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KAM-XM-SERIES
HD UDC/UPC/UNC/DNC/UGC MODULES

Instruction Manual

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KAM-XM-SERIES Instruction Manual

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Preface

About This Manual

This manual describes the features of a specific 2000 Series module in the Kameleon Media Processing System. As part of this module family, it is subject to Safety and Regulatory Compliance described in the 2000 Series frame and power supply documentation (see the *2000 Series Frames Instruction Manual*).

KAM-XM Series Up/Down Conversion Modules

Introduction

This manual covers installation, configuration and operation of the following Kameleon KAM-XM Series modules:

- KAM-XM-UDC – HDTV Up/Down Converter

- KAM-XM-UPC – HDTV High Quality Up Converter

- KAM-XM-UNC – HDTV Up Converter with Advanced SDTV Noise Reduction

- KAM-XM-UCG – HDTV Character Generator Quality Up Converter

- KAM-XM-DNC – HDTV Down Converter

Module functionality is summarized in Table 1.

Table 1. KAM-XM Up and Down Converter Module Summary

Function	KM-XM-UDC	KM-XM-UPC	KM-XM-UNC	KM-XM-UGC	KM-XM-DNC
Aspect Ratio Control	X	X	X	X	X
Proc Amp Adjustments (for video processing)	X	X	X	X	X
Color Space Conversion	X	X	X	X	X
Detail Enhancement	X	X	X	X	X
Spike Filter (Adaptive Median filtering)	X		X		
Brickwall Filter	X		X		
Temporal Recursive Filter (Auto or Manual mode)	X		X		
GPI Control (3 external GPI inputs controlling presets)	X	X	X	X	X
Color Legalizer Control	X	X	X	X	X
First 2 audio groups of HD video are re-embedded into SDI stream.					X
First 2 audio groups of SDTV video re-embedded into HD output stream with compensating delay.	X		X		
Re-insertion of Closed Caption data into HD output stream.		X	X		

The KAM-XM Up/Down conversion series modules also feature:

- Proprietary Teranex™ PixelMotion™ De-interlacing,

- Support of SD and HD video with embedded audio, including Dolby-E,

- Hot-swap capability,

- Operates in the same frame with other 2000 and Kameleon modules,

- Three external GPI inputs to trigger selectable Preset 1-10 registers,

- Network control with the Newton Control Panel or Kameleon web control, and

- Support of NetConfig™ configuration tool and NetCentral™ SNMP-based monitoring system.

Module Descriptions

Each KAM-XM module uses the same circuit board with the application software enabled for the particular module type. The module type is identified by a sticker on the circuit board and the Model name is identified in the web page header. For up/down conversion rates supported, refer to .

The modules described in this manual include the following:

- KAM-XM-UDC – supports broadcast quality up and down conversion of SD and HD video with embedded audio with the standard conversion controls. In addition, it also offers noise reduction controls with adaptive median spike, brickwall, and temporal recursive filters. This application utilizes de-interlacing on a pixel-by-pixel basis for preserving fine detail from the original image. Down conversion offers an anti-aliasing filter.

- KAM-XM-UNC – supports broadcast quality HD up conversion for SDI video with or without embedded audio with the standard conversion controls. In addition, this module also offers advanced noise reduction with adaptive median spike, brickwall, and temporal recursive filter controls. This application utilizes de-interlacing on a pixel-by-pixel basis for preserving fine detail from the original image.

- KAM-XM-UPC – supports broadcast quality HD up conversion for SDI video with or without embedded audio with the standard conversion controls. This application utilizes de-interlacing on a pixel-by-pixel basis for preserving fine detail from the original image.

- KAM-XM-UCG – a high quality SDTV character generator up converter with the standard up conversion controls that performs de-interlacing on a field by field basis depending on the amount of motion in the material.

- KAM-XM-DNC – this broadcast quality down converter application also utilizes de-interlacing on a pixel-by-pixel basis. Once the image has been de-interlaced and down converted, detail enhancement can be applied to the image to further shape the output. The first two groups of audio from the HD video are re-embedded into the standard definition SDI video signal.

Supported Up/Down Conversion Rates

The modules support the conversion rates summarized in Table 2.

Table 2. Format Conversion Input/Output Combinations

Input Format	Output Format	KAM-XM-				
		UNC	**UPC**	**UCG**	**DNC**	**UDC**
480i59.94	480i59.94	X	X	X		X
480i59.94	720p59.94	X	X	X		X
480i59.94	1080i59.94	X	X	X		X
576i50	576i50	X	X	X		X
576i50	720p50	X	X	X		X
576i50	1080i50	X	X	X		X
720p50	576i50				X	X
720p59.94	480i59.94				X	X
1080i50	576i50				X	X
1080i59.94	480i59.94				X	X

System Requirements

Operation of the KAM-XM modules in 2000 Series frames has the following hardware and software requirements:

- Modules must be installed in a 2000T1DNG or 2000T3DNG Kameleon 2000 Series frame containing a a 2000GEN module.

- The frame must have a 2000NET module with assembly number 671-5231-01 or later running software version 3.2.2 or later.

Note   These requirements are necessary for proper cooling support and interface to the Newton Control Panel configuration, NetConfig and GUI control, and SNMP monitoring.

Existing Kameleon frames can be upgraded with the necessary modules and software for proper operation. Contact your sales representative for more information.

All KAM-XM module sets require two vertical module slots of frame space. Frame density for the 1 RU frame is two module sets and six module sets for a fully stuffed 3 RU frame. Both dual and single height Kameleon and 2000 modules can be mixed in the frames.

Quick Start Guide

This Quick Start Guide is provided for an overview of installing the KAM-XM modules. Each step gives you a link to a more detailed description of each process.

1. Install the KAM-XM modules in the 2000 Kameleon frame. Install the XM-IO-1 Rear module first, then install the front module in the corresponding front slot (*Module Placement in the 2000 Frame on page 12*).

2. Connect the 2000 frame to the network and navigate the web browser to the frame. This process is described in detail in the 2000NET Instruction Manual available on-line.

3. Navigate to the module you would like to configure and click on the appropriate slot to access the module links (*Links and Web Pages on page 34*).

4. Click on the Slot Config link on the left side of the page (*Slot Config Web Page on page 52*). This page allows you to assign a name to this module. Assigning easily recognizable names will help later in the configuration process.

5. Cable the rear module signal connections (*Cabling on page 15*).

6. Configure the input and output formats on the Format web page (*Format Web Page on page 38*).

7. Configure the Reference source on the Reference web page (*Reference Web Page on page 39*). Select the type of reference from either the input signal or an external reference (2000GEN module installed in the 2000 frame).

8. Continue with module configuration depending on the module type.

Installation

Installation of a KAM-XM module set is a process of:

- Placing the KAM-XM rear module in a frame slot,
- Placing the front media module in the corresponding front slot, and
- Cabling signal ports.

Module Placement in the 2000 Frame

There are twelve slot locations in both the front and rear of a Kameleon 3 RU frame to accommodate KAM-XM modules. A KAM-XM module set consists of a front media module and a dual height rear module that requires two module slots.

Each KAM-XM front media module plugs into the front of the 2000 frame mid-plane. The rear module plugs into the corresponding rear slot to provide the input and output interface connectors.

A 3 RU 2000T3 frame fully stuffed with KAM-XM front and rear modules will accommodate up to six module sets. A 1 RU 2000T1 frame will accommodate up to 2 module sets.
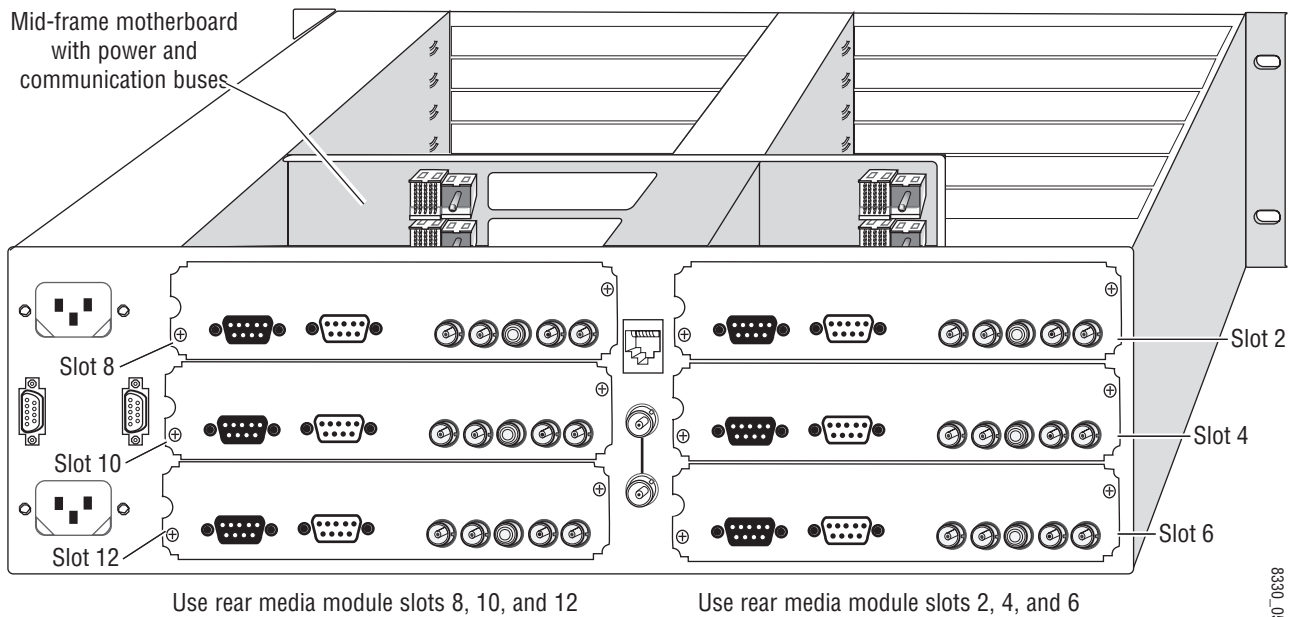
The KAM-XM front and rear module can be plugged in and removed from a Kameleon 2000 Series frame with power on. When power is applied to the module, LED indicators reflect the initialization process (see *Power Up* on page 11).

