

8K Streaming Encoder e8

User's manual



Version 1.5
May 21, 2020

SOCIONEXT Inc.

Document code: MN04-00009-4E

Disclaimer

This product is designed and manufactured for use in consumer and professional applications. Customers considering the use of this product in specialized applications where failure or malfunction could directly affect human life or cause physical injury, or where extremely high levels of reliability are required (such as air traffic control, aerospace systems, atomic energy control, medical devices for life support) are requested to consult our sales representative before embarking on such specialized use. Socionext Inc. will not be held liable for any claims and/or damages arising from uses such as those described above without the prior approval of the company.

Notice with using**NOTICE**

- Read and follow all warning notices and instructions marked on the product or included in the documentation.
- Do not use this device near water and clean only with a dry cloth.
- Do not block any ventilation openings.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Remove the power connector immediately in case of any abnormalities.
- Unplug this device during lightning storms or when unused for long periods of time.
- Do not open the chassis. There are no user-serviceable parts inside. Opening the chassis will void the warranty.
- Only use attachments and accessories specified and/or sold by the manufacturer.
- Refer all servicing to qualified service personnel. Servicing is required when the device has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the device, the device has been exposed to rain or moisture, does not operate normally, or has been dropped.
- Since the Mains plug is used as the disconnection for the device, it must remain readily accessible and operable.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the device.
- Disconnect the external AC power supply line cord(s) from the mains power before moving the unit.

Revision history

Date	Revision	Description
June 5th, 2019	1.0a	First edition
June 17th, 2019	1.1	8. Limited product warranty This section was added.
Aug. 9, 2019	1.2	1. Overview The function list was modified. 3. Starting e8 GUI Note 2 was added. 3.1 Screen description of e8 APP The Setting tab was deleted, and the description for the Control and Maintenance tabs was modified. 4.1 Step 1: Checking video input status The description was modified. 4.2 Step 2: Setting Video Encode parameters The following setting items were added: Video input format, GOP size, and GOP type 4.3 Step 3: Setting Audio Encode parameters The option 'Pass-through' of Encode audio codec was deleted. 4.4 Step 4: Setting System parameters The description was modified. 4.5 Step 5: Setting Output parameters The option SRT was added to Network protocol. The table of Output additional condition was modified. 5.2 Network configuration The description of the steps ii and iv was modified. 5.3 Change of GUI password This section was added. 5.4 Unmounting USB flash drive This section was added. 5.5 Shut-down of e8 This section was added. 7. License This chapter was added.
Nov. 8, 2019	1.3	2.1 Video input source The SDI number in the figure was corrected. 2.4 Launching e8 / Shutdown e8 The description was modified. 4.5 Step 5: Setting Output parameters The table of Network format was modified.
Mar. 5, 2020	1.4	3.1 Screen description of e8 APP The figure of the e8 APP screen was updated. The monitoring functions in Encode State were added for the Control tab. 4.2 Step 2: Setting Video Encode parameters The Code quantity ratio parameters were added. 4.3 Step 3: Setting Audio Encode parameters The Channel layout parameter was added.
May 21, 2020	1.5	4.3 Step 3: Setting Audio Encode parameters The Channel layout parameter was updated. 4.6 Step 6: Setting other control settings The 'Keep encoding when signal discount' setting was added.

Date	Revision	Description
May 21, 2020	1.5	(Continued) 5.3 Negotiating with network device This section was added. 6.3 Network device information The network link speed information was added.

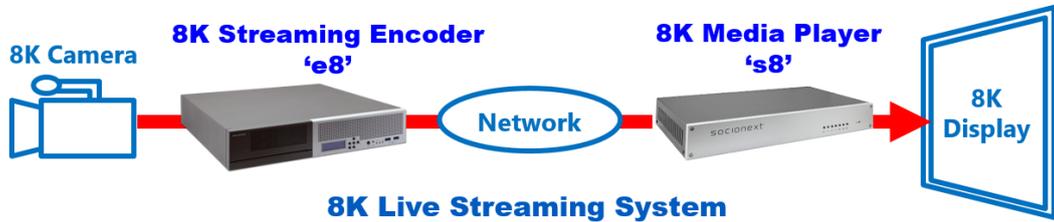
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1. Overview

This document contains the usage of 8K Streaming Encoder 'e8' (hereinafter e8).

The e8 encoder enables real-time live video streaming through network with 8K resolution that makes impressive experience for public and private screening, live streaming and other applications.



The 8K Media Player 's8' provided by Socionext is prepared as the 8K stream decoder which is most suitable for e8.

Key Features

- 8K60p real-time streaming of video shooting by 8K camera
- Easy to use and small body size

Function List

	Item	Specification
Interface	Input	Connector: 12G-SDI x 4 channels, BNC type Video: 8K, 2 sample interleave Audio: SDI embedded audio
	Output	Gigabit Ethernet x 2 channels USB3.0 x 2 channels (for recording)
Encoding Function	Video	Resolution: 7680 x 4320 pixels Pixel format: 10-bit, 8-bit / 4:2:2, 4:2:0 Framerate: 60p, 59.94p, 50p, 30p, 29.97p, 25p, 24p, 23.98p Encoding format: HEVC Bitrate: 60 Mbps - 200 Mbps Supports embedding HDR parameters
	Audio	Encoding format: AAC LC Channel: 2 channels
Streaming Function	Streaming Protocol	HTTP Live Streaming (HLS) RTMP (with proprietary extension) RTP (with or without FEC) SRT
	Container Format	MPEG-2 TS
Recoding Function	Supported Storage	USB flash drive
	File Format	MP4
Chassis	User Interface	Buttons and LCD display on front panel
	Dimensions	370 mm (W) x 350 mm (D) x 70 mm (H)
	Power Supply	100 – 240 V
Others	Certification	CE FCC Class A CCC

2. Preparation for Live streaming

2.1. Video input source

Need to have a device to input for e8.

