

AXIS HEVC ENCoder & DECoder User Manual

May 22, 2019



This document features the AXIS HEVC encoder, h.265 stand-alone 4K UHD and HDR encoder and AXIS HEVC decoder, h.265 stand-alone 4K UHD and HDR decoder. The two units operate as a paired system.

Referenced the specification as posted on the Wave Central's web site:
www.wavecentralrf.com

WARNING



The HD/SDI Video input connector is 75 Ohms. Make sure that the video cable(s) are fitted with 75 Ohm and NOT 50 Ohm connectors.

The illustration on the right is the correct BNC connector.

Failure to do so will damage the BNC connector(s). The customer is liable for any damages for not adhering to this practice.



AXENC Rear Panel View

Introduction to the AXENC

There are two modes of operation. **Mode 1:** 4K Ultra HD Mode. Input video format is 4K Ultra HD. Format must be the same as the camera provided format. **Mode 2:** HD Mode. Input video is HD video, this can be up to four separate HD video streams. An optional software key is required.

Getting Started

Typical video format used must match the video source e.g. 2160p50 or 2160p59. **P** Progressive mode must be used for 4K UHD (Ultra HD) mode.

The Video Sample Format must match the video source e.g. SQD (Square Division) quad pictures or **2SI** (two sample Interleave).

The Camera format for this procedure as described in this operator's manual is set to 2160p 59.94 and **2SI**

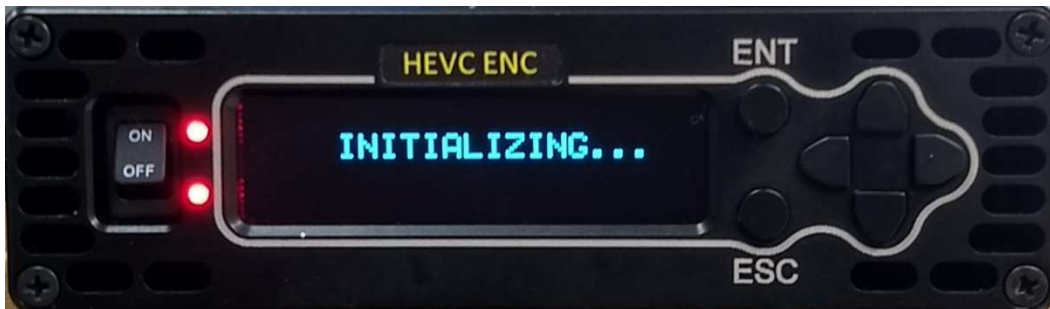
Once the source format is determined the AXENC is powered from the external 12 VDC power supply provided. No external connections are required during the initial startup. Turn the power switch on to begin the initialization boot up procedure.



Power On Screen



Initializing Stage 1



Initializing Stage 2



Initializing Stage 3



Initializing Complete

The Initialization process takes approximately one minute. The Green LED indicates the unit has initialized and in communication with the front panel display. The Red LED indicates there are no input signals present.

In a typical test scenario at Wave Central the AXENC is connected to the AXDEC via the ASI connectors, using 75 Ohm serial coax cable.

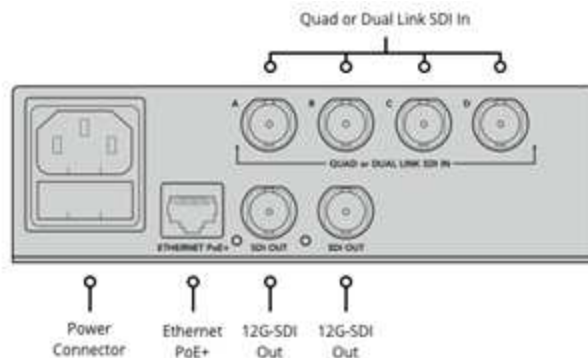


CAMERA SIGNAL SOURCE and MONITORING

The test camera is IO Industries, Flare 4KSDI, 4K/UHD, Multiple 3G/HD-SDI output formats (SMPTE 292/425M). Four standard 3G/HD-SDI outputs are SDI-1, SDI-2, SDI-3 and SDI-4. Tri-Level sync input. The FLARE camera format is set to **2160p 59** (UHDp59.94), **2SI** (2-Sample Interleave), Color Sampling 4:2:0 for Wave Central's testing purposes.



Video monitor is Blackmagic Designs 12G SDI Ultra HD with a Quad SDI to 12G.



