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Schindler Imaging

MVP-24X

Frame Rate Converter

Operations Manual

Rev 2.0

For proper operation and user safety, please read through this manual before powering the MVP-24X.

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UPDATES

CATEGORY	CHANGES TO MVP-24X	CHANGES TO MANUAL
VERSION 1.11 / 1.03 / x1.02* Sept 1, 2004		
BUG FIX	No VGA Input (VGA - ??) BUG FIX Fixed VGA initialization problem which prevented VGA inputs from working (All units purchased or repaired after Sept 1, 2004 contain this fix). This problem involved the power-up sequence of the VGA processor chip. Some chips appeared to have problems initializing from a cold start. A software routine was added to assist the VGA chip in initializing correctly. This failure was characterized by the VGA input not detecting a valid input signal, and displaying "VGA - ??". A work-around is to cycle the power after the unit has been on for several minutes and is up to normal operating temperature.	
VERSION 1.20 / 1.05 / x1.10* July 12, 2006		
BUG FIX	System Lock-up BUG FIX Fixed control software bug which allowed an extremely rare lock-up condition. This problem involved the RS232/RS422 input connector. The MVP24 would lock-up if it received an unknown signal on its RS232 input. Cables connected to that connector might pickup stray impulses from nearby power-spikes, radios, cell-phones, etc. causing the lockup condition. The lockup condition was characterized as intermittent vertical jumping/flashing of the image, and a loss of certain controls such as Go to BLACK. Cycling power was the only way to clear the unit from this lock-up condition.	
GENLOCK	Improved Genlock Detector Firmware The new detector will lock to more tri-level sync signals (i.e. 720p and 1080p-24). A new sync separator hardware upgrade provides more stability when genlocking to tri-level signals (All units purchased or repaired after July 1, 2006 contain the upgrade). Existing units may be upgraded by returning them to Schindler Imaging Inc. Sync Separator Status menu A new status menu is provided to display which sync separator the unit has: "original" or "New HD sync separator". The status menu can be displayed by accessing the copyright menu (menu following the Serial number menu) and pressing the "+" and "-" buttons simultaneously. VGA Vertical Phase Adjustment BUG FIX The Vertical Phase Adjustment menu now correctly adjusts the VGA outputs in addition to all other outputs. (In previous versions, the VGA outputs stayed fixed at 0 degrees regardless of the phase setting).	2.5.3 Misc Hardware Information

* Version numbers refer to: Software (U852) / Firmware (U851) / VGA_board_software (U702) - denoted by "x"

CATEGORY	CHANGES TO MVP-24X	CHANGES TO MANUAL
DV I/O (OPTION)	Support for DV (1394) Input and Output A new hardware option is now available allowing DV (IEEE-1394 standard definition) sources to be used as inputs. When not selected as the input, the DV connector becomes an output (only valid in 29.976 output frame rate). DV Status Menu – A status menu is provided to show information about the DV input signal.	<i>Appendix A - Specifications</i> 2.3.3h <i>DV Status</i>
VGA INPUTS	DVI Input Enabled The DVI input is now enabled and will accept computer graphics up to 1080p with a maximum clock rate of 165MHz. Note: this input only accepts RGB data and does not support signals requiring HDCP copy protection. Support for Higher Resolution Analog Inputs The Analog Input has been programmed to recognize many new standards above 1024x768. For a complete list, see the specifications section. Note: The MVP-24X has a maximum processing resolution of 1024x768. All input resolutions which are greater, will be scaled down to 1024x768. Universal Lock Mode For unrecognized analog input resolutions, a universal lock mode is now employed which will sample the signal at 1024 pixels per line. This method should allow processing of signals that previously could not be accepted. Support for HDTV RGBHV Inputs 1080i and 720p RGB video can now be received by either analog VGA or DVI inputs. Note: Inputs must be RGB and the analog inputs must have separate H&V signals. The VGA inputs cannot accept component video and cannot accept composite sync or sync-on-green. 720p will be processed as 1024x720p. 1080i will be process as 1024x540p. VGA Input Status Display A new status menu is provided to show all the information about the VGA input signal. Plug and Play Support Both the Analog RGB and DVI inputs now support the Plug and Play standard by emulating a native 1024x768 display device with a maximum input of 1920x1080p.	2.3.3j <i>VGA INPUT</i> <i>Appendix A - Specifications</i> 6.9 <i>Universal Lock</i> Section 7 <i>High Definition Video Processing</i> 2.3.3n <i>SOURCE - VGA Input Status</i> <i>Appendix A - Specifications</i>
VGA to VIDEO	VGA to VIDEO Flicker Reduction Filter In VGA -> VIDEO mode, a new menu "Flicker Filter" has been added under the FILTERS / SHARPNESS category. This filter reduces or eliminates the interlace flicker on video outputs produced by sharp VGA graphics. There are Off, Low, Normal, and High settings.	2.3.6e <i>Flicker Filter</i>

CATEGORY	CHANGES TO MVP-24X	CHANGES TO MANUAL
VID+VGA	VIDEO SHRINK functions changed For VID+VGA modes, the "Video Shrink" menus (under EFX2) have been renamed "Video Window". For example, "Video Shrink Hsize" is now called "Video Window Hsize". This name change refers to the video "window" that is superimposed over the VGA image. CROP WINDOW menu This menu was added (under EFX2) which crops the video "window". It allows cropping of 0% to 18.75% in 1.25% increments. It is used to crop out unwanted signals (such as closed captioning and edge artifacts) and produces a clean edge. Note: The Horz and Vert Crop menus have been removed from the SIZE / POSTION category for VID+VGA modes.	2.3.9a <i>Vid Window H-size</i> 2.3.9b <i>Vid Window H-pos</i> 2.3.9c <i>Vid Window V-size</i> 2.3.9d <i>Vid Window V-pos</i> 2.3.9e <i>Crop Window</i> 2.3.5e <i>Vid Vert Crop</i> 2.3.5f <i>Vid Horz Crop</i>
ZOOM	Video Zoom - Feature added in version 1.11/1.03 <u>Menu operation and location changed</u> in version 1.20/1.05 Two menus are now located under the SIZE / POSITION category which allow zooming and panning (centering) within the video image (menus removed from EFX1 location). VGA Zoom - Feature added in version 1.11/1.03 <u>Menu operation and location changed</u> in version 1.20/1.05 Two menus are now located under the SIZE / POSITION category which allow zooming and panning (centering) within the VGA image (menus removed from EFX1 location).	2.3.5g <i>Vid Zoom</i> 2.3.5h <i>Vid Zoom Center</i> 2.3.5m <i>VGA Zoom</i> 2.3.5n <i>VGA Zoom Center</i>
MODE	DUAL Mode (VIDEO or VGA) Quick Select A new feature has been added to quickly switch between VIDEO and VGA access modes. Pressing the MODE button by itself (no other keys pressed) will instantly toggle the access mode. This can be done without having to exit a menu category. (This feature is only for the DUAL Video and VGA mode) (VIDEO or VGA) Access MODE Recall On power-up, the MVP-24 now remembers the previous setting of the access mode (VIDEO or VGA) used in "DUAL" mode. VIDEO ONLY Mode (VGA POWER-DOWN) In this mode, only the video paths are active. The VGA board is now placed in a power-down state to reduce power consumption and heat generation (this is a correction to the previous version which did not power-down the VGA board).	2.3.1c <i>Front Panel Control - Quick Select Feature</i>

CATEGORY	CHANGES TO MVP-24X	CHANGES TO MANUAL
FREEZE	Video Freeze in VGA modes The FREEZE button now correctly freezes the video image when being processed by the VGA board (VID -> VGA and Vid+VGA modes)	2.4.1a <i>Freeze</i>
EFX1	EFX1 Effects Generator Limited effects can be applied to the video signal using the EFX1 button, such as: Fade to Black, Video Noise, and Synchronized Snow. EFX Transition Time This menu sets the time interval for the selected effect to transition to ON or OFF. The EFX1 indicator will flash during the transition. EFX Source This menu selects a signal to be combined with the video through the EFX mixer. Black, Test Signal Generator, Random Noise Generator, Small Block Noise, and Large Block Noise can be selected. EFX Mixer Level This menu adjusts the mixture between the selected signal and the video. 0% = no EFX1 signal and 100% video, 100% = 100% EFX1 signal and no video.	2.4.3 <i>EFX1</i> 2.4.3a <i>EFX Transition Time</i> 2.4.3b <i>EFX Source</i> 2.4.3c <i>EFX Mixer</i>
MISC.	Display of VGA and DV Option's Version Numbers The version numbers of all software and firmware PROMs for the VGA board can be displayed by accessing the copyright menu (menu following the Serial number menu) and pressing the "+" button. The version numbers for the DV option can be displayed by accessing the copyright menu (menu following the Serial number menu) and pressing the "-" button.	2.5.3 <i>Misc Hardware Information</i>
MISC.	Updated HELP menu text strings	

QUICK REFERENCE CHART

VIDEO FUNCTIONS

FUNCTION	MENU	DESCRIPTION	MENU ACCESS	LOCATION
AGC: AUTOMATIC GAIN CONTROL	VID1 AGC: VID2 AGC: SVHS AGC:	Use to enable or disable Automatic Gain Control for selected input.	 +  , NEXT OR PREV	See section 2.3.3b See section 2.3.3c See section 2.3.3d
BETACAM INPUT FORMAT	YRB FORMAT:	Use to select between Betacam and SMPTE/EBU input levels.	 +  , NEXT OR PREV	See section 2.3.3f
BLACK		Enable or disable Black mode (go to black level).		See section 2.4.7
BRIGHTNESS	SETUP (BRIGHTNESS):	Use to adjust setup level.	 +  , NEXT OR PREV	See section 2.3.4b
CENTER	VERT CENTER: HORZ CENTER:	Use to adjust position of picture.	 +  , NEXT OR PREV	See section 2.3.5b See section 2.3.5d
CHANNEL SELECT	RF MODULATOR:	Use to select channel for RF Modulator.	 +  , NEXT OR PREV	See section 2.3.7f
CHASSIS TEMPERATURE	CHASSIS TEMPERATURE:	Status of internal temperature in deg. C.	 +  , NEXT OR PREV	See section 2.4.9b
COLOR BALANCE	COLOR BALANCE-X COLOR BALANCE-Y	Use to adjust color balance.	 +  , NEXT OR PREV	See section 2.4.5c See section 2.4.5d
COLOR CORRECTION	COLOR CORRECTION-X COLOR CORRECTION-Y	Use to adjust color correction.	 +  , NEXT OR PREV	See section 2.4.5a See section 2.4.5b
COLOR CORRECT (COLOR TEMP)		Enable or disable Color Correction (Temp).		See section 2.4.5
COLOR LEVEL	SATURATION (COLOR):	Use to adjust color level.	 +  , NEXT OR PREV	See section 2.3.4c
COLOR STANDARD	OUT STANDARD:	Use to select output color standard.	 +  , NEXT OR PREV	See section 2.3.7b
COLOR TEMPERATURE	COLOR CORRECTION COLOR BALANCE	Use to adjust color correction/ balance.	 +  , NEXT OR PREV	See section 2.4.5a,b See section 2.4.5c,d
COLOR TEMP PRESETS	COLOR TEMP PRESET:	Use to recall/ load stored color correction settings.	 +  , NEXT OR PREV	See section 2.4.5e
CONTRAST	LEVEL(CONTRAST):	Use to adjust video level.	 +  , NEXT OR PREV	See section 2.3.4a
CROP HORIZONTAL	VID HORZ CROP:	Use to crop left and right 2.5% of picture.	 +  , NEXT OR PREV	See section 2.3.5f
CROP VERTICAL	VID VERT CROP:	Use to crop top and bottom 2.5% of picture.	 +  , NEXT OR PREV	See section 2.3.5e
CROSS COLOR FILTER	CROSS COLOR FILTER:	Use to enable or disable cross color filter.	 +  , NEXT OR PREV	See section 2.3.6c
DEFAULT SETTINGS	RECALL SETTINGS:	Use to recall stored or default settings.	 +  , NEXT OR PREV	See section 2.3.2a
DETAIL ENHANCEMENT	HORZ SHARPNESS: VERT SHARPNESS:	Use to adjust sharpness of picture.	 +  , NEXT OR PREV	See section 2.3.6a See section 2.3.6b
DRIVE REFERENCE OUT	DRIVE REF OUTPUT:	Use to select signal at Drive Ref Output.	 +  , NEXT OR PREV	See section 2.3.7e
DUB MODE	Y/C DUB MODE:	Use to enable or disable Dub mode for Y/C input.	 +  , NEXT OR PREV	See section 2.3.3e

VIDEO FUNCTIONS (continued)

DV STATUS	DV STATUS:	Displays status of DV input. (OPTION)	 +  , 	See section 2.3.3h
EBU INPUT FORMAT	YRB FORMAT:	Use to select between Betacam and SMPTE/EBU input levels.	 +  , 	See section 2.3.3f
EFX1		Enable or disable Effect		See section 2.4.3
EFX MIXER LEVEL	EFX MIXER:	Use to set mixture of EFX signal and video.	 +  , 	See section 2.4.3c
EFX SOURCE	EFX SOURCE:	Use to select EFX signal for mixing with video.	 +  , 	See section 2.4.3b
EFX TRANSITION TIME	EFX TRANSITION TIME:	Use to set ON / OFF time for EFX1 effect.	 +  , 	See section 2.4.3a
FAN		Enable or disable FAN.		See section 2.4.9
FAN SPEED	FAN SPEED:	Use to adjust speed of fan when enabled.	 +  , 	See section 2.4.9a
FIELD DISPLAY MODE	FIELD DISPLAY MODE:	Use to control how field mode is displayed.	 +  , 	See section 2.4.8a
FIELD FREEZE	FREEZE DISPLAY MODE:	Use to control how a freeze is displayed.	 +  , 	See section 2.4.1a
FIELD MODE		Enable or disable Field mode.		See section 2.4.8
FILM MODE	MOTION FILTER:	Select between normal and film mode.	 +  , 	See section 2.3.6d
FRAME FREEZE	FREEZE DISPLAY MODE:	Use to control how a freeze is displayed.	 +  , 	See section 2.4.1a
FRAME RATE	OUTPUT RATE:	Use to select output frame rate.	 +  , 	See section 2.3.7a
FREEZE		Enable or disable freeze.		See section 2.4.1
GENLOCK SOURCE	GENLOCK SOURCE:	Use to select type of genlock input.	 +  , 	See section 2.3.8a
GOTO BLACK		Enable or disable Black mode (go to black level).		See section 2.4.7
HARDWARE VERSION NUMBERS	Copyright notice menu	Menu display of optional hardware version numbers.	 , 	See section 2.5.3
HORIZONTAL CENTER	HORZ CENTER:	Use to adjust position of picture in horz direction.	 +  , 	See section 2.3.5d
HORIZONTAL CROP	VID HORZ CROP:	Use to crop left and right 2.5% of picture.	 +  , 	See section 2.3.5f
HORIZONTAL SHARPNESS	HORZ SHARPNESS:	Use to adjust horizontal sharpness of picture.	 +  , 	See section 2.3.6a
HORIZONTAL SIZE	HORZ SIZE:	Use to adjust size of picture in horz direction.	 +  , 	See section 2.3.5c
HOURS OF OPERATION	HOURS OF OPERATION	Menu display of total hours of operation.	 , 	See section 2.5.2
HUE	HUE (TINT):	Use to adjust color phase.	 +  , 	See section 2.3.4d
INPUT SELECT	INPUT SELECT:	Use to select desired input.	 +  , 	See section 2.3.3a See section 1.8

VIDEO FUNCTIONS (continued)

INPUT STANDARD	INPUT STANDARD:	Use to select desired input standard.	 +  , 	See section 2.3.3i
LEVEL, VIDEO	LEVEL (CONTRAST):	Use to adjust video level.	 +  , 	See section 2.3.4a
MONOCHROME		Enable or disable Monochrome (B&W).		See section 2.4.6
MOTION FILTER	MOTION FILTER:	Select between normal and film mode.	 +  , 	See section 2.3.6d
OPTION VERSION NUMBERS	Copyright notice menu	Menu display of optional hardware version numbers.	 , 	See section 2.5.3
OUTPUT FORMAT	VIDEO OUT FORMAT:	Use to select video output format. (vidYC,YRB,RGB)	 +  , 	See section 2.3.7c See section 1.6.2
OUTPUT FRAME RATE	OUTPUT RATE:	Use to select output frame rate.	 +  , 	See section 2.3.7a
OUTPUT STANDARD	OUT STANDARD:	Use to select output color standard.	 +  , 	See section 2.3.7b
OUTPUT RATE	OUTPUT RATE:	Use to select output frame rate.	 +  , 	See section 2.3.7a
PHASE ADJUST	VERTICAL PHASE:	Use to adjust vertical phase of ALL outputs.	 +  , 	See section 2.3.8b
RECALL SETTINGS (PRESETS)	RECALL SETTINGS:	Use to recall stored or default settings.	 +  , 	See section 2.3.2a
REFERENCE OUTPUTS	SYNC REF OUTPUT: DRIVE REF OUTPUT:	Use to select signal at <i>Ref Outputs</i> .	 +  , 	See section 2.3.7d See section 2.3.7e
RF MODULATOR CHANNEL OUT	RF MODULATOR:	Use to select channel for RF Modulator.	 +  , 	See section 2.3.7f
RGB SYNC INPUT FORMAT	RGB SYNC FORMAT:	Use to select between 3 or 4 wire input.	 +  , 	See section 2.3.3g
SAVE SETTINGS (PRESETS)	STORE SETTINGS:	Use to store settings to presets.	 +  , 	See section 2.3.2b
SATURATION	SATURATION(COLOR):	Use to adjust color level.	 +  , 	See section 2.3.4c
SERIAL NUMBER DISPLAY	SERIAL NUMBER:	Menu display of chassis serial number.	 , 	See section 2.5.1
SETUP	SETUP (BRIGHTNESS):	Use to adjust setup level.	 +  , 	See section 2.3.4b
SHARPNESS	HORZ SHARPNESS: VERT SHARPNESS:	Use to adjust sharpness of picture.	 +  , 	See section 2.3.6a See section 2.3.6b
SIZE	VERT SIZE: HORZ SIZE:	Use to adjust size of picture.	 +  , 	See section 2.3.5a See section 2.3.5c
SMPTE/EBU INPUT FORMAT	YRB FORMAT:	Use to select between Betacam and SMPTE /EBU input levels.	 +  , 	See section 2.3.3f
STORE COLOR TEMP SETTINGS	STORE TEMP SETTINGS:	Use to store color temp (correction/bal) settings.	 +  , 	See section 2.4.5f
STORE SETTINGS (PRESETS)	STORE SETTINGS:	Use to store settings to presets.	 +  , 	See section 2.3.2b
SYNC REFERENCE OUTPUT	SYNC REF OUTPUT:	Use to select signal at <i>Sync Ref Output</i> .	 +  , 	See section 2.3.7d

VIDEO FUNCTIONS (continued)

