

socionext™

X500E  
HEVC UHD Encoder  
User's Guide

Version 1.2.0

Model No: SCOF50A-00E

Document code: MN04-00008-3E

**Socionext America.**  
**2811 Mission College Blvd., 5th Floor**  
**Santa Clara, CA 95054**  
**USA**

**Email:** [x500-support@socionext.com](mailto:x500-support@socionext.com)

**Web:** <http://www.socionextus.com/>

The information contained in this document, or any addendum or revision thereof is the intellectual property of Socionext Inc. and is subject to all relevant copyright, patent and other laws and treaties protecting intellectual property, as well as any specific agreement protecting Socionext Inc. rights in the aforementioned information. Any use of this document or the information contained herein for any purposes other than those disclosed is strictly forbidden.

Socionext Inc. reserves the right, without prior notice or liability, to make changes to product design or specifications.

Socionext Inc. assumes no responsibility for product use or for the rights of third parties, which may be affected in any way by the product's use.

This document may contain flaws, omissions or typesetting errors; no warranty is granted nor liability assumed in relation thereto unless specifically stated in Socionext Inc.'s sales contract or order confirmation.

Information contained herein is periodically updated and changes will be incorporated into subsequent editions. If you encounter an error, please notify Socionext Inc.

All specifications are subject to change without prior notice.

All company names, brand names and trademarks herein are property of their respective owners.

Copyright 2019-2020 Socionext Inc.

Revision History

Date	Revision	Description
June 4, 2019	1.1.0	Initial version
Oct. 2, 2019	1.1.1	<p>Minor editorial changes were made.</p> <p>5.2 Overheating Table 25 was modified.</p> <p>Appendix A System Specifications P frame was deleted from supported frames in "Codec features". KC class A was added to "Regulatory Compliance". The class of FCC was corrected in "Regulatory Compliance".</p> <p>Appendix B Safety and Compliance "KC class A statement" was added. "General Caution" was modified. "Caution with using" was modified.</p>
Jan. 23, 2020	1.2.0	<p>1.2 Definition "TS-SRT" and "RTT" were added to Table 2.</p> <p>4.1.1 Assigning an IP Address NOTE was modified.</p> <p>4.3 Channel Settings "TS-SRT" was added to "Streaming mode" in Table 11.</p> <p>4.3.2 Streaming Modes The description for "TS-SRT Streaming" was added.</p> <p>5.3 Restoring System Defaults NOTE was modified.</p> <p>Appendix A System Specifications "TS-SRT" was added to "Streaming Protocols" in the table.</p>

## Table of Contents

<b>1</b>	<b>INTRODUCTION</b>	<b>8</b>
1.1	SUPPORT	8
1.2	DEFINITIONS	9
<b>2</b>	<b>INSTALLING THE SYSTEM</b>	<b>10</b>
2.1	UNPACKING THE X500E PACKAGE	10
2.2	INSTALLING THE XVTEC MANAGEMENT TOOL	10
<b>3</b>	<b>USING X500E</b>	<b>11</b>
3.1	BUTTONS	12
3.2	CONNECTORS	12
3.3	LEDs	12
<b>4</b>	<b>CONFIGURING X500E</b>	<b>14</b>
4.1	GETTING STARTED	14
4.1.1	Assigning an IP Address	14
4.1.2	Accessing X500E	16
4.1.3	Work Area	18
4.2	VIDEO INPUT	19
4.3	CHANNEL SETTINGS	21
4.3.1	Video Bitrate Settings	24
4.3.2	Streaming Modes	25
4.4	SYSTEM SETTINGS	30
4.4.1	System Settings Main Page	31
4.4.2	Time & Date	32
4.4.3	Network Configuration	34
4.4.4	User Management	36
4.4.5	Firmware Upgrade	37
4.4.6	Licensed Features	39
4.5	SYSTEM STATUS	40
4.6	ABOUT	41
4.6.1	Socionext Legal Page	42
4.6.2	Open Source Software	43
4.6.3	Certifications	44
4.7	REBOOT	44
<b>5</b>	<b>BOOTING, TROUBLESHOOTING AND RECOVERY</b>	<b>46</b>
5.1	BOOTING X500E	46
5.1.1	Static IP Address	46
5.1.2	DHCP-Allocated IP Address	46
5.2	OVERHEATING	47
5.3	RESTORING SYSTEM DEFAULTS	48
5.4	SYSTEM RECOVERY	48
5.4.1	Recovery Using Image on USB Memory Stick	48
5.4.2	Recovery Using Image on Network	50
5.5	RESETTING THE USER NAME AND PASSWORD	52
<b>6</b>	<b>REST-API</b>	<b>54</b>
6.1	REST-API OPERATIONS	54
<b>APPENDIX A</b>	<b>SYSTEM SPECIFICATIONS</b>	<b>55</b>
<b>APPENDIX B</b>	<b>SAFETY AND COMPLIANCE</b>	<b>57</b>

## List of Figures

Figure 1: X500E Front Panel .....	11
Figure 2: X500E Rear Panel .....	11
Figure 3: LED Panel.....	12
Figure 4: List of Devices Discovered.....	15
Figure 5: Setting the X500E IP Address .....	15
Figure 6: List of Devices Discovered.....	15
Figure 7: Requesting Dynamic Allocation of an IP Address .....	16
Figure 8: Entering the IP Address in the Browser Address Bar .....	16
Figure 9: Enter User Name and Password .....	16
Figure 10: Configuration System Page Layout .....	17
Figure 11: Video Input Page.....	19
Figure 12: Channel Settings Page.....	21
Figure 13: TS-UDP Streaming Fields.....	25
Figure 14: RTP Streaming Fields.....	26
Figure 15: RTSP Streaming Fields.....	26
Figure 16: TS-SRT Streaming Fields (Listener).....	27
Figure 17: TS-SRT Streaming Fields (Caller) .....	28
Figure 18: System Settings Menu .....	30
Figure 19: Systems Settings Main Page .....	31
Figure 20: Time & Date Page .....	33
Figure 21: Network Configuration Page.....	34
Figure 22: User Management Page.....	36
Figure 23: Firmware Upgrade Page .....	37
Figure 24: Selecting the Image File .....	38
Figure 25: Upgrade Status Field .....	38
Figure 26: Upgrade LED Indicators.....	38
Figure 27: Upgrade Completed LED Indicators.....	39
Figure 28: Licensed Features Page.....	39
Figure 29: Enabled Features .....	40
Figure 30: System Status Page .....	40
Figure 31: About Page.....	41
Figure 32: Legal Page .....	42
Figure 33: OSS Page .....	43
Figure 34: Certifications Page .....	44
Figure 35: Reboot Confirmation .....	44
Figure 36: X500E Rebooting.....	45
Figure 37: End of Boot Sequence with Successful IP Address Allocation .....	46
Figure 38: Attempting to Retrieve Network Parameters from DHCP Server.....	46
Figure 39: X500E Failed to Retrieve IP Address from DHCP Server .....	47
Figure 40: Release SW Button to Begin Restoring Defaults.....	48
Figure 41: System Defaults Successfully Restored.....	48

Figure 42: Release SW Button to Begin System Recovery ..... 49

Figure 43: Recovery LED Indicators..... 49

Figure 44: End of Recovery Process ..... 49

Figure 45: Recovery Page..... 51

Figure 46: Selecting the Image File ..... 51

Figure 47: Upgrade Status Field ..... 52

Figure 48: Recovery LED Indicators..... 52

Figure 49: Resetting the User/Password ..... 53

## List of Tables

Table 1: Contact Us .....	8
Table 2: Definitions .....	9
Table 3: Items Shipped in the X500E Package .....	10
Table 4: Buttons .....	12
Table 5: Front Panel Connectors.....	12
Table 6: Rear Panel Connectors .....	12
Table 7: LEDs .....	13
Table 8: Main Menu Entries.....	17
Table 9: Control Types .....	18
Table 10: Video Input Field Descriptions .....	20
Table 11: Channel Settings Field Descriptions .....	22
Table 12: Valid Minimum/Maximum Bitrates .....	24
Table 13: Recommended Bitrates in Normal Encoding Latency Modes.....	24
Table 14: Recommended Bitrates in Low Encoding Latency Modes .....	24
Table 15: TS-UDP Streaming Field Descriptions.....	25
Table 16: RTP Streaming Field Descriptions .....	26
Table 17: RTSP Streaming Field Descriptions.....	27
Table 18: SRT Streaming Field Descriptions (Listener) .....	28
Table 19: SRT Streaming Field Descriptions (Caller) .....	29
Table 20: System Settings Menu Entries.....	30
Table 21: Systems Settings Field Descriptions .....	32
Table 22: Time & Date Field Descriptions.....	33
Table 23: Network Configuration Field Descriptions .....	35
Table 24: User Management Field Descriptions .....	36
Table 25: Firmware Upgrade Field Descriptions.....	37
Table 26: System Status Field Descriptions .....	41
Table 27: Overheating Conditions .....	47

## 1 Introduction

The X500E HEVC UHD Encoder (hereinafter referred to as “X500E”) delivers superior video quality, allowing users to stream broadcast quality UHD video with up to 50% bandwidth savings compared to H.264. X500E provides best-in-class HEVC video quality of up to 4:2:2 10-bit and sets new industry standards for bit rate and latency.

### 1.1 Support

Contact us via the address below for more information and assistance:

**Table 1: Contact Us**

Email
Support: <a href="mailto:x500-support@socionext.com">x500-support@socionext.com</a>

## 1.2 Definitions

**Table 2: Definitions**

Term	Definition
AAC_LC	Advanced Audio Coding – Low Complexity Profile
HEVC	High-Efficiency Video Coding, a video compression standard. Standard guidelines are presented in ITU-T Recommendation H.265
Pixel depth	The number of bits used to represent the color (or a color component) of a single pixel. Typical pixel depths are 8 (for 24-bit color) and 10 for (30-bit color).
Color space	A numerical model representation of colors, usually over 3 axes, for example, RGB or YCbCr.
Frame rate	The frequency (rate) at which consecutive images (frames) appear on a display, expressed in frames per second (fps).
GOP	Group of Pictures
Bit rate	The number of bits transmitted or processed in a given period of time, expressed in bits per second (bps).
IDR	Instantaneous Decoder Refresh. An IDR frame is a specialized I-frame that clears the reference buffer so that no future frame can reference frames processed before the IDR frame.
TS-UDP	Transport Stream over UDP
TS-SRT	Transport Stream over SRT
RTP	Real Time Protocol
RTSP	Real Time Streaming Protocol
MAC	Media Access Control. A MAC address is a unique identifier assigned to network interfaces that supports communications at the data link layer (Ethernet) of a network segment (LAN).
IP	Internet Protocol. An IP address is a numerical identifier assigned to a computing device or node in a TCP/IP network. The address is used to locate and identify the node in communications with other nodes on the network.
APIPA	Automatic Private IP Addressing. Used to automatically assign an IP address when no DHCP server is available.
DNS	Domain Name Server. DNS is a naming system used to translate domain names into numerical IP addresses that are used to locate and identify computer services.
RTT	Round Trip Time. This is the time required for a packet to travel from a specific source to a specific destination and back again.
Unicast	A one-to-one association between a sender and destination. Each destination address uniquely identifies a single receiver endpoint.
Multicast	A one-to-many-of-many or many-to-many-of-many association. Datagrams are routed simultaneously in a single transmission to many recipients. It differs from broadcast in that the destination address designates a subset, and not necessarily all, of the accessible nodes.

## 2 Installing the System

### 2.1 Unpacking the X500E Package

The items listed below are shipped in the X500E package. When opening the package, make sure that all of the items are found. If any item is missing, please contact your representative.

**Table 3: Items Shipped in the X500E Package**

Items Shipped in the X500E Package
X500E
Power supply, international cable kit
Four rubber feet pads
Quick installation guide
EULA
Warranty statement

### 2.2 Installing the XVTEC Management Tool

The XVTEC Management Tool is a Windows application used to perform discovery and to configure the network settings of X500E.

#### To install the XVTEC Management Tool:

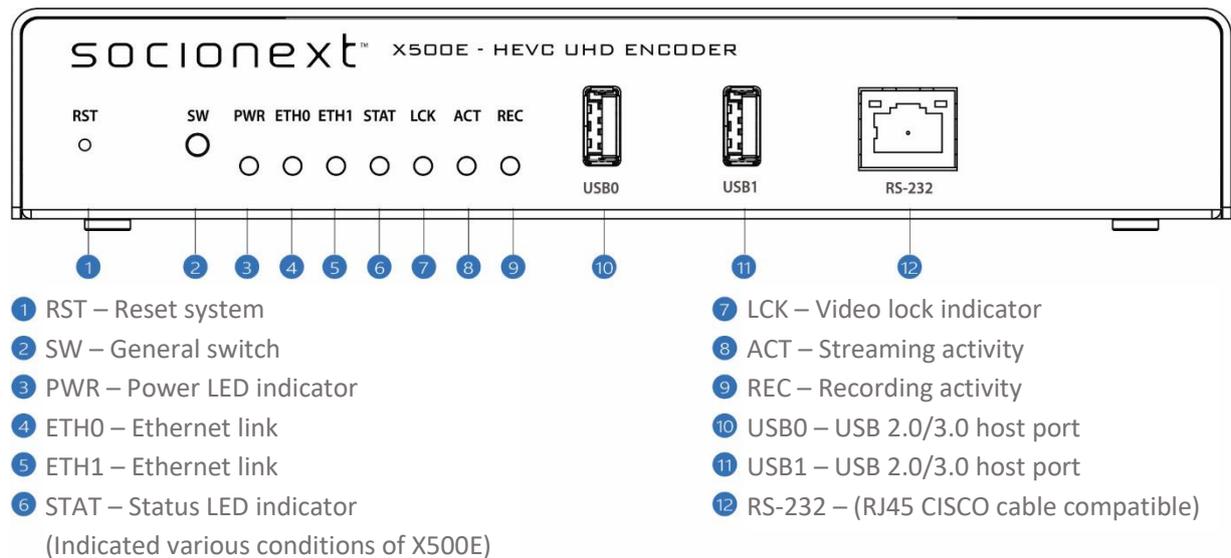
1. Download the XVTEC Management Tool from the XVTEC site at discovery setup tool via the Downloads page: <http://www.xvtec.com/support/downloads/>
2. Run the installation file that you just downloaded, and follow the instructions as presented in the installation wizard.
3. Before executing the tool that you installed, disable Windows Firewall to enable discovery of the network.

### 3 Using X500E

This chapter contains information on the interfaces on the front and rear panels of X500E:

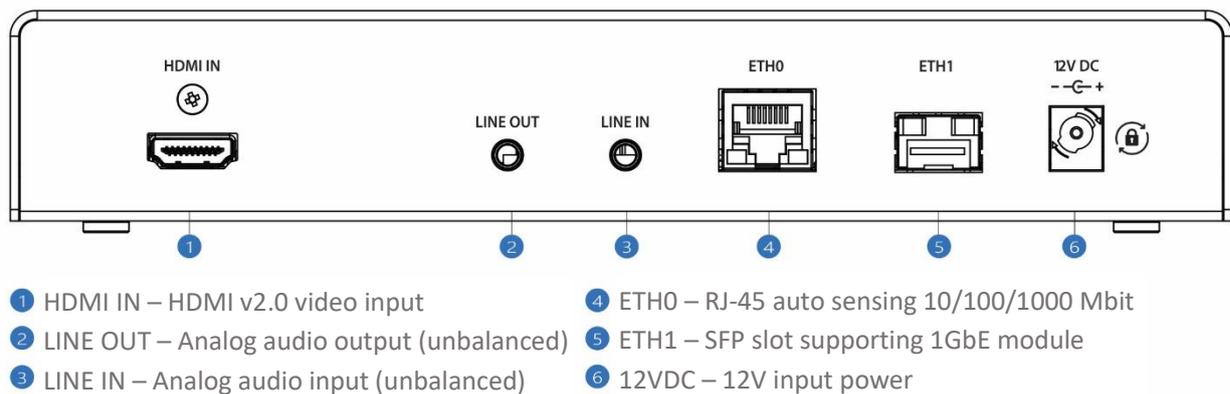
- [Buttons](#)
- [Connectors](#)
- [LEDs](#)

The front panel of X500E appears as depicted in the figure below:



**Figure 1: X500E Front Panel**

The rear panel of X500E appears as depicted in the figure below:



**Figure 2: X500E Rear Panel**

### 3.1 Buttons

The table below describes the buttons on the front panel of X500E.