To install a KAM-XM module set in the frame:

1. For fully stuffing a 3 RU frame with KAM-XM modules, locate a vacant slot in slot 2, 4, 6, 8, 10, or 12 of the rear of the frame (Figure 1 on page 13). The rear module uses two slots.
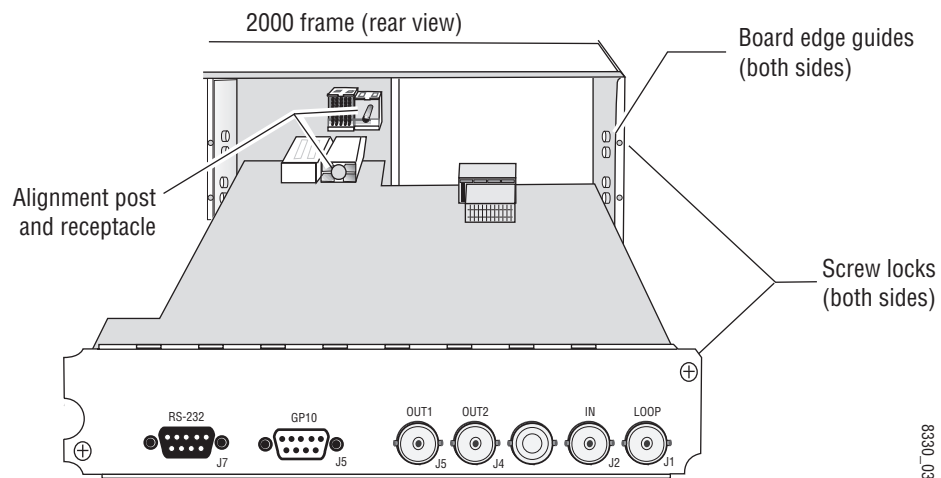
Note   This configuration (using slots 2, 4, 6, 8, and 10) is only suggested when fully stuffing the frame with KAM-XM modules. There are no restrictions on which slot to use as long as there is room in the frame. You may use any two slots (odd or even numbered) for a KAM-XM module with any Kameleon or 2000 module combination.

Figure 1. Fully Stuffed 3 RU Frame, Rear View

Mid-frame motherboard
with power and
communication buses

Slot 8

Slot 10

Slot 12

Slot 2

Slot 4

Slot 6

Use rear media module slots 8, 10, and 12   Use rear media module slots 2, 4, and 6

8330_05

2. Insert the rear module into vacant rear slot 2, 4, 6, 8, 10, or 12 of the frame as illustrated in Figure 2.

3. Verify that the module connector seats properly against the midplane.

4. Using a crossblade screwdriver, tighten the two screw locks to secure the module in the frame.

Figure 2. Installing KAM_XM Rear Module

2000 frame (rear view)

Board edge guides
(both sides)

Alignment post
and receptacle

Screw locks
(both sides)

RS-232   GP10   OUT1   OUT2   IN   LOOP

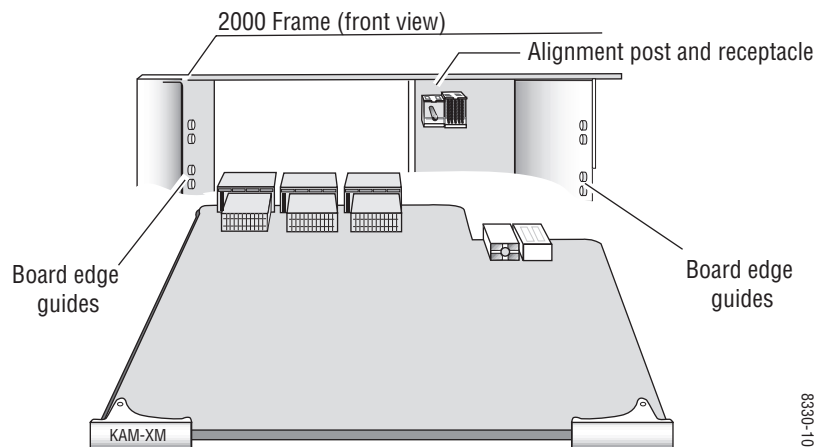J7   J5   J5   J4   J2   J1

8330_03

5. Locate the front slot 2, 4, 6, 8, 10, or 12 in the frame corresponding to the rear module circuit board. The 3 RU frame front view is illustrated in Figure 3. Module slots where the KAM-XM should be installed are highlighted in gray for a fully stuffed 2000 frame.

Figure 3. 2000 Series 3 RU Frame, Front Slots

Install Front Media modules
into slots 2, 4, 6, 8, 10, and 12.

8330_01
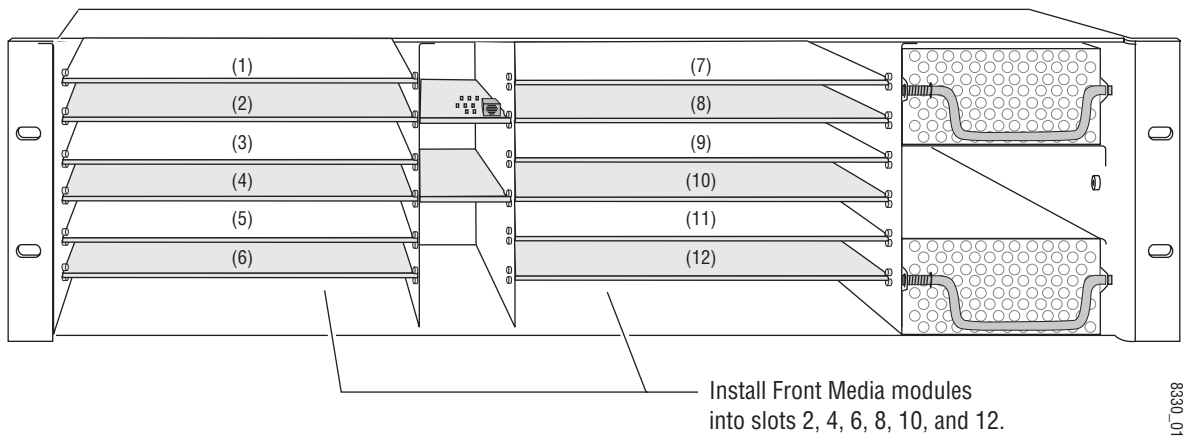
6. With the component side up, insert the front media module in the corresponding front slot (see Figure 4).

7. Verify that the module connector seats properly against the midplane and rear module connector.

8. Press firmly on both ejector tabs to seat the module.

Figure 4. Installing Front Media Module

2000 Frame (front view)

Alignment post and receptacle

Board edge
guides

Board edge
guides

KAM-XM

8330-10

Cabling

All cabling to the KAM-XM module set is done on the corresponding Dual Height KAM-XM-R rear module (XM-IO-1) at the back of the 2000 frame.

KAM-XM-R Rear Module Connections

Refer to Figure 5 for an illustration of the KAM-XM rear module.

The KAM-XM rear module provides the following input and output and control connections.

- IN (BNC)– a serial digital input that may be either standard definition (SD) or high definition (HD) video depending on the front module type.

- LOOP (BNC)– provides an output for the input signal to be looped to another destination.

- OUT1 (BNC)– this serial digital output connection can be either SD or HD depending on the front module type and the output format selected.

- OUT2 (BNC)– this serial digital output connection can be either SD or HD depending on the front module type and the output format selected.

- RS-232 Port (DB-9, Male) – this serial port allows a direct interface to the module for testing and configuration purposes. This port is not normally used.

- GPI0 Port (DB-9, Female) – this port allows connection of external GPI (General Purpose Interface) signals to the module as described in *GPI0 Connections for GPI Control on page 17*.

Figure 5. KAM-XM Rear Module Input/Output Connectors
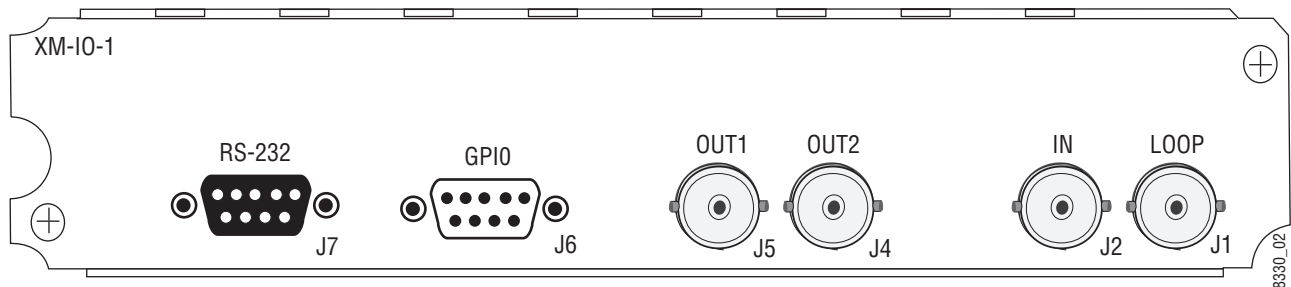
KAM-XM-UPC

For a KAM-XM-UPC HDTV Up Converter, connect the SD signal to be up converted to the IN (J2) BNC. Loop the signal from the LOOP (J1) BNC to another destination if required.

Connect the OUT1 (J5) and OUT2 (J4) BNCs to the HDTV device.

KAM-XM-UDC

For a KAM-XM-UDC HDTV Up/Down Converter, connect the SD signal to be up converted or the HD signal to be down converted to the IN (J2) BNC. Loop the signal from the LOOP (J1) BNC to another destination if required.

Connect the OUT1 (J5) and OUT2 (J4) BNCs to the HDTV device if up converting or the SDTV device if down converting.

KAM-XM-UNC

For a KAM-XM-UNC HDTV Up Converter with advanced SDTV noise reduction, connect the SD signal to be up converted to the IN (J2) BNC. Loop the signal from the LOOP (J1) BNC to another destination if required.

Connect the OUT1 (J5) and OUT2 (J4) BNCs to the HDTV device.

KAM-XM-UCG

For a KAM-XM-UCG HDTV Character Generator Up Converter, connect the SD signal to be up converted to the IN (J2) BNC. Loop the signal from the LOOP (J1) BNC to another destination if required.

Connect the OUT1 (J5) and OUT2 (J4) BNCs to the HDTV device.

KAM-XM-DNC

For a KAM-XM-DNC Down Converter, connect the HDTV signal to be down converted to the IN (J2) BNC. Loop the signal from the LOOP (J1) BNC to another destination if required.