TEST SIGNAL GENERATOR		Enable or disable TSG.	TEST SIGNAL GENERATOR 	See section 2.4.2
TEST SIGNAL LEVELS	TEST SIGNAL LEVELS:	Selects if TSG is modified by level controls.	MENU ENABLE + TEST SIGNAL GENERATOR, NEXT OR PREV  + 	See section 2.4.2b
TEST SIGNAL SELECT	TEST SIGNAL:	Use to select which test signal is displayed.	MENU ENABLE + TEST SIGNAL GENERATOR, NEXT OR PREV  + 	See section 2.4.2a
TINT	HUE(TINT):	Use to adjust color phase.	MENU ENABLE + LEVELS, NEXT OR PREV  + 	See section 2.3.4d
VERSION NUMBERS	Copyright notice menu	Menu display of optional hardware version numbers.	MENU ENABLE, NEXT  , 	See section 2.5.3
VERTICAL CENTER	VERT CENTER:	Use to adjust position of picture in vert direction.	MENU ENABLE + SIZE / POSITION, NEXT OR PREV  + 	See section 2.3.5b
VERTICAL CROP	VID VERT CROP:	Use to crop top and bottom 2.5% of picture.	MENU ENABLE + SIZE / POSITION, NEXT OR PREV  + 	See section 2.3.5e
VERTICAL PHASE	VERTICAL PHASE:	Use to adjust vertical phase of ALL outputs.	MENU ENABLE + GENLOCK / PHASE, NEXT OR PREV  + 	See section 2.3.8b
VERTICAL SIZE	VERT SIZE:	Use to adjust size of picture in vert direction.	MENU ENABLE + SIZE / POSITION, NEXT OR PREV  + 	See section 2.3.5a
VERTICAL SHARPNESS	VERT SHARPNESS:	Use to adjust vertical sharpness of picture.	MENU ENABLE + FILTERS / SHARPNESS, NEXT OR PREV  + 	See section 2.3.6b
VIDEO HORZ CROP	VID HORZ CROP:	Use to crop left and right 2.5% of picture.	MENU ENABLE + SIZE / POSITION, NEXT OR PREV  + 	See section 2.3.5f
VIDEO LEVEL	LEVEL (CONTRAST):	Use to adjust video level.	MENU ENABLE + LEVELS, NEXT OR PREV  + 	See section 2.3.4a
VIDEO OUTPUT FORMAT	VIDEO OUT FORMAT:	Use to select video output format (vidYC,YRB,RGB)	MENU ENABLE + OUTPUTS / FRM RATE, NEXT OR PREV  + 	See section 2.3.7c See section 1.6.2
VIDEO OUTPUT FRAME RATE	OUTPUT RATE:	Use to select output frame rate.	MENU ENABLE + OUTPUTS / FRM RATE, NEXT OR PREV  + 	See section 2.3.7a
VIDEO VERTICAL CROP	VID VERT CROP:	Use to crop top and bottom 2.5% of picture.	MENU ENABLE + SIZE / POSITION, NEXT OR PREV  + 	See section 2.3.5e
VIDEO ZOOM	VIDEO ZOOM:	Use to set both horz and vert zoom factor.	MENU ENABLE + SIZE / POSITION, NEXT OR PREV  + 	See section 2.3.5g
VIDEO ZOOM CENTER	VIDEO ZOOM CENTER:	Use to both horz and vert center the zoomed image.	MENU ENABLE + SIZE / POSITION, NEXT OR PREV  + 	See section 2.3.5h
Y/C DELAY	Y/C DELAY:	Use to adjust horizontal position of color.	MENU ENABLE + LEVELS, NEXT OR PREV  + 	See section 2.3.4e
Y/C DUB MODE	Y/C DUB MODE:	Use to enable or disable Dub mode for Y/C input.	MENU ENABLE + INPUTS, NEXT OR PREV  + 	See section 2.3.3e
YRB INPUT FORMAT	YRB FORMAT:	Use to select between Betacam and SMPTE/EBU input levels.	MENU ENABLE + INPUTS, NEXT OR PREV  + 	See section 2.3.3f
YRB OUTPUT FORMAT	VIDEO OUT FORMAT:	Use to select video output format (vidYC,YRB,RGB)	MENU ENABLE + OUTPUTS / FRM RATE, NEXT OR PREV  + 	See section 2.3.7c See section 1.6.2
ZOOM VIDEO	VIDEO ZOOM:	Use to set both horz and vert zoom factor.	MENU ENABLE + SIZE / POSITION, NEXT OR PREV  + 	See section 2.3.5g
ZOOM VIDEO CENTER	VIDEO ZOOM CENTER:	Use to both horz and vert center the zoomed image.	MENU ENABLE + SIZE / POSITION, NEXT OR PREV  + 	See section 2.3.5h

VGA FUNCTIONS

FUNCTION	MENU	DESCRIPTION	MENU ACCESS	LOCATION
AUTO HORZ POSITION	VGA IN HORZ POSITION:	Indicates AUTO position, or use for MANUAL position control.	 +  , NEXT OR PREV	See section 2.3.3k See section 6
AUTO VERT POSITION	VGA IN VERT POSITION:	Indicates AUTO position, or use for MANUAL position control.	 +  , NEXT OR PREV	See section 2.3.3l See section 6
AUTO SAMPLE PHASE	VGA IN SAMPLE PHASE:	Indicates AUTO phase, or use for MANUAL phase control.	 +  , NEXT OR PREV	See section 2.3.3m See section 6
CENTER	VGA VERT CENTER: VGA HORZ CENTER:	Use to adjust position of VGA image.	 +  , NEXT OR PREV	See section 2.3.5i See section 2.3.5l
COLOR CORRECTION GAIN	VGA OUT GAIN(%):	Use to apply color correction of R,G, & B VGA outputs.	 +  , NEXT OR PREV	See section 2.4.5g
COLOR CORRECTION GAMMA	VGA OUT GAMMA:	Used for color correction of R,G, & B VGA outputs.	 +  , NEXT OR PREV	See section 2.4.5h
COLOR CORRECTION PEDESTAL	VGA OUT PEDESTAL:	Used for color balance of R,G, & B VGA outputs.	 +  , NEXT OR PREV	See section 2.4.5i
COLOR TEMPERATURE	VGA OUT GAIN(%): VGA OUT GAMMA: VGA OUT PEDESTAL:	Use color correction menus to set color temperature.	 +  , NEXT OR PREV	See section 2.4.5g See section 2.4.5h See section 2.4.5i
CROP VIDEO WINDOW	CROP WINDOW:	Use to crop size of video window within VGA image.	 +  , NEXT OR PREV	See section 2.3.9e
FLICKER FILTER	FLICKER FILTER:	Use to reduce flicker for VGA to VIDEO conversion.	 +  , NEXT OR PREV	See section 2.3.6e
FORMAT AND FRAME RATE	VGA OUTPUT:	Use to select output Format and frame rate.	 +  , NEXT OR PREV	See section 2.3.7d
FREQUENCY TRIM	VGA FREQ TRIM:	Use to adjust Frequency of VGA output horizontal sync.	 +  , NEXT OR PREV	See section 2.3.7e
HIGH DEFINITION INPUTS		Processing HDTV inputs.		See section 7
HORIZONTAL CENTER	VGA HORZ CENTER:	Use to adjust position of VGA image in horz direction.	 +  , NEXT OR PREV	See section 2.3.5l
HORIZONTAL SIZE	VGA HORZ SIZE:	Use to adjust size of VGA image in horz direction.	 +  , NEXT OR PREV	See section 2.3.5k
INPUT HORZ POSITION	VGA IN HORZ POSITION:	Indicates AUTO position, or use for MANUAL position control.	 +  , NEXT OR PREV	See section 2.3.3k See section 6
INPUT VERT POSITION	VGA IN VERT POSITION:	Indicates AUTO position, or use for MANUAL position control.	 +  , NEXT OR PREV	See section 2.3.3l See section 6
INPUT SAMPLE PHASE	VGA IN SAMPLE PHASE:	Indicates AUTO phase, or use for MANUAL phase control.	 +  , NEXT OR PREV	See section 2.3.3m See section 6
INPUT SELECT	VGA INPUT SELECT:	Use to select desired VGA input.	 +  , NEXT OR PREV	See section 2.3.3j
OUTPUT FORMAT AND FRAME RATE	VGA OUTPUT:	Use to select output Format and frame rate.	 +  , NEXT OR PREV	See section 2.3.7d

VGA FUNCTIONS (continued)

SIZE	VGA VERT SIZE: VGA HORZ SIZE:	Use to adjust size of VGA image.	 +  ,	NEXT OR PREV	See section 2.3.5i See section 2.3.5k
VERTICAL CENTER	VGA VERT CENTER:	Use to adjust position of VGA image in vert direction.	 +  ,	NEXT OR PREV	See section 2.3.5i
VERTICAL SIZE	VGA VERT SIZE:	Use to adjust size of VGA image in vert direction.	 +  ,	NEXT OR PREV	See section 2.3.5j
VIDEO WINDOW CROP	CROP WINDOW:	Use to crop size of video window within VGA image.	 +  ,	NEXT OR PREV	See section 2.3.9e
VIDEO WINDOW HORZ POSITION	VID WINDOW H-POS:	Use to adjust position of video window within VGA image.	 +  ,	NEXT OR PREV	See section 2.3.9b
VIDEO WINDOW HORZ SIZE	VID WINDOW H-SIZE:	Use to adjust size of video window within VGA image.	 +  ,	NEXT OR PREV	See section 2.3.9a
VIDEO WINDOW VERT POSITION	VID WINDOW V-POS:	Use to adjust position of video window within VGA image.	 +  ,	NEXT OR PREV	See section 2.3.9d
VIDEO WINDOW VERT SIZE	VID WINDOW V-SIZE:	Use to adjust size of video window within VGA image.	 +  ,	NEXT OR PREV	See section 2.3.9c
VGA COLOR TEMPERATURE	VGA OUT GAIN(%): VGA OUT GAMMA: VGA OUT PEDESTAL:	Use color correction menus to set color temperature.	 +  ,	NEXT OR PREV	See section 2.4.5g See section 2.4.5h See section 2.4.5i
VGA OUTPUT FREQUENCY TRIM	VGA FREQ TRIM:	Use to adjust Frequency of VGA output horizontal sync.	 +  ,	NEXT OR PREV	See section 2.3.7e
VGA OUTPUT	VGA OUTPUT:	Use to select output Format and frame rate.	 +  ,	NEXT OR PREV	See section 2.3.7d
VGA VERTICAL CENTER	VGA VERT CENTER:	Use to adjust position of VGA image in vert direction.	 +  ,	NEXT OR PREV	See section 2.3.5i
VGA VERTICAL SIZE	VGA VERT SIZE:	Use to adjust size of VGA image in vert direction.	 +  ,	NEXT OR PREV	See section 2.3.5j
VGA ZOOM	VGA ZOOM:	Use to set VGA zoom factor.	 +  ,	NEXT OR PREV	See section 2.3.5m
VGA ZOOM CENTER	VGA ZOOM CENTER:	Use to both horz and vert center the zoomed image.	 +  ,	NEXT OR PREV	See section 2.3.5n
WINDOW CROP	CROP WINDOW:	Use to crop size of video window within VGA image.	 +  ,	NEXT OR PREV	See section 2.3.9e
WINDOW HORZ POSITION	VID WINDOW H-POS:	Use to adjust position of video window within VGA image.	 +  ,	NEXT OR PREV	See section 2.3.9b
WINDOW HORZ SIZE	VID WINDOW H-SIZE:	Use to adjust size of video window within VGA image.	 +  ,	NEXT OR PREV	See section 2.3.9a
WINDOW VERT POSITION	VID WINDOW V-POS:	Use to adjust position of video window within VGA image.	 +  ,	NEXT OR PREV	See section 2.3.9d
WINDOW VERT SIZE	VID WINDOW V-SIZE:	Use to adjust size of video window within VGA image.	 +  ,	NEXT OR PREV	See section 2.3.9c
ZOOM VGA	VGA ZOOM:	Use to set VGA zoom factor.	 +  ,	NEXT OR PREV	See section 2.3.5m
ZOOM VGA CENTER	VGA ZOOM CENTER:	Use to both horz and vert center the zoomed image.	 +  ,	NEXT OR PREV	See section 2.3.5n

3 YEAR LIMITED WARRANTY MVP-24X

Schindler Imaging, Inc. warrants that this product is free from defects in material or workmanship for a period of three (3) years from the date of original purchase. In case of manufacturer defects in material or workmanship incurred through normal usage, Schindler Imaging, Inc. agrees to repair (remedy) the defective product without charge.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Any implied warranty is limited in duration to three years provided in this, the only, expressed warranty.

No responsibility is assumed for incidental or consequential damages; nor damage due to misuse or the use of any unauthorized attachment or modification; nor assumption of responsibility for damage by use of an unspecified electrical circuit. In no event shall Schindler Imaging, Inc. be responsible or liable for any damages arising from the use of this product, whether such damages be direct, indirect, consequential or otherwise. Schindler Imaging, Inc. shall not be liable for any loss of use, revenue or profit.

Warranty is void if the unit is operated while the cabinet is open.

Warranty is void if the unit's air flow is obstructed in any way.

Warranty is void if service is performed by any non-authorized individual or agency.

Warranty is void if unauthorized modifications are made to the unit.

This warranty is limited to the original purchaser of the unit. Warranty is non-transferable.

TABLE OF CONTENTS

UPDATES.....	a
QUICK REFERENCE CHART.....	i
3 YEAR LIMITED WARRANTY.....	vii
SAFETY INFORMATION	1
INTRODUCTION	2
SECTION 1 - REAR PANEL CONNECTIONS.....	4
<i>Figure 1. MVP-24X Rear Panel.....</i>	<i>4</i>
1.0 ENTRY MODULE	4
1.0.1 AC POWER	4
1.0.2 FUSE HOLDER	4
1.1 SERIAL NUMBER	4
1.2 REMOTE CONNECTOR.....	4
1.3 GENLOCK INPUTS.....	4
1.4 REFERENCE OUTPUTS.....	5
1.4.1 SYNC REFERENCE OUTPUT	5
1.4.2 FRM/V-DRIVE OUTPUT	5
1.5 VIDEO OUTPUTS.....	5
1.5.1 VID2 OUTPUT	5
1.5.2 VID1-YC / YRB / RGB OUTPUTS.....	5
1.5.3 SVHS OUT	5
1.6 VGA OUTPUTS	5
1.6.1 XVGA1, XVGA2 OUTPUTS	5
1.7 RF MODULATOR.....	6
1.7.1 RF OUTPUT	6
1.7.2 AUDIO IN.....	6
1.8 VIDEO INPUTS	6
1.8.1 SERIAL-D1 INPUT (OPTIONAL)	6
1.8.2 VID2 (SYNC) INPUT	6
1.8.3 VID1-YC / YRB / RGB INPUTS.....	6
1.8.4 SVHS INPUT	6
1.8.5 IEEE 1394 "DV" INPUT (OPTIONAL)	6
1.9 VGA INPUTS.....	6
1.9.1 DVI (DIGITAL) INPUT.....	6
1.9.2 XVGA (ANALOG) INPUT	6
SECTION 2 - FRONT PANEL OPERATION.....	7
<i>Figure 2. MVP-24X Front Panel.....</i>	<i>7</i>
2.1 DISPLAY	7
<i>Figure 3. MVP-24X Status Display.....</i>	<i>7</i>
2.2 CONTROLS.....	8
2.2.1 Rotary knob, + and - buttons.....	8
2.2.2 NEXT and PREV.....	8

2.2.3	HELP / INFO.....	8
2.2.4	MENU ENABLE.....	8
2.3	CATEGORY BUTTONS AND MENUS.....	9
2.3.1	MODE.....	9
2.3.1a	Menu: <i>Mode</i>	9
2.3.1b	Menu: <i>Front Panel Control (for DUAL Vid&VGA mode)</i>	9
2.3.1c	Menu: <i>Front Panel Control - Quick Select Feature (for DUAL Vid&VGA mode)</i>	9
2.3.2	PRESETS.....	9
2.3.2a	Menu: <i>Recall Settings</i>	9
2.3.2b	Menu: <i>Store Settings *</i>	10
2.3.3	INPUTS.....	10
2.3.3a	Menu: <i>Input Select</i>	10
2.3.3b	Menu: <i>Vid1 AGC</i>	10
2.3.3c	Menu: <i>Vid2 AGC</i>	10
2.3.3d	Menu: <i>SVHS AGC</i>	10
2.3.3e	Menu: <i>Y/C Dub Mode</i>	11
2.3.3f	Menu: <i>YRB Format</i>	11
2.3.3g	Menu: <i>RGB sync Format</i>	11
2.3.3h	Menu: <i>DV Status</i>	11
2.3.3i	Menu: <i>Input Standard</i>	11
2.3.3j	Menu: <i>VGA Input</i>	11
2.3.3k	Menu: <i>VGA In Horz Position</i>	12
2.3.3l	Menu: <i>VGA In Vert Position</i>	12
2.3.3m	Menu: <i>VGA In Sample Phase</i>	12
2.3.3n	Menu: <i>SOURCE - VGA Input Status</i>	12
2.3.4	LEVELS.....	12
2.3.4a	Menu: <i>Level (Contrast)</i>	12
2.3.4b	Menu: <i>Setup (Brightness)</i>	12
2.3.4c	Menu: <i>Saturation (Color)</i>	13
2.3.4d	Menu: <i>Hue (Tint)</i>	13
2.3.4e	Menu: <i>Y/C Delay</i>	13
2.3.5	SIZE / POSITION.....	13
2.3.5a	Menu: <i>Vert Size</i>	13
2.3.5b	Menu: <i>Vert Center</i>	13
2.3.5c	Menu: <i>Horz Size</i>	13
2.3.5d	Menu: <i>Horz Center</i>	14
2.3.5e	Menu: <i>Video Vert Crop</i>	14
2.3.5f	Menu: <i>Video Horz Crop</i>	14
2.3.5g	Menu: <i>Video Zoom</i>	14
2.3.5h	Menu: <i>Video Zoom Center</i>	14
2.3.5i	Menu: <i>VGA Vert Size</i>	15
2.3.5j	Menu: <i>VGA Vert Center</i>	15
2.3.5k	Menu: <i>VGA Horz Size</i>	15
2.3.5l	Menu: <i>VGA Horz Center</i>	15
2.3.5m	Menu: <i>VGA Zoom</i>	15
2.3.5n	Menu: <i>VGA Zoom Center</i>	15
2.3.6	FILTERS / SHARPNESS.....	16
2.3.6a	Menu: <i>Horz Sharpness</i>	16
2.3.6b	Menu: <i>Vert Sharpness</i>	16
2.3.6c	Menu: <i>Cross Color Filter</i>	16
2.3.6d	Menu: <i>Motion Filter</i>	16
2.3.6e	Menu: <i>Flicker Filter</i>	16
2.3.7	OUTPUTS / FRM RATE.....	17
2.3.7a	Menu: <i>Output Rate</i>	17
2.3.7b	Menu: <i>Out Standard</i>	17
2.3.7c	Menu: <i>Video Out Format</i>	17
2.3.7d	Menu: <i>VGA Output</i>	17
2.3.7e	Menu: <i>VGA Freq Trim</i>	18
2.3.7f	Menu: <i>Sync Ref Output</i>	18
2.3.7g	Menu: <i>Drive Ref Output</i>	18
2.3.7h	Menu: <i>RF Modulator</i>	18