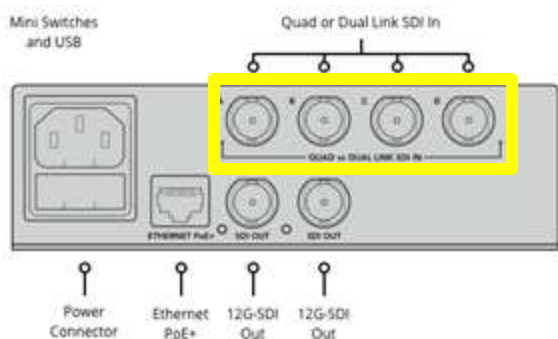
HEVC ENCODER & DECODER CONNECTIONS



Connect SDI's 1 through 4 from the camera to the four SDI inputs 1 through 4 on the HEVC Encoder. Connect the ASI OUT from the Encoder to the ASI IN on the Decoder.



Connect the four SDI outputs from the Decoder to the four Inputs on the Quad SDI to 12G converter, SDI-1 to A, SDI-2 to B, SDI-3 to C and SDI-4 to D.

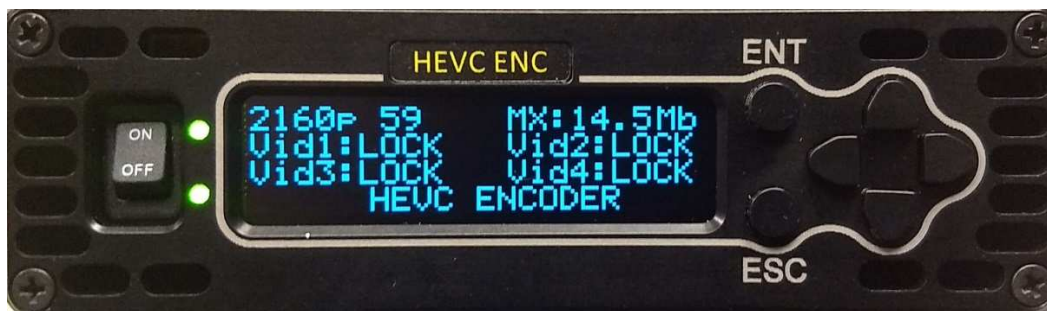


12G SDI Ultra HD Monitor

Connect 12G-SDI Out to SDI input Ultra HD Monitor.

HEVC ENCODER SETTINGS

The Encoder settings are determined, using a Wave Central AXIS Wireless camera System. The transmit signal is a DVB-T, 8 MHz channel in the appropriate licensed channel. Modulation: 16-QAM, Code rate 2/3 and GI (Guard Interval) 1/8, resulting of a Bit rate of 14.7 Mbits/s. This will provide an adequate robust signal and very acceptable 4K picture quality. Remember this is a base line setting for system testing. Your requirements will vary and the HEVC Encoder and Decoder can be adjusted to suite those requirements.



Encoder locked to the four SDI video signals and a bit rate of 14.5Mb, just under the bit rate that the camera transmitter is set (14.7Mb).



NAVIGATING THE HEVC ENC MENUS

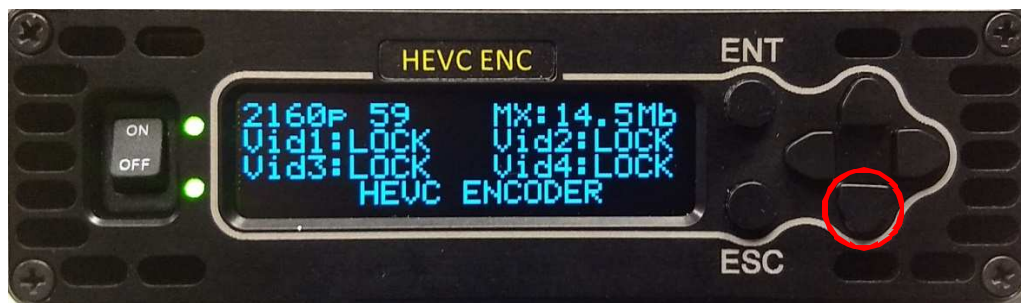
Press the ENT button on the front panel. The next menu will be the CONFIG VIDEO. Press the ENT button, VIDEO SOURCE will display **DEFAULT**. Push the Down button, VIDEO SAMPLE FORMAT is displayed: **2SI** (2-Sample Interleave). Push the down button again and VIDEO FORMAT displays: **2160p 59** (59.94).

Press the down button and VIDEO BITRATE is displayed: AUTO. Press the down button and MUX RATE is displayed: **14.500 Mb**. The MUX BITRATE was set by pressing the ENT button. Notice the first intergerr "0" is highlighted. Toggling the upper or lower button will change the values.

