8K Streaming Encoder e8

User’s manual

Version 1.3
Nov. 8, 2019

SOCIONEXT Inc.

Document code: MN04-00009-2E
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.

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## Revision history

<table>
<thead>
<tr>
<th>Date</th>
<th>Revision</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 5th, 2019</td>
<td>1.0a</td>
<td>First edition</td>
</tr>
<tr>
<td>June 17th, 2019</td>
<td>1.1</td>
<td>8. Limited product warranty&lt;br&gt;This section was added.</td>
</tr>
<tr>
<td>Aug. 9, 2019</td>
<td>1.2</td>
<td>1. Overview&lt;br&gt;The function list was modified.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Starting e8 GUI&lt;br&gt;Note 2 was added.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.1 Screen description of e8 APP&lt;br&gt;The Setting tab was deleted, and the description for the Control and Maintenance tabs was modified.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.1 Step 1: Checking video input status&lt;br&gt;The description was modified.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.2 Step 2: Setting Video Encode parameters&lt;br&gt;The following setting items were added:&lt;br&gt;Video input format, GOP size, and GOP type</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.3 Step 3: Setting Audio Encode parameters&lt;br&gt;The option 'Pass-through' of Encode audio codec was deleted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.4 Step 4: Setting System parameters&lt;br&gt;The description was modified.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.5 Step 5: Setting Output parameters&lt;br&gt;The option SRT was added to Network protocol.&lt;br&gt;The table of Output additional condition was modified.</td>
</tr>
<tr>
<td>Nov. 8, 2019</td>
<td>1.3</td>
<td>2.1 Video input source&lt;br&gt;The SDI number in the figure was corrected.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.4 Launching e8 / Shutdown e8&lt;br&gt;The description was modified.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.5 Step 5: Setting Output parameters&lt;br&gt;The table of Network format was modified.</td>
</tr>
</tbody>
</table>
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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

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interface</strong></td>
<td></td>
</tr>
<tr>
<td>Input</td>
<td>Connector: 12G-SDI x 4 channels, BNC type Video: 8K, 2 sample interleave Audio: SDI embedded audio</td>
</tr>
<tr>
<td>Output</td>
<td>Gigabit Ethernet x 2 channels USB3.0 x 2 channels (for recording)</td>
</tr>
<tr>
<td>Audio</td>
<td>Encoding format: AAC LC Channel: 2 channels</td>
</tr>
<tr>
<td><strong>Streaming Function</strong></td>
<td>Streaming Protocol: HTTP Live Streaming (HLS) RTMP (with proprietary extension) RTP (with or without FEC) SRT</td>
</tr>
<tr>
<td><strong>Recoding Function</strong></td>
<td>Supported Storage: USB flash drive File Format: MP4</td>
</tr>
<tr>
<td><strong>Chassis</strong></td>
<td>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</td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td>Certification: CE FCC Class A CCC</td>
</tr>
</tbody>
</table>
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.)

![Conceptual diagram of 8K 2SI input from 12G SDI](image)

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.

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

<table>
<thead>
<tr>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locked</td>
<td>Video signal is input and locked in the format shown in ‘Frame rate’.</td>
</tr>
<tr>
<td>Unlocked</td>
<td>Video signal is not input. <strong>Encoding cannot be started if the input status is Unlocked.</strong></td>
</tr>
</tbody>
</table>

4.2. Step 2: Setting Video Encode parameters.

➢ Frame rate
   Choose the frame rate for encoding video.

<table>
<thead>
<tr>
<th>Settings</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto</td>
<td>Auto detect mode</td>
</tr>
<tr>
<td>60p, 59.94p, 50p, 30p, 29.97p, 25p, 24p, 23.98p</td>
<td>Select the same value with Frame rate in the ‘Video Input’ window.</td>
</tr>
</tbody>
</table>

➢ 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](image1.png) ![Slice division](image2.png)

   * 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.

     \[
     \text{Max bitrate} \geq \text{Ave bitrate} \times 1.2 \\
     \text{Ave bitrate} \times 0.8 \geq \text{Min bitrate} \geq 0
     \]
   
