

**Osprey<sup>®</sup>**

***Video***

***Talon PRO User Guide***

***02/26/2020***

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## OVERVIEW

Thank you for purchasing the Osprey® Talon PRO video encoder from Osprey Video. This user guide provides step-by-step instructions for installing and using your new video encoder. For the latest Osprey product information and news, visit our website at [www.ospreyvideo.com](http://www.ospreyvideo.com).

## FEEDBACK:

We greatly value your input. Please direct any questions, comments or support issues to

[support@ospreyvideo.com](mailto:support@ospreyvideo.com)

**+1 972 488 7156**

## PRODUCT DESCRIPTION

The Osprey Talon PRO is a hardware based, small form-factor video encoder designed to be easy to use, portable, and easily stream 4K, HD or SD content to broadband and mobile networks. It supports 2 simultaneous inputs (3 total) and can stream HEVC or AVC via an extensive array of transports. Its versatility makes it an excellent Cloud Contribution Encoder. It has an intuitive web interface for configuration.

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## FEATURES

- Web-Based/Wireless Configuration and Monitoring
- H.265 encode in resolutions up to 2160p30
- H.264 video from QCIF to 2160p30
- H.265, H.264, MJPEG
- Low Latency
- Fully controllable parameters: resolution, max bitrate, GOP and on-the-fly bitrate control
- Zixi Feeder™ Support
- SRT Support (Modes Supported: Caller & Sender)
- HE-AAC, HEV2-AAC, AAC-LC
- 2 Channels Line Level and Embedded Audio
- Interfaces: HDMI 1.4a input/output, Display Port 1.1 input, 2x 3G-SDI input, Gigabit Ethernet, Re-Clocked SDI loop through, Line Level Audio input
- Outputs: RTP, RTSP, MPEG-2 TS over UDP, RTMP, RTMPS, Zixi Feeder, SRT, and TSRTMP
- MP4 & TS File Recording
- 4SDI stereo pairs supported
- Support for Dual HD SDI mode or HD SDI and a HDMI input
- Audio Resampling support
- Live Video Preview in the web browser
- ROI crop encode
- Supports unicast and multicast streaming
- 1x USB 2.0 interface for local storage
- 1x Micro-SD card interface for local storage
- Operating System: Embedded Linux
- Redundant Power Supply

## SUPPORTED INPUT RESOLUTIONS

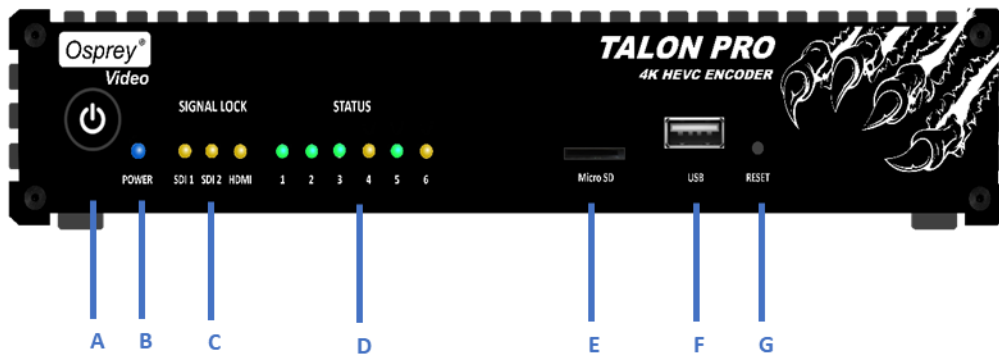
**HDMI (TV):** 2160p30, 1080p60, 1080p59.94, 1080p50, 1080p30, 1080p29.97, 1080p25, 1080p24, 1080p23.98, 1080i30, 1080i29.97, 1080i25, 1080i24, 1080i23.98, 720p60, 720p59.94, 720p50, 720p30, 720p29.97, 720p25, 720p24, 720p23.98, 576p50, 480p60

**NOTE: HDMI 1080I MODES REQUIRE OPERATING MODE HD\_INTERLACED IN SYSTEM SETUP TAB**

**HDMI (PC):** 3560x1760 @ 30fps, 2560x1600(WQXGA) @ 25fps, 2560x1600 @ 30fps, 2560x1600 @ 50fps, 2560x1600 @ 60fps, 1920x1200 @ 60fps, 1680x1050 @ 60fps, 1600x1200 @ 60fps, 1600x900 @ 60fps, 1440x900 @ 60fps, 1400x1050 @ 60fps, 1280x1024 @ 60fps, 1280x1024 @ 75fps, 1280x1024 @ 85fps, 1280x960 @ 60fps, 1280x800 @ 60fps, 1280x768 @ 60fps, 1280x768 @ 75fps, 1280x768 @ 85fps, 1280x720 @ 75fps, 1280x720 @ 85fps, 1280x600 @ 60fps, 1152x864 @ 60fps, 1024x768 @ 60fps, 1024x768 @ 70fps, 1024x768 @ 75fps, 1024x768 @ 85fps, 960x600 @ 60fps, 848x480 @ 60fps, 800x600 @ 60fps, 800x600 @ 72fps, 800x600 @ 75fps, 800x600 @ 85fps, 640x480 @ 60fps, 640x480 @ 75fps, 640x480 @ 85fps, 640x360 @ 60fps

**SDI:** 1080p60, 1080p59.94, 1080p50, 1080p30, 1080p29.97, 1080p25, 1080p24, 1080p23.98, 1080i30, 1080i29.97, 1080i25, 1080i24, 1080i23.98, 720p60, 720p59.94, 720p50, 720p30, 720p29.97, 720p25, 720p24, 720p23.98, 576i25, 480i30, 480i29.97

## Front Panel



### A: POWER SWITCH

Latching switch stays on if power is interrupted

### B: POWER INDICATOR

Changing colors indicate power and boot status

### C: SIGNAL STATUS

Indicates signal latching for each input

### D: STATUS LIGHTS

User programmable to indicate encoding status, along with system alerts

### E: MICRO SD CARD

Space for saving/archiving video

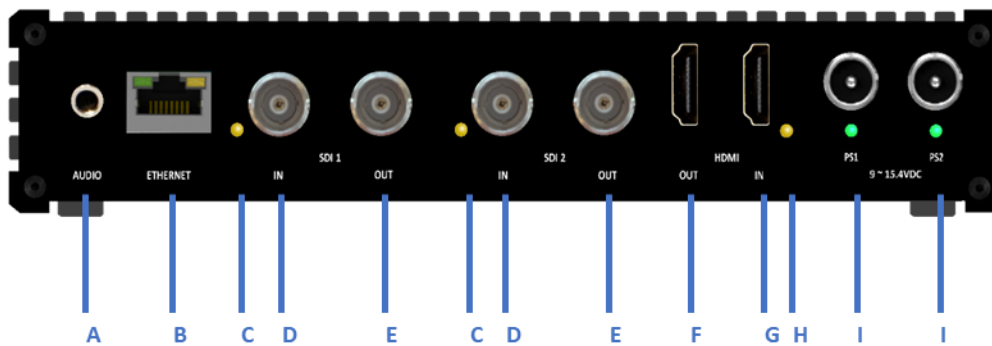
### F: USB PORT

For system updates or quick video storage

### G: RESET

Two stage restore. Return to default settings, or restore factory image

# Rear Panel



## A: ANALOG AUDIO INPUT

Stereo line level or mic level audio input, 1/8 inch TRS

## B: ETHERNET PORT

Gig-E connection to the ethernet

## C: SDI SIGNAL STATUS

Indicates signal latching for SDI input

## D: SDI INPUTS

BNC connectors for 3G SDI input

## E: SDI LOOPOUT

Signal Pass Through for SDI. User configurable as active or passive

## F: MONITOR OUT

HDMI output. Can be switched to monitor any of the three inputs

## G: HDMI IN

Input for HDMI signals up to 4K 30

## H: HDMI LINK

Yellow LED indicates sync on HDMI input

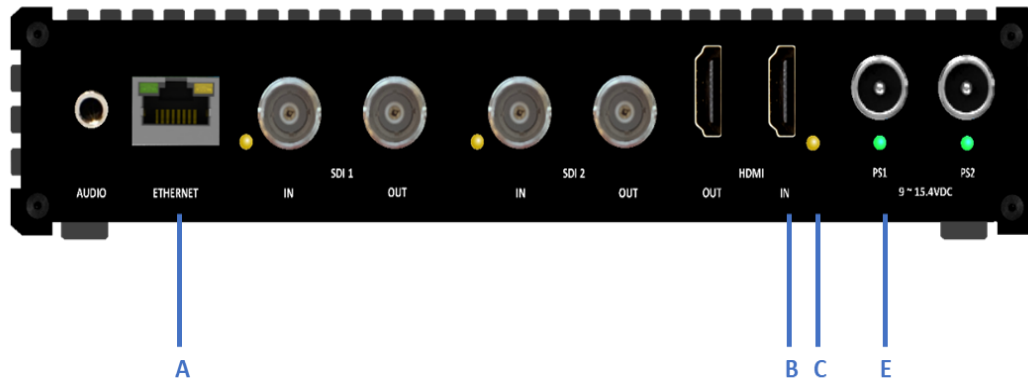
## I: POWER CONNECTION

Connection for redundant power supplies. Can also work as single



## QUICK SETUP

### CONNECT THE ENCODER



#### 1: CONNECT TO ETHERNET

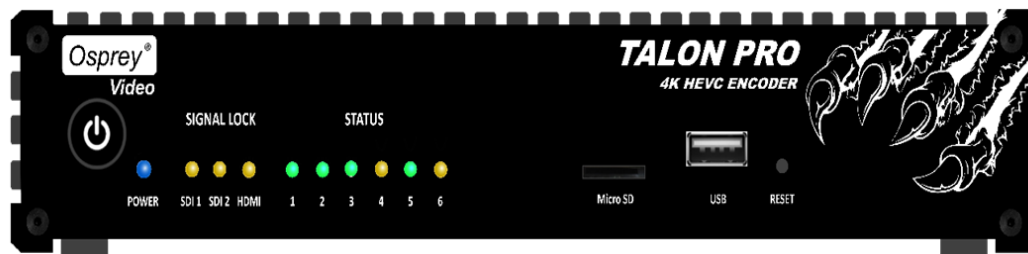
Connect an ethernet cable from Ethernet “A” on the back of Talon to a switch, router or other DHCP server on the same network as your Windows PC.

#### 2: CONNECT HDMI SOURCE

Select an HDMI source producing either HD or UHD  
Verify there is at the source  
Connect the HDMI source to the HDMI In “B” on Talon

#### 3: CONNECT TO POWER

Connect 12V power supply. “E”



#### 4: Press Power Switch

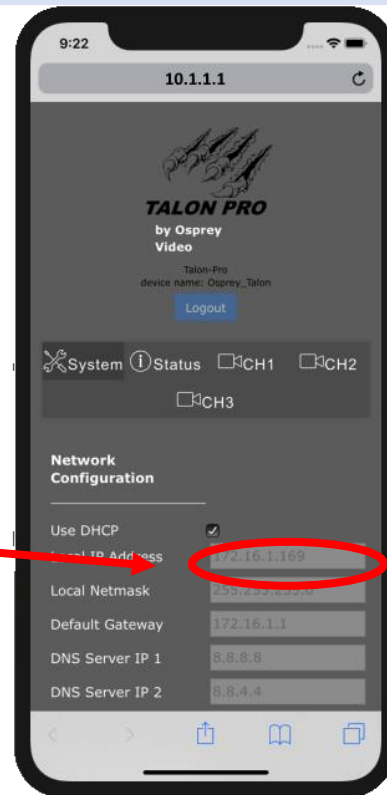
The front status lights will flash indicating booting.  
When the “Power” light turns BLUE, booting is complete.

## VERIFY THE IP ADDRESS

1. Use a smart phone
2. Turn on wireless networking



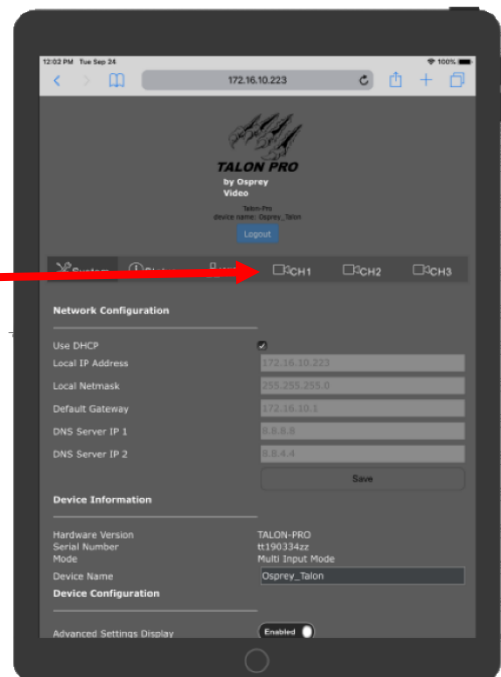
3. Connect to wireless network "Talon-Pro (your Talon serial number) with password "0spr3yT@10n"
4. Using the phone's browser, go to <http://10.1.1.1>
5. Read the Local IP Address of the Talon Here:



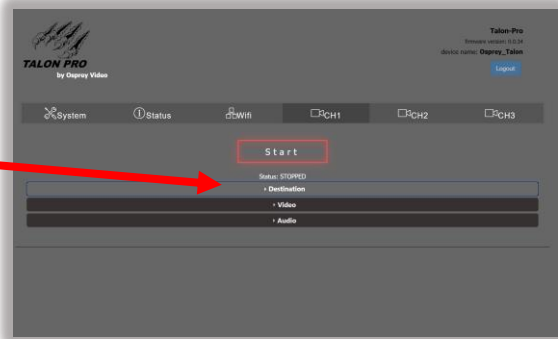
## CONNECT VIA A BROWSER

Using a PC, MAC or Tablet that is on the same network as the Talon, enter the IP address you found above. EXAMPLE <http://192.168.2.21>