2.3.8	GENLOCK / PHASE	18
2.3.8a	Menu: <i>Genlock Source</i>	18
2.3.8b	Menu: <i>Vertical Phase</i>	18
2.3.9	EFX2	19
2.3.9a	Menu: <i>Vid Window H-size</i>	19
2.3.9b	Menu: <i>Vid Window H-pos</i>	19
2.3.9c	Menu: <i>Vid Window V-size</i>	19
2.3.9d	Menu: <i>Vid Window V-pos</i>	19
2.3.9e	Menu: <i>Crop Window</i>	19
2.4	ACTIVE BUTTONS AND MENUS	20
2.4.1	FREEZE	20
2.4.1a	Menu: <i>Freeze Display Mode</i> (MENU ENABLE + FREEZE)	20
2.4.2	TEST SIGNAL GENERATOR	20
2.4.2a	Menu: <i>Test Signal</i> (MENU ENABLE + TEST SIGNAL GENERATOR)	20
2.4.2b	Menu: <i>Test Signal Levels</i> (MENU ENABLE + TEST SIGNAL GENERATOR)	20
2.4.3	EFX1	21
2.4.3a	Menu: <i>EFX Transition Time</i> (MENU ENABLE + EFX1)	21
2.4.3b	Menu: <i>EFX Source</i> (MENU ENABLE + EFX1)	21
2.4.3c	Menu: <i>EFX Mixer</i> (MENU ENABLE + EFX1)	21
2.4.3d	<i>EFX1 Programming Examples:</i>	21
2.4.4	EFX2	21
2.4.5	COLOR CORRECT	22
2.4.5a	Menu: <i>Color Correction-X:*</i> (MENU ENABLE + COLOR CORRECT)	22
2.4.5b	Menu: <i>Color Correction-Y:*</i> (MENU ENABLE + COLOR CORRECT)	22
2.4.5c	Menu: <i>Color Balance-X:*</i> (MENU ENABLE + COLOR CORRECT)	22
2.4.5d	Menu: <i>Color Balance-Y:*</i> (MENU ENABLE + COLOR CORRECT)	22
2.4.5e	Menu: <i>Color Temp Preset:*</i> (MENU ENABLE + COLOR CORRECT)	22
2.4.5f	Menu: <i>Store Temp Settings:*</i> (MENU ENABLE + COLOR CORRECT)	23
2.4.5g	Menu: <i>VGA Out Gain(%):*</i> (MENU ENABLE + COLOR CORRECT)	23
2.4.5h	Menu: <i>VGA Out Gamma:*</i> (MENU ENABLE + COLOR CORRECT)	23
2.4.5i	Menu: <i>VGA Out Pedestal:*</i> (MENU ENABLE + COLOR CORRECT)	23
2.4.6	MONOCHROME	24
2.4.6a	Menu: (MENU ENABLE + MONOCHROME)	24
2.4.7	BLACK	24
2.4.7a	Menu: (MENU ENABLE + BLACK)	24
2.4.8	FIELD MODE	24
2.4.8a	Menu: <i>Field Display Mode</i> (MENU ENABLE + FIELD MODE)	24
2.4.9	FAN	25
2.4.9a	Menu: <i>FAN Speed</i> (MENU ENABLE + FAN)	25
2.4.9b	Menu: <i>Chassis Temperature</i> (MENU ENABLE + FAN)	25
2.4.10	REMOTE	25
2.4.10a	Menu: (MENU ENABLE + REMOTE)	25
2.5	SPECIALTY MENUS	25
2.5.1	Menu: <i>Serial Number:</i> (press NEXT without MENU ENABLE)	25
2.5.2	Menu: <i>Hours of Operation:</i> (press PREV without MENU ENABLE)	25
2.5.3	Menu: <i>Misc Hardware Information:</i> (press NEXT twice without MENU ENABLE)	25
2.6	EXT REF INDICATOR	25
SECTION 3 - APPLICATIONS		26
	<i>Figure 4. Real-time frame rate conversion and synchronization.</i>	26
	<i>Figure 5. 30 FPS to 24 FPS videotape conversion.</i>	26
	<i>Figure 6. Multiple Displays or Video Walls.</i>	27
	<i>Figure 7. Single Camera without Sync Box.</i>	28
SECTION 4 - OVERVIEW OF 24 FPS VIDEO PLAYBACK		29
4.1	INTRODUCTION	29
4.2	FRAME RATES	29
	<i>Figure 8. 24 FPS Camera filming a 30 FPS video.</i>	29

4.3	SHUTTER PHASE	29
	<i>Figure 9. Effect of phase difference on motion.</i>	30
4.4	SHUTTER ANGLES	30
	<i>Figure 10a. Example of shutter angle > 180 degrees.</i>	31
	<i>Figure 10b. Example of shutter angle < 180 degrees.</i>	31
	<i>Figure 11. Example of shutter angle > 180 degree, with 0 degrees of shutter phase.</i>	32
SECTION 5 – HELPFUL TIPS AND SUGGESTIONS		33
5.1	INTRODUCTION	33
5.2	MONITORS	33
5.2.1	VERTICAL LOCK REQUIREMENT.....	33
5.2.2	VIDEO FORMAT.....	33
5.2.3	SIZE & CENTERING CONTROLS.....	33
5.2.4	LEVEL (PROC AMP) CONTROLS.....	33
5.2.5	SHARPNESS.....	33
5.2.6	COLOR TEMPERATURE.....	33
5.3	COLOR TEMPERATURE	34
5.3.1	COLOR CORRECTION.....	34
5.3.2	COLOR TEMP PRESET.....	34
5.3.3	ADJUSTMENTS.....	34
5.3.4	TEST SIGNALS.....	34
5.3.5	PROCEDURE.....	34
5.3.6	EFFECTS.....	34
5.4	SYNCHRONIZATION	35
5.4.1	MVP-24X AS MASTER REFERENCE.....	35
5.4.2	SINGLE CAMERA AS REFERENCE.....	35
5.4.3	GENLOCKING: NO NEED FOR BLACK BURST.....	35
5.5	PHASING THE CAMERA'S SHUTTER	35
5.5.1	PHASING USING A SYNC BOX.....	35
5.5.2	SINGLE CAMERA PHASING USING THE MVP-24X.....	35
5.5.3	TEST SIGNAL: F1-BLU/F2-YEL.....	36
	<i>Figure 12a. Vertical Phase at 90 degrees.</i>	36
	<i>Figure 12b. Vertical Phase at 0 degrees.</i>	36
5.5.4	FIELD MODE: "field1/black".....	36
	<i>Figure 13a. Field Mode (field1/black): Vertical Phase at 90 degrees.</i>	37
	<i>Figure 13b. Field Mode (field1/black): Vertical Phase at 0 degrees.</i>	37
5.6	WIDE CAMERA SHUTTER ANGLES (>> 180 degrees)	37
5.6.1	CALCULATING RANGE OF SHUTTER ANGLES.....	37
	<i>Figure 14. Calculation of shutter angles for normal blanking.</i>	37
5.6.2	INCREASING SHUTTER ANGLE BY RESIZING IMAGE.....	38
	<i>Figure 15. Maximum shutter angle by reducing vertical size.</i>	38
5.6.3	INCREASED SHUTTER ANGLE BY USING FIELD MODE:"field1/black".....	38
	<i>Figure 16. Maximum shutter angle by using FIELD MODE:"field1/black".</i>	38
SECTION 6 – VGA INPUT PROCESSING		39
6.1	INTRODUCTION	39
6.2	VGA INPUT SIGNALS	39
6.3	VGA CAPTURE WINDOW	39
6.4	AUTO POSITIONING	39
6.5	HORZ AND VERT POSITION CONTROLS	39
6.6	SAMPLE PHASE (SHARPNESS)	40
	<i>Figure 17a. Example of VGA "stair-step" signal</i>	40
	<i>Figure 17b. Example of Video "linear" signal</i>	40
	<i>Figure 18a. Example of incorrect sampling phase (distorted)</i>	40
	<i>Figure 18b. Example of centered sampling phase (sharp)</i>	40
6.7	AUTO SAMPLE PHASE	40
6.8	SAMPLE PHASE CONTROL	40

6.9	UNIVERSAL LOCK	41
SECTION 7 – HIGH DEFINITION VIDEO PROCESSING		42
7.1	INTRODUCTION	42
7.2	ANALOG (RGB) INPUT REQUIREMENTS	42
7.3	DIGITAL (DVI) INPUT REQUIREMENTS	42
7.4	SUGGESTIONS FOR USING HD SOURCES	42
APPENDIX A - SPECIFICATIONS		43
APPENDIX B - CONNECTOR PINOUTS		46
APPENDIX C - WRITE ENABLE SWITCH		47
NOTES		48

SAFETY INFORMATION

- ✓ **Power source** This product is intended to operate from a power source of 110 VAC, +/- 20 %, at 60 Hz, or 220 VAC, +/- 20 %, at 50 Hz. A protective ground connection, by way of the grounding conductor in the power cord, is essential for safe operation.

- ✓ **Grounding** The chassis of this product is grounded through the grounding conductor of the power cord. To avoid electric shock, plug the power cord into a properly wired receptacle before making any connections to the product. A protective ground connection, by way of the grounding conductor in the power cord, is essential for safe operation.

- ✓ **Danger from loss of ground** If the protective ground connection is lost, all accessible conductive parts, including ones that appear to be insulated, can render an electric shock.

- ✓ **Proper power cord** Use only the power cord and connector specified for the product. Use only a cord that is in good condition.

- ✓ **Proper fuse** The power fuse is located in a serviceable fuse holder on the back panel of the unit. The fuse holder accepts 5mm diameter fuses. Replace only with **1.5A, 250VAC**, fast acting fuse.

- ✓ **Operating location** Do not operate this equipment under any of the following conditions: explosive atmospheres, in wet locations, in inclement weather, improper or unknown AC mains voltage, or if improperly fused.

To avoid personal injury or injury to others, do not remove the product covers or panels. Do not operate the product without the covers and panels properly installed and secured.

INTRODUCTION

Congratulations on your decision to use Schindler Imaging's MVP-24X Frame Rate Converter. The MVP-24X is a broadcast quality video and VGA frame rate converter designed specifically for the film industry and widely used by studios and playback specialists. Conventional standards converters are not designed for the varied playback situations encountered in the industry, and often require the use of additional equipment. Schindler Imaging has incorporated the functionality of other equipment with our high quality processing, producing a single unit solution to simplify the task of 24 frame playback.

- | | |
|---|--|
| ☐ Video Inputs | The MVP-24X accepts standard NTSC video signals (videotape machines, video cameras, tuners, video disks, video games, etc.) with composite, Y/C, SVHS, YRB (Betacam or SMPTE-EBU levels), RGB (3/4 wire sync), optional Serial D1(digital) and optional DV (IEEE 1394) formats. |
| ☐ VGA Inputs | The MVP-24X accepts standard analog VGA (15pin HD connector) and digital DVI signals at resolutions of 640x480 through 1920x1080. |
| ☐ Video Outputs | The MVP-24X produces 23.976 FPS, 24.000 FPS, 24.022 FPS, 25.000 FPS and 30 (29.97) FPS video, with composite, SVHS, and either Y/C, Y/R/B (Betacam or SMPTE-EBU levels) or RGB formats. For composite and SVHS outputs, the MVP-24X can generate all standard sub carrier formats (NTSC, NTSC-4.43, PAL, SECAM, PAL-N and PAL-M) for maximum compatibility of existing monitors. |
| ☐ VGA Outputs | The MVP-24X produces VGA resolutions of 640x480, 800x600, and 1024x768. Each with refresh rates of 47.94, 48.00, 48.04, 50.00, 59.94, 71.91, 72.00, 72.06 75.00, 89.91, 95.88, 96.00, 96.08, and 100 Hz |
| ☐ Dual Mode | The MVP-24X can be configured as two units in one. In Dual mode Video in to Video out is processed simultaneously with VGA in to VGA out. |
| ☐ Format Conversion | The MVP-24X can be configured to convert Video to VGA, or VGA to Video. |
| ☐ Video + VGA | The MVP-24X can be configured to combine Video and VGA signals. Video can be resized into a window within the VGA image. |
| ☐ Genlock | The MVP-24X will lock to Vertical Drive, Frame square wave, Composite video sync, or HD 1080sF tri-level composite sync. The MVP-24X may be vertically phased to this reference with a range of >360 degrees. This allows the MVP-24X to be phased to the camera* eliminating the need for a shutter synchronizer for single camera shots. |
| ☐ Progressive Processing | The MVP-24X utilizes full progressive video in it's processing to guarantee maximum sharpness and clarity. A motion adaptive vertical temporal filter is used to de-interlace the in-coming video to produce full progressive video, maintaining full vertical resolution of the original interlaced frame. |

-
- | | |
|---|---|
| ☐ Locked Color at 24.000 FPS | A unique feature of the MVP-24X is the “locked color” produced in 24.000 FPS mode. With proprietary digital techniques, true color locked 24.000 FPS composite video is produced without annoying video artifacts such as “roaming” dot patterns and detail “breathing” which are typical of traditional methods used in frame rate conversion, usually involving unlocked or non-coherent color. |
| ☐ Color Temperature | Color controls are provided for adjusting the color temperature of the picture to match the ambient lighting in the scene being filmed. Color correction and balance controls are provided for video outputs. Gain, gamma and pedestal controls are provided for VGA outputs. The MVP-24X has user presets to store favorite settings, as well as factory presets for 3200, 4800, and 5500 degrees. |
| ☐ Size & Centering Controls | The MVP-24X allows the vertical and horizontal size of the picture as well as it's position to be adjusted. This provides easy calibration of monitors which were not setup for 24 frame playback. These controls can also be used for effects by shrinking or stretching the picture, or making non standard aspect ratios. Internal test signals are provided for precise resizing and positioning. |
| - larger shutter angles | These controls can also be used to achieve increased vertical blanking time. This would allow for shutter angles greater than 180 degrees*. |
| ☐ Field Mode | The MVP-24X video outputs can be configured to display field 1's only, while blanking out field 2's (see section 2.4.8). This allows the operator to see exactly what the camera's shutter will see. |
| - viewing | |
| - phasing | It can also be used to help “phase” the camera's shutter, since a complete picture will only be seen through the camera when the two are in phase. |
| - larger shutter angles | This mode also allows larger shutter angles* ($>180^{\circ}$) to be used, since there are no field 2's present to interfere. |
| ☐ H/V Sharpness Controls | The MVP-24X provides separate Horizontal and Vertical Sharpness Controls. Each control has 3 levels of sharpening, and 4 levels of softening. |
| ☐ Proc. Amp Controls | The MVP-24X provides standard Proc. Amp controls for adjusting Video Level (affecting the Contrast of the image), Setup Level (affecting brightness), Chroma (affecting saturation of color level) and Hue (affecting the tint). |
| ☐ Freeze Frame | The MVP-24X can freeze an image and display it as either field 1,2 or full frame. |
| ☐ Go to Black | A “go to black” button will switch the output of the unit to black to simulate the monitor being turned off. |
| ☐ Test Signal/ Alignment Pattern Generator | Test signals may be generated to assist the operator with level adjustments, color correction, sizing the image, and adjusting the camera's shutter phase. These patterns include: Color bars, SMPTE bars, mono and color 5 and 10 step, mono and color ramp, grayscale, sizing chart, Blue screen, Green screen, RED screen, and many more. |

* Limitations may apply. See manual for further details.

SECTION 1

REAR PANEL CONNECTIONS

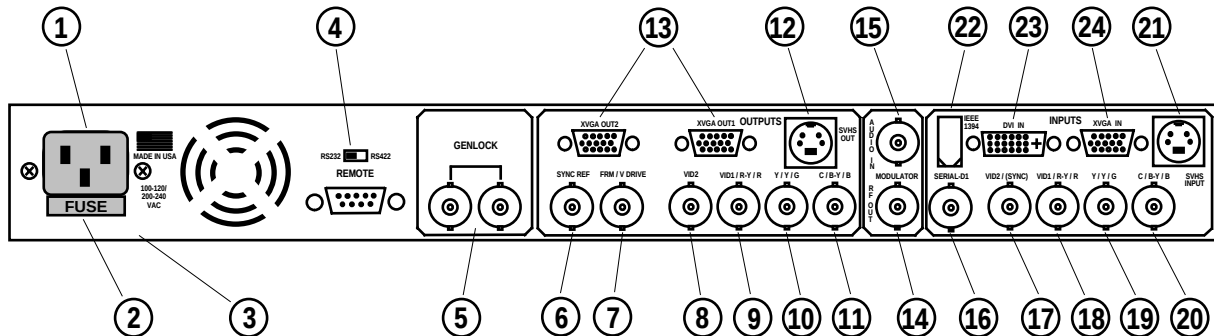


Figure 1. MVP-24X Rear Panel

1.0 ENTRY MODULE

1.0.1 AC POWER

- ① This product is intended to operate from a power source of 110 VAC, +/- 20 %, at 60 Hz, or 220 VAC, +/- 20 %, at 50 Hz. A protective ground connection, by way of the grounding conductor in the power cord, is essential for safe operation.

1.0.2 FUSE HOLDER

- ② This fuse holder accepts 5mm diameter fuses.
Replace only with 1.5A, 250VAC, fast acting fuse.

1.1 SERIAL NUMBER

- ③ The serial number for the MVP-24X is found on the lower left edge of the back panel.

1.2 REMOTE CONNECTOR

- ④ This 9 pin D connector is used to externally control the MVP-24X. Use the switch to select between RS232 and RS422.

1.3 GENLOCK INPUTS

- ⑤ These BNC connectors provide a "loop through" connection for an external sync reference. The reference may be composite sync, tri-level sync, vertical drive, or a frame square wave. The reference signal may be daisy chained through the unit to other equipment requiring external sync. If the unit is the last piece of equipment in the chain, then the second connection will require termination. If no signal is applied to either connector then an internal sync generator is used for the reference.

1.4 REFERENCE OUTPUTS

1.4.1 SYNC REFERENCE OUTPUT

- ⑥ This BNC connector provides a reference output signal for synchronizing other film equipment or cameras. The output signal is selected at the front panel by using the menu “*Sync Ref Output*” under *OUTPUTS*. Possible output signal are: Video composite sync, 1Vpp composite sync, +5V composite sync, -5V composite sync, HDSF tri-level sync, +5V vert drive, -5V vert drive, +5V Frame drive, and -5V Frame drive.

1.4.2 FRM/V-DRIVE OUTPUT

- ⑦ This BNC connector provides a reference output signal for synchronizing other film equipment or cameras. The output signal is selected at the front panel by using the menu “*Drive Ref Output*” under *OUTPUTS*. Possible output signal are: +5V vert drive, -5V vert drive, +5V Frame drive, and -5V Frame drive.

1.5 VIDEO OUTPUTS

1.5.1 VID2 OUTPUT

- ⑧ This BNC connector provides composite video output.

1.5.2 VID1-YC / YRB / RGB OUTPUTS

- ⑨ ⑩ ⑪ These three BNC connectors are the main video outputs. They are multi-format outputs and are configured at the front panel by using the menu “*VIDEO OUT FORMAT*” under *OUTPUTS*. The three connectors can be configured as either: [Composite, Y, C] ; [R-Y, Y, B-Y] ; or [Red, Green, Blue].

1.5.3 SVHS OUT

- ⑫ This 4 pin mini-DIN connector provides SVHS video output.
(Note: This output is not valid when main outputs are configured as RGB.)

1.6 VGA OUTPUTS

1.6.1 XVGA1, XVGA2 OUTPUTS

- ⑬ These 15HD female connectors provides analog VGA outputs.

1.7 RF MODULATOR**1.7.1 RF OUTPUT**

- ⑭ This BNC connector provides a RF output for connection to a television or monitor with a tuner. The output frequency is selected as either channel 3 or 4 at the front panel by using the menu “*RF Modulator*” under *OUTPUTS*.
(Note: For best picture quality, composite, Y/C, or component video should be used if possible). An audio input is also provided for the RF output.

1.7.2 AUDIO IN

- ⑮ This BNC connector takes audio in and combines it with the output video to produce the RF output signal.

1.8 VIDEO INPUTS**1.8.1 SERIAL-D1 INPUT (OPTIONAL)**

- ⑯ This BNC connector is the serial digital video input.

1.8.2 VID2 (SYNC) INPUT

- ⑰ This BNC connector is the Composite video input VID2, or SYNC input for 4 wire RGB inputs.

1.8.3 VID1-YC / YRB / RGB INPUTS

- ⑱ ⑲ ⑳ These three BNC connectors are the main video inputs. They are multi-format inputs and are used for Composite, Y/C, YRB, or RGB inputs. The desired input format is selected at the front panel by using the menu “*INPUT SELECT*” under *INPUTS*.

1.8.4 SVHS INPUT

- ㉑ This 4 pin mini-DIN connector is the SVHS input.

1.8.5 IEEE 1394 “DV” INPUT (OPTIONAL)

- ㉒ This connector is the IEEE 1394 video input.

1.9 VGA INPUTS**1.9.1 DVI (DIGITAL) INPUT**

- ㉓ This connector is the DVI input for digital VGA sources.

1.9.2 XVGA (ANALOG) INPUT

- ㉔ This 15HD male connector is the analog VGA input.