The e8 encoder supports only 8K 2sample interleave (2SI) format. (4K 2SI x4 inputs are not supported.)

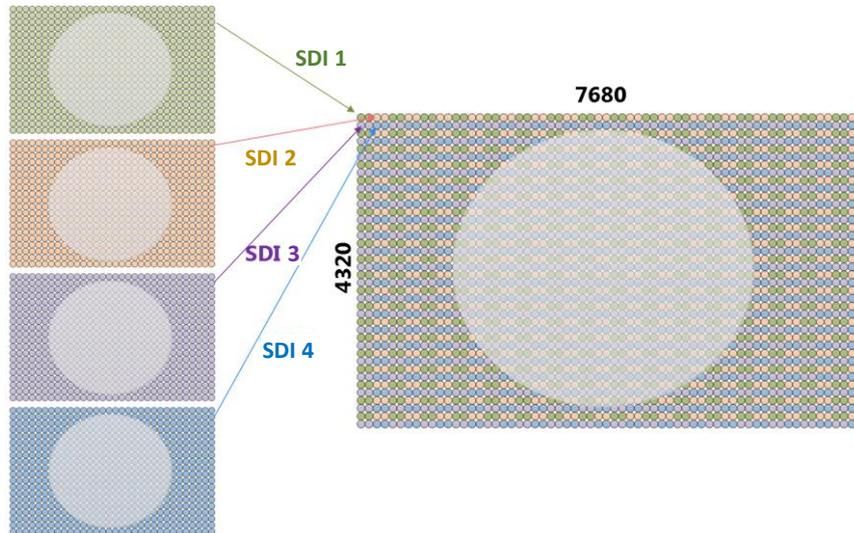


Fig: Conceptual diagram of 8K 2SI input from 12G SDI

2.2. Stream receiving equipment

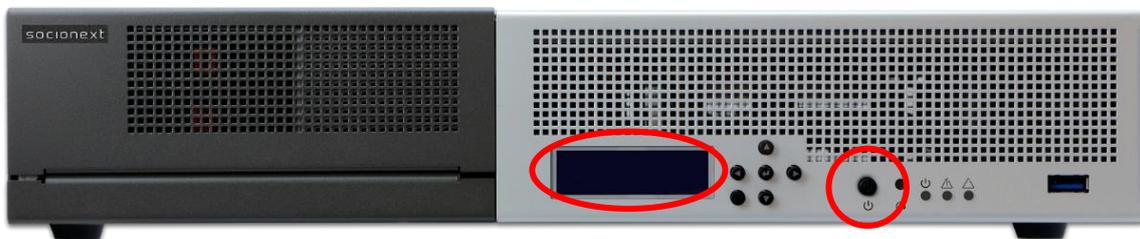
Need to prepare the server, decoder and monitor to receive live streaming as you needed.

2.3. Control devices for e8

Need to prepare 'monitor', 'monitor cable (VGA)', 'keyboard (USB)', and 'mouse (USB)'.

(These devices are not needed when the e8 GUI is controlled by the system other than localhost.)

2.4. Launching e8 / Shutdown e8



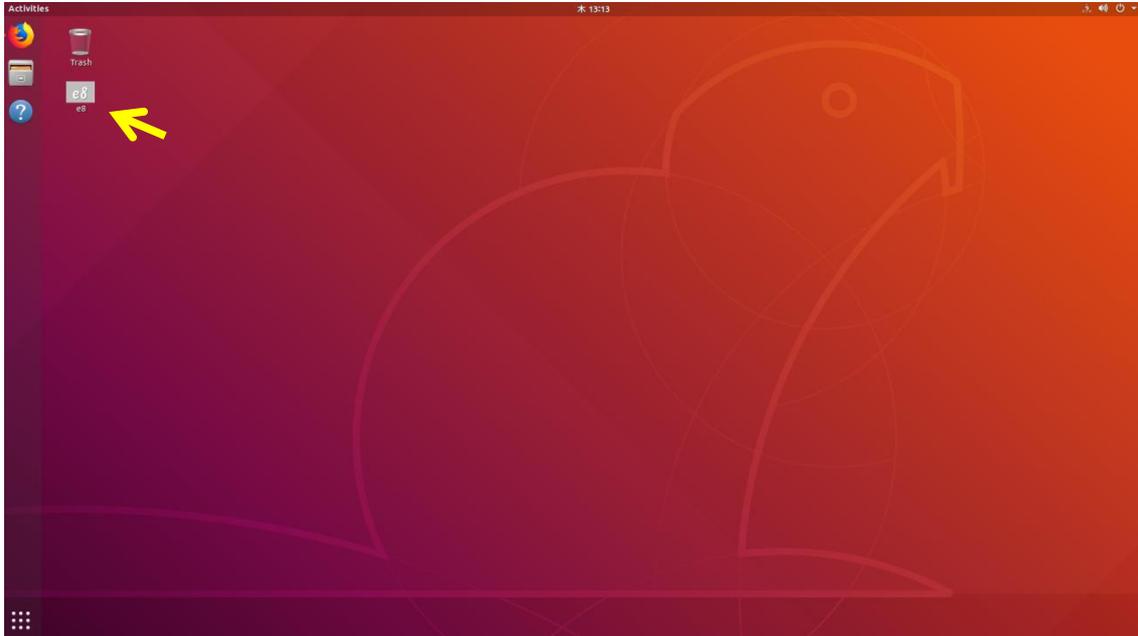
Launching e8: Press the power on/off button to launch e8.
The IP address of LAN1 is displayed on the upper row of the LCM. The IP address of LAN2 is displayed on the lower row of the LCM.

