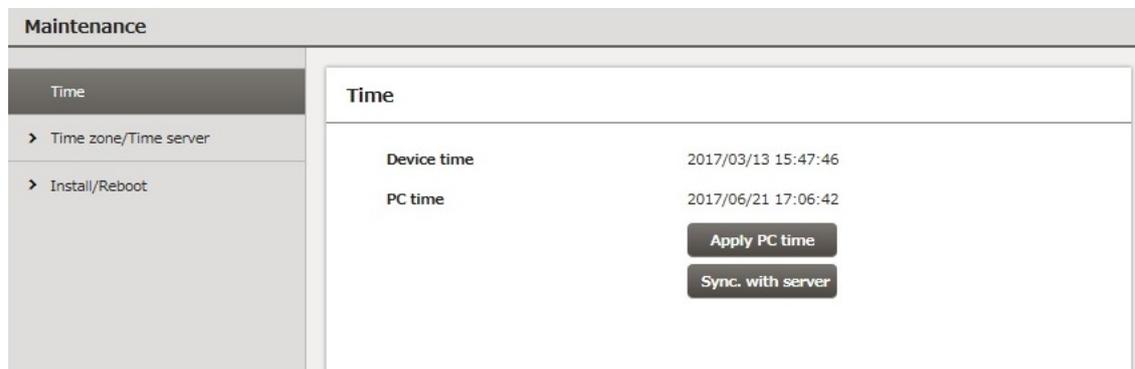


Figure 3-12 Sample screenshot of Maintenance

(1) Time

You can set the unit time to the PC time by clicking the **Apply PC time** button. Set the time in this operation at initial startup of the unit or at startup of the unit powered off for a long time. With a time server configured, clicking the **Sync. with server** button will immediately synchronize the unit with the time server.

(2) Time zone/Time server

The time zone is set with a UTC offset. For Japan, select [+9 hours] since the offset is UTC + 9 hours. When using the unit outside Japan, set the time zone appropriate to the location.

To synchronize with a time server, set the synchronization interval and the IP address of the time server. You can set any period from 1 to 65535 minutes for the synchronization interval.

(3) Install/Reboot

- Installing software

The latest software for the IP-HE950 is provided from Fujitsu official website.

You can download the software to a PC and install it on the unit by following the procedure below.

Select [Install/Reboot] from the Maintenance screen to display the screen shown in **Figure 3-13 Software installation screen**. Click the browse button for software, and specify the file for the software to be updated. Then, click the **Install** button to start installation. The unit is rebooted once the installation ends.

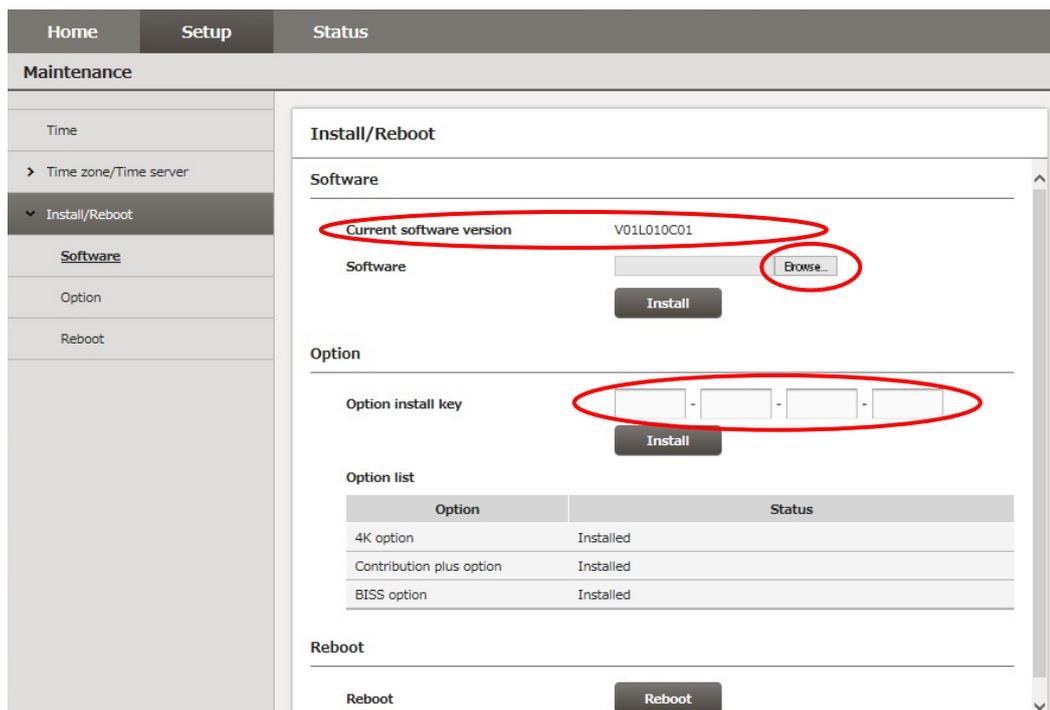


Figure 3-13 Software installation screen

After the installation completes, confirm the software version from a Web browser.

CAUTION

Do not power off or operate the front panel buttons during installation. Otherwise, you may prevent the IP-HE950 from starting.

Do not access another webpage during installation. Otherwise, you may lose information on the progress.

Installation takes about 15 minutes.

- Installing a software option

If a software option license was purchased separately from the IP-HE950, the corresponding optional function will need to be enabled. After the license has been applied to acquire a key code, enter the key code in the option installation key fields on the screen shown in **Figure 3-13 Software installation screen**. Then, click the **Install** button.

The software must be updated to the latest version, depending on the option. Check the software version. If required, install the software first.

"A.3 Applying an Option License" contains instructions to apply the license.

- Reboot
Click the **Reboot** button to restart the unit.

3.3.5 Stream output

Click [Stream output] from the settings menu list of the IP-HE950E (encoder) to display the following screen.

	CPU utilization	IP bit rate	System bit rate	Video bit rate
Encoder 1:	---	--- (Max 100M)	--- (Max 60M)	--- (Range 2-58M)

Figure 3-14 Sample Screenshot of Stream output

You can check the bit rate set for streams in the encoder on this screen.

(1) Encoder settings

Table 3-5 Encoder settings shows the setting items and setting details of video and audio input and encoding.

Table 3-5 Encoder settings

Item	Setting	Selection/Setting values	Remarks	
Operation mode	Encoding mode	{Single encoder / Dual encoder}		
AV input	Video input interface	{SDI / SFP1 & SFP2(Quad-link) ^{*1} }		
	SFP1	3G-SDI INx2	When Video input interface is SFP1 & SFP2	
	SFP2	3G-SDI INx2		
	Video input format	{2160p/59.94*1 / 2160p/50*1 / 2160p/29.97*1 / 1080p/59.94 / 1080p/50 / 1080i/59.94 / 1080i/50 / 720p/59.94 / 720p/50}	2160p/29.97 is selectable only with SFP1 & SFP2	
	4K video division method	{2 sample Interleave / Square-division} ^{*1}	When Video input interface is SFP1 & SFP2	
	Video to encode without input	{Color bar / Gray / Black}	Encode one of three patterns on left	
	Buffer for video input	{Enable / Disable}		
	Audio input interface	Embedded		
Encoder 1				
Encode	Video coding method	H.265/HEVC		
	Video coding format	{2160p/59.94*1 / 2160p/50*1 / 2160p/29.97*1 / 1080p/59.94 / 1080p/50 / 1080i/59.94 / 1080i/50 / 720p/59.94 / 720p/50}	Same as video input format in V01L010	
	Bit rate setting	{IP bit rate / System bit rate / Video bit rate}		
	IP bit rate	Up to 100.000 Mbps	Lower limit of setting value depends on video coding format	
	System bit rate	Up to 60.000 Mbps		
	Video bit rate	Up to 58.000 Mbps		
IP	IP output	{Enable / Disable}	*2	
	Streaming mode	{Unicast (Simplex) / Unicast / Multicast}	Table 3-6 Encoder IP settings lists setting items of every mode	
	TTL	1 to 255		
	TOS control	0 to ff		
	Stream format	TS		
	Streaming port	Local port		0, 1024 to 64000
		Destination port	1024 to 64000	
DVB-ASI	DVB-ASI output	{Enable / Disable}	*2	
	TS packet length	{188 bytes / 204 bytes}		
BISS	IP	{Enable / Disable}	Detail settings are in Table 3-8 BISS settings	
	DVB-ASI	{Enable / Disable}		

Item	Setting	Selection/Setting values	Remarks	
Video	Profile	{Main / Main10 / Main4:2:2 10}		
	Resolution	{3840x2160 / 1920x1080 / 1280x720}	Same as video input format in V01L010	
	Performance	{Low latency / Standard quality / Best quality}		
	Prefilter	{OFF / LIGHT / MEDIUM / HEAVY}	When Video coding format is 1080i	
	Adaptive GOP	{Enable / Disable}	Enabled in scene changes	
	IRAP picture interval	{0.5s / 1s}	*3	
Audio	Coding method	{MPEG-1 Layer2 / MPEG-2 AAC LC / Pass-thru(SMPTE302M) / None}		
	Input source	Embedded 1 to 8		
	MPEG-1 Layer2			
	Channel mode	{Stereo}		
	Audio rate	{128 / 256 / 384kbps}		
	MPEG-2 AAC LC			
	Channel mode	{Dual monaural / Stereo}		
	Audio rate	{64 / 128 / 256kbps}		
	Pass-thru (SMPTE 302M)			
	Sampling bit	{16bit / 20bit / 24bit}		
	Audio rate	16bit: 1920kbps / 20bit: 2304kbps / 24bit: 2688kbps		
	Audio language	3 alphanumeric characters	Listed in Table 3-9 Major ISO 639-2 language code	
	PID	Transport stream ID	0 to ffff	
Program Number/Service ID		1 to ffff		
PMT PID		10 to 1ffe		
PCR PID		10 to 1fff	Same value can't be set	
Video PID		10 to 1ffe		
Audio1 PID		10 to 1ffe		
PCR interval		30 to 100 ms	Every 10 ms	
PSI interval		100 ms		

Item	Setting	Selection/Setting values	Remarks	
Encoder 2				
Encode	Video coding method	H.264/AVC		
	Video coding format	{1080i/59.94 / 1080i/50}	Same as video input format in V01L010	
	Bit rate setting	{IP bit rate / System bit rate / Video bit rate}		
	IP bit rate	Up to 100.000 Mbps	Lower limit of setting value depends on video coding format	
	System bit rate	Up to 30.000 Mbps		
	Video bit rate	Up to 27.000 Mbps		
IP	IP output	{Enable / Disable}	*2	
	Streaming mode	{Unicast (Simplex) / Unicast / Multicast}	Table 3-6 Encoder IP settings lists setting items of every mode	
	TTL	1 to 255		
	TOS control	0 to ff		
	Stream format	TS / TTS		
	Streaming port	Local port	0, 1024 to 64000	0 is automatically assigned
		Destination port	1024 to 64000	
Video	Profile	{High / Main}		
	Resolution	{1920x1080 / 1440x1080}		
	Performance	{Low latency / Standard quality / Best quality}		
	Prefilter	{OFF / LIGHT / MEDIUM / HEAVY}		
	IRAP picture interval	{0.5s / 1s}	*3	
Audio	Coding method	{MPEG-1 Layer2 / MPEG-2 AAC LC / None}		
	Input source	Embedded 1 to 8		
	MPEG-1 Layer2			
	Channel mode	{Stereo}		
	Audio rate	{128 / 256 / 384kbps}		
	MPEG-2 AAC LC			
	Channel mode	{Stereo}		
	Audio rate	{64 / 128 / 256kbps}		
	Audio language	3 alphanumeric characters	Listed in Table 3-9 Major ISO 639-2 language code	
	PID	Transport stream ID	0 to ffff	
Program Number/Service ID		1 to ffff		
PMT PID		10 to 1ffe	Same value can't be set	
PCR PID		10 to 1fff		
Video PID		10 to 1ffe		
Audio1 PID		10 to 1ffe		
PCR interval		30 to 100 ms	Every 10 ms	
PSI interval		100 ms		

*1 This can be selected only if the 4K encoder option is installed.

- *2 Simultaneous output and independent configuration are possible for IP and DVB-ASI.
- *3 A longer cycle improves encoding efficiency, but it may delay loading of the stream at the receiving end.

First, select encoding mode either "Single encoder" or "Dual encoder". "Single encoder" operates as one encoder without input limitation. "Dual encoder" operates as two encoders which accepts only 1080i video format. Encoder1 can output from both IP and DVB-ASI, Encoder2 can output from IP only.

The three streaming modes are "Unicast (Simplex)," "Unicast," and "Multicast." They operate as described below.

"Unicast (Simplex)" distributes the stream to each specified IP address.

"Unicast" receives a unicast request packet from the decoder and distributes the stream. If the decoder is disconnected from the network, such as because it is powered off, unnecessary IP packets are not sent to the network. Thus, this mode makes the load of the network lessen. This function is unique to the Fujitsu IP series. The upper limit on the number of unicast streams is calculated so that the IP bit rate multiplied by the number of streams is less than or equal to 100 Mbps.

"Multicast" makes it possible for one stream from the encoder to be received by multiple decoders with the network function. Network support of multicast is a prerequisite.

Table 3-6 Encoder IP settings lists setting items that support streaming mode. The error correction functions that can be selected depend on the streaming mode. **Table 3-7 Error correction settings** lists setting items for every error correction function.