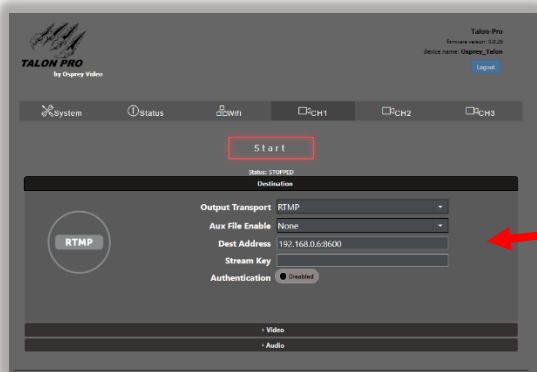
Select a Channel



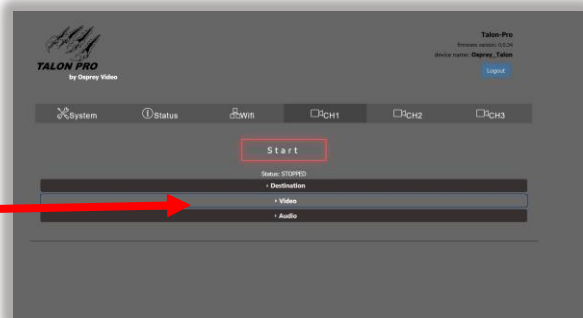
Click on the  
Destination Bar



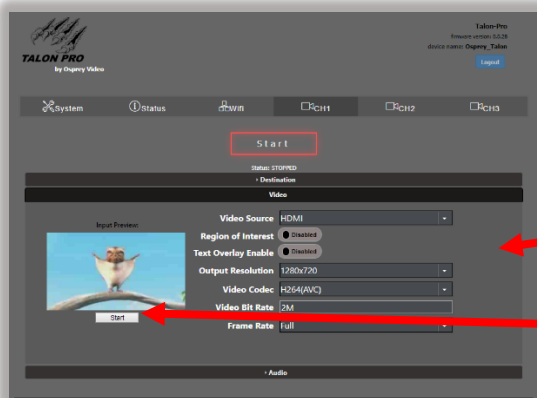
Enter Destination Info



Click on the Video Bar

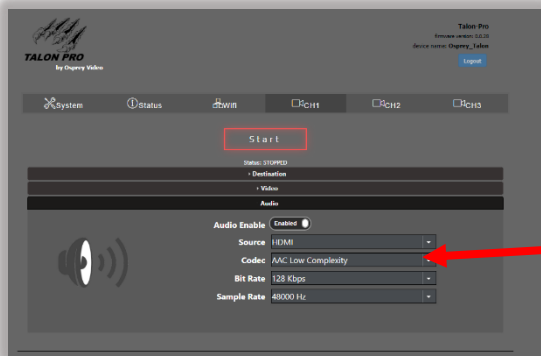
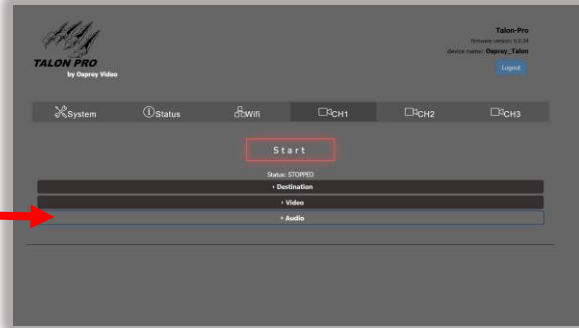


Video Settings



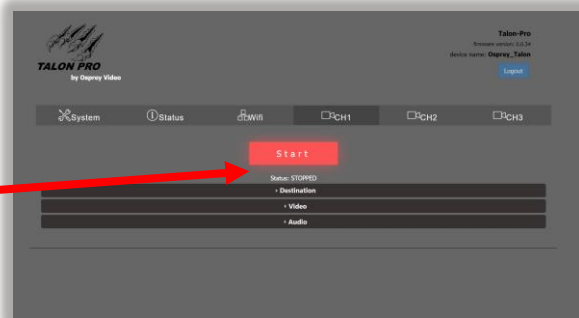
Video Preview

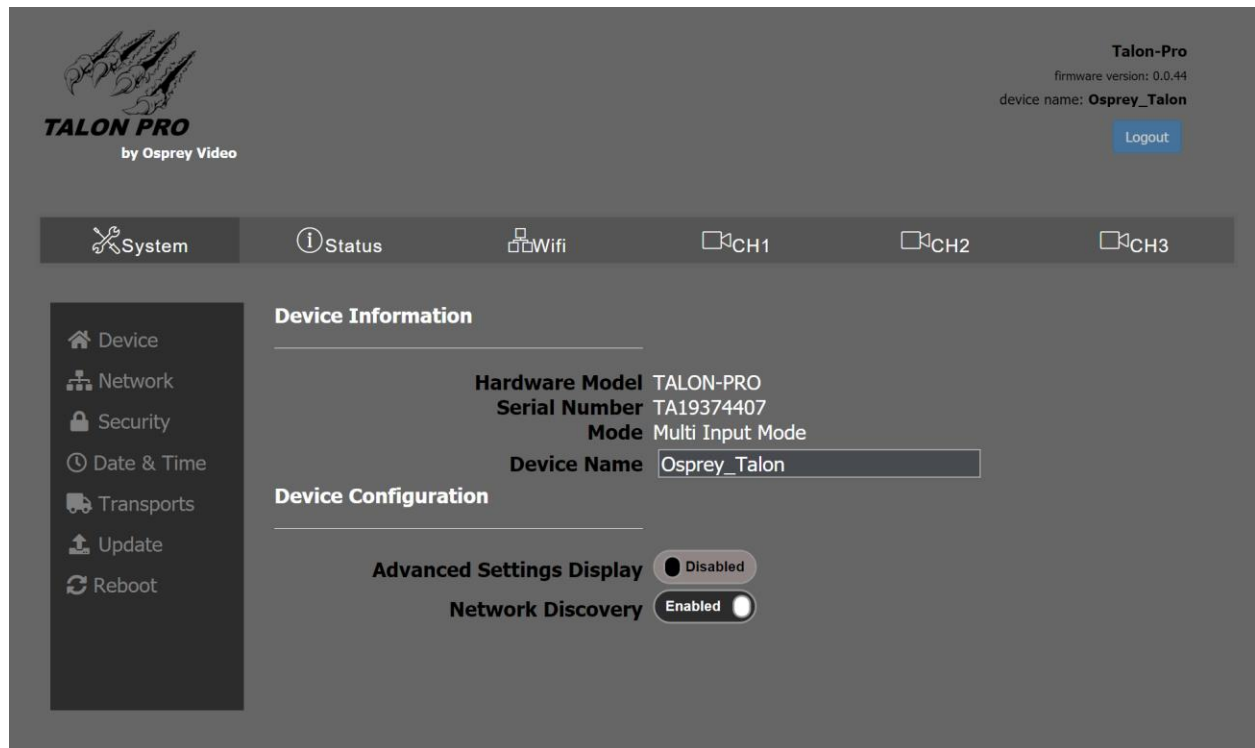
Click on the Audio Bar



Enter Audio Info

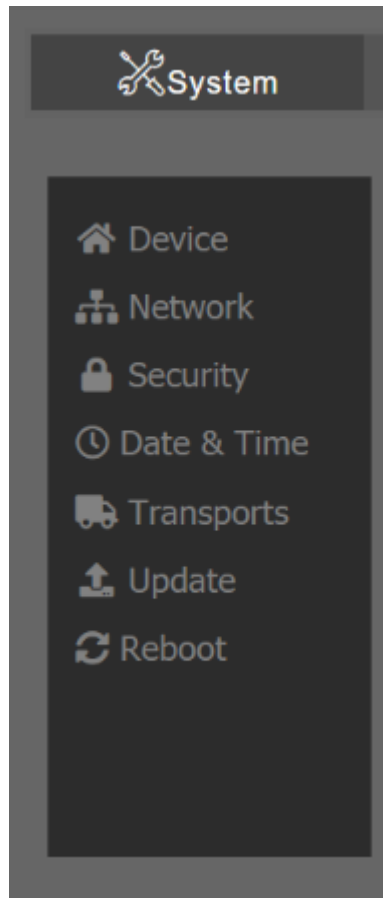
Select START





The Web UI can be reached from any modern browser that has access to the network where the Talon PRO resides. It opens at a landing page that displays information regarding the global system settings. The informational tabs are SYSTEM, STATUS, and Wi-Fi. Most of the global settings are found beneath the SYSTEM tab. Before moving on to encoder configuration, familiarize yourself with the basic SYSTEM settings.

## SYSTEM



The System tab has device information along with global system settings.

## DEVICE

### DEVICE INFORMATION

#### Device Information

<b>Hardware Model</b>	TALON-PRO
<b>Serial Number</b>	TT00000005
<b>Mode</b>	Multi Input Mode
<b>Device Name</b>	<input type="text" value="Osprey_Talon"/>

---

## HARDWARE MODEL

TALON-PRO

---

## SERIAL NUMBER

The Device Serial Number is used by other parts of the system to identify this encoder and the features associated with it. It cannot be changed by the user.

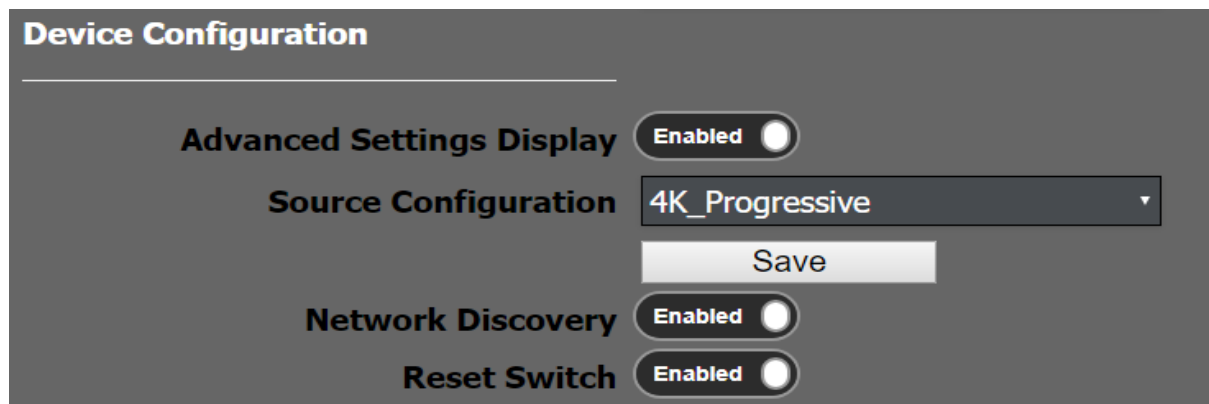
---

## MODE

Indicates whether the encoder is in Multi Input mode, or Single Input mode. The default is Multi Input. This changes to Single Mode if, in the Streaming Options category below the Ultra Low Latency option is enabled.

---

## DEVICE CONFIGURATION



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## ADVANCED SETTINGS DISPLAY

The basic encoding settings are enabled by default. For greater customization, additional settings may be accessed by enabling Advanced Settings.

If Enabled, the advanced settings become visible in the UI. The default is Disabled.

---

## SOURCE CONFIGURATION (ADVANCED)

Specifies which source combination is available. Options are:

1. 4K30 HDMI + SDI1
2. SDI1 + SDI2
3. HDMI + SDI1

Options 1 and 2 only support progressive inputs. Option 3 supports 3G HDMI, and SDI as well as interlaced SDI inputs.

Changing this setting requires a reboot.

---

## NETWORK DISCOVERY

When Enabled this allows the encoder to announce its presence on the network so that it can be discovered by the configuration utility. The default is Enabled.

---

## RESET SWITCH (ADVANCED)

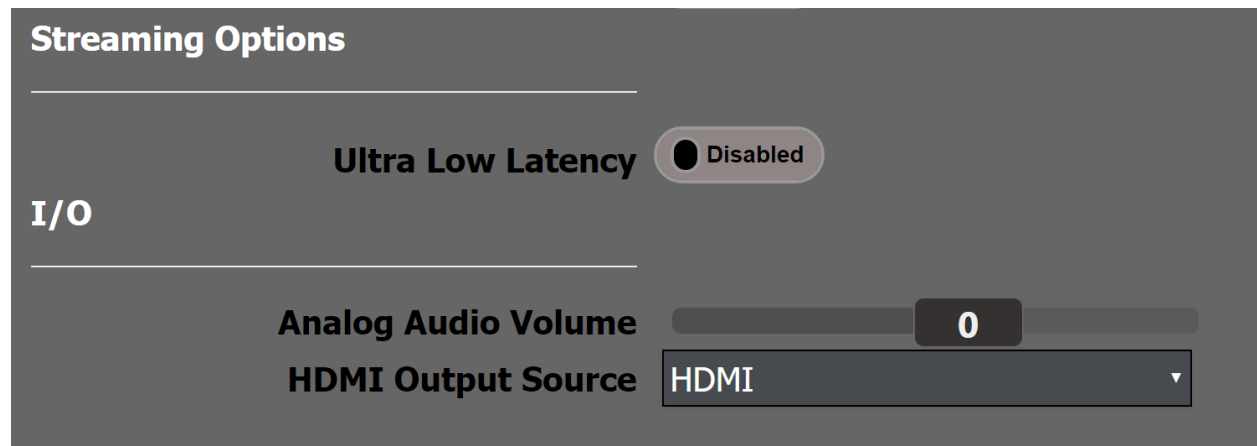
If this is Enabled, there is a recessed button on the front of the encoder that lets the user reset the system back to factory settings. You may Disable this to prevent unauthorized resetting of the device. The default setting is Enabled.

To clear all encoder settings, press and hold the reset button. The six Status LEDs will turn green one at a time. When they all flash at once, release the button and the system will reboot. All encoder settings will be removed. Non encoder settings will remain.

To clear all system settings and restore to the last system image, press and hold until the six Status LEDs light green. Continue to hold the button until the six all change to yellow. When the button is released the encoder will reboot and all settings will be returned to their factory defaults. This includes network settings.

---

## STREAMING OPTIONS (ADVANCED)



---

### ULTRA LOW LATENCY

Default setting is Disabled. When Enabled reduces the overall encoding latency of Talon. To do this the device runs in "Single Input Mode". Only one input can be used. This setting can result in degraded video quality and should not be used for regular streaming.

Changing this setting requires the system to reboot. Any encoders that are running will be stopped.

---

### I/O (ADVANCED)

---

#### ANALOG AUDIO VOLUME

This slider adjusts the incoming volume of a source that is connected to the analog audio input on the front panel. Moving the slider to the right will increase the volume up to 12db. Moving the slider to the left will pad a loud input up to 12db.



---

## HDMI OUTPUT SOURCE

By default the HDMI output on the rear of the Talon displays the signal from the HDMI input. Here you may select any other source and display it on the HDMI output for monitor purposes. This selection can be changed while Talon is encoding without effecting the streaming output.

## NETWORK

The screenshot displays the Talon-Pro web interface. At the top left is the 'TALON PRO by Osprey Video' logo. At the top right, it shows 'Talon-Pro', 'firmware version: 0.0.28', and 'device name: Osprey\_Talon', with a 'Logout' button. Below this is a navigation bar with icons for System, Status, Wifi, CH1, CH2, and CH3. On the left is a sidebar menu with options: Device, Network, Security, Date & Time, Transports, Update, and Reboot. The main content area is titled 'Network Configuration' and contains the following settings:

Setting	Value
Use DHCP	<input checked="" type="checkbox"/>
Local IP Address	172.16.10.223
Local Netmask	255.255.255.0
Default Gateway	172.16.10.1
DNS Server IP 1	8.8.8.8
DNS Server IP 2	8.8.4.4

Below the settings is a 'Save' button.

---

## NETWORK CONFIGURATION

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### DHCP

By default, Talon is set to receive an IP address automatically via DHCP.

---

### STATIC IP

If you do not wish to use DHCP you may uncheck the box and assign a static address manually. Be certain that the static IP you set is valid before rebooting. Failure can cause Talon to become inaccessible to the web UI. When that occurs, you can use Talon's wireless access point to reset the address or use the reset button on the front of the device to restore the system to original default settings.