Using the Right button will toggle to the next position. Up or down buttons are used to set numbers. Once completed, press the ENT button.



Press the down button and VIDEO MODE is displayed: HEVC (High Efficiency Video Coding). Press the down button again and VIDEO DELAY MODE is displayed: LOW DELAY. Press the down button again and VIDEO CHROMA FORMAT is displayed: 4:2:0. Press the down button and VIDEO BIT DEPTH is displayed: 10-bit.



Press the ENT button and the next system menu will appear. Push the down button and select the CONFIG AUDIO menu. Press the ENT button; confirm the AUDIO SOURCE 1 EMBEDDED 1 (1/2) is displayed. Continue to scroll down until the AUDIO MODE PAIR 1 MPEG2 LAYER 1 is displayed. Continuing to scroll will display the remaining audio menus. All menus are located at end of this manual.

Press the ESC button and return the CONFIG AUD system menu. The next menu is CONFIG PIDs; these are set and should not have to be changed. The next system menu is CONFIG IP. This is used to set the ENC and decoder parameters via a web browser. Scroll down to UNIT menu by pressing the down button. Press the ENT button. The HEVC VERSION software is displayed, scroll down to the following menus: HEVC FPGA TEMP, HEVC PSU TEMP, HEVC VOLTAGE, HEV SERIAL Number and WC (Display screen) VERSION. Pressing the ESC button several times will return to the home screen.

NAVIGATING THE HEVC DEC MENUS



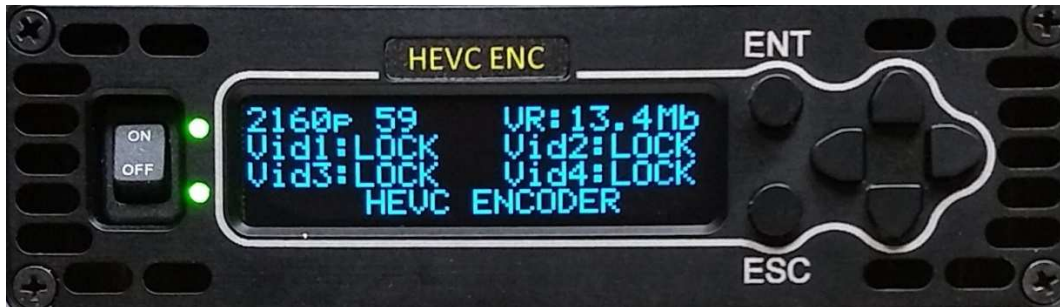
The setting described above is for the HEVC DEC when there is no ASI signal present.



The HEVC Decoder is now locked to the input ASI signal from the HEVC Encoder. The video monitor will now display a 4K UHD picture. If not, Scroll to the VIDEO CONFIG menu, toggle to and verify on both the ENC and DEC that they are both set with VIDEO QUAD SYNC OFF and VIDEO SAMPLE: 2SI



The user is encouraged to navigate the menus of both the Encoder and Decoder. Using the HVEC ENC, from the default menu,



access to each menu is via the **ENT** button. Example: **VIDEO CONFIG**. Pushing the ENT button again will access the 'sub' menus. **VIDEO SOURCE**. Pressing the Up or Down buttons, will scroll through the various menus in each section. Pressing the **ENT** button, in a sub menu will highlight that selection. While highlighted, using the Up or Down buttons, will change its parameters. Once a new parameter has been selected, the ENT button is pressed. This will save the changed parameter and now will appear un-highlighted. Pressing the ESC button until the default menu is displayed as pictured above. All the PIDs (video, Audio, PRC and PMT) should match between the HEVC encoder and decoder.

HEVC ENC Main Menu Selections:

CONFIG VIDEO
CONFIG AUDIO
CONFIG PIDs
CONFIG IP
UNIT

SUB Menu Selections:

CONFIG VIDEO

VIDEO SOURCE
Default
VIDEO SAMPLE FORMAT
2SI
VIDEO FORMAT
2160p 59

VIDEO BITRATE
Auto
MUX BITRATE
14.500 Mb
VIDEO MODE
HEVC
VIDEO DELAY MODE
Low Delay
VIDEO CHROMA FORMAT
4:2:0
VIDEO BIT DEPTH
10-bit
VIDEO QUAD SYNC MODE
OFF
VIDEO HD DUPLICATION
Single HD Output
VIDEO HDR/WGC MODE
Auto

