**CameraAxe Lightning Menu**

The Lightning Menu was designed to optimize capture of lightning strikes, even during daylight hours when it is most difficult.. The CameraAxe will trigger both Camera1 and Camera2 ports when the light sensor, plugged into Sensor1, detects a light value that is Trigger Value (Trig Val) above the Reference Level. The Reference Level is first set when the Activate button is pressed, and is updated periodically based on the Update Reference Period (Updt). This means that the CameraAxe will adjust for slow changes in ambient light conditions, but will trigger with the quick rise in light level due to a lightning strike.

The Lightning Menu is shown in the image below. The select and arrow buttons allow the user to navigate to the different parameters to set up the menu functions.

**Lightning Menu Mode**

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| |  |  |  | | --- | --- | --- | | **Lightning Menu V2.1** | | | | **Trig Val** | **010/789** |  | | **Updt(ms)** | **0200** |  | | **PhotoMod** | **Simple** |  | |  | **Camera1** | **Camera2** | | **Prefocus** | **Yes** | **Yes** | | **Bulb sec** | **00.20** | **00.20** | |

The top area of the menu sets the three main parameters, while the bottom section contains settings specific to each of the two camera ports. The light sensor must be plugged into the Sensor1 port.

The table below shows the different settings available for each parameter and a brief description of the function of that parameter.

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| --- | --- | --- |
| Parameter | Options | Description |
| Trig Val  (Trigger Value) | Numeric value between  000 and 999 | Set point / Current value  First value is the trigger threshold value you set, and second value displayed is the current value read by sensor. The Device will be triggered when the light sensor reading is “Trigger Value” higher than the Reference Value. The default Trigger Value is 10. The current sensor value is displayed to the right of the trigger value to aid in picking an appropriate Trigger Value. While the default Trigger Value of 10 is a great starting point, values as low as 2 (!) have been successfully used for far away lightning in some conditions. If the CameraAxe is triggering on lightning outside of your area of interest, especially in darker ambient light, you may want to raise the Trigger Value considerably, and you can use the information in the Photo Mode Displays to help pick an appropriate value. See \*\*Note\*\* below. |
| Updt(ms)  (Update Reference Period) | Numeric value between  0000 and 9999 milliseconds | The time period between updates of the sensor Reference Value, in milliseconds. The default value is 200 ms (.2 second). It is not recommended to use a lower value, and it is recommended to set it slightly longer than the BulbSec below to avoid resetting the reference while the camera is taking an image.  The Lightning Function triggers based on the difference between the current sensor value and a Reference Value. This Reference Value is updated:   1. When Activate is pressed 2. Every “Updt(ms)”milliseconds, when not in a strike and not during the Bulb sec delay described below.     This allows the Reference Base Value for the trigger to adjust to ambient light levels over time, such as moving dark clouds, and only trigger when a quick positive change in light levels (i.e. a lightning strike) is detected. |
| Display | Simple  Advanced | Choose which Display type will be used when in Photo/Activate mode. The Simple (default) and Advanced displays are described below. |
|  |  | Values for each camera. |
| Prefocus | Yes  No | If set to **Yes**, pre-focus enabled continually while the CameraAxe is in Activate/Photo mode. This is equivalent to holding the shutter button half-pressed on most cameras. The default is **Yes** for Camera 1 & 2 and this is highly recommended to reduce shutter lag and insure that the camera is ready for a lightning strike. NOTE: Leave this set to **No** if you are connecting this port to a flash. |
| Bulb sec | Numeric value between  00.00 and 99.99 sec | The number of seconds that the device will be activated. The default value is .2 sec. It is recommended that this value be set to a value that is just greater than either your shutter speed or your camera’s frame rate (shots per second), whichever is longer. With that setting, the CameraAxe will delay long enough for your camera to take the picture and write the image to disk, and be ready to fire again if the lightning strike is still active. It is also recommended that longer shutter speeds, such as 1/20th - 1/5th sec (50 - 200 ms) be used to help capture all of the “tails” of the lightning strike. For example, if your camera has a frame rate of 4.0 shots per second (250 ms), use a minimum of .25 Bulb Sec or more if your shutter is open longer.  If set to 0.0, be sure to set Prefocus to Yes or your camera may not trigger every time. |

\*\*Note\*\*: As the ambient scene becomes brighter, the Reference Value will move higher. If the Reference Base plus Trigger Value goes over the WorkingMaxValue of 1012, the text “Too Hi” will appear on the Trigger Value line.

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| **Trig Val** | **010/789 Too Hi** |

This is an indication that the Trigger Value is set too high for this ambient situation, and unless the Reference Base Value goes down, the CameraAxe will not be able to trigger. If you really think you might get lightning that is brighter than this ambient level, do one of two things: 1) reduce your Trigger Value (you are likely to get more false triggers, but give it a try); 2) add a snoot to limit the Field Of View of the sensor, or add a neutral density filter in front of the sensor to reduce its light readings and leave room to trigger.

**Lightning Photo Mode** (Simple)

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| --- | --- | --- | --- | --- | --- | --- | --- |
| |  | | --- | | **Lightning Photo Mode V2.1** | | **Reference Base 895** | | **Current Val/Dif 899 /4** | | **Trigger Value +3** | | **Update Ref (ms) 200** | | **TrigCnt/PeakVal 6/1005** | | **Press Activate to Exit** | |

Once you press Activate, you enter Photo Mode and a new screen appears. This display is intended to inform you of what is happening, such as changes in light values, and to help you in adjusting the Trigger Value and Update Reference Period. No changes can be made in this mode – if you want to adjust settings, press Activate to go back to Menu Mode.

