

ImageEvolution X3

Product Manual



thinklogical[™]
Extend • Distribute • Innovate

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Subject: ImageEvolution X3
Revision: Rev D, June 2011

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PREFACE

About this Product Manual

This product manual is divided into four sections for Introduction, System Features, Connecting the Image Evolution X3, Installation, Regulatory and Safety Compliance and Product Support. These are sub-divided to help you easily find the topics and procedures you are looking for. This manual also contains Appendices.

Conventions Used in this Manual

As you read this manual you will notice certain conventions that bring your attention to important information. These are **Notes** and **Warnings**. Examples are shown below.



Note: Important Notes appear in blue text preceded by a yellow exclamation point symbol, like this.

A note is meant to call the reader's attention to helpful information at a point in the text that is relevant to the subject being discussed.



Warning! All Warnings appear in red text, followed by blue text, and preceded by a red stop sign, like this.

A warning is meant to call the reader's attention to critical information at a point in the text that is relevant to the subject being discussed.

BEFORE STARTING ANY PROCEDURE, IT IS RECOMMENDED THAT YOU READ THE INSTRUCTIONS THOROUGHLY BEFORE PROCEEDING.

1. Introduction

1.1. Contents

When you receive your Thinklogical ImageEvolution X3, you should find the following items:

- ImageEvolution X3 Switch – IEC-000003.
- AC power cord – PWR-000006-R (International connections may differ).
- ImageEvolution X3 product manual.

1.2. Product Overview

The Thinklogical ImageEvolution X3 is a high performance scaler and frame rate converter unit that allows for advanced image enhancement. The unit supports SD, HD/Dual-Link HD/3G SDI and supports SMPTE standards.

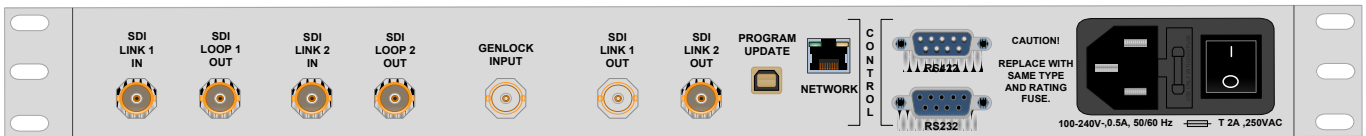


FIGURE 1: *Rear View of ImageEvolution X3*

The following model is available from Thinklogical:

IEC-000003

ImageEvolution X3

2. System Features

2.1. General System Features

The ImageEvolution X3 is a high performance converter and scaler that transitions SDI video signals into any desired output format and provides the highest quality images for professional audio-visual end users. System features include support for up to 8 channels of embedded audio and ancillary data. Users are able to control the ImageEvolution X3 through its front panel multi-function selector. RS-232 and RS-422 port are available for remote control of the unit. An internal AC power supply means no wall wart so the product can easily be stand-alone or rack mounted.

Each ImageEvolution X3 system includes the following features:

Conversion/Scaling:

- Input and Output: SD, HD-SDI, Dual-link HD-SDI, 3D, 3G*
- Input and output formats supported: progressive, interlaced, PsF
- 3D Processing
 - Conversion of dual stream HD-SDI input to side-by-side 3G-SDI or HD-SDI Output
 - Conversion of dual stream HD-SDI input to line interleaved 3G-SDI Output
 - Conversion of dual stream HD-SDI input to dual stream HD-SDI Output
 - Conversion of side-by-side 3G-SDI or HD-SDI to a 2D right half image 3G-SDI or HD-SDI Output
- Supports Closed Captioning and Time Code Processing
- SMPTE standards supported: 259M-C, 292, 372M, 424M, 425 level A and level B
- Active SMPTE compliant loop out ports
- Internal universal AC power supply
- Supports 8 channels of embedded audio, as well as ancillary data
- 20 user programmable presets
- Genlock Capable (House Sync)

note1: 12-bit max supported on output, 10-bit max supported on input

note2: YCbCr & RGB supported on output, YCbCr supported on input

Video Processor Features:

- Per pixel motion-adaptive video noise reduction- removes the white Gaussian noise present in most types of video

- Content adaptive block and mosquito noise reduction- significantly reduces the blocking and mosquito noise artifacts present in compressed video
- Advanced per-pixel, motion-adaptive, edge-adaptive 3D de-interlacing with support for arbitrary film cadences- removes “jaggies” and “feathering” to produce smooth and clear images
- Adaptive scaling- produces sharp and clean images and low or high resolutions
- Natural dept expansion- enhances details and sensation of depth for greater realism and super resolution effect
- Adaptive contrast enhancement (ACE) brings out shadow detail without crushing mid-tones or highlights
- Intelligent color remapping (ICR) enables vivid color without hue shifts and clipping while maintaining accurate flesh tone
- Qdeo™ true color- a unique solution for using the full dynamic range of 10-bit and 12-bit displays which eliminates contouring seen when viewing typical 8-bit consumer video

Technical Specifications

Frame Rate Formats Supported: Progressive, Interlaced, PsF

Function	Video Standards Supported	Formats
SD-SDI	SMPTE 259M	PAL and NTSC
HD-SDI	SMPTE 292M	All standard HD-SDI compatible formats
Dual-link HD-SDI	SMPTE 372M	All 1080 line video formats compatible with SMPTE 372M
3G SDI	SMPTE 424M, 425M, Level A and B	All SMPTE 425 level A and B compatible formats

Storage Temperature	0 to 50 deg C , 5 – 95 % RH, non condensing
Power Supply Voltage	100 to 240 VAC, 50/60 Hz Universal AC power supply
Power Consumption	26 Watts, typical
Heat Dissipation	88.7 BTUs per hour
Rear Panel Connectors	USB B (1) Console Port RS-422 M (1) Console Port RS-232 F (1) HD-SDI Input BNC Connectors with Loopback outputs (2) HD-SDI BNC Connectors HD-SDI Out (2) Genlock BNC Input (1) RJ45 Connector for 10/100 base 'T' Ethernet (1) BNC Connector for GENLOCK input (1)
Operating Temperature and Humidity	0 to 50 °C (32 to 122 °F); 5 to 95% RH, non-condensing
Enclosure Dimensions	Rack Size: EIA 19" Height: 1U-1.72" (43.69mm) Depth: 9.5 (241.3mm) Width: 17.49" (444.2mm)
Compliance	Pending approvals for US, Canada, and European Union

2.2. Hardware

2.2.1. Desktop or Rack Mount Device

You may choose to place it on a shelf or desktop (rubber feet included), or rack mount using the supplied mounting brackets (19 inch rack mountable). The front panel should be visible and unobstructed to facilitate programming. The front panel buttons may also need to be accessible. All connections are made to the rear of the chassis. The ImageEvolution X3 chassis does not need to be opened or accessed. The sturdy metal case allows units to be stacked, as required.

