Schindler Imaging
a trademark of California Media Engineering Inc.

CAL MEDIA ENGINEERING
www.calmedia.com

MVPHD-24

Video Frame Rate Converter

- ❑ Supports 23.98, 24.00, 25.00, 29.97, and 30.00 Fps frame-rates.
- ❑ Designed specifically for 24 frame video playback
- ❑ Similar look and feel to older model MVP-24
- ❑ Supports SD, HD, and graphic resolutions up to 1080p for inputs and outputs
- ❑ Full up/down/cross frame-rate converter
- ❑ Composite, component, SDI, VGA, and HDMI inputs and outputs.
- ❑ Auto input format/frame rate detection including VGA and HDMI resolutions
- ❑ 10 bits per channel
- ❑ 3 dimensional COMB filter (for composite input)
- ❑ Motion compensated de-interlacer
- ❑ Proc Amp controls
- ❑ High performance scaler with adjustable picture resizing
- ❑ RGB color correction controls
- ❑ Output Color Temperature controls with 3200, 4800, and 5600 degree presets
- ❑ Test signal generator for all outputs, including user generated full frame signals
- ❑ Four FLASH based still image buffers available as inputs
- ❑ Capture or Load still images to or from SD/MMC card
- ❑ Visual effects including freeze frame, synchronized snow, or MPEG blockiness dissolve *
- ❑ Genlock to Frame-Drive, Vert-drive, HD tri-level, SD black burst, or SDI input
- ❑ Genlock phase controls: vertical (360 degree), horizontal, and subcarrier
- ❑ Genlock indicator LED on the front panel
- ❑ Audio channel mapping and level controls for embedded SDI and HDMI audio *
- ❑ Dedicated EFX, TSG, Color Temp, Monochrome, Goto Black, and FAN buttons
- ❑ User presets + factory default settings *
- ❑ 1 RU chassis, 17 x 12 inches, with removable rack mount ears
- ❑ Front panel OLED graphic display for status and menu driven controls
- ❑ 1.5 inch Front panel video display for monitoring output video
- ❑ SD/MMC card interface to upgrade firmware and load or save still images
- ❑ Chassis fan on/off control with 16 speed selections (to reduce audible noise on set)
- ❑ Medical grade power supply
- ❑ Internal Raspberry PI to provide remote control via Ethernet connection and openGear Dashboard software, supporting multiple MVPHD-24 units. *
- ❑ Raspberry PI with connectable USB drive may also be a selectable HDMI input for 24 frame conversion of mp4 files, or customized websites. *

* future firmware release

Version 0.7.5

Specifications

ANALOG INPUTS:

	Composite	1.0 Vpp (including sync)	**CBVS** / R / Pr	BNC, 75Ω
	Y/C	(Y) 1.0 Vpp (including sync)	**Y** / G / Y	BNC, 75Ω
		(C) 700 mVpp	**C** / B / Pb	BNC, 75Ω
or	RGB	(Red) 700 mVpp	CBVS / **R** / Pr	BNC, 75Ω
		(Green) 1.0 Vpp (including sync)	Y / **G** / Y	BNC, 75Ω
		(Blue) 700 mVpp	C / **B** / Pb	BNC, 75Ω
or	YPbPr	(Pr) 700 mVpp	CBVS / R / **Pr**	BNC, 75Ω
		(Y) 1.0 Vpp (including sync)	Y / G / **Y**	BNC, 75Ω
		(Pb) 700 mVpp	C / B / **Pb**	BNC, 75Ω
	VGA	RGB = 700 mVpp, TTL Horz and Vert Sync Pixel clock up to 170MHz VESA EDID version 1.3 - Plug and Play	**VGA**	HD-15 Male, 75Ω
	GENLOCK (External Ref)	1.0 Vpp video (286 mVpp composite sync), or +/- 2.3 Vpp min, 5.5 Vpp max Frame or Vertical Drive	**GENLOCK**	2 BNCs ,Hi-Z loop

DIGITAL INPUTS:

	SDI	800 mVpp, SD/HD/3G (270MHz / 1.485GHz / 2.97GHz) SD - Auto EQ to 400 meters (Belden 1694A) HD - Auto EQ to 200 meters (Belden 1694A) 3G - Auto EQ to 120 meters (Belden 1694A)	**SDI**	BNC, 75Ω
	Loop Out	800 mVpp, SD/HD/3G (270MHz / 1.485GHz / 2.97GHz) Re-clocked loop-through output	**SDI**	BNC, 75Ω
	HDMI	HDMI v1.4, EDID v1.3	**HDMI**	HDMI Type A

Specifications subject to change without notice.