Simple Photo Mode Values and Descriptions

Reference Base

The value displayed is the Reference Base sensor value that is used in the trigger determination. It is a sensor value from a prior time, such as just after the last trigger or at the last Update Reference Period.

Current Value

The latest sensor reading. Sensor values are always between 0 and 1023 (although most light sensors will not read all the way up to 1023).

Dif (Current Difference)

The difference (Current Value – Reference Base). Note that this value can be positive or negative. Positive indicates a brighter scene, negative values indicate that the scene is darker than Reference.

Trigger Value

The present Trigger Value as set in the menu is displayed as a reminder. The “+” is shown to indicate that the lightning function will only trigger when the Current Value is greater than the Reference Base plus the Trigger Value. Or stated as a formula: Trigger when (Current Value – Reference Base) > Trigger Value.

\*\*Note\*\*: As the ambient scene becomes brighter, the Reference Value will move higher. If the Reference Base plus Trigger Value goes over the WorkingMaxValue of 1012, the text “Too Hi” will appear on the Trigger Value line. The CameraAxe may not be able to trigger under these conditions.

**Trigger Value Too Hi+110**

Update Ref sec

This is just a reminder of the Update Reference Period set in the menu mode

TrigCnt (Trigger Count)

This display lets you know how many times the Lightning Function has triggered the camera while in Photo Mode. It is cleared when you go back to Menu Mode. It is helpful if you are away from your camera/tripod/CameraAxe and want to know if it triggered while you were gone!

PeakVal (Peak Value During Strike)

This displays the peak Sensor Value during the last lightning strike. It is helpful to compare to the Reference Value and to your trigger value. If you see a Peak Value that is close to the same value as your Reference Base, you may want to decrease your Trigger Value.

**Lightning Advanced Photo Mode Display**

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| **Ltg Adv-Activate to Exit** |
| **r896 c/d901 /5 Trg10**  **Stk# Ref Pk Duratn(Us)** |
| **6 895 951 150523** |
| **5 901 912 77024** |
| **4 921 989 66** |
| **3 979 992 1478** |

This mode allows display of the current values as well as the details of the last four “strikes”, as detected by the CameraAxe. The last strike is on top and the Strike Number (Stk#) also indicates the total number of strikes since activation. The details about strikes prior to the last four will not be shown. The purpose of this display is to show you the details of how long (Duration) the lightning strikes are lasting, how bright they are (Pk), and how the lightning brightness compares to the ambient light level as seen by the sensor (Ref).

Line 2 -- Current Values

Rf – Reference Base Value

Cur/D – Current Value of the sensor / Difference between Current Value and Reference Base

Trg -- The Trigger Value that was chosen is shown for reference. See \*\*Note\*\* Below

Lines 4-7 (with Titles on Line 3)

Stk#

The number of this strike, counting from activation.

Ref

The Reference Base Value that was in effect when this strike was triggered.

Pk

The Peak Sensor Value during the strike.

Duratn(Us)

The Duration of the strike in microseconds. Note: If the duration of the strike is shorter than the camera shutter lag at your current camera settings, then the camera may trigger, but you might not capture the lightning strike in the image. And because lightning often has multiple short pulses during one visible “strike”, the CameraAxe may report a shorter duration of some of these pulses, up to the BulbSec setting, and then reset to take an additional image.

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\*\*Note\*\*: As the ambient scene becomes brighter, the Reference Value will move higher. If the Reference Base plus Trigger Value goes over the WorkingMaxValue of 1012, the text “Too Hi” will appear on the Trigger Value line. The CameraAxe may not be able to trigger under these conditions.

**r896 c/d901 /5 Too Hi**

\*\*Note2\*\*. The CameraAxe microsecond timer has a maximum value of about 71.5 minutes from the time it is powered on. There is a slight chance that you might see a negative strike duration, or the CameraAxe might freeze if a strike happens within a few seconds of the roll-over time. Please ignore any negative duration and if by chance you see the CameraAxe in a hung state, simply press Activate to go back to the menu or power down to reset.

**Camera Setting Recommendations**

While there are many different camera settings that will work, here are some recommendations and thought starters.

Settings to insure lowest shutter lag – While modern DSLRs are fast enough to capture lightning with the Camera Axe, there are many camera settings that slow down the camera’s response to a trigger. And some of these will slow it down enough that even though the camera triggers, you won’t capture a short lightning strike. These settings vary between camera makes, but take a look or test these settings:

* Set the Lightning Menu to Prefocus = Yes – This reduces shutter lag by 5 – 10 ms.
* Autofocus vs Manual focus – in my testing on a Canon 6D, setting the lens to autofocus has a few milliseconds less shutter lag. I personally use back-button focus, so the camera isn’t really focusing when the shutter is half-pressed (or Prefocus in the menu)
* Auto-exposure vs manual exposure – My testing showed very little difference in lag, test yours

Settings recommended for good lightning capture

Shutter Speed -- Since a lightning strike might last anywhere from 80-100ms, up to a second or two, for a multi-strike, you may capture more “fingers” or “branches” of the strike if your shutter speed is slow. I’ve had decent results with 1/25 sec., but I suspect that’s about as fast as one should go. That allows for 60-70ms shutter lag and then 40ms of shutter open, and you’ve captured most of a “normal” strike. However, if you can use a longer shutter speed, you have a better chance to capture more. Try a low ISO setting and medium to high aperture value to allow a slower shutter speed. In very bright conditions, a neutral density filter (ND) might be a good idea to allow a slower shutter speed than without it.