## SECURITY

The screenshot displays the web interface of the Talon-Pro device. At the top left is the 'TALON PRO by Osprey Video' logo. At the top right, it shows 'Talon-Pro', 'firmware version: 0.0.28', and 'device name: Osprey\_Talon', with a 'Logout' button. Below the header is a navigation bar with tabs: 'System' (selected), 'Status', 'Wifi', 'CH1', 'CH2', and 'CH3'. On the left side of the 'System' tab is a sidebar menu with options: 'Device', 'Network', 'Security' (highlighted), 'Date & Time', 'Transports', 'Update', and 'Reboot'. The main content area is titled 'Security Configuration'. It contains a 'Service Port' toggle switch currently set to 'Enabled'. Below this is the 'Device Password' section, which includes two input fields for 'New password' and 'Confirm password', and a 'change' button.

---

### SERVICE PORT

To turn off the hardware service port set this to “Disabled”.

---

### DEVICE PASSWORD

You can create a password for the web UI here. If no password is set no login is required. Username is “admin” and cannot be changed.

## DATE & TIME

The screenshot shows the Talon-Pro web interface. At the top left is the logo "TALON PRO by Osprey Video". At the top right, it says "Talon-Pro", "firmware version: 0.0.28", and "device name: Osprey\_Talon" with a "Logout" button. Below this is a navigation bar with tabs: "System" (selected), "Status", "Wifi", "CH1", "CH2", and "CH3". On the left side of the main content area is a sidebar menu with options: "Device", "Network", "Security", "Date & Time" (selected), "Transports", "Update", and "Reboot". The main content area is titled "Network Time Protocol (NTP)". It contains the following settings: "NTP Service" with a toggle switch set to "Enabled", "Time Zone" with a dropdown menu showing "America/Chicago", and "Server" with a text input field containing "128.138.141.172". A "Save" button is located below the server input field.

---

### NTP SERVICE

Talon supports Network Time Protocol (NTP) for clock synchronization on computer networks. It is enabled by default.

---

### TIME ZONE

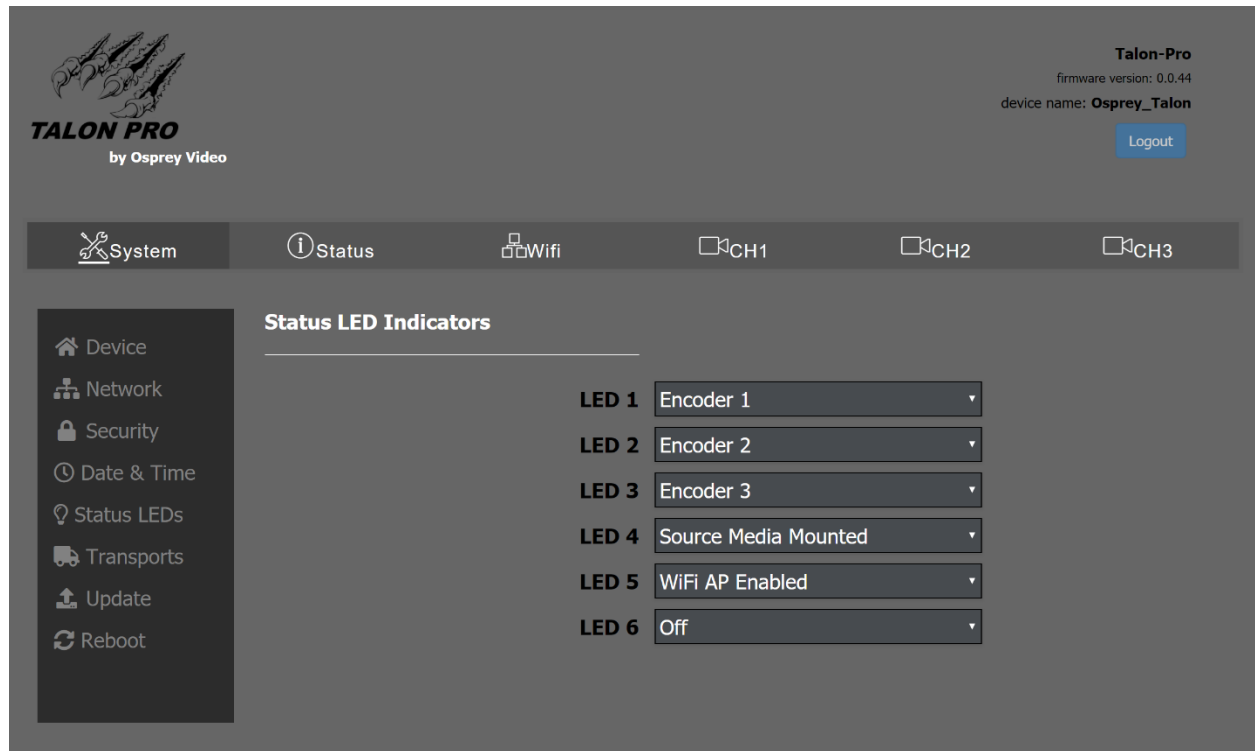
For NTP purposes, set this to your local time zone. (continent/location)

---

### SERVER

By default, the server address is set for the outside NTP server. If your network uses a local timeserver, you may input that address here.

## STATUS LED (ADVANCED)



### STATUS LED INDICATORS

On the front of the Talon PRO are six user configurable LEDs. These can each be set to light up under a specified condition. The options are:

- Encoder 1: indicates Encoder 1 is active
- Encoder 2: indicates Encoder 2 is active
- Encoder 3: indicates Encoder 3 is active
- Source Media Mounted: indicates if a USB drive or SD card has been recognized by the OS
- WiFi AP enabled: indicates that the WiFi access point is on.

## TRANSPORTS

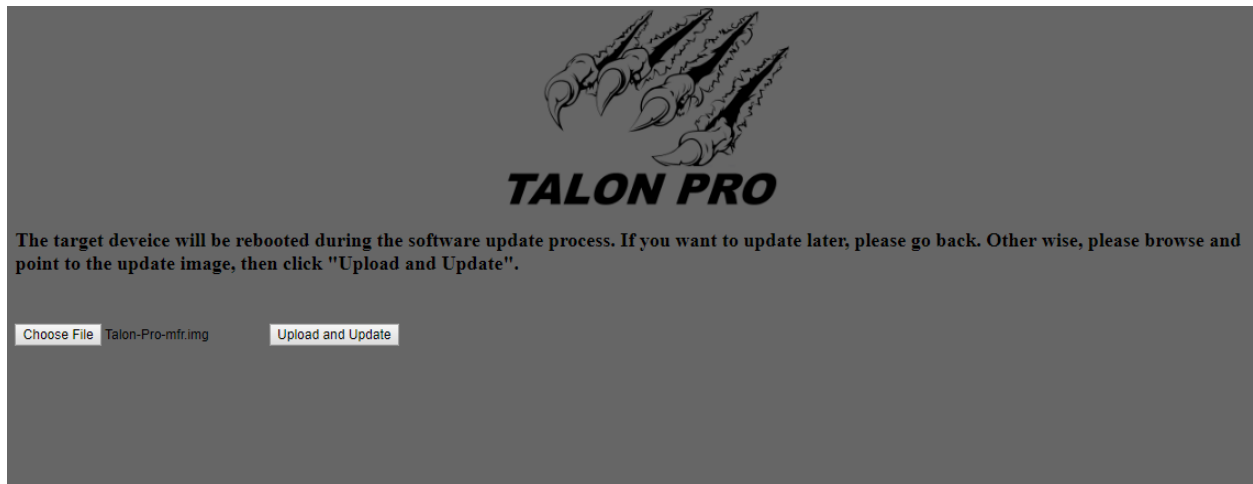
The screenshot shows the Talon-Pro web interface. At the top left is the logo "TALON PRO by Osprey Video". At the top right, it says "Talon-Pro", "firmware version: 0.0.28", and "device name: Osprey\_Talon" with a "Logout" button. Below this is a navigation bar with icons for "System", "Status", "Wifi", "CH1", "CH2", and "CH3". On the left is a sidebar menu with icons for "Device", "Network", "Security", "Date & Time", "Transports", "Update", and "Reboot". The main content area is titled "Output Transport Configuration". Below the title, it says: "Below are the available output transports on this device. By default, all options appear on each channel menu. You may remove seldom used options by unchecking them here." There is a list of 14 transport options, each with a label and a toggle switch labeled "Enabled":

Transport Option	Status
UDP	Enabled
RTMP	Enabled
RTMPS	Enabled
TSRTP	Enabled
RTSP	Enabled
RTP	Enabled
Facebook Live	Enabled
Wowza	Enabled
Zixi	Enabled
IBM Cloud Video	Enabled
StreamSpot	Enabled
SRT	Enabled
Save to MP4	Enabled
Save to TS	Enabled

### OUTPUT TRANSPORT CONFIGURATION

There are 14 available transport options that are enabled by default. To simplify setup, some admins prefer to remove unused transports from the encoder menu. Disabling any of them here prevents them from appearing in the encoder configuration dialog.

## UPDATE



---


## UPDATE PROCEDURE

Updates to Talon are made available via the web. If an update is necessary, download it from the Osprey website and save it to your local PC. From Talon's update page, click "Choose File" and choose the downloaded file from its location on your PC. Then click "Upload and Update".


## REBOOT


To Reboot Talon without having to power cycle the encoder, click Reboot, and then click "Reboot Now" on the dialog box that appears. You will be unable to access the encoder from the UI while it is rebooting. The reboot process usually takes less than 30 seconds. The front panel LEDs will flash until the boot sequence is completed.


## STATUS


**TALON PRO**  
by Osprey Video


**Talon-Pro**  
firmware version: 0.0.28  
device name: **Osprey\_Talon**  
[Logout](#)

 System

 **Status**

 CH1

 CH2

 CH3

**Video Status**

CH	Bitrate (Kbps)	Actual Bitrate	FPS	Actual FPS	Key-frame FPS	Width	Height
1	2000.00	2054.98	60.0	59.9	1.0	1280	720

**Audio Status**

Channel	Codec	Samplerate	Input	Frames
1	fdk_aac	44100	HDMI	836

**Stream Status**

Channel	URL	Frames
1	rtmp://wowza.ospreyvideo.com/noauth/pro	1170

**Input Status**

Input	Resolution	FPS
HDMI1	1280x720p	59.94

**Temperature Status**

Sensor	Temp (Celsius)
CPU	49.50

[Refresh](#)  
Auto Refresh ☐

This tab provides a status overview of all inputs and all streams, along with CPU Temperature status from a single page. The refresh button updates the page when pressed. For continuous updates select “Auto Refresh”

## WIFI CONFIGURATION

**TALON PRO**  
by Osprey Video

**Talon-Pro**  
firmware version: 0.0.44  
device name: **Osprey\_Talon**  
[Logout](#)

System Status **Wifi** CH1 CH2 CH3

### Wifi Configuration

**Access Point** ☒ Enabled

**SSID** Talon-Pro TA19374417

**Authentication (WPA)** ☒ Enabled

**Password** .....

[Save Credentials](#)

The Wi-Fi on the Talon is an access point for configuration only. It will not support WiFi streaming. To access your Talon, select the Access Point whose SSID is the same as the Serial Number. Once selected, use the password “0spr3yT@10n” to connect to the access point. In your browser, connect to the IP 10.1.1.1 to reach the Web UI and determine the IP address of your Talon. You can continue to use the access point to configure your encoders, or you can use the IP address to connect with a browser from a PC. For complete instructions see the Talon Quick Start Guide.

---

### ACCESS POINT

The Talon Wi-Fi access point is enabled by default. To turn off the Access Point, select “Disabled”

---

### SSID

The SSID is “Talon-Pro” followed by the serial number of the Talon. You can distinguish multiple encoders in the same vicinity by the serial number.

---

### AUTHENTICATION

Authentication is turned on by default. If it is disabled anyone who tries to connect can do so without a password. It is recommended that authentication always be enabled.

---

### PASSWORD

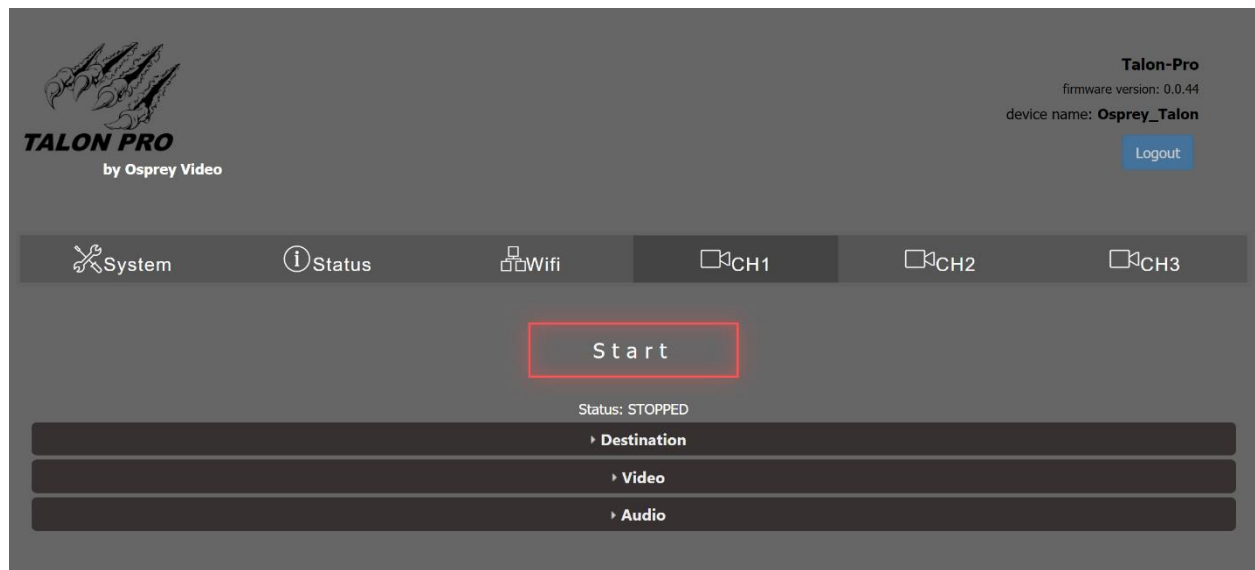
The default password for WiFi is 0spr3yT@10n This is the same for every Talon.

---

**NOTE: FOR SECURITY, YOU SHOULD CHANGE THE PASSWORD AFTER FIRST SETUP.**



## ENCODERS CH1, CH2, CH3



## SET ENCODER SETTINGS

All settings for creating a stream can be found by clicking on the tab for the individual encoders labeled CH1, CH2 and CH3. To configure an encoder, it is best to start first with the “Destination” ribbon. Each type of encoder transport has configuration options that are unique to that encoder type. By selecting the “Output Transport” first, these options are activated on the subsequent “Video” and “Audio” ribbons.