Table 3-6 Encoder IP settings

Live distribution	Setting	Selection/Setting values	Remarks
Unicast (Simplex)	Acceptable stream number	1 to 4	Setting range depends on IP bit rate
	Unicast addresses 1 to 4	***.***.***.***	
	ARP auto update	{Enable / Disable}	
	Error correction	{Disable / FEC / SMPTE2022 FEC (single) / SMPTE2022 FEC (dual)}	
	Protocol	{RTP / UDP}	
Unicast	Acceptable stream number	1 to 4	Setting range depends on IP bit rate
	ARP auto update	{ Enable }	
	Error correction	{Disable / FEC / ARQ / FEC & ARQ}	
	Protocol	RTP	
	Unicast request port/Local port	1024 to 64000	
Multicast	Acceptable stream number	1	
	Multicast address	***.***.***.***	
	Streaming interface	{LAN1 / LAN2}	
	Error correction	{Disable / FEC / SMPTE2022 FEC(single) / SMPTE2022 FEC(dual)}	
	Protocol	{RTP / UDP}	

Among the error correction functions, FEC, ARQ, and FEC & ARQ are functions unique to the Fujitsu IP series. FEC & ARQ especially does not increase the bandwidth for the error correction function, and it achieves robust error correction. However, ARQ requires a network connection that allows bidirectional communication. If any part of the path will be unidirectional communication only, select another error correction function.

Table 3-7 Error correction settings

Error correction	Setting	Selection/Setting values	Remarks
FEC	FEC interval	4 to 24	
ARQ	ARQ control port (Local)	Streaming port + 1	This value is automatically set.
SMPTE 2022 FEC (single)	SMPTE 2022 FEC matrix	[4 to 20] x [4 to 20]	Total of matrix multiplication needs to be less than or equal to 100
	SMPTE 2022 FEC port (Destination)	Streaming port + 2	This value is automatically set.
SMPTE 2022 FEC (dual)	SMPTE 2022 FEC matrix	[4 to 20] x [4 to 20]	Total of matrix multiplication needs to be less than or equal to 100
	SMPTE 2022 FEC port (Destination)	Streaming destination port + 2 Streaming destination port + 4	This value is automatically set.

The stream form Encoder1 can be BISS encrypted. It can be set to IP and DVB-ASI individually. The Injected ID for Mode E is common in IP and DVB-ASI.

Table 3-8 BISS settings

BISS mode	Setting	Setting values	Remarks
Mode 1	Session word	12 digit hexadecimal	
Mode E	Encrypted session word	16 digit hexadecimal	
	Injected ID	14 digit hexadecimal	Common in IP and DVB-ASI

Table 3-9 Major ISO 639-2 language codes

Language	Language (3-character code)
Danish	dan
Dutch	dut/nld ^{*4}
English	eng
Finnish	fin
French	fre/fra ^{*4}
German	ger/deu ^{*4}
Italian	ita
Japanese	jpn
Norwegian	nor
Portuguese	por
Spanish	spa
Swedish	swe
Not configured	Blank

*4 Two codes are assigned to one language.

(2) Encoder address report

This function notifies the receiving terminal, such as a decoder, of the IP address of the encoder. If the IP address of the encoder is not a static IP address, the decoder is notified of the IP address so that the encoder selection function of the decoder can select and receive from the preferred encoder. In this case, the IP address of the decoder must be a static IP address. This function is unique to the Fujitsu IP series.

Table 3-10 Encoder address report settings

Item	Setting	Selection/Setting values	Remarks
Encoder information	Encoder name	Up to 16 alphanumeric characters	
	Local port	0, 1024 to 64000	0 is automatically assigned
Destination settings	Destination 1 to 10	IP address	***.***.***.***
		Destination port	1024 to 64000

3.3.6 Stream input

Click [Stream input] from the settings menu list of the IP-HE950D (decoder) to display the following screen.

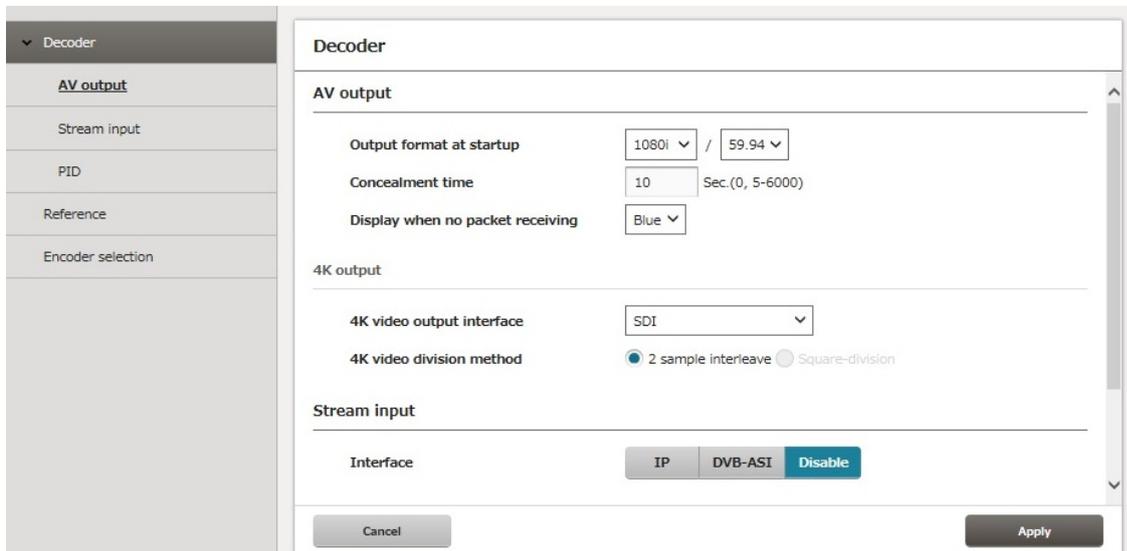


Figure 3-15 Sample screenshot of Stream input

(1) Decoder settings

Table 3-11 Decoder settings shows the setting items and setting details of video and audio output and decoding.

Table 3-11 Decoder settings

Item	Setting	Selection/Setting values	Remarks
AV output	Output format at startup	{2160p/59.94*1 / 2160p/50*1 / 2160p/29.97*1 / 1080p/59.94 / 1080p/50 / 1080i/59.94 / 1080i/50 / 720p/59.94 / 720p/50}	2160p/29.97 is selectable only with SFP1 & SFP2
	Concealment time	0, 5 to 6000 s	0 disables setting below, so nothing is done when no data packet is received
	Display when no packet receiving	{Blue / Gray}	Video output of pattern on left, inside of unit
	4K video output interface	{SDI / SFP1 & SFP2(Quad-link)*1}	
	SFP1	3G-SDI IN x 2	When Video output interface is SFP1 & SFP2
	SFP2	3G-SDI IN x 2	
	4K video division method	{2 sample Interleave / Square-division}	Can be selected when Video output interface is SFP1 & SFP2
Stream input	Interface	{IP / DVB-ASI / Disable}	
	Streaming mode	{Unicast (Simplex) / Unicast / Multicast}	When Interface is IP. Table 3-12 Decoder IP settings lists detailed settings items
	Jitter absorbing buffer	1 to 150 ms	
BISS	BISS	{Enable / Disable}	
	BISS mode	{Mode 1 / Mode E}	
	Session word	12 digit hexadecimal	For Mode 1
	Encrypted session word	16 digit hexadecimal	For Mode E
	Injected ID	14 digit hexadecimal	
PID	PID operation mode	{AUTO / Program number / PMT / Manual}	How to specify decoding program
	Program number/Service ID	1 to ffff	When Program Number is specified
	PMT PID	10 to 1ffe	When PMT is specified
	PCR PID	10 to 1fff	When individually specified
	Video PID	10 to 1fff	
	Audio1 PID	10 to 1fff	

*1 This can be selected only if the 4K encoder option is already installed.

Table 3-12 Decoder IP settings

Live distribution	Setting	Selection/Setting values	Remarks
Unicast (Simplex)	SMPTE 2022 FEC	{Enable / Disable}	
	Streaming port (local)	1024 to 64000	Each port number needs to be set such that none are duplicated
	Encoder address report port (local)	1024 to 64000	
Unicast	Source IP address	***.***.***.***	
	Unicast request cycle	3 to 30 s	
	ARQ	{Enable / Disable}	
	ARQ buffering time	40 to 2000 ms	
	Streaming port (Local)	1024 to 64000	Each port number needs to be set such that none are duplicated; 0 is automatically assigned
	Distribution request port	Local port	
		Destination port	1024 to 64000
	ARQ control port	Streaming port + 1	This value is automatically set.
	Encoder address report port (Local)	1024 to 64000	
Multicast	Source IP address	***.***.***.***	
	IGMP version	{Version 2 / Version 3}	
	IGMPv3 source IP address	***.***.***.***	For IGMPv3
	SMPTE 2022 FEC	{Enable / Disable}	
	Streaming port (Local)	1024 to 64000	Each port number needs to be set such that none are duplicated
	Encoder address report port (Local)	1024 to 64000	

(2) Reference

Select a reference (video output standard) from the following:

- PCR
Video signals are output based on the PCR of the stream that will be received. This is the recommended setting when the unit is connected to a TV monitor or the like.
- Internal
Video signals are output based on the internal clock of the unit. Use this setting when the stream is not stable, such as when the distribution path of the stream has a wireless section.
- BB
Video signals are output synchronized with externally input BB signals. Use this setting when synchronizing video output of multiple units.
- Tri-sync
Video signals are output synchronized with externally input Tri-sync signals. Use this setting when synchronizing video output of multiple units.

If Reference is BB or Tri-sync, you can set a phase shift within the range of -500000 to 500000 ns.

If Reference is PCR, BB signals can be output. Video can be output where multiple decoders are connected in cascade and synchronized.

If Reference is BB, input signals can be passed throughout as is.

(3) Encoder selection

The encoder selection displays a list of encoders if decoder is set as a destination at Encoder address report in encoder. To receive a stream from an encoder from an IP interface, select one of encoders on the encoder selection list.

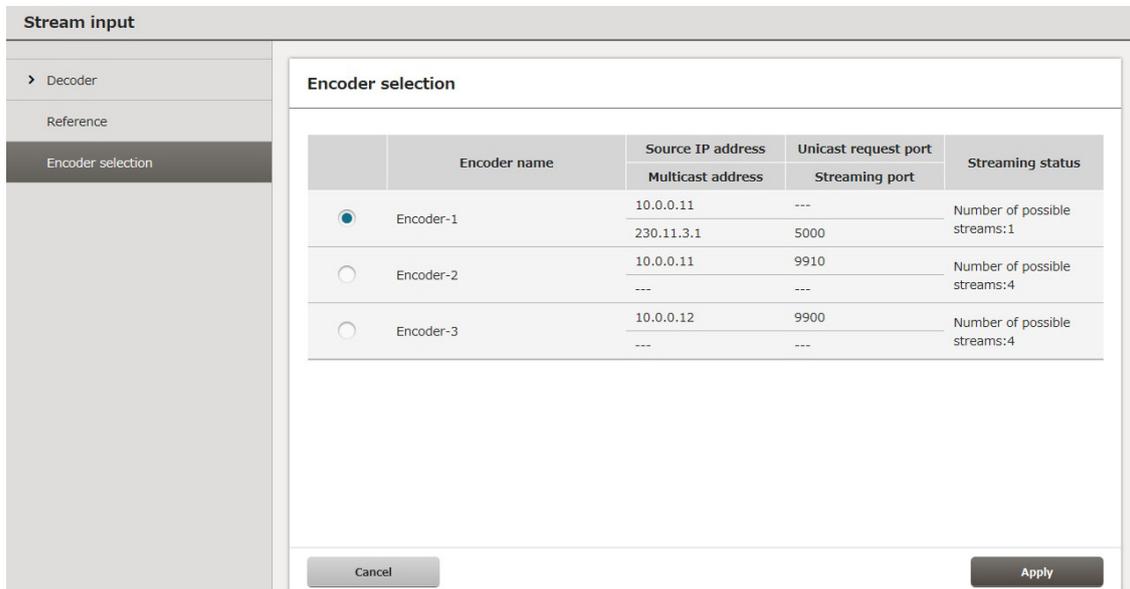


Figure 3-16 Sample screen of Encoder selection

3.4

Status

Click [Status] in global navigation to display the following status screen that shows the operating status of the IP-HE950E (encoder) or the IP-HE950D (decoder). You can check the unit operating status in more detail than on the home screen.

