# Seek InspectionCAM

*Quick Start Guide*

Welcome to Seek Thermal's Seek Inspection Camera Quick Start Guide. This guide covers how to get the Seek Inspection Camera (InspectionCAM) imaging and some general recommendations for first article inspection setups. For a more detailed guide, please refer to the Seek Inspection Camera User Manual.

## Start Imaging

### Required hardware: Windows 10 or 11 PC

1) Remove the InspectionCAM from the box; there is a Welcome Card, Focus Tool, USB Stick, and USB-C to USB-A Cable in the box as well.

2) Take the USB Stick and plug it into the Windows PC and run the *Seek Inspection Camera Viewer.*msi installer.

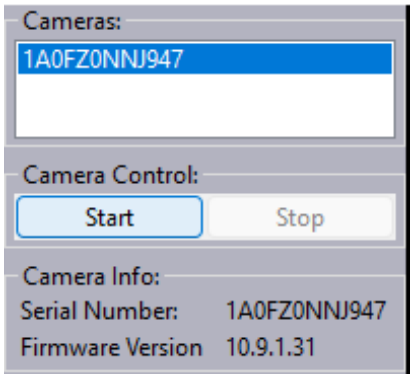
3) There are mounting holes on the back of the camera and with the removal of the black cap on the bottom of the camera an additional ¼"-20 mounting hole can be used. Mount the camera into position.

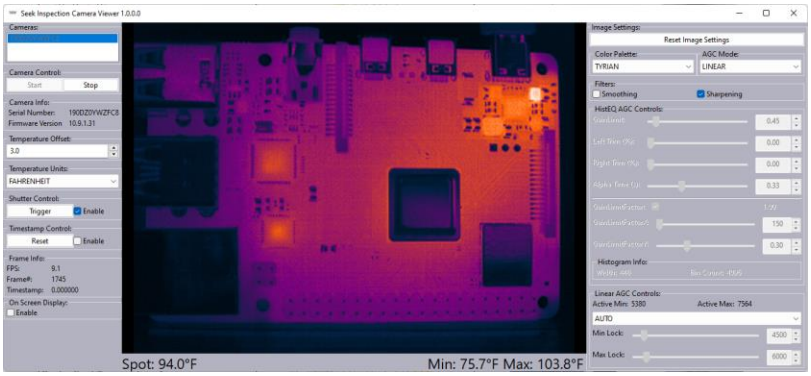
*Cosmetic Cap*

*¼"-20 Mounting Hole*

4) Use the USB-C cable to plug the camera into the PC and open the Seek Inspection Camera Viewer Software.

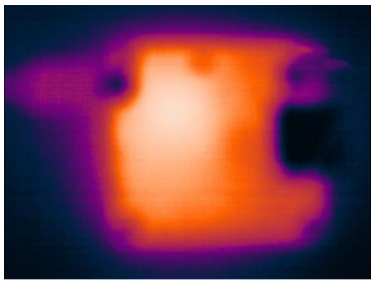
5) The camera serial number (SN) will show up in the Cameras: list section in the upper left corner of the software. Selecting the SN will turn it blue, then push the start button to image.



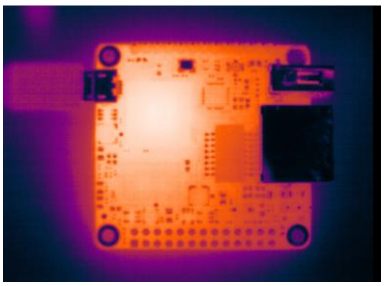




6) By default, the camera is focused to infinity; use the Focus Tool to focus the camera on objects at close distances. Insert the Focus Tool int the grooves around the inside of the lens and rotate the tool counterclockwise to focus closer and clockwise to focus farther away.

*Insert the Focus Tool and turn counterclockwise to focus closer*



*Object at 200mm away from camera*
*Camera focused for infinity*



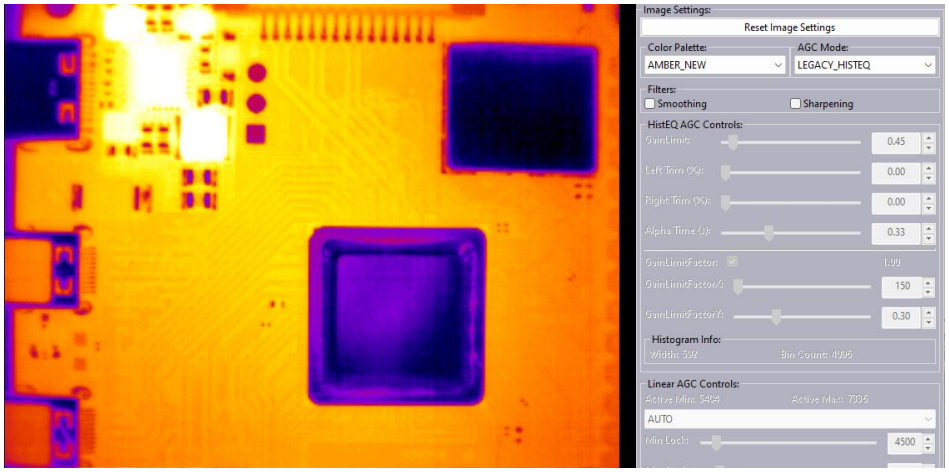
*Object at 200mm away from camera*
*Camera focused for 200mm*

**WARNING:** Unscrewing the lens too many times can remove the lens from the housing. Insert the lens back into the housing and screw the lens clockwise if lens comes out. To avoid accidental lens removal do not try to focus on objects closer than 40mm away from the camera lens.

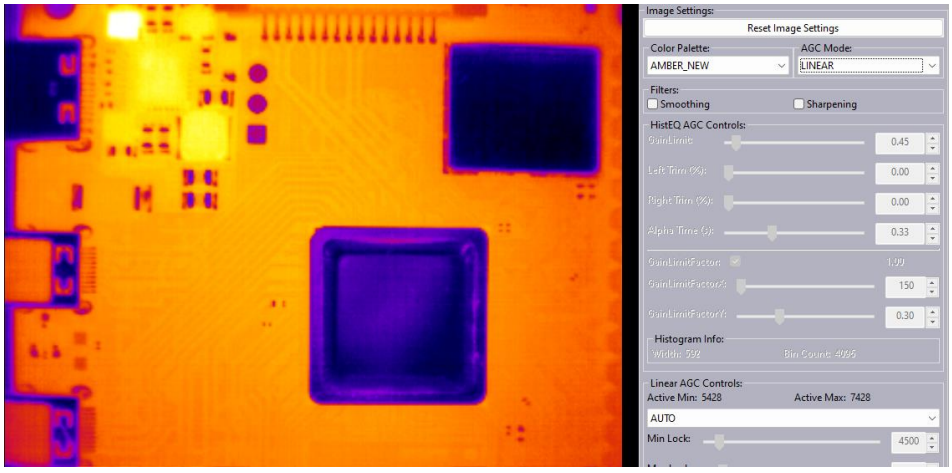
# Commonly Used Setups and Features in Inspection Software

## AGC Modes

Toggling between the Legacy Histogram (LEGACY_HISTEQ) and LINEAR AGC modes can help show the general layout and heatmap of an object.