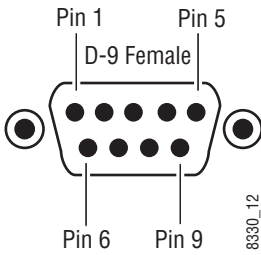Connect the OUT1 (J5) and OUT2 (J4) BNCs to the SDTV device.

GPIO Connections for GPI Control

The KAM-XM modules can receive up to three General Purpose Interface (GPI) external triggers to automatically activate specific user presets configured on the GPI (page 51) and Presets web pages (page 50). Customer-supplied external GPI triggers are wired through connector J6 (GPIO) on the rear module.

Inputs to the GPI are held high and expect a contact closure to ground to activate the programmed presets. There is a 100 mA maximum sink to ground.

Table 3 provides pinouts for the GPI I/O control port, connector J6.

Table 3. Connector GP10 Wiring for GPI Control

| GPIO Control	Pin	Connector J6
	1	GPI Input 1
	2	GPI Input 2
Pin 1 Pin 5	3	GPI Input 3
D-9 Female	4	Reserved
	5	System Ground
	6	System Ground
	7	Not Connected
Pin 6 Pin 9 8330_12	8	Reserved
	9	Reserved

Power Up and Module Status

The front LED indicators are illustrated in Figure 6.

Upon power-up, the green PWR LED should light.

Note   The KAM-XM module will take approximately 25 seconds to boot up.

Refer to Table 4 on page 19 to see a complete list of possible operating conditions and the resulting indicator status.

Figure 6. Front Edge LEDs Indicators
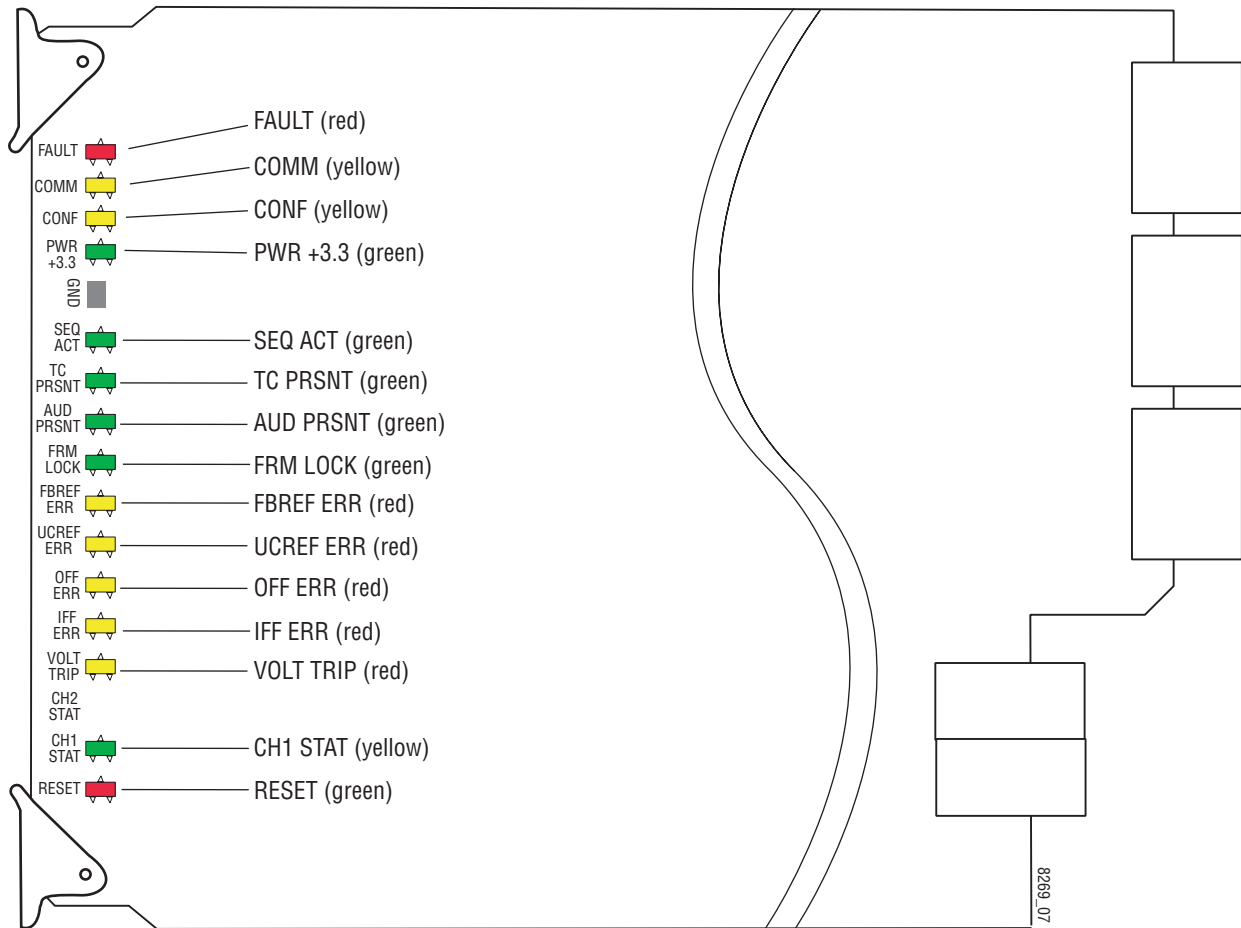
A red FAULT LED indicates an error situation and, when noted with the other indicator LEDs, can indicate a specific problem area. Table 4 describes signal output and LED indications for the various input combinations and user settings.

Table 4. Indicator LEDs and Conditions Indicated

LED	Indication	Condition
FAULT (red)	Off	Normal operation.
	On continuously	Module has detected an Optic 1 or Optic 2 internal fault from the submodule or a write failure has occurred on the front module.
	Long flash	No input is detected for the input or the input does not match the format selected manually, no rear module is present, or the wrong rear module is present.
COMM (yellow)	Off	No activity on frame communication bus.
	3 Short Flashes	Location Command received by the module from a remote control system.
	Short flash	Activity present on the frame communication bus.
CONF (yellow)	On	Module is initializing, changing operating modes, or updating firmware.
	Off	Module is in normal operating mode.
PWR +3.3 (green)	Off	No power to module, fuse blown, or module's DC/DC converter failed.
	On continuously	Normal operation, module is powered.
SEQ ACT (green)	Off	Input video not detected or PLL unlocked.
	Blinking	Normal operation, Sequencer Active LED should be blinking to Indicate good video input and PLLs locked.
TC PRSNT (green)	Off	No timecode or bad timecode.
	On	Good timecode is detected.
AUD PRSNT (green)	Off	No embedded audio detected.
	On	Embedded audio detected.
FRM LOCK (green)	Off	Input to output frame rates are not locked.
	On	Normal operation, input to output frame rates are locked.
FBREF ERR (yellow)	Off	No FrameBuilder refresh error detected.
	On	FrameBuffer refresh error detected, output could be corrupted such as bad output image.
UCREF ERR (yellow)	Off	No Microcode refresh error detected.
	On	Microcode refresh error detected, Microcode memory could be corrupted.
OFF ERR (yellow)	Off	Normal operation, no Output FIFO underflow/overflow error detected.
	On	Output FIFO underflow/overflow error condition detected.
IFF ERR (yellow)	Off	Normal operation, no input FIFO underflow/overflow error condition detected.
	On	Input FIFO is detecting underflow/overflow error condition.
VOLT TRIP (yellow)	Off	Normal state, no under voltage trip detected.
	On	Under voltage trip detected, one or more supply voltages is below specification.
CH1 STAT (green)	Off	No input detected or bad input.
	On	Normal operation, good input detected.
RESET (red)	Off	Normal operation, board is not in Reset mode.
	On	Module is in reset mode, including FPGA configuration sequence.

Configuration

The KAM-XM modules are configured remotely using the 2000NET network interface GUI and/or a networked Newton Control Panel.

Refer to the following sections for configuration instructions:

- Configuration Summary (page 20)
- Remote Control and Monitoring Web Pages (page 30)
- Newton Control Panel Configuration (page 55)

Operation of these control types is explained in detail in their respective sections of this manual.

Before configuration, verify that system requirements have been met as described in *System Requirements on page 10*.

Configuration Summary

This section provides a summary of all available filters and controls that can be adjusted on the KAM-XM module. Use this section for a summary of what adjustments can be made. Table 5 on page 27 provides a summary in table format of all controls and their ranges, default values, and remote and control panel function names and locations for setting each value.

Up and Down Conversion

Up and down conversion in today's facilities is required for interconnection between video formats that have different numbers of pixels/line, lines/field, and in some cases, a different number of fields or frames/second. This interconnection requires the use of up and down format conversion devices.

Up conversion involves a three dimensional process for dealing with conversion of a moving image. Moving images exist in three dimensions. The horizontal dimension is made up of individual pixels. The vertical dimension is made up of lines contained in the field or frame. These exist in what is referred to as the spatial domain. The number of fields or frames per second is known as the temporal domain.

Generally, the process of up conversion deals with changing the number of pixels and lines in a format (spatial domain). This process is a form of sample rate conversion. One main issue with this process is that of resolution. Resolution cannot be created so the resolution of the original input signal must be carefully recovered and passed to the up converted output.

This is done by a process of de-interlacing the input signal so that the full vertical detail of the input is retained. On the KAM-XM modules this is basically accomplished by using an enhanced version of motion compensated de-interlacing which generates a motion vector for every pixel in the image.

In the process of up conversion, several factors must be addressed and the following controls are provided on the modules for these considerations:

Format Conversion

The video input to the module and the video output from the module can be selected as desired. On the Format Conversion web page (Figure 19 on page 38), the currently detected input is reported, the desired format pull-down is available and the status of the desired conversion format is reported as available.

The available input/output format combinations are summarized in Table 2 on page 9.

Aspect Ratio Modes

Most SD material is in a 4:3 aspect ratio while HD material is 16:9. Aspect ratio in this case refers to the ratio of an image width to height, not related to image size. The effect of aspect ratio in up conversion (4:3 to 16:9) is a process of cropping, stretching, or squeezing the image. To address these issues, the module provides a control for selecting one of three standard aspect ratio conversion options:

• Anamorphic – this mode is designed to be used with material originally captured with an anamorphic lens. It ensures that the top and bottom edges of the input aspect ratio match the top and bottom edges of the output aspect ratio. When used with standard 4:3 material, it will have the effect of stretching the material horizontally as illustrated in Figure 7. This results in a distortion of the geometry of the image, particularly causing circles to appear as ovals when present in the image.