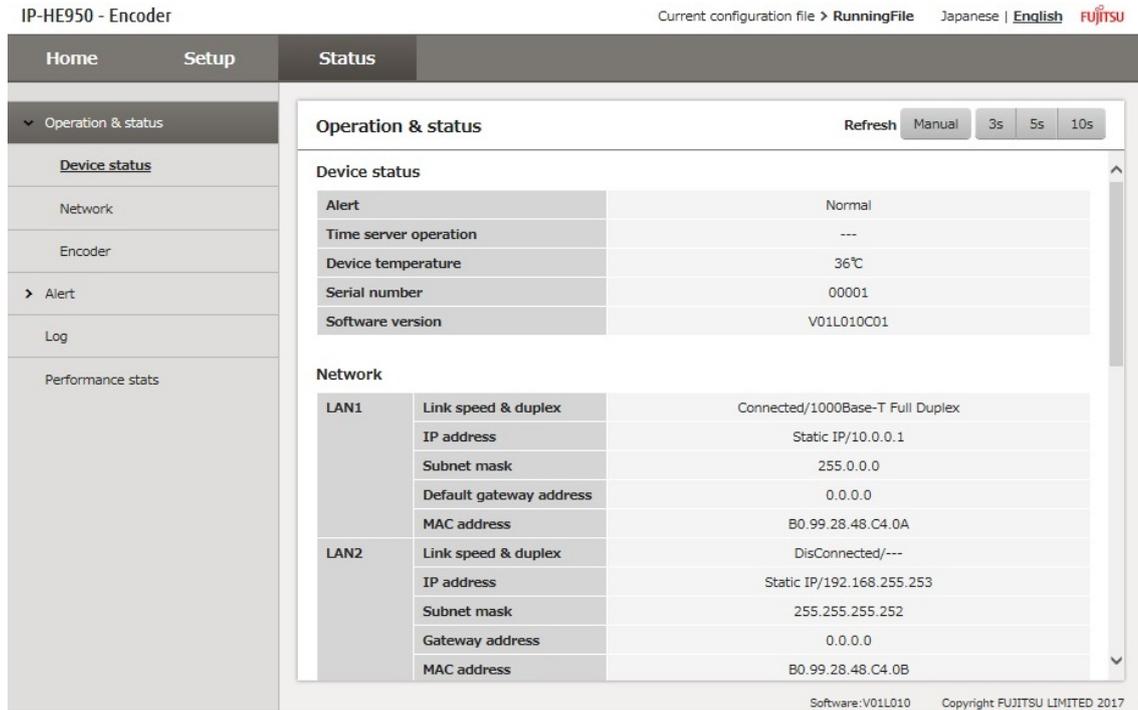


Figure 3-17 Sample screen of Status for encoder

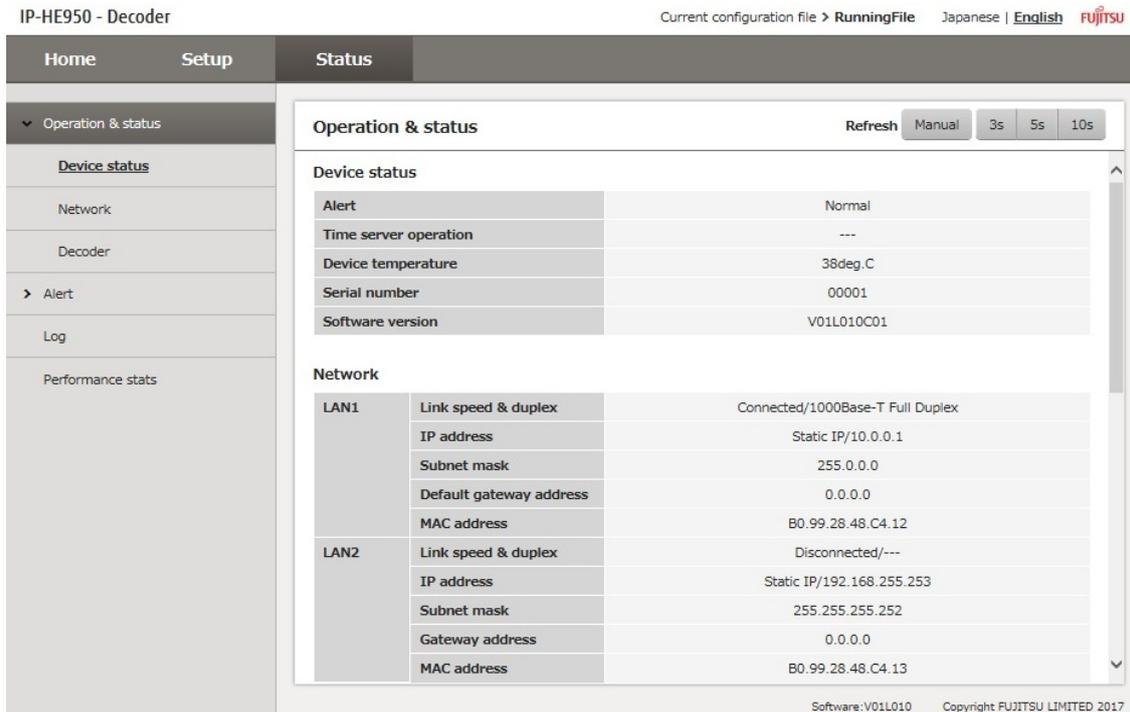


Figure 3-18 Sample screen of Status for decoder

Select a refresh interval from {3s / 5s / 10s} at the top right to automatically refresh the displayed information at the specified interval. Select {Manual} to suspend automatic refresh.

3.4.1 Operation & status

(1) Unit status

The following table shows items common to the IP-HE950E and the IP-HE950D.

Table 3-13 List of unit status display items

	Item	Displayed contents
Unit status	Alert	{Normal / Occurred}
	Time server operation	{Normal / Not synchronized / Error / ---}
	Unit temperature	XX°C
	Serial number	XXXXX
	Software version	VxxLxxxCxx

(2) Network

The following table shows items common to the IP-HE950E and the IP-HE950D.

Table 3-14 List of network display items

	Item	Displayed contents
LAN1	Link speed & duplex	{Connected / Disconnected} / {1000Base-T Full Duplex / 1000Base-T Half Duplex / 100Base-TX Full Duplex / 100Base-TX Half Duplex / 10Base-T Full Duplex / 10Base-T Half Duplex}
	IP address	{Static IP / DHCP / PPPoE} / ***.***.***.***
	Subnet mask	***.***.***.***
	Default gateway address	***.***.***.***
	MAC address	XX:XX:XX:XX:XX:XX
LAN2	Link speed & duplex	{Connected / Not connected} / {1000Base-T Full Duplex / 1000Base-T Half Duplex / 100Base-TX Full Duplex / 100Base-TX Half Duplex / 10Base-T Full Duplex / 10Base-T Half Duplex}
	IP address	{Static IP} / ***.***.***.***
	Subnet mask	***.***.***.***
	Default gateway address	***.***.***.***
	MAC address	XX:XX:XX:XX:XX:XX

(3) Encoder

The IP-HE950E displays the following encoder status. When encoding mode is “Single encoder”, only encoder 1 status is displayed. When “Dual encoder”, both of encoder 1 and encoder 2 status are displayed.

Table 3-15 Encoder 1 status

Item		Displayed contents
AV input		{SDI / SFP1 & SFP2}
SFP1		{3G-SDI INx2 / ---}
SFP2		{3G-SDI INx2 / ---}
Video input format		{2160p/59.94 / 2160p/50 / 2160p/29.97 / 1080p/59.94 / 1080p/50 / 1080i/59.94 / 1080i/50 / 720p/59.94 / 720p/50 / / ---/---}
IP bit rate		XX.X Mbps / ---
System bit rate		XX.X Mbps / ---
Video	Coding method	H.265/HEVC / ---
	Profile	{Main / Main10 / Main4:2:2 10 / ---}
	Resolution	{3840x2160 / 1920x1080 / 1280x720 / ---}
	Bit rate	XX.X Mbps / ---
Audio 1	Coding method	{MPEG-1 Layer2 / MPEG-2 AAC LC / Pass-thru(SMPTE302M) / ---}
	Bit rate	XXX kbps / ---
	Language	XXX / ---
DVB-ASI output		{Enable / Disable}
IP output		{Enable / Disable}
Destination IP address		IP streaming destination IP address:Port number
Transport stream ID		0 to ffff / ---
Program Number/Service ID		1 to ffff / ---
PMT PID		10 to 1ffe / ---
PCR PID		10 to 1fff / ---
Video PID		10 to 1ffe / ---
Audio1 PID		10 to 1ffe / ---

Table 3-16 Encoder 2 status

Item		Displayed contents
AV input		Common with Encoder 1.
SFP1		It is available when AV input is SDI and Video input format is 1080i.
SFP2		
Video input format		
IP bit rate		XX.X Mbps / ---
System bit rate		XX.X Mbps / ---
Video	Coding method	H.264/AVC / ---
	Profile	{High / Main / ---}
	Resolution	{1920x1080 / 1440x1080 / ---}
	Bit rate	XX.X Mbps / ---
Audio 1	Coding method	{MPEG-1 Layer2 / MPEG-2 AAC LC / ---}
	Bit rate	XXX kbps / ---
	Language	XXX / ---
DVB-ASI output		---
IP output		{Enable / Disable}
Destination IP address		IP streaming destination IP address:Port number
Transport stream ID		0 to ffff / ---
Program Number/Service ID		1 to ffff / ---

Item	Displayed contents
PMT PID	10 to 1ffe / ---
PCR PID	10 to 1fff / ---
Video PID	10 to 1ffe / ---
Audio1 PID	10 to 1ffe / ---

(4) Decoder

The IP-HE950D displays the following decoder status.

Table 3-17 Decoder status

Item	Displayed contents	
Stream input	{Started(Receiving) / Started(Not received) / Stopped} / For IP interface input {Distribution source IP address:Port number}	
SFP1	{3G-SDI INx2 / ---}	
SFP2	{3G-SDI INx2 / ---}	
System bit rate	XX.X Mbps / ---	
Video	Coding method	H.265/HEVC
	Output format	{2160p/59.94 / 2160p/50 / 2160p/29.97 / 1080p/59.94 / 1080p/50 / 1080i/59.94 / 1080i/50 / 720p/59.94 / 720p/50 / / ---/---}
	Resolution	{3840x2160 / 1920x1080 / 1280x720 / ---}
	Frame rate	XX.XX fps / ---
	Bit rate	XX.X Mbps / ---
Audio 1	Coding method	{MPEG-1 Layer2 / MPEG-2 AAC LC / Pass-thru(SMPTE302M) / ---}
	Bit rate	XXX kbps
	Language	XXX / ---
ARQ	{Enable (RTT=XX.Xms) / ---}	
TS packet size	{188 bytes / 204 bytes / ---}	
Transport stream ID	0 to ffff / ---	
Program number/Service ID	1 to ffff / ---	
PMT PID	10 to 1ffe / ---	
PCR PID	10 to 1fff / ---	
Video PID	10 to 1ffe / ---	
Audio1 PID	10 to 1ffe / ---	

3.4.2 Alert

The displayed information on current alerts generated in the unit is divided by level. The levels are: major, minor, and warning. For the codes displayed and their descriptions, refer to "**A.1 Alert/Log List.**"

3.4.3 Log

Information on up to 250 alerts generated in the unit is saved together with timestamp information. For descriptions of the alerts, refer to "**A.1 Alert/Log List.**" Clicking the **Delete all** button clears the log information.

3.4.4 Performance statistics

The displayed statistical information relates to sending/receiving streams. Select the display target and display unit and click the **Display** button to display the target data. The following tables show the items displayed depending on the selected target.

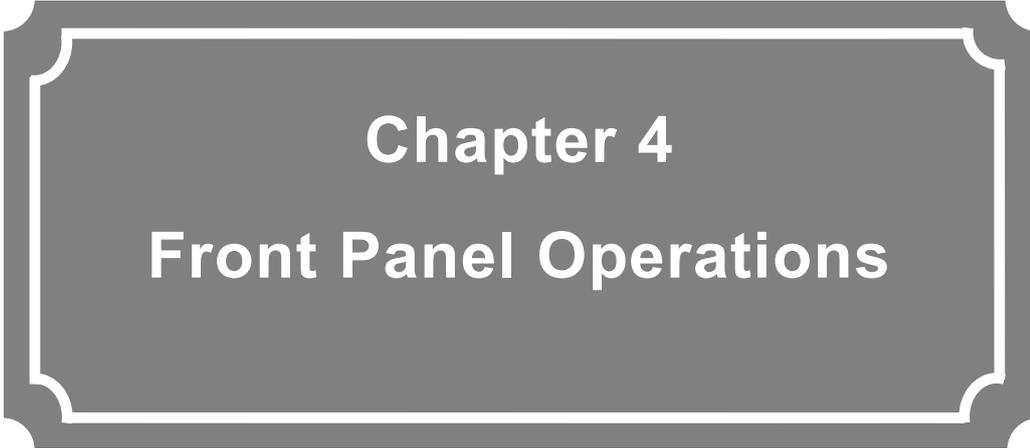
Table 3-18 List of display items for IP-HE950E statistics

Display target	Item
Encoder 1 (IP)	Number of IP packets sent
	Number of FEC packets sent
	Number of ARQ requests received
	Number of ARQ packets resent
Encoder 1 (DVB-ASI)	Number of TS packets sent
Encoder 2 (IP)	Number of IP packets sent
	Number of FEC packets sent
	Number of ARQ requests received
	Number of ARQ packets resent

Table 3-19 List of display items for IP-HE950D statistics

Display target	Item
Decoder (IP)	Number of IP packets received
	Number of IP packets recovered
	Number of packets lost
	Number of FEC packets received
	Number of resent packets received
	Number of packets recovered by FEC
	Number of ARQ requests sent
	Number of packets recovered by ARQ
	Number of data losses exceeding concealment time
	Number of reloading TS streams
	Number of BISS decrypted
	Number of BISS decryption errors(unsupported TSC)
	Number of BISS decryption errors(unused)
	Number of discontinuous PCR values
	Number of times jitter control buffer exceeded capacity
Decoder (DVB-ASI)	Number of TS packets received
	Number of data losses exceeding concealment time
	Number of BISS decrypted
	Number of BISS decryption errors(unsupported TSC)
	Number of BISS decryption errors(unused)
	Number of discontinuous PCR values
	Number of video decoding errors
Number of audio decoding errors	

For the display unit, select from "All," "1 Hour," "1 Day," "1 Week," and "1 Month". Clicking the **Delete** button clears all the information.