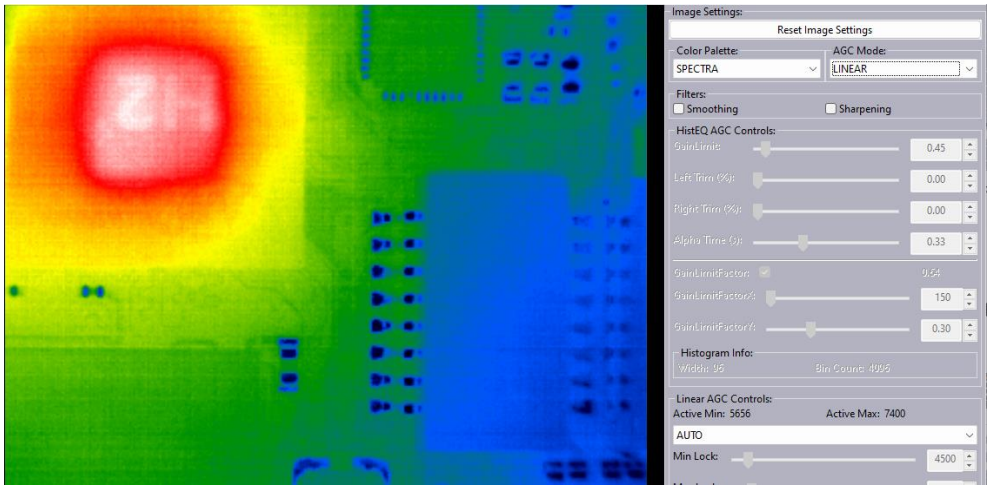

*LEGACY_HISTEQ*



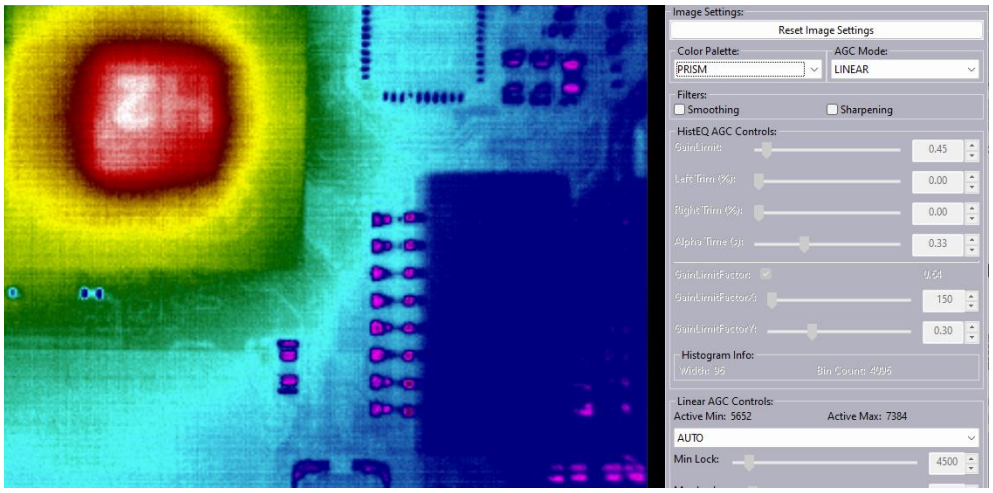

*LINEAR*

## Color Palettes

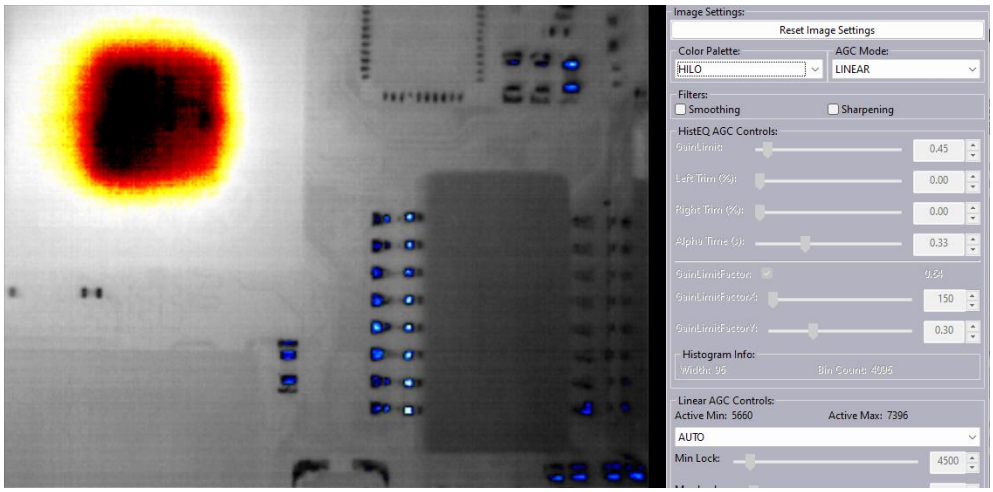
For fast analysis try toggling between SPECTRA, PRISM, and HILO to show where warmer and cooler temperatures and areas of interest are on a device.