SECTION 2

FRONT PANEL OPERATION

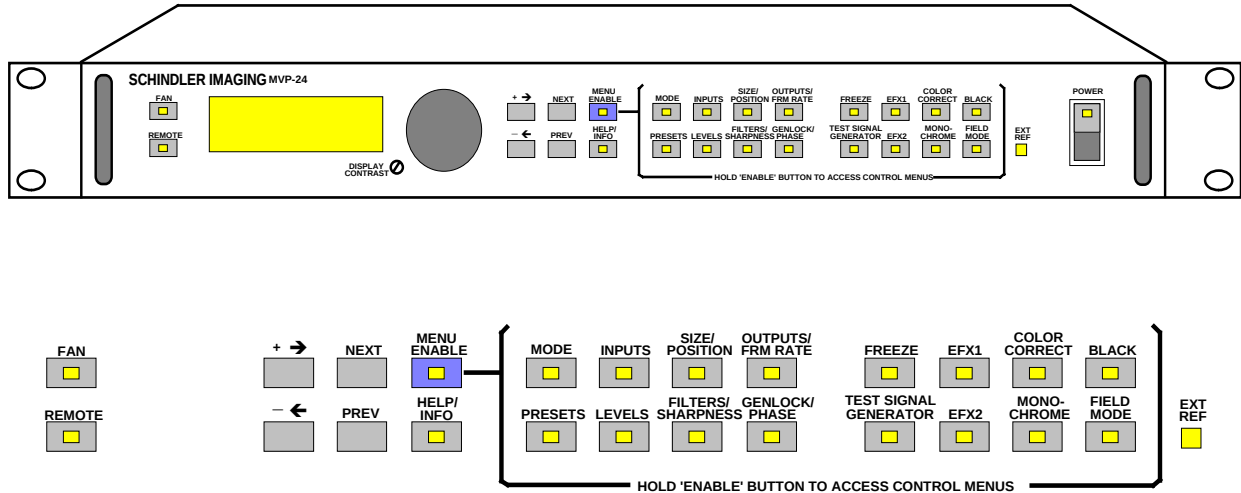


Figure 2. MVP-24X Front Panel

2.1 DISPLAY

The MVP-24X utilizes a graphic LCD display to report status information, and to assist the operator when making adjustments.

The top line of the display always indicates important status about the operation of the MVP-24X. This allows the operator to see at a glance, how the MVP-24X is configured.

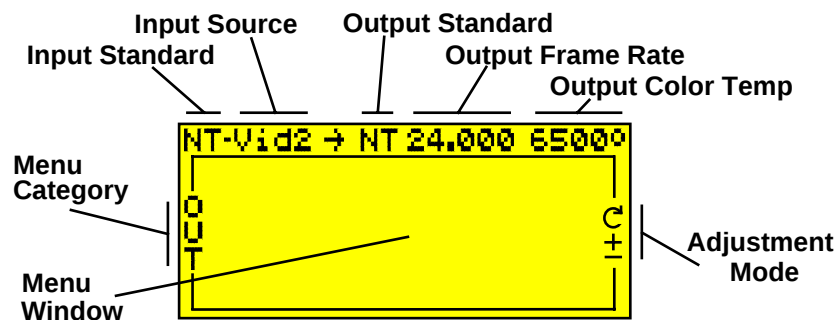
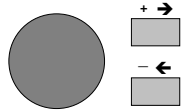


Figure 3. MVP-24X Status Display

The remainder of the display is used for various adjustment and status menus.

2.2 CONTROLS



2.2.1

The rotary knob, + and - buttons are used to make changes and adjustments to the displayed menus.

Icons will appear on the display to indicate when these controls are active.
 indicates the rotary knob is active. $\pm$ Indicates the + and – buttons are active.



2.2.2

NEXT and PREV (previous) buttons are used to access additional menus for a selected category.



2.2.3

HELP/INFO button is used to get information about a selected menu or to diagnose a problem. When pressed, an information window appears along the bottom line of the display. Text information is displayed within the window. Use the knob or +/- buttons to scroll through any additional information. To close the information window, press **HELP/INFO** again, or change to another menu.

If the **HELP/INFO** button indicator is flashing, then a problem has been detected. Pressing the button in this mode will display the help window with a description of the detected problem. Pressing the button a second time will display either another detected problem, or the standard information window.



2.2.4

MENU ENABLE button is used to access adjustment menus for all category buttons. To access menus for a desired category (such as “Inputs”), push the MENU ENABLE button down and continue holding it down while also pushing the category button (such as “Inputs”). The display will now show the first menu in that category.

To exit any menu, press MENU ENABLE (alone) and release.

2.3 CATEGORY BUTTONS AND MENUS

The following buttons are used to access menus for each category. These buttons are only active when MENU ENABLE is also pressed. When a category is active, the category and MENU ENABLE buttons will illuminate yellow for video modes, or green for VGA modes.

The following menus may only be available under certain operating modes.

2.3.1



MODE

This button (with MENU ENABLE) is used to configure the operating mode of the MVP-24X.

2.3.1a

Menu: **Mode**

This menu is used to select the operating mode of the MVP-24X.*

VIDEO ONLY mode = conversion of video signals only, VGA path is powered down.
 DUAL Vid&VGA mode = Video to Video and separate VGA to VGA conversions.
 Vid -> VGA mode = Video is converted to VGA.
 VGA -> Vid mode = VGA is converted to Video.
 VGA+Vid -> VGA mode = VGA and Video inputs are combined and converted to VGA.
 VGA+Vid -> Vid mode = VGA and Video inputs are combined and converted to Video.

The current selected mode is indicated in BOLD print on the first line.

⇒ Use the Knob or +/- buttons to display desired mode within the brackets on the second line.

⇒ Once desired mode is displayed, push on the knob to enter selection.

The new selection will now appear in BOLD on first line.

*See Section 2.3.2 for further discussion of operating modes.

2.3.1b

Menu: **Front Panel Control (for DUAL Vid&VGA mode)**

While in DUAL mode, this menu is used to select which signal path (VIDEO or VGA) is controlled by the front panel. If VIDEO is selected, the status of the video conversion is displayed and menu buttons access the video controls. If VGA is selected, the status of the VGA conversion is displayed and menu buttons access the VGA controls. This menu is only present in the DUAL Vid&VGA mode.

⇒ Use the Knob, +/- buttons or press MODE(see 2.3.1c) to select VIDEO or VGA.

2.3.1c

Front Panel Control - Quick Select Feature (for DUAL Vid&VGA mode)

Pressing the MODE button by itself (no other keys pressed) will instantly toggle the *Front Panel Control* selection. This can be done within any menu and without having to exit the menu. For example, while using the *Video Input Select* menu, pressing the MODE button will cause an instant switch to the *VGA Input Select* menu.

2.3.2



PRESETS

Presets are stored settings for all functions within the MVP-24X.

This button (with MENU ENABLE) is used to access menus for recalling and storing presets.

2.3.2a

Menu: **Recall Settings**

(available in all operating modes)

Recalling a preset will overwrite all current settings (video and VGA regardless of operating mode) within the MVP-24X with settings stored in the preset.

⇒ Use the Knob to select a preset (0,1,2 or 3).

Note: Preset 0 is a factory default and will change all settings to nominal values.

⇒ Once the desired preset is selected, press + and – buttons simultaneously to recall settings from the preset.

2.3.2



PRESETS (continued)

2.3.2b

Menu: **Store Settings ***

(available in all operating modes)

Storing a preset will save all settings (video and VGA regardless of operating mode) within the MVP-24X to a selected preset.

Each preset may be assigned a unique eight character name.

⇒ Use the Knob to select a preset number (1,2 or 3).

Note: Preset 0 is a factory default and cannot be written to.

⇒ To load default name, push knob while cursor is positioned under selected preset number.

⇒ To edit the name, press + or – button to move the cursor into the eight character name. Use the Knob to change the character where the cursor is positioned.

Note: Pushing knob will advance the selected character to “A”.

⇒ Once desired preset and name are selected, press + and – buttons simultaneously to store settings to the preset.

* Note: Write Enable switch must be ON (enabled) to access the *Store* menu (see *Appendix-C*).

2.3.3



INPUTS

This button (with MENU ENABLE) is used to access menus for selecting and configuring inputs.

2.3.3a

Menu: **Input Select**

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu is used to select the video input source for the MVP-24X.*

The current selected source is indicated in BOLD print on the first line.

⇒ Use the Knob or +/- buttons to move desired source within the brackets on the second line.

⇒ Once desired source is selected, push on the knob to enter selection.

The new selection will now appear in BOLD on first line.

*See Section 1.8.2 for proper connections of the multi-format video inputs.

2.3.3b

Menu: **Vid1 AGC**

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

Automatic Gain Control for Vid1 Input. This menu will be present if the Vid1 source is currently selected. It is used to control AGC for Vid1 input.

⇒ Use the Knob or +/- buttons to turn AGC ON or OFF.

2.3.3c

Menu: **Vid2 AGC**

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

Automatic Gain Control for Vid2 Input. This menu will be present if the Vid2 source is currently selected. It is used to control AGC for Vid2 input.

⇒ Use the Knob or +/- buttons to turn AGC ON or OFF.

2.3.3d

Menu: **SVHS AGC**

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

Automatic Gain Control for SVHS Input. This menu will be present if the SVHS source is currently selected. It is used to control AGC for SVHS input.

⇒ Use the Knob or +/- buttons to turn AGC ON or OFF.

2.3.3

**INPUTS (continued)**

2.3.3e

Menu: Y/C Dub Mode

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

Dub Mode may be used with a VTR with Y-688 outputs. Dub Mode may provide for improved picture quality by taking advantage of the Y-688 output's increased bandwidth (resolution). In this mode the Y input is connected to the Y-688's Y output, and the C input is connected to the VTR's composite output. Dub Mode enables a COMB filter on the C input to remove any luminance (Y) components from the composite source. This menu will be present if the Y/C source is currently selected.

⇒ Use the Knob or +/- buttons to turn Dub Mode ON or OFF.

2.3.3f

Menu: YRB Format

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

The Format for YRB inputs may be either **Beta** (Betacam) levels (700mV), or **EBU** (SMPTE-EBU) levels (525mV). This menu will be present if the YRB source is currently selected.

⇒ Use the Knob or +/- buttons to select between Beta or EBU.

2.3.3g

Menu: RGB sync Format

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

The RGB input may be configured for 3 wire (sync on green), or 4wire (sync on Vid2/sync input). This menu will be present if the RGB source is currently selected.

⇒ Use the Knob or +/- buttons to select between 3wire or 4wire.

2.3.3h

Menu: DV Status

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

The menu displays information about the detected DV signal. There are no adjustments. This menu will be present if the DV source is currently selected.

2.3.3i

Menu: Input Standard

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu is used to select the video input standard for the MVP-24X. The MVP-24X supports NTSC, PAL-M, and NTSC 4.43 as input standards. The current selected standard is indicated in BOLD print on the first line.

⇒ Use the Knob or +/- buttons to move desired standard within the brackets on the second line.

⇒ Once desired standard is selected, push on the knob to enter selection. The new selection will now appear in BOLD on first line.

2.3.3j

Menu: VGA Input

(available in DUAL(VGA), VGA->Vid, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu is used to select the VGA input source (RGB or DVI) for the MVP-24X. The current selected source is indicated in BOLD print on the first line.

⇒ Use the Knob or +/- buttons to move desired source within the brackets on the second line.

⇒ Once desired source is selected, push on the knob to enter selection. The new selection will now appear in BOLD on first line.

2.3.3



INPUTS (continued)

2.3.3k

Menu: **VGA In Horz Position**

(available in DUAL(VGA), VGA->Vid, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu is used to adjust the horizontal position of the analog VGA input's capture window. In auto mode (default), the MVP-24X automatically adjusts the position. In manual mode, the current position is indicated in BOLD print on the second line.

**See Section 6 for further discussion of VGA capture window.*

- ⇒ Push the knob to alternate between auto position and manual position.
- ⇒ Use the Knob or +/- buttons to adjust position in manual mode.

2.3.3l

Menu: **VGA In Vert Position**

(available in DUAL(VGA), VGA->Vid, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu is used to adjust the vertical position of the analog VGA input's capture window. In auto mode (default), the MVP-24X automatically adjusts the position. In manual mode, the current position is indicated in BOLD print on the second line.

**See Section 6 for further discussion of VGA capture window.*

- ⇒ Push the knob to alternate between auto position and manual position.
- ⇒ Use the Knob or +/- buttons to adjust position in manual mode.

2.3.3m

Menu: **VGA In Sample Phase**

(available in DUAL(VGA), VGA->Vid, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu is used to adjust the sampling phase of the analog VGA input's capture window. In auto mode (default), the MVP-24X automatically adjusts the phase. In manual mode, the current phase is indicated in BOLD print on the second line.

**See Section 6.6 for further discussion of VGA sampling phase.*

- ⇒ Push the knob to alternate between auto phase and manual phase.
- ⇒ Use the Knob or +/- buttons to adjust phase in manual mode.

2.3.3n

Menu: **SOURCE - VGA Input Status**

(available in DUAL(VGA), VGA->Vid, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu displays information about the selected VGA input. There are no adjustments.

2.3.4



LEVELS

This button (with MENU ENABLE) is used to access menus for adjusting picture levels.

2.3.4a

Menu: **Level (Contrast)**

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu is used to adjust the level (or contrast) of the video inputs.

- ⇒ Use the Knob or +/- buttons to adjust.

2.3.4b

Menu: **Setup (Brightness)**

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu is used to adjust the black level (or brightness) of the video inputs.

- ⇒ Use the Knob or +/- buttons to adjust.

2.3.4



LEVELS (continued)

2.3.4c

Menu: **Saturation (Color)**

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu is used to adjust the color level of the video inputs.

⇒ Use the Knob or +/- buttons to adjust.

2.3.4d

Menu: **Hue (Tint)**

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu is used to adjust the color hue (or tint) of the video inputs.

⇒ Use the Knob or +/- buttons to adjust.

2.3.4e

Menu: **Y/C Delay**

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu is used to adjust the horizontal (side to side) position of the color portion of the video inputs with respect to the luminance (black and white) portion. Can be used to correct color smear artifacts produced by VTR's.

⇒ Use the Knob or +/- buttons to adjust.

2.3.5



SIZE / POSITION

This button (with MENU ENABLE) is used to access menus for adjusting the size and position of the picture.

2.3.5a

Menu: **Vert Size**

(available in DUAL(VIDEO), VGA->Vid, and VGA+Vid->Vid operating modes)

This menu is used to adjust the size of the video outputs' active picture in the vertical (up-down) direction. This menu displays the size in both percent and number of active lines.

⇒ Use the +/- buttons to adjust in 5 line increments.

⇒ Use the Knob to adjust in 1 line increment.

2.3.5b

Menu: **Vert Center**

(available in DUAL(VIDEO), VGA->Vid, and VGA+Vid->Vid operating modes)

This menu is used to position the center of the video outputs' active picture in the vertical (up-down) direction.

⇒ Use the +/- buttons to adjust in 5 line increments.

⇒ Use the Knob to adjust in 1 line increment.

2.3.5c

Menu: **Horz Size**

(available in DUAL(VIDEO), VGA->Vid, and VGA+Vid->Vid operating modes)

This menu is used to adjust the size of the video outputs' active picture in the horizontal (side to side) direction. This menu displays the size in both percent and number of pixels.

⇒ Use the +/- buttons to adjust in 10 pixel increments.

⇒ Use the Knob to adjust in 2 pixel increments.

2.3.5

**SIZE / POSITION** (continued)

2.3.5d

Menu: *Horz Center*

(available in DUAL(VIDEO), VGA->Vid, and VGA+Vid->Vid operating modes)

This menu is used to position the center of the video outputs' active picture in the horizontal (side to side) direction.

- ⇒ Use the +/- buttons to adjust in 5 pixel increments.
- ⇒ Use the Knob to adjust in 1 pixel increment.

2.3.5e

Menu: *Video Vert Crop*

(available in DUAL(VIDEO) and Vid->VGA operating modes)

Vertical cropping blanks the top and bottom 2.5% of the video outputs' active picture. Cropping can be used to remove unwanted edge signals (such as closed captioning or teletext) when picture edge is visible.

- ⇒ Use the Knob or +/- buttons to turn cropping ON or OFF.

2.3.5f

Menu: *Video Horz Crop*

(available in DUAL(VIDEO) and Vid->VGA operating modes)

Horizontal cropping blanks the left and right 2.5% of the video outputs' active picture. Cropping can be used to remove unwanted edge signals when picture edge is visible.

- ⇒ Use the Knob or +/- buttons to turn cropping ON or OFF.

2.3.5g

Menu: *Video Zoom*

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu is used to control the amount of zoom applied to the video input. The amount is displayed in percent. Adjustments are made in the horizontal direction, vertical direction or both directions simultaneously. The direction is selected by pushing the Knob. The top line indicates the direction selected for adjustment.

- ⇒ Push Knob to select direction for adjustment.
- ⇒ Use the +/- buttons to adjust in 20% increments.
- ⇒ Use the Knob to adjust in 2% increments.

2.3.5h

Menu: *Video Zoom Center*

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu is used to position the video input when "Video Zoom" is > 100%. The position is displayed in percent. . Adjustments are made in the horizontal or vertical direction, indicated on the top line. The direction is selected by pushing the Knob.

(Note: This setting has no effect if "Video Zoom" = 100%.)

- ⇒ Push Knob to select direction for adjustment.
- ⇒ Use the +/- buttons to adjust in 5% increments.
- ⇒ Use the Knob to adjust in 0.5% increments.

2.3.5



SIZE / POSITION (continued)

2.3.5i

Menu: VGA Vert Size

(available in DUAL(VGA), Vid->VGA, and VGA+Vid->VGA operating modes)

This menu is used to adjust the size of the VGA outputs' active picture in the vertical (up-down) direction. This menu displays the size in percent.

- ⇒ Use the +/- buttons to adjust in 5% increments.
- ⇒ Use the Knob to adjust in 0.5% increments.

2.3.5j

Menu: VGA Vert Center

(available in DUAL(VGA), Vid->VGA, and VGA+Vid->VGA operating modes)

This menu is used to position the center of the VGA outputs' active picture in the vertical (up-down) direction.

- ⇒ Use the +/- buttons to adjust in 2.5% increments.
- ⇒ Use the Knob to adjust in 0.25% increment.

2.3.5k

Menu: VGA Horz Size

(available in DUAL(VGA), Vid->VGA, and VGA+Vid->VGA operating modes)

This menu is used to adjust the size of the VGA outputs' active picture in the horizontal (side to side) direction. This menu displays the size in percent.

- ⇒ Use the +/- buttons to adjust in 5% increments.
- ⇒ Use the Knob to adjust in 0.5% increments.

2.3.5l

Menu: VGA Horz Center

(available in DUAL(VGA), Vid->VGA, and VGA+Vid->VGA operating modes)

This menu is used to position the center of the VGA outputs' active picture in the horizontal (side to side) direction.

- ⇒ Use the +/- buttons to adjust in 2.5% increments.
- ⇒ Use the Knob to adjust in 0.25% increment.

2.3.5m

Menu: VGA Zoom

(available in DUAL(VGA), VGA->Vid, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu is used to control the amount of zoom applied to the VGA input (vertical and horizontal). The amount of zoom is displayed in percent.

- ⇒ Use the +/- buttons to adjust in 25% increments.
- ⇒ Use the Knob to adjust in 25% increments.

2.3.5n

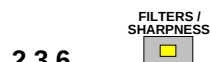
Menu: VGA Zoom Center

(available in DUAL(VGA), VGA->Vid, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu is used to position the VGA input when "VGA Zoom" is > 100%. The position is displayed in percent.. Adjustments are made in the horizontal or vertical direction, indicated on the top line. The direction is selected by pushing the Knob.

(Note: This setting has no effect if "VGA Zoom" = 100%.)

- ⇒ Push Knob to select direction for adjustment.
- ⇒ Use the +/- buttons to adjust in 5% increments.
- ⇒ Use the Knob to adjust in 0.5% increments.



2.3.6

FILTERS / SHARPNESS

This button (with MENU ENABLE) is used to access menus for adjusting various filters.

2.3.6a

Menu: **Horz Sharpness**

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu is used to adjust the horizontal (side to side) sharpness of the video input.

⇒ Use the Knob or +/- buttons to adjust.

2.3.6b

Menu: **Vert Sharpness**

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu is used to adjust the vertical (top to bottom) sharpness of the video input.

⇒ Use the Knob or +/- buttons to adjust.