**Table 4: Buttons**

Label	Description
RST	Internal button used to reset the system in recovery scenarios only. A pin is required in order to push the button from the outside of X500E. Two reset levels are supported: <ul style="list-style-type: none"> <li>• <b>Soft reset.</b> Press for 1 second to reset X500E.</li> <li>• <b>Hard reset.</b> Press for 10 seconds to shut down and restart X500E.</li> </ul>
SW	Multi-purpose switch used in factory reset and recovery scenarios.

### 3.2 Connectors

Table 5 and Table 6 below list the connectors on the front and rear panels of X500E.

**Table 5: Front Panel Connectors**

Label	Description
USB0	USB 2.0/3.0 host port 0
USB1	USB 2.0/3.0 host port 1
RS232	RS232 Serial port with RJ45 connector (no support)

**Table 6: Rear Panel Connectors**

Label	Description
HDMI In	HDMI v2.0 video input connector
Line Out	Unbalanced analog audio output (no support)
Line In	Unbalanced analog audio input
Eth0	Ethernet port 0 – RJ45 connector, 10/100/1000 Mbps Half/Full Duplex Auto-Negotiation
Eth1	Ethernet port 1 – SFP slot supporting a 1 GbE module (no support)
12V DC	12V input power

### 3.3 LEDs

The LED panel, as shown in the figure below, appears on the front panel of X500E.



**Figure 3: LED Panel**

The table below describes the use of the LEDs appearing on the LED panel.

Table 7: LEDs

LED	Indication
PWR	On/Off indicator. <ul style="list-style-type: none"> <li>Green: X500E is powered on.</li> </ul>
ETH0	Ethernet link indicator for Ethernet port 0. <ul style="list-style-type: none"> <li>Green: Ethernet link established.</li> </ul>
ETH1	Ethernet link indicator for Ethernet port 1. (no support) Green: Ethernet link established.
STAT	Multi-purpose system status indicator. For further information, refer to the following sections: <ul style="list-style-type: none"> <li><a href="#">Boot Sequence – with static IP address</a></li> <li><a href="#">Boot Sequence – with DHCP-allocated IP address</a></li> <li><a href="#">Overheating</a></li> <li><a href="#">Restoring System Defaults</a></li> <li><a href="#">System Recovery</a></li> </ul>
LCK	Video lock indicator. When X500E detects a supported video standard, the LED will light up as shown below: <ul style="list-style-type: none"> <li>Red: SD resolution</li> <li>Orange: FHD/HD resolution</li> <li>Green: 4K/UHD resolution</li> </ul>
ACT	Streaming activity indicator. <ul style="list-style-type: none"> <li>Blinking Green: Streaming is active.</li> </ul>
REC	Recording activity indicator (no support).

**NOTE**

The **STAT**, **LCK**, **ACT**, and **REC** LEDs are used in parallel to indicate process-specific states during the boot sequence and recovery operations.

## 4 Configuring X500E

XVTEC provides two tools for configuration of X500E:

- **The XVTEC Management Tool**, a Windows application used to perform discovery and configure the network settings of X500E.
- **The web-based Configuration System**, which is used to configure the X500E's settings using a standard web browser. The browsers supported are:
  - Google Chrome
  - Mozilla Firefox
  - Microsoft Edge

### 4.1 Getting Started

The following sections provide guidelines for initial use of X500E.

#### 4.1.1 Assigning an IP Address

In order to communicate with X500E, a valid IP address must be assigned to X500E using the XVTEC Management Tool via one of the following two options:

- Using a [static IP address](#)
- Using a [DHCP-allocated IP address](#)

---

#### NOTE

The factory-set IP address of X500E is in the APIPA range (169.254.x.x). The lower two bytes of the MAC address are assigned to the 3rd and 4th octets of the APIPA IP address for each X500E.

Example:

MAC address: C4-7D-46-1D-FC-EB (FCh = 252, EBh = 235)

IP address: 169.254.252.235



---

##### 4.1.1.1 Assigning a Static IP Address

**To assign a static IP address to X500E:**

1. Execute the XVTEC Management Tool. The application discovers the devices in your network and displays them in a list, as shown in the figure below.

---

#### NOTE

To enable discovery of the devices, you may need to disable the Windows Firewall before executing the XVTEC Management Tool.

---

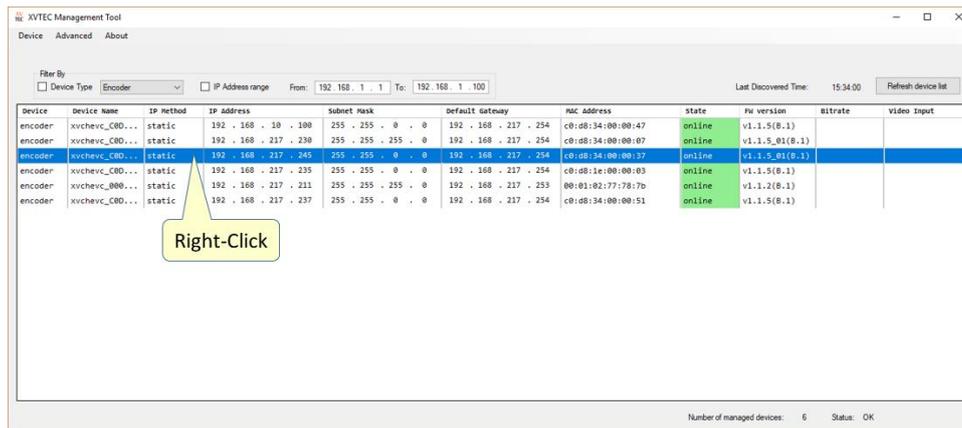


Figure 4: List of Devices Discovered

- Find the row in the table associated with X500E. Right-click on the row and select **Set IP**. The Set Device IP dialog box appears, as shown in the figure below.

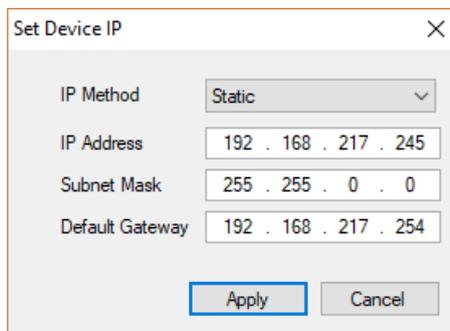


Figure 5: Setting the X500E IP Address

- Make sure that the IP Method selected is **Static**.
- Enter the X500E's **IP Address**, **Subnet Mask**, and **Default Gateway** settings. Click **Apply** to save the new settings.

#### 4.1.1.2 Assigning a DHCP-Allocated IP Address

To assign a DHCP-allocated IP address to X500E:

- Execute the XVTEC Management Tool. The application discovers the devices in your network and displays them in a list, as shown in the figure below.

#### NOTE

To enable discovery of the devices, you may need to disable the Windows Firewall before executing the XVTEC Management Tool.

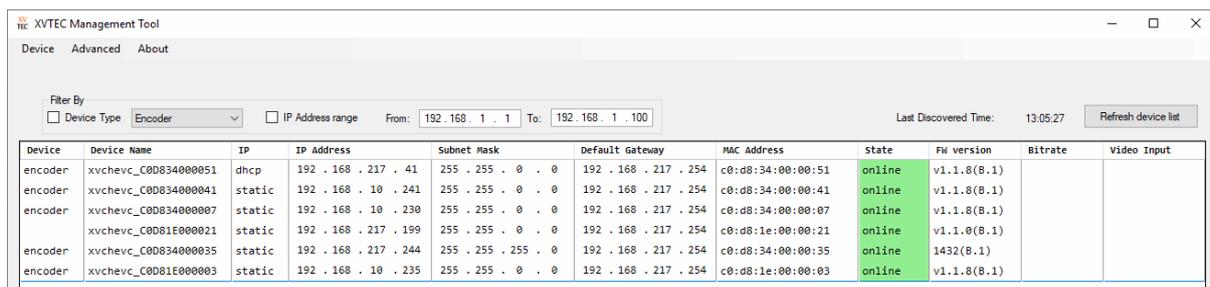
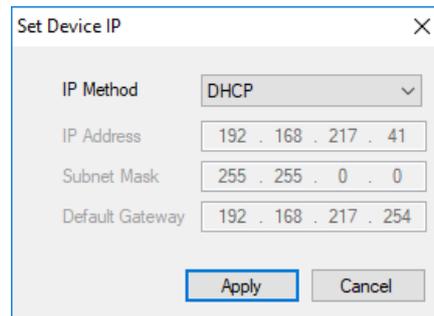


Figure 6: List of Devices Discovered

- Find the row in the table associated with X500E. Right-click on the row and select **Set IP**. The Set Device IP dialog box appears, as shown in the figure below.



The 'Set Device IP' dialog box contains the following fields:

- IP Method: DHCP (selected in a dropdown menu)
- IP Address: 192 . 168 . 217 . 41
- Subnet Mask: 255 . 255 . 0 . 0
- Default Gateway: 192 . 168 . 217 . 254

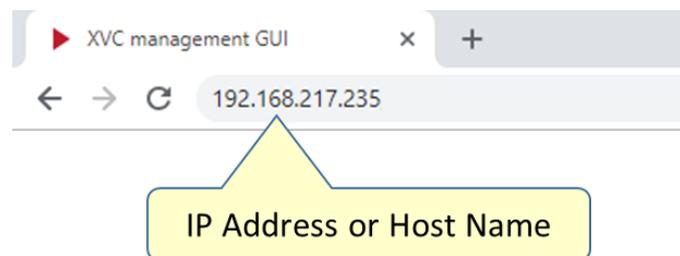
Buttons: Apply, Cancel

**Figure 7: Requesting Dynamic Allocation of an IP Address**

- Select **DHCP** from the IP Method drop-down list, and then click **Apply**. X500E will attempt to retrieve the network settings from the DHCP server. During the allocation process, the LEDs on the X500E's front panel will respond as described in Section 5.1.2. Following retrieval of the network settings, the new settings will appear on the main window of the XVTEC Management Tool, as shown in Figure 6 above.

#### 4.1.2 Accessing X500E

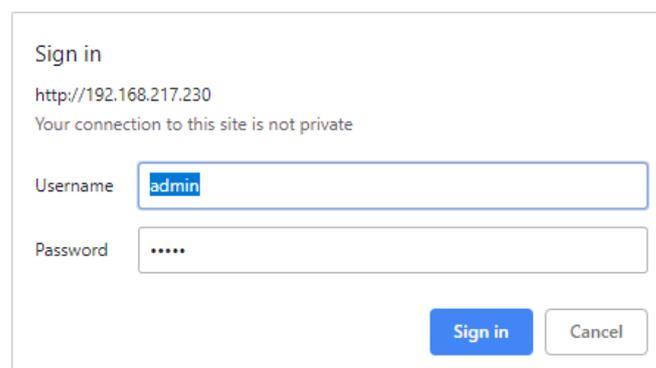
To access and configure X500E using the web-based user interface, enter the IP address of X500E in the address bar of the browser, as shown in the figure below:



**Figure 8: Entering the IP Address in the Browser Address Bar**

Sign in by entering your user name and password in the dialog box displayed by your browser. A sample dialog box will appear, as shown in the figure below. The default credentials are:

- Username:** admin
- Password:** admin



The 'Sign in' dialog box shows the following information:

- URL: http://192.168.217.230
- Warning: Your connection to this site is not private
- Username field: admin
- Password field: masked with dots
- Buttons: Sign in, Cancel

**Figure 9: Enter User Name and Password**

The main page of the Configuration System will appear in the browser window. The page includes a main menu and a work area, as shown in the figure below:

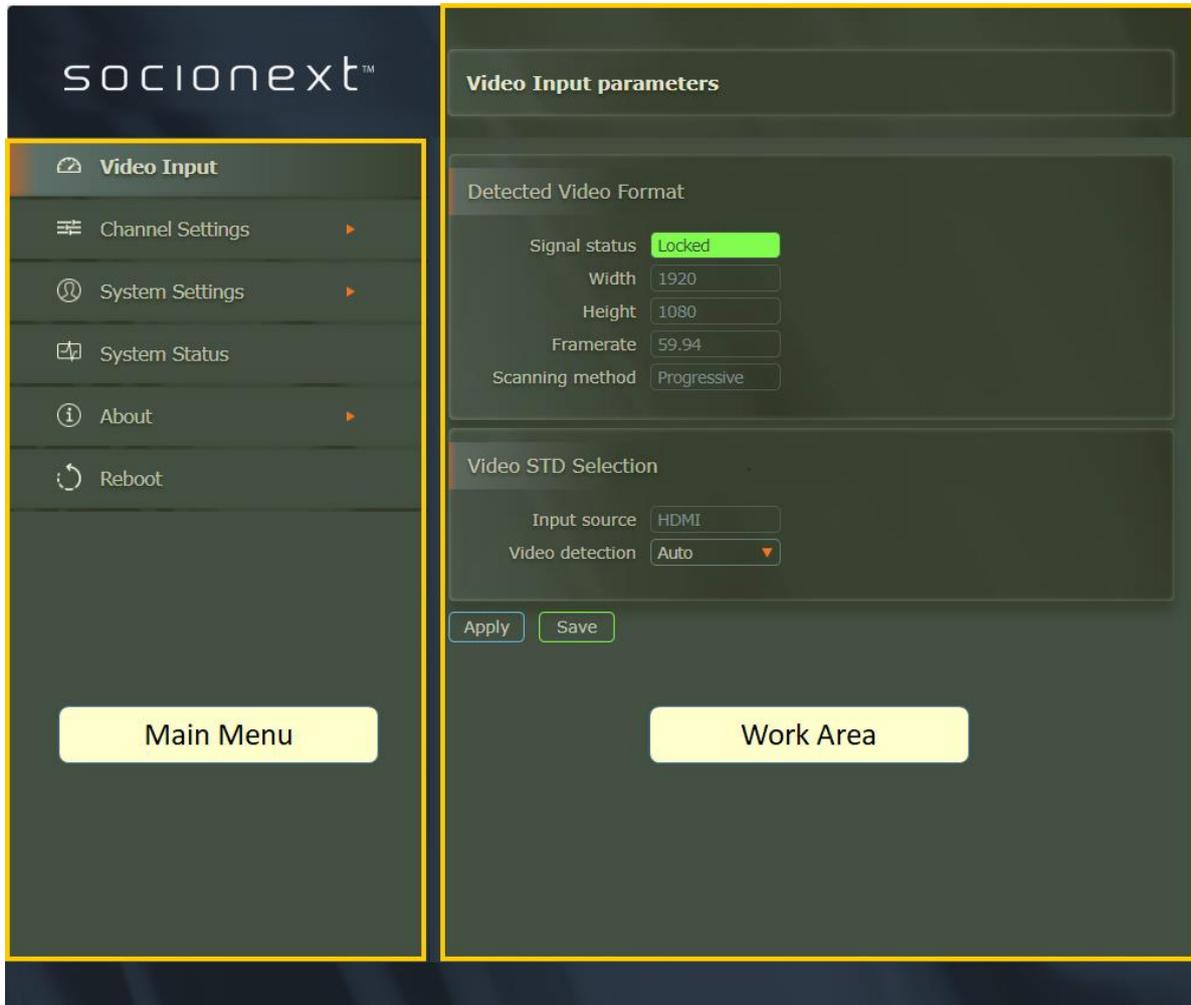


Figure 10: Configuration System Page Layout

The Main Menu offers the following capabilities, which are described in detail in the following sections:

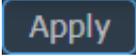
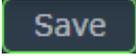
Table 8: Main Menu Entries

Entry	Description
<a href="#">Video Input</a>	Provides access to video input format and settings.
<a href="#">Channel Settings</a>	Used to configure audio and video encoding parameters.
<a href="#">System Settings</a>	Used to perform administrative operations and configure network settings.
<a href="#">System Status</a>	Displays system-related data.
<a href="#">About</a>	Provides information on technical support, licensing, and system certifications.
<a href="#">Reboot</a>	Restarts X500E.

### 4.1.3 Work Area

This section contains guidelines for using the controls in the work area of the Configuration System, as described in the table below.

**Table 9: Control Types**

Field Type	Example	Description
<b>Field Types</b>		
Read/Write		Fields whose values can be modified – values appear in a bright color.
Read-Only		Fields whose values <i>cannot</i> be modified – values appear in a dark color.
Check Box		Used to enable or disable a function.
List Box		Click on the field to open a list box containing alternative values.
<b>Button Types</b>		
Apply		Click to apply changes made on the page to the current session only. Changes are not saved after system reboot.
Save		Click to apply changes made on the page to the current session and to save them permanently to Flash memory.
Refresh		Click to restore the fields on the page to the values that were set during the last <b>Apply</b> or <b>Save</b> operation.
Copy		Click to copy the stream URL to the clip board for decoders such as ffplay.

## 4.2 Video Input

Select **Video Input** on the main menu to display the Video Input page, as shown in the figure below.