Figure 7. 16:9 Anamorphic Mode

4:3 Original   16:9 conversion with horizontal stretch
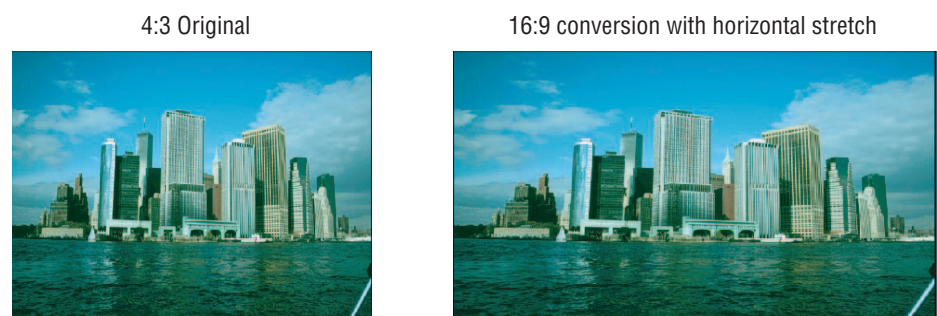
- Common Top & Bottom – this mode ensures that the top and bottom edges of the input image match the top and bottom edges of the output aspect ratio. A 4:3 image set to this mode will appear centered in a 16:9 display with black bars, or pillars (pillarbox), on the left and right sides as illustrated in Figure 8.

Figure 8. Common Top and Bottom Mode

- Common Side (Common Left & Right) – this mode ensures that the left and right edges of the input image match the left and right edge of the output aspect ratio. As illustrated in the Anamorphic example (Figure 7 on page 21), for a 4:3 image, the left and right edges are stretched to match the left and right edges of the output.

  In order to maintain correct geometry of the image, in Common Side mode the input image is stretched vertically as well, creating a zoom effect (Figure 9). This method results in correct geometry of the image but also results in overall loss of approximately 33% of the input information in the vertical domain. This loss of information means less vertical information is available to the interpolation process resulting in lowering the overall resolution of the output image.

Figure 9. Common Sides Mode

Stretched
vertically

Other aspect ratio controls include the following:

- Zoom Crop – when turned on, will zoom the image by 3 pixels and then crop the image by 3 pixels. This corrects issues that arise on the top or bottom edge or on the left or right side of an image.

- Edge Trim – this control adjust the amount of border cropping in the X and Y directions. It is adjustable from 0-50 or 0-20 pixels, depending on the conversion currently in use.

- Fill Shade – this control is used when input the aspect ratio is smaller than the output aspect ratio and there are areas in the output display that are filled with black. The Fill Shade control adjusts the luminance level (Y) and color (Cb and Cr) of these areas from 64 (digital black) to 940 (digital white).

Proc Amp Controls

Proc Amp controls are provided for making adjustments to the output video signal. Each Proc Amp function must be enabled before adjustments can be made.

The following Proc Amp controls are available:

- Video Gain – sets the overall amplitude with a range of ± 6 dB.

- Black Level – adjusts the black level with a range of ± 30 IRE.

- Hue – adjusts the phase with a range of ± 9 degrees.

- Saturation – adjusts the chroma saturation with a range of ± 6 dB.

Detail Enhance Controls

Once the image has been de-interlaced and up converted, detail enhancement can be applied to the image to further sharpen the output detail. This process utilizes an industry standard film compositing technique called unsharp masking. The filtering process adds an additional level of image detail by detecting the edges of objects and adjusting the contrast ratio around these objects to help separate them from the background. This edge sharpening filter allows for both positive and negative aperture correction.

The following user adjustable controls are available in Detail Enhance:

- Horizontal – enabling the horizontal control allows the user to soften or sharpen the horizontal detail in the image. The range of this control is ± 7.0 dB.

- Vertical – enabling the vertical control allows the user to soften or sharpen the vertical detail in the image. The range of this control is ± 7.0 dB.

Noise Reduction

Two of the modules covered in this manual (KAM-XM-UNC – Up Converter with Noise Reduction and KAM-XM-UDC– Up/Down Converter) provide the additional noise filtering and reduction controls described below.

Spike Filtering

This is an adaptive median filter that works well in removing random impulse noise. This type of filtering performs spatial processing to determine which pixels in an image have been affected by impulse noise. The adaptive median filter classifies pixels as noise by comparing each pixel in the image to its surrounding neighbor pixels. The size of the neighborhood is adjustable, as well as the threshold for the comparison.

A pixel that is different from a majority of its neighbors, as well as being not structurally aligned with those pixels to which it is similar, is labeled as impulse noise. These noise pixels are then replaced by the median pixel value of the pixels in the neighborhood that have passed the noise labeling test. This results in a prime benefit of not eroding edges or other small structures in the image with repeated application of the adaptive median filter.

This type of filtering provides controls for setting the adaptive threshold of the luminance and the chroma channels. The filter must be enabled to allow processing.

Brickwall Filtering

This is a low pass filter with a sharp cutoff. This type of high-order low pass filter attenuates high frequencies (image detail) while leaving low frequency information unaffected. Impulse and Gaussian noise contain high frequency components and will be diminished with this filter is on.

This filter is primarily intended for pre-compression processing, to attenuate high frequency information that will normally be quantized away in the compression process. When used for pre-compression, it can improve the efficiency and quality of the compression process. By controlling the manner in which the detail is removed, compression artifacts can be minimized. A boost can be applied after the brickwall filter to accentuate the remaining edges in the filtered image.

One of the benefits of removing high frequency noise before compression is that there are more bits to spend when generating the compressed stream since there is less information to compress. In addition, the potential for loss of desirable information due to the compression of small details is decreased, resulting in a more consistent output.

Controls for this filter type include the following:

- Enable – the filter must be enabled.

- Boost – sets the amount of amplitude prior to the cutoff frequency. This boosting of the amplitudes gives the appearance of sharpening in the image to help compensate for blurring that occurs when filtering out high frequency information.

- Cutoff – sets the cutoff frequency so that information greater than this value will be filtered. Information less than the cutoff value will be left alone.

- Direction Control – allows setting the filter to affect both the horizontal and vertical axes or just the horizontal or vertical axis.

Temporal Recursive Filtering

This noise reducer is a motion adaptive temporal recursive filter that works well in removing random and Gaussian noise. Each pixel in the filter process is labeled as motion, no motion, or noise.

Each of these classes of pixels is treated differently in the noise reduction process as follows:

- For pixels in which there is no motion, low Gaussian noise may be reduced via temporal processing by a weighted averaging over successive frames.

- For pixels labeled as random noise, spatial processing replaces these pixels.

- Pixels labeled as being in motion are left as is to avoid artifacts that may be introduced through temporal processing.

Controls for temporal filtering include the following:

- Enable – the filter must be enabled.

- Red Overlay – when turned on, the filter superimposes a red overlay onto areas in the input image where the temporal recursive filter identifies motion. This red overlay will display what area is not being filtered.

- Auto – when **Auto** mode is turned on, a feedback controller is engaged that dynamically sets the distance, no motion, and motion slider controls based on noise and motion measurements. The pixels determined to be in motion will be shown in red as shown in Figure 10 on page 26. These pixels will not have any noise reduction applied to them.

  The Bias control in Auto mode adjusts the noise set point in the temporal recursive controller. The higher the bias, the more aggressive the controller is towards the noise in the scene. The lower the bias setting, the more sensitive the controller is towards motion in the scene.

• Manual mode – when **Auto** mode is turned off, the temporal recursive filter is in **Manual** mode. This will activate a number of controls for manual temporal filtering.

The **Distance** control is set to determine the sensitivity to motion between the current frame and historical frames. This threshold represents a percentage of the current pixel value that the historical pixel value must be within in order to be considered unchanged. Therefore, a setting of zero would detect motion at every pixel, applying no filtering occurring. A setting of 40 would be less sensitive to motion, temporally filtering every pixel which could result in blurring or any objects or areas that are in motion. If the Distance control is set too low, too little filtering may occur, whereas, if set too high, too much filtering will be applied.

The **No Motion** control sets the historical weighting factor for areas in the frame where no motion has been detected. A setting of 100% forces the filter to use only historical data in areas where no motion has been detected. A setting of zero forces the filter to use only current data in areas where no motion has been detected.

The **Motion** control sets the historical weighting factor for areas in the frame where motion has been detected. A setting of 100% forces the filter to use only historical data in areas where motion has been detected. A setting of zero forces the filter to use only current data in areas where motion has been detected.

Figure 10. Temporal Recursive Filter Red Overlay

Red Overlay showing pixels in motion
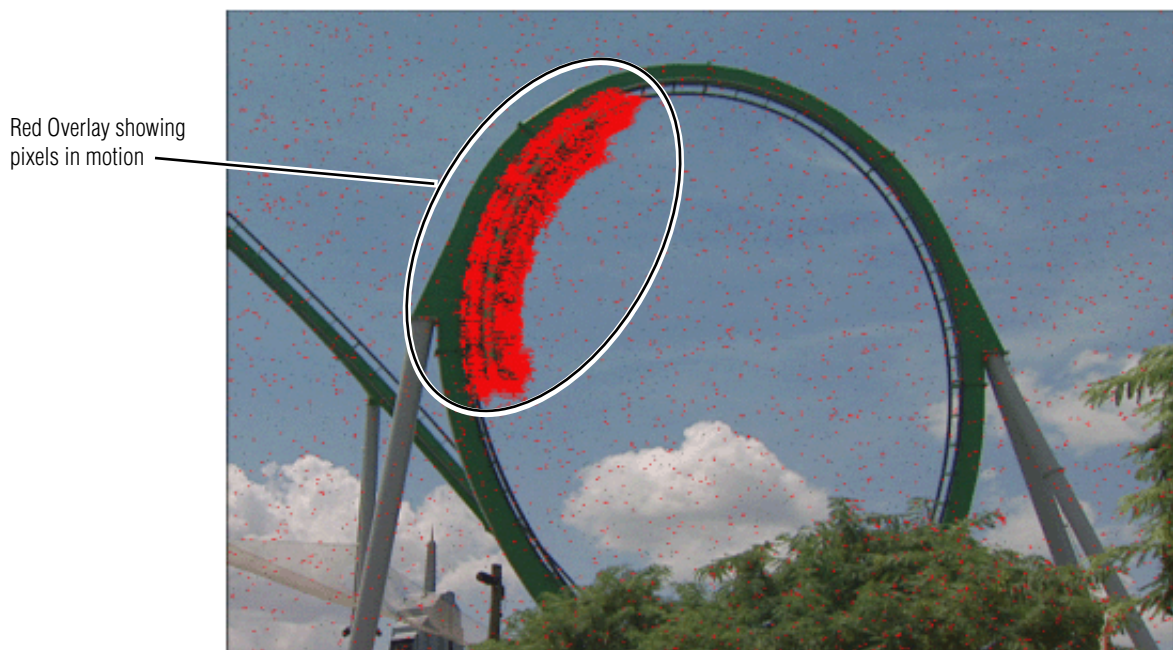
Color Legalizer

Color legalizer controls are provided to set the upper and lower limits for luma and chroma values to be within legal limits for broadcasting and downstream equipment.