*SPECTRA*

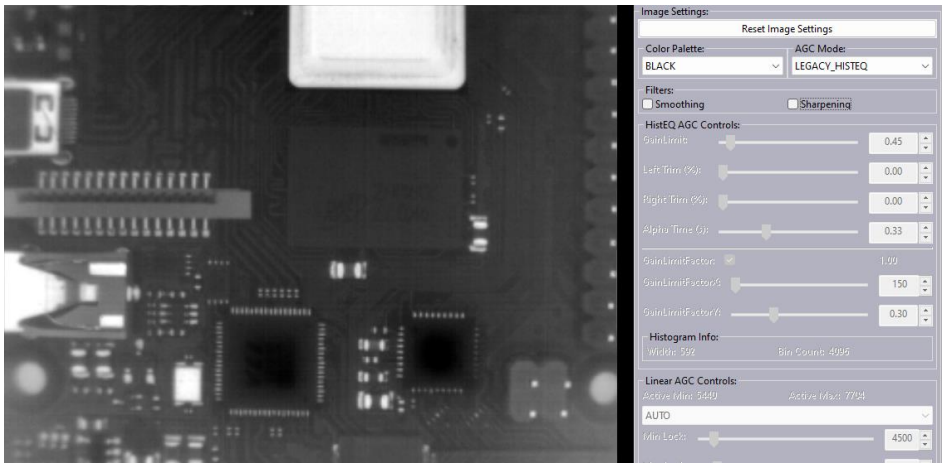



*PRISM*

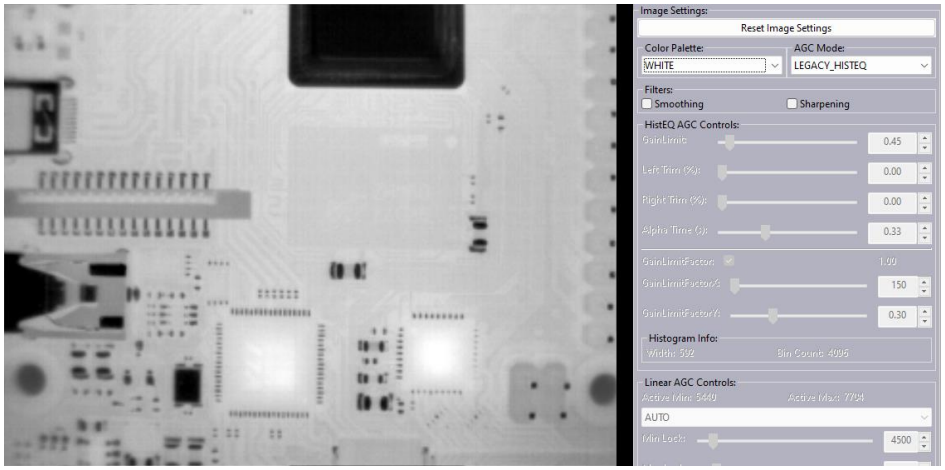



*HILO*

For more detailed analysis toggle between the WHITE and BLACK color palettes to show details other palettes sometimes blur together.




*BLACK*

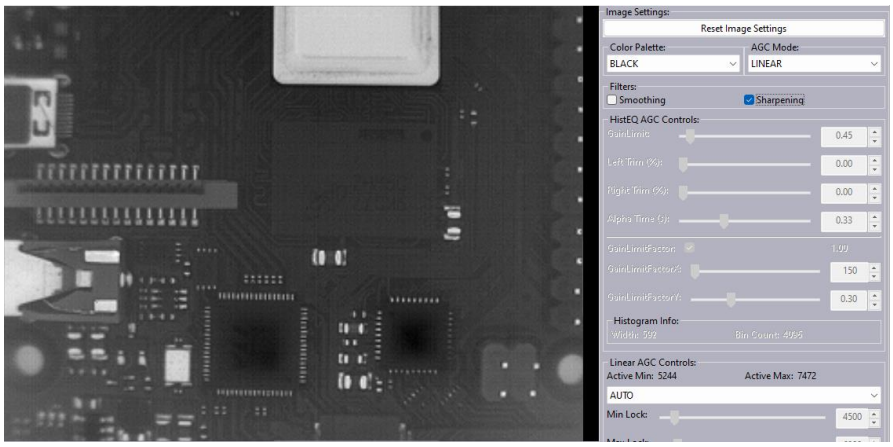



*WHITE*

## Sharpening and Smoothing Filters

While in the WHITE and BLACK color palettes, use the sharpening and smoothing filters to adjust the image clarity. Sharpening will try to highlight edges in the image. Smoothing will try to smooth the image out; however, this may also smooth out some details as well.


*Sharpening Off*
*Smoothing On*




*Sharpening On*
*Smoothing Off*

Most inspection installations use the common setups, settings, and features in the Seek Thermal Inspection Camera Viewer software reviewed in this guide. Toggling between these different Color Palettes, AGC modes, and Filters can highlight and accentuate image data and details. For a more extensive overview of the Seek Inspection Camera and the Seek Inspection Camera Viewer software, please see the Seek Inspection Camera User Manual.

# Seek Inspection Camera

## *User Manual*

# Table of Contents

# What's in the Box

**USB STICK** includes User Manual, Quick Start Guide, Camera Warranty Policy, Seek Inspection Camera Viewer Software Installer

**FOCUS TOOL** used to focus the camera on objects near and far away. The cameras default focus is set to distance of infinity. Turning the lens counterclockwise will focus on objects closer to the camera, while turning the lens clockwise will focus on objects farther away.

**WARNING:** Unscrewing the lens too many times can remove the lens from the housing. Insert the lens back into the housing and screw the lens clockwise if lens comes out. To avoid accidental lens removal do not try to focus on objects closer than 40mm away from the camera lens.

**USB Cable** 2-meter USB-C male to USB-A male cable.

**InspectionCAM** Seek Inspection Camera

## What's Required

A Windows 10 or 11 PC is required to run the Seek Inspection Camera Viewer software.

## Register the Inspection Camera

It is very important to register the Seek Inspection Camera right away. This will help track the warranty of the camera, but more importantly this is how to stay up to date with all the latest software releases and future improvements to the Seek Inspection Camera system. To register the camera, please visit https://www.thermal.com/register.

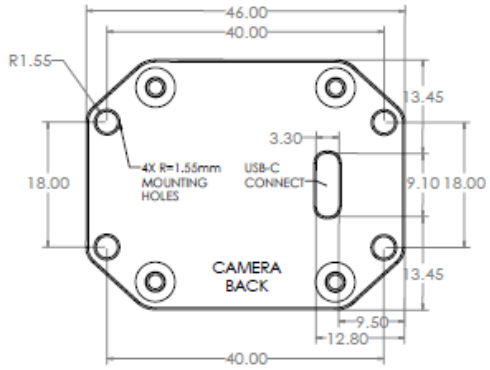
## Camera Mounting Options

There is a ¼"-20 mounting hole on the bottom of the camera. To access the hole, simply remove the cosmetic cap from the bottom of the housing.

