

MASTER FOUR



User Manual
R599761

Cine **VERSUM**

Changes

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1.0 GETTING STARTED

1.1 Introduction

Thank you for purchasing the Master Four Video processor.

The Master Four features advanced professional video-processing that enhances the performances of your display:

- Mosquito Noise Reduction
- Fine Detail Enhancement
- Edge Enhancement
- Color Management: Gain, Offset and Gamma
- THEATRE Mode to control a motorized Anamorphic Lens

And also the previously award winning video-processing:

- 10-bit Precision Deinterlacing of 480i, 576i, 1080i
- 10-bit Precision Video Scaling up to 1080p
- PReP™ of 480p, 576p, 720p, 1080p
- Progressive Cadence Detection of 480p, 576p, 720p, 1080p
- RightRate™ High Performance Frame Rate Conversion

Special features:

- 4x HDMI 1.3 (High Definition Multimedia Interface) Inputs
- 1x HDMI 1.3 Output
- THX and ISFccc compliance
- 2x 12V Trigger
- SD and HD-SDI input capability (with Dual SD HD-SDI Input Module, ref. S7011060)

1.2 Unpacking and Inspection

Your Master Four carton should contain the following items:

- Master Four Video Processor
- Universal 6V@7A AC-to-DC Power Converter
- Power Cord
- Remote Control
- Master Four User Manual
- 5 RCA to BNC adapters
- Rack mount kit
- Serial Cable for Software Updates and Automation (1:1)

1.3 Display Compatibility Requirements

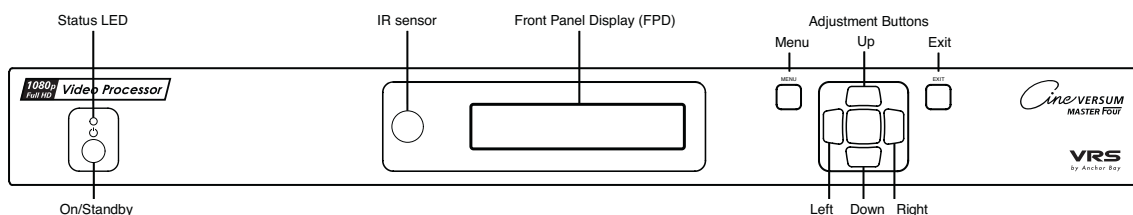
Master Four video processing product is compatible with a wide range of displays. These include digital TVs, projectors, and flat panel displays, as well as other emerging technologies that can support 480p or higher resolution video signals.

To determine if your display is compatible with the Master Four, look to see if it has one of the inputs listed below. If not, then your display is probably limited to receive a standard NTSC, PAL or SECAM interlaced signal and will not function correctly with the Master Four:

Compatible inputs: HDMI, DVI-D, VGA (sub D-15), 5 BNC RGBHV inputs, Component inputs (YCbCr or YPbPr).

2.0 GETTING STARTED

2.1 Front Panel Overview



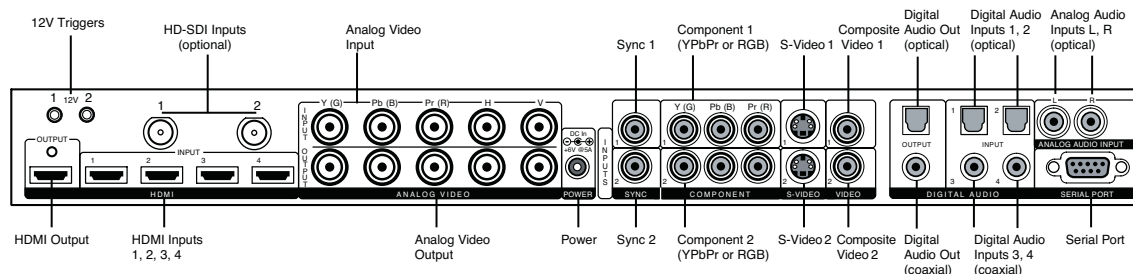
STATUS LED	SIGNIFICATION
OFF	The unit is in Standby Mode
Red	No signal detected
Blue	The unit is processing the selected input
Blinking Blue	HDCP authentication in progress
Green	The unit detects an unsupported signal

- On/Standby button toggles unit power between On and Standby.
- IR sensor is where all IR commands are received by the Master Four. Do not obstruct this window.
- Front Panel Display (FPD) - This is where all information from the on screen display (OSD) is duplicated to assist in the setup of your Master Four.
- Navigation Keys - These keys are duplicated on the remote control and function exactly the same.



You can switch inputs on the front panel of the Master Four using the navigation keys (v and ^). To do this, press the Down or Up without pressing the Menu button first and select the Input Select sub-menu.

2.2 Rear Panel Overview



Video Inputs Compatibility

The Master Four has eleven (11) video inputs and an optional dual HD-SDI input. The inputs support the following formats:

- Video 1 (NTSC, PAL, PAL-M and SECAM)
- Video 2 (NTSC, PAL, PAL-M and SECAM)
- S-Video 1 (NTSC, PAL, PAL-M and SECAM)
- S-Video 2 (NTSC, PAL, PAL-M and SECAM)
- Component/RGBS 1 (480i/p@60Hz, 576i/p@50Hz, 720p@50/60Hz, 1080i@50/60Hz)
- Component/RGBS 2 (480i/p@60Hz, 576i/p@50Hz, 720p@50/60Hz, 1080i@50/60Hz)
- RGBHV/Component (480p, 576p, 720p@50/60Hz, 1080i@50/60Hz, VGA/SVGA/XGA/SXGA@60Hz)
- HDMI 1 to 4 (480i/p, 576i/p, 720p@50/60Hz, 1080i@50/60Hz 1080p@24/25/50/60Hz, VGA/SVGA/XGA/SXGA@60Hz)

- HD-SDI 1 and 2 (SD 480i@60Hz and 576i@50Hz YCbCr 4:2:2, HD 1080p50Hz and 1080p60Hz YCbCr 4:2:2)

**Note:**

The Master Four is able to process HDCP protected signals. However, the output signal may be only visible if a valid HDCP supported display is hooked up to the Master Four's HDMI output connector. The output signal would never be visible through the Master Four's analog BNC output connectors.

Video Outputs

The Master Four has two video outputs, one analog and one digital. The default signal output is by 1080p.

The analog output on the Master Four can output the following signal from any resolutions up to 1920 x 1080:

- YPbPr (Component)
- RGBHV
- RGsB
- RGSB

The HDMI output on the Master Four can output any resolutions up to 1920 x 1080 @ 60Hz: (1080p24 included)

- RGB 4:4:4 (8-bit)
- YCbCr 4:2:2 (10-bit)
- YCbCr 4:4:4 (8-bit)

To connect the Master Four to a display that has a DVI input, use either an HDMI-to-DVI cable or an adapter.

Audio Inputs

There are nine (9) audio inputs on the Master Four:

- Two (2) Optical Digital inputs
- Two (2) Coaxial Digital inputs
- One (1) Analog (L/R) input
- Four (4) HDMI inputs

While the digital and analog audio inputs can be assigned to any one of the video inputs, the HDMI audio inputs are tied directly to the HDMI video signal connected on the same input.

The Master Four accepts digital audio sourced from DVD players, satellite receivers, digital set top boxes, game consoles, or other digital audio devices. These inputs are compatible with most consumer digital audio formats, including CD-Audio (44.1kHz/16 bit LPCM), Dolby Digital, and DTS.

The coaxial digital audio inputs are compatible with any format with a sampling frequency between 24kHz and 192kHz, and with a data word structure up to 24 bits in length. The optical digital audio inputs are compatible with any format with a sampling frequency between 24kHz and 96kHz and with a data word structure up to 24 bits in length. The HDMI audio inputs are compatible with HDMI 1.3 audio formats.

Audio Outputs

There are two digital audio outputs, one coaxial and one optical. Both are active at the same time, with the selected input Digital Audio stream.

12V Triggers Outputs

There are two 12V Trigger outputs that are designed to support a total combined load of 500 mA.

Power Supply Input

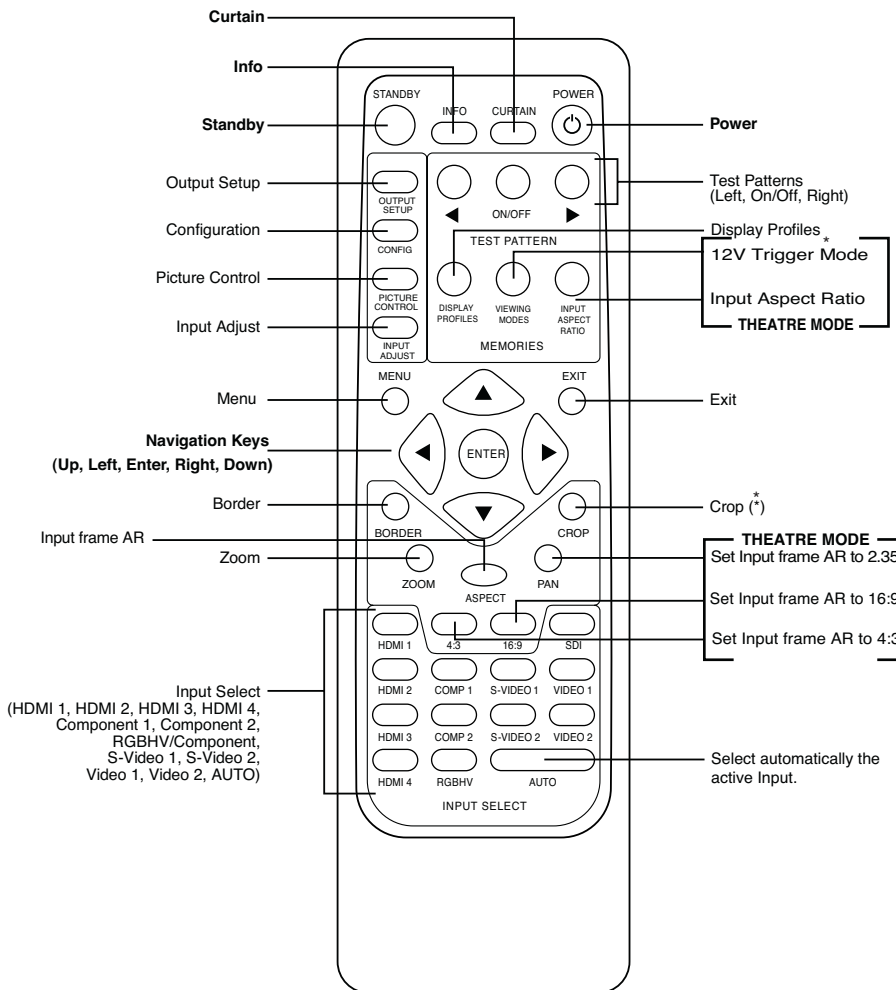
The Master Four comes with a 6V@7A AC-to-DC converter power supply, which accepts 100-240 VAC at 50/60Hz. To attach power to the unit:



Use only the power supply that came with your Master Four.