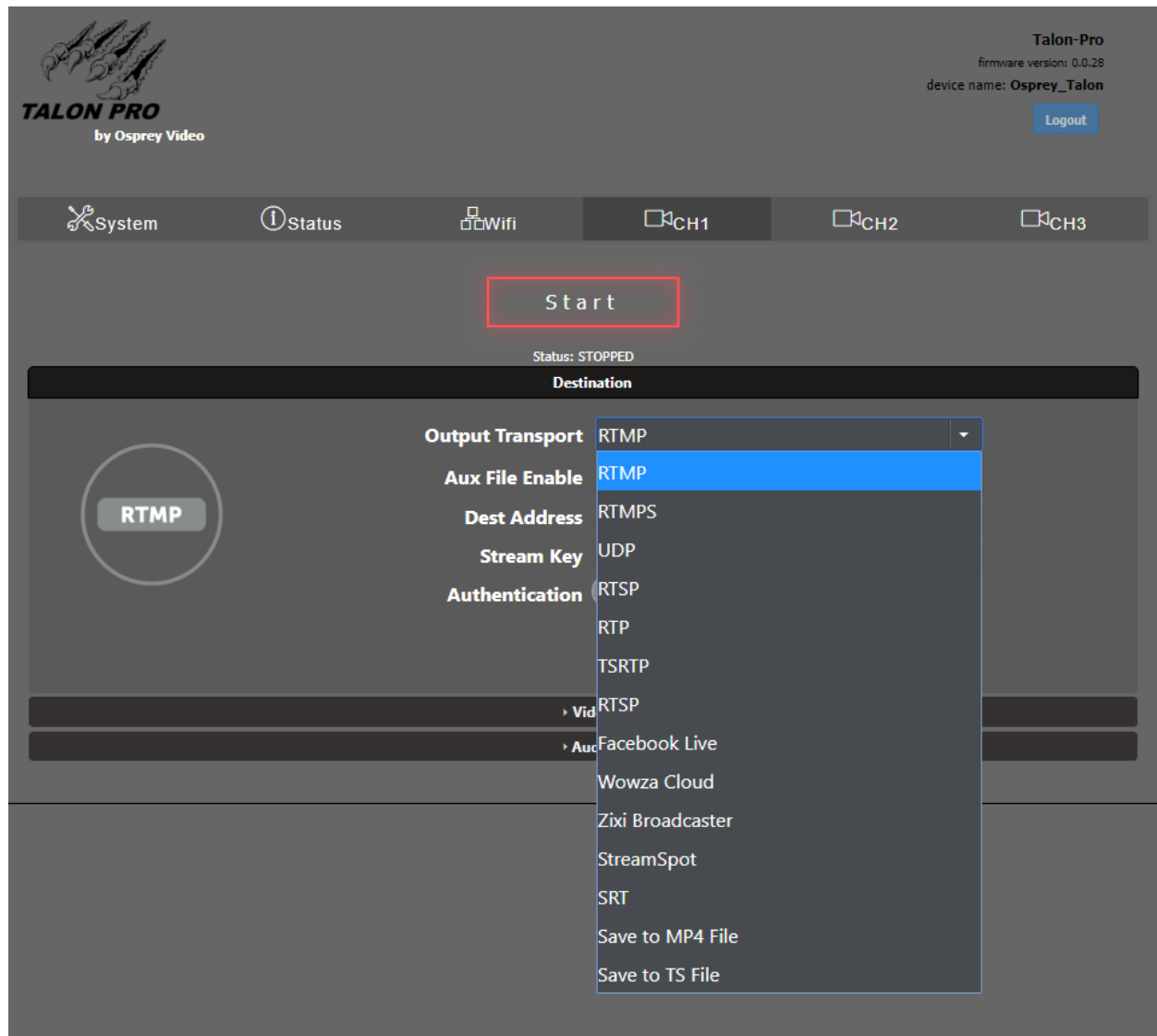
## START

All encoder options should be configured before clicking on the “Start” button.

## DESTINATION

The Destination ribbon is where you select the transport type and location of the video stream you are creating. The selection of the Output Transport will change the options available on the Destination page, as well as the Video selections found on the next ribbon. For that reason, it is recommended that you start all configuration at the Destination tab.

## OUTPUT TRANSPORT



Output Transport is where you select the format of the encoded IP stream. Selecting RTMP will present a different set of options than selecting UDP. As each selection is different, refer to the Encoder Configuration Page in the User Guide for each Output Transport.

### NOTE:

- IF UDP IS SELECTED, DON'T FORGET TO CHECK THE VALUE OF TS RATE TO MAKE SURE IT IS IN LINE WITH EXPECTATION.
- RTP REQUIRES AN SDP FILE FOR THE RECEIVER THAT CORRESPONDS WITH THE VIDEO CODEC USED.
- RTSP REQUIRES THE USE OF THE RTSP URL.
- ZIXI CAUSES STREAMING VIA ZIXI FEEDER™ TO A ZIXI RECEIVER™ COMPATIBLE DEVICE.

## AUX FILE

**TALON PRO**  
by Osprey Video

**Talon-Pro**  
firmware version: 0.0.44  
device name: **Osprey\_Talon**  
[Logout](#)

System Status Wifi CH1 CH2 CH3

**Start**

Status: STOPPED

**Destination**

**RTMP**

**Output Transport** RTMP

**Aux File** None

**Dest Address** 192.168.0.6/\_definst\_

**Stream Key** 09x0x12n&&\$e1rsd

**Authentication** Disabled

**Auto Start** Disabled

Video

Audio

The AUX FILE menu is for creating and saving a file at the same time as the encoder is streaming. Options are None, TSfile or MP4file. Some transports do not support all options. The option will be grayed out if it is not supported by the transport you have suggested.

An Aux File can be saved simultaneously with RTMP, RTMPS, UDP, RTSP, RTP, TS RTP TRSP and SRT. When “None” is selected the menu appears as above. When TSfile or MP4file are selected, the option menu appears.

The screenshot shows the Talon-Pro web interface. At the top left is the logo "TALON PRO by Osprey Video". At the top right, it says "Talon-Pro", "firmware version: 0.0.44", and "device name: Osprey\_Talon" with a "Logout" button. Below this is a navigation bar with icons for "System", "Status", "Wifi", "CH1", "CH2", and "CH3". In the center, there is a "Start" button highlighted with a red rectangle. Below the "Start" button, it says "Status: STOPPED". The main configuration area is titled "Destination" and contains several settings: "Output Transport" (RTMP), "Aux File" (MP4File), "Output" (USB Flash Drive), "Output Device" (/dev/sdb1), "Path and File Prefix" (MOV1\_%F\_%T\_), "Max File Size" (1024M), "MP4 Index" (Streaming), "Dest Address" (192.168.0.6/\_definst\_), "Stream Key" (09x0x12n&&\$e1rsd), "Authentication" (Disabled), and "Auto Start" (Disabled). On the left side of the configuration area, there is a circular button labeled "RTMP". At the bottom, there are two expandable sections: "Video" and "Audio".

NOTE: SPECIAL TRANSPORTS LIKE WOWZA CLOUD AND FACEBOOK LIVE DO NOT ALLOW FOR SIMULTANEOUS FILE SAVING.

## OUTPUT

If MP4File or TSFile are selected, Multiple file related dialogs appear.

“Output” allows selection of “USB Flash Drive”, which provides access to an attached USB stick or SD Card, or “Network Share”

## OUTPUT DEVICE (USB FLASH DRIVE ONLY)

If “USB Flash Drive” is selected the “Output Device” dialog appears. Here you can select from devices that have been mounted by the OS. There is a Unmount icon to finish and unmount a device. Always unmount a USB Flash Drive before removing it to ensure that the files have finished.

---

#### NETWORK SHARE (ONLY WHEN “NETWORK SHARE” IS SELECTED IN “OUTPUT”

IRL for network share i.e //192.168.1.99/ShareName

---

#### DOMAIN

Domain name for authentication to the network share

---

#### USERNAME

Account username with permission to access the network share

---

#### PASSWORD

Password to account referenced above

---

#### PATH AND FILE PREFIX

The path to the file location for the encoded file. i.e. FolderName/SubFolder.

This is followed by the name for the saved file.

---

#### DECODER URL

For UDP, RTP and TSRTMP this is the URL to set your decoder or player to in order to play the stream.

---

#### MULTICAST IP (RTS/UDP ONLY)

Specifies the default multicast address for the video RTP stream

Default is 255.1.2.3

---

#### DEST ADDRESS

IP address for the destination of the encoded stream.

---

#### STREAM KEY

Stream Key or stream name to be appended to the Destination Address.

---

#### DESTINATION PORT

The destination port that the encoder is streaming to.

Range is 0-9999. Default is 8600

---

#### MAX FILE SIZE

The maximum size for the file before creating a new file.

Recommendation is 1024M

---

#### MP4 INDEX

Options are for regular file saving, or formatted for streaming.

---

#### DECODER URL (RTSP/UDP/TSRTP ONLY)

Shows the url for use in VLC (and others) to decode the stream.

---

#### AUTHENTICATION

Enable authentication when your RTMP stream requires a username and password.

---

#### USER

Username for stream authentication

---

#### PASSWORD

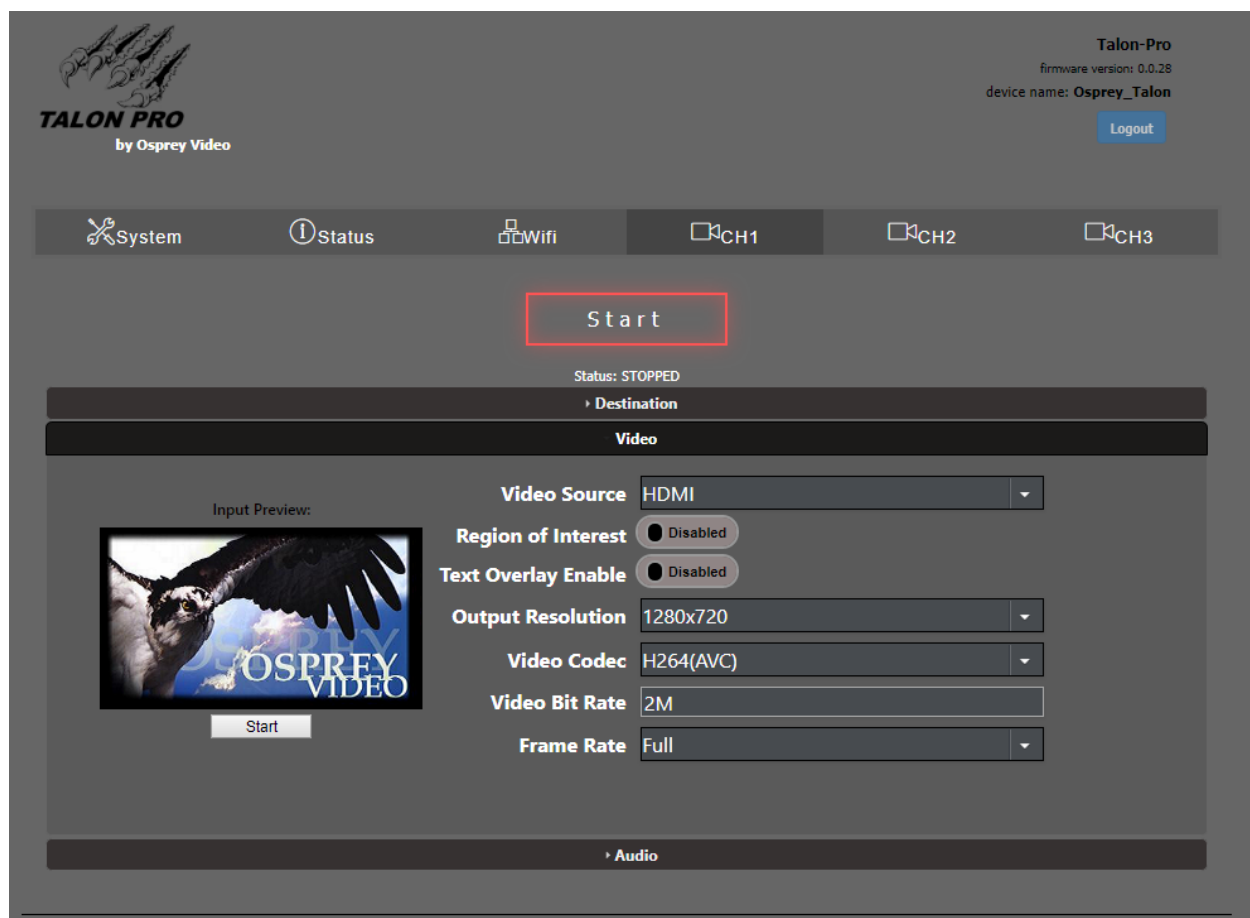
Password for the stream account

---

#### AUTO START

When enabled, this causes the stream to start when Talon is rebooted. Useful to ensure that the stream restarts without intervention in the event of accidental power outage.

## VIDEO




## SOURCE

Select video source from the pull-down. Options change depending on which mode was selected under System/Device/Device Configuration.


- 4K\_Progressive > HDMI (UHD) and SDI1 (3G)
- Dual SDI > SDI1 and SDI2 (3G)
- HD Interlaced > HDMI (1080p60) and SDI1 (1080p60) 1080i and SD supported


By clicking on “Start” below the Input Preview window you can view the video on your selected source.


## ROI CROPPING (ADVANCED)





Talon-Pro  
firmware version: 0.0.44  
device name: Osprey\_Talon  
[Logout](#)

 System

 Status

 CH1

 CH2


 CH3

Start

Status: STOPPED

Destination

Video


Input Preview:  
  
Start

SourceHDMI

Region of InterestEnabled

ROI Resolution1280 x 720

ROI Location0 x 0

ROI

Rotate EnableDisabled

Text OverlayDisabled

Output Resolution1280x720

CodecH264(AVC)

Rate ControlCBR

Quality ModeBalanced

Interface ModeCombined

GDRDisabled

Bit Rate2M

Frame RateFull

GOP Size60 Frames

Audio

This feature allows users to select a portion of a larger image for streaming. The output will be the size of the cropped image rather than the “Output Resolution” selected in the dialog. ROI, Rotation and Text Overlay settings are only visible if ADVANCED has been selected.



---

## ROI RESOLUTION

Select the size to crop. Alternately, you can drag and drop the square in the ROI monitor.

---

## ROI LOCATION

Select the location of the crop. Alternately, you can drag and drop the picture in the ROI Monitor

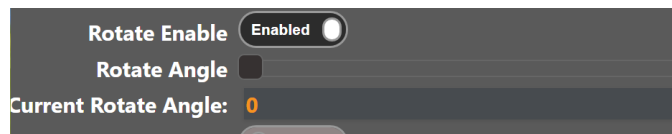
---

## ROI MONITOR

Displays a frame of the active video for setting ROI Resolution and Location

---

## ROTATE ENABLE



Enabling rotation allows compensation for the angle of a stationary camera by changing how it is viewed by the stream. It is possible to invert the view where necessary by moving the slider. The effect of this change can be viewed in the stream in real time. It does not show in the live monitors.

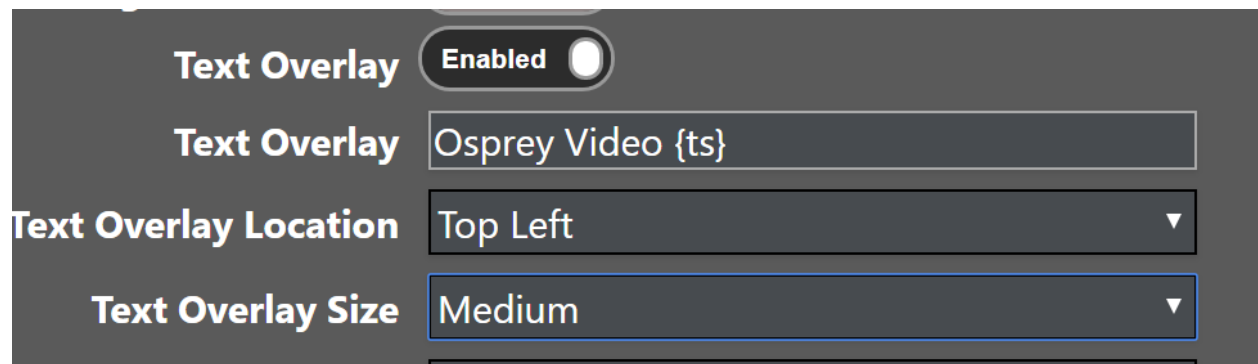
---

## CURRENT ROTATE ANGLE

For reference the current setting is shown

---

## TEXT OVERLAY



When TEXT OVERLAY is enabled, the text in the OVERLAY TEXT box will appear on the streamed video. It can be used as a watermark, or video identification. Additionally, you may overlay a TIMESTAMP on the video by adding {ts} in the overlay window. The date and time will be overlayed on the video stream in YYYY-MM-DD HH:MM:SS format.

