How to use Chronos with External Triggers

This tutorial will show you how to use your external trigger cable to trigger 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 own 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 labelled Trig1. This port is labelled 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.
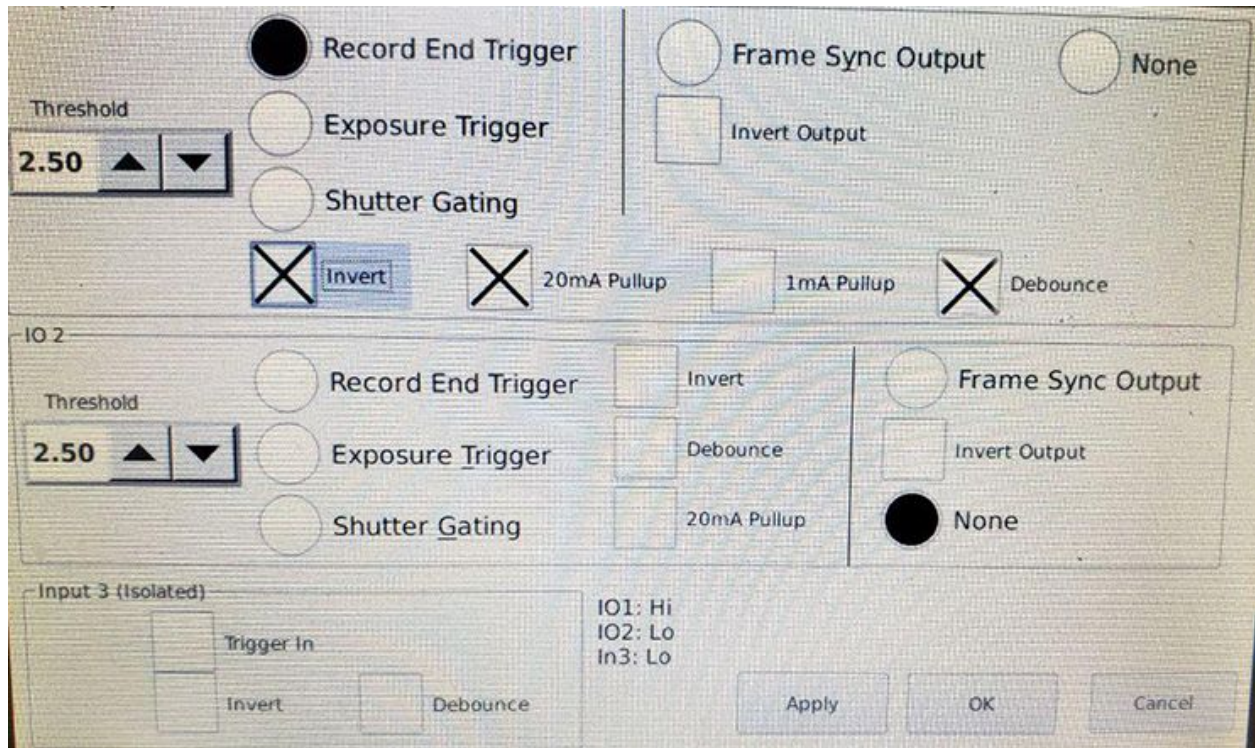
IO ports used for external triggering in this tutorial require to be shorted to trigger an event. The trigger switch used in this demonstration does just that, however, you can use any of the IO ports with different trigger devices to achieve the same result. **For advanced trigger settings, see page 4.**

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 to increase the length further, or chain multiple cameras to one trigger.

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 in order 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.

Threshold
2.50 ▲ ▼

● Record End Trigger   ○ Frame Sync Output   ○ None
○ Exposure Trigger   ☐ Invert Output
○ Shutter Gating

☒ Invert   ☒ 20mA Pullup   ☐ 1mA Pullup   ☒ Debounce

IO 2

Threshold
2.50 ▲ ▼

○ Record End Trigger   ☐ Invert   ○ Frame Sync Output
○ Exposure Trigger   ☐ Debounce   ☐ Invert Output
○ Shutter Gating   ☐ 20mA Pullup   ● None

Input 3 (Isolated)

☐ Trigger In
☐ Invert   ☐ Debounce

IO1: Hi
IO2: Lo
In3: Lo

Apply   OK   Cancel

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?

A trigger can only be used to end a recording at this time.

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. When the threshold is crossed, the input state changes between high

and low. 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 pullup setting: Whether you need a pullup 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 pullup 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 pullup 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 pullup 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 together and force the signal to go low again.

Exposure Trigger: External triggers on IO 1 or IO 2 controls the start of exposure, and the exposure duration is controlled by the camera. To use this mode, first select the desired resolution and maximum frame rate in Record Settings. The exposure time is limited to 1/frame rate, if longer exposures are desired, you must reduce the frame rate. Once 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 maximum, the sensor may be set to a low-frame-rate mode. This mode will limit the maximum achievable frame rate.) Once 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, 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. Output will be active when shutter is open. Can be inverted with Invert checkbox under 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 low level instead of high when checked (ie. Recording ends when 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.