MALLINCAM HD-10

[Version 1.1]
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[Mallincam HD-10 User Manual]

This document will quickly introduce you to the wonders of the Mallincam HD-10 Camera. We will include instructions on how to install the Software and Drivers and how connect the HD-10 to your HDMI Monitor or computer along with explanations of the camera's major settings. The purpose of this guide is to quickly get you up and running with the HD-10 Camera so that you can image the skies and share your passion with others.

Revision History

Version	Date	Revision Description
1.0	07/07/2017	Template Creation
1.1	02/01/2018	Typo Corrections

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1. Introduction

The Mallincam HD-10 is a world first ever produced true HD High Definition live video camera for astronomical work, whose output is HDMI. The new MallinCam HD-10 has a computer, memories and processor all built in the camera which can be used as a stand-alone unit without any external computer assistance. If a user does want to use a computer however, the USB2 permits full camera control via computer and software. The MallinCam HD-10 is a true versatile astronomical video camera making it easy to operate.

The USB2 connectivity has dual function. It can be used for the camera mouse control and access the full built-in camera software without a computer or a user may choose to connect to computer for full control and image acquisition to a PC. The back bone of this newest MallinCam Video Observational System is the use of a 2.1 megapixel High Performance, Back Illuminated, High Definition Sony CMOS sensor delivering 1 ms second up to 10 seconds of exposures for many popular deep sky objects, Planetary views, Lunar views, Solar observation (when used with proper solar filter) with spectacular results when observed on a HDMI monitor (user supplied) of any size ready to impressed your audience when viewing astronomical features on a large HD monitor in 16:9 resolution at 1080P.

For the first time, an HDMI camera is equipped with complete exposure and gain settings. It allows to exposure settings from 1ms to up to 10 seconds and 63 levels of gain adjustment making the sensitivity of the sensor up to 300 times higher. Built in video and image Recorder via SD card (supplied) in 1080P. Just click on the button to start recording 1080P videos at 30fps. The recorded video files will be saved to the high-speed SD card directly built-in the camera. It also allows playback of the recorded videos from the SD card directly allowing a user to show the previous night observation when cloudy or rainy condition exist.

The Built-in Mouse control is the significant innovation of the MallinCam HD-10 embedding the application software inside the camera. The user can control the camera with just a mouse. There is no need for a PC. The dual-core processor of the MallinCam HD-10 adopts an innovative FPGA dual-core processor, FPGA1 high-definition image quality processor and FPGA2 image output controller, to ensure high speed high quality images live. 3D Noise Reduction with up to seven times sampling (averaged stacking) is included. Increase of the exposure time increases the image noise. But the integrated fully adjustable 3D noise reduction function keeps the MallinCam HD-10 image always clean and sharp.

So, thank you for your purchase, and let the adventure begin.

The Contents of the HD-10 - Package

Specifications:

CCD sensor:	Sony CMOS sensor
Sensor size:	5.6. x 3.2 mm
Active pixel array size:	1945 (H) × 1097 (V) (2.1 Mega Pixels)
Pixel size:	2.9 x 2.9 microns
Analog-to-Digital conversion:	12-bit output
Exposure time range:	1 milli-seconds to 10 seconds
Weight:	15.7 oz. (446 gm)
Mounting interface:	c-Mount

Included in Package:

① MallinCam HD-10 CMOS① imaging camera
② High Speed SD Card
③ USB 2.0 Cable
④ HDMI Cable
⑤ USB Mouse
⑥ Flash drive containing software installation files
⑦ 1.25" eyepiece adapter
⑧ AC Power Supply

> **Note** You can use your own wireless mouse with the HD-10. This will make it easier to control the camera, rather than be tethered so close to the camera.

2. Installing Driver and Software

System Requirements

PC running either Windows ® (32-bit & 64-bit) XP, Vista, 7, 8, 8.1, 10

Performance is not guaranteed if the following specification cannot be reached.

- Equal to Intel Core2 2.8GHz or Higher
- Memory: 4GB or More
- USB port: USB 2.0 Port
- Display Monitor: 17" or Larger Recommended
- A video display capable of rendering 1024x768 resolution minimum; 1280x1024 or higher is recommended, and in 24-bit color
- One available fully-specified high-speed USB 2.0 port
- 120V AC Power for adapter, or 12V, 2.0A AC Source

Installing the Software

Step 1

Visit the Software Downloads Page in the Support Tab located on the website: www.mallincam.net
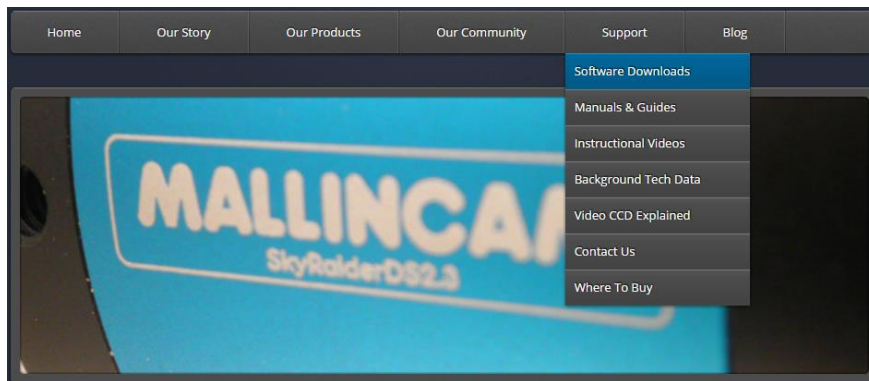
Step 2

Select the Blue **Click Here** Button to download the **HD-10 Driver.**

After you have clicked on the Blue **Click Here** indicator, a zipped file will be downloaded onto your computer.

Note

*Make sure that the HD-10 is **not plugged** into the computer.*

3. The Mallincam HD-10 with a HDMI Monitor

Connecting the HD-10 to your HDMI Monitor

First make sure you have the following pieces of equipment:

- Mallincam HD-10 Camera
- 1.25" C nose-piece adapter
- SD Card (inserted into SD slot on back of Camera)
- 12V Power Adapter
- HDMI Cable
- USB Mouse (one is provided, or **use your own wireless mouse**)
- HDMI Monitor (with power cable)

Remove the rubber dust cover from the front of the HD-10 camera (place it back in the box for safe keeping).

Screw in the 1.25" nose piece adapter to the front of the HD-10. (You may need to remove the blue protection screen covering the CMOS sensor prior to attaching nose-piece).

Insert the Mallincam HD-10 camera (with .125" adapter attached) into the 1.25" piece holder of your Telescope.

Attach the **USB Mouse Cable**, the **HDMI Cable**, and **Power Cable** to the back of the HD-10. A **Red LED** power indicator will turn on.

Hint

Now is a good time to balance your telescope (with the HD-10 camera attached) on your mount.

Attached the other end of your **HDMI Cable** to your **HDMI Monitor**.

Power on the Monitor.

Power on the HD-10 Camera by **Pressing** the **ON/OFF Button** on the back of the camera. A **blue LED** should turn on.

Your HDMI Monitor should now display the image coming from the Mallincam HD-10 camera.

Note

Move the mouse to the **Left Side** of the screen and the **Photo** and **Setting** Icons will appear on the monitor's screen.

➢ **Clicking** on **Photo Icon** will have the HD-10 take an image and store it on the SD card.

➢ **Clicking** on the **Settings Icon** will open of the setting control panel on the monitor's screen.

Move the mouse to the **Right Side** of the screen and the HD-10's image control Icons will appear.

Moving the mouse **away from the sides** of the monitor will remove the Icons from the screen.
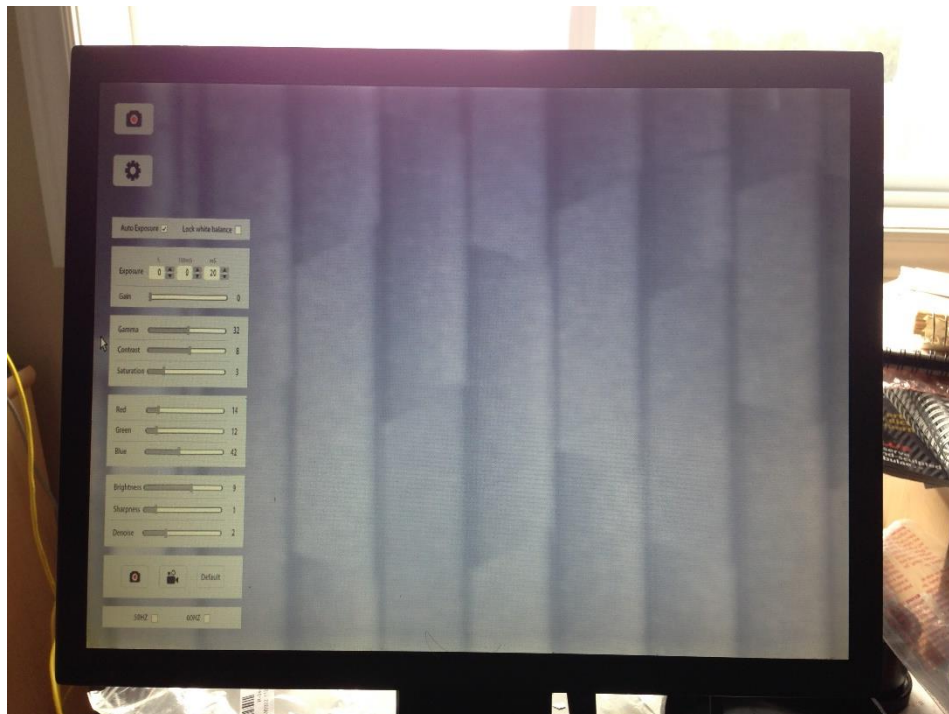
HD-10 Control Icons

The following image provides a fast description and location of the various Control Icon that are available for you to control the Mallincam HD-10 camera using just a HDMI Monitor.

Mouse on **Left Side** of Monitor

Mouse on **Right Side** of Monitor

Camera

Settings

	Flip Horizontally
	Flip Vertically
	Zoom in
	Zoom Out
	Crop
	Divison Cancel
	Insert a Crossline
	Compare Images
	Browse Images
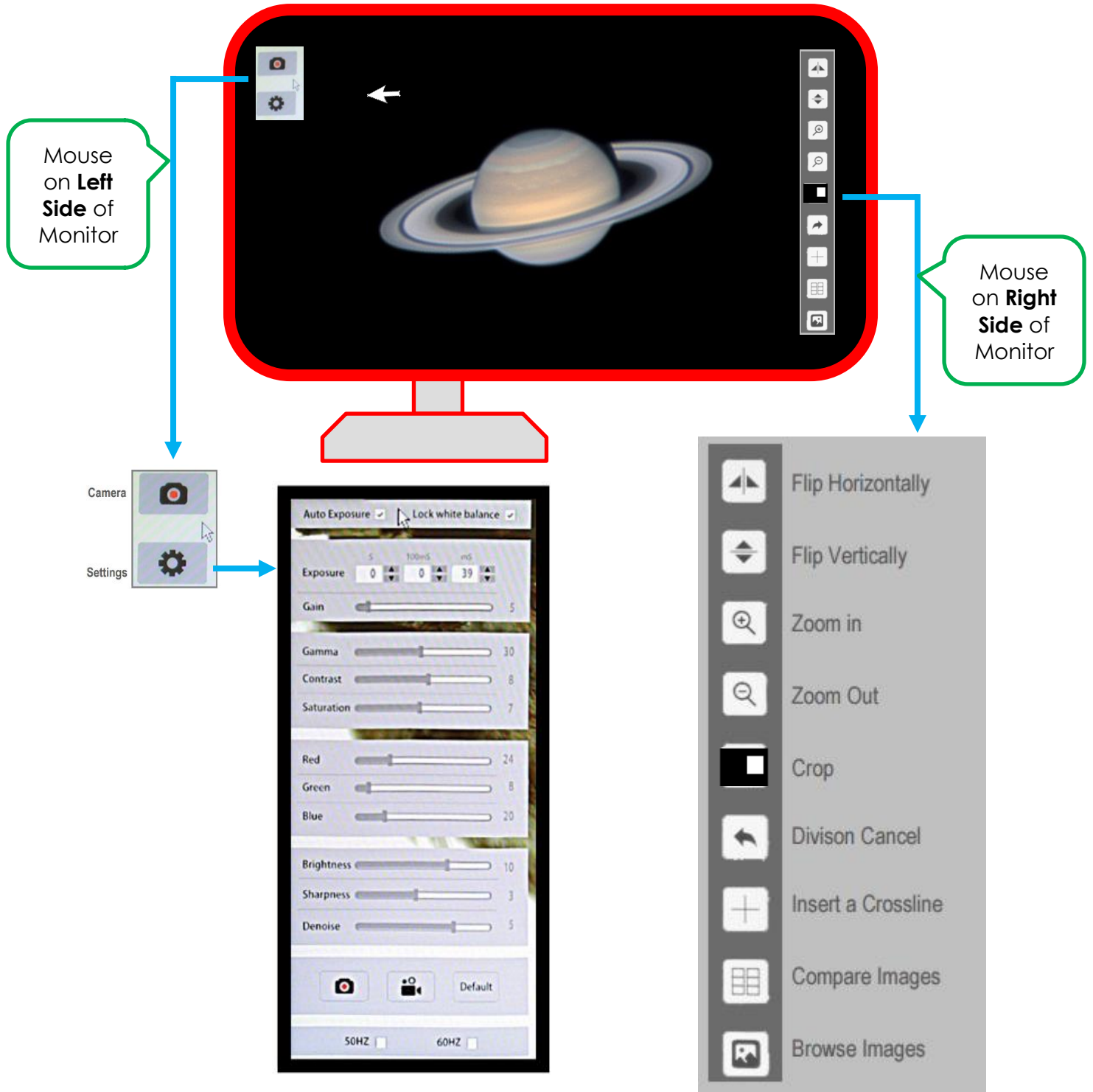
Note The **Action Icons** appropriate icons appear on the various sides of the Monitor when the **Mouse Cursor** is placed in that area. Moving the mouse away from the sides causes the **Icons** and **Open Windows** to disappear.

Detailed Icon Description

Camera Icon

Clicking on this Icon will tell the Mallincam HD-10 to save the current image on the SD card inserted into the back on the camera. The format of the image will be JPEG (.jpg). Once the image has been saved, the HD-10 Camera will revert back to live view.
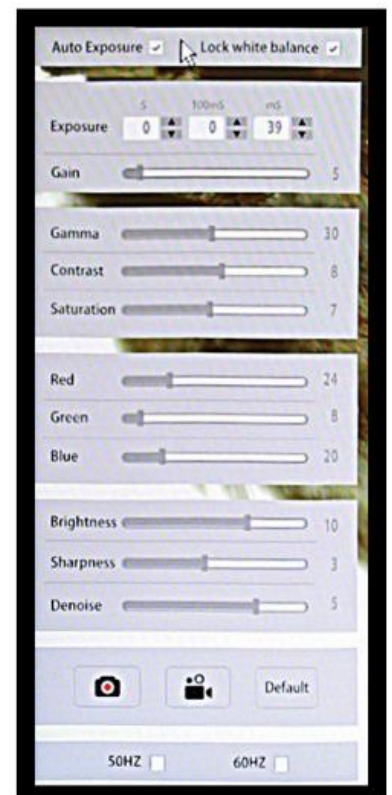
Settings Icon

Clicking on this Icon will tell the Mallincam HD-10 to pop-up a settings Window on the Left Side of the Monitor.

Settings Control

Clicking on the Settings Icon will open-up or close the **Settings Control Window**.