Note: To use a different timestamp format add strftime characters in the tag. For example, for timestamp format of YYYY/MM HH:MM:SS use "{ts%Y/%m %H:%M:%S}"

---

## OVERLAY TEXT

Text Overlay content goes here

---

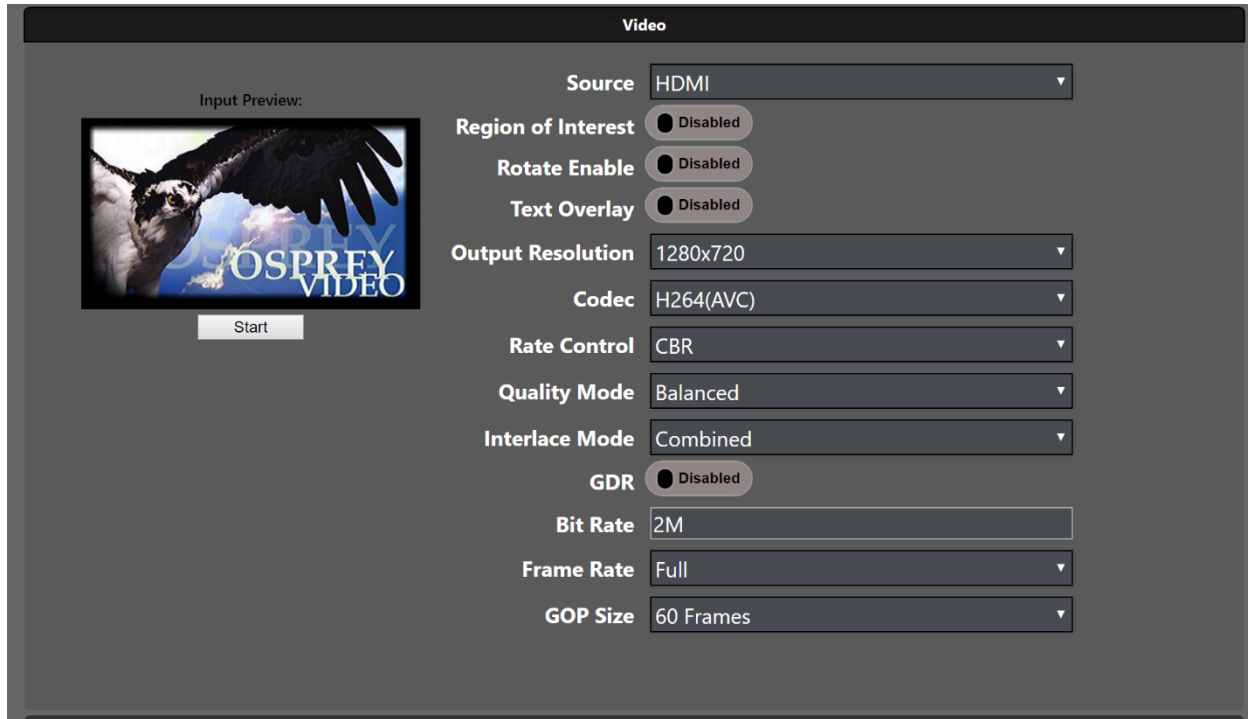
## OVERLAY LOCATION

Select a location for the overlay

---

## OVERLAY TEXT SIZE

Select SMALL, MEDIUM or LARGE for text size.



---

## OUTPUT RESOLUTION

Select a video resolution for the stream from the dropdown. If this resolution is different from the capture resolution, resizing will occur. Follow Input generates the resolution based on the capture resolution.

---

## CODEC

Selects the codec used for compression of the output video stream.

H265 (HEVC), H264 (AVC), MJPEG

Note: RTMP only supports H264

---

## PROFILE (H264 ONLY) (ADVANCED)

Options as High, Main and Baseline

---

#### RATE CONTROL (ADVANCED)

Selects the encoder rate control mechanism. VBR (Variable Bitrate) means that the encoding bitrate can fluctuate within the bitrate statistical period. CBR (Constant Bitrate) means that a stable encoding bitrate is ensured within the bitrate statistical time.

---

#### QUALITY MODE (ADVANCED)

Low Latency, Balanced, High Quality

Low Latency optimizes encoder settings for latency at the expense of quality. High Quality optimizes settings for quality at the expense of Latency

---

#### INTERLACE MODE (ADVANCED)

In the case of interlaced input, this selects how the unit formats the output stream. In Combined mode the top and bottom fields are combined into a single frame. In separated mode the fields are set separately for an HEVC stream. Decoders will need to support field separated mode.

Separated mode is not available for H264.

---

#### VIDEO BIT RATE

Textbox for entering video bitrate. For example:

1M = 1,000,000 bits per second

1000k = 1,000,000 bits per second

2.5M = Not a Valid Format

Used on RTP, RTSP and RTMP only.

---

#### FRAME RATE

Used to encode at less than the input frame rate, (for example, an input frame rate of 30fps with Half selected would cause an output stream of 15fps). If interlaced input is used, then this is used to reduce the number of fields being encoded.

---

#### GOP SIZE

I-frame frequency. The number of frames in each Group of Pictures (GOP)

10 – 240 Frames, Default 60 Frames

## AUDIO

---

### AUDIO ENABLE

Enable audio here to encode audio from available sources.

---

### SOURCE

Select from HDMI, HD-SDI1-2, Mic Line-in, Mic, or Auto

Select "MIC Line-In" when using a nonpowered/  
non-amplified microphone.

Select "MIC" when using a powered/amplified  
microphone. Select "Auto" to follow the video source.

---

### CODEC

Select the codec to be used for the audio encode.

Options are AAC Low Complexity, AAC High Complexity, AACLC Mpeg2, and AAC HE2.

---

### BIT RATE

Target bitrate for audio encode. The bitrate range for AACLC is 12-384 Kbps. 64 Kbps or higher is recommended.  
Bitrate range for AACHE and HE V2 is 32-64 Kbps.

---

### SAMPLE RATE

Select the audio sample rate.

48k, 44.1k and 32k are available.

---

### PID

Audio PID for transport streams. Range is 0-8191. Default is 120.

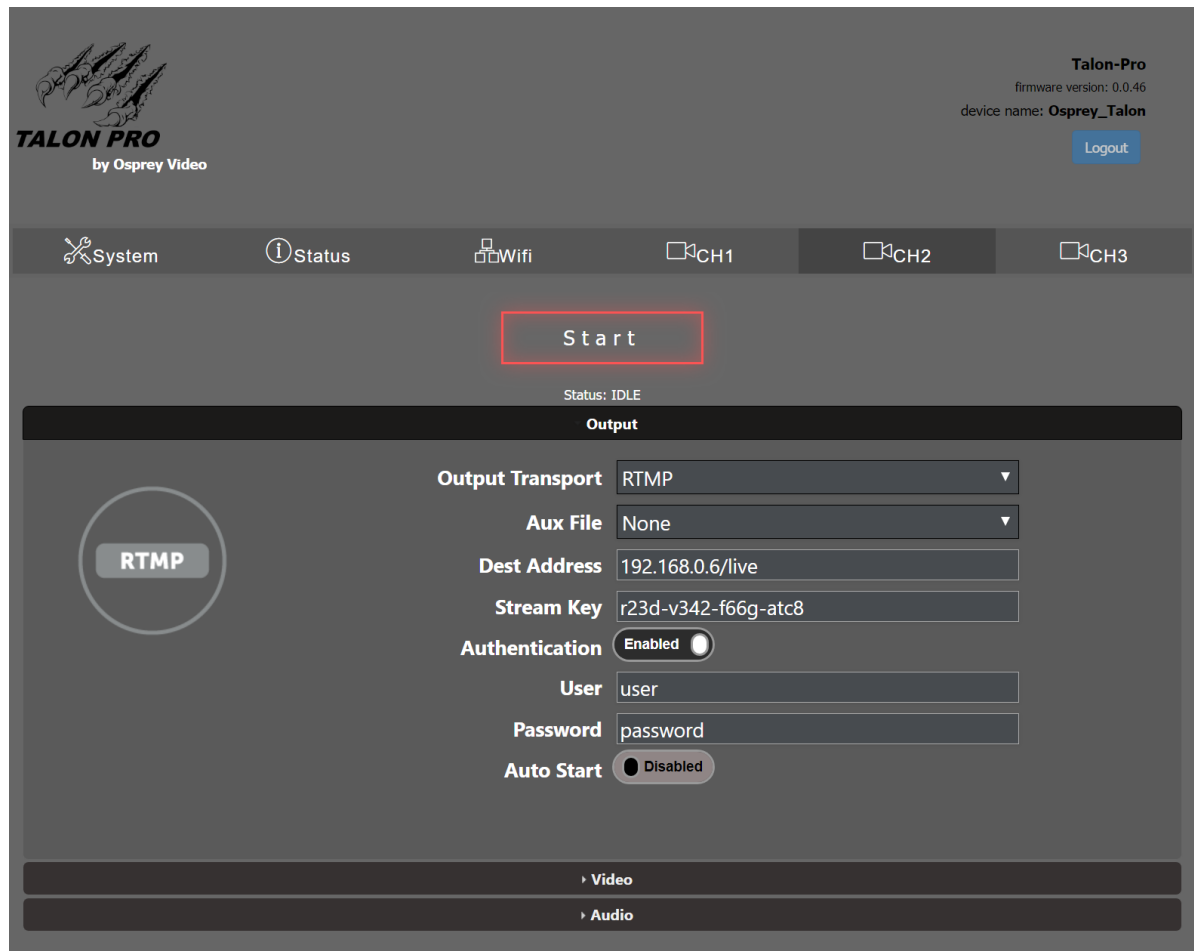
---

### MAX PTS-PCR

Maximum difference between the PTS and PCR in the audio stream. It is generally recommended to leave this value at 250. Certain decoders may require a value similar to the video delay. If an issue is encountered with a specific decoder, try setting this value to the same value as the video delay.

Range 0-8191. Default is 250

## CONFIGURING ENCODER FOR RTMP/RTMPS



Talon PRO supports H.264 streaming to an RTMP streaming server. Osprey Video is a member of the Wowza Media Systems™ Technology Alliance partner program, and the Wowza Streaming Engine™ is used here as an example.

Return to the Web UI.

Select CH1, CH2 or CH3.

Ensure that the selected encoder shows a status of “STOPPED”

If necessary, click on the “Stop” button in the “Channel Controls” section of the user interface CH1 tab or the “Stop All” button in the lower right corner of the screen of any tab.

Select the “Output” ribbon.

Set “Output Transport” to “RTMP or RTMPS.”

The “Dest Address” textbox should be formatted as “IP\_address:port/application” where the IP address is the address of the PC with the Wowza server installed. Port refers to the port used on this PC. The

application will need to match the application used in Wowza and the stream name is of your choosing. For the pictured example, enter “192.168.0.4:1935/live/”.

The name of the stream, or the Stream Key required by your RTMP server should be entered at “Stream Key”. For online services such as Youtube Live, place the stream key in the “Stream Key” window.

If your server requires it, set “Authentication” to “Enable” and enter your valid Wowza login credentials. Continue configuration by selecting the “Video” ribbon.

Select Source, Output Resolution etc from the pull-down menus. Note that H.264 is the only codec available in RTMP.

Select the “Audio” ribbon

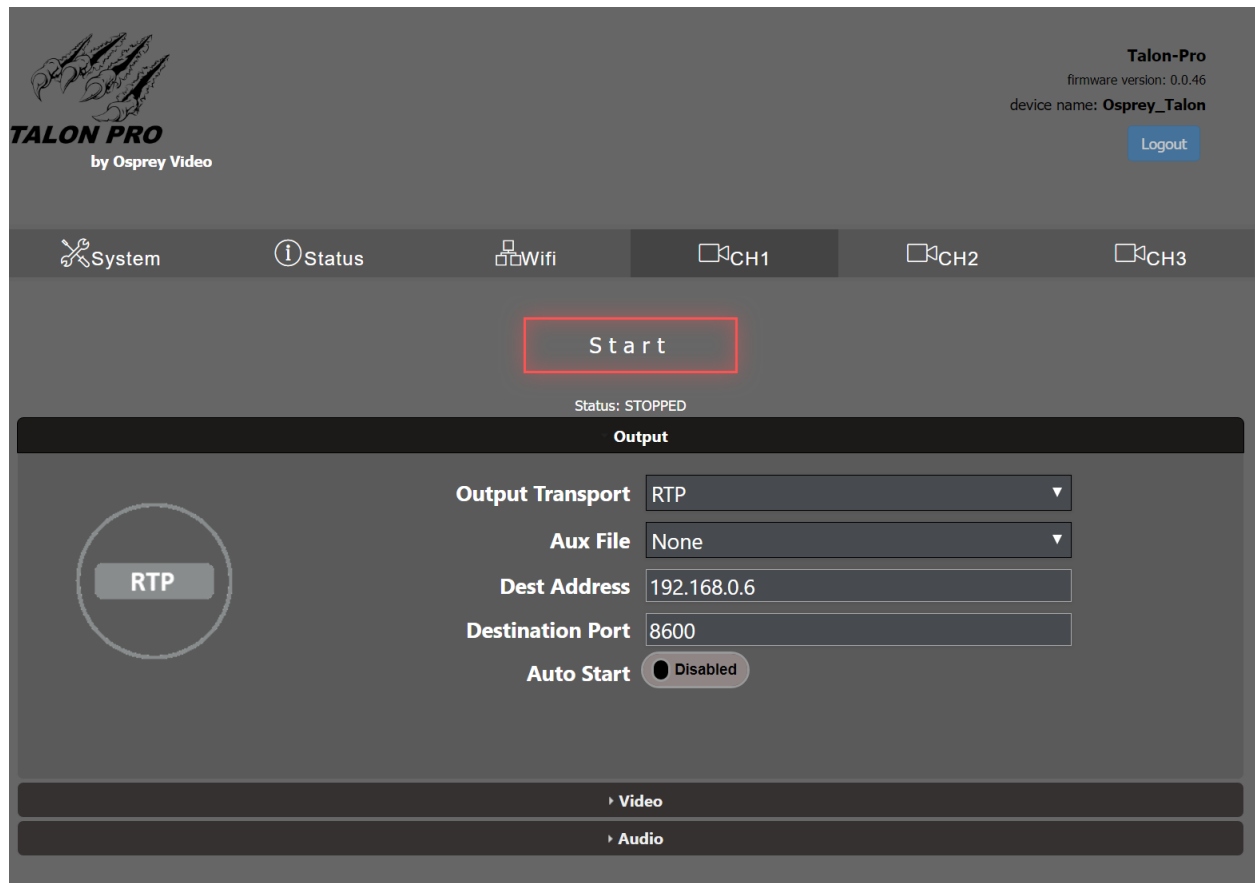
Select from the available options under “Source”

Select which audio pair to use for audio. NOTE: RTMP only accepts one pair at a time. It is not possible to stream more than one stereo pair per encoding.