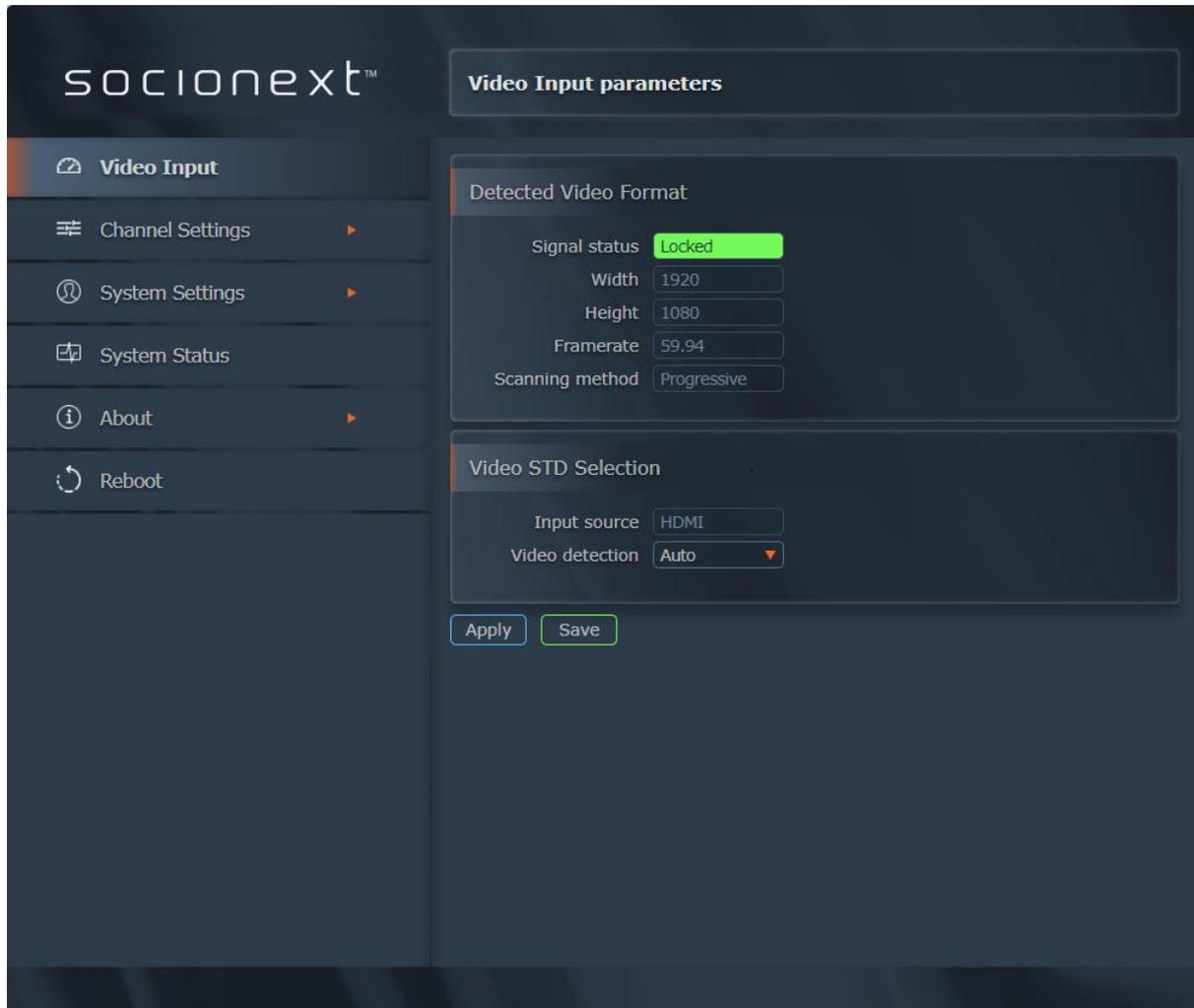


Figure 11: Video Input Page

The fields appearing on the page are described in the table below.

**Table 10: Video Input Field Descriptions**

Field	Description
<b>Detected Video Format</b>	
Signal status	Indicates if X500E has detected a supported video standard: <ul style="list-style-type: none"> <li>• If detected, the message <b>Locked</b> appears on a green background</li> <li>• If not detected, the message <b>Not Locked</b> appears on a red background.</li> </ul>
Width	The width of the image in pixels
Height	The height of the image in pixels
Frame rate	The image frame rate, in frames per second (fps)
Scanning method	The scanning method used to display a video frame: <ul style="list-style-type: none"> <li>• <b>Interlaced</b>. Scanning method in which even-numbered and odd-numbered lines are captured alternately.</li> <li>• <b>Progressive</b>. Scanning method in which the entire image is captured at every frame.</li> </ul>
<b>Video Standard Selection</b>	
Input source	The transmission standard supported by the input source – for example: <ul style="list-style-type: none"> <li>• <b>HDMI</b> (High-Definition Multimedia Interface). Supports version 2.0 of the HDMI digital video interface.</li> </ul>
Video Detection	The method used to detect the video input source: <ul style="list-style-type: none"> <li>• <b>Auto</b>. Only automatic detection by X500E is supported.</li> </ul>

### 4.3 Channel Settings

The Channel Settings tab is used to configure the following parameters:

- Video encoding parameters
- Audio encoding parameters
- Streaming parameters

Select **Channel Settings** and the relevant channel number on the main menu to display the Channel Settings page, as shown in the figure below.

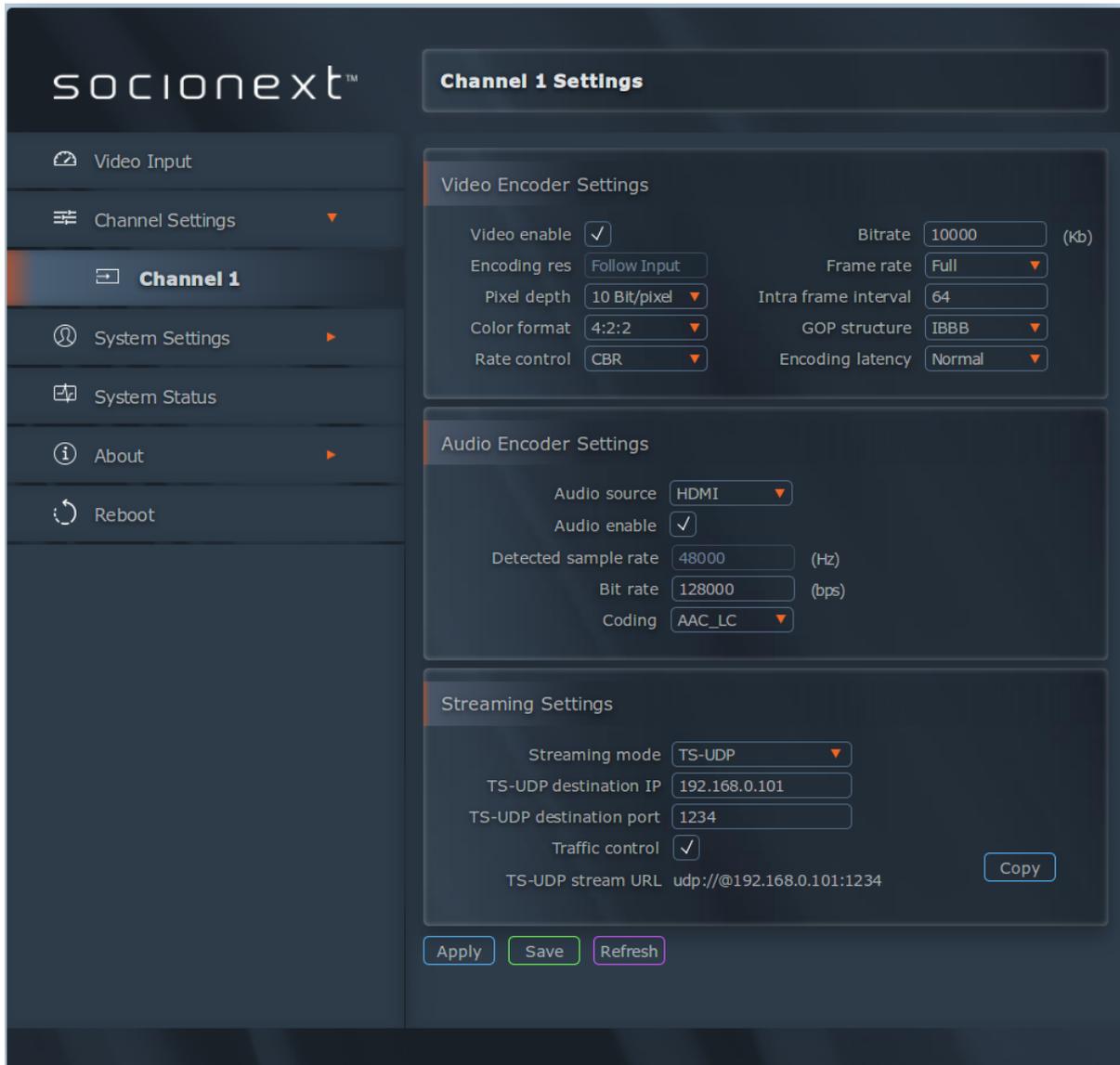


Figure 12: Channel Settings Page

The fields appearing on the page are described in the table below.

**Table 11: Channel Settings Field Descriptions**

Field	Description
<b>Video Encoder Settings</b>	
Video enable	If checked, the selected video channel is enabled for compression and transmission.
Encoding res	The resolution of the encoded video: <ul style="list-style-type: none"> <li>Only <b>Follow input</b> is supported. The video input resolution is preserved.</li> </ul>
Pixel depth	Pixel depth, the number of bits used to specify each color component (Y, Cb, Cr) of a pixel: <ul style="list-style-type: none"> <li><b>8 Bit/pixel</b> – Each component is represented using 8 bits</li> <li><b>10 Bit/pixel</b> – Each component is represented using 10 bits</li> </ul>
Color format	The chroma subsampling scheme used to compress video transmissions. <ul style="list-style-type: none"> <li><b>4:2:0</b> – The video is compressed using 4:2:0 color space (normal quality)</li> <li><b>4:2:2</b> – The video is compressed using 4:2:2 color space (high quality)</li> </ul>
Rate control	The algorithm used by X500E to maintain the target bit rate of X500E. <ul style="list-style-type: none"> <li><b>CBR</b> (Constant Bit Rate). In CBR, X500E encodes the video at a constant bit rate.</li> <li><b>Capped VBR</b> (Capped Variable Bit Rate). In Capped VBR, X500E encodes the video at a variable bit rate, allocating more bits for complex scenes.</li> </ul> Typically, both schemes generate similar bit rates, but Capped VBR encoding has more bit rate fluctuations.
Bitrate/Average bitrate	Average video output bitrate. A higher average bitrate yields a better-quality video. <a href="#">Click to view a list of valid video bitrates.</a>
Frame rate	The ratio of the target (output) frame rate to the input frame rate: <ul style="list-style-type: none"> <li>Full (All frames are encoded)</li> <li>1/2 (Every second frame is encoded)</li> <li>1/4 (Every 4th frame is encoded)</li> <li>1/8 (Every 8th frame is encoded)</li> </ul> Note: <ul style="list-style-type: none"> <li>For interlaced video standards (such as 1080i25/30), only the “Full” frame rate is supported.</li> </ul>
Intra frame interval	The interval (in number of frames) upon which X500E will produce an I/IDR (Intra/Instantaneous Decodable Refresh) Frame. When setting this field to 32, for example, X500E generates an I/IDR frame every 32 frames. <p>The interval selected depends on the application and network conditions. For low bitrate transmissions, the interval value should be high – allowing X500E to reduce traffic volume by sending more P (Predictive) frames.</p> <ul style="list-style-type: none"> <li>Minimum value: 32 frames</li> <li>Maximum value: 248 frames</li> <li>Recommended values: 32 or 64</li> </ul> Note: The final value will be automatically adjusted by X500E.
GOP structure	The Group of Pictures (GOP) structure used: <ul style="list-style-type: none"> <li>IPPP</li> <li>IBBB (for interlace M=4 for progressive M=8)</li> </ul> The structure determines whether an I-frame is followed by P-frames (Predictive coded picture) or B-frames (Bi-predictive coded picture). <p>Note: X500E uses forward reference B-frames instead of P-frames when IPPP is selected.</p>

Encoding latency	Controls the level of latency introduced by X500E. <ul style="list-style-type: none"> <li>• <b>Normal:</b> Approximately 1000 ms</li> <li>• <b>Low:</b> Approximately 50 ms</li> </ul>
<b>Audio Encoder Settings</b>	
Audio source	The interface used to input audio signals into X500E: <ul style="list-style-type: none"> <li>• <b>HDMI.</b> High-Definition Multimedia Interface.</li> <li>• <b>LINE IN.</b> The 3.5 mm analog audio input interface.</li> </ul>
Audio enable	If checked, audio input is encoded.
Detected sample rate	The detected audio sampling rate used. Note: Only 48 kHz is supported.
Bit rate	The audio bit rate used by X500E, in bits per second (bps). Valid values are between 64,000 and 256,000 bps. Default is 80,000 bps.
Coding	The audio compression method: <ul style="list-style-type: none"> <li>• Only <b>AAC-LC</b> compression is supported.</li> </ul>
<b>Streaming Settings</b>	
Streaming mode	The streaming mode selected. The following modes are supported: <ul style="list-style-type: none"> <li>• <a href="#">TS-UDP</a>. Transport Stream over UDP.</li> <li>• <a href="#">RTP</a>. Real-Time Protocol over UDP.</li> <li>• <a href="#">RTSP</a>. Real-Time Streaming Protocol.</li> <li>• TS-SRT. Transport Stream over SRT (<a href="#">Listener/Caller</a>)</li> </ul> Details on configuring the individual streaming modes are found in the following section.

### 4.3.1 Video Bitrate Settings

Table 12 below summarizes the minimum and maximum bitrates supported by X500E for major video standards.

- The *minimum bitrate* value depends on the video input standard. In addition, the minimum bit rate scales proportionally with the frame rate selected. For example, if the minimum bitrate for 2160p60 is 2812 kbps, then the minimum bitrate for 2160p30 (a 50% reduction in frame rate) will be 1406 kbps (a 50% reduction in bitrate).
- The *maximum bitrate* is always 80,000 kbps.

**Table 12: Valid Minimum/Maximum Bitrates**

Video Standard	Minimum Bitrate (kbps)	Maximum Bitrate (kbps)
480i29.97 (NTSC)	500	80000
576i25 (PAL)	500	80000
480p60	500	80000
576p50	500	80000
720p60	312	80000
1080i30	703	80000
1080p60	703	80000
2160p60	2812	80000
4K(DCI)p60	3000	80000

Table 13 and Table 14 below list recommended video bitrate values for different video resolutions in normal and low encoding latency modes. The bitrate for Medium or more is highly recommended.

**Table 13: Recommended Bitrates in Normal Encoding Latency Modes**

Video Resolution	Video Quality (kbps)		
	High	Medium	Low
3840x2160@60p	80,000	16,000	8,000
1920x1080@60p	32,000	4,000	2,000
720x480@60p	8,000	1,000	500

**Table 14: Recommended Bitrates in Low Encoding Latency Modes**

Video Resolution	Video Quality (kbps)		
	High	Medium	Low
3840x2160@60p	80,000	60,000	32,000
1920x1080@60p	32,000	20,000	8,000
720x480@60p	8,000	8,000	2,000

### 4.3.2 Streaming Modes

X500E supports the following streaming modes:

- [TS-UDP](#). Transport Stream over UDP.
- [RTP](#). Real-Time Protocol over UDP.
- [RTSP](#). Real-Time Streaming Protocol.
- TS-SRT. Transport Stream over SRT ([Listener/Caller](#))

#### TS-UDP Streaming (Push Mode)

The following fields appear in the Streaming Settings section when you choose TS-UDP streaming.



Figure 13: TS-UDP Streaming Fields

The fields appearing in this section are described in the table below.

Table 15: TS-UDP Streaming Field Descriptions

Field	Description
<b>TS-UDP Streaming Settings</b>	
TS-UDP destination IP	The destination IP address of the TS-UDP stream. Note: TS-UDP supports unicast and multicast transmissions. To perform a multicast transmission, use a multicast-dedicated IP address.
TS-UDP destination port	The destination port number of the TS-UDP stream.
Traffic control	Enable smoothing the stream output from Ethernet port. This function is supported for TS-UDP only.
TS-UDP stream URL	This address is generated automatically by X500E and should be copied to the video decoder / player.

#### NOTE

The IPv4 multicast IP address range is between 224.0.0.0 and 239.255.255.255. Contact your system administrator for the specific address to use.