This window allows you to:
- turn on or off auto exposure.
- Set exposure
- Set Gain, Gamma, Contrast, and Saturation
- Tweak the Color values
- Set the Brightness, Sharpness, and Denoise values
- Take a Snapshot
- Take a Video
- Choose anti-flicker frequency

Note Moving the mouse cursor away from the **left-side** of the HDMI Monitor's Window will cause the **Icons** and **Settings Control Window** to disappear, Moving the mouse cursor back to the **left-side** of the HDMI Monitor's Window will bring back the **Icons** and **Settings Control Window**.

Image Action Window

Flip Horizontally   **Click** on this Icon to Move the left side of the image to the right side, and the right side of the image to the left.

Flip Vertically   **Click** on this Icon to Move the top of the image to the bottom of the window and the bottom of the image to the top of the window.

Zoom in   **Click** on this Icon to zoom in, or click and hold to zoom in continuously until maximum is reached. Zoom Range from **1x** to **10x**.

Zoom out   **Click** on this Icon to zoom out, or click and hold to zoom out continuously until minimum is reached. Zoom range from **10x** to **1x**.

Mask   **Clic**k on this Icon and the mouse cursor will change to a **hand**. Now **Click-Hold-and-Drag** the hand-cursor to create a box on the screen. Only the portion of the image inside the box will be visible, the remainder will be blacked-out. You can now place your hand cursor inside the box, and **Click-Hold-and-Drag** the box to various areas of the screen to view different parts of the total image. To return the **Image Window** to full screen just **Right-Click** anywhere on the screen.

Division Cancel   **Click** on this Icon to return the Image Window to the full current image being picked up by the HD-10. This Icon control is used after using the **Compare Images** Icon.

Inset a Crossline   **Click** on this Icon to place a **Red Crosshair** on the **Image Window**. **Click** on the Icon again to change the crosshairs to **Green**. **Click** on it again to remove the crosshairs from the **Image Window**.
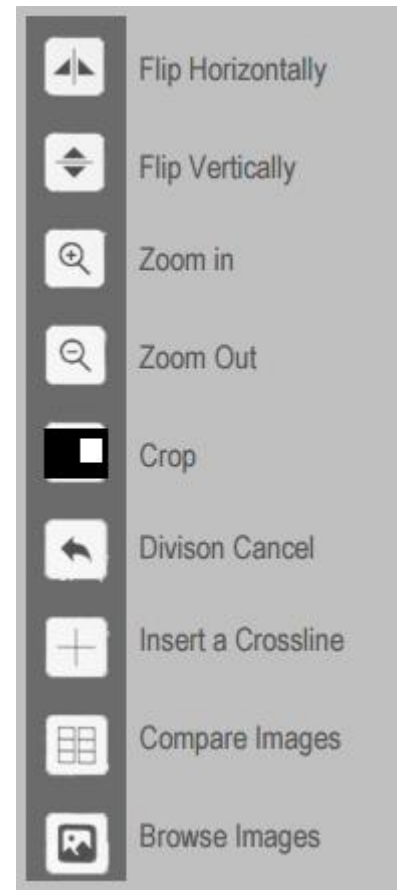
Compare Images **Click** on this Icon to Display currently saved images on the SD card. A larger box will contain the live image from the HD-10 camera. Located on the bottom of the screen are controls to scan forward (**right arrow**) or backward (**left arrow**) through other images on the SD card. The **Home Icon** will return the Image window the full live image.

Left-Clicking on any of the **Saved images** will split the screen with that **Saved Image** on the **left hal**f of the Image Window, and the current live image on the **right half** of the Image Window. You can **Left-Click-Hold-and Drag** both the left-half (saved image) and right-half (live image) so that you can compare the part of the saved image to a particular part of the live image. To return back to your full live image, use the **Division Cancel Icon**.

Browse Images **Clicking** on this Icon will display the first 12 saved images located on the SD card. Use **Left** or **Right** arrows located on the bottom of the screen to load the **previous** or the **next** set of images.

Clicking on a saved image will make that image full size for viewing pleasure, or start the Video File if you clicked on a video recording. **Clicking** on the **X Icon** will provide you an option to permanently delete that saved image from the SD Card. **Click** on the **House Icon** to return back to the **12 Panel Saved Image Window**.

Once in the **12 Panel Saved Image Window**, **clicking** on the **House Icon** will return you back to the live full screen image being displayed by the Mallincam HD-10 camera.

Imaging with the Camera

You have attached the Mallincam HD-10 camera to the telescope, and have connected the power, mouse, and HDMI cables. You have also removed the lens cap from the telescope (how many times do we forget this step). And, you are now read to image.

You should be seeing an image (it may be out of focus, too bright, or even too dim) on your HDMI monitor.

Step 1 **Move** the mouse icon to the **left side** of your monitor, you should see two icons automatically pop-up.
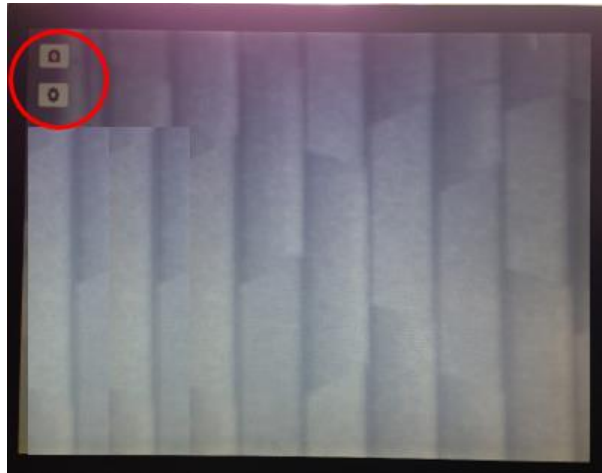
Step 2 **Click** on the bottom icon (the **Settings Icon**), and a **Settings Control Window** will pop-up. The HD-10 remembers when this window is clicked open, and it will automatically appear when you next move the mouse icon to the left side of your monitor.
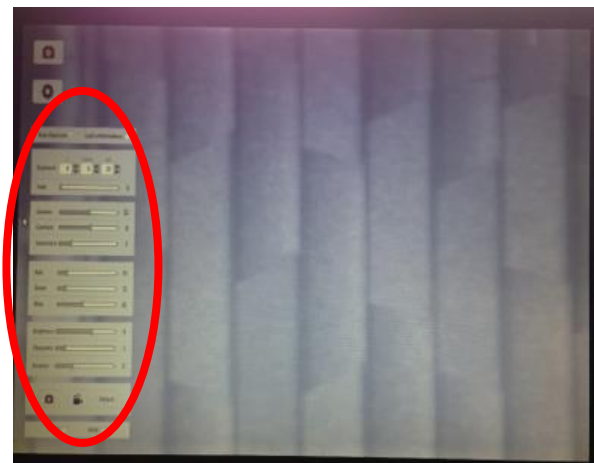

We will use this window to help get the correct exposure and set other adjustments to tweak the image to our satisfaction.

Step 3

As a starting point, move the mouse cursor to the **Auto Exposure** box, and make sure it is **checked**. This will give us a starting point for the exposure setting.

The current exposure value (as determined by the Auto Exposure Control), will now appear in the Exposure box.
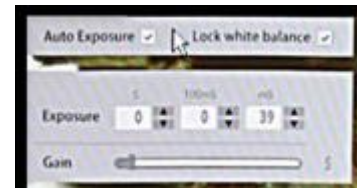
You can select an exposure range from 1 micro-seconds all the way to 10 seconds

Step 4

Uncheck the **Auto Exposure** (the exposure setting will not change), and now by using your mouse icon. **Click** on the little **up** and **down** arrows in the appropriate Exposure settings control (s-seconds, 100ms, and ms), to provide an exposure value to your liking.
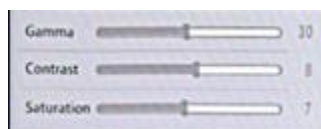
Note

You can also now adjust the **Gain** (**Left-Click-Hold-and-Drag** the **gain slider**) to make the image brighter or dimmer. You will get more comfortable with finding to best exposure/gain values for your image. Play with them to see how the exposure and the gain values affects your image. Gain is a setting that controls the amplification of the signal from the camera sensor to the screen. Too much amplification can cause noise in the image.

*The next three commands will allow us to tweak the image further by adjusting the **Gamma**, **Contrast**, and **Saturation** values on the HD-10.*

Step 5

By using the mouse cursor, **Left-Click-Hold-and-Drag** the slider bar of each of the **Gamma**, **Contrast,** and **Saturation** controls to produce an image that meets your requirements.

Gamma - Each pixel in an image has brightness level, called luminance. This value is between 0 to 1, where 0 means complete darkness (black), and 1 is brightest (white). Different display devices (monitor, phone screen, TV) do not display luminance correctly. So, one needs to correct them, therefore the gamma correction function allows you to brighten the dimmer area for the image, or darken the brighter area of the image.

Contrast - Contrast is the scale of difference between black and white in your images. Without contrast you wouldn't have an image because there wouldn't be any differentiation between light and dark; everything would be black, white, or a single shade of grey somewhere in between.

Saturation - Saturation is similar to contrast, however instead of increasing the separation between shadows and highlights, we increase the separation between colors.

*The next three commands will allow us to tweak the colors of the image further by adjusting the **Red**, **Green**, and **Blue** values.*

Step 6 By using the mouse cursor, **Left-Click-Hold-and-Drag** the slider bar of each of the **Red**, **Green,** and **Blue** controls to produce an image whose colors that meets your requirements.
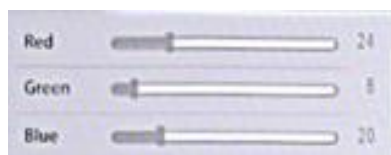
*The Final three commands will allow us to tweak the display of the image further by adjusting the **Brightness**, **Sharpness**, and **Denoise** values.*

Step 7 By using the mouse cursor, **Left-Click-Hold-and-Drag** the slider bar of each of the **Brightness**, **Sharpness,** and **Denoise** controls to produce an image that meets your requirements.

Brightness - Traditional brightness simply brightens the entire image from the shadows to the highlights equally. When increasing brightness, you may find that you lose some contrast on the brightest details in the image while the rest of the image has the same contrast as before.

Sharpness - Sharpness can be defined as edge contrast, that is, the contrast along edges in a object in the image. When we increase sharpness, we increase the contrast only along/near edges in the object while leaving smooth areas of the image alone.

Denoise - All cameras produce some form of noise (especially when you increase the exposure time), the **denoise control** can help eliminate the typical noise that is picked-up. Be careful, as the more aggressive you set the denoise control, the more often actual captured data will be removed on your image. Balance is the key.

Note If after making control adjustment of your image and it looks worse that when you started (this happens as you slowly learn what controls best work for your system), you can display **click** on the **Default Button** located on the bottom right of the Control window. The Mallincam HD-10 will reset all of the controls back to their defaults.

Default

Note Your electrical power system way cause cycle flickering of the image, if this rare case occurs click on either the **50 Hz** (Europe) or **60 Hz** (North America) check boxes to see if this improves the image. Normally **60 Hz** is the default setting for our equipment.

50HZ ☐   60HZ ☐

*Now that you have the image tweak to your perfection (it takes a while to learn what controls work best for your telescope combination. You now can either Save a **snapshot** or start **a video recording** of what is being captured. Images and recordings are saved onto your SD data card.*

To save a JPEG snapshot of whatever image is currently on your monitor, just **click** on the **Camera Icon**. The Mallincam HD-10 will automatically save the image on the SD Card (the image name will temporarily pop-up in the middle of the screen, such as IMG0001.JPG.

To Start a .avi (VID001.AVI) recording of the images being captured on HD-10, just **click** on the **Video Camera Icon**. The status timer will appear and the lower right side of the image indicating how long the video currently is. To stop the recording, just **click** again on the **Video Camera Icon**.

Note You can use the **Browse Images Icon** (from the right side of the screen), to view or delete the saved snapshot or video file.

4.   The Mallincam HD-10 with a Computer

Connecting the HD-10 to your Computer

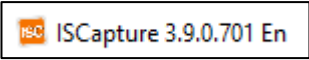First make sure you have the following pieces of equipment:

- Mallincam HD-10 Camera
- 1.25" C nose-piece adapter
- SD Card (inserted into SD slot on back of Camera)
- 12V Power Adapter
- USB Cable
- Recommended USB extension cable
- Laptop or Computer

First Time Installation of Software

Copy the **ISCaptue Software** from the provided USB Stick (or the latest download from Mallincam.net) into folder of your choice on your computer.

Unzip the **ISCapture Software**
➢   **Right-Click** -> **Extract All**

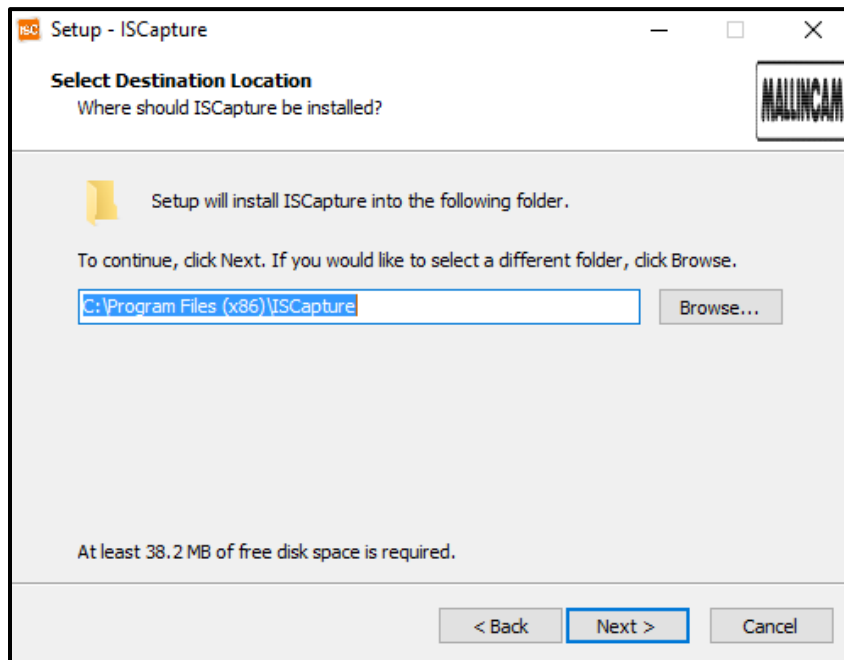**Open** the extracted **ISCapture Folder.**