Select from the available audio codecs. AAC LC, AAC-HE and AAC HE2 are recommended codecs for AVC and HEVC encoding.

Select “START”

## CONFIGURING ENCODER FOR RTP



Return to the Web UI.

Select CH1, CH2 or CH3.

Ensure that the selected encoder shows a status of “STOPPED”

If necessary, click on the “Stop” button

Select the “Output” ribbon.

Set “Output Transport” to “RTP.”

Set “Dest Address” the IP address of the destination of the encoded stream.

Select the “Video” ribbon and select the Output Resolution, Codec and related settings. For RTP you may use H264(AVC) or H265(HEVC)

Select the “Audio” ribbon and select the Source, Codec and Bitrate for the Audio. NOTE: You may select ONE stereo pair from the available inputs. (SDI and HDMI expose 4 pairs each)

Select “START”

---

## ABOUT SDP FILES

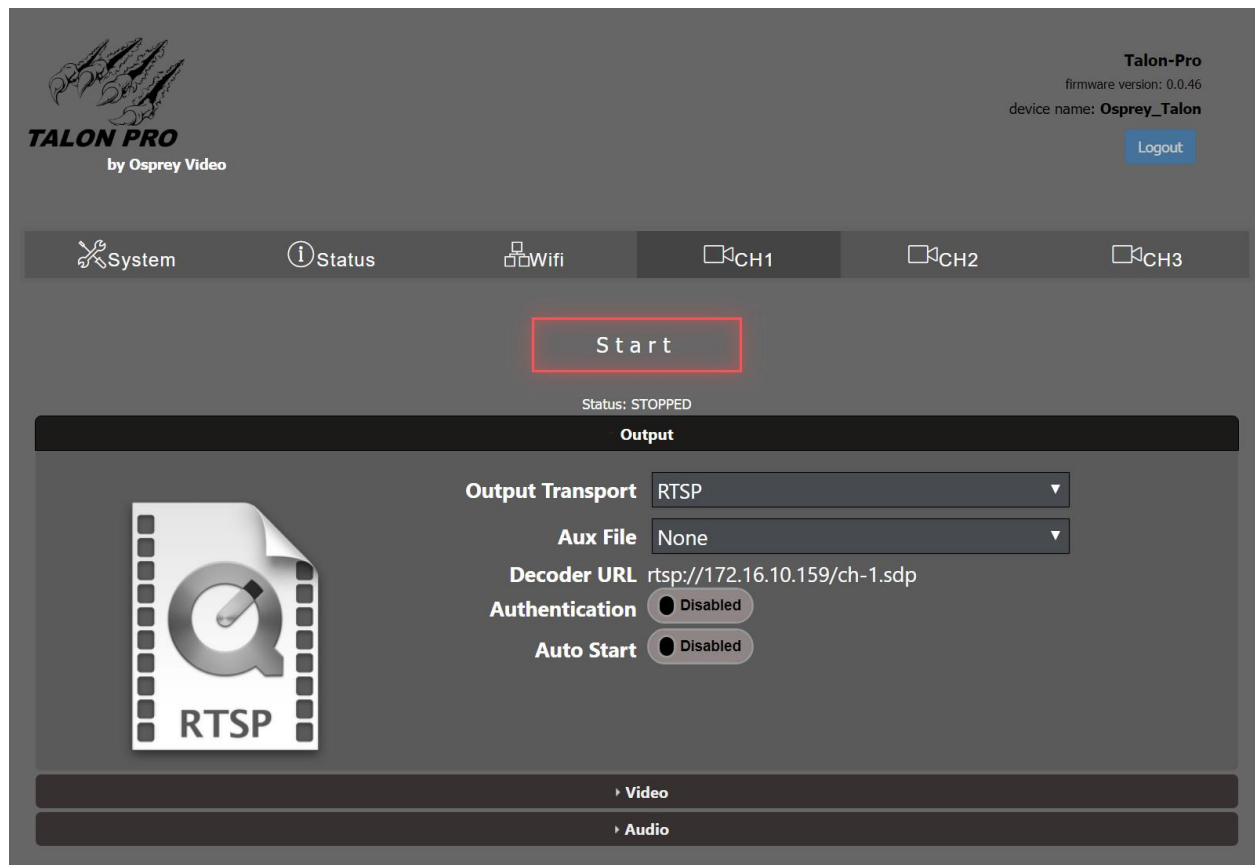
Some RTP/RTSP connections may require a Session Description Protocol (SDP) file that is placed on the media server to direct users to the stream. Talon does not support creation or automatic injection of SDP files. Should your media server require such a file, it can be created using notepad. The expected format for delivering video from Talon is:

```
v=0
o=- 653 1 IN IN4 TALON_IP
s=Osprey Talon streaming video
t=0 0
m=audio USER_SELECTED_PORT(audio) RTP/AVP 97
a=tool:Talon
a=recvonly
a=type:broadcast
c=IN IP4 DESTINATION_IP
a=rtpmap:97 mpeg4-generic/48000/2
a=fmtp:97 streamtype=5; profile-level-id=14; mode=AAC-hbr; config=0990; sizeLength=13;
indexLength=3; indexDeltaLength=3; constantDuration=1024
m=video USER_SELECTED_PORT(video) RTP/AVP 102
c=IN IP4 DESTINATION_IP
a=rtpmap:102 H264/90000
a=fmtp:102 packetization-mode=1
b=AS:200
```

Items in **BOLD RED** type contain user provided information.



## CONFIGURING ENCODER FOR RTSP



Return to the Web UI.

Select CH1, CH2 or CH3.

Ensure that the selected encoder shows a status of “STOPPED”

If necessary, click on the “Stop” button

Select the “Output” ribbon.

Set “Output Transport” to “RTSP.”

The Decoder URL for the RTSP stream will be the IP address of the encoder + /ch-1.sdp

Select the “Video” ribbon and make the appropriate Source, Output Resolution and Codec settings. Note that RTSP supports both H.265(HEVC) and H.264(AVC).

Select the “Audio” ribbon


Select from the available options under “Source”

Select which audio pair to use for audio. NOTE: RTSP only accepts one pair at a time. It is not possible to stream more than one stereo pair per encoder.

Select from the available audio codecs. AAC LC, AAC-HE and AAC HE2 are recommended codecs for AVC and HEVC encoding.

Select “START”

CONFIGURING ENCODER FOR UDP



TALON PRO  
by Osprey Video

Talon-Pro

firmware version: 0.0.46

device name: Osprey\_Talon

Logout

System

Status

Wifi

CH1

CH2

CH3

Start

Status: STOPPED

MPEG-TS

Output Transport

UDP

Aux File

None

Decoder URL

udp://@192.168.0.6:8600

Dest Address

192.168.0.6

Destination Port

8600

Video PID

221

PCR PID

521

PCR Interval

50

PMT PID

31

Video Max Delay

1000

TS Rate

3000K

TS Lowlat Mode

Disabled

Auto Start

Disabled

Video

Audio

Return to the Web UI.

Select CH1, CH2 or CH3.

Ensure that the selected encoder shows a status of “STOPPED”

If necessary, click on the “Stop” button.

Select the “Output” ribbon.

Set “Output Transport” to “UDP.”

You can set the “Dest Address” to:

(a) the IP address of the decoder or decoding PC. (in the pictured example, 192.168.0.6)

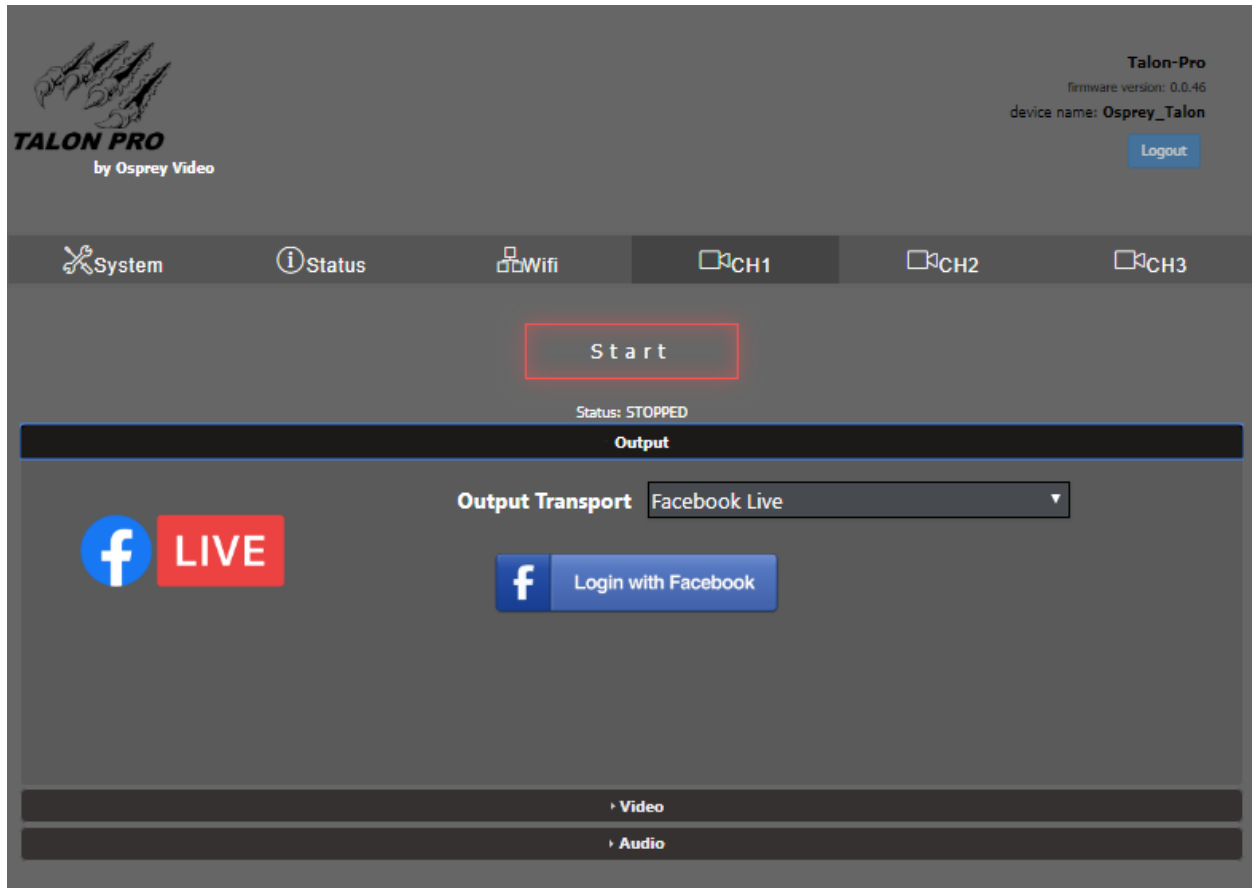
(b) or to a multicast address (An example multicast address would be “225.1.2.3”. If you are on a shared network, check with your Network Administrator.)

Make note of the value of “Dest Port” (This will be “8600” by default).

AUDIO NOTE: When selecting audio channels, HDMI and SDI each support 4 stereo pairs for audio. When streaming with UDP, users can stream up to four pairs simultaneously.

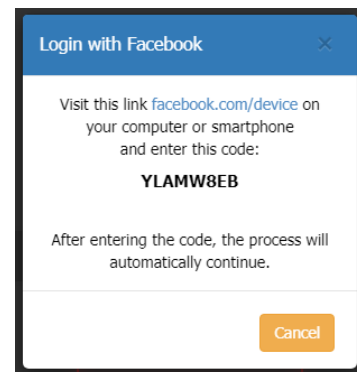
## CONFIGURING ENCODER FOR FACEBOOK™ LIVE

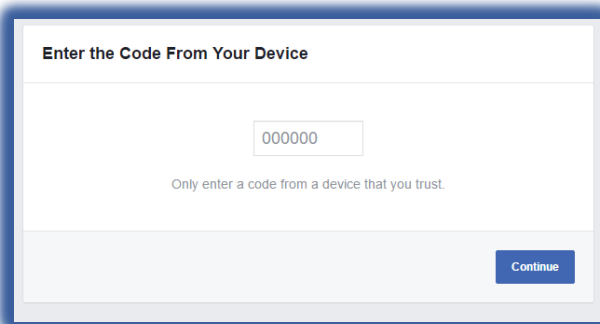
If you are going to do 24/7 streaming, or are creating a regular stream every day, Osprey has created an API level application that works from within Talon. Once Talon has been authorized to stream to your Facebook page or timeline, it is not necessary to reauthorize the stream. This means that there is no need for the encoder operator to have full credentials for the Facebook page after the stream is authorized.



To use the Facebook Live API, select it from the Output Setup pull down menu  
Facebook will respond with a connection code and a link to their site.

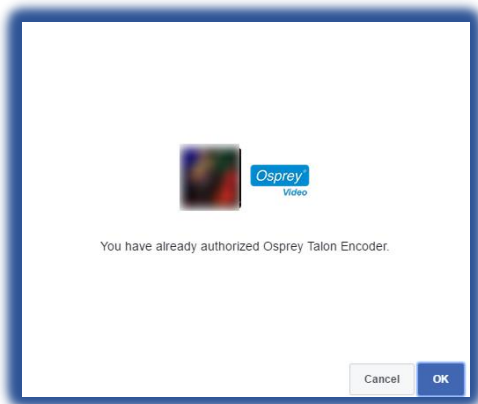
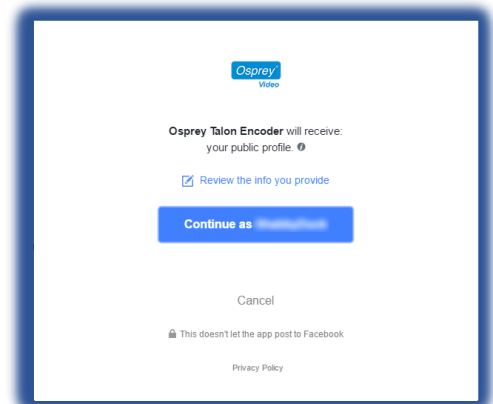
Copy the code and then click on the link. The link will take you to your Facebook page where you can enter the code provided. This code authorizes your encoder to send video to your Facebook page. If your browser isn't currently logged in to Facebook, you will need to login now.



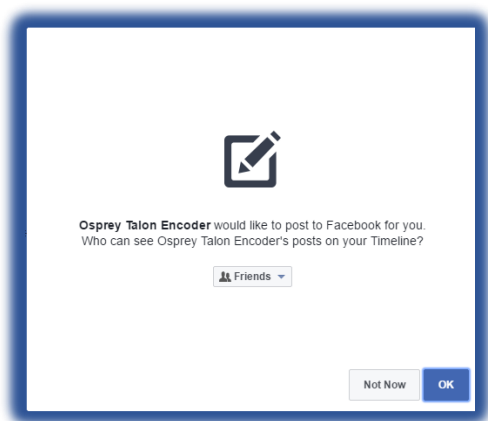


Press “Continue”

This box tells you that the Osprey Talon Encoder will receive your public profile. Press “Continue” to assign posting permissions to Talon.

