Overview

The UltrachromeHR stand-alone chroma keying and compositing system that includes 4 primary components:

1. 2, 3 or 4 Chroma Key channels with Input Delay Management and Fill Channel Color correction and Proc Amp.
2. 4 x MiniME compositing engines each with Background, Preset and 3 Key busses.
3. 8 x Channels of Media Store (4 x key & 4 x Fill) for local Graphics storage and insertion
4. Signal routing with 2 x MultiViewers.

The UltrachromeHR chroma key includes two different key generator designs that can be used independently or in combination to achieve the very best result.

The HR Wedge Key is purely chroma based and discriminates between the color vector angle and level of the background color vs the color vectors and levels in the foreground components. This key design is like most existing chroma key technologies and can provide a very good result under ideal conditions, however if the content includes high detail luma content in edge regions, these may not be included in key generation.

The HR Detail Key adopts a different design philosophy and adds luminance dependency to a three-dimensional spherical color discriminator. This keyer can develop subtle key and fill shapes and discriminate high detail luma content in edge transition areas. However, this design may be challenged by content where background and foreground levels are similar within the fill itself.

By combining these two key technologies UltrachromeHR can generate a composite key that includes the best qualities of each key type.

Each Chroma Keyer includes a two-channel variable input delay paths to compensate for external Virtual Set background generation and accepts a standard SDI (4:2:2) camera input and an additional 0:4:4 full bandwidth chroma input when used with a Ross ACID camera. The chroma Keyer also includes a post keyer fill processor that allows the fill image to be matched to the color temperature of the virtual environment. The chroma keyer outputs standard Key/Fill signals to the internal routing system for use directly as an output to a downstream device as well as to any of the 3 keyers in each of the 4 MiniME's.

Each MiniME has its own Background and Preset bus as well as 3 linear keyers that can accept the key/fill signals from the chroma key as well as external key/fill sources. The MiniME can independently cut or dissolve keyers and background/preset.

The internal Media Stores can be loaded with stills and animations for use as additional key sources as well as used to capture stills from internal or external sources.

All internal and external sources and destinations are distributed via an internal routing system, for full flexibility and two configurable MultiViewers are included for monitoring.

Initial setup

Step 1.

UltrachromeHR is controlled via the Ross Dashboard control software, please download and install Dashboard for Mac or PC from the Ross website (www.rossvideo.com/dashboard)

Step 2.

Connect the dashboard computer via Ethernet (via a router or directly) to network port 1 on the UltrachromeHR frame. (note the default IP address of port 1 is 192.168.0.123, this can be changed via Dashboard once connection is established).

Step 3.

Use Dashboard to configure input settings; under the Configuration Tab select 'Inputs' and then 'Physical'. Here you can name the physical connections to the frame and add associations for 044 and garbage matte / mask inputs (if present). Here is where you would also associate an alpha channel with a fill input for Auto Selection in the MiniME keyers.
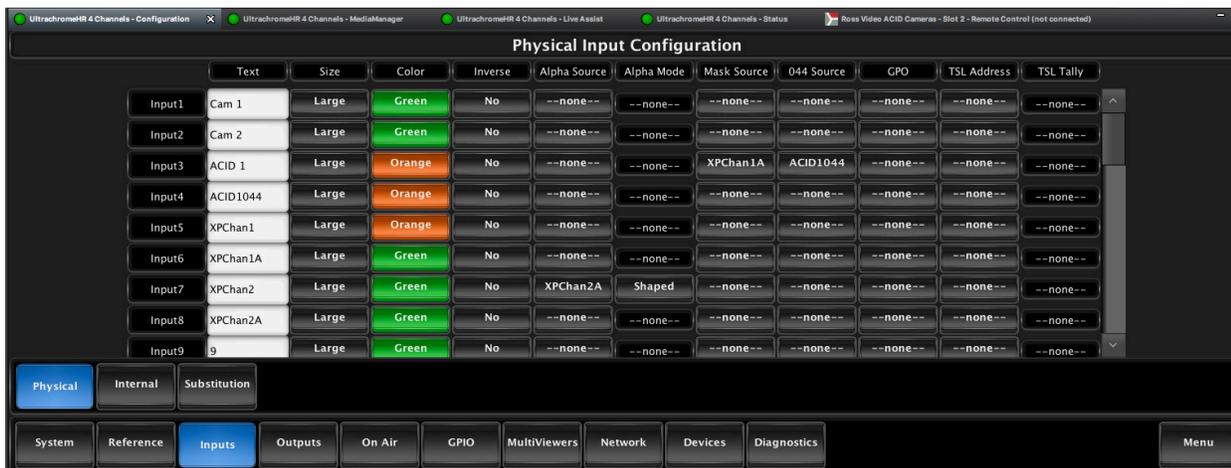
Step 4.