The **ISCapture** install program will be inside this folder.   ISCapture 3.9.0.701 En
Double-Click on the program to start the installation process.
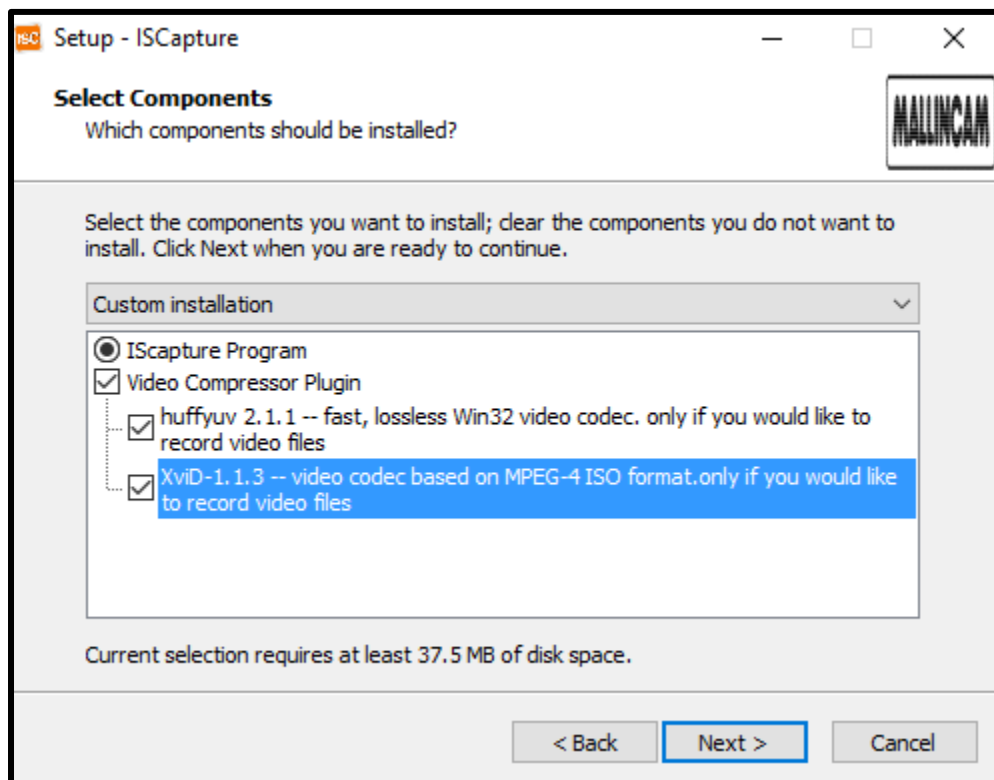
The following window should appear:
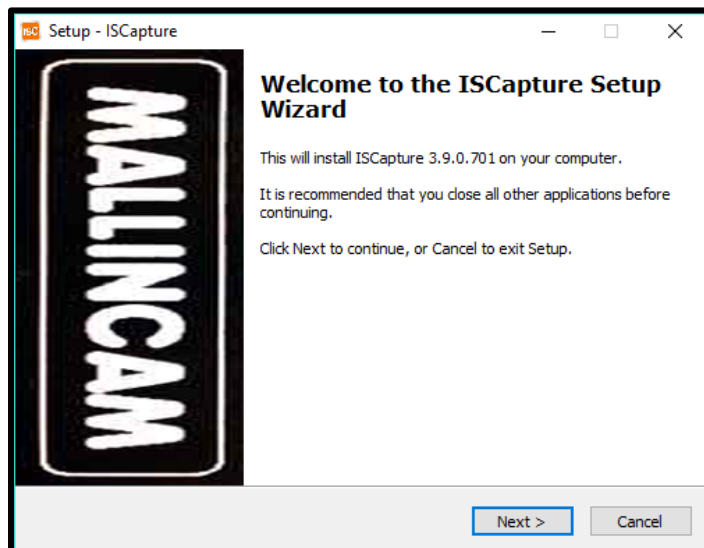
Click on **Next** to continue the installation process.
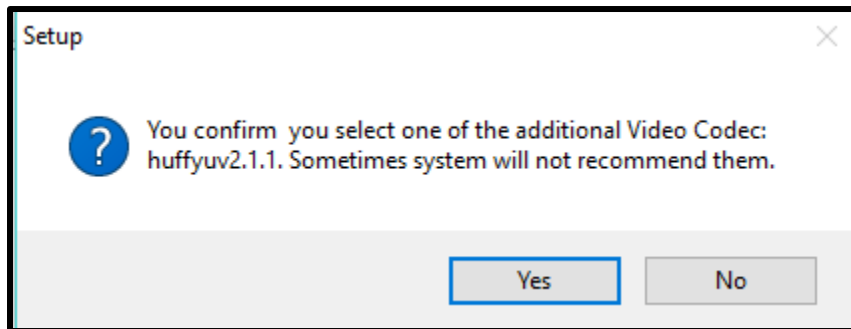
An **Acceptance Window** will now appear.

Either **accept** the file location for the **ISCApture Software** to be installed in or **choose** a folder of your choice. We recommend accepting the default location.
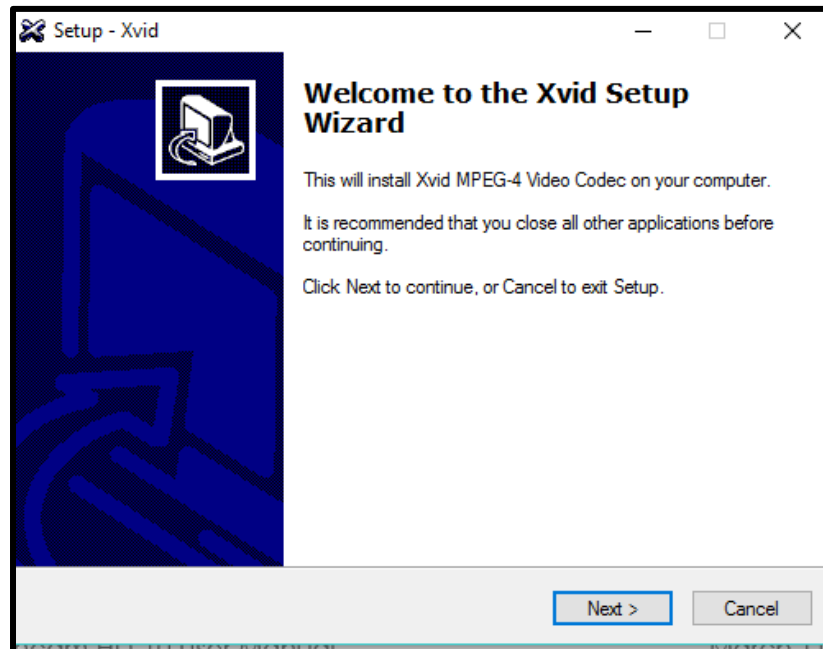
Click on **Next** to pop-up the **Codec Plugin window**.

Select the **codecs** to include if you plan on recording your imaging.

**Click** on **Next** to accept the **Confirmation Windows**.

Setup

? You confirm you select one of the additional Video Codec: huffyuv2.1.1. Sometimes system will not recommend them.

Yes   No

Click on **Yes** to accept and then the **Xvid Setup Window** will appear.

Setup - Xvid

Welcome to the Xvid Setup Wizard

This will install Xvid MPEG-4 Video Codec on your computer.

It is recommended that you close all other applications before continuing.

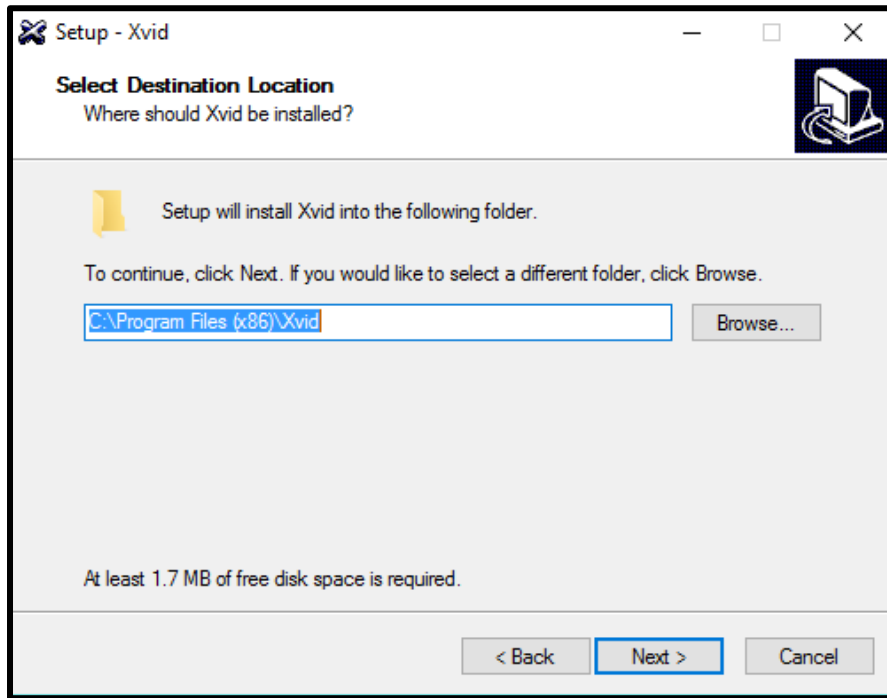Click Next to continue, or Cancel to exit Setup.

Next >   Cancel

Click on **Next** to accept the **Window** and then the **Licence Agreement Acceptance Window** will appear.
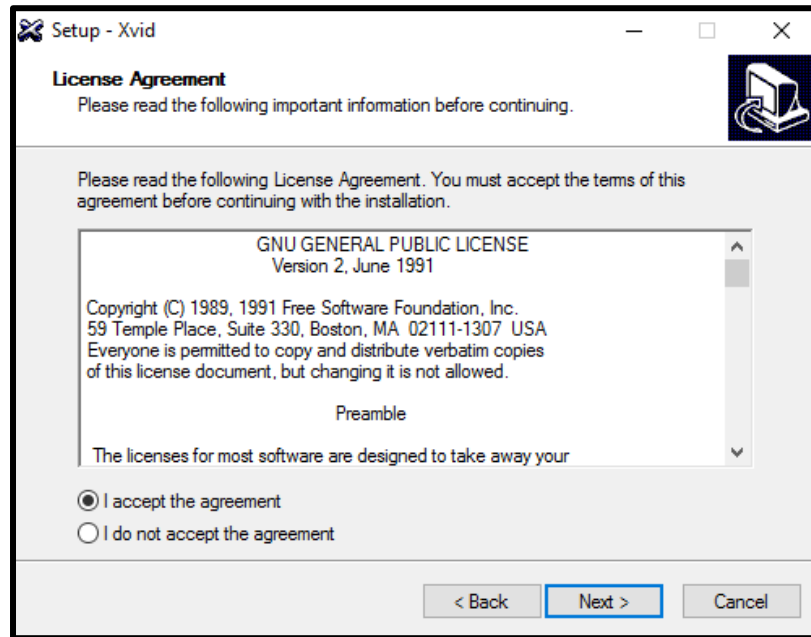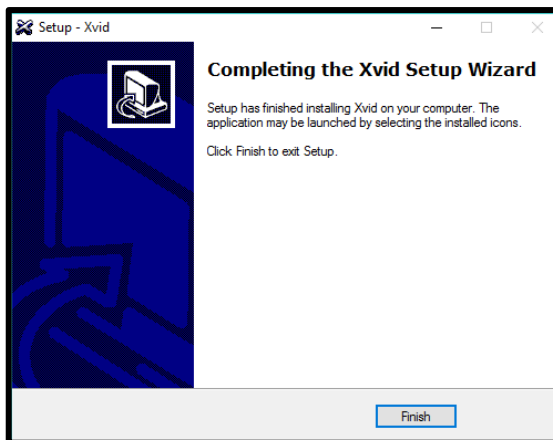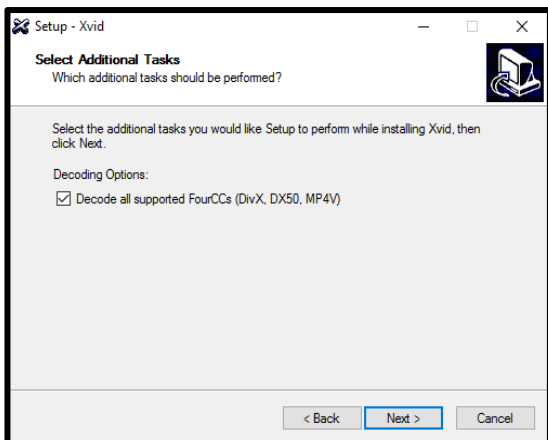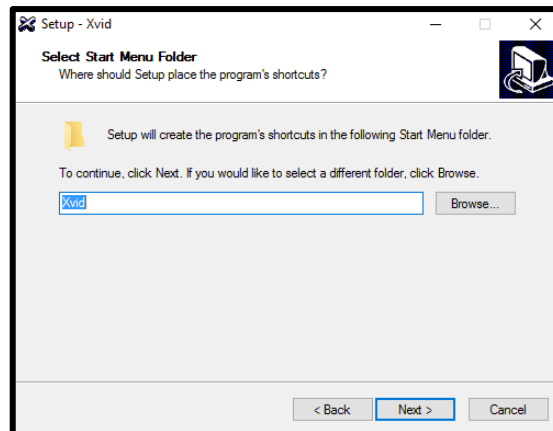
> **Choose** the "**I accept the agreement**" bubble, then **Click** on **Next** to accept the **agreement** and then the **final setup verification Window** will appear.
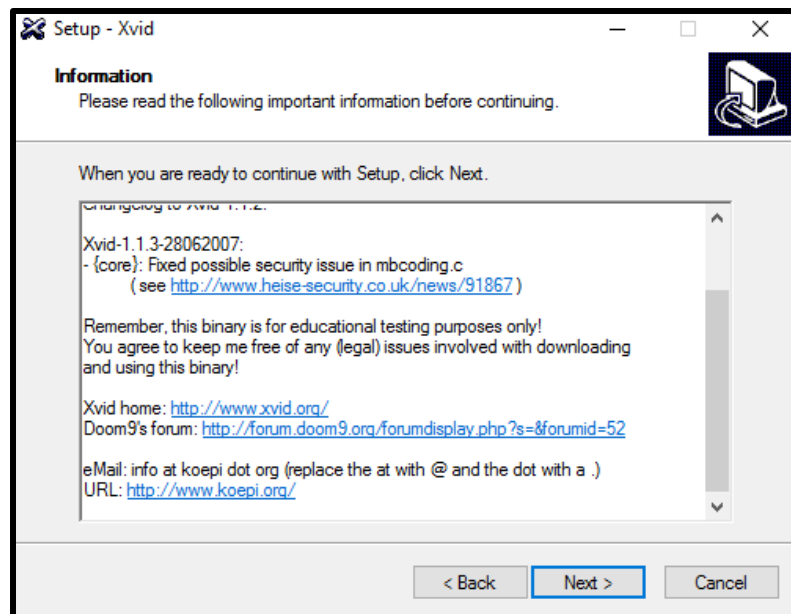
A sequence of **Windows** will now appear for choosing the folder location and names. We recommend choosing the **default** and selecting **Next**.
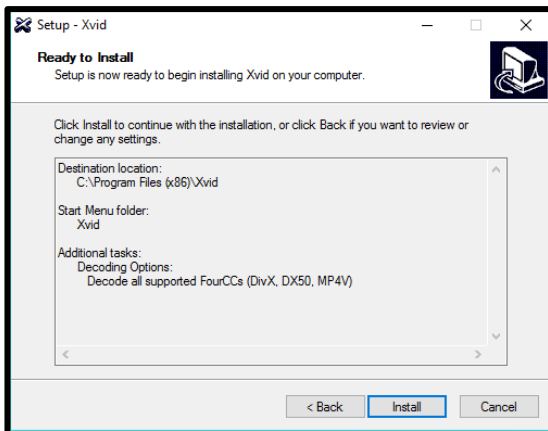
Once the software is installed the final **Completed Window** will appear to inform you that the installation is finished.

Click on **Finish** to acknowledge.

Once complete, you will now have a **ISCapture Icon** on your desktop.

Starting on the HD-10 on the Computer
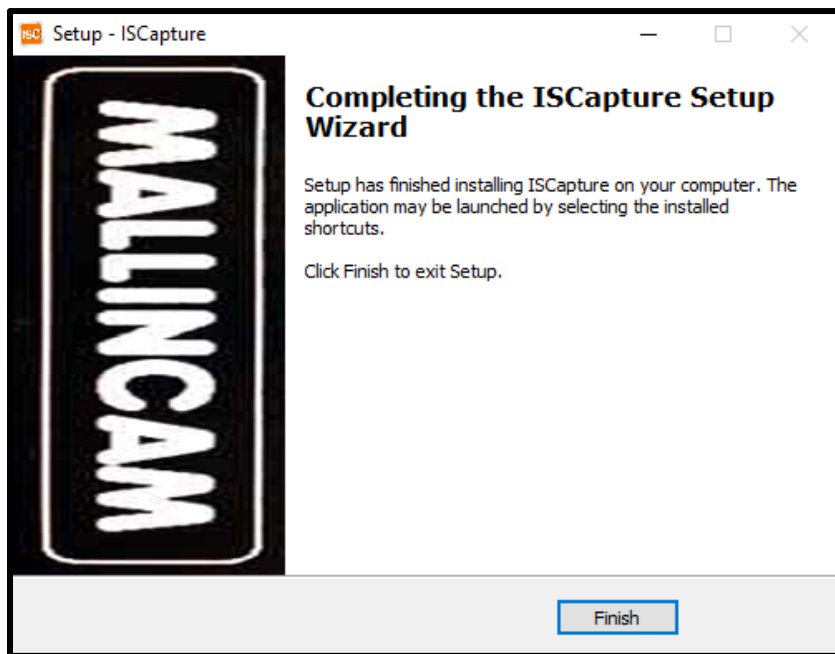
Attach the provided **usb cable** from the MallinCam HD-10 to a usb port on your Computer.

