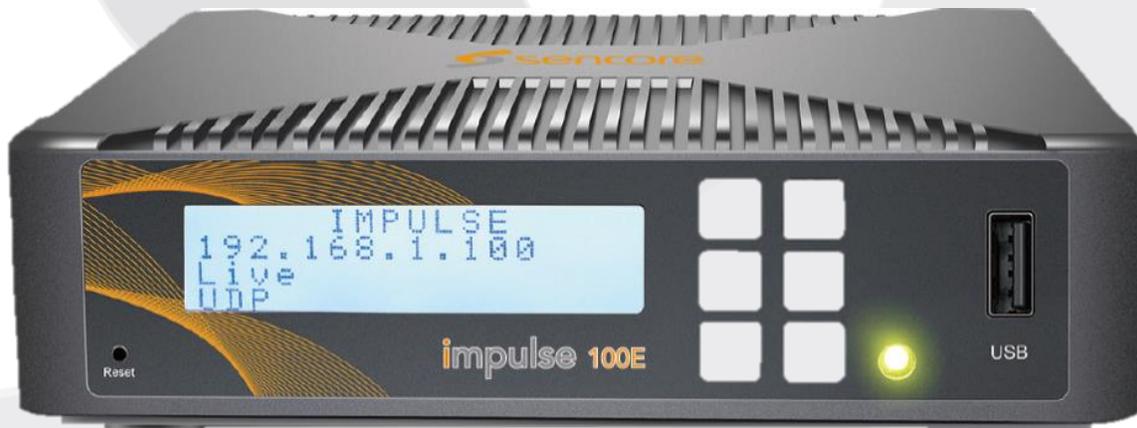




Impulse 100E Network Encoder and Streamer

User Manual



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www.sencore.com

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About Sencore

Sencore is an engineering leader in the development of high-quality signal transmission solutions for the broadcast, cable, satellite, IPTV, telecommunications, and professional audio/video markets. The company's world-class portfolio includes video delivery products, system monitoring and analysis solutions, and test and measurement equipment, all designed to support system interoperability and backed by best-in-class customer support. Sencore meets the rapidly changing needs of modern media by ensuring the efficient delivery of high-quality video from the source to the home. For more information, visit www.sencore.com.

Revision History

Date	Version	Description	Author
05/28/2020	1.0	Initial Release	ACP

Safety Instructions

- Read these instructions
- Keep these instructions
- Heed all warnings
- Follow all instructions
- Do not use this apparatus near water
- Clean only with dry cloth
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus 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 apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- Do not expose this apparatus to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the apparatus.
- The mains plug of the power supply cord shall remain readily operable.
- **Damage Requiring Service:** Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
 - When the power-supply cord or plug is damaged.
 - If liquid has been spilled, or objects have fallen into the product.
 - If the product has been exposed to rain or water.
 - If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as an improper adjustment of the controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.
 - If the product has been dropped or damaged in any way.
 - The product exhibits a distinct change in performance.

SAFETY PRECAUTIONS

There is always a danger when using electronic equipment.

Unexpected high voltages can be present at unusual locations in defective equipment and signal distribution systems. Become familiar with the equipment that you are working with and observe the following safety precautions.

- Every precaution has been taken in the design of your Impulse 100E to ensure that it is as safe as possible. However, safe operation depends on you the operator.
- Always be sure your equipment is in good working order. Ensure that all points of connection are secure to the chassis and that protective covers are in place and secured with fasteners.
- Never work alone when working in hazardous conditions. Always have another person close by in case of an accident.
- Always refer to the manual for safe operation. If you have a question about the application or operation, email ProCare@Sencore.com.
- **WARNING** – To reduce the risk of fire or electrical shock never allow your equipment to be exposed to water, rain or high moisture environments. If it is exposed to a liquid, remove power safely (at the breaker) and send your equipment to be serviced by a qualified technician.
- To reduce the risk of shock the Impulse 100E must be connected to a mains socket outlet with a protective earthing connection.
- For the Impulse 100E, the mains plug is the main disconnect and should remain readily accessible and operable at all times.

⚠ Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Package Contents

The following is a list of the items that are contained along with the Impulse 100E:

1. Quick Start Guide
2. AC Power Supply
3. A/V Adapter Cable

Note: If any option cables were ordered with the Impulse 100E, they will be contained in the box as well.

If any of these items were omitted from the packaging of the Impulse 100E please call 1-800-SENCORE to obtain a replacement. Manuals for Sencore products can be downloaded at www.sencore.com

Table of Contents

Section 1 Overview	8
1.1 Product Introduction.....	9
1.2 Front Panel Overview	9
1.3 Rear Panel Overview.....	9
Section 2 Installation	11
2.1 Installation Preparation	12
2.2 Equipment Wiring and Connection	12
2.3 Maintenance	12
2.4 Network Setup via Front Panel	12
2.4.1 Static IP Address/Subnet Mask/Gateway.....	12
2.4.2 DHCP.....	14
Section 3 Operating the Front Panel	16
3.1 Impulse 100E Front Panel Overview	17
Section 4 Operating the Web Interface	19
4.1 Impulse 100E Web Interface Overview	20
4.1.1 Logging in to the Impulse 100E Web Interface	20
4.1.2 Status Page	21
4.2 Live Mode	22
4.2.1 Advanced Settings.....	26
4.3 Playback Mode	30
4.3.1 Basic Settings Tab.....	30
4.4 Recording Mode	31
4.5 System Settings Menu	32
Section 5 Appendix.....	38
Appendix A – Acronyms and Glossary	39
Appendix B – Using Manual RTMP Streaming for YouTube	41

Section 1 Overview



Introduction

This section includes the following topics:

1.1	Product Introduction.....	9
1.2	Front Panel Overview	9
1.3	Rear Panel Overview.....	9

1.1 Product Introduction

The Impulse 100E is a cost-effective single-channel encoder and streamer for audio and video processing and transport. It supports professional encoding and IP streaming for live encoding, uploading, and playback.

1.2 Front Panel Overview

The Impulse 100E can be controlled from the front panel with the LCD screen and buttons that are shown below in Figure 1. A detailed description of using the front panel can be found in Section 3.



Figure 1: Impulse 100E Unit Front Panel

1. Reset Button: pressing this will reboot the Impulse 100E.
2. LCD Screen: shows menus for user status and unit control
3. Up, Down, Left, Right, OK and Menu Buttons: provides navigation and entry within LCD screen menus
4. Error Indicator: light indicates red when the unit is in alarmed condition
5. USB Port: purposed for storage while using the record and playback features.
Note: the Impulse 100E is only compatible with the FAT32 USB/SD format.

1.3 Rear Panel Overview

The Impulse 100E comes standard with all of the hardware back panel features shown and listed below except where noted as an Impulse 100E-01 or Impulse 100E-02 exclusive option. Refer to the Figure 2 at the top of the next page.

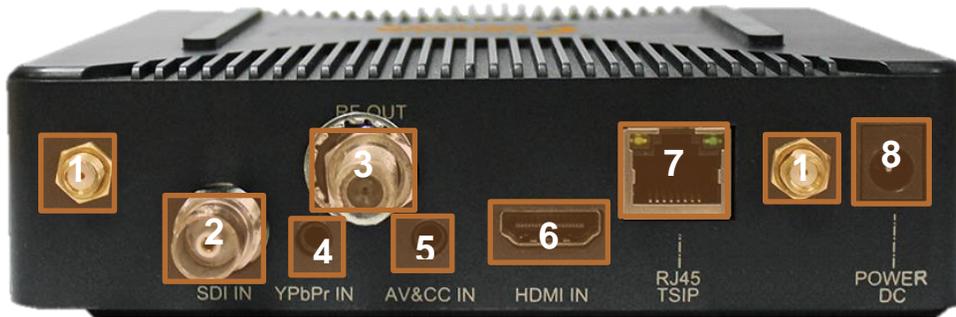


Figure 2: Impulse 100E Unit Back Panel

1. SMA Antenna
2. SDI In (exclusive to the Impulse 100E-01)
3. RF out – for QAM modulation (exclusive to Impulse 100E-02)
4. YPbPr In
5. AV/CCIN – Audio/Video or closed caption input
6. Digital Video Input Connector (HDMI)
7. RJ45 – management and UDP output port (10/100)
8. DC Input – power input (12V – 2A)

Section 2 Installation



Introduction

This section includes the following topics:

2.1	Installation Preparation	12
2.2	Equipment Wiring and Connection	12
2.3	Maintenance	12
2.4	Network Setup via Front Panel	12

2.1 Installation Preparation

This chapter includes information for the technicians installing the equipment.

Before starting, confirm the device is in good condition and the necessary cabling is present to complete the installation.

When unpacking the unit, inspect it for shipping damage. If any damage is found, contact Sencore customer service.

2.2 Equipment Wiring and Connection

Only use the supplied power connector or a 12V, 2A equivalent.

Connect to the RJ45 port with a CAT5 cable. Access the Impulse 100E management interface with a PC on the same network or directly connected to the Impulse.

2.3 Maintenance

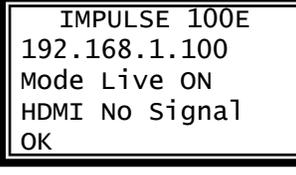
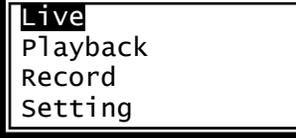
The Impulse 100E is a maintenance-free piece of equipment. There are no user serviceable parts inside unit.