2.3 Remote Control Overview

The functions of these buttons are detailed in the next paragraph. An asterisk (*) indicates this feature will be implemented in future software.



Power/Standby Buttons

The Master Four remote has a Power and a Standby button. The Power button always turns the Master Four on and the Standby button always put the unit into Standby mode.

Curtain Button

The Master Four remote has a Curtain button which allows you to close a 'curtain' over the image. This feature is especially useful when an image is paused on a display susceptible to burn-in.

Remote Control Battery Installation

The remote control for the Master Four requires two AA batteries. These should be replaced as needed by Alkaline batteries because they last longer without leaking.

To install the remote control batteries:

- 1) Locate the battery compartment on the back of the remote control.
- 2) Remove the cover from the back. To do this, press the tab attached to the cover and pull the cover with the guide on the back of the remote control.
- 3) Remove the old batteries (if applicable).
- 4) Insert two new AA batteries in the compartment as shown on the inside of the battery compartment. Make sure the batteries are correctly inserted, observing the proper polarity.
- 5) After installation, replace the cover and dispose of the old batteries (if applicable).

Menu Navigation

You can control the Master Four as follows:

- From the front panel controls
- From the remote control
- From a programmed universal remote control
- Using the serial connection on the back panel

The menu navigation controls on the remote control are duplicated on the front panel of the Master Four.

THEATRE Mode

The exclusive CineVERSUM THEATRE Mode features a unique and easy to configure mode for Home Cinema installs that use an Anamorphic Lens with cinemascope screens. The THEATRE Mode use optimized quick access buttons to automatically control the scaling operations and Anamorphic Lens position. See "THEATRE MODE", page 24 for more details on variable aspect ratios setups.

Info Screen Button

Press the Info button to display a window that shows information about the system including:

Input Status : Active Input
Signal Type - Input Framerate / Colorspace
De-interlacing Method
Mosquito Noise Reduction / Fine Detail / Edge Enhancement
Aspect Ratio (Frame/Active)
Audio source / encoding
Output Status: Selected Output
Format resolution
Output Frame Rate
Selected Output Preset
12V Trigger 1 Status / Trigger 2 Status
Aspect Ratio (Display/Screen)
Display Profile

This screen can be helpful during troubleshooting.

3.0 SETUP

3.1 Initial Set-Up

STEP 1 - Power Up

- 1) Attach the removable power cord to the external power supply.
- 2) Plug the removable power cord into a wall outlet or power conditioner, if applicable.
- 3) Plug the small connector attached to the cable that comes out of the power supply into the Master Four.

The Master Four should power on and display 'CineVERSUM Powered by ABT' on the FPD.

STEP 2 - Connect the scaler to your display

Once you have installed the Master Four into your system, you must properly configure it for the display device being driven. The Master Four is shipped from the factory with the following preset default settings:

- Input Select is set to AUTO, to automatically detect an active input in a pre-configured priority.
- The Digital Video output is selected with RGB 4:4:4 color space
- The output format is set to SMPTE 274M, 1080p@50Hz or 1080p@60Hz according to the active source refresh rate.

Use either the remote control or the front panel controls to perform the initial setup of the Master Four's output. The procedure below uses the front panel buttons to perform initial setup.

Accessing the Master Four's On Screen Display is crucial, not only in allowing you to navigate the menu of the Master Four, but also to let you know that the Master Four is sending a compatible signal to the display. If the OSD is not visible on the display's screen when you press one of the sub-menu buttons on the remote control, then you must configure the Master Four Signal output to obtain a compatible signal.

Displays with a DVI or HDMI Input

The default output on the Master Four is digital RGB 4:4:4 (DVI Standard). The default format output is 1920x1080 progressive (1080p). If you don't have any picture on your screen, change the output resolution to a lower one (1080i for example if your display is HD-Ready but not Full-HD compatible). If the Master Four is configured to output on its Analog output, go through steps 1 to 5 to change the active output to HDMI.

- 1) Press the Menu button on the front panel of the Master Four once. You should see 'Main Menu / Input Select' on the FPD.
- 2) Press the Up button once. You should see 'Main Menu / Output Setup' on the FPD.
- 3) Press the Enter button. You should see 'Output Setup / Analog/Digital' on the FPD.
- 4) Press the Enter button. You should see 'Analog/Digital / BNC (Analog)'.
- 5) Press the Down button to select 'HDMI (Digital)' and press the Enter button.

Displays with a Component (YPbPr) Input

- 1) Press the Menu button on the front panel of the Master Four once. You should see
- 2) 'Main Menu / Input Select' on the FPD.
- 3) Browse to 'Main Menu / Output Setup' sub-menu on the FPD.
- 4) Press the Enter button. You should see 'Output Setup / Analog/Digital' on the FPD.
- 5) Press the Enter button once again. You should see 'Analog/Digital / BNC (Analog)'. If you don't, press the Up button once and then press Enter. You should see 'Output Setup / Analog/Digital' on the FPD.
- 6) Browse to 'Output Setup / Color Space' sub-menu on the FPD.
- 7) Press the Enter button once. You should see 'Color Space / YPbPr' on the FPD. If you don't, press the Up button once and then press Enter. You should see the Master Four's on screen Display (OSD) on your screen.



The Master Four cannot output a component signal if the input signal is from a DVI or HDMI source with HDCP. Instead the Master Four outputs a blue screen.

Displays with a VGA HD-15 (Computer) or 5BNC RGBHV input

- 1) Press the Menu button on the front panel of the Master Four once. You should see 'Main Menu / Input Select' on the FPD.
- 2) Browse to 'Main Menu / Output Setup' sub-menu on the FPD.
- 3) Press the Enter button. You should see 'Output Setup / Analog/Digital' on the FPD.
- 4) Press the Enter button. You should see 'Analog/Digital / BNC (Analog)'. If you don't, press the Up button once and then press Enter. You should see 'Output Setup / Analog/Digital' on the FPD.
- 5) Browse to 'Output Setup / Color Space' sub-menu on the FPD.
- 6) Press the Enter button once. You should see 'Color Space / RGB' on the FPD. If you don't, press the Up button once and press Enter. You should see the Master Four's on screen Display (OSD) on your screen.



The Master Four cannot output an RGBHV signal if the input signal is from a DVI or HDMI source with HDCP. Instead the Master Four outputs a blue screen.

STEP 3 - Connecting your Sources to the Master Four

Up to 12 video sources can be connected to the Master Four. Use preferably digital connection between your source and the Master Four to avoid unnecessary digital to analog conversion.

3.2 Audio Operation

The Master Four features an audio delay function to exactly match the video delay incurred by the video processing. It accepts four discrete digital audio inputs: two coaxial (Audio 1, 2) and two optical (Audio 3 and 4), one analog audio input and four HDMI audio inputs.

The locations of the audio inputs are shown on the back panel diagrams earlier in this product guide.

The factory default audio assignment is as follows:

- Audio 1 (optical): none
- Audio 2 (optical): none
- Audio 3 (coaxial): none
- Audio 4 (coaxial): none
- Stereo (analog): none

**Note:**

The HDMI audio inputs can only be assigned to the same HDMI video input although any of the other audio inputs can be assigned to any of the HDMI video inputs. You can assign a Digital Audio input to each Video input in the following manner:

You can assign an audio input to each Video input in the following manner:

- 1) Select a video input on the remote control.**
- 2) Select Audio 1, 2, 3, 4, Stereo, HDMI or Off from the 'Input Adjust/Audio Input' menu.**



If an analog video input is selected, the HDMI option will not be available.

4.0 MENU OPTIONS

4.1 Input Select

There are 13 available inputs on the Master Four:

- VIDEO 1 Video 1 (Composite)
- VIDEO 2 Video 2 (Composite)
- S-VIDEO 1 S-Video 1
- S-VIDEO 2 S-Video 2
- COMPONENT 1 Component/RGBs 1
- COMPONENT 2 Component/RGBs 2
- RGBHV RGBHV/Component
- HDMI 1 HDMI 1
- HDMI 2 HDMI 2
- HDMI 3 HDMI 3
- HDMI 4 HDMI 4
- HD-SDI 1 HD-SDI (HD-SDI Video Input Module required)
- HD-SDI 2 HD-SDI (HD-SDI Video Input Module required)
- AUTO Automatic active input detection and selection

These inputs can be accessed in five different ways:

- Using the front panel using the Left and Right buttons
- Using the remote control with the direct access buttons
- Using a universal remote programmed with the discrete codes
- Using the OSD from the front panel or from the remote to access the Input Select menu
- Using RS232 Serial Automation Protocol

4.2 Input Aspect Ratio Control

The Input Aspect Ratio control selects the aspect ratio for the current input signal. The Master Four automatically converts from the selected input aspect ratio to the selected output aspect ratio.

Push the Aspect button once to show the current input aspect ratio control function. To cycle through the available functions, push the Aspect button repeatedly.

For the Input AR function, push the Up or Down button once to show the current setting. Push either of these buttons again to cycle through the available aspect ratios. Push the Exit button to exit the menu and go back to the Input Aspect Ratio selection.

For the Zoom, Pan and Borders functions, push the Up or Down button to select the two control settings available: horizontal and vertical. Push the Enter button to adjust each setting.