Shutdown e8: Press the power on/off button to start shutdown sequence.

3. Starting e8 GUI

Launching e8 GUI automatically.

Note 1: Also can be launch with the following desktop icon.

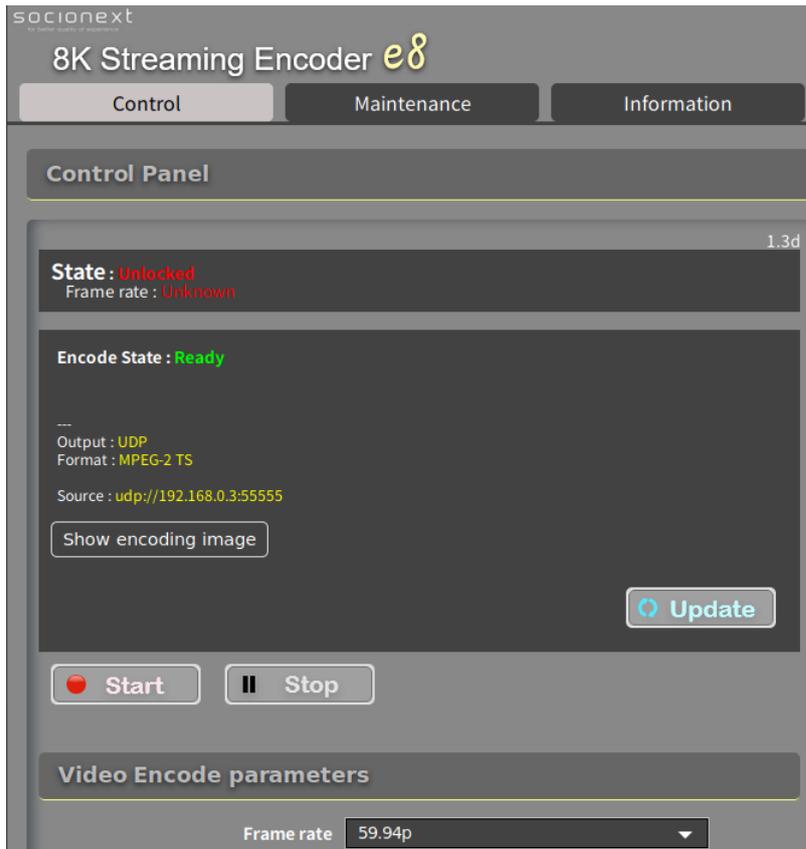


Note 2: When the e8 GUI is started by the remote desktop function, the username and password are needed:

Username: e8 (cannot be changed)

Initial password: e8 (can be changed in e8 GUI)

3.1. Screen description of e8 APP



The e8 APP has three tabs.

Tab	Description
'Control'	Used to set the encoding parameters, and to start, stop, and monitor encoding. State: Monitoring of SDI input status Encode State: Monitoring of e8 conditions, snapshot of input video, and monitoring of input audio level Encode control: Control of encoding start/stop Video Encode parameters: Setting items related to video encoding Audio Encode parameters: Setting items related to audio encoding System parameters: Setting the bitrate for container Output parameters: Setting items for network protocol
'Maintenance'	Used to update software, configure network settings, change password, and shut down e8. Software update: Updating e8 driver and e8 APP Network configuration: Setting up Network Password: Change of GUI password Shut down: Shut-down of e8
'Information'	Used to get various kinds of information. Software version: e8 driver, application version number Debug log: Getting a log of e8 encoding information Network device: Getting network connection status

4. Procedure of encoding operation

4.1. Step 1: Checking video input status

- (i) Move to '**Control**' tab.
- (ii) 'State' indicates the input status of 12G SDI signal.

State	Description
Locked	Video signal is input and locked in the format shown in 'Frame rate'.
Unlocked	Video signal is not input. <i>Encoding cannot be started if the input status is Unlocked.</i>

4.2. Step 2: Setting Video Encode parameters.

➤ Frame rate

Choose the frame rate for encoding video.

Settings	Description
Auto	Auto detect mode
60p, 59.94p, 50p, 30p, 29.97p, 25p, 24p, 23.98p	Select the same value with Frame rate in the 'Video Input' window.

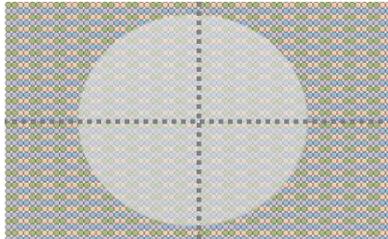
➤ Video input format

Select **8K 2SI** as the video input format.

