INTRODUCTION: The HDC-925 1RU product is an up, down and cross conversion unit that promotes image quality to the Professional video world. The HDC-925 is packed with features such as PixelMotion™ De-interlacing and Multi-Directional Diagonal filter (MDDF™) algorithms, drastically reducing jaggies on diagonal lines. This product also has Per-Pixel Temporal Recursive Noise Reduction algorithm that minimizes HD and SD video noise.

Flexview™ Aspect Ratio is a non-linear anamorphic aspect ratio designed for converting 4:3 aspect ratio material to 16:9 aspect ratios without the distortion that is often associated with anamorphic stretching. Flexview leaves the center portion of the image Untouched and provides increasing amounts of stretch towards the edges of the image, filling the 16:9 images without distorting the center area of the image.

This high-quality converter uses the Teranex's HQV™ Technology and yields unsurpassed image quality for the demanding user.

This flexible product is able to handle just about all broadcasting formats at its inputs and outputs in either HD or SD formats. The HDC-925 uses a Silicon Optix Realta image processing engine inside that maximizes image processing capability. The result? The best possible picture from a flexible, powerful, and user-friendly front panel. The front panel along with the software allows the user to setup all functions of the HDC-925

OVERVIEW

PixelMotion™ De-interlacing: PixelMotion de-interlacing of video originated material produces perfect progressive frames in preparation for further processing. The processing aperture is adjusted on a pixel-by-pixel basis, which preserves all of the detail of the original interlaced image and eliminates jaggies in the output image.

Aspect Ratio Control: Allows selection from standard aspect ratios, such as common top & bottom, common sides, 14:9 and Anamorphic. In addition, it allows for Flexview, a non-linear anamorphic aspect ratio , to be used in up-conversions.

Detail Enhancement: Is an edge-sharpening filter based on a traditional film compositing technique called "Unsharp Masking." This filter corrects any blurring introduced during image capture, compression or resampling.

Noise Reduction Adjustable noise reduction controls offer a greater degree of temporal recursive noise reduction with fewer artifacts. A bias control allows the aggressiveness to be fine-tuned. For filter performance testing, a Red Overlay can be applied that will color pixels that are in motion in Red

Up-/Down-conversion: In situations where the highest image quality up- or down-conversion is necessary, Link's HDU-925 uses proprietary PixelMotion™ De-interlacing and Detail Enhancement combined with powerful array processing to provide the best image solution.

APPLICATION: The first step in the conversion process is to identify whether the input material is video or film originated. The identification process happens in a fully automatic mode and selects either PixelMotion De-interlacing for video based material or 3:2 Detection for film based material. The goal is to apply the appropriate filter in order to recover the full vertical resolution of the input material.

PixelMotion de-interlacing produces perfect progressive frames in preparation for further processing. The processing aperture is adjusted on a pixel-by-pixel basis, which preserves all of the detail of the original interlaced image. Additionally, the filter eliminates "jaggies" in the output image, providing well-defined edges on objects and producing the sharpest images possible.

3:2 Detection recognizes the redundant fields inserted by the telecine during the conversion of film to video. This advanced 3:2 pull-down filter avoids frame rate conversion artifacts and provides the highest vertical resolution and motion quality.

Since the quality of the video de-interlacing is so high, there will be no difference visible in the vertical resolution seen with film originated material and that of the de-interlaced video originated material.

Once the image has been de-interlaced and up-converted, Detail Enhancement can be applied to the image to further sharpen and enhance the output. This filter adds an additional level of image quality by helping to better define the detail in the up-converted image. Detecting the edges of objects and adjusting the contrast ratio around those objects to help separate them from the Background achieve this.

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LINK ELECTRONICS, INC.

HD/SD SDI UP/DOWN/CROSS CONVERSION MODEL HDC-925

Features

- ◆ Broadcast Quality Processing
- ◆ Up/Down/Cross Conversion
- ◆ SD/HD SDI I/O
- ◆ Noise Reduction
- ◆ 8 Channels of Embedded Audio
- ◆ WSS & RP186 Aspect Ratio Control
- ◆ FlexView™ Aspect Ratio
- ◆ Control And Status Via Web Browser
- ◆ Full SD 608 & HD 708 Closed Caption Support
- ◆ Black Burst/Tri-Level Gen-Lock

- ◆ Audio Error Checking
- ◆ Frame Synchronizer
- ◆ Audio Delay
- ◆ Video Proc Amp
- ◆ DVI-I Output
- ◆ HD Caption Line Select
- ◆ 5 GPI Triggered Selection
- ◆ ATC Ancellary Time Code Supported
- ◆ Detail & Sharpness Enhancement
- ◆ Ease of Operation

The Link Electronics HDC-925 is a DTV format converter that can convert SD video to and from HD in real time with exceptional quality.