A dark gray rectangular box with rounded corners and a white double-line border. The text "Chapter 4" and "Front Panel Operations" is centered in white.

Chapter 4

Front Panel Operations

This chapter describes settings and operations from the front panel.

4.1 Overview	54
4.2 Operations	55
4.3 Front Panel Display	56
4.4 Special Operations	64

4.1

Overview

4.1.1 Front panel

The front panel of the unit has a display (VFD) and operation keys, and provides some of the Web GUI functions.



Figure 4-1 Front panel on the IP-HE950E

The front panel display has a size of 22 characters x 4 lines. Abbreviated expressions may be displayed (e.g., ENCODER1 -> ENC1) because of this defined number of characters per line. If not operated for 60 seconds, the display moves to the TOP screen, and the brightness of the front panel decreases (100% -> 25%).

Refer to "4.2.1 Operation key" for detail key operations. Refer to "4.3.1 Screen type" for detail display contents.

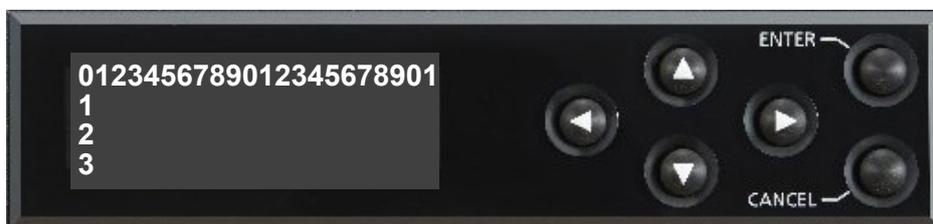


Figure 4-2 Front panel display and operation keys

4.2

Operations

4.2.1 Operation key

Table 4-1 Operation key describes about each key.

Table 4-1 Operation key descriptions

Operation key	Description
ENTER	Moves from the TOP screen to a menu screen. Moves from an item screen to a settings screen. Moves from a settings screen to a processing screen.
CANCEL	Moves to the screen that is one level higher.
Cursor key	
Up 	Moves from a menu screen or item screen to the screen that is one level higher. Used on a settings screen to select an arbitrary value.
Down 	Moves from a menu screen to the screen that is one level lower. Used on a settings screen to select an arbitrary value.
Left 	Moves from a menu screen to another menu screen at the same level. Used on a settings screen (value entry) to move the cursor to any position.
Right 	Moves from a menu screen to another menu screen at the same level. Used on a settings screen (value entry) to move the cursor to any position.

4.3

Front Panel Display

4.3.1 Screen types

Table 4-2 Screen types outlines the types of screens displayed by the front panel.

Table 4-2 Screen types

Screen type	Description	Screen transition
TOP screen	The screen displays the status during operation. It appears when the unit is restarted or 60 seconds have passed without an operation being done.	Use the ENTER key or Down key to move to a menu screen.
Menu screen	The screen displays a menu (item).	Use the cursor keys to move to a menu screen or item screen. Use the CANCEL key or Up key to move to the screen that is one level higher.
Item screen	The screen displays items and their current values.	Use the Left and Right keys to move to an adjacent item screen in the same menu. Use the ENTER key to move to a settings screen. Use the CANCEL key or Up key to move to the screen that is one level higher.
Settings screen	The screen is used to change and set the values of items. Depending on the item, either select a setting value from a list (value selection) or enter a setting value directly (value setting) on the screen. The cursor (blinking) appears at the beginning of the setting value. An asterisk (*) is displayed (only for value selection) next to the current value. Arrows are displayed to represent the cursor keys that can be used.	After changing any value, use the ENTER key to move to a processing screen and proceed with the update processing. Use the CANCEL key to move to the screen that is one level higher.
Processing screen	The screen displays the update processing in progress.	The screen transition varies depending on the update processing result. OK/NG: Moves to an item screen. Busy: Moves to the Busy screen.
Busy screen	The screen appears when the unit is in the Busy state (processing).	Use the ENTER key to move back to the screen where an update is in progress, and proceed with the update processing. Use the CANCEL key to move to an item screen without proceeding with the update processing.

4.3.2 Screen transitions

The following figure shows the relationship between screens.

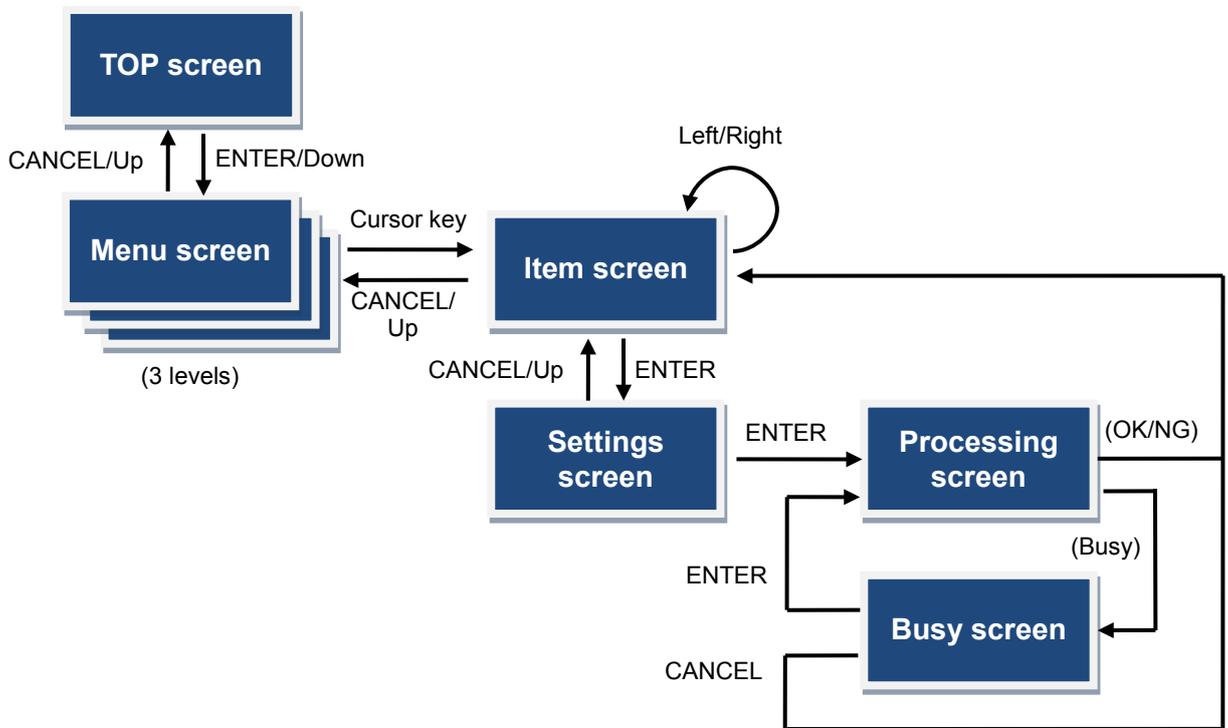


Figure 4-3 Front panel screen transitions

4.3.3 Screen layout

The front panel displays the menu hierarchy on the first line, an item name on the second line, and a setting value on the third line.

The panel displays an asterisk (*) next to the current setting value (for a selection item), and arrows representing the cursor keys that can be used.



Figure 4-4 Front panel screen layout

4.3.4 Screen menus

This section shows the main contents displayed on the front panel.

The figures contain menus up to the second level. For details, refer to **Table 4-3 List of operation items**. For information on special operations (shutdown and unit reboot) that can be executed from the front panel, refer to " **4.4 Special Operations.**"

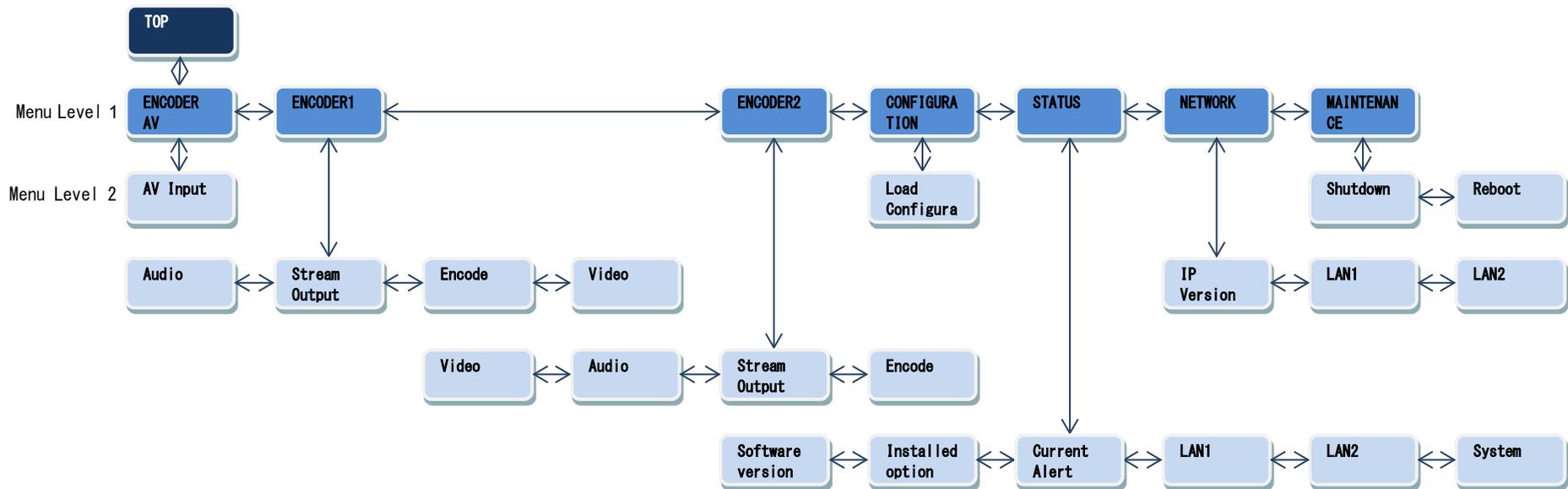


Figure 4-5 IP-HE950E Front panel display menus

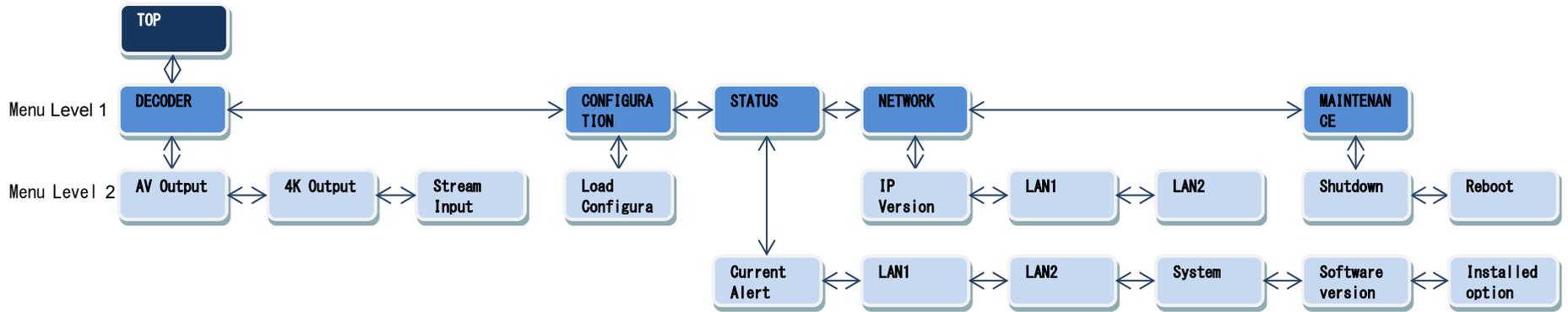


Figure 4-6 IP-HE950D Front panel display menus

4.3.5 TOP screen

The TOP screen of the IP-HE950E displays the operating status of the encoder. The screen displays the encoding setting, transmission system rate, and transmission counter.



Figure 4-7 TOP screen display on the IP-HE950E

The TOP screen of the IP-HE950D displays the operating status of the decoder. The screen displays the video coding method, output format, receiving system rate, reception counter, packet loss counter, and error correction counter. The status is refreshed at an interval of three seconds.



Figure 4-8 TOP screen display on the IP-HE950D

4.3.6 Operation details

You can operate and check the following items from the front panel.