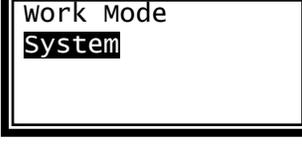
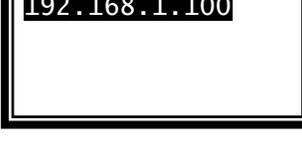
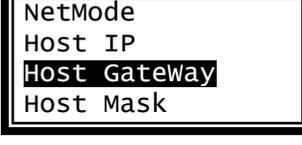
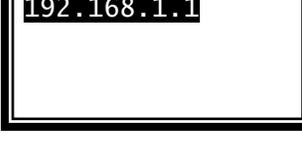
2.4 Network Setup via Front Panel

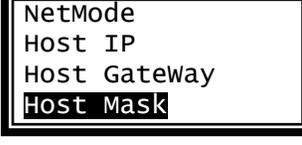
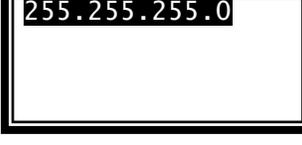
The Impulse 100E can be accessed on a network connection to allow remote management. For these features to work, the network settings for the Impulse 100E must first be configured properly for the network it is connected to.

2.4.1 Static IP Address/Subnet Mask/Gateway

To setup the Impulse 100E with a static IP address, use the following steps:

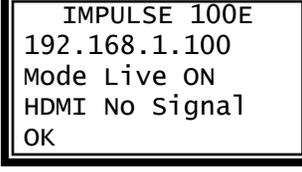
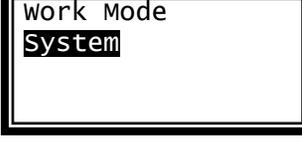
<p>1. The default screen on the Impulse 100E is the “Status” page. This will report the name of the unit, its current IP, the Mode as well as the status of the input (used in tandem with the red/green LED light on the front panel).</p>	
<p>2. Press the MENU button to enter the page where settings can be viewed and configured.</p>	

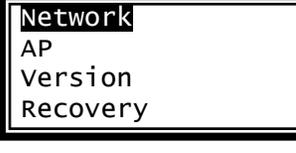
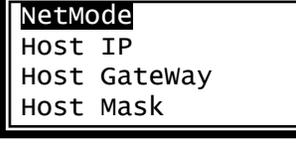
<p>3. Use the ▲ and ▼ buttons to move the cursor to “Setting”, and then press the OK button to enter the system menu.</p>	
<p>4. Use the ▲ and ▼ buttons to move the cursor to “Network”, then press the OK button to enter the network menu.</p>	
<p>5. Use the ▲ and ▼ buttons to move the cursor to “NetMode”, then press the OK button.</p>	
<p>6. Confirm that the unit is currently set to “DHCP: Disable”. If it is, press the MENU button to return to the network menu. If it is not, press the OK button to disable DHCP and repeat Step1~4.</p>	
<p>7. Use the ▲ and ▼ buttons to move the cursor to “Host IP”, then press the OK button to enter the menu where Host IP can be viewed and configured.</p>	
<p>8. Press the OK button to initiate changing the IP. Use the ▲ and ▼ buttons to change the value of the digit and the ◀ and ▶ buttons to change the location. Press OK to finish and apply, and then repeat Step1~4 to return to the network menu.</p>	
<p>9. Use the ▲ and ▼ buttons to move the cursor to “Host Gateway”, then press the OK button to enter the menu where Host GateWay can be viewed and configured.</p>	
<p>10. Press the OK button to initiate changing the GateWay. Use the ▲ and ▼ buttons to change the value of the digit and the ◀ and ▶ buttons to change the location. Press OK to apply, and then repeat Step1~4 to return to the network menu.</p>	

<p>11. Use the ▲ and ▼ buttons to move the cursor to “Host Mask”, then press the OK button to enter the menu where Host Mask can be viewed and configured.</p>	
<p>12. Press the OK button to initiate changing the Mask. Use the ▲ and ▼ buttons to change the value of the digit and the ◀ and ▶ buttons to change the location.</p>	
<p>13. Use the ▲ and ▼ buttons to move the cursor to “Host Mask”, then press the OK button to enter the menu where Host Mask can be viewed and configured.</p>	
<p>14. Press the OK button to initiate changing the DNS. Use the ▲ and ▼ buttons to change the value of the digit and the ◀ and ▶ buttons to change the location.</p>	
<p>15. Press OK to apply. The IP will now be accessible on the network it was configured to!</p>	

2.4.2 DHCP

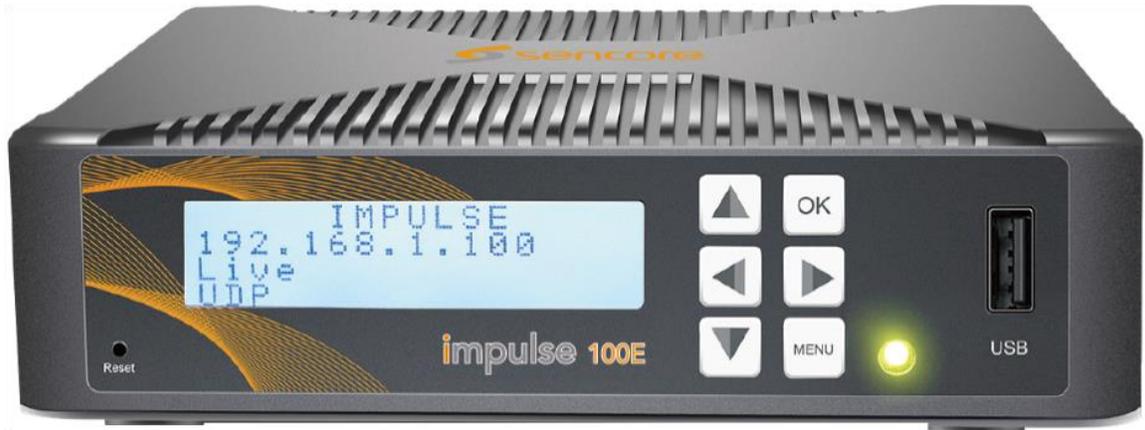
The Impulse 100E can be configured to use DHCP to obtain an IP address/Subnet Mask/Gateway.

<p>1. The native screen on the Impulse 100E is the “Status” page. This will report the name of the unit, its current IP as well as the status of the input (used in tandem with the red/green LED light on the front panel).</p>	
<p>2. Press the MENU button to enter the page where settings can be viewed and configured.</p>	
<p>3. Use the ▲ and ▼ buttons to move the cursor to “Setting”, and then press the OK button to enter the system menu.</p>	

<p>4. Use the ▲ and ▼ buttons to move the cursor to “Network”, then press the OK button to enter the network menu.</p>	 <p>A screenshot of a menu with the following items: Network (highlighted), AP, Version, and Recovery.</p>
<p>5. Use the ▲ and ▼ buttons to move the cursor to “NetMode”, then press the OK button.</p>	 <p>A screenshot of a menu with the following items: NetMode (highlighted), Host IP, Host Gateway, and Host Mask.</p>
<p>6. If the DHCP setting is currently set to “Disable”, press the OK button to enable DHCP.</p>	 <p>A screenshot of DHCP settings with the following items: DHCP: Disable (highlighted) and DNS: Static.</p>

Note: It may take up to a minute for the Impulse 100E to obtain an IP address.

Section 3 Operating the Front Panel



Introduction

This section includes the following topics:

3.1	Impulse 100E Front Panel Overview	17
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3.1 Impulse 100E Front Panel Overview

The Impulse 100E front panel allows the user to configure all settings that are present in the web interface using the buttons indicated in Figure 3.

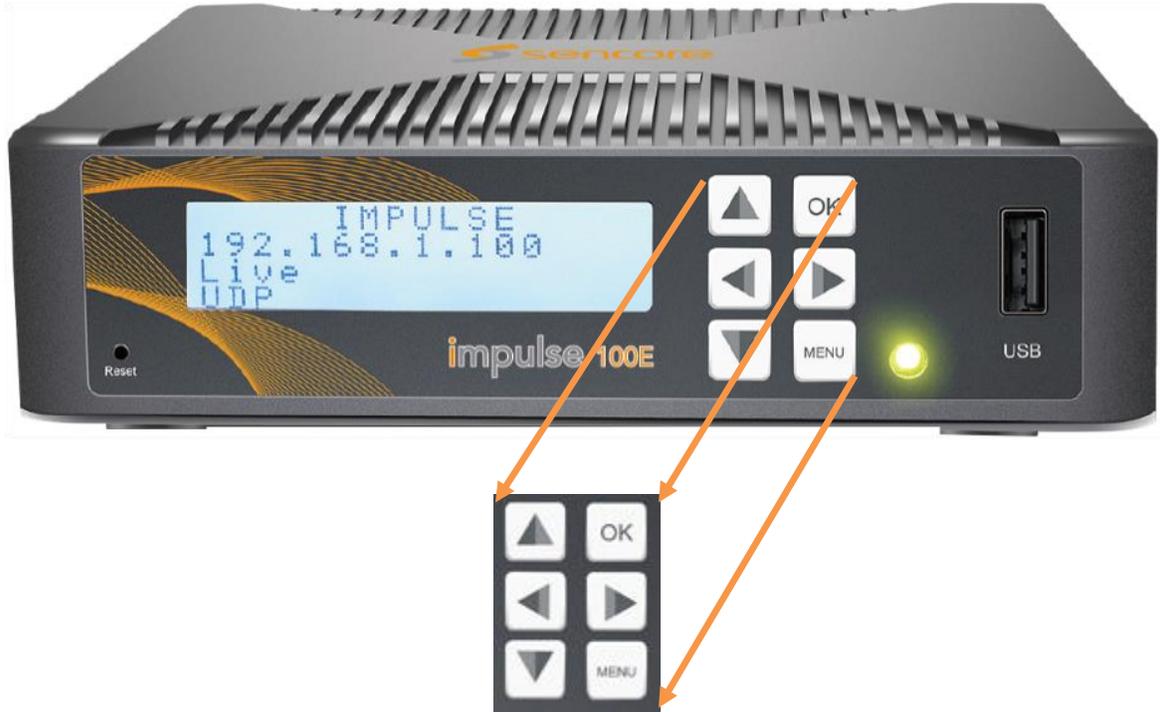


Figure 3: Front Panel Navigation Keys

The screen below is the idle screen of the Impulse 100E. This idle screen shown in Figure 4 displays the management IP address of the unit as well as the status of the input/output.