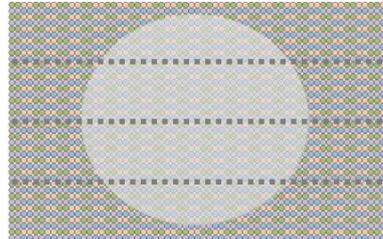
➤ Encode video type

Select the Encoding method from **Square division** and **Slice division**.

Square division (divided into 4 tiles)



Slice division (divided into 4 slices)



* The above is an illustration and does not actually include dotted lines.

➤ Rate control

Select the rate control mode from **VBR** and **CBR**.

➤ MAX bitrate / Ave bitrate / Min bitrate

Specify the bit rate for video encoding. (Units: kbps)

- Rate control = VBR,

Specify MAX bitrate, Ave bitrate, and Min bitrate according to the following rules.

$$\text{Max bitrate} \geq \text{Ave bitrate} * 1.2$$

$$\text{Ave bitrate} * 0.8 \geq \text{Min bitrate} \geq 0$$

- Rate control = CBR,

Specify Ave bitrate.

➤ Video format

Select the video format of the encoding video from **4:2:0/8bit**, **4:2:2/8bit**, **4:2:0/10bit**, and **4:2:2/10bit**.

➤ Tier

Select the HEVC syntax tier from **Main** and **High**.

➤ CPB delay

Select the CPB delay value for encoding video from **0.5**, **1**, and **3**. (Units: seconds)

➤ GOP size

Select the GOP size from **32** and **64**.

➤ GOP type

Select the GOP type from **Open** and **Closed**.

➤ Scene change detection

Select the scene change detection setting from **Enable** and **Disable**.

➤ Low delay mode

Select the low delay mode from **Enable** and **Disable**.

➤ HDR related parameters

Specify the HDR related parameters.

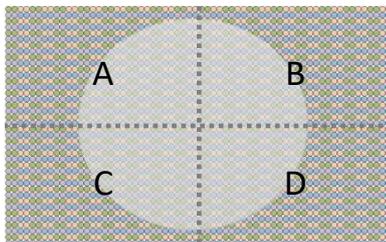
Setting example

Param	SDR	PQ	HLG
Transfer characteristics	BT.709 or BT.2020	SMPTE ST2084	ARIB STD-B67
Mastering Primaries	-	DCI-P3 or BT.2020	DCI-P3 or BT.2020
Max luminance	-	1000	-
Min luminance	-	0.01	-
Max CLL	-	10000	-
Max FALL	-	150	-

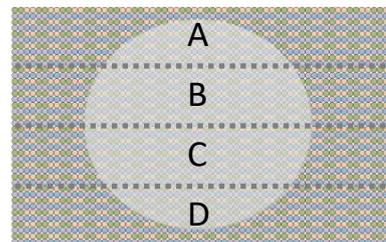
➤ Code quantity ratio parameters

Specify the ratio of the code quantity to be allocated to each of the A to D areas shown in the following figures in the range from 0 to 255. If this ratio is set to 0, e8 will execute the same operation as the setting value 1.

Square division



Slice division



4.3. Step 3: Setting Audio Encode parameters.

➤ Encode audio codec

Choose the codec for audio encoding.

Setting	Description
AAC-LC	Extract SDI embedded audio and encode it to MPEG-2 AAC-LC.
LPCM	Extract SDI embedded audio and multiplex LPCM with SMPTE 302M compliance. MPEG-2 TS should be selected for Storage format / Network format in 'Output parameters' section. Supported only 48kHz sampling and 16 bits LPCM.
Unused	The audio is not multiplexed.

➤ Channel layout

Select the audio channel layout from **Stereo (ch1-ch2)**, **Stereo (ch3-ch4)**, **Stereo (ch5-ch6)**, **Stereo x 3 (ch1-ch6)**, and **5.1ch (ch1-ch6)**.

➤ Ave bitrate

Specify the audio bit rate when **AAC-LC** is selected as 'Encode audio codec'.

➤ Offset time

Specify the time (unit: ms) to start multiplexing the audio stream as an offset value for the video. Specify a negative value when the audio is later than the video. Specify a positive value when the audio is earlier than the video.

Note: The recommended value is **20 msec**.

4.4. Step 4: Setting System parameters.

➤ System rate

'system rate' is valid only for the **MPEG-2 TS** output mode with **UDP, TCP, RTP, and SRT** and **Storage** output mode.

$$\text{'System rate'} = (\text{Video bit rate} + \text{Audio bit rate}) * 1.1$$

Here, Video bit rate is 'Max bitrate' for VBR or 'Ave bitrate' for CBR, and Audio bit rate is 'Ave bitrate' for AAC-LC.

If the 'Encoder audio codec' is set **LPCM**, Audio bit rate is as follows:

$$\text{Audio bit rate} = 1928 \text{ kbps}$$

If the value is not entered or is smaller than the minimum value to be specified, the minimum value will be set.

4.5. Step 5: Setting Output parameters

➤ Output method

Select the output method from **Storage only, Network only** and **Network/Storage**.

➤ Storage format

Select the container format for Storage output from **MP4, MPEG-2 TS** and **Video ES**.

➤ Network protocol

Select the network protocol for Network output from **TCP, UDP, RTP, HLS, RTMP, and SRT**.

➤ Network format

Choose the container format for Network output as follows.