CONFIG AUDIO

AUDIO SOURCE 1
Embedded 1 (1/2)
AUDIO SOURCE 2
Embedded 1 (3/4)
AUDIO SOURCE 3
Embedded 1 (5/6)
AUDIO SOURCE 4
Embedded 1 (7/8)
AUDIO MODE PAIR 1
MPEG2 Layer 2
AUDIO MODE PAIR 2
Off
AUDIO MODE PAIR 3
Off
AUDIO MODE PAIR 4
Off
LEFT LEVEL GAIN 1
0.0
RIGHT LEVEL GAIN 2
0.0

CONFIG PIDs

VIDEO PID
000100
AUDIO PID 1
000200
AUDIO PID 2
000201
AUDIO PID 3
000202
AUDIO PID 4
000203
PCR PID
000249
PMT PID
000250
SIT PID
000017

CONFIG IP

IP ADDRESS 0
192.168.0.21
GATEWAY ADDRESS 0
192.168.0.1
IP MASK 0
255.255.255.0
DHCP 0
On
IP ACTIVE ADDRESS 0
0.0.0.0
IP ADDRESS 1 (Ethernet Port)
192.168.1.21
GATEWAY ADDRESS 1
192.168.1.1
IP MASK 1
255.255.255.0
DHCP 1
Off
IP ACTIVE ADDRESS 1
192.168.1.21
IP BRIDGE
Off

UNIT

HEVC VERSION
V1.6.1
HEVC FPGA TEMP
48.1
HEVC PSU TEMP
53.5
HEVC VOLTAGE
11.7
HEVC SERIAL
e09f4738
WC VERSION (Display)
H.1.7

HEVC DEC Main Menu Selections:



Using the HVEC ENC, from the default menu, access to each menu is via the **ENT** button. Example: **VIDEO CONFIG**. Pushing the ENT button again will access the 'sub' menus. **VIDEO SOURCE**. Pressing the Up or Down buttons, will scroll through the various menus in each section.

CONFIG VIDEO

VIDEO SAMPLE FORMAT
2SI
VIDEO FORMAT
2160p 59
VIDEO MODE
HEVC
VIDEO DELAY MODE
Low Delay

VIDEO CONCEAL
000100
VIDEO CONCEAL REF
000100
GENLOCK MODE
Off
GENLOCK LINE OFFSET
000000
GENLOCK PIXEL OFFSET
00000
VIDEO FAIL MODE
Freeze Frame
VIDEO QUAD SYNC MODE
Off
VIDEO HD DUPLICATION
Single HD Output

CONFIG AUDIO

AUDIO MODE PAIR 1
LPCM-16bit
AUDIO MODE PAIR 2
AAC
AUDIO MODE PAIR 3
AAC
AUDIO MODE PAIR 4
AAA
OUTPUT LEVEL PAIR 1
+24dBu
OUTPUT LEVEL PAIR 2
+24dBu

CONFIG PIDs

SERVICE SELECT
Auto Service Number
SERVICE NUMBER
000001
VIDEO PID
000100
AUDIO PID 1
000200

AUDIO PID 2
000201
AUDIO PID 3
000202
AUDIO PID 4
000203
PCR PID
000249
PMT PID
000250
SIT PID
000017

CONFIGIP

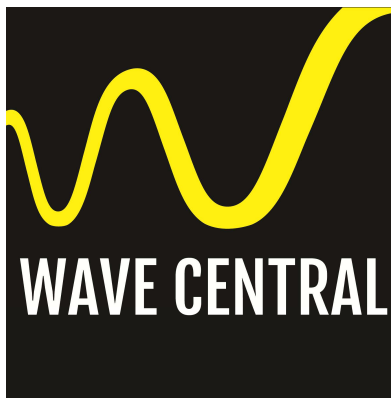
IP ADDRESS 0
192.168.0.21
GATEWAY ADDRESS 0
192.168.0.1
IP MASK 0
255.255.255.0
DHCP 0
On
IP ACTIVE ADDRESS 0
0.0.0.0
IP ADDRESS 1 (Ethernet Port)
192.168.1.21
GATEWAY ADDRESS 1
192.168.1.1
IP MASK 1
255.255.255.0
DHCP 1
Off
IP ACTIVE ADDRESS 1
192.168.1.21
IP BRIDGE
Off

UNIT

HEVC VERSION
V1.6.1

HEVC FPGA TEMP
51.9
HEVC PSU TEMP
53.3
HEVC VOLTAGE
11.7
HEVC SERIAL
F7de7bx9
WC VERSION
H.1.7

The scope of this document is to get you started. When a system is purchased from Wave Central LLC, all components are staged and tested in accordance with your operational parameters. Wave Central LLC is not liable for any omissions or errors that may result in the loss of use of these products described herein.



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