Check that the CK channels have the correct alpha channel assignment under the 'Internal' input tab.

Step 5.

Assign signal to physical outputs as required (note MultiViewers (MV1 and MV2) are only available on outputs 1 & 2.
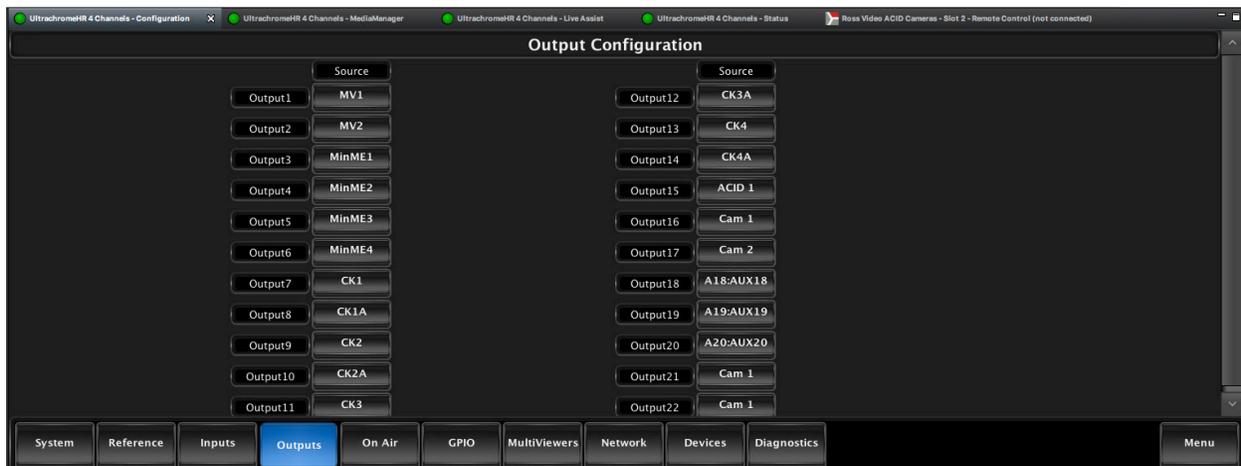
Step 6.