Table 4-3 List of operation items

Level 1	Level 2	Level 3	Level 4	Setting/ Display value
ENCODER AV	AV Input	AV Settings	Input interface	SDI / SFP1 & SFP2
			Input format	2160p/1080p/1080i/ 720p
			Input frame	59.94/50/29.97

Level 1	Level 2	Level 3	Level 4	Setting/ Display value	
ENCODER1	Stream Output	DVB-ASI setting	Output	Enable/Disable	
		IP settings	Output	Enable/Disable	
	Encode	Encode settings	Encode format	2160p/1080p/1080i/ 720p	
			Encode frame	59.94/50/29.97	
			Bit rate setting	IP bit rate/ System bit rate/ Video bit rate	
			IP bit rate	xxxxxx kbps	
			System bit rate	xxxxx kbps	
			Video bit rate	xxxxx kbps	
	Video	Video settings	Resolution	3840x2160/ 1920x1080/ 1280x720	
			Performance	Low latency/ Standard quality/ Best quality	
	Audio	Audio1 settings	Coding method	None/ MPEG1-Layer2/ MPEG2-AAC LC/ SMPTE302M	
			Channel mode	Dual mono/Stereo	
			Quantization bit	16bit/20bit/24bit	
			Bit rate	xxxx kbps	
	ENCODER2 (Displayed when Dual encoding)	Stream Output	IP setting	Output	Enable/Disable
		Encode	Encode settings	Encode format	1080i
				Encode frame	59.94/50
Bit rate setting				IP bit rate/ System bit rate/ Video bit rate	
IP bit rate				xxxxxx kbps	
System bit rate				xxxxx kbps	
Video bit rate				xxxxx kbps	
Video		Video settings	Resolution	1920x1080/ 1440x1080	
			Performance	Low latency/ Standard quality/ Best quality	
Audio		Audio1 settings	Coding method	None/ MPEG1-Layer2/ MPEG2-AAC LC	
			Channel mode	Stereo	
			Bit rate	xxxx kbps	

Level 1	Level 2	Level 3	Level 4	Setting/ Display value
DECODER	AV Output	AV settings	Startup format	2160p/1080p/ 1080i/720p
			Startup frame	59.94/50/29.97
	4K Output	4K settings	Output interface	SDI/SFP1 & SFP2
	Stream Input	Stream setting	Interface	Disable/DVB-ASI/IP
			Streaming mode	Unicast (Simplex)/ Unicast/Multicast
			IPv4 unicast addr	xxx.xxx.xxx.xxx
			IPv4 multicast addr	xxx.xxx.xxx.xxx
CONFIGURATION	Load Configuration			Config number for loading
STATUS	Current Alert	Major		Alert code name
		Minor		Same as above
		Warning		Same as above
	LAN1	IPv4 address		xxx.xxx.xxx.xxx ^{*1}
		IPv4 subnetmask		xxx.xxx.xxx.xxx ^{*1}
		IPv4 default-gw		xxx.xxx.xxx.xxx ^{*1}
		MAC address		xx:xx:xx:xx:xx:xx
		Speed&Duplex		Transmission rate & duplex
	LAN2	IPv4 address		xxx.xxx.xxx.xxx
		IPv4 subnetmask		xxx.xxx.xxx.xxx
		IPv4 gateway		xxx.xxx.xxx.xxx
		MAC address		xx:xx:xx:xx:xx:xx
		Speed&Duplex		Transmission rate & duplex
	System	SFP slot1		Displays installation status and type
		SFP slot2		Displays installation status and type
		Serial number		Serial number
		Temperature		Unit temperature
	Software Version	Software version		VxxLxxCxx
	Installed option	4K		Installed/Not Installed
		Contribution +		Installed/Not Installed
		BISS		Installed/Not Installed

Level 1	Level 2	Level 3	Level 4	Setting/ Display value
NETWORK	IP Version	IP version setting	IP version	IPv4
	LAN1	LAN1 settings	IPv4 address mode	Static IP/DHCP/PPPoE
			IPv4 address	xxx.xxx.xxx.xxx
			IPv4 subnetmask	xxx.xxx.xxx.xxx
			IPv4 default gateway	xxx.xxx.xxx.xxx
			Speed & Duplex	Bit rate & duplex
NETWORK	LAN2	LAN2 settings	IPv4 address mode	Static IP
			IPv4 address	xxx.xxx.xxx.xxx
			IPv4 subnetmask	xxx.xxx.xxx.xxx
			IPv4 gateway	xxx.xxx.xxx.xxx
			Speed & Duplex	Transmission rate & duplex
		Static network1	IPv4 network addr	xxx.xxx.xxx.xxx
			IPv4 subnetmask	xxx.xxx.xxx.xxx
		Static network2	IPv4 network addr	xxx.xxx.xxx.xxx
			IPv4 subnetmask	xxx.xxx.xxx.xxx
		Static network3	IPv4 network addr	xxx.xxx.xxx.xxx
	IPv4 subnetmask		xxx.xxx.xxx.xxx	
	Static network4	IPv4 network addr	xxx.xxx.xxx.xxx	
		IPv4 subnetmask	xxx.xxx.xxx.xxx	
	Static network5	IPv4 network addr	xxx.xxx.xxx.xxx	
		IPv4 subnetmask	xxx.xxx.xxx.xxx	
	MAINTENANCE	Shutdown		
Reboot			Executes reboot	

*1 If the IPv4 address mode is DHCP or PPPoE and an address failed to be obtained, "---" is displayed.

The ranges of values or choices of some items are depending on other settings.

4.4

Special Operations

4.4.1 Shutdown

You can shut down the unit by operating the keys on the front panel. You can safely power off the unit by shutting it down before powering it off.

If the unit is powered off while it has an active PPPoE connection, it might take time extra to establish next connection. When the unit has an active PPPoE connection, we recommend shutting down the unit before powering it off.

To shut down, display the Shutdown item on the MAINTENANCE menu, and press the ENTER key.



Figure 4-9 Shutdown screen

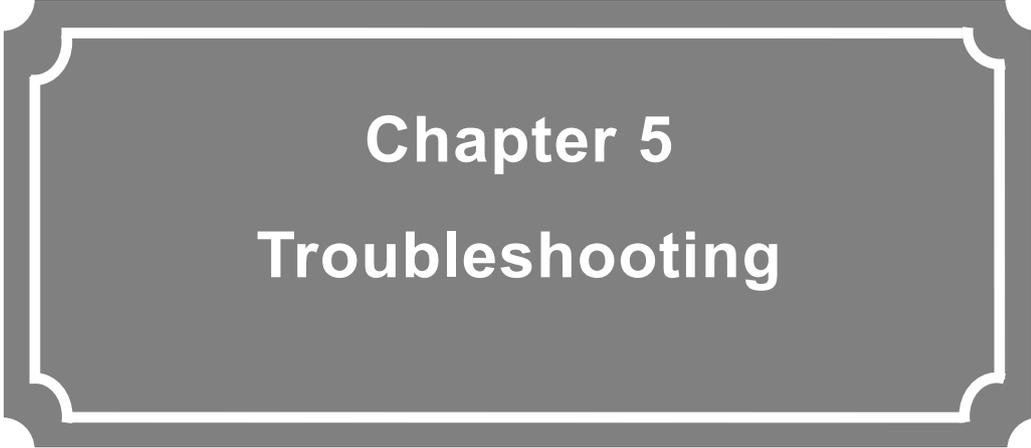
4.4.2 Unit reboot

You can reboot the unit by operating the keys on the front panel.

Set the unit to reboot from the Reboot item on the MAINTENANCE menu.



Figure 4-10 Reboot screen

A large, dark gray rectangular box with rounded corners and a white double-line border. The text "Chapter 5 Troubleshooting" is centered in white, bold font.

Chapter 5 Troubleshooting

This chapter describes the actions to take if, for example, audio/video is not output or an alarm LED goes on.

5.1 Troubleshooting	66
5.2 Alarm LED Goes On	69

5.1

Troubleshooting

If you think your IP-HE950 is malfunctioning, take the corresponding corrective action in the table below, according to the applicable conditions.

If a problem persists, contact Fujitsu sales or Fujitsu partners. Before handing over the unit to them, initialize it as instructed in "**3.3.3 Configuration file**" to delete your confidential data.

WARNING

Possibility of electric shock

Contact your system administrator before checking the voltage of a power outlet. Otherwise, electric shock may occur.

Table 5-1 Check details and corrective actions

Classification	Symptom	Check	Corrective action
Power/ Startup	The unit cannot be powered on.	Is the power code connected?	Confirm that the power code is properly connected to the outlet.
		Is the outlet voltage normal?	Measure the voltage with a tester to confirm that the voltage is normal. If another unit is connected to the same outlet, check the operation of the unit.
Hardware	The ALM LED is on.	The IP-HE950 is faulty.	Check the details of the error from the Web GUI or the front panel.
	The PWR LED lights up in orange.	Is the ambient temperature of the IP-HE950 higher than that in the specifications?	Adjust the temperature conditions so that the ambient temperature of the IP-HE950 meets the specifications.
		Is there any shielding material in the installation area?	Remove the shielding material.
Operation	Commands cannot be used via a LAN. (The Web GUI cannot be displayed.)	Is the RDY LED blinking?	The hardware system is operating while the RDY LED is blinking. Wait until the LED stays on.
		Is the IP address of the unit correct? You can check the IP address of the unit from the front panel.	Check [STATUS] - [LAN1,2] - [IPv4 address] - [default-gw].
		Is the correct IP address displayed on the front panel?	Automatic acquisition of the IP address possibly failed. Check and set the address from the [NETWORK] - [LAN1,2] - [LAN1,2 settings] menu on the front panel.
		Are the LINK LEDs on the IP-HE950 and hub on?	If they are not, the UTP cable is not connected. Check the UTP cable.

Classification	Symptom	Check	Corrective action
Operation	Commands cannot be used via a LAN.	Issue a PING command to the IP address of the IP-HE950. Does it respond?	If not: - Check the network settings on the PC (to check whether the net mask and gateway address are valid).
	(The Web GUI cannot be displayed.)	Is a valid browser with valid settings being used?	- Confirm that a supported browser is used. - Disable the proxy and compatibility view settings of the browser, and retry the operation.
Video	No video is output. (Black screen)	Is the monitor turned on?	Check the monitor power and operation.
		Is the IP-HE950 turned on?	Confirm that the PWR LED is on.
		Is the IP-HE950D correctly connected to the monitor?	Check the connection between the IP-HE950D and monitor.
	A blue/gray screen is output.	Has decoding started?	Confirm that the decoder is running and receiving stream input. Confirm the settings for receiving streams as described in "3.3.6 Stream."
		Is the setup normal?	Check the streaming format, streaming address, and port number settings of the encoder and decoder as described in "3.3.5 Stream" and "3.3.6 Stream."
		Is "Running" shown for the encoder output settings?	Check the encoder operating status to confirm that "Running" is shown for DVB-ASI output and IP output.
	Only color bars are displayed.	Is the video input of the encoder normal?	If there is no video input, the encoder outputs color bars or a gray view according to the "Display when video input disconnected" setting on the AV input setup screen. Check video input.
		Is the video input of the encoder correctly configured?	Confirm that the video input interface and video input format settings in "3.3.5 Stream" match video input signals.
	The received video sometimes stops, or the video is distorted.	Is there a receiving error?	Check the number of data packets received, in the decoder statistics described in "3.4.4 Performance statistics." Display the performance statistics several times. If the number of data packets lost is incrementing, the network load may be high or there may be a problem with a setting. Consult your network administrator.
Is the MTU size too small?		Use the size recommended for the network used.	

Classification	Symptom	Check	Corrective action
Audio	No sound comes out.	Is the IP-HE950 turned on?	Confirm that the PWR LED is on.
		Is the IP-HE950 correctly connected to the speaker?	Check the connection between the IP-HE950 and the speaker.
		Is the volume of the speaker too low?	Check the volume of the speaker.
		Has an alert been generated on the distribution source unit?	If an alert was generated, refer to the operating manual of the distribution source unit.
		Is the distribution source unit correctly connected to the audio source?	Check the connection of the audio cable.
		Is the encoder audio format set to "No audio"?	Confirm that the audio format is correctly set as described in " 3.3.5 Stream. "
Noise is generated.	Disconnect the audio output cable from the IP-HE950. Does that eliminate the noise?		If the noise does not disappear even after the cable is disconnected, check the audio cable and audio output equipment.
		Is there a receiving error?	Check the number of data packets received, in the decoder statistics described in "3.4.4 Performance statistics." Display the performance statistics several times. If the number of data packets lost is incrementing, the network load may be high or there may be a problem with a setting. Consult your network administrator.
Maintenance	Software cannot be installed.	Is the file specification valid? Has the license key been correctly entered?	If the message "Software installation failed. (Data error)" appears, the file specification is invalid or the license key was entered incorrectly.

5.2

Alarm LED Goes On

An alarm LED (ALM or IN DWN) goes on when the IP-HE950 detects an alert. After the alarm LED goes on, check the generated alert, from the Web GUI or front panel of the IP-HE950.

5.2.1 Checking an Alert

For instructions to check an alert from the Web GUI, refer to "**3.3.1 Network**" and "

3.4.2 Alert." For instructions to operate the front panel, refer to "**4.2.1 Operation key.**" For information on alert codes displayed on the front panel, refer to "**Table A.1-1 Alert/Log list.**" For instructions to check a log, refer to "**3.4.3 Log.**"

Table 5-2 Main types of alerts and corrective actions lists the main types of alerts and their corrective actions. Take appropriate action according to the details of the generated alert.

Table 5-2 Main types of alerts and corrective actions

Alert type	Corrective action
Network status (L000 to LFFF)	Check for an error in the network and linked unit. If no error can be identified, contact your system administrator.
Unit status (E000 to EFFF)	Power off the unit and power it on again once. If the unit is still operating abnormally after being powered on, contact maintenance personnel. The personnel may ask for the alert code.
AV/stream input (I000 to IFFF)	Check for an error in input signals, such as video input and reference input. Check the video output equipment and video cable connected to the video input terminal.

5.2.2 LED indications

Table 5-3 LED indications lists what is indicated by the LEDs on the IP-HE950. The display state of an alarm LED (ALM or IN DWN) varies depending on the alert level. For the alert level setting, refer to "3.3.2 Manag."

Table 5-3 LED indications

LED type		On	Blinking	Off
PWR	Green	Power on	-	Power OFF
	Orange	Temperature shutdown	-	-
RDY	Green	Normal operation	Operating normally	Shutdown status
IN DWN	Orange	Major alert of network/input error	Minor alert of network/input error	No alert
ALM	Orange	Major alert of unit error	Minor alert of unit error	No alert
LINK/ACT	Green	LINK established	Ether frame detected	LINK not established
100/1000M	Green	100M operation	1000M operation	10M operation



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Setting and Condition Tables

A.1 Alert/Log List

The following table is an alert/log list.