'Network Protocol'	Support 'Network format' (Container format)
TCP UDP	MPEG-2 TS Video ES
RTP SRT	MPEG-2 TS
HLS	MPEG-2 TS fMP4
RTMP	FLV CodecID for FLV video-specific metadata. Basically, it is treated the same as AVC with CodecID=7, but use CodecID=12.

➤ Output additional condition

Specify additional information depending on the setting of 'Network Protocol' and 'Output method'.

'Output Method'	'Network Protocol'	Necessary settings
Network	TCP	'Address' Specify destination address. 'Port' Specify port number to be used for transfer.
	UDP	'Address' Specify destination address. Set 224.1.1.1 for multicast. 'Port' Specify port number to be used for transfer.
	RTP	'Address' Specify destination address. 'Port' Specify port number to be used for transfer. 'Pro-MPEG FEC Column' Choose the L (Column) value. 'Row' Choose the D (Row) value. Note: Choose the L and D values so as to meet the following condition: $L \times D \leq 100$
	HLS	'Segment time' Select length of each segment from 0.5, 1, 2, 3, 4, 5, and 10 . (Units: sec) 'Segment count' Select the number of segments included in the content list file (.m3u8) from 2, 4, 6, and 8 . The e8 encoder works as a HLS server. Accessible at http://(ip_address)/hls/m31_8k.m3u8
	RTMP	'Server URL' Specify the RTMP server URL to push the stream.
	SRT	'Address' Specify destination address. 'Port' Specify port number to be used for transfer.
Storage	-	'Folder name' Specify the output directory from dialog box . Note: Remove the USB flash drive after executing the procedure described in Section 5.5. 'Add timestamp' Check it to add a timestamp to the file name.

4.6. Step 6: Setting other control settings

➤ Keep encoding when signal discount

Check it to keep the encoding even when input signal is temporarily disconnected.

➤ Restart automatically when error occurs

Check it to enable the automatic restart of encoding when an error occurs.

4.7. Step 7: Applying the settings

Click **'Apply'** to reflect all settings.

- If there is a warning message box, review the settings according to this message.
- Otherwise, the message 'Proceed with processing?' is displayed. The setting is reflected by the OK button.

4.8. Step 8: Starting Encoding

- (i) Move to **'Control'** tab.
- (ii) The parameter settings are reflected to the 'Status' area in the window. The filename of the output stream is displayed in 'Output file name'
- (iii) Click **'Update'**. The current status is displayed in the upper part of the 'State' area.

State	Description
Ready	The encoding setting is completed. Click 'Start' to start Encoding. The State will be Running .
Running	The encoding operation is running. Click 'Stop' to stop Encoding. The State will be Stopping .
Stopping	After the encoding is completed, the stop processing is automatically started. Click 'Update' to set the State Ready .
Stopping/Error(reason)	If the error occurs during the encoding operation, the message 'Error' and the error factor will be displayed and the stop processing will be automatically started. The details of the error information can be confirmed by the acquisition of the debugging log (see Section 6.2). Click 'Update' to set the State Ready .

5. Maintenance

5.1. Software update

- (i) Move to '**Maintenance**' tab.
- (ii) Click '**Browse...**' to select the update file 'm31_8k_update_vxxx.zip'.
- (iii) Click '**Update start**' button.
- (iv) Wait until the status becomes 'Completed'.
- (v) Shutdown e8.
- (vi) Start e8.
- (vii) Confirm the version information described in Section 6.1.

5.2. Network configuration

- (i) Move to '**Maintenance**' tab.

- (ii) Select the device name from **LAN1** and **LAN2** of **Device name**. Enter the IP address, prefix length, and default gateway into **Address**, **Netmask**, and **Gateway**, respectively. Enter the DNS into **DNS** as necessary.
- (iii) After entering these items, click '**Set network config**'.
When using DHCP, check **DHCP enable**. By default, DHCP is enabled.
Note: Set **Netmask** to 24 when the subnet mask is 255.255.255.0.
- (iv) When clicking '**Confirm**' after selecting the device name, the current network configuration is displayed. For the network connection condition, see Section 6.3.

5.3. Negotiating with network device

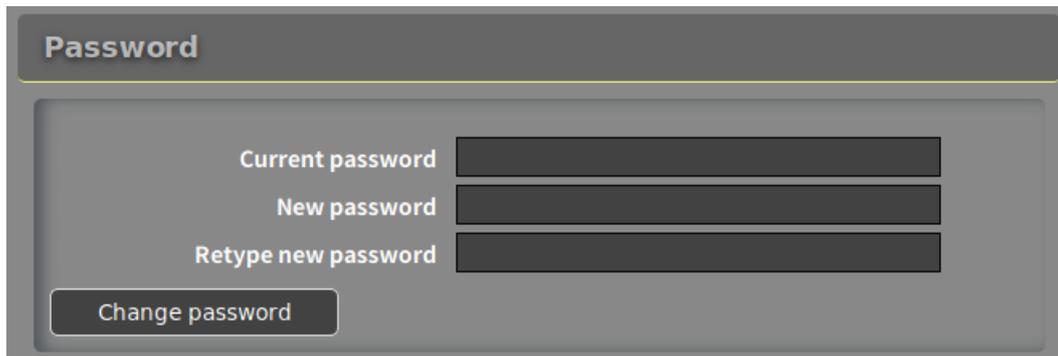
- (i) Move to '**Maintenance**' tab.