## RTP Streaming

The following fields appear in the Streaming Settings section when you choose RTP streaming.

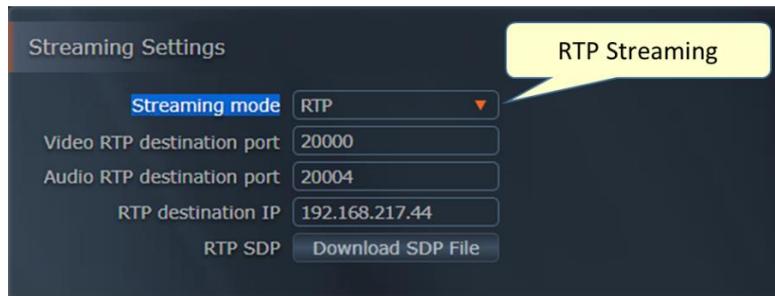


Figure 14: RTP Streaming Fields

The fields appearing in this section are described in the table below.

Table 16: RTP Streaming Field Descriptions

Field	Description
<b>RTP Streaming Settings</b>	
Video RTP destination port	The destination video UDP port of the RTP stream.
Audio RTP destination port	The destination audio UDP port of the RTP stream.
RTP destination IP	The destination IP address of the RTP stream. Note: RTP supports <b>unicast</b> and <b>multicast</b> transmission. To perform a multicast transmission, use a multicast-dedicated IP address.
RTP SDP	The SDP (Session Description Protocol) file is generated automatically by X500E and contains information about the streaming parameters. The player should open this file to display the stream.

### NOTE

The RTP specification recommends that you select even RTP port numbers, and the next higher odd number for associated RTCP ports. Note that X500E does not send RTCP packets. Example RTP port selections:

\* Video RTP destination port: 55000 (associated RTCP port number would be 55001)

\* Audio RTP destination port: 55002 (associated RTCP port number would be 55003)

## RTSP Streaming

RTSP supports streaming to a single client in unicast only. When an RTSP session is active, session requests from other clients will be refused. The following fields appear in the Streaming Settings section when you choose RTSP streaming.



Figure 15: RTSP Streaming Fields

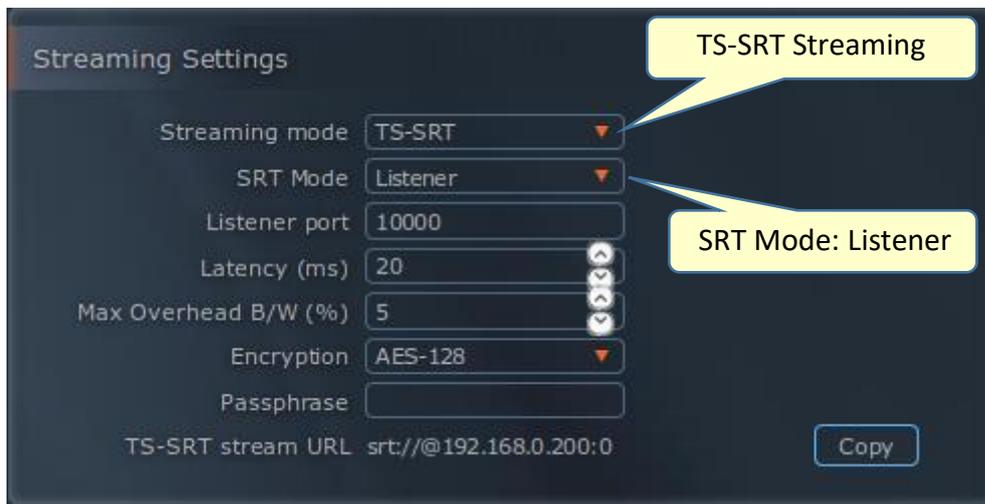
The fields appearing in this section are described in the table below.

**Table 17: RTSP Streaming Field Descriptions**

Field	Description
<b>RTSP Streaming Settings</b>	
RTSP port	The TCP port number of the RTSP session.
RTSP stream name	The name of the RTSP stream.
RTSP stream URL	The URL address is generated automatically by X500E and should be copied to the video decoder / player.

**TS-SRT Streaming (SRT Streaming: Listener)**

TS-SRT supports streaming in Listener mode. The streaming target is only one SRT destination by unicast. When a TS-SRT session is active, the session requests from other Callers will be refused. The following fields appear in the Streaming Settings section when TS-SRT and Listener are selected as the streaming and SRT modes.



**Figure 16: TS-SRT Streaming Fields (Listener)**

The fields appearing in this section are described in the table below.

Table 18: SRT Streaming Field Descriptions (Listener)

Field	Description
<b>TS-SRT Streaming Settings</b>	
SRT Mode	SRT connection mode. [Listener]: Sets X500E to wait for a request to open an SRT connection.
Listener port	Listener port number. Range: 1024 to 65535
Latency (ms)	SRT latency value (maximum buffer size available for managing SRT packets). The minimum value is three times the RTT of the ping command. Range: 20 to 2000 ms
Max Overhead B/W (%)	Maximum stream bandwidth overhead for the recovery of packet loss. Range: 5 to 100%
Encryption	Whether the AES encryption of the SRT stream is disabled or the length of AES encryption key if enabled. The options of this length are as follows: Options: AES-128, AES-192, and AES-256
Passphrase	A string used to generate the AES encryption key wrapper. Range: 10 to 79 characters
TS-SRT Stream URL	The URL address is generated automatically by X500E and should be copied to the video decoder / player.

**NOTE**

For details of each field, see Secure Reliable Transport Protocol Deployment Guide which can be found on the SRT ALLIANCE website.

**TS-SRT Streaming (SRT Streaming: Caller)**

TS-SRT supports streaming in Caller mode. The streaming target is only one SRT destination by unicast. When a TS-SRT session is active, the session requests from other Callers will be refused. The following fields appear in the Streaming Settings section when TS-SRT and Caller are selected as the streaming and SRT modes.



Figure 17: TS-SRT Streaming Fields (Caller)

The fields appearing in this section are described in the table below.

**Table 19: SRT Streaming Field Descriptions (Caller)**

Field	Description
<b>TS-SRT Streaming Settings</b>	
SRT Mode	SRT connection mode. [Caller]: Sets X500E as the initiator of an SRT connection.
Destination URL	Destination IP address for the SRT stream.
Destination port	Destination port number for the SRT stream. Range: 1024 to 65535
Latency (ms)	SRT latency value (maximum buffer size available for managing SRT packets). The minimum value is three times the RTT of the ping command. Range: 20 to 2000 ms
Encryption	Whether the AES encryption of the SRT stream is disabled or the length of AES encryption key if enabled. The options of this length are as follows: Options: AES-128, AES-192, and AES-256
Passphrase	A string used to generate the AES encryption key wrapper. Range: 10 to 79 characters

---

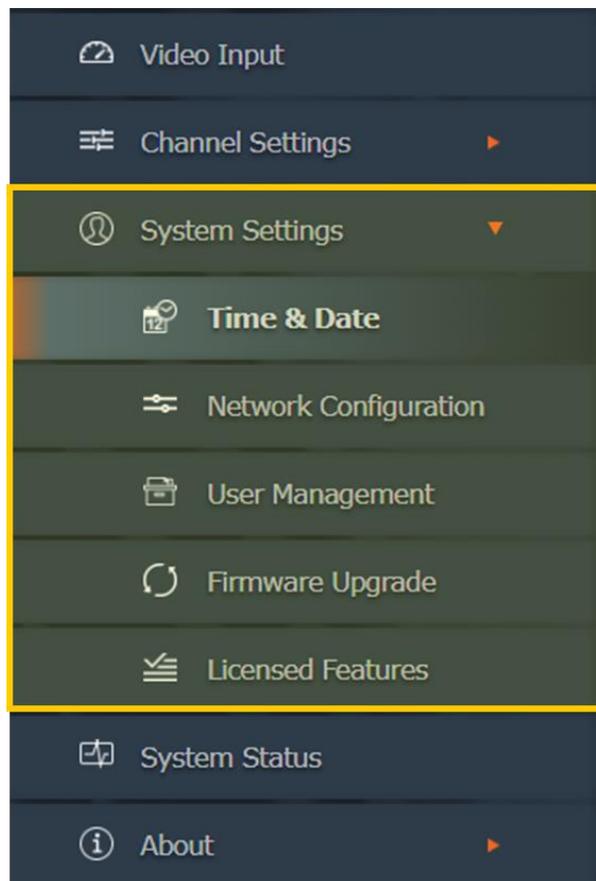
#### NOTE

For details of each field, see Secure Reliable Transport Protocol Deployment Guide which can be found on the SRT ALLIANCE website.

---

#### 4.4 System Settings

Select **System Settings** on the main menu to open the System Settings Menu, as shown in the figure below:



**Figure 18: System Settings Menu**

The Systems Settings menu provides the following capabilities, which are described in detail in the following sections:

**Table 20: System Settings Menu Entries**

Entry	Description
<a href="#">System Settings</a>	Displays firmware version information.
<a href="#">Time &amp; Date</a>	Used to set the system time and date.
<a href="#">Network Configuration</a>	Used to set the X500E's network parameters.
<a href="#">User Management</a>	Used to authorize users to manage X500E using the web interface.
<a href="#">Firmware Upgrade</a>	Used to perform firmware upgrades.
<a href="#">Licensed Features</a>	Displays a list of features that have been enabled for use with X500E.

#### 4.4.1 System Settings Main Page

The System Settings main page displays firmware version information. To access the page from the main menu, select **System Settings**. The System Settings main page appears as depicted in the figure below.

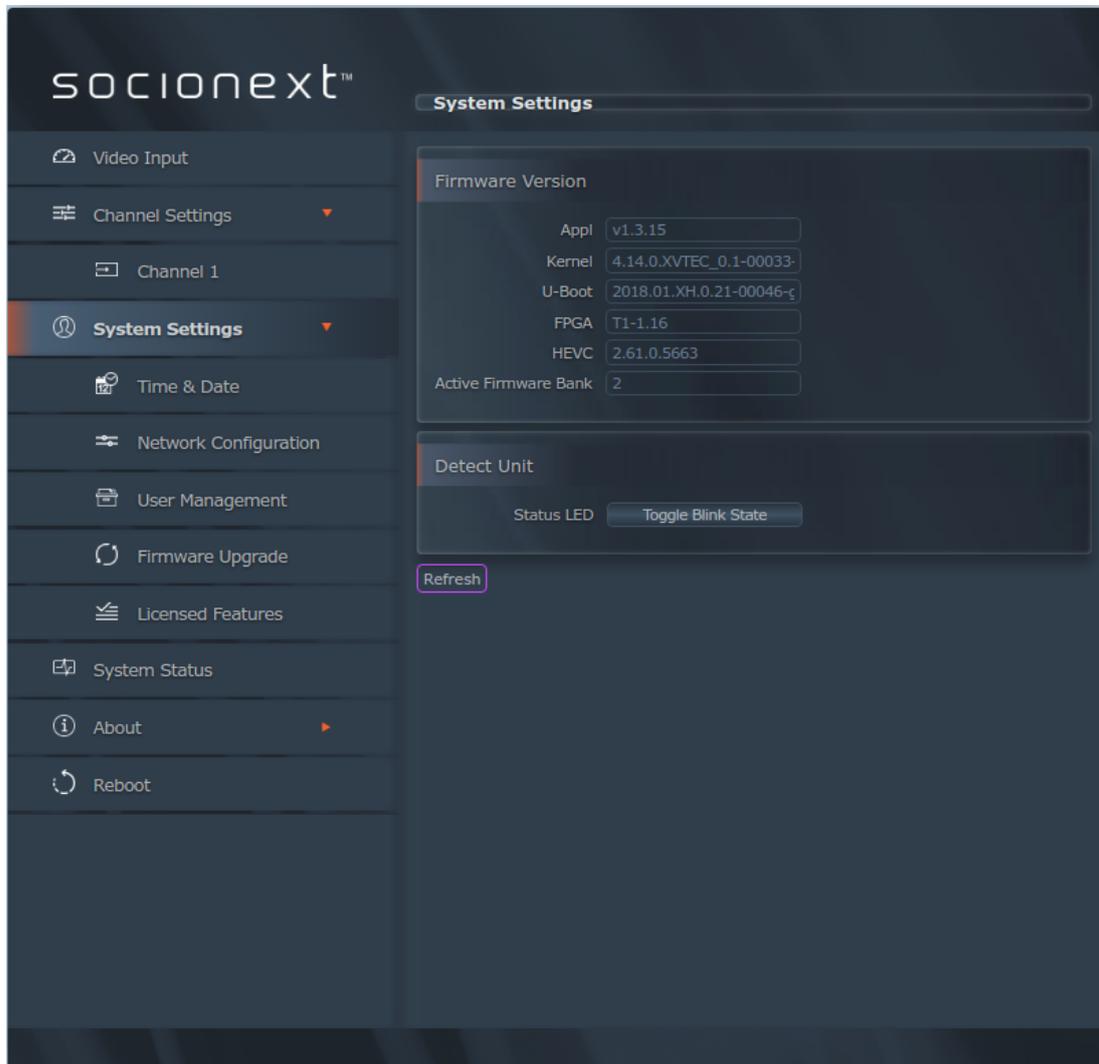


Figure 19: Systems Settings Main Page

The fields appearing on the page are described in the table below.

Table 21: Systems Settings Field Descriptions

Field	Description
<b>Firmware Version</b>	
Appl	The global firmware version
Kernel	Linux kernel version
U-Boot	U-boot version
FPGA	FPGA binary data version
HEVC	HEVC firmware version
Active Firmware Bank	The number of the active bank (an area in the FLASH memory) where all the software/firmware components are loaded
<b>Detect Unit</b>	
Status LED	Click on the button to toggle the <b>STAT</b> LED between <i>blinking</i> and <i>not blinking</i> . You can use this function to identify X500E currently being managed.

#### 4.4.2 Time & Date

The Time & Date page is used to set the system time and date – either manually, or automatically by an NTP server. To access the page from the main menu, select **System Settings >> Time & Date**. The Time & Date page appears as depicted in the figure below.

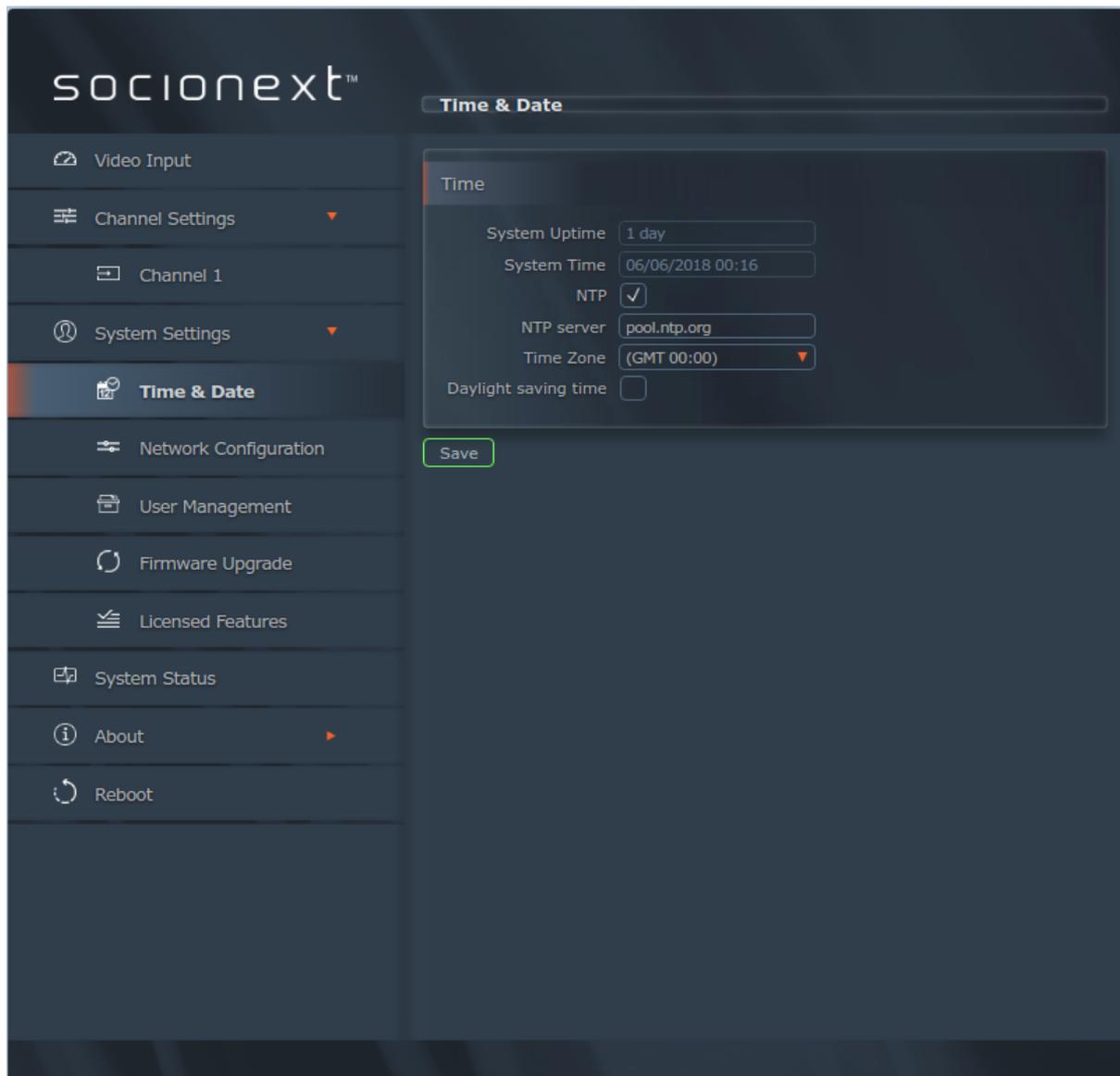


Figure 20: Time &amp; Date Page

The fields appearing on the page are described in the table below.