Plugin the **AC Power Adapter** into the back of the HD-10 (a Red   LED will indicate that the camera has power)

Power on the HD-10 by pressing on the **ON/OFF button** located on   the back of the camera. A **Blue LED** should turn on.

Double-Click on the **ISCapture Icon** (located on your Desktop) to start the software.

The **ISCapture Window** should open with current image displayed in the Video window.
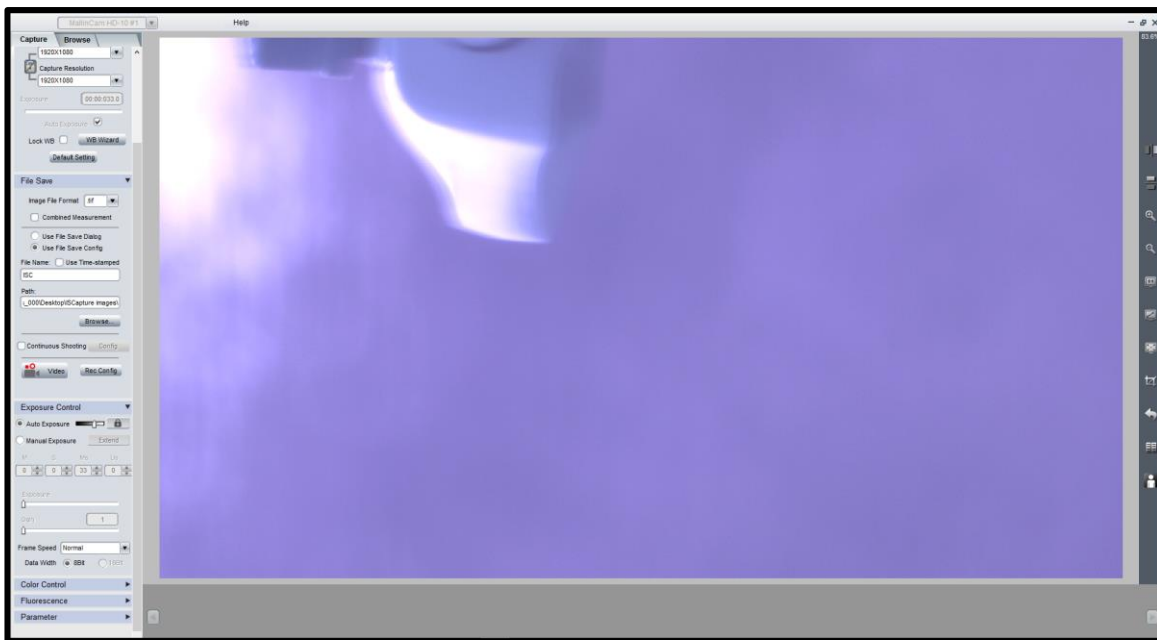
The ISCapture Window

The **IsCapture Software Window** is segmented into a few regions to make viewing and adjusting the HD-10 camera easy and intuitive.

①   The **Camera Selection** Bar

②   **Display Window**.

③   **Feature Tabs**.

④   **Image Action Tabs**.

⑤   **Image Tray**.

The **Feature Tab Panel** provides a variety of **Drop-down tabs** to open-up more controls within the Feature Tab Panel. When the little **black triangle** next to the tab descriptor is pointing to the right, the tab is closed. When the little black triangle is pointing down, the Tab is open (thus displaying more controls)

Clicking in the little black triangle toggles the tab from being open or closed, thus allowing you more control of what information controls are available for you to use.

HD-10 Quick Setup and Pictorial Work-Flow

A typical workflow when using the **HD-10**.
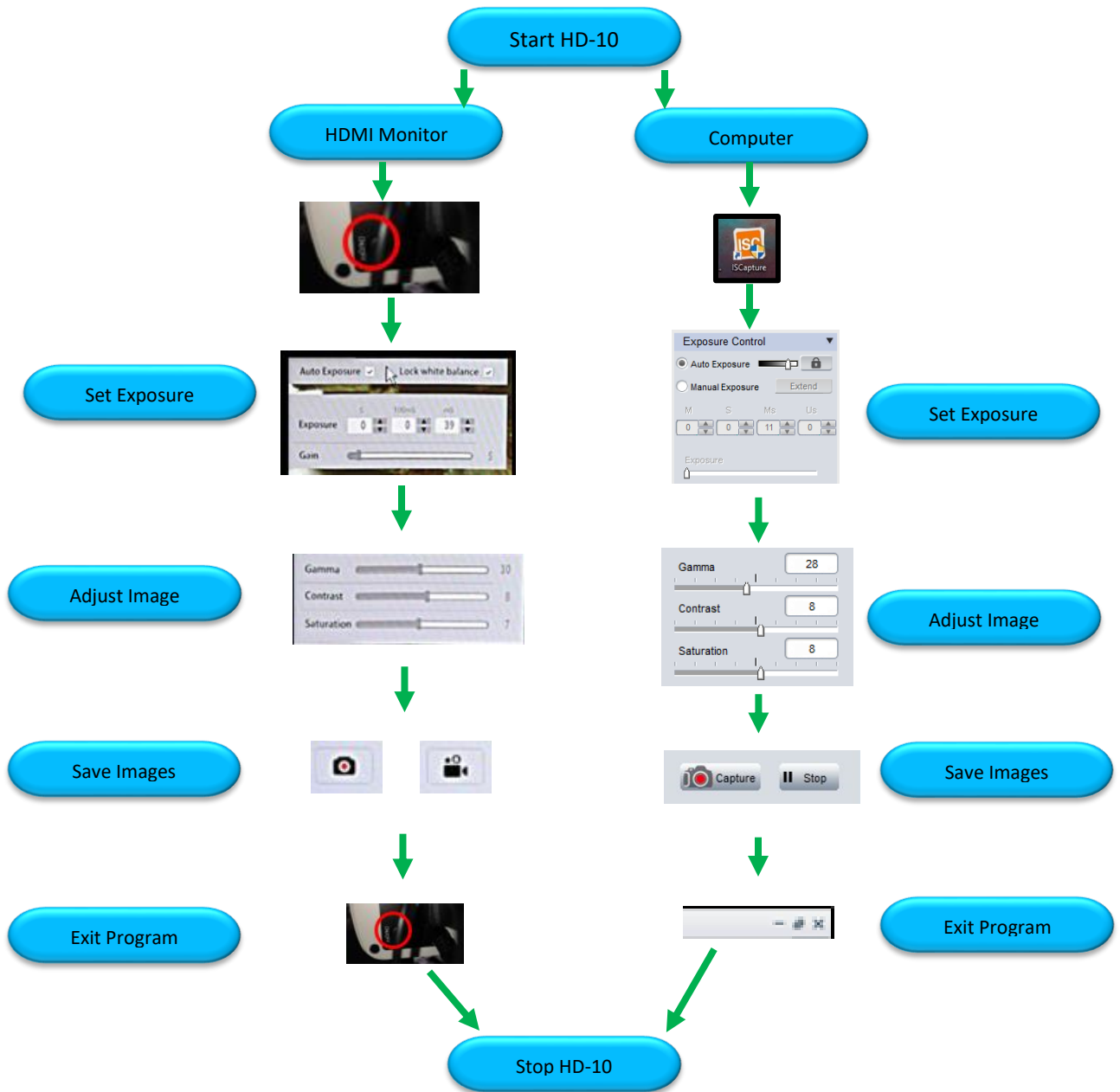
Detailed Work-Flow Procedures

This section describes the typical procedures in imaging using a computer. For a more detailed explanation of each control see the section **HD-10 Control Software** below.

Step 1 **Exposure**

Once you have HD-10 ISCapture program up and running, you should see an image of whatever the HD-10 camera is looking at (at whatever exposure setting the software is set at).

At the Top of the Window you should see MallinCam HD-10 displayed in the camera selector.

The first thing you should do (until you become more familiar with the operation of the Camera) is to turn on the **Auto Exposure**. The ISCapture Software provides a couple of locations where you can adjust the exposure:
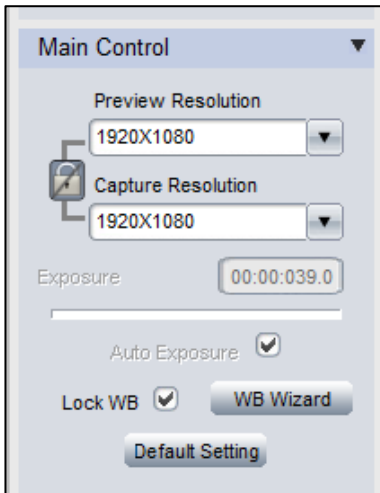
or
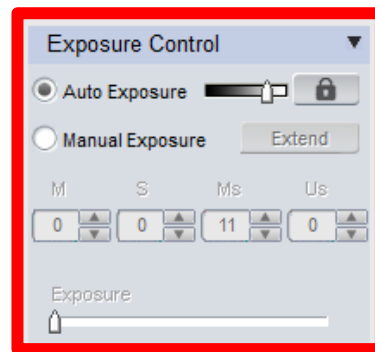
But, we recommend that you use the actual **Exposure Control** tab from the **Feature Tab**.

Click on the **Auto Exposure Bubble Button** to activate Auto Exposure. The Mallincam HD-10 will use its internal processor to produce an exposure time that it believes is best for the current image.

Note You can tweak this expose time by using the **Left-Click-Hold-and-Drag** technique on the slider to the right of the Auto Exposure.
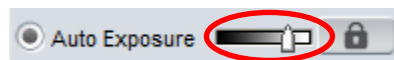
*Now if you would like to set the **Manual Exposure** time to the current **Auto Exposure** time then follow this technique.*

Click on the **Manual Exposer Bubble Button** to select it. Now, **Click** back on the **Auto Exposer Bubble Button** to again select it. Finally select the **Manual Exposure Bubble Button** again, and the time that the **Auto Exposure** had will automatically be set in to the **Manual Exposure** time settings.
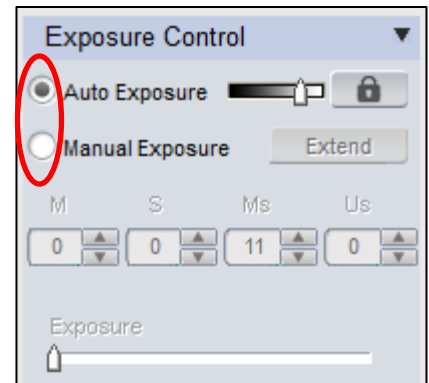
Now that you have an image with an exposure setting that produces an image that is satisfactory to you, you should now be able to bring your telescope in to proper focus.

Step 2 **Gain**

When on **Manual Exposure**, you can also now adjust the **Gain** (**Left-Click-Hold-and-Drag** the **gain slider**) to make the image brighter (larger **Gain** value) or dimmer (smaller **Gain** value). You will get more comfortable with finding to best exposure/gain values for your image. Play with them to see how the exposure and the gain values affects your image. **Gain** is a setting that controls the amplification of the signal from the camera sensor to the screen. Too much amplification can cause noise in the image.
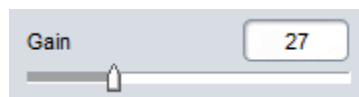
Step 3

Gamma, Contrast, and Saturation

Located in the **Color Control** Tab are the three controls called **Gamma**, **Contrast**, and **Saturation**. By using the mouse cursor, **Left-Click-Hold-and-Drag** the slider bar of each of the **Gamma**, **Contrast,** and **Saturation** controls to produce an image that meets your requirements.

Gamma -   Each pixel in an image has brightness level, called luminance. This value is between 0 to 1, where 0 means complete darkness (black), and 1 is brightest (white). Different display devices (monitor, phone screen, TV) do not display luminance correctly. So, one needs to correct them, therefore the gamma correction function allows you to brighten the dimmer area for the image, or darken the brighter area of the image.

Contrast -   Contrast is the scale of difference between black and white in your images. Without contrast you wouldn't have an image because there wouldn't be any differentiation between light and dark; everything would be black, white, or a single shade of grey somewhere in between.

Saturation -   Saturation is similar to contrast, however instead of increasing the separation between shadows and highlights, we increase the separation between colors.

Step 4

Monochrome

Some objects (the moon and the Sun in particular), can provide more detail when viewed in Black and White. You can select this option by checking the **Monochrome checkbox** located beneath the **Saturation Control**. Once selected, the color of the image will be transformed into shades of grey. Unchecking the checkbox will return the image to its colors.
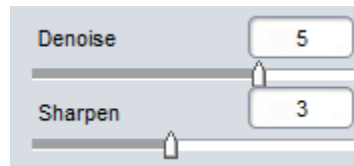
Step 5

Red, Green, and Blue

Different optical paths, and different seeing conditions can affect the color balance of your images. By using the mouse cursor, **Left-Click-Hold-and-Drag** the slider bar of each of the **Red**, **Green,** and **Blue** controls to produce an image whose colors meet your requirements.

Red	0.22
Green	0.78
Blue	0.66
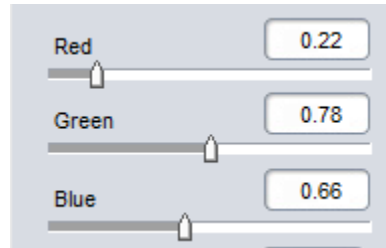
Step 6

Denoise and Sharpen

By using the mouse cursor, **Left-Click-Hold-and-Drag** the slider bar of each of the **Sharpness,** and **Denoise** controls to produce an image that meets your requirements. The higher the number that more aggressive the control works on your image.

| Denoise | 5 |
| Sharpen | 3 |

Sharpness -   Sharpness can be defined as edge contrast, that is, the contrast along edges in a object in the image. When we increase sharpness, we increase the contrast only along/near edges in the object while leaving smooth areas of the image alone.

Denoise -   All cameras produce some form of noise (especially when you increase the exposure time), the **denoise control** can help eliminate the typical noise that is picked-up. Be careful, as the more aggressive you set the denoise control, the more often actual captured data will be removed on your image. Balance is the key.

Note

If after making control adjustment of your image and it looks worse that when you started (this happens as you slowly learn what controls best work for your system), you can display **Click** on the **Default** Button located beneath the **Sharpen Control**. The Mallincam HD-10 will reset all of the controls back to their defaults.

Default

Step 7

White Balance

*Different planetary objects in combinations with difference telescopes, may throw off the colour balance of the HD-10. We can bring everything back to normal by using the **White Balance** control which is located in the Main Control.*
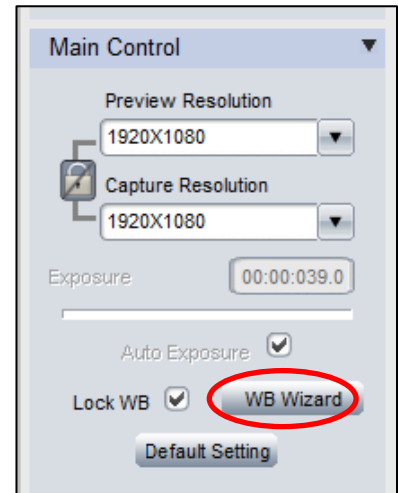
Unlock the White Balance by **unchecking** the **Lock WB** check box.