2.2.2. Cooling

The ImageEvolution X3 uses two DC fans to move air horizontally through the enclosure. They will turn on automatically when the internal temperature reaches a preprogrammed temperature.



Note: Be sure to leave adequate ventilation space on both sides of the units (2" minimum), especially if the units are being stacked.

3. Connecting the ImageEvolution X3

All physical connections to the product use industry-standard connectors. All connections are found on the rear of the unit.

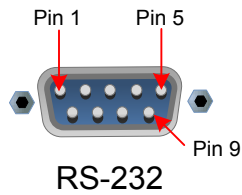
3.1 Front Panel View:



3.2 Rear Panel View

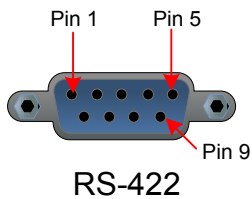


3.3 RS-232 Pin Out



- Pin 1 DCD_OUT
- Pin 2 RX_IN
- Pin 3 TX_OUT
- Pin 4 DTR_IN
- Pin 5 GND
- Pin 6 DSR_OUT
- Pin 7 RTS_IN
- Pin 8 CTS_OUT
- Pin 9 RI_OUT

3.4 RS-422 Pin Out



- Pin 1 GND
- Pin 2 RX +
- Pin 3 TX-
- Pin 4 GND
- Pin 5 NC
- Pin 6 GND
- Pin 7 RX-
- Pin 8 TX+
- Pin 9 GND

4. Installation

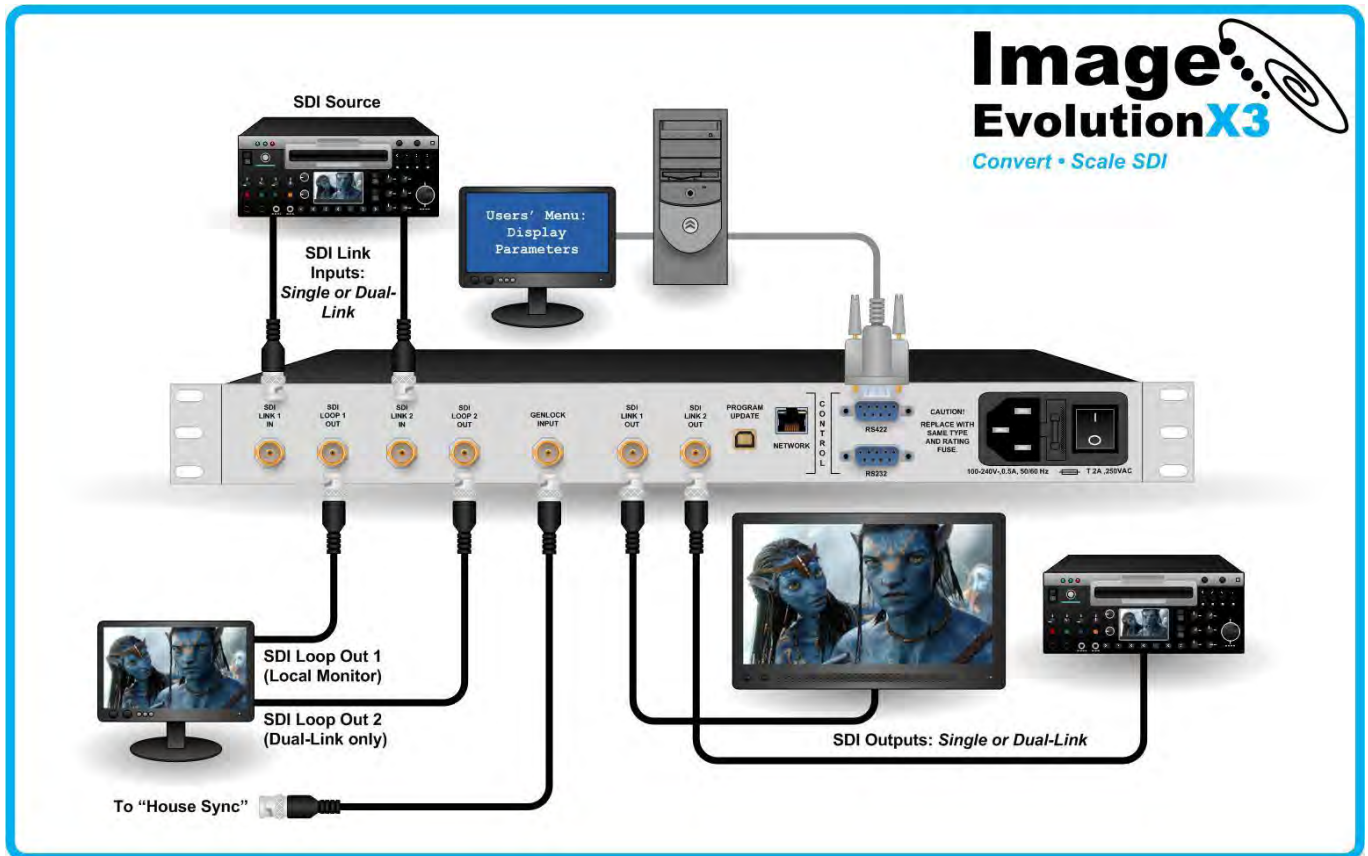


Image Evolution Setup:

1. In the case of a single link SDI or HD-SDI, or dual link HD-SDI source, coax cable(s) may be connected between the Image Evolution's Link1 IN (or in the case of dual link, Link1 and Link2 IN), and an HD-SDI source. If desired, coax cables may be connected between the Link1 (or Link1 and Link2) LOOP BACK BNC connectors and a suitable monitor (or monitors). Loop back outputs will provide a raw or unprocessed output of the video input on LINK1 IN or LINK2 IN.
2. If single or dual link HD-SDI is the desired output, connect coax cables between the BNC connector(s) LINK1 OUT (or LINK1 and LINK2 OUT) and a suitable monitor (or monitors). LINK1 OUT and LINK2 OUT provide processed output of the video input.
3. Connect CAT-5 cable between the RJ-45 on the Image Evolution and 10/100 Ethernet port if a network is available. (Available in future firmware updates)
4. The USB on the Image Evolution need not be connected at this point. Note: When performing a firmware upgrade it is recommended that the IEX3 be restored

back to the factory default. (1080i @ 60 at 4:2:2 10-bit mode). See section on 'Restore Factory Config'

User Menu Configurations:

The IEX3 has many configuration options and Appendices A and B will cover these options in detail. Every configuration can be set regardless of the user interface (e.g. RS-232, RS-422, Front Panel Display, Web Interface).

5. Regulatory and Safety

5.1 Safety Requirements

5.1.1 Symbols Found on Product

Markings and labels on the product follow industry-standard conventions. Regulatory markings found on the products comply with requirements.

5.2 Regulatory Compliance

The Thinklogical Inc. products are designed and made in the USA. Our products have been tested by a nationally recognized testing laboratory and found to be compliant with the following standards (both domestic USA and many international locations).

5.2.1 North America

These products WILL comply with the following standards:

Safety

- ANSI/UL60950-1: 1st Edition (2003)
- CAN/CSA C22.2 No. 60950-1-03

Electromagnetic Interference

- FCC CFR47, Part 15, Class A
- Industry Canada ICES-003 Issue 2, Revision 1

5.2.2 Australia & New Zealand

This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

European Union

5.2.2.1 Declaration of Conformity

Manufacturers name and address:

Thinklogical LLC
100 Washington Street
Milford, CT 06460 USA
Telephone (203)647-8700

Product name

- Model: ImageEvolution X3

This product complies with the requirements of the Low Voltage Directive 72/23/EEC and the EMC Directive 89/336/EEC.

5.2.2.2 Standards with which the Products Comply

Safety

- CENELEC EN 60950-1, 1st Edition (2001)

Electromagnetic Emissions

- EN55022: 1994 (IEC/CSP1R22:1993)
- EN61000-3-2/A14:2000
- EN61000-3-3:1994

Electromagnetic Immunity

- EN55024:1998 Information Technology Equipment-Immunity Characteristics
- EN61000-4-2:1995 Electro-Static Discharge Test
- EN61000-4-3:1996 Radiated Immunity Field Test
- EN61000-4-4:1995 Electrical Fast Transient Test
- EN61000-4-5:1995 Power Supply Surge Test
- EN61000-4-6:1996 Conducted Immunity Test
- EN61000-4-8:1993 Magnetic Field Test
- EN61000-4-11:1994 Voltage Dips & Interrupts Test

5.2.3 Supplementary Information

The following statements may be appropriate for certain geographical regions and might not apply to your location.



Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference to radio communications at his own expense.



Note: This Class A digital apparatus complies with Canadian ICES-003 and has been verified as being compliant within the Class A limits of the FCC Radio Frequency Device Rules (FCC Title 47, Part 15, Subpart B Class A), measured to CISPR 22: 1993 limits and methods of measurement of Radio Disturbance Characteristics of Information Technology Equipment.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.



Warning! This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.



Note: The user may notice degraded audio performance in the presence of electromagnetic fields.

5.2.4 Product Serial Number

Thinklogical products have a unique serial number, imprinted on a small silver label that is placed on the bottom of the chassis. The serial number includes a date-code. The format for the date-code is two digits for the month; two digits for the day and four digits for the year and two or three digits for a unique unit number. This serial number is also found on the original shipping carton.

6. How to Contact Us

6.1 Customer Support

Thank you for choosing a Thinklogical product for your application. We appreciate your business and are interested in helping you successfully use our product. Thinklogical is here to help you.

Thinklogical is an engineering company; you receive the information you require from the key engineer. We believe that the first line of support is the design engineer that developed the product. Therefore, your questions will be handled promptly by an engineer.

To contact Thinklogical, use the following telephone numbers and internet-based methods.

6.1.1 Website

Check out our website for current product offerings, support information and general information about all of the products we offer.

Our internet website offers product information on all current systems, including technical specification sheets and installation guides (for viewing online or for download), product diagrams showing physical connections and other information you might need.

Internet: www.thinklogical.com



Note: Most online documents are stored as Adobe Acrobat “PDF” files. If you do not have the Adobe Acrobat reader needed to view PDF files, visit www.adobe.com for a download.

6.1.2 Email

Thinklogical is staffed Monday through Friday from 8:30am to 5:00pm, Eastern Time Zone. We will try to respond to your email inquiries promptly, use the following email addresses for your different needs:

info@thinklogical.com – Information on Thinklogical and our products.

sales@thinklogical.com – Sales Department - orders, questions or issues.

support@thinklogical.com – Product support, technical issues or questions, product repairs and request for Return Authorization.

6.1.3 Telephone

Telephone Sales: Contact our expert, technically oriented sales staff via telephone in Milford, CT at **(203) 647-8700** or if in the continental US, you may use our **toll-free number (800) 291-3211**. We are here Monday through Friday from 8:30am to 5:00pm, Eastern Time Zone. Ask for their direct dial phone number when you call.

Telephone Product Support: Contact Product Support via telephone in Milford, CT at **(203) 647-8700**. The support lines are manned Monday through Friday, 9am to 5pm, Eastern Time Zone.

International Sales: Please contact our US sales staff in Milford, CT at **(203) 647-8700**. We are here Monday through Friday, 8:30am to 5:00pm, Eastern Time Zone (same as New York City). If leaving a voice message, please provide a “best time to call back” so we may reach you at your convenience.

Our switchboard attendant will direct your call during regular business hours. We have an automated attendant answering our main telephone switchboard after regular business hours and holidays. You can leave voice messages for individuals at any time. Our Sales Representatives have direct numbers to speed up your next call to us.

