

SDI to HDMI Converter and SDI to HDMI Converter/Extender



Product Manual

thinklogical[™]
Extend • Distribute • Innovate

Thinklogical LLC.
100 Washington Street
Milford, Connecticut 06460 U.S.A.

Telephone (203) 647-8700
Fax (203) 783-9949
www.thinklogical.com

Copyright Notice

Copyright © 2011 All rights reserved. Printed in the U.S.A.

Thinklogical LLC
100 Washington Street
Milford, Connecticut 06460 U.S.A.
Telephone (203) 647-8700

All trademarks and service marks are property of their respective owners.

Subject: SDI to HDMI Converter
Revision: Rev A, July 2011

Table of Contents

PREFACE

About this Product Manual

This product manual is divided into four sections for Introduction, System Features, Connecting the SDI to HDMI Converter and Extender, 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 SDI to HDMI Converter, you should find the following items:

- SDI to HDMI Converter (SDC-000001) OR
SDI to HDMI Converter/Extender (SDC-000001-LC)
- AC/DC adapter universal input 90-264 VAC – PWR-000022-R
- SDI to HDMI Converter product manual.

1.2. Product Overview

The Thinklogical SDI to HDMI Converter allows you to seamlessly convert a broadcast quality SDI signal to HDMI. The unit is full SMPTE compliant, including the active loop out port.