Table 22: Time &amp; Date Field Descriptions

Field	Description
<b>Time</b>	
System Uptime	The time elapsed since the last X500E reboot, in hh:mm format.
System Time	The current system date and time
NTP	If checked, the system date and time are synchronized with an NTP server.
NTP Server	The URL of the NTP server used.
Time Zone	The time zone in which X500E operates. Select the appropriate time zone using the list box.
Daylight Saving Time	If checked, the system date and time are adjusted for daylight savings.

### 4.4.3 Network Configuration

The Network Configuration page is used to set the X500E's network parameters. To access the page from the main menu, select **System Settings >> Network Configuration**. The Network Configuration page appears as shown in the figure below.

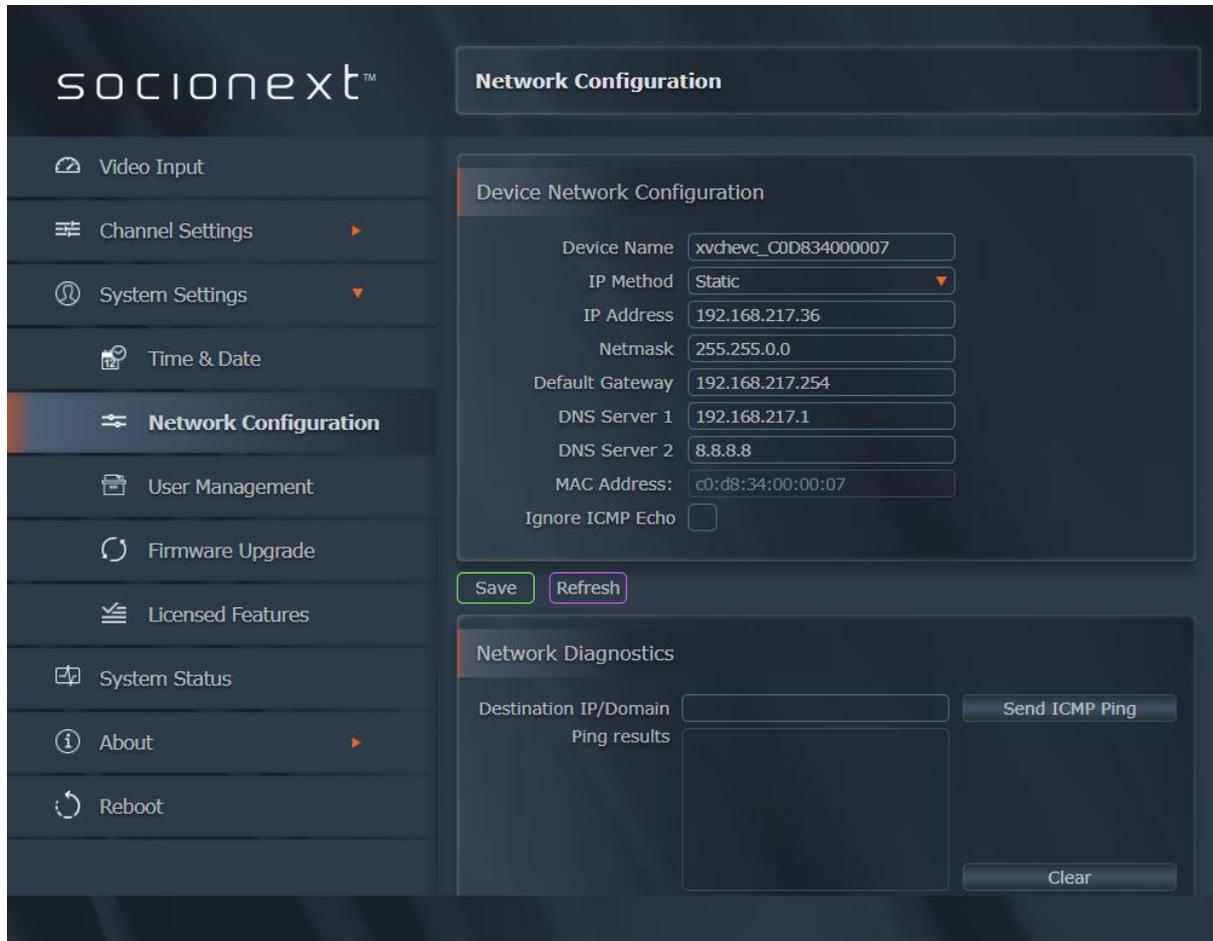


Figure 21: Network Configuration Page

The fields appearing on the page are described in the table below.

**Table 23: Network Configuration Field Descriptions**

Field	Description
<b>Device Network Configuration</b>	
Device Name	The X500E device name. The factory-supplied device name is generated by concatenating the prefix "xvchevc_" with the MAC address of X500E.
IP Method	The method used to allocate an IP address for X500E: <ul style="list-style-type: none"> <li>• <b>Static.</b> The IP address is set manually.</li> <li>• <b>DHCP.</b> The IP address is allocated automatically using the DHCP (Dynamic Host Configuration Protocol).</li> <li>• <b>Note:</b> If a DHCP server is <b>not</b> up and running, X500E will fail to receive network configurations. In this case, X500E will attempt several times to send a DHCP request to the server. If no response is received, the X500E's IP address defaults to an APIPA address. The IP address of X500E can be discovered using the XVTEC Management Tool</li> </ul>
IP Address	The <a href="#">IP address</a> of X500E
Netmask	The subnetwork mask used by the network segment in which X500E operates.
Default Gateway	The IP address of the default gateway that serves as the forwarding host ( <a href="#">router</a> ) to other networks when no other route specification matches the destination IP Address.
DNS Server 1	The IP address or host name of the main DNS server accessed by X500E.
DNS Server 2	The IP address or host name of the secondary DNS server accessed by X500E.
MAC Address	The MAC address of X500E.
Ignore ICMP Echo	If checked, X500E ignores ICMP Echo (ping) requests. This feature can help prevent Denial of Service (DoS) attacks.
<b>Network Diagnostics</b>	
Destination IP/Domain	The IP address or domain name of the ping request destination. Click <b>Send ICMP Ping</b> to initiate the request.
Ping Results	Displays the results of the ping responses. Click <b>Clear</b> to erase the results.

#### 4.4.4 User Management

The User Management page is used to authorize users to manage X500E using the web interface. To access the page from the main menu, select **System Settings >> User Management**. The User Management page appears as shown in the figure below.

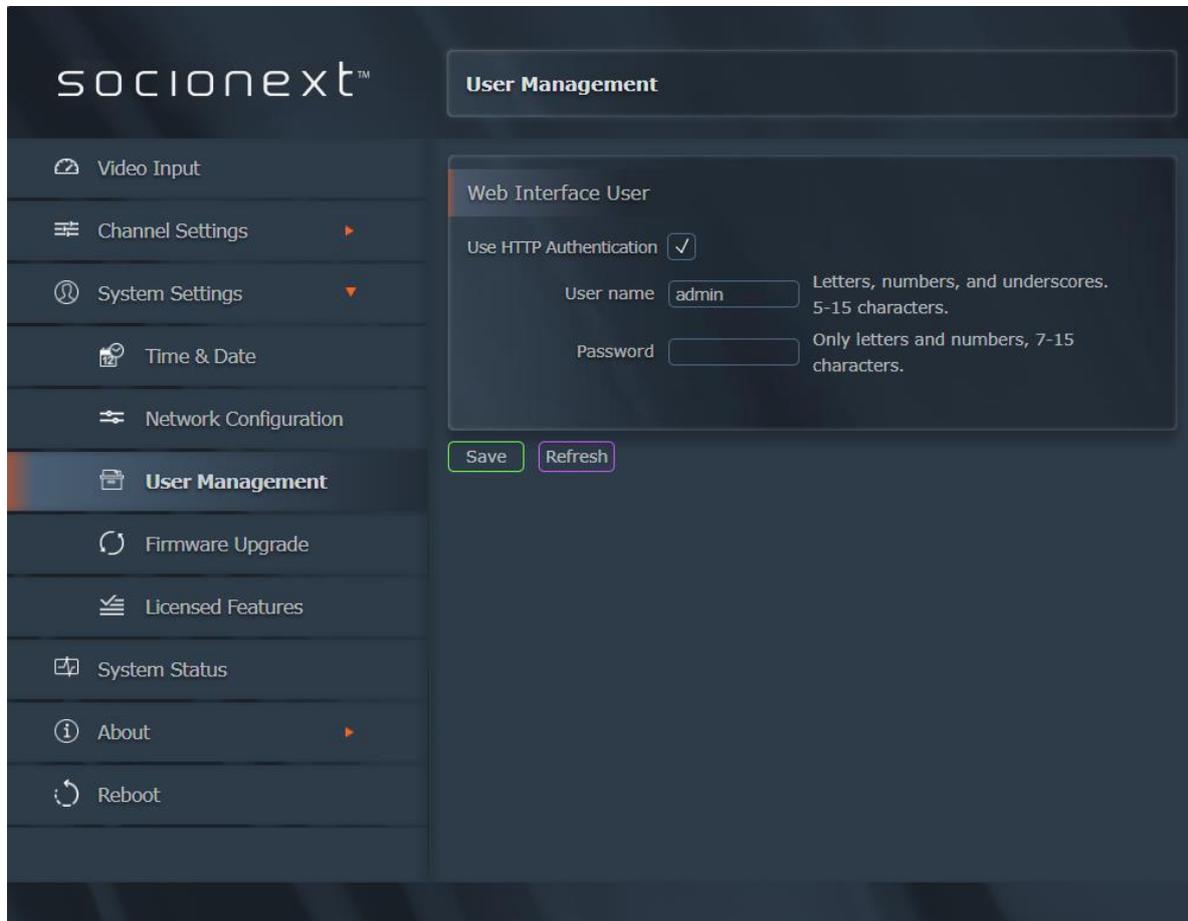


Figure 22: User Management Page

The fields appearing on the page are described in the table below.

Table 24: User Management Field Descriptions

Field	Description
<b>Web Interface User</b>	
Use HTTP Authentication	If checked, an HTTP Authorization request is required in order to authenticate the credentials of web-based client users.
User Name	Web-based client user name.
Password	Web-based client user's password.

#### NOTE

To [reset the user name and password](#), use the XVTEC Management Tool.

#### 4.4.5 Firmware Upgrade

The Firmware Upgrade page is used to manage the firmware upgrade process. To access the page from the main menu, select **System Settings >> Firmware Upgrade**. The Firmware Upgrade page appears as depicted in the figure below.

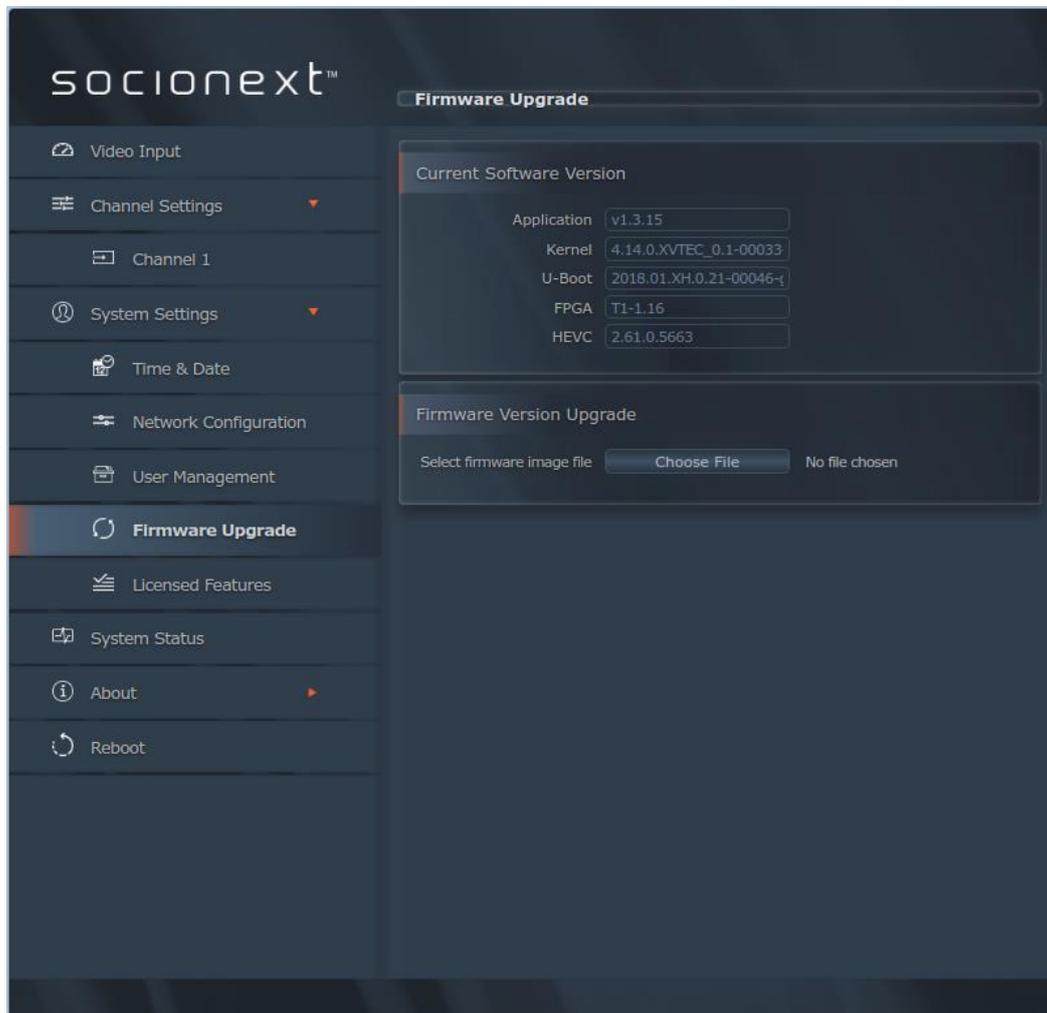


Figure 23: Firmware Upgrade Page

The fields appearing on the page are described in the table below.

Table 25: Firmware Upgrade Field Descriptions

Field	Description
<b>Current Software Version</b>	
Application	The global firmware version
Kernel	Linux kernel version
U-Boot	U-boot version
FPGA	FPGA binary data version
HEVC	HEVC firmware version
<b>Firmware Version Upgrade</b>	
Select Firmware Image File	The image file to be uploaded into Flash memory. Click <b>Choose File</b> to select an image file for upload.

### To upgrade the X500E firmware:

1. Click on the **Choose File** button. An Open dialog box will appear, as shown in the figure below.

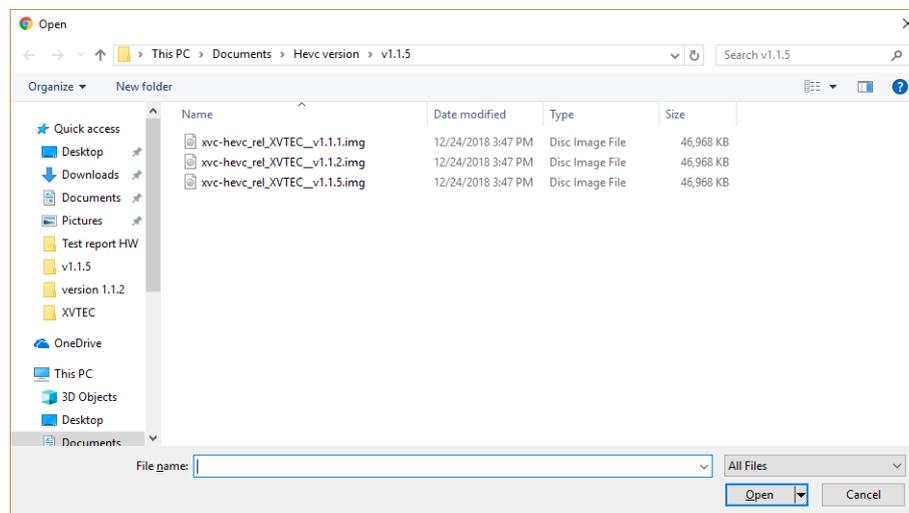


Figure 24: Selecting the Image File

2. Navigate the system and select the image file to be uploaded. Click **Open**. The name of the selected image file will appear next to the **Choose File** button.
3. Click **Upload** to upload the image file to X500E. A series of progress messages will appear in a new field – **Update Status** – that appears on the page, as shown in Figure 25 below:
  - “Loading”
  - “Saving”
  - “Validation”
  - “Rebooting.” At this point, there will be a loss of connectivity with X500E. Connectivity will be restored following the successful completion of the boot process.