- Push Up and Down to increase or decrease the setting.
- Push Exit again to exit this mode.



Note:

The Zoom and Pan functions are applied to the input signal, not the output. This is an important consideration, especially for the Pan function. For example: If you do not zoom a full frame image more than 100%, there is nothing to pan. However, if part of the image is not on the screen, then the Pan function will work.



The Master Four's menu is exit automatically after 30 seconds of no user interaction.

Video input signals are usually classified in the following two ways:

- Frame Aspect Ratio
- Active Aspect Ratio

Frame Aspect Ratio

Frame Aspect Ratio (FAR) consists of two possible ratios: 4:3 or 16:9. DVD discs encoded in a 16:9 frame are sometimes referred to as anamorphic or enhanced for widescreen TV's. For example, a non-anamorphic widescreen DVD has a FAR of 4:3.

Active Aspect Ratio

Active Aspect Ratio (AAR) is the aspect ratio of the image or content (movie). This content is typically stated on the back cover of DVD discs. Some common active aspect ratios are as follows:

- 1.33:1 (4:3)
- 1.55:1
- 1.66:1
- 1.78:1 (16:9)
- 1.85:1
- 2.35:1 (Cinemascope)

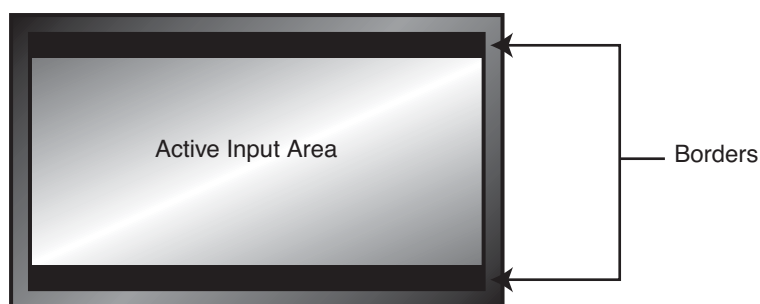
To use aspect ratio's in addition to these, the Master Four provides the option to choose a custom aspect ratio called User with a range of 1.01:1-3.00:1.

Master Four Image Mapping

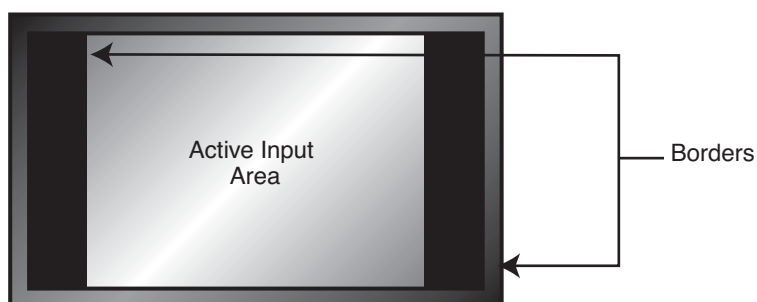
The situation when the Frame Aspect Ratio (FAR) is the same as the Active Aspect Ratio (AAR) is sometimes called Full Frame. This situation is illustrated below.

The Master Four maps the AAR to the Output Aspect Ratio (OAR) in the following three ways:

- When the AAR is greater than OAR, the Master Four puts up Borders at the top and bottom as shown below:



- When the AAR is less than the OAR, the Master Four puts up Borders on the left and right as shown below:



- When the AAR is equal to the OAR (Output Aspect Ratio), the Master Four supplies no border as shown below.



Panorama

The Panorama feature is a non-linear stretch that can be applied to a video source to fulfil a larger format. The panorama stretches the picture with minimal perceptual distortion in the center of the screen. This mode can be turned 'On' or 'Off' to a 4:3 picture to fulfill a 16:9 screen, or applied to a 16:9 picture to fulfill a 2.35:1 screen.

Zoom

The Zoom function zooms in on or magnifies the image on your display. The minimum zoom is 100%, (no zooming); the maximum zoom is 150% (zoom magnification factor of 1.5X).

- Horizontal Zoom Control: Push the Enter button to show the current Zoom setting. Push the Up and Down button to increase or decrease the zooming factor.
- Vertical Zoom Control: Push the Enter button to show the current Zoom setting. Push the Up and Down button to increase or decrease the zooming factor.

Pan

The Pan function allows the image to be shifted up, down, left and right. Note that the Pan function can only be used after the image has been zoomed to any value greater than 100%.

- Horizontal Pan Control: Push the Enter button to show the current Pan setting. Push the Up button to pan to the right. Push the Down button to pan to the left.
- Vertical Pan Control: Push the Enter button to show the current Pan setting. Push the Up button to pan up. Push the Down button to pan the image down.

Borders

The Borders function allows you to add horizontal and/or vertical borders around the image. These borders obscure part of the input image. Certain input-to-output aspect ratios already result in left/right or top/bottom border being added. This control allows the system-generated borders to be extended, or for borders to be added when none exist. As the borders are adjusted (see below) the Master Four temporarily increases the gray level of the borders so that they are visible during the adjustment process. The level will return to normal after the adjustment has ceased.

- Horizontal Border Control: Push the Up button to move the left and right borders towards the middle of the image, increasing the border width and cutting off the sides of the input image. Push the Down button to move the left and right borders away from the image and decreases their width. If there are system-generated left/right borders already present (for example, when the input aspect ratio is 4:3 and the output aspect ratio is 16:9), the border width cannot be decreased beyond the base width created by the aspect ratio conversion.
- Vertical Border Control: Push the Up button to move the top and bottom borders towards the middle of the image, increasing the border height and cutting off the sides of the input image. Push the Down button to move the top and bottom borders away from the image and decrease their height. If there are system-generated top/bottom borders already present (for example, when the input aspect ratio is 16:9 and the output aspect ratio is 4:3), the border height cannot be decreased beyond the base height created by the aspect ratio conversion.

Borders are automatically added by the system when the Active Input Aspect Ratio is not the same as the Output Aspect Ratio as explained earlier in this guide. However you can add more borders using the Borders menu.

Presets

You can specify the Input Aspect Ratio by using the Presets or Manually.

Using Presets

You can use Presets with either the OSD or the Remote Control Input Aspect Ratio button. Refer to the Preset sub-menu in the Input AR menu for doing this with the OSD. The remote control operation is described below.

- 4:3 button selects 4:3 aspect ratio.
- 16:9 button selects 16:9 aspect ratio.
- Pan button selects 2.35 aspect ratio.

Pushing the Input Aspect Ratio button repeatedly selects Preset 1 through Preset 10 and User in sequence without using the On-Screen Display (OSD).

The ten user-defined preset value selections (Preset 1 - 10) are stored in non-volatile memory and always available. Each of these presets consists of the following:

- Frame Aspect Ratio
- Active Input Aspect Ratio
- Zoom parameter
- Pan parameter

- Borders

The User preset selection is also stored in non-volatile memory. However the User selection is always updated after you modify any pre-defined aspect ratio setting. In order to permanently keep a custom aspect ratio setting, you must save it to one of the four preset selections.

Setting the Input Aspect Ratio Manually

You can set the following parameters manually:

- Frame Aspect Ratio
- Active Input Aspect Ratio
- Zoom factor
- Pan parameter
- Borders (horizontal and vertical)



Typically you only need to select the Frame Aspect Ratio and Active Input Aspect Ratio to get an acceptable picture.

The Active Input Aspect Ratio menu item lists the most common movie aspect ratios (1.33:1, 1.85:1 and 2.35:1). You can also customize the Input Aspect Ratio using the Up and Down buttons.

Save User-defined presets as follows:

- Customize the aspect ratio manually (refer to Setting the Input Aspect Ratio Manually above).
- Select one of the presets from the 'Save User To' menu. Confirm the action by selecting Yes.



Be careful, because saving to a preset deletes the previous preset.

If you have not customized the aspect ratio, and the current aspect ratio settings are the same as a system defined preset. In this case, the system will not allow you to save the preset setting.

4.3 Input Adjust Control

Push the Input Adjust button once to show the current input adjustment function. You can cycle through the available functions by pushing this button repeatedly.

The available 'input adjust' functions are as follows:

- Deinterlacing Method
- PReP™
- Image Shift
- Overscan
- Color Space
- Input Level
- VCR mode
- HDMI Config
- Auto Priority
- Audio Input
- AV Lip Sync

Mosquito Noise Reduction

This option reduces the random noise that appears along the edges of compressed broadcasts. There are four settings to this control: off, low, Medium, and High. The default setting for this control is 'off'.

Deinterlacing

You can choose between seven different deinterlacing methods that better suits your need:

- Auto:
This setting is to be used with when the content may be a mix of film and video based content.
- Film Bias Mode:
This mode is intended for use on content that is known to be film-based

- **Video Mode:**
This mode is intended for use on content that is known to be video-based.
- **Forced 3:2**
This mode is intended to be used with High-Quality film source like HD-DVD and Blue-Ray. This forced cadence mode is definitely useful for watching a movie from start to finish but they are less useful for content with a lot of bad edits, and also if you are going to skip chapters.
- **Forced 2:2**
Same as Forced 3:2 but applying a 2:2 filter.
- **2:2 Even:**
This mode should be used when the user knows that the source is high-quality 2:2 pulldown (i.e. film-based content played back in a country with a 50Hz video standard) and wants to avoid any loss of cadence lock while watching that source. This mode weaves two adjacent fields together starting with an even field and combining it with the following odd field. This will provide a higher quality overall signal than the 'Auto' or 'Film Mode' settings, providing that the source really is 2:2 pulldown and does not have bad edits. Only one of the '2:2' Deinterlacing settings is correct for any given source and the correct mode can be chosen by simply trying both of them and selecting the one which does not result in combing artifacts.
- **2:2 Odd:**
This mode is very similar to '2:2 Even' except that this weaves two adjacent fields together starting with an odd field and combining it with the following even field.
- **Game Mode 1:**
This mode gives you minimal latency with edge-adaptive processing. The total amount of delay with source-locked output mode set on the Master Four is about half a frame of delay. Unlocked frame rates will increase this delay.
- **Game Mode 2:**
This mode gives you minimal latency with both motion and edge-adaptive processing. The total amount of delay with source-locked output mode set on the Master Four is about one and a half frames of delay. Unlocked frame rates will increase this delay.