   - 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

<table>
<thead>
<tr>
<th>Param</th>
<th>SDR</th>
<th>PQ</th>
<th>HLG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer characteristics</td>
<td>BT.709 or BT.2020</td>
<td>SMPTE ST2084</td>
<td>ARIB STD-B67</td>
</tr>
<tr>
<td>Mastering Primaries</td>
<td>-</td>
<td>DCI-P3 or BT.2020</td>
<td>DCI-P3 or BT.2020</td>
</tr>
<tr>
<td>Max luminance</td>
<td>-</td>
<td>1000</td>
<td>-</td>
</tr>
<tr>
<td>Min luminance</td>
<td>-</td>
<td>0.01</td>
<td>-</td>
</tr>
<tr>
<td>Max CLL</td>
<td>-</td>
<td>10000</td>
<td>-</td>
</tr>
<tr>
<td>Max FALL</td>
<td>-</td>
<td>150</td>
<td>-</td>
</tr>
</tbody>
</table>

4.3. Step 3: Setting Audio Encode parameters.

➢ Encode audio codec
Choose the codec for audio encoding.

<table>
<thead>
<tr>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAC-LC</td>
<td>Extract SDI embedded audio and encode it to MPEG-2 AAC-LC.</td>
</tr>
<tr>
<td>LPCM</td>
<td>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.</td>
</tr>
<tr>
<td>Unused</td>
<td>The audio is not multiplexed.</td>
</tr>
</tbody>
</table>

➢ 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.

  ‘System rate’ = (Video bit rate + 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:

  Audio bit rate = 1928 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.

<table>
<thead>
<tr>
<th>‘Network Protocol’</th>
<th>Support ‘Network format’ (Container format)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCP</td>
<td>MPEG-2 TS</td>
</tr>
<tr>
<td></td>
<td>Video ES</td>
</tr>
<tr>
<td>UDP</td>
<td></td>
</tr>
<tr>
<td>RTP</td>
<td>MPEG-2 TS</td>
</tr>
<tr>
<td>SRT</td>
<td></td>
</tr>
<tr>
<td>HLS</td>
<td>MPEG-2 TS</td>
</tr>
<tr>
<td></td>
<td>fMP4</td>
</tr>
<tr>
<td>RTMP</td>
<td>FLV</td>
</tr>
<tr>
<td></td>
<td>CodecID for FLV video-specific metadata.</td>
</tr>
<tr>
<td></td>
<td>Basically, it is treated the same as AVC</td>
</tr>
<tr>
<td></td>
<td>with CodecID=7, but use CodecID=12.</td>
</tr>
</tbody>
</table>
➢ Output additional condition
Specify additional information depending on the setting of ‘Network Protocol’ and ‘Output method’.

<table>
<thead>
<tr>
<th>‘Output Method’</th>
<th>‘Network Protocol’</th>
<th>Necessary settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network</td>
<td>TCP</td>
<td>‘Address’ Specify destination address. ’Port’ Specify port number to be used for transfer.</td>
</tr>
<tr>
<td></td>
<td>UDP</td>
<td>‘Address’ Specify destination address. Set 224.1.1.1 for multicast. ’Port’ Specify port number to be used for transfer.</td>
</tr>
<tr>
<td></td>
<td>RTP</td>
<td>‘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 )</td>
</tr>
<tr>
<td></td>
<td>HLS</td>
<td>‘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 an HLS server. Accessible at http://(ip_address)/hls/m31_8k.m3u8</td>
</tr>
<tr>
<td></td>
<td>RTMP</td>
<td>‘Server URL’ Specify the RTMP server URL to push the stream.</td>
</tr>
<tr>
<td></td>
<td>SRT</td>
<td>‘Address’ Specify destination address. ’Port’ Specify port number to be used for transfer.</td>
</tr>
<tr>
<td></td>
<td>Storage</td>
<td>’Folder name’ Specify the output directory from dialog box. Note: Remove the USB flash drive after executing the procedure described in Section 5.4. ’Add timestamp’ Check it to add a timestamp to the file name.</td>
</tr>
</tbody>
</table>

4.6. Step 6: Setting other control settings
➢ 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.

<table>
<thead>
<tr>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ready</strong></td>
<td>The encoding setting is completed. Click ‘Start’ to start Encoding.</td>
</tr>
<tr>
<td></td>
<td>The State will be Running.</td>
</tr>
<tr>
<td><strong>Running</strong></td>
<td>The encoding operation is running. Click ‘Stop’ to stop Encoding.</td>
</tr>
<tr>
<td></td>
<td>The State will be Stopping.</td>
</tr>
<tr>
<td><strong>Stopping</strong></td>
<td>After the encoding is completed, the stop processing is automatically started.</td>
</tr>
<tr>
<td></td>
<td>Click ‘Update’ to set the State Ready.</td>
</tr>
<tr>
<td><strong>Stopping/Error(reason)</strong></td>
<td>If the error occurs during the encoding operation, the message ‘Error’</td>
</tr>
<tr>
<td></td>
<td>and the error factor will be displayed and the stop processing will be</td>
</tr>
<tr>
<td></td>
<td>automatically started.</td>
</tr>
<tr>
<td></td>
<td>The details of the error information can be confirmed by the acquisition of</td>
</tr>
<tr>
<td></td>
<td>the debugging log (see Section 6.2).</td>
</tr>
<tr>
<td></td>
<td>Click ‘Update’ to set the State Ready.</td>
</tr>
</tbody>
</table>
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. Change of GUI password

(i) Move to ‘Maintenance’ tab.