6.1.4 Fax

Our company facsimile number is **(203) 783-9949**. Please indicate the nature of the fax on your cover sheet and provide return contact information.

6.1.5 Product Support

Thinklogical's support personnel are available Monday through Friday from 8:30am to 5:00pm, Eastern Time Zone. If your application might require assistance at some time outside of our normal business hours, please contact us beforehand and we will do our best to make arrangements to help you with your Thinklogical products.

6.1.6 Warranty

Thinklogical, LLC (“Thinklogical”) warrants this product against defects in materials and workmanship for a period of one (1) year from the date of delivery (ordinary wear and tear excluded). This limited warranty does not cover defects resulting from (i) use of the product other than as described in the applicable documentation for the product; (ii) modifications to or repairs of the product that are made by any party other than Thinklogical or a party acting on Thinklogical's behalf, or (iii) combination of the product with third party products that is not consented to by Thinklogical. Occurrences of events described in (i) – (iii) shall void the foregoing warranty. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Except for the express warranty set forth above, to the fullest extent permitted under applicable law, Thinklogical, LLC and its suppliers disclaim any and all other warranties, express and implied, including without limitation the implied warranties of merchantability, fitness for a particular purpose, title and non-infringement.

If the defective product is returned to the authorized dealer within one (1) year of the delivery date, repair or replacement of the product will be made. Repairs may be made with refurbished parts. If repair or replacement is not possible, Thinklogical may keep the defective product and refund the amount that you paid for the defective product. These are Thinklogical's sole obligations, and your exclusive remedies, for a breach of the limited warranty set forth above.

To return a defective product, contact the Thinklogical authorized dealer from whom you purchased the product. Do not return a product directly to Thinklogical without prior authorization from your dealer.

If you have received prior authorization from your dealer and are returning a product directly to Thinklogical:

1. Contact your sales representative, or call Customer Support at (800)291-3211 or + (203)647-8700.
2. Describe the defect with the product and Customer Support will issue a Return Merchandise Authorization Number (RMA#).
3. Pack the product in all of its original packing, if possible, and write the RMA number on the box.
4. Return the product to:
Thinklogical, LLC
Attn: RMA# [Insert the RMA# issued to you, by Thinklogical, here.]
100 Washington Street
Milford, CT 06460 USA

Note: Extended warranties are available from Thinklogical at an additional cost. Contact your sales representative for further information and pricing.

6.1.7 Our Address

If you have any issue with the product, have product questions or need technical assistance with your Thinklogical® system, please call us at **800-291-3211 (USA only)** or **(203) 647-8700** and let us help. If you'd like to write us, we are located at:

Thinklogical LLC
100 Washington Street
Milford, CT 06460 USA

APPENDIX A

A.1. GUI

The graphical user interface (GUI) for the IE X3 was developed for ease of use to create, set, and recall custom configurations. There are 6 main menus that allow you to configure the input/output, video processor, audio, user configurations, system settings and system information. There are sub-menus under the video processor menu for video control and picture control.

Note- When power has been cycled on a unit it will reset to factory settings unless the “Set Power On Config” has been set in the User Menu.

Input/Output Menu

This menu allows you to select the input and the format of the output. There is also an option to select the 3D output as well as Enable Genlock, Enable Ancillary Time Codes, and Enable Ancillary closed caption.

By clicking the “Take” button at the bottom of the screen you are able to commit the settings that you have selected.

The screenshot displays the GUI for the thinklogical Image Evolution X3. At the top, there are logos for 'thinklogical' and 'Image Evolution X3 Convert & Scale SDI'. Below the logos is a navigation bar with six tabs: 'INPUT/OUTPUT' (selected), 'VIDEO PROC', 'AUDIO', 'USER', 'SYSTEM SET', and 'SYSTEM INFO'. The main content area is divided into two columns: 'INPUT' and 'OUTPUT'.
In the 'INPUT' column, there is a dropdown menu for 'Single Link Input 1' and three checked checkboxes: 'Loop 1 Output Enable', 'Loop 2 Output Enable', and 'Auto Input Detect Enable'.
In the 'OUTPUT' column, there are four dropdown menus: 'Select SD Format', 'Select HD Format', 'DL_1080psf24', and 'Select 3G Level A Format'. Below these is a dropdown for 'Select 3G Level B Format'.
The '3D Output' section has radio buttons for 'Off', 'Line by Line', 'Side by Side', 'Dual Stream', and 'Right Half Zoom'. To the right of these are three checked checkboxes: 'Enable Genlock', 'Enable Ancillary Time Codes', and 'Enable Ancillary Closed Caption'.
At the bottom left of the main content area is a large 'TAKE' button.

Video Processor > Video Control

The video control sub-menu allows you to control De-Interlacer, Noise Reducer, Compression Artifact Reducer, Edge Enhancer, and Adaptive Contrast Enhancer.

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Image EvolutionX3 Convert & Scale SDI

INPUT/OUTPUT VIDEO PROC AUDIO USER SYSTEM SET SYSTEM INFO

VIDEO CTRL PICTURE CTRL

De-Interlacer

- Off
- Default
- 2D Vector
- 2D Vector Aggressive
- 3D Fixed
- 3D Motion Adaptive
- 3D Motion Aggressive
- 3D Motion Linear

Noise Reducer

- Off
- Default
- 2D
- 3D Fixed
- 3D Adaptive
- Automatic

Compression Artifact Reducer

- Off
- Enable
- Mosquito Noise
- Block Noise
- All Blocks

Edge Enhancer

- Off
- Low
- Medium
- High

Adaptive Contrast Enhancer

- Off
- Low
- Medium
- High
- Range 0-255
- Range 16-235
- ACE Brightness

Video Processor > Picture Control

The picture control sub-menu allows you to control Hue Saturation, Advanced Color Remapping, Flesh Tone Correction and Color Temperature. You can also reset all levels back to the factory default.