PReP™

PReP™ stands for "Progressive ReProcessing". This is the first video processing method that significantly improves progressive video signals and removes artifacts caused by inferior interlaced-to-progressive conversion. Video signals that originate in an interlaced format are often degraded by artifacts incurred when the signal is converted from interlaced to progressive formats by general purpose chips in DVD players, AV receivers, and set-top boxes. Poor interlaced-to-progressive conversion is especially problematic with large-screen HDTVs, as upscaling to higher resolutions often amplifies artifacts created in the conversion process, making them more noticeable.

Turning on PReP™ video processing will improve images on high-resolution displays and give access to the Precision Deinterlacing menu. PReP™ should be activated only with progressive video input known to be originally interlaced.

Cadence Detect

This option can be turned on with progressive input signals. When the output framerate is not locked to the input framerate, this processing features an advanced cadence detection that can detect a film-based content (originally encoded at 24fps) within an upscaled signal.

Overscan

The Overscan function scales the input image proportionally in both vertical and horizontal dimensions by the user-specified overscan factor. The purpose of Overscan is to remove unwanted image portions around the perimeter of the image. The default overscan value is 0, which means 100% of the input image is shown. The maximum overscan value is 20 which means the input image is scaled up by 120%.

Image Shift and Field Swap

These adjustments are available with HD-SDI and analog inputs. They allow a fine adjustment of the picture to the selected output. These functions can be set independently for different input formats.

Color Space

The color space setting allows the user to specify what the input signal is on the RGBHV/Component and HDMI inputs. The YPbPr setting only applies to the RGBHV/Component input. The YCbCr 4:2:2 and YCbCr 4:4:4 and Auto settings only apply to the HDMI inputs. The options are:

- RGB
- YPbPr

- YCbCr 4:2:2 color space
- YCbCr 4:4:4 color space
- Auto

Input Level

The input level setting allows the user to specify the levels of the input signal, either Video (16-235) or PC (0-255)

- Video
- PC

VCR Mode

VCR Mode decouples the output timing completely from the input timing to ensure a stable output from the Master Four for VCR playback especially during trick-play modes (play forward, play reverse, still/pause).

- On – Output timing is decoupled from the input timing regardless of Frame Rate settings.
- Off – Output timing is dependent on Frame Rate settings.
- Auto - Turns on VCR Mode if a VCR source is detected.

HDMI Config

HDCP mode

- Off: HDCP is disabled at the Master Four's HDMI input. some sources turn off HDCP in this case and the Master Four drives a non-HDCP DVI display or an analog display.
- On: The Master Four continuously looks for a HDCP source on its HDMI input.

Auto Aspect Ratio

- Off: The Aspect Ratio is determined by user.
- On: The Master Four reads the video aspect ratio contained into the Info Frame and applies it if available.

Auto Colour Space

- Off: The Color space is determined by user.
- On: The Master Four applies the Color Space specified into the Info Frame if available.

Auto Input Priority Selection

The Auto Input Priority Selection function assigns different priorities to the video input's automatic active video selection mode (AUTO in Input Select menu). First select the video input, then change the priority of that input.

- 1) Press the Down button. The first video input Video 1 is shown.
- 2) Press the Enter button to view the current priority of the selected input.
- 3) Press the Up or Down button to change the priority of the selected input.
- 4) Press the Exit button again to complete the priority assignment.
- 5) Repeat Steps 1 through 4 to select the next video input and adjust the priority setting.

Audio Input

The Audio Input function assigns an audio input to the currently selected video input. Four digital audio inputs and a single analog audio input are available.

To assign the audio input to another video input, push the Down button. The front panel display (FPD) shows the current setting. For more info about how to assign an audio input to a video input, refer to Audio Input Operation.

AV Lip Sync

The Master Four automatically delays the input audio to match the video processing delay. You can choose to increase or decrease the audio delay by changing this setting. Push the Up or Down button to display the current additional bias delay setting (default 0). Use the Up or Down button to increase or decrease the delay in milliseconds.



Note:

The total audio delay cannot be less than zero, that is, the Master Four cannot have negative audio delay. If you choose to decrease the automatic delay setting by a certain amount, this value could be changed by the Master Four in situations where the Master Four's calculated delay plus the specified additional delay results in a value less than zero.

4.4 Input Picture Controls

Fine Detail

This control enhances the fine detail in pictures. Fine detail can be sharpened by adjusting the control into the positive range, up to 100, it can be softened by adjusting this control into negative range down to -100. The midrange setting is 0.

Edge Enhancement

This control enhances the sharpness of picture on the edges. To sharpen the edge change this setting into the positive range up to 100, soften the edge setting a negative value up to -100. The midrange setting is 0.

Brightness

This control adjusts the brightness (black level) of the overall image output from the Master Four. If you turn it up too high, it may make black look gray. In general, you should adjust this up until you see the black areas of your display turn gray and then back it down just below that point. Default setting is 0 (midrange).

Contrast

Contrast adjusts the ratio between white and black signal levels and is effective as a gain control. The difference between this and the Brightness control is that this adjusts the difference between the brightest and darkest part of the image. Note that all displays have a maximum white level. Going beyond this level only "clips" the upper gray levels and you will lose color resolution at the brighter levels. Adjust this control up until you see the brighter levels of the image begin to wash out. At this point, back it down just below that point. The default setting is 0 (midrange).

Saturation

The Master Four allows you to control the saturation of the image independent of the display. Saturation is the same as the "Color" control on most TVs and controls the richness of the color in the image. The default setting is 0 (midrange).

Hue

As with Saturation, hue can also be controlled independent of the display. Hue is the same as the "Tint" control found on most TVs and controls how colors are displayed in the image. The Hue control is not available for Component or PAL/SECAM inputs. The default setting is 0 (midrange).

Y/C Delay

Sometimes there is a lag between the Luminance (Y) and the Chrominance (Pb/Pr or Cb/Cr) of the video signal. This causes a color "smearing" because the color component of the image is not lining up properly to the black and white luminance component of the image. The Master Four can compensate for these errors in the source signal by shifting the phase of the Y with respect to the C, forward or backward to align them properly.

Use the Down and Up buttons to adjust the phase and observe the effects on your display to obtain the optimal setting. The default is 0.

Chroma Filter (Auto CUE-C)

This feature removes chroma upsampling errors (CUE) found in video sources which have been MPEG encoded and then improperly decoded.

- Off - No chroma filtering. Use this setting if the source does not have a CUE problem.
- On - Chroma filtering is always on. Use this setting if the source is known to have a CUE problem.
- Auto - Automatic chroma error detection and correction. Use this setting when you don't know if a source has a CUE problem. Also use this setting for all digital sources which use MPEG2 decoders (DVD players, digital satellite receivers, and so on.) as it will also detect and correct chroma errors created by all sources of this type when the source is encoded as interlaced (also sometimes called Interlaced Chroma Problem, or ICP).

4.5 Configuration

Test Patterns

The Master Four has 35 internal test patterns to assist in the setup of your individual sources and your display. To learn more about how to use the internal test patterns, refer to the section Setting up an Master Four Using the Internal Test Patterns and Avia: Guide to Home Theater Calibration DVD. To turn the test patterns on and off, use the Test Pattern On/Off button.

To navigate backwards and forwards through the available test patterns use the < and > buttons, respectively.

Auto Standby

The default setting is 'Off', which means Master Four is always in Active mode, regardless of the activity state of the selected input. If Auto Standby is 'On', the Master Four goes into Standby mode 30 seconds after the selected input becomes inactive. To see the current setting, press Up or Down. Then press the same button again to change the setting.

LED Brightness

This selection allows the user to configure the behavior of the Front Panel LED brightness. The 'Active' parameter adjusts the brightness of the Front Panel LED when the menu is being navigated. The 'Reduced' parameter adjusts the brightness of the Front Panel LED during normal usage, when the menu is not being navigated.

User Mode

You have limited access to the output timing controls in 'Normal' mode. In 'Advanced' user mode, you have access to the complete set of output timing controls. Push the Down button to see the current setting and the FPD displays either 'Normal' or 'Advanced' user level. Push the Down button again to select the alternate mode.

Serial Port Rate

The serial port is used by the automation system controllers to control the Master Four. The serial port baud rate defaults to 19200 bps, but can be changed using the Up or Down button.

Factory Default

The Factory Default option allows you to reset system settings to the factory default.

- 1) Press either the Up or Down button. The FPD displays 'No'.
- 2) Press the same button to switch to 'Yes'.
- 3) Confirm this selection by pressing the Enter button.

Software Update

To install the latest software for your Master Four, please follow the procedure described below.

- 1) Set the communication speed to 57600 bps in the serial baud rate menu.
- 2) Connect the Master Four to your computer with the RS-232 cable.
- 3) Change the software update value to 'Yes' to begin the update process.



The upgrade procedure is fully detailed in the Software Update Procedure.

12V Trigger Level

The 12V Trigger outputs can be programmed to operate at normal or negative logic. The options are:

- Normal: when the 12V trigger is active, the output level is 12Vcc, when inactive the outputs is set to 0 Vcc.
- Negative: when the 12V trigger is active, the output level is 0Vcc, when inactive the output is set to 12Vcc.

12V Trigger 1 state is determined by the state of the Master Four. When the Master Four is switched ON, the 12V Trigger 1 is active, when switched OFF or in standby mode, the 12V Trigger 1 is inactive. 12V Trigger 2 is a programmable output that can control the Theatre Anamorphic Lens position.

Information

This setting shows information about the system including:

Input Status

- Signal Type - Input Framerate / Colorspace
- De-interlacing Method
- Mosquito Noise Reduction / Fine Detail / Edge Enhancement
- Aspect Ratio (Frame/Active)
- Audio source / encoding

Output Status

- Format resolution
- Output Frame Rate
- Selected Output Preset
- 12V Trigger 1 Status / Trigger 2 Status
- Aspect Ratio (Display/Screen)
- Display Profile

This screen can be helpful during troubleshooting.

