

## Carbonite Black UltraChrome

The Carbonite Black and Carbonite Black+ frames can be upgraded to a standalone chroma keyer providing up to 4 independent UltraChrome 2 chroma keys as well as the advanced UltraChromeHR 0:4:4 signal processing when paired with a ACID camera.

The Carbonite Black UltraChrome shares the same hardware as the Carbonite Black and Carbonite Black+, but is configured differently. The most significant difference is that the Carbonite Black UltraChrome does not have any MEs. MiniME™ engines and aux buses are used for video routing. Some of the other differences are listed below.

**Note:** This document provides additional information on the setup and operation of Carbonite Black UltraChrome and is intended to be used in conjunction with standard switcher documentation that came with your system.

	Carbonite Black	Carbonite Black UltraChrome
Media-Store Channels (Max)	2	8 (4×fill + 4×alpha)
MEs (Max)	1	0
MiniME™ Engines	2	4
MiniME™ Keyers	2	3
Proc Amps (Out)	3	4
Frame Delays	0	8

## Video Input Setup

Video inputs to the Carbonite Black UltraChrome have the additional options of being able to assign a garbage matte/mask to a source, as well as assign the source with the UltraChromeHR 0:4:4 video.

**Note:** The special UltraChromeHR chroma key input requires an ACID camera with the 0:4:4 video output stream.

### To Assign a Garbage Mask to an Input

The garbage mask input is similar to a standard box mask but allows for a dynamically generated mask. The mask is applied directly to the chroma key outputs and does not consume any of the key resources of the MiniME™.

1. Click **Navigation Menu > Configuration > Inputs > Physical**.
2. Click the **Mask Source** button for the video input that you want to apply the garbage mask to.
3. Click the source that you want to use as the garbage mask.

### To Assign an 0:4:4 Stream to a Source

The UltraChromeHR signal consists of a standard 4:2:2 camera input and an exclusive 0:4:4 chroma input from the Ross ACID cameras. You must associate the 0:4:4 input with the primary camera input.

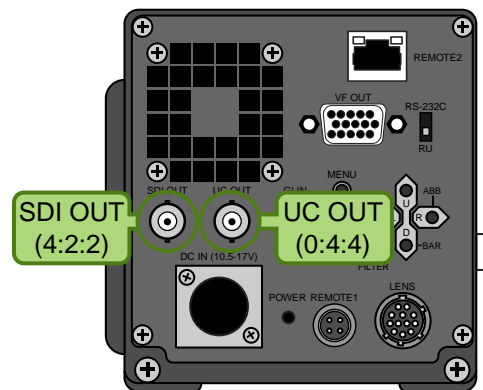


Figure 1: UltraChromeHR Connections on ACID

1. Ensure that you have the **UC OUT** and **SDI OUT** video streams from the ACID camera connected to two input BNCs on Carbonite Black UltraChrome.
2. Click **Navigation Menu > Configuration > Inputs > Physical**.
3. Click the **0:4:4 Source** button for the SDI video input that is coming from the camera.
4. Click the source that has the 0:4:4 video stream coming from the camera.

### To Assign the Chroma Key Alpha to the Fill

By default, the alpha signals from each chroma key is assigned as the alpha source for the video fill from the chroma key. This is important for the auto select key to be able to properly match the fill and alpha pair from each chroma key engine.

1. Click **Navigation Menu > Configuration > Inputs > Physical**.

2. Click the **Alpha Source** button for the chroma key fill (**CKX**) you want to assign an alpha to.
3. Click the chroma key alpha source (**CKXA**) that you want to assign to the fill.

## Video Output Setup

The output of each chroma key engine, MiniME™, MultiViewer, and aux bus can be assigned to an output BNC.

*Note: Restrictions on what video signals can be output on specific BNCs for the Carbonite Black and Carbonite Black frames also apply when the Carbonite Black UltraChrome software is loaded.*

### To Assign a Source to an Output

1. Click **Navigation Menu > Configuration > Outputs**.
2. Click the **Source** button for the output BNC that you want to assign an output to.
3. Click the video output that you want to assign to the output BNC.

## UltraChrome 2 Chroma Key Engine

An UltraChrome Chroma Key is a key in which the hole is cut based on a color value, or hue, rather than a luminance value or alpha signal. The color is removed and replaced with background video from another source. The default color is blue.

UltraChrome 2 can work in two modes, depending on the lighting conditions and subject matter used for the chroma key.

- **HR Wedge Key** — Based on the standard chroma keyer and discriminates between the color vector angle and level of the background color vs the color vectors and levels in the foreground components. This produces very good results under ideal conditions. However, if the scene includes high detail luma content in edge regions, these may not be included in the output.
- **HR Detail Key** — Differs from the standard chroma keyer in that it adds luminance dependency to a three-dimensional spherical color discriminator. This chroma keyer can develop subtle video and alpha shapes and discriminate high detail luma content in

edge transition areas. However, this design may have problems with content where background and foreground levels are similar within the video itself.

*Tip: UltraChrome 2 also offers the option to combine these two modes to offer good capture of high luma detail in the edge regions as well as compensation for similar foreground and background levels.*

The UltraChrome 2 chroma keyer uses an independent chroma key engine to produce the video and alpha components of the key. These internal video streams can be composited in a MiniME™ keyer, or fed out two separate video streams to an external device, such as a video server.