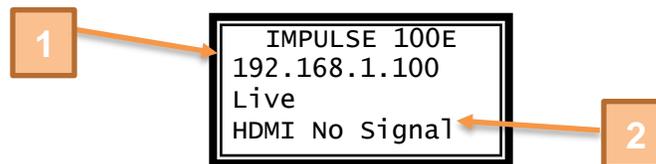


Figure 4: Idle LCD Screen

1. IP address of RJ45 port
2. Status of input/output

Press the **MENU** button in order to view and change additional configuration or exit from additional menus. Use the arrow keys to cycle through the options and **OK** to enter additional menus and toggle settings. Figure 5 on the next page shows the first front panel menu after the idle screen.

The highlighted line indicates the cursor, which can be moved with the ▲ and ▼ arrow keys. The **OK** button will select the highlighted line and proceed to the next menu. Pressing the **MENU** will go back the previous menu, in this case returning to the idle screen.



Figure 5: Menu Selection Screen

Section 4 Operating the Web Interface



Introduction

This section includes the following topics:

4.1	Impulse 100E Web Interface Overview	20
4.2	Live Mode	22
4.3	Playback Mode	30
4.4	Recording Mode	31
4.5	System Settings Menu	32

4.1 Impulse 100E Web Interface Overview

4.1.1 Logging in to the Impulse 100E Web Interface

To open the Impulse 100E web interface, use one of the following supported browsers and navigate to the unit's IP address:

- Firefox 3.5 & above
- Google Chrome

The user will need to login to the web interface. The default login credentials (username/password): admin/admin. After entering “admin” into both fields shown in Figure 6, click the login button or press the enter key.

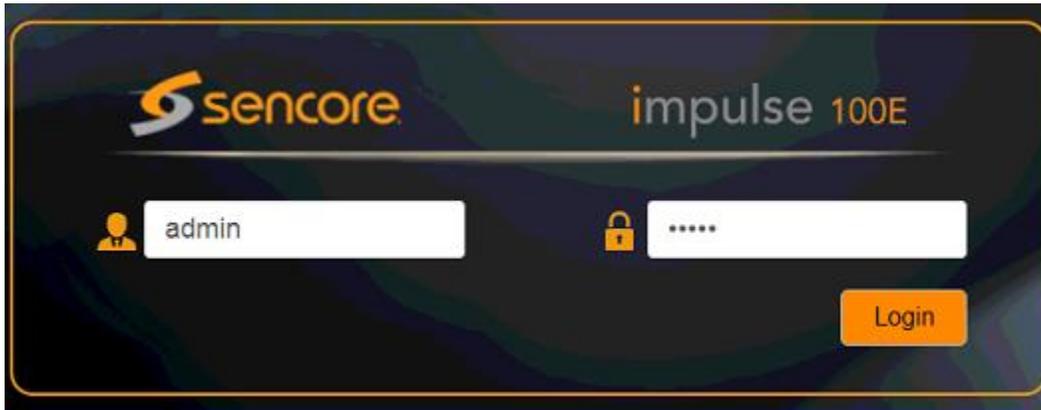


Figure 6: User Login Prompt

If this menu does not appear when navigating to the IP address on the front panel of the unit, confirm the PC is configured with an IP address in the same range.

4.1.2 Status Page

After logging into the web interface of the Impulse 100E, the user will be taken to the Status page as seen in Figure 7 below.

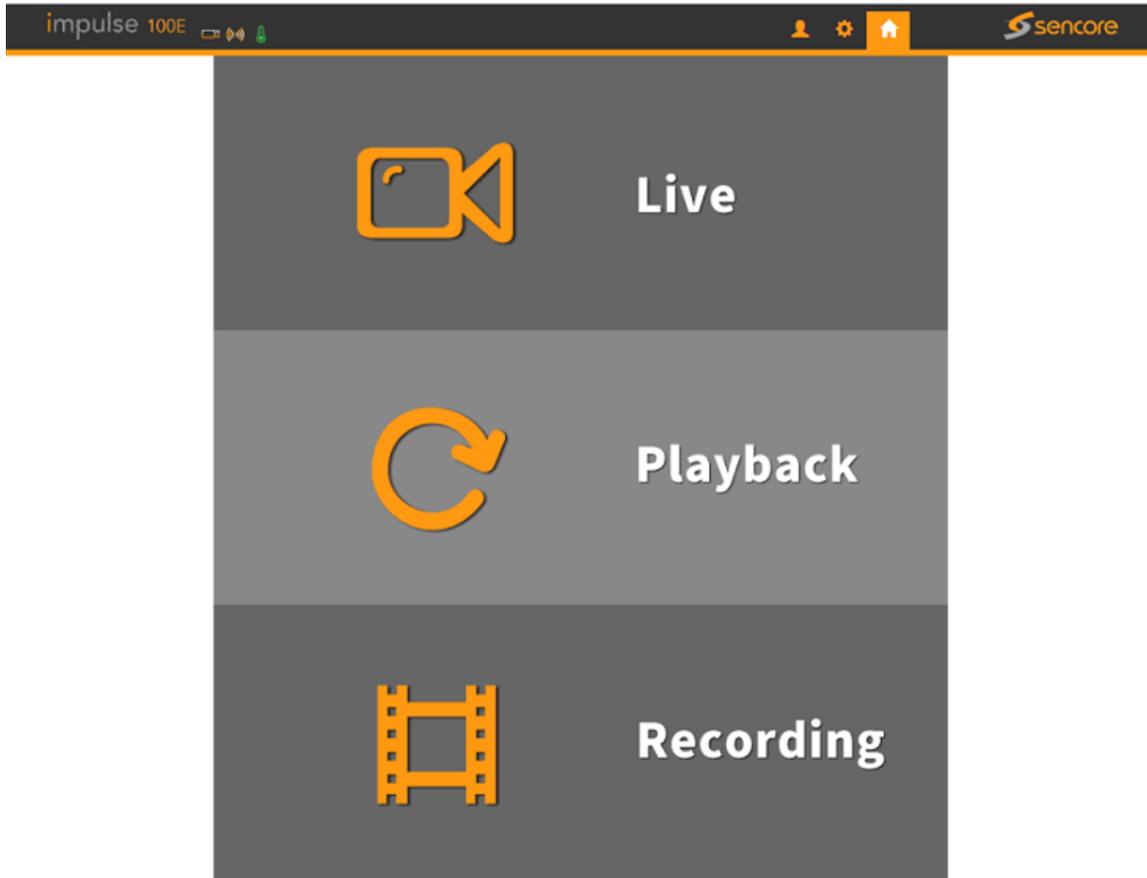


Figure 7: Status Page

Impulse 100E provides 3 working modes: Live, Playback and Recording. Click to enter the desired working mode. (*Figure 7*)

Live Mode: to encode a live channel via HDMI/SDI/CVBS input and IP output.

Playback Mode: to play the recorded TS from external USB disk.

Recording Mode: to record the encoded TS and store it to the external USB disk

4.2 Live Mode

To set the parameters for HD/SD channel encoding, as well as the broadcasting mode parameters.

Basic Setting

The screenshot displays the 'Live' configuration page for the Impulse 100E device. The page has a dark header with the 'impulse 100E' logo, status icons, and the 'sencore' logo. The main content area is titled 'Live' and includes an 'Advanced Settings' link. The configuration fields are as follows:

Input	HDMI
Output	HLS
Encrypt	<input type="checkbox"/>
HLS URL(Ethernet)	http://192.168.1.110/hls/live.m3u8
HLS URL(Wireless)	http://192.168.48.2/hls/live.m3u8

A red warning bar at the bottom of the configuration area contains the text: *• Device does not support HDCP!*

Figure 8: Live Mode

This interface provides the main parameters of encoding and broadcasting. Please check and set the parameters according to the following items:

- **Input:** HDMI/YPbPr/AV/SDI/Auto source can be selected
- **Output:** supports UDP/RTSP/HLS/Modulation/RTP/RTMP
- **Encrypt:** used for HLS and generates HLS key
- **HLS URL(Ethernet/Wireless):** Automatically generated depending on your network IP addresses

UDP setting

User can set the IP address and port parameters.