This is used to improve the network link speed.

- (ii) Select the device name from **LAN1** and **LAN2**.
- (iii) Click '**Negotiate**'.

5.4. Change of GUI password

- (i) Move to **'Maintenance'** tab.



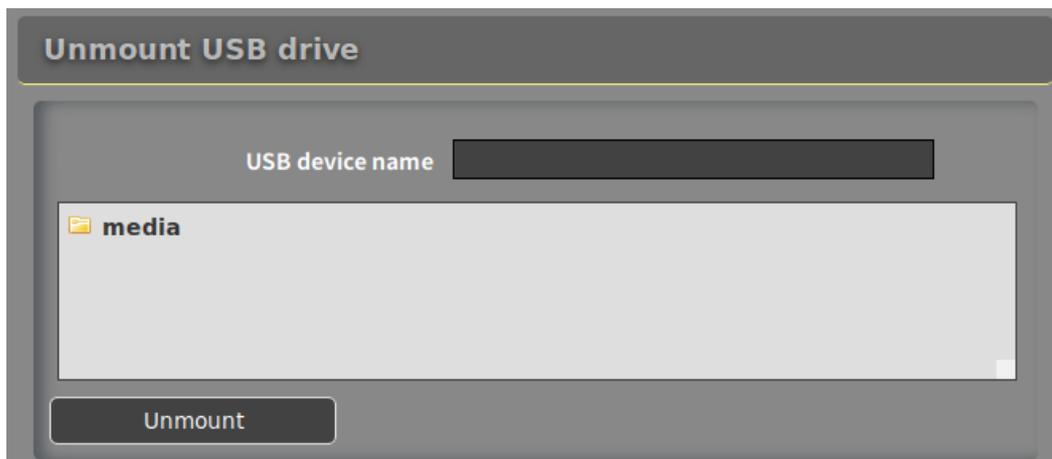
The screenshot shows a dialog box titled "Password". It contains three input fields: "Current password", "New password", and "Retype new password". Below these fields is a button labeled "Change password".

Specify the password necessary for using the e8 GUI by the remote desktop function. The initial password is e8.

- (ii) Enter the current password into **Current password**.
- (iii) Enter the new password into **New password**.
- (iv) Enter the new password into **Retype new password** again.
- (v) Click **'Change password'**.

5.5. Unmounting USB flash drive

- (i) Move to **'Maintenance'** tab.



The screenshot shows a dialog box titled "Unmount USB drive". It has a text input field for "USB device name". Below this is a list box containing a folder icon and the text "media". At the bottom of the dialog is a button labeled "Unmount".

- (ii) Select the USB flash drive (/media/e8/xxxxxx) to be unmounted from dialog box.
- (iii) Click **'Unmount'**.
- (iv) Wait until the status is 'Completed'.

5.6. Shut-down of e8

- (i) Move to **'Maintenance'** tab.



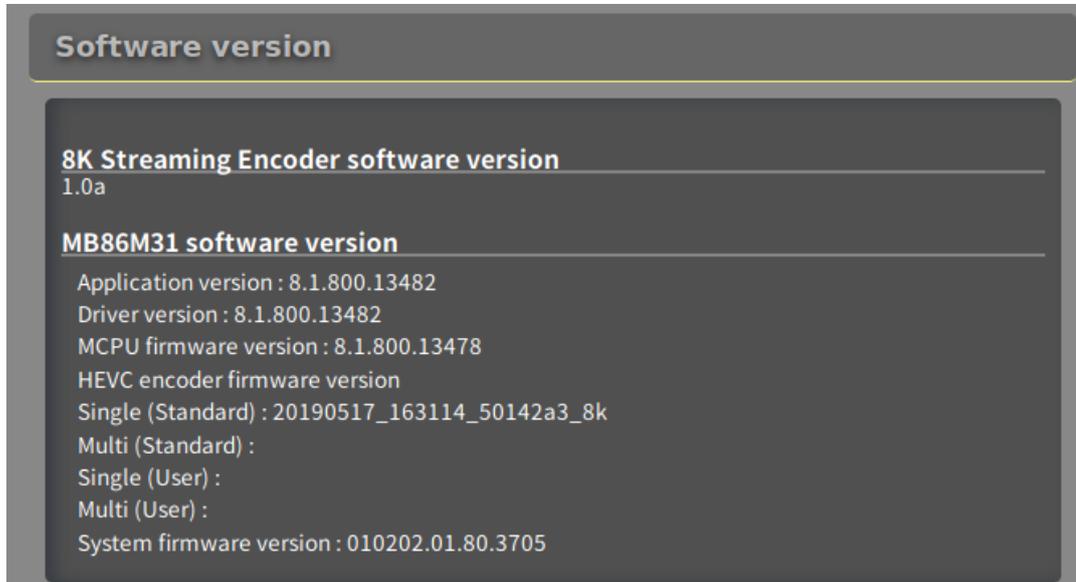
The screenshot shows a dialog box titled "Shut down". It contains a single button labeled "Shut down".

- (ii) Click **'Shut down'**.