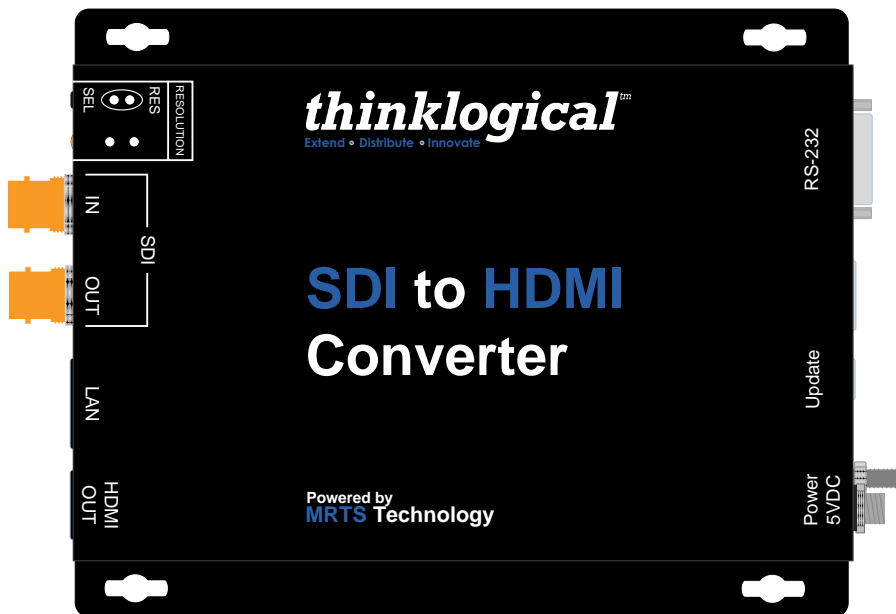


FIGURE 1: *Top View of SDI to HDMI Converter*

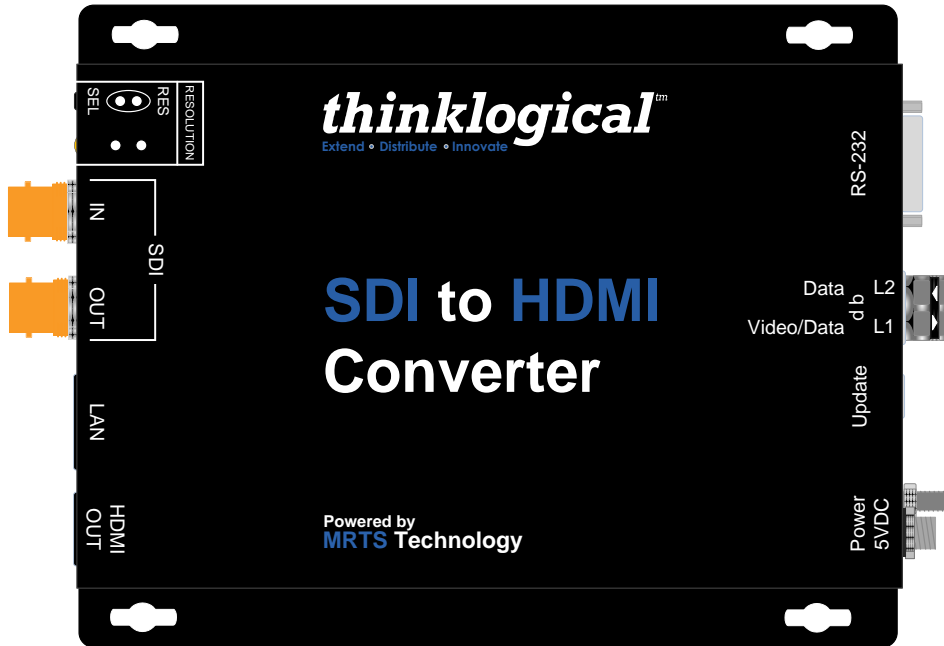


FIGURE 2: *Top View of SDI to HDMI Converter/Extender*

2. System Features

2.1. General System Features

The Thinklogical SDI to HDMI Converter allows you to seamlessly convert a broadcast quality SDI signal to HDMI. The SDI to HDMI Converter is full SMPTE compliant, including the active loop out port. The SDI to HDMI Converter/Extender has a fiber output that is fully compatible with our Velocity line of receivers as well as our VX routers for a comprehensive conversion and extension solution. Not only does it convert and scale video signals in real-time it also provides the highest quality images for professional audio-visual end users.

Each SDI to HDMI Converter system includes the following features:

Conversion/Scaling:

- Input: SD, HD, 3G SDI
- Output: 1080p50, 1080p60, 720p50, 720p60, 576p50, 480p60
- Fiber optic output compatible with Thinklogical Velocity Receivers and VX Routers
- SDI embedded audio conversion to HDMI output and compatible with Thinklogical Velocity Receivers
- User Control via RS-232, Ethernet, User LCD, and Encoder knob
- SMPTE input standards supported: 259M-C, 292, 424M, 425 level A and level B
- Active SMPTE compliant loop out port
- Automatic Video 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

2.2. 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
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	+5.0 VDC
DC Adapter	AC/DC adapter universal input 90-264 VAC
Power Consumption	With Velocity SFP: 9.5 Watts Without Velocity SFP: 8.5 Watts
Operating Temperature and Humidity	0 to 50 °C (32 to 122 °F); 5 to 95% RH, non-condensing
Enclosure Dimensions	Height: 1.1" (27.94 mm) Depth: 7" (177.80 mm) Width: 5.375" (136.65 mm)
Weight	Actual Weight: 1 lb (0.45 kg) Shipping Weight: 9 lbs (4.08 kg)
Compliance	Pending approvals for US, Canada, and European Union

3. Connecting the SDI to HDMI Converter

All physical connections to the product use industry-standard connectors. Connections are on the input and output sides of the unit:

3.1 Input and Output View:

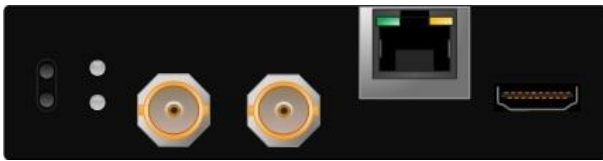
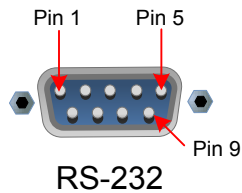