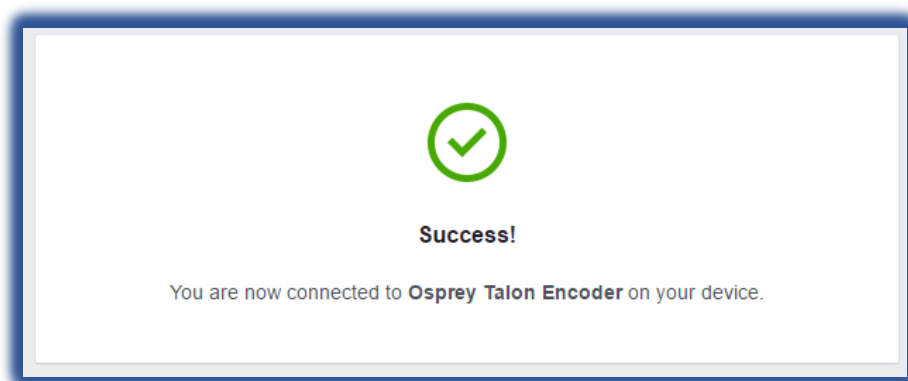
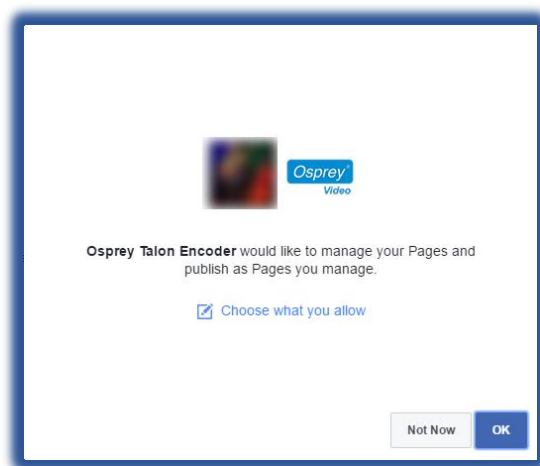


If you’ve already granted permissions to Talon you will receive a **message** telling you that the encoder has previously been authorized.



Facebook will need your permission for Talon to post video to your timeline. You may select what audience can view the video.

If you have other pages that you manage from this Facebook account, you can assign permissions to them here.



You have completed Facebook configuration. Now go back to Talon to provision your stream.

The screenshot shows the Talon-PRO web interface. At the top left is the logo "TALON PRO by Osprey Video". At the top right, it says "Talon-Pro", "firmware version: 0.0.46", and "device name: Osprey\_Talon" with a "Logout" button. Below this is a navigation bar with icons for "System", "Status", "Wifi", "CH1", "CH2", and "CH3". In the center, there is a "Start" button highlighted with a red box. Below the "Start" button, it says "Status: STOPPED". The main section is titled "Output" and contains the following fields:

- Output Transport:** Facebook Live (dropdown menu)
- Aux File:** None (dropdown menu)
- Stream Title:** lester's test (text input)
- Stream Description:** a test by lester (text area)
- Page Name:** Osprey Tips and Tricks (dropdown menu)
- Stream Type:** Continuous Live (dropdown menu)
- Log out:** A button with the Facebook logo.
- Auto Start:** Disabled (toggle switch)

At the bottom, there are two expandable sections: "Video" and "Audio".

On the Talon PRO output screen enter a “Stream Title” for your Facebook stream, along with a brief description

The name of the page you are posting to will be the “Page Name”. If you manage more than one page with your Facebook ID you will be able to select which one receives your video.

Last, select the “Stream Type”. Selecting “Continuous Live” will broadcast indefinitely on your page but will never be archived. Regular streams post for a maximum of four hours. When they stop they are archived to your page.

To begin your stream press “Start”. The stream will end when you stop the encoder. It is not necessary to log out of Facebook unless you no longer want this encoder to have access to your page.

Unlike streams originating from your regular Facebook page or encoder, it is not necessary to get a new authorization in order to stream again. Simply select START

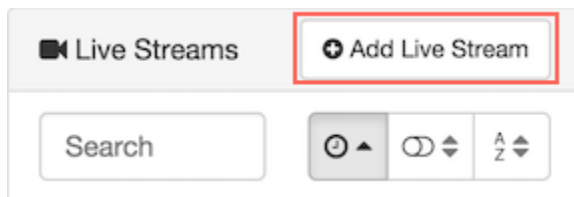
## CONFIGURING ENCODER FOR WOWZA CLOUD

Talon has an API level application integration to allow users to quickly connect with their Wowza Streaming Cloud® account. Below are the easy steps to connect with Wowza Streaming Cloud.

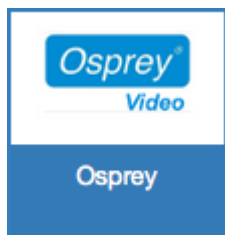
### Create a live stream that uses Osprey as the video source

If you haven't already done so, create a live stream in Wowza Streaming Cloud that uses the Osprey Talon encoder as the video source.

1. Sign in to Wowza Streaming Cloud.
2. Click the **Live Streams** menu, and then click **Add Live Stream**.



3. On the **Live Stream Setup** page, enter a **Live Stream Name**, choose a **Broadcast Location**, and then click **Next**.
4. On the **Video Source and Transcoder Settings** page, select **Osprey** as the encoder you want to use to connect to Wowza Streaming Cloud.



5. Specify other video source settings, click **Next**, and complete the steps to finish creating the live stream.

**Note:** For more information about live stream settings, see [Add a live stream](#).

Wowza Streaming Cloud creates the live stream and displays the **Overview** tab of the live stream detail page.

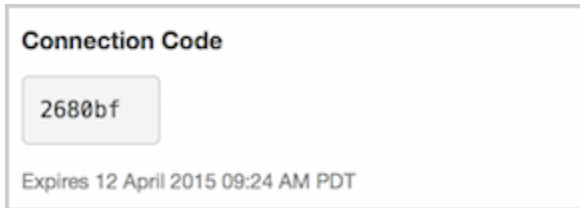
### Connect the Osprey Talon to Wowza Streaming Cloud

After you've added a live stream in Wowza Streaming Cloud, configure the Osprey Talon to connect to it. You can configure the Talon in either of two ways: by using the Wowza Streaming Cloud connection code, or by using the XML connection settings file that Wowza Streaming Cloud generated for the live stream.

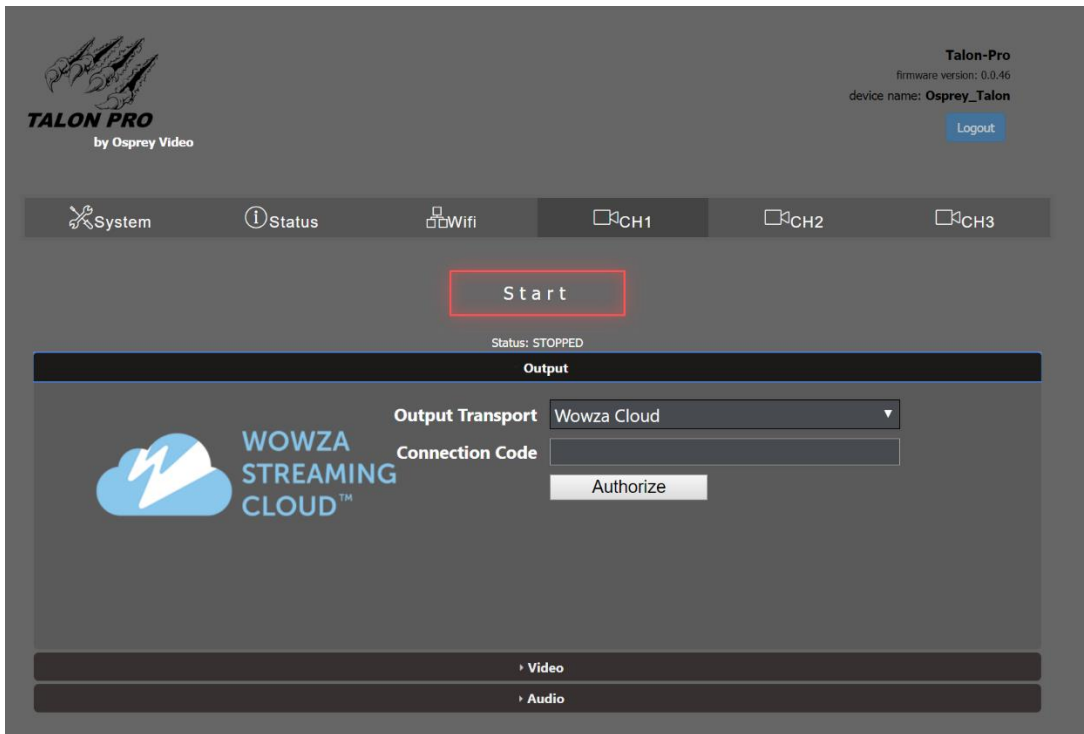


## Connect using the Connection Code

1. In the **Live Streams** panel of the **Live Streams** page of Wowza Streaming Cloud, select the live stream that uses Osprey as its video source.
2. On the **Overview** tab of the live stream detail page, make note of the six-digit **Connection Code**.



3. Sign in to the Osprey Talon web-based admin interface.
4. Click the **CH1** tab or click the plus sign to create a new stream.
5. Under **Output**, for **Output Transport**, choose **Wowza Cloud**.
6. Enter the **Connection Code** from the **Overview** tab of your live stream detail page.



7. Click **Authorize**.
8. Configure any other required settings for your broadcast. See the Encoder Setup section for information on how to configure a stream.

Configure any other required settings for your broadcast. See the “Encoder Setup” portion of this guide for information on how to configure a stream.

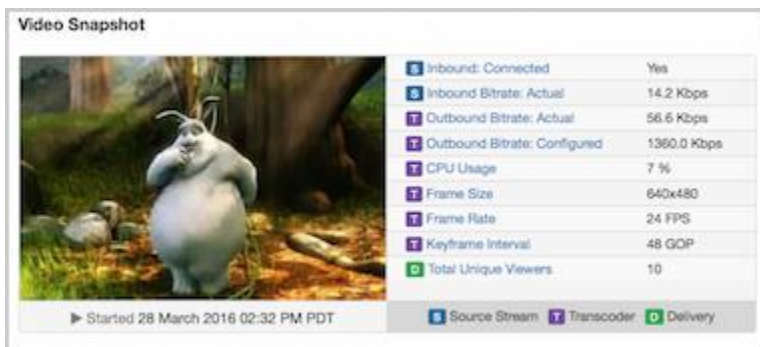
#### Test the connection

1. In the Wowza Streaming Cloud web manager, select the live stream that uses the Osprey Talon as its video source.
2. Click **Start Live Stream** at the top of the live stream detail page.
3. Click **Start** to confirm that you want to start the stream.

Wowza Streaming Cloud opens the stream and connects with the Osprey encoder.

4. In the Osprey Talon admin interface, start your video source.
5. In the Wowza Streaming Cloud web manager, confirm that the stream is working by looking at the **Video Snapshot** in the **Overview** tab of the live stream detail page.

The video snapshot displays a frame from the live stream every 5 seconds. The started date and time appear under the snapshot. Source stream, transcoder, and delivery metrics begin to update.



Metric	Value
Inbound: Connected	Yes
Inbound Bitrate: Actual	14.2 Kbps
Outbound Bitrate: Actual	56.6 Kbps
Outbound Bitrate: Configured	1360.0 Kbps
CPU Usage	7 %
Frame Size	640x480
Frame Rate	24 FPS
Keyframe Interval	48 GOP
Total Unique Viewers	10

Started 28 March 2016 02:32 PM PDT

Source Stream Transcoder Delivery

6. Click **Stop Live Stream** at the top of the live stream detail page to end your test stream, and then stop the stream in the Osprey encoder.

For more information regarding Wowza Streaming Cloud check out

<https://www.wowza.com/forums/content.php?810-How-to-connect-an-Osprey-Talon-encoder-to-Wowza-Streaming-Cloud>.

## CONFIGURING ENCODER FOR ZIXI™ BROADCASTER

The screenshot shows the TALON PRO web interface. At the top left is the TALON PRO logo with the text "by Osprey Video". At the top right, it says "Talon-Pro", "firmware version: 0.0.47\_SP1", and "device name: Osprey\_Talon" with a "Logout" button. Below this is a navigation bar with icons for System, Status, Wifi, CH1, CH2, and CH3. The CH1 tab is selected. In the center, there is a "Start" button highlighted with a red rectangle. Below the "Start" button, the status is "STOPPED". The main configuration area is titled "Output" and features the ZIXI logo on the left. The settings are as follows:

Setting	Value
Output Transport	Zixi Broadcaster
Aux File	None
Zixi Server Address	192.168.0.6:8600
Zixi Session ID	
Zixi Overhead	15
Zixi Latency	500
Zixi Credential Enable	Enabled
Zixi Remote ID	
Zixi Password	
Video PID	221
PCR PID	521
PCR Interval	50
PMT PID	31
Video Max Delay	1000
TS Lowlat Mode	Disabled
Auto Start	Disabled

At the bottom of the configuration area, there are expandable sections for "Video" and "Audio".

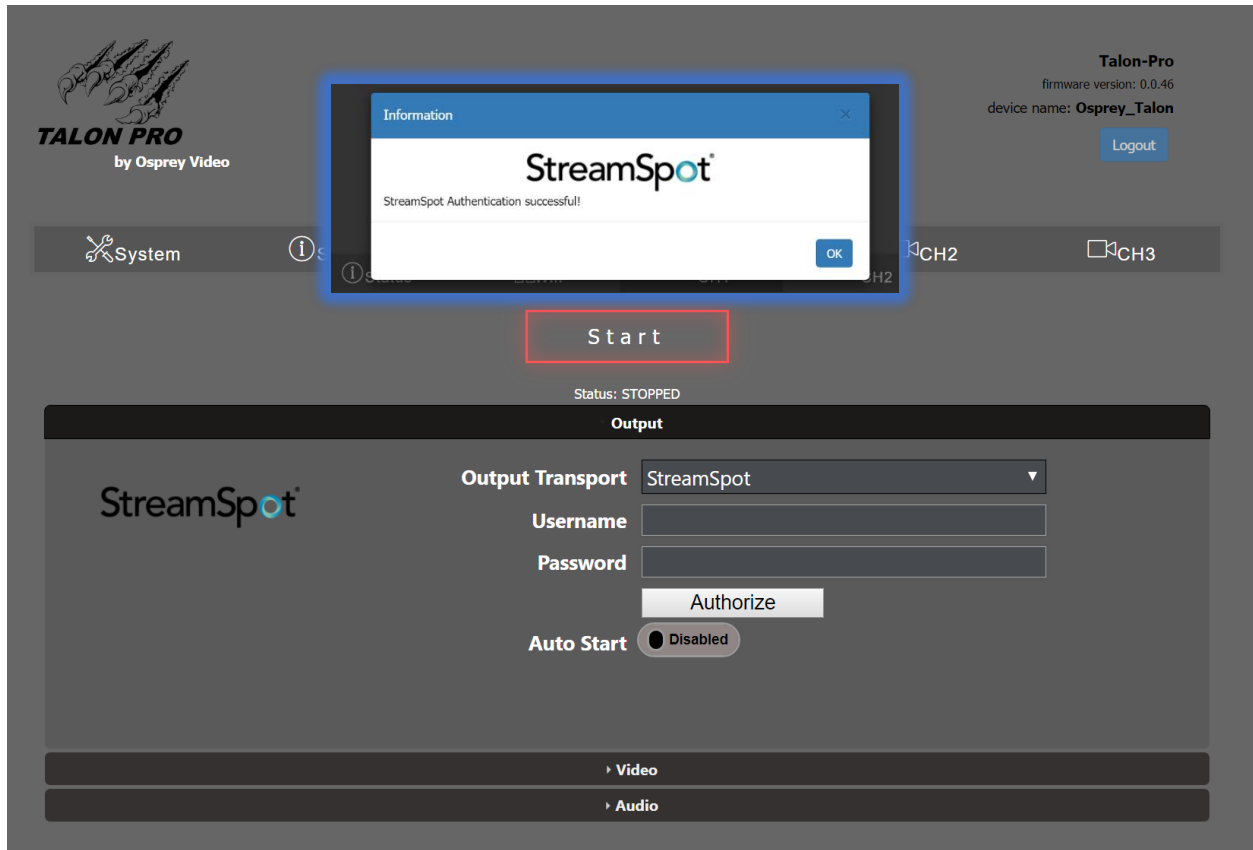
Talon PRO can act as a Zixi Feeder. If you have an existing Zixi account simply select "ZIXI" from the Output Setup dialog.