*Cosmetic Cap*

*¼"-20 Mounting Hole*

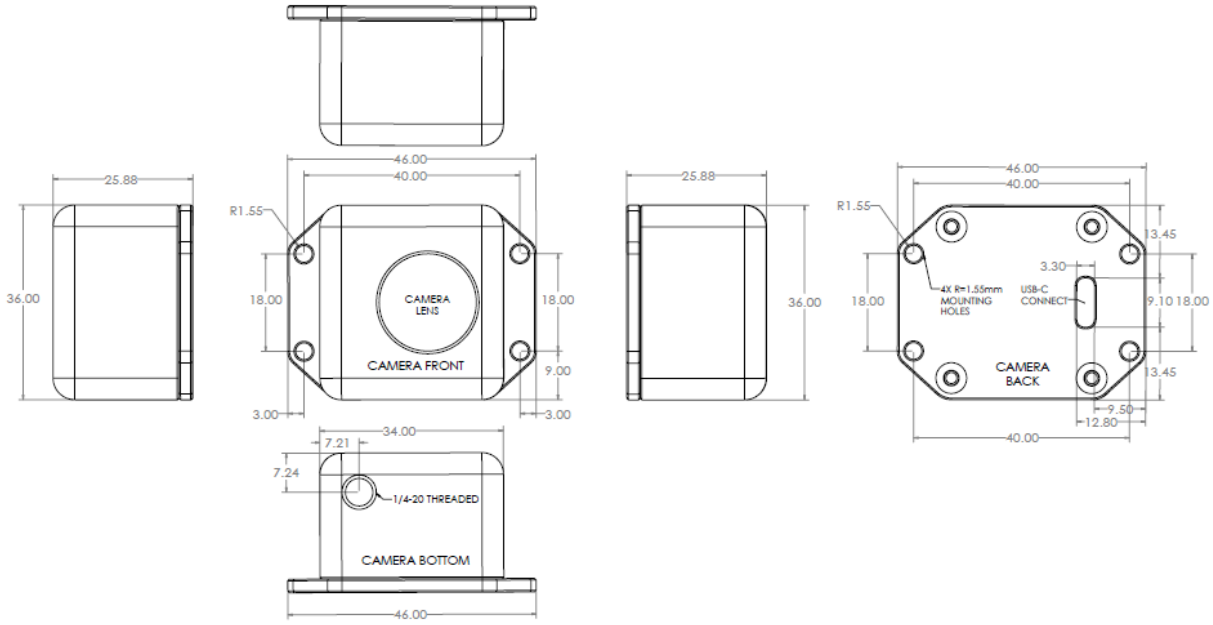
An additional mounting option, there are four mounting holes on the back plate on the camera.




*Back Mounting Plate pattern and dimensions in millimeters (mm)*

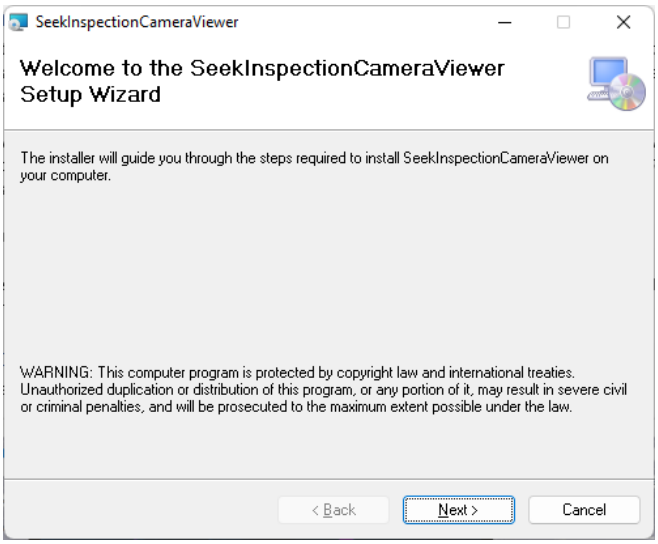
## Dimensional Drawing

The drawing below represents the InspectionCAM's full product dimensions in millimeters (mm).




## Install the Seek Inspection Camera Viewer

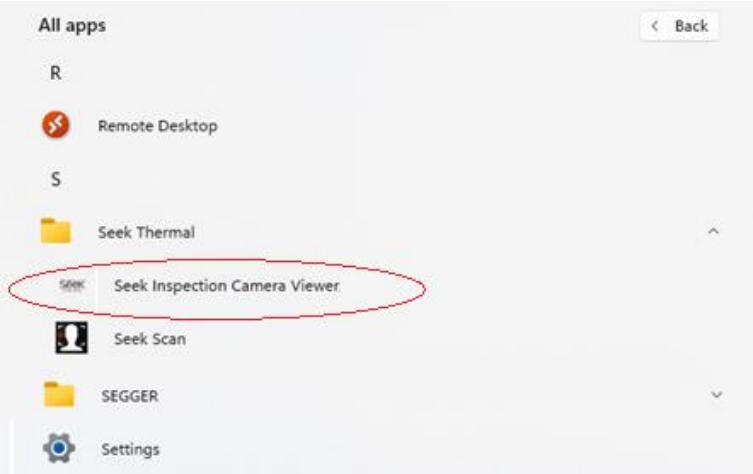
1) On the USB Stick inside of the Inspection Camera box is the Seek Inspection Camera software installer. Plug the USB stick into the Windows PC and double click on the *SeekInspectionCameraViewerInstaller.msi* file to start the installation.




2) Push the **Next** button, chose a location on the PC to install the software, and hit **Next** to continue to run through the rest of the installation.