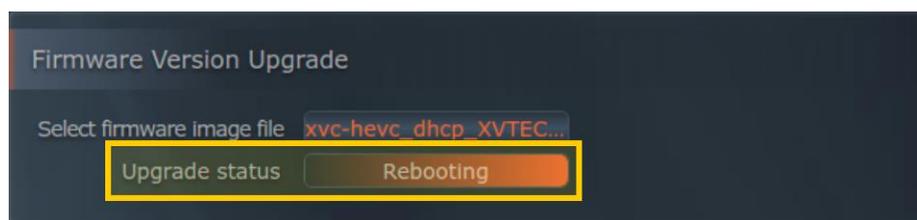


Figure 25: Upgrade Status Field

Following reboot, the upgrade process may continue for several minutes, as multiple hardware components are updated. During the process the **STAT** LED will blink green, as shown in the figure below:



Figure 26: Upgrade LED Indicators

Following successful completion of the upgrade, the **STAT** LED appears in green, as shown in the figure below:



Figure 27: Upgrade Completed LED Indicators

#### 4.4.6 Licensed Features

The Licensed Features page displays a list of features that have been enabled for use with X500E. To access the page from the main menu, select **System Settings >> Licensed Features**. The Licensed Features page appears as shown in the figure below.

#### NOTE

In a future release, you will be able to use this page to enable additional features.

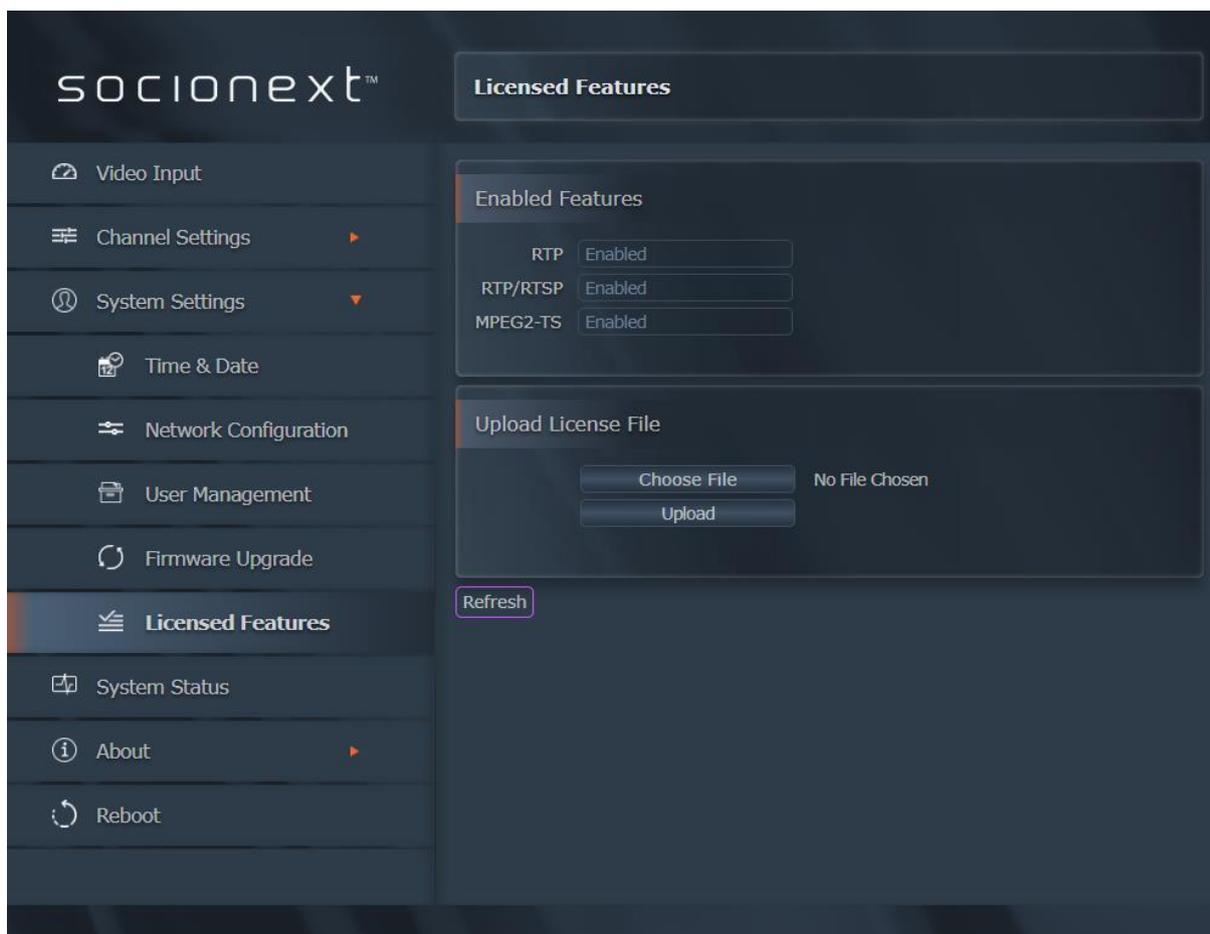


Figure 28: Licensed Features Page

The Enabled Features section displays a list of features that have been enabled for use with X500E.

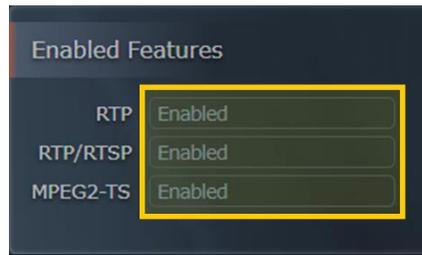


Figure 29: Enabled Features

#### 4.5 System Status

Select **System Status** on the main menu to display the System Status page, as shown in the figure below.

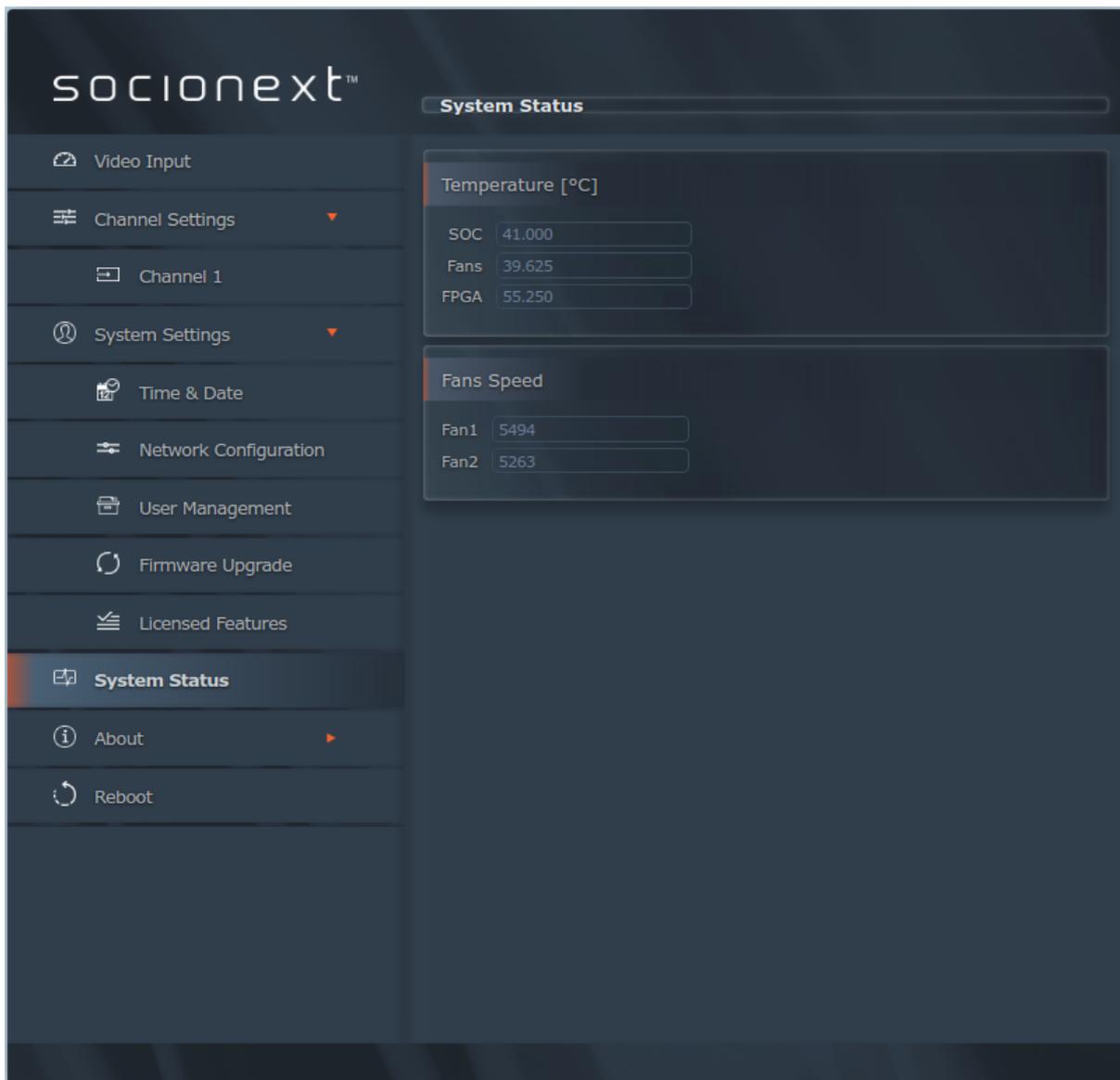


Figure 30: System Status Page

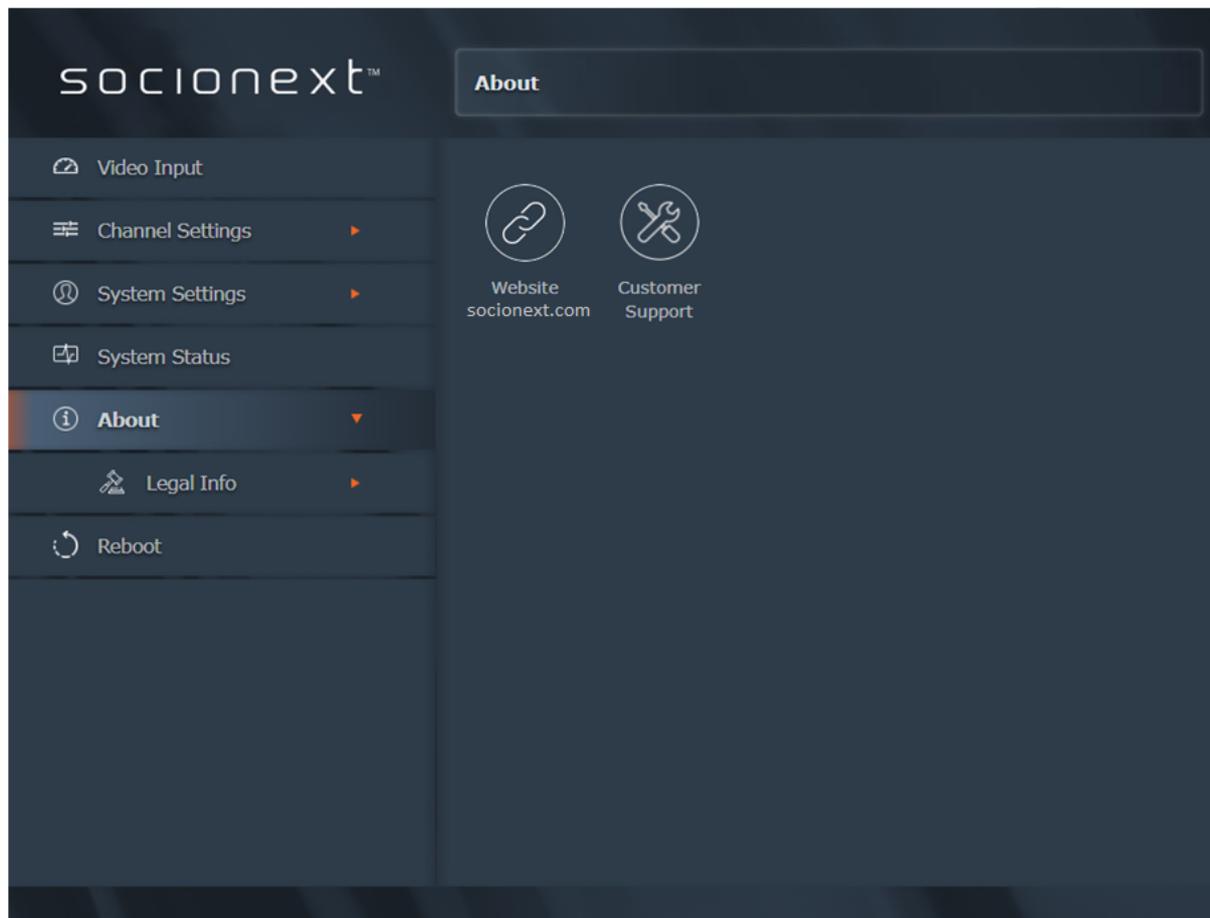
The fields appearing on the page are described in the table below.

**Table 26: System Status Field Descriptions**

Field	Description	
<b>Temperature [°C]</b>		
SOC	The temperature as measured at the video processor system-on-chip.	
Fans	The temperature as measured near the fans.	
FPGA	The temperature as measured at the FPGA	
<b>Fans Speed</b>		
Fan1	The speed of fan #1, in RPM.	At least 500 RPM is required for normal operation. Note: If both the Fan1 and Fan2 fields display a value of <b>45</b> , the fans are <i>not operational</i> .
Fan2	The speed of fan #2, in RPM.	

## 4.6 About

Select **About** on the main menu to display the About page, as shown in the figure below.



**Figure 31: About Page**

The About page provides access to the following resources:

- The Socionext website at [www.socionext.com](http://www.socionext.com)
- Customer support – the Socionext website Downloads page

### 4.6.1 Socionext Legal Page

The Socionext Legal page presents the End User License Agreement and warranty information. To access the page from the main menu, select **About >> Legal Info >> Socionext Legal**. The page appears as depicted in the figure below.