LED indication symbols -: No effect, ON: On; B: Blinking, OFF: Off, L: On/Blinking/Off depending on the alert level

Table A.1-1 Alert/Log list

ALMCODE	Default level	Variable level (OK: Variable, D: Default)						Alert name (translated from Japanese version)	Detailed parameter (example)	LED					
		Major	Minor	Warning	Off	Notification	Notification off			PWR	RDY *3	LINK/A CT *1	100/1000M *2	IN_DWN	ALM
								Power off							
0001	Notification					D	OK	Boot (Power on)	V01L001C01 ConfigName [Cancel] pressed at maintenance start, Maintenance [Down] key pressed at bundle start, Factory Firmware	ON	-	-	-	-	-
0002	Notification					D	OK	Boot (Reset)	V01L001C01 ConfigName [Cancel] pressed at maintenance start, Maintenance [Down] key pressed at bundle start, Factory Firmware	-	-	-	-	-	-
0003	Notification					D	OK	Boot (Restart)	V01L001C01 ConfigName [Cancel] pressed at maintenance start, Maintenance [Down] key pressed at bundle start, Factory Firmware	-	-	-	-	-	-
0004	Notification					D	OK	Boot (Other)	V01L001C01 ConfigName [Cancel] pressed at maintenance start, Maintenance [Down] key pressed at bundle start, Factory Firmware	-	-	-	-	-	-
0005	Notification off					OK	D	Shutdown		-	OFF	-	-	-	-

ALMCODE	Default level	Variable level (OK: Variable, D: Default)						Alert name (translated from Japanese version)	Detailed parameter (example)	LED					
		Major	Minor	Warning	Off	Notification	Notification off			PWR	RDY*3	LINK/ACT*1	100/1000M*2	IN_DWN	ALM
0010	Notification off					OK	D	Software update	"V01L001C01 -> V01L002C01" etc.	-	-	-	-	-	-
0011	Notification					D	OK	Option update	"4K" etc.	-	-	-	-	-	-
0012	Notification					D	OK	Configuration file update		-	-	-	-	-	-
0013	Notification					D	OK	Configuration information update		-	-	-	-	-	-
0014	Notification					D	OK	Configuration file loading	"Configuration1 ConfigName1" etc.	-	-	-	-	-	-
0015	Notification					D	OK	Configuration file initialization		-	-	-	-	-	-
0A00	Notification off					OK	D	RTC initialization		-	-	-	-	-	-
0B00	Warning			D				Unit time error		-	-	-	-	-	L
E000	Warning			D				FlashROM error	"/dev/mtd0" etc.	-	-	-	-	-	L
E001	Warning			D				Flash checksum error	"software" or "configuration" or "running configuration" "configuration #1 to 10" or "option"	-	-	-	-	-	L
E010	Minor		D					VFD device error		-	-	-	-	-	L
E020	Major	D	OK	OK	OK			FAN error	100RPS	-	-	-	-	-	L
*E020	Major	D	OK	OK	OK			FAN error restoration	100RPS	-	-	-	-	-	OFF
E030	Major	D						Power error #1		-	-	-	-	-	ON
E040	Minor	OK	D	OK	OK			Temperature warning #1	TEMP1=60 TEMP2=50 FAN=100RPS	-	-	-	-	-	L
*E040	Minor	OK	D	OK	OK			Temperature warning restoration #1	TEMP1=60 TEMP2=50 FAN=100RPS	-	-	-	-	-	OFF

ALMCODE	Default level	Variable level (OK: Variable, D: Default)						Alert name (translated from Japanese version)	Detailed parameter (example)	LED					
		Major	Minor	Warning	Off	Notification	Notification off			PWR	RDY*3	LINK/ACT*1	100/1000M*2	IN_DWN	ALM
E041	Minor	OK	D	OK	OK			Temperature warning #2	TEMP1=60 TEMP2=50 FAN=100RPS	-	-	-	-	-	L
*E041	Minor	OK	D	OK	OK			Temperature warning restoration #2	TEMP1=60 TEMP2=50 FAN=100RPS	-	-	-	-	-	OFF
E042	Major	D						Temperature error #1	TEMP1=60 TEMP2=50 FAN=100RPS	ON*4	-	-	-	-	-
E043	Major	D						Temperature error #2	TEMP1=60 TEMP2=50 FAN=100RPS	ON*4	-	-	-	-	-
E044	Major	D						Temperature sensor communication error #1		-	-	-	-	-	ON
E045	Major	D						Temperature sensor communication error #2		-	-	-	-	-	ON
E050	Major	D						Clock error #1		-	-	-	-	-	ON
E051	Major	D						Clock error #2		-	-	-	-	-	ON
E052	Major	D						Clock error #3		-	-	-	-	-	ON
E060	Major	D						Clock error #7		-	-	-	-	-	ON
E061	Major	D						Clock error #8		-	-	-	-	-	ON
E062	Major	D						Clock error #9		-	-	-	-	-	ON
E063	Major	D						Clock error #10		-	-	-	-	-	ON
E064	Major	D						Clock error #11		-	-	-	-	-	ON
E065	Major	D						Clock error #12		-	-	-	-	-	ON
E066	Major	D						Clock error #13		-	-	-	-	-	ON

ALMCODE	Default level	Variable level (OK: Variable, D: Default)						Alert name (translated from Japanese version)	Detailed parameter (example)	LED					
		Major	Minor	Warning	Off	Notification	Notification off			PWR	RDY*3	LINK/ACT*1	100/1000M*2	IN_DWN	ALM
E067	Major	D						Clock error #14		-	-	-	-	-	ON
E068	Major	D						Clock error #15		-	-	-	-	-	ON
E069	Major	D						Clock error #16		-	-	-	-	-	ON
E06A	Major	D						Clock error #17		-	-	-	-	-	ON
E06B	Major	D						Clock error #18		-	-	-	-	-	ON
E070	Major	D						Clock error #19		-	-	-	-	-	ON
E090	Major	D						Memory error #1		-	-	-	-	-	ON
E093	Off				D			FPGA#1 memory error	AVFPGA CRAM	-	-	-	-	-	-
E094	Off				D			FPGA#2 memory error	SFPGA CRAM	-	-	-	-	-	-
E0B0	Warning			D				RTC device access error		-	-	-	-	-	L
E300	Off	OK	OK	OK	D			ENCODER1: Hardware error		-	-	-	-	-	L
*E300	Off	OK	OK	OK	D			ENCODER1: Hardware error restoration		-	-	-	-	-	OFF
E400	Off	OK	OK	OK	D			ENCODER1: Software error		-	-	-	-	-	L
*E400	Off	OK	OK	OK	D			ENCODER1: Software error restoration		-	-	-	-	-	OFF
E410	Minor	OK	D	OK	OK			ENCODER1: Send buffer overflow		-	-	-	-	-	L
*E410	Minor	OK	D	OK	OK			ENCODER1: Send buffer overflow restoration		-	-	-	-	-	OFF

ALMCODE	Default level	Variable level (OK: Variable, D: Default)						Alert name (translated from Japanese version)	Detailed parameter (example)	LED					
		Major	Minor	Warning	Off	Notification	Notification off			PWR	RDY *3	LINK/A CT *1	100/1000M *2	IN_DWN	ALM
E600	Off	OK	OK	OK	D			ENCODER2: Hardware error		-	-	-	-	-	L
*E600	Off	OK	OK	OK	D			ENCODER2: Hardware error restoration		-	-	-	-	-	OFF
E700	Off	OK	OK	OK	D			ENCODER2: Software error		-	-	-	-	-	L
*E700	Off	OK	OK	OK	D			ENCODER2: Software error restoration		-	-	-	-	-	OFF
E710	Minor	OK	D	OK	OK			ENCODER2: Send buffer overflow		-	-	-	-	-	L
*E710	Minor	OK	D	OK	OK			ENCODER2: Send buffer overflow restoration		-	-	-	-	-	OFF
E700	Off	OK	OK	OK	D			DECODER: Hardware error		-	-	-	-	-	L
*E700	Off	OK	OK	OK	D			DECODER: Hardware error restoration		-	-	-	-	-	OFF
E800	Off	OK	OK	OK	D			DECODER: Software error		-	-	-	-	-	L
*E800	Off	OK	OK	OK	D			DECODER: Software error restoration		-	-	-	-	-	OFF
E900	Major	D	OK	OK	OK			SFP1: Unimplemented		-	-	-	-	-	B or L
*E900	Major	D	OK	OK	OK			SFP1: Restoration for unimplementation		-	-	-	-	-	OFF
E910	Major	D	OK	OK	OK			SFP1: Connection type error		-	-	-	-	-	B or L
*E910	Major	D	OK	OK	OK			SFP1: Connection type error restoration		-	-	-	-	-	OFF
E920	Major	D						SFP1: Temperature error		-	-	-	-	-	B
*E920	Major	D						SFP1: Temperature error restoration		-	-	-	-	-	OFF

ALMCODE	Default level	Variable level (OK: Variable, D: Default)						Alert name (translated from Japanese version)	Detailed parameter (example)	LED					
		Major	Minor	Warning	Off	Notification	Notification off			PWR	RDY *3	LINK/A CT *1	100/1000M *2	IN_DWN	ALM
E930	Major	D					SFP1: Voltage error		-	-	-	-	-	B	
EA00	Major	D	OK	OK	OK		SFP2: Unimplemented		-	-	-	-	-	B or L	
*EA00	Major	D	OK	OK	OK		SFP2: Restoration for unimplementation		-	-	-	-	-	OFF	
EA10	Major	D	OK	OK	OK		SFP2: Connection type error		-	-	-	-	-	B or L	
*EA10	Major	D	OK	OK	OK		SFP2: Connection type error restoration		-	-	-	-	-	OFF	
EA20	Major	D					SFP2: Temperature error		-	-	-	-	-	B	
*EA20	Major	D					SFP2: Temperature error restoration		-	-	-	-	-	OFF	
EA30	Major	D					SFP2: Voltage error		-	-	-	-	-	B	
EC00	Warning	OK	OK	D	OK		4K decoder option uninstallation		-	-	-	-	-	L	
*EC00	Warning	OK	OK	D	OK		Restoration for 4K decoder option uninstallation		-	-	-	-	-	OFF	
EC10	Warning	OK	OK	D	OK		Contents transmission decoder option uninstallation		-	-	-	-	-	L	
*EC10	Warning	OK	OK	D	OK		Restoration for contents transmission decoder option uninstallation		-	-	-	-	-	OFF	
EF00	Major	D					SFPGA configuration error		-	-	-	-	-	ON	
EF01	Major	D					AVFPGA configuration error		-	-	-	-	-	ON	
EF10	Major	D					Device access error #1		-	-	-	-	-	ON	
EF11	Major	D					Device access error #2		-	-	-	-	-	ON	

ALMCODE	Default level	Variable level (OK: Variable, D: Default)						Alert name (translated from Japanese version)	Detailed parameter (example)	LED					
		Major	Minor	Warning	Off	Notification	Notification off			PWR	RDY*3	LINK/ACT*1	100/1000M*2	IN_DWN	ALM
L000	Warning	OK	OK	D	OK			LINK alert generated (LAN1)		-	-	OFF	OFF	L	-
*L000	Warning	OK	OK	D	OK			LINK alert restoration (LAN1)	"100BaseTX_HD" etc.	-	-	ON	ON	OFF	-
L010	Warning	OK	OK	D	OK			DHCP connection error (LAN1)		-	-	-	-	L	-
*L010	Warning	OK	OK	D	OK			DHCP connection error restoration (LAN1)	10.0.0.1/24,10.0.0.254	-	-	-	-	OFF	-
L011	Notification					D	OK	DHCP connection update (LAN1)	10.0.0.1/24,10.0.0.254 -> 10.0.0.100/24,10.0.0.254	-	-	-	-	-	-
L020	Warning	OK	OK	D	OK			PPPoE connection error (LAN1)		-	-	-	-	L	-
*L020	Warning	OK	OK	D	OK			PPPoE connection error restoration (LAN1)	10.0.0.1/24,10.0.0.254	-	-	-	-	OFF	-
L021	Notification					D	OK	PPPoE connection update (LAN1)	10.0.0.1/24,10.0.0.254 -> 10.0.0.100/24,10.0.0.254	-	-	-	-	-	-
L100	Warning	OK	OK	D	OK			LINK alert generated (LAN2)		-	-	OFF	OFF	L	-
*L100	Warning	OK	OK	D	OK			LINK alert restoration (LAN2)	"100BaseTX_HD" etc.	-	-	ON	ON	OFF	-
L200	Warning	OK	OK	D	OK			Time server synchronization error		-	-	-	-	L	-
*L200	Warning	OK	OK	D	OK			Time server synchronization error restoration		-	-	-	-	OFF	-
I300	Minor	OK	D	OK	OK			SDI: Input down		-	-	-	-	L	-
*I300	Minor	OK	D	OK	OK			SDI: Input restoration		-	-	-	-	OFF	-
I310	Minor	OK	D	OK	OK			SDI: Video input synchronization error		-	-	-	-	L	-
*I310	Minor	OK	D	OK	OK			SDI: Video input synchronization error restoration		-	-	-	-	OFF	-