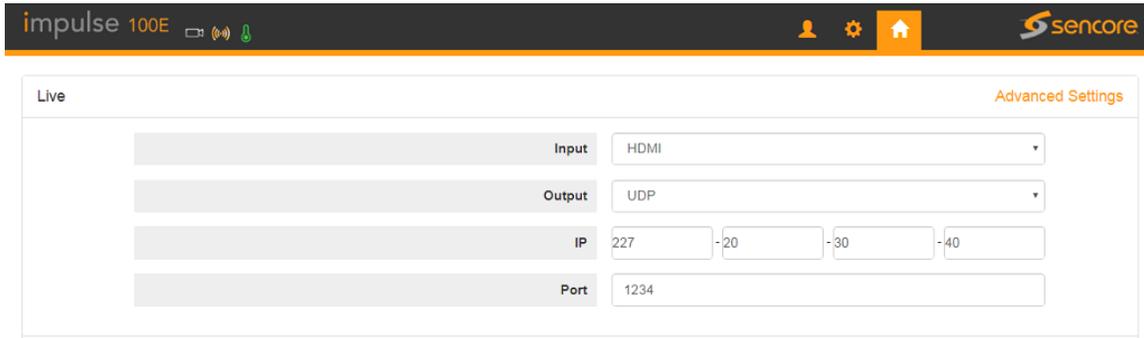


Figure 9: UDP Setting

RTSP setting

User can view RTSP URL (Ethernet) and RTSP URL (Wireless) parameters.



Figure 10: RTSP Setting

HLS setting

User can view HLS URL (Ethernet) and HLS URL (Wireless) parameters.

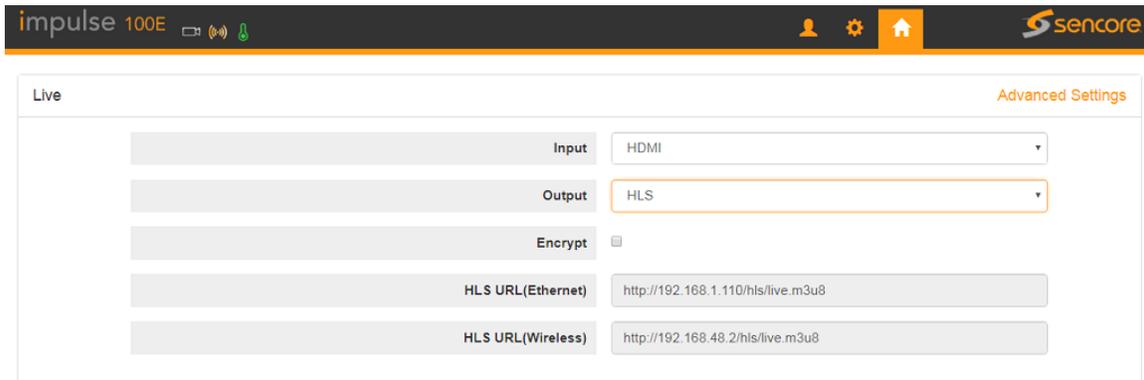


Figure 11: HLS Setting

Modulation setting

User can set the Frequency from 66000 to 858000 kHz.

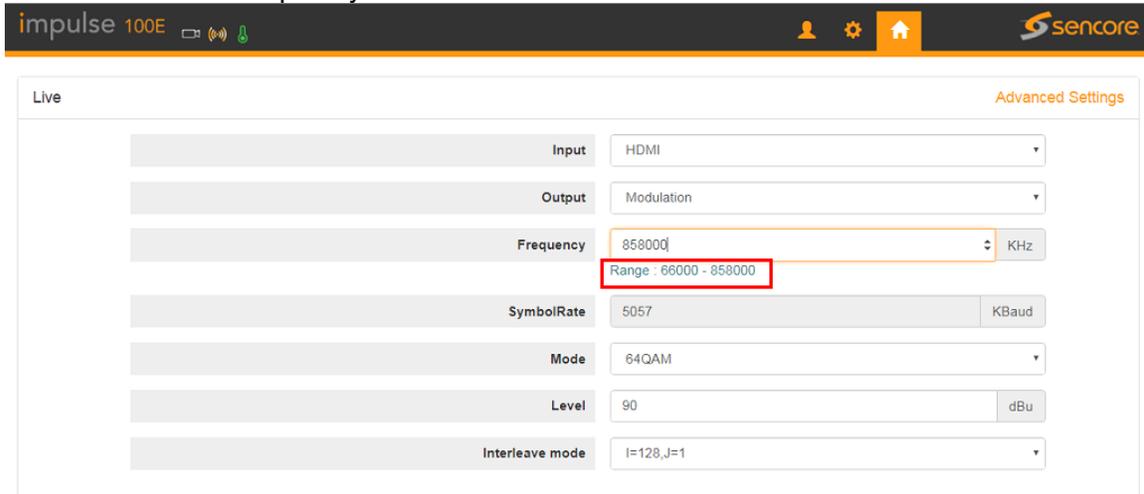


Figure 12: Modulation Setting

QAM mode supports 64/256QAM output.



Figure 13: QAM Mode

The output Level Range is 90-116 dBu.



The image shows a software control element. On the left is a grey button labeled "Level". To its right is a white input field with an orange border containing the number "90". To the right of the input field is a small grey button with a double-headed vertical arrow. Further right is another grey button labeled "dBu". Below the input field, the text "Range : 90 - 116" is displayed in a light blue color.

Figure 14: Output Level Range

Video Info

Video Info	
Video Source	HDMI
Video PID	66
Video Encoding Mode	H264
Video Resolution	1280x720_60i
Resolution Mode	Manual
Horizontal Pixels	1280
Vertical Pixels	720
Framerate	30
Scan Type	Interlace
Aspect Ratio	Auto
Video Bitrate Mode	CBR
Video Bitrate[Range: 300 - 18000]	4000 Kbps
Video Profile	Main
Video Level	H264 4.0
GOP Structure	IBBP
GOP Size	60
GOP Close	Enable
Close Caption	Disable

Figure 17: Video Info

Audio Info

Figure 18: Audio Info

Setting	Range	Description
Video Source	HDMI, AV, YPbPr, SDI	Based on the source User selected on the basic setting page
Video PID	32-8190	
Video Encoding Mode	Mpeg-2, H.264	
Video Resolution	1920x1080, 1680x1200, 1600x900, 1440x1050, 1440x900, 1360x768, 1280x1024, 1280x720, 1280x800, 1280x768, 1080x768, 1024x576, 960x540, 850x480, 800x600, 720x576, 720x540, 720x480, 720x404	Resolutions that will match the incoming source.
Resolution Mode	Manual/Auto	Manual mode- Use can decide to use what resolution Automatically match the incoming source
Aspect Ratio	Auto, 16x9_LetterBox, 16x9_Cutoff, 4x3_PillarBox, 4x3_Cutoff	Aspect Ratio of the encoded video
Video Bit Rate	600~20000 (kbps)	Specifies outgoing video bitrate for the Impulse 100E
Video Profile	Baseline, Main, High	
Video Level	Automatic, H264 1b, H264 1.0, H264 1.1, H264 1.2, H264 1.3, H264 2.0, H264 2.1, H264 2.2,	

GOP Structure	H264 3.0, H264 3.1, H264 3.2, H264 4.0, H264 4.1, H264 4.2 IBBP,IPPP,IBP,IBBBP	Specifies the order in which intra and inter-frames are arranged.
GOP Size	6-63	Specifies the number of frames between two I-frames
GOP Close	Enable/Disable	
Close Caption	Enable/Disable	
Audio Source	Audio HDMI, Audio MIC	Choosing Audio HDMI will use the audio in HDMI input. Choosing Audio MIC will use an external audio source routed through the “Audio IN” port on the back panel
Audio PID	32-8190	
Audio Encoding Mode	AC3,MPEG1 Layer2,MPEG2 AAC-LC,MPEG4 AAC-LC	Specifies the Audio Encoding mode of the encoded program
Audio Bit Rate	448, 384, 320, 256, 224, 192, 160, 128, 112, 96, 80, 64, 48, (kbps)	Specifies outgoing audio bitrate for the Impulse 100E.
Audio Volume	-12 to +12 dB	Specifies how soft or loud the volume is
Audio Sampling Rate	Automatic, 48, 44.1, 32 (kHz)	Specifies audio sampling rate the Impulse 100E will encode to.

Live Video Status

Click the  icon on the right-bottom corner to direct User to the Live Video Status page. The page displays and updates the real-time status of encoding and streaming.