Select the Dashboard Live Assist Menu and select the Bus Assignments tab. Here you can set the sources desired for the Chroma key, MiniME and MiniME keyers.
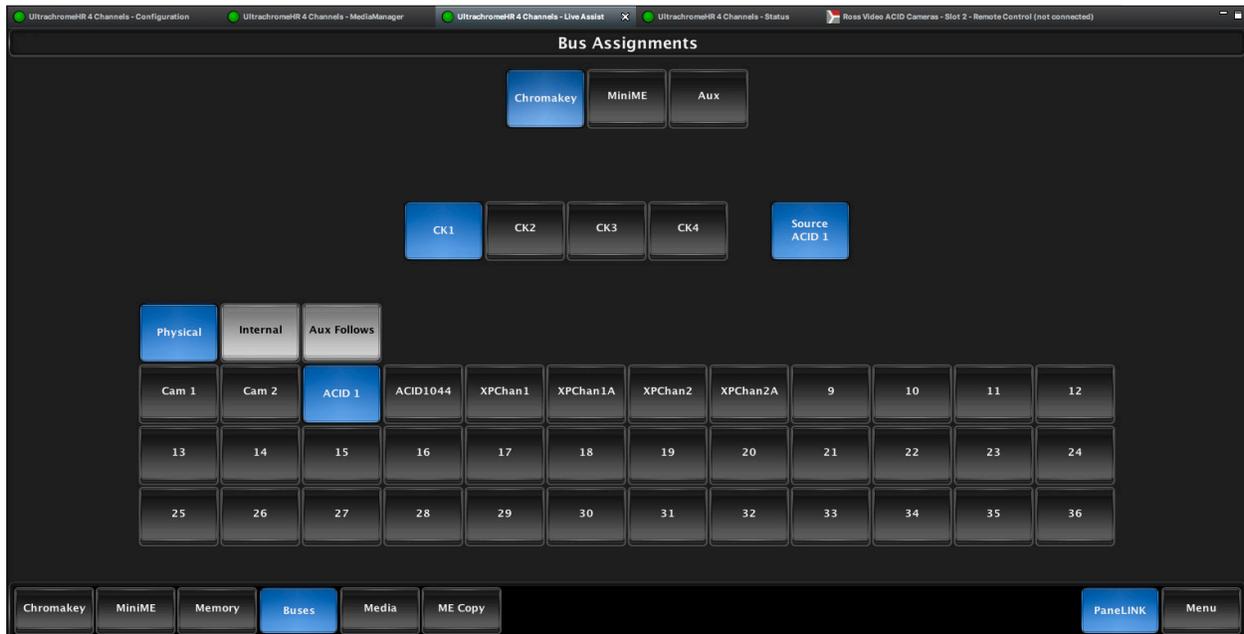
Step 7.

Select the MiniME tab and cut on the keyer that has been assigned to the Chroma key. Monitor the MiniME output.

Step 8.

Select the Chromakey Tab. The select the color of the chroma key background at the top of the menu and initialize the chroma keyer by pressing the 'Init' button in the top right.

The MiniME output should now show the chroma key source keyed over the chosen background. If the lighting and camera settings are ideal, the resultant key should be good. Typically, some chroma key adjustment will be required.

Note* If there is an 0:4:4 input available, select the Delay/HR tab and set HR Mode to ON. (note, make sure the 0:4:4 input is assigned to the primary 4:2:2 input as described in Step 3.). If this is selected and no 0:4:4 input is present, the keyer will not produce a correct output.

The UltrachromeHR Chroma keyer control set consists of global control parameters and parameters for two different keying technologies that can be selected individually or combined to achieve optimal results from each of the key shapes.

It is recommended that for initial adjustment each key type is selected and setup individually and Global Parameters are set after primary key settings have been adjusted.

Step 9.

Chroma Key Adjustments:

It is recommended that adjustment procedure is as follows:

1.**HR Wedge Key Parameters: Select HR Wedge Key only**

Gain: Setting Gain is of primary importance; it is recommended that this is set with the Angle Control set to 100 and the Lift control set to 0. Adjust the Gain control until the background is fully removed leaving a reasonable key edge. Note that too much gain will produce hard and undesirable key edges. This control should be adjusted in conjunction with the Background Luma Suppress control, to ensure the best compromise between background removal and key edge quality. The fill portion of the signal may at this point contain semitransparent areas, this can be corrected with the Angle and Lift controls.