ALMCODE	Default level	Variable level (OK: Variable, D: Default)						Alert name (translated from Japanese version)	Detailed parameter (example)	LED					
		Major	Minor	Warning	Off	Notification	Notification off			PWR	RDY *3	LINK/ACT *1	100/1000M *2	IN_DWN	ALM
I400	Minor	OK	D	OK	OK			SFP1-1: Input down		-	-	-	-	L	-
*I400	Minor	OK	D	OK	OK			SFP1-1: Input restoration		-	-	-	-	OFF	-
I401	Minor	OK	D	OK	OK			SFP1-2: Input down		-	-	-	-	L	-
*I401	Minor	OK	D	OK	OK			SFP1-2: Input restoration		-	-	-	-	OFF	-
I410	Minor	OK	D	OK	OK			SFP1-1: Video input synchronization error		-	-	-	-	L	-
*I410	Minor	OK	D	OK	OK			SFP1-1: Video input synchronization error restoration		-	-	-	-	OFF	-
I411	Minor	OK	D	OK	OK			SFP1-2: Video input synchronization error		-	-	-	-	L	-
*I411	Minor	OK	D	OK	OK			SFP1-2: Video input synchronization error restoration		-	-	-	-	OFF	-
I600	Minor	OK	D	OK	OK			SFP2-1: Input down		-	-	-	-	L	-
*I600	Minor	OK	D	OK	OK			SFP2-1: Input restoration		-	-	-	-	OFF	-
I601	Minor	OK	D	OK	OK			SFP2-2: Input down		-	-	-	-	L	-
*I601	Minor	OK	D	OK	OK			SFP2-2: Input restoration		-	-	-	-	OFF	-
I610	Minor	OK	D	OK	OK			SFP2-1: Video input synchronization error		-	-	-	-	L	-
*I610	Minor	OK	D	OK	OK			SFP2-1: Video input synchronization error restoration		-	-	-	-	OFF	-
I611	Minor	OK	D	OK	OK			SFP2-2: Video input synchronization error		-	-	-	-	L	-
*I611	Minor	OK	D	OK	OK			SFP2-2: Video input synchronization error restoration		-	-	-	-	OFF	-

ALMCODE	Default level	Variable level (OK: Variable, D: Default)						Alert name (translated from Japanese version)	Detailed parameter (example)	LED					
		Major	Minor	Warning	Off	Notification	Notification off			PWR	RDY *3	LINK/A CT *1	100/1000M *2	IN_DWN	ALM
I800	Minor	OK	D	OK	OK			DVB-ASI input down		-	-	-	-	L	
*I800	Minor	OK	D	OK	OK			DVB-ASI input restoration		-	-	-	-	OFF	
I810	Minor	OK	D	OK	OK			DVB-ASI synchronization error		-	-	-	-	L	
*I810	Minor	OK	D	OK	OK			DVB-ASI synchronization error restoration		-	-	-	-	OFF	
I900	Minor	OK	D	OK	OK			Reference: Input down		-	-	-	-	L	-
*I900	Minor	OK	D	OK	OK			Reference: Input restoration		-	-	-	-	OFF	-
I910	Minor	OK	D	OK	OK			Reference: Clock synchronization error		-	-	-	-	L	-
*I910	Minor	OK	D	OK	OK			Reference: Clock synchronization error restoration		-	-	-	-	OFF	-
IB80	Minor	OK	D	OK	OK			DECODER: Input data error	#XXXXXXXXXXXXXXXXX (For details of X, refer to the "Target counters of input data error alerts and bits supported" sheet)	-	-	-	-	L	-
*IB80	Minor	OK	D	OK	OK			DECODER: Input data error restoration	#XXXXXXXXXXXXXXXXX (For details of X, refer to the "Target counters of input data error alerts and bits supported" sheet)	-	-	-	-	OFF	-

- *1 LINK established: On, Ether frame detected: Blinking, LINK not determined: Off
- *2 10M: Off, 100M: On, 1000M: Blinking
- *3 Green: On (running normally), Blinking (software loading/shutdown in progress), Off (software not running), Green/Orange: Blinking alternately (card starting/running)
- *4 The POWER LED lights up in orange during a temperature shutdown. Power off/on for recovery

Table A.1-2 Target counters of input data error alerts and bits supported

Bit	1	2	3	4	5	6	7	8	9	10	11	12	13	14 to 64		
Interface	IP	IP	IP	IP	Undefined	DVB-ASI	DVB-ASI	DVB-ASI	Undefined	DVB-ASI	DVB-ASI	IP	IP	Undefined		
Error item	Number of reloading TS streams	Number of discontinuous PCR values	Number of video 1 decoding errors	Number of audio decoding errors		Number of discontinuous PCR values	Number of video 1 decoding errors	Number of audio decoding errors		Number of BISS decryption errors(unsupported TSC)		Number of BISS decryption errors(unsupported TSC)	Number of BISS decryption errors(unsupported TSC)			

A.2 Port Numbers Used

Table A.2-1 List of port numbers used

Description		TCP/UDP	Port number (initial value)	Remarks
Encoder	Streaming port	Local port (source)	UDP 0, 1024 to 64000 (0) (*2)	(*1)
		Destination port (destination)	UDP 1024 to 64000 (5000)	
	ARQ control port	Local port (source)	UDP [Streaming, local port number] + 1 (Automatically set)	
		Destination port (destination)	UDP [Streaming, destination port number] + 1 (Automatically set)	
	SMPTE 2022 FEC distribution port	Local port (source)	UDP Same as [Streaming, local port number]	
		Destination port (destination)	UDP [Streaming, destination port number] + 2 (Automatically set) [Streaming, destination port number] + 4 (Automatically set)	
	Distribution request port	Local port (receiving)	UDP 1024 to 64000 (9900)	
	Encoder information notification	Local port (source)	UDP 0, 1024 to 64000 (0) (*2)	
Notification port (destination)		UDP 1024 to 64000		
Decoder	Streaming port	Local port (receiving)	UDP 1024 to 64000 (5000)	
	ARQ control port	Local port (receiving)	UDP [Streaming port number] + 1 (Automatically set)	
	SMPTE 2022 FEC streaming port	Local port (receiving)	UDP [Streaming, destination port number] + 2 (Automatically set) [Streaming, destination port number] + 4 (Automatically set)	
		Distribution request port	Local port (source)	UDP 0, 1024 to 64000 (0) (*2)
	Destination port (destination)		UDP 1024 to 64000 (9900)	
HTTP	Web GUI access port	TCP	80	
DHCP (Client)	Port for IP address acquisition with DHCP	UDP	68	
NTP	Port for time synchronization with time server	UDP	123	
SNMP	SNMP MIB reception port	UDP	161	
SNMP (TRAP)	SNMP trap destination port	UDP	162	

*1 The value depends on the setting. You can set a value within the listed range.

*2 If 0 is specified for the port number, a port number within the range of 64100 to 65000 is automatically set.

A.3 Applying an Option License

If you purchased an option license separately from the IP-HE950, you will need to apply for an installation key to activate function.

To apply, fill in the necessary information on the application form in IP-HE950_LicenseRequestSheet.txt, which is on Fujitsu official website. Then, send the form as a file attachment in an e-mail to fj-ss_nw_ipinskey@dl.jp.fujitsu.com. The necessary information includes the serial number of your IP-HE950, where you will be installing the optional function. You can check for the unit serial number on the label on the front/bottom of the IP-HE950, from global navigation on the Web GUI by selecting [Status] - [Unit status], and from [STATUS] - [System] - [Serial number] on the front panel.

After you send the license application form, you will be notified by e-mail within two business days about the installation key issued.

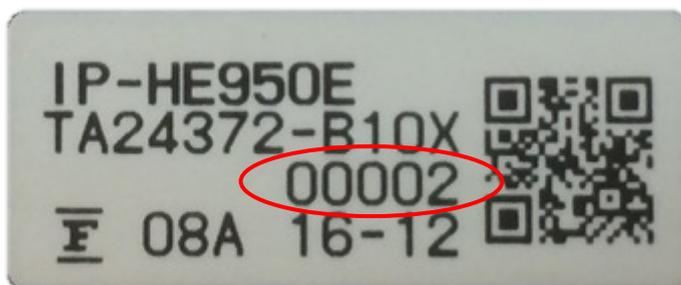


Figure A.3-1 Example of a front/bottom label on the IP-HE950

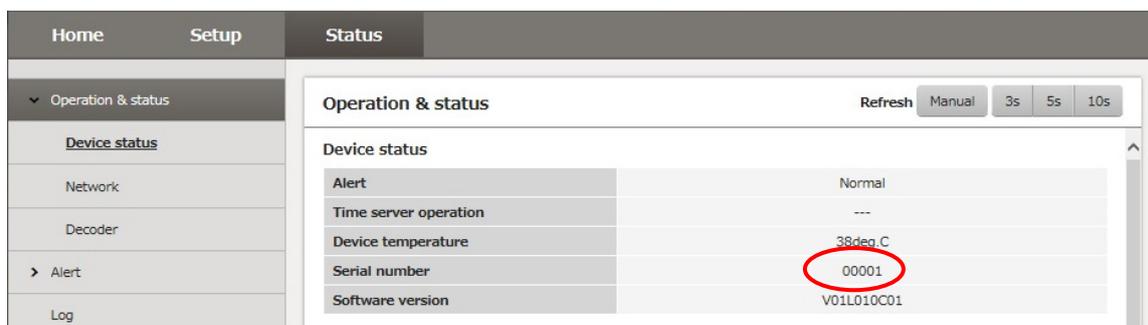


Figure A.3-2 Example of the Web GUI displaying an IP-HE950 serial number

Glossary

AAC (Advanced Audio Coding)

Audio compression technology used with the video compression standards MPEG-2 and MPEG-4. AAC was standardized as ISO 13818-7 in April 1997. It has a high compression rate, supporting maximum sampling frequencies of up to 96 kHz, according to the standard.

AC-3

Audio encoding technology developed by Dolby Laboratories in the U.S. The format consists of five independent channels of sound plus one channel for low-frequency playback, so it is also called 5.1 Channel Surround.

AES/EBU

AES (Audio Engineering Society) and EBU (European Broadcasting Union) standardized for professional digital audio I/O (IEC-60958 TYPE-1). It was applied to ANSI (American National Standard Institute) too.

ARP (Address Resolution Protocol)

A protocol that is used to acquire the MAC address of the transmission destination of Ethernet frames. This protocol uses an IP address to acquire the MAC address. If the MAC address of the transmission destination of IP packets is unknown, an ARP packet requesting the MAC address is broadcast. The MAC address is acquired using the response to this request.

ARQ (Automatic Repeat reQuest)

An error correcting method in which error packet will be retransmitted automatically when a packet error is detected at the receiver (decoder). The IP-HE950 has a real-time high error-control ability, equipped with the original FEC + ARQ hybrid method.

BISS (Basic Interoperable Scrambling System)

A scrambling system formulated by the EBU in May 2002. This system has three modes: MODE 0, MODE 1 and MODE E. In MODE 1, a 12-character (48-bit) session word is used for encryption and decryption. In MODE E, a 16-character (64-bit) encrypted session word and

14-character (56-bit) injected ID are used for encryption and decryption. In MODE 0, encryption is not used.

BB (Black Burst)

Sync signal of the black level's video signal which is used to synchronize.

BNC (Bayonet Neill Concelman)

One of the coaxial cable connectors which have 75 ohms or 50 ohms impedance. It uses the lock called Bayonet Lock and is very easy and compact to use. It is used for test gear and digital audio because it supports high frequencies of up to 4 GHz.

CAT (Conditional Access Table)

An information table to support the limited receiving.

CC (Closed Captioning)

Data for broadcast captioning. It is multiplexed at an Ancillary data area, a virtual or horizontal blanking area of a video signal, in an HD/SD-SHI signal.

DHCP (Dynamic Host Configuration Protocol)

Protocol that automatically assigns the required information, such as the IP address needed by a computer to connect to a network.

DID/SDID

DID (Data Identifier word of Ancillary data) and SDID (Secondary Data Identifier word) indicates the type of user data transmitted in an Ancillary data packet.

DVB-ASI (Digital Video Broadcasting - Asynchronous Serial Interface)

Standard interface in DVB (Digital Video Broadcasting: European Digital Broadcasting standardization organization) and used in MPEG CODEC most commonly. It is an asynchronous serial interface and standardized in ETSI TR 101 891.

Dual-Link SDI

Video transmission format with a bit rate of 2.970 Gbps through a pair of coaxial cables.

Encrypted session word

16-character (64-bit) word specified by the user in BISS MODE E. A session word is derived from the specified encrypted session word (and injected ID). Then, encryption or decryption in BISS MODE E is performed.

FEC (Forward Error Correction)

A method in which the sender transmits a redundant packet to the receiver for error correction in addition to the sending packet. It enables the receiver to correct errors without the need to request the sender for retransmission.

GOP (Group Of Pictures)

The smallest of the structural units composing a video. A GOP consists of three types of frames: I frame, P frame, and B frame.

HD-BNC (High Density BNC)

One of the coaxial cable connectors which have 75 ohms characteristic impedance. It is smaller than the standard BNC, and its implementation rate is four times higher.

HD-SDI (High Definition television - Serial Digital Interface)

HD-SDI is the serial digital interface to transmit HD (High Definition) video signals, whose transmission rate is 1.485 Gbps. It can transmit a multiplexing HD video signal, PCM audio signal, and data signal like a timestamp.

HE-AAC (High-Efficiency Advanced Audio Coding)

Extended format of MPEG-4 AAC. It greatly improves the sound quality at low bit rates, such as below 64 kbps.