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INPUT/OUTPUT VIDEO PROC AUDIO USER SYSTEM SET SYSTEM INFO

VIDEO CTRL PICTURE CTRL

HUE SATURATION ENABLE

COLOR LEVEL

RED 64 [Slider] [Color Bar] [-] [+]

GREEN 64 [Slider] [Color Bar] [-] [+]

BLUE 64 [Slider] [Color Bar] [-] [+]

YELLOW 64 [Slider] [Color Bar] [-] [+]

MAGENTA 64 [Slider] [Color Bar] [-] [+]

CYAN 64 [Slider] [Color Bar] [-] [+]

ADVANCED COLOR REMAPPING

- OFF
- GRASS
- SKY
- SKYGRASS
- VIVID
- DEFAULT
- STANDARD

COLOR TEMPERATURE

- NORMAL
- COOL
- WARM
- CUSTOM

FLESH TONE CORRECTION

- OFF
- LEVEL 1
- LEVEL 2
- LEVEL 3
- LEVEL 4
- LEVEL 5
- LEVEL 6

HUE SATURATION 64 [Slider]

BRIGHTNESS 0 [Slider]

CONTRAST 10.0 [Slider]

TINT 0 [Slider]

BLACK LEVEL 0 [Slider]

ALL LEVELS TO DEFAULT

Audio

The audio menu allows you to select which output audio channel is sourced with any input audio channel. It also allows you to enter an audio delay (from -50 ms to +50 ms) when needed.

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INPUT/OUTPUT VIDEO PROC **AUDIO** USER SYSTEM SET SYSTEM INFO

AUDIO ENABLE

Output Channel 1 source is from: Input Channel 1

Output Channel 2 source is from: Input Channel 2

Output Channel 3 source is from: Input Channel 3

Output Channel 4 source is from: Input Channel 4

Output Channel 5 source is from: Input Channel 5

Output Channel 6 source is from: Input Channel 6

Output Channel 7 source is from: Input Channel 7

Output Channel 8 source is from: Input Channel 8

AUDIO DELAY (ms) 0

User

The user menu allows you to save your current configuration by name or restore factory configuration. You can also use the drop down menu to “Select Config Name” and set power on configuration (which sets the current configuration to be the default power on configuration), restore factory configuration and delete the selected configuration.

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INPUT/OUTPUT VIDEO PROC AUDIO **USER** SYSTEM SET SYSTEM INFO

SELECT CONFIG NAME

SAVE CURRENT CONFIG AS...

RESTORE FACTORY CONFIG

SET POWER ON CONFIG

RESTORE CONFIG

DELETE CONFIG

System Set

The system set menu allows you to view the IP address, Mask and Gateway of the unit in use. From this menu you can also select either RS-232 or RS-422 as the serial port. You must hit the “Save/Apply” button to save your changes.

The IP address, Mask, and Gateway can all be changed via RS-232/RS-422 control or via the front panel only. The fields are read-only on the GUI.

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INPUT/OUTPUT VIDEO PROC AUDIO USER **SYSTEM SET** SYSTEM INFO

IP Address 192.168.13.7
Mask 255.255.255.0
Gateway 192.168.4.5

Serial Port RS-232

APPLY

System Info

The system info menu allows you to view information for the inputs and outputs as well as Genlock and software and firmware versions.

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INPUT/OUTPUT VIDEO PROC AUDIO USER SYSTEM SET **SYSTEM INFO**

Input 1 Locked

Video Format	1080i59.94(HD)orPSF30
Words per Active Line	1920
Total Words per Line	2200
Lines per Active Frame	540
Total Lines per Frame	1125
Progressive	0
PSF	0
Rate Select	HD
1.000 or 1.001	1.001
Data Stream 1 VPID	0x85 0x06 0x80 0x01

Input 2 Locked

Video Format	1080i59.94(HD)orPSF30
Words per Active Line	1920
Total Words per Line	2200
Lines per Active Frame	540
Total Lines per Frame	1125
Progressive	0
PSF	0
Rate Select	HD
1.000 or 1.001	1.001
Data Stream 1 VPID	0x85 0x06 0x80 0x01

Version Information

FPGA 1 Version	0x030E
FPGA 2 Version	0x0304
Software Version	50 35
Linux Version	x3 V1.00
GUI Version	50 10629-A
Temperature	93 F (34 C)

Output Locked

Video Format	1080sf24(DL) 4:2:2
Words per Active Line	3840
Total Words per Line	4400
Lines per Active Frame	1080
Total Lines per Frame	1125
Vertical Lock	Locked
Horizontal Lock	Locked
Data Stream 1 VPID	0x8A 0xC6 0x01 0x02

Genlock on

Video Format	Output Follows Input
Reference Present	Yes
Reference Locked	Yes
FSync Clock Present	Yes
VSsync Clock Present	Yes
HSync Clock Present	Yes
Genlock Verification	Passed

APPENDIX B

B.1. RS-232, RS-422, Front Panel Display

There are a lot of status and configuration settings that can be viewed but are not output to the Front Panel display due to the display limitations. The RS-232 and RS-422 interface menus will have an 'exit' option. Selecting this option will display the menu items one level up. The SPACE bar will repeat the current menu and the ENTER key will return the user to the top level menu. This document will be formatted similar to how the configuration menus are displayed on power-up.

The RS-232 setup and configuration is as follows:

- Use Hyperterm or similar type interface.
- Baud rate is 115200, 8 bits, no parity, 1 stop bit, no flow control
- Emulate VT-100 mode

MAIN USER MENU:

- A: Set Input Select
- B: Set Output Select
- C: Video Processing Setup
- D: Audio Info and Setup
- E: User Config Setups
- F: System Settings
- G: System Information

MAIN MENU:

A: Set Input Select



Note: A valid input must be applied in order for the configuration to be used.

- a: Single Link Input 1**
Selects the video and embedded audio source from BNC Input 1. This will select the video signal to be processed from link 1. Note: This is also the default link and does not have to be selected when configuring the output video format. Signal does need to be present for configuration to be successful.
- b: Single Link Input 2**
Selects the video and embedded audio source from BNC Input 2.
- c: Dual Link**
Selects a Dual link Video and embedded audio source on BNC Inputs 1 and 2.
- d: Dual Stream 3D**
Inputs 1 & 2 are to be used for Left Eye / Right Eye signals for 3D processing for output line-by-line, side-by-side, or rate-converted Dual Stream.
- e: Enable Loop 1 Output**
This will enable the video signal applied to input 1 to be looped back out of the IEX3. This is enabled as default.
- f: Disable Loop 1 Output**
Turns off the BNC Loop output 1.
- g: Enable Loop 2 Output**
This will enable the video signal applied to input 2 to be looped back out of the IEX3. This is enabled as default.
- h: Disable Loop 2 Output**
Turns off the BNC Loop output 2.
- i: AUTO mode ON**
Detects when a video source has changed format. On cable insertion, the unit performs a re-configuration of the last known output setting with the new input.
- j: AUTO Mode OFF**
Turns off the AUTO mode.
- j: Right Half Frame (3D to 2D)**
This feature will scale the right half side of the input video and display it as full screen.

