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How to use Chronos with External Triggers

Tutorial Overview:

This tutorial will show you how to use your external trigger cable to record end events from a distance. This is useful when the camera is in a hard-to-reach or dangerous place where it would not be ideal to go near the device. **Get your external trigger switch here.**

Using the External Trigger Cable to Stop Recording

1. On the left side of the camera you will find the port bay. Look for the circular BNC port labeled Trig1. This port is labeled as IO1 in the camera software. Chronos has 2 IO ports and one input port for external devices, the trigger cable used in this demonstration fits into the IO port with a BNC port.

IO ports used for external triggering in this tutorial are required to be shorted to trigger an event.

The trigger switch used in this demonstration does just that. However, you can use any of the IO ports with different trigger devices to achieve the same result. **For advanced trigger settings, see page 2.**


2. Plug the end of the trigger cable into the BNC port. It will press in and twist to the right. Note that when using a BNC trigger, if the cable isn't long enough, you can use a BNC extension cable. Krontech sells up to 90 feet extensions with the ability to stack multiple extensions to increase the length further, or to chain multiple cameras to one trigger.

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3. Power on Chronos. Enter the Trigger Switch I/O Settings on the main camera page. Since we are using IO 1, we will use the first menu labeled IO 1 (BNC).

4. Select Record End Trigger as the function and enable the 20mA pullup setting to change the IO to an active low. You will also need to check the invert box and debounce to avoid accidental misfires. You can leave the other settings as is, additional settings on this screen are outlined below for further customization.
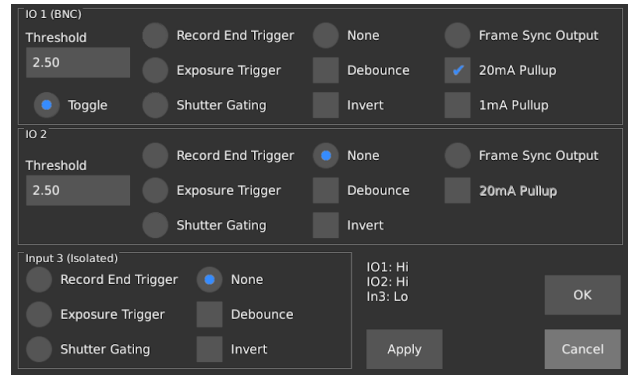
5. Select Apply and OK to return to the camera menu. Test the trigger by manually starting the recording and then hitting the trigger cable to stop recording. You have successfully set up your external trigger cable!

Can you start a recording with a trigger?

Yes, you can select the Toggle box and you can start and end a recording by pressing the trigger switch button.

Additional Advanced Trigger settings (Helpful for custom trigger devices)

How to choose a threshold: The threshold sets the input threshold voltage (in volts) for that IO. The input state changes between high and low when the threshold is crossed. The range is from 0 to 6.6V. For example, if you set the threshold to 2.5 volts, the camera would consider a trigger signal of 2 volts as "not triggered" and 3 volts as "triggered".

How to choose a pull-up setting: Whether you need a pull-up or not depends on what is generating the trigger signal into the camera. If there is nothing on the trigger cable that will generate any signal at all, then the voltage on the trigger will just float around without doing anything. In this case, the pull-up can be enabled to output a weak signal from the camera.

For example, our trigger cables are a pair of wires and a switch that connects the two wires when pressed.

When the switch is open, if there was no pull-up then you couldn't detect if the switch was open or closed because the voltage on the wire would never have any meaningful value on it. However, when you apply a pull-up then the camera will weakly pull the voltage on the trigger pin to a high value until you close the switch, which will connect the wires and force the signal to go low again.

Exposure Trigger: External triggers on IO 1 or IO 2 control the start of exposure, and the camera controls the exposure duration. To use this mode, first select the desired resolution and maximum frame rate in Record Settings. The exposure time is limited to a 1/frame rate, if longer exposures are desired, you must reduce the frame rate. Once the frame rate is set, select Exposure Trigger for the desired input on the Trigger/IO settings page. Ensure debounce is disabled for proper operation, and select invert and pullups as required. For TTL input, no pullups are generally required. With Invert unchecked, exposure will start on the rising edge of the input.

When you turn this on, the camera will not capture any frames until it detects a change on the trigger signal from inactive-to-active, at which point the camera will expose exactly one frame and then go back to waiting for another inactive-to-active change on the trigger signal.

This allows you to synchronize the time at which the camera is capturing a frame with an external device.

Shutter Gating: In this mode, the shutter is directly controlled by either Trigger IO 1 or IO 2. Exposure occurs for as long as the signal is active. (Support for other IO sources will be added in a future software update.) To use this mode, first select the desired resolution in Record Settings, and set the maximum frame rate. If you select a frame rate lower than the maximum, the sensor may be set to a low-frame-rate mode. This mode will limit the maximum achievable frame rate.

Once the frame rate is set, select Shutter Gating on the desired input on the Trigger/IO settings page. Ensure debounce is disabled for proper operation, and select invert and pullups as required. For TTL input, no pullups are generally required. With Invert unchecked, exposure will occur when the input is at a logic high level. In this mode, black cal can only be performed when a stable repetitive trigger

is received by the camera. If a stable trigger source isn't available, set the mode to None in Trigger/IO settings, perform a black calibration, and then set the mode back to Shutter Gating.

For more information on Shutter gating, see page 14 in the Chronos 1.4 manual. This setting applies to all models of Chronos.

Frame Sync Output: Sets function of IO to frame sync output. The output will be active when the shutter is open. It can be inverted with the Invert checkbox under the Frame Sync Output radio button.

Debounce: The debounce setting is to help avoid errors/misfires when using a physical switch as the trigger source. Selecting the debounce option in trigger settings causes the inputs to be sampled every 10ms, to avoid spurious triggers due to switch contact bounce.

Invert: Invert inverts the input level, so that trigger input will be sensitive to a low level instead of a high when checked (ie. Recording ends when the trigger is pressed instead of when it is released).

This is a brief outline of setting up external triggers. If you have any questions regarding triggers, please contact us at **support@krontech.ca.**