6. Information

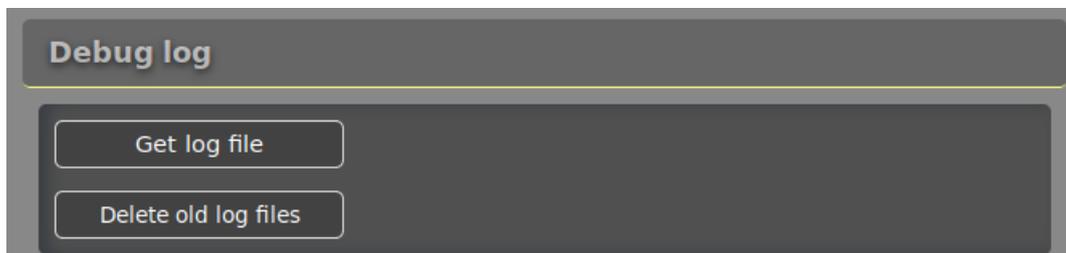
6.1. Software version of e8

- (i) Move to '**Maintenance**' tab.
- (ii) The software version information is displayed.



6.2. Acquiring log files for debugging

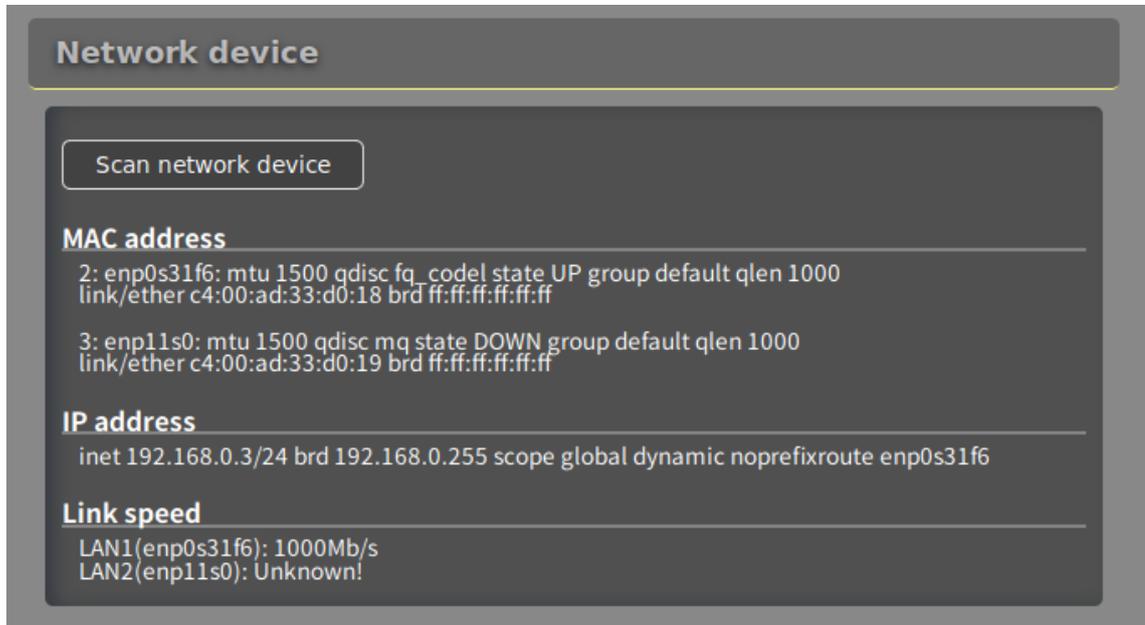
- (i) Move to '**Information**' tab.



- (ii) Click '**Get log file**'.
- (iii) The list of the log files is displayed. The log files for debugging can be acquired.
- (iv) Click '**Delete old log files**' when deleting all old log files.

6.3. Network device information

- (i) Move to 'Information' tab.
- (ii) Click 'Scan network device' to get network device information.
- (iii) The network device name and MAC address are displayed.
- (iv) The IP address of the device connected to the network is displayed.
- (v) The network link speed is displayed.



E.g. the above network device 2 is:

network device name: **enp0s31f6**
 Mac address: **c4:00:ad:28:88:2e**
 IP address: **10.213.90.78**

7. License

For the license of various kinds of the software included in this product, refer to the files '/usr/share/doc/*/copyright', '/usr/share/doc/*/LICENSE', etc.

8. Support

Please contact us for more information and assistance by email using the contact information below.

Email
Support: sni-e8-support@ml.css.socionext.com

9. Limited product warranty

IMPORTANT - CONTRACT CREATION

ACCESSING, COPYING DOWNLOADING, STUDYING, ANALYZING and/or using (collectively, "use") the product (as defined below) in any way whatsoever and/or using the product will signify that you have read this agreement, understood it, and unconditionally agreed to be bound by all the terms and conditions set forth in this agreement. If you do not agree to the terms and conditions of this agreement you may not use the product.

Limited Product Warranty

Thank you (the "User") for purchasing Socionext's 8K streaming encoder 'e8'.

I. Warranty

I-A Scope

Socionext warrants that the Socionext's 8K streaming encoder 'e8' (the "**Socionext Product**") will be free from defects in materials and workmanship under normal use for a period of *one year (12 months)* from the date of original purchase as evidenced by a valid invoice or receipt (the "**Warranty Period**"). If a defect arises during the **Warranty Period**, Socionext, at its option and to the extent permitted by law will (1) repair the **Socionext Product** at no charge using new parts or parts that are equivalent to new in performance and reliability, (2) replace the **Socionext Product** with a functionally equivalent product, or (3) refund the original purchase price. This warranty excludes damage resulting from abuse, accident, modifications or other causes that are not defects in materials and workmanship of the **Socionext Product**.