2.3.6c

Menu: **Cross Color Filter**

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This filter may help reduce cross-color (improperly separated chroma sub carrier) artifacts by removing high frequency information from the luminance (black and white) portion of the picture. THIS FILTER WILL REDUCE THE HORIZONTAL SHARPNESS OF THE PICTURE.

⇒ Use the Knob or +/- buttons to turn filter ON or OFF.

2.3.6d

Menu: **Motion Filter**

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu selects between Normal and Film Mode for video inputs. Film Mode detects the presence of a film 3:2 field sequence and alters the algorithm for improved motion and vertical detail with film sources.

WARNING, FILM MODE SHOULD ONLY BE USED WITH ORIGINAL FILM SOURCES. DO NOT USED WITH TIME-COMPRESSED OR EDITED FILM SOURCES OR VIDEO.

⇒ Use the Knob or +/- buttons to turn filter ON or OFF.

2.3.6e

Menu: **Flicker Filter**

(available in VGA->Vid and VGA+Vid->Vid operating modes)

This filter reduces or eliminates the interlace flicker on video outputs when converting from VGA graphics to video. Select between Off, Low, Normal, and High settings.

THIS FILTER WILL REDUCE THE VERTICAL SHARPNESS OF THE PICTURE.

⇒ Use the Knob or +/- buttons to turn adjust filter.



2.3.7

OUTPUTS / FRM RATE

This button (with MENU ENABLE) is used to access menus for selecting and configuring outputs.

2.3.7a

Menu: *Output Rate*

(available in DUAL(VIDEO), VGA->Vid, and VGA+Vid->Vid operating modes)

This menu is used to select the video outputs' frame rate. The MVP-24X supports 23.976, 24.000, 24.022, 25.000, and 29.970 frame rates. This selection has no effect on the color standard of the output (see 2.3.7b *Out Standard* to select color standard). Any color standard can be produced at any frame rate; i.e. NTSC is not limited to 29.970 but can also be 25.000, 24.000 etc.; PAL is not limited to 25.000 but can also be 29.970, 24.000 etc. The current selected frame rate is indicated in BOLD print on the first line.

- Note: This setting will effect the frame rate of the VGA outputs.

- ⇒ Use the Knob or +/- buttons to move desired rate within the brackets on the second line.
- ⇒ Once desired rate is selected, push on the knob to enter selection. The new selection will now appear in BOLD on first line.

2.3.7b

Menu: *Out Standard*

(available in DUAL(VIDEO), VGA->Vid, and VGA+Vid->Vid operating modes)

This menu is used to select the video outputs' color standard for the MVP-24X. The MVP-24X supports NTSC, PAL-M, NTSC 4.43, PAL, SECAM, and PAL-N. This selection has no effect on the frame rate of the output (see 2.3.7a *Output Rate* to select frame rate). Any color standard can be produced at any frame rate; i.e. NTSC is not limited to 29.970 but can also be 25.000, 24.000 etc.; PAL is not limited to 25.000 but can also be 29.970, 24.000 etc.).

The current selected standard is indicated in BOLD print on the first line.

- ⇒ Use the Knob or +/- buttons to move desired standard within the brackets on the second line.
- ⇒ Once desired standard is selected, push on the knob to enter selection. The new selection will now appear in BOLD on first line.

2.3.7c

Menu: *Video Out Format*

(available in DUAL(VIDEO), VGA->Vid, and VGA+Vid->Vid operating modes)

This menu selects the output format for the MVP-24X's multi-format outputs.* The Output Format may be either Vid1/Y/C, RGB, YRB **Beta** (Betacam) levels (700mV), or YRB **EBU** (SMPTE-EBU) levels (525mV).

- ⇒ Use the Knob or +/- buttons to select format.

*See Section 1.6.2 for proper connections of the multi-format video outputs.

2.3.7d

Menu: *VGA Output*

(available in DUAL(VGA), Vid->VGA, and VGA+Vid->VGA operating modes)

This menu is used to select the VGA outputs' resolution and refresh (frame) rate. The MVP-24X supports 640x480 @ [47.94 through 119.9] Hz, 800x600 @ [47.94 through 119.9] Hz, and 1024x768 @ [47.94 through 100.0] Hz.

The current selected output is indicated in BOLD print on the first line.

- Note: This setting will effect the frame rate of the Video outputs.

- ⇒ Use the Knob or +/- buttons to move desired output within the brackets on the second line.
- ⇒ Once desired output is selected, push on the knob to enter selection. The new selection will now appear in BOLD on first line.

2.3.7

**OUTPUTS / FRM RATE (continued)**

2.3.7e

Menu: VGA Freq Trim

(available in DUAL(VGA), Vid->VGA, and VGA+Vid->VGA operating modes)

This menu is used to adjust the VGA outputs' horizontal frequency. The MVP-24X allows the total number of lines per frame to be increased or decreased, thus changing the horizontal frequency while maintaining the correct refresh (frame) rate.

⇒ Use the Knob or +/- buttons to adjust.

2.3.7f

Menu: Sync Ref Output

(available in all operating modes)

This menu is used to configure the SYNC REF OUTPUT. Choose between video composites sync, 1 Vpp composite sync, +5V (TTL-CMOS) composite sync, -5V composite sync, HDSF Hi-definition 1080sF tri-level sync, +5V vertical drive, -5V vertical drive, +5V frame drive (square wave), or -5V frame drive (square wave).

⇒ Use the Knob or +/- buttons to select reference signal for output.

2.3.7g

Menu: Drive Ref Output

(available in all operating modes)

This menu is used to configure the FRM/ V-DRIVE OUTPUT. Choose between +5V vertical drive, -5V vertical drive, +5V frame drive (square wave), or -5V frame drive (square wave).

⇒ Use the Knob or +/- buttons to select reference signal for output.

2.3.7h

Menu: RF Modulator

(available in DUAL(VIDEO), VGA->Vid, and VGA+Vid->Vid operating modes)

This menu is used to select the output channel for the RF Modulator. The Output channel may be either US channel 3, or US channel 4.

⇒ Use the Knob or +/- buttons to select channel.

2.3.8

**GENLOCK / PHASE**

This button (with MENU ENABLE) is used to access menus for genlocking and phasing.

2.3.8a

Menu: Genlock Source

(available in all operating modes)

This menu is used to select the source type to be used for genlocking the MVP-24X. The "Auto Detect" (default) setting automatically determines the type of input present. The "Composite Sync" setting is for a composite video, black-burst, TTL level composite sync or tri-level High definition sync signal only. The "Frm/Vrt Drive" setting is for a vertical drive pulse, or a frame square wave signal only.

⇒ Use the Knob or +/- buttons to select genlock type.

2.3.8b

Menu: Vertical Phase

(available in all operating modes)

This menu is used to vary the vertical phase of all the output signals from the MVP-24X. When genlocked, this phase adjustment is with respect to the genlock source. See section 5.5 for tips on using this feature.

⇒ Use the Knob or +/- buttons to select genlock type.

2.3.9

**EFX2**

This button (with MENU ENABLE) is used to access menus for creating a video window in VGA+VID modes.

2.3.9a

Menu: Vid Window H-size

(available in VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

These controls are used to create a Video Window within the VGA image.

This menu is used to reduce the size of the video input in the horizontal (side to side) direction. The amount of reduction is displayed in percent.

- Note: This feature is only available in the VGA+Vid modes.

⇒ Use the +/- buttons to adjust in 5% increments.

⇒ Use the Knob to adjust in 0.5% increments.

2.3.9b

Menu: Vid Window H-pos

(available in VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

These controls are used to create a Video Window within the VGA image.

This menu is used to position the video window in the horizontal (side to side) direction. The position is displayed in percent.

- Note: This setting has no effect if "Vid Shrink H-size" = 100%.

- Note: This feature is only available in the VGA+Vid modes.

⇒ Use the +/- buttons to adjust in 5% increments.

⇒ Use the Knob to adjust in 0.5% increments.

2.3.9c

Menu: Vid Window V-size

(available in VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

These controls are used to create a Video Window within the VGA image.

This menu is used to reduce the size of the video input in the vertical (up-down) direction. The amount of reduction is displayed in percent.

- Note: This feature is only available in the VGA+Vid modes.

⇒ Use the +/- buttons to adjust in 5% increments.

⇒ Use the Knob to adjust in 0.5% increments.

2.3.9d

Menu: Vid Window V-pos

(available in VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

These controls are used to create a Video Window within the VGA image.

This menu is used to position the video window in the vertical (up-down) direction. The position is displayed in percent.

- Note: This setting has no effect if "Vid Shrink V-size" = 100%.

- Note: This feature is only available in the VGA+Vid modes.

⇒ Use the +/- buttons to adjust in 5% increments.

⇒ Use the Knob to adjust in 0.5% increments.

2.3.9e

Menu: Crop Window

(available in VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

These controls are used to create a Video Window within the VGA image.

This menu is used to crop the edges of the window in both the horizontal and vertical directions. This is used to remove unwanted edge artifacts or signals (such as closed captioning), and produce a clean edge.

The amount of cropping is displayed in percent.

- Note: This feature is only available in the VGA+Vid modes.

⇒ Use the Knob or +/- buttons to adjust in 1.25% increments.

2.4 ACTIVE BUTTONS AND MENUS

The following buttons provide two functions. When pressed alone, they activate or de-activate the named function. Upon activation, the button will illuminate red. When pressed along with MENU ENABLE, they are used to access adjustment menus for the named function. While the menu mode is active, the button will illuminate yellow, or flash between red and yellow if that function is also active.

2.4.1



FREEZE Video

This button (alone) will freeze or un-freeze the displayed video picture.

2.4.1a

Menu: **Freeze Display Mode** (MENU ENABLE + FREEZE)

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu is used to control how a freeze is displayed.

Select between field 1, field 2 or full frame.

Note; the MVP-24X's processing produces very stable full frame freezes even with significant motion. Full frame mode is usually the preferred mode.

⇒ Use the +/- buttons to select how a freeze is displayed.

2.4.2



TEST SIGNAL GENERATOR

This button (alone) will enable or disable the video test signal generator.

2.4.2a

Menu: **Test Signal** (MENU ENABLE + TEST SIGNAL GENERATOR)

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu is used to select which video test signal is displayed.

⇒ Use the Knob or +/- buttons to select test signal.

The following signals are available:

Sizing Chart (circle, square grid and over scan markings)

Color Bars

SMPTE Bars

Monochrome 5 step

Modulated 5 step

Monochrome 10 step

Modulated 10 step

Monochrome Ramp

Modulated Ramp

NTC-7 (Pulse and Bar)

Multipulse

Multiburst

6 MHz Frequency Sweep

Vertical Frequency Sweep

50 IRE Flat Field

75% Window (75 IRE, 75% square)

12 Field pulse (Window signal once every 12 fields)

RED screen

GREEN screen

BLUE screen

F1-BLU/F2-YEL (Alternating field signal, F1=Blue, F2=Yellow)

2.4.2b

Menu: **Test Signal Levels** (MENU ENABLE + TEST SIGNAL GENERATOR)

This menu selects whether test signals can be modified by level controls (level, setup, saturation, hue), or fixed at unity levels.

⇒ Use the Knob or +/- buttons to select.

2.4.3



EFX1

This button (alone) will activate or deactivate the Selected EFFECT.

Limited effects can be applied to the video signal using the EFX1 button, such as: Fade to Black, Video Noise, and Synchronized Snow.

2.4.3a

Menu: **EFX Transition Time** (MENU ENABLE + EFX1)

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu is used to set the time interval for the selected effect to transition from OFF to ON, or ON to OFF. The time interval is in units of input video frames. The EFX1 indicator will flash during the transition.

- ⇒ Use the +/- buttons to adjust in 10 frame increments.
- ⇒ Use the Knob to adjust in 1 frame increments.

2.4.3b

Menu: **EFX Source** (MENU ENABLE + EFX1)

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu selects which signal is to be combined with the video through the EFX mixer. Black, Test Signal Generator, Random Noise Generator, Small Block Noise, and Large Block Noise can be selected.

- ⇒ Use the Knob or +/- buttons to select.

2.4.3c

Menu: **EFX Mixer** (MENU ENABLE + EFX1)

(available in DUAL(VIDEO), Vid->VGA, VGA+Vid->VGA, and VGA+Vid->Vid operating modes)

This menu adjusts the mixture between the selected signal and the video signal. 0% = no EFX1 signal and 100% video, 100% = 100% EFX1 signal and no video.

- ⇒ Use the +/- buttons to adjust in 10% increments.
- ⇒ Use the Knob to adjust in 1 % increments.

2.4.3d

EFX1 Programming Examples:

- Synchronized Snow:* This will produce a full frame 100% noise signal ("snow")
 Transition Time = 0 (instant ON/OFF)
 EFX Source = Random Noise Generator
 EFX Mixer = 100% (all noise + no video)
- Fade to Black:* This will produce a Fade to Black in 1 second.
 Transition Time = 30 (30 frames)
 EFX Source = Black
 EFX Mixer = 100% (all black + no video)
- Video Noise:* This will add noise ("snow") to the video signal.
 Transition Time = 100 (noise fades in and out)
 EFX Source = Random Noise Generator
 EFX Mixer = 10% (noise + video)
 Note: Mixer can be manually adjusted once EFX1 is ON
 to vary the amount of noise in the picture.

2.4.4



EFX2

This button alone currently has no function. See section 2.3.9 for menu functions.



2.4.5

COLOR CORRECT*

This button (alone) will enable or disable video color correction (color temperature) settings. When enabled, the status line of the display will indicate the color temp (if preset used) or USER. When disabled, the status line of the display will indicate 6500°, which is the default color temperature for a video monitor. *See section 5.3 for more information.

2.4.5a

Menu: **Color Correction-X:*** (MENU ENABLE + COLOR CORRECT)

(available in DUAL(VIDEO), VGA->Vid, and VGA+Vid->Vid operating modes)

This menu is used to adjust video color correction (white balance) along the X axis of the color circle. COLOR CORRECT must be enabled for these settings to take effect. *See section 5.3 for more information.

⇒ Use the Knob or +/- to adjust.

2.4.5b

Menu: **Color Correction-Y:*** (MENU ENABLE + COLOR CORRECT)

(available in DUAL(VIDEO), VGA->Vid, and VGA+Vid->Vid operating modes)

This menu is used to adjust video color correction (white balance) along the Y axis of the color circle. COLOR CORRECT must be enabled for these settings to take effect. *See section 5.3 for more information.

⇒ Use the Knob or +/- to adjust.

2.4.5c

Menu: **Color Balance-X:*** (MENU ENABLE + COLOR CORRECT)

(available in DUAL(VIDEO), VGA->Vid, and VGA+Vid->Vid operating modes)

This menu is used to adjust video color balance (black balance) along the X axis of the color circle. COLOR CORRECT must be enabled for these settings to take effect. *See section 5.3 for more information.

⇒ Use the Knob or +/- to adjust.

2.4.5d

Menu: **Color Balance-Y:*** (MENU ENABLE + COLOR CORRECT)

(available in DUAL(VIDEO), VGA->Vid, and VGA+Vid->Vid operating modes)

This menu is used to adjust video color balance (black balance) along the Y axis of the color circle. COLOR CORRECT must be enabled for these settings to take effect. *See section 5.3 for more information.

⇒ Use the Knob or +/- to adjust.

2.4.5e

Menu: **Color Temp Preset:*** (MENU ENABLE + COLOR CORRECT)

(available in DUAL(VIDEO), VGA->Vid, and VGA+Vid->Vid operating modes)

This menu is used to load presets (stored correction and balance settings) for video color temperatures. Loading a preset will overwrite any color correction and color balance settings. COLOR CORRECT must be enabled for these settings to take effect. *See section 5.3 for more information.

⇒ Use the Knob or +/- to select a preset.

⇒ Once the desired preset is selected, push the knob to load settings from the preset.

2.4.5



COLOR CORRECT* (continued)

2.4.5f

Menu: **Store Temp Settings:*** (MENU ENABLE + COLOR CORRECT)

(available in DUAL(VIDEO), VGA->Vid, and VGA+Vid->Vid operating modes)

This menu is used to store video correction and balance settings to a color temperature preset. Each preset may be assigned a unique four character name.

⇒ Use the Knob to select a preset number (1,2,3 or 4).

Note: Presets 6500,5500,4800, and 3200 are factory default settings and cannot be written to.

⇒ To load default name, push knob while cursor is positioned under selected preset number.

⇒ To edit the name, press + or – button to move the cursor into the four character name. Use the Knob to change the character where the cursor is positioned.

Note: Pushing knob will advance the selected character to “0”.

⇒ Once desired preset and name are selected, press + and – buttons simultaneously to store settings to the preset.

* Note: Write Enable switch must be ON (enabled) to access the Store menu (see Appendix-C).

2.4.5g

Menu: **VGA Out Gain(%):*** (MENU ENABLE + COLOR CORRECT)

(available in DUAL(VGA), Vid->VGA, and VGA+Vid->VGA operating modes)

This menu is used to adjust the VGA output color levels.

Adjustments are made to the red (RED), green (GRN), or blue (BLU) channels; or all channels (RGB) simultaneously.

⇒ Push Knob to select color channel for adjustment.

⇒ Use the Knob (rotate) or +/- to adjust.

2.4.5h

Menu: **VGA Out Gamma:*** (MENU ENABLE + COLOR CORRECT)

(available in DUAL(VGA), Vid->VGA, and VGA+Vid->VGA operating modes)

This menu is used to adjust the gamma of the VGA outputs.

Adjustments are made to the red (RED), green (GRN), or blue (BLU) channels; or all channels (RGB) simultaneously.

⇒ Push Knob to select color channel for adjustment.

⇒ Use the Knob (rotate) or +/- to adjust.

2.4.5i

Menu: **VGA Out Pedestal:*** (MENU ENABLE + COLOR CORRECT)

(available in DUAL(VGA), Vid->VGA, and VGA+Vid->VGA operating modes)

This menu is used to adjust the VGA output black levels.

Adjustments are made to the red (RED), green (GRN), or blue (BLU) channels; or all channels (RGB) simultaneously.

⇒ Push Knob to select color channel for adjustment.

⇒ Use the Knob (rotate) or +/- to adjust.

- 2.4.6**  **MONOCHROME**
This button (alone) will enable or disable monochrome mode. When enabled, all color information is removed from the video outputs leaving a black and white picture.

2.4.6a Menu: (MENU ENABLE + MONOCHROME)
There are no menus available for this function.

- 2.4.7**  **BLACK**
This button (alone) will enable or disable Black mode. When enabled, the video outputs go to black level (0 IRE).

2.4.7a Menu: (MENU ENABLE + BLACK)
There are no menus available for this function.

- 2.4.8**  **FIELD MODE**
This button (alone) will enable or disable field mode.

2.4.8a Menu: **Field Display Mode** (MENU ENABLE + FIELD MODE)
(available in DUAL(VIDEO), VGA->Vid, and VGA+Vid->Vid operating modes)

This menu is used to control how the picture is displayed in field mode.

“field1/field1” displays field 1 for both output fields.

“field2/field2” displays field 2 for both output fields.

“field1/black” displays field1 and blanks the output for field2.

“field2/black” displays field2 and blanks the output for field1.

FIELD MODE must be enabled for these settings to take effect.

* See sections 5.5 and 5.6 for tips and additional usage of this feature.

⇒ Use the +/- buttons to select field mode.

Field1/black

*Field1/black is a mode which displays only field 1, and blanks out field 2. This mode can be used to see exactly what the film camera's shutter will see. Many principles of interlaced video depend on the ability of the human eye to average artifacts between odd and even fields. Unfortunately the shutter of a film camera only ever sees one of the two fields, and therefore no averaging occurs. This could produce many artifacts on film that might not have been seen during the filming. The **Field1/black** setting eliminates all even fields. The picture will appear to flash rapidly, but any interlace artifacts should be more apparent to the operator. See sections 5.5 and 5.6 for tips and additional usage of this feature.*

2.4.9 FAN

This button (alone) will enable or disable the fan.

2.4.9a Menu: **FAN Speed** (MENU ENABLE + FAN)
(available in all operating modes)

This menu is used to adjust the speed of the fan when enabled.
⇒ Use the Knob or +/- to adjust.