Click on the **WB Wizard** button, and follow the instructions.

Even though the procedure was designed for microscopes control, it works very well for telescopes.
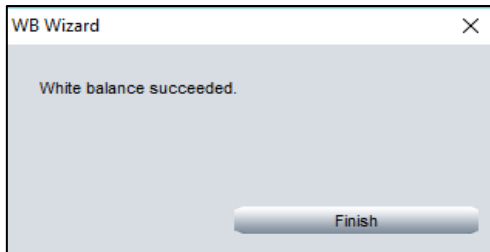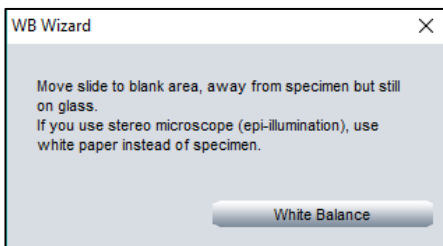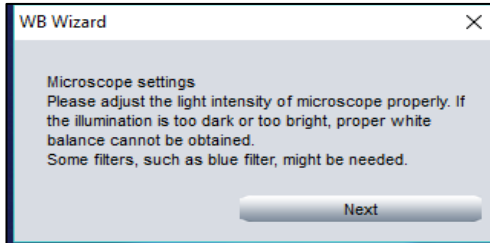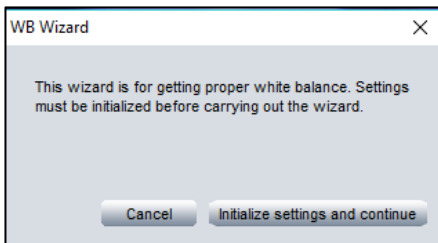
Now **lock** the **White Balance**.

Note If you don't like the White Balance adjustments, you can go back to the default settings by **Clicking** on the **Default Setting** button beneath the **White Balance** controls.
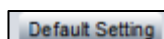
Note

White Balance controls are also available in the **Color Control Tab**,
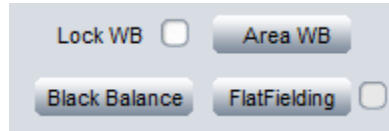
You have the option of selection an area of your image, and using that portion of the image as your white standard.

Click on the **Area WB** button, and your **Mouse Arrow** will turn to multiple colors. You then **Left-Click-Hold-and-Drag** to draw a rectangle around the portion of your image that will be your standard. Once you release your mouse button, you will be provided with options to **Cancel** or **OK** to accept the area.
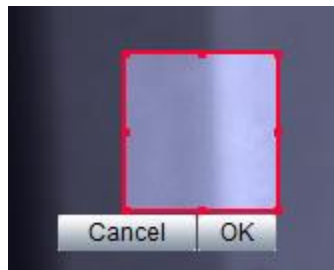
Click on **OK.**

The software will then automatically adjust your White Balance.

Note Beneath the Area WB buttons are to other commands, that are a work in progress.

Black Balance will provide a similar technique to White Balance but dealing with the Blacks.

Flat Fielding will help in improving your image by removing optical defects.

Currently we recommend you leave these controls alone, until the software engineers work out the best way to implement these for astronomical objects.

Note If you experiment and the colors get weird and out of whack, just **Click** on the **Default Setting** Button in the **Main Control** Tab.
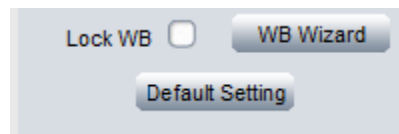
Histogram (Brightness)

Hiding in the **Fluorescence Tab** has useful tools that will assist you in imaging astronomical objects quickly and easily. The **Live Image Histogram** allows you to either manually control the **brightness** of each of the channels or let the software perform this task for you. This allows you to pull out as much detail hidden in the image as you can.

Again, if you get messed up with in making adjustments, this Tab provides a **Default Button** that will reset everything back to the default settings.

It will take you the most amount of time to become comfortable with the tools in this **Fluorescence Tab**. Don't be afraid to experiment with the settings.

These tools allow you to manually or automatically adjust the **image levels** of all color components the image that the HD-10 camera is producing.

You have manual control of the image levels when the **Auto checkbox** is un-checked.

Left-Click and **Hold** to drag the **Black**, **Grey**, and **White arrow slider** underneath the Live **Histogram**.

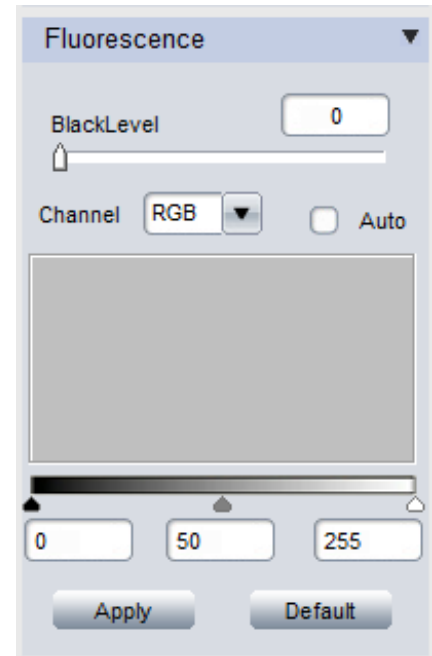The Blue (active) **Histogram** provides a pictorial view of the image intensities from dark to bright. In a dark image, the blue will be more towards the left, and in a bright image will have the blue histogram pushed towards the right. Adjust the exposure to get a **Histogram** that uses most of the window, then move the **White** and **Black sliders** to just touch the left and right sides of the **Histogram**. If the arrow sliders are inside the **Histogram**, then the brightness' are clipped (which sometimes is beneficial when too bright or too dark an image is on the screen).

This tool will take you the most amount of time to become comfortable with, use the **Auto checkbox** to see how it works.

Black Arrow Slider

When moved to the right will reveal more detail in bright areas of the image, when moved to the left will produce less detail in bright area of image

Grey Arrow Slider

When moved to the left or right, adjusts the detail in the brightness zones in the image.

White Arrow Slider

When this arrow is moved to the left, it will provide more detail in the dark areas of the image. When it is moved to the right, it will provide less detail in the dark areas of the image.

You can manually enter in the value for the sliders if required.

Once image levels are at your satisfaction **Left-Click** on the **Apply Button** for the system to lock in these settings.

The **Default Button** resets the **Fluorescence** settings back to normal.

| Step 9 | **Capture a Still Image** |

You now have your masterpiece on the screen (the Moon, a Planet), and you would like to save it for bragging rights. But, before we perform this task we need to tell the software the format we would like to save our images in, and more importantly, where we would like to save our images. We will save our images in **Bitmap** (bmp) format in this example.

Left-Click on the **File Save Tab.**

Located in the **File Save Tab's** expanded window, you will see **Image File Format** with a dropdown format selector with the current chosen format (**.tif** in image to the right). If not set to **.bmp**, then change it to **.bmp**.

Left-Click on the Radio Button **Use File Save Config** and **Check** the **Use Time-stamped** option.

Now, for the location.

Under the **Path** heading, **Left-Click** on the **Browse Button** to choose a directory (folder) location that you would like to save your images and videos.

Note: Once the Path is selected, any images or video in that folder location will appear in the **Image Tray**.

So, now it's time to save our masterpiece.

Left-Click on the **Capture Button** (looks like a **camera icon**) just above the **Main Control Tab.**

You should now see a small picture in the **Image Tray** of your newly saved image with its unique name displayed underneath it. The image is automatically saved in the chosen directory on your computer when you **Left-Click** on the **Capture Button**.

frame rate 6.2 fps

Capture | Stop

Main Control ▶

File Save ▼

Image File Format .tif ▼

☐ Combined Measurement

○ Use File Save Dialog
● Use File Save Config

File Name: ☐ Use Time-stamped

ISC

Path:
;_000\Desktop\ISCapture images\

Browse...

☐ Continuous Shooting   Config

Video   Rec Config
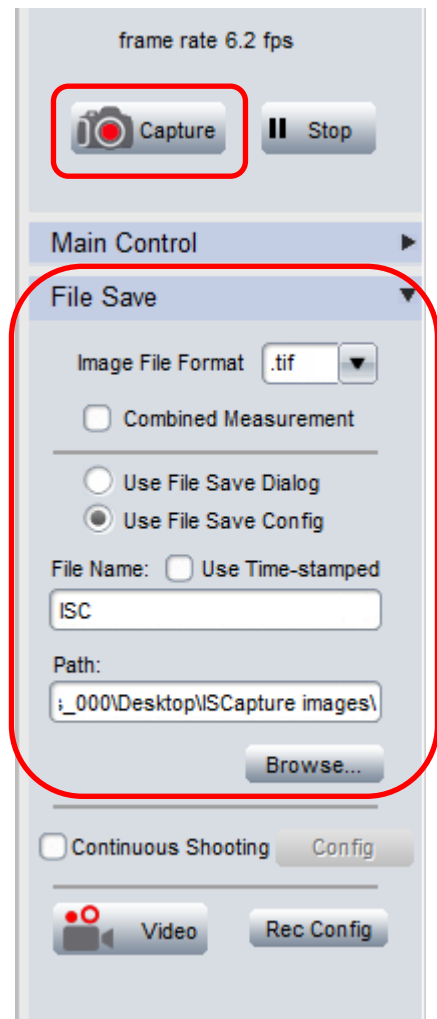
Step 10   **Capture a Video Sequence**

*So, you might be thinking that still captures are good, but video captures are better. Well, let's save a short video of what our Mallincam HD-10 is looking at.*

Since we have already told the software which folder to save our image in (see above), it is now time to save a video sequence. But first, notice beside the **Video Button**, is the **Rec Config Button** (a control that allows us to set up our video recording) both being located at the bottom of the **File Save** Tab.

Left-Click on **Rec Config** and a **Video Compressor Settings** pop-up window will appear.
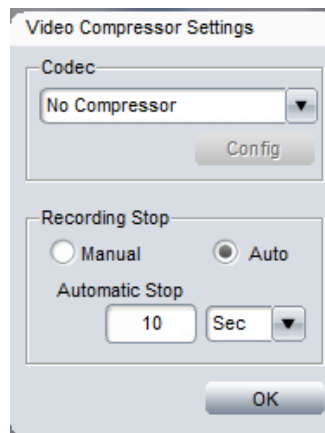
We will leave the codec at **No Compressor**, and will tell the software to automatically save 10 seconds worth of video.

Left-Click on the **Auto**, and set **Automatic Stop** to **10 Sec**. Once set, **Click** on the **OK** button.

We are now ready to save our video sequence.

Left-Click on the **Video Button** (has video camera icon).

The computer will save about **10 seconds** worth of video in the location specified in the **Path** directory. Once completed, you will see a small preview image (white with black borders on the top and bottom) appear in the **Saved Images** window. The file name will be numbers with an **avi** extension. That is your saved video file. You can view that file with any video viewing software (such as Window Media Player, VLC, etc).

5.   HD-10 Control Software

This section covers in detail all the controls and settings in the various regions of the **HD-10 Control Software**. It will take a while to become comfortable with them, but the reward is worth the effort.

HD-10 Control Bar

The top of the HD-10 Control Software window contains a Control Bar.
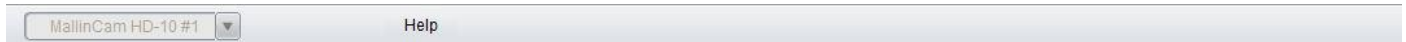
The Control Bar will allow you to:

- Select a HD-10 camera (if you have more than one.)
- Access the Help Manual (when available) and check current Software Version Number.
- Minimize and resize the software window.
- Shut down the HD-10 Control Software.

Connected Camera Selector

If you have installed more than one Mallincam HD-10 camera then this control will provide you the option of selecting a HD-10 camera that you have currently connected to your computer. **Note:** You will need to **Stop** the live capture display from the **Capture Tab** before the software will allow you to choose an alternate camera. If you only have one HD-10 camera attached to your computer then that model of camera will automatically appear in this window.

Action Tabs

The Mallincam HD-10 Control Software provide you with two major **Action Tabs**: **Capture**, and **Browse**.
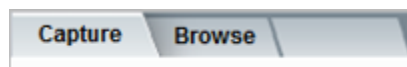
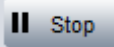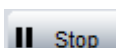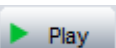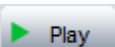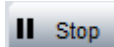- The **Capture Tab** displays what the HD-10 is currently imaging in real time and allows you to adjust the image and exposure values, save still shots or save video sequences.
- The **Browse Tab** allows you to load a saved image and check its properties or rename it.

➤ Capture Tab

The **Capture Tab** is the main Tab used for viewing your live images form the HD-10 camera. The top line will indicate the current **frame rate** in **fps** (frames per second). The faster your computer (or the lower resolution of your HD-10) the higher the display rate.

Just underneath your will see two buttons **Capture** and **Stop**. Pressing the **Capture** button will cause the software to take a snapshot of the current on-screen image (location and resolution are located in the **File Save Tab**).

When **‖ Stop** is present, then the HD-10 is displaying continuous image updates in real time at the current exposure rate.

> ➤ Pressing **‖ Stop** will change the icon to **▶ Play** and the screen will freeze at the current frame.

> ➤ Again pressing **▶ Play** will have the HD-10 start displaying updated images again and changing the icon back to the **‖ Stop** symbol
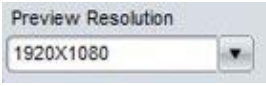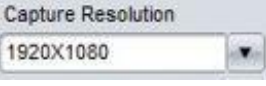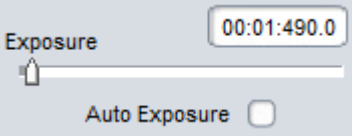
Finally, the **Capture Tab** has 6 Feature Tab Lines: **Main Control**, **File Save**, **Exposure Control**, **Color Control**, **Fluorescence**, and **Parameter**. Each of these Tabs can be expanded by **Left-Clicking** on the ▶ symbol.

Main Control Tab

Main Control Tab allows you to set the resolution in which your Mallincam HD-10 camera is both displaying (**Preview Resolution**) the image and when it saves the images (**Capture Resolution**). In this tab you can also quickly adjust the **Exposure** rate as well as set the **White Balance**.

To open up the **Main Control Tab**, just click on the ▼ symbol.

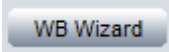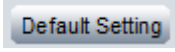| Feature	Title	Usage
Preview Resolution 1920X1080	**Live Image Resolution**	This drop-down selector allows you to choose from a list of available resolutions that your HD-10 camera can display in. The smaller the resolution (2 x 2 binning) the faster the frames per second the HD-10 can produce. The different resolutions have different maximum exposure settings. The **HD-10** currently only provides a 1920 x 1080 resolution.
Capture Resolution 1920X1080	**Captured Image Resolution**	This drop-down selector allows you to choose from a list of available resolutions that your HD-10 camera can save the images in. The smaller the resolution (2 x 2 binning) the smaller files. For video, the HD-10 will be able to save more frames per second in the video sequence when a smaller resolution is chosen. The HD-10 has two Capture Resolutions available: ➢ 1920 x 1080 ➢ 3264 x 1836
(lock symbols)	**Resolution Lock**	By **Clicking** on this symbol, you can have the **Capture Resolution** automatically match the **Preview Resolution**. **Click** on the **Lock** symbol again and it will remove the connection lines and each resolution can be set independently from the other.
Exposure 00:01:490.0 Auto Exposure ☐	**Quick Exposure Adjustment**	By **Holding Down** the **Left-Mouse Button**, you can drag the **slider** to the right or left to increase or decrease the exposure setting. You may find it easier to just **Left-Click** on the **Slider Bar Arrow**, then use your **left** or **right** arrow keys on your keyboard to adjust the exposure setting. As you make exposure adjustments you will notice the exposure value change in the display window above the **Exposure** slide bar. By **Checking** the **Auto Exposure Check-Box**, you will allow the software to choose what it feels is the optimum exposure. If you de-select **Auto Exposure**, you will again have full control, and the system will display what it had chosen as the optimum exposure value in the display window.