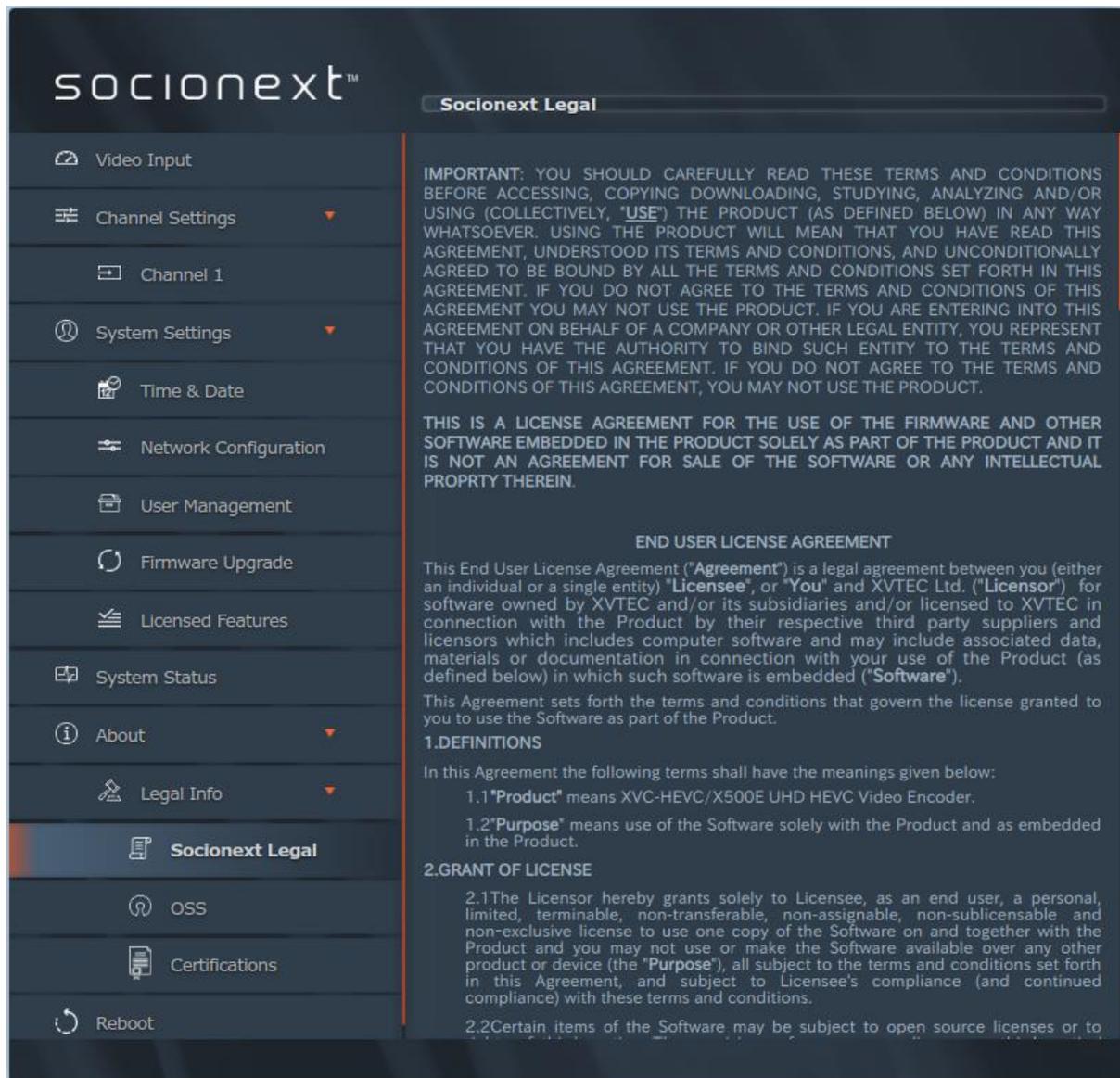


Figure 32: Legal Page

### 4.6.2 Open Source Software

The OSS (Open Source Software) page provides access to a list of OSS packages integrated into X500E, together with licensing information. To access the page from the main menu, select **About >> Legal Info >> OSS**. The page appears as shown in the figure below.

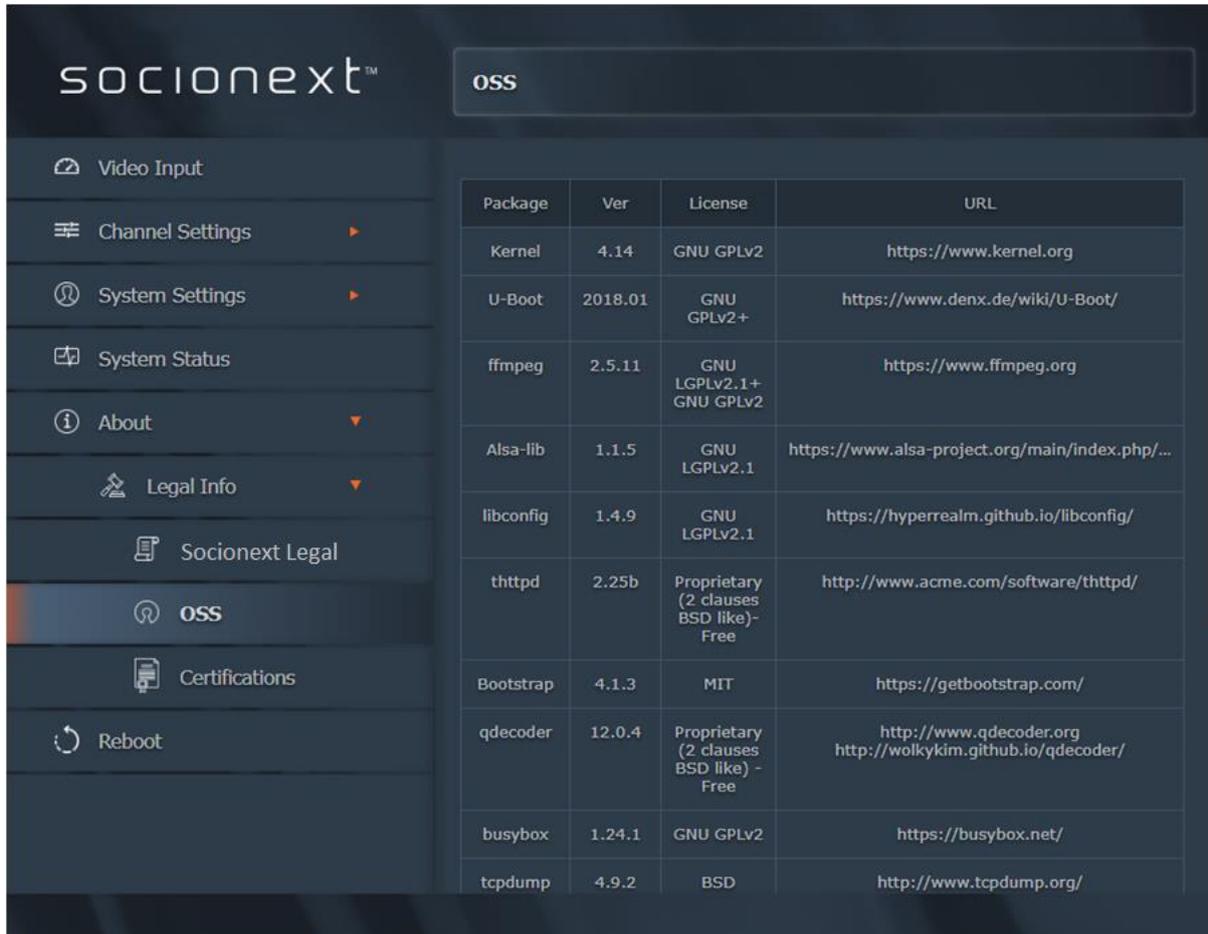


Figure 33: OSS Page

### 4.6.3 Certifications

The Certifications page displays a series of symbols representing certifications granted to X500E. To access the page from the main menu, select **About >> Legal Info >> Certifications**. The page appears as shown in the figure below.

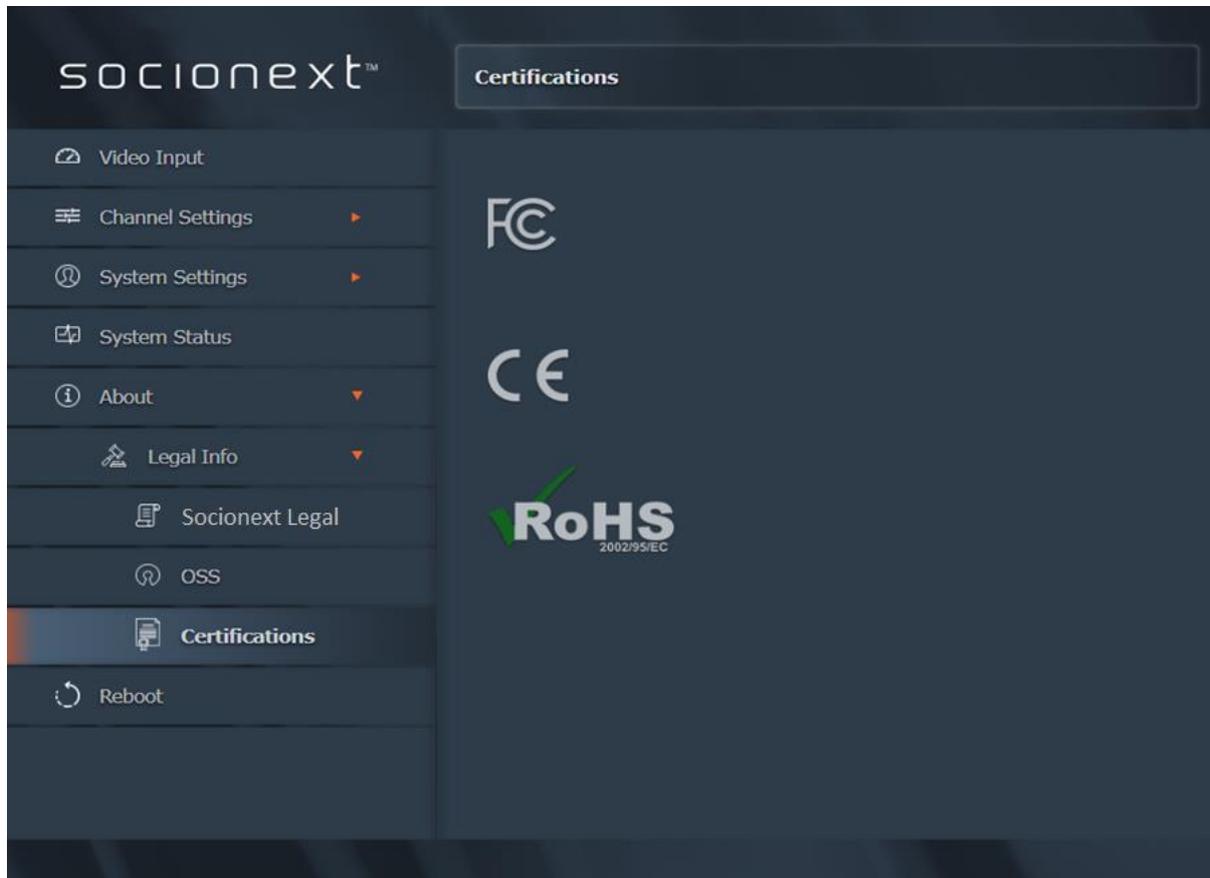


Figure 34: Certifications Page

### 4.7 Reboot

Select **Reboot** on the main menu to shut down and restart X500E. The following decision box appears, requesting that you confirm the Reboot command.

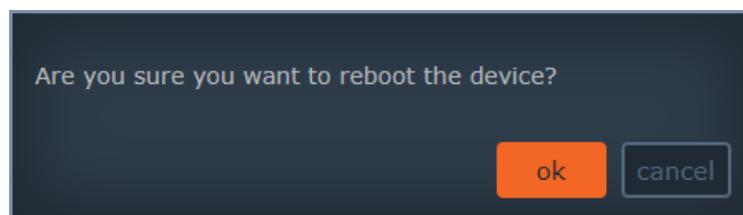
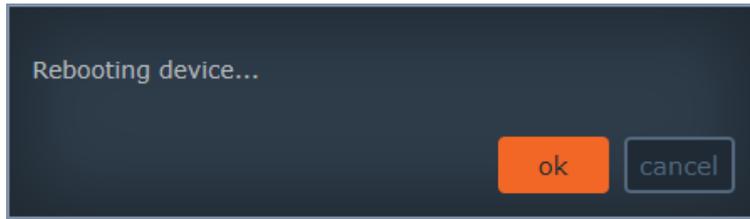


Figure 35: Reboot Confirmation

Click **OK** to confirm the reboot. The following message box appears, informing you that the reboot process has begun.



**Figure 36: X500E Rebooting**

For more information on the reboot process, see the [Boot Sequence](#) section.

## 5 Booting, Troubleshooting and Recovery

This chapter provides details on booting, troubleshooting and recovery operations.

### 5.1 Booting X500E

To boot X500E, perform one of the following operations:

- Select **Reboot** on the main menu (see the [Reboot](#) section).
- Press the **SW** button (short press) on the front panel of X500E.
- Disconnect and then reconnect the input power connector.

During the booting process the LEDs on the front panel of X500E will light up or blink according to the current system state. The following sections describe the LED behavior when booting in Static and DHCP mode:

- Booting with a [static IP address](#)
- Booting with a [DHCP-allocated IP address](#)

#### 5.1.1 Static IP Address

Following the X500E boot using a static IP address, the following LED behavior is observed:

1. The **STAT**, **LCK**, **ACT**, and **REC** LEDs are lit in orange, one after another.
2. The **STAT**, **LCK**, **ACT**, and **REC** LEDs turn red for several seconds.
3. X500E loads the manually-configured IP address, and the **STAT** LED appears in green, as shown in the figure below:



Figure 37: End of Boot Sequence with Successful IP Address Allocation

#### 5.1.2 DHCP-Allocated IP Address

Following the X500E boot using a DHCP-allocated IP address, the following LED behavior is observed:

1. The **STAT**, **LCK**, **ACT**, and **REC** LEDs are lit in orange, one after another.
2. The **STAT**, **LCK**, **ACT**, and **REC** LEDs turn red for several seconds.
3. X500E will attempt to retrieve network parameters from a DHCP server. The **STAT** LED blinks in orange, as shown in the figure below:



Figure 38: Attempting to Retrieve Network Parameters from DHCP Server

4. If the DHCP server responds and successfully allocates an IP address to X500E, the **STAT** LED turns green, as shown in Figure 37 above, ending the boot sequence.
5. While waiting for the DHCP server response, the **STAT** LED blinks in orange for up to one minute, as shown in Figure 38 above. After one minute, the connection attempts cease, an APIPA IP address is allocated, and the **STAT** LED appears in orange, as shown in Figure 39 below.



Figure 39: X500E Failed to Retrieve IP Address from DHCP Server

6. To resume the connection attempts between X500E and the DHCP server, remove the LAN cable's RJ-45 connector from **ETH0 port**, and re-insert it. X500E re-initiates the DHCP process, and the **STAT** LED blinks in orange for up to one minute, as described in step 5.

## 5.2 Overheating

The **STAT** LED serves as an indicator of the X500E overheating. The following table provides guidelines for handling X500E in an overheating scenario.

### NOTE

The STAT LED is used for multiple types of indications in a variety of processes. Note that *overheating and fan malfunction alarms have the highest priority, and always override all other indications.*

Table 27: Overheating Conditions

Status	STAT LED Behavior	Video SoC Temp.	FPGA Temp.	Recovery
Normal	Green	< 70°C	< 90°C	-
Fan failure	Red			Fan failures: <ul style="list-style-type: none"> <li>• Fans not detected by the software</li> <li>• Fans operate under the minimum required speed: 500 RPM.</li> </ul>
Critical	Red, slow blink	70°C - 72°C	90°C - 92°C	X500E is reset after 60 seconds. Upon reset, only basic infrastructure and functionality are enabled – CPU, memories, peripherals, and communications. Full operation resumes upon return to Normal status.
Emergency	Red, fast blink	> 72°C	> 92°C	X500E is powered off after 30 seconds. Recovery requires disconnection and reconnection of input power connector

### 5.3 Restoring System Defaults

Perform the following operations if you need to restore the factory system defaults.

---

#### NOTE

The factory-set IP address of X500E is in the APIPA range (169.254.x.x).

---

#### To restore system defaults:

1. Disconnect the input power connector to power down X500E.
2. Reconnect the input power while pressing and holding down the **SW** button (long hold). Continue holding down and pay attention to the behavior of the **STAT** LED:
3. After approximately 10 seconds, the **STAT**, **LCK**, **ACT**, and **REC** LEDs will blink in orange, as shown in Figure 40 below. At this point, release the **SW** button to begin restoring the system defaults.



Figure 40: Release SW Button to Begin Restoring Defaults

4. Wait while X500E restores the system defaults. At the end of the process, the **STAT** LED should appear in green, as shown in Figure 41 below.



Figure 41: System Defaults Successfully Restored

### 5.4 System Recovery

In the event of a firmware malfunction, perform a system recovery to restore normal operation. You can upload an image using one of two methods:

- [From the USB memory stick](#) (flash drive) inserted into one of the USB ports of X500E.
- [From the network](#), using the X500E's configuration web user interface.

#### 5.4.1 Recovery Using Image on USB Memory Stick

1. Disconnect the input power connector to power down X500E.
2. Create a directory, “/firmware/upgrade/” in the USB memory stick.
3. Copy the desired recovery image file to the “/firmware/upgrade/” (the image file must be named *xvc-hevc.img*).
4. Insert the USB memory stick with the recovery image into one of the USB ports of X500E.

---

#### NOTE

\* The partition containing the image should be formatted using the EXT4 or FAT32 (and **not** NTFS) file systems.

\* During the recovery process, the second USB interface should remain *unconnected*.

---

5. Reconnect the input power while pressing and holding down the SW button for approximately 20 seconds. Pay attention to the behavior of the **STAT** LED:
  - After approximately 10 seconds, the **STAT**, **LCK**, **ACT**, and **REC** LEDs will blink in orange.
  - After approximately 20 seconds, the **STAT**, **LCK**, **ACT**, and **REC** LEDs will light up in orange (without blinking), as shown in Figure 42 below. At this point, release the **SW** button to start the system recovery.