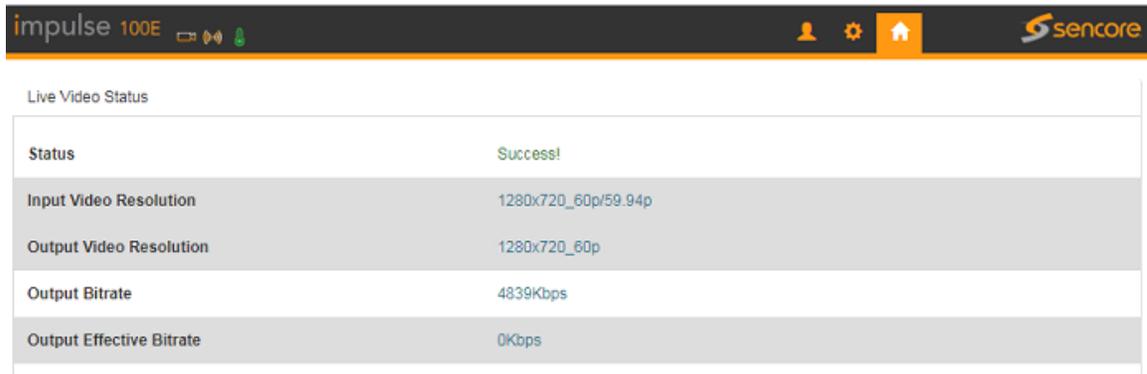


Figure 19: Live Video Status

4.3 Playback Mode

4.3.1 Basic Settings Tab

1. Plug one USB disk in the USB port on the front panel of the Impulse 100E to play the TS from the disk.
2. Click the Playback icon to get to the playback page, which will list all the available TS from the USB Disk.
3. Click the required TS to play.

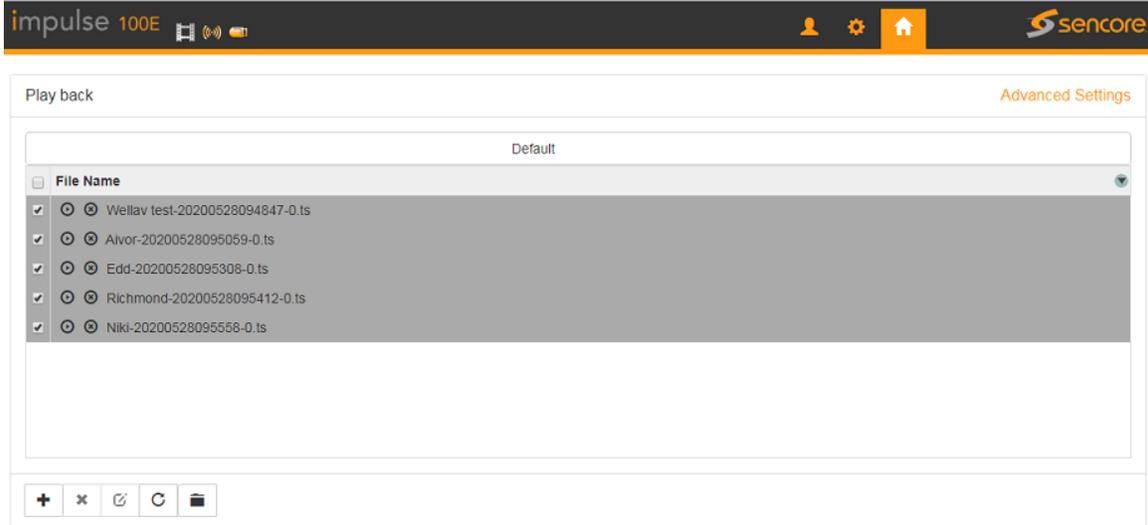


Figure 20: Playback Page

Note: The Playback page will save and display the TS list from memory of the last USB disk, if there is no disk connected.



to add new Playlist. The default play list is named as “default”.



to delete the existing Play list



to modify the play list name



to change the play mode, including single cycle, listing loop, random and ordered playback



to add new TS to the play list

4.4 Recording Mode

Basic Setting

1. Connect a USB disk to the Impulse 100E.
2. Set the encoding parameters, and click the start icon to start recording or click the pause icon to stop the recording.
3. Click the status icon to reflect to the Status Page.

The screenshot shows the 'Recording' configuration page. At the top left, it says 'impulse 100E' with status icons. At the top right, there are navigation icons (user, settings, home) and the 'sencore' logo. The main content area is titled 'Recording' and includes an 'Advanced Settings' link. The settings are as follows:

Input	HDMI
Record Format	TS
Record Name	record
Recording	Loop

Figure 21: Recording Mode Page

Note: After exceeding the minimum available free USB space of 10MB, the Impulse 100E will overwrite the oldest file created by it. This unit will not overwrite pre-existing files on the USB. The Impulse will not record if the available free USB space is occupied by pre-existing files or if the USB is not connected.

Recording Status

This page offers the status of the recording and the storage of the connected USB Disk.

The screenshot shows the 'Recording Status' page. At the top left, it says 'impulse 100E' with status icons. At the top right, there are navigation icons (user, settings, home) and the 'sencore' logo. The main content area is titled 'Recording Status' and displays the following information:

Status	Free
Input Video Resolution	No Video
Output Video Resolution	No Video
Output Bitrate	4838Kbps
Output Effective Bitrate	4645Kbps
Record Name	record
USB1	2.610M/23.908M Safely remove
Recorded Time	00:00:00
Record Size	0M

Figure 22: Recording Status Page

4.5 System Settings Menu

The system settings page, as seen in Figure 23, contains information and operations regarding the Impulse 100E’s base system. On this page, the software version and licensing can be viewed and upgraded, network settings can be configured and the Impulse can be defaulted or rebooted remotely.

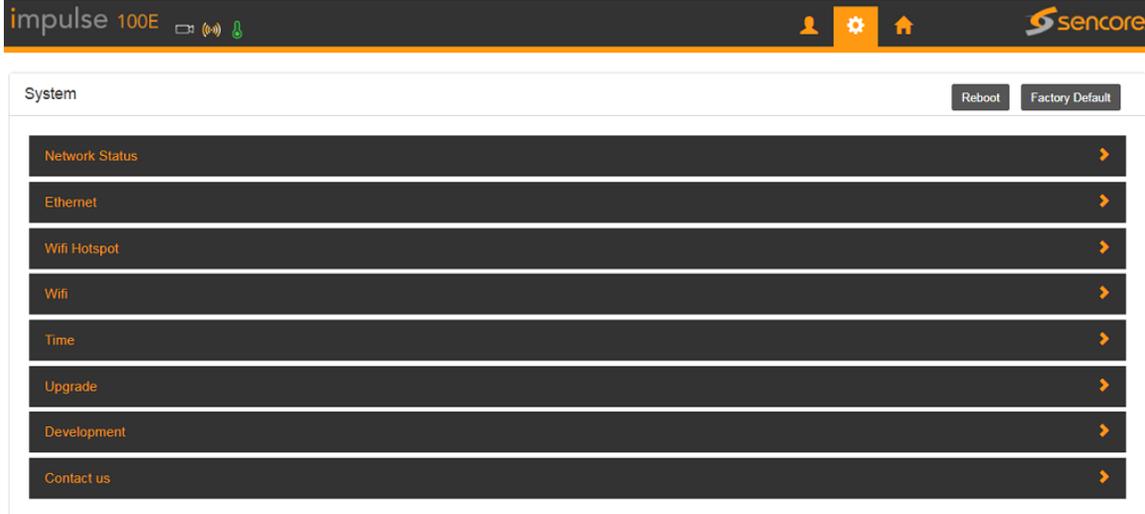


Figure 23: System Menu Page

Network Status

This page shows status of network:

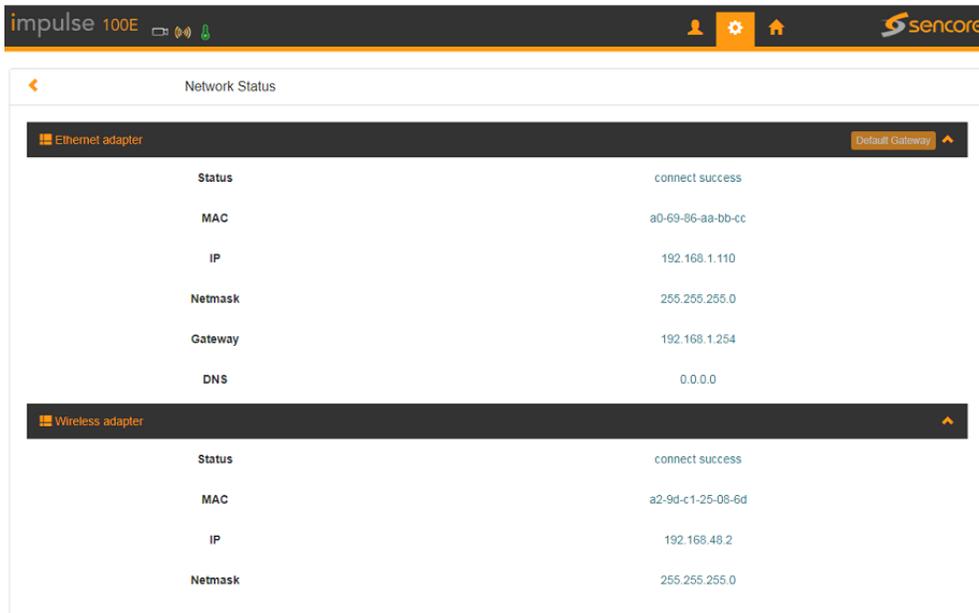


Figure 24: Network Status Page

Ethernet

To set up equipment management access IP address, Subnet Mask, Gateway and DNS. The Impulse 100E can be configured to use DHCP to obtain an IP address/Subnet Mask/gateway.

The screenshot shows the 'Ethernet' configuration page. At the top right, there is a 'DHCP' toggle switch set to 'OFF'. Below this, there are four rows of input fields:

- IP:** 192, -168, -1, -110
- Subnet Mask:** 255, -255, -255, -0
- Gateway:** 192, -168, -1, -254
- DNS:** 0, -0, -0, -0

Figure 25: Ethernet Page

Wi-Fi Hotspot

This page shows how to set a Wi-Fi Hotspot which enables PC, Hand phone or Tablet to log in to the device via wireless connection.