Each luma and chroma value is a 10-bit value making the minimum limit 0 and the maximum limit 1019. High and low luma and chroma limit controls are provided for setting the upper and lower limits that the module will output. By default, these controls will cut off values outside of the legal range.

GPI and User Controls

Configuration is provided for setting up GPI triggers from external devices. Up to ten different module preset configurations can be defined then assigned to the three external GPIs or recalled on the Preset web page.

Configuration Summary Table

Table 5 provides a complete summary of the KAM-XM functions and a comparison of the functionality available with each control type along with the ranges and default values for each parameter.

Table 5. Summary of KAM-XM Configuration Functions

Function Type	Default	Range/Choices Resolution	Web Page/ Function Name	Newton Panel	Notes/ Conditions
Format Conversion Input	Up Converter: 480i59.94 Down Converter: 720p50	480i59.94 576i50 720p50 720p59.94 1080i50 1080i59.94	Format Conversion/ Input pulldown	InDesired	Current input/output format and availability for selected formats are reported as read-only
Current Input Format	480i59.94	See list above	Format Conversion/ Current read-only report	InCurrent	
Input Available	–	Yes or No	Format Conversion/ Input Current read-only	InAvailable	
Format Conversion Output	Up Converter: 480i59.94 Down Converter: 576i50	See list above	Format Conversion/ Output pulldown	OutDesired	
Current Output Format	480i59.94	See list above	Format Conversion/ Current read-only report	InCurrent	
Output Available	–	Yes or No	Format Conversion/ Output Current read-only	Available	
Apply Formats selected	–	–	Format/ **Apply** button	Apply	
Reference	Input	Input or External	Reference/ Reference pulldown	Ref	–

Table 5. Summary of KAM-XM Configuration Functions

Function Type	Default	Range/Choices Resolution	Web Page/ Function Name	Newton Panel	Notes/ Conditions
Current Aspect	Anamorphic	Anamorphic, Common Top or Common Side	Aspect/ Current Aspect pulldown	Aspect	–
Zoom Crop	Off	On or Off	Aspect/ Zoom Crop checkbox	Crop	Aspect controls
Edge Trim – X or Y Trim	0 pixels	0-50 pixels 0-20 pixels	Aspect/ Edge Trim X or Y Trim control	XTrim YTrim	
Fill Shade – Y/Cb/Cr Channels	64	64-940	Aspect/ Fill Shade Y, Cb or Cr control	FillY FillCb FillCr	
Video Gain Enable	Off	On or Off	ProcAmp/ Video Gain Enabled checkbox	GainEn	Control must be enabled
Video Gain	0 dB	± 6.0 dB	ProcAmp/ Video Gain control	Gain	
Black Level Enable	Off	On or Off	ProcAmp/ Black Level Enabled checkbox	BlackEn	Control must be enabled
Black Level	0 IRE	± 30 IRE	ProcAmp/ Black Level control	Black	
Hue Enable	Off	On or Off	ProcAmp/ Hue Enabled checkbox	HueEn	Control must be enabled
Hue	0 degrees	± 9.0 degrees	ProcAmp/ Hue control	Hue	
Saturation Enable	Off	On or Off	ProcAmp/ Saturation Enabled checkbox	SaturEn	Control must be enabled
Saturation	0 dB	± 6 dB	ProcAmp/ Saturation control	Satur	
Horizontal Detail Enhance Enable	Off	On or Off	Detail Enhance/ Horizontal Enable checkbox	EnhHorEn	Control must be enabled
Horizontal Detail Enhance	0 dB	± 7 dB	Detail Enhance/ Horizontal (dB) control	EnhHorDB	
Vertical Detail Enhance Enable	Off	On or Off	Detail Enhance/ Vertical Enable checkbox	EnhVerEn	Control must be enabled
Vertical Detail Enhance	0 dB	± 7 dB	Detail Enhance/ Vertical control	EnhVerDB	
Luma Limit High	4	4 - 1019	Color Legalizer/ Color Legalizer Levels/ Luma Limit High control	N/A	–
Luma Limit Low	979	4 - 979	Color Legalizer/ Color Legalizer Levels/ Luma Limit Low control		
Chroma Limit High	4	4 - 1019	Color Legalizer/ Color Legalizer Levels/ Chroma Limit High control		
Chroma Limit Low	979	4 - 979	Color Legalizer/ Color Legalizer Levels/ Chroma Limit Low control		

Table 5. Summary of KAM-XM Configuration Functions

Function Type	Default	Range/Choices Resolution	Web Page/ Function Name	Newton Panel	Notes/ Conditions
Available on KAM-XM-UDC and KAM-XM-UNC only:					
Spike filter enable	Off	On or Off	Spike/ Enable pulldown	SpikeEn	Control must be enabled
Spike Luma/Chroma control	90%	1 - 100%	Spike/ Luma/Chroma control	SpkLuma	
Brickwall filter enable	Off	On or Off	Brickwall/ Enable pulldown	BrickEn	
Brickwall Boost control	0 dB	0 - 4 dB	Brickwall/ Boost control	Boost	
Brickwall Cutoff	3.5 MHz	0.9, 1.0, 1.25, 1.50, 1.75, 2.0, 2.25, 2.5, 2.75, 3.0, 3.25, 3.5, 3.75, 4.0, 4.25, 4.5, 4.75, 5.0, 5.25, 5.5 MHz	Brickwall/ Cutoff control	Cutoff	Control must be enabled
Brickwall direction	Horizontal & Vertical	Horizontal & Vertical Horizontal Vertical	Brickwall/ Direction pulldown	Dir	
Temporal Recusive filter enable	Off	On or Off	Temporal Recursive/ Enable pulldown	RcrsvEn	–
Temporal Recursive Red Overlay	Off	On or Off	Temporal Recursive/ Red Overlay pulldown	RedOvEn	–
Temporal Recursive Auto	On	On or Off	Temporal Recursive/ Auto pulldown	Auto	–
Temporal Recursive Bias	0	± 6	Temporal Recursive/ Auto pulldown	Bias	Auto mode only
Temporal Recursive Distance	15%	0 - 40%	Temporal Recursive/ Distance control	Distance	Manual mode only (Auto off)
Temporal Recursive No Motion	50%	0 - 100%	Temporal Recursive/ No Motion control	Motion (PID 1096)	
Temporal Recursive Motion	0%	0 - 100%	Temporal Recursive/ Motion control	NoMotion	

Remote Control and Monitoring

KAM-XM module remote control and monitoring is performed remotely through the web GUI (see Figure 11 on page 31) or the Newton control panel.

This section describes the GUI access to the module configuration functions. For Newton Control Panel control, refer to *Newton Control Panel Configuration on page 55*.

Refer to the 2000NET Network Interface Module Instruction Manual for information on setting up and operating the 2000 frame network.

Note   The physical appearance of the menu displays shown in this manual represent the use of a particular platform, browser and version of 2000NET module software. They are provided for reference only. Displays will differ depending on the type of platform and browser you are using and the version of the 2000NET software installed in your system. This manual reflects 2000NET version 3.2.2.

The 2000 and Kameleon modules can be addressed by clicking on a specific module icon in the frame status display or on a module name or slot number in the link list on the left.

Use the **Refresh** button to update the web page.

Figure 11. 2000 Frame GUI

The Links section lists the frame and its current modules. The selected link's Status page is first displayed and the sub-list of links for the selection is opened. The sub-list allows you to select a particular information page for the selected device.

Content display section displays the information page for the selected frame or module (frame slot icons are also active links).

Refresh button for manual update of page

Web Page Operations and Functional Elements

Pulldown Menus

Check box ———

Refresh button ———

Coarse adjust ———

Fine adjust ———

Apply button ———

Status LED ———
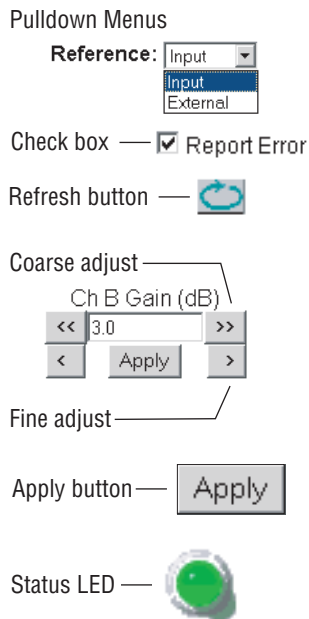
The following conventions and functional elements (shown at left) are used in KAM-XM web page operations. (The examples shown throughout this manual represent 2000NET software version 3.2.2 or later):

• Pulldown menus are used in many cases to make parameter choices.

• Check boxes are used when a selection can be enabled or disabled.

• A **Refresh** button (circular arrow) is provided for manual refresh of the web page to view recently changed parameters.

• Each numerical adjustment control has a **Coarse** adjust button (left and right outside double arrow) and a **Fine** adjust button (left and right inside single arrow).

  To change a value, use the arrow button controls or enter a value into the number field and select the **Apply** button. You may also enter a number into the number field from a keyboard and hit the **Enter** key to apply the value.

• The Status LED is explained below.

Status and Identification Headers

Each configuration web page has a Status and Identification Header.

Status LED icon

The Status LED icon reports communication status for the frame slot and is a link to the module Status page where Warnings and Faults are displayed. LED colors indicate:

• Green = Pass – no problems detected

• Yellow = Configuration error warning

• Red = Fault condition detected

Variables:

• Model and Description are read-only generated by the module.

• Frame Location is entered in 2000 Series Frame configuration.