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’.

5.4. Unmounting USB flash drive

(i) Move to ‘Maintenance’ tab.

(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’.

5.5. Shut-down of e8

(v) Move to ‘Maintenance’ tab.

(vi) Click ‘Shut down’.
6. Information

6.1. Software version of e8

(i) Move to ‘Maintenance’ tab.
(ii) The software version information is displayed.

![Software version](image)

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.

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.

<table>
<thead>
<tr>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Support:</strong> <a href="mailto:sni-e8-support@ml.css.socionext.com">sni-e8-support@ml.css.socionext.com</a></td>
</tr>
</tbody>
</table>


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.

I-B Clarification
The warranty is for repair, replacement or refund only. Socionext shall not be liable for any loss, cost, damage, or expense of any kind arising out of a breach of the warranty or of the sale. IN NO EVENT WILL SOCIONEXT BE LIABLE FOR ANY AMOUNT GREATER THAN THE PURCHASE PRICE OF A DEFECTIVE PRODUCT.

I-C Limitation of liability
TO THE EXTENT PERMITTED BY APPLICABLE LAW SOCIONEXT IS NOT LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR SERVICE OF THE PRODUCT. THE WARRANTY AND REMEDIES DESCRIBED IN SECTION I-A (SCOPE) ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, REMEDIES, AND CONDITIONS, WHETHER ORAL, WRITTEN, EXPRESS, STATUTORY OR IMPLIED. TO THE EXTENT PERMITTED BY APPLICABLE LAW, SOCIONEXT EXPRESSLY DISCLAIMS ALL EXPRESS WARRANTIES, ALL IMPLIED WARRANTIES, AND ALL CONDITIONS, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, NON-INFRINGEMENT, FITNESS FOR A PARTICULAR PURPOSE, SATISFACTORY QUALITY AND ANY WARRANTIES ARISING OUT OF COURSE OF DEALING OR USAGE OF TRADE. IF IMPLIED WARRANTIES CANNOT BE DISCLAIMED, THEN SUCH WARRANTIES ARE LIMITED IN DURATION TO THE DURATION OF THIS WARRANTY.

II. Exclusions
II-A As is
Other than as explicitly stated herein, to the extent permitted by applicable law, the Socionext Product and any accompanying or related documentation are provided on an “as is” basis. In addition, due to the continual development of new techniques for intruding upon and attacking networks, Socionext does not warrant that the Socionext Product will be free of vulnerability to intrusion or attack.
II-B IP infringement
Without derogating from Section II-A above, Socionext disclaims and shall have no obligation to indemnify or defend the User or any third party in respect of any actual or alleged infringement of any actual or pending patents, copyright or other intellectual property rights. Socionext shall have no liability arising out of any such actual or alleged intellectual property infringement.

II-C Matters not included in warranty
SOCIONEXT DOES NOT WARRANT THAT THE SOCIONEXT PRODUCT WILL MEET THE USER’S REQUIREMENTS OR THAT THE SOCIONEXT PRODUCT’S OPERATION WILL BE SECURE, UNINTERRUPTED, ERROR-FREE, FREE OF VIRUSES, BUGS, WORMS, OTHER HARMFUL COMPONENTS OR OTHER LIMITATIONS, THAT DEFECTS IN THE SOCIONEXT PRODUCT WILL BE CORRECTED, OR THAT THE SOCIONEXT PRODUCT WILL MEET THE CUSTOMER’S REQUIREMENTS OR INTENDED USE OR PERFORM WITH ANY HARDWARE OR SOFTWARE PROVIDED BY THIRD PARTIES.

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.
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.

For more information about where you can drop off your waste for recycling, please contact your local authority, or where you purchased your product.

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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*

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。

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<th>镉 (Cd)</th>
<th>六价铬 (Cr(VI))</th>
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○：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。

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END OF DOCUMENT