	Lock WB	By **Left-Clicking** on this check-box the software will lock the current white balance.
	White Balance Wizard	This Wizard was designed for a microscope application, but I found it works well for astronomy (I set it on a day time object) then activate the Wizard. Just follow the instruction on the screen and compare results.
	Default Settings	**Left-Clicking** on this button restores all of the parameters to their default settings. This is a very useful tool, as sometimes you get lost in all of the **tuning** that you have been doing, and you are having difficulties getting the image back to a view that is decent.

File Save Tab
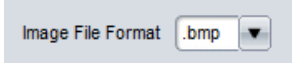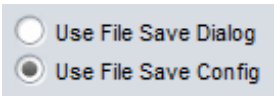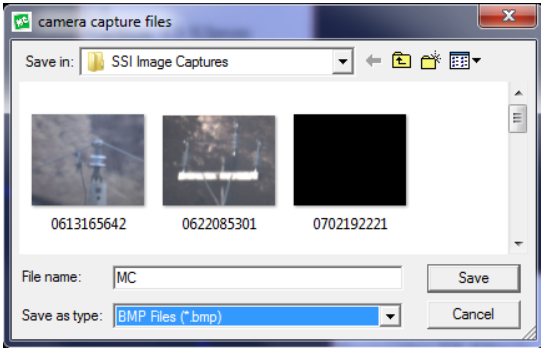
The **File Save Tab** contains all the options that allow you to choose what format and at what location you would like to save your images in.
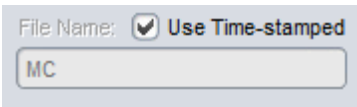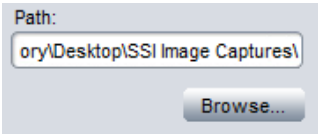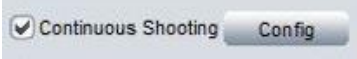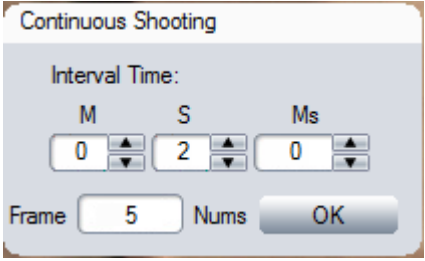
You can also configure the type of compression to be used when saving your **avi** videos, along with how long each video segment should be.
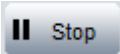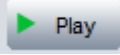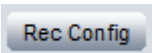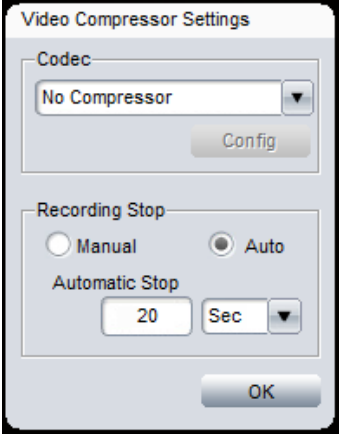
The **File Save Tab** also provides some naming options that can make managing your images easier.

To open up the **File Save Tab**, just click on the ▼ symbol

Feature	Title	Usage
	Saved Image Format	This drop-down selector allows you to choose from a list of available formats that the HD-10 software can save your image in. Formats include: • **bmp** (Bitmap) – can be read by most graphics programs • **jpg** (JPEG) a compressed format for saving files • **tif** (TIFF) this is a **t**agged **I**mage **F**ile **F**ormat, It is used by most astronomical image software.
	Save Structure	When the **Use File Save Dialog** is selected, then every time you **Left-Click** on the **Capture** or the **Video Buttons**, a **file save window** will pop-up allowing you the choice of file name, file location and file format. When the **Use File Save Config** is selected, the system will automatically use the **File Name** and **Path** settings to save the image or video. See below for instructions on **File Name** and **Path**.

	File Name	When the **Use Time-stamped** is selected (checked), the image or video will be saved using a Time Format structure. This structure is in the form of **MMDDHHmmss** ➢ **MM** –two digit **Month** ➢ **DD** – two digit **Day** ➢ **HH** – two digit **Hour** ➢ **mm** – two digit **Minute** ➢ **ss** –two digit **Second** When **Use Time-stamped** is un-checked then you can enter a name into the box below. **Note**: you can leave the name fixed, and any successive **Captures** or **Videos** will add a number following the name. For example: ➢ MC ➢ MC_1 ➢ MC_2
	File Path	You can use the **Browse Button** to have a pop-up window appear that will allow you to choose a location where you would like the software to save your images or videos. Once chosen, any current images or videos in that folder will appear in the **Image Tray**. The current location will appear in the **Path Box** above the **Browse Button**.
	Continuous Shooting	**Left Click** on the **Config Button** and a pop-up window will appear: Using this window select an interval time between each image, and the number of images to take. **Click** on the **OK** button to accept.

		Now if the **Continuous Shooting** checkbox is selected, then when you **Click** on the ![Capture button] **Button (**located at top of the **Capture Tab)**, the software will start the image taking process saving them in the designated **Path** with the chosen **File Name** settings indicating the image names (name or time stamped) to use. **Note:** to abort the **Continuous Shooting** run, **Click** on the ![Stop button] **Button** next to the ![Capture button] **Button**. Don't forget to **Click** on the now displayed ![Play button] **Button** to have the software display the real-time video image again.
![Video button]	**Record Video**	**Clicking** on this button starts the Video Capture routine as determined by the settings in the **Rec Config** button. Once the recording has started, you can again **Click** on the **Video Button** to abort the process. The name and location of the video will be determined by the settings in the **File Name** and **Path** settings.
![Rec Config button]	**Video Format**	It is here that you choose which compression **Codec** to use (we recommend you choose **No Compressor** so that you have complete video data). You can choose to either **Manually Stop** the video capture process, or to have the software **Automatically Stop** the capture process after any number of **seconds** or **frames**. **Click** on the **OK Button** to have the software accept your settings.

		Note: Large **time** or **frame** values will create large video **avi** files. Sometimes the length of these files is larger than the Windows **avi** format allows and the image may look totally Black when being viewed from a video viewer such as **Windows Media Player** (the **avi index** is not created correctly). If you are having problems viewing your video file, we recommend that you use **VirtualDub** to load and fix the **avi** file (it will fix it automatically). You can then have **VirtualDub** re-save the fixed file.
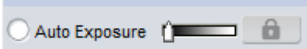
Exposure Tab
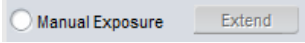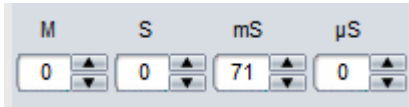
It is here in the **Exposure Tab** that you have complete control of the exposure process. You can have the HD-10 camera try to pick the best exposure for the current image, or you can take control of the exposure yourself.
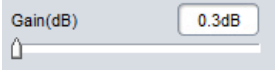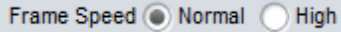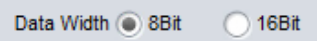
You can adjust the exposure either by entering an exposure value or by sliding an exposure bar. This tab also allows you to adjust the **Gain** of the camera. Finally, you can also choose the **Frame Rate** (Normal or High), with the **Data Width** is fixed at 8 Bit, to suit your needs.

To open up the **Exposure Tab**, just click on the ▼ symbol

Feature	Title	Usage
Auto Exposure	**Auto Exposure**	When **Auto Exposure** is selected, the software will continuously attempt to find the best exposure setting required to display the image being captured by the HD-10 camera. You will now also have the ability to adjust this slider. This is the **Auto Exposure Target Value** slider. You use this slider to set a reference exposure time for the **Auto Exposure** to target on. For example, if the image you are looking at is dim, you would move the slider to the right (higher value), thus instructing the **Auto Exposure** that it will need to start looking at longer exposure times. Since the **Auto Exposure** is a continuous process, once you have determined that the image is correctly exposed, you can **lock** (pause the **Auto Exposure** process) by **Left-Clicking** on the symbol. The software will now also indicate in the **Exposure Time Window**, what the system is using for the current exposure if you **lock** then **unlock** then l**ock** again.

| | Manual Exposure | This setting allows you to manually adjust the **Exposure Time** for the HD-10 camera. You will currently be able to adjust the time from about **0** seconds to **10** seconds.

Once selected you can now adjust the exposure in several ways.

Method 1
The first method is to actually enter in an exposure time into the **Exposure Time Window**.

Choose either the (**M**)inute, (**S**)econd, (**m**)illisecond, or (**µ**)second Window and enter in a value from the keyboard. Once you have started entering a value the symbol beside the numbers will change to a green check mark. Once you have finished entering in the value, you will need to **Left-Click** on the symbol to have the software accept your entered value.

Method 2
The second method is to **Left-Click** on the **up** and **down** arrows ( ) adjacent to the time value you are interested in changing. This will scroll up or down the time values and you will immediately see the changes on the image.

Method 3
The third method allows you to slide the **Exposure Slider Arrow**.

Left-Click and **Hold** the mouse button and drag the slider to the l**eft** or **right**. This rapidly adjusts the Exposure times from shortest to longest exposure values (currently, from 0 seconds to 10 seconds on HD-10). Alternatively, if you **Left-Click** on the **Exposure Slider Arrow**, you can then use the **left** and **right** arrow keys on your keyboard to adjust the Slider (this gives you fine **mS** adjustments). |
|---|---|---|

Gain(dB) 0.3dB	**Gain**	This control allows you to adjust the **Gain** on the camera. The higher the value the brighter the image will become. • **Left-Click** and **Hold** to drag the **slider arrow** along the slider to adjust the gain. • **Left-Click** on the **slider arrow**, the use the **left** and **right** keyboard arrows to adjust the gain. When using too high a gain you can amplify noise in the image.
Frame Speed ● Normal ○ High	**Frame Speed**	You can adjust the **Frame per Second** rate by either choosing the **Norma**l or the **High**. When set to **Norma**l, you can obtain a **lower** frame rate than when set to **High**. The **Normal** setting also allows for a **longer maximum exposure time**, while the **High** selection will **reduce** the maximum possible exposure time.
Data Width ● 8Bit ○ 16Bit	**Data Width**	You can adjust the number of data bits to use for the displaying the image. 16 bit contains more data information, thus puts more strain on the **cpu** of your computer. Theoretically 8 bit provides 2^8 = **256 grey levels** to represent the image, while 16 bit provides 2^16 = **65536 grey levels**. **Note:** Either setting saves the image at 24 bits with the HD-10 series of cameras.

Color Control Tab

It is here in the **Color Control Tab** that you can adjust the visual appearance of the displayed image. You have the ability to adjust the:
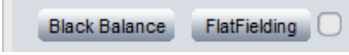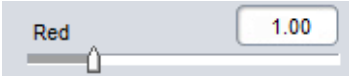
- **Gamma**
- **Contrast**
- **Saturation**
- **Color or Monochrome**
- **White Balance**
- **Red Balance**
- **Green Balance**
- **Blue Balance**
- **Denoise**
- **Sharpen**
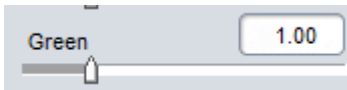
You will spend some time in this tab tweaking your image to produce a final output that matches your equipment. If you ever get lost in the image, the **Color Control Tab** provides a **Default Button** to set the image back to the default settings.
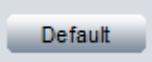
Feature	Title	Usage
Gamma	**Gamma**	This control allows you to adjust the **Gamma,** that is, how the brightness is distributed across the spectrum of the monitor. You adjust the **Gamma** value to obtain the correct reproduction of intensity of the image on your monitor. To adjust the **Gamma**: • **Left-Click** and **Hold** to drag the **slider arrow** to the left or right. • **Left-Click** on the **slider arrow** and use the keyboard's **left** and **right** arrow keys to move the slider. Adjust the **Gamma** value to produce the best image for your equipment. The default value for **Gamma** is **0**, and this value is recommended for most situations.

Contrast	**Contrast**	This setting allows you to manually adjust the **Contrast** of the image, that is, the difference scale between dark and light parts of your image. A high contrast value will make the shadows become darker and highlights become brighter, thus loosing image details. To adjust the **Contrast**: • **Left-Click** and **Hold** to drag the **slider arrow** to the left or right. • **Left-Click** on the **slider arrow** and use the keyboard's **left** and **right** arrow keys to move the slider. Adjust the **Contrast** value to produce the best image for your equipment. The default value for **Gamma** is **-20**, but I find the contrast value of 0 a great place to start.
Saturation	**Saturation**	This control allows you to adjust the **Saturation** on the camera, that is, the intensity of the color in the image. The higher the value the more intense the colors of image will become. To adjust the **Saturation**: • **Left-Click** and **Hold** to drag the **slider arrow** along the slider to adjust the gain. • **Left-Click** on the **slider arrow**, the use the **left** and **right** keyboard arrows to adjust the gain. The **Saturation slider** can only be adjusted if the **Color Enhancement** box is checked (see below).
Color Enhancement Monochrome	**Color / Monochrome**	To make the color image for vivid, uncheck **the Monochrome box**, then use the above **Saturation Control** to enhance the colors. Checking the **Monochrome box** gives you a grey scale image.

	White Balance	These controls allow you to control the **White Balance** for your image, that is, get the colors of your image as accurate as you can. To obtain the best white balance use the following procedures: • Move to and Image a blank area (preferably white) or blank object. • **Left-Click** on the **Area WB Button** (then **Left-Click** and **Hold** to draw rectangle around blank area). • Software will correct the colors of the image automatically. • Move back to you object. You can then lock in the White Balance by **checking** the **Lock WB** checkbox.
	Black Balance/Flat Fielding	Just as in using the White Balance, you can **Click** the **Black Balance** button. You will notice that the Red, Green, and Blue color balance values are all set to 0.78. To undo the **Black Balance** control, just **click** on the **Default Button** at the bottom of the **Color Control Tab**. **Flat Fielding** is a work in progress, when the software tries a remove any optical distortions. Just click on the **Flat Fielding** button to activate (the checkbox will become checked), and **uncheck** the checkbox to disable the process.
	Red Balance	This control allows you to control the intensity of **Red** color in your image. To adjust this parameter: • **Left-Click** and **Hold** on the **slider arrow** to drag it to the left or right to adjust the Red intensity. • **Left-Click** on the **slider arrow** and then use the **left** or **right** arrow keys on your keyboard to move the slider.

Green ![slider] 1.00	**Green Balance**	This control allows you to control the intensity of **Green** color in your image. To adjust this parameter: • **Left-Click** and **Hold** on the **slider arrow** to drag it to the left or right to adjust the Green intensity. • **Left-Click** on the **slider arrow** and then use the **left** or **right** arrow keys on your keyboard to move the slider.
Blue ![slider] 1.00	**Blue Balance**	This control allows you to control the intensity of **Blue** color in your image. To adjust this parameter: • **Left-Click** and **Hold** on the **slider arrow** to drag it to the left or right to adjust the Blue intensity. • **Left-Click** on the **slider arrow** and then use the **left** or **right** arrow keys on your keyboard to move the slider.
Denoise ![slider] 5	**Denoise**	All cameras produce some form of noise (especially when you increase the exposure time), the **denoise control** can help eliminate the typical noise that is picked-up. To adjust this parameter: • **Left-Click** and **Hold** on the **slider arrow** to drag it to the left or right to adjust the Denoise intensity from a range of 0 to 7. • **Left-Click** on the **slider arrow** and then use the **left** or **right** arrow keys on your keyboard to move the slider Be careful, as the more aggressive you set the denoise control, the more often actual captured data will be removed on your image. Balance is the key.