• Slot number reports the module's location in the frame.

An example of the Status page for each of the modules covered in this manual are shown in Figure 12 (UDC), Figure 13 (UPC), Figure 14 (UNC), Figure 15 (UCG), and Figure 16 (DNC).

Figure 12. KAM-XM-UDC Status Header

Status

Model: KAM-XM-UDC Description: Up/Down Converter
Frame Location: not assigned , Slot: 4

Figure 13. KAM-XM-UPC Status Header

Status

Model: KAM-XM-UPC Description: HQ Up Converter
Frame Location: not assigned , Slot: 8

Figure 14. KAM-XM-UNC Status Header

Status

Model: KAM-XM-UNC Description: HQ Up Converter with Noise Reducer
Frame Location: not assigned , Slot: 2

Figure 15. KAM-XM-UCG Status Header

Status

Model: KAM-XM-UCG Description: Up Converter
Frame Location: not assigned , Slot: 10

Figure 16. KAM-XM-DNC Status Header

Status

Model: KAM-XM-DNC Description: Down Converter
Frame Location: Mod Lab - Bay 2 , Slot: 11

Links and Web Pages

- Status
- License
- Format
- Reference
- Aspect
- ProcAmp
- Detail Enhance
- Spike
- Brickwall
- Temporal Recursive
- Mosquito
- Advanced Aperture
- Color Legalizer
- Presets
- GPI
Slot Config
Software Update

The Kameleon 2000 GUI provides the following links (see graphic at left) to configuration web pages for all of the modules covered in this manual unless otherwise specified:

- Status – reports input signal status and module information (page 35)

- License – reports the module type (page 37)

- Format – provides controls for setting input and output format (page 38)

- Reference – provides controls for selecting the video reference for the module (page 39)

- Aspect – provides aspect ratio conversion options (page 40)

- ProcAmp – provides processing amplifier controls (page 42)

- Detail Enhance – provides horizontal and vertical detail enhancement controls (page 43)

- The following web pages are available only with KAM-XM-UNC and KAM-XM-UDC modules:

  - Spike – provides adaptive median filter for random noise removal (page 44)

  - Brickwall – provides a low pass filter with a sharp cutoff for impulse and gaussian noise conditions (page 45)

  - Temporal Recursive – provides a motion adaptive filter for removing random and gaussian noise (page 46)

- Mosquito – is not available in this application (page 48)

- Advanced Aperture – is not available in this application (page 48)

- Color Legalizer – provides luma and chroma high and low limit controls for setting legal color limits (page 49)

- Presets – provides ten Preset registers for store and recall of module configuration (page 50)

- GPI – enable and assign Preset registers to GPI Inputs 1-3 for external recall (page 51)

- Slot Config – provides Slot ID and Memory functions, Frame Health reporting and SNMP reporting enable/disable controls (page 52)

- Software Update – gives software update information (page 54).

A summary of all configuration value ranges, defaults, and control types is given in Table 5 on page 27.

Status Web Page

Use this link → - Status
- License
- Format
- Reference
- Aspect
- ProcAmp
- Detail Enhance

The Status web page (Figure 17 on page 36) reports status of the following module functions:

Inputs

Status for the input video and the reference source is reported as **GOOD** or **LOST**.

Identification

The Identification section lists the following information about the module:

- Part Number

- Serial Number

- Board ID

- License Tag

Version

The Version section lists currently loaded video and audio firmware and software information.

Component Download Status

The current software version is listed in the Component Download Status Area for all download components. The version for each of these components should be the same.

Figure 17. KAM-XM Status Web Page

Status

Model: KAM-XM-UPC Description: HQ Up Converter
Frame Location: not assigned , Slot: 8

Inputs

Video	GOOD
Reference	GOOD

Identification

Part Number	115-0079-01
Serial Number	G0026
Board ID	4
License Tag	D1.07.31.29.1D.67

Version

Program	UVC
Software	1.0.7.5
Video Firmware	1.4.2
Audio Firmware	1.0.0
P4K-MC Firmware	1.0.1

Component Download Status

Apps	1.0.7.5
uCode1	1.0.7.5
uCode2	1.0.7.5
uCode3	1.0.7.5
UVC	1.0.7.5
Firmware	1.0.7.5

License Web Page

Use this link
- Status
- License
- Format
- Reference
- Aspect
- ProcAmp
- Detail Enhance

The License web page (Figure 18) displays read-only values for identifying the License Tag and Key and the type of module in the Licensed Packages area.

Note This information is set at the factory to determine module type and options.

Figure 18. KAM-XM License Web Page

Format Web Page

Use this link

The Format web page (Figure 19) provides the controls for selecting the Input and Output format for the module. Possible input and output formats, as well as the defaults for an up and down converter are summarized in Table 2 on page 9.

Format Conversion

In the Format Conversion display the **Current** input and output format are displayed. To change the input, use the Input **Desired** pulldown and select the format. If it is available a **Yes** will appear in the **Available** column.

Note   Changing the input or output format will cause the module to reload the application. This will take approximately 60 seconds and a reloading message will appear during this time. Select the Refresh button at the top of the page to see the new settings after this time has elapsed.

Select the **Apply** button to set the values.

Note   All possible input and output values will be listed and can be selected in the pulldowns. If the value does not apply to the application it will be reported as not available.

Figure 19. KAM-XM Format Web Page.

Reference Web Page

Use this link

The Reference web page (Figure 20) provides the controls for selecting the video reference for the module.

Use the following controls to set input and output format:

Reference – set the module reference to either **Input** (from the currently selected video input) or **External** (from the 2000GEN module in the frame).

Bad Video Input – when the **Ignore** checkbox is selected, the module will not perform an application restart and will only lose the output for 2 frames. Under normal circumstances if a video switch/error occurs in the input SDI signal, the module will perform an application restart to recover, resulting in a 3 second loss of video output.

Note   This mode requires that the source and frame be synchronized via an external reference.

Figure 20. KAM-XM Reference Web Page
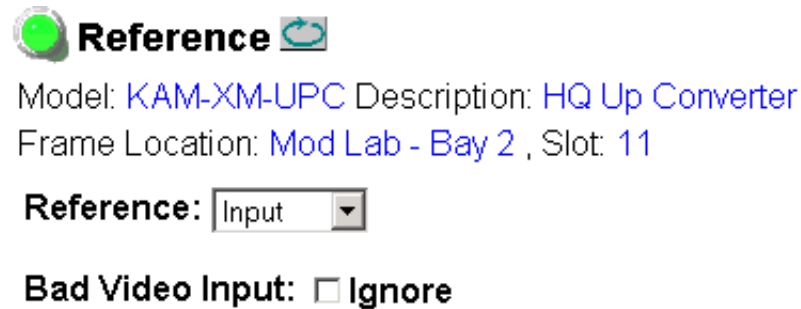
Reference

Model: KAM-XM-UPC Description: HQ Up Converter
Frame Location: Mod Lab - Bay 2 , Slot: 11

Reference: Input

Bad Video Input: ☐ Ignore

Aspect Web Page

- License
- Format

Use
this → - Reference
link - Aspect
- ProcAmp
- Detail Enhance
- Spike

The Aspect web page (Figure 21 on page 41) provides the controls for selecting the aspect ratio mode for the module.

Current Aspect

Set the desired Aspect mode to one of the following:

- Anamorphic

- Common Side (Common Left & Right)

- Common Top & Bottom

Note   Changing the aspect from **Common Sides** or to **Common Sides** will cause the module to reload the application. This will take approximately 60 seconds and the module will display a message stating that the application is reloading. Select the Refresh button to see the new settings after this time has elapsed.

Refer to *Aspect Ratio Modes on page 21* for an overview for setting the aspect ratio mode.

Zoom/Crop

This control when enabled by checking the **On** checkbox, zooms the image by 3 pixels and then crops the image by 3 pixels. This allows correction of issues that occur on the top and bottom or left and right edges of an image.

Edge Trim

Use the X Trim and Y Trim controls to adjust the amount of border cropping in pixels in the X and Y directions performed on the image.

Fill Shade

When the input aspect ratio is smaller than the output aspect ratio there are areas in the output display filled with black. The Fill Shade controls adjust the luminance (Y) and color (Cb and Cr) of the black display areas.

Figure 21. KAM-XM Aspect Web Page

Proc Amp Web Page

Use
this   link

- Format
- Reference
- Aspect
- ProcAmp
- Detail Enhance
- Spike
- Brickwall

The Proc Amp web page (Figure 22) provides the controls for adjusting the video processing parameters for the output of the module. Ranges and default values are summarized in Table 5 on page 27.

Each control must be enabled by checking the **Enabled** checkbox.

Enter the desired value by selecting the **Apply** button or use a keyboard to enter a value and select the **Enter** key.

Use the Proc Amp controls to set the following parameters:

Video Gain – sets the overall amplitude of the output video signal from ± 6 dB.

Black Level – adjusts the black level of the video output signal ±30 IRE.

Hue – adjusts the phase of the output video signal ± 9 degrees.

Saturation – adjusts the chroma saturation of the output video signal ± 6 dB.

Figure 22. KAM-XM ProcAmp Web Page

ProcAmp

Model: KAM-XM-UPC Description: HQ Up Converter
Frame Location: Mod Lab - Bay 2 , Slot: 11

ProcAmp

		Video Gain (db)
Video Gain	☐ Enabled	‹‹ 0.0 ›› ‹ Apply ›
Black Level	☐ Enabled	Black Level (IRE) ‹‹ 0 ›› ‹ Apply ›
Hue	☐ Enabled	Hue (degrees) ‹‹ 0.0 ›› ‹ Apply ›
Saturation	☐ Enabled	Saturation (db) ‹‹ 0.0 ›› ‹ Apply ›

Detail Enhance Web Page

The Detail Enhance web page (Figure 23) provides the controls for determining the amount of detail enhancement applied to the signal.

Each control must be enabled by checking the **Enable** checkbox.

Enter the desired value by selecting the **Apply** button or use a keyboard to enter a value and select the **Enter** key.

Use the following controls to perform detail enhancement:

Horizontal – this control is used to soften or sharpen the horizontal detail in the image (± 6 dB).

Vertical – this control is used to soften or sharpen the vertical detail in the image (± 6 dB).

Figure 23. KAM-XM Detail Enhance Web Page

Spike Web Page

Use this link

- Aspect
- ProcAmp
- Detail Enhance
- Spike
- Brickwall
- Temporal Recursive
- Mosquito

The Spike web page (Figure 24) is active only on the KAM-XM-UNC and KAM-XM-UDC modules.