FIGURE 3: Input View



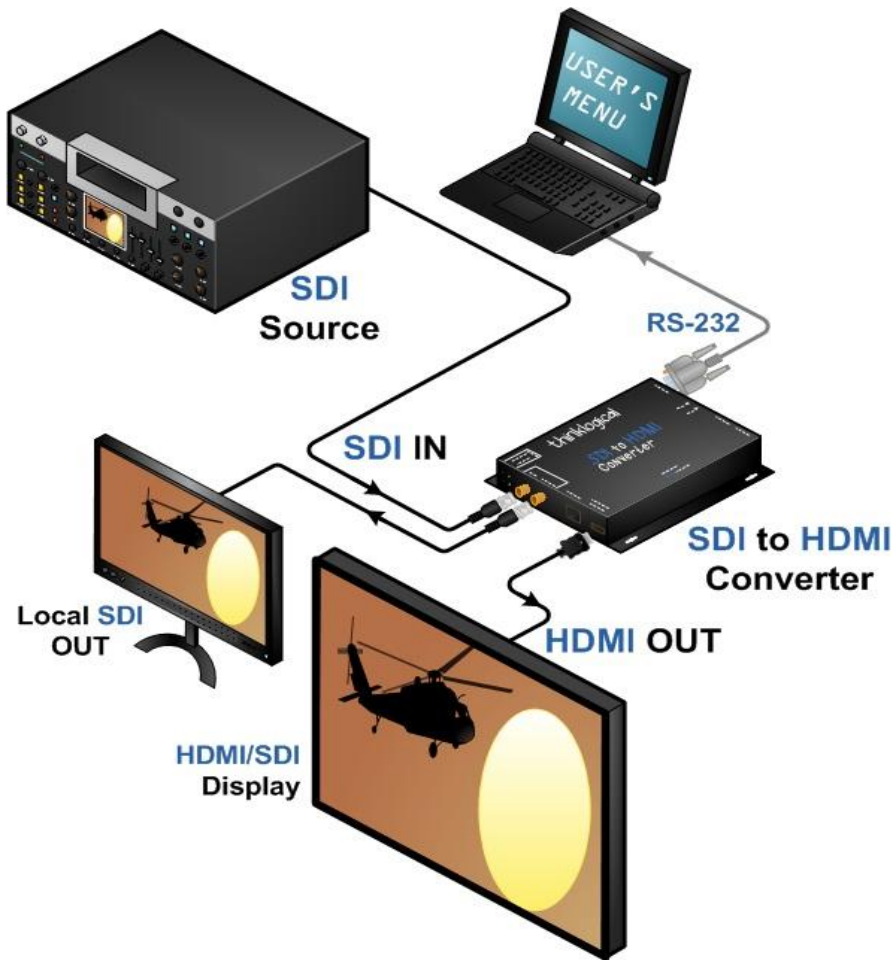
Figure 4: Output View

3.2 RS-232 Pin Out

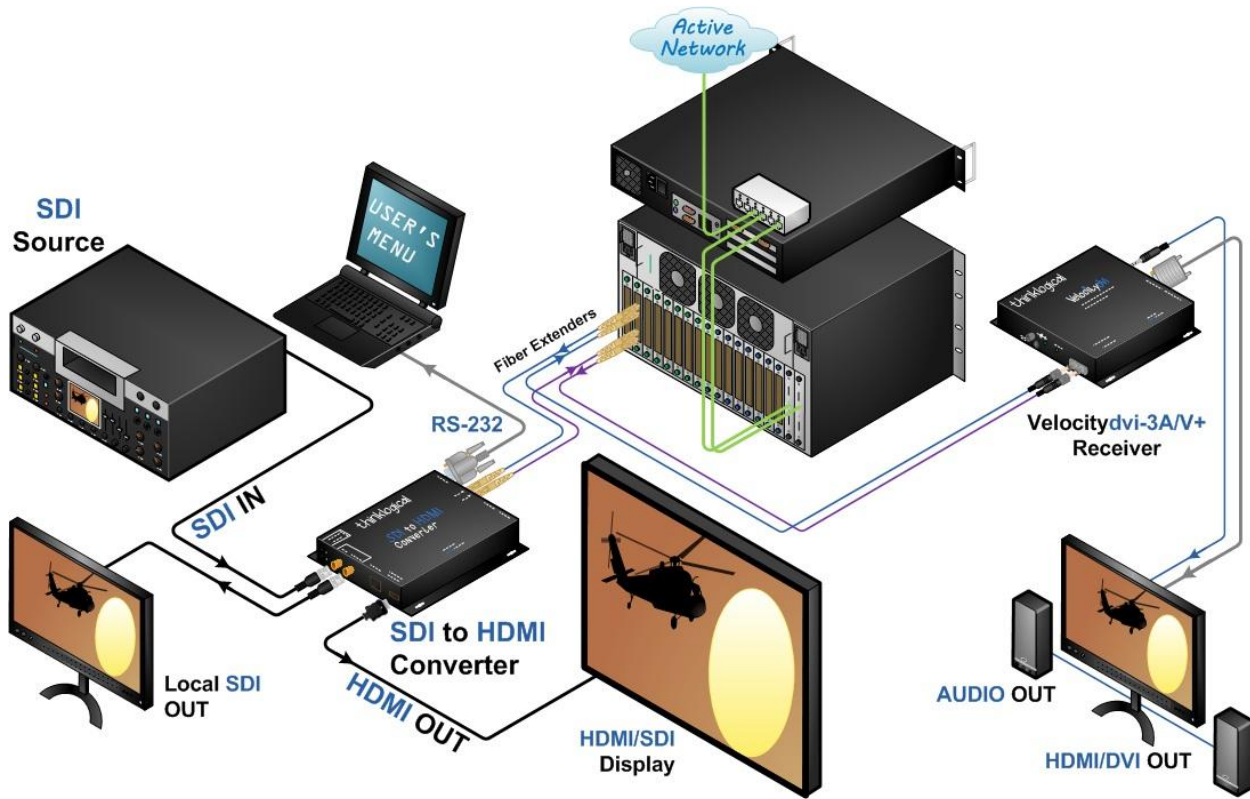


Pin 1	DCD_OUT
Pin 2	RX_IN
Pin 3	TX_OUT
Pin 4	DTR_IN
Pin 5	GND
Pin 6	DSR_OUT
Pin 7	RTS_IN
Pin 8	CTS_OUT
Pin 9	RI_OUT

3. Installation



Note: If using a HDMI display with audio speakers, two channels of HDMI embedded audio will be heard through the display. The two channels to be processed can be selected the user.



SDI to HDMI Converter 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 SDI to HDMI Converter's Link IN), and an HD-SDI source. If desired, coax cables may be connected between the Link LOOP BACK BNC connector and a suitable monitor (or monitors). Loop back outputs will provide a raw or unprocessed output of the video input on LINK IN.
2. Connect HDMI/DVI monitor to HDMI output.
3. Connect CAT-5 cable between the RJ-45 on the SDI to HDMI Converter 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 SDI to HDMI Converter be restored back to the factory default. (See section on 'Restore Factory Config')

User Menu Configurations:

The SDI to HDMI Converter has many configuration options and this document will cover these options in detail. Every configuration can be set regardless of the user interface (e.g. RS-232 or Web Interface). There are numerous status and configuration settings that can be viewed. The RS-232 interface menu 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**
Selects the video and embedded audio source from BNC Input. Signal does need to be present for configuration to be successful.
- b. Enable Loop Output**
This will enable the video signal to be looped back out of the SDI to HDMI Converter. This is enabled as default.
- c. Disable Loop Output**
Turns off the BNC Loop output.
- d. 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.

- e: **AUTO Mode OFF**
Turns off the AUTO mode.

MAIN MENU:

B: Set Output Select



Note: Items in this menu will configure the output video format. The video coming out of the SDI to HDMI will be affected during configuration.

- a: **480p@ 60**
- b: **576p @ 50**
- c: **720p @ 50**
- d: **720p @ 60**
- e: **1080p @ 50**
- f: **1080p @ 60**

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.