4.6 Output Setup

Analog/Digital (A/D)

Push the Down button to show the current output type. Push the Down button again to select the next item on the list shown below. You can also use the Up button to cycle through the output types.

- Analog Output (BNC-style connectors)
- Digital Output (HDMI connector)

Output Format

This menu shows the current output format. You can change the Master Four output signal by selecting a different format and you can modify the output signal timings by pressing "enter" button. Make sure to select the correct output format in regards to the framerate conversion.

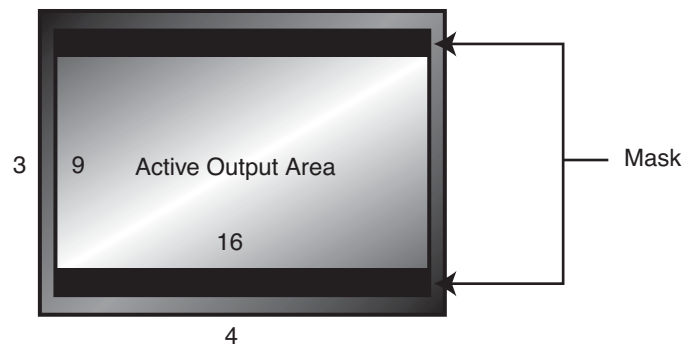
Output Aspect Ratio Control

There are four controls for Output Aspect Ratio (OAR):

- Display Aspect Ratio
- Screen Aspect Ratio
- Image Shift
- Underscan

Aspect Ratios (Display / Screen)

The Display Aspect Ratio is the full aspect ratio of the display, normally specified in the display manual. Common display aspect ratios are 4:3 and 16:9. Less common ones are 5:4, 2.35:1 and others. The example below shows a 16:9 input with a 4:3 screen.

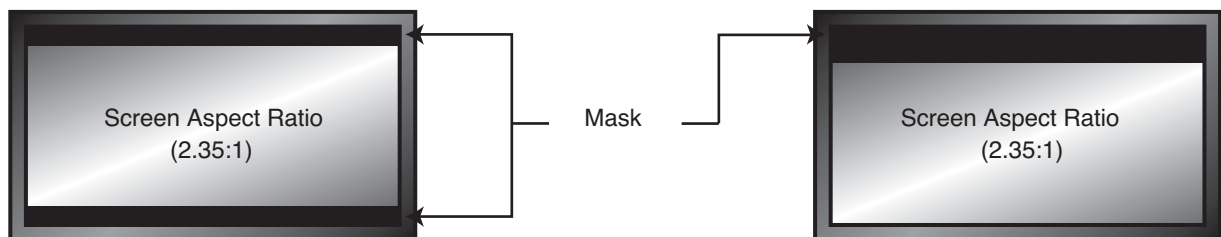


The region outside the Active Output area (called the mask) is inactive, and only important for creating video timing signals for the display. Input video data is never mapped to this region.

When the Display Aspect Ratio is not the same as Active Output Aspect Ratio, the mask is set to blanking levels and always centers the position of the active area over the display area.

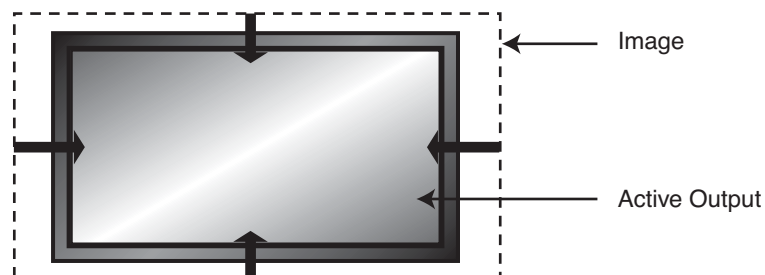
Image shift

Image shift allows you to adjust the location of the image on your screen both horizontally and vertically when the 'Screen' aspect ratio is not equal to the 'Display' aspect ratio. The example below shows 16:9 projector (1.78:1) and a 2.35:1 screen, you can shift the image to match the exact location of your screen. In this situation, the image is shifted down putting all of the mask at the top of the projected image.



Underscan

Underscan represents the visible display area, a sub-set of the Active Output Area. Underscan is like a negative zoom which preserves the aspect ratio of the active area. The default for this setting is 0. As you increase underscan, the smaller portion of the active display area appears while preserving the aspect ratio of the active display area.



Sync Type

The Sync Type option sets the synchronization signal type of the output format. Press the Up or Down button to show the current sync type. Press the same button again to move to the next sync type.

Currently, the Master Four supports seven sync types: Bi-level, Tri-level, Composite Sync (on the H BNC connector), H+V+, H+V-, H-V+, H-V-.

Color Space

The color space parameter sets the color space of the output format. Press the Up or Down button to show the current color space. Press the same button again to select the alternate color space. Two analog color space options are supported: YPbPr (default) and RGB. Three digital color space options are supported: RGB (default), YCbCr 4:2:2 and YCbCr 4:4:4.

Output Level

The output level setting allows the user to specify the levels of the output signal, either Video (16-235) or PC (0-255)

- Video
- PC

Framerate Conversion

This parameter enables framerate conversion. There are four sets of controls: 24Hz, 25Hz, 50Hz and 60Hz framerates. Use the "Judder" test pattern to determine whether your display support the desired framerate output, then you can choose a framerate conversion between:

- Locked mode (1:1): This means that the Master Four output frame rate tracks the input rate - i.e., the output rate is locked to the input rate. In the 1:1 mode. There is always exactly one output frame for every input frame/field. This mode has the advantage that there are never any dropped or repeated frames (unless the source itself does this). One disadvantage of this mode is that when the video source is changed, the Master Four has to re-lock to the new input signal timing. This can cause a disruption in the Master Four output signal and your display system may lose the video signal and temporarily.
- Unlocked mode: This means that the Master Four frame rate is independent of the input rate. Regardless of any variations in the input, the output frame rate will be fixed at the specified value. This mode results in the most stable output signal as it's independent of any changes in the input signal. Unlike the locked mode, the Master Four output signal will not be disrupted when the input source is changed. However, it's guaranteed to cause dropped or repeated frames as the input and output frame rates are not the same. Note that regardless of what number the unlocked output frame rate is set to, it will never be identical to the input rate in this mode as the output signal timing is independent of the input timing. These dropped/repeated frames can result in visible irregularities in smooth motion, sometimes called motion judder or stutter.
- Locked mode (2:2 or 3:2): For standard definition interlaced sources the Master Four can detect 2:2 and 3:2 pulldown cadences and convert these to either a 2:2 or 3:3 frame repetition rate. The main advantage of this is for 60 Hz sources using 3:2 pulldown, as the irregular 3:2 pattern can be converted to 2:2 at 48 Hz or 3:3 at 72 Hz. In these modes, each original film frame is repeated exactly 2 or 3 times, respectively, and motion is therefore smoother. Note that these modes are only useful when the video source is film-based - i.e., 3:2 pulldown for 24 Hz film on 60 Hz sources, and 2:2 pulldown for 25 Hz film on 50 Hz sources. If the source is not film-based, then the end result is a lot like unlocked mode without that mode's stability advantages.

Border Level

The border level setting is global, that is, there is only one border level setting for the system. To adjust the border level, push the Up or Down button. The current level is shown. The default value is '0'. Push the Up or Down button to decrease or increase the border level.

Picture Controls

The Master Four has picture memories for each accepted format that are automatically saved and recalled on each input. In addition to these controls, the Master Four has output picture controls that can be used for multiple applications. One application is to save two separate output modes for day/night usage where the ambient light changes. Another application is to adjust the output for separate connected displays. There are two memory slots available, titled "preset 1" and "preset 2".

To make adjustments to one of these modes, first select the desired mode in the "Preset" submenu and then make the desired changes to the output picture controls: brightness, contrast, saturation, hue, gamma setting, RGB gains and RGB offsets.

There are also three additional memory slots which are dedicated to certified calibrator use and can be set during the system installation. They are intentionally locked.

HDCP Mode

There are two HDCP modes:

- Off: HDCP is disabled at the Master Four's HDMI output.
- On: The Master Four continuously looks for a HDCP display device on its HDMI output.

Display Profiles

A display profile is a group of display parameters you can save and easily recall in the future. A display profile consists of a set of display parameters that can be assigned to an output. It contains the following parameters:

- Output Type (Analog or Digital)
- Format (Resolution and all video output timing information)
- Output Aspect Ratio
- Sync Type
- Color Space
- Output Level
- Frame Rate Conversion
- Border Level
- Output picture control
- HDCP Mode

A current custom display profile (called User) is also stored in non-volatile memory. However it will be overridden when you make any modifications to the display profile. You should always save the current display profile to Profile 10 to 1.

Selecting and Saving a Display Profile

Use the following procedure to select and save a display profile:

- 1) Set up the profile by making changes to the output setup menu items. If you make custom settings (such as output timing parameters), they are saved to User.
- 2) Save the settings to a profile by selecting Profile 1 through 10 in the Save menu and pressing Enter.
- 3) Once the Profile is saved, the Save menu is grayed out until you make changes to the profile again.

Auto Linking of Input and Display Profiles

The Auto feature links a specific input to a display profile. To enable this feature, use Output Setup [Display Profile] Auto. When you select an input/format, the display profile used (Profile 1 through 10 or User) is saved in the saved input settings. When you turn Auto On, the system uses a display profile based on the selected input.

For example, suppose you choose Display Profile 1 using Video 1 input and Display Profile 2 using S-Video 1 input.

- With Auto set to On, when Video 1 is the active input, the system automatically uses Display Profile 1.
- When S-Video 1 is the active input, Display Profile 2 is used.

When Auto is Off, the selected display profile is used independently of the active input.

5.0 THEATRE MODE

5.1 The THEATRE Concept

The Master Four centralizes the controls and automation commands of the THEATRE Concept for a unique, versatile and unexpectedly simple to operate 2.35:1 theatre experience using the THEATRE Anamorphic Lens.

The Master Four features the exclusive new version of the award-winning THEATRE Mode for a complete and incomparable control over a motorized anamorphic lens.