This web page provides noise reduction with an adaptive median filter that works well in reducing random impulse noise. Refer to *Spike Filtering on page 24* for a discussion of the Spike filter.

Enable the control by selecting the **On** selection in the **Enable** pulldown.

Luma & Chroma – sets the adaptive threshold of the filter in the luminance and chrominance channels. This threshold represents a percentage of the central pixel value that surrounding neighbors must be within in order to be considered similar. Setting the filter to 100 (maximum) forces the filter on for every pixel, resulting in a standard median filter being applied to the entire luminance and chrominance channels.

Figure 24. KAM-XM Spike Web Page

Spike

Model: KAM-XM-UNC Description: HQ Up Converter with Noise Reducer
Frame Location: not assigned , Slot: 2

Enable: On

Luma & Chroma
<< 0 >>
< Apply >

Brickwall Web Page

- ProcAmp
- Detail Enhance
- Spike
Use
this — Brickwall
link - Temporal Recursive
- Mosquito
- Advanced Aperture

The Brickwall web page (Figure 25) is active only on the KAM-XM-UNC and KAM-XM-UDC modules.

This web page provides noise reduction by using a low pass filter with a sharp cutoff to attenuate high frequencies. This type of filter is best for diminishing Gaussian and impulse noise. Refer to *Brickwall Filtering on page 24* for a discussion on using the Brickwall filter.

Enable the control by selecting **On** in the **Enable** pulldown then use the following controls for the Brickwall filter:

Boost – sets the amount of boosting in dB of amplitudes prior to the cutoff frequency. This gives the appearance of sharpening the image to help compensate for blurring that occurs when filtering out high frequency information.

Cutoff – sets the cutoff frequency in MHz above which information will be filtered while information below the cutoff will be left untouched.

Direction – this control allows the user to set the direction in which the filters above will affect the picture.

- **Vertical** applies the filters to the vertical axis only.

- **Horizontal** applies the filters to the horizontal axis only.

- **Horizontal & Vertical** applies the filters to the both axes.

Figure 25. KAM-XM Brickwall Web Page
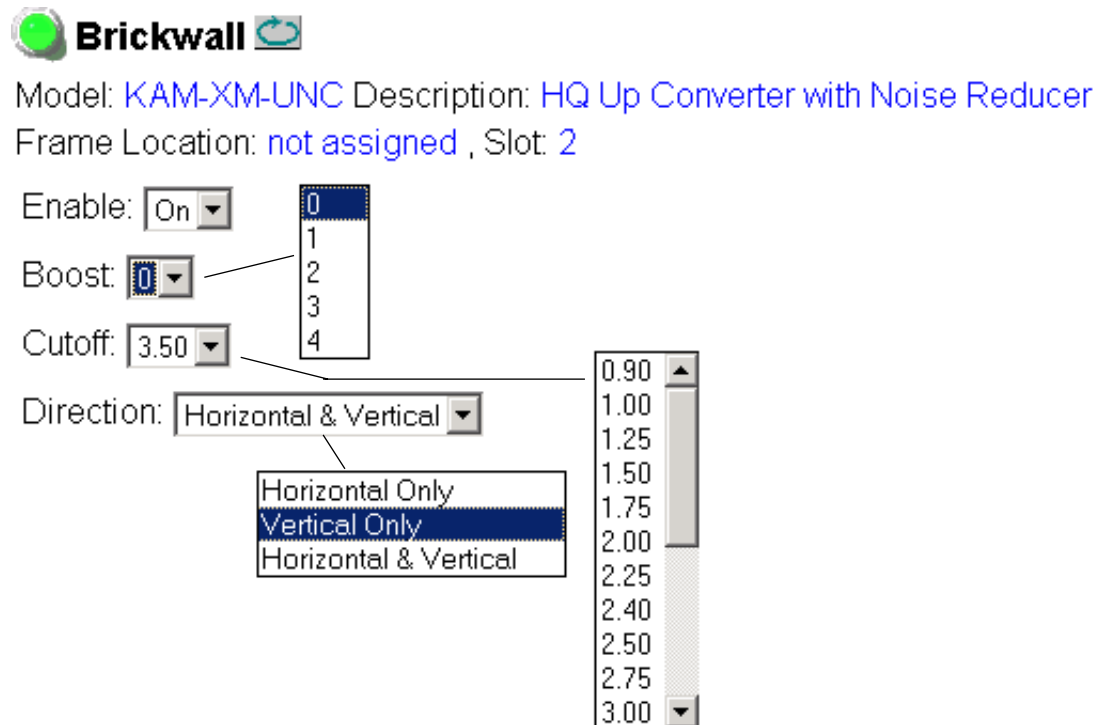
Temporal Recursive Web Page

- Detail Enhance
- Spike
- Brickwall

Use this → Temporal Recursive link
- Mosquito
- Advanced Aperture
- Color Legalizer

The Temporal Recursive web page is active only on the KAM-XM-UNC and KAM-XM-UDC modules.

This is a motion adaptive temporal recursive filter that works well in removing random and Gaussian noise. Refer to *Temporal Recursive Filtering on page 25* for a discussion on using this filter.

This filter can operate in either Auto or Manual mode.

Auto Mode

Enable the control by selecting **On** in the **Enable** pulldown.

Red Overlay – when enabled (**On**), a red overlay is superimposed onto areas in the input image where the temporal recursive filter identifies motion.

Auto – enabling this mode (Figure 26) engages a feedback controller that dynamically sets the Distance, No Motion and Motion control setting available in Manual mode based on noise and motion measurement extracted from the scene.

Bias – is active only in Auto mode. This control adjusts the noise set point in the temporal recursive controller. The higher the bias the more aggressive the controller is towards noise in the scene. The lower the bias setting the more sensitive the controller is towards motion.

Figure 26. KAM-XM Temporal Recursive – Auto Mode

Manual Mode

Enable the control by turning **Auto** off. The web page will appear as shown in Figure 27.

Red Overlay – when enabled (**On**), a red overlay is superimposed onto areas in the input image where the temporal recursive filter identifies motion.

Auto – disabling Auto (**Off**) puts the Temporal Recursive filter in Manual mode.

Figure 27. KAM-XM Temporal Recursive – Manual Mode

Distance – sets the distance threshold to determine the sensitivity to motion between the current frame and historical frames. The range of this control is from 0 – 40, with the nominal value for the distance threshold at 15. A setting of 0 will detect motion at every pixel, causing no filtering to occur. A setting of 40 will be less sensitive to motion, temporally filtering every pixel, which may result in blurring of any objects/areas in motion. In summary, if the distance is set too low, the module detects everything as moving and applies no filtering. If set too high, no motion is detected, and everything is filtered.

No Motion – sets the historical weighting factor for areas in the frame where no motion has been detected. A high setting forces the filter to use only historical data in areas where no motion as been detected. A low setting forces the filter to use only current data in areas where no motion has been detected.

Motion – sets the historical weighting factor for areas in the frame where motion has been detected. A low setting forces the filter to use only current data in areas where motion has been detected.

Mosquito Web Page

- Spike
- Brickwall
- Temporal Recursive

Use this link — Mosquito
- Advanced Aperture
- Color Legalizer
- Presets

The Mosquito web page (Figure 28) indicates it is not available on these module types.

Figure 28. KAM-XM Mosquito Web Page

Advanced Aperture Web Page

- Brickwall
- Temporal Recursive
- Mosquito

Use this link — Advanced Aperture
- Color Legalizer
- Presets
- GPI

The Advance Aperture web page (Figure 29) indicates it is not available on these module types.

Figure 29. KAM-XM Advanced Aperture Web Page

Color Legalizer Web Page

Use
this
link

The Color Legalizer web page (Figure 30) provides the controls for setting the high and low legal limits for the luma and chroma values as described in *Color Legalizer* .

Use the following controls to set High and Low limits for Luma and Chroma:

Luma – set the legal limits for the Luma signal with the High and Low controls.

Chroma – set the legal limits for the Chroma signal with the High and Low controls.

Figure 30. KAM-XM Color Legalizer Web Page

Presets Web Page

Use this link

The Presets web page (Figure 31) provides storage of up to ten Preset registers for local recall or recall of up to three registers with an external GPI trigger (see *GPI Web Page on page 51*).

Each register may be named as desired by typing over the default names.

Selecting the **Store** button next to a register name will save the entire current module configuration to that register.

Selecting the **Recall** button next to a register name will recall the stored configuration to the module immediately.

Note   The existing configuration of the module is also saved automatically to an internal module register called Preset 0 once a minute. This feature of KAM-XM models only, allows the module to recover from a power cycle to the same configuration it had when powered down. This is not the same as Slot Memory on the 2000NET module as explained on page 52.

Figure 31. KAM-XM Presets Web Page

GPI Web Page

Use this link

- Mosquito
- Advanced Aperture
- Color Legalizer
- Presets
- GPI
- Slot Config
- Software Update

The GPI web page (Figure 32) allows enabling and selection of Preset registers to be recalled by three external GPI inputs (Input 1-3). The Presets are defined on the Presets web page (*Presets Web Page on page 50*).

Select the desired Preset register (Preset 1-10) for each GPI input in the corresponding pulldown. Check the **Enabled** check box to enable the GPI input.

External GPI connection is explained in *GPI0 Connections for GPI Control on page 17*.

Figure 32. KAM-XM GPI Web Page

GPI

Model: KAM-XM-UCG Description: Up Converter
Frame Location: Mod Lab - Bay 2 , Slot: 11

GPI Inputs

Input 1	☐ Enabled	Preset 1 ▼
Input 2	☐ Enabled	Preset 4 ▼
Input 3	☑ Enabled	Preset 8 ▼

Preset 1
Preset 2
Preset 3
Preset 4
Preset 5
Preset 6
Preset 7
Preset 8
Preset 9
Preset 10

Slot Config Web Page

- Mosquito
- Advanced Apertu
- Color Legalizer
- Presets
- GPI

Use this — Slot Config link Software Update

Use the Slot Config web page (Figure 33 on page 53) to perform the following functions on the modules:

- **Slot Identification** – You may identify the module by typing a specific name in the **Name** field. The assigned name is stored on the 2000NET module and travels with the 2000NET module if it is moved to another frame. Select **Default** to enter the factory default module name.