H.264

One of the video compression coding systems standardized, in May 2003 in this case, by the ITU (International Telecommunication Union). It is also standardized as a part of MPEG-4 (MPEG-4 part 10 Advanced Video Coding) by the ISO (International Organization for Standardization). Therefore, it is commonly called H.264/MPEG-4 AVC or H.264/AVC, showing both parties. This technology is used for various applications from those with low bit rates and low resolutions like mobile TV to those with high bit rates and high

resolutions like HDTV. It is improved so that the data capacity is half that of MPEG-2, which is in widespread use.

H.265

One of the video compression coding systems standardized, in January 2013 in this case, by the ITU (International Telecommunication Union). From the study phase of the research and development team JCT-VC (Joint Collaborative Team on Video Coding), it has also been called HEVC (High Efficiency Video Coding) by VCEG (Video Coding Experts Group) of the ITU and MPEG of the ISO (International Organization for Standardization).

H.265 has a high compression rate due to optimization of the block size and other reasons, and achieved compression performance that is almost twice that of H.264. It will be used for 4K and other high-resolution video, and video distribution for mobile terminals.

IBBP/IBP/IPPP/PPPP

Video encoding structure with the I, P, and B frames.

I frame: Intra frame. Frame encoded using internal video information.

P frame: Prediction Picture frame. Frame encoded using correlation with a previous frame.

B frame: Bi-directional Inter frame. Frame encoded using the previous and coming I frames or P frames.

IGMPv2

Protocol defined in RFC 2236 for receiving IPv4 multicast datagrams. IGMPv2 includes functions for participating in and leaving IPv4 multicast groups, and so on.

IGMPv3

Protocol defined in RFC 3376. In addition to the IGMPv2 function, the information source filtering function that can be specified to receive multicast datagrams transmitted from a dedicated IPv4 address has been added.

Injected ID

14-character (56-bit) ID specified by the user in BISS MODE E. A session word is derived from the specified injected ID and encrypted session word. Then, encryption or decryption in BISS MODE E is performed.

IPv4 (Internet Protocol version 4)

Internet protocol that is currently the dominant version on the Internet. The network address length is 32 bit, and it is anticipated that address space will be exhausted due to the growing use of the Internet.

IPv6 (Internet Protocol version 6)

Internet protocol that is the successor to IPv4, which is currently the dominant IP protocol version on the Internet. The network address length is extended from 32 bits in IPv4 to 128 bits to solve the address space exhaustion problem that is worsening with the growing use of the Internet. IPv6 also provides stateless address auto-configuration that allows an IPv6 address to be automatically generated based on the information from the router and the MAC address of the IP-HE950.

LED (Light-Emitting Diode)

This unit has power LED and alarm LED lamps. The power LED lamp lights up in green to indicate that the power is on. The alarm LED lamp lights up in orange to indicate that an alert has been generated.

MLD v1 (Multicast Listener Discovery version 1)

Protocol defined in RFC 2710. It is used to detect the multicast listeners receiving a multicast datagram.

MLD v2 (Multicast Listener Discovery version 2)

Protocol defined in RFC 3810. In addition to the MLD v1 support function, it has an information source filtering function, which enables specification for receiving only the packets sent from a specific source address (or any address except that specific source address).

MPEG-4

A video data compression method that is a part of the MPEG standard. MPEG-4 was designed to distribute video images of low picture quality (due to a high compression ratio) over slow communication lines (e.g., cellular phone and telephone lines). MPEG-4 was also designed to transmit video together with audio at about 64 kilobits per second. The name of this standard comes from the name of the organization promoting standardization of color video compression encoding formats. MPEG-4 defines a framework for an object encoding format that can be flexibly extended comprehensively, including not only natural images and audio but also various media such as computer graphics and text. It covers a wide range of transmission speeds from a low bit rate of several kbps to several Mbps. The aim is to become the multimedia encoding format that can be practical to use from mobile terminals and other applications with low bit rates.

NTSC (National Television Standards Committee)

Standard established by a U.S. standardization body for analog television systems. NTSC images are made of 29.97 interlaced frames per second, each of which is composed of 525 scan lines in total.

NIT (Network Information Table)

Physical network information for sending streams is stored in this table.

NTP (Network Time Protocol)

Communication protocol to synchronize the clocks of the network-connected equipment with the correct time of a time server.

PAL (Phase Alternating Line)

Standard developed in Germany for analog color television broadcasting. PAL images are made of 25 interlaced frames per second, each of which is composed of 625 scan lines in total.

PAT (Program Association Table)

The table and list of programs of a TS (Transport Stream) are described with PMT PIDs. The PID of the PAT is 0.

PCR (Program Clock Reference)

Standard clock for synchronizing the time of the transmitter (encoding) and receiver (decoding) in an MPEG-2 TS.

PES (Packetized Elementary Stream)

A packetized method provided by MPEG-2 Systems. Encoded video or audio bit streams are called "elementary streams." Each of these streams are packetized following a standard and called "PES."

PID

A packet identifier, which has 13-bit information, included in a TS packet. It is used to indicate the information transmitted in each TS packet.

PMT (Program Map Table)

ID table which identifies audio, video, and so on.

PPPoE (Point-to-Point Protocol over Ethernet)

Communication protocol defined in RFC 2516 and mainly used to connect to Internet connection services such as DSL, CATV, and FETH.

PPS (Picture Parameter Set)

A header in NAL (Network Abstraction Layer) of H.264/AVC and H.265/HEVC, in which information on encoding the whole picture is written.

Pro-MPEG FEC

FEC method standardized by Pro-MPEG Forum (Professional-MPEG Forum). It generates and sends 2-dimensional (columns x rows) redundant packets. It is now standardized as SMPTE 2022-1.

PS (Program Stream)

An MPEG-2 method for multiplexing video, audio, and data, the PS method is used for transmission and storage in an error-free environment.

PSI (Program Specific Information)

This is the information on the program to which each ES in a TS packet belongs (e.g., PAT, PMT, and CAT).

RS-232C

Interface standard that was mainly established by the Electronics Industry Association (EIA) for communication between data terminals and data

communications equipment.

RS-422

One of the standards for serial communication standardized by the Electronics Industries Association (EIA). RS-422 data transmission can be strongly resistant to noise, travels on cables as long as 1.2 km, and has a maximum communication speed of 10 Mbps.

RTP

Abbreviation of real-time transport protocol. This transport protocol is for transferring image data or voice data in real time.

SD-SDI (Standard Definition television - Serial Digital Interface)

Standard definition digital video interface standardized in SMPTE 259M.

SFP (Small Form-factor Pluggable)

Module that can connect various interfaces to FPGA and other such devices, when inserted into a generic SFP cage and connector.

SDT (Service Description Table)

Detailed descriptions such as the service names of the system and service providers are stored in this table.

Session word

12-character (48-bit) word specified by the user in BISS MODE 1. The specified session word is used for encryption or decryption in BISS MODE 1.

SMPTE 2022-1 FEC

Same FEC method as the above-mentioned Pro-MPEG FEC. It generates and sends 2-dimensional (columns x rows) redundant packets.

SNMP v1 (Simple Network Management Protocol version 1)

Communication protocol defined in RFC 1065, RFC 1066, and RFC 1213 for monitoring and controlling network equipment. The protocol defines a framework for network management protocols and other protocols. This framework is used for SNMP v2c, SNMP v3, etc.

SNMP v2c (Simple Network**Management Protocol version 2c)**

Communication protocol defined in RFC 1901 and RFC 1908 for monitoring and controlling network equipment. The protocol enables communications using v2, which has higher communication security and performance, on a community basis similar to communications using v1.

TOS (Type Of Service)

Type of service that can be added within IP packets. It is used for controlling the order of priority of packets in a router, etc.

TS (Transport Stream)

Abbreviation of Transport Stream, which is in MPEG-2 Systems for multiplexing video, audio, and data. The TS method is used for transmission in an environment, such as ATM communication or digital broadcasting, where errors may occur.

TSC (Transport Scrambling Control)

A field in MPEG-2 TS header information, which indicates the scrambling mode of a stream. The TSC of a stream that is encrypted with the BISS method is defined as 2.

TTL (Time To Live)

Abbreviation of Time To Live, which indicates the survival time of a packet on a network. If a packet sent to a network happens to enter a loop because of a setting error on a router, it will not survive forever but will be discarded when the specified survival time is reached.

UTC (Coordinated Universal Time)

International standard time. The UTC is calculated based on the time measured by an atomic clock, which uses the second in the SI unit system as a reference value, making adjustments that insert leap seconds to compensate for the time difference from Greenwich Mean Time (GMT).

VFD (Vacuum Fluorescent Display)

Also called a fluorescent display tube. Unlike a liquid crystal display, the displayed content itself emits light, so the contrast is clearer than on an LCD. Other features of a VFD are operability over a wide temperature range and less influence on function by the temperature gradient.

VITC (Vertical Interval Time Code)

Time code signal embedded in the vertical blanking area of a video sync signal.

Alert log

A record of errors that occurred on units and communication lines.

Embedded audio

A method to embed AES/EBU digital audio signal into the blanking area of an SDI (Serial Digital Interface) signal.

Original network ID

ID for identifying a transport stream. Each transport stream is identified by the combination of an original network ID and a transport stream ID.

Auto sensing

Function to automatically detect input signals and track encoding. The IP-HE950 supports Auto sensing for 3G-SDI/HD-SDI/SD-SDI at 50/59.94 Hz.

Language code

Code to identify the language of the audio stream to transmit. The language is written with a three-character code defined in ISO 639 part 2.

Center Cut

Method to down-convert the video source from, for example, the 16:9 screen size ratio (aspect ratio) to 4:3. When selected, this method trims the right and left sides of the video.

System rate

Data amount per second of encoding data including that up to MPEG-2 Systems. The data for the network packets and FEC packets is not included.

Symbol rate

Symbol transmission speed defined by the number of symbols sent to the transmission line per second. The unit of measurement is symbol/s.

Squeeze

One method of down-converting from the 16:9 screen size ratio (aspect ratio) of an HD video source to the 4:3 screen size ratio of SD video.

Square division

One method used to divide the screen to transmit 4K video to quad-link 3G-SDI. 4K video is transmitted divided into four full-HD videos.

IP satellite mode

A function used in transmission using IP satellite connection. It distributes streams that inhibit the bit stuffing function of the HDLC procedure, which is used in IP satellite connection. (This function inserts 0 after five consecutive 1's.)

TTS (Time stamped Transport Stream)

A 192-byte packet consisting of a basic 188-byte MPEG TS and a 4-byte timestamp counted by a 27-MHz clock.

Downconverter

Converting from an HD-SDI signal to an SD-SDI signal.

Pre-Filter

Filter that works before encoding of a video signal for an improvement in video quality with rough movement at low encoding rates.

Private PES

Packetized elementary stream standardized by MPEG-2 Systems that users can use for any data transmission.

Program Number/Service ID

ID for identifying a channel (service) provided by a broadcasting company. By specifying a Program Number/service ID, you can select an arbitrary transport stream from multiple transport streams.

Profile

This defines various encoding formats used for compressing an image. The profile can be changed, depending on the use of the compressed image.

Ancillary data

Transmitted kind of data located in the blanking area of a digital video interface (e.g., audio data and time code data).

Multicast

Method to send packet (data) to the specified multiple network terminals concurrently.

Unicast

Communication with a station at a single address (that is, most general one-to-one communication).

Refresh Cycle

GOP cycle from one I frame to the next I frame in the GOP that contains the I frames. In a GOP that does not contain I frames, the frame cycle is the cycle until one whole screen is updated using intra-slices.

The longer the cycle, the more improved the video quality. However, the recovery time from a video error caused by a data receiving error at the decoder is also longer.

Letterbox

One method of down-converting from the 16:9 screen size ratio (aspect ratio) of an HD video source to the 4:3 screen size ratio of SD video. The resulting image has black bars at top and bottom of the video.

12G-SDI

Interface that supports the transmission speed of 12 Gbps, which allows uncompressed transmission of 4K video. A 3840/60p signal can be transmitted through a single BNC cable.

2 Sample Interleave

One method used to divide the screen to transmit 4K video to quad-link 3G-SDI, with horizontal sampling every 2 pixels on every other line (interleaving). Any link can be used for HD monitor video.

3G-SDI

Interface that achieves the high-resolution video transmission required for 1080p and digital cinema. The transmission capacity is 3 Gbps, and a 1080/60p signal can be transmitted through a single BNC cable.

Tri-sync

Sync signal used for High Definition TV. One characteristic is that no phase gap is generated even if the sync signal shrinks due to signal attenuation.

4K video

General term for video with supported horizontal and vertical resolutions of about 4,000 x 2,000, respectively. The resolution adopted by TV broadcasts is 3840 x 2160 and by digital cinema is 4096 x 2160.

4:2:0

One of the video formats. In this format, the number of pixels for the color-difference components (Pb and Pr) is half the number of pixels for the brightness component (Y) in the horizontal and vertical directions.

4:2:2

One of the video formats. In this format, the number of pixels for the color-difference components (Pb and Pr) is half the number of pixels for the brightness component (Y) in only the horizontal direction.

Release Notes

- Software version V01L010

- Release (2017/7/18)
- Additional video frequency
2160p x 3840 / 29.97Hz
All resolutions / 50Hz
- Additional audio codec : MPEG-1 Layer 2
- Encoder 2 (H.264/AVC) function
- BISS function
- English WEB-GUI
- SNMP control with extended MIB
- Prefilter for video input 1080i
- Releasing of the following limitations
Main 4:2:2 10 on 2160p
SMPTE302M 20bit/24bit

- Software version V01L001

- Initial release (2017/3/10)

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Software User's Guide

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