2.4.9b Menu: **Chassis Temperature** (MENU ENABLE + FAN)
(available in all operating modes)

This menu shows the internal temperature of the chassis in degrees Celsius.

2.4.10 REMOTE

This button currently has no function, but is reserved for future enhancements

2.4.10a Menu: (MENU ENABLE + REMOTE)
There are no menus available for this function.

2.5 SPECIALTY MENUS

The following menus can be accessed when the MVP-24X is in standby mode (no menus selected). Pressing MENU ENABLE (alone) will exit any currently accessed menus.

2.5.1 Menu: **Serial Number:** (press NEXT without MENU ENABLE)
(available in all operating modes)

This menu displays the chassis serial number.

2.5.2 Menu: **Hours of Operation:** (press PREV without MENU ENABLE)
(available in all operating modes)

This menu displays the total number of hours that the chassis has been powered.

2.5.3 Menu: **Misc Hardware Information:** (press NEXT twice without MENU ENABLE)
(available in all operating modes)

This menu is used to access information about installed options.
The default display shows the Schindler Imaging copyright notice.
⇒ Push "+" to display the version numbers of the VGA option.
⇒ Push "-" to display the version numbers of the DV option.
⇒ Push "+" and "-" together to display the type of sync separator installed.

2.6 EXT REF INDICATOR



This yellow LED lights solid when the unit is locked to an external sync reference. A flashing LED indicates a problem with the reference signal; the frame rate of the reference does not match the selected rate, or the wrong reference type is selected (see section 2.3.8a), or the external sync is unstable. When the LED is off, then the unit is locked to the internally generated sync.

SECTION 3

APPLICATIONS

Below, are a few typical examples of how the MVP-24X can be used.

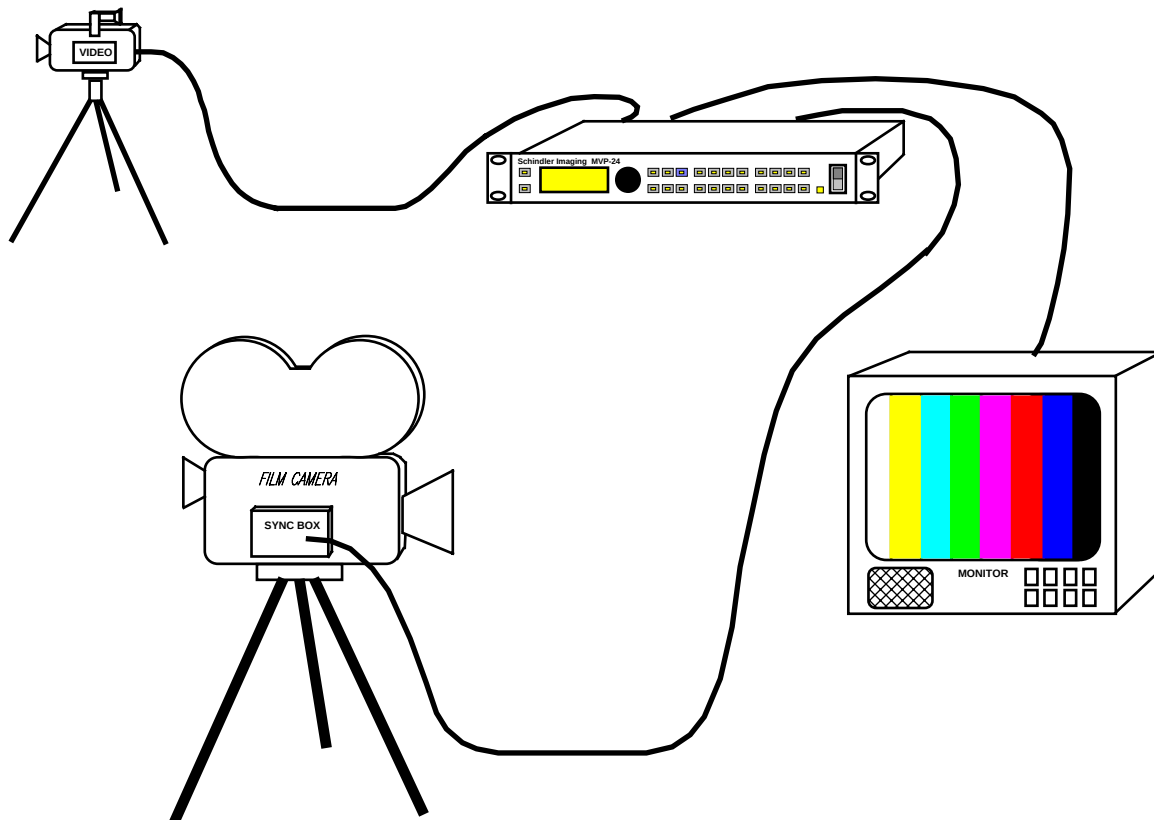


Figure 4. Real-time frame rate conversion and synchronization.

A live video camera is used as the source. The film camera is locked to the reference output of the MVP-24X with the use of a camera synchronizer box.

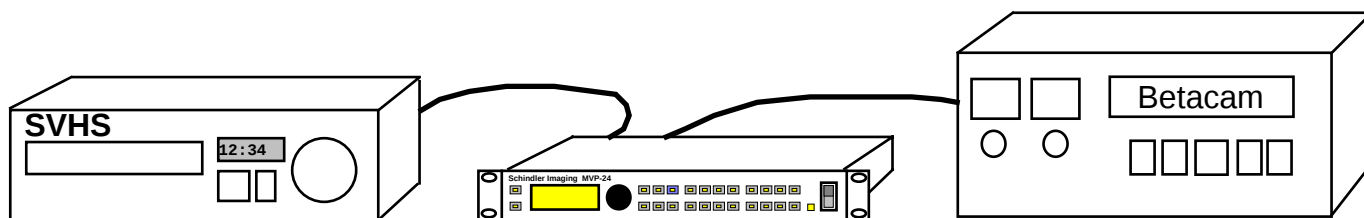


Figure 5. 30 FPS to 24 FPS videotape conversion.

The MVP-24X is being used for transferring a tape source at 30 FPS to 24 FPS for recording on a modified 24 FPS VCR. Note, in this application, the MVP-24X is also converting the SVHS input format to Component output format for the Betacam VCR.

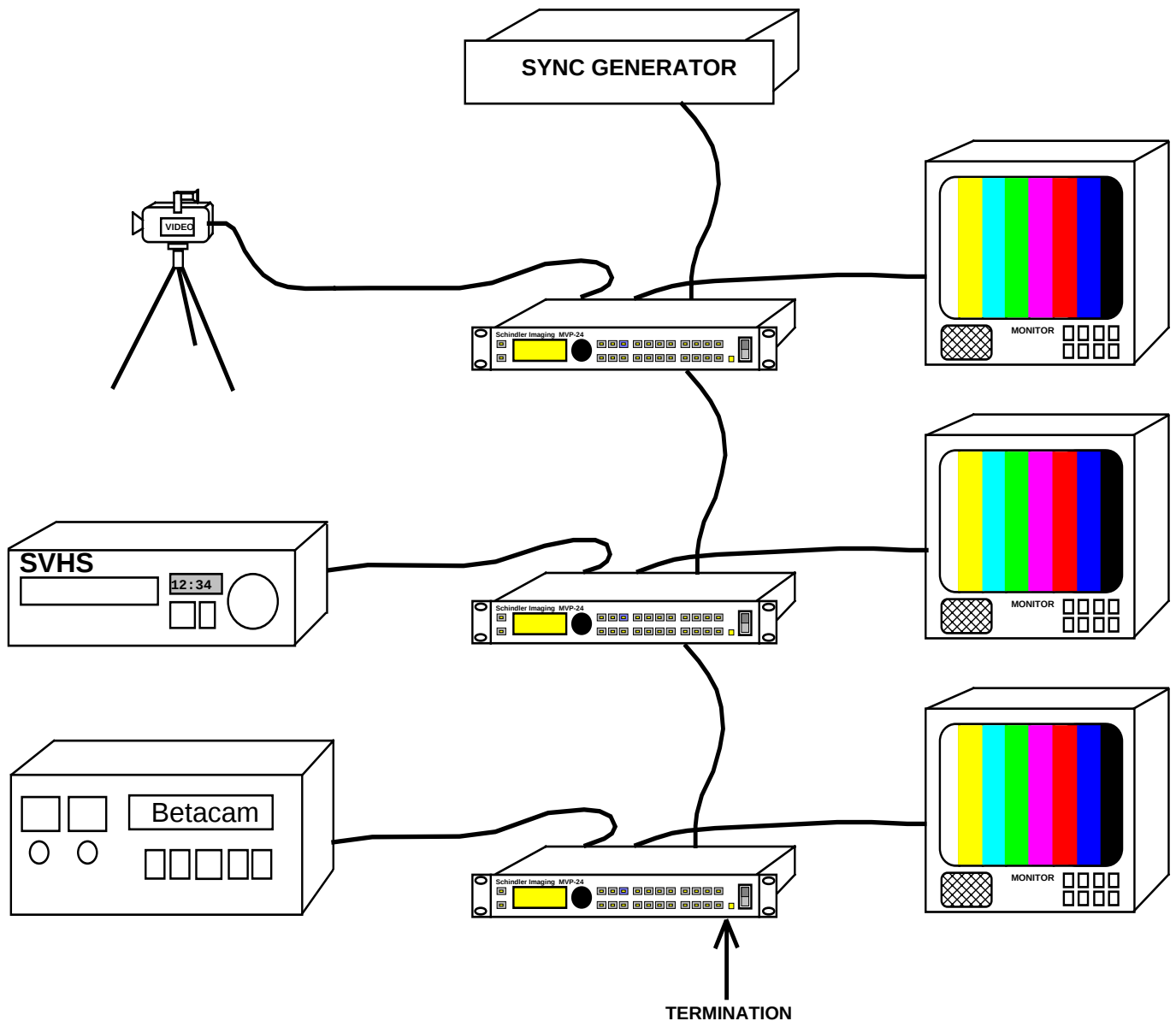


Figure 6. Multiple Displays or Video Walls.

Multiple MVP-24X units are being used for converting to 24 FPS as well as synchronizing all the monitors to the same reference. Either an external sync generator is used, or the first MVP-24X can be used as the reference.

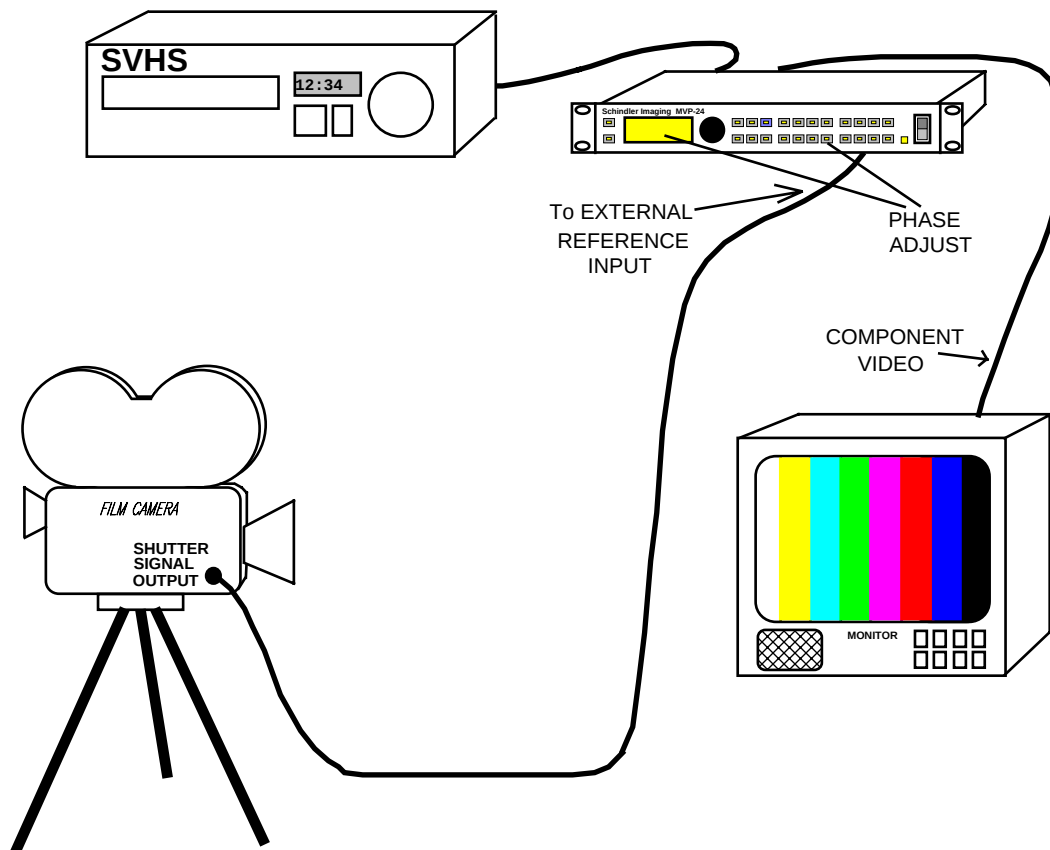


Figure 7. Single Camera without Sync Box.

The MVP-24X is being sync locked to the shutter signal produced by the film camera. Adjustment is made on the MVP-24X to phase the vertical blanking bar out of the picture while looking through the camera's view finder.

Note: If the shutter signal is created mechanically, color phase (tint) errors may occur in composite and Y/C outputs. For mechanical shutter signals, it is recommended to use component video as the output format.

SECTION 4

OVERVIEW OF 24 FPS VIDEO PLAYBACK

4.1 INTRODUCTION

There are three factors that affect the camera's ability to film a television monitor; the frame rates of the camera and monitor, the phase of the camera's shutter and the monitor, and the shutter angle of the camera. What follows is a simplified description of these factors.

4.2 FRAME RATES

The frame rate of a film camera is typically 24 Frames Per Second (FPS), while a television's frame rate is 30 FPS (for NTSC). When a 30 FPS television is filmed with a 24 FPS camera the result is a picture with light and dark horizontal bands that roll through the picture. This is caused by the shutter's exposure time not equaling the video's scanning time. Figure 8 below, demonstrates this phenomenon.

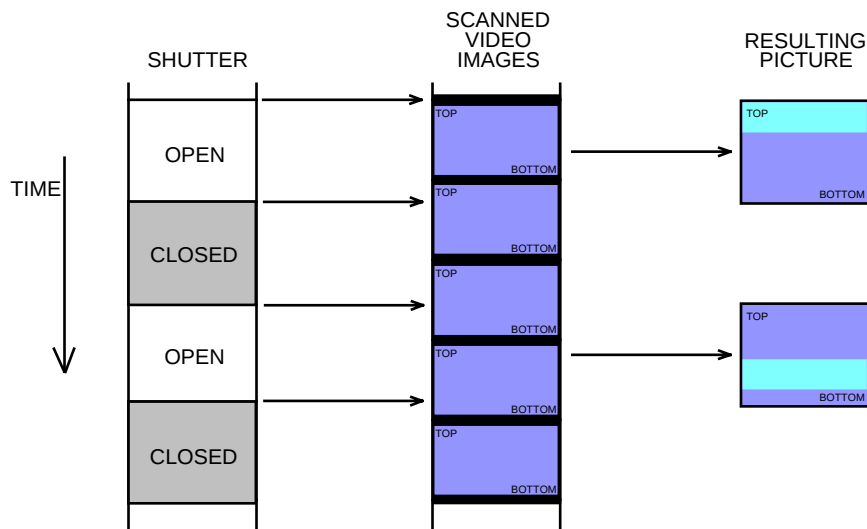


Figure 8. 24 FPS Camera filming a 30 FPS video.

As can be seen from figure 8, when the camera's shutter opens, one and a fraction video images are exposed to the film. The overlapping portion of the video image becomes double exposed, thus producing a light band in the image. Since each succeeding shutter opening occurs at different places in the video, the band appears in different locations in the picture. The final result is a light band that appears to move or roll through the picture.

If the video's frame rate is made equal to the film camera's 24 FPS rate, then exactly one whole image can be exposed on the film, thus eliminating the problem.

4.3 SHUTTER PHASE

Once the video's frame rate is made equal to the camera's frame rate, then the phases of the camera's shutter and the monitor become important. It will be assumed that the camera's shutter is open 50% of the time and closed the other 50%. Because the time period of one shutter opening equals one video image, one complete picture will always be exposed onto the film with no light or dark bands. However, depending on the phase of the shutter with respect to the video, the exposed picture may actually be made of portions of different video images. This becomes a problem when there is motion in the video image. Figure 9 demonstrates the effects of shutter phase and motion.

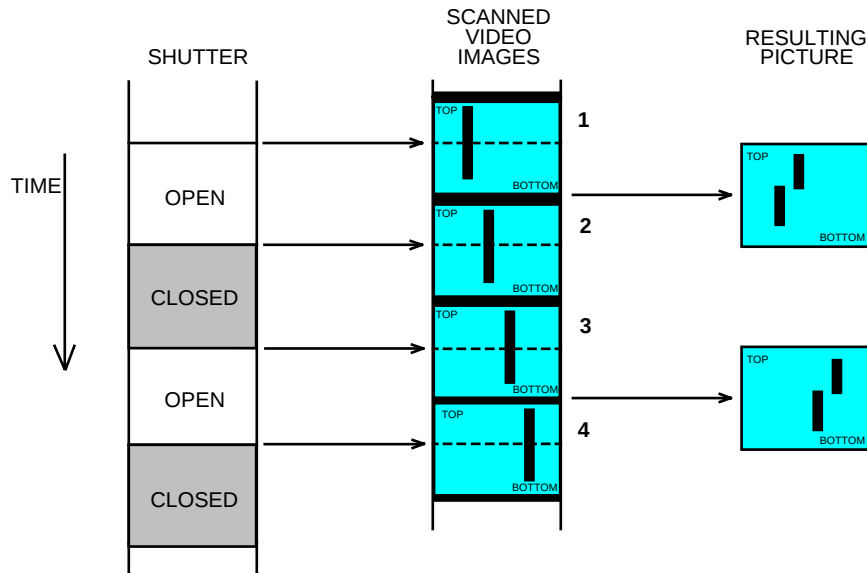


Figure 9. Effect of phase difference on motion.

In figure 9, the sequence of video images shows an object moving left to right. The time that the shutter opens is occurring in the middle of a video image. The film will become exposed with the bottom portion of image 1 and the top portion of image 2. This results in a picture where any objects in motion may be split in half.

The preceding example demonstrated a 90 degree phase difference between the shutter and the video image. If the phase of the camera's shutter or the phase of the video image can be adjusted to bring these two into alignment (or 0 degrees), then a whole picture without motion splitting will be produced.

4.4 SHUTTER ANGLES

The preceding discussion assumed that the camera's shutter was open 50% of the time and closed the other 50%. This 50/50 condition is referred to as a 180 degree shutter angle.

Referring back to figure 9, it was seen that with a 180 degree shutter angle, one whole picture was produced from two halves (even though there were motion artifacts). This worked because the time of the shutter opening was exactly the time of one video image. If the shutter angle is now changed to 51% open and 49% closed (~184 degrees), then the open time is now greater than one video image. This will result in one and a fraction video images being exposed onto the film. If the shutter and the video image are not in alignment (as in figure 9), then a light horizontal band will be produced in the middle of the picture. Figure 10a demonstrates this effect.

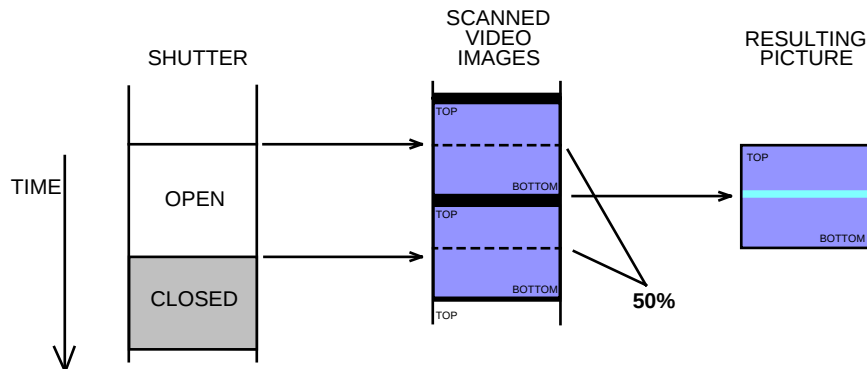


Figure 10a. Example of shutter angle > 180 degrees.