Sharpen [3]	**Sharpen**	This control allows you to adjust the **Sharpness** of the camera, that is, how distinct the image looks. The higher the value the more precise the edges of image will become. To adjust the **Sharpness**: • **Left-Click** and **Hold** to drag the **slider arrow** along the slider to adjust the **Saturation**. • **Left-Click** on the **slider arrow**, the use the **left** and **right** keyboard arrows to adjust the **Saturation**. Adjust the **Sharpness** value to produce the best image for your equipment. The value for **Sharpen** start at **0** and can go as high as **7.0.**
Default	**Default**	Resets all of the adjusted parameters in the **Color Control Tab** back to their defaults.
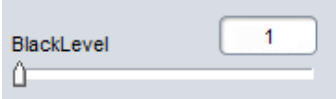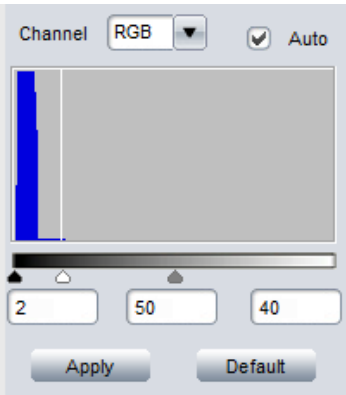
Fluorescence Tab
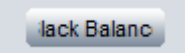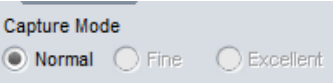
The **Fluorescence Tab** has useful tools that will assist you in imaging astronomical objects quickly and easily. The **Live Image Histogram** allows you to either manually control the brightness of each of the channels or let the software perform this task for you. This allows you to pull out as much detail hidden in the image as you can.

Again, if you get messed up with in making adjustments, this Tab provides a **Default Button** that will reset everything back to the default settings.

It will take you a while to become comfortable with the tools in this **Fluorescence Tab**. Don't be afraid to experiment with the settings.

Feature	Title	Usage
BlackLevel [1]	**Blacklevel**	This control (which is currently not activated) allows you to adjust the **BlackLevel**, that is, how the brightness level at the darkest part of the image is distributed. The larger the value the more detail that can be seen in the dark areas of the image. To adjust the **BlackLevel**: • **Left-Click** and **Hold** to drag the **slider arrow** to the left or right. • **Left-Click** on the **slider arrow** and use the keyboard's **left** and **right** arrow keys to move the slider. Adjust the **BlackLevel** value to produce the best image for your equipment. The default value for **BlackLevel** is **1**.
Channel RGB ☑ Auto 2 50 40 Apply Default	**Histogram**	These tools allow you to manually or automatically adjust the **image levels** of all color components the image that the HD-10 camera is producing. You have manual control of the image levels when the **Auto checkbox** is un-checked. **Left-Click** and **Hold** to drag the **Black**, **Grey**, and **White arrow slider** underneath the Live **Histogram**. The Blue dynamic **Histogram** provides a pictorial view of the image intensities from dark to bright. In a dark image, the blue will be more towards the left, a bright image will have the blue histogram towards the right. Adjust the exposure to get a **Histogram** that uses most of the window, then move the **White** and **Black sliders** to just touch the left and right sides of the **Histogram**. If the arrow sliders are inside the **Histogram**, then the brightness' are clipped (which sometimes is beneficial when too bright or too dark an image is on the screen). This tool will take you the most amount of time to become comfortable with, use the **Auto checkbox** to see how it works.

		Black Arrow Slider When moved to the right will reveal more detail in bright areas of the image, when loved to the left will produce less detail in bright area of image **Grey Arrow Slider** When moved to the left or right adjusted the detail in the brightness zones in the image. **White Arrow Slider** When this arrow is moved to the left, it will provide more detail in the dark areas of the image. When it is moved to the right, it will provide less detail in the dark areas of the image. You can manually enter in the value for the sliders if required. Once image levels are at your satisfaction **Left-Click** on the **Apply Button** for the system to lock in these settings. The **Default Button** resets the **Fluorescence** settings back to normal.
Jack Balanc	**Black Balance**	This control will automatic balance the **Red**, **Green**, and **Blue** settings (all three will be set to 0.78). To turn off the Black Balance, use the **Default** button located in the **Color Control Tab**.
Capture Mode ◉ Normal ○ Fine ○ Excellent	**Capture Mode**	This Control is planned for future releases. Its purpose is to improve the capture quality of images taken from the Mallincam HD-10 camera.

Parameter Tab

Because of the varied setting adjustments that can be made when fine tuning the image, the software provides this **Parameter Tab** to save those settings. The **Parameter Tab** will provide you the ability to save up to **4** Parameter sets. Each set contains the following information:

- **Exposure Time**
- **Gain**
- **Data Width**
- **Gamma**
- **Contrast**
- **Saturation**
- **Color Enhancement**
- **Monochrome**
- **RGB Gain**
- **Black Levels**
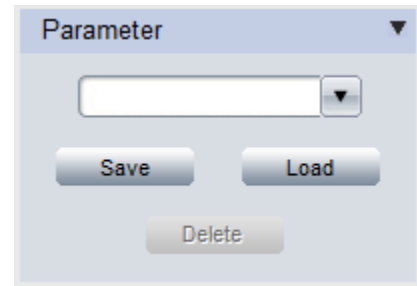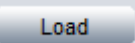
To save a Parameter Setting
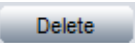
➢ **Enter a Name** you will use for the current settings in the available **Drop-down Box**.
➢ **Left-Click** on the **Save Button.**

The Software will pop-up a window letting you know that it successfully saved the Parameter Settings. **Left-Click** on **OK** to acknowledge the message.

To Load a previously saved Parameter Setting

➢ **Left-Click** on the [▼] Button to open the **Drop-Down Menu**.
➢ **Left-Click** on the **Parameter Setting Name** that you would like to use.
➢ **Left-Click** on the Load Button to activate those settings.

To Delete a Parameter Group Setting

➢ **Left-Click** on the [▼] Button to open the **Drop-Down Menu**.
➢ **Left-Click** on the Parameter setting **Name** that you would like to delete.
➢ **Left-Click** on the Delete Button to remove those group settings.

Capture Tab Action Keys

On the right-hand side of the **HD-10 Control Software** screen you will see **Action keys** with symbolic icons. The action keys for the **Capture Tab** is slightly different for the action keys for the **Browse Tab**. Just **Left-Click** on the **icon** and the software will perform its task immediately.

The following **Action Keys** are available when the **Capture Tab** is active

Flips the image **Horizontally**.

Flips the image **Vertically**.

Increases the zoom factor on the image (the zoom percent is displayed at top of Action Keys bar).

Decreases the zoom factor on the image (the zoom percent is displayed at top of Action Keys bar).

Sets the zoom factor to **100%**.

Sets the zoom factor to **fit** the complete image in window.

Uses **Full Screen** for the image (click on **Exit**, to return to normal screen).

Allow you to **Crop** out all but a small window (once cropped, you can zoom in or out on this piece).

Resets the cropped image back to normal.

Browse Tab

The **Browse Tab** is the location where you will examine saved images from this session or from previous sessions. You can think of this Tab location as the **Image Management** area of the Software.

The **Browse Tab** will have its own set of **Action Keys** located on the Right of the screen to speed up the process of maintaining the current image.

Any image that is selected from the **Image Tray** will be loaded into the main **Display Zone**, and the Image details will be displayed in the **Browse Tab**.

The **Browse Tab** will display the following data about the image:

- **File Name** (extension determines format of image).
- **Date** and **Time** image was taken.
- **Data Bit** value of image.
- **Image size.**
- Any **notes** that you added about the image.

You can also **Left-Click** on the **FileName** Window and can change the name of the current image, or **Left-Click** in the **Note** Window and **add** or **change** the comments about the image. **Left-Clicking** on the **Save Button** will save the data in the current **Path** location.

Changing Path Location

You can Load images from other directories by **Left-Clicking** on the **Browse Button** and choosing a directory of interest. The software will automatically load the images into the **Image tray** for you, and will change the **Path** to represent the now chosen Folder.
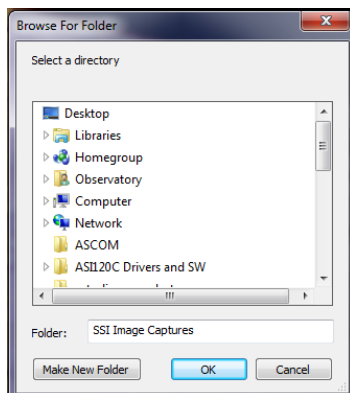
Don't Forget that you can use the **Action Keys** from the Right side of the screen to: **Zoom** in and out, **Print**, **Delete**, and a variety of other actions (see section on **Action Keys** for more detail).
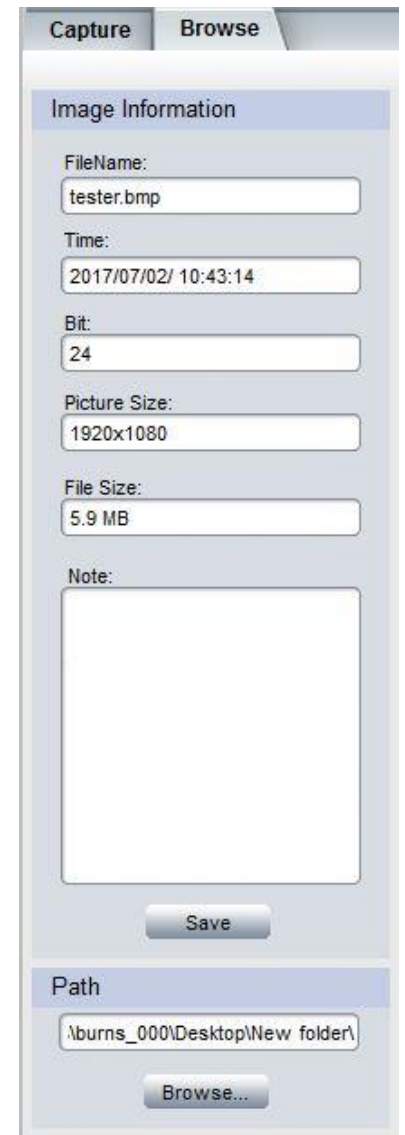
Browse Tab Action Keys

On the right-hand side of the **HD-10 Control Software** screen you will see **Action keys** with symbolic icons. The action keys for the **Browse Tab** is slightly different for the action keys for the **Capture Tab**. Just **Left-Click** on the **icon** and the software will perform its task immediately.

Rotates the Image to the **Right 90°**.

Rotates the Image to the **Left 90°**.

Increases the zoom factor on the image (the zoom percent is displayed at top of Action Keys bar).

Decreases the zoom factor on the image (the zoom percent is displayed at top of Action Keys bar).

Sets the zoom factor to **100%**.

Sets the zoom factor to **fit** the complete image in window.

Allows you to **Left-Click** and **Hold** to move a large image around screen.

Allow you to **Crop** out all but a small window (once cropped, you can zoom in or out on this piece).

Resets the cropped image back to normal.

Deletes the Image from both **Screen** and **Image Tray**.

Allows you to **Print** the **currently** displayed image.

Allows you **Change** the **Current Image Folder** and or **load** an image from another folder onto the screen.

Saves the **Current Image** on the screen with a **_bak** name extension.

Saves the **Current Image** on the screen with a **name** and **format** of your choice.

6.   Appendix

Appendix A: Connecting to Night Skies Network (NSN) using the HD-10 Software

Introduction

I found that when I first started connecting to NSN, things started happening too fast for me to keep track of everything at once. So, pre-planning was the most the most crucial step for me. I found that by doing test runs in the comfort of my house allowed me to develop my techniques that work for the equipment and software that I use. Below are the results and steps that I use to broadcast on NSN, feel free to follow them and/or made modification as you deem as necessary.

Note
Computer real-estate will be your nemesis. So, the size of the monitor (laptop), number of screens that you are using, and the number of software programs being used simultaneously will dictate how you will manage your windows. I will describe how I have organized my windows under a variety of situations (1 computer, 1 computer with 2 monitors, which software packages am I using, and what am I trying to do this session). Remember, it's all about having fun, and *time* and *patience* are your best friends (not to mention all the guys and gals, and the Yahoo – MallinCam site : https://groups.yahoo.com/neo/groups/mallincam/conversations/messages

One of the most important decisions you will need to make with broadcasting the image of the HD-10 is what Video capture software are you going to use. Some simple suggestions:

The HD-10 Control Software is not capable of modifying the Video Image and having that Video Image be directly captured by NSN Flash. So, if you want to use all the features of the HD-10 software and broadcast those results, as well as save screen shots and videos of your images, then we need another program to capture the HD-10's Software output and have the output from that program linked to NSN's Flash grabber.

You currently have three choices for that other program: Splitcam, Manycam, and WebcamMax. All three have about the same features, some of these have versions that will cost you, but all have a version that is free (reduced functions, advertisements, etc...). My current program of choice is Splitcam (I can live with the Advertisements), but all three work just as well. Find the video capture software that works best with your browser.

You will then use Manycam/Splitcam/Webcam Max along with HD-10 Control Software.

Step 1   *Plug in the HD-10 camera into an USB Port on your computer.*

Note
Always use the same port for your connected devices. I even mark on my laptop which usb port is for which device.

Step 2   *Double Click on the HD-10 Control Software icon.*

Get the image of your object on the Image Window of the HD-10 Software, adjust the settings on the software for your planned object and size the window so you have room for other software on your monitor real-estate. If you have a dual Monitor system, move the HD-10 Software to the second monitor.

Note   During your initial *NSN* experience, you will find it difficult to even get the object of interest onto the HD-10 Software window. Spend some time playing and adjusting the settings prior to connecting to NSN. As you become more comfortable, you will find that you won't worry about this step and will adjust the setting while connected to NSN (with the whole universe watching you tweak it live).

Step 3   *Start Manycam/Splitcam/WebcamMax*

Note   Size the Manycam/Splitcam/WebcamMax window so that is beside the HD-10 Software Window and you can see both with little overlap. If you have a dual monitor system you can slide both the HD-10 Software Window and the Manycam/Splitcam/WebcamMax window to the second monitor.