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II-C Matters not included in warranty

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II-D Change of warranties

Socionext reserves the right to change its warranties at any time and without notice, at its sole discretion, with respect to future sales and deliveries. No other person is authorized to modify this limited warranty.

III. Handling of claims

III-A Warranty period

All claims for warranty must be made within the **Warranty Period**. Any claim for warranty made after the **Warranty Period** shall be void. No repair or replacement of any **Socionext Product** or part thereof shall extend the **Warranty Period** and Socionext shall have no responsibility following the expiration of the **Warranty Period**.

III-B Documentation

The User must maintain and present a valid invoice or receipt detailing the purchased **Socionext Product**, its serial number and date of delivery, in order to exercise any right with respect to the warranty.

III-C Return of products

All returns of defective **Socionext Products** must include **Socionext Product's** serial number, and must be made through Socionext. Unauthorized returns of **Socionext Products** will not be accepted by Socionext and the User will be responsible for their shipment back to the User.

III-D Return shipments

All returns must be shipped prepaid by the User.

III-E Shipment of warranted and non-warranted products

Shipment of the repaired or replaced warranted products to User's location shall be at the expense of Socionext. Shipment of the repaired or replaced non-warranted products to User's location shall be at the expense of User.

III-F Invalidity

The warranty provided herein shall be void and of no effect in the event (a) the product label has been altered, defaced or removed; (b) unauthorized use of the **Socionext Product** has occurred (including, but not limited to, use of the **Socionext Product** other than in accordance with the **Socionext Product's** manuals, specifications or documentation); (c) unauthorized modifications are made to the **Socionext Product**; (d) the serial number of the **Socionext Product** has been altered, defaced or removed; (e) any repair, maintenance or modification of the **Socionext Product** has been made by any persons or entity, other than Socionext (except for any software updates authorized by Socionext); (f) accident, negligence, abnormal physical or electrical stress, abnormal environmental conditions, acts of God, abuse or misuse of the **Socionext Product** (including, but not limited to, damage caused by fire, oxidation, lightning strike, natural disasters, cracks or fractures and/or burns resulting from faulty or failed electrical power); and (g) there was any combination of the **Socionext Product** with hardware or software not authorized or provided by

Socionext or otherwise approved by Socionext in the **Socionext Product's** manuals, specifications or documentation.

IV. Entirety

IV-A Entire agreement

The warranty provided in Section I-A is the sole, exclusive and entire warranty for **Socionext Products**. To the extent permitted by law, there are no warranties which extend beyond the terms of this agreement.

IV-B Not applicable

The Uniform Law in the United Nations Convention on Contracts for the International Sale of Goods (Vienna, 1980) shall not apply to this warranty nor the sale of **Socionext Products**.

V. Governing law

This warranty shall be governed by Japanese law, without regard to its conflict of law provisions.

THE FOREGOING LIMITATIONS AND EXCLUSIONS APPLY TO THE EXTENT PERMITTED BY APPLICABLE LAW IN YOUR JURISDICTION. THIS LIMITATION OF LIABILITY MAY NOT BE VALID IN SOME AREAS. YOU MAY HAVE RIGHTS THAT CANNOT BE WAIVED UNDER CONSUMER PROTECTION AND OTHER LAWS. SOCIONEXT DOES NOT SEEK TO LIMIT YOUR WARRANTY OR REMEDIES TO ANY EXTENT NOT PERMITTED BY LAW.

Appendix A Safety and Compliance

FCC Class A statement

This product has been tested and found to comply with the limits for a Class A digital device 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 product generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference with 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.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

Note: Changes or modifications not expressly approved by Socionext could void the user's authority to operate the equipment.

Canadian Compliance (Industry Canada)

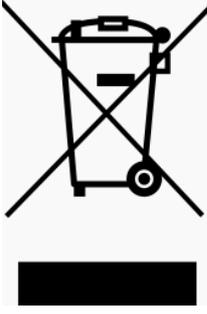
CAN ICES-3(B)/NMB-3(B)

Manufacturer Declaration for European Community



The device satisfies the requirements of the EU regulation Electromagnetic Compatibility, Low Voltage Directive, RoHS Directive. The device carries the CE mark of conformity (CE = Communauté Européenne = European Union).

This product has been tested and found to comply with the emission limits for a 'Class B' product. Operation of this product in a domestic environment may cause radio interference, in which case the user may be required to take adequate measures.

	<p>This symbol on the product or its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment.</p> <p>For more information about where you can drop off your waste for recycling, please contact your local authority, or where you purchased your product.</p>
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China RoHS Declaration

Compliance with Administration on the Control of Pollution Caused by Electronic Information Products of the People's Republic of China

	<p>该标记是按照 2016 年 1 月 21 日公布的[电器电子产品有害物质限制使用管理办法]以及 SJ/T11364[电子电气产品有害物质限制使用标识要求] 在中国销售的电器电子产品环保使用期限的标识。如遵守关于该产品的安全及使用上的注意事项, 在该期限内(从生产日期起算) 该产品不会因产品中的有害物质泄漏或突然发生的异变, 而引起环境污染以及对人体或财产产生重大影响。</p>
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产品中有毒有害物质或元素的名称及含量

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷线路板	×	○	○	○	○	○
外壳·底盘	○	○	○	○	○	○

○: 表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。
 ×: 表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。

END OF DOCUMENT