The HDC-925 is able to up/down/cross convert HD SD SDI signals, packed with proprietary algorithms such as PixelMotion™ De-interlacing and Multi-Directional Diagonal filters, and Per-Pixel Temporal Recursive Noise Reduction algorithms minimizing HD and SD video noise.

The HDC-925 features FlexView™ Aspect Ratio, a non-linear anamorphic aspect ratio designed for converting 4:3 aspect ratio material to 16:9 aspect ratios without the distortion that is often associated with anamorphic stretching.

The HDC-925 is able to handle a myriad of SD/HD Broadcasting formats. The HDC-925 is a high-quality Format Converter based on Teranex's HQV award winning Technology. It yields unsurpassed image quality for the demanding Professional.

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Video Input:
SD & HD SDI Input:
- SD HD SDI, 10-bit serial digital input at 270Mb/s per SMPTE-259-C or 20-bit serial digital input at 1.485Gb/s per SMPTE 292-1997, SD audio embedding per SMPTE 272M or HD audio embedding per SMPTE-299
  - Formats SD: 480i59.94, 576i50
  - Formats HD: SMPTE-274M: 1080i59.94, 1080i50, 1080sf23.98
  - Formats HD: SMPTE-296M: 720p59.94, 720p50
  - Cable Length SD: 300m Belden 1694A at 270Mb/s and HD: 110m Belden 1694A at 1.485Gb/s
- Automatic input format detection or Manual input format selection
- Active loop out

SD & HD SDI Output (2):
- SD HD SDI, 10-bit serial digital output at 270Mb/s per SMPTE-259-C or 20-bit serial digital output at 1.485Gb/s per SMPTE 292-1997, SD audio embed per SMPTE 272M or HD audio embed per SMPTE-299
  - Formats SD: 480i59.94, 576i50
  - Formats HD: SMPTE-274M: 1080i59.94, 1080i50, 1080sf23.98
  - Formats HD: SMPTE-296M: 720p59.94, 720p50
  - Return Loss: >15dB up to 1.5GHz per SMPTE-292M
  - Jitter: <0.2UI as per SMPTE-292M

Reference Input
- SD Blackburst – SMPTE-170M or HD Tri-level Sync – SMPTE 274M / SMPTE296M
- Active loop out
- Pixel and Line adjustment (range of adjustment based on selected output format)

Audio Input/Output, Embedded Audio:
- 8 channels of embedded audio
- Sampling: 48KHz
- Quantization: SD: 20-bits, HD: 24-bits

Ancillary Data Input/Output:
Closed Caption
- SMPTE-334m
- SDID=1, SDID=2 not currently supported
- Service 1 Only
- ITU-608 pass-through for 480i59.94 Input/Output processing (all incoming services will pass through, i.e. CC1, CC2, CC3, CC4, T1, T2, T3,T4, and XDS).
- ITU-608 to ITU-708 translation for 480i59.94 up-conversions to 720p59.94 & 1080i59.94 (only the primary language from CC1 will be transcoded to DTVCC service S1).
- ITU-708 pass-through for HD Input/Output processing for 720p59.94 & 1080i59.94 (all DTVCC services will pass through, the frame rate and checksums will be adjusted as necessary).
- ITU-708, Line 21 extraction for down-conversions from 1080i59.94 or 720p59.94 to 480i59.94 (only if the line 21 data is present in the 708 CDP, otherwise the output will contain a clock-run-in with null text).