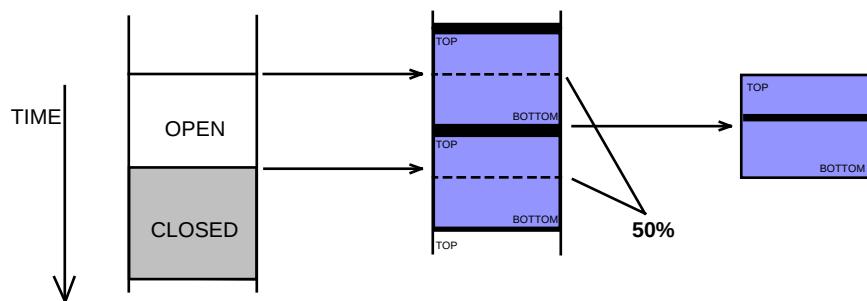


Figure 10b. Example of shutter angle < 180 degrees.

In Figure 10a, the shutter angle is greater than 180 degrees. As can be seen from this example, a small portion of the image is seen by the film twice, double exposing it and creating a light horizontal band in the picture. Conversely, figure 10b demonstrates the condition when the shutter angle is less than 180 degrees. In this case a small portion of the image is never seen by the film, thus leaving a black horizontal band in the picture. It should be apparent that the larger the shutter angle differs from 180 degrees, the larger this banding artifact is.

If the examples in figures 10a and 10b were aligned so that the shutter opening occurred at the top of the video image (shutter phase equals 0 degrees), then this banding artifact goes away. This is due to the video image's blanking interval.

In a television system, the image is scanned from the top left corner down to the bottom right corner. The television then requires time to move back to the top so it can begin another scan. During this time, the video signal is blanked, so that no light appears at the output of the television's picture tube. This time is referred to as the blanking interval.

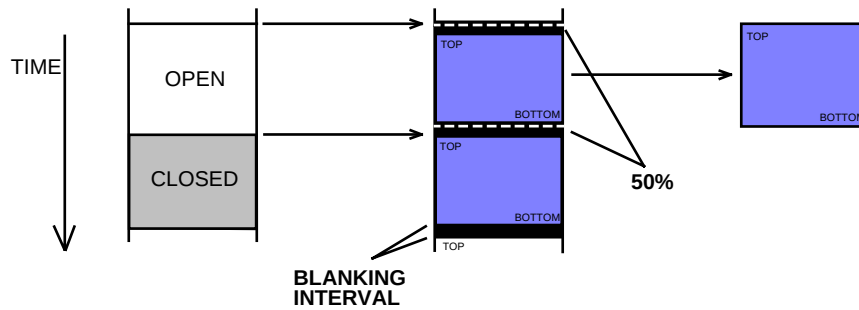


Figure 11. Example of shutter angle > 180 degree, with 0 degrees of shutter phase.

Figure 11 demonstrates the condition when the shutter and the image are in alignment. Even though the shutter angle is greater than 180 degrees, the area of the image that would be double exposed is now blanked. The result is a perfect picture.

It should be noted that the blanking interval of a standard video image is approximately eight percent. This means that the shutter angle must not differ from 180 degrees by more than the 8 percent (14 degrees) or else a visible artifact will occur. The phase stability and frequency tolerance of the system also become more critical as the phase difference approaches the 8 percent.

SECTION 5

HELPFUL TIPS AND SUGGESTIONS

5.1 INTRODUCTION

The MVP-24X comes equipped with many features to help with the varying demands of video playback. This section offers suggestions on various configurations and the use of the MVP-24X's special features to simplify the task of video playback.

5.2 MONITORS

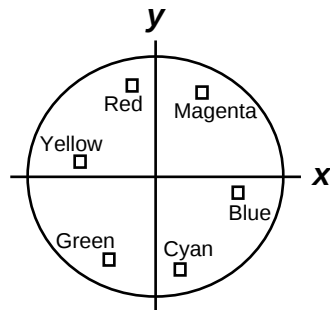
The selection of the video monitor is very important, and unfortunately this choice is often made by set designers or directors with little thought to the logistics involved in making it work. The MVP-24X has several features that were designed for this situation.

- | | | | | | | | | | | |
|------------------------|--|--|------------------------|--------------------------------------|-------------|------------------------------------|-----------|-------------------------------------|--------------|--|
| 5.2.1 | VERTICAL LOCK REQUIREMENT | There is one important requirement of the monitors used, they must be able to vertically lock to a 24 FPS video signal . Most older monitors which have a vertical hold control will most likely have a range large enough to lock up. However, newer televisions and monitors having a digital locking circuit with no controls might not be able to lock at 24 FPS. These monitors must be modified in order to be used. | | | | | | | | |
| 5.2.2 | VIDEO FORMAT | <p>The MVP-24X produces various output formats to feed to the monitor depending on what the monitor is capable of receiving.</p> <table border="0"><tr><td>Component (YRB or RGB)</td><td>- produces the best quality picture.</td></tr><tr><td>Y/C or SVHS</td><td>- produces a high quality picture.</td></tr><tr><td>Composite</td><td>- the standard format for monitors.</td></tr><tr><td>RF Channel 3</td><td>- used for televisions without video inputs.</td></tr></table> | Component (YRB or RGB) | - produces the best quality picture. | Y/C or SVHS | - produces a high quality picture. | Composite | - the standard format for monitors. | RF Channel 3 | - used for televisions without video inputs. |
| Component (YRB or RGB) | - produces the best quality picture. | | | | | | | | | |
| Y/C or SVHS | - produces a high quality picture. | | | | | | | | | |
| Composite | - the standard format for monitors. | | | | | | | | | |
| RF Channel 3 | - used for televisions without video inputs. | | | | | | | | | |
| 5.2.3 | SIZE & CENTERING CONTROLS | <p>The MVP-24X has controls which allow the video image to be resized to match the monitor being used. This could save time when presented with a monitor which is still calibrated for standard NTSC. A "Sizing Chart" test signal is provided for making these adjustments to ensure the correct aspect ratio of the image.</p> <p><i>See section 2.3.5 for more information.</i></p> | | | | | | | | |
| 5.2.4 | LEVEL (PROC AMP) CONTROLS | <p>Level controls allow the brightness, contrast, color saturation, and tint to be adjusted to compensate for the monitor.</p> <p><i>See section 2.3.4 for more information.</i></p> | | | | | | | | |
| 5.2.5 | SHARPNESS | <p>The Horz and Vert Sharpness feature can be used to improve the sharpness on low resolution monitors.</p> <p><i>See section 2.3.6 for more information.</i></p> | | | | | | | | |
| 5.2.6 | COLOR TEMPERATURE | (See following section). | | | | | | | | |

5.3 COLOR TEMPERATURE

The color temperature of television monitors must be adjusted to match the ambient lighting in the scene being filmed. It is possible to individually adjust each monitor's screen controls to set them to the proper temperature, however this would be difficult to do on the set and it could not be performed quickly. The solution has been to use color correction devices to alter the colorimetry of the video signal instead of the monitors. The MVP-24X has built in color correction controls as well as 3200, 4800, and 5500 degree presets* which can be used for this purpose.

- | | | |
|-------|--------------------|---|
| 5.3.1 | COLOR CORRECTION | Pressing the COLOR CORRECT button (alone) will enable or disable the color correction and balance settings. |
| 5.3.2 | COLOR TEMP PRESET* | Using the "Color Temp Preset" menu (see section 2.4.5) load pre-defined settings for a user defined or 3200, 4800, or 5500 degree temperature picture. |
| 5.3.3 | ADJUSTMENTS | Menu controls are used to adjust "Color Correction" and "Color Balance". The adjustments work on the x and y axis of the color circle as viewed with a NTSC vector scope. |



CW (+)  = x axis moves right (more blue)
y axis moves up (more red)

CENTER (0) = no color added

CCW (-)  = x axis moves left (more yellow)
y axis moves down (more cyan)

COLOR CORRECTION controls only add color to the white or lighter areas of the picture.

COLOR BALANCE controls add color to all intensities equally, including black or darker areas of the image.

- | | | |
|-------|--------------|--|
| 5.3.4 | TEST SIGNALS | The built in test signal generator contains various grayscale patterns to assist with color temperature adjustments. |
| 5.3.5 | PROCEDURE | Using a color temperature meter along with the "grayscale steps" test signal, first adjust the COLOR BALANCE controls for the proper temperature in the black or dark steps looking at the monitor. Second, adjust the COLOR BALANCE controls for the proper temperature in the white steps. |
| 5.3.6 | EFFECTS | By using the MONOCHROME control to turn off color, a black and white security-cam look can be achieved while maintaining proper color temperature so that the filmed image turns out truly black and white.

By exaggerating the color correction controls with color turned off, a sepia or tinted monochrome effect is also possible. |

* The Color Temp presets are correct assuming the monitor has been properly calibrated for the television standard of 6500 degree color temperature.

5.4 SYNCHRONIZATION

For proper setup, the Camera(s) and the monitor(s) must be synchronized. This is typically done by supplying a master reference to all the cameras and video equipment used. (See Figures 4 - 7 in Section 3 for typical applications).

- | | | |
|-------|---|---|
| 5.4.1 | MVP-24X AS
MASTER
REFERENCE | The MVP-24X has an internal sync generator which may be used for the master reference. The MVP-24X generates Vertical Drive, Frame, and composite sync signals to synchronize other equipment. |
| 5.4.2 | SINGLE CAMERA
AS REFERENCE | <p>For single camera shots, it is possible to use the shutter signal from the camera as the master reference. This eliminates the need and expense for a camera sync box. The MVP-24X(s) will receive the camera's frame or V-drive signal and synchronize the video monitor(s) to it (See Figure 7).</p> <p>Note: If the shutter signal is created mechanically, color phase (tint) errors may occur in composite and Y/C outputs. For mechanical shutter signals, it is recommended to use component video as the output format.</p> |
| 5.4.3 | GENLOCKING:
NO NEED FOR
BLACK BURST | Unlike most video converters which require a black burst video signal for genlock, the MVP-24X will lock to most anything. The MVP-24X only requires a vertical signal which can be in the form of Vertical Drive, Frame square wave, Composite horizontal and vertical sync, Black burst, or even High Def 1080sF tri-level sync. The MVP-24X will also generate all of the above regardless of the form of the input (see section 2.3.7d and e). This eliminates the need and expense for miscellaneous sync converter boxes. |

5.5 PHASING THE CAMERA'S SHUTTER

It is important to vertically phase the camera with the monitors to eliminate any artifacts. As described in section 4.3 (Overview of 24 FPS Playback) even if the shutter angle is 180 degrees there can still be motion splitting if the camera and monitor are not in alignment. Traditionally, the camera is phase aligned by looking through the view finder and adjusting camera phase until the artifact is out of the picture. This can be difficult if the shutter angle is exactly 180 degrees because it will be difficult to see the artifact. The MVP-24X has Test Signals to simplify this task.

- | | | |
|-------|---|---|
| 5.5.1 | PHASING USING
A SYNC BOX | For multiple camera shots, it's usually required that each camera have its own synchronizer box. This allows the shutter phase of each camera to be adjusted with respect to a reference. This reference can be a master sync generator, or the MVP-24X. The camera sync box will have a phase control which will be used to vertically phase the camera. |
| 5.5.2 | SINGLE CAMERA
PHASING USING
THE MVP-24X | For single camera shots, it is possible to lock the MVP-24X(s) to the shutter signal from the camera, and eliminate the camera sync box (see Figure 7). In this configuration, the monitor will be phase adjusted instead of the camera. The procedure is similar, except the "Vertical Phase" control menu (see section 2.3.8b) on the MVP-24X is used to make the adjustment. |

5.5.3 TEST SIGNAL:
F1-BLU/F2-YEL

The MVP-24X generates a special test signal for the purpose of phasing the camera with the monitor ("F1-BLU/F2-YEL"). It is a field alternating signal that appears to the eye as a gray flashing image. The signal is really blue in field one, and yellow in field two. Since the camera shutter sees only 50% of the picture (at 180 degrees), it will only see one of the two fields. When phased correctly, the shutter will either see an all blue or an all yellow picture. If shutter phase is not correct, there will be a split image that is half blue and half yellow.

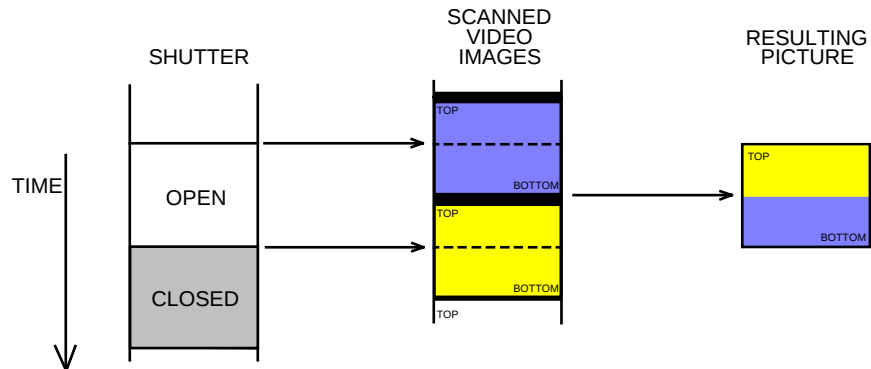


Figure 12a. Vertical Phase at 90 degrees.

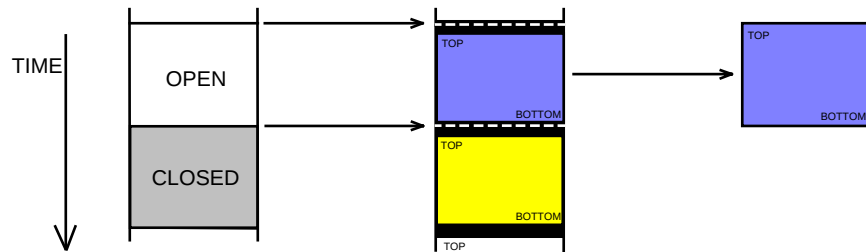


Figure 12b. Vertical Phase at 0 degrees.

5.5.4 FIELD MODE:
"field1/black"

The MVP-24X has a special field mode called "field1/black" which displays only field 1, and blanks out field 2 (see section 2.4.8). This mode can be used to help "phase" the camera's shutter. When the MVP-24X's FIELD MODE is enabled and configured for "field1/black", field one is displayed, but field two is blanked. When viewing the image through the camera's view finder, a whole picture will only be seen when the phase is 0 degrees.

Note: If FIELD MODE:(field1/black) is to be used during actual filming, it is important to know how the view finder works. On some cameras, the view finder is seeing the image during the non-exposure time. A mirror either directs light to the film or to the view finder. If this is the case, then the image seen through the view finder is not the image being recorded on film. A black picture could result as the final filmed image. A test should be made to determine this, before using this FIELD MODE on a production.

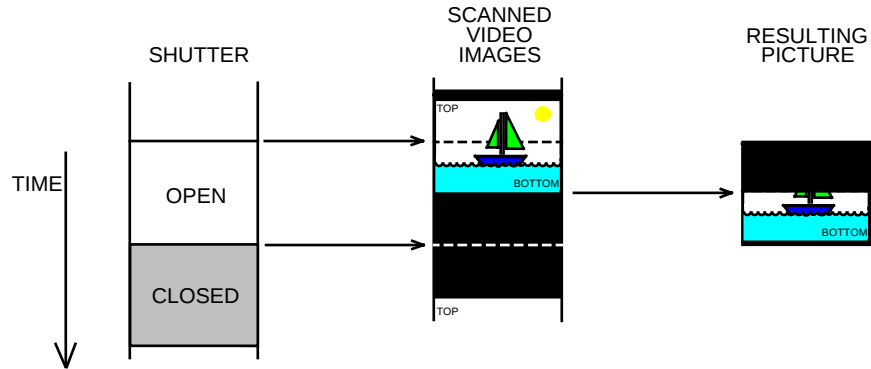


Figure 13a. Field Mode (field1/black): Vertical Phase at 90 degrees.

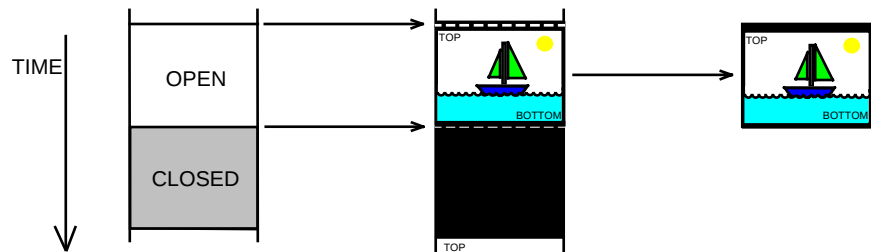


Figure 13b. Field Mode (field1/black): Vertical Phase at 0 degrees.

5.6 WIDE CAMERA SHUTTER ANGLES (>> 180 degrees)

In order to film standard 24 FPS video, the camera shutter angle needs to be approximately 180 degrees. Often times however, larger shutter angles are desired or required by the director. Using the MVP-24X, it is possible to increase the shutter angle and still avoid any artifacts in the picture.

As explained earlier (section 4.3, Overview of 24 FPS playback), the blanking interval of the video signal allows some variance of the shutter angle when the phase of the shutter is at 0 degrees. By increasing the blanking interval, larger shutter angles can be achieved.

5.6.1 CALCULATING RANGE OF SHUTTER ANGLES

Standard 24 FPS video has 300 active lines of picture information per field (1/2 frame) of video, and 655 lines in the complete frame. It can be seen that $300 / 655 = 0.458$ or 45.8%. 45.8% of 360 degrees is 164.9 degrees, which is the minimum shutter angle required to capture the whole image. It can also be seen that $(655-300) / 655 = 0.542$ or 54.2%. 54.2% of 360 degrees is 195.1 degrees, which is the maximum shutter angle before the second field image begins to be exposed.

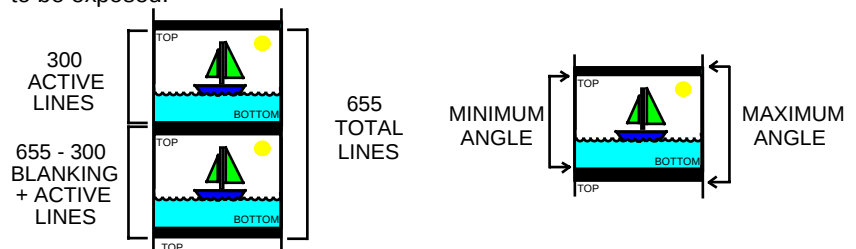


Figure 14. Calculation of shutter angles for normal blanking.

5.6.2 INCREASE SHUTTER ANGLE BY RESIZING IMAGE

One method to get larger shutter angles is to increase the blanking interval by reducing the vertical image size. The MVP-24X has VERTICAL SIZE and CENTER controls which can be used for this purpose. The minimum size the image can be reduced to is 50%, or 150 active lines per field (1/2 of 300 lines/frame). Calculating the maximum shutter angle yields: $(655 - 150) / 655 = .771$ or 77.1%. 77.1% of 360 degrees is 278 degrees.

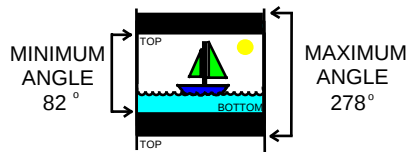


Figure 15. Maximum shutter angle by reducing vertical size.

Once the image has been sized to achieve the desired shutter angle, the picture will probably look compressed when viewed on the monitor. Using the monitor's Vertical Size and Centering controls, adjust the monitor to correct the picture's aspect ratio back to normal (use the "Sizing Chart" built-in test signal).