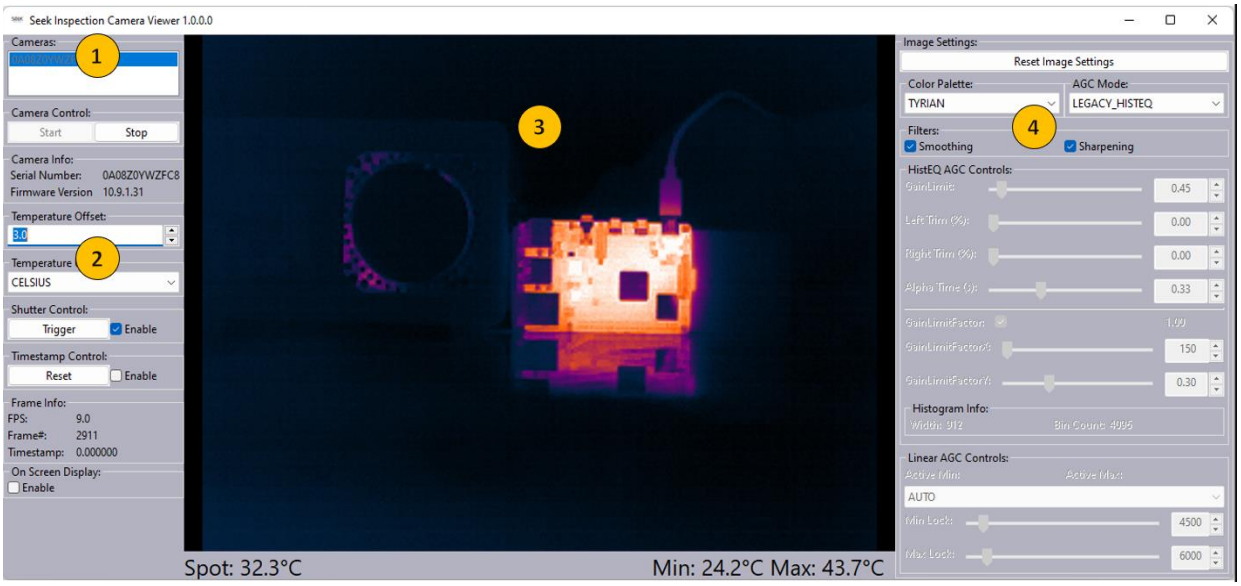
3) Once installed, navigate to the software in the Windows PC Apps list under Seek Thermal -> Seek Inspection Camera Viewer and open the software.

4) Plug in the InspectionCAM using the USB cable, select the camera from the Cameras: list and push the **Start** button connect and image.




## Inspection Camera Viewer Layout

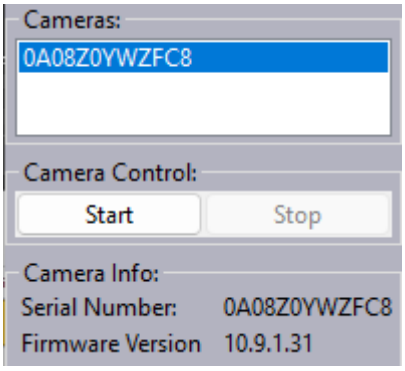
The Seek Inspection Camera Viewer software can be broken down into four main sections:




1. Camera Connection and Information
2. General Settings and Controls
3. Imagery and Temperature Data
4. Image Settings and Controls

# Camera Connection and Information

This section of the software allows you to select the camera from the camera list and open a data connection to the camera. The camera serial number and firmware version are also visible in this area.




## Cameras

This is a list of the available and recognized Seek Thermal devices by Serial Number. Plug in the InspectionCAM and select the camera from the list, which will be highlighted in blue once selected. Press the **Start** button in the *Camera Control* section to connect and image the Seek Thermal camera.

## Camera Control

Connect to and image a selected (blue) camera from the *Cameras:* list section.

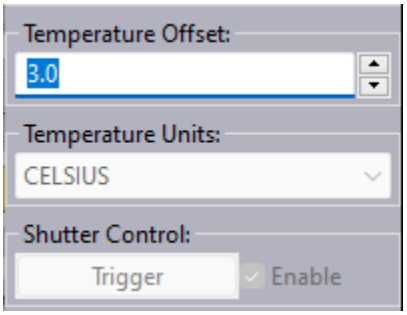
- Press the **Start** button to connect to the selected camera and start imaging.
- Press the **Stop** button to disconnect and stop imaging from the connected camera.

## Camera Info

This contains the camera serial number and the current firmware version.

# General Settings and Controls

These features allow the user to make setting adjustments and selections in the software. Controls and settings for temperature, shutter, on screen displays (OSD), and timestamp are available on the left side of the software.



## Temperature Offset

A global temperature offset can be added or subtracted to the temperature values displayed in the application. This is useful in fine tuning or adjusting the camera temperature data in various installations and setups. Distance and lens focus position can affect the temperature readings from the camera.

## Temperature Units

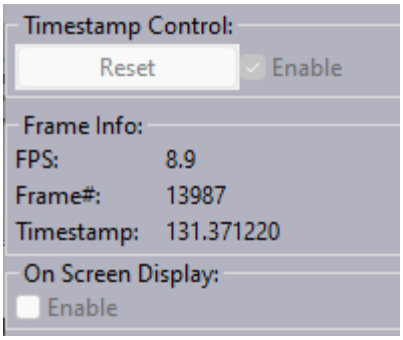
Select from 3 different temperature units: Celsius, Fahrenheit, Kelvin.

## Shutter Control

Control the state of the camera's automatic shutter or trigger shutter events manually at any time.

- The **Enable** checkbox
  - When checked the camera runs in Automatic Shutter mode.
  - When unchecked the camera runs in Manual Shutter mode.
- Press the **Trigger** button to trigger a shutter event at any time.

**Note:** It is highly recommended that the Automatic Shutter be Enabled at all times. This will correct any drift the pixels in the array may experience.




## Timestamp Control & Frame Info

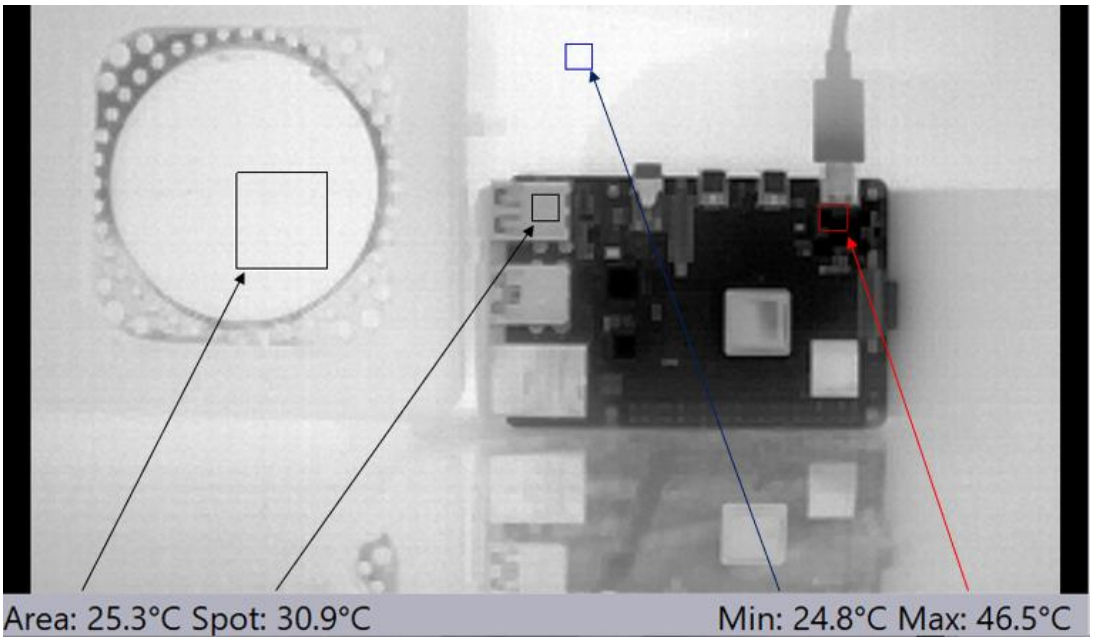
The Inspection Cam Viewer allows for the user to track and manage digital time stamp. Frame information like current system frame rate and the current frame number are displayed in the Frame Info section.