The screenshot shows the 'Wifi Hotspot' configuration page. At the top right, there is a 'ON' toggle switch. Below this, there are five rows of input fields:

- SSID:** NB100-25-08-5d
- Mode:** Auto
- Channel:** Auto
- Encrypt:** ON
- Password:** 12345678

Figure 26: Wi-Fi Hotspot Page

Wi-Fi

Enable Impulse 100E Wi-Fi function to connect to wireless LAN.

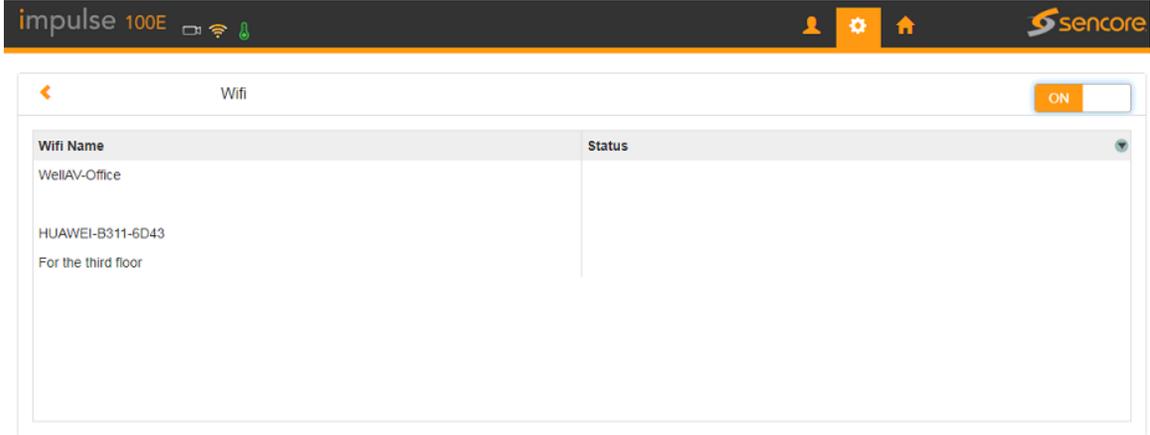


Figure 27: Wi-Fi Page

Note: Wi-Fi hotspot and Wi-Fi reception have the same range. When it is used as a hotspot, Wi-Fi reception is disabled automatically, vice versa.

Time

To configure the system time to sync with Manual or Internet time.



Figure 28: Time Page

Upgrade

To upgrade the software, select a file and click the Arrow button. It will take several minutes to finish the upgrading and after that, it will reboot automatically.



Figure 29: Upgrade Page

Development

To export and clear the logs, check the debug info, export configuration, upgrade license, and view system information.



Figure 30: Development Page

Logs: User can export and clear logs in this interface.



Figure 31: Logs Page

Debug: User can check the debug info which is usually used by R&D for troubleshooting.

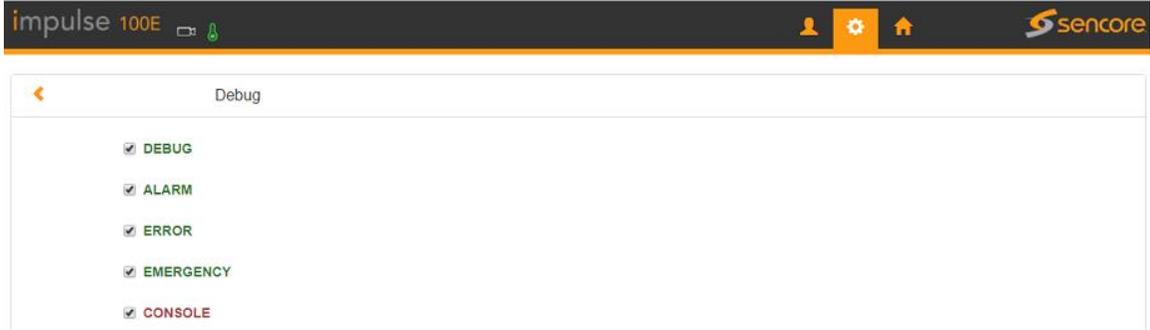


Figure 32: Debug Page

Configuration: User can export configuration (including system and service configuration) in this tab.

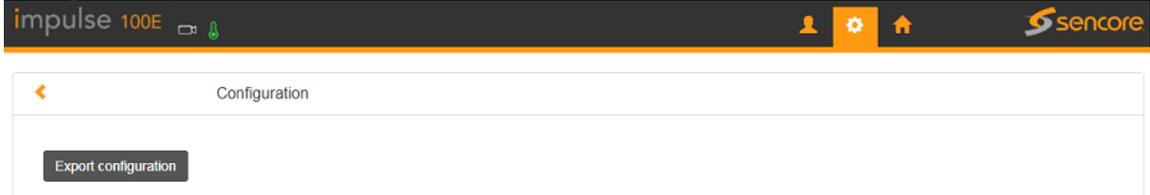


Figure 33: Configuration Page

License: User can export and upgrade license, please do reboot to activate the uploaded license.



Figure 34: License Page

System Information: User can check system info in this tab.



The screenshot shows the 'System Information' page in the Impulse 100E interface. The page has a dark header with the 'impulse 100E' logo, a mobile device icon, a green status icon, a user profile icon, a settings gear icon, a home icon, and the 'sencore' logo. The main content area is a table with the following data:

System Information	
Software Version	1.8.20
Firmware Version	1.0.1
Hardware Version	0.0.0
Driver	Pro100
Encode Firmware	3c-1-14
SPI ROM	pro

Figure 35: System Information Page

Section 5 Appendix



Introduction

This section includes the following appendices:

Appendix A	– Acronyms and Glossary	39
Appendix B	– Using Manual RTMP Streaming for YouTube	41

Appendix A – Acronyms and Glossary

AAC: Advanced Audio Coding

AC-3: Also known as Dolby Digital

AV: Audio Video

Bit Rate: The rate at which the compressed bit stream is delivered from the channel to the input of a decoder.

BNC: British Naval Connector

BPS: Bits per second.

CC: Closed Caption

DHCP: Dynamic Host Configuration Protocol

Frame: A frame contains lines of spatial information of a video signal. For progressive video, these lines contain samples starting from one time instant and continuing through successive lines to the bottom of the frame. For interlaced video a frame consists of two fields, a top field and a bottom field. One of these fields will commence one field later than the other.

GOP: Group of Pictures, a collection of I, P and B frames in a coded video stream.

GUI: Graphical User Interface

HD: High Definition

High level: A range of allowed picture parameters defined by the MPEG-2 video coding specification which corresponds to high definition television.

HLS: HTTP Live Streaming

I/O: Input / Output

IP: Internet Protocol

Kbps: 1000 bit per second

LED: Light Emitting Diode

Main level: A range of allowed picture parameters defined by the MPEG-2 video coding specification with maximum resolution equivalent to ITU-R Recommendation 601.

Main profile: A subset of the syntax of the MPEG-2 video coding specification that is expected to be supported over a large range of applications.

Mbps: 1,000,000 bits per second.

MPEG: Refers to standards developed by the ISO/IEC JTC1/SC29 WG11, *Moving Picture Experts Group*. MPEG may also refer to the Group.

MPEG-2: Refers to ISO/IEC standards 13818-1 (Systems), 13818-2 (Video), 13818-3 (Audio), 13818-4

NTSC: National Television System Committee

PCR: Program Clock Reference

PID: Packet Identifier. A unique integer value used to associate elementary streams of a program in a single or multi-program transport stream.

Profile: A defined subset of the syntax specified in the MPEG-2 video coding specification.

RS-232: Recommended Standard. A standard for serial binary data interconnection.

RTMP(S): Real-Time Messaging Protocol (Secure)

RTSP: Real-Time Streaming Protocol

RW: Read/Write

SD: Standard Definition

SDI: Serial Digital Interface

SMPTE: Society of Motion Pictures and Television Engineers

SPTS: Single Program Transport Stream

TS: Transport Stream

UDP: User Datagram Protocol

Appendix B – Using Manual RTMP Streaming for YouTube

The Impulse 100E can be configured for streaming to any website capable of receiving RTMP. It is necessary to create a new stream instance on the intended receiving platform and enter the corresponding URL and stream key on the Impulse 100E.

General RTMP Streaming

- 1) Confirm the Impulse 100E is connected to the public internet.
- 2) Connect a baseband source (HDMI or SDI), and then confirm that the Impulse 100E detects the input using the “Status” page in the Web interface.
- 3) Navigate to the “Live Service” menu (Figure 36 below).

Live		Advanced Settings
Input	HDMI	
Output	RTMP	
FMS URL	rtmp://172.16.1.254/mylive	
Stream	live_stream	
Port	1935	
Encrypt	<input type="checkbox"/>	

Figure 36: Live Service

- 4) Confirm that the “Output” option is set to “RTMP”.
- 5) Confirm that the “Port” is set to 1935 for YouTube.
- 6) Enter the URL from the receiving website into the “ FMS URL ” field.
- 7) Enter the stream key from the receiving website into the “Stream” field.
- 8) Click “Start”. The Impulse 100E may take up to five minutes to prepare the stream.
- 9) It will display “RTMP Normal” if the connection was successful.