5.6.3 INCREASED SHUTTER ANGLE BY USING FIELD MODE: "field1/black"

Another method to increase the shutter angle, is to use FIELD MODE: "field1/black" (see section 2.4.8). In this mode all of field 2 is blanked. This has the effect of increasing the blanking interval by over 300 lines. This would theoretically allow for a 360 degree shutter angle. $(655 - 0) / 655 = 1.0$ or 100%. 100% of 360 degrees is 360 degrees.

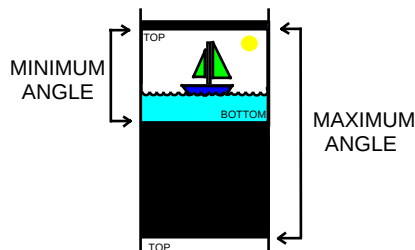


Figure 16. Maximum shutter angle by using FIELD MODE: "field1/black".

Note: If FIELD MODE:(field1/black) is to be used during actual filming, it is important to know how the view finder works. On some cameras, the view finder is seeing the image during the non-exposure time. A mirror either directs light to the film or to the view finder. If this is the case, then the image seen through the view finder is not the image being recorded on film. A black picture could result as the final filmed image. A test should be made to determine this, before using this FIELD MODE on a production.

SECTION 6

VGA INPUT PROCESSING

6.1 INTRODUCTION

The MVP-24X is a digital processing unit. In order to process analog signals, the MVP-24X must first convert the signal from analog to digital. This is achieved by a method called "digital sampling". The analog signal is "sampled" every pixel time, and that sample is converted into a number representing the magnitude (brightness) of that pixel. The following sections describe the steps involved in accurately sampling the VGA input to produce the best possible picture.

6.2 VGA INPUT SIGNALS

It is often said that the only standard for VGA signals is that there is no standard. Since there are no exact standards, manufacturers are free to use whatever timing works best for them. As a result, each VGA card manufactured can produce different signal timings for the same resolution, causing large variations in picture position from card to card.

In order to successfully sample a VGA image, the exact horizontal and vertical positions must be known. If the exact position cannot be determined, part of the image might not be sampled, resulting in a cropped picture. Because of the variations of input positions, the MVP-24X employs a "Capture Window" and an "AUTO" positioning algorithm to accurately sample the image.

6.3 VGA CAPTURE WINDOW

When a new signal is applied to the VGA input, the MVP-24X analyzes the horizontal and vertical frequencies of the signal to determine what its resolution is. Based on pre-programmed tables for each resolution, the MVP-24X is able to nominally sample the input signal. A capture window is then produced which is the nominal position settings +/- 5%.

6.4 AUTO POSITIONING

If the MVP-24X is operating in "Auto" mode, it analyzes the sampled image to find the outside edges of the picture. If each of the four edges (left, right, top and bottom) land inside the capture window, the MVP-24X will "Auto" size and position the image to these four edges. Once the "Auto" mode has locked, it will remain with those settings until a new input is detected.

The "Auto" mode requires that the VGA's picture does not have any black information on any edge (left, right, top and bottom). If there is black information on a picture edge (often caused by a screen saver, or Video), the "Auto" mode may incorrectly position or resize the image. (Note: if all edges are not detected within the capture window, auto-positioning does not occur, and the previous settings are retained).

6.5 HORZ AND VERT POSITION CONTROLS

Two menus are provided to control the position of the sampled picture:
"VGA In Horz Position" and "VGA In Vert Position"

In "Auto" mode, these menus indicate the position values determined by the "Auto" positioning algorithm.

These menus can also be used to override the "Auto" mode and manually position the image. "Manual" mode is provided to allow the operator to adjust the position when the "Auto" mode has not positioned the image correctly based on the image content.

Pushing on the Knob will change the mode from "Auto" to "Manual" and vice-versa.

When switching to "Manual" mode the last "Auto" position values are maintained to allow the user a starting point for adjusting the position. Switching back to "Auto" from "Manual" will restart the "Auto" position algorithm.

6.6 SAMPLE PHASE (SHARPNESS)

VGA cards often drive their outputs directly from a DAC (Digital to Analog Converter). This produces a signal with a “stair-step” component to it (see figure 17a). This is different than traditional video processing which filters the DAC outputs to produce a smooth linear signal (see figure 17b).

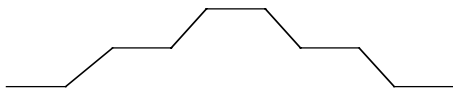


Figure 17a.
Example of VGA “stair-step” signal



Figure 17b.
Example of Video “linear” signal

Because of this “stair-step” signal the position of each sample (or “sample phase”) is very important in producing a clear sharp image (see figures 18a and 18b). The sample phase is given in degrees, and represents the sample position within one pixel period (the time period between each pixel).

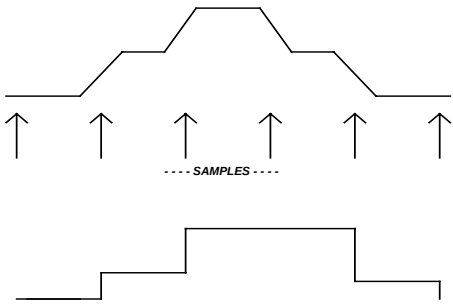


Figure 18a.
Example of incorrect sampling phase (distorted)

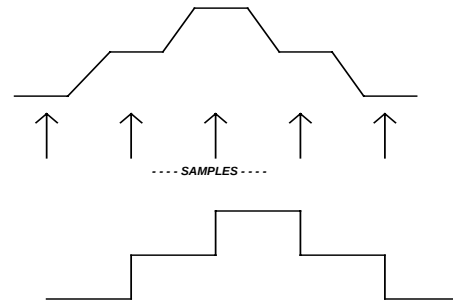


Figure 18b.
Example of centered sampling phase (sharp)

In order to achieve an accurate sample of the VGA image, sampling must be performed near the center of each step. If instead, the sample occurs near the steps' transitions, incorrect samples will be taken resulting in a distorted or blurred picture.

6.7 AUTO SAMPLE PHASE

If the MVP-24X is operating in “Auto” phase mode, it analyzes every pixel of the sampled image at every sample phase position, and determines the best sample phase. Once the “Auto” mode has locked, it will remain with that phase setting until a new input is detected.

6.8 SAMPLE PHASE CONTROL

A menu is provided to control the sampling phase: “VGA In Sample Phase”

In “Auto” mode, this menu indicates the phase value determined by the “Auto” phase algorithm.

This menu can also be used to override the “Auto” mode and manually adjust the sample phase. “Manual” mode is provided to allow the operator to adjust the phase when the “Auto” mode has incorrectly phased the image.

Pushing on the Knob will change the mode from “Auto” to “Manual” and vice-versa.

When switching to “Manual” mode the last “Auto” phase value is maintained to allow the user a starting point for adjusting the phase. Switching back to “Auto” from “Manual” will restart the “Auto” phase algorithm.

6.9 UNIVERSAL LOCK

The MVP-24X relies on pre-programmed tables to define nominal timing information for all common resolutions. These tables allow the system to recognize and lock to signals such as 1024x768 @ 60Hz.

Rarely a non-standard signal might be applied for which there is no table. Normally, the MVP-24X would not be able to identify or lock to this signal. However with version x1.10, a new "Universal Lock" feature has been added that allows the MVP-24X to still display an image based on the input signal.

The NEW Universal Lock feature must determine the following parameters to achieve lock:

6.9.1	HORZ RESOLUTION	It is first decided that the horizontal sampling will be 1024 pixels per line. This value is chosen simply because it happens to be the native resolution of the MVP-24X and any other number of pixels would be scaled to 1024 eventually.
6.9.2	HORZ OVERSCAN	Since the signal is unknown, the horizontal position of the image cannot be determined. To compensate, the picture size is assumed to be 10% larger than actually expected. This should prevent any cropping of the sampled image.
6.9.3	VERT RESOLUTION	By analyzing the sync signals of the unknown input, the total number of vertical lines can be determined. From that value the vertical resolution of the image is approximated, again using a 10% overscan approach to prevent cropping.
6.9.4	PIXEL CLOCK	By combining the measured frame rate and total vertical lines, and the estimated horizontal samples, a pixel clock can then be calculated

If all these parameters are successfully determined and the results are within the operating range of the hardware, then a stable picture should result.

Once the signal has locked, the user may need to manually adjust the "**VGA In Horz Position**" and "**VGA In Vert Position**" controls to center the image (see section 6.5).

Note: This method is an approximation and the final image will be scaled to 1024x768. Therefore the resulting picture may not be as sharp as the original signal.

SECTION 7

HIGH DEFINITION VIDEO PROCESSING

7.1 INTRODUCTION

The MVP-24X has been programmed to recognize and process High Definition RGB Video signals through the VGA inputs. Based on the signal's timing, the MVP-24X identifies 720p and 1080i as video signals and alters the processing (such as "Auto" positioning controls – see *section 6*) to accommodate them. In addition, spatial de-interlacing is performed on the 1080i analog input.

**NOTE: The maximum resolution of the MVP-24X is 1024x768.
Therefore 720p will be converted to 1024x720, and 1080i will be converted to 1024x540.**

7.2 ANALOG (RGB) INPUT REQUIREMENTS

The MVP-24X will only accept RGBHV signals (RGB + separate H & V sync).

It will NOT accept component video signals (the common format for most High Definition equipment).

It will NOT accept composite sync or sync on green.

7.3 DIGITAL (DVI) INPUT REQUIREMENTS

The MVP-24X will only accept non-HDCP (copy protection) signals.

It will only process RGB information and will NOT accept digital component signals.

1080i signals will not be de-interlaced but will pass directly as 540p.

7.4 SUGGESTIONS FOR USING HD SOURCES

To support standard HDTV devices, an analog component to RGBHV converter may be required.

The converter must convert the component video to RGB video, and it must convert the video's tri-level sync to separate H and V sync signals.

A simple analog converter is recommended since it will not add any delay to the signal.

Schindler Imaging Inc. has tested a converter by **Key Digital:**

ClearVideo3 – Component Video to VGA Video Adapter, KD-CTCA3

Note: DIP switches 1 and 2 must be set to ON for H and V sync output.

Our testing found this unit works for 1080i 30 Fps, and 720p 60 Fps video.

However the sync signals are incorrect and will not work with the MVP-24X for 24 Fps, 25 Fps, 48 Fps and 50 Fps video.

APPENDIX A

SPECIFICATIONS

MVP-24X SPECIFICATIONS

VIDEO INPUTS:

	Composite-1	1.0 Vpp (including sync)	Vid1 / R-Y / R	BNC, 75Ω
	Y/C	(Y) 1.0 Vpp (including sync)	Y / Y / G	BNC, 75Ω
		(C) 700 mVpp	C / B-Y / B	BNC, 75Ω
or	YRB	(R-Y) 700 mVpp	Vid1 / R-Y / R	BNC, 75Ω
		(Y) 1.0 Vpp (including sync)	Y / Y / G	BNC, 75Ω
		(B-Y) 700 mVpp	C / B-Y / B	BNC, 75Ω
or	RGB	(Red) 700 mVpp	Vid1 / R-Y / R	BNC, 75Ω
		(Green) 700 mVpp or 1.0 Vpp w/sync	Y / Y / G	BNC, 75Ω
		(Blue) 700 mVpp	C / B-Y / B	BNC, 75Ω
		(sync – 4 wire) 300 mVpp thru 6 Vpp MAX	Vid2 / SYNC	BNC, 75Ω
	Composite-2	1.0 Vpp (including sync)	Vid2 / SYNC	BNC, 75Ω
	SVHS	(Y) 1.0 Vpp (including sync)	SVHS	4 pin mini-DIN, 75Ω
		(C) 700 mVpp		
	(OPTION)			
	SERIAL-D1	800 mVpp, Auto EQ to 300 meters (8281)	SERIAL-D1	BNC, 75Ω
	(OPTION)			
	DV In/Out	IEEE-1394 standard, 6 pin – Non Powered	1394 I/O	6-pin Molex
	Audio	(for RF modulator) 316 mV (-10 dBV)	AUDIO IN	BNC, 28KΩ
	GENLOCK	1.0 Vpp video (286 mVpp composite sync), or	GENLOCK	2 BNCs ,Hi-Z loop
	(External Ref)	+/- 3 Vpp min, 12 Vpp max Frame or Vertical Drive		

VGA INPUTS:

Analog RGB*	RGBHV = 700 mVpp RGB, TTL Horz and Vert Sync	VGA	HD-15 Male, 75Ω
	* Must have separate H and V sync signal. MVP-24X will not accept composite sync or sync on green.		
	VESA EDID version 1.3 - Plug and Play		
Digital DVI	165 MHz maximum – single link	DVI	DVI-D
	VESA EDID version 1.3 - Plug and Play		

Supported Input Resolutions :

640x480	@ 60,66,70,72,75,85,90,100,120 Hz
800x600	@ 56,60,70,72,75,85,90,100,120 Hz
1024x768	@ 60,70,72,75,85,90,100,120 Hz
1152x864	@ 60,70,75,85,100 Hz
1280x720	@ 60,75,85 Hz
1280x768	@ 60,75,85 Hz
1280x960	@ 60,70,72,75,85 Hz
1280x1024	@ 60,75,85 Hz
1600x1200	@ 60 Hz
1920x1080	@ 60Hz
HDTV-720p	@ 50,60 Hz
HDTV-1080i	@ 50,60 Hz

All specifications are subject to change without notice.

VIDEO OUTPUTS:

	Composite-1 Y/C	1.0 Vpp (including sync)	Vid1 / R-Y / R BNC, 75Ω
		(Y) 1.0 Vpp (including sync)	Y / Y / G BNC, 75Ω
		(C) 700 mVpp	C / B-Y / B BNC, 75Ω
or	YRB	(R-Y) 700 mVpp	Vid1 / R-Y / R BNC, 75Ω
		(Y) 1.0 Vpp (including sync)	Y / Y / G BNC, 75Ω
		(B-Y) 700 mVpp	C / B-Y / B BNC, 75Ω
or	RGB	(Red) 700 mVpp	Vid1 / R-Y / R BNC, 75Ω
		(Green) 1.0 Vpp w/sync	Y / Y / G BNC, 75Ω
		(Blue) 700 mVpp	C / B-Y / B BNC, 75Ω
	Composite-2	1.0 Vpp (including sync)	Vid2 BNC, 75Ω
	SVHS	(Y) 1.0 Vpp (including sync)	SVHS 4 pin mini-DIN, 75Ω
		(C) 700 mVpp	
	DV In/Out	IEEE-1394 standard, 6 pin – Non Powered	1394 I/O 6-pin Molex
	Sync Ref	(selectable) 150 mVpp, 500 mVpp, +2.5Vp, -2.5Vp	BNC, 75Ω
		(selectable) 300mVpp, 1.0Vpp, +5V TTL, -5Vp	Hi-Z
	FRM / V-Drive	(selectable) +2.5Vp, -2.5Vp	BNC, 75Ω
		(selectable) +5V TTL, -5Vp	Hi-Z

VIDEO 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
24.022 FPS	15.734KHz @ 655 lines
25.000 FPS	15.625KHz @ 625 lines
29.970 FPS	15.734KHz @ 525 lines
PAL / SECAM / PAL-N	
23.976 FPS	15.608KHz @ 651 lines
24.000 FPS	15.624KHz @ 651 lines
24.022 FPS	15.638KHz @ 651 lines
25.000 FPS	15.625KHz @ 625 lines
29.970 FPS	15.734KHz @ 525 lines

VGA OUTPUTS:

Analog RGB	700 mVpp RGB, TTL Horz and Vert Sync	VGA	2 x HD-15 Female, 75Ω
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VGA OUTPUT FORMATS:

640x480	@ 47.95, 48.00, 48.04, 50.00, 59.94, 71.93, 72.00, 72.07, 75.00, 89.91, 95.90, 96.00, 96.09, 100 Hz
800x600	@ 47.95, 48.00, 48.04, 50.00, 59.94, 71.93, 72.00, 72.07, 75.00, 89.91, 95.90, 96.00, 96.09, 100 Hz
1024x768	@ 47.95, 48.00, 48.04, 50.00, 59.94, 71.93, 72.00, 72.07, 75.00, 89.91, 95.90, 96.00, 96.09, 100 Hz
720p (1024x720)	@ 47.95, 48.00, 48.04, 50.00, 59.94

All specifications are subject to change without notice.

VIDEO PERFORMANCE

Composite, Y/C, SVHS Inputs:

Bandwidth	5.0 MHz
Signal Filter	Digital Adaptive 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%
Sampling	9 bit ADC 4:2:2, 13.5 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%
Sampling	10 bit ADC 4:2:2, 13.5 MHz

Luma of composite, Y and YRB/RGB Outputs:

Sampling	10 bit DAC 27MHz
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Chroma of composite, Y/C and SVHS Outputs:

Sampling	8 bit DAC 27MHz
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Processing:

CCIR 601 digital (internal 16 bit 4:2:2 limit)
Full Frame TBC. – Accepts non-interlace video
games, and Macrovision encoded sources.
Adaptive Progressive processing with 2 frame
motion filtering.

Residual time base error

+/- 15 nsec

Delay through unit

@ 24.000 FPS

approx. 1 frame +/- 1 field
(measured) 46ms or 2.75 fields on average

VGA PERFORMANCE

Analog RGBHV Input:

Sampling	8 bit ADC RGB, 158 MHz maximum
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Digital DVI Input:

Pixel Clock	165 MHz maximum
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Processing:

24bit digital RGB 100MHz maximum,
2 frame motion filtering.

Memory:

1024x768 maximum resolution

ENVIRONMENTAL

Power Supply

47 - 63 Hz, 85 -264 VAC auto ranging

Fuse

5x20mm **1.5 AMP** 250-Volt Fast Acting Fuse

Power Dissipation

60 Watts MAX

Operating Temperature

+32° F (0° C) to +113° F (45° C)

Operating Humidity

10% to 85% RH

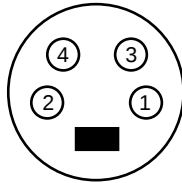
Dimensions

2.25 inches (with feet) x 14 inches x 19 inches

All specifications are subject to change without notice.

APPENDIX B

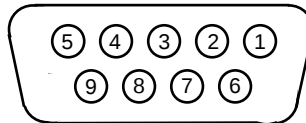
CONNECTOR PINOUTS



Rear Panel SVHS Pin out

SVHS INPUT AND OUTPUT

1	GND (Y)	3	Y
2	GND (C)	4	C



Rear Panel Remote Pin out

REMOTE – RS232 Configuration*

1	CD	4	DTR	7	RTS
2	RXD	5	GND	8	CTS
3	TXD	6	DSR	9	AUX

REMOTE – RS422 Configuration*

1	GND	4	GND	7	RXB
2	RXA	5	AUX	8	TXA
3	TXB	6	GND	9	GND

*REMOTE CONFIGURATION

The Remote PORT is configurable by a switch on the back panel.

APPENDIX C

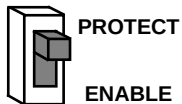
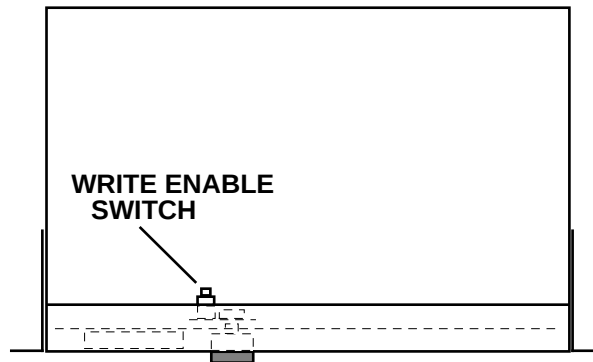
WRITE ENABLE SWITCH

WRITE ENABLE SWITCH

The MVP-24X has a write enable switch inside the chassis. This switch enables or disables any menus which store information, such as presets.

The switch is located inside the chassis, behind the front panel knob.

To access the switch, remove the top cover of the chassis.
Locate the switch by referring to the figure below.



When the switch is in the up position, it is configured for Write Protect.



When the switch is in the down position, it is configured for Write Enable.