The new THEATRE Mode features:

- Mode1 for CIH installs
- Mode2 for CIW installs
- Direct programming button for the 12V Trigger 2
- Direct access button on the Remote Control Unit to switch between 2.35, 16:9 formats

5.2 Dedicated Menus

Output Setup ⇒ 12V Trigger #2 (Viewing Mode on RCU)

This menu controls the state of the 12V Trigger 2 output located at the back of the Master Four Theatre:

- ON: the 12V Trigger 2 is active and outputs up to 250 mA at 12Vcc.
- OFF: the 12V Trigger 2 is inactive and is set to 0 Vcc.
- THEATRE: this option gives to the Master Four the full control of the 12V Trigger #2 states. See “Configure the Master Four to control the THEATRE Concept”, page 25 to configure the THEATRE Mode.

Output Setup ⇒ Aspect Ratio ⇒ Lens

The Lens Aspect Ratio menu defines the presence or not of an anamorphic lens into the projection system. The options are:

- Mode 1: the picture is vertically stretched by a factor of 1.33 (vertical zoom of 133%) to eliminate the black bars from the projected picture. This mode is also frequently referenced as Constant Image Height (CIH) because when the Anamorphic Lens is installed the projected image would have the same height.
- Mode 2: the picture is compressed horizontally by a factor of 1.33. (horizontal zoom of 75%). This mode is also referenced as Constant Image Width (CIW) because once the Anamorphic lens is placed in front of the projector beam, the projected picture would have the same width.
- Mode 1 - Auto: this option triggers 3 simultaneous actions.
 - 1) Apply the Mode1 video processing (horizontal stretching by a factor of 133%) when the selected Input Active Aspect Ratio is large enough (Active AR must be set to 2.33:1 or higher).
 - 2) Switch the 12V Trigger #2 to 12Vcc if the 12V Trigger #2 is set to THEATRE Mode. (Output setup ⇒ 12V Trigger #2 ⇒ THEATRE)
 - 3) Switch the Output Screen to 2.35:1.

Configuration ⇒ 12V Trigger Level

The 12V Trigger outputs can be programmed to operate at normal or negative logic. The options are:

- Normal: when the 12V trigger is active, the output level is 12Vcc, when inactive the outputs is set to 0 Vcc.
- Negative: when the 12V trigger is active, the output level is 0Vcc, when inactive the output is set to 12Vcc.

12V Trigger #1 state is determined by the state of the Master Four. When the Master Four is switched ON, the 12V Trigger #1 is active, when switched OFF or in standby mode, the 12V Trigger #1 is inactive.

12V Trigger #2 is a programmable output that can control the Theatre Anamorphic Lens position.

5.3 Frame and Active Aspect Ratios

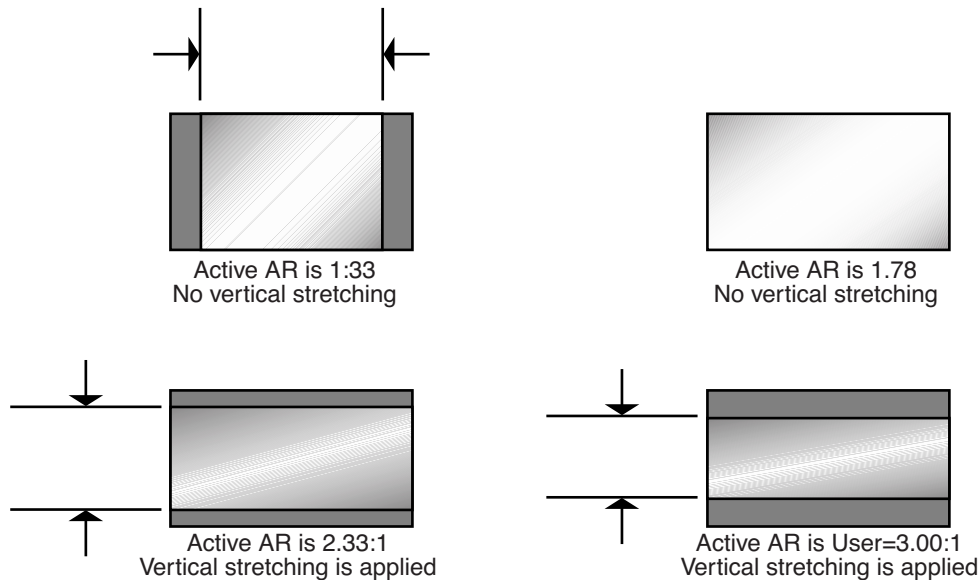
The Theatre Mode is a new automation process that determines the Anamorphic Lens position in or out of the projector beam. The decision is base on the Frame Aspect Ratio and Active Aspect Ratio values.

The Aspect Ratio is the width divided by the height. The Frame of a picture is the whole picture projected, that includes the vertical or horizontal black masking. The Active part of a picture is the effective portion of the Frame.

Examples of 16:9 video sources with different Active AR:

The following sources are considered as 16:9 Frames, and when the Active AR is larger than 1.78, the content is generally letterboxed into a 16:9 picture.

- DVD 16:9 compatible also called 'Anamorphic 16:9'
- HDTV programs (720p, 1080i)
- Blue Ray Disc, HD-DVD (1080p24, 1080p60)



16:9 Frame AR and variable Active AR

When the Active AR is larger than 2.33:1, the black areas are large enough to apply a 1.33x vertical stretching to the picture without information lost. Then the picture geometry is restored to its original AR with the anamorphic lens with seamless black masking using the higher definition.

5.4 Configure the Master Four to control the THEATRE Concept

The Master Four has ensures two tasks when coupled with a THEATRE Concept.

Anamorphic Pre-Processing

The Master Four is programmed to apply a vertical stretch per resolution and input. Configure the Master Four into THEATRE Mode to have it set automatically:

- Output Setup ⇒ Aspect Ratio ⇒ Lens - Mode 1 - Auto
- Input Aspect Ratio ⇒ Frame AR ⇒ 16:9
- Input Aspect Ratio ⇒ Active AR ⇒ select the Active AR that suits your video source

The vertical stretching is automatically set when the Master Four is configured in THEATRE Mode and if the Input Active AR is larger than 2.33:1.

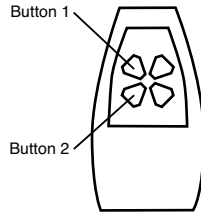


Note:

By applying a vertical stretch to the video source, the vertical resolution of the picture is greatly improved. The other gain of this process is to activate the unused pixels of the display matrix of the projector, and it greatly improves the brightness performances and render finer details in a constant image height (CIH) setup, allowing the use of larger screens.

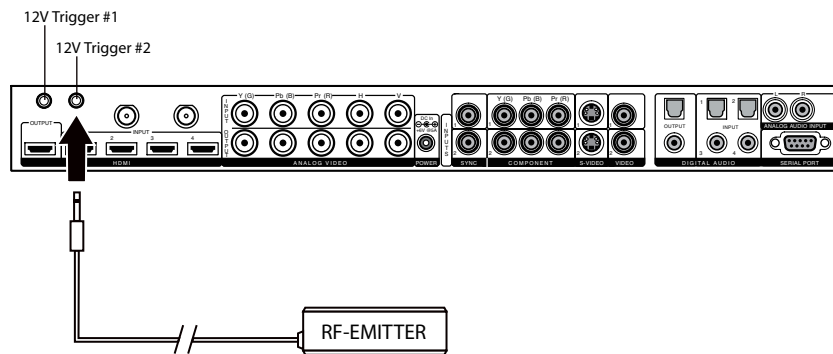
Driving the Motorized Lens

The THEATRE Concept comes with a Radio-Frequency remote control unit (RF-RCU) to operate the position of the Anamorphic Lens. Push Button 1 to move the Anamorphic Lens out, push Button 2 to move the Anamorphic Lens in front of the projector beam.



Use the RF-RCU supplied with the THEATRE Concept during calibration only.

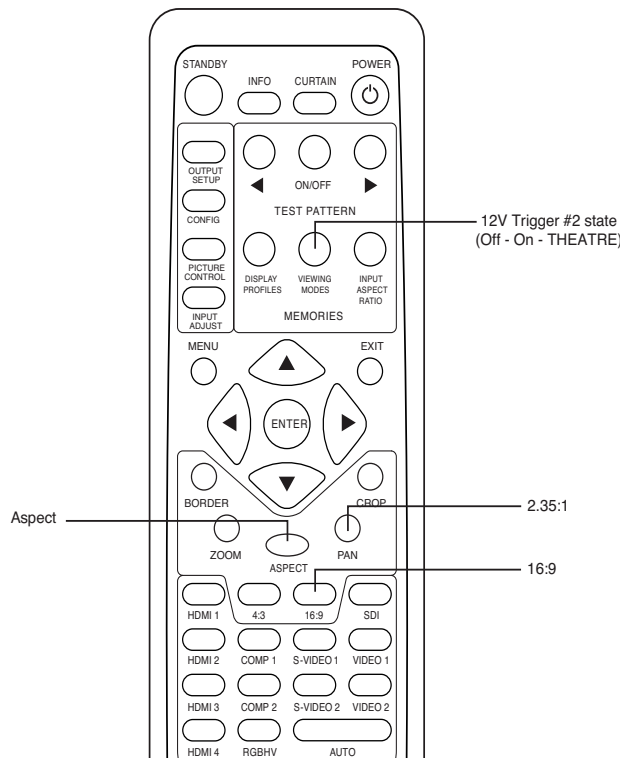
Once the THEATRE Concept is properly calibrated, the Master Four controls the Lens position with the RF-Emitter supplied with the THEATRE Concept connected to the 12V Trigger #2 of the Master Four. To do so, set the 12V Trigger 2 to ON or THEATER Mode.



Connect the RF-Emitter supplied with the THEATRE Concept to the Master Four.

When the 12V Trigger 2 is set to "THEATRE Mode", the Master Four sets automatically the Lens position per input and input format.

5.5 Quick Access with the Remote Control Unit.



Master Four RCU and quick access to THEATRE Mode features

‘16:9’ button on the RCU

The ‘16:9’ button on the RCU directly changes the Input Active Aspect Ratio to 1.78:1.