The screenshot shows the 'Live' configuration page for the Impulse 100E device. The page has a dark header with 'impulse 100E' on the left and 'sencore' on the right. Below the header, there are navigation icons for user, settings, and home. The main content area is titled 'Live' and includes an 'Advanced Settings' link. The settings are as follows:

Input	HDMI
Output	RTMP
FMS URL	rtmp://172.16.1.254/mylive
Stream	live_stream
Port	1935
Encrypt	<input type="checkbox"/>

At the bottom of the settings area, there is a red banner with the text '• RTMP: Normal'.

Figure 37: Live Service: RTMP Normal

10) The Impulse 100E is now streaming to the receiving website and is ready for viewing.

Manual YouTube RTMP Streaming

This procedure outlines the steps from “General RTMP Streaming”, using YouTube as the receiving website with emphasis on collecting the “Uploading Node” and “URL” fields for the Impulse 100E.

- 1) Perform Step1~6 from the “General RTMP Streaming” procedure.
- 2) Navigate to www.youtube.com and log in.
- 3) Click on the “User Profile” icon in the top right corner of the screen as indicated in Figure 38 below.



Figure 38: User Profile Icon

- 4) In the dropdown tab that appears under the “User Profile” icon, click “YouTube Studio”. The YouTube Studio Dashboard, seen in Figure 39, allows for creating and managing live content as well as the monitoring and analyzing streams.

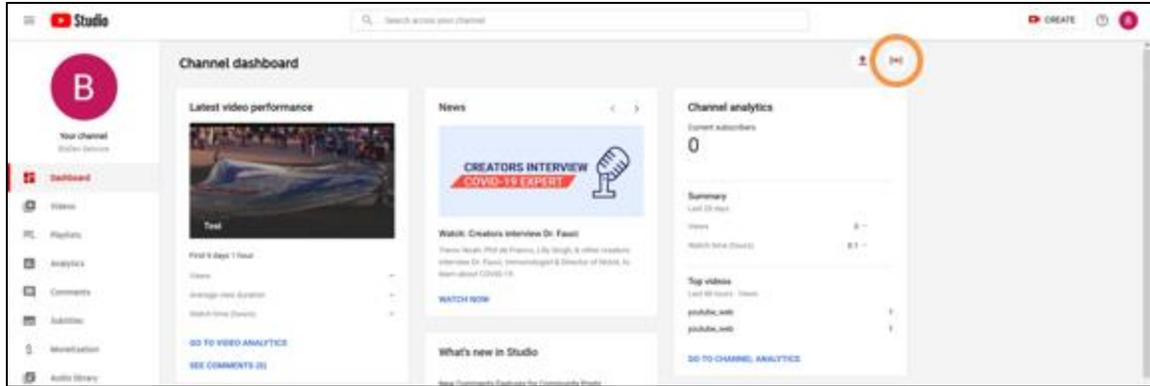


Figure 39: YouTube Studio Dashboard Overview

- 5) Click the “Go Live”  icon as indicated in Figure 39 above.
- 6) The YouTube Studio “Go Live” menu has options for managing all current streams as well as scheduling upcoming streams. Click the  icon in the upper left corner as indicated in Figure 40 to expand the navigation pane.

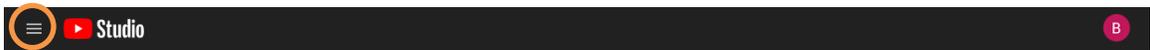


Figure 40: Navigation Pane Icon

- 7) On the dropdown tab, confirm that “Stream” is selected (see Figure 41 below).

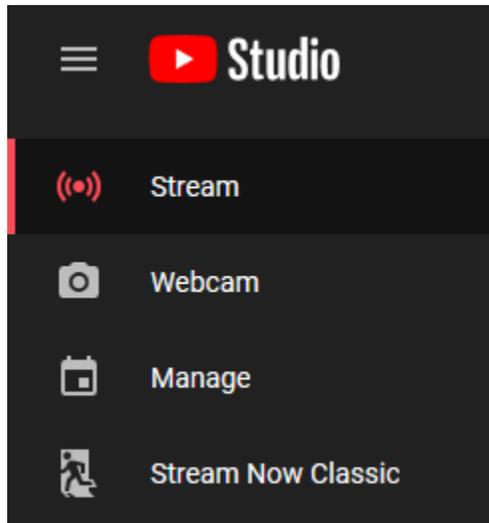


Figure 41: Stream Option

- 8) On the prompt that follows, displayed in Figure 42, click “New Stream”.

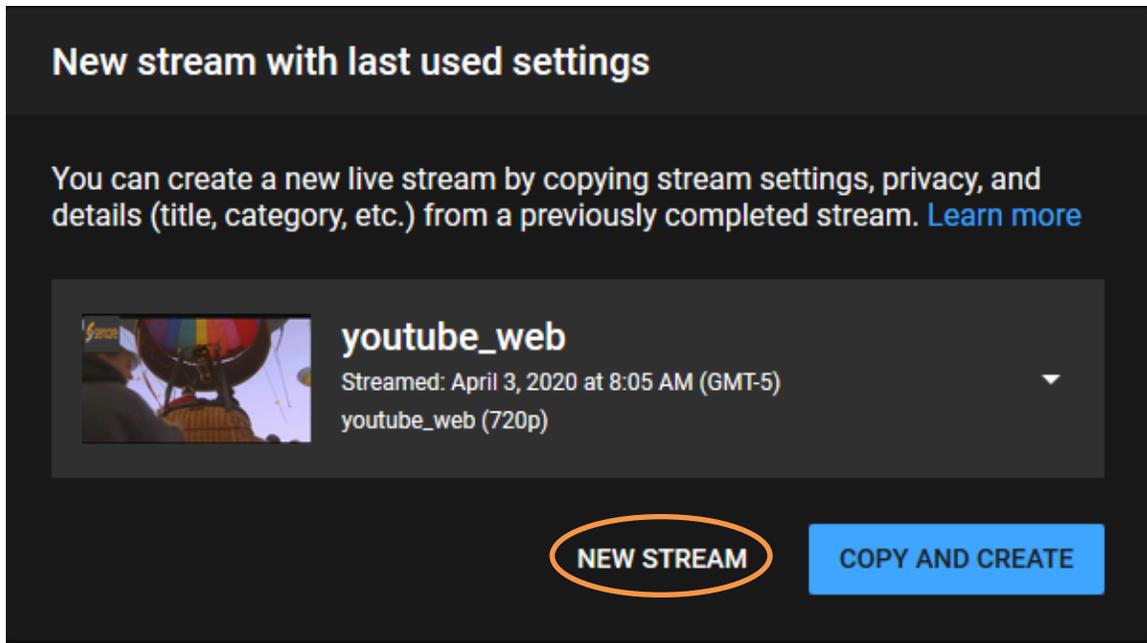


Figure 42: Stream Creation Prompt

- 9) Enter a title in the “Create a title” field and choose an “Audience” similarly to Figure 43, and then click “Create Stream”.

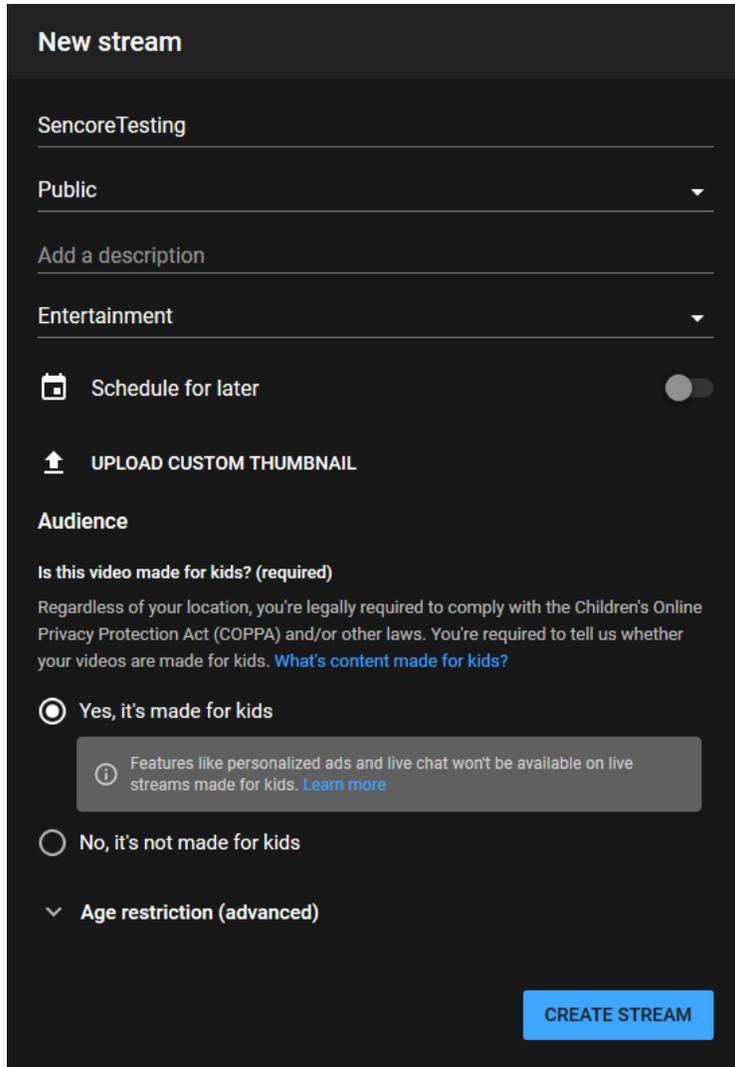
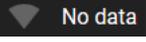


Figure 43: New Stream Prompt

- 10) The “Stream Menu” that follows, displayed in Figure 44 on the next page, contains analytics about the incoming stream as well as necessary information to link the Impulse 100E encoder to the YouTube stream instance. Click to select the “Stream Settings” option, underneath the  icon to display the “Stream Key”.