Insert your Zixi Destination Address and Session ID (Channel Name).

When Zixi Credential is enabled, users can enter their Zixi Password. Authentication uses a combination of the Session ID and Password. If assigned on the Zixi Broadcaster, the Zixi Remote ID grants access priority for that channel. Any other connected stream will be removed and replaced by the holder of the Remote ID. The rest of the Zixi settings are set at their default. If you need to adjust these settings, consult your Zixi Broadcaster instructions.

## CONFIGURING ENCODER FOR STREAMSPOT


Talon PRO has API support for StreamSpot. To use your pre-existing StreamSpot account, select StreamSpot from the “Output Format” menu and enter your Username and Password and click “Authorize”.



When authorization is successful, StreamSpot will respond with a completion dialog. Close the dialog and start your encoder. The encoder will remain authorized until you select “Logout”.

If you have access to additional sub accounts from your login they will be available in the pull-down and can be selected before you start the stream.

## CONFIGURING ENCODER FOR SRT

**TALON PRO**  
by Osprey Video


Talon-Pro  
firmware version: 0.0.46  
device name: **Osprey\_Talon**  
[Logout](#)

System Status Wifi CH1 CH2 CH3

Start

Status: STOPPED

Output

**SRT**  
SECURE  
RELIABLE  
TRANSPORT

Output Transport

SRT

Aux File

None

SRT Mode

Push

SRT Dest Address

172.16.10.61

SRT Port

8000

Latency

120

Chunk Size

1316

Auto Start

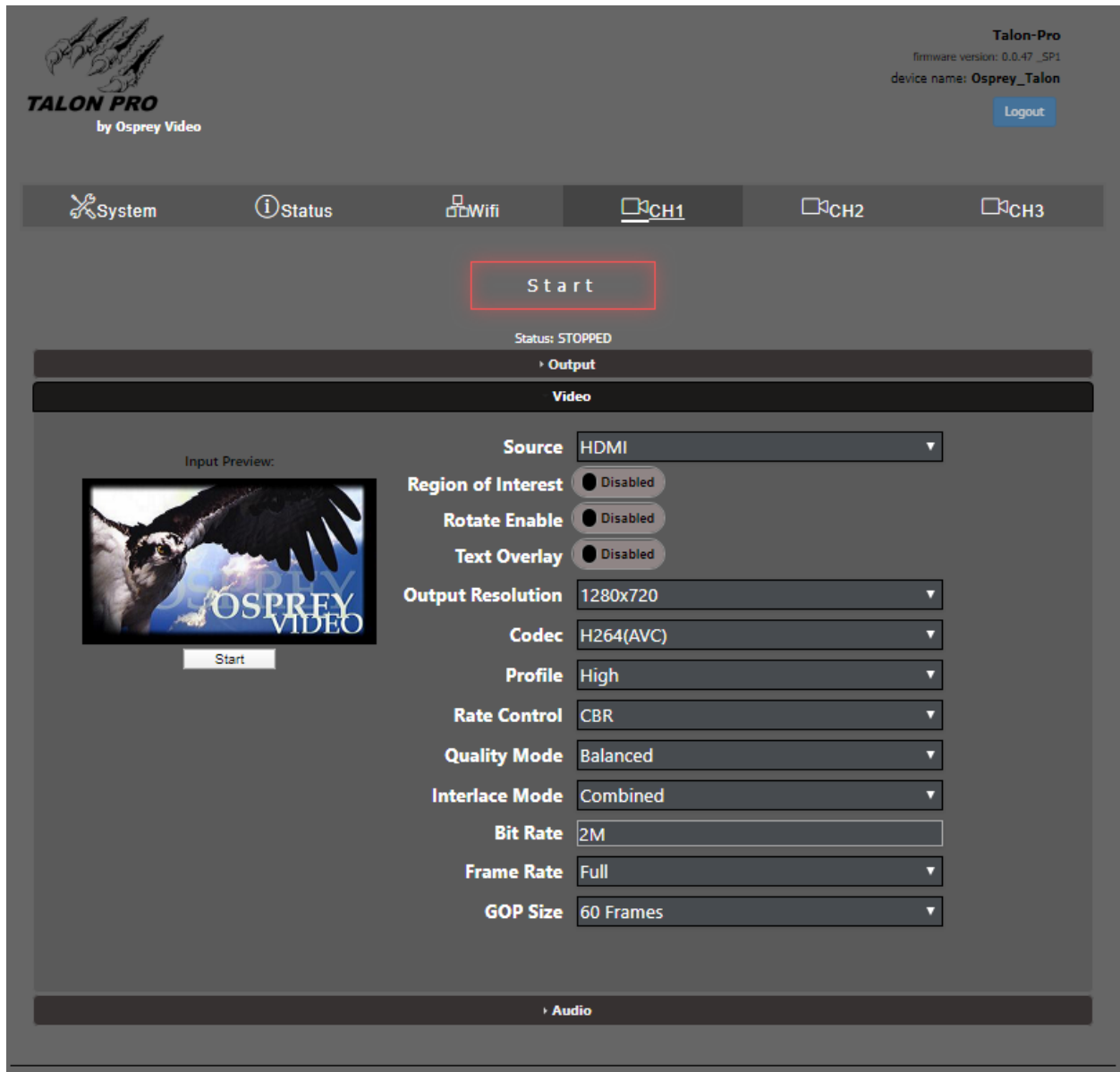
☐ Disabled

Video

Audio

To PUSH a stream with SRT, select from the Output Transport and enter the SRT Destination address and port. The remainder of the settings are set to SRT defaults.

## CONFIGURING H.264(AVC) ENCODING



When H.264 codec is selected, options specific to that codec become available in the “Video” ribbon.

**Profile:** Baseline, Main or High

The H.264 profile of the bitstream. Generally High is used for 2160p or greater, Main for D1, and Baseline for less than D1. This option will not be available when H.265 Video Codec is selected.

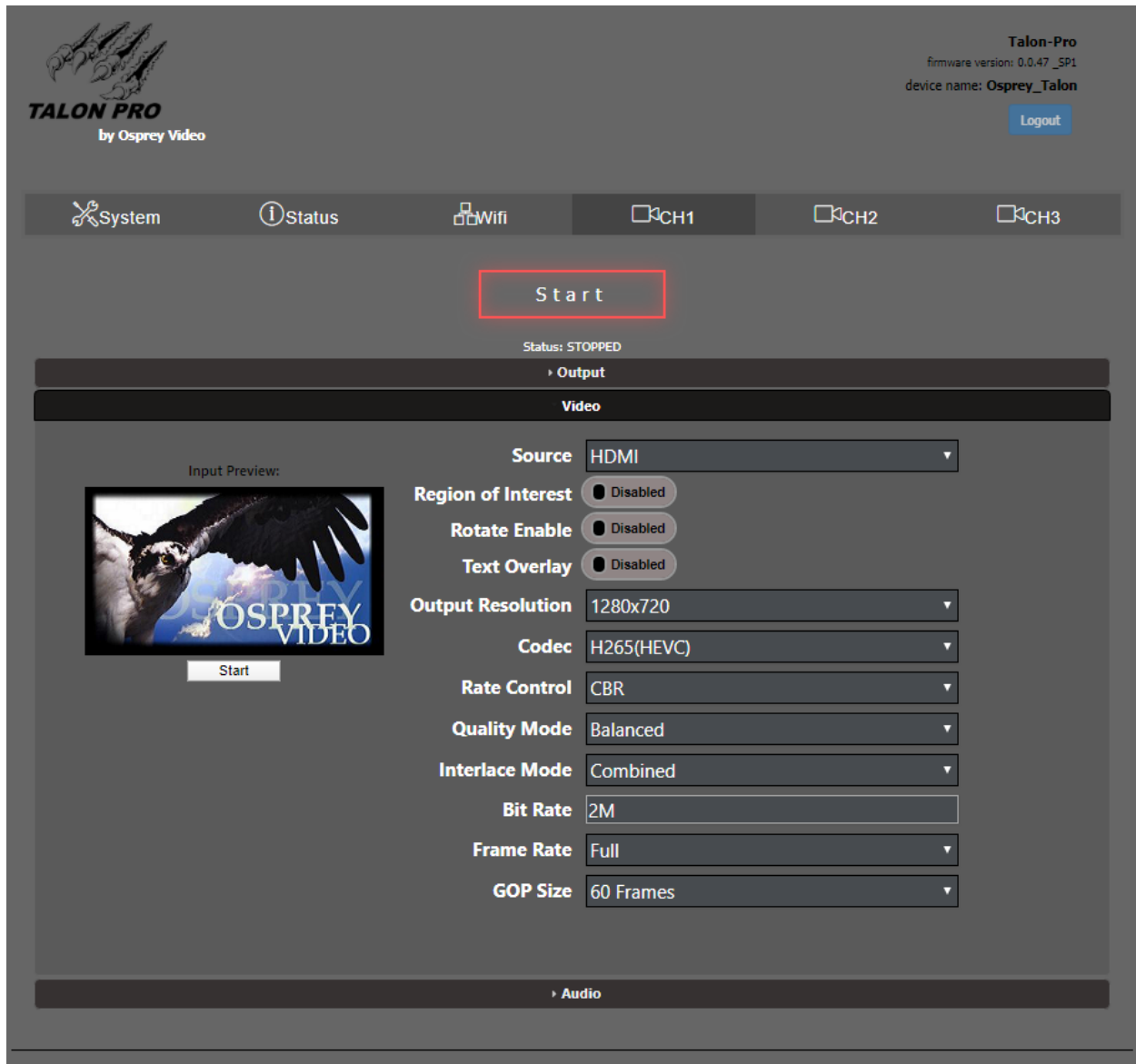
**Rate Control:** VBR or CBR

Selects the encoder rate control mechanism. VBR (Variable Bitrate) means that the encoding bitrate can fluctuate within the bitrate statistical period. CBR (Constant Bitrate) means that a stable encoding bitrate is ensured within the bitrate statistical time.

**Quality Mode:** Low Latency, Balance, High Quality

Low Latency optimizes the encoder settings for latency at the expense of quality and High Quality optimizes the encoder settings for quality at the expense of latency.

## CONFIGURING H.265 (HEVC) ENCODING.



When H.264 codec is selected, options specific to that codec become available in the “Video” ribbon.

### **RATE CONTROL: VBR OR CBR**

Selects the encoder rate control mechanism. VBR (Variable Bitrate) means that the encoding bitrate can fluctuate within the bitrate statistical period. CBR (Constant Bitrate) means that a stable encoding bitrate is ensured within the bitrate statistical time.

### **QUALITY MODE: LOW LATENCY, BALANCE, HIGH QUALITY**

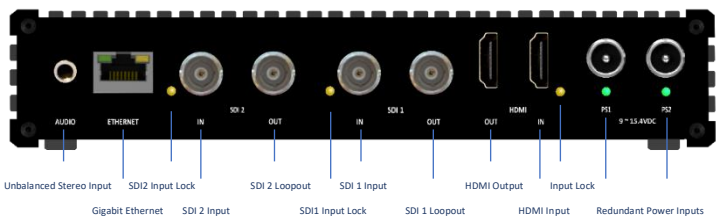
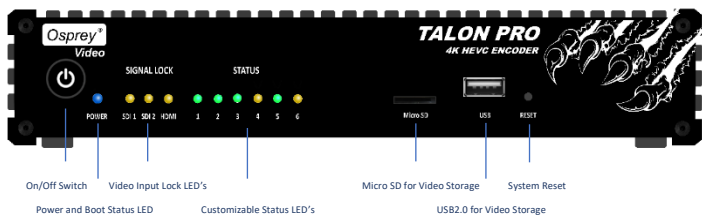


Low Latency optimizes the encoder settings for latency at the expense of quality and High Quality optimizes the encoder settings for quality at the expense of latency.

**INTERLACE MODE:** COMBINED, SEPARATED

In the case of interlaced inputs this selects how the unit formats the output stream. In Combined mode the top and bottom fields are combined into a single frame. In separated mode the fields are set separately for an HEVC stream. The decoder will need to support field separated mode.

# Specifications:



## Video Inputs:

- 2 x 3G/HD/SD-SDI with Loopouts
- 1 x HDMI 1.4 UHD

## Audio Inputs:

- 2 x Embedded SDI (4 Stereo Pairs each)
- 1 x Embedded HDMI (4 Stereo Pairs)
- 1 x Analog unbalanced stereo

## Video Input Resolution:

- Up to 3840x2160 (UHD) 30fps on HDMI
- Up to 1920x1080 60fps on SDI

## HDMI Output:

- Selectable preview of any input

## Streaming Transports:

- RTMP, UDP, RTP, RTSP, SRT™, Zixi™,
- Saving to MP4 and TS file
- CDN integrations

## Video Processing:

- Upscale/Downscale, Frame rate Conversion, Deinterlacing, Text Overlay, Region of Interest, Image Rotation

## Video Compression:

- H.264 (AVC), H.265 (HEVC), MJPEG

## Encoding Controls

- Maximum 100Mbit/s Aggregate Output Bitrate
- 40Mbit/s per channel instance
- Frame rate Full, Half, Quarter and Sixth
- Low Latency option <55ms

## Closed Captions

- Re-embeds existing CEA608/708 captions

## Audio Compression:

- AAC-LC, AAC-HE, AAC-HEv2

## Audio Sample Rate

- 32kHz, 44.1kHz, 48kHz
- Audio Bitrate 12Kbps to 384Kbps

## Storage

- Network Drive
- USB drive
- Micro SD

## Power

- 9.0 ~ 15.4VDC | 7W
- Redundant power connections



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