ANALOG OUTPUTS:

	Composite	1.0 Vpp (including sync)	**CBVS** / R / Pr	BNC, 75Ω
	Y/C	(Y) 1.0 Vpp (including sync)	**Y** / G / Y	BNC, 75Ω
		(C) 700 mVpp	**C** / B / Pb	BNC, 75Ω
or	RGB	(Red) 700 mVpp	CBVS / **R** / Pr	BNC, 75Ω
		(Green) 1.0 Vpp (including sync)	Y / **G** / Y	BNC, 75Ω
		(Blue) 700 mVpp	C / **B** / Pb	BNC, 75Ω
or	YPbPr	(Pr) 700 mVpp	CBVS / R / **Pr**	BNC, 75Ω
		(Y) 1.0 Vpp (including sync)	Y / G / **Y**	BNC, 75Ω
		(Pb) 700 mVpp	C / B / **Pb**	BNC, 75Ω
	VGA	RGB = 700 mVpp, TTL Horz and Vert Sync	**VGA**	2 x HD-15 Male, 75Ω
	Composite	1.0 Vpp (including sync)	**CBVS**/REF1	BNC, 75Ω
	Sync Ref	2.5V TTL SYNC	CBVS/**REF1**	BNC, Hi-Z
	Composite	1.0 Vpp (including sync)	**CBVS**/REF2	BNC, 75Ω
	Sync Ref	2.5V TTL SYNC	CBVS/**REF2**	BNC, Hi-Z

COMPOSITE OUTPUT FORMATS: (interlaced 2:1 with user controlled active lines of video)

NTSC / NT443 / PAL-M	
23.976 FPS	15.752KHz @ 657 lines
24.000 FPS	15.720KHz @ 655 lines
25.000 FPS	15.625KHz @ 625 lines
29.970 FPS	15.734KHz @ 525 lines
30.000 FPS	15.750KHz @ 525 lines
PAL / SECAM / PAL-N	
23.976 FPS	15.608KHz @ 651 lines
24.000 FPS	15.624KHz @ 651 lines
25.000 FPS	15.625KHz @ 625 lines
29.970 FPS	15.734KHz @ 525 lines
30.000 FPS	15.750KHz @ 525 lines

DIGITAL OUTPUTS:

SDI Out	800 mVpp, SD/HD/3G (270MHz / 1.485GHz / 2.97GHz)	**SDI**	**2 x** BNC, 75Ω
HDMI	HDMI v1.4	**HDMI**	HDMI Type A

CONTROL:

GPIO	General purpose I/O Activates on closure to ground	**GPIO**	DB-15, internal pullup
Remote	Dashboard control software via Network connection	**Ethernet**	RJ-45

MEMORY CARD:

Type	MMC, SD, SDHC
Format	FAT16 or FAT32 required for STILL storage (cards > 64MB are typically FAT16 or FAT32)
Still Capacity	253 stills maximum

Specifications subject to change without notice.

VIDEO PERFORMANCE

Composite, Y/C Inputs:	
Bandwidth	5.0 MHz
Signal Filter	Digital Adaptive 3D-COMB filter
Signal to Noise Ratio	>58 dB (weighted, 10KHz to 5 MHz)
Differential Phase	<2 deg
Differential Gain	<2%
K-Factor (2T Pulse)	<2%
4 x over-sampling	10 bit ADC 4:2:2, 54 MHz
Component YRB/RGB Inputs:	
Bandwidth	5.5 MHz
Signal to Noise Ratio	>61 dB
Differential Phase	<1 deg
Differential Gain	<1%
K-Factor (2T Pulse)	<1%
SD - 4 x over-sampling	10 bit ADC 4:2:2, 54 MHz
HD - 2 x over-sampling	10 bit ADC 4:2:2, 148.5 MHz
Composite, Y/C Outputs:	
4 x over-sampling	10 bit DAC 54MHz
Component YRB/RGB Outputs:	
SD - 4 x over-sampling	10 bit ADC 4:2:2, 54 MHz
HD - 2 x over-sampling	10 bit ADC 4:2:2, 148.5 MHz

PROCESSING

Internal sampling	4:2:2 10 bit per channel
CBVS Input Processing	Adaptive 3D COMB filter, Full Frame TBC. – Accepts non-interlace video games, and Macrovision encoded sources.
De-interlace	Motion compensated adaptive de-interlacer
Frame rate conversion	Progressive processing with 3 frame motion filtering.
Residual time base error	+/- 15 nsec
Delay through unit	approx. 1 frame +/- 1 field
@ 24.000 FPS	(measured) 46ms or 2.75 fields on average

ENVIORNMENTAL

Power Supply	47 - 63 Hz, 85 -264 VAC auto ranging
Power Dissipation	70 Watts MAX
Operating Temperature	$+32^{o}$ F (0^{o} C) to $+113^{o}$ F (45^{o} C)
Operating Humidity	10% to 85% RH
Dimensions	2.25 inches (with feet) x 12 inches x 19 inches

Specifications subject to change without notice.