- Enable or disable via the **Enable** checkbox.
- Reset the timestamp by selecting the **Reset** button**.**

## On Screen Display (OSD)

The On-Screen Display section allows the user to turn on or off the visual boxes representing the temperature values displayed on the bottom of the software. When in BLACK mode the boxes will be colored as follows:

Center Spot (Spot) – Black
Minimum Spot (Min) – Blue
Maximum Spot (Max) – Red
Drawn Area (Area) – Black




### Custom Drawn Area

When the On-Screen Display (OSD) is enabled, the user can draw an area in the image and display the average temperature in the custom drawn area. Use the mouse to draw and remove the custom area.

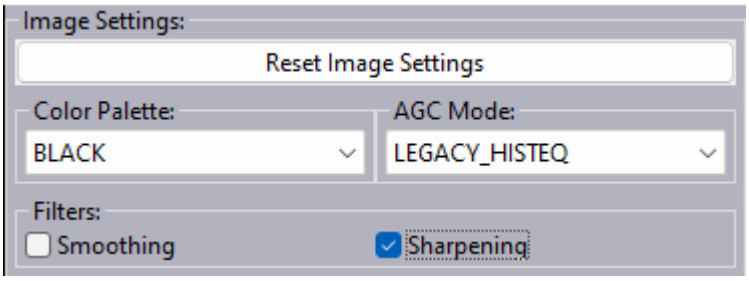
1st Mouse Click – Sets upper left corner position of Drawn Area

2nd Mouse Click – Sets lower right corner position of Drawn Area

3rd Mouse Click Inside the Area Box – Removes the Drawn Area

**NOTE:** The On-Screen Display must be enabled to add, remove, and see the custom drawn area.

## Image Settings and Controls



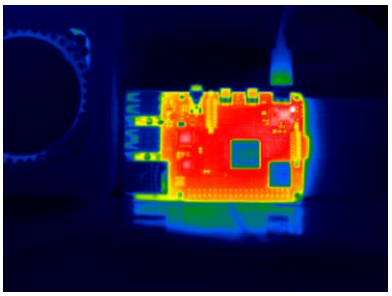

### Image Settings

Press the **Reset Image Settings** button to restore the default image settings for the InspectionCAM.

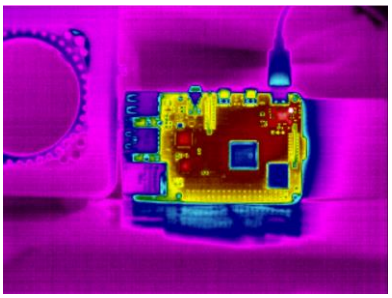
## Color Palette

There are several color palettes to choose from in the color palette drop down list. For inspection applications Seek recommends switching between a few different palettes to see different contrasts.

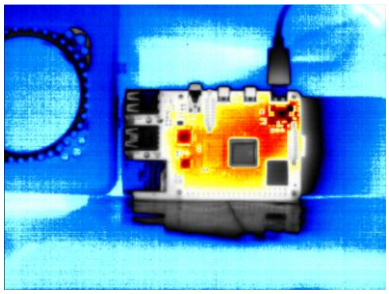
For faster high-level analysis Seek recommends toggling between the SPECTRA, PRISM, and HILO color palettes. This can help quickly identify area of interest on a device.



*SPECTRA*

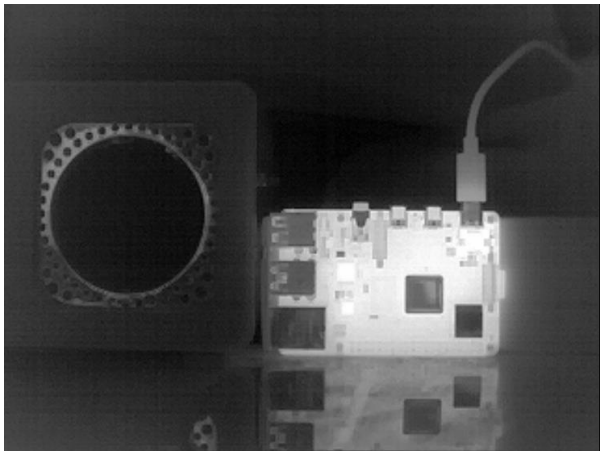


*PRISM*

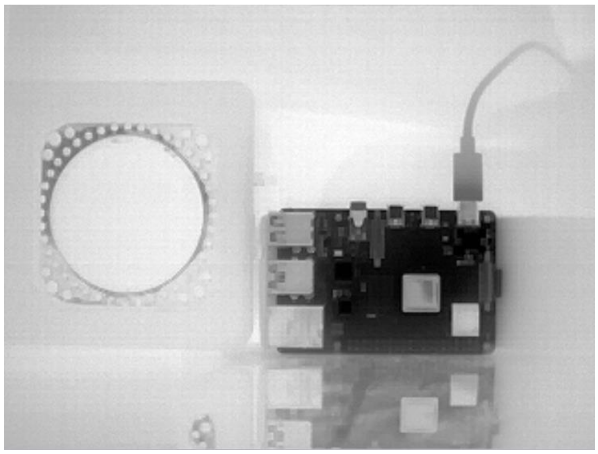


*HILO*

Toggle between the WHITE and BLACK palettes to show more precision and detail in areas of interest.



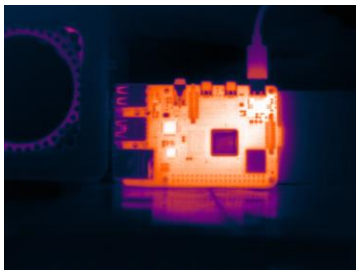
WHITE



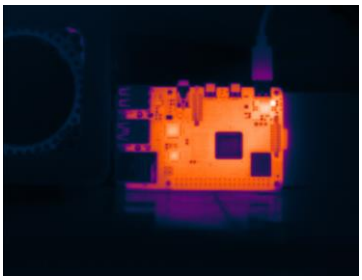
BLACK

## AGC Mode

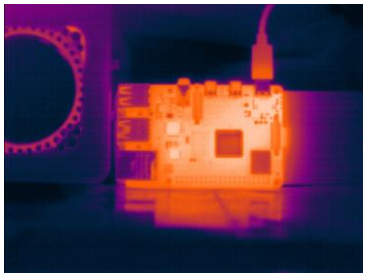
There are three automatic gain control (AGC) algorithms that can be used to image the camera data: LEGACY_HISTEQ, LINEAR, and HISTEQ.