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 Input Info**
Get Audio information from BNC Input.
- d: Set Audio Delay**
Audio Delay range is from -50 - +50 in mS with the default being 0.
- e: Get Audio Delay**
The programmed Audio Delay in mS.
- f: Get Audio Channel Cfg.**
Get the audio channel mapping.
- g: Assign Audio Channels**
Configure input to output channel configuration.
- h: Restore Audio Channels**
Restore factory defaults
- i: Enable/Disable Audio Channels**
Configure channels and a group / channel basis.

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-accessible 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 SDI to HDMI Converter 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: Ethernet Settings**
Settings for the network interface.

MAIN MENU:

G: System Information

The following is used for retrieving information regarding current setup and signal detection information. 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 information.

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

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: 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 „a“) 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

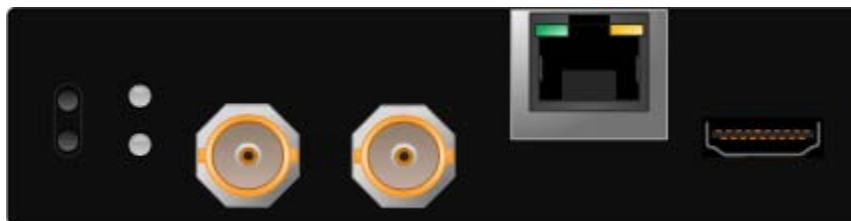
Selects the menus for the Adaptive Contrast Enhancer (ACE) video processing functions.

- 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).













4. Button Configuration

4.1 Configuring the Converter by using the front panel buttons.

Front panel buttons and LED's are an easy way to quickly configure the unit without the need for any other communication interfaces. The top button is used to cycle through the six different output modes and the bottom button is used to commit the resolution. The LED's will blink while going through the resolution but enter a steady state when a resolution is accepted. There is a timeout of ten seconds if a configuration is not chosen. The following will show the LED combinations and their associated resolution:



Output Mode LED Indicators

 	576p50
 	480p60
 	720p50
 	720p60
 	1080p50
 	1080p60

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 their 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