Vertical Interval Time Code (VITC)
- Supports vertical interval timecode (VITC) delay to automatically match the video processing delay

Video Indexing
- Supports WSS & RP186

Processing Features:
Video Proc Amp
- Video gain – adjustable +/- 6dB, default = 0
- Black Level – adjustable +/- 30mV, default = 0
- Hue – adjustable -179 to +178, default = 0
- Saturation – adjustable +/- 6dB, default = 0

Enhance
- Detail Enhance - adjustable 0 to 100, default = 0
- Sharpness - adjustable 0 to 100, default = 63

Colorspace conversions
- Operates automatically based on the selected conversion
- There are no user controls for this function

OUT / IN	480i59.94	576i50	720p59.94	720p50	1080i59.94	1080i50	1080sf23.98
480i59.94	■		■		■		
576i50		■		■		■	
720p59.94	■		■		■		
720p50		■		■		■	
1080i59.94	■		■		■		
1080i50		■		■		■	
1080sf23.98	■		■	■			■

Temporal Recursive Noise Reduction Filter
- Bias - adjustable High, Medium, Low, Off, default = Off
- Split screen - On/Off
- Red Overlay - On/Off

DVI Output
- DVI Type: DVI–I, Single Link
- Formats Supported: 720p59.94, 720p50, 1080i59.94 & 1080sf23.98

Auto, Film, Video
- Allows selection of auto, film, or video processing modes. Default = Auto

Aspect Ratio Conversion
- Fixed Aspect Ratio Conversions
- Common Top & Bottom
- Common Sides
- Anamorphic
- Flexview

Audio Processing
- Supports audio delay adjustment
- 500ms to +500ms, default = 0ms

Ethernet:
- **10/100-BaseT Ethernet**
- Supports DHCP

User Presets
- The HDC-925 supports 5 User Presets per video processing channel

General Purpose Interface (GPI)
- The HDC-925 supports 5 GPI inputs
- GPI 1 is assigned to User Preset 1
- GPI 2 is assigned to User Preset 2
- GPI 3 is assigned to User Preset 3
- GPI 4 is assigned to User Preset 4
- GPI 5 is assigned to User Preset 5
- GPI triggers can be momentary closures or held low

OLC Web Interface

Format
Input Format Selection
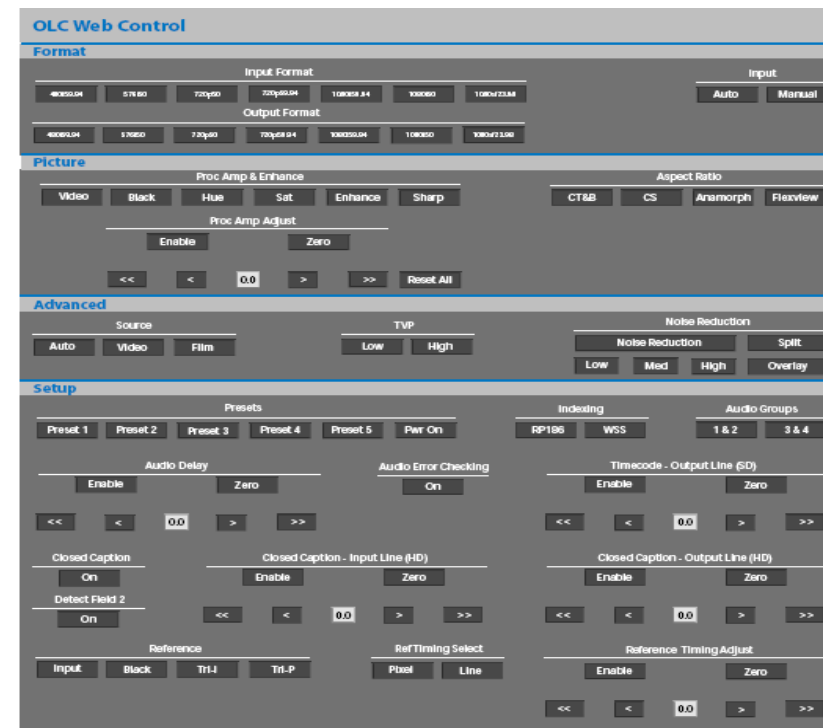Auto or Manual Selection
Output Format Selection

Picture
Proc Amp & Enhance Settings Adjustment
Aspect Ratio Selection
Proc Amp Adjust Selection

Advanced
Source Selection
TVP Level Selection
Noise Reduction Level Selection

Setup
Preset Selection
Index Support Selection
Audio Group Selection
Audio Delay Adjustment Selection
Audio Error Checking
Timecode Output Line Selection
Closed Caption Support Selection
Closed Caption HD Input/Output Line Selection
Reference Source Selection
Pixel/Timing Adjustment Selection
Reference Timing Adjustment Selection

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