Figure 42: Release SW Button to Begin System Recovery

6. Wait while X500E performs a series of recovery operations. During the recovery process, the **STAT** LED will blink in green, while the **LCK**, **ACT**, and **REC** LEDs will light up in orange, as shown in Figure 43 below:



Figure 43: Recovery LED Indicators

Following a successful recovery, X500E will reboot. At the end of the boot sequence, the **STAT** LED will light up in green, as shown in Figure 44 below.



Figure 44: End of Recovery Process

## 5.4.2 Recovery Using Image on Network

To perform system recovery with an image on the network:

1. Disconnect the input power connector to power down X500E.
2. Reconnect the input power while pressing and holding down the SW button for approximately 20 seconds. Pay attention to the behavior of the **STAT** LED:
  - After approximately 10 seconds, the **STAT** LED will blink in orange.
  - After approximately 20 seconds, the **STAT** LED will light up in orange (without blinking), as shown in Figure 42 above. At this point, release the **SW** button to start the system recovery.

The recovery process automatically configures the following X500E's network settings:

- IP address: 192.168.1.100
- Subnet mask: 255.255.255.0

The system boots using the new network settings.

---

### NOTE

The host's (your PC's) IP address must be set to the same IP domain as X500E in order to access X500E. For example, you can set the PC's IP address to: 192.168.1.101

---

3. Enter the IP address of X500E in the address bar of your browser to display the Recovery page, as shown in the figure below:

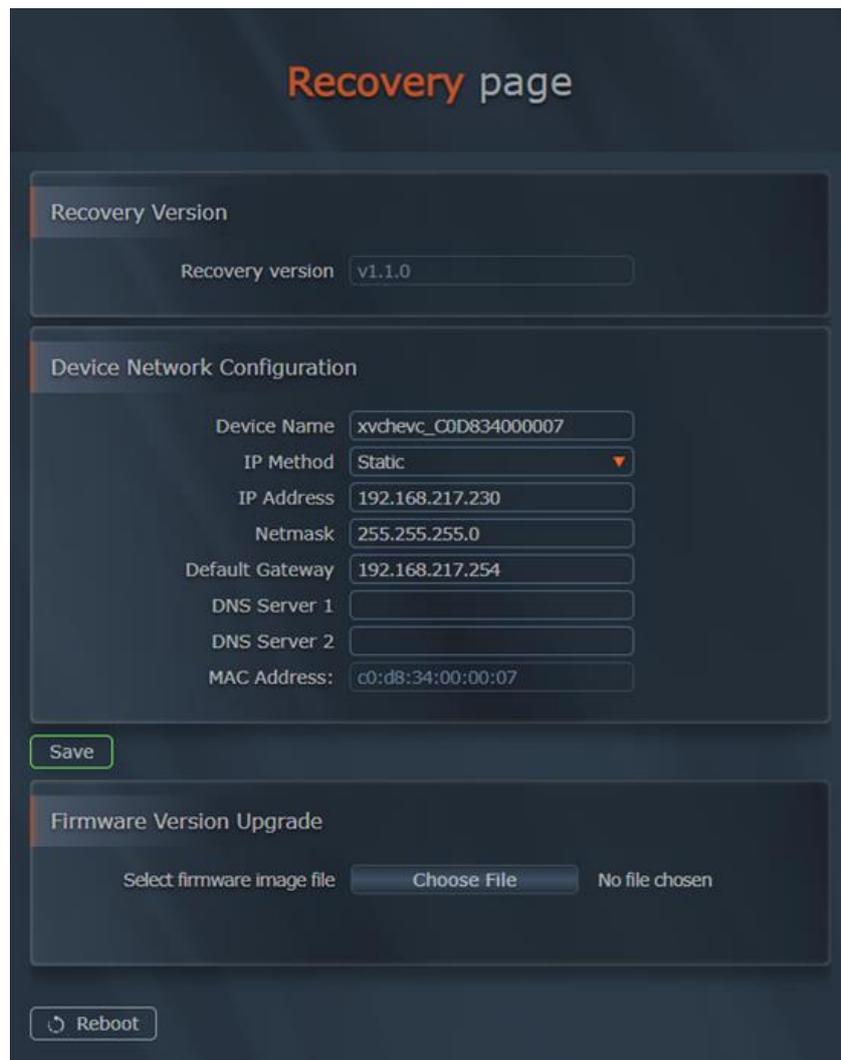


Figure 45: Recovery Page

4. Set the IP Address and Netmask as required (optional).
5. Click on the **Choose File** button. An Open dialog box appears, as shown in the figure below.

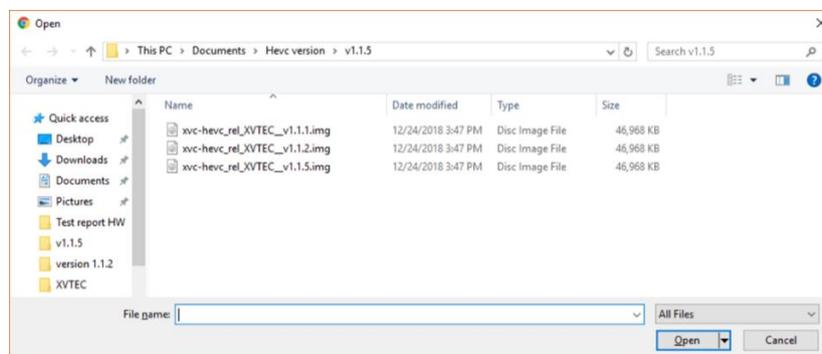


Figure 46: Selecting the Image File

6. Navigate the system and select the image file to be uploaded. Click **Open**. The name of the image file selected appears next to the **Choose File** button.
7. Click **Upload** to upload the image file to X500E. A series of progress messages will appear in a new field – **Update Status** – that appears on the page, as shown in Figure 47 below:
  - “Loading”
  - “Saving”
  - “Validation”
  - “Rebooting.” At this point, there will be a loss of connectivity with X500E. Connectivity will be restored following the successful completion of the boot process.



Figure 47: Upgrade Status Field

Following reboot, the recovery process may continue for several minutes, as multiple hardware components are updated. During the recovery process, the **STAT** LED appears in blinking green, while the **LCK**, **ACT**, and **REC** LEDs appear in orange, as shown in Figure 48 below:



Figure 48: Recovery LED Indicators

Following a successful recovery, X500E will reboot. At the end of the boot sequence, the **STAT** LED will appear in green, as shown in Figure 44 above.

8. [Access X500E from your browser](#) using the newly configured IP address.

---

#### NOTE

You may need to clear cookies and site data from your browser before executing this step.

---

## 5.5 Resetting the User Name and Password

You can reset the user name and password used to access the web-based user interface using the XVTEC Management Tool.

### To assign a static IP address to X500E:

1. Execute the XVTEC Management Tool. The application discovers the devices in your network, and displays them in a list, as shown in the figure below.

---

#### NOTE

To enable discovery of the devices, you may need to disable the Windows Firewall before executing the XVTEC Management Tool.

---

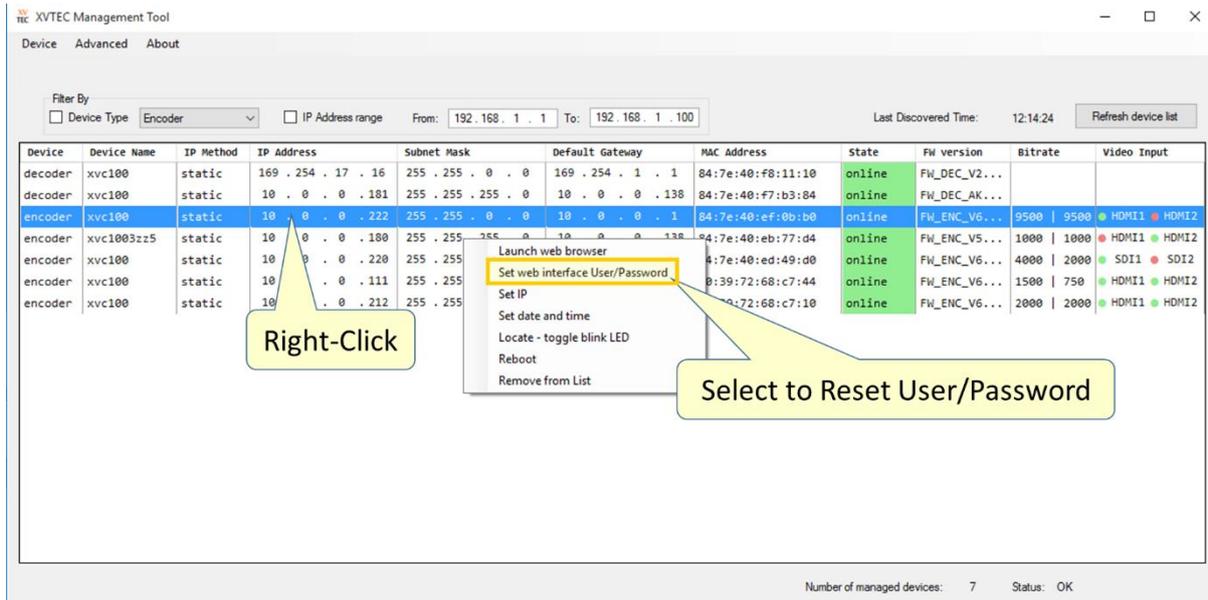


Figure 49: Resetting the User/Password

2. Find the row in the table associated with X500E. Right-click on the row, and then select **Set web interface User/Password**.
3. In the dialog box that appears, enter a new user name and password, and then click **Apply**.

## 6 REST-API

This chapter describes the operations for executing the REST-API in detail.

### 6.1 REST-API Operations

To execute the REST-API, use the operations according to the manual at the following URL.

<https://xvtec.docs.stoplighr.io/>

## Appendix A System Specifications

Video	
Video Input	HDMI Type A connector, HDMI v2.0a (Non HDCP)
Input Resolution	4K: 4096x2160p [23.97, 24, 25, 29.97, 30, 50, 59.94, 60] Hz UHD: 3840x2160p [23.97, 24, 25, 29.97, 30, 50, 59.94, 60] Hz FHD: 1920x1080p [23.97, 24, 25, 29.97, 30, 50, 59.94, 60] Hz HD: 1280x720p [50, 59.94, 60] Hz, 1920x1080i [25, 29.97, 30] Hz SD: 720x576p50 Hz, 720x576i25 Hz, 720x480p59.94 Hz, 720x480i29.97 Hz
Output Streams	Up to 4Kp60 HEVC over IP
Video Compression	HEVC/H.265 ISO/IEC 23008-2 HEVC (H.265) Main 10 4:2:2, up-to level 5.1, high tier
Codec features	Configurable GOP size, FPS, BPS I/B frames support 4:2:0 and 4:2:2 color space 10/8-bit pixel depth Supports progressive and field based interlaced coding Rate control: CBR and capped VBR Bitrates: from 500 kbps to 80 Mbps Frame rate: full, 1/2, 1/4, 1/8 of the input frame rate
Encoding Performance	Up to 4Kp60 4:2:2 10-bit HEVC stream
Audio	
Audio Input	HDMI embedded audio Analog audio unbalanced (PL stereo connector)
Audio Sample Format	Single stereo channel audio at Fs = 48kHz, 16-bit/sample
Audio Compression	MPEG-2 AAC-LC (ISO/IEC 13818-7), configurable bitrate 64 - 256kbps
Latency	
Latency Modes	Low latency mode: < 50 ms (encoding latency at 4Kp60 20 Mbps with 1GbE I/F) Normal mode latency: up to 2000 ms depending on GOP structure Note: The stream is compliant to RFC-7798, RTP for HEVC
Interfaces	
Ethernet	Eth: RJ45, Ethernet 10/100/1000 Base-T, auto-neg, auto-sense, half/full duplex
Streaming Protocols	TS-UDP: Transport Stream over UDP (Unicast/Multicast) RTP: Real-Time Protocol over UDP (Unicast/Multicast) RTSP: Real-Time Streaming Protocol (Unicast, single client) TS-SRT: Transport Stream over SRT (Unicast)
Other Protocols	HTTP, IGMP V1/V2, DHCP client
Other Interfaces	2 x USB 2.0/3.0 host ports RS-232 (RJ45 Cisco cable compatible) LED indicators (Power on, Ethernet link, Status, Video lock, Streaming, Recording) Tactile switches

X500E Management	Web-based interface via browser REST API Remote firmware upgrade via browser or REST API Hardware button for resetting factory defaults
<b>Physical/Environmental</b>	
Dimensions (WxHxD)	214mm x 37mm x 155mm
Weight	730 grams
Operational Temperature	0°C to 50°C
Operational Humidity	Up to 90%, non-condensing
Power Supply	12 VDC @5A
Power Consumption	Typical: 18 - 20W (varies according to use case)
Regulatory Compliance	FCC part 15 class B, CE, KC class A

## Appendix B Safety and Compliance

### FCC Class B statement

This equipment has been tested and found to comply with the standards for a class B digital device, pursuant to part 15 of the FCC Rules. These standards are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

### 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 other household waste. Rather, it is your responsibility to dispose of equipment by bringing it to a designated collection point that handles recycling of discarded electrical and electronic equipment. The separate collection and recycling of your 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 the point of purchase.</p>
-----------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

**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>
------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

**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	○	○	○	○	○	○
交流适配器	×	○	○	○	○	○

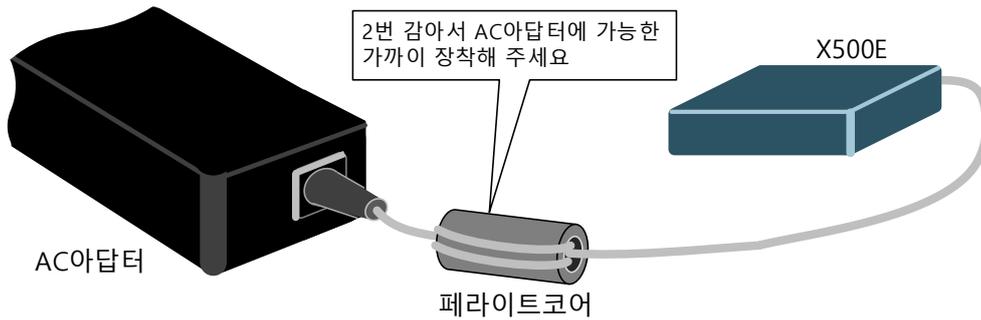
○：表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。  
 ×：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。

## KC class A 인증 (KC class A statement)

### 사용자 안내문

이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.

KC class A 에 준거한 상태로 X500E 를 사용하기 위해서는 아래 사진과 같이 AC 어댑터의 DC 쪽 케이블에 페라이트 코어를 장착할 필요가 있습니다.



페라이트 코어는 포함되어 있지 않기 때문에 아래의 제품을 준비하십시오.

형번: ZCAT2132-1130(TDK 제품)또는 이에 상응하는 제품

주의: 페라이트 코어를 장착하지 않고 사용할 경우, 주변기기에 전파간섭을 일으킬 우려가 있습니다.

## General Caution

This product is designed and manufactured for use in consumer and professional applications. Customers considering using 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 asked to consult Socionext Inc. before undertaking 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.

## Caution with using



### CAUTION

- Do not use this device near water and clean only with a dry cloth. In addition, do not use this device under the condition in which a dew condensation occurs. Liquid spilled on this device may cause failure or electrical shock due to a short circuit.
- Do not block any ventilation openings. Inside or chassis temperature increase of this device may cause failure or burn.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat. Inside or chassis temperature increase of this device may cause failure or burn.
- Remove the power connector immediately in case of any abnormalities. Continuing to use this device with the abnormalities may cause failure or electrical shock.
- Unplug this device during lightning storms or when unused for long periods of time. Failure, electrical shock, or fire may be caused if this device is not unplugged in this situation.
- Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and areas where cords protrude from the device. Use of damaged power cord may cause electrical shock.
- Disconnect all cables from this device before moving this device. Moving this device with the cable(s) connected may cause failure, electrical shock, or injury.

## NOTICE

- Read and follow all notices and instructions marked on the product or included in the documentation.
- 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 Socionext Inc. Servicing is required when the device is damaged in any way, such as when the power supply cords or plug is damaged, when liquid is spilled or objects fall onto the device, when the device is exposed to rain or moisture, does not operate normally, or when the device is dropped.
- Since the power supply plug is used as the disconnection for the device, it must remain readily accessible and operable.
- The connectivity with all HDMI devices is not guaranteed. The HDMI cable conforming to the HDMI standard should be used.

**END OF DOCUMENT**