When set into THEATRE Mode, the Master Four automatically moves the Anamorphic Lens out of the projector beam and restore the black bars of the 16:9 video Input Frame.

If the video Input Frame AR is 4:3, use the ‘4:3’ button instead.



Note:

The ‘16:9’ button is useful to restore the original input signal when a portion of the On Screen Display (OSD) of your player is located on the top and/or bottom of the Active Frame. Typically at the startup of a DVD, the language and subtitles selection is generally not displayed in Cinemascope® format, but in a 16:9 frame.

‘Pan’ button on the RCU for 2.35:1 sources

The ‘Pan’ button on the RCU directly changes the Input Active Aspect Ratio to 2.35:1.

When set into THEATRE Mode, the Master Four automatically moves the Anamorphic Lens in front of the projector beam and apply the vertical stretch to restore the original 2.35:1 aspect ratio to the screen.

‘Aspect’ button on the RCU

The ‘Aspect’ button of the RCU is a shortcut to the ‘Active AR’ Menu to quickly change this setting. when selecting an Input Active AR greater than 2.33:1, the Master Four configured in THEATRE Mode will command the Anamorphic Lens to moves in front of the projector beam and apply the correct vertical picture stretching to obtain a full frame at 2.35:1 aspect ratio. Press sequentially until you get the desired aspect ratio:

Input Aspect Ratio ⇒ Active AR ⇒ 1.33, 1.55, 1.66, 1.78, 1.85, 2.35 or User (1.01 - 3.00)

‘Viewing Mode’ button on the RCU

The ‘Viewing Mode’ button is a shortcut to the ‘12V Trigger #2’ Menu. When the RF-Emitter is connected to the Master Four, press sequentially ‘Viewing Mode’ button to control the Anamorphic Lens position:

Output Setup ⇒ 12V Trigger #2 ⇒ OFF: the Lens moves out of the projector beam

Output Setup ⇒ 12V Trigger #2 ⇒ ON: the Lens moves in the projector beam

Output Setup ⇒ 12V Trigger #2 ⇒ THEATRE: the Lens position is set automatically determined by the Master Four per input and input format.

6.0 APPENDIX

6.1 Non-Volatile Memory Settings

The Master Four stores a variety of user settings in non-volatile memory. Non-volatile memory retains its contents when power is lost. There is one group of system settings and one group of user settings.

Input / Format Settings

The Master Four supports an independent set of saved settings based on input and format.



Note:

There is a separate set of settings not just for each input but for each format as well. This provides a lot of flexibility but is complex. For example, you can make settings for an input with an NTSC source, but when the source is changed to PAL, you must specify new settings.

There is only one set of presets (Preset 1 to 10) for the whole system and signal inputs. However, the User preset is per input and per format.

6.2 Frame Rate Conversion

To determine the correct framerate conversion, use the 'Judder' test pattern. The 'Judder' test pattern displays a bar that bounces back and forth at the chosen output frequency selected in the 'framerate' parameter. When this test pattern is displayed correctly, the bar moves smoothly across the screen and bounces from side to side.

When this pattern is displayed incorrectly, this bar may 'tear' as it moves across the screen. To adjust the framerate conversion, go to the 'Output Setup' menu.

For displays that will only display 50Hz (PAL) set the output framerate as described below:

Output Setup ⇒ Framerate ⇒ 50Hz ⇒ 50Hz Lock

Output Setup ⇒ Framerate ⇒ 60Hz ⇒ Unlock ⇒ 50.00

For displays that will only display 60Hz (NTSC) set the output framerate as described below:

Output Setup ⇒ Framerate ⇒ 50Hz ⇒ Unlock ⇒ 59.94

Output Setup ⇒ Framerate ⇒ 60Hz ⇒ 60Hz Lock

6.3 Display Calibration

Test Patterns Used: Brightness/Contrast
 Color8 Bars75
 Color8 Bars100
 Gray Ramp

The Master Four has several test patterns to assist in the setup of your display. Adjustments should be made on your display, not on the Master Four, to correctly setup your Master Four and display.

The 'Brightness/Contrast' test pattern will assist you in setting up both the brightness (black level) and contrast (white level) of your display. The 'Brightness/Contrast' test pattern is composed of 4 quarter-screen blocks. Two of the blocks have a background level of standard black and the other two blocks have a background level of standard white. Embedded in the black blocks are 3 bars.

One is 4 IRE below black (blacker-than-black), one is 1 IRE above black, and the third is 2 IRE above black. Embedded in the white blocks are 3 bars. One is 1 IRE above white (whiter-than-white), one is 1 IRE below white, and the third is 2 IRE below white. The bottom two blocks differ slightly from these levels. For the bottom two blocks, the blacker-than-black is at the lowest possible luma level and the whiter-than-white bar is at the highest possible luma level. When the brightness and contrast are adjusted correctly, you should be able to see the 1 IRE and 2 IRE above black bars on the black background and the 1 IRE and 2 IRE below white bars should be visible on the white background. When the brightness is adjusted correctly, black objects should appear 'black' with the details still intact

and lighter areas should be 'light', not gray, with the details still intact. When the contrast is adjusted correctly, white objects will appear 'white' with the details still intact. Because the contrast settings can affect brightness settings we recommend that you check the brightness setting after making this adjustment.

**Note:**

If you have a CRT based display, following the instructions above may yield a contrast setting too high. If the contrast is set too high, you will get blooming and loss of details in the highlighted areas. It is more helpful to use the two vertical lines in the test pattern. Adjust the contrast up and down and you will notice that these lines will bend as you increase the contrast. To properly adjust contrast on a CRT based display, decrease the contrast until the vertical lines start to straighten out. If possible, the two lines should be straight. On some CRT, the lines may not straighten even if you turn the contrast to its minimum. If this is the case, slowly increase the contrast to a point just before the vertical lines have extreme bending. You have now properly set up the contrast of your display. Continue to set up brightness as detailed above.

The 'Color8 Bars75' and 'Color8 Bars100' will assist in setting up the saturation (color) and hue (tint) of your display. The 'Color8 Bars75' test pattern consists of 8 vertical bars across the screen at a 75% saturation level. The 'Color8 Bars100' test pattern consists of 8 vertical bars across the screen at a 100% saturation level. From left to right the bars are: white, yellow, cyan, green, magenta, red, blue, and black. To properly adjust the saturation and hue you will need to use the blue colored filter that comes with AVIA. You will also need to turn off any automatic flesh tone controls on your display before making these adjustments. When the Saturation and Hue are adjusted correctly, the white bar and the blue bar should be exactly the same shade when looking through the blue filter. Saturation and hue settings interact with each other so after making this setting you may want to go back and check that the saturation setting is correct.

The 'Gray Ramp' can help verify that your display is showing the gradients between black and white correctly. You should see a smooth transition between black and white with this test pattern.

Special Equipment Needed for Display Calibration

To assist in this calibration, the Master Four includes IRE windows to be used with the proper calibration equipment.

Test Patterns Used:

- Window IRE10
- Window IRE20
- Window IRE30
- Window IRE40
- Window IRE50
- Window IRE60
- Window IRE70
- Window IRE80
- Window IRE90
- Window IRE100

**IRE**

IRE stands for International Radio Engineers and it is a relative scale. It defines the volt peak to peak video divided up into 140 IRE units. This is done to make numbers for luminance levels easier to communicate. In the ISF Training Manual, it is described as the amplitude of the video signal from blanking (zero volts) to peak white is 0.714286 volts or 100 IRE units.

Synchronization signals extend from blanking to -0.285714 volts or -40 IRE units.

6.4 CRT and Anamorphic Lens Calibration

To get the best picture from a CRT-based display and an Anamorphic projection, you can use the following test patterns. They are useful to properly set color convergence and general picture geometry

Test Patterns Used:

- XHatch Coarse
- XHatch Fine
- Focus

6.5 Source Calibration

Test Patterns Used: Half Black/White
 H-Clr7 Bars75
 H-Clr7 Bars100
 H-Clr8 Bars75
 H-Clr8 Bars100

To get the best performance out of each of your sources you should individually calibrate each input specifically to the connected source. In this section, all picture control adjustments are made using the Master Four's picture controls. Keep in mind that if you replace a source with a new component you will also want to recalibrate the input. To calibrate each source correctly you will need the source to output a reference test pattern similar to what is built in to the Master Four. For sources like DVD, D-VHS this content is commonly available in their test patterns menu. But for a source like HD satellite or cable, these test patterns are played on channels like HDNet at off hours.

Use these test patterns and modify the Input Picture Controls (Brightness, Contrast, Saturation and Hue) together with the half test patterns to obtain a proper match for each source.

6.6 Troubleshooting

My Master Four shows an error message.

If the Master Four does not boot correctly, you may get an error message. Performing a hard reset of the Master Four should clear any memory errors and reboot the unit to its factory default. If you still get an error message after performing a hard reset, contact our distributor for service.

- Perform a hard reset of the Master Four unit using the remote control as follows:
 - 1) Press the Configuration button on the remote until the Front Panel Display (FPD) reads 'Configuration / Factory Default'.
 - 2) Press Enter. The FPD indicates 'No'
 - 3) Press the up arrow. The FPD indicates 'Yes'
 - 4) Press Enter. The Master Four reboots to its factory default
- Perform a hard reset of the Master Four unit using the buttons on the front panel as follows:
 - 1) Unplug the power supply from the Master Four unit
 - 2) Press Menu and Exit buttons simultaneously while plugging the power back in.
 - 3) The Master Four will take about 15-20 seconds to perform the hard reset.

The picture has horizontal lines with the Output set to 1080p60 (or 720p60)

The Output Format 1080p60 is defined by SMPTE 274M standard to match a Video Output at 60 frames per second (or 59.94Hz, depending on your display). Using the Output Format 1080p60 with a Video Signal at 50Hz can lead to a wrong decoding by your display.