MAIN MENU:

B: Set Output Select



Note: Items in this menu will configure the output video format. The video coming out of the IEX3 is duplicated on both ports with the exception of Dual Link mode.

By selecting any of the following formats, this becomes the default configuration on all subsequent power cycle iterations.

- a: Standard Def. Output**
Selects the menu for Standard Definition video output format.

- b: High Definition Output**
Selects the menus for High Definition video output format.

- c: HD Dual Link Output**
Selects the menus for Dual Link video output. format.

- d: 3G Level A Output**
Selects the menus for 3G Level A video output format.

- e: 3G Level B Output**
Selects the menus for 3G Level B video output format.

MAIN MENU:

C: Video Processing Setup

- a: Comp. Artifact Reducer**
Selects the menu for Component Artifact Reducer (CAR) video processing functions.
- b: DeInterlacer**
Selects the menus for the DeInterlacer (DEINT) video processing functions.
- c: Noise Reducer**
Selects the menus for the Noise Reduction (NR) video processing functions.
- d: Picture Control**
Selects the menus for Picture Control (PC) video processing functions.
- e: Edge Enhancer**
Selects the menus for Edge Enhancement (EE) video processing functions.
- f: Color Management Unit**
Selects the menus for Color Management Unit (CMU) video processing functions.
- g: Adapt. Contrast Enhancer**
Selects the menus for the Adaptive Contrast Enhancer (ACE) video processing functions.
- h: 3D Control Menu**
Selects the menu for output 3D processing formats.

MAIN MENU:

D: Audio Info and Setup

- a: Enable Audio Output**
Enables the embedded audio output from the selected input.

- b: Disable Audio Output**
Mutes all embedded audio output channels.

- c: Get Audio Info Input 1**
Get Audio information from BNC Input 1.

- d: Get Audio Info Input 2**
Get Audio information from BNC Input 2.

- e: Set Audio Delay**
Audio Delay range is from -50 - +50 in mS with the default being 0.

- f: Get Audio Delay**
The programmed Audio Delay in mS.

- g: Get Audio Channel Cfg.**
Get the audio channel mapping.

- h: Assign Audio Channels**
Configure input to output channel configuration.

MAIN MENU:

E: User Config Setups

- a: Save Current Config**
Saves the current system settings to the non-volatile Memory. Maximum of 20 characters for the record name.

- b: Set Power On Config**
This option will set the current configuration to the user in-accessable region of flash. This configuration is restored during power up.

- c: Restore Config Record**
Recall any one of the current saved configuration records.

- d: Restore Factory Config**
By selecting this, the IEX3 will delete the stored power on configuration. configuration and will re-configure to the factory default on the next power cycle (1080i @ 60 Hz). Another way to achieve this is to hold down the front panel knob for a minimum of 5 seconds during a power cycle.

- e: Erase Record(s)**
Erase a particular record or all records.

MAIN MENU:

F: System Settings

a: Genlock Enable

A valid 'House Sync' needs to be applied to this input before enabling.

b: Genlock Disable

Disables GenLock.

c: Serial Port Select

Selects between the RS-232 and the RS-422 serial port communications interfaces.



Note: Communication can be lost if switching away from the current active communications port!

d: Ethernet Settings

Settings for the network interface.

e: Ancillary Data Settings

Enable/Disable Closed Captioning (DID=0x61, SDID=0x1) and Time Code (DID=0x60, SDID=0x60) data as well as a user configurable DID/SDID pair. Note that the user configurable pair will pass data at the incoming frame rate regardless of the configured output frame rate. The Time Codes and Closed Captioning info is processed to compensate for different input/output frame rates.



Note: IEX3 supports SMPTE 334 CDP708 data stream processing for all frame rates. However, only the 608 data packet contents within the CDP708 are forwarded (708 data contents shall be overwritten with inactive padded data). IEX3 will handle the contents of CDP708 data in release TBD.

f: Perform Lamp Test

Verify the 9 front panel LED's for proper operation.

MAIN MENU:

G: System Information

The following is used for retrieving information regarding current setup and signal detection information. The 'Get Genlock Info' is not available for display on the Front Panel. The 'Get Input X', 'Get Output Info' will display the signal format only on the Front Panel whereas the other communications interfaces will display more verbose info.

- a: Get Software Version**
Displays the System's software version number.
- b: Get FPGA 1 Version**
Displays FPGA 1 version number
- c: Get FPGA 2 Version**
Displays FPGA 2 version number
- d: Get Local Temperature**
Displays the temperature inside the box
- e: Get Input 1 Info**
Displays Information about the video and embedded audio signal on BNC Input 1
- f: Get Input 2 Info**
Displays Information about the video and embedded audio signal on BNC Input 2
- g: Get Output Info**
Displays Information about the video and embedded audio signal on BNC
Outputs
- h: Get Genlock Info**
Displays Information about the incoming Genlock signal on BNC Genlock Input

MAIN MENU:

B: Set Output Select

SUB-MENU:

a: Standard Def. Output

Selects a SD output format type of the selected resolutions:

a: 480i @ 59.94 (525-270)

b: 576i @ 50 (625-270)

MAIN MENU:

B: Set Output Select

SUB-MENU:

b: High Definition Output

Selects a HD output format type of the selected resolutions:

- a: 720p @ 23.97
- b: 720p @ 24
- c: 720p @ 25
- d: 720p @ 29.97
- e: 720p @ 30
- f: 720p @ 50
- g: 720p @ 59.94
- h: 720p @ 60
- i: 1035i @ 59.94
- j: 1035i @ 60
- k: 1080i @ 50
- l: 1080i @ 59.94
- m: 1080i @ 60
- n: 1080p @ 23.97
- o: 1080p @ 24
- p: 1080p @ 25
- q: 1080p @ 29.97
- r: 1080p @ 30
- s: 1080psf @ 23.97
- t: 1080psf @ 24
- u: 1080psf @ 25
- v: 1080psf @ 29.97
- w: 1080psf @ 30



Note: All HD outputs are 10 bit YCbCr 4:2:2

MAIN MENU:

B: Set Output Select

SUB-MENU:

c: HD Dual Link Output

Selects a HD-DL output format type of the selected resolutions:

- a: 1080i @ 50
- b: 1080i @ 59.94
- c: 1080i @ 60
- d: 1080p @ 23.97
- e: 1080p @ 24
- f: 1080p @ 25
- g: 1080p @ 29.97
- h: 1080p @ 30
- i: 1080p @ 50 4:2:2 10b
- j: 1080p @ 59.94 4:2:2 10b
- k: 1080p @ 60 4:2:2 10b
- l: 1080sf @ 23.97
- m: 1080sf @ 24
- n: 1080sf @ 25
- o: 1080sf @ 29.97
- p: 1080sf @ 30

1080p50, 1080p59.94, and 180p60 can only be YCbCr 4:2:2 10 bit.

All other resolutions will proceed to a sub-menu for color space and bit width selection.

MAIN MENU:

B: Set Output Select

SUB-MENU:

d: 3G Level A Output

Selects a 3G Level A output format type of the selected resolutions:

- | | | |
|----|----------------|-----------|
| a: | 1080i @ 50 | |
| b: | 1080i @ 59.94 | |
| c: | 1080i @ 60 | |
| d: | 1080p @ 23.97 | |
| e: | 1080p @ 24 | |
| f: | 1080p @ 25 | |
| g: | 1080p @ 29.97 | |
| h: | 1080p @ 30 | |
| i: | 1080p @ 50 | 4:2:2 10b |
| j: | 1080p @ 59.94 | 4:2:2 10b |
| k: | 1080p @ 60 | 4:2:2 10b |
| l: | 1080sf @ 23.97 | |
| m: | 1080sf @ 24 | |
| n: | 1080sf @ 25 | |
| o: | 1080sf @ 29.97 | |
| p: | 1080sf @ 30 | |

1080p50, 1080p59.94, and 180p60 can only be YCbCr 4:2:2 10 bit.

All other resolutions will proceed to a sub-menu for color space and bit width selection.

MAIN MENU:

B: Set Output Select

SUB-MENU:

e: 3G Level B Output

Selects a 3G Level B output format type of the selected resolutions:

a:	1080i @ 50	
b:	1080i @ 59.94	
c:	1080i @ 60	
d:	1080p @ 23.97	
e:	1080p @ 24	
f:	1080p @ 25	
g:	1080p @ 29.97	
h:	1080p @ 30	
i:	1080p @ 50	4:2:2 10b
j:	1080p @ 59.94	4:2:2 10b
k:	1080p @ 60	4:2:2 10b
l:	1080sf @ 23.97	
m:	1080sf @ 24	
n:	1080sf @ 25	
o:	1080sf @ 29.97	
p:	1080sf @ 30	

1080p50, 1080p59.94, and 1080p60 can only be YCbCr 4:2:2 10 bit.

All other resolutions will proceed to a sub-menu for color space and bit width selection.

Menu after Dual Link/3G A/ 3G B resolution selection:

Output DL/3G Color Space/Bits Menu

Selects the output color space (YCbCr or RGB) and the bit width (10 or 12 bits):

- a: YCbCr 4:4:4 10b
- b: YCbCr 4:4:4 10b
- c: YCbCr 4:4:4 10b
- d: RGB 4:4:4 10b
- e: RGB 4:4:4 10b

MAIN MENU:

C: Video Processing Setup

SUB-MENU:

a: Comp. Artifact Reducer

This feature is used to reduce compression artifacts that are caused by video compression schemes such as MPEG2. Mostly used on YCbCr 4:2:2 interlaced or progressive input video.

a: **Comp. Arti. Reducer EN**

Enables the Compression Artifact Reducer.

b: **Mosq. Noise Reducer EN**

Enables the Mosquito (Ringing) Noise Reducer.

c: **Block Noise Reducer EN**

Enables the Block (8x8) Noise Reducer.

d: **Non Std Block Noise Det EN**

Enables the Non-Standard Block Detection.

e: **Enable All CAR Blocks**

Enables All the above (A,B,C,D) Noise Reduction Blocks.

f: **Disable All CAR Blocks**

Disables All the Noise Reduction Blocks.

MAIN MENU:

C: Video Processing Setup

SUB-MENU:

b: DeInterlacer

Selects the menu for the DeInterlacer (DEINT) video processing functions .

a: Deinterlacer BYPASS

Bypasses the deinterlacer (input is progressive).

b: Deint 2D VECTOR

Sets the Interlacer for 2D Vector mode (Interlaced input DEFAULT mode).

c: Deint 2D VECTOR AGGRES.

Sets the Interlacer for 2D Aggressive mode (Interlaced input).

d: Deint 3D FIXED

Sets the Interlacer for 3D fixed mode (Interlaced input).

e: Deint 3D Mo Adpt Vector

Sets the Interlacer for 3D Motion Adaptive Vector mode.

f: Deint 3D MA Vect Aggres

Sets the Interlacer for 3D Motion Adaptive Vector Aggressive mode.

g: Deint 3D MA Vect Linear

Sets the Interlacer for 3D Motion Adaptive Vector Linear mode.

h: DEINTERLACER DEFAULT

Sets the Interlacer for DEFAULT mode.

MAIN MENU:

C: Video Processing Setup

SUB-MENU:

c: Noise Reducer

Selects the menus for the Video Noise Reduction (NR) video processing functions.
Used mostly on YCbCr 4:2:2 Input video.

- a: Noise Reducer DISABLE**
Disables the Noise Reduction block.

- b: Noise Reducer 2D**
Sets the Noise Reducer for 2D (Spatial) mode.

- c: Noise Reducer 3D Fixed**
Sets the Noise Reducer for 3D Fixed (Temporal) mode.