Step 4   *Have Manycam/ Splitcam/Webcam Max grab the Desktop image*

Note   All of these packages have the ability to get a Desktop Image. Choose this option and overlay the sizing window on top of your *HD-10 Software Image Window*. You may need to play with the sizes until you obtain the ideal combination of both that fit in your screen. You want to ensure that you get a good image of whatever the HD-10 Software is looking at inside the Manycam/Splitcam/Webcam Max window.
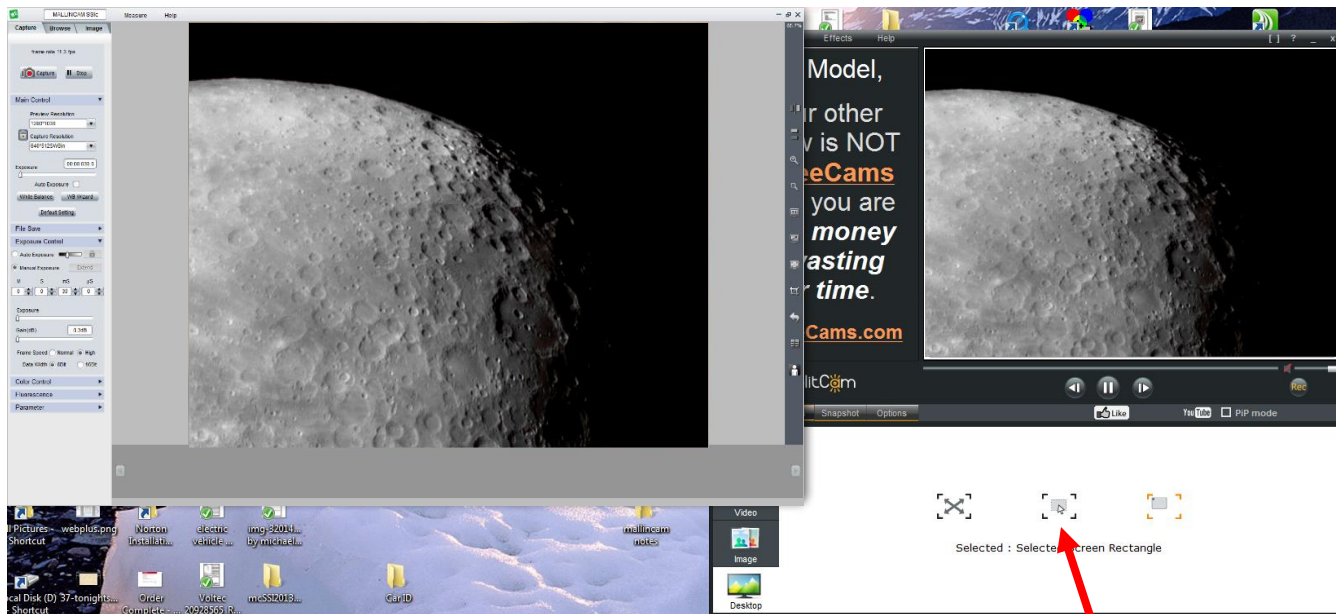
This allows you to select the size and location of the desktop that you want on SplitCam. Just slide and adjust the overlay on top of your HD-10 Software image.

Step 5

Adjust the Resolution and frames/second (fps) value on Manycam/Splitcam/WebcamMax

Note

This will be trial and error; it all depends upon resolution, bandwidth, and what over members on NSN experience from your broadcasted image. You will end up adjusting both on the Manycam/Splitcam/Webcam Max side as well and on the NSN side to get the best image. A helpful hint: I slide over the Manycam/ Splitcam/Webcam Max window so that some of the text appears in the Manycam/Splitcam/Webcam Max window. Can the members on NSN read the words? If not, adjust. Remember, this may take a couple of sessions until you obtain the ideal resolutions for your particular setup. For me I have set Splitcam at 800x800 and NSN at HDCAM.

Step 6

Minimize the Manycam/Splitcam/Webcam Max software window

Click on the little underscore on the top right side of the Manycam/Splitcam/Webcam Max window. This will eliminate the Manycam/Splitcam/Webcam Max window from your desktop (it should now appear on the bottom of your desktop monitor), but note that the software is still running and still has hold of your desktop (HD-10 VIDEO Software) image location.

Note

Do not move the HD-10 Window around your desktop when broadcasting, since Manycam /Splitcam/WebcamMax is just grabbing the real-estate location that currently your HD-10 Software image is situated at. If you move the HD-10 Software Window, then Manycam /Splitcam/ Webcam Max will still grab the desktop location, but may not grab the whole HD-10 Video Image. Don't be afraid to practice moving the HD-10 Software window when not broadcasting to learn how it affects the displayed Manycam/ Splitcam/ WebcamMax Window. If you need to, you can again use the Manycam/ Splitcam/ WebcamMax desktop select icon and select or change the location or size of the window for it to grab.

If you have a dual monitor, you can leave the Manycam/Splitcam/WebcamMax window open on the second monitor since real-estate will not be an issue in the situation. In fact with Splitcam, you have an option to view the displayed image in full screen mode by clicking on the"*[ ]*" symbol in the upper right side of the screen (the *escape key* returns you back to normal size).

Step 7   *Start your Web Browser of Choice*

You may have to play with a number of Browsers to see which one works well with your particular computer setup. I have had success with 3 browsers: *Chrome*, *Internet Explorer*, and *Maxthon*. My current favourite browser to use for NSN broadcast is *Chrome*.

Step 8   *Log into Night Skies Network (NSN)*

Have your Web Brower go to the location: http://www.nightskiesnetwork.ca/ . Locate and click on the *BROADCASTERS AND MEMBERS SIGN IN* button. The next *Login* screen will ask you to enter your *username* and *password*.   You will next be presented with the *Channel Line Up* screen for Night Skies network. Click on the *Login* selection on the upper right-hand side of the screen.

You will be presented with the *Channel Launch Sign In* screen for NSN. Again, enter your *Username* and *Password* and click on *Publish Channel* button.

Step 9   *Allow Adobe Flash to use your Manycam/Splitcam/WebcamMax*

The *Adobe Flash Player Settings* window will pop up on your screen asking you for permission to use your camera and your microphone. Select *Allow*.
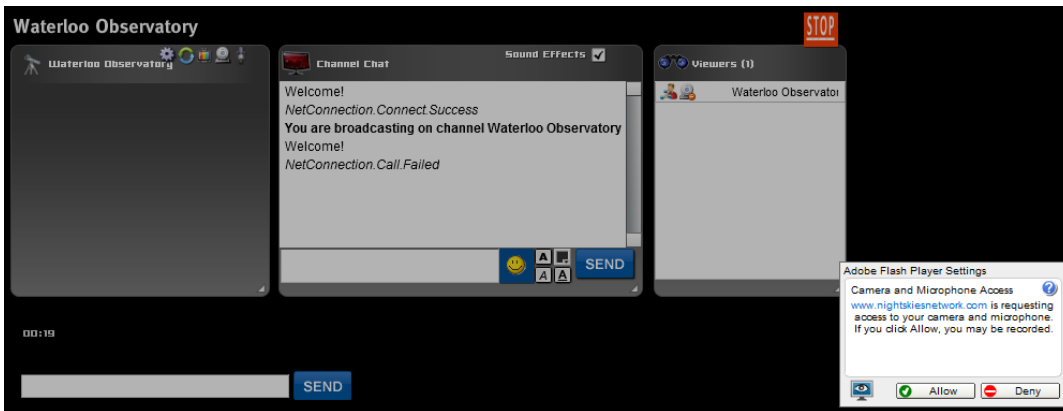
Step 10   *Turn off your Microphone*

Until you have your microphone figured out, it is best to initially turn it off. If you do not, the viewers on NSN may hear an extreme loud buzzing (feedback noise). Later on we will look at using the microphone, but until then I recommend *CLICKING* on the little *microphone symbol* on the upper right corner of the NSN video display window to disable the microphone.

Step 11

Set a message for the NSN observers

It is a good idea to display a message above the NSN display window, so that the other NSN views understand what you are doing. When initially setting up (which usually takes longer when you are learning), I usually type the message "*Setting Up the Camera*" then *CLICK* on the *SEND* button to have it displayed.

Note

When you are us and running and everything is working as it should, you will change the message to indicate, what telescope, mount, and camera you are using. For that is the most frequently asked question from the NSN viewers.

Step 12

Select the Camera

Now is the time to activate the camera, or in our case have NSN driver point to our Manycam/Splitcam/Webcam Max output.

➢ *RIGHT CLICK* inside the NSN Video window to bring up a *Settings Window*
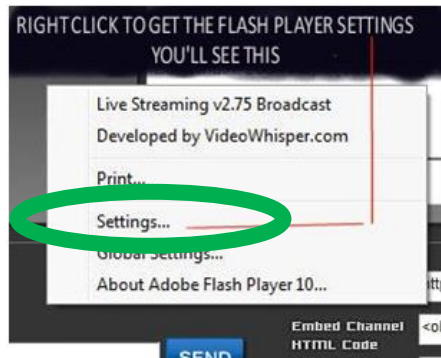
➢ *CLICK* on the *Settings* choice and you will be presented with the *Adobe Flash Player Settings Window.*
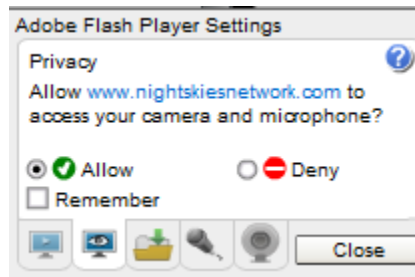
➢ *CLICK* on the *Camera Icon* and you will be presented with a *pull down menu* to select your camera.

➢ *CLICK* on the *Pull Down* list to select your camera of choice.
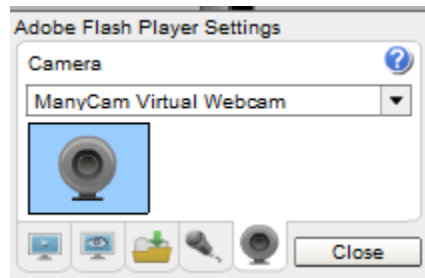
> ➢ **CLICK** on **CLOSE** to Continue (After you have selected WebCamMax , SplitCam, or ManyCam).

> **NSN** will remember what camera you chose from the last visit. So usually you only have to go through this process whenever you want to change what camera device you would like the *NSN flash driver* to use.

Step 13   *Choose your Camera Settings*

We will now select the settings for our camera. We have the option of changing: The *Bandwidth*, *Picture*, *Resolution*, *Framerate*, and even the *microphone rate* (when you are ready). The changes will **not be activated** until you **CLICK** on the Green *OK* symbol in the window.

> ➢ **LEFT CLICK** inside the NSN video Window to bring up the *Camera Settings Window*.
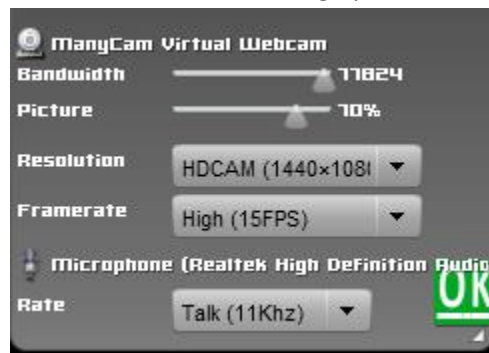
> ➢ *Use the sliders* for *Band Width* and *Picture* values. I usually have both of my sliders way on the right. Over time you will find the sweet spot for your system.

> ➢ Select your *Resolution* from the *Pull Down Menu*. I select *HDCAM (800 x 600*) for my system (this seems to give the sharpest image with my 800 x600 settings in Manycam/Splitcam). Again, play with these to see what settings the NSN viewers say is the best.

> ➢ Select your *Frame Rate*. From its *Pull Down Menu*. I usually leave it at 15 fps, but I have used 30 fps at times. Again trial and error for your system.

> ➢ **CLICK** on the green *OK* symbol to accept these settings.

That's it, you are done. If everything is working well and the Window's gods are in a good mood, you should be broadcasting whatever object the HD-10 is capturing. You should now enter another Message and **SEND** it out to indicate what system you are using and what object you are viewing.

Note   There is a time delay on what you say (if you have you microphone activated) and do on your computer as compared to what others see (and hear) on the NSN broadcast.

Note   You will freeze (and I don't mean like what Chris does when he broadcasts in winter till 3am), I mean from time to time your NSN connection will freeze for no apparent reason. It happens to us all. When this happens, you can simply terminate the Web browser program (Ctrl –Alt-Del). Then restart your browser and Log back into NSN. This usual is a very quick process. But, sometimes we all have to restart our computer (this takes longer for we need to power down hardware and software) and reactivate everything before login back in. Don't worry, the NSN viewers sense what is happening and will keep the conversations going while waiting for you to come back on.

Don't be afraid to ask for advice by typing in on the Video chat window, as we are all learning and are willing to assist whenever we can.

When ready, try activating the microphone (click on the microphone symbol). Other will let you know if they can hear you, or if there is noise. Remember there are settings for the microphone in the camera settings window.

Note   When you are finished with your session, you simply say your good nights to the crowd of NSN viewers to let them know that your session is ending. *CLICK* on the red *STOP* button on your NSN Window and NSN will shut down your channel and you can power down your system and call it an evening (It won't force the NSN viewers off the channel and some viewers will continue chatting long after you have gone to bed).

Appendix B – First Aid for the HD-10

The HD-10 Software says it can't find the Camera

Diagnosis: This software automatically looks for the HD-10 camera when it starts. If it cannot locate the camera attached to a USB Port, it will present this message.

Cure: First step: Make sure the blue LED light on the camera is lit. If not reseat the USB cable into both the computer and the HD-10 camera (also check power).

- Restart the Software

Second step: Verify that in Device Manager that the driver for the HD-10 doesn't have a yellow exclamation mark beside it.

If Yes, then Windows is having issues with the driver (too many possible issues to explain all) so first reboot the computer to see if that resolves the issue.

- If not: uninstall software, reboot, reinstall software, reboot, check camera.
- Still not: try another USB Port (I had difficulties with using my USB3 Port).
- Still not: do a malware check there may be viruses and other ugly stuff on your computer.
- Still not: check with the Mallincam Yahoo group to see if other can assist

My Image is all White.

Diagnosis: The exposure setting is too high for the current object being imaged.

Cure: Go to the Exposure Tab, and lower the exposure all the way down. Give the system some time to get caught up (if your exposure was set to 10 seconds, it will take 10 seconds before it can lower the exposure). Now the image should be black, so you can now increase the exposure until you start seeing the object appear in the display window.

My Images is looking all wrong, colors, blotchy.

Diagnosis: The HD-10 software can control so many aspects of the camera that sometimes we get lost in making adjustments, we need to put everything back to normal.

Cure: Go to the Color Control Tab, locate and Left-Click on the Default Button. Now go to the Exposure **Control Tab** and lower its value (or Click on Default) to get the image back to expected values.

When I save my AVI Video it only saves part of the Video.

Diagnosis: This is a limitation with the AVI format in Windows. Microsoft's Video for windows has some hardwired limitations that impose a maximum video file size of 1-2GB depending on the version of the RIFF parser code in the MCIAVI driver.

Surprisingly enough, much video software was written to these standards and this is where much of today's incompatibility stems from.

The AVI file header is 32-bits in length. As a result there is a 4GB limitation in its file size.

Cure: Use VirtualDub and see if it can extract all of the frames. If not. Rather than use the HD-10 Software, use the DirectShow driver (Discover C15) with another video imaging software such as VirtualDub, or SharpCap and let these software packages save your videos. ManyCam, Spltcam, and WebCamMax also have the ability to save videos.

My HD-10 is frozen, or the commands do not seem to be working correctly.

Diagnosis: Somehow the HD-10 internals have become corrupted (power surge, static, cosmic ray) and all we need to do is reboot the camera and software.

Cure: The best advice is to close the HD-10 Software Window (if possible, remember the Ctrl-Alt-Del process to bring up the task Manager). Now reboot the computer and reconnect to the HD-10 camera to see if the issue is resolved.

My Image on the Screen is great, but when I try to Modify it, the image is all White.

Diagnosis: This most likely is caused by you trying to modify (under the **Image Tab**) the image before you have actually saved the image. You can adjust the properties of the live view in the **Capture Tab**, but if you want to modify the image in the **Image Tab**, you must first save the Image, then select the Image from the **Image Tray**.

Cure:

- **Left-Click** on the **Snap-Shot Button** in the **Capture Tab** to save the image (it will now appear in the **Image Tray**.
- **Left-Click** on the **Image Tab** (the screen may be White).
- **Left-Click** on the **Saved Image** in the **Image Tray** (it will now appear on the **Display Zone**.

You can now use the tools in the **Image Tab** to adjust the image properties.

Appendix C: Notes