Background Luma Suppress: The 'Init' function should set this reasonably well, if the set color and lighting is uneven, adjustment may be necessary to ensure the chroma background is fully suppressed. (Adjustment Tip. In the MiniME turn on a Box Mask for the key channel that has the chroma key assigned and position the box to reveal the background. This will show any background suppression errors)

Box Mask: Incorrect Luma Supression   *Box Mask: Correct Luma Supression*

Angle: This adjustment changes the color wedge angle (wedge shape) that is used to detect areas of foreground (fill) and background (key) based on the chosen color vector. Changing this detection angle will increase the density of the fill content. Dependent on subject matter, this control can help 'fill in' areas of heavy spill without hardening edge detail. Adding Lift after this adjustment may still be required

Lift: This control will amplify the generated key signal to 'fill in' areas of transparency. However, a large amount of lift can reduce key edge quality. It is recommended that this control be adjusted after the Angle control.

Highlight Correction: Dependent on lighting conditions, camera setup and subject – some areas of the image might contain high luminance levels at edge boundaries that may require additional Lift. This control allows lift to be selectively applied to those areas only.

2. HR Detail Key Parameters: Select HR Detail key only

Clip: This control adjusts the clip level between foreground and background key area. It should be adjusted to achieve complete background removal. It is recommended that this control be adjusted several times to ensure it is set to where the background is just removed, setting it too high will reduce the edge quality of the resultant image.

Gain: This adjustment will 'lift' the fill image and should be adjusted to achieve solid fill content. Note that setting gain too high will introduce undesirable dark boundaries.

Shadow Sensitivity: Adjusts the level of dark image regions, particularly in cast shadow areas.

Shadow Density: This control works in conjunction with Shadow Sensitivity and adjusts the apparent lightness of the dark / shadow areas

Highlight Sensitivity: This parameter only affects image areas with specular highlights such as reflective surfaces. Areas of high spill reflection may be detected as key areas and print through to the background, this adjustment will allow such areas to be filled in correctly.

3. Select HR Combined Key

This combines the output of both the HR Wedge and HR Detail keyers and dependent on subject, lighting conditions and camera setup can produce the best results. However, for some environments the selection of an individual key type may be preferred.

4. Global Parameter Controls:

Chroma Angle: This should always be set correctly by the 'Init' function and controls the fill color that has been detected as color spill, normally no adjustment is necessary. If there are any minor chroma differences in spill areas this control can be used to make corrections.

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Re-spill Color: This control works in conjunction with the Re-spill Color selector button. Using the re-spill color button set a color that is near to the average color of the background/lighting conditions of the virtual environment. Then this color can be added into those areas of the fill that contained spill from the chroma set. Subtle amounts of spill replacement can make the resultant composition more realistic.

Edge Softness: This control allows key edges to be filtered to eliminate undesirable hard edges and add realism to a scene by simulating depth of field characteristics.

Background Normal Adjust: If the subject image contains fine detail such as fine hair with a luminance level that is close in value to the chroma set color background level – it may be difficult to provide good separation between background and foreground elements. In this case the Background Normal Adjustment can offset the detected level of the chroma background and allow for fine tuning. However, this adjustment will interact with settings of both key types and re-adjustment may be required.

General:

High quality chroma keying with a natural look is fully achievable with the UltrachromeHR keying system. However, as with any chroma key system careful attention should be paid to the chroma key environment.

The set itself should be lit evenly with a reasonable level of brightness, too bright or too dark will compromise the ability to produce a great result. Too bright may also generate high levels of reflected color background (Spill) into the foreground subject, again compromising key quality. When the camera output is viewed on a waveform monitor the background set level should ideally be between 50-75% of the overall image level. The foreground subject/s should be separately lit.

Camera shading should be adjusted using appropriate charts, ensuring that grey scale, lens flare, gamma and white/black balance correctly set. If using and ACID H200 camera, it is recommended it be set in HDR mode - HLG1200. This mode is compatible with standard (non HDR signals) and the wider dynamic range allows greater image separation in lower light regions. Also, the camera should be set at its minimum gain to ensure the lowest noise levels and Detail levels should be kept at minimum to avoid sharp edge transitions.

Real elements, presenters and props should naturally not contain colors similar to the background and clothing or props with high reflectivity should also be avoided to minimize color spill.

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