- d: Noise Reducer 3D Adapt**
Sets the Noise Reducer for 3D Adaptive (Temporal) mode.

- e: Noise Reducer Default**
Sets the Noise Reducer for Default mode.

- f: Noise Reducer Automatic**
Sets the Noise Reducer for Automatic mode.

MAIN MENU:

C: Video Processing Setup

SUB-MENU:

d: Picture Control

- a: Set All Levels Default**
Restores Contrast, Brightness, Tint, Black, Color Temp levels to defaults.

- b: Set Contrast Level**
Enter the Contrast Level 0 to +10. The Default value is 10.

- c: Set Brightness Level**
Enter the Brightness Level -100 to +100. The Default value is 0.

- d: Set Tint Level**
Enter the Tint Level -180 to +180. The Default value is 5.

- e: Set Black Level**
Enter the Black Level 0 to +100. The Default value is 0.

- f: Set Color Temperature**
 - SUB MENU : Video Set Color Temperature Menu**
 - a: Color Temperature NORMAL**
Sets the color temp to 6500.

 - b: Set Color Temperature COOL**
Sets the color temp to 8000.

 - c: Color Temperature WARM**
Sets the color temp to 6000.

 - d: Color Temperature CUSTOM**
Enter Color Temp Level 6000 to 8000 (Normal = 6500)

MAIN MENU:

C: Video Processing Setup

SUB-MENU:

e: Edge Enhancer

Selects the menus for Edge Enhancement (EE) video processing functions.

a: Edge Enhancer OFF

b: Edge Enhancer LOW

c: Edge Enhancer MED

d: Edge Enhancer HIGH

MAIN MENU:

C: Video Processing Setup

SUB-MENU:

f: Color Management Unit

Selects the menus for Color Management Unit (CMU) video processing functions.

a: Hue Saturation Menu

Video Hue Saturation Menu

- a: Hue Saturation ENABLE
- b: Hue Saturation DISABLE
- c: Intelligent Saturation ENABLE
- d: Intelligent Saturation DISABLE
- e: Set HUE Saturation Level
- f: Set HUE Global Sat. Level
- g: ICR Advanced Menu



Note: Hue saturation needs to be enabled (selection „d“) in order for „Set HUE Saturation Level“ (selection „e“) to be valid.

b: Qdeo True Color Menu

Video Qdeo Menu

- a: Qdeo True Color OFF
- b: Qdeo True Color SOFT
- c: Qdeo True Color GENTILE
- d: Qdeo True Color MEDIUM
- e: Qdeo True Color HIGH

c: Film Grain Gain Menu

Video Film Grain Gain MENU

- a: Disable Film Grain Gain
- b: Set Film Grain Gain
Range is 0 - 255. Default is 0.

- c: Set FGG Temporal Freq.
Range is 0 - 255. Default is 0.

d: Flesh Tone Correction

- a: Set FTDC Preset Enable
- b: Set FTDC Preset Level 1
- c: Set FTDC Preset Level 2
- d: Set FTDC Preset Level 3
- e: Set FTDC Preset Level 4
- f: Set FTDC Preset Level 5
- g: Set FTDC Preset Level 6
- h: Set FTDC Preset Disable

e: Set GAMMA Menu

- a: GAMMA Disable
- b: GAMMA 1.8
- c: GAMMA 2.5
- d: GAMMA S-Curve Light
- e: GAMMA S-Curve Dark

MAIN MENU:

C: Video Processing Setup

SUB-MENU:

g: Adapt. Contrast Enhancer

Selects the menus for the Adaptive Contrast Enhancer (ACE) video processing functions.

- a: **ACE PRESET OFF**
- b: **ACE PRESET LOW**
- c: **ACE PRESET MEDIUM**
- d: **ACE PRESET HIGH**
- e: **ACE PRESET RANGE 0-255**
- f: **ACE PRESET RANGE 16-235**
- g: **ACE Brightness Menu**
 - a: **Brightness DISABLE**
 - b: **Brightness DEFAULT**
 - c: **Brightness Taper Size**
Enter Taper Size (16, 32, 64, 128, 256, 512).

 - d: **Brightness Taper Side**
Enter Taper Side Select (1,2).

 - e: **Brightness Enhancement**
Enter Enhancement Level (1 - 15).

 - f: **Brightness Threshold 1**
Enter Threshold 1 Level (0 - 1023).

 - g: **Brightness Threshold 2**
Enter Threshold 2 Level (0 - 1023).

MAIN MENU:

C: Video Processing Setup

h: 3D Control Menu

- a: Left/Right Frame Menu**
Menu to functions that will allow the zooming in of an incoming 3D side-by-side signal and display one half as a 2D image (left eye or right eye).
- b: Line-By-Line Output Menu**
Select output format of a line-by-line signal.
- c: Disable Line-By-Line Output**
Turns off the line-by-line feature.
- d: Side-By-Side Output Menu**
Select output format of a side-by-side signal.
- e: Disable Side-By-Side Output**
Turns off the side-by-side feature.
- f: Dual Stream Output Menu**
Select output format of a dual stream signal.
- g: Enable Adaptive Clock**
Factory Use.
- h: Disable Enable Adaptive Clock**
Factory Use.

MAIN MENU:

C: Video Processing Setup

h: 3D Control Menu

a: Left/Right Frame Menu

Left/Right Frame (3D) – Right Half Zoom (3D → 2D)

This feature enables the conversion of a 3d left/right image input (two full HD images from left and right cameras are squeezed horizontally into a regular HD frame) to a 2d right image output (any format). Input modes supported: HD-SDI (720p, 1080i, 1080p) & 3G-SDI Level A.

SUB-MENU:

a: Enable Right Half 3D->2D

This will take the Horizontal Total width of the configured input and divide this number by two and will stretch the right half of the input video signal and display it full screen. This feature is enabled for HD-SDI (1080i, 1080p, 720p) & 3G-SDI Level A input modes.

b: Disable Right Half

Disables Right Half Frame mode and Re-formats the input to display the full input frame.

c: Adjust Right Half 3D->2D

This will fine tune the half-way point of the input video. Only even values are valid and if an odd value is entered, the software will round down by one. This is to keep the color space bits aligned.