**LEGACY_HISTEQ** is a fixed histogram based AGC algorithm. Different color palettes will highlight and focus on warmer parts of the board and drowned out the background when big temperature gaps occur. The LEGACY_HISTEQ AGC Mode is often used in inspection applications.



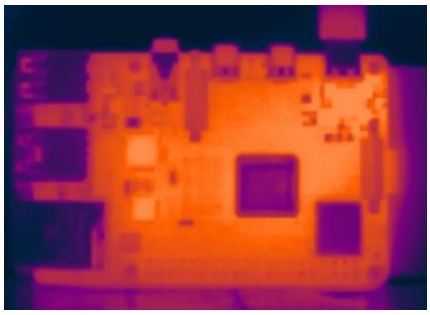
**LINEAR** is a linearly based AGC algorithm. Linear AGC Mode can be run in four different ways: AUTO, LOCKED, MIN LOCK, and MAX LOCK. This will make a linear mapping from the lowest to highest temperature in the scene for image colorization. The Linear AGC Mode is often used in inspection application.



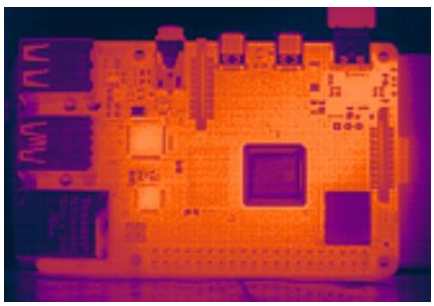
**HISTEQ** is an adjustable histogram based AGC algorithm with various controls and parameters to adjust how the algorithm performs. Different color palettes can bring out low temperatures while looking at high temperatures at the same time.

## Filters: Smoothing & Sharpening

The software has two filters that can be enabled and disabled: Smoothing and Sharpening.



**Smoothing** will try to smooth out noise in the image but can also hide details in the image.



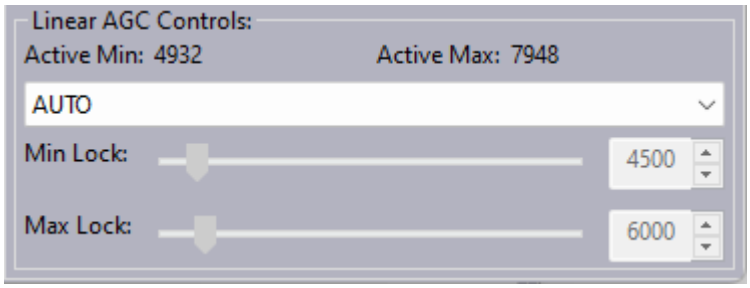
**Sharpening** will give the image more crisp, pixelated edges but can introduce more noise into the image.

## Linear AGC Controls

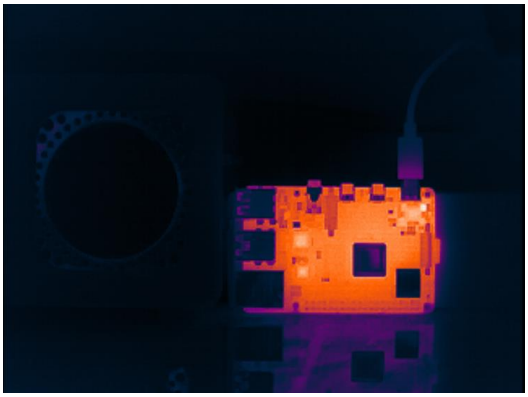
The LINEAR AGC Mode will make linear mapping of the coldest point in a scene to the warmest. This is often useful in electronic component analysis. Along with the LINEAR imaging algorithm, there are various controls given to adjust algorithm and imagery: AUTO, LOCKED, MIN LOCK, and MAX LOCK.

### Active Min & Active Max

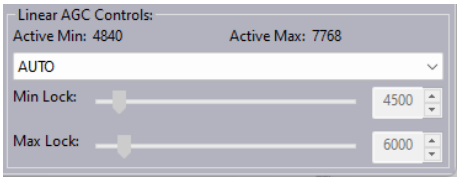
At the top of the Linear AGC Controls there are two fields displaying the active minimum and maximum count values of the active image. These can be used to help tune the locking minimum and maximum values for the linear AGC algorithm to focus on specific objects of temperature in the image.

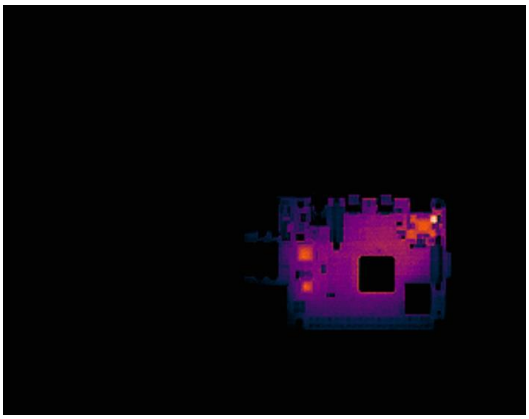



**Note:** Count values correspond to active colorized heat imagery data and not the absolute temperature of the object itself.

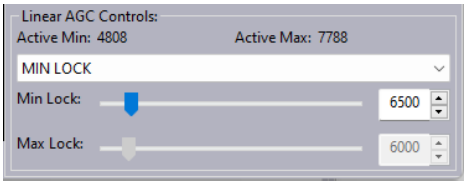


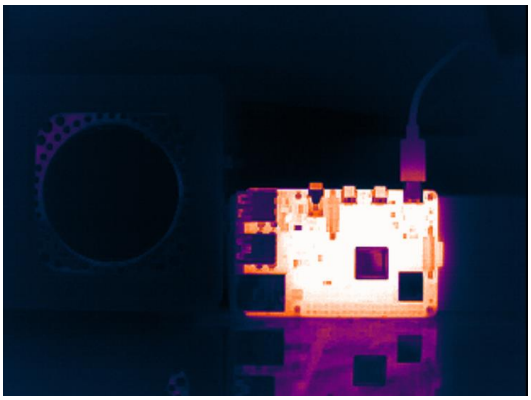
**AUTO** automatically sets the minimum and maximum count values in the linear AGC algorithm color mapping.