### To Select the Chroma Key on a Keyer

The outputs of the chroma key engine must be selected on a key bus to be properly keyed and to adjust the chroma key parameters.

1. Click **Navigation Menu > Live Assist > MiniME**.
2. Click the **Key X** button for the keyer you want to view the chroma key on.
3. Click **Auto Select**.
4. Click **Key Fill:** and select **CKX** for the chroma key you want to use.

### To Set Up a Chroma Key

Set up the chroma key with the source you want to use and adjust the parameters. Ensure that the chroma key output has been selected on a keyer so that you can view the output as you adjust the parameters.

1. Click **Navigation Menu > Live Assist > Chroma Key**.
2. Click **CK X** for the chroma key engine you want to use.
3. Click **CK Source** and select the video source you want to use for the chroma key.

*Note: You can only select a physical input, frame delay, or a Media-Store for a chroma key. You can also select an Aux Bus, but the source selected on the Aux Bus must be valid for the chroma key.*

4. Click **Setup** (only required if you are using a separate 0:4:4 source).



5. Click the **Use 0:4:4 Source** button to turn UltraChromeHR with a separate 0:4:4 chroma source on. Ensure that the chroma key source and 0:4:4 UltraChromeHR signals are properly set up. Refer to [To Assign an 0:4:4 Stream to a Source](#) on page 1 for information on assigning a source as an 0:4:4 input.

**Tip:** The **Debug Output Source** buttons are for diagnostic purposes only. Adjust these settings only when instructed to do so by Ross Video Technical Support.

6. Click **Parameters**.
7. Click the **Color** button for the color of the background you are using for your chroma key.

**Note:** The scene must contain at least 5% of the desired chroma key color for the chroma key to properly key out that color.

8. Click **Init**.
9. Click the **Key Type** button for the chroma key mode you want to use.
  - **Wedge Key** — based on the standard chroma keyer and discriminates between the color vector angle and level of the background color vs the color vectors and levels in the foreground components.
  - **Detail Key** — differs from the standard chroma keyer in that it adds luminance dependency to a three-dimensional spherical color discriminator.
  - **Combination Key** — combine the two modes to offer good capture of high luma detail in the edge regions as well as compensation for similar foreground and background levels.

**Note:** All adjustments are always available, even if they are not applied by the selected mode.

10. Adjust the **Wedge Key Parameters** as follows:
  - **Gain** — use this setting to set the **Angle Control** to 100 and the **Lift** to 0 and then adjust this setting until the background is fully removed, leaving a reasonable edge to the key. Too much gain will produce hard and undesirable edges.

**Tip:** Adjust the **Gain** with the **Bkgd Luma Suppress** to balance between background removal and edge quality.

- **Bkgd Luma Suppress** — use this setting to compensate for uneven color or lighting in the shot to ensure the chroma background is fully suppressed.

**Tip:** Turn on the box mask in the chroma key to compare the backgrounds. The masked area shows the background source without the key settings applied.

- **Angle** — use this setting to change the color wedge angle (wedge shape) that is used to detect areas of foreground (fill) and background (alpha) based on the chosen color vector. This can help fill in areas of heavy spill without hardening edge detail.
- **Lift** — use this setting to amplify the generated alpha signal to fill in areas of transparency.
- **Highlight Correction** — use this setting to lift areas of the image might contain high luminance levels at edge boundaries. This could be due to lighting conditions, camera setup, or subject.

11. Adjust the **Detail Key Parameters** as follows:

- **Clip** — use this setting to clip between the foreground and background. You are looking to achieve complete background removal.

**Tip:** Clip should be set to the point where the background is just removed. Setting it too high will reduce edge quality.

- **Gain** — use this setting to lift the fill image. You are looking to achieve solid fill content.

**Tip:** Setting the gain too high may introduce dark boundaries.

- **Shadow Sensitivity** — use this setting to adjust the level of dark image areas, particularly in cast shadow areas.
- **Shadow Density** — use this setting to adjust the apparent lightness of the dark / shadow areas in conjunction with the **Shadow Sensitivity**.
- **Highlight Sensitivity** — use this setting to fill areas with specular highlights, such as reflective surfaces, that can show through to the background.

12. Configure the **Auto Adjust** parameters as follows:



- **Measurement Src** — click **Measurement Src** and select the video source that you are going to be putting the chroma key over. The chroma key engine uses this source to adjust the edge area and re-spill values.
- **Auto Edge Luma** — use the measurement source to automatically calculate the edge luma.
- **Auto Re-Spill Color** — use the measurement source to automatically calculate the re-spill color. The color is based on the average color of the measurement source.

13. Adjust the **Global Parameters** as follows:

- **Chroma Angle** — use this setting to select the fill color that has been detected as color spill. You should not have to adjust this setting.
- **Edge Luma** — use this setting to adjust the luminance of the edges.
- **Edge Softness** — use this setting to filter the edges to eliminate undesirable hard edges and add realism to a scene by simulating depth of field characteristics.
- **Re-Spill** — use the **Re-Spill Color** and **Re-Spill Sat** settings to select a color that is near the average color of the background/lighting that needs to be added into those areas of the fill that contain the spill from the chroma set.

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