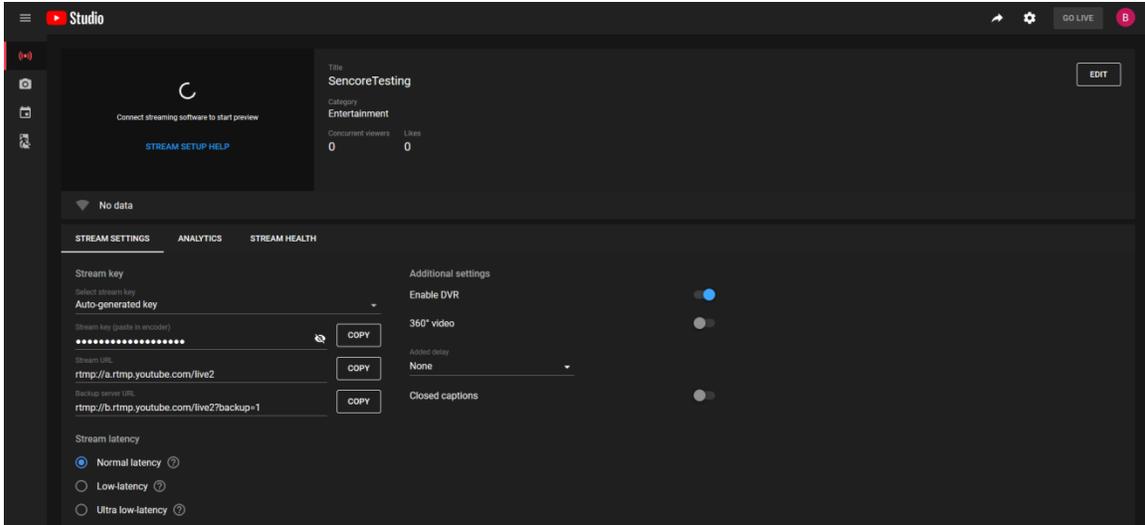
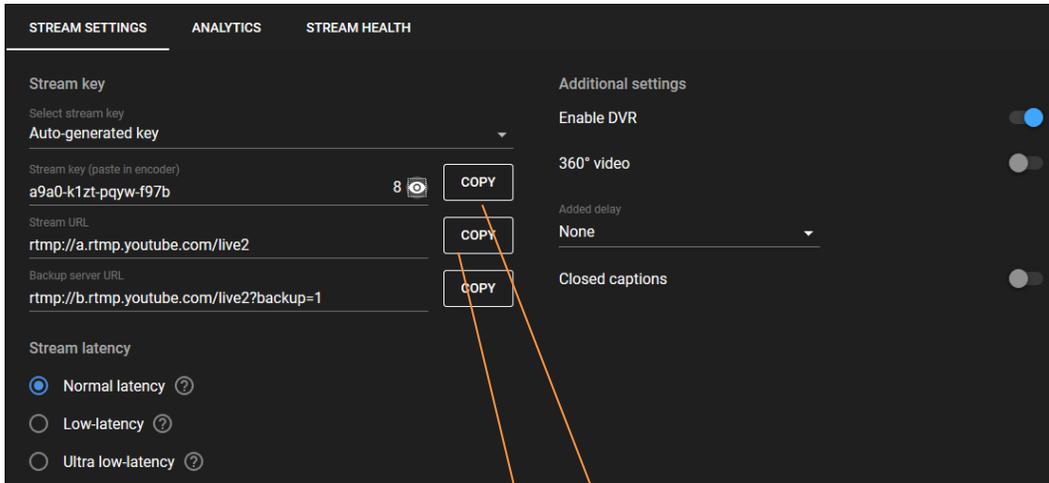


Figure 44: Stream Menu Overview

11) As shown in Figure 45, copy and paste the randomly generated “Stream key” from YouTube to the “Uploading Node” on the Impulse 100E, then copy and paste the “Stream URL” from YouTube to the “URL” on the Impulse 100E. Click Apply.



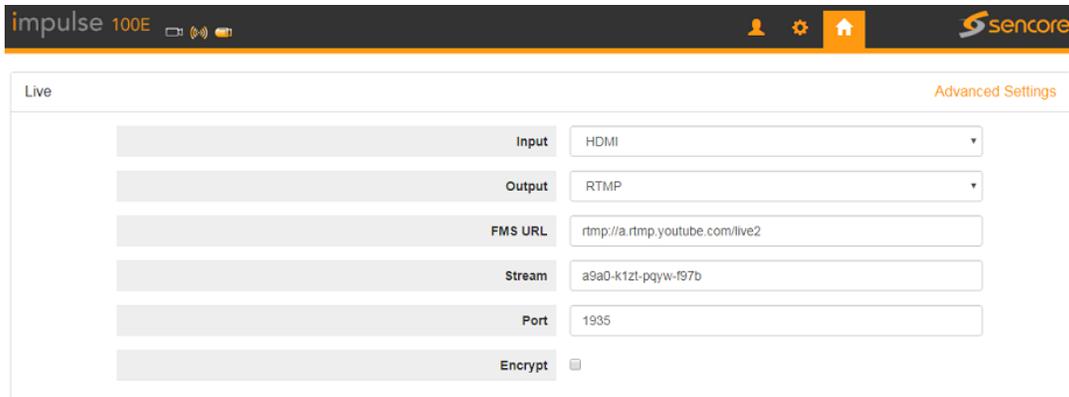


Figure 45: Stream Key and Stream URL Locations

- 12) On the Impulse, click “Start”. The Impulse 100E may take up to five minutes to prepare the stream.
- 13) It will display “RTMP Normal” if the connection was successful.

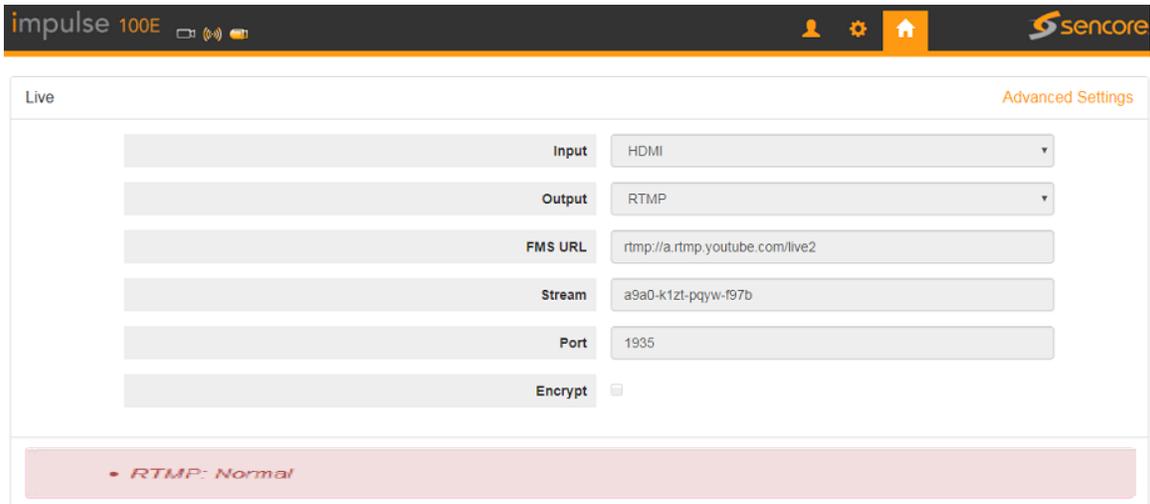


Figure 46: Output Status

- 14) Return to the “Stream Menu” on YouTube. With likeness to Figure 47 below, the connection status will indicate “Excellent Connection”, and a thumbnail of the stream will appear in the upper-left corner. Click “Go Live” in the top-right corner to begin streaming to YouTube.

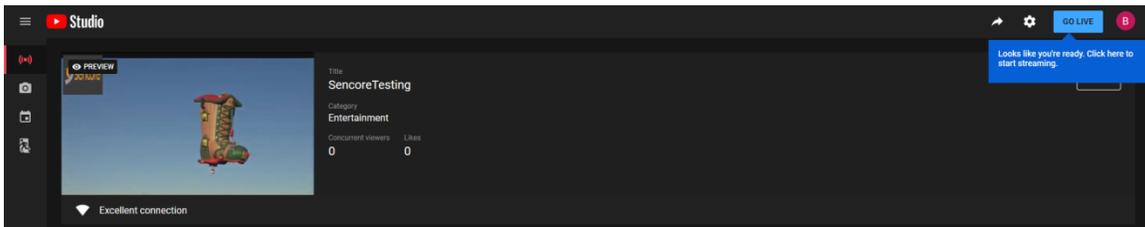


Figure 47: Stream Menu Receiving RTMP