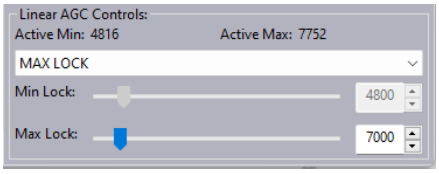


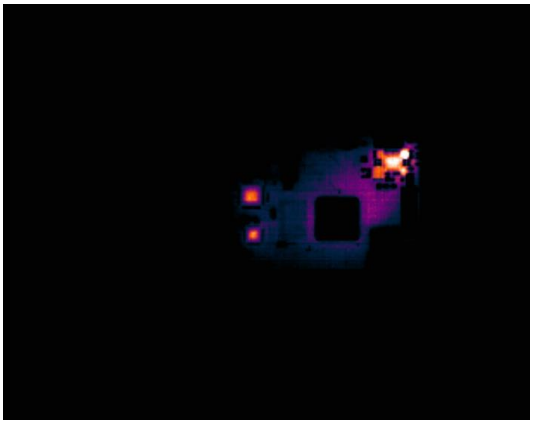
**MIN LOCK** sets the minimum count value in the linear AGC algorithm color mapping. This can often be used to hide cooler components and objects in the image.



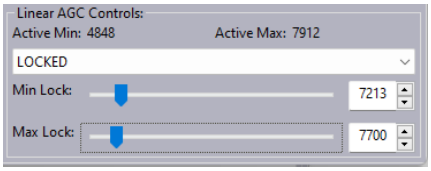



**MAX LOCK** sets the maximum count value in the linear AGC algorithm color mapping. This can often be used to bring in cooler components and objects in the image.



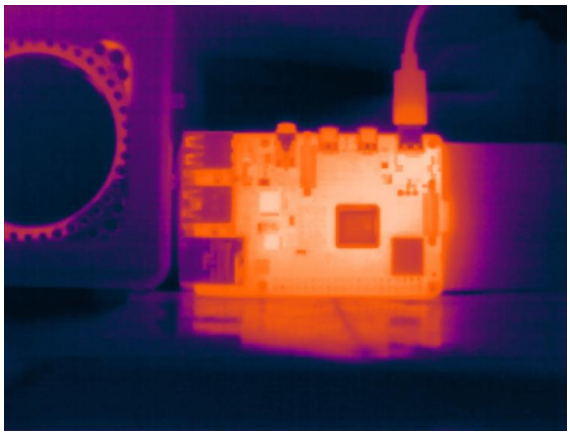
**LOCKED** sets a minimum and maximum count values used in the linear AGC algorithm color mapping. This can often be used to focus on specific components of certain temperatures in the image.



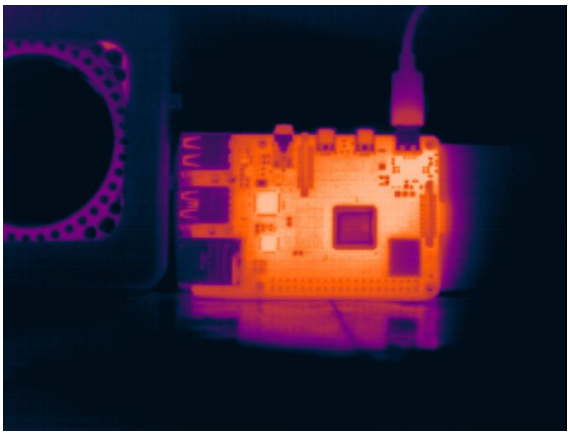
## HistEQ AGC Controls

Seek Thermal Inspection Camera Viewer offers one more AGC algorithm for imaging, HISTEQ. This is an adjustable histogram algorithm.

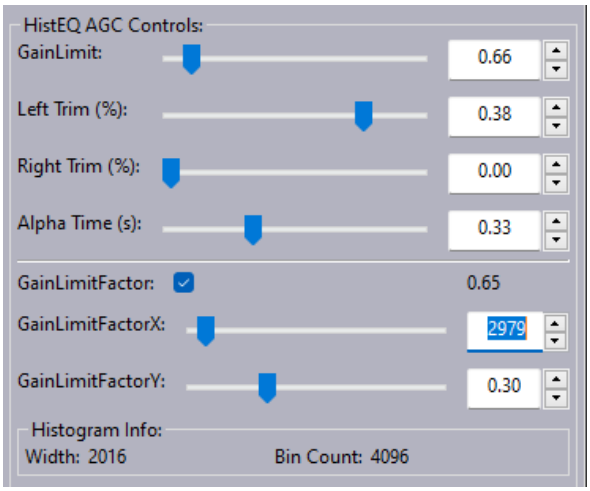
**NOTE:** The histogram algorithm is tuned by default for imaging the camera in general situations both indoors and outside.



*Default HistEQ AGC Controls*



*Tuned HistEQ AGC Controls*




**GainLimit** sets how much gain is used in the Histogram algorithm colorization. Gain can sometimes be compared to 'thermal sensitivity'. Increasing the gain limit can increase the thermal contrast but can also introduce noise into an image.

**Left Trim** trims the bottom of the histogram algorithm making colder parts of the image fade in detail and contrast.

**Right Trim** trims the top of the histogram algorithm making warmer parts of the image fade in detail and contrast.

**Alpha Time** sets how rapidly or slowly HistEQ settings are applied to the histogram algorithm. A time of 0 seconds will allow no transition and instant change or use larger values to apply changes more gradually.

**GainLimitFactor** enables and disables the gain limit factor, which is the value multiped by the GainLimit. Use the GainLimitFactorX and GainLimitFactorY parameters to set the GainLimitFactor.

**GainLimitFactorX** sets how many counts are spread out over the histogram algorithm. Allowing more counts will make histogram larger, typically darkening portions of the image and details.

**GainLimitFactorY** sets the minimum value for the GainLimitFactor. Setting a higher minimum value will typically lighten portions of the image and details.

**Histogram Information** provides the Histogram algorithm's current Width and Bin Count of the active image from the camera.

## Customize or Integrate InspectionCAM

Seek's Inspection Camera Viewer is compatible with the Seek Thermal SDKs. To design a custom software or integrate the Seek Thermal Inspection Camera into any existing Windows, Linux, or Android system and access the Seek Thermal SDKs, visit https://developer.thermal.com.