To obtain a clear picture, do as follow:

- Change the output frame rate to 50 Hz-locked then change the output format to 1080p50
 Output Setup ⇒ Frame Rate ⇒ 50 Hz ⇒ 50 Hz lock or Unlock ⇒ 50.00
 Output Setup ⇒ Format ⇒ 1080p50
 The Output Signal sent to your display would have a frame rate of 50Hz, using the 1080p50 Output Format.
- or
- Change the Frame rate from 50Hz to 60 Hz:
 Output Setup ⇒ Frame Rate ⇒ 50Hz ⇒ Unlock ⇒ 59.94 by using the Up button.
 The Output Signal sent to your display would have a 59.94Hz frame rate, using the 1080p60 Output Format.

The picture is green when I use the analog output of the Master Four.

A green picture usually means that a component video signal is being sent to the RGBHV input of a display. Follow the instructions earlier in the user guide to setup your Master Four to work with a display with RGBHV inputs

No picture when I connect the Master Four to the HDMI input of my display.

The default output from the Master Four is 1080p. Make sure that the display is Full-HD compliant (accept 1920x1080 resolution in progressive format and is HDCP capable). Try a lower resolution if your display is HDCP compliant.

The Blue status LED blinks on the front panel of the Master Four.

A blinking blue light on the Master Four means that the scaler is processing the HDCP handshaking. If the Master Four is unable to authenticate with the display the status LED will continue blinking. Verify that your display is HDCP compliant. If it is not HDCP compliant, use component connections.

If the display is compliant, then verify that the 'HDCP mode' is set to 'On' in the 'Input Adjust' and 'Output Setup' menus. Select the Input into the "Input Select" Menu. If the problem persists, check the cabling and try new cables, if possible or try cycling the power on your display or HDCP source.

The Green status LED blinks on the front panel of the Master Four.

The LED on the Master Four blinks green when it is passing a copy protected signal to a non-HDCP display. If your display is not HDCP compliant, then the image won't be displayed. Use component connections from your source to your Master Four instead.

Will I lose the settings on my Master Four if I update the software version.

The Master Four retains its settings upon software update. To avoid any disturbances if a power loss happens during the update process, please take note of your current settings.

7.0 COMPLETE MENU TREE

Input Select		
Video 1		
Video 2		
S-Video 1		
S-Video 2		
Component 1		
Component 2		
RGBHV / Component		
HDMI 1		
HDMI 2		
HDMI 3		
HDMI 4		
HD-SDI 1 (Dual SD HD-SDI Input Module - S7011060 is required)		
HD-SDI 2 (Dual SD HD-SDI Input Module - S7011060 is required)		
Auto		
Input Aspect Ratio		
Frame AR		
	4 : 3	
	16 : 9	
Active AR	(Quick Access: 'Aspect' button on RCU)	
	1.33 : 1	(Quick Access: '4:3' button on RCU)
	1.55 : 1	
	1.66 : 1	
	1.78 : 1	(Quick Access: '16:9' button on RCU)
	1.85 : 1	
	2:35 : 1	(Quick Access: 'Pan' button on RCU)
	User	Range 1.01-3.00
Panorama		
	ON	
	OFF	
Zoom		
	Horizontal	Range 0-100
	Vertical	Range 0-100
Pan		
	Horizontal	Range 0-100
	Vertical	Range 0-100
Borders		
	Horizontal	Range 0-200
	Vertical	Range 0-200
Preset		
	4:3 Full Frame	
	LetterBox	
	16:9 Full Frame	
	4:3 Stretch	
	Preset 1	
	Preset 2	
	...	
	Preset 10	
	User	
Save User To		
	Preset 1	No
		Yes
	Preset 2	No
		No

Table 1: Complete Menu Tree

		Yes
	...	
	Preset 10	
		No
		Yes
Input Adjust		
	Mosquito Noise Reduction	
	OFF	
	Low	
	Medium	
	High	
	Deinterlacing	
	Auto	
	Film Bias Mode	
	Video Mode	
	2:2 Even	
	2:2 Odd	
	Game Mode 1	
	Game Mode 2	
	PReP	
	ON	
	OFF	
	Cadence Detect	
	ON	
	OFF	
	Overscan	Range 0-20
	Image Shift (for analog and HD-SDI inputs)	
	Horizontal	Range 0-30
	Vertical	Range 0-30
	Field Swap	
	ON	
	OFF	
	Color Space	
	RGB	
	YPbPr	
	YCbCr 4:2:2	
	YCbCr 4:4:4	
	Auto	
	Input Level	
	Video	
	PC	
	VCR Mode	
	ON	
	OFF	
	Auto	
	HDMI Config	
	HDCP Mode	
		OFF
		ON
	Auto Aspect Ratio	
		OFF
		ON
	Auto Color Space	
		OFF
		ON
	Auto Priority	
	Range 1-13	
	Audio Input	

Table 1: Complete Menu Tree

	OFF
	Audio 1
	Audio 2
	Audio 3
	Audio 4
	Stereo
	HDMI
AV Lipsync	Range 0-200
Picture Control	
Fine detail	Range -100 +100
Edge Enhancement	Range -100 +100
Brightness	Range -100 +100
Contrast	Range -100 +100
Saturation	Range -100 +100
Hue	Range -100 +100
Y/C Delay	Range -100 +100
CUE Correction	
	OFF
	ON
	Auto
Configuration	
Test Patterns	
	OFF
	Frame Geometry
	Brightness/Contrast
	Vertical Lines
	Horizontal Lines
	Judder
	Checkboard
	Color8 Bars75
	Color8 Bars100
	Window IRE10
	Window IRE20
	Window IRE30
	Window IRE40
	Window IRE50
	Window IRE60
	Window IRE70
	Window IRE80
	Window IRE90
	Window IRE100
	Gray Ramp
	Xhatch Coarse
	Xhatch Fine
	Focus
	Half B/W
	H-Clr7 Bars75
	H-Clr7 Bars100
	H-Clr8 Bars 75
	H-Clr8 Bars100
	Black
	White
	Red
	Green
	Blue
	Cyan
	Magenta
	Yellow

Table 1: Complete Menu Tree

Auto Standby	OFF	
	ON	
Led Brighthness	Navigation	Range 0-3
	Normal	Range 0-3
User Mode	Normal	
	Advanced	
Serial Port Rate	4800	
	9600	
	14400	
	19200	
	38400	
	57600	
Factory Default	No	
	Yes	
Software Update	No	
	Yes	
12V Trigger (Levels)		
	Trigger #1	
		Normal
		Negative
	Trigger #2	
		Normal
		Negative
Information		
Output Setup		
Analog / Digital	BNC (Analog)	
	HDMI (Digital)	
Format	480p	
	540p	
	576p	
	720p-50	
	720p-60	
	1080i-50	
	1080i-60	
	1080p-24	
	1080p-25	
	1080p-50	
	1080p-60	
	800x600 (SVGA)	
	1024x768 (XGA)	
	1280x1024 (SXGA)	
	848x480	
	852x480	
	1366x768	
	852x576	
	1366x768 (1)	
	1366x768 (2)	
	1360x768 (1)	
	1360x768 (2)	
	1280x768	

Table 1: Complete Menu Tree

1024x1024
1024x852
1024x768
1024x576
848x600
1365x1024
1400x1050
1400x788
960x540
1280x960
1440x960
1440x1152
User
Horizontal Shift
Horizontal Size
Horizontal Front Porch
Horizontal Sync
Horizontal Back Porch
Horizontal Total
Vertical Shift
Vertical Size
Vertical Front Porch
Vertical Sync
Vertical Back Porch
Vertical Total
Aspect Ratio
Display
4 : 3
5 : 4
16 : 9
2.35 : 1
User
Range 1.01-3.00
Lens
Mode 1
Mode 1-Auto
Mode 2
None
Screen
4 : 3
5 : 4
16 : 9
2.35 : 1
User
Range 1.01-3.00
Image Shift
Vertical
Range -30 +30
Horizontal
Range -30 +30
Underscan
Range 0-100
Sync Type
Bi-Level
Tri-Level
Composite
H+/V+
H+/V-
H-/V+
H-/V-
Color Space
RGB
YPbPr

Table 1: Complete Menu Tree

	YCbCr 4:2:2		
	YCbCr 4:4:4		
Output Level	PC		
	Video		
Framerate	24 Hz		
		24 Hz Lock	
		48 Hz Lock	
		60 Hz Lock	
		72 Hz Lock	
		Unlock	Range 24-120
	25 Hz		
		25 Hz Lock	
		50 Hz Lock	
		75 Hz Lock	
		Unlock	Range 25-120
	30 Hz		
		30 Hz Lock	
		60 Hz Lock	
		User	
		Unlock	Range 30-120
	50 Hz		
		25 Hz Lock	
		50 Hz Lock	
		75 Hz Lock	
		Unlock	Range 25-120
	60 Hz		
		24 Hz Lock	
		48 Hz Lock	
		60 Hz Lock	
		72 Hz Lock	
		Unlock	Range 24-120
Border Level	Range -16 +100		
Picture Control	Presets		
		ISF Day Normal	
		ISF Day Bright	
		ISF Night	
		Preset 1	
		Preset 2	
	Brightness	Range -100 +100	
	Contrast	Range -100 +100	
	Saturation	Range -100 +100	
	Hue	Range -100 +100	
	Gain		
		Red	Range 0.50-2.50
		Green	Range 0.50-2.50
		Blue	Range 0.50-2.50
	Offset		
		Red	Range 0.50-2.50
		Green	Range 0.50-2.50
		Blue	Range 0.50-2.50
	Gamma		
		Red	Range 0.50-2.50
		Green	Range 0.50-2.50
		Blue	Range 0.50-2.50
HDCP Mode			

Table 1: Complete Menu Tree

	OFF	
	ON	
12V Trigger #2	(Quick Access: 'Viewing Mode' button on RCU	
	OFF	
	ON	
	THEATRE	
Display Profile		
	Select	
		User
		Profile 1
		Profile 2
		...
		Profile 10
	Save	
		Profile 1
		No
		Yes
		Profile 2
		No
		Yes
		...
		Profile 10
		No
		Yes
	Auto	
		OFF
		ON

Table 1: Complete Menu Tree

Cine **VERSUM**

Contact Information

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*Cine*VERSUM