- **Slot Memory** – the slot configuration for each media module is automatically saved periodically (once an hour) to the 2000NET module in that frame. You may also select the **Learn Module Config** button at any time to save the current configuration for this slot. The configuration is saved on the 2000NET module. If the 2000NET module is removed or powered down, the stored configurations are not saved.

  When the **Restore upon Install** box has been checked, the current configuration saved to this slot is saved as slot memory. When the current module is removed and another module of the same type is installed, the configuration saved to the 2000NET module will be downloaded to the new module. The box must be checked before the current module with the saved configuration is removed.

Note   On KAM-XM models only, module configuration is automatically saved once a minute to an internal Preset 0 register on the module itself. If power is cycled, the module will recover to the last configuration it was in before being powered down. If this module is moved to another slot, it will retain its Preset 0 configuration unless it is moved to another cell where the **Restore Upon Install** button has been selected. In this case, the Preset 0 configuration will be overridden with the configuration saved to that slot.

- **Frame Health Reporting** – the reporting of Slot Fault, Signal Loss, and Reference Loss can be enabled or disabled to the Frame Health alarm connector on the rear of the Kameleon 2000 frame by selecting or deselecting the checkbox.

- **Hardware Switch Controls** – a read-only status report of 2000NET module switch settings for Module Status Reporting and Asynchronous Status Reporting (dipswitch S1 segment 7 and dipswitch S2 segment 1). These functions must be enabled for the following Slot SNMP Trap Reports to function.

- **Slot SNMP Trap Reports** – displayed only when the SNMP Agent software has been installed on the 2000NET module. Slot SNMP traps can be enabled only when the hardware switches for Module Fault reporting and Asynchronous Status reporting are in enabled on the 2000NET module.

  The enabled SNMP traps will be reported to any SNMP manager that is identified as an SNMP Report Destination in 2000NET configuration. Trap severity is read-only hard-coded information that is interpreted and responded to by the SNMP Manager software configuration.

Figure 33. KAM-XM Slot Config Web Page

Slot Config

Model: KAM-XM-UPC Description: HQ Up Converter
Frame Location: Mod Lab - Bay 2 , Slot: 11

Slot Identification

Name: KAM-XM-UPC   [Default]

Slot Memory

☐ Restore upon Install

[Learn Module Config]

Frame Health Reporting

	Slot Fault	Signal Loss	Reference Loss
Enabled	☑	☑	☑

Hardware Switch Controls

Module Status Reporting: Enabled Asynchronous Status Reporting: Enabled

Slot SNMP Trap Reports

	Slot Fault	Module Removed	Signal Loss	Reference Loss
Enabled	☑	☑	☑	☑
Trap Severity	Alarm	Warning	Warning	Warning

Software Update Web Page

- Mosquito
- Advanced Aperture
- Color Legalizer
- Presets
Use - GPI
this Slot Config
link \ Software Update

The Software update page (Figure 34) allows updating of software from remote locations such as a CD-ROM or the Grass Valley web site. For instructions on updating to the latest software, refer first to the Release Notes that accompany any software update for complete details.

Updating with this method requires the use of an ftp server application available from the Grass Valley web site. Refer to the 2000NET Network Interface Instruction Manual for instructions for installing and using the ftp server application.

Software updates may also be performed using the NetConfig application available from Grass Valley. Refer to the NetConfig Instruction Manual for more information.

For Grass Valley contact information, refer to *Contacting Grass Valley on page 2*

Figure 34. KAM-XM Software Update Web Page

Newton Control Panel Configuration

A Newton Control Panel can be interfaced to the 2000 Kameleon Series frame over the local network to control module configuration and control parameters.

The available control panel controls are listed in Table 5 on page 27. An example of the Newton Configurator for the KAM-XM-UNC is shown in Figure 35.

Note   Not all control parameters are available with the control panel.

Figure 35. Newton Configurator Example

Refer to the documentation that accompanies the Newton Control Panel for installation, configuration, and operation information.

Specifications

Table 6. KAM-XM Series Specifications

Parameter	Value
SD/HD Video Input	
Standard	

KAM-XM-UNC
    KAM-XM-UPC
    KAM-XM-UGC
	SMPTE 259-C (270 Mb/s)

KAM-XM-UDC	SMPTE 259-C (270 Mb/s), SMPTE 292M (1.5 Gb/s), SMPTE 274M, SMPTE 296M, SMPTE 349M
KAM-XM-DNC	SMPTE 292M (1.5 Gb/s), SMPTE 274M, SMPTE 296M, SMPTE 349M
Number of inputs	1 with active loop-through
Connector	BNC per IEC 60169-8 Amendment 2
Equalization	

KAM-XM-UNC
    KAM-XM-UPC
    KAM-XM-UGC
	Automatic to 300 m @ 270 Mb/s with Belden 1694 or equivalent cable

KAM-XM-UDC	Automatic to 100 m @ 1.5 Gb/s/300 m @ 270 Mb/s with Belden 1694 or equivalent
KAM-XM-DNC	Automatic to 100 m @ 1.5 Gb/s with Belden 1694 or equivalent cable
Return Loss	> 15 dB @ 270 Mb/s (and 1.5 Gb/s)
Active Input Loop-through Output	
Standard	

KAM-XM-UNC
    KAM-XM-UPC
    KAM-XM-UGC
	SMPTE 259-C (270 Mb/s)

KAM-XM-UDC	SMPTE 259-C (270 Mb/s), SMPTE 292M (1.5 Gb/s), SMPTE 274M, SMPTE 296M, SMPTE 349M
KAM-XM-DNC	SMPTE 292M (1.5 Gb/s), SMPTE 274M, SMPTE 296M, SMPTE 349M
Number of outputs	1
Connector	BNC per IEC 60169-8 Amendment 2
DC offset	0 V ± 0.5 V
Rise and fall time	750 ps nominal for SD
Overshoot	< 10% of amplitude
Return loss	> 9 dB @ 1.5 Gb/s
Wideband jitter	< 0.2 UI
Up/Down Converted Serial Video Output	
Standard	

KAM-XM-UNC
    KAM-XM-UPC
    KAM-XM-UGC
    KAM-XM-DNC
	SMPTE 292M (1.5 Gb/s)

KAM-XM-UDC	SMPTE 259-C (270 Mb/s) or SMPTE 292M (1.5 Gb/s)
Number of outputs	2
Connector	BNC per IEC 60169-8 Amendment 2
DC offset	0 V ± 0.5 V
Rise and fall time	750 ps nominal for SD

Table 6. KAM-XM Series Specifications - (continued)

Parameter	Value
Overshoot	< 10% of amplitude
Return loss	> 15 dB @ 270 Mb/s, > 9 dB @ 1.5 Gb/s
Wideband jitter	< 0.2 UI
Input to Output Processing Delay	
Video delay	
KAM-XM-UNC KAM-XM-UPC KAM-XM-UGC KAM-XM-UDC	4 frames (up conversion)
KAM-XM-UDC KAM-XM-DNC	2 frames (down conversion)
Audio delay	Delayed and re-embedded in time with the output video
Electrical	
Power	27 W
EMI/RFI	Complies with FCC Part 15 Class A, EU EMC Directive
Physical	
Number of slots	2, installation in even numbered frame slots recommended for maximum frame density
Environmental	
Operating temperature range	See specifications for Kameleon 2000 frame
Non-operating Temperature	-10 to 70 ° C
Operating Humidity Range	10 to 90% non condensing

Service

The KAM-XM modules make extensive use of surface-mount technology and programmed parts to achieve compact size and adherence to demanding technical specifications. Circuit modules should not be serviced in the field unless as directed by Grass Valley Customer Service.

Power-up Diagnostics Failure

If the module has not passed self-diagnostics, do not attempt to troubleshoot. Return the unit to Grass Valley (see *Module Repair*).

Troubleshooting

If your module is not operating correctly, proceed as follows:

• If module power is not present, check fuse F1 (see Figure 36).

• Check for presence and quality of input signals.

• Verify that source equipment is operating correctly.

• Check cable connections.

Figure 36. KAM-XM Voltage Testpoints and Fuse Location

GRASS VALLEY
KAM-XM-DNC — Module Type Label
115-0079-02   B

Fuse: 2.5 A FAST, 125 V

F1

8330_08
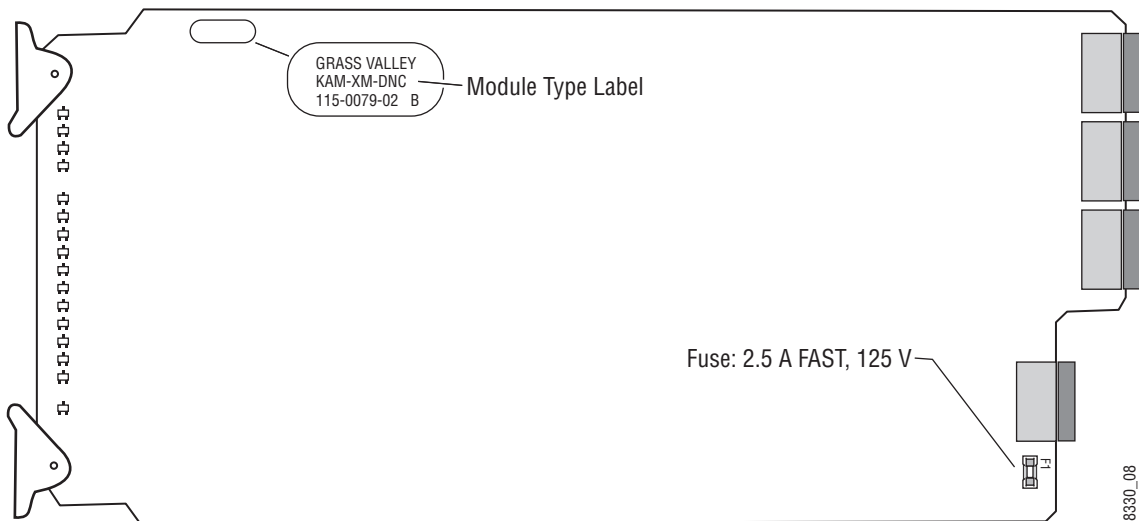
Module Repair

If the module is still not operating correctly, replace it with a known good spare and return the faulty module to a designated Grass Valley repair depot. Call your Grass Valley representative for depot location. Refer to *Contacting Grass Valley* at the front of this document for